

Stormwater Management Plan



THE CITY OF



OWATONNA



January 2006



City of Owatonna
City Administration Building
540 West Hills Circle
Owatonna, MN 55060

January 23, 2006

Dear Honorable Mayor and City Council,

Enclosed is the City of Owatonna Stormwater Management Plan (SWMP). This plan serves as a working implementation tool for current water resource management needs within the City. This plan will also address the future stormwater management needs as expansion and development occurs. The complete copy of the report is made available for review in the City Engineering Department.

Another significant portion of this report is the preparation of the Stormwater Ordinance. The Stormwater Ordinance provides the enforcement procedures for the goals and policies referenced in the SWMP.

McCombs Frank Roos and Associates would also like to thank David Strand, Community Development Director, and Jeff Johnson, Public Works Director, for their assistance in completing this SWMP and help preparing the Stormwater Ordinance.

We would be pleased to meet with the City Council and other City Staff at a convenient time to discuss the contents and policies of this report.

Respectfully Submitted,

McCombs Frank Roos and Associates, Inc.

Adam Parker, P.E.
763-476-6010 ext. 153
aparker@mfra.com

STORMWATER MANAGEMENT PLAN

For the

CITY OF OWATONNA

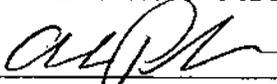
Prepared by

McCombs Frank Roos Associates, Inc.

January, 2006

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

1-19-06
Date


Adam T. Parker
Minnesota Registration No. 42733

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STORMWATER MANAGEMENT PLAN**

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KEY STORMWATER AND SURFACE WATER ACRONYM EXPLANATIONS
(website links provided where applicable)

BFE-Base Flood Elevation www.fema.gov/fhm/

BMP-Best Management Practice

BWSR-Minnesota Board of Water and Soil Resources www.bwsr.state.mn.us

CIP-Capital Improvements Program

CN-Curve Number policy.nrcs.usda.gov/scrrips/lpsis.dll/H/HI_210_630_9.pdf

EPA-Environmental Protection Agency www.epa.gov

FEMA-Federal Emergency Management Agency www.fema.gov

FIRM-Flood Insurance Rate Map www.fema.gov/fhm/

FIS-Flood Insurance Study www.fema.gov/fhm/

FWS-Fish and Wildlife Service www.fws.gov

HEC-RAS-Hydrologic Engineering Centers River Analysis System www.hec.usace.army.mil

HSG-Hydrologic Soil Group ftp://ftp.wcc.nrcs.usda.gov/downloads/hydrology_hydraulics/neh630/hydro_soil_groups.pdf

HWL-High Water Level

IDF-Intensity Duration Frequency

ISTS-Individual Sewage Treatment Systems www.pca.state.mn.us/programs/ists/

LOMR-Letter of Map Revision www.fema.gov/fhm/

LGU-Local Government Unit www.bwsr.state.mn.us/wetlands/wca/index.html

MCM-Minimum Control Measure www.pca.state.mn.us/water/stormwater/stormwater-ms4.html

MDNR-Minnesota Department of Natural Resources www.dnr.state.mn.us

MNDOT - Minnesota Department of Transportation www.dot.state.mn.us

MPCA-Minnesota Pollution Control Agency www.pca.state.mn.us

MS4-Municipal Separate Storm Sewer System www.pca.state.mn.us/water/stormwater/stormwater-ms4.html

NFRAP-No Further Remedial Action Planned www.pca.state.mn.us/backyard/neighborhood.html

KEY STORMWATER AND SURFACE WATER ACRONYM EXPLANATIONS - Continued
(website links provided where applicable)

- NPDES-National Pollutant Discharge Elimination System <http://efpub.epa.gov/npdes/>
- NRCS-National Resource Conservation Service www.nrcs.usda.gov
- NWI-National Wetland Inventory www.nwi.fws.gov
- NWL-Normal Water Level
- OHWL-Ordinary High Water Level www.dnr.state.mn.us/waters/watermgmt_section/pwpermits/ohw.html
- PWI-Protected Waters Inventory www.dnr.state.mn.us/waters/watermgmt_section/pwi/index.html
- SCS-Soil Conservation Service (*see Natural Resource Conservation Service*)
- SWCD-Soil and Water Conservation District www.co.steele.mn.us/ENV/SERV/envserv.html
- SWPPP-Storm Water Pollution Prevention Plan or Program
- TR-20-Technical Release 20 www.wcc.nrcs.usda.gov/hydro/hydro-tools-models-tr20.html
- TMDL-Total Maximum Daily Load www.pca.state.mn.us/water/tmdl/index.html
- USCOE-United States Corps of Engineers www.mvp.usace.army.mil
- USDA-United States Department of Agriculture (*see Natural Resource Conservation Service*)
- VIC-Voluntary Investigation and Cleanup www.pca.state.mn.us/cleanup/vic.html
- WCA-Wetland Conservation Act www.bwsr.state.mn.us/wetlands/wca/index.html
- WMO-Watershed Management Organization(s) (*see MN State Statute 103B.205*)

SECTION I

EXECUTIVE SUMMARY

SECTION I – EXECUTIVE SUMMARY

1.1. Introduction

The City of Owatonna has prepared this Stormwater Management Plan (SWMP) to provide the City and its residents with direction concerning the administration and implementation of stormwater management activities within the community. The SWMP inventories city land and water resources and presents water management policies and goals. The policies and goals will address known stormwater related problems and concerns about future development activities. The SWMP was prepared in accordance with Minnesota Statutes 103B.235 to 103B.355.

1.2. Purpose

The general purposes and objectives of the Owatonna SWMP are as follows:

1. Provide City Staff with a workable tool for implementing best management practices (BMPs) with developers by establishing uniform local policies and official controls for stormwater management.
2. Prevent flooding in developing areas.
3. Provide recommendations for reducing or alleviating flooding in developed areas.
4. Reduce to the greatest practical extent the public capital and operating expenditures necessary to control excessive volumes and rates of runoff.
5. Promote groundwater recharge.
6. Protect and enhance fish and wildlife habitat.
7. Preserve wetlands, streams, and other important natural resources of the community.

1.3. Regulatory Requirements

This SWMP is intended to meet the requirements, needs and directions of the following regulatory requirements:

1. Minnesota Wetland Conservation Act of 1991 and subsequent rules and amendments.

2. State and Federal laws pertaining to National Pollution Discharge Elimination System (NPDES) Phase II permitting for stormwater outfalls for both individual construction sites and Municipal Separate Storm Sewer Systems (MS4's) to designated drainageways.
3. Erosion Control Guidelines and Best Management Practices prepared by the Minnesota Pollution Control Agency.

1.4. Water Resource Management Related Agreements

The City of Owatonna has no other water resource management related joint powers agreements with adjacent communities or private parties.

1.5. Stormwater Management Plan Content

The City of Owatonna's SWMP has been developed to meet the needs and planning requirements of the community. The following paragraphs identify the major sections of the SWMP and where information can be located in the plan document.

Section I – Executive Summary

This section presents an introduction for the local water management plan, a summary of City objectives, regulatory requirements included in the plans preparation, and a general overview of the plan contents. This section also summarizes strategic recommendations for consideration by the City in implementing the SWMP.

Section II – Surface Water Resource Inventory

This section categorizes a wide range of information directly and indirectly related to the surface water system. The subsections provide information and references regarding water resource and physical factors within the City of Owatonna including the following:

- Precipitation data for hydrologic/hydraulic review and design.
- Surface soils information
- Geology
- Natural resources, public recreation areas, rare plant and animal species.
- Land use, population and public utility services.
- Potential pollution sources.
- NPDES Phase II MS4 Permit information.
- Surface water information including stormwater drainage areas, wetlands, lakes, and rivers.
- Flood studies.
- Surface water quality.

Section III – Establishment Of Policies And Goals

This section outlines goals and policies addressing water resource management needs of the City and their relationship with Regional, State, and Federal goals and programs. Goals and policies relating to the following issues are presented:

- Water quantity
- Water quality
- Erosion and sedimentation
- Wetlands
- Public ditch and tile systems
- Recreation, fish and wildlife
- Enhancement of public participation
- Groundwater

Section IV – Assessment Of Problems And Corrective Actions

This section provides an assessment of existing or potential water resource related problems within the City. This section also describes potential structural, nonstructural and programmatic solutions to the identified problems.

Section V – Implementation Program

This section identifies the regulatory controls, management programs, design and performance standards, and capital improvements to be utilized by the City in implementing this SWMP.

Section VI – Implementation Priorities & Financial Considerations

This section presents controls, programs and improvement priorities that can be reasonably funded and implemented by the City in the near and longer-term future. This section also identifies the estimated costs and financial impacts of implementing the proposed regulatory controls and programs.

Section VII – Stormwater Management And Erosion Control Plan Standards

This section addresses stormwater management and erosion control standards the City should adopt whenever new development, or redevelopment will occur. Implementation of these standards along with the Stormwater Ordinance will help minimize the impact of stormwater runoff from the site and to receiving downstream areas.

Section VIII – Amendment Procedures

This section presents controls, programs and improvement priorities that can be reasonably funded and implemented by the City in the near and longer-term future. This section also identifies the estimated costs and financial impacts of implementing the proposed regulatory controls and programs.

I.6. Recommendations

The following recommendations are presented for the City's consideration based upon the information compiled for this SWMP:

1. The City should review and adopt the SWMP by resolution as part of the Comprehensive Plan.
2. The SWMP should be used to guide future water resource management decisions and stormwater related issues in existing and projected urban growth areas.
3. The SWMP should be used as part of the City's capital improvements planning process to address and prioritize necessary stormwater related infrastructure needs.
4. The City should examine existing and potential funding sources available for implementing stormwater regulatory controls and improvements. Development of stormwater area charges should be considered for newly developing areas or redevelopment areas to address the off-site impacts of urbanization.
5. The City should consider the additional staff time and financial resources required to implement this SWMP and develop additional revenue sources and budget accordingly.
6. The City should develop a Water Resource Library at City Hall containing this SWMP and other water resource related information and public educational materials.
7. The City should develop a public information and education program to foster sound water resource protection practices within the community.

8. The City should establish and implement a stormwater facility inspection and maintenance plan for the proper control of stormwater and for maintaining the water quality of stormwater discharges.
9. The City should evaluate areas that are shown to be located within 100-year flood zones established by this plan and the FEMA study. The City should give first priority to structures within these zones and develop mitigation strategies to reduce or eliminate the flood hazard potential.
10. The SWMP provides a general framework for addressing existing and future surface water management issues within the City. Additional evaluation will be required when specific development proposals are prepared. Final highwater levels governing building elevations adjacent to ponding areas and floodplains should be established as development occurs or when stormwater management facilities are designed for construction.
11. The surface water management strategies of this SWMP have been developed based upon the Projected Growth Areas Map. The SWMP should be updated if there are changes to the City's projected land use.
12. The City should inventory the storm structures that were located by the SWMP and place that information into the City Storm Sewer Database.
13. The City should update the storm model each time development, or redevelopment occurs within the city.
14. The City should consider developing a model that can evaluate the individual Lateral Storm Sewer Systems (structures that convey higher frequency storm events, i.e. 10-year) that exist in the city.

SECTION II

SURFACE WATER RESOURCE INVENTORY

SECTION II – SURFACE WATER RESOURCE INVENTORY

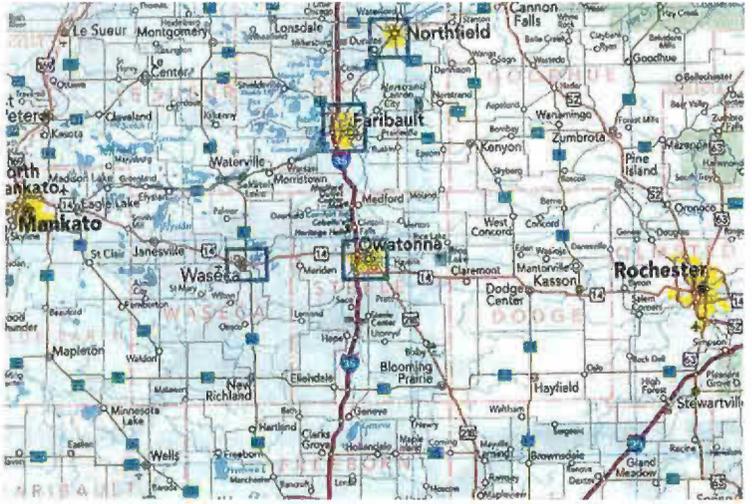
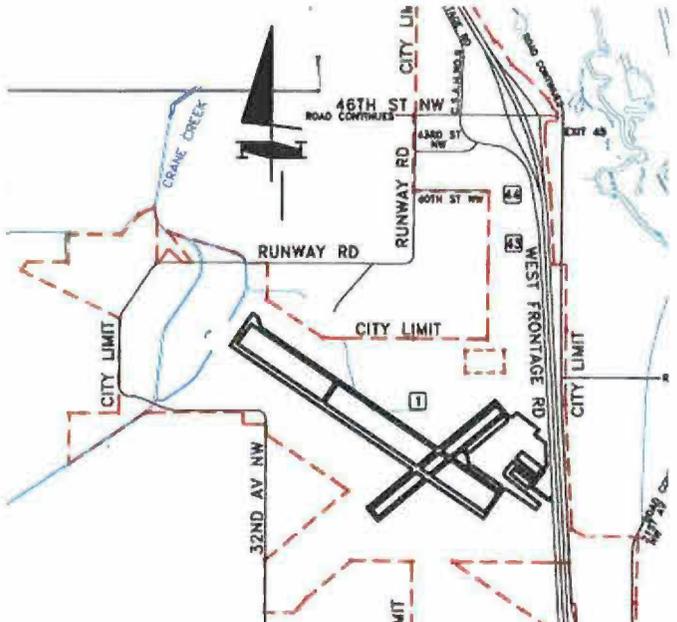
II.1 Surface Water Resources - Introduction

This section provides a generalized description and summary of surface water resource factors affecting the City of Owatonna. The first component of the section includes local information on precipitation, geology, topography, soils, natural resource and unique features and scenic areas, potential water pollution sources, current and existing land use and information regarding the NPDES Phase II MS4 program. The second component of the section will deal with surface water systems and presents information on the City's lakes, rivers, wetlands, drainage patterns, hydrologic systems, floodplain areas and flood studies.

Much of the information contained within this section was compiled from available government sources. Whenever possible, the location of the information or additional resources have been identified or referenced including links to the government agencies websites.

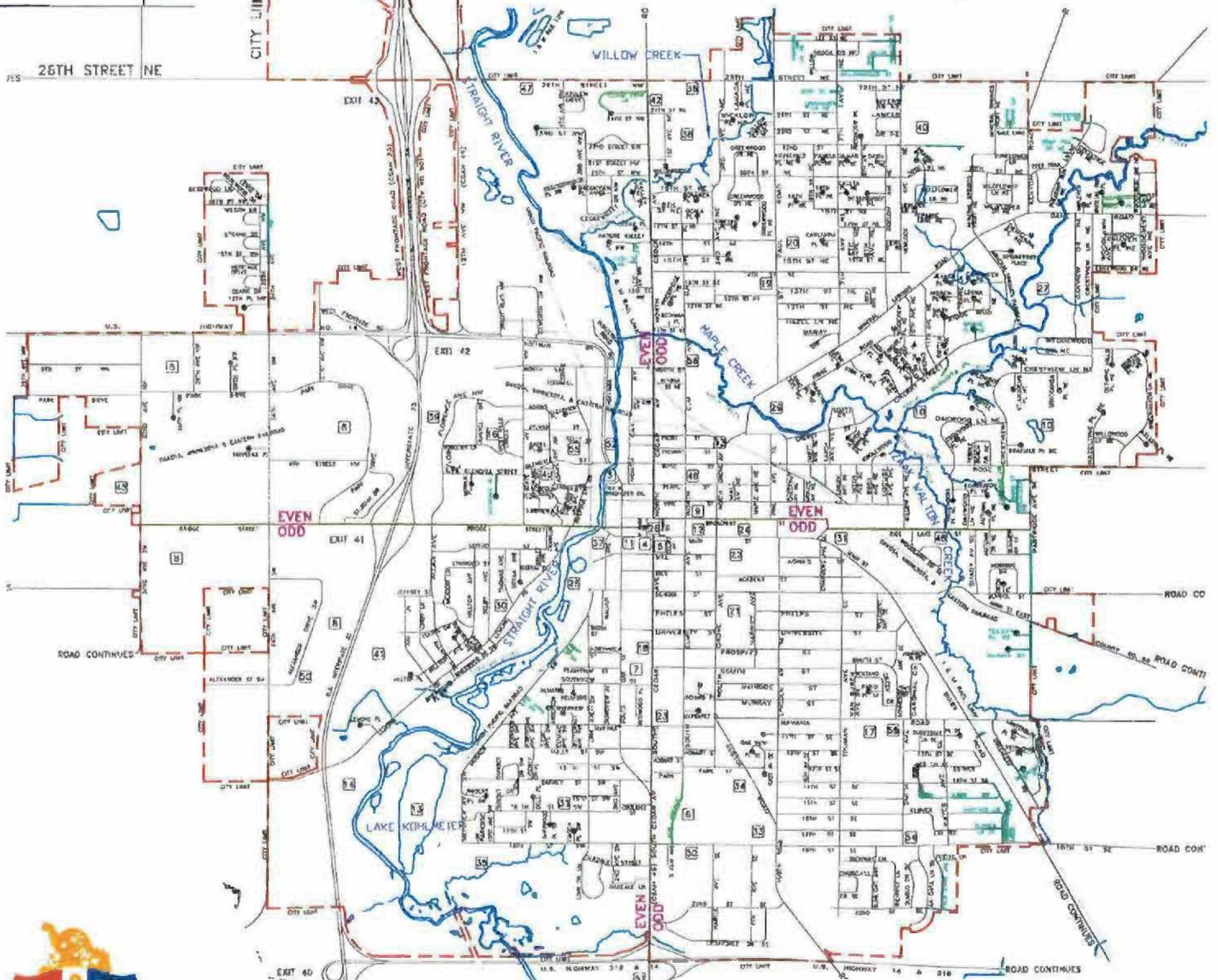
II.1.1. Location

The City of Owatonna occupies approximately 24 square miles in central Steele County as shown in Figure 1. The communities adjacent to Owatonna are the townships of Clinton Falls and Owatonna. Larger communities located within 25 miles from Owatonna include Waseca, Faribault, and Dodge Center. Major streams and rivers that travel within the city include the Straight River as well as Crane, Maple, Willow, and Izaak Walton Creeks. All four creeks will eventually empty into the Straight River. In addition to the rivers and creeks is Lake Kohlmeier, which is located in the southern end of town near the Straight River. All aforementioned creeks, rivers, and lakes are shown in Figure 1.



Source: Hedberg Maps

Regional Map



Source: City of Owatonna

City Map



Location Maps Figure 1

II.1.2. Precipitation

The climate of the Owatonna area is a humid continental climate with moderate precipitation, wide daily temperature variations, warm humid summers and cold winters. The total average annual precipitation is approximately 32 inches of which over 1/3 occurs in the months of June, July and August. The annual snowfall average is about 41 inches and is equivalent to approximately 4 inches of water. The average monthly temperature, precipitation, and snowfall are shown on Table 1.

The time period used to gather the data was taken from the years 1971 to 2000.

