Comprehensive SurfaceWater Management Plan



City of Shakopee

SHAKOPEE

WSB & Associates, Inc.

COMPREHENSIVE WATER RESOURCE MANAGEMENT PLAN

FOR THE CITY OF SHAKOPEE, MINNESOTA

JANUARY 2007

PREPARED BY:

WSB & Associates, Inc.
701 Xenia Avenue South, Suite 300
Minneapolis, MN 55416
(763) 541-4800
(763) 541-1700 (Fax)

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

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Todd E. Hubmer, P.E.

Reg. No. 24043

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDICES

SECTION I

I. EXECUTIVE SUMMARY

This Comprehensive Water Resource Management Plan for the City of Shakopee replaces the 1998 Comprehensive Stormwater Management Plan which has been updated to incorporate new information and policies that have been developed since the adoption of the 1998 Plan. This updated plan has been developed to meet the local watershed management planning requirements of the Metropolitan Surface Water Management Act. It has also been developed to be in conformance with the needs and requirements of various water management organizations, Scott County programs, Metropolitan Council requirements, Scott County Soil and Water Conservation District guidelines, and state and federal laws. This document and its referenced literature is intended to provide a comprehensive inventory of pertinent water resource related information that affects the City of Shakopee.

Section II

Section II of this plan provides an introduction and purpose. The Water Resource Management Plan has been developed to provide the City with direction concerning the administration and implementation of water resource activities within the City. This plan is intended to meet the requirements for a local watershed management plan as required by the Metropolitan Surface Water Management Act and be in conformance with Board of Water and Soil Resources (BWSR) Rules Chapter 8410. This section also lists the personnel contacts involved in the assistance and implementation of this plan.

Section III

Section III of this plan provides an inventory of land and water resources within the City including a general description and summary of data related to precipitation, geology, topography, flood problem areas, existing flood insurance studies, shoreline ordinances, surface and ground water appropriations, ground water, soils, land use, public utilities services, public areas for water-based recreation and access, fish and wildlife habitat, unique features, scenic areas and pollutant source locations within the City.

This section contains general summary information about the soils within the City, fishery information, historical sites, and the location of various pollutant sources. A number of maps were also developed as part of the Plan to assist in summarizing this information.

Section IV

Section IV of this plan outlines water resource management related goals and policies of the City. Goals and policies have been developed for the City concerning water quantity, water quality, recreation, fish and wildlife management, enhancement of public participation, information and education, ground water, wetlands, and erosion.

Section V

Section V of this Plan provides an assessment of the existing and potential water resource related concerns within the City. These concerns were identified based on an analysis of the land and resource data collected as part of this plan preparation and through public input. This section summarizes the problems and corrective actions that

were identified through this process.

Section VI

Section VI outlines implementation priorities and develops an implementation program. This section contains a prioritized listing of the studies, programs and capital improvements that have been identified as necessary to respond to the water resource needs within the City. The implementation period identified within this report for the programs, studies and capital improvements is from the year 2006 through 2015. This plan is to be used for planning purposes only. Detailed feasibility analysis has not been completed to develop this section; therefore, cost estimates are subject to change and updates as more detailed information is obtained.

Section VII

Section VII discusses the financial considerations of implementing the proposed regulatory controls, programs and improvements, which have been identified in this plan and their financial impact on the City. Funding sources available for implementing the policies and corrective actions identified within this plan are identified. Other possible funding sources for the implementation of this plan include special assessments and grant monies, which may be secured from various local, regional, County, State or Federal agencies. These other funding sources will be necessary to aggressively implement the Plan.

Section VIII

Section VIII discusses the procedures to be followed in the event this Plan is amended. Once this Plan is approved, no significant changes to this plan can be facilitated without the approval of the proposed revisions by the Watershed Management Organizations and Districts within the City that are affected by the change. Significant changes to the plan shall be made known to the Mayor, City Council, City Staff, the Metropolitan Council, and the affected Watershed Management Organizations and Districts within the City.

Appendices

Appendices are included in the back of the plan and contain a variety of background information. These documents are included because they provide supporting information to the main body of the plan, are useful information, and/or are required by Minnesota Rules.

Additional material is referenced within this report and is available at the City.

This Water Resource Management Plan will be in effect through the year 2015, at which time this plan will be updated. However, if significant changes to the plan are deemed necessary prior to that date the City may revise this plan in its entirety.

II. INTRODUCTION AND PURPOSE

A. General

This Water Resource Management Plan has been developed to provide the City of Shakopee with direction concerning the administration and implementation of all water resource management activities within the City of Shakopee. The plan is intended to meet the requirements for a local watershed management plan as required by the Metropolitan Surface Water Management Act and be in conformance with BWSR Rules Chapter 8410.

In addition to being in conformance with the above state law, this plan has also been developed to meet the needs, requirements, and direction outlined in the following:

1. The Lower Minnesota River Watershed District Plan

2. The Prior Lake - Spring Lake Watershed District Plan

3. The Scott County Watershed Management Organization Plan

4. State Laws and Rules concerning wetland management as outlined in the Wetland Conservation Act of 1991

5. State and Federal laws regarding the need to secure a National Pollutant Discharge Elimination System (NPDES) permit

6. Applicable erosion control and soil loss guidelines

This plan incorporates the approaches and direction provided in the programs and documents listed above into a comprehensive plan that can be consistently applied across the City.

B. Personnel Contacts

To implement this plan, a coordinated water resource management approach must be used. This approach utilizes the services of staff personnel within the City and surrounding communities as well as staff personnel associated with the various watershed districts and water management organizations having jurisdiction over areas within the City. The watershed districts and watershed management organizations having jurisdiction in the City are shown on **Figure II-1.**

The primary implementation responsibility will lie with the appropriate staff members at the City. Assistance from the surrounding municipalities and Water Management Organizations will also be expected. Outlined below are the names, addresses, and telephone numbers for personnel having responsibilities

for overseeing or implementing various aspects of the Stormwater Management Plan.

City of Shakopee:
Bruce Loney
Public Works Director, City of Shakopee
129 Holmes Street
Shakopee, MN 55379-1376
(952) 233-9361

Lower Minnesota River Watershed District
Terry Schwalbe
1600 Bavaria Road
Chaska, MN 55318
(952)227-1037

Prior Lake - Spring Lake Watershed District
Shannon Lotthammer
15815 Franklin Trail SE, Suite 100
Prior Lake, MN 55372-2926
(952) 447-4166

Scott Watershed Management Organization
Paul Nelson
200 Fourth Ave West – Room A200
Shakopee, MN 55379
(952) 496-8054

Metropolitan Council
Jack Frost
230 East 5th St
St. Paul, MN 55101
(651) 602-1078

C. Water Resource Related Agreements

The City of Shakopee has entered into a number of water resources related agreements that govern in part how the City must manage its water resources. These agreements include joint powers agreements between the City and Watershed Management Organizations having jurisdiction within its boundaries, agreements between the city and adjoining communities, or agreements it may have with other governmental units or private parties. Listed below is a description of the water resource related agreements which the City has entered into. A copy of these agreements or appropriate portions thereof, are included in **Appendix A**.

1. Joint Powers Agreement for Prior Lake Outlet Channel

2. Joint Powers Agreement between the City of Shakopee and the City of Savage relating to stormwater management planning within the Eagle Creek Watershed.

3. City of Shakopee, Prior Lake-Spring Lake Watershed District and Shakopee Mdewakanton Sioux Community agreement for maintenance of PLSL Outlet Channel.

Comprehensive Water Resources Management Plan

SHAKOPEE

Watershed Management Organizations Boundaries Map

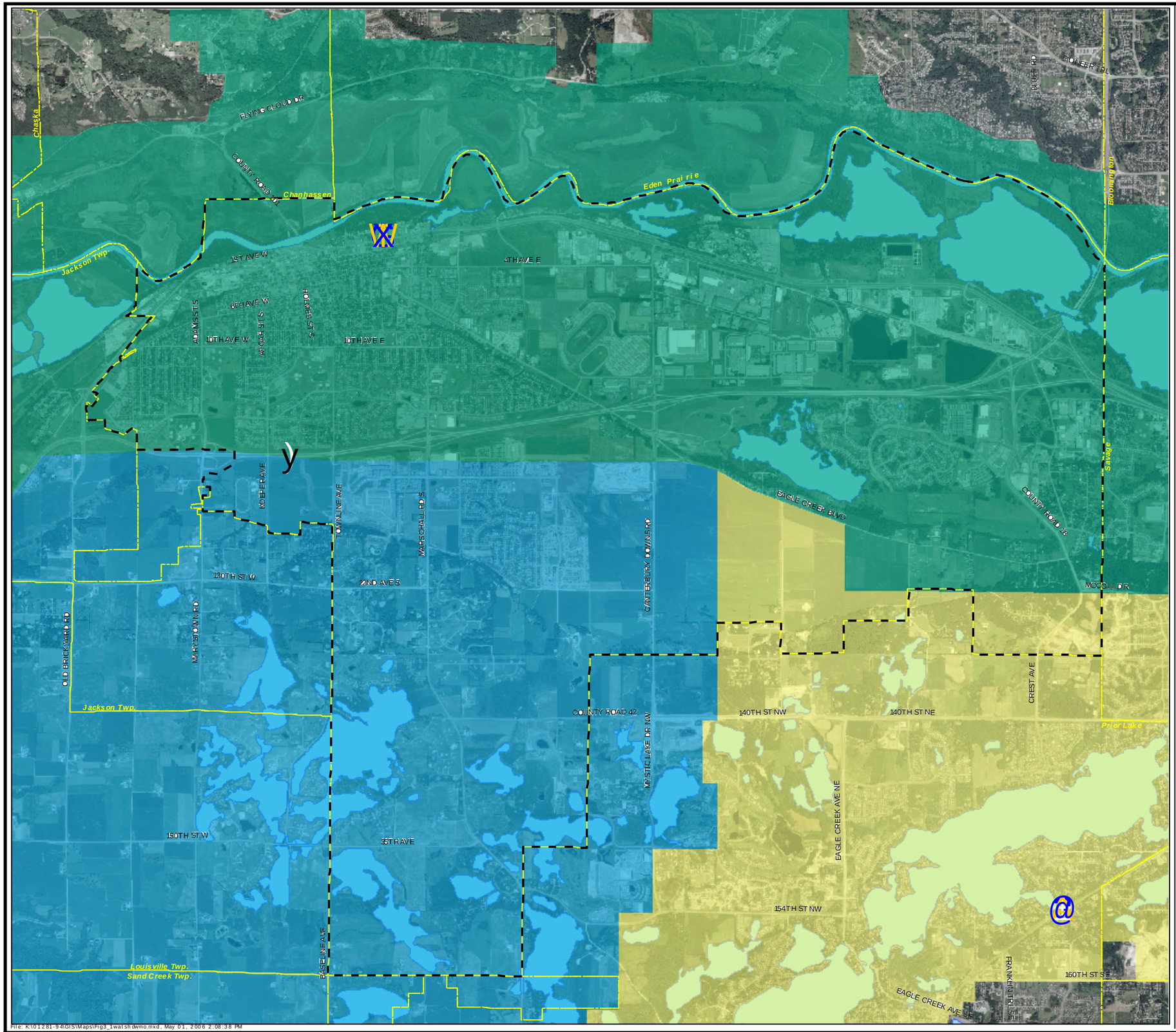
Figure II-1

0

0 2,000 4,000 8,000 Feet

Legend

- SCOTT WO
- PRIOR LAKE/SPRING LAKE WO
- LOWER MINNESOTA RIVER WO



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III. LAND AND WATER RESOURCE INVENTORY

As required by the Metropolitan Surface Water Management Act, this section of the plan provides a general description and summary of the climate, geology, surficial topography, surface and groundwater resource data, soils, land use, public utilities services, water based recreation, fish and wildlife habitat, unique features, scenic areas, and pollutant sources. This section also identifies where detailed information can be obtained for many of these areas of concern.

A. Precipitation

The climate within the Minneapolis/St. Paul metropolitan area is described as a humid continental climate with moderate precipitation, wide daily temperature variations, warm humid summers and cold winters. The total average annual precipitation is approximately 27 inches of which approximately 1/3 occurs in the months of June, July and August. The annual snowfall average is about 56 inches. The average monthly temperature, precipitation, and snow fall are included in **Table III-1**. **Figures III-1** and **III-2** provide the 100-year, 24-hour rainfall and the annual normal precipitation within the State of Minnesota. Other additional climatological information for the area can be obtained from the U.S. Weather Bureau Technical Paper 40.

B. Geology and Topographic Information

1. Geology:

The City of Shakopee is located in northern Scott County and borders the Minnesota River (**Figure III-3).** The general geology of the City and to a greater extent the areas within Scott County has been studied and the results outlined in the Scott County Geologic Atlas. The study provides information on the geology and hydrogeology for areas within the City of Shakopee.

The document indicates that the bedrock within the City of Shakopee is of the Prairie du Chien, Jordan Sandstone, St. Lawrence formation, and the Franconia formation. The bedrock elevations can vary depending on type from 450 feet to 750 feet above sea level. The surficial geology for the City varies in depth over the bedrock formations as a result of the cover being outwash deposits.

The City contains four surficial geologic regions. The first region is the lower terrace. The lower terrace lies 30 to 50 feet above the present flood plain of the Minnesota River. This terrace is cut in the outwash deposit of ice-contacted stratified drift, till and bedrock. The second geologic region is the middle terrace. This is very similar to the lower terrace but is 75 to 115 feet above the present flood plain of the Minnesota River. The third geologic region is the upper terrace. It is again very similar to the lower terrace, but its surface is 120 to 180 feet above the present flood plain and the terrace is not cut into the bedrock. The fourth terrace lies above the

upper terrace and is comprised of till forming irregular hills. These irregular hills typically have a relief range of 15 feet to 60 feet.

Additional geologic information for areas within the City of Shakopee can be found in the Scott County Geologic Atlas which can be obtained at the Water Resource Library at Shakopee City Hall.

Table III – 1. Average Monthly Temperature, Precipitation, and Snowfall Data (Source: Minnesota State Climatology Office)

Months	**Average Temp** (F^0)	**Precipitation** (MSP Airport)	**Snowfall** (inches)
January	12.2	0.83	12.5
February	18.2	0.85	9.2
March	31.0	1.60	11.6
April	46.4	2.17	3.6
May	58.5	3.38	0.1
June	68.2	4.17	0.0
July	73.6	3.55	0.0
August	70.5	3.40	0.0
September	60.5	2.89	0.0
October	48.8	2.01	0.4
November	33.1	1.45	7.3
December	17.9	0.94	11.3
Totals	**44.8**	**27.24**	**56.0**

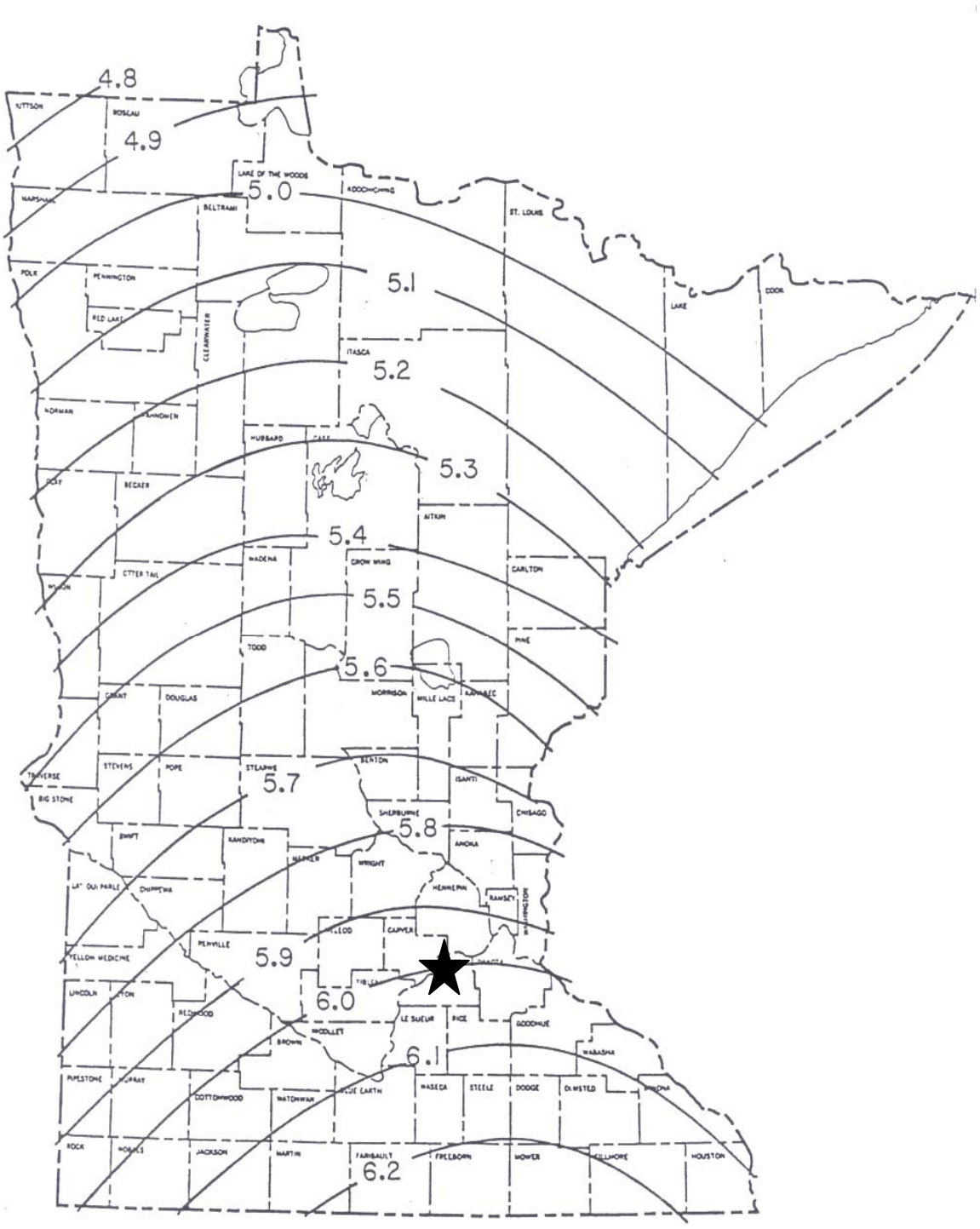


Figure III-1. 1% Chance Rainfall Event in 24-hours within the State of Minnesota

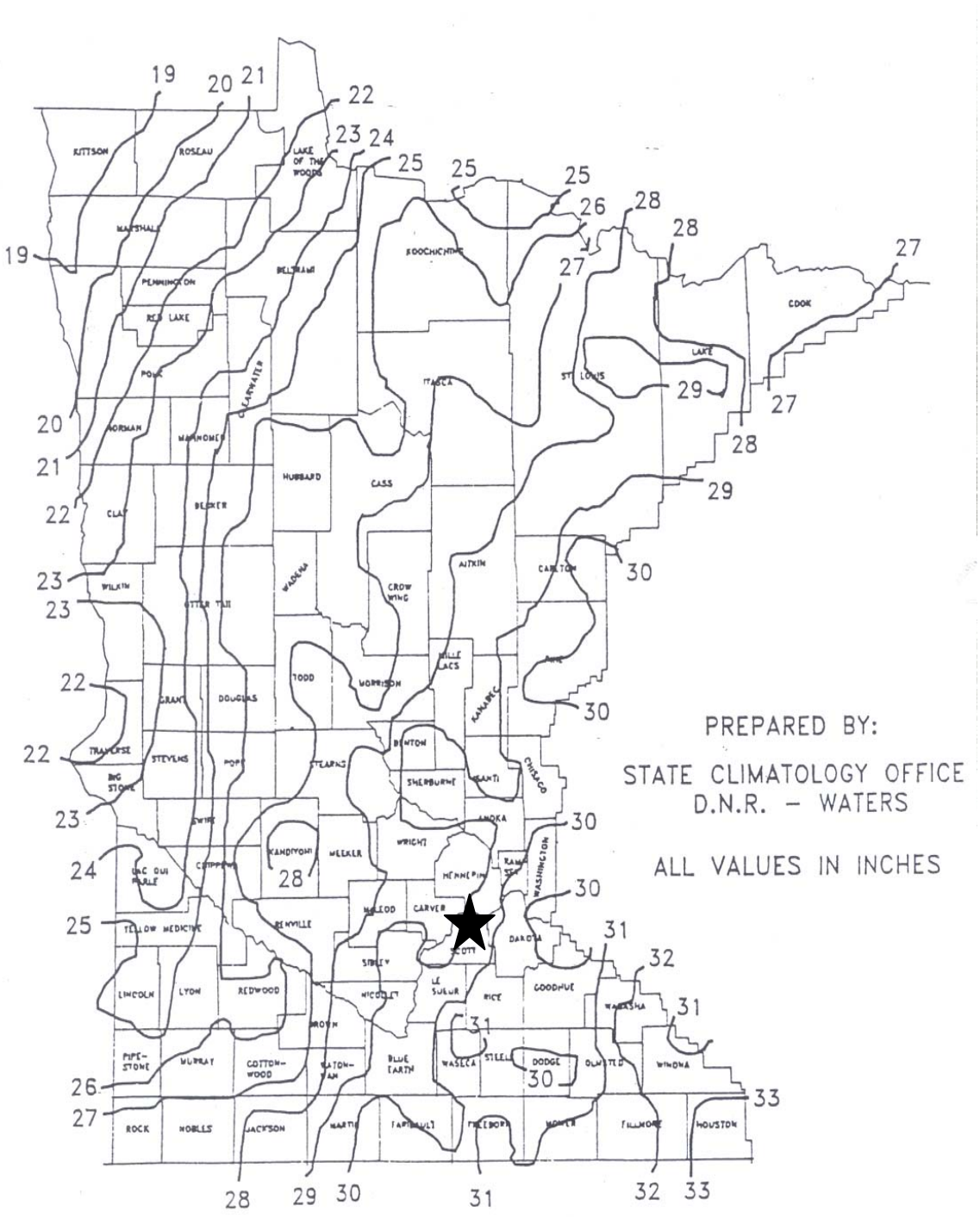


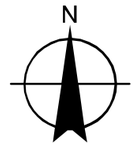
Figure III-2. Annual Normal Precipitation within the State of Minnesota

Comprehensive Water Resources Management Plan

SHAKOPEE

Location Map

Figure III-3



0 3 6 12 Miles

Legend

Study Area

Anoka Co.
Hennepin Co.
Ramsey Co.
Washington Co.
Carver Co.
Scott Co.
Dakota Co.
Shakopee
Wyoming
Chisago Lake S
Franconia Twp
Wyoming Twp
Columbus Twp.
Forest Lake
New Scandia Twp.
Ramsey
Andover
Ham Lake
Anoka
Rogers
Dayton
Champlin
Coon Rapids
Blaine
Lino Lakes
Hugo
May Twp.
Hanover
Lexington
Osseo
Brooklyn Park
Spring Lake Park
Mounds View
White Bear Twp.
Dellwood
Stillwater Twp.
Corcoran
Maple Grove
Greenfield
North Oaks
Grant
Fridley
Shoreview
Arden Hills
Brooklyn Center
White Bear Lake
New Brighton
Stillwater
Columbia Heights
Pine Springs
Oak Park Heights
Medina
Independence
Plymouth
Robbinsdale
St. Anthony
Little Canada
Roseville
Maplewood
North St. Paul
Bayport
Baytown Twp.
Golden Valley
Lake Elmo
Oakdale
Orono
Wayzata
Minneapolis
West Lakeland Twp.
Watertown
Hollywood Twp.
Spring Park
St. Louis Park
St. Paul
Deephaven
Minnetonka
Hopkins
St. Bonifacius
Shorewood
Excelsior
Woodbury
Afton
West St. Paul
New Germany
Mayer
Edina
Mendota
South St. Paul
Mendota Heights
Victoria
Richfield
Sunfish Lake
Newport
Chanhassen
Camden Twp.
Waconia
Laketown Twp.
Eden Prairie
Bloomington
Eagan
Inver Grove Heights
St. Paul Park
Cottage Grove
Grey Cloud Island Twp.
Denmark Twp.
Chaska
Chaska Twp.
Norwood Young America
Cologne
Jackson Twp.
Dahlgren Twp.
Carver
Burnsville
Savage
Apple Valley
Rosemount
Nininger Twp.
Hastings
Hamburg
Louisville Twp.
Prior Lake
Coates
Hancock Twp.
Sand Creek Twp.
Credit River Twp.
Lakeville
Vermillion
Marshan Twp.
St. Lawrence Twp.
Farmington
Belle Plaine
Hampton
Miesville
Blakeley Twp.
Helena Twp.
Cedar Lake Twp.
Eureka Twp.
Douglas Twp.
New Prague
Greenvale Twp.
Sciota Twp.
Northfield
35W
35E
94
694
494
35

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2. Topography:

Stormwater generated from areas within the City is generally directed from the south to the north into the Minnesota River. The specific drainage patterns which depict topography for areas within the City are shown on the subwatershed delineation map on **Figure III-4**. As can be observed from the subwatershed delineation map, the City is divided into six watersheds as follows:

- Mill Pond Watershed
- Blue Lake Watershed
- Eagle Creek Watershed
- Rice Lake Watershed
- Minnesota River Watershed
- Sand Creek Watershed

The Minnesota River on the northern City border is the low point of the City at approximately 700 feet above sea level. The high point for the City of Shakopee is located on the southern border with an approximate elevation of 1050 feet above sea level.

C. Surface Water Resource Data

Available surface water data within the watershed is summarized within this section. Detailed information has been included either in the appendices to this report or has been identified by reference and is available in the Water Resource Library at the City Hall.

1. Wetland Inventory:

The City contains over 200 wetlands of various sizes and types. These wetlands have been identified by the U. S. Fish and Wildlife Service utilizing aerial photography as the inventory resource. Each area that appeared to be wetland on the aerial photo was mapped and a National Wetland Inventory (NWI) was created. The Department of Natural Resources (DNR) has also completed an inventory of the Public Waters and Wetlands. The NWI map is shown on **Figure III-5** and the DNR Public Waters Map is shown on **Figure III-6.**

2. Major Bodies of Water

There are several major bodies of water that convey and store water within the City. These water bodies include:

- Minnesota River
- Dean Lake
- Blue Lake
- Fisher Lake
- Lake O'Dowd
- Prior Lake-Spring Lake Outlet Channel

3. Hydrologic System:

Figure III-4 shows the subwatersheds within the City along with the location of the trunk conveyance system that hydraulically connects the retention basins.

The City contains six distinct watersheds. The Mill Pond Watershed receives stormwater run-off from western Shakopee and eastern Jackson Township. This watershed drains approximately 14.3 square of Shakopee and Jackson Township. This watershed generally carries water from the south to the north discharging into the Minnesota River at the Mill Pond via overland flow and within the Upper Valley Drainageway.

The Blue Lake Watershed receives stormwater run-off from the eastern two-thirds of Shakopee and from portions of Prior Lake. This watershed generally carries water from the south to the north through Deans Lake outletting into Blue Lake which discharges to the Minnesota River. The Prior Lake -Spring Lake outlet channel is the primary conveyance route to Blue Lake for this watershed. The outlet channel directs water from Prior Lake to the north through Pike Lake and then to Shakopee via Deans Lake and the Deans Lake bypass channel. The outlet channel eventually discharges water to Blue Lake and the Minnesota River. The Prior Lake-Spring Lake Outlet is managed through a Joint Powers Agreement (**Appendix A**) by the Cities of Prior Lake, Shakopee, the Mdewakanton Sioux Community, and the Prior Lake-Spring Lake Watershed District.

The Sand Creek Watershed receives water from several municipalities and townships located south and west of Shakopee. Shakopee contributes approximately 1,000 acres in south Central Shakopee to the Sand Creek Watershed. This watershed carries water from southern Shakopee to the southwest into the Sand Creek conveyance system and ultimately discharges into the Minnesota River.

The very eastern edge of Shakopee, which borders the City of Savage, is drained by two separate watersheds. The first watershed directs water northeasterly through the intersection of T.H. 169 and County Road 18 then flows to the east into Rice Lake. This watershed is denoted as RL 2 or Rice Lake 2. This watershed consists of 320 acres and is drained as part of the T.H. 169 bypass drainage system. The second watershed directs water easterly to Eagle Creek in the City of Savage. These subwatersheds are noted at EC 1 through EC 22.

All areas within the City have been hydraulically modeled. As part of this modeling effort, watershed areas were delineated, existing and proposed stormwater retention and treatment facilities were defined, and a hydrologic/hydraulic analysis was performed to quantify the 1-year and 100-year peak discharge rates, storage requirements, and other pertinent hydrologic/hydraulic information for the stormwater retention areas and trunk conveyance systems within the City. Results of this modeling effort are included in **Appendix B.**

The hydraulic modeling effort was completed in compliance with the Lower Minnesota River Watershed District, Prior Lake-Spring Lake Watershed District, and Scott County Watershed Management Organization Plans. The hydrologic modeling for the City was completed using the following criteria:

- The peak rate of stormwater run-off entering the City from Jackson Township was limited to either 1/3 cfs per contributing acre of drainage area or pre-settlement discharge rates.

- The peak discharge rate from subwatersheds within the City was limited to at least 1/3 cfs per contributing acre of drainage area for Mill Pond, Eagle Creek, Minnesota River, Rice Lake, Sand Creek, and Blue Lake Watershed from Deans Lake to the Minnesota River. The Blue Lake watershed upstream of Deans Lake was limited to 0.1 cfs/acre of contributing drainage area. In areas where adequate stormwater storage is available in the form of natural wetlands and depressions the peak discharge rates were limited to the average daily run-off rate of a 10-day, 100-year run-off event. Further discussion of allowable peak discharge rates is included in **Section IV.**

- Storm water storage was provided to accommodate the run-off generated from a 100-year 24-hour storm event above the retention outlet elevation, while allowing a peak discharge rate of no greater than 1/3 cfs per acre of contributing drainage area.

- Storage was modeled either with off-line or in-line storage. Off-line storage is defined as ponds which store and treat stormwater run-off prior to discharging into main conveyance systems. On-line storage is defined as ponds that store and treat storm water runoff within the main conveyance system. The modeled retention ponds were a total of 8 feet in depth with 4 feet of depth below the invert of the outlet and 4 feet of allowable bounce above the outlet in a 24-hour 100-year storm event.

- In-line storage was utilized only where large natural retention areas were available or where storage was available in a mainline ditch.

In addition to the TR-20 based model, a HEC-2 water surface profile model for the main line ditch north of TH 169 was created and the results are shown in **Appendix B.** Additional information on the water surface profile program and the information and data used to establish this water surface profile is shown in **Appendix B.**

D. Flood Problem Areas

A review of past City records and/or studies has identified a number of areas that have been reported to have flood or drainage problems during various rainfall events. The location of these water resource problem areas is shown in **Figure III-7. Section V** contains a listing of the areas of concern and a brief description of the problem if available.

E. Existing Flood Insurance Studies

A Federal Emergency Management Agency (FEMA) Flood Insurance Study (FIS) was completed for areas within the City of Shakopee along the Minnesota River. Included in the FIS is a flood plain study of the Minnesota River completed by the United States Department of Interior. The results were outlined in a report entitled "Flood Plain Areas of the Lower Minnesota River" dated 1973. This report identified the boundaries of the floodway and floodplain. A flood insurance study for the City of Shakopee dated March 1989 provides flood information for properties along the Minnesota River. A copy of this flood insurance study is included in **Appendix**. **Figure III-8** shows the 100-year floodplain within the City.

Copies of publications containing flood insurance information are available in the Water Resource Library at the Shakopee City Hall.

F. Water Quality Data

Water quality monitoring within the City has been undertaken in the past by the Metropolitan Council, the Minnesota Pollution Control Agency, the Minnesota Department of Natural Resources, the Lower Minnesota River Watershed Management Organization, and the City of Shakopee. These water quality studies include:

- Hydrological Study of Fisher and Blue Lake by Norman Chemical Company in 1979 and 1980.
- Stan Smith's Contamination Study on Fisher and Blue Lake completed in 1985.
- Water quality data generated from various sampling programs. Information is available at the Minnesota Pollution Control Agency web site at www.pca.state.mn.us/data/edaWater/index.cfm
- Lake Water Monitoring of O'Dowd Lake by the Minnesota Department of Natural Resources in 1984.
- Mill Pond Treatment Basin Final Report by OSM & Associates in 1997.
- Citizen Assisted Monitoring Program (CAMP) reports coordinated by Metropolitan Council Environmental Services (MCES) and the City.
- Lower Minnesota River Dissolved Oxygen TMDL Report in 2004.
- P8 model from 1999 Comprehensive Storm Water Management Plan.

Figure III-9 shows the location of monitoring sites within the City that have been used in the past to collect water quality or quantity data. Water quality information listed above is available at Shakopee City Hall or from the Minnesota Pollution Control Agency's web-site. Deans Lake and O'Dowd Lake have the most recent water quality data as summarized below:

	Total Phosphorus (mean)	Chlorophyll-a (mean)	Secchi Disk (mean)	Carlson Trophic Index
Deans Lake	177 ppb	30.6 ppb	0.5 meters	H
O'Dowd Lake	76 ppb	59 ppb	1.0 meters	E

The City also has a few impaired waters within its boundaries. These impaired waters include the following:

Water body	Impairment
O'Dowd Lake	Mercury, excess nutrients
Minnesota River	Mercury, PCB's, turbidity, fecal coliform; dissolved oxygen
Deans Lake	Excess nutrients

A Total Maximum Daily Load (TMDL) study has been completed for the Lower Minnesota River Dissolved Oxygen impairment in 2004. This study is available on the MPCA's web site at www.pca.state.mn.us/. Much of this study affects phosphorus discharges from various wastewater treatment plants. However, it does require a 30% reduction in non-point source phosphorus loading from the City of Shakopee.

G. Shoreland and Floodplain Ordinances

The City has developed and adopted Shoreland Management Regulations and Floodplain Management Regulations and Ordinances. A copy of these regulations is included in **Appendix D.** Per these regulations, the City has developed the following shoreland designations:

Water Body Name	Water Body Number/Location	Shoreland Classification
Blue Lake	70-0088	Natural Environment
Dean Lake	70-0074	Natural Environment
Fisher Lake	70-0087	Natural Environment
Rice Lake	70-0025	Natural Environment
Unnamed	70-0080	Natural Environment
O'Dowd	70-0095	Recreational
Minnesota River	From west section line of Section 4, T115N, R22W	Transition River
Minnesota River	From the border of Scott and Le Sueur Counties to the east section line of Section 5, T115N, R22W	Agricultural River
Eagle Creek	From Basin 245,	Tributary Stream

	Section 13, T115N, R22W to Section 13, T 115N, R22W	
Unnamed to Minnesota River	From Section 2, T115N, R22W to Section 1, T115N, R22W	Tributary Stream
Unnamed Tributary (part of PLSL Outlet Channel)	From Basin 249, Section 23, T115N, R22W to Section 14, T115N, R22W	Tributary Stream

The City's Shoreland Regulations also indicates that low floor elevations must be at least three feet above the highest known water level or three feet above the Ordinary High Water Level, whichever is greater. The City's Floodplain Regulations only require that the low floor elevation be two feet above the 100-year high water level. This discrepancy will be corrected in the Floodplain Regulations as part of implementation of the Plan.

The most up to date ordinance can be found at the City's website at www.ci.shakopee.mn.us

H. Surface Water\Ground Water Appropriations

Within the City, municipal wells serve the City's water needs. The Shakopee Public Utilities Commission (SPUC) is responsible for supplying water for the City. The location of DNR groundwater appropriation permits are shown on **Figure III-10.**

I. Groundwater Resource Data

Groundwater resource data for areas within the City is available by reviewing the content of two reports. A brief description of the content for these documents is provided below. These documents are available at the Water Resource Library, Shakopee City Hall.

- The Scott County Geologic Atlas completed in 1982 contains information on aquifers, depth to ground water table, and areas sensitive to ground water pollution.

- The Scott County Comprehensive Groundwater Plan contains groundwater information, issues and policies for Scott County.

- SPUC monitors aquifer levels through the use of 14 wells located throughout the City. Manual soundings are taken at each of the wells and are reported to the DNR on an annual basis.

J. Soils Information

Detailed soil information is available from the Scott County Soil Survey. This survey was prepared by the U.S. Department of Agriculture Soil Conservation Service. Using the Scott County Soil Survey, the hydrologic soil classification map for the City was developed and is shown on **Figure III-11.** The soils for the City of Shakopee have been classified into four hydrologic soil groups which are defined as follows:

Group A - These soils have high infiltration rates even when thoroughly wetted. The infiltration rates range from 0.3 to 0.5 inches per hour. These soils consist chiefly of deep, well drained to excessively drained sands and gravel. These soils have a high rate of water transmission, therefore resulting in a low run-off potential.

Group B - These soils have moderate infiltration rates ranging from 0.15 to 0.30 inches per hour when thoroughly wetted. These soils consist of deep moderately well to well drained soils with moderately fine to moderately coarse textures.

Group C - These soils have slow infiltration rates ranging from 0.05 to 0.15 inches per hour when thoroughly wetted.

Group D - These soils have very slow infiltration rates ranging from 0 to 0.05 inches per hour when thoroughly wetted. These soils are typically clay soils with high swelling potential, soils with high permanent water table, soils with a clay layer at or near the surface, or shallow soils over nearly impervious material.

Figure III-15 shows the areas defined as steep slopes with areas greater than 12% slope. These areas are regulated in the City's Shoreland Ordinance and Erosion Control Ordinance.

Additional information on the geology and soil for this area can be obtained from the Scott County Geologic Atlas available at the Water Resource Library at Shakopee City Hall.

K. Land Use and Public Utilities Services

Existing and projected land use for areas within the City is fully described in the Shakopee Comprehensive Plan that is available in the Water Resource Library, Shakopee City Hall. The City has a land use plan that includes residential, commercial and industrial development, designated park and open space areas, and public recreational areas. Land use mapping is shown on **Figure III-13.**

The Shakopee Public Utility Commission (SPUC) supplies municipal water service the City. Public utility services available for lands within the City have also been clearly described in the City's Comprehensive Plan.

The City has entered into an orderly annexation agreement with Jackson Township. Toward that end, the City has included the Jackson Township area in its comprehensive plan and stormwater management plan. As areas are annexed, they will need to comply with these plans.

L. Public Areas for Water Based Recreation and Access

The City has a variety of areas are used for water based recreation. These areas include the following:

- **O'Dowd Lake:** O'Dowd Lake is 256 acres in size and is located in the southwest corner of Shakopee. The lake has public access as well as the O'Dowd Lake Community Park. The water based recreation available at O'Dowd Lake Community Park is picnicking, swimming, fishing and hiking.

- **Minnesota River:** A public boat launch is located within Huber Park.

- **Dean Lake:** Dean Lake offers passive water based recreation in the form of trails and parks near and around the lake.

- **Murphy's Landing:** Murphy's Landing is an historic site owned by the Three Rivers Park District. The site is on the river and offers a living history museum portraying Minnesota life on the River between 1840-1890.

- **Minnesota Valley National Wildlife Refuge:** This large park area along the Minnesota River throughout Shakopee and beyond offer passive water based recreation opportunities through miles of hiking trails along the river and floodplain areas.

The City of Shakopee also contains three parks located on the Minnesota River. These three parks are Huber Community Play Field, Memorial Community Park, and the James Wilke Regional Park Reserve. The water resource related activities available at Huber Community Play Field include picnicking, fishing, boating and hiking. This park also contains a public boat landing. The water based recreation available at Memorial Community Park includes picnicking, fishing and hiking. The water based recreation available at the James Wilke Regional Park Reserve includes picnicking, fishing, and hiking. The majority of water based recreation within the City centers around the Minnesota River.

More information on these Public Parks is available in the Shakopee Comprehensive Plan available in the Water Resources Library at Shakopee City Hall.

M. Fish and Wildlife Habitat

Figures III-5 and III-6 shows the inventory of waterbodies and wetlands within the City. Most of the areas that have been identified in this inventory provide wildlife habitat to varying degrees. Suitable fishery habitat within the City is limited. O'Dowd Lake and the Minnesota River are the only water bodies located within the City that have been identified as capable of supporting a generally healthy fishery population. Eagle Creek, located just east of Shakopee in the City of Savage is a designated trout stream. Other small lakes or ponds within the City may have the potential to support a fish population but the threat of winter kill limits stocking of any type of game fish population within these basins.

A few areas have also been mapped by the DNR's County Biological Survey. These areas include the marsh located on the north end of Dean Lake and some oak woodlands located northeast of Dean Lake. Areas within the Minnesota Valley National Wildlife Refuge have also been mapped by in the County Biological Survey. These areas also have been noted to contain rare, endangered, or threatened plant and animal species. Based on information about the City's natural resources, the City has developed a Natural Resource Corridor Map as shown on **Figure III-13.**

N. Unique Features and Scenic Areas

As discussed above, there are some areas mapped by the County Biological Survey as well as some areas that contain rare, endangered, or threatened plant and animal species. In addition, the following areas have unique features that the City plans to take special care in managing, if and when the parcel is proposed for development.

- The Minnesota River bluffs adjacent to the river and shoreline.
- The highlands located in the southern portion of the City.
- Eagle Creek and Boiling Springs along the eastern edge of the Shakopee and Savage border.

The City has developed a natural Resource Corridor Map based on available natural resource information pertaining to slopes, lakes and streams, endangered species, woodlands, non-woody upland vegetation, wetlands, recreational opportunities, accessibility, and wildlife.

O. Pollutant Sources

Figure III-14 identifies the location of all known open and closed sanitary landfills, open dumps, and Minnesota Superfund Hazardous Waste Sites. This map also shows the location of registered underground and above ground storage tank sites.

The above pollutant source locations have been identified by the Minnesota Pollution Control Agency. Each pollutant site is contained within one or more lists kept by Federal and State regulators. Additional information about these sites is available from the Minnesota Pollution Control Agency.

P. Storm Water Pollution Prevention Plan

The City has developed a SWPPP in conformance with the NPDES requirements. This SWPPP is reviewed annually and a report to the MPCA submitted. The SWPPP and the annual reports are incorporated by reference. The City is also required to develop a Nondegradation Plan and submit it to the MPCA by November 2007. The Nondegradation Plan will be incorporated into this Water Resource Management Plan upon its completion.

Comprehensive Water Resources Management Plan

SHAKOPEE

Subwatershed Delineation Map

Figure III-4

N

0 2,000 4,000 8,000 Feet

Legend

- Sub-Watershed Boundary
- Flow Direction

Minor Watersheds

- Blue Lake
- Eagle Creek
- Mill Pond
- Minnesota River
- Rice Lake
- Sand Creek
- West Shakopee/Jackson

WSB & Associates, Inc.

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Comprehensive Water Resources Management Plan

SHAKOPEE

National Wetland Inventory Map

Figure III-5

0

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Legend

NWI Wetland

The wetland boundaries have not been field verified or delineated for this map.

WSB & Associates, Inc.

File: K:\01281-94\GIS\Maps\Fig3_5NWI.mxd, Dec 30, 2005 1:46:43 PM

Comprehensive Water Resources Management Plan

SHAKOPEE

DNR Public Waters / Public Wetlands Map

Figure III-6

O

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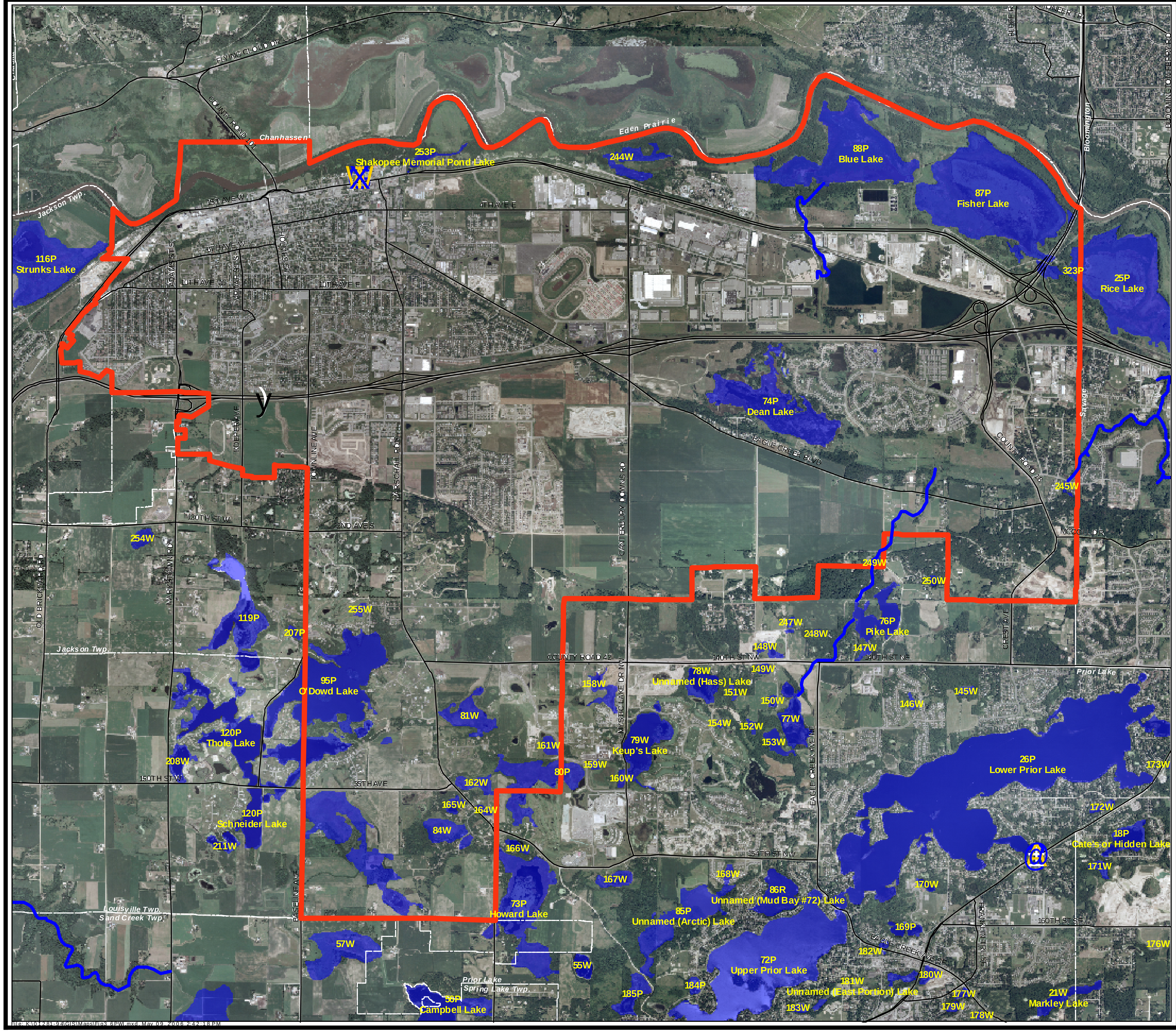

Legend

Protected Waters & Wetlands

Note: DNR protected wetland / waters are shown as depicted on the MnDNR protected wetland / waters sheet 2 of 2 for Scott County. The wetland boundaries have not been field verified or delineated for this map.

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Comprehensive Water Resources Management Plan

SHAKOPEE

Flood Problem Areas Map

Figure III-7

N

0 2,000 4,000 8,000 Feet

Legend

Water Resource Problem Area

1. This is a localized depression within the Cantebury south drainage area, which does flood during various rainfall events causing problems for businesses in the area.

2. A drainage problem has been noted in the vicinity of CR 21 immediately South of CR 16. Standing water has been observed following various rainfall events.

3. A drainage problem has been observed in the vicinity of Marschall Rd and Valley View Rd.

4. A drainage problem was identified one mile south of CR 16 and CR 83.

5. During various rainfall events flooding has occurred in the Boiling Springs area.

6. This drainage problem area is a result of high groundwater table and poorly maintained ditches.

7. Prior Lake was historically a land locked basin and is subject to flooding.

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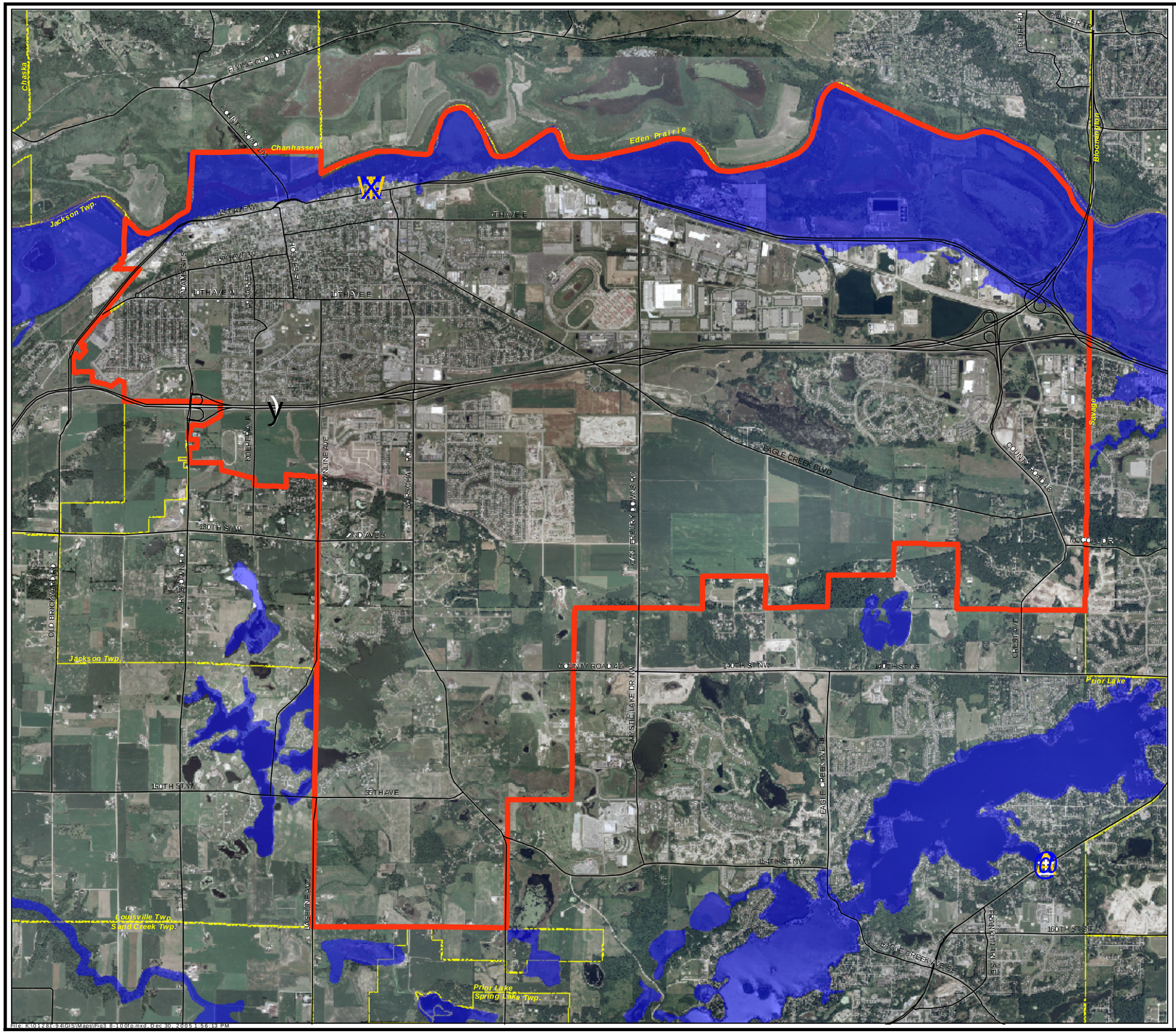
Comprehensive Water Resources Management Plan

SHAKOPEE

FEMA Floodplain Map

Figure III-8



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Legend

100 Year Floodplain

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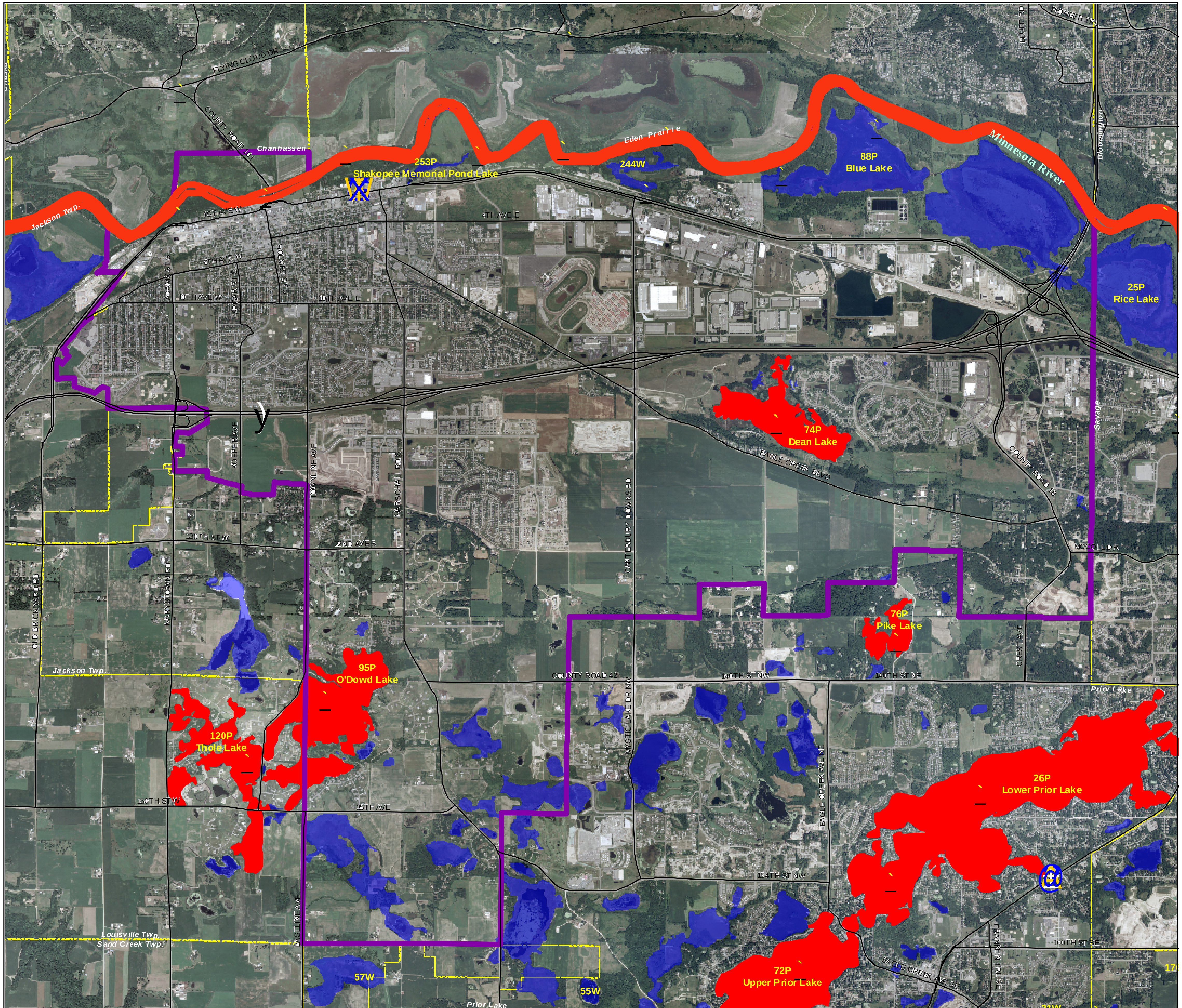
Comprehensive Water Resources Management Plan

SHAKOPEE

Water Quality Monitoring Locations

Figure III-9



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Legend

Water Quality Monitoring Location

Impaired Waters

WSB

Comprehensive Water Resources Management Plan

SHAKOPEE

Ground Water Appropriations Map

Figure III-10

N

0 2,000 4,000 8,000 Feet

Legend

WATER USE

- (AQUACULTURE
-) DEWATERING
-) FIRE PROTECTION
- * IRRIGATION
-) WATERWORKS
- (EXTRACTIVE/ PROCESSING
-) POLLUTION CONTAINMENT
-) QUARRY DEWATERING

Source: MnDNR

WSB & Associates, Inc.

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Comprehensive Water Resources Management Plan

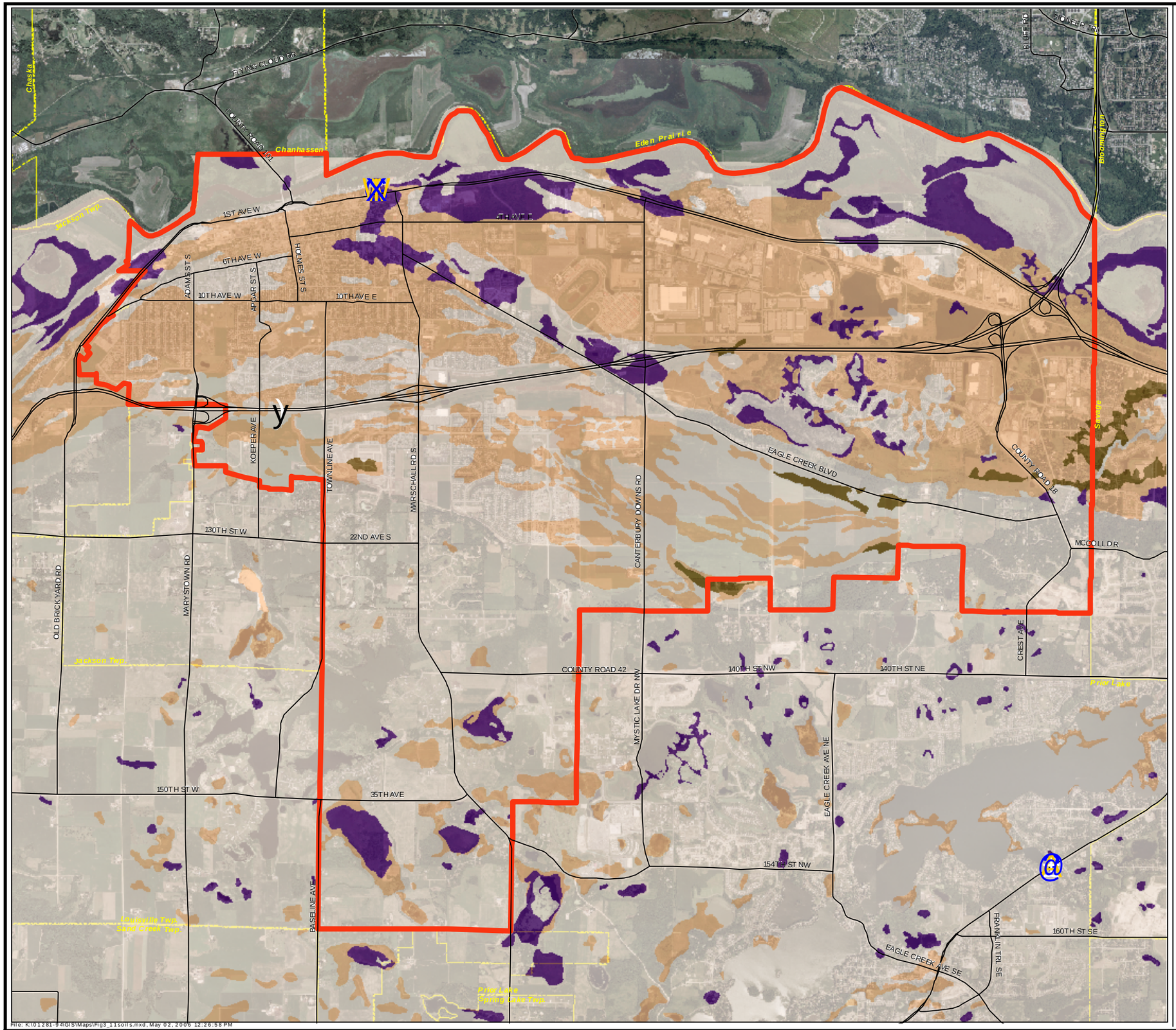
SHAKOPEE

Soils Map

Figure III-11

N

0 2,000 4,000 8,000 Feet



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LEGEND

Hydrologic Group

- A - These Soils have high infiltration rates even when thoroughly wetted. The infiltration rates are .3 inches per hour and greater. These soils consist chiefly of deep, well drained to excessively drained sands and gravel. These soils have a high rate of water transmission, therefore resulting in a low runoff potential.
- B - These soils have a moderate infiltration rate ranging from .15 to .3 inches per hour when thoroughly wetted. These soils consist of deep moderately well to well drained soils with moderately fine to moderately coarse textures.
- C - These soils have slow infiltration rates ranging from .05 to .15 inches per hour when thoroughly wetted.
- D - These soils have very slow infiltration rates ranging from 0 to 0.05 inches per hour when thoroughly wetted. These soils are are typically clay soils with high swelling potential at or near the surface or shallow soils over nearly impercious material.

WSB & Associates, Inc.

Comprehensive Water Resources Management Plan

SHAKOPEE

Proposed Land Use Map

Figure III-12

N

0 2,000 4,000 8,000 Feet

Minnesota River

Blue Lake

Fisher Lake

Dean Lake

Lake O'Dowd

Downtown Inset

0 1,000 2,000 Feet

Legend

- SMSC
- Mining Overlay

Proposed Land Use

- Single Family Residential
- Medium Density Residential
- High Density Residential
- Mixed Use
- Business Park
- Commercial
- Industrial
- Entertainment
- Institutional
- Open Space
- Park

WSB & Associates, Inc.

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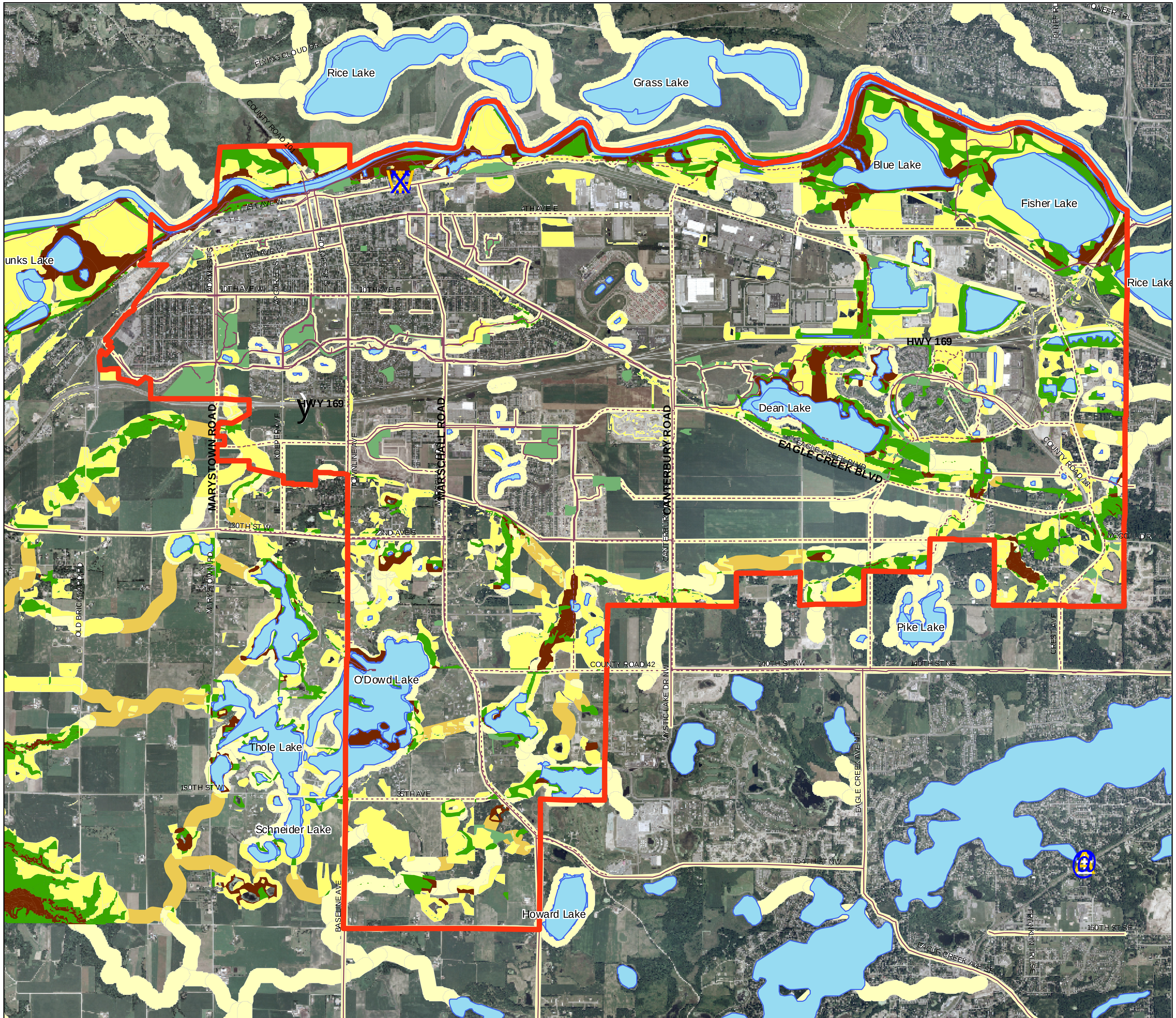

Comprehensive Water Resources Management Plan

SHAKOPEE

Greenway Locations

Figure III-13

0 2,000 4,000 8,000 Feet

Legend

- PARK AND OPEN SPACE
- BUFFER
- CORRIDOR CONNECTIONS

TRAILS

- EXISTING
- PROPOSED
- Streams_from_Scott

CORRIDOR PRIORITY RANKING

- GOOD
- BETTER
- BEST
- WATERBODY

WSB & Associates, Inc.

Comprehensive Water Resources Management Plan

SHAKOPEE

Pollutant Source Location Map

Figure III-14

N

0 2,000 4,000 8,000 Feet

LEGEND

k LEAKING UNDERGROUND STORAGE TANKS

k MASTER ENTITY SYSTEM SITES

The Master Entity System List combines 14 state and federal pollutant lists and systems including Brownfield sites, National Priorities List, and others. Sites shown may have been previously cleaned up. They are shown for historical & preliminary site review purposes only. Contact the MPCA for current status.

Last Updated: January 12, 2005

WSB & Associates, Inc.

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Comprehensive Water Resources Management Plan

SHAKOPEE

Steep Slope Map

Figure III-15

N

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Legend

Slopes Greater Than 12%

WSB & Associates, Inc.

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IV. ESTABLISHMENT OF GOALS AND POLICIES

The City of Shakopee has developed a number of goals and policies that conform to the overall purpose that is specified in Minnesota Statutes Section 103B.201. These goals and policies have been developed to compliment County, Regional or State goals and policies. They have also been developed to preserve and use natural water storage and retention systems in order to:

A. Limit public capital expenditures that are necessary to control excessive volumes and rates of runoff.

B. Improve water quality.

C. Prevent flooding and erosion from surface flows.

D. Promote ground water recharge.

E. Protect and enhance fish and wildlife habitat and water recreational facilities.

F. Secure the other benefits associated with the proper management of surface water.

Through the stormwater management planning effort, the City of Shakopee will apply Nationwide Urban Run-off Program (NURP) Standards for the design of new stormwater management ponds and the use of the Minnesota Pollution Control Agency's best management practices (BMP) for all new developments in Shakopee to reduce non-point source pollution associated with stormwater run-off. The City of Shakopee will incorporate these standards and requirements in this Water Resource Management Plan by reference and will adopt the appropriate land use controls to implement this Federal and State policy. This Water Resource Management Plan represents the City's primary action for obtaining the 30% reduction of non-point pollution in the Minnesota River.

The goals and policies that the City has developed address issues related to water quantity, water quality, recreation, fish and wildlife, enhancement of public participation, information and education, public ditch system management, groundwater management, wetland management and soil erosion management. Outlined below are the goals and policies that have been developed for each of the above areas of concern.

A. Water Quantity

Goal:
Limit public capital expenditures that are necessary to control excessive volumes and rates of runoff.

Policies:

1. As is part of any new development activity, adequate runoff rate control measures must be incorporated into the design to ensure that stormwater runoff rates will be in conformance with the rates outlined in this plan.

2. In Jackson Township annexation area, development is required to limit the 2-year, 10-year, and 100-year critical storm events to the pre-settlement rates. This can be accomplished with local or regional detention facilities. The following curve numbers shall be used to analyze pre-settlement conditions.

Soil Group	Runoff Curve Numbers
A	30
B	55
C	71
D	77

3. The City will require the following criteria for discharge rates:
    a. In newly developing watersheds, measures shall be taken to limit runoff rates generated by any subwatershed to the rates specified in the Stormwater Management Plan for the City, or if the plan does not specify a rate, the discharge rate should be limited to 1/3 cfs per acre for 100-year critical duration events.

    b. For newly developing or redeveloping areas within the Blue Lake Drainage System upstream of Deans Lake, it is the policy of the City of Shakopee that the maximum peak discharge rate will be limited to a maximum of 0.1 cfs per acre in a 100-year storm.

    c. An attempt will be made to limit the peak discharge rate from all newly developing property in the Blue Lake District upstream of Deans Lake, to approximately 1/20 of a cfs for rainfall events having intensities relating to a Ten (10) year return frequency event.

    d. The peak discharge rate requirements shall be waived to the extent necessary to allow an outlet orifice to be limited to no less than the equivalent area of eight-inch opening, and/or allow the outlet to be sized to allow the detention area to draw down to within one foot of the normal run-out elevation within 72 hours following the onset of a 100-year rainfall event.

4. The design of all major stormwater storage facilities shall attempt to accommodate the 100-year critical runoff event. These facilities include lakes, ponds, and their outlets. The critical event shall be the 100-year 24-hour storm event or the 10-day snowmelt event, whichever requires the largest pond volume and has the highest flood elevation.

5. New storm lateral sewer systems shall be designed to accommodate discharge rates associated with the 10-year storm event.

6. Any new development or redevelopment will maintain a minimum building opening elevation three feet above the anticipated 100-year high water elevation as a standard practice. However, if this three foot freeboard requirement is considered a hardship, the standard could be lowered to two feet if the following can be demonstrated:

a. That, within the two foot freeboard area, storm water storage is available which is equal to or exceeds 50% of the storm water storage currently available in the basin below the 100-year elevation.

b. That a 25% obstruction of the basin outlet over a 24 hour period would not result in more than one foot of additional bounce in the basin.

c. An adequate overflow route from the basin is available that will provide one foot of freeboard for the proposed low building opening.

7. The City requires setting minimum basement floor elevations to an elevation that meets the following criteria:

   a. The basement floor will be four feet above the currently observed groundwater elevations in the area.

   b. The basement floor elevation will be two feet above the elevation of any known historic high groundwater elevations for the area. Information on historic high groundwater elevations can be derived from any reasonable sources including piezometer data, soil boring data, percolation testing logs, etc.

   c. The basement floor elevation will be two feet above the 100-year high surface water elevation for the area unless it can be demonstrated that this standard creates a hardship. If the two foot standard is considered a hardship, the standard could be lowered to one foot above the highest anticipated groundwater elevation resulting from a 100-year critical duration rainfall event. The impact of high surface water elevations on groundwater elevations in the vicinity of the structure can take into consideration the site=s distance from the floodplain area, the soils, the normal water elevation of surface depressions in the area, the static groundwater table and historic water elevations in the area. This information shall be provided by a registered engineer or soil scientist.

8. The City requires pretreatment of runoff prior to infiltration wherever it is practical and reasonable to do so, provided that past and existing land use practices do not have a significant potential to contaminate the stormwater runoff. Infiltration will be required in all areas with A and B hydrologic soils. In addition in areas where enhanced infiltration practices are employed, a minimum of three feet of soil must be present between the pond bottom and bedrock to treat infiltrating storm water.

9. As part of the City's Nondegradation Plan development, the City will develop additional infiltration requirements based on a City-wide basis rather than a site-by-site approach due to varying soil conditions.

10. The City encourages the use of Low Impact Development (LID) techniques for new development and redevelopment to reduce water quality and quantity impacts and will investigate allowed/approved methods to be used in the City.

11. The City will develop an infiltration monitoring program to monitoring the existing infiltration areas for effectiveness and maintenance needs.

12. Landlocked depressions which presently do not have a defined outlet and do not typically overflow may be allowed a positive outlet provided it is in conformance with the approved Water Resource Management Plan, does not cause downstream flooding, sufficient dead storage is provided to retain back-to-back 100-year, 24-hour rainfalls, it will not affect the stability of downstream water resources, and it has been demonstrated that volume control practices alone will not address the problem.

13. Floodplain alterations or filling shall not cause a net decrease in flood storage capacity below the 100-year critical flood elevation unless it is shown that the activity will not cause an increase in flood elevation.

14. The City will develop a storm water management ordinance and update its current ordinances that incorporate the requirements of this Plan. This ordinance will be available on the City's website when completed.

B. Water Quality

Goal:

Maintain or improve the quality of water in lakes, streams or rivers within or immediately downstream of the City of Shakopee.

Policies:

1. For new development or redevelopment, storm water quality treatment is required to NURP guidelines. The City has developed the following NURP design recommendations for the design of storm water treatment basins:

    a. A permanent pool ("dead storage") volume below the principal spillway (normal outlet) which shall be greater than or equal to the runoff from a 2.5 inch rainfall over the entire contributing drainage area assuming full development.

    b. A permanent pool average depth (basin volume/basin area) which shall be $\geq$ 4 feet, with a maximum depth of $\leq$ 10 feet.

    c. An emergency overflow (emergency outlet) adequate to control the one percent frequency/critical duration rainfall event.

    d. Basin side slopes below the 100-year high water level and above the normal water level should be no steeper than 4:1, and preferably flatter. A basin shelf with a minimum width of 10 feet and one foot deep below the normal water level is recommended to enhance wildlife habitat, reduce potential safety hazards, and improve access for long-term maintenance.

    e. To prevent short-circuiting, the distance between major inlets and the normal outlet shall be maximized.

f. A flood pool ("live storage") volume above the principal spillway shall be adequate so that the peak discharge rates meet the requirement of **Section A**.

g. No orifice smaller than eight inches is allowed in the construction of ponds or outlets within the City.

h. Consideration for aesthetics and wildlife habitat should be included in the design of the pond.

2. The City will accept other storm water quality treatment methods on a case-by-case basis it they meet or exceed the removal efficiencies provided by a NURP pond.

3. The City will actively participate in the development of Total Maximum Daily Load (TMDL) studies for Deans Lake, O'Dowd Lake, and the Minnesota River.

4. The City will reduce its non-point source phosphorus loading to the Minnesota River by a minimum of 30% through the implementation of this Plan as required by the Minnesota River Dissolved Oxygen TMDL Study.

5. The City incorporates its Storm Water Pollution Prevention Plan (SWPPP) into this Water Resource Management Plan by reference and can be viewed on-line at www.ci.shakopee.mn.us.

6. The City will develop and submit an NPDES Nondegradation Plan by November 2007. The City's Water Resource Management Plan (WRMP) will be updated at that time to incorporate the results of the Nondegradation Plan and will use the WRMP as a vehicle to implement the Nondegradation/SWPPP Plan.

7. The City has adopted the following water resource classifications for water quality as follows:

Water Body	Water Quality Classification*	Desired Water Quality Parameters	Goals
Eagle Creek	Level I	TP: < 30 ug/L Chl a: < 10 ug/L Secchi: >2 meters	Preserve existing human use of the water body such as fishing or swimming
Deans Lake	Level III	TP: 45-75 ug/L Chl a: 20-40 ug/L Secchi: 0.6-1.0 meters	Preserve existing human use of the water body such as fishing
Minnesota River	Level II/III	TP: 30-75 ug/L Chl a: 10-40 ug/L Secchi: 0.6-2.0 meters	Achieve 40% reduction in non-source pollution
Blue Lake	Level IV	NA	Enhance natural plant and animal communities as well as passive water recreation such as hiking, wildlife observation, and fishing
Fisher Lake	Level IV	NA	Enhance natural plant and animal communities as well as passive water recreation such as hiking, wildlife observation, and fishing
O'Dowd	Level III	TP: 45-75 ug/L Chl a: 20-40 ug/L Secchi: 0.6-1.0 meters	Preserve existing human use of the water body such as fishing

Level I: Level I water bodies fully support all water-based recreational activities including swimming, scuba diving, and snorkeling.

Level II: Level II water bodies are appropriate for all recreational uses except full body contact activities. Recreational activities for these water bodies include boating, water skiing, etc.

Level III: Level III water bodies will support fishing (in lakes capable of supporting a fishery), aesthetic viewing activities, and observing wildlife.

Level IV: Level IV water resources are wetlands and may be suitable for aesthetic viewing activities, observing wildlife, and other appropriate public uses.

Level V: Level V water bodies are generally intended for runoff management (i.e. storm water detention) and have no significant recreational use values.

8. The City will investigate opportunities to retrofit the downtown area to provide additional water quality treatment in this fully developed area.

9. The City of Shakopee will sweep the streets at least two times annually.

10. The City of Shakopee will require the inclusion of oil skimmers in the construction of new pond outlets, and add skimmers to the existing system whenever feasible and practical. The designs shall provide for skimmers that extend a minimum of 4 inches below the water surface and minimize the velocities of water passing under the skimmer to less than 0.5 feet per second for rainfall events having a one year return frequency.

11. The City will work with Scott County to develop a program to ensure that solid or liquid waste is disposed of properly. This program will include providing information to homeowners on proper disposal and/or use of yard waste in an environmentally responsible manner. It will also educate its residents on the proper disposal of household hazardous waste including waste oil, paints, and solvents. The City will work with Scott County toward securing locations within the City limits where household hazardous waste may be dropped off.

12. The City will discourage use of fertilizers and pesticides in shoreland protection zones to minimize pollutant runoff to public waters.

13. The City will work with the County to develop a sanitary sewer plan to address the issues concerning individual sewage treatment systems consistent with State standards.

14. The City will continue to implement its retention/treatment basin clean out and maintenance plan that will address maintenance to the extent feasible and practical. The goal of this plan will be to assure that the City's retention and treatment basins will have the capability to retain and treat stormwater in future years.

15. The City will develop and implement a water quality monitoring program capable of establishing that the stormwater treatment basins constructed within the City are not only designed to Nationwide Urban Runoff Standards but also meet the anticipated design removal efficiencies based on actual monitoring of the system. This program will be carried out to the extent deemed necessary and reasonable by the Shakopee City Council.

C. Recreation, Fish and Wildlife

Goal:

Protect and enhance recreational facilities and fish and wildlife habitat.

Policies:

1. The City of Shakopee will work with and support to the maximum extent practical the efforts of Minnesota Department of Natural Resources, the Corps of Engineers, the United States Environmental Protection Agency, the U.S. Fish and Wildlife Service, and other appropriate agencies in promoting public enjoyment and protecting fish, wildlife, and recreational resource values in the watershed.

2. The City will partner with the Scott WMO to undertake aquatic plant surveys on O'Dowd Lake.

3. The City will encourage land owners to maintain wetlands and open space areas for the benefit of wildlife.

4. The City will encourage the expansion of DNR fish stocking programs in appropriate lake and streams of the City.

5. The City will preserve unique features and aesthetics such as those identified in **Section III** to the greatest extent feasible.

6. The City's Natural Resource Corridor Map **(Figure III-13)** shall be taken into account if areas within the corridor are proposed to be developed.

7. Development shall be required to adhere to the City's Shoreland and Tree Preservation Ordinances.

8. The City will remove impediments to the storm water management system as needed. These impediments could include beaver lodges, downed trees, and/or unauthorized man-made structures.

D. Enhancement of Public Participation Information and Education

Goal:

Educate and inform the public on pertinent water resource management issues and increase public participation in water management activities.

Policies:

1. Through the City's MS4 NDPES permit, the City has implemented a public education plan that provides information on pertinent water management issues. This includes annual meetings, information in newsletters, and information on the City's web-site. The City's SWPPP and NPDES permit are incorporated by reference and can be viewed on-line at www.ci.shakopee.mn.us.

2. The City will work with the Watershed Districts in public education efforts.

3. Through the City's public education effort, information about maintaining wetland buffers will be targeted at homeowners.

E. Public Ditch Systems

Goal:

Provide a mechanism through which public ditch systems will be managed.

Policies:

1. No officially established public or judicial ditch systems have been identified within the corporate boundaries within the City of Shakopee. The City has other funding mechanisms available that allow it to adequately respond to drainage issues within the remaining stormwater conveyance systems within the City. As a result, it will be

the City's policy not to establish any public ditch systems within the City pursuant to Minnesota Statues Section 103D or 103E in the future.

F. Groundwater

Goal:
To protect the quality and supply of groundwater resources.

Policies:

1. Promote and coordinate with other agencies the continuation of existing groundwater monitoring, inventorying or permitting programs.

2. Encourage the development of spill prevention, control, and counter measure plans that are consistent with State and/or Federal regulations.

3. The City will work with the Shakopee Public Utilities Commission (SPUC) to implement a Wellhead Protection Plan to the extent necessary.

4. Encourage preservation of wetlands, ponds and parks areas to encourage infiltration of precipitation in areas where land use is not anticipated to adversely affect groundwater or surface water runoff.

5. Support efforts to gather further information on the hydrogeology of the region. When such information becomes available, including information on the location of groundwater recharge areas, the City will take into consideration these areas for the purpose of maintaining their recharge capabilities in protecting groundwater quality.

6. Cooperate with Scott County Environmental Health Department to insure that all unsealed or improperly abandoned wells within the watershed are properly sealed. Technical requirements for the abandonment of these wells will be in conformance with the Minnesota Department of Health Water Well Code.

7. Work with Scott County in the implementation of the Scott County Groundwater Protection Plan.

G. Wetlands

Goals:
Protect wetlands in conformance with the requirements of the Wetland Conservation Act of 1991.

Policies:

1. The City of Shakopee will accept the Local Governmental Unit (LGU) responsibility for wetland management and manage these wetlands in conformance with the Wetland Conservation Act (Minnesota Rules Chapter 8420). The City will maintain any wetland information obtained as the LGU. Information regarding the City's permitting process is included in **Appendix E.**

2. Prior to any site development activities, the City will require a site inspection from trained wetland delineation professional to identify the location and extent of any wetlands present.

3. Any review of a proposed wetland encroachment will initially address the issue of avoidance. It will be the city's policy that prior to allowing any wetland encroachment; all reasonable attempts to avoid such alteration must be demonstrated. This avoidance review must also consider the reasonableness of the no build alternative.

4. As part of new development or redevelopment of a site that contains wetlands, a MnRAM 3.0 functional assessment, or more recent version, will be required to be submitted by the project proposer and reviewed by the City.

5. Based on the results of the MnRAM 3.0 assessment (or more recent version of MnRAM) wetlands will be classified as outlined in this policy. These classifications are based on the Scott WMO requirements. Based on the classification, the following buffers will be implemented around wetlands as part of new development or redevelopment.

Category	Average Buffer Width	Minimum Buffer Width
Exceptional	65	25
High	50	25
Moderate	35	25
Low	25	25

6. Wetland buffers shall be dedicated in outlots or conservation easement. Monumentation at the lot corners or every 200 feet, whichever is shorter, shall be required and shown on the plat.

7. Setbacks from the wetland buffers will be required for all new development and redevelopment to provide useable yard space and reduce the chances of buffer encroachment. A 10 foot structure setback from the buffer to the building at the side yard or the commercial building is required. A 30 foot structure setback from the buffer to the house is required for front and rear residential structures.

8. The City's ordinances will be updated to incorporate the policies outlined in this Plan.

H. Erosion

Goals:

Prevent erosion and sedimentation to the maximum reasonable extent.

Policies:

1. Erosion and sedimentation control plans and SWPPP's for projects that disturb one acre of more of land shall be reviewed and enforced by the City for all new

developments. These plans shall conform to the requirements of the Scott WMO requirements and the NPDES Construction Stormwater Permit.

2. The City will conduct erosion inspections for areas in the City not currently under construction but are susceptible to erosion (i.e. bluff areas).

3. The City will sweep the streets at least two times annually.

4. The City will prohibit work in areas having steep slopes (>12%) and high erosion potential where the impacts of significant erosion cannot be protected against or mitigated in accordance with the City's ordinances.

5. The City requires a 30 foot structure setback and a 50 foot storm water pond/infiltration area setback from the top of bluff.

6. The City will actively administer a program for controlling sediment erosion from single family home construction sites.

7. The City will adhere to the requirements of its NPDES SWPPP. The City's SWPPP is available upon request from the City's Engineering Department.

