CITY OF OSSEO

STORM WATER POLLUTION PREVENTION PROGRAM (SWPPP)

2008

CITY OF OSSEO

STORM WATER POLLUTION PREVENTION PLAN

TABLE OF CONTENTS

INTRODUCTION

I. STORM WATER POLLUTION PREVENTION PROGRAM (SWPPP)

Index Pages: Supporting BMP Information

A. Public Education & Outreach

B. Public Participation/Involvement

C. Illicit Discharge Detection and Elimination

D. Construction Site Stormwater Runoff Control

E. Post Construction Stormwater Management in New Development & Redevelopment

F. Pollution Prevention/Good Housekeeping

APPENDICES

A. Shingle Creek Chloride TMDL

B. Evaluating Proposed Stormwater Infiltration Project in Vulnerable Wellhead Protection Areas (MDOH)

C. Shingle Creek Chloride TMDL Implementation Plan

INTRODUCTION

A. Plan Intent

This Storm Water Pollution Prevention Plan has been prepared with the purpose of meeting the requirements of the NPDES Phase II permit as outlined in the Minnesota Pollution Control Agency general permit and in the most recent modifications to the Clean Water Act. This document describes the City's 5-year plan to meet each of the six minimum measures described by the permit.

For each minimum control measure, there is a list of appropriate Best Management Practices that have been reviewed and chosen by City staff because they have been deemed the most appropriate and cost effective method for meeting the requirements outlined in the general permit.

This 5-year endeavor and will undoubtedly be modified throughout the period of the permit. The general public is welcome to review this plan and to submit recommendations for revision during the annual SWPPP hearing that is anticipated in either January or February. The Minnesota Pollution Control Agency is also anticipated to submit comments and recommendations for both mandatory and suggested plan revisions. These requested revisions will be made available to the general public for review and comment.

The City will document its relevant actions proving its efforts to comply with the conditions of the permit. The City intends to keep all documented actions, the most current rendition of this SWPPP and any requested revisions on file with the permit.

B. Key Water Resources

The City of Osseo is fully developed; no significant changes to the existing environment and the current land use plan are anticipated. The City of Osseo is wholly within the Shingle Creek and West Mississippi watersheds. The Shingle Creek District encompasses the central and southern districts of Osseo, while the West Mississippi watershed covers the remaining portion. Shingle Creek has an EPA approved TMDL Implementation Plan for chloride. The City of Osseo needs to incorporate identified BMPs from the implementation plan into this SWPPP.

There are no DNR protected water bodies within the City and only one DNR protected waterway. Because the City has been fully developed for quite a while, there are few remaining wetlands that exist.

The topography is flat to gently rolling with a maximum elevation differential of 20 feet. Dominant soils are coarse textured allowing rapid percolation but the water table is high with low areas tending to be wet.

C. Approach toward pollution prevention

The City's general approach is to map all of its significant discharges into its receiving waters and to utilize the Best Management Practice approach to limit pollutants and illicit discharges through these outfalls by both structural and non-structural methods. Engineered installations such as retention ponds, sedimentation basins and in-line sediment removal devices are generally considered to be structural methods. Educating the general public as well as the City's maintenance personnel in more pollution conscious methods of mowing, fertilizing and proper waste disposal are generally considered to be non-structural methods.

D. Discussion

The remainder of this report details the proposed methods the City plans to utilize in meeting the requirements of the six minimum control measures (MCM) outlined in the General Permit. The SWPPP was developed with consideration given to sources of pollutants, potential polluting activities and sensitivity of receiving waters.

Table of Best Management Practices (BMP's) Identified

1-PUBLIC EDUCATION AND OUTREACH

Distribute Educational Materials **1a-1**

Implement an Education Program **1b-1**

Education Program: Public Education and Outreach **1c-1**

Education Program: Public Participation **1c-2**

Education Program: Illicit Discharge Detection and Elimination **1c-3**

Education Program: Construction Site Run-off Control **1c-4**

Education Program: Post-Construction Stormwater Management in New Development and Redevelopment **1c-5**

Education Program: Pollution Prevention/Good Housekeeping for Municipal Operations **1c-6**

Coordination of Education Program **1d-1**

Annual Public Meeting **1e-1**

BMP Summary Sheet

MS4 Name: City of Osseo

Minimum Control Measure: 1-PUBLIC EDUCATION AND OUTREACH

Unique BMP Identification Number: 1a-1

***BMP Title:** Distribute Educational Materials

***BMP Description:**

This BMP will be tied into 1c-1 Public Education and Outreach.

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

***Measurable Goals:**

-Number of articles included in City newsletters.
-Number of pieces of literature distributed at City Hall.
-Number of hits on City web site.

***Timeline/Implementation Schedule:**

Year 1: Begin with articles in City newsletters.
Year 2-5: Post materials and create links on City web site.
Year 2-5: Update educational material yearly as necessary.

Specific Components and Notes:

Stormwater awareness.

***Responsible Party for this BMP:**

Name: Randy Korfiatis
Department: Public Services Department
Phone: 763-425-5741
E-mail: rkorfiatis@ci.osseo.mn.us

BMP Summary Sheet

MS4 Name: City of Osseo

Minimum Control Measure: PUBLIC EDUCATION AND OUTREACH

Unique BMP Identification Number: 1b-1

***BMP Title:** Implement an Education Program

***BMP Description:**

-Implement an education program that involves distributing educational materials to the community and making educational presentations at the annual public meeting.

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

***Measurable Goals:**

-Development of an educational program.

-Number of educational materials distributed.

***Timeline/Implementation Schedule:**

Year 1: Develop a stormwater education program.

Year 2-5: Implement the educational program that has been developed.

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: Randy Korfiatis

Department: Public Services Department

Phone: 763-425-5741

E-mail: rkorfiatis@ci.osseo.mn.us

BMP Summary Sheet

MS4 Name: City of Osseo

Minimum Control Measure: 1-PUBLIC EDUCATION AND OUTREACH

Unique BMP Identification Number: 1c-1

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

***Audience(s) Involved:**

General public including residents, homeowners, business owners and school children (students K-12).

***Educational Goals for Each Audience:**

Increase the public awareness and understanding of stormwater issues within the community. Inform and educate the public about how and what they do impacts stormwater runoff quality.

***Activities Used to Reach Educational Goals:**

1) Bring attention of stormwater issues to the residents through sponsored community events and working with Shingle Creek and West Mississippi Watersheds by using their Educational BMPs as listed on attached sheets.
    a. Volunteer community storm sewer ditch cleanup days.
    b. Promote the Great Shingle Creek clean up days and seek volunteers.
2) Develop a stormwater hotline for citizens to report illegal dumping.
3) Have articles in the City's newsletter; highlight storm water issues and watershed events and programs.
4) Stormwater information on the City web site.
5) Stormwater educational materials at all public buildings.
6) Promote pet waste disposal program, provide dog owners information when getting a license and making available at Veterinary Clinics.
7) Work with the Shingle Creek to promote educational aspects for use in the schools.

***Activity Implementation Plan:**

<u>Activity #1</u>

Year 1: Develop the plan for volunteer public participation events and programs.
Year 2-5: Community clean up day held in the spring of each year.
Year 2-5: Storm sewer ditch clean up to be held the same week of the spring clean up day.
Year 2-5: Promote the Great Shingle Creek Clean up and seek volunteers.

<u>Activity #2</u>

Year 1: Establish a stormwater hotline.
Years 1-5: Track the number and location of illegal dumping incidents reported and ones that are not reported but discovered by City employees.
Years 3-5: Evaluate the information for trends and review education efforts on illegal dumping.

<u>Activity #3</u>

Year 1-5: Publish stormwater articles quarterly in the City newsletter.

Activity #4
Year 1: Develop stormwater page on City web site and links post for public use.
Year 2-5: Update the web site as needed quarterly.

Activity #5
Year 1-2: Research educational materials available; have materials in place by the start of year 3.

Activity #6
Year 1: Research what educational materials are available for pet waste and have ready to hand out by the spring quarter of year 2.
Year 1: Place signs in public areas that have had pet waste problems.
Years 2-5: Monitor areas with signs and evaluate the effectiveness of signs and educational materials (Public Service workers mowing will perform monitoring).

Activity #7
Years 2-5: Work with the Watersheds on the educational aspect and support their efforts in education of school children.

***Performance Measures:**

Activity #1
-Complete plan and implement volunteer public participation events and programs tied with the watersheds.
-Track number of Osseo residents participating in Great Shingle Creek clean up.
-Track amount of trash collected from stormsewer ditch clean up.

Activity #2
-Track increase/decrease in illegal dumping incident.

Activity #3
-Publish stormwater articles quarterly.
-In year three look into a survey to determine if citizens read the articles and if their knowledge increased in stormwater issues.

Activity #7
-Work with the watershed to monitor the educational materials they are using.

***Responsible Party for this BMP:**

Name: Randy Korfiatis
Department: Public Services Department
Phone: 763-425-5741
E-mail: rkorfiatis@ci.osseo.mn.us

BMP Summary Sheet

MS4 Name: City of Osseo

Minimum Control Measure: 1-PUBLIC EDUCATION AND OUTREACH

Unique BMP Identification Number: 1c-2

***BMP Title:** Education Program: Public Participation

***Audience(s) Involved:**

General public including City residents, homewoners and business owners.

***Educational Goals for Each Audience:**

1) Increase the public awareness and understanding of storm water issues within the community and watershed.
2) Inform and educate the public about the impacts of stormwater runoff on water runoff on water quality and what
they can do to actively protect lakes and streams from polluted stormwater runoff.
3) Inform and educate the public about how the City will manage stormwater runoff through its Stormwater
Pollution Prevention Program (SWPPP).

***Activities Used to Reach Educational Goals:**

1) The City will report in the newsletter and on its' web site activities related to managing stormwater and implementing the SWPPP. Some topics in the newsletter may include the effects on the streams and lakes the public has in the watershed downstream; events and programs on how the public can participate to raise their awarness about stormwater runoff.
2) The City will sponsor a clean up day for the Parks and the storm sewer drainage ditch.
3) The City will hold a public information meeting anually to discuss the SWPPP to update the citizens on the progress toward implementing the SWPPP. The City will accept written and oral comments throughout the year and at the annual meeting.

***Activity Implementation Plan:**

<u>Activity #1</u>

Years 1-5: Publish articles in the City newsletter and post on City's web site on stormwater management and SWPPP quarertly.

<u>Activity #2</u>

Year 1: Develop a plan for sponsoring and implementing the City Park and Storm Sewer Drainage Ditch Clean Up Day.

Years 2-5: Clean up the parks and drainage ditch annually.

Year 1-5: Hold public infomational meeting annually. Provide notice of the meeting in the community newsletter, on the City website, and local newspaper 30 days prior to the meeting.

***Performance Measures:**

<u>Activity #1</u>

-Publish stormwater articles quarterly.
-At the end of the third year look into surveying the citizens to determine if the stormwater articles were read and if they felt that their knowledge of stormwater issues increased. Survey will be conducted under BMP summary sheet 1c-1 (Education Program: Public Education and Outreach) Perfomance Measure).

<u>Activity #2</u>

-Track the number of persons participating in the Park/Ditch clean up.
-Track the amount of trash collected and report in the community newsletter.

Activity #3
-Complete public notice
-Track number citizens attending the annual meeting
-Track number of question at the meeting about the SWPPP / stormwater issues addressed at the meeting.
-Track the number of comments received from the public on an annual basis.

Activity #1- #3
-At the end of year 2 the City will evaluate the the effectivness of the Education Program for Public Participation and make adjustments as needed to increase public awarness and participation.

***Responsible Party for this BMP:**

Name: Randy Korfiatis
Department: Public Services Department
Phone: 763-425-5741
E-mail: rkorfiatis@ci.osseo.mn.us

BMP Summary Sheet

MS4 Name: City of Osseo

Minimum Control Measure: 1-PUBLIC EDUCATION AND OUTREACH

Unique BMP Identification Number: 1c-3

***BMP Title:** Education Program: Illicit Discharge Detection and Elimination

***Audience(s) Involved:**

General public including City residents, home owners, business owners and City employees.

***Educational Goals for Each Audience:**

Increase the public and businees communties as well as City employee awarness and understanding of Illicit Discharge in the Storm Sewer System.

***Activities Used to Reach Educational Goals:**

1) Bring to the attention of the residents the impacts of illicit discharge into the storm sewer.
   a. Articles in the City news letters and on City web site.
2) Educate the local business the effects of illicit discharge in the storm sewer.
   a. Distrubute articles to manufactoring, auto and repair businesses that may effect storm water.
3) Find training for City employees related to illicit discharges.

***Activity Implementation Plan:**

Years 1) Research and find information that can be distributed to residents, business and City employees.
Year 2) Find training for City employees and budget for future training.
Year 3-5) Send City employees to training.

***Performance Measures:**

Activity #1
Research for materials that will help in the understanding the effects of illicit discharge.
Activity #2
Distribute the materials to both the resident business owner and City employees.
Activity #3
Find training for City employees and make it available residents and business owners.
Activity #4
While monitoring the storm sewer system, survey residents and businesses to determine if educational materials were read and if they felt their knowledge of storm sewer issues has increased.

***Responsible Party for this BMP:**

Name: Randy Korfiatis
Department: Public Services Department
Phone: 763-425-5741
E-mail: rkorfiatis@ci.osseo.mn.us

BMP Summary Sheet

MS4 Name: City of Osseo

Minimum Control Measure: 1-PUBLIC EDUCATION AND OUTREACH

Unique BMP Identification Number: 1c-4

***BMP Title:** Education Program: Construction Site Run-off Control

***Audience(s) Involved:**

General public including: City residents, homeowners, business owners, City employees, construction companys, City Council and Planning Commission..

***Educational Goals for Each Audience:**

-Educate contractors, developers and building inspectors about acceptable BMP's for stormwater pollution prevention at construction sites.

***Activities Used to Reach Educational Goals:**

1) Research educational materials and distribute to contractors who apply for a permit that may affect the storm sewer system.
2) Provide materials with each exterior building permit requests.
3) Send Public Service employees to proper silt fence installation training.
4) Have Planning Commission and City Engineer review City ordinance for proper construction site control and enforcement.

***Activity Implementation Plan:**

Year 1-2: Have Planning Commission review the construction site ordinance and make recommendations to the City Council if changes are needed.
Year 1-2: Develop educational materials to be included with building permits.
Year 2-5: Have information available to contractors when pulling a permit that will disrupt the soil on major construction projects.
Year 2-5: Provide educational materials with building permits.

***Performance Measures:**

Activity #1: Have information available to contractors when pulling a permit that will disrupt the soil on major construction projects.
Activity #2: Number of building permits with materials attached that were issued.
Activity #3: Have Planning Commission review the construction site ordinance and make recommendations to the City Council if changes are needed.

***Responsible Party for this BMP:**

Name: Randy Korfiatis
Department: Public Services Department
Phone: 763-425-5741
E-mail: rkorfiatis@ci.osseo.mn.us

BMP Summary Sheet

MS4 Name: City of Osseo

Minimum Control Measure: 1-PUBLIC EDUCATION AND OUTREACH

Unique BMP Identification Number: 1c-5

***BMP Title:** Education Program: Post-Construction Stormwater Management in New Development and Redevelopment

***Audience(s) Involved:**

-Homeowners
-Builders
-Contractors and Developers
-City Employees
-Engineers

***Educational Goals for Each Audience:**

To increase the awareness of the impacts of development and redevelpoment and the impact it has on stormwater quality and storm sewer system capacity.