Table 1 – Average Climate Data For Owatonna

Month	Temperature (F°)	Precipitation (Inches)	Snowfall (Inches)
January	11.4	1.01	10.5
February	18.3	0.59	6.1
March	31.0	1.91	7.3
April	45.6	2.94	2.9
May	58.3	3.93	0
June	68.4	4.05	0
July	72.1	4.58	0
August	69.8	4.43	0
September	60.9	3.12	0
October	48.9	2.27	0.6
November	31.5	1.82	5.1
December	17.4	0.91	8.7
ANNUAL AVERAGE	44.4	31.64	41.2

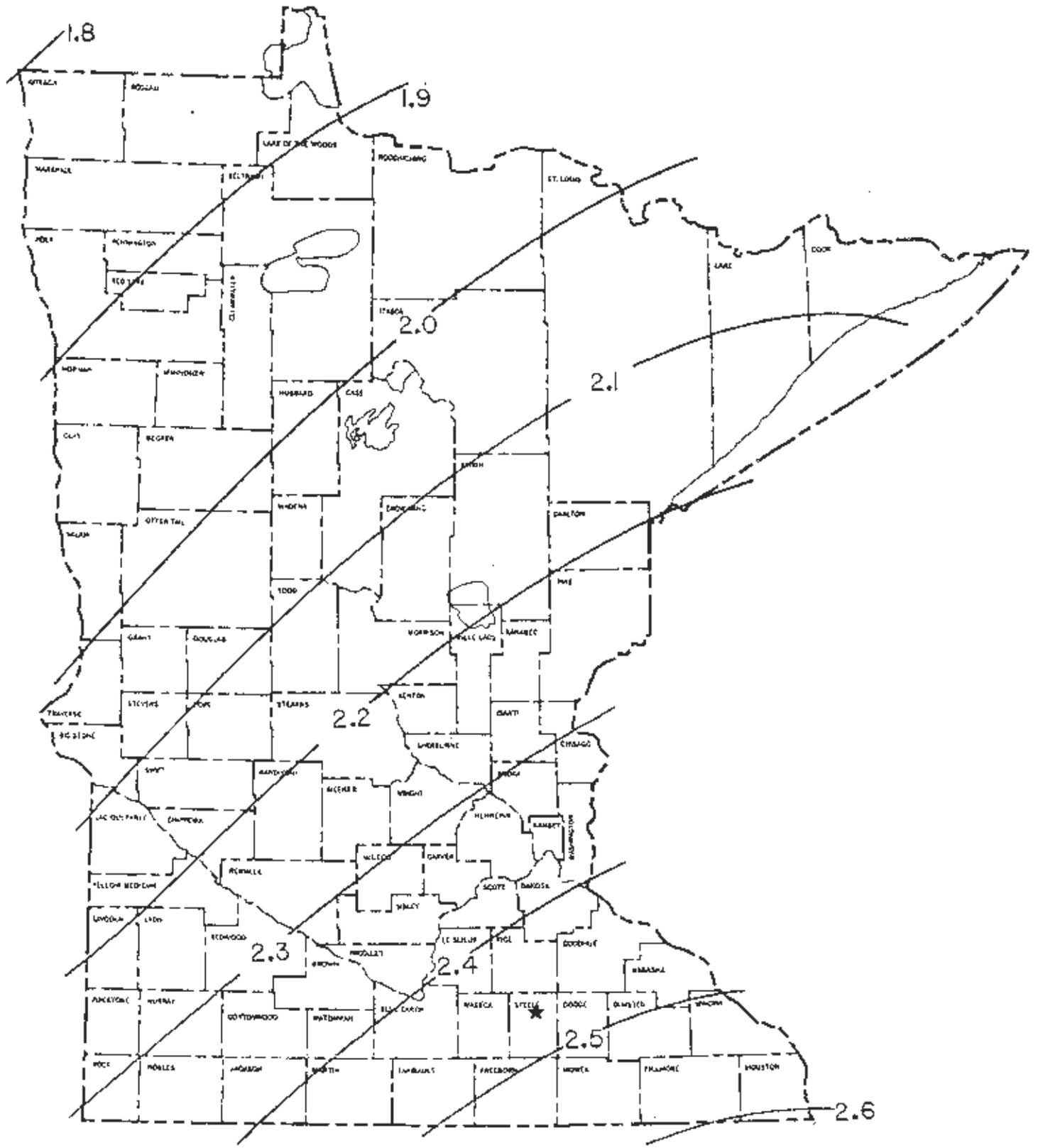
SOURCE: Midwestern Regional Climate Center

To classify rain events for purposes of flood protection, treatment volume, and rate control, the most common method is to design for a specific return period based on a 24-hour precipitation event. In the City of Owatonna, the return periods used are the 1-year, 2-year, 10-year and 100-year frequency events. The 1-year event is used primarily to size stormwater treatment facilities, the 2-year event is typically used for post-development flowrate control, the 10-year is typically used for lateral storm sewer design, as well as post-development flowrate control. The 100-year event is typically used for pond and lake flood protection facilities, flowrate control, and flood elevations. Figures 2, 3,4 and 5 show the 24-hour rainfall amounts for the 1-year, 2-year, 10-year, and 100-year storm events for Minnesota with the City of Owatonna being identified by a star in each figure. The table below summarizes the occurrence probabilities and rainfall amounts for the 1,2,10, and 100-year events.

Table 2- Precipitation Event Occurrence Probabilities

Precipitation (Storm) Event (Return Period)	Probability of Storm Event Occurring in Any Given Year	Probability of Storm Event Occurring at Least Once During Return Period	24-hour Precipitation Amount (inches)
1-year	100%	100%	2.48
2-year	50%	75%	2.90
10-year	10%	65%	4.35
100-year	1%	63%	6.15

To provide flood protection for properties and structures higher than 100-year event frequency storms is only justified for critical flood control projects. The costs of providing a higher than 100-year protection storm drainage system usually will outweigh the costs of flood damage occurring with an incrementally smaller storm capacity system. The importance of providing and maintaining emergency overflows especially in new developments will provide additional flood protection when the storm event exceeds primary collection system (trunk storm sewer, pond) event design.

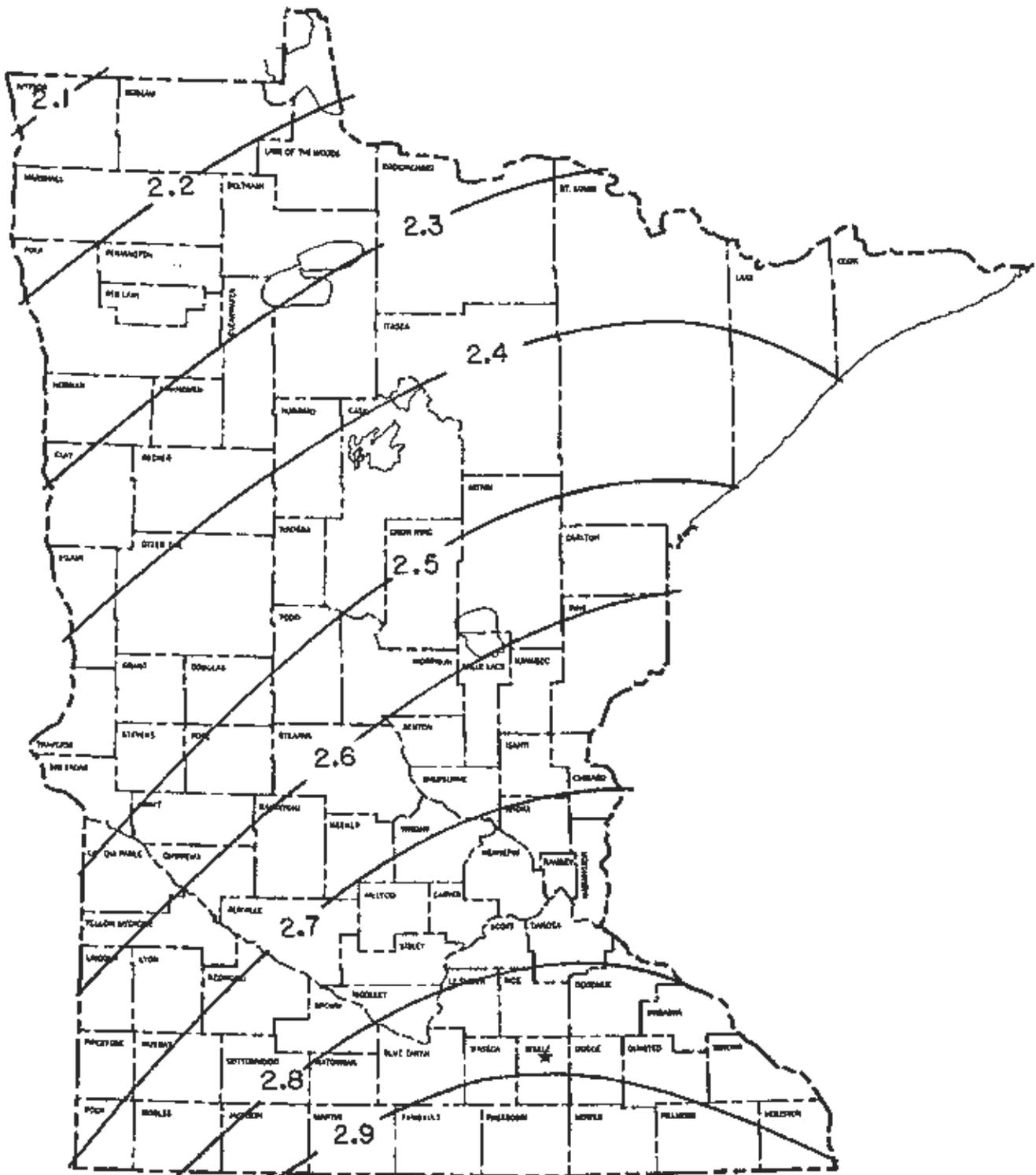


Source: USWB TP 40



1-Year 24-Hour Rainfall Amounts

Figure 2

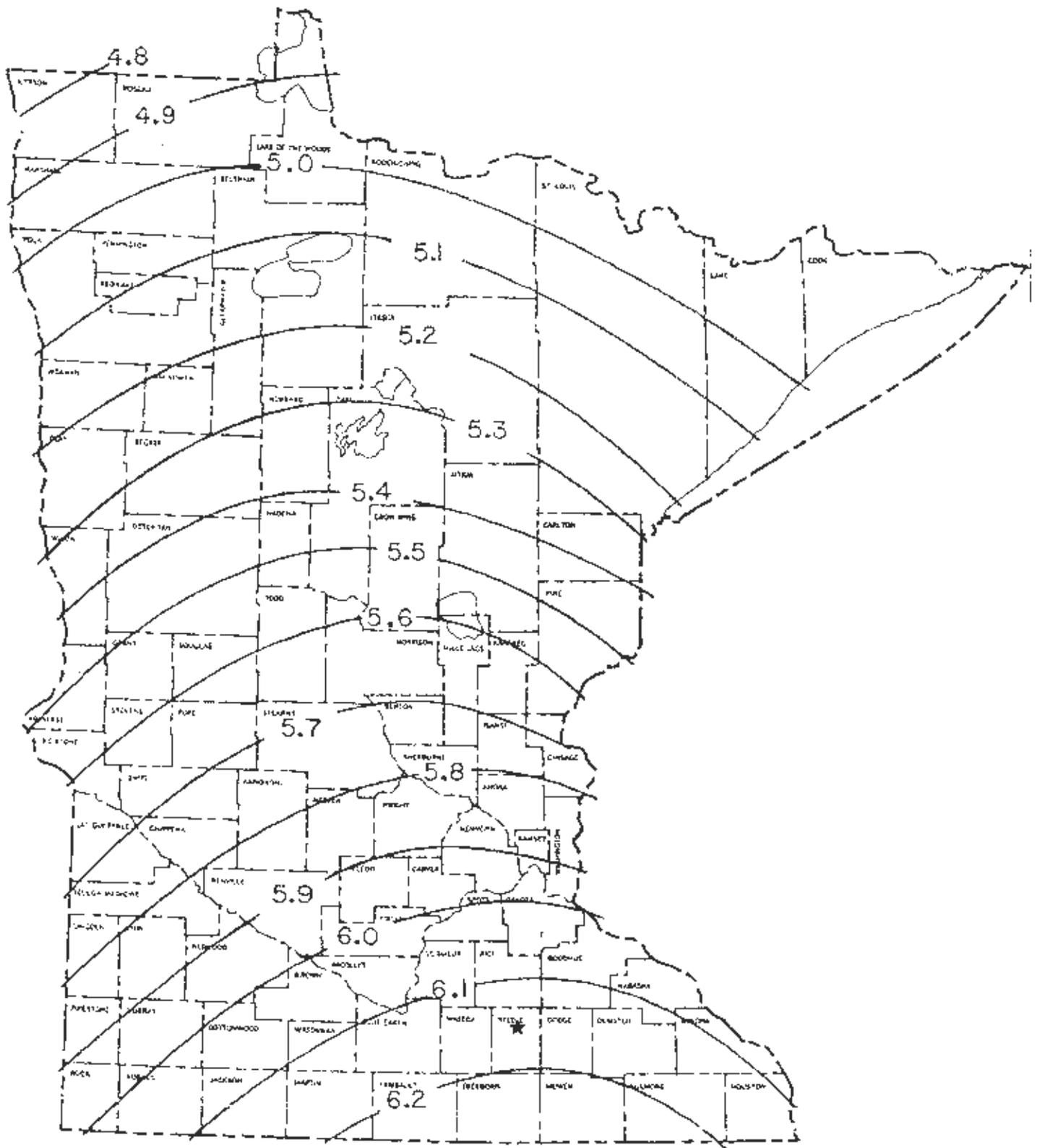


Source: USWB TP 40



2-Year 24-Hour Rainfall Amounts

Figure 3



Source: USWB TP 40



100-Year 24-Hour Rainfall Amounts

Figure 5

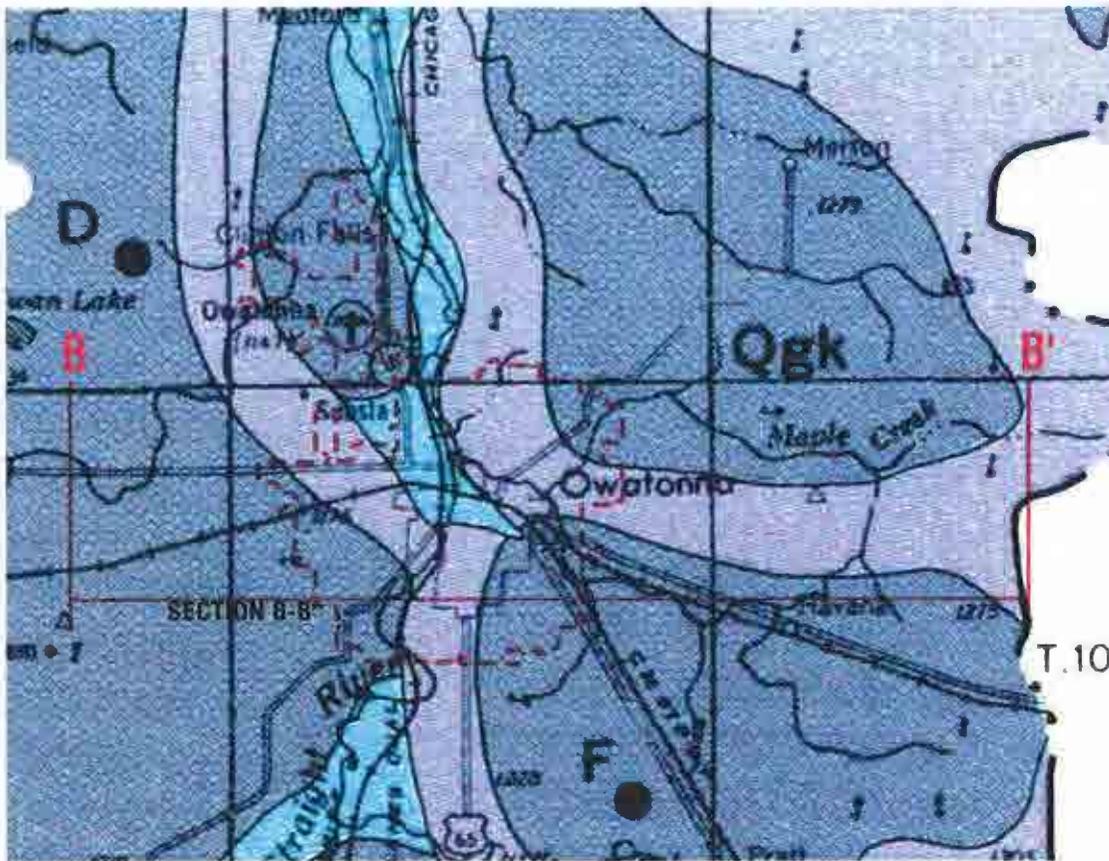
Additional climate information for the area can be found in the Minnesota Hydrology Guide prepared by the USDA Soil Conservation Service, the U.S. Weather Bureau Technical Paper 40, and the Midwestern Regional Climate Center.

II.1.3. Geology

The general geology of Steele County and the City of Owatonna has been compiled by the United States Geological Survey in a document titled Water Resources of the Cannon River Watershed, Southeastern Minnesota (H.W. Anderson, Jr., et al, 1974).

The general surficial geology in the City as shown in the top half of Figure 6 consists of three main glacial till components. In the southeastern and western parts of the city, the glacial till deposits have an unstratified mixture of clay, silt, and gravel (labeled Qgk). In the northern and southern parts of the city near the Straight River the till consists of silt, sand and gravel deposits (labeled Q). The remainder of the city lies in an area of gray till and local gravel deposits (labeled Qtm).

Bedrock is generally at a depth of 50 to 200 feet throughout the City. Below the majority of the City the first bedrock contact consists of the Galena Dolomite Formation. The formation consists of limestone with layers of shale woven in near the bottom of the formation. The bedrock layer is about 200 feet thick and can support aquifer use. Groundwater can move from the top bedrock layer to lower bedrock formations. Groundwater movement will be slowed at about 125 feet below the lowest Galena layer due to presence of a thin, low-permeable clay layer. However, slightly below the clay layer lies the Prairie Du Chien and Jordan Limestone layers which have good aquifer capabilities and groundwater movement. A typical cross section is defined and shown in the lower photo in Figure 6.



Q
River alluvium
Silt, sand, and gravel deposits

Qo
Glacial outwash
Mostly shallow surficial sand and gravel deposits. Aquifers are at, or near, land surface, and located along main drainages. Mantled by thin alluvial deposits in most places.

Qg
Ground moraine, gray till
Mostly till, an unsorted, unstratified mixture of clay, silt, sand, and gravel. Aquifers are local sand lenses buried at various depths within the till. Ground moraine is generally flatlying.

Qem
End moraine, gray till
Mostly gray till and local gravel deposits. Aquifers are sand and gravel lenses generally buried at various depths within the till. The end moraines are elongate ridges of varying height.



Scale: None
APPROX. CITY LIMIT

Og
Galeota Dolomite
Limestone and dolomitic limestone, mainly gray, inter-layered with shale near base. Yields water from fractures and solution cavities. Thickness about 200 feet.

Dspk
Decorah Shale, Platteville Limestone and Glenwood Shale
Decorah shale is a greenish-gray fossiliferous shale that contains scattered limestone lenses. Thickness generally less than 20 feet. Platteville Limestone is generally thin-bedded dolomite and limestone. Approximate thickness 15 feet. Glenwood Shale is a grayish-green to yellow shale with a limy clayey sandstone. Approximate thickness 10-20 feet. These three formations restrict vertical water movement, however, small quantities of water are available from the Decorah and Platteville.

