

**Chapter 4  
Water Resource Management Plan**

**4.1 Sewer  
4.2 Surface Water Management  
4.3 Water Emergency and Conservation Plan**

**4.1 Sewer**

**Growth Forecasts**

The forecasts of wastewater flows for Circle Pines as contained in the adopted *Water Resources Management Policy Plan* are listed below. These forecasts are for sewer development. The sewer housing forecasts were estimated based on SAC data, annual city reports, current trends and other information relating to Circle Pines. The wastewater flows are based on historical wastewater flow data and the projected sewer housing and employment data.

	<b>2010</b>	<b>2020</b>	<b>2030</b>
<b>Sewered Population</b>	<b>5,400</b>	<b>5,300</b>	<b>5,400</b>
<b>Sewered Households</b>	<b>2,050</b>	<b>2,100</b>	<b>2,200</b>
<b>Sewered Employment</b>	<b>2,250</b>	<b>2,400</b>	<b>2,450</b>
<b>Average Annual Wastewater Flow (MGD)</b>	<b>0.45</b>	<b>0.43</b>	<b>0.43</b>
<b>Allowable Peak Hourly Flow (MGD)</b>	<b>1.58</b>	<b>1.5</b>	<b>1.5</b>

*Source: Metropolitan Council*

The City is not expecting significant increase in the projected population, households or employment in the city. Projected sewer flows for the city are not significant enough to make changes to the sewer system. No new development or redevelopment is anticipated to occur in the city.

The wastewater flow from Circle Pines is treated at the Metropolitan WWTP located within St. Paul, MN.

Circle Pines is served by Council interceptor 4-NS-523. This interceptor currently has an available capacity of .72 mgd to provide for the long-term needs of the city. The Metropolitan Council has scheduled the Blaine Relief Project No. 805300 that will affect Circle Pines and is scheduled for construction between 2008-2010.

**Infiltration and Inflow**

On June 19, 1998, the City of Circle Pines entered into a Grant Agreement with the Metropolitan Council Environmental Services Division (MCES) to evaluate the Inflow and Infiltration (I/I) of clear water into the sanitary sewer system. The grant is part of an ongoing MCES program to reduce the amount of I/I across the metro area. Inflow and Infiltration Study Report was done by WSB and Associates in April of 2000.

Inflow and Infiltration refer to water entering the sanitary sewer system from sources other than service connections. The water is typically clear, that is, not requiring treatment. Inflow is runoff from rain events that drain directly into the sanitary sewer for such sources as storm sewer cross connections, footing drains, sump pumps, and open manholes. Infiltration refers to ground water that enters the sewer system through open pipe joints, leaking manhole walls and cracked or broken pipe.

An inflow problem generally shows up as a dramatic spike in the sewer flow during and immediately after a rain or snow melt event. The duration is generally short and the peak flow high. Oftentimes, inflow will result in short-term system backups that can flood basements and occasionally rise out of manholes.

Infiltration is also highlighted during rain and snow melt events, however, the rise in flow is delayed and flow rates can remain elevated for quite some time. The delay in rising flow rates is due to the time required for rainwater to filter through the ground to the sanitary sewer. This filtering both reduces the peaks and prolongs the duration of the high flows.

Left unchecked, I/I costs communities money for a number of reasons. First, treating water that is already clean costs a city in chemical addition and electrical costs. The dilution of the wastewater reduces the efficiency of the treatment process making it more difficult to meet pollutant elimination regulations. Second, treatment plants and sanitary sewers must be made larger to handle the peak flows that can surge to the treatment plant after runoff events. As an example, a community with a large I/I problem may need to construct a treatment plant able to handle a flow rate of 5 million gallons per day (MGD) as compared to perhaps only 2.5 MGD if a low level of I/I was present. This is a significant difference in capital expenditures.

MCES has established an I/I goal for the City of Circle Pines. This goal is based on the ratio of total monthly flow of the maximum month to the minimum month for each calendar year. MCES has set this ratio goal as "not to exceed 1.73."

This report outlines the City of Circle Pines existing sanitary sewer system, the work effort currently underway in regards to I/I detection and elimination, and the recommended future steps needed to further reduce I/I levels.

### ***Background Data***

In preparing this report, WSB utilized all portions of the following data sources.

MCES Daily Flow Meter Data 1994- 1997

MCES Monthly Flow Meter Data - 1997 –2000

Television Inspection Reports - February 1998, November 1999

In addition to the above-referenced sources, discussions with City Staff and MCES personnel were instrumental in completing this report.

## **Existing System**

The north half of the Circle Pines sanitary sewer system was constructed primarily in 1962. The southern portions of the system were built during the 1980's. The system consists of approximately 12 miles of gravity sewer, 474 manholes, and 3 lift stations. The lift stations were installed in 1967, 1983, and 1987. The sanitary sewer system also include approximately 1.6 miles of MCES trunk sewer and 4 meter stations as shown in Figure 2. MCES meters the flow and provides treatment, billing the City based on the amount of flow generated each month.

## **Work Effort**

### **A. Review of Flow Records**

Daily and monthly flow records from the MCES were reviewed in an effort to determine the quantity and type of clear water entering the sanitary sewer system. A summary of the data collected appears in Appendices A and B of this report.

Figure 3 shows the daily total flow and a 70-day average flow over a two-year period based on 4 meters. The "70 day average" was developed by CH2MHill in the 1992 I/I Evaluation for the Metropolitan Waste Control Commission. Because of seasonal changes in average flow, a 70-day average is used rather than an average for the entire study period when identifying inflow peaks. The 70-day average flow represents the average daily flow for the 35 days before and after the plotted date. The 70-day average contains an algorithm to screen out peak days which may skew the average. The screening algorithm removes days in which the flow was greater than the 95th percentile of daily flow for the period February 1994 through December 1997. The raw data is contained in Appendix A in the Inflow and Infiltration Study Report by WSB.

The peak flow peaking factor is obtained by dividing the daily flow by the 70-day average. The daily peaking factors have been as high as 2.67 times the average flow. Below is a compilation of the 10 highest peaks from 1994 to 1997.

<b>Date</b>	<b>Daily Peaking Factor</b>
May 21, 1994	1.79
September 14, 1994	1.80
October 25, 1995	1.69
October 26, 1995	1.73
January 28, 1996	2.18
May 19, 1996	1.84
July 19, 1997	1.72
July 22, 1997	2.67
October 13, 1997	2.03
October 14, 1997	1.76

In looking at the data, the peaks generally lasted 2 or more days. This trend is an indication of the infiltration component discussed earlier. The moderate magnitude of the peaks is also an indication of a low inflow component of the system I/I.

Figure 4 shows daily flow versus rainfall events for the period July 1997 through August 1997. This was a period of several intense rainfalls ranging from 2.8 inches up to 3.7 inches in a single event. As can be seen on this chart, the daily sewer flow increased typically 2 to 3 days after the rainfall event. The rainfall that occurred between July 17 and July 22 shows how multiple rainfall events impact the sanitary sewer system. It appears that the first rainfall saturated the ground and subsequent rainfall events then compounded the infiltration producing a peak flow of 1.03 million gallons. The rapid decrease in sanitary sewer flows may be an indication of the sandy soils that are present in Circle Pines. Ground water levels are likely to bounce up above the sanitary sewer levels then decrease rapidly.

The data contained in Figure 4 shows the clearest evidence that the primary issue with clear water entering the sanitary sewer system is related more to infiltration than it is to inflow. Typically, with inflow, the peaks are much higher and often occur during rain events. Infiltration generally occurs a number of days after a rainfall event as is indicated in the chart. The sandy soils present in Circle Pines may provide an explanation for the relatively low volumes of I/I estimated below.

Typically, infiltration problems have a much greater volume associated with them than do inflow problems because groundwater levels may be above the sanitary sewer for extended periods of time. The sandy soils tend to drain quickly limiting the amount of time ground water has to enter the sanitary sewer system.

Figure 5 shows non-irrigation water use for the period 1996-1997, sanitary sewer flows for 1994-1999, and precipitation from 1994-1997. This figure also shows the MCES maximum monthly flow goal based on 1.73 times the lowest flow for any month in a given calendar year. There are a number of points to be made from this chart.

The first point is that there does not seem to be a strong correlation between the non-irrigation water usage and sanitary sewer flows. The peaks in the sewer flow seem to be generally independent of the peaks in water usage. The peaks in sewer flow are primarily inflow and infiltration.

The difference between water usage and sewer metering indicate that approximately 43 million gallons (MG) of clear water entered the sewer system for the 2-year period (1996-1997) analyzed. Total metered flow for this period was 258 MG. Approximately 17% of the total metered flow is I/I based. Averaging across the study period, approximately 21.5 MG of I/I enter the system each year. MCES bills the City \$1,200 per MG for sewage treatment in the year 2000. The I/I costs are then approximately \$25,800 annually.

The second point to consider is the correlation between the monthly rainfall and sanitary sewer flows. There is an obvious correlation between high precipitation months and increased sanitary sewer flows. Again this indicates I/I entering sanitary sewer system.

Finally, the "MCES Goal" line data on this chart shows the maximum allowed flow for any given month that is allowed by MCES within the prescribed 1.73 ratio. The goal has been exceeded only twice during the study period; occurring in August and November of 1996. The raw data for Figure 5 is located in Appendix B of the Inflow and Infiltration Study Report done by WSB.

Beginning after 1995 there appears to be a trend of generally increasing flows moving into the year 2000. Because of this phenomenon we went back into the records and examined annual sewer flow versus precipitation from 1990-1999. This data is presented in Figure 6 and shows that sanitary sewer flows generally decreased from 1990-1995 and have generally increased from 1995-present. The current higher flows are not exceeding the previous levels experienced in the early 1990's. The data does not suggest a direct correlation between precipitation and the sanitary sewer flows, however, a general trend can be inferred. Our opinion is that the fast draining sandy soils present in Circle Pines makes the level of I/I in the sanitary sewer system dependent more upon the timing of precipitation events than simply on the magnitude of the annual volume.

City staff have expressed a concern regarding possible sanitary sewer flows entering the Circle Pines sewer system from buildings that are not within the city municipal boundaries. If this is the case, there are obvious financial implications to the City and, because the water use is not accounted for, may reduce the estimated volumes of I/I entering the system.

## **B. TV Inspections**

The City contracted with Visu-Sewer Clean and Seal, Inc. for the televising of 7,640 lineal feet of sanitary sewer in sewer districts 1 and 12 during November 1999. Twelve locations were noted as being likely sources of infiltration that should be repaired. The pipe material is vitrified clay pipe, which can be susceptible to cracking and leaking. All of the deficiencies noted were located in sewer district 12 along West Golden Lake Road. The inspection report can be found in Appendix C in the Inflow and Infiltration Study Report done by WSB. The City has continued to televise and repair for infiltration.

## ***I/I Removal Strategy***

Removing additional I/I from the sanitary sewer system requires a continuing program of inspections, maintenance, and repairs.

The sanitary sewer system is no different than other infrastructure types. As with streets, every year the condition of the sewer system degrades. Cracks form, joints leak and infiltration increases. If the existing system is left alone, it will only continue to deteriorate and become worse. An annual maintenance program similar to street seal coating should be considered for the sanitary sewer system to monitor this degradation. These programs are often called annual I/I reduction programs.

An annual I/I reduction program is simple in concept. Each year, inspect 10% of the sanitary sewer system. Based on these inspections, determine the repairs needed

to eliminate the I/I from the area and perform the work. Typical inspections include televising lines, smoke testing and manhole inspections. Typical repair contracts will include pressure grouting pipe and manholes, slip lining pipe, structural lining of manholes and installation of chimney seals on manhole adjusting rings.

Of particular importance is the last item, installation of chimney seals. Because of the freeze thaw cycles in Minnesota, the adjusting rings (the area between the cast iron frame and the precast manhole wall) are especially susceptible to cracks and I/I. Typically, the joints between the rings, frame and manhole wall are made of mortar which does not have a great deal of flexibility. During freeze/thaw cycles, the castings move up and down with the roadway, cracking the mortar joints and opening an I/I pathway. "Chimney seals" are one type of flexible rubber gasket that can be installed around the inside or outside of the manhole. They flex with the ground during freeze/thaw cycles and remain watertight. There are several types of these flexible products available to address the variable conditions and uses in a collection system.

With a base annual I/I reduction program of 10 percent of the sewer system, an anticipated scope of inspection and repair is shown below. It is very difficult to predict the level of repair that will be needed prior to completing the inspection. The quantities noted were developed from past experience in other communities.

**Preliminary Opinion of Probable Construction Cost 100 percent Effort Level**

Item Description	Quantity	Unit	Unit Cost	Total Cost
Minor Manhole Repair	100	Each	\$300	\$30,000
Major Manhole Repair	10	Each	\$2,500	\$25,000
Minor Pipe Repair	3200	L.F.	\$15.00	\$48,000
Major Pipe Repair	700	L.F.	\$65.00	\$45,500
Clean and Televis	63,000	L.F.	\$.80	\$50,400
Manhole Inspection	500	Each	\$10.00	\$5,000
			<b>Subtotal</b>	\$203,900
			<b>+10% Contingency</b>	\$20,390
			<b>Subtotal</b>	\$224,290
			<b>+20% Indirect Costs</b>	\$4,485
			<b>Total Project Costs</b>	\$269,148

A 10 percent annual effort level yields an estimated annual expenditure of \$26,900.

**Cost Effectiveness**

It is important to consider the cost effectiveness of the annual program described above. I/I reduction programs have a large spread in their effectiveness in reducing sewer flows. Some very successful programs have significantly reduced the amount of I/I in the sewer systems. However, it is also common for there to be very little actual reduction in sewer flows. That is not to say these program were not successful, just that all of the potential I/I sources could not be immediately

identified and rehabilitated. The I/I defects that are rehabilitated will reduce treatment costs, but additional previously-unidentified sources may become active, suggesting that the removal was not completely effective.

Infiltration, as opposed to inflow, is very difficult to remove because the groundwater can enter any crack in manholes, sewer pipe, joints and service lines. When one crack is repaired, the water may enter through another one further upstream. Each repair makes it more difficult for water to enter, but it is impossible to completely eliminate all infiltration.

On the other hand, if nothing is done in terms of maintenance and repair, the pipe and manholes will continue to deteriorate, increasing the amount of groundwater entering the system. So, while the volume of I/I may or may not decrease with annual maintenance, I/I certainly will not increase as quickly as if nothing had been done.

Therefore, while a definitive answer to the question of how much I/I will be removed from the sewer system cannot be answered, the cost effectiveness of both the annual maintenance and sump pump removal programs are inherent. The existing 17% I/I rate in Circle Pines is high and the annual program should reduce that rate. The annual maintenance program is needed as much for future I/I prevention as it is for current I/I reduction.

No I/I reduction program will eliminate all of the clear water from the sewer system. However, I/I is currently costing the City approximately \$25,800 per year and a reduction effort may be warranted.

**Capital Improvements**

From the inspection reports noted above, we recommend as a minimum the following improvements. These improvements include repairing all of the deficiencies that have an identified infiltration flow and those that have evidence of infiltration (mineral deposits, cracked pipe, etc)

**Preliminary Opinion of Probable Construction Cost**

Repairs	Quantity	Unit	Cost	Total Cost
Spot Repair (cracked pipe)	12	Each	\$1,200	\$14,440
			Contingencies (10%)	\$1,400
			Probable Total Construction Costs	\$15,840

**Summary and Recommendations**

The results of the Circle Pines Inflow/Infiltration Study as presented in this report are summarized below.

1. The City of Circle Pines has an existing sanitary sewer system made up of approximately 12 miles of gravity sewer, 474 manholes and 3 lift stations. There is also approximately 1.6 miles of MCES trunk sewer within the City.
2. The sanitary sewer system is subjected to peak flows from primarily infiltration sources. The treatment costs of the clear water is estimated at approximately \$25,800 annually.
3. The likely infiltration sources include cracked and/or leaking manholes, open pipe joints and broken pipe.
4. The City televised approximately 7,640 feet of sanitary sewer in November 1999. Twelve repair locations were identified.
5. It is recommended that the City repair these 12 locations at an approximate construction cost of \$15,840.
6. It is recommended that the City continue their I/I reduction effort with an annual program to identify and reduce both inflow and infiltration sources.
7. The annual I/I Reduction Program should include inspection and repair of approximately 10% of the sanitary sewer system each year. The preliminary anticipated annual cost of the program is approximately \$26,900.

It is recommended that a flexible scaling product be used to seal the adjustment ring area be installed on every manhole where street reconstruction or pavement overlay projects take place.

***Continued Actions Taken by the City***

1. City continues to televise portions of the city.
2. Areas of concern are being addressed with maintenance.
3. Sump Pump Removal Program. When the city replaces water meters a check as to where the sump pump discharges is noted.
4. The city is also considering new utilities as it begins the street reconstruction program.

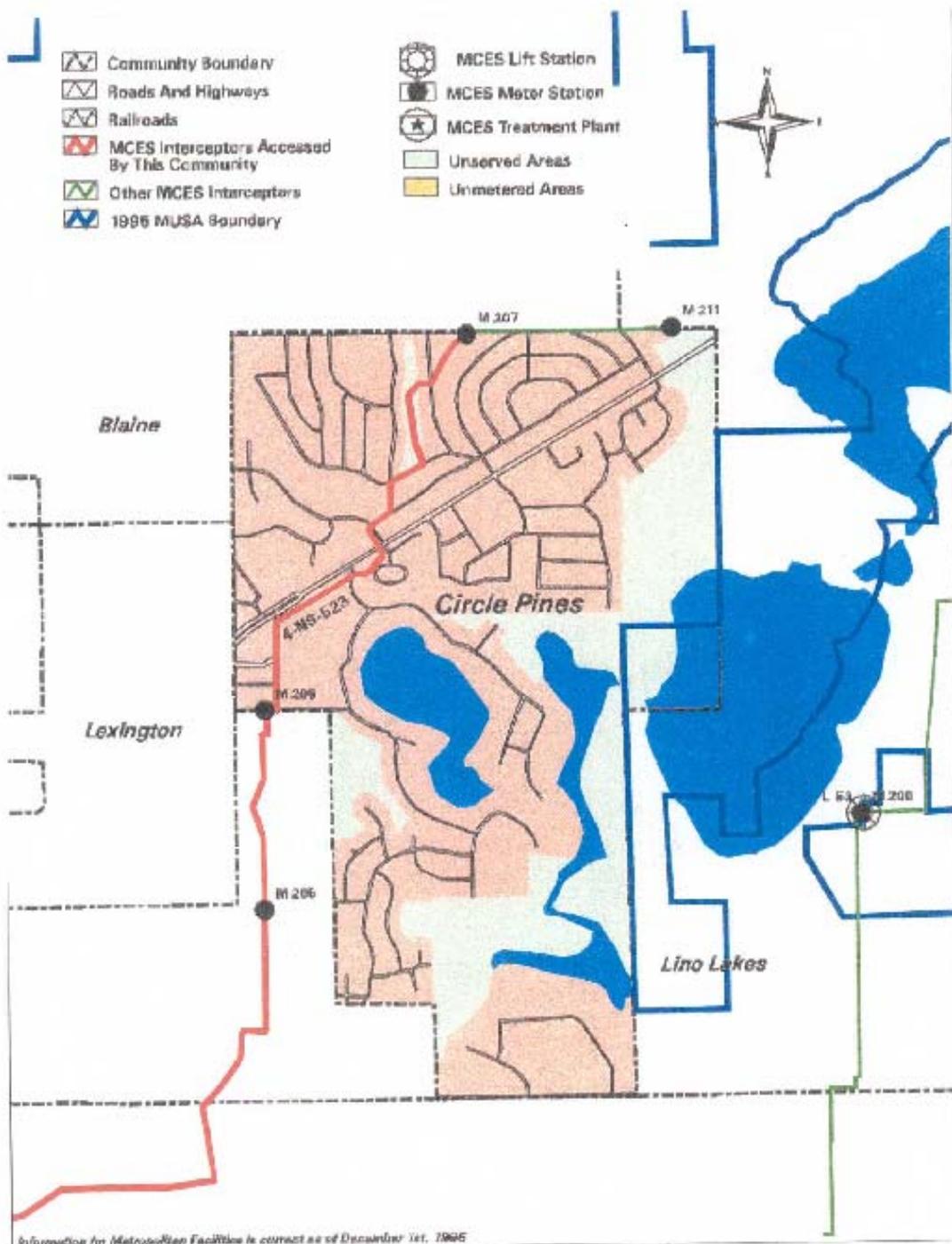


Figure 2

Circle Pines Sanitary Sewer Flow

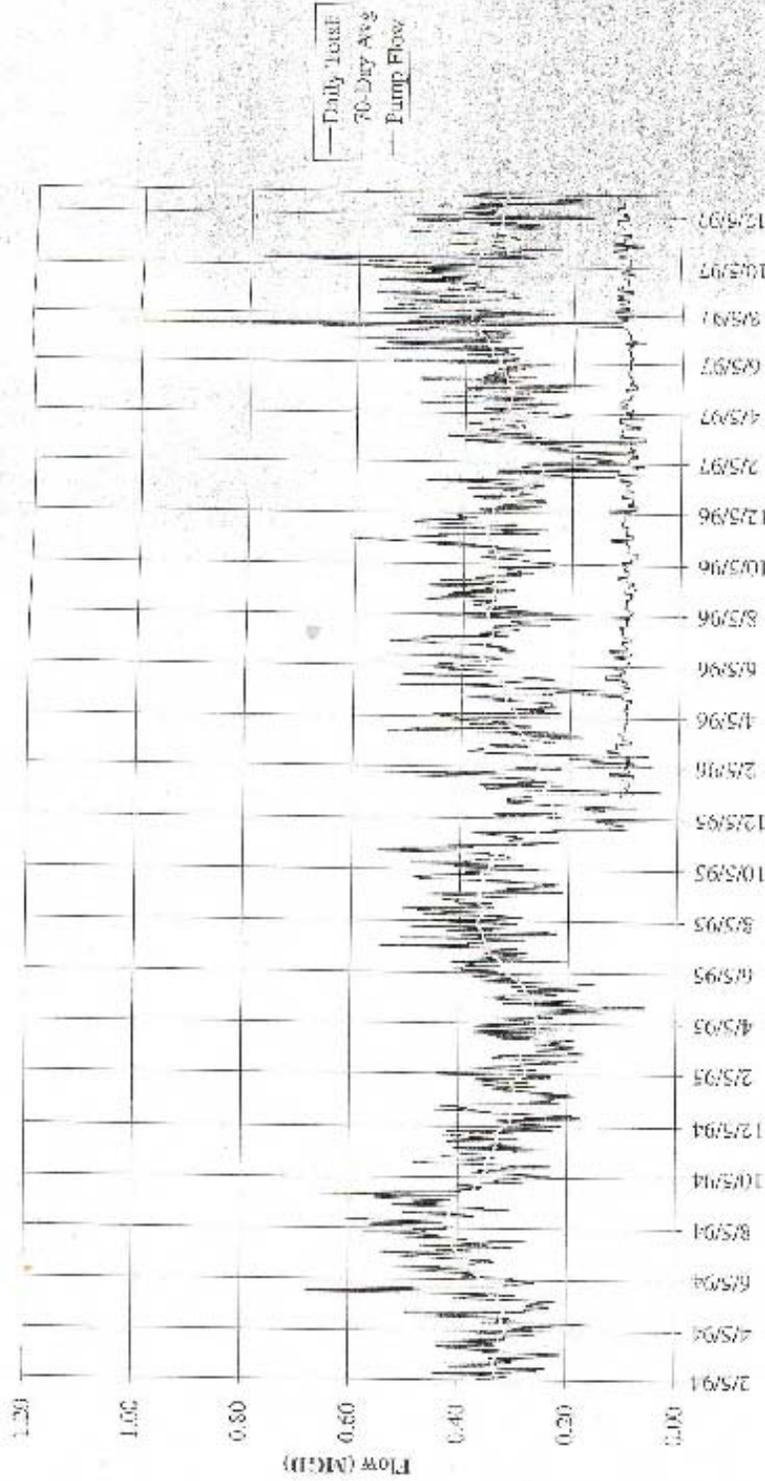


Figure 3

4/20/01

July-August 1997 Flow vs. Rainfall

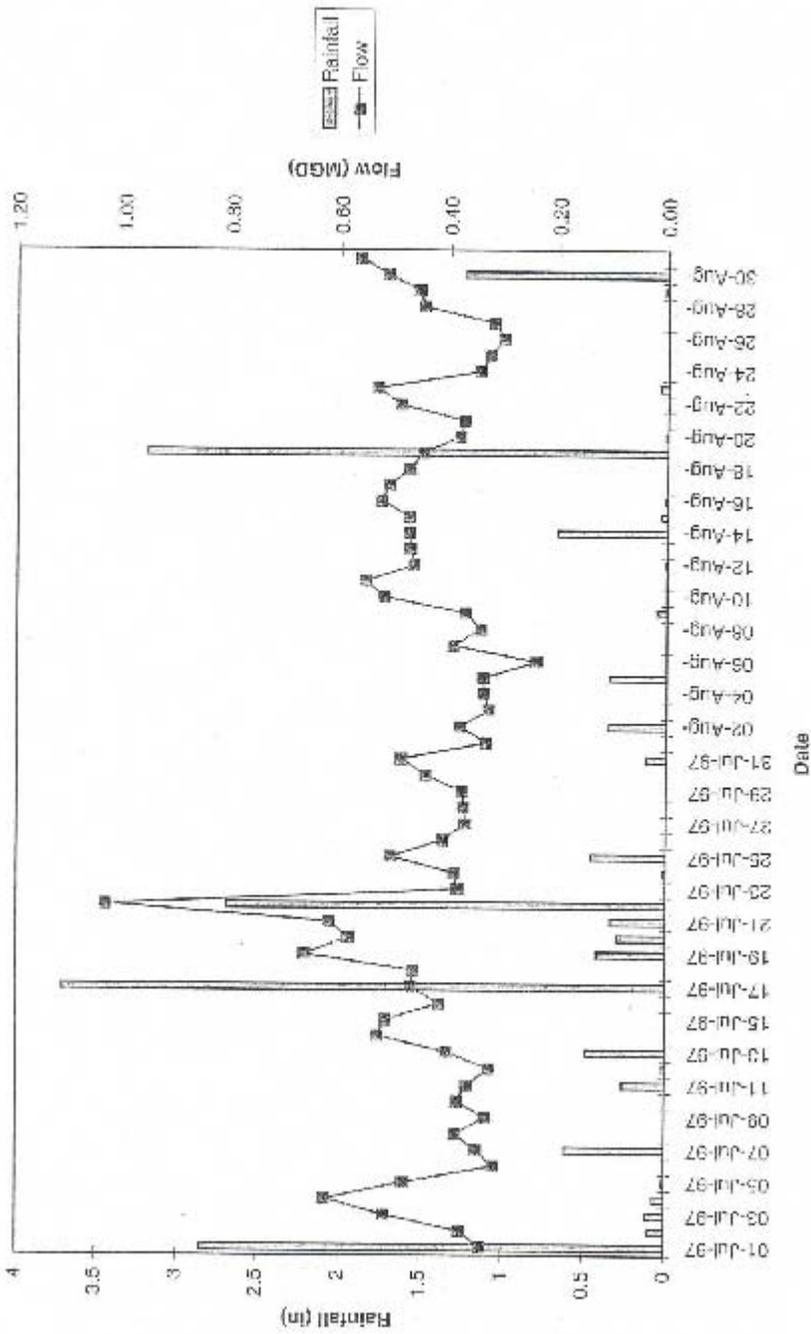
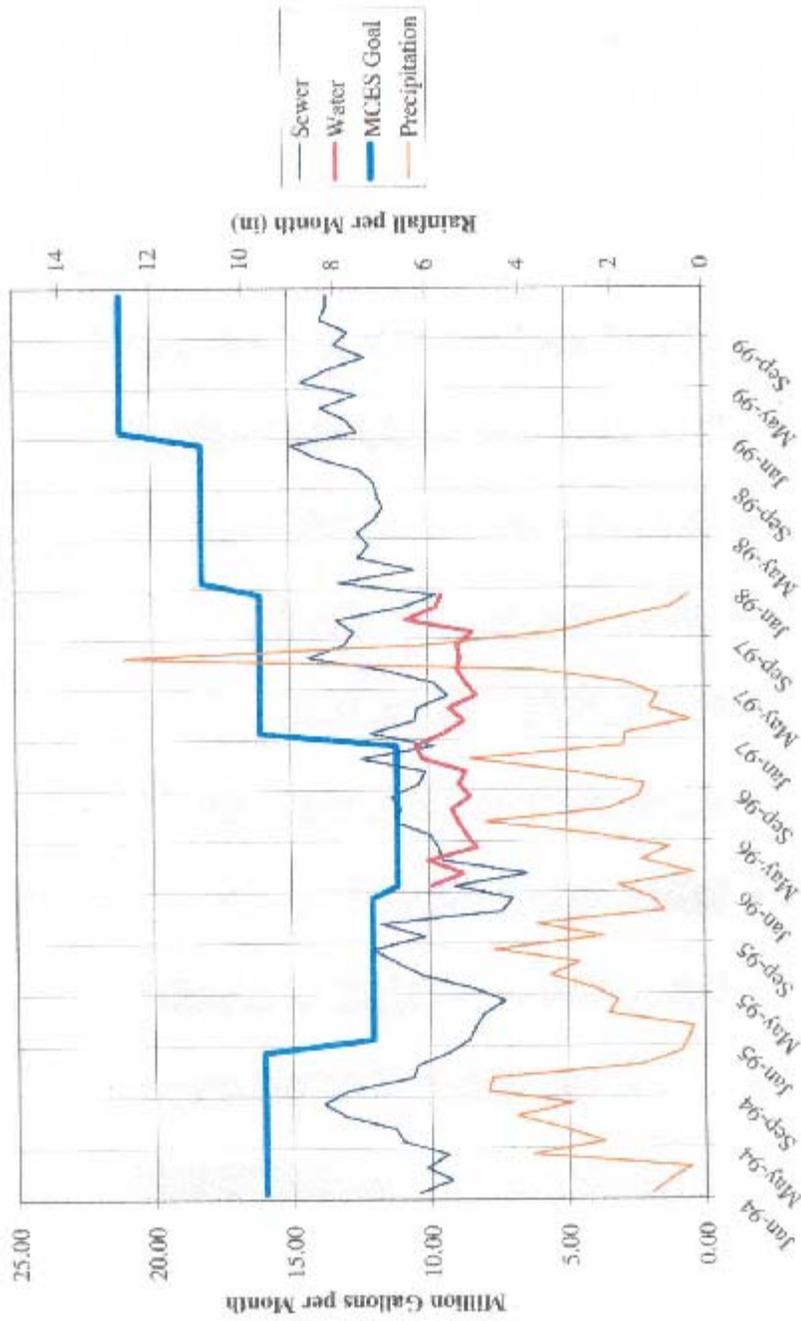


