

City of Long Lake Water Supply Plan Feb. 17, 2020



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DEPARTMENT OF NATURAL RESOURCES – DIVISION OF ECOLOGICAL AND WATER RESOURCES AND METROPOLITAN COUNCIL

INTRODUCTION TO WATER SUPPLY PLANS (WSP)

Who needs to complete a Water Supply Plan

Public water suppliers serving more than 1,000 people, large private water suppliers in designated Groundwater Management Areas, and all water suppliers in the Twin Cities metropolitan area are required to prepare and submit a water supply plan.

The goal of the WSP is to help water suppliers: 1) implement long term water sustainability and conservation measures; and 2) develop critical emergency preparedness measures. Your community needs to know what measures will be implemented in case of a water crisis. A lot of emergencies can be avoided or mitigated if long term sustainability measures are implemented.

Groundwater Management Areas (GWMA)

The DNR has designated three areas of the state as Groundwater Management Areas (GWMAs) to focus groundwater management efforts in specific geographies where there is an added risk of overuse or water quality degradation. A plan directing the DNR's actions within each GWMA has been prepared. Although there are no specific additional requirements with respect to the water supply planning for communities within designated GWMAs, communities should be aware of the issues and actions planned if they are within the boundary of one of the GWMAs. The three GWMAs are the North and East Metro GWMA (Twin Cities Metro), the Bonanza Valley GWMA and the Straight River GWMA (near Park Rapids). Additional information and maps are included in the [DNR Groundwater Management Areas webpage](#).

Benefits of completing a WSP

Completing a WSP using this template, fulfills a water supplier's statutory obligations under M.S. [M.S.103G.291](#) to complete a water supply plan. For water suppliers in the metropolitan area, the WSP will help local governmental units to fulfill their requirements under M.S. 473.859 to complete a local comprehensive plan. Additional benefits of completing WSP template:

- The standardized format allows for quicker and easier review and approval
- Help water suppliers prepare for droughts and water emergencies.
- Create eligibility for funding requests to the Minnesota Department of Health (MDH) for the Drinking Water Revolving Fund.
- Allow water suppliers to submit requests for new wells or expanded capacity of existing wells.
- Simplify the development of county comprehensive water plans and watershed plans.
- Fulfill the contingency plan provisions required in the MDH wellhead protection and surface water protection plans.

- Fulfill the demand reduction requirements of Minnesota Statutes, section 103G.291 subd 3 and 4.
- Upon implementation, contribute to maintaining aquifer levels, reducing potential well interference and water use conflicts, and reducing the need to drill new wells or expand system capacity.
- Enable DNR to compile and analyze water use and conservation data to help guide decisions.
- Conserve Minnesota's water resources

If your community needs assistance completing the Water Supply Plan, assistance is available from your area hydrologist or groundwater specialist, the MN Rural Waters Association circuit rider program, or in the metropolitan area from Metropolitan Council staff. Many private consultants are also available.

WSP Approval Process

10 Basic Steps for completing a 10-Year Water Supply Plan

1. Download the DNR/Metropolitan Council Water Supply Plan Template from the [DNR Water Supply Plan webpage](#).
2. Save the document with a file name with this naming convention:
WSP_cityname_permitnumber_date.doc.
3. The template is a form that should be completed electronically.
4. Compile the required water use data (Part 1) and emergency procedures information (Part 2)
5. The Water Conservation section (Part 3) may need discussion with the water department, council, or planning commission, if your community does not already have an active water conservation program.
6. Communities in the seven-county Twin Cities metropolitan area should complete all the information discussed in Part 4. The Metropolitan Council has additional guidance information on their [Water Supply webpage](#). All out-state water suppliers **do not** need to complete the content addressed in Part 4.
7. Use the Plan instructions and Checklist document from the [DNR Water Supply Plan webpage](#) to insure all data is complete and attachments are included. This will allow for a quicker approval process.
8. Plans should be submitted electronically using the [MPARS website](#) – no paper documents are required.
9. DNR hydrologist will review plans (in cooperation with Metropolitan Council in Metro area) and approve the plan or make recommendations.
10. Once approved, communities should complete a Certification of Adoption form, and send a copy to the DNR.

Complete Table 1 with information about the public water supply system covered by this WSP.

Table 1. General information regarding this WSP

Requested Information	Description
DNR Water Appropriation Permit Number(s)	1965-0980 1965-0980-1A
Ownership	<input checked="" type="checkbox"/> Public or <input type="checkbox"/> Private
Metropolitan Council Area	<input checked="" type="checkbox"/> Yes or <input type="checkbox"/> No (Hennepin)
Street Address	450 Virginia Ave P.O. Box 606
City, State, Zip	Long Lake, MN 55356
Contact Person Name	Sean Diercks
Title	Public Works Director
Phone Number	952-476-2855
MDH Supplier Classification	Municipal

PART 1. WATER SUPPLY SYSTEM DESCRIPTION AND EVALUATION

The first step in any water supply analysis is to assess the current status of demand and availability. Information summarized in Part 1 can be used to develop Emergency Preparedness Procedures (Part 2) and the Water Conservation Plan (Part 3). This data is also needed to track progress for water efficiency measures.

A. Analysis of Water Demand

Complete Table 2 showing the past 10 years of water demand data.

- Some of this information may be in your Wellhead Protection Plan.
- If you do not have this information, do your best, call your engineer for assistance or if necessary leave blank.

If your customer categories are different than the ones listed in Table 2, please describe the differences below:

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Table 2. Historic water demand (see definitions in the [glossary](#) after Part 4 of this template)

Year	Pop. Served	Total Connections	Residential Water Delivered (MG)	C/I/I Water Delivered (MG)	Water used for Non-essential	Wholesale Deliveries (MG)	Total Water Delivered (MG)	Total Water Pumped (MG)	Water Supplier Services	Percent Unmetered/Unaccounted	Average Daily Demand (MGD)	Max. Daily Demand (MGD)	Date of Max. Demand	Residential Per Capita Demand (GPCD)	Total per capita Demand (GPCD)
2007	1842	740	46.300	30.100	N/A	N/A	76.400	77.170	N/A	1.0%	0.210	0.580	8/27/2007	68.86	129.05
2008	1842	765	43.848	30.578	N/A	N/A	74.426	79.229	N/A	6.1%	0.217	0.966	10/16/2008	65.22	117.84
2009	1842	741	45.629	26.591	N/A	N/A	72.220	78.672	N/A	8.3%	0.216	0.555	6/3/2009	67.87	117.01
2010	1745	741	40.092	24.415	N/A	N/A	64.507	68.009	N/A	5.2%	0.186	0.421	6/17/2010	62.95	106.78
2011	1768	741	40.407	25.143	N/A	N/A	65.550	70.770	N/A	7.4%	0.194	0.484	10/7/2011	62.61	109.67
2012	1760	740	44.899	28.400	N/A	N/A	73.299	73.693	N/A	0.6%	0.202	0.454	7/13/2012	69.89	114.72
2013	1760	741	39.781	25.181	N/A	N/A	64.962	65.688	N/A	1.1%	0.180	0.523	11/16/2013	61.93	102.25
2014	1760	741	36.138	26.135	N/A	N/A	62.273	64.291	N/A	3.1%	0.176	0.520	5/06/2014	56.25	100.08
2015	1760	755	34.906	25.719	N/A	N/A	60.625	65.216	N/A	7.1%	0.179	0.550	10/19/2015	54.34	101.52
2016	1760	756	35.317	25.235	N/A	N/A	60.552	66.230	N/A	8.6%	0.181	0.453	9/16/2016	54.98	103.10
2017	1768	756	34.436	24.191	N/A	N/A	60.281	66.153	N/A	8.9%	0.181	0.426	9/01/2017	53.36	102.51
Avg. 2012-2017	1761	748	37.580	25.810			63.670	66.879		4.9%	0.183	0.488		58.46	104.03

MG – Million Gallons **MGD** – Million Gallons per Day **GPCD** – Gallons per Capita per Day

See [Glossary](#) for definitions. A list of [Acronyms and Initialisms](#) can be found after the Glossary.

Complete Table 3 by listing the top 10 water users by volume, from largest to smallest. For each user, include information about the category of use (residential, commercial, industrial, institutional, or wholesale), the amount of water used in gallons per year, the percent of total water delivered, and the status of water conservation measures.

Table 3. Large volume users

Customer	Use Category (Residential, Industrial, Commercial, Institutional, Wholesale)	Amount Used (Gallons per Year)	Percent of Total Annual Water Delivered	Implementing Water Conservation Measures? (Yes/No/Unknown)
1. TEK PRODUCTS	COMMERCIAL	4,087,000	5.3%	UNKNOWN
2. TOWN CENTER	COMMERCIAL	2,040,000	2.6%	UNKNOWN
3. FOODLINER	COMMERCIAL	1,982,000	2.6%	UNKNOWN
4. SUPERAMERICA	COMMERCIAL	1,532,000	2.0%	UNKNOWN
5. THREE PT DEV.	COMMERCIAL	1,359,000	1.8%	UNKNOWN
6. LAKE ENGINEER	COMMERCIAL	1,239,000	1.6%	UNKNOWN
7. AMERICINN	COMMERCIAL	1,156,000	1.5%	UNKNOWN
8. JEM TECH	COMMERCIAL	916,000	1.2%	UNKNOWN
9. LD FOODS	COMMERCIAL	914,000	1.2%	UNKNOWN
10. RED ROOSTER	COMMERCIAL	772,000	1.0%	UNKNOWN

B. Treatment and Storage Capacity

Complete Table 4 with a description of where water is treated, the year treatment facilities were constructed, water treatment capacity, the treatment methods (i.e. chemical addition, reverse osmosis, coagulation, sedimentation, etc.) and treatment types used (i.e. fluoridation, softening, chlorination, Fe/MN removal, coagulation, etc.). Also describe the annual amount and method of disposal of treatment residuals. Add rows to the table as needed.

Table 4. Water treatment capacity and treatment processes

Treatment Site ID (Plant Name or Well ID)	Year Construct ed	Treatment Capacity (GPD)	Treatment Method	Treatment Type	Annual Volume of Residuals	Disposal Process for Residuals	Do You Reclaim Filter Backwash Water?
WELLHOUSE #1 Well 1A	2004	1,728,000 (1200 gpm well)	Chemical addition	Fluoridation, chlorination, Fe/Mn sequestration	N/A	N/A	N/A
WELLHOUSE #2 Well 2	1966	1,008,000 (700 gpm well)	Chemical addition	Fluoridation, chlorination, Fe/Mn sequestration	N/A	N/A	N/A
Total	N/A	2,736,000	N/A	N/A	N/A	N/A	N/A

Complete Table 5 with information about storage structures. Describe the type (i.e. elevated, ground, etc.), the storage capacity of each type of structure, the year each structure was constructed, and the primary material for each structure. Add rows to the table as needed.

Table 5. Storage capacity, as of the end of the last calendar year

Structure Name	Type of Storage Structure	Year Constructed	Primary Material	Storage Capacity (Gallons)
WATER TOWER	Elevated storage	1983	steel	200,000
Total	NA	NA	NA	200,000

Treatment and storage capacity versus demand

It is recommended that total storage equal or exceed the average daily demand.

Discuss the difference between current storage and treatment capacity versus the water supplier's projected average water demand over the next 10 years (see Table 7 for projected water demand):

The current treatment and storage capacity exceeds the average daily demand. The projected average daily demand over the next ten years will be equal to or slightly above the storage capacity recommendations.

C. Water Sources

Complete Table 6 by listing all types of water sources that supply water to the system, including groundwater, surface water, interconnections with other water suppliers, or others. Provide the name of each source (aquifer name, river or lake name, name of interconnecting water supplier) and the Minnesota unique well number or intake ID, as appropriate. Report the year the source was installed or established and the current capacity. Provide information about the depth of all wells. Describe the status of the source (active, inactive, emergency only, retail/wholesale interconnection) and if the source facilities have a dedicated emergency power source. Add rows to the table as needed for each installation.

Include copies of well records and maintenance summary for each well that has occurred since your last approved plan in **Appendix 1**.

Table 6. Water sources and status

Resource Type (Groundwater, Surface water, Interconnection)	Resource Name	MN Unique Well # or Intake ID	Year Installed	Capacity (Gallons per Minute)	Well Depth (Feet)	Status of Normal and Emergency Operations (active, inactive, emergency only, retail/wholesale interconnection))	Does this Source have a Dedicated Emergency Power Source? (Yes or No)
Groundwater	Prairie du Chien-Jordan	206933	1966	1200	448'/365'	Active	No
Groundwater	Prairie du Chien-Jordan	667910	2004	700	475'/240'	Active	No
Groundwater	Prairie du Chien-Jordan	208849	1948	500	340'/188'	Abandoned/Sealed	No
Orono Inter- connection				500		Emergency Only	No

Limits on Emergency Interconnections

Discuss any limitations on the use of the water sources (e.g. not to be operated simultaneously, limitations due to blending, aquifer recovery issues etc.) and the use of interconnections, including capacity limits or timing constraints (i.e. only 200 gallons per minute are available from the City of Prior Lake, and it is estimated to take 6 hours to establish the emergency connection). If there are no limitations, list none.

The City of Orono will supply water to the city of Long Lake in an emergency via two automatic pressure sensing interconnection valves on the water distribution systems located at the intersections of Wayzata Blvd. and Brimhall Road, and Wayzata Blvd. and Brown Road. In addition, a manual interconnection valve is located at the intersection of Wayzata Blvd. and Willow Drive.

D. Future Demand Projections – Key Metropolitan Council Benchmark

Water Use Trends

Use the data in Table 2 to describe trends in 1) population served; 2) total per capita water demand; 3) average daily demand; 4) maximum daily demand. Then explain the causes for upward or downward trends. For example, over the ten years has the average daily demand trended up or down? Why is this occurring?

The residential population and business growth in Long Lake has remained nearly the same the last 10 years. There has been a noticeable reduction in residential per capita demand over the last ten years. The total per capita has remained nearly the same due to a slightly increased commercial/industrial demand. The average daily demand and maximum daily demand has remained very consistent and stable over the past ten years. It is expected that there will be no significant increase in the number of future households or businesses because the city is fully developed. Small changes in water demand will occur incrementally in the future due to redevelopment related activities.

Use the water use trend information discussed above to complete Table 7 with projected annual demand for the next ten years. Communities in the seven-county Twin Cities metropolitan area must also include projections for 2030 and 2040 as part of their local comprehensive planning.

Projected demand should be consistent with trends evident in the historical data in Table 2, as discussed above. Projected demand should also reflect state demographer population projections and/or other planning projections.

Table 7. Projected annual water demand

Year	Projected Total Population	Projected Population Served	Projected Total Per Capita Water Demand (GPCD)	Projected Average Daily Demand (MGD)	Projected Maximum Daily Demand (MGD)
2016	1760*	1760*	103.10*	0.181*	0.453*
2017	1768*	1768*	102.51*	0.181*	0.426*
2018	1782	1782	104	0.185	0.500
2019	1796	1796	104	0.187	0.504
2020	1810	1810	104	0.188	0.508
2021	1835	1835	104	0.191	0.515
2022	1860	1860	104	0.193	0.522
2023	1885	1885	104	0.196	0.529
2024	1910	1910	104	0.199	0.536
2025	1935	1935	104	0.201	0.543
2030	1960	1960	104	0.204	0.550
2040	1990	1990	104	0.207	0.559

GPCD – Gallons per Capita per Day

MGD – Million Gallons per Day

Projection Method

Describe the method used to project water demand, including assumptions for population and business growth and how water conservation and efficiency programs affect projected water demand:

The Metropolitan Council projections were used to determine future population. Average daily demand was based on the population projections and the average total per capita demand 104 (GPCD) over the past 5 years. The maximum day demand was based on average day demand projections and the highest day peaking factor of 2.7 (average of last past 4 years). *Denotes actual data.

E. Resource Sustainability

Monitoring – Key DNR Benchmark

Complete Table 8 by inserting information about source water quality and quantity monitoring efforts. The list should include all production wells, observation wells, and source water intakes or reservoirs. Groundwater level data for DNR’s statewide network of observation wells are available online through the [DNR’s Cooperative Groundwater Monitoring \(CGM\) webpage](#).

Table 8. Information about source water quality and quantity monitoring

MN Unique Well # or Surface Water ID	Type of monitoring point	Monitoring program	Frequency of monitoring	Monitoring Method
MN Unique Well # 667910	<input checked="" type="checkbox"/> production well <input type="checkbox"/> observation well <input type="checkbox"/> source water intake <input type="checkbox"/> source water reservoir	<input checked="" type="checkbox"/> routine MDH sampling <input checked="" type="checkbox"/> routine water utility sampling <input type="checkbox"/> other	<input checked="" type="checkbox"/> continuous <input type="checkbox"/> hourly <input type="checkbox"/> daily <input checked="" type="checkbox"/> monthly <input type="checkbox"/> quarterly <input type="checkbox"/> annually	<input checked="" type="checkbox"/> SCADA <input type="checkbox"/> grab sampling <input type="checkbox"/> steel tape <input type="checkbox"/> stream gauge
MN Unique Well # 206933	<input checked="" type="checkbox"/> production well <input type="checkbox"/> observation well <input type="checkbox"/> source water intake <input type="checkbox"/> source water reservoir	<input checked="" type="checkbox"/> routine MDH sampling <input checked="" type="checkbox"/> routine water utility sampling <input type="checkbox"/> other	<input type="checkbox"/> continuous <input type="checkbox"/> hourly <input type="checkbox"/> daily <input checked="" type="checkbox"/> monthly <input type="checkbox"/> quarterly <input type="checkbox"/> annually	<input type="checkbox"/> SCADA <input checked="" type="checkbox"/> grab sampling <input checked="" type="checkbox"/> steel tape <input type="checkbox"/> stream gauge

Water Level Data

A water level monitoring plan that includes monitoring locations and a schedule for water level readings must be submitted as **Appendix 2**. If one does not already exist, it needs to be prepared and submitted with the WSP. Ideally, all production and observation wells are monitored at least monthly.

Complete Table 9 to summarize water level data for each well being monitored. Provide the name of the aquifer and a brief description of how much water levels vary over the season (the difference between the highest and lowest water levels measured during the year) and the long-term trends for each well. If water levels are not measured and recorded on a routine basis, then provide the static water level when each well was constructed and the most recent water level measured during the same season the well was constructed. Also include all water level data taken during any well and pump maintenance. Add rows to the table as needed.

Groundwater hydrographs illustrate the historical record of aquifer water levels measured within a well and can indicate water level trends over time. For each well in your system, provide a hydrograph for the life of the well, or for as many years as water levels have been measured. Include the hydrographs in **Appendix 3**. An example of a hydrograph can be found on the [DNR's Groundwater Hydrograph webpage](#). Hydrographs for DNR Observation wells can be found in the [CGM](#) discussed above.

Table 9. Water level data

Unique Well Number or Well ID	Aquifer Name	Seasonal Variation (Feet)	Long-term Trend in water level data	Water level measured during well/pumping maintenance
MN Unique Well # 667910	Prairie du Chien-Jordan	4.6	<input type="checkbox"/> Falling <input checked="" type="checkbox"/> Stable <input type="checkbox"/> Rising	Continuous/ monthly
MN Unique Well # 206933	Prairie du Chien-Jordan	7.6	<input type="checkbox"/> Falling <input checked="" type="checkbox"/> Stable <input type="checkbox"/> Rising	monthly

Potential Water Supply Issues & Natural Resource Impacts – Key DNR & Metropolitan Council Benchmark

Complete Table 10 by listing the types of natural resources that are or could potentially be impacted by permitted water withdrawals in the future. You do not need to identify every single water resource in your entire community. The goal is to help you triage the most important water resources and/or the water resources that may be impacted by your water supply system – perhaps during a drought or when the population has grown significantly in ten years. This is emerging science, so do the best you can with available data. For identified resources, provide the name of specific resources that may be impacted. Identify what the greatest risks to the resource are and how the risks are being assessed. Identify any resource protection thresholds – formal or informal – that have been established to identify when actions should be taken to mitigate impacts. Provide information about the potential mitigation actions that may be taken, if a resource protection threshold is crossed. Add additional rows to the table as needed. See the glossary at the end of the template for definitions.

Some of this baseline data should have been in your earlier water supply plans or county comprehensive water plans. When filling out this table, think of what are the water supply risks, identify the resources, determine the threshold and then determine what your community will do to mitigate the impacts.

Your DNR area hydrologist is available to assist with this table.

For communities in the seven-county Twin Cities metropolitan area, the [Master Water Supply Plan Appendix 1 \(Water Supply Profiles\)](#), provides information about potential water supply issues and natural resource impacts for your community.

Steps for completing Table 10

1. Identify the potential for natural resource impacts/issues within the community

First, review available information to identify resources that may be impacted by the operation of your water supply system (such as pumping).

Potential Sources of Information:

- County Geologic Atlas
- Local studies
- Metropolitan Council System Statement (for metro communities)
- Metropolitan Council Master Water Supply Plan (for metro communities)

ACTION: Check the resource type(s) that may be impacted in the column “Resource Type”

2. Identify where your water supply system is most likely to impact those resources (and vice versa).

Potential Sources of Information:

- Drinking Water Supply Management Areas
- Geologic Atlas - Sensitivity
- If no WHPA or other information exists, consider rivers, lakes, wetlands and significant within 1.5 miles of wells; and calcareous fens and trout streams within 5 miles of wells

ACTION: Focus the rest of your work in these areas.

3. *Within focus areas, identify specific features of value to the community*

You know your community best. What resources are important to pay attention to? It may be useful to check in with your community's planning and zoning staff and others.

Potential Sources of Information:

- Park plans
- Local studies
- Natural resource inventories
- Tourist attractions/recreational areas/valued community resource

ACTION: Identify specific features that the community prioritizes in the "Resource Name" column (for example: North Lake, Long River, Brook Trout Stream, or Green Fen). If, based on a review of available information, no features are likely to be at risk, note "None".

4. *Identify what impact(s) the resource is at risk for*

Potential Sources of Information:

- Wellhead Protection Plan
- Water Appropriation Permit
- County Geologic Atlas
- MDH or PCA reports of the area
- Metropolitan Council System Statement (for metro communities)
- Metropolitan Council Master Water Supply Plan (for metro communities)

ACTION: Check the risk type in the column "Risk". If, based on a review of available information, no risk is identified, note "None anticipated".

5. *Describe how the risk was assessed*

Potential Sources of Information:

- Local studies
- Monitoring data (community, WMO, DNR, etc.)
- Aquifer testing
- County Geologic Atlas or other hydrogeologic studies
- Regional or state studies, such as DNR's report 'Definitions and Thresholds for Negative Impacts to Surface Waters'
- Well boring logs

ACTION: Identify the method(s) used to identify the risk to the resource in the "Risk Assessed Through" column

6. *Describe protection threshold/goals*

What is the goal, if any, for protecting these resources? For example, is there a lower limit on acceptable flow in a river or stream? Water quality outside of an accepted range? A lower limit on acceptable aquifer level decline at one or more monitoring wells? Withdrawals that exceed some percent of the total amount available from a source? Or a lower limit on acceptable changes to a protected habitat?

Potential Sources of Information:

- County Comprehensive Water Plans
- Watershed Plans or One Watershed/One Plan
- Groundwater or Aquifer Plans
- Metropolitan Master Plans
- DNR Thresholds study
- Community parks, open space, and natural resource plans

ACTION: Describe resource protection goals in the “Describe Resource Protection Threshold” column or reference an existing plan/document/webpage

7. *If a goal/threshold should trigger action, describe the plan that will be implemented.*

Identify specific action, mitigation measures or management plan that the water supplier will implement, or refer to a partner’s plan that includes actions to be taken.

Potential Sources of Information:

- County Comprehensive Water Plans
- Watershed Plans or One Watershed/One Plan
- Groundwater or Aquifer Plans
- Metropolitan Master Plans
- Studies such as DNR Thresholds study

ACTION: Describe the mitigation measure or management plan in the “Mitigation Measure or Management Plan” column.

8. *Describe work to evaluate these risks going forward.*

For example, what is the plan to regularly check in to stay current on plans or new data?

Identify specific action that the water supplier will take to identify the creation of or change to goals/thresholds, or refer to a partner’s plan that includes actions to be taken.

Potential Sources of Information:

- County Comprehensive Water Plans
- Watershed Plans or One Watershed/One Plan
- Groundwater or Aquifer Plans
- Metropolitan Master Plans
- Studies such as DNR Thresholds study

ACTION: Describe what will be done to evaluate risks going forward, including any changes to goals or protection thresholds in the “Describe how Changes to Goals are monitored” column.

Table 10. Natural resource impacts (*List specific resources in Appendix 12)

Resource Type	Resource Name	Risk	Risk Assessed Through *	Describe Resource Protection Threshold or Goal *	Mitigation Measures or Management Plan	Describe How Thresholds or Goals are Monitored
<input type="checkbox"/> River or stream		<input checked="" type="checkbox"/> None anticipated <input type="checkbox"/> Flow/water level decline <input type="checkbox"/> Degrading water quality trends <input type="checkbox"/> Impacts on endangered, threatened, or special concern species habitat <input type="checkbox"/> Other: _____	<input type="checkbox"/> Geologic atlas or other mapping <input type="checkbox"/> Modeling <input type="checkbox"/> Modeling <input type="checkbox"/> Monitoring <input type="checkbox"/> Aquifer testing <input type="checkbox"/> WRAPS or other watershed report <input type="checkbox"/> Proximity (<1.5 miles) <input type="checkbox"/> Other: _____ <input checked="" type="checkbox"/> Other: _____	<input checked="" type="checkbox"/> Not applicable <input type="checkbox"/> Additional data is needed to establish <input type="checkbox"/> See report: _____ <input type="checkbox"/> No data available <input type="checkbox"/> Other: _____	<input checked="" type="checkbox"/> Not applicable <input type="checkbox"/> Change groundwater pumping <input type="checkbox"/> Increase conservation <input type="checkbox"/> Other: _____	<input checked="" type="checkbox"/> Not applicable <input type="checkbox"/> Newly collected data will be analyzed <input type="checkbox"/> Regular check-in with these partners: _____ <input type="checkbox"/> Other: _____
<input type="checkbox"/> Calcareous fen		<input checked="" type="checkbox"/> None anticipated <input type="checkbox"/> Flow/water level decline <input type="checkbox"/> Degrading water quality trends <input type="checkbox"/> Impacts on endangered, threatened, or special concern species habitat <input type="checkbox"/> Other: _____	<input type="checkbox"/> Geologic atlas or other mapping <input type="checkbox"/> Modeling <input type="checkbox"/> Modeling <input type="checkbox"/> Monitoring <input type="checkbox"/> Aquifer testing <input type="checkbox"/> WRAPS or other watershed Report <input type="checkbox"/> Proximity (<5 miles) <input type="checkbox"/> Other: _____ <input type="checkbox"/> Other: _____	<input checked="" type="checkbox"/> Not applicable <input type="checkbox"/> Additional data is needed to establish <input type="checkbox"/> See report: _____ <input type="checkbox"/> Other: _____	<input checked="" type="checkbox"/> Not applicable <input type="checkbox"/> Change groundwater pumping <input type="checkbox"/> Increase conservation <input type="checkbox"/> Other: _____	<input checked="" type="checkbox"/> Not applicable <input type="checkbox"/> Newly collected data will be analyzed <input type="checkbox"/> Regular check-in with these partners: _____ <input type="checkbox"/> Other: _____

Resource Type	Resource Name	Risk	Risk Assessed Through *	Describe Resource Protection Threshold or Goal *	Mitigation Measures or Management Plan	Describe How Thresholds or Goals are Monitored
<input checked="" type="checkbox"/> Lake	Long Lake (27016000)	<input type="checkbox"/> None anticipated <input checked="" type="checkbox"/> Flow/water level decline <input checked="" type="checkbox"/> Degrading water quality trends <input type="checkbox"/> Impacts on endangered, threatened, or special concern species habitat <input type="checkbox"/> Other: _____	<input type="checkbox"/> Geologic atlas or other mapping <input type="checkbox"/> Modeling <input type="checkbox"/> Modeling <input checked="" type="checkbox"/> Monitoring <input type="checkbox"/> Aquifer testing <input type="checkbox"/> WRAPS or other watershed report <input type="checkbox"/> Proximity (<1.5 miles) <input checked="" type="checkbox"/> Other: Met Council Water Supply Profile, DNR LakeFinder, MPCA Surface Water Data	<input type="checkbox"/> Not applicable <input checked="" type="checkbox"/> Additional data is needed to establish <input type="checkbox"/> See report: _____ <input type="checkbox"/> Other: _____	<input type="checkbox"/> Not applicable <input type="checkbox"/> Change groundwater pumping <input checked="" type="checkbox"/> Increase conservation <input type="checkbox"/> Other: _____	<input type="checkbox"/> Not applicable <input checked="" type="checkbox"/> Newly collected data will be analyzed <input type="checkbox"/> Regular check-in with these partners: _____ <input type="checkbox"/> Other: _____

Resource Type	Resource Name	Risk	Risk Assessed Through *	Describe Resource Protection Threshold or Goal *	Mitigation Measures or Management Plan	Describe How Thresholds or Goals are Monitored
<input checked="" type="checkbox"/> Wetland	Unnamed along Long Lake Creek	<input checked="" type="checkbox"/> None anticipated <input checked="" type="checkbox"/> Flow/water level decline <input checked="" type="checkbox"/> Degrading water quality trends <input type="checkbox"/> Impacts on endangered, threatened, or special concern species habitat <input type="checkbox"/> Other: _____	<input type="checkbox"/> Geologic atlas or other mapping <input type="checkbox"/> Modeling <input type="checkbox"/> Modeling <input type="checkbox"/> Monitoring <input type="checkbox"/> Aquifer testing <input type="checkbox"/> WRAPS or other watershed report <input type="checkbox"/> Proximity (<1.5 miles) <input checked="" type="checkbox"/> Other: Met Council Water Supply Profile, National Wetlands Inventory	<input checked="" type="checkbox"/> Not applicable <input checked="" type="checkbox"/> Additional data is needed to establish <input type="checkbox"/> See report: _____ <input type="checkbox"/> Other: _____	<input type="checkbox"/> Not applicable <input type="checkbox"/> Change groundwater pumping <input checked="" type="checkbox"/> Increase conservation <input type="checkbox"/> Other: _____	<input type="checkbox"/> Not applicable <input checked="" type="checkbox"/> Newly collected data will be analyzed <input type="checkbox"/> Regular check-in with these partners: _____ <input type="checkbox"/> Other: _____
<input type="checkbox"/> Trout stream		<input type="checkbox"/> None anticipated <input type="checkbox"/> Flow/water level decline <input type="checkbox"/> Degrading water quality trends <input type="checkbox"/> Impacts on endangered, threatened, or special concern species habitat <input type="checkbox"/> Other: _____	<input type="checkbox"/> Geologic atlas or other mapping <input type="checkbox"/> Modeling <input type="checkbox"/> Modeling <input type="checkbox"/> Monitoring <input type="checkbox"/> Aquifer testing <input type="checkbox"/> WRAPS or other watershed report <input type="checkbox"/> Proximity (< 5 miles) <input type="checkbox"/> Other: _____	<input type="checkbox"/> Not applicable <input type="checkbox"/> Additional data is needed to establish <input type="checkbox"/> See report: _____ <input type="checkbox"/> Other: _____	<input type="checkbox"/> Not applicable <input type="checkbox"/> Change groundwater pumping <input type="checkbox"/> Increase conservation <input type="checkbox"/> Other: _____	<input type="checkbox"/> Not applicable <input type="checkbox"/> Newly collected data will be analyzed <input type="checkbox"/> Regular check-in with these partners: _____ <input type="checkbox"/> Other: _____

Resource Type	Resource Name	Risk	Risk Assessed Through *	Describe Resource Protection Threshold or Goal *	Mitigation Measures or Management Plan	Describe How Thresholds or Goals are Monitored
<input checked="" type="checkbox"/> Aquifer	Prairie du Chien-Jordan	<input type="checkbox"/> None anticipated <input checked="" type="checkbox"/> Flow/water level decline <input type="checkbox"/> Degrading water quality trends <input type="checkbox"/> Impacts on endangered, threatened, or special concern species habitat <input type="checkbox"/> Other: _____	<input type="checkbox"/> Geologic atlas or other mapping <input type="checkbox"/> Modeling <input checked="" type="checkbox"/> Monitoring <input type="checkbox"/> Aquifer testing <input type="checkbox"/> Proximity (obwell < 5 miles) <input checked="" type="checkbox"/> Other: Met Council Water Supply Profile, Wellhead Protection Plan Part 2	<input type="checkbox"/> Not applicable <input checked="" type="checkbox"/> Additional data is needed to establish <input type="checkbox"/> See report: _____ <input type="checkbox"/> Other: _____	<input type="checkbox"/> Not applicable <input type="checkbox"/> Change groundwater pumping <input checked="" type="checkbox"/> Increase conservation <input type="checkbox"/> Other: _____	<input type="checkbox"/> Not applicable <input checked="" type="checkbox"/> Newly collected data will be analyzed <input type="checkbox"/> Regular check-in with these partners: _____ <input type="checkbox"/> Other: _____

Wellhead Protection (WHP) and Source Water Protection (SWP) Plans

Complete Table 11 to provide status information about WHP and SWP 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 (WHP) Plan and Surface Water Protection (SWP) Plan.

Table 11. Status of Wellhead Protection and Source Water Protection Plans

Plan Type	Status	Date Adopted	Date for Update
WHP	<input type="checkbox"/> In Process <input checked="" type="checkbox"/> Completed <input type="checkbox"/> Not Applicable	March 2015 (September 2004)	2024
SWP	<input type="checkbox"/> In Process <input checked="" type="checkbox"/> Completed <input type="checkbox"/> Not Applicable	Sept 2006	November 2013

WHP – Wellhead Protection Plan **SWP** – Source Water Protection Plan

F. Capital Improvement Plan (CIP)

Please note that any wells that received approval under a ten-year permit, but that were not built, are now expired and must submit a water appropriations permit.

Adequacy of Water Supply System

Complete Table 12 with information about the adequacy of wells and/or intakes, storage facilities, treatment facilities, and distribution systems to sustain current and projected demands. List planned capital improvements for any system components, in chronological order. Communities in the seven-county Twin Cities metropolitan area should also include information about plans through 2040.

The assessment can be the general status by category; it is not necessary to identify every single well, storage facility, treatment facility, lift station, and mile of pipe.

Please attach your latest Capital Improvement Plan as **Appendix 4**.

Table 12. Adequacy of Water Supply System

System Component	Planned action	Anticipated Construction Year	Notes
Wells/Intakes	<input checked="" type="checkbox"/> No action planned - adequate <input type="checkbox"/> Repair/replacement <input type="checkbox"/> Expansion/addition		
Water Storage Facilities	<input type="checkbox"/> No action planned - adequate <input checked="" type="checkbox"/> Repair/replacement <input type="checkbox"/> Expansion/addition	As Needed	
Water Treatment Facilities	<input checked="" type="checkbox"/> No action planned - adequate <input type="checkbox"/> Repair/replacement <input type="checkbox"/> Expansion/addition		
Distribution Systems (Pipes, valves, etc.)	<input type="checkbox"/> No action planned - adequate <input checked="" type="checkbox"/> Repair/replacement <input type="checkbox"/> Expansion/addition	As Needed	
Pressure Zones	<input checked="" type="checkbox"/> No action planned - adequate <input type="checkbox"/> Repair/replacement <input type="checkbox"/> Expansion/addition		
Other:	<input checked="" type="checkbox"/> No action planned - adequate <input type="checkbox"/> Repair/replacement <input type="checkbox"/> Expansion/addition		

Proposed Future Water Sources

Complete Table 13 to identify new water source installation planned over the next ten years. Add rows to the table as needed.

Table 13. Proposed future installations/sources

Source	Installation Location (approximate)	Resource Name	Proposed Pumping Capacity (gpm)	Planned Installation Year	Planned Partnerships
Groundwater	N/A				
Surface Water	N/A				
Interconnection to another supplier	N/A				

Water Source Alternatives - Key Metropolitan Council Benchmark

Do you anticipate the need for alternative water sources in the next 10 years? Yes ☐ No ☒

For metro communities, will you need alternative water sources by the year 2040? Yes ☐ No ☒

If you answered yes for either question, then complete table 14. If no, insert NA.

Complete Table 14 by checking the box next to alternative approaches that your community is considering, including approximate locations (if known), the estimated amount of future demand that could be met through the approach, the estimated timeframe to implement the approach, potential partnerships, and the major benefits and challenges of the approach. Add rows to the table as needed.

For communities in the seven-county Twin Cities metropolitan area, these alternatives should include approaches the community is considering to meet projected 2040 water demand.

