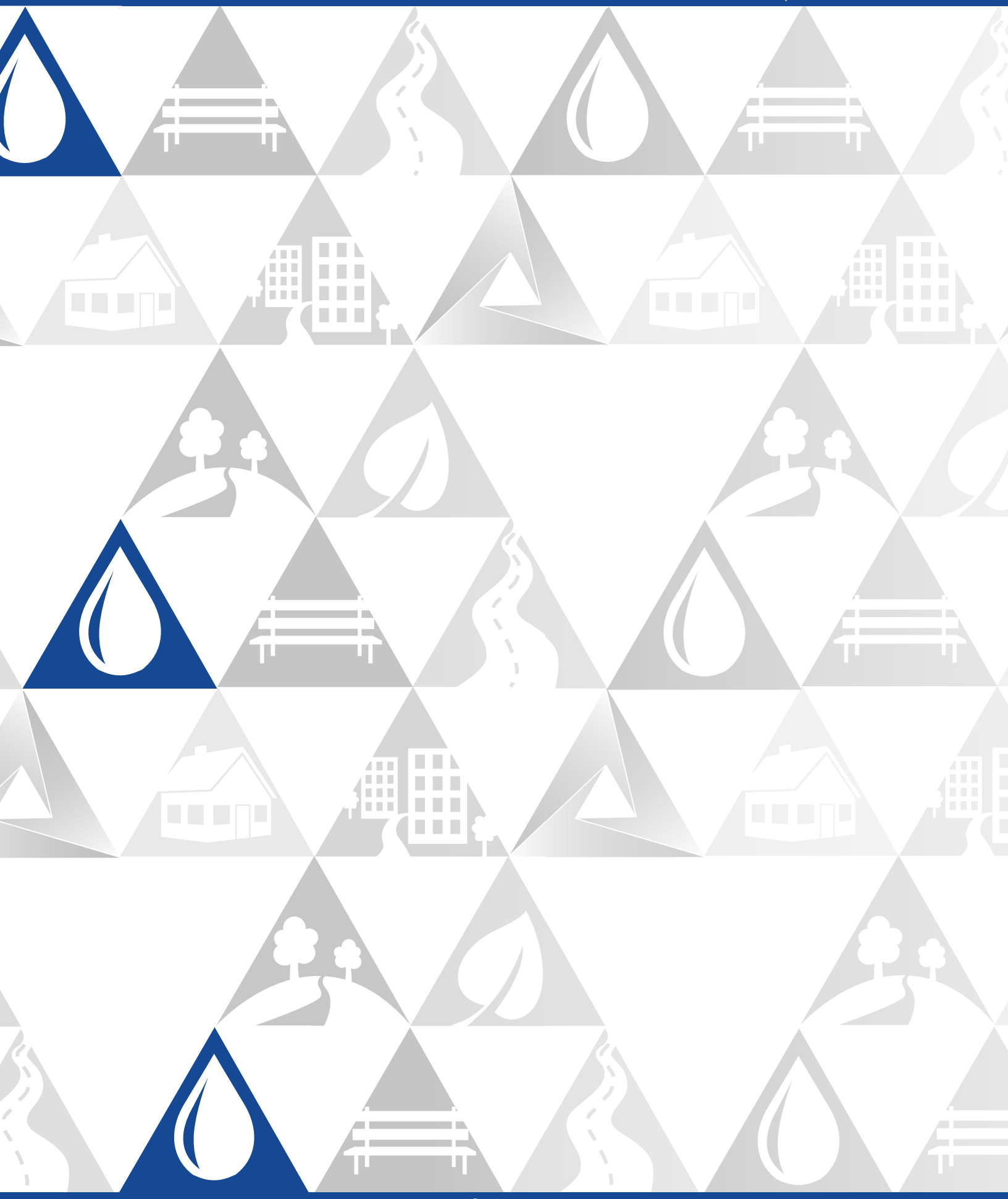


## Chapter 5

# Water Resources

- Introduction
- Key Points
- History
- Existing Conditions
- Policy Plan
- Implementation Plan

# Contents

# Key Points

- Continuous water quality improvements to local water bodies and groundwater as well as preservation of wetlands and natural areas are essential.
- There are a multitude of ways to improve the quality and reduce the volume of stormwater runoff, including the addition of native plants and rain gardens, reducing the use of chemicals, and limiting impervious surface.
- It is time to make significant investments in aging sanitary sewer, water, and stormwater infrastructure to maintain the integrity and function of the water resources system.
- Golden Valley still experiences flooding, and the City must continue to address flood risk in a variety of ways.
- Protecting the drinking water supply from pollutants, ensuring access to an adequate supply of drinking water, and decreasing water consumption are vital to Golden Valley's health and prosperity.
- It is important to involve and educate the public about issues related to water resources, particularly stormwater management.


PHOTO BY CITY OF GOLDEN VALLEY

# Section 1: Introduction

Golden Valley has a rich stock of water resources that contribute to the community's character, health, and quality of life. Preservation, conservation, and enhancement of these resources are critical.

The Water Resources chapter includes a set of coordinated policies and strategies for managing and improving the City's water supply, wastewater, and surface water systems, all of which are vital resources that must be sustained for future generations. The City's work is influenced by the Metropolitan Council's 2040 Water Resources Policy Plan, which moves beyond simply managing these resources to meet regulatory requirements. Both the City and Metropolitan Council take a proactive planning approach to water resource management, reflecting the value the community places on natural resources.

The City's past water resource successes include:

- construction of numerous flood control and flood storage projects that have helped preserve life and property, reduce flood levels, and prevent costly flood damages
- implementation of projects and best management practices that helped protect and improve water quality throughout the City
- removal of Wirth Lake from the state's impaired water list for excess nutrients
- improved water quality in Bassett Creek with a measured decrease in phosphorus, nitrates, and sediment and an increase in biological indicators (fish and insects)
- protected water quality in Twin Lake, which continues to meet state and watershed standards
- establishment of 13 conservation easements and 32 native vegetation buffers totaling 53 acres
- creation of two wetland banks certified by the Board of Water and Soil Resources
- receipt of Blue Star Award for excellence in stormwater management
- reduction in inflow and infiltration (I/I) by 28 percent, inspection of 54 percent of properties, and compliance by 44 percent of properties since I/I program inception 10 years ago

The City continues to build upon these past successes to improve the quality and effectiveness of water resource planning and management through 2040 and beyond.

PHOTO BY CITY OF GOLDEN VALLEY

## Section 2: History

With its proximity to the Mississippi River, the Golden Valley area has a long history of abundant water resources. These resources began to be significantly affected by human settlement in the early to mid-1900s, but during this time development was still limited and sporadic.

In the 1950s, the population grew rapidly with post-war suburbanization. The Village of Golden Valley was involved in water planning, but it was not until the 1960s and 1970s that significant government resolution and local management of water resources was introduced. Much of Golden Valley's infrastructure for water resources was installed prior to 1970. Since then, planning, regulation, and oversight has increased.

Today, the City partners with several agencies to perform this work, including the Bassett Creek Watershed Management Commission (BCWMC), Metropolitan Council Environmental Services (MCES), Joint Water Commission (JWC), Minnesota Pollution Control Agency (MPCA), Department of Natural Resources (DNR), and others. The City's role in water resource management continues to evolve as state and federal laws change.