Figure 4

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**Circle Pines Water, Sewer & Precipitation**



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**Figure 5**

Annual Sewer Flow vs. Precipitation

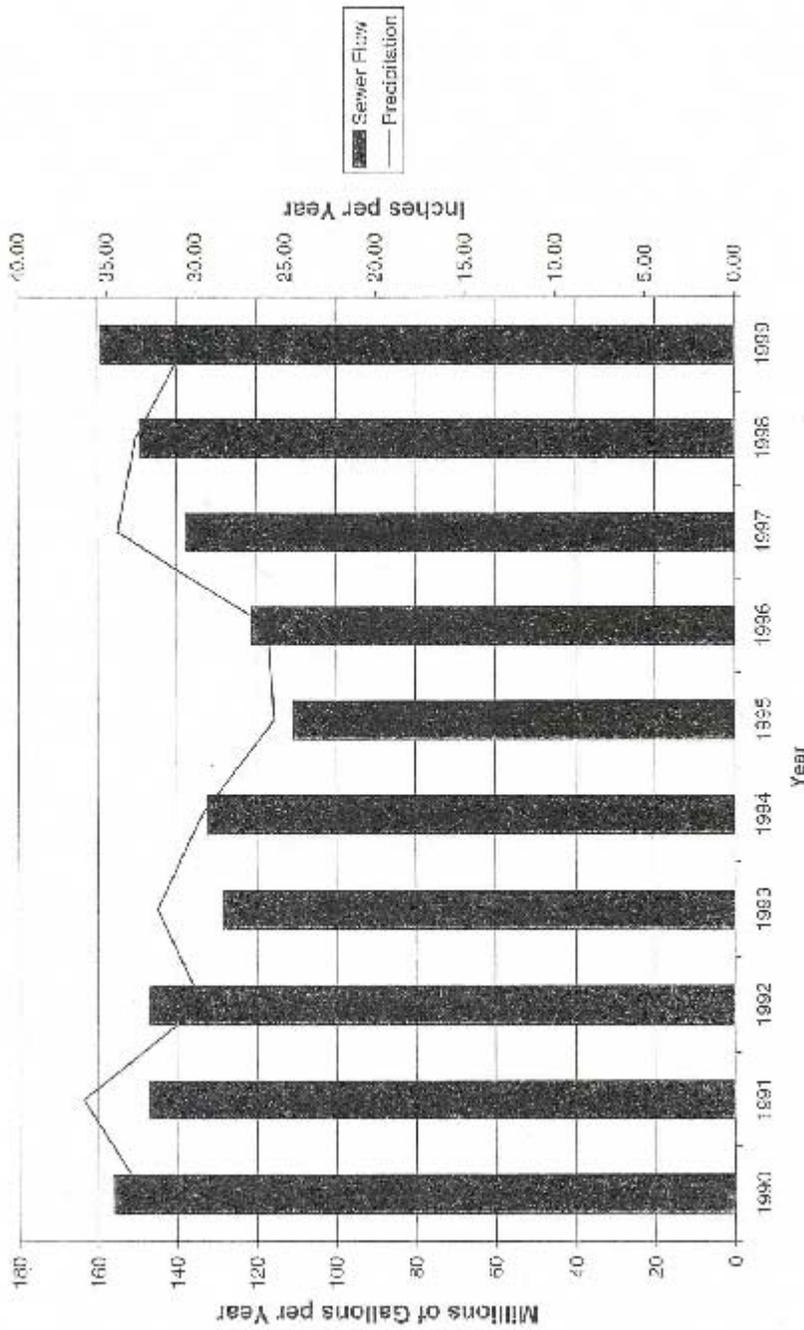


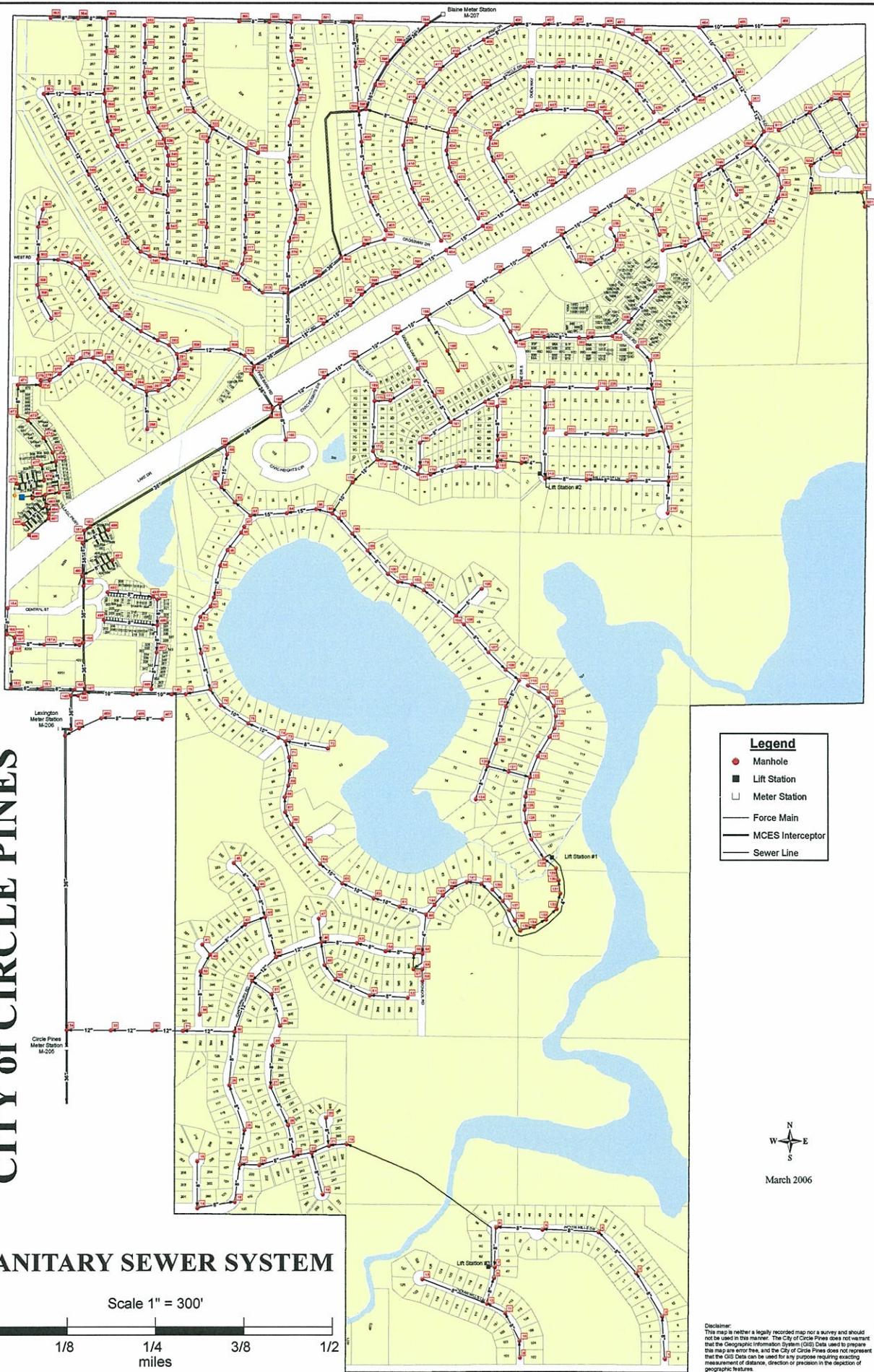
Figure 6

4/7/00

# CITY OF CIRCLE PINES

## SANITARY SEWER SYSTEM

Scale 1" = 300'



**Legend**

- Manhole
- Lift Station
- Meter Station
- Force Main
- MCES Interceptor
- Sewer Line



March 2006

Disclaimer: This map is neither a legally recorded map nor a survey and should not be used in this manner. The City of Circle Pines does not warrant that the Geographic Information System (GIS) Data used to prepare this map are error free, and the City of Circle Pines does not represent that the GIS Data can be used for any purpose requiring exacting measurement of distance, direction or precision in the depiction of geographic features.

## 4.2 Surface Water Management

### ***Introduction and Purpose***

A Comprehensive Stormwater Management Plan was prepared for the city by WSB in December of 1999 and has been updated to include current requirements and standards. This plan is intended to be consistent with local watershed management plan as required by the by Minn. Stat. 103B.235, Minn. Stat. 103B, and be in conformance with Minnesota Rules Chapter 8410. Appendices noted in this document are located in the City of Circle Pines Stormwater Management Plan located at city hall and are available upon request.

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 Rice Creek Watershed District Plan (WD) dated October 1997 and the 2000 amendment.
2. State Laws and anticipated future Rules concerning wetland management as outlined in the Wetland Conservation Act of 1991.
3. Applicable erosion control and soil loss guidelines that are available through various County Soil and Water Conservation Districts (SWCD's), the Soil Conservation Service (SCS), and the Minnesota Pollution Control Agency (MPCA).
4. Phase I and II NPDES MS4 Permit

This plan blends the approaches and direction provided in the programs and documents listed above into a unified plan that can be consistently applied across the City of Circle Pines.

### ***Personal Contacts***

To implement this plan, a coordinated water resource management approach must be utilized. This approach utilizes the services of staff personnel within the City of Circle Pines as well as personnel associated with Rice Creek Watershed District.

### ***Water Resource Related Agreements***

The City of Circle Pines entered into a joint powers agreement with Anoka County to help maintain Ditch 53-62. A Well Head Protection Plan has been approved by the Minnesota Department of Health. Future agreements could 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 with other governmental units or private parties. Existing and future agreements or appropriate portions thereof are included in Appendix A of the Stormwater Management Plan.

### ***Executive Summary***

The Stormwater Management Plan of the City of Circle Pines has been developed to meet 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. This document is intended to provide a comprehensive inventory of pertinent water resource related information that affects the City.

The plan provides an inventory of land and water resources within the City. This section of the plan includes a general description and summary of the data related to precipitation, geology, topography, surface water resource data, flood problem areas, existing flood insurance studies, water quality, shoreline ordinances, surface and groundwater appropriations, solids, land use, public areas for water-based recreation, fish and wildlife habitat, and pollutant sources within the City.

The plan outlines goals and policies that address the water resource management needs of the City as well as the county, regional, state and federal agencies. Water resource management goals and issues concerning water quality, water quantity, fish and wildlife management, groundwater, and wetlands are addressed in this section of the report.

The plan provides assessment of existing problems and identifies potential corrective actions.

The plan identifies the financial impact of implementing various corrective actions. A prioritized listing of the corrective actions that the City feels they can reasonably fund and implement in the future. A prioritized listing of the studies, programs, and capital improvements are also identified.

The plan discusses the procedures to be followed in the event this Comprehensive Stormwater Management Plan is amended. Once this Comprehensive Stormwater Management Plan is approved, no significant changes to this plan can be facilitated without the approval of the proposed revisions by Rice Creek Watershed District.

Minor changes to this plan can be made by the City Staff without outside review. 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 of Circle Pines.

### ***Land and Water Resource Inventory***

Below is a descriptive summary of resources, as required in Minnesota Rules Section 8410.0060.

#### ***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 twenty-nine inches (29"), of which approximately one-third (1/3) occurs in the months of June, July, and August. The annual snowfall

average is about fifty inches (50") and is equivalent to approximately five inches (5") of water. The average monthly temperature, precipitation, and snow fall are included in Table 1. The design storms for the City of Circle Pines are 5.9 inches of rain for a 100-year, 24-hour event, and 7.2 inches of runoff for a 100-year, 10-day runoff event. Figure 1 and 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.

*Geomorphology*

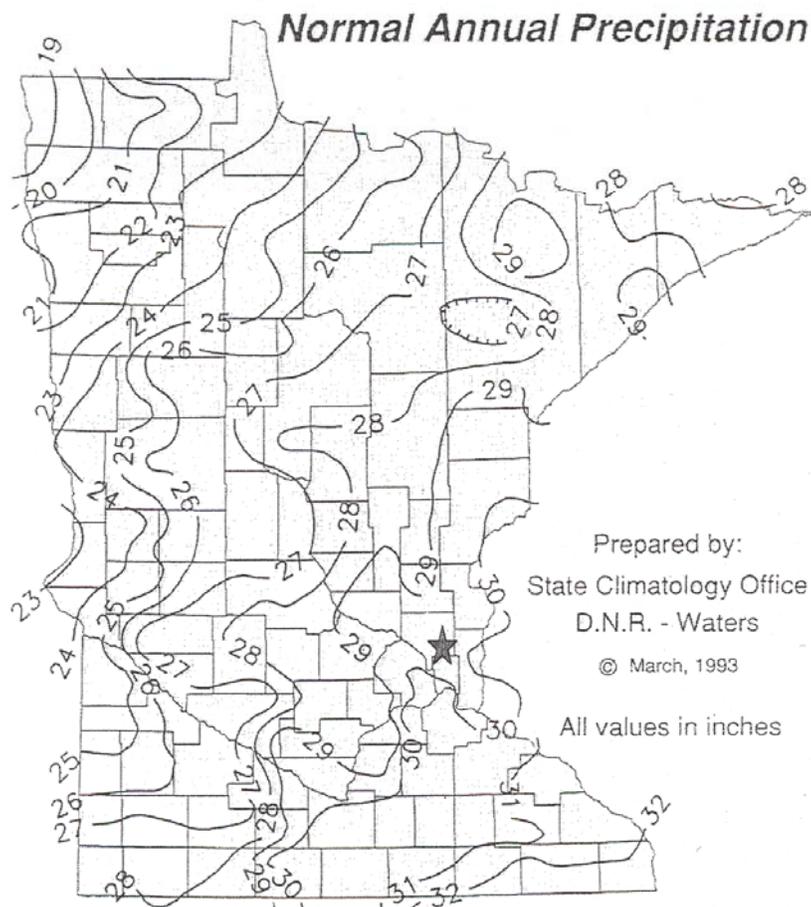
The City of Circle Pines is two (2) square miles in area and located in southern Anoka County. The city lies within the Anoka Sandplains geomorphic area. The Anoka Sandplain is an outwash plain formed during the retreat of the Grantsburg Lobe. The material making up the plain is principally fine sand. Depressions are common in the plain and were formed when isolated glaciers melted. They are now filled with peat deposits, marshes or lakes. The landscape within the Anoka Sandplain is generally described as a gently undulating plain. Water tables in Circle Pines are near the surface in depressions and from two (2) to nine (9) feet or more below the surface in rises.

**Table 1  
Average Monthly Temperature, Precipitation and Snowfall Data for  
Minneapolis/St. Paul Metropolitan Area**

Month	Average Temp. F°	Precip. Inches	Snowfall Inches
January	11.8	.83	9.8
February	17.9	.85	8.4
March	31.0	1.60	10.7
April	46.4	2.17	2.8
May	58.5	3.38	.1
June	68.2	4.17	0
July	73.6	3.55	0
August	70.5	3.4	0
September	60.5	2.89	0
October	48.8	2.01	.5
November	33.2	1.45	7.8
December	17.9	.94	9.3
<b>Annual Average</b>	<b>44.9</b>	<b>27.24</b>	<b>49.4</b>

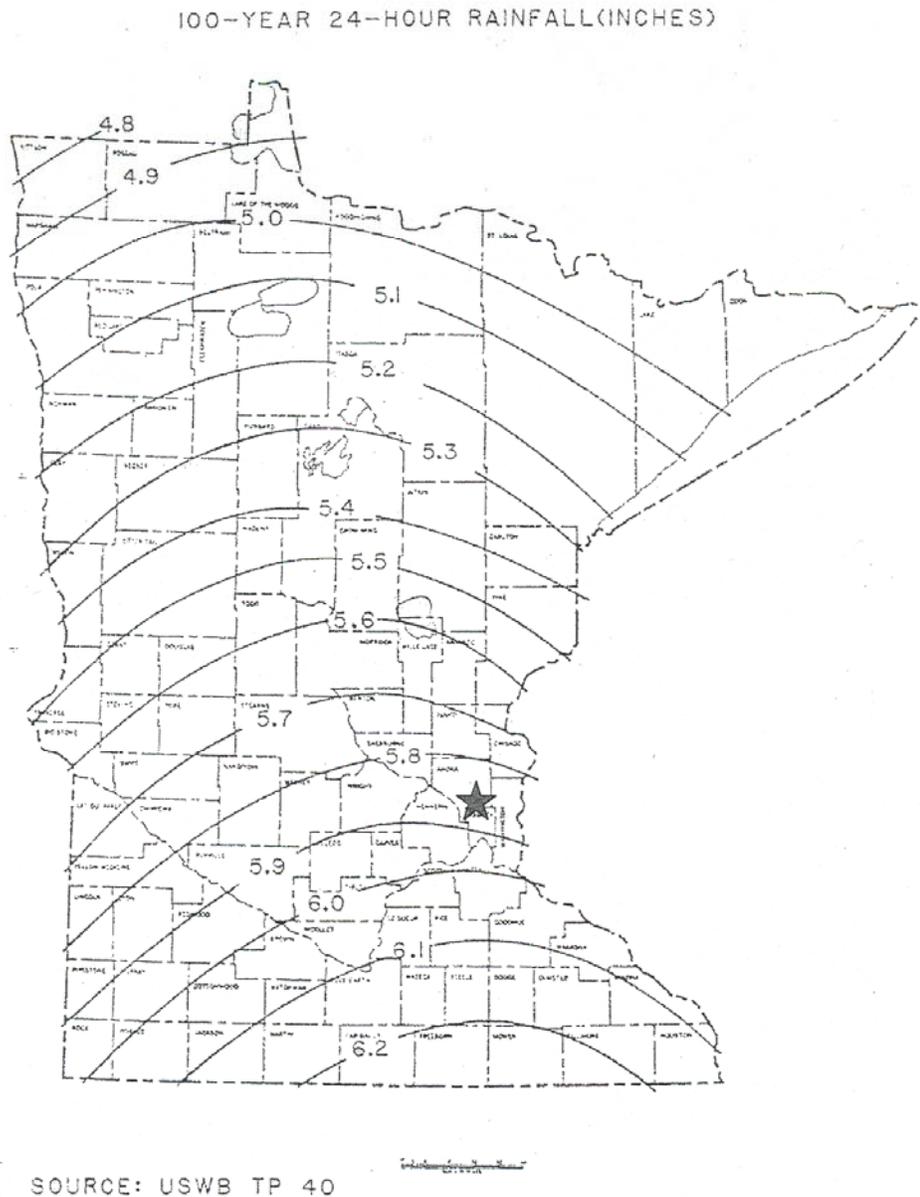
Source: Minnesota Climatology Working Group Web Page for Minneapolis/St. Paul from 1964-1993.

Figure 2. Normal Annual Precipitation



"Normal" is a 30 year average, 1961 to 1990.

Figure 1. 100-Year, 24-Hour Rainfall



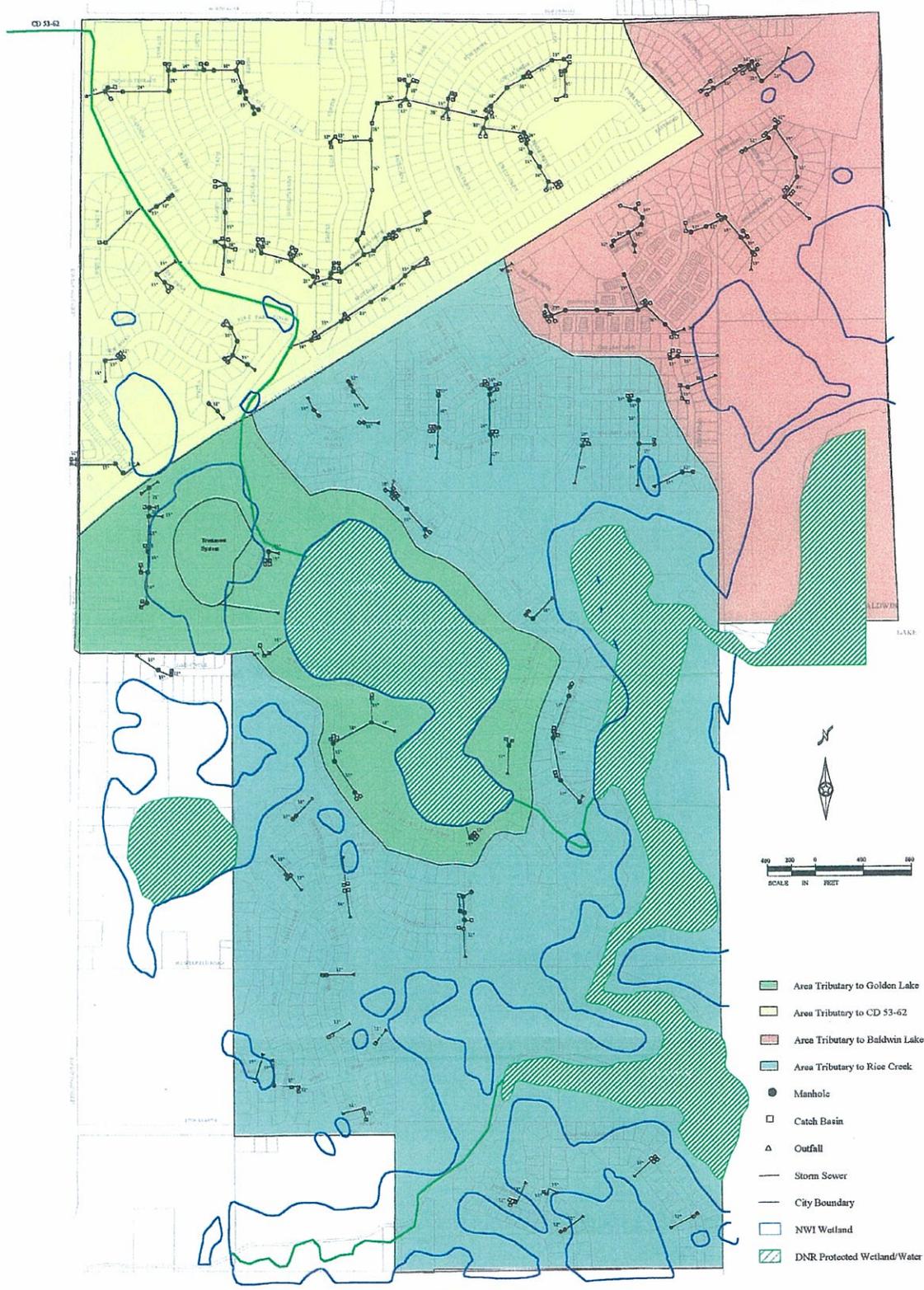


Figure 4  
Stormwater Conveyance System Map

**WSB**  
A. Froehlich, Inc.  
350 Westwood Lake Office  
8441 Weyzata Boulevard  
Minneapolis, MN 55426  
612-541-8000  
FAX 541-1700  
INFRASTRUCTURE • ENGINEERS • PLANNERS

## **Surface Water Resource Data**

### *Wetland Inventory*

Wetland inventories have been completed by U.S. Fish and Wildlife Service as published on the National Wetland Inventory Maps, and by the Minnesota Department of Natural Resources as published in their Protected Waters Inventory. These wetland inventories will be utilized to assist in determining if a wetland is present on a given parcel of property within the City.

### *Hydrologic System*

Stormwater run-off generated from areas within the City of Circle Pines generally flow from the north to the south into Rice Creek. Figure 4 shows the stormwater conveyance system for the City of Circle Pines. The main water bodies that receive stormwater are County Ditch 53-62, Golden Lake, Baldwin Lake, and Rice Creek.

Water from the northern portion of Circle Pines generally drains westerly to County Ditch 53-62. This County Ditch then conveys water south through the Golden Lake Wetland Treatment System and into Golden Lake. With the addition of the Golden Lake Wetland Treatment System to Rice Creek Subwatershed 11, this watershed meets or exceeds the stormwater treatment standards set forth in the Rice Creek Watershed District Plan. Golden Lake then discharges water south to Rice Creek.

Water from the northeastern portion of Circle Pines drains to the south into Baldwin Lake. Baldwin Lake then outlets to Rice Creek. The southern portion of Circle Pines drains directly to Rice Creek, which then conveys water to the south leaving the City just north of the County line.

Figure 4 shows the location of storm sewers and their outfalls in the City of Circle Pines.

Figure 8 is a detailed Storm Sewer Map.

### **Floodplain Areas**

There are no recognized flooding problems flooding within the City of Circle Pines.

### **Existing Flood Insurance Studies**

A FEMA flood insurance study has been completed for the City and is included in the Stormwater Plan Appendix D.

The City's Flood Plain Management Ordinance and Rice Creek Watershed District Flood Plain Management Policies are included in the Stormwater Management Plan in Appendix E.

### *Water Quality Data*

Water quality monitoring within the City of Circle Pines has been undertaken by the Rice Creek Watershed District Pollution Control Agency, and the City of Circle Pines. There are currently a few water quality monitoring stations located at the

Golden Lake Wetland Treatment System, Golden Lake, Baldwin Lake and in Rice Creek at the outlet of Golden Lake.

Two water bodies are listed as impaired by the Pollution Control Agency as follows

- Golden Lake: Impaired for excess nutrients
- Rice Creek: Impaired for fish and macroinvertebrate community.

The City's has been involved in the stakeholder process for the Golden Lake TMDL. The City will be undertaking an alum treatment demonstration project with RCWD to reduce phosphorus load to Golden Lake to meet the TMDL. The City has allocated funding for this purpose with assistance from the RCWD.

#### *Shoreland Ordinances*

The City of Circle Pines has developed and adopted Shoreland Management Regulations.

#### *Surface Water/Ground Water Appropriations*

This information has been acquired from the Minnesota Department of Natural Resources Metro Waters Division. (Stormwater Management, Figure 9 Appendix G)

#### *Soils Information*

The City of Circle Pines consists mostly of Zimmermann, Isanti and Rifle soils. These soils have a low runoff potential and high infiltration rates. Rifle poorly drains, organic soils with poor permeability.