Table 14. Alternative water sources

Alternative Source Considered	Source and/or Installation Location (approximate)	Estimated Amount of Future Demand (%)	Timeframe to Implement (YYYY)	Potential Partners	Benefits	Challenges
<input type="checkbox"/> Groundwater	N/A					
<input type="checkbox"/> Surface Water	N/A					
<input type="checkbox"/> Reclaimed stormwater	N/A					
<input type="checkbox"/> Reclaimed wastewater	N/A					
<input type="checkbox"/> Interconnection to another supplier	N/A					

PART 2. EMERGENCY PREPAREDNESS PROCEDURES

The emergency preparedness procedures outlined in this plan are intended to comply with the contingency plan provisions required by MDH in the WHP and SWP. Water emergencies can occur as a result of vandalism, sabotage, accidental contamination, mechanical problems, power failings, 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. Municipalities that already have written procedures dealing with water emergencies should review the following information and update existing procedures to address these water supply protection measures.

A. Emergency Response Plan

Section 1433(b) of the Safe Drinking Water Act, (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. MDH recommends that Emergency Response Plans are updated annually.

Do you have an Emergency Response Plan? Yes ☒ No ☐

Have you updated the Emergency Response Plan in the last year? Yes ☐ No ☒

When did you last update your Emergency Response Plan? 2016

Complete Table 15 by inserting the noted information regarding your completed Emergency Response Plan.

Table 15. Emergency Response Plan contact information

Emergency Response Plan Role	Contact Person	Contact Number	Phone	Contact Email
Emergency Response Lead	WAYZATA POLICE CHIEF	952-404-5340		MRISVOLD@WAYZATA.ORG
Alternate Emergency Response Lead	LONG LAKE FIRE CHIEF	952-473-9701		JVANEYLL@LONGLAKEMN.GOV

B. Operational Contingency Plan

All utilities should have a written operational contingency plan that describes measures to be taken for water supply mainline breaks and other common system failures as well as routine maintenance.

Do you have a written operational contingency plan? Yes ☒ No ☐

At a minimum, a water supplier should prepare and maintain an emergency contact list of contractors and suppliers.

C. Emergency Response Procedures

Water suppliers must meet the requirements of MN Rules 4720.5280. Accordingly, the Minnesota Department of Natural Resources (DNR) requires public water suppliers serving more than 1,000 people to submit Emergency and Conservation Plans. Water emergency and conservation plans that have been approved by the DNR, under provisions of Minnesota Statute 186 and Minnesota Rules, part 6115.0770, will be considered equivalent to an approved WHP contingency plan.

Emergency Telephone List

Prepare and attach a list of emergency contacts, including the MN Duty Officer (1-800-422-0798), as **Appendix 5**. An [Emergency Contact List template](#) is available at the [MnDNR Water Supply Plans webpage](#).

The list should include key utility and community personnel, contacts in adjacent water suppliers, and appropriate local, state and federal emergency contacts. Please be sure to verify and update the contacts on the emergency telephone list and date it. Thereafter, update on a regular basis (once a year is recommended). In the case of a municipality, this information should be contained in a notification and warning standard operating procedure maintained by the Emergency Manager for that community. Responsibilities and services for each contact should be defined.

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 and maintenance records should be maintained in secured central and back-up locations so that the records are accessible for emergency purposes. 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. It is critical that public water supplier representatives and emergency response personnel communicate about the response procedures and be able to easily obtain this kind of information both in electronic and hard copy formats (in case of a power outage).

Do records and maps exist? Yes ☒ No ☐

Can staff access records and maps from a central secured location in the event of an emergency?

Yes ☒ No ☐

Does the appropriate staff know where the materials are located?

Yes ☒ No ☐

Procedure for Augmenting Water Supplies

Complete Tables 16 – 17 by listing all available sources of water that can be used to augment or replace existing sources in an emergency. Add rows to the tables as needed.

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. Municipalities are

encouraged to execute cooperative agreements for potential emergency water services and copies should be included in **Appendix 6**. Outstate Communities may consider using nearby high capacity wells (industry, golf course) as emergency water sources.

WSP should include information on any physical or chemical problems that may limit interconnections to other sources of water. Approvals from the MDH are required for interconnections or the reuse of water.

Table 16. Interconnections with other water supply systems to supply water in an emergency

Other Water Supply System Owner	Capacity (GPM & MGD)	Note Any Limitations On Use	List of services, equipment, supplies available to respond
CITY OF ORONO	500 GPM	N/A	

GPM – Gallons per minute MGD – million gallons per day

Table 17. Utilizing surface water as an alternative source

Surface Water Source Name	Capacity (GPM)	Capacity (MGD)	Treatment Needs	Note Any Limitations On Use
N/A	N/A	N/A	N/A	N/A

If not covered above, describe additional emergency measures for providing water (obtaining bottled water, or steps to obtain National Guard services, etc.)

The City of Long Lake has a reciprocal water agreement with the City of Orono as their contingency strategy.

Allocation and Demand Reduction Procedures

Complete Table 18 by adding information about how decisions will be made to allocate water and reduce demand during an emergency. Provide information for each customer category, including its priority ranking, average day demand, and demand reduction potential for each customer category. Modify the customer categories as needed, and add additional lines if necessary.

Water use categories should be prioritized in a way that is consistent with Minnesota Statutes 103G.261 (#1 is highest priority) as follows:

1. Water use for human needs such as cooking, cleaning, drinking, washing and waste disposal; use for on-farm livestock watering; and use for power production that meets contingency requirements.
2. Water use involving consumption of less than 10,000 gallons per day (usually from private wells or surface water intakes)
3. Water use for agricultural irrigation and processing of agricultural products involving consumption of more than 10,000 gallons per day (usually from private high-capacity wells or surface water intakes)
4. Water use for power production above the use provided for in the contingency plan.

5. All other water use involving consumption of more than 10,000 gallons per day.
6. Nonessential uses – car washes, golf courses, etc.

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. Lower priority uses 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. Water use for lawn sprinkling, vehicle washing, golf courses, and recreation are legislatively considered non-essential.

Table 18. Water use priorities

Customer Category	Allocation Priority	Average Daily Demand (GPD)	Short-Term Emergency Demand Reduction Potential (GPD)
Residential	1	107,000	180,000
Institutional/Comm/Ind	2	75,000	125,000
TOTAL		182,000	305,000

GPD – Gallons per Day

Tip: Calculating Emergency Demand Reduction Potential

The emergency demand reduction potential for all uses will typically equal the difference between maximum use (summer demand) and base use (winter demand). In extreme emergency situations, lower priority water uses must be restricted or eliminated to protect priority domestic water requirements. Emergency demand reduction potential should be based on average day demands for customer categories within each priority class. Use the tables in Part 3 on water conservation to help you determine strategies.

Complete Table 19 by selecting the triggers and actions during water supply disruption conditions.

Table 19. Emergency demand reduction conditions, triggers and actions (Select all that may apply and describe)

Emergency Triggers	Short-term Actions	Long-term Actions
<input checked="" type="checkbox"/> Contamination <input checked="" type="checkbox"/> Loss of production <input checked="" type="checkbox"/> Infrastructure failure <input checked="" type="checkbox"/> Executive order by Governor <input type="checkbox"/> Other: _____	<input type="checkbox"/> Supply augmentation through _____ <input checked="" type="checkbox"/> Adopt (if not already) and enforce a critical water deficiency ordinance to penalize lawn watering, vehicle washing, golf course and park irrigation & other nonessential uses. <input type="checkbox"/> Water allocation through _____ <input checked="" type="checkbox"/> Meet with large water users to discuss their contingency plan.	<input type="checkbox"/> Supply augmentation through _____ <input checked="" type="checkbox"/> Adopt (if not already) and enforce a critical water deficiency ordinance to penalize lawn watering, vehicle washing, golf course and park irrigation & other nonessential uses. <input type="checkbox"/> Water allocation through _____ <input checked="" type="checkbox"/> Meet with large water users to discuss their contingency plan.

Notification Procedures

Complete Table 20 by selecting trigger for informing customers regarding conservation requests, water use restrictions, and suspensions; notification frequencies; and partners that may assist in the notification process. Add rows to the table as needed.

Table 20. Plan to inform customers regarding conservation requests, water use restrictions, and suspensions

Notification Trigger(s)	Methods (select all that apply)	Update Frequency	Partners
<input checked="" type="checkbox"/> Short-term demand reduction declared (< 1 year)	<input checked="" type="checkbox"/> Website <input checked="" type="checkbox"/> Email list serve <input checked="" type="checkbox"/> Social media (e.g. Twitter, Facebook) <input type="checkbox"/> Direct customer mailing, <input checked="" type="checkbox"/> Press release (TV, radio, newspaper), <input checked="" type="checkbox"/> Meeting with large water users (> 10% of total city use) <input type="checkbox"/> Other: _____	<input checked="" type="checkbox"/> Daily <input type="checkbox"/> Weekly <input type="checkbox"/> Monthly <input type="checkbox"/> Annually	
<input checked="" type="checkbox"/> Long-term Ongoing demand reduction declared	<input checked="" type="checkbox"/> Website <input checked="" type="checkbox"/> Email list serve <input checked="" type="checkbox"/> Social media (e.g. Twitter, Facebook) <input type="checkbox"/> Direct customer mailing, <input checked="" type="checkbox"/> Press release (TV, radio, newspaper), <input checked="" type="checkbox"/> Meeting with large water users (> 10% of total city use) <input type="checkbox"/> Other: _____	<input checked="" type="checkbox"/> Daily <input type="checkbox"/> Weekly <input type="checkbox"/> Monthly <input type="checkbox"/> Annually	
<input checked="" type="checkbox"/> Governor's critical water deficiency declared	<input checked="" type="checkbox"/> Website <input checked="" type="checkbox"/> Email list serve <input checked="" type="checkbox"/> Social media (e.g. Twitter, Facebook) <input type="checkbox"/> Direct customer mailing, <input type="checkbox"/> Press release (TV, radio, newspaper), <input type="checkbox"/> Meeting with large water users (> 10% of total city use) <input type="checkbox"/> Other: _____	<input checked="" type="checkbox"/> Daily <input type="checkbox"/> Weekly <input type="checkbox"/> Monthly <input type="checkbox"/> Annually	

Enforcement

Prior to a water emergency, municipal water suppliers must adopt regulations that restrict water use and outline the enforcement response plan. The enforcement response plan must outline how conditions will be monitored to know when enforcement actions are triggered, what enforcement tools will be used, who will be responsible for enforcement, and what timelines for corrective actions will be expected.

Affected operations, communications, and enforcement staff must then be trained to rapidly implement those provisions during emergency conditions.

Important Note:

Disregard of critical water deficiency orders, even though total appropriation remains less than permitted, is adequate grounds for immediate modification of a public water supply authority's water use permit (2013 MN Statutes 103G.291)

Does the city have a critical water deficiency restriction/official control in place that includes provisions to restrict water use and enforce the restrictions? (This restriction may be an ordinance, rule, regulation, policy under a council directive, or other official control) Yes ☐ No ☒

If yes, attach the official control document to this WSP as **Appendix 7**.

If no, the municipality must adopt such an official control within 6 months of submitting this WSP and submit it to the DNR as an amendment to this WSP.

Irrespective of whether a critical water deficiency control is in place, does the public water supply utility, city manager, mayor, or emergency manager have standing authority to implement water restrictions? Yes ☐ No ☒

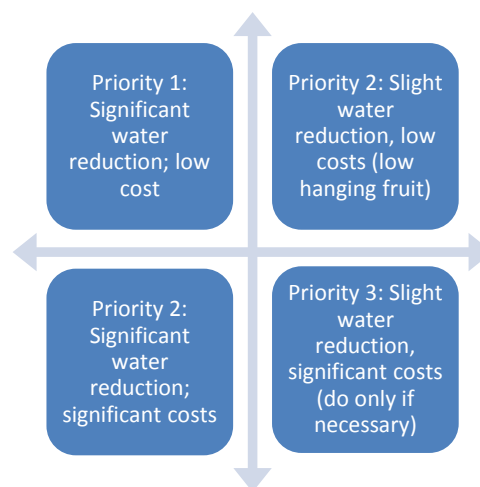
If yes, cite the regulatory authority reference: _____.

If no, who has authority to implement water use restrictions in an emergency?

City Council /Utility Board

PART 3. WATER CONSERVATION PLAN

Minnesotans have historically benefited from the state's abundant water supplies, reducing the need for conservation. There are however, limits to the available supplies of water and increasing threats to the quality of our drinking water. Causes of water supply limitation may include: population increases, economic trends, uneven statewide availability of groundwater, climatic changes, and degraded water quality. Examples of threats to drinking water quality include: the presence of contaminant plumes from past land use activities, exceedances of water quality standards from natural and human sources, contaminants of emerging concern, and increasing pollutant trends from nonpoint sources.



There are many incentives for conserving water; conservation:

- reduces the potential for pumping-induced transfer of contaminants into the deeper aquifers, which can add treatment costs
- reduces the need for capital projects to expand system capacity
- reduces the likelihood of water use conflicts, like well interference, aquatic habitat loss, and declining lake levels
- conserves energy, because less energy is needed to extract, treat and distribute water (and less energy production also conserves water since water is used to produce energy)
- maintains water supplies that can then be available during times of drought

It is therefore imperative that water suppliers implement water conservation plans. The first step in water conservation is identifying opportunities for behavioral or engineering changes that could be made to reduce water use by conducting a thorough analysis of:

- Water use by customer
- Extraction, treatment, distribution and irrigation system efficiencies
- Industrial processing system efficiencies
- Regulatory and barriers to conservation
- Cultural barriers to conservation
- Water reuse opportunities

Once accurate data is compiled, water suppliers can set achievable goals for reducing water use. A successful water conservation plan follows a logical sequence of events. The plan should address both conservation on the supply side (leak detection and repairs, metering), as well as on the demand side (reductions in usage). Implementation should be conducted in phases, starting with the most obvious and lowest-cost options. In some cases, one of the early steps will be reviewing regulatory constraints to water conservation, such as lawn irrigation requirements. Outside funding and grants may be available for implementation of projects. Engage water system operators and maintenance staff and customers in brainstorming opportunities to reduce water use. Ask the question: "How can I help save water?"

Progress since 2006

Is this your community's first Water Supply Plan? Yes ☐ No ☒

If yes, describe conservation practices that you are already implementing, such as: pricing, system improvements, education, regulation, appliance retrofitting, enforcement, etc.

If no, complete Table 21 to summarize conservation actions taken since the adoption of the 2006 water supply plan.

Table 21. Implementation of previous ten-year Conservation Plan

2006 Plan Commitments	Action Taken?
Change water rates structure to provide conservation pricing	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Water supply system improvements (e.g. leak repairs, valve replacements, etc.)	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Educational efforts	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
New water conservation ordinances	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Rebate or retrofitting Program (e.g. for toilet, faucets, appliances, showerheads, dish washers, washing machines, irrigation systems, rain barrels, water softeners, etc.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Enforcement	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Describe other	<input type="checkbox"/> Yes <input type="checkbox"/> No

What are the results you have seen from the actions in Table 21 and how were results measured?

Reflection of the table #2 data shows that both the residential per capita demand use, and total per capita demand use is trending downward.

A. Triggers for Allocation and Demand Reduction Actions

Complete table 22 by checking each trigger below, as appropriate, and the actions to be taken at various levels or stages of severity. Add in additional rows to the table as needed.

Table 22. Short and long-term demand reduction conditions, triggers and actions

Objective	Triggers	Actions
Protect surface water flows	<input type="checkbox"/> Low stream flow conditions <input type="checkbox"/> Reports of declining wetland and lake levels <input type="checkbox"/> Other: _____	<input type="checkbox"/> Increase promotion of conservation measures <input type="checkbox"/> Other: _____
Short-term demand reduction (less than 1 year)	<input checked="" type="checkbox"/> Extremely high seasonal water demand (more than double winter demand) <input type="checkbox"/> Loss of treatment capacity <input checked="" type="checkbox"/> Lack of water in storage <input type="checkbox"/> State drought plan <input type="checkbox"/> Well interference <input type="checkbox"/> Other: _____	<input checked="" type="checkbox"/> Adopt (if not already) and enforce the critical water deficiency ordinance to restrict or prohibit lawn watering, vehicle washing, golf course and park irrigation & other nonessential uses. <input type="checkbox"/> Supply augmentation through _____ <input type="checkbox"/> Water allocation through _____ <input type="checkbox"/> Meet with large water users to discuss user's contingency plan.
Long-term demand reduction (>1 year)	<input checked="" type="checkbox"/> Per capita demand increasing <input checked="" type="checkbox"/> Total demand increase (higher population or more industry). Water level in well(s) below elevation of _____ <input type="checkbox"/> Other: _____	<input checked="" type="checkbox"/> Develop a critical water deficiency ordinance that is or can be quickly adopted to penalize lawn watering, vehicle washing, golf course and park irrigation & other nonessential uses. <input checked="" type="checkbox"/> Enact a water waste ordinance that targets overwatering (causing water to flow off the landscape into streets, parking lots, or similar), watering impervious surfaces (streets, driveways or other hardscape areas), and negligence of known leaks, breaks, or malfunctions. <input checked="" type="checkbox"/> Meet with large water users to discuss user's contingency plan. <input type="checkbox"/> Enhanced monitoring and reporting: audits, meters, billing, etc.
Governor's "Critical Water Deficiency Order" declared	<input checked="" type="checkbox"/> Describe	<input checked="" type="checkbox"/> Describe Stage 1: Restrict lawn watering, vehicle washing, golf course and other non-essential uses. Stage 2: Suspend lawn watering, vehicle washing, golf course and park irrigation and other non-essential uses.

B. Conservation Objectives and Strategies – Key benchmark for DNR

This section establishes water conservation objectives and strategies for eight major areas of water use.

Objective 1: Reduce Unaccounted (Non-Revenue) Water loss to Less than 10%

The Minnesota Rural Water Association, the Metropolitan Council and the Department of Natural Resources recommend that all water uses be metered. Metering can help identify high use locations and times, along with leaks within buildings that have multiple meters.

It is difficult to quantify specific unmetered water use such as that associated with firefighting and system flushing or system leaks. Typically, water suppliers subtract metered water use from total water pumped to calculate unaccounted or non-revenue water loss.

Is your five-year average (2005-2014) unaccounted Water Use in Table 2 higher than 10%?

Yes ☐ No ☒

What is your leak detection monitoring schedule? (e.g. Monitor 1/3rd of the city lines per year)

Every 5 years.

Water Audits - are designed to help quantify and track water losses associated with water distribution systems and identify areas for improved efficiency and cost recovery. The American Water Works Association (AWWA) has a recommended water audit methodology which is presented in [AWWA's M36 Manual of Water Supply Practices: Water Audits and Loss Control Programs](#). AWWA also provides a free spreadsheet-based water audit tool that water suppliers can use to conduct their own water audits. This free water audit tool can be found on AWWA's [Water Loss Control webpage](#). Another resource for water audit and water loss control information is [Minnesota Rural Water Association](#).

What is the date of your most recent water audit? _2013_____

Frequency of water audits: ☐ yearly ☒ other (specify frequency) __5 year_____

Leak detection and survey: ☐ every year ☐ every other year ☒ periodic as needed

Year last leak detection survey completed: ____2013_____

If Table 2 shows annual water losses over 10% or an increasing trend over time, describe what actions will be taken to reach the <10% loss objective and within what timeframe

Metering -AWWA recommends that every water supplier install meters to account for all water taken into its system, along with all water distributed from its system at each customer's point of service. An effective metering program relies upon periodic performance testing, repair, maintenance or replacement of all meters. Drinking Water Revolving Loan Funds are available for purchase of new meters when new plants are built. AWWA also recommends that water suppliers conduct regular water

audits to account for unmetered unbilled consumption, metered unbilled consumption and source water and customer metering inaccuracies. Some cities install separate meters for interior and exterior water use, but some research suggests that this may not result in water conservation.

Complete Table 23 by adding the requested information regarding the number, types, testing and maintenance of customer meters.

Table 23. Information about customer meters

Customer Category	Number of Customers	Number of Metered Connections	Number of Automated Meter Readers	Meter testing intervals (years)	Average age/meter replacement schedule (years)
Residential				As needed	1 /25
Irrigation meters				As needed	1/25
Institutional				As needed	1/25
Commercial				As needed	1/25
Industrial				As needed	1/25
Public facilities				As needed	1/25
Other				As needed	
TOTALS	756	756		NA	NA

For unmetered systems, describe any plans to install meters or replace current meters with advanced technology meters. Provide an estimate of the cost to implement the plan and the projected water savings from implementing the plan.

--

Table 24. Water source meters

	Number of Meters	Meter testing schedule (years)	Number of Automated Meter Readers	Average age/meter replacement schedule (years)
Well 1A Wellhouse #1	1		N/A	As needed
Well 2 Wellhouse #2	1		N/A	As needed

Objective 2: Achieve Less than 75 Residential Gallons per Capita Demand (GPCD)

The 2002 average residential per capita demand in the Twin Cities Metropolitan area was 75 gallons per capita per day.

Is your average 2010-2015 residential per capita water demand in Table 2 more than 75? Yes ☐ No ☒

What was your 2010 – 2015 five-year average residential per capita water demand? 61.3
g/person/day

Describe the water use trend over that timeframe:

As indicated in table #2 both the total per capita demand in water use, and the residential per capita demand in water use is trending slightly downward during this reporting period.

Complete Table 25 by checking which strategies you will use to continue reducing residential per capita demand and project a likely timeframe for completing each checked strategy (Select all that apply and add rows for additional strategies):

Table 25. Strategies and timeframe to reduce residential per capita demand

Strategy to reduce residential per capita demand	Timeframe for completing work
<input type="checkbox"/> Revise city ordinances/codes to encourage or require water efficient landscaping.	
<input type="checkbox"/> Revise city ordinance/codes to permit water reuse options, especially for non-potable purposes like irrigation, groundwater recharge, and industrial use. Check with plumbing authority to see if internal buildings reuse is permitted	
<input type="checkbox"/> Revise ordinances to limit irrigation. Describe the restricted irrigation plan:	
<input type="checkbox"/> Revise outdoor irrigation installations codes to require high efficiency systems (e.g. those with soil moisture sensors or programmable watering areas) in new installations or system replacements.	
<input checked="" type="checkbox"/> Make water system infrastructure improvements	On going
<input type="checkbox"/> Offer free or reduced cost water use audits) for residential customers.	
<input type="checkbox"/> Implement a notification system to inform customers when water availability conditions change.	
<input type="checkbox"/> Provide rebates or incentives for installing water efficient appliances and/or fixtures indoors (e.g., low flow toilets, high efficiency dish washers and washing machines, showerhead and faucet aerators, water softeners, etc.)	
<input type="checkbox"/> Provide rebates or incentives to reduce outdoor water use (e.g., turf replacement/reduction, rain gardens, rain barrels, smart irrigation, outdoor water use meters, etc.)	
<input type="checkbox"/> Identify supplemental Water Resources	
<input type="checkbox"/> Conduct audience-appropriate water conservation education and outreach.	
<input type="checkbox"/> Describe other plans	

Objective 3: Achieve at least 1.5% annual reduction in non-residential per capita water use

(For each of the next ten years, or a 15% total reduction over ten years.) This includes commercial, institutional, industrial and agricultural water users.

Complete Table 26 by checking which strategies you will use to continue reducing non-residential customer use demand and project a likely timeframe for completing each checked strategy (add rows for additional strategies).

Where possible, substitute recycled water used in one process for reuse in another. (For example, spent rinse water can often be reused in a cooling tower.) Keep in mind the true cost of water is the amount on the water bill PLUS the expenses to heat, cool, treat, pump, and dispose of/discharge the water. Don't just calculate the initial investment. Many conservation retrofits that appear to be prohibitively expensive are actually very cost-effective when amortized over the life of the equipment. Often reducing water use also saves electrical and other utility costs. Note: as of 2015, water reuse, and is not allowed by the state plumbing code, M.R. 4715 (a variance is needed). However, several state agencies are addressing this issue.

Table 26. Strategies and timeframe to reduce institutional, commercial industrial, and agricultural and non-revenue use demand

Strategy to reduce total business, industry, agricultural demand	Timeframe for completing work
<input checked="" type="checkbox"/> Conduct a facility water use audit for both indoor and outdoor use, including system components	
<input type="checkbox"/> Install enhanced meters capable of automated readings to detect spikes in consumption	
<input type="checkbox"/> Compare facility water use to related industry benchmarks, if available (e.g., meat processing, dairy, fruit and vegetable, beverage, textiles, paper/pulp, metals, technology, petroleum refining etc.)	
<input type="checkbox"/> Install water conservation fixtures and appliances or change processes to conserve water	
<input checked="" type="checkbox"/> Repair leaking system components (e.g., pipes, valves)	On going
<input type="checkbox"/> Investigate the reuse of reclaimed water (e.g., stormwater, wastewater effluent, process wastewater, etc.)	
<input type="checkbox"/> Reduce outdoor water use (e.g., turf replacement/reduction, rain gardens, rain barrels, smart irrigation, outdoor water use meters, etc.)	
<input checked="" type="checkbox"/> Train employees how to conserve water	On going
<input checked="" type="checkbox"/> Implement a notification system to inform non-residential customers when water availability conditions change.	On going
<input type="checkbox"/> Nonpotable rainwater catchment systems intended to supply uses such as water closets, urinals, trap primers for floor drains and floor sinks, industrial processes, water features, vehicle washing facilities, cooling tower makeup, and similar uses shall be approved by the commissioner. Plumbing code 4714.1702, Published October 31, 2016	
<input type="checkbox"/> Describe other plans:	

Objective 4: Achieve a Decreasing Trend in Total Per Capita Demand

Include as **Appendix 8** one graph showing total per capita water demand for each customer category (i.e., residential, institutional, commercial, industrial) from 2005-2014 and add the calculated/estimated linear trend for the next 10 years.

Describe the trend for each customer category; explain the reason(s) for the trends, and where trends are increasing.

The residential per capita water demand shows a downward trend. Watermain replacement efforts, conservation efforts, installation of new residential water meters, and fluctuating economic conditions. The CII customer category demand remains relatively flat showing no significant increase or decrease in water use demand.

Objective 5: Reduce Ratio of Maximum day (peak day) to the Average Day Demand to Less Than 2.6

Is the ratio of average 2005-2014 maximum day demand to average 2005-2014 average day demand reported in Table 2 more than 2.6? Yes ☒ No ☐

Calculate a ten-year average (2005 – 2014) of the ratio of maximum day demand to average day demand: 2.66

The position of the DNR has been that a peak day/average day ratio that is above 2.6 for in summer indicates that the water being used for irrigation by the residents in a community is too large and that efforts should be made to reduce the peak day use by the community.

It should be noted that by reducing the peak day use, communities can also reduce the amount of infrastructure that is required to meet the peak day use. This infrastructure includes new wells, new water towers which can be costly items.

Objective 6: Implement Demand Reduction Measures

Water Conservation Program

Municipal water suppliers serving over 1,000 people are required to adopt demand reduction measures that include a conservation rate structure, or a uniform rate structure with a conservation program that achieves demand reduction. These measures must achieve demand reduction in ways that reduce water demand, water losses, peak water demands, and nonessential water uses. These measures must be approved before a community may request well construction approval from the Department of Health or before requesting an increase in water appropriations permit volume ([Minnesota Statutes, section 103G.291, subd. 3 and 4](#)). Rates should be adjusted on a regular basis to ensure that revenue of the system is adequate under reduced demand scenarios. If a municipal water supplier intends to use a Uniform Rate Structure, a community-wide Water Conservation Program that will achieve demand reduction must be provided.

Current Water Rates

Include a copy of the actual rate structure in **Appendix 9** or list current water rates including base/service fees and volume charges below.

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

Frequency of billing: ☐ Monthly ☐ Bimonthly ☒ Quarterly ☐ Other: _____

Water Rate Evaluation Frequency: ☒ every year

☐ every ____ years ☐ no schedule

Date of last rate change: _2018_____

Table 27. Rate structures for each customer category (Select all that apply and add additional rows as needed)

Customer Category	Conservation Billing Strategies in Use *	Conservation Neutral Billing Strategies in Use **	Non-Conserving Billing Strategies in Use ***
Residential	<input type="checkbox"/> Monthly billing <input checked="" type="checkbox"/> Increasing block rates (volume tiered rates) <input type="checkbox"/> Seasonal rates <input type="checkbox"/> Time of use rates <input checked="" type="checkbox"/> Water bills reported in gallons <input type="checkbox"/> Individualized goal rates <input type="checkbox"/> Excess use rates <input type="checkbox"/> Drought surcharge <input type="checkbox"/> Use water bill to provide comparisons <input type="checkbox"/> Service charge not based on water volume <input type="checkbox"/> Other (describe)	<input type="checkbox"/> Uniform <input type="checkbox"/> Odd/even day watering	<input type="checkbox"/> Service charge based on water volume <input type="checkbox"/> Declining block <input type="checkbox"/> Flat <input type="checkbox"/> Other (describe)
Commercial/ Industrial/ Institutional	<input type="checkbox"/> Monthly billing <input checked="" type="checkbox"/> Increasing block rates (volume tiered rates) <input type="checkbox"/> Seasonal rates <input type="checkbox"/> Time of use rates <input checked="" type="checkbox"/> Water bills reported in gallons <input type="checkbox"/> Individualized goal rates <input type="checkbox"/> Excess use rates <input type="checkbox"/> Drought surcharge <input type="checkbox"/> Use water bill to provide comparisons <input type="checkbox"/> Service charge not based on water volume <input type="checkbox"/> Other (describe)	<input type="checkbox"/> Uniform	<input type="checkbox"/> Service charge based on water volume <input type="checkbox"/> Declining block <input type="checkbox"/> Flat <input type="checkbox"/> Other (describe)
<input type="checkbox"/> Other			

*** Rate Structures components that may promote water conservation:**

- **Monthly billing:** is encouraged to help people see their water usage so they can consider changing behavior.
- **Increasing block rates (also known as a tiered residential rate structure):** Typically, these have at least three tiers: should have at least three tiers.
 - The first tier is for the winter average water use.
 - The second tier is the year-round average use, which is lower than typical summer use. This rate should be set to cover the full cost of service.
 - The third tier should be above the average annual use and should be priced high enough to encourage conservation, as should any higher tiers. For this to be effective, the difference in block rates should be significant.
- **Seasonal rate:** higher rates in summer to reduce peak demands
- **Time of Use rates:** lower rates for off peak water use
- **Bill water use in gallons:** this allows customers to compare their use to average rates
- **Individualized goal rates:** typically used for industry, business or other large water users to promote water conservation if they keep within agreed upon goals.
- **Excess Use rates:** if water use goes above an agreed upon amount this higher rate is charged
- **Drought surcharge:** an extra fee is charged for guaranteed water use during drought
- **Use water bill to provide comparisons:** simple graphics comparing individual use over time or compare individual use to others.
- **Service charge or base fee that does not include a water volume** – a base charge or fee to cover universal city expenses that are not customer dependent and/or to provide minimal water at a lower rate (e.g., an amount less than the average residential per capita demand for the water supplier for the last 5 years)
- **Emergency rates** -A community may have a separate conservation rate that only goes into effect when the community or governor declares a drought emergency. These higher rates can help to protect the city budgets during times of significantly less water usage.

****Conservation Neutral****

- **Uniform rate:** rate per unit used is the same regardless of the volume used
- **Odd/even day watering** –This approach reduces peak demand on a daily basis for system operation, but it does not reduce overall water use.

***** Non-Conserving *****

- **Service charge or base fee with water volume:** an amount of water larger than the average residential per capita demand for the water supplier for the last 5 years
- **Declining block rate:** the rate per unit used decreases as water use increases.
- **Flat rate:** one fee regardless of how much water is used (usually unmetered).

Provide justification for any conservation neutral or non-conserving rate structures. If intending to adopt a conservation rate structure, include the timeframe to do so:

The city has an increasing block rate.

Objective 7: Additional strategies to Reduce Water Use and Support Wellhead Protection Planning

Development and redevelopment projects can provide additional water conservation opportunities, such as the actions listed below. If a Uniform Rate Structure is in place, the water supplier must provide a Water Conservation Program that includes at least two of the actions listed below. Check those actions that you intent to implement within the next 10 years.

Table 28. Additional strategies to Reduce Water Use & Support Wellhead Protection

<input type="checkbox"/>	Participate in the GreenStep Cities Program, including implementation of at least one of the 20 “Best Practices” for water
<input checked="" type="checkbox"/>	Prepare a master plan for smart growth (compact urban growth that avoids sprawl)
<input checked="" type="checkbox"/>	Prepare a comprehensive open space plan (areas for parks, green spaces, natural areas)
<input type="checkbox"/>	Adopt a water use restriction ordinance (lawn irrigation, car washing, pools, etc.)
<input type="checkbox"/>	Adopt an outdoor lawn irrigation ordinance
<input type="checkbox"/>	Adopt a private well ordinance (private wells in a city must comply with water restrictions)
<input type="checkbox"/>	Implement a stormwater management program
<input type="checkbox"/>	Adopt non-zoning wetlands ordinance (can further protect wetlands beyond state/federal laws-for vernal pools, buffer areas, restrictions on filling or alterations)
<input type="checkbox"/>	Adopt a water offset program (primarily for new development or expansion)
<input type="checkbox"/>	Implement a water conservation outreach program
<input type="checkbox"/>	Hire a water conservation coordinator (part-time)
<input type="checkbox"/>	Implement a rebate program for water efficient appliances, fixtures, or outdoor water management
<input type="checkbox"/>	Other

Objective 8: Tracking Success: How will you track or measure success through the next ten years?

The city will continue to monitor water use data to see if conservation efforts are working.

Tip: The process to monitor demand reduction and/or a rate structure includes:

- The DNR Hydrologist will call or visit the community the first 1-3 years after the water supply plan is completed.
- They will discuss what activities the community is doing to conserve water and if they feel their actions are successful. The Water Supply Plan, Part 3 tables and responses will guide the discussion. For example, they will discuss efforts to reduce unaccounted for water loss if that is a problem, or go through Tables 33, 34 and 35 to discuss new initiatives.
- The city representative and the hydrologist will discuss total per capita water use, residential per capita water use, and business/industry use. They will note trends.
- They will also discuss options for improvement and/or collect case studies of success stories to share with other communities. One option may be to change the rate structure, but there are many other paths to successful water conservation.
- If appropriate, they will cooperatively develop a simple work plan for the next few years, targeting a couple areas where the city might focus efforts.

C. Regulation

Complete Table 29 by selecting which regulations are used to reduce demand and improve water efficiencies. Add additional rows as needed.

Copies of adopted regulations or proposed restrictions or should be included in **Appendix 10** (a list with hyperlinks is acceptable).

Table 29. Regulations for short-term reductions in demand and long-term improvements in water efficiencies

Regulations Utilized	When is it applied (in effect)?
<input type="checkbox"/> Rainfall sensors required on landscape irrigation systems	<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared Emergencies
<input type="checkbox"/> Water efficient plumbing fixtures required	<input type="checkbox"/> New development <input type="checkbox"/> Replacement <input type="checkbox"/> Rebate Programs
<input type="checkbox"/> Critical/Emergency Water Deficiency ordinance	<input type="checkbox"/> Only during declared Emergencies
<input checked="" type="checkbox"/> Watering restriction requirements (time of day, allowable days, etc.)	<input type="checkbox"/> Odd/even <input type="checkbox"/> 2 days/week <input checked="" type="checkbox"/> Only during declared Emergencies
<input type="checkbox"/> Water waste prohibited (for example, having a fine for irrigators spraying on the street)	<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared Emergencies
<input type="checkbox"/> Limitations on turf areas (requiring lots to have 10% - 25% of the space in natural areas)	<input type="checkbox"/> New development <input type="checkbox"/> Shoreland/zoning <input type="checkbox"/> Other
<input type="checkbox"/> Soil preparation requirements (after construction, requiring topsoil to be applied to promote good root growth)	<input type="checkbox"/> New Development <input type="checkbox"/> Construction Projects <input type="checkbox"/> Other
<input type="checkbox"/> Tree ratios (requiring a certain number of trees per square foot of lawn)	<input type="checkbox"/> New development <input type="checkbox"/> Shoreland/zoning <input type="checkbox"/> Other
<input type="checkbox"/> Permit to fill swimming pool and/or requiring pools to be covered (to prevent evaporation)	<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared Emergencies
<input type="checkbox"/> Ordinances that permit stormwater irrigation, reuse of water, or other alternative water use (Note: be sure to check current plumbing codes for updates)	<input type="checkbox"/> Describe

D. 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 municipal water suppliers develop a long-term plan to retrofit public buildings with water efficient plumbing fixtures and appliances. Some water suppliers have developed partnerships with organizations having similar conservation goals, such as electric or gas suppliers, to develop cooperative rebate and retrofit programs.

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

Complete Table 30 by checking which water uses are targeted, the outreach methods used, the measures used to identify success, and any participating partners.

