Water Emergency and Conservation Plan

Bloomington, Minnesota

Introduction

The **Water Emergency and Conservation Plan for Bloomington, Minnesota**, was prepared to comply with Minnesota State Statutes 103G.291, Subd. 3, which requires all municipal suppliers serving more than 1,000 customers to have a plan approved by the Department of Natural Resources (DNR) before January 1996. The original plan was submitted in October 1995 and revised in November 1997. This is a plan update, which is required every ten years.

A Water Supply Plan is also a required element of the Metro Area Community Local Comprehensive Plans. The Water Supply Plan should be submitted to the Metropolitan Council at the same time the Water Emergency and Conservation Plan is submitted to the DNR. If forecasts change before submitting the complete 2008 Comprehensive Plan, an amended Water Supply Plan will need to be included at that time.

The **Water Emergency and Conservation Plan** and **Metropolitan Council Water Supply Plan for Bloomington, Minnesota**, were organized as directed using the provided template. This entire plan is 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.

Abbreviations

Several abbreviations and acronyms are used throughout this document. A listing of these abbreviations and acronyms follows.

DNR .....Minnesota Department of Natural Resources
EU .....Equivalent Unit
GPCD.....Gallons Per Capita Per Day
GPED .....Gallons Per Employee Day
GPD.....Gallons Per Day
GPM.....Gallons Per Minute
ICI .....Industrial/Commercial/Institutional
MG .....Million Gallons
MGD .....Million Gallons Per Day
MGY .....Million Gallons Per Year
PDCJ .....Prairie du Chien-Jordan
PSI.....Pounds Per Square Inch

PART I. WATER SUPPLY SYSTEM DESCRIPTION AND EVALUATION

This section contains detailed information on Bloomington's existing water supply system. This information is used to evaluate the ability of the system to meet current and future demands. This information is also used to aid in the development of the emergency and conservation plans.

GENERAL INFORMATION

DNR Water Appropriation Permit Number(s)	731429
Name of Water Supplier	City of Bloomington
Address	1800 West Old Shakopee Rd.
Contact Person	Robert Cockriel
Title	Utility Superintendent
Phone Number	952-563-8774
E-Mail Address	rcockriel@ci.bloomington.mn.us

A. ANALYSIS OF WATER DEMAND.

Historic Water Demand
See Table 1 for the past 10 years' water demand. The table categories are similar to those suggested in the template.

Water Use Trends
Variations in the water usage are typical of systems in this geographic area. Residential customer water demands during the winter are quite consistent and predicable, but summer demands can be quite variable. The reason for the variability during the summer is that a large portion of the summer consumption involves outdoor uses which are greatly influenced by weather conditions; *the hotter and dryer the weather, the more water use is experienced*. More specific to Bloomington is the large hospitality industry and employment base, and its ability to create huge and variable demands. For example, in the wake of September 11, consumer travel stopped, the hospitality industry (hotels, Mall of America, airport, retail stores) experienced record low attendance, industry scaled back production because products could not be transported, and water consumption to hit an un-anticipated low. *Do not underestimate the impact (both positive and negative) of significant events.* Growth in population and service connections were relatively flat over the ten-year period, but the per capita water use (both residential and total) seems to be slowly declining. Again, the variability seen is greatly influenced by weather conditions. Historical records show Bloomington's low percentage of unaccounted for water. The vast majority of the unaccounted for water is a result of authorized use by the treatment plant, various Public Works operations, and documented users.

TABLE 1 Historic Water Demand

Year	Total Population	Population Served	Total Connections	Residential Water Sold (MG)	ICI Water Sold (MG)	Wholesale Deliveries (MG)	Total Water Sold (MG)	Total Water Pumped (MG)	Percent Unmetered/ Unaccounted	Average Demand (MGD)	Maximum Demand (MGD)	Residential GPCD	Total GPCD
1996	88700	88700	25033	2966.4	1584.7	0	4551.1	2940.2	0.4%	12.5	28.2	91.6	140.6
1997	88080	88080	25123	2685.6	1615.0	0	4300.6	2843.9	1.4%	11.8	29.6	83.5	133.8
1998	88375	88375	25202	2664.3	1637.6	0	4301.9	2618.1	3.3%	11.8	25.9	82.6	133.4
1999	88538	88538	25245	2577.3	1458.2	0	4035.5	2766.9	4.5%	11.1	27.7	79.8	124.9
2000	88545	88545	25454	2869.2	1669.0	0	4538.2	2018.2	5.0%	12.4	23.5	88.8	140.4
2001	85172	85172	25549	2939.7	1645.7	0	4585.4	1374.1	0.1%	12.6	32.3	94.6	147.5
2002	85172	85172	25555	2550.5	1572.0	0	4122.5	2509.6	5.0%	11.3	24.6	82.0	132.6
2003	85400	85400	25615	3420.7	1631.0	0	5051.7	3789.0	0.1%	13.8	32.6	109.7	162.1
2004	85172	85172	25656	2734.6	1565.1	0	4299.7	3631.0	6.6%	11.8	24.5	88.0	138.3
2005	85442	85442	25221	2554.7	1640.4	0	4195.1	3515.9	7.5%	11.5	31.5	81.9	134.5

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.