#### *Land Use and Public Utilities Services*

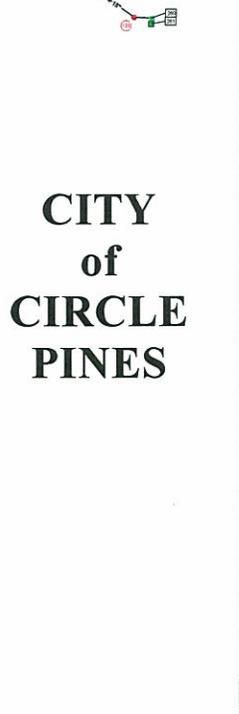
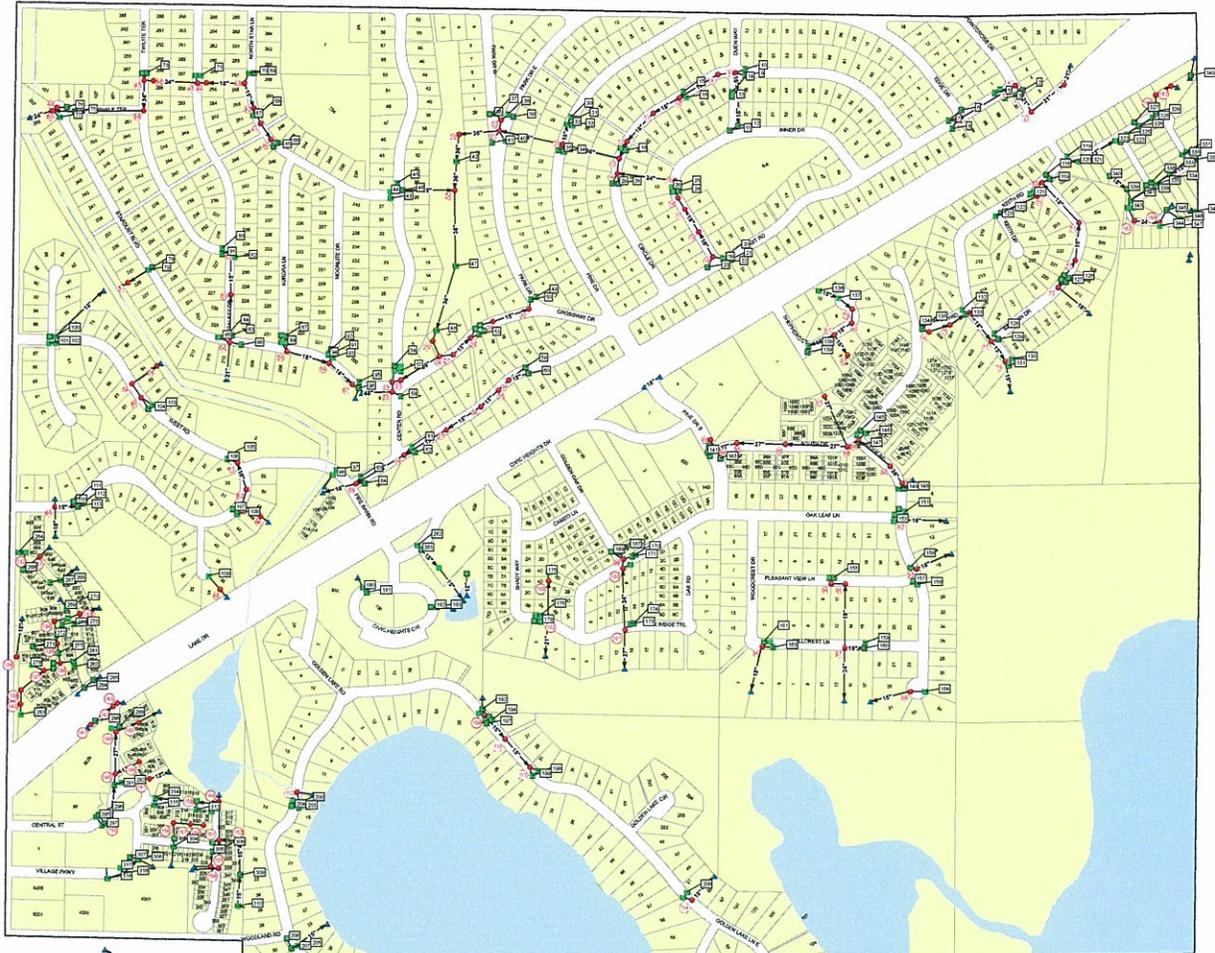
The City of Circle Pines is essentially fully developed. The City has land use practices that include residential, commercial and industrial development, as well as designated park and open space areas and public recreational areas.

#### *Public Areas for Water Based Recreation and Access*

Water based recreation within the City of Circle Pines is limited to the Golden Lake Beach Park. Water based recreation available on Golden Lake includes swimming, fishing, non-motorized boating, and canoeing on Rice Creek.

#### *Fish and Wildlife Habitat*

The City of Circle Pines contains one lake, Golden Lake, which is capable of supporting a generally healthy fish population. Baldwin Lake, the other major body of water within the City of Circle Pines is considered suitable as major waterfowl breeding ground. The major wildlife habitat classification for the City is Blue Stream Prairie Community.



# CITY of CIRCLE PINES

## STORM SEWER SYSTEM

Scale 1" = 300'



**Legend**

- Manhole
- Catch Basin
- ▲ FES
- Sewer Line and Size



March 2006

Disclaimer:  
This map is neither a legally recorded map nor a survey and should not be used in that manner. The City of Circle Pines does not warrant that the Geographic Information System (GIS) Data used to prepare this map are error free, and the City of Circle Pines does not represent that the GIS Data can be used for any purpose requiring exacting measurement of distance, direction or precision in the depiction of geographic features.



City of

# CIRCLE PINES

## EXISTING LAND USE

### Comprehensive Plan Map



### LEGEND

Key: Existing Land Use  
(Acreage / Percent of Total)

- 2-3 Housing Units / Acre  
(188.66 ac. / 15.19%)
- 4 Housing Units / Acre  
(227.43 ac. / 18.31%)
- 4-8 Housing Units / Acre  
(39.46 ac. / 3.18%)
- 10+ Housing Units / Acre  
(26.93 ac. / 2.17%)
- Commercial  
(22.21 ac. / 1.79%)
- City and County Parks  
(161.91 ac. / 13.03%)
- Schools, Churches,  
and Nonpark Lands  
(55.21 ac. / 4.44%)
- Regional Open Space  
(201.04 ac. / 16.18%)
- Water  
(139.22 ac. / 11.21%)
- Vacant  
(1.64 ac. / 0.13%)
- Right-of-Way  
(178.52 ac. / 14.37%)

Total: 1242.22 ac. / 100.00%



800 400 0 800 Feet  
 1 inch equals 800 feet

**Table 2  
Plant and Animal Species**

**Blue Stream Community**

Trees

Shrubs	Wild Rose Dogwood		
Herbs	Little Blue Stream Porcupine Grass June Grass Big Bluestream Switch Grass Sedge Sunflower	Sand Grass Bluebell Paint Brush Thistle Draba Prairie Smoke	Prarie Phlox Indian Grass Wolfberry Lead Plant
Mammals	Thirteen-lined Ground Squirrel Pocket Gopher Badger Red Fox Spotted Skunk		
Birds	Western Meadowlark Horned Lark Pheasant Savannah Sparrow		

Source: Hickok 1997

**Pollutant Sources**

Pollutant sources have been identified by the MPCA and are shown on Figure 11 in Appendix P. These pollutants include tanks and spills (MPCA City Facility List), leaksites (MPCA Leaksite List), spill emergency response (MPCA Emergency Response Summary), and information from the MPCA Master Entity System. This appendix also lists the names associated with the locations on the map.

**NPDES Phase II**

The Pollution Control Agency implemented the National Pollutant Discharge Elimination System (NPDES) Phase II Stormwater Program in March 2003. Phase II requires municipal separate storm sewer systems (MS4's) in urban areas to obtain an NPDES permit. Permits for construction sites greater than one acre will also be required as part of the Phase II. The City has submitted its Stormwater Pollution Prevention Plan (SWPPP) and Annual Reports in conformance with the MPCA guidelines. The SWPPP is implemented through the City meeting its requirements and through the local stormwater management plan.

***Establishment of Goals and Policies***

The City has developed a number of policies and goals that conform to the overall purpose that is specified in Minnesota Statutes Section 103B.201.

These goals and policies have been developed to avoid conflict with any 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:

1. Limit public capital expenditures that are necessary to control excessive volumes and rates of runoff.
2. Improve water quality.
3. Prevent flooding and erosion from surface flows.
4. Promote groundwater recharge.
5. Protect and enhance fish and wildlife habitat and water recreational facilities.
6. Secure the other benefits associated with the proper management of surface water.

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. Any development or redevelopment within the City of Circle Pines will be required to manage stormwater in conformance with the policies and content of the City's Comprehensive Stormwater Plan, the Rice Creek Watershed District rules, and all previous agreements the City has entered into for stormwater management.
2. The design of all major stormwater storage facilities shall attempt to accommodate a critical duration event with a critical duration 100-year storm event. These facilities include lakes, ponds, and their outlets. New storm sewer systems shall be designed to accommodate a 5-year critical duration event.
3. For new development and redevelopment, future storm water runoff rates must be less than or equal to the existing runoff rates for the critical 2-year and 100-year events.
4. Any new development or redevelopment within the City will require a minimum building opening of 2-ft above the anticipated 100-year high water elevation. However, if this 2-ft freeboard requirement is

considered a hardship, the standard could be lowered to 1-ft if the developer can demonstrate the following:

- a. That within the 2-ft freeboard area, stormwater storage is available which is equal to or exceeds 50% of the stormwater 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 1-ft of additional bounce in the basin.
- c. An adequate overflow route from the basin is available that will provide assurance 1-ft of freeboard will be maintained for the proposed low building opening.

The City will require setting minimum basement floor elevations to an elevation that meets the following criteria:

- d. Basement floor elevations adjacent to landlocked basins will be required to be 2-ft higher than the back-to-back 100-year rainfall events or 1-ft over the landlocked basin emergency overflow, whichever is less.
- e. The basement floor elevation will be 2-ft 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 piezometers, soil borings, percolation tests, etc.
- f. The basement floor elevation will be 2-ft above the 100-year high water elevation for the area unless it can be demonstrated that the basement floor will be 1-ft above the highest anticipated groundwater elevation that could result from the high surface water elevations during a 100-year critical duration rainfall event. The impact of high surface water elevation on groundwater elevations in the vicinity of the structure can take into consideration that site's distance from the flood plain area, the soils, the static groundwater table and historic water elevations in the area.

Certified surveys verifying the permitted low floor elevations are required to issue a certificate of occupancy.

- 5 Wetlands will be protected within the City boundaries to assure that the value of wetlands in relation to their surface water quantity benefits are not significantly impacted by development.
6. It is the intention of the City to utilize natural ponding areas such as wetlands for the impoundment and treatment of surface water runoff

in accordance with state and local laws and with policies outlined in the Stormwater Management Plan in **Appendix K** only if it can be shown that the functions and values of the wetland will not be adversely affected by excavation, substantially increased sediment load, tributary area, or water level fluctuations. These natural ponding areas are preferred over impoundments constructed in upland areas.

7. The City may provide an outlet to landlocked basins, provided that the following can be demonstrated:
  - a. The 10-day, 100-year average runoff rate will not increase
  - b. The downstream flood profile will not be significantly impacted by increased discharge rates or volumes.
  - c. Wetlands will not be dewatered (unless exempt as per the Wetland Conservation Act and Watershed District Rules).
  - d. The stormwater storage volume below the outlet elevation is at least equal to the runoff generated from back-to-back 100 year, 24-hour rainfall events.
8. The City will require compensatory storage equal to the storage losses resulting from floodplain fill.
9. The City will encourage the use of Best Management Practices (BMP's) to promote infiltration of precipitation such as the use of grass swales and parking lot size reduction.
10. Infiltration of the first ½ inch of runoff is required from the new impervious surface area created by new projects where there are A and B soils and where previous or existing land uses are appropriate for infiltration. The Rice Creek Watershed District (RCWD) may have additional requirements for infiltration that will need to be met. The RCWD rules can be reviewed at <http://ricecreek.org/>.
11. Flood fringe encroachment within shoreland areas associated with public waters will only be allowed if it can be demonstrated that there will be no subsequent adverse impacts on natural vegetation, water quality buffers, and wildlife habitat.
12. The City will acquire easements over areas 25-ft from the centerline of any major drainageway which has over 200 acres of tributary area, and public ditch easements 50-ft either side of centerline over public ditches. The City may also acquire

easements overfloodplain areas upon development of such areas. The City will adhere to the recommendations of the Watershed Districts and work with these agencies to obtain easement limits.

13. For compensatory storage in wetland basins not wholly contained within a developer's property, compensatory live storage equal to or greater than the increased volume of runoff resulting from development will be required to protect downstream landowners and prevent the incremental volume and rate increases resulting from wetland fill.
14. The City will implement the Golden Lake outlet structure maintenance program.

## **B. Water Quality**

### Goal:

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

### Policies:

In the design and construction of all new stormwater conveyance systems and modifications to existing stormwater conveyance systems, pretreatment of stormwater runoff to Nationwide Urban Runoff Program (NURP) must be provided prior to discharge. It is intended that all discharges to county ditches, lakes, and DNR protected wetlands will be treated. These NURP recommendations (Walker, 1987) include the following:

- 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 two-year event over the entire contributing drainage area assuming full development.
- b. A permanent pool average depth (basin volume/basin area) which shall be equal to or over four feet (> 4'), with a maximum depth of equal to or less than ten feet (< 10').
- c. An emergency spillway (emergency outlet) adequate to control the critical duration 100-year storm event.

- d. Basin side slopes above the normal water level should be no steeper than four to one (4: 1), and preferably flatter. A basin shelf with a minimum width of ten feet (10') and one foot (1') depth 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. Retardance of peak discharges for the more frequent storms can be achieved through a principal spillway design which may include a perforated vertical riser, small orifice retention outlet, or compound weir.

Baffled weir and pond outlet structure details can be found in the Stormwater Management Plan in **Appendix Q**.

- 2. The City will sweep the streets at least two times annually. Furthermore, future purchases of street sweeping units will give consideration to street sweepers which have the greatest ability to remove nutrients from the streets within the community.
- 3. The City will require the inclusion of skimmers in the construction of new pond outlets, and add skimmers to the existing system whenever feasible and practical to prevent floatables from being discharged downstream. Skimmer structures will have a minimum 4-inch overlap, and the maximum 1 -year storm event discharge velocity should not exceed 0.5 feet per second.
- 4. The City will include provisions for coarse sedimentation and skimming floatable materials prior to stormwater discharge to lakes and DNR-protected wetlands. Skimmers will be designed to skim the one-year storm event. This requirement will apply in all cases except where it is deemed not feasible or not practical to do so. Considerations for variance to this policy will only be made in cases where the direct drainage area is limited in size and the probability that a significant pollutant discharge from the area to areas outside the City would be extremely unlikely.

5. The City will encourage programs aimed at fostering responsible water quality management practices by its residents. The program may educate residents on the proper use of fertilizer and encourage residents to use fertilizer having no phosphorus content.
6. The City will encourage homeowners with properties adjacent to water resources to establish a vegetative buffer strip at the shoreline. This strip should consist of legumes or other perennial grasses to limit erosion and nutrient transport across the buffer strip.
7. The City incorporates by reference the “Minnesota Stormwater Manual” for the use and design of storm water management Best Management Practices (BMP’s). This manual can be viewed at [www.pca.state.mn.us/water/stormwater/stormwater-manual.html](http://www.pca.state.mn.us/water/stormwater/stormwater-manual.html).
8. The City has developed a stormwater drainage system maintenance plan. This plan was developed to assure that the retention/treatment basin clean out and maintenance was addressed to the extent that is feasible and practical and to meet the requirements of the NPDES permit. The goal of this plan is to assure that the City's retention and treatment basins will have the capability to retain and treat stormwater in future years. A copy of this maintenance plan is included in the Stormwater Management Plan in **Appendix J**.
9. The City will protect wetlands to assure that their fish and wildlife, environmental quality, and socio-economic values are maintained.
10. The City may 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 NURP 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 Circle Pines City Council. The City will keep the RCWD informed of all water quality monitoring program updates.
11. No site development involving outside storage of soluble, toxic, or buoyant materials in the floodplain will

be allowed.

12. For areas within the City that are redeveloping, NURP treatment will be required for the entire site if more than 50% of the property area is undergoing redevelopment. If less than 50% of the property is being redeveloped, treatment for only the disturbed portion will be required.
13. The City will adopt the Minnesota Pollution Control Agency "Individual Wastewater Treatment System Regulations" within three months of Stormwater Management Plan approval.
14. The City will develop a capital improvement plan that will address any untreated stormwater discharge to waterbodies within the City.

### **C. Recreation, Fish and Wildlife**

#### Goal:

Protect and enhance recreational facilities and fish and wildlife habitat.

#### Policies:

1. The City will work with and support to the maximum extent practical the efforts of the Minnesota Department of Natural Resources, the Corps of Engineers, the United States Environmental Protection Agency, the U.S. Fish and Wildlife Service, Rice Creek Watershed District, and other appropriate agencies in promoting public enjoyment and protecting fish, wildlife, and recreational resource values in the watershed.
2. Preserve wetlands that provide habitat for wildlife and spawning of fish.
3. The City will encourage land owners to maintain wetlands and open space areas for the benefit of wildlife.
4. The City will sweep the streets at least two times annually. Furthermore, future purchases of street sweeping units will give consideration to street sweepers which have the greatest ability to remove nutrients from the streets within the community.

## 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. The City intends to prepare and distribute information on pertinent water management issues to City residents a minimum of one time per year. This information will be incorporated into the City's monthly newsletter and will provide an opportunity for residents to participate in watershed management activities.
2. The City has implemented public education efforts in conformance with the NPDES SWPPP requirements. This information can be found in the city's SWPPP available at City Hall.

A copy of the description of the program to be implemented by the City will be included in the Stormwater Management Plan in **Appendix 0**.

## E. Groundwater

### Goal:

To manage surface water runoff to the degree necessary to provide groundwater recharge and to prevent groundwater contamination.

### Policies:

1. To promote and coordinate with other agencies the continuation of existing groundwater monitoring, inventorying or permitting programs.
2. To encourage the development of spill prevention, control, and counter measure plans that are consistent with State and/or Federal regulations.
3. To provide assistance to State or other governmental agencies in resolving groundwater quality problems.
4. The City will encourage preservation of wetlands, ponds and parks to encourage infiltration of precipitation in areas where land use is not anticipated to adversely affect surface water runoff. The City will

evaluate each application on an individual basis for the use of BMP's to promote infiltration of precipitation such as the use of grass swales and parking lot size reduction. A complete checklist and BMP's from RCWD is included in the Stormwater Management Plan in **Appendix M**.

5. The City will sweep the streets at least two times annually. Furthermore, future purchases of street sweeping units will give consideration to street sweepers which have the greatest ability to remove nutrients from the streets within the community.
6. The City will work with the Minnesota Department of Health and Anoka County Environmental Health Department to develop and implement a well head protection plan for Anoka County in accordance with State requirements.
7. Groundwater appropriation users must demonstrate that resulting discharges will not create drainage or erosion problems.
8. The City will use the Minnesota Department of Health guidance for evaluating proposed infiltration projects adjacent to their wellhead protection areas. The location of these areas and the MDH guidance can be found in the City's SWPPP.

## **F. Wetlands**

### Goals:

The City will protect wetlands in conformance with the requirements of the Wetland Conservation Act of 1991.

### Policies:

1. The City of Circle Pines designates the Rice Creek Watershed District (RCWD) as the Local Governmental Unit responsible for wetland management in conformance with Minnesota Rules Chapter 8420 as developed by the Board of Water and Soil Resources and adopts the RCWD policies and rules by reference. The RCWD Rules can be found at <http://ricecreek.org/>.
2. The City will utilize wetland inventory information developed by the U.S. Fish and Wildlife Service and the Minnesota Department of Natural Resources to preliminarily determine the presence of wetlands within sites to be developed. An on-site review is required to identify wetlands as per **Policy IV.G.3**.

3. Prior to any site development activities, the City will require a site inspection to identify the location and extent of any wetlands present. The proponent of the site development shall have the burden of providing to the City a report showing the on-site inspection and delineation of all wetland areas by a trained wetland delineation professional. If any wetland encroachment is proposed, wetland values and impacts will be evaluated on a case-by-case basis in conformance with the rules associated with the Wetland Conservation Act of 1991 and the rules of the RCWD.
4. 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. When wetland impacts are unavoidable, wetlands will be mitigated according to WCA and RCWD within the RCWD. If it can be demonstrated that mitigation within the same watershed is not feasible, mitigation can occur elsewhere.
5. The City will sweep the streets at least two times annually. Furthermore, future purchases of street sweeping units will give consideration to street sweepers which have the greatest ability to remove nutrients from the streets within the community.
6. The City will not allow any mowing, burning, or other non-filling related alteration to an existing wetland without the expressed written approval of the City.
7. Creation of open water area/wildlife ponds shall be done in conformance with the "General Design Considerations for Wildlife Pond Construction and Wetland Alterations". This document is included in the Stormwater Management Plan in **Appendix Q**.
8. Wetland alteration shall comply with the constraints of the City's Floodplain Management Ordinance as outlined in in the Stormwater Management Plan in **Appendix E**.

## G. Erosion

### Goals:

To prevent erosion and sedimentation to the maximum reasonable

extent.

Policies:

1. Erosion and sedimentation control plans shall be reviewed and enforced by the City for all new developments. These plans shall conform to the general criteria set forth in the MPCA NPDES Genertal Construction Stormwater Permit.
2. The City will sweep the streets at least two times annually. Furthermore, future purchases of street sweeping units will give consideration to street sweepers which have the greatest ability to remove nutrients from the streets within the community.
3. The City will adopt an erosion control ordinance. This ordinance be included in Appendix L in the Stormwater Management Plan when it becomes available.

## **H. Shoreland Management Requirements**

Goals:

To protect shoreland areas within the City in accordance with the DNR.

Policies:

1. The City has developed a shoreland management ordinance in accordance with the DNR. A copy of the Shoreland Management Ordinance is included in the Stormwater Management Plan in **Appendix F**.
2. Flood fringe encroachment within shoreland areas associated with public waters will only be allowed if it can be demonstrated that there will be no subsequent adverse impacts on natural vegetation, water quality buffers, and wildlife habitat.

### ***Problems and Corrective Actions***

Outlined below is an assessment of existing and potential water resource related problems and a description of all non-structural, structural, and/or programmatic solutions to the problems. Also included below is a description of the corrective actions the City could take to address the problems identified.

#### **A. Lake and Stream Water Quality Problems**

1. Degradation of water quality in Golden Lake. Additionally, Golden Lake is listed as an impaired water for nutrients.

## **CORRECTIVE ACTION**

- a. The City will operate and maintain a Golden Lake Wetland Treatment System and a lake aeration system in Golden Lake.
  - b. Implement the City of Circle Pine's Water Resource Management Plan.
  - c. Develop and implement a plan to provide treatment for stormwater runoff prior to discharge to Rice Creek, Golden Lake, County Ditch 53-62, and Baldwin Lake where reasonable and practical to do so.
  - d. Work with the Watershed District and/or upstream communities to improve the quality of water resources.
  - e. The City will participate in the development of the TMDL and implementation study for Golden Lake.
2. Rice Creek is listed as an impaired water for biota.
- a. The City will participate in the development of the TMDL and implementation study.
  - b. The City will operate and maintain the Golden Lake Wetland Treatment System and lake aeration system.
  - c. Work with the Watershed District and/or upstream communities to improve the quality of water resources.

### **B. Flooding or Stormwater Rate Control Concerns within the City of Circle Pines**

1. The City has not experienced any flooding or stormwater rate control problems.

### **No Corrective Action Required**

### **C. Flooding or Stormwater Rate Control Concerns Between the City of Circle Pines and Adjoining Communities**

1. High flow rates and highwater levels in Rice Creek, the Rice Creek Chain of Lakes, and County Ditch 53-62 have been noted.

## **CORRECTIVE ACTION**

The City will work with the Rice Creek Watershed District to manage flooding and rate control concerns experienced within the City.

### **D. Impacts of Water Quantity or Quality Management Practices on Recreational Opportunities**

1. The City has experienced impacts to recreational opportunities in Golden Lake as the result of water quantity or quality impacts.

## **CORRECTIVE ACTION**

- a. The City will continue to operate and implement the Golden Lake restoration project.
- b. The City will continue to work with the Watershed District to improve water quality in Ditch 53-62.

### **E. Impacts of Stormwater Quality on Fish and Wildlife Resources**

1. The City has experienced impacts to fish and wildlife resources due to pollution and sediment loading in Golden Lake.

## **CORRECTIVE ACTION**

- a. The City will periodically inspect sedimentation depths and remove sediment in the Golden Lake treatment system as needed.
- b. The City will work with the Watershed District to maintain the wetland treatment system for improving the water quality in County Ditch 53-62.

### **F. Impacts of Soil Erosion on Water Quality and Water Quantity**

1. Soil erosion, particularly upstream in the City of Blaine, has degraded the quality of water in Ditch 53-62 with heavy sediment loads which are then transferred to Golden Lake. The City of Blaine does require new developments to meet Watershed District standards.

## **CORRECTIVE ACTION**

The City will periodically inspect and remove sediment in the wetland treatment system to improve the water quality in Ditch 53-62 before entering Golden Lake. The Rice Creek Watershed District and upstream communities will be responsible for control of the upstream erosion problem.

**G. The Adequacy of Existing Regulatory Controls to Manage or Mitigate Adverse Impacts on Public Waters and Wetlands**

1. The City of Circle Pines, in cooperation with the Rice Creek Watershed District, has adequate regulatory controls in place to manage and mitigate adverse impacts on public waters and wetlands.

**CORRECTIVE ACTION**

- a. Continue to implement the stormwater system maintenance plan in the Stormwater Management Plan in **Appendix J**.
- b. The City will continue to implement Best Management Practices.
- c. Continue to work with the Rice Creek Watershed District to mitigate adverse impacts on public waters and wetlands.
- d. The City designates the RCWD as the permitting authority for new and redevelopment projects in the City. Any projects within the City need to obtain a permit and meet the requirements of the RCWD.

**H. The Adequacy of Programs to Limit Soil Erosion and Corresponding Water Quality Degradation**

1. Current programs are adequate to limit soil erosion from areas under development.

**CORRECTIVE ACTION**

- a. The City will continue to work with the Soil and Water Conservation District (SWCD), Rice Creek Watershed District, and MPCA (NPDES Program) to implement Best Management Practices.
- b. Implement the City of Circle Pines Stormwater

Management Plan.

- c. The City currently has limited funding sources available but will also attempt to secure grant funding through available programs to assist in funding some activities.

**I. The Adequacy of Programs to Maintain the Tangible and Intrinsic Values of Natural Storage and Retention Systems**

- 1. The City has currently in place adequate programs to maintain these systems.

**CORRECTIVE ACTION**

- a. Implement the City of Circle Pines Water Resource Management Plan.
- b. The City will continue to work with the County, Rice Creek Watershed District, bordering municipalities, DNR and SWCD to maintain the tangible and intrinsic values at natural storage retention systems within the City.
- c. The City currently has limited funding sources available but will also attempt to secure grant funding through available programs to assist in funding some activities.

**J. The Adequacy of Programs to Maintain Water Level Control Structures**

- 1. The City has a program to maintain water level control structures.

**CORRECTIVE ACTION**

- a. The City will implement the stormwater system maintenance program outlined in Stormwater Management Plan in **Appendix J**.
- b. The Golden Lake outlet structure maintenance program will consist of:
  - 1. An annual inspection of the dam
  - 2. Periodic inspection of the debris deposition and cleaning of deposition

**K. 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. The City currently has limited funding sources available but will also attempt to secure grant funding through available programs to assist in funding some activities.

### **CORRECTIVE ACTION**

- a. Stormwater funds and special assessment funding may be adequate to implement the studies, programs and capital improvements outlined in this plan.
- b. The City may apply for grants, state and federal funds for the implementation of capital improvements identified in this management plan.
- c. The City may establish a fund for the management of the stormwater system maintenance plan.

### **Ordinances**

*Wetland protection-* The City of Circle Pines has included in its Stormwater Management Plan the adoption of the Wetland Conservation Act 1991.

*Erosion control-* The City's policy is to...

1. Prohibit encroachment that will reduce the capacity of floodways and to allow only structures in the flood fringe that have been flood proofed or that will not receive excessive damage.
2. Establish 100-year flood levels based on critical storm events.
3. Adopt floodplain zoning ordinances conforming to state regulations.
4. Minimize runoff velocities and maximize natural cover in order to reduce erosion.
5. Provide measures necessary to contain sediment and control erosion within construction sites.

*Shoreland Ordinance-* Is available upon request

*Floodplain Ordinance-* Is available upon request

### **Financial Consideration**

Capital Improvement Plan is included in Chapter 6 of the Comprehensive Plan. Additionally, the City will be undertaking a demonstration project with RCWD to reduce phosphorus load to Golden Lake to meet the TMDL. The City has allocated funding for this purpose, with assistance from the RCWD.

### **Amendment Procedures**

It is the intention of the City of Circle Pines to have this Stormwater Management Plan reviewed and approved by the Rice Creek Watershed District (RCWD). Once approved, no significant changes to this plan can be facilitated without the approval of the proposed revisions by the RCWD. Significant changes to the local plan shall be approved by the following parties:

1. City Council
2. The city of Circle Pines Public Works Department
3. Rice Creek Watershed Management District and 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 district 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. Adjustments 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 without outside review. It is the intention of the city that this plan will be in effect through 2011 unless significant changes to the plan are deemed necessary prior to that date.

The RCWD will be completing an update of their Watershed Management Plan in 2009. At that time, the City will undertake a complete update and revision of the Stormwater Management Plan to incorporate new RCWD policies and rules. Also at that time the City will also commit to changing the CIP to reflect the plan update and revisions.