Table 30. Retrofitting programs (Select all that apply)

Water Use Targets	Outreach Methods	Partners
<input checked="" type="checkbox"/> Low flush toilets, <input type="checkbox"/> Toilet leak tablets, <input checked="" type="checkbox"/> Low flow showerheads, <input checked="" type="checkbox"/> Faucet aerators;	<input checked="" type="checkbox"/> Education about <input type="checkbox"/> Free distribution of <input type="checkbox"/> Rebate for <input type="checkbox"/> Other	<input type="checkbox"/> Gas company <input type="checkbox"/> Electric company <input type="checkbox"/> Watershed organization
<input type="checkbox"/> Water conserving washing machines, <input type="checkbox"/> Dish washers, <input checked="" type="checkbox"/> Water softeners;	<input checked="" type="checkbox"/> Education about <input type="checkbox"/> Free distribution of <input type="checkbox"/> Rebate for <input type="checkbox"/> Other	<input type="checkbox"/> Gas company <input type="checkbox"/> Electric company <input type="checkbox"/> Watershed organization
<input checked="" type="checkbox"/> Rain gardens, <input type="checkbox"/> Rain barrels, <input type="checkbox"/> Native/drought tolerant landscaping, etc.	<input checked="" type="checkbox"/> Education about <input type="checkbox"/> Free distribution of <input type="checkbox"/> Rebate for <input type="checkbox"/> Other	<input type="checkbox"/> Gas company <input type="checkbox"/> Electric company <input type="checkbox"/> Watershed organization

Briefly discuss measures of success from the above table (e.g. number of items distributed, dollar value of rebates, gallons of water conserved, etc.):

The city includes education for water saving measures that can be accomplished in the home.

E. Education and Information Programs

Customer education should take place in three different circumstances. First, customers should be provided information on how to conserve water and improve water use efficiencies. Second, information should be provided at appropriate times to address peak demands. Third, emergency notices and educational materials about how to reduce water use should be available for quick distribution during an emergency.

Proposed Education Programs

Complete Table 31 by selecting which methods are used to provide water conservation and information, including the frequency of program components. Select all that apply and add additional lines as needed.

Table 31. Current and Proposed Education Programs

Education Methods	General summary of topics	#/Year	Frequency
Billing inserts or tips printed on the actual bill	Water conservation methods	2	<input checked="" type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Consumer Confidence Reports	As required by law	1	<input checked="" type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Press releases to traditional local news outlets (e.g., newspapers, radio and TV)	N/A		<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Social media distribution (e.g., emails, Facebook, Twitter)	N/A		<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Paid advertisements (e.g., billboards, print media, TV, radio, web sites, etc.)	N/A		<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Presentations to community groups			<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Staff training			<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Facility tours			<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies

Education Methods	General summary of topics	#/Year	Frequency
Displays and exhibits			<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Marketing rebate programs (e.g., indoor fixtures & appliances and outdoor practices)			<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Community news letters	Water conservation methods		<input checked="" type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Direct mailings (water audit/retrofit kits, showerheads, brochures)			<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Information kiosk at utility and public buildings			<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Public service announcements			<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Cable TV Programs			<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Demonstration projects (landscaping or plumbing)			<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
K-12 education programs (Project Wet, Drinking Water Institute, presentations)			<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Community events (children's water festivals, environmental fairs)			<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Community education classes			<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Water week promotions			<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies

Education Methods	General summary of topics	#/Year	Frequency
Website (include address: www.longlakemn.gov)	Water conservation methods		<input checked="" type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Targeted efforts (large volume users, users with large increases)			<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Notices of ordinances			<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Emergency conservation notices			<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Other:			<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies

Briefly discuss what future education and information activities your community is considering in the future:

The city will continue to present educational material regarding to water conservation.

PART 4. ITEMS FOR METROPOLITAN AREA COMMUNITIES

Minnesota Statute 473.859 requires WSPs 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 information in Parts 1-3 addresses water demand for the next 10 years. However, additional information is needed to address water demand through 2040, which will make the WSP consistent with the Metropolitan Land Use Planning Act, upon which the local comprehensive plans are based.

This Part 4 provides guidance to complete the WSP in a way that addresses plans for water supply through 2040.

A. Water Demand Projections through 2040

Complete Table 7 in Part 1D by filling in information about long-term water demand projections through 2040. Total Community Population projections should be consistent with the community's system statement, which can be found on the Metropolitan Council's website and which was sent to the community in September 2015.

Projected Average Day, Maximum Day, and Annual Water Demands may either be calculated using the method outlined in *Appendix 2* of the *2015 Master Water Supply Plan* or by a method developed by the individual water supplier.

B. Potential Water Supply Issues

Complete Table 10 in Part 1E by providing information about the potential water supply issues in your community, including those that might occur due to 2040 projected water use.

The [Master Water Supply Plan](#) provides information about potential issues for your community in *Appendix 1 (Water Supply Profiles)*. This resource may be useful in completing Table 10.

You may document results of local work done to evaluate impact of planned uses by attaching a feasibility assessment or providing a citation and link to where the plan is available electronically.

C. Proposed Alternative Approaches to Meet Extended Water Demand Projections

Complete Table 12 in Part 1F with information about potential water supply infrastructure impacts (such as replacements, expansions or additions to wells/intakes, water storage and treatment capacity, distribution systems, and emergency interconnections) of extended plans for development and redevelopment, in 10-year increments through 2040. It may be useful to refer to information in the community's local Land Use Plan, if available.

Complete Table 14 in Part 1F by checking each approach your community is considering to meet future demand. For each approach your community is considering, provide information about the amount of

future water demand to be met using that approach, the timeframe to implement the approach, potential partners, and current understanding of the key benefits and challenges of the approach.

As challenges are being discussed, consider the need for: evaluation of geologic conditions (mapping, aquifer tests, modeling), identification of areas where domestic wells could be impacted, measurement and analysis of water levels & pumping rates, triggers & associated actions to protect water levels, etc.

D. Value-Added Water Supply Planning Efforts (Optional)

The following information is not required to be completed as part of the local water supply plan, but completing this can help strengthen source water protection throughout the region and help Metropolitan Council and partners in the region to better support local efforts.

Source Water Protection Strategies

Does a Drinking Water Supply Management Area for a neighboring public water supplier overlap your community? Yes ☒ No ☐

If you answered no, skip this section. If you answered yes, please complete Table 32 with information about new water demand or land use planning-related local controls that are being considered to provide additional protection in this area.

Table 32. Local controls and schedule to protect Drinking Water Supply Management Areas

Local Control	Schedule to Implement	Potential Partners
<input type="checkbox"/> None at this time		
<input checked="" type="checkbox"/> Comprehensive planning that guides development in vulnerable drinking water supply management areas	2018	City of Orono, City of Wayzata
<input type="checkbox"/> Zoning overlay		
<input type="checkbox"/> Other:		

Technical assistance

From your community's perspective, what are the most important topics for the Metropolitan Council to address, guided by the region's Metropolitan Area Water Supply Advisory Committee and Technical Advisory Committee, as part of its ongoing water supply planning role?

- ☒ Coordination of state, regional and local water supply planning roles
- ☐ Regional water use goals
- ☐ Water use reporting standards
- ☐ Regional and sub-regional partnership opportunities
- ☐ Identifying and prioritizing data gaps and input for regional and sub-regional analyses
- ☐ Others: _____

GLOSSARY

Agricultural/Irrigation Water Use - Water used for crop and non-crop irrigation, livestock watering, chemigation, golf course irrigation, landscape and athletic field irrigation.

Average Daily Demand - The total water pumped during the year divided by 365 days.

Calcareous Fen - Calcareous fens are rare and distinctive wetlands dependent on a constant supply of cold groundwater. Because they are dependent on groundwater and are one of the rarest natural communities in the United States, they are a protected resource in MN. Approximately 200 have been located in Minnesota. They may not be filled, drained or otherwise degraded.

Commercial/Institutional Water Use - Water used by motels, hotels, restaurants, office buildings, commercial facilities and institutions (both civilian and military). Consider maintaining separate institutional water use records for emergency planning and allocation purposes. Water used by multi-family dwellings, apartment buildings, senior housing complexes, and mobile home parks should be reported as Residential Water Use.

Commercial/Institutional/Industrial (C/I/I) Water Sold - The sum of water delivered for commercial/institutional or industrial purposes.

Conservation Rate Structure - A rate structure that encourages conservation and may include increasing block rates, seasonal rates, time of use rates, individualized goal rates, or excess use rates. If a conservation rate is applied to multifamily dwellings, the rate structure must consider each residential unit as an individual user. A community may have a separate conservation rate that only goes into effect when the community or governor declares a drought emergency. These higher rates can help to protect the city budgets during times of significantly less water usage.

Date of Maximum Daily Demand - The date of the maximum (highest) water demand. Typically this is a day in July or August.

Declining Rate Structure - Under a declining block rate structure, a consumer pays less per additional unit of water as usage increases. This rate structure does not promote water conservation.

Distribution System - Water distribution systems consist of an interconnected series of pipes, valves, storage facilities (water tanks, water towers, reservoirs), water purification facilities, pumping stations, flushing hydrants, and components that convey drinking water and meeting fire protection needs for cities, homes, schools, hospitals, businesses, industries and other facilities.

Flat Rate Structure - Flat fee rates do not vary by customer characteristics or water usage. This rate structure does not promote water conservation.

Industrial Water Use - Water used for thermonuclear power (electric utility generation) and other industrial use such as steel, chemical and allied products, paper and allied products, mining, and petroleum refining.

Low Flow Fixtures/Appliances - Plumbing fixtures and appliances that significantly reduce the amount of water released per use are labeled “low flow”. These fixtures and appliances use just enough water to be effective, saving excess, clean drinking water that usually goes down the drain.

Maximum Daily Demand - The maximum (highest) amount of water used in one day.

Metered Residential Connections - The number of residential connections to the water system that have meters. For multifamily dwellings, report each residential unit as an individual user.

Percent Unmetered/Unaccounted For - Unaccounted for water use is the volume of water withdrawn from all sources minus the volume of water delivered. This value represents water “lost” by miscalculated water use due to inaccurate meters, water lost through leaks, or water that is used but unmetered or otherwise undocumented. Water used for public services such as hydrant flushing, ice skating rinks, and public swimming pools should be reported under the category “Water Supplier Services”.

Population Served - The number of people who are served by the community's public water supply system. This includes the number of people in the community who are connected to the public water supply system, as well as people in neighboring communities who use water supplied by the community's public water supply system. It should not include residents in the community who have private wells or get their water from neighboring water supply.

Residential Connections - The total number of residential connections to the water system. For multifamily dwellings, report each residential unit as an individual user.

Residential Per Capita Demand - The total residential water delivered during the year divided by the population served divided by 365 days.

Residential Water Use - Water used for normal household purposes such as drinking, food preparation, bathing, washing clothes and dishes, flushing toilets, and watering lawns and gardens. Should include all water delivered to single family private residences, multi-family dwellings, apartment buildings, senior housing complexes, mobile home parks, etc.

Smart Meter - Smart meters can be used by municipalities or by individual homeowners. Smart metering generally indicates the presence of one or more of the following:

- Smart irrigation water meters are controllers that look at factors such as weather, soil, slope, etc. and adjust watering time up or down based on data. Smart controllers in a typical summer will reduce water use by 30%-50%. Just changing the spray nozzle to new efficient models can reduce water use by 40%.
- Smart Meters on customer premises that measure consumption during specific time periods and communicate it to the utility, often on a daily basis.
- A communication channel that permits the utility, at a minimum, to obtain meter reads on demand, to ascertain whether water has recently been flowing through the meter and onto the premises, and to issue commands to the meter to perform specific tasks such as disconnecting or restricting water flow.

Total Connections - The number of connections to the public water supply system.

Total Per Capita Demand - The total amount of water withdrawn from all water supply sources during the year divided by the population served divided by 365 days.

Total Water Pumped - The cumulative amount of water withdrawn from all water supply sources during the year.

Total Water Delivered - The sum of residential, commercial, industrial, institutional, water supplier services, wholesale and other water delivered.

Ultimate (Full Build-Out) - Time period representing the community's estimated total amount and location of potential development, or when the community is fully built out at the final planned density.

Unaccounted (Non-revenue) Loss - See definitions for "percent unmetered/unaccounted for loss".

Uniform Rate Structure - A uniform rate structure charges the same price-per-unit for water usage beyond the fixed customer charge, which covers some fixed costs. The rate sends a price signal to the customer because the water bill will vary by usage. Uniform rates by class charge the same price-per-unit for all customers within a customer class (e.g. residential or non-residential). This price structure is generally considered less effective in encouraging water conservation.

Water Supplier Services - Water used for public services such as hydrant flushing, ice skating rinks, public swimming pools, city park irrigation, back-flushing at water treatment facilities, and/or other uses.

Water Used for Nonessential Purposes - Water used for lawn irrigation, golf course and park irrigation, car washes, ornamental fountains, and other non-essential uses.

Wholesale Deliveries - The amount of water delivered in bulk to other public water suppliers.

Acronyms and Initialisms

AWWA – American Water Works Association
C/I/I – Commercial/Institutional/Industrial
CIP – Capital Improvement Plan
GIS – Geographic Information System
GPCD – Gallons per capita per day
GWMA – Groundwater Management Area – North and East Metro, Straight River, Bonanza,
MDH – Minnesota Department of Health
MGD – Million gallons per day

MG – Million gallons
MGL – Maximum Contaminant Level
MnTAP – Minnesota Technical Assistance Program (University of Minnesota)
MPARS – MN/DNR Permitting and Reporting System (new electronic permitting system)
MRWA – Minnesota Rural Waters Association
SWP – Source Water Protection
WHP – Wellhead Protection

APPENDICES TO BE SUBMITTED BY THE WATER SUPPLIER

Appendix 1: Well records and maintenance summaries

Go to [Part 1C](#) for information on what to include in appendix

Appendix 2: Water level monitoring plan

Go to [Part 1E](#) for information on what to include in appendix

Appendix 3: Water level graphs for each water supply well

Go to [Part 1E](#) for information on what to include in appendix

Appendix 4: Capital Improvement Plan

Go to [Part 1E](#) for information on what to include in appendix

Appendix 5: Emergency Telephone List

Go to [Part 2C](#) for information on what to include in appendix

Appendix 6: Cooperative Agreements for Emergency Services

Go to [Part 2C](#) for information on what to include in appendix

Appendix 7: Municipal Critical Water Deficiency Ordinance

Go to [Part 2C](#) for information on what to include in appendix

Appendix 8: Graph of Ten Years of Annual Per Capita Water Demand for Each Customer Category

Go to [Objective 4 in Part 3B](#) for information on what to include in appendix

Appendix 9: Water Rate Structure

Go to [Objective 6 in Part 3B](#) for information on what to include in appendix

Appendix 10: Ordinances or Regulations Related to Water Use

Go to [Objective 7 in Part 3B](#) for information on what to include in appendix

Appendix 11: Implementation Checklist

Provide a table that summarizes all the actions that the public water supplier is doing, or proposes to do, with estimated implementation dates.

Appendix 12: Sources of Information for Table 10

Provide links or references to the information used to complete Table 10. If the file size is reasonable, provide source information as attachments to the plan.

Appendix 1

Well Records and Maintenance Summaries

667910

County Hennepin
 Quad Excelsior
 Quad ID 105A

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING REPORT
 Minnesota Statutes Chapter 1031

Entry Date 07/15/2002
 Update Date 04/16/2015
 Received Date

Well Name LONG LAKE 1A		Township 118	Range 23	Dir Section W 34	Subsection DBBDC	Well Depth 475 ft.	Depth Completed 475 ft.	Date Well Completed 01/04/2002	
Elevation 990 ft.		Elev. Method 7.5 minute topographic map (+/- 5 feet)				Drill Method Driven	Drill Fluid Bentonite		
Address						Use community supply(municipal)		Status Active	
Well 380 LONGVIEW AV LONG LAKE MN 55356						Well Hydrofractured?		Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> From To	
C/W 1964 PARK AV LONG LAKE MN 55356						Casing Type Step down		Joint Welded	
Stratigraphy Information						Drive Shoe?		Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Above/Below 2 ft.	
Geological Material		From	To (ft.)	Color	Hardness	Casing Diameter		Weight	Hole Diameter
TOP SOIL		0	5	BLACK	SOFT	18 in. To 240 ft.		lbs./ft.	24 in. To 19 ft.
CLAY		5	15	YELLOW	SOFT	19 in. To 24 ft.		lbs./ft.	23 in. To 240 ft.
CLAY		15	60	BLUE	SOFT				
CLAY GRAVEL		60	190	GRAY	SOFT				
CLAY GRAVEL		190	192	GRAY	SOFT				
LIMESTONE		192	343	BRN/RED	HARD				
LIMESTONE		343	345	RED/BRN	HARD				
SANDSTONE		345	390	YELLOW	SOFT				
SANDSTONE		390	395	WHITE	MEDIUM				
SANDSTONE		395	400	WHT/RED	MEDIUM				
SANDSTONE SHALE		400	410	WHT/GRN	M.SOFT				
SANDSTONE		410	420	WHITE	SOFT				
SANDSTONE SHALE		420	430	WHT/GRN	MEDIUM				
SANDSTONE SHALE		430	440		MEDIUM				
SANDSTONE		440	442	PINK	MED-HRD				
SANDSTONE SHALE		442	450		MED-HRD				
SANDSTONE SHALE		450	470		MED-HRD				
80 % SHALE		470	475		MED-HRD				
Open Hole						From 240 ft.		To 475 ft.	
Screen?						Type		Make	
Static Water Level						86 ft.		Land surface Measure 01/04/2002	
Pumping Level (below land surface)						106 ft.		5 hrs. Pumping at 1200 g.p.m.	
Wellhead Completion						Pitless adapter manufacturer		Model	
						<input type="checkbox"/> 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 checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not Specified	
Material						Amount		From To	
Neat Cement						17 Cubic yards		0 ft. 240 ft.	
Nearest Known Source of Contamination						200 feet		West Direction	
Well disinfected upon completion?						<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		Sewer Type	
Pump						<input checked="" type="checkbox"/> Not Installed		Date Installed	
Manufacturer's name						Model Number		HP Volt	
Length of drop pipe						ft Capacity		g.p. Type	
Abandoned						Does property have any not in use and not sealed well(s)?		<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
Variance						Was a variance granted from the MDH for this well?		<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Miscellaneous						First Bedrock		Prairie Du Chien Group	
Last Strat						St.Lawrence Formation		Aquifer Prairie Du Chien-	
Located by						Minnesota Department of Health		Depth to Bedrock 190 ft	
Locate Method						GPS SA Off (averaged)			
System						UTM - Mad83, Zone 15, Meters		X 454827 Y 4981412	
Unique Number Verification						Tag on well		Input Date 03/18/2003	
Angled Drill Hole									
Well Contractor						Traut M.J. Well Co.		71536 TRAUT, T.	
Licensee Business						Lic. or Reg. No.		Name of Driller	

Remarks

GAMMA LOGGED 7-2-2002. M.G.S. NO. 4177. LOGGED BY JIM TRAEIN. TO 422FT.
 VARIANCE #2556.

WELL LOCATION
County Name
Hennepin

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
Minnesota Statutes Chapter 103I

MINNESOTA UNIQUE WELL NO.

667910

Township Name
Orono

Township No.
118

Range No.
23W

Section No.
34

Fraction
SE 1/4 SE NW 1/4

WELL DEPTH (completed)
477 Top of Casing

Date Work Completed
1-4-02

House Number, Street Name, City, and Zip Code of Well Location
1964 Park Ave Long Lake MN 55356

DRILLING METHOD
☐ Cable Tool
☐ Auger
☒ Driven
☐ Rotary
☐ Dug
☐ Jetted

Show exact location of well in section grid with "X".
Sketch map of well location. Showing property lines, roads and buildings.

DRILLING FLUID
Bentonite

WELL HYDROFRACTURED? ☐ YES ☒ NO
FROM _____ ft. to _____ ft.

PROPERTY OWNER'S NAME
City of Long Lake

Properly owner's mailing address if different than well location address indicated above.
**1964 Park Ave
Long Lake, MN 55356**

USE
☐ Domestic
☐ Irrigation
☐ Environ. Bore Hole
☐ Monitoring
☒ Community PWS
☐ Noncommunity PWS
☐ Dewatering
☐ Heating/Cooling
☐ Industry/Commercial
☐ Remedial

CASING Drive Shoe? ☒ Yes ☐ No
☒ Steel ☐ Threaded ☒ Welded
☐ Plastic ☐ _____

HOLE DIAM.

CASING DIAMETER WEIGHT
24 in. to **19** ft. _____ lbs./ft.
18 in. to **240** ft. _____ lbs./ft.
_____ in. to _____ ft. _____ lbs./ft.

SCREEN
Make _____
Type _____
Slot/Gauze _____
Set between _____ ft. and _____ ft. FITTINGS: _____

OPEN HOLE
from **240** ft. to **475** ft.
Diam. _____
Length _____

STATIC WATER LEVEL
86 ft. ☒ below ☐ above land surface Date measured **1-4-02**

PUMPING LEVEL (below land surface)
106' ft. after **5** hrs. pumping **1200** g.p.m.

WELL HEAD COMPLETION
☐ Ploss adapter manufacturer _____ Model _____
☐ Casing Protection _____
☒ At-grade (Environmental Wells and Borings ONLY)
☒ 12 in. above grade

GROUTING INFORMATION
Well grouted? ☒ Yes ☐ No
Grout Material ☒ Neat cement ☐ Bentonite ☐ Concrete ☐ High Solids Bentonite
from **0** to **240** ft. **17** yds. ☒ bags
from _____ to _____ ft. _____ yds. ☐ bags
from _____ to _____ ft. _____ yds. ☐ bags

NEAREST KNOWN SOURCE OF CONTAMINATION
200 feet **West** direction **Sewer Line**
Well disinfected upon completion? ☒ Yes ☐ No

PUMP
☒ Not installed Date installed _____
Manufacturer's name _____
Model number _____ HP _____ Volts _____
Length of drop pipe _____ ft. Capacity _____ g.p.m.
Type: ☐ Submersible ☐ L.S. Turbine ☐ Reciprocating ☐ Jet ☐ _____

ABANDONED WELLS
Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No

VARIANCE
Was a variance granted from the MDH for this well? ☒ Yes ☐ No TN# **2556**

WELL CONTRACTOR CERTIFICATION
This well was drilled under my supervision and in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.

Mark J Traut Wells, Inc. 71536
Licensee Business Name Lic. or Reg. No.
Mark J Traut 6/14/02
Authorized Representative Signature Date
Tony Traut 6-14-02
Name of Driller Date
HE-01205-07 (Rev. 2/99)

GEOLOGICAL MATERIALS	COLOR	HARDNESS MATERIAL	FROM	TO
Topsoil	Blk	S	0	5
Clay	Yellow	S	5	15
Clay	Blue	S	15	60
Clay Gravel	Grey	S	60	192
Limestone	Brn Red	H	192	345
Sandstone	Yellow	S	345	390
Sandstone	White	M	390	395
Sandstone	White Red	M	395	400
Sandstone	White Red	M	400	410

REMARKS. ELEVATION, SOURCE OF DATA, etc.
SEP 20 2002
DATA RECEIVED
From **MARK J TRAUT**
MINN. DEPT. OF HEALTH COPY **667910**

[illegible]



AUTOMATIC SYSTEMS CO.

March 23, 2011

Mr. Marv Wurzer
City of Long Lake
2145 Daniels Street
Long Lake, MN. 55356

Reference: Alarm Dialer

Dear Marv:

In accordance with your request to our Mr. Terry Moore during his recent service trip we are pleased to offer the following:

- A One (1) **4-Channel Automatic Alarm dialer** as manufactured by Raco.
- B One (1) **Lot of field labor** as required to remove the existing defective alarm dialer and installed the new unit.
- C One (1) Lot of startup, testing and training.

Your net price for Items A through , FOB factory with **freight allowed** to jobsite including one (1) year warranty from date of startup (not to exceed 18 months from date of shipment).....\$2135.00 (plus tax).

Please note, price does not include any sales or use tax.

Thank you very much for the opportunity of providing you with the above proposal, should you wish to proceed with an order please sign on the space provided below and return a copy to this office.

We look forward to hearing from you, should you have any questions please don't hesitate to give Terry or me a call.

MANUFACTURERS REPRESENTATIVES

- ☒ **MAIN OFFICE:** P.O. BOX 120358
☐ **BRANCH OFFICE:** P.O. BOX 787

CONTROLS

ST. PAUL, MINNESOTA 55112
AMES, IOWA 50010

MECHANICAL EQUIPMENT

PHONE 651-631-9005 (FAX) 651-631-0027
PHONE 515-232-4770 (FAX) 515-232-0795

Ins called 4-2011

March 23, 2011

Page 2

Long Lake, MN

Sincerely,

Lane Stewart

Lane Stewart
Automatic Systems Company

Accepted by:

Mary Wayne

Date:

3-23-11

City of Long Lake Public Works Director

Cc: Mr Terry Moore - ASC

PO# 0831-PW



Invoice

6845 - 20th Avenue South, Ste 140
Centerville, MN 55038-7761
Phone 651-773-5422/Fax 651-773-5423

DATE	INVOICE #
1/8/2014	12973

BILL TO	SHIP TO
City of Long Lake Accounts Payable 450 Virginia Avenue PO Box 606 Long Lake, MN 55356	City of Long Lake Public Works Dept Marv Wurzer 2145 Daniels Street Long Lake, MN 55356

P.O. NUMBER	TERMS	DUE DATE	REP	SHIP	VIA	OTHER
Verbal Marv	Net 30	2/7/2014	DPS	1/8/2014	SERVICE	SCADA
QUANTITY	ITEM CODE	DESCRIPTION			PRICE EACH	AMOUNT
1	Evaluation Fee	Evaluation Fee for On-site (Labor Only) Services 1-3-2014 to test radio and antennae signal strength at each site by using specialized test equipment to analyze the SCADA System. MN State Sales Tax - Exempt ST-3			375.00	375.00
		<i>Fee for TCIC Technician Labor</i> <i>(No charge for equipment rental)</i> <i>Charge for CIE Technician to Follow</i> <i>see invoice # 12889.</i> <i>PO# 1523-PW</i> <i>1-17-14.</i>			0.00%	0.00

It's been a pleasure working with you! Thank you for your business.

Total \$375.00

To make a credit card payment, please call 651-773-5422 and ask for the finance department.

Web Site	www.cieinc.net	USD	Accredited BBB Member Since 2004	CIE, Inc. Federal Tax ID No. 41-1643709
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On late payments, the contract price shall, without prejudice to Seller's right to immediate payment, be increased by 1 1/2% per month on the unpaid balance, but not to exceed the maximum permitted by law.



6845 - 20th Avenue South, Ste 140
Centerville, MN 55038-7761
Phone 651-773-5422/Fax 651-773-5423

pw
copy

Invoice

DATE	INVOICE #
12/31/2013	12968

BILL TO	SHIP TO
City of Long Lake Accounts Payable 450 Virginia Avenue PO Box 606 Long Lake, MN 55356	City of Long Lake Public Works Dept Marv Wurzer 2145 Daniels Street Long Lake, MN 55356

P.O. NUMBER	TERMS	DUE DATE	REP	SHIP	VIA	OTHER
Verbal Marv	Net 30	1/30/2014	DFS	12/31/2013	SERVICE	
QUANTITY	ITEM CODE	DESCRIPTION			PRICE EACH	AMOUNT
		MN State Sales Tax 6.875%			6.875%	79.11

It's been a pleasure working with you! Thank you for your business.

To make a credit card payment, please call 651-773-5422 and ask for the finance department.

Total \$1,229.77

Web Site	www.cieinc.net	USD	Accredited BBB Member Since 2004	CIE, Inc. Federal Tax ID No. 41-1643709
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On late payments, the contract price shall, without prejudice to Seller's right to immediate payment, be increased by 1 1/2% per month on the unpaid balance, but not to exceed the maximum permitted by law.



Purchase Order Form

PO# 1536 - PW

BILL TO: City of Long Lake
450 Virginia Avenue
PO Box 606
Long Lake, MN 55356
Phone / (952) 473-6961
Fax / (952) 476-9622

SHIP TO: ☐ Long Lake City Hall (CH)
450 Virginia Avenue / Long Lake, MN 55356
☒ Long Lake Public Works Department (PW)
2145 Daniels Street / Long Lake, MN 55356
☐ Long Lake Fire Department (FD)
340 Willow Drive / Long Lake, MN 55356

INSTRUCTIONS TO STAFF

- 1) A Purchase Order Form must be completed and approved prior to every purchase. Invoices associated with on-going pre-approved contracts for services may not require a Purchase Order, if waived in advance by the City Administrator.
- 2) A **Department Head signature is required for all purchases, prior to purchase**. Department Head is defined as the City Administrator for City Hall employees; the Public Works Director for the Public Works Department; and the Fire Chief or Assistant Fire Chief for the Fire Department.
- 3) **Additionally, City Administrator approval is required on all purchases over \$500, prior to purchase**.
- 4) Please print clearly and legibly.

PURCHASE ORDER REQUEST

DATE PREPARED 2-20-14 DATE NEEDED BY _____
VENDOR Connelly Industrial Electronics
VENDOR ADDRESS 6845 - 20th Ave So CITY / STATE / ZIP Canterville, Ill. 55038-7761
VENDOR CONTACT - Dan Swenson VENDOR E-MAIL _____
VENDOR PHONE (651) 773-5432 VENDOR FAX (651) 773-5423

DESCRIPTION	QUANTITY	UNIT PRICE	TOTAL
Continued Control Problems with radio system - Water Level Controls	3.5 hrs	95.00	332.50
	64 miles	56 per	35.84
ALL Antennas checked again for resistance - changes made.			
(This See represents Labor cost to Connelly Industrial to work with Technician from TCIC see invoice # 17993 which was labor only see TCIC)			
		SHIPPING & HANDLING	
		MN SALES TAX	
		TOTAL	368.34

NEED FOR PURCHASE Repair - investigation of intermittent alarms - daily alarms reduced to 1 per week - likely water tower antenna lead

APPARATUS / FLEET VEHICLE ID (IF APPLICABLE) _____

EXPENDITURE ACCOUNT CODE 601-49400-4040 EXPLANATION Equip Maint + Repair

SIGNATURES ** ATTENTION VENDORS: PURCHASE ORDER NOT VALID WITHOUT REQUIRED SIGNATURES **

EMPLOYEE NAME Marv Wenzel

TITLE Public Works Director

DEPARTMENT HEAD SIGNATURE Marv Wenzel

DATE 2-20-14

DEPARTMENT HEAD SIGNATURE REQUIRED ON ALL PURCHASES

CITY ADMINISTRATOR SIGNATURE _____

DATE _____

ADMINISTRATOR SIGNATURE REQUIRED ON ALL PURCHASES OVER \$500



Purchase Order Form

PO# 1520 - PW

BILL TO: City of Long Lake
450 Virginia Avenue
PO Box 606
Long Lake, MN 55356
Phone / (952) 473-6961
Fax / (952) 476-9622

SHIP TO: ☐ Long Lake City Hall (CH)
450 Virginia Avenue / Long Lake, MN 55356
☒ Long Lake Public Works Department (PW)
2145 Daniels Street / Long Lake, MN 55356
☐ Long Lake Fire Department (FD)
340 Willow Drive / Long Lake, MN 55356

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- 3) **Additionally, City Administrator approval is required on all purchases over \$500, prior to purchase.**
- 4) Please print clearly and legibly.

PURCHASE ORDER REQUEST

DATE PREPARED Jan 15th 2014 DATE NEEDED BY /
VENDOR Connelly Industrial Electronics
VENDOR ADDRESS 6845- 20th Ave South CITY / STATE / ZIP Ste 140 Cantonville, Minn 55038-771
VENDOR CONTACT Bob Connelly VENDOR E-MAIL
VENDOR PHONE (651) - 773-5422 VENDOR FAX (651) 773-5423

DESCRIPTION	QUANTITY	UNIT PRICE	TOTAL
Water System Radio control system Tech 2.5 hrs		95.00	237.50
intermittent failure. (Numerous Alarms)	70 miles	.565	39.55
Trouble shooting investigation and repairs to date.	Tech 8 hrs	95.00	760.00
	87 miles	.565	49.13
Note: Water Tower antenna cable will need to be repaired - Alarms Reduced Substantially Solving repair.	Tax	6.875	79.11
SHIPPING & HANDLING			
MN SALES TAX			
TOTAL			<u>1229.77</u>

NEED FOR PURCHASE Water System level Control System Repair.
Radio / cable / antenna problems

APPARATUS / FLEET VEHICLE ID (IF APPLICABLE)

EXPENDITURE ACCOUNT CODE 601, 49400, 4040 EXPLANATION Equip Maint & Repair

SIGNATURES ** ATTENTION VENDORS: PURCHASE ORDER NOT VALID WITHOUT REQUIRED SIGNATURES **

EMPLOYEE NAME Mark Wurzen TITLE Public Works Director

DEPARTMENT HEAD SIGNATURE Mark Wurzen DATE 1-15-2014

DEPARTMENT HEAD SIGNATURE REQUIRED ON ALL PURCHASES

CITY ADMINISTRATOR SIGNATURE _____ DATE _____

ADMINISTRATOR SIGNATURE REQUIRED ON ALL PURCHASES OVER \$500



Purchase Order Form

PO# 1523 - PW

BILL TO: City of Long Lake
450 Virginia Avenue
PO Box 606
Long Lake, MN 55356
Phone / (952) 473-6961
Fax / (952) 476-9622

SHIP TO: ☐ Long Lake City Hall (CH)
450 Virginia Avenue / Long Lake, MN 55356
☒ Long Lake Public Works Department (PW)
2145 Daniels Street / Long Lake, MN 55356
☐ Long Lake Fire Department (FD)
340 Willow Drive / Long Lake, MN 55356

INSTRUCTIONS TO STAFF

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- 2) A **Department Head signature is required for all purchases, prior to purchase**. Department Head is defined as the City Administrator for City Hall employees; the Public Works Director for the Public Works Department; and the Fire Chief or Assistant Fire Chief for the Fire Department.
- 3) **Additionally, City Administrator approval is required on all purchases over \$500, prior to purchase.**
- 4) Please print clearly and legibly.

PURCHASE ORDER REQUEST

DATE PREPARED 1-17-14 DATE NEEDED BY
VENDOR Connolly Industrial Electronics
VENDOR ADDRESS 6845 - 20th Ave South, Ste 140 CITY / STATE / ZIP Centerville, Mn. 55038-7861
VENDOR CONTACT Bob Connolly VENDOR E-MAIL
VENDOR PHONE (651) 773-5422 VENDOR FAX (651) 773-5423

DESCRIPTION	QUANTITY	UNIT PRICE	TOTAL
Evaluation of radio + antenna system at all 3 water system sites using specialized equipment 1-3-14	1	375.00	375.00
Continuous Alarms for low tank level and power fails - have been reduced but not completely cured. - Need to replace cable at Water Towers.			
SHIPPING & HANDLING			
MN SALES TAX			
TOTAL			375.00

NEED FOR PURCHASE Water System Repair

APPARATUS / FLEET VEHICLE ID (IF APPLICABLE)

EXPENDITURE ACCOUNT CODE 601-49400-4040

EXPLANATION Equip Maint + Repair

SIGNATURES ** ATTENTION VENDORS: PURCHASE ORDER NOT VALID WITHOUT REQUIRED SIGNATURES **

EMPLOYEE NAME Marv Wutzer

TITLE Public Works Director

DEPARTMENT HEAD SIGNATURE

DATE 1-17-14

DEPARTMENT HEAD SIGNATURE REQUIRED ON ALL PURCHASES

CITY ADMINISTRATOR SIGNATURE

DATE

ADMINISTRATOR SIGNATURE REQUIRED ON ALL PURCHASES OVER \$500



DATE	INVOICE #
4/24/2014	13159

BILL TO
City of Long Lake Accounts Payable 450 Virginia Avenue PO Box 606 Long Lake, MN 55356

SHIP TO
City of Long Lake Public Works Dept Marv Wurzer 2145 Daniels Street Long Lake, MN 55356

P.O. NUMBER	TERMS	DUE DATE	REP	SHIP	VIA	OTHER
Verbal Marv	Net 30	5/24/2014	NJC	4/24/2014	SERVICE	SCADA
QUANTITY	ITEM CODE	DESCRIPTION			PRICE EACH	AMOUNT
4.25	Tech Labor	Tech Labor Services 4-17-2014 Service Trip: SCADA 1) Service trip to troubleshoot radio issues. a) Cycled Radio power 2) Dialer makes erroneous calls a) Messages for "general" channel 3 are wrong. i. The recorded message when dialer channel 3 is active are the ones for dialer channel 2 b) Dialer makes calls when channel is not active. 3) Need to quote an eight channel dialer (original 4-channel size only provides minimal coverage) with eight hours of labor to Marv 4) Quote prepared and sent via e-mail on 4-18-2014			95.00	403.75
82	Mileage	Mileage			0.56	45.92
<i>Marv Wayne 5-12-14</i> <i>PO# 1599-PW</i> <i>acct. 601-49400-4040</i>						
It's been a pleasure working with you! Thank you for your business.					Total \$449.67	
To make a credit card payment, please call 651-773-5422 and ask for the finance department.						
Web Site	www.cieinc.net	USD	Accredited BBB Member Since 2004		CIE, Inc. Federal Tax ID No. 41-1643709	
On late payments, the contract price shall, without prejudice to Seller's right to immediate payment, be increased by 1 1/2% per month on the unpaid balance, but not to exceed the maximum permitted by law.						