TABLE 2 Large Volume Users

Customer	Gallons per year	% of total annual use
Mall of America	139,101,000	3.3%
Cypress Semiconductor	58,923,000	1.4%
Seagate – Nord Ave. facility	52,832,000	1.3%
Seagate – W. 77th facility	50,310,000	1.2%
Sheraton Bloomington Hotel	36,905,000	0.9%
Marriott Hotel	24,250,000	0.6%
Thunderbird Hotel	24,220,000	0.6%
Seagate – Computer Ave. facility	20,319,000	0.5%
L'Hotel Sofitel	20,240,000	0.5%
Georgetown Park	19,331,000	0.5%

Guidelines for Developing Public Water Supply Emergency and Conservation Plans define large volume customers as users that consumed more than five percent of the total production. No customers have met this criteria. The largest volume customer for Bloomington is the Mall of America (not including the anchor stores). The preceding table identifies the then largest water consumption customers in Bloomington during 2005.

B. TREATMENT AND STORAGE CAPACITY

TABLE 3(A) Water Treatment

Water Treatment Plant Capacity	14 MGD

Water Treatment Process *including solids management*.
Bloomington's treatment process is conventional lime softening through a contact solids basin (mixing, flocculation, and sedimentation), recarbination, chlorination, filtration, fluoridation, and ammonia addition for a chloramine disinfectant residual in the distribution system. The solids generated, approximately seven cubic yards per million gallons treated, are gravity concentrated and land applied as a certified agricultural liming product through the Minnesota Department of Agriculture (MDA).

TABLE 3(B) Storage Capacity

Total Storage Capacity		**Average Day Demand** (average of last 5 years)
30 MG		12.2 MGD
Type of Structure	Number of Structures	Total Gallons
Elevated Storage	3	6 MG
Ground Storage	4	24 MG

The storage capacity available has historically been and continues to be adequate to meet the maximum hour demand. The maximum hour demand is defined as the greatest demand anticipated for the water system over a period of a few hours.

C. WATER SOURCES.

The Bloomington public water supply consists of two separate sources, a groundwater source and a surface water source. The groundwater source is provided by six water wells pumping directly to a lime softening treatment plant located within the city of Bloomington. The Bloomington plant is run 24 hours a day, producing a consistently high quality product with a variation in output depending on the time of year. The surface water portion of the supply, purchased wholesale from the City of Minneapolis, is also lime-softened water. The Minneapolis portion of the supply is stored in two 10-million gallon reservoirs located at 82nd and Penn in Bloomington. The water is pumped from the 20 MG "82nd Street Reservoir" into the Bloomington distribution system based upon system demand. The reservoir is used primarily as a peaking facility.

The water in the distribution system is a blend of these two finished potable waters. The yearly average of Bloomington treated water versus the Minneapolis purchased water is 75% to 25%. Both supplies are stored and pumped from separate, isolated reservoirs into the distribution system based upon demand.

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

Total Capacity of Sources	43,700 GPM or 62.9 MGD
Firm Capacity (largest pump out of service)	36,300 GPM or 52.3 MGD

The water treated at the Bloomington Water Treatment Plant is pumped into the distribution system using four high service pumps located at the plant. The capacity of the pumps is 18.0 MGD and the firm capacity is 12.2 MGD.

The water purchased from Minneapolis is pumped from the 82nd Street Reservoir Pumping Station into the Bloomington distribution system based on system demand. The 82nd Street Pumping Station has five high service pumps with a capacity of 44.9 MGD and a firm capacity of 34.3 MGD.

Combined, the system capacity is 62.9 MGD with a firm capacity of 52.3 MGD.

Bloomington does have the ability to float on the City of Minneapolis water system, via gravity feed, using two bypasses. The bypass operation does not require any pumps within the City of Bloomington. The *estimated capacity* of the two lines is 30,000 GPM.

TABLE 4(B) Groundwater Sources

Well # or name	Unique Well Number	Year Installed	Well & Casing Depth (ft)	Well Diameter (in)	Capacity (GPM)	Geologic Unit	Status
1	222910	1973	345 / 440	34x20	2100	PDCJ	Active Use
2	222911	1973	315 / 390	30x24	2100	PDCJ	Active Use
3	222912	1974	450 / 953	30x24x20x16	2100	Hinckley	Active Use
4	133389	1978	282 / 376	30x24	2100	PDCJ	Active Use
5	603079	2001	307 / 405	30x24x18	2100	PDCJ	Active Use
6	603080	2001	298 / 399	30x24x18	2100	PDCJ	Active Use

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

All wells, except number three, obtain water from the Prairie du Chien-Jordan aquifer. Well number three obtains water from the Hinckley aquifer. The capacity of the wells is 18.1 MGD. The firm capacity of the wells is 15.1 MGD, which is slightly higher than the designed treatment plant capacity of 14 MGD. All wells are actively used. Treatment plant staff operates all the wells and rotates the use to balance run time hours on an annual basis.

TABLE 4(C) Surface Water Sources

This table does not apply to the Bloomington report.

TABLE 4(D) Wholesale or Retail Interconnections

Water Supply System	Capacity (GPM/MGD)	Wholesale or retail
City of Minneapolis	30 MGD	Retail

Bloomington is considered one of the Minneapolis consecutive systems. Two supply lines run down Oliver and Knox Avenues from 60th Street in Minneapolis, through Richfield, to the 82nd Street Reservoirs. The current contract with the City of Minneapolis allows for a maximum purchase of 30 MGD to be delivered through the 36-inch and 42-inch supply lines feeding the 82nd Street Reservoir. The bypasses are exercised monthly to maintain their operability, but are designed primarily for emergency diversion of water around the reservoir/pumping station and directly into the Bloomington distribution system.

