

## Water Resources Analysis and Plan

This chapter of the *Waconia Comprehensive Plan* addresses the local and regional wastewater system, the water supply system, and surface water management.

### Wastewater and Comprehensive Sewer Plan

#### Introduction

The purpose of this element of the Comprehensive Plan is to update the City's comprehensive sewer plan taking into account current population and land use projections.

The updated plan will provide a guide plan for the extension of sanitary sewer through new developments to ensure that all portions of the 2030 growth area can ultimately be serviced.

The preparation of a wastewater and comprehensive sewer plan (CSP) is mandated by the Metropolitan Council. The plan requirements are defined in their Local Planning Handbook and Appendix B-2 of their Water Resources Management Plan.

#### Existing Sanitary Sewer System

The existing municipal sanitary sewer system is shown on Figure 6-1. The City of Waconia's wastewater treatment is provided by the Metropolitan Council Environmental Services (MCES) Blue Lake Waste Water Treatment Facility located in Shakopee. Conveyance of wastewater to the treatment facility is provided by a series of MCES trunk facilities including L-70. L-70 is a MCES owned lift station located on the eastern edge of Waconia. L-70 was constructed in 1997, and has since experienced reduced pumping capacity. Also, the downstream dual force mains have experienced corrosion and breaking issues over the years. Consequently, an upgrade of L-70 and forcemain replacement project is currently in the planning process ("Victoria and St. Bonifacius Area Facility Plan", Dated December 2005, MCES Project Number 04P0007).

The City is divided into three service areas as is shown on Figure 6-1. All flow from service area one is conveyed to the MCES lift station by the L-52 lift station. There are four secondary lift stations that pump wastewater to the L-52 lift station. All flow from

service area two is conveyed to the MCES lift station by the H-284 lift station. There are also four secondary lift stations that pump wastewater to the H-284 lift station. The third service area discharges directly to the MCES lift station via gravity flow.

The first of the main lift stations is known as L-52, or the Harms Lakeview Terrace Station. This facility provides service to approximately 90% of the “old part of town” of Waconia as well as newer developments located north of Burandt Lake and east of CSAH 10, approximately 750 acres. This lift station discharges into a 36-inch trunk gravity line that discharges directly to L-70. This lift station (L-52) was formerly owned and operated by MCES. In 1999, the City took over ownership and operation of L-52. L-52 has a wet well / dry well configuration, and currently discharges through an 8-inch forcemain. This facility is currently undergoing a pump and control upgrade, and a forcemain realignment and replacement. Upon completion of the upgrade in 2008, the lift station and forcemain capacity will be approximately 1850 gpm and will discharge through a 16-inch forcemain.

The second lift station is known as H-284, or the Highway 284 Station. This facility provides service to the remainder of the existing city limits with the exception of the far northeast corner of the City, the Pine Hill area, the Legacy Village area and the Interlaken area. The service area encompasses approximately 1600 acres. This lift station has a wet well configuration with submersible pumps, and discharges through a 12-inch forcemain. Pump upgrades over the years and the separation of the L-52 forcemain from the H-284 forcemain in 1999 result in a current capacity of approximately 1300 gpm.

The remainder of the City, including the northeast corner, the Pine Hill area, the Legacy Village area, and the northern portion of the Interlaken area flow by gravity to the 36-inch trunk sewer that discharges directly to L-70. This area is included in service area 3.

The evaluation of the existing sewer system revealed that the trunk mains north of TH 5 are undersized to handle future growth to the west and northwest. Therefore, no development is planned to the west of Lake Waconia and County Road 10. Currently the City can only expand to the east and south until improvements are made to the existing trunk mains on the western edge of the City. The remaining city trunk mains are adequate to serve future development as planned.

There are no on-site sewage disposal facilities within the current city boundaries. On-site systems of surrounding areas are likely to be eliminated as the city boundaries are expanded through annexations. Recently, the properties along Old Beach Lane were annexed into the City and a project is currently underway to connect the properties to the City sewer system. There are no public or private wastewater treatment plants in the current city boundary or the planned area. All maintenance pertaining to private wastewater treatment plants located outside of the city boundary has been transferred to Carver County.