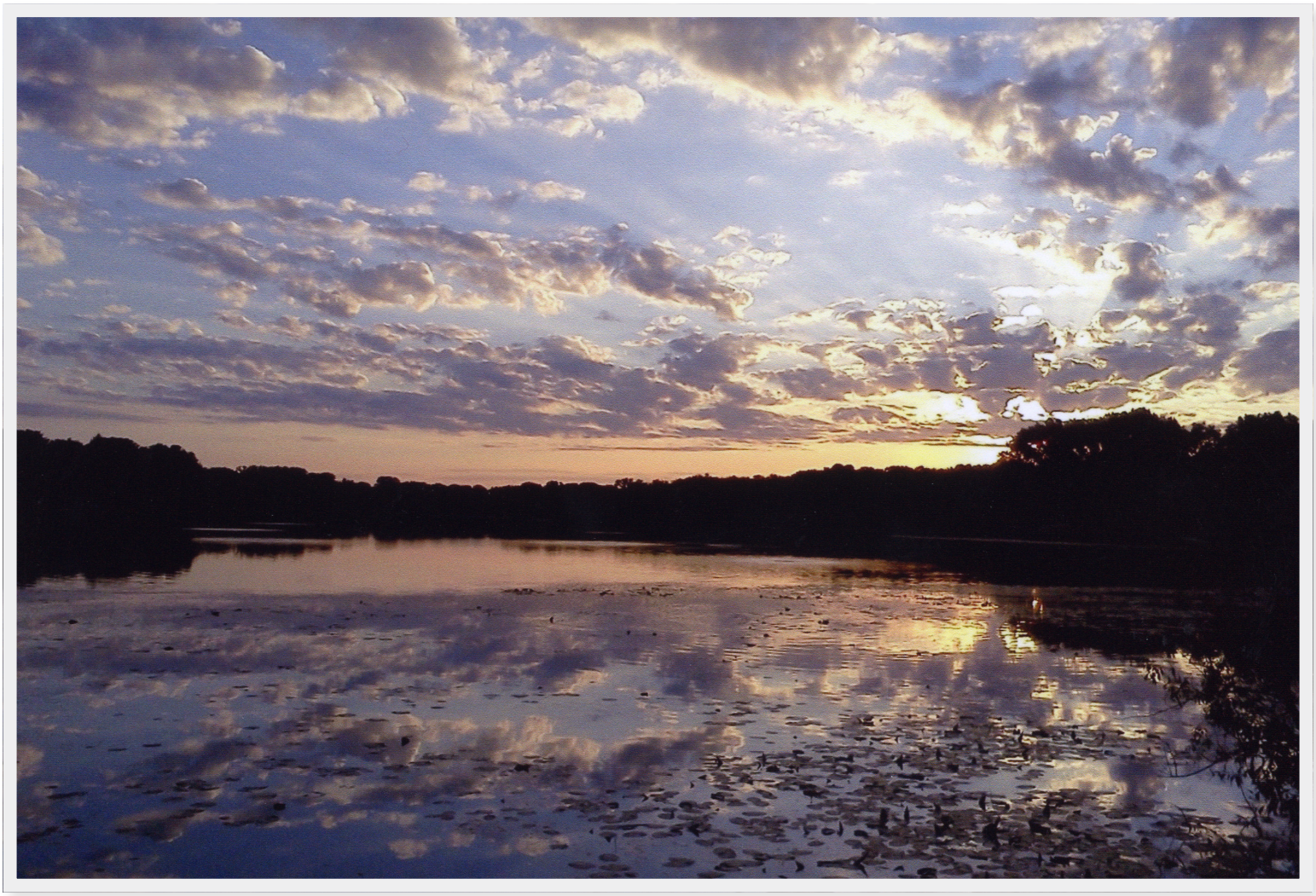


PHOTO BY SUSAN RAMLET, 2014 VIEWS OF THE VALLEY

# Section 3: Existing Conditions And Future Demands

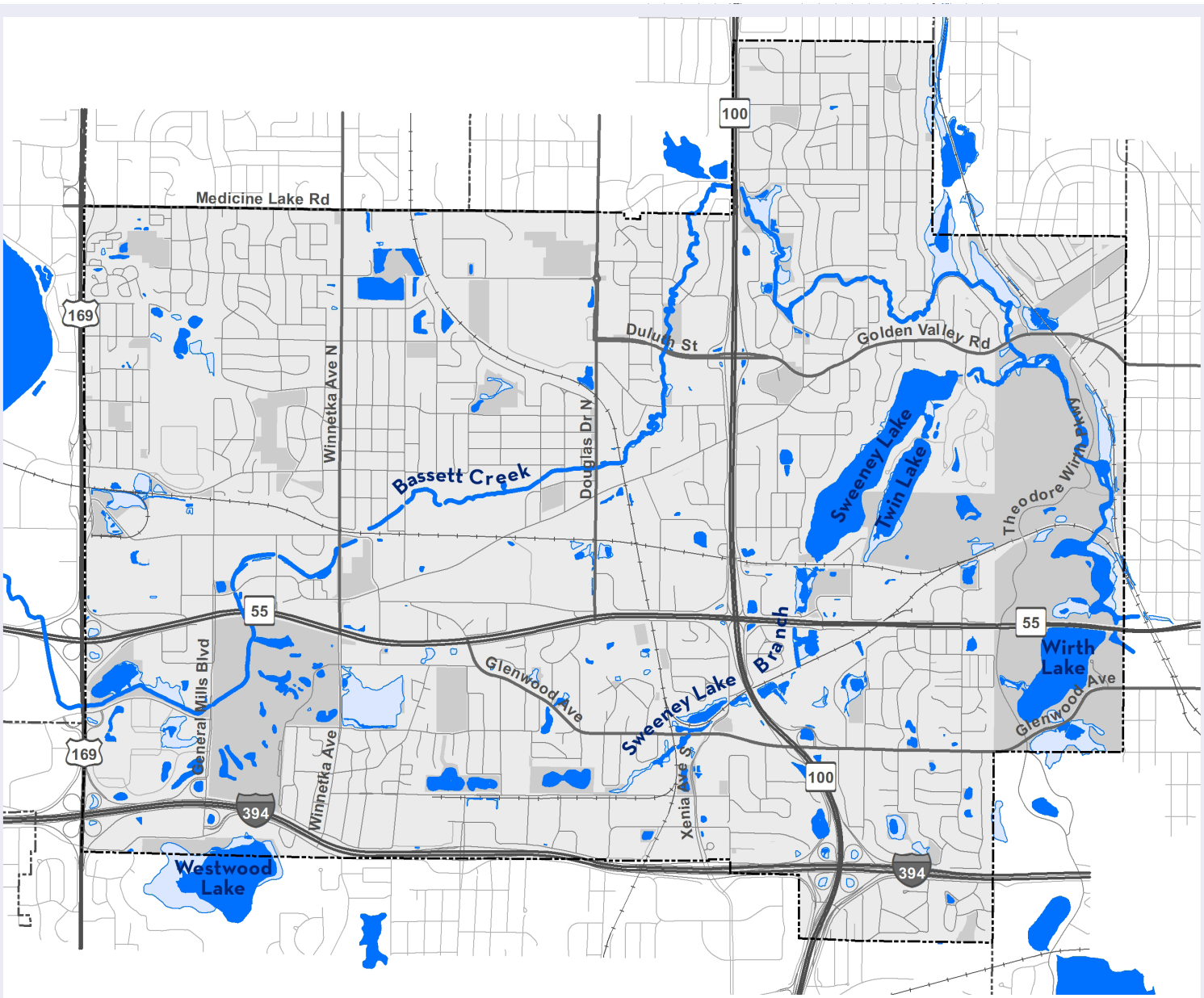
## Surface Water

### Key Points

- Although many water quality improvements have been made, there are still a number of impairments that affect the use and enjoyment of the water bodies in Golden Valley. One way to help improve water quality is to incorporate green infrastructure techniques and practices, such as planting trees and native vegetation, green roofs, stormwater capture and reuse, and rain gardens.
- Many storm sewer pipes are aging, undersized, or constructed of materials such as corrugated metal and are reaching the end of their useful design life.
- Although the City has completed a number of flood control projects and floodplain management actions, flooding and flood risk continues to be an important and ongoing issue.