In 1984, a capacity test was conducted on these two transmission lines supplying water from Minneapolis to Bloomington. The Minneapolis maximum supply capability was determined to be 31.2 MGD.

TABLE 4(E) Emergency Interconnections

Water Supply System	Capacity (GPM/MGD)	Note any limitations on use
City of Edina	12000 GPM	Connection location and water quality differences may severely limit system performance.

There are two 8-inch connections between Bloomington and Edina's distribution systems. The connections were provided to improve service along a uniquely situated commercial area between the two communities. If the connections were ever used for emergency purposes, the performance of Bloomington's distribution system would be very low, based on the connection locations, system pressures, and water quality differences between the two communities.

Distribution system interconnection with other cities or private wells do not exist and are not being considered at this time.

D. DEMAND PROJECTIONS.

TABLE 5 Ten Year Demand Projections

Year	Population Served	Average Day Demand (MGD)	Maximum Day Demand (MGD)	Projected Demand (MGY)
2007	86894	13.3	36.2	4840
2008	87140	13.4	36.4	4876
2009	87386	13.5	36.6	4911
2010	87632	13.6	36.8	4947
2011	87919	13.6	36.9	4964
2012	88206	13.6	37.0	4980
2013	88493	13.7	37.1	4996
2014	88780	13.7	37.2	5013
2015	89067	13.8	37.4	5029
2016	89354	13.8	37.5	5046
2020	90503	13.9	37.6	5062
2030	93000	14.3	38.6	5226

Projection Methods
The water demand projections were based on the 1998 Black & Veatch Water Supply Master Plan data (using a residential use of 90 GPCD and an employee use of 45 GPED). The methodology used was linear extrapolations projection data. The population projection methodology on the 2010 and 2020 forecasts was based on assumptions of future growth in residential units based on available land and redevelopment trends; future people per household by type of unit; and future vacancy rates. The methodology on 2030 Met Council forecasts is summarized online at

http://www.metrocouncil.org/metroarea/ForecastMethodology.htm. The methodology used on the 2006 to 2016 yearly forecasts were linear extrapolations of the 2000, 2010 and 2020 forecasts.

The population forecasts were prepared in the late 1990's for use in the 2000 Comprehensive Plan Update. They are outdated and currently in the process of being updated based on new information.

E. RESOURCE SUSTAINABILITY

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

TABLE 6 Monitoring Wells

Unique well number	Type of well (production, observation)	Frequency of Measurement (daily, monthly etc.)	Method of Measurement (steel tape, SCADA etc.)
222910	Production	monthly	SCADA
222911	Production	monthly	SCADA
222912	Production	monthly	SCADA
133389	Production	monthly	SCADA
603079	Production	monthly	SCADA
603080	Production	monthly	SCADA

Records of water levels for each of Bloomington's production wells is maintained by the Utility.

The DNR Waters Division, in conjunction with federal and local units of government, maintains and measures approximately 750 observation wells around the state. Ground water level data are available online at www.dnr.state.mn.us/waters or by contacting the Ground Water Level Monitoring Manager, DNR Waters, 500 Lafayette Road, St. Paul, MN 55155-4032, or calling (651) 259-5700.

Water Level Data.
The following is a trend graph of dynamic water levels for each of Bloomington's six wells since their origination. Although the average level varies from year to year, continued pumping does not appear to be causing a reduction in the aquifer level.

Natural Resource Impacts
There are no known natural resource features that are or could be influenced by water withdrawals from our municipal production wells.

Sustainability
Groundwater modeling, both steady state and time-varying conditions, was performed as part of the 1998 Black & Veatch Water Supply Master Plan. The model utilized data from the Metropolitan Ground Water Modeling Project at the MPCA, high capacity and observation well data for Hennepin, Scott, and Dakota Counties from the Department of Natural Resources, and results from the Bloomington Well Head Protection modeling performed by Barr Engineering. The model did not indicate any negative impact on aquifer sustainability. A recent groundwater study indicated that excess aquifer capacity is discharged into the Minnesota River.

Source Water Protection Plans

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 Plan (WHP) and Surface Water Protection Plan (SWP).

Date WHP Plan Adopted:	April 2004
Date for Next WHP Update:	April 2014
SWP Plan:	☐ In Process ☐ Completed ☒ Not Applicable

F. CAPITAL IMPROVEMENT PLAN (CIP)

Adequacy of Water Supply System
The current water supply installations, treatment facilities, and distribution system are adequate to sustain the current and projected water demands.

Proposed Water Sources
No new production wells are planned in the current CIP.

Water Source Alternatives
No new water sources are being proposed.

Preventative Maintenance
Due to the infrastructure age, current preventative maintenance programs, and recent capital improvements to water treatment plants, pumping stations, SCADA, and distribution transmission mains, no areas have been identified as “prone to fail” and, hence, no capital improvements are planned.

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 this emergency plan is to establish proper emergency response procedures for implementation in the event of a water-related emergency. This plan contains essential information for reference and will be incorporated into the City of Bloomington's overall emergency response plan.

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.

Bloomington has prepared and completed the plan, and received certification as noted below.

Community water suppliers, like Bloomington, 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.