***Activities Used to Reach Educational Goals:**

1) Locate information on post-contruction management and present to the Council Planning Commisssion and EDA at meeting.
2) Have City Engineer review ordinance to ensure compliance with local watershed for compliance of post -construction runoff.

***Activity Implementation Plan:**

Activity #1
Year 2: Find training information and bring to the City Council, Planning Commission, EDA and City Employees.

Activity #2
Year 1: Have the City Engineer review the ordinance and make recommendations as necessary.

***Performance Measures:**

-Track the training of City elected and appointed positions after training inquire if their knowledge has been increased.
-Make necessary changes to City ordinance made by recommendations from City Engineer.

***Responsible Party for this BMP:**

Name: Randy Korfiatis
Department: Public Services Department
Phone: 763-425-5741
E-mail: rkorfiatis@ci.osseo.mn.us

BMP Summary Sheet

MS4 Name: City of Osseo

Minimum Control Measure: 1-PUBLIC EDUCATION AND OUTREACH

Unique BMP Identification Number: 1c-6

***BMP Title:** Education Program: Pollution Prevention/Good Housekeeping for Municipal Operations

***Audience(s) Involved:**

City employees in public services, fire department, police department and the general public.

***Educational Goals for Each Audience:**

Increase the awareness and understanding of stormwater issues within the community and watershed.
Inform and educate employees on stormwater runoff.

***Activities Used to Reach Educational Goals:**

1) Training on not washing of vehicles outside.
2) Proper salt application during winter months.
3) Training on frequency of street sweeping.
4) Proper fertilizer application.
5) Proper salt storage training.
6) Effects of large amounts of water used on fire fighting and storm sewer issues.

***Activity Implementation Plan:**

Activity #1
Year 1-5: At department meetings cover the effects of washing vehicles out-side and the effects of the run-off.
Activity #2
Year 2: Find training for Public Service Department employees for proper salt use.
Activity #3
Year 1: Research training on the frequency of sweeping.
Years 1-5: Train public service department employees of the benefits of sweeping.
Activity #4
Years 1-5: Have all Public Service Department employees licensed by the State Agriculture Department for spreading of fertilizer and weed control.
Activity #5
Years 1-5: Train Public Service Department employees on proper salt storage.
Activity #6
Years 1-5: At one of the monthly Fire Department training nights go over the impacts of fire fighting and the use of large amounts of water in the storm sewer system.

***Performance Measures:**

Activity #1-6
-Track the training logs of each department and keep copy on file.
-After year two the City will review the BMP and make adjustments as necessary to include other areas that may need to be addressed.

***Responsible Party for this BMP:**

Name: Randy Korfiatis
Department: Public Services Department
Phone: 763-425-5741
E-mail: rkorfiatis@ci.osseo.mn.us

BMP Summary Sheet

MS4 Name: City of Osseo

Minimum Control Measure: 1-PUBLIC EDUCATION AND OUTREACH

Unique BMP Identification Number: 1d-1

***BMP Title:** Coordination of Education Program

***BMP Description:**

-Hold discussions with local water resource educators and MS4 communities in the area to discuss the delivery of storm water educational BMPs, inventory local existing programs, develop educational priorities and implementation opportunities for consideration during the development of the Education Plan.

***Measurable Goals:**

-2006-2010 Education Plan

***Timeline/Implementation Schedule:**

Year 1: Identify other MS4 communities in the vicinity.
Year 2: Contact local organizations to determine the educational roles with regards to the SWPPP and participate as needed.
Year 3: Work with local organizations to facilitate new educational opportunities.
Year 4: Implement some of the new educational programs through cooperative efforts with local organizations.
Year5: Continue to promote and work with local organizations for new and existing educational programs.

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: Randy Korfiatis
Department: Public Services Department
Phone: 763-425-5741
E-mail: rkorfiatis@ci.osseo.mn.us

BMP Summary Sheet

MS4 Name: City of Osseo

Minimum Control Measure: 1-PUBLIC EDUCATION AND OUTREACH

Unique BMP Identification Number: 1e-1

***BMP Title:** Annual Public Meeting

***BMP Description:**

The City will hold an annual meeting to get input on the Cities SWPPP. The City will also use this meeting for part of the Education Program: Public Participation.

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

***Measurable Goals:**

1) Increase the knowledge of the citizens, homeowners, business owners and City employees of stormwater runoff and the impacts they have.
2) Track the number of people attending training within the City.

***Timeline/Implementation Schedule:**

Years 1-5: Begin annual meetings. Meeting scheduled annually sometime in January or February throughout the term of the permit.

Specific Components and Notes:

-The notice will contain the following information: reference to the SWPPP, date, time and location of the public hearing, concise description of the manner in which the public hearing is to be conducted and where a copy of the SWPP is available for the public to review.
-All timely and relevant comments will be considered in adjusting the SWPPP.

***Responsible Party for this BMP:**

Name: Randy Korfiatis

Department: Public Services Department

Phone: 763-425-5741

E-mail: rkorfiatis@ci.osseo.mn.us

Table of Best Management Practices (BMP's) Identified

2-PUBLIC PARTICIPATION/INVOLVEMENT

Comply with Public Notice Requirements..... 2a-1

Solicit Public Input and opinion on the Adequacy of the SWPPP 2b-1

Consider Public Input.....2c-1

BMP Summary Sheet

MS4 Name: City of Osseo

Minimum Control Measure: 2-PUBLIC PARTICIPATION/INVOLVEMENT

Unique BMP Identification Number: 2a-1

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

***BMP Description:**

The City will comply with the public notice requirements by posting the meeting in the City newsletter, the local paper and post on the City's website. Publishing of the notice in a local newspaper, per part V.G.1.e.2 of the General Permit, is but one component of compliance.

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

***Measurable Goals:**

1) To better inform the public the City will post the annual meeting in the City newsletter.
2) The City will post the notice on the website one quarter prior to the meeting date.
3) The City will place an add in the local newspaper and run the add until the week of the meeting.

***Timeline/Implementation Schedule:**

Years 1-5: The City will post annual meeting notices and keep hard copies of each on file at Public Service Department office.

Specific Components and Notes:

-The notice will contain the following information: reference to the SWPPP, date, time and location of the public hearing. Concise description of the manner in which the public hearing is to be conducted and where a copy of the SWPP will be available for the public to review.
-All timely and relevant comments will be considered in adjusting the SWPPP.

***Responsible Party for this BMP:**

Name: Randy Korfiatis
Department: Public Services Department
Phone: 763-425-5741
E-mail: rkorfiatis@ci.osseo.mn.us

BMP Summary Sheet

MS4 Name: City of Osseo

Minimum Control Measure: 2-PUBLIC PARTICIPATION/INVOLVEMENT

Unique BMP Identification Number: 2b-1

***BMP Title:** Solicit Public Input and Opinion on the Adequacy of the SWPPP

***BMP Description:**

1) The City will hold an annual meeting to describe the how the City manages the stormwater runoff and the SWPPP. The City will use the meeting to enhance the general public knowledge of stormwater runoff issues.
2) If the annual meeting is held at the same time as a regular City Council meeting it shall be placed in the first part of the meeting allowing the public to have input on the SWPPP.
3) At the meeting, the City will present the SWPPP, its's purpose, goals and requirements of the SWPPP for education of the public and encourage input from the public.
4) The City will provide time at the meeting for oral input from the public. Persons not able to attend the meeting will be given an opportunity to have written input. A reasonable amount of time will be given at the meeting for public comment relating to the SWPPP.
5) The City will also solicit public input and provide opportunity for comments about the SWPPP at any other public meeting, as needed, regarding modifications or changes to the SWPPP.

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

***Measurable Goals:**

1) Increase the citizen's understanding of their impact on stormwater runoff and increase their input on the SWPPP. Evaluate the public input and participation on the SWPPP, review the education program and make adjustments as needed.
2) Track the number of attendees at the the annual meeting.
3) Prepare and provide information for the annual meeting.
4) Track and record the number of oral and written comments on the SWPPP.
5) Hold additional meeting(s) as needed if any changes are needed to the SWPPP; track the level of public input on the changes.

***Timeline/Implementation Schedule:**

Years 1-5: The City will implement the education and outreach efforts according to the timeline /implementation schedule in BMP summary sheet 1c-2 and also as listed by the Watershed as listed on attached BMP sheets.

Year 3: Review the Education Program for Public Participation and make changes as needed.

Years 1-5: Hold public meeting annually, before June 30th of each year.

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: Randy Korfiatis

Department: Public Services Department

Phone: 763-425-5741

E-mail: rkorfiatis@ci.osseo.mn.us

BMP Summary Sheet

MS4 Name: City of Osseo

Minimum Control Measure: 2-PUBLIC PARTICIPATION/INVOLVEMENT

Unique BMP Identification Number: 2c-1

***BMP Title:** Consider Public Input

***BMP Description:**

1) The City will review public comments both written and oral received from the annual meeting and from meetings held when changes are made to the SWPPP.
2) The City will review the comments and how these comments would effect the SWPPP and storm water runoff issues.
3) The City shall respond in 30 days to any written comments after the annual meeting as it relates to the SWPPP.

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

***Measurable Goals:**

1) Track both oral and written comments received at the annual meeting meetings when changes or alterations are made to the SWPPP.
2) The City will review these comments and impacts to the SWPPP if changes are being requested to the SWPPP.
3) Track the written comments and keep comments and City response on file at Public Services Department.

***Timeline/Implementation Schedule:**

Years 1-5: Track the number of comments and what comments are made to the SWPPP.
Years 1-5: After the each annual meeting the City will review the SWPPP for any changes that may be needed.
Years 1-5: Track and keep on file any written comments and City response to comments.

Specific Components and Notes:

Public Service Department and Engineering will be responsible for reviewing and responding to public comments about the SWPPP. Comments will be reviewed individually and responses made accordingly.

***Responsible Party for this BMP:**

Name: Randy Korfiatis
Department: Public Services Department
Phone: 763-425-5741
E-mail: rkorfiatis@ci.osseo.mn.us

Table of Best Management Practices (BMP's) Identified

3-ILLICIT DISCHARGE DETECTION AND ELIMINATION

Storm Sewer System Map **3a-1**

Regulatory Control Program **3b-1**

Illicit Discharge Detection and Elimination Plan **3c-1**

Public and Employee Illicit Discharge Information Program **3d-1**

Identification of Non Stormwater Discharges and Flows **3e-1**

BMP Summary Sheet

MS4 Name: City of Osseo

Minimum Control Measure: 3-ILLICIT DISCHARGE DETECTION AND ELIMINATION

Unique BMP Identification Number: 3a-1

***BMP Title:** Storm Sewer System Map

***BMP Description:**

1) The City shall complete a storm sewer map indicating all pipe size, structures and outfalls within the City limits.
2) The City will update maps when chages are made to the storm sewer system.

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

***Measurable Goals:**

1) Review the current maps and have City Engineer make changes to maps that may be out of date.
2) The City will make the changes to maps when alterations or repairs are made to the storm sewer system.

***Timeline/Implementation Schedule:**

Year 1: Review maps and have the City engineer make changes as needed.
Year 1-2: Add pipe sizes, ponds and structural pollution control devices (if any) to the storm sewer system map.
Year 1-5: Keep map up-to-date.

Specific Components and Notes:

Currently the City has an AutoCAD map showing the piping layout of the storm sewer system. Pipe sizes, ponds, and structural pollution control devices, if any exist, need to be added to the map.

***Responsible Party for this BMP:**

Name: Randy Korfiatis
Department: Public Services Department
Phone: 763-425-5741
E-mail: rkorfiatis@ci.osseo.mn.us

BMP Summary Sheet

MS4 Name: City of Osseo

Minimum Control Measure: 3-ILLICIT DISCHARGE DETECTION AND ELIMINATION

Unique BMP Identification Number: 3b-1

***BMP Title:** Regulatory Control Program

***BMP Description:**

1) The City shall have in place the means to handle illicit discharge to the storm sewer system with regulatory language in the City ordinance.
2) The City shall take the appropriate acts when illicit discharge is discovered.

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

***Measurable Goals:**

1) The City will review the current ordinance and make changes as needed to handle illicit discharge.
2) Draft City ordinance.
3) Hold public hearing.
4) Consider public input and revise ordinance as necessary.
5) Adopt illicit discharge ordinance.

***Timeline/Implementation Schedule:**

Year 2009: Draft City ordinance, hold public hearing, adopt illicit discharge ordinance.
Year 2010: Implementation of illicit discharge ordinance.

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: Randy Korfiatis
Department: Public Services Department
Phone: 763-425-5741
E-mail: rkorfiatis@ci.osseo.mn.us

BMP Summary Sheet

MS4 Name: City of Osseo

Minimum Control Measure: 3-ILLICIT DISCHARGE DETECTION AND ELIMINATION

Unique BMP Identification Number: 3c-1

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

***BMP Description:**

1) The City shall inspect all outfalls annually during the dry periods or low flow times for any illicit discharge into the storm sewer system.
2) The City shall maintain the sanitary sewer be cleaning sections every third year to help ensure no backups occur in the sanitary sewer that may affect the storm sewer system.
3) The City shall inspect the sanitary sewer by camera to look for any cross-connections and pipe that may be damages and affect the storm sewer system.
4) The City shall have the lift stations inspected yearly to ensure proper operation.
   For any non-storm water discharge the City finds that are significant the City shall develop an action plan to address the discharge.
5) Develop administrative procedures for notifying and enforcing non-compliance of illicit discharges.

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

***Measurable Goals:**

1) Develop plan to inspect all outfalls of storm sewer system.
2) Develop mapping plan for cleaning sanitary sewer system.
3) Develop a map and plan for video inspection of all sanitary sewer lines.
4) Develop plan to have lift stations inspected yearly to ensure proper operation.
5) Develop procedures for notifying and enforcing non-compliance of illicit discharges.

***Timeline/Implementation Schedule:**

Year 1: Develop plans for inspections, sanitary sewer cleaning video inpsection of sewer lines and operations of lift stations.
Year 1: Develop administrative procedures for notifying and enforcing non-compliance of illicit discharges.
Years 1-5: Continue with inspections and programs.Year 2-3: Review the programs and make adjustments as necessary.

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: Randy Korfiatis
Department: Public Services Department
Phone: 763-425-5741
E-mail: rkorfiatis@ci.osseo.mn.us

BMP Summary Sheet

MS4 Name: City of Osseo

Minimum Control Measure: 3-ILLICIT DISCHARGE DETECTION AND ELIMINATION

Unique BMP Identification Number: 3d-1

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

***BMP Description:**

The City will use the education efforts in the BMP 1c-3 for providing information to the general public about the effects of illegal discharges in the storm sewer.

The City will develop training for all City employees. This training will focus on those employees who may have the largest impact on the storm sewer, which will likely include Public Services Department, Parks and the City Engineer. The training will focus on the aspects of illegal dischages and the effects.

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

***Measurable Goals:**

1) See BMP sheet 1c-3 for goals on public education efforts.
2) Develop training for City staff or include employees in training put on by the watershed.
3) Train all City employees who are involved in the activitites that could possibly result in illicit discharge.
4) Continue the training annually with specific areas focused on illicit discharge

***Timeline/Implementation Schedule:**

See BMP sheet 1c-3 for time line schedule for public education efforts.
Year 1-2: Develop training program for City employees.
Year 2: Train all City employees who are involved in activities which could possibly result in illicit discharge to the stormwater system.
Year 3: Review training and make adjustments as necessary.
Year 2-5: Continue with training of Public Services Department employees.