The primary waterway in Golden Valley is Bassett Creek, which runs through many neighborhoods and parks. Its watershed encompasses more than 40 square miles in Crystal, Golden Valley, Medicine Lake, Minneapolis, Minnetonka, New Hope, Plymouth, Robbinsdale, and St Louis Park. This watershed includes the main branch of Bassett Creek, which originates at the outlet of Medicine Lake, and the Sweeney Lake branch of Bassett Creek, which flows through Sweeney Lake and joins the main stem in Theodore Wirth Park. Figure 5.1 shows the abundance of surface water resources in the community.

# Figure 5.1: Surface Water Resources




**Surface Water Resources**

- Streams
- Lakes and Ponds
- Other Wetlands

0 0.25 0.5 1 Mile

Sources: Hennepin County Surveyors Office for Property Lines (2017), City of Golden Valley for all other layers (2017).

PHOTO BY CITY OF GOLDEN VALLEY

*Students from the SEA School collect water samples.*

The City's ongoing water management efforts have preserved some of Golden Valley's large recreational lakes, ponds, wetlands, creeks, wooded areas, and parks from development and other pressures. For example, the Surface Water Management Plan (SWMP) impacts land use planning and development by providing a complete and detailed guide and reference for protecting and managing water resources in the city, including stormwater. This includes policy decisions, water resource management, implementation priorities, regulatory program references, and capital improvement budgeting. The SWMP is consistent with the guidance from the Metropolitan Council, BCWMC, and Minnehaha Creek Watershed District (MCWD). The entire SWMP is included in Appendix 5A.

## Resource Inventory And Assessment

The SWMP provides technical information, maps, and tables that describe the surface and subsurface conditions of Golden Valley. This includes information regarding climate and precipitation, topography, watersheds and drainage patterns, land use, soils, geology and groundwater resources, surface waters, wetlands and natural resources, water quality, water quantity and flooding, fisheries and aquatic habitat, recreational and scenic areas, and potential pollutant sources.

It also includes information about the City's stormwater management system, including an inventory of the major and minor subwatersheds and stormwater management infrastructure. Based on this inventory, the City performed an assessment (see Appendix 5A) and identified the following issues and opportunities:

- **Water quality—**including stormwater runoff water quality, MPCA impaired waters, total maximum daily load studies, water body classification and water quality goals, water quality best management practice (BMP) maintenance, shoreland management, and more
- **Water quantity and flood risk reduction—**including floodplain management, rate and volume control, hydrologic and hydraulic modeling, and identifying areas of localized flooding and flood risk
- **Wetland management—**including wetland and shoreland buffers, aquatic invasive species, and wetland classification and inventory
- **Groundwater management—**including infiltration, groundwater sustainability, and wellhead protection
- **Erosion and sediment control—**including Bassett Creek erosion issues, construction site management, and implementing best management practices
- **Interagency issues—**including maintenance of infrastructure and parks not owned by the City

## Water Quality

Lakes, ponds, streams, and wetlands in Golden Valley are important community assets. The City recognizes the importance of water quality in its water bodies and has taken steps to protect and improve these resources. These include adopting water quality management policies, collecting water quality data, reviewing projects for conformance with water quality performance standards, and implementing water quality improvement projects.

The quality of surface water is compromised by pollutants typical of urbanized areas. The City uses programs and enforcement of regulations to limit pollutant loading. Pollutant loading from developed areas may have significant negative impacts on water quality and ecological function of water resources. For lakes, ponds, and wetlands, phosphorus and chloride are pollutants of concern.

### What Is Non-point Source Runoff?

Pollution sources are separated into two categories: point source and non-point source. Point sources of pollution are identifiable localized sources of pollution such as industrial discharge and sewage effluent. Non-point source pollution comes from unidentifiable, general sources like fertilizer or pesticides in urban and agricultural runoff.

Throughout the city, non-point source runoff, especially stormwater runoff, is a major source of pollutant loading.

The City works to limit pollutant loading from stormwater runoff through its project review and permitting program, appropriate operation and maintenance of its stormwater management system, and capital projects designed to reduce the amounts of stormwater generated (eg, low-impact development) and/or remove pollutants from stormwater. The City aims to achieve pollutant load reductions in its lakes and streams as required by the state or watershed management organizations as well as BCWMC and state water quality standards to preserve beneficial uses.

Most stormwater in Golden Valley eventually flows into Bassett Creek, which is an impaired water and does not meet water quality standards for chloride, fish and insect bio-assessments, and fecal coliform (bacteria). The primary concern in Golden Valley is the health of surface water such as Bassett Creek, which may degrade as heavy precipitation events and freeze/thaw cycles increase. For example, more freeze/thaw cycles may lead to increased amounts of salt/deicer applied to the roads, which may deteriorate stormwater facilities and water quality. Increased precipitation may make it more difficult to maintain stormwater practices that help reduce pollution and maintain the health of surface water.

The City implements BMPs to reduce stormwater impacts on surface water. These practices include cleaning ponds, stormwater pipes, catch basins, outlets, sump catch basins, and manholes. The City sweeps streets in spring, summer, and fall, and continues to use innovative approaches to reduce and better target the application of chloride in winter while still taking public safety into account. Redevelopment is the primary opportunity to make improvements to water quality treatment as well as to volume and rate control, filtration, infiltration, and reuse.

Pollutant concentrations exceeding applicable state water quality standards may impair a water body's beneficial use(s) and can result in its inclusion on the MPCA's Impaired Waters List. For impaired water bodies, the MPCA requires completion of a total maximum daily load (TMDL) study to identify the sources of the impairment and strategies to restore water quality. The City works with the BCWMC and MCWD to address impairments located within their respective jurisdictions. Impaired waters located in or downstream of Golden Valley include:

- Sweeney Lake
- Wirth Lake
- Bassett Creek (Main Stem)
- Medicine Lake
- Minnehaha Creek
- Lake Hiawatha

Enhanced water quality can be achieved by:

- protecting and enhancing fish and wildlife habitat
- maintaining and enhancing the integrity and ecological function of aquatic resources and shoreland areas
- minimizing pollutant loading from stormwater runoff through non-point source pollution reduction and treatment
- complying with all applicable stormwater regulations established by the Environmental Protection Agency (EPA), MPCA, Hennepin County, BCWMC, MCWD, and Metropolitan Council
- minimizing the volume of stormwater runoff entering Bassett Creek

PHOTO BY CITY OF GOLDEN VALLEY

*Stormwater pond with native buffer*

## What Are Impaired Waters?

A body of water is considered impaired if it fails to meet one or more water quality standards. Minnesota water quality standards protect lakes, rivers, streams, and wetlands. Monitoring suggests that about 40 percent of Minnesota's lakes and streams are impaired, which is comparable to impairment rates in other states.