Emergency Response Plan	Contact Person	Contact Number
Emergency Response Lead	Gregg Randahl	952-563-4909
Alternate Emergency Response Lead	Robert Cockriel	952-563-8774
Emergency Response Plan Certification Date	June 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. Bloomington has such an operational contingency plan at the Utility Division offices.

A. Emergency Telephone List

The emergency telephone list and emergency contact responsibilities are outlined and included in the City's overall emergency plan. Because this plan is a public document, personnel contact information will not be included.

B. Current Water Sources and Service Area

Quick access to concise and detailed information on water sources, water treatment, and the distribution system in addition to detailed maps of the system showing the treatment plants, water sources, storage facilities, supply lines, interconnections, and other information is useful in an emergency. These records and maps exist and staff can access the documents in the event of an emergency at the Utility Division offices.

C. Procedure for Augmenting Water Supplies

See Part 1, Section C, Water Sources, for information regarding augmenting water supplies.

Interconnections with adjacent distribution systems can be used for emergency and auxiliary water supply. However, consideration must be given to water quality and pressure differences between distribution systems when evaluating potential interconnections. Consideration must also be given to the levels of raw water treatment provided by the adjacent communities. This is particularly important between two well supplies where one is softened and the other is not. The blend of these two waters would result in a chemical precipitation reaction that could eventually lead to severe occlusion of the distribution piping. In order for Bloomington to stay in compliance with the EPA Lead and Copper Rule, Bloomington must meet the water quality parameter as outlined in the Bloomington Optimal Corrosion Control Treatment Desk-Top Evaluation. Mixing of non-treated water with our softened water would make these quality parameters unattainable and, hence, place Bloomington in violation of the SDWA. It is also worth noting that a mixing of these different water types would also affect water sensitive industrial users, such as computer component manufacturers.

D. Allocation and Demand Reduction Procedures

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)

First Priority. Domestic water supply, excluding industrial and commercial uses of municipal water supply, and use for power production that meets contingency requirements.

> *NOTE:* 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.

Second Priority. Water uses involving consumption of less than 10,000 gallons per day.

Third Priority. Agricultural irrigation and processing of agricultural products.

Fourth Priority. Power production in excess of the use provided for in the contingency plan under first priority.

Fifth Priority. Uses, other than agricultural irrigation, processing of agricultural products, and power production.

Sixth Priority. 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.

A staged response to emergency conditions will be implemented based on the appropriate trigger conditions. The requested customer response will be in proportion to the existing or predicted emergency condition and as dictated by state statute. Table 8 lists the priority ranking, average day demand, and demand reduction potential for each customer category.

Mild Condition Measures

1. Inform the public through the media that a trigger condition has been reached and users should reduce consumption.
2. Inform public of the implementation of odd/even sprinkling restrictions, where odd-numbered addresses are permitted to water on odd-numbered days, and even-numbered addresses are permitted to water on even-numbered days. A warning or fine issuance is implemented as an enforcement mechanism.
3. Issue warnings/fines for runoff due to over-watering and for watering paved surfaces.

Moderate Condition Measures

1. Inform public of increasing severity of conditions and request users to continue to reduce consumption.
2. Continue odd/even sprinkling ban and restrict all sprinkling between noon and six p.m.
3. Prohibit ornamental uses.
4. Request industrial and commercial customers to modify processes where possible, and increase recycling.

Severe Condition Measures

1. Request consumers to continue to reduce consumption.
2. Prohibit all outdoor water uses.
3. Prohibit all water uses involving consumption in excess of 10,000 gallons per day.
4. Require industrial and commercial water users to stop operations and conserve available water for essential health and safety issues.

Table 8 Water Use Priorities

Customer Category	Allocation Priority	Average Day Demand (GPD)	Demand Reduction Potential (GPD) *
Residential	1 and 5	8,000,000	6,500,000
Services using less than 10,000 GPD	2		
Institutional, Commercial, and Industrial	1 and 5	5,100,000	2,000,000
Non-essential	6	Anything in excess of 13.1 MGD	
	TOTALS	13,100,000	8,500,000

** Demand Reduction Potential is the demand experienced after implementing reduction procedures.*

Notification Procedures

Past announcements of water restrictions have been successfully disseminated to the public via the City website, Bloomington Sun, a weekly publication, WCCO radio, and local cable television. These three media sources will continue to be used for future communication to the general public. The Director of Public Works, at the direction of the City Manager, will be responsible for implementation of the appropriate demand reduction measures. The measures previously discussed will be implemented in the order presented as demands approach the supply capacity of the water system allowing for adequate fire protection at all times. Enforcement of the restrictions is the key to demand reduction.

Triggers for Allocation and Demand Reduction Actions

The below triggers are intended as guidelines for use in imposing the emergency demand reduction measures.

- ☒ Water Demand
- ☒ Treatment Capacity
- ☒ Storage Capacity
- ☒ Groundwater Levels
- ☒ Pump, Booster Station or Well Out of Service
- ☒ Governor's Executive Order – Critical Water Deficiency (required by statute)
- ☒ Water Main Break
- ☒ Loss of Production
- ☒ Security Breach
- ☒ Contamination

The experience and judgment of the Bloomington staff must also be considered since there are numerous significant trends, such as storage levels versus time of day, weather forecasts, and the impact of weekends and holidays on demands, that are best interpreted on a continuous basis by the operating personnel. Remember, the potential for water availability problems during the onset of a drought are almost impossible to predict.