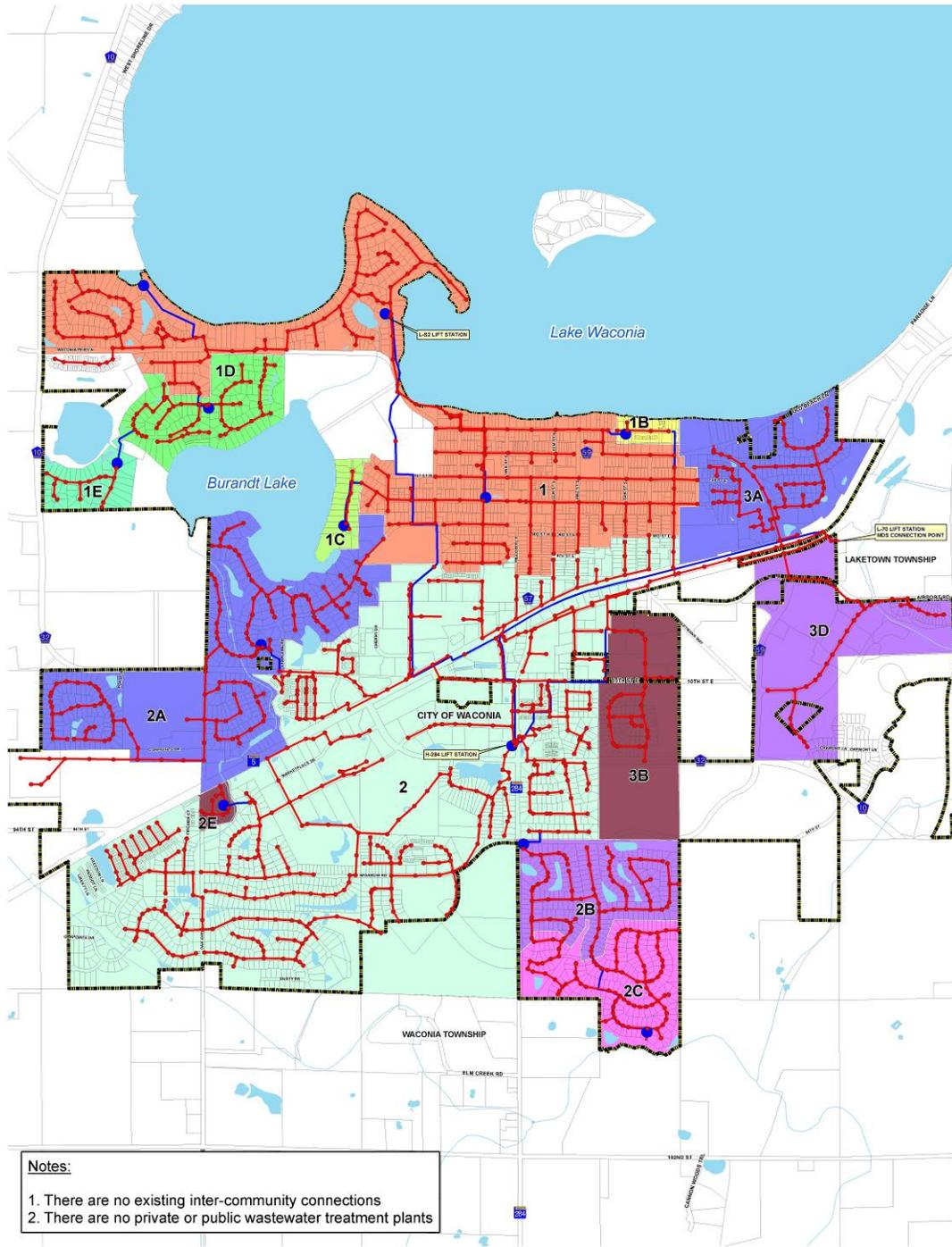
The City has also adopted Ordinance 401 that states:

*Where a public Sanitary Sewer System constructed after July 1, 1975 is located within one hundred feet of the property line of a lot, tract or parcel of land on which is situated any house or building used for human occupancy, employment, recreation or other purpose, such house or building must have suitable toilet facilities therein which are connected directly with such sewer. All connections shall be made at the owners expense and shall be made within sixty (60) days after service is available. However, when sewer is not available until after November 1, and connection is impractical due to weather conditions, connection shall be completed by May 30 of the following year.*

Ordinance 404 states:

*At such times as a public Sanitary Sewer becomes available to a property served by a private sewage disposal system, a direct connection shall be made to the public sewer in compliance with this Chapter, and any septic tanks, cesspools, or similar private sewage disposal facilities shall be abandoned.*

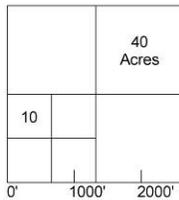
No inter-community connections of the sanitary system currently exist and none are anticipated as part of the ultimate system.



**Notes:**  
 1. There are no existing inter-community connections  
 2. There are no private or public wastewater treatment plants

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- Existing Manhole
  - Existing Lift Station
  - Existing Gravity Pipe
  - Existing Forcemain
- Sanitary District**
- 1
  - 1B
  - 1C
  - 1D
  - 1E
  - 2
  - 2A
  - 2B
  - 2C
  - 2E
  - 3A
  - 3B
  - 3D
- Lakes/Ponds
  - Streams
  - Parcels
  - City Limits



**Figure 6-1**  
Existing Sanitary System

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## Existing Sanitary Sewer Flows

The flows to the primary individual lift stations can be estimated by multiplying the pump running time which is recorded at each station times the pump capacity. Using the pump running time recorded for 2007 and the pump capacity information the following results were produced:

- L-52 lift station: Average Daily Flow = 0.321 mgd (Service Area 1)
- H-284 lift station: Average Daily Flow = 0.342 mgd (Service Area 2)

These flows along with an estimated existing flow of 0.061 mgd of gravity flow to the MCES lift station (Service Area 3) results in a total estimated flow of 0.724 mgd from the City of Waconia.