206933

County Hennepin

Quad Excelsior

Quad ID 105A

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 08/24/1991

Update Date 04/22/2015

Received Date

Well Name LONG LAKE 2	Township 118	Range 23	Dir Section W 35	Subsection CABBDD	Well Depth 448 ft.	Depth Completed 448 ft.	Date Well Completed 00/00/1965
Elevation 960 ft.	Elev. Method 7.5 minute topographic map (+/- 5 feet)				Drill Method Cable Tool	Drill Fluid	
Address					Use community supply(municipal)	Status Active	
Contact 1964 PARK AV LONG LAKE MN 55356					Well Hydrofractured? Yes <input type="checkbox"/> No <input type="checkbox"/>	From To	
Well 1345 WAYZATA BL W LONG LAKE MN 55356					Casing Type Step down	Joint	
Stratigraphy Information					Drive Shoe? Yes <input type="checkbox"/> No <input type="checkbox"/>	Above/Below	
Geological Material	From	To (ft.)	Color	Hardness	Casing Diameter 12 in. To 366 ft. lbs./ft. 20 in. To 184 ft. lbs./ft.		
CLAY	0	22	YELLOW				
BLUE CLAY W/SMALL	22	27					
BOULDERS	27	30					
COARSE GRAVEL	30	33					
FINE SAND	33	37					
BOULDER CLAY	37	42					
COARSE SAND	42	47					
FINE SAND	47	57					
GRAVEL	57	67					
MEDIUM SAND	67	121					
CLAY & SAND	121	132					
FINE SAND	132	142					
SANDSTONE	142	152					
SAND & CLAY	152	157					
ST. PETER	157	158					
ST. PETER	158	178					
SHALE	178	182					
SHALE & LIMESTONE	182	202					
SHAKOPEE LIMESTONE	202	292	RED	HARD			
SHAKOPEE LIMESTONE	292	324		SOFT			
JORDAN SANDSTONE	324	345	YELLOW	SOFT			
JORDAN SANDSTONE	345	422		MEDIUM			
JORDAN SANDSTONE	422	429					
JORDAN SANDSTONE	429	431					
JORDAN SANDSTONE	431	448	WHITE	HARD			
Open Hole From 366 ft. To 448 ft.					Screen? <input type="checkbox"/> Type Make		
Static Water Level 72 ft. Land surface Measure 08/31/1988							
Pumping Level (below land surface)							
Wellhead Completion Pitless adapter manufacturer Model <input type="checkbox"/> Casing Protection <input 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 <input type="checkbox"/> Not Specified							
Nearest Known Source of Contamination feet Direction Type Well disinfected upon completion? <input type="checkbox"/> Yes <input type="checkbox"/> No							
Pump <input checked="" type="checkbox"/> Not Installed Date Installed Manufacturer's name Model Number HP Volt Length of drop pipe ft Capacity g.p. Typ							
Abandoned Does property have any not in use and not sealed well(s)? <input type="checkbox"/> Yes <input type="checkbox"/> No							
Variance Was a variance granted from the MDH for this well? <input type="checkbox"/> Yes <input type="checkbox"/> No							
Miscellaneous First Bedrock St. Peter Sandstone Aquifer Jordan Last Strat St. Lawrence Formation Depth to Bedrock 158 ft Located by Minnesota Department of Health Locate Method GPS SA On (averaged) System UTM - Mad83, Zone 15, Meters X 456081 Y 4981388 Unique Number Verification Information from Input Date 10/12/1999							
Angled Drill Hole							
Well Contractor Mueller Well Co. 96460 Licensee Business Lic. or Reg. No. Name of Driller							
Remarks LONG LAKE MUNI #2 MP=1.8 MARV WURZER. GAMMA LOGGED 3-20-1996. ORIG. DEPTH 366 FT DEEP, 184' OF 20" CSG, 366 FT. 12" LINER, FM 1972 MDH SAN RPT							

Alden Pool and Municipal Supply Co.
 268 South Broadway
 Wells MN 56097-1630
 800-253-7235



Invoice

DATE	INVOICE NO
3/12/2018	18085

BILL TO
City of Long Lake Attn Luke 450 Virginia Avenue Long Lake MN 55356

SHIP TO
City of Long Lake Attn Luke 450 Virginia Avenue Long Lake MN 55356

P.O. NO.	TERMS

DESCRIPTION	QTY	RATE	AMOUNT
Gas chlorinator SR 9 Switchover regulator system 2 regulators 1 rate meter 100 ppd and 1 ejector#12 \$2600 complete system with unions	1	2,800.00	2,800.00
SPRING GOOD CUSTOMER DISCOUNT		-200.00	-200.00
Shipping & handling 1-507-383-1063 no charge		0.00	0.00
<div data-bbox="792 1035 1117 1276" data-label="Image"> </div> <div data-bbox="560 1470 917 1543" data-label="Text"> <p>601-444-00-2210</p> </div> <div data-bbox="535 1585 812 1638" data-label="Text"> <p>Wells #2</p> </div>			
Total			\$2,600.00
Balance Due			\$2,600.00



6845 - 20th Avenue South, Ste 140
Centerville, MN 55038-7761
Phone 651-773-5422/Fax 651-773-5423

Invoice

DATE	INVOICE #
1/31/2014	12989

BILL TO
City of Long Lake Accounts Payable 450 Virginia Avenue PO Box 606 Long Lake, MN 55356

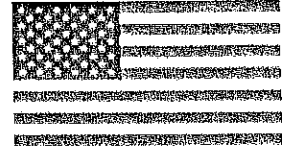
SHIP TO
City of Long Lake Public Works Dept Marv Wurzer 2145 Daniels Street Long Lake, MN 55356

P.O. NUMBER	TERMS	DUE DATE	REP	SHIP	VIA	OTHER
Verbal Marv	Net 30	3/2/2014	DFS	1/31/2014	SERVICE	
QUANTITY	ITEM CODE	DESCRIPTION			PRICE EACH	AMOUNT
3.5	Tech Labor	Tech Labor 1-3-2014 Service Trip: 1. Investigate the three antennas 2. Water Tower antennae lead looks to be OK 3. Well 1 antennae looks great (the lead-in and connectors were replaced last week) 4. At the other remotes, it was noticed that Zones 3, 4, 5 had the most errors - so they were disabled 5. Well 2 antennae looks OK except that the three foot jumper cable from radio to the surge arrestor had more loss than to be expected			95.00	332.50
64	Mileage	Mileage			0.56	35.84
<p>⊗ Fee for CIE Technician Labor working with TCIC Technician, and specialized equipment.</p> <p>* Mon-Wed 2-20-14</p> <p>PO# 1536-PW</p> <p>601-49400-4040</p>						
To make a credit card payment, please call 651-773-5422 and ask for the finance department.						
It's been a pleasure working with you! Thank you for your business.					Total	\$368.34
Web Site	www.cieinc.net	USD	Accredited BBB Member Since 2004		CIE, Inc. Federal Tax ID No. 41-1643709	
On late payments, the contract price shall, without prejudice to Seller's right to immediate payment, be increased by 1 1/2% per month on the unpaid balance, but not to exceed the maximum permitted by law.						

In Control, Inc.
10350 Jamestown Street NE
Blaine, MN 55449



Designed and Built By
In Control, Inc.



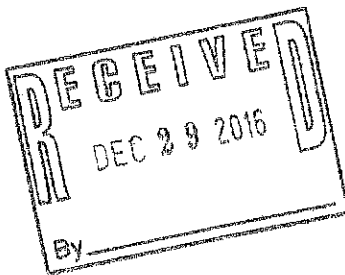
Sold To:

City of Long Lake
450 Virginia Avenue
PO Box 606
Long Lake, MN 55356

Invoice Number: 16035ED01

Invoice Date: Dec 27, 2016

InC Project ID: 16035ED

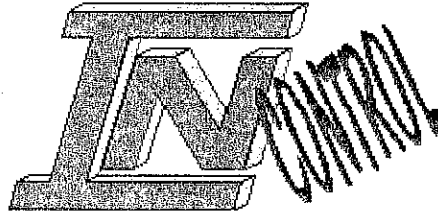
Customer ID	Purchase Order	Payment Terms	Sales Rep	Page
0594CofLL	Verbal J Goehring	Net 30 Days	JWK-SR	1
Quantity	Item	Description	Unit Price	Extension
5.50		Engineering Services for Mike McCann See Attached Field Service Report Tax Exempt Thanks for your Business! 	135.00	742.50

Sales Tax	0.00
Freight	

PAST DUE BALANCES ARE SUBJECT TO 2% (24% APR) PER MONTH SERVICE CHARGE

Total **\$742.50**

Phone: (763) 783-9500 If you have a question about this invoice please call
Fax: (763) 783-9502 Ken Kawiecki at extension 1003



FIELD SERVICE REPORT

Customer Information	Service Information
Work Requested by: Jason Goehring	Date Work Performed: 12/9/16
Customer Name: City of Long Lake	Travel Hours: 1
Customer Address: 450 Virginia Ave, PO Box 606	On Site Hours: 3.5
Customer City: Long Lake	Office Hours: 1
Customer State: MN	Total Hours: 5.5
Customer Zip: 55356	Warranty (y/n): N
Customer Phone: (763) 479-9846	Paid Service (y/n): Y
Date Requested: November 2016	Field Engineer: MJM
Customer P.O. Number: Verbal	Job Number: 16035ED

Description of Work Performed:

Well 2 had been changing to pressure control mode and overflowing the tower. I examined the PLC program and found that there are multiple conditions that will start the well. The logic at well 2 is setup to switch to local control mode whenever communication is lost. In addition the logic was setup to switch to pressure mode whenever the pressure went below the low pressure setpoint regardless of whether the control mode was local or remote. With this logic, the control mode can switch to pressure mode behind the scenes and then lie in wait until the control mode is switched to local. Then the only way to get out of pressure mode is to meet the stop pressure setpoint. In order to help resolve this problem and confusion, I have added some additional logic to prevent switching to pressure mode unless the control mode is set to local.

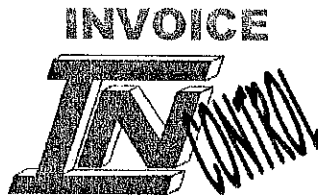
Mike McCann
12/23/2016

IN - Control, inc.

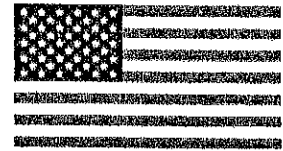
10350 Jamestown Street NE
Blaine, MN 55449

Phone: (763) 783-9500
Fax: (763) 783-9502

In Control, Inc.
10350 Jamestown Street NE
Blaine, MN 55449

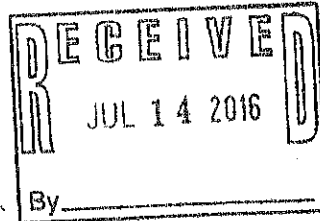


Designed and Built By
In Control, Inc.



Sold To:

City of Long Lake
450 Virginia Avenue
PO Box 606
Long Lake, MN 55356



Invoice Number: 16035EB01

Invoice Date: Jul 11, 2016

InC Project ID: 16035EB

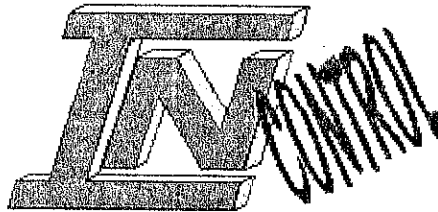
Customer ID	Purchase Order	Payment Terms	Sales Rep	Page
0594CofLL	Verbal J Goehring	Net 30 Days	JWK-SR	1
Quantity	Item	Description	Unit Price	Extension
4.00		Engineering Services for Mike McCann See Attached Field Service Report. Tax Exempt Thanks for your Business!	135.00	540.00

Sales Tax	0.00
Freight	

PAST DUE BALANCES ARE SUBJECT TO 2% (24% APR) PER MONTH SERVICE CHARGE

Total **\$540.00**

Phone: (763) 783-9500 If you have a question about this invoice please call
Fax: (763) 783-9502 Ken Kawiecki at extension 1003

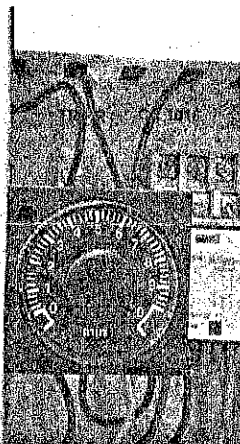


FIELD SERVICE REPORT

Customer Information		Service Information	
Work Requested by:	Jason Goehring	Date Work Performed:	6/30
Customer Name:	City of Long Lake	Travel Hours:	1
Customer Address:	450 Virginia Ave, PO Box 606	On Site Hours:	3
Customer City:	Long Lake	Office Hours:	0
Customer State:	MN	Total Hours:	4
Customer Zip:	55356	Warranty (y/n):	N
Customer Phone:	(763) 479-9846	Paid Service (y/n):	Y
Date Requested:	July 2016	Field Engineer:	MJM
Customer P.O. Number:	Verbal	Job Number:	16035EB

Description of Work Performed:

Well 2 had shut down and was indicating "High Temperature Alarm" on the operator interface at the well house. After going online with the GE PLC, it was found that the reason why the pump was not running was actually a fail to start alarm. Initially, there appeared to be no specific reason for the fail to start and the alarm was reported as being intermittent. After further investigation, it was found that there was an external prelube timer that was set to just under 2 minutes. The PLC fail to start timer was set to 2 minutes and must wait until the prelube timer to time out before the start command is sent to the well. Since the two timer values are so close together it is possible to get the fail to start alarm if the hardware timer sometimes takes a little longer to time out. In order to resolve this issue, I changed the PLC fail to start timer from 2 minutes to 3 minutes.



Hardware Prelube Timer

Mike McCann
7/10/2016

IN - Control, inc.

10350 Jamestown Street NE
Blaine, MN 55449

Phone: (763) 783-9500
Fax: (763) 783-9502



M-Series® M2000

M2000-to-M2000 Interchangeability Procedure

SCOPE

This document defines the process for updating an M2000 amplifier.

LIMITATIONS

For M2000-to-M2000 replacement, all detector sizes are allowed for exchange.

M2000-TO-M2000 ACCURACY STATEMENT

The M2000 amplifier will be within $\pm 0.10\%$ of Full Scale.

M2000-TO-M2000 UPDATE PROCEDURE

- Record the amplifier pipe diameter: DN200 / 8
- Record the amplifier detector factor: 4143.60
- Record the amplifier detector offset: -0.0034 m/s
- Record all applicable setup parameters in the tables provided in this document.
- Disconnect power to the amplifier before removing connections.
- ✓ Remove all wiring connections from the amplifier.
- Remove amplifier PCB/enclosure and replace with new PCB/enclosure.
- Reconnect Coil/Electrode connections. Reconnect all other pluggable inputs and outputs.
- Apply power to the amplifier.
- Configure Pipe Diameter with original value recorded in step 1.
- Configure Detector Factor with original value recorded in step 2.
- Configure Detector Offset with original value recorded in step 3.
- Configure M2000 to remaining parameters recorded in step 4.

RECORD SETUP PARAMETERS

Main Menu

METER SETUP				
Scale Factor	00.00 %			
Empty Pipe	off			
Power Line Freq	60 HZ			
Excitation Freq	(7.5, 15, 1.0, 3.75)			
Pipe Diameter	8"			
Amplifier Factor				
Detector Factor	4143.60			
Detector Current				
Detector Offset	-0.0034 m/s			
MEASUREMENTS				
Flow Unit	GPM			
Totalizer Unit	US Gallons			
Full Scale Flow	1230.00 gpm Max = 5975.43 gpm			
Low Flow Cut Off	0.2%			
Flow Direction	Uni-Directional			
Damping Factor	NO DAMPING			
INPUTS/OUTPUTS				
Analog Output	Range 4-20mA Alarm High			
Digital Input	None			
Digital Outputs	#1	#2	#3	#4
Pulses/Unit	000000.00	0000049.	N/A	N/A
Pulse Width	0	0	N/A	N/A
Full Scale Freq	N/A	N/A		N/A
Preset Amount	0	0		
Set Point Min	0	0		
Set Point Max	100%	100%		
Output Type	Normally open	Normal open		
Select Function				

Forward Pulse →

NOTE: Tables continue on the next page.



Badger Meter

Communications Menu

Port A Settings	
Interface	Modbus RTU (DEF) ✓
Modbus RTU (def)	
Remote Menu	
Disable Port	
Port Address	(1-247)
Baud Rate	9600 (DEF)
Parity	Even (DEF)
Data Bits	8 bits (DEF)
Stop Bits	1 Stop Bit (DEF)

Advanced Menu

Unit Multiplier	Off
Backlight Control	Timed Off 1 min
Analog Output	
Software Filter	
Activation	Off
Filter Delay	N = 0001
Acceleration	1.0000
Constant Flow	150.00000 M3S2
Peak Detect	00.0
Empty Pipe Cal	
Cal Empty Pipe	Volts 3.000
Cal Full Pipe	Volts 0.118
Security	
Set Admin Pin	
Set Service Pin	"
Set User Pin	
Language Select	

Control. Manage. Optimize.

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www.badgermeter.com

The Americas | Badger Meter | 4545 West Brown Deer Rd | PO Box 245036 | Milwaukee, WI 53224-9536 | 800-876-3837 | 414-355-9400
 Mexico | Badger Meter de las Americas, S.A. de C.V. | Pedro Luis Ogazón N°32 | Esq. Angelina N°24 | Colonia Guadalupe Inn | CP 01950 | Mexico, DF | México | +52-55-5662-0882
 Europe, Middle East and Africa | Badger Meter Europe GmbH | Nürtinger Str 76 | 72639 Neuffen | Germany | +49-7025-9208-0
 Europe, Middle East Branch Office | Badger Meter Europe | PO Box 341442 | Dubai Silicon Oasis, Head Quarter Building, Wing C, Office #C209 | Dubai / UAE | +971-4-371 2503
 Czech Republic | Badger Meter Czech Republic s.r.o. | Mariškova 2082/26 | 621 00 Brno, Czech Republic | +420-5-41420411
 Slovakia | Badger Meter Slovakia s.r.o. | Raciarska 109/B | 831 02 Bratislava, Slovakia | +421-2-44 63 83 01
 Asia Pacific | Badger Meter | 80 Marine Parade Rd | 21-06 Parkway Parade | Singapore 449269 | +65-63464835
 China | Badger Meter | 7-1202 | 99 Hangzhong Road | Minhang District | Shanghai | China 201101 | +86-21-5763 5412

Legacy Document Number: IAB-168-01-EN

In Control, Inc.
10350 Jamestown Street NE
Blaine, MN 55449



Designed and Built By
In Control, Inc.



Sold To:

City of Long Lake
450 Virginia Avenue
PO Box 606
Long Lake, MN 55356

Invoice Number: **16035EA01**

Invoice Date: Mar 28, 2016

InC Project ID: 16035EA

Customer ID	Purchase Order	Payment Terms	Sales Rep	Page
0594CofLL	Verbal M Wurzer	Net 30 Days	JWK-SR	1
Quantity	Item	Description	Unit Price	Extension
7.00		Engineering Services for Mike McCann See Attached Field Service Report. Please Send a Copy of your Tax Exempt Certificate Thanks for your Business!	135.00	945.00
<div>★ Thank you 4-11-16 PO# 2162-PC 601-49400-3000 Professional Services - well control repair!</div>				
			Sales Tax Freight	0.00

PAST DUE BALANCES ARE SUBJECT TO 2% (24% APR) PER MONTH SERVICE CHARGE

Total **\$945.00**

Phone: (763) 783-9500 If you have a question about this invoice please call
Fax: (763) 783-9502 Ken Kawiecki at extension 1003



FIELD SERVICE REPORT

Customer Information	Service Information
Work Requested by: Marv Wurzer	Date Work Performed: 2/24 and 3/21
Customer Name: City of Long Lake	Travel Hours: 2
Customer Address: 450 Virginia Ave, PO Box 606	On Site Hours: 5
Customer City: Long Lake	Office Hours: 0
Customer State: MN	Total Hours: 7
Customer Zip: 55356	Warranty (y/n): N
Customer Phone: 612-720-4261	Paid Service (y/n): Y
Date Requested: January 2016	Field Engineer: MJM
Customer P.O. Number: Verbal	Job Number: 16035EA

Description of Work Performed:

February 24th, 2016 - MJM 4 Hours

Well 2 was experiencing radio communication failures on a regular basis. The original signal strength was recorded at -94dB. A signal strength be above -90dB with a TransNET radio will cause intermittent signal loss.

A test antenna and coax cable was used to verify the existing cabling and antenna. Similar results were obtained with the test antenna when it was at the same elevation and direction as the existing antenna. By changing the direction of the existing antenna, the signal strength was improved to -84dB. This was a significant increase in signal strength but something was still not right.

Well 2 talks to the radio at the water tower via an antenna located on top of the tower. Since the tower can be seen from well 2, the signal should have been stronger. It was found that the antenna was located in the center of the top of the tower and the path to well 2 was obscured by one of the cell phone antennas located on the perimeter. The antenna was moved from the center to the perimeter between two of the cell antennas.

March 21st, 2016 - MJM 3 Hours

After changing the direction of the well 2 antenna and relocating the water tower antenna, the signal strength at well 2 was retested and was recorded at -67dB. This is a very strong signal and should provide reliable communication to well 2.

Mike McCann
March 21st, 2016

IN - Control, inc.

10350 Jamestown Street NE
Blaine, MN 55449

Phone: (763) 783-9500
Fax: (763) 783-9502



Purchase Order Form

PO# 2162 - PW

BILL TO: City of Long Lake
450 Virginia Avenue
PO Box 606
Long Lake, MN 55356
Phone / (952) 473-6961
Fax / (952) 476-9622

SHIP TO: ☐ Long Lake City Hall (CH)
450 Virginia Avenue / Long Lake, MN 55356
☒ Long Lake Public Works Department (PW)
2145 Daniels Street / Long Lake, MN 55356
☐ Long Lake Fire Department (FD)
340 Willow Drive / Long Lake, MN 55356

INSTRUCTIONS TO STAFF

- 1) A Purchase Order Form must be completed and approved prior to every purchase. Invoices associated with on-going pre-approved contracts for services may not require a Purchase Order, if waived in advance by the City Administrator.
- 2) A Department Head signature is required for all purchases, prior to purchase. Department Head is defined as the City Administrator for City Hall employees; the Public Works Director for the Public Works Department; and the Fire Chief or Assistant Fire Chief for the Fire Department.
- 3) Additionally, City Administrator approval is required on all purchases over \$500, prior to purchase.
- 4) Please print clearly and legibly.

PURCHASE ORDER REQUEST

DATE PREPARED 4-11-16 DATE NEEDED BY _____

VENDOR IN Control, Inc

VENDOR ADDRESS 10350 Janesville ST. NE CITY / STATE / ZIP Blaine, MN

VENDOR CONTACT _____ VENDOR E-MAIL _____

VENDOR PHONE () _____ VENDOR FAX () _____

DESCRIPTION	QUANTITY	UNIT PRICE	TOTAL
Well Control Issue Investigation -	7 hr	135.00/hr	945.00
Report attached -			
Radio signal strength increased by moving water tower antenna (PW) and realigning well #2 antenna (IN-Control)			
SHIPPING & HANDLING			
Invoice # 16035EA01 (3-28-16)			
MN SALES TAX			
TOTAL			945.00

NEED FOR PURCHASE Numerous Data + Communication Failure at well #2 + well #1 - well controls unreliable

APPARATUS / FLEET VEHICLE ID (IF APPLICABLE) _____

EXPENDITURE ACCOUNT CODE 601-49400-3000 EXPLANATION Professional Services -

SIGNATURES ** ATTENTION VENDORS: PURCHASE ORDER NOT VALID WITHOUT REQUIRED SIGNATURES **

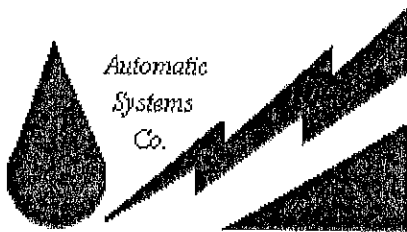
EMPLOYEE NAME Mark Whitzer TITLE Public Works Director

DEPARTMENT HEAD SIGNATURE Mark Whitzer DATE 4-11-16

DEPARTMENT HEAD SIGNATURE REQUIRED ON ALL PURCHASES _____

CITY ADMINISTRATOR SIGNATURE _____ DATE _____

ADMINISTRATOR SIGNATURE REQUIRED ON ALL PURCHASES OVER \$500 _____



AUTOMATIC SYSTEMS CO.

Long Lake, Mn 11/6/13

File #2 Well

Power Fail Alarm incorrectly indicating at Well 2

- There was some confusion about what Alarm was actually being displayed. The owner was saying that Well 2 was indicating a false Power Fail locally but not showing the Alarm at the Telemetry Master, Well 1.

Actually Well 2 was indicating a Well 1 Power Fail. There is an Alarm screen on Well 2's HMI which appears to indicate many of Well 1's Alarms.

After going online with both Wells PLCs it was unclear how Well 1's Alarms were being sent to Well 2. I was unable to look at the HMIs tag designations, not having the Cutler Hammer PowerMate HMI programming software.

After returning to the office and getting the PowerMate software functional it was determined that the Well 1 Alarms were not present at Well 2 and the entire 'Well 1 Alarm' screen at Well 2 was never functional dating to the original integrator. The indicators on this screen are tied to local unused registers in Well 2's PLC. Apparently the unused register assigned to the Well 1 Power Fail indicator changed values. Not likely to occur on its own but possible during a power cycle.

ASC could make a PLC program change at Well 2 forcing the associated Well 1 Alarm indicator registers to 0. (These would be registers R591- Well 1 Intrusion; R590 - Well 1 Power Fail; R592- Well 1 Fire Alarm; R594-Well 1 Flood; R593-Well 1 Low Temp; R595- Well 1 Sprinkler; R596-Well 1 CL2 Leak)

It was suggested to the owner that the Well 1 Alarm Screen at Well 2 be simply labeled 'Not to be used'. The owner is considering options.

Manufacturer's Representatives * Controls * Mechanical Equipment

* MAIN Office: P.O. Box 120359 St Paul, MN

Phone 651-631-9005 (Fax) 651-631-0027

Branch Office: P.O. Box 787 Ames, Iowa

Phone 515-232-4770 (Fax) 515-232-0795



INVOICE

INVOICE NO. 15894

RECEIVED

01 10 2013

BERGERSON-CASWELL, INC.
WELL DRILLING AND PUMPS
5115 Industrial Street
Maple Plain, MN 55359
PH: 763-479-3121
FX: 763-479-2183

BILL TO
City of Long Lake
P.O. Box 606
Long Lake, MN 55356

JOB
31525T-Long Lake Pump #2
P.O. Box 606
Long Lake, MN 55356

CUSTOMER	PURCHASE ORDER NO.	BILL THRU	TERMS	INVOICE DATE	PAGE
LONG LAK			Net 30	7/9/13	1

ITEM NO.	QUANTITY	DESCRIPTION	UNIT PRICE	EXTENDED PRICE
----------	----------	-------------	------------	----------------

Job #31525T

RE: PUMP #2 LOCKED UP

5-13-13 Freed up pump by raising, lowering impellers and back flushing. Started and tested pump. Shut down and restarted under normal conditions. This well pump's approximately 100 ppm at anital startup and drops to less than 2 ppm within a few minutes.

5-17-13 Pump was not locked up this time, there was a problem in the controls of the installation.

*All applicable State and Federal Taxes have been paid on all Installed Materials for this Installation and are included in the Material Prices.

2.5	HR Labor (Eugene & Mike) 5-13-13	200.00	500.00*
2	HR Labor (Tom) 5-17-13	150.00	300.00*

W. M. M. 7-10-13
PO# 1379-PW
601-49400-4040
Equip Maint & Repair

* means item is non-taxable

THANK YOU FOR YOUR BUSINESS!

PAST DUE ACCOUNTS SUBJECT TO 1.5% FINANCE
CHARGES PER MONTH PLUS ALL COLLECTION COSTS.

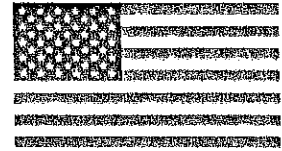
SALE AMOUNT	800.00
TOTAL	\$800.00

All payments paid by paper check will be converted to Images and the transaction will be completed as an ACH Transaction, when applicable. Unless Customer notifies Bergerson Caswell not to process Customer's Checks using the Image and ACH Services, those items will be converted to Images and processed using the ACH Services.

In Control, Inc.
10350 Jamestown Street NE
Blaine, MN 55449



Designed and Built By
In Control, Inc.



Sold To:

City of Long Lake
450 Virginia Avenue
PO Box 606
Long Lake, MN 55356

Invoice Number: 17054MB01

Invoice Date: Nov 6, 2017

InC Project ID: 17054MB

Customer ID	Purchase Order	Payment Terms	Sales Rep	Page
0594CofLL	Verbal J Goehring	Net 30 Days	JIVER	1

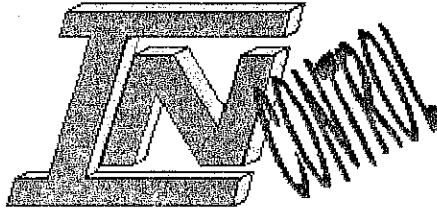
Quantity	Item	Description	Unit Price	Extension
5.50	EXP 0200004	Engineering Services for Patrick McPeck See Attached Field Service Report	135.00	742.50
66.00		Mileage	0.70	46.20
1.00		Equipment RTE-B1AF20 - Idec - Timer 120Vac	65.96	65.96
1.00		Equipment 800T-XA -AB Contact Block 1 NO, 1 NC	36.72	36.72
		Tax Exempt		
		Thanks for your Business!		
<div>RECEIVED NOV - 9 2017 By _____ 601-49400-3000 Well #2 Repairs Don Long 11-20-2017</div>				

Sales Tax	0.00
Freight	

PAST DUE BALANCES ARE SUBJECT TO 2% (24% APR) PER MONTH SERVICE CHARGE

Total **\$891.38**

Phone: (763) 783-9500 If you have a question about this invoice please call
Fax: (763) 783-9502 Ken Kawiecki at extension 1003



FIELD SERVICE REPORT

Customer Information		Service Information	
Work Requested by:	Luke	Date Work Performed:	11/1/17
Customer Name:	City of Long Lake	Travel Hours:	2
Customer Address:	450 Virginia Ave, PO Box 606	On Site Hours:	3
Customer City:	Long Lake	Office Hours:	0.5
Customer State:	MN	Total Hours:	5.5
Customer Zip:	55356	Warranty (y/n):	N
Customer Phone:	(612) 720-4263	Paid Service (y/n):	Y
Date Requested:	October 2017	Field Engineer:	Patrick McPeck
Customer P.O. Number:	Verbal	Job Number:	17054MB

Description of Work Performed:

The pump at Well 2 had been failing intermittently for approximately 1 week at the time we were contacted. This failure would stop the pump after it had already been running. Reported times of failure ranged between run times of 5 minutes and 30+ minutes. No VFD faults were evident nor were any alarms present on the HMI. These alarms would occur in both auto and hand.

Upon arriving, I started the pump at Well 2 in hand. No failure was immediately apparent and it was moving water at approximately 700 GPM. The led indicator light on the pre-lube mechanical timer was blinking erratically during and after it's time out cycle. It was found that the timer was still sending voltage to the pre lube solenoid even after timing out. Due to this malfunction, it was decided to replace the timer. During my inspection I also found poor grounding to the control panel. The reading from 124 VAC (Line to Neutral) hot was 95 VAC Line to Ground. This would indicate a grounding/bonding problem at the service entrance where neutral and ground should be bonded at equal potential. All wires involved with the starting and operation of the pump were traced and examined for any faults or loose terminals. No problems were apparent with any of the wiring. A potential loose and oxidized contact was found at the Hand/Off/Auto switch on the door, this was replaced.

After a thorough inspection and operation of the pump, I was able to observe one failure. The pre-lube timer's coil (replacement) was briefly de-energized for under a second. This caused the pump to stop and the pre-lube cycle to begin again. All parts of this circuit and timer were again inspected and no apparent issues were found. A possible cause of this intermittent and brief failure would be the UPS in the enclosure briefly shutting down due to the poor ground. To rule out this possibility, the UPS was temporarily bypassed in the enclosure. We continued to start and stop the pump in hand and were unable to observe any failures.

Service actions taken:

- Malfunctioning Pre—Lube timer replaced
- Oxidized switch contacts replaced
- UPS bypassed in the event that the poor ground is causing problems with its controls and power delivery system.

Future service suggestions:

IN - Control, inc.

10350 Jamestown Street NE
Blaine, MN 55449

Phone: (763) 783-9500
Fax: (763) 783-9502



Due to the poor readings to ground, I would suggest you have an electrician check the bonding at the panel entrance and elsewhere in the building's electrical system. If bypassing the UPS fixes the problem, further investigation of the grounding is assuredly warranted as well as potentially replacing the UPS in the enclosure.

-PHM 11/1/17

IN - Control, inc.

10350 Jamestown Street NE
Blaine, MN 55449

Phone: (763) 783-9500
Fax: (763) 783-9502



REQUEST FOR ACTION LONG LAKE CITY COUNCIL

Meeting Date: September 7, 2010

Agenda Item: No. 7

Subject: Accept Test Pumping Quote from Bergerson – Caswell, Inc. for 2010 Well and Well House No. 2 Rehabilitation Project

Prepared By: Terrance R. Post, City Administrator

Staff Initials: 

Recommended City Council Action

Staff recommends the following motion:

Motion to accept the quote from Bergerson - Caswell Inc. in an amount not to exceed \$6,100 to test pump Well No. 2 and to authorize the City Administrator to notify the contractor of the award.

Overview / Background

At the August 17, 2010 regular meeting, the Long lake City Council approved the proposal from SEH for engineering services in support of the 2010 Well and Well House No. 2 Rehabilitation Project. One of the objectives of this project is to upgrade the pumping capacity of the well from the current 500 gallons per minute (gpm) to 1,000 gpm for fire service water capacity needs supporting future downtown Long Lake economic redevelopment activities. However, a necessary first step is to perform a test pump to determine the capability of pumping 1,000 gpm or if necessary well development is necessary to accomplish the increased pumping capacity objective.

Quotes were obtained from two well drilling firms – Bergerson-Caswell from Maple Plain and Traut Wells from Waite Park. The Bergerson quote ranged from a low of \$5,500 to \$6,100 if generator power was required. The Traut quote was a fixed amount of \$8,280.

The recommendation of SEH Project Engineer Chris Larson and staff is to accept the quote from Bergerson – Caswell, Inc. based upon the lower quote amount.

Engineer Larson has also provided a proposed project activity schedule and timeline for Council's general information. Council should note that the last two activities scheduled to be started in 2011 (building painting and driveway overlay/retaining wall replacement) will be dependent upon actual inception-to-date project costs incurred to that point and remaining funds availability in TIF District 2 Fund No. 382.

Supporting Information

- Chris Larson August 31, 2010 recommendation memo to Terry Post
- Bergerson-Caswell 08/30/10 written quote
- Traut Wells 08/31/10 written quote
- 2010 Well No. 2 Rehabilitation proposed project schedule

Financial Impact: \$5,500 to \$6,100 Budgeted (Y / N) Y Source: TIF District 2 Fund No. 382

Notes:



1/2

Bergerson - Caswell Inc.
5115 Industrial Street
Maple Plain, MN 55359
(763) 479-3121 Fax: (763) 479-2183

August 30, 2010

CITY OF LONG LAKE

Attn: Mr. Marv Wurzer
PO Box 606
Long Lake, MN 55356

SEH ENGINEERS

Attn: Mr. Chris Larsen

RE: QUOTE TO UPGRADE WELL PUMP #2

Dear Mr. Wurzer;

Bergerson-Caswell Inc. appreciates the opportunity to assist you with your well and pump maintenance. We are familiar with this well in that we have redeveloped this well twice, and it has been performing since the last redevelopment.