### **Impaired Waters**

Golden Lake has been identified as an impaired water and the TDML report has not been completed at this time. Knowing that Golden Lake was an impaired water the city of Circle Pines approved a water quality plan for Golden Lake in 2003.

CITY OF CIRCLE PINES MS4 SWPPP

**STORM WATER POLLUTION PREVENTION PROGRAM  
FOR THE MANAGEMENT  
OF MUNICIPAL SEPARATE STORM SEWER SYSTEMS  
WITHIN THE CITY OF CIRCLE PINES**

**CERTIFICATION**

---

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.

---

Peter R. Willenbring, P.E.

Date: May 15, 2006

Lic.No.15998

CITY OF CIRCLE PINES MS4 SWPPP

**Table of Contents**

**Cover Letter**

**Title Page**

- I. Introduction
- II. Municipal Separate Storm Sewer System Evaluation
- IV. Best Management Practices Implementation Plan
- V. Annual Report

**List of Figures**

- 1. Location Map
- 2. DNR Public Waters Map
- 3. National Wetland Inventory Map

**List of Tables**

- 1. BMP Implementation Plan

## CITY OF CIRCLE PINES MS4 SWPPP

### I. INTRODUCTION

This Storm Water Pollution Prevention Program (SWPPP) has been prepared in conformance with the National Pollutant Discharge Elimination System (NPDES), Phase II Rules and is in compliance with the provisions of the Clean Water Act, as amended, (33 U.S.C. 1251ET SEQ; hereafter, the "Act"), 40 CFR 122, 123, and 124, as amended, ET SEQ; Minnesota Statutes Chapters 115 and 116, as amended and Minnesota Rules, Chapter 7001. The urbanized area covered by this SWPPP is shown in **Figure 1**.

The goal of the National Pollutant Discharge Elimination System Permit is to restore and maintain the chemical, physical, and biological integrity of waters of the state through management and treatment of urban storm water runoff. The Department of Natural Resources Wetland and Waters, and the wetlands identified in the National Wetland Inventory located within the project area are shown in **Figure 2 & 3**. This program requires that this be accomplished through the management of Municipal Separate Storm Sewer Systems (MS4s) through the preparation of a Storm Water Pollution Prevention Program (SWPPP).

The SWPPP identifies the goals and the Best Management Practices (BMPs) that will be undertaken to meet the requirements of the NPDES Phase II rules. Measurable goals have been established for each of the BMPs included in the SWPPP along with an implementation plan and the persons responsible for implementing the BMPs.

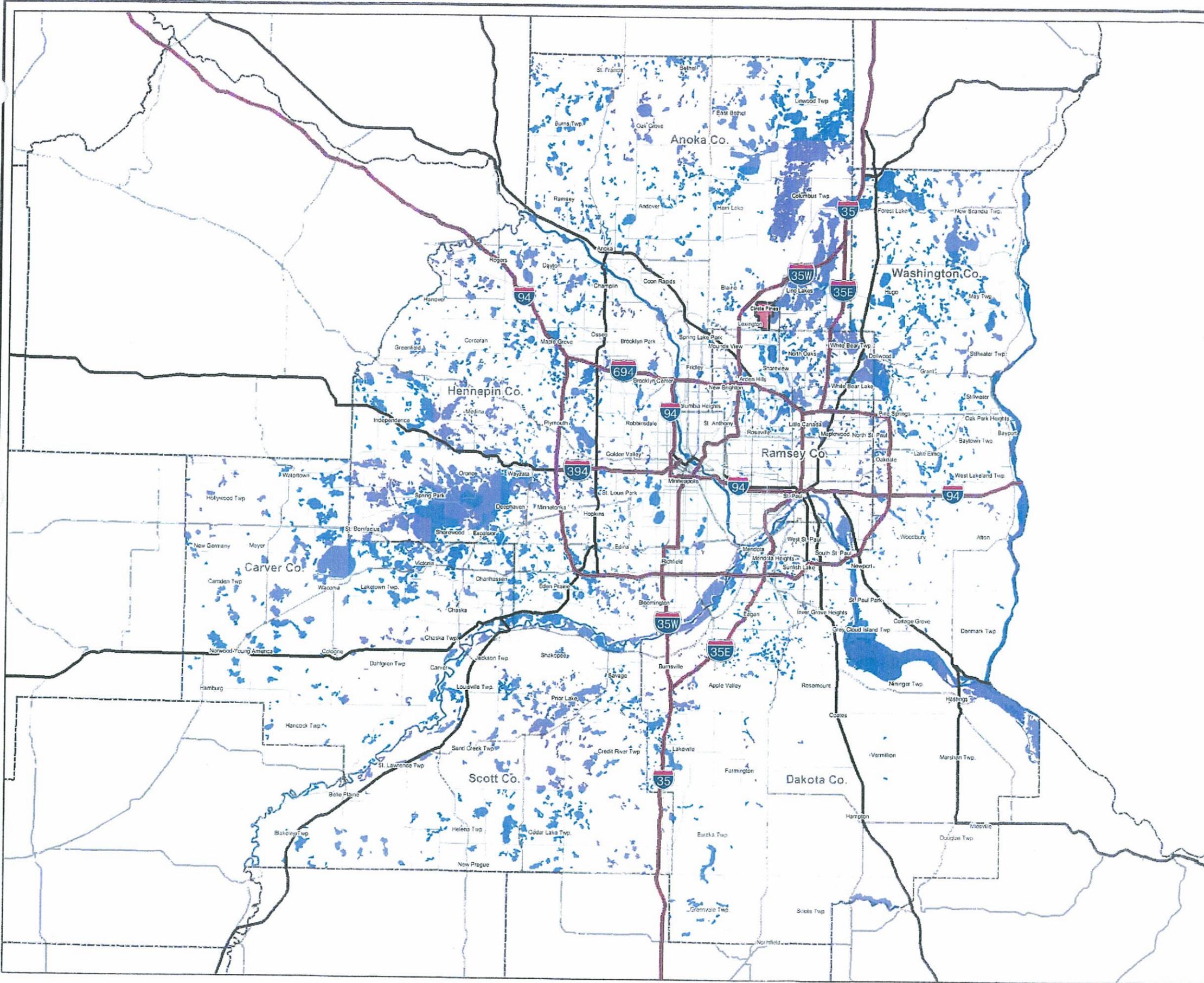
This SWPPP has been prepared to manage and reduce the discharge of pollutants from MS4s to the maximum extent practicable (MEP). This will be accomplished through the implementation of the BMPs outlined within this SWPPP. These BMPs could be a combination of education, maintenance, control techniques, system design and engineering methods, and other such provisions that are appropriate to meet the requirements of the NPDES Phase II permit. BMPs have been prepared to address each of the six minimum control measures as outlined in the rules. These six minimum control measures are:

1. Public education and outreach on storm water impacts.
2. Public participation/involvement.
3. Illicit discharge detection and elimination.
4. Construction site stormwater runoff control.
5. Post construction storm water management in new development and redevelopment.
6. Pollution prevention/good housekeeping for municipal operations.

For each of these six minimum control measures, appropriate BMPs have been identified along with measurable goals, an implementation schedule, and the persons responsible to complete each measure.

CITY OF CIRCLE PINES MS4 SWPPP

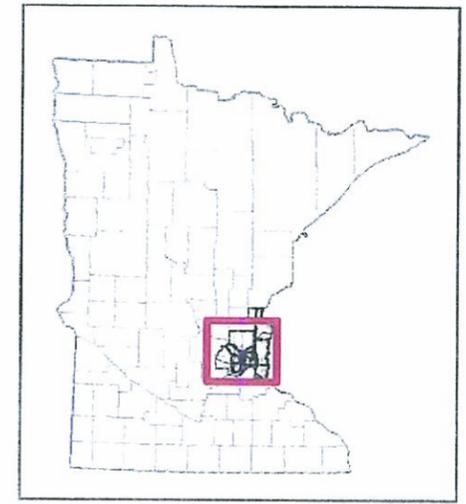
**Figure 1**  
**Location Map**



# City Of Circle Pines MS4/SWPPP



## Location Map Figure 1

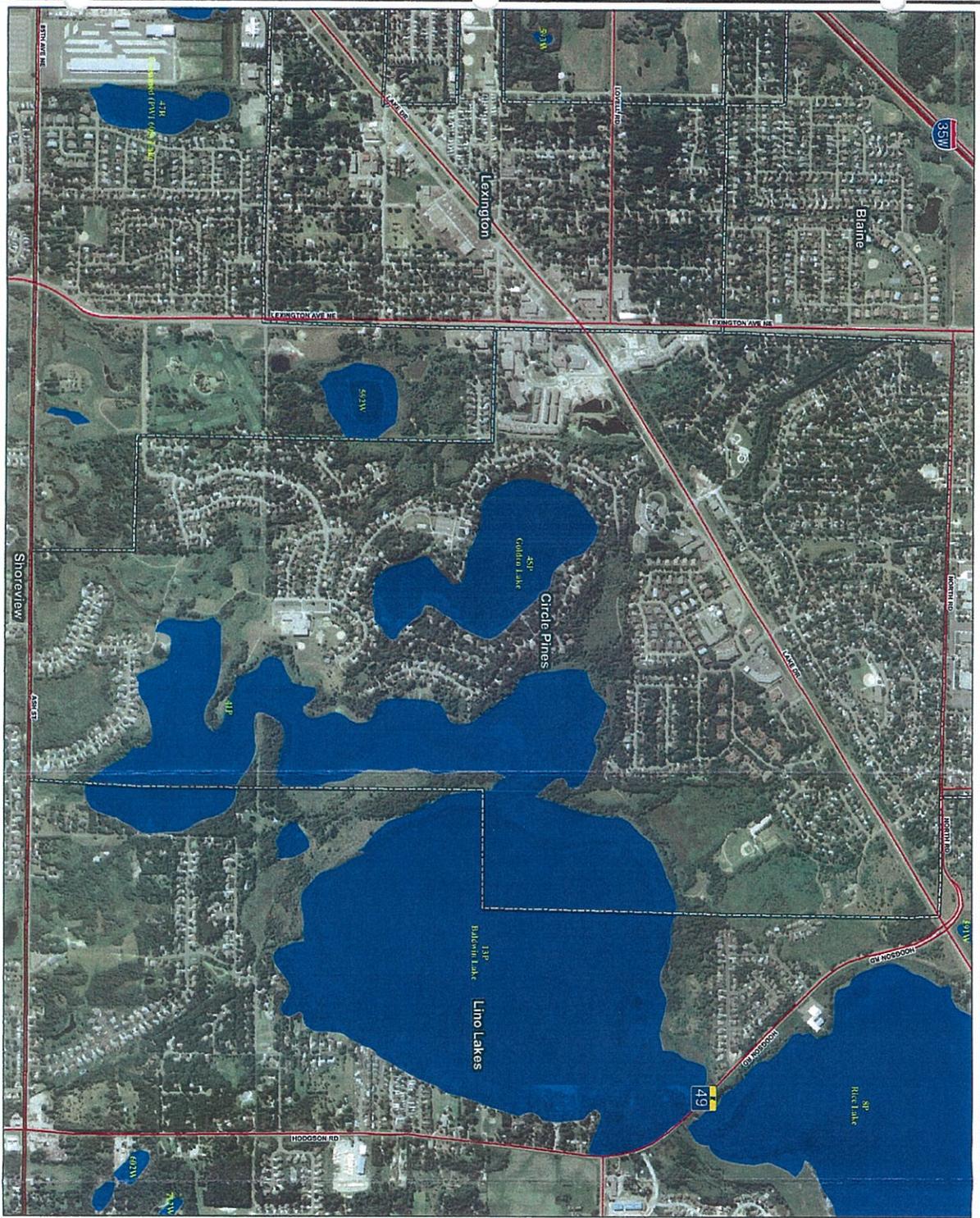


CITY OF CIRCLE PINES MS4 SWPPP

**Figure 2**  
**DNR Public Waters Map**

CITY OF CIRCLE PINES MS4 SWPPP

**Figure 3**  
**National Wetlands Inventory Map**



**City Of Circle Pines  
MS4/SWPPP**

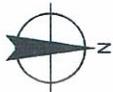


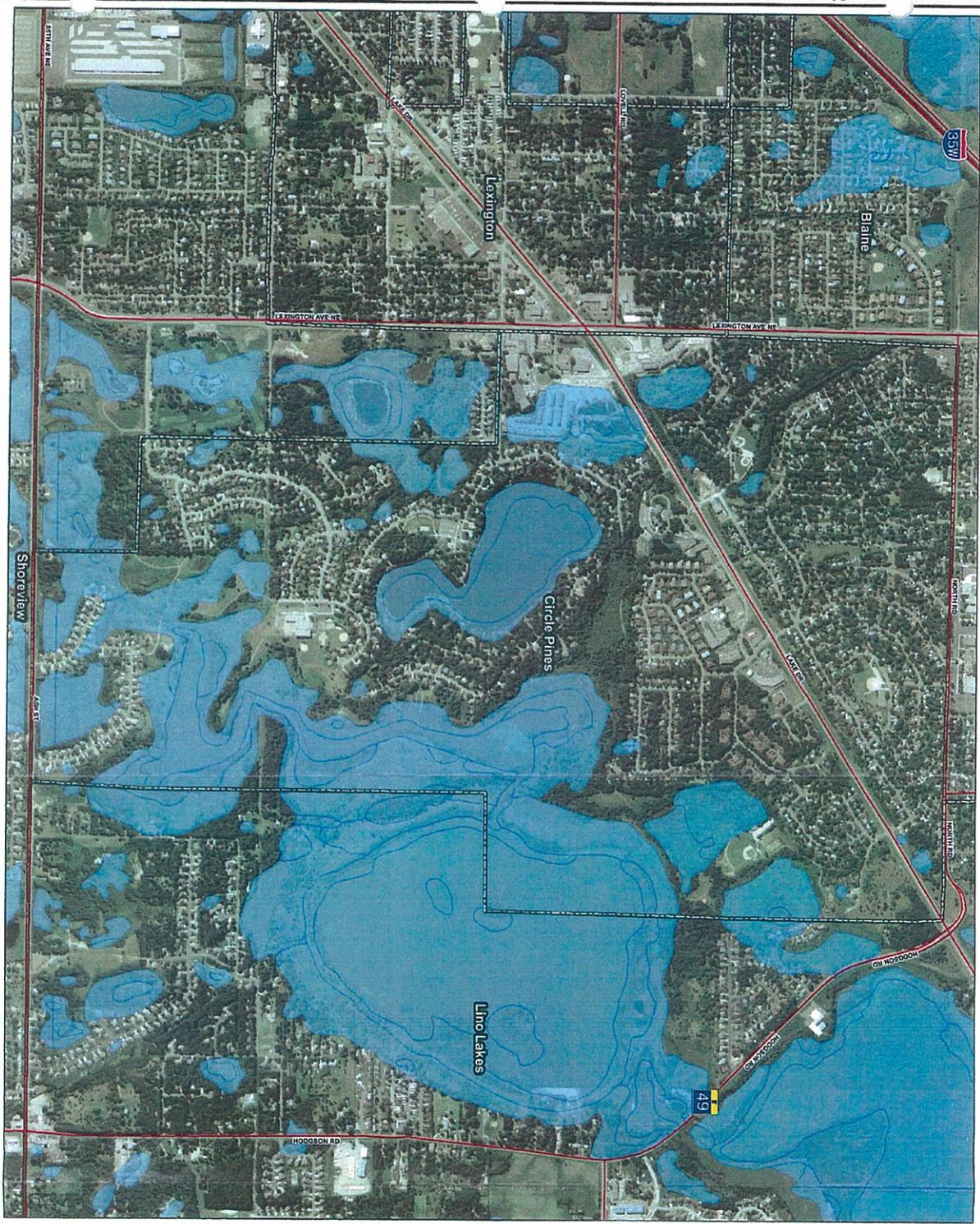
**DNR Public  
Waters/Wetlands**

**Figure 2**

**Legend**

-  Roads
-  Corporate Boundaries
-  DNR Public Waters & Wetlands





**City Of Circle Pines  
MS4/SWPPP**



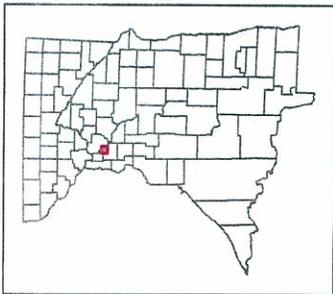
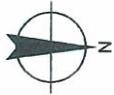
**CIRCLE PINES**

**NW1 Wetlands**

**Figure 3**

**Legend**

-  Roads
-  Corporate Boundaries
-  NW1 Wetlands



## CITY OF CIRCLE PINES MS4 SWPPP

### II. MUNICIPAL SEPARATE STORM SEWER SYSTEM EVALUATION

An evaluation of the storm sewer system was completed to determine the factors affecting the Maximum Extent Practicable (MEP) standards set forth within the NPDES Phase II Rule. Factors which were used in developing the BMPs outlined in this SWPPP were as follows:

1. Sources of pollutants
2. Potential polluting activities being conducted in the watershed
3. Sensitivity of receiving waters and wetlands within the system
4. Intended uses of receiving waters
5. Local concerns and storm water issues
6. The size of the MS4, the available staff, and the number of residents
7. BMP implementation schedules
8. Ability to finance storm water related programs
9. Hydraulics and hydrology of the watershed
10. Geology
11. Ability to finance and perform operation and maintenance of the MS4
12. Land uses
13. Development and redevelopment expectations
14. Watershed characteristics
15. Organizational structure of the municipal operator

In conformance with the requirements for the preparation of the SWPPP, a number of non-storm water discharges were evaluated to determine if they are significant contributors of pollutants to the storm sewer system. Non-storm water discharges which were evaluated include:

1. Flushing of municipal waterlines
2. Residential, commercial and agricultural landscape irrigation
3. Stream flow diversions
4. Groundwater outputs and rising elevations
5. Uncontaminated pumped ground water
6. Uncontaminated groundwater infiltration
7. Filtration backwash from municipal water treatment facility
8. Discharge of foundation drains into the MS4
9. Potable water source discharges
10. Condensation from air conditioning units
11. Car washing by individual residents
12. Discharges from the chlorinated swimming pools
13. Wash water from street sweeping activities
14. Water discharged from firefighting activities

These sources of non-storm water inputs into the municipal separate storm sewer system were determined **not** to be significant contributors of pollutants. Therefore, BMPs will not be prepared to address these storm water discharges.

The City of Circle Pines has developed this SWPPP, and the Best Management Practices within it, to reach the goal of reducing the discharge of pollutants to the "maximum extent practicable."

## CITY OF CIRCLE PINES MS4 SWPPP

This SWPPP incorporates new activities and existing practices to develop a program, designed to protect water quality as required by the Clean Water Act. The BMPs included within this SWPPP, are the results of the City carefully and thoughtfully evaluating the storm water discharges within their jurisdiction, and as a result believe implementation of these BMPs meet the prescribed “maximum extent practicable” standard.

### **III. STORM WATER POLLUTION PREVENTION PROGRAM**

This Storm Water Pollution Prevention Program (SWPPP) outlines the Best Management Practices (BMPs) which are appropriate for the City of Circle Pines to control or reduce the pollutants in storm water runoff to the maximum extent practicable. This SWPPP was developed based on the factors previously discussed within the areas tributary to the Municipal Separate Storm Sewer System.

The City of Circle Pines reserves the right to amend and/or delete the described BMPs based on the availability of funding for this program. Furthermore, the City may coordinate the responsibility of selected BMPs with other governing agencies such as community groups, non-profit organizations, soil and water conservation districts, watershed districts, watershed management organizations, school districts, University of Minnesota Extension, or county, regional, state, and federal government programs, which represent storm water within the City.

Best Management Practices (BMPs) have been prepared for each of the six minimum control measures. A description of each BMP, an implementation schedule, measurable goals that determine the success or benefit, and the person responsible to complete each BMP is included in **Section II**.

A description of the six minimum control measures and the BMPs which have been developed to meet the requirements of each minimum control measure are outlined in the following pages:

## CITY OF CIRCLE PINES MS4 SWPPP

### **MCM 1.0 PUBLIC EDUCATION AND OUTREACH ON STORMWATER IMPACTS**

The public education program has been developed to distribute educational materials to the community or conduct equivalent outreach activities. The BMPs identified will focus on the impact of storm water discharges on streams, rivers, and wetlands, and the steps that the public can take to reduce pollutants in storm water runoff.

These activities have been prepared to individually address each of the six minimum control measures. For each minimum control measure, the education program identifies the audience or audiences involved, educational goals for each audience, activities used to reach educational goals for each audience, activity implementation plans, including responsible persons in charge, entities responsible for given activities, and schedules and performance measures that can be used to determine success in reaching educational goals.

The public education and outreach BMPs that will be undertaken include:

- 1) Produce and distribute information on illicit discharges, erosion, shoreline management, composting and pollution prevention and other applicable BMPs utilized in the SWPPP. This information may be distributed through City mailings, newsletters, bill stuffing, and on the City website.
- 2) Incorporate public information on the SWPPP issues into a separate page on the City's website. The web page would specifically describe the SWPPP, each minimum control measure, the goals and actions planned by the City, provide links to BMPs, articles on each control measure, and collect feedback from site visitors.
- 3) Provide training opportunities for City staff including erosion control, BMPs, good housekeeping, and pollution prevention. Training topics could include, but are not limited to:
  - a) Mn/DOT Erosion Control Certification
  - b) Storm Water Pollution Prevention Program Workshops
  - c) Best Management Practices Workshops
  - d) Brochures and publications distributed to staff
- 4) Coordinate/develop public education materials and outreach programs with the Rice Creek Watershed District and Anoka Conservation District. Programs will consist of website development, public presentations, educational materials, etc.

### **MCM 2.0 PUBLIC PARTICIPATION/INVOLVEMENT**

This minimum control measure requires that the City provide measures to receive public input and opinion on the adequacy of the SWPPP. This input can be received from public meetings, oral testimony, and written correspondence. To reach this goal, the City anticipates implementing the following BMPs:

- 1) Conduct an annual public meeting on the City's Storm Water Pollution Prevention Program and solicit opinion on the plan and consider written and oral input on the adequacy of the SWPPP.

## CITY OF CIRCLE PINES MS4 SWPPP

- 2) The City intends to incorporate public information on SWPPP issues into a separate page on the City's website. The web page would specifically describe the SWPPP, each minimum control measure, the goals and actions planned by the City, provide links to BMPs, articles on each control measure, and collect feedback from site visitors.

### **MCM 3.0 ILLICIT DISCHARGE DETECTION AND ELIMINATION**

A number of BMPs have been developed to implement and enforce a program to detect and eliminate illicit discharges into the municipal separate storm sewer system. These BMPs include:

- 1) Review existing city ordinances relating to illicit discharges, and develop/adopt an illicit discharge ordinance (if necessary).
- 2) Utilize volunteer organizations to collect trash and debris from roadsides.
- 3) Annually update all identified City-owned storm sewer conveyances (24" or greater) to reflect changes or additions to the storm sewer system. This will also identify all outfalls and discharge points leaving the City.
- 4) Continue to visually inspect and record all reported non-stormwater discharges within 24 hours of discovery and/or report.
- 5) Train City staff, implement procedures, and incorporate BMPs in handling equipment and hazardous materials used by the City.
- 6) Develop and implement a program to detect and reduce non-storm water discharges, including illegal dumping.

### **MCM 4.0 CONSTRUCTION SITE STORM WATER RUNOFF CONTROL**

A number of BMPs have been developed and will be implemented and enforced to reduce pollutants and storm water runoff from construction activities with land disturbances equal to or greater than one acre. These BMPs include:

- 1) Review current permit stipulations/City codes relating to project specific erosion and sediment control (update as necessary).
- 2) Every applicant for a City permit to allow land disturbing activities must submit a project specific stormwater management plan (if applicable) and/or erosion control plan to the City.
- 3) Provide a phone number, website, and point of contact for the public to report storm water pollution issues. Staff procedures for stormwater non-compliance are defined in BMP summary sheet 4e-1.

## CITY OF CIRCLE PINES MS4 SWPPP

- 4) Construction site operators must conform to NPDES Phase II, watershed district, and City ordinances pertaining to erosion and sediment controls and waste controls.
- 5) All erosion control inspections, violations, and remedial actions taken by the City will comply with NPDES Phase II construction permit guidelines. New City staff will be provided erosion control training within 3 years of the individual's hire date.

### **MCM 5.0 POST CONSTRUCTION STORM WATER MANAGEMENT FOR NEW DEVELOPMENT AND REDEVELOPMENT**

A program of BMPs has been prepared to address storm water runoff from new development and redevelopment projects that disturb equal to or greater than one acre. This program insures that controls are in place that would prevent or minimize water quality impacts from development activities. These BMPs include:

- 1) Continue to use existing development review policies currently in place to address water quality, erosion control, and BMP's.
- 2) City staff will document and record all repairs, maintenance, or new construction of structural and non-structural BMP's used on City construction projects.
- 3) Inspecting post-construction BMP's then evaluate inspection records for determining the corrective maintenance actions (if necessary) for the long-term operation of all storm water management facilities.

### **MCM 6.0 POLLUTION PREVENTION/GOOD HOUSEKEEPING FOR MUNICIPAL OPERATIONS**

To meet the requirements of the pollution prevention and good housekeeping for municipal operations, a number of BMPs have been prepared. These BMPs include:

- 1) Annual inspection of 20% of the outfalls, sediment basin, and ponds within the city's storm sewer system. The results of these inspections will be compiled in a report and include sediment levels, watershed information and record recommended maintenance and maintenance schedules
- 2) Inspect and document all structural pollution control devices a minimum of once per year.
- 3) Evaluating, annually inspecting, and modifying (if necessary) current BMP's in place on all exposed stockpiles, storage, and materials located within City owned property.
- 4) The City will annually evaluate landscaping and lawn-care practices, which may include the use of fertilizers, pesticides, herbicides, lawn mowing, grass clipping collection, mulching and composting, and develop BMPs to reduce storm water pollution.
- 5) The City will annually review practice and policies of road salt applications. The City will consider alternative products, calibration of equipment, inspection of vehicles and staff training to reduce pollutants from road deicing activities.

CITY OF CIRCLE PINES MS4 SWPPP

- 6) The City will continue with the current street sweeping program, identify improvements, and implement changes to reduce storm water pollutants.

**MCM 7.0 ADDITIONAL BEST MANAGEMENT PRACTICES**

- a. The City will adopt and implement the Minnesota Department of Health's "*Evaluating Proposed Storm Water Infiltration Projects in Vulnerable Wellhead Protection Areas*" (Draft-July 19, 2006) as a guidance manual in evaluating all proposed infiltration projects within or adjacent to vulnerable drinking water supply management areas (DWSMA).

**IV. BEST MANAGEMENT PRACTICES IMPLEMENTATION PLAN**

A summary of BMPs are provided in **Table 1**. Detailed descriptions of each of the BMPs contained within the SWPPP are provided in **Section II**.

CITY OF CIRCLE PINES MS4 SWPPP

**Table 1  
BMP IMPLEMENTATION PROGRAM**

<b>Best Management Practices</b>	<b>Description of BMP &amp; Goal</b>	<b>Schedule</b>
<b>MCM 1 Public Education and Outreach</b>		
<b>1a-1</b> <u>Distribute Educational Materials</u> Brochures, Handouts, and Newsletters, SWPPP Web Page, Annual Public Meeting	Produce and distribute information on illicit discharges, erosion control, 6 MCM's, BMP's, shoreline management, and other SWPPP practices. Coordinate with RCWD and ACD to develop educational materials and outreach programs.	January 1, 2007. Annually evaluate and update as needed 2008 – 2011.
<b>1b-1</b> Implement an Education Program	Record attendance, web site visits, keep minutes, record statements/requests, and written comments.	January 1, 2007. Annually evaluate and update as needed 2008 – 2011.
<b>1c-1 through 1c-6</b> Education Programs	Increase awareness, understanding, and knowledge of daily behavior changes, the City's SWPPP, and 6 MCM's that reduce stormwater pollution within the City.	Refer to each specific educational program BMP summary sheet.
<b>1d-1</b> Coordination of Educational Programming	Continue to coordinate educational components, programming, and schedule with outside organizations.	January 1, 2007 or as specified in each BMP of MCM 1.
<b>1e-1</b> Annual Public Meeting	Hold an annual public meeting to distribute educational materials and present an overview of the MS4 program and City's SWPPP	Minimum of once/year, annually through May 31, 2011.
<b>MCM 2 Public Participation and Involvement</b>		
<b>2a-1</b> Comply with Public Notice Requirements	Notice the annual public meeting in the official newspaper 30 days prior to the meeting date	Annually through May 31, 2011
<b>2b-1</b> Solicit Public Input and Opinion on the Adequacy of the SWPPP	Hold an annual public meeting and host a web page to solicit public opinion on the SWPPP	Minimum of once/year, annually through 2011.
<b>2c-1</b> Consider Public Input	Record attendance, keep minutes, record statements, and written comments and document changes made to the SWPPP	Minimum of once/year, annually through 2011.
<b>MCM 3 Illicit Discharge Detection and Elimination</b>		
<b>3a-1</b> Storm Sewer System Map	Update storm sewer system map, as needed.	Annually 2006 – May 31, 2011
<b>3b-1</b> Regulatory Control Program	Review existing city ordinances relating to illicit discharges, and develop/adopt an illicit discharge ordinance (if necessary).	Review existing ordinance/Draft ordinance/public comment period (if applicable) in 2006. City Council review/Adopt ordinance in 2007 (if applicable). Annually review existing ordinances or adopt ordinance 2008-May 31, 2011.