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: Randy Korfiatis
Department: Public Services Department
Phone: 763-425-5741
E-mail: rkorfiatis@ci.osseo.mn.us

BMP Summary Sheet

MS4 Name: City of Osseo

Minimum Control Measure: 3-ILLICIT DISCHARGE DETECTION AND ELIMINATION

Unique BMP Identification Number: 3e-1

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

***BMP Description:**

The City will develop a process to determine if any of the following items of non-stormwater discharges or flows are significant contributions of pollutants to our MS4:

Flushing of Water System, residents draining of swimming pools, irrigation and lawn watering, diverted stream flows, rising ground waters, uncontaminated groundwater infiltration, uncontaminated pumped groundwater, discharges from potable water sources, air conditioner condensation, springs, water from crawl space pumps, individual residential car washing, flows from riparian habitats and wetlands, sump pumps, footing drains, street water wash and discharges from fire fighting activities.

For any non-stormwater discharges or flows the City finds to be a significant contributor of pollutants to the storm water system the City will develop an action plan to evaluate and address the impact of the discharge.

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

***Measurable Goals:**

1) Develop a process to investigate and evaluate the potential for the non-stormwater discharges identified in this permit to be a significant contributor of pollutants.
2) Investigate and evaluate non-stormwater discharges and flows.
3) Develop an action plan for those contributors found to be a significate contributor of pollutants to the stormwater.
4) Implement the action plan for the significant non-stormwater discharges and flows.

***Timeline/Implementation Schedule:**

Year 2) Develop process to investigate and evaluate non-stormwater discharges and flows.
Year 3) Conduct investigation and evaluation of non-stormwater discharges and flows and develop action plans for those which are identified as being significant contributors of pollutants to the stormwater.
Year 4) Implement those actions plans as needed.
Year 5) Review the action plans and non-stormwater discharges and make adjustments as needed.

Specific Components and Notes:

The City look at putting in the City newsletter an article in the spring of the year about procedures to dechlorinate swimming pool water prior to discharge.

***Responsible Party for this BMP:**

Name: Randy Korfiatis
Department: Public Services Department
Phone: 763-425-5741
E-mail: rkorfiatis@ci.osseo.mn.us

Table of Best Management Practices (BMP's) Identified

4-CONSTRUCTION SITE STORMWATER RUNOFF CONTROL

Ordinance or other Regulatory Mechanism..... 4a-1

Construction Site Implementation of Erosion and Sediment Control BMPs..... 4b-1

Waste Controls for Construction Site Operators.....4c-1

Procedure for Site Plan Review 4d-1

Establishment of Procedures for the Receipt and Consideration of Reports of Stormwater Noncompliance.....4e-1

Establishment of Procedures for Site Inspections and Enforcement 4f-1

BMP Summary Sheet

MS4 Name: City of Osseo

Minimum Control Measure: 4-CONSTRUCTION SITE STORMWATER RUNOFF CONTROL

Unique BMP Identification Number: 4a-1

***BMP Title:** Ordinance or other Regulatory Mechanism

***BMP Description:**

The City will review the current City ordinance for construction site stormwater runoff and see if any changes are needed to the ordinance. At this time the City shall look into any fees that may be collected if violations occur with the City ordinance.

-Revise existing ordinance or draft a new ordinance as necessary.
-Complete public hearing.
-Consider public input and adjust ordinance as necessary.
-Adopt construction site ordinance.

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

***Measurable Goals:**

The City shall detemine if the current ordinance is adequate and if there are any ways to enforce or collect fines for not following the ordinance.

***Timeline/Implementation Schedule:**

Year 1: Information gathering on model and review existing ordinances.
Year 1-2: Draft revisions to the construction site storm water runoff control ordinance as necessary.
Year 2: Public hearing for public input on construction site storm water runoff control ordinance.
Adoption of the construction site storm water runoff control ordinance.
Year 2-5: Enforcement of ordinance.

Specific Components and Notes:

Ordinance adoption to be completed within 6 months of permit extension coverage.

***Responsible Party for this BMP:**

Name: Randy Korfiatis
Department: Public Services Department
Phone: 763-425-5741
E-mail: rkorfiatis@ci.osseo.mn.us

BMP Summary Sheet

MS4 Name: City of Osseo

Minimum Control Measure: 4-CONSTRUCTION SITE STORMWATER RUNOFF CONTROL

Unique BMP Identification Number: 4b-1

***BMP Title:** Construction Site Implementation of Erosion and Sediment Control BMPs

***BMP Description:**

Every applicant for a city permit to allow land disturbing activities must submit an erosion control plan for review and approval by the City prior to the start of construction.

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

***Measurable Goals:**

Implementation of the erosion control plan on each construction site.

***Timeline/Implementation Schedule:**

Review erosion control plans as necessary.

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: Randy Korfiatis

Department: Public Services Department

Phone: 763-425-5741

E-mail: rkorfiatis@ci.osseo.mn.us

BMP Summary Sheet

MS4 Name: City of Osseo

Minimum Control Measure: 4-CONSTRUCTION SITE STORMWATER RUNOFF CONTROL

Unique BMP Identification Number: 4c-1

***BMP Title:** Waste Controls for Construction Site Operators

***BMP Description:**

-Implementation of new site inspection procedures to incorporate water quality considerations for construction site operators.
-Examine site specific BMP's for adequate waste control management during inspections.

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

***Measurable Goals:**

-Implementation of new inspections.
-Number of incidents recorded in the inspection log.
-Number of inspections performed each year.

***Timeline/Implementation Schedule:**

Year 1: Incorporate water quality considerations into the site inspection checklist.
Year 2-5: Perform site inspections.

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: Randy Korfiatis
Department: Public Services Department
Phone: 763-425-5741
E-mail: rkorfiatis@ci.osseo.mn.us

BMP Summary Sheet

MS4 Name: City of Osseo

Minimum Control Measure: 4-CONSTRUCTION SITE STORMWATER RUNOFF CONTROL

Unique BMP Identification Number: 4d-1

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

***BMP Description:**

The City's ordinance requires that erosion control plans be implemented, inspected, and approved by the City before the commencement of any construction.

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

***Measurable Goals:**

Review of all construction development plans.

***Timeline/Implementation Schedule:**

Ongoing as necessary.

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: Randy Korfiatis

Department: Public Services Department

Phone: 763-425-5741

E-mail: rkorfiatis@ci.osseo.mn.us

BMP Summary Sheet

MS4 Name: City of Osseo

Minimum Control Measure: 4-CONSTRUCTION SITE STORMWATER RUNOFF CONTROL

Unique BMP Identification Number: 4e-1

***BMP Title:** Establishment of Procedures for the Receipt and Consideration of Reports of Stormwater Noncompliance

***BMP Description:**

Formally adopt a policy to receive and process noncompliance reports.
Procedure shall include:

- Immediate response to the source of the report.
- Maintain a log of all reports, the assignment, estimated completion date and current status.

Items may be referred to administration, field staff, council or consultants for recommendations and/or resolution.

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

***Measurable Goals:**

-Number of reports received annually.
-Time required to bring non-compliance issues into compliance.

***Timeline/Implementation Schedule:**

Year 1: Identify actions that could result in non-compliance.
Year 2: Draft procedure for non-compliance issue resolution.
Year 3-5: Initiate non-compliance procedures and enforcement.

Specific Components and Notes:

Develop a procedure to receive and process non-compliance reports.

***Responsible Party for this BMP:**

Name: Randy Korfiatis
Department: Public Services Department
Phone: 763-425-5741
E-mail: rkorfiatis@ci.osseo.mn.us

BMP Summary Sheet

MS4 Name: City of Osseo

Minimum Control Measure: 4-CONSTRUCTION SITE STORMWATER RUNOFF CONTROL

Unique BMP Identification Number: 4f-1

***BMP Title:** Establishment of Procedures for Site Inspections and Enforcement

***BMP Description:**

-Construction sites 1 acre or larger, or with the potential to pollute stormwater, will be required to have stormwater pollution prevention plans in place prior to commencement of earth-disturbing activities.

-Initiate site inspections and enforce stormwater and erosion/sediment control measures.

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

***Measurable Goals:**

-All sites 1 acre or larger will issued permits and SWPPP plans in place; smaller sites will be evaluated to determine if a SWPPP will be required.
-Number of project specific construction SWPPP's submitted to the City.
-Number of sites inspected.
-Number of enforcements implemented.

***Timeline/Implementation Schedule:**

Year 1-5: Conduct site inspections.
Year 2-5: Evaluate the City's process for inspecting and enforcing stormwater and erosion/sediment control measures. Make any adjustments and/or changes as necessary to the inspection process.

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: Randy Korfiatis
Department: Public Services Department
Phone: 763-425-5741
E-mail: rkorfiatis@ci.osseo.mn.us

Table of Best Management Practices (BMP's) Identified

5-POST-CONSTRUCTION STORMWATER MANAGEMENT IN NEW DEVELOPMENT AND REDEVELOPMENT

Development and Implementation of Structural and/or Non-structural BMPs 5a-1

Regulatory Mechanism to Address Post Construction Runoff from New Development and Redevelopment 5b-1

Long-term Operation and Maintenance of BMPs 5c-1

BMP Summary Sheet

MS4 Name: City of Osseo

Minimum Control Measure: 5-POST-CONSTRUCTION STORMWATER MANAGEMENT IN NEW DEVELOPMENT AND REDEVELOPMENT

Unique BMP Identification Number: 5a-1

***BMP Title:** Development and Implementation of Structural and/or Non-structural BMPs

***BMP Description:**

The City shall look into how it can develop and implement stuctrual and /or non-srtuctual BMPs that can best serve the City and the watershed. The City will work with the watershed to see how the City can help with regional BMPs that are appropiate and economically viable to the City.

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

***Measurable Goals:**

The City shall review documentation for structural and non-structural BMPs and have strategies to implement these BMPs.

***Timeline/Implementation Schedule:**

Year 1: The City will collect information for review.
Year 2: The City shall review this information and develop strategies for adoption.
Year 3: The City shall place these strategies into the ordinance.
Year 4-5: The City will develop a program for special waters and develop a goal for improved water clarity working with the watershed.

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: Randy Korfiatis
Department: Public Services Department
Phone: 763-425-5741
E-mail: rkorfiatis@ci.osseo.mn.us

BMP Summary Sheet

MS4 Name: City of Osseo

Minimum Control Measure: 5-POST-CONSTRUCTION STORMWATER MANAGEMENT IN NEW DEVELOPMENT AND REDEVELOPMENT

Unique BMP Identification Number: 5b-1

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

***BMP Description:**

The City will need to review the ordinance for post construction stormwater management in new development and redevelopment. The City will need to establish a program for inspections.

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

***Measurable Goals:**

The City will review the current ordinace and update as needed. The City shall develop a process and a program for inspection of stormwater post construction runoff from new development and redevelopment. The City shall put into place a procedure for enforcement if the ordinance is not followed.

***Timeline/Implementation Schedule:**

Year 1: Review the current ordinance and make recommendations for changes to include structural and non-structural BMPs.
Year 2: Implement the ordinance.
Year 3-5: Document the amount of non-compliance of the ordinance and review ordinance to see if changes may be needed.

Specific Components and Notes:

Review and possible revisions to the ordinance in relationship to post construction stormwater management will be made corresponding to the timeframe of BMP 4a-1, within 6 months of permit extension coverage.

***Responsible Party for this BMP:**

Name: Randy Korfiatis
Department: Public Services Department
Phone: 763-425-5741
E-mail: rkorfiatis@ci.osseo.mn.us

BMP Summary Sheet

MS4 Name: City of Osseo

Minimum Control Measure: 5-POST-CONSTRUCTION STORMWATER MANAGEMENT IN NEW DEVELOPMENT AND REDEVELOPMENT

Unique BMP Identification Number: 5c-1

***BMP Title:** Long-term Operation and Maintenance of BMPs

***BMP Description:**

The City will develop a procedure and policy for the long-term operation and to maintain BMPs.

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

***Measurable Goals:**

The City shall use the watershed and the City Engineer in help keeping current on new BMPs and review them to see if they are both practical and within the Citys' budget.

***Timeline/Implementation Schedule:**

Year1: The City will place in budget money for the City Engineer to review the SWPPP and make recommendations for changes as needed.

Year 2-5: The City will evaluate the BMPs and make changes to the SWPPP as needed.

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: Randy Korfiatis

Department: Public Services Department

Phone: 763-425-5741

E-mail: rkorfiatis@ci.osseo.mn.us

Table of Best Management Practices (BMP's) Identified

6-POLLUTION PREVENTION/GOOD HOUSEKEEPING

Municipal Operations and Maintenance Program 6a-1

Street Sweeping 6b-1

Annual Inspection of All Structural Pollution Control Devices 6c-1

Inspection of a Minimum of 20 Percent of the MS4 Outfalls, Sediment Basins and Ponds Each Year on a Rotating Basis 6d-1

Annual Inspection of All Exposed Stockpile, Storage and Material Handling Areas 6e-1

Inspection Follow-up Including the Determination of Whether Repair, Replacement, or Maintenance Measures are Necessary and the Implementation of the Corrective Measures 6f-1

Record Reporting and Retention of All Inspections and Responses to the Inspections 6g-1

Evaluation of Inspection Frequency 6h-1

BMP Summary Sheet

MS4 Name: City of Osseo

Minimum Control Measure: 6-POLLUTION PREVENTION/GOOD HOUSEKEEPING

Unique BMP Identification Number: 6a-1

***BMP Title:** Municipal Operations and Maintenance Program

***BMP Description:**

The City shall review its Municipal Operations and Maintenance to see if changes can be made to help in the reduction of stormwater pollutants. The review shall include but will not be limited to the following: salt/sand storage and application, pesticide and herbicide applications, mowing and street street sweeping, catch basin inspections. The City will develop procedures for inspections and standard operation procedures.

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

***Measurable Goals:**

1) The City will send City employees to training and continuing education for stormwater runoff.
2) As part of the chloride TMDL operators will be trained in proper use of equipment and application of salt on roads and sidewalks.
3) The City will develop operating procedures for general operations for municipal operations.
4) The City will develop and use inspection reports for the stormwater system.
5) Annual calibration of salt spreaders.

***Timeline/Implementation Schedule:**

Year 1: The City will start to look into standard operating procedures.
Year 2: The City will review and implement operating procedures for the municipal operations.
Year 3: The City will develop storm sewer catch basin inspections and reports.
Year 3-5: The City will review operations procedures and make changes as needed.
Years 1-5: Operator training for proper salt use as training becomes available.
Years 1-5: Calibration of salt spreaders.

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: Randy Korfiatis
Department: Public Services Department
Phone: 763-425-5741
E-mail: rkorfiatis@ci.osseo.mn.us

BMP Summary Sheet

MS4 Name: City of Osseo

Minimum Control Measure: 6-POLLUTION PREVENTION/GOOD HOUSEKEEPING

Unique BMP Identification Number: 6b-1

***BMP Title:** Street Sweeping

***BMP Description:**

The City will develop a street sweeping policy. At a minimum the streets will be swepted three times a year.

As part of the chloride TMDL stakeholders agreed to sweep city streets as soon as possible in late winter to remove as much residual product as possible left over from winter road operations.

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

***Measurable Goals:**

The City will develop a street sweeping policy and will use the LMC model policy as a reference.

***Timeline/Implementation Schedule:**

Year 1: The City will develop and implement a street sweeping policy.
Year 2: The City will monitor the effects of the street sweeping policy by inspections of the storm sewer system and cleaning of storm sewer pipes.
Year 2-5: The City will evaluate the street sweeping policy and make changes as needed.