Originally this well was designed to produce 540Gpm @ 324'TDH, and it has done that for an extended period of time. To increase the installation to a 1,000 Gpm could be possible, but in my opinion should be tested for higher capacities before the project is completely designed. There are other installations in this area with similar wells that do support 700-800Gpm and therefore this well should do that by changing and upgrading the equipment size and Hp of the electrical, but to obtain the mentioned 1,000Gpm, I recommend flow testing the well and determine the maximum flow that should be obtained from this well. It may be possible to obtain the 1,000 Gpm if additional development and a larger cavern is created to minimize sand pumping when the well is pump, and we can determine this by performing the recommended flow testing. Below I have provided a cost breakdown as requested for the equipment required to perform the desired upgrade, along with a cost to perform the flow testing

PROJECT COST to perform the Flow testing to the well:

Labor and equipment to mobilize to site remove well pump and install test pump	\$ 1,850.00
Test Pump well 8-12 hours @ \$200.00/hr (generator power)	\$ 2,400.00
Using City power for test pumping: deduct \$50.00/hr	{\$ 600.00}
Labor and equipment to remove test pump and reinstall owners pump or temp pump	\$ 1,850.00
TOTAL TO FLOW TEST WELL	\$ 5,500.00 or \$6,100.00

Materials for upgrading installation: 850 Gpm @ 350'TDH

100 hp VLT premium efficient US motor	\$ 8,400.00
Pump Bowl assembly Goulds 11CHC-6 (850 Gpm @ 352'TDH)	\$ 7,150.00
8"x 119.25" T&C pipe: 13 each ea. @ \$ 405.00/ea	\$ 5,265.00
8"x 59.25" T&C pipe: 2 each ea. @ \$ 275.00/ea	\$ 550.00
8"x 10' tail pipe	\$ 400.00
8" spider bearing assemblies, 14 each @ \$85.00/ea.	\$ 1,190.00
8"x 8"x 16.5" high profile discharge head w/ 1.5" packing assembly	\$ 1,650.00
140' of 1.5" SS line shafting T&C @ \$35.00/ft.	\$ 4,900.00
Head shaft assembly	\$ 650.00
140'x 1" poly for draw down testing @ \$1.00/ft	\$ 140.00
Misc. installation items	\$ 200.00
Labor to heat straighten shafting, and prepare the installation	\$ 1,000.00
Labor to remove & reinstall well pump, start up and test	\$ 3,150.00

TOTAL PROJECT COST AS LISTED

\$ 34,645.00

Traut Wells

141 28th Ave South
Waite Park, MN 56387
320-251-5090
Email joetraut@trautwells.com
www.trautwells.com

Quote - City of Long Lake well 2 - Test pumping

DATE: 8/31/2010

PHONE #

FAX #

NAME: City of Long Lake - well 2

ADDRESS

ATTN: Chris Larson

JOB #

30-0000

RE: If generator is needed for test pumping - 125.00/HR

Description
MOB/DEMOB
Remove existing pump
Set test pump
Run test pump (power from city)
Pull test pump
Reinstall permanent pump
PER.DIEM & ROAD EXP.

Unit	Unit Price	QTY	Totals
LS	1,950.00	1	\$ 1,950.00
HR.	175.00	5	\$ 875.00
HR.	175.00	4	\$ 700.00
HR.	95.00	24	\$ 2,280.00
HR.	175.00	4	\$ 700.00
HR.	175.00	5	\$ 875.00
PR.DAY	225.00	4	\$ 900.00

TOTAL MATERIALS
TOTAL LABOR
INCOMING FREIGHT
TOTAL

\$	-
\$	8,280.00

Long Lake Well No. 2 Rehabilitation
Proposed Project Schedule

<u>Driveway Overlay/Retaining Wall Replacement</u>	<u>Start Date</u>	<u>Completion Date</u>
Solicit Quotes	10/18/10	11/5/10
Council Approval	11/16/10	11/16/10
Overlay Driveway	Spring 2011	
Replace Retaining Wall	Spring 2011	



REQUEST FOR ACTION LONG LAKE CITY COUNCIL

Meeting Date: August 17, 2010

Agenda Item: No. 7

Subject: Approve Scope and Fee Proposal for City Engineer SEH for 2010 Well and Well House No. 2 Rehabilitation Project and Authorize Solicitation of Construction Quotes

Prepared By: Terrance R. Post, City Administrator

Staff Initials:

TRP

Recommended City Council Action

Staff recommends the following motion:

Motion to approve the Short Elliott Hendrickson (SEH) scope and fee proposal, estimated to be \$30,000, for engineering services in support of the 2010 Well and Well House No. 2 Rehabilitation Project and to authorize its execution by the City Administrator; as well as authorizing the solicitation of quotes for the various project scope construction packages.

Overview / Background

Earlier in the year, Council gave direction to staff to focus expending remaining funds in TIF District No. 2 on infrastructure projects that would support future economic development activity in the city. The projects selected were the replacement of the Willow Drive Water Main currently underway and the rehabilitation of Well and Well House No. 2. Staff has estimated that there will be approximately \$200,000 available to the well rehabilitation project.

Public Works Director Wurzer and City Engineer Boxrud have each been advised on the funding limitation for the well rehabilitation project. Together, they have identified project elements that accomplish the primary goal and stay within the project funding parameter. It should be noted that this project was earlier identified in the City's long range CIP as being in the \$450k to \$500k range. The primary scope reductions have included not rebuilding the well house, not cutting in a new access driveway, and not regrading the site because of severe slope issues.

This project is also somewhat time sensitive in that Well No. 2 will not be in service during this construction activity. The ideal construction month would be October, although the purchase of such a large pump and motor require months of lead time from the manufacturers.

City Engineer Boxrud will be in attendance at the meeting to more fully describe the project details, timing, and any questions council may have regarding the proposal.

Staff recommends the acceptance of the SEH engineering services contract proposal in support of the 2010 Well and Well House No. 2 Rehabilitation Project and also authorize the solicitation of quotes for the various project element construction packages.

Supporting Information

- Dan Boxrud August 11, 2010 contract proposal letter to Terry Post

Financial Impact: \$200,000

Budgeted (Y / N) N

Source: TIF District 2 Fund No. 382

Notes:



RECEIVED

AUG 12 2010

August 11, 2010

RE: City of Long Lake, MN
Well and Well House No 2
Rehabilitation
SEH No. LONGL 107914

Mr. Terry Post
City of Long Lake, MN
450 Virginia Avenue
Long Lake, MN 55356

Dear Mr. Post:

The rehabilitation of Well and Well House No 2 has been planned for over 5 years. It has been planned to increase the capacity to 1,000 gallons per minute (gpm). This would achieve the firm pumping capacity needed to provide adequate design fire protection (driven mostly by the commercial and industrial areas) to the City of Long Lake. Although prior rehabilitation proposals and budgets anticipated correction of the steep driveway and general inaccessibility of the site, the project is now scaled back to meet a proposed budget of \$200,000. The scope of the improvements is detailed in the attached Memorandum from Chris Larson dated August 10, 2010.

We anticipate working closely with Marv Wurzer, Public Works Director, to jointly determine the most cost effective way to package quotations, and coordinate our efforts with those of public works to avoid redundancy. Our services will consist of conducting studies, investigations, and designs to the extent necessary to solicit quotations from the various types of contractors needed to complete this rehabilitation. We will also assist in getting quotations, provide shop drawing review, conduct construction site visits as necessary, and assistance during the start-up.

We will also furnish such Additional Services as you may request or as required.

It is important to not take the well out of service until the end of the peak summer usage period, late September to early October, and to have the well back in service as soon as possible. Therefore, the first quotations should be ready for solicitation by early September to beat winter weather. Interior work can be done into the winter months. Accordingly, we will start our services promptly after receipt of authorization on August 17. We anticipate most engineering and construction work being underway this fall with the project fully functional before spring.

This letter and the Agreement for Professional Services between the City of Long Lake and SEH along with Exhibits A, B, C-1, and D represent the entire understanding between you and us in respect of the project and may only be modified in writing signed by both of us.

You will pay us a fee for our services, currently estimated to be \$30,000, in accordance with Exhibit C-1, Rate Table method.



MEMORANDUM

TO: Dan Boxrud/SEH

FROM: Chris Larson/SEH

DATE: August 10, 2010

RE: Long Lake Wellhouse No. 2 Rehab
SEH No. 107914

The well and wellhouse were constructed in 1965. Well No. 2 is drawing water from the Jordan aquifer and is currently capable of pumping 500 gallons per minute (gpm). Our prior review of the well log and development data indicates that the well can possibly be redeveloped to a capacity of 1,000 gpm. This will require that the pump and motor be replaced to pull that much water from the well. The City has an overall budget of \$200,000.

The pump for Well No. 2 was last pulled and serviced in 1996. Approximately 70 cubic yards of sand was removed from Well No. 2 in 1996 (routine maintenance for sandstone wells). Given that the pump was last serviced in 1996, it is time for the pump to be pulled and serviced even if a rehabilitation project is not pursued.

To upgrade Well No. 2 to be capable of pumping 1,000 gpm, the following improvements need to be made:

- Pull existing pump and motor, test pump well, redevelop well (remove sand)
- Provide new pump and column capable of producing 1,000 gpm (or whatever the well will provide sand free)
- Upsize motor from 60 hp to 100 hp (estimated)
- New pump discharge head
- New electrical motor starter, controls, and communications

In addition to upgrading the well pump and motor, the wellhouse is also in need of repairs. Some of the improvements are required to bring the wellhouse into compliance with Minnesota Department of Health regulations. The following wellhouse improvements are recommended:

- New insulated roof, explore insulating block walls
- New exhaust fans and heater
- Process piping improvements (piping, check valve, air release valve)
- New flow meter
- Electrical transfer switch and generator receptacle
- Interior and exterior painting
- New chlorine chemical feed equipment (booster pump, ejector, scales etc.)
- New fluoride and polyphosphate chemical feed equipment
- Secondary containment for the polyphosphate and fluoride chemical tanks
- Retaining wall replacement and driveway overlay



MEMORANDUM

TO: Terry Post
Marv Wurzer

FROM: Christopher Larson, P.E.

DATE: December 6, 2010

RE: Wellhouse No. 2 Rehabilitation– Mechanical and Electrical Quotes
SEH No. 113888

The following table summarizes the status of the Wellhouse No. 2 projects and costs that have currently been incurred:

<u>Project</u>	<u>Status</u>	<u>Cost</u>
Test Pumping	Completed	\$6,100
New Pump & Motor	Completed	\$31,000
New Roof	Construction to start week of Dec. 6	\$8,500
Chemical Fill Station	Construction underway	\$16,600
Total Construction Cost:		\$62,200
Engineering		\$30,000
Total Cost to date:		\$92,200

Mechanical Quotes

We solicited quotes for the process piping, chemical feed systems, demolition, windows, doors, plumbing, and HVAC from Gridor Construction, Inc., Rice Lake Construction Group, and Magney Construction. The quotes are as follows:

Gridor Construction Inc.	\$72,090
Rice Lake Construction Group	\$86,800
Magney Construction	\$94,700

The quotes (attached) are broken down by task and portions of the work can be eliminated from the project if desired. We have had a positive experience working with Gridor in the past.

Electrical Quotes

We solicited quotes for the electrical work including a new electrical service, new motor starter, modifications to the existing PLC, radios, and necessary SCADA modifications from Killmer Electric, Industrial Electric Company, and Electrical Installation and Maintenance. The quotes are as follows:

Killmer Electric	\$64,067
Industrial Electric Company	\$66,370
Electrical Installation & Maintenance	\$67,812

The electrical quotes (attached) are broken down by task and include various adds/deducts. The above prices include all of the proposed work (i.e. radios, SCADA upgrades). We have had a positive experience working with Killmer in the past.

Wellhouse No. 2 Rehabilitation
December 6, 2010
Page 2

Recommendation of Award

The original project budget for the Wellhouse No. 2 rehabilitation was \$200,000; however, another \$47,000 was reportedly available due to a watermain project being completed under budget.

If the entire mechanical and electrical quotes are awarded, it will bring the overall project budget to \$228,357. It should be noted that this includes work not originally envisioned as part of this project (radios, SCADA upgrades, windows, doors, etc.). However, we believe that this work is worthwhile and should be done as part of the overall project.

If the additional \$47,000 is available for this project bringing the total available budget to \$247,000, we recommend awarding the entire mechanical and electrical projects to Gridor Construction and Killmer Electric.

Please call me at (651) 765-2961 with any questions or concerns.

Attachments: Mechanical Quotes
 Electrical Quotes

cc: Dan Boxrud, SEH



GRIDOR CONSTR., INC.

3990 27th Street SE
Buffalo, MN 55313

(763) 559-3734
(Fax) 559-3736

Improving America's Water Quality since 1970

12/1/10

Mr. Chris Larson
Short Elliot Hendrickson
3535 Vadnais Center Drive
St. Paul, MN 55110-5196

Subject: Well House No 2 Rehabilitation for the City of Long Lake, MN

Dear Mr. Larson,

As requested Gridor Construction, Inc is pleased to provide the following for your consideration:

Provide all labor and equipment for the following scopes of work:

Demolition -	\$ 2,684.82
Concrete Work -	\$ 1,418.10
Masonry - (Glass Block)	\$ 3,456.80
Doors and Hardware -	\$ 4,479.79
Chemical Feed Systems -	\$ 19,827.88
Flow meter/Pressure Transmitter -	\$ 6,185.38
Process Piping/Valves -	\$ 11,016.35
Gauges -	\$ 531.86
Mechanical Insulation -	\$ 1,263.24
Plumbing -	\$ 9,480.39
HVAC -	<u>\$ 11,745.00</u>
Total	\$ 72,089.61

Not included in the above price:

Electrical/Integration work - By others
Painting - By others

Please feel free to contact me with any questions or concerns in regards to this quote or any other work you'd be interested in us quoting.

Best Regards,

Peter Nordang
Project Manager
Gridor Construction Inc.

P. 763.746.9082
F. 763.559.3736
peter@gridor.com



December 1st, 2010

PROPOSAL

Long Lake Wellhouse #2 Rehabilitation
City of Long Lake, MN

TO: Christopher T. Larson, P.E.
SEH, Inc.
3535 Vadnais Center Drive
St. Paul, MN 55110-5196

Price Breakdown	Price
Mobilization	\$ 1,500.00
Demolition	\$ 1,850.00
Concrete	\$ 2,250.00
Masonry	\$ 5,250.00
Steel Doors and Frames	\$ 4,250.00
Chemical Feed Equipment	\$ 21,500.00
Magnetic Flow Meter	\$ 5,350.00
Process Piping, Valves and Fittings	\$ 17,600.00
Plumbing	\$ 12,350.00
Heating, Venting and Air Conditioning	\$ 14,900.00
Total Price	\$ 86,800.00

Rice Lake Construction Group

Steve Perpich
Project Manager

MAIN OFFICE

22360 County Road 12
PO Box 517
Deerwood, MN 56444
PH 218-546-5519
FX 218-546-7016

ATWATER OFFICE

200 Atlantic Avenue W.
PO Box 689
Atwater, MN 56209
PH 320-974-8821
FX 320-974-8500

SEND TO Company name S.E.H.		From Kevin Vranicar
Attention Mr. Chris Larson, PE		Date 12/1/2010
Fax (651) 490-2150	Phone (651) 765-2961	Proposal # 01 - Wellhouse No. 2 Rehabilitation - Long Lake, MN

☐ Urgent ☐ Please comment ☒ Please review ☐ For your information

Total pages, including cover: 1

COMMENTS

Re: Wellhouse No. 2 Rehabilitation - Long Lake, MN

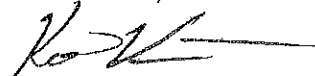
Chris,

Magney Construction, Inc. is pleased to present the following proposal to furnish the necessary material, equipment and labor to complete the rehabilitation project as per drawings 01R1, 01P1, DP1, 01M1, dated 11/16/10 and the specifications dated November, 2010. Our proposal also accounts for the clarifications that were e-mailed on 11/19/10. Below is a summary of the costs associated with this proposal:

Building Permit Allowance	\$	500.00
Mobilization, Insurance & General Conditions	\$	12,300.00
Demolition	\$	6,900.00
Cast-In-Place Concrete	\$	1,550.00
Unit Masonry - Glass Block Windows	\$	1,650.00
Steel Doors, Frames & Hardware	\$	3,900.00
Chemical Feed Equipment	\$	22,600.00
Magnetic Flow Meter	\$	3,500.00
Process Piping, Fittings, Valves & Gauges	\$	15,400.00
Plumbing	\$	10,400.00
HVAC	\$	14,500.00
Pressure Transmitter	\$	1,500.00
Lump Sum Total	\$	94,700.00

Please review this proposal and feel free to contact me with any questions, comments, or concerns. We look forward to working with you on this project and we sincerely appreciate the opportunity to bid.

Thank You,



Kevin Vranicar
 Project Manager

Accepted By	Date

Industrial
Commercial
Underground



5141 Lakeland Avenue North
Crystal, Minnesota 55429
Telephone: (763) 425-2525
Fax: (763) 424-1258

December 2nd, 2010

Mr. Christopher Larson, PE
Short Elliot Hendrickson
3535 Vanais Center Drive
St. Paul, MN 55110

Re: Well No. 2 Rehabilitation
Long Lake, MN
Dear Chris,

Killmer Electric Company proposes to provide electrical construction services for the subject project. This proposal is prepared in accordance with plans prepared by SHE dated 11-16-10, and site visit.

Misc. Included

- New Electrical Service.
- Coordination with Xcel Energy. Cost to be covered by others.
- New PVC conduit utilized.
- New 125HP VFD w/full bypass. (*Deduct \$2,000.00 to remove bypass*)
- Use of existing conduits if available.
- PLC mods required for new motor VFD control.

Excluded

- Payment and performance bonds.
- Drawdown level sensor.
- Radio Upgrade. See alternate add.
- New Magnetic Flow Meter.

Total Base Bid: \$55,634.00

Alternate Add – Radio/SCADA Upgrade Add: \$8,433.00

Provide PLC and radios as describe on electrical sheet

Thank you for the opportunity to provide a proposal on this project.
Please call with any questions or comments.

Regards,

A handwritten signature in black ink, appearing to read "Matthew Pettit".

Matthew Pettit
Project Manager

An Equal Opportunity Employer





INDUSTRIAL ELECTRIC COMPANY

December 3, 2010

Mr. Christopher Larson
SEH
3535 Vadnais Center Drive
St. Paul, MN 55110-5196

**RE: Wellhouse No. 2 Rehabilitation
City of Long Lake, MN**

Dear Chris:

We are pleased to present our electrical construction proposal for the project referenced above. Our proposal is based on drawing sheet E by SEH dated 11-16-10 and additional information you provided. Our proposal is subject to the scope of work and qualifications listed below:

Wellhouse No. 2 Rehabilitation:

All electrical for rehabilitation of the Wellhouse No. 2 per drawing E including the following:

- Disconnect and/or remove electrical equipment during demolition.
- Provide (furnish & install) distribution equipment and wiring per the Power Riser on sheet E. Includes: 400A wall mount CT cabinet, 400A double-throw manual transfer switch, 400A 480/277V "P" panel with TVSS unit, 30kVA transformer, 100A 208/120V "LP" panel, 1 ½ hp soft start, and 125 hp VFD with bypass disconnect.
- Provide light fixtures & switches, unit heater, and receptacles. Includes conduit & wiring.
- Connect to two exhaust fans and water heater [equipment furnished and installed by others].
- Connect to pressure transmitter, magnetic flow meter, pump solenoid valve, and well level transducer. Includes conduit & wiring. Equipment furnished and installation in piping by others.
- Reinstall flood water detector.
- Connect to 125 hp well pump and 1 ½ hp chlorine pump. Includes conduit & wiring.
- Provide receptacle for chemical fill.
- Provide wiring to existing SCADA panel. Programming revisions to control panel for new pumps and devices.
- Relocate and provide power to existing Civil Defense equipment.
- Provide switched receptacle and generator receptacle at the chemical fill station. Note: conduits provided by others.

NOTE: communication system work [radios, antennas, modems, etc.] is not included.

NOTE: Telemetry and Process Controls, Inc. is the base bid integrator.

Base Bid Electrical Proposal: \$ 56,470.00

Communication System Work:

All electrical for communications system work as shown on the note on drawing E including the following:

- Well #2: provide antenna, antenna cable, radios, change modems, and make PLC changes for radios to the existing SCADA panel. Note: conduit to Civil Defense Pole by others.
- Well #1: provide antenna, antenna cable, radios, change modems, and make PLC changes for radios.
- Tower: provide omni-direction antenna, antenna cable, radios, change modems, and make PLC changes for radios.

Communication System Work – ADD: \$ 9,990.00

VOLUNTARY DEDUCTS FROM BASE BID WORK

Delete Integral Bypass from 125 hp Allen Bradley VFD – **DEDUCT:** **\$ 3,200.00**

Allen Bradley SMC-3 instead of SMC Flex for 1 ½ hp – **DEDUCT:** **\$ 1,250.00**
OR

Allen Bradley FVNR combo starter instead of SMC Flex for 1 ½ hp – **DEDUCT:** **\$ 1,750.00**

Integration by Automatic Systems Company instead of TPC – **DEDUCT:** **\$ 2,100.00**

Qualifications:

1. Electrical permit is included. Material sales tax is included.
2. Electrical Utility Service Connections charges are not included [per email from engineer].
3. Payment and performance bonds are not included.
4. Salvaged electrical material is property of Industrial Electric.
5. Water, toilet, and refuse collection services are not included.

We look forward to the opportunity to discuss our proposal with you. If you have any questions, please feel free to call me at 612-331-1268.

Sincerely,
Industrial Electric Company



Joseph P. Black
Project Manager

Electrical Installation & Maintenance Co.

1480 County Road 90
Maple Plain, MN 55359
763-479-3744 phone
763-479-3745 fax

PROPOSAL

DATE	ESTIMATE NO.
12/3/2010	6502

NAME / ADDRESS
SEH ATTN: CHRIS LARSON RE: LONG LAKE WELL #2 REMODEL

DESCRIPTION	TOTAL
1. BASE PRICE FOR ELECTRICAL ON REMODEL ON WELLHOUSE #2	47,750.00
2. WELL #1 & #2 & WATERTOWER SCADA MODIFICATIONS	15,582.00
3. LABOR ONLY WELL #2	1,080.00
4. LABOR ONLY WELL #1 & WATERTOWER	3,400.00
(DEDUCT IF RADIO EQUIPMENT IS NOT UTILIZED AND THE EXISTING MODEMS REMAIN - \$6,306.00)	
THIS PRICE IS IF YOU USE TELEMETRY PROCESS CONTROL	
WE LOOK FORWARD TO DOING BUSINESS WITH YOU	TOTAL \$67,812.00



MEMORANDUM

TO: Terry Post

FROM: Christopher Larson, P.E.

DATE: October 11, 2010

RE: Wellhouse No. 2 – New Roof Quotes
SEH No. 113888

Attached are quotes from Sela Roofing, Berwald Roofing, and Dalbec Roofing to provide a new roof for Wellhouse No. 2. The existing roof was installed in the 1960s and is need of replacement.

The following is a summary of the quotes:

Sela Roofing	\$8,500
Berwald Roofing	\$9,873
Dalbec Roofing	\$16,965

We recommend awarding the project to Sela Roofing because their price is low and they are a reputable company.

Please call me at (651) 765-2961 with any questions or concerns.

Attachments Sela Roofing Quote
 Berwald Roofing Quote
 Dalbec Roofing Quote

cc: Marv Wurzer, City of Long Lake
 Dan Boxrud, SEH



CITY OF LONG LAKE
450 VIRGINIA AVENUE
P.O. BOX 606
LONG LAKE, MN 55346

ACCEPTANCE COPY
OCTOBER 11, 2010
651-765-2961

We propose to tear off and re-roof the well house #2 roof at the above address and install a GAF NDL roofing system by:

- Tear off the existing roofing down to the concrete Clean up and haul away all debris from the premises.
- Install tapered panels of Isocyanurate roof insulation tapering from 2.5" to 4.5" over the entire roof surface for an average R-22.
- Mop one layer of 1/2" wood fiber board roof insulation over the entire roof surface.
- Install 4 layers of type IV fiberglass felt, running all felts up into the base flashings. Each layer of felt will be mopped in solid with hot asphalt at a rate of no less than 25 lbs. per sq. ft.
- Flash all walls with an additional layer of modified bitumen 160 mil flashing material, fasten and secure.
- Install new galvanized sheet metal chimney stack base flashings in place of existing.
- Install new pre-finished sheet metal scupper where existing is now.
- Install proper ice water shield to encapsulate all wood blocking.
- Flood coat the entire roof surface with a final layer of hot asphalt at a rate of 60 lbs. per 100 sq. ft. and embed washed roofing gravel in asphalt while still hot at a rate of 500 lbs. per 100 sq. ft.
- Install new pre-finished cant edge metal around the outside perimeter.
- Install new pre-finished sheet metal counter flashing at all roof curbs, roof to wall locations and secure.
- Install new pre-finished open faced downspouts in place of existing.

CONTINUED ON PAGE 2.....

Sela Roofing Commercial Division
1743 County Road F East, White Bear Lake, MN 55110
612-623-1982 (Phone) 612-331-4019 (Fax)
Visit us at www.selaservices.com
State of Minnesota License ID #0001050

CITY OF LONG LAKE
450 VIRGINIA AVENUE
P.O. BOX 606
LONG LAKE, MN 55346

ACCEPTANCE COPY
OCTOBER 11, 2010
651-765-2961

CONTINUED FROM PAGE 1.....

- Remove all roofing equipment and materials from job site when completed and clean up and haul away all debris from the premises.

COST FOR THE ABOVE-DESCRIBED WORK IS: \$ 8,500.00

NOTE: The cost of one 3'x3' aluminum hatch is included in price.

GUARANTEE: This Contract comes with a Ten (10) year conditional guarantee on workmanship and materials.

PAYMENT: A payment of 1/3rd of the Contract amount is due upon the set-up of the roofing project and monthly progress payments will be invoiced and due upon receipt. Interest on unpaid balances after completion accrues at the rate of 1 1/2% (1.5%) per month (18% per annum).

NOTE: This proposal may be withdrawn by SELA if not accepted within Thirty (30) days, and price is subject to Manager's approval for Seven (7) days after customer's signature as acceptance. In the event customer attempts to and/or does cancel or breach this agreement, the parties agree that SELA's resulting damages will be difficult to ascertain and that SELA shall be entitled to liquidated damages in a sum equal to twenty percent (20%) of the total Contract price or \$500.00, whichever is greater. The parties agree that this is not a penalty, is not an amount greatly disproportionate to SELA's estimated actual damages, and is an accurate approximation of SELA's lost profit due to customer's cancellation and/or breach of this agreement.

Acceptance of the Proposal: The above prices, specifications and conditions, including those set forth in the "Additional Contract Terms" attached hereto, are satisfactory and are hereby accepted. Sela is authorized to do the work as specified. Payment will be made as outlined.

THANK YOU!!!

DAN SCHEEL, SERVICE MANAGER
SELA COMMERCIAL DIVISION

THE ATTACHED "ADDITIONAL CONTRACT TERMS" ARE INCORPORATED HEREIN BY REFERENCE AND ARE PART OF THIS CONTRACT

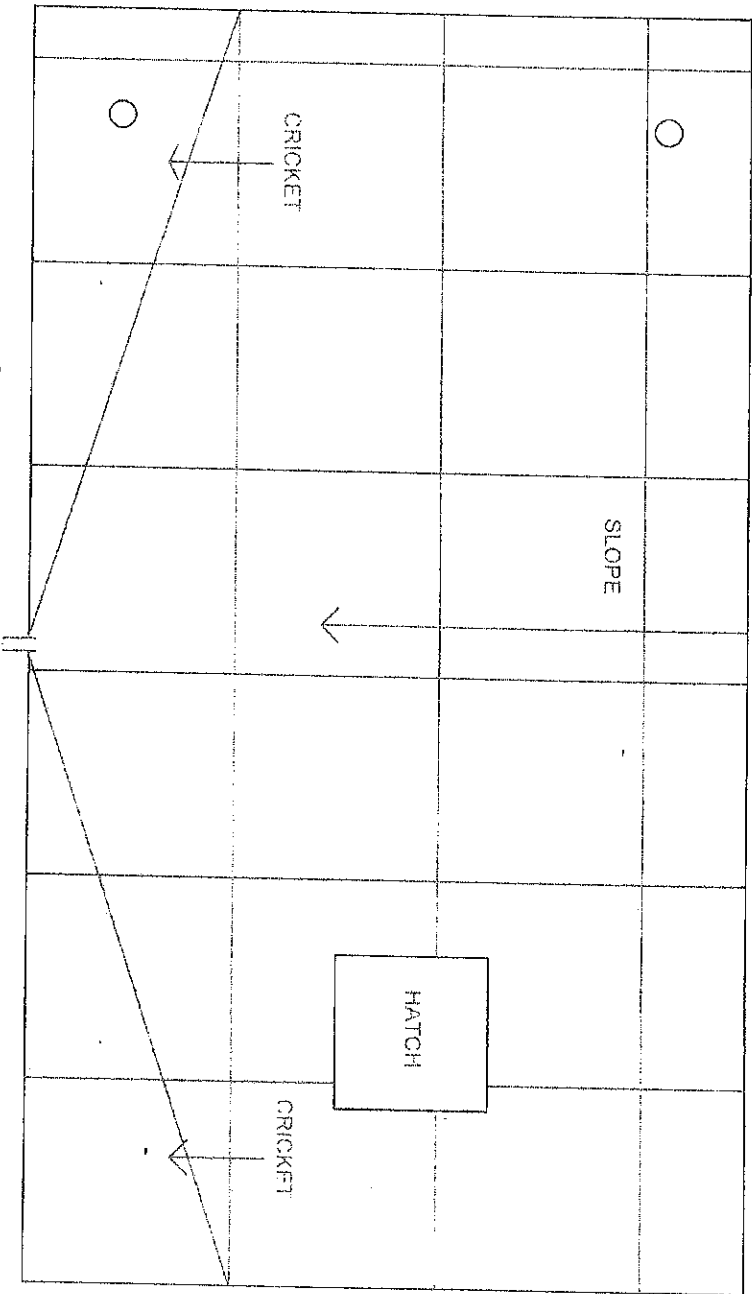
SELA ROOFING AND REMODELING INC.: CUSTOMER:

BY: Dan Scheel

BY: _____

DATED: 10-11-10

DATED: _____



LONG LAKE WELL HOUSE #2	SCALE 3/8" = 1'
----------------------------	--------------------



Berwald Roofing Company, Inc. ROOFING AND SHEET METAL

2440 North Charles Street
North St. Paul, MN 55109

651-777-7411
fax: 651-777-1871
www.berwaldroofing.com

PROPOSAL

October 11, 2010

SUBMITTED TO: SEH
3535 Vadnais Center Drive
St. Paul, MN 55110-5196

Faxed _____
Mailed _____

ATTENTION: Christopher T. Larson
PHONE: 651-765-2961

CELL: 651-955-1428

JOB NAME: Well House #2
JOB LOCATION: Long Lake, MN

WE PROPOSE TO FURNISH ALL LABOR MATERIAL, EQUIPMENT, AND INSURANCE TO COMPLETE SHEET METAL AND ROOFING ACCORDING TO PLANS AND SPECIFICATIONS.

Area: 327 sq ft.

Tear off existing built-up roof.

Tapered insulation (isocyanurate) and ½" rigid insulation top layer mopped in place with hot asphalt R value 22.22.

4-ply asphalt roof with Type IV fiberglass felt.

Modified bitumen base flashing, wood cant, plate, 40-mil peel & stick at perimeter.

Prefinished sheet metal flashing (75')

Prefinished scupper (1)

3'0" x 3'0" aluminum roof hatch.

We propose to furnish material and labor -- complete in accordance with above specifications, for the sum of **Nine thousand eight hundred seventy-three and no/100 dollars \$9,873.00.**

NOTE: Terms of payment: Net 30 days. This proposal is valid for 30 days. It may be withdrawn or modified if not accepted during this time. All material is guaranteed to be as specified. All work to be completed in a workmanlike manner according to standard practices. Any alteration or deviation from above specifications involving extra costs will be executed only upon written orders, and will become an extra charge over and above the estimate. All agreements are contingent upon strikes, accidents or delays beyond our control. Owner is to carry fire, tornado and other necessary insurance. Our workers are fully covered by Workman's Compensation Insurance.

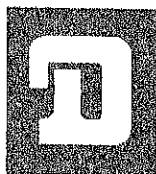
Authorized Signature: _____

Ron Kloempken Cell # 612-803-7357

Acceptance of Proposal - The above prices, specifications and conditions are satisfactory and are hereby accepted. You are authorized to do the work as specified. Payment will be made as outlined above.

Date of Acceptance: _____ Signature: _____

EEO/AA
Industrial - Commercial - Residential
Since 1936



DALBEC ROOFING

October 7, 2010

Marv Wurzer
City of Long Lake
450 Virginia Ave
Long Lake, MN 55356

Proposal for Re-Roofing at:
Pumphouse #2
1345 West Wayzata Blvd.
Long Lake, MN 55356

We propose to furnish the necessary labor, material and equipment required to perform the roof replacement on the above named project as follows:

DEMOLITION

1. Remove existing built up roof, to roof decking.
2. Remove the existing metal flashing and rotted wood blocking.
3. Properly haul away all debris from the project site and dispose of item in the appropriate landfill.

INSULATION

1. Install wood blocking at perimeter to accommodate the new insulation.
2. Install a base layer of 3.2" isocyanurate roof insulation in hot asphalt to the concrete deck. Install additional tapered insulation sumps at 2 scuppers. (Locations to be determined)
3. Install a top layer of 1/2" fiberboard insulation embedded in hot asphalt. The roof will have an average "R" value of 22.2, which meets state code.

ROOFING

1. Four (4)-plies of type IV fiberglass roofing felt set in solid moppings of type III asphalt.
2. Flood coat roof with type III asphalt (60# per square) and embed No 7 roofing gravel (500# per square).
3. Install one (1) ply of reinforced modified base flashing at vertical surfaces.
4. Flash into roof all vent stacks, scuppers, and (1) new 4' x 4' clear opening roof hatch at existing access opening.
5. Install Ice and Water Shield over the top of the roof edge perimeter.

SHEET METAL

1. 24- gauge prefinished coping with galvanized keeper strip at perimeter walls.
2. 24- gauge prefinished counter flashing at roof hatch.
3. 24-gauge scuppers and downspouts.

All of the above for the sum of: SIXTEEN THOUSAND NINE HUNDRED SIXTY FIVE AND 00/100
--- \$16,965.00

NOTES

1. Manufacturers 10- year warranty included.
2. Manufactures 20-year sheet metal warranty is included.
3. Quote includes required permits and standard Contractors Liability Insurance
4. We did not figure handling or disposal of hazardous material if present.
5. Quote includes the price of an asbestos test on the existing roof material.
6. This Proposal may be withdrawn by us if not accepted within 30 days. There will be a labor increase for all work performed after May 1st, 2011.
7. Winter conditions are not figured. If snow and ice removal are needed, this will be done on a time and material basis.
8. To reuse existing access cover in lieu of a replacement hatch: **Deduct \$1,900.00**

We appreciate the opportunity to provide you with this estimate. If you have any questions, or if I can be of further assistance, please call me.



Tony Rozeske

ACCEPTED _____
PRINT NAME _____

DATE _____

208849

County Hennepin

Quad Excelsior

Quad ID 105A

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING REPORT
Minnesota Statutes Chapter 1031

Entry Date 08/24/1991

Update Date 02/05/2016

Received Date

Well Name LONG LAKE 1	Township 118	Range 23	Dir Section W 34	Subsection DBBBBC	Well Depth 340 ft.	Depth Completed 340 ft.	Date Well Completed 00/00/1952
Elevation 990 ft. Elev. Method 7.5 minute topographic map (+/- 5 feet)					Drill Method Cable Tool	Drill Fluid	
Address					Use abandoned	Status Sealed	
Contact 1964 PARK AV LONG LAKE MN 55356					Well Hydrofractured? Yes <input type="checkbox"/> No <input type="checkbox"/> From To		
Well 1964 PARK AV LONG LAKE MN 55356					Casing Type Single casing Joint		
Stratigraphy Information					Drive Shoe? Yes <input type="checkbox"/> No <input type="checkbox"/> Above/Below		
Geological Material	From	To (ft.)	Color	Hardness	Casing Diameter	Weight	Hole Diameter
DRIFT	0	188			12 in. To	198 ft. lbs./ft.	12 in. To 340 ft.
SHAKOPEE-ONEOTA	188	290					
JORDAN SANDSTONE	290	340					
					Open Hole	From 198 ft.	To 340 ft.
					Screen? <input type="checkbox"/>	Type	Make
					Static Water Level		
					86.3 ft.	Land surface	Measure 07/26/1988
					Pumping Level (below land surface)		
					94 ft.	6 hrs.	Pumping at 350 g.p.m.
					Wellhead Completion		
					Pitless adapter manufacturer Model		
					<input type="checkbox"/> 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 <input type="checkbox"/> Not Specified		
					Nearest Known Source of Contamination		
					feet	Direction	Type
					Well disinfected upon completion? <input type="checkbox"/> Yes <input type="checkbox"/> No		
					Pump <input checked="" type="checkbox"/> Not Installed Date Installed		
					Manufacturer's name		
					Model Number	HP	Volt
					Length of drop pipe	ft	Capacity g.p. Typ
					Abandoned		
					Does property have any not in use and not sealed well(s)? <input type="checkbox"/> Yes <input type="checkbox"/> No		
					Variance		
					Was a variance granted from the MDH for this well? <input type="checkbox"/> Yes <input type="checkbox"/> No		
					Miscellaneous		
					First Bedrock	Prairie Du Chien Group	Aquifer Prairie Du Chien
					Last Strat	Prairie Du Chien Group	Depth to Bedrock 188 ft
					Located by Minnesota Department of Health		
					Locate Method GPS SA On (averaged)		
					System	UTM - Mad83, Zone 15, Meters	X 454782 Y 4981444
					Unique Number Verification	Information from	Input Date 10/12/1999
					Angled Drill Hole		
					Well Contractor		
					Bergerson-Caswell	27058	
					Licensee Business	Lic. or Reg. No.	Name of Driller
Remarks							
LONG LAKE #1 MUNI WELL MP=3.6 MARV WURZER.							
ORIG. DRILLED 1946, DEPTH 369 FT.							
SEALED 4/30/2004 BY 27058; PREVIOUS USE: PC							
1945 WELL NO. 1 WAS "OVER 400 FT. DEEP". MAY BE ANOTHER WELL.							