CITY OF CIRCLE PINES MS4 SWPPP

Best Management Practices	Description of BMP & Goal	Schedule
<b>3c-1</b> Illicit Discharge Detection and Elimination Plan	Utilize volunteer organizations to collect trash and debris from roadsides. Develop and implement a program to detect and reduce non-storm water discharges.	February 1, 2007
<b>3d-1</b> Public and Employee Illicit Discharge Information Program	Review current illicit discharge educational information/training available to City staff and public.	Annual review in 2006 to May 31, 2011
<b>3e-1</b> Identification of Non Stormwater Discharges and Flows	The City has identified and evaluated all non-storm water discharges (as defined in Part V.G.3.e) to be insignificant pollutant contributors.	Completed
<b>MCM 4</b> Construction Site Storm Water Runoff Control		
<b>4a-1</b> Ordinance or other Regulatory Mechanism	Review current permit stipulations/City codes relating to project specific erosion and sediment control (update as necessary).	Review and add additional requirements (if applicable) by January 1, 2007. Implement permit requirements in 2007 to May 31, 2011.
<b>4b-1, 4c-1</b> Construction Site Implementation of Erosion and Sediment Control BMP's: Waste Controls for Construction Site Operators	Construction site operators must conform to NPDES Phase II, watershed district, and City ordinances pertaining to erosion and sediment controls and waste controls.	Review and add additional requirements (if applicable) by January 1, 2007. Implement permit requirements by February 1, 2007 to May 31, 2011.
<b>4d-1</b> Procedure for Site Plan Review	Every applicant for a City permit to allow land disturbing activities must submit a project specific stormwater management plan (if applicable) and/or erosion control plan to the City.	Continue in 2006; monitor throughout May 31, 2011.
<b>4e-1</b> Establishment of Procedures for the Receipt and Consideration of Reports of Stormwater Noncompliance	Provide a phone number, website, and point of contact for the public to report storm water pollution issues. Staff procedures for stormwater non-compliance are defined in BMP summary sheet 4e-1.	Implement by January 1, 2007; evaluate and update as needed in 2008 through May 31, 2011.
<b>4f-1</b> Establishment of Procedures for Site Inspections and Enforcement	All erosion control inspections, violations, and remedial actions taken by the City will comply with NPDES Phase II construction permit guidelines. New City staff will be provided erosion control training within 3 years of the individual's hire date.	Review and revise (if necessary) current inspection and enforcement procedures in 2007. Annually update training records through May 31, 2011.
<b>MCM 5</b> Post Construction Storm Water Management Measures		
<b>5a-1</b> Development and Implementation of Structural and/or Non-Structural BMP's	The City will evaluate all structural and non-structural BMP's during the plan review process for the potential of new and/or revised BMP's. The City will also actively look for non-structural opportunities where prudent and feasible.	Begin evaluation January 1, 2007, annually through May 31, 2011.

CITY OF CIRCLE PINES MS4 SWPPP

Best Management Practices	Description of BMP & Goal	Schedule
<b>5b-1</b> Regulatory Mechanism to Address Post Construction Runoff from New Development and Redevelopment	The City will continue to inspect and maintain all storm water management facilities as described within the Comprehensive Storm Water Management Plan and applicable City codes.	Continue in 2006 and update as needed 2007 to May 31, 2011
<b>5c-1</b> Long-term Operation and Maintenance of BMP's	The City will continue to annually inspect a minimum of 20% of all its MS4 outfalls, sediment basins, and ponds, then evaluate and record the number of proposed maintenance projects and successful funding of each project (if applicable). Success of this BMP is defined as achieving the measurable goals of minimum control measure 6.	Continue in 2006 to May 31, 2011
<b>MCM 6</b> <b>Pollution Prevention/Good Housekeeping Measures</b>		
<b>6a-1</b> Municipal Operations and Maintenance Program	Develop and implement a pollution prevention operations & maintenance schedule consistent with the BMPs detailed in this permit and minimum control measure #6.	Implement by February 1, 2007; Implement by April 1, 2007; annually evaluate and update as needed 2007 – May 31, 2011.
<b>6a-2</b> Street Sweeping Program	Street sweep once annually. Record the annual number of times streets are brush swept as well as document any additional activities that were undertaken regarding this program	Sweep once per year; record annually 2006- May 31, 2011.
<b>6b-2</b> Annual Inspection of All Structural Pollution Control Devices	Inspect and document all structural pollution control devices a minimum of once per year.	Minimum of once/year, annually through May 31, 2011.
<b>6b-3</b> Inspection of a Minimum of 20% of the MS4 Outfalls, Sediment Basins and Ponds Each Year on a Rotating Basis.	The City will inspect a minimum of 20% each year and record the number of outfalls inspected, and rate the condition of outfalls and ponds.	Inspect a minimum of 20% per year. Begin recording inspections in 2006, and continue through May 31, 2011 or until 100% complete prior to May 31, 2011.
<b>6b-4</b> Annual Inspection of All Exposed Stockpile, Storage, and Material Handling Areas.	Locate and inspect all exposed stockpile, storage and material handling areas located on City-owned properties, record inspections, correct and document all remedial actions a minimum of once per year.	Continue annually through May 31, 2011.
<b>6b-5</b> Inspection Follow-up, Including the Determination of Whether Repair, Replacement, or Maintenance Measures are Necessary and the Implementation of the Corrective Measures.	Repair, replacement, and/or maintenance completed will be documented and recorded within the City's SWPPP annually.	Annually update records in 2006 to May 31, 2011.
<b>6b-6</b> Record Reporting and Retention of All Inspections and Responses to the Inspections	The City will record the number of inspection record requests and distributed materials.	Minimum of one/year, annually through May 31, 2011.
<b>6b-7</b> Evaluation of Inspection Frequency	Record retention of inspection results and maintenance performed or recommended. The frequency of inspections may be adjusted after 2 years at the discretion of the City engineer.	Minimum of one/year, annually through May 31, 2011.

CITY OF CIRCLE PINES MS4 SWPPP

Best Management Practices	Description of BMP & Goal	Schedule
<p><b>6b-8</b> Landscaping &amp; Lawn Care Practices Review</p>	<p>Continue to evaluate current practices of fertilizer, pesticide, and herbicide application, mowing operations, grass clipping collection, mulching, and composting.</p>	<p>Minimum of one/year, annually through May 31, 2011.</p>
<p><b>6b-9</b> Road Salt Application Review</p>	<p>Continue to evaluate current practices of road salt applications, alternative products, calibration of equipment, inspection of vehicles and staff training.</p>	<p>Minimum of one/year, annually through May 31, 2011.</p>
<p><b>Additional BMP's</b></p>		
<p><b>7</b> <b>Evaluation of Potential Storm Water Infiltration Projects for Impacts within Source Water Protection Areas</b></p>	<p>The City will adopt and implement the Minnesota Department of Health's "Evaluating Proposed Storm Water Infiltration Projects in Vulnerable Wellhead Protection Areas" (Draft-July 19, 2006)</p>	<p>Implement prior to January 1, 2007</p>

CITY OF CIRCLE PINES MS4 SWPPP

**V. ANNUAL REPORT**

An annual report will be prepared and submitted to the MPCA prior to June 30 of each year from 2006 through 2011. This annual report will summarize the following:

A. Status of Compliance With Permit Conditions

The annual report will contain an assessment of the appropriateness of the BMPs and progress toward achieving the identified measurable goals for each of the minimum control measures. This assessment will be based on results collected and analyzed, inspection findings, and public input received during the reporting period.

B. Work Plan

The annual report will contain a list of storm water activities that are planning to be undertaken in the next reporting cycle.

C. Modifications to the SWPPP

The annual report will identify changes to BMPs or measurable goals for any of the minimum control measures.

D. Notice of Coordinated Activities

A notice will be included in the annual report for any portions of the permit for which a government entity or organization outside of the MS4 is being utilized to fulfill any BMP contained in the SWPPP.

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**Water Quality Management Plan for Golden Lake**

**Prepared for the City of Circle Pines**

**January 2003**

**Prepared By:**

**WSB & Associates, Inc.  
4150 Olson Memorial Highway, Suite 300  
Minneapolis, MN 55422  
(763) 541-4800  
(763) 541-1700 (Fax)**

**CERTIFICATION**

---

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.

---

Pete Willenbring, P.E.

Date: January 20, 2003

Lic.No.15998

## CERTIFICATION

---

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.

---

Pete Willenbring, P.E.

Date: January 20, 2003

Lic.No.15998

## Table of Contents

I.	Introduction.....	1
	Figure 1: Location Map	
II.	Background Information.....	1
III.	Description of Problems.....	3
IV.	Improvement Goals .....	4
V.	Discussion of Options Available to Meet Lake Improvement Goals.....	5
VI.	Proposed Management Plan.....	10

### TABLES

Table 1: Costs and Potential Benefits Associated with Options.....	9
Table 2: Activities Selected to be Implemented.....	11

## I. INTRODUCTION/PURPOSE

This Water Quality Management Plan for Golden Lake was prepared by the Golden Lake Water Quality Task Force, a group of citizens, and City Representatives on behalf of the City of Circle Pines in their goal of improving the lake's water quality, reducing the rooted aquatic plant infestation, and enhancing the lake as a fishery.

The Task Force believes the plan outlined herein, describes the most cost-effective feasible improvements available to meet the goals set forth by the Golden Lake Water Quality Task Force in their recent meetings. These improvement goals were developed by the Task Force over the past year as they met monthly with residents and agency officials to discuss the condition of and improvement options for Golden Lake. As part of these meetings, input was received from representatives from the Minnesota Department of Natural Resources, Minnesota Pollution Control Agency, and others who have undertaken previous studies or implemented improvement projects in and around Golden Lake for the purpose of protecting or improving its water quality.

## II. BACKGROUND INFORMATION/DESCRIPTION OF PROBLEM

Golden Lake is a 57 acre lake located within the City of Circle Pines (see **Figure 1**). The lake has a maximum depth of 25 feet, an average depth of 8 feet, and receives runoff water from a 4,400 acre watershed. Approximately ninety percent (90%) of this area is located in the City of Blaine, and the remaining ten percent (10%) is within the City of Circle Pines. The land use within most of the area draining to the lake from the City of Blaine consists of sod farms, wetlands, and commercially developed property. Runoff from these areas is conveyed to Golden Lake via Anoka County Ditch 53-62.

Over the past 20+ years, water quality studies and resident surveys have been completed for Golden Lake. As a result of these studies, a number of findings have generally been made relative to the condition of this lake and its associated eco-system. Outlined below is a summary of these studies and their findings:

### 1. **Minnesota Department of Natural Resources Assessment**

Minnesota Department of Natural Resources has categorized this lake as "non-supporting" for swimming activities due to frequent algal blooms and poor transparencies in the summer months. Based on total phosphorus, chlorophyll-a, and transparency measurements, the lake is currently classified as hypereutrophic and experiences frequent algal blooms.

### 2. **Minnesota Pollution Control Agency Assessment**

The Minnesota Pollution Control Agency has categorized Golden Lake as "threatened" in their recent statewide lake assessment. This "threatened" classification was given to the lake based on recent sechi depth transparency and phosphorus concentration information, as well as a review of past water quality

data available for the lake that is stored in the MPCA's water quality data base "STORET".

3. **1982 Diagnostic Feasibility Study**

The University of Minnesota Limnological Research Center, in conjunction with the consulting engineering firms of Orr, Schelen, Mayeron & Associates, and the Environmental Research Group Inc., completed a Diagnostic Feasibility Study as part of the EPA Clean Lakes Grant Program in 1982. This Feasibility Study indicated that the inflow of nutrients from its upstream watershed along with hypolimnetic oxygen depletion and subsequent sediment phosphorus release (internal loading) caused extensive algal blooms and hypolimnetic oxygen depletion. This study recommended diversion of inflows, hypolimnetic aeration, and biomanipulation. Hypolimnetic aeration and biomanipulation were both implemented as a result of this Feasibility Study, but the diversion of inflows was not undertaken.

4. **Review of Other Water Quality Monitoring Data, Studies and Analyses**

As part of the development of this water quality management plan, WSB & Associates, Inc., along with the Golden Lake Water Quality Task Force also reviewed and analyzed other available monitoring data and studies completed for Golden Lake for which no interpretation of the data was provided. The WSB and Task Force analysis of this data supported the following findings:

- A. The inflow of water from County Ditch 53-62 into Golden Lake produces excessively high hydraulic and nutrient loadings that significantly impact the water quality within Golden Lake.
- B. The deposition of sediment in the bottom of Golden Lake over the years has resulted in a nutrient rich substrate that results in increased internal nutrient recycling within the lake, and also contributes to the expansion of rooted aquatic plants within the littoral (shallow) areas of the lake.
- C. The use of the hypolimnetic aeration system within the lake is reducing the internal nutrient recycling, has prevented further reductions in the quality of water within the lake, and has aided in maintaining the lake as a fishery. However, these studies have also shown that this aeration system as currently sized is only able to meet the lake's oxygen demand for a small area.
- D. The previous construction of the upstream treatment basis has reduced the sediment transport into the basin and reduced the loading of particulate nutrients into the lake basin. However, the soluble nutrient loading is still high enough to cause extensive algal blooms during the summer growing season.

### III. DESCRIPTION OF MAJOR PROBLEMS IMPACTING PUBLIC USE OF THE LAKE

Based on input from residents and the general public utilizing Golden Lake over the past years, there are three recurring problems that are routinely impacting the public use of Golden Lake. They include:

1. **Excessive Algal Blooms and Corresponding Reductions in Transparency**

Golden Lake experiences frequent heavy algal blooms during the summer months. These algal blooms significantly impact the clarity of the water, at times result in floating mats of algae being present in the lake, and reduce the appeal of swimming, fishing, and boating on the lake. The Minnesota Department of Natural Resources has classified the lake as “non-supportive” for swimming activities based on similar observations.

2. **Excessive Rooted and Floating Aquatic Plant Growth**

Residents indicate that rooted aquatic plants are significantly impacting the public’s use of the lake both for fishing and in swimming areas. Rooted aquatic plant surveys indicate that over 60% of the area of the lake is impacted by rooted aquatic plants at the height of the growing season. These rooted aquatic plants were also identified to be “pumping” phosphorus from the bottom sediments into the water column during certain times of the year further increasing the in-lake phosphorus concentrations present in the water column, which result in increased algae growth.

3. **Winter Fish Kills/Fishery Management**

Residents have indicated that over the years, Golden Lake has been subject to winter fish kills that have resulted in odor and aesthetic problems along with a greater proliferation of bullheads and carp. These winter fish kills have also reduced populations of bluegills and large mouth bass. The installation of the currently operating hypolimnetic aeration system has reduced the frequency and/or severity of winter fish kills and has been somewhat beneficial in increasing the median size of the fish in the lake.

### IV. IMPROVEMENT GOALS FOR GOLDEN LAKE

The Golden Lake Task Force has identified three specific measurable improvement goals for Golden Lake, and believes that it is feasible to meet these goals with a reasonable expenditure of funds. The Task Force also believes if these goals are met, the public use of the lake will not be impacted for swimming, boating, fishing, and other aesthetic uses.

A description of the measurable goals in each of these areas is outlined below:

#### A. Improve Water Quality

The water quality goals that have been set require that transparency, phosphorus concentrations, and chlorophyll a concentrations be maintained so as to meet an average Carlson Trophic State Index (TSI) of 50 and a maximum Carlson Trophic State Index of 55. These values will be based on taking and analyzing a surface water sample from the lake once per month from April through September, analyzing this sample for section depth transparency, phosphorus, and chlorophyll a concentration, and determining the corresponding TSI from these analysis results.

#### **B. Manage Excessive Growth Of Rooted Aquatic Plants**

As part of this management objective, rooted aquatic plants will be controlled to the extent necessary so as not to hinder the use of the lake in designated swimming, boating, or fishing areas. It is recognized and acknowledged that this aquatic plant management program will be implemented only over selected areas as some rooted aquatic plant growth is beneficial to the lake for other purposes. A map will be prepared showing areas in the lake that will remain free of aquatic plant infestation.

#### **C. Manage Lake for Fishing Purposes**

The goal of this plan is for Golden Lake to maintain healthy populations of desirable fish species. Residents of all ages within the City currently utilize this lake for recreational fishing and this use is anticipated to increase in the future.

The City will work with the Minnesota Department of Natural Resources to implement the fish stocking and lake management plan they have on file.

### **V. DISCUSSION OF OPTIONS AVAILABLE TO MEET LAKE IMPROVEMENT GOALS**

As part of the development of this Golden Lake Water Quality Management Plan, the results of previously completed water quality studies were reviewed and updated, the problems identified by the task force were analyzed and options available for addressing these problems and the improvement goals for Golden Lake were investigated. Based on this investigation, a number of improvement options were identified that singly and/or collectively could meet the improvement goals identified for Golden Lake. A description of these options is outlined below and further information on the costs and associated benefits for each option are shown in **Table 1**.

#### **1. Install and Operate Alum or Ferric Chloride Injection System Upstream of Golden Lake Wetland Treatment System**

This option consists of constructing a chemical storage and metering facility at a location upstream of the Golden Lake Wetland Treatment System. This facility would measure the flow and meter at the proper dose, alum or ferric chloride into the water flowing by the facility. The chemical addition would remove phosphorus through a chemical reaction and precipitate it out of the water prior to reaching Golden Lake. The phosphorus that is precipitated by this chemical reaction would settle out in the wetland treatment basin upstream of Golden Lake.

2. **Implement In-Lake Alum Treatment for Golden Lake**

This treatment has similar benefits as the treatment describe above but the phosphorus removed by the chemical treatment is deposited in the bed of the lake and not in the treatment basin upstream. This alternative is not as expensive as the option associated with pretreating the inflow and may have some benefits associated with reducing the internal nutrient release from the bottom sediments of Golden Lake, but also results in the build-up of phosphorus laden bottom sediments in the lake.

3. **Lake Level Drawdown in Winter**

This option consists of drawing the water levels within the lake down four to six feet in the winter, and allowing the sediments in the shallower areas to freeze, consolidate, and decompose under significantly different conditions than those present in the lake when they are under water. Water levels would be allowed to rebound to previous levels in the spring following this treatment. This process has been shown to be effective in reducing the growth of rooted aquatic plants, enhancing the consolidation of lake bottom sediments, and expanding the oxidation of organic bottom sediments in these shallow areas.

4. **Lake Level Drawdown, Dredging, Scraping, and Sediment Delta Removal**

This alternative is similar to that of Option 3, however, in addition to the drawdown activity, dredging, scraping, and removal of sediments that are present in these areas would be undertaken. This activity would reduce the presence of aquatic seed beds; remove organic sediments and deepen the lake in the areas.

5. **Biomanipulation**

Biomanipulation is a method of physically manipulating the biology of the lake (fish species, plant species, etc.) in an effort to address public use problems.

One method involves eliminating a population of small, minnow-sized fish that feed on smaller insects known as daphnia (water fleas). These daphnia feed on algae, and if enough of the daphnia are present these organisms, have the ability to reduce algal populations which are a source of concern to the residents. Although biomanipulation can be successful, it has proven to be difficult to maintain these limited populations of minnow-size fish and expanded populations of daphnia in the lake for an extended period of time without constant management.

6. **Diversion**

This alternative consists of diverting the current inflow of water and associated nutrients to the downstream outlet of the lake. Bypassing the lake through this process reduces the corresponding nutrient loading that has resulted in many of the water quality problems being experienced within the lake in its recent past. This alternative would have the potential for significantly improving the long-term “health” of the lake in the future.
7. **Enhanced Storm Water Treatment in Areas Upstream of I-35W**

This alternative consists of constructing additional storm water treatment systems upstream in the City of Blaine to treat the water generated in this area prior to its discharge downstream into Golden Lake. This alternative has the potential to provide some limited reduction in hydraulic and nutrient loading to Golden Lake. The magnitude of this improvement would be limited and it is unlikely such enhancements would be able to fully address the problems identified by the task force.
8. **Weed Harvesting**

This option consists of utilizing an aquatic weed harvesting program to manage the rooted aquatic macrophyte infestation problem present in Golden Lake. This treatment would be required periodically throughout the summer months, and is generally more costly than utilization of an herbicide treatment to control rooted aquatic plant growth. This harvesting alternative does have the potential to fully address rooted aquatic plant growth problems for residents using the lake to the extent allowed by the Minnesota Department of Natural Resources.
9. **Herbicide Treatment to Control Rooted Aquatic Plants**

This alternative is similar to Option 8 except herbicide is used to kill rooted aquatic plants in areas that are designated to be free of these plants. Treatment is required annually and is generally less costly than weed harvesting. This option has potential similar benefits as weed harvesting but due to the use of chemicals, has some limited potential environmental side effects.
10. **Phosphorus Control Ordinance in Upstream Watershed**

This option consists of passing an ordinance to prohibit the use of phosphorus in the upstream watershed. This approach would be similar to the State of Minnesota recently passing legislation banning the use of phosphorus containing fertilizers by homeowners in the metropolitan area effective January 1, 2004. However, this legislation does not apply to farmers, and one of the most significant sources of nutrients in the upstream watershed is from the application of fertilizers to sod fields that are present in this upstream area. It should also be noted that phosphorus is a nutrient that is necessary to stimulate root growth in newly seeded areas. If this alternative is selected, it would likely be necessary for the City of Blaine and Circle Pines to pass an ordinance prohibiting phosphorus to be utilized for farming practices in these areas.

**11. Expansion of Upstream Wetland Treatment System**

This alternative consists of expanding the size of the current upstream wetland treatment system so as to improve its ability to remove pollutants directed to it from County Ditch 53-62 prior to its discharge into Golden Lake. An expansion of this treatment system was recently undertaken as part of a townhouse development that is under construction in this area. An analysis of the benefits of this expansion indicates that a reduction of nutrient loading from this area will occur as a result of the expanded system but the extent of this reduction is not adequate to have a measurable benefit on the quality of water in Golden Lake.

**12. Hypolimnetic Withdrawal**

This alternative consists of installing a new outlet for the lake in such a manner to direct water that currently overflows from the lake surface to be withdrawn from the bottom of the lake instead. Because the quality of the water in the bottom of the lake is generally of poorer quality than that of surface waters, this would result in more nutrients being carried out of the lake when water is discharged than it has in the past. This alternative has the potential to provide long-term benefits to the water quality of the lake; however, the watershed district has expressed concerns that this alternative will degrade the quality of water of water bodies downstream from Golden Lake if this option is exercised. For this reason, there is some concern that this alternative is not feasible from a regulatory standpoint.

**13. Expanded Aeration System**

This alternative consists of expanding the existing, or installing a new aeration system to supplement the existing hypolimnetic aeration system that is present in the lake. The current hypolimnetic aeration system takes water from the bottom of the lake, aerates it, and returns it to the hypolimnion of the lake so as not to destroy the stratification of the lake in the summer or winter months. This system has been shown to be effective in managing the fish population, as well as maintaining oxygen near the sediments in the vicinity of the aerator discharge point. This oxygenated environment reduces the amount of nutrients that are released into the water column from the bottom sediments of the lake in this area. Expanding this aeration system would expand the area over which these benefits are received.

**14. Expand Non-Point Source Runoff Controls in Direct Watershed**

This alternative consists of expanding measures to treat storm water runoff directed to Golden Lake from its immediate watershed. As identified in the background information, the lake has a watershed of approximately 4,400 acres, of which approximately 400 acres (10%) is within the direct watershed. This option anticipates undertaking additional measures to attempt to further improve the quality of water discharged from this direct watershed into the lake. Due to its limited area (10%), and the fact that much of this water is already treated

before discharge, these measures are not anticipated to significantly improve the water quality of Golden Lake.

**15. Fish Stocking**

This alternative consists of working with the Minnesota Department of Natural Resources in the implementation of their fish stocking program so as to maintain a robust and healthy population of desirable fish species in the lake. In order for the fisheries management component of this plan to be realized, this fish stocking component will need to be undertaken annually in the future.

**TABLE 1**

**COSTS AND POTENTIAL BENEFITS ASSOCIATED WITH OPTIONS**

Option No.	Description of Proposed Improvement	Estimate of Cost	Potential Benefit		
			Water Quality	Aquatic Plant Control	Fisheries Management
1	Alum or Ferric Chloride Treatment Upstream	\$200,00-400,000	High	Low/Possible Negative Impact	Low
2	Alum or Ferric Chloride Treatment In-lake	\$30,000 per treatment	High	Low/Possible Negative Impact	Low
3	Lake Level Draw-down in Winter	\$50,000-100,000, less in future yrs.	High	High	High/Medium /Low
4	Lake Level Draw-down, Dredging, Scraping, and Sediment Delta Removal	\$300,000-900,000	High	High	High/Medium /Low
5	Biomaniipulation	\$50,000-200,000	Medium	Medium	High
6	Diversion	\$250,000-350,000	High	Low	Low
7	Treatment Enhancements Upstream of I 35W	\$150,000-250,000	Low	Low	Low
8	Weed Harvesting	\$40,000 annually	Low	High	Low
9	Herbicide Treatment of Rooted Aquatics	\$2,000-5,000 annually	Low	High	Low
10	Phosphorus Control Ordinance in Upstream Watershed	\$0	Low	Low	Low
11	Expansion of Upstream Wetland Treatment System	\$200,000-400,000	Low	Low	Low
12	Hypolimnetic Withdrawal	\$100,000	Low/Medium	Low	Low
13	Expanded Aeration System	\$100,000-200,000	Low	Low	Medium
14	Expanded NPS Watershed Management Measures in Direct Watershed	\$25,000-100,000	Low	Low	Low
15	Fish Stocking	DNR Funded	Low	Low	High

## **VI. PROPOSED MANAGEMENT PLAN**

Based on a review of the various improvement alternatives that are available to meet the goals identified, a review of their preliminary estimate of cost, and their associated potential benefits, the task force has determined that the Golden Lake Management Plan should consist of implementing the following improvement projects if the City wishes to meet the lake improvement goals outlined in this plan:

1. Complete a lake level drawdown, dredging, scraping, and sediment delta removal project (**Option 4**).
2. Divert flows around Golden Lake from County Ditch 53-62 (**Option 6**).
3. Undertake annual herbicide treatment of rooted aquatic plants in selected areas (**Option 9**).
4. Implement phosphorus control ordinance in upstream watersheds to the extent possible (**Option 10**).
5. Expand aeration system (**Option 13**).
6. Expand non-point source watershed management measures in the direct watershed (**Option 14**).
7. Work with the Minnesota Department of Natural Resources to implement aggressive fish stocking program (**Option 15**).

**Table 2** provides a summary of these selected options, and an estimate of cost estimate to implement these improvement alternatives.

**Table 2**  
**Activities to be Implemented as Part of the Golden Lake Water Quality Management Plan**

Option No.	Description of Proposed Improvement	Estimate of Cost	Potential Benefit		
			Water Quality Improvement	Aquatic Plant Control	Fisheries Management
4	Lake Level Draw Down in Winter	\$300,000-900,000	High	High	High/Medium/Low
6	Diversion	\$250,000-350,000	High	Low	Low
9	Herbicide Treatment of Rooted Aquatic Plants	\$2,000-5,000 annually*	Low	High	Low
10	Phosphorus Control Ordinance in Upstream Wetland	\$0	Low	Low	Low
13	Expanded Aeration System	\$100,000-200,000	Low	Low	Medium
14	Expanded NPS Watershed Management Measures in Direct Watershed	\$25,000-100,000	Low	Low	Low
15	Fish Stocking	Paid for by the DNR	Low	Low	High
<b>TOTAL*</b>		<b>\$675,000-1,550,000</b>			

\*Annual costs not included in this total

## **VII. IMPLEMENTATION PLAN**

It is the intention of the Golden Lake Task Force and the Circle Pine City Council to work toward the implementation of the options outlined within this management plan.

However, it is recognized that in order to implement these improvement projects, a significant source of funds from outside the City will need to be secured. Toward that end, the City of Circle Pines intends to fund the improvements needed by securing financial support from a wide range of stakeholders and interest groups, including state, federal, and local agencies. The City also anticipates it will be necessary to submit grant applications and funding requests to these various agencies and interest groups in order to achieve these goals. The City, The Golden Lake Task Force, and city residents intend to undertake activities to secure such support in the coming year.