Osp
St. Peter Sandstone
Light-yellow or white medium- to fine-grained massive well-sorted quartz sandstone. Thin clay layer at base restricts vertical water movement. Moderate amounts of water available from sandstone. Approximate thickness, 100 feet.

Opc
Prairie du Chien Group
Comprised of the Shakopee Dolomite, New Richmond Sandstone, Onoda Dolomite. Shakopee is mainly dolomite containing chert and a few thin sandstone beds; locally the New Richmond Sandstone is at the base. Onoda Dolomite overlies the Shakopee and is mainly dolomite containing chert, locally near the base. Large quantities of water available. Prairie du Chien Group and Jordan Sandstone are hydrologically connected. Approximate thickness, 200 feet.

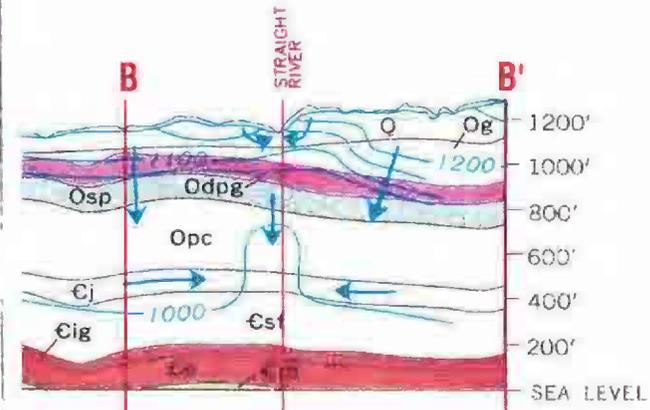
Cj
Jordan Sandstone
Yellow or white coarse- to medium-grained quartz sandstone, commonly cross-bedded; locally silty, fine-grained. Large amounts of water available. Hydrologically connected with Prairie du Chien Group. Approximate thickness 100 feet.

Csf
St. Lawrence and Franconia Formations
St. Lawrence Formation is silty, sandy dolomite and shale. Generally does not yield water and retards vertical water movement. Approximate thickness, 35 feet. Franconia Sandstone is typically green very fine-grained glauconitic shaly quartz sandstone that does not yield much water. Franconia thickness averages about 150 feet.

Cs
Ironton and Galesville Sandstones
Ironton Sandstone is a thin medium- to coarse-grained sandstone. It is difficult to distinguish from the underlying Galeville Sandstone, which is slightly less silty. Together these sandstones yield moderate amounts of water and have an average thickness of about 50 feet.

Ce
Eau Claire Sandstone
Interbedded gray to reddish-brown sandstone, siltstone, and shale; locally glauconitic. Retards vertical water movement and does not yield much water. Average thickness about 100 feet.

Cm
Mount Simon Sandstone
Gray to pink medium- to coarse-grained sandstone. Yields medium to large amounts of water (usually more than 100 gpm). Average thickness about 175 feet.



SECTION B-B'

EXPLANATION

Q
Glacial deposits
Mostly till, some sand and gravel outwash, and loess. Includes Holocene deposits.

Contact

Water table
Approximately located

Equipotential line
Line of equal hydraulic potential, interval 20 feet, station is mean sea level

General direction of water movement

Source: USGS

General Surficial Geology Figure 6



II.1.4. Topography

The City of Owatonna outside of the Straight River and its tributaries consists of gently rolling glacial moraine with local relief of 5 to 20 feet. The surface water within the moraine area will drain directly to the Straight River. Near the Straight River and its tributaries, the land does experience sudden drops as much as 80 feet. The downtown elevations within 1/4 mile of the river remain relatively level. The overall City elevations range from 1240 feet above sea level on the southwest portion to 1080 feet above sea level located near the banks of the Straight River.

II.1.5. Soils

The Natural Resource Conservation Service (formerly the Soil Conservation Service) prepared the Soil Survey for Steele County in 1973. This reference maps the location of specific soil types throughout the City of Owatonna and provides detailed data on the typical characteristics of each soil type. This reference can be viewed at the City of Owatonna's Resource Library.

In general, the soils in the City of Owatonna have been grouped into the four soils associations as shown on Figure 7. Site specific conditions may vary from the general descriptions shown in the figure especially where development has altered the surface by cutting or filling.

The *Webster-Clarion-Nicollet Association* is found primarily on the western edge of the City. This association consists of gently undulating to nearly flat loamy soil. The soil can exhibit both good or slow drainage. The soils in this association can generally support septic drainfields and infiltration in areas where the water table does not encroach.

The *Lester-Webster-Le Seuer Association* is found primarily along the west-central and southeastern areas of the City. This association consists of gently undulating to nearly flat loamy soil. The soil can exhibit both good or slow drainage. These soils may have permeability problems therefore septic drainfield and infiltration support may be a concern. In flat areas, the water table has a good chance on

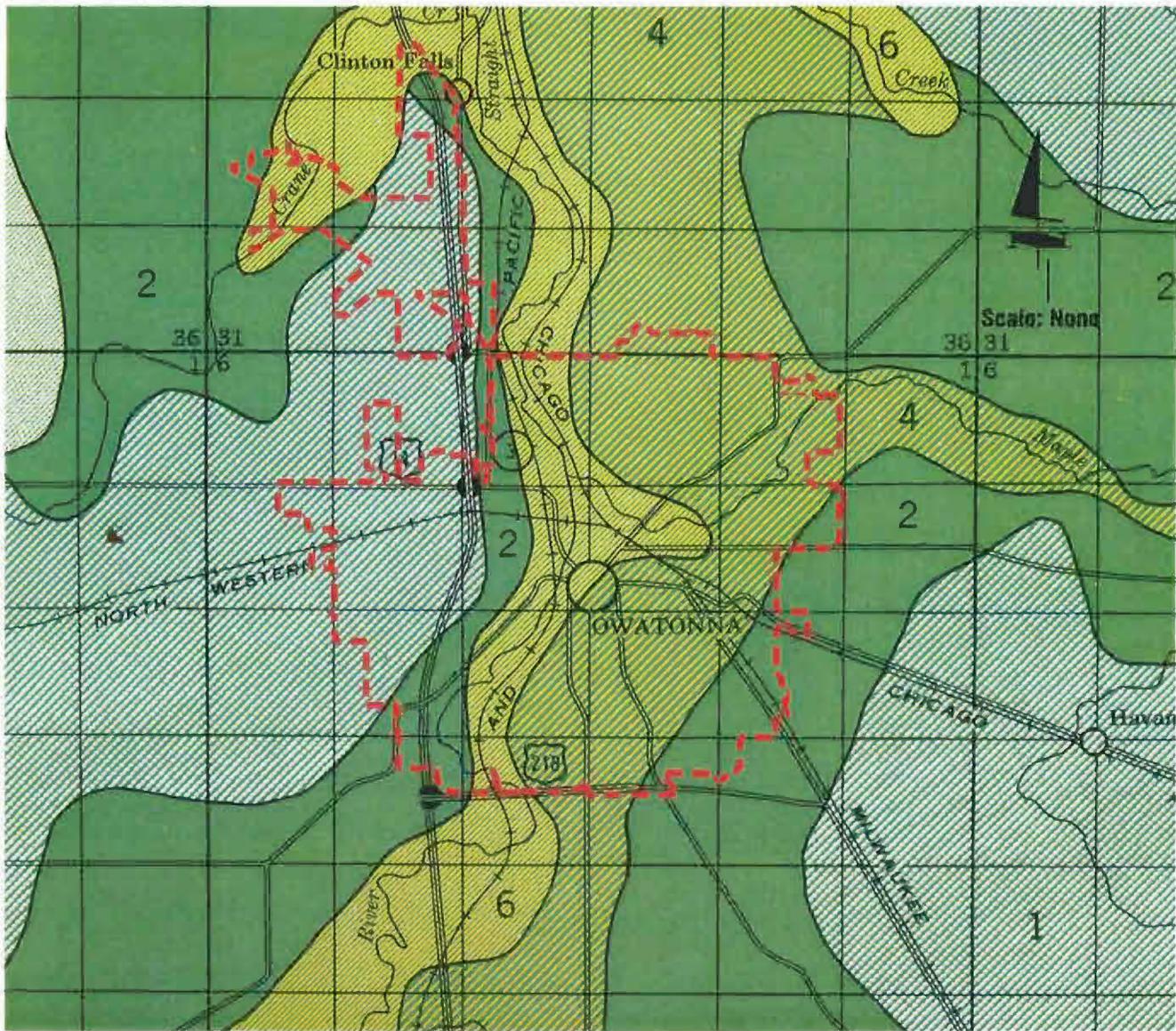
encroaching near the top surface. Erosion control on the sloping soils is a significant management concern.

The *Bixby-Dakota-Biscay-Estherville Association* is found primarily along the river flats particularly along the Straight River and Maple Creek areas. This association consists of low sloping loamy soil. In upland areas, the soil will most likely exhibit excessive drainage whereas in low areas, the soil will likely exhibit slow drainage. The soil may not be suitable for septic drainfields and infiltration due to slow drainage and potential pollution hazards. Erosion control on the sloping soils is a significant management concern.

The *Hayden-Webster-Lester Association* is found primarily along the east central areas in the City. the soil will most likely exhibit excessive drainage whereas in low areas, the soil will likely exhibit slow drainage. This association consists of a wide variation from nearly flat to steep sloped loamy soil. These soils may have permeability problems, therefore septic drainfield and infiltration support may be a concern. In flat areas, the water table has a good chance on encroaching near the top surface. Erosion control on the sloping soils is a significant management concern.

II.1.6. Natural Resources

The existence and health of habitat generally determines the abundance and diversity of fish and wildlife within the City. Three distinct habitats affecting wildlife are prairie, forest and water area. Due to the rolling terrain, woodlands, wetlands, and lakes within the City, conditions are well suited for diverse types of natural habitat and wildlife. Most of the City's wetlands, lakes and streams provide wildlife habitat to varying degrees. However, the urbanized character of the City has reduced the quantities and variety of natural wildlife.



SOIL ASSOCIATIONS *

- 1** Webster-Clarion-Nicollet association: Poorly drained to well-drained, nearly level to rolling, loamy soils
- 2** Lester-Webster-Le Sueur association: Well-drained to poorly drained, nearly level to rolling, loamy soils
- 3** Ierdal-Kilkenny-Shields association: Poorly drained to well-drained, nearly level to rolling, loamy and clayey soils
- 4** Hayden-Webster-Lester association: Well-drained and poorly drained, nearly level to steep, loamy soils
- 5** Maxcreek-Moland-Mertor association: Poorly drained to well-drained, nearly level to gently undulating, mainly silty soils
- 6** Bixby-Dakota-Biscay-Estherville association: Poorly drained to somewhat excessively drained, nearly level, loamy soils

* Texture refers to surface layer and subsoil of major soils in each association.

Compiled 1972

 APPROX. CITY LIMIT

Source: NRCS

Surface Soils Association Figure 7



Wildlife Management and Public Recreation

The MNDR has not prepared any wildlife management plans nor have they designated any waterfowl areas within the City. The Straight River has several canoe launching locations within the city. Lake Kohlmeier contains a fishing pier for public use and the MDNR does fish stocking.

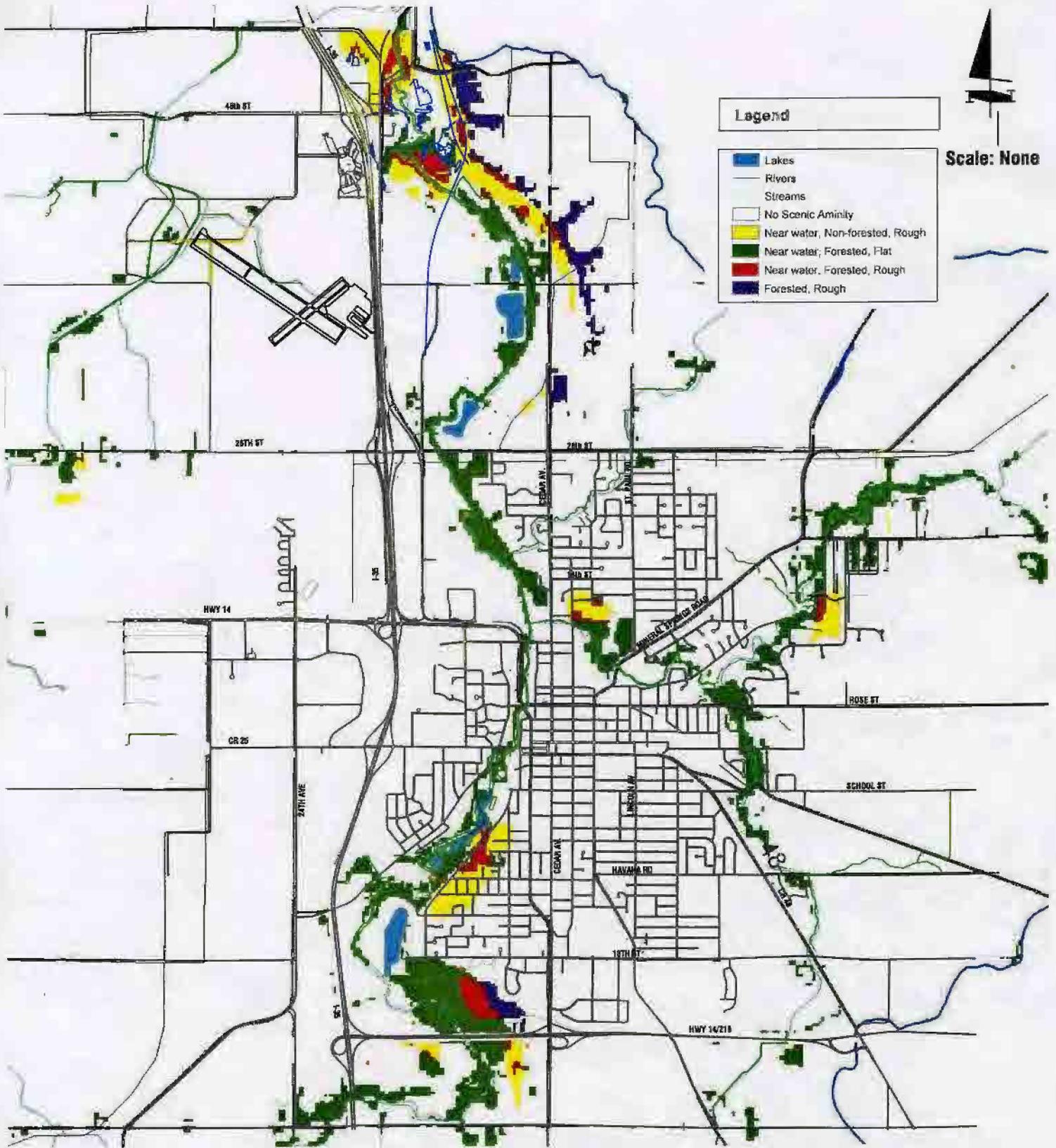
Unique Features and Scenic Areas

There have been several plant and animal species identified by the MDNR Natural Heritage and Non-Game Research Program in or near the City of Owatonna. An index showing the list of occurrences appears in Appendix A and approximate locations are shown in Maps 1 through 4. The predominant rare species have occurred along the Straight River and Maple Creek. There are also several rare plant species that have been located just east of the current City Limits. The MDNR office will require environmental review if any land alteration, grading, or construction activities are planned near rare species areas.

The MDNR has also identified scenic areas within the City. Scenic areas are defined as having heavy forest cover, or are of proximity to watercourses that have significant natural features. Those areas are shown in Figure 8. Great care should be taken to preserve these scenic areas that have extensive natural and scenic value to the community. Any land alteration or stormwater improvements in or near these areas should be made to minimize impact where practicable.

II.1.7. Land Use

The Land Use Map is shown in Figure 9. The map includes existing land use as well as future planned land use. The existing areas are generated based on aerial photography taken from the year 2000. The future planned areas have been generated by the City Planning Department and shows future land use based on strategic planning and extends out to the year 2016.



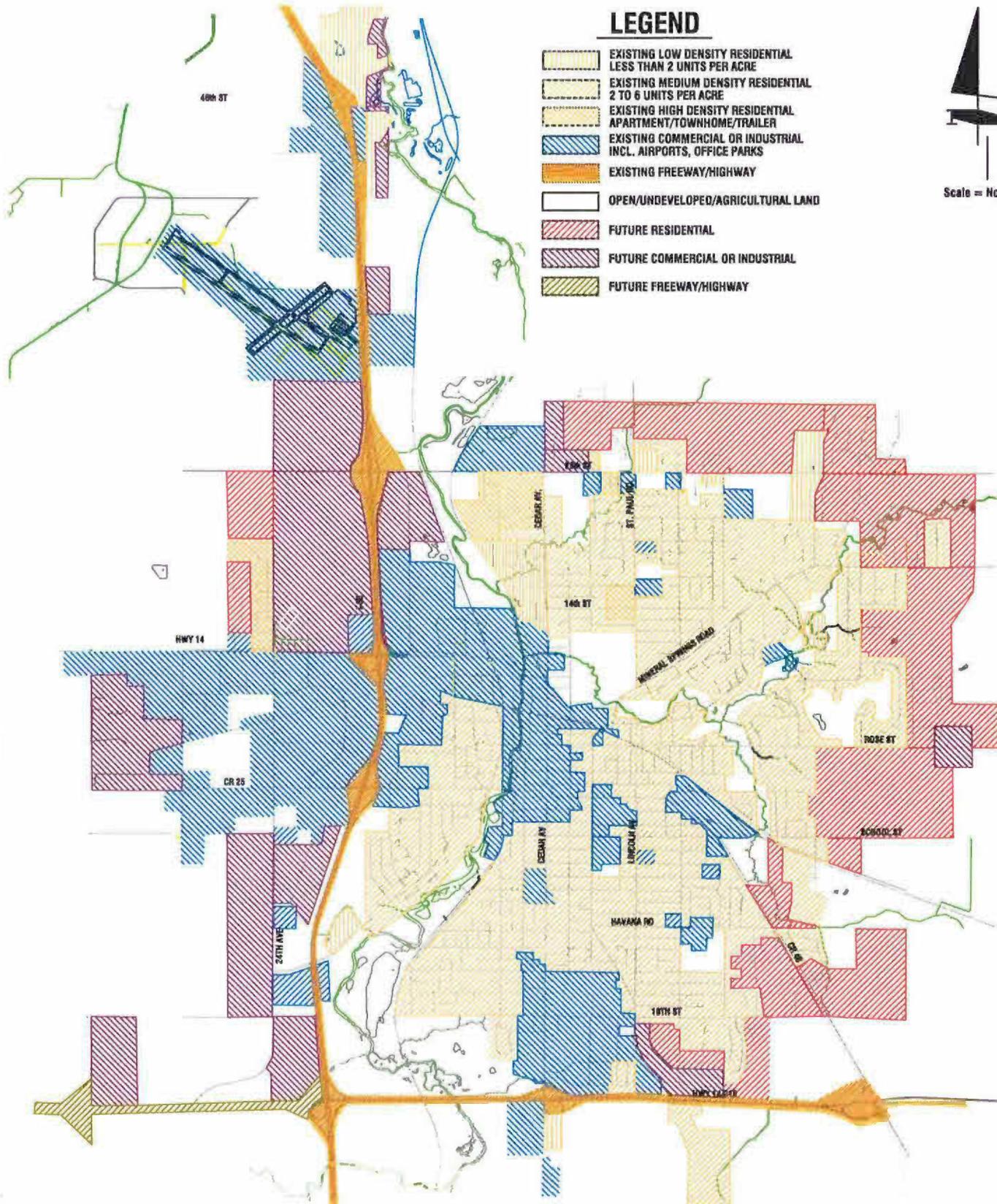
Source: Center for Urban and Regional Affairs and MDNR for the Sustainable Lakes Project



Scenic Areas Map Figure 8

LEGEND

-  EXISTING LOW DENSITY RESIDENTIAL
LESS THAN 2 UNITS PER ACRE
-  EXISTING MEDIUM DENSITY RESIDENTIAL
2 TO 6 UNITS PER ACRE
-  EXISTING HIGH DENSITY RESIDENTIAL
APARTMENT/TOWNHOME/TRAILER
-  EXISTING COMMERCIAL OR INDUSTRIAL
INCL. AIRPORTS, OFFICE PARKS
-  EXISTING FREEWAY/HIGHWAY
-  OPEN/UNDEVELOPED/AGRICULTURAL LAND
-  FUTURE RESIDENTIAL
-  FUTURE COMMERCIAL OR INDUSTRIAL
-  FUTURE FREEWAY/HIGHWAY



Existing Land Use Based on 2000 Aerial Photo
Future Land Use Based on City Planning Dept.