Appendix 2

Water Level Monitoring Plan

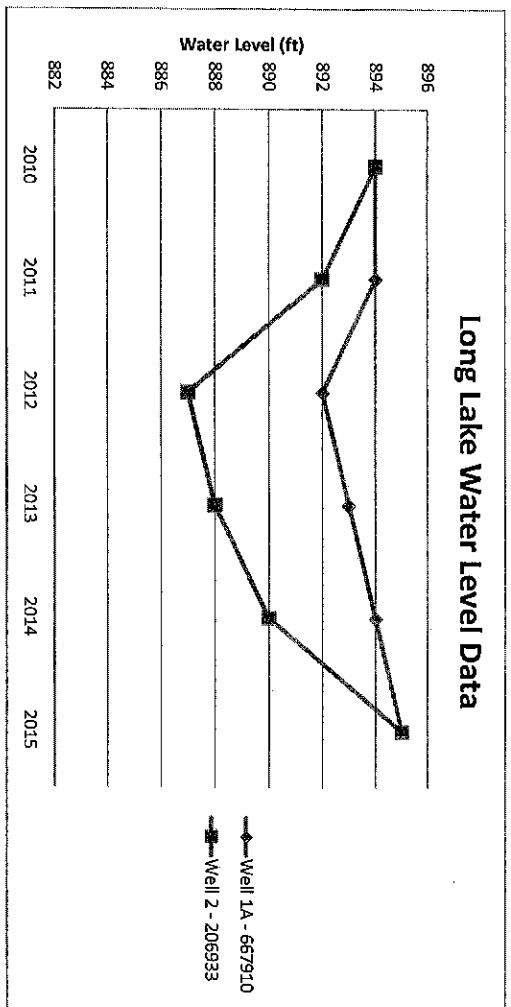
Water Level Monitoring Plan
City of Long Lake, MN

Well Name	Well ID	Well Type	Aquifer	Location	Monitoring Type	Monitoring Frequency	Reporting Frequency
Well 1A	667910	Production	Prairie du Chien - Jordan	Orchard Ln	SCADA	Daily	Annually
Well 2	206933	Production	Prairie du Chien - Jordan	Wayzata Blvd	Steel Tape	Weekly	Annually

Appendix 3

Water Level Graphs for each Water Supply Well

Elevation (ft)	Well 1	Well 2
	990	960
Drawdown (ft)	Water level (ft)	Drawdown (ft)
2010	96	894
2011	96	894
2012	98	892
2013	97	893
2014	96	894
2015	95	895
Static Water Level	86	72



Appendix 4
Capital Improvement Plan

[illegible]

[illegible]

Appendix 5

Emergency Telephone List

City of Long Lake
Emergency Telephone List
6/15/18

Emergency Response Team	Name	Work Telephone	Alternate Telephone
Emergency Response Lead	Orono Police Chief	952-249-4700	952-258-5321
Alternate Emergency Response Lead	Long Lake Fire Chief (James Van Eyll)	952-473-9701	952-471-9777
Water Operator	Sean Diercks	952-476-2855	
Alternate Water Operator	Don (Luke) Laakkonen	952-476-2855	
Public Communications	Scott Weske	952-473-6961 ext.2	

State and Local Emergency Response Contacts	Name	Work Telephone	Alternate Telephone
State Incident Duty Officer	Minnesota Duty Officer	800-422-0798 Out State	651-649-5451 Metro
County Emergency Director	Daniel Bovitz	612-596-0249	
National Guard	Minnesota Duty Officer	800-422-0798 Out State	651-649-5451 Metro
Mayor/Board Chair	Marty Schneider	612-237-3843	
Fire Chief	James Van Eyll	952-473-9701	952-471-9777
Sheriff	Richard Stanek (Hennepin Co.)	612-348-3744	
Police Chief	Mike Risvold (Wayzata)	952-404-5343	
Ambulance	N/A	911	
Hospital	Regency Minneapolis	763-588-2750	
Doctor or Medical Facility	Park Nicollet – Wayzata	952-993-8250	

State and Local Agencies	Name	Work Telephone	Alternate Telephone
MDH District Engineer	Isaac Bradlich	651-201-3971	
MDH	Drinking Water Protection	651-201-4700	
State Testing Laboratory	Minnesota Duty Officer	800-422-0798 Out State	651-649-5451 Metro
MPCA	St. Paul Office	651-296-6300	800-657-3864
DNR Area Hydrologist	Kate Drewry	651-259-5753	
County Water Planner	Joe Settles	612-348-6157	

Utilities	Name	Work Telephone	Alternate Telephone
Electric Company	Xcel Energy	800-895-4999	
Gas Company	CenterPoint Energy	612-374-4727	800-245-2377
Telephone Company	CenturyLink	800-475-7526	
Gopher State One Call	GSOC	800-252-1166 or 811	651-454-0002
Highway Department	James Grube (Hennepin Co.)	612-596-0300	

Mutual Aid Agreements	Name	Work Telephone	Alternate Telephone
Neighboring Water Systems	Scott Oberaigner (Orono)	952-249-4680	
Emergency Water Connection	Orono Police Chief	952-249-4700	
Materials			

Preferred Contractors	Name	Work Telephone	Alternate Telephone
Water Contractors	Valley Rich	952-448-3002	
	Widmer Construction	952-955-5062	
Sewer Contractors	Kothrade Sewer, Water and Excavating	763-498-8702	
	Drain King	763-786-3000	888-391-6241
	Roto Rooter	612-872-2929	612-788-9029

Communications	Name	Work Telephone	Alternate Telephone
News Paper	The Pioneer	952-442-4414	
Radio Station	CBS Radio	612-370-0611	
School Superintendent	Karen Orcutt (Orono)	952-449-8305	
Property & Casualty Insurance			
Television Network	WCCO	612-339-4444	

Appendix 6

Cooperative Agreements for Emergency Services

AGREEMENT
BETWEEN THE CITY OF LONG LAKE
AND THE CITY OF ORONO PROVIDING
RECIPROCAL EMERGENCY WATER SUPPLY

THIS AGREEMENT, made and entered into this 11th day of April, 1994, by and between the City of Long Lake hereinafter referred to as "Long Lake," a municipal corporation, organized and existing as a city under the laws of the State of Minnesota, and the City of Orono, hereinafter referred to as "Orono," a municipal corporation, organized and existing as a city under the laws of the State of Minnesota.

WHEREAS, it will be beneficial to both cities to make arrangements for interconnections of the contiguous water service mains in both cities for use as a mutual emergency reservoir by the parties hereto; and

WHEREAS, it is necessary that there be permanent arrangements for the use, maintenance and repairs;

NOW, THEREFORE, it is agreed by and between the parties hereto that:

1. The Orono water main is connected to the existing water distribution system at Long Lake as shown on the plans as prepared by the City Engineer of Orono and approved by the City Engineer of Long Lake. Said plans are dated and shall be incorporated by reference to this agreement.
2. Long Lake and Orono shall pay each other for water consumed by either of the parties during emergencies or maintenance at the average rate prevailing at the time of usage. The average shall be determined by adding the two city rates and dividing by two.
3. The exchange and sale of water is to be limited to cases of emergencies or water system maintenance, cleaning and repair work. Emergencies shall be defined as follows:
 - (a) Interruption of normal water supply due to mechanical failure and for up to five (5) days for repair. However, if the mechanical failure causing service interruption shall, of necessity, require additional time, the parties hereto may agree, upon mutual consent, to extend the time.
 - (b) Fire emergencies which cannot adequately be taken care of by the use of one system.
4. The two-way valve shall remain closed at all times under normal conditions. Opening or closing of the valve for water system maintenance, cleaning and repair shall be done

only after two weeks notification of the City Clerk of either city which notification may be given only by the City Clerks, the water department superintendents or the fire chiefs of each city. The valve may be opened under emergency conditions without prior notice, but the City Clerk shall be notified as soon as possible thereafter and in no event later than 24 hours after the occurrence.

5. Repair and maintenance costs shall be borne by Long Lake for any portion of the pipe within its city limits and by Orono for that portion within the city limits of Orono.

6. Long Lake agrees that Orono shall not be responsible or liable in any manner for any claim, demand, action or cause of action of any kind arising out of the negligent performance or failure to perform any of the work provided herein by Orono. The above provision shall apply also to any failure by Orono for any reason to supply water service to Long Lake. Long Lake agrees to indemnify Orono, its officers and employees and to save and keep them harmless from all losses and expenses including attorney fees, expenses and court costs incurred as a result of any claim, demand, action or cause of action arising out of the construction, operation, maintenance or presence of the water line or the failure to provide water service at any time to Long Lake.

Orono agrees that Long Lake shall not be responsible or liable in any manner for any claim, demand or cause of action arising out of the negligent performance or failure to perform any of the work provided herein by Long Lake. The above provision shall apply to any failure by Long Lake for any reason to supply water service to Orono. Orono agrees to indemnify Long Lake, its officers and employees and to save and keep them harmless from all losses or expenses including attorney fees, expenses and court costs incurred as a result of any claim, demand, action or cause of action arising out of the construction, operation, maintenance or presence of the water line or the failure by Long Lake for any reason to supply water service to Orono.

7. Long Lake acknowledges that Orono is under no duty to provide a supply of water to Long Lake and Orono also acknowledges that Long Lake is under no duty to supply water to Orono.

8. Upon termination of this agreement by either party Long Lake shall take those steps necessary to install a shutoff valve at Long Lake's sole expense in Long Lake to prevent the passage of any water and Orono shall install a similar valve in Orono to prevent water passage between the two cities.

9. In the event both Long Lake and Orono shall have an emergency simultaneously, then each city shall operate on its own system and neither shall be responsible to the other to provide any water. Orono does not guarantee that any amount of water will be available at any given time and neither shall Long Lake.

10. This agreement shall be perpetual, but shall be subject to cancellation by either party upon the following conditions:

(a) Either party may cancel this agreement upon a 90-day written notice without cause.

(b) In the event one system introduces impure water into the other system and corrective action is not immediately taken upon notification, the party receiving impure water may cancel this agreement immediately.

Executed by the parties as of the day and year first above written.

WITNESS:

Harvey M. Hallen

CITY OF ORONO

By

Edward J. Callahan
Its Mayor

And

Ronald E. Moore
Its City Administrator

WITNESS:

Jane Gargenson

CITY OF LONG LAKE

By

Tod Olson
Its Mayor

And

L. Vene Hansen
Its City Clerk

WATER SYSTEM INTERCONNECTION AGREEMENT

THIS AGREEMENT is entered into as of this ____ day of April, 2003, by and between the City of Long Lake (Long Lake), a municipal corporation, and the City of Orono (Orono), a municipal corporation.

RECITALS

WHEREAS, Long Lake and Orono are interested in sharing public services that will promote the public health, safety, and welfare of its citizens; and

WHEREAS, Long Lake and Orono have a water system interconnection located between the south side and north side of Wayzata Boulevard within the right-of-way of Willow Road (Willow Interconnection). It has a water system interconnection that can be operated manually; and

WHEREAS, Long Lake and Orono believe that additional water system interconnections will benefit both communities by allowing water to flow from one community to another during emergency or major maintenance of a community water system; and

WHEREAS, Long Lake and Orono desire to enter into an agreement to provide for the design, construction, and maintenance of water system interconnections for the mutual benefit; and

WHEREAS, Long Lake and Orono have already agreed to split the costs of the design and construction for two additional water system interconnections between the two communities; and to share the cost of maintenance of all these systems.

NOW, THEREFORE, for and in consideration of the mutual covenants contained herein and other good and valuable consideration, Long Lake and Orono agree as follows:

1. Long Lake and Orono confirm that they will share the costs equally for the design of two additional water system interconnections in accordance with the design prepared by Short, Elliot and Henderson (SEH). The location of the two new water system interconnections is set forth in the attached schematic, marked Exhibit A and are located as follows:

- a. The south side of Wayzata Boulevard to the north side of Wayzata Boulevard near Brimhall Avenue at a location to be determined (Brimhall Interconnection); and
- b. The Long Lake water main located on the north side of Wayzata Boulevard west of Virginia Avenue, to the Orono Avenue water main located on the north side of Wayzata Boulevard west of Virginia Avenue at a location to be determined (Virginia Interconnection).

2. The Brimhall and Virginia Interconnections will be automatic systems. The parties acknowledge that the existing Willow Interconnection will continue to be operated manually.

Upon receipt of the SEH invoice for the design of the Brimhall and Virginia Interconnections, Long Lake shall forward a copy to Orono. Long Lake and Orono will split those costs equally and pay the invoice on a timely basis.

3. Long Lake and Orono agree to split the costs equally of the construction of the Brimhall and Virginia Interconnections. The construction work will be added to an existing Long Lake City utility contract by change order. Upon receipt of the invoice, Long Lake will forward the invoice related to the Brimhall and Virginia Interconnections to Orono to be split equally between the two cities.

4. Long Lake and Orono agree that they will split the costs equally of the ongoing maintenance expense of the operation of the three water system interconnections, i.e. Willow, Brimhall, and Virginia.

Dated: 4-15-03

CITY OF LONG LAKE

By: 

Its Mayor

By: 

Its City Administrator

849535.1

Dated: 7-14-03

CITY OF ORONO

By: 

Its Mayor

By: 

Its City Administrator

Attachment to the Orono/ Long Lake Water Interconnection Agreement

There are two new separate water system interconnections referenced in this interconnection agreement. The agreement states that the operation and maintenance costs for these two interconnections will be shared equally between the two Cities. The two interconnections are similar in design with the same type of valves and a sump pump in each interconnection enclosure. In order to simplify the administration of this agreement, each City will be responsible for the operation, maintenance, and repair of one interconnect. Electric service will be required for sump pump operation in both interconnects, and each City will be responsible for payment of the costs for electric service for their interconnect.

The City of Orono will be responsible for the maintenance and operation of the interconnection located north of Highway 12 across from Virginia Avenue.

The City of Long Lake will be responsible for the maintenance and operation of the interconnection located south of Highway 12 near Brimhall Avenue.

Appendix 7

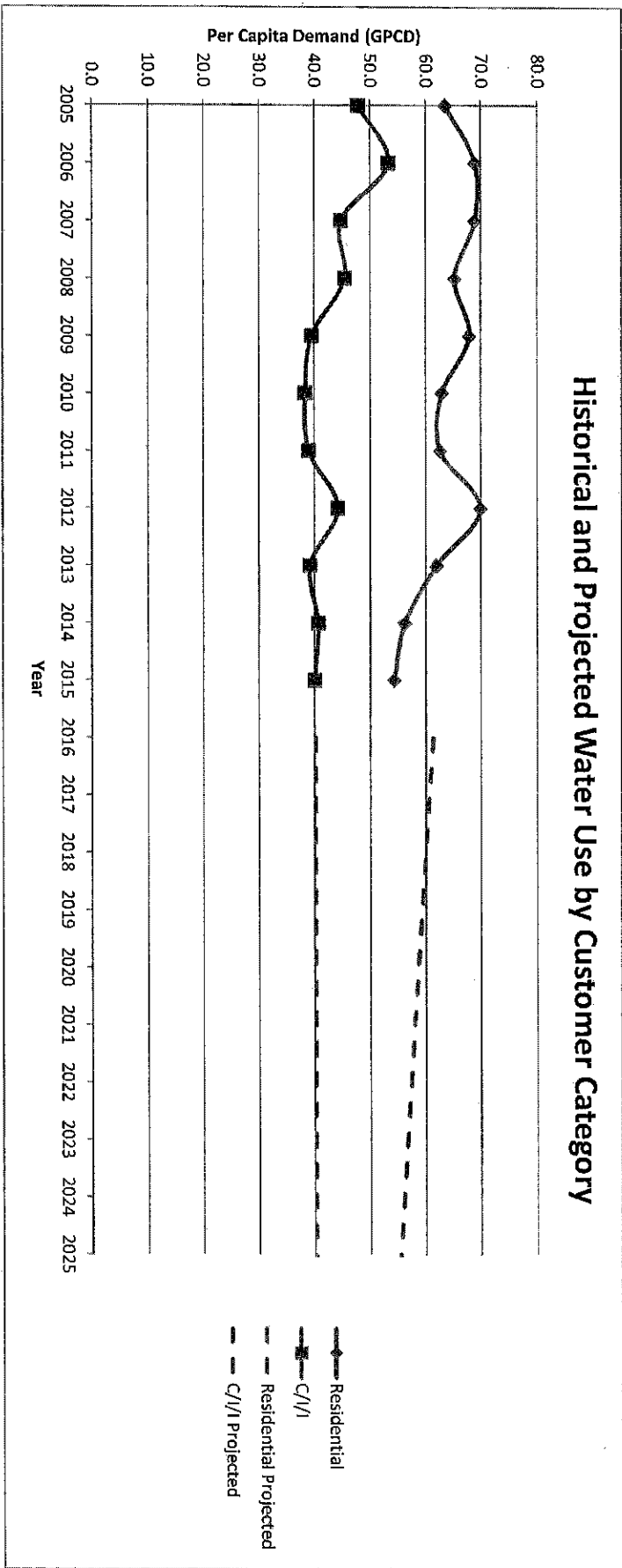
Municipal Critical Water Deficiency Ordinance

The City does not have a Critical Water Deficiency Ordinance in place.

Appendix 8

Graph showing annual per capita water demand
for each customer category during the last ten years

Historical and Projected Water Use by Customer Category



Appendix 9

Water Rate Structure



City of Long Lake 2018 Rates

WATER USAGE CHARGES		REFERENCES
Residential and commercial minimum fixed charge (applies to all properties)	\$4.05 / qtr	CH 36, ART II, DIV 4, SEC 36-102
RESIDENTIAL Tier 1 = 0 - 10,000 gallons used per quarter	\$2.67 / 1,000 gal	CH 36, ART II, DIV 4, SEC 36-102
RESIDENTIAL Tier 2 = Over 10,000 gallons used per quarter	\$4.01 / 1,000 gal	CH 36, ART II, DIV 4, SEC 36-102
COMMERCIAL Tier 1 = 0 - 40,000 gallons used per quarter	\$2.67 / 1,000 gal	CH 36, ART II, DIV 4, SEC 36-102
COMMERCIAL Tier 2 = Over 40,000 gallons used per quarter	\$4.01 / 1,000 gal	CH 36, ART II, DIV 4, SEC 36-102
LARGE INDUSTRIAL Tier 1 = 0 - 340,000 gallons used per quarter	\$2.67 / 1,000 gal	
LARGE INDUSTRIAL Tier 2 = Over 340,000 gallons used per quarter	\$4.01 / 1,000 gal	CH 36, ART II, DIV 4, SEC 36-102
Hydrant hook up fee per day	\$50.00 / day	CH 36, ART II, DIV 4, SEC 36-102
Minnesota Department of Health water connection fee	\$1.59 / qtr	CH 36, ART II, DIV 4, SEC 36-102

Appendix 10

Adopted or proposed regulations
to reduce demand or improve water efficiency

The following zoning ordinances contain regulations for short-term demand reductions and/or long-term improvements in water efficiencies

Section 21 – Off-Street Parking Requirements

Subdivision 4

Perimeter Tree Planting Requirements

The perimeter of parking areas for all commercial, industrial, institutional, and multiple family properties shall be planted with deciduous shade trees at least 3" in diameter at a number equal to 1 tree per 4 parking spaces, and spaced to provide maximum shading of the parking area.

Appendix 11

Implementation Checklist:

Summary of all the actions that a community is doing or proposes to do,
including estimated implementation dates

Appendix 11:

Implementation Check List

1. Data Collection of static and pumping levels of municipal wells: The public works department will continue to conduct routine collection of groundwater levels at the municipal well sites. This activity will provide data for the evaluation of groundwater elevations trends over time. On-going.
2. Educate the public on water conservation efforts: The city will provide information to the public to encourage users to voluntarily incorporate water saving habits and tools into their lifestyles via website, newsletters, links to the MDH, Met Council, and Hennepin County. On-going.
3. Incorporate information water supply plan to City's Comprehensive Plan: The city will use this water supply plan as a resource when updating it's Comprehensive Plan. Planned update of Comp. Plan 2018
4. Improve the existing water system's operation and maintenance programs: The city will continue to conduct water loss audits, and water conservation testing. The city will also continue to incorporate, capital replacement projects of aging water infrastructure into the capital improvement plan to ensure the water distribution system remains efficient and to keep water loss to a minimum. On-going.

Appendix 12

Sources of Information for Table 10

 [\(/index.html\)](#)



Page Menu

Long Lake

ID: 27016000

County: Hennepin

Near: Long Lake

Border Water: No

Sentinel Lake ([/fisheries/slice/sentinel.html](#)): No

Size and Depth

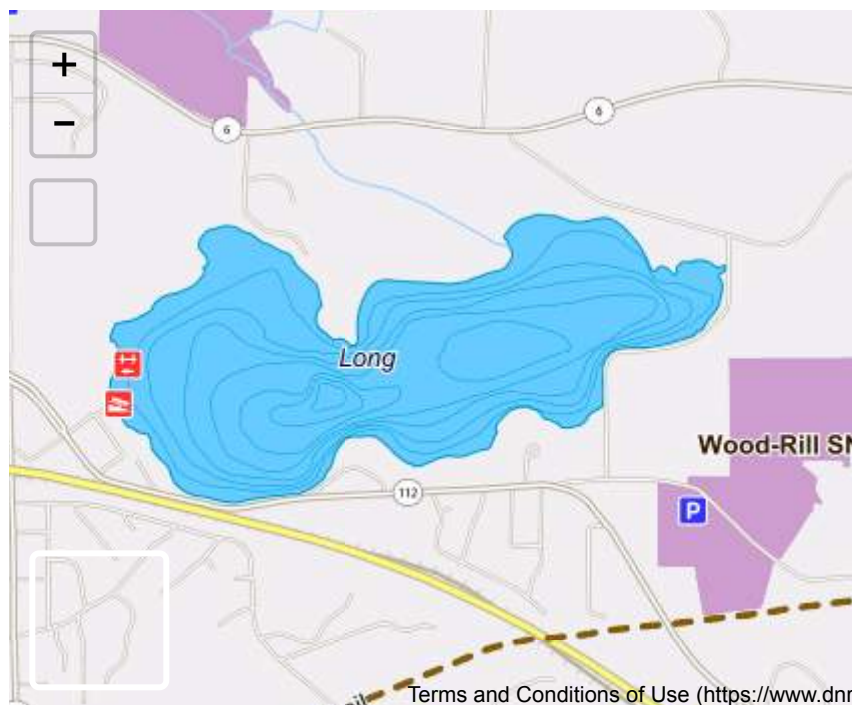
Area: 284.99 acres

Littoral Area: 131 acres

Shore Length: 3.87 miles

Maximum Depth: 33 feet

Fish Species: black bullhead, black crappie, bluegill, brown bullhead, channel catfish, green sunfish, hybrid sunfish, largemouth bass, northern pike, pumpkinseed, walleye, white crappie, yellow bullhead, yellow perch, bowfin (dogfish), common carp, white sucker, bluntnose minnow, central mudminnow, golden shiner, Johnny darter, spottail shiner



Terms and Conditions of Use (https://www.dnr.state.mn.us/sitetools/data_software_license.html)

Fishing Regulations:[General \(/fishing/regs.html?topic=general\)](/fishing/regs.html?topic=general) »[Inland Waters \(/fishing/regs.html?topic=inland\)](/fishing/regs.html?topic=inland) »**Invasive species:** Eurasian watermilfoil[Stop aquatic hitchhikers \(/invasives/preventspread_watercraft.html\)](/invasives/preventspread_watercraft.html) »**Give us your feedback**

Help us improve LakeFinder. Just send your comments to webmaster.dnr@state.mn.us
(<mailto:webmaster.dnr@state.mn.us?subject=LakeFinder%20Updates>).



(//)

Questions?

Call 651-296-6157 or 888-MINNDNR (646-6367)

Email us: info.dnr@state.mn.us (<mailto:info.dnr@state.mn.us>)

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(/aboutdnr/disclaimers_and_policies.html) | A-Z list (/site_tools/azlist.html)

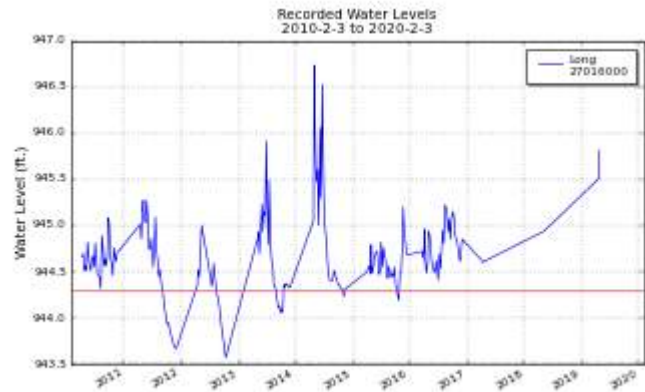
 [\(/index.html\)](#)



Lake name: Long

County: Hennepin

nr.state.mn.us/cgi-bin/hydrograph/cgi.py?Long&startdate=2010-2-3&enddate=2020-2-3



[type=time series&show ohwl=1&show legend=1&output format=png&width=780&height=440](#)

Last 10 years of data, click to enlarge.

Water Level Data

Period of record: 10/19/1937 to 04/24/2019

of readings: 1174

Highest recorded: 947.39 ft (08/08/2004)

Lowest recorded: 943.24 ft (06/26/1987)

Recorded range: 4.15 ft

Last reading: 945.51 ft (04/24/2019)

Ordinary High Water Level (OHW) [\(/waters/surfacewater_section/hydrographics/ohw.html\)](#)

elevation: 944.3 ft

Datum: NGVD 29 (ft)

Download lake level data as: [[dBase \(https://files.dnr.state.mn.us/cgi-bin/lk_levels_dump.cgi?format=dbf&id=27016000\)](https://files.dnr.state.mn.us/cgi-bin/lk_levels_dump.cgi?format=dbf&id=27016000)] [[ASCII \(https://files.dnr.state.mn.us/cgi-bin/lk_levels_dump.cgi?format=csv&id=27016000\)](https://files.dnr.state.mn.us/cgi-bin/lk_levels_dump.cgi?format=csv&id=27016000)] (If you have trouble try right clicking on the appropriate link and choosing the "Save ... As" option.)

Benchmarks

Elevation: 946.51 ft

Datum: NGVD 29 (ft)

Date Set: 05/09/2018

Location: T118R23S34

Description: Found 2019. Low concrete on right downstream (SE) abutment on footbridge across 20' wide channel between holding pond and Long Lake, approximately 60' NW from boat launch area, at Nelson Lakeside Park access, 1860 Symes St, Long Lake, on SW side of lake.

Elevation: 949.08 ft

Datum: NGVD 29 (ft)

Date Set: 04/14/1992

Location: T118R23S35

Description: Found 2018 for use only with prior permission from landowner. Centerline at North end of East sidewalk on lakeward side of private house, at private residence, 1010 Old Long Lake Rd, Wayzata, at SE side of lake.

Elevation: 951.16 ft

Datum: NGVD 29 (ft)

Date Set: 04/14/1992

Location: T118R23S35

Description: Found 2016. Centerline of upstream headwall of outlet culvert off cemetery road on South side of lake, on SW side of Union Cemetery property, 1400 Wayzata Blvd W, Orono. [Note: Add 0.10' to NGVD 1929 elevations to equate to NAVD 88 datum as per GPS survey 2/18/16.]



(/)

Questions?

Call 651-296-6157 or 888-MINNDNR (646-6367)

Email us: info.dnr@state.mn.us (mailto:info.dnr@state.mn.us)

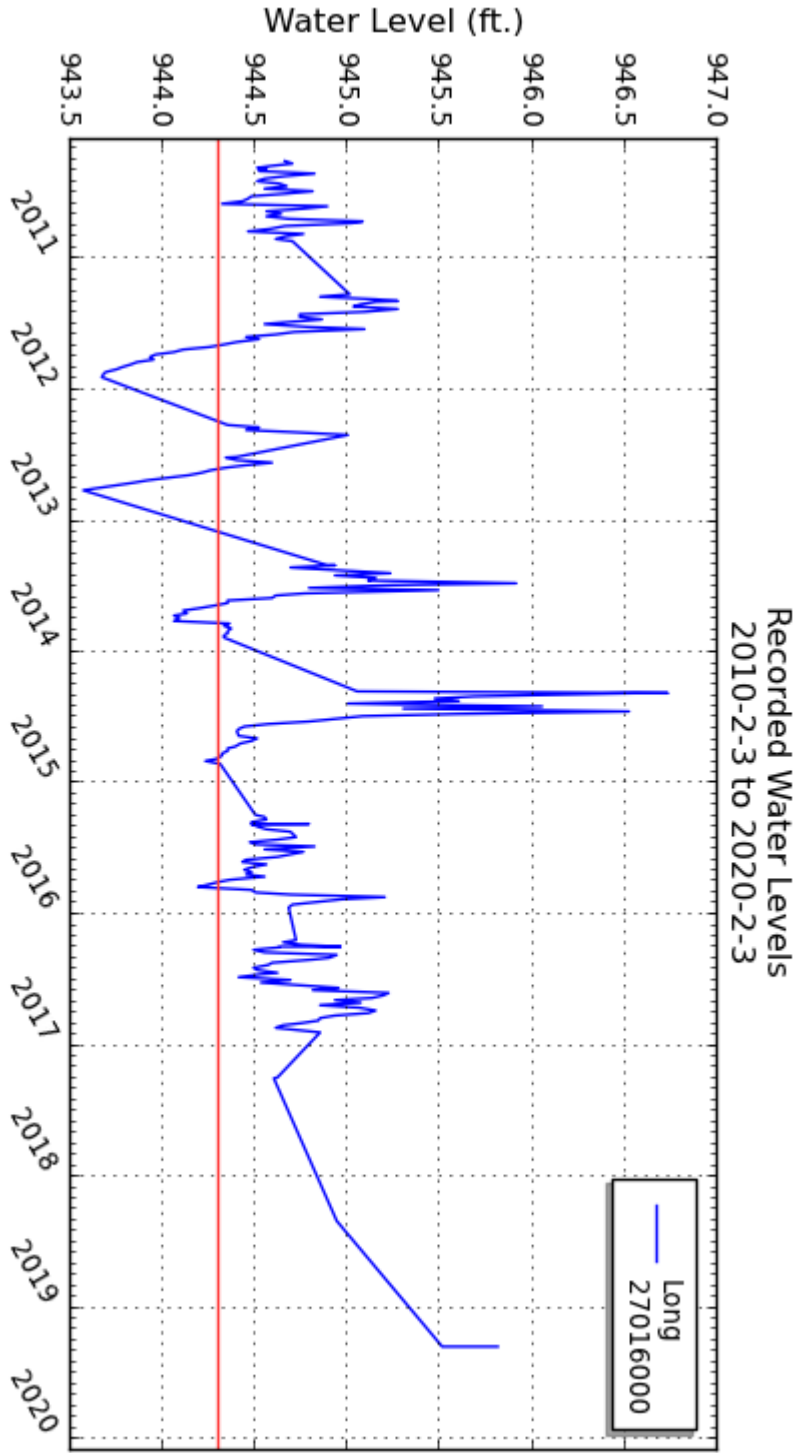
Connect with us     <https://www.facebook.com/MinnesotaDNR> <https://twitter.com/MinnesotaDNR> <https://www.instagram.com/MinnesotaDNR> <https://www.youtube.com/channel/UCjvKwvYnUjUjUjUjUjUjUjUjUj>

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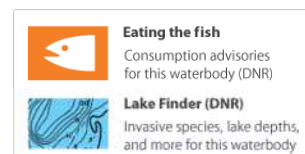


Surface water data
Lake and stream water quality assessment information

[New search](#)

Long: AT LONG LAKE (Lake)

Lake identification number: **27-0160-00**



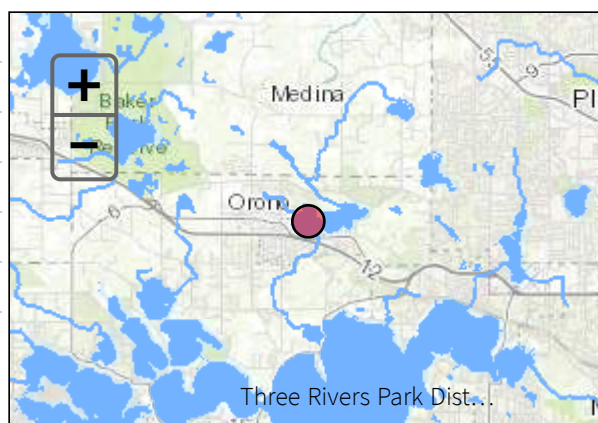
Overall Condition:

Not always suitable for swimming and wading due to low clarity or excessive algae caused by the presence of nutrients such as phosphorus in the water.

Description	Assessments	Monitoring Data	Water Quality Summary
Transparency Trend	Land Use		

Description

Major Watershed:	<u>Mississippi River - Twin Cities</u>
County:	Hennepin
Location:	AT LONG LAKE
Surface Area:	277.526294207 acres
Maximum Depth:	33 feet
Ecoregion:	North Central Hardwood Forests
Use Classification:	<u>2B, 3C</u>



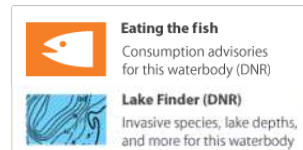


Surface water data
Lake and stream water quality assessment information

[New search](#)

Long: AT LONG LAKE (Lake)

Lake identification number: **27-0160-00**



Overall Condition:

Not always suitable for swimming and wading due to low clarity or excessive algae caused by the presence of nutrients such as phosphorus in the water.

Description	Assessments	Monitoring Data	Water Quality Summary
Transparency Trend	Land Use		

MPCA Water Quality Assessments

Click the Project # to view the project's detail page

Beneficial use	Assessment year*	Assessed condition	Impairment cause	Restoration project no
Aquatic consumption		Use not assessed	Mercury in fish tissue	http://www.pca.state.mn.us/wfhy9ef
Aquatic life	2013	Insufficient data for use assessment		
Aquatic recreation	2012	One or more standards not met	Nutrients	

* When Assessed condition is "One or more standards not met," Assessment year is the year before the impairment was added to the Inventory of Impaired Waters. Otherwise, Assessment year is the year in which MPCA's most recent assessment was performed.

More information on [water quality standards](#).

More information on [monitoring and assessment](#).

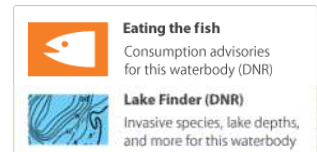


Surface water data
Lake and stream water quality assessment information

[New search](#)

Long: AT LONG LAKE (Lake)

Lake identification number: **27-0160-00**



Overall Condition:

Not always suitable for swimming and wading due to low clarity or excessive algae caused by the presence of nutrients such as phosphorus in the water.

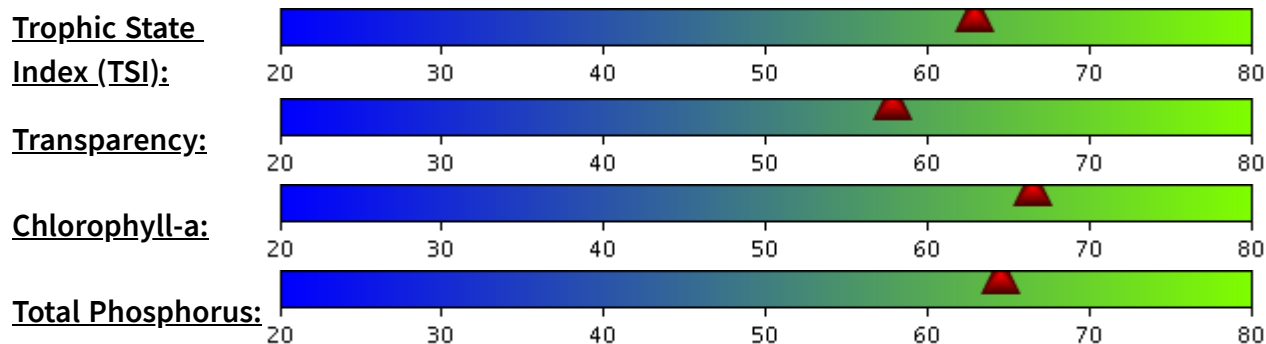
Description	Assessments	Monitoring Data	Water Quality Summary
Transparency Trend	Land Use		

Water Quality Summary

Recreational suitability measures

The **Trophic State Index (TSI)** is a number that summarizes a lake's overall nutrient richness. Nutrient richness ranges from clear lakes, low in nutrients (oligotrophic), to green lakes, with very high nutrient levels (hypereutrophic). The chart below shows the overall TSI rating for this lake (top bar), followed by TSI ratings for the individual parameters that contribute to nutrient richness. The TSI calculations are based on data collected between June and September 2008 to 2017.