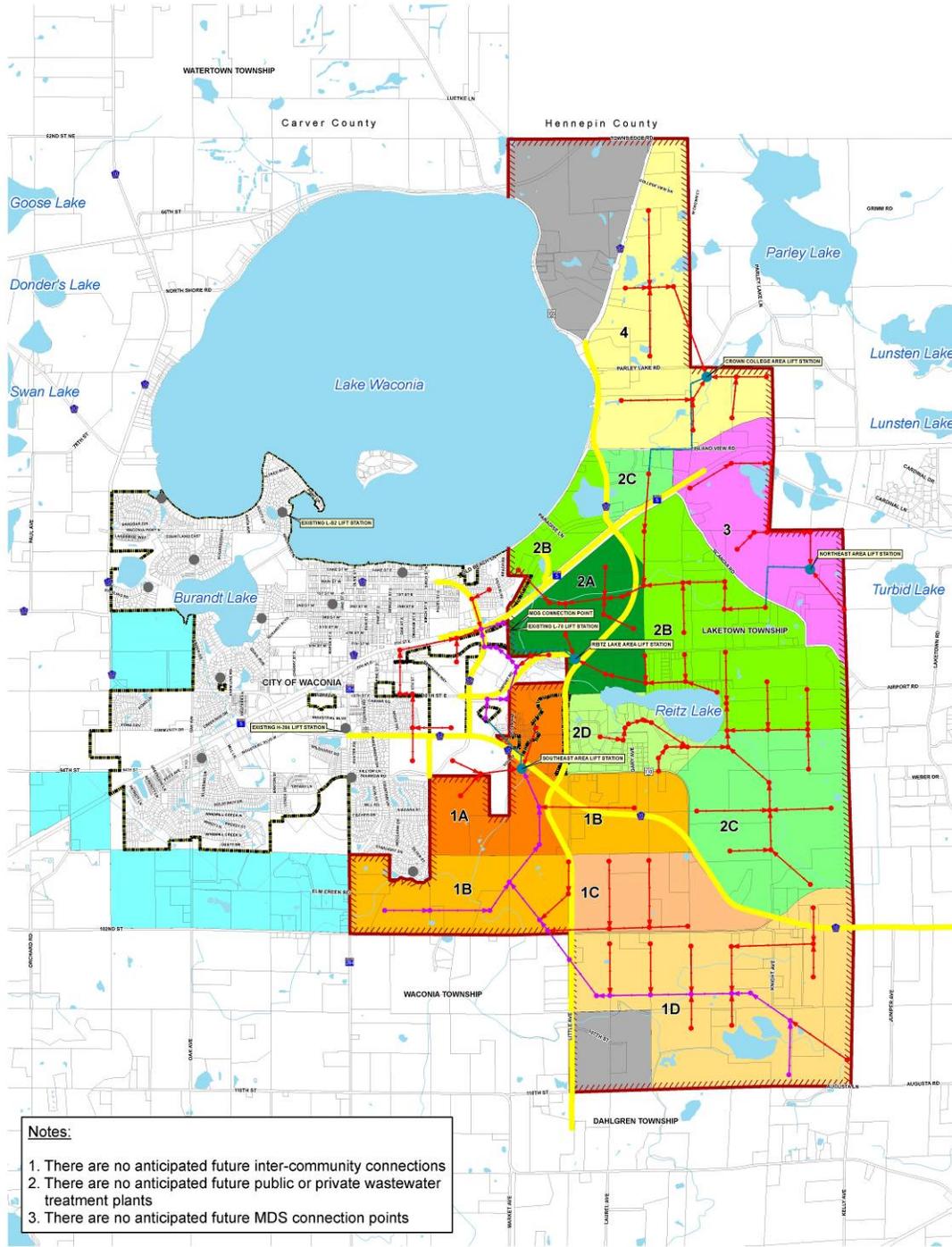
## Future Sanitary Sewer System

The future municipal sanitary sewer system is shown on Figure 6-2. This system includes the addition of two primary lift stations and two secondary lift stations. Additional secondary lift stations will likely be necessary depending on the timing of development and final design of grades, utility service, etc. of individual developments. All new lift stations will discharge to the MCES lift station L-70.

The third primary lift station to be constructed is known as the Southeast Area Station. This lift station is currently under construction, with an anticipated operational date of summer 2008. This facility will provide service to approximately 2400 acres in the southeast region of Waconia. This lift station will have a wet well configuration with submersible pumps, and discharges through a 16-inch forcemain. The initial capacity of the station will be approximately 1600 gpm, with ultimate capacity of approximately 5200 gpm.