8. The City will update its erosion control ordinance.

V. ASSESSMENT OF PROBLEMS AND CORRECTIVE ACTIONS

Outlined below is an assessment of existing and potential water resource related problems that are known at this time. These problems have been identified based on an analysis of the land and water resource data collected as part of this local plan preparation and through public input. A description of any existing or potential problem within the topic area has been listed.

A. Lake and stream water quality problems.

1. Sediment deposition in Deans Lake from the Prior Lake - Spring Lake outlet channel.

   Corrective Action

   The PLSLWD has completed work to address this issue. The sediment deposition is not currently an issue and will continue to be monitored.

2. Degradation of water quality in Deans Lake.

3. Septic system failures around Deans Lake have occurred as a result of high water fluctuations in this basin.

   Corrective Action:

   The City will work with Scott County, the PLSLWD, and LMRWD to complete diagnostic feasibility study for Deans Lake that will establish a recommended long term management program. The study will identify feasible options for protecting or improving water quality, maintaining reasonably stable lake levels, and outline a management program that will assure that proper and reasonable management measures are implemented. This study should also address the existing performance and water quality impacts of the septic systems that are in place around the lake.

4. Miscellaneous ponds within the City have been subject to degradation as a result of erosion and sediment deposition into these ponds and basins.

   Corrective Action:

   The City inspects all of its storm sewer outfalls, sediment basins, and ponds on a rotating basis every five years. Maintenance will be conducted as needed.

5. Lack of effective water quality monitoring process for lakes and other waterbodies.

Corrective Action:

The City will implement a water quality monitoring program on O'Dowd and Deans Lake through the CAMP or CLMP programs.

6. Wells along County Road 16 were found to be high in nitrates.

Corrective Action:

The City will work with SPUC and Scott County to develop a groundwater quality management plan for the City that will address well water quality. It is anticipated this plan will be based on implementation of a more regional plan, perhaps by Scott County.

7. The Minnesota River, O'Dowd Lake, and Deans Lake have been identified by the Minnesota Pollution Control Agency (MPCA) as impaired waters.

Correction Action:

The City will be an active participant with the MPCA and the Watershed Districts to set Total Maximum Daily Loads (TMDLs) for the impaired waters in the City.

B. Flooding and Stormwater rate control concerns within the City.

1. Low water elevations in Deans Lake were identified as a problem.

Corrective Action:

In 2006 the City constructed the Deans Lake outlet structure to maintain the water levels in the Lake and to address the issues associated with the outlet channel erosion. However, the Lake is still susceptible to low water conditions during drought conditions like many other water bodies. No additional corrective actions are needed at this time.

2. A flooding problem was noted in the vicinity of Marschall Road at Valley View Road.

3. A flooding problem was identified behind Eagle Creek Town Hall.

4. A flooding problem was identified one mile south of County Road 16 and County Road 83.

Corrective Action:

The City will complete a flood problem area study in the vicinity of County Road 21 immediately south of County Road 16, area in the vicinity of Marschall Road at Valley View Road, area in the vicinity behind Eagle Creek Town Hall, and the area in the vicinity one mile south of County Road 16 and County Road 83.

The City will pursue partnering with the Watershed Districts, Watershed Management Organizations, and others to incorporate volume control BMP's into development and re-development projects.

5. The Prior Lake Outlet Channel is an on going concern for rate control, flooding, and erosion.

   Corrective Action:

   The City will cooperate with Prior Lake/Spring Lake Watershed District to support their outlet operation and maintenance project. The Joint Powers Agreement in **Appendix A** outlines this relationship.

6. A flooding problem was noted in the vicinity of County Road 21 immediately south of County Road 16.

   Corrective Action:

   It is believed that this problem was addressed in the reconstruction of CSAH 16

C. Flooding or stormwater rate control concerns between the City and adjoining communities.

1. The rate and volume of water within the Prior Lake-Spring Lake outlet channel within the Cities of Prior Lake, Shakopee, and the SMSC have been a concern.

   Corrective Action:

   The Cities of Prior Lake, Shakopee, and the SMSC have entered into an agreement regarding allowable discharge rates and funding of repair projects along the PLSL outlet channel as outlined in **Appendix A.**

2. A concern has been noted regarding the protection of groundwater levels within the Eagle Creek Watershed in order to protect the Boiling Springs and Fen areas.

   Corrective Action:

   The City of Shakopee will undertake a groundwater study in the vicinity of Boiling Springs and Fen areas to the extent necessary to assure these areas will be protected. The City will also work with the City of Savage to coordinate the two cities groundwater protection activities within the Boiling Springs and Fen areas.

3. Prior Lake within the City of Prior Lake is susceptible to flooding. A small portion of the City of Shakopee drains to Prior Lake.

Corrective Action
The City will pursue partnering with the Watershed Districts, Watershed Management Organizations, and others to incorporate volume control BMP's into development and re-development projects in this subwatershed.

D. Impacts of water quantity or quality management practices on recreational opportunities.

1. It is a concern to maintain and improve the water quality of Lake O'Dowd and Dean Lake to provide recreational opportunities.

   Corrective Action:

   The City will pursue participation in MCES' Camp Program or CLMP Program to monitor and track trends of water quality of the lakes.

   The City will participate in the development of TMDL studies for these water bodies.

2. Non-point source pollution to the Minnesota River from its watershed has resulted in the River not meeting its designated water quality standards.

   Corrective Action:

   Implement Shakopee Comprehensive Water Resource Management Plan to address non-point source pollution directed to the Minnesota River and reduce non-point source phosphorus loads by at least 30%.

   Meet requirements associated with Cities NPDES Permit for Upper Valley Drainageway Outfall.

   The City will implement its SWPPP and prepare its Nondegradation Plan.

E. Impacts of stormwater quality on fish and wildlife resources.

1. Illegal dumping of hazardous materials into the City's storm sewer system by the public reduces downstream water quality.

   Corrective Action:

   The City will develop an illicit discharge ordinance and educate the public as a part of MS4 SWPPP minimum control measures.

F. Impacts of soil erosion on water quality and water quantity.

1. During significant rainfall events, soil erosion, particularly from construction sites has carried sediment to waterbodies within the City. This sediment deposition may have resulted in reducing the depth of water within these waterbodies and degrading the quality of water in the basin.

2. It was noted that additional erosion control was necessary in many areas undergoing single family home construction.

Corrective Action:

The City will continue to implement erosion control programs currently in place within the City for areas where construction activity is taking place.

The City will update its erosion control ordinance

3. Bluff erosion north of County Road 16 in the vicinity of Mullenhardt Road and the intersection of County Road 21 and Country Road 17 was noted.

Corrective Action:

Develop City program to complete semi-annual inspection across the City for the purposes of identifying areas within the City that are not under active construction but over which erosion problems are present.

G. General impact of land use practices and in particular land development and land alteration on water quality and water quantity.

1. Selected areas of the City have been exposed to increased rates and volumes of stormwater runoff as a result of an increase in impervious surface area. Other land development and land use practices have negatively impacted both water quality and quantity outside of the City limits.

Corrective Action:

Implement Shakopee's Comprehensive Water Resource Management Plan and implement Shakopee's Nondegradation Plan, which is under development. The Water Resource Management Plan and the Nondegradation Plan will be integrated through the plan amendment process.

H. The adequacy of existing regulatory controls to manage or mitigate adverse impacts on public waters and wetlands, to limit soil erosion, and to maintain storage systems.

1. It is the City will need to update its ordinances to be in conformance with this Water Resource Management Plan.

Corrective Action:

The City will review and update ordinances to be in conformance with this Plan.

2. The need for a community educational program was noted.

Corrective Action:

The City will implement a Community Education Plan to increase residents' awareness and reduce violations concerning proper water resource management.

I. The adequacy of programs to maintain water level control structures.

1. The City believes adequate programs are in place to maintain all water level control structures within the City.

No corrective action required.

J. The adequacy of capital improvement programs to correct problems relating to water quality, water quality management, fish and wildlife habitat, public waters and wetland management, and recreational opportunities.

1. Construction of a fixed positive outlet from Deans Lake that would establish a normal elevation has been requested. In addition, as part of the construction of such an outlet, drainage issues related to the Prior Lake Spring Lake discharge, the MN/DOT bypass improvements, and downstream drainage issues were all identified as issues requiring additional study and constructed improvements.

Corrective Action Completed

2. The downtown Shakopee area is completing developed and does not provide opportunities for water quality treatment.

Corrective Action

Identify and construct storm water quality retrofit projects in the downtown area over the next five years.

K. Identification of potential problems which are anticipated to occur within the next twenty years based on growth projections and planned urbanization.

1. The City anticipates residents within the City will exert increased pressure to improve the quality of water within the City and the appearance of stormwater retention areas.

Corrective Action:

The implementation of this Comprehensive Water Resource Management Plan will address water quantity, quality, and maintenance issues associated with stormwater retention areas.

2. Increased demand for public access and/or trail systems for waterbodies within the City.

3. The need for an improved public boat access for the Minnesota River.

Corrective Action:

The City is in the process of constructing a Minnesota River boat access project. It is anticipated the project will be completed by 2007. The City will also continue to work to provide trail systems and water based recreation areas.

N. The adequacy of existing technical and background information on systems in the City that are used to manage water resources.

Information appears to be adequate.

VI. FINANCIAL CONSIDERATIONS

Implementation of the proposed regulatory controls, programs and improvements that are identified in this plan will have a financial impact on the City. To establish how significant this impact will be, a review of the means and ability of the City of Shakopee to fund these controls, programs and improvements is necessary. Toward this end, please find outlined below a listing of various sources of revenue which the City can utilize to implement the water resource management efforts outlined in this plan.

DESCRIPTION OF FUNDING SOURCE	REVENUE GENERATED
1. Revenue generated by City of Shakopee Storm Drainage Utility.	$1,200,000/year
2. Special assessments for local improvements made under the authority granted by Minnesota Statutes Chapter 429.	Variable depending on activities undertaken
3. Revenue generated by Watershed Management Special Tax Districts provided for under Minnesota Statutes Chapter 473.882.	Variable depending on activities undertaken
4. For projects being completed by or in cooperation with the Lower Minnesota River Watershed District and/or the Prior Lake/Spring Lake Watershed District, project funds could be obtained from watershed district levies associated with their administrative funds, construction funds, preliminary funds, repair and maintenance funds or survey and data acquisition funds, as provided for in Minnesota Statutes Chapter 103D.905; Funds of the Watershed District.	Variable depending on activities undertaken
5. Grant monies that may be secured from various local, regional, County, State, or Federal agencies.	Variable depending on activities undertaken
6. Other Sources. These may be other sources of funding for stormwater activities such as tax increase financing, user fees, special benefit charges, etc. The City will continue to explore additional revenue sources.	Variable depending on activities undertaken
7. Ponding fund or trunk storm fee	Variable depending on development
8. Metropolitan Council Water Quality Grant.	Variable depending on activities undertaken
9. Cost share and/or incentive funds from Scott WMO, PLSLWD, or LMRWD	Variable depending on project

VII. IMPLEMENTATION PRIORITIES/IMPLEMENTATION PROGRAM

Based on the information developed in **Sections III through VI**, the City has developed a water resource management program that reflects the needs and concerns of the City staff, council, citizens, and the funding capabilities of the City. A prioritized listing of the studies, programs and capital improvements that have been identified as necessary to respond to all of the water resource needs within the City is outlined on the following tables. Following the tables are detailed work plans which define the tasks associated with completing the stormwater management programs, studies and capital improvement projects. The City anticipates implementing at least to some extent the regulatory programs or improvements identified within this plan by the year 2015.

TABLE VII-1

CAPITAL IMPROVEMENT PROJECTS

Capital Improvement Projects												
No.	Plan Reference Location	Priority	Project Description	Cost Estimate[a]	Potential Funding Sources	2006	2007	2008	2009	2010	2011 - 2015	Comments
CIP-1	V.B	High	Contribute to PLSL outlet channel operation and maintenance	$1,481,690	Storm Water Utility Fund	$434,533	$267,753	$209,693	$173,369	$100,299	$296,043	See **Appendix A**
CIP-2	V.J	High	Contruct storm water quality retrofit projects in downtown area	$410,000	Storm Water Utility Fund		$100,000	$100,000	$100,000	$100,000	$10,000	
CIP-3	V.K	High	Improve public access and trail system to water based recreation areas	$250,000	Storm Water Utility Fund	$25,000	$25,000	$25,000	$25,000	$25,000	$125,000	
CIP-4	V.J	Done	Construct stable outlet structure for Dean Lake.	$0	Storm Water Utility Fund	Completed 2006						
			Total:	$2,141,690		$459,533	$392,753	$334,693	$298,369	$225,299	$431,043	

These tables are provided for planning purposes only.

TABLE VII-2

STORM WATER MANAGEMENT OPERATION AND MAINTENANCE PROGRAMS

Storm Water Management Programs												
No.	Plan Reference Location	Priority	Project Description	Cost Estimate[a]	Funding Sources	2006	2007	2008	2009	2010	2011 - 2015	Comments
SMP-1	IV.B	High	Sweep streets at least twice per year	$500,000	ROW Maintenance Fund	$50,000	$50,000	$50,000	$50,000	$50,000	$250,000	
SMP-2	V.A	High	Inspect storm water outfalls and ponds on a rotating basis	$50,000	Storm Water Utility	$5,000	$5,000	$5,000	$5,000	$5,000	$25,000	
SMP-3	IV.B	High	Work with Scott County on household hazardous waste disposal program	$50,000	Sewer Utility	$5,000	$5,000	$5,000	$5,000	$5,000	$25,000	
SMP-4	IV.B	High	Continue storm water basin monitoring and clean out program	$200,000	Storm Water Utility	$20,000	$20,000	$20,000	$20,000	$20,000	$100,000	
SMP-5	IV.C	High	Continue beaver/wildlife management program to prevent blockage of the storm water management system	$10,000	Storm Water Utility	$1,000	$1,000	$1,000	$1,000	$1,000	$5,000	
SMP-6	IV.D	High	Continue to implement public education program	$50,000	Storm Water Utility	$5,000	$5,000	$5,000	$5,000	$5,000	$25,000	
SMP-7	IV.G	High	Perform Local Government Unit (LGU) Role for Wetland Conservation Act	$50,000	General Fund	$10,000	$10,000	$10,000	$10,000	$10,000	IV.G50000	

TABLE VII-2

STORM WATER MANAGEMENT OPERATION AND MAINTENANCE PROGRAMS

Storm Water Management Programs												
No.	Plan Reference Location	Priority	Project Description	Cost Estimate[a]	Funding Sources	2006	2007	2008	2009	2010	2011 - 2015	Comments
SMP-8	IV.H	High	Inspect and enforce erosion control measures required for site development activities within the City in accordance with the NPDES Erosion Control Program.	$100,000	Permit Fees	$10,000	$10,000	$10,000	$10,000	$10,000	$50,000	
SMP-9	IV.H V.F	High	Conduct semi-annual erosion control inspections for areas in the City not currently underconstruction (i.e. bluff areas, channels, etc)	$10,000	Storm Water Utility	$1,000	$1,000	$1,000	$1,000	$1,000	$5,000	
			Total:	$1,020,000		$107,000	$107,000	$107,000	$107,000	$107,000	$485,000	

These tables are provided for planning purposes only.

TABLE VII-3

STORM WATER MANAGEMENT STUDIES

Storm Water Management Studies

No.	Plan Reference Location	Priority	Project Description	Cost Estimate[a]	Funding Sources	2006	2007	2008	2009	2010	2011-2015	Comments
SMS-1	IV.A IV.B	High	Develop Nondegradation Plan	$32,000	Storm Water Utility	$15,000	$17,000					Includes developing updated infitlration requirements
SMS-2	IV.B V.A V.D	High	Implement a water quantity and quality monitoring program	$90,000	Storm Water Utility; Grants		$10,000	$10,000	$10,000	$10,000	$50,000	
SMS-3	IV.A	High	Conduct infitlration basin monitoring program	$25,000	Grants		$25,000					Implementation items will be developed based on study
SMS-4	V.A	High	Complete Diagnostic Feasibility Study for Deans Lake	$12,000	City; Grants; Watershed District			$12,000				
SMS-5	IV.A	High	Develop storm water management ordinance	$3,000	City	$3,000						
SMS-6	IV.H V.F	High	Update the erosion control ordinance	$3,000	City	$3,000						
SMS-7	V.E	High	Develop an illicit discharge ordiance	$3,000	City	$3,000						

TABLE VII-3

STORM WATER MANAGEMENT STUDIES

Storm Water Management Studies

No.	Plan Reference Location	Priority	Project Description	Cost Estimate[a]	Funding Sources	2006	2007	2008	2009	2010	2011-2015	Comments
SMS-8	IV.G	High	Develop wetland ordinance	$3,000	City	$3,000						
SMS-9	IV.A	High	Develop recommendations on acceptable LID practices within the City	$5,000	City		$5,000					
SMS-10	IV.B	Medium	Work with Scott County to develop a sanitary sewer plan that addresses failing ISTS systems	$15,000	City			$15,000				
SMS-11	IV.B V.A V.D	Medium	Participate in development of TMDL for Deans Lake	$10,000	City, Watershed District. Adjoining Cities, MPCA						$10,000	
SMS-12	IV.B V.A V.D	Medium	Participate in development of TMDL for O-Dowd Lake	$10,000	City, Watershed District. Adjoining Cities, MPCA						$10,000	
SMS-13	IV.B V.A V.D	Medium	Participate in TMDL development for Minnesota River	$10,000							$10,000	
SMS-14	V.B	Medium	Complete a flood problem area study for County Road 21, 16, Marschall Road, Valley View Road	$20,000				$10,000	$10,000			

TABLE VII-3

STORM WATER MANAGEMENT STUDIES

Storm Water Management Studies

No.	Plan Reference Location	Priority	Project Description	Cost Estimate[a]	Funding Sources	2006	2007	2008	2009	2010	2011-2015	Comments
SMS-15	V.C	Medium	The City of Shakopee will undertake a groundwater study in the vicinity of Boiling Springs and Fen.	$10,000					$10,000			
SMS-16	IV.C	Low	Undertake aquatic plant survey on O'Dowd Lake with the Scott WMO	$5,000	City, Scott WMO					$5,000		
			Total:	$256,000		$27,000	$57,000	$47,000	$30,000	$15,000	$80,000	

These tables are provided for planning purposes only.

TABLE VII-4								
SUMMARY								
		Proposed Expenses for Year						
Tables	Cost Estimate[a]	2006	2007	2008	2009	2010	2011-2015	Comments
Table VI-1: Capital Improvement Projects	$2,141,690	$459,533	$392,753	$334,693	$298,369	$225,299	$431,043	
Table VI-2: Surface Water Management Operation and Maintenance Programs	$1,020,000	$107,000	$107,000	$107,000	$107,000	$107,000	$485,000	
Table VI-3: Surface Water Management Studies	$256,000	$27,000	$57,000	$47,000	$30,000	$15,000	$80,000	
Grand Total:	**$3,417,690**	**$593,533**	**$556,753**	**$488,693**	**$435,369**	**$347,299**	**$996,043**	

These tables are provided for planning purposes only.

VIII. AMENDMENT PROCEDURES

It is the intention of the City to have this Water Resource Management Plan reviewed and approved by the Lower Minnesota River Watershed District, the Prior Lake/Spring Lake Watershed District, and the Scott County Watershed Management Organization. Once approved, no significant changes to this plan can be facilitated without the approval of the proposed revisions by the Watershed Management Organizations within the City that are affected by the change. Significant changes to the local plan shall be made known to the following parties:

1. The Mayor and City Council of the City of Shakopee
2. City of Shakopee Engineering and Parks Department staff
3. Affected Watershed Management Organizations and Districts within the City of Shakopee
4. Metropolitan Council

Following notification of the above parties, they shall have 60 days to comment on the proposed revisions. Failure to respond within 60 days constitutes approval. Upon receipt of approvals from the affected Watershed Management Organizations within the City, any proposed amendments will be considered approved.

Minor changes to the plan shall be defined as changes that do not modify the goals, policies, or commitments expressly defined in this plan by the City. Adjustment to subwatershed boundaries will be considered minor changes provided that the change will have no significant impact on the rate or quality in which stormwater runoff is discharged from the City boundaries. Minor changes to this plan can be made by the staff at the City of Shakopee without outside review. It is the intention of the City of Shakopee that this plan be updated by the year 2015 unless significant changes to the plan are deemed necessary prior to that date.

Additional revisions to meet upcoming requirements are anticipated. The following lists the upcoming studies that will likely result in revisions to the Plan. These revisions will be considered minor amendments to the Plan:

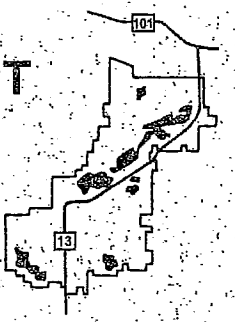
- Nondegradation Plan for MS4 Permit – anticipated in 2008
- Comprehensive Plan Amendment – anticipated 2008

APPENDIX A

Water Resource Related Agreements

PRIOR LAKE - SPRING LAKE WATERSHED DISTRICT

Phone (952) 447-4166
Fax (952) 447-4167
www.plslwd.org



Memorandum

September 6, 2005

To: Steve Albrecht, City of Prior Lake
Stan Ellison, Scott Walz, Shakopee Mdewakanton Sioux Community
Bruce Loney, City of Shakopee

From: Shannon Lotthammer, District Administrator

CC: Bryce Huemoeller, Huemoeller, Bates and Gontarek (District Attorney)

Re: Revised Joint Powers Agreement

Enclosed for your review, comment and approval are the proposed revisions to the Joint Powers Agreement (JPA) for the Prior Lake Outlet Channel. The proposed revisions reflect our discussions in recent years regarding updates to the JPA, as well as the cost-share approach we developed and discussed last spring for the construction of the Outlet Channel Restoration and Enhancement Project and the ongoing operation and maintenance of the Outlet Channel.

The enclosed document identifies the proposed JPA changes using underlining to denote additions to the text and strikethrough to denote deletions. It is a bit difficult to read in this format, so please let me know if you would like to receive a "clean" version with all the changes accepted, or if you prefer a PDF file.

The proposed JPA revisions were reviewed and discussed by the Prior Lake-Spring Lake Watershed District (PLSLWD) Board at a workshop on August 30, 2005, at which time the Board approved the revised JPA for signature by the PLSLWD once the Cities of Prior Lake and Shakopee and the Shakopee Mdewakanton Sioux Community (SMSC) have also approved the agreement. It is the PLSLWD's hope that the revised JPA can be reviewed, approved and executed by all the parties before the end of this year.

Finally, please note that as we discussed last spring, due to limitations of the State of Minnesota's joint powers agreement statute the SMSC cannot be a party to the JPA. Therefore, a separate Memorandum of Agreement (MOA) will need to be executed with the SMSC that has the same provisions as the JPA. I will send out a copy of that MOA to all of you once it is completed, which should be in the next two weeks. In the meantime, if you have any questions about the proposed revised JPA please contact me at (952) 447-4166 or slotthammer@plslwd.org.

Thank you for all of your assistance as we worked through the details of the cost share agreement and the changes to the JPA. I look forward to hearing from you, and to the final approval and execution of the revised JPA and the MOA!

JOINT POWERS AGREEMENT

Agreement, made and entered into as of _____, 2005, by and between the City of Prior Lake, Minnesota, a municipal corporation, ("Prior Lake"); the City of Shakopee, Minnesota, a municipal corporation, ("Shakopee"); and the Prior Lake-Spring Lake Watershed District, Prior Lake, Minnesota, a political subdivision of the State of Minnesota, ("Watershed District").

~~WHEREAS, the Watershed District is presently engaged in the implementation of a project, identified as the "Lake Outlet Project, Number WD-76-4", ("Lake Outlet"), to construct an artificial outlet for Prior Lake for the purpose of draining water from Prior Lake and transporting such water to the Minnesota River; and~~

~~WHEREAS, the plans and specifications for the Lake Outlet require the improvement of certain natural drainage courses and the construction of certain drainage channels within the municipal boundaries of Shakopee and more particularly described on Exhibit "A", which is attached hereto and by reference made a part hereof; and~~

WHEREAS, since the completion of the Lake Outlet Project, as defined below, the Shakopee Mdewakantion Sioux Community has acquired land tributary to the Outlet Channel, as defined below, and development has occurred in areas of Prior Lake and Shakopee tributary to the Outlet Channel; and

WHEREAS, the approved comprehensive plans of Prior Lake, Shakopee and Scott County identify additional development that will occur during the next 40 years; and

WHEREAS, the cities of Prior Lake and Shakopee and the Shakopee Mdewakanton Sioux Community ("SMSC") have begun using the Outlet Channel to convey storm water from developed areas within their boundaries or ownership; and

WHEREAS, the Watershed District, Prior Lake, Shakopee and SMSC (jointly the "Project Cooperators") are planning a project to restore and enhance the Outlet Channel to complete needed repairs and ensure channel stability and capacity for existing and future storm water flows ("Outlet Channel Restoration and Enhancement Project") in accordance with a Conceptual Design, as defined below; and

WHEREAS, the Watershed District is planning modifications to the Outlet Structure, as defined below, to repair the Outlet Structure and improve its efficiency; and

~~WHEREAS, the temporary and permanent easements specified by the plans and specifications for the construction of the foregoing drainage improvements can only be obtained from the affected property owners with the cooperation and assistance of Shakopee; and~~

WHEREAS, the Outlet Channel ~~drainage improvements~~Restoration and Enhancement Project is ~~and easement acquisitions contemplated by the Watershed District are~~ of direct and immediate benefit to the SMSC, Prior Lake and Shakopee because (a) the ~~drainage channel improvements~~Outlet Channel Restoration and Enhancement Project ~~are~~ is in conformance with the SMSC's, Prior Lake's and Shakopee's overall drainage plan in the area of the ~~Lake Outlet~~Outlet Channel's drainage route; (b) the easements to be acquired within the City of Shakopee can also be used by Shakopee for public utility and ~~right-of-way~~drainage purposes, (c) the easements to be acquired within the City of Prior Lake can also be used by Prior Lake for public utility and drainage purposes, and (~~c~~d) ~~the channel improvements may reroute local runoff into Dean's Lake and thereby supplement and increase the level of the lake~~an operable Outlet Channel with adequate storm water conveyance capacity allows for the orderly development of the SMSC, Prior Lake and Shakopee; and

WHEREAS, Prior Lake and Shakopee desire to assist the Watershed District to acquire the easements necessary for the construction of the ~~drainage c~~Outlet Channel ~~improvements~~ Restoration and Enhancement Project ~~specified in the Lake Outlet plans and specifications~~, upon the conditions hereafter set forth; and

WHEREAS, the ~~implementation of the Lake~~ Outlet Structure is of direct and immediate benefit to Prior Lake because the ~~improvements contemplated by the Lake Outlet are~~ Outlet Structure is designed to reduce the impact of flooding on Prior Lake insofar as it affects the owners of property along the shore and within the established flood plain, and as it affects the capability of Prior Lake to provide essential municipal services during times of flooding; and

~~WHEREAS, Prior Lake desires to be made a part to this Agreement to enable it to participate in decisions affecting the use and management of the Lake Outlet; and~~

WHEREAS, there is a need to clarify responsibilities regarding the ongoing use, operation and maintenance of the Outlet Structure and Outlet Channel by the Watershed District, SMSC, Prior Lake and Shakopee, and

WHEREAS, the parties hereto desire to enter into a joint powers agreement pursuant to Minnesota Statutes Section 471.59~~1~~, (1949, as amended), upon the terms and conditions hereinafter specified; and

WHEREAS, the Watershed District has authority under Minnesota Statutes Section ~~112.43, Subd. 1(2)~~103D.335, Subd. 2, (~~1955~~1990, as amended), to contract with other public corporations to effectuate the purposes of the Act; and

WHEREAS, Prior Lake and Shakopee have authority to engage in a joint powers agreement for utility and drainage purposes pursuant to Minnesota Statutes Section 412.221, Subd. 2 (1949, as amended); and~~.~~

WHEREAS, for reasons of state law the SMSC does not have authority to engage in a joint powers agreement for utility and drainage purposes, and can only participate by executing a separate Memorandum of Agreement ("MOA") with one or more of the Project Cooperators; and

WHEREAS, this Agreement allocates responsibilities to the SMSC in anticipation that the SMSC will enter into and fulfill its obligations under a separate MOA with one or more of the Project Cooperators; and

WHEREAS, this Agreement provides alternate provisions in the event that the SMSC does not enter into an MOA with the Project Cooperators or meet its obligations under such a MOA;

NOW, THEREFORE, in consideration of the mutual covenants and agreements hereinafter contained, it is agreed by and between the parties hereto as follows:

ARTICLE I
DEFINITIONS

Unless otherwise expressly provided herein or the context otherwise requires, each of the following capitalized terms when used herein shall have the following defined meanings:

Conceptual Design – A plan for restoring and enhancing the Outlet Channel, as defined below, that was developed with the input of the Project Cooperators as part of the "Prior Lake Outlet Study and Lake Volume Management Study" completed by the District in 2003. The Conceptual Design is based on the use of bioengineering and natural stream technology practices to improve channel stability, reduce erosion, and enhance the habitat and aesthetics of the Outlet

Channel, as defined below. A copy of the Conceptual Design is attached hereto as Exhibit "A" and by reference made a part hereof.

Lake Outlet Project – A project completed by the Watershed District in 1983 to construct an artificial outlet for Prior Lake for the purpose of draining water from Prior Lake and transporting such water to the Minnesota River, including the improvement of certain natural drainage courses and the construction of certain drainage channels within the municipal boundaries of Prior Lake and Shakopee.

Outlet Channel – The seven miles of natural and constructed drainage courses within the municipal boundaries of Prior Lake and Shakopee that were connected, constructed and improved as part of the Lake Outlet Project. The Outlet Channel extends from the Outlet Structure, as defined below, north to the Minnesota River at Blue Lake. For the purposes of planning and construction of restoration/enhancements and maintenance, the Outlet Channel is divided into the following eight segments:

- Segment 1: Prior Lake to County Road 42
- Segment 2: County Road 42 to the inlet of Pike Lake
- Segment 3: The outlet of Pike Lake to Pike Lake Trail
- Segment 4: Pike Lake Trail to County Road 16
- Segment 5: County Road 16 to the inlet of Dean Lake
- Segment 6: The outlet of Dean Lake to State Trunk Highway 169
- Segment 7: State Trunk Highway 169 to State Trunk Highway 101
- Segment 8: State Trunk Highway 101 to the Minnesota River

Outlet Structure – The structure and pipe that was installed on Lower Prior Lake by the Watershed District in 1983 as part of the Lake Outlet Project, to provide an outlet for the lake.

Project Cooperators – The Prior Lake-Spring Lake Watershed District, City of Prior Lake, City of Shakopee and Shakopee Mdewakanton Sioux Community, who are jointly undertaking the Outlet Channel Restoration and Enhancement Project.

Construction Fund – A fund established for costs associated with construction of the Outlet Channel Restoration and Enhancement Project, pursuant to Article VII below.

Operating Fund – A fund established for the costs of Outlet Channel operation and routine maintenance, pursuant to Article VII below.

Emergency Maintenance Fund – A fund established for the costs of emergency maintenance and repair of the Outlet Channel, pursuant to Article VII below.

Outlet Operating Plan (2004, as amended) – A plan documenting the management policy and operating procedures for the Outlet Structure, as developed by the Watershed District and approved by the Minnesota Department of Natural Resources. A copy of the Plan is attached hereto as Exhibit "B" and by reference made a part hereof.

ARTICLE ~~I~~II

STATEMENT OF PURPOSE

Section ~~1~~2.01. General Purpose. The general purpose of this Agreement is to (a) provide a format by which the Project Cooperators can restore and enhance the Outlet Channel to meet existing and future lake outlet and storm water conveyance needs, (b) facilitate the fair distribution of the costs of restoring, enhancing, operating and maintaining the Outlet Channel, and (c) provide a format whereby the Watershed District can ~~construct and~~ operate, repair, improve and maintain an artificial outlet that ~~can be~~ is used to drain flood waters from Prior Lake and transport them to the Minnesota River via the Outlet Channel. The ~~construction~~restoration and enhancement of the ~~Lake Outlet~~ Outlet Channel requires the acquisition of easements in Prior Lake and Shakopee and construction of enhancements. ~~Thereafter, the Watershed District must construct improvements~~ to the ~~drainage channel~~Outlet Channel along the ~~entire~~ system. The ~~portion of the drainage channel~~Outlet Channel is located ~~in Shakopee is~~ within an area which has been identified by Prior Lake, Shakopee and the SMSC as needing future capacity in excess of the levels projected by the Watershed District as being required for safe and efficient operation of the ~~Lake~~ Outlet Structure. It is the intention of the parties to this Agreement to establish a legally binding procedure for acquiring the necessary additional easements ~~in Shakopee and to set forth conditions that must be fulfilled to~~and sharing the costs of the construction and ~~operate~~ maintenance of the necessary Outlet Cehannel ~~improvements~~Restoration and Enhancement Project. The Agreement shall specify the procedures and responsibilities for maintenance of the Outlet Cehannel ~~improvements~~ and the conditions that must be fulfilled ~~prior to actually releasing~~during the release of water from Prior Lake. The Agreement shall specify the responsibilities of the parties with respect to maintenance of the ~~drainage channel~~Outlet Channel and the additional uses that may be made of the additional easements by Prior Lake and Shakopee.

ARTICLE ~~V~~III

~~USED~~ USES OF ~~DRAINAGE~~ OUTLET CHANNEL

Section ~~5~~3.01 Permitted Uses by Watershed District. The Watershed District shall use the ~~drainage c~~Outlet Channel for the purpose of draining water from Prior Lake and for no other purposes.

Section ~~5~~3.02. Permitted Uses by Prior Lake, Shakopee and SMSC. Prior Lake, Shakopee and the SMSC shall use the Outlet Channel for the purposes of conveying storm water from drainage areas tributary to the Outlet Channel. The tributary drainage areas downstream of Prior Lake are identified in Table 1 below, and the maximum allowable discharge rates to the Outlet Channel from the Watershed District, Prior Lake, Shakopee and the SMSC are specified in Table 2. Table 3 presents the peak flow rates to the Outlet Channel for each segment. These peak flow rates were calculated for each Outlet Channel segment by multiplying the drainage area from Table 1 by the applicable discharge rate per acre from Table 2 for each Project Cooperator. ~~reserves the right to use the easements obtained by the Watershed District in connection with its overall drainage plans as they are from time to time developed by Shakopee.~~

Table 1: Outlet Channel Tributary Drainage Areas (downstream of Prior Lake).

Outlet Channel Segment	Watershed District	Prior Lake	SMSC**	Shakopee	SubTotal
1	N/A*	658	28	0	686
2	*	261	3	0	264
3	*	1,145	5	94	1,244
4	*	827	1,787	2,622	5,236
5	*	0	7	758	765
6	*	0	261	927	1,188
7	*	0	0	1,407	1,407
8	*	0	0	101	101
Total	*	**2,891**	**2,092**	**5,909**	**10,892**

*The Watershed District's contribution to the Outlet Channel is not dependent on drainage area; it is based on a maximum flow through the Outlet Structure of 65 cubic feet per second.
**Includes Fee and Trust lands.

Table 2: Outlet Channel Maximum Discharge Rates per Acre.

Project Cooperator	Maximum flow rate to Outlet Channel, per acre
Watershed District	65 cfs total (max flow through Outlet Structure)
City of Shakopee South of Dean Lake (Upstream)	0.10 cfs/acre
City of Shakopee North of Dean Lake (Downstream)	0.33 cfs/acre
City of Prior Lake	0.17 cfs/acre
Shakopee Mdewakanton Sioux Community	0.05 cfs/acre

Table 3: Allowable Peak Discharge Rates to the Outlet Channel, by Project Cooperator and Segment.

	Peak Discharge Rates, in cfs, by Project Cooperator			
Segment	Watershed District	Prior Lake	SMSC	Shakopee
1	65	112	1	0
2	65	156	2	0
3	65	351	2	9
4	65	492	91	272
5	65	492	92	347
6	65	492	105	656
7	65	492	105	1125
8	65	492	105	1159

The tributary areas and drainage rates in Table 2 and Table 3 shall be the basis for the hydrologic and hydraulic design capacity of the Outlet Channel Restoration and Enhancement Project.

Section 3.03. Exceeding Allowable Discharge Rates. The Watershed District may request that the Project Cooperators provide verification that new developments within the drainage areas tributary to the Outlet Channel downstream of Prior Lake will not result in an increase in the per acre drainage rate specified in Table 2 or the peak discharge rates specified in Table 3. In the event that an increase in ~~runoff~~discharge rate beyond those specified in Tables 2 or 3 ~~in Shakopee~~ results in or causes the need for repairs, maintenance, or expansion of the design capacity for the ~~drainage~~ Outlet ~~channel~~Channel beyond that specified in this Agreement, the Project Cooperator discharging the additional flow ~~Shakopee~~ shall make or install all repairs,

maintenance or improvements necessary to ~~increase the capacity of the drainage channel to~~ handle the increased flow. Any such repairs, maintenance or improvements shall be at the sole cost or expense of the Project Cooperator with the increased discharge~~Shakopee~~; and ~~both Prior Lake and the Watershed District~~the other Project Cooperators shall be indemnified and held harmless from any and all liability for such cost or expense and for such increased flow.

Section ~~5~~3.0~~4~~3 Additional Authorized Prior Lake and Shakopee Uses. Prior Lake and Shakopee may, subject to the limitations of specific easements, use the easements without termination of this Agreement~~,~~ for the installation, operation and maintenance of public services and utilities to include without limitation public streets, sanitary sewer, water, storm sewer, electrical and natural gas. In no event shall such uses interfere or otherwise restrict the drainage function of the ~~channel~~Outlet Channel. All cost or expense to install, operate and maintain such utilities and any damage to the ~~channel~~ Outlet Channel resulting from such installation, operation and maintenance shall be borne by either Prior Lake or Shakopee and ~~both Prior Lake and the Watershed District shall be indemnified and held harmless from any liability therefore~~the responsible City shall indemnify and hold harmless from any liability the other Project Cooperators.

ARTICLE ~~H~~IV

ACQUISITION OF ~~DRAINAGE~~ OUTLET CHANNEL EASEMENTS

Section ~~2~~4.01. Acquisition of Outlet Channel ~~Channel~~ Easements. To the extent possible, the Project Cooperators intend to obtain the necessary easements for the construction of the Outlet Channel Restoration and Enhancement Project and the ongoing operation and maintenance of the Outlet Channel by dedication pursuant to the applicable subdivision ordinances within Prior Lake and Shakopee. If the timing of the construction of the Outlet Channel Restoration and Enhancement Project requires that easements be obtained prior to subdivision, ~~T~~the Watershed District is authorized to negotiate for and acquire ~~suitable~~ the necessary Outlet Channel easements within the municipal boundaries of Prior Lake and Shakopee ~~for the construction of the Lake Outlet.~~ In conducting the negotiations and/or condemnation proceedings necessary for the acquisition of the ~~required~~ easements, the Watershed District shall comply in all respects with Shakopee Resolution No. 1643, entitled "A Resolution Adopting A Policy For The City Of Shakopee Concerning The Condemnation Of

Easements And Land Needed For The Installation Of Public Improvements". To the extent possible within the budgetary limitations established by the Watershed District for the Lake Outlet, the Watershed District shall also endeavor to acquire easements in dimensions required by Shakopee. The plans and specifications for the ~~Lake Outlet~~Outlet Channel Restoration and Enhancement Project shall specify the ultimate alignment and dimensions of the easements.

Section ~~24~~.02. Uses of and Title to Easements. The easements to be acquired by the Watershed District shall be for ~~utility and~~ drainage purposes over, under, and across the affected properties. In the City of Shakopee, t~~T~~he title to the easements shall be acquired in the ~~Joint~~ joint names of the Watershed District and Shakopee.

Section ~~24~~.03. Assistance by Shakopee. In the event that it becomes necessary in the opinion of the Watershed District to acquire the required easements by means of condemnation proceedings, Shakopee shall cooperate with and assist the Watershed District in pursuing condemnation. In that event, all legal proceedings shall be brought in the joint name of the Watershed District and Shakopee by the Shakopee City Attorney in accordance with Shakopee Resolution No. 1643.

Section ~~24~~.04. Easement Acquisition Costs. All costs or expense necessary and incidental to the acquisition of ~~the~~ easements for the Outlet Channel shall be the responsibility of and borne by the ~~Watershed District~~Project Cooperators according to the cost-share allocation specified in Article VII. The Project Cooperators shall contribute their share of the easement acquisition costs to the Construction Fund. ~~The costs for which the Watershed District shall have direct and exclusive responsibility shall include without limitation all costs related to the acquisition of the easements, legal fees, court costs, appraisal fees, survey fees, abstracting fees, and recording fees. The Watershed District agrees to indemnify and hold Shakopee harmless from any and all liability of any nature arising from, and for all cost and expense relating to, the acquisition of the easements.~~

~~Section 2.05. Payment of Easement Acquisition Costs. The Watershed District shall pay the easement acquisition costs on or before 30 days following receipt of the proceeds from the sale of the municipal bonds used to finance the Lake Outlet in the event that the contracts for the improvements are let and the work on the improvements proceeds. In the event that the Watershed District elects either not to let contracts for the improvements or elects not to let contracts for the improvements or elects not to commence work on the improvements, the~~

~~easement acquisition cost shall be paid on or before 30 days after receipt of the reimbursement funds received from Scott County in accordance with Minnesota Statutes Section 1112.47, Subd. 2, (1955, as amended). The Watershed District agrees to indemnify and hold Shakopee harmless from any costs or expenses related to easement acquisition.~~

ARTICLE V

CONSTRUCTION OF OUTLET CHANNEL RESTORATION AND ENHANCEMENT PROJECT

Section 5.01. General. The Outlet Channel is in need of restoration and enhancement to stabilize the channel banks and ensure adequate capacity for existing and future storm water conveyance needs. The final design for each segment of the Outlet Channel Restoration and Enhancement Project shall be consistent with the Conceptual Design and shall accommodate the expected drainage capacity needs of the Project Cooperators as identified in Table 3 above.

Section 5.02. Responsibilities for Outlet Channel Restoration and Enhancement Project. The Watershed District will lead and coordinate the project to design and construct the Outlet Channel restoration and enhancements. Prior to construction, the District shall obtain all permits and approvals required by any governmental unit having jurisdiction over the Outlet Channel Restoration and Enhancement Project, including without limitation Prior Lake, Shakopee, the Lower Minnesota River Watershed District, the Department of Natural Resources and the U.S. Army Corps of Reserves. The District shall design the Outlet Channel Restoration and Enhancement Project to conform to generally acceptable engineering practices and the Conceptual Design, and shall consult with the Project Cooperators during the final design of each channel segment. The Watershed District shall furnish the Project Cooperators with complete copies of the final draft plans and specifications for each segment of the Outlet Channel for their review and comment. The Project Cooperators shall approve the plans and specifications or request modifications within 60 days of receiving the final draft plans from the Watershed District. The Watershed District shall endeavor to incorporate the comments and needs of the Project Cooperators into the plans. However, if situations arise where the Watershed District receives comments that are inconsistent with the Outlet Channel design capacity needs, the Conceptual Design or with other comments, to avoid delays in the project the

Watershed District's determination on questions of design shall be conclusive and the dispute resolution provisions of Article X shall not apply.

Section 5.03. Construction Schedule. The design and construction of the Outlet Channel Restoration and Enhancement Project is expected to occur over a period of five years, beginning in 2005. The construction activities will be scheduled to coordinate with the subdivision and development of land adjacent to the Outlet Channel to the extent possible. The anticipated construction schedule for the Outlet Channel Restoration and Enhancement Project is more particularly described in Exhibit "C", which is attached hereto and by reference made a part hereof.

Section 5.04. Use of the Outlet Channel During Construction and Vegetation Establishment. The Outlet Channel will continue to be used by the Project Cooperators for stormwater conveyance while the Outlet Channel Restoration and Enhancement Project is under construction and before the vegetation is fully established. During construction and until the vegetation is established, erosion control best management practices will be installed and maintained and the construction efforts will be sequenced to protect downstream resources. Despite these efforts, a situation may arise where a downstream impact occurs following a large rainfall or other runoff- or weather-related event. In the event of a downstream impact, the Project Cooperators shall work together to remediate the impact, and shall include that work as an element of the overall Outlet Channel Restoration and Enhancement Project, subject to the cost-share allocation specified in Article VII.

Section 5.05. Obligation to Contribute to the Cost of the Outlet Channel Restoration and Enhancement Project. All costs and expense for the design and construction of the Outlet Channel Restoration and Enhancement Project are the responsibility of the Project Cooperators as specified in Article VII. A Construction Fund shall be established for the costs of constructing the Outlet Channel Restoration and Enhancement Project, according to Article VII below.

ARTICLE VI

OPERATION AND MAINTENANCE OF ~~DRAINAGE~~ OUTLET CHANNEL

~~Section 6.01. Obligation of Watershed District to Provide Initial Construction Warranty for Drainage channel Improvements. For a period of three (3) years following completion of the~~

~~improvements made to the drainage channel as part of the initial construction of the Lake Outlet, the Watershed District shall have the sole and exclusive obligation to stabilize the channel bank and restore any damage to the drainage channel or adjoining property resulting from the initial construction work. In addition, any work performed by the Watershed District during the foregoing three (3) year period to repair, replace or correct defects that arise out of or in connection with the initial construction shall be similarly guaranteed for an additional three (3) year period from and after the date of such repair, replacement or correction.~~

Section 6.01. General. Following the completion of each segment of the Outlet Channel Restoration and Enhancement Project, annual operation and maintenance activities will be necessary to monitor the status of the Outlet Channel and ensure the stability and continued performance of the channel. In addition, occasional emergency repairs may be required following significant or sustained flow events, and due to normal wear and tear.

Section 6.02. Responsibilities for Outlet Channel Operation and Maintenance. The Watershed District shall be responsible for inspecting and coordinating the operation and maintenance of the Outlet Channel. All maintenance activities shall conform to the maintenance plan for the Outlet Channel, generally acceptable engineering practices and the Conceptual Design. The District shall obtain all permits and approvals required for the maintenance activities by any governmental unit having jurisdiction over the Outlet Channel, including without limitation Prior Lake, Shakopee, the Lower Minnesota Watershed District, the Department of Natural Resources and the U.S. Army Corps of Reserves. When immediate action is not required to address an identified maintenance need, the Watershed District shall furnish the Project Cooperators with complete copies of the plans and specifications for the maintenance activity for their review and comment. The Project Cooperators shall approve the plans and specifications or request modifications within 15 days of receiving them from the Watershed District. The Watershed District shall endeavor to incorporate the comments and needs of the Project Cooperators into the plans. However, if situations arise where the Watershed District receives comments that are inconsistent with the Outlet Channel maintenance needs, the Conceptual Design or with other comments, to avoid delays in Outlet Channel maintenance the Watershed District's determination on questions of maintenance shall be conclusive and the dispute resolution provisions of Article X shall not apply.

Section 6.03. Inspection of the Outlet Channel. Each year, the Watershed District shall inspect the Outlet Channel according to the procedures established in the Outlet Operating Plan (2004, as amended). In the event that an inspection reveals that repair or maintenance is required to maintain the stability of the channel banks, ensure the free flow of water through the Outlet Channel, or prevent downstream impacts, the District shall coordinate the completion of such repairs or maintenance in accordance with this Article.

Section 6.04. Routine Maintenance. Routine maintenance of the Outlet Channel, such as mowing or burning the vegetation and removing sediment from accumulation zones, shall be necessary to ensure continued bank stability, prevent encroachment by undesirable weed species, and prevent migration of sediment downstream. For each segment of the Outlet Channel, a maintenance plan shall be completed and shall be reviewed by the Project Cooperators prior to commencement of the routine maintenance activities. The Project Cooperators shall approve the maintenance plan or request modifications within 60 days of receiving it from the Watershed District. The Watershed District shall endeavor to incorporate the comments and needs of the Project Cooperators into the plan. However, if situations arise where the Watershed District receives comments that are inconsistent with the Outlet Channel maintenance needs, the Conceptual Design or with other comments, to avoid delays in Outlet Channel maintenance the Watershed District's determination on questions of maintenance shall be conclusive and the dispute resolution provisions of Article X shall not apply.

Section 6.05. Emergency Repair and Maintenance. On occasion, weather conditions or flow patterns along the Outlet Channel may result in a bank failure, culvert obstruction or other condition that requires prompt repair or maintenance to ensure free flow of water in the Outlet Channel, maintain channel stability and avoid downstream impacts. The need for emergency or non-routine maintenance activities may be identified by any of the Project Cooperators and communicated to the Watershed District. Once the need is identified, a plan shall be developed for completing the necessary repair or maintenance that conforms to the Conceptual Design. If the Watershed District is unavailable or unable to respond to complete the emergency repair or maintenance, any of the Project Cooperators may complete the maintenance and the associated costs shall be paid from the Emergency Maintenance Fund. The Project Cooperator completing the emergency repair or maintenance shall endeavor to provide the other Project Cooperators with 24 hours notice of any emergency repair or maintenance activity; however, the Project

Cooperator is entitled to move forward with the emergency maintenance activity regardless of response from the other Project Partners, provided that the activity conforms to the Conceptual Design.

Section 6.06. Obligation to Pay for the Costs of Outlet Channel Operation and Maintenance.

(a) The Project Cooperators shall have a continuing obligation throughout the entire term of this Agreement to contribute to the cost incurred for the routine operation and maintenance of the Outlet Channel, including vegetation management, sediment removal, and Outlet Channel inspections. An Operating Fund shall be established for the costs of operation and routine maintenance according to Article VII below.

(b) The Project Cooperators shall also have a continuing obligation throughout the entire term of this Agreement to contribute to the cost incurred for the emergency repair and maintenance of the Outlet Channel, provided that the need for the emergency repair or maintenance is not the result of flows exceeding the flow limitations identified in Tables 2 and 3. An Emergency Maintenance Fund shall be established for the costs of emergency repair and maintenance according to Article VII below. If the need for emergency repair or maintenance results from flows exceeding the flow limitations identified in Tables 2 and 3, the parties that exceed their flow limitations shall be responsible for the costs of the emergency repair or maintenance in an amount proportional to their flow.

~~Section 6.02. Obligations of Watershed District to Contribute to the Routine Maintenance of Drainage Channel.~~

~~(a) In addition to its obligations to provide construction warranties pursuant to Section 6.01, the Watershed District shall have a continuing obligation throughout the entire term of this Agreement to contribute to the cost incurred for the routine maintenance of the drainage channel. The amount of the Watershed District's contribution to the routine maintenance of the drainage channel shall be determines as follows:~~

~~(i)Before the time that Shakopee alters or otherwise makes use of the drainage channel in connection with its overall drainage plan or in connection with the installation of public services and utilities, the Watershed District shall have~~

~~sole and exclusive obligations to perform and pay the cost of all routine maintenance to the drainage channel.~~

~~(ii)After the time that Shakopee modifies the drainage channel in connection with its overall drainage plan or in connection with the installation of public services and utilities, the Watershed District shall have the sole and exclusive obligation to perform and pay the cost of all routine maintenance to that portion of the drainage channel lying southerly of Dean's Lake (including the Dean's Lake diversion structure); provided, however, that at such time as there exists continuous flow of water between the main outlet structure on Prior lake and State Highway No. 101, the Watershed District shall have sole and exclusive obligation to perform and pay the cost of routine maintenance for the entire drainage channel. In no event, however, shall the Watershed District have any responsibility for loss or damage to any public services or utilities installed or maintained in the drainage channel easement by Shakopee.~~

~~(b) In addition to the continuing obligations of the Watershed District to contribute to the routine maintenance of the drainage channel, the Watershed District shall have the obligation of inspecting the drainage channel before and after releasing water from Prior Lake and shall repair any impediment to such discharge before releasing water and restore any damage caused to the drainage channel by such discharge thereafter. The post-discharge inspection shall be made as soon as practical after the discharge has ended. Any emergency restoration work as evidenced by the inspection shall be made as soon as practical after the discharge has ended. Any emergency restoration work as evidenced by the inspection shall be completed within a time frame consistent with the severity of the damage caused and such other physical and weather conditions that may bear upon the work to be performed. In no event, however, shall the time frame for completing permanent repairs exceed one (1) year from the date that the discharge causing the damage was ended.~~

~~Section 6.03. Obligation of Shakopee to Contribute to the Routine Maintenance of Drainage Channel.~~

~~(a) Before the time that Shakopee modifies the drainage channel in connection with its overall drainage plan or in connection with the installation of public services and utilities,~~

~~Shakopee shall have no obligation to contribute to the cost of the routine maintenance of the drainage channel.~~

~~(b) After the time that Shakopee modifies the drainage channel in connection with its overall drainage plan, or in connection with the installation of public services and utilities, and except as otherwise provided in Section 6.02 (a) (ii) Shakopee shall have the sole and exclusive obligation to perform and pay the cost of all routine maintenance to that portion of the drainage channel lying southerly of Dean's Lake.~~

ARTICLE VII

OUTLET CHANNEL COST-SHARE AND FUNDING

Section 7.01. General. The responsibility of the cost for the design, construction, operation, repair and maintenance of the Outlet Channel shall be distributed among the Project Cooperators based on the following general principles:

(a) The cost-share obligation shall be allocated among the Project Cooperators based on each Project Cooperator's estimated need for and anticipated use of the Outlet Channel for stormwater conveyance.

(b) The Watershed District's cost-share obligation shall be based on the maximum 65 cubic feet per second discharge from the Outlet Structure.

(c) The cost-share obligation for Prior Lake, Shakopee and the SMSC shall be based on each Project Cooperator's contributing drainage area to the Outlet Channel downstream of the Outlet Structure and their stated rate control goals for the Outlet Channel drainage area(s) within their jurisdiction.

(d) The contributing drainage area from the SMSC shall include lands held in fee and lands held in trust.

(e) A separate cost-share allocation shall be determined for each Outlet Channel segment.

(f) Each Project Cooperator's cost-share obligation shall begin at the point where stormwater from that Project Cooperator's jurisdictional boundaries flow into the Outlet Channel, and shall extend from that first point of discharge downstream to the point of inlet into Blue Lake.

Section 7.02. Cost-Share Allocation. All costs and expense for the design and construction of the Outlet Channel Restoration and Enhancement Project in conformance with the Conceptual Design, and the ongoing operation, maintenance and repair of the Outlet Channel are the responsibility of the Project Cooperators as specified in Table 4. The costs shall include without limitation all costs for the construction, operation and maintenance of the Outlet Channel, including construction costs, easement acquisition costs, design costs, engineering fees, vegetation management costs, staff costs, legal fees, and permit application fees and related expenses. The formula used to calculate the cost-share allocation is based on the hydrologic and drainage area information described in Tables 1 through 3, and is more particularly described on Exhibit "D", which is attached hereto and by reference made a part hereof. The estimated cost to each Project Cooperator for the design and construction of the Outlet Channel Restoration and Enhancement Project and the first five years of maintenance is more particularly described on Exhibit "E", which is attached hereto and by reference made a part hereof. If the SMSC fails to meet its obligations under the separate MOA with the Project Cooperators, the cost-share allocated to the SMSC shall be shared by the Watershed District, Prior Lake and Shakopee according to the cost-share percentages calculated without the SMSC.

Table 4. Cost-Share Allocation for Outlet Channel

Outlet Channel Segment	**Cost-Share Percentage for Each Project Cooperator**				**Total**
	Watershed District	City of Prior Lake	City of Shakopee	SMSC	
1	91.7%	7.9%	0%	0.4%	100%
2	88.9%	10.7%	0%	0.4%	100%
3	76.7%	20.7%	2.2%	0.4%	100%
4	40.1%	15.2%	33.5%	11.2%	100%
5	36.6%	13.9%	39.2%	10.3%	100%
6	36.9%	14.0%	37.3%	11.9%	100%
7	29.1%	11.0%	50.5%	9.4%	100%
8	28.7%	10.9%	51.2%	9.2%	100%

Section 7.03. Revisions to the Cost-Share Allocation Due to Changes in Drainage Area Downstream of the Outlet Structure. Because the cost-share allocation is based in part on relative drainage area within the Outlet Channel watershed downstream of the Outlet Structure, if this Outlet Channel drainage area changes by more than 40 acres for any of the Project

Cooperator, the cost-share allocation will be revised according to the method described in Exhibit D. Following such a revision any easement acquisition, design, construction, operation or maintenance costs incurred after the change in drainage area will be borne by the Project Cooperators according to the revised cost-share allocation, except that if the change in drainage area results in an increased flow to the Outlet Channel beyond the design parameters specified in this Agreement, the Project Cooperator with the increased flow shall make or install at its sole cost all improvements necessary to increase the capacity of the Outlet Channel to handle the increased flow. The costs shall include without limitation all costs for the construction of the increased capacity for the Outlet Channel, including direct construction costs, easement acquisition costs, design costs, engineering fees, staff costs, legal fees, and permit application fees and related expenses.

Section 7.04. Annual Coordination and Planning Meeting. Each year in March, the Watershed District shall convene the Project Cooperators to discuss the design, construction, operation and maintenance activities planned for the Outlet Channel that year, and to develop budgets for construction, operation and maintenance activities. The Project Cooperators shall also review the previous year's activities, review any requested modifications to the cost-share allocation due to changes in drainage area, and refine the construction cost estimates based on the most recent project data. If for any reason the Project Cooperators fail to agree on a budget for Outlet Channel construction, operation and maintenance activities, the budget for the prior year shall apply to the next year, and the annual contribution of each project Cooperator shall be based on that budget.

Section 7.05. Creation of Construction Fund and Payment of Construction Cost-Share. Beginning in 2006, a Construction Fund shall be established for the cost of designing and constructing the Outlet Channel Restoration and Enhancement Project and acquiring necessary easements. In January of each year of the construction project, each Project Cooperator shall deposit into the Construction Fund their share of the engineer's estimate of the design, easement acquisition and construction costs for that calendar year, according to the cost-share allocation in Section 7.02. The Construction Fund shall be administered by the Watershed District in accordance with the following provisions:

(a) The Watershed District may access the Construction Fund at any time to pay the actual costs of acquiring easements for and design and construction of the Outlet

Channel Restoration and Enhancement Project, including appraisal fees, easement transaction costs, engineering and design fees, permitting fees, construction costs, and staff costs;

(b) The Watershed District shall provide a summary of the Construction Fund balance to the Project Cooperators on a quarterly basis;

(c) Following the end of the fiscal year and before January 30 of the next year, the Watershed District shall provide the Project Cooperators with a detailed accounting of the Construction Fund for the previous year. Any funds remaining at year end shall be credited to each Project Cooperator according to the cost-share allocation in Section 7.02 and the amount shall be subtracted from the next year's funding contribution;

(d) All interest earned by the Construction Fund shall remain in the fund for future construction expenditures. Funds shall be retained in accounts that conform to the requirements of Minnesota Statutes Chapter 118A; and

(e) Following the construction of the Outlet Channel Restoration and Enhancement Project and the completion of all construction contracts and obligations, the Watershed District shall prepare and furnish to the Project Cooperators a final accounting report for the Construction Fund. The balance of the Construction Fund upon completion of the Outlet Channel restoration and Enhancement Project shall be returned to the Project Cooperators according to the cost-share allocation in Section 7.02 or applied to a Project Cooperator's share of the annual Operating Fund contribution at the Project Cooperator's direction.

Section 7.06. Creation of Operating Fund and Payment of Operation and Maintenance Cost-Share. Beginning in 2006, the Project Cooperators shall establish an Operating Fund to pay the costs of Outlet Channel operation and routine maintenance activities. In January of each year, each Project Cooperator shall deposit into the Operating Fund their share of the operations and routine maintenance budget for that year, according to the cost-share allocation in Section 7.02. The Operating Fund shall be administered by the Watershed District in accordance with the following provisions:

(a) The Watershed District may access the funds in the Operating Fund at any time to pay the actual costs of operation and routine maintenance of the Outlet Channel, including construction and maintenance costs, staff costs and engineering fees;

(b) The operation and routine maintenance expenditures shall be consistent with the budget developed during the annual Coordination and Planning Meeting. Any variation from the budget of more than 10 percent shall first be agreed upon in writing by the Project Cooperators;

(c) The Watershed District shall provide a summary of the Operating Fund balance to the Project Cooperators on a quarterly basis;

(d) Following the end of the fiscal year and before January 30 of the next year, the Watershed District shall provide the Project Cooperators with a detailed accounting of the Operating Fund for the previous year, and shall either invoice the Project Cooperators for any deficit, refund any surplus, or carry forward the balance to the next year of Outlet Channel operations and routine maintenance; and

(e) All interest earned by the Operating Fund shall remain in the fund for future operation and routine maintenance expenditures. Funds shall be retained in accounts that conform to the requirements of Minnesota Statutes Chapter 118A.

Section 7.07. Creation of Emergency Maintenance Fund and Payment of Emergency Maintenance Cost-Share. An Emergency Maintenance Fund of $250,000 shall be established during the first five years of the Outlet Channel Restoration and Enhancement Project to provide a stable funding source for the completion of emergency maintenance and repairs as needed along the Outlet Channel. The Emergency Maintenance Fund shall be established by five years of annual contributions of $50,000 from the Project Cooperators, beginning in the year 2006, according to the cost-share allocation identified in Section 7.02. The Emergency Maintenance Fund shall be administered by the Watershed District in accordance with the following provisions:

(a) A Project Cooperator that completes emergency repair or maintenance of the Outlet Channel according to Section 6.05 may access the funds in the Emergency Maintenance Fund at any time to pay the costs of the emergency maintenance. Eligible costs may include but are not limited to construction costs, staff costs and engineering fees;

(b) Following the completion of the non-routine or emergency maintenance, the Project Cooperator that completed the work shall submit to the other Project Cooperators an accounting of the cost of the maintenance, including construction costs, engineering

fees and staff costs, and the Watershed District shall reimburse the Project Cooperator for the cost of the non-routine or emergency maintenance work from the Emergency Maintenance Fund;

(c) In the first full fiscal year following the completion of an emergency or non-routine maintenance activity, the Project Cooperators responsible for that segment shall, by January 30, replenish the Emergency Maintenance Fund in an amount equal to the cost of the maintenance activity, including engineering fees and staff time plus an inflation factor equal to the *Engineering News Record* Construction Cost Index, according to the cost-share formula identified in Section 7.02;

(d) The Watershed District shall provide a summary of the Emergency Maintenance Fund balance to the Project Cooperators on a quarterly basis;

(e) Following the end of the fiscal year and before January 30 of the next year, the Watershed District shall provide the Project Cooperators with a detailed accounting of the Emergency Maintenance Fund for the previous year; and

(f) All interest earned by the Emergency Maintenance Fund shall remain in the fund for future maintenance expenditures. Funds shall be retained in accounts that conform to the requirements of Minnesota Statutes Chapter 118A.

Section 7.08. Administration and Recordkeeping. The Watershed District shall administer the Construction Fund, Operating Fund, and Emergency Maintenance Fund according to the following provisions:

(a) The Watershed District shall retain all financial records for a period of six years following the completion of the work;

(b) The Watershed District shall provide quarterly fund balance statements to the Project Cooperators;

(c) By January 30 of each year, the Watershed District shall provide the Project Cooperators with a detailed accounting of the income, expenditures, and year-end balance for each Fund for the previous year;

(d) The Watershed District shall include the Funds in its annual audit and provide a copy of the audit to the Project Cooperators, and upon request shall make these financial records available for review or audit by any Project Cooperator; and

(e) The Watershed District shall be entitled to reimbursement from the Operating Fund for the actual staff costs and accounting fees associated with maintaining the financial records and completing the reporting for the Construction Fund, Operating Fund, and Emergency Maintenance Fund.

ARTICLE ~~III~~VIII

CONSTRUCTION AND OPERATION OF ~~LAKE~~ PRIOR LAKE OUTLET STRUCTURE

Section ~~3~~8.01. Obligation of Watershed District. The construction of the Outlet Structure on Prior Lake~~Lake Outlet~~, including ~~without limitation the construction of all channel improvements appurtenant thereto~~any repairs or improvements, shall be the sole and exclusive responsibility of the Watershed District. Prior to the commencement of construction, the Watershed District shall obtain all permits and approvals required by any governmental unit having jurisdiction over the ~~Lake Outlet improvements~~Outlet Structure, including without limitation permits from ~~Shakopee, the Lower Minnesota Watershed District, the Minnesota Water Resources Board~~ Prior Lake, and the Minnesota Department of Natural Resources~~, the Environmental Quality Council and the Metropolitan Council~~.

Section ~~3~~8.02. Plans and Specifications for the ~~Lake~~ Outlet Structure~~Improvements~~. The Watershed District shall design the ~~Lake Outlet~~ Outlet Structure improvements to conform with generally acceptable engineering specifications and the findings of the "Prior Lake Outlet Channel and Lake Volume Management Study", May 2003. The Watershed District shall furnish ~~Shakopee~~ Prior Lake with complete copies of the plans and specifications for the ~~Lake Outlet~~Outlet Structure improvements certified to by the Watershed District's engineer. Prior Lake ~~Shakopee~~ shall approve or request modification to all such plans and specifications as they relate to improvements to be placed within its corporate limits within 60 days of receiving a completed request for approval from the Watershed District. The Watershed District's determination on questions of design shall be conclusive as to the parties to this Agreement, so long as the design is consistent with the outlet structure concept identified in the "Prior Lake Outlet Channel and Lake Volume Management Study", May 2003.

Section ~~3~~8.03 Payment of ~~Lake~~ Outlet Structure Construction Costs. All costs or expenses incurred to construct, repair and maintain the ~~Lake~~ Outlet Structure ~~improvements~~ shall be the responsibility of and borne by the Watershed District. The costs to be paid by Watershed

District shall include without limitation all direct construction costs, engineering fees, legal fees, administration expense and permit application fees. The Watershed District shall indemnify and hold Prior Lake and Shakopee harmless from any liability for any cost or expense incurred in constructing or maintaining the ~~Lake~~ Outlet Structure~~improvements~~.

Section 8.04. Operation of Outlet Structure. Water shall be released from the Prior Lake Outlet Structure in accordance with the Outlet Operating Plan (2004, as amended).

~~ARTICLE IV~~

~~OPERATION OF LAKE OUTLET~~

~~Section 4.01. General.~~

~~(a)Water shall not be released from Prior Lake by opening the main Lake Outlet gate at any time when such discharge would jeopardize the health, safety or property of the residents or property owners of Shakopee.~~

~~(b)The determination of when and to what degree such jeopardy has ceased, or has been reduced to the extent that the discharge of water from Prior Lake may commence, shall by made jointly by the engineers of the Watershed District, Shakopee and Prior Lake in accordance with the following procedures:~~

~~(i)An inspection shall be made to determine the depth and velocity of the flow at various locations in the drainage channel.~~

~~(ii) The available capacity in the drainage channel shall be determined by using Manning's equation for open channel flow. All calculations shall be performed by the Watershed District's engineer and shall be confirmed by the engineers of Prior Lake and Shakopee.~~

~~(iii) The "available capacity in the drainage channel" shall be defined as the calculated maximum rate of discharge at which the Lake Outlet can be allowed to operate without resultant damage to the drainage channel or to adjoining properties.~~

~~(c)After the available capacity in the drainage channel has been determined by the engineers of the Watershed District, Prior Lake and Shakopee, the main Lake Outlet gate may be opened subject to adjustment so as to release water at a rate that will not exceed the available capacity in the drainage channel.~~

~~Section 4.02. Notice to Shakopee of Intent to Open Main Lake Outlet Gate. Prior to the opening of the main Lake Outlet gate and the release of water from Prior Lake, the Watershed District shall give Shakopee no less than 24 hours' advance notice in accordance with Section 12.01.~~

~~Section 4.03. Inspection of Drainage Channel.~~

~~(a)Prior to the opening of the main Lake Outlet gate and the release of water from Prior Lake, the Watershed District shall inspect the drainage channel to insure the free flow of water for the anticipated rate and duration of the release period and to determine the available capacity in the drainage channel in accordance with Section 4.01 (b). Notice of any such inspection shall be given to the engineers of Prior Lake and Shakopee and either City may elect to have a representative present for any inspection. In the event that the inspection reveals that repair or maintenance is required to insure the free flow of water through the drainage channel, the party having responsibility for such repair and maintenance in accordance with Article VI shall promptly perform such repairs or maintenance so as to prevent any undue delay in the release of water from Prior Lake. In the event that such repairs are not promptly undertaken by the responsible party, the Watershed District shall have the right to perform, or cause to be performed, the repairs to be made after 24 hours' notice and to recover the costs pertinent thereto from the responsible party. Daily inspections of drainage channel conditions shall be made by the Watershed District during times that Lake Outlet drainage rates exceed 20 CFS. In such event, the responsible party shall reimburse the Watershed District upon due demand therefore for all sums paid, or the fair value of any work performed, by the Watershed District in connection with such repair or maintenance.~~

~~(b) After the main Lake Outlet gate has been closed and the water in the drainage channel has receded, the Watershed District shall make an inspection of the drainage channel to determine whether it has been damaged by the flow of water from Prior Lake. Notice of any such inspection shall be given to the engineers of Prior lake and Shakopee, and either city may elect to have a representative present for any inspection. In the event that the inspection reveals that repair or maintenance is required to insure the free flow of water through the drainage channel, the party having responsibility for such repair and maintenance in accordance with Article VI shall promptly perform such repairs or maintenance so as to prevent any undue delay in the release of water from Prior Lake.~~

(c)The inspection requirements set forth in Sections 4.03 (a) and (b) constitute the minimum obligation of the parties; and any party to this Agreement shall have the full right to make such additional inspection of the drainage channel as it may deem necessary, with or without notice to any other party.

(d)Written reports of all inspections shall be made by the inspection party and shall be forwarded to each of the other parties.

Section 4.04. Operation of Dean's Lake Diversion Structure Gate.

(a) The Watershed District shall have the exclusive authority for the operation of the Dean's Lake diversion structure gate except as otherwise provided in this Section 4.04.

(b) The normal position of the Dean's Lake diversion structure gate (that is; the position of the gate during times that water is not being released from Prior Lake) shall not direct the flow of runoff through Dean's Lake. Nevertheless, the Watershed District agrees to comply with reasonable requests by Shakopee to divert normal runoff through Dean's Lake provided, however, that such request shall be made to the Watershed District in writing and shall be accompanied by the Agreement of Shakopee to indemnify and hold the Watershed District harmless from any liability for loss, damage and cost, including without limitations reasonable attorney's fees, resulting from the diversion of runoff through Deans' lake pursuant to the request of Shakopee.

(c) During the periods that water being released from Prior Lake is flowing through Dean's Lake diversion structure, the diversion structure gate shall be positioned so as to divert all runoff through Dean's Lake. However, in the event that the diversion of runoff into Dean's Lake is causing or creates an eminent danger to private property, Shakopee shall have the authority to abate the flow of runoff into Dean's Lake by repositioning the diversion structure gate to direct all or part of the runoff to the existing natural drainage route. Shakopee shall give the Watershed District prior notice of its intent to redirect the flow of runoff by adjustment of the diversion structure gate.

Section 4.05. Additional Operation Conditions Imposed Upon the Watershed District. The Lake Outlet will be operated in accordance with the terms and conditions of the permit issued by the Minnesota Department of Natural Resources. A copy of the permit is attached hereto as Exhibit "B", and by reference made a part hereof.

ARTICLE ~~VIII~~IX

INDEMNIFICATION

Section ~~7~~9.01. Indemnification of Shakopee and Prior Lake by the Watershed District. Subject to the limitations of Minnesota Statutes Sections 466.01 to 466.15 (1963, as amended), ~~T~~the Watershed District shall indemnify and hold Shakopee and Prior lake harmless from any and all liability, cost or expense, including without limitation reasonable attorney's fees and court costs, arising out of or in connection with the construction, improvement, use and maintenance of the ~~drainage channel~~Outlet Channel by the Watershed District.

Section ~~7~~9.02. Indemnification of the Watershed District and Prior Lake by Shakopee. Subject to the limitations of Minnesota Statutes Sections 466.01 to 466.15 (1963, as amended), Shakopee shall indemnify and hold the Watershed District and Prior Lake harmless from any and all liability, cost or expense, including without limitation reasonable attorney's fees and court costs, arising out of or in connection with Shakopee's improvement, use and maintenance of the ~~drainage channel~~Outlet Channel ~~and the drainage channel easement~~.

Section 9.03. Indemnification of the Watershed District and Shakopee by Prior Lake. Subject to the limitations of Minnesota Statutes Sections 466.01 to 466.15 (1963, as amended), Prior Lake shall indemnify and hold the Watershed District and Shakopee harmless from any and all liability, cost or expense, including without limitation reasonable attorney's fees and court costs, arising out of or in connection with Prior Lake's improvement, use and maintenance of the Outlet Channel.

Section ~~7~~9.~~03~~04. Insurance and Evidence Thereof. Each of the parties to this Agreement shall provide on the demand of the other, evidence that the risks covered by this Article are insured through an insurance company licensed to do business in the State of Minnesota by a policy or policies having minimum per occurrence limits of three Hundred Thousand ($300,000.) Dollars.

ARTICLE ~~VIII~~X

RESOLUTIONS OF DISPUTES

Section ~~8~~10.01. Policy for Resolving Disputes. The parties to this Agreement acknowledge that if disputes do arise over the construction of this Agreement, or over the rights and obligations of the parties hereto, such disputes will, in all likelihood, affect substantial rights

with respect to the health and safety of the persons and property of the citizens residing within their respective jurisdictions and will further arise under the time frames that do not allow for extended investigation or negotiations regarding the relative merits of the respective position to the dispute. Therefore, the following procedure for resolving disputes has been implemented to give each party to this Agreement the opportunity to present, to the fullest extent possible, the essence of their position to a qualified arbitrator and yet at the same time receive a knowledgeable decision, from a person having sufficient technical experience and expertise, within the shortest possible time.

Section ~~8~~10.02. Procedure for Resolving Disputes. All disputes arising out of or in connection with this Agreement shall be resolved as follows:

(a) A meeting between the parties shall be held promptly within five (5) days after delivery of notice of any dispute to attempt in good faith to negotiate a resolution of the dispute. The dispute notice shall be delivered to all parties in the manner provided herein for notices.

(b) If within five (5) days after such meeting, or any additional meetings as the parties mutually deem necessary, or if the parties fail to meet within five (5) days after delivery of the initial dispute notice, the parties agree to submit the dispute to mediation in accordance with Rule 114 of the Minnesota General Rules of Practice and bear equally the costs of the mediation. The parties agree to participate in good faith in the mediation and negotiations related thereto for a period of ten (10) days, unless the parties mutually extend the mediation period.

(c) If the parties are not successful in resolving the dispute through mediation, then any remaining unresolved controversy or claim arising out of or in connection with this Agreement shall be resolved by binding arbitration in accordance with Minnesota Statutes Section 572.08(c) (1957, as amended), and the following conditions:

(i) The dispute shall be heard by a panel of three (3) arbitrators, one of whom shall be selected by each of the parties hereto within five (5) days after expiration of the ten (10) day period for mediation of the dispute. The selection of arbitrators shall be made in a notice delivered to all other parties in the manner provided herein for notices. If any party fails to select an arbitrator within the five (5) day selection period, the remaining arbitrator(s) shall be selected within two

(2) days after expiration of the initial selection period by the arbitrator(s) previously appointed by the parties.

(ii) The hearing before the arbitrators shall be held within ten (10) days after selection of the arbitration panel, unless otherwise mutually agreed by the parties.

(iii) The decision of the arbitrators shall be rendered within fifteen (15) days after selection of the arbitration panel, unless otherwise mutually agreed by the parties.

~~All disputes arising out of or in connection with this Agreement shall be resolved by arbitration in accordance with Minnesota Statutes Section 572.08 (e), (1957, as amended), the Minnesota Uniform Arbitration Act, and the following conditions:~~

~~(a)The dispute shall be heard by a board consisting of three (3) arbitrators. The Watershed District and Prior Lake shall appoint one (1) member to the Board. Shakopee shall appoint one (1) member to the Board. The third Board member shall be appointed by the members previously appointed by the parties.~~

~~(b)The election to arbitrate disputes shall be made in writing, duly served upon all of the other parties in the manner provided herein for notices.~~

~~(c)The hearing before the arbitrators shall be held within five (5) days after service of the election to arbitrate, unless otherwise agreed in writing by each of the parties.~~

~~(d)~~(a) ~~The decision of the arbitrators shall be rendered not later than seven (7) days after service of the election to arbitrate, unless otherwise agreed in writing by each of the parties.~~

Section ~~8~~10.03. Enforcement of Award. The award of the arbitrators shall be enforceable by any district judge of the First Judicial District of the State of Minnesota.

ARTICLE ~~IX~~XI

AMENDMENT

Section ~~9~~11.01. Amendment. Any amendment to this Agreement shall be in writing and duly executed by each of the parties. Any amendment shall be effective from and after the date that it is recorded in the Office of the Scott County Recorder.

ARTICLE XII

TERMINATION

Section ~~10~~12.01 Perpetual. The duration of this Agreement shall be perpetual, or until otherwise expressly rescinded or terminated by the parties. Any such agreement of rescission or termination shall be recorded in the Office of the Scott County Recorder.

ARTICLE ~~XI~~XIII

DISTRIBUTION OF PROPERTY

Section ~~11~~13.01. Distribution of Property Generally. In the event of the rescission or termination of this Agreement, all property or surplus monies acquired as a result of the joint exercise of powers provided for herein shall be returned to the contributing party in proportion to the contribution provided for the respective party.

Section ~~11~~13.02. Title to Easements Upon Termination. Upon termination of this Agreement, the Watershed District shall convey to Shakopee, all of its right, title and interest in that portion of the ~~drainage channel~~Outlet Channel lying ~~southerly~~ northerly of Scott County Road 16 and within the municipal limits of Shakopee.

ARTICLE ~~XII~~XIV

MISCELLANEOUS

Section ~~12~~14.01. Notices. Any notice required to be given or submitted under this Agreement shall be duly given if delivered personally or if mailed, by certified or registered mail, postage prepaid, addressed to the ~~parties at their respective addresses specified below, or to such other address with respect to any party as such party shall notify the others in writing~~administrator or manager of the addressee at their respective principal offices, or to such other address with respect to any party as such party shall notify the others in writing.

Section ~~12~~14.02. Successors and Assigns. This Agreement shall be binding upon and inure to the benefit of the legal successors and assigns of the parties.

Section ~~12~~14.03. Construction. This Agreement shall be construed in accordance with the law of the State of Minnesota.

~~If to Prior Lake:~~

~~(Name)~~
~~City Manager~~
~~16200 Eagle Creek Avenue SE~~
~~Prior Lake, Minnesota 55372~~

~~If to Shakopee:~~

~~(Name)~~
~~City Administrator~~
~~129 South Holmes~~
~~Shakopee, Minnesota 55379~~

~~Prior Lake-Spring Lake Watershed District~~

~~By:~~

~~Its:~~

~~And:~~

~~Its:~~

CITY OF PRIOR LAKE

BY
ITS MAYOR

AND
ITS CITY MANAGER

CITY OF SHAKOPEE

BY
ITS MAYOR

AND
ITS CITY ADMINISTRATOR

PRIOR LAKE-SPRING LAKE
WATERSHED DISTRICT

BY _____
ITS PRESIDENT

AND _____
ITS SECRETARY

STATE OF MINNESOTA)

) ss

COUNTY OF SCOTT)

On this _____day of _____, 2003, the foregoing Joint Powers Agreement was acknowledge before me by _____ and _____, the _____and _____, the_____, respectively, of the City of Prior Lake, a municipal corporation, on behalf of said corporation.

_____

Notary Public

STATE OF MINNESOTA)

) ss

COUNTY OF SCOTT)

On this _____day of _____, 2003, the foregoing Joint Powers Agreement was acknowledged before me by _____and _____, the_____and_____ the_____, respectively of the City of Shakopee, a municipal corporation, on behalf of said corporation.

_____

Notary Public

STATE OF MINNESOTA)

) ss

COUNTY OF SCOTT)

On this _____day of _____, 2003, the foregoing Joint Powers Agreement was acknowledged before me by _____and _____the _____and _____ respectively, of the Prior Lake-Spring Lake Watershed District, a political subdivision of the State of Minnesota, on behalf of said district.

_____

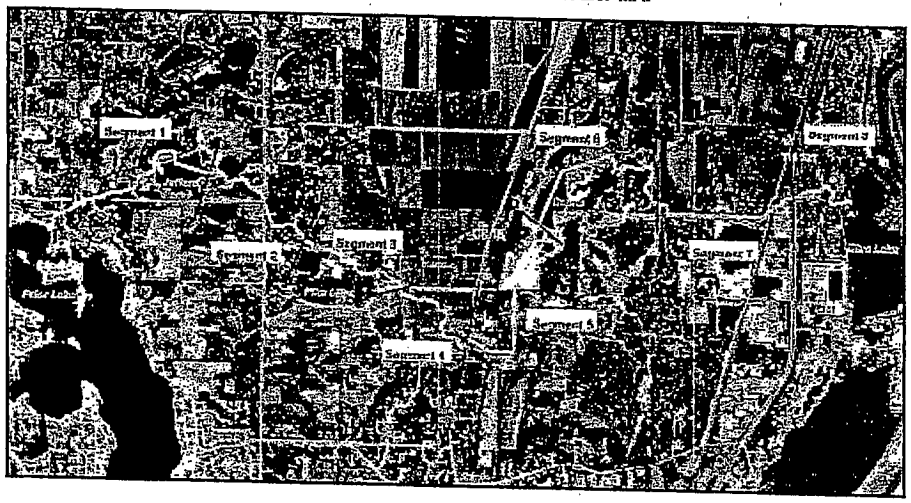
Notary Public

EXHIBIT A

Conceptual Design

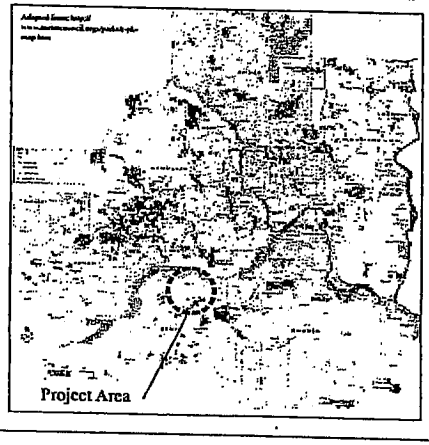
(Excerpted from "Prior Lake Outlet Channel Lake Volume Management Study," PLSLWD, May 2003)

PRIOR LAKE OUTLET CHANNEL CONTEXT MAP



NOT TO SCALE

TWIN CITIES METRO REGIONAL CONTEXT MAP



PRIOR LAKE OUTLET CHANNEL FUTURE CONCEPTUAL PLAN

Shakopee, Prior Lake MN

SHEET INDEX	
Cover Sheet	1
Goals and Design Directives	2
Proposed Outlet Channel Improvements Plan and Profile Drawings	3 - 12

Owner:
Prior Lake-Spring Lake Watershed District
16670 Franklin Trail
Suite 110
Prior Lake, MN 55372
(952) 447-4166
(952) 447-4167

District Engineer:
Wenck Associates, Inc.
1800 Pioneer Creek Center
Maple Plain, MN 55359
Ph. (763) 479-4200
Fax (763) 479-4242

District Ecological Designer:
The Kestrel Design Group, Inc.,
5136 Hankerson Ave. Suite 1
Edina MN 55436
Ph. 952 928-9600
Fax 952 928-1939
www.kestreldesigngroup.com

Portions of the concept development funded by the Minnesota Department of Natural Resources through a Flood Damage Reduction Grant

Rev. No
Rev Date:

Drawn By:
Checked By:
Project No:
Date:

District Ecological Designer:
The Kestrel Design Group, Inc.,
5136 Hankerson ave. Suite 1
Edina MN 55436
Ph. 952 928-9600
Fax 952 928-1939

District Engineer:
Wenck Associates, Inc.
1800 Pioneer Creek Center
Maple Plain, MN 55359
Ph. (763) 479-4200
Fax (763) 479-4242

PRIOR LAKE OUTLET CHANNEL
Prior Lake MN
Owner:
Prior Lake - Spring Lake Watershed District

COVER SHEET

SHEET 1 of 12

PRIOR LAKE OUTLET CHANNEL

MISSION

To insure adequate capacity and channel stability of the Prior Lake Outlet Channel into the future under existing flow and easements to convey Prior Lake overflow waters to Blue Lake and prevent arbitrary closures of the channel to Prior Lake discharges.