## Stormwater Management

Aging, damaged, or undersized infrastructure may impair the function of the City's stormwater system. The City's stormwater and water resource management program includes:

- implementation of the City's National Pollutant Discharge Elimination System (NPDES) Municipal Stormwater (MS4) Permit and Stormwater Pollution Prevention Plan (SWPPP)
- specific tasks requested or required by BCWMC and MCWD
- inspection, operation, and maintenance of the City's stormwater management system
- project review and permitting
- education and public involvement
- studies and capital projects

The City coordinates utility improvements with road rehabilitation to minimize disturbance and cost, prioritizing areas where improvements are most needed to provide services. Implementation occurs through capital improvement projects, the Infrastructure Renewal Plan (IRP), various studies, and ongoing programs specifically listed in Appendix 5A.

## Groundwater Management

The growing population in the Twin Cities metropolitan area has put increased pressure on groundwater, and it is crucial that the quantity and quality of groundwater resources be protected for future generations.

The Minnesota Department of Health (MDH) is responsible for the protection of groundwater quality, and it aims to prevent contaminants from entering the recharge zones of public water supply wells through its wellhead protection program. This includes the development of wellhead protection plans (WHPPs) and guidance to limit potential for groundwater contamination. Wellhead protection efforts may restrict or prevent the use of certain stormwater BMPs within these areas to prevent possibly contaminated stormwater from reaching groundwater supplies.

The City will cooperate with efforts of BCWMC, MCWD, and others to educate the general public regarding the importance of implementing BMPs to protect groundwater quality and quantity. Also, the City will cooperate with St Louis Park, Robbinsdale, Plymouth, and Minnetonka regarding wellhead protection programs and activities. Lastly, the City will aim to promote groundwater recharge, increase the groundwater base flow of Bassett Creek, and work to establish more uniform local policies and official controls for groundwater resources. Figure 5.2 illustrates the relationship between surface water and groundwater in Golden Valley.

## Water Quality And Flood Risk

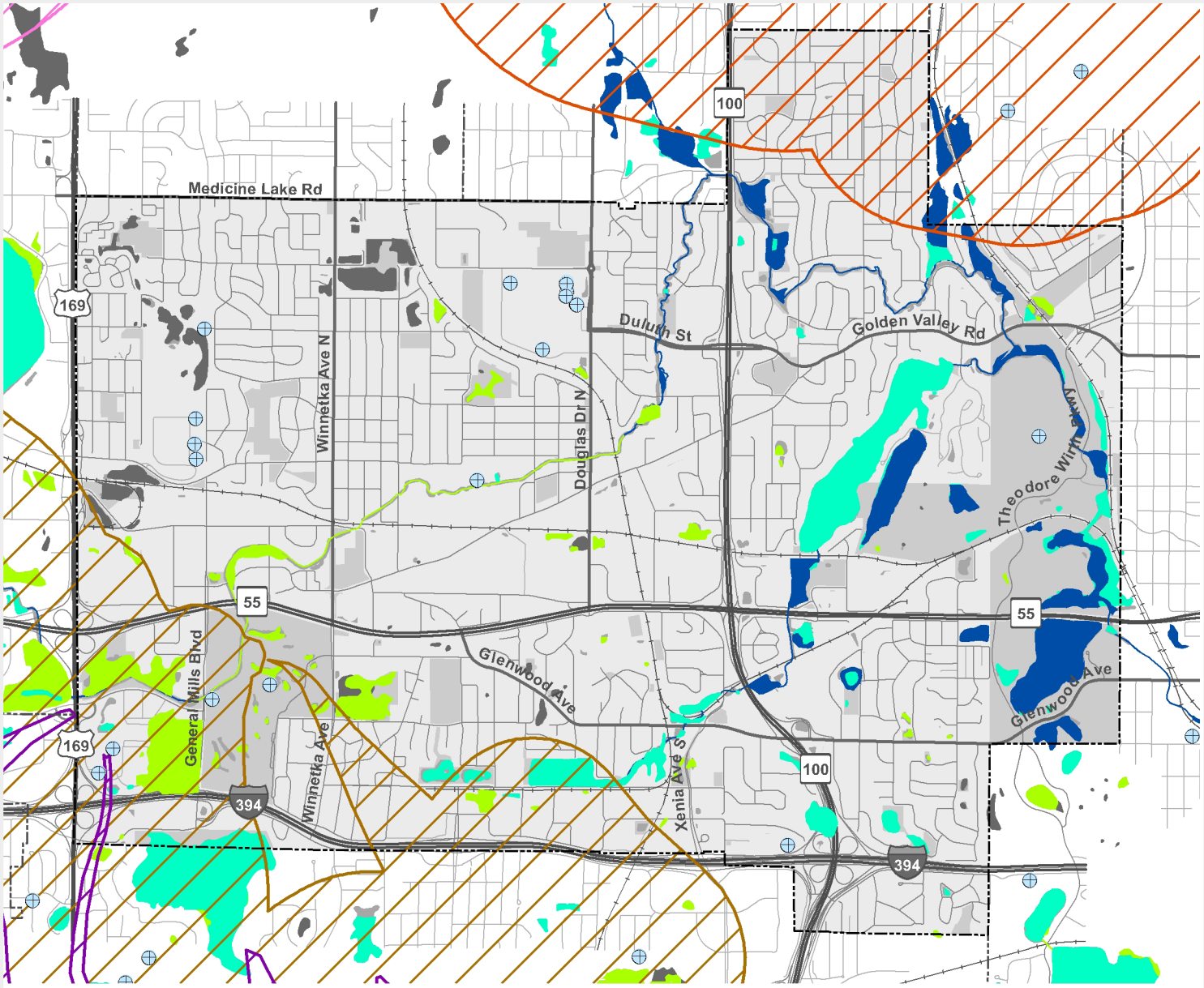
Floodplains are important ecological features, as they are the primary interface between the aquatic and terrestrial habitats. Floodplains tend to be seasonal wetlands and areas that are protected from development and encroachment, as they allow a safe place for seasonal flooding and protect homes, businesses, and infrastructure.