The final primary lift station in the planned area is known as the Reitz Lake Area lift station. This facility will provide service to approximately 2295 acres in the eastern and northeastern regions of Waconia. This lift station will also convey flow pumped from two additional secondary lift stations (northeast area lift station and the Crown College area lift station). This lift station will discharge through a 14-inch forcemain with an ultimate capacity of approximately 4400 gpm.

Table 6-1 shows the necessary improvements to the trunk sanitary system along with the estimated year of completion and the triggering event. Due to the fact that the combined total pumping capacity exceeds the existing pumping capacity of the MCES lift station L-70, the timing, design and operating conditions of the proposed lift stations will need to be coordinated with the MCES.



**Notes:**

1. There are no anticipated future inter-community connections
2. There are no anticipated future public or private wastewater treatment plants
3. There are no anticipated future MDS connection points

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<ul style="list-style-type: none"> <li>● Proposed Manhole (Full Flow Design)</li> <li>● Proposed Manhole (Half Flow Design)</li> <li>● Proposed Lift Station</li> <li>● Existing Lift Station</li> <li>— Proposed Trunk Gravity Sewer (Full Flow Design)</li> <li>— Proposed Trunk Gravity Sewer (Half Flow Design)</li> <li>— Proposed Forcemain</li> <li>— Future Streets</li> <li>— Future Service Area Boundary</li> </ul>	<p><b>Proposed Sanitary Districts</b></p> <ul style="list-style-type: none"> <li>■ Served With Existing System</li> <li>■ Crown College Area 4</li> <li>■ Northeast Area 3</li> <li>■ Reitz Lake Area 2A</li> <li>■ Reitz Lake Area 2B</li> <li>■ Reitz Lake Area 2C</li> <li>■ Reitz Lake Area 2D</li> <li>■ Southeast Area 1A</li> </ul>	<ul style="list-style-type: none"> <li>■ Southeast Area 1B</li> <li>■ Southeast Area 1C</li> <li>■ Southeast Area 1D</li> <li>■ Private Utility Area</li> <li>■ Lakes/Ponds</li> <li>■ Streams</li> <li>■ Parcels</li> <li>■ City Limits</li> </ul>
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**Figure 6-2  
Proposed  
Sanitary System**

**Table 6-1  
Trunk Sewer Improvements Schedule**

Improvement	Year Completion is Required	Triggering Event
1. L-52 Lift Station Capacity Upgrade and Forcemain Re-routing (Under Construction)	2008	Continued Build-out of Existing Lots and Service Issues with Existing System
2. Southeast Area Lift Station (Under Construction)	2008	Interlaken Development and Carver County CSAH 10 Realignment
3. Gravity sewer extension to allow abandonment of Secondary Lift Station 2B	(1)	Completion of Waterford Development
4. Reitz Lake Lift Station & Forcemain	(1)	Any Development within Stage 2A
5. Southeast Area Interceptor	(1)	Any development within Stage 1B
6. Trunk Sewer Main Extensions	(1)	Development Proposals in 2030 Growth Area
7. CIPP, MH Rehabilitation, Misc. Maintenance	Ongoing	As Problems are Identified and Evaluated

(1) Schedule dependent on development timing, size, and/or location.

### Future Sanitary Sewer Flows

The forecasts of population, households, employment, and wastewater flows for Waconia as contained in the adopted *Water Resources Management Policy Plan* are listed below in Table 6-2.

**Table 6-2  
Population, Households, Employment, and Wastewater Flow Forecasts**

Year	2000	2010	2015	2020	2025	2030
Sewered Population	6,814	10,600	16,000	20,000	22,700	25,000
Sewered Households	2,568	4,500	6,750	8,000	9,100	10,000
Sewered Employment	3,777	7,000	8,550	9,900	11,500	13,000
Ave. Annual Wastewater Flow (MGD)		1.01	1.50	1.77	2.01	2.13
Allowable Peak Hourly Flow (MGD)		3.13	4.70	5.13	5.82	5.96

- 1) Flow projections based on 2.74 persons per unit and 100 gallons per capita per day.
- 2) The City has evaluated the projected wastewater flows with the proposed land uses and accepts the Met Council forecasts listed in the above table.

### Inflow and Infiltration

Infiltration is defined as ground water which enters the sewer system. This can occur through leaking joints and broken pipes. Inflow is defined as surface water which enters the sewer system. This can occur through sump pump discharge, drain tile, surface drain and roof drain connections to the sewer. Both use available capacity in the sewer system and therefore reducing I/I can restore capacity in the system.

The City of Waconia has made extensive effort in reducing inflow and infiltration (I&I) into their sanitary sewer system. The City began annual Cured In Place Pipe (CIPP) lining projects in 1994. Since that time, all of the City's existing VCP sewer mains have been lined with the exception of one short pipe along Highway 5. These efforts have greatly reduced the I&I entering the City's system, however, there is still an I&I issue associated with individual house services in the "old" part of the City. The City is actively evaluating methods and procedures for reducing the I&I contribution from these privately owned individual sewer services. The City has completed a pilot study project to test the cost, effectiveness, and methodology of lining private services. To date, evaluation of the service lining program is ongoing.