Land Use Plan Figure 9

II.1.8 Population

The City of Owatonna continues to grow in population. With the addition of additional industries and businesses, the population can only expect further growth in the years to come. Table 2 summarizes the population data for the years 1980, 1990 and 2000. The growth is also expected due to the steady increase in population from the years 1980 to 2000, and the occupancy rates and average people per household numbers that have remained steady over the past two decades.

Table 3 – City of Owatonna Population Data

Year	Population	Median Age	Average Household Size	Average Density Per Square Mile*	Housing Occupancy Rate
1980	18632	28.7	2.7	1419	96.2%
1990	19386	32.4	2.6	1476	97.4%
2000	22434	34.9	2.5	1709	97.3%

*density = population / 13.12 sq. mi
 Source= U.S. Census Bureau

II.1.9. Public Utilities Services

The City of Owatonna has municipal sanitary sewer and watermain available throughout most parts of the City. Utilities are available to all properties. Septic tanks are located in the City primarily in areas that are not served by municipal sanitary sewer. Currently, there is no known database or location map of active septic fields made from either City or County services.

The public lateral storm sewer system within the central part of the City is extensive and generally follows topographic drainage patterns and roadway corridors. Much of the storm sewer discharges into City wetlands, waterbodies, and lakes without prior treatment. Outside the main City lateral storm sewer system, lies culverts and public tile and ditch systems. The majority of culvert, ditch and tile

system discharges also land in wetlands and streams without prior treatment. Additional information on storm sewer systems and drainage features are presented in the Surface Water System subsection of this SWMP.

II.1.10 Potential Pollutant Sources

Various land use practices have the potential to contaminate local surface waters and groundwaters. There is significant water contamination potential at open and closed landfills, dumps, hazardous waste sites, animal feed lots, and underground and above ground storage tanks. Even in-place or abandoned wells can allow contamination of groundwaters if not properly constructed or taken out of service. Potential sources of surface water and groundwater contamination within the City of Owatonna are identified in Appendix B.

The potential sources shown in Appendix B are locations that have hazardous waste generator permits, voluntary investigation and cleanup (VIC) sites, city dumps, and underground and above ground (including leaking) storage tanks. The potential pollutant source information was obtained from the MPCA. Additional information on VIC, and other dumpsites can be accessed through the MPCA website at www.pca.state.mn.us/backyard/neighborhood.html.

The City does have Individual Sewage Treatment Systems (ISTS)'s or septic fields in areas that are not served by City sanitary sewer. Non-properly functioning septic fields can be a pollution concern to groundwater and surface waters. In addition to ISTS's, animal feedlots can carry significant amounts of pathogens, and other waste-related diseases into surface waters. Sites that have septic fields or animal feedlots should be investigated for treatment function. Special priority should be given in areas that are located in close proximity to surface waters, sandy soils with high transmissivity rates (3 inches per hour or higher), or within close proximity to a perched or high groundwater table.

II.1.11 NPDES Phase II MS4 Permit Information

II.1.11.1 Background

The Phase II program requires operators of MS4's to obtain permits and implement programs and practices to control polluted storm water into receiving water bodies. The permit requirement language was originally constructed by the United States Environmental Protection Agency (EPA) (64 Federal Register at 68737 (1999)). The first phase of the program only pertained for MS4's in municipalities that have over 100,000 population. The second phase has been expanded to cover municipalities (such as Owatonna) that have a population of 10,000 or higher. The EPA permit authorization is performed through the Minnesota Pollution Control Agency (MPCA). The length the permit is effective for a period of 5 years.

The intent of the NPDES Phase II Program is to get municipalities to reduce or control the amount of storm water runoff, both in the form of water quality, rate control. Another key component is to educate businesses and public about proper stormwater management. The program is comprised of six minimum control measures (MCM's). Those measures are:

- Public education and outreach
- Public participation/involvement
- Illicit discharge, detection, and elimination
- Construction site runoff control
- Post-construction site runoff control
- Pollution prevention/good housekeeping

II.1.11.2 Permit Requirements

To obtain the MS4 permit, the city must generate a stormwater pollution prevention plan (SWPPP) that contains best management practices (BMP's) for each MCM. These MCM'S must have attainable goals for each BMP. BMP's are defined by the MPCA as "schedules of activities, prohibition of practices to prevent or reduce the pollution of waters of the state." The current Phase II permit (MN R 040000) is available online to view and is located on the MPCA website. The web address is

www.pca.state.mn.us/water/stormwater/stormwater-ms4.html. The website also contains additional information on the MS4 Phase II program including guidance and further explanations.

II.1.11.3 Current Permit Status

On March 10, 2003, Municipalities defined as “Mandatory MS4’s” had to obtain an NPDES Phase II MS4 permit. The City is not a “Mandatory MS4” but is currently listed as a “Discretionary MS4”. Discretionary MS4’s are defined by the MPCA as MS4’s that do have a population of at least 10,000 and are currently under review to determine if these MS4’s will be required to obtain permits.

The current MN R 040000 permit was revised by the MPCA in February 2005. One of the revisions include requiring several Discretionary MS4’s such as the City of Owatonna to obtain permit coverage. The revised permit is scheduled for adoption at the end of January 2006. In the event the City is required to obtain permit coverage, the MPCA will give the City approximately 12 to 18 months to prepare the SWPPP.

II.2 Surface Water System

This section summarizes the available surface water data within the City. The surface water data included in this section pertains to surface waters such as lakes, wetlands, and rivers, and surface waters associated with storm events. Additional surface water information is included in the Appendices of this SWMP.

II.2.1. Lakes and Protected Waters

The MDNR currently list Lake Kohlmeier, Straight River, Maple Creek, and Izaak Walton Creek as protected water bodies within the City of Owatonna. Protected Waters are defined as wetlands and watercourses that are 2.5 acres or larger. Minnesota Statute Chapter 103G provides specific criteria for protected status. The Protected Water Map for Steele County is available for review online at www.dnr.state.mn.us/waters/watermgmt_section/pwi/download.html.

The MDNR has prepared a Fish Population Assessment and Fisheries Lake Survey for Lake Kohlmeier. The report identifies physical lake and water clarity characteristics of the lake and fish population. The MDNR has also prepared a Lake Depth map. The reports, management plans, and Lake Depth maps are available from the MDNR Fisheries Division and are also available for review online at www.dnr.state.mn.us/lakefind/index.html.

Table 4 shows the Minnesota Department of Natural Resources (MDNR) classification for Lake Kohlmeier.

Table 4 – MDNR Lake Classification

Waterbody Name	MDNR Id. No.	Surface Area	Management Classification
Kohlmeier	74-19P	32 acres	Centrarchid

Notes:
Centrarchid = Sunfish/Crappie/Bass

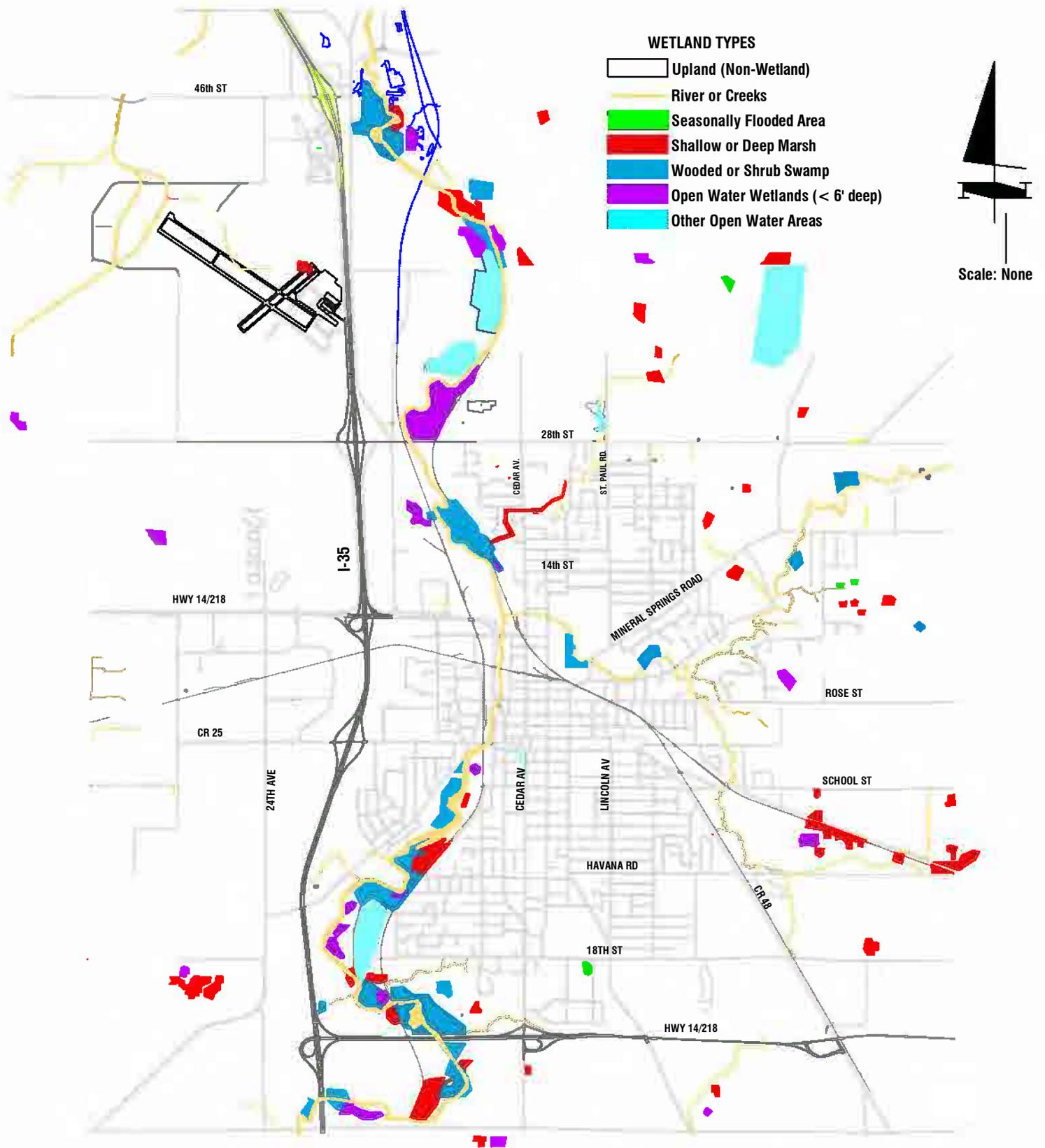
Water Clarity Data has been collected for Lake Kohlmeier in the form of Secchi Disk* readings. The Secchi Disk readings are located in Appendix E.

*secchi disk – device to determine water clarity. Disk is dropped into water and the depth from the top of water to where disk is no longer visible is the reading. The higher the depth, generally the more clearer the lake. Values at or above 2 meters = 6.5 ft. indicate relatively clear lakes with moderate plant growth.

II.2.2. Wetlands

The U.S. Fish and Wildlife Service have prepared National Wetlands Inventory (NWI) maps. The wetlands as identified by the NWI are shown in Figure 10. The wetlands are classified by type and are color-coded accordingly. The majority of the wetlands are found near the creeks and rivers located within the City. The full size Wetland Inventory Maps can be viewed at the City Water Resource Library.

The last NWI review occurred in 1990 and was based on 1980 aerial photography. The wetlands identified on the NWI map may have since been altered. A more in-depth wetland delineation to verify



Source: National Wetlands Inventory, Aerial Photos
 Note: Wetland Locations Approximate

Wetland Areas Map

Figure 10

actual wetland locations (according to WCA rules) should be done on individual sites where development is scheduled to occur.

The various wetland inventories identify and classify wetlands based on two primary systems. Those classification systems are the Circular 39 and the Cowardin and were both developed by the U.S. Fish and Wildlife Service. The MDNR classifies their protected waters by the Circular 39 system, and the NWI maps were defined by the Cowardin. Minnesota Board of Water and Soil Resources (BWSR) has prepared a brochure that gives brief explanation of the classification systems including photos of the different types of wetlands and also provides translations between the two systems that appear in Appendix C. The classification systems were developed for a wide number of purposes and to assist in meeting differing water resource management goals. Although not comprehensive, these inventories can all be utilized in determining whether wetlands are present on a specific property and how land uses may be affected.

The City of Owatonna has no near-term plans to inventory the functional values of wetlands within the community but will review the functional values of impacted wetlands on a case-by-case basis in accordance with Minnesota Statue, Section 103B.3355 during the City review of individual project proposals. Steele County has accepted responsibility as the Local Government Unit under the Minnesota Wetlands Conservation Act. A diagram in Appendix D shows the state and federal agency jurisdictional control over wetlands within the City.

II.2.3. Creeks and Rivers

The City's creeks and rivers provide transportation of surface water generated through rain and snow accumulation. The majority of the urban runoff generated in the City will travel through the City storm sewer and outlet directly either to a creek or a river. The runoff that outlets to these creeks and rivers contain substantial amounts of sediment and other urban pollutants that may contribute to degradation of these water bodies. Besides providing flood control and receiving stormwater outlets, the riverbed areas contain significant natural wildlife habitat including fish and other water species.

The MDNR has not prepared fish management plans for any of the City's streams or creeks. No Fish Consumption Advisories are in effect for any of the City's rivers. Additional water quality information on the City's rivers and creeks can be found in Section II.2.6.

II.2.4. County Ditch and Drain Tile Systems

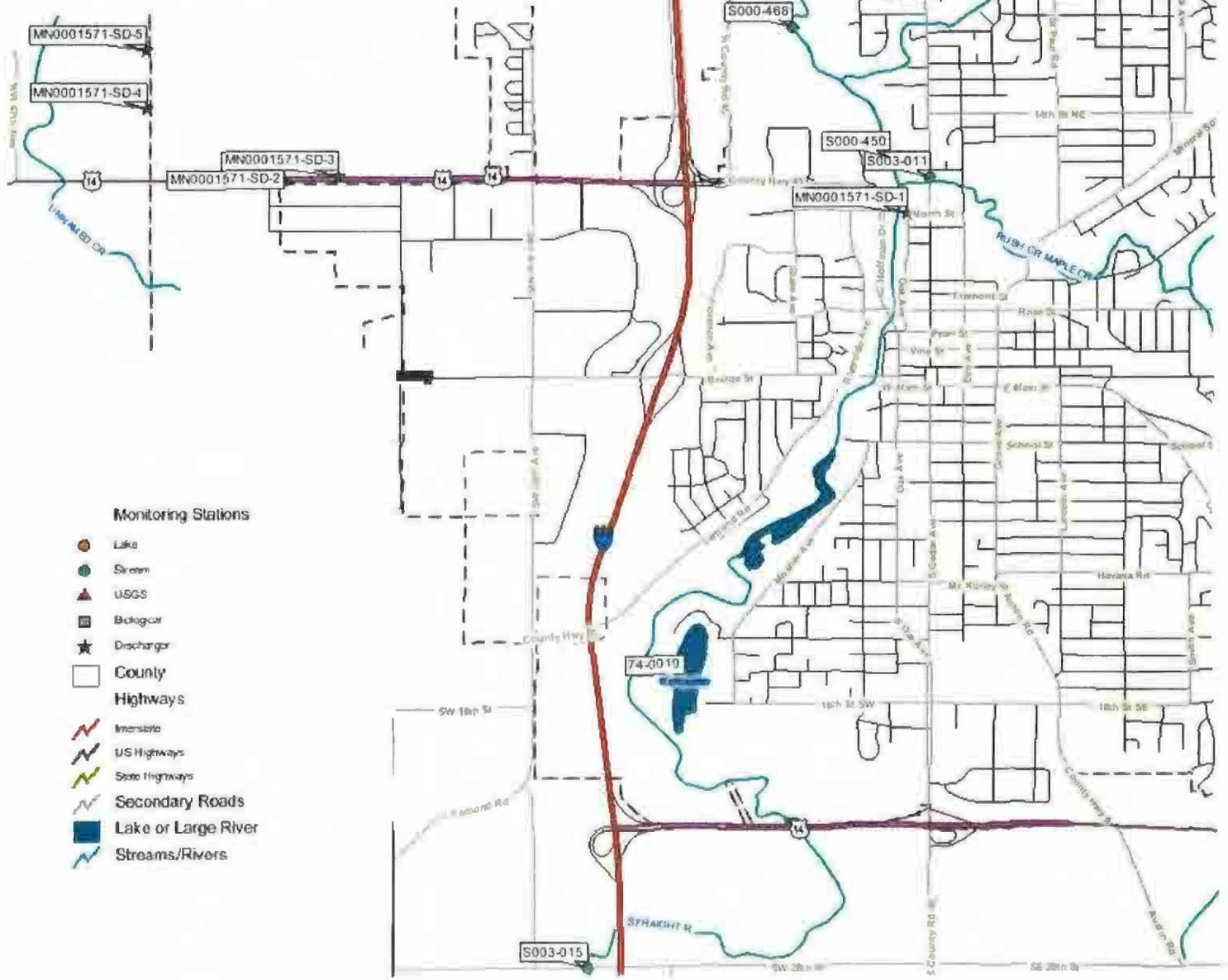
There exist numerous County Ditch and County Tile systems throughout the City. Those areas include several systems located in the Industrial Park area, and along the Southeast portion of the City. The tile systems were made to drain agricultural fields to either a county ditch or to other open areas. The approximate tile locations have been mapped but were not surveyed. As a result, the actual tile locations can vary considerably from what is located on City maps.

Over time, as agricultural areas developed, those developments have altered, filled, or removed existing tile lines and county ditches. Problems that have manifested include flooding below the surface because of upstream drainage, or flooding due to breaks in the tile lines. To alleviate the flooding due to altering/removing the tile lines, the City will need to meet with the County Ditch Engineers whenever development is scheduled to occur. The City should also work with the County Ditch Engineers on remediating any current flooding areas. Section V contains additional goals and policies regarding work and development over County Ditch and Tile Systems.

II.2.5. Surface Water Quality Monitoring Locations

The MPCA has established surface water quality monitoring sites throughout the city. The monitoring sites include several locations along the Straight River, Maple and Crane Creek, Lake Kohlmeier, and several industrial discharge locations. Figure 11 contains a map that shows the monitoring sites and Station ID's. The monitoring data appears based on the Station ID and is located in Appendix E. The data in Appendix E appears based on the sample date in tabular form.