The Governor's Task Force, which is directed by the DNR and is comprised of various agencies in addition to several public water power suppliers, has established a program to monitor surface water availability. Surface water conditions may be used as an indicator of potential ground-water conditions since a portion of some aquifers' recharge is derived from surface water. Other aquifers (such as the Prairie du Chien-Jordan aquifer) bleed into surface water through cracks in the confining layers, as evidenced in the southern boundary of Bloomington where it borders the Minnesota River. The Task Force should be consulted during drought conditions to obtain information that may be useful in predicting potential declining groundwater levels.

Each of the listed triggers is intended to result in the implementation of emergency demand reduction procedures. In addition to meeting any of the following trigger conditions, Bloomington with initiate the same outdoor water use restrictions imposed by the Minneapolis City Engineer as authorized by the Minneapolis City Council.

Mild Condition Triggers

Situation: Water demands for each of the previous three consecutive days are greater than 90 percent of the total water supply capacity of the system (44 MGD), in addition to all of the following:

a) less than one-half inch of precipitation over the previous seven days
b) maximum air temperatures of approximately 80 degrees or higher
c) continued dry and warm weather forecast

Moderate Condition Triggers

Situation: Mild condition demand reduction measures have been implemented, but demands have not been sufficiently reduced. Water demands approaching the system capacity, in addition to all of the following:

a) less than one-half inch of precipitation over the previous seven days
b) maximum air temperatures of approximately 80 degrees or higher
c) continued dry and warm weather forecast
d) finished water storage reservoir water levels drop to less than 50 percent of capacity (30 MG divided by two or 15 MG) on three consecutive days. However, adequate treated water pumping capacity is still available to refill storage.
e) firm capacity of the well field has declined to approximately the plant design capacity.
f) Governor's Drought Task Force indicates that surface water levels are approaching critically low levels and the Task Force member utilities have implemented drought response procedures.

Severe Condition Triggers

Situation: Moderate condition demand reduction measures have been implemented but demands have not been sufficiently reduced. Water demands greater than the system supply capacity, in addition to all of the following:

a.) less than one-half inch of precipitation over the previous seven days
b.) maximum air temperatures of approximately 80 degrees or higher
c.) continued dry and warm weather forecast
d.) finished water storage reservoir water levels drop to less than 50 percent of capacity on three consecutive days. Adequate treated water pumping capacity is not available to refill storage.
e.) Governor declares by executive order that there is a critical water deficiency (M.S. 103G.291).

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.

E. Enforcement

A public information program to inform customers of emergency conditions, stressing the importance of compliance with the restrictions, will be implemented concurrently with the trigger condition. It is anticipated that enforcement of water restrictions will be rare; however, having enforcement mechanisms in place will allow for a timely response. The City will continue the $25 per violation surcharge which is assessed against the property and added to a customer's bill, associated with the odd/even sprinkling program. A warning would be issued prior to imposing the fine. The service will be shut off and a reconnection fee established pursuant to Section 11.02(c) of the City code, which would be imposed after three violations in a season. This program would be maintained and enforced as necessary based on the severity of the water shortage. The Utilities Division, with the assistance of other City departments during an emergency, would be charged with the enforcement of the program.

F. Authority to Implement Water Emergency Responses

Bloomington's City Manager has the authority to implement emergency water responses.

PART III. WATER CONSERVATION PLAN

The purpose of this section is to update the water conservation plan for Bloomington. This section evaluates the conservation potential of the Bloomington service area and presents a recommended plan for a water conservation program. The role of water conservation in terms of water resource planning is reviewed, conservation potential is evaluated for each major class of customer, specific potential conservation program activities are evaluated, and a recommended plan is presented.

A. Conservation Goals

The following section establishes goals for various measures of water demand.

Unaccounted Water (calculate five-year averages with data from Table 1)	
Average annual volume unaccounted water for the last 5 years	126,499,000 gallons
Average percent unaccounted water for the last 5 years	3.9 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%.	
Bloomington is below the recommended goal.	

Residential Gallons Per Capita Demand (GPCD)	
Average residential GPCD use for the last 5 years (use data from Table 1)	91.2 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.	
In 2002 Bloomington's average residential GPCD was 82; very close to the stated average. Bloomington will continue public education on wise water use and stress the importance of conservation.	

Total Per Capita Demand
The per capita demand trend is flat to slightly declining. Bloomington will continue public education on wise water use and stress the importance of conservation.

Peak Demands (calculate average ratio for last five years using data from Table 1)	
Average maximum day to average day ratio	2.3
If peak demands exceed a ratio of 2.6, describe the goals for lowering peak demands.	
Bloomington is below the recommended goal.	

The City of Bloomington's conservation goal is to supply an adequate amount of potable water to meet the normal demands of the customers and allow for system growth, while promoting the wise use of water as a responsible person practice. The ultimate benefit may be to potentially delay and/or reduce the need to increase the water supply capacity in the future.

B. Water Conservation Programs

1. **Metering**.

Metering is widely recognized as an essential requirement for any water utility's effort to measure and reduce water demand. A large majority, but not all, of the water utilities in the United States meter the volume of water delivered to customers and base their charges on metered consumption. Studies have demonstrated that water demand decreases on the order of 20 percent when customers are metered and billed on water consumption. The DNR/ Metropolitan Council guidelines strongly encourage full metering of customers served by the utility.