In addition to lining sewers, the City has televised and evaluated the condition of existing sanitary service lines as part of the Infrastructure Rehabilitation Plan. The 2007 street reconstruction project included the replacement of all sanitary sewer services of the public portion totaling ten city blocks. The scope of work on the 2008 street reconstruction project includes the replacement of sanitary sewer services totaling seven city blocks.

In 2006 and 2007, a 36-inch trunk sewer was installed parallel to the existing 36-inch trunk main located along Highway 5. This parallel sewer line includes two flow control structures and is intended to provide underground storage and rate control to facilitate reductions in peak flow rates to L-70 during high I&I periods. It is the City's goal to remove all I&I at its source and once I&I issues have been corrected, the overflow structures can be removed and the 36-inch line can be used as a trunk sewer main.

The City of Waconia has recently adopted a program designed to target replacement of all footing and foundation drains. This program will provide large scale service lateral televising, point of sale inspection and require disconnection of any footing or foundation drain connections.

The City has also adopted Ordinance 599 that states:

*No roof runoff, sump pump, footing tile or drain, swimming pool discharge, or surface water drainage shall be connected to the sanitary sewer system and no building shall be constructed nor shall any existing buildings be altered in such a manner that any source of discharge or drainage other than sanitary sewer shall connect with the sanitary sewer system inside or outside the building.*

All existing prohibited connections were required to be disconnected and/or removed in 1991.

## Public Water Supply

### Introduction

The purpose of this element of the Comprehensive Plan is to update the City's comprehensive water plan taking into account current population and land use projections. The updated plan will provide a guide plan for the extension of municipal water through new developments to ensure that all portions of the planning area can ultimately be serviced.

The preparation of water supply plan is mandated by the Metropolitan Council. The plan requirements are defined in its Local Planning Handbook and Appendix B-2 of its Water Resources Management Plan. The Handbook states, "If the water supply plan was completed before the full comprehensive plan update, the comprehensive plan update only needs to include a summary of changes made since the water supply plan was submitted to the DNR and Metropolitan Council." Waconia submitted its Water Supply Plan in October 2007 and comments were received in January 2008. Issues were addressed and the Water Supply Plan was resubmitted in June 2008. The City is currently waiting for approval.

### Existing Water Supply System

The City of Waconia currently owns and operates two water treatment facilities, five production facilities (wells), three elevated storage facilities and an extensive distribution system to provide municipal water service to its residents and businesses. Please see Figure 6-3 for the existing municipal water supply system

Water Treatment Plant 2 is located in the "old area" of the City and was upgraded in approximately 2000. The facility provides iron removal through aeration, detention, and filtration, and has a capacity of approximately 500 gpm. This facility is currently used as a back-up treatment source in high demand periods and it will continue to be used as such in the future.

Water Treatment Plant 3 began operation in 1996, and is located in the east central area of the City along Tenth Street. The facility provides iron and manganese removal through aeration, detention, and filtration, and has a capacity of 1500 gpm. The facility also includes 650,000 gallons of underground storage in a clear well. A plant expansion of Water Treatment Plant 3 is currently under construction and is anticipated to be operational in the fall of 2008. This plant expansion will increase the capacity of the plant to approximately 3400 gpm, and includes the addition of 245,000 gallons of underground storage in a clear well.