Floodplains are based on the elevation of water that is expected to occur during certain storm events. From a regulatory standpoint, the floodplain is defined as the elevation of water


PHOTO BY CITY OF GOLDEN VALLEY

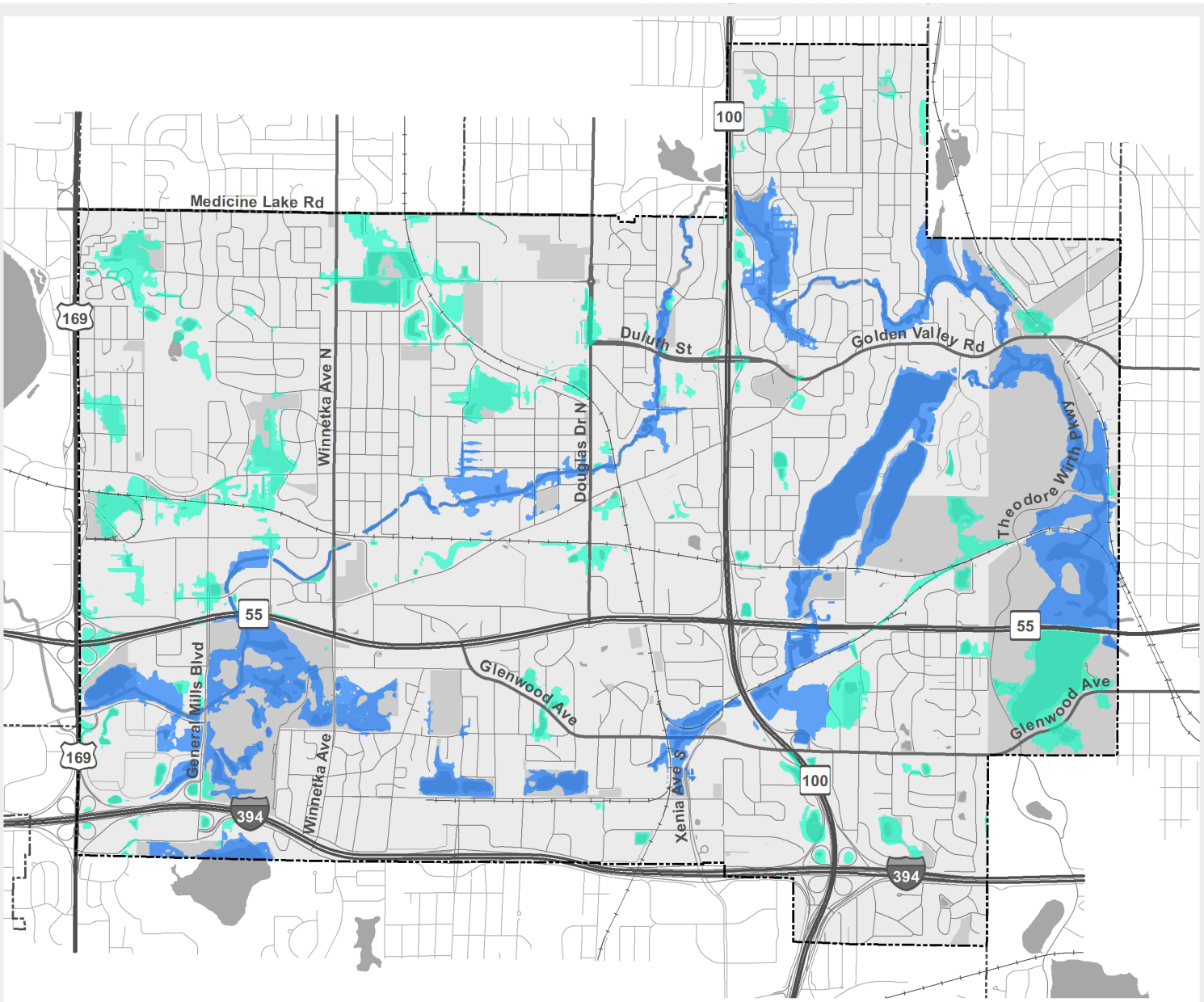
*Flooding can limit street access temporarily in residential neighborhoods.*

# Figure 5.2: Surface Water Interaction With Groundwater




Sources: MN Department of Health for Wells and Wellhead Protection Area (2017), Metropolitan Council for Surface Water Type for Regional Screening (2008), City of Golden Valley for all other layers (2017).

# Figure 5.3: Floodplain




**1% Annual Chance Floodplain**

- BCWMC Jurisdiction
- Local Jurisdiction

0 0.25 0.5 1 Mile

Sources: Hennepin County Surveyors Office for Property Lines (2017), BCWMC for 1% annual chance floodplain model (2017), City of Golden Valley for all other layers (2017).

PHOTO BY CITY OF GOLDEN VALLEY

*Hwy 55 Flood Control Structure*

caused by a precipitation event that has a 1 percent chance of being equaled or exceeded in any given year. This floodplain has been identified in Figure 5.3.

Past urban development in Golden Valley and higher precipitation amounts have increased the rate and volume of stormwater runoff generated by precipitation, which has increased the risk of flooding. To address areas of significant flooding along Bassett Creek, the City, BCWMC, and other state and federal agencies cooperated to construct the BCWMC Flood Control Project. Construction of the Flood Control Project and continued flood risk reduction practices have addressed the most significant flooding issues along Bassett Creek, though flooding issues still exist. Ongoing flood control tasks include:

- maintaining and repairing the Flood Control Project system
- managing development and redevelopment throughout the watershed to minimize the risk of flooding
- identifying and implementing additional projects to reduce flood risk along the Bassett Creek trunk system
- flood-proofing or voluntary acquisition of homes remaining in the floodplain
- regulating stormwater runoff discharges and volumes to minimize flood risk, flood damages, and the future costs of stormwater management systems

In 2017, the BCWMC adopted a new flood elevation model that is used to help guide the design and review of projects and development. The City will continue to use this model and other data to evaluate specific areas of flood risk and evaluate options to address these risks.

It is important that the City minimize the risk of flooding along Bassett Creek, its tributaries, and other flood-prone areas to protect human life, property, and surface water systems that may be damaged by flood events. This work will include:

- maintaining the City's stormwater system to consistently provide the intended level of service and protection
- implementing strategies to manage the impact of future increased precipitation and changing climate patterns on City stormwater infrastructure and planning

## Wetland Management

Much of Golden Valley was originally wetland. Before the establishment of protective regulations, many wetland areas were drained or filled as the city developed. And although Golden Valley is almost completely developed, numerous wetlands remain.

The City is committed to preserving and enhancing the quality of its wetlands as well as the adjacent natural areas. Specific management techniques used are based on a variety of factors. An inventory of wetlands and natural areas, assessment of needs, and set of management practices are detailed in the City's SWMP and the Natural Resources Management Plan (NRMP).

### Erosion And Sediment Control

The BCWMC and its member cities have identified the extent and severity of streambank erosion along most of the Bassett Creek trunk system, including the portion of Bassett Creek passing through Golden Valley. The City's original inventory was completed in 2003, and it has been updated annually since then.

To address stream erosion issues, the BCWMC has identified and implemented capital projects to restore streambank areas since the initial stream erosion inventory was performed. Future projects are included in the BCWMC capital improvement program and the City's implementation program.

The City issues Stormwater Management Permits to use best practices and monitor construction projects on private property. It is committed to minimizing erosion and sedimentation for all water resources in the community and to using soil protection and sedimentation controls to maintain public health, safety, and welfare.