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**ATTACHMENT  
PROPOSED IMPLEMENTATION PLAN**

### Proposed Implementation Plan

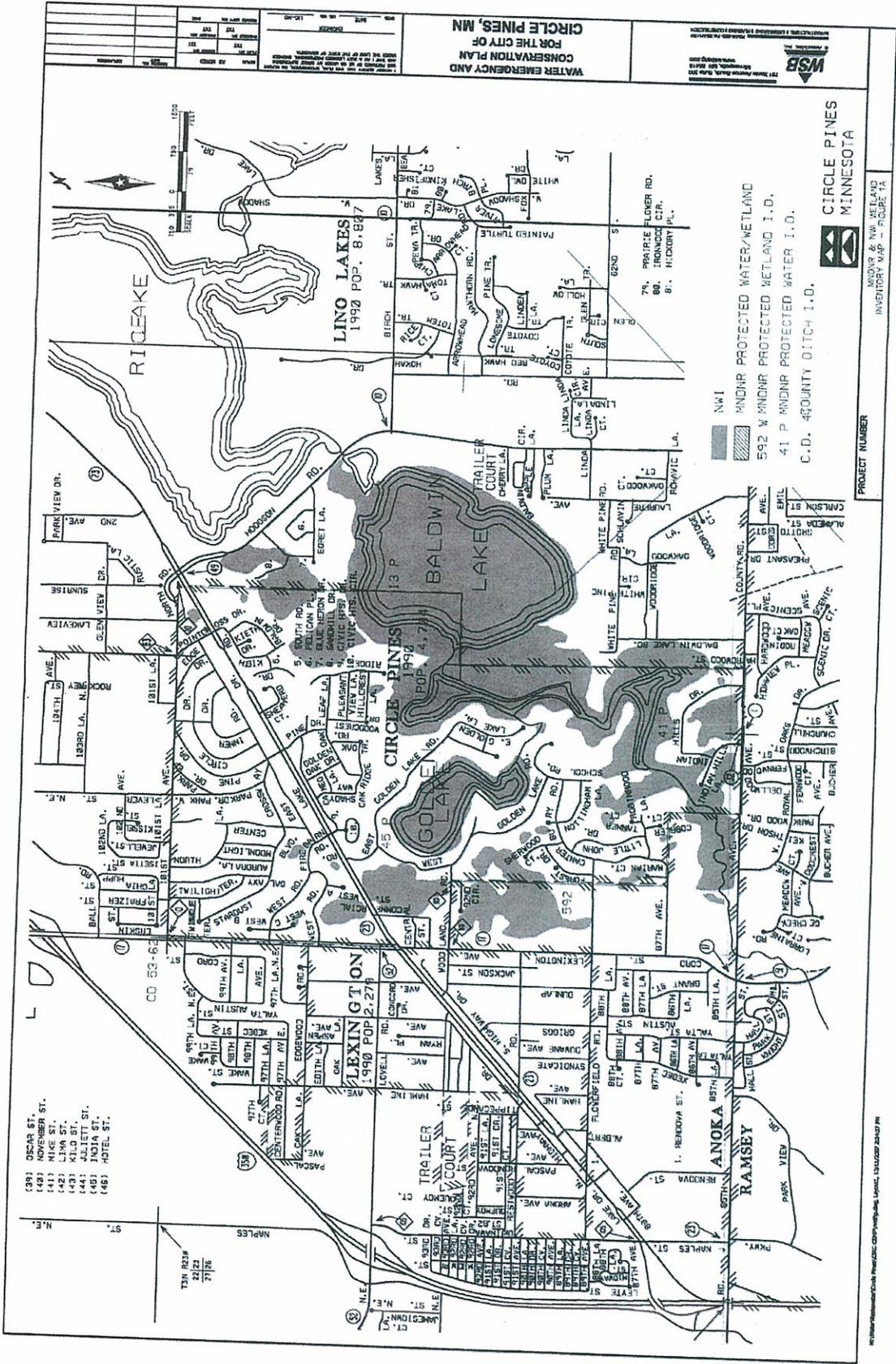
In order for the City to implement the Golden Lake Management Plan, it will be necessary to secure funding for the project from a number of sources. Toward that end, it is anticipated that a formal and rigorous effort to secure funding over an extended period of time will need to be undertaken by the Task Force Members, City Council and Staff, and interested residents in order for this project to go forward.

Outlined below is a list of potential sources of funding that may be able to contribute financial support towards implementation of the Management Plan as outlined in **Table 2**. Other funding sources and/or activities may also be available that are not listed below.

It is recommended that the Task Force, City Council, City Staff, and other interested residents review these funding sources and develop a formal process to solicit funds from these agencies or entities

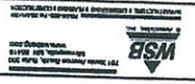
Agency or Entity Name	Contact	Grant Name/Description	Level of Assistance	Application Deadline
City of Circle Pines	City of Circle Pines~200 Civic Heights Circle~Circle Pines, MN 55014~763-784-5898	Various	Varies	NA
Rice Creek Watershed District	Steve Hobbs, District Administrator 4325 Pheasant Ridge Drive, Suite 611 Blaine MN 55449-4541 Phone: (763) 398-3070   Fax: (763) 398-3088	Various	Varies	NA
DNR	Grants Manager Local Grants Program Department of Natural Resources 500 Lafayette Road, Box 10 St. Paul, MN 55155-4010 Fax: (651)296-6047	Environmental Partnerships Grants. Funds available for community environmental service projects to clean up areas such as lakes, streams, and wetlands	Up to a maximum of 50% of the total eligible costs not to exceed \$20,000, minimum project cost is \$1,000.	Submit by June 1, 2003 for project review and evaluation. Grants awarded in 2004.
DNR Fish and Wildlife	Gerald Johnson Regional Fisheries Manager/DNR Fish & Wildlife 500 Lafayette Road, Box 12 St. Paul, MN 551155 Phone: (651) 772-7955 Fax: (651) 297-4916 E-Mail: <a href="mailto:gerald.johnson@dnr.state.mn.us">gerald.johnson@dnr.state.mn.us</a>	CORE (Cooperative Opportunities for Resource Enhancement). Funds available for aeration, fishing piers, fishery management.	Varies depending on funds available for fiscal year. Pays for initial costs of project installation	Submit in 2003 for consideration, ranking and review. Grants awarded in 2004.

Agency or Entity Name	Contact	Grant Name/Description	Level of Assistance	Application Deadline
MPCA	Glen Skuta 520 Lafayette Road St. Paul, MN 55155-4194 (651)296-7359	Clean Water Partnership/Federal 319 Program.	Up to 50% of eligible costs.	To be announced
MPCA	Jennifer Klang 651-282-2618 jennifer.klang@pca.state.mn.us	Citizens' Lake Monitoring Program	Volunteer/Lake Homeowners	NA
BWSR	Marybeth Block BWSR One West Water Street, Suite 200 St. Paul, MN 55107 (651)297-7965	Local Water Planning Challenge Program 2004/5 Land and water quality treatment, monitoring and maintenance.	Matching Funds	To be announced (usually must be submitted by the end of February annually)
House Representative	Philip Krinkie 365 State Office Building Saint Paul, Minnesota 55155 (651) 296-2907 E-mail: <a href="mailto:rep.phil.krinkie@house.mn">rep.phil.krinkie@house.mn</a>	Direct Legislative Appropriation	Varies	NA
Senate Representative	Mady Rieter 132D State Office Building St. Paul, MN 55155 Capitol phone: (651) 296-1253 E-mail: <a href="mailto:sen.mady.rieter@senate.mn">sen.mady.rieter@senate.mn</a>	Direct Legislative Appropriation	Varies	NA
City of Blaine	Blaine City Hall 10801 Town Square Drive Blaine, MN 55449 763-785-6161	Various	Varies	NA
Circle Pines Lexington Lion's Club	Jan Kreminski (651)784-7231 P.O. Box 13 Circle Pines, MN 55014	Charitable Donations for Non-Profit Organizations. Community service projects.	Varies	NA
Anoka Soil and Water Conservation District	Chris Lord - Manager Anoka SWCD 16015 Central Avenue NE #103 Ham Lake, MN 55304 (763)434-2030	Various	Varies	NA
Anoka County	Anoka County Government Center 2100 3rd Avenue Anoka, Minnesota 55303 763-421-476	Various	Varies	NA
Mn/DOT	Patti Loken Metro State Aid Office Waters Edge Building, 1550 W. County Road B2, Roseville, Minnesota 55113 (651)582-1373	Cooperative Agreements and State Assistance with Road related projects (Diversion of Ditch 53-62)	Varies	NA
Other Civil Groups	To be established	To be established	To be established	NA



- (39) OSCAR ST.
- (40) NOVEMBER ST.
- (41) LINDA ST.
- (42) LINDA ST.
- (43) KILD ST.
- (44) JULIETT ST.
- (45) INDIA ST.
- (46) HOTEL ST.

**WATER EMERGENCY AND CONSERVATION PLAN FOR THE CITY OF CIRCLE PINES, MN**



**CIRCLE PINES MINNESOTA**

- NWI
- MNDNR PROTECTED WATER/WETLAND
- MNDNR PROTECTED WETLAND I.D.
- MNDNR PROTECTED WATER I.D.
- C.D. 40 COUNTY DITCH I.D.

PROJECT NUMBER: MNDNR & NWI WETLAND INVENTORY MAP - FIGURE 1A

**4.3 WATER EMERGENCY AND CONSERVATION PLAN**

**FOR THE  
CITY OF CIRCLE PINES, MINNESOTA**

**October 30, 2007**

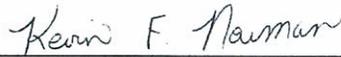
**Prepared By:**

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

## CERTIFICATION

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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.

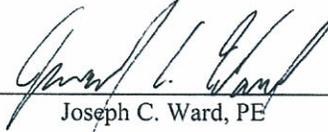


Kevin F. Newman, PE

Date: October 30, 2007

Lic. No. 25198

Prepared By:



Joseph C. Ward, PE

Date: October 30, 2007

Lic. No. 45855

## TABLE OF CONTENTS

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### TITLE SHEET

### LETTER OF TRANSMITTAL

### CERTIFICATION SHEET

### TABLE OF CONTENTS

#### **PART I WATER SUPPLY SYSTEM DESCRIPTION AND EVALUATION .....1**

A.	Analysis of Water Demand.....	1
B.	Treatment and Storage Capacity.....	3
C.	Water Sources.....	4
D.	Demand Projections.....	5
E.	Resource Sustainability.....	5
F.	Capital Improvement Plan (CIP).....	7

#### **PART II EMERGENCY RESPONSE PROCEDURES.....9**

	Federal Emergency Response Plan.....	9
	Operational Contingency Plan.....	9
A.	Emergency Telephone List.....	10
B.	Current Water Sources and Service Area.....	10
C.	Procedure for Augmenting Water Supplies.....	10
D.	Allocation and Demand Reduction Procedures.....	11
E.	Enforcement.....	13

#### **PART III WATER CONSERVATION PLAN.....15**

A.	Conservation Goals.....	15
B.	Water Conservation Programs.....	16
1.	Metering.....	16
2.	Unaccounted Water.....	17
3.	Conservation Water Rates.....	17
4.	Regulation.....	18
5.	Education and Information Programs.....	19
6.	Retrofitting Programs.....	20

#### **PART IV ITEMS FOR METROPOLITAN AREA PUBLIC SUPPLIERS.....22**

##### **Figure IA**

National Wetland Inventory

##### **Attachment IA**

Well Boring and Maintenance Records

##### **Attachment IB**

Well Water Level Records

**TABLE OF CONTENTS (continued)**

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**Attachment IIIA**

Water Utility Rates

**Attachment IIIB**

Adopted Regulations and Ordinances

**Attachment IIIC**

Past Education Efforts

**DEPARTMENT OF NATURAL RESOURCES – DIVISION OF WATERS and  
METROPOLITAN COUNCIL**

**WATER EMERGENCY AND CONSERVATION PLAN**

These guidelines are divided into four parts. The first three parts, Water Supply System Description and Evaluation, Emergency Response Procedures and Water Conservation Planning apply statewide. Part IV, relates to comprehensive plan requirements that apply only to communities in the Seven-County Twin Cities Metropolitan Area. If you have questions regarding water emergency and conservation plans, please call (651) 259-5703 or (651) 259-5647 or e-mail your question to [wateruse@dnr.state.mn.us](mailto:wateruse@dnr.state.mn.us). Metro Communities can also direct questions to the Metropolitan Council at [watersupply@metc.state.mn.us](mailto:watersupply@metc.state.mn.us) or (651) 602-1066.

DNR Water Appropriation Permit Number(s)	590782
Name of Water Supplier	Centennial Utilities
Address	200 Civic Heights Circle
Contact Person	Rich Lavell
Title	Public Works Superintendent
Phone Number	763-231-2606
E-Mail Address	<a href="mailto:rlavell@ci.circle-pines.mn.us">rlavell@ci.circle-pines.mn.us</a>

**PART I. WATER SUPPLY SYSTEM DESCRIPTION AND EVALUATION**

The first step in any water supply analysis is to assess the current status of demand and supplies. Information in Part I, can be used in the development of Emergency Response Procedures and Conservation Plans.

**A. ANALYSIS OF WATER DEMAND.**

Fill in Table 1 for the past 10 years water demand. If your customer categories are different than the ones listed in Table 1, please note the changes below.
Commercial connections include all non-residential connections.

**TABLE 1 Historic Water Demand**

Year	Total Population	Population Served	Total Connections	Residential Water Sold (MG)	C/I/I Water Sold (MG)	Wholesale Deliveries (MG)	Total Water Sold (MG)	Total Water Pumped (MG)	Percent Unmetered/Unaccounted	Average Demand (MGD)	Maximum Demand (MGD)	Residential gallons/capita/day	Total gallons/capita/day
1996	4,779	4,779		147.614	6.550		154.164	167.094	8.4	0.458	1.035	84.6	88.4
1997	4,772	4,772	1,672	145.608	5.490		151.099	149,975	-0.7	0.411	1.357	83.6	86.7
1998	4,772	4,772	1,676	154.223	6.369		160.592	161.515	0.6	0.443	1.219	88.5	92.2
1999	4,784	4,784	1,674	140.046	6.113		146.159	167.797	14.8	0.460	0.955	80.2	83.7
2000	4,663	4,663	1,689	152.041	6.767		158.808	176.953	11.4	0.485	1.252	89.3	93.3
2001	4,670	4,670	1,697	141.155	8.091		149.246	144.530	-3.2	0.396	1.527	82.8	87.6
2002	4,670	4,670	1,743	120.032	5.356		125.387	122.060	-2.7	0.334	0.929	70.4	73.6
2003	4,742	4,742	1,841	143.430	6.077		149.507	167.510	12.0	0.459	1.508	82.9	86.4
2004	4,950	4,950	1,884	144.207	4.841		149.048	171.588	15.1	0.470	1.522	79.8	82.5
2005	5,072	5,072	1,920	145.943	6.410		152.353	157.388	3.3	0.431	1.483	78.8	82.3

MG – Million Gallons MGD – Million Gallons per Day C/I/I- Commercial, Industrial, Institutional

**Residential.** Water used for normal household purposes, such as drinking, food preparation, bathing, washing clothes and dishes, flushing toilets, and watering lawns and gardens.

**Institutional.** Hospitals, nursing homes, day care centers, and other facilities that use water for essential domestic requirements. This includes public facilities and public metered uses. You may want to maintain separate institutional water use records for emergency planning and allocation purposes.

**Commercial.** Water used by motels, hotels, restaurants, office buildings, commercial facilities, both civilian and military.

**Industrial.** Water used for thermoelectric power (electric utility generation) and other industrial uses such as steel, chemical and allied products, food processing, paper and allied products, mining, and petroleum refining.

**Wholesale Deliveries.** Bulk water sales to other public water suppliers.

**Unaccounted.** Unaccounted for water is the volume of water withdrawn from all sources minus the volume sold.

**Residential Gallons per Capita per Day = total residential sales in gallons/population served/365 days Total Gallons per Capita per Day = total water withdrawals/population served/365 days**

**NOTE:** Non-essential water uses defined by Minnesota Statutes 103G.291, include lawn sprinkling, vehicle washing, golf course and park irrigation and other non-essential uses. Some of the above categories also include non-essential uses of water.

**Water Use Trends.** Discuss factors that influence trends in water demand (i.e. growth, weather, industry, conservation). If appropriate, include a discussion of other factors that affect daily water use, such as use by non-resident commuter employees or large water consuming industry.

Since 1996 the population of Circle Pines increased 293 people or 6 percent. The City land use consists largely of single family residential units and is developed to capacity at the current density. Total water demand and water demand per capita has trended downward since 2000, and total water sold has been fairly consistent since 1996.

**TABLE 2 Large Volume Users - List the top 10 largest users.**

Customer	Gallons per year	% of total annual use
City is primarily residential		
there are no large volume users		

**B. TREATMENT AND STORAGE CAPACITY.**

**TABLE 3(A) Water Treatment**

Water Treatment Plant Capacity	2.16	Million Gallons per Day
Describe the treatment process used (i.e., softening, chlorination, fluoridation, Fe/Mn removal, reverse osmosis, coagulation, sedimentation, filtration, others). Also, describe the annual amount and method of disposal of treatment residuals, if any.		
Disinfection is accomplished by chlorination. Treatment includes fluoridation and iron and manganese removal. Aeration and green sand filtration are used to remove iron and manganese.		

**TABLE 3(B) Storage Capacity - List all storage structures and capacities.**

Total Storage Capacity	Average Day Demand (average of last 5 years)	
500,000	Gallons	397,500 Gallons per day
Type of Structure	Number of Structures	Gallons
Elevated Storage	1	500,000
Ground Storage		
Other:		

C. **WATER SOURCES.** List all groundwater, surface water and interconnections that supply water to the system. Add or delete lines to the tables as needed.

**TABLE 4(A) Total Water Source Capacity for System (excluding emergency connections)**

<b>Total Capacity of Sources</b>	2,200	Gallons per minute
<b>Firm Capacity (largest pump out of service)</b>	1,000	Gallons per minute

**TABLE 4(B) Groundwater Sources -** Copies of water well records and well maintenance information should be included with the public water supplier's copy of the plan in Attachment IA. See Page 8, Part F for a description of ongoing well maintenance.

Well # or name	Unique Well Number	Year Installed	Well & Casing Depth (ft)	Well Diameter (in)	Capacity (GPM)	Geologic Unit	Status
2	00208995	1961	321&303	12	1,000	Drift	Active Use
3	00208636	1967	270&181	16	1,200	Jordan	Active Use

Status: Active use, Emergency, Standby, Seasonal, Peak use, etc. GPM – Gallons per Minute  
 Geologic Unit: Name of formation(s), which supplies water to the well

**TABLE 4(C) Surface Water Sources**

Intake ID	Resource name	Capacity (GPM/MGD)

GPM – Gallons per Minute MGD – Million Gallons per Day

**TABLE 4(D) Wholesale or Retail Interconnections -** List interconnections with neighboring suppliers that are used to supply water on a **regular basis** either wholesale or retail.

Water Supply System	Capacity (GPM/MGD)	Wholesale or retail

GPM – Gallons per Minute MGD – Million Gallons per Day

**TABLE 4(E) Emergency Interconnections** - List interconnections with neighboring suppliers or private sources that can be used to supply water on an emergency or occasional basis. Suppliers that serve less than 3,300 people can leave this section blank, but must provide this information in Section II C.

Water Supply System	Capacity (GPM/MGD)	Note any limitations on use
City of Shoreview	7,600/11.0	
City of Lexington	1,250/1.8	
City of Lino Lakes	4,950/7.1	
City of Blaine	12,500/18.0	Primary Emergency Supplier

GPM – Gallons per Minute MGD – Million Gallons per Day

#### D. DEMAND PROJECTIONS.

**TABLE 5 Ten Year Demand Projections**

Year	Population Served	Average Day Demand (MGD)	Maximum Day Demand (MGD)	Projected Demand (MGY)
2007	5,072	0.410	1.53	149.65
2008	5,072	0.410	1.53	149.65
2009	5,072	0.410	1.53	149.65
2010	5,072	0.410	1.53	149.65
2011	5,072	0.410	1.53	149.65
2012	5,072	0.410	1.53	149.65
2013	5,072	0.410	1.53	149.65
2014	5,072	0.410	1.53	149.65
2015	5,072	0.410	1.53	149.65
2016	5,072	0.410	1.53	149.65

MGD – Million Gallons per Day MGY – Million Gallons per Year

**Projection Method.** Describe how projections were made, (assumptions for per capita, per household, per acre or other methods used).

Since 1996 the population of Circle Pines has slightly increased and is at capacity for the planned development density. The City land use consists largely of single family residential units. Until redevelopment of existing property begins, which is not expected within the next ten years, water demand is not expected to increase. Redevelopment would cause increased housing density, and higher water demand per acre.

#### E. RESOURCE SUSTAINABILITY .

**Sustainable water use: use of water to provide for the needs of society, now and in the future, without unacceptable social, economic, or environmental consequences.**

**Monitoring.** Records of water levels should be maintained for all production wells and source water reservoirs/basins. Water level readings should be taken monthly for a production well or observation well that is representative of the wells completed in each water source formation. **If water levels are not currently measured each year, a monitoring plan that includes a schedule for water level readings must be submitted as an Attachment.**

**TABLE 6 Monitoring Wells - List all wells being measured.**

Unique well number	Type of well (production, observation)	Frequency of Measurement (daily, monthly etc.)	Method of Measurement (steel tape, SCADA etc.)
00208995	Production	Annually	Steel tape
00208636	Production	When pump is pulled for maintenance (5 yrs), no access	Steel tape

**Water Level Data.** Summarize water level data including seasonal and long-term trends for each ground and/or surface water source. If water levels are not measured and recorded on a routine basis then provide the static water level (SWL) when the well was constructed and a current water level measurement for each production well. Also include all water level data taken during well and pump maintenance.

Historical water level data indicates that water levels have remained in a consistent range, and increased since construction. At the time of construction Well #2 (1961) had a SWL of 29.5, and Well #3 (1967) had a SWL of 30.0. In July of 2006, Well #2 had a SWL of 45 and Well #3 had SWL of 45 in May 2000.

Water levels are measured every five years in Well #3 when the pump is pulled for major maintenance, because there is no access or transducer capable of measuring the water level. Well #2 water has no transducer, therefore levels are recorded during annual pump maintenance to provide cost savings to the City. However, when improvements are constructed for the wells, additional equipment and access will be considered to allow continual water level readings.

**Attachment IB: Nearby DNR Observation Well SWL data from website and City records.**

**Ground Water Level Monitoring** – DNR Waters in conjunction with federal and local units of government maintain and measure approximately 750 observation wells around the state. Ground water level data are available online [www.dnr.state.mn.us/waters](http://www.dnr.state.mn.us/waters). Information is also available by contacting the Ground Water Level Monitoring Manager, DNR Waters, 500 Lafayette Road, St. Paul, MN 55155-4032 or call (651) 259-5700.

**Natural Resource Impacts.** Indicate any natural resource features such as calcareous fens, wetlands, trout streams, rivers or surface water basins that are or could be influenced by water withdrawals from municipal production wells. Also indicate if resource protection thresholds have been established and if mitigation measures or management plans have been developed.

There are no natural resource features that could be affected by municipal production well withdrawals. Figure IA shows the National Wetland Inventory (NWI) for the City. There are protected and impaired surface waters within the City, however the Wellhead Protection Plan has indicated that the groundwater aquifers are confined. Therefore, they do not influence surface waters and surface waters do not influence the groundwater.

Resource protection thresholds have not been established, because they have been determined to not influence each other, thus no mitigation measures have been established. A Comprehensive Storm Water Management Plan and Wellhead Protection Plan have been adopted to protect the City's groundwater and surface water quantity and quality.

**Sustainability.** Evaluate the adequacy of the resource to sustain current and projected demands. Describe any modeling conducted to determine impacts of projected demands on the resource.

The Wellhead Protection Plan indicated there is ample water supply for the foreseeable future to meet projected demands. The DNR's monitoring of ground water levels in the aquifers has indicated there is little or no lowering of the water level in the City's available aquifers.

<b>Source Water Protection Plans.</b> The emergency procedures in this plan are intended to comply with the contingency plan provisions required in the Minnesota Department of Health's (MDH) Wellhead Protection (WHP) Plan and Surface Water Protection (SWP) Plan.	
<b>Date WHP Plan Adopted:</b>	April 26, 2006
<b>Date for Next WHP Update:</b>	No date set
<b>SWP Plan:</b>	<input type="checkbox"/> In Process <input checked="" type="checkbox"/> Completed <input type="checkbox"/> Not Applicable

**F. CAPITAL IMPROVEMENT PLAN (CIP).**

**Adequacy of Water Supply System.** Are water supply installations, treatment facilities and distribution systems adequate to sustain current and projected demands?  Yes  No If no, describe any potential capital improvements over the next ten years and state the reasons for the proposed changes (CIP Attachment ).

No population growth is expected over the next ten years, therefore current supplies are adequate.

**Proposed Water Sources.** Does your current CIP include the addition of new wells or intakes?  Yes  No If yes, list the number of new installations and projected water demands from each for the next ten years. Plans for new production wells must include the geologic source formation, well location, and proposed pumping capacity.

There are no new proposed water sources.

**Water Source Alternatives.** If new water sources are being proposed, describe alternative sources that were considered and any possibilities of joint efforts with neighboring communities for development of supplies.

There are no new proposed water sources.

**Preventative Maintenance.** Long-term preventative programs and measures reduce the risk of emergency situations. Identify sections of the system that are at risk due to age, materials or other problems. This information should be used to plan for improvements, preventative maintenance, and to determine the types of parts (e.g., couplings, etc.) to have in stock to reduce repair time.

The well pumps are critical to the system as they supply and do wear out with extensive use. Also, water meters in the distribution system wear out over time. The City's CIP accounts for well major motor maintenance at each well every five years and replacement of all water meters every fifteen years. The City annually performs maintenance on each of its wells. These ongoing well inspections and repairs include checking the water level, motor electrical condition, motor lubrication, water quality samples, pumping rates, and other items. Attachment IA in the inspection report detailing all items inspected and maintained annually.

## PART II. EMERGENCY RESPONSE PROCEDURES

Water emergencies can occur as a result of vandalism, sabotage, accidental contamination, mechanical problems, power failures, drought, flooding, and other natural disasters. The purpose of emergency planning is to develop emergency response procedures and to identify actions needed to improve emergency preparedness. In the case of a municipality, these procedures should be in support of, and part of, an all-hazard emergency operations plan. If your community already has written procedures dealing with water emergencies we recommend that you use these guidelines to review and update existing procedures and water supply protection measures.

### Federal Emergency Response Plan

Section 1433(b) of the Safe Drinking Water Act as amended by the Public Health Security and Bioterrorism Preparedness and Response Act of 2002 (Public Law 107-188, Title IV – Drinking Water Security and Safety) requires community water suppliers serving over 3,300 people to prepare an Emergency Response Plan. **Community water suppliers that have completed the Federal Emergency Response Plan and submitted the required certification to the U.S. Environmental Protection Agency have satisfied Part II, Sections A, B, and C of these guidelines and need only provide the information below regarding the emergency response plan and source water protection plan and complete Sections D (Allocation and Demand Reduction Procedures), and E (Enforcement).**

Provide the following information regarding your completed Federal Emergency Response Plan:

Emergency Response Plan	Contact Person	Contact Number
Emergency Response Lead	On-Call Utility Personnel	763-784-6751
Alternate Emergency Response Lead	City Administrator	763-231-2605
Emergency Response Plan Certification Date	December 22, 2004	

**Operational Contingency Plan.** An operational contingency plan that describes measures to be taken for water supply mainline breaks and other common system failures as well as routine maintenance is recommended for all utilities. Check here  if the utility has an operational contingency plan. At a minimum a contact list for contractors and supplies should be included in a water emergency telephone list.

*Communities that have completed Federal Emergency Response Plans should skip to Section D.*

**EMERGENCY RESPONSE PROCEDURES**

- A. Emergency Telephone List.** A telephone list of emergency contacts must be included as Attachment (N/A) to the plan (complete template or use your own list). The list should include key utility and community personnel, contacts in adjacent communities, and appropriate local, state and federal emergency contacts. Please be sure to verify and update the contacts on the emergency telephone list on a regular basis (once each year recommended). In the case of a municipality, this information should be contained in a notification and warning standard operating procedure maintained by the warning point for that community. Responsibilities and services for each contact should be defined.
  
- B. Current Water Sources and Service Area.** Quick access to concise and detailed information on water sources, water treatment, and the distribution system may be needed in an emergency. System operation, water well and maintenance records should be maintained in a central secured location so that the records are accessible for emergency purposes and preventative maintenance. A detailed map of the system showing the treatment plants, water sources, storage facilities, supply lines, interconnections, and other information that would be useful in an emergency should also be readily available. Check here  if these records and maps exist and staff can access the documents in the event of an emergency.
  