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: Randy Korfiatis
Department: Public Services Department
Phone: 763-425-5741
E-mail: rkorfiatis@ci.osseo.mn.us

BMP Summary Sheet

MS4 Name: City of Osseo

Minimum Control Measure: 6-POLLUTION PREVENTION/GOOD HOUSEKEEPING

Unique BMP Identification Number: 6c-1

***BMP Title:** Annual Inspection of all Structural Pollution Control Devices

***BMP Description:**

The City shall review its Municipal Operations and Maintenance to see if changes can be made to help in the reduction of stormwater pollutants. The review shall include but will not be limited to the following: salt/sand storage and application, pesticide and herbicide applications, mowing and street street sweeping, catch basin inspections. The City will develop procedures for inspections and standard operation procedures.

***Measurable Goals:**

1) Number of employee training opportunities attended that were related to stormwater runoff.
2) The City will develop operating procedures for general operations for municipal operations.
3) The City will develop and use inspection reports for the stormwater system.

***Timeline/Implementation Schedule:**

Years 1-5: Conduct routine annual inspections.

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: Randy Korfiatis

Department: Public Services Department

Phone: 763-425-5741

E-mail: rkorfiatis@ci.osseo.mn.us

BMP Summary Sheet

MS4 Name: City of Osseo

Minimum Control Measure: 6-POLLUTION PREVENTION/GOOD HOUSEKEEPING

Unique BMP Identification Number: 6d-1

***BMP Title:** Inspection of a Minimum of 20 Percent of the MS4 Outfalls, Sediment Basins and Ponds Each Year on a Rotating Basis

***BMP Description:**

- Inspect 20% of all outfalls 24" and larger, sediment basins and ponds on an annual basis. These inspections will be done on a rotating basis such that 100% of the outfalls are completed within the 5-year permit cycle.

***Measurable Goals:**

- Number of outfalls, sediment basins and ponds inspected each year.

***Timeline/Implementation Schedule:**

Years 1-5: Annual inspection of, at a minimum, 20% of the MS4 outfalls, sediment basins and ponds on a rotating basis.

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: Randy Korfiatis

Department: Public Services Department

Phone: 763-425-5741

E-mail: rkorfiatis@ci.osseo.mn.us

BMP Summary Sheet

MS4 Name: City of Osseo

Minimum Control Measure: 6-POLLUTION PREVENTION/GOOD HOUSEKEEPING

Unique BMP Identification Number: 6e-1

Title: Inspection of All Exposed Stockpile, Storage and Material Handling Areas

Description:

-Create a procedure and an inventory to register and track stockpile sites (material, temporary or permanent, location, BMPs used), inspection results.

-Add to exterior building permit request forms a question where soil materials will be stockpiled and the BMP to be used to prevent erosion.

-From the registry inventory create a list for inspection.

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

***Measurable Goals:**

-Number of permanent and temporary stockpiles of record.
-Actions recommended for non-compliance.

***Timeline/Implementation Schedule:**

Year 1: The City will start to look into standard operating procedures.
Year 2: The City will review and implement operating procedures for the municipal operations.
Year 3: The City will develop storm sewer catch basin inspections and reports.
Year 3-5: The City will review operations procedures and make changes as needed.

Specific Components and Notes:

The City supports implementation of the Shingle Creek Chloride TMDL implementation plan through the Shingle Creek Watershed. Currently the City stores its' salt in a Hennepin County storage facility. If future salt piles are stored within the City these stockpiles will be monitored on a regular basis.

***Responsible Party for this BMP:**

Name: Korfiatis
Department: Services Department
Phone: 763-425-5741
E-mail: rkorfiatis@ci.osseo.mn.us

BMP Summary Sheet

MS4 Name: City of Osseo

Minimum Control Measure: 6-POLLUTION PREVENTION/GOOD HOUSEKEEPING

Unique BMP Identification Number: 6f-1

***BMP Title:** Inspection follow-up including the determination of whether repair, replacement, or maintenance measures are necessary and the implementation of the corrective measures.

***BMP Description:**

The City will develop a procedure for follow-up of the annual inspection and determine if repair is needed, replacement or what corrective action may be needed based upon the inspection reports. The City will take the action needed based on budget.

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

***Measurable Goals:**

-Completed repairs.
-Inspection log records.

***Timeline/Implementation Schedule:**

Year 1: Develop procedure for follow up to the annual inspections.
Year 2: From this procedure, review the annual inspections and determine if any corrective action are needed, make repairs.
Year2-5: Review the annual inspections reports and implement needs in annual budget.
Year 4-5: Review the process and determine if any changes should be made.

Specific Components and Notes:

-Inspection log records.
-Corrective actions will receive follow-up visits.

Priority will be given to projects that will prevent flooding on public and private property. For projects that do not receive immediate attention, due to public safety concerns, projects will be placed in a capital improvement program.

***Responsible Party for this BMP:**

Name: Randy Korfiatis
Department: Public Services Department
Phone: 763-425-5741
E-mail: rkorfiatis@ci.osseo.mn.us

BMP Summary Sheet

MS4 Name: City of Osseo

Minimum Control Measure: 6-POLLUTION PREVENTION/GOOD HOUSEKEEPING

Unique BMP Identification Number: 6g-1

***BMP Title:** Record reporting and retention of all inspections and responses to the inspections.

***BMP Description:**

The City will develop a record reporting and will follow the current retention policy of all inspections, responses to the inspections.

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

***Measurable Goals:**

The City will develop a reporting process and keep the records for the annual inspections and the City's response to the inspections. The City will review the current record retention policy and will follow the current policy.

***Timeline/Implementation Schedule:**

Year 1: Develop a reporting system and record retention policy for the annual inspections and the City's response to the inspections.

Year 2-5: Collect reports and keep on file at the Public Services Department office.

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: Randy Korfiatis

Department: Public Services Department

Phone: 763-425-5741

E-mail: rkorfiatis@ci.osseo.mn.us

BMP Summary Sheet

MS4 Name: City of Osseo

Minimum Control Measure: 6-POLLUTION PREVENTION/GOOD HOUSEKEEPING

Unique BMP Identification Number: 6h-1

***BMP Title:** Evaluation of inspection frequency

***BMP Description:**

The City will determine the frequency of the inspections and adjust the inspections after reviewing the results of the inspections.

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

***Measurable Goals:**

The City will determine if the annual inpsections are adequate and if they should be adjusted.

***Timeline/Implementation Schedule:**

Year 1: Develop a process to review the annual inspections and determine the results and determine if they should be adjusted.

Year 2-5: Review the inspections and adjust the inspections as needed.

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: Randy Korfiatis

Department: Public Services Department

Phone: 763-425-5741

E-mail: rkorfiatis@ci.osseo.mn.us

Table of Best Management Practices (BMP's) Identified

7-ADDITIONAL BMPs

Review Process for Appendix C: Limitations On Coverage..... 7-1

Evaluation of Potential Stormwater Infiltration Projects for Impacts within Source Water Protection .....

Areas..... 7-2

Impaired Waters Review Process IV.D-1

BMP Summary Sheet

MS4 Name: City of Osseo

Minimum Control Measure: N/A

Unique BMP Identification Number: 7-1

***BMP Title:** Review Process for Appendix C: Limitations On Coverage

***BMP Description:**

In Appendix C of the General Permit, the following items must be identified when these resources could potentially be impacted by any new discharges:

Part E: Discharges requiring Environmental Review
Part F: Discharges affecting Threatened or Endangered Species
Part G: Discharges affecting Historic or Archeological sites

For any project that would result in a discharge having the potential to adversely impact one of the above Parts, the City must conduct the required review and coordinate with the appropriate agencies in accordance with those requirements.

***Measurable Goals:**

Number of times each year that proposed projects with discharges affecting Part E, Part F, or Part G in Appendix C of the General Permit, that requires additional review.

***Timeline/Implementation Schedule:**

The City will begin implementation immediately.

Specific Components and Notes:

The City Planner is responsible for determining when a proposed project will require review of Parts E, F and G of Appendix C of the General Permit.

***Responsible Party for this BMP:**

Name: Randy Korfiatis
Department: Public Services Department
Phone: 763-425-5741
E-mail: rkorfiatis@ci.osseo.mn.us

BMP Summary Sheet

MS4 Name: City of Osseo

Minimum Control Measure: N/A

Unique BMP Identification Number: 7-2

***BMP Title:** Evaluation of Potential Stormwater Infiltration Projects for Impacts within Source Water Protection Areas

***BMP Description:**

The City will follow the Minnesota Department of Health's document "***Evaluating Proposed storm Water Infiltration Projects in Vulnerable Wellhead Protection Areas***" (1.1-July, 2007) as a guidance manual for evaluating all proposed infiltration projects within or adjacent to vulnerable drinking water supply management areas (DWSMA).

If the proposed infiltration/discharge is determined by the City to potentially affect the local drinking water supply, the City will prohibit the construction of the infiltration area or incorporate the necessary BMPs to minimize the identified pollutant(s) prior to infiltrating the vulnerable portions of the DWSMA.

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

-In the Appendix of this SWPPP.

***Measurable Goals:**

- The City will use the Minnesota Department of Health's document "***Evaluating Proposed Storm Water Infiltration Projects in Vulnerable Wellhead Protection Areas***" (1.1-July, 2007) as a guide in evaluating proposed infiltration projects within or adjacent to vulnerable DWSMA's.
- The City will prohibit the construction of the infiltration area or incorporate specific BMPs to reduce pollutants from infiltrating within vulnerable DWSMA's.
- The City will annually record the evaluation, denial, and implemented BMP's, of all proposed infiltration projects within and/or adjacent to vulnerable DWSMA's.

***Timeline/Implementation Schedule:**

The City will begin implementing the goals by January 1, 2009.

Specific Components and Notes:

The Drinking Water Supply Management Area (DWSMA) maps, for both Maple Grove and Brooklyn Park, show that the entire City of Osseo is within an area of variable vulnerability. This means that aquifer sensitivity ranges from low to high in the degree of geological protection afforded the aquifer(s) used by the public water supply.

***Responsible Party for this BMP:**

Name: Randy Korfiatis

Department: Public Services Department

Phone: 763-425-5741

E-mail: rkorfiatis@ci.osseo.mn.us

BMP Summary Sheet

MS4 Name: City of Osseo

Minimum Control Measure: IV.D Section 303(d) listings

Unique BMP Identification Number: IV.D - 1

***BMP Title:** Impaired Waters Review Process

***BMP Description:**

The City of Osseo will create a review process that identifies all discharges from the City's MS4 system to impaired waters, as defined by the current USEPA approved 303(d) list.

The review process will include the following:

- Identification of impaired waters that are likely to be impacted by the City's stormwater discharge.
- Identification of all potential stormwater discharges to impaired waters using data from the City's storm sewer maps and field surveys.
- Delineation of watershed areas that contribute to the above discharges.
- Evaluation of the hydrology, land use and other characteristics of the watershed areas that may impact the impaired water as a result of a stormwater discharge from the City's stormwater system.

Based on the review above, the City will determine if any changes to the existing stormwater system or BMPs are needed to minimize the impact of discharges to the impaired waters. If such modifications are deemed necessary, the City of Osseo will modify the SWPPP and submit those modifications to the MPCA with the current year's annual report. All assumptions, reasoning, and justification used to reach a conclusion on whether or not SWPPP revisions are necessary will be documented in the decision making process and records of this determination kept along with all records associated with the MS4 permit. A narrative summary of this review will then be prepared, and identify any associated SWPPP revisions that were made.

***Measurable Goals:**

- Determine what processes are in place and what has already been accomplished that will help meet these permit conditions.
- Prepare an inventory of all impaired waters within the jurisdictional boundaries of the MS4, as well as those outside these boundaries likely to have an impact as a result of receiving stormwater discharge from the MS4; compile as much detail about the stormwater discharges they receive from the MS4 as is available.
- Prepare a map that includes all impaired waters that the MS4 discharge may impact, all MS4 discharge points that may impact these waters, and delineated watersheds that may contribute to the impairment.
- Complete a written overview of the conclusions reached through the review, including the decision making process used to determine what SWPPP revisions may be needed.
- Prepare a projected schedule and timeline to incorporate any necessary changes into the SWPPP.

***Timeline/Implementation Schedule:**

2008:

-Identify what tasks have been completed by the City of Osseo to meet the requirements of section IV.D. of the MS4 General Permit.

-Identify impaired waters receiving likely impacts from stormwater discharges from MS4 and locate discharges.

-Develop a map of all impaired waters within the MS4, all MS4 discharge points that may impacte these waters, and delineated watersheds that may contribute to the impairments.

2008-2009:

-Complete an evaluation of hydrology, land use, and other watershed characteristics for watersheds that

contribute runoff to impaired waters.

200-2010:

-Submit Annual Report to the MPCA. The annual report will include an overview of the impaired waters review and any changes to the SWPPP that have been deemed necessary through this review process.

-Review changes to the 303(d) impaired waters list and conduct a review of additional listed impaired waters likely to be impacted by the City's stormwater discharge.

Specific Components and Notes:

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

When an USEPA approved TMDL is finalized, the City of Osseo intends to fully comply with all limits and requirements set forth I the TMDL in accordance with the schedules outlined in the TMDL and the MS4 Permit.

***Responsible Party for this BMP:**

Name: Randy Korfiatis

Department: Public Services Department

Phone: 763-425-5741

E-mail: rkorfiatis@ci.osseo.mn.us

APPENDIX A

SHINGLE CREEK
CHLORIDE
TMDL

TOTAL MAXIMUM DAILY LOAD (TMDL)

SWPPP Addendum Discussion Section
Shingle Creek Chloride TMDL

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

Commission Activities

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

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

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

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

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

Evaluation. The Commission has collected monthly reports of road salt and brine application within the watershed from the MS4s since 2002 and will continue to collect those monthly reports at least through winter 2011-2012. At the end of the first five year period in 2012, the Commission will evaluate the success of BMP implementation in reducing chloride concentrations in Shingle Creek and will reconvene the Technical Advisory Committee (of which the MPCA is a participant) to determine if adjustments to the Implementation Plan are necessary.

City of Osseo Activities

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

The following referenced BMP Sheets contain activities that relate to the implementation strategies to reduce chloride in Shingle Creek:

BMP Sheet	Activity
1c-6 and 6a-1	Operator Training
6a-1	Municipal Operations and Maintenance Program
6b-1	Street Sweeping

In addition, we plan to undertake the following new or expanded Best Management Practices over the next five years. New or revised BMP sheets are attached to this SWPPP addendum.

- Train and certify all supervisors and crew leaders in Snow and Ice Control Practices.
- Track chloride application and submit monthly reports to the Shingle Creek Watershed Management Commission.
- Participate in Watershed Commission Technical Advisory Committee meetings and workshops.
- Print one article annually in the City Newsletter reporting progress toward meeting the watershed goals.

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

Table 1 below sets forth the BMPs that the City of Osseo intends to undertake to implement the Shingle Creek chloride TMDL.

Table 1. Shingle Creek Chloride TMDL BMP Implementation, City of Osseo.

BMP	Time period for implementation	Resources needed	Estimated chloride load reduction	Comments
Calibrate spreaders	Annually, at start of ice control season	None	Variable	Already implemented
Street Sweeping	Annually, late winter	None	Variable	
Equip balance of trucks with pre-wetting and road sensors	As vehicles routinely replaced	$15,000-20,000 additional per truck	Based on literature, 20-25% reduction	In equipment replacement plan
Train and certify all supervisors and crew leaders through LTAP	2009	$250	Variable	In budget

BMP Summary Sheet

MS4 Name: City of Osseo

Minimum Control Measure: TMDL

Unique BMP Identification Number: TMDL-1

***BMP Title:** Research Salt Alternatives

***BMP Description:**

Investigate and monitor new products, equipment and methods that could serve as alternatives to applying salt to roadways during the winter months.