SEE INSET A FOR CONTINUATION



Scale: None

- Monitoring Stations**
- Lake
 - Stream
 - USGS
 - Biological
 - Discharger
 - County
- Highways**
- Interstate
 - US Highways
 - State Highways
 - Secondary Roads
- Water Features**
- Lake or Large River
 - Streams/Rivers

Source: MPCA



Surface Water Quality Monitoring Locations

Figure 11

The surface water quality information is also available online through the MPCA's interactive website. Also included are explanations of the water quality measurements used for each site evaluation. The information can be accessed directly via the web at www.pca.state.mn.us/data/eda/index.cfm.

II.2.6. Impaired Surface Waters and TMDL

The Straight River from Maple Creek to Crane Creek, Crane Creek, and Maple Creek are classified as impaired by the MPCA. The impaired status was determined as part of the MPCA's 2004 report to the U.S. EPA Total Maximum Daily Load (TMDL) program.

The stretches of the Straight River, Crane Creek, and Maple Creek within the City are impaired due to containing high levels of Fecal Coliform (FC). FC's are bacteria that are present in animal wastes such as farm animals and humans. FC by itself does not pose any threat to humans but is used as an indicator of possible pathogens and other disease carrying bacteria that can cause Typhoid, Hepatitis A, and Cholera which are harmful to humans. The most probable causes of FC can be traced to failing septic systems and extensive runoff from animal feedlots, but also can occur naturally in soil.

In addition, the Straight River is impaired based on Turbidity. Excess Turbidity can significantly degrade the aesthetic quality of waterbodies. Aquatic organisms may have trouble finding food and gill function may be affected in turbid waters. The causes of Turbidity can include sediment washing away from existing river banks and through sediment transport via City storm drainage.

The MPCA does have a TMDL FC implementation and remediation plan approved for the area including Owatonna. A TMDL Turbidity implementation plan currently does not exist. The City may have to update the SWMP to include any TMDL allocation requirements set forth by the MPCA that relate directly to surface water or stormwater issues. Further information about the TMDL program can be accessed via the web at www.pca.state.mn.us/water/tmdl/.

II.2.7. City Subwatersheds and Drainage Districts

The city's drainage patterns for purposes of this study were defined by seven subwatershed boundaries. Those seven boundaries are Straight River North, Straight River Central, and Straight River South, Maple Creek, Willow Creek, Izaak Walton Creek, and Crane Creek. A figure showing the subwatershed boundaries is shown in Figure 12. In each subwatershed boundary lies anywhere between 8 and 29 drainage districts. A brief narrative for each subwatershed area is given below.

Straight River North Subwatershed

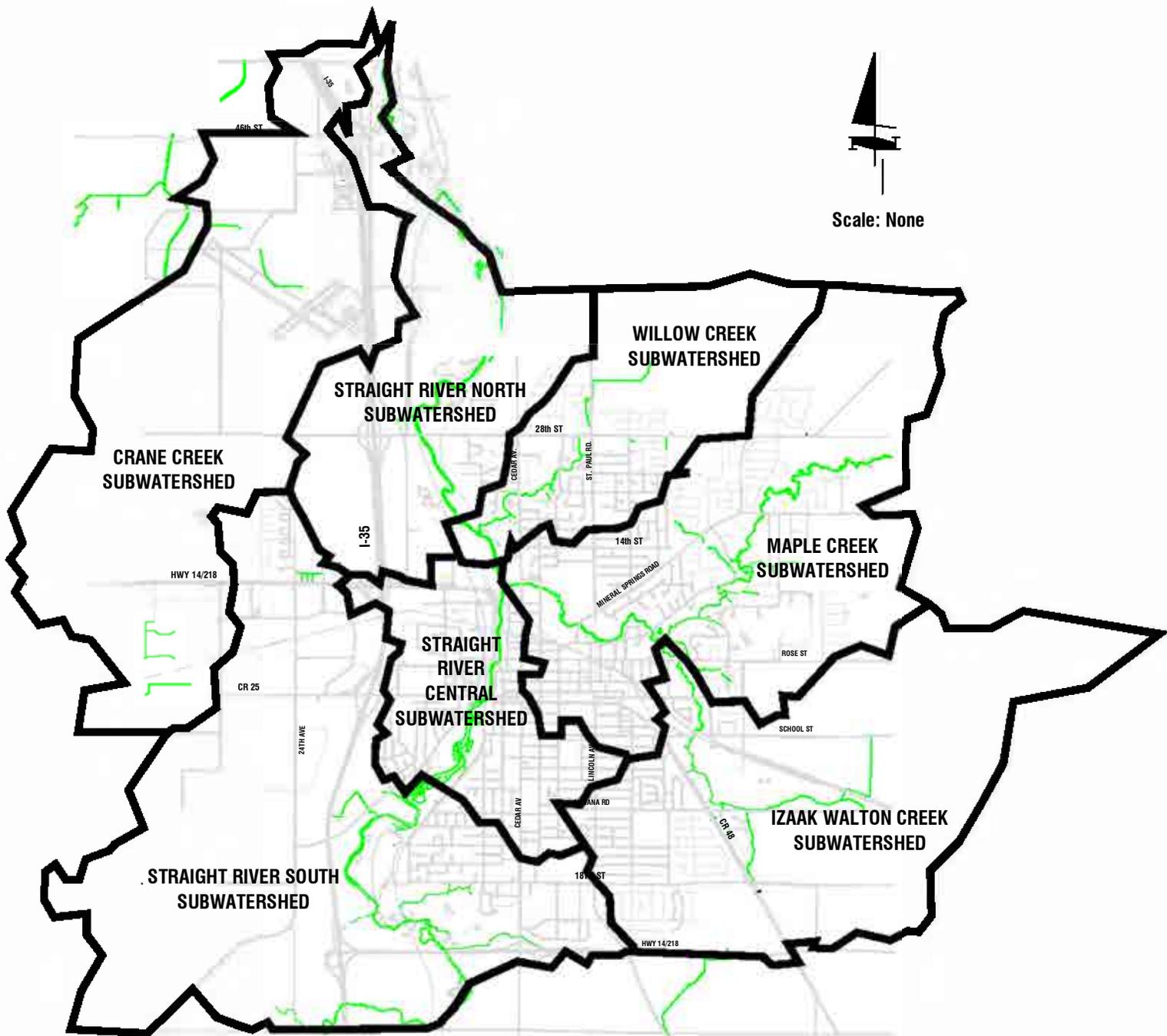
The Straight River North Subwatershed contains area that drains directly to the Straight River from just north of the Willow Creek tributary entrance to north of the City Limits. The area to the south contains substantial amounts of commercial development. The northern area has some development near the freeway, as well as some open areas to the east. The stormwater drainage primarily flows through ditches and culverts. The watershed contains 13 drainage districts and a detailed map of the subwatershed shown in Map 1.

Crane Creek Subwatershed

The Crane Creek Subwatershed contains area that drains directly to Crane Creek. Crane Creek eventually joins the Straight River just north of the City Limits. The majority of the subwatershed is either undeveloped or is agricultural use with the exceptions of commercial areas off Hwy 14 and near the airport. The stormwater drainage in the subwatershed is served by ditch and culverts with the exception of the Hwy. 14 area, which also has tile systems. The subwatershed contains 11 drainage districts and a detailed map of the subwatershed is shown in Map 1.

Straight River Central Subwatershed

The Straight River Central subwatershed contains area that drains directly to the Straight River from just north of Lake Kohlmeier to the Willow Creek tributary entrance. A major portion of the downtown area is contained in this watershed. The major land use types are commercial and industrial. The watershed is mostly developed. The stormwater drainage flows primarily through City trunk storm



Subwatershed Boundaries
Figure 12

sewer. The watershed contains 11 drainage districts and a detailed map of the subwatershed is shown in Map 2.

Straight River South Subwatershed

The Straight River South subwatershed contains area that drains directly to the Straight River from the south City Limit line to just north of Lake Kohlmeier. The area contains a mix of open and developed land. Major commercial areas are located along the western and southeastern sides of the watershed. The watershed also contains a significant residential portion located in the center area. The stormwater drainage along the western side flows through ditches and culverts and lies on top of a county tile system. The drainage on the eastern side flows primarily through city trunk storm sewer. The southern portion flows through ditches and culverts. The watershed contains 29 drainage districts and a detailed map of the subwatershed is shown in Map 2.

Maple Creek Subwatershed

The Maple Creek subwatershed contains area that drains directly to the Maple Creek from the eastern edge of town to the point where the creek enters the Straight River. The area to the east is a rapidly developing residential area. The western portion contains a large part of the downtown area. The stormwater drainage flows primarily through City trunk sewer where housing exists and through the downtown area, otherwise the area drains through ditches and culverts or is undefined. The subwatershed contains 21 drainage districts and a detailed map of the subwatershed shown in Map 3.

Willow Creek Subwatershed

The Willow Creek subwatershed contains area that drains directly to the Willow Creek from the eastern and northern edge of town to the point where the creek enters the Straight River. The southern portion of the subwatershed is mostly developed and is of pre-dominant residential use. The northern-most part is undeveloped, but just south contains newer residential units, and future residential units are planned. The stormwater drainage in the developed area is served primarily by City trunk storm sewer. The undeveloped areas either are served by ditch and culvert, or have no defined drainage routing. The subwatershed contains 7 drainage districts and a detailed map is shown in Map 3.

Izaak Walton Creek Subwatershed

The Izaak Walton (IW) Creek (Maple Creek Tributary based on FEMA study) Subwatershed contains area that drains directly to the IW Creek from the headwaters beyond the City Limits (south of Hwy 14/218 to the point where the creek enters Maple Creek. The eastern portion of the subwatershed is mainly agricultural and the western side is mainly residential. The stormwater drainage in the western side is served primarily by City trunk storm sewer. The eastern side is served by culverts on top of county tile. The southeast side is primarily served by ditch and culverts. The subwatershed contains 14 drainage districts and a detailed map is shown in Map 4.

An additional map entitled "Overall Drainage Map" showing the entire City drainage at a smaller scale has been provided. The map shows similar information as Maps 1 through 4 and is enclosed in the binder folder.

II.2.8. Flood Insurance Studies

In 1981 the Federal Emergency Management Agency (FEMA) completed Flood Insurance Rate Maps (FIRM) and Floodway Maps for the City of Owatonna. The FEMA Community Number for the City of Owatonna is 270463. The flood study is primarily confined to the main tributaries and rivers located within the City. The following paragraphs describe the purposes of both map series.

The FIRM identifies areas within the City as being within Zone A: 100-year flood plain (flood elevation not determined); Zone A2: 100-year flood plain (flood elevation determined); Zone B: 100-year to 500-year flood plain; or Zone C: Areas of minimal flooding. Maps 1 through 4 contain the approximate FIRM areas within the 100-year flood plain.

The FIRM identifies only the approximate extent of flooding. There may be instances where existing topography located within a FIRM floodplain boundary is higher than the base flood elevation (BFE). In those cases, a Letter of Map Amendment (LOMA) or Letter of Map Change (LOMC) may be required from FEMA to remove the areas above the BFE from requiring flood insurance coverage.

More information on the LOMA and LOMC policies and additional information can be found on the FEMA website located at: www.fema.gov/fhm.

The Floodway Maps show identical flood areas as displayed in the FIRM. The Floodway Maps identify cross-sectional areas that are shown in the corresponding Flood Insurance Study Report (FIS). Those cross-sections identify flood profiles for the Straight River, Maple Creek, and the Maple Creek Tributary (Izaak Walton Creek). Floodways are identified by FEMA as "areas that should be kept free of obstructions to allow floodwaters to move downstream".

The City currently uses the floodplain information to review development proposals based upon the real extent of flood plains identified in the FIRM and FIS. For determination of specific flow rates and floodplain elevations, an updated hydrologic/hydraulic analysis may be required utilizing current topographic data and water control structures.

At the time of the printing, the Owatonna flood study ended at the City Limits. The City Limits have since expanded following the study. The Steele County flood study contains additional flood zones that cover the areas located outside the Owatonna flood study. The Steele County flood study was also completed in 1981. The individual FIRM and Floodway Maps, and the FIS provided by FEMA for Owatonna and Steele County can be obtained at the City Water Resource Library.

II.2.9 Storm Water Modeling Information

As part of the SWMP preparation, a limited hydrologic analysis was conducted for each drainage district located within the subwatersheds. The hydrologic model utilized the HydroCAD computer program. HydroCAD is a hydrologic/hydraulics program based on techniques developed by the Soil Conservation Service (SCS). The computer model is similar to the SCS TR-20 program that simulates single storm events and uses similar methodology. The results of the HydroCAD model provide a probability-statistical determination of runoff flowrates, pond volumes and water elevations. The model can also provide qualitative and quantitative estimates of storm-water impacts as a result of industrial, commercial or residential expansions.

II.2.10 Modeling Limitations

The analysis does not attempt to model large rivers and creeks located within the City (Straight, Maple and Crane) due to the bodies of water extending well beyond the City Limits and due to the limitations of the program. However, the runoff flow-rates and volumes determined for each drainage district can be entered into specific river-modeling programs (such as HEC-RAS). The analysis also does not evaluate individual storm sewer catch basins and segments. Also excluded from the modeling are the runoff contributions from county tile or city sump systems. The tile and sump systems do not produce consistent levels of stormwater flow due to the water's movement through soil and breaks or diversions within the lines. All stormwater flow is assumed to route overland in areas where tile lines or sumps exist.

II.2.11 Modeling Process

To investigate the hydrologic characteristics for each drainage district, the analysis included map and plan review, subwatershed delineation from aerial topography, field reconnaissance, limited field surveys, and the development of a hydrologic model. The analysis determined subwatershed and drainage district areas, hydrologic conditions, and peak discharge rates based on the 10-year and 100-year, 24-hour storm events for both current and future development.

II.2.12 Drainage District Runoff Volume and Flow-Rate Determination

To determine runoff volumes and flow-rates for each drainage district, runoff curve numbers (CN) were used as part of the HydroCAD (SCS TR-20) program. The CN's are dependent on land use and can range from 55 for wooded areas to 98 for impervious surfaces. The CN's vary based on the type of soil, cover type or vegetation, and the amount of impervious surfaces the watershed area has. The CN's were based on a Hydrologic Soil Group (HSG) of "B" Soils. The HSG and CN's were determined through the NRCS's Hydrology Guide for Minnesota. NRCS "B" Soils have moderate soil transmission rates (0.15 to 0.30 inches per hour) and is the predominant soil type (including urban cut and fill land) in the City.

The following CN's were imputed into each drainage district's model. The values are based on the land use type. The CN values are presented in Table 5.

Table 5 – CN's Used For Each Land Use Type

Land Use	CN Value
Woods/ Open Lands	58
Agricultural – City Parks – Golf Courses	65
Low Density Residential (less than 2 housing units per acre)	70
Medium Density Residential (2-5 housing units per acre)	78
High Density Residential (6 units or more per acre including townhomes, apartments, condominiums)	85
Commercial and Industrial Areas	85
Open Water (Ponds, Lakes)	98
Freeway, Major Highway Right-Of-Way	82
Special Cases	Varies

II.2.13 Modeling Results (Existing Conditions)

The hydrologic data was inputted for each drainage district located within the seven subwatersheds. For each drainage district, peak flow rates and volumes were determined based on the 10 and 100-year storm events. The flow rates and volumes for each district were routed to a ponding area, culverts and ditches, or a trunk storm line.

For drainage districts that were routed to a pond or through culverts and ditches, the 10 and 100-year approximate flood locations were determined. The flood locations were determined by analyzing ponding and depression areas provided by aerial topography. The flood volume was then routed through culverts located through as-built or surveyed information. The 10 and 100-year flood locations

(where water ponds to a depth of 1 foot or more based on modeling) are shown on each subwatershed map (Maps 1 through 4) and the Overall Drainage Map.

Drainage districts located within the area served primarily by city trunk storm sewer(s) with insignificant ponding areas (where the ponding areas do not significantly affect peak flowrates), a 10-year storm was routed through the storm line(s) at select locations. Storm line locations shown to have sufficient capacity to route the 10-year storm event without surcharging structure are indicated by a box with a blue arrow on the subwatershed and drainage maps. For the select locations shown to be over-capacity based on the 10-year event, boxes with red arrows are shown. The arrows are pointed in the direction of apparent downstream flow. The trunk line modeling assumed the receiving catch basins can capture all incoming flow with no obstructions.

Significant and critical depressed areas served by trunk storm sewer are also identified in each of the subwatershed and drainage maps. Those depressed areas identified can be a flooding concern when the receiving trunk storm line is over-capacity. Those areas should be investigated by the City and provide some form of overflow protection (if not already provided) particularly in districts where the trunk storm line is shown not to carry the 10-year event.

For drainage districts that either did not have well-defined ponding areas or did not have trunk sewer lines located within the district, or were located directly over major rivers (Straight, Crane, Maple), those districts were not modeled in HydroCAD with the exception of hydrologic flows generated based on drainage district land use. An asterisk appears next to the drainage district ID located in Maps 1-4 and the Overall Drainage Map for those districts that weren't modeled.

In addition to the flooding elevations and trunk storm line routing evaluated based on HydroCAD modeling, the approximate 100-year FEMA flood areas are also shown in Maps 1 through 4 and the Overall Drainage Map. The 10 and 100-year district flooding elevations are not shown once they are inside the 100-year FEMA floodplain boundary (with the exception of the Izaak Walton Creek area) or in areas served primarily by trunk storm sewer.

II.2.14 Modeling Summary

Appendix F summarizes the hydrologic analysis for each subwatershed's drainage district. The information is prepared in a tabular format. Included in the appendix is:

- Primary routing method used for each drainage district (storm line, pond, ditch/culvert, or none)
- 10 and 100-year flowrates and ponding elevations (for drainage districts that contain significant ponding areas or ditches and culverts)
- 10 and 100-year flowrates (for drainage districts served primarily by trunk storm sewer - with insignificant ponding)
- Overall Curve Numbers used for existing and future conditions

The flowrates for both existing and developed cases are based on the CN's used in Table 5.

Appendix G contains a cost summary for future stormwater improvements to the City. Typical improvements include addition of trunk sewer or regional ponding to limit downstream flowrate and flooding elevations. Included in the appendix are costs associated with excavation, installation of outlet or trunk storm sewer pipe, land costs to install these improvements, and engineering and overhead costs. Areas where the proposed improvements are described in Appendix G are identified on Maps 1 through 4 and the Overall Drainage Map. See Section V.4 for further capital improvement information.

II.2.15 Need for Additional Hydrologic Data and Studies

As land use patterns change and development or redevelopment occurs within Owatonna, more detailed and site specific hydrologic/hydraulic analysis should be conducted and updated accordingly. The 100-year flood elevation levels should be updated in areas studied by the FEMA FIS and compared to existing FEMA levels. If the FEMA FBE elevations are shown to change, then a LOMR should be made showing the updated FBE. In areas that are served by trunk storm sewer line historically prone to flooding or is shown to be over capacity based on HydroCAD modeling, a more detailed evaluation of the trunk storm line including individual catch basins and individual branch storm lines should be conducted.

II.2.16 Flood Problem Areas

There are a number of known areas within the City that have historic flooding or surface water control problems. Most of the areas experience inconvenience flooding (i.e., not life-threatening) and may not be within the FEMA 100-year flood plains. Section IV and V provides a more thorough listing of flooding areas and surface water control problems within the City along with potential corrective actions.