- C. Procedure for Augmenting Water Supplies.** List all available sources of water that can be used to augment or replace existing sources in an emergency. In the case of a municipality, this information should be contained in a notification and warning standard operating procedure maintained by the warning point for that community. Copies of cooperative agreements should be maintained with your copy of the plan and include in Attachment (N/A). Be sure to include information on any physical or chemical problems that may limit interconnections to other sources of water. Approvals from the MN Department of Health are required for interconnections and reuse of water.

**TABLE 7 (A) Public Water Supply Systems – List interconnections with other public water supply systems that can supply water in an emergency.**

Water Supply System	Capacity (GPM/MGD)	Note any limitations on use

GPM – Gallons per Minute      MGD – Million Gallons per Day

**TABLE 7 (B) - Private Water Sources – List other sources of water available in an emergency.**

Name	Capacity (GPM/MGD)	Note any limitations on use

GPM – Gallons per Minute      MGD – Million Gallons per Day

**D. Allocation and Demand Reduction Procedures.** The plan must include procedures to address gradual decreases in water supply as well as emergencies and the sudden loss of water due to line breaks, power failures, sabotage, etc. During periods of limited water supplies public water suppliers are required to allocate water based on the priorities established in Minnesota Statutes 103G.261.

Water Use Priorities (Minnesota Statutes 103G.261)	
<b>First Priority.</b>	Domestic water supply, excluding industrial and commercial uses of municipal water supply, and use for power production that meets contingency requirements.
	<i>NOTE:</i> Domestic use is defined (MN Rules 6115.0630, Subp. 9), as use for general household purposes for human needs such as cooking, cleaning, drinking, washing, and waste disposal, and uses for on-farm livestock watering excluding commercial livestock operations which use more than 10,000 gallons per day or one million gallons per year.
<b>Second Priority.</b>	Water uses involving consumption of less than 10,000 gallons per day.
<b>Third Priority.</b>	Agricultural irrigation and processing of agricultural products.
<b>Fourth Priority.</b>	Power production in excess of the use provided for in the contingency plan under first priority.
<b>Fifth Priority.</b>	Uses, other than agricultural irrigation, processing of agricultural products, and power production.
<b>Sixth Priority.</b>	Non-essential uses. These uses are defined by Minnesota Statutes 103G.291 as lawn sprinkling, vehicle washing, golf course and park irrigation, and other non-essential uses.

List the statutory water use priorities along with any local priorities (hospitals, nursing homes, etc.) in Table 8. Water used for human needs at hospitals, nursing homes and similar types of facilities should be designated as a high priority to be maintained in an emergency. Local allocation priorities will need to address water used for human needs at other types of facilities such as hotels, office buildings, and manufacturing plants. The volume of water and other types of water uses at these facilities must be carefully considered. After reviewing the data, common sense should dictate local allocation priorities to protect domestic requirements over certain types of economic needs. In Table 8, list the priority ranking, average day demand and demand reduction potential for each customer category (modify customer categories if necessary).

**Table 8 Water Use Priorities**

Customer Category	Allocation Priority	Average Day Demand (GPD)	Demand Reduction Potential (GPD)
Residential	1	393,000	69,900
Commercial	2	17,000	3,000
	3		
	4		
	5		
	6		
	<b>TOTALS</b>	<b>410,000</b>	<b>72,900</b>

GPD – Gallons per Day

**Demand Reduction Potential.** The demand reduction potential for residential use will typically be the base demand during the winter months when water use for non-essential uses such as lawn watering do not occur. The difference between summer and winter demands typically defines the demand reduction that can be achieved by eliminating non-essential uses. In extreme emergency situations lower priority water uses must be restricted or eliminated to protect first priority domestic water requirements. Short-term demand reduction potential should be based on average day demands for customer categories within each priority class.

**Triggers for Allocation and Demand Reduction Actions.** Triggering levels must be defined for implementing emergency responses, including supply augmentation, demand reduction, and water allocation. Examples of triggers include: water demand >100% of storage, water level in well(s) below a certain elevation, treatment capacity reduced 10% etc. Each trigger should have a quantifiable indicator and actions can have multiple stages such as mild, moderate and severe responses. Check each trigger below that is used for implementing emergency responses and for each trigger indicate the actions to be taken at various levels or stages of severity in Table 9.

- |                                     |  |                          |                         |
|-------------------------------------|--|--------------------------|-------------------------|
| <input checked="" type="checkbox"/> | Water Demand   | <input type="checkbox"/> | Water Main Break        |
| <input type="checkbox"/>            | Treatment Capacity   | <input type="checkbox"/> | Loss of Production      |
| <input type="checkbox"/>            | Storage Capacity   | <input type="checkbox"/> | Security Breach         |
| <input type="checkbox"/>            | Groundwater Levels   | <input type="checkbox"/> | Contamination           |
| <input type="checkbox"/>            | Surface Water Flows or Levels  | <input type="checkbox"/> | Other (list in Table 9) |
| <input checked="" type="checkbox"/> | Pump, Booster Station or Well Out of Service                                 |                          |                         |
| <input type="checkbox"/>            | Governor's Executive Order – Critical Water Deficiency (required by statute) |                          |                         |

**Table 9 Demand Reduction Procedures**

Condition	Trigger(s)	Actions
<b>Tier I (Voluntary)</b>	Demand > 0.41 MGD = 285 GPM = average day demand	A voluntary conservation request is issued by the City Administrator. Customers are asked to limit outdoor watering to every other day. Customers with odd-numbered street addresses alternate outdoor watering with even-numbered addresses. All municipal operations are placed on mandatory conservation with park irrigation limited as defined by the director of parks and public works.
<b>Tier II (Mild)</b>	Demand > 1.21 MGD = 840 GPM = 10 yr average maximum day demand	A mandatory water conservation decree is issued by the City Administrator. Outdoor watering is limited to every other day for customers as described in Tier I.
<b>Tier III (Moderate)</b>	Demand > 1.53 MGD = 1,050 GPM = Highest maximum day demand recorded	A mandatory water conservation decree is issued, limiting outdoor watering by customers to once every five days. Watering of trees will be allowed on an even-odd basis. No private car washing will be allowed. Special water users, as designated by the City Administrator, may be allowed a supplemental water allowance in order to maintain operations.

Condition	Trigger(s)	Actions
<b>Tier IV (Strong)</b>	Demand > 1.73 MGD = 1,200 GPM = Well firm capacity remaining demand recorded	A mandatory water conservation decree is issued, banning all lawn watering. Major commercial users over 10,000 gpd may be restricted at the discretion of the City Administrator.
<b>Tier V (Severe)</b>	Demand > 2.16 MGD = 1,500 GPM = Treatment capacity exceeded	A mandatory water conservation decree is issued, placing weekly limits on water use by all customers. Limits shall be set at the discretion of the City Administrator, based on available supply system capacity, priority of users, and other pertinent considerations (i.e. nursing homes, hospitals, child care centers and schools).
<b>Critical Water Deficiency (M.S. 103G.291)</b>	Executive Order by Governor & as provided in above triggers	Stage 1: Restrict lawn watering, vehicle washing, golf course and park irrigation and other nonessential uses Stage 2: Suspend lawn watering, vehicle washing, golf course and park irrigation and other nonessential uses

*Note:* The potential for water availability problems during the onset of a drought are almost impossible to predict. Significant increases in demand should be balanced with preventative measures to conserve supplies in the event of prolonged drought conditions.

**Notification Procedures.** List methods that will be used to inform customers regarding conservation requests, water use restrictions, and suspensions. Customers should be aware of emergency procedures and responses that they may need to implement.

The City Administrator or his designee shall be responsible for media notification and distribution of public notices for an emergency. The monthly utility newsletter will notify customers of restrictions and conservation requests.

**E. Enforcement.** Minnesota Statutes require public water supply authorities to adopt and enforce water conservation restrictions during periods of critical water shortages.

**Public Water Supply Appropriation During Deficiency.**  
Minnesota Statutes 103G.291, Subdivision 1.

Declaration and conservation.

(a) If the governor determines and declares by executive order that there is a critical water deficiency, public water supply authorities appropriating water must adopt and enforce water conservation restrictions within their jurisdiction that are consistent with rules adopted by the commissioner.

(b) The restrictions must limit lawn sprinkling, vehicle washing, golf course and park irrigation, and other nonessential uses, and have appropriate penalties for failure to comply with the restrictions.

An ordinance that has been adopted or a draft ordinance that can be quickly adopted to comply with the critical water deficiency declaration must be included in the plan (include with other ordinances in Attachment 7 for Part III, Item 4). Enforcement responsibilities and penalties for non-compliance should be addressed in the critical water deficiency ordinance. Sample regulations are available at [www.dnr.state.mn.us/waters](http://www.dnr.state.mn.us/waters)

**Authority to Implement Water Emergency Responses.** Emergency responses could be delayed if city council or utility board actions are required. Standing authority for utility or city managers to implement water restrictions can improve response times for dealing with emergencies. Who has authority to implement water use restrictions in an emergency?

- Utility Manager       City Manager       City Council or Utility Board  
 Other (describe): City Administrator

**Emergency Preparedness.** If city or utility managers do not have standing authority to implement water emergency responses, please indicate any intentions to delegate that authority. Also indicate any other measures that are being considered to reduce delays for implementing emergency responses.

**PART III. WATER CONSERVATION PLAN**

Water conservation programs are intended to reduce demand for water, improve the efficiency in use and reduce losses and waste of water. Long-term conservation measures that improve overall water use efficiencies can help reduce the need for short-term conservation measures. Water conservation is an important part of water resource management and can also help utility managers satisfy the ever-increasing demands being placed on water resources.

Minnesota Statutes 103G.291, requires public water suppliers to implement demand reduction measures before seeking approvals to construct new wells or increases in authorized volumes of water. Minnesota Rules 6115.0770, require water users to employ the best available means and practices to promote the efficient use of water. Conservation programs can be cost effective when compared to the generally higher costs of developing new sources of supply or expanding water and/or wastewater treatment plant capacities.

**A. Conservation Goals.** The following section establishes goals for various measures of water demand. The programs necessary to achieve the goals will be described in the following section.

<b>Unaccounted Water</b> (calculate five year averages with data from Table 1)		
Average annual volume unaccounted water for the last 5 years	37.535	MG
Average percent unaccounted water for the last 5 years	4.9	percent
AWWA recommends that unaccounted water not exceed 10%. Describe goals to reduce unaccounted water if the average of the last 5 years exceeds 10%.		

<b>Residential Gallons Per Capita Demand (GPCD)</b>		
Average residential GPCD use for the last 5 years (use data from Table 1)	78.9	GPCD
In 2002, average residential GPCD use in the Twin Cities Metropolitan Area was 75 GPCD. Describe goals to reduce residential demand if the average for the last 5 years exceeds 75 GPCD. Reduce City water consumption below 75 GPCD 2012.		

<b>Total Per Capita Demand:</b> From Table 1, is the trend in overall per capita demand over the past 10 years <input type="checkbox"/> increasing or <input checked="" type="checkbox"/> decreasing? If total GPCD is increasing, describe the goals to lower overall per capita demand or explain the reasons for the increase.

<b>Peak Demands</b> (calculate average ratio for last five years using data from Table 1)		
Average maximum day to average day ratio	3.34	
If peak demands exceed a ratio of 2.6, describe the goals for lowering peak demands. Reduce City water peak demands to 3.0 by 2012.		

**B. Water Conservation Programs.** Describe all short-term conservation measures that are available for use in an emergency and long-term measures to improve water use efficiencies for each of the six conservation program elements listed below. Short-term demand reduction measures must be included in the emergency response procedures and must be in support of, and part of, a community all-hazard emergency operation plan.

1. **Metering.** The American Water Works Association (AWWA) recommends that every water utility meter all water taken into its system and all water distributed from its system at its customer's point of service. An effective metering program relies upon periodic performance testing, repair, repair and maintenance of all meters. AWWA also recommends that utilities conduct regular water audits to ensure accountability. Complete Table 10 (A) regarding the number and maintenance of customer meters.

**TABLE 10 (A) Customer Meters**

	Number of Connections	Number of Metered Connections	Meter testing schedule (years)	Average age/meter replacement schedule (years)
Residential	1,807	1,807*	Owner request	5 / 15
Institutional				/
Commercial	30	30*	Owner request	5 / 15
Industrial				/
Public Facilities				/
Other				/
<b>TOTALS</b>	<b>1,837</b>	<b>1,837</b>		

\*There are several connections reported by the City as unmetered. However, they are several businesses or residences served by one connection or meter. Therefore, all connections are metered.

<b>Unmetered Systems.</b> Provide an estimate of the cost to install meters and the projected water savings from metering water use. Also indicate any plans to install meters.
There are no unmetered connections. The City recently replaced all meters and added the ability to read them electronically.

**TABLE 10 (B) Water Source Meters**

	Number of Meters	Meter testing schedule (years)	Average age/meter replacement schedule (years)
Water Source (wells/intakes)	2	No schedule	Unknown / No schedule
Treatment Plant	1	No schedule	Unknown / No schedule

2. **Unaccounted Water.** Water audits are intended to identify, quantify, and verify water and revenue losses. The volume of unaccounted-for water should be evaluated each billing cycle. The AWWA recommends a goal of ten percent or less for unaccounted-for water. Water audit procedures are available from the AWWA and MN Rural Water Association.

Frequency of water audits:  each billing cycle  yearly  other: No schedule

Leak detection and survey:  every year  every    years  periodic as needed  
Year last leak detection survey completed: Unknown

**Reducing Unaccounted Water.** List potential sources and efforts being taken to reduce unaccounted water. If unaccounted water exceeds 10% of total withdrawals, include the timeframe for completing work to reduce unaccounted water to 10% or less.

Water meters are checked upon customer request.

3. **Conservation Water Rates.** Plans must include the current rate structure for all customers and provide information on any proposed rate changes. Discuss the basis for current price levels and rates, including cost of service data, and the impact current rates have on conservation.

**Billing Frequency:**  Monthly            Bimonthly            Quarterly  
 Other (describe):

**Volume included in base rate or service charge:** 0 gallons or 0 cubic feet

**Conservation Rate Structures**

- Increasing block rate: rate per unit increases as water use increases  
 Seasonal rate: higher rates in summer to reduce peak demands  
 Service charge or base fee that does not include a water volume

**Conservation Neutral Rate Structure**

- Uniform rate: rate per unit is the same regardless of volume

**Non-conserving Rate Structures**

- Service charge or base fee that includes a large volume of water  
 Declining block rate: rate per unit decreases as water use increases  
 Flat rate: one fee regardless of how much water is used (unmetered)

**Other (describe):**

**Water Rates Evaluated:**  every year    every    years    no schedule

Date of last rate change: 1995 for meters less than 1.5" in size, 2004 for meters greater than 1.5" in size.

Declining block (the more water used, the cheaper the rate) and flat (one fee for an unlimited volume of water) rates should be phased out and replaced with conservation rates. Incorporating a seasonal rate structure and the benefits of a monthly billing cycle should also be considered along with the development of an emergency rate structure that could be quickly implemented to encourage conservation in an emergency.

<p><b>Current Water Rates.</b> Include a copy of the actual rate structure in Attachment or list current water rates including base/service fees and volume charges below.</p>
<p>See Attachment IIIA.</p>

<p><b>Non-conserving Rate Structures.</b> Provide justification for the rate structure and its impact on reducing demands or indicate intentions including the timeframe for adopting a conservation rate structure.</p>

4. **Regulation.** Plans should include regulations for short-term reductions in demand and long-term improvements in water efficiencies. Sample regulations are available from DNR Waters. Copies of adopted regulations or proposed restrictions should be included in Attachment III B of the plan. Indicate any of the items below that are required by local regulations and also indicate if the requirement is applied each year or just in emergencies.

- Time of Day: no watering between 10 am and 7 pm (reduces evaporation)  year around  seasonal  emergency only
- Odd/Even: (helps reduce peak demand)  year around  seasonal  emergency only
- Water waste prohibited (no runoff from irrigation systems)  
Describe ordinance:
- Limitations on turf areas for landscaping (reduces high water use turf areas)  
Describe ordinance:
- Soil preparation (such as 4"-6" of organic soil on new turf areas with sandy soil)  
Describe ordinance:
- Tree ratios (plant one tree for every            square feet to reduce turf evapotranspiration)  
Describe ordinance:
- Prohibit irrigation of medians or areas less than 8 feet wide  
Describe ordinance:
- Permit required to fill swimming pool  every year  emergency only
- Other (describe):

**State and Federal Regulations (mandated)**

- Rainfall sensors on landscape irrigation systems. Minnesota Statute 103G.298 requires "All automatically operated landscape irrigation systems shall have furnished and installed technology that inhibits or interrupts operation of the landscape irrigation system during periods of sufficient moisture. The technology must be adjustable either by the end user or the professional practitioner of landscape irrigation services."
- Water Efficient Plumbing Fixtures. The 1992 Federal Energy Policy Act established manufacturing standards for water efficient plumbing fixtures, including toilets, urinals, faucets, and aerators.

<p><b>Enforcement.</b> Are ordinances enforced? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If yes, indicate how ordinances are enforced along with any penalties for non-compliance.</p> <p>The police department enforces the watering ban, for which the penalty is a \$25 citation. The swimming pool ordinance is enforced by permit. Permits are denied or approved by the City Administration department. A contract building inspector provides enforcement for the City and State building codes.</p>
--

5. **Education and Information Programs.** Customers should be provided information on how to improve water use efficiencies a minimum of two times per year. Information should be provided at appropriate times to address peak demands. Emergency notices and educational materials on how to reduce water use should be available for quick distribution during an emergency. If any of the methods listed in the table below are used to provide water conservation tips, indicate the number of times that information is provided each year and attach a list of education efforts used for the last three years.

Current Education Programs	Times/Year
Billing inserts or tips printed on the actual bill	3
Consumer Confidence Reports	1
Local news papers	
Community news letters	
Direct mailings (water audit/retrofit kits, showerheads, brochures)	
Information at utility and public buildings	
Public Service Announcements	
Cable TV Programs	
Demonstration projects (landscaping or plumbing)	
K-12 Education programs (Project Wet, Drinking Water Institute)	
School presentations	1
Events (children's water festivals, environmental fairs)	
Community education	
Water Week promotions	
Information provided to groups that tour the water treatment plant	
Website (include address: <a href="http://www.centennialutilities.com">www.centennialutilities.com</a> )	Year-round
Targeted efforts (large volume users, users with large increases)	
Notices of ordinances (include tips with notices)	2
Emergency conservation notices (recommended)	2
Other: Conservation Tips available on website	Year-round

List education efforts for the last three years in Attachment III B of the plan. Be sure to

indicate whether educational efforts are on-going and which efforts were initiated as an emergency or drought management effort.

**Proposed Education Programs.** Describe any additional efforts planned to provide conservation information to customers a minimum of twice per year (required if there are no current efforts).

A packet of conservation tips and information can be obtained by contacting DNR Waters or the Minnesota Rural Water Association (MRWA). The American Water Works Association (AWWA) [www.awwa.org](http://www.awwa.org) or [www.waterwiser.org](http://www.waterwiser.org) also has excellent materials on water conservation that are available in a number of formats. You can contact the MRWA 800/367-6792, the AWWA bookstore 800/926-7337 or DNR Waters 651/259-5703 for information regarding educational materials and formats that are available.

- 6. Retrofitting Programs.** Education and incentive programs aimed at replacing inefficient plumbing fixtures and appliances can help reduce per capita water use as well as energy costs. It is recommended that communities develop a long-term plan to retrofit public buildings with water efficient plumbing fixtures and that the benefits of retrofitting be included in public education programs. You may also want to contact local electric or gas suppliers to see if they are interested in developing a showerhead distribution program for customers in your service area.

A study by the AWWA Research Foundation (Residential End Uses of Water, 1999) found that the average indoor water use for a non-conserving home is 69.3 gallons per capita per day (gpcd). The average indoor water use in a conserving home is 45.2 gpcd and most of the decrease in water use is related to water efficient plumbing fixtures and appliances that can reduce water, sewer and energy costs. In Minnesota, certain electric and gas providers are required (Minnesota Statute 216B.241) to fund programs that will conserve energy resources and some utilities have distributed water efficient showerheads to customers to help reduce energy demands required to supply hot water.

**Retrofitting Programs.** Describe any education or incentive programs to encourage the retrofitting of inefficient plumbing fixtures (toilets, showerheads, faucets, and aerators) or appliances (washing machines).

The City is currently working toward educating customers with regards to retrofitting, however due to costs city wide program cannot be implemented at this time.

**Plan Approval.** Water Emergency and Conservation Plans must be approved by the Department of Natural Resources (DNR) every ten years. Please submit plans for approval to the following address:

DNR Waters  
Water Permit Programs Supervisor  
500 Lafayette Road  
St. Paul, MN 55155-4032

or Submit electronically to  
[wateruse@dnr.state.mn.us](mailto:wateruse@dnr.state.mn.us).

**Adoption of Plan.** All DNR plan approvals are contingent on the formal adoption of the plan by the city council or utility board. Please submit a certificate of adoption (example available) or other action adopting the plan.

Metropolitan Area communities are also required to submit these plans to the Metropolitan Council. Please see PART IV. ITEMS FOR METROPOLITAN AREA PUBLIC SUPPLIERS.

**METROPOLITAN COUNCIL**

**PART IV. ITEMS FOR METROPOLITAN AREA PUBLIC SUPPLIERS**

Minnesota Statute 473.859 requires water supply plans to be completed for all local units of government in the seven-county Metropolitan Area as part of the local comprehensive planning process. Much of the required information is contained in Parts I-III of these guidelines. However, the following additional information is necessary to make the water supply plans consistent with the Metropolitan Land Use Planning Act upon which local comprehensive plans are based. Communities should use the information collected in the development of their plans to evaluate whether or not their water supplies are being developed consistent with the Council's Water Resources Management Policy Plan.

<b>Policies.</b> Provide a statement(s) on the principles that will dictate operation of the water supply utility: for example, "It is the policy of the city to provide good quality water at an affordable rate, while assuring this use does not have a long-term negative resource impact."
Centennial Utilities supplies water to residents and businesses in Circle Pines. Centennial Utilities is also responsible for providing good, safe drinking water to its customers.

<b>Impact on the Local Comprehensive Plan.</b> Identify the impact that the adoption of this water supply plan has on the rest of the local comprehensive plan, including implications for future growth of the community, economic impact on the community and changes to the comprehensive plan that might result.
The water supply plan will have no effect on the City's comprehensive plan. The majority of the City is fully developed to current zoning, thus the City's main goal is to monitor redevelopment. Redevelopment presents an opportunity to improve water efficiencies within the residences and the water system. Adopting this plan has little growth effects and will have positive economic implications as it promotes water conservation and extends the life of the City's water system.

**Demand Projections**

Year	Total Community Population	Population Served	Average Day Demand (MGD)	Maximum Day Demand (MGD)	Projected Demand (MGY)
2010	5,072	5,072	0.410	1.53	149.65
2020	5,072	5,072	0.410	1.53	149.65
2030	5,072	5,072	0.410	1.53	149.65
Ultimate	5,072	5,072	0.410	1.53	149.65

Population projections should be consistent with those in the Metropolitan Council's *2030 Regional Development Framework* or the Communities 2008 Comprehensive Plan update. If population served differs from total population, explain in detail why the difference (i.e., service to other communities, not complete service within community etc.).

## PLAN SUBMITTAL AND REVIEW OF THE PLAN

The plan will be reviewed by the Council according to the sequence outlined in Minnesota Statutes 473.175. **Prior to submittal to the Council, the plan must be submitted to adjacent governmental units for a 60-day review period.** Following submittal, the Council determines if the plan is complete for review within 15 days. If incomplete, the Council will notify the community and request the necessary information. When complete the Council will complete its review within 60 days or a mutually agreed upon extension. The community officially adopts the plan after the Council provides its comments.

Plans can be submitted electronically to the Council; however, the review process will not begin until the Council receives a paper copy of the materials. Electronic submissions can be via a CD, 3 ½" floppy disk or to the email address below. Metropolitan communities should submit their plans to:

Reviews Coordinator  
Metropolitan Council  
390 Robert St,  
St. Paul, MN 55101

electronically to:  
[watersupply@metc.state.mn.us](mailto:watersupply@metc.state.mn.us)

**FIGURE IA**  
**National Wetland Inventory**

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*Water Emergency and Conservation Plan  
City of Circle Pines, MN  
WSB Project No. 1015-64*



**ATTACHMENT IA**

**Well Boring and Maintenance Records**

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*Water Emergency and Conservation Plan  
City of Circle Pines, MN  
WSB Project No. 1015-64*

Unique No. 00208995	MINNESOTA DEPARTMENT OF HEALTH <b>WELL AND BORING RECORD</b> Minnesota Statutes Chapter 1031		Update Date 2003/02/19
County Name Anoka			Entry Date 1991/04/15
Township Name 31	Township 23	Range Dir W	Section Subsection 25 BACA
Well Name CIRCLE PINES 2	Well Depth 321 ft.	Depth Completed 321 ft.	Date Well Completed 1959/12/00
Well Owner's Name CIRCLE PINES 2 CENTER RD CIRCLE PINES MN 55014-	Drilling Method Cable Tool	Drilling Fluid	
Contact's Name CITY OF CIRCLE PINES  CIRCLE PINES MN 55014-	Well Hydrofractured? <input type="checkbox"/> Yes <input type="checkbox"/> No	From ft. to ft.	
GEOLOGICAL MATERIAL COLOR HARDNESS FROM TO	Use Community Supply (municipal)	Casing Drive Shoe? <input type="checkbox"/> Yes <input type="checkbox"/> N Hole Diameter	
FINE SAND 0 34	Casing Diameter 12 in. t	Weight(lbs/ft) 301 ft	
SANDY CLAY 34 38	Screen Y	Open Hole From ft. to ft.	
CLAY 38 58	Make EVERDUR	Type	
SAND & GRAVEL 58 97	Diameter Slot Length Set	Fitting	
HARDPAN 97 121	12 15 3 301 ft. to 304 ft		
SAND 121 133	12 35 1 304 ft. to 305 ft		
SANDY CLAY 133 173	12 55 9 305 ft. to 314 ft		
HARDPAN 173 183	12 100 7 314 ft. to 321 ft		
SAND 183 217	Static Water Level 30 ft. from Land surface	Date 1959/12/00	
SAND, GRAVEL, SOME SAN 217 263	PUMPING LEVEL (below land surface)		
SAND & GRAVEL 263 285	58.5 ft. after hrs. pumping 1100 g.p.m.		
FINE SAND 285 300	Well Head Completion		
GRAVEL 300 319	Pitless adapter mfr Model		
HARDPAN 319 321	Casing Protection <input checked="" type="checkbox"/> 12 in. above grade		
	<input type="checkbox"/> At-grade(Environmental Wells and Borings ONLY)		
	Grouting Information Well grouted? <input type="checkbox"/> Yes <input type="checkbox"/> No		
	Nearest Known Source of Contamination		
	ft. direction type		
	Well disinfected upon completion? <input type="checkbox"/> Yes <input type="checkbox"/> No		
	Pump <input type="checkbox"/> Not Installed Date Installed Y		
	Mfr nam		
	Model HP 75 Volts		
	Drop Pipe Length ft. Capacity E+03 g.p.m		
	Type T		
	Any not in use and not sealed well(s) on property? <input type="checkbox"/> Yes <input type="checkbox"/> No		
	Was a variance granted from the MDH for this Well? <input type="checkbox"/> Yes <input type="checkbox"/> No		
USGS Quad Circle Pines	Elevation 909	Well CONTRACTOR CERTIFICATION Lic. Or Reg. No. 62012	

Acquirer: QBAA

Alt ID: 99-0704

License Business Name

Name of Driller

HORRIGAN, D.