PROJECT APPROACH AND TIMELINE:

- Coordination with property owners and stakeholders is essential for successful ecological design
- Outline of concept planning coordination and review for Prior Lake Outlet Channel:
  - o Property owners
  - o Technical Advisory Committee
  - o Board Review
  - o Agency Review
- Prior Lake Outlet Channel Concept Plan is conceptual in nature.
- Prior Lake Outlet Channel Treatments outlined in Concept Plan are general.
- Prior Lake Outlet Channel construction documents will be produced based on Concept Plan recommendations with field fitting employed throughout.

PROJECT LIMITS (PHYSICAL PARAMETERS):

- Primarily a 30' to 50' easement that occassionally expands, also including public waters alongside the outlet channel route.

PROJECT GOALS:

1. Hydrological Parameters:

- Minimize property damage to landowners along the channel, while minimizing Prior Lake water level fluctuations and property damage to lakeshore owners.
- Preserve Prior Lake-Spring Lake Watershed District's Prior Lake discharge capacity rights to the outlet channel from consumption by stormwater generated from new development.
- Limit flow rate from Prior Lake to maximum capacity of existing pipe: 65 cfs.
- Require entities using the channel as a stormwater trunk facility to provide or pay for this capacity and contribute proportionally to the maintenance trust.
- Use a holistic approach that combines upstream runoff management within Prior Lake Watershed to minimize runoff to Prior Lake Channel with an efficient outlet and stable channel.
- Repair/ retrofit of driveway crossings by Prior Lake-Spring Lake Watershed District where hydrologically necessary. Crossings become property of land owner.
- Issues of steady base flow or navigation were not considered – this outlet channel was designed as an intermittent flow regime.

2. Stabilization:

- Stabilize banks so that they stay within easement.
- Use an integrated structure approach to soil stabilization focused on soil/root interface rather than a surface application approach: maximize rhizosphere and minimize use of hard armor by using vegetative soil stabilization rather than fieldstone for bank toe stabilization whenever possible.
- Where hard armor is necessary; use fieldstone (igneous rock) rather than limestone to maximize life span.

3. Natural aesthetic:

- Give this man made channel (ditch) a more natural channel stream feel.
- Stabilize in a natural aesthetic.
- Maximize use of vegetative soil stabilization and minimize use of hard armor.

3. Wildlife Corridor:

- Provide wildlife habitat structure both in aquatic and terrestrial zones of the Prior Lake Outlet Channel where possible.
- Preserve, protect or enhance the aquatic environment of the waterbodies along the outlet channel.
- Preserve/enhance habitat corridor for wildlife migration patterns especially Neotropical migrants, amphibians, and charismatic lepidoptera (butterflies).
- Preserve/ create/ enhance a community asset that combines a corridor for watchable wildlife and native vegetation with a functional channel for conveying water runoff.

4. Maintenance:

- Secure maintenance access throughout channel length.
- Minimize long term maintenance needs and capital expenditures for the outlet system.
- Minimize maintenance by mimicking presettlement vegetation structure.
- Anticipated maintenance requires controlled burns, selective shade reduction and other measures to maintain integrity of vegetative treatments and their rhizosphere (root zone).

DESIGN ASSUMPTIONS:

- Assume future stormwater discharges to the channel based on future conditions land use models provided by the Cities of Shakopee and Prior Lake.

POTENTIAL PROJECT EXPANSION

MISSION

A) Stabilize Prior Lake Outlet Channel under existing flow and a much wider easement – 200 to 300' wide – to both convey Prior Lake overflow water to Blue lake and provide a corridor for a greenway connection from Prior Lake to the Minnesota River Wildlife Refuge...

B)...with a potential non-consumptive recreation trail connection per above.

PROJECT LIMITS (PHYSICAL PARAMETERS)

- Easement extended to 200' to 300' wide where feasible

GOAL

- To become part of a larger greenway connection, managed cooperatively with other stakeholders and interested parties.

DESIGN DIRECTIVES

SHEET 2 of 12

Rev No
Rev Date:

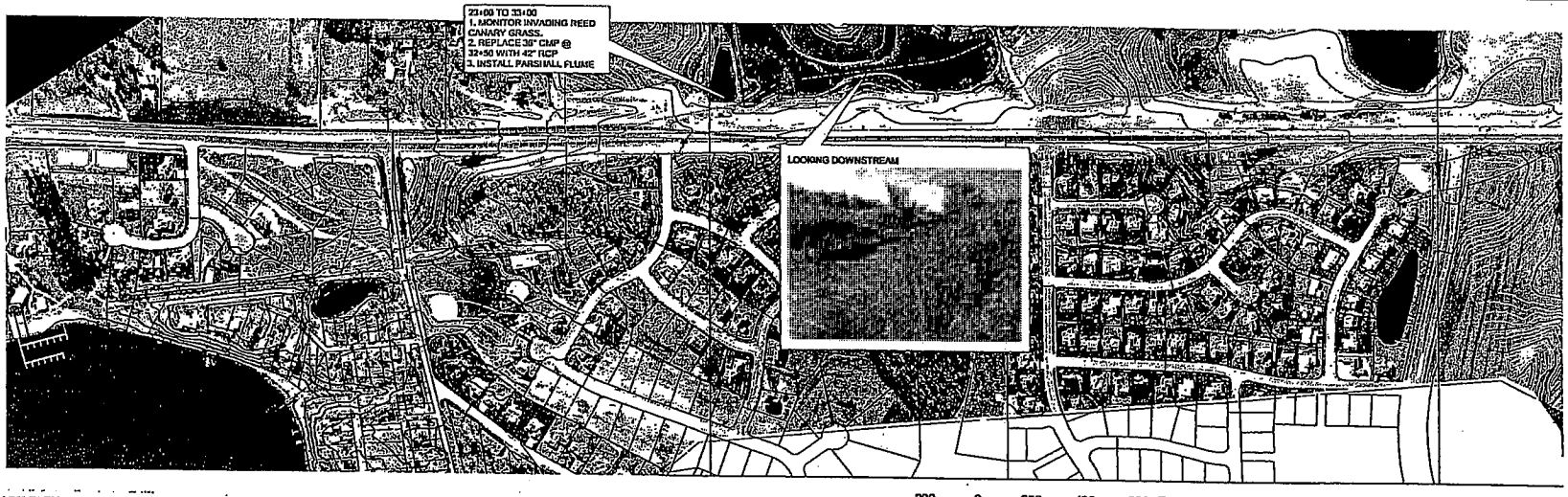
Drawn By:
Checked By:
Project No:
Date:

District Ecological Designer:
The Kestrel Design Group, Inc.,
5136 Hankerson ave. Suite 1
Edina MN 55436
Ph. 952 928-9600
Fax 952 928-1939

District Engineer:
Wenck Associates, Inc.
1800 Pioneer Creek Center
Maple Plain, MN 55359
Ph. (763) 479-4200
Fax (763) 479-4242

PRIOR LAKE OUTLET CHANNEL
Prior Lake MN

Owner:
Prior Lake - Spring Lake Watershed District



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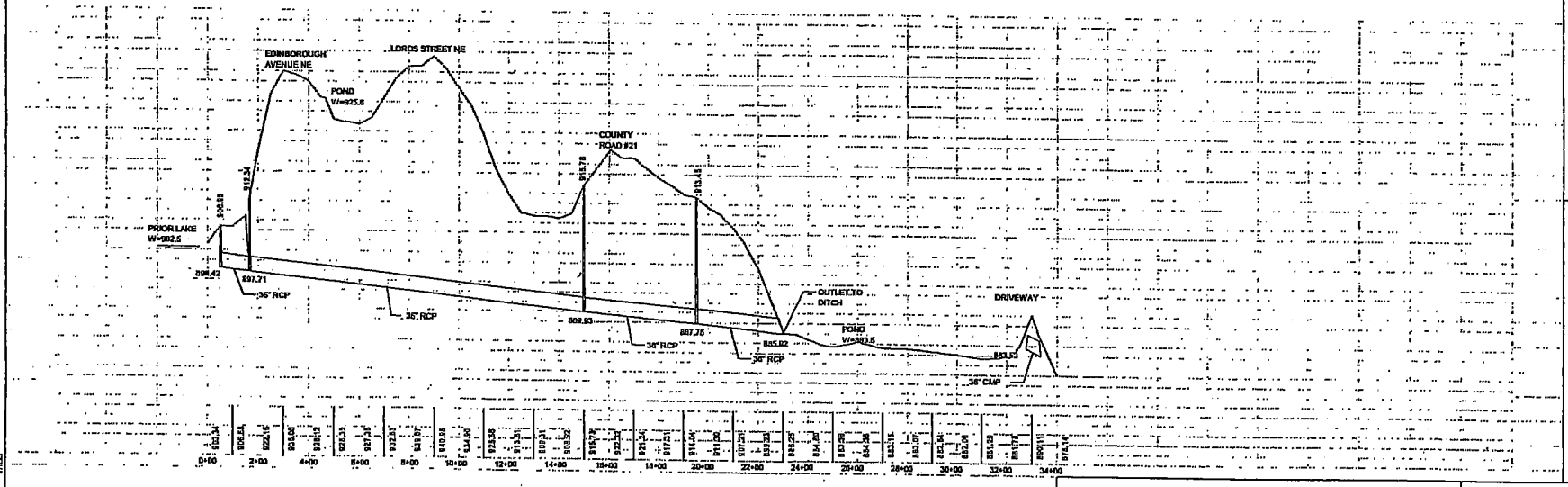
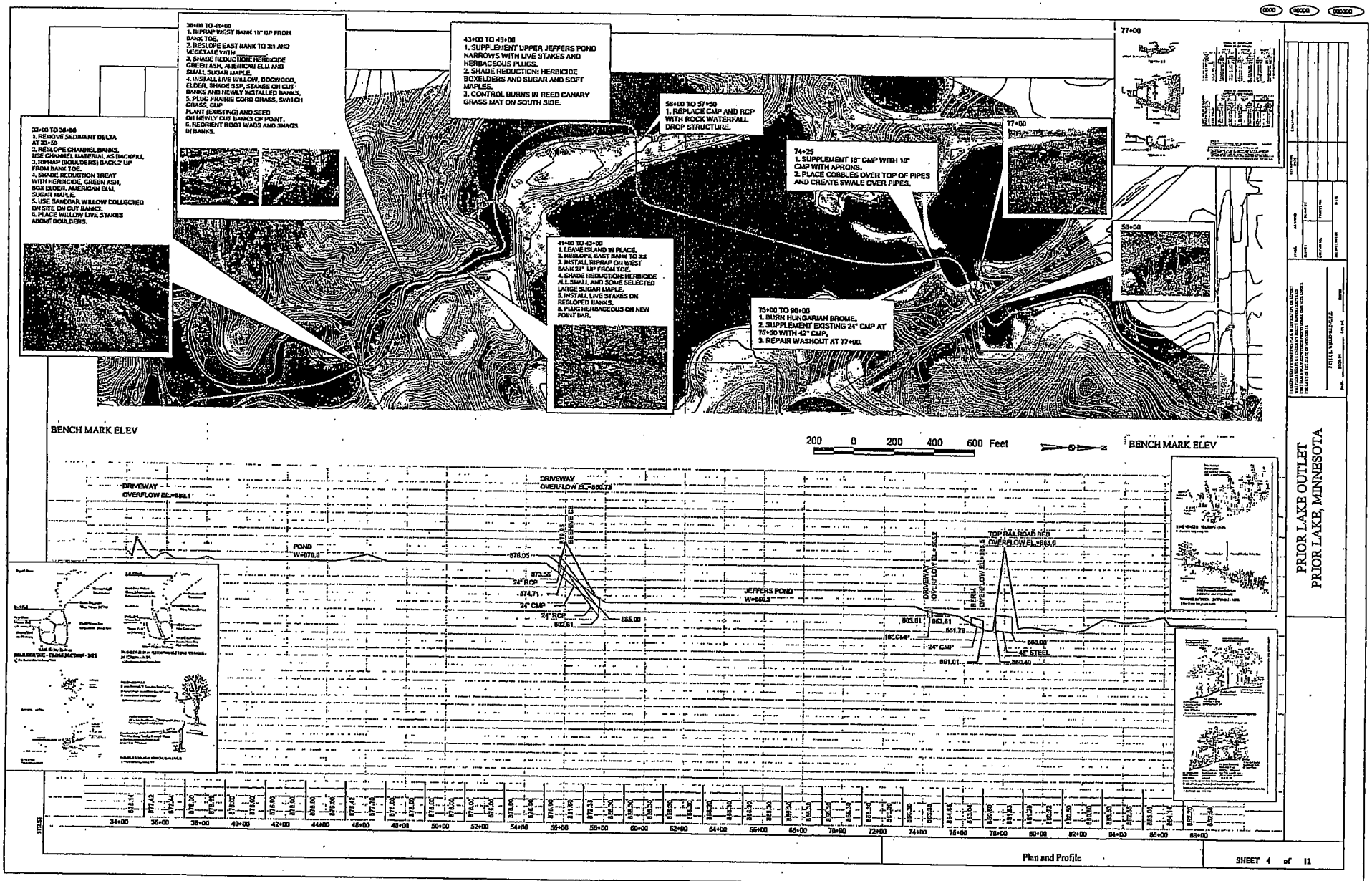
BENCH MARK ELEV



PRIOR LAKE OUTLET
PRIOR LAKE, MINNESOTA

Plan and Profile

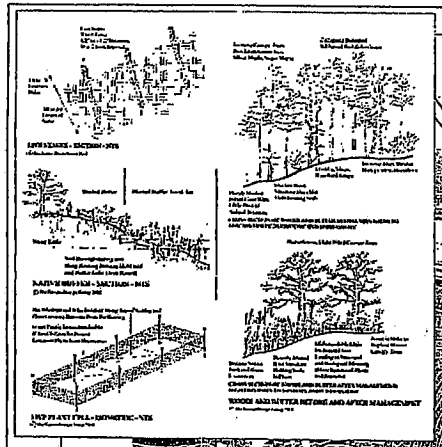
SHEET 3 of 12



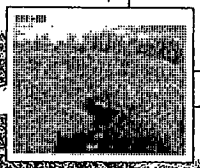
PRIOR LAKE OUTLET
PRIOR LAKE, MINNESOTA

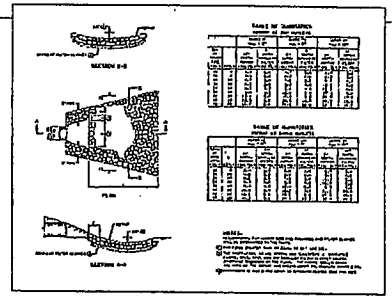
Plan and Profile

SHEET 4 of 12



98+00 to 111+50
1. INSTALL PLUNGE POOLS 29 FEET WIDE x 30 FEET LONG AT DOWNSTREAM END OF CULVERTS. 97+00, 100+50, 110+00.
2. INSTALL RIPRAP ON OUTSIDE BENDS, ENTIRE LENGTH, 2 FEET UP FROM BANK TOE.
3. REMOVE LOGS AND SNAGS IN CHANNEL. REUSE CHANNEL R.O.W., USE ROOT WADS ON CUT BANKS.
4. RESLOPE ALL BANKS AT 3:1 FOR LOWEST 10 FEET.
5. INSTALL LIVE STAKES IN RESLOPED BANKS.
6. INSTALL LIVE HERBACEOUS PLUGS IN POINT BARS.
7. DEEP SHADE REDUCTION: HERBICIDE SUGAR, SILVER MAPLES AND BUCKTHORN.



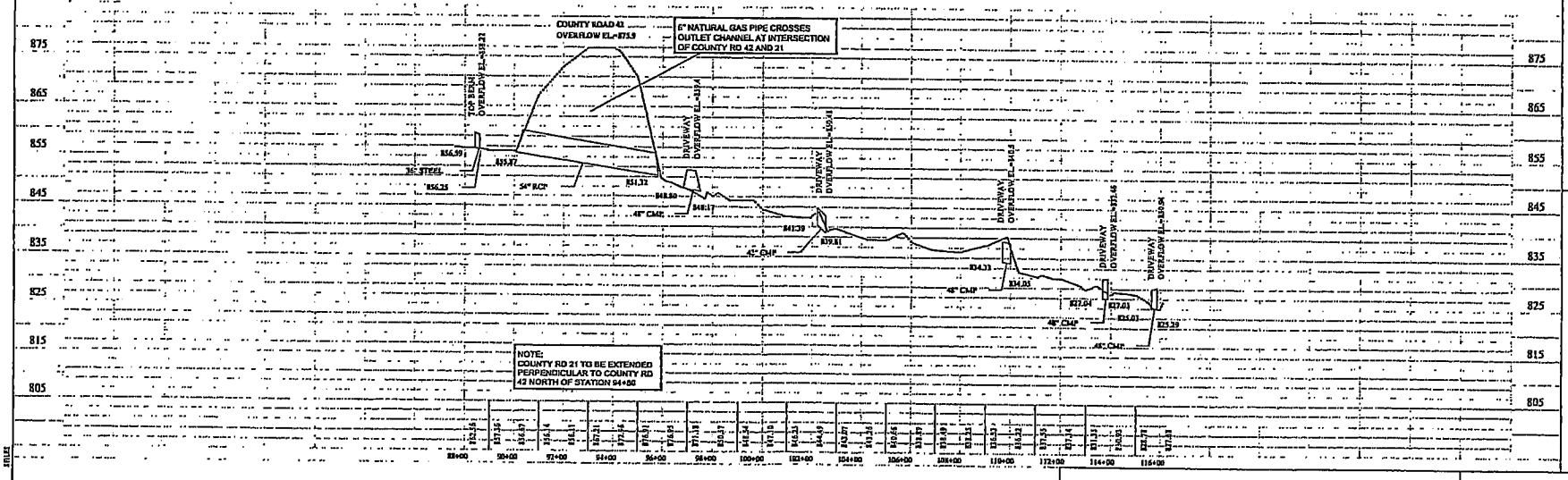


BENCH MARK ELEV

PHOTO FLOWN APRIL 16, 1998

200 0 200 400 600 Feet

BENCH MARK ELEV



PRIOR LAKE OUTLET
PRIOR LAKE, MINNESOTA

Plan and Profile

SHEET 5 of 12

113+50 TO 116+60
1. BOULDER TOE ON CUT BANKS ONLY.
2. SHADE REDUCTION: BOX ELDER, ASPEN, SUGAR/SILVER MAPLE AND BUCKTHORN.
3. INSTALL HERBACEOUS LIVE PLUGS IN POINT BARS.
4. INSTALL LIVE CUT BRANCHES IN CUT BANKS.

116+50 TO 119+00
1. REMOVE SNAGS IN CHANNEL AND PLACE IN CHANNEL R.O.W.
2. DEEP SHADE REDUCTION: HERBICIDE BOX ELDER, SUGAR/SILVER MAPLE AND BUCKTHORN.
3. INSTALL HERBACEOUS LIVE PLUGS IN POINT BARS.
4. INSTALL LIVE STAKES IN CUT BANKS.

119+00 TO 121+00
1. INSTALL RIPRAP ON CUT BANK AT 120+00, ONE TO TWO ROCK VANES.
2. REORIENT TREE WADS IN BANK.
3. INSTALL LIVE STAKES IN CUT BANKS.
4. DEEP DEEP SHADE REDUCTION HERBICIDE SUGAR/SILVER MAPLE AND BUCKTHORN.
5. INSTALL HERBACEOUS LIVE PLUGS IN POINT BARS.

131+30 TO 135+00
1. SUPPLEMENT EXISTING 36" CMP WITH ANOTHER 36" CMP @ 131+30.
2. BURN CATTAIL WETLAND ON A 2 TO 3 YEAR CYCLE.
3. CONSTRUCT PLUNGE POOL AT DOWNSTREAM END OF TWO 36" CMP'S AT 131+30.

138+00 TO 144+00
1. REMOVE ROCK IN CHANNEL AND PLACE INTO TOE OF SLOPE.
2. REMOVE AND DISPOSE OF GEOSYNTHETIC FABRIC IN CHANNEL BOTTOM.
3. INSTALL BOULDER RIP RAP AT 2 FEET UP FROM TOE OF BANK.
4. SHADE REDUCTION: HERBICIDE BOX ELDER AND SMALL SUGAR/SILVER MAPLE.
5. INSTALL LIVE STAKES ON RESLOPED BANKS OF CUT BANKS.
6. INSTALL HERBACEOUS LIVE PLUGS IN POINT BARS.
7. CONSTRUCT PLUNGE POOL AT 136+00.
8. SUPPLEMENT EXISTING 36" CMP WITH ONE 36" CMP AT 136+00.
9. CONSTRUCT 2 RIFFLES WITHIN REACH.
10. INSTALL 24" HDPE BYPASS PIPE FROM SWIMMING BEACH TO 141+00.

145+00 TO 155+00
1. BURN OPEN WETLAND EDGE ON TWO TO THREE YEAR CYCLE.

NOTE:
THINNING AND SHADE REDUCTION WILL BE COORDINATED WITH PROPERTY OWNERS.

PHOTO FLOWN APRIL 16, 1998

NATIVE BUFFER - SECTION - NTS

LIVE STAKES - SECTION - NTS

131+50 AND 137+00

110+00 TO 121+00 AND 136+00 TO 144+00

200 0 200 400 600 Feet

DRIVEWAY OVERFLOW EL=820.84
DRIVEWAY OVERFLOW EL=820.18
DRIVEWAY OVERFLOW EL=822.6
DRIVEWAY OVERFLOW EL=815.0
POND W=820.0
819.04
818.34
36" CMP
818.73
818.48
36" CMP ARCH

820 810 800 790 780 770

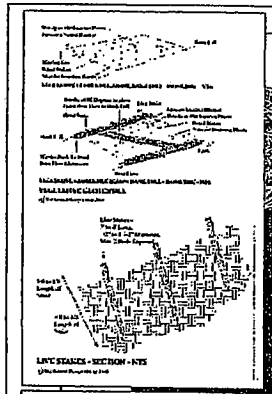
116+00 118+00 120+00 122+00 124+00 126+00 128+00 130+00 132+00 134+00 136+00 138+00 140+00 142+00 144+00 146+00 148+00 150+00 152+00

840 830 820 810 800 790 780 770

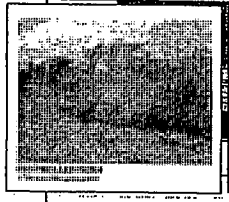
PRIOR LAKE OUTLET
PRIOR LAKE, MINNESOTA

Plan and Profile

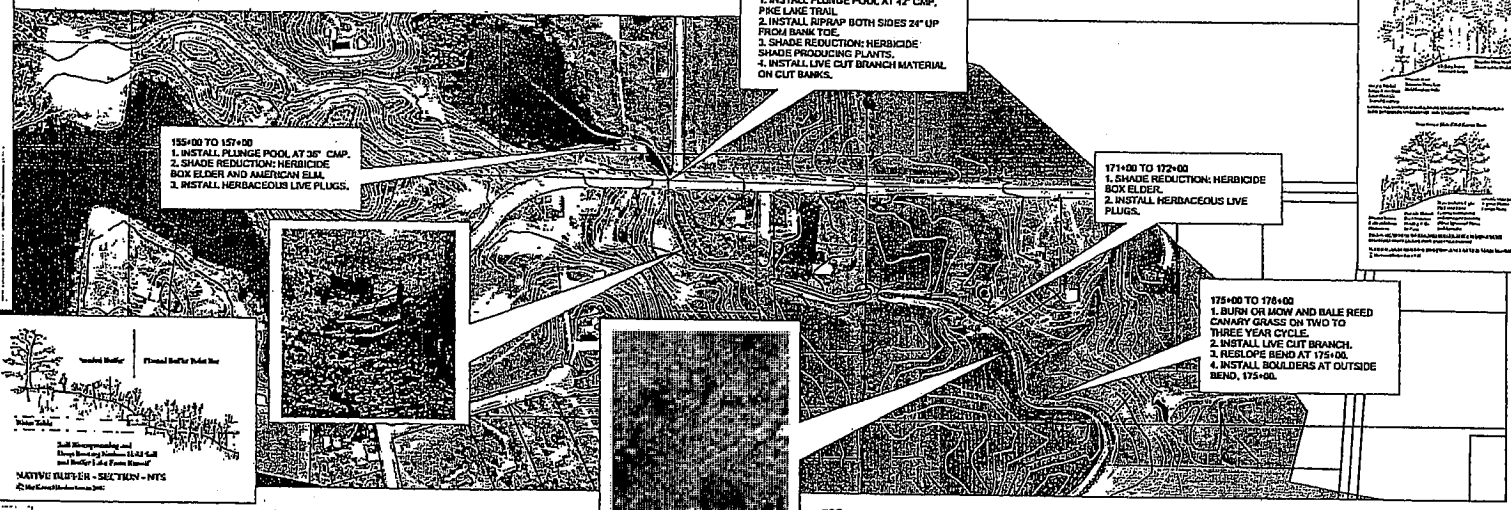
SHEET 6 of 12

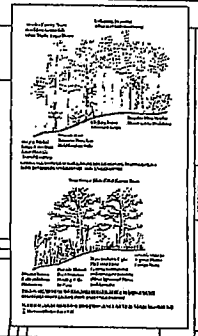


LIVE STAKES - SECTION - NTS



NATIVE BUFFER - SECTION - NTS

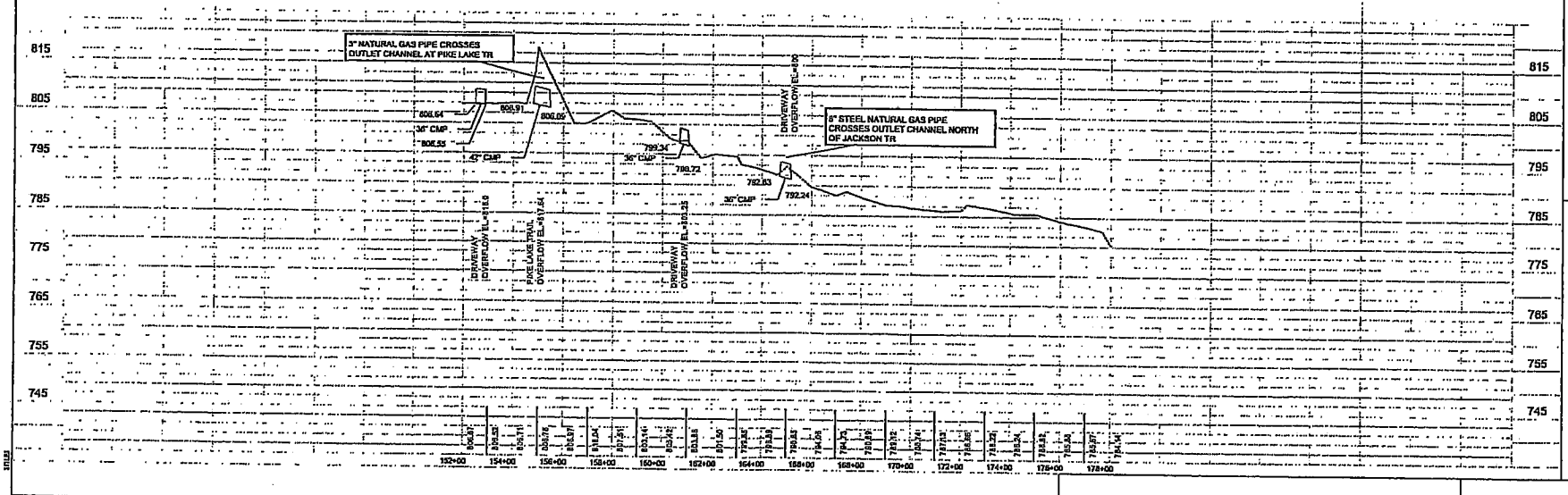




BENCH MARK ELEV

PHOTO FLOWN APRIL 16, 1998 B.O.P. TO STA 167+00

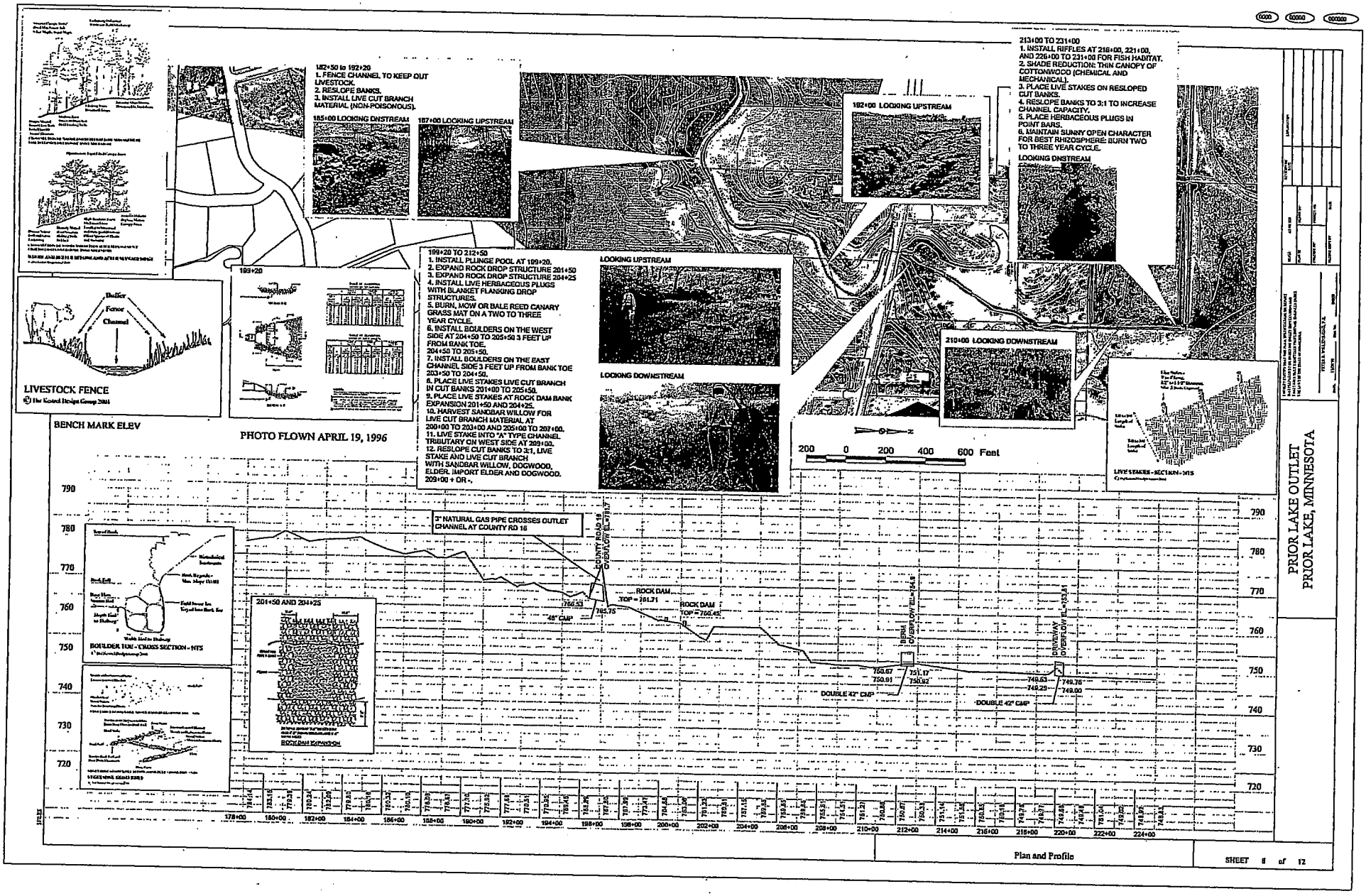
PHOTO FLOWN APRIL 19, 1996 STA 167+00 TO E.O.P.



PRIOR LAKE OUTLET
PRIOR LAKE, MINNESOTA

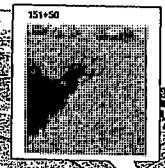
Plan and Profile

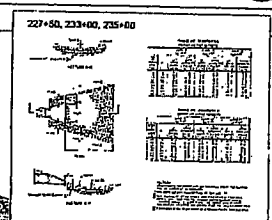
SHEET 7 of 12

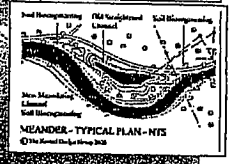

182+50 to 192+20
1. FENCE CHANNEL TO KEEP OUT LIVESTOCK.
2. RESLOPE BANKS.
3. INSTALL LIVE CUT BRANCH MATERIAL (NON-POISONOUS).
185+00 LOOKING DNSTREAM
187+00 LOOKING UPSTREAM
192+00 LOOKING UPSTREAM
213+00 TO 231+00
1. INSTALL RIFFLES AT 216+00, 221+00, AND 226+00 TO 231+00 FOR FISH HABITAT.
2. SHADE REDUCTION: THIN CANOPY OF COTTONWOOD (CHEMICAL AND MECHANICAL).
3. PLACE LIVE STAKES ON RESLOPED CUT BANKS.
4. RESLOPE BANKS TO 3:1 TO INCREASE CHANNEL CAPACITY.
5. PLACE HERBACEOUS PLUGS IN POINT BARS.
6. MAINTAIN SUNNY OPEN CHARACTER FOR BEST RHIZOSPHERE: BURN TWO TO THREE YEAR CYCLE.
LOOKING DNSTREAM
199+20 TO 212+50
1. INSTALL PLUNGE POOL AT 199+20.
2. EXPAND ROCK DROP STRUCTURE 201+50
3. EXPAND ROCK DROP STRUCTURE 204+25
4. INSTALL LIVE HERBACEOUS PLUGS WITH BLANKET FLANKING DROP STRUCTURES.
5. BURN, MOW OR BALE REED CANARY GRASS MAT ON A TWO TO THREE YEAR CYCLE.
6. INSTALL BOULDERS ON THE WEST SIDE AT 204+50 TO 205+50 3 FEET UP FROM BANK TOE.
204+50 TO 205+50.
7. INSTALL BOULDERS ON THE EAST CHANNEL SIDE 3 FEET UP FROM BANK TOE 203+50 TO 204+50.
8. PLACE LIVE STAKES LIVE CUT BRANCH IN CUT BANKS 201+00 TO 205+50.
9. PLACE LIVE STAKES AT ROCK DAM BANK EXPANSION 201+50 AND 204+25.
10. HARVEST SANDBAR WILLOW FOR LIVE CUT BRANCH MATERIAL AT 200+00 TO 203+00 AND 205+00 TO 207+00.
11. LIVE STAKE INTO "A" TYPE CHANNEL TRIBUTARY ON WEST SIDE AT 209+00.
12. RESLOPE CUT BANKS TO 3:1, LIVE STAKE AND LIVE CUT BRANCH WITH SANDBAR WILLOW, DOGWOOD, ELDER. IMPORT ELDER AND DOGWOOD.
209+00 + OR -.
LOOKING UPSTREAM
LOOKING DOWNSTREAM
210+00 LOOKING DOWNSTREAM
Buffer
Fence
Channel
LIVESTOCK FENCE
199+20
BENCH MARK ELEV
PHOTO FLOWN APRIL 19, 1996
200 0 200 400 600 Feet
LIVE STAKES - SECTION - NTS
3" NATURAL GAS PIPE CROSSES OUTLET CHANNEL AT COUNTY RD 16
COUNTY ROAD 16 OVERFLOW EL=761.7
ROCK DAM TOP = 761.71
ROCK DAM TOP = 760.45
48" CMP
764.53
765.75
BERM OVERFLOW EL=754.9
DRIVEWAY OVERFLOW EL=753.4
750.67
750.91
751.17
750.92
749.53
749.29
749.76
749.00
DOUBLE 42" CMP
DOUBLE 42" CMP
201+50 AND 204+25
ROCK DAM EXPANSION
BOULDER TOE - CROSS SECTION - NTS
790
780
770
760
750
740
730
720
178+00 180+00 182+00 184+00 186+00 188+00 190+00 192+00 194+00 196+00 198+00 200+00 202+00 204+00 206+00 208+00 210+00 212+00 214+00 216+00 218+00 220+00 222+00 224+00
PRIOR LAKE OUTLET
PRIOR LAKE, MINNESOTA
Plan and Profile
SHEET 8 of 12

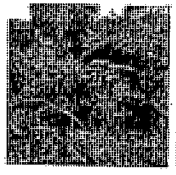
213+50 to 230+00
1. MAINTAIN SUNNY CHARACTER FOR BEST RHIZOSPHERE: BURN REED CANARY GRASS MAT 215+00 TO 220+00 ON TWO TO THREE YEAR CYCLE.
2. RIP RAP UPSTREAM AND DOWNSTREAM CULVERTS PER MNDOT DETAIL FOR PLUNGE POOL AND EXTEND RIP RAP FROM CULVERT INVERT TO EDGE OF FARM ROAD, 213+50 221+00, 227+50, AND 232+50.
3. EXTEND PLUNGE POOL OF THREE CULVERTS AT 234+50 50 FEET DOWNSTREAM 3 FEET UP FROM TOE OF BANK.
4. RESLOPE CUT BANKS 3:1 FOR ENTIRE REACH.
5. WILD LIFE AND LIGHT REQUIREMENTS: INSTALL A DIVERSITY OF LIVE CUT BRANCH MATERIAL THROUGHOUT (STAKES, BRUSH BUNDLES & WATTLES) DOGWOOD BLACKBERRY, ELDER, WILLOW, RASBERRY AND BUTTON BUSH.
6. SHADE REDUCTION: THIN CANOPY OF COTTONWOOD (CHEMICAL AND MECHANICAL

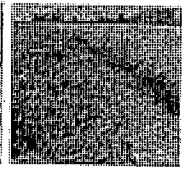
235+00 TO 254+00
1. INVESTIGATE WITH OWNERS TO ESTABLISH MEANDERS AND OXBOW WETLANDS FOR WATER STORAGE AND QUALITY IN SAND OUTWASH PLAIN FOR INFILTRATION.
2. RIFFLES FOR HABITAT.
3. MAINTAIN SUN REGIME: BURN, MOW AND BAIL WITH HERBICIDE SPRAYING OF REED CANARY GRASS MAT.
4. INSTALL LIVE PLUGS WITH EC BLANKET ON CUT BANKS AND EMERGENTS ON-CHANNEL POINT BARS (ALL PLUGS IN LPC).
5. WILDLIFE: TWO TO SIXTEEN TWENTY INCH NORTHERN PIKE AT 235+00 AND PLAIN POCKET GOPHER IN CHANNEL SAND STOCK PILE.

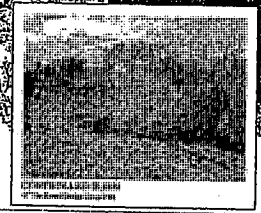










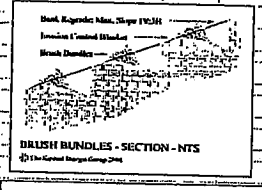


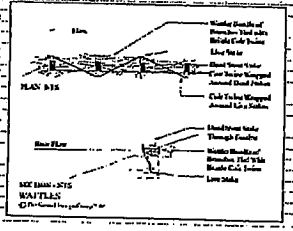
BENCH MARK ELEV

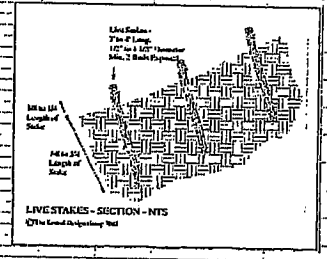
N

200 0 200 400 600 Feet

BENCH MARK ELEV







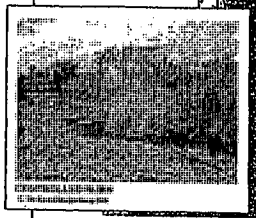
NOTES:
COORDINATE WITH SCOTT COUNTY HIGHWAY DEPARTMENT REGARDING FUTURE ROUTE OF COUNTY RD 21 AND DEVELOPMENT OF REGIONAL STORM WATER MANAGEMENT FACILITIES. THE PROPOSED ALIGNMENT OF COUNTY RD 21 WILL CROSS OUTLET CHANNEL BETWEEN STATIONS 240+00 AND 245+00

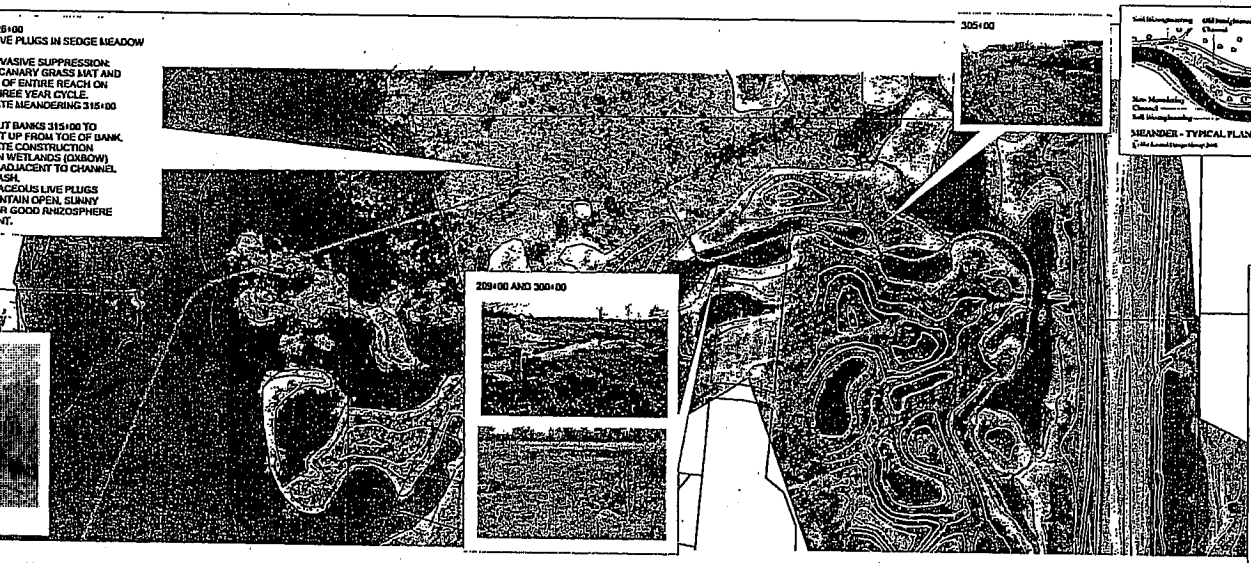
PRIOR LAKE OUTLET
PRIOR LAKE, MINNESOTA

Plan and Profile

SHEET 9 of 12

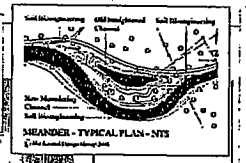
290+00 TO 326+00
1. INSTALL LIVE PLUGS IN SEDGE MEADOW OPENINGS.
2. WOODY INVASIVE SUPPRESSION. BURN REED CANARY GRASS MAT AND EMERGENTS OF ENTIRE REACH ON A TWO TO THREE YEAR CYCLE.
3. INVESTIGATE MEANDERING 315+00 TO 326+00.
4. RIP RAP CUT BANKS 315+00 TO 326+00 2 FEET UP FROM TOE OF BANK.
5. INVESTIGATE CONSTRUCTION INFILTRATION WETLANDS (OXBOW) OPEN FLATS ADJACENT TO CHANNEL SAND OUTWASH.
6. USE HERBACEOUS LIVE PLUGS ONLY TO MAINTAIN OPEN, SUNNY CHARTER FOR GOOD RHIZOSPHERE DEVELOPMENT.



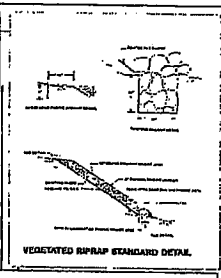


209+00 AND 300+00

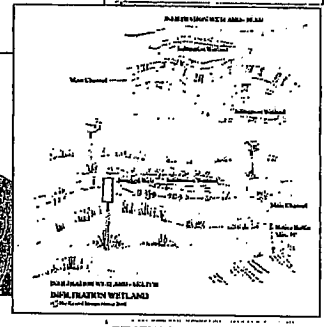
305+00



MEANDER - TYPICAL PLAN - NTS



VEGETATED RIPRAP STANDARD DETAIL



BENCH MARK ELEV

PHOTO FLOWN APRIL 19, 1996

200 0 200 400 600 Feet

BENCH MARK ELEV

760
750
740
730
720
710
700
690

DEAN'S LAKE
W=747

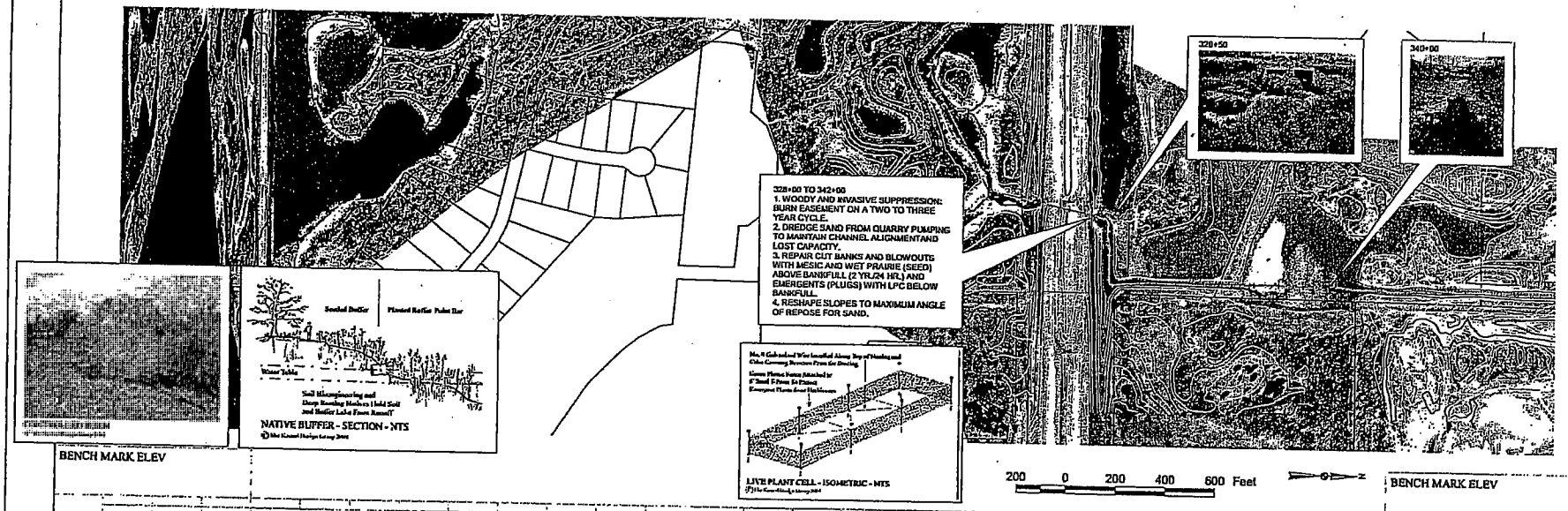
NOTE:
CONSIDER OUTLET STRUCTURE FOR DEANS LAKE AND MODIFICATIONS TO BY-PASS IN CONTEXT OF LAKE MANAGEMENT GOALS.

265+00 268+00 270+00 272+00 274+00 276+00 278+00 280+00 282+00 284+00 286+00 288+00 290+00 292+00 294+00 296+00 298+00 300+00 302+00 304+00 306+00 308+00 310+00 312+00 314+00 316+00 318+00 320+00

PRIOR LAKE OUTLET
PRIOR LAKE, MINNESOTA

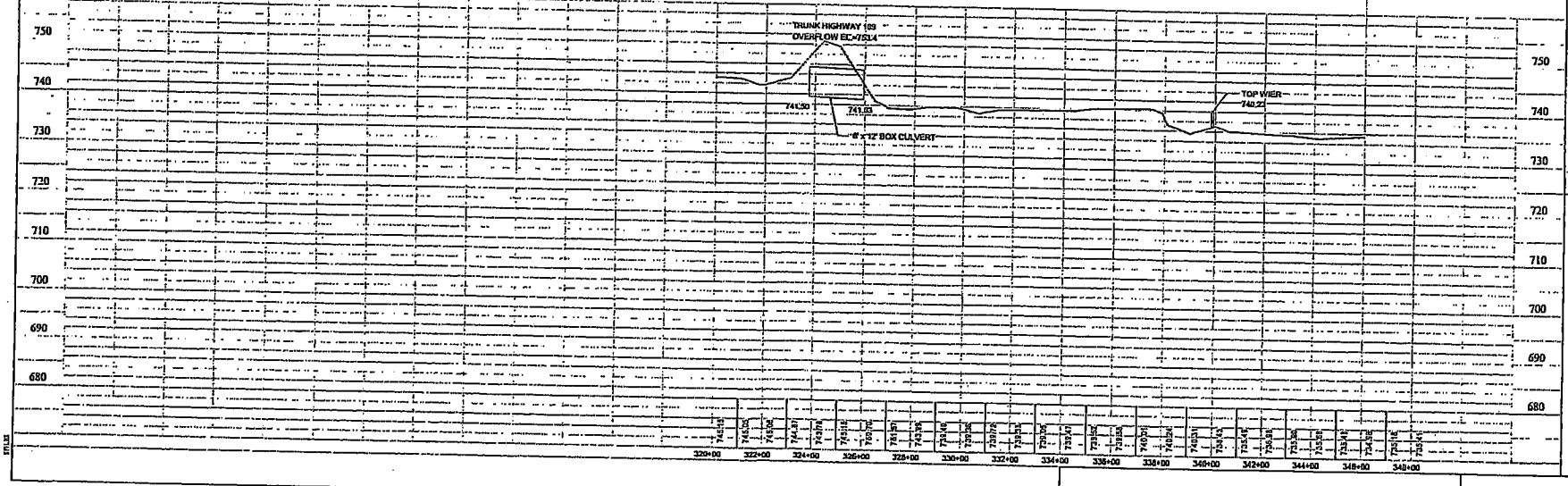
Plan and Profile

SHEET 10 of 12



BENCH MARK ELEV

BENCH MARK ELEV



PRIOR LAKE OUTLET
PRIOR LAKE, MINNESOTA

Plan and Profile

SHEET 11 of 12

342+00 TO 355+00
1. RESLOPE CHANNEL BANKS TO 1.5:1
2. RIP RAP LOWER 3 FEET.
3. PLANT WITH SAND PRAIRIE MIX SEED AND HERBACEOUS LIVE PLUGS.
4. REMOVE SEDIMENT IN CHANNEL TO MAINTAIN ALIGNMENT VOLUME APPROX. 15 FEET WIDE BY 23 FEET DEEP.
5. INSTALL RIP RAP AT APRONS AND CUT BANKS AT THE DOWNSTREAM SIDE OF THE TWO 48" RCP AT 347+00.
6. MAINTAIN SUNNY OPEN, SAND PLAIN CHARACTER: BURN THROUGH CORRIDOR ON TWO TO THREE YEAR CYCLE.

355+00 TO 360+00
1. 355+00 REFORM PLUNGE POOL AT DOWNSTREAM SIDE OF WEIR APPROX. 30 FEET x 50 FEET.
2. 355+00 TO 355+90 REMOVE SEDIMENT BETWEEN WEIRS TO KEEP FLOW IN CHANNEL (15 FEET W. x 3 FEET H. x 50 FEET L.).
3. 355+90 REFORM PLUNGE POOL AT DOWNSTREAM SIDE OF WEIR APPROX. 30 FEET x 50 FEET.
4. FILL IN SHEET PILING TIE BACKS IN TO BANKS AT BOTH WEIRS WITH RIP RAP.
5. INSTALL LIVE CUT BRANCHES AROUND SHEET PILING AT BOTH WEIRS.
6. REPAIR FAILING CUT BANKS AT DOWN STREAM SIDE OF SECOND WEIR 355+90, 25 FEET L. x 15 FEET H. WITH BOULDERS, LIVE STAKE BETWEEN BOULDERS.
7. PLANT RIVER BANK GRAPE ON RANGE FENCE ON SHEET PILING WEIR FACES.
8. MAINTAIN SAND PRAIRIE MATRIX: BURN THROUGH CORRIDOR ON TWO TO THREE YEAR CYCLE.
9. RESLOPE CHANNEL BANKS TO 1.5 : 1.

380+00 TO 385+00
1. RESLOPE AT 1.5 : 1.
2. INSTALL BOULDER TOE ON CUT BANK.
3. INSTALL PLUNGE POOL DOWNSTREAM SIDE OF CULVERT AT 385+00 6 FEET W. x 50 FEET L.
5. SHADE REDUCTION: HERBICIDE SHADE PLANTS IN PLACE.
6. INSTALL LIVE CUT BRANCHES AND HERBACEOUS LIVE PLUGS.

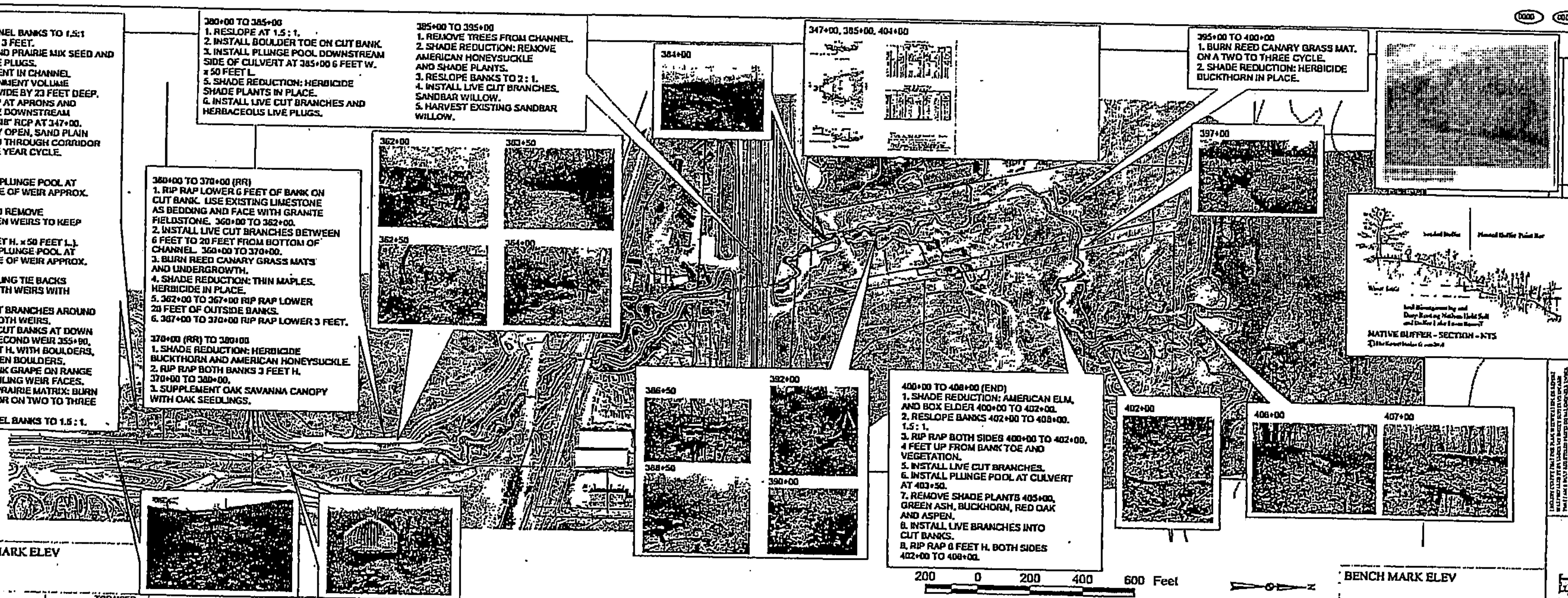
385+00 TO 395+00
1. REMOVE TREES FROM CHANNEL.
2. SHADE REDUCTION: REMOVE AMERICAN HONEYSUCKLE AND SHADE PLANTS.
3. RESLOPE BANKS TO 2 : 1.
4. INSTALL LIVE CUT BRANCHES. SANDBAR WILLOW.
5. HARVEST EXISTING SANDBAR WILLOW.

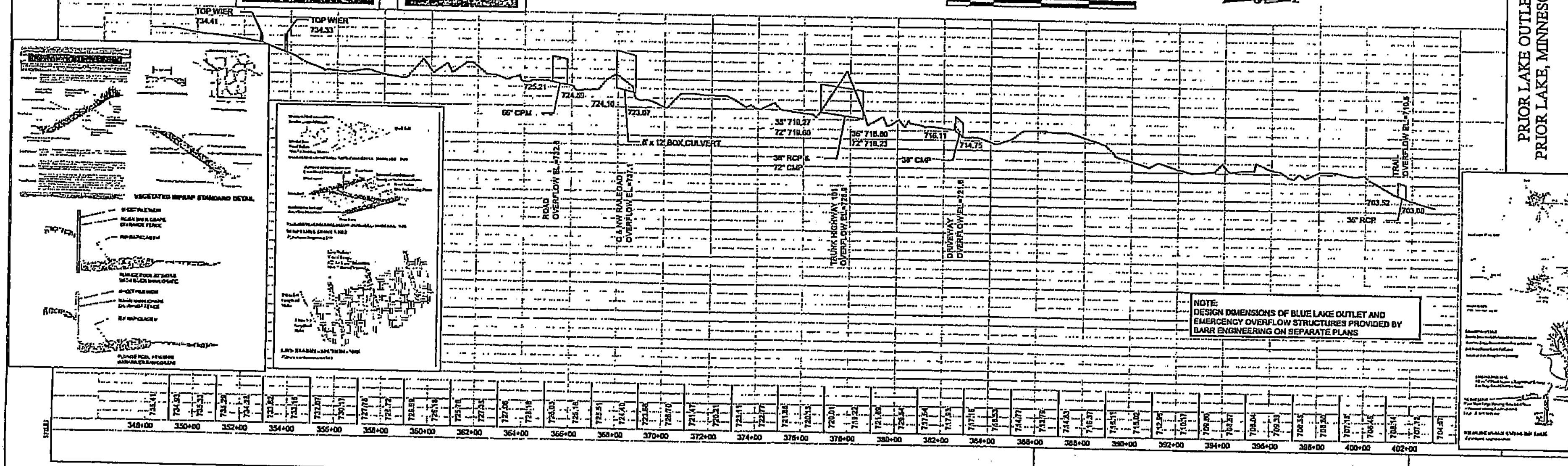
360+00 TO 370+00 (RR)
1. RIP RAP LOWER 6 FEET OF BANK ON CUT BANK. USE EXISTING LIMESTONE AS BEDDING AND FACE WITH GRANITE FIELDSTONE. 360+00 TO 362+00.
2. INSTALL LIVE CUT BRANCHES BETWEEN 6 FEET TO 20 FEET FROM BOTTOM OF CHANNEL. 360+00 TO 370+00.
3. BURN REED CANARY GRASS MATS AND UNDERGROWTH.
4. SHADE REDUCTION: THIN MAPLES. HERBICIDE IN PLACE.
5. 362+00 TO 367+00 RIP RAP LOWER 20 FEET OF OUTSIDE BANKS.
6. 367+00 TO 370+00 RIP RAP LOWER 3 FEET.

370+00 (RR) TO 380+00
1. SHADE REDUCTION: HERBICIDE BUCKTHORN AND AMERICAN HONEYSUCKLE.
2. RIP RAP BOTH BANKS 3 FEET H. 370+00 TO 380+00.
3. SUPPLEMENT OAK SAVANNA CANOPY WITH OAK SEEDLINGS.

395+00 TO 400+00
1. BURN REED CANARY GRASS MAT. ON A TWO TO THREE CYCLE.
2. SHADE REDUCTION: HERBICIDE BUCKTHORN IN PLACE.

400+00 TO 408+00 (END)
1. SHADE REDUCTION: AMERICAN ELM, AND BOX ELDER 400+00 TO 402+00.
2. RESLOPE BANKS 402+00 TO 408+00. 1.5 : 1.
3. RIP RAP BOTH SIDES 400+00 TO 402+00. 4 FEET UP FROM BANK TOE AND VEGETATION.
5. INSTALL LIVE CUT BRANCHES.
6. INSTALL PLUNGE POOL AT CULVERT AT 403+50.
7. REMOVE SHADE PLANTS 405+00, GREEN ASH, BUCKHORN, RED OAK AND ASPEN.
8. INSTALL LIVE BRANCHES INTO CUT BANKS.
8. RIP RAP 6 FEET H. BOTH SIDES 402+00 TO 408+00.





NOTE:
DESIGN DIMENSIONS OF BLUE LAKE OUTLET AND EMERGENCY OVERFLOW STRUCTURES PROVIDED BY BARR ENGINEERING ON SEPARATE PLANS

PRIOR LAKE OUTLET
PRIOR LAKE, MINNESOTA

Plan and Profile

SHEET 12 of 12

EXHIBIT B

Outlet Operating Plan

PRIOR LAKE-SPRING LAKE WATERSHED DISTRICT

OUTLET CONTROL STRUCTURE FOR PRIOR LAKE

MANAGEMENT POLICY AND OPERATING PROCEDURES

REVISED OCTOBER 2004

PRIOR LAKE-SPRING LAKE WATERSHED DISTRICT
15815 FRANKLIN TRAIL S.E., SUITE 100
PRIOR LAKE, MN 55372

TABLE OF CONTENTS

LAKE OUTLET CONTROL STRUCTURE
MANAGEMENT POLICY AND OPERATING PROCEDURES

INTRODUCTION

The purpose of this document is to state the goals, policies and operating procedures that govern the use of the Prior Lake Outlet Structure.

The Outlet Structure is designed to allow water to be drained off Prior Lake during times of high lake levels in order to minimize the effects on structures around Prior Lake. The outlet has been used to discharge excess water from Prior Lake since it was constructed in 1983. The original structure controls discharge by means of a front slide gate and 16 side gates. However, after 20 year of use the structure has some cracks, monitoring has shown that it is inefficient in maximizing the use of the 36 inch reinforced concrete outlet pipe, and it is being used more than originally anticipated. In addition, the channel downstream of the outlet box could also be modified in several places to operate more efficiently and in ways that take care of erosion problems and enhance the environment. The District has therefore proposed channel improvements and a new outlet box.

The new outlet box will consist of a fix-crested weir set at an elevation of 902.5 feet (mean sea level), which will eliminate the need to manually open and close the outlet to discharge water from the lake. The outlet box will be equipped with a slide gate to allow manual discharge of water between lake elevations 902.0 feet and 902.5 feet as allowed by this Operating Plan. The new outlet box will also be equipped with a slide gate on the outlet pipe to allow for closure of the outlet if needed.

This revised Operating Plan reflects operating changes for the new outlet structure. Maintenance of the channel improvements is covered in the Joint Powers Agreement and the Outlet Channel Maintenance Plan that is being developed for the channel improvements. Background information and studies leading up to the decision for channel improvements and a new box are documented in the *Environmental Assessment Worksheet for the Prior Lake Outlet and Channel Improvement Project* prepared by the Prior Lake-Spring Lake Watershed District July 2004, and

the *Prior Lake Outlet Channel and Lake Volume Management Study* prepared by the District in May 2003. Preparation of this study was made possible by a Flood Damage Reduction Grant from the Minnesota Department of Natural Resources, and included significant input from the public and from project partners such as the Cities of Prior Lake and Shakopee and the Minnesota Department of Natural Resources (DNR). Plans for the new structure are included as Attachment 1.

The District anticipates constructing the new outlet box in 2006 or 2007. In the interim, this updated Operating Plan will govern the operations of the existing outlet structure, except that the outlet gates will need to be manually opened and closed in accordance with this Plan until the new outlet box is constructed.

The original lake outlet operation plan outlined four guidelines to follow with regard to lake outlet operation. The following is a list of the guidelines excerpted from that procedure.

1. Runoff from the District shall, whenever and wherever practical, be retained or detained in storage upstream from Prior Lake as opposed to being allowed to flow to the lake and to the outlet.

2. The District intends to fully comply with all of the provisions of the Joint Powers Agreements.

3. The establishing of hard and fast "release or no release" conditions and elevations for opening and closing the outlet will limit the necessary flexibility required for proper water resource management and should be decided in favor of closely monitoring conditions and reacting rationally to those conditions, predicted probable conditions, and predetermined calculations which indicate probable results of contemplated actions.

4. At any time the lake level reaches 903.5, the outlet will be open and sufficient water released to allow for the runoff from 10-year, one-hour storm.

This Management Policy and Operating Procedure, though not adopting these guidelines specifically, has been written to continue using guidelines that are protective of downstream interests while minimizing property damage to Prior Lake lakeshore owners. This is reflected in the goals and policies presented in the next sections.

SECTION I – MANAGEMENT GOALS

The Management Goals are the desired end to which the District's policies are directed. The 1987 Operating Plan listed three specific goals to guide management of the outlet structure. The three goals are:

1. To reduce flooding on the lake and discharge channel to the greatest practical extent.
2. To enhance recreation, wild and aquatic life survival and aesthetics when feasible and consistent with the operating policy.
3. To minimize shoreline problems and downstream channel erosion by stabilizing lake levels and discharge rates.

The new planning efforts for the project add a fourth goal which is:

4. To use a holistic approach for managing runoff to limit downstream flows that combines upstream runoff management within the watershed with an efficient outlet and stable channel.

SECTION II – MANAGEMENT POLICY

The Management Policies are a means to achieving an established goal. They are listed according to the goal they are designed to help achieve.

A. Flood Reduction Goal

1. The District will control the discharge from Prior Lake to a flow rate not to exceed the lesser of the maximum capacity of the drainage channel or 65 cubic feet per second (cfs).
2. The District will require all upstream stormwater conveyance systems be designed to ensure flood protection for downstream receiving waters.
3. The District will require the optimum use of wetlands, detention ponds and infiltration techniques for the temporary storage of stormwater runoff.
4. The District will cooperate with other involved agencies to manage development based on the 100-year flood level for all bodies of water

B. Enhancement of Recreation, Wild and Aquatic Life Survival and Aesthetics Goal.

1. The District will require erosion control measures to be implemented to improve and protect the appearance of shoreline areas.
2. The District will discourage the use of lake beds and beds of water bodies for the placement of roads, highways, utilities, and other non-water related activities.
3. The District will encourage the wise use of shorelands and other sensitive areas (e.g., steep slopes) in the Watershed District.

C. Improvement of Conditions Goal

1. The District will apply a multi-use approach to consider the benefits and detriments to not only the water resources but also on wild and aquatic life, recreation and aesthetics.

2. The District will seek opportunities to develop or improve wild and aquatic life, recreation and aesthetics in conjunction with District projects.
3. The District will work to improve outlet channel conditions by stabilizing discharges.
4. The District will restore/enhance and maintain the outlet channel according to the conceptual design identified in the *Prior Lake Outlet Channel and Lake Volume Management Plan* completed by the District in May 2003 and the Joint Powers Agreement.

SECTION III – OPERATING PROCEDURES

The Outlet Operating Procedure establishes the limits within which discharges may occur. The procedure establishes discharge zones that are described as a function of lake level. A range of discharges is defined for each zone because of the numerous considerations which must be taken into account for operation of the outlet. The discharge zones are based on sound hydrologic principles and are designed to achieve the Management Goals and Policies. Hydrologic analysis and decisions related to establishing the discharge zones are documented in the *Prior Lake Outlet Channel and Lake Volume Management Study* completed by the District in May 2003. The attached exhibits show the discharge zones and their allowable discharge rates. These zones are described in Section III.A below.

The Joint Powers Agreements with the Cities of Prior Lake and Shakopee specify certain actions to be taken before releasing any water through the Lake Outlet. Prior to discharge of water through the outlet, 1) the City of Shakopee must be given 24 hour notice in writing of the potential for the outlet to begin discharging, 2) the drainage channel must be inspected to insure free flow of water, and 3) the available capacity of the discharge channel must be verified.

A. Discharge Settings and Adjustments

The discharge setting and adjustments are described as zones of control in the following paragraphs.

A-1: Zone 1 – Maximum Drainage Channel Capacity

At the lake elevation of 904.0, structures around the lake begin to experience damage due to flooding. To effectively respond to potential flooding, it is necessary for discharge to begin at lower lake levels. Zone 1 starts at lake elevation 903.5. For this situation, the maximum allowable rate shall be the available capacity in the drainage channel. As part of the overall Outlet and Channel Improvement Project, the outlet channel will be restored and enhanced to ensure it has the capacity to accept a maximum rate of flow from Prior Lake of 65 cfs without resultant damage to the drainage channel or to adjoining properties. The 65 cfs maximum

discharge is based on the capacity of the outlet pipe that extends from the outlet below County State-Aid Highway (CSAH) 21, to the channel just west of CSAH 21.

Each year, prior to the outlet beginning to discharge, the drainage channel must be inspected to insure free flow, and whenever the elevation of Prior Lake approaches 902.5 feet and the District anticipates that the outlet will soon begin to flow, a 24-hour notice must be given to the Cities of Shakopee and Prior Lake and the DNR regarding the potential for the Lake Outlet to begin to discharge..

A-2: Zone 2 – 58 cfs Maximum

Allowable discharges within this zone range from zero to 58 cfs depending on the time of the year, elevation of Prior Lake, upstream reserves, channel stability and potential for flooding. The Lake Outlet is designed such that discharge will occur above elevation 902.5. Attachment 2 provides the rating curve for the outlet box and identifies the flow rates calculated for various lake levels. The District will monitor lake levels and notify the Cities of Prior Lake and Shakopee and the DNR when it appears that, based on an analysis of current lake level, upstream reserves and predicted precipitation, the level of Prior Lake is about to exceed 902.5 feet and the outlet is about to begin discharging.

A-3: Zone 3 – Spring Discharge Period

During March and April, discharge will be allowed above elevation 902.0, with the approval of the DNR Regional Office, based on an analysis of expected lake level increase due to snowmelt and upstream reserves. Allowable discharges within this zone range from zero to 30 cfs.

A-4: Zone 4 – No Discharge

Unless approved by the DNR, discharges will not be allowed when the lake is below elevation 902.5 except during March and April when discharges will not be allowed below elevation 902.0.

The District may also request permission on a case by case basis from DNR to discharge when the lake elevation is between 902.0 and 902.5 in the fall of the year under extraordinary wet

conditions. These wet conditions would consist of there is still a significant amount of the flow coming into Prior Lake from Spring Lake by November 1. This flow would need to create a risk for an over-winter rise in lake level, freeze-up of the outlet panel(s), and potential spring flooding problems in combination with snow melt. For consideration the District must provide evidence of the wet condition, and the risk of spring flooding.

B. Data Collection and Discharge Adjustment Procedures

Field data shall be collected and discharge adjustments at the Lake Outlet Control Structure shall be performed in accordance with this section to implement the policy identified in Section I, Management Policy.

B-1: Outlet Channel Discharge Data

Discharge measurements will be taken using continuous recording equipment installed at the outlet when the outlet structure is in operation. The outlet channel will also be routinely inspected (i.e., approximately daily during the first week of discharge from the outlet, and approximately every other day during subsequent weeks of discharge) at selected locations, such as road crossings, during outlet operation. These inspections will be completed to identify erosion or flooding problems and adjust outlet discharges in conformance with the JPA.

B-2: Lake Levels, Ditch and Creek Discharge Data

The following data will be collected:

Data	Frequency
Water levels on Fish, Spring, Prior and Pike Lakes	Monthly (minimum) during open water season
Flows from County Ditch 13 to Spring Lake	Continuous recording during open water season
Flows from Spring Lake to Prior Lake	Continuous recording during open water season

B-3: Analysis and Reporting of Data

The District shall analyze all data collected on a regular basis. A summary of that data shall be transmitted to the Managers and the DNR Regional Office annually, or more frequently if problems or issues arise. Should quickly changing conditions be encountered, verbal reports will be transmitted as required.

All verbal summary reports shall include a recommendation for adjustment, if any, of the discharge at the control structure along with the time the adjustment is to be implemented. The recommendations shall also identify when the adjustment will be implemented.

B-4: Implementation of Recommended Action

Upon verbal approval by a majority of the Managers, the District shall implement the recommended discharge adjustment as directed and in accordance with Section III Operating Procedures. If the discharge adjustment is a significant change from the current discharge condition, the adjustment will be approved by the Board of Managers at the next regularly scheduled meeting of the Board.

B-5: Frequency of Discharge Adjustment

Discharge adjustment frequency will be limited, to the extent practical. Emergency discharge adjustments may be implemented under the conditions specified in paragraphs B.6 or B.7 below.

B-6: Emergency Adjustment

The District shall have the authority to change the discharge between regular adjustments where immediate change is necessary to reduce or avoid significant risk to safety or damage to property which would likely result if the change is made. The District Staff shall promptly communicate all such emergency adjustments to the Managers, the Cities of Prior Lake and Shakopee, and the DNR.

If sudden conditions produce high outlet channel flows due to downstream runoff and it is feasible to store water on the lake for 12 to 48 hours, the outlet will be closed to allow outlet

channel flows to abate. The District has developed a monitoring program using flow gauging stations and rain gauges to assist with promptly reacting to extreme rainfall events.

B-7: High Water Conditions

When high water conditions are reported or predicted, the District shall promptly investigate the reported or predicted high water condition and determine whether adjustment can be made in the discharge through the control structure that would reduce the high water conditions. If adjustments can be made that are consistent with the Management Policy, the District shall promptly make such adjustments as are appropriate to reduce high water conditions as soon as possible.

B-8: Operational Responsibility

The District may enter into a contract with another governmental agency to provide operating personnel. Employees of the contracting agency will handle minor maintenance and repairs when required and will make regular trips to the site as directed by the District.

The control structure shall be operated by the District in accordance with the limitations set forth in the Lake Outlet Control Structure Management Policy and Operating Procedures, Minnesota DNR Permit No. 79-6016 and the Joint Powers Agreement with the Cities of Prior Lake and Shakopee.

B-9: Annual Summary of Data

The District shall prepare an annual summary of all data received regarding outlet operations, including adjustments made in the discharge rate. This summary shall be distributed to the Managers, the Minnesota Department of Natural Resources, the municipalities of Prior Lake and Shakopee and the Board of County Commissioners of Scott County and shall be available to interested persons.

SECTION IV – TERMS AND AMENDMENTS TO THE MANAGEMENT POLICY AND OPERATING PROCEDURES

A. Term

This document defines the Management Policy and Operating Procedures for the Lake Outlet Control Structure at Prior Lake for the period of January 1, 2005, and thereafter. Any amendments to this document shall be made pursuant to Section IV.2 below.

B. Review of Management Policy and Operating Procedures

On or before October 1, 2007, the District shall submit to the DNR any amendments to this Management Policy and Operating Procedures deemed necessary by the District for the three (3) year period commencing January 1, 2008. At least thirty (30) days prior to any submittal to the DNR, the District shall provide the municipalities within the watershed a copy of the proposed amendments such that sufficient opportunity to submit comments to the DNR is allowed. Within sixty (60) days of receipt, the DNR shall advise the District in writing of the acceptance, rejection, modification or additions to the proposal.

Any public hearing that may be held on proposed amendment to the Management Policy and Operating Procedures shall be governed by Minnesota Statutes 103G.311. If a hearing is held, the existing operational procedures shall remain in full force and effect until a final administrative decision is reached. Following the final administrative hearing decision, or if no hearing is held, the amendments, if any, shall be incorporated into the foregoing Management Policy and Operating Procedures for the following three (3) year term commencing January 1, 2008 and be distributed to affected municipalities and agencies.

This review procedure shall be repeated every three (3) years.

Attachment 1:

Conceptual Plans for Revised Outlet Structure

Attachment 2:
Rating Curve for Existing and Proposed New Outlet Structure

		New Rating Curve	Old Rating Curve
Depth	WSEl	Q- cfs	Q- cfs
0	898.68	0	0
0.6	899.28	0	0
1.2	899.88	0	0
1.8	900.48	0	0
2.4	901.08	0	0
3	901.68	0	0
3.1	901.78	0	0
3.2	901.88	0	0
3.3	901.98	0	0
3.4	902.08	0	0
3.5	902.18	0	0
3.6	902.28	0	0
3.7	902.38	0	7.12
3.8	902.48	0	14.24
3.9	902.58	6.72	21.36
4	902.68	22.68	28.48
4.1	902.78	44	35.59
4.2	902.88	56.54	42.71
4.3	902.98	56.75	49.83
4.4	903.08	56.95	55.14
4.5	903.18	57.15	57.15
4.6	903.28	57.35	57.35
4.7	903.38	57.55	57.55
4.8	903.48	57.75	57.75
4.9	903.58	57.94	57.94
5	903.68	58.14	58.14
5.1	903.78	58.34	58.34
5.2	903.88	58.53	58.53
5.3	903.98	58.73	58.73
5.4	904.08	58.92	58.92
5.5	904.18	59.12	59.12
5.6	904.28	59.31	59.31
5.7	904.38	59.5	59.5
5.8	904.48	59.7	59.7
5.9	904.58	59.89	59.89
6	904.68	60.08	60.08
6.1	904.78	60.27	60.27
6.2	904.88	60.46	60.46
6.3	904.98	60.65	60.65
6.4	905.08	60.84	60.84
6.5	905.18	61.02	61.02
6.6	905.28	61.21	61.21
6.7	905.38	61.4	61.4
6.8	905.48	61.58	61.58
6.9	905.58	61.77	61.77

(Cont.)

		New Rating Curve	Old Rating Curve
Depth	WSEl	Q- cfs	Q- cfs
7	905.68	61.95	61.95
7.1	905.78	62.14	62.14
7.2	905.88	62.32	62.32
7.3	905.98	62.51	62.51
7.4	906.08	62.69	62.69
7.5	906.18	62.87	62.87
7.6	906.28	63.05	63.05
7.7	906.38	63.24	63.24
7.8	906.48	63.42	63.42
7.9	906.58	63.6	63.6
8	906.68	63.78	63.78
8.1	906.78	63.96	63.96
8.2	906.88	64.13	64.13
8.3	906.98	64.31	64.31
8.4	907.08	64.49	64.49
8.5	907.18	64.67	64.67
8.6	907.28	64.84	64.84
8.7	907.38	65.02	65.02
8.8	907.48	65.2	65.2
8.9	907.58	65.37	65.37
9	907.68	65.55	65.55
9.1	907.78	65.72	65.72
9.2	907.88	65.9	65.9
9.3	907.98	66.07	66.07
9.4	908.08	66.24	66.24
9.5	908.18	66.41	66.41

EXHIBIT C

Outlet Channel Restoration and Enhancement Project Construction Schedule

	Segment	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
1	Prior Lake To CR 42	D	C (winter 05-06)	M1	M1	M1	M1	M1	M2	M2	M2	M2
2	CR 42 to Pike Lake Inlet		D	C (winter 06-07)	M1	M1	M1	M1	M1	M2	M2	M2
3	Pike Lake Inlet to Pike Lake Trail			D	C (winter 07-08)	M1	M1	M1	M1	M1	M2	M2
4	Pike Lake Trail to CR 16			D	C (winter 07-08)	M1	M1	M1	M1	M1	M2	M2
5	CR 16 to Deans Lake Outlet	D	C (winter 05-06)	M1	M1	M1	M1	M1	M2	M2	M2	M2
6	Deans Lake Outlet to TH 169	D	C (fall-winter 05-06)	M1	M1	M1	M1	M1	M2	M2	M2	M2
7	TH 169 to TH 101		D	C (winter 06-07)	M1	M1	M1	M1	M1	M2	M2	M2
8	TH 101 to Blue Lake Inlet				D	C (winter 08-09)	M1	M1	M1	M1	M1	M2

Notes: D= Design, C= construction, M1= 0-5 yr maintenance, M2, 6+ yr maintenance.

EXHIBIT D

Calculation Method for Outlet Channel Cost-Share Allocation

The Outlet Channel cost-share allocation in Table 4 was calculated for each Outlet Channel segment as follows:

1. The tributary drainage area for each Project Cooperator from Table 1 was multiplied by the maximum discharge rate per acre from Table 2.

2. The resulting peak discharge rate for each Project Cooperator was then multiplied by a duration factor (see Table D-1) to factor in the period of discharge in addition to the maximum discharge rate.

Table D-1. Duration Factors.

Project Cooperator	Duration Factor Used (Days)
Prior Lake-Spring Lake Watershed District	10
City of Shakopee, south of Dean Lake (Upstream)	2
City of Shakopee, north of Dean Lake (Downstream)	1
City of Prior Lake	0.5
Shakopee Mdewakanton Sioux Community	2

3. The flows from each Project Cooperator were then added to determine the total flow for that segment, in cfs-days.

4. Finally, for each Project Cooperator the relative flow contribution was determined as a percent of the total. That percent was then identified as the cost-share allocation for the Project Cooperator for that segment (see Table D-2).

Table D-2. Cost-Share Allocation Calculation Table.

Segment	Stakeholder	Tributary Drainage Area (acres)	Flow (cfs)	Resulting Flow (cfs-days)	% of Total with Duration Factor
1	Prior Lake Spring Lake Watershed District (PLSLWD)	--	65	650	91.7%
	City of Shakopee	0	0	0	0.0%
	City of Prior Lake	658	112	56	7.9%
	Shakopee Mdewakanton Sioux Community (SMSC)	28	1	3	0.4%
2	PLSLWD	--	65	650	88.9%
	City of Shakopee	0	0	0	0.0%
	City of Prior Lake	261	156	78	10.7%
	SMSC	3	2	3	0.4%
3	PLSLWD	--	65	650	76.7%
	City of Shakopee	94	9	19	2.2%
	City of Prior Lake	1,145	351	175	20.7%
	SMSC	5	2	4	0.4%
4	PLSLWD	--	65	650	40.1%
	City of Shakopee	2,622	272	543	33.5%
	City of Prior Lake	827	492	246	15.2%
	SMSC	1,787	91	182	11.2%
5	PLSLWD	--	65	650	36.6%
	City of Shakopee	758	347	695	39.2%
	City of Prior Lake	0	492	246	13.9%
	SMSC	7	92	183	10.3%
6	PLSLWD		65	650	36.9%
	City of Shakopee	927	656	656	37.3%
	City of Prior Lake	0	492	246	14.0%
	SMSC	261	105	209	11.9%
7	PLSLWD		65	650	29.1%
	City of Shakopee	1,407	1125	1125	50.5%
	City of Prior Lake	0	492	246	11.0%
	SMSC	0	105	209	9.4%
8	PLSLWD		65	650	28.7%
	City of Shakopee	101	1159	1159	51.2%
	City of Prior Lake	0	492	246	10.9%
	SMSC	0	105	209	9.2%

EXHIBIT E

Outlet Channel Restoration and Enhancement Project
Construction and Maintenance Costs

The following table presents the engineer's estimate for the costs of the design and construction of the Outlet Channel Restoration and Enhancement Project and the first five years of maintenance, by Project Partner:

	2005	2006	2007	2008	2009	2010
PLSLWD	$ -	**$904,095**	$475,501	$398,591	$222,551	$181,567
City of Shakopee	$ -	**$434,533**	$267,753	$209,693	$173,369	$100,299
City of Prior Lake	$ -	**$192,996**	$114,165	$115,049	$59,875	$44,379
SMSC	$ -	**$119,424**	$68,427	$57,647	$38,326	$25,135
Total	$ -	**$ 1,651,048**	$ 925,845	$ 780,980	$ 494,120	$ 351,380

	2011	2012	2013	2014	2015	Partner Total
PLSLWD	$155,731	$117,642	$81,281	$81,281	$77,865	$2,696,105
City of Shakopee	$ 86,027	$68,796	$49,103	$49,103	$43,014	$1,481,688
City of Prior Lake	$ 38,064	$29,993	$20,323	$20,323	$19,032	$654,198
SMSC	$ 21,558	$16,623	$11,878	$11,878	$10,779	$381,677
Total	$301,380	$ 233,055	$ 162,585	$ 162,585	$ 150,690	$ 5,213,669

Note:
Annual costs shown here include capital and maintenance costs, but not any easement acquisition costs. Capitol construction cost estimates are based on $150/ linear foot of channel.

JOINT POWERS AGREEMENT

AGREEMENT, made and entered into by and between the CITY OF PRIOR LAKE, Minnesota, a municipal corporation, ("PRIOR LAKE"); the CITY OF SHAKOPEE, Minnesota, a municipal corporation, ("SHAKOPEE"); and the PRIOR LAKE-SPRING LAKE WATERSHED DISTRICT, Prior Lake, Minnesota, a political subdivision of the State of Minnesota, ("WATERSHED DISTRICT").