### Opportunities

Major opportunities for the City to address these issues are summarized at the end of this section and include cooperative efforts with Watershed Management Organizations (WMOs), partnerships with adjacent cities, redevelopment opportunities, and coordination with other City programs, including the IRP. As a fully developed city, there are limited opportunities and resources to implement capital improvements to address water quality, water quantity, or natural resource issues. To maximize the effectiveness of its water resource management program, Golden Valley seeks to leverage the following:

- **Partnerships—**The City cooperates with the BCWMC, MCWD, Hennepin County, Minneapolis Parks and Recreation Board, and state agencies to carry out water resource activities and projects designed to achieve common goals. The City also partners with neighboring cities to address intercommunity stormwater management issues.
- **Redevelopment—**As private and public properties redevelop, the City will implement the policies and regulatory controls at its disposal to improve and upgrade the stormwater system.
- **Infrastructure Renewal Program (IRP)—**Through this program, the City evaluates and prioritizes all infrastructure (including stormwater) for rehabilitation and replacement. Activities performed through this program provide opportunities to address surface water issues by improving stormwater conveyance capacity, retrofitting water quality improvements, and implementing other best management practices.
- **Coordination with other City/WMO programs –** Coordinating stormwater and surface water management activities with other City programs (eg, park improvements) presents an opportunity to increase operational efficiency, reduce costs, and limit the frequency and duration of disruptions to City services.

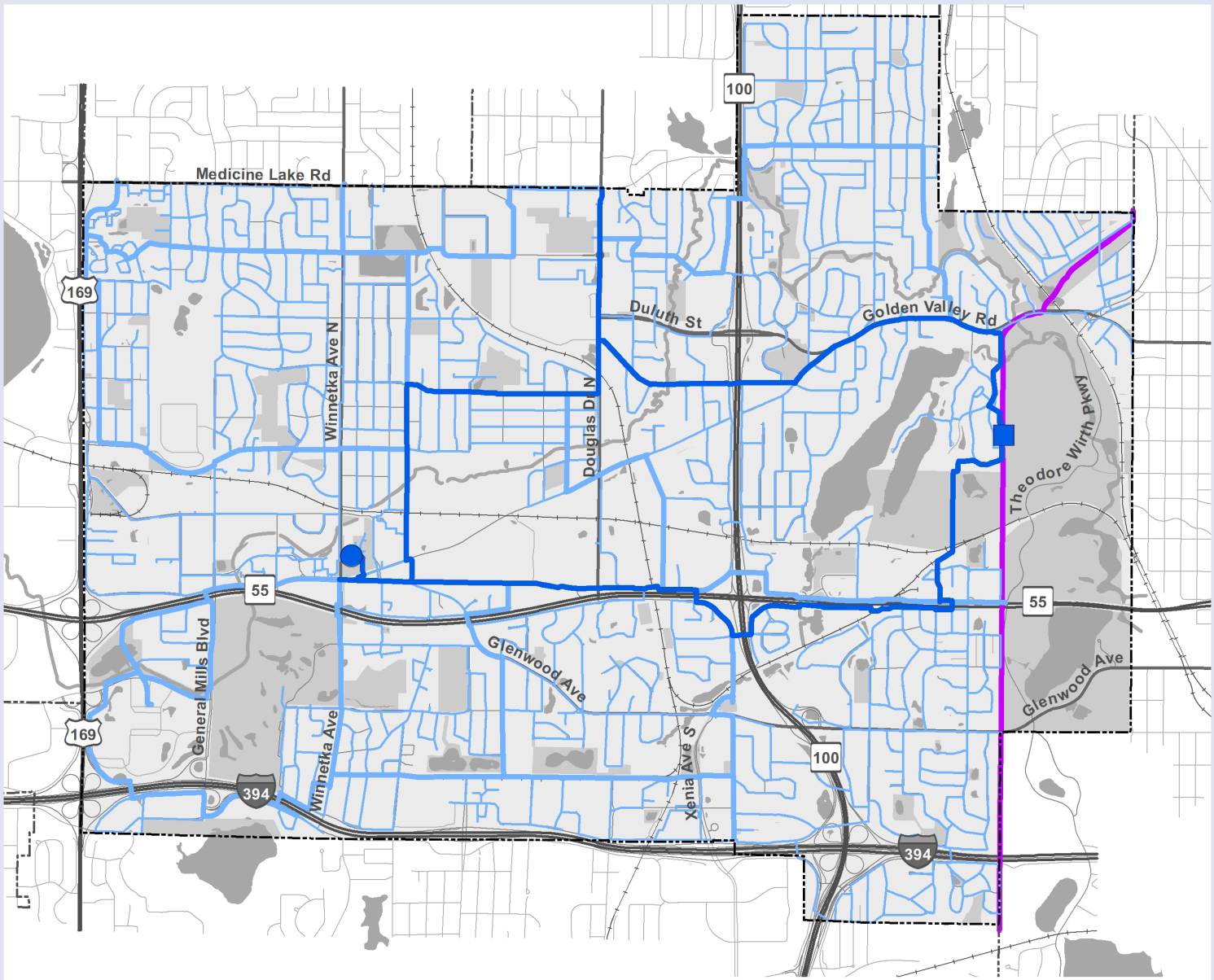
## Water Supply

### Key Points

- All Golden Valley drinking water comes from the Mississippi River through pipes owned by Minneapolis, whereas most cities use groundwater as their source of drinking water.
- The majority of Golden Valley water main was installed in the late 1950s and early 1960s and is reaching the end of its useful design life.
- Golden Valley is working to limit residential water usage in the summer months to conserve this valuable resource.
- Golden Valley has installed emergency backup water wells and has established procedures for emergencies.