***Measurable Goals:**

Operator attendance to trade shows and conferences discussing alternatives to road salt.

***Timeline/Implementation Schedule:**

Years 1-5: On-going

Specific Components and Notes:

***Responsible Party for this BMP:**

Name: Randy Korfiatis

Department: Public Services Department

Phone: 763-425-5741

E-mail: rkorfiatis@ci.osseo.mn.us

APPENDIX B

EVALUATING PROPOSED STORMWATER INFILTRATION PROJECT IN VULNERABLE WELLHEAD PROTECTION AREAS

Evaluating Proposed Stormwater Infiltration Projects in Vulnerable Wellhead Protection Areas

Minnesota Department of Health

Introduction

Infiltration is widely promoted because it is a practice with demonstrated long-term value in managing stormwater. As a management technique, properly designed and executed infiltration practices convey several benefits, including the following (as identified in the Minnesota Stormwater Manual): 1) reducing the volume of stormwater runoff; 2) controlling and improving water quality; 3) recharging groundwater; 4) mitigating thermal affects on cold-water fisheries; and 5) attenuating peak flows. Infiltration is clearly a versatile and effective technique for addressing a wide range of stormwater issues. Accordingly, Minnesota Department of Health (MDH) encourages its use in most settings statewide.

Infiltration practices redirect stormwater into the subsurface, where it becomes groundwater. As most people in Minnesota use groundwater as a source of drinking water, the MDH would like to see care exercised in planning projects involving stormwater infiltration, especially in vulnerable wellhead protection areas.

Stormwater runoff often carries with it contaminants that can lead to adverse health effects. The types of contaminants vary widely depending on land use; common contaminants include nitrates, pathogens, metals, chloride, and hydrocarbons. When present at high concentrations, these contaminants can pollute groundwater supplies if infiltrated into the ground. The effects of such contamination can be devastating. An example involving not urban stormwater but runoff from agricultural fields in Ontario illustrates the danger posed by pathogens. Infiltration of the runoff led directly to bacteriological contamination of a well and the associated public water supply system. The resulting disease outbreak took several lives and sickened hundreds of others. This example not only demonstrates the potential for rapid connection between surface water and groundwater, but it clearly indicates that groundwater quality can be jeopardized by infiltration of stormwater from the ground surface.

Most of the public water supply systems that distribute drinking water in Minnesota rely on groundwater as their source. Drinking water protection activities are the responsibility in Minnesota of the MDH. As part of these efforts, MDH regulates wellhead protection planning activities carried out by public water suppliers in the state. One of the goals of wellhead protection planning is to determine the recharge area (i.e., the wellhead protection area) for a well and to manage that area in a manner consistent with safeguarding the drinking water supply.

Stormwater management occurs in urban or suburban areas and in developing communities where impervious surfaces begin to replace natural ground cover. This

document describes suggested considerations for evaluating projects that use infiltration to manage stormwater, with emphasis on how such projects may affect groundwater used for drinking water purposes in wellhead protection areas. A flowchart (Appendix A) is attached to help understand the process.

General Requirements

Federal, regional and state authorities regulate various aspects of the manner in which stormwater is handled, managed, and controlled in Minnesota. For example, the Minnesota Pollution Control Agency (MPCA) administers the Stormwater program, which regulates much of the management of stormwater through the use of permits. The MPCA, regional and local authorities are typically the governmental entities implementing and enforcing stormwater requirements. This guidance applies regardless of whether the stormwater management at the site is regulated or not.

The Minnesota Department of Health has no regulatory authority over most routine handling of stormwater, but does administer the Wellhead Protection Program and other drinking water protection programs. Wellhead protection planning is largely a local activity in Minnesota. Individual public water supply systems decide how to manage land use within wellhead protection areas. Certain land use activities may adversely affect groundwater supplies. Therefore wellhead protection strategies are balanced with aquifer vulnerability. As wellhead protection planning and stormwater management both involve a substantial amount of local government involvement and leadership, good opportunities exist for adopting a consistent approach in the application of each.

Assembling Existing Information

This document is intended for use as guidance for local authorities in evaluating stormwater infiltration projects. Prior to doing so, existing information must be gathered, as described in this section.

- *Is your proposed project in an approved wellhead protection area?* Information in a wellhead plan may help to evaluate proposed infiltration projects. Copies of the report are usually kept with the wellhead protection manager for the public water supplier. While municipalities are typically the largest groundwater users for public consumption, other entities that may have wellhead plans are schools, mobile home parks, and large businesses or employers. Step 1, below, describes how to identify wellhead activities in your area of interest.
- *What aquifer is used by drinking water supply wells in the area of the proposed infiltration?* It is important to know the aquifer used by area wells because in some parts of the state, many potential aquifers are available and depending on local geology, each aquifer may have a different sensitivity to activities at the ground surface.
- *Where is the aquifer(s)vulnerable to contamination from activities at the land surface?* Vulnerability means the degree to which the aquifer is likely to be affected by activities at the ground surface. A wellhead protection plan

distinguishes between zones within the wellhead protection area that are vulnerable from those that are not. Understanding this characteristic helps in evaluating the risk posed by activities like stormwater management.

- *What land uses exist or are proposed for the area generating stormwater?* Local authorities are the best source of information on local land use. Land uses vary in their potential to generate contaminants in stormwater runoff. For example, potential contaminants from industrial or commercial areas are far different from those that may be generated from park or residential areas. The Minnesota Stormwater Manual (links in Appendix B) describes certain land uses that it terms "potential stormwater hotspots (PSH)" that may be incompatible with infiltration in wellhead protection areas. Land use is very hard to characterize broadly. Accordingly, site-specific considerations should be made wherever possible. Consult the Minnesota Stormwater Manual for information on land uses and associated stormwater problems.
- *What are the contaminants of concern in the stormwater and can contaminants be managed?* Do the stormwater management protocols identify any type of pre-treatment that may help to mitigate contaminants in the runoff and are they appropriate for the types of contaminants that are likely to be present in the stormwater?

Each of these items is considered as part of the evaluation process that MDH proposes for considering stormwater infiltration projects in vulnerable wellhead protection areas. The process is described below and is summarized in the flowchart attached as Appendix A.

Process for Evaluating Stormwater Infiltration Projects

Step 1: **Determine if any part of the proposed infiltration site is within a vulnerable wellhead protection area (WHPA) or drinking water supply management area (DWSMA) as defined by Minnesota Rules (4720.5100-5590).** This information is available from the Wellhead Protection Manager at the public water supplier or from MDH staff (651-201-4700). Also, the wellhead protection plan likely contains a section describing the vulnerability assessment, which describes how the vulnerability is determined and how it may vary throughout the DWSMA.

The term 'infiltration site" refers to any structure or device designed to transfer surface waters to the subsurface. In practice, these facilities range in size from rain gardens designed to handle runoff from residential rooftops to basins collecting runoff from large commercial areas. The scale of the infiltration project, in terms of the volume of stormwater handled, clearly must be considered, along with land use, as part of this review process. MDH generally encourages multiple small-scale infiltration projects distributed over a large site in lieu of one large structure to handle stormwater from a site.

> **If yes, proceed to Step 2**. Yes means that the infiltration site is in close proximity to wells used to supply a public water supply system. The wellhead report may indicate the travel time in years between the proposed site and the wells. A vulnerable determination (very high, high, or moderate vulnerability) means the

aquifer will likely be affected by activities at the ground surface. Hence, the proposed infiltration needs to be considered in more detail.

If no, it is unlikely that the proposed stormwater management project will affect drinking water supplies for a public water supply system (with a defined wellhead area), but the project still must comply with MPCA and local requirements for stormwater handling.

Step 2: **Does the aquifer receiving the water from the infiltration basin exhibit fracture or solution-enhanced groundwater flow conditions (secondary porosity features)?** This means groundwater flow through rocks or other geologic materials exhibiting porosity is dominated by fractures or dissolution features (examples include the Prairie du Chien Dolomite and the Galena Limestone). Aquifers characterized by secondary porosity can display extremely rapid groundwater travel times that can put a well at risk in a matter of hours and can have complicated and tortuous flowpaths that are difficult to predict without special testing. Infiltration of stormwater within WHPAs is not recommended in such settings, especially if karst features exist. Infiltration might be acceptable if the karst aquifer is covered by 100 feet or more of other materials. The Minnesota Stormwater Manual identifies karst settings as especially problematic in managing stormwater. Appendix B contains web links to the complete stormwater manual, which should be consulted for more background on managing stormwater in karst areas, as well as maps showing the location of Minnesota's karst areas. However, the manual does not specifically cover the issue of stormwater infiltration in wellhead protection areas of a fractured or solution-enhanced aquifer.

If no, proceed to Step 3.

If yes, infiltration may not be appropriate for this setting. Consider other stormwater handling procedures such as stormwater retention and conveyance outside of the WHPA or moving the infiltration area to a non-vulnerable part of the DWSMA. Additional handling alternatives are presented in the Minnesota Stormwater Manual (see reference in Appendix B).

Step 3: **Is the proposed infiltration site within the 1-year time-of-travel (emergency response zone) as designated by MDH?** A 1-year travel time is significant for several reasons. Most pathogens are not viable in the groundwater after 365 days. So a 1-year travel time represents a margin of safety that will allow some contaminants to attenuate or, additionally, sufficient time for local authorities to react.

If no, proceed to Step 4.

If yes, infiltration is not appropriate in this setting as insufficient time is available after infiltration to cause pathogens to die off or for local authorities to react to a spill. Extenuating circumstances here might be the presence of a sufficiently thick unsaturated zone between the water table and the base of the infiltration site that pathogen attenuation would take place.

Step 4: **What current or proposed land uses drain into the infiltration site?**

Classify the predominant land use upgradient of the infiltration site into one of the following categories:

1. Commercial and industrial;
2. Transportation corridors;
3. Forest, parkland, open space;
4. Low density residential;
5. High density residential; and
6. Golf course, active agricultural (i.e., cropland, feedlots).

Stormwater infiltration in commercial and industrial areas, as well as in transportation corridors is only appropriate if the collection and infiltration system is designed to allow spill containment. MPCA permitting requirements currently prohibit infiltration from industrial areas containing exposed potential contaminant sources or from vehicle fueling or maintenance areas. Categories 3 through 6 represent land uses from which infiltrated runoff is not as likely to contain contaminants that may adversely affect human health if introduced into a drinking water supply, although this may depend on 1) the degree to which land management BMPs have been adopted, and 2) stormwater pretreatment measures. The use of stormwater infiltration devices may be acceptable in areas where they would otherwise be inappropriate if flows from, say, rooftop drainage could be collected for infiltration separate from runoff from industrial areas.

The land use categories presented here are quite broad and there will be differences in the kinds of contaminants that could be generated in runoff from each. The Minnesota Stormwater Manual contains a lengthy discussion (chapter 13) about potential stormwater hotspots (PSHs), which are land uses that have the potential to affect the water quality of stormwater. The Minnesota Stormwater Manual describes conditions under which infiltration of runoff from land uses containing PSHs as a practice is not appropriate. Users of this guidance should be familiar with the PSHs identified in the Minnesota Stormwater Manual as a means of providing context for evaluating general land uses. While the manual identifies many PSHs, the list is not exhaustive, and each land use should be considered on its own merits.

Step 5: (This step does not apply to some land uses – see flow chart): **Are emergency procedures for containment of spills established and acceptable?** The primary concern here relates to transportation corridors. Fuels, chemicals, and other potentially hazardous materials all are moved on roadways and railways. Accidents that happen in unpredictable locations have the potential to affect groundwater. While it may not be practical to design protections against the eventuality of all possible such accidents, local and regional authorities should have a means of responding should a spill occur.

> **If no**, infiltration is not appropriate in this setting.
>
> **If yes**, infiltration may be acceptable but only if contingency responses for spill containment are included in the site planning process.

***Step 6*: Are site planning, BMPs, pre-treatment, or secondary containment measures, or natural attenuation characteristics in the vadose zone acceptable to meet federal drinking water standards?** Every infiltration device or basin should be designed to do as much as is practical at every opportunity to limit the pollutant load to the subsurface. This extends to maintaining the infiltration device so its performance does not deteriorate with age. Regardless of the approach used, the goal is that the water exiting the infiltration device and recharging the groundwater system should meet federal drinking water quality standards. This goal is more stringent than is required by MPCA for routine consideration of stormwater management, but is warranted if a large proportion of the water pumped for drinking water purposes is comprised of infiltrated stormwater. However, it should be noted that drinking water standards are not enforceable except in the water delivered in the public water supply system. Dilution and other attenuation processes may significantly impact concentrations between where stormwater infiltration takes place and where the well pumps water for drinking water purposes.

> **If no**, infiltration is not appropriate in this setting.
>
> **If yes**, planned infiltration appropriate unless site conditions differ in a manner likely to affect stormwater quality adversely thereby not meeting drinking water standards.

Special Situations

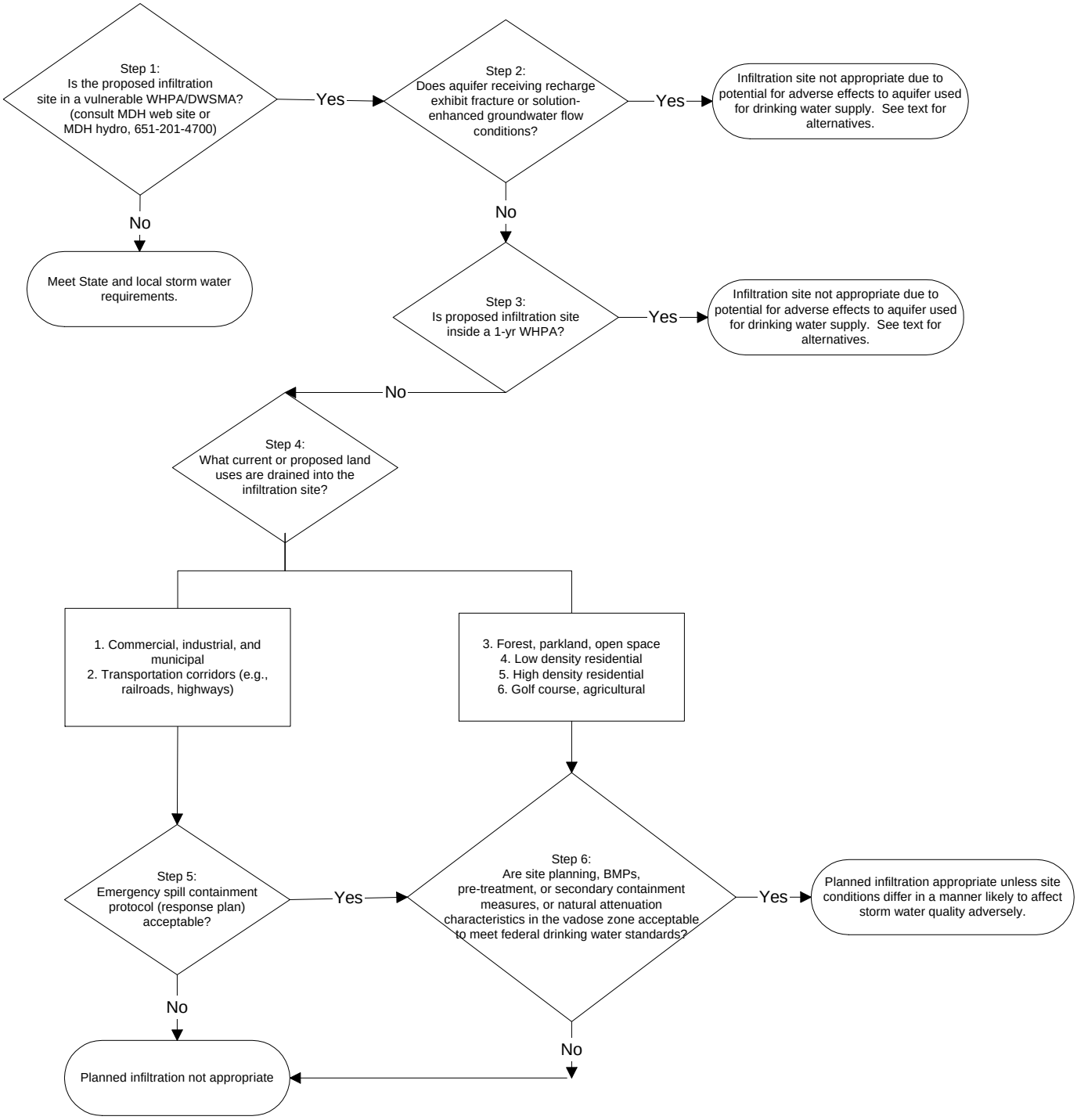
Certain circumstances may dictate a response to the proposed infiltration different from the recommendations of this guidance. For instance, a project involving the infiltration of volumes of water that are large relative to the amount pumped by a nearby well may leave little room for natural processes to dilute the stormwater. Or perhaps specialized predictive tools, such as a groundwater flow model, are available that can help to forecast the effects of the infiltration. Such tools may make it easier to interpret likely effects of the proposed infiltration. While it is impossible to predict all such extenuating circumstances, it will be the role of the user to decide how to incorporate such conditions in the analysis of site-specific infiltration proposals.