WHEREAS, the Watershed District is presently engaged in the implementation of a project, identified as the "Lake Outlet Project, Number WD 76-4", ("Lake Outlet"), to construct an artificial outlet for Prior Lake for the purpose of draining water from Prior Lake and transporting such water to the Minnesota River; and

FINAL DRAFT (SIGNED)

WHEREAS, the plans and specifications for the Lake Outlet require the improvement of certain natural drainage courses and the construction of certain drainage channels within the municipal boundaries of Shakopee and more particularly described on Exhibit "A", which is attached hereto and by reference made a part hereof; and

WHEREAS, the temporary and permanent easements specified by the plans and specifications for the construction of the foregoing drainage improvements can only be obtained from the affected property owners with the cooperation and assistance of Shakopee; and

WHEREAS, the drainage improvements and easement acquisitions contemplated by the Watershed District are of direct and immediate benefit to Shakopee because (a) the drainage channel improvements are in conformance with Shakopee's overall drainage plan in the area of the Lake Outlet's drainage route; (b) the easement to be acquired can also be used by Shakopee for public utility and right-of-way purposes, and (c) the channel improvements may reroute local runoff into Dean's Lake and thereby supplement and increase the level of the lake; and

WHEREAS, Prior Lake and Shakopee desire to assist the Watershed District acquire the easements necessary for the construction of the drainage channel improvements specified in the Lake Outlet plans and specifications, upon the conditions hereinafter set forth; and

Section 2.03. Assistance by Shakopee. In the event that it becomes necessary in the opinion of the Watershed District to acquire the required easements by means of condemnation proceedings, Shakopee shall cooperate with and assist the Watershed District in pursuing condemnation. In that event, all legal proceedings shall be brought in the joint name of the Watershed District and Shakopee by the Shakopee City Attorney in accordance with Shakopee Resolution No. 1643.

Section 2.04. Easement Acquisition Costs. All costs or expense necessary and incidental to the acquisition of the easements shall be the responsibility of and borne by the Watershed District. The costs for which the Watershed District shall have direct and exclusive responsibility shall include without limitation all costs related to the acquisition of the easements, legal fees, court costs, appraisal fees, survey fees, abstracting fees, and recording fees. The Watershed District agrees to indemnify and hold Shakopee harmless from any and all liability of any nature arising from, and for all cost and expense relating to the acquisition of the easements.

Section 2.05. Payment of Easement Acquisition Costs. The Watershed District shall pay the easement acquisition costs on or before 30 days following receipt of the proceeds from the sale of the municipal bonds used to finance the Lake Outlet in the event that the contracts for the improvements are let and the work on the improvements proceeds. In the event that the Watershed District elects either not to let contracts for the improvements or elects not to let contracts for the improvements or elects not to commence work on the improvements, the easement acquisition cost shall be paid on or before 30 days after receipt of the reimbursement funds received from Scott County in accordance with Minnesota Statutes Section 112.48 , Subd. 2, (1955, as amended). The Watershed District agrees to indemnify and hold Shakopee harmless from any costs or expenses related to easement acquisition.

ARTICLE III

CONSTRUCTION OF LAKE OUTLET

Section 3.01. Obligation of Watershed District. The construction of the Lake Outlet, including without limitation the construction of all channel improvements appurtenant thereto, shall be the sole and exclusive responsibility of the Watershed District. Prior to the commencement of construction, the Watershed District shall obtain all permits and approvals required by any governmental unit having jurisdiction over the Lake Outlet improvements, including without limitation permits from Shakopee, the Lower Minnesota Watershed District, the Minnesota Water Resources Board, the Department of Natural Resources, the Environmental Quality Council and the Metropolitan Council

Section 3.02. Plans and Specifications for the Lake Outlet Improvements. The Watershed District shall design the Lake Outlet improvements to conform with generally acceptable engineering specifications. The Watershed District shall furnish Shakopee with complete copies of the plans and specifications for the Lake Outlet improvements certified to by the Watershed District's engineer. Shakopee shall approve all such plans and specifications as they relate to improvements to be placed within its corporate limits. The Watershed District's determination on questions of design shall be conclusive as to the parties to this Agreement.

Section 3.03. Payment of Lake Outlet Construction Costs. All costs or expenses incurred to construct the Lake Outlet improvements shall be the responsibility of and borne by the Watershed District. The costs to be paid by the Watershed District shall include without limitation all direct construction costs, engineering fees, legal fees, administration expense and permit application fees. The Watershed District shall indemnify and hold Shakopee harmless from any liability for any cost or expense incurred in constructing the Lake Outlet improvements.

ARTICLE IV

OPERATION OF LAKE OUTLET

Section 4.01. General.

(a) Water shall not be released from Prior Lake by opening the main Lake Outlet gate at any time when such discharge would jeopardize the health, safety or property of the residents or property owners of Shakopee.

(b) The determination of when and to what degree such jeopardy has ceased, or has been reduced to the extent that the discharge of water from Prior Lake may commence, shall be made jointly by the engineers of the Watershed District, Shakopee and Prior Lake in accordance with the following procedures:

(i) An inspection shall be made to determine the depth and velocity of the flow at various locations in the drainage channel.

(ii) The available capacity in the drainage channel shall be determined by using Manning's equation for open-channel flow. All calculations shall be performed by the Watershed District's engineer and shall be confirmed by the engineers of Prior Lake and Shakopee.

(iii) The "available capacity in the drainage channel" shall be defined as the calculated maximum rate of discharge at which the Lake Outlet can be allowed to operate without resultant damage to the drainage channel or to adjoining properties.

(c) After the available capacity in the drainage channel has been determined by the engineers of the Watershed District, Prior Lake and Shakopee, the main Lake Outlet gate may be opened subject to adjustment so as to release water at a rate that will not exceed the available capacity in the drainage channel.

Section 4.02. Notice to Shakopee of Intent to Open Main Lake Outlet Gate. Prior to the opening of the main Lake Outlet gate and the release of water from Prior Lake, the Watershed District shall give Shakopee no less than 24 hours advance notice in accordance with Section 12.01.

Section 4.03. Inspection of Drainage Channel.

(a) Prior to the opening of the main Lake Outlet gate and the release of water from Prior Lake, the Watershed District shall inspect the drainage channel to insure the free flow of water for the anticipated rate and duration of the release period and to determine

the available capacity in the drainage channel in accordance with Section 4.01(b). Notice of any such inspection shall be given to the engineers of Prior Lake and Shakopee, either City may elect to have a representative present for any inspection. In the event that the inspection reveals that repair or maintenance is required to insure the free flow of water through the drainage channel, the party having responsibility for such repair and maintenance in accordance with Aticle VI shall promptly perform such repairs or maintenance so as to prevent any undue delay in the release of water from Prior Lake. In the event that such repairs are not promptly undertaken by the responsible party, the Watershed District shall have the right to perform, or cause to be performed, the repairs to be made after 24 hours' notice and to recover the costs pertinent thereto from the responsible party. Daily inspections of drainage channel conditions shall be made by the Watershed District during times that Lake Outlet drainage rates exceed 20 cfs. In such event, the responsible party shall reimburse the Watershed District upon due demand therefore for all sums paid, or for the fair value of any work performed, by the Watershed District in connection with such repair or maintenance.

(b) After the main Lake Outlet gate has been closed and the water in the drainage channel has receded, the Watershed District shall make an inspection of the drainage channel to determine whether it has been damaged by the flow of water from Prior Lake. Notice of any such inspection shall be given to the engineers of Prior Lake and Shakopee, and either City may elect to have a representative present for any inspection. In the event that the inspection reveals that repair or maintenance is required to insure the free flow of water through the drainage channel, the party having responsibility for such repair and maintenance in accordance with Aticle VI shall rpomptly perform such repairs or maintenance so as to prevent any undue delay in the release of water from Prior Lake.

(c) The inspection requirements set forth in Sections 4.03(a) and (b) constitute the minimum obligation of the parties; and any part to this Agreement shall have the full right to make such additional inspection of the drainage channel as it may deem necessary, with or without notice to any other party.

(d) Written reports of all inspections shall be made by the inspecting party and shall be forwarded to each of the other parties.

Section 4.04. ~~Operation of Dean's Lake Diversion Structure Gate.~~

(a) ~~The Watershed District shall have the exclusive authority~~ for the operation of the Dean's Lake diversion structure gate except as otherwise provided in this Section 4.04.

(b) ~~The normal position of the Dean's Lake diversion~~ structure gate (that is, the position of the gate during times that water is not being released from Prior Lake) shall [per agreement] direct the ~~flow of runoff through Dean's Lake~~. Nevertheless, the Watershed District agrees to comply with reasonable requests by Shakopee to divert normal runoff through Dean's Lake; provided, however, that such request shall be made to the Watershed District in writing and shall be accompanied by the Agreement of Shakopee to indemnify and hold the Watershed District harmless from any liability for loss, damage and cost, including without limitations reasonable attorney's fees, resulting from the diversion of runoff through Dean's Lake pursuant to the request of Shakopee.

(c) During the periods that water being released from Prior Lake is flowing through the Dean's Lake diversion structure, the diversion structure gate shall be positioned so as to divert all runoff through Dean's Lake. However, ~~in the event that the diversion of runoff into Dean's Lake is causing or creates an eminent danger to private property, Shakopee shall have the authority to abate the flow of runoff into Dean's Lake by repositioning the diversion structure gate to direct all or part of the runoff to the existing natural drainage route.~~ Shakopee shall give the Watershed District prior notice of its intent to redirect the flow of runoff by adjustment of the diversion structure gate.

Section 4.05. ~~Additional Operational Conditions Imposed Upon the Watershed District.~~ The Lake Outlet will be operated in accordance with the terms and conditions of the permit issued by the Minnesota Department of Natural Resources. A copy of the permit is attached hereto as ~~Exhibit [redacted]~~ and by reference made a part hereof.

ARTICLE V

~~USES OF DRAINAGE CHANNEL~~

Section 5.01. Permitted Uses by Watershed District. The Watershed District shall use the drainage channel for the purpose of draining water from Prior Lake and for no other purposes.

Section 5.02. Permitted Uses by Shakopee. Shakopee reserves the right to use the easements obtained by the Watershed District in connection with its overall drainage plans as they are from time to time developed by Shakopee. In the event runoff in Shakopee results in or causes the need for expansion of the design capacity for the drainage channel, Shakopee shall make or install all improvements necessary to increase the capacity of the drainage channel to handle the increased flow. Any such improvements shall be made at the sole cost or expense of Shakopee; and both Prior Lake and the Watershed District shall be indemnified and held harmless from any and all liability for such cost or expense and for such increased flow.

Section 5.03. Additional Authorized Shakopee Uses. Shakopee may use the easements without termination of this Agreement, for the installation, operation and maintenance of public services and utilities to include without limitation public streets, sanitary sewer, water, storm sewer, electrical and natural gas. In no event shall such uses interfere or otherwise restrict the drainage function of the channel. All cost or expense to install, operate and maintain such utilities and any damage to the channel resulting from such installation, operation and maintenance shall be borne by Shakopee and both Prior Lake and the Watershed District shall be indemnified and held harmless from any liability therefor.

ARTICLE VI

~~MAINTENANCE OF DRAINAGE CHANNEL~~

Section 6.01. ~~Obligation of Watershed District to Provide Initial Construction Warranty for Drainage Channel Improvement.~~ For a period of ~~three (3) years~~ following completion of the improvements made to the drainage channel as part of the initial construction of the Lake Outlet, the Watershed District shall have the sole and exclusive obligation to stabilize the channel bank and restore any damage to the drainage channel or adjoining property resulting from the initial construction work. In addition, any work performed by the Watershed District during the foregoing three (3) year period to repair, replace or correct defects that arise out of or in connection with the initial construction work shall be similarly guaranteed for an additional three (3) year period from and after the date of such repair, replacement or correction.

Section 6.02. Obligations of Watershed District to Contribute to the Routine Maintenance of Drainage Channel.

(a) In addition to its obligations to provide construction warranties pursuant to Section 6.01, the Watershed District shall have a continuing obligation throughout the entire term of this Agreement to contribute to the cost incurred for the routine maintenance of the drainage channel. The amount of the Watershed District's contribution to the routine maintenance of the drainage channel shall be determined as follows:

(i) ~~Before the time that Shakopee alters or~~ otherwise makes use of the drainage channel in connection with its overall drainage plan or in connection with the installation of public services and utilities, ~~the Watershed District shall have sole and exclusive obligations to perform and pay the cost of all routine maintenance to the drainage channel.~~

(ii) After the time that Shakopeee modifies the drainage channel in connection with its overall drainage plan or in connection with the installation of public services and utilities, the Watershed District shall have the sole and exclusive obligation to perform and pay the cost of all routine maintenance to that portion of the drainage channel lying southerly of Dean's Lake (including the Dean's Lake diversion structure); provided, however, that at such time as there exists a continuous flow of water between the main outlet structure on Prior Lake and State Highway No. 101, the Watershed District shall have the sole and exclusive obligation to perform and pay

the cost of routine maintenance for the entire drainage channel. In no event, however, shall the Watershed District have any responsibility for loss or damage to any public services or utilities installed or maintained in the drainage channel easement by Shakopee.

(b) In addition to the continuing obligations of the Watershed District to contribute to the routine maintenance of the drainage channel, the Watershed District shall have the obligation of inspecting the drainage channel before and after releasing water from Prior Lake and shall repair any impediments to such discharge before releasing water and restore any damage caused to the drainage channel by such discharge thereafter. The post-discharge inspection shall be made as soon as practical after the discharge has ended. Any emergency restoration work as evidenced by the inspection shall be made as soon as practical after the discharge has ended. Any emergency restoration work as evidenced by the inspection shall be completed within a time frame consistent with the severity of the damage caused and such other physical and weather conditions that may bear upon the work to be performed. In no event, however, shall the time frame for completing permanent repairs exceed one (1) year from the date that the discharge causing the damage was ended.

Section 6.03. Obligation of Shakopee to Contribute to the Routine Maintenance of Drainage Channel.

(a) Before the time that Shakopee modifies the drainage channel in connection with its overall drainage plan or in connection with the installation of public services and utilities, Shakopee shall have no obligation to contribute to the cost of the routine maintenance of the drainage channel.

(b) After the time that Shakopee modifies the drainage channel in connection with its overall drainage plan, or in connection with the installation of public services and utilities, and except as otherwise provided in Section 6.02(a) (ii) Shakopee shall have the sole and exclusive obligation to perform and pay the cost of all routine maintenance to that portion of the drainage channel lying southerly of Dean's Lake.

ARTICLE VII

INDEMNIFICATION

Section 7.01. Indemnification of Shakopee and Prior Lake by the Watershed District. The Watershed District shall indemnify and hold Shakopee and Prior Lake harmless from any and all liability, cost or expense, including without limitation reasonable attorney's fees and court costs, arising out of or in connection with the construction, improvement, use and maintenance of the drainage channel by the Watershed District.

Section 7.02. Indemnification of the Watershed District and Prior Lake by Shakopee. Shakopee shall indemnify and hold the Watershed District and Prior Lake harmless from any and all liability, cost or expense, including without limitation reasonable attorney's fees and court costs, arising out of or in connection with Shakopee's improvement, use and maintenance of the drainage channel and the drainage channel easement.

Section 7.03. Insurance and Evidence Thereof. Each of the parties to this Agreement shall provide on the demand of the other evidence that the risks covered by this Article are insured throug an insurance company licensed to do business in the State of Minnesota by a policy or policies having minimum per occurrence limits of Three Hundred Thousand ($300,000) Dollars.

ARTICLE VIII

RESOLUTIONS OF DISPUTES

Section 8.01. Policy for Resolving Disputes. The parties to this Agreement acknowledge that if disputes do arise over the construction of this Agreement, or over the rights and obligations of the parties hereto, such disputes will, in all likelihood, affect substantial rights with respect to the health and safety of the persons and property of the citizens residing within their respective jurisdictions and will further arise under the time frames that do not allow for extended investigation of or negotiations regarding the relative merits of the respective position to the dispute. Therefore, the following procedure for resolving disputes has been implemented to give each party to this Agreement the

opportunity to present, to the fullest extent possible, the essence of their position to a qualified arbitrator and yet at the same time receive a knowledgeable decision, form a person having sufficient technical experience and expertise, within the shortest possible time.

Section 8.02. Procedure for Resolving Disputes. All disputes arising out of or in connection with this Agreement shall be resolved by arbitration in accordance with Minnesota Statutes Section 572.08 (c), (1957, as amended), the Minnesota Uniform Arbitration Act, and the following conditions:

(a) The dispute shall be heard by a board consisting of three (3) arbitrators. The Watershed District and Prior Lake shall appoint one (1) member to the Board. Shakopee shall appoint one (1) member to the Board. The third Board member shall be appointed by the members previously appointed by the parties.

(b) The election to arbitrate a dispute shall be made in writing, duly served upon all of the other parties in the manner provided herein for notices.

(c) The hearing before the arbitrators shall be held within five (5) days after service of the election to arbitrate, unless otherwise agreed in writing by each of the parties.

(d) The decision of the arbitrators shall be rendered not later than seven (7) days after service of the election to arbitrate, unless otherwise agreed in writing by each of the parties.

Section 8.03. Enforcement of Award. The award of the arbitrators shall be enforceable by any district judge of the First Judicial District of the State of Minnesota.

ARTICLE IX

AMENDMENT

Section 9.01. Amendment. Any amendment to this Agreement shall be in writing and duly executed by each of the parties. Any amendment shall be effective from and after the date that it is recorded in the Office of the Scott County Recorder.

ARTICLE X

TERMINATION

Section 10.01. Perpetual. The duration of this Agreement shall be perpetual, or until otherwise expressly rescinded or terminated by the parties. Any such agreement of rescission or termination shall be recorded in the Office of the Scott County Recorder.

ARTICLE XI

DISTRIBUTION OF PROPERTY

Section 11.01. Distribution of Property Generally. In the event of the rescission or termination of this Agreement, all property or surplus monies acquired as a result of the joint exercise of powers provided for herein shall be returned to the contributing party in proportion to the contribution provided for by the respective party.

Section 11.02. Title to Easements Upon Termination. Upon termination of this Agreement, the Watershed District shall convey to Shakopee, all of its right, title and interest in that portion of the drainage channel lying southerly of Scott County Road 16 and within the municipal limits of Shakopee.

ARTICLE XII

MISCELLANEOUS

Section 12.01. Notices. Any notice required to be given or submitted under this Agreement shall be duly given if delivered personally or if mailed, by certified or registered mail, postage prepaid, addressed to the parties at their respective addresses specified below, or to such other address with respect to any party as such party shall notify the others in writing.

If to Prior Lake:

Michael A. McGuire
(Name)

City Manager
4629 Dakota Street Southeast
Prior Lake, Minnesota 55372

If to Shakopee:

John K. Anderson
(Name)

City Administrator
129 East 1st Avenue
Shakopee, Minnesota 55379

If to the Watershed District: Don O. Benson
(Name)

Staff Administrator
4690 Colorado Street Southeast
Prior Lake, Minnesota 55372

Section 12.02. Successors and Assigns. This Agreement shall be binding upon and inure to the benefit of the legal successors and assigns of the parties.

Section 12.03. Construction. This Agreement shall be construed in accordance with the law of the State of Minnesota.

Section 12.04. Definitions. The terms defined in this Section 12.04 (except as may be otherwise expressly provided in this Agreement or when the context otherwise requires) shall for all purposes of this Agreement have the following respective meanings:

(a) "CFS" shall mean and refer to cubic feet per second.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement on the 2nd day of June, 1981.

CITY OF PRIOR LAKE

By: Walter Thiesfeldt

Its: Mayor

And: Michael A. McGuire

Its: City Manager

CITY OF SHAKOPEE

By: [signature]

Its: Mayor

And: John K. Anderson

Its: City Administrator

AMENDMENT OF JOINT POWERS AGREEMENT

AGREEMENT, made and entered into by and between the CITY OF PRIOR LAKE, Minnesota, a municipal corporation, ("PRIOR LAKE"); the CITY OF SHAKOPEE, Minnesota, a municipal corporation, ("SHAKOPEE"); and the PRIOR LAKE-SPRING LAKE WATERSHED DISTRICT, Prior Lake, Minnesota, a political subdivision of the State of Minnesota, ("WATERSHED DISTRICT").

WHEREAS, the parties hereto are all of the parties to a Joint Powers Agreement, dated on the 2nd day of June, 1981, filed for record in the Office of the Scott County Recorder on the ____ day of _____, 19__, as document number _____, relating to the Watershed District's implementation of a project, identified as the "Lake Outlet Project, Number WD 76-4", to construct an artificial outlet for Prior Lake for the purpose of draining water from Prior Lake and transporti ; such water to the Minnesota River; and

WHEREAS, Section 4.04(b) of the Joint Powers Agreement contains a "scrivener's error" that occurred during the typing of the final draft of the Joint Powers Agreement and which consists of the omission of a word which materially changes the meaning of Section 4.04(b) in a manner contrary to the intention of the parties; and

WHEREAS, the parties hereto desire by this Agreement to amend the Joint Powers Agreement to correct the foregoing drafting error.

NOW, THEREFORE, in consideration of the mutual covenants hereinafter contained, the parties hereto agree that Section 4.04(b) of the aforementioned Joint Powers Agreement shall be, and hereby is, effective on the date hereof, amended to read as follows:

> "(b) The normal position of the Dean's Lake diversion structure gate (that is, the position of the gate during times that water is not being released from Prior Lake) shall not direct the flow of runoff through Dean's Lake. Nevertheless, the Watershed District agrees to comply with reasonable requests by Shakopee to divert normal runoff through Dean's Lake; provided, however, that such request shall be made to the Watershed District in writing and shall be accompanied

Orr
Schelen
Maveron &
Associates, Inc.

300 Park Place Center
5775 Wayzata Boulevard
Minneapolis, MN 55416-1228

612-595-5775
1-800-753-5775
FAX 595-5774

Engineers
Architects
Planners
Surveyors

June 28, 1993

Mr. Bruce Bullert
Director of Public Works
City of Savage
6000 McColl Drive
Savage, MN 55423

Re: Stormwater Management Plan for Boiling Springs Area within
Cities of Shakopee and Savage
OSM Project No. 4925.00

Dear Bruce:

Attached is our previously drafted letter regarding the above project, the map showing the drainage areas as mentioned in this letter of April 8, 1993 and a copy of the Joint Powers Agreement between the City of Shakopee and the City of Savage.

Please review and advise us of any comments you may have.

Sincerely,

ORR-SCHELEN-MAYERON
& ASSOCIATES, INC.

Peter R. Willenbring, P.E.
Manager, Water Resource Department

enclosures

c: Dave Hutton w/attachments
City of Shakopee

Orr
Schelen
Mayeron &
Associates, Inc.

300 Park Place Center
5775 Wayzata Boulevard
Minneapolis, MN 55416-1228

612-595-5775
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FAX 595-5774

Engineers
Architects
Planners
Surveyors

April 8, 1993

Mr. Bruce Bullert
Director of Public Works
City of Savage
6000 McColl
Savage, MN 55378

Mr. Dave Hutton
City of Shakopee
129 East Avenue
Shakopee, MN 55379

Re: Stormwater Management Plan for Boiling Springs Area within the Cities of Shakopee and Savage.
OSM Project No. 4925.00 Task 4464

Gentlemen:

As a follow-up to our previous meeting, we have revised our hydrologic analysis for the Boiling Springs Area to reflect the inclusion of a 130 acre watershed on the west side of County Road 89 that will be directed to the east from Shakopee into the City of Savage. Attached please find a map showing the drainage areas tributary to the City of Savage from the City of Shakopee along with the computer output from our hydrologic model which was set up for this area within the City of Shakopee. This revised analysis yielded the following information:

1. The peak discharge rate directed into the City of Savage from the City of Shakopee at the outlet of Watershed 7 is anticipated to be 25.5 cfs for a 10-year return frequency event and 46.8 cfs for a 100-year return frequency event.

2. The peak discharge rate out of Subwatershed 8 which will be directed into the City of Savage is anticipated to be limited to 2.3 cfs for a 10-year event and 4.1 cfs for a 100-year event.

As can be observed from this information, the City of Shakopee is proposing to limit the total discharge rate across the municipal boundary in this area to approximately 28 and 51 cfs for a 10 and 100-year return frequency storm respectively. Based on the total tributary drainage area being approximately 329 acres, this represents a peak discharge rate of approximately .16 cfs per acre for a 100-year event which is considerably less than the .33 cfs per acre standard that has been typically utilized throughout the remaining

areas within the City of Shakopee. In addition, please find attached a draft joint powers agreement which has been prepared for your review.

It is requested you review this information and advise me of any concerns you may have with this proposed drainage concept.

Sincerely,

ORR-SCHELEN-MAYERON
& ASSOCIATES, INC.

Peter R. Willenbring, P.E.
Manager, Water Resource Department

enclosures

bjf

JOINT POWERS AGREEMENT
BETWEEN THE CITY OF SHAKOPEE AND THE CITY OF SAVAGE RELATING TO STORMWATER MANAGEMENT PLANNING WITHIN THE EAGLE CREEK WATERSHED

THIS AGREEMENT is entered into between the City Shakopee, a Minnesota municipal corporation, hereinafter called "Shakopee" and the City of Savage, a Minnesota municipal corporation, hereinafter called "Savage".

WHEREAS, Savage and Shakopee are preparing or will prepare comprehensive stormwater management plans which must address stormwater run-off transcending their municipal boundary in the vicinity of Eagle Creek, and

WHEREAS, the City of Savage is currently constructing or will construct storm drainage improvements associated with development in this area, and

WHEREAS, the Minnesota Department of Natural Resources is encouraging the City of Savage and the City of Shakopee to direct stormwater run-off away from Eagle Creek as much as can be reasonably accommodated so as to protect this trout stream resource from impact, and

WHEREAS, the City of Shakopee has within its municipal boundaries, a drainage area of approximately 328.9 acres that currently is directed into the City of Savage or will overflow into the City of Savage, and

WHEREAS, both the Cities of Shakopee and Savage desire to enter into an agreement that defines the anticipated rates and volumes of run-off directed across the municipal boundary so that adequate stormwater management planning and design can be implemented by both communities, and

NOW THEREFORE, Savage and Shakopee agree as follows:

1. The surface area within Shakopee that will be tributary to Savage is approximately 328.9 acres as shown on the attached Savage/Shakopee drainage study map, dated April 6, 1993.
2. The peak discharge rate from Watershed 7 will be 25.5 and 46.8 cfs for a 10 and 10-year return frequency event, and the peak discharge rate from Subwatershed 8 will be 2.3 and 4.1 cfs for a 10 and 100-year return

frequency event as shown on a table within the Savage/Shakopee drainage study map, dated April 6, 1993 and supported by the hydrologic model output for this area, referred to as Exhibit 2 and dated April 6, 1993.

3. The parties mutually recognize and agree that the City of Savage shall be responsible for the design, construction, and supervision of all necessary stormwater related improvements to accommodate the discharge rates outlined in Item 2. above.

4. The City of Shakopee will have the right at all reasonable times to review and examine any construction documents relating to the drainage improvements proposed in this area, as well as examine the installation and construction of any existing or future systems.

5. Savage agrees to indemnify and hold harmless Shakopee from any and all claims, actions, or causes of action for damage to persons or property including legal or other expenses in any way arising out of the negligence of Savage in the design, operation or maintenance of the systems constructed within the City of Savage.

IN WITNESS WHEREOF, the parties have set their hands this ____ day of _____, 1993.

CITY OF SAVAGE

_____
Mayor

_____
City Administrator

CITY OF SHAKOPEE

_____
Mayor

_____
Manager

JOINT POWERS AGREEMENT
BETWEEN THE CITY OF SHAKOPEE AND THE CITY OF SAVAGE
FOR STORM SEWER CONSTRUCTION WITHIN
EAGLE CREEK 1ST ADDITION
CITY PROJECT NO. 94-02

THIS AGREEMENT is entered into between the City of Shakopee, a Minnesota municipal corporation, hereinafter called "Shakopee," and the City of Savage, a Minnesota municipal corporation, hereinafter called "Savage," as a Joint Powers Agreement under the authority of Minnesota Statute 471.59.

WHEREAS, Shakopee has prepared a Comprehensive Stormwater Management Plan for the Eagle Creek drainage watershed, that provides for a portion of Shakopee's stormwater runoff to drain towards Savage; and

WHEREAS, Savage has adopted the Eagle Creek Stormwater Management Plan as part of the AUAR Mitigation Strategy and overall city-wide Comprehensive Stormwater Plan, and

WHEREAS, Savage has designed and awarded a contract for Eagle Creek 1st Addition, said project includes provisions for upgrading the storm sewer facilities in Savage to include the additional runoff from a portion of the area in Shakopee draining towards Savage; and

WHEREAS, both Shakopee and Savage desire to enter into an agreement that provides cost sharing for the construction of the storm sewer facilities proposed by Savage, said cost sharing to be based on a specified plan for the Eagle Creek Watershed flow as determined by the City of Shakopee Stormwater Management Plan completed by OSM, dated June 24, 1994; and

WHEREAS, the City of Savage will no longer be able to discharge stormwater runoff into Eagle Creek due to the mitigation plan adopted as part of the AUAR and will now need to route the Zinran Avenue outlet directly to the Minnesota River (via Mn/DOT detention ponds).

NOW, THEREFORE, Shakopee and Savage agree as follows:

1. Recommended Improvement Alternative No. 3, as listed in the Shakopee Stormwater Management Plan for Eagle Creek, will be the alternative utilized to accommodate stormwater runoff out of the Eagle Creek Watershed.

2. That during the peak discharge rate of the Eagle Creek Watershed in the 100-year, 24-hour storm event, Shakopee contributes 26% to the total peak flow and Savage contributes 74% to the total peak flow.

3. That Shakopee will pay 0% of the costs to upgrade the stormwater outlet system from Zinran Avenue to the Minnesota River.

4. That Shakopee will limit its peak flow from Subwatershed 8 (as shown on Attachment A) to 4cfs. Savage will construct the storm sewer in Eagle Creek 1st Addition large enough to handle the additional 4 cfs from Shakopee.

5. That Savage will construct the regional NURP pond identified as Pond 15 on Figure 4 in the Eagle Creek Stormwater Plan, and Shakopee will pay its proportionate share of the pond based on contributing flow as outlined in paragraph 6 below. (See Attachments A and B).

6. The cost of the storm sewer to be paid by Shakopee is 14.8%, because its contributing flow is 4 cfs of the total flow in the storm sewer of 27 cfs (4/27 = 14.8%). The estimated pond costs for Shakopee is based on 6.7% because its contributing flow is 4 cfs of the total pond inlet flow of 59.7 cfs (4/59.7 =6.7%). The cost apportionment consists of the construction cost based on bids received, plus Savage's standard 26% for engineering and administrative costs.

   Shakopee's total proposed cost is as follows:

   A. Total Storm Sewer Cost to Shakopee = $145,591.89 x 14.8% = $21,547.60

   B. Total pond cost to Shakopee = $7,941.18 (see Attachment C)

   Total cost is $29,488.78

7. Shakopee shall pay to Savage its share of the costs related to these pipe segments in one (1) lump sum payment by January 1 of the year following the date that Shakopee starts utilizing the storm sewer as an outlet. The costs shall be the actual construction cost, plus engineering, administrative, and legal costs, as listed above in paragraph 6. Shakopee shall not be charged any interest from the time the construction is completed until Shakopee utililizes the storm sewer an an outlet.

8. Shakopee will limit flows from Subwatershed 8 to the rates established in the Stormwater Management Plan by constructing on-site storage and retention facilities as development or redevelopment occurs. Said on-site storage facilities in Shakopee will be owned and operated by Shakopee. All improvements and piping in Savage will be owned and operated by Savage. Shakopee and Savage do not intend to acquire any jointly owned personal property or real estate under the provisions of this agreement.

9. The parties mutually recognize and agree that Savage shall be the contracting party and shall be responsible for the design, supervision, and completion of the construction contracts. In so doing, Savage shall proceed pursuant to Minnesota Statute 429. Shakopee shall concur in the award of the contract to the lowest responsible bidder. Upon award of the contract to the successful bidder, Savage will deliver an executed copy thereof to Shakopee. After completion of the project, Savage shall provide ongoing maintenance of the storm sewer facilities in Savage covered by this agreement.

10. Shakopee shall have the right at all reasonable times to review and examine the installation and construction. If for any reason the contract costs increase significantly, or if changes must be made to the contract as a result of conditions being different than originally contemplated, Savage shall obtain the approval of Shakopee for such cost increases or changes.

11. Savage agrees to indemnify and hold harmless Shakopee from any and all claims, actions, or causes of action for damage to persons or property, including legal or other expenses in any way, arising out of the negligence of Savage in the operation and maintenance of the project described herein.

IN WITNESS WHEREOF, the parties have set their hands this 20th day of February, 1996.

CITY OF SAVAGE:

By: _____
Mayor

By: _____
City Administrator

CITY OF SHAKOPEE:

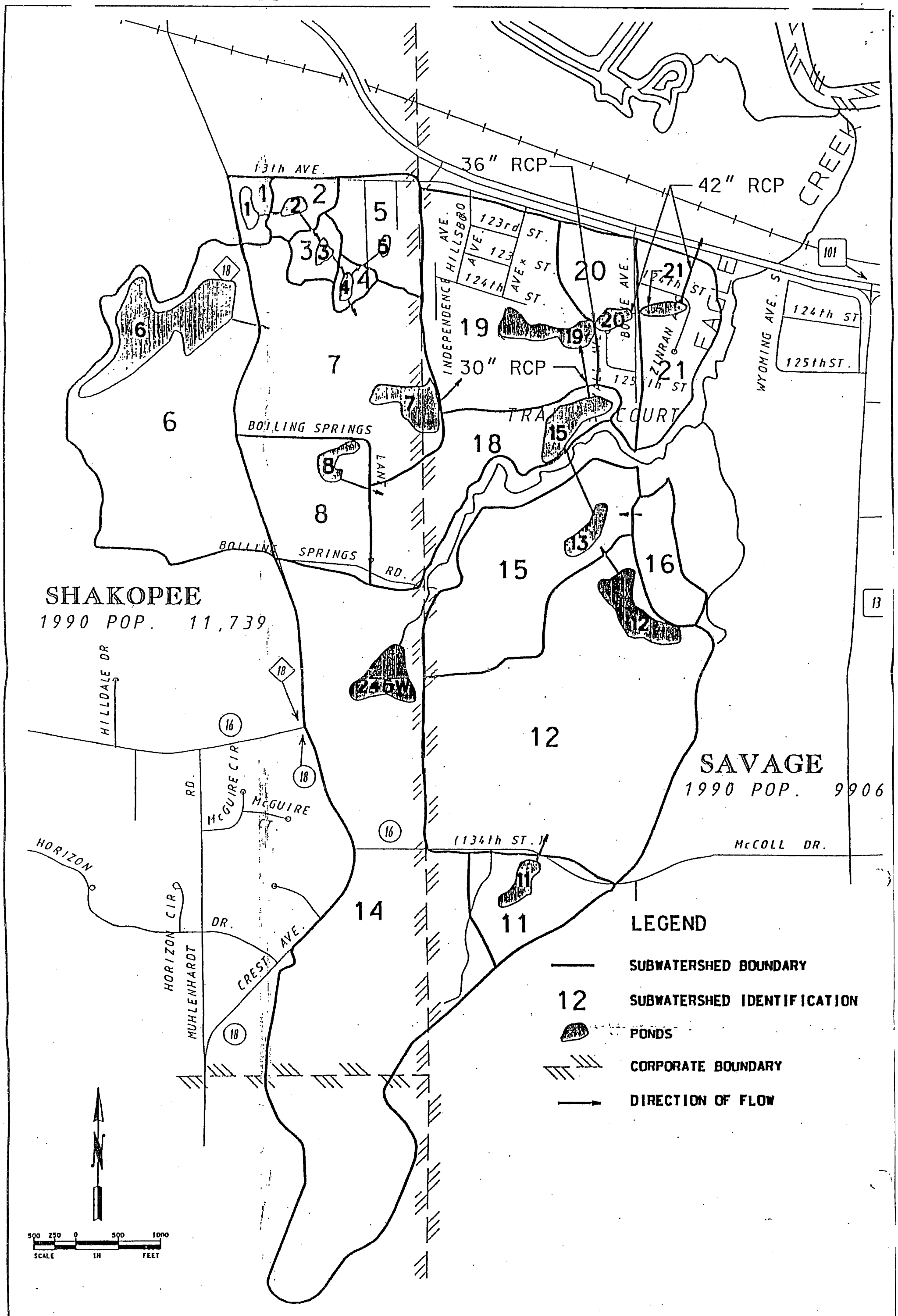
By: _____
Mayor

By: _____
City Administrator

By: _____
City Clerk

F:\USERS\ENGINEER\94-02\JNTPWRS.F14

ATTACHMENT A



Orr Schelen Mayeron & Associates, Inc.
Engineers ▪ Architects ▪ Planners ▪ Surveyors

EAGLE CREEK WATERSHED S

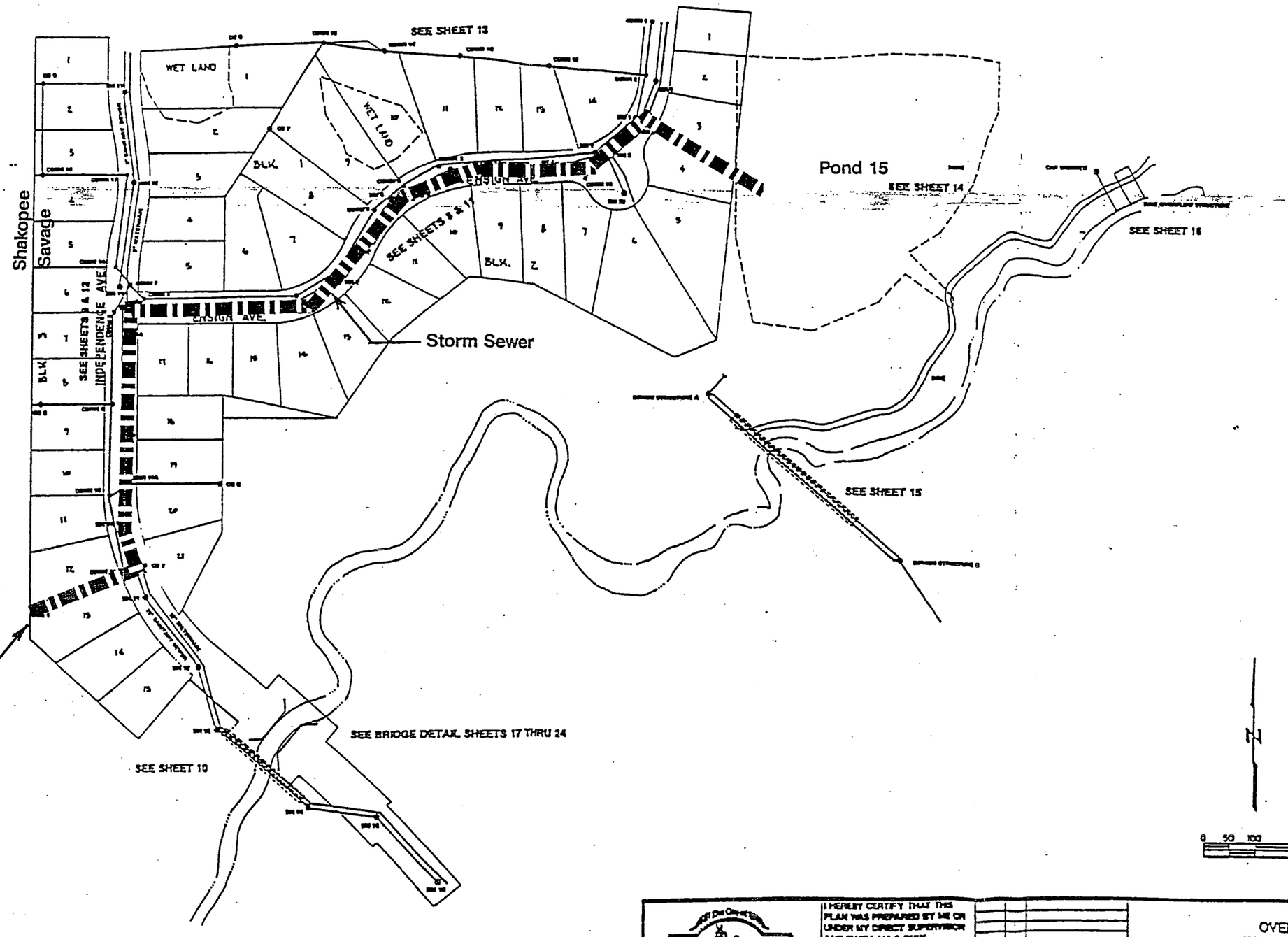
I HEREBY CERTIFY THAT THIS PLAN SPECIFICATION OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA

PETER R. WILLENBRING

SCALE: AS NOTED
PLAN BY: TAW
DESIGN BY:
CHECKED BY: PRW
CONTRACT NO. 1776.78

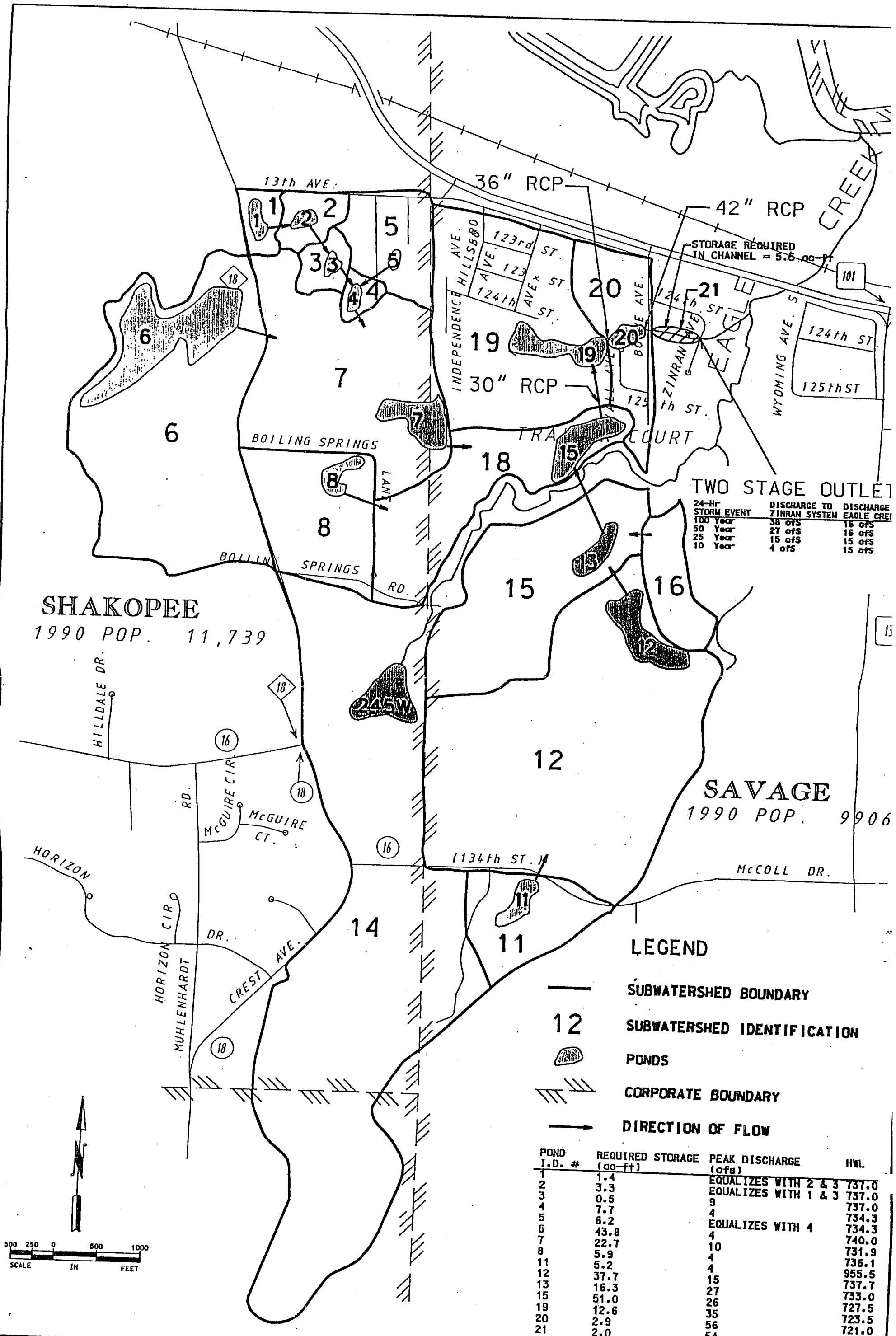
ATTACHMENT B

EAGLE CREEK 1ST ADDITION



I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF

OVERALL
EAGLE CREEK
CITY PROJECT 94-02



POND I.D. #	REQUIRED STORAGE (ac-ft)	PEAK DISCHARGE (cfs)	HWL
1	1.4	EQUALIZES WITH 2 & 3	737.0
2	3.3	EQUALIZES WITH 1 & 3	737.0
3	0.5	9	737.0
4	7.7	4	734.3
5	6.2	EQUALIZES WITH 4	734.3
6	43.8	4	740.0
7	22.7	10	731.9
8	5.9	4	736.1
11	5.2	4	955.5
12	37.7	15	737.7
13	16.3	27	733.0
15	51.0	26	727.5
19	12.6	35	723.5
20	2.9	56	721.0
21	2.0	54	716.1

Orr Schelen Mayeron & Associates, Inc.
Engineers ▪ Architects ▪ Planners ▪ Surveyors
Park Place East ▪ 5775 Wayzata Boulevard
Minneapolis, MN 55416-1228 ▪ 612-595-5775

EAGLE CREEK WATERSHED STUDY
ALTERNATIVE

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.

PETER R. WILLENBRING

SCALE: AS NOTED
PLAN BY: TAW
DESIGN BY:
CHECKED BY: PRW
COMP. NO.: 1776.76

FIG. 4

Attachment C

NURP Pond Cost Split

I. Construction Cost (from bids)

Nurp Pond Bid	$ 75,137.60
Clay liner for dike	43,387.50
	$118,525.10

II. Cost Breakdown: (Percentages are based on total cfs.)

A. Shakopee: 6.7% of $118,525.10 $ 7,941.18

B. Covington Ponds 3rd Addition (Previously Assessed): $ 42,162.53 (developer)
City portion of Covington Ponds 3rd Addition: $ 7,467.08 (City)

C. Eagle Creek 1st Addition:

$118,525.10
18,600.00 (Estimated 6,000 c.y. @ $3.10/c.y. price for filling streets in Covington Ponds
$ 99,925.10 east of the the NURP pond)

61% of $99,925.10= $60,954.31
($20,000 of this cost will be paid for by the City for grading of the regional pond east of the NURP pond)

Eagle Creek 1st Addition (Hirscher Farms): $ 40,954.31 (developer)
City portion of Eagle Creek 1st Addition $ 20,000.00 (City)

III. Summary for NURP Pond:

1.	Shakopee	$ 7,941.18
2.	Covington Ponds 3rd	42,162.53
3.	Eagle Creek 1st Addn.	40,954.31
4.	City	27,467.08
		$118,525.10

Revised 4/15/97
Revised 4/12/95
Revised 3/15/95

JOINT POWERS AGREEMENT
BETWEEN THE CITY OF SHAKOPEE AND THE CITY OF SAVAGE
FOR STORM SEWER

City Project 94-05
Covington Ponds Third Addition

THIS AGREEMENT is entered into between the City of Shakopee, a Minnesota municipal corporation, hereinafter called "Shakopee" and the City of Savage, a Minnesota municipal corporation, hereinafter called "Savage", as a Joint Powers Agreement under the authority of Minnesota Statute 471.59.

WHEREAS, Savage and Shakopee have prepared comprehensive plans which include storm sewer plans that provide for a portion of Shakopee to drain towards Savage; and

WHEREAS, Savage has held public hearings for Project 94-05, has awarded a contract for this project, and has completed the construction of this project; and

WHEREAS, said project included provisions for upgrading the storm sewer facilities in Savage to include the runoff from a portion of the area in Shakopee draining towards Savage; and

WHEREAS, both Shakopee and Savage desire to enter into an agreement that provides cost sharing for the improvement of the storm sewer facilities constructed by Savage, said cost sharing to be based on a specified plan for the Eagle Creek Watershed flow as determined by the Storm Water Management Plan completed by OSM dated June 24, 1994; and

WHEREAS, Savage has previously completed the construction of storm drainage facilities, under City Project 91-18, to accommodate storm water flow from future development in Section 18 in Savage to Zinran Ave. outlet to Eagle Creek; and

WHEREAS, the City of Savage will no longer be able to discharge stormwater runoff into Eagle Creek due to the mitigation plan adopted as part of the AUAR and will now need to route the Zinran Avenue outlet directly to the Minnesota River (via Mn/DOT detention ponds).

NOW, THEREFORE, Shakopee and Savage agree as follows:

1. Recommended Improvement Alternative No. 3 will be the alternative utilized to accommodate storm water runoff out of the Eagle Creek Watershed.

2. That during the peak discharge rate out of the Eagle Creek Watershed in the 100-year 24-hour storm event, Shakopee contributes 26% to the peak flow and Savage contributes 74% to the peak flow.

3. That Shakopee will pay 0% of the costs to upgrade the storm water outlet system from Zinran Avenue to the Minnesota River.

4. That Savage will construct the NURP pond as shown on Exhibit A at no cost to Shakopee.

5. That the cost to Shakopee for connection to the 126th Street storm sewer system in Savage is $40,000.

6. That Shakopee is creating a wetland 2-3 acres in size as a part of their Maras Street Improvement Project, and the estimated value of this wetland creation is between $15,000 and $20,000 per acre, with a total estimated value of $30,000 to $60,000.

7. That Shakopee will allow Savage to use the wetland credits created by the Shakopee Maras Street Improvement Project in lieu of $40,000 for the 126th Street storm sewer connection.

8. That in the event that circumstances do not allow the exchange of these wetland credits to Savage from Shakopee,

Shakopee shall pay to Savage $40,000 in exchange for the 126th Street storm sewer connection, in one lump sum payment or in ten (10) equal installments with simple interest commencing the 1st of the month following the date of signing of this Joint Powers Agreement. The interest rate shall be the rate that Savage pays for its general obligation bonds in the year that this agreement is finalized. For the purposes of this agreement, the interest rate is assumed to be 8%. Said rate will be adjusted when the actual rates are known.

9. Shakopee will limit flows from said undeveloped lands to the existing pre-developmental rates by constructing on-site storage and retention as development occurs. Said on-site storage facilities in Shakopee will be owned and operated by Shakopee. All improvements and piping in Savage will be owned and operated by Savage. Shakopee and Savage do not intend to acquire any jointly owned personal property or real estate under the provisions of this agreement in its present form.

10. Savage shall provide routine maintenance of the storm sewer facilities covered by this agreement.

11. Savage agrees to indemnify and hold harmless Shakopee from any and all claims, actions or causes of action for damage to persons or property, including legal or other expenses in any way, arising out of the negligence of Savage in the operation and maintenance of the project described herein.

12. Either city can terminate this agreement upon a one (1) year written notice to the other city, on the condition that Savage receives full payment of all amounts owed under the terms of this agreement by the effective date of the termination.

IN WITNESS WHEREOF, the parties have set their hands this _____day of _____, 1997.

CITY OF SAVAGE:

By: _____
Its Mayor

By: _____
Its City Administrator

CITY OF SHAKOPEE: 4-15-97

By: _____
Its Mayor

By: _____
Its City Administrator

By: _____
Its City Clerk

JSS

C:\WPDOCS\MISC\JNTAGMT.M15

APPENDIX B

Hydrologic/Hydraulic Model

TABLE OF CONTENTS

1. Mill Pond Watershed

CITY OF SHAKOPEE
COMPREHENSIVE STORMWATER MANAGEMENT PLAN
MILL POND WATERSHED 2-YEAR EVENT

SUB-WATERSHED NUMBER	PRE-SETTLEMENT AREA (Acre)	FULLY DEVELOPED AREA (Acre)	Tc (min)	SCS CN		PEAK RUNOFF RATE (cfs)		PEAK RUNOFF RATE CFS												
				PRE-SETTLEMENT	FULLY DEVELOPED	PRE-SETTLEMENT	FULLY DEVELOPED	PRE-SETTLEMENT	2-YR 24-HR FULLY DEVELOPED	PEAK OUTFLOW FROM POND (cfs)	PEAK FLOW IN CHANNEL (cfs)	2-YR 24-HR PEAK OUTFLOW FROM POND (cfs)	2-YR 24-HR PEAK FLOW IN CHANNEL (cfs)	PRE-SETTLEMENT	FULLY DEVELOPED	PRE-SETTLEMENT	2-YR 24-HR FULLY DEVELOPED	EXISTING	PROPOSED	COMMENTS
MP1-A1	75	20.7	14.2	48	90	0.27	49.12	0.27	49.12	8.1	8.1	146.1	NA	788.0	788.0	0.0	0.7	2 - 10' X 6' BOX		TH 169 CROSSING #1-SP 7005-57-SHEET 215 & 266-273
MP1-A2	NA	148.8	28.6	NA	87	NA	208.71	NA	208.71	NA	NA	84.4	NA	NA	794.0	NA	8.9	OVERLAND	2 - 36" RCP	PROPOSED LINEAR STORAGE & OUTLET PIPE TO TH 169 CROSSING #1
MP1-AA	NA	10.35	20	NA	89	NA	19.76	NA	19.76	NA	NA	7.6	NA	NA	798.0	NA	6.3	18" RCP		EXISTING PIPE FROM CR 69 POND - SE QUAD OF CR 69 & TH 169
MP1-AB	NA	17.86	30	NA	89	NA	26.73	NA	26.73	NA	NA	6.9	NA	NA	803.7	NA	10.8	36" RCP		EXISTING OUTLET PIPE UNDER CR 69-SW TO SE QUAD
MP1-AC	NA	24.69	25	NA	76	NA	19.83	NA	19.83	NA	NA	11.8	NA	NA	800.0	NA	0.6	2 - 48" RCP		EXISING CULVERTS UNDER TH 169 FROM NE TO SE QUAD
MP1-AD	NA	34.8	35	NA	86	NA	40.54	NA	40.54	NA	NA	8.4	NA	NA	802.0	NA	2.1	42" RCP		EXISING CULVERT UNDER CR69 FROM NW TO NE QUAD
MP1-B	251	222	25.6	43	88	0.15	350.26	0.15	350.26	1.9	NA	51.7	NA	798.0	795.2	1.0	20.4	42" X 26" RCP-A		EXISTING CULVERT UNDER CR 69 FROM SW TO SE QUAD
MP1-C	6.5	6.44	21.4	55	72	0.2	4.19	0.2	4.19	0.2	0.2	4.2	3.2	852.0	852.0	0.0	0.0	OVERLAND		OVERLAND FLOW FROM BLUFF INTO RAVINE TO NW
MP1-D	6.8	6.8	14.8	55	72	0.24	5.56	0.24	5.56	0.6	0.5	13.9	13.8	850.0	850.0	0.0	0.0	OVERLAND		OVERLAND FLOW FROM BLUFF INTO RAVINE TO NW
MP1-E	15.8	15.8	28.6	55	72	0.47	8.41	0.47	8.41	0.5	0.5	13.1	13.1	868.0	868.0	0.0	0.0	OVERLAND		OVERLAND FLOW FROM BLUFF INTO RAVINE TO NW
MP1-F	32.6	27.1	35.6	55	72	0.91	12.33	0.91	12.33	0.0	NA	3.1	NA	870.0	870.0	0.4	0.5	OVERLAND	12" RCP	PROPOSED CULVERT FOR RATE CONTROL TO RAVINE IN BLUFF
MP1-G	20.8	20.8	15.8	55	76	0.71	22.14	0.71	22.14	0.3	0.3	1.0	1.0	870.0	870.0	0.1	0.9		15" RCP	PROPOSED CULVERT FOR RATE CONTROL TO RAVINE IN BLUFF
MP1-H	37.2	42	34.3	52	85	0.42	47.2	0.42	47.2	2.0	NA	22.8	NA	800.0	798.0	0.3	4.5	CONTROL STRUCT.		EXISTING CONTROL STRUCTURE - CP 89-78-01 - SHEET 22
MP1-I	30.5	29.7	35.8	36	71	0	12.34	0	12.34	1.9	NA	9.4	NA	800.0	799.0	0.1	0.7	8' X 5' BOX		CULVERT UNDER CR 78-CP 89-78-01 - SHEET 14
MP1-J	74.7	70.6	45.5	51	76	0.6	37.18	0.6	37.18	2.0	NA	13.0	NA	808.0	808.0	0.2	3.3		24" RCP	PROPOSED INLET TO CR 78 STORM SEWER
MP1-K	6.9	6.9	25.7	55	72	0.21	3.96	0.21	3.96	0.1	NA	0.5	NA	878.0	878.0	0.0	0.2		18" RCP	PROPOSED INLET TO CR 78 STORM SEWER STRUCT.
MP1-L	38.1	38.1	44.6	55	72	0.99	14.72	0.99	14.72	1.5	NA	11.1	NA	866.0	866.0	0.0	0.2		18" RCP	PRPOPOSED OUTLET FOR RATE CONTROL-BERM CONST. @ OUTLET
MP1-M	52.9	58.4	42.6	55	72	1.32	23.41	1.32	23.41	0.8	NA	3.7	NA	884.0	884.0	0.1	2.2		15" RCP	PRPOPOSED OUTLET FOR RATE CONTROL-BERM CONST. @ OUTLET
MP1-M1	NA	19.7	20	NA	72	NA	13.41	NA	13.41	NA	NA	5.2	NA	NA	935.0	NA	0.3	24" RCP		EXISTING CULVERT UNDER CR 69-SW QUAD CR 69 & CR 78
MP1-N	6.3	6.3	14	55	72	0.23	5.31	0.23	5.31	0.2	0.2	12.0	6.4	870.0	870.0	0.0	0.0	OVERLAND		OVERLAND FLOW FROM BLUFF NORTH TO TH 169 DTICH IN CHANNEL
MP1-O	11.4	11.4	10	55	72	0.48	11.36	0.48	11.36	1.6	1.6	11.3	10.8	852.0	852.0	0.0	0.0			OVERLAND FLOW FROM BLUFF NORTH TO TH 169 DTICH IN CHANNEL
MP1-P	46.6	46.6	33.9	55	72	1.32	22.04	1.32	22.04	1.3	NA	1.7	NA	916.0	916.0	0.0	1.5		15" RCP	PROP. CULVERT FOR RATE CONTROL FROM BLUFF TO THE TH 169 DITCH
MP1-Q	9.8	9.8	15.3	55	72	0.34	7.87	0.34	7.87	0.1	0.1	0.2	0.2	936.0	936.0	0.0	0.4		12" RCP	PROP. CULVERT FOR RATE CONTROL FROM BLUFF
MP1-R	43.8	43.8	39.5	52	84	0.49	42.15	0.49	42.15	4.1	4.1	11.4	32.2	800.0	820.0	0.0	2.2	MnDOT- CULVERTS	36" RCP	INCREASE STORAGE AND INSTALL OUTLET TO TH 169 DITCH
MP1-S	48.9	48.9	26.5	54	73	1.13	29.98	1.13	29.98	3.9	NA	20.2	NA	860.0	851.8	0.0	0.1		36" RCP	PROP. CULVER T FOR RATE CONTROL-CREATE STORAGE WEST OF CSAH 15
MP1-T	105.5	105.7	32.1	55	72	3.03	52.04	3.03	52.04	2.9	NA	34.0	NA	920.0	920.0	0.0	1.0		36" RCP	PROP. CULVERT/DITCH BLOCK FOR RATE CONTROL-CREATE STORAGE IN RAVINE
MP1-U	19.1	24.8	14.7	31	77	0	29.36	0	29.36	0.0	NA	4.7	NA	808.0	805.0	0.0	0.8		24" RCP	PROP. STORAGE AND CULVERT CROSSING TH 169
MP1-V	5.6	5.6	34	35	83	0	5.67	0	5.67	0.0	NA	1.8	NA	806.0	806.0	0.0	0.2		24" RCP	PROP. CULVERT TO STORAGE BASIN SE OF TH 169
MP1-W	46.2	43.3	58.3	33	84	0	31.58	0	31.58	0.0	NA	8.0	NA	810.0	811.5	0.0	3.9	30" CMP		SOUTH DITCH OF TH 169 OUTLETS TO SO. TO CROSSING UNDER TH 69
MP1-X	9.5	9.5	19.8	55	74	0.3	7.64	0.3	7.64	0.3	0.2	7.7	5.9	842.0	842.0	0.0	0.0		24" RCP	PROP. CULVERT FOR RATE CONTROL FROM BLUFF
MP1-Y	109.5	26.8	30.5	55	76	3.39	18.77	3.39	18.77	3.4	3.2	17.2	40.6	868.0	868.0	0.0	0.1	2 - 24" RCP		TWO CULVERTS OUTLETS FROM EAST DITCH OF CR 69
MP1-Y1	NA	42.4	21.9	NA	72	NA	27.15	NA	27.15	NA	NA	27.1	NA	NA	895.0	NA	0.1	36" CMP		EXISTING CENTERLINE CULVERT UNDER CR 69 - EAST TO WEST
MP1-Y2	NA	40.1	39.6	NA	72	NA	16.89	NA	16.89	NA	NA	9.9	NA	NA	919.8	NA	0.5	24" RCP		EXISTING CENTERLINE CULVERT UNDER CR 69 - EAST TO WEST
MP1-Z	7.2	7.2	19.1	50	84	0.04	11.11	0.04	11.11	3.7	NA	21.1	NA	840.0	829.0	0.1	0.1	2 - 42" RCP		EXISTING DITCH STORAGE ON THE WEST SIDE OF CSAH 15
MP2-A	NA	13.9	20	NA	85	0.23	21.95	NA	21.95	21.1	NA	33.9	NA	796.4	799.1	0.8	1.1	15" CMP	24" CMP	PRPOSED CULVERT CROSSING OF 128TH ST.
MP2-B	53.9	13.2	20	40	66	0	4.85	0	4.85	0.0	NA	4.4	NA	806.0	806.0	0.0	0.0	12' X 6' BOX		TH 169 CROSSING #2-SP 7005-57-SHEET 218 & 244
MP2-B1	NA	51	30	NA	75	NA	33.54	NA	33.54	NA	NA	2.1	NA	NA	816.0	NA	4.3	30" RCP		TH 169 EB ENT. RAMP CULVERT-SP 7005-57 - SHEET 221

CITY OF SHAKOPEE
COMPREHENSIVE STORMWATER MANAGEMENT PLAN
MILL POND WATERSHED 2-YEAR EVENT

SUB-WATERSHED NUMBER	PRE-SETTLEMENT AREA (Acre)	FULLY DEVELOPED AREA (Acre)	Tc (min)	SCS CN		PEAK RUNOFF RATE (cfs)		PEAK RUNOFF RATE CFS												
				PRE-SETTLEMENT	FULLY DEVELOPED	PRE-SETTLEMENT	FULLY DEVELOPED	PRE-SETTLEMENT	2-YR 24-HR FULLY DEVELOPED	PEAK OUTFLOW FROM POND (cfs)	PEAK FLOW IN CHANNEL (cfs)	2-YR 24-HR PEAK OUTFLOW FROM POND (cfs)	2-YR 24-HR PEAK FLOW IN CHANNEL (cfs)	PRE-SETTLEMENT	FULLY DEVELOPED	PRE-SETTLEMENT	2-YR 24-HR FULLY DEVELOPED	EXISTING	PROPOSED	COMMENTS
MP2-C	70.1	30.8	25.9	50	79	0.44	29.49	0.44	29.49	21.0	NA	30.6	NA	830.0	824.0	0.1	0.1		8" ORIFICE-24" RCP	COUNTYSIDE DEVELOPMENT POND & OUTLET CONTROL STRUCTURE
MP2-D	64.9	30.9	33.8	52	71	0.73	13.35	0.73	13.35	19.8	NA	13.7	NA	843.0	845.0	0.0	3.1	3 - 66" RCP		TH 169 EB ENT. RAMP CULVERT-SP 7005-57 - SHEET 235
MP2-D1	NA	17.5	25	NA	72	NA	10.24	NA	10.24	NA	NA	#N/A	NA	NA	NA	NA	NA		4' WEIR-60" RCP	COUNTRYSIDE DEVELOPMENT POND SO. OF 17TH AVE. EXTENSION
MP2-D2	NA	6.5	20	NA	72	NA	4.43	NA	4.43	NA	NA	#N/A	NA	NA	NA	NA	NA			COUTRYSIDE DEVELOPMENT TO POND IN MP2-D
MP2-D3	NA	12.9	20	NA	70	NA	7.34	NA	7.34	NA	NA	#N/A	NA	NA	NA	NA	NA			COUTRYSIDE DEVELOPMENT TO POND IN MP2-D
MP2-D4	NA	45.3	25	NA	70	NA	22.06	NA	22.06	NA	NA	#N/A	NA	NA	NA	NA	NA			COUTRYSIDE DEVELOPMENT TO POND IN MP2-D
MP2-E	24.7	24.7	16.2	53	71	0.42	17.6	0.42	17.6	1.0	1.0	10.0	10.8	902.0	898.6	0.0	2.6	24" RCP		EXISTING CULVERT CROSSING CSAH 15 - SURVEY DATA
MP2-F	21.2	21.2	19.6	55	72	0.68	14.6	0.68	14.6	0.8	NA	17.8	NA	920.0	911.6	0.1	0.2	18" RCP		OUTLET CONTROL STRUCTURE - MT. OLIVE POND
MP2-G	50.4	50.4	42.5	55	72	1.33	20.16	1.33	20.16	0.6	NA	15.8	NA	920.0	918.0	0.2	0.4	13" RCP		OUTLET CONTROL STRUCTURE TO NORTH
MP2-H	3.2	3.2	15	55	72	0.11	2.6	0.11	2.6	0.1	NA	0.9	NA	928.0	925.8	0.0	0.1	24" X 15" RCP-A		OUTLET CONTROL STRUCTURE-NW QUAD OF CR 78 AND CSAH 15
MP2-I	27.9	24.2	34.2	55	72	0.79	11.37	0.79	11.37	0.8	0.8	0.0	0.0	900.0	894.4	0.2	3.4		24" RCP	PROPOSED POND OUTLET W/ EXISTING STORAGE
MP2-J	14	14	36.3	57	73	0.68	6.86	0.68	6.86	0.5	0.5	2.5	2.5	910.0	910.0	0.0	0.2	24" RCP		EXISTING CULVERT UNDER CR 78-SURVEY DATA PROPOSED INFILTRATION AREA
MP2-K	25.1	25.4	37.9	54	71	0.51	10.08	0.51	10.08	0.2	NA	0.6	NA	920.0	910.0	0.1	0.9	WEIR-36" RCP		EXISTING WEIR TO CULVERT UNDER 128TH ST.
MP2-L	33.6	33.4	57.7	57	73	1.34	11.64	1.34	11.64	18.8	19.4	3.6	3.6	910.0	907.8	1.6	6.1	48" RCP		EXISTING CULVERT UNDER CR 78-PROPOSED INFILTRATION AREA
MP2-M	40.7	40.4	49.3	55	72	1.03	14.55	1.03	14.55	18.7	18.7	3.1	3.1	920.0	920.0	8.6	5.8	24" RCP		EXISTING CULVERT UNDER CSAH 15- WEST TO EAST FLOW
MP2-N	178.1	179.2	79.1	60	74	10.69	53.62	10.69	53.62	0.1	NA	0.0	NA	920.0	917.5	5.0	17.9	18" RCP		EXISTING CULVERT UNDER CR 73 - WEST TO EAST FLOW
MP2-O	20.2	20.2	28.4	55	72	0.6	10.83	0.6	10.83	0.3	0.3	1.0	1.0	969.5	969.5	0.0	0.6	18" RCP		EXISTING CULVERT UNDER CR 73 - SURVEY DATA-ROAD LOW POINT
MP2-P	16.2	16.2	16.8	55	72	0.54	12.31	0.54	12.31	0.5	0.5	12.1	11.9	965.0	965.0	0.0	0.2		15" RCP	PROPOSED CULVERT TO THE NORTH & STORAGE IN DEPRESSION
MP2-Q	18.9	19	43.7	58	73	1.07	8.14	1.07	8.14	0.3	NA	4.6	NA	980.0	980.0	0.1	0.1		15" RCP	PROPOSED CULVERT & STORAGE IN WATERSHED FOR RATE CONTROL
MP2-R	51.8	51.1	95.2	55	72	1.06	11.33	1.06	11.33	0.2	0.2	0.1	0.1	970.0	970.0	0.6	3.3	OVERLAND		POTENTIAL STORAGE AREA AND RATE CONTROL W/CULVERT
MP2-S	13.1	13.1	21.4	55	72	0.41	8.52	0.41	8.52	0.1	NA	0.9	NA	970.0	970.0	0.1	0.4	36" CMP		EXISTING DRIVEWAY CULVERT DOWNSTREAM OF POND T1
MP2-T	456.1	81.5	55	67	73	33.82	29.51	33.82	29.51	36.3	NA	32.3	NA	925.0	925.0	0.1	0.3		24" RCP	PROPOSED CUVERT AND BERM CONST. TO MAXIMIZE STORAGE & RATE CONTROL
MP2-T1	NA	367.4	231.9	NA	80	NA	73.12	NA	73.12	NA	NA	0.6	NA	NA	938.0	NA	37.4		15" RCP	PERCHED DEPRESSION- PROPOSED OUTLET-OVERLAND TO THE NE AND SW TO POND T1
MP2-U	20.3	20.3	20	60	74	2.81	16.24	2.81	16.24	0.2	NA	0.1	NA	968.0	968.0	0.3	1.3	54" X 60" CMP-A		EXISTING CENTERLINE CULVERT UNDER CSAH 15 POTENTIAL RATE CONTROL STRUCUTRE ON WEST
MP2-V	18.1	18.1	20	55	72	0.58	12.32	0.58	12.32	0.2	0.2	3.6	3.6	963.0	963.0	0.1	0.3	36" CMP		EXISTING CULVERT UNDER CSAH 15- WEST TO EAST FLOW
MP2-W	99.1	99.1	122.8	56	72	2.28	18	2.28	18	1.5	1.5	1.8	1.8	942.0	942.0	0.3	4.5		18" RCP	PROPOSED CULVERT UNDER DRIVEWAY-MINIMAL STORAGE TO EOF
MP2-X	16	15.9	20	56	73	0.74	11.76	0.74	11.76	0.3	NA	4.0	NA	948.8	948.8	0.0	0.2	2 - 24" RCP		EXISTING CETERLINE CULVERTS UNDER CR 78
MP3-A	32	31.7	48.5	55	72	0.81	11.55	0.81	11.55	0.9	0.9	0.0	0.0	918.0	910.2	0.3	4.5		15" RCP	PROPOSED CULVERT & BERM CONST. FOR RATE CONTROL
MP3-B	49.4	49.4	85.1	57	73	1.67	12.8	1.67	12.8	0.7	0.7	0.7	0.7	934.0	934.0	0.2	2.5		18" RCP	PROPOSED CULVERT UNDER CR 78 TO THE NORTH-NO CULVERT IDEN. IN SURVEY
MP3-C	22.3	22.3	47.3	59	74	1.5	9.77	1.5	9.77	0.4	0.4	0.6	0.6	910.0	910.0	0.1	1.0	12' X 6' BOX		TH 169 CROSSING # 3 - SP 7005-57 - SHEET 226 & 274
MP4-A	124.3	10.8	20	45	72	0.21	7.35	0.21	7.35	10.6	NA	25.5	NA	813.0	813.0	0.4	0.5		8" ORIFICE-24" RCP	COUNTRYSIDE DEVELOPMENT POND SO. TH 169 WEST OF CROSSING #3
MP4-A1	NA	43.2	20	NA	75	NA	37.24	NA	37.24	NA	NA	1.9	NA	NA	816.0	NA	4.8		24" ORIFICE-48" RCP	SHAKOPEE HIGH SCHOOL WEST POND-OUTLET CONTROL STRUCTURE
MP4-A2	NA	31.8	15	NA	80	NA	44.83	NA	44.83	NA	NA	13.0	NA	NA	834.0	NA	3.4			SHAKOPEE HIGH SCHOOL & SOUTH AREA TO EAST POND
MP4-A3	NA	54.93	30	NA	75	NA	36.12	NA	36.12	NA	NA	#N/A	NA	NA	NA	NA	NA		24" ORIFICE-48" RCP	SHAKOPEE HIGH SCHOOL EAST POND-OUTLET CONTROL STRUCTURE
MP4-A4	NA	40.4	20	NA	80	NA	48.42	NA	48.42	NA	NA	18.4	22.2	NA	827.0	NA	14.4		6" ORIFICE-24" RCP	COUNTRYSIDE DEV. POND ON THE EAST SIDE OF TH 169 CROSSING # 3
MP4-A5	NA	9.7	20	NA	75	NA	8.36	NA	8.36	NA	NA	0.0	NA	NA	816.0	NA	1.4		6" ORIFICE-24" RCP	PROPOSED COUNRTYSIDE DEV. POND IN THE NE CORNER OF SITE
MP4-A6	NA	21	20	NA	75	NA	18.1	NA	18.1	NA	NA	1.0	NA	NA	819.0	NA	2.0		42" RCP	SHAKOPEE HIGH SCHOOL DEPRESSION ON SOUTH PROPERTY BOUNDARY

CITY OF SHAKOPEE
COMPREHENSIVE STORMWATER MANAGEMENT PLAN
MILL POND WATERSHED 2-YEAR EVENT

SUB-WATERSHED NUMBER	PRE-SETTLEMENT AREA (Acre)	FULLY DEVELOPED AREA (Acre)	Tc (min)	SCS CN		PEAK RUNOFF RATE (cfs)		PEAK RUNOFF RATE CFS												
				PRE-SETTLEMENT	FULLY DEVELOPED	PRE-SETTLEMENT	FULLY DEVELOPED	PRE-SETTLEMENT	2-YR 24-HR FULLY DEVELOPED	PEAK OUTFLOW FROM POND (cfs)	PEAK FLOW IN CHANNEL (cfs)	2-YR 24-HR PEAK OUTFLOW FROM POND (cfs)	2-YR 24-HR PEAK FLOW IN CHANNEL (cfs)	PRE-SETTLEMENT	FULLY DEVELOPED	PRE-SETTLEMENT	2-YR 24-HR FULLY DEVELOPED	EXISTING	PROPOSED	COMMENTS
MP4-B1	NA	58.23	30	NA	72	NA	29.98	NA	29.98	NA	NA	25.2	NA	NA	831.0	NA	0.3		24" RCP	CR 77 AND HIGH SCHOOL AREA TO DEPRESSIONAL STORAGE ON SCHOOL SITE TO THE EAST.
MP4-B2	NA	8.28	25	NA	71	NA	4.43	NA	4.43	NA	NA	4.4	12.1	NA	844.0	NA	0.0	24" RCP		AREA TRIBUTARY TO DEPRESSION ON WEST SIDE OF CR 77 &
MP4-C	34.9	24	11.2	55	72	1.38	22.69	1.38	22.69	0.5	NA	8.4	NA	846.0	845.5	0.1	0.3	40" X 30" CMP-A		EXISTING CULVERT UNDER 128TH ST.
MP4-D1	NA	7.8	35.3	NA	72	NA	3.59	NA	3.59	NA	NA	5.4	5.6	NA	883.0	NA	0.6		24" RCP	PROPOSED STORAGE AND POND OUTLET
MP4-D2	NA	16.9	35.3	NA	72	NA	7.77	NA	7.77	NA	NA	4.0	NA	NA	892.0	NA	0.3	24" RCP		EXISTING CULVERT UNDER CR 77-EXISTING STORAGE
MP4-D3	NA	6	20	NA	72	NA	4.09	NA	4.09	NA	NA	0.5	NA	NA	901.7	NA	0.1		30"	PROPOSED OUTLET CONTROL STRUCTURE & BERM FOR RATE CONTROL AND MAXIMIZE
MP4-D4	NA	27.5	25	NA	74	NA	19.01	NA	19.01	NA	NA	1.5	NA	NA	900.0	NA	0.9		15" RCP	PROPOSED CULVERT FOR RATE CONTROL AND MAXIMIZE STORAGE
MP4-E	22.5	22.7	30.6	58	73	1.52	12.58	1.52	12.58	0.8	NA	1.4	NA	900.0	900.0	0.1	0.7		18" CMP	THOLE LAKE EXISTING CULVERT-SURVEY DATA-RECOMMEND CONTROL STRUCTURE TO STOP
MP5-A	109.1	286.7	69.6	75	84	38.66	183.36	38.66	183.36	3.5	NA	0.3	NA	946.0	942.6	19.8	38.1	4'X 5' BOX		EXISTING STRUCTURE UNDER CSAH 15-INFILTRATION AREA-POTENTIAL RATE CONTROL
MP5-B	109.1	109.1	55.5	53	71	1.55	32.94	1.55	32.94	1.0	NA	0.0	NA	950.0	944.8	0.2	5.9	24" CMP		SW CELL OF THOLE LAKE @ NE QUAD OF CSAH 15 & CSAH 14
MP5-C	45.2	50.2	50.3	77	84	23.71	40.67	23.71	40.67	2.0	NA	0.2	NA	950.0	943.0	94.1	9.6	24" CMP		EXISTING CULVERT UNDER CSAH 15-WEST TO EAST FLOW
MP5-D	42.7	42.7	18.8	55	72	1.38	30.28	1.38	30.28	0.8	NA	14.0	NA	950.0	946.7	0.1	0.5	24" CMP		EXISTING CULVERT UNDER CSAH 14 TO THE NORTH FROM THE SW QUAD TO NW QUAD
MP5-E	15	13.7	20.4	55	72	0.47	9.19	0.47	9.19	0.2	NA	1.0	NA	960.0	952.2	0.0	0.3	24" RCP		EXISTING CULVERT UNDER CSAH 14 TO THE NORTH FROM THE SE QUAD TO NE QUAD
MP5-F	24.8	24.8	18.7	55	72	0.8	17.59	0.8	17.59	0.2	NA	0.7	NA	950.0	946.3	0.3	0.9	24" CMP		EXISTING CULVERT FROM STORAGE AREA IN DEVELOPMENT WEST OF THOLE LAKE.
MP5-G	25.7	26.8	20	62	75	5.24	23.11	5.24	23.11	0.6	0.6	0.0	0.0	948.0	945.2	0.5	2.5	12" CMP		EXISTING CULVERT FROM DEPRESSION IN DEVELOPMENT WEST OF THOLE LAKE.
MP5-H	9.2	9.2	20	66	77	3.38	9.12	3.38	9.12	0.6	NA	0.2	NA	950.0	947.3	0.1	0.5	2- 24" CMP & 18" CMP		SCHNEIDER LAKE OUTLET CULVERTS-SAP 70-614-01 - SHEET 3
MP5-I	99.2	99.2	17	75	84	94.5	162.87	94.5	162.87	6.9	NA	6.9	NA	948.0	942.6	3.3	14.7	18" RCP		EXISTING CULVERT FIELD SURVEY IN DEVELOPED AREA.
MP5-J	11.3	11.3	20	60	74	1.57	9.04	1.57	9.04	0.2	0.2	0.0	0.0	950.0	947.0	0.1	0.7	18" RCP		EXISTING CULVERT FIELD SURVEY IN DEVELOPED AREA.
MP5-K	28	28	43.8	58	73	1.59	11.95	1.59	11.95	NA	0.0	0.0	0.0	NA	945.1	NA	1.7		24" RCP	PROPOSED CULVERT-UNABLE TO FIELD LOCATE CULVERT IN DRIVEWAY
MP5-L	152	152	139.3	63	76	10.13	34.63	10.13	34.63	3.0	NA	1.7	NA	948.0	948.0	6.4	26.5	OVERLAND		LARGE WETLAND SW OF MP5-L AND SCHNEIDER LAKE-NO CULVERT IDENTIFIED IN FIELD SURVEY
MP5-M	81.1	81.1	98.8	61	74	5.13	20.56	5.13	20.56	4.1	NA	16.6	NA	950.0	950.0	1.8	4.6	36" RCP		EXISTING CULVERT UNDER CSAH 15
MP5-N	143.4	143.4	55.3	55	72	3.52	47.25	3.52	47.25	3.5	3.4	16.0	15.4	950.0	946.8	1.2	6.1	OVERLAND		POTENTIAL STORAGE AREA AND RATE CONTROL W/CULVERT
MP5-O	99.3	100.6	66.9	60	74	6.68	34.01	6.68	34.01	6.5	NA	33.0	NA	950.0	950.0	0.1	0.3	24" CMP		EXISTING CENTERLINE CULVERT UNDER CR 73 - EOF TO EAST - SURVEY DATA
MP5-P	29.5	29.5	87.8	55	72	0.63	6.86	0.63	6.86	0.3	0.3	1.1	1.0	968.0	962.6	0.1	1.0	10" CMP		EXISTING CENTERLINE CULVERT UNDER CR 73 - EOF TO EAST - STORAGE WEST OF ROAD
MP5-Q	21.4	21.4	22.8	55	72	0.66	13.36	0.66	13.36	0.2	0.2	0.0	0.0	964.0	958.9	0.1	1.2	18" RCP		O'DOWD LAKE OUTLET TO THOLE LAKE - EXISTING CULVERT TO WEST
MP6-A	602.7	602.7	60	78	86	297.56	479.09	297.56	479.09	2.2	NA	0.1	NA	946.0	942.6	48.6	84.2	OVERLAND		DEPRESSION WEST OF CR 79 - SURVEY DATA OF CULVERT
MP6-B	53.9	54	30	59	74	4.65	32.87	4.65	32.87	2.0	NA	17.4	NA	950.0	950.0	0.2	0.8	24" RCP		SE QUAD OF CR 78 & CR 79 - GOLF COURSE POND - PROPOSED CONTROL STRUCTURE WITH 12" RCP
MPE1-A	46.2	46.2	77.1	67	67	7.31	7.31	7.31	7.31	3.8	3.8	3.8	3.8	898.3	898.3	1.3	1.3	10" RCP		EXISTING CENTERLINE CULVERT UNDER CR 79 - WEST TO EAST FLOW TO GOLF COURSE
MPE1-B	13	13	30	65	65	3.14	3.14	3.14	3.14	0.6	NA	0.6	NA	907.0	907.0	0.2	0.2	18" RCP		EXISTING CENTERLINE CULVERT UNDER CR 79 - WEST TO EAST FLOW TO GOLF COURSE