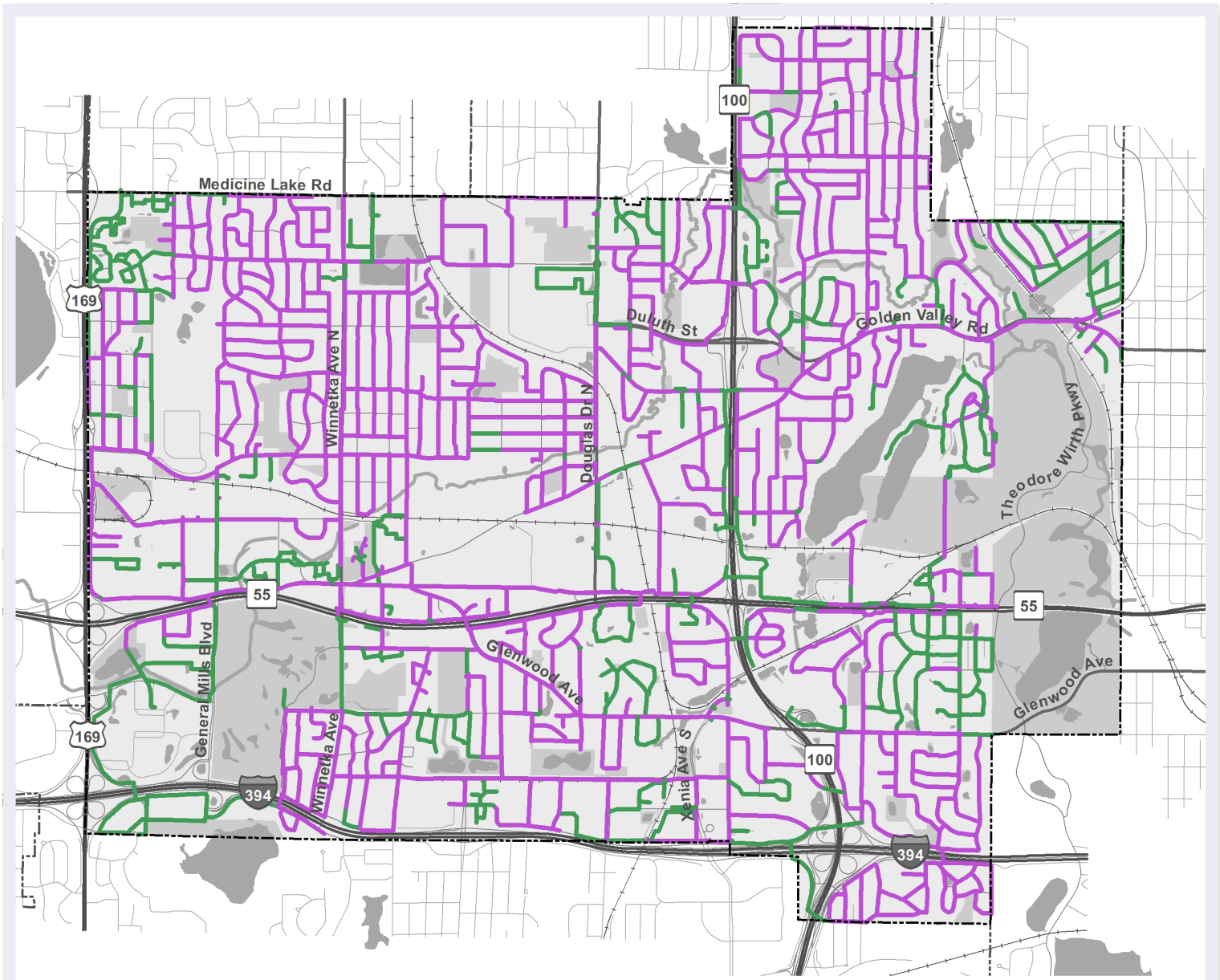

PHOTO BY CITY OF GOLDEN VALLEY

# Figure 5.4: Water Supply System By Ownership And Size




Sources: Hennepin County Surveyors Office for Property Lines (2017), City of Golden Valley for all other layers (2017).

# Figure 5.5: Water Supply System By Material




**Water Main by Material**

- CIP, PCCP, and LJP (generally over 50 years old)
- DIP, HDPE, and Cured Liner (generally under 50 years old)

0 0.25 0.5 1 Mile

Sources: Hennepin County Surveyors Office for Property Lines (2017), City of Golden Valley for all other layers (2017).

## Water Storage And Transmission

From the years of early settlement in Golden Valley, drinking water was supplied to the population via private wells on individual properties. Starting in the early 1960s, Golden Valley's drinking water has come from the Mississippi River and is treated and conveyed by the City of Minneapolis. Since the mid-1960s, Golden Valley has been a member of the Joint Water Commission (JWC), a partnership with the cities of Crystal and New Hope. The JWC jointly owns and operates the water system that stores and transmits potable drinking water throughout the three-city service area.

The JWC currently purchases Minneapolis potable water under a 20-year agreement signed in 2004, which replaced a previous agreement signed in 1963. As the supplier, Minneapolis must deliver treated water that meets federal Primary Drinking Water Standards.

Figures 5.4 and 5.5 show the City's water supply system in terms of location, size, material, and ownership. The JWC system consists of three elevated storage tanks (two in New Hope and one in Golden Valley) and five underground reservoirs (three in Crystal and two in Golden Valley). In addition, the JWC owns and maintains 16 miles of pipe that are 16-inch in diameter or larger, eight miles of which are located in Golden Valley. The JWC also owns three wells, which could be used in the event of an emergency to provide back-up drinking water.

In 2016, the JWC performed a study on all of the Prestressed Concrete Cylinder Pipe (PCCP) that makes up the JWC distribution system. The results showed the majority of the PCCP in the JWC system is in good condition in relation to its age. No part of the PCCP system is in need of immediate replacement. However, PCCP will still be proactively replaced on an opportunity basis as street projects allow.

The City owns and maintains the smaller (less than 16-inch diameter) water mains and faces a continuous need to reinvest in its water supply and distribution system. The major vulnerability is the age and condition of this underground infrastructure, as well as the water pipes coming into the City as part of the JWC system.

The majority of Golden Valley's water distribution system was installed in the late 1950s and early 1960s and consists of cast iron pipe, which is brittle and prone to breaking. Approximately 73 percent of the water system is nearing the end of its useful life, and less than 12.5 percent of the City's 128 miles of water main (smaller than 16-inch diameter) has been repaired or replaced. The average cost to repair or replace one mile of pipe is $1.4 mil-

PHOTO BY HENNEPIN COUNTY

*A 2014 break in the 36-inch JWC water main in Robbinsdale created a large sinkhole in a busy street and threatened the water supply for three communities.*

lion. Over the past 20 years, the City has seen an increase in the amount and cost of maintenance (pipe breaks, deterioration, sink holes).

Increased precipitation and freeze/thaw cycles have the potential to stress and damage infrastructure systems like pipes (stormwater, sanitary sewers, water), roads, and bridges. This may result in increased maintenance costs, structural damage to public infrastructure, damage to private properties, disruption of services, and inconveniences to residents.

The JWC and the City of Golden Valley must develop a comprehensive strategy for the repair and replacement of the water system. The challenge will be to balance repair with replacement, given that the majority of the pipes are reaching the end of their service life. Since it is not feasible to replace the majority of the water system at once, prioritizing replacement will be the leading challenge.

The City's IRP systematically identifies and prioritizes replacement and rehabilitation of the underground public utilities, including water main, storm sewer, sanitary sewer, and streets. The program will transition from the utility improvements made with the Pavement Management Program (PMP). The IRP breaks Golden Valley into 40 different areas to go through infrastructure rehabilitation or replacement in the first year and pavement rehabilitation in the second year. The City has recently adopted and will continue to develop IRP funding mechanisms, and it will use a systematic approach to prioritize replacement across Golden Valley in a cost-effective manner.

PHOTO BY CITY OF GOLDEN VALLEY

*Water main installation in Golden Valley*

### Water Consumption

The water supply system is designed to meet current and expected future water consumption of Golden Valley residents. Over the last 10 years, Golden Valley's population has been fairly consistent, and water demand has shown a slight decline (see Table 5.1). Reductions in water use during this time appear to be due to low flow fixtures, precipitation, and conservation. Historical annual water sales data is reported in three customer categories: residential, commercial and industrial (see Table 5.2). Over

## Table 5.1 Golden Valley Water Demand

| Year | Population | Water Service Connections | Total Water Sold (MG) | Average Day Water Demand (MGD) |
|---|---|---|---|---|
| 2007 | 20,900 | 7,059 | 1,040 | 2.84 |
| 2008 | 20,317 | 7,139 | 1,028 | 2.82 |
| 2009 | 20,508 | 7,150 | 1,006 | 2.76 |
| 2010 | 20,371 | 7,143 | 887 | 2.43 |
| 2011 | 20,595 | 7,144 | 934 | 2.56 |
| 2012 | 20,773 | 7,139 | 1,008 | 2.76 |
| 2013 | 20,845 | 7,141 | 918 | 2.52 |
| 2014 | 20,866 | 7,149 | 807 | 2.21 |
| 2015 | 21,571 | 7,148 | 787 | 2.16 |
| 2016 | 21,367 | 7,157 | 768 | 2.10 |