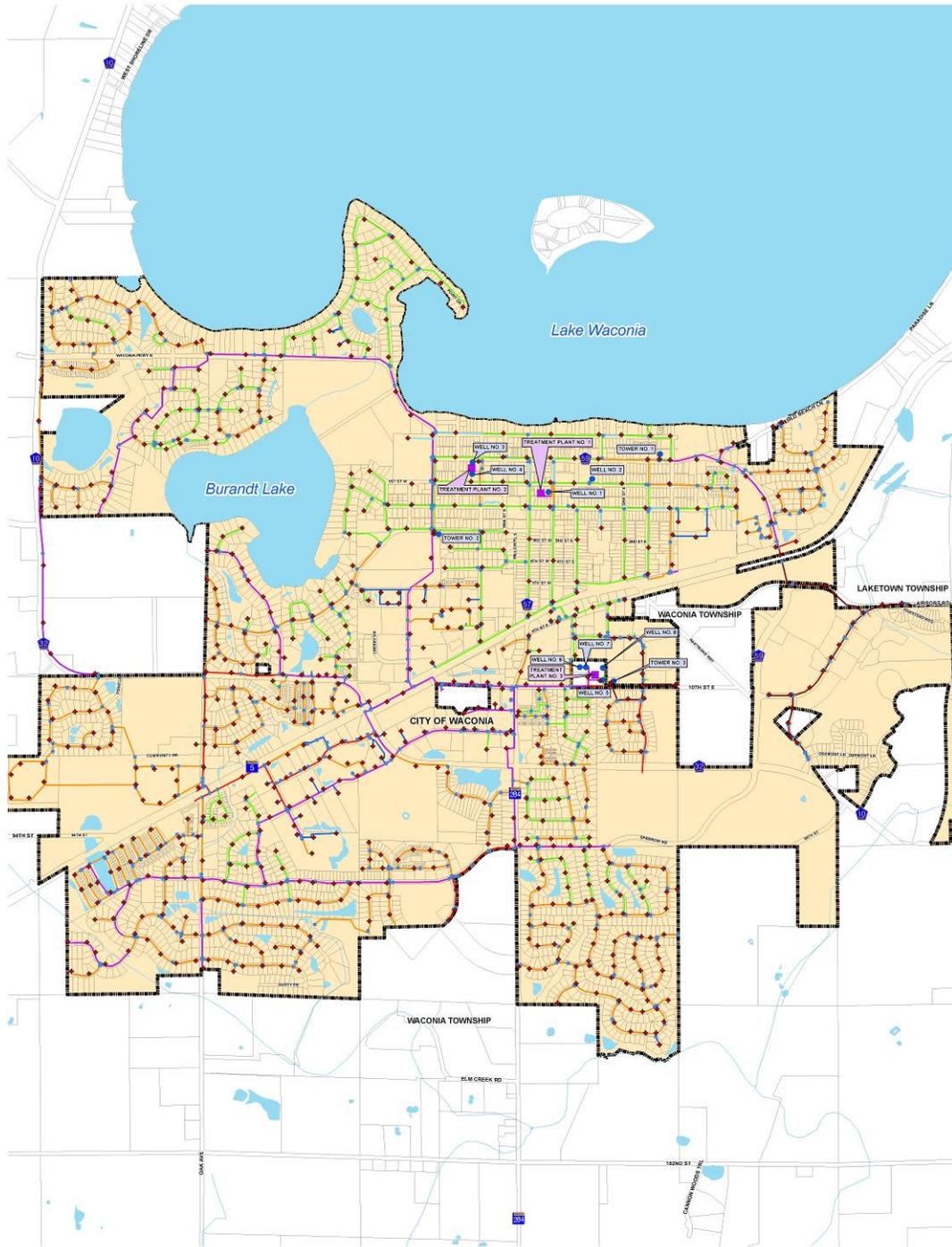
The total treatment capacity in the City after completion of the plant expansion will be approximately 3900 gpm, and the total underground storage provided will be 895,000 gallons.

Wells 2 and 3 supply Water Treatment Plant 2, and are capable of producing approximately 460 gpm each. Wells 5 and 6 supply Water Treatment Plant 3, and are capable of producing 450 gpm and 1,500 gpm respectively. In 2007, Well 7 was put into service, and supplies Water Treatment Plant 3. Well 7 is a drift well capable of producing approximately 1,000 gpm. It is intended to reduce the demand from the existing Mt Simon wells during off-peak periods. An additional well, Well 8, is currently in the design process, and is anticipated to be operational in 2008. Well 8 will also be a drift well, capable of producing approximately 500 gpm, intended to further reduce demand from the existing Mt. Simon wells, and will also supply Water Treatment Plant #3.

The total existing production capacity in the City is approximately 3,870 gpm. Upon completion of Well 8, the total capacity will be approximately 4,370 gpm.

Tower 1 is located in the northeasterly area of the City, and has a storage capacity of 75,000 gallons. Tower 2 is located in the northwesterly area of the City and has a storage capacity of 250,000 gallons. Tower 3 was put into service in the summer of 2007, is located next to Water Treatment Plant 3, and has a storage capacity of 2,000,000 gallons. All towers have the same overflow elevation, thus the entire city is a single zone system. The total existing elevated storage capacity in the City is 2,325,000 gallons. The total storage capacity including underground storage after completion of the Water Treatment Plant 3 expansion will be 3,220,000 gallons.

The City's distribution system includes piping varying in size from 4-inch to 16-inch. A series of 16-inch diameter trunk lines have recently been installed to facilitate system looping and tower operation. An additional 16-inch trunk line along Tenth Street which connects Tower 3 to the western side of the City is in the planning process and anticipated to be operational in 2008.



*City of Waconia 2008 Comp Plan Update*

- ◆ Hydrants
- Valves
- Buildings
- Wells
- Watermain
  - 4"
  - 6"
  - 8"
  - 10"
  - 12"
  - 16"
  - Unknown
- Lakes/Ponds
- Streams
- Parcels
- ⬢ City Limits

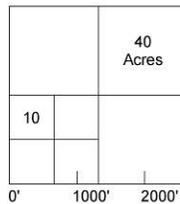


Figure 6-3  
Existing  
Water System

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## Future Water System

The existing treatment plant will have a capacity of 3,400 gpm (4.896 mgd) after the 2008 plant expansion. This capacity will service an average day demand of approximately 1.7 MGD. Based on the current population projections, it is estimated that this will be reached in the year 2017. An additional water treatment plant will be needed at this time. It is recommended that this plant have an ultimate capacity of 2,000 – 2,500 gpm with raw water initially provided by 2 new 500 gpm drift or FIG wells. Two wells will be required at approximately this time to allow for the firm capacity to reach 500 gpm. As the existing treatment plant site does not allow for additional expansion and the new wells must be a significant distance from the existing wells to avoid impacting existing capacities, the additional treatment will need to be provided by a separate plant. This plant will require expansion along with additional production wells post 2030. The approximate location of this future water treatment plant and wells is in the southeast area of the City and is shown on Figure 6-4.