Clear	Moderately Clear	Green	Very Green
(<u>Oligotrophic</u>)	(<u>Mesotrophic</u>)	(<u>Eutrophic</u>)	(<u>Hypereutrophic</u>)



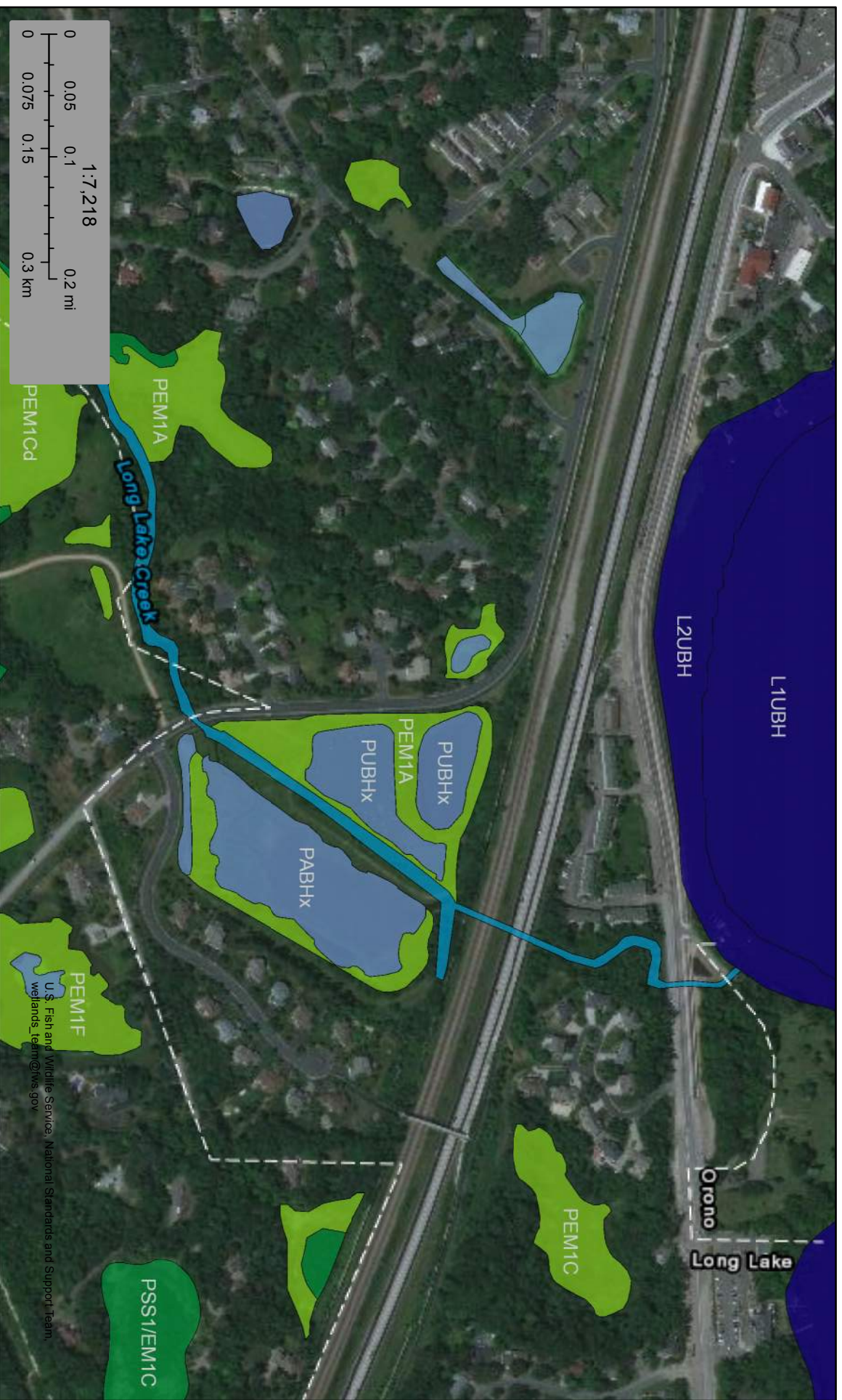
Overall Trophic State Index for This Lake: 63

Parameter	10-Year average of all summer samples	Parameter TSI	Expected TSI range for lakes in same ecoregion	Number of samples
Transparency (meters)	1	58	43 - 54	65
Chlorophyll-a (parts per billion)	39	67	46 - 61	66
Total Phosphorus (parts per billion)	66	65	49 - 61	67

Water transparency is an excellent indicator of water quality, and the majority of these data are collected by volunteers. Join the MPCA's [Citizen Lake Monitoring Program](#) and help collect this important information for your lake.



Long Lake Creek Wetlands



February 3, 2020

Wetlands

- | | | | |
|--|-----------------------------------|--|----------|
| | Freshwater Emergent Wetland | | Lake |
| | Estuarine and Marine Deepwater | | Other |
| | Estuarine and Marine Wetland | | Riverine |
| | Freshwater Forested/Shrub Wetland | | |
| | Freshwater Pond | | |

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

U.S. Fish and Wildlife Service, National Standards and Support Team,
wetlands_team@fws.gov

Long Lake Water Supply Profile

Overview of water system and use in the community

The community owns and operates their own water supply system.

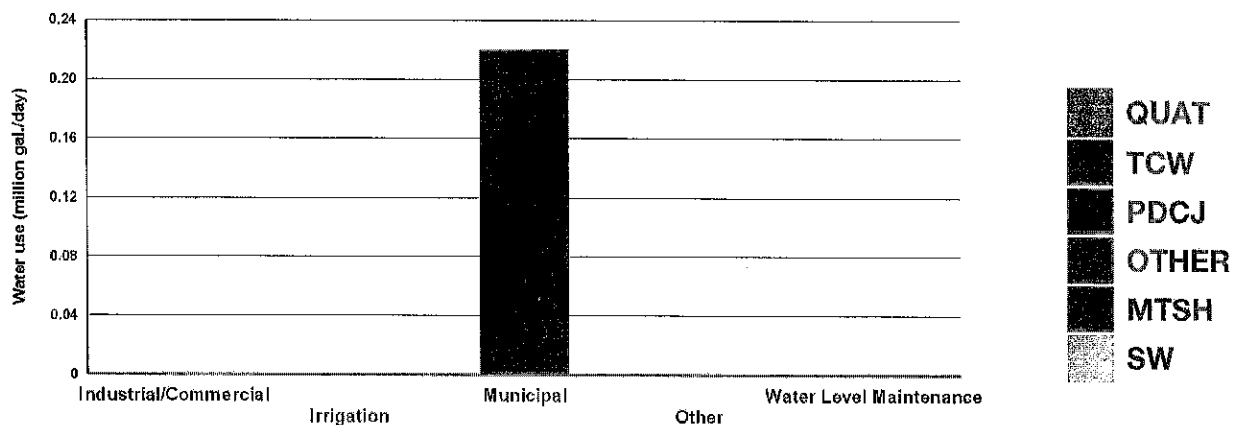
Available approaches to meet current and future demand

1. Conservation
2. Groundwater sources
3. Stormwater reuse
4. Reclaimed wastewater
5. Enhanced recharge
6. Surface water sources

Number of active public and private DNR-permitted wells and surface water intakes that provide water to residents and businesses in the community

Source	Municipal Wells or intakes in the community	Non-Municipal Wells or intakes in the community	Municipal Wells or intakes outside the community
Mt. Simon-Hinckley (MTSH)	0	0	0
Prairie du Chien-Jordan (PDCJ)	1	0	0
Quaternary (QUAT)	0	0	0
Tunnel City-Wonewoc (TCW)	0	0	0
Multi-aquifer (MULTI)	0	0	0
Surface Water (SW)	0	0	0

Amount of water used, on average, by water appropriation permit holders in key water use categories (chart will be blank if no DNR-permitted wells or intakes provide water in the community)



Municipal Water Use

Municipal water treatment: Fluoride , Disinfection, Iron/Manganese Sequestration

Rate structure: Unknown

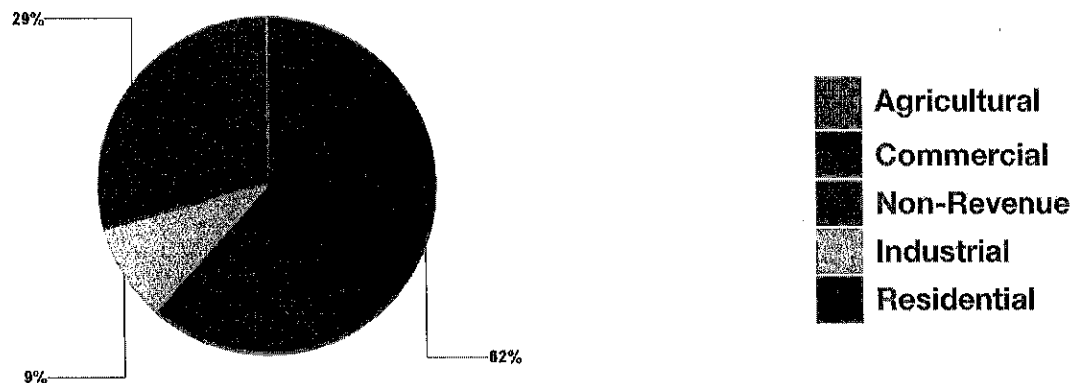
Permitted amount in 2012: 178 (million gallons/year)

Reported use in 2012: 74 (million gallons/year) 0.20 (million gallons/day)

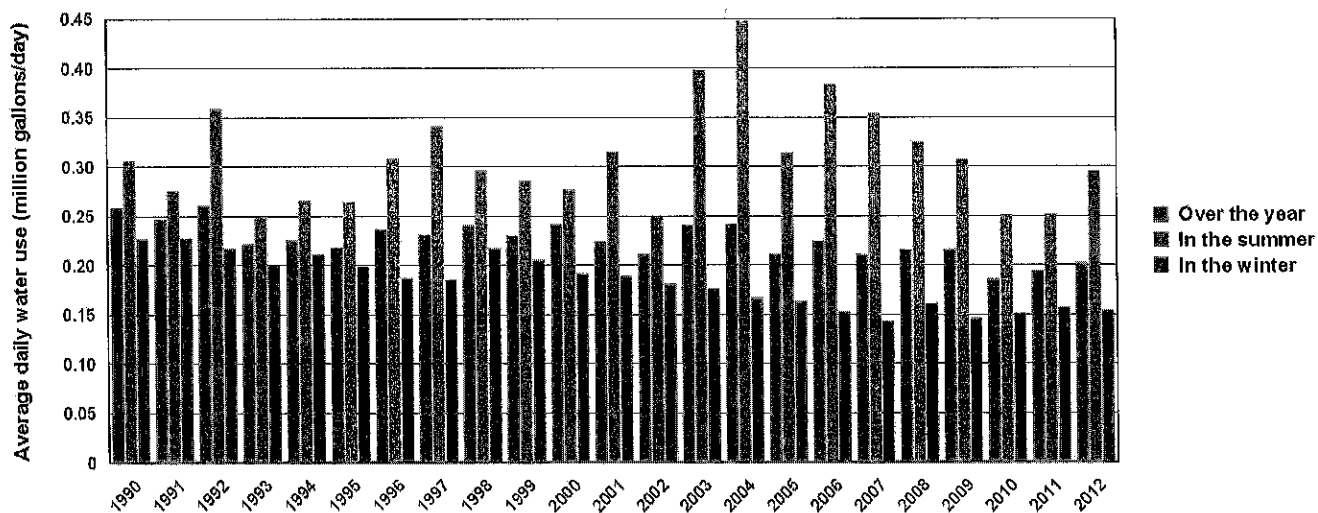
Note: *this may be higher than permitted amount if, for example, water is purchased from a neighbor*

Residential water use per person in 2012: 68 gallons per person per day

Water use by major categories in 2012



Historical municipal water use in the community



Projected municipal water use

	2020	2030	2040
Population Served	1,810	1,960	1,990
Total Population	1,810	1,960	1,990
Projected Average Daily Water Use (Million Gal./Day), Plus or Minus 20%	0.22	0.23	0.24
Total Per Capita Water Use (Gal./Person/Day)	119	119	119
What per capita water use would be, if population grew without changing total water use:	112	103	101

Water resource plans and permits that address the following issues support more sustainable water supplies

- State and federal requirements, such as Safe Drinking Water Act standards, conditions identified on water appropriation permits issued by the DNR, water quality permits issued by the MPCA and others
- Potential for water use conflicts and well interference
 - Due to the pervasiveness of private wells in the metro area, there exists a potential water use conflict and well interference of all appropriators
- Potential for significant decline in aquifer water levels
 - A nearby DNR observation well documents a declining trend in aquifer water levels
- Potential for impacts of groundwater pumping on surface water features and ecosystems
 - Surface waters in this area may be directly connected to regional groundwater system
- Significant vulnerability to contamination
 - Travel time from land surface to bedrock aquifers is estimated to be less than 50 years
- Significant uncertainty about aquifer productivity and extent
 - Part of the area may not be well-represented by a Minnesota Department of Health aquifer test
 - The county geologic atlas is more than twenty years old
 - Part of the area may not be represented by a Minnesota Department of Natural Resources or community observation well

Note: *Local studies may be underway or completed to provide more information about these issues.*

The Metropolitan Council's Local Planning Handbook contains interactive maps of all of these issues, and they are also summarized in Chapter 5 of this Master Water Supply Plan.

As appropriate, incorporate the following actions into plans and programs, consistent with your organization's roles and responsibilities

- Acknowledge the issues above and support partnerships to address them in local water supply plans and water appropriation permit applications.
- Explore and support water demand (water conservation) programs such as incentives, ordinances, education and outreach, rates and other approaches. The Metropolitan Council Water Conservation Toolbox can support these efforts.
- Promote the evaluation of water conflict and well interface as part of the water appropriation permit request and review process. Before requesting water appropriations, water users in this areas should evaluate the need to address water conflict and well interference including a) an inventory of all active domestic

and public water supply wells near proposed well locations and b) an analysis of existing water level/water withdrawal data to identify where future drawdowns could affect domestic wells.

- Support collaborative efforts to evaluate the likelihood of significant declines in aquifer water levels before water appropriation permits are requested. The analysis may be determined in consultation with DNR and can vary from a graphical comparison of water levels to local groundwater flow modeling. If this analysis suggests future declines are likely to be unacceptable, a management plan should be developed and include additional water level and pumping rate monitoring, triggers and actions to protect aquifer levels, a schedule for periodic analysis of data to identify the need for action to mitigate impacts, and a schedule for periodic and timely reporting to DNR.
- Work with partners to evaluate relationships between aquifer withdrawals and surface water features. If a connection is likely, management plans should include aquifer testing, monitoring water levels and pumping rates and surface water flow, triggers and actions to protect aquifer levels, a schedule for periodic analysis of data to identify the need for action to mitigate impacts, and a schedule for periodic and timely reporting to DNR.
- Collaborate with partners, including MDH, to support local actions that prevent the spread of contamination. This may include implementation of source-water protection plan measures to mitigate public health risks. Where significant contamination exists, MDH will continue enhanced monitoring, and public water suppliers in the area may need to implement treatment processes to meet Safe Drinking Water Act requirements and manage pumping to better control the extent and magnitude of contaminant plumes.
- Work with partners to identify opportunities for sharing information, reducing duplicate work, and partnering on projects that improve understanding about aquifer productivity and extent.
- Support collaborative efforts to periodically review local water supply risks and potential alternatives to mitigate those risks. Technical advances, regulatory adjustments and sub-regional developments can present new opportunities for local water suppliers to enhance the resiliency, sustainability, and affordability of their water supplies.
- Continue to work with local, state and federal agencies, as required.

Note: The actions listed above may be underway or completed, and information may be available from local public water suppliers, planners, or water resource managers.

Additional information and guidance is provided in the Local Planning Handbook. Metropolitan Council staff can also provide technical and planning assistance.

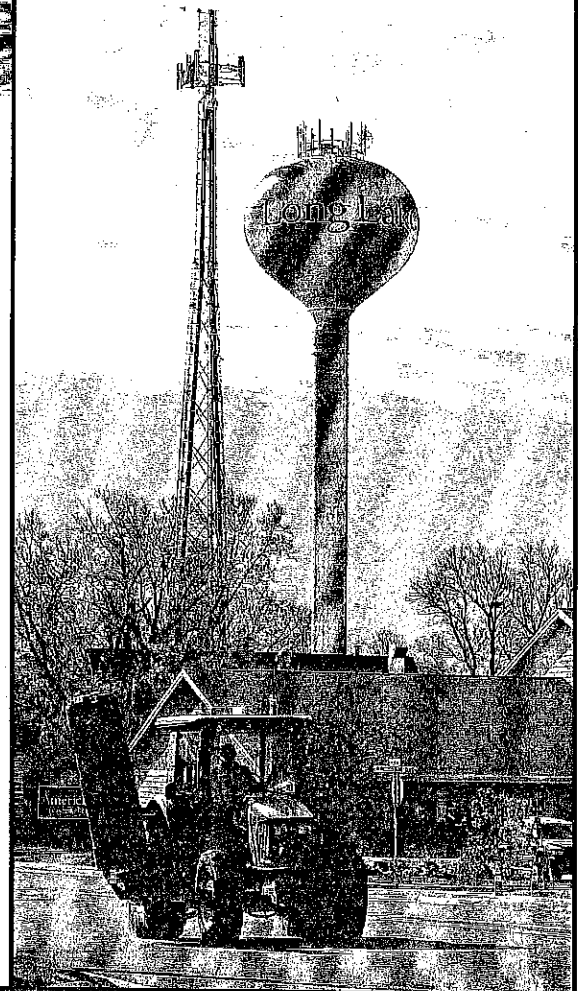


City of Long Lake
450 Virginia Avenue, PO Box 606 • Long Lake, MN 55356

March 2015

WELLHEAD Protection Plan Part 2

WSB Project No. 2151-01



701 Xenia Avenue South, Suite 300
Minneapolis, MN 55416
Tel: (763) 541-4800 • Fax: (763) 541-1700
wsbeng.com

Wellhead Protection Plan

Part 2

City of Long Lake, Minnesota

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Appendix A- Figures

Figure 1- Public Land Survey System Map

Figure 2 - DWSMA Location

Figure 3- Location of Wells in DWSMA

Figure 4- Bedrock Geology

Figure 5-City of Long Lake Existing Land Use Map

Figure 6-Zoning within the DWSMA

Figure 7- Existing Land Use within the DWSMA

Figure 8-Annual Water withdrawal (gals/yr)

Figure 9-Projected Water Use (to 2016)

Figure 10-2030 Future Land Use Map

Figure 11- Potential Contaminant Source List -Wells

Appendix B- Consumer Confidence Report

Appendix C- Inner Well Management Zone

Appendix D - Wellhead Protection Plan Part 1

PUBLIC WATER SUPPLY PROFILE

PUBLIC WATER SUPPLY

City of Long Lake
450 Virginia Avenue
Long Lake, Minnesota 55356
Phone: (952) 473-6961

WELLHEAD PROTECTION MANAGER

Marv Wurver, Public Works Director
450 Virginia Avenue
Long Lake, Minnesota
Phone: (952) 476-2855
E-Mail: mwurver@ci.long-lake.mn.us

CONSULTANT/TECHNICAL ASSISTANCE

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Phone: (763) 231-4874
E-Mail: lstorlie@wsbeng.com

Breanne Rothstein, Planner
WSB & Associates, Inc.
701 Xenia Ave. S, Suite 300
Minneapolis, Minnesota 55416
Phone: (763) 231-4863
E-Mail: brothstein@wsbeng.com

GENERAL INFORMATION

Unique Well Number(s): 00667910, 00206933, 00509097
Size of Population Served: 1,803 (2012)
County: Hennepin

PUBLIC WATER SUPPLY WELLS

Local Well Name	Unique Number	Aquifer	Casing Depth (ft)	Well Depth (ft)	Date Constructed
Long Lake 1A	00667910	Prairie du Chien/Jordan	240 feet	475 feet	01/04/2002
Long Lake 2	00206933	Jordan	366 feet	448 feet	1965
Orono 3	00509097	Prairie du Chien/Jordan	312 feet	381 feet	11/12/1990

DOCUMENTATION LIST

<u>Step</u>	<u>Date Performed</u>
Part I Approval Notice Received from MDH	February 2013
Scoping 2 Meeting Held (4720.5349, subp. 1)	September 19, 2013
Second Scoping Decision Notice Received (4720.5340, subp. 2)	October 10, 2013
Part II submitted to Local Units of Government (LGUs) (4720.5350, subp. 1 & 2)	July 18, 2014
Review Considered (4720.5350, subp. 3)	July and August 2014
Public Hearing Conducted (4720.5350, subp. 4)	October 7, 2014
Part II of WHP Plan Submitted (4720.5360, subp. 1)	October 9, 2014
Approved Review Notice Received	TBD

EXECUTIVE SUMMARY

The Wellhead Protection Plan (the Plan) for the City of Long Lake (City) addresses municipal water supply wells used by Long Lake (2 municipal wells) and Orono (1 municipal well) and the associated source water aquifers (the Prairie du Chien Jordan and Jordan– the aquifers from which the municipal wells pump water).

Part 1 of the Plan was completed and approved by the Minnesota Department of Health (MDH) on February 2013. The Wellhead Protection Plan (Part 1) presented the delineation of the Wellhead Protection Area (WHPA), the drinking water supply management area (DWSMA), and the vulnerability assessments for the system's wells and aquifers within the DWSMA. The boundaries of the DWSMA are shown in **Figure 2**. The DWSMA is mostly in Long Lake, but also partly in Orono. Water supply wells covered by this delineation and this Part 2 Plan are listed on **page 4**.

The *vulnerability assessment* for the aquifers within the DWSMA was performed using available information and indicates that the vulnerability of the aquifers used by the system is classified as **low**. The results of the aquifer vulnerability assessment determine *what types of potential contamination sources* must be managed within the DWSMA:

- Low vulnerability areas – wells
- Moderate vulnerability areas – wells and tanks
- High vulnerability areas – all land uses and potential contaminant sources

This document includes the following information:

- A review of data elements identified by the MDH as applicable to the DWSMA, as outlined in the Second Scoping Decision Notice, dated October 10, 2013.
- Results of an inventory of potential contaminant sources within the DWSMA.
- Review of changes, issues, problems, and opportunities related to the public water supply and the identified potential contaminant sources.
- A discussion of potential contaminant source management strategies and the goals, objectives, and action plans associated with these management strategies.
- A review of the wellhead and source water protection evaluation program and Long Lake's alternative water supply contingency strategy.

The goals and objectives of this Plan focus on managing potential contaminant sources within the DWSMA, reducing the potential contaminant pathways to the source water aquifer that may be provided by private wells, and educating property owners and water supply users.

The City of Long Lake's Wellhead Protection (WHP) team has identified the following goals for implementation of this Plan:

Goal 1: The City will maintain or improve the current level of water quality so that the municipal water supply will continue to meet or exceed all applicable state and federal water quality standards.

Goal 2: The City will continue to supply sufficient water quantity for system users and emergency needs.

Goal 3: The City will provide and promote activities that protect the source water aquifer that provides water to the municipal system.

Goal 4: The City will continue to collect data to support future wellhead and source water protection efforts.

Implementation of these goals will be achieved through direct management efforts to the following areas to prevent future contamination of the aquifer and increase awareness of groundwater protection:

- A. Well Management
- B. Public Education
- C. Data Collection
- D. Water Conservation
- E. Land Use Planning and Zoning
- F. Implementation
- G. Evaluation

The success of the Plan must be evaluated in order to determine whether or not the Plan is accomplishing what the City intended to do. Monitoring and evaluation of the Plan and associated activities will be conducted every two years that the Plan is in effect.

CHAPTER ONE: DATA ELEMENTS AND ASSESSMENT (4720.5200)

Long Lake currently uses the following wells to provide the City's drinking water:

- Well 1A - 667910
- Well 2 - 206933

Additionally, the City of Orono has a public well located in the DWSMA for Long Lake, which is Well 3 for Orono, unique number 00509097.

The DWSMA delineated in the Long Lake Wellhead Protection Plan area delineation study is found in Township 118, Range 23, Sections 34 and 35, as outlined in **Figure 1**. **Figure 3** indicates the location of known public and private wells found within the DWSMA.

I. REQUIRED DATA ELEMENTS AND ANALYSIS

In accordance with Minnesota Rules Chapter 4720.5200 and the Second Scoping Decision Notice dated October 10, 2013, the data elements and their assessments required to be included in the Plan for the City are presented in this Section. Data elements discussed in this Section include geology, land use, and groundwater quantity and quality.

1. GEOLOGY

The geology under Long Lake is a complex series of glacial sediment strata (drift) over faulted Paleozoic sedimentary bedrock. The drift beneath Long Lake is sediment from at least two glacial episodes, some of it deposited in and around meltwater lakes. Most of the glacial sediment in the Long Lake area is clay-rich and loamy till which does not generally conduct water efficiently. The thickness of the unconsolidated sediment varies greatly but can be generalized to approximately 200 feet thick. There are some sand and gravel layers within the glacial sediment that yield moderate volumes of water, but the exact location, depth, and extent, and sustainability of these layers is not known. Wells constructed in the drift can be expected to produce 100-500 gallons per minute (gpm) at relatively low construction cost, but carry the risk of drying up during periods of drought or interfering with other nearby wells. In some areas, the drift aquifers may yield higher volumes and/or have more than one aquifer available.

The Paleozoic sedimentary rocks around the Twin Cities Metro area have three primary aquifers: the Prairie du Chien-Jordan, the Franconia-Ironton-Galesville (FIG), and the Mt. Simon-Hinckley. Each of these is separated by a confining layer that essentially separates the aquifers. There is a documented fault in the bedrock just to the west of Long Lake which may not affect water production from the available bedrock aquifers. The fault probably fractured bedrock in the area, which means that vertical flow through confining layers is more likely in the Long Lake area, especially near the west end of the DWSMA near the fault. The possibility of vertical flow through fractures must be considered within the DWSMA for contaminants that manage to get into the generally low-conductivity drift. **Figure 4** shows the existing bedrock geology in the area near the DWSMA.

2. LAND USE

Current and historic land use in the vicinity of the DWSMA is discussed in this section, as well as information on political and parcel boundaries. This information for the City of Long Lake was used to delineate the DWSMA.

It is important to understand land use in order to determine key areas for concern in managing a wellhead protection area. For example, knowledge about the location of future development or areas of redevelopment within the DWSMA may reveal a need to closely manage the activity within more sensitive areas. Additionally, any land uses that currently pose a potential threat to the City's water supply would need to be highlighted to increase awareness of any concerns.

Figure 5 shows the DWSMA superimposed over the existing land use maps and parcel boundaries for the City of Long Lake. Land uses found within the DWSMA include single-family residential uses, commercial businesses, parks, institutional and industrial uses. The DWSMA is located in the primary downtown area of the City, where many of the historical buildings and auto-oriented services are located. Orono is also partially located in the DWSMA.

Potential threats to the water supply were determined by analyzing data relevant to the public water supply wells, the quality of water being drawn into the wells, or land and groundwater uses around the wells. Furthermore, a site investigation was completed to identify any additional possible Class V injection wells or wells within the DWSMA of any depth not found in the public water supply databases. No Class V injection wells were discovered through a site visit or the database search. The following potential contaminant sources were found to be within the DWSMA:

- Public and Private Wells. **Figure 3** shows a map that includes the public and private wells that are known to be located in the DWSMA. There are 16 known wells in the DWSMA, 3 of them for public supply (including one located in Orono). **Figure 11** shows detailed information about these wells.

Based on the geology of the area, the DWSMA associated with the Long Lake municipal wells has been determined to be a low susceptibility for contamination. Despite its relatively low vulnerability, best management practices should be developed for municipal and private wells. Specific non-point source land use acreage was not determined for this report, but the zoning and land use maps (see **Figures 6 and 7**) provide a tool for understanding the scope of land uses in the DWSMA.

3. GROUNDWATER QUANTITY

The City of Long Lake currently operates three active water supply wells, as shown on **Figure 3**. As outlined in the Part 1 of the WHPP (**Appendix D**) and depicted on the DNR State Water Use Database System. **Figure 8** illustrates the annual withdrawal from 2006 to 2010. **Figure 9** shows the projected water use to 2016.

Well No. 2 pumps water from the Jordan aquifer. Well No. 1A pumps water from the Prairie du Chien and Jordan aquifer(s). A five percent increase in water use is expected in the next five years.

Additional information about Long Lake's water supply system in general is presented in various City reports and may be requested for further information. In addition, well construction details, well logs, and past and projected pumping rates are included in the Wellhead Protection Plan Part 1 located in **Appendix D**.

4. GROUNDWATER QUALITY

The City of Long Lake produces an annual report on the quality of its groundwater called the Consumer Confidence Report. **Appendix B** is the 2013 Consumer Confidence Report, which outlines the results of quality monitoring done on the City's drinking water. Figure 11 shows that the City is in compliance with maximum contaminant levels set by the State and Federal Safe Drinking Water Rules for the contaminants analyzed. Water supplied by Well Nos. 1 and 2 meet all Maximum Contaminant Level (MCL) National Primary Drinking Water Regulations.

Water samples have been regularly obtained from the City wells and tested for regulated contaminants. As mentioned in Part 1, data summaries were obtained from the MDH, and it was determined based on this data that tritium was not detected in wells located within the DWSMA. Tritium is not a health hazard, but is an indicator of vertical migration travel time and aquifer vulnerability. The absence of tritium indicates that the travel time from the surface to the aquifers is extensive and supports the geologic sensitivity rating of low to very-low for the City wells. In addition, the thick confining bedrock units and glacial clay between the surface and the aquifer aid in protection the City's groundwater supply.

Non-municipal owned wells, particularly those that are completed in or penetrate the Jordan Aquifer, will continue to be considered when developing the management strategies for the Long Lake DWSMA. Unmaintained, damaged, poorly constructed, or unused/abandoned wells could provide a direct route for contaminants to enter the aquifers utilized by the City of Long Lake as their drinking water supply.

Management strategies are discussed in Chapter Five, which focus on activities that have the most potential to impact the aquifer system the City of Long Lake is using for its drinking water supply.

WELLHEAD PROTECTION AREA DELINEATION CRITERIA

Part 1 of the Wellhead Protection Plan provides documentation regarding how the following delineation criteria were applied to determining the boundaries of the WHPA:

1. **Time of Travel** – 10 years
2. **Aquifer Transmissivity** – porous media aquifer delineations, pumping tests conducted at former Long Lake Well 1 (02088490), MPCA Metro Model
3. **Daily Volume of Water Pumped** – historical volumes and projected future volumes, which ever was greater.

4. **Hydrologic Boundaries** - Surface water features, geological boundaries, high capacity wells, and overland drainage.
5. **Groundwater Flow Field** - MODFLOW

The Inner Well Management Zone information is located in **Appendix C** of this report.

CHAPTER TWO: IMPACT OF CHANGES ON PUBLIC WATER SUPPLY WELLS (4720.5220)

In accordance with Minnesota Rules 4720.5220 a wellhead protection plan must identify and describe expected changes that may occur during the next ten years to:

1. The physical environment
2. Land use
3. Groundwater

1. PHYSICAL ENVIRONMENT

The City of Long Lake is not expected to grow significantly over the next 10 years. Long Lake is primarily built-out, and any changes to the physical environment would be a function of re-development. Therefore, there are not many anticipated changes in the physical environment that would impact the public water supply in a substantial way.

2. LAND USE

According to the Comprehensive Plan, the City of Long Lake is planning some re-development of their downtown area. A master plan completed for downtown indicates a mix of commercial and residential uses. Also, the city is planning for an expansion of their industrial park on the west side of the city, where current commercial properties re-located. The industrial park is the location of aging, heavier industrial uses, and is the primary location of the potential contaminant sources. The City of Orono has primarily commercial properties located in the DWSMA, which are anticipated to stay in commercial use, as well as a new, medium density townhome development north of Old Highway 12. An existing land use map for the year 2008 and a future land use map for the year 2030 are shown on **Figures 8 and 10, respectively**.

3. GROUNDWATER

The City does not anticipate significant growth in population or water usage over time. As stated in Part 1 of the Plan (**Appendix D**), the City projected a five percent increase in water usage over the next five years. However, with an increased focus on water conservation, it is the hope of the City that water quantity drawn from well pumping would stay the same or decrease over time. With regard to quality, Long Lake's groundwater has historically been of good quality.

A. INFLUENCE OF EXISTING WATER AND LAND GOVERNMENT PROGRAMS AND REGULATIONS

There are a number of existing rules and regulations at the County and Local levels requiring regulations related to managing wells within the system's DWSMA.

City of Long Lake and Orono Regulations

The cities of Long Lake and Orono both have regulations that make efforts to protect the interconnection of groundwater systems and stormwater systems with sanitary sewer systems. While Orono allows new wells, they require an analysis of the availability of public water systems before drilling.

Minnehaha Creek Watershed District Regulations

The Minnehaha Creek Watershed District has several goals in their Comprehensive Water Resources Management Plan, and several rules related to surface water quality, which also serve to impact groundwater quality. Through the regulation of filling and impacting wetlands, groundwater quality and quantity is enhanced. Through the wetland buffer rule and their stormwater rule which requires pre-treatment, the MCWD further enhances the groundwater recharge and quality. The MCWD focuses their stormwater management regulations on infiltration with the expressed purpose of maintaining groundwater recharge and protecting the hydrology of high value groundwater resources. Overall, the MCWD is one of the most active watershed districts in requiring the protection of groundwater resources.

B. ADMINISTRATIVE, TECHNICAL, AND FINANCIAL CONSIDERATIONS

The City of Long Lake has a small staff in the public works department. The Public Works Director will work in conjunction with their consultant City Engineer to protect the city's wells and water sources and implement the policies listed herein.

Funds to support ongoing wellhead and source water protection efforts will come from the City's water utility fund, but grants from the Department of Health could also be used to cover the costs of implementing this plan. Wellhead and source water protection activities will be evaluated on an annual basis, and any changes in the focus of the tasks will also be evaluated to determine if additional funding will be necessary to accommodate the changes.

CHAPTER THREE: ISSUES, PROBLEMS, AND OPPORTUNITIES (4720.5230)

Part 1 and Part 2 of Long Lake's Wellhead Protection Plan have utilized current local and regional information available for compiling and assessing data elements. At a minimum, this Plan will be revised or updated every 10 years as required by the Wellhead Protection Rules and the most recent and accurate data will be utilized at that time. To support on-going wellhead protection efforts, the City will collect data on wells, water quality and land use within its DWSMA. Due to limited resources to independently collect the full range of data and recreate the necessary databases, the City will continue to mainly rely on databases maintained by the State and County agencies to obtain and verify data, as needed.

I. ISSUES, PROBLEMS, AND OPPORTUNITIES IDENTIFIED BY THE CITY OF LONG LAKE THROUGH THIS REPORT

The City of Long Lake currently does not identify issues or problems and hopes to continue their wellhead protection effort similarly to how it was conducted in the past.

II. ISSUES, PROBLEMS, AND OPPORTUNITIES DISCLOSED AT PUBLIC MEETINGS AND IN WRITTEN COMMENTS

At the beginning of the wellhead protection amendment process, the City of Long Lake sent a notification to other local units of government of its intention to amend their wellhead and source water protection efforts. After approval by the MDH, Long Lake sent copies of the Part 1 report to the local units of government.

The City was not informed of any issues, problems, or opportunities by the local units of government during that time.

III. ISSUES, PROBLEMS, AND OPPORTUNITIES RELATED TO STATUS & ADEQUACY OF OFFICIAL CONTROLS, PLANS, AND OTHER LOCAL, STATE, AND FEDERAL PROGRAMS

Numerous controls, plans and programs exist that may be used to achieve the wellhead protection goals identified in this Plan. State and local units of government currently enforce land use ordinances, zoning laws, sewer ordinances, well permits, and groundwater use appropriation permits. The City will continue to work with neighboring communities to ensure proper management of the portion of the DWSMA that extends into the City of Orono. It is anticipated that most local issues may be adequately addressed through these existing processes and adopting of best management practices.

Given the low vulnerability of the DWSMA to potential contamination, the wellhead protection team does not recommend any additional regulations be imposed at this time. However, the team does recommend that overall regional coordination of wellhead protection efforts be initiated.

CHAPTER FOUR: WELLHEAD PROTECTION GOALS (4720.5240)

In accordance with Minnesota Rules 4720.5240 this section must address goals for present and future water use and land use to provide a framework for determining plan objectives and related actions.

Goals outlined in this part were selected based on the information gathered and compiled from the data elements, delineations of the WHPAs and DWSMA, results of the vulnerability assessments, results of the potential contaminant source inventory, expected changes in land and water uses, identified issues, problems, and opportunities, and evaluation of this information.