SECTION III

ESTABLISHMENT OF GOALS AND POLICIES

SECTION III – ESTABLISHMENT OF GOALS AND POLICIES

The City of Owatonna has developed the goals and policies contained in this section to conform with the water resource purposes specified in Minnesota Statute Section 103B.201. They have been developed to avoid conflict with existing State, Regional, and County goals and policies. The general purposes of the goals and policies are as follows:

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

The goals and policies developed by the City address water quality, water quantity, erosion and sediment control, wetlands, public ditch systems, groundwater, recreation, fish and wildlife, and enhancement of public participation. Outlined below are the goals and policies developed for each of the above items.

III.1. Water Quantity

Goal: To limit public capital expenditures necessary to control excessive volumes and rates of runoff.

Policies:

1. The city will require that proposed stormwater discharge rates as a result of development be consistent with the subwatershed discharge rates and water levels identified in this SWMP. If discharge rates are not specified, they will be limited to pre-development rates unless the downstream conveyance systems and waterbodies can accommodate the increased stormwater flowrates and volumes created by development.

2. Where practical and feasible, stormwater facilities will be developed on a regional basis, rather than on an individual site basis. For land development projects, the City will determine whether regional or on-site stormwater facilities are required and the level of City participation in planning and construction.
3. The City will review downstream stormwater-related impacts (within the community) of development proposals and proactively address water resource-related concerns.
4. The design of new stormwater storage facilities and trunk lines will accommodate the 100-year storm event without causing flooding to building structures. Lateral storm sewer will be designed for the 10-year storm event. Additional information on stormwater design standards is contained in Section V.3 and Section VII.
5. Stormwater facilities receiving discharges from adjacent communities will be designed to accommodate existing runoff rates and anticipated volumes.
6. Peak stormwater rates discharging from the City into an adjacent community will not exceed pre-development discharge rates without notifying the adjacent community.
7. Lowest openings and lowest floor elevations (without City approved flood protection measures) for new buildings adjacent to wetlands or other water bodies shall provide a minimum 2-foot freeboard over the projected High Water Level (HWL). For buildings adjacent to wetlands or other water bodies without a calculated HWL, there shall be a minimum of a 3-foot freeboard above the Ordinary Highwater Elevation (OHW).
8. The City will encourage the development of positive outlets for landlocked areas to control future water levels on the site or areas adjacent to the developing property. The outlets will be designed to control high water conditions and to not drain landlocked areas.

9. The City will encourage the utilization of natural ponding areas and wetlands for stormwater storage and treatment if not in conflict with the classifications and management strategies of this SWMP.
10. The City will encourage the use of natural drainageways for conveying stormwater where the drainageway can accommodate or be improved to accommodate proposed flows and volumes.
11. Enhanced filtration practices will be encouraged, where feasible, in areas where the present or future land use does not have a significant potential to contaminate stormwater runoff or infiltrated groundwater. Infiltration methods shall be in accordance to guidelines presented in Appendix J.
12. Public stormwater facilities will be regularly inspected and maintained as necessary for adequate operations. For private stormwater facilities, the City may require a maintenance agreement with the development proposal identifying regular inspection and maintenance of stormwater facilities.
13. Wetlands within the City will be protected to assure that the wetland's values for providing water quantity benefits will not be significantly impacted by development proposals.

III.2. Water Quality

Goal: To maintain or improve water quality of City waterbodies and wetlands.

Policies:

1. In the design and construction of new stormwater conveyance systems, or modification of existing systems, pretreatment of stormwater runoff will be required prior to discharge to a City waterbody or wetland. Pretreatment methods shall be wet detention basins meeting MPCA recommendations or a facility providing equivalent performance standards. Exceptions to this requirement may be

allowed by the City if pretreatment is not technically or economically feasible. Additional information on design standards is contained in Section V.3 and VII.

2. Ponding areas constructed for water quality improvements shall include a skimmer at the pond outlet, if feasible, to remove oil and other floating materials in stormwater runoff.
3. The City will develop a maintenance program to regularly inspect and maintain public stormwater management facilities to assure their effectiveness. The City may require the owner of private stormwater facilities to execute a maintenance agreement with the City for regular inspection and maintenance of private systems.
4. The City will sweep paved public streets within the community at least two times per year. Areas with direct discharge into lakes, wetlands, and streams will be given first priority. In addition, for future purchase or rental of street sweeping equipment, the City will consider utilizing street sweepers that are highly effective at removing nutrients from the street.
5. The City will develop and implement Best Management Practices (BMP's) at City public works facilities and City owned lands to retain and prevent pollutants in stormwater runoff from leaving the site.
6. The City will require the preparation and implementation of erosion and sediment control plans and BMP's for construction and land development activities in accordance with MPCA permitting guidelines.
7. The City will protect wetlands within the community to assure that the wetlands value in providing water quality benefits will not be significantly impacted.
8. The City will develop and implement a public education program to foster responsible water quality management practices by City residents and businesses. The public information will

include proper lawn fertilizing and lawn chemical use, disposal of lawn waste, and disposal of solid, liquid, and household hazardous waste products.

9. The City will participate with the MPCA and Steele County on water quality monitoring programs proposed within the community.

III.3. Erosion and Sedimentation Control

Goal: To prevent erosion and sedimentation to the maximum reasonable extent practicable.

Policies:

1. The City will require the preparation and implementation of erosion and sediment control plans and best management practices for construction and land development activities in accordance with NPDES Phase II Construction Activity, and the adopted City Stormwater Ordinance.
2. The City will enforce the erosion and sediment control plan and best management practices on construction sites to control erosion, soil loss, and sedimentation. Areas adjacent to waterbodies and wetlands will receive highest priority.
3. The City will cooperate with State and Federal requirements for stormwater permits on land alteration activities.
4. The City may prohibit work in areas having steep slopes and/or high erosion potential where the impacts of significant erosion cannot be protected against or mitigated. In addition, as part of the development proposal, the City may require restrictive easements on areas having steep slopes or high erosion potential. The City will not allow land disturbance or development activities in areas of 18% or more. The City will require developers to clearly define all areas 18% or over on the Erosion Control Plan.
5. The City will sweep paved streets within the community at least two times per year. Areas with direct discharge into lakes, wetlands, and streams will be given first priority.

6. The City will establish an inspection program to evaluate sites where land disturbance will take place. The inspections will follow the procedures established in Sections 7 through 9 of the Stormwater Ordinance as well as other applicable State and Federal permit requirements.
7. The City will require financial securities to assure compliance of the stormwater pollution control plan. The securities procedure shall be based on Sections 6.4 to 6.7 of the Stormwater Ordinance.

III.4. Wetlands

Goal: To protect wetlands in conformance with the requirements of the Minnesota Wetlands Conservation Act and rules, and other State, County, and Federal regulations.

Policies:

1. Steele County has accepted the Local Governmental Unit (LGU) responsibility for wetland management and will manage wetlands in conformance with the Minnesota Wetlands Conservation Act (WCA) of 1991, its amendments and rules (MN Rules Chapter 8420).
2. The City will notify parties proposing land disturbing activities (i.e.: altering, dredging, filling, and draining) in wetlands of possible permit requirements from the MDNR, MPCA, and US Army Corps of Engineers (USCOE).
3. The City will cooperate with the permitting programs of Steele County, MDNR, MPCA, and USCOE for proposed activities within the jurisdictional wetlands.
4. The City will utilize available wetlands inventory information developed by the U.S. Fish and Wildlife Service, and the MDNR to preliminarily identify the location of wetlands on properties where land alteration is proposed.
5. The City will require a wetlands report identifying jurisdictional wetlands as part of the City approval process for land development. If wetland encroachments are proposed with the

development, wetland values and impacts will be evaluated on a case-by-case basis in accordance with the requirements of the WCA and rules.

6. Wetland excavations for the purpose of wildlife enhancement will comply with the criteria described in the MDNR publication “Excavated Ponds for Waterfowl” (1992).
7. The City will cooperate with interested private or governmental parties on wetland restoration projects and may participate in the State’s wetland banking program if the City’s interests are benefited.
8. For new developments or redevelopments that increase impervious surface areas, the City will require pretreatment of stormwater runoff prior to discharge to a City waterbody or wetland. Pretreatment methods shall meet MPCA NPDES Permanent Stormwater Management requirements (refer to MN R10001 permit), or a facility providing equivalent performance standards. Exceptions to this requirement may be allowed by the City if pretreatment is not technically or financially feasible.

III.5. Public Ditch and Tile Systems

Goal: The City will cooperate with county agencies efforts to maintain the existing county tile and ditch systems.

Policies:

1. The City will notify Steele County Ditch Engineer and require location of existing tile and ditch systems for any land alteration activities.
2. The City will not allow any alteration to the ditch or tile system without approval from Steele County Ditch Engineer.
3. The City will require mitigation if altering of the ditch system is proposed. The mitigation will need to show through necessary calculations no net loss of ditch capacity.

4. The City will work with the Steele County Ditch Engineer if any ditch or tile improvements or repairs are required.
5. The City will work to develop mitigation plans for known problem areas that are currently located over existing tile lines.
6. The City will not allow any proposed storm sewer lines to connect to any county tile line.

III.6. Groundwater

Goal: To protect groundwaters by prudent management of surface waters.

Policies:

1. The City will cooperate with County and State agencies to inventory and seal abandoned wells and notify its residents of State standards on well abandonment.
2. The City will require individual sewage treatment systems (ISTS) to be in conformance with the State of Minnesota's on-site sewage treatment system requirements.
3. The City will consider the significance of sensitive geologic areas when making land use decisions, when reviewing development proposals, or when proposing construction of stormwater facilities. Activities that may have significant contamination potential will be required to include groundwater protection measures.
4. The City will encourage the use of infiltration methods to promote groundwater recharge where groundwater will not be significantly impacted by the land use or stormwater runoff.
5. The City has established a local spill response, containment, and cleanup protocol that includes first response activities by the local fire department and subsequent assistance, as necessary, by the Minnesota State Duty Officer.

6. The City will work with County and State Agencies with policies established by an adopted Groundwater Management Plan that pertain to surface water management activities.
7. The City will not allow any illegal discharges or illicit connections to enter the City stormwater system. The City will follow procedures established by Sections 8.1 to 8.4 of the Stormwater Ordinance to ensure compliance to not allow any illegal or non-stormwater discharge into the City stormwater system.

III.7. Recreation, Fish and Wildlife

Goal: To protect and enhance recreational facilities, and fish and wildlife habitat.

Policies:

1. The City will support the efforts of Local, State, and Federal agencies promoting public enjoyment, and the protection of fish, wildlife, and recreational resource values in the City.
2. The City will protect wetlands in accordance with the goals and policies of this plan.
3. The City will encourage its residents to retain existing wetlands, vegetation buffers, and open spaces for the benefit of wildlife habitat.
4. The City will encourage the MDNR to continue the existing fish stocking programs in City lakes and expedite implementation of lake management plans.
5. The City will guide future land planning and community development considering existing wooded areas.

III.8. Enhancement of Public Participation, Information and Education

Goal: To educate and inform the public on water resources management issues, and to increase public participation in water management activities.

Policies:

1. The City will develop and implement a public education program to foster public participation in responsible water quality management practices by residents and businesses. The public education will include topics such as: fertilizer use and the limited need for phosphorus in fertilizer; lawn care and lawn chemical use; solid, liquid and household hazardous waste disposal; and natural water resource systems and protection methods.
2. The City will coordinate public information and education programs with information and activities from State and Federal agencies and the watershed management organizations.
3. The City will prepare and distribute water resource and water quality related information to residents at least once annually. The City will also have various water resource protection information available at City Hall for review by its residents.
4. The City will develop a Water Resources Library available for public review at City Hall. The library will contain resources referenced in this SWMP, public information on water quality practices and activities, and other water resource-related documents and information.
5. The City will consider forming an Environmental Commission, or Advisory Committee to address water resource-related public education and information, solicit public concerns and issues, and develop further water resource management strategies as issues arise.
6. The City will utilize best management practices in the management of City lands and public works facilities, recreational areas, and open space areas.

7. The City will require all lawn care companies operating in the community to have phosphorus-free fertilizer available for lawn applications and inform lawn care customers that phosphorus may not be required in fertilizer applications. The City prohibits phosphorus fertilizer applications except where noted in Sections 1052.05 and 1052.10 of the City Code as shown in Appendix I.

SECTION IV

ASSESSMENT OF PROBLEMS AND CORRECTIVE ACTIONS

SECTION IV – ASSESSMENT OF PROBLEMS AND CORRECTIVE ACTIONS

This section contains an assessment of existing and potential water resource related problems presently known within the City and a description of structural, non-structural, or programmatic solutions that could be used to address or correct the problems. The problems and concerns have been identified by City staff as part of the land and water resource data collected in the preparation of this SWMP. Some of the topics discussed herein are repetitive because they are presented according to the State rules and are outlined for local management plan preparation.

IV.1. Lake and Stream Water Quality

Assessment:

- a. Straight River, Maple Creek, and Crane Creek within the City are listed as “Impaired” by the MPCA TMDL program based on limited monitoring data.
- b. Reduced water quality discharges from erosion and sedimentation in stormwater quality ponds.
- c. Sediments in runoff being discharged directly into lakes and City waterbodies from roadway areas and storm sewer outfall pipes without prior pretreatment.

Corrective Action:

- a. Define and reduce the land use activities within the City causing water quality degradation to the rivers and creeks once the TMDL is approved. Cooperate with MPCA and Steele County SWCD on District projects in tributary subwatersheds and waterways within the City.
- b. Develop and implement a stormwater facility inspection and maintenance plan for stormwater piping, sumps, and ponding facilities.

- c. Stringently uphold City erosion control standards for land development and house building activities; prioritize or increase frequency of street sweeping for areas draining directly into City waterbodies; require new storm sewer outfalls to incorporate stormwater treatment prior to discharge, where feasible; incorporate stormwater treatment in system upgrade projects where feasible; regularly maintain and clean storm sewer ponding and piping facilities; dredge and dispose of sediment debris at storm sewer outlets; construct natural or structural sediment control buffers at end of roadways draining into waterbodies.

IV.2. Flooding and Rate Control Issues

Assessment:

- a. The SWMP has identified problem areas that can or has experienced flooding during significant rainfall events. The problem areas include areas that have previously flooded, and have shown the potential to flood based on modeling results.
- b. The City will have future flooding problems due to industrial, commercial and residential expansions namely along the western and southern portions of the city.
- c. Storm main located in the central part of town is generally undersized based on HydroCAD modeling, and contains segments built from vitrified clay.

Corrective Action:

- a.and b. The SWMP Capital Improvement Plan (CIP) has identified proposed ponding and/or storm line improvements intended to alleviate localized flood impacts within the city. The implementation of these CIP projects will provide the City better means to control existing flooding locations, and future flooding due to urbanization. The CIP is further explained in Section V.

- c. If not already identified in the CIP, these areas should be further investigated and assess potential flood damage to property particularly where low-points or sags along the storm lines are located. The vitrified clay segments should be televised or inspected to determine if there are breaks which affect storm line capacity. Those segments found to be defective should be removed, or slipped-lined so capacity can be restored. Major repair or upgrades needed as a result of investigations should be included in the CIP program.

IV.3. Impacts of Water Quantity or Quality Management Practices on Recreational Opportunities

Assessment:

- a. Existing land use activities and land development within the City may adversely impact water related recreational activities in City waterbodies.
- b. Sediments in stormwater discharges at storm sewer outfalls create sediment deltas at boat docking areas obstructing lake and river usage.

Corrective Action:

- a. Water related recreational activities will be considered in land use decisions and in reviewing land development proposals.
- b. Implementing erosion control practices, street sweeping, storm sewer upgrades and maintenance, and dredging will uphold recreational opportunities.

IV.4. Impacts of Stormwater Quality on Fish and Wildlife Resources

Assessment:

- a. Sediment, nutrients and urban pollutants in untreated stormwater discharges adversely impacts water quality and fish and wildlife resources.
- b. Manicured lawns immediately adjacent to lakes and wetlands may allow lawn chemicals to runoff directly into waterbodies and also encourages habitation of lawns by Canada geese and the resulting deposition of waterfowl waste.

Corrective Action:

- a. Stormwater discharges will be pre-treated prior to release into City waterbodies and wetlands, where feasible.
- b. Residents will be encouraged to not use lawn chemicals in areas that may readily drain into waterbodies, wetlands and watercourses. Natural vegetative alternatives to manicured lawns will be encouraged around all City waterbodies.

IV.5. Impacts of Soil Erosion on Water Quality and Quantity

Assessment:

- a. Construction-related soil erosion can occur on small-and large-scale construction projects. Sediment can be discharged off-site or into City waterbodies by direct runoff or by construction equipment tracking sediment off-site.
- b. Erosion of steep slopes due to natural causes or construction activities can adversely impact waterbodies or watercourses.

Corrective Actions:

- a. Erosion and sediment control plans will be prepared, implemented, and enforced on construction projects to prevent erosion, sedimentation and adverse water quality impacts.
- b. Existing eroded steep slopes will be addressed and corrected, when feasible, or as part of development proposals. Development within steep slopes will be discouraged unless adverse impacts can be properly mitigated.

IV.6. General Impact of Land Use Practices, and in Particular, Land Development and Wetland Alteration on Water Quality and Water Quantity

Assessment:

- a. Land use practices, land development and wetland alterations may have a significant impact on water quality and water quantity. Impervious surfaces are often the receiving source of urban pollutants and contribute more runoff volume than natural land and vegetation. Increased development in the City has the potential to increase downstream flooding and degrade water quality.
- b. Land development in adjacent communities may increase the flooding potential within the City and future land development in Owatonna, without proper planning, may increase the flooding potential within the City.

Corrective Actions:

- a. Implementation of the stormwater management practices within this SWMP will address potential negative impacts of land development. The City will work with new development proposals to remedy existing drainage problems, where feasible. Implementation and enforcement of erosion control best management practices will protect the quality of surface waters.

- b. Better communications and cooperation with adjacent communities will reduce unanticipated impacts of land development and improve joint water resource planning and improvement efforts.

IV.7. Adequacy of Existing Regulatory Controls to Manage or Mitigate Adverse Impacts on Public Waters and Wetlands

Assessment:

- a. Public waters and wetlands are currently regulated by programs administered by the USCOE, MDNR and by Minnesota's Wetland Conservation Act (WCA). Steele County has accepted the responsibility of the Local Government Unit (LGU) and currently administers the WCA requirements.

Corrective Action:

- a. It is the City's position that the existing regulatory programs and the implementation of this SWMP can adequately manage or mitigate adverse impacts on public waters and wetlands.

IV.8. Adequacy of Programs to Limit Soil Erosion and Water Quality Degradation

Assessment:

- a. As part of the land development or alteration, the City requires the qualified preparation of stormwater management plan, by a qualified party, including an erosion and sediment control plans to address temporary and permanent water quantity and quality issues and erosion concerns. Sometimes, stormwater management facilities are not fully constructed. In other cases, erosion control practices are not implemented or maintained. These shortcomings result in the project potentially not meeting design standards and soil erosion standards. This may result in the degradation of water quality.

Corrective Action:

- a. The City will enforce its current sediment and erosion control program and require verification that permanent stormwater management facilities have been constructed in accordance with the approved plans.

IV.9. Adequacy of Existing Programs to Maintain the Tangible and Intrinsic Values of Natural Storage and Retention Systems

Assessment:

- a. There is a varied and diverse wildlife in City waterbodies. Land use activities and future land development have the potential to reduce recreational and wildlife opportunities and the natural values of the City waterbodies.