CITY OF SHAKOPEE
COMPREHENSIVE STORMWATER MANAGEMENT PLAN
MILL POND WATERSHED 2-YEAR EVENT

SUB-WATERSHED NUMBER	PRE-SETTLEMENT AREA (Acre)	FULLY DEVELOPED AREA (Acre)	Tc (min)	SCS CN		PEAK RUNOFF RATE (cfs)		PEAK RUNOFF RATE CFS												
				PRE-SETTLEMENT	FULLY DEVELOPED	PRE-SETTLEMENT	FULLY DEVELOPED	PRE-SETTLEMENT	2-YR 24-HR FULLY DEVELOPED	PEAK OUTFLOW FROM POND (cfs)	PEAK FLOW IN CHANNEL (cfs)	2-YR 24-HR PEAK OUTFLOW FROM POND (cfs)	2-YR 24-HR PEAK FLOW IN CHANNEL (cfs)	PRE-SETTLEMENT	FULLY DEVELOPED	PRE-SETTLEMENT	2-YR 24-HR FULLY DEVELOPED	EXISTING	PROPOSED	COMMENTS
MP1-A1	75	20.7	14.2	48	90	0.27	49.12	0.27	49.12	8.1	8.1	146.1	NA	788.0	788.0	0.0	0.7	2 - 10' X 6' BOX		TH 169 CROSSING #1-SP 7005-57-SHEET 215 & 266-273
MP1-A2	NA	148.8	28.6	NA	87	NA	208.71	NA	208.71	NA	NA	84.4	NA	NA	794.0	NA	6.9	OVERLAND	2 - 36" RCP	PROPOSED LINEAR STORAGE & OUTLET PIPE TO TH 169 CROSSING #1
MP1-AA	NA	10.35	20	NA	89	NA	19.76	NA	19.76	NA	NA	7.6	NA	NA	798.0	NA	6.3	18" RCP		EXISTING PIPE FROM CR 69 POND - SE QUAD OF CR 69 & TH 169
MP1-AB	NA	17.86	30	NA	89	NA	26.73	NA	26.73	NA	NA	6.9	NA	NA	803.7	NA	10.8	36" RCP		EXISTING OUTLET PIPE UNDER CR 69-SW TO SE QUAD
MP1-AC	NA	24.69	25	NA	76	NA	19.83	NA	19.83	NA	NA	11.8	NA	NA	800.0	NA	0.6	2 - 48" RCP		EXISING CULVERTS UNDER TH 169 FROM NE TO SE QUAD
MP1-AD	NA	34.8	35	NA	66	NA	40.54	NA	40.54	NA	NA	0.4	NA	NA	802.0	NA	2.1	42" RCP		EXISING CULVERT UNDER CR69 FROM NW TO NE QUAD
MP1-B	251	222	25.6	43	68	0.15	350.26	0.15	350.26	1.9	NA	51.7	NA	798.0	795.2	1.0	20.4	42" X 26" RCP-A		EXISTING CULVERT UNDER CR 69 FROM SW TO SE QUAD
MP1-C	6.5	6.44	21.4	55	72	0.2	4.19	0.2	4.19	0.2	0.2	4.2	3.2	852.0	852.0	0.0	0.0	OVERLAND		OVERLAND FLOW FROM BLUFF INTO RAVINE TO NW
MP1-D	6.8	6.8	14.8	55	72	0.24	5.56	0.24	5.56	0.6	0.5	13.9	13.8	850.0	850.0	0.0	0.0	OVERLAND		OVERLAND FLOW FROM BLUFF INTO RAVINE TO NW
MP1-E	15.8	15.8	28.6	55	72	0.47	8.41	0.47	8.41	0.5	0.5	13.1	13.1	868.0	868.0	0.0	0.0	OVERLAND		OVERLAND FLOW FROM BLUFF INTO RAVINE TO NW
MP1-F	32.6	27.1	35.6	55	72	0.91	12.33	0.91	12.33	0.0	NA	3.1	NA	870.0	870.0	0.4	0.5	OVERLAND	12" RCP	PROPOSED CULVERT FOR RATE CONTROL TO RAVINE IN BLUFF
MP1-G	20.8	20.8	15.8	55	75	0.71	22.14	0.71	22.14	0.3	0.3	1.0	1.0	870.0	870.0	0.1	0.9		15" RCP	PROPOSED CULVERT FOR RATE CONTROL TO RAVINE IN BLUFF
MP1-H	37.2	42	34.3	52	85	0.42	47.2	0.42	47.2	2.0	NA	22.8	NA	800.0	798.0	0.3	4.5	CONTROL STRUCT.		EXISTING CONTROL STRUCTURE - CP 89-78-01 - SHEET 22
MP1-I	30.5	29.7	35.8	36	71	0	12.34	0	12.34	1.9	NA	9.4	NA	800.0	799.0	0.1	0.7	8' X 5' BOX		CULVERT UNDER CR 78-CP 89-78-01 - SHEET 14
MP1-J	74.7	70.6	45.5	51	76	0.6	37.18	0.6	37.18	2.0	NA	13.0	NA	808.0	808.0	0.2	3.3		24" RCP	PROPOSED INLET TO CR 78 STORM SEWER
MP1-K	6.9	6.9	25.7	55	72	0.21	3.96	0.21	3.96	0.1	NA	0.5	NA	878.0	878.0	0.0	0.2		18" RCP	PROPOSED INLET TO CR 78 STORM SEWER-STRUCT.
MP1-L	38.1	38.1	44.6	55	72	0.99	14.72	0.99	14.72	1.5	NA	11.1	NA	866.0	866.0	0.0	0.2		18" RCP	PRPOPOSED OUTLET FOR RATE CONTROL-BERM CONST. @ OUTLET
MP1-M	52.9	58.4	42.6	55	72	1.32	23.41	1.32	23.41	0.8	NA	3.7	NA	884.0	884.0	0.1	2.2		15" RCP	PRPOPOSED OUTLET FOR RATE CONTROL-BERM CONST. @ OUTLET
MP1-M1	NA	19.7	20	NA	72	NA	13.41	NA	13.41	NA	NA	5.2	NA	NA	935.0	NA	0.3	24" RCP		EXISTING CULVERT UNDER CR 69-SW QUAD CR 69 & CR 78
MP1-N	6.3	6.3	14	55	72	0.23	5.31	0.23	5.31	0.2	0.2	2.0	6.4	870.0	870.0	0.0	0.0	OVERLAND		OVERLAND FLOW FROM BLUFF NORTH TO TH 169 DTICH IN CHANNEL
MP1-O	11.4	11.4	10	55	72	0.48	11.36	0.48	11.36	1.6	1.6	11.3	10.8	852.0	852.0	0.0	0.0			OVERLAND FLOW FROM BLUFF NORTH TO TH 169 DTICH IN CHANNEL
MP1-P	46.6	46.6	33.9	55	72	1.32	22.04	1.32	22.04	1.3	NA	1.7	NA	916.0	916.0	0.0	1.6		15" RCP	PROP. CULVERT FOR RATE CONTROL FROM BLUFF TO THE TH 169 DITCH
MP1-Q	9.8	9.8	15.3	55	72	0.34	7.87	0.34	7.87	0.1	0.1	0.2	0.2	936.0	936.0	0.0	0.4		12" RCP	PROP. CULVERT FOR RATE CONTROL FROM BLUFF
MP1-R	43.8	43.8	39.5	52	84	0.49	42.15	0.49	42.15	4.1	4.1	11.4	32.2	800.0	820.0	0.0	2.2	MnDOT- CULVERTS	36" RCP	INCREASE STORAGE AND INSTALL OUTLET TO TH 169 DITCH
MP1-S	48.9	48.9	26.5	54	73	1.13	29.98	1.13	29.98	3.9	NA	20.2	NA	860.0	851.8	0.0	0.1		36" RCP	PROP. CULVER T FOR RATE CONTROL-CREATE STORAGE WEST OF CSAH 15
MP1-T	105.6	105.7	32.1	55	72	3.03	52.04	3.03	52.04	2.9	NA	34.0	NA	920.0	920.0	0.0	1.0		36" RCP	PROP. CULVERT/DITCH BLOCK FOR RATE CONTROL-CREATE STORAGE IN RAVINE
MP1-U	19.1	24.8	14.7	31	77	0	29.36	0	29.36	0.0	NA	4.7	NA	808.0	805.0	0.0	0.8		24" RCP	PROP. STORAGE AND CULVERT CROSSING TH 169
MP1-V	5.6	5.6	34	35	83	0	5.67	0	5.67	0.0	NA	1.8	NA	806.0	806.0	0.0	0.2		24" RCP	PROP. CULVERT TO STORAGE BASIN SE OF TH 169
MP1-W	46.2	43.3	58.3	33	84	0	31.58	0	31.58	0.0	NA	8.0	NA	810.0	811.5	0.0	3.9	30" CMP		SOUTH DITCH OF TH 169 OUTLETS TO SO. TO CROSSING UNDER TH 69
MP1-X	9.6	9.5	19.8	55	74	0.3	7.64	0.3	7.64	0.3	0.2	7.7	5.9	842.0	842.0	0.0	0.0		24" RCP	PROP. CULVERT FOR RATE CONTROL FROM BLUFF
MP1-Y	109.5	26.8	30.5	55	76	3.39	18.77	3.39	18.77	3.4	3.2	17.2	40.6	868.0	868.0	0.0	0.1	2 - 24" RCP		TWO CULVERTS OUTLETS FROM EAST DITCH OF CR 69
MP1-Y1	NA	42.4	21.9	NA	72	NA	27.15	NA	27.15	NA	NA	27.1	NA	NA	895.0	NA	0.1	36" CMP		EXISTING CENTERLINE CULVERT UNDER CR 69 - EAST TO WEST
MP1-Y2	NA	40.1	39.6	NA	72	NA	16.89	NA	16.89	NA	NA	9.9	NA	NA	919.8	NA	0.5	24" RCP		EXISTING CENTERLINE CULVERT UNDER CR 69 - EAST TO WEST
MP1-Z	7.2	7.2	19.1	50	84	0.04	11.11	0.04	11.11	3.7	NA	21.1	NA	840.0	829.0	0.1	0.1	2 - 42" RCP		EXISTING DITCH STORAGE ON THE WEST SIDE OF CSAH 15
MP2-A	NA	13.9	20	NA	85	0.23	21.95	NA	21.95	21.1	NA	33.9	NA	796.4	799.1	0.8	1.1	15" CMP	24" CMP	PRPOSED CULVERT CROSSING OF 128TH ST.
MP2-B	53.9	13.2	20	40	66	0	4.85	0	4.85	0.0	NA	4.4	NA	806.0	806.0	0.0	0.0	12' X 6' BOX		TH 169 CROSSING #2-SP 7005-57-SHEET 218 & 244
MP2-B1	NA	51	30	NA	75	NA	33.54	NA	33.54	NA	NA	2.1	NA	NA	816.0	NA	4.3	30" RCP		TH 169 EB ENT. RAMP CULVERT-SP 7005-57 - SHEET 221
MP2-C	70.1	30.8	25.9	50	79	0.44	29.49	0.44	29.49	21.0	NA	30.6	NA	830.0	824.0	0.1	0.1		8" ORIFICE-24" RCP	COUNTYSIDE DEVELOPMENT POND & OUTLET CONTROL STRUCTURE

CITY OF SHAKOPEE
COMPREHENSIVE STORMWATER MANAGEMENT PLAN
MILL POND WATERSHED 2-YEAR EVENT

SUB-WATERSHED NUMBER	PRE-SETTLEMENT AREA (Acre)	FULLY DEVELOPED AREA (Acre)	Tc (min)	SCS CN		PEAK RUNOFF RATE (cfs)		PEAK RUNOFF RATE CFS												
				PRE-SETTLEMENT	FULLY DEVELOPED	PRE-SETTLEMENT	FULLY DEVELOPED	PRE-SETTLEMENT	2-YR 24-HR FULLY DEVELOPED	PEAK OUTFLOW FROM POND (cfs)	PEAK FLOW IN CHANNEL (cfs)	2-YR 24-HR PEAK OUTFLOW FROM POND (cfs)	2-YR 24-HR PEAK FLOW IN CHANNEL (cfs)	PRE-SETTLEMENT	FULLY DEVELOPED	PRE-SETTLEMENT	2-YR 24-HR FULLY DEVELOPED	EXISTING	PROPOSED	COMMENTS
MP2-D	64.9	30.9	33.8	52	71	0.73	13.35	0.73	13.35	19.8	NA	13.7	NA	843.0	845.0	0.0	3.1	3 - 66" RCP		TH 169 EB ENT. RAMP CULVERT-SP 7005-57 - SHEET 235
MP2-D1	NA	17.5	25	NA	72	NA	10.24	NA	10.24	NA	NA	NA	NA	NA	NA	NA	NA		4' WEIR-60" RCP	COUTRYSIDE DEVELOPMENT POND SO. OF 17TH AVE. EXTENSION
MP2-D2	NA	6.5	20	NA	72	NA	4.43	NA	4.43	NA	NA	NA	NA	NA	NA	NA	NA			COUTRYSIDE DEVELOPMENT TO POND IN MP2-D
MP2-D3	NA	12.9	20	NA	70	NA	7.34	NA	7.34	NA	NA	NA	NA	NA	NA	NA	NA			COUTRYSIDE DEVELOPMENT TO POND IN MP2-D
MP2-D4	NA	45.3	25	NA	70	NA	22.06	NA	22.06	NA	NA	NA	NA	NA	NA	NA	NA			COUTRYSIDE DEVELOPMENT TO POND IN MP2-D
MP2-E	24.7	24.7	16.2	53	71	0.42	17.6	0.42	17.6	1.0	1.0	10.0	10.8	902.0	898.6	0.0	2.6	24" RCP		EXISTING CULVERT CROSSING CSAH 15 - SURVEY DATA
MP2-F	21.2	21.2	19.6	55	72	0.68	14.6	0.68	14.6	0.8	NA	17.8	NA	920.0	911.6	0.1	0.2	18" RCP		OUTLET CONTROL STRUCTURE - MT. OLIVE POND
MP2-G	50.4	50.4	42.5	55	72	1.33	20.16	1.33	20.16	0.6	NA	15.8	NA	920.0	918.0	0.2	0.4	18" RCP		OUTLET CONTROL STRUCTURE TO NORTH
MP2-H	3.2	3.2	15	55	72	0.11	2.6	0.11	2.6	0.1	NA	0.9	NA	928.0	925.8	0.0	0.1	24" X 15" RCP-A		OUTLET CONTROL STRUCTURE-NW QUAD OF CR 78 AND CSAH 15
MP2-I	27.9	24.2	34.2	55	72	0.79	11.37	0.79	11.37	0.8	0.8	0.0	0.0	900.0	894.4	0.2	3.4		24" RCP	PROPOSED POND OUTLET W/ EXISTING STORAGE
MP2-J	14	14	36.3	57	73	0.68	6.86	0.68	6.86	0.5	0.5	2.5	2.5	910.0	910.0	0.0	0.2	24" RCP		EXISTING CULVERT UNDER CR 78-SURVEY DATA PROPOSED INFILTRATION AREA
MP2-K	25.1	25.4	37.9	54	71	0.51	10.08	0.51	10.08	0.2	NA	0.6	NA	920.0	910.0	0.1	0.9	WEIR-36" RCP		EXISTING WEIR TO CULVERT UNDER 128TH ST.
MP2-L	33.6	33.4	57.7	57	73	1.34	11.64	1.34	11.64	18.8	19.4	3.6	3.6	910.0	907.8	1.6	6.1	48" RCP		EXISTING CULVERT UNDER CR 78-PROPOSED INFILTRATION AREA
MP2-M	40.7	40.4	49.3	55	72	1.03	14.55	1.03	14.55	16.7	18.7	0.1	3.1	920.0	920.0	8.6	5.8	24" RCP		EXISTING CULVERT UNDER CSAH 15- WEST TO EAST FLOW
MP2-N	178.1	179.2	79.1	60	74	10.69	53.62	10.69	53.62	0.1	NA	0.0	NA	920.0	917.5	5.0	17.9	18" RCP		EXISTING CULVERT UNDER CR 73 - WEST TO EAST FLOW
MP2-O	20.2	20.2	28.4	55	72	0.6	10.83	0.6	10.83	0.3	0.3	1.0	1.0	969.5	969.5	0.0	0.6	18" RCP		EXISTING CULVERT UNDER CR 73 - SURVEY DATA - ROAD LOW POINT
MP2-P	16.2	16.2	16.8	55	72	0.54	12.31	0.54	12.31	0.5	0.5	12.1	11.9	965.0	965.0	0.0	0.2		15" RCP	PROPOSED CULVERT TO THE NORTH & STORAGE IN DEPRESSION
MP2-Q	18.9	19	43.7	58	73	1.07	8.14	1.07	8.14	0.3	NA	4.6	NA	980.0	980.0	0.1	0.1		15" RCP	PROPOSED CULVERT & STORAGE IN WATERSHED FOR RATE CONTROL
MP2-R	51.8	51.1	95.2	55	72	1.06	11.33	1.06	11.33	0.2	0.2	0.1	0.1	970.0	970.0	0.6	3.3	OVERLAND		POTENTIAL STORAGE AREA AND RATE CONTROL W/CULVERT
MP2-S	13.1	13.1	21.4	55	72	0.41	8.52	0.41	8.52	0.1	NA	0.9	NA	970.0	970.0	0.1	0.4	36" CMP		EXISTING DRIVEWAY CULVERT DOWNSTREAM OF POND T1
MP2-T	456.1	81.5	55	67	73	33.82	29.51	33.82	29.51	36.3	NA	32.3	NA	925.0	925.0	0.1	0.3		24" RCP	PROPOSED CUVERT AND BERM CONST. TO MAXIMIZE STORAGE & RATE CONTROL
MP2-T1	NA	367.4	231.9	NA	80	NA	73.12	NA	73.12	NA	NA	0.5	NA	NA	938.0	NA	37.4		15" RCP	PERCHED DEPRESSION- PROPOSED OUTLET- OVERLAND TO THE NE AND SW TO POND T1
MP2-U	20.3	20.3	20	60	74	2.81	16.24	2.81	16.24	0.2	NA	0.1	NA	968.0	968.0	0.3	1.3	54" X 60" CMP-A		EXISTING CENTERLINE CULVERT UNDER CSAH 15 POTENTIAL RATE CONTROL STRUCUTRE ON WEST
MP2-V	18.1	18.1	20	55	72	0.58	12.32	0.58	12.32	0.2	0.2	3.6	3.6	963.0	963.0	0.1	0.3	36" CMP		EXISTING CULVERT UNDER CSAH 15-WEST TO EAST FLOW
MP2-W	99.1	99.1	122.8	56	72	2.28	18	2.28	18	1.5	1.5	1.8	1.8	942.0	942.0	0.3	4.5		18" RCP	PROPOSED CULVERT UNDER DRIVEWAY-MINIMAL STORAGE TO EOF
MP2-X	16	15.9	20	56	73	0.74	11.76	0.74	11.76	0.3	NA	4.0	NA	948.8	948.8	0.0	0.2	2 - 24" RCP		EXISTING CETERLINE CULVERTS UNDER CR 78
MP3-A	32	31.7	48.5	55	72	0.81	11.55	0.81	11.55	0.9	0.9	0.0	0.0	918.0	910.2	0.3	4.5		15" RCP	PROPOSED CULVERT & BERM CONST. FOR RATE CONTROL
MP3-B	49.4	49.4	85.1	57	73	1.67	12.8	1.67	12.8	0.7	0.7	0.7	0.7	934.0	934.0	0.2	2.5		18" RCP	PROPOSED CULVERT UNDER CR 78 TO THE NORTH- NO CULVERT IDEN. IN SURVEY
MP3-C	22.3	22.3	47.3	59	74	1.5	9.77	1.5	9.77	0.4	0.4	0.6	0.6	910.0	910.0	0.1	1.0	12' X 6' BOX		TH 169 CROSSING # 3 - SP 7005-57 - SHEET 226 & 274
MP4-A	124.3	10.8	20	45	72	0.21	7.35	0.21	7.35	10.6	NA	25.5	NA	813.0	813.0	0.4	0.5		8" ORIFICE-24" RCP	COUNTRYSIDE DEVELOPMENT POND SO. TH 169 WEST OF CROSSING #3
MP4-A1	NA	43.2	20	NA	75	NA	37.24	NA	37.24	NA	NA	1.9	NA	NA	816.0	NA	4.8		24" ORIFICE-48" RCP	SHAKOPEE HIGH SCHOOL WEST POND-OUTLET CONTROL STRUCTURE
MP4-A2	NA	31.8	15	NA	80	NA	44.83	NA	44.83	NA	NA	13.0	NA	NA	834.0	NA	3.4			SHAKOPEE HIGH SCHOOL & SOUTH AREA TO EAST POND
MP4-A3	NA	54.93	30	NA	75	NA	36.12	NA	36.12	NA	NA	NA	NA	NA	NA	NA	NA		24" ORIFICE-48" RCP	SHAKOPEE HIGH SCHOOL EAST POND-OUTLET CONTROL STRUCTURE
MP4-A4	NA	40.4	20	NA	80	NA	48.42	NA	48.42	NA	NA	18.4	22.2	NA	827.0	NA	14.4		6" ORIFICE-24" RCP	COUNTRYSIDE DEV. POND ON THE EAST SIDE OF TH 169 CROSSING # 3
MP4-A5	NA	9.7	20	NA	75	NA	8.36	NA	8.36	NA	NA	0.0	NA	NA	816.0	NA	1.4		6" ORIFICE-24" RCP	PROPOSED COUNRTYSIDE DEV. POND IN THE NE CORNER OF SITE
MP4-A6	NA	21	20	NA	75	NA	18.1	NA	18.1	NA	NA	1.0	NA	NA	819.0	NA	2.0		42" RCP	SHAKOPEE HIGH SCHOOL DEPRESSION ON SOUTH PROPERTY BOUNDARY.
MP4-B1	NA	58.23	30	NA	72	NA	29.98	NA	29.98	NA	NA	25.2	NA	NA	831.0	NA	0.3		24" RCP	CR 77 AND HIGH SCHOOL AREA TO DEPRESSIONAL STORAGE ON SCHOOL SITE TO THE EAST.
MP4-B2	NA	8.28	25	NA	71	NA	4.43	NA	4.43	NA	NA	4.4	12.1	NA	844.0	NA	0.0	24" RCP		AREA TRIBUTARY TO DEPRESSION ON WEST SIDE OF CR 77 &

CITY OF SHAKOPEE
COMPREHENSIVE STORMWATER MANAGEMENT PLAN
MILL POND WATERSHED 2-YEAR EVENT

SUB-WATERSHED NUMBER	PRE-SETTLEMENT AREA (Acre)	FULLY DEVELOPED AREA (Acre)	Tc (min)	SCS CN		PEAK RUNOFF RATE (cfs)		PEAK RUNOFF RATE CFS												
				PRE-SETTLEMENT	FULLY DEVELOPED	PRE-SETTLEMENT	FULLY DEVELOPED	PRE-SETTLEMENT	2-YR 24-HR FULLY DEVELOPED	PEAK OUTFLOW FROM POND (cfs)	PEAK FLOW IN CHANNEL (cfs)	2-YR 24-HR PEAK OUTFLOW FROM POND (cfs)	2-YR 24-HR PEAK FLOW IN CHANNEL (cfs)	PRE-SETTLEMENT	FULLY DEVELOPED	PRE-SETTLEMENT	2-YR 24-HR FULLY DEVELOPED	EXISTING	PROPOSED	COMMENTS
MP4-C	34.9	24	11.2	55	72	1.38	22.69	1.38	22.69	0.5	NA	8.4	NA	846.0	845.5	0.1	0.3	40" X 30" CMP-A		EXISTING CULVERT UNDER 128TH ST.
MP4-D1	NA	7.8	35.3	NA	72	NA	3.59	NA	3.59	NA	NA	5.4	5.6	NA	883.0	NA	0.6		24" RCP	PROPOSED STORAGE AND POND OUTLET
MP4-D2	NA	16.9	35.3	NA	72	NA	7.77	NA	7.77	NA	NA	4.0	NA	NA	892.0	NA	0.3	24" RCP		EXISTING CULVERT UNDER CR 77-EXISTING STORAGE
MP4-D3	NA	6	20	NA	72	NA	4.09	NA	4.09	NA	NA	0.5	NA	NA	901.7	NA	0.1		30"	PROPOSED OUTLET CONTROL STRUCTURE & BERM FOR RATE CONTROL AND MAXIMIZE
MP4-D4	NA	27.5	25	NA	74	NA	19.01	NA	19.01	NA	NA	1.5	NA	NA	900.0	NA	0.9		15" RCP	PROPOSED CULVERT FOR RATE CONTROL AND MAXIMIZE STORAGE
MP4-E	22.5	22.7	30.6	58	73	1.52	12.58	1.52	12.58	0.8	NA	1.4	NA	900.0	900.0	0.1	0.7		18" CMP	THOLE LAKE EXISTING CULVERT-SURVEY DATA-RECOMMEND CONTROL STRUCTURE TO STOP FISH
MP5-A	109.1	286.7	69.6	75	84	38.66	183.36	38.66	183.36	3.5	NA	0.3	NA	946.0	942.6	19.8	38.1	4' X 5' BOX		EXISTING STRUCTURE UNDER CSAH 15-INFILTRATION AREA-POTENTIAL RATE CONTROL
MP5-B	109.1	109.1	55.5	53	71	1.55	32.94	1.55	32.94	1.0	NA	0.0	NA	950.0	944.8	0.2	5.9	24" CMP		SW CELL OF THOLE LAKE @ NE QUAD OF CSAH 15 & CSAH 14
MP5-C	45.2	50.2	50.3	77	84	23.71	40.67	23.71	40.67	2.0	NA	0.2	NA	950.0	943.0	94.1	9.6	24" CMP		EXISTING CULVERT UNDER CSAH 15-WEST TO EAST FLOW
MP5-D	42.7	42.7	18.8	55	72	1.38	30.28	1.38	30.28	0.8	NA	14.0	NA	950.0	946.7	0.1	0.5	24" CMP		EXISTING CULVERT UNDER CSAH 14 TO THE NORTH FROM THE SW QUAD TO NW QUAD
MP5-E	15	13.7	20.4	55	72	0.47	9.19	0.47	9.19	0.2	NA	1.0	NA	960.0	952.2	0.0	0.3	24" RCP		EXISTING CULVERT UNDER CSAH 14 TO THE NORTH FROM THE SE QUAD TO NE QUAD
MP5-F	24.8	24.8	18.7	55	72	0.8	17.59	0.8	17.59	0.2	NA	0.7	NA	950.0	946.3	0.3	0.9	24" CMP		EXISTING CULVERT FROM STORAGE AREA IN DEVELOPMENT WEST OF THOLE LAKE
MP5-G	25.7	26.8	20	62	75	5.24	23.11	5.24	23.11	0.6	0.6	0.0	0.0	948.0	945.2	0.5	2.5	12" CMP		EXISTING CULVERT FROM DEPRESSION IN DEVELOPMENT WEST OF THOLE LAKE.
MP5-H	9.2	9.2	20	66	77	3.38	9.12	3.38	9.12	0.6	NA	0.2	NA	950.0	947.3	0.1	0.5	2- 24" CMP & 18" CMP		SCHNEIDER LAKE OUTLET CULVERTS SAP 70-614-01 - SHEET 3
MP5-I	99.2	99.2	17	75	84	94.5	162.87	94.5	162.87	6.9	NA	6.9	NA	948.0	942.6	3.3	14.7	18" RCP		EXISTING CULVERT FIELD SURVEY IN DEVELOPED AREA.
MP5-J	11.3	11.3	20	60	74	1.57	9.04	1.57	9.04	0.2	0.2	0.0	0.0	950.0	947.0	0.1	0.7	18" RCP		EXISTING CULVERT FIELD SURVEY IN DEVELOPED AREA.
MP5-K	28	28	43.8	58	73	1.59	11.95	1.59	11.95	NA	0.0	0.0	0.0	NA	945.1	NA	1.7		24" RCP	PROPOSED CULVERT-UNABLE TO FIELD LOCATE CULVERT IN DRIVEWAY
MP5-L	152	152	139.3	63	76	10.13	34.63	10.13	34.63	3.0	NA	1.7	NA	948.0	948.0	6.4	26.5	OVERLAND		LARGE WETLAND SW OF MP5-L AND SCHNEIDER LAKE-NO CULVERT IDENTIFIED IN FIELD SURVEY
MP5-M	81.1	81.1	98.8	61	74	5.13	20.56	5.13	20.56	4.1	NA	16.6	NA	950.0	950.0	1.8	4.6	36" RCP		EXISTING CULVERT UNDER CSAH 15
MP5-N	143.4	143.4	55.3	55	72	3.52	47.25	3.52	47.25	3.5	3.4	10.0	15.4	950.0	946.8	1.2	6.1	OVERLAND		POTENTIAL STORAGE AREA AND RATE CONTROL W/CULVERT
MP5-O	99.3	100.6	66.9	60	74	6.68	34.01	6.68	34.01	6.5	NA	33.0	NA	950.0	950.0	0.1	0.3	24" CMP		EXISTING CENTERLINE CULVERT UNDER CR 73 - EOF TO EAST - SURVEY DATA
MP5-P	29.5	29.5	87.8	55	72	0.63	6.86	0.63	6.86	0.3	0.3	1.1	1.0	968.0	962.6	0.1	1.0	18" CMP		EXISTING CENTERLINE CULVERT UNDER CR 73 - EOF TO EAST - STORAGE WEST OF ROAD
MP5-Q	21.4	21.4	22.8	55	72	0.66	13.36	0.66	13.36	0.2	0.2	0.0	0.0	964.0	958.9	0.1	1.2	18" RCP		O'DOWD LAKE OUTLET TO THOLE LAKE - EXISTING CULVERT TO WEST
MP6-A	602.7	602.7	60	78	86	297.56	479.09	297.56	479.09	2.2	NA	0.1	NA	946.0	942.6	48.6	84.2	OVERLAND		DEPRESSION WEST OF CR 79 - SURVEY DATA OF CULVERT
MP6-B	53.9	54	30	59	74	4.65	32.87	4.65	32.87	2.0	NA	17.4	NA	950.0	950.0	0.2	0.8	24" RCP		SE QUAD OF CR 78 & CR 79 - GOLF COURSE POND - PROPOSED CONTROL STRUCTURE WITH 12" RCP
MPE1-A	46.2	46.2	77.1	67	67	7.31	7.31	7.31	7.31	3.8	3.8	3.8	3.8	898.3	898.3	1.3	1.3	18" RCP		EXISTING CENTERLINE CULVERT UNDER CR 79 - WEST TO EAST FLOW TO GOLF COURSE
MPE1-B	13	13	30	65	65	3.14	3.14	3.14	3.14	0.6	NA	0.6	NA	907.0	907.0	0.2	0.2	18" RCP		EXISTING CENTERLINE CULVERT UNDER CR 79 - WEST TO EAST FLOW TO GOLF COURSE

CITY OF SHAKOPEE
COMPREHENSIVE STORMWATER MANAGEMENT PLAN
MILL POND WATERSHED 10-YEAR EVENT

SUB-WATERSHED NUMBER	PRE SETTLEMENT AREA (Acre)	FULLY DEVELOPED AREA (Acre)	Tc (min)	SCS CN		PEAK RUNOFF RATE (cfs)		PEAK RUNOFF RATE CFS			PEAK FLOW IN CHANNEL (cfs)	10-YR 24-HR PEAK OUTFLOW FROM POND (cfs)	10-YR 24-HR PEAK FLOW IN CHANNEL (cfs)							
				PRE-SETTLEMENT	FULLY DEVELOPED	PRE-SETTLEMENT	FULLY DEVELOPED	PRE-SETTLEMENT	10-YR 24-HR FULLY DEVELOPED	PEAK OUTFLOW FROM POND (cfs)				PRE-SETTLEMENT	FULLY DEVELOPED	PRE-SETTLEMENT	10-YR 24-HR FULLY DEVELOPED	EXISTING	PROPOSED	COMMENTS
MP1-A1	75	20.7	14.2	48	90	0.27	49.12	4.7	82.93	102.4	102.4	187.1	NA	788.0	788.0	0.1	4.0	2 - 10' X 6' BOX		TH 169 CROSSING #1-SP 7005-57-SHEET 215 & 266-273
MP1-A2	NA	148.8	28.6	NA	87	NA	209.71	NA	374.3	NA	NA	97.3	NA	NA	794.0	NA	18.2	OVERLAND	2 - 36" RCP	PROPOSED LINEAR STORAGE & OUTLET PIPE TO TH 169 CROSSING #1
MP1-AA	NA	10.35	20	NA	89	NA	19.76	NA	34.1	NA	NA	10.7	NA	NA	798.0	NA	13.6	18" RCP		EXISTING PIPE FROM CR 69 POND - SE QUAD OF CR 69 & TH 169
MP1-AB	NA	17.86	30	NA	89	NA	26.73	NA	46.34	NA	NA	16.4	NA	NA	803.7	NA	12.4	36" RCP		EXISTING OUTLET PIPE UNDER CR 69-SW TO SE QUAD
MP1-AC	NA	24.69	25	NA	76	NA	19.83	NA	45.07	NA	NA	33.8	NA	NA	800.0	NA	1.3	2 - 48" RCP		EXISING CULVERTS UNDER TH 169 FROM NE TO SE QUAD
MP1-AD	NA	34.8	35	NA	86	NA	40.54	NA	74.3	NA	NA	22.3	NA	NA	802.0	NA	3.6	42" RCP		EXISING CULVERT UNDER CR69 FROM NW TO NE QUAD
MP1-B	251	222	25.6	43	88	0.15	350.26	5.26	615.72	16.1	NA	62.6	NA	798.0	795.2	4.3	52.1	42" X 26" RCP-A		EXISTING CULVERT UNDER CR 69 FROM SW TO SE QUAD
MP1-C	6.5	6.44	21.4	55	72	0.2	4.19	2.89	10.76	2.9	2.0	10.8	9.6	852.0	852.0	0.0	0.0	OVERLAND		OVERLAND FLOW FROM BLUFF INTO RAVINE TO NW
MP1-D	6.8	6.8	14.8	55	72	0.24	5.56	3.87	13.97	7.4	6.3	90.2	48.0	850.0	850.0	0.0	0.0	OVERLAND		OVERLAND FLOW FROM BLUFF INTO RAVINE TO NW
MP1-E	15.8	15.8	28.6	55	72	0.47	8.41	5.71	21.85	5.7	5.6	35.3	35.3	868.0	868.0	0.0	0.0	OVERLAND		OVERLAND FLOW FROM BLUFF INTO RAVINE TO NW
MP1-F	32.6	27.1	35.6	55	72	0.91	12.33	10.06	32.11	0.0	NA	6.3	NA	870.0	870.0	1.7	1.5	OVERLAND	12" RCP	PROPOSED CULVERT FOR RATE CONTROL TO RAVINE IN BLUFF
MP1-G	20.8	20.8	15.8	55	76	0.71	22.14	11.34	49.5	2.8	2.6	3.7	3.7	870.0	870.0	0.3	1.7		15" RCP	PROPOSED CULVERT FOR RATE CONTROL TO RAVINE IN BLUFF
MP1-H	37.2	42	34.3	52	85	0.42	47.2	7.74	87.92	17.3	NA	52.0	NA	800.0	798.0	1.1	8.5	CONTROL STRUCT.		EXISTING CONTROL STRUCTURE - CP 89-78-01 - SHEET 22
MP1-I	30.5	29.7	35.8	36	71	0	12.34	0.09	33.3	17.8	NA	26.0	NA	800.0	799.0	0.4	1.7	8' X 5' BOX		CULVERT UNDER CR 78-CP 89-78-01 - SHEET 14
MP1-J	74.7	70.6	45.5	51	76	0.6	37.18	9.82	85.25	19.1	NA	21.2	NA	808.0	808.0	1.0	7.8		24" RCP	PROPOSED INLET TO CR 78 STORM SEWER
MP1-K	6.9	6.9	25.7	55	72	0.21	3.96	2.69	10.24	1.3	NA	2.3	NA	878.0	878.0	0.1	0.4		18" RCP	PROPOSED INLET TO CR 78 STORM SEWER STRUCT.
MP1-L	38.1	38.1	44.6	55	72	0.99	14.72	10.1	38.67	13.8	NA	16.5	NA	866.0	866.0	0.0	1.6		18" RCP	PRPOPOSED OUTLET FOR RATE CONTROL-BERM CONST. @ OUTLET
MP1-M	52.9	58.4	42.6	55	72	1.32	23.41	12.7	60.96	7.6	NA	7.9	NA	884.0	884.0	0.5	5.5		15" RCP	PRPOPOSED OUTLET FOR RATE CONTROL-BERM CONST. @ OUTLET
MP1-M1	NA	19.7	20	NA	72	NA	13.41	NA	34.18	NA	NA	17.0	NA	NA	935.0	NA	0.7	24" RCP		EXISTING CULVERT UNDER CR 69-SW QUAD CR 69 & CR 78
MP1-N	6.3	6.3	14	55	72	0.23	5.31	3.72	13.31	3.7	3.3	53.5	34.8	870.0	870.0	0.0	0.0	OVERLAND		OVERLAND FLOW FROM BLUFF NORTH TO TH 169 DTICH IN CHANNEL
MP1-O	11.4	11.4	10	55	72	0.48	11.36	8.23	27.95	16.8	15.7	28.0	27.6	852.0	852.0	0.0	0.0			OVERLAND FLOW FROM BLUFF NORTH TO TH 169 DTICH IN CHANNEL
MP1-P	46.6	46.6	33.9	55	72	1.32	22.04	14.9	57.37	14.9	NA	5.4	NA	916.0	916.0	0.0	3.3		15" RCP	PROP. CULVERT FOR RATE CONTROL FROM BLUFF TO THE TH 169 DITCH
MP1-Q	9.8	9.8	15.3	55	72	0.34	7.87	5.46	19.79	1.4	1.3	0.9	0.9	936.0	936.0	0.1	0.8		12" RCP	PROP. CULVERT FOR RATE CONTROL FROM BLUFF
MP1-R	43.8	43.8	39.5	52	84	0.49	42.15	8.32	80.47	52.8	52.6	27.7	78.5	800.0	820.0	0.2	3.9	MnDOT CULVERTS	36" RCP	INCREASE STORAGE AND INSTALL OUTLET TO TH 169 DITCH
MP1-S	48.9	48.9	26.5	54	73	1.13	29.98	19.36	74.77	46.0	NA	51.5	NA	860.0	851.8	0.1	0.2		36" RCP	PROP. CULVER T FOR RATE CONTROL-CREATE STORAGE WEST OF CSAH 15
MP1-T	105.5	105.7	32.1	55	72	3.03	52.04	34.95	134.87	34.0	NA	65.2	NA	920.0	920.0	0.2	3.2		36" RCP	PROP. CULVERT/DITCH BLOCK FOR RATE CONTROL-CREATE STORAGE IN RAVINE
MP1-U	19.1	24.8	14.7	31	77	0	29.36	0	63.93	0.0	NA	15.2	NA	808.0	805.0	0.0	1.6		24" RCP	PROP. STORAGE AND CULVERT CROSSING TH 169
MP1-V	5.6	5.6	34	35	83	0	5.67	0.01	11.03	0.0	NA	4.9	NA	806.0	806.0	0.0	0.4		24" RCP	PROP. CULVERT TO STORAGE BASIN SE OF TH 169
MP1-W	46.2	43.3	58.3	33	84	0	31.58	0.02	60.27	0.0	NA	18.3	NA	810.0	811.5	0.0	5.8	30" CMP		SOUTH DITCH OF TH 169 OUTLETS TO SO. TO CROSSING UNDER TH 69
MP1-X	9.5	9.5	19.8	55	74	0.3	7.64	4.45	18.25	4.4	2.8	18.1	17.1	842.0	842.0	0.0	0.1		24" RCP	PROP. CULVERT FOR RATE CONTROL FROM BLUFF
MP1-Y	109.5	26.8	30.5	55	76	3.39	18.77	45.71	42.82	45.7	43.7	46.4	85.6	868.0	868.0	0.0	0.2	2 - 24" RCP		TWO CULVERTS OUTLETS FROM EAST DITCH OF CR 69
MP1-Y1	NA	42.4	21.9	NA	72	NA	27.15	NA	69.57	NA	NA	69.6	NA	NA	895.0	NA	0.1	36" CMP		EXISTING CENTERLINE CULVERT UNDER CR 69 - EAST TO WEST
MP1-Y2	NA	40.1	39.6	NA	72	NA	16.89	NA	44.24	NA	NA	22.7	NA	NA	919.8	NA	1.3	24" RCP		EXISTING CENTERLINE CULVERT UNDER CR 69 - EAST TO WEST
MP1-Z	7.2	7.2	19.1	50	84	0.04	11.11	1.54	20.95	45.2	NA	52.9	NA	840.0	829.0	0.4	0.2	2 - 42" RCP		EXISTING DITCH STORAGE ON THE WEST SIDE OF CSAH 15
MP2-A	NA	13.9	20	NA	85	0.23	21.95	NA	40.64	85.2	NA	90.7	NA	796.4	799.1	2.1	2.2	15" CMP	24" CMP	PRPOSED CULVERT CROSSING OF 128TH ST.
MP2-B	53.9	13.2	20	40	66	0	4.85	0.51	16.37	0.5	NA	15.7	NA	806.0	806.0	0.0	0.1	12' X 6' BOX		TH 169 CROSSING #2-SP 7005-57-SHEET 218 & 244

CITY OF SHAKOPEE
COMPREHENSIVE STORMWATER MANAGEMENT PLAN
MILL POND WATERSHED 10-YEAR EVENT

SUB-WATERSHED NUMBER	PRE SETTLEMENT AREA (Acre)	FULLY DEVELOPED AREA (Acre)	Tc (min)	SCS CN		PEAK RUNOFF RATE (cfs)		PEAK RUNOFF RATE CFS												
				PRE-SETTLEMENT	FULLY DEVELOPED	PRE-SETTLEMENT	FULLY DEVELOPED	PRE-SETTLEMENT	10-YR 24-HR FULLY DEVELOPED	PEAK OUTFLOW FROM POND (cfs)	PEAK FLOW IN CHANNEL (cfs)	10-YR 24-HR PEAK OUTFLOW FROM POND (cfs)	10-YR 24-HR PEAK FLOW IN CHANNEL (cfs)	PRE-SETTLEMENT	FULLY DEVELOPED	PRE-SETTLEMENT	10-YR 24-HR FULLY DEVELOPED	EXISTING	PROPOSED	COMMENTS
MP2-B1	NA	51	30	NA	75	NA	33.54	NA	78.83	NA	NA	3.6	NA	NA	816.0	NA	7.2	30" RCP		TH 169 EB ENT. RAMP CULVERT-SP 7005-57 - SHEET 221
MP2-C	70.1	30.8	25.9	50	79	0.44	29.49	12.29	62.17	84.6	NA	72.9	NA	830.0	824.3	0.3	0.2		8" ORIFICE TO 24" RCP	COUNTYSIDE DEVELOPMENT POND & OUTLET CONTROL STRUCTURE
MP2-D	64.9	30.9	33.8	52	71	0.73	13.35	13.6	36.04	79.1	NA	35.6	NA	843.0	845.0	0.8	6.8	3 - 66" RCP		TH 169 EB ENT. RAMP CULVERT-SP 7005-57 - SHEET 235
MP2-D1	NA	17.5	25	NA	72	NA	10.24	NA	26.47	NA	NA	NA	NA	NA	NA	NA	NA		4' WEIR-60" RCP	COUNTRYSIDE DEVELOPMENT POND SO. OF 17TH AVE. EXTENSION
MP2-D2	NA	6.5	20	NA	72	NA	4.43	NA	11.28	NA	NA	NA	NA	NA	NA	NA	NA			COUTRYSIDE DEVELOPMENT TO POND IN MP2-D
MP2-D3	NA	12.9	20	NA	70	NA	7.34	NA	20.19	NA	NA	NA	NA	NA	NA	NA	NA			COUTRYSIDE DEVELOPMENT TO POND IN MP2-D
MP2-D4	NA	45.3	25	NA	70	NA	22.06	NA	61.68	NA	NA	NA	NA	NA	NA	NA	NA			COUTRYSIDE DEVELOPMENT TO POND IN MP2-D
MP2-E	24.7	24.7	16.2	53	71	0.42	17.6	10.06	46.01	10.5	6.6	17.3	33.8	902.0	898.6	0.0	4.1	24" RCP		EXISTING CULVERT CROSSING CSAH 15 - SURVEY DATA
MP2-F	21.2	21.2	19.6	55	72	0.68	14.6	10	37.34	5.3	NA	21.9	NA	920.0	911.6	0.4	0.5	18" RCP		OUTLET CONTROL STRUCTURE - MT. OLIVE POND
MP2-G	50.4	50.4	42.5	55	72	1.33	20.16	13.8	52.97	4.5	NA	15.8	NA	920.0	918.0	0.8	3.0	18" RCP		OUTLET CONTROL STRUCTURE TO NORTH
MP2-H	3.2	3.2	15	55	72	0.11	2.6	1.81	6.54	0.5	NA	4.0	NA	928.0	925.8	0.0	0.1	24" X 15" RCP-A		OUTLET CONTROL STRUCTURE-NW QUAD OF CR 78 AND CSAH 15
MP2-I	27.9	24.2	34.2	55	72	0.79	11.37	8.85	29.53	5.9	5.9	3.6	3.6	900.0	894.4	0.6	5.6		24" RCP	PROPOSED POND OUTLET W/ EXISTING STORAGE
MP2-J	14	14	36.3	57	73	0.68	6.86	5.38	17.23	4.8	4.6	6.7	6.7	910.0	910.0	0.1	0.7	24" RCP		EXISTING CULVERT UNDER CR 78-SURVEY DATA PROPOSED INFILTRATION AREA
MP2-K	25.1	25.4	37.9	54	71	0.51	10.08	6.53	27.39	2.0	NA	3.2	NA	920.0	910.0	0.3	1.7	WEIR-36" RCP		EXISTING WEIR TO CULVERT UNDER 128TH ST.
MP2-L	33.6	33.4	57.7	57	73	1.34	11.64	9.26	29.52	74.8	77.6	12.2	15.3	910.0	907.8	4.0	6.7	48" RCP		EXISTING CULVERT UNDER CR 78-PROPOSED INFILTRATION AREA
MP2-M	40.7	40.4	49.3	55	72	1.03	14.55	10	37.95	74.7	74.7	10.1	10.1	920.0	920.0	19.6	11.9	24" RCP		EXISTING CULVERT UNDER CSAH 15- WEST TO EAST FLOW
MP2-N	178.1	179.2	79.1	60	74	10.69	53.62	52.02	131.47	1.0	NA	0.2	NA	920.0	917.5	18.0	37.2	18" RCP		EXISTING CULVERT UNDER CR 73 - WEST TO EAST FLOW
MP2-O	20.2	20.2	28.4	55	72	0.6	10.83	7.32	28.02	3.5	3.5	4.5	4.5	969.5	969.5	0.2	1.2	18" RCP		EXISTING CULVERT UNDER CR 73 - SURVEY DATA-ROAD LOW POINT
MP2-P	16.2	16.2	16.8	55	72	0.54	12.31	8.48	31.1	8.4	7.5	17.7	17.7	965.0	965.0	0.0	0.5		15" RCP	PROPOSED CULVERT TO THE NORTH & STORAGE IN DEPRESSION
MP2-Q	18.9	19	43.7	58	73	1.07	8.14	7.07	20.49	2.1	NA	4.9	NA	980.0	980.0	0.4	0.9		15" RCP	PROPOSED CULVERT & STORAGE IN WATERSHED FOR RATE CONTROL
MP2-R	51.8	51.1	95.2	55	72	1.06	11.33	8.22	29.27	1.3	1.3	0.3	0.3	970.0	970.0	2.1	7.5	OVERLAND		POTENTIAL STORAGE AREA AND RATE CONTROL W/CULVERT
MP2-S	13.1	13.1	21.4	55	72	0.41	8.52	5.82	21.88	0.7	NA	3.5	NA	970.0	970.0	0.3	0.9	36" CMP		EXISTING DRIVEWAY CULVERT DOWNSTREAM OF POND T1
MP2-T	456.1	81.5	55	67	73	33.82	29.51	99.97	74.41	116.3	NA	63.4	NA	925.0	925.0	0.1	1.5		24" RCP	PROPOSED CUVERT AND BERM CONST. TO MAXIMIZE STORAGE & RATE CONTROL
MP2-T1	NA	367.4	231.9	NA	80	NA	73.12	NA	151.8	NA	NA	2.7	NA	NA	938.0	NA	78.3		15" RCP	PERCHED DEPRESSION- PROPOSED OUTLET-OVERLAND TO THE NE AND SW TO POND T1
MP2-U	20.3	20.3	20	60	74	2.81	16.24	16.06	38.76	0.8	NA	0.4	NA	968.0	968.0	0.8	2.7	54" X 60" CMP-A		EXISTING CENTERLINE CULVERT UNDER CSAH 15 POTENTIAL RATE CONTROL STRUCUTRE ON WEST
MP2-V	18.1	18.1	20	55	72	0.58	12.32	8.39	31.4	1.5	1.5	15.8	15.7	963.0	963.0	0.3	0.7	36" CMP		EXISTING CULVERT UNDER CSAH 15- WEST TO EAST FLOW
MP2-W	99.1	99.1	122.8	56	72	2.28	18	14.51	46.96	9.8	9.7	10.4	10.3	942.0	942.0	1.2	7.6		18" RCP	PROPOSED CULVERT UNDER DRIVEWAY-MINIMAL STORAGE TO EOF
MP2-X	16	15.9	20	56	73	0.74	11.76	8.4	28.96	3.0	NA	6.7	NA	948.8	948.8	0.2	0.7	2 - 24" RCP		EXISTING CETERLINE CULVERTS UNDER CR 78
MP3-A	32	31.7	48.5	55	72	0.81	11.55	7.97	30.15	5.3	5.3	5.6	0.5	918.0	910.2	0.9	9.9		15" RCP	PROPOSED CULVERT & BERM CONST. FOR RATE CONTROL
MP3-B	49.4	49.4	85.1	57	73	1.67	12.8	10.38	32.49	4.8	4.7	2.3	2.3	934.0	934.0	0.9	5.0		18" RCP	PROPOSED CULVERT UNDER CR 78 TO THE NORTH NO CULVERT IDEN. IN SURVEY
MP3-C	22.3	22.3	47.3	59	74	1.5	9.77	8.72	23.95	2.6	2.6	2.3	2.3	910.0	910.0	0.5	1.9	12' X 6' BOX		TH 169 CROSSING # 3 - SP 7005-57 - SHEET 226 & 274
MP4-A	124.3	10.8	20	45	72	0.21	7.35	4.53	18.74	41.9	NA	61.8	NA	813.0	813.0	0.9	1.0		8" ORIFICE TO 24" RCP	COUNTRYSIDE DEVELOPMENT POND SO. TH 169 WEST OF CROSSING #3
MP4-A1	NA	43.2	20	NA.	75	NA	37.24	NA	86.31	NA	NA	3.1	NA	NA	816.0	NA	7.3		24" ORIFICE TO 48" RCP	SHAKOPEE HIGH SCHOOL WEST POND-OUTLET CONTROL STRUCTURE
MP4-A2	NA	31.8	15	NA	80	NA	44.83	NA	91.03	NA	NA	50.6	NA	NA	834.0	NA	4.8			SHAKOPEE HIGH SCHOOL & SOUTH AREA TO EAST POND
MP4-A3	NA	54.93	30	NA	75	NA	36.12	NA	84.91	NA	NA	NA	NA	NA	NA	NA	NA		24" ORIFICETO 48" RCP	SHAKOPEE HIGH SCHOOL EAST POND-OUTLET CONTROL STRUCTURE
MP4-A4	NA	40.4	20	NA	80	NA	48.42	NA	99.17	NA	NA	35.4	56.0	NA	827.0	NA	26.9		6" ORIFICE TO 24" RCP	COUNTRYSIDE DEV. POND ON THE EAST SIDE OF TH 169 CROSSING # 3

CITY OF SHAKOPEE
COMPREHENSIVE STORMWATER MANAGEMENT PLAN
MILL POND WATERSHED 10-YEAR EVENT

SUB-WATERSHED NUMBER	PRE SETTLEMENT AREA (Acre)	FULLY DEVELOPED AREA (Acre)	Tc (min)	SCS CN		PEAK RUNOFF RATE (cfs)		PEAK RUNOFF RATE CFS												
				PRE-SETTLEMENT	FULLY DEVELOPED	PRE-SETTLEMENT	FULLY DEVELOPED	PRE-SETTLEMENT	10-YR 24-HR FULLY DEVELOPED	PEAK OUTFLOW FROM POND (cfs)	PEAK FLOW IN CHANNEL (cfs)	10-YR 24-HR PEAK OUTFLOW FROM POND (cfs)	10-YR 24-HR PEAK FLOW IN CHANNEL (cfs)	PRE-SETTLEMENT	FULLY DEVELOPED	PRE-SETTLEMENT	10-YR 24-HR FULLY DEVELOPED	EXISTING	PROPOSED	COMMENTS
MP4-A5	NA	9.7	20	NA	75	NA	8.36	NA	19.38	NA	NA	0.5	NA	NA	816.0	NA	1.8		6" ORIFICE TO 24" RCP	PROPOSED COUNRTYSIDE DEV. POND IN THE NE CORNER OF SITE
MP4-A6	NA	21	20	NA	75	NA	18.1	NA	41.96	NA	NA	1.6	NA	NA	819.0	NA	3.2		42" RCP	SHAKOPEE HIGH SCHOOL DEPRESSION ON SOUTH PROPERTY BOUNDARY
MP4-B1	NA	58.23	30	NA	72	NA	29.98	NA	77.77	NA	NA	59.3	NA	NA	831.0	NA	1.0		24" RCP	CR 77 AND HIGH SCHOOL AREA TO DEPRESSIONAL STORAGE ON SCHOOL SITE TO THE EAST.
MP4-B2	NA	8.28	25	NA	71	NA	4.43	NA	11.89	NA	NA	11.5	30.7	NA	844.0	NA	0.0	24" RCP		AREA TRIBUTARY TO DEPRESSION ON WEST SIDE OF CR 77 &
MP4-C	34.9	24	11.2	55	72	1.38	22.69	23.6	56.22	5.5	NA	19.9	NA	846.0	845.5	0.4	0.9	40" X 30" CMP-A		EXISTING CULVERT UNDER 128TH ST.
MP4-D1	NA	7.8	35.3	NA	72	NA	3.59	NA	9.31	NA	NA	21.4	25.6	NA	883.0	NA	0.8		24" RCP	PROPOSED STORAGE AND POND OUTLET
MP4-D2	NA	16.9	35.3	NA	72	NA	7.77	NA	20.18	NA	NA	14.0	NA	NA	892.0	NA	0.6	24" RCP		EXISTING CULVERT UNDER CR 77-EXISTING STORAGE
MP4-D3	NA	6	20	NA	72	NA	4.09	NA	10.41	NA	NA	2.1	NA	NA	901.7	NA	0.3		30"	PROPOSED OUTLET CONTROL STRUCTURE & BERM FOR RATE CONTROL AND MAXIMIZE
MP4-D4	NA	27.5	25	NA	74	NA	19.01	NA	45.85	NA	NA	5.6	NA	NA	900.0	NA	1.9		15" RCP	PROPOSED CULVERT FOR RATE CONTROL AND MAXIMIZE STORAGE
MP4-E	22.5	22.7	30.6	58	73	1.52	12.58	10.85	31.52	5.8	NA	4.8	NA	900.0	900.0	0.3	1.6		18" CMP	THOLE LAKE EXISTING CULVERT-SURVEY DATA-RECOMMEND CONTROL STRUCTURE TO STOP FISH
MP5-A	109.1	286.7	69.6	75	84	38.66	183.36	92.32	350.81	13.9	NA	1.3	NA	946.0	942.6	49.4	76.7	4' X 5' BOX		EXISTING STRUCTURE UNDER CSAH 15-INFILTRATION AREA-POTENTIAL RATE CONTROL
MP5-B	109.1	109.1	55.5	53	71	1.55	32.94	19.2	89.06	10.0	NA	6.4	NA	950.0	944.8	1.0	9.5	24" CMP		SW CELL OF THOLE LAKE @ NE QUAD OF CSAH 15 & CSAH 14
MP5-C	45.2	50.2	50.3	77	84	23.71	40.67	53.12	77.84	7.0	NA	2.6	NA	950.0	943.0	97.2	18.3	24" CMP		EXISTING CULVERT UNDER CSAH 15-WEST TO EAST FLOW
MP5-D	42.7	42.7	18.8	55	72	1.38	30.28	20.69	76.91	14.0	NA	25.2	NA	950.0	946.7	0.3	1.8	24" CMP		EXISTING CULVERT UNDER CSAH 14 TO THE NORTH FROM THE SW QUAD TO NW QUAD
MP5-E	15	13.7	20.4	55	72	0.47	9.19	6.87	23.5	2.6	NA	4.4	NA	960.0	952.2	0.2	0.8	24" RCP		EXISTING CULVERT UNDER CSAH 14 TO THE NORTH FROM THE SE QUAD TO NE QUAD
MP5-F	24.8	24.8	18.7	55	72	0.8	17.59	12.09	44.81	2.3	NA	2.8	NA	950.0	946.3	0.9	1.8	24" CMP		EXISTING CULVERT FROM STORAGE AREA IN DEVELOPMENT WEST OF THOLE LAKE.
MP5-G	25.7	26.8	20	62	75	5.24	23.11	24.03	53.55	2.9	2.9	0.0	0.0	948.0	945.2	1.3	5.5	12" CMP		EXISTING CULVERT FROM DEPRESSION IN DEVELOPMENT WEST OF THOLE LAKE.
MP5-H	9.2	9.2	20	66	77	3.38	9.12	11.41	20.04	3.1	NA	0.8	NA	950.0	947.3	0.3	1.0	2- 24" CMP & 18" CMP		SCHNEIDER LAKE OUTLET CULVERTS-SAP 70-614-01 - SHEET 3
MP5-I	99.2	99.2	17	75	84	94.5	162.87	217.39	306.51	22.5	NA	9.9	NA	948.0	942.6	7.3	29.9	18" RCP		EXISTING CULVERT FIELD SURVEY IN DEVELOPED AREA.
MP5-J	11.3	11.3	20	60	74	1.57	9.04	8.94	21.58	0.8	0.8	0.0	0.0	950.0	947.0	0.3	1.6	18" RCP		EXISTING CULVERT FIELD SURVEY IN DEVELOPED AREA.
MP5-K	28	28	43.8	58	73	1.59	11.95	10.49	30.24	NA	0.0	0.0	0.0	NA	945.1	NA	3.9		24" RCP	PROPOSED CULVERT-UNABLE TO FIELD LOCATE CULVERT IN DRIVEWAY
MP5-L	152	152	139.3	63	76	10.13	34.63	37.55	79.52	15.5	NA	7.3	NA	948.0	948.0	19.2	59.5	OVERLAND		LARGE WETLAND SW OF MP5-L AND SCHNEIDER LAKE-NO CULVERT IDENTIFIED IN FIELD SURVEY
MP5-M	81.1	81.1	98.8	61	74	5.13	20.56	22.17	49.94	22.7	NA	44.0	NA	950.0	950.0	5.6	8.8	36" RCP		EXISTING CULVERT UNDER CSAH 15
MP5-N	143.4	143.4	55.3	55	72	3.52	47.25	32.7	124.21	23.5	22.4	37.5	35.6	950.0	946.8	3.7	13.1	OVERLAND		POTENTIAL STORAGE AREA AND RATE CONTROL W/CULVERT
MP5-O	99.3	100.6	66.9	60	74	6.68	34.01	33	83.46	31.1	NA	73.6	NA	950.0	950.0	0.3	3.0	24" CMP		EXISTING CENTERLINE CULVERT UNDER CR 73 - EOF TO EAST - SURVEY DATA
MP5-P	29.5	29.5	87.8	55	72	0.63	6.86	4.91	17.94	2.5	2.3	4.4	4.3	968.0	962.6	0.4	2.0	18" CMP		EXISTING CENTERLINE CULVERT UNDER CR 73 - EOF TO EAST - STORAGE WEST OF ROAD
MP5-Q	21.4	21.4	22.8	55	72	0.66	13.36	9.05	34.22	1.8	1.6	0.0	0.0	964.0	958.9	0.3	2.9	18" RCP		O'DOWD LAKE OUTLET TO THOLE LAKE - EXISTING CULVERT TO WEST
MP6-A	602.7	602.7	60	78	86	297.56	479.09	650.86	882.82	5.4	NA	0.3	NA	946.0	942.6	103.1	171.3	OVERLAND		DEPRESSION WEST OF CR 79 - SURVEY DATA OF CULVERT
MP6-B	53.9	54	30	59	74	4.65	32.87	29.27	79.63	14.8	NA	52.5	NA	950.0	950.0	0.7	1.7	24" RCP		SE QUAD OF CR 78 & CR 79 - GOLF COURSE POND - PROPOSED CONTROL STRUCTURE WITH 12" RCP
MPE1-A	46.2	46.2	77.1	67	67	7.31	7.31	23.43	23.43	6.3	6.3	6.3	6.3	898.3	898.3	7.2	7.2	18" RCP		EXISTING CENTERLINE CULVERT UNDER CR 79 - WEST TO EAST FLOW TO GOLF COURSE
MPE1-B	13	13	30	65	65	3.14	3.14	11.48	11.48	3.4	NA	3.4	NA	907.0	907.0	0.4	0.4	18" RCP		EXISTING CENTERLINE CULVERT UNDER CR 79 - WEST TO EAST FLOW TO GOLF COURSE

CITY OF SHAKOPEE
COMPREHENSIVE STORMWATER MANAGEMENT PLAN
MILL POND WATERSHED 100-YEAR EVENT

SUB-WATERSHED NUMBER	PRE SETTLEMENT AREA (Acre)	FULLY DEVELOPED AREA (Acre)	Tc (min)	SCS CN		PEAK RUNOFF RATE (cfs)		PEAK RUNOFF cfs			PRE-SETTLEMENT PEAK DISCHARGE RATE		FULLY DEVELOPED PEAK DISCHARGE RATE				NWL		REQUIRED STORAGE (ac-ft)			POND OUTLET DESCRIPTION FULLY DEVELOPED CONDITION		
				PRE SETTLEMENT	FULLY DEVELOPED	PRE SETTLEMENT	FULLY DEVELOPED	PRE-SETTLEMENT	100-YR 24-HR FULLY DEVELOPED	100-YR 10-DAY FULLY DEVELOPED	PEAK OUTFLOW FROM POND (cfs)	PEAK FLOW IN CHANNEL (cfs)	100-YR 24-HR PEAK OUTFLOW FROM POND (cfs)	100-YR 10-DAY PEAK OUTFLOW FROM POND (cfs)	100-YR 24-HR PEAK FLOW IN CHANNEL (cfs)	100-YR 10-DAY PEAK FLOW IN CHANNEL (cfs)	PRE SETTLEMENT	FULLY DEVELOPED	PRE SETTLEMENT	100-YR 24-HR FULLY DEVELOPED	100-YR 10-DAY FULLY DEVELOPED	EXISTING	PROPOSED	COMMENTS
MP1-A1	9.81	20.7	14.2	48	90	0.27	49.12	22.76	126.21	9.81	308.6	308.6	280.5	169.0	NA	NA	788.0	788.0	2.7	9.6	8.2	2 - 10' X 6' BOX		TH 169 CROSSING #1-SP 7005-57-SHEET 215 & 266-273
MP1-A2	NA	148.8	28.6	NA	87	NA	208.71	NA	590.67	68.77	NA	NA	110.9	91.0	NA	NA	NA	794.0	NA	33.2	11.9	OVERLAND	2 - 36" RCP	PROPOSED LINEAR STORAGE & OUTLET PIPE TO TH 169 CROSSING #1 PROPOSED INFILTRATION & STORAGE SYSTEM
MP1-AA	NA	10.35	20	NA	89	NA	19.76	NA	52.64	4.86	NA	NA	14.0	11.7	NA	NA	NA	798.0	NA	23.3	16.1	18" RCP		EXISTING PIPE FROM CR 69 POND - SE QUAD OF CR 69 & TH 169 SP 7005-57 - SHEET 211 & 231-232
MP1-AB	NA	17.86	30	NA	89	NA	26.73	NA	71.66	8.23	NA	NA	29.6	14.3	NA	NA	NA	803.7	NA	14.3	12.1	36" RCP		EXISTING OUTLET PIPE UNDER CR 69-SW TO SE QUAD SP-7005-57-SHEET 210 & 230-231
MP1-AC	NA	24.69	25	NA	76	NA	19.83	NA	81.42	11.48	NA	NA	72.1	19.0	NA	NA	NA	800.0	NA	3.3	1.8	2 - 48" RCP		EXISING CULVERTS UNDER TH 169 FROM NE TO SE QUAD SP 7005-57 - SHEET 211 & 231-232
MP1-AD	NA	34.8	35	NA	86	NA	40.54	NA	118.87	15.9	NA	NA	43.6	11.7	NA	NA	NA	802.0	NA	5.5	2.5	42" RCP		EXISING CULVERT UNDER CR69 FROM NW TO NE QUAD SP 7005-57 - SHEET 211 & 231-232
MP1-B	251	222	25.6	43	88	0.15	350.26	NA	961.08	103.15	73.9	NA	71.9	66.0	NA	NA	798.0	795.2	11.9	107.2	62.8	42" X 26" RCP-A		EXISTING CULVERT UNDER CR 69 FROM SW TO SE QUAD SP 7005-57 - SHEET 209 - PROPOSED STORAGE & INFILTRATION
MP1-C	6.5	6.44	21.4	55	72	0.2	4.19	NA	20.62	3.01	9.3	8.0	48.7	3.0	22.6	3.0	852.0	852.0	0.0	0.0	0.0	OVERLAND		OVERLAND FLOW FROM BLUFF INTO RAVINE TO NW
MP1-D	6.8	6.8	14.8	55	72	0.24	5.56	NA	26.54	3.22	24.8	23.1	219.5	59.3	123.3	29.4	850.0	850.0	0.0	0.1	0.0	OVERLAND		OVERLAND FLOW FROM BLUFF INTO RAVINE TO NW
MP1-E	15.8	15.8	28.6	55	72	0.47	8.41	NA	42.14	7.3	18.6	18.5	80.7	23.3	76.3	23.2	868.0	868.0	0.0	0.0	0.0	OVERLAND		OVERLAND FLOW FROM BLUFF INTO RAVINE TO NW
MP1-F	32.6	27.1	35.6	55	72	0.91	12.33	NA	62.32	12.37	0.0	NA	9.6	6.9	NA	NA	870.0	870.0	4.1	3.2	1.8	OVERLAND	12" RCP	PROPOSED CULVERT FOR RATE CONTROL TO RAVINE IN BLUFF
MP1-G	20.8	20.8	15.8	55	76	0.71	22.14	NA	88.73	9.83	12.6	12.0	6.7	4.9	6.7	4.9	870.0	870.0	0.7	3.2	2.2		15" RCP	PROPOSED CULVERT FOR RATE CONTROL TO RAVINE IN BLUFF
MP1-H	37.2	42	34.3	52	85	0.42	47.2	NA	142.1	19.22	73.3	NA	107.4	51.1	NA	NA	800.0	798.0	2.8	14.5	9.8	CONTROL□STRUCT.		EXISTING CONTROL STRUCTURE - CP 89-78-01 - SHEET 22
MP1-I	30.5	29.7	35.8	36	71	0	12.34	NA	65.57	13.56	75.9	NA	70.3	24.8	NA	NA	800.0	799.0	1.1	3.2	2.1	8' X 5' BOX		CULVERT UNDER CR 78-CP 89-78-01 - SHEET 14
MP1-J	74.7	70.6	45.5	51	76	0.6	37.18	NA	155.32	31.68	79.4	NA	66.8	35.0	NA	NA	808.0	808.0	2.5	10.3	9.0		24" RCP	PROPOSED INLET TO CR 78 STORM SEWER
MP1-K	6.9	6.9	25.7	55	72	0.21	3.96	NA	19.75	3.2	5.5	NA	6.1	2.5	NA	NA	878.0	878.0	0.2	0.7	0.4		18" RCP	PROPOSED INLET TO CR 78 STORM SEWER STRUCT.
MP1-L	38.1	38.1	44.6	55	72	0.99	14.72	NA	75.03	17.12	51.4	NA	22.4	17.2	NA	NA	866.0	866.0	0.0	4.6	2.2		18" RCP	PRPOPOSED OUTLET FOR RATE CONTROL-BERM CONST. @ OUTLET
MP1-M	52.9	58.4	42.6	55	72	1.32	23.41	NA	118.24	26.32	29.0	NA	16.2	10.3	NA	NA	884.0	884.0	1.2	11.3	9.4		15" RCP	PRPOPOSED OUTLET FOR RATE CONTROL-BERM CONST. @ OUTLET
MP1-M1	NA	19.7	20	NA	72	NA	13.41	NA	65.44	9.24	NA	NA	25.1	8.8	NA	NA	NA	935.0	NA	1.5	0.4	24" RCP		EXISTING CULVERT UNDER CR 69-SW QUAD CR 69 & CR 78
MP1-N	6.3	6.3	14	55	72	0.23	5.31	NA	25.28	2.99	11.7	11.3	140.3	6.8	106.5	3.5	870.0	870.0	0.0	0.0	0.0	OVERLAND		OVERLAND FLOW FROM BLUFF NORTH TO TH 169 DTICH IN CHANNEL
MP1-O	11.4	11.4	10	55	72	0.48	11.36	NA	52.61	5.44	53.9	53.7	53.5	11.2	53.1	11.2	852.0	852.0	0.0	0.0	0.0			OVERLAND FLOW FROM BLUFF NORTH TO TH 169 DTICH IN CHANNEL
MP1-P	46.6	46.6	33.9	55	72	1.32	22.04	NA	110.75	21.34	48.7	NA	8.4	7.6	NA	NA	916.0	916.0	0.0	6.8	5.6		15" RCP	PROP. CULVERT FOR RATE CONTROL FROM BLUFF TO THE TH 169 DITCH
MP1-Q	9.8	9.8	15.3	55	72	0.34	7.87	NA	37.62	4.63	6.3	5.8	2.5	2.3	2.5	2.3	936.0	936.0	0.3	1.4	1.3		12" RCP	PROP. CULVERT FOR RATE CONTROL FROM BLUFF
MP1-R	43.8	43.8	39.5	52	84	0.49	42.15	NA	132.01	19.87	176.6	176.3	42.6	15.7	123.2	70.0	800.0	820.0	1.0	6.4	2.6	MnDOT□CULVERTS	36" RCP	INCREASE STORAGE AND INSTALL OUTLET TO TH 169 DITCH
MP1-S	48.9	48.9	26.5	54	73	1.13	29.98	NA	141.29	22.68	159.5	NA	84.7	52.4	NA	NA	860.0	851.8	0.3	0.3	0.3		36" RCP	PROP. CULVER T FOR RATE CONTROL-CREATE STORAGE WEST OF CSAH 15
MP1-T	105.5	105.7	32.1	55	72	3.03	52.04	NA	260.81	48.56	113.1	NA	92.5	44.9	NA	NA	920.0	920.0	0.5	7.8	1.5		36" RCP	PROP. CULVERT/DITCH BLOCK FOR RATE CONTROL-CREATE STORAGE IN RAVINE
MP1-U	19.1	24.8	14.7	31	77	0	29.36	NA	112.89	11.74	0.2	NA	22.1	9.6	NA	NA	808.0	805.0	0.0	3.1	1.2		24" RCP	PROP. STORAGE AND CULVERT CROSSING TH 169
MP1-V	5.6	5.6	34	35	83	0	6.67	NA	18.28	2.56	0.2	NA	9.6	2.2	NA	NA	806.0	806.0	0.0	0.6	0.3		24" RCP	PROP. CULVERT TO STORAGE BASIN SE OF TH 169
MP1-W	46.2	43.3	58.3	33	84	0	31.58	NA	98.76	18.97	0.8	NA	29.2	12.6	NA	NA	810.0	811.5	0.1	8.5	4.8	30" CMP		SOUTH DITCH OF TH 169 OUTLETS TO SO. TO CROSSING UNDER TH 69
MP1-X	9.5	9.5	19.8	55	74	0.3	7.64	NA	33.9	4.46	14.3	11.7	28.5	10.0	28.0	10.0	842.0	842.0	0.0	0.2	0.0		24" RCP	PROP. CULVERT FOR RATE CONTROL FROM BLUFF
MP1-Y	109.5	26.8	30.5	55	76	3.39	18.77	NA	77.84	12.34	149.1	146.3	132.8	12.3	101.4	32.0	868.0	868.0	0.0	0.5	0.0	2 - 24" RCP		TWO CULVERTS OUTLETS FROM EAST DITCH OF CR 69 PRIMARY TO THE WEST AND EOF TO THE NORTH
MP1-Y1	NA	42.4	21.9	NA	72	NA	27.18	NA	133.63	19.82	NA	NA	133.2	19.8	NA	NA	NA	895.0	NA	0.2	0.0	36" CMP		EXISTING CENTERLINE CULVERT UNDER CR 69 -EAST TO WEST DITCH STORAGE USED IN FULLY DEVELOPED MODELING
MP1-Y2	NA	40.1	39.6	NA	72	NA	16.89	NA	85.86	18.17	NA	NA	42.7	16.7	NA	NA	NA	919.8	NA	2.9	0.8	24" RCP		EXISTING CENTERLINE CULVERT UNDER CR 69 -EAST TO WEST DITCH STORAGE OVERTOPS TO THE NORTH IN THE EAST DITCH
MP1-Z	7.2	7.2	19.1	50	84	0.04	11.11	NA	34.03	3.38	161.3	NA	86.5	54.4	NA	NA	840.0	829.0	0.8	0.3	0.2	2 - 42" RCP		EXISTING DITCH STORAGE ON THE WEST SIDE OF CSAH 15
MP2-A	14	13.9	20	53	85	0.23	21.95	NA	65.43	6.52	223.8	NA	190.1	134.2	NA	NA	796.4	799.1	4.0	3.6	2.8	15" CMP	24" CMP	PRPOSED CULVERT CROSSING OF 128TH ST.
MP2-B	53.9	13.2	20	40	66	0	4.85	NA	35.17	6.19	12.1	NA	28.4	9.7	NA	NA	806.0	806.0	0.0	0.3	0.1	12' X 6' BOX		TH 169 CROSSING #2-SP 7005-57-SHEET 218 & 244
MP2-B1	NA	51	30	NA	75	NA	33.54	NA	145.29	23.51	NA	NA	9.3	4.5	NA	NA	NA	816.0	NA	11.2	10.1	30" RCP		TH 169 EB ENT. RAMP CULVERT-SP 7005-57 - SHEET 221
MP2-C	70.1	30.8	25.9	60	79	0.44	29.49	NA	107.89	14.3	221.7	NA	146.8	120.6	NA	NA	830.0	824.0	0.5	0.3	0.3		8" ORIFICE□24" RCP	COUNTYSIDE DEVELOPMENT POND & OUTLET CONTROL STRUCTURE
MP2-D	64.9	30.9	33.8	52	71	0.73	13.35	NA	71.15	14.15	208.0	NA	111.3	109.7	NA	NA	843.0	845.0	2.5	11.7	11.6	3 - 66" RCP		TH 169 EB ENT. RAMP CULVERT-SP 7005-57 - SHEET 235 UPSTREAM CULVERTS FROM CORSSING #2
MP2-D1	NA	17.6	25	NA	72	NA	10.24	NA	50.9	8.14	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		4' WEIR-60" RCP	COUNTRYSIDE DEVELOPMENT POND SO. OF 17TH AVE. EXTENSION OUTLET CONTROL STRUCTURE
MP2-D2	NA	6.5	20	NA	72	NA	4.43	NA	21.59	3.05	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA			COUTRYSIDE DEVELOPMENT TO POND IN MP2-D
MP2-D3	NA	12.9	20	NA	70	NA	7.34	NA	40.01	6.05	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA			COUTRYSIDE DEVELOPMENT TO POND IN MP2-D
MP2-D4	NA	45.3	25	NA	70	NA	22.06	NA	122.92	21.07	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA			COUTRYSIDE DEVELOPMENT TO POND IN MP2-D
MP2-E	24.7	24.7	16.2	53	71	0.42	17.6	NA	89.24	11.66	40.6	31.2	25.7	21.7	71.8	28.1	902.0	898.6	0.0	7.0	5.4	24" RCP		EXISTING CULVERT CROSSING CSAH 15 - SURVEY DATA WEST TO EAST FLOW TO COUNTRYSIDE DEVELOPMENT
MP2-F	21.2	21.2	19.6	55	72	0.68	14.6	NA	71.41	9.95	21.0	NA	33.4	18.1	NA	NA	920.0	911.6	1.1	1.2	0.2	18" RCP		OUTLET CONTROL STRUCTURE - MT. OLIVE POND
MP2-G	50.4	50.4	42.5	55	72	1.33	20.16	NA	102.61	22.72	19.1	NA	24.5	15.8	NA	NA	920.0	918.0	2.0	6.4	2.6	18" RCP		OUTLET CONTROL STRUCTURE TO NORTH
MP2-H	3.2	3.2	15	55	72	0.11	2.6	NA	12.41	1.51	2.2	NA	9.2	1.5	NA	NA	928.0	925.8	0.1	0.2	0.1	24" X 15" RCP-A		OUTLET CONTROL STRUCTURE-NW QUAD OF CR 78 AND CSAH 15
MP2-I	27.9	24.2	34.2	55	72	0.79	11.37	NA	57.09	11.08	24.7	24.6	16.3	18.3	16.3	18.3	900.0	894.4	1.4	6.0	6.1		24" RCP	PROPOSED POND OUTLET W/ EXISTING STORAGE

CITY OF SHAKOPEE
COMPREHENSIVE STORMWATER MANAGEMENT PLAN
MILL POND WATERSHED 100-YEAR EVENT

SUB-WATERSHED NUMBER	PRE SETTLEMENT AREA (Acre)	FULLY DEVELOPED AREA (Acre)	Tc (min)	SCS CN		PEAK RUNOFF RATE (cfs)		PEAK RUNOFF cfs			PRE-SETTLEMENT PEAK DISCHARGE RATE		FULLY DEVELOPED PEAK DISCHARGE RATE				NWL		REQUIRED STORAGE (ac-ft)			POND OUTLET DESCRIPTION FULLY DEVELOPED CONDITION		COMMENTS
				PRE SETTLEMENT	FULLY DEVELOPED	PRE SETTLEMENT	FULLY DEVELOPED	PRE-SETTLEMENT	100-YR 24-HR FULLY DEVELOPED	100-YR 10-DAY FULLY DEVELOPED	PEAK OUTFLOW FROM POND (cfs)	PEAK FLOW IN CHANNEL (cfs)	100-YR 24-HR PEAK OUTFLOW FROM POND (cfs)	100-YR 10-DAY PEAK OUTFLOW FROM POND (cfs)	100-YR 24-HR PEAK FLOW IN CHANNEL (cfs)	100-YR 10-DAY PEAK FLOW IN CHANNEL (cfs)	PRE SETTLEMENT	FULLY DEVELOPED	PRE SETTLEMENT	100-YR 24-HR FULLY DEVELOPED	100-YR 10-DAY FULLY DEVELOPED	EXISTING	PROPOSED	
MP2-J	14	14	36.3	57	73	0.68	6.86	NA	32.82	6.38	17.9	17.7	13.0	10.1	13.0	10.1	910.0	910.0	0.2	1.8	1.2	24" RCP		EXISTING CULVERT UNDER CR 78-SURVEY DATA PROPOSED INFILTRATION AREA
MP2-K	25.1	25.4	37.9	54	71	0.51	10.08	NA	54.13	11.55	8.7	NA	9.8	7.4	NA	NA	920.0	910.0	0.9	3.0	2.6	WEIR-36" RCP		EXISTING WEIR TO CULVERT UNDER 128TH ST.
MP2-L	33.6	33.4	57.7	57	73	1.34	11.64	NA	56.31	14.65	197.7	204.5	30.9	38.8	46.2	52.7	910.0	907.8	7.4	8.8	10.0	48" RCP		EXISTING CULVERT UNDER CR 78-PROPOSED INFILTRATION AREA
MP2-M	40.7	40.4	49.3	55	72	1.03	14.55	NA	73.68	17.99	197.4	197.4	27.5	34.8	27.5	34.8	920.0	920.0	34.8	21.1	24.2	24" RCP		EXISTING CULVERT UNDER CSAH 15- WEST TO EAST FLOW
MP2-N	178.1	179.2	79.1	60	74	10.69	53.62	NA	247.12	75.53	7.4	NA	4.3	12.6	NA	NA	920.0	917.5	40.4	62.9	102.0	18" RCP		EXISTING CULVERT UNDER CR 73 - WEST TO EAST FLOW SECONDARY CENTERLINE CULVERT TO THE SOUTH
MP2-O	20.2	20.2	28.4	56	72	0.6	10.83	NA	54.09	9.34	14.6	14.6	12.1	6.2	12.1	6.2	969.5	989.5	0.5	2.3	1.6	18" RCP		EXISTING CULVERT UNDER CR 73 - SURVEY DATA-ROAD LOW POINT
MP2-P	16.2	16.2	16.8	55	72	0.54	12.31	NA	59.26	7.64	27.2	26.0	19.7	12.0	19.6	12.0	965.0	965.0	0.0	1.3	0.2		15" RCP	PROPOSED CULVERT TO THE NORTH & STORAGE IN DEPRESSION
MP2-Q	18.9	19	43.7	68	73	1.07	8.14	NA	39.06	8.55	7.5	NA	5.5	4.8	NA	NA	980.0	980.0	0.9	2.1	0.6		15" RCP	PROPOSED CULVERT & STORAGE IN WATERSHED FOR RATE CONTROL
MP2-R	51.8	51.1	95.2	55	72	1.06	11.33	NA	57.01	20.93	4.1	4.1	1.0	2.0	1.0	2.0	970.0	970.0	4.5	13.6	20.9	OVERLAND		POTENTIAL STORAGE AREA AND RATE CONTROL W/CULVERT
MP2-S	13.1	13.1	21.4	55	72	0.41	8.52	NA	41.94	6.13	2.7	NA	9.0	3.8	NA	NA	970.0	970.0	0.6	1.6	2.4	36" CMP		EXISTING DRIVEWAY CULVERT DOWNSTREAM OF POND T1 EOF AT ELEV. 932.5 TO THE NORTH-PROPOSED INFILTRATION
MP2-T	456.1	81.5	55	67	73	33.82	29.51	NA	142.33	35.94	258.6	NA	157.5	48.1	NA	NA	925.0	925.0	0.2	3.0	0.4		24" RCP	PROPOSED CUVERT AND BERM CONST. TO MAXIMIZE STORAGE & RATE CONTROL
MP2-T1	NA	367.4	231.9	NA	80	NA	73.12	NA	263.11	118.27	NA	NA	7.0	15.0	NA	NA	NA	938.0	NA	137.8	230.2		15" RCP	PERCHED DEPRESSION- PROPOSED OUTLET- OVERLAND TO THE NE AND SW TO POND T1
MP2-U	20.3	20.3	20	60	74	2.81	16.24	NA	71.89	9.52	2.6	NA	1.0	1.5	NA	NA	968.0	968.0	1.7	4.5	5.7	54" X 60" CMP-A		EXISTING CENTERLINE CULVERT UNDER CSAH 15 POTENTIAL RATE CONTROL STRUCUTRE ON WEST SIDE OF CSAH 15
MP2-V	18.1	18.1	20	55	72	0.58	12.32	NA	60.12	8.49	6.4	6.4	38.4	8.0	38.3	8.0	963.0	963.0	0.7	1.1	0.5	36" CMP		EXISTING CULVERT UNDER CSAH 15- WEST TO EAST FLOW POTENTIAL RATE CONTROL LOCATION
MP2-W	99.1	99.1	122.8	56	72	2.28	18	NA	91.44	38.56	32.3	32.1	29.8	26.0	29.8	26.0	942.0	942.0	2.6	12.2	11.3		18" RCP	PROPOSED CULVERT UNDER DRIVEWAY-MINIMAL STORAGE TO EOF
MP2-X	16	15.9	20	56	73	0.74	11.76	NA	54.56	7.46	12.4	NA	9.6	5.3	NA	NA	948.8	948.8	0.5	1.5	0.4	2 - 24" RCP		EXISTING CETERLINE CULVERTS UNDER CR 78
MP3-A	32	31.7	48.5	55	72	0.81	11.55	NA	58.55	14.14	18.3	18.3	42.9	80.7	20.2	46.9	918.0	910.2	2.0	10.3	10.7		15" RCP	PROPOSED CULVERT & BERM CONST. FOR RATE CONTROL
MP3-B	49.4	49.4	85.1	57	73	1.87	12.8	NA	62.35	20.61	16.2	16.1	5.0	5.5	5.0	5.5	934.0	934.0	1.9	8.8	9.7		18" RCP	PROPOSED CULVERT UNDER CR 78 TO THE NORTH-NO CULVERT IDEN. IN SURVEY
MP3-C	22.3	22.3	47.3	59	74	1.5	9.77	NA	45.05	9.97	9.5	9.2	6.6	5.3	6.6	5.3	910.0	910.0	1.0	3.3	2.9	12' X 6' BOX		TH 169 CROSSING # 3 - SP 7005-57 - SHEET 226 & 274
MP4-A	124.3	10.8	20	45	72	0.21	7.36	NA	35.87	5.07	194.2	NA	139.8	139.2	NA	NA	813.0	813.0	2.6	1.9	1.9		8" ORIFICE-24" RCP	COUNTRYSIDE DEVELOPMENT POND SO. TH 169 WEST OF CROSSING #3 OUTLET CONTROL STRUCTURE
MP4-A1	NA	43.2	20	NA	75	NA	37.24	NA	157.73	20.27	NA	NA	4.8	3.7	NA	NA	NA	816.0	NA	11.3	9.7		24" ORIFICE & 48" RCP	SHAKOPEE HIGH SCHOOL WEST POND-OUTLET CONTROL STRUCTURE
MP4-A2	NA	31.8	15	NA	80	NA	44.83	NA	154.69	15.04	NA	NA	139.3	25.3	NA	NA	NA	834.0	NA	5.6	4.3			SHAKOPEE HIGH SCHOOL & SOUTH AREA TO EAST POND
MP4-A3	NA	54.93	30	NA	75	NA	36.12	NA	156.49	25.33	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		24" ORIFICE-48" RCP	SHAKOPEE HIGH SCHOOL EAST POND-OUTLET CONTROL STRUCTURE
MP4-A4	NA	40.4	20	NA	80	NA	48.42	NA	169.33	18.95	NA	NA	111.3	75.3	131.6	131.6	NA	827.0	NA	35.6	32.3		6" ORIFICE-24" RCP	COUNTRYSIDE DEV. POND ON THE EAST SIDE OF TH 169 CROSSING # 3 OUTLET CONTROL STRUCTURE
MP4-A5	NA	9.7	20	NA	75	NA	8.36	NA	35.42	4.55	NA	NA	1.0	1.1	NA	NA	NA	816.0	NA	2.6	2.8		6" ORIFICE-24" RCP	PROPOSED COUNRTYSIDE DEV. POND IN THE NE CORNER OF SITE
MP4-A6	NA	21	20	NA	75	NA	18.1	NA	76.67	9.88	NA	NA	2.0	1.8	NA	NA	NA	819.0	NA	5.2	4.3		42" RCP	SHAKOPEE HIGH SCHOOL DEPRESSION ON SOUTH PROPERTY BOUNDARY
MP4-B1	NA	58.23	30	NA	72	NA	29.98	NA	150.43	26.85	NA	NA	81.3	46.9	NA	NA	NA	831.0	NA	4.2	1.5		24" RCP	CR 77 AND HIGH SCHOOL AREA TO DEPRESSIONAL STORAGE ON SCHOOL SITE TO THE EAST.
MP4-B2	NA	8.28	25	NA	71	NA	4.43	NA	23.27	3.85	NA	NA	18.7	3.9	46.0	14.5	NA	844.0	NA	0.1	0.0	24" RCP		AREA TRIBUTARY TO DEPRESSION ON WEST SIDE OF CR 77 & SOUTHEAST CORNER OF COUNTYSIDE DEV.
MP4-C	34.9	24	11.2	55	72	1.38	22.69	NA	106.17	11.43	26.2	NA	27.8	10.7	NA	NA	846.0	845.5	1.1	1.9	0.4	40" X 30" CMP-A		EXISTING CULVERT UNDER 128TH ST.
MP4-D1	NA	7.8	35.3	NA	72	NA	3.59	NA	18.02	3.56	NA	NA	38.2	21.3	45.1	28.2	NA	883.0	NA	0.9	0.8		24" RCP	PROPOSED STORAGE AND POND OUTLET
MP4-D2	NA	16.9	35.3	NA	72	NA	7.77	NA	39.05	7.72	NA	NA	20.9	9.4	NA	NA	NA	892.0	NA	1.4	0.4	24" RCP		EXISTING CULVERT UNDER CR 77-EXISTING STORAGE
MP4-D3	NA	6	20	NA	72	NA	4.09	NA	19.93	2.81	NA	NA	6.1	2.3	NA	NA	NA	901.7	NA	0.6	0.3		30"	PROPOSED OUTLET CONTROL STRUCTURE & BERM FOR RATE CONTROL AND MAXIMIZE STORAGE
MP4-D4	NA	27.5	25	NA	74	NA	19.01	NA	85.35	12.79	NA	NA	7.9	10.4	NA	NA	NA	900.0	NA	3.9	7.9		15" RCP	PROPOSED CULVERT FOR RATE CONTROL AND MAXIMIZE STORAGE
MP4-E	22.5	22.7	30.6	58	73	1.52	12.58	NA	59.71	10.45	20.5	NA	8.3	7.6	NA	NA	900.0	900.0	0.7	3.7	3.0		18" CMP	THOLE LAKE EXISTING CULVERT-SURVEY DATA-RECOMMEND CONTROL STRUCTURE TO STOP FISH MIGRATION TO THE NORTH
MP5-A	109.1	286.7	69.6	75	84	38.66	183.36	NA	575.95	123.07	40.3	NA	3.8	7.5	NA	NA	946.0	942.6	100.1	137.3	253.7	4' X 5' BOX		EXISTING STRUCTURE UNDER CSAH 15-INFILTRATION AREA-POTENTIAL RATE CONTROL
MP5-B	109.1	109.1	55.5	53	71	1.55	32.94	NA	176.31	48.08	42.4	NA	26.4	29.8	NA	NA	950.0	944.8	2.6	14.9	15.6	24" CMP		SW CELL OF THOLE LAKE @ NE QUAD OF CSAH 15 & CSAH 14
MP5-C	45.2	50.2	50.3	77	84	23.71	40.67	NA	127.91	22.31	18.9	NA	7.7	10.4	NA	NA	950.0	943.0	102.5	29.8	35.9	24" CMP		EXISTING CULVERT UNDER CSAH 15-WEST TO EAST FLOW
MP5-D	42.7	42.7	18.8	56	72	1.38	30.28	NA	146.94	20.07	58.2	NA	30.4	20.3	NA	NA	950.0	946.7	0.8	4.4	1.1	24" CMP		EXISTING CULVERT UNDER CSAH 14 TO THE NORTH FROM THE SW QUAD TO NW QUAD
MP5-E	15	13.7	20.4	55	72	0.47	9.19	NA	45.06	6.42	11.4	NA	11.7	5.0	NA	NA	960.0	952.2	0.4	1.4	0.8	24" RCP		EXISTING CULVERT UNDER CSAH 14 TO THE NORTH FROM THE SE QUAD TO NE QUAD
MP5-F	24.8	24.8	18.7	55	72	0.8	17.59	NA	85.74	11.66	14.7	NA	8.0	6.3	NA	NA	950.0	946.3	1.9	3.3	2.8	24" CMP		EXISTING CULVERT FROM STORAGE AREA IN DEVELOPMENT WEST OF THOLE LAKE.
MP5-G	25.7	26.8	20	62	75	5.24	23.11	NA	97.85	12.57	9.0	9.0	0.0	0.7	0.0	0.7	948.0	945.2	2.6	9.9	16.1	12" CMP		EXISTING CULVERT FROM DEPRESSION IN DEVELOPMENT WEST OF THOLE LAKE.
MP5-H	9.2	9.2	20	66	77	3.38	9.12	NA	35.6	4.32	9.0	NA	1.8	1.5	NA	NA	950.0	947.3	0.6	1.7	1.5	2-24" CMP & 18" CMP		SCHNEIDER LAKE OUTLET CULVERTS-SAP 70-614-01 - SHEET 3 UNABLE TO FIELD LOCATE CULVERTS
MP5-I	99.2	99.2	17	75	84	94.5	162.87	NA	497.8	46.77	55.1	NA	13.1	16.8	NA	NA	948.0	942.6	13.4	56.3	106.3	18" RCP		EXISTING CULVERT FIELD SURVEY IN DEVELOPED AREA.
MP5-J	11.3	11.3	20	60	74	1.57	9.04	NA	40.02	5.3	2.8	2.8	0.0	0.3	0.0	0.3	950.0	947.0	0.8	3.0	5.1	18" RCP		EXISTING CULVERT FIELD SURVEY IN DEVELOPED AREA.
MP5-K	28	28	43.8	58	73	1.59	11.95	NA	57.8	12.59	NA	2.7	1.3	4.7	1.3	4.7	NA	945.1	NA	6.7	8.4		24" RCP	PROPOSED CULVERT-UNABLE TO FIELD LOCATE CULVERT IN DRIVEWAY
MP5-L	162	152	139.3	63	76	10.13	34.63	NA	144.99	57.31	46.2	NA	15.8	19.6	NA	NA	948.0	948.0	39.7	104.7	147.3	OVERLAND		LARGE WETLAND SW OF MP5-L AND SCHNEIDER LAKE-NO CULVERT IDENTIFIED IN FIELD SURVEY
MP5-M	81.1	81.1	98.8	61	74	5.13	20.56	NA	94.04	32.99	79.7	NA	73.0	61.8	NA	NA	950.0	950.0	13.0	12.3	14.8	36" RCP		EXISTING CULVERT UNDER CSAH 15
MP5-N	143.4	143.4	55.3	55	72	3.52	47.25	NA	240.99	63.17	93.8	86.5	45.7	41.5	45.7	41.4	950.0	946.8	7.8	23.0	18.6	OVERLAND		POTENTIAL STORAGE AREA AND RATE CONTROL W/CULVERT