Contacting Minnesota Department of Health Staff

Appendix B lists various resources available to help work through this guidance, including MDH staff contacts. MDH hydrologists are generally assigned to specific regions of the state (see Appendix B) but additional assistance is available by calling the Source Water Protection Unit at 651-201-4700.

Appendix A

Appendix A.
A Flow Chart for Evaluating Proposed Stormwater Infiltration Projects in Areas with Vulnerable Groundwater



Note: This flow chart intended for use in conjunction with MDH guidance on evaluating storm water infiltration projects in vulnerable wellhead protection areas.

Appendix B

Appendix B

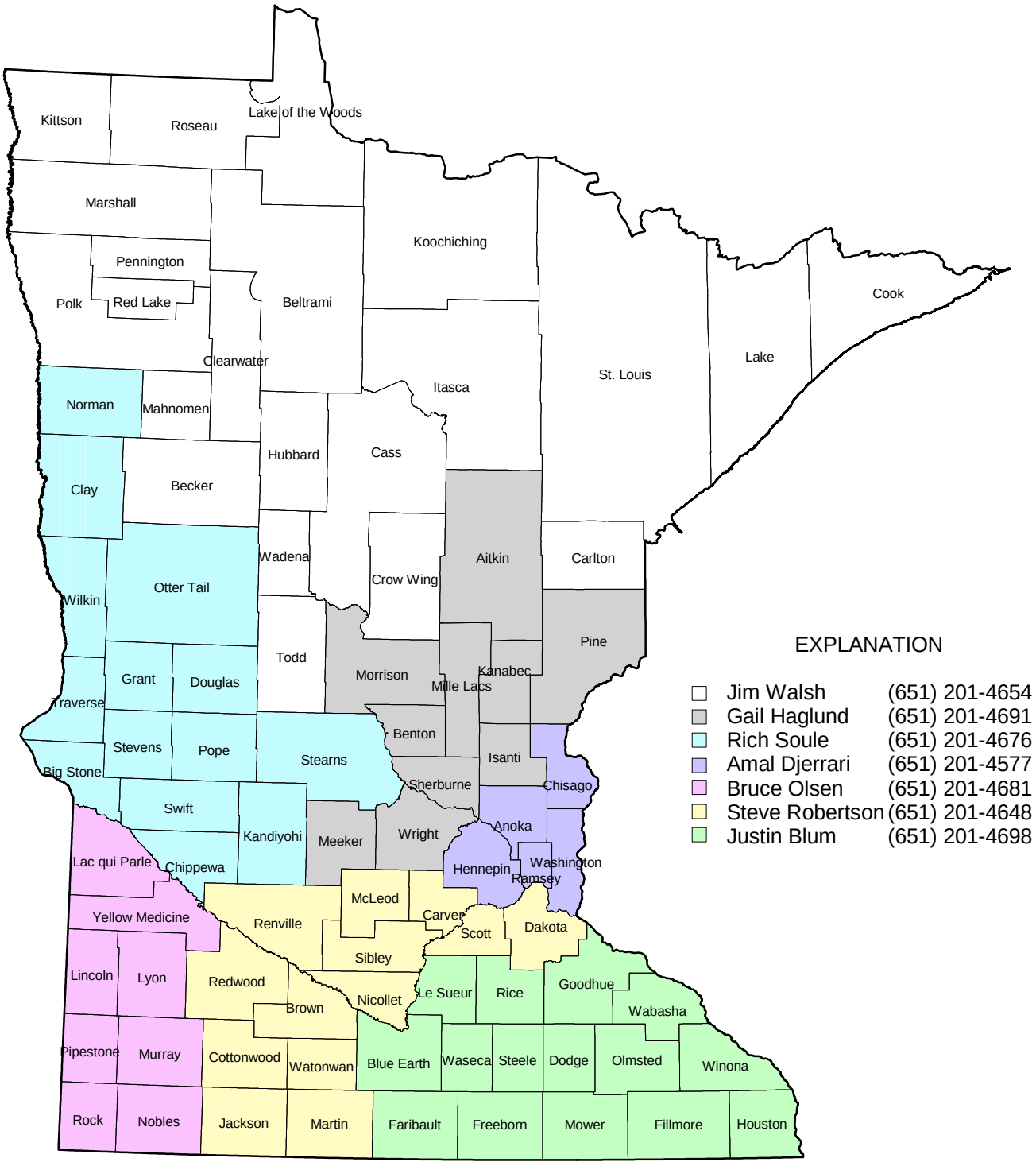
Minnesota Stormwater Manual

www.pca.state.mn.us/water/stormwater/stormwater-manual.html

MDH Hydrologists by Region

See map on next page.

Hydrologist Areas, Wellhead Protection



o:\dwpswp\grow\apr\state\hydroareas.apr

APPENDIX C

SHINGLE CREEK
CHLORIDE TMDL
IMPLEMENTATION PLAN

Minnesota Pollution Control Agency

520 Lafayette Road North | St. Paul, MN 55155-4194 | 651-296-6300 | 800-657-3864 | 651-282-5332 TTY | www.pca.state.mn.us

March 5, 2007

Mr. Craig Cooper, Chair
Shingle Creek Water Management Commission
3235 Fernbrook Lane
Plymouth, MN 55447

Re: Shingle Creek Chloride Total Maximum Daily Load and associated Implementation Plan Approvals

Dear Mr. Cooper:

This letter is to inform you that the U.S. Environmental Protection Agency has approved the Shingle Creek Chloride TMDL and Minnesota Pollution Control Agency (MPCA) has reviewed and is approving the Implementation Plan for the Shingle Creek Chloride Total Maximum Daily Load (TMDL).

The Implementation Plan calls for ongoing activities by the Commission and the member cities. The Implementation Plan lays out five principles to be followed and further explains the best management practices which will be employed to protect Shingle Creek and to achieve the reductions in Chloride necessary to meet the TMDL.

The MPCA would like to thank the Commission for all your hard work in successfully completing these two important documents. The MPCA looks forward to working with the Commission and the member cities in restoring Shingle Creek to once again achieving water quality standards.

Sincerely,

Faye E. Sleeper

Faye Sleeper, Manager
Watershed Section
Regional Division

FES/TL:bao

cc: Doug Thomas, BWSR

Shingle Creek Chloride TMDL Implementation Plan

Shingle Creek WMC
Brooklyn Center
Brooklyn Park
Crystal
Maple Grove
Minneapolis
Minneapolis Parks
New Hope
Osseo
Plymouth
Robbinsdale
Mn/DOT
Hennepin County

Wenck File #1240

Prepared for:

SHINGLE CREEK
WATER MANAGEMENT COMMISSION

Prepared by:

WENCK ASSOCIATES, INC.
1800 Pioneer Creek Center
P.O. Box 249
Maple Plain, Minnesota 55359-0249
(763) 479-4200

February 2007

Wenck

Wq-iw8-02c

Table of Contents

1.0 INTRODUCTION 1-1

2.0 CHLORIDE TMDL SUMMARY 2-1

3.0 IMPLEMENTATION PLAN DEVELOPMENT 3-3

3.1 Plan Development Process 3-3
3.2 Implementation Plan Principles 3-4
3.2.1 Utilize Appropriate Plow Techniques 3-4
3.2.2 Balance Public Safety and Environmental Risk 3-4
3.2.3 Encourage Communication 3-5
3.2.4 Foster Stewardship 3-5
3.2.5 Communicate With the Public 3-5
3.3 Implementation Plan Process 3-5

4.0 WATERSHED COMMISSION ACTIVITIES 4-1

4.1 General Coordination 4-1
4.1.1 Annual Report on Monitoring and Activities 4-1
4.1.2 City Salt Management Plans 4-1
4.1.3 Permit Requirements 4-1
4.2 Education 4-2
4.2.1 Private Applicator Education 4-2
4.2.2 Public Education and Outreach 4-2
4.2.3 Conduct Official Education 4-2
4.2.4 Coordinate an Annual Applicator Workshop 4-2
4.3 Ongoing Monitoring 4-3
4.3.1 Monitoring 4-3

5.0 STAKEHOLDER ACTIVITIES 5-1

5.1 BMP Implementation 5-1
5.1.1 Product Application Equipment and Decisions 5-1
5.1.2 Deicer Stockpiles 5-2
5.1.3 Operator Training 5-2
5.1.4 Cleanup and Snow Stockpiling 5-3
5.1.5 Ongoing Research into Salt Alternatives 5-3
5.2 Tracking and Reporting 5-3

6.0 ADAPTIVE MANAGEMENT 6-1

1.0 Introduction

Shingle Creek, an 11-mile urban/suburban stream located in the northwestern portion of the Minneapolis metropolitan region, was designated an Impaired Water by the Minnesota Pollution Control Agency (MPCA) and US Environmental Protection Agency (EPA) for chloride concentrations that exceed the State established standards. The Shingle Creek Watershed Management Commission (SCWMC) has completed a Total Maximum Daily Load (TMDL) analysis to quantify the pollutant reductions needed to meet the water quality standards for chloride in Shingle Creek, in accordance with Section 303(d) of the Clean Water Act. The TMDL was prepared in cooperation with the nine cities with land located in the Shingle Creek watershed as well as Hennepin County and the Minnesota Department of Transportation (Mn/DOT).

The analysis determined that the majority of chloride in the Shingle Creek watershed is derived from nonpoint sources including road deicing, commercial and industrial deicing, and fertilizer application, with the primary source being road salt and salt substitutes applied to the dense network of local roads and county and state highways in the watershed. The TMDL concluded that an overall 71 percent reduction in chloride load must be achieved to meet State chloride concentration standards. This Implementation Plan details the specific activities the stakeholders in the watershed plan to undertake to attain that reduction.

2.0 Chloride TMDL Summary

A key aspect of a TMDL is the development of an analytical link between loading sources and receiving water quality. To establish that link, conductivity and chloride concentrations were measured at various locations in Shingle Creek and several key tributaries and storm sewers in the watershed. The cities in the watershed, Hennepin County, and Mn/DOT tracked and reported the road salt applied during all ice and snow control operations in 2002-2003. Load duration curves were prepared to better understand the relationship between flow in Shingle Creek and chloride concentration, to compare dry conditions to flood conditions. Load duration curves were also prepared seasonally to better understand seasonal variations.

Table 1. Summary of Exceedance Occurrences under Varied Flow Regimes.

Site	Winter			Spring			Summer		
	Low Flow	Medium Flow	High Flow	Low Flow	Medium Flow	High Flow	Low Flow	Medium Flow	High Flow
SC00	*Yes*	*Yes*	*Yes*	No	No	No	No	No	No
SCI94	*Yes*	*Yes*	*Yes*	No	No	No	No	No	No
SC03	*Yes*	*Yes*	*Yes*	No	No	*Yes*	No	No	No
SC04	*Yes*	*Yes*	*Yes*	No	No	*Yes*	No	No	No
SCSS1	--	*Yes*	No	No	*Yes*	No	No	No	No
SCPine	*Yes*	*Yes*	*Yes*	No	No	No	No	No	No

Source: ***Shingle Creek Chloride TMDL Report.***

Winter (December 1 through March 31) load violations occurred across all of the flow regimes. Spring (April and May) load violations occurred during the low flows. High flows offered enough dilution capacity or were late enough that the salt sources were depleted. Summer (June 1 through August 31) load violations did not occur. However, very dry periods had loads approaching the standard, suggesting that ground water is close to the standard concentration of 230 mg/L.

Critical conditions for the load and wasteload allocations were defined as all winter flow conditions. However, because chloride is entirely a nonpoint source issue in the Shingle Creek watershed, it is inappropriate to define the TMDL as a single number. The TMDL is entirely dependent upon the daily flow and concentration, which is highly dynamic. Therefore, the TMDL is represented by an allowable daily load across all flow regimes as is demonstrated in Figure 1. To determine acceptable loads under the critical flow regimes, chronic standard concentrations were multiplied by the flow at each interval.

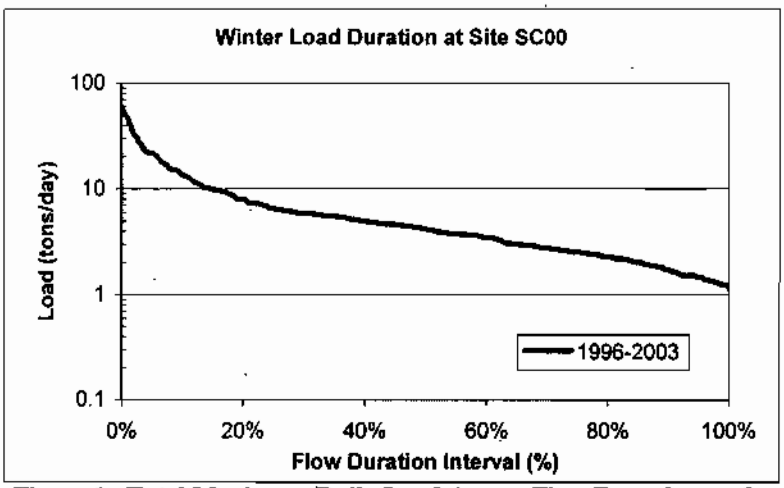


Figure 1. Total Maximum Daily Load Across Flow Exceedances for Shingle Creek. Data used to calculate the load duration curve was from December 1996 thorough March 2003.
Source: ***Shingle Creek Chloride TMDL Report.***

For purposes of implementation, the TMDL is represented as a percent reduction across the flow regimes needed to meet the standard (see Table 2). Reductions were calculated as the 90th percentile of all reductions needed to meet the standard during winter. In essence, the reduction represents what is needed so that 90% of the samples would be in compliance with the water quality standard.

Table 2. TMDL for Chlorides in Shingle Creek as Represented by a Percent Reduction.