The City has a very proactive metering program where all residential and ICI water customers served by the City are metered. Residential meters are read once every two months. Larger commercial accounts are read every month. The City performs radio frequency readings for all ICI accounts.

The City has a meter change-out program in place. One staff member is dedicated full time to meter removals, testing, repairs and replacements. The utility also has a meter shop with a test bench.

There is an ongoing random testing program for commercial meters. Every commercial meter that is removed is tested for accuracy.

The City meters all public buildings such as park buildings and fire stations. All record keeping and billing of these accounts is internal to the City.

Table 10 (A) shows the number of metered connections in 2005 and the customer meter maintenance and replacement schedule. Table 10 (B) shows the number of treatment plant source water meters, meter testing schedule, and the average age of the meters.

TABLE 10 (A) Customer Meters

	Number of Connections	Number of Metered Connections	Meter testing schedule (years)	Average age/meter replacement schedule (years)
Residential	24090	24090	Random (250/yr)	25 yrs / 25 yrs
Institutional, Commercial, Industrial	1131	1131	Random	5 yrs / 10 yrs
TOTALS	25221	25221		

TABLE 10 (B) Water Source Meters

	Number of Meters	Meter testing schedule (years)	Average age/meter replacement schedule (years)
Water Source (wells/intakes)	6	Annual check	10 years / As needed
Treatment Plant	1	Annual check	4 years / As needed

2. **Unaccounted for Water**

A distribution system water audit is a systematic analysis performed to account for all water withdrawn by a water utility. Causes of "unaccounted for" water include meter inaccuracy, unmetered uses (both authorized and unauthorized), leakage, and other system losses (such as water consumed in the operation of the treatment plant). Water audits identify, quantify and verify these losses. The performance of a water audit is analogous to a business taking inventory of its stock.

Unaccounted for water in the entire Bloomington system is very low, less than four percent of the total yearly demand. The unaccounted for water is a result of authorized use at the water treatment plant, and use by public works personnel in field operations. Bloomington performs water audits annually and leak detection as needed.

3. **Conservation Water Rates**

a. Current Rate Structure

The City has for many years billed for water based on the volume consumed, at a uniform rate plus a minimum service charge. This meets the DNR/Metropolitan Council standards for a water conserving rate structure. The rate presently charged is $1.89 per thousand gallons, with a minimum service charge based on the size of the meter. The basic charge does not include any volume. Rate changes are evaluated each fall of the year. The last rate change was in 2005.

Bloomington bills residential water customers every other month and all ICI customers monthly.

The water rates are designed to recapture the annual operation and maintenance costs of the utility and to provide a capital reserve for future utility projects. Additional capital costs are recovered through special assessments and connection charges. Special assessments are levied by the City at the time the City provides an accessible water system to the property. These are gradually repaid by property owners over a period of years, but act as a lien on the property and usually are paid in full when a parcel is sold. The current assessment rate varies and is based on the adjusted front footage of the property at the time of development. City staff develops the guidelines for special assessments and connection charges and periodically revises the rates.

Bloomington has a 20-year contract with the City of Minneapolis with respect to this wholesale water purchasing that expires in 2017. The wholesale rate structure used is a typical multiple step wholesale purchasing arrangement. The base rate of the structure is the current Minneapolis residential declining block rate or "inside" rate.

b. Alternative Rate Structures

The DNR/Metropolitan Council conservation plan guidelines state that uniform rates are acceptable. There are two alternative rates that are also acceptable, increasing block and seasonal. Both rates are common among water utilities where water shortages occur and conservation is a significant issue. Seasonal rates and increasing block rates are both intended to price water so that the rate reflects the greater expense of meeting larger demands and peak demands.

An increasing block rate structure is premised on incrementing the unit price of the water per increment of greater water usage. This is perhaps the most common conservation-oriented rate. If the increase in price for larger blocks of consumption are large enough, it can serve as an incentive for conservation.

A seasonal rate structure prices the unit price of water higher during the peak demand season as compared to the rest of the year. This particular structure is useful in encouraging customers to reduce landscape water demands. The ultimate goal of this structure is to conserve water and to potentially reduce or postpone capital facilities construction undertaken solely to meet peak demand. Seasonal rates are designed to send a price signal to the consumer which is indicative of the higher costs associated with the greater demands placed on the system.

The seasonal rate is usually preferable to the increasing block rate. The increasing block rate is more complex to administer. The increasing block rate also tends to charge large water users higher rates, regardless of their efficiency. Some utilities have circumvented this problem by calculating seasonal surcharges on a customer-by-customer basis.

In economic terms, water demand is considered elastic. This means that an increase in price tends to result in a decrease in demand. The degree of price elasticity of water demand has been studied on many occasions and the reported findings vary considerably. Factors such as type of water use, customer type, existing water use efficiency, and the socioeconomic characteristics of the community are a few of the variables that affect the elasticity coefficient. Suburban communities are likely to have lower elasticity coefficients, i.e., higher seasonal water rates may be viewed by customers as relatively insignificant. The AWWA publication *Water Conservation* notes that price elasticity varies between indoor and outdoor uses, with elasticity coefficients as follows.

- Indoor use: -0.26% The percent reduction in consumption equals 0.26 times the increase in price.
- Outdoor use: -0.40% The percent reduction in consumption equals 0.40 times the increase in price.