Corrective Action:

- a. It is the City's position that the existing State, Federal and Local regulatory controls will maintain the tangible and intrinsic values of City waterbodies.

The City will maintain flood storage volumes below 100-year flood plain elevations on all waterbodies, and obtain easements, where feasible, below floodplain elevations for the protection and maintenance of the waterbodies.

The City may consider future water quality analysis or diagnostic feasibility studies of City lakes to further determine conditions of the waterbodies, potential expanded uses, and long-term impacts of existing or future land activities.

IV.10. Adequacy of Existing Programs to Maintain Water Level Control Structures

Assessment:

- a. As land development occurs, ponds and storm sewers are being constructed within the community. Pond outlets and skimmers control water levels and outlet discharges.

Corrective Action:

- a. The City will develop an outlet control maintenance plan to periodically inspect public lake and pond outlet structures and other important stormwater facilities. The maintenance plan will include cleaning, maintaining, and upgrading facilities as necessary, and as feasible. For private stormwater facilities, maintenance agreements may be developed to ensure proper water level and discharge control and functioning stormwater facilities.

IV.11. Adequacy of Capital Improvements Program to Correct Problems Related to Water Quality, Water Quantity Management, Fish and Wildlife Habitat, Public Waters and Wetland Management, and Recreational Opportunities.

Assessment:

- a. The SWMP's CIP has prioritized capital improvements needed within the community. The CIP will also likely identify funding sources for the improvements in the near future. Currently the City has a stormwater utility fund that may be used to fund stormwater management projects and programs deemed by the City to be in the public's best interest.

Corrective Action:

- a. The City will need to identify and prioritize stormwater-related improvements in the CIP and additional methods of project financing. In addition, the City will need to address a variety of water quality and quantity issues in conjunction with land development proposals or City street improvement projects on a case-by-case basis, when feasible.

IV.12. Future Potential Problems Anticipated to Occur Within Next 20 Years Based on Growth Projections and Planned Urbanization

Assessment:

- a. General – Urbanization with added areas of impervious surfaces has the potential to decrease water quality and increase flooding potential both during construction and after development is complete. During construction, erosion and sedimentation can degrade water quality and in the longer-term, additional pollutants may be discharged to waterbodies due to urbanization.
- b. Pond and Stormwater Maintenance – Urbanization will increase the number of public and private stormwater ponding and drainage facilities. For the facilities to adequately and effectively function, routine inspection and maintenance will be required. City and private funds will need to be expended for stormwater-related inspections and maintenance.
- c. Minor Storm Sewer and Water Quality Improvements – It is anticipated that there will be increased public pressure to address minor storm sewer or drainage problems and water quality issues within the City. The projects are often difficult to fund and to obtain wide community support due to perceived limited benefit.

Corrective Action:

- a. General – To maintain water quality and protect against flooding, urbanization will need to follow an orderly process of site evaluation, design and project construction. Construction activities will need to include erosion control practices, and low impact site development. The CIP includes proper stormwater ponding and storm drainage facilities for the control of surface waters based on anticipated land use. The City will emphasize using regional treatment basins for these urbanizing areas.
- b. Pond and Storm Sewer Maintenance – A city-wide pond and storm sewer maintenance program should be established and funded to regularly inspect, clean, and maintain

public stormwater facilities. For private stormwater facilities, maintenance agreements may be established identifying maintenance programs, responsible parties, and consequences for non-compliance.

- c. **Minor Storm Sewer and Water Quality Improvements** – Minor stormwater-related improvements should be identified and prioritized. A funding method should be established and a process determined for implementing these projects.

SECTION V

IMPLEMENTATION PROGRAM

SECTION V – IMPLEMENTATION PROGRAM

This section identifies the various methods, programs and official controls available to the City for the implementation of this SWMP. Many of these items are already in place, and currently utilized by the City.

V.1. Regulatory Controls

There are various regulatory controls to manage and protect water resources and reduce stormwater-related impacts in the community. The following presents each of the official controls:

1. Floodplain Management Ordinance

The City has adopted an MDNR-approved Floodplain Management Ordinance.

2. Stormwater Ordinance

The City is in the process of adopting an ordinance for proposed and existing stormwater facilities. The current ordinance appears in Appendix H. The ordinance will present a major portion of the goals and policies presented in the SWMP.

3. Wetland Regulation

Steele County has accepted the responsibility of the Local Governmental Unit (LGU) under the Minnesota Wetlands Conservation Act.

4. Subdivision Ordinance

The City has adopted Platting and Subdivision Regulations controlling the land use and development of property within the community. In addition to other items, the ordinance addresses City project review and approvals, development of steep slopes, the necessity of erosion and sediment control plans, design standards for stormwater facilities and required flowage and drainage easements.

5. Dredging

The City will not assume responsibility for permitting this activity. The permitting responsibility will be retained by the State and Federal agencies.

6. Erosion Control

The City will assume responsibility for this permitting and require land disturbing activities to comply with City standards that meet or exceed MPCA requirements.

7. Stormwater Management for Land Development Projects

The City will assume responsibility for this permitting and will require land development projects to comply with City standards that meet or exceed MPCA requirements.

8. Stream and Lake Crossing

The City will assume responsibility for permitting this activity, where possible, and require development, land activities, and roadway construction to comply with City ordinances and standards, and State rules and permitting requirements.

V.2. Management Programs

The City will implement or encourage the following water resource-related management protection programs.

V.2.1. Best Management Practices

- a. The City will continue sweeping paved public streets at least two times per year with highest priority given to streets draining directly to waterbodies.
- b. The City will develop and implement a public stormwater facility inspections and maintenance plan and require similar plans for private stormwater systems. Stormwater facilities will be inspected every other year with deficiencies identified and prioritized. Deficiencies will be

corrected as deemed necessary by the City and in accordance with available funds and City priorities.

- c. The City will vacuum storm sewer sump manholes on a yearly basis.
- d. The City will endeavor to provide a yard waste management program for the community's leaves and brush. Citizens will be encouraged in City newsletters to develop their own compost areas and at locations well away from waterbodies and wetlands.

V.2.2. Public Education

The City will prepare and implement a public education program to foster sound water resource protection practices within the community. Public education may include at least two public information newsletters per year distributed to the citizens and made available for review at City Hall. Information will include topics such as restricting phosphorus use, proper lawn waste disposal, wetlands awareness, etc. In addition, the City will develop additional strategies necessary to protect the City's water related amenities.

V.2.3. Phosphorus Ordinance

The City has adopted an ordinance regarding phosphorus fertilizer application. The City will also provide the public with information on the limited necessity of phosphorus in lawn fertilizing and the determination of phosphorus needs based on soil tests. The City phosphorus ordinance appears in Appendix I.

V.2.4. Water Quality Monitoring

The City will support efforts of the MPCA, Steele County SWCD, and other agencies collecting water samples in the City.

V.3. Stormwater Design and Performance Standards

The following design and performance standards will assist in proper stormwater management, reduce flooding impacts, and help in the planning for urban development and redevelopment.

V.3.1 Maximum Flowrates

Maximum stormwater discharge rates will be controlled on a subwatershed basis, where feasible, to not exceed the existing subwatershed flowrates. For land development projects, the City will determine whether regional or on-site stormwater facilities are required. Subwatershed discharges or individual site discharges may only exceed existing conditions in cases where the downstream stormwater conveyance system is adequate to convey the additional discharges. In the case of discharge across municipal boundaries, the downstream community will be made aware of the proposed discharge increase.

V.3.2. Ponding Facilities

Stormwater ponding facilities shall be designed and constructed to meet water quantity and water quality requirements of this SWMP. Ponding facilities shall also meet additional requirements described in the Stormwater Ordinance when adopted.

On-site water quality ponds shall be wet detention basins meeting the wet detention pond recommendations or equivalent performance standards outlined in the MPCA's handbook entitled "Protecting Water Quality in Urban Areas." Equivalent performance standards will be treatment standards obtained by wet detention ponds, including removal efficiencies of 90% for suspended solids and 60% for total phosphorous. Stormwater ponds shall include a skimmer, where feasible, to remove oils and other floating pollutants. Additional pond design standards are provided in Section VII.

V.3.3. Stormwater Conveyance Systems

Trunk storm sewer and conveyance systems downstream of ponds or other stormwater storage areas shall be capable of conveying the 100-year storm event discharge from the storage facility without flooding structures. Lateral storm sewers within site developments shall be designed for the 10-year storm event. Natural drainageways used for trunk or lateral storm drainage shall be bio-engineered or structurally armored to prevent erosion.

V.3.4 Floodplain Standards and Minimum Building Floor Elevations

Storage volumes below flood plains and projected 100-year high water levels shall be maintained. Fill which displaces storage volumes below flood plains, if allowed, shall be mitigated elsewhere on the same waterbody. Fill and excavated areas below the floodplain shall be protected against erosion.

Lowest openings and lowest floor elevations (without City approved flood protection measures) for new buildings adjacent to wetlands or other water bodies shall provide a minimum 2-foot freeboard over the projected High Water Level (HWL). For buildings adjacent to wetlands or other water bodies without a calculated HWL, there shall be a minimum of a 3-foot freeboard above the Ordinary Highwater Elevation (OHW).

V.4. Stormwater Capital Improvements Program (CIP)

One of the key objectives of this SWMP is to control stormwater runoff while minimizing public expenditures, and to prepare a regional pond system to handle industrial expansions. The development of the City stormwater CIP will greatly help accomplish these objectives. The CIP projects have been identified based on historical upland flooding problems that have occurred within the City, anticipated city growth, and based on HydroCAD modeling. The improvements will include stormwater ponds that will be built to current City standards and will provide water quality treatment, and trunk storm lines designed to carry either pond outlets, or channelized urban runoff. Detailed cost estimates will appear

in Appendix G. The locations of the stormwater improvements are found in Maps 1 through 4 and the Overall Drainage Map.

V.4.1 CIP Priority Ranking of Projects

The stormwater CIP projects have been prioritized into four categories alphabetically based on importance. The projects identified by the City as posing the highest current flood hazard risk based on anticipated or real property or health damage are placed in the “A” category. The “B” category projects are located in lower flood hazard risk areas where development is scheduled to take place. The “C” category projects are also located in future development areas but currently do not exhibit appreciable flood hazard risks. The “D” priority projects are located in lower flood hazard risk areas where future expansion is likely not to occur. The “A” and “D” projects generally serve areas where ultimate development has already occurred or no major development is planned. These projects do not include remediation of any areas located within FEMA 100-year floodplain boundaries and are restricted to areas impacted by localized flooding only.

The City should fund the “A” projects and “B” projects (when development is scheduled to occur) as soon as feasible and when funds are available. Funding sources that the City can use to pay for these projects are identified in Section VI.3. For “B” and “C” projects, the City should rely primarily on the developments that will contribute pollutant and expanded runoff to these ponds as the primary funding source.

V.4.2 CIP Project Cost Analysis

To determine the improvement cost estimates, average values for excavation and pipe installation were calculated based on submitted construction projects for the year 2003 printed in the *Contractor's Data Report* for Minnesota. Inflation was added to the construction costs to account for present day (2006) dollars. The costs for land acquisition were calculated based on current land values used by the City Engineering Department. The costs for engineering, contingency, restoration, and other indirect costs are assumed as a percentage of the project costs for pipe installation, land acquisition, and excavation. An additional 3%¹ increase in construction cost should be added based on inflation each year following year 2006.

¹= Approximate value used for yearly inflation for construction projects determined by the Engineering News Record.

SECTION VI

IMPLEMENTATION PRIORITIES AND FINANCIAL CONSIDERATIONS

SECTION VI – IMPLEMENTATION PRIORITIES AND FINANCIAL CONSIDERATIONS

VI.1. Implementation Priorities

This SWMP has presented an implementation program identifying the various regulatory controls, management programs and potential capital improvements to address City water resource related needs and funding capabilities. Table 6 below prioritizes the implementation program. It is the City's position that regulatory controls and management programs can be funded within 0-12 months of this SWMP being adopted by the City Council. Capital improvements will need to be implemented and funded by private parties or the City based upon City growth, demand and available resources.

Table 6 – Implementation Program Priorities

Ranking	Implementation Program Description
1	Adoption of a Stormwater Ordinance and SWMP to verify adequate planning and engineering review of all new development or redevelopment sites and roadway improvements for conformance with goals, policies and management objectives mentioned in this SWMP.
2	Construct or require construction of capital improvements to address existing flooding and stormwater rate control problems and concerns identified as “A” priority CIP projects (see Section V and Appendix G) of this SWMP.
3	Improve inspection and enforcement of erosion control measures for site development.
4	Develop and implement a stormwater facilities inspection and maintenance plan. Highest priority should be the central portion of town served by clay mains and trunk storm main shown to be deficient based on modeling.
5	Acquire easements for future ponding areas, stormwater facilities, and for access to outlet control structures.
6	Develop and implement a public information and education plan.
7	Construct or require construction of capital improvement to address possible stormwater related problems anticipated due to future City growth and urbanization identified as “B” or “C” priority projects of this SWMP.
8	Construct or require construction of capital improvements to address existing flooding and stormwater rate control problems and concerns identified as “D” priority projects of this SWMP.

VI.2. Financial Considerations

Implementing this SWMP will have financial impacts on the City. The paragraphs below describe the implementation item and the anticipated cost of the associated regulatory control or management program. These are not necessarily new costs to be budgeted by the City since many of these costs are already being charged back to developments or included within current City programs. The subsection to follow identifies various methods available to the City for funding these programs and future capital improvements.

- a. The City will review site plans and other proposed projects for conformance with this SWMP. The estimated cost for this item is \$5,000-10,000 per year. These costs will generally be recouped from the proposers of new developments.
- b. The City will inspect and enforce erosion control measures identified in this SWMP. The estimated cost for inspection is \$15,000-20,000 per year. Portions of these costs will be recovered by permit fees associated with building activity.
- c. The City will review municipal stormwater facilities every other year. The estimated cost for this item is \$5,000-10,000 per year. Costs for needed maintenance of stormwater facilities may require additional financial resources based on specific needs.
- d. Acquisition of easements around ponding areas, stormwater facilities or for access to outlet control structures will be identified during the City project review process. Some easements can potentially be obtained during the project review process. The additional cost for this item will vary greatly based on project approval conditions and the value and use of property within the easement areas.
- e. The City will develop and implement a public information and education plan. The estimated cost for this item is \$5,000 per year.

- f. Construction of capital improvements addressing known water resource problem areas or anticipated problems due to redevelopment and growth will require detailed engineering feasibility studies, construction documents and property easements. The specific improvements will need to be determined based on need, cost and availability of funds.

VI.3. Funding Sources

V.I.3.1 City Funding Sources

Existing City Funding Sources

The City currently has a number of funding sources available to pay for the regulatory controls, management program, and capital improvements identified in this SWMP. Those sources include general tax revenue, bonding, special assessments and the City's Stormwater Utility Fee. The City currently generates approximately \$215,000 per year for Storm Water Utility Fee revenues. For minor storm water projects and repair the City budgets \$25,000 per year.

While general tax revenues and the stormwater utility fee can likely fund the regulatory and management programs, special assessments and bonding will generally be required to fund the larger capital improvements projects. Special assessments may not be effective for some projects because there may be difficulties in determining public benefit or assessing runoff impacts from individual contributors. Bonds may also not be effective due to the risk involved and the possible negative effects on the City's bond rating.

Additional City Funding Sources

The City may also levy additional monies to pay for stormwater improvements. Minnesota Statutes 103B.241 allows the City to create these levies to pay for projects identified in the SWMP. Those projects can include regional ponding, upgrades of existing stormwater structures, etc.

The City can assess new development by creating Impact Fees based on the type of development that is proposed. Impact fees can also be assessed in forms similar to fees associated with other utilities like

building permit fees, connection charges, land development fees, area use charges, etc. Impact Fee rates should be consistent based on proposed land use similar to the Stormwater Area Charge and the rate schedule should be included, once approved, in the Stormwater Ordinance.

In areas that are slated for redevelopment, the use of Tax Increment Financing (TIF) may be used to fund stormwater improvements. The City should use caution on when to apply and document a stringent procedure on when TIF money can go to fund these stormwater improvements especially if there are Impact Fees already in place.

There are also other additional sources of revenue that the City should explore in addition to City measures in providing stormwater improvements. The type of sources is divided up by public and private agencies. The public sources include county, state and national governmental agencies. Some of the public sources can dissolve due to government cutbacks, or new programs may evolve as a result of legislation. Private sources are mainly dependent on individual private donations.

VI.3.2 Public Funding Sources

County Agencies

Steele County may have available funds for stormwater projects within the city. The projects tend to be more educative in nature and are part of the “Green Source 2020” program. Current projects include storm drain stenciling and marsh restoration.

The Steele County SWCD has set forth an implementation plan for wetlands, soil erosion, flooding areas, landuse, hazardous waste, septic fields and surface water projects. The City may be able to share costs of implementing these projects that are identified high priority by both the SWCD and the City.

State Agencies

The Minnesota BWSR has several grant programs that can be enacted by City projects. Most of these funds are in the form of matching grants. The BWSR has a set policy on how to apply for these grants and requires approval of the SWCD in addition to BWSR in order to receive these funds. The grant programs BWSR currently provides are the Reinvest In Minnesota program, the Cost-Share program for general projects, the Feedlot Water Quality Cost-Share program for feedlots, and the Natural Resources Block Grant program for shorelines and wetlands.

The MDNR has several grant programs that can apply. Some programs are intended for private landowners, however the city can also benefit due to areas owned by private parties that can be restored to provide open areas that can alleviate flooding or other stormwater problems that may exist. Those programs include:

- Land Donation (Land Gift Fund)
- Forestry Challenge Grants – where the City can use monies for tree protection, creating City forest management plans, and volunteer training.
- Project CORE – for fish management areas
- Roadsides for Wildlife – program which the DNR reimburses the City for improvements that are made to the roadways to improve wildlife (revegetating, erosion control)
- Minnesota Natural Prairie Bank Conservation Program – pays landowner up to 60% of the market rate of cropland use to maintain land as prairie.

The MPCA has several volunteer, grant, and loan programs that can be available to fund City projects.

These projects include:

- Clean Water Partnership Section 319 Grant Program - state program that offers grants (one-to-one funding) for improvements that include lake and stream improvements, as well as non-point source pollution areas.
- Citizen Lake Monitoring Program – will provide supplies to monitor lakes on a volunteer basis (secchi disk).

- River Monitoring Program – similar to lake monitoring, but the volunteers determine river clarity through transparency tubes as well as observation data. Volunteers also collect precipitation data to gauge stream activity.
- Water Pollution Revolving Loan Program – can be used to fund non-point pollution remediation programs with the EPA providing some up-front grant monies.

The Minnesota Office of Environmental Assistance (MOEA) offers “time sensitive grants” to agencies looking to reduce or control waste. The agency will be accepting applications until 2006.

MNDOT state aid funds can be used to acquire right-of-way or make infrastructure improvements on roads within the city.

Federal Agencies

The USEPA office of Waters and Wetlands department has set up a website database which lists current grant and loan programs available through federal agencies such as WCA, FWS, FEMA, FHWA, USCOE, USEPA, US Department of Agriculture (USDA), etc. The website provides detailed information including funds available, application procedures and deadlines, type of allotment (i.e. matching or direct grant or reimbursement, or loan). The database includes all funding programs that pertain to watershed protection including education and water quality testing. The website is updated periodically and is located at: <http://cfpub.epa.gov/fedfund/index.cfm>.