CITY OF SHAKOPEE
COMPREHENSIVE STORMWATER MANAGEMENT PLAN
MILL POND WATERSHED 100-YEAR EVENT

SUB-WATERSHED NUMBER	PRE SETTLEMENT AREA (Acre)	FULLY DEVELOPED AREA (Acre)	Tc (min)	SCS CN		PEAK RUNOFF RATE (cfs)		PEAK RUNOFF cfs			PRE-SETTLEMENT PEAK DISCHARGE RATE		FULLY DEVELOPED PEAK DISCHARGE RATE				NWL		REQUIRED STORAGE (ac-ft)			POND OUTLET DESCRIPTION FULLY DEVELOPED CONDITION		
				PRE SETTLEMENT	FULLY DEVELOPED	PRE SETTLEMENT	FULLY DEVELOPED	PRE-SETTLEMENT	100-YR 24-HR FULLY DEVELOPED	100-YR 10-DAY FULLY DEVELOPED	PEAK OUTFLOW FROM POND (cfs)	PEAK FLOW IN CHANNEL (cfs)	100-YR 24-HR PEAK OUTFLOW FROM POND (cfs)	100-YR 10-DAY PEAK OUTFLOW FROM POND (cfs)	100-YR 24-HR PEAK FLOW IN CHANNEL (cfs)	100-YR 10-DAY PEAK FLOW IN CHANNEL (cfs)	PRE SETTLEMENT	FULLY DEVELOPED	PRE SETTLEMENT	100-YR 24-HR FULLY DEVELOPED	100-YR 10-DAY FULLY DEVELOPED	EXISTING	PROPOSED	COMMENTS
MP5-O	99.3	100.6	66.9	60	74	6.68	34.01	NA	157.36	43.37	79.6	NA	117.2	55.9	NA	NA	950.0	950.0	0.6	13.5	8.9	24" CMP		EXISTING CENTERLINE CULVERT UNDER CR 73 - EOF TO EAST - SURVEY DATA
MP5-P	29.5	29.5	87.8	55	72	0.63	6.86	NA	35.07	12.24	9.0	8.6	11.0	8.1	10.9	8.1	968.0	962.6	1.0	3.4	2.6	18" CMP		EXISTING CENTERLINE CULVERT UNDER CR 73 - EOF TO EAST - STORAGE WEST OF ROAD
MP5-Q	21.4	21.4	22.8	55	72	0.66	13.36	NA	65.75	9.99	7.7	6.7	0.0	17.9	0.0	6.5	964.0	958.9	0.8	5.3	6.2	18" RCP		O'DOWD LAKE OUTLET TO THOLE LAKE - EXISTING CULVERT TO WEST
MP6-A	602.7	602.7	60	78	86	297.56	479.09	NA	1416.91	263.41	10.9	NA	0.8	0.9	NA	NA	946.0	942.6	164.3	293.8	538.2	OVERLAND		DEPRESSION WEST OF CR 79 - SURVEY DATA OF CULVERT
MP6-B	53.9	54	30	59	74	4.65	32.87	NA	149.06	24.9	50.0	NA	110.5	23.7	NA	NA	950.0	950.0	1.7	2.9	1.0	24" RCP		SE QUAD OF CR 78 & CR 79 - GOLF COURSE POND - PROPOSED CONTROL STRUCTURE WITH 12" RCP INLET TO 24" RCP OUTLET
MPE1-A	46.2	46.2	77.1	67	67	7.31	7.31	NA	50.06	19.53	16.3	16.3	16.3	23.3	16.3	23.3	898.3	898.3	16.7	16.7	17.7	18" RCP		EXISTING CENTERLINE CULVERT UNDER CR 79 - WEST TO EAST FLOW TO GOLF COURSE
MPE1-B	13	13	30	65	65	3.14	3.14	NA	25.59	5.99	8.6	NA	8.6	5.1	NA	NA	907.0	907.0	0.9	0.9	0.5	18" RCP		EXISTING CENTERLINE CULVERT UNDER CR 79 - WEST TO EAST FLOW TO GOLF COURSE

2. Minnesota River Watershed

CITY OF SHAKOPEE
COMPREHENSIVE STORMWATER MANAGEMENT PLAN
MINNESOTA RIVER WATERSHED 1-YEAR EVENT

SUB-WATERSHED NUMBER	FULLY DEVELOPED AREA (Acre)	Tc (min)	SCS CN	PEAK RUNOFF RATE	FULLY DEVELOPED PEAK DISCHARGE RATE		NWL	REQUIRED STORAGE (ac-ft)	
			FULLY DEVELOPED	FULLY DEVELOPED	PEAK OUTFLOW FROM POND (cfs)	PEAK FLOW IN CHANNEL (cfs)	FULLY DEVELOPED	FULLY DEVELOPED	COMMENTS
MR1A	69.2	35	85	58.0	39.9	NA	725.0	6.4	VALLEY PARK 1ST ADDITION
MR1B	51.7	30	89	132.3	82.1	NA	736.0	9.2	VALLEY PARK 6TH ADDITION
MR1C	62.2	30	85	140.8	116.9	NA	740.0	0.7	VALLEY PARK 5TH ADDITION
MR1D	10.1	25	85	25.6	7.5	NA	727.0	1.1	VALLEY PARK 1ST ADDITION
MR1E	6.2	15	89	22.9	3.4	NA	746.0	0.6	VALLEY PARK 1ST ADDITION
MR2A	84.8	40	85	159.2	20.7	NA	719.3	10.4	SOUTHEAST QUAD OF CR 83 & TH 101
MR3A	85.6	20	81	212.7	11.5	NA	733.5	11.3	SOUTH OF 4TH AVE & CERTAINTEED
MR3B	117.4	30	83	248.3	4.9	NA	735.0	19.3	SOUTH OF 4TH AVE & CERTAINTEED
MR3C	29.9	35	71	33.8	2.6	NA	728.8	2.2	SOUTHWEST QUAD OF CR 83 & TH 101
MR4A	20.6	34.8	64	15.1	46.4	NA	724.8	3.0	CERTAINTEED
MR4B	8.3	12	91	35.1	2.2	NA	733.2	1.3	CERTAINTEED
MR4C	8.5	9.6	91	36.8	28.5	NA	727.9	0.6	CERTAINTEED
MR4D	7.1	24	88	20.1	17.0	NA	730.1	0.2	CERTAINTEED
MR4E	9.7	21.6	92	32.4	31.9	NA	726.6	1.0	CERTAINTEED
MR4F	15.1	19.8	93	53.6	23.1	NA	729.6	1.5	CERTAINTEED
MR4G	18.6	20	94	67.0	12.0	NA	730.5	6.8	SCHERER BROS.
MR4H	8.1	13	88	30.9	18.2	NA	731.5	0.5	SCHERER BROS.
MR5A	53.4	30	89	136.7	9.0	NA	730.0	8.7	UNDEV. AREA EAST OF SHENANDOAH DRIVE.
MR6A	26.3	25	85	66.6	14.5	NA	730.0	3.3	UNDEV. AREA EAST OF SHENANDOAH
MR6B	20.4	25	85	51.6	6.4	NA	731.0	2.2	SPUC FACILITY
MR6C	74.4	30	80	140.8	8.3	NA	731.5	16.7	UNDEV. AREA WEST OF SHENANDOAH & NORTH OF 4TH AVE.
MR6D	7.6	25	75	13.0	4.5	NA	744.0	0.4	SOUTH EAST QUAD OF SHENANDOAH & 4TH AVE.

CITY OF SHAKOPEE
COMPREHENSIVE STORMWATER MANAGEMENT PLAN
MINNESOTA RIVER WATERSHED 10-YEAR EVENT

SUB-WATERSHED NUMBER	FULLY DEVELOPED AREA (Acre)	Tc (min)	SCS CN	PEAK RUNOFF RATE	FULLY DEVELOPED PEAK DISCHARGE RATE		NWL	REQUIRED STORAGE (ac-ft)	
			FULLY DEVELOPED	FULLY DEVELOPED	PEAK OUTFLOW FROM POND (cfs)	PEAK FLOW IN CHANNEL (cfs)	FULLY DEVELOPED	FULLY DEVELOPED	COMMENTS
MR1A	69.2	35	85	141.2	124.4	NA	725.0	10.8	VALLEY PARK 1ST ADDITION
MR1B	51.7	30	89	132.3	82.1	NA	736.0	9.2	VALLEY PARK 6TH ADDITION
MR1C	62.2	30	85	140.8	116.9	NA	740.0	0.7	VALLEY PARK 5TH ADDITION
MR1D	10.1	25	85	25.6	7.5	NA	727.0	1.1	VALLEY PARK 1ST ADDITION
MR1E	6.2	15	89	22.9	3.4	NA	746.0	0.6	VALLEY PARK 1ST ADDITION
MR2A	84.8	40	85	159.2	20.7	NA	719.3	10.4	SOUTHEAST QUAD OF CR 83 & TH 101
MR3A	85.6	20	81	212.7	11.5	NA	733.5	11.3	SOUTH OF 4TH AVE & CERTAINTEED
MR3B	117.4	30	83	248.3	4.9	NA	735.0	19.3	SOUTH OF 4TH AVE & CERTAINTEED
MR3C	29.9	35	71	33.8	2.6	NA	728.8	2.2	SOUTHWEST QUAD OF CR 83 & TH 101
MR4A	20.6	34.8	64	15.1	46.4	NA	724.8	3.0	CERTAINTEED
MR4B	8.3	12	91	35.1	2.2	NA	733.2	1.3	CERTAINTEED
MR4C	8.5	9.6	91	36.8	28.5	NA	727.9	0.6	CERTAINTEED
MR4D	7.1	24	88	20.1	17.0	NA	730.1	0.2	CERTAINTEED
MR4E	9.7	21.6	92	32.4	31.9	NA	726.6	1.0	CERTAINTEED
MR4F	15.1	19.8	93	53.6	23.1	NA	729.6	1.5	CERTAINTEED
MR4G	18.6	20	94	67.0	12.0	NA	730.5	6.8	SCHERER BROS.
MR4H	8.1	13	88	30.9	18.2	NA	731.5	0.5	SCHERER BROS.
MR5A	53.4	30	89	136.7	9.0	NA	730.0	8.7	UNDEV. AREA EAST OF SHENANDOAH DRIVE
MR6A	26.3	25	85	66.6	14.5	NA	730.0	3.3	UNDEV. AREA EAST OF SHENANDOAH
MR6B	20.4	25	85	51.6	6.4	NA	731.0	2.2	SPUC FACILITY
MR6C	74.4	30	80	140.8	8.3	NA	731.5	16.7	UNDEV. AREA WEST OF SHENANDOAH & NORTH OF 4TH AVE.
MR6D	7.6	25	75	13.0	4.5	NA	744.0	0.4	SOUTH EAST QUAD OF SHENANDOAH & 4TH AVE

CITY OF SHAKOPEE
COMPREHENSIVE STORMWATER MANAGEMENT PLAN
MINNESOTA RIVER WATERSHED 100-YEAR EVENT

SUB-WATERSHED NUMBER	FULLY DEVELOPED AREA (Acre)	Tc (min)	SCS CN	PEAK RUNOFF RATE (cfs)		FULLY DEVELOPED PEAK DISCHARGE RATE				NWL	REQUIRED STORAGE (ac-ft)		
			FULLY DEVELOPED	100-YR 10-DAY	100-YR 24-HR FULLY DEVELOPED	100-YR 10-DAY PEAK OUTFLOW FROM POND (cfs)	100-YR 24-HR PEAK OUTFLOW FROM POND (cfs)	100-YR 10 DAY PEAK FLOW IN CHANNEL (cfs)	100-YR 24-HR PEAK FLOW IN CHANNEL (cfs)	FULLY DEVELOPED	100-YR 10-DAY	100-YR 24-HR FULLY DEVELOPED	COMMENTS
MR1A	69.2	35	85	31.6	230.0	61.0	240.4	NA	NA	725.0	9.6	12.3	VALLEY PARK 1ST ADDITION
MR1B	51.7	30	89	23.8	204.5	46.0	98.1	NA	NA	736.0	2.3	16.1	VALLEY PARK 6TH ADDITION
MR1C	62.2	30	85	28.7	227.4	28.7	138.3	NA	NA	740.0	0.1	2.7	VALLEY PARK 5TH ADDITION
MR1D	10.1	25	85	4.7	41.3	5.3	9.2	NA	NA	727.0	0.6	1.8	VALLEY PARK 1ST ADDITION
MR1E	6.2	15	89	2.9	35.2	2.2	3.9	NA	NA	746.0	0.2	1.1	VALLEY PARK 1ST ADDITION
MR2A	84.8	40	85	38.41	257.8	18.71	28.14	NA	NA	719.3	8.91	17.9	SOUTHEAST QUAD OF CR 83 & TH 101
MR3A	85.6	20	81	40.15	358.3	17.79	33.87	NA	NA	733.5	16.29	18.1	SOUTH OF 4TH AVE & CERTAINTEED
MR3B	117.4	30	83	54.13	410.4	5.96	6.57	NA	NA	735.0	27.58	33.5	SOUTH OF 4TH AVE & CERTAINTEED
MR3C	29.9	35	71	13.66	66.4	5.15	5.31	NA	NA	728.8	4.06	4.2	SOUTHWEST QUAD OF CR 83 & TH 101
MR4A	20.6	34.8	64	9.42	34.7	40.01	60.74	NA	NA	724.8	2.17	5.3	CERTAINTEED
MR4B	8.3	12	91	3.95	52.8	1.67	9.87	NA	NA	733.2	0.81	1.9	CERTAINTEED
MR4C	8.5	9.6	91	4.04	55.4	7.09	36.17	NA	NA	727.9	0.16	1.1	CERTAINTEED
MR4D	7.1	24	88	3.29	31.3	3.27	23.17	NA	NA	730.1	0.04	0.3	CERTAINTEED
MR4E	9.7	21.6	92	4.54	48.6	24.42	37.73	NA	NA	726.6	0.53	1.7	CERTAINTEED
MR4F	15.1	19.8	93	7.1	79.5	23.07	30.71	NA	NA	729.6	1.41	3.3	CERTAINTEED
MR4G	18.6	20	94	8.72	98.6	23.49	30.2	NA	NA	730.5	7.20	7.3	SCHERER BROS.
MR4H	8.1	13	88	3.84	47.9	19.24	26.47	NA	NA	731.5	0.58	1.0	SCHERER BROS.
MR5A	53.4	30	89	24.62	211.2	9.03	15.62	NA	NA	730.0	8.79	13.6	UNDEV. AREA EAST OF SHENANDOAH DRIVE
MR6A	26.3	25	85	12.23	107.4	16.44	32.96	NA	NA	730.0	3.56	6.1	UNDEV. AREA EAST OF SHENANDOAH
MR6B	20.4	25	85	9.49	83.3	5.24	16.54	NA	NA	731.0	1.19	3.5	SPUC FACILITY
MR6C	74.4	30	80	34.31	241.5	9.99	32.19	NA	NA	731.5	20.57	22.8	UNDEV. AREA WEST OF SHENANDOAH & NORTH OF 4TH AVE.
MR6D	7.6	25	75	3.54	24.0	3.05	20.18	NA	NA	744.0	0.17	0.5	SOUTH EAST QUAD OF SHENANDOAH & 4TH AVE.

3. Rice Lake Watershed

CITY OF SHAKOPEE
COMPREHENSIVE STORMWATER MANAGEMENT PLAN
RICE LAKE WATERSHED 1-YEAR EVENT

SUB-WATERSHED NUMBER	FULLY DEVELOPED AREA (Acre)	Tc (min)	SCS CN	PEAK RUNOFF RATE	FULLY DEVELOPED PEAK DISCHARGE RATE		NWL	REQUIRED STORAGE (ac-ft)	COMMENTS
			FULLY DEVELOPED	FULLY DEVELOPED	PEAK OUTFLOW FROM POND (cfs)	PEAK FLOW IN CHANNEL (cfs)	FULLY DEVELOPED	FULLY DEVELOPED	
RL2	18.3	15	83	23.0	0.8	NA	736.2	6.6	OUTLET NORTH TO MnDOT ROW
RL3	105.8	20	81	99.2	9.3	NA	736.4	9.7	BASIN WEST OF COMMERCIAL PROPERTY
RL4	29.8	15	82	35.2	8.4	NA	738.0	2.1	BASIN NORTH OF SOUTHBRIDGE PARKWAY
RL5	89.0	15	79	85.5	7.3	NA	738.1	3.4	BASIN SOUTH OF SOUTHBRIDGE PARKWAY
RL6	32.2	18	78	25.8	3.6	NA	743.8	0.8	SCHOOL BASIN NORTH OF FUTURE CR 21
RL7	42.5	30	79	26.4	1.3	NA	744.0	1.8	UNDEV. PROPERTY NORTH OF SOUTHBRIDGE PARKWAY

CITY OF SHAKOPEE COMPREHENSIVE STORMWATER MANAGEMENT PLAN RICE LAKE WATERSHED 10-YEAR EVENT									
SUB-WATERSHED NUMBER	FULLY DEVELOPED AREA (Acre)	Tc (min)	SCS CN	PEAK RUNOFF RATE	FULLY DEVELOPED PEAK DISCHARGE RATE		NWL	REQUIRED STORAGE (ac-ft)	
			FULLY DEVELOPED	FULLY DEVELOPED	PEAK OUTFLOW FROM POND (cfs)	PEAK FLOW IN CHANNEL (cfs)	FULLY DEVELOPED	FULLY DEVELOPED	COMMENTS
RL2	18.3	15	83	58.2	26.2	NA	736.2	10.8	OUTLET NORTH TO MnDOT ROW
RL3	105.8	20	81	269.4	50.3	NA	736.4	16.5	BASIN WEST OF COMMERCIAL PROPERTY
RL4	29.8	15	82	91.6	36.7	NA	738.0	5.8	BASIN NORTH OF SOUTHBRIDGE PARKWAY
RL5	89.0	15	79	245.2	41.4	NA	738.1	8.1	BASIN SOUTH OF SOUTHBRIDGE PARKWAY
RL6	32.2	18	78	77.7	12.6	NA	743.8	2.4	SCHOOL BASIN NORTH OF FUTURE CR 21
RL7	42.5	30	79	78.2	5.6	NA	744.0	4.5	UNDEV. PROPERTY NORTH OF SOUTHBRIDGE PARKWAY

CITY OF SHAKOPEE
COMPREHENSIVE STORMWATER MANAGEMENT PLAN
RICE LAKE WATERSHED 100-YEAR EVENT

SUB-WATERSHED NUMBER	FULLY DEVELOPED AREA (Acre)	Tc (min)	SCS CN	PEAK RUNOFF RATE (cfs)		FULLY DEVELOPED PEAK DISCHARGE RATE				NWL	REQUIRED STORAGE (ac-ft)		COMMENTS
			FULLY DEVELOPED	100-YR 10-DAY	100-YR 24-HR FULLY DEVELOPED	100-YR 10-DAY PEAK OUTFLOW FROM POND (cfs)	100-YR 24-HR PEAK OUTFLOW FROM POND (cfs)	100-YR 10-DAY PEAK FLOW IN CHANNEL (cfs)	100-YR 24-HR PEAK FLOW IN CHANNEL (cfs)	FULLY DEVELOPED	100-YR 10-DAY	100-YR 24-HR FULLY DEVELOPED	
RL2	18.3	15	83	8.7	95.5	53.5	55.4	NA	NA	736.2	13.7	13.9	OUTLET NORTH TO MnDOT ROW
RL3	105.8	20	81	49.62	455.1	52.5	85.4	NA	NA	736.4	22.7	23.2	BASIN WEST OF COMMERCIAL PROPERTY
RL4	29.8	15	82	14.1	152.0	35.0	50.3	NA	NA	738.0	9.4	10.3	BASIN NORTH OF SOUTHBRIDGE PARKWAY
RL5	89.0	15	79	42.1	422.2	30.0	69.9	NA	NA	738.1	11.2	14.1	BASIN SOUTH OF SOUTHBRIDGE PARKWAY
RL6	32.2	18	78	15.15	135.9	11.4	16.4	NA	NA	743.8	1.7	4.7	SCHOOL BASIN NORTH OF FUTURE CR 21
RL7	42.5	30	79	19.6	136.1	6.3	6.9	NA	NA	744.0	6.2	8.6	UNDEV. PROPERTY NORTH OF SOUTHBRIDGE PARKWAY

4. Eagle Creek Watershed

CITY OF SHAKOPEE
COMPREHENSIVE STORMWATER MANAGEMENT PLAN
EAGLE CREEK WATERSHED 1-YEAR EVENT

SUB-WATERSHED NUMBER	FULLY DEVELOPED AREA (Acre)	Tc (min)	SCS CN	PEAK RUNOFF RATE	FULLY DEVELOPED PEAK DISCHARGE RATE		NWL	REQUIRED STORAGE (ac-ft)	COMMENTS
			FULLY DEVELOPED	FULLY DEVELOPED	PEAK OUTFLOW FROM POND (cfs)	PEAK FLOW IN CHANNEL (cfs)	FULLY DEVELOPED	FULLY DEVELOPED	
EC-1	69.2	25	74	31.5	4.4	N/A	724.4	3.2	EAGLE CREEK WATERSHED OUTLET EAST TO SAVAGE
EC-10	31.9	25	83	29.8	NA	N/A	NA	NA	SUBWATERSHED TRIBUTARY TO EC5 POND
EC-11	28.2	25	89	37.6	NA	N/A	NA	NA	SUBWATERSHED TRIBUTARY TO EC9 POND
EC-12	4.9	20	85	6.0	21.7	N/A	739.0	0.1	CR 18 ROW DISCHARGING EAST TO EC9
EC-13	12.9	20	89	19.5	1.3	N/A	739.5	0.9	PROPOSED POND WEST OF CR18
EC-14	9.5	20	85	11.6	18.1	N/A	741.0	0.0	DITCH STORAGE NORTHWEST QUAD OF CR21 & SOUTHBRIDGE PARKWAY
EC-15	5.6	20	85	6.8	6.7	N/A	747.0	0.0	EXISTING CULVERT UNDER SOUTHBRIDGE PARKWAY
EC-16	33.2	10	83	50.0	1.3	N/A	747.5	10.9	RIVERSIDE FIELDS 3RD ADD. - SOUTH OF FUTURE CR21
EC-17	9.9	20	83	10.6	0.5	N/A	747.5	2.8	RIVERSIDE BLUFFS POND-SOUTH OF CR21
EC-18	25.9	25	65	3.5	NA	N/A	NA	NA	REARYARD FLOW TO SAVAGE
EC-19	63.8	45	65	5.9	0.5	N/A	910.0	1.0	PROPOSED POND FOR RATE CONTROL-BOILING SPRINGS
EC-2	31.5	20	81	29.6	2.4	N/A	732.0	1.1	PROPOSED POND-RATE CONTROL
EC-20	29.4	25	70	8.6	1.1	N/A	750.0	0.4	EXISTING POND WEST OF EAGLE CREEK-OUTLETS TO SAVAGE
EC-21	31.8	30	65	3.8	NA	N/A	NA	NA	OUTLETS TO SAVAGE
EC-22	3.6	20	65	0.6	NA	N/A	NA	NA	REARYARD FLOW TO SAVAGE
EC-3	12.8	20	81	12.0	2.3	N/A	734.0	3.0	EXISTING POND
EC-4	7.6	20	81	7.1	1.9	N/A	736.0	0.2	PROPOSED POND
EC-5	49.9	20	83	53.5	2.7	N/A	735.0	11.9	SCOTT COUNTY TRANSIT SITE-SOUTHBRIDGE DEV. POND-NE
EC-6	8.3	20	85	10.1	8.3	N/A	736.1	0.1	AREA EAST OF STAGECOACH ROAD-DITCH STORAGE
EC-7	1.2	20	81	1.1	0.0	N/A	736.0	0.1	SOUTHBRIDGE DEVELOPMENT POND-SW
EC-8	14.9	25	77	8.9	0.9	N/A	735.5	1.4	SOUTHBRIDGE DEVELOPMENT POND-SE
EC-9	26.3	20	89	40.0	10.1	N/A	736.0	4.5	SOUTHBRIDGE DEVELOPMENT POND-NW

CITY OF SHAKOPEE
COMPREHENSIVE STORMWATER MANAGEMENT PLAN
EAGLE CREEK WATERSHED 10-YEAR EVENT

SUB-WATERSHED NUMBER	FULLY DEVELOPED AREA (Acre)	Tc (min)	SCS CN	PEAK RUNOFF RATE	FULLY DEVELOPED PEAK DISCHARGE RATE		NWL	REQUIRED STORAGE (ac-ft)	COMMENTS
			FULLY DEVELOPED	FULLY DEVELOPED	PEAK OUTFLOW FROM POND (cfs)	PEAK FLOW IN CHANNEL (cfs)	FULLY DEVELOPED	FULLY DEVELOPED	
EC-1	69.2	25	74	115.4	9.7	N/A	724.4	7.5	EAGLE CREEK WATERSHED OUTLET EAST TO SAVAGE
EC-10	31.9	25	83	76.5	NA	N/A	NA	NA	SUBWATERSHED TRIBUTARY TO EC5 POND
EC-11	28.2	25	89	81.7	NA	N/A	NA	NA	SUBWATERSHED TRIBUTARY TO EC9 POND
EC-12	4.9	20	85	14.4	41.5	N/A	739.0	0.4	CR 18 ROW DISCHARGING EAST TO EC9
EC-13	12.9	20	89	42.4	2.1	N/A	739.5	2.2	PROPOSED POND WEST OF CR18
EC-14	9.5	20	85	27.9	35.2	N/A	741.0	0.2	DITCH STORAGE NORTHWEST QUAD OF CR21 & SOUTHBRIDGE PARKWAY
EC-15	5.6	20	85	16.5	15.6	N/A	747.0	0.1	EXISTING CULVERT UNDER SOUTHBRIDGE PARKWAY
EC-16	33.2	10	83	125.1	3.2	N/A	747.5	13.9	RIVERSIDE FIELDS 3RD ADD. - SOUTH OF FUTURE CR21
EC-17	9.9	20	83	27.0	1.2	N/A	747.5	3.6	RIVERSIDE BLUFFS POND-SOUTH OF CR21
EC-18	25.9	25	65	26.0	NA	N/A	NA	NA	REARYARD FLOW TO SAVAGE
EC-19	63.8	45	65	42.1	2.1	N/A	910.0	4.2	PROPOSED POND FOR RATE CONTROL-BOILING SPRINGS
EC-2	31.5	20	81	80.2	3.7	N/A	732.0	3.6	PROPOSED POND-RATE CONTROL
EC-20	29.4	25	70	40.1	4.8	N/A	750.0	1.6	EXISTING POND WEST OF EAGLE CREEK-OUTLETS TO SAVAGE
EC-21	31.8	30	65	28.1	NA	N/A	NA	NA	OUTLETS TO SAVAGE
EC-22	3.6	20	65	4.1	NA	N/A	NA	NA	REARYARD FLOW TO SAVAGE
EC-3	12.8	20	81	32.6	7.5	N/A	734.0	3.8	EXISTING POND
EC-4	7.6	20	81	19.4	3.8	N/A	736.0	0.6	PROPOSED POND
EC-5	49.9	20	83	136.6	4.2	N/A	735.0	27.4	SCOTT COUNTY TRANSIT SITE-SOUTHBRIDGE DEV. POND-NE
EC-6	8.3	20	85	24.4	19.8	N/A	736.1	0.7	AREA EAST OF STAGECOACH ROAD-DITCH STORAGE
EC-7	1.2	20	81	3.0	0.0	N/A	736.0	0.2	SOUTHBRIDGE DEVELOPMENT POND-SW
EC-8	14.9	25	77	28.4	2.1	N/A	735.5	2.8	SOUTHBRIDGE DEVELOPMENT POND-SE
EC-9	26.3	20	89	86.8	20.5	N/A	736.0	10.7	SOUTHBRIDGE DEVELOPMENT POND-NW

CITY OF SHAKOPEE
COMPREHENSIVE STORMWATER MANAGEMENT PLAN
EAGLE CREEK WATERSHED 100-YEAR EVENT

SUB-WATERSHED NUMBER	FULLY DEVELOPED AREA (Acre)	Tc (min)	SCS CN	PEAK RUNOFF RATE (cfs)		FULLY DEVELOPED PEAK DISCHARGE RATE				NWL	REQUIRED STORAGE (ac-ft)		COMMENTS
			FULLY DEVELOPED	100-YR 10-DAY	100-YR 24-HR FULLY DEVELOPED	100-YR 10-DAY PEAK OUTFLOW FROM POND (cfs)	100-YR 24-HR PEAK OUTFLOW FROM POND (cfs)	100-YR 10 DAY PEAK FLOW IN CHANNEL (cfs)	100-YR 24-HR PEAK FLOW IN CHANNEL (cfs)	FULLY DEVELOPED	100-YR 10-DAY	100-YR 24-HR FULLY DEVELOPED	
EC-1	69.2	25	74	32.2	214.8	12.7	12.3	N/A	N/A	724.4	19.4	17.6	EAGLE CREEK WATERSHED OUTLET EAST TO SAVAGE
EC-10	31.9	25	83	14.8	126.0	NA	NA	NA	N/A	NA	NA	NA	SUBWATERSHED TRIBUTARY TO EC5 POND
EC-11	28.2	25	89	13.1	126.1	NA	NA	NA	N/A	NA	NA	NA	SUBWATERSHED TRIBUTARY TO EC9 POND
EC-12	4.9	20	85	2.3	23.2	12.6	46.7	NA	N/A	739.0	0.2	0.6	CR 18 ROW DISCHARGING EAST TO EC9
EC-13	12.9	20	89	6.0	65.4	1.0	1.8	NA	N/A	739.5	2.7	3.8	PROPOSED POND WEST OF CR18
EC-14	9.5	20	85	4.5	45.0	9.8	38.2	NA	N/A	741.0	0.0	0.6	DITCH STORAGE NORTHWEST QUAD OF CR21 & SOUTHBRIDGE PARKWAY
EC-15	5.6	20	85	2.6	26.5	5.7	21.8	NA	N/A	747.0	0.0	0.1	EXISTING CULVERT UNDER SOUTHBRIDGE PARKWAY
EC-16	33.2	10	83	15.8	204.1	4.3	5.1	NA	N/A	747.5	15.1	17.3	RIVERSIDE FIELDS 3RD ADD. - SOUTH OF FUTURE CR21
EC-17	9.9	20	83	4.6	44.6	1.1	1.4	NA	N/A	747.5	3.9	4.6	RIVERSIDE BLUFFS POND-SOUTH OF CR21
EC-18	25.9	25	65	12.1	57.8	NA	NA	NA	N/A	NA	NA	NA	REARYARD FLOW TO SAVAGE
EC-19	63.8	45	65	28.7	94.9	13.2	7.8	NA	N/A	910.0	8.2	7.3	PROPOSED POND FOR RATE CONTROL-BOILING SPRINGS
EC-2	31.5	20	81	14.8	135.5	3.7	4.5	NA	N/A	732.0	3.7	6.7	PROPOSED POND-RATE CONTROL
EC-20	29.4	25	70	13.7	79.8	6.0	7.0	NA	N/A	750.0	2.5	3.6	EXISTING POND WEST OF EAGLE CREEK-OUTLETS TO SAVAGE
EC-21	31.8	30	65	14.7	62.6	NA	NA	NA	N/A	NA	NA	NA	OUTLETS TO SAVAGE
EC-22	3.6	20	65	1.7	9.1	NA	NA	NA	N/A	NA	NA	NA	REARYARD FLOW TO SAVAGE
EC-3	12.8	20	81	6.0	55.1	6.5	7.9	NA	N/A	734.0	3.6	4.9	EXISTING POND
EC-4	7.6	20	81	3.6	32.7	2.9	3.9	NA	N/A	736.0	0.3	1.2	PROPOSED POND
EC-5	49.9	20	83	23.4	225.2	6.9	6.8	NA	N/A	735.0	43.7	41.8	SCOTT COUNTY TRANSIT SITE-SOUTHBRIDGE DEV. POND-NE
EC-6	8.3	20	85	3.9	39.2	0.9	28.9	NA	N/A	736.1	2.7	1.4	AREA EAST OF STAGECOACH ROAD-DITCH STORAGE
EC-7	1.2	20	81	0.6	5.1	0.0	0.0	NA	N/A	736.0	0.7	0.4	SOUTHBRIDGE DEVELOPMENT POND-SW
EC-8	14.9	25	77	6.9	50.6	1.2	2.3	NA	N/A	735.5	5.1	4.4	SOUTHBRIDGE DEVELOPMENT POND-SE
EC-9	26.3	20	89	12.4	133.9	10.5	22.0	NA	N/A	736.0	18.1	18.5	SOUTHBRIDGE DEVELOPMENT POND-NW

5. Sand Creek Watershed

CITY OF SHAKOPEE
COMPREHENSIVE STORMWATER MANAGEMENT PLAN
SAND CREEK WATERSHED 1-YEAR EVENT

SUB-WATERSHED NUMBER	FULLY DEVELOPED AREA (Acre)	Tc (min)	SCS CN	PEAK RUNOFF RATE	FULLY DEVELOPED PEAK DISCHARGE RATE		NWL	REQUIRED STORAGE (ac-ft)	COMMENTS
			FULLY DEVELOPED	FULLY DEVELOPED	PEAK OUTFLOW FROM POND (cfs)	PEAK FLOW IN CHANNEL (cfs)	FULLY DEVELOPED	FULLY DEVELOPED	
SC1	89.9	37	76	37.3	5.2	NA	940.0	2.2	OUTLET SOUTH ACROSS 150TH ST. TO SC4
SC2	92.5	37	65	9.6	1.0	1	950.0	1.1	OVERLAND FLOW PATH SOUTHWEST TO SC1
SC3	277.1	67	73	55.5	1.0	1.04	948.0	11.0	LARGE WETLAND SOUTHWEST OF 150TH ST.-OUTLET WEST TO SC4
SC4	772.8	147	74	96.6	3.1	NA	938.0	38.7	BASDIN OUTLETS SOUTHWEST ACROSS CITY LIMITS
SC5	30.1	35	73	9.7	1.3	NA	985.0	0.6	DISCHARGE TO THE SOUTH

CITY OF SHAKOPEE
COMPREHENSIVE STORMWATER MANAGEMENT PLAN
SAND CREEK WATERSHED 10-YEAR EVENT

SUB-WATERSHED NUMBER	FULLY DEVELOPED AREA (Acre)	Tc (min)	SCS CN	PEAK RUNOFF RATE	FULLY DEVELOPED PEAK DISCHARGE RATE		NWL	REQUIRED STORAGE (ac-ft)	COMMENTS
			FULLY DEVELOPED	FULLY DEVELOPED	PEAK OUTFLOW FROM POND (cfs)	PEAK FLOW IN CHANNEL (cfs)	FULLY DEVELOPED	FULLY DEVELOPED	
SC1	89.9	37	76	125.0	17.7	NA	940.0	7.4	OUTLET SOUTH ACROSS 150TH ST. TO SC4
SC2	92.5	37	65	70.0	4.6	4.57	950.0	5.2	OVERLAND FLOW PATH SOUTHWEST TO SC1
SC3	277.1	67	73	217.7	3.4	3.36	948.0	35.6	LARGE WETLAND SOUTHWEST OF 150TH ST.-OUTLET WEST TO SC4
SC4	772.8	147	74	352.3	9.8	NA	938.0	122.9	BASDIN OUTLETS SOUTHWEST ACROSS CITY LIMITS
SC5	30.1	35	73	37.7	4.7	NA	985.0	2.1	DISCHARGE TO THE SOUTH

CITY OF SHAKOPEE
COMPREHENSIVE STORMWATER MANAGEMENT PLAN
SAND CREEK WATERSHED 100-YEAR EVENT

SUB-WATERSHED NUMBER	FULLY DEVELOPED AREA (Acre)	Tc (min)	SCS CN	PEAK RUNOFF RATE (cfs)		FULLY DEVELOPED PEAK DISCHARGE RATE				NWL	REQUIRED STORAGE (ac-ft)		COMMENTS
			FULLY DEVELOPED	100-YR 10-DAY	100-YR 24-HR FULLY DEVELOPED	100-YR 10-DAY PEAK OUTFLOW FROM POND (cfs)	100-YR 24-HR PEAK OUTFLOW FROM POND (cfs)	100-YR 10 DAY PEAK FLOW IN CHANNEL (cfs)	100-YR 24-HR PEAK FLOW IN CHANNEL (cfs)	FULLY DEVELOPED	100-YR 10-DAY	100-YR 24-HR FULLY DEVELOPED	
SC1	89.9	37	76	40.9	227.1	27.0	34.2	NA	NA	940.0	11.2	13.8	OUTLET SOUTH ACROSS 150TH ST. TO SC4
SC2	92.5	37	65	42.1	156.7	13.3	10.4	13.3	10.39	950.0	13.4	10.9	OVERLAND FLOW PATH SOUTHWEST TO SC1
SC3	277.1	67	73	119.4	416.4	9.0	6.7	9.0	6.73	948.0	90.5	65.3	LARGE WETLAND SOUTHWEST OF 150TH ST.-OUTLET WEST TO SC4
SC4	772.8	147	74	287.6	663.4	32.0	18.7	NA	NA	938.0	353.5	225.4	BASIN OUTLETS SOUTHWEST ACROSS CITY LIMITS
SC5	30.1	35	73	13.7	71.6	6.5	9.4	NA	NA	985.0	2.8	4.0	DISCHARGE TO THE SOUTH

6. Blue Lake Watershed

CITY OF SHAKOPEE
COMPREHENSIVE STORMWATER MANAGEMENT PLAN
BLUE LAKE WATERSHED 1-YEAR EVENT

SUB-WATERSHED NUMBER	AREA (Acre)	Tc (min)	SCS CN	PEAK RUNOFF RATE (cfs)	FULLY DEVELOPED PEAK DISCHARGE RATE		NWL	REQUIRED STORAGE (ac-ft)	
			FULLY DEVELOPED	FULLY DEVELOPED	PEAK OUTFLOW FROM POND (cfs)	PEAK FLOW IN CHANNEL (cfs)	FULLY DEVELOPED	FULLY DEVELOPED	COMMENTS
BLD4D	22.5	23	70	7.0	9.13	NA	834.0	0.10	RESERVATION-SOUTH OF CITY LIMITS
BLD4E	17.9	35	70	4.1	NA	NA	NA	NA	RESERVATION-SOUTH OF CITY LIMITS
BLD4F	32.5	53	63	1.9	15.44	NA	830.0	0.01	RESERVATION-SOUTH OF CITY LIMITS
BLD4G	68.2	53	73	13.9	13.56	13.56	876.0	0.18	RESERVATION-SOUTH OF CITY LIMITS
BLD4H	9.1	35	72	2.6	0.21	NA	890.0	0.20	RESERVATION-SOUTH OF CITY LIMITS
BLD4I	9.0	24	62	0.6	34.91	NA	830.0	0.04	RESERVATION-SOUTH OF CITY LIMITS
BLD6A	245.0	63	70	37.0	0.06	NA	959.0	8.30	SOUTH OF SHAKOPEE-MYSTIC LAKE
BLD7A	274.4	67	72	49.6	3.34	20.21	813.5	6.21	AREA EAST OF CR 83 & VALLEY VIEW ROAD
BLD8A	118.5	28	74	49.8	2.24	0	808.0	3.32	PARKMEADOWS EAST
BLD8B	62.7	30	70	21.2	3.7	NA	816.0	0.84	PARK MEADOWS
BLD9A	73.8	50	65	6.4	1.37	NA	839.0	1.54	AREA SW OF VALLEY VIEW ROAD & CR83
BLE1A	72.5	45	80	36.6	88.2	NA	744.5	0.49	TH 169 DITCH @ BOX CULVERTS
BLE1B	22.1	20	92	39.1	54.09	NA	747.9	0.32	AREA SW OF TH 169 & CR 83
BLE1C	31.5	20	75	18.4	NA	NA	NA	NA	AREA SOUTH OF CR16 & TH169
BLE1E	26.7	15	92	54.7	29.55	NA	746.0	2.57	VALLEY GREEN CORP CENTER
BLE1F	14.0	15	92	28.7	9.76	NA	747.0	2.72	VALLEY GREEN CORP CENTER
BLE1G	3.6	15	92	7.4	23.6	NA	747.0	1.46	VALLEY GREEN CORP CENTER
BLE1H	32.1	30	92	44.6	33.11	NA	749.5	0.95	VALLEY GREEN CORP CENTER
BLE1I	25.5	15	92	52.1	11.54	NA	747.5	2.38	VALLEY GREEN CORP CENTER
BLE2A	120.8	25	72	44.6	0.86	NA	778.0	4.20	SHAKOPEE GRAVEL SITE
BLE2B	251.6	45	74	75.0	2.12	NA	795.0	10.08	SMSC-AREA SOUTHEAST OF CR 16 & CR 83
BLE2C	56.5	45	74	16.9	1.67	NA	798.0	4.10	DEVELOPMENT SE OF CR16 & CR 83
BLA11A	76.1	30	75	33.6	4.91	NA	743.0	15.04	SOUTHBRIDGE DEVELOPMENT
BLA11B	31.5	25	75	15.8	6.88	NA	743.3	0.36	SOUTHBRIDGE DEVELOPMENT
BLA11C	10.6	30	75	4.7	6.27	NA	748.5	0.00	SOUTHBRIDGE DEVELOPMENT
BLA11D	10.0	20	75	5.8	9.14	NA	744.0	1.67	SOUTHBRIDGE DEVELOPMENT
BLA11E	35.1	25	75	17.6	2.54	NA	743.5	1.29	SOUTHBRIDGE DEVELOPMENT
BLA11F	8.9	20	75	5.2	0.03	NA	745.0	0.44	SOUTHBRIDGE DEVELOPMENT
BLA11G	7.5	25	68	1.7	0	NA	747.9	0.22	SOUTHBRIDGE DEVELOPMENT
BLA11H	26.0	30	75	11.5	0.62	NA	746.0	0.87	SOUTHBRIDGE DEVELOPMENT

CITY OF SHAKOPEE
COMPREHENSIVE STORMWATER MANAGEMENT PLAN
BLUE LAKE WATERSHED 1-YEAR EVENT

SUB-WATERSHED NUMBER	AREA (Acre)	Tc (min)	SCS CN	PEAK RUNOFF RATE (cfs)	FULLY DEVELOPED PEAK DISCHARGE RATE		NWL	REQUIRED STORAGE (ac-ft)	
			FULLY DEVELOPED	FULLY DEVELOPED	PEAK OUTFLOW FROM POND (cfs)	PEAK FLOW IN CHANNEL (cfs)	FULLY DEVELOPED	FULLY DEVELOPED	COMMENTS
BLA11I	11.7	25	75	5.9	0	NA	746.0	0.58	SOUTHBRIDGE DEVELOPMENT
BLA9A1	406.2	45	82	237.0	36.3	NA	742.0	40.11	VALLEY PARK TO KMART POND
BLA9A2	37.3	30	75	16.5	14.38	NA	755.0	0.14	VALLEY PARK TO KMART POND
BLA9A4	13.9	25	85	14.8	NA	NA	NA	NA	VALLEY PARK TO KMART POND
BLA9A5	10.4	30	75	4.6	NA	NA	NA	NA	VALLEY PARK TO KMART POND
BLA9B1	3.6	20	70	1.2	NA	24.04	NA	NA	AREA NE OF CR 83 & TH 169
BLA9B2	34.7	25	89	46.3	16.35	NA	746.0	3.94	AREA NE OF CR 83 & TH 169
BLA9B3	4.9	20	75	2.9	5.88	NA	758.0	0.00	CANTERBURY DOWNS
BLA9B4	8.0	15	89	14.2	NA	NA	NA	NA	CANTERBURY DOWNS
BLA9B5	48.6	30	75	21.6	3.11	NA	745.0	2.54	
BLA9B6	16.3	20	85	19.8	6.8	NA	746.0	1.68	
BLA9B7	31.7	40	82	20.1	0.97	NA	746.0	3.85	CANTERBURY DOWNS
BLA9B8	24.1	35	75	9.5	2.15	NA	746.0	0.52	CANTERBURY DOWNS
BLB2J	11.3	10	76	10.5	0.58	NA	758.0	3.94	RIVERSIDE BLUFFS DEVELOPMENT
BLB2K	75.1	45	76	27.1	0	NA	750.0	14.79	WETLAND AREA EAST OF RIVERSIDE BLUFF & SOUTH OF RIVERSIDE FIELDS
BLB2L	27.9	10	77	26.0	0.74	NA	753.0	6.68	RIVERSIDED FIELDS
BLB2M	22.3	10	76	20.6	0.64	NA	753.0	2.68	RIVERSIDE FIELDS
BLB2N	21.8	20	75	12.7	0.38	NA	753.0	5.65	RIVERSIDE BLUFFS
BLB2O	17.7	20	82	17.8	0.5	NA	750.0	6.46	AREA EAST OF CR18 FLOWS WEST TO BLB2K
BLB2P	58.8	45	78	25.3	5.68	NA	754.0	1.47	
BLB2Q	22.3	22.3	72	8.9	7.45	NA	752.0	0.50	GLACIER ESTATES
BLB2R	23.9	45.9	72	5.7	0.45	NA	776.0	0.59	
BLD10A	203.0	80	65	13.1	16.15	16.2	844.0	5.70	AREA WEST OF CR83 & SOUTH OF VALLEY VIEW ROAD
BLD10B	42.0	30	72	13.7	11.66	NA	846.0	1.87	AREA WEST OF CR83 & SOUTH OF VALLEY VIEW ROAD
BLD11A	187.0	45	65	17.3	16.21	14.59	908.0	0.29	SOUTH OF CITY LIMITS
BLD11B	22.8	20	70	7.8	0.66	NA	924.0	0.38	SOUTH OF CITY LIMITS
BLD11C	32.8	30	70	8.4	0.21	NA	944.0	0.97	SOUTH OF CITY LIMITS
BLD12A	24.6	38	65	2.5	0.06	NA	884.0	0.50	SOUTH OF CITY LIMITS
BLD13A	83.9	48	55	0.6	0.24	17.43	884.0	0.34	SOUTH OF CITY LIMITS
BLD14A	50.7	45	73	13.6	0.93	NA	846.0	1.41	

CITY OF SHAKOPEE
COMPREHENSIVE STORMWATER MANAGEMENT PLAN
BLUE LAKE WATERSHED 1-YEAR EVENT

SUB-WATERSHED NUMBER	AREA (Acre)	Tc (min)	SCS CN	PEAK RUNOFF RATE (cfs)	FULLY DEVELOPED PEAK DISCHARGE RATE		NWL	REQUIRED STORAGE (ac-ft)	
			FULLY DEVELOPED	FULLY DEVELOPED	PEAK OUTFLOW FROM POND (cfs)	PEAK FLOW IN CHANNEL (cfs)	FULLY DEVELOPED	FULLY DEVELOPED	COMMENTS
BLD14B	197.0	60	65	15.3	11.45	NA	854.0	2.07	
BLD14C	203.0	45	65	18.7	0.18	NA	928.0	4.31	
BLD14D	32.5	30	65	3.9	0.18	NA	872.0	0.59	
BLD15A	116.5	45	65	10.9	7.9	7.9	880.0	1.74	
BLD15B	36.5	30	65	4.4	0.03	0.31	904.0	0.78	
BLD15C	31.5	30	70	6.1	NA	0.28	NA	NA	
BLD15D	18.3	20	85	22.2	6.84	6.84	915.5	1.09	
BLD15E	25.6	25	80	19.5	7.11	NA	917.5	0.56	
BLD15F	67.0	30	73	24.3	0.73	NA	921.1	7.61	
BLD16A	13.5	20	65	2.1	1.62	1.28	920.0	0.03	
BLD16B	288.0	70	70	40.2	0.22	NA	925.4	9.65	
BLD17A	666.0	55	70	110.9	0	NA	944.0	23.84	
BLD18A	116.0	45	72	28.0	NA	NA	NA	NA	GREENFIELD DEVELOPMENT
BLD4J	12.3	24	68	2.8	2.8	NA	831.5	0.01	RESERVATION
BLD4K	26.1	22	70	8.4	42.32	NA	843.6	0.03	RESERVATION
BLD4L	20.5	32	70	5.0	23.96	NA	855.5	0.00	RESERVATION
BLD4M	21.3	45	60	0.7	0	NA	889.0	0.26	RESERVATION
BLE1J	14.7	15	89	26.0	6.66	NA	748.5	1.37	VALLEY GREEN CORP CENTER
BLE1K	1.8	10	80	2.2	0.05	NA	746.0	0.07	VALLEY GREEN CORP CENTER
BLB5A1	NA	NA	NA	NA	55.61	NA	765.0	0.24	CR 16 PROPOSED CUVERT CROSSINGS

CITY OF SHAKOPEE
COMPREHENSIVE STORMWATER MANAGEMENT PLAN
BLUE LAKE WATERSHED 10-YEAR EVENT

SUB-WATERSHED NUMBER	AREA (Acre)	Tc (min)	SCS CN	PEAK RUNOFF RATE (cfs)	FULLY DEVELOPED PEAK DISCHARGE RATE		NWL	REQUIRED STORAGE (ac-ft)	
			FULLY DEVELOPED	FULLY DEVELOPED	PEAK OUTFLOW FROM POND (cfs)	PEAK FLOW IN CHANNEL (cfs)	FULLY DEVELOPED	FULLY DEVELOPED	COMMENTS
BLA1	67.0	40.0	73.0	77.21	11.16	272.24	700.0	4.55	OUTFALL TO BLUE LAKE
BLA2	25.6	35	89	59.9	7.7	265.42	706.0	3.58	PRIOR LAKE OUTLET CHANNEL SOUTH OF TH101
BLA3	42.8	41	81	68.6	0	261.58	720.0	8.17	PRIOR LAKE OUTLET CHANNEL BETWEEN RR & TH169
BLA5	144.6	35	85	298.6	0	253.93	722.0	37.42	
BLA7	22.5	17	89	80.7	3.53	NA	740.0	3.49	
BLA8	8.4	20	85	24.6	NA	NA	NA	NA	TH169 ROW TO PRIOR LAKE OUTLET CHANNEL
BLA12	11.4	15	85	38.7	178.57	NA	0.0	0.00	TH169 BOX CULVERTS-MINIMAL CHANNEL STORAGE
BLA4	78.0	44	81	118.9	7.69	NA	728.0	11.53	ADC SITE
BLA4B	40.9	0	89	249.7	3.78	NA	736.0	6.97	ADC SITE
BLA6A	28.7	20	80	70.4	167.25	NA	740.0	44.25	VALLEY PARK WETLAND COMPLEX
BLA6B	60.0	37	81	103.3	12.71	NA	740.0	6.02	VALLEY PARK
BLB1A	408.5	64	88	605.8	144.29	NA	746.9	388.34	VALLEY GREEN CORP CENTER
BLB1B	26.8	15	92	109.8	1.92	NA	749.0	18.86	VALLEY GREEN CORP CENTER
BLB1C	18.9	15	84	62.0	2.02	NA	750.0	5.94	VALLEY GREEN CORP CENTER
BLB1D	41.9	25	82	97.1	5.92	NA	748.5	11.02	VALLEY GREEN CORP CENTER
BLB1E	10.5	25	85	26.9	242.99	NA	746.9	3.62	VALLEY GREEN CORP CENTER
BLB1F	24.0	72.2	70	15.2	1.88	NA	804.0	1.64	VALLEY GREEN CORP CENTER
BLB2A	9.5	25	85	24.5	249.53	NA	747.3	3.20	PLOC UPSTREAM OF FUTURE CR21
BLB2B	3.5	15	98	15.8	0.45	NA	744.0	1.13	FUTURE FIRE STATION
BLB2C	7.9	20	85	20.5	2.28	NA	752.6	1.43	RIDGEVIEW FARMS
BLB2D	32.6	25	74	54.4	12.93	NA	752.2	4.51	RIDGEVIEW FARMS
BLB2E	3.5	20	72	8.1	696.05	NA	747.5	0.54	FUTURE RIDGECREEK
BLB2F	35.1	30	75	54.3	438.45	NA	748.0	22.69	FUTURE RIDGECREEK
BLB2G	54.6	30	79	100.4	10.31	NA	751.5	5.23	FUTURE RIDGECREEK
BLB2H	18.0	25	75	31.4	219.69	NA	748.5	3.16	RIVERSIDE BLUFFS
BLB2I	6.4	20	70	10.0	214.32	NA	755.0	3.16	RIVERSIDE BLUFFS-PLOC DISCHARGE SIMULATED AS POND
BLB3A	28.6	37.7	72	32.7	13.15	NA	812.0	2.28	AREA SOUTH OF CR 16-UPSTREAM OF GLACIER ESTATES
BLB3B	26.8	24.8	72	43.7	25.95	NA	810.2	0.57	AREA SOUTH OF CR 16-UPSTREAM OF GLACIER ESTATES
BLB3C	40.5	36	60	21.1	10.26	NA	895.0	0.55	AREA SOUTH OF CR 16-UPSTREAM OF GLACIER ESTATES
BLB4A	20.2	25	65	20.3	5.55	8	916.0	1.17	SOUTHEAST CORNER OF CITY

CITY OF SHAKOPEE
COMPREHENSIVE STORMWATER MANAGEMENT PLAN
BLUE LAKE WATERSHED 10-YEAR EVENT

SUB-WATERSHED NUMBER	AREA (Acre)	Tc (min)	SCS CN	PEAK RUNOFF RATE (cfs)	FULLY DEVELOPED PEAK DISCHARGE RATE		NWL	REQUIRED STORAGE (ac-ft)	
			FULLY DEVELOPED	FULLY DEVELOPED	PEAK OUTFLOW FROM POND (cfs)	PEAK FLOW IN CHANNEL (cfs)	FULLY DEVELOPED	FULLY DEVELOPED	COMMENTS
BLB4B	37.4	52.4	65	22.0	2.45	NA	942.0	1.89	SOUTHEAST CORNER OF CITY
BLB4C	20.3	37	70	21.1	4.43	NA	970.0	1.21	SOUTHEAST CORNER OF CITY
BLB4D	60.0	66.9	65	29.4	2.82	NA	980.0	3.86	SOUTHEAST CORNER OF CITY
BLB4E	16.0	37.6	65	12.0	0.78	NA	1016.0	0.93	SOUTHEAST CORNER OF CITY
BLB5A	123.8	57.6	66	72.7	10.52	189.76	786.0	9.12	OFFLINE POND ADJACENT TO PLOC-SEE BLB5A1 FOR CR16 FLOWS
BLB5B	11.2	38	75	14.7	2.02	NA	790.0	0.84	AREA SOUTHEAST OF CR16 & PIKE LAKE ROAD
BLB5C	86.5	47.5	72	83.6	11.08	NA	782.0	8.71	AREA SOUTHEAST OF CR16 & FOOTHILL TRAIL
BLB5D	16.2	20	65	18.8	NA	16.01	NA	NA	SOUTH OF CITY LIMITS
BLB5E	12.2	20	65	14.2	NA	13.25	NA	NA	SOUTH OF CITY LIMITS
BLB6A	13.6	20	75	27.2	0.4	NA	805.0	3.41	ELEMENTARY SCHOOL SITE
BLB6B	20.8	25	77	39.7	2.1	NA	805.0	2.05	FUTURE RIDGEVIEW FARMS SOUTH
BLB6C	110.4	30	72	147.5	6.09	NA	805.4	13.28	AREA SOUTHEAST OF FUTURE CR21 & CR16
BLB7A	23.6	25	75	41.2	7.93	NA	800.0	3.72	FUTURE RIDGEVIEW FARMS SOUTH
BLB7B	89.1	30	75	106.9	7.5	NA	812.0	6.61	AREA WEST OF FUTURE CR21 & RIDGEVIEW FARMS SOUTH
BLB7C	28.2	25	75	49.3	2.23	NA	827.0	2.64	
BLB8A	89.0	43	65	60.7	7.96	7.95	850.0	5.12	RAVINE EAST OF FOOTHILL TRAIL
BLB8B	9.1	20	75	18.2	1.3	3.71	956.0	0.74	POND WEST OF CR 18
BLB8C	13.5	25	72	20.4	2.41	NA	982.0	0.82	POND EAST OF CR 18
BLC1B	29.4	25	72	44.5	4.59	NA	884.0	4.62	SOUTH OF CITY LIMITS
BLBC1C	58.6	40.8	72	63.2	NA	NA	NA	NA	SOUTHERN CITY LIMITS
BLBC1D	18.3	25	72	27.7	NA	NA	NA	NA	SOUTHERN CITY LIMITS
BLC1E	14.8	20	72	25.7	1.92	NA	960.0	1.22	SOUTH OF CITY LIMITS
BLD1A	118.8	45	74	132.4	5.92	154.84	802.0	12.30	AREA WEST OF FUTURE CR21-PIKE LAKE ROAD CROSSING TO PLOC
BLD1B	73.0	40	74	88.3	4.11	NA	811.0	7.15	AREA WEST OF FUTURE CR21
BLD1D	126.8	45	70	114.7	82.98	NA	806.0	29.83	RESERVATION
BLD2A	204.0	90	74	135.6	10.96	91.61	810.0	20.37	RESERVATION
BLD3A	75.6	45	72	76.2	NA	NA	NA	NA	RESERVATION-SOUTH OF CITY LIMITS
BLD4A	19.2	35	70	20.8	109.24	NA	819.5	2.24	RESERVATION-SOUTH OF CITY LIMITS
BLD4B	12.7	23.3	70	18.1	107.98	NA	822.0	3.35	RESERVATION-SOUTH OF CITY LIMITS
BLD4C	13.5	35	70	14.6	83.23	NA	827.0	2.23	RESERVATION-SOUTH OF CITY LIMITS

CITY OF SHAKOPEE
COMPREHENSIVE STORMWATER MANAGEMENT PLAN
BLUE LAKE WATERSHED 10-YEAR EVENT

SUB-WATERSHED NUMBER	AREA (Acre)	Tc (min)	SCS CN	PEAK RUNOFF RATE (cfs)	FULLY DEVELOPED PEAK DISCHARGE RATE		NWL	REQUIRED STORAGE (ac-ft)	
			FULLY DEVELOPED	FULLY DEVELOPED	PEAK OUTFLOW FROM POND (cfs)	PEAK FLOW IN CHANNEL (cfs)	FULLY DEVELOPED	FULLY DEVELOPED	COMMENTS
BLD4D	22.5	23	70	32.3	39.36	NA	834.0	0.49	RESERVATION-SOUTH OF CITY LIMITS
BLD4E	17.9	35	70	19.4	NA	NA	NA	NA	RESERVATION-SOUTH OF CITY LIMITS
BLD4F	32.5	53	63	16.4	65.05	NA	830.0	0.09	RESERVATION-SOUTH OF CITY LIMITS
BLD4G	58.2	53	73	54.8	49.59	49.59	876.0	0.63	RESERVATION-SOUTH OF CITY LIMITS
BLD4H	9.1	35	72	11.0	1.3	NA	890.0	0.62	RESERVATION-SOUTH OF CITY LIMITS
BLD4I	9.0	24	62	7.4	90.49	NA	830.0	0.15	RESERVATION-SOUTH OF CITY LIMITS
BLD6A	245.0	63	70	172.3	0.78	NA	959.0	29.30	SOUTH OF SHAKOPEE-MYSTIC LAKE
BLD7A	274.4	67	72	205.8	17	80.69	813.5	25.39	AREA EAST OF CR 83 & VALLEY VIEW ROAD
BLD8A	118.5	28	74	183.5	3.49	0.01	808.0	13.61	PARKMEADOWS EAST
BLD8B	82.7	30	70	99.4	4.2	NA	816.0	6.17	PARK MEADOWS
BLD9A	73.8	50	65	45.0	7.14	NA	839.0	4.55	AREA SW OF VALLEY VIEW ROAD & CR83
BLE1A	72.5	45	80	105.0	186.17	NA	744.5	2.59	TH 169 DITCH @ BOX CULVERTS
BLE1B	22.1	20	92	78.6	137.51	NA	747.9	0.63	AREA SW OF TH 169 & CR 83
BLE1C	31.5	20	75	65.0	NA	NA	NA	NA	AREA SOUTH OF CR16 & TH169
BLE1E	26.7	15	92	109.5	52.31	NA	746.0	7.02	VALLEY GREEN CORP CENTER
BLE1F	14.0	15	82	57.4	24.61	NA	747.0	4.48	VALLEY GREEN CORP CENTER
BLE1G	3.6	15	92	14.8	50.01	NA	747.0	2.32	VALLEY GREEN CORP CENTER
BLE1H	32.1	30	82	90.0	60.68	NA	749.5	1.75	VALLEY GREEN CORP CENTER
BLE1I	25.5	15	92	104.3	31.41	NA	747.5	4.13	VALLEY GREEN CORP CENTER
BLE2A	120.8	25	72	182.8	5.83	NA	778.0	11.30	SHAKOPEE GRAVEL SITE
BLE2B	251.6	45	74	280.3	13.3	NA	795.0	25.68	SMSC-AREA SOUTHEAST OF CR 16 & CR 83
BLE2C	56.5	45	74	62.9	3.36	NA	798.0	8.10	DEVELOPMENT SE OF CR16 & CR 83
BLA11A	76.1	30	75	117.7	36.26	NA	743.0	49.37	SOUTHBRIDGE DEVELOPMENT
BLA11B	31.5	25	75	55.0	14.97	NA	743.3	1.60	SOUTHBRIDGE DEVELOPMENT
BLA11C	10.6	30	75	16.4	8.67	NA	748.5	0.26	SOUTHBRIDGE DEVELOPMENT
BLA11D	19.0	20	75	20.0	43.94	NA	744.0	4.01	SOUTHBRIDGE DEVELOPMENT
BLA11E	35.1	25	75	61.3	22.26	NA	743.5	2.75	SOUTHBRIDGE DEVELOPMENT
BLA11F	8.9	20	75	17.6	0.58	NA	745.0	1.33	SOUTHBRIDGE DEVELOPMENT
BLA11G	7.5	25	68	9.1	0.77	NA	747.9	0.48	SOUTHBRIDGE DEVELOPMENT
BLA11H	26.0	30	75	40.2	3.73	NA	746.0	2.16	SOUTHBRIDGE DEVELOPMENT

CITY OF SHAKOPEE
COMPREHENSIVE STORMWATER MANAGEMENT PLAN
BLUE LAKE WATERSHED 10-YEAR EVENT

SUB-WATERSHED NUMBER	AREA (Acre)	Tc (min)	SCS CN	PEAK RUNOFF RATE (cfs)	FULLY DEVELOPED PEAK DISCHARGE RATE		NWL	REQUIRED STORAGE (ac-ft)	
			FULLY DEVELOPED	FULLY DEVELOPED	PEAK OUTFLOW FROM POND (cfs)	PEAK FLOW IN CHANNEL (cfs)	FULLY DEVELOPED	FULLY DEVELOPED	COMMENTS
BLA11I	11.7	25	75	20.4	0	NA	746.0	1.77	SOUTHBRIDGE DEVELOPMENT
BLA9A1	406.2	45	82	634.8	288.57	NA	743.0	66.78	VALLEY PARK TO KMART POND
BLA9A2	37.3	30	75	57.7	38.22	NA	755.0	0.75	VALLEY PARK TO KMART POND
BLA9A4	13.9	25	85	35.7	NA	NA	NA	NA	VALLEY PARK TO KMART POND
BLA9A5	10.4	30	75	16.1	NA	NA	NA	NA	VALLEY PARK TO KMART POND
BLA9B1	3.6	20	70	5.6	NA	133.41	NA	NA	AREA NE OF CR 83 & TH 169
BLA9B2	34.7	25	89	100.5	82.89	NA	746.0	5.35	AREA NE OF CR 83 & TH 169
BLA9B3	4.9	20	75	9.8	8.13	NA	758.0	0.04	CANTERBURY DOWNS
BLA9B4	8.0	15	89	30.5	NA	NA	NA	NA	CANTERBURY DOWNS
BLA9B5	46.6	30	75	75.2	10.94	NA	745.0	6.53	
BLA9B6	16.3	20	85	47.7	18.45	NA	746.0	2.54	
BLA9B7	31.7	40	82	53.7	3.05	NA	746.0	6.66	CANTERBURY DOWNS
BLA9B8	24.1	35	75	33.6	6.7	NA	746.0	1.75	CANTERBURY DOWNS
BLB2J	11.3	10	76	33.1	1.81	NA	758.0	4.60	RIVERSIDE BLUFFS DEVELOPMENT
BLB2K	75.1	45	76	91.8	3.15	NA	750.0	45.03	WETLAND AREA EAST OF RIVERSIDE BLUFF & SOUTH OF RIVERSIDE FIELDS
BLB2L	27.9	10	77	84.8	3.24	NA	753.0	9.69	RIVERSIDED FIELDS
BLB2M	22.3	10	76	65.0	3.18	NA	753.0	4.22	RIVERSIDE FIELDS
BLB2N	21.8	20	75	43.5	2.32	NA	753.0	6.84	RIVERSIDE BLUFFS
BLB2O	17.7	20	82	46.7	7.16	NA	750.0	14.72	AREA EAST OF CR18 FLOWS WEST TO BLB2K
BLB2P	58.6	45	78	78.5	12.59	NA	754.0	6.23	
BLB2Q	22.3	22.3	72	36.3	32.21	NA	752.0	1.93	GLACIER ESTATES
BLB2R	23.9	45.9	72	23.6	1.64	NA	776.0	1.95	
BLD10A	203.0	80	65	86.8	54.38	55.07	844.0	38.39	AREA WEST OF CR83 & SOUTH OF VALLEY VIEW ROAD
BLD10B	42.0	30	72	56.1	85.51	NA	846.0	6.55	AREA WEST OF CR83 & SOUTH OF VALLEY VIEW ROAD
BLD11A	187.0	45	65	123.4	33.7	33.67	908.0	6.42	SOUTH OF CITY LIMITS
BLD11B	22.8	20	70	35.7	5.74	NA	924.0	1.21	SOUTH OF CITY LIMITS
BLD11C	32.8	30	70	39.4	1.54	NA	944.0	2.74	SOUTH OF CITY LIMITS
BLD12A	24.8	38	65	18.6	0.7	NA	884.0	1.78	SOUTH OF CITY LIMITS
BLD13A	83.9	48	55	21.0	3.41	65.01	884.0	1.87	SOUTH OF CITY LIMITS
BLD14A	50.7	45	73	53.8	3.81	NA	846.0	4.32	

CITY OF SHAKOPEE
COMPREHENSIVE STORMWATER MANAGEMENT PLAN
BLUE LAKE WATERSHED 10-YEAR EVENT

SUB-WATERSHED NUMBER	AREA (Acre)	Tc (min)	SCS CN	PEAK RUNOFF RATE (cfs)	FULLY DEVELOPED PEAK DISCHARGE RATE		NWL	REQUIRED STORAGE (ac-ft)	
			FULLY DEVELOPED	FULLY DEVELOPED	PEAK OUTFLOW FROM POND (cfs)	PEAK FLOW IN CHANNEL (cfs)	FULLY DEVELOPED	FULLY DEVELOPED	COMMENTS
BLD14B	197.0	60	65	105.0	91.67	NA	854.0	7.17	
BLD14C	203.0	45	65	133.9	3.51	NA	928.0	16.71	
BLD14D	32.5	30	65	28.7	1.52	NA	872.0	1.92	
BLD15A	118.5	45	65	78.2	49.75	49.71	880.0	4.50	
BLD15B	36.5	30	65	32.2	0.74	2.42	904.0	2.95	
BLD15C	31.5	30	70	37.9	NA	1.84	NA	NA	
BLD15D	18.3	20	85	53.6	15.91	15.91	915.5	2.52	
BLD15E	25.6	25	80	55.1	12.61	NA	917.5	1.86	
BLD15F	67.0	30	73	94.1	4.16	NA	921.1	11.58	
BLD16A	13.5	20	85	15.7	15.22	14.16	920.0	0.07	
BLD16B	288.0	70	70	187.7	2.07	NA	925.4	33.49	
BLD17A	866.0	55	70	518.3	1.74	NA	944.0	90.43	
BLD18A	116.0	45	72	116.9	NA	NA	NA	NA	GREENFIELD DEVELOPMENT
BLD4J	12.3	24	68	15.4	13.11	NA	831.5	0.12	RESERVATION
BLD4K	26.1	22	70	38.5	77.96	NA	843.6	0.11	RESERVATION
BLD4L	20.5	32	70	23.5	75.29	NA	855.3	0.02	RESERVATION
BLD4M	21.3	45	60	9.4	0	NA	889.0	1.53	RESERVATION
BLE1J	14.7	15	89	55.9	14.22	NA	748.5	2.21	VALLEY GREEN CORP CENTER
BLE1K	1.8	10	80	6.0	0.06	NA	746.0	0.26	VALLEY GREEN CORP CENTER
BLB5A1	NA	NA	NA	NA	212.72	NA	765.0	0.67	CR 18 PROPOSED CULVERT CROSSINGS

CITY OF SHAKOPEE
COMPREHENSIVE STORMWATER MANAGEMENT PLAN
BLUE LAKE WATERSHED 100-YEAR EVENT

SUB-WATERSHED NUMBER	AREA (Acre)	Tc (min)	SCS CN	PEAK RUNOFF RATE (cfs)		FULLY DEVELOPED PEAK DISCHARGE RATE				NWL	REQUIRED STORAGE (ac-ft)		COMMENTS
			FULLY DEVELOPED	100-YR 10-DAY	100-YR 24-HR FULLY DEVELOPED	100-YR 10-DAY PEAK OUTFLOW FROM POND (cfs)	100-YR 24-HR PEAK OUTFLOW FROM POND (cfs)	100-YR 10-DAY PEAK FLOW IN CHANNEL (cfs)	100-YR 24-HR PEAK FLOW IN CHANNEL (cfs)	FULLY DEVELOPED	100-YR 10-DAY	100-YR 24-HR FULLY DEVELOPED	
BLA1	67.0	40.0	73.0	30.4	146.8	15.84	22.0	658.9	542.3	700.0	5.99	8.69	OUTFALL TO BLUE LAKE
BLA2	25.6	35	89	11.7	92.7	5.4	7.7	649.5	533.7	706.0	2.61	6.04	PRIOR LAKE OUTLET CHANNEL SOUTH OF TH101
BLA3	42.8	41	81	19.4	116.6	1.8	0.0	646.0	527.5	720.0	21.63	13.85	PRIOR LAKE OUTLET CHANNEL BETWEEN RR & TH169
BLA5	144.6	35	85	66.1	483.2	0.0	0.0	636.0	516.1	722.0	96.90	60.66	
BLA7	22.5	17	89	10.6	124.2	3.2	3.9	NA	NA	740.0	2.28	5.79	
BLA8	8.4	20	85	3.9	39.6	NA	NA	NA	NA	NA	NA	NA	TH169 ROW TO PRIOR LAKE OUTLET CHANNEL
BLA12	11.4	15	85	5.4	62.1	504.3	355.4	NA	NA	0.0	0.00	0.00	TH169 BOX CULVERTS-MINIMAL CHANNEL STORAGE
BLA4	78.0	44	81	35.1	202.2	10.0	11.5	NA	NA	728.0	12.26	18.86	ADC SITE
BLA4B	40.9	0	89	19.8	379.7	3.2	4.0	NA	NA	736.0	5.16	11.86	ADC SITE
BLA6A	28.7	20	80	13.5	120.4	238.7	300.8	NA	NA	740.0	62.90	86.92	VALLEY PARK WETLAND COMPLEX
BLA6B	60.0	37	81	27.3	175.5	8.8	14.9	NA	NA	740.0	6.95	11.36	VALLEY PARK
BLB1A	408.3	64	88	177.0	960.7	458.3	313.1	NA	NA	746.9	641.01	542.49	VALLEY GREEN CORP CENTER
BLB1B	26.8	15	92	12.7	164.2	2.1	2.4	NA	NA	749.0	19.82	22.52	VALLEY GREEN CORP CENTER
BLB1C	18.9	15	84	8.9	100.6	1.7	2.1	NA	NA	750.0	6.35	8.12	VALLEY GREEN CORP CENTER
BLB1D	41.9	25	82	19.5	162.0	7.4	10.7	NA	NA	748.5	12.03	14.57	VALLEY GREEN CORP CENTER
BLB1E	10.5	25	85	4.9	43.4	527.4	439.2	NA	NA	746.9	6.85	6.06	VALLEY GREEN CORP CENTER
BLB1F	24.0	72.2	70	10.2	30.7	2.8	2.9	NA	NA	804.0	3.23	3.49	VALLEY GREEN CORP CENTER
BLB2A	9.5	25	85	4.4	39.4	523.9	436.1	NA	NA	747.3	7.01	5.39	PLOC UPSTREAM OF FUTURE CR21
BLB2B	3.5	15	98	1.7	22.6	0.2	1.1	NA	NA	744.0	1.73	1.53	FUTURE FIRE STATION
BLB2C	7.0	20	85	3.3	33.1	1.8	5.3	NA	NA	752.8	1.11	1.92	RIDGEVIEW FARMS
BLB2D	32.6	25	74	15.2	101.3	15.3	18.0	NA	NA	752.2	5.55	7.14	RIDGEVIEW FARMS
BLB2E	3.5	20	72	1.6	11.6	506.9	416.2	NA	NA	747.5	5.87	4.86	FUTURE RIDGECREEK
BLB2F	35.1	30	75	16.2	100.1	499.2	404.7	NA	NA	748.0	35.32	29.75	FUTURE RIDGECREEK
BLB2G	54.6	30	79	25.2	174.9	10.0	14.4	NA	NA	751.5	5.84	9.73	FUTURE RIDGECREEK
BLB2H	18.0	25	75	8.4	57.6	480.6	386.7	NA	NA	748.5	12.06	7.23	RIVERSIDE BLUFFS
BLB2I	6.4	20	70	3.0	19.9	481.0	395.1	NA	NA	755.0	7.88	5.75	RIVERSIDE BLUFFS-PLOC DISCHARGE SIMULATED AS POND
BLB3A	28.6	37.7	72	13.0	63.3	20.1	24.9	NA	NA	812.0	3.69	5.03	AREA SOUTH OF CR 16-UPSTREAM OF GLACIER ESTATES
BLB3B	28.8	24.8	72	13.4	83.9	13.4	32.6	NA	NA	810.2	0.08	1.69	AREA SOUTH OF CR 16-UPSTREAM OF GLACIER ESTATES
BLB3C	40.5	36	60	18.5	55.2	17.0	43.1	NA	NA	895.0	0.94	1.22	AREA SOUTH OF CR 16-UPSTREAM OF GLACIER ESTATES
BLB4A	20.2	25	66	9.4	45.1	9.5	8.7	13.8	12.7	916.0	2.65	2.28	SOUTHEAST CORNER OF CITY
BLB4B	37.4	52.4	65	16.6	49.7	4.3	4.0	NA	NA	942.0	5.02	4.38	SOUTHEAST CORNER OF CITY
BLB4C	20.3	37	70	9.3	42.3	6.5	6.3	NA	NA	970.0	3.10	2.83	SOUTHEAST CORNER OF CITY
BLB4D	60.0	66.9	65	25.9	66.4	4.9	4.3	NA	NA	980.0	12.63	9.30	SOUTHEAST CORNER OF CITY
BLB4E	16.0	37.8	65	7.3	26.8	2.2	1.8	NA	NA	1016.0	2.88	1.87	SOUTHEAST CORNER OF CITY
BLB5A	123.8	57.6	66	54.4	160.4	15.5	3.8	464.2	374.9	786.0	70.17	52.88	OFFLINE POND ADJACENT TO PLOC-SEE BLB5A1 FOR CR16 FLOWS
BLB5B	11.2	38	75	5.1	27.1	2.2	2.9	NA	NA	790.0	0.99	1.67	AREA SOUTHEAST OF CR16 & PIKE LAKE ROAD
BLB5C	86.5	47.5	72	38.7	161.9	17.9	17.1	NA	NA	782.0	18.82	17.41	AREA SOUTHEAST OF CR16 & FOOTHILL TRAIL
BLB5D	16.2	20	65	7.6	41.4	NA	NA	13.5	38.3	NA	NA	NA	SOUTH OF CITY LIMITS
BLB5E	12.2	20	65	5.7	31.2	NA	NA	5.7	30.0	NA	NA	NA	SOUTH OF CITY LIMITS
BLB6A	13.6	20	75	6.4	49.6	0.7	1.7	NA	NA	805.0	3.64	4.25	ELEMENTARY SCHOOL SITE
BLB6B	20.8	25	77	9.7	70.6	2.5	3.0	NA	NA	805.0	2.77	3.91	FUTURE RIDGEVIEW FARMS SOUTH
BLB6C	110.4	30	72	50.9	285.4	8.1	8.4	NA	NA	805.4	22.02	23.54	AREA SOUTHEAST OF FUTURE CR21 & CR16
BLB7A	23.6	25	75	11.0	75.6	11.5	11.9	NA	NA	800.0	6.04	6.36	FUTURE RIDGEVIEW FARMS SOUTH
BLB7B	69.1	30	75	31.9	197.0	10.2	11.2	NA	NA	812.0	10.76	12.72	AREA WEST OF FUTURE CR21 & RIDGEVIEW FARMS SOUTH
BLB7C	28.2	25	75	13.1	90.3	2.8	3.2	NA	NA	827.0	4.14	5.18	