A more aggressive approach to demand reduction would be the implementation of a seasonal or increasing block rate structure. Implementing an increasing block, seasonal rate, or excess use surcharge may reflect the higher cost of purchasing water from Minneapolis for peak demands. In reality, the increased costs to purchase additional water from Minneapolis would be offset by the revenue received for the increased usage. So, the net effect of these rates would be to penalize the user for utilizing the water for outside uses. The City currently bills residential customers (defined as any meter less than 1.5 inches) on a two-month billing cycle. Monthly billing would mirror a price increase as a result of a rate change better, by sending a quicker price signal to the customer. This could potentially result in lower demand. However, monthly billing of all residential customers would require a substantial increase in the City's effort to read the meters and prepare

the bills which, in turn, would drive up the unit price of the water consumed.

Additional studies would be necessary to ensure that rate restructuring would provide adequate revenue recovery, and be acceptable to the community. The studies would also have to address the current billing cycles to ensure that any change in the rate structure is equitable to all customers.

4. **Regulation**

a. Section 11.23 of the Bloomington City Code authorizes the City Council to limit water usage by adopting a resolution setting forth restrictions on water usage and penalties for non-compliance.

Another significant requirement limiting water usage is the federal law requiring water-efficient plumbing fixtures nationwide. These requirements have been in force since January 1994 for residential water users and 1997 for commercial water users.

b. Additional Ordinances. A number of other ordinances could be considered. Ordinances are generally unpopular with customers and costly to monitor and/or enforce, but can be effective in achieving conservation if they are enforced. Most ordinances prohibit uses of water for one of two reasons – the use is clearly wasteful and irresponsible, or the ordinance is instituted as a short-term measure in response to a drought or other emergency.

Ordinances that may be considered include:

- Prohibition of landscape irrigation water running off private property.

- Prohibition of watering during peak daylight hours, between noon and 6:00 p.m. This general time span is considered an inefficient time to water due to potentially high evaporation rates.

- Requirement for water-efficient irrigation systems for new ICI development.

- Requirement for automatic sprinkler systems to have rain-monitoring equipment to automatically disable sprinkling system on rainy days. This is currently a State Plumbing Code requirement.

With the exception of customers' water uses which impact others, or are outright wasteful of water, or are emergency related, it is recommended that the City's conservation program invest more time and effort in other measures such as education, customer assistance and incentives. Educating customers on the prudence of not watering between noon and 6:00 p.m. can in itself be an effective means of limiting demand during the period. It has not, however, been proven to reduce overall water consumption. Note: Bloomington staff concurs with the inefficiency of watering between noon and 6:00 p.m. Creation of a "6:00 p.m." peak would have a significant impact on the utility's electrical conservation programs and practices. Research is needed to address all the potential problems with a "6:00 p.m." peak, including, but not limited to, electrical, water system hydraulics, and staffing issues.

It is recommended that watering restrictions be reserved for implementation during water shortages. Furthermore, water savings due to these measures would not be included when determining the required capacity of the system, rather, remain as a safety factor for emergency conditions.

Enforcement

If the City Council approved a watering restriction or ban, Utility staff would monitor and enforce the City for violators.

Non-compliance penalties are $25 per violation and assessed to the property owner. If there are more than two warnings, the Utility has the option to shut the water service off.

Below is the adopted City Code.

Bloomington City Code:
SEC. 11.23. RESTRICTED HOURS FOR SPRINKLING.

(a) **Restrictions on water usage.** Whenever it is determined by either the Mayor or the City Council that a shortage of water supply may be imminent, either may act in accordance with the procedures hereinafter described to limit the uses of City water and the times and hours during which water from the City water supply may be used.

(b) **Council action.** The City Council may act by resolution to limit water usage. The resolution shall state in detail the restrictions imposed on water usage and the charge for instances of non-compliance. The restrictions shall become effective 24 hours after passage of the resolution. The Council shall take such action as is reasonably practicable to inform the general public of the imposition of the restrictions on water usage and of the charges and other penalties which could be imposed for violation of such restrictions.

(c) **Action by the Mayor.** The Mayor may act by filing with the City Clerk a written certification that there is an imminent shortage of water supply. The certification shall specify in detail the restrictions on water usage and the charge for instances of non-compliance and shall become effective 24 hours after being filed. The City Clerk shall endorse on each filing the time and date of filing. The Mayor shall take such action as is reasonably practicable to inform the general public of the imposition of restrictions on water usage and of the charges and other penalties for violation of such restrictions. Restrictions imposed by the Mayor may be revoked by written directive from the Mayor to the City Clerk, who shall endorse on such directive the date and time of receipt, or by action of the City Council.

(d) **Penalties.**

(1) For each instance of non-compliance with water usage restrictions imposed by this section, a charge of up to $25.00 shall be assessed against the property on which the violation occurred and added to the water bill for such premises. The amount of the charge shall be specified by the Council in its resolution and the Mayor in his certification to the City Clerk.

(2) Failure to comply with water usage restrictions after two warnings shall be cause for the discontinuance of water service.

(3) Failure to comply with water usage restrictions shall be a petty misdemeanor punishable by the maximum fine allowed by law for such offenses.

(Code, 1958 S 30.22; Ord. No. 81-27, 6-29-81)

5. **Education and Information Programs**

Water conservation programs to be successful, must combine technical measures (which directly reduce water consumption), with educational efforts to instruct and encourage customers to implement those measures. A wide range of materials has been developed on the subject of water conservation by various organizations. One organization that has done an extraordinary amount of research and publication on the topic of water conservation is the American Water Works Association.