VI.3.3 Private Funding Sources

There exist private organizations that can provide funding for stormwater related projects. These programs or organizations specialize in cleanup and restoration of lands and water but also may provide assistance in stormwater education issues. Some of these agencies include:

- Izaak Walton League
- Civic (Community Service) Organizations
- Adopt-a-Highway/Stream/River
- Ducks Unlimited
- Pheasants Forever

The USEPA also provides a comprehensive website database on private groups that will offer grants for additional stormwater related projects including flood control. The database is updated periodically and provides links to the individual organizations and a brief description of each site. The website can be found at <http://cfpub.epa.gov/fedfund/othersources.cfm>.

SECTION VII

STORMWATER MANAGEMENT PLAN AND EROSION CONTROL STANDARDS

SECTION VII – STORMWATER MANAGEMENT PLAN AND EROSION CONTROL STANDARDS

All new construction or development projects with land disruption over 1.0 acres and is located within the city limits or is located within the drainage boundaries defined by the SWMP, will be required to prepare and submit for City review a stormwater management plan and erosion control plan meeting the following standards mentioned in this SWMP and minimum MPCA Best Management Practices (erosion control measures) during construction. In addition to standards provided in this SWMP, the stormwater and erosion control plans shall also meet standards applicable to the City Stormwater Ordinance.

VII.1. Stormwater Management Plans

The plans shall be prepared in accordance to application procedures set forth in Sections 5.0 to 5.2 in the current draft of the City Stormwater Ordinance. The plans shall show all items as mentioned in Section 5.2 for the existing conditions, site construction, and final site plan as well as any other pertinent information as necessary or if required by the City for each plan.

- a. The rate of runoff from the developed site shall not exceed peak direct runoff discharges for the applicable existing Drainage District flowrates as identified in Appendix F of this SWMP. Exceptions shall include written notification from the City Engineer allowing the increased discharge in cases where rate control will be maintained downstream, or if rate control is not feasible. In cases where discharge rates are not identified, and for all other cases, the developed peak rates shall not exceed existing conditions for the 2, 10 and 100-year storm events.
- b. All proposed structural stormwater detention facilities (and/or retention) shall be required to maintain or improve stormwater quality prior to discharge from the site. Acceptable detention/retention facilities include but are not limited to:

- Wet Detention Basins
- Infiltration Basin/Infiltration Trenches/Rainwater Gardens
- Grassed/Vegetated Swales
- Extended Detention Dry Ponds
- Underground Vaults
- Filter Strips

All proposed temporary or permanent detention/retention facilities must ultimately show treatment levels that meet or exceed MPCA pollutant removal standards and must use acceptable engineering methods. Once approved by the City, the developer must provide a copy of the approved MPCA Phase II "Storm Water Discharge associated with Construction Activity" permit application (MN R.100001) before land alteration can commence. Each individual downstream conveyance system shall be designed for the 100-year, 24-hour storm event and at the point of ultimate discharge, the flow-rates must be below existing conditions for the 2, 10 and 100-year events or at flows as determined by the City Engineer. Each facility must also have emergency overflows provided and identified on the plans.

- c. All Wet Detention Basins shall be designed in accordance with MPCA Permanent Storm Water Management System Standards and in Section 7.9 of the City Stormwater Ordinance. Wet Detention Basins shall be of similar construction to Figure 13 that is shown at the end of this section.
- d. If infiltration is intended as part of a permanent stormwater BMP, the infiltration basin, trench, rain garden shall be built according to the Infiltration Basin Design and Construction Manual that appears in Appendix J. A sketch of a typical infiltration/filtration basin is provided in Figure 14. If basins are approved, the developer owner may be required to provide a maintenance agreement for each basin constructed. The City will not maintain private infiltration basins.

- e. All detention/retention facilities shall be located at or above the 100-year flood elevation at the site, where possible, and must provide easement areas for required future access, vegetative buffers, and prevent future encroachments or filling.
- f. The volume of site runoff may not increase due to the proposed project when the receiving area downstream is landlocked, and not capable of accommodating the increased volume of runoff. In landlocked areas, the City will encourage construction of a stormwater outlet system and will require easements around ponded water areas and the downstream conveyance systems. A back-to-back 100-year 24-hour storm event shall be used to determine flood impact to any landlocked area, only if no outlet can feasibly be provided.
- g. Runoff draining onto a site must be accommodated in the analysis and design of new stormwater management facilities.
- h. Downstream stormwater impacts due to development shall be addressed with development proposals. Impacts due to water quantity (flowrates and volumes) and water quality shall be identified and appropriate mitigation measures incorporated.
- i. Lowest openings and lowest floor elevations (without City approved flood protection measures) for new buildings adjacent to wetlands or other water bodies shall provide a minimum 2-foot freeboard over the projected High Water Level (HWL). The City will consider allowing a minimum of 2 feet separation where highwater conditions are well established. Emergency overflows shall be at least 1.5 feet below any adjacent building openings in other low areas (i.e. street lowpoints, backyard lowpoints) that do not have an established 100-year highwater elevation, or in lowpoints served by storm sewer that is normally dry after storm events.
- j. There shall be no encroachment upon the floodway (main flowage channel) of the 100-year floodplain. Encroachments may be allowed if pertinent calculations show less than 0.1 increase in the FEMA 100-Year HWL Elevation subject to approval by the City Engineer.

Encroachment into a 100-year floodplain is discouraged but will be allowed if compensatory floodplain storage is provided in the same waterbody and the filled area and excavated areas are properly protected against erosion.

- k. Stormwater design analysis shall utilize an industry standard hydrograph and routing method. Storm sewer lateral systems can be analyzed utilizing a hydrograph method or the rational method. Lateral storm sewers shall be designed to accommodate the 10-year storm event. Runoff “C” values and IDF curves used for the rational method shall be in accordance with MNDOT Drainage Manual Dated August 30, 2000.
- l. An evaluation of local County Tile and Ditch Systems must be performed before any work can begin. The proposed site shall not alter the operation of these tile and ditch systems without approval of the County Ditch Engineer. Tile systems shall not be used for any proposed stormwater conveyance.

VII.2. Erosion Control Plans

Proposed erosion control plans shall show location and type of all temporary and permanent erosion control BMP's on the plan. Detail plates shall be provided for all structural BMP's that are used for either temporary or permanent erosion control.

The plan shall show proposed methods of retaining waterborne sediments on-site during the construction period and proposed restoration, covering or re-vegetation after construction.

The plan shall show locations of any temporary sediment basin(s). Temporary sedimentation basins shall be designed in accordance with Part III.B of the MPCA “Storm Water Discharge associated with Construction Activity” (MN R100001) permit.

Sites with high erosion potential characterized by steep slopes (12% slope or higher) or erodible soil will be required to provide site-specific construction recommendations by a Soils Engineer for City review.

If infiltration/filtration basins (including rainwater gardens) are proposed for the construction site, a note must appear on the plan stating; “The infiltration/filtration basin area(s) cannot be used to treat construction site runoff, and shall not be constructed to final grade until the contributing drainage area has been fully stabilized to the satisfaction of the City Engineer.” In addition, the following statement shall also appear; “ The proposed infiltration basins shall be roped off as not to allow heavy construction site traffic to enter any basin and the basins shall be staked off before any construction can begin.”

If any disturbed soil is located within 200 lineal feet of an “surface water” as defined by the MPCA, and the area has a continual positive slope to the “surface water”, the exposed area must provide temporary erosion protection, or permanent cover according to Part IV.B.2 of the MPCA MN R100001 Permit. Those areas requiring temporary erosion protection or permanent cover shall be identified on the erosion control plan.

All sediment control practices shall be installed according to Part IV.C of the MPCA MN R100001 Permit and Sections 7.1 to 7.7, and Sections 8.1 to 8.4 of the City Stormwater Ordinance. If there are conflicting terms with the MPCA permit and City Ordinance, the more restrictive installation procedure shall dictate.

The erosion control plan shall provide rock construction entrances for all entrances where heavy construction traffic will enter. Those entrances must be clearly identified on the plan.

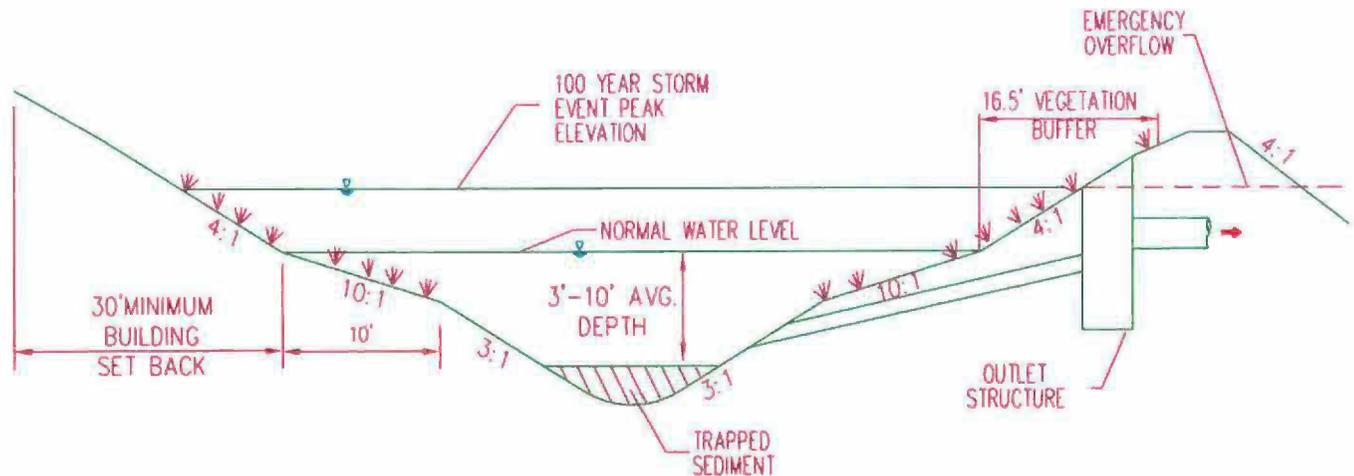
The City shall receive documentation the NPDES General Storm Water Permit for Construction Activity application has been approved from the MPCA, as well as any other approved

applications if required for the construction site such as the Subdivision Registration form, Permit Transfer/Modification form, and the Notice of Termination form.

The City shall be responsible in enforcement of the erosion control and the stormwater management plan. If there is any observed failure of the erosion control or the stormwater management plan measures, the City will notify all applicants listed on the applicable permit to begin corrective work. The notification, timeframe for the permit holder to correct the failure, and City enforcement procedures will follow Section 9.1 of the City Stormwater Ordinance.

STORMWATER DETENTION FACILITIES SHALL BE DESIGNED IN ACCORDANCE WITH THE LATEST VERSION OF THE MPCA PUBLICATION "PROTECTING WATER QUALITY IN URBAN AREAS." AT A MINIMUM, DESIGNS SHALL INCLUDE ALL FEATURES SHOWN HERE.

SLOPES SHALL BE NO STEEPER THAN THOSE SHOWN.



NOTES

THE PERMANENT POND SURFACE AREA SHALL AT LEAST 2% OF THE IMPERVIOUS DRAINAGE AREA OR 1% OF THE ENTIRE DRAINAGE AREA, WHICHEVER AMOUNT IS GREATER.

RECOMMENDED PERMANENT POOL LENGTH-TO-WIDTH RATIO IS 3:1 OR GREATER.

A PROTECTIVE BUFFER STRIP OF VEGETATION SURROUNDING THE PERMANENT POOL SHALL BE PROVIDED AT A MINIMUM WIDTH OF ONE ROD (16.5').

ALL PONDS SHALL HAVE A SKIMMING DEVICE TO KEEP, OIL, GREASE, AND OTHER FLOATABLE MATERIAL FROM MOVING DOWNSTREAM DURING A 1-YEAR STORM.

PONDS SHOULD HAVE A DEAD STORAGE VOLUME EQUAL TO THE POST-DEVELOPMENT RUNOFF FROM A 1-YEAR RAINFALL EVENT.

PONDS SHOULD HAVE A 20' ACCESS EASEMENT IF NOT LOCATED ALONG A ROADWAY.

PONDS SHOULD INCORPORATE MULTI-STAGED OUTLETS TO LIMIT THE 2, 10, AND 100-YEAR PEAK FLOWS TO PRE-DEVELOPED LEVELS AS NECESSARY.

CITY APPROVED VEGETATION WHICH IS CONSISTENT WITH THE SURROUNDING WETLAND VEGETATION SHOULD BE PROPOSED IN THE 10:1 BENCH AREA.

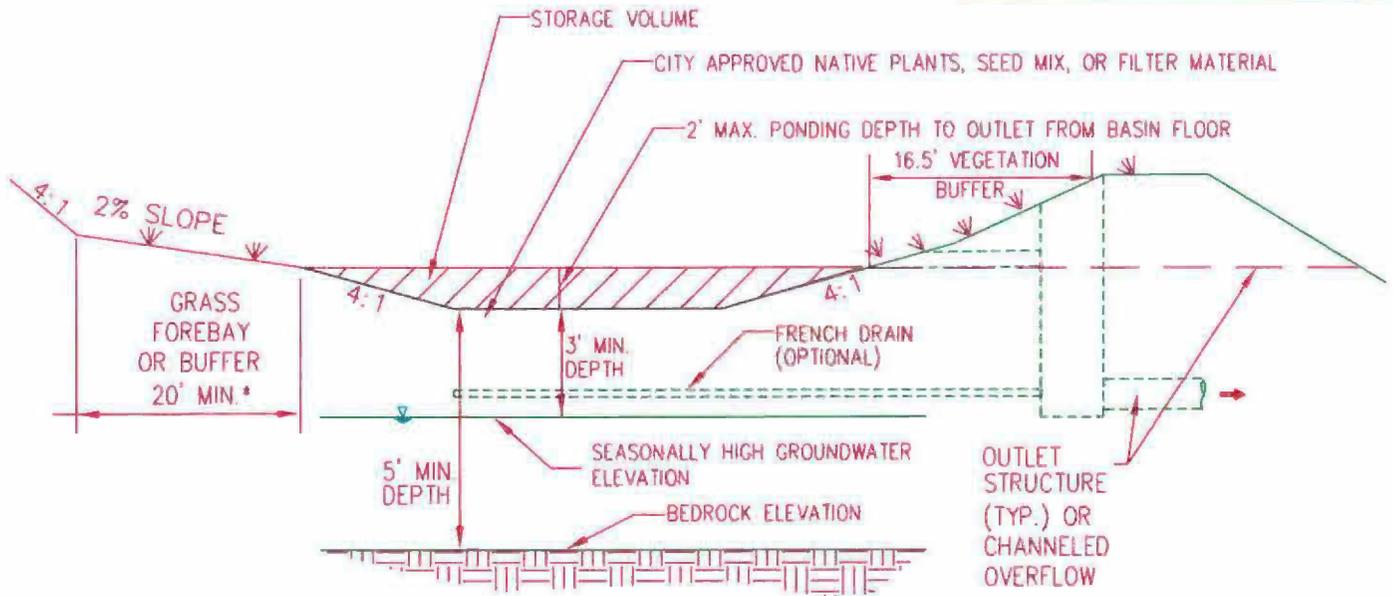
EMERGENCY OVERFLOWS SHALL BE PLACED AT LEAST 1.5' BELOW ADJACENT BUILDING OPENINGS.



**Typical Wet Detention Basin
Figure 13**

STORMWATER DETENTION FACILITIES SHALL BE DESIGNED IN ACCORDANCE WITH THE LATEST VERSION OF THE MPCA PUBLICATION "PROTECTING WATER QUALITY IN URBAN AREAS." AT A MINIMUM, DESIGNS SHALL INCLUDE ALL FEATURES SHOWN HERE.

SLOPES SHALL BE NO STEEPER THAN THOSE SHOWN.



* = REQUIRED IF DRAINAGE IS ROUTED TO BASIN BY PIPE

NOTES

THE BASIN STORAGE VOLUME SHALL BE EQUAL OR GREATER TO THE VOLUME GENERATED BY A 1-YEAR RAINFALL EVENT, OR 0.5 INCH TIMES THE CONTRIBUTING IMPERVIOUS AREA, WHICHEVER IS GREATER UNLESS ADDITIONAL TREATMENT IS PROVIDED BY ANOTHER BMP BEFORE ULTIMATE DOWNSTREAM DISCHARGE.

A PROTECTIVE BUFFER STRIP OF VEGETATION SURROUNDING THE BASIN HWL SHALL BE PROVIDED AT A MINIMUM WIDTH OF ONE ROD (16.5').

INFILTRATION RATE USED FOR DESIGN SHALL BE NO GREATER THAN 1/2 THE OBSERVED RATE.

BASIN SHOULD INCORPORATE MULTI-STAGED OUTLETS TO LIMIT THE 2, 10, AND 100-YEAR PEAK FLOWS TO PRE-DEVELOPED LEVELS (IF BASIN WILL PROVIDE FLOOD PROTECTION) AS NECESSARY.

BASIN SHOULD HAVE A 20' ACCESS EASEMENT IF NOT LOCATED ALONG A ROADWAY.

BASIN SHALL PROVIDE EROSION PROTECTION ON CHANNELIZED OVERFLOWS.

BASIN SHALL BE PLACED NO CLOSER THAN 50' FROM A DRINKING WATER WELL.

BUILDINGS SHALL BE PLACED NO CLOSER THAN 30' UPSTREAM OR 100' DOWNSTREAM FROM THE BASIN.

OBSERVED INFILTRATION RATE SHALL BE 0.5 INCHES PER HOUR OR MORE AND SHALL NOT BE PLACED IN NRCS "D" SOILS.

BASIN SHALL NOT BE USED TO INFILTRATE CONSTRUCTION RUNOFF AND SHALL BE ROPED OFF DURING CONSTRUCTION.

CONSULT "INFILTRATION BASIN DESIGN AND CONSTRUCTION MANUAL FOR USE IN OWATONNA" FOR ADDITIONAL REQUIREMENTS AND GUIDELINES.



Typical Infiltration/Filtration Basin

Figure 14

SECTION VIII

AMENDMENT PROCEDURES

SECTION VIII – AMENDMENT PROCEDURES

This SWMP has been prepared to extend through the year 2016. If the City proposes changes to this SWMP before year 2016, the changes and their impacts will be determined by the City as either a “minor” change or a “major” change. The general descriptions of minor or major changes and the associated reviewal and approval requirements are presented as follows:

Minor Changes would include small adjustments to subwatershed or subdistrict boundaries or other minor changes that would not significantly affect the rate or quality of stormwater runoff discharged across the municipal boundary or significantly affect highwater levels within the City. Minor changes also include revisions made to the stormwater related Capital Improvements Program to best meet the City’s water resource needs and financial considerations. For proposed minor changes, the City Engineering department will revise and date the revision to the SWMP, then issue a notice of revision to all SWMP planholders signed by the City Engineer.

Major Changes are those that could have significant impacts on the rates, volumes, water qualities and water levels of stormwater runoff within the City or across its municipal boundaries. Major changes also include revisions and additions to the "Stormwater Management Plan and Erosion Control Plan Standards" found in Section VII. For proposed major changes, the City Engineering department will prepare a document, which defines the change and includes information on the scope and impacts of the change. The major change will be implemented after the document is adopted by the City Council. The City Engineering department will then revise and date the revision to the SWMP, then issue a notice of revision to all SWMP planholders signed by the City Engineer.