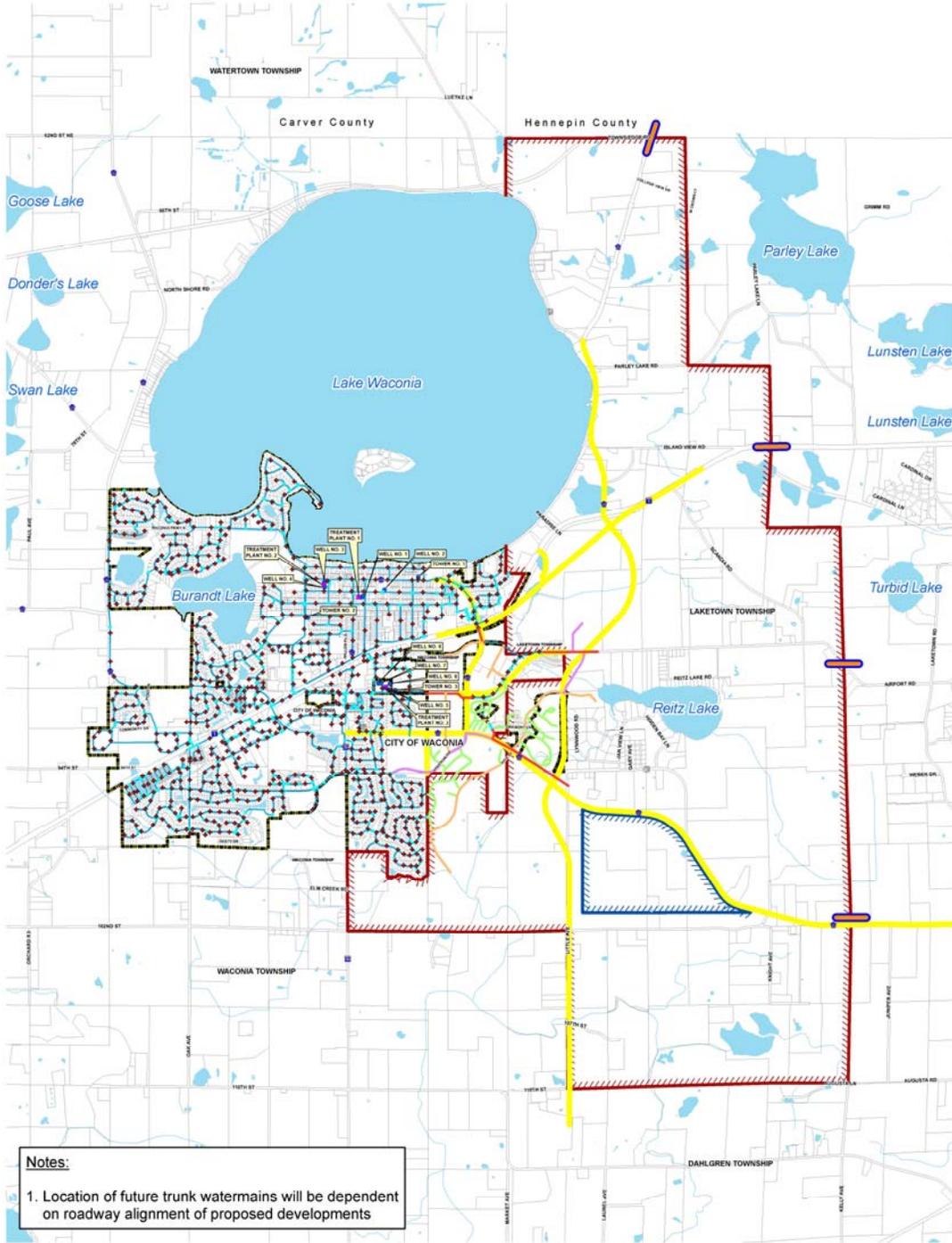
The minimum elevated storage needs to equal the average day demand of water. The City currently has 2,325,000 gallons of elevated storage. Therefore, an additional water tower will be required when the average day demand exceeds 2.3 MGD. Based on the current population and water usage projections, a new tower will therefore be needed in the year 2025. To minimize the lengths of raw water pipelines, this tower location will be adjacent to the future water treatment plant and municipal wells.

Table 6-3 shows the necessary improvements to the trunk watermain system along with the estimated year of completion and the triggering event.