---

## Report Copy

---

HE-01205-06 (Rev. 9/96)

Unique No. 00208636		MINNESOTA DEPARTMENT OF HEALTH <b>WELL AND BORING RECORD</b> <i>Minnesota Statutes Chapter 1031</i>			Update Date 2003/02/19	
County Name Anoka					Entry Date 1991/04/15	
Township Name	Township	Range	Dir	Section	Subsection	Well Depth
	31	23	W	25	DBABBB	270 ft.
				Depth Completed	Date Well Completed	
				270 ft.	1967/09/08	
Well Name CIRCLE PINES 3				Drilling Method Cable Tool		
Well Owner's Name CIRCLE PINES 3				Drilling Fluid		
CIRCLE PINES MN 55014-				Well Hydrofractured? <input type="checkbox"/> Yes <input type="checkbox"/> No		
Contact's Name CITY OF CIRCLE PINES				From ft. to ft.		
CIRCLE PINES MN 55014-				Use Community Supply (municipal)		
GEOLOGICAL MATERIAL COLOR HARDNESS FROM TO				Casing Drive Shoe? <input type="checkbox"/> Yes <input type="checkbox"/> N Hole Diameter		
FINE SAND 0 30				Casing Diameter Weight(lbs/ft)		
FINE SAND, GRAY CLAY GRAY 30 41				20 in. t 141 ft		
SANDY CLAY 41 70				16 in. t 181 ft		
FINE SANDY CLAY RED 70 100				Screen N Open Hole From 181 ft. to 270 ft.		
SAND-ROCKS 100 105				Make Type		
COARSE SAND-CLAY-ROCK 105 117				Static Water Level 30 ft. from Land surface Date 1967/09/05		
COARSE SAND-BOULDERS 117 129				PUMPING LEVEL (below land surface)		
LIMESTONE 129 166				ft. after 3 hrs. pumping 1000 g.p.m.		
JORDAN SANDSTONE 166 265				Well Head Completion		
SHALE 265 270				Pitless adapter mfr Model		
				Casing Protection <input checked="" type="checkbox"/> 12 in. above grade		
				<input type="checkbox"/> At-grade(Environmental Wells and Borings ONLY)		
				Grouting Information Well grouted? <input type="checkbox"/> Yes <input type="checkbox"/> No		
				Nearest Known Source of Contamination		
				ft. direction type		
				Well disinfected upon completion? <input type="checkbox"/> Yes <input type="checkbox"/> No		
				Pump <input type="checkbox"/> Not Installed Date Installed Y		
				Mfr nam		
				Model HP Volts		
				Drop Pipe Length ft. Capacity g.p.m		
				Type T		
REMARKS, ELEVATION, SOURCE OF DATA, etc.				Any not in use and not sealed well(s) on property? <input type="checkbox"/> Yes <input type="checkbox"/> No		
M.G.S. NO.449. SAMPLES FROM 0-130 FT. ONLY.				Was a variance granted from the MDH for this Well? <input type="checkbox"/> Yes <input type="checkbox"/> No		
USGS Quad Circle Pines Elevation 913				Well CONTRACTOR CERTIFICATION Lic. Or Reg. No. 27010		
Aquifer: CJSJ Alt Id: 59-0782				License Business Name		
<b>Report Copy</b>				Name of Driller		

HE-01205-06 (Rev. 9/96)

U1-03-2006 13:33  
10-03-206 1:24PM

WSB & ASSOCIATES  
FROM MCCARTHY WELL CO. 9524451950

7635411100 P.02/02  
P. 2



# McCarthy WELL COMPANY



MAIN OFFICE, SHOP, YARD & WAREHOUSE • 590 CITATION DRIVE • SHAKOPEE, MN 55379-1887

*"There is No Substitute for Experience"*

24 HOUR EMERGENCY SERVICE • WELL DRILLING, SEALING & DEVELOPMENT  
LINE SHAFT & SUBMERSIBLE PUMPS FOR ANY APPLICATION

Date: 10/3/2006 Phone: (952) 854-5333 or (888) 854-5333 • Fax: (952) 445-1950

Rich LaVell

City of Circle Pines  
200 Civic Heights Circle  
Circle Pines MN 55014-1755

RE: Recap of last well service on each well.

Here is summary of the last work performed on the wells and pumps.

Well #2 - In May of 2004 our firm removed the pump from the well due to low capacity. We replaced the gear drive, installed new ratchet and pins, installed 50' of new column pipe, furnished new line shaft bearings, packing bushing, bowl bearings and wear rings. The static water level was 39' and on our 9/15/06 pump inspection the static water level was 45'.

Well #3 - In May of 2000 the locked up due to excessive sand pumping. Our firm removed the pump, measured the static water level at 45' and bailed the sand from the well. We replaced some column, shafting and retainers, we replaced the bowl bearings and wear rings, metalized the head shaft and installed a new check valve and gear drive.

Sincerely,

Timothy M. McCarthy - CWD/PI  
McCarthy Well Company

cc: Joe Ward - WSB

---

Your 24 Hour Full Service Well & Pump Company

*Nation's Oldest • Northwest's Largest Water Producers*

TOTAL P.02



# McCarthy Well Company

MAIN OFFICE, SHOP, YARD & WAREHOUSE • 590 CITATION DRIVE • SHAKOPEE, MN 55379-1887



"THERE IS NO SUBSTITUTE FOR EXPERIENCE"

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Phone: (952) 854-5333 or (888) 854-5333 • Fax: (952) 445-1950

## "18 POINT PUMP PERFORMANCE INSPECTION REPORT"

Circle Pines, MN, City of

Date: 9/14/2000

Circle Pines MN

Well/Pump Name: 2

This report is not to be used to determine compliance with any codes, regulations, laws, or rules. Its sole purpose is to attempt to evaluate the operating performance of the well and pump at the time of the inspection. COMPOSITE RATING

1. Check Wiring & Connections- Good  Good  Fair  Poor
2. Check Starter Heater Coils- Good  Good  Fair  Poor
3. Check Voltage Supply- L 1-4 Gas L 2-5 Gas L 3-6 Gas Unbalance -  Good  Fair  Poor
4. Check Voltage Running- L 1-4 Gas L 2-5 Gas L 3-6 Gas Unbalance - Hertz Gas  Good  Fair  Poor
5. Check Motor Amps- Percentage Of Full Load Amp Capacity Unbalance  Good  Fair  Poor
6. Check Resistance Between Line & Ground-L1 - L2 - L3 -  Good  Fair  Poor
7. Check Resistance Between Motor Windings-L1-2 - L2-3 - L1-3 -  Good  Fair  Poor
8. Check Pump & Motor Operating R.P.M.- 1800  Good  Fair  Poor
9. Check Temperature-Motor Good Well Room Good  Good  Fair  Poor
10. Check Bearing Lube-Motor Top Good Bottom Good Pump Prelube Good  Good  Fair  Poor
11. Check Bearing Noise-Motor Good Pump Good Right Angle Drive NA  Good  Fair  Poor
12. Check Vibration-Motor Good Pump Good Right Angle Drive NA  Good  Fair  Poor
13. Check Discharge Head Packing Box Bearing- Good  Good  Fair  Poor
14. Check Discharge Line Check Valve Good Pump Foot Valve Good  Good  Fair  Poor
15. Check Start/Stop Cycle- Good Air Relief/Vacuum Breaker Good  Good  Fair  Poor
16. Check Condition Of Water Sample- Good  Good  Fair  Poor
17. Check Pumping Rate- 630  G.P.M.  C.F.P.M. Is Pump Throttled NO  Good  Fair  Poor
18. Check Water Levels-Static Airline Pumping Airline Yield Good Per Foot Draw Down  Good  Fair  Poor  
Broken Broken

Comments:

This pump appears to be operating properly at this time.

Report By: Mike McCarthy

Your 24 Hour Full Service Well & Company

Nation's Oldest • Northwest's Largest Water Producers

**ATTACHMENT IB**  
**Well Water Level Records**

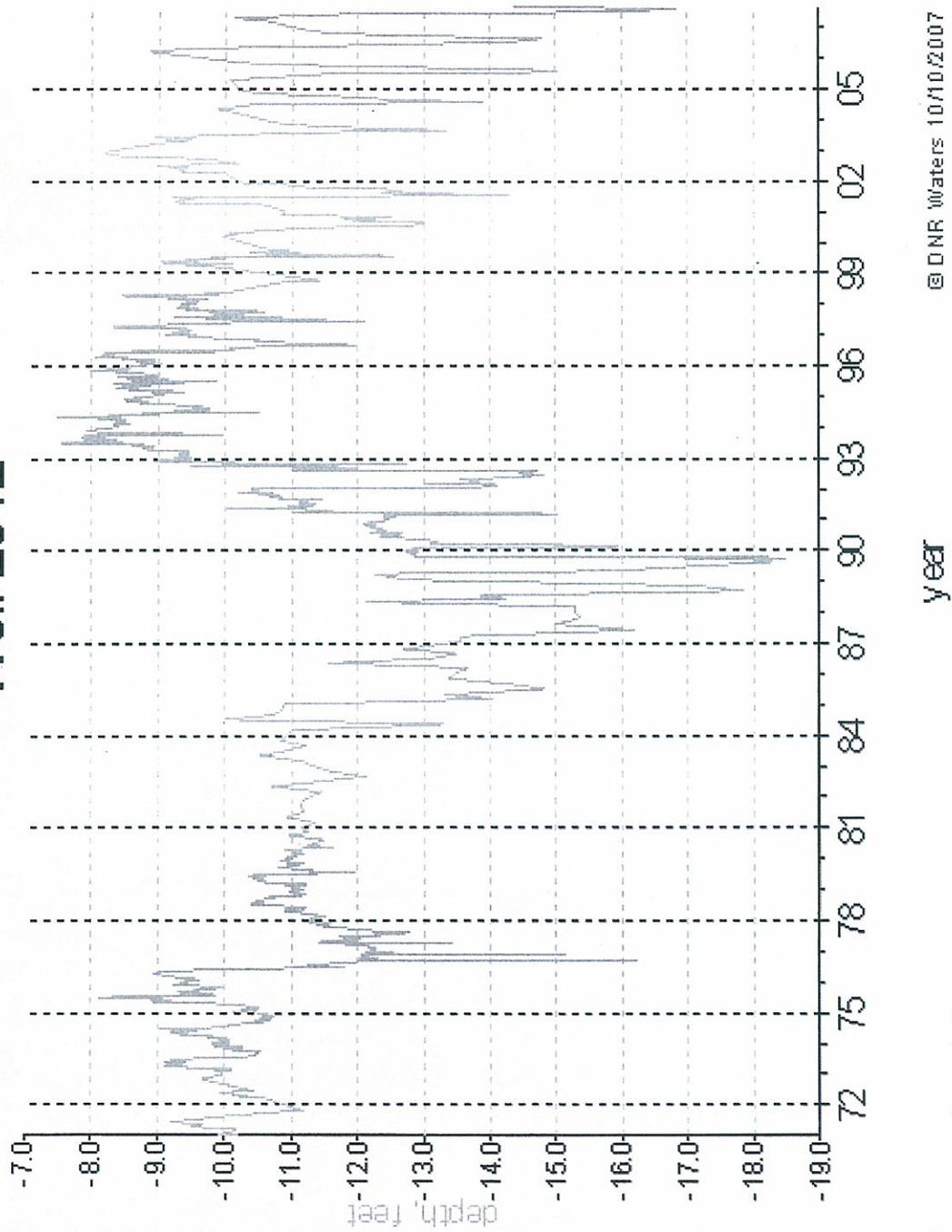
---

*Water Emergency and Conservation Plan  
City of Circle Pines, MN  
WSB Project No. 1015-64*

Water Level-Static (feet)		
Year	Well 2	Well 3
2007	48	Access Blocked
2006	45	Access Blocked
2004	Good	Good
2002	Airline Broken	Good
2001	Good	Good
1999	46	45
1996	50	34
1994	21	38
1993	23	38
1992	35	40
1991	33	38
1990	42	42
1985	27	26
1984	35	30
1982	24	37
1981	35	43
1980	35	30
1979	36	30

Well Water Pumping Levels		
Year	Well 2	Well 3
2007	66	Access Blocked
2006	63	Access Blocked
2004	Good	Good
2002	Airline Broken	Good
2001	Good	Good
1999	64 @ 600 GPM	53 @ 600 GPM
1996		54 @ 750 GPM
1995	57 @ 760 GPM	44 @ 800 GPM
1994	41 @ 800 GPM	45 @ 760 GPM
1993	61 @ 810 GPM	48 @ 830 GPM
1992	60 @ 900 GPM	48 @ 970 GPM
1991	48 @ 880 GPM	45
1990	78 @ 1000 GPM	54 @ 980
1985	59	42
1984	51	54
1982	44 @ 850 GPM	55 @ 990 GPM
1981	55 @ 970 GPM	55 @ 980 GPM
1980	60 @ 1150	45 @ 1030
1979	60 @ 1130	45 @ 980

# Well 2012

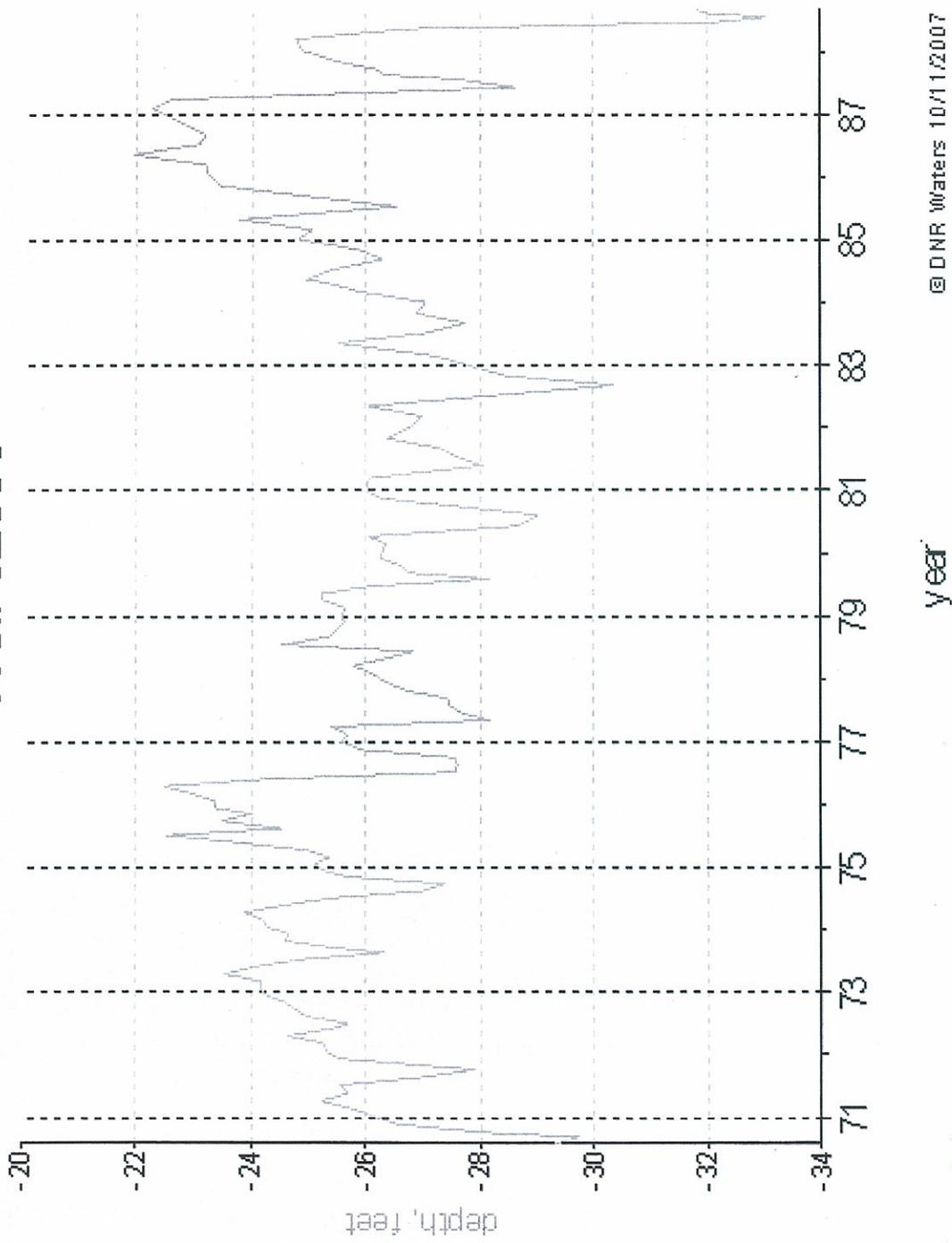


© DNR Waters 10/10/2007

year

Water Emergency and Conservation Plan  
City of Circle Pines, MN  
WSB Project No. 1015-64

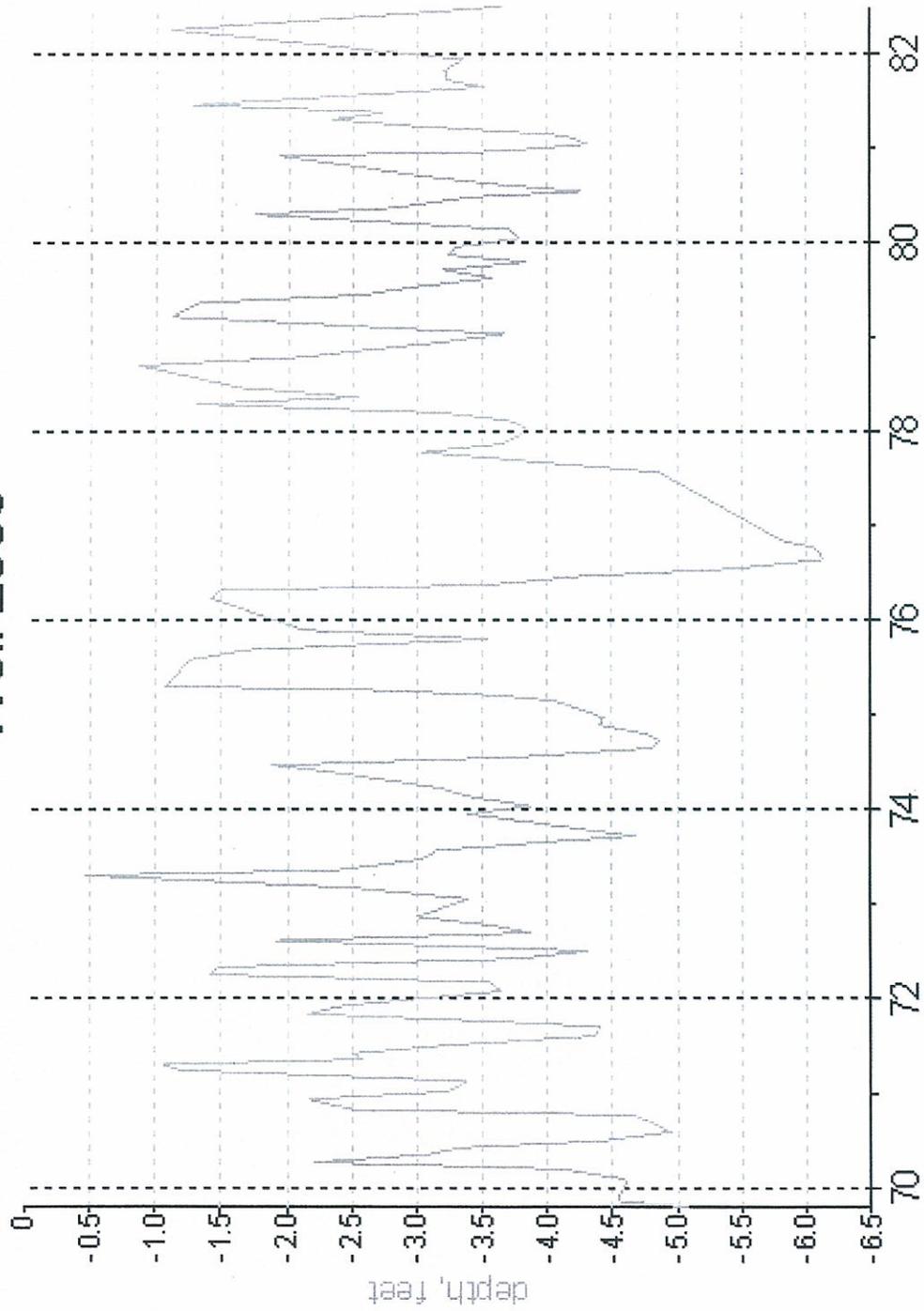
# Well 62006



City of Circle Pines, MN  
MSB Project No. 1015-64

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# Well 2006



© DNR Waters 10/11/2007

year

City of Circle Pines, MN  
WSB Project No. 1015-64

**ATTACHMENT IIIA**

**Water Utility Rates**

**Centennial Utilities  
Rate & Fee Schedule**

**Water Rates and Fees**

<b>Residential Meter Size</b>	<b>Monthly Flat Rate</b>	<b>Effective Date</b>	<b>Volume Rate</b>	<b>Effective Date</b>
Less than 1.5"	\$6.50	1/1/95	1.27/1,000 Gallons	1/1/06
1.5 Meter	\$7.50	4/1/04	1.27/1,000 Gallons	1/1/06
2" Meter	\$11.50	4/1/04	1.27/1,000 Gallons	1/1/06
3" Meter	\$12.00	4/1/04	1.27/1,000 Gallons	1/1/06
4" Meter	\$16.00	4/1/04	1.27/1,000 Gallons	1/1/06
6" Meter	\$19.50	4/1/04	1.27/1,000 Gallons	1/1/06

Commercial Bulk Water Sales	\$200 deposit +\$25 per month fee+ 1.27/1000 Gallons
Water Reconnection Fee	\$40
Non-reading or Late Reading Fee	\$9.00 Effective 07/01/06
Water Access Charge	\$1750 per residential equivalency (REC)
Water Access Charge-Filtration Plant	\$1000 per residential equivalency (REC)
New Residential Water Connection Charge	\$80 + .50 surcharge +WAC
New Commercial Water Connection Charge	\$80 + .50 surcharge +WAC
Connection to Residential Repair	\$80 + .50 surcharge +WAC
Connection to Commercial Repair	\$80 + .50 surcharge +WAC

**ATTACHMENT IIIB**

**Adopted Regulations and Ordinances**

610.20 Additional Connection Charge. Any person that does not connect to the municipal sanitary sewer system within 12 months after said sanitary sewer service is deemed available by action of the Utilities Commission, may be required to pay, in addition to all other charges enumerated above or by resolution of the Utilities Commission, the service connection charge imposed on the City by the Metropolitan Waste Control Commission, plus any additional charges set by the Utilities Commission.

SECTION 615 - REGULATING THE OPERATION OF PUBLIC WATER  
DURING SHORTAGES

Section 615.01 Lawn Sprinkling Restrictions. The use of the municipal water system for lawn sprinkling and/or gardens shall be regulated as provided in this section. The sprinkling of laws will be restricted to odd/even each year from June 1 through August 30. All properties with addresses that end with an odd number may be sprinkled only on odd numbered days, and properties with addresses that end with an even number may be sprinkled only on even numbered days. This section applies only to those individuals drawing water for sprinkling from city supply. The City Administrator may impose hourly sprinkling restriction to conserve water as necessary.

615.02 Additional Restrictions. In the case of a severe shortage the City Administrator, subject to review of the Utilities Commission, is authorized to impose additional restrictions to provide for the safe operation of the municipal water supply.

615.03 Violation. No person shall cause water to be used in violation of the provisions of this Section.

SECTION 620 - SEWERS AND DRAINS

620.01 Definitions. Unless the context otherwise indicates, the following terms have the meanings stated:

Subd. 1 Sewage Works. All facilities for collecting, pumping, treating and disposing of sewage.

Subd. 2 Filling of Swimming Pools. Filling of swimming pools directly from fire hydrants, or other similar municipal water outlets, shall require appropriate City permit.

1335.06 Variance. Any person seeking a variance from the standards and requirements of this Section may apply for a variance in accordance with the procedures specified in Subsection 1310.03 of this Chapter, except that the written material provided in support of the variance application shall be the plans and specifications required for a swimming pool building permit required under this Section.

Subd. 6 Electrical and Utility installations. All wiring, installation of heating units, grading, installation of pipes, and all other installations and constructions relating to a swimming pool shall be subject to inspection by the appropriate City inspectors.

**1335.04 Fencing and Lighting.**

Subd. 1 Fencing. All outdoor swimming pools existing and hereafter constructed, altered or reconstructed shall be completely enclosed by a non-climbable fence or barrier. All fence openings or points of entry into the pool area enclosure shall be equipped with gates. The fence and gates shall be at least five (5) in height but no more than six (6) in height and shall be constructed of materials approved by the building inspector. All pools shall be provided with safeguards to prevent children from gaining uncontrolled access thereto. All gates shall be equipped with self-closing and self-latching devices placed on the top of the gate or otherwise inaccessible to small children. All fence posts shall be decay or corrosion-resistant and shall be set in concrete bases, or other suitable protection. No more than four (4) inches of space shall be permitted between the bottom of the fence or barrier and the ground or other surface.

Subd. 2 Lighting. Lighting for the swimming pool shall be directed into or onto the pool and not onto adjacent property. Swimming pool lighting shall measure no more than one (1) foot candle power at any point on the boundary line of any adjacent property.

**1335.05 Use of Pools.**

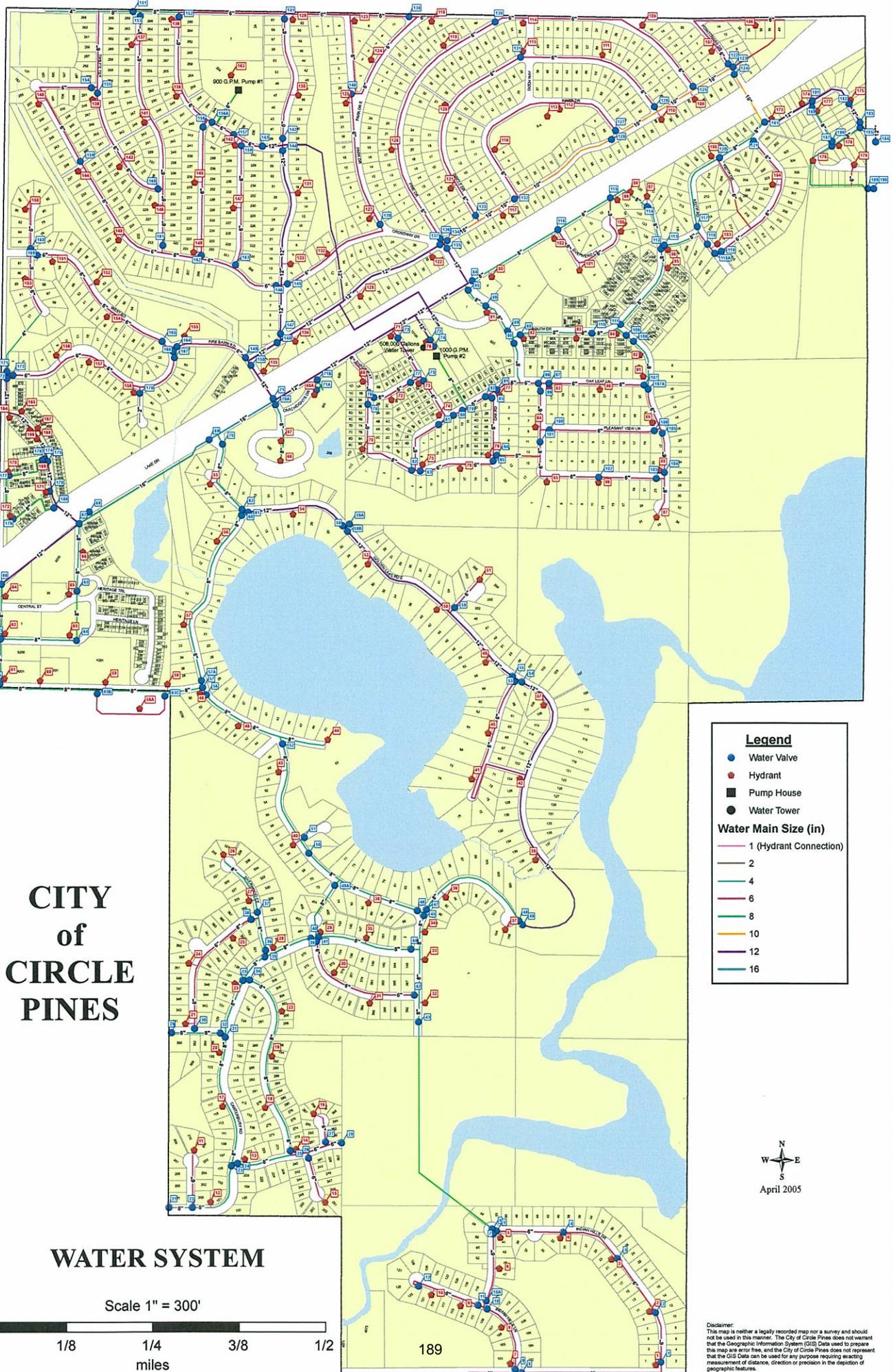
Subd. 1 Nuisances Prohibited. A swimming pool shall not be located, designed, operated or maintained so as to unduly interfere with the property rights of others. It shall be unlawful for any person to make, continue or cause to be made or continued at any swimming pool, any loud or unusual noise, or any noise which annoys, disturbs, injures or endangers the comfort, repose, peace or safety of others. The use, or permitting the use of, or the operation of radio receiving sets, musical instruments, phonographs or other machines or devices for the production or reproduction of sound in such manner or volume as to disturb the peace, quiet and comfort of the public shall be unlawful.

**ATTACHMENT IIIC**

**Past Education Efforts**

#### Past Years Education Efforts

1. On-going - Water saving conservation tips available on website
2. 04-06-06 - "Tricia and the Toonies" presentation to Golden Lake Elementary School
3. On-going - Monthly Utility Newsletter – during summer months typically contains information regarding water conservation tips, ordinances, emergency conservation notices, and annual consumer confidence report



# CITY of CIRCLE PINES

## WATER SYSTEM

Scale 1" = 300'



**Legend**

- Water Valve
- Hydrant
- Pump House
- Water Tower

**Water Main Size (in)**

- 1 (Hydrant Connection)
- 2
- 4
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April 2005

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