Water conservation requires changes in customers' habits, and education is necessary to convince customers to change those habits. The need for conservation should be explained. The explanation should include the benefits of conservation for both the community and the customer. A separate program for education of school-age children is a very effective component of any educational conservation program.

The seven key steps in developing an information campaign are summarized as:

1. Develop a clear and persuasive statement of purpose.
2. Choose an appropriate theme.
3. Identify key target groups.
4. Select members for a water conservation committee.
5. Identify communication paths, resource materials and volunteers.
6. Design and implement specific campaigns.
7. Ensure effective coordination and follow-through.

Community involvement is a key element to the success of a water conservation program. The City should continue to disseminate information and provide educational assistance on conservation issues using any of the following forums:

- Present AWWA conservation videos on the Bloomington public access television channel.

- Notify community groups and schools of the availability of water conservation-oriented literature and videos for their use. A City staff member could assist with the presentation of the material, if desired.

- Provide information booths at various community functions (celebrations, sporting events, etc.) for dissemination of conservation-oriented information.

The educational program should emphasize the prudent use of water for irrigation. Demonstration gardens can provide excellent examples of the use of conservation-oriented landscape. Local nurseries can be requested to participate in the educational program. Information regarding proper watering techniques to reduce water use and increase the drought tolerance of vegetation should be part of the educational effort.

Education Programs
Bloomington typically performs four to 10 (water quality report, two to four different handouts at public buildings, public school presentations, water plant tours, and various articles in City or other public communication materials) educational programs annually, depending on the weather, time of year, and/or other conditions. Bloomington does not track educational efforts beyond six months and did not enclose any materials. No educational efforts were initiated as an emergency or drought management effort, as neither condition has occurred.

Proposed Education Programs
The City is always looking for new educational programs to present to the public in the aforementioned venues.

6. **Retrofitting Programs**

Plumbing retrofit programs have been undertaken by numerous utilities to assist customers in reducing indoor water consumption. Retrofit programs typically offer low flow showerheads, low flow faucet aerators, and devices to decrease the volume used for toilet tank flushing. The designs of these programs vary in the level of effort and expense devoted to distribution and installation of the fixtures.

There has been a proliferation of plumbing retrofit items offered on the marketplace due to demand from conservation programs. Many different versions of retrofit devices are available, and the design and performance of these items have steadily improved.

Faucet retrofits are usually accomplished by installing low flow aerators. They are available in flow rates as low as 0.5 gpm, with the typical aerator having a rate of one gpm. These lower flow rates are significantly lower than the non-conserving faucets, which ordinarily flow four gpm or greater. Typically, customers have had few objections to the performance of faucet aerators. They are easily installed by screwing them onto the faucet. Faucet aerators conserve energy as well by reducing the use of hot water.

Showerhead retrofits are accomplished by removing the old showerhead and replacing it with a new low flow model. To comply with the requirements of the Federal Energy Policy Act, the showerhead must use 2.5 gpm or less. These are now the only showerheads legally available. Older, non-conserving showerheads used five gpm or greater. Many of the early models of the water-conserving showerheads were not well received by the customers. The designs have greatly improved. Similar to faucets, showerheads also conserve energy by reducing the use of hot water.

Many devices are available for tank toilet retrofits. These can be classified into six groups.

- Fixed volume displacement devices.
- Variable volume displacement devices.
- Mechanical devices with fixed cycle times.
- Mechanical devices with variable cycle times.
- Mechanical devices with user-controlled cycle times.
- Dual flush devices.

As an alternate to retrofitting existing toilets, new ultra low flush (ULF) models could be installed which meet the federal water efficiency requirement of 1.6 gallons or less. To promote the installation of ULF toilets, many utilities in water-short areas of the country (Los Angeles, Tucson, New York City, etc.) have undertaken ULF toilet rebate programs where the utility pays a share of the customer's cost for purchase of a new ULF toilet to replace an existing high-consumption toilet.

One of the most important considerations in implementation of a plumbing retrofit program is the method by which retrofit kits are distributed to customers. Methods include, but are not limited to:

- *Depot program*. Customers are advised that kits are available for them to come and pick up if they are interested.

- *Mass mailing*. Kits are mailed to customers.

- *Door-to-door*. Crews distribute the kits directly to customers. Some of these programs include follow-up surveys to answer questions and verify installation.

If the City considered a retrofitting program, it would be recommended that the City use the depot method. Plumbing retrofit kits would be made available for customers that are interested in picking up a kit and installing the kit themselves. It is hard to estimate how many customers served by the City will participate.

Retrofitting Programs
Bloomington encourages the use of efficient plumbing fixtures but currently has no plans to institute a formal incentive program.

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.

Water Supply Policy Statement
Bloomington Utility Mission Statement: "Bloomington is committed to deliver quality water and dependable wastewater services of outstanding value to our customers through responsible and creative stewardship of the assets we manage."

Impact on the Local Comprehensive Plan
This plan should have a minimal impact on the local comprehensive plan.

Demand Projections

Year	Total Community Population	Population Served	Average Day Demand (MGD)	Maximum Day Demand (MGD)	Projected Demand (MGY)
2010	87632	87632	13.6	36.8	4947
2020	90503	90503	13.9	37.9	5062
2030	93000	93000	14.3	38.6	5226

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.).
Population projection data was taken from the Met Council's *2030 Regional Development Framework.*