**Table 6-3  
Trunk Water Improvements Schedule**

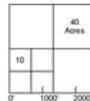
Improvement		Year Completion is Required	Triggering Event
1.	Water Treatment Plant No. 3 Expansion	2008	Southeast Area Developments
2.	Well No. 8	2008	Southeast Area Developments
3.	16-Inch Trunk Watermain to Tower 3	2008	Completion of Tower 3 in 2007
3.	Two Drift or FIG Wells	2017	When Average Day Demand Exceeds 1.7 MGD.
4.	Water Treatment Plant No. 4	2017	Two Drift or FIG Wells
5.	Water Tower No. 4	2025	When Average Day Demand Exceeds 2.3 MGD.
6.	Trunk Watermain Extensions	(1)	Development Proposals in 2030 Growth Area
7.	Hydrant/Valve Replacement, Repair of Breaks/Leaks, Misc. Maintenance	Ongoing	As Problems are Identified and Evaluated

(1) Schedule dependent on development timing, size, and/or location.



*City Of Waconia 2008 Comp Plan Update*

- |                           |                                   |                                      |
|---------------------------|-----------------------------------|--------------------------------------|
| <b>Proposed Watermain</b> | • Existing Valves                 | — Potential Interconnection Location |
| — 8"                      | • Existing Buildings              | — Future Streets                     |
| — 10"                     | • Existing Wells                  | — Lakes/Ponds                        |
| — 12"                     | — Existing Watermain              | — Streams                            |
| — 16"                     | — Future WTP, Well, & Water Tower | — Parcels                            |
| • Existing Hydrants       | — Future Service Area Boundary    | — City Limits                        |



**Figure 6-4  
Proposed  
Water System**

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## Surface Water Management

### Introduction

The City of Waconia's Local Surface Water Management Plan (SWMP) has been developed to meet the surface water related needs of the community and address the management planning requirements of the Metropolitan Surface Water Management Act. The SWMP has been prepared in general accordance with Minnesota State Statute 103B.235 and Minnesota Rules Chapter 8410. In meeting these requirements it is necessary to address the goals and objectives of the jurisdictional watershed district, in this case the Carver County Water Management Organization, CCWMO. The goal of the plan is to maintain and improve surface water quality and minimize impacts of increased water quantity through appropriate planning, policy enforcement and capital improvement projects.

The following summarizes key sections in the plan:

### Land and Water Resources Inventory

Section 4 of the Plan includes a detailed summary of the land and water resources within and adjacent to the City. The section also includes a description of all waters receiving runoff from the city within 1 mile that are on the MPCA's Impaired Waters 303(d) list. A brief description of the Minnesota Land Cover Classification System (MLCCS) data completed by Carver County, as well as the mapping as it pertains to the City, has been included.

### Surface Water Goals and Policies

This section outlines goals and policies addressing water resource management needs of the City and their relationship with Regional, State, and Federal goals and programs.

Goals and policies relating to the following issues are presented:

- Impaired Waters & TMDL Implications
- Water Quantity
- Water Quality
- Erosion and Sedimentation
- Wetlands
- Groundwater
- Individual Sewage and Treatment Systems
- Feedlots
- Recreation, Habitat and Shoreland Management
- Education and Public Involvement

Generally, the City will work to ensure erosion control and surface water quality standards are met through enforcement of the City's permitting requirements and the Best

Management Practices (BMPs) outlined in the City's Storm Water Pollution Prevention Plan (SWPPP). The City will ensure compliance with the National Pollutant Discharge Elimination System (NPDES) Phase II permits municipal operations and for construction activity greater than 1 acre, as well as the requirements of the CCWMO Rules. The Rules of the MCWD will become relevant when annexation reaches the northeasterly extents of the projected 2030 city limits; otherwise the City is wholly within the jurisdiction of the CCWMO.

### **Watershed Assessment and Proposed Actions**

This section contains an assessment of existing and potential water resource related issues presently known within the City, as well as a description of structural, non-structural, or programmatic solutions that are proposed to address or correct the issues. The section includes a detailed description of each subcatchment in need of attention and those areas that have been analyzed for potential future regional ponding.

### **Costs and Funding Considerations**

Section 7 of the plan discusses the assumptions used when determining the estimated costs of proposed retrofit options and regional treatment basins. In addition, potential funding issues and sources are discussed.

### **Implementation Prioritization & Capital Improvement Plan**

This section includes a prioritized ranking of the specific surface water related improvements identified in the plan. City cooperation with the Carver County Water, Environment and Natural Resources Committee is key to maintaining the relevance of the City's prioritization plan. This section also includes identification of a Capital Improvement Plan, with approximate costs and funding sources for the noted improvements.

### **Amendments to the Plan**

It is the City's intention to have this SWMP reviewed and approved by the CCWMO in accordance with Minnesota Statute and the requirements for acceptance of this Comprehensive Plan. The modeling and mapping portions of the plan will be revised on a biennial basis to ensure relevance and adequacy for use as a planning tool. Similarly, the plan will be revised within 2 years of new State or Watershed rule revisions to ensure city conformance with changing policy.