CITY OF SHAKOPEE
COMPREHENSIVE STORMWATER MANAGEMENT PLAN
BLUE LAKE WATERSHED 100-YEAR EVENT

SUB-WATERSHED NUMBER	AREA (Acre)	Tc (min)	SCS CN	PEAK RUNOFF RATE (cfs)		FULLY DEVELOPED PEAK DISCHARGE RATE				NWL	REQUIRED STORAGE (ac-ft)		COMMENTS
			FULLY DEVELOPED	100-YR 10-DAY	100-YR 24-HR FULLY DEVELOPED	100-YR 10-DAY PEAK OUTFLOW FROM POND (cfs)	100-YR 24-HR PEAK OUTFLOW FROM POND (cfs)	100-YR 10-DAY PEAK FLOW IN CHANNEL (cfs)	100-YR 24-HR PEAK FLOW IN CHANNEL (cfs)	FULLY DEVELOPED	100-YR 10-DAY	100-YR 24-HR FULLY DEVELOPED	
BLB8A	89.0	43	65	40.1	136.1	13.5	12.7	13.5	12.7	850.0	12.62	11.32	RAVINE EAST OF FOOTHILL TRAIL
BLB8B	9.1	20	75	4.3	33.2	1.6	1.9	4.2	5.1	956.0	1.00	1.46	POND WEST OF CR 18
BLB8C	13.5	25	72	6.3	39.3	2.7	3.2	NA	NA	962.0	1.04	1.77	POND EAST OF CR 18
BLC1B	29.4	25	72	13.7	85.5	8.2	7.1	NA	NA	884.0	10.20	8.07	SOUTH OF CITY LIMITS
BLBC1C	58.6	40.8	72	26.5	122.9	NA	NA	NA	NA	NA	NA	NA	SOUTHERN CITY LIMITS
BLBC1D	18.3	25	72	8.5	53.2	NA	NA	NA	NA	NA	NA	NA	SOUTHERN CITY LIMITS
BLC1E	14.8	20	72	6.9	49.2	1.6	1.7	NA	NA	960.0	2.37	2.43	SOUTH OF CITY LIMITS
BLD1A	118.8	45	74	53.4	248.2	13.3	12.7	323.6	311.1	802.0	23.40	21.90	AREA WEST OF FUTURE CR21-PIKE LAKE ROAD CROSSING TO PLOC
BLD1B	73.0	40	74	33.1	165.3	6.1	6.3	NA	NA	811.0	13.27	13.86	AREA WEST OF FUTURE CR21
BLD1D	126.8	45	70	56.9	230.7	148.2	166.0	NA	NA	806.0	36.60	37.79	RESERVATION
BLDZA	204.0	90	74	84.3	254.8	20.0	20.0	202.4	150.9	810.0	36.79	37.29	RESERVATION
BLD3A	75.6	45	72	34.0	147.8	NA	NA	NA	NA	NA	NA	NA	RESERVATION-SOUTH OF CITY LIMITS
BLD4A	19.2	35	70	8.8	41.6	111.7	147.0	NA	NA	819.5	2.33	3.97	RESERVATION-SOUTH OF CITY LIMITS
BLD4B	12.7	23.3	70	5.9	36.0	107.3	143.3	NA	NA	822.0	3.10	9.07	RESERVATION-SOUTH OF CITY LIMITS
BLD4C	13.5	35	70	6.2	29.3	63.3	124.4	NA	NA	827.0	1.43	5.79	RESERVATION-SOUTH OF CITY LIMITS
BLD4D	22.5	23	70	10.5	64.3	18.5	66.0	NA	NA	834.0	0.19	1.31	RESERVATION-SOUTH OF CITY LIMITS
BLD4E	17.9	35	70	8.2	38.9	NA	NA	NA	NA	NA	NA	NA	RESERVATION-SOUTH OF CITY LIMITS
BLD4F	32.5	53	63	14.4	39.0	41.7	105.5	NA	NA	830.0	0.05	0.25	RESERVATION-SOUTH OF CITY LIMITS
BLD4G	58.2	53	73	25.8	104.7	27.4	74.8	27.4	74.8	876.0	0.28	2.06	RESERVATION-SOUTH OF CITY LIMITS
BLD4H	9.1	35	72	4.2	21.2	2.2	2.7	NA	NA	890.0	0.92	1.19	RESERVATION-SOUTH OF CITY LIMITS
BLD4I	9.0	24	62	4.2	18.0	51.8	150.0	NA	NA	830.0	0.07	0.34	RESERVATION-SOUTH OF CITY LIMITS
BLD6A	245.0	63	70	106.5	348.4	6.6	2.6	NA	NA	959.0	93.11	55.16	SOUTH OF SHAKOPEE-MYSTIC LAKE
BLD7A	274.4	67	72	118.4	400.7	32.6	27.8	182.5	130.9	813.5	49.37	46.87	AREA EAST OF CR 83 & VALLEY VIEW ROAD
BLD8A	118.5	28	74	54.8	342.4	65.9	13.7	60.5	9.5	808.0	31.45	21.21	PARKMEADOWS EAST
BLD8B	82.7	30	70	38.1	199.2	4.4	4.5	NA	NA	816.0	11.96	14.21	PARKMEADOWS
BLD9A	73.8	50	65	32.9	101.6	77.9	28.3	NA	NA	839.0	27.08	21.81	AREA SW OF VALLEY VIEW ROAD & CR83
BLE1A	72.5	45	80	32.6	180.6	117.4	283.3	NA	NA	744.5	1.29	5.91	TH 169 DITCH @ BOX CULVERTS
BLE1B	22.1	20	92	10.4	117.7	25.0	196.5	NA	NA	747.9	0.18	1.34	AREA SW OF TH 169 & CR 83
BLE1C	31.5	20	75	14.8	114.9	NA	NA	NA	NA	NA	NA	NA	AREA SOUTH OF CR16 & TH169
BLE1E	26.7	15	92	12.6	163.6	31.7	57.7	NA	NA	746.0	3.57	11.39	VALLEY GREEN CORP CENTER
BLE1F	14.0	15	92	6.6	85.8	13.7	35.5	NA	NA	747.0	3.18	6.31	VALLEY GREEN CORP CENTER
BLE1G	3.6	15	92	1.7	22.1	14.5	59.6	NA	NA	747.0	1.25	3.15	VALLEY GREEN CORP CENTER
BLE1H	32.1	30	92	14.8	135.0	14.1	76.4	NA	NA	749.5	0.59	2.86	VALLEY GREEN CORP CENTER
BLE1I	25.5	15	92	12.0	156.0	11.3	47.8	NA	NA	747.5	2.76	6.14	VALLEY GREEN CORP CENTER
BLE2A	120.8	25	72	56.2	361.5	15.6	14.0	NA	NA	778.0	22.26	19.93	SHAKOPEE GRAVEL SITE
BLE2B	251.6	45	74	113.0	525.7	27.3	26.1	NA	NA	795.0	48.70	46.05	SMSC-AREA SOUTHEAST OF CR 16 & CR 83
BLE2C	56.5	45	74	25.4	118.0	8.6	9.8	NA	NA	798.0	10.82	11.91	DEVELOPMENT SE OF CR16 & CR 83
BLA11A	76.1	30	75	35.1	217.0	51.5	46.9	NA	NA	743.0	95.23	68.59	SOUTHBRIDGE DEVELOPMENT
BLA11B	31.5	25	75	14.7	100.8	10.0	60.2	NA	NA	743.3	1.64	2.56	SOUTHBRIDGE DEVELOPMENT
BLA11C	10.6	30	75	4.9	30.2	6.4	13.8	NA	NA	748.5	0.08	0.65	SOUTHBRIDGE DEVELOPMENT
BLA11D	10.0	20	75	4.7	36.5	53.7	52.4	NA	NA	744.0	5.88	4.74	SOUTHBRIDGE DEVELOPMENT
BLA11E	35.1	25	75	16.3	112.4	12.5	41.3	NA	NA	743.5	3.98	3.54	SOUTHBRIDGE DEVELOPMENT
BLA11F	8.9	20	75	4.2	32.5	0.5	0.8	NA	NA	745.0	4.38	2.43	SOUTHBRIDGE DEVELOPMENT
BLA11G	7.5	25	68	3.5	18.9	2.5	3.0	NA	NA	747.9	0.73	0.93	SOUTHBRIDGE DEVELOPMENT
BLA11H	26.0	30	75	12.0	74.1	4.7	8.4	NA	NA	746.0	4.04	3.89	SOUTHBRIDGE DEVELOPMENT

CITY OF SHAKOPEE
COMPREHENSIVE STORMWATER MANAGEMENT PLAN
BLUE LAKE WATERSHED 100-YEAR EVENT

SUB-WATERSHED NUMBER	AREA (Acre)	Tc (min)	SCS CN	PEAK RUNOFF RATE (cfs)		FULLY DEVELOPED PEAK DISCHARGE RATE				NWL	REQUIRED STORAGE (ac-ft)		COMMENTS
			FULLY DEVELOPED	100-YR 10-DAY	100-YR 24-HR FULLY DEVELOPED	100-YR 10-DAY PEAK OUTFLOW FROM POND (cfs)	100-YR 24-HR PEAK OUTFLOW FROM POND (cfs)	100-YR 10-DAY PEAK FLOW IN CHANNEL (cfs)	100-YR 24-HR PEAK FLOW IN CHANNEL (cfs)	FULLY DEVELOPED	100-YR 10-DAY	100-YR 24-HR FULLY DEVELOPED	
BLA11I	11.7	25	75	5.4	37.5	5.0	1.3	NA	NA	746.0	2.72	2.53	SOUTHBRIDGE DEVELOPMENT
BLA9A1	406.2	45	82	182.4	1064.9	304.3	690.9	NA	NA	743.0	69.04	96.74	VALLEY PARK TO KMART POND
BLA9A2	37.3	30	75	17.2	106.4	17.0	45.3	NA	NA	755.0	0.17	2.28	VALLEY PARK TO KMART POND
BLA9A4	13.9	25	85	6.5	57.5	NA	NA	NA	NA	NA	NA	NA	VALLEY PARK TO KMART POND
BLA9A5	10.4	30	75	4.8	29.7	NA	NA	NA	NA	NA	NA	NA	VALLEY PARK TO KMART POND
BLA9B1	3.6	20	70	1.7	11.2	NA	NA	51.7	420.9	NA	NA	NA	AREA NE OF CR 83 & TH 169
BLA9B2	34.7	25	89	16.1	155.1	33.3	147.8	NA	NA	746.0	4.67	6.21	AREA NE OF CR 83 & TH 169
BLA9B3	4.9	20	75	2.3	17.9	5.3	12.1	NA	NA	758.0	0.00	0.14	CANTERBURY DOWNS
BLA9B4	8.0	15	89	3.8	46.9	NA	NA	NA	NA	NA	NA	NA	CANTERBURY DOWNS
BLA9B5	46.6	30	75	22.4	138.6	23.1	39.8	NA	NA	745.0	8.21	9.28	
BLA9B6	16.3	20	85	7.7	76.8	12.2	32.9	NA	NA	746.0	2.91	3.09	
BLA9B7	31.7	40	82	14.4	90.2	4.9	6.8	NA	NA	746.0	8.16	9.09	CANTERBURY DOWNS
BLA9B8	24.1	35	75	11.0	61.8	4.8	9.1	NA	NA	746.0	2.66	3.61	CANTERBURY DOWNS
BLB2J	11.3	10	76	5.4	58.6	1.1	2.6	NA	NA	758.0	5.59	5.50	RIVERSIDE BLUFFS DEVELOPMENT
BLB2K	75.1	45	76	33.7	167.0	41.2	19.3	NA	NA	750.0	71.87	50.36	WETLAND AREA EAST OF RIVERSIDE BLUFF & SOUTH OF RIVERSIDE FIELDS
BLB2L	27.9	10	77	13.3	148.9	4.2	4.5	NA	NA	753.0	15.47	13.58	RIVERSIDED FIELDS
BLB2M	22.3	10	76	10.6	115.6	4.0	5.1	NA	NA	753.0	6.57	6.32	RIVERSIDE FIELDS
BLB2N	21.8	20	75	10.2	79.4	2.7	3.6	NA	NA	753.0	8.43	8.64	RIVERSIDE BLUFFS
BLB2O	17.7	20	82	8.3	78.0	13.7	10.8	NA	NA	750.0	32.60	24.64	AREA EAST OF CR18 FLOWS WEST TO BLB2K
BLB2P	58.8	45	78	25.4	138.7	15.3	17.0	NA	NA	754.0	12.48	13.10	
BLB2Q	22.3	22.3	72	10.4	69.6	37.1	68.6	NA	NA	752.0	2.54	2.94	GLACIER ESTATES
BLB2R	23.9	45.9	72	10.7	45.9	2.4	2.5	NA	NA	776.0	3.69	3.95	
BLD10A	203.0	80	65	85.5	196.2	150.2	106.8	80.0	76.8	844.0	93.34	85.37	AREA WEST OF CR83 & SOUTH OF VALLEY VIEW ROAD
BLD10B	42.0	30	72	19.4	108.6	105.4	152.2	NA	NA	846.0	28.08	18.64	AREA WEST OF CR83 & SOUTH OF VALLEY VIEW ROAD
BLD11A	187.0	45	65	84.0	278.0	44.0	47.7	44.0	47.7	908.0	13.86	17.97	SOUTH OF CITY LIMITS
BLD11B	22.6	20	70	10.7	70.7	11.7	15.2	NA	NA	924.0	11.86	2.33	SOUTH OF CITY LIMITS
BLD11C	32.8	30	70	15.1	79.0	5.3	4.2	NA	NA	944.0	5.58	4.85	SOUTH OF CITY LIMITS
BLD12A	24.8	38	65	11.3	41.6	3.6	2.1	NA	NA	884.0	4.54	3.24	SOUTH OF CITY LIMITS
BLD13A	83.9	48	55	37.5	68.2	28.8	6.5	114.4	97.5	884.0	8.02	5.69	SOUTH OF CITY LIMITS
BLD14A	50.7	45	73	22.8	102.5	5.6	5.9	NA	NA	846.0	7.75	8.55	
BLD14B	197.0	60	65	86.1	236.3	161.0	201.2	NA	NA	854.0	11.59	15.48	
BLD14C	203.0	45	65	91.2	301.8	11.8	8.6	NA	NA	928.0	51.67	31.94	
BLD14D	32.5	30	65	15.0	64.0	4.2	3.5	NA	NA	872.0	5.01	3.88	
BLD15A	118.5	45	65	53.2	176.2	80.1	109.8	80.1	109.7	880.0	6.24	6.73	
BLD15B	36.5	30	65	16.8	71.9	4.7	2.4	10.2	6.9	904.0	7.58	5.20	
BLD15C	31.5	30	70	14.5	75.9	5.5	4.9	5.5	4.9	921.5	4.78	4.43	
BLD15D	18.3	20	85	8.6	86.2	15.8	21.2	15.8	21.2	915.5	2.51	3.71	
BLD15E	25.6	25	80	11.9	94.2	12.4	13.1	NA	NA	917.5	1.91	4.45	
BLD15F	67.0	30	73	30.9	179.2	7.8	7.6	NA	NA	921.1	17.01	17.33	
BLD16A	13.5	20	65	6.3	34.5	14.8	34.1	14.8	32.8	920.0	0.07	0.11	
BLD16B	288.0	70	70	123.5	377.9	14.7	7.0	NA	NA	925.4	327.44	83.84	
BLD17A	666.0	55	70	293.7	1044.0	40.0	15.1	40.0	15.1	944.0	230.43	148.03	
BLD18A	116.0	45	72	52.1	226.7	NA	NA	NA	NA	NA	NA	NA	GREENFIELD DEVELOPMENT
BLD4J	12.3	24	68	5.8	31.9	6.0	22.4	NA	NA	831.5	0.02	0.50	RESERVATION
BLD4K	26.1	22	70	12.2	76.6	50.6	124.3	NA	NA	843.6	0.04	0.37	RESERVATION

CITY OF SHAKOPEE
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			FULLY DEVELOPED	100-YR 10-DAY	100-YR 24-HR FULLY DEVELOPED	100-YR 10-DAY PEAK OUTFLOW FROM POND (cfs)	100-YR 24-HR PEAK OUTFLOW FROM POND (cfs)	100-YR 10-DAY PEAK FLOW IN CHANNEL (cfs)	100-YR 24-HR PEAK FLOW IN CHANNEL (cfs)	FULLY DEVELOPED	100-YR 10-DAY	100-YR 24-HR FULLY DEVELOPED	
BLD4L	20.5	32	70	9.4	47.3	38.2	110.4	NA	NA	855.3	0.01	0.04	RESERVATION
BLD4M	21.3	45	60	9.6	24.8	9.3	4.4	NA	NA	889.0	1.94	1.81	RESERVATION
BLE1J	14.7	15	89	6.9	86.0	5.5	17.7	NA	NA	748.5	1.37	3.15	VALLEY GREEN CORP CENTER
BLE1K	1.8	10	80	0.8	10.2	0.1	0.1	NA	NA	746.0	0.34	0.48	VALLEY GREEN CORP CENTER
BLB5A1	NA	NA	NA	NA	NA	483.2	394.0	NA	NA	765.0	1.55	1.21	CR 16 PROPOSED CUVERT CROSSINGS

APPENDIX C
FEMA Flood Insurance Study

1.0 INTRODUCTION

1.1 Purpose of Study

The purpose of this Flood Insurance Study is to investigate the existence and severity of flood hazards in the City of Shakopee, Scott County, Minnesota, and to aid in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. Initial use of this information will be to convert Shakopee to the regular program of flood insurance by the Federal Insurance Administration. Further use of the information will be made by local and regional planners in their efforts to promote sound land use and flood plain development.

1.2 Coordination

The flood problems of Shakopee were reviewed at a meeting held in November 1975, with city officials, and representatives from the Federal Insurance Administration, the Minnesota Department of Natural Resources (State Coordinating Agency), and the U.S. Geological Survey in attendance.

During the course of the study, additional meetings were held with appropriate city officials in addition to the initial contact. These discussions were intended to keep community officials informed as to the progress of the study and to answer questions.

During the course of study, the Minnesota Department of Natural Resources and the Board of Managers for the Lower Minnesota River Watershed District were also contacted for information.

The final community coordination meeting was held on September 26, 1977. It was attended by local officials, and representatives of the Federal Insurance Administration; the Minnesota Department of Natural Resources; the U.S. Geological Survey; and local, financial, and insurance organizations. There were no objections to the study, and nothing was brought up that would require changes in this report.

1.3 Authority and Acknowledgments

The source of authority for this Flood Insurance Study is the National Flood Insurance Act of 1968, as amended.

The hydrologic and hydraulic analyses for this study were performed by the U.S. Geological Survey, Water Resources Division, for the

Federal Insurance Administration, under Inter-Agency Agreement No. IAA-H-8-76, Project Order No. 10. This work, which was completed in March 1977, covered all significant flooding sources affecting the City of Shakopee.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the incorporated area of the City of Shakopee, Scott County, Minnesota. The area of study is shown on the Vicinity Map (Figure 1).

The Minnesota River was selected for detailed study. No other areas were identified as having sufficient flood problems to warrant study at this time. Those areas studied by detailed methods were chosen with consideration given to all proposed construction and forecasted development through 1982.

2.2 Community Description

Shakopee is located along the south bank of the Minnesota River, in Scott County, in east-central Minnesota. The city is bordered by Savage to the east, Prior Lake to the south, Eden Prairie across the Minnesota River to the north, Chanhassen to the northwest, and Scott County to the west. The corporate limits of Shakopee extend for over 9 miles along the Minnesota River.

The Minnesota River valley through Shakopee is very wide and flat. It is bordered by steep bluffs on the north and gentle slopes on the south, which formed the confines of the glacial River Warren.

Until August 1971, Shakopee was a residential community, with an area of 3.0 square miles, at the south end of the bridge carrying U.S. Highway 169 and Minnesota State Highway 101 across the Minnesota River. The Township of Eagle Creek, with an area of approximately 35 square miles, adjoined Shakopee on the east and south. At that time, Shakopee and approximately 24 square miles of the Township of Eagle Creek were consolidated to form the present City of Shakopee.

In 1970, the population of Shakopee was 6876, and the whole of the Township of Eagle Creek had a population of 2215 (Reference 1). A population estimate made by the Metropolitan Council for Shakopee in 1976 was 9738.

The area which was previously the Township of Eagle Creek is largely rural agricultural land, with the exception of a small area of heavy industry along the Chicago and Northwestern Railway, directly east of the former Shakopee. New developments consist of scattered

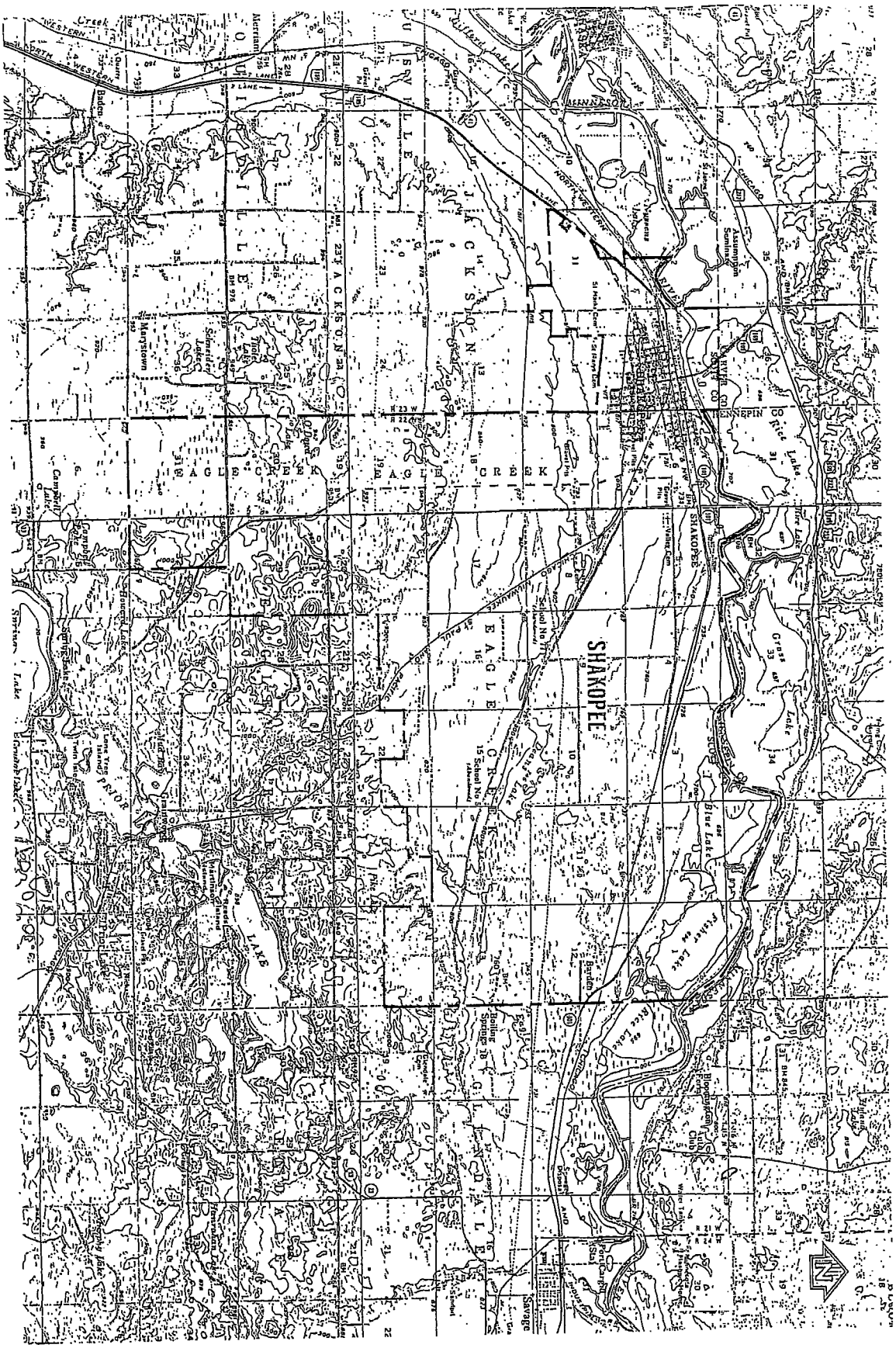

FIGURE 1

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
Federal Insurance Administration

CITY OF SHAKOPEE, MN
(SCOTT CO.)

APPROXIMATE SCALE

½ 0 2 3 MILES

VICINITY MAP

residential areas along the main roads in the area that was formerly the Township of Eagle Creek and expansion of the residential, commercial, and industrial area eastward along Minnesota State Highway 101 and the Chicago and Northwestern Railway, from the former Shakopee area. A steady growth is expected in the foreseeable future owing to Shakopee's location with respect to the cities of Minneapolis and St. Paul.

Soils in Shakopee are medium-and coarse-grained along the Minnesota River and south to the bluff, where ground elevations rise approximately 100 feet. Soils in the hills and to the south are medium to moderately fine-grained (Reference 2). The coarse-grained soils are well drained, except in the area northeast of Dean Lake. Finer soils to the south are poorly drained, with several ponds, lakes, and marshes in that area. The line of hills is steeply sloping and forested in native hardwood trees. Several small creeks carry runoff from the hills onto the coarse- textured soils below, where the channels end and runoff seeps into the soil. Heavy growth of marsh grass occurs in the poorly drained areas. Much of the southern part of the community remains in rural, agricultural land.

A relatively wide climatic variation occurs in this region (Reference 3). The average daily summer temperatures range from 56° to 85°F, and average daily winter temperatures range from 5° to 27°F. The average annual precipitation is 26.8 inches.

A 9-foot navigation channel on the Minnesota River is maintained by the U.S. Army Corps of Engineers to River Mile 15. Private interests maintain the channel an additional 7 miles to River Mile 22 in Shakopee in spite of continual problems with siltation. With the limited usefullness of the channel for navigation in the area, there is not a lot of pressure to develop the Minnesota River flood plain in Shakopee.

Continuing economic development within the study area is expected and pressures leading to intensified flood plain use will undoubtedly accompany such development.

2.3 Principal Flood Problems

The major flood problem at Shakopee is created by floodflows generated by the Minnesota River. The Minnesota River valley was eroded in the plain by the glacial River Warren which carried outflow from glacial Lake Agassiz. The channel thus created has remained as a wide, flat flood plain bounded by steep hills and bluffs and contains the present meandering stream which floods much of the valley width once the low banks are overtopped. The drainage area is over 16,000 square miles above Shakopee, and the river is subject to wide variations in stage and discharge, causing relatively frequent flooding.

Several severe floods have occurred in recent years. The highest on record occurred in April 1965 when a peak flow of 117,000 cubic feet per second (cfs) was recorded, and in April 1969, when the peak flow was 84,600 cfs. The 1965 flood discharge is very close to the 100-year flood estimate of 115,000 cfs, indicating a recurrence interval of just over 100 years. The recurrence interval for the 1969 flood is approximately 40 years.

Severe flooding on the Minnesota River is caused by either snowmelt or rainfall combined with snowmelt. However, the valley floor is flat, the channel capacity is small, and the drainage area is large; thus, small rises resulting from excessive rainfall frequency cause much of the valley floor to be flooded. Low areas near the river are particularly susceptible. As a result, no development has taken place on the valley floor; but, along the low rises overlooking the valley, several structures have been built in the flood plain.

2.4 Flood Protection Measures

Diking around the Peavey grain terminal and one other business provides a limited amount of protection to those properties. Of greater benefit to Shakopee are the State Flood Plain Regulations (Reference 4) and their application with data of the Lower Minnesota River Flood Plain Study (Reference 5). It is known that unregulated encroachments in the flood plain downstream from Shakopee during the past 15 years have caused backwater that extends upstream through Shakopee and for several miles beyond. The regulations incorporate a floodway throughout the downstream 36 miles of the Minnesota River valley and limits encroachment to that which would result in 0.5 foot of backwater on the profile for conditions at the time of the study. Without the application of those regulations and the data provided by the Lower Minnesota River Flood Plain Study, unregulated encroachment would have continued and flood stages along the Minnesota River would have continually increased for any flow rate.

3.0 ENGINEERING METHODS

For flooding sources studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Floods having recurrence intervals of 10, 50, 100, and 500 years have been selected as having special significance for flood plain management and for flood insurance premium rates. The analyses reported here reflect current conditions in the watersheds of the flooding sources.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak discharge-frequency relationships for floods of the selected recurrence intervals for each stream studied in detail in the community.

Data for the flow-frequency analysis and corresponding river stages were derived from two gaging station records collected by the U.S. Geological Survey (Reference 6). One station is located on the Mississippi River at St. Paul, below the confluence of the Minnesota and Mississippi Rivers, for which 101 years of records were used. The other is on the Minnesota River near Jordan, Minnesota, upstream from the study reach, for which 36 years of records were available.

Owing to the prevailing flat slope of the Lower Minnesota River, it is necessary to consider the flood characteristics of the Mississippi and Minnesota Rivers at their confluence, as the combined flows at this point will influence the flood-frequency profiles throughout the reach extending through Shakopee. Therefore, a flow-frequency analysis based on the record for the Mississippi River at St. Paul was used to derive the elevation of the 100-year flood at the mouth of the Minnesota River. The flood-frequency analysis of the records for the Minnesota River near Jordan provided the flow rates of the Minnesota River for the various frequency floods.

Flood-frequency analyses for both gaging station records were made using the standard log-Pearson Type III method (Reference 7). In both cases, a log-normal distribution provided the best fit to the data. The peak flows associated with the 100-year flood were then coordinated with the U.S. Army Corps of Engineers, under an inter-agency agreement for Minnesota, which provides for a mutually acceptable flood-frequency estimate to be used for studies or projects under the jurisdiction of Federal or State agencies. Comparison of the estimates for the 100-year flood revealed only minor discrepancies, which were reconciled by an administrative decision. The adopted compromise flow estimates for the 100-year flood are 160,000 cfs for the Mississippi River at St. Paul and 115,000 cfs for the Minnesota River at Jordan. Frequency curves at both sites were then adjusted to fit the agreed upon flow estimates at the 100-year frequency interval.

Peak discharge-drainage area relationships for the Minnesota River are shown in Table 1.

Table 1. Summary of Discharges

Flooding Source and Location	Drainage Area (Square Miles)	Peak Discharges (Cubic Feet per Second) 10-Year	50-Year	100-Year	500-Year
Minnesota River Near Jordan	16,200	48,400	91,400	115,000	182,000

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of streams in the community were carried out to provide estimates of the elevations of floods of the selected recurrence intervals along each stream studied in the community.

Water-surface elevations of floods of the selected recurrence intervals were computed through use of the U.S. Army Corps of Engineers HEC-2 step-backwater computer program (Reference 8).

Cross sections for the backwater analysis of the Minnesota River were located at close intervals above and below bridges and in other developed areas to compute the significant backwater effects of all encroachments on the flood plain. Overbank cross section data at 22 designated locations were obtained in Shakopee by photogrammetric techniques (Reference 9). Underwater soundings were then made to complete the valley cross sections.

Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles (Exhibit 1). For stream segments for which a floodway is computed (Section 4.2), selected cross section locations are also shown on the Flood Boundary and Floodway Map (Exhibit 2).

High-water elevation data obtained for the 1969 flood, which was well documented, were used to calibrate the step-backwater computer model. Adjustments to the model were made to reproduce known profile points throughout a 35-mile reach of the Minnesota River, including the study area.

The starting elevation corresponding to the various flow frequencies at the mouth of the Minnesota River, used in the step-backwater computations, were furnished by the Minnesota Department of Natural Resources (Reference 10). These elevations were determined by their step-backwater analysis of the flood frequency profiles for the Mississippi River starting from the St. Paul gaging station and continuing up the Mississippi River to the mouth of the Minnesota River.

Roughness factors (Manning's "n") for these computations were assigned on the basis of aerial photographs (Reference 9) and field inspection of flood plain areas. Adjustments to the roughness factors were made as required by the calibration process noted above. Values of "n" used in the study ranged from 0.035 in the channel to 0.11 in wooded, overbank areas.

Flood profiles were drawn showing computed water-surface elevations to an accuracy of 0.5 foot for floods of the selected recurrence intervals (Exhibit 1).

River Mile mark locations shown on the maps are from the U.S. Army Corps of Engineers' Navigation Charts (Reference 11). These charts were developed several years ago; these are still in use, with mile mark locations continued, though the channel may have changed. Distances between River Mile mark locations may be slightly different than 1 mile. Cross sections are located on the profile plot using the River Mile scale. Because the profiles are quite flat, cross sections are shown only to the nearest tenth of the distance between River Mile marks.

All elevations are referenced to the National Geodetic Vertical Datum of 1929 (NGVD). Elevation reference marks used in the study are shown on the maps.

Flood elevations on the Minnesota River in Shakopee are seldom raised by ice jams during spring thaws; ice cover is minimal because navigation being maintained during the winter period. The hydraulic analyses for this study are based only on the effects of unobstructed flow. The flood elevations, as shown on the profiles, are thus considered valid only if hydraulic structures, in general, remain unobstructed, operate properly, and do not fail.

4.0 FLOOD PLAIN MANAGEMENT APPLICATIONS

A prime purpose of the National Flood Insurance Program is to encourage State and local governments to adopt sound flood plain management programs. Each Flood Insurance Study, therefore, includes a flood boundary map designed to assist communities in developing sound flood plain management measures.

4.1 Flood Boundaries

In order to provide a national standard without regional discrimination, the 100-year flood has been adopted by the Federal Insurance Administration as the base flood for purposes of flood plain management measures. The 500-year flood is employed to indicate additional areas of flood risk in the community. For the stream studied in detail, the boundaries of the 100- and 500-year floods have been delineated using the flood elevations determined at each cross section; between cross sections, the boundaries were interpolated using topographic maps at scale of 1:6000, with a contour interval of 2 feet (Reference 5).

In cases where the 100- and 500-year flood boundaries are close together, only the 100-year flood boundary has been shown.

Flood boundaries for the 100- and 500-year floods are shown on the Flood Boundary and Floodway Map (Exhibit 2).

Small areas within the flood boundaries may lie above the flood elevations and, therefore, not be subject to flooding; owing to limitations of the map scale, such areas are not shown.

4.2 Floodways

Encroachment on flood plains, such as artificial fill, reduces the flood-carrying capacity and increases flood heights, thus increasing flood hazards in areas beyond the encroachment itself. One aspect of flood plain management involves balancing the economic gain from flood plain development against the resulting increase in flood hazard. For purposes of the National Flood Insurance Program, the concept of a floodway is used as a tool to assist local communities in this aspect of flood plain management. Under this concept, the area of the 100-year flood is divided into a floodway and a floodway fringe. The floodway is the channel of a stream, plus any adjacent flood plain areas, that must be kept free of encroachment in order that the 100-year flood be carried without substantial increases in flood heights. As minimum standards, the Federal Insurance Administration limits such increases in flood heights to 1.0 foot, provided that hazardous velocities are not produced. In Minnesota, state regulations limit the increases in flood heights to 0.5 foot, which is the maximum limiting value used in this study. Under this concept, a community such as Shakopee, which exercises control on only one side of the stream, should generally be restricted to a maximum increase of 0.25 foot. The remaining 0.25 foot is reserved for the community on the opposite side of the stream.

To provide a comprehensive and integrated in-depth floodway analysis for the Lower Minnesota River, local funding had been provided under cooperative agreement with the U.S. Geological Survey to permit a coordinated study of a 35-mile reach of the Minnesota River, extending from Carver Rapids to the mouth, an area which includes the City of Shakopee. In some areas (including Shakopee), the flood potential, in terms of stage, has significantly increased for 1965 flow conditions due to extensive development since the 1965 flood.

Floodways were selected by local officials for their respective jurisdictional areas. Preliminary flood plain area maps were provided to aid local officials in their selection (Reference 5); and, in addition, several discussions were held under the auspices of the Lower Minnesota River Watershed District and the Minnesota Department of Natural Resources to provide technical background data.

An analysis of floodway conditions must also consider increased flood elevations resulting from permissible encroachments on the Mississippi River flood plain. A potential increase of 0.2 foot in the 100-year flood elevation at the mouth of the Minnesota River was estimated by the Minnesota Department of Natural Resources.

The floodway designated by Shakopee city officials was incorporated in the digital model and the calculated maximum increase in elevation (surcharge) from the water-surface profile for the 100-year flood did not exceed 0.5 foot; therefore, the selected floodway configurations meet minimum State standards. The results of these computations are tabulated at selected cross sections for each stream segment for which a floodway is computed (Table 2).

As shown on the Flood Boundary and Floodway Map (Exhibit 2), the floodway boundaries were determined at cross sections; between cross sections, the boundaries were interpolated. In cases where the floodway and 100-year flood boundaries are close together, only the floodway boundary has been shown.

The area between the floodway and the boundary of the 100-year flood is termed the floodway fringe. The floodway fringe thus encompasses the portion of the flood plain that could be completely obstructed without increasing the water-surface elevation of the 100-year flood more than 0.5 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to flood plain development are shown in Figure 2.

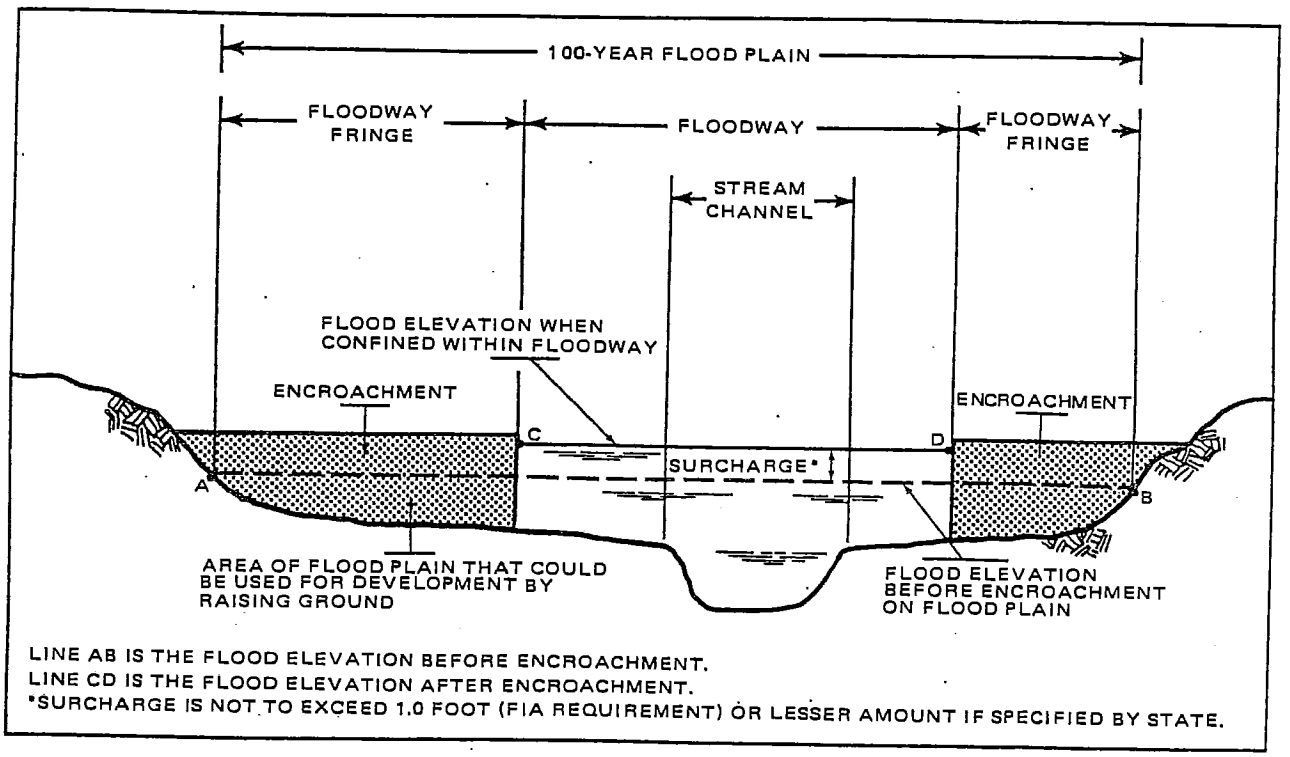

Figure 2. Floodway Schematic

5.0 INSURANCE APPLICATION

In order to establish actuarial insurance rates, the Federal Insurance Administration has developed a process to transform the data from the engineering study into flood insurance criteria. This process includes

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION		
CROSS SECTION	DISTANCE[1]	WIDTH[2] (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	WITH FLOODWAY	WITHOUT FLOODWAY (FEET NGVD)	DIFFERENCE
Minnesota River							
A	17.0	5,420	125,000	0.9	721.2	720.7	0.5
B	17.3	5,790	106,000	1.1	721.2	720.8	0.4
C	17.6	5,940	133,000	0.9	721.3	720.8	0.5
D	17.9	5,710	128,000	0.9	721.3	720.9	0.4
E	18.4	5,360	119,000	1.0	721.4	720.9	0.5
F	19.0	5,490	82,000	1.4	721.4	721.0	0.4
G	19.3	4,400	107,000	1.1	721.5	721.0	0.5
H	19.7	5,370	114,000	1.0	721.6	721.1	0.5
I	20.4	6,160	106,000	1.1	721.7	721.2	0.5
J	20.8	6,030	135,000	0.8	721.7	721.3	0.4
K	21.5	5,550	127,000	0.9	721.8	721.3	0.5
L	22.2	5,160	111,000	1.0	721.9	721.4	0.5
M	22.7	5,130	93,900	1.2	722.0	721.5	0.5
N	23.5	5,650	111,000	1.0	722.1	721.6	0.5
O	24.0	6,290	125,000	0.9	722.1	721.7	0.4
P	24.5	5,860	133,000	0.9	722.2	721.7	0.5
Q	24.9	5,660	109,000	1.1	722.2	721.8	0.4
R	25.1	5,620	104,000	1.1	722.2	721.8	0.4
S	25.1	5,460	109,000	1.1	722.3	721.9	0.4
T	25.7	4,630	79,700	1.4	722.4	722.0	0.4
U	26.0	5,320	90,900	1.3	722.5	722.1	0.4
V	26.7	5,380	91,400	1.2	722.8	722.4	0.4

[1]Miles Above Mouth [2]All Floodway Widths Extend Beyond the Corporate Limits

TABLE 2

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
Federal Insurance Administration

CITY OF SHAKOPEE, MN
(SCOTT CO.)

FLOODWAY DATA

MINNESOTA RIVER

the determination of reaches, Flood Hazard Factors, and flood insurance zone designations for the flooding source studied in detail affecting the City of Shakopee.

5.1 Reach Determinations

Reaches are defined as lengths of watercourses having relatively the same flood hazard, based on the average weighted difference in water-surface elevations between the 10- and 100-year floods. This difference does not have a variation greater than that indicated in the following table for more than 20 percent of the reach:

Average Difference Between 10- and 100-year Floods	Variation
7.1 to 12 feet	2.0 feet

Two reaches meeting the above criterion were required for the Minnesota River in Shakopee. The locations of the reaches are shown on the Flood Profiles (Exhibit 1).

5.2 Flood Hazard Factors

The Flood Hazard Factor (FHF) is the Federal Insurance Administration device used to correlate flood information with insurance rate tables. Correlations between property damage from floods and their FHF are used to set actuarial insurance premium rate tables based on FHFs from 005 to 200.

The FHF for a reach is the average weighted difference between the 10- and 100-year flood water-surface elevations expressed to the nearest one-half foot, and shown as a three-digit code. For example, if the difference between water-surface elevations of the 10- and 100-year floods is 0.7 foot, the FHF is 005; if the difference is 1.4 feet, the FHF is 015; if the difference is 5.0 feet, the FHF is 050. When the difference between the 10- and 100-year water-surface elevations is greater than 10.0 feet, accuracy for the FHF is to the nearest foot.

5.3 Flood Insurance Zones

After the determination of reaches and their respective Flood Hazard Factors, the entire incorporated area of the City of Shakopee was divided into zones, each having a specific flood potential or hazard. Each zone was assigned one of the following flood insurance zone designations:

Zones A18 and A20: Special Flood Hazard Areas inundated by the 100-year flood, determined by detailed methods; base flood elevations shown, and zones subdivided according to Flood Hazard Factors.

Zone B:	Areas between the Special Flood Hazard Areas and the limits of the 500-year flood, including areas of the 500-year flood plain that are protected from the 100-year flood by dike, levee, or other water control structure; also areas subject to certain types of 100-year shallow flooding where depths are less than 1.0 foot; and areas subject to 100-year flooding from sources with drainage areas less than 1 square mile. Zone B is not subdivided.
Zone C:	Areas of minimal flooding.

The flood elevation differences, Flood Hazard Factors, flood insurance zones, and base flood elevations for the flooding source studied in detail in the community are summarized in Table 3.

5.4 Flood Insurance Rate Map Description

The Flood Insurance Rate Map for the City of Shakopee is, for insurance purposes, the principal result of the Flood Insurance Study. This map (published separately) contains the official delineation of flood insurance zones and base flood elevation lines. Base flood elevation lines show the locations of the expected whole-foot water-surface elevations of the base (100-year) flood. This map is developed in accordance with the latest flood insurance map preparation guidelines published by the Federal Insurance Administration.

6.0 OTHER STUDIES

The U.S. Geological Survey has prepared a Flood Plain Study for the Lower Minnesota River (Reference 5). That study is in complete agreement with the present Flood Insurance Study for Shakopee.

The flood elevation data reported in this study are in agreement with the Flood Insurance Study prepared for the unincorporated areas of Scott County, Minnesota (Reference 12).

This study is authoritative for the purposes of the National Flood Insurance Program; data presented herein either supersede or are compatible with all previous determinations.

7.0 LOCATION OF DATA

Survey, hydrologic, hydraulic, and other pertinent data used in this study can be obtained by contacting the office of the Federal Insurance

FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1% (100-YEAR) FLOOD AND			FLOOD HAZARD FACTOR	ZONE	BASE FLOOD ELEVATION (FEET NGVD)[3]
		10% (10-YEAR)	2% (50-YEAR)	0.2% (500-YEAR)			
Minnesota River							
Reach 1	0001,0002 0003	-10.0	-2.8	6.7	100	A20	Varies - See Map
Reach 2	0001	-9.2	-2.7	6.7	090	A18	Varies - See Map

[1] Flood Insurance Rate Map Panel [2] Weighted Average [3] Rounded to Nearest Foot

TABLE 3

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
Federal Insurance Administration

CITY OF SHAKOPEE, MN
(SCOTT CO.)

FLOOD INSURANCE ZONE DATA

MINNESOTA RIVER

Administration, Regional Director, 1 North Dearborn, Chicago, Illinois 60606.

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DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
Federal Insurance Administration

CITY OF SHAKOPEE, MN
(SCOTT CO.)

01P

FLOOD PROFILES

MINNESOTA RIVER

APPENDIX D
Ordinances

SHAKOPEE
COMMUNITY PRIDE SINCE 1857

SEC. 11.54. SHORELAND OVERLAY ZONE (SH)

(Deleted, Ord. 500; Added, Ord. 500, November 13, 1997)

Subd. 1. Statutory Authorization and Policy.

A. **Statutory Authorization**. This Section is adopted pursuant to the authorization and policies contained in Minnesota Statutes, Chapter 103.F, Minnesota Regulations, Parts 6120.2500 - 6120.3900, and the planning and zoning enabling legislation in Minnesota Statutes, Chapter 462. (Ord. 537, February 18, 1999)

B. **Policy.** The uncontrolled use of shorelands of Shakopee, Minnesota affects the public health, safety and general welfare not only by contributing to pollution of public waters, but also by impairing the local tax base. Therefore, it is in the best interests of the public health, safety and welfare to provide for the wise subdivision, use and development of shorelands of public waters. The legislature of Minnesota has delegated responsibility to local governments of the state to regulate the subdivision, use and development of the shorelands of public waters and thus preserve and enhance the quality of surface waters, conserve the economic and natural environmental values of shorelands, and provide for the wise use of waters and related land resources. The City of Shakopee, Minnesota, hereby recognizes this responsibility.

Subd. 2. General Provisions and Definitions.

A. **Jurisdiction.** The provisions of this Section shall apply to the shorelands of the public water bodies as classified in Subdivision 4 of this Section. Pursuant to Minnesota Regulations, Parts 6120.2500 - 6120.3900, no lake, pond, or flowage less than ten (10) acres in size in municipalities or twenty-five (25) acres in size in unincorporated areas need be regulated in a local government's shoreland regulations. A body of water created by a private user where there was no previous shoreland may, at the discretion of the governing body, be exempt from this Section.

B. **Compliance.** The use of any shoreland of public waters; the size and shape of lots; the use, size, type and location of structures on lots; the installation and maintenance of water supply and waste treatment systems, the grading and filling of any shoreland area; the cutting of shoreland vegetation; and the subdivision of land shall be in full compliance with the terms of this Section and other applicable regulations.

C. **Enforcement.** The Zoning Official is responsible for the administration and enforcement of this Section. Any violation of the provisions of this Section or failure to comply with any of its requirements (including violations of conditions and safeguards established in connection with grants of variances or conditional uses) shall constitute a misdemeanor and shall be punishable as defined by law. Violations of this Section can occur regardless of whether or not a permit is required for a regulated activity pursuant to Subdivision 3 A of this Section.

D. **Interpretation.** In their interpretation and application, the provisions of this Section

shall be held to be minimum requirements and shall be liberally construed in favor of the governing body and shall not be deemed a limitation or repeal of any other powers granted by State Statutes.

E. **Severability.** If a court of competent jurisdiction adjudges any section, clause, provision, or portion of this Section unconstitutional or invalid, the remainder of this Section shall not be affected thereby.

F. **Abrogation and Greater Restrictions.** It is not intended by this Section to repeal, abrogate, or impair any existing easements, covenants, or deed restrictions. However, where this Section imposes greater restrictions, the provisions of this Section shall prevail. All other sections inconsistent with this Section are hereby repealed to the extent of the inconsistency only.

G. **Definitions.** Unless specifically defined below, words or phrases used in this Section shall be interpreted so as to give them the same meaning as they have in common usage and so as to give this Section its most reasonable application. For the purpose of this Section, the words "must" and "shall" are mandatory and not permissive. All distances, unless otherwise specified, shall be measured horizontally.

1. **"Accessory structure" or "facility":** any building or improvement subordinate to a principal use which, because of the nature of its use, can reasonably be located at or greater than normal structure setbacks.

2. **"Bluff":** A topographic feature such as a hill, cliff, or embankment having the following characteristics (an area with an average slope of less than 18% over a distance for fifty (50) feet or more shall not be considered part of the bluff):

   a. Part or all of the feature is located in a shoreland area;

   b. The slope rises at least twenty-five (25) feet above the ordinary high water level of the waterbody;

   c. The grade of the slope from the toe of the bluff to a point twenty-five (25) feet or more above the ordinary high water level averages 30% or greater; and

   d. The slope must drain toward the waterbody.

3. **"Bluff impact zone"**: A bluff and land located within twenty (20) feet from the top of a bluff.

4. **"Boathouse":** A structure designed and used solely for the storage of boats or boating equipment.

5. **"Building line":** A line parallel to a lot line or the ordinary high water level at the required setback beyond which a structure may not extend.

6. **"Commercial use":** The principal use of land or buildings for the sale, lease, rental, or trade of products, goods, and services.

7. **"Commissioner":** The Commissioner of the Department of Natural Resources.

8. **"Conditional use":** A land use or development as defined by ordinance that would not be appropriate generally, but may be allowed with appropriate restrictions as provided by official controls upon a finding that certain conditions as detailed in the zoning code exist, the use or development conforms to the comprehensive land use plan of the community, and the use is compatible with the existing neighborhood.

9. **"Deck":** A horizontal, unenclosed platform with or without attached railings, seats, trellises, or other features, attached or functionally related to a principal use or site and at any point extending more than three (3) feet above ground.

10. **"Duplex," "triplex," and "quad":** A dwelling structure on a single lot, having two (2), three (3), and four (4) units, respectively, being attached by common walls and each unit equipped with separate sleeping, cooking, eating, living, and sanitation facilities.

11. **"Dwelling site":** A designated location for residential use by one (1) or more persons using temporary or movable shelter, including camping and recreational vehicle sites.

12. **"Dwelling unit":** Any structure or portion of a structure, or other shelter designed as short-or long-term living quarters for one (1) or more persons, including rental or timeshare accommodations such as motel, hotel, and resort rooms and cabins.

13. **"Extractive use":** The use of land for surface or subsurface removal of sand, gravel, rock, industrial minerals, other nonmetallic minerals, and peat not regulated under Minnesota Statutes, Sections 93.44 to 93.51.

14. **"Forest land conversion":** The clear cutting of forested lands to prepare for a new land use other than re-establishment of a subsequent forest stand.

15. **"Hardship":** "Hardship" means the same as that term is defined in Minnesota Statutes, Chapter 462.

16. **"Height of building":** The vertical distance between the highest adjoining ground level at the building or ten (10) feet above the lowest ground level, whichever is lower, and the highest point of a flat roof or average height of the highest gable of a pitched or hipped roof.

17. **"Industrial use":** The use of land or buildings for the production, manufacture, warehousing, storage, or transfer of goods, products, commodities, or other wholesale items.

18. **"Intensive vegetation clearing":** The complete removal of trees or shrubs in a contiguous patch, strip, row, or block.

19. **"Lot":** A parcel of land designated by plat, metes and bounds, registered land survey, auditors plot, or other accepted means and separated from other parcels or portions by said description for the purpose of sale, lease, or separation.

20. **"Lot width":** The shortest distance between lot lines measured at the midpoint of the building line.

21. **"Nonconformity":** Any legal use, structure or parcel of land already in existence, recorded, or authorized before the adoption of official controls or amendments thereto that would not have been permitted to become established under the terms of the official controls as now written, if the official controls had been in effect prior to the date it was established, recorded or authorized.

22. **"Ordinary high water level":** The boundary of public waters and wetlands, and shall be an elevation delineating the highest water level which has been maintained for a sufficient period of time to leave evidence upon the landscape, commonly that point where the natural vegetation changes from predominantly aquatic to predominantly terrestrial. For watercourses, the ordinary high water level is the elevation of the top of the bank of the channel. For reservoirs and flowages, the ordinary high water level is the operating elevation of the normal summer pool.

23. **"Planned unit development":** A type of development characterized by a unified site design for a number of dwelling units or dwelling sites on a parcel, whether for sale, rent, or lease, and also usually involving clustering of these units or sites to provide areas of common open space, density increases, and a mix of structure types and land uses. These developments may be organized and operated as condominiums, time-share condominiums, cooperatives, full fee ownership, commercial enterprises, or any combination of these, or cluster subdivisions of dwelling units, residential condominiums, townhouses, apartment buildings, campgrounds, recreational vehicle parks, resorts, hotels, motels, and conversions of structures and land uses to these uses.

24. **"Planning unit developments, commercial":** These are typically uses that provide transient, short-term lodging spaces, rooms, or parcels and their operations are essentially service-oriented. For example, hotel/motel accommodations, resorts, recreational vehicle and camping parks, and other primarily service-oriented activities are commercial planned unit developments.

25. **"Planned unit developments, residential":** A use where the nature of residency is not transient and the major or primary focus of the development is not service-oriented. For example, residential apartments, manufactured home parks, time-share condominiums, townhouses, cooperatives, and full fee ownership residences would be considered as residential planned unit developments. To qualify as a residential planned unit development, a development must contain at least five (5) dwelling units or sites.

26. **"Public waters":** Any waters as defined in Minnesota Statutes, Section 103G.005, Subdivisions 14 and 15.

27. **"Semipublic use":** The use of land by a private, nonprofit organization to provide a public service that is ordinarily open to some persons outside the regular constituency of the organization.

28. **"Sensitive resource management":** The preservation and management of areas unsuitable for development in their natural state due to constraints such as shallow soils over groundwater or bedrock, highly erosive or expansive soils, steep slopes, susceptibility to flooding, or occurrence of

flora or fauna in need of special protection.

29. **"Setback:** The minimum horizontal distance between a structure, sewage treatment system, or other facility and an ordinary high water level, sewage treatment system, top of a bluff, road, highway, property line, or other facility.

30. **"Sewage treatment system":** A septic tank and soil absorption system or other individual or cluster type sewage treatment system as described and regulated in Subdivision 5H of this Section.

31. **"Sewer system":** Pipelines or conduits, pumping stations, and force main, and all other construction, devices, appliances, or appurtenances used for conducting sewage or industrial waste or other wastes to a point of ultimate disposal.

32. **"Shore impact zone":** Land located between the ordinary high water level of a public water and a line parallel to it at a setback of 50% of the structure setback.

33. **"Shoreland":** Land located within the following distances from public waters: 1,000 feet from the ordinary highwater level of a lake, pond, or flowage; and 300 feet from a river or stream, or the landward extent of a floodplain designated by ordinance on a river or stream, whichever is greater. The limits of shorelands may be reduced whenever the waters involved are bounded by topographic divides which extend landward from the waters for lesser distances and when approved by the Commissioner.

34. **"Significant historic site":** Any archaeological site, standing structure, or other property that meets the criteria for eligibility to the National Register of Historic Places or is listed in the State Register of Historic Sites, or is determined to be an unplatted cemetery that falls under the provisions of Minnesota Statutes, Section 307.08. A historic site meets these criteria if it is presently listed on either register or if it is determined to meet the qualifications for listing after review by the Minnesota state archaeologist or the director of the Minnesota Historical Society. All unplatted cemeteries are automatically considered to be significant historic sites.

35. **"Steep slope":** Land where agricultural activity or development is either not recommended or described as poorly suited due to slope steepness and the site's soil characteristics, as mapped and described in available county soil surveys or other technical reports, unless appropriate design and construction techniques and farming practices are used in accordance with the provisions of this Section. Where specific information is not available, steep slopes are lands with average slopes over 12%, as measured over horizontal distances of fifty (50) feet or more, that are not bluffs.

36. **"Structure":** Any building or appurtenance, including decks, except aerial or underground utility lines, such as sewer, electric, telephone, telegraph, gas lines, towers, poles, and other supporting facilities.

37. **"Subdivision":** Land that is divided for the purpose of sale, rent, or lease, including Planned Unit Developments.

38. **"Surface water-oriented commercial use":** The use of land for

commercial purposes, where access to and use of a surface water feature is an integral part of the normal conductance of business. Marinas, resorts, and restaurants with transient docking facilities are examples of such use.

39. **"Toe of the bluff":** The lower point of a fifty (50) foot segment with an average slope exceeding 18%.

40. **"Top of the bluff":** The higher point of a fifty (50) foot segment with an average slope exceeding 18%.

41. **"Uses With Water-Oriented Needs (Water-Oriented Uses)"**: A land use that has as an intrinsic element access to, or use of, the water for recreational purposes. Such uses include, but are not necessarily limited to, marinas, resorts, boat or canoe accesses, and fishing docks. (Added, Ord. 586, November 16, 2000)

42. **"Uses Without Water-Oriented Needs (non water-oriented uses)"**: Any land use that does not have as an intrinsic element access to, or use of, the water for recreational purposes. Commercial, industrial, or business park land uses that do not meet the definition of "surface water-oriented commercial use"* contained herein are by definition "non water-oriented uses". (Added, Ord. 586, November 16, 2000)

    * Defined at Code Sec. 11.54, Subdivision 2, 35. as "The use of land for commercial purposes, where access to and use of a surface water feature is an integral part of the normal conductance of business. Marinas, resorts, and restaurants with transient docking facilities are examples of such use." (Added, Ord. 586, November 16, 2000)

43. **"Variance":** The same as that term is defined or described in Minnesota Statutes, Chapter 462.

44. **"Water-oriented accessory structure or facility":** A small, above ground building or other improvement, except stairways, fences, docks, and retaining walls, which, because of the relationship of its use to a surface water feature, reasonably needs to be located closer to public waters than the normal structure setback. Examples of such structures and facilities include boathouses, gazebos, screen houses, fish houses, pump houses, and detached decks.

45. **"Wetland":** A surface water feature classified as a wetland in the United States Fish and Wildlife Service Circular No. 39 (1971 edition).

Subd. 3. Administration.

A. Permits Required.

1. A permit is required for the construction of buildings or building additions (and including such related activities as construction of decks and signs), the installation and/or alteration of sewage treatment systems, and those grading and filling activities not exempted by Subdivision 5C of this Section. Application for a permit shall be made to the Building Official on the forms provided. The application shall include the necessary information so that the Building Official can determine the site's suitability

for the intended use and that a compliant sewage treatment system will be provided.

2. A permit authorizing an addition to an existing structure shall stipulate that an identified nonconforming sewage treatment system, as defined by Subdivision 5H, shall be reconstructed or replaced in accordance with the provisions of this Section.

B. **Certificate of Zoning Compliance.** The Zoning Administrator shall issue a certificate of zoning compliance for each activity requiring a permit as specified in Subdivision 3A of this Section. This certificate will specify that the use of land conforms to the requirements of this Section. Any use, arrangement, or construction at variance with that authorized by permit shall be deemed a violation of this Section and shall be punishable as provided in Subdivision 2C of this Section.

C. **Variances.**

1. Variances may only be granted in accordance with Minnesota Statutes, Chapter 462. A variance may not circumvent the general purposes and intent of this Section. No variance may be granted that would allow any use that is prohibited in the zoning district in which the subject property is located. Conditions may be imposed in the granting of a variance to ensure compliance and to protect adjacent properties and the public interest. In considering a variance request, the Board of Adjustment and Appeals and Appeals must also consider whether the property owner has reasonable use of the land without the variance, whether the property is used seasonally or year-round, whether the variance is being requested solely on the basis of economic considerations, and the characteristics of development on adjacent properties.

2. The Board of Adjustment and Appeals and Appeals shall hear and decide requests for variances in accordance with the rules that it has adopted for the conduct of business. When a variance is approved after the Department of Natural Resources has formally recommended denial in the hearing record, the notification of the approved variance required in Subdivision 3D2 below shall also include the Board of Adjustment and Appeals and Appeal's summary of the public record/testimony and the findings of facts and conclusions which supported the issuance of the variance.

3. For existing developments, the application for variance must clearly demonstrate whether a conforming sewage treatment system is present for the intended use of the property. The variance, if issued, must require reconstruction of a nonconforming sewage treatment system.

D. **Notifications to the Department of Natural Resources.**

1. Copies of all notices of any public hearings to consider variances, amendments, or conditional uses under local shoreland management controls must be sent to the commissioner or the commissioner's designated representative and postmarked at least ten (10) days before the hearings. Notices of hearings to consider proposed subdivisions must include copies of the proposed subdivision.

2. A copy of approved amendments and subdivisions, and final decisions

granting variances or conditional uses under local shoreland management controls must be sent to the commissioner or the commissioner's designated representative and postmarked within ten (10) days of final action.

Subd. 4. Shoreland Classification System and Land Use Districts.

A. **Shoreland Classification System.** The public waters of the City of Shakopee have been classified below consistent with the criteria found in Minnesota Regulations, Part 6120.3300, and the Protected Waters Inventory Map for Scott County, Minnesota.

1. The shoreland area for the waterbodies listed in Subdivision 4A2 and 4A3 shall be as defined in Subdivision 2G33 and as shown on the Official Zoning Map.

2. **Lakes.**

a.

Natural Environment Lakes	**Protected Waters Inventory I.D. No.**
Blue Lake	I.D. No. 70-0088
Dean Lake	I.D. No. 70-0074
Fisher Lake	I.D. No. 70-0087
Rice Lake	I.D. No. 70-0025
Unnamed	I.D. No. 70-0080

b.

Recreational Development Lakes	**Protected Waters Inventory I.D. No.**
O'Dowd Lake	I.D. No. 70-0095

3. **Rivers and Streams.**

a. **Transition Rivers**	**Legal Description**
Minnesota River	From the West section line of Section 4, Township 115N. Range 22W**

b. **Agricultural Rivers**	**Legal Description**
Minnesota River	From the border of Scott and LeSueur Counties to the East section line of Section 5, Township 115N, Range 22W**

c. **Tributary Streams**	*
Eagle Creek	From Basin 245, Section 13, Township 115, Range 22W to Section 13, Township 115, Range 22W**

Unnamed to MN River	From Section 2, Township 115, Range 22W to Section 1, Township 115, Range 22W**
Unnamed Tributary	From Basin 249, Section 23, Township 115, Range 22W to Section 14, Township 115, Range 22W**

* All protected watercourses in the City of Shakopee shown on the Protected Waters Inventory Map for Scott County, a copy of which is hereby adopted by reference, not given a classification in Items A-E above shall be considered "Tributary".

**All from and to locations are subject to actual municipality boundaries.

B. Land Use District Descriptions.

1. **Criteria For Designation.** The land use districts in Subdivision 4B2, and the delineation of a land use district's boundaries on the Official Zoning Map, must be consistent with the goals, policies, and objectives of the comprehensive land use plan and the following criteria, considerations, and objectives:

   a. General Considerations and Criteria for All Land Uses:

   (1) preservation of natural areas;
   (2) present ownership and development of shoreland areas;
   (3) shoreland soil types and their engineering capabilities;
   (4) topographic characteristics;
   (5) vegetative cover;
   (6) in-water physical characteristics, values, and constraints;
   (7) recreational use of the surface water;
   (8) road and service center accessibility;
   (9) socioeconomic development needs and plans as they involve water and related land resources;
   (10) the land requirements of industry which, by its nature, requires location in shoreland areas; and
   (11) the necessity to preserve and restore certain areas having significant historical or ecological value.

   b. Factors and Criteria for Planned Unit Developments:

   (1) existing recreational use of the surface waters and likely increases in use associated with Planned Unit Developments;
   (2) physical and aesthetic impacts of increased density;
   (3) suitability of lands for the planned unit development approach;
   (4) level of current development in the area; and
   (5) amounts and types of ownership of undeveloped lands.

2. **Land Use District Descriptions.** The land use districts provided below, and the allowable land uses therein for the given classifications of waterbodies, shall be properly delineated on the Official Zoning Map for the shorelands of this community. These land use districts are in conformance with the criteria specified in Minnesota Regulations, Part

6120.3200, Subp. 3. Where a conflict exists between a zoning classification in existence prior to the adoption of this Section and the land use described below, the land use designated on the City's Zoning Map shall govern, so long as it is consistent with the City's Comprehensive Plan:

a. Land Use Districts For Lakes

		Recreational Development Lakes	Natural Environment Lakes
(1)	**Special Protection District - Uses**		
	- Forest management	P	P
	- Sensitive resource management	P	P
	- Agricultural; cropland and pasture	P	P
	- Agricultural feedlots	C	C
	- Parks and historic sites	C	C
	- Extractive use	C	C
	- Single residential	C	C
	- Mining of metallic minerals and peat	P	P
(2)	**Residential District - Uses**		
	- Single residential	P	P
	- Semipublic	C	C
	- Park & historic sites	C	C
	- Extractive use	C	C
	- Duplex, triplex, quad residential	C	C
	- Forest management	P	P
	- Mining of metallic minerals and peat	P	P
(3)	**High Density Residential District - Uses**		
	- Residential planned unit developments	C	C
	- Single residential	P	P
	- Surface water oriented commercial *	C	C
	- Semipublic	C	C
	- Parks & historic sites	C	C
	- Duplex, triplex, quad residential	P	C
	- Forest management	P	P
(4)	**Water Oriented Commercial District - Uses**		
	- Surface water-oriented commercial	P	C
	- Commercial planned unit development **	C	C
	- Public, semipublic	C	C
	- Parks & historic sites	C	C
	- Forest management	P	P

* As accessory to a residential planned unit development.

** Limited expansion of a commercial planned unit development involving up to six (6) additional dwelling units or sites may be allowed as a permitted use provided the provisions of Subdivision 8 of this Section are satisfied.

(5)	**General Use District - Uses**		
	- Commercial	P	C
	- Commercial planned unit development **	C	C
	- Industrial	C	C ***
	- Public, semipublic	P	C

- Extractive use	C	C
- Parks & historic sites	C	C
- Forest management	P	P
- Mining of metallic minerals and peat	P	P

*** Industrial uses are allowed by conditional use permit on Natural Environment Lakes if properly zoned and if the conditions in 11.54, Subdivision 9 of this Section are satisfied. (Ord. 537, February 18, 1999)

b. Land Use Districts for Rivers and Streams

		Transition	Agricultural	Tributary
(1)	**Special Protection District - Uses**			
	- Forest management	P	P	P
	- Sensitive resource management	P	P	P
	- Agricultural: cropland and park	P	P	P
	- Agricultural feedlots	C	C	C
	- Parks and historic sites	C	C	C
	- Extractive use	C	C	C
	- Single residential	C	C	C
	- mining/metallic minerals and peat	P	P	P
(2)	**Residential District - Uses**			
	- Single residential	P	P	P
	- Semipublic	C	C	P
	- Parks and historic sites	C	C	P
	- Extractive use	C	C	C
	- Duplex, triplex, quad residential	C	P	C
	- Forest management	P	P	P
	- Mining/metallic minerals and peat	P	P	P
(3)	**High Density Residential - Uses**			
	- Residential planned unit dev.	C	C	C
	- Single residential	P	P	P
	- Surface water oriented commercial *	C	C	C
	- Semipublic	C	C	C
	- Parks and historic sites	C	C	C
	- Duplex, triplex, quad residential	C	C	C
	- Forest management	P	P	P
(4)	**Water-oriented Commercial - Uses**			
	- Surface water-oriented commercial	C	C	C
	- Commercial planned unit dev.*	C	C	C
	- Public, semipublic	P	P	P
	- Parks and historic sites	C	C	C
	- Forest management	P	P	P
(5)	**General Use District - Uses**			
	- Commercial	C	P	C
	- Commercial planned unit dev. **	C	C	C
	- Industrial	N	C	C
	- Public, semipublic	C	P	C
	- Extractive use	C	C	C
	- Parks and historic sites	C	C	C
	- Forest management	P	P	P

- Mining/metallic minerals and peat	P	P	P

* As accessory to a residential planned unit development.

** Limited expansion of a commercial planned unit development involving up to six (6) additional dwelling units or sites may be allowed as a permitted use provided the provisions of Subdivision 8 of this Section are satisfied.

3. Use and Upgrading of Inconsistent Land Use District.

a. The land use districts adopted in Shakopee City Code Chapter 11, Sections 11.22 - 11.46, as they apply to shoreland areas, and their delineated boundaries on the Official Zoning Map, are not consistent with the land use district designation criteria specified in Subdivision 4B2 herein. These inconsistent land use district designations may continue until revisions are proposed to change either the land use district designation within an existing land use district boundary shown on the Official Zoning Map or to modify the boundary of an existing land use district shown on the Official Zoning Map.

b. When a revision is proposed to an inconsistent land use district provision, the following additional criteria and procedures shall apply:

(1) **For Lakes.** When a revision to a land use district designation on a lake is considered, the land use district boundaries and use provisions therein for all the shoreland areas within the jurisdiction of this Section on said lake must be revised to make them substantially compatible with the framework in Subdivision 4B1 and 4B2 of this Section.

(2) **For Rivers and Streams.** When a revision to a land use district designation on a river or stream is proposed, the land use district boundaries and the use provisions therein for all shoreland on both sides of the river or stream within the same classification within the jurisdiction of this Section must be revised to make them substantially compatible with the framework in Subdivision 4B1 and 4B2 of this Section. If the same river classification is contiguous for more than a five (5) mile segment, only the shoreland for a distance of two and one-half (2-1/2) miles upstream and downstream, or to the class boundary if closer, need be evaluated and revised.

c. When an interpretation question arises about whether a specific land use fits within a given "use" category, the interpretation shall be made by the Board of Adjustment and Appeals. When a question arises as to whether a land use district's boundaries are properly delineated on the Official Zoning Map, this decision shall be made by the Shakopee City Council.

d. When a revision is proposed to an inconsistent land use district provision by an individual party or landowner, this individual party or landowner will only be responsible to provide the supporting

and/or substantiating information for the specific parcel in question. The Shakopee City Council will direct the Zoning Administrator to provide such additional information for this waterbody as is necessary to satisfy Items a. and b.

e. The Shakopee City Council must make detailed findings of fact when taking final action that the revision, and the upgrading of any inconsistent land use district designations on said waterbody, are consistent with the enumerated criteria and use provisions of Subdivision 4B.

Subd. 5. Zoning and Water Supply/Sanitary Provisions.

A. **Lot Area and Width Standards.** The lot area (in square feet) and lot width standards (in feet) for single, duplex, triplex; and quad residential lots created after the date of enactment of this Section for the lake and river/stream classifications are the following:

1. **Unsewered Lakes**

a. **Natural Environment:**

	Riparian Lots		Nonriparian Lots	
	Area	Width	Area	Width
Single	80,000	200	80,000	200
Duplex	120,000	300	160,000	400
Triplex	160,000	400	240,000	600
Quad	200,000	500	320,000	800

b. **Recreational Development:**

	Riparian Lots		Nonriparian Lots	
	Area	Width	Area	Width
Single	40,000	150	40,000	150
Duplex	80,000	225	80,000	265
Triplex	120,000	300	120,000	375
Quad	160,000	375	160,000	490

2. **Sewered Lakes:**

a. **Natural Environment:**

	Riparian Lots		Nonriparian Lots	
	Area	Width	Area	Width
Single	40,000	125	20,000	125
Duplex	70,000	225	35,000	220
Triplex	100,000	325	52,000	315
Quad	130,000	425	65,000	410

b. **Recreational Development:**

	Riparian Lots		Nonriparian Lots	
	Area	Width	Area	Width

Single	20,000	75	15,000	75
Duplex	35,000	135	26,000	135
Triplex	50,000	195	38,000	190
Quad	65,000	255	49,000	245

3. **River/Stream Lot Width Standards.** There is no minimum lot size requirement for rivers and streams. The lot width standards for single, duplex, triplex and quad residential developments for the six (6) river/stream classifications are:

	Transition	**Agricultural**	**Urban & Tributary**	
			No Sewer	**Sewer**
Single	250	150	100	75
Duplex	375	225	150	115
Triplex	500	300	200	150
Quad	625	375	250	190

4. **Additional Special Provisions.**

a. Residential subdivisions with dwelling unit densitites exceeding those in the tables in Subdivision 5A2 and 5A3 can only be allowed if designed and approved as residential Planned Unit Developments under Subdivision 8 of this Section. Only land above the ordinary high water level of public waters can be used to meet lot area standards, and lot width standards must be met at both the ordinary high water level and at the building line. The sewer lot area dimensions in Subdivision 5A2 can only be used if publicly owned sewer system service is available to the property.

b. Subdivisions of duplexes, triplexes, and quads on Natural Environment Lakes must also meet the following standards:

(1) each building must be set back at least 200 feet from the ordinary high water level;

(2) each building must have common sewage treatment and water systems in one (1) location and serve all dwelling units in the building;

(3) watercraft docking facilities for each lot must be centralized in one (1) location and serve all dwelling units in the building; and

(4) no more than 25% of a lake's shoreline can be in duplex, triplex, or quad developments.

c. Lots intended as controlled accesses to public waters or as recreation areas for use by owners of nonriparian lots within subdivisions are permissible and must meet or exceed the following standards:

(1) they must meet the width and size requirements for residential lots, and be suitable for the intended uses of controlled access lots.

(2) If docking, mooring, or over-water storage of more than six (6) watercraft is to be allowed at a controlled access lot, then the width of the lot (keeping the same lot depth)

must be increased by the percent of the requirements for riparian residential lots for each watercraft beyond six (6), consistent with the following table:

Controlled Access Lot Frontage Requirements

Ratio of lake size to shore length (acres/mile)	Required increase in frontage (percent)
Less than 100	25
100-200	20
201-300	15
301-400	10
Greater than 400	5

(3) controlled access lots must be jointly owned by all purchasers of lots in the subdivision or by all purchasers of nonriparian lots in the subdivision who are provided riparian access rights on the access lot; and

(4) covenants or other equally effective legal instruments must be developed that specify which lot owners have authority to use the access lot and what activities are allowed. The activities may include watercraft launching, loading, storage, beaching, mooring, or docking. They must also include other outdoor recreational activities that do not significantly conflict with general public use of the public water or the enjoyment of normal property rights by adjacent property owners. Examples of the nonsignificant conflict activities include swimming, sunbathing, or picnicking. The covenants must limit the total number of vehicles allowed to be parked and the total number of watercraft allowed to be continuously moored, docked, or stored over water, and must require centralization of all common facilities and activities in the most suitable locations on the lot to minimize topographic and vegetation alterations. They must also require all parking areas, storage buildings, and other facilities to be screened by

vegetation or topography as much as practical from view from the public water, assuming summer, leaf-on conditions.

d. The use of motorized watercraft (including but not limited to boats powered by inboard and outboard motors and jet skis) is prohibited on natural environment lakes.

B. Placement, Design, and Height of Structures.

1. Placement of Structures on Lots. When more than one (1) setback applies to a site, structures and facilities must be located to meet all setbacks. Where structures exist on the adjoining lots on both sides of a proposed building site, structure setbacks may be altered without a variance to conform to the adjoining setbacks from the ordinary high water level, provided the proposed building site is not located in a shore impact zone or in a bluff impact zone.. Structures shall be located as follows:

a. Structure and On-site Sewage System Setbacks (in feet) from Ordinary High Water Level*.

Classes of Public Waters	Setbacks * Unsewered	Structures Sewered	Sewage Treatment System
Lakes			
Natural Environment	150	150	150
Recreational Development	100	75	75
Rivers			
Transition	150	150	100
Agriculture and Tributary	100	50	75

* One (1) water-oriented accessory structure designed in accordance with Subdivision 5C2 of this Section may be set back a minimum distance of ten (10) feet from the ordinary high water level.

b. Additional Structure Setbacks. The following additional structure setbacks apply, regardless of the classification of the waterbody:

Setback From:		Setback (in feet)
(1)	top of bluff;	30
(2)	unplatted cemetery;	50
(3)	right-of-way line of federal, state or county highway; and	50

(4)	right-of-way line of town road, public street, or other roads or streets not classified.	20

c. **Bluff Impact Zones.** Structures and accessory facilities, except stairways and landings, must not be placed within bluff impact zones.

d. **Uses Without Water-oriented Needs.** Uses without water-oriented needs must be located on lots or parcels without public water frontage, or, if located on lots or parcels with public waters frontage, must either be set back double the normal ordinary high water level setback or be substantially screened from view from the water by vegetation or topography, assuming summer, leaf-on conditions.

2. **Design Criteria For Structures.**

a. **High Water Elevations.** Structures must be placed in accordance with any floodplain regulations applicable to the site. Where these controls do not exist, the elevation to which the lowest floor, including basement, is placed or flood-proofed must be determined as follows:

(1) for lakes, by placing the lowest floor at a level at least three (3) feet above the highest known water level, or three (3) feet above the ordinary high water level, whichever is higher; (Ord. 537, February 18, 1999)

(2) for rivers and streams, by placing the lowest floor at least three (3) feet above the flood of record, if data are available. If data are not available, by placing the lowest floor at least three (3) feet above the ordinary high water level, or by conducting a technical evaluation to determine effects of proposed construction upon flood stages and flood flows and to establish a flood protection elevation. Under all three (3) approaches, technical evaluations must be done by a qualified engineer or hydrologist consistent with parts 6120.5000 to 6120.6200 governing the management of flood plain areas. If more than one (1) approach is used, the highest flood protection elevatoin determined must be used for placing structures and other facilities; and

(3) water-oriented accessory structures may have the lowest floor placed lower than the elevation determined in this item if the structure is constructed of flood-resistant materials to the elevation, electrical and mechanical equipment is placed above the elevation and, if long duration flooding is anticipated, the structure is built to withstand ice action and wind-driven waves and debris.

b. **Water-oriented Accessory Structures.** Each lot may have one (1) water-oriented accessory structure not meeting the normal structure setback in Subdivision 5B1 of this Section if this water-

oriented accessory structure complies with the following provisions:

(1) the structure or facility must not exceed ten (10) feet in height, exclusive of safety rails, and cannot occupy an area greater than 250 square feet. Detached decks must not exceed eight (8) feet above grade at any point;

(2) the setback of the structure or facility from the ordinary high water level must be at least ten (10) feet;

(3) the structure or facility must be treated to reduce visibility as viewed from public waters and adjacent shorelands by vegetation, topography, increased setbacks or color, assuming summer, leaf-on conditions;

(4) the roof may be used as a deck with safety rails, but must not be enclosed or used as a storage area;

(5) the structure or facility must not be designed or used for human habitation and must not contain water supply or sewage treatment facilities; and

(6) as an alternative for general development and recreational development waterbodies, water-oriented accessory structures used solely for watercraft storage, and including storage of related boating and water-oriented sporting equipment, may occupy an area up to 400 square feet provided the maximum width of the structure is twenty (20) feet as measured parallel to the configuration of the shoreline.

c. **Stairways, Lifts, and Landings.** Stairways and lifts are the preferred alternative to major topographic alterations for achieving access up and down bluffs and steep slopes to shore areas. Stairways and lifts must meet the following design requirements:

(1) stairways and lifts must not exceed four (4) feet in width on residential lots. Wider stairways may be used for commercial properties, public open-space recreational properties, and Planned Unit Developments;

(2) landings for stairways and lifts on residential lots must not exceed thirty-two (32) square feet in area. Landings larger than thirty-two (32) square feet may be used for commercial properties, public open-space recreational properties, and Planned Unit Developments;

(3) canopies or roofs are not allowed on stairways, lifts, or landings;

(4) stairways, lifts, and landings may be either constructed above the ground on posts or pilings, or placed into the ground, provided they are designed and built in a manner that ensures control of soil erosion;

(5) stairways, lifts, and landings must be located in the most visually inconspicuous portions of lots, as viewed from the surface of the public water assuming summer, leaf-on conditions, whenever practical; and

(6) facilities such as ramps, lifts, or mobility paths for physically handicapped persons are also allowed for achieving access to shore areas, provided that the dimensional and performance standards of sub-items (1) to (5) are complied with in addition to the requirements of Minnesota Regulations, Chapter 1340.

d. **Significant Historic Sites.** No structure may be placed on a significant historic site in a manner that affects the values of the site unless adequate information about the site has been removed and documented in a public repository.

e. **Steep Slopes.** The Building Official and/or the City Engineer must evaluate possible soil erosion impacts and development visibility from public waters before issuing a permit for construction of sewage treatment systems, roads, driveways, structures, or other improvements on steep slopes. When determined necessary, conditions must be attached to issued permits to prevent erosion and to preserve existing vegetation screening of structures, vehicles, and other facilities as viewed from the surface of public waters, assuming summer, leaf-on vegetation.

3. **Height of Structures.** All structures in residential districts, except churches and nonresidential agricultural structures, must not exceed thirty-five (35) feet in height.

C. **Shoreland Alterations.** Alterations of vegetation and topography will be regulated to prevent erosion into public waters, fix nutrients, preserve shoreland aesthetics, preserve historic values, prevent bank slumping, and protect fish and wildlife habitat.

1. **Vegetation Alterations.**

a. Vegetation alteration necessary for the construction of structures and sewage treatment systems and the construction of roads and parking areas regulated by Subdivision 5D of this Section are exempt from the vegetation alteration standards that follow.

b. Removal or alteration of vegetation, except for agricultural and forest management uses as regulated in Subdivision 5F is allowed subject to the following standards:

(1) Intensive vegetation clearing within the shore and bluff impact zones and on steep slopes is not allowed. Intensive vegetation clearing for forest land conversion to another use outside of these areas is allowable as a conditional use if an erosion control and sedimentation plan is developed and approved by the soil and water conservation district in which the property is located.