Critical Condition[1]	Wasteload Allocation (percent reduction)	Load Allocation (percent reduction)	Margin of Safety (percent reduction)	TMDL (percent reduction)
Winter Low Flow (60 to 100%)	48%	3% [1]	12%	63%
Winter Runoff (60% to 0%)	61%	4% [1]	6%	71%

[1]Assumed groundwater reductions with reductions of surface application of chloride (37% and 52% respectively). Total load reduction was based on an assumed stream load share of 8%. For example, a 37% load reduction on 8% of the entire load results in a 3% reduction of the entire load.

3.0 Implementation Plan Development

The activities and BMPs identified in the implementation plan are the result of a series of stakeholder working-meetings led by the Shingle Creek Watershed Management Commission. Representatives from cities, Mn/DOT, Hennepin County and regulatory agencies met four times to discuss the TMDL requirements, BMPs and technologies available to address chloride, public safety, and the feasibility of implementing the activity. A summary implementation plan for the TMDL document was developed using this input, distributed to stakeholders for review and posted on the SCWMC website www.shinglecreek.org for public review and comment. This Implementation Plan expands upon that summary plan with more detail.

3.1 PLAN DEVELOPMENT PROCESS

The first task in developing the implementation plan was determining the allocation of load reductions to the users in the watershed. The stakeholders agreed to work collectively towards a 71% reduction in chloride use to understanding that each stakeholder was working under unique financial, public safety and perception, and feasibility limitations. This collective approach allows for greater reductions for some agencies and less for those with greater constraints.

As the second step in the process, member cities of the SCWMC, Mn/DOT, and Hennepin County agreed to identify and implement BMPs focused on reducing chloride use. Stakeholder meetings focused on current activities and identification of activities that can be considered to address the needed load reductions. The topics discussed included:

1. Product application equipment and decisions
2. Product stockpiles
3. Product type and quality
4. Operator training
5. Clean-up and snow stockpiling
6. Ongoing research into salt alternatives

During the stakeholder process, each stakeholder discussed their current policies and practices for winter road maintenance and identified those areas where load reduction improvements could be achieved in each of the six identified categories. These comments are detailed in the tables in Appendix A.

3.2 IMPLEMENTATION PLAN PRINCIPLES

Through the discussion of policies and practices, current activities, and ongoing research, the stakeholders developed five principles to guide development and implementation of the load reduction plan. These include:

1. Utilize appropriate snow plow techniques
2. Select, store, and apply materials appropriately to balance public safety and environmental risks
3. Encourage communication between applicators
4. Foster stewardship through improved applicator awareness
5. Communicate with the public

3.2.1 Utilize Appropriate Plow Techniques

Written snowplow policies should specify salt application policies and practices as well as other snow and ice control policies and practices. These policies should include expectations for operator training, materials use, application rates and procedures, and equipment maintenance and replacement. Each stakeholder should annually evaluate its policies and practices and make adjustments to the written policies as necessary.

3.2.2 Balance Public Safety and Environmental Risk

Each stakeholder agreed that chloride use must be reduced, but that it should be done so strategically to minimize risks to public safety, especially on high priority ice control locations such as bridge decks, intersections, ramps, and hills. Initial efforts should focus on implementing salt reduction practices where feasible and in environmentally sensitive areas, and continuing research into and conducting trial applications of new products and equipment.

3.2.3 Encourage Communication

The stakeholders agreed that the stakeholder meetings themselves had been a useful forum for discussion and sharing. Opportunities to share ideas and experiences to widen the knowledge base should be part of the implementation plan.

3.2.4 Foster Stewardship

Improved applicator training should focus on ways to reduce the use of salt while maintaining public safety. Applicators should understand the environmental risks from the overuse of salt to place the reduction plan into context and to gain a sense of stewardship.

3.2.5 Communicate With the Public

Public education should take a variety of forms, and should include both general and specialized information, targeted but not limited to:

- General public
- Elected and appointed officials
- Public agency staff
- Private applicators
- Property managers

Education opportunities might include workshops, public meetings, brochures, newspaper articles, and signs.

3.3 IMPLEMENTATION PLAN PROCESS

The stakeholders agreed that implementation should be a joint effort, with the SCWMC taking responsibility for ongoing coordination, general education and monitoring activities and the applicators taking responsibility for BMP implementation. The cities, Hennepin County, and MnDOT would be expected to incorporate these BMPs into their Storm Water Pollution Prevention Plans (SWPPP) and NPDES Minimum Measures, and to annually assess progress toward advancing the implementation principles detailed above in Section 3.2. The stakeholders will annually report to the SCWMC their annual activities, and the Commission will summarize those activities into its own Water Quality Annual Report. This framework is illustrated in Figure 2 below.

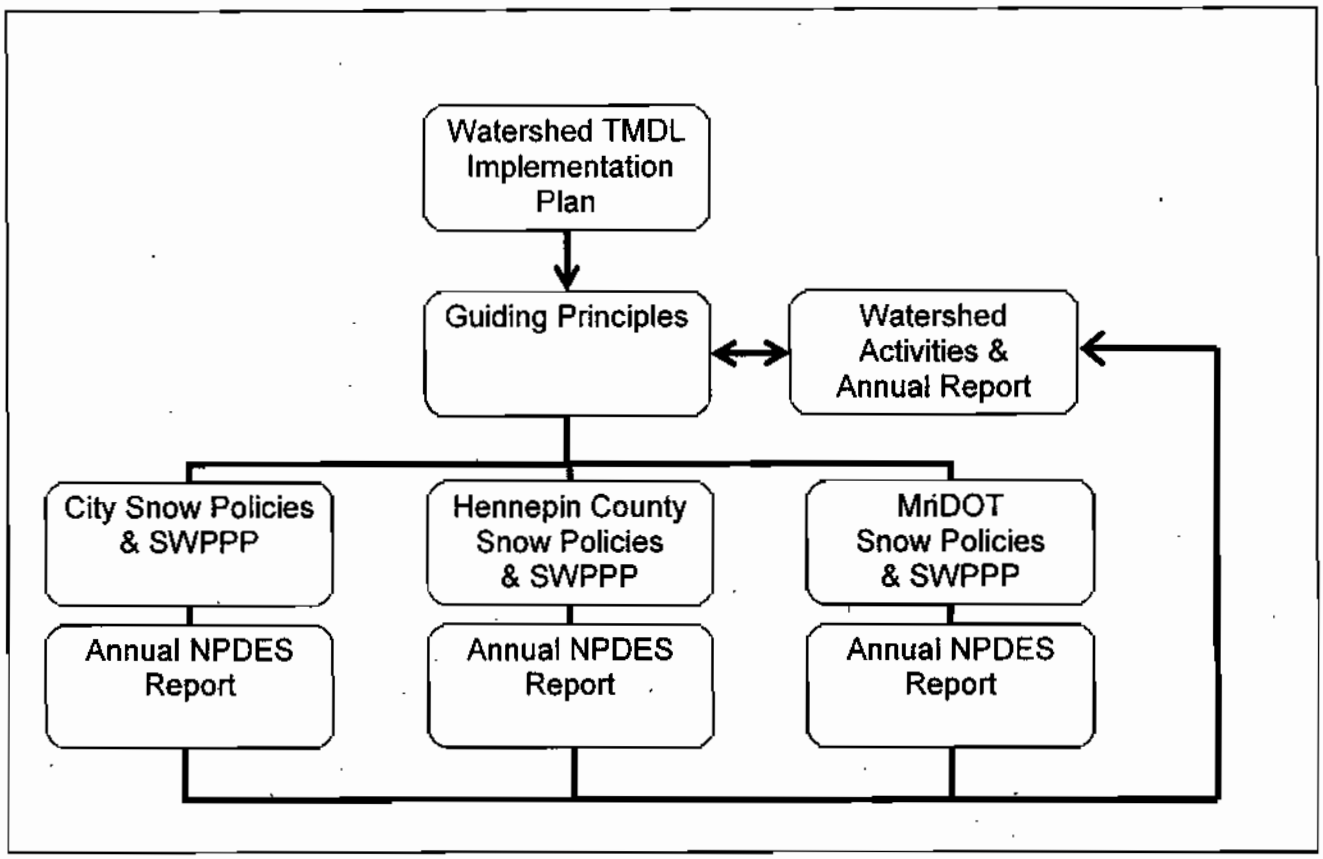


Figure 2. Implementation Framework.

4.0 Watershed Commission Activities

The SCWMC has agreed to take the lead on general coordination, education, and ongoing monitoring. The Commission will also collect annual NPDES reports from the stakeholders and compile BMP activities undertaken by all parties. This information will be incorporated into the Commission's annual Water Quality Report. The following activities will be conducted by the SCWMC.

4.1 GENERAL COORDINATION

4.1.1 Annual Report on Monitoring and Activities

An annual report on salt reduction activities is necessary under the adaptive management guidelines established in the TMDL. This report will provide the cities with necessary information for their annual NPDES reports. The report will track BMP implementation and monitoring data to evaluate activity effectiveness. The estimated annual cost of this activity is $5,000.

4.1.2 City Salt Management Plans

The implementation plan asks the Cities to develop and maintain a City Salt Management Plan. Many Cities already have these, but a template is needed to easily compare activities between Cities. A template will reduce the Cities' workload, promote consistency across the watershed, and provide an easily amendable plan for reducing salt use. The SCWMC will develop a template for the City Salt Management Plans at an estimated cost of $3,000.

4.1.3 Permit Requirements

The commission will incorporate private (commercial) snow management rules for reducing chloride use and include chloride reduction in the Commission project review program. One requirement may be the development of a salt management plan for individual commercial

properties. The commission will develop a template for the salt management plan. The estimated cost of this activity is $2,000.

4.2 EDUCATION

4.2.1 Private Applicator Education

Although chloride used by private (commercial) applicators is a small proportion of the overall load in the watershed, education can help reduce unnecessary chloride-based deicer use in the watershed. Some educational materials have been developed by Canadian agencies regarding private use of chloride-based deicers. Private applicator education will include development of brochures, newsletters, and workshops to educate private applicators on chloride issues in the watershed. The estimated cost of this activity is $1,500 annually.

4.2.2 Public Education and Outreach

One measure that may allow for reductions in usage of deicing chemicals is to increase public awareness of the environmental effects of road salt and ultimately to gain public acceptance for changing ice control practices. This acceptance may require encouraging behavioral changes such as reduced driving speeds during icy conditions or changing public expectations for snow removal and deicing. This task will educate the public to help manage expectations and identify the need for chloride reductions. Activities may include newsletter articles, brochures, and presentations. The estimated cost of this activity is $3,000 annually.

4.2.3 Conduct Official Education

There is a need for city, county, and state officials to understand the TMDL and the proposed implementation activities so that they can effectively balance public safety issues with environmental risks. The SCWMC will develop an education strategy and materials for this task. The estimated cost of this activity is $1,000 annually.

4.2.4 Coordinate an Annual Applicator Workshop

The purpose of the workshop is to annually bring together city, county, and state supervisory and street and highway maintenance staff to discuss salt use, application, and storage issues,

techniques, and technologies, thus facilitating information sharing and technology transfer. The estimated cost of this activity is $1,000 annually.

4.3 ONGOING MONITORING

4.3.1 Monitoring

The SCWMC has agreed to take the lead on monitoring and tracking the effectiveness of activities implemented to reduce chloride in Shingle Creek; chloride and conductivity monitoring at two locations is already incorporated into the Commission's annual monitoring activities. The Commission has routinely monitored stream flow and water quality in Shingle Creek since 1996. Two locations, one downstream of Humboldt Avenue in Minneapolis ("SC-0, ") and one upstream of Zane Avenue in Brooklyn Park ("SC-2") are monitored for water quantity and various water quality chemical parameters.

Upon the initiation of the TMDL study, the SCWMC increased monitoring at these two stations to include grab samples of chloride and collection of conductivity at 15-minute intervals. A third site at Queen Avenue in Minneapolis ("SC-1") is monitored for flow by the US Geological Survey (USGS) as a part of its ongoing National Assessment of Water Quality (NAWQA). Chemical parameters are no longer routinely measured at the USGS site, although conductivity is collected. The Queen Avenue data are available on-line real-time at http://waterdata.usgs.gov/mn/nwis/uv?05288705.

The Commission also on a continuing basis collects from the road authorities in the watershed a monthly report of road salt applied by snow plow route. This data is compiled into a database and is used to calculate the amount of chloride applied per lane mile. This can be summarized by road authority or subwatershed.

By combining in-stream data such as flow, conductivity and concentration with salt application data, the Commission can evaluate how BMPs implemented in the watershed impact chloride concentrations in the creek.

The Commission also sponsors annual volunteer macroinvertebrate monitoring in Shingle Creek at three locations. Student groups led by trained volunteers collect macroinvertebrates twice a year through Hennepin County Environmental Services' RiverWatch program. Hilsenhoff's Family Biotic Index is calculated from these results, and is used as a general indicator of stream biotic health.

The Commission has also periodically undertaken a more rigorous macroinvertebrate analysis using the MPCA collection protocol. The Macroinvertebrate Index of Biotic Integrity (M-IBI) is calculated from these results, and is used as a more precise indicator of stream health. The Commission expects that this level of analysis will be undertaken about every five years, with the next collection scheduled to be completed in 2007 as part of the Shingle Creek Biotic Integrity/Dissolved Oxygen TMDLs.

Limited fish community data is available. A fishery analysis was last performed in 1997; the next collection is scheduled to be completed in 2007 as part of the Shingle Creek Biotic Integrity/Dissolved Oxygen TMDLs. The fish and macroinvertebrate data will be used to evaluate the impacts of various stressors, including chloride, on biotic integrity. Future monitoring will be performed to determine how implementation of BMPs in the watershed and in the stream improve the biologic communities.

The Commission annually publishes a Water Quality Report that compiles and interprets this and other monitoring data from the lakes, streams, and wetlands in the watershed. The Annual Report on Monitoring and Activities described in Section 4.1.1 above will be included in this annual Water Quality Report. As the Commission moves into implementing BMPs in response to other TMDLs in the watershed (13 lake excess nutrient TMDLs, biotic integrity and dissolved oxygen in Shingle Creek, biotic integrity in Bass Creek), those Annual Reports will be incorporated into the annual Water Quality Report as well. The Water Quality Report will demonstrate the linkage between BMP implementation and water quality and biotic integrity, especially for waters with multiple impairments such as Shingle Creek.

5.0 Stakeholder Activities

Although the SCWMC will be the lead on the implementation of the Chloride TMDL, individual stakeholders will be ultimately responsible for implementing the identified BMPs. These activities will be included in the NPDES Phase II Permits that all of the stakeholders hold, and activities will be reported annually.

Each stakeholder is in a unique position to implement BMPs. For example, implementation of BMPs requiring new equipment or accessories is dependant upon the individual stakeholder's ongoing equipment replacement schedule. Other activities must be integrated into other street and highway maintenance responsibilities. The following are the general BMP implementation areas agreed to by the stakeholders. The tables in Appendix A provide more detail by stakeholder on current activities and proposed BMPs or activities.

5.1 BMP IMPLEMENTATION

5.1.1 Product Application Equipment and Decisions

In many cases, less road salt can be used without compromising public safety. To avoid over application, standards can be established for application rates that account for pavement temperature ranges and timing. Newer technologies such as pre-wetting and anti-icing can result in the same results while using significantly less product. Pre-wetting of salt refers to applying water, or some other liquid agent such as magnesium chloride, to the salt either prior to or during application of the material. Pre-wetting reduces the amount of scatter and loss of material, ultimately reducing the usage amounts. To this end, the stakeholders in the watershed have agreed to incorporate the following practices:

1. Calibrate spreaders annually.

2. Use the Road Weather Information Service (RWIS) and other sensors such as truck mounted or hand held sensors to improve application decisions such as the amount and timing of application
3. Evaluate new technologies such as prewetting and anti-icing as equipment needs to be replaced. These technologies will be adopted where feasible and practical.
4. Investigate and adopt new products (such as Clear Lane, a commercially available pretreated salt) where feasible and cost effective.