The public water supply is considered to have low vulnerability to contamination. The goals and objectives of this Plan will focus on managing potential contaminant sources within the DWSMA, reducing the potential contaminant pathways to the source water aquifer that may be provided by private wells, educating property owners and water supply users, and working with the neighboring communities to ensure proper management of the portion of the DWSMA in their respective community.

The City of Long Lake's WHP team has identified the following goals for implementation of this Plan:

Goal 1: The City will maintain or improve the current level of water quality so that the municipal water supply will continue to meet or exceed all applicable state and federal water quality standards.

Goal 2: The City will continue to supply sufficient water quantity for system users and emergency needs.

Goal 3: The City will provide and promote activities that protect the source water aquifer that provides water to the municipal system.

Goal 4: The City will continue to collect data to support future wellhead and source water protection efforts.

CHAPTER FIVE: OBJECTIVES AND PLANS OF ACTION (4720.5250)

Given the issues, problems, and opportunities discussed in Chapter Three and the goals stated in Chapter Four, the Wellhead Protection Plan delegates direct management efforts to the following areas to prevent future contamination of the aquifer and increase awareness of groundwater protection:

- | | |
|--|--------------------------|
| <i>A. Well Management</i> | <i>F. Implementation</i> |
| <i>B. Public Education</i> | <i>G. Evaluation</i> |
| <i>C. Data Collection</i> | |
| <i>D. Water Conservation</i> | |
| <i>E. Land Use Planning and Zoning</i> | |

In 2004, the City of Long Lake completed a Part II Wellhead Protection Plan. Many of the objectives and plans of action listed in the 2004 report are still valid and applicable today. The goals that are identified in that report are shown as **asterisked** in the Plan of Action.

PLAN OF ACTION

A. WELL MANAGEMENT

Objective A1: Take measures to promote proper sealing of abandoned, unused, unmaintained, or damaged wells*

Action A1: Make property owners aware of potential technical and financial resources that are available to assist them in securing grant funding for properly sealing wells.

Who:	City of Long Lake public works department and administration
Cooperators:	MDH, Hennepin County
Time Frame:	On-going
Estimated Cost:	\$500 annually in staff time
How:	Use the City's website, newsletters, or direct mailings to make well owners aware of well sealing cost-share programs. Assist realtors when appropriate to pass along information to property owners preparing to sell.

Objective A2: Educate the public about proper well management.*

Action A2: Provide links to MDH and County well management web sites on the City's website, include information in the City's newsletter or other direct mailings.

Who:	City of Long Lake administration
Cooperators:	MDH
Time Frame:	Ongoing
Estimated Cost:	\$250 in staff time
How:	Use the City's website, newsletters, or direct mailings. Use local newspaper, public access or social media sites.

Objective A3: Incorporate Wellhead Protection Initiatives into City Plans*

Action A3: The City will use this Wellhead Protection Plan as a resource when updating its Comprehensive Plan, Local Water Management Plan, Water Supply Plan, and other relevant plans.

Who:	City of Long Lake planning and engineering consultants
Cooperators:	City staff, consultants
Time Frame:	3 to 5 years

Estimated Cost:	\$5,000 to include in all other updates to planning documents
How:	Wellhead Protection initiatives will be addressed and incorporated into the City's various plan updates.

Objective A4: Continue to monitor the water quality from City's wells (existing and new) to ensure high quality*

Action A4: Maintain water quality sampling requirements mandated by MDH and analyze trends in water chemistry, looking for any possible degradation of quality or changes in aquifer hydraulics, including publishing the Drinking Water Consumer Confidence Report.

Who:	City of Long Lake public works
Cooperators:	Minnesota Department of Health
Time Frame:	annually
Estimated Cost:	No additional cost
How:	Staff will review annual water quality reports and assist MDH in the completion of the annual CCR.

Objective A5: Develop a contingency plan in the case of groundwater or source water contamination*

Action A5: Coordinate with local emergency management and response officials to develop a water supply contingency plan and alternative water supply plan.

Who:	City of Long Lake administration
Cooperators:	City Engineering consultant
Time Frame:	3 to 5 years, coordinated with next Emergency Management Plan update
Estimated Cost:	\$5,000
How:	Working with adjacent communities and emergency management officials to update the reciprocal water agreement.

Objective A6: Management of Class V Injection Wells

Action A6: If any Class V injection wells are identified in the future, add those wells to the well inventory and work with the MDH to provide information to the property owner on management and/or permitting options.

Who:	City of Long Lake public works department
------	---

Cooperators:	Engineering consultant
Time Frame:	ongoing
Estimated Cost:	no additional cost
How:	Add any new Class V injection wells to the PCSI inventory.

B. PUBLIC EDUCATION

Objective B1: Develop a public support and understanding for the wellhead protection planning through the use of web sites, newsletters, and handouts.

Action B1.1: Include information about wellhead protection and groundwater protection in the City newsletter.

Who:	City of Long Lake administration
Cooperators:	City of Long Lake public works and building departments
Time Frame:	Ongoing
Estimated Cost:	\$500 in staff time
How:	Identify and obtain existing educational materials available from MDH and other sources. Write articles describing wellhead protection and include contact information and website addresses for existing educational resources.

C. DATA COLLECTION

Objective C1: Continue to collect and maintain local geologic and hydrogeologic data in order to improve and augment current information and to provide additional data for future revisions to this Plan.

Action C1.1: Monitor static and pumping levels in municipal wells.

Who:	City of Long Lake public works department
Cooperators:	None
Time Frame:	Ongoing
Estimated Cost:	No additional cost
How:	Conduct routine collection of groundwater levels in the municipal wells, which will provide data for the evaluation of groundwater elevation trends over time. A decreasing trend in static water levels in the municipal wells may be cause for the City to pursue more restricted water use measures and /or more effective methods to control public

	water supply use. This data can also be used to verify the groundwater flow field in the source water aquifer.
--	--

Action C1.2: Cooperate and support future data collection efforts by other agencies.

Who:	City of Long Lake public works department
Cooperators:	Various agencies
Time Frame:	Ongoing
Estimated Cost:	\$500
How:	Provide assistance to agencies as requested.

D. WATER CONSERVATION**Objective D1:** Implement a community-wide water conservation program.**Action D1:** Implement conservation measures included in the Water Supply Plan.

Who:	City of Long Lake public works department and City Council
Cooperators:	Engineering consultants
Time Frame:	1 to 2 years
Estimated Cost:	\$5,000
How:	Educate the public to encourage users to voluntarily incorporate water saving habits and tools into their lifestyles, consider options to improve the exiting water system's operation and maintenance procedures and incorporate costs associated with water conservation programs, analyze benefits of adjusting water rate structure and consider meter replacement or calibration.

E. LAND USE PLANNING AND ZONING**Objective E1:** Eliminate or reduce the potential pollution risks to the source water aquifer and minimize the risk of altering the WHPA and DWSMA area.**Action E1:** Include a review of this Plan as part of the Comprehensive Plan update when evaluating appropriate sites for future development

Who:	City of Long Lake building department
Cooperators:	City of Long Lake public works department

Time Frame:	Next Comp Plan update
Estimated Cost:	\$1,500
How:	Copies of this Plan will be distributed to city staff and consultants for review and incorporate it as part of their comprehensive plan update.

F. IMPLEMENTATION

Objective F1: Track and report Wellhead Protection activities to aid in implementing Wellhead Protection Objectives.

Action F1: Complete an internal annual report on completed WHP activities.

Who:	City of Long Lake public works department
Cooperators:	Engineering consultants
Time Frame:	annually
Estimated Cost:	\$500 in staff time
How:	Report will be prepared and provided to the City.

G. EVALUATION

Objective G1: Evaluate Plan.

Action G1: Complete an evaluation report every 2 years.

Who:	City of Long Lake public works department, building official, administration, and City Council
Cooperators:	Engineering consultants
Time Frame:	annually
Estimated Cost:	\$2,500 per review
How:	Prepare a written report using the MDH Wellhead Protection Program Evaluation form or a format selected by the City. Provide report to the City Council and MDH Source Water Protection Unit.

CHAPTER SIX: EVALUATION PROGRAM (4720.5270)

The success of the Wellhead Protection Plan must be evaluated in order to determine whether or not the Plan is accomplishing what the City of Long Lake intended to do. Monitoring and evaluation of the Plan and associated activities will be conducted every two years that the Plan is in effect. The evaluation activities will include the following items:

- Track the implementation of the goals, objectives, and plans of action discussed in Chapter Five of this Plan;
- Analyze the effectiveness of specific plans of action regarding the protection of Long Lake's municipal water supply;
- Identify possible changes to the plans of action which may improve their effectiveness; and
- Determine the adequacy of financial resources and staff availability to carry out the management strategies planned for the each year.

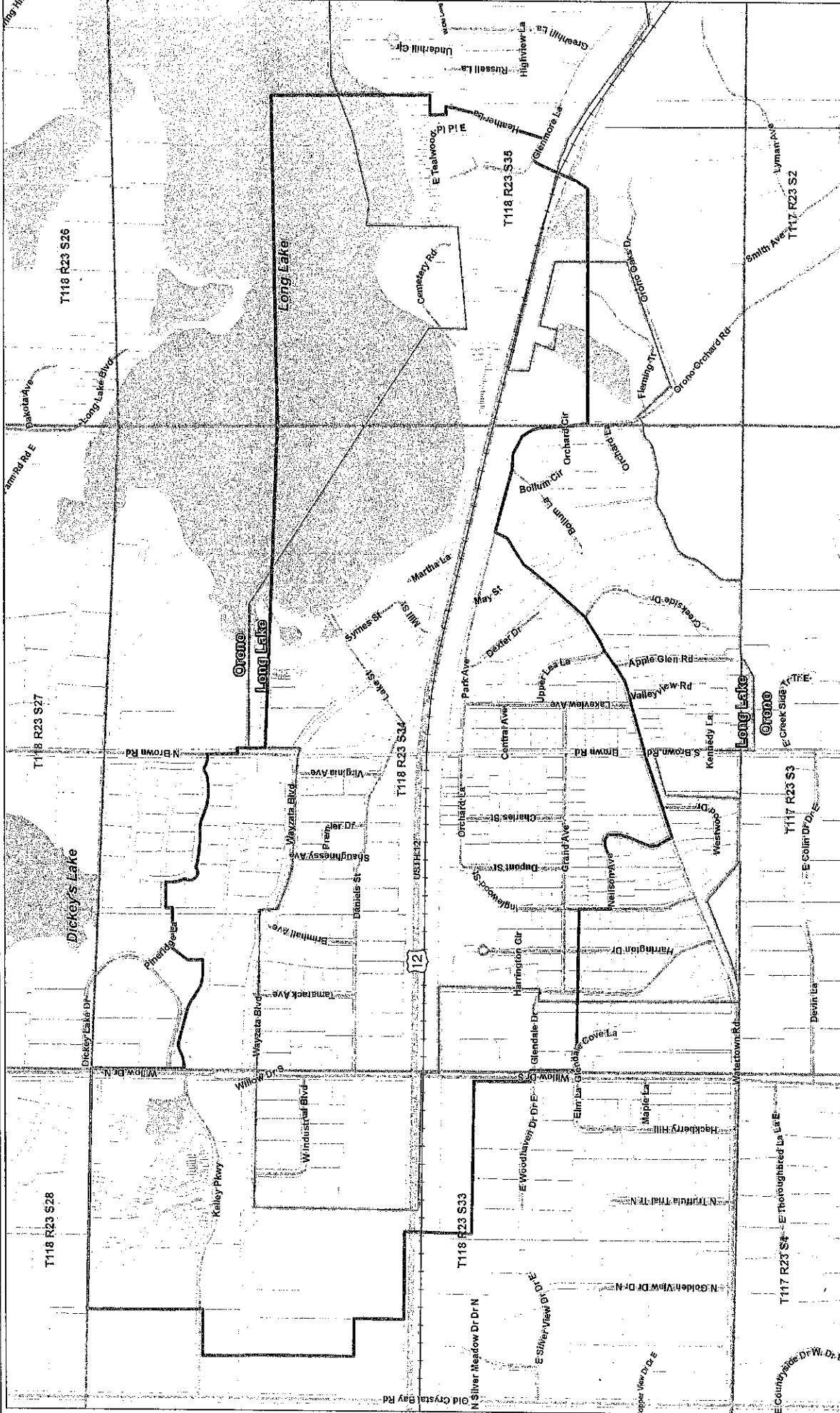
The City of Long Lake will continue to coordinate with the MDH in the annual monitoring of the City's municipal water supply to determine if the management strategies presented in this Plan are having a positive impact on water quality and to identify what water quality problems may still be occurring and how they need to be addressed.

At the end of each evaluation period (every two years) City staff or the City's consultant will make a written report regarding progress in implementing the Plan, as well as an evaluation of the costs and benefits of the Plan activities. This report may be completed using the MDH Wellhead Protection Program Evaluation form. A copy of the evaluation report will be sent to the MDH Source Water Protection Unit in St. Paul. The City will also keep a copy of the evaluation report in its records. The intent of the evaluation is to compile a complete and comprehensive study of the implementation strategies for use when the City updates or revises this Plan. As required by the Wellhead Protection Rules, this Plan will be updated every 10 years at a minimum.

CHAPTER SEVEN: ALTERNATIVE WATER SUPPLY CONTINGENCY STRATEGY (4720.5280)

A contingency plan is put into effect to establish, provide, and keep updated certain emergency response procedures and information for the public water supply, which may become vital in the event of a partial or total loss of public water supply services as a result of a natural disaster, chemical contamination, civil disorder, or human-caused disruption. Currently, the City of Long Lake has a reciprocal water agreement with the City of Orono as their contingency strategy. The written agreement is provided in the DNR approved Water Supply Plan available upon request at City Hall.

Appendix A: Figures



1 inch = 700 feet

Legend

	Sections
	DWSMA Area

Figure 1
Long Lake, MN

Public Land Survey Map

Long Lake
DWSMA Area

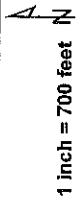
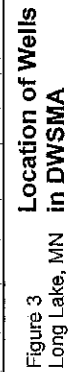
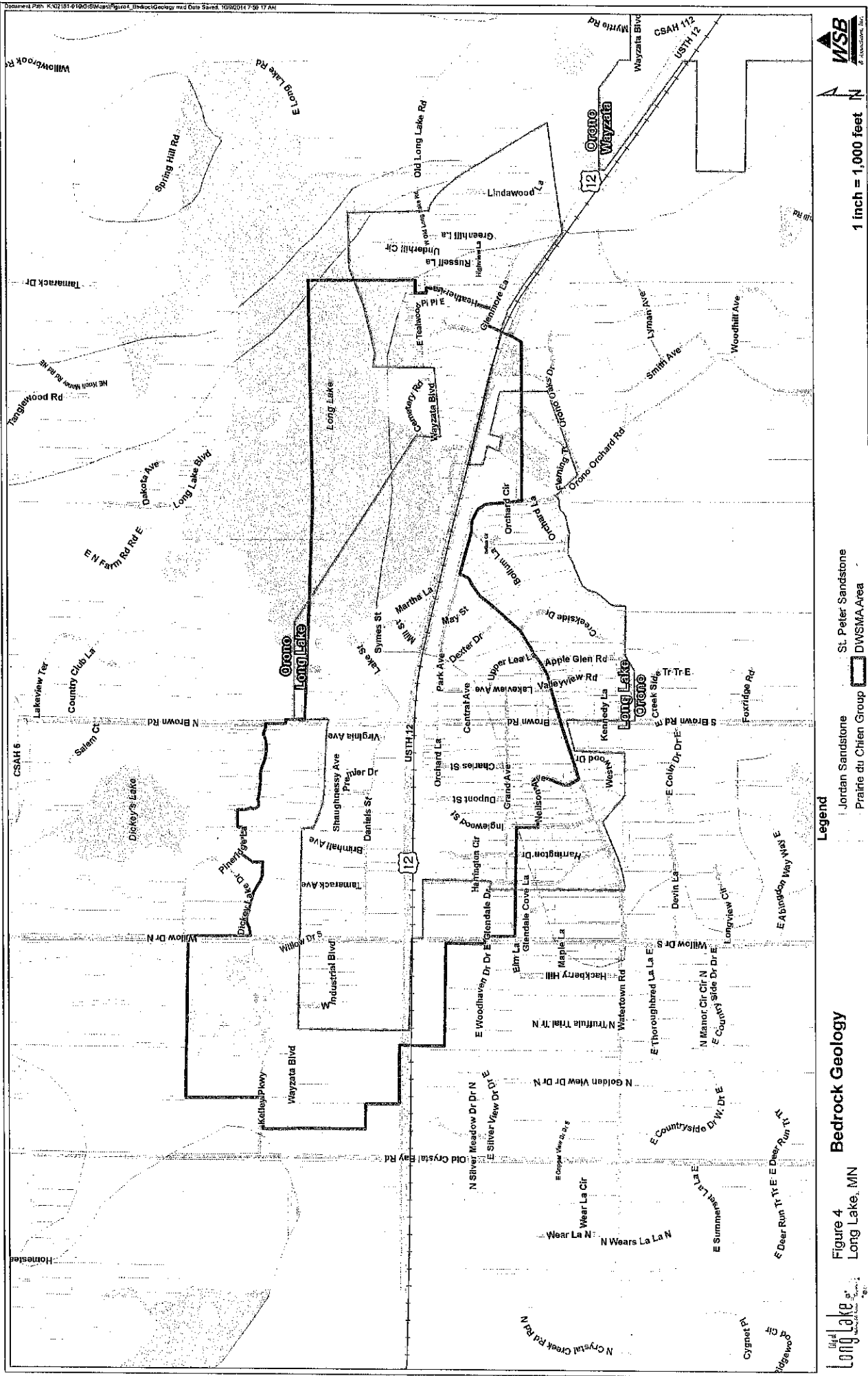


Figure 2
Drinking Water Supply Management
Long Lake, MN
Area (DWSMA) Location



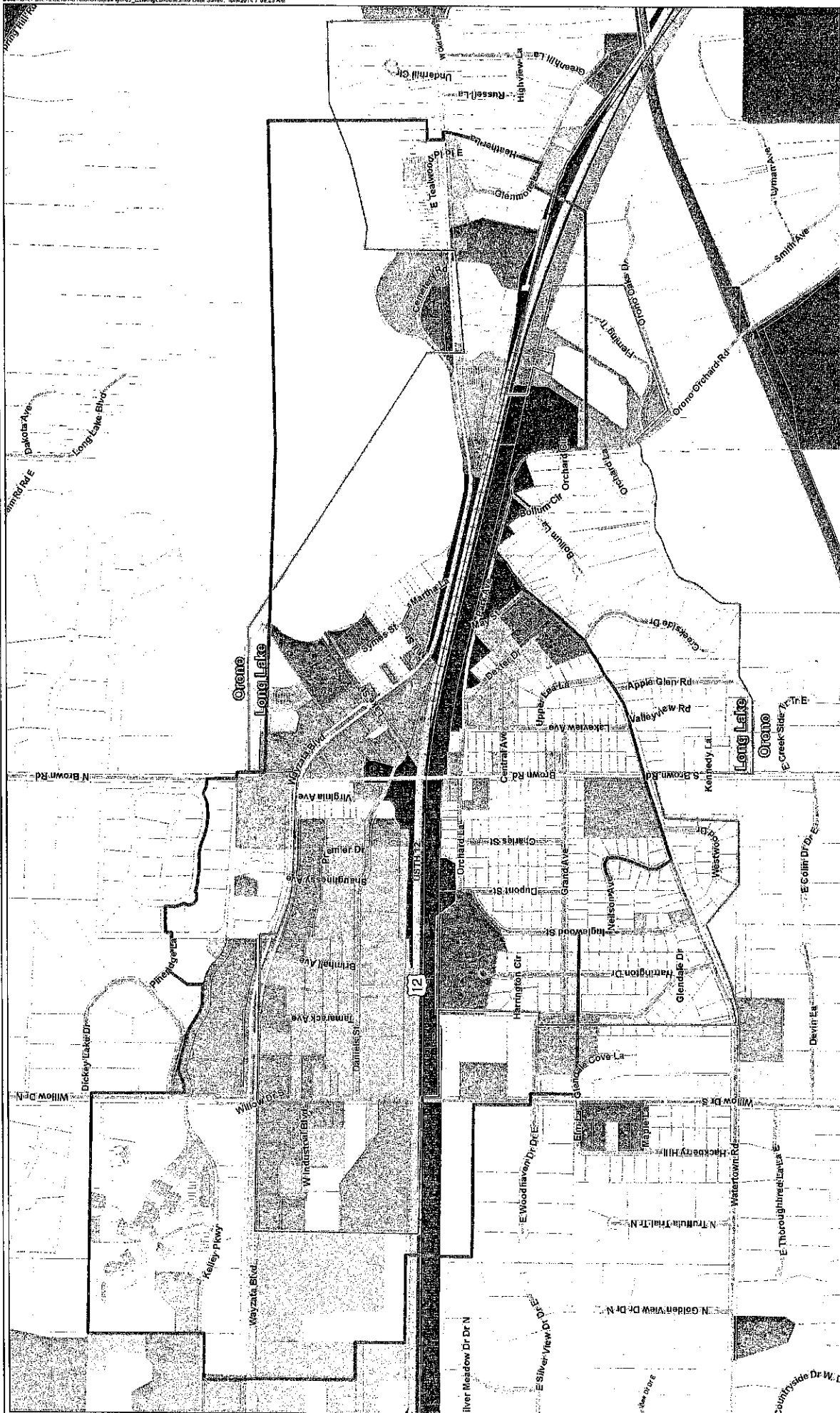


WSB
1 inch = 1,000 feet

Legend
St. Peter Sandstone
Jordan Sandstone
Prairie du Chien Group

Figure 4
Long Lake, MN

Long Lake, MN



City of Long Lake, MN Existing Land Use Map

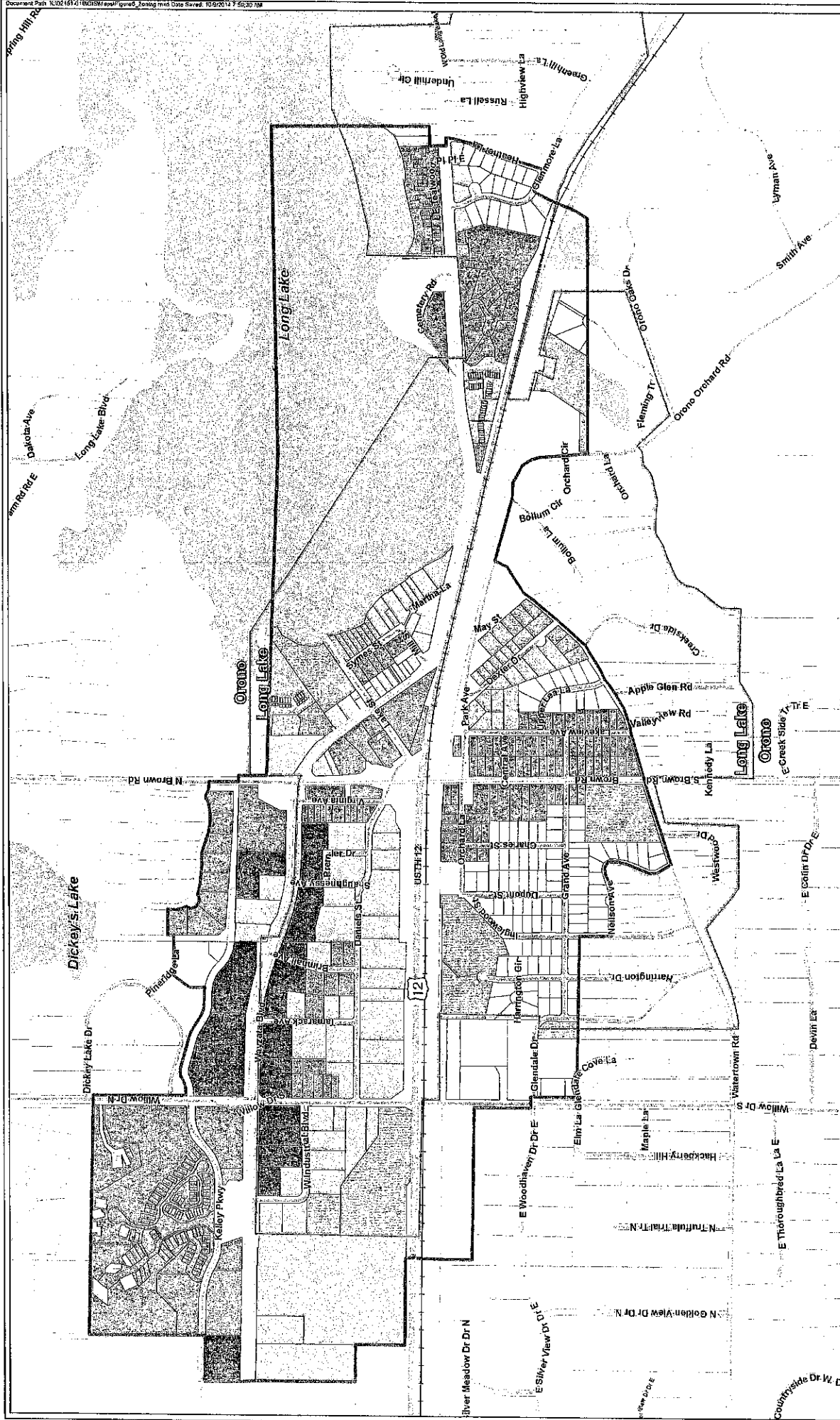
Figure 5
Long Lake, MN

Legend

- Single Family Detached
- Single Family Attached
- Multi-Family
- Residential and Other Commercial
- Office
- Mixed Use Industrial
- Industrial and Utility
- Institutional
- Park, Recreational or Preserve
- Golf Course
- Major Highway
- Railway
- Undeveloped
- Water
- DWSMA Area

1 inch = 700 feet

WSB
WISCONSIN STATE BUREAU OF SURVEY



Long Lake
Minnesota

Figure 6
Zoning within
Long Lake, MN
the DWSMA

WSB
of Minnesota, Inc.

1 inch = 700 feet

<p> R-1A SINGLE FAMILY RESIDENTIAL</p> <p> R-1 SINGLE FAMILY RESIDENTIAL</p> <p> R-2 LAKESHORE SINGLE FAMILY RESIDENTIAL</p> <p> R-3 SINGLE FAMILY RESIDENTIAL</p>	<p> R-4 SINGLE & TWO FAMILY RESIDENTIAL</p> <p> R-5 MULTIPLE FAMILY RESIDENTIAL</p> <p> R-8 LAKESHORE MULTIPLE FAMILY RESIDENTIAL</p> <p> B-2A SERVICE BUSINESS DISTRICT</p>	<p> B-1 LIMITED BUSINESS</p> <p> B-2 GENERAL BUSINESS</p> <p> V-1 VILLAGE COMMERCIAL 1</p> <p> I-1 INDUSTRIAL</p>	<p> I-2 INDUSTRIAL</p> <p> INSTITUTIONAL</p> <p> P.U.D. (PLANNED UNIT DEVELOPMENT)</p> <p> DWSMA Area</p>
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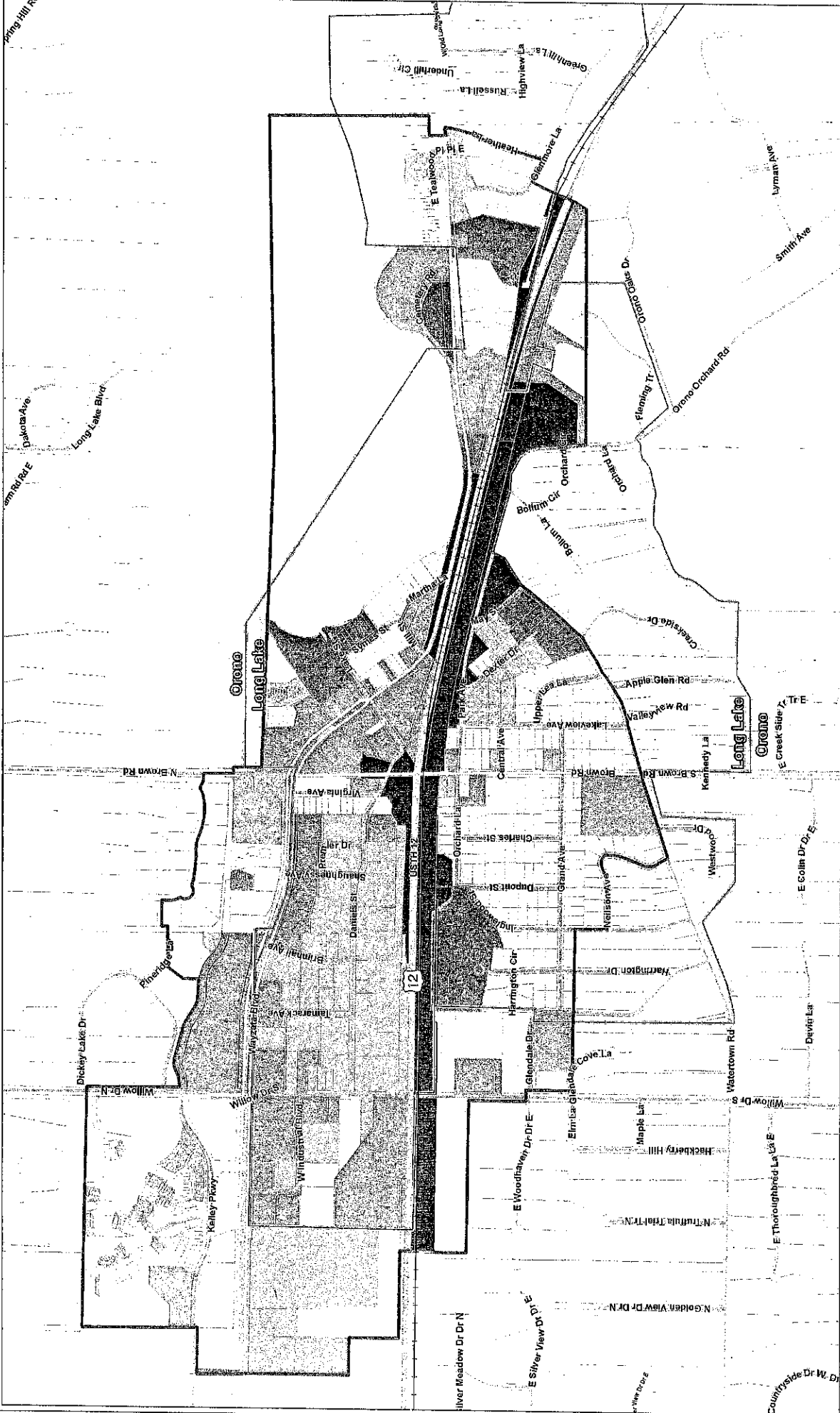


Figure 7 Existing Land Use Within the DWSSMA
Long Lake, MN

1 inch = 700 feet

WSB
WISCONSIN STATE BUREAU OF SURVEY

Figure 8: Annual Water Withdrawal (gals/year)

Unique Number	Well Name	2007	2008	2009	2010	2011
206933	2	32,200,000	31,500,000	36,700,000	21,200,000	19,400,000
667910	1A	44,900,000	47,000,000	41,900,000	46,800,000	51,300,000
	Totals	77,100,000	78,500,000	78,600,000	68,000,000	70,700,000

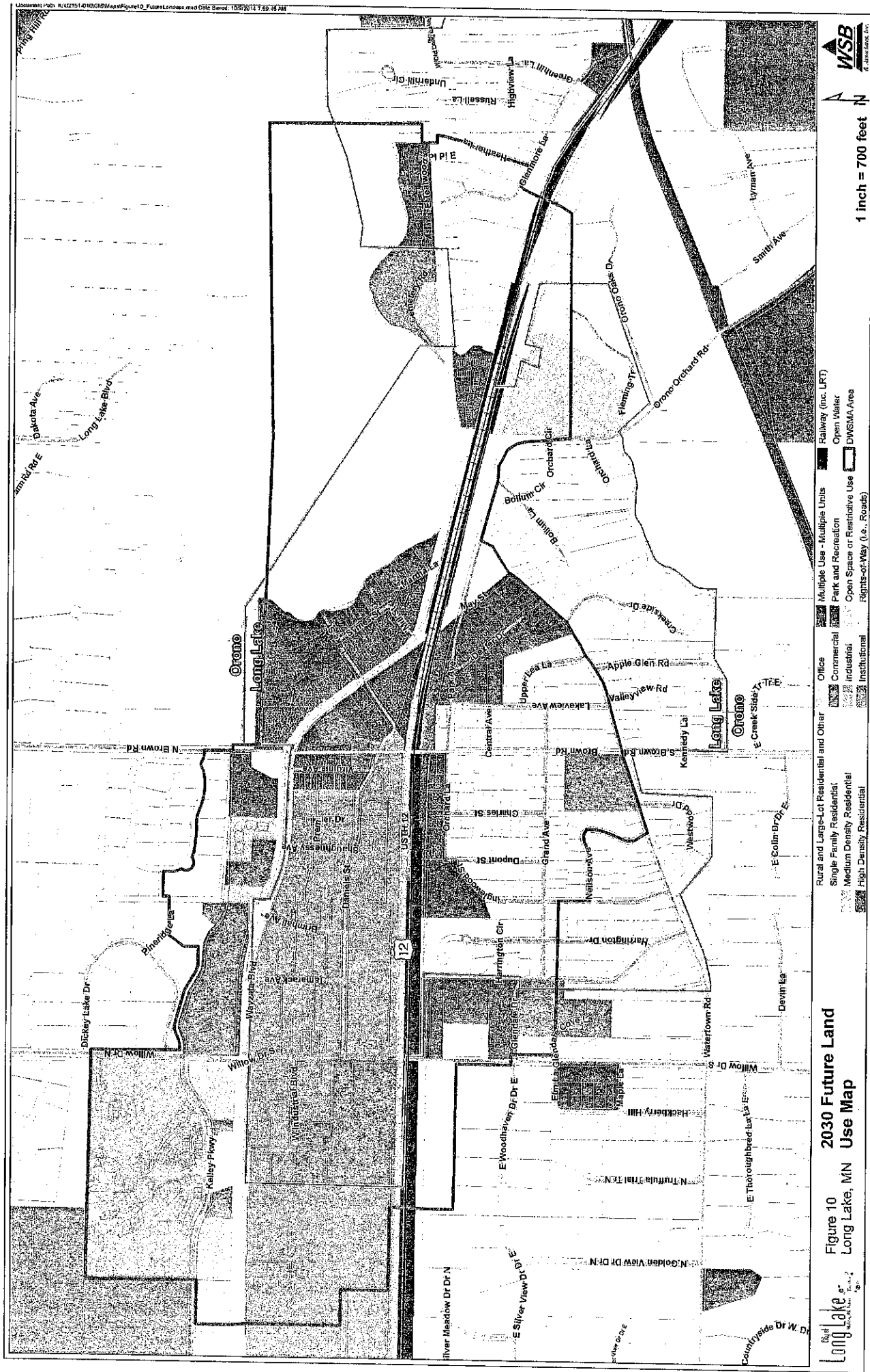
Source: DNR State Water Use Database Permit No. 1965-0980

¹City of Long Lake

Figure 9: Projected Water Use (to 2016)

Unique Number	Well Name	Maximum Withdrawal 2007-2011 (gal/yr)	Projected 2016 Withdrawal (gal/yr) 5 percent increase
206933	2	36,700,000	31,253,408
667910	1A	51,328,000	51,352,087
Totals		88,028,000	82,605,495

Source: City of Long Lake Wellhead Protection Plan Part 1 (Appendix B)



Long Lake, MN
Figure 10
2030 Future Land Use Map

- Rural and Large-Lot Residential and Other
Single Family Residential
Medium Density Residential
High Density Residential
Commercial
Industrial
Institutional
Multiple Use - Multiple Units
Park and Recreation
Open Space or Restrictive Use
Rights-of-Way (i.e., Roads)
Railway (inc. LRT)
Open Water
DWSMA Area

1 inch = 700 feet

Figure 11: Potential Contaminant Source Inventory (Wells)

PID_NO	PCS_CODE	UNIQUE_NO	WELLNAME	CASE_DIA	CASE_DEPTH	UTME	UTMN	FACILITY_CODE	Notes
351182331	WEL	00206933	LONG LAKE 2	12	366	456080	4981389	4000	Located here
341182342	WEL	00667910	LONG LAKE 1A	18	240	454826	4981413	4000	
	WEL	00164574	OSGOOD, LARRY	4	216	453952	4981424	1100	Not here
351182331	WEL	00158431	NICK MAZANYI	4	195	456247	4981262	1100	Not located
341182322	WEL	00509074	ORONO TW	4	307	454337	4982018	4000	
	WEL	00206926	LONG LAKE NO.1	24	183	455110	4981705	5000	Water fountain in park, didn't see well
341182341	WEL	00208849	LONG LAKE 1	12	198	454781	4981445	4000	
341182322	WEL	00509097	ORONO 3	16	312	454343	4982016	4000	