(2) In shore and bluff impact zones and on steep slopes,

limited clearing of trees and shrubs and cutting, pruning, and trimming of trees is allowed to provide a view to the water from the principal dwelling site and to accommodate the placement of stairways and landings, picnic areas, access paths, livestock watering areas, beach and watercraft access areas, and permitted water-oriented accessory structures of facilities, provided that:

(a) the screening of structures, vehicles, or other facilities as viewed from the water, assuming summer, leaf-on conditions, is not substantially reduced;
(b) along rivers, existing shading of water surfaces is preserved; and
(c) the above provisions are not applicable to the removal of trees, limbs, or branches that are dead, diseased, or pose safety hazards.

2. Topographic Alterations/Grading and Filling.

a. Grading and filling and excavations necessary for the construction of structures, sewage treatment systems, and driveways under validly issued construction permits for these facilities do not require the issuance of a separate grading and filling permit. However, the grading and filling standards in this Section must be incorporated into the issuance of permits for construction of structures, sewage treatment systems, and driveways.

b. Public roads and parking areas are regulated by Subdivision 5D of this Section.

c. Notwithstanding Items a. and b. above, a grading and filling permit will be required for:

(1) the movement of more than ten (10) cubic yards of material on steep slopes or within shore or bluff impact zones; and

(2) the movement of more than fifty (50) cubic yards of material outside of steep slopes and shore and bluff impact zones.

d. The following considerations and conditions must be adhered to during the issuance of construction permits, grading and filling permits, conditional use permits, variances and subdivision approvals:

(1) Grading or filling in any type 2, 3, 4, 5, 6, 7, or 8 wetland must be evaluated to determine how extensively the proposed activity would affect the following functional qualities of the wetland*:

(a) sediment and pollutant trapping and retention;
(b) storage of surface runoff to prevent or reduce flood damage;
(c) fish and wildlife habitat;

(d) recreational use;
(e) shoreline or bank stabilization; and
(f) noteworthiness, including special qualities such as historic significance, critical habitat for endangered plants and animals, or others.

* This evaluation must also include a determination of whether the wetland alteration being proposed required permits, reviews, or approvals by other local, state, or federal agencies such as a watershed district, the Minnesota Department of Natural Resources, or the United States Army Corps of Engineers. The applicant will be so advised.

(2) Alterations must be designed and conducted in a manner that ensures only the smallest amount of bare ground is exposed for the shortest time possible;

(3) Mulches or similar materials must be used, where necessary, for temporary bare soil coverage, and a permanent vegetation cover must be established as soon as possible.

(4) Methods to minimize soil erosion and to trap sediments before they reach any surface water feature must be used;

(5) Altered areas must be stabilized to acceptable erosion control standards consistent with the field office technical guides of the local soil and water conservation districts and the United States Soil Conservation Service;

(6) Fill or excavated material must not be placed in a manner that creates an unstable slope;

(7) Plans to place fill or excavated material on steep slopes must be reviewed by qualified professionals for continued slope stability and must not create finished slopes of 30% or greater;

(8) Fill or excavated material must not be placed in bluff impact zones;

(9) Any alterations below the ordinary high water level of public waters must first be authorized by the commissioner under Minnesota Statutes, Section 103G.005;

(10) Alterations of topography must only be allowed if they are accessory to permitted or conditional uses and do not adversely affect adjacent or nearby properties; and

(11) Placement of natural rock riprap, including associated grading of the shoreline and placement of a filter blanket, is permitted if the finished slope does not exceed three (3)

feet horizontal to one (1) foot vertical, the landward extent of the riprap is within ten (10) feet of the ordinary high water level, and the height of the riprap above the ordinary high water level does not exceed three (3) feet.

e. Connections to public waters. Excavations where the intended purpose is connection to the public water, such as boat slips, canals, lagoons, and harbors, must be controlled by local shoreland controls. Permission for excavations may be given only after the commissioner has approved the proposed connection to public waters.

D. Placement and Design of Roads, Driveways, and Parking Areas.

1. Public and private roads and parking areas must be designed to take advantage of natural vegetation and topography to achieve maximum screening from view from public waters. Documentation must be provided by a qualified individual that all roads and parking areas are designed and constructed to minimize and control erosion to public waters consistent with the field office technical guides of the local soil and water conservation district, or other applicable technical materials.

2. Roads, driveways, and parking areas must meet structure setbacks and must not be placed within bluff and shore impact zones, when other reasonably and feasible placement alternatives exist. If no alternatives exist, they may be placed within these areas, and must be designed to minimize adverse impacts.

3. Public and private watercraft access ramps, approach roads, and access-related parking areas may be placed within shore impact zones provided the vegetative screening and erosion control conditions of this subpart are met. For private facilities, the grading and filling provisions of Subdivision 5C2 of this Section must be met.

E. Stormwater Management.

The following general and specific standards shall apply:

1. **General Standards:**

a. When possible, existing natural drainageways, wetlands, and vegetated soil surfaces must be used to convey, store, filter, and retain stormwater runoff before discharge to public waters.

b. Development must be planned and conducted in a manner that will minimize the extent of disturbed areas, runoff velocities, erosion potential, and reduce and delay runoff volumes. Disturbed areas must be stabilized and protected as soon as possible and facilities or methods used to retain sediment on the site.

c. When development density, topographic features, and soil and vegetation conditions are not sufficient to adequately handle stormwater runoff using natural features and vegetation, various types of constructed facilities such as diversions, settling basins, skimming devices, dikes, waterways, and ponds may be used.

Preference must be given to designs using surface drainage, vegetation, and infiltration rather than buried pipes and man-made materials and facilities.

2. **Specific Standards:**

   a. Impervious surface coverage of lots must not exceed 25% of the lot area.

   b. When constructed facilities are used for stormwater management, documentation must be provided by a qualified individual that they are designed and installed consistent with the field office technical guide of the local soil and water conservation districts.

   c. New constructed stormwater outfalls to public waters must provide for filtering or settling or suspended solids and skimming of surface debris before discharge.

F. **Standards for Commercial, Industrial, Public, and Semipublic Uses.**

1. Surface water-oriented commercial uses and industrial, public, or semipublic uses with similar needs to have access to and use of public waters may be located on parcels or lots with frontage on public waters. Those uses with water-oriented needs must meet the following standards:

   a. in addition to meeting impervious coverage limits, setbacks, and other zoning standards in this Section, the uses must be designed to incorporate topographic and vegetative screening of parking areas and structures;

   b. uses that require short-term watercraft mooring for patrons must centralize these facilities and design them to avoid obstructions of navigation and to be the minimum size necessary to meet the need; and

   c. uses that depend on patrons arriving by watercraft may use signs and lighting to convey needed information to the public, subject to the following general standards:

      (1) no advertising signs or supporting facilities for signs may be placed in or upon public waters. Signs conveying information or safety messages may be placed in or on public waters by a public authority or under a permit issued by the county sheriff;

      (2) signs may be placed, when necessary, within the shore impact zone if they are designed and sized to be the minimum necessary to convey needed information. They must only convey the location and name of the establishment and the general types of goods or services available. The signs must not contain other detailed information such as product brands and prices, must not be located higher than ten (10) feet above the ground, and must not exceed thirty-two (32) square feet in size. If illuminated by artificial lights, the lights must be shielded

or directed to prevent illumination out across public waters; and

(3) other outside lighting may be located within the shore impact zone or over public waters if it is used primarily to illuminate potential safety hazards and is shielded or otherwise directed to prevent direct illumination out across public waters. This does not preclude use of navigational lights.

1. Uses without water-oriented needs must be located on lots or parcels without public waters frontage, or, if located on lots or parcels with public waters frontage, must either be set back double the normal ordinary high water level setback or be substantially screened from view from the water by vegetation or topography assuming summer, leaf-on conditions. (Ord. 537, February 18, 1999)

3. **Agriculture Use Standards.**

a. General cultivation farming, grazing, nurseries, horticulture, truck farming, sod farming, and wild crop harvesting are permitted uses if steep slopes and shore and bluff impact zones are maintained in permanent vegetation or operated under an approved conservation plan (Resource Management Systems) consistent with the field office technical guides of the local soil and water conservation districts or the United States Soil Conservation Service, as provided by a qualified individual or agency. The shore impact zone for parcels with permitted agricultural land uses is equal to a line parallel to and fifty (50) feet from the ordinary high water level.

b. Animal feedlots must meet the following standards:

(1) new feedlots must not be located in the shoreland of watercourses or in bluff impact zones and must meet a minimum setback of 300 feet from the ordinary high water level of all public waters basins; and

(2) modifications or expansions to existing feedlots that are located within 300 feet of the ordinary high water level or within a bluff impact zone are allowed if they do not further encroach into the existing ordinary high water level setback or encroach on bluff impact zones.

4. **Extractive and Mining Uses.** Extractive and mining uses shall not be allowed in the shoreland district. (Ord. 537, February 18, 1999)

G. **Conditional Uses.** Conditional uses allowable within shoreland areas shall be subject to the review and approval procedures, and criteria and conditions for review of conditional uses established community-wide. The following additional evaluation criteria and conditions apply within shoreland areas:

1. **Evaluation criteria.** A thorough evaluation of the waterbody and the topographic, vegetation, and soils conditions on the site must be made to ensure:

a. the prevention of soil erosion or other possible pollution of public waters, both during and after construction;

b. the visibility of structures and other facilities as viewed from public waters is limited;

c. the site is adequate for water supply and on-site and sewage treatment; and

d. the types, uses, and numbers of watercraft that the project will generate are compatible in relation to the suitability of public waters to safely accommodate these watercraft.

2. **Conditions attached to conditional use permits.** The Board of Adjustment and Appeals, upon consideration of the criteria listed above and the purposes of this Section, shall attach such conditions to the issuance of the conditional use permits as it deems necessary to fulfill the purposes of this Section. Such conditions may include, but are not limited to, the following:

a. increased setbacks from the ordinary high water level;
b. limitations on the natural vegetation to be removed or the requirement that additional vegetation be planted; and
a. special provisions for the location, design, and use of structures, sewage treatment systems, watercraft launching and docking areas, and vehicle parking areas.

H. **Water Supply and Sewage Treatment.**

1. **Water Supply.** Any public or private supply of water for domestic purposes must meet or exceed standards for water quality of the Minnesota Department of Health and the Minnesota Pollution Control Agency.

2. **Sewage Treatment.** Any premises used for human occupancy must be provided with an adequate method of sewage treatment, as follows:

a. Publicly-owned sewer systems must be used where available.

b. All private sewage treatment systems must meet or exceed the Minnesota Pollution Control Agency's standards for individual sewage treatment systems contained in the document titled, "Individual Sewage Treatment Systems Standards, Chapter 7080", a copy of which is hereby adopted by reference and declared to be a part of this Section.

c. On-site sewage treatment systems must be set back from the ordinary high water level in accordance with the setbacks contained in Subdivision 5B1 of this Section.

d. All proposed sites for individual sewage treatment systems shall be evaluated in accordance with the criteria in sub-items (1)-(4). If the determination of a site's suitability cannot be made with publicly available, existing information, it shall then be the responsibility of the applicant to provide sufficient soil borings and percolation tests from on-site field investigations.

Evaluation criteria:

(1) depth to the highest known or calculated ground water table or bedrock;
(2) soil conditions, properties, and permeability;
(3) slope;
(4) the existence of lowlands, local surface depressions, and rock outcrops;

e. Nonconforming sewage treatment systems shall be regulated and upgraded in accordance with Subdivision 6C of this Section.

Subd. 6. Nonconformities. All legally established nonconformities as of the date of this Section may continue, but they will be managed according to applicable state statutes and other regulations of this community for the subjects of alterations and additions, repair after damage, discontinuance of use, and intensification of use; except that the following standards will also apply in shoreland areas:

A. Construction on Nonconforming Lots of Record.

1. Lots of record in the office of the county recorder on the date of enactment of local shoreland controls that do not meet the requirements of Subdivision 5A of this Section may be allowed as building sites without variances from lot size requirements provided the use is permitted in the zoning district, the lot has been in separate ownership from abutting lands at all times since it became substandard, was created compliant with official controls in effect at the time, and sewage treatment and setback requirements of this Section are met.

2. A variance from setback requirements must be obtained before any use, sewage treatment system, or building permit is issued for a lot. In evaluating the variance, the Board of Adjustment and Appeals shall consider sewage treatment and water supply capabilities or constraints of the lot and shall deny the variance if adequate facilities cannot be provided.

3. If, in a group of two (2) or more contiguous lots under the same ownership, any individual lot does not meet the requirements of Subdivision 5A of this Section the lot must not be considered as a separate parcel of land for the purposes of sale or development. The lot must be combined with the one (1) or more contiguous lots so they equal one (1) or more parcels of land, each meeting the requirements of Subdivision 5A of this Section as much as possible.

B. Additions/Expansions to Nonconforming Structures.

1. All additions or expansions to the outside dimensions of an existing nonconforming structure must meet the setback, height, and other requirements of Subdivision 5 of this Section. Any deviation from these requirements must be authorized by a variance pursuant to Subdivision 3C.

2. Deck additions may be allowed without a variance to a structure not meeting the required setback from the ordinary high water level if all of the

following criteria and standards are met:

a. the structure existed on the date the structure setbacks were established;
b. a thorough evaluation of the property and structure reveals no reasonable location for a deck meeting or exceeding the existing ordinary high water level setback of the structure;
c. the deck encroachment toward the ordinary high water level does not exceed 15% of the existing setback of the structure from the ordinary high water level or does not encroach closer than thirty (30) feet, whichever is more restrictive; and
d. the deck is constructed primarily of wood, and is not roofed or screened.

C. **Nonconforming Sewage Treatment Systems.**

1. A sewage treatment system not meeting the requirements of Subdivision 5H of this Section must be upgraded, at a minimum, at any time a permit or variance of any type is required for any improvement on, or use of, the property. For the purposes of this provision, a sewage treatment system shall not be considered nonconforming if the only deficiency is the sewage treatment system's improper setback from the ordinary high water level.

2. The governing body of the City of Shakopee has by formal resolution notified the commissioner of its program to identify nonconforming sewage treatment systems. The City of Shakopee will require upgrading or replacement of any nonconforming system identified by this program within a reasonable period of time which will not exceed two (2) years. Sewage systems installed according to all applicable local shoreland management standards adopted under Minnesota Statutes, Section 105.485, in effect at the time of installation may be considered as conforming unless they are determined to be failing, except that systems using cesspools, leaching pits, seepage pits, or other deep disposal methods, or systems with less soil treatment area separation above groundwater than required by the Minnesota Pollution Control Agency's Chapter 7080 for design of on-site sewage treatment systems, shall be considered nonconforming.

Subd. 7. Subdivision Provisions.

A. **Land Suitability.** Each lot created through subdivision must be suitable in its natural state for the proposed use with minimal alteration. Suitability analysis by the local unit of government shall consider susceptibility to flooding, existence of wetlands, soil and rock formations with severe limitations for development, severe erosion potential, steep topography, inadequate water supply or sewage treatment capabilities, near-shore aquatic conditions unsuitable for water-based recreation, important fish and wildlife habitat, presence of significant historic sites, or any other feature of the natural land likely to be harmful to the health, safety, or welfare of future residents of the proposed subdivision or of the community.

B. **Consistency with Other Controls.** Subdivisions must conform to all official controls of this community. A subdivision will not be approved where a later variance from one (1) or more standards in official controls would be needed to use the lots for their intended purpose. In areas not served by publicly owned sewer and water systems, a subdivision will not be approved unless domestic water supply is available and a sewage treatment system consistant with Subdivision 5B and 5H can be provided for every lot. Each lot shall meet the minimum lot size and

dimensional requirements of Subdivision 5A, including at least a minimum contiguous lawn area, that is free of limiting factors sufficient for the construction of two (2) standard soil treatment systems. Lots that would require use of holding tanks must not be approved.

C. **Information Requirements.** Sufficient information must be submitted by the applicant for the community to make a determination of land suitability. The information shall include at least the following:

1. topographic contours at ten (10) foot intervals or less from United States Geological Survey maps or more accurate sources, showing limiting site characteristics;

2. the surface water features required in Minnesota Statutes, Section 505.02, Subdivision 1, to be shown on plats, obtained from United States Geological Survey quadrangle topographic maps or more accurate sources;

3. adequate soils information to determine suitability for building and on-site sewage treatment capabilities for every lot from the most current existing sources or from field investigations such as soil borings, percolation tests, or other methods;

4. information regarding adequacy of domestic water supply; extent of anticipated vegetation and topographic alterations; near-shore aquatic conditions, including depths, types of bottom sediments, and aquatic vegetation; and proposed methods for controlling stormwater runoff and erosion, both during and after construction activities;

5. location of 100-year flood plain areas and floodway districts from existing adopted maps or data; and

6. a line or contour representing the ordinary high water level, the "toe" and the "top" of bluffs, and the minimum building setback distances from the top of the bluff and the lake or stream.

D. **Dedications.** When a land or easement dedication is a condition of subdivision approval, the approval must provide easements over natural drainage or ponding areas for management of stormwater and significant wetlands.

E. **Platting.** All subdivisions that create five (5) or more lots or parcels that are two and one-half (2-1/2) acres or less in size shall be processed as a plat in accordance with Minnesota Statutes, Chapter 505. No permit for construction of buildings or sewage treatment systems shall be issued for lots created after these official controls were enacted unless the lot was approved as part of a formal subdivision.

F. **Controlled Access or Recreational Lots.** Lots intended as controlled accesses to public waters or for recreational use areas for use by nonriparian lots within a subdivision must meet or exceed the sizing criteria in Subdivision 5N of this Section.

Subd. 8. Planned Unit Developments (PUD's)

A. **Types of PUD's Permissible.** Planned Unit Developments (PUD's) are allowed

for new projects on undeveloped land, redevelopment of previously built sites, or conversions of existing buildings and land. The land use districts in which they are an allowable use are identified in the land use district descriptions in Subdivision 4B of this Section and the official zoning map.

B. **Processing of PUD's.** Planned Unit Developments must be processed consistent with the City's Zoning Ordinance, except that an expansion to an existing commercial PUD involving six (6) or less new dwelling units or sites since the date this Section was adopted is permissible as a permitted use provided the total project density does not exceed the allowable densities calculated in the project density evaluation procedures in Subdivision 8E. Approval cannot occur until the environmental review process (EAW/EIS) is complete, where those processes are required by State law and regulation.

C. **Application for a PUD.** The applicant for a PUD must submit the following documents prior to final action being taken on the application request:

1. A site plan and/or plat for the project showing locations of property boundaries, surface water features, existing and proposed structures and other facilities, land alterations, sewage treatment and water supply systems (where public systems will not be provided), and topographic contours at ten (10) foot intervals or less. When a PUD is a combined commercial and residential development, the site plan and/or plat must indicate and distinguish which buildings and portions of the project are residential, commercial, or a combination of the two.

2. A property owners association agreement (for residential PUD's) with mandatory membership, and all in accordance with the requirements of Subdivision 8F of this Section.

3. Deed restrictions, covenants, permanent easements or other instruments that: 1) properly address future vegetative and topographic alterations, construction of additional buildings, beaching of watercraft, and construction of commercial buildings in residential PUD's; and 2) ensure the long-term preservation and maintenance of open space in accordance with the criteria and analysis specified in Subdivision 8F of this Section.

4. When necessary, a master plan/drawing describing the project and the floor plan for all commercial structures to be occupied.

5. Those additional documents as requested by the Zoning Official that are necessary to explain how the PUD will be designed and will function.

D. **Site "Suitable Area" Evaluation.** Proposed new or expansions to existing Planned Unit Developments must be evaluated using the following procedures and standards to determine the suitable area for the dwelling unit/dwelling site density evaluation in Subdivision 8E.

1. The project parcel must be divided into tiers by locating one (1) or more lines approximately parallel to a line that identifies the ordinary high water level at the following intervals, proceeding landward:

Shoreland Tier Dimensions

	Unsewered	**Sewered**
Recreational development lakes	267 feet	267 feet

Natural environment lakes	400 feet	320 feet
All river classes	300 feet	300 feet

2. The suitable area within each tier is next calculated by excluding from the tier area all wetlands, bluffs, or land below the ordinary high water level of public waters. This suitable area and the proposed project are then subjected to either the residential or commercial planned unit development density evaluation steps to arrive at an allowable number of dwelling units or sites.

E. **Residential and Commercial PUD Density Evaluation.** The procedures for determining the "base" density of a PUD and density increase multipliers are as follows. Allowable densities may be transferred from any tier to any other tier further from the waterbody, but must not be transferred to any other tier closer.

1. **Residential PUD "Base" Density Evaluation:**

a. The suitable area within each tier is divided by the single residential lot size standard for lakes or, for rivers, the single residential lot width standard times the tier depth, unless the local unit of government has specified an alternative minimum lot size for rivers which shall then be used to yield a base density of dwelling units or sites for each tier. Proposed locations and numbers of dwelling units or sites for the residential Planned Unit Developments are then compared with the tier, density, and suitability analyses herein and the design criteria in Subdivision 8F.

2. **Commercial PUD "Base" Density Evaluation.**

a. Determine the average inside living area size of dwelling units or sites within each tier, including both existing and proposed units and sites. Computation of inside living area sizes need not include decks, patios, stoops, steps, garages, or porches and basements, unless they are habitable space.

b. Select the appropriate floor area ratio from the following table:

Commercial Planned Unit Development
Floor Area Ratios *
Public Waters Classes

*Average unit floor area (sq. ft.)	Agricultural and tributary river segments	Recreational development lakes and transition river segments	Natural environment lakes
200	.040	.020	.010
300	.048	.024	.012
400	.056	.028	.014
500	.065	.032	.016
600	.072	.038	.019
700	.082	.042	.021
800	.091	.046	.023

900	.099	.050	.025
1,000	.108	.054	.027
1,100	.116	.058	.029
1,200	.125	.064	.032
1,300	.133	.068	.034
1,400	.142	.072	.036
1,500	.150	.075	.038

* For average unit floor areas less than shown, use the floor area ratios listed for 200 square feet. For areas greater than shown, use the ratios listed for 1,500 square feet. For recreational camping areas, use the ratios listed at 400 square feet. Manufactured home sites in recreational camping areas shall use a ratio equal to the size of the manufactured home, or if unknown, the ratio listed for 1,000 square feet.

c. Multiply the suitable area within each tier by the floor area ratio to yield total floor area for each tier allowed to be used for dwelling units or sites.

d. Divide the total floor area by tier computed in Item c. above by the average inside living area size determined in Item a. above. This yields a base number of dwelling units and sites for each tier.

e. Proposed locations and numbers of dwelling units or sites for the commercial planned unit development are then compared with the tier, density and suitability analyses herein and the design criteria in Subdivision 8F.

3. Density Increase Multipliers.

a. Increases to the dwelling unit or dwelling site base densities previously determined are allowable if the dimensional standards in Subdivision 5 are met or exceeded and the design criteria in Subdivision 8F are satisfied. The allowable density increases in Item b. below will only be allowed if structure setbacks from the ordinary high water level are increased to at least 50% greater than the minimum setback, or the impact on the waterbody is reduced an equivalent amount through vegetative management, topography, or additional means acceptable to the local unit of government and the setback is at least 25% greater than the minimum setback.

b. Allowable Dwelling Unit or Dwelling Site Density Increases for Residential or Commercial Planned Unit Developments:

Density evaluation tiers	Maximum density increase within each tier (percent)
First	50
Second	100
Third	200
Fourth	200
Fifth	200

F. Maintenance and Design Criteria.

1. Maintenance and Administration Requirements.

a. Before final approval of a planned unit development, adequate provisions must be developed for preservation and maintenance in perpetuity of open spaces and for the continued existence and functioning of the development.

b. **Open space preservation.** Deed restrictions, covenants, permanent easements, public dedication and acceptance, or other equally effective and permanent means must be provided to ensure long-term preservation and maintenance of open space. The instruments must include all of the following protections:

(1) commercial uses prohibited (for residential PUD's);
(2) vegetation and topographic alterations other than routine maintenance prohibited;
(3) construction of additional buildings or storage of vehicles and other materials prohibited; and
(4) uncontrolled beaching of watercraft prohibited.

c. **Development organization and functioning.** Unless an equally effective alternative community framework is established, when applicable, all residential Planned Unit Developments must use an owners association with the following features:

(1) membership must be mandatory for each dwelling unit or site purchaser and any successive purchasers;
(2) each member must pay a pro rata share of the association's expenses, and unpaid assessments can become liens on units or sites;
(3) assessments must be adjustable to accommodate changing conditions; and
(4) the association must be responsible for insurance, taxes, and maintenance of all commonly owned property and facilities.

2. **Open Space Requirements.** Planned Unit Developments must contain open space meeting all of the following criteria:

a. at least 50% of the total project area must be preserved as open space;

b. dwelling units or sites, road rights-of-way, or land covered by road surfaces, parking areas, or structures, except water-oriented accessory structures or facilities, are developed areas and shall not be included in the computation of minimum open space;

c. open space must include areas with physical characteristics unsuitable for development in their natural state, and areas containing significant historic sites or unplatted cemeteries;

d. open space may include outdoor recreational facilities for use by owners of dwelling units or sites, by guests staying in commercial dwelling units or sites, and by the general public;

e. open space may include subsurface sewage treatment systems if the use of the space is restricted to avoid adverse impacts on the

systems;

f. open space must not include commercial facilities or uses, but may contain water-oriented accessory structures or facilities;

g. the appearance of open space areas, including topography, vegetation, and allowable uses, must be preserved by use of restrictive deed covenants, permanent easements, public dedication and acceptance, or other equally effective and permanent means; and

h. the shore impact zone, based on normal structure setbacks, must be included as open space. For residential PUD's, at least 50% of the shore impact zone area of existing developments or at least 70% of the shore impact zone area of new developments must be preserved in its natural or existing state. For commercial PUD's, at least 50% of the shore impact zone must be preserved in its natural state.

3. **Erosion Control and Stormwater Management.** Erosion control and stormwater management plans must be developed and the PUD must:

a. be designed, and the construction managed, to minimize the likelihood of serious erosion occurring either during or after construction. This must be accomplished by limiting the amount and length of time of bare ground exposure. Temporary ground covers, sediment entrapment facilities, vegetated buffer strips, or other appropriate techniques must be used to minimize erosion impacts on surface water features. Erosion control plans approved by a soil and water conservation district may be required if project size and site physical characteristics warrant; and

b. be designed and constructed to effectively manage reasonably expected quantities and qualities of stormwater runoff. Impervious surface coverage within any tier must not exceed 25% of the tier area, except that for commercial PUD's 35% impervious surface coverage may be allowed in the first tier of general development lakes with an approved stormwater management plan and consistency with Subdivision 5C.

4. **Centralization and Design of Facilities.** Centralization and design of facilities and structures must be done according to the following standards:

a. Planned Unit Developments must be connected to publicly owned water supply and sewer systems, if available. On-site water supply and sewage treatment systems must be centralized and designed and installed to meet or exceed applicable standards or rules of the Minnesota Department of Health and Subdivision 5B and 5H of this Section. On-site sewage treatment systems must be located on the most suitable areas of the development, and sufficient lawn area free of limiting factors must be provided for a replacement soil treatment system for each sewage system;

b. Dwelling units or sites must be clustered into one (1) or more groups and located on suitable areas of the development. They must be designed and located to meet or exceed the following

dimensional standards for the relevant shoreland classification: setback from the ordinary high water level, elevation above the surface water features, and maximum height. Setbacks from the ordinary high water level must be increased in accordance with Subdivision 8E3 of this Section for developments with density increases;

c. Shore recreation facilities including but not limited to swimming areas, docks, and watercraft mooring areas and launching ramps, must be centralized and located in areas suitable for them. Evaluation of suitability must include consideration of land slope, water depth, vegetation, soils, depth to groundwater and bedrock, or other relevant factors. The number of spaces provided for continuous beaching, mooring, or docking of watercraft must not exceed one (1) for each allowable dwelling unit or site in the first tier (notwithstanding existing mooring sites in an existing commercially used harbor). Launching ramp facilities, including a small dock for loading and unloading equipment, may be provided for use by occupants of dwelling units or sites located in other tiers;

d. Structures, parking areas, and other facilities must be treated to reduce visibility as viewed from public waters and adjacent shorelands by vegetation, topography, increased setbacks, color, or other means acceptable to the local unit of government, assuming summer, leaf-on conditions. Vegetative and topographic screening must be preserved, if existing, or may be required to be provided;

e. Accessory structures and facilities, except water oriented accessory structures, must meet the required principal structure setback and must be centralized; and

f. Water-oriented accessory structures and facilities may be allowed if they meet or exceed design standards contained in Subdivision 5B of this Section and are centralized.

G. Conversions. Local governments may allow existing resorts or other land uses and facilities to be converted to residential Planned Unit Developments if all of the following standards are met:

1. Proposed conversions must be initially evaluated using the same procedures for residential Planned Unit Developments involving all new construction. Inconsistencies between existing features of the development and these standards must be identified.

2. Deficiencies involving water supply and sewage treatment, structure color, impervious coverage, open space, and shore recreation facilities must be corrected as part of the conversion or as specified in the conditional use permit.

3. Shore and bluff impact zone deficiencies must be evaluated and reasonable improvements made as part of the conversion. These improvements must include, where applicable, the following:

a. removal of extraneous buildings, docks or other facilities that no

longer need to be located in shore or bluff impact zones;

b. remedial measures to correct erosion sites and improve vegetative cover and screening of buildings and other facilities as viewed from the water; and

c. if existing dwelling units are located in shore or bluff impact zones, conditions are attached to approvals of conversions that preclude exterior expansions in any dimension or substantial alterations. The conditions must also provide for future relocation of dwelling units, where feasible, to other locations, meeting all setback and elevation requirements when they are rebuilt or replaced.

4. Existing dwelling unit or dwelling site densities that exceed standards in Subdivision 8E may be allowed to continue but must not be allowed to be increased, either at the time of conversion or in the future. Efforts must be made during the conversion to limit impacts of high densities by requiring seasonal use, improving vegetative screening, centralizing shore recreation facilities, installing new sewage treatment systems, or other means.

Subd. 9. Industrial Uses on Natural Environment Lakes. (Ord. 537, February 18, 1999)

A. Conditional Use Permit Required. Industrial uses are allowed on Natural Environment Lakes by Conditional Use Permit if such uses are allowed by the Shakopee Zoning Ordinance in the underlying zoning district, and if the conditions attached to the development of the site are met.

B. Impervious Surface Coverage. Industrial uses on natural Environment Lakes shall be allowed 50% maximum lot coverage with impervious surfaces. This can be increased to 75% maximum lot coverage if the City has an adopted Stormwater Management Plan which adequately addresses stormwater runoff and surface water quality issues in the City, and a specific site plan is reviewed and approved by the City for the Industrial use in question which follows the policies and procedures in the Stormwater Management Plan and which utilizes accepted engineering practices to divert, detain, and/or treat runoff before entering the Natural Environment Lake.

C. Building Height. The maximum allowable building height for Industrial uses on Natural Environment Lakes is thirty-five (35) feet.

D. Substantial Screening. "Substantially screened from view of water" as required in Section 11.54, Subdivision 5 D. of this Chapter when applied to Industrial uses on Natural Environment Lakes which are considered "uses without water-oriented needs" shall mean screening of at least 75% opacity in summer, leaf-on conditions, by either vegetation or topography, as determined by the Zoning Administrator.

E. Trails in Shore Impact Zone. Trails may be allowed in the shore impact zone as part of a conditional use permit.

SHAKOPEE
COMMUNITY PRIDE SINCE 1857

SEC. 11.56. FLOODPLAIN OVERLAY ZONE (FP)

(Deleted, Ord. 567, March 16, 2000)
(Added, Ord. 567, March 16, 2000)

Subd. 1. Statutory Authorization, Findings of Fact and Purpose.

A. **Statutory Authorization.** The legislature of the State of Minnesota has, in Minnesota Statutes, Chapter 103F and 462 delegated the responsibility to local government units to adopt regulations designed to minimize flood losses. Therefore, the City Council of the City of Shakopee, Minnesota does ordain as follows:

B. **Findings of Fact.**

1. The flood hazard areas of Shakopee, Minnesota are subject to periodic inundation which results in potential loss of life, loss of property, health and safety hazards, disruption of commerce and governmental services, extraordinary public expenditures for flood protection and relief, and impairment of the tax base, all of which adversely affect the public health, safety, and general welfare.

2. **Methods Used to Analyze Flood Hazards.** This Section is based upon a reasonable method of analyzing flood hazards which is consistent with the standards established by the Minnesota Department of Natural Resources.

C. **Statement of Purpose.** It is the purpose of this Section to promote the public health, safety, and general welfare and to minimize those losses described in Subdivision 1.B.1. by provisions contained herein.

Subd. 2. General Provisions.

A. **Lands to Which Section Applies.** This Section shall apply to all lands within the jurisdiction of the City of Shakopee shown on the Official Zoning Map and/or the attachments thereto as being located within the boundaries of the Floodway or Flood Fringe Districts.

B. **Establishment of Official Zoning Map.** The Official Zoning Map together with all materials attached thereto is hereby adopted by reference and declared to be a part of this Section. The attached material shall include the Flood Insurance Study for the City of Shakopee prepared by the Federal Insurance Administration dated September 29, 1978 therein, the Letter of Map revision, issued by the Federal Emergency Management and dated October 23, 1997, and all of the attachments thereto relating to revisions to the Flood Boundary and Floodway Map, Flood Insurance Rate Map, and Floodway Data Table. The Official Zoning Map shall be on file in the Office of the City Clerk and the Community Development Department. (Amended, Ord. 568, May 25, 2000)

C. **Regulatory Flood Protection Elevation.** The Regulatory Flood Protection Elevation shall be an elevation no lower than one (1) foot above the elevation of

the regional flood plus any increases in flood elevation caused by encroachments on the flood plain that result from designation of a floodway.

D. **Interpretation.**

1. In their interpretation and application, the provisions of this Section shall be held to be minimum requirements and shall be liberally construed in favor of the Governing Body and shall not be deemed a limitation or repeal of any other powers granted by State Statutes.

2. The boundaries of the zoning districts shall be determined by scaling distances on the Official Zoning Map. Where interpretation is needed as to the exact location of the boundaries of the district as shown on the Official Zoning Map, as for example where there appears to be a conflict between a mapped boundary and actual field conditions and there is a formal appeal of the decision of the Zoning Administration, the Board of Adjustment shall make the necessary interpretation. All decisions will be based on elevations on the regional (100 year) flood profile and other available technical data. Persons contesting the location of the district boundaries shall be given a reasonable opportunity to present their case to the Board and to submit technical evidence.

E. **Abrogation and Greater Restrictions.** It is not intended by this Section to repeal, abrogate, or impair any existing easements, covenants, or deed restrictions. However, where this Section imposes greater restrictions, the provisions of this Section shall prevail. All other Sections inconsistent with this Section are hereby repealed to the extent of inconsistency only.

F. **Warning and Disclaimer of Liability.** This Section does not imply that areas outside the flood plain districts or land uses permitted within such districts will be free from flooding or flood damages. This Section shall not create liability on the part of the City of Shakopee or any officer or employee thereof for any flood damages that result from reliance on this Section or any administrative decision lawfully made hereunder.

G. **Severability.** If any Section clause, provision, or portion of this Section is adjudged unconstitutional or invalid by a court of competent jurisdiction, the remainder of this Section shall not be affected thereby.

H. **Definitions.** Unless specifically defined below, words or phrases used in this Section shall be interpreted so as to give them the same meaning as they have in common usage and so as to give this Section its most reasonable application.

1. **Accessory Use or Structures** - a use or structure on the same lot with, and of a nature customarily incidental and subordinate to, the principal use or structure.

2. **Basement** – means any area of a structure, including crawl spaces, having its floor or base subgrade (below ground level) on all four (4) sides, regardless of the depth of excavation below ground level.

3. **Conditional Use** – means a specific type of structure or land use listed in the official control that may be allowed but only after an in-depth review procedure and with appropriate conditions or restrictions as provided in the official zoning controls or building codes and upon a finding that: (1) certain conditions as detailed in the zoning ordinance exist and (2) the

structure and/or land use conform to the comprehensive land use plan if one exists and are compatible with the existing neighborhood.

4. **Equal Degree of Encroachment** – a method of determining the location of floodway boundaries so that flood plain lands on both sides of a stream are capable of conveying a proportionate share of flood flows.

5. **Flood** – a temporary increase in the flow or stage of a stream or in the stage of a wetland or lake that results in the inundation of normally dry areas.

6. **Flood Frequency** – the frequency for which it is expected that a specific flood stage or discharge may be equaled or exceeded.

7. **Flood Fringe** – that portion of the flood plain outside of the floodway. Flood fringe is synonymous with the term "floodway fringe" used in the Flood Insurance Study for the City of Shakopee.

8. **Flood Plain** – the beds proper and the areas adjoining a wetland, lake or watercourse which have been or hereafter may be covered by the regional flood.

9. **Flood-Proofing** – a combination of structural provision, changes, or adjustments to properties and structures subject to flooding, primarily for the reduction or elimination of flood damages.

10. **Floodway** – the bed of a wetland or lake and the channel of a watercourse and those portions of the adjoining flood plain which are reasonably required to carry or store the regional flood discharge.

11. **Obstruction** – any dam, wall, wharf, embankment, levee, dike, pile, abutment, projection, excavation, channel modification, culvert, building, wire, fence, stockpile, refuse, fill, structure, or matter in, along, across, or projecting into any channel, watercourse, or regulatory floodplain which may impede, retard or change the direction of the flow of water, either in itself or by catching or collecting debris carried by such water.

12. **Principal Use or Structure** – means all uses or structures that are not accessory uses or structures.

13. **Reach** – a hydraulic engineering term to describe a longitudinal segment of a stream or river influenced by a natural or man-made obstruction. In an urban area, the segment of a stream or river between two (2) consecutive bridge crossings would most typically constitute a reach.

14. **Regional Flood** – a flood which is representative of large floods known to have occurred generally in Minnesota and reasonably characteristic of what can be expected to occur on an average frequency in the magnitude of the 100 year recurrence interval. Regional flood is synonymous with the term "base flood" used in the Flood Insurance Study.

15. **Regulatory Flood Protection Elevation** – the Regulatory Flood Protection Elevation shall be an elevation no lower than one (1) foot above the elevation of the regional flood plus any increases in flood elevation caused by encroachments on the flood plain that result from designation of a floodway.

16. **Structure** – anything constructed or erected on the ground or attached to the ground or on-site utilities, including, but not limited to, buildings, factories, sheds, detached garages, cabins, manufactured homes, travel trailers, vehicles not meeting the exemption criteria specified in Section 9.31 of the ordinance and other similar items.

17. **Variance** – means a modification of a specific permitted development standard required in an official control including this Section to allow an alternative development standard not stated as acceptable in the official control, but only as applied to a particular property for the purpose of alleviating a hardship, practical difficulty or unique circumstance as defined and elaborated upon in a community's respective planning and zoning enabling legislation.

Subd. 3. Establishment of Zoning District.

A. **Districts:**

1. **Floodway District.** The Floodway District shall include those areas designated as floodway on the Flood Boundary and Floodway Map adopted in Subdivision 2.B.

2. **Flood Fringe District.** The Flood Fringe District shall include those areas designated as floodway fringe on the Flood Boundary and Floodway Map adopted in Subdivision 2.B.

B. **Compliance.** No new structure or land shall hereafter be used and no structure shall be located, extended, converted or structurally altered without full compliance with the terms of this Section and other applicable regulations which apply to uses within the jurisdiction of this Section. Within the Floodway and Flood Fringe Districts, all uses not listed as permitted uses or conditional uses in Subdivisions 4, 5 and 6 that follow, respectively, shall be prohibited. In addition, a caution is provided herein that:

1. New manufactured home, replacement manufactured homes and certain travel trailers and travel vehicles are subject to the general provisions of this Section and specifically Subdivision 9.

2. Modifications, additions, structural alterations or repair after damage to existing nonconforming structures and nonconforming uses of structures of land are regulated by the general provisions of this Section and specifically Subdivision 11; and

3. As built elevations for elevated or flood proofed structures must be certified by ground surveys and flood proofing techniques must be designed and certified by a registered professional engineer or architect as specified in the general provisions of this Section and specifically as stated in Subdivision 10 of this Section.

Subd. 4. Floodway District.

A. **Permitted Uses:**

1. General farming, pasture, grazing, outdoor plant nurseries, horticulture, truck farming, forestry, sod farming and wild crop harvesting.

2. Industrial-commercial loading areas, parking areas, and airport landing strips.

3. Private and public golf courses, tennis courts, driving ranges, archery ranges, picnic grounds, boat launching ramps, swimming areas, parks wildlife and nature preserves, game farms, fish hatcheries, shooting preserves, target ranges, trap and skeet ranges, hunting and fishing areas, and single or multiple purpose recreational trails.

4. Residential laws, gardens, parking areas, and play areas.

B. Standards for Floodway Permitted Uses:

1. The use shall have a low flood damage potential.

2. The use shall be permissible in the underlying zoning district if one exists.

3. The use shall not obstruct flood flows or increase flood elevations and shall not involve structures, fill, obstructions, excavations or storage of materials or equipment.

C. Conditional Uses:

1. Structures accessory to the uses listed in Subdivision 4.A. above and the uses listed in Subdivision 4.C.2. – 8. below.

2. Extraction and storage of sand, gravel, and other materials.

3. Marinas, boat rentals, docks, piers, wharves, and water control structures.

4. Railroads, streets, bridges, utility transmission lines, and pipelines.

5. Storage yards for equipment, machinery, or materials.

6. Placement of fill.

7. Travel trailers and travel vehicles either on individual lots of record or in existing or new subdivisions or commercial or condominium type campgrounds, subject to the exemptions and provisions of Subdivision 9.C. of this Section.

8. Structural works for flood control such as levees, dikes and floodwalls constructed to any height where the intent is to protect individual structures and levees or dikes where the intent is to protect agricultural crops for a frequency flood event equal to or less than the ten (10) year frequency flood event.

D. Standards for Floodway Conditional Uses:

1. **All Uses.** No structure (temporary or permanent), fill (including fill for roads and levees), deposit, obstruction, storage of materials or equipment, or other uses may be allowed as a Conditional Use that will cause any increase in the stage of the 100-year or regional flood or cause an increase in flood damages in the reach or reaches affected.

2. All floodway Conditional Uses shall be subject to the procedures and standards contained in Subdivision 10.D. of this Section.

3. The conditional use shall be permissible in the underlying zoning district if one exists.

4. **Fill:**

   a. Fill, dredge spoil and all other similar materials deposited or stored in the flood plain shall be protected from erosion by vegetative cover, mulching, riprap or other acceptable method.

   b. Dredge spoil sites and sand and gravel operations shall not be allowed in the floodway unless a long-term site development plan is submitted which includes and erosion/sedimentation prevention element to the plan.

   c. As an alternative, and consistent with Subsection b. immediately above, dredge spoil disposal and sand and gravel operations may allow temporary, on-site storage of fill or other materials which would have caused an increase to the stage of the 100-year or regional flood but only after the Governing Body has received an appropriate plan which assures the removal of the materials from the floodway based upon the flood warning time available. The Conditional Use Permit must be title registered with the property in the Office of the County Recorder.

4. **Accessory Structures:**

   a. Accessory structures shall not be designed for human habitation.

   b. Accessory structures, if permitted, shall be constructed and placed on the building site so as to offer the minimum obstruction to the flow of flood waters. (1) Whenever possible, structures shall be constructed with the longitudinal axis parallel to the direction of flood flow, and (2) so far as practicable, structures shall be placed approximately on the same flood flow lines as those of adjoining structures.

   c. Accessory structures shall be elevated on fill or structurally dry flood proofed in accordance with the FP-1 or FP-2 flood proofing classifications in the State Building Code. As an alternative, an accessory structure may be flood proofed to the FP-3 or FP-4 flood proofing classification in the State Building Code provided the accessory structure constitutes a minimal investment, does not exceed 500 square feet in size, and for a detached garage, the detached garage must be used solely for parking of vehicles and limited storage. All flood proofed accessory structures must meet the following additional standards, as appropriate:

      i. the structure must be adequately anchored to prevent flotation, collapse or lateral movement of the structure and shall be designed to equalize hydrostatic flood forces on exterior walls; and

      ii. any mechanical and utility equipment in a structure must

be elevated to or above the Regulatory Flood Protection Elevation or properly flood proofed.

6. **Storage of Materials and Equipment:**

   a. The storage or processing of materials that are, in time of flooding, flammable, explosive, or potentially injurious to human, animal, or plant life is prohibited.

   b. Storage of other materials or equipment may be allowed if readily removable from the area within the time available after a flood warning and in accordance with a plan approved by the Governing Body.

7. Structural works for flood control that will change the course, current or cross section of protected wetlands or public waters shall be subject to the provisions of Minnesota Statutes, Chapter 105. Community-wide structural works for flood control intended to remove areas from the regulatory flood plain shall not be allowed in the floodway.

8. A levee, dike or floodwall constructed in the floodway shall not cause an increase to the 100-year or regional flood and the technical analysis must assume equal conveyance or storage loss on both sides of a stream.

Subd. 5. Flood Fringe District (FF)

A. **Permitted Uses:** Permitted Uses shall be those uses of land or structures listed as Permitted Uses in the underlying zoning use district(s). If no pre-existing, underlying zoning use districts exist, then any residential or non-residential structure or use of a structure or land shall be a Permitted Use in the Flood Fringe provided such use does not constitute a public nuisance. All permitted uses shall comply with the standards for Flood Fringe "Permitted Uses" listed in Subdivision 5.B. and the "Standards for all Flood Fringe Uses" listed in Subdivision 5.E.

B. **Standards for Flood Fringe Permitted Uses:**

1. All structures, including accessory structures, must be elevated on fill so that the lowest floor including basement floor is at or above the Regulatory Flood Protection Elevation. The finished fill elevation for structures shall be no lower than one (1) foot below the Regulatory Flood Protection Elevation and the fill shall extend at such elevation at least fifteen (15) feet beyond the outside limits of the structure erected thereon.

2. As an alternative to elevation on fill, accessory structures that constitute a minimal investment and that do not exceed 500 square feet for the outside dimension at ground level may be internally flood proofed in accordance with Subdivision 4.D.5.

3. The cumulative placement of fill where at any one time in excess of one thousand (1,000) cubic yards of fill is located on the parcel shall be allowable only as a Conditional Use, unless said fill is specifically intended to elevate a structure in accordance with Subdivision 5.B.1. of this Section.

4. The storage of any materials or equipment shall be elevated on fill to the Regulatory Flood Protection Elevation.

5. The provisions of Subdivision 5.E. of this Section shall apply.

C. **Conditional Uses:** Any structure that is not elevated on fill or flood proofed in accordance with Subdivisions 5.B.1. – 5.B.2. or any use of land that does not comply with the standards in Subdivision 5.B.3. – Subdivision 5.B.4. shall only be allowable as a Conditional Use. An application for a conditional use shall be subject to the standards and criteria and evaluation procedures specified in Subdivisions 5.D. – 5.E. and Subdivision 10.D. of this Section.

D. **Standards for Flood Fringe Conditional Uses:**

1. Alternative elevation methods other than the use of fill may be utilized to elevate a structure's lowest floor above the Regulatory Flood Protection Elevation. These alternative methods may include the use of stilts, pilings, parallel walls, etc., or above-grade, enclosed areas such as crawl spaces or tuck under garages. The base or floor of an enclosed area shall be considered above-grade and not a structure's basement or lowest floor if: 1) if the enclosed area is above-grade on at least one (1) side of the structure; 2) it is designed to internally flood and is constructed with flood resistant materials; and 3) it is used solely for parking of vehicles, building access or storage. The above-noted alternative elevation methods are subject to the following additional standards:

   a. **Design and Certification** – the structure's design and as-built condition must be certified by a registered professional engineer or architect as being in compliance with the general design standards of the State Building Code and, specifically, that all electrical, heating, ventilation, plumbing and air conditioning equipments and other service facilities must be at or above the Regulatory Flood Protection Elevation or be designed to prevent flood water from entering or accumulating within these components during times of flooding.

   b. **Specific Standards for Above-Grade, Enclosed Areas** – above-grade, fully enclosed areas such as crawl spaces or tuck under garages must be designed to internally flood and the design plans must stipulate:

      i. The minimum area of openings in the walls where internal flooding is to be used as a flood proofing technique. When openings are placed in a structure's walls to provide for entry of flood waters to equalize pressures, the bottom of all openings shall be no higher than one (1) foot above grade. Openings may be equipped with screens, louvers, valves, or other coverings, or devices provided that they permit the automatic entry and exit of flood waters.

      ii. That the enclosed area will be designed of flood resistant materials in accordance with the FP-3 or FP-4 classifications in the State Building Code and shall be used solely for building access, parking of vehicles or storage.

2. Basements, as defined by Subdivision 2.H.2. of this Section, shall be

subject to the following:

a. Residential basement construction shall not be allowed below the Regulatory Flood Protection Elevation.

b. Non-residential basements may be allowed below the Regulatory Flood Protection Elevation provided the basement is structurally dry flood proofed in accordance with Subdivision 5.D.3. of this Section.

3. All areas of non-residential structures including basements to be placed below the Regulatory Flood Protection Elevation shall be flood proofed in accordance with the structurally dry flood proofing classifications in the State Building Code. Structurally dry flood proofing must meet the FP-1 or FP-2 flood proofing classification in the State Building Code and this shall require making the structure watertight with the walls substantially impermeable to the passage of water and with structural components having the capability of resisting hydrostatic and hydrodynamic loads and the effects of buoyancy. Structures flood proofed to the FP-3 or FP-4 classification shall not be permitted.

4. When at any one (1) time more than 1,000 cubic yards of fill or other similar material is located on a parcel for such activities as on-site storage, landscaping, sand and gravel operations, landfills, roads dredge spoil disposal or construction of flood control works, an erosion/sedimentation control plan must be submitted unless the community is enforcing a state approved shoreland management ordinance. In the absence of a state approved shoreland ordinance, the plan must clearly specify methods to be used to stabilize the fill on site for a flood event at a minimum of the 100-year or regional flood event. The plan must be prepared and certified by a registered professional engineer or other qualified individual acceptable to the Governing Body. The plan may incorporate alternative procedures for removal of the material from the flood plain if adequate flood warning time exists.

5. **Storage of Materials and Equipment:**

a. The storage or processing of materials that are, in time of flooding, flammable, explosive, or potentially injurious to human, animal, or plant life is prohibited.

b. Storage of other materials or equipment may be allowed if readily removable from the area within the time available after a flood warning and in accordance with a plan approved by the Governing Body.

6. The provisions of Subdivision 5.E. of this Section shall also apply.

E. **Standards for All Flood Fringe Uses:**

1. All new principal structures must have vehicular access at or above an elevation not more than two (2) feet below the Regulatory Flood Protection Elevation. If a variance to this requirement is granted, the Board of Adjustment must specify limitations on the period of use or occupancy of the structure for time of flooding and only after determining that adequate flood warning time and local flood emergency response procedures exist.

2. **Commercial Uses** – accessory land uses, such as yards, railroad tracks, and parking lots may be at elevations lower than the Regulatory Flood Protection Elevation. However, a permit for such facilities to be used by the employees or the general public shall not be granted in the absence of a flood warning system that provides adequate time for evacuation if the area would be inundated to a depth greater than two (2) feet or be subject to flood velocities greater than four (4) feet per second upon occurrence of the regional flood.

3. **Manufacturing and Industrial Uses** – measures shall be taken to minimize interference with normal plat operations especially along streams having protracted flood durations. Certain accessory land uses such as yards and parking lots may be at lower elevations subject to requirements set out in Subdivision 5.E.2. above. In considering permit applications, due consideration shall be given to needs of an industry whose business requires that it be located in flood plain areas.

4. Fill shall be properly compacted and the slopes shall be properly protected by the use of riprap, vegetative cover or other acceptable method. The Federal Emergency Management Agency (FEMA) has established criteria for removing the special flood hazard area designation for certain structures properly elevated on fill above the 100-year flood elevation – FEMA's requirements incorporate specific fill compaction and side slope protection standards for multi-structure or multi-lot developments. These standards should be investigated prior to the initiation of site preparation if a change of special flood hazard area designation will be requested.

5. Flood plain developments shall not adversely affect the hydraulic capacity of the channel and adjoining flood plain of any tributary watercourse or drainage system where a floodway or other encroachment limit has not been specified on the Official Zoning Map. (Amended, Ord. 568, May 25, 2000)

6. Standards for travel trailers and travel vehicles are contained in Subdivision 9.C.

7. All manufactured homes must be securely anchored to an adequately anchored foundation system that resists flotation, collapse and lateral movement. Methods of anchoring may include, but are not to be limited to, use of over-the-top or frame ties to ground anchors. This requirement is in addition to applicable state or local anchoring requirements for resisting wind forces.

Subd. 6. Reserved for Future Use.

Subd. 7. Subdivisions[2]

[2] This Section is not intended as a substitute for a comprehensive City or county subdivision ordinance. It can, however, be used as an interim control until the comprehensive subdivision ordinance can be amended to include necessary flood plain management provisions.

A. **Review Criteria.** No land shall be subdivided which is unsuitable for the reason of flooding, inadequate drainage, water supply or sewage treatment facilities. All lots within the flood plain districts shall contain a building site at or above the Regulatory Flood Protection Elevation. All subdivisions shall have water and

sewage treatment facilities that comply with the provisions of the Section and have road access both to the subdivision and to the individual building sites no lower than two (2) feet below the Regulatory Flood Protection Elevation. For all subdivisions in the flood plain, the Floodway and Flood Fringe boundaries, the Regulatory Flood Protection Elevation and the required elevation of all access roads shall be clearly labeled on all required subdivision drawings and platting documents.

B. **Removal of Special Flood Hazard Area Designation.** The Federal Emergency Management Agency (FEMA) has established criteria for removing the special flood hazard area designation for certain structures properly elevated on fill above the 100-year flood elevation. FEMA's requirements incorporate specific fill compaction and side slope protection standards for multi-structure or multi-lot developments. These standards should be investigated prior to the initiation of site preparation if a change of special flood hazard area designation will be requested.

Subd. 8. Public Utilities, Railroads, Roads, and Bridges.

A. **Public Utilities.** All public utilities and facilities such as gas, electrical, sewer, and water supply systems to be located in the flood plain shall be flood-proofed in accordance with the State Building Code or elevated to above the regulatory Flood Protection Elevation.

B. **Public Transportation Facilities.** Railroad tracks, roads, and bridges to be located within the flood plain shall comply with Subdivisions 4 and 5 of the Section. Elevation to the Regulatory Flood Protection Elevation shall be provided where failure or interruption of these transportation facilities would result in danger to the public health or safety or where such facilities are essential to the orderly functioning of the area. Minor or auxiliary roads or railroads may be constructed at a lower elevation where failure or interruption of transportation services would not endanger the public health or safety.

C. **On-site Sewage Treatment and Water Supply Systems.** Where public utilities are not provided: 1) on-site water supply systems must be designed to minimize or eliminate infiltration of flood waters into the systems; and 2) new or replacement on-site sewage treatment systems must be designed to minimize or eliminate infiltration of flood waters into the systems and discharges from the systems into flood waters and they shall not be subject to impairment or contamination during times of flooding. Any sewage treatment system designed in accordance with the State's current statewide standards for on-site sewage treatment systems shall be determined to be in compliance with this Section.

Subd. 9. Manufactured Homes and Manufactured Home Parks and Placement of Travel Trailers and Travel Vehicles.

A. New manufactured home parks and expansions to existing mobile manufactured home parks shall be subject to the provisions placed on subdivision by Subdivision 7 of this Section.

B. The placement of new or replacement manufactured homes in existing manufactured home parks or on individual lots of record that are located in flood plain districts will be treated as a new structure and may be placed only if elevated in compliance with Subdivision 5 of this Section. If vehicular road access for pre-existing manufactured home parks is not provided in accordance with Subdivision 5.E.1., then replacement manufactured homes will not be allowed until the property owner(s) develops a flood warning emergency plan acceptable to the Governing

Body.

1. All manufactured homes must be securely anchored to an adequately anchored foundation system that resists flotation, collapse and lateral movement. Methods of anchoring may include, but are not to be limited to, use of over-the-top or frame ties to ground anchors. This requirement is in addition to applicable state or local anchoring requirements for resisting wind forces.

C. Travel trailers and travel vehicles that do not meet the exemption criteria specified in Subdivision 9.C.1. below shall be subject to the provisions of this Section and as specifically spelled out in Subdivision 9.C.3. – 9.C.4. below.

1. **Exemption** – travel trailers and travel vehicles are exempt from the provisions of this Section if they are placed in any of the areas listed in Subdivision 9.C.2. below and further they meet the following criteria:

   a. have current licenses required for highway use.

   b. are highway ready meaning on wheels or the internal jacking system, are attached to the site only by quick disconnect type utilities commonly used in campgrounds and trailer parks and the travel trailer/travel vehicle has no permanent structural type additions attached to it.

   c. the travel trailer or travel vehicle and associated use must be permissible in any pre-existing, underlying zoning use district.

2. **Areas Exempted for Placement of Travel/Recreational Vehicles:**

   a. Individual lots or parcels of record.

   b. Existing commercial recreational vehicle parks or campgrounds.

   c. Existing condominium type associations.

3. Travel trailers and travel vehicles exempted in Subdivision 9.C.1. lose this exemption when development occurs on the parcel exceeding $500 dollars for a structural addition to the travel trailer/travel vehicle or an accessory structure such as a garage or a storage building. The travel trailer/travel vehicle and all additions and accessory structures will then be treated as a new structure and shall be subject to the elevation/flood proofing requirements and the use of land restrictions specified in Subdivisions 4 and 5 of this Section.

4. New commercial travel trailer or travel vehicle parks or campgrounds and new residential type subdivisions and condominium associations and the expansion of any existing similar use exceeding five (5) units or dwelling sites shall be subject to the following:

   a. Any new or replacement travel trailer or travel vehicle will be allowed in the Floodway or Flood Fringe Districts provided said trailer or vehicle and its contents are placed on fill above the Regulatory Flood Protection Elevation and proper elevated road access to the site exists in accordance with Subdivision 5.E.1. of this Section. Any fill placed in a floodway for the purpose of

elevating a travel trailer shall be subject to the requirements of Subdivision 4.

b. All new or replacement travel trailers or travel vehicles not meeting the criteria of a. above may, as an alternative, be allowed as a Conditional Use if in accordance with the following provisions and the provisions of Subdivision 10.D. of the Section. The applicant must submit an emergency plan for the safe evacuation of all vehicles and people during the 100 year flood. Said plan shall be prepared by a registered engineer or other qualified individual and shall demonstrate that adequate time and personnel exist to carry out the evacuation. All attendant sewage and water facilities for new or replacement travel trailers or other recreational vehicles must be protected or constructed so as to not be impaired or contaminated during times of flooding in accordance with Subdivision 8.C. of this Section.

Subd. 10. Administration.

A. **Zoning Administrator:** a Zoning Administrator or other official designated by the Governing Body shall administer and enforce this Section. If the Zoning Administrator finds a violation of the provisions of this Section the Zoning Administrator shall notify the person responsible for such violation in accordance with the procedures stated in Subdivision 12 of the Section.

B. **Permit Requirements.**

1. **Permit Required.** A permit issued by the Zoning Administrator in conformity with the provisions of this Section shall be secured prior to the erection, addition, or alteration of any building, structure, or portion thereof, prior to the use or change of use of a building, structure, or land; prior to the change or extension of a nonconforming use; and prior to the placement of fill, excavation of materials, or the storage of materials or equipment within the flood plain.

2. **Application for Permit.** Application for a Permit shall be made in duplicate to the Zoning Administrator on forms furnished by the Zoning Administrator and shall include the following where applicable: plans in duplicate drawn to scale, showing the nature, location, dimensions, and elevations of the lot; existing or proposed structures, fill or storage of materials; and the location of the foregoing in relation to the stream channel.

3. **State and Federal Permits.** Prior to granting a permit or processing an application for a conditional use permit or variance, the Zoning Administrator shall determine that the applicant has obtained all necessary State and Federal Permits.

4. **Certificate of Zoning Compliance for a New, Altered, or Nonconforming Use.** It shall be unlawful to use, occupy, or permit the use or occupancy of any building or premises or part thereof hereafter created, erected, changed, converted, altered, or enlarged in its use or structure until a Certificate of Zoning Compliance shall have been issued by the Zoning Administrator state that the use of the building or land conforms to the requirements of this Section.

5. **Construction and Use to be Provided on Applications, Plans, Permits, Variances and Certificates of Zoning Compliance.** Permits, conditional use permits, or certificates of Zoning Compliance issued on the basis of approved plans and applications authorize only the use, arrangement, and construction set forth in such approved plans and applications, and no other use, arrangement or construction. Any user, arrangement, or construction at variance with that authorized shall be deemed a violation of this Section, and punishable as provided by Subdivision 12 of this Section.

6. **Certification.** The applicant shall be required to submit certification by a registered professional engineer, registered architect, or registered land surveyor that the finished fill and building elevations were accomplished in compliance with the provisions of this Section. Flood proofing measures shall be certified by a registered professional engineer or registered architect.

7. **Record of First Floor Elevation.** The Zoning Administrator shall maintain a record of the elevation of the lowest floor (including basement) of all new structures and alterations or additions to existing structures in the flood plain. The Zoning Administrator shall also maintain a record of the elevation to which structures and alterations or additions to structures are flood-proofed.

C. **Board of Adjustment:**

1. **Rules.** The Board of Adjustment shall adopt rules for the conduct of business and may exercise all of the powers conferred on such Boards by State law.

2. **Administrative Review.** The Board shall hear and decide appeals where it is alleged there is error in any order, requirement, decision, or determination made by an administrative official in the enforcement or administration of this Section.

3. **Variances.** The board may authorize upon appeal in specific cases such relief or variance from the terms of this Section as will not be contrary to the public interest and only for those circumstances such as hardship, practical difficulties or circumstances unique to the property under consideration, as provided for in the respective enabling legislation for planning and zoning for cities or counties as appropriate. In the granting of such variance, the Board of Adjustment shall clearly identify in writing the specific conditions that existed consistent with the criteria specified in the respective enabling legislation which justified the granting of the variance. No variance shall have the effect of allowing in any district uses prohibited in that district, permit a lower degree of flood protection than the Regulatory Flood Protection Elevation for the particular area, or permit standards lower than those required by State law.

4. **Hearings.** Upon filing with the Board of Adjustment of an appeal from a decision of the Zoning Administrator, or an application for a variance, the Board shall fix a reasonable time for a hearing and give due notice to the parties in interest as specified by law. The Board shall submit by mail to the Commissioner of Natural Resources a copy of the application for proposed variances sufficiently in advance so that the Commissioner will receive at least ten (10) days notice of the hearing.

5. **Decisions.** The Board shall arrive at a decision on such appeal or variance within 120 days. In passing upon an appeal, the Board may, so long as such action is in conformity with the provisions of this Section, reverse or affirm, wholly or in part, or modify the order, requirement, decision or determination of the Zoning Administrator or other public official. It shall make its decision in writing setting forth the findings of fact

and the reasons for its decisions. In granting a variance the Board may prescribe appropriate conditions and safeguards such as those specified in Subdivision 10.D.6. which are in conformity with the purposes of this Section. Violations of such conditions and safeguards, when made a part of the terms under which the variance is granted, shall be deemed a violation of this Section punishable under Subdivision 12. A copy of all decisions granting variances shall be forwarded by mail to the Commissioner of Natural Resources within ten (10) days of such action.

6. **Appeals.** Appeals from any decision of the Board may be made, and as specified in this Community's Official Controls and also Minnesota Statutes.

7. **Flood Insurance Notice and Record Keeping.** The Zoning Administrator shall notify the applicant for a variance that 1) the issuance of a variance to construct a structure below the base flood level will result in increased premium rates for flood insurance up to amounts as high as $25 for $100 of insurance coverage and 2) such construction below the 100-year or regional flood level increases risks to life and property. Such notification shall be maintained with a record of all variance actions. A community shall maintain a record of all variance actions, including justification for their issuance, and report such variances issued in its annual or biennial report submitted to the Administrator of the National Flood Insurance Program.

D. **Conditional Uses.** The City of Shakopee Board of Adjustment and Appeals shall hear and decide applications for Conditional Uses permissible under this Section. Applications shall be submitted to the Zoning Administrator who shall forward the application to the Board of Adjustment and Appeals for consideration.

1. **Hearings.** Upon filing with the Board of Adjustment and Appeals an application for a conditional use permit, the Board of Adjustment and Appeals shall submit by mail to the Commissioner of Natural Resources a copy of the application for proposed Conditional Use sufficiently in advance so that the Commission will receive at least ten (10) days notice of the hearing.

2. **Decisions.** The Board of Adjustment and Appeals shall arrive at a decision on a Conditional Use Permit within 120 days. In granting a Conditional Use Permit the Board of Adjustment and Appeals shall prescribe appropriate conditions and safeguards, in addition to those specified in Subdivision 10.D.6, which are in conformity with the purposes of this Section. Violations of such conditions and safeguards, when made a part of the terms under which the Conditional Use Permit is granted, shall be deemed a violation of this Section punishable under Subdivision 12. A copy of all decisions granting Conditional Use Permits shall be forwarded by mail to the Commissioner of Natural Resources within ten (10) days of such action.

3. **Procedures to be Followed by the Board of Adjustment and Appeals in Passing on Conditional Use Permit Applications Within All Floodplain Districts.**

   a. Require the applicant to furnish such of the following information and additional information as deemed necessary by the Board of Adjustment and Appeals for determining the suitability of the particular site for the proposed use:

      i. Plans in triplicate drawn to scale showing the nature, location, dimensions, and elevation of the lot, existing or proposed structures, fill storage of materials, flood-proofing measures, and the relationship of the above to the location of the stream channel.

      ii. Specifications for building construction and materials, flood-proofing, filling, dredging, grading, channel improvement, storage of materials, water supply and sanitary facilities.

   b. Transmit one (1) copy of the information described in Subsection a. to a designated engineer or other expert person or agency for technical assistance, where necessary, in evaluating the proposed project in relation to flood heights and velocities, the seriousness of flood damage to the use, the adequacy of the plans for protection, and other technical matters.

   c. Based upon the technical evaluation of the designated engineer or expert, the Board of Adjustment and Appeals shall determine the specific flood hazard at the site and evaluate the suitability of the proposed use in relation to the flood hazard.

4. **Factors Upon Which the Decision of the Board of Adjustment and Appeals Shall be Based.** In passing on Conditional Use applications, the Board of Adjustment and Appeals shall consider all relevant factors specified in other sections of this Section, and:

   a. The danger to life and property due to increased flood heights or velocities caused by encroachments.

   b. The danger that materials may be swept onto other lands or downstream to the injury of others or they may block bridges, culverts or other hydraulic structures.

   c. The proposed water supply and sanitation systems and the ability of these systems to prevent disease, contamination, and unsanitary conditions.

   d. The susceptibility of the proposed facility and its contents to flood damage and the effect of such damage on the individual owner.

   e. The importance of the services provided by the proposed facility to the community.

   f. The requirements of the facility for a waterfront location.

g. The availability of alternative locations not subject to flooding for the proposed use.

h. The compatibility of the proposed use with existing development and development anticipated in the foreseeable future.

i. The relationship of the proposed use to the comprehensive plan and flood plain management program for the area.

j. The safety of access to the property in times of flood for ordinary and emergency vehicles.

k. The expected heights, velocity, duration, rate of rise, and sediment transport of the flood waters expected at the site.

l. Such other factors which are relevant to the purposes of this Section.

5. **Time for Acting on Application.** The Board of Adjustment and Appeals shall act on an application in the manner described above within 120 days from receiving the application, except that where additional information is required pursuant to Subdivision 10.D.4. of this Section. The Board of Adjustment and Appeals shall render a written decision within 60 days from the receipt of such additional information. (Amended, Ord. 568, May 25, 2000)

6. **Conditions Attached to Conditional Use Permits.** Upon consideration of the factors listed above and the purpose of this Section, the Board of Adjustment and Appeals shall attach such conditions to the granting of Conditional Use Permits as it deems necessary to fulfill the purposes of this Section. Such conditions may include, but are not limited to, the following:

a. Modification of waste treatment and water supply facilities.

b. Limitations on period of use, occupancy, and operation.

c. Imposition of operational controls, sureties, and deed restrictions.

d. Requirements for construction of channel modifications, compensatory storage, dikes, levees, and other protective measures.

e. Flood-proofing measures, in accordance with the State Building Code and this Section. The applicant shall submit a plan or document certified by a registered professional engineer or architect that the flood-proofing measures are consistent with the Regulatory Flood Protection Elevation and associates flood factors for the particular area.

Subd. 11. Nonconforming Uses.

A. A structure or the use of a structure or premises which was lawful before the passage or amendment of this Section but which is not in conformity with the provisions of this Section may be continued subject to the following conditions:

1. No such use shall be expanded, changed, enlarged, or altered in a way which increases its nonconformity.

2. Any alteration or addition to a nonconforming structure or nonconforming use which would result in increasing the flood damage potential of that structure or use shall be protected to the Regulatory Flood Protection Elevation in accordance with any of the elevation on fill or flood-proofing techniques (i.e., FP-1 thru FP-4 floodproofing classifications) allowable in the State Building Code, except as further restricted in Subdivision 11.A.3. below.

3. The cost of any structural alterations or additions to any nonconforming structure over the life of the structure shall not exceed 50% of the market value of the structure unless the conditions of this Section are satisfied. The cost of all structural alterations and additions constructed since the adoption of the Community's initial flood plain controls must be calculated into today's current cost which will include all costs such as construction materials and a reasonable cost placed on all manpower or labor. If the current cost of all previous and proposed alterations and additions exceeds 50% of the current market value of the structure, then the structure must meet the standards of Subdivision 4 or 5 of this Section for new structures depending upon whether the structure is in the Floodway or Flood Fringe, respectively.

4. If any nonconforming use is discontinued for twelve (12) consecutive months, any future use of the building premises shall conform to this Section. The assessor shall notify the Zoning Administrator in writing of instances of nonconforming uses which have been discontinued for a period of twelve (12) months.

5. If any nonconforming use or structure is destroyed by any means, including floods, to an extent of 50% or more of its market value at the time of destruction, it shall not be reconstructed except in conformity with the provisions of this Section. The applicable provisions for establishing new uses or new structures in Subdivision 4 or 5 will apply depending upon whether the use or structure is in the Floodway or Flood Fringe, respectively.

Subd. 12. Penalties for Violation.

A. Violation of the provisions of this Section or failure to comply with any of its requirements (including violations of conditions and safeguards established in connection with grants of variances or conditional uses) shall constitute a misdemeanor and shall be punishable as defined by law.

B. Nothing herein contained shall prevent the City of Shakopee from taking such other lawful action as is necessary to prevent or remedy any violation. Such actions may include but are not limited to:

1. In responding to a suspected Section violation, the Zoning Administrator and local government may utilize the full array of enforcement actions available to it including but not limited to prosecution and fines, injunctions, after-the-fact permits, orders for corrective measures or a request to the National Flood Insurance Program for denial of flood insurance availability to the guilty party. The community must act in good faith to enforce these

official controls and to correct Section violations to the extent possible so as not to jeopardize its eligibility in the National Flood Insurance Program.

2. When a Section violation is either discovered by or brought to the attention of the Zoning Administrator, the Zoning Administrator shall immediately investigate the situation and document that nature and extent of the violation of the official control. As soon as is reasonably possible, this information will be submitted to the appropriate Department of Natural Resources and Federal Emergency Management Agency Regional Office along with the community's plan of action to correct the violation to the degree possible.

3. The Zoning Administrator shall notify the suspected party of the requirements of this Section and all other official controls and the nature and extent of the suspected violation of these controls. If the structure and/or use is under construction or development, the Zoning Administrator may order the construction or development immediately halted until a proper permit or approval is granted by the Community. If the construction or development is already completed, then the Zoning Administrator may either (1) issue an order identifying the corrective actions that must be made within a specified time period to bring the use or structure into compliance with the official controls, or (2) notify the responsible party to apply for an after-the-fact permit/development approval within a specified period of time not to exceed 30 days.

4. If the responsible party does not appropriately respond to the Zoning Administrator within the specified period of time, each additional day that lapses shall constitute an additional violation of this Section and shall be prosecuted accordingly. The Zoning Administrator shall also upon the lapse of the specified response period notify the landowner to restore the land to the condition which existed prior to the violation of this Section.

Subd. 13. Amendments.

A. The flood plain designation on the official zoning map shall not be removed from flood plain areas unless it can be shown that the designation is in error or that the area has been filled to or above the elevation of the regional flood and is contiguous to lands outside the flood plain. Special exceptions to this rule may be permitted by the Commissioner of Natural Resources if Commissioner determines that, through other measures, lands are adequately protected for the intended use.

B. All amendments to this Section, including amendments to the official zoning map, must be submitted to and approved by the Commissioner of Natural Resources prior to adoption. Changes in the official zoning map must meet the Federal Emergency Management Agency's (FEMA) Technical Conditions and criteria and must receive prior FEMA approval before adoption. The Commissioner of Natural Resources must be given ten (10) days written notice of all hearings to consider an amendment to this Section and said notice shall include a draft of the ordinance amendment or technical study under consideration.

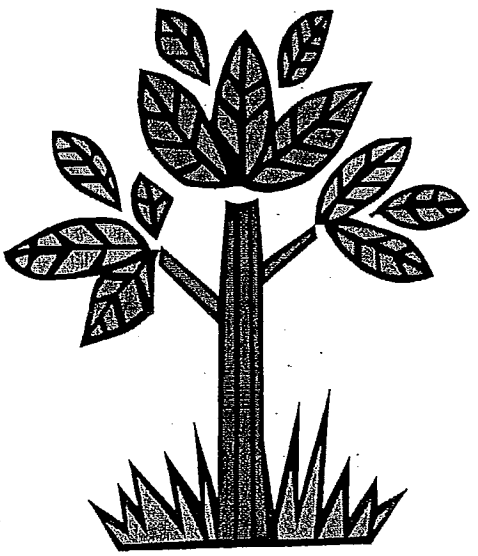
CITY OF SHAKOPEE

WOODLAND AND TREE MANAGEMENT

ORDINANCE AND GUIDELINES

FOR

BUILDERS



2-11-04

CITY OF SHAKOPEE
WOODLAND AND TREE MANAGEMENT ORDINANCE
GUIDELINES FOR BUILDERS

Pursuant to City Code 11.60 SUBD. 9:

THE FOLLOWING STANDARDS SHALL APPLY TO ALL RESIDENTIAL DEVELOPMENT FOR WHICH A BUILDER PERMIT IS ISSUED AFTER THE EFFECTIVE DATE OF THIS CHAPTER.

Subd. 9. Woodland Management Regulations. The following requirements and standards shall apply to any Development on any parcel of land containing a Woodland and for which a preliminary plat, minor subdivision, building permit, or grading permit is required.

A. DEFINITIONS

Applicant means any person proposing a Development.

Development means: (1) the construction of a new building or new structure on a vacant parcel of land containing a woodland; (2) the platting or subdivision of a parcel of land containing a woodland; or (3) any activity for which a grading permit is required on land containing a woodland.

Diameter at Breast Height, or DBH, means the length of a straight line through the trunk of a tree (in inches) measured at 54 inches above the ground from the uphill side of the tree.

Tree means a living specimen of a woody plant species that is either a deciduous tree whose diameter is 6-inches or greater at DBH, or a coniferous tree whose height is 12 feet or greater.

Natural Resources Inventory means information maintained by the City based on a study conducted by the City of Shakopee in 2002 that identifies and classifies the land cover of the City of Shakopee, Jackson Township and Louisville Township in a project area covering 32,551 acres.

Minnesota Land Cover Classification System (MLCCS) is a comprehensive classification system that identifies cultural and natural land covers types as well as providing a multitude of other land planning data.

Woodland means the area within the contiguous dripline created by a grouping of woody plant species if the grouping contains at least one Tree.

B. WOODLAND MANAGEMENT PLAN

1. Any Applicant who desires to remove any Tree on any parcel of land containing a Woodland must submit a Woodland Management Plan to the City and must demonstrate that there are no feasible or prudent alternatives to removing any Tree.
2. The Woodland Management Plan must consist of a survey or scaled drawing showing the topography, boundaries, woodlands, fens, wetlands and individual trees or vegetation with an overlay of the proposed improvements including, but not limited to, streets, building pads, driveways, utilities, structures, and facilities. The drawing shall clearly illustrate the areas of Trees and Woodlands proposed for removal and the manner by which the Applicant intends to replace the removed Trees.
3. Site inspections to ensure compliance with the Woodland Management Regulations must occur prior to the issuance of any permit for the Development. The Applicant must survey and stake all platted property lines, streets, parks, open spaces, building pads and tree protection areas prior to site inspection.

C. TREE REPLACEMENT

1. The measure of tree replacement will be based on the quality of the woodland or forest located on the parcel of land to be developed, as classified on the Forest/Woodlands Quality Map in the Natural Resources Inventory ("NRI"). If the Applicant's woodland is not in the NRI, the Minnesota Land Cover Classification System will be used to determine the quality of the woodland or forest. The Applicant shall replace removed trees according to the following schedule:

High Quality Woodlands/Forests	Replace one Tree for every Tree removed
Medium Quality Woodlands/Forests	Replace one Tree for every two Trees removed
Low Quality Woodlands/Forests	Replace one Tree for every three trees removed

2. Reforestation and landscaping should utilize a variety of tree species, and shall not utilize any species presently under disease epidemic without prior written approval from the City.
3. The species of Trees planted must be hardy under local conditions, must be compatible with the local landscape, and must not be less than one and a half (1-1/2") inches diameter at DBH.
4. The City's landscaping requirement for Trees will count towards the Tree replacement required by this Subdivision.
5. The City may accept other vegetative or environmental alternatives proposed by an Applicant if those alternatives are monetarily or ecologically equivalent to the value of the Tree replacement required by this Subdivision.

D. TREE AND WOODLANDS MITGATION STANDARDS

1. All Development activities, including grading and contouring, must take place in such a manner that the root zone aeration stability of existing Trees are not affected and must provide existing Trees with a watering area equal to a minimum of one-half (1/2) the crown area.
2. Installation of snow fencing or polyethylene laminate safety netting shall be placed at the drip line or at the perimeter of the critical root zone, whichever is greater, of Trees and Woodlands to be preserved. No grade change, construction activity, or storage of materials shall occur within the fenced area.
3. The Applicant and the Applicant's contractors shall take steps to prevent the change in soil chemistry due to concrete washout and leakage or spillage of toxic materials, such as fuels or paints. Washout areas must be identified on site and signage of those areas should be provided in the construction area.
4. The Best Management Practices recognized by the City shall be followed.
5. Structures, driveways, and parking facilities shall be located in such a manner that the maximum number of Trees should be preserved.

E. MISCELLANEOUS

1. The removal of diseased Trees or Trees seriously damaged by storms or other acts of God is permitted.
2. No grading or building permits shall be issued until the Applicant has installed proper protective fencing around the Trees being preserved or protected and shall be inspected by the City prior to approval.

3. If the Applicant disagrees with the City staff decision with respect to the interpretation or enforcement of this Subdivision, the Applicant may appeal that decision by following the procedure established in Section 11.90 of this Code.

SUBMITTALS

Prior to approval of a Building Permit, the Builder/Owner shall provide the City of Shakopee **three copies** of the Woodland & Tree Management Plan for each lot being developed. The Plan must be a survey or scaled drawing consisting of the following:

1. Identify all trees and woodlands located from the rear Lot Line to the front of the Lot.
2. Indicate the woodland rating of the subdivision and how many trees are required for replacement. (Check with the Land Developer to determine if your Lot is in a High, Medium or Low quality Woodland)
3. Identify any deciduous trees six inches or greater in diameter at breast height (trunk) and conifers 12 feet in height or more.
4. Show the location trees being removed, saved and or being added.

USE THE APPROPRIATE CODES ON THE DRAWING

		TREE SYMBOLS
Trees Subject for Removal	(R)	O Deciduous tree
Trees To Preserve/Save	(S)	X Conifer tree
New Trees/Replacement	(N)	
Fence protection at drip-line	(-o-o-o-o-o-)	

Include on the survey or scaled drawing

Name of Development: _____ Block: _____ Lot No.: _____
Property Address:_____ Property Owner: _____
Builder Name:_____ Builder Address: _____
Builder Phone Number (Cell & Fax no.) and Email Address: _____
WOODLAND RATING: HIGH MEDIUM LOW (circle)

HOME BUILDERS PLEASE NOTE

Acceptable Tree Fence Protection

- Silt Fence (preferably orange) Black fencing requires staking marked as "Tree Protection Fence"
- Plastic/Wood snow fence.
- No machinery, excess dirt or construction materials are allowed within the fenced tree areas or drip line.
- All fencing must be placed at the dripline of the tree.

APPENDIX E
Permitting Process and Information

U.S. Army Corps of Engineers Section 404 Permit Program

Section 404 of the Federal Clean Water Act regulates through the US Corps of Engineers (COE) the action of putting fill or dredged material into any water or wetland area. The applicant must prove that there are no other alternatives and that mitigation can be accomplished. Mitigation will create water or wetland areas having values sufficient to offset the values lost because of the fill. A national goal is to avoid any net loss of wetlands. Applicants who are proposing impact to wetlands or waters need to obtain a permit from the COE.

State Permit Programs

MPCA Construction Site Permits for Over One-Acre Disturbances

Any construction activity that disturbs one acre or more of land area is required to apply for an MPCA NPDES permit. Construction activity includes clearing, grading, excavation, road building, demolition, and construction of residential houses, office buildings, commercial facilities, or industrial buildings.

MPCA Water Quality Permits

For discharges of wastewater and construction dewatering.

DNR Protected Waters Permits

- Required to do any work which will change or diminish the course, current, or cross-section of any lake, marsh or stream that is designated as a protected water or wetland on the DNR's *Protected Waters and Wetlands Inventory* maps. Protected waters are all water basins and watercourses that meet the criteria set forth in the Minn. Statutes Section 103G.005, subd. 15. Protected wetlands are types 3, 4, and 5 (Cowardin classification[1])
- Required to do any work below the ordinary high water mark: draining, filling, dredging, channeling, construction of dams, harbors or permanent offshore structures and placement of bridges and culverts.
- DNR can establish a minimum protection elevation for water basins and a protected low flow for watercourses.

DNR Water Appropriation Permit

Required to appropriate or use state waters for domestic use serving more than 25 persons and for any other use which exceeds 10,000 gallons/day or 1 million gallons /year.

DNR Shoreland and Floodplain Zoning Regulations

DNR regulates lands adjoining protected waters and wetlands. Shoreland ordinances are required to specified counties and cities on a priority basis. DNR sets minimum land use standards which local units of government must adopt and enforce through their zoning ordinances, except that planned unit development must be approved directly by the DNR.

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[1] Lewis M. Cowardin *Classification of Wetlands and Deepwater Habitats of the United States,* FWS/OBS-79/31. U.S. Fish and Wildlife Service, U.S. Department of Interior, 1979.

- Shoreland zoning ordinances apply to all land within 1,000 feet of the shore of a protected water basin or wetland and within 300 feet of a protected watercourse or landward extent of a designated floodplain. Standards vary according to the water body classification; standards include land use, lot size, lot width, structure setbacks and sanitary system setbacks.
- Floodplain zoning ordinances apply to lakes and streams and cover all land inundated by 100-year storm events. The floodway is protected as it is needed to carry off the resulting flows. Development along the floodway fringe must conform to the City's shoreland zoning standards as long as it remains protected from 100-year flood damage.

Watershed District Permit Programs

Prior Lake-Spring Lake Watershed District

The Prior Lake-Spring Lake Watershed District requires a permit for grading and storm water management activities within district boundaries. The permit application is available on the watershed district website at www.plslwd.org/.

Lower Minnesota River Watershed District

The Lower Minnesota River Watershed District does not have a separate permitting program. The City's requirements are intended to meet the LMRWD's requirements so duplication in permitting efforts is not needed.

Scott Watershed Management Organization

The Scott WMO does not have a permitting program within the City's boundaries. The City's requirement are intended to meet the Scott WMO's requirements.

City of Shakopee

The City requires a permit for building activities, land disturbing activities, wetland alteration and work within the right-of-way. Projects need to be in conformance with City ordinances, the Comprehensive Water Resource Management Plan, the Wetland Conservation Act, the City's most recent editions of its Design Criteria and its General Specifications and Standard Detail Plates for Street and Utility Construction. Applications must be filled out to apply for a permit. This information is available at the City of Shakopee.

Right-of-way permit and grading permit applications are available on the City's website at http://www.ci.shakopee.mn.us/publicworks_engineer.cfm