The estimated cost of implementing this activity will vary based on the technologies. Some examples include:

- Dry tailgate spreader: $3,000
- Prewetting: $6,000
- Spreader: $9,000
- Epoke spreaders: $60,000
- Brine storage system: $25,000
- Salt: $34/ton; Clear Lane: $39/ton + $5/ton delivery

5.1.2 Deicer Stockpiles

One source of chloride is runoff from salt storage facilities. The stakeholders agree to cover all product stockpiles and store them on impervious surfaces. Additionally, stakeholders will maintain general housekeeping policies associated with the handling of road salt to minimize the potential for wash-off of excess or spilled salt. There is no additional cost expected for this activity.

5.1.3 Operator Training

Operator training may result in significant reductions in road salt use. Training will focus on finding the best balance between environmental concerns and public safety. Supervisors and operators will be trained to determine the least amount of product necessary to maintain public safety. The stakeholders agree to conduct annual training that may include outside support such as LTAP (Local Technical Assistance Program) or vendor training on the appropriate use of technologies or products. The estimated cost of this activity is $1,000 for staff time annually per LGU.

5.1.4 Cleanup and Snow Stockpiling

Snow disposal can be a concern, especially in areas where snow cannot be pushed off the side of the road. Snow plowed directly streamside can leak high concentrations of chloride directly into the base flow resulting in increased chloride concentrations. Although little snow hauling occurs in the Shingle Creek watershed, the stakeholders agree to stockpile snow away from sensitive areas. All stakeholders also agree to sweep City streets as soon as possible in late winter to remove as much residual product as possible. There is no additional cost expected for this activity.

5.1.5 Ongoing Research into Salt Alternatives

Technologies associated with winter road maintenance are constantly changing based on the needs of the industry, resulting in a need to keep informed on new practices, technologies, and products that can ultimately protect public safety and the environment. All of the stakeholders will evaluate the technologies on an annual basis and implement the most appropriate technologies where feasible. Information will be shared at the annual applicator workshop. The estimated cost of this activity is $2,000 for staff time annually per LGU, plus the cost of any technologies implemented.

5.2 TRACKING AND REPORTING

Each stakeholder will integrate BMPs into the SWPPP six minimum measures required by their NPDES General Permits for stormwater discharges. Activities will be tracked and reported in their annual NPDES report. Each stakeholder will provide a copy of the annual report to the Commission, which will then incorporate that information into the Commission's annual Water Quality Report. There is no additional cost expected for this activity.

APPENDIX A STAKEHOLDER ACTIVITIES DETAIL TABLES

6.0 Adaptive Management

The load allocations in the TMDL represent aggressive goals for chloride reductions with the added challenge of addressing public safety and ice control expectations. Consequently, implementation will be conducted using adaptive management principles. Adaptive management is appropriate because it is difficult to predict the chloride reduction that will occur from implementing strategies with the paucity of information available to demonstrate expected reductions. Future technological advances or unacceptable impacts to public safety may alter the specific course of actions detailed here. Continued monitoring and "course corrections" responding to monitoring results are the most appropriate strategy for attaining the water quality goals established in this TMDL while maintaining required levels of public safety.

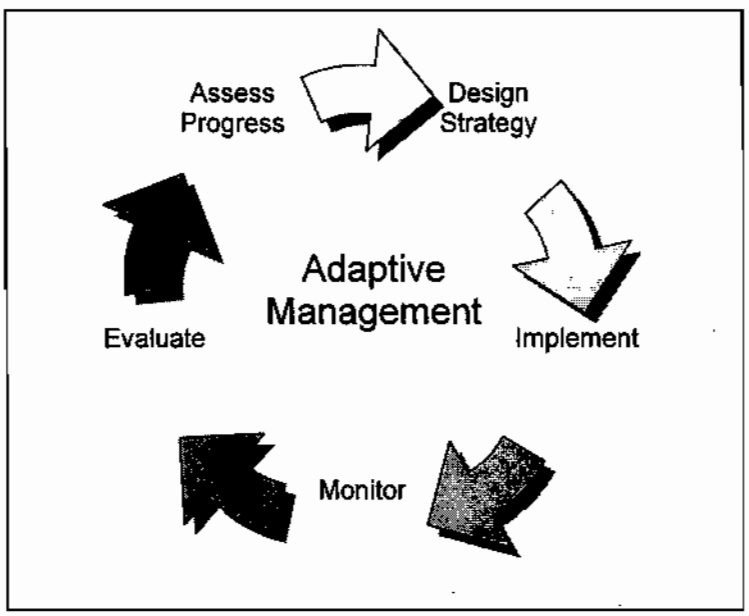


Figure 3. Adaptive management

6.0 Adaptive Management

The load allocations in the TMDL represent aggressive goals for chloride reductions with the added challenge of addressing public safety and ice control expectations. Consequently, implementation will be conducted using adaptive management principles. Adaptive management is appropriate because it is difficult to predict the chloride reduction that will occur from implementing strategies with the paucity of information available to demonstrate expected reductions. Future technological advances or unacceptable impacts to public safety may alter the specific course of actions detailed here. Continued monitoring and "course corrections" responding to monitoring results are the most appropriate strategy for attaining the water quality goals established in this TMDL while maintaining required levels of public safety.

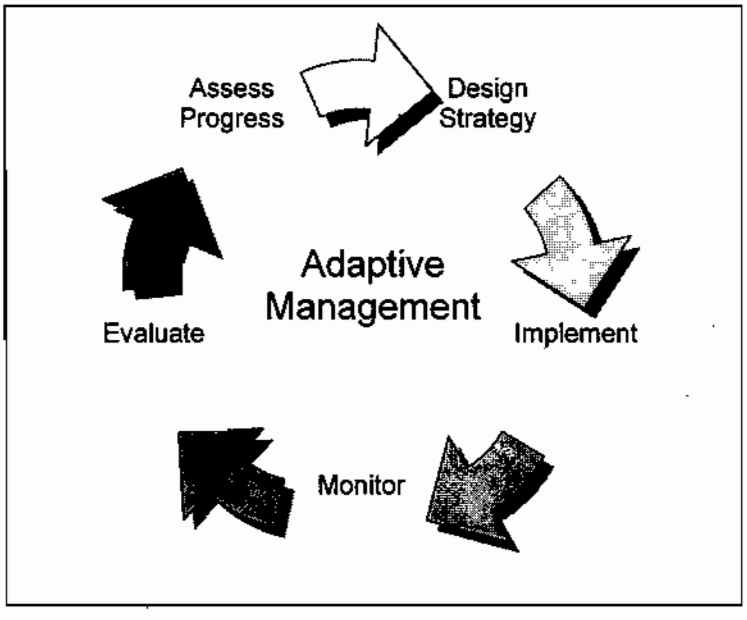


Figure 3. Adaptive management

TABLE A1. PRODUCT APPLICATION EQUIPMENT AND DECISIONS

CITY	CURRENT ACTIVITIES	PROPOSED BMPS/ACTIVITIES
Brooklyn Center	Dry Salt. Calibrate spreaders annually. Weather dependent decisions. Use MnDOT pavement sensors (RWIS) and hand held sensor. Turnover = 11 years.	Annual/on-going process. Investigate alternatives such as Clear Lane. Evaluate prewetting in sensitive areas. Implement if funds available.
Brooklyn Park	Dry salt. Calibrate spreaders annually Weather dependent application. Monitor Mn/DOT pavement sensors. Turnover = 15 years	Investigate alternatives such as prewetting. Improve driver training.
Crystal	3:1 dry sand/salt mixture. <0 degrees for Clear Lane. Turnover = 14 years.	
Maple Grove		
Minneapolis	3:1 dry salt/sand mixture on residential, curves, intersections, and hills. Anti-ice mix, Clear Lane, Salt. Turnover = 15 years.	Research into new products and appropriate BMPs.
Minneapolis Parks	Use straight sand on walking paths and parking lots. Rely on City of Minneapolis for salt when necessary.	Considering pilot project to test anti-icing materials.
New Hope	2:1 salt/sand. Computerized sanders. Truck temperature sensors - air and pavement. Turnover = 12 years.	Annual calibration of spreaders. Continued research.
Osseo	2:1 salt/sand. Use Clear Lane in mixture applied at all intersections, curves and slight inclines. Operators use judgment based on current and future weather conditions. Turnover when Council deems necessary.	Annual calibration of spreaders.
Plymouth	Prewetted on most trucks. $MgCl_2$ on bridges. One hand-held temp sensor. Follow MnDOT temp guidance. Turnover = 14 years.	All trucks prewetting in 10 years. Add a couple of brine units/year. Try treated salt (Clear Lane) Calibrate annually.
Robbinsdale	Dry salt/sand mixture. Turnover = 7 years. Not calibrated.	Interested in EPOKE. May recommend as part of capital budget. Calibrate spreaders annually. Review CIP for salt storage and application technologies.
Hennepin County	Snow and Ice Control Manual used to set policy for: 1. Use of straight salt, treated salt, or salt sand mix dependent upon ADT volumes, temperature, and weather conditions. 2. Rates of product and ratio of salt/sand mixture to be used for given ADT volumes, temperature and weather conditions. 3. Level of service based on end of storm. Equipment consists of tandem and single axle trucks equipped with tailgate or hopper sanders Foreman and Supervisors' trucks and select plowing equipment are equipped with ambient and pavement temperature sensors	Begin an anti-icing program for bridges and select roadway areas. Money budgeted for 2006, use to occur on third shift. Purchase of 2- 2,500 to 3,000 gallon tanker trucks for anti-icing application. Equip all application trucks with AVL and ability for automated data capture. Fleet turnover 10 years

TABLE A2. PRODUCT STOCKPILES

CITY	CURRENT ACTIVITIES	PROPOSED BMPS
Brooklyn Center	Enclosed bldg on impervious surface, small detention area that returns all water, minimal runoff.	At MEP.
Brooklyn Park	Enclosed bldg on impervious surface, minimal runoff - goes to pond, spillage pushed back into bldg.	At MEP.
Crystal	Enclosed bldg, half of runoff goes to drainage pond.	Future, improve runoff detention w/better pond facility. Working on it now.
Maple Grove	Covered on asphalt.	
Minneapolis		
Minneapolis Parks	Use City of Minneapolis' stockpiles.	
New Hope	Enclosed bldg on impervious surface, detention pond.	At MEP.
Osseo	No salt storage in watershed. Covered on asphalt. Spillage pushed back into shed.	Hennepin County is building a new facility in 2005 where the City will store the bulk of its material.
Plymouth	Facility is outside watershed	
Robbinsdale	Salt and sand piles on impervious surface, tarped.	Salt shed in 2005 budget.
Hennepin County	All storage areas are in enclosed buildings with impervious floors Runoff from loading area goes to storm sewer connections Loading area spills are pushed back into building	

MEP = Maximum Extent Practicable

TABLE A3. OPERATOR TRAINING

CITY	CURRENT ACTIVITIES	PROPOSED BMPS
Brooklyn Center	Annual driver training. Review application procedures with drivers after each event.	Consider outreach training (LTAP) if funds available.
Brooklyn Park	Attend annual snow plow/ice control meeting. Talk to drivers who use more salt.	Provide additional training.
Crystal		
Maple Grove		
Minneapolis	Vendors, Mn/DOT, LTAP, and internal trainers review, bring to and discuss practices and methods or material applications with the work force.	Additional training is always a need as equipment and material practices change.
Minneapolis Parks		Annual operator training. Establish in-house written procedures.
New Hope	Operators use their own judgment. Have sensors in truck. Need to retrain and calibrate every year	
Osseo	None.	Provide additional training.
Plymouth		Improve driver training. Need training by vendors. Remind drivers how much salt they're using.
Robbinsdale		
Hennepin County	Annual driver training with equipment vendors for proper calibration of equipment. Operators attend annual snow and ice control district meetings. Management reviews application data with operators that appear to be using the product incorrectly	Automate the gathering of data through the use of AVL Develop additional annual training with MnDot, and LTAP

TABLE A4. CLEAN-UP / SNOW STOCKPILING

CITY	CURRENT ACTIVITIES	PROPOSED BMPS
Brooklyn Center	Plow ASAP, No hauling unless problematic. Sweep ASAP in spring and fall.	Evaluate annually.
Brooklyn Park	Plow ASAP, no hauling. Sweep ASAP in spring	Evaluate annually.
Crystal	Plow ASAP. Haul from some cul-de-sacs - goes to old field at airport. Little/no salt content. Sweep 5-6 times annually, in spring ASAP.	Evaluate annually.
Maple Grove	Haul snow. Vacuum sweep 2x/year. Other sweeping thru-out year including winter.	Evaluate annually.
Minneapolis	Arterials plowed immediately, residential next day. Spring/fall comprehensive sweeping. Actually sweep 5-6 times/year. Parkways on 11 to15-day cycle. Watersheds on 30-day cycle. Critical watersheds regenerative sweeper. Tier system.	Evaluate annually.
Minneapolis Parks	No hauling and no stockpiling. Vacuum sweep all year long. Sweep along parkway if city can't.	Evaluate annually.
New Hope	Plow ASAP. Minimal hauling. Sweep spring & fall, early window in spring (contracted).	Evaluate annually.
Osseo	Plow ASAP. Haul snow off of Central and intersections along 81. Piled on field behind Elementary School. Sweep streets 5-6 times a year. Central done ASAP in Spring and then monthly..	Evaluate annually.
Plymouth	Plow ASAP. Plows active during storms. No hauling. Sweep ASAP, annually. Broom works all year long after storms. Vacuum-assisted sweeping.	May have to haul downtown. Evaluate annually.
Robbinsdale	Plow ASAP; have two areas for stockpiling. Sweep 4x/year.	Evaluate annually.
Hennepin County	Plow ASAP No hauling unless requested by city Will clear bridge decks of snow but dispose of on roadside area Annually sweep all needed roadway areas Clean silt traps in various catch basins	Evaluate annually

TABLE A5. ONGOING RESEARCH RE SALT ALTERNATIVES

CITY	CURRENT ACTIVITIES	PROPOSED BMPS
Brooklyn Center	Network w/other organizations re new products. Monitor new products/equipment - Clear Lane.	Continue monitoring of new products and equipment for effectiveness (Mn.DOT, MSSA, SUPPUNERS)
Brooklyn Park	Try new products/equipment - Clear Lane. Shed for prewetting.	
Crystal	Check out electronic controls on sanders.	
Maple Grove	Has tried several new products. Future: No change.	
Minneapolis	Mn/DOT does deep research, City actively researches. Has limited lab. Research Clear Lane – Current research= does the product do what it claims -- determine if better/worse than what we're currently doing/using. Determine where to do BMPs -- is it giving us bang for the buck? Looking to partner w/St. Paul. $MgCl_2$ truck.	Continue research department. Research Clear Lane.
Minneapolis Parks	Use City of Minneapolis' research.	Considering pilot project to test anti-icing materials.
New Hope	Investigate new products, equipment, and methods.	Will probably try Clear Lane next year.
Osseo	None.	Investigate and monitor new products, equipment, and methods.
Plymouth	Investigate new products, equipment, and methods.	Try new products as feasible.
Robbinsdale		Monitor new products/equipment.
Hennepin County	Attend conferences to stay current on technology and monitor technical publications and trade journals Investigate and try new products, equipment and methods Network with other agencies	