*MG: Million Gallons* *MGD: Million Gallons Per Day*

## Table 5.2 Golden Valley Water Sales

| Year | Residential (gallons) | Commercial (gallons) | Industrial (gallons) | Total |
|---|---|---|---|---|
| **2007** | 654,717,115 | 270,786,223 | 115,165,662 | **1,040,669,000** |
| **2008** | 627,803,000 | 310,768,000 | 89,363,000 | **1,027,934,000** |
| **2009** | 636,446,000 | 287,738,000 | 82,695,000 | **1,006,879,000** |
| **2010** | 547,476,000 | 267,388,000 | 73,016,000 | **887,880,000** |
| **2011** | 554,757,000 | 308,845,000 | 71,171,000 | **934,773,000** |
| **2012** | 632,683,000 | 298,408,000 | 78,479,000 | **1,009,570,000** |
| **2013** | 556,132,000 | 285,431,000 | 77,389,000 | **918,952,000** |
| **2014** | 516,707,000 | 216,239,000 | 74,741,000 | **807,687,000** |
| **2015** | 499,155,000 | 213,268,000 | 74,716,000 | **787,139,000** |
| **2016** | 486,605,000 | 210,336,000 | 71,776,000 | **768,717,000** |
| **Total Gallons Sold** | 5,712,481,115 **(62%)** | 2,669,207,223 **(29%)** | 808,511,662 **(9%)** | **9,190,200,000** |


PHOTO BY CITY OF GOLDEN VALLEY

*Rink flooding is one example of unmetered water use.*

the last 10 years, residential water consumption has averaged 62 percent of water sold.

The City is challenged with reducing the per capita water consumption in a manner that minimizes financial impacts and creates appropriate incentives for commercial and residential customers. One way is by promoting water-saving irrigation systems and sustainable landscaping.

Per capita water use is determined by dividing total daily water use (including residential, commercial, and industrial categories) by the total service area population and is expressed as gallons per capita per day (GPCPD). Total residential per capita water use has averaged 75 GPCPD over the last 10 years (see Table 5.3). Residential per capita water consumption is calculated by dividing the average residential daily water demand by the total population. For Golden Valley, this falls within the range normally expected for residential water use and is about average for the Twin Cities metropolitan area.

## Table 5.3: Golden Valley Per Capita Water Use

| Year | Population | Total Water Sold (MG) | Residential Gallons Sold | Residential GPCPD | Total GPCPD |
|---|---|---|---|---|---|
| 2007 | 20,900 | 1,040,669,000 | 654,717,115 | 85.8 | **136.4** |
| 2008 | 20,317 | 1,027,934,000 | 627,803,000 | 84.6 | **138.6** |
| 2009 | 20,508 | 1,006,879,000 | 636,446,000 | 85.0 | **134.5** |
| 2010 | 20,371 | 887,880,000 | 547,476,000 | 73.6 | **119.4** |
| 2011 | 20,595 | 934,773,000 | 554,757,000 | 73.8 | **124.4** |
| 2012 | 20,773 | 1,009,570,000 | 632,683,000 | 83.4 | **133.2** |
| 2013 | 20,845 | 918,952,000 | 556,132,000 | 73.1 | **120.8** |
| 2014 | 20,866 | 807,687,000 | 516,707,000 | 67.8 | **106.1** |
| 2015 | 21,571 | 787,139,000 | 499,155,000 | 63.4 | **100.0** |
| 2016 | 21,367 | 768,717,000 | 486,605,000 | 62.4 | **98.6** |
| | | | **Average** | **75.3** | **121.2** |

*GPCPD: Gallons Per Capita Per Day*

### Unmetered Water Use

As in all water systems, some of the water the JWC purchases from Minneapolis is never sold to water system customers. The difference between the water produced and the water sold is referred to as unmetered water. It can result from many factors, including unidentified leaks in the storage and distribution system, water main breaks, periodic fire hydrant flushing, fire-fighting and training, unmetered hockey rink flooding, municipal pool uses, storage tank maintenance, unauthorized use, unmetered services, and inaccurate meters.

Golden Valley's unmetered water use is estimated by comparing the average annual water purchased from the City of Minneapolis with the average annual metered consumption by Golden Valley customers. From 2012 to 2016, unmetered water use ranged from 9 to 12 percent of total water purchased. The JWC's goal is to maintain unmetered use at or below 9 percent of water purchased. Unmetered use below 10 percent is considered acceptable for normal system leakage, unbilled water uses, and meter inaccuracies.

Planned meter replacements and regular calibration,

## Table 5.4: Golden Valley Water Use Projections

| Year | Projected Population | Per Capita Residential Use (GPCPD) | Average Day Use (MG) | Maximum Day Use (MG) | Annual Water Use (MG) |
|---|---|---|---|---|---|
| **2020** | 24,800 | 102 | 2.53 | 5.06 | **923** |
| **2030** | 25,800 | 102 | 2.63 | 5.26 | **961** |
| **2040** | 26,700 | 102 | 2.72 | 5.45 | **994** |

*MG: Million Gallons GPCPD: Gallons Per Capita Per Day*

leak detection surveys, and maintenance programs will improve measurement of water use and help identify if there is a water loss problem. In 2012, the JWC purchased and installed new intake meters for the Golden Valley reservoirs. The JWC also works with the City of Minneapolis to calibrate water supply meters regularly. Future plans call for effluent meters at the Golden Valley reservoirs to more accurately measure water leaving the reservoir site and entering the distribution system.

### Future Water Consumption

Water use projections in Table 5.4 are based on the following assumptions:

- continued stable or slightly increasing population in accordance with the Metropolitan Council's projections
- a maximum day to average day water demand ratio of 2.0 (used for planning purposes)
- adequacy of the existing water supply for meeting projected water demands through 2017 and beyond

Reducing residential and commercial water consumption provides several benefits. It reduces reliance on vulnerable resources, it reduces the amount of water that must be purchased, and it directly reduces the cost of water service.

The City of Golden Valley and the JWC have established the water conservation objectives to limit:

- per capita residential demand to 70 GPCPD, which is the Twin Cities metro median
- peak daily demand to less than 2.0 times average daily demand
- total peak daily JWC purchases from Minneapolis to less than 11.4 million gallons per day (MGD)
- unaccounted-for water to less than 9 percent

Reducing excessive discretionary summer residential water demand is a primary objective. Residential demands comprise 62 percent of total water use. The JWC's 10-year goal will be to maintain residential per capita use at 70 GPCPD. Reducing excessive discretionary summer commercial water demand is also a primary objective, particularly water use related to commercial landscape irrigation. The JWC's goal is to reduce peak water demands through public education and other programs.

### Emergency Preparedness

In the event of a water emergency (eg, drought, flood, tornado, or contamination of the Mississippi River), the JWC and the City of Golden Valley have policies and procedures in place for continued water supply.

In 2014, the JWC installed three emergency wells that draw water from the Prairie du Chien/Jordan aquifer. Infrastructure is in place for a fourth well in Golden Valley if future needs warrant the addition. In the event of an interruption in the Minneapolis water supply, or in any distribution lines to the Crystal or Golden Valley reservoirs, the JWC would rely on the emergency wells, which provide flows that meet the average day demand.

Prior to 2014, the JWC could only rely on 31.5 million gallons of operating storage in the Crystal and Golden Valley reservoirs. There were two instances, one in 2013 and one in 2014 where service was interrupted due to a water main break on the 36-inch distribution line that runs through Robbinsdale to the Crystal reservoir. That water main has since been replaced, but as a result of the two large breaks and as part of that project, emergency procedures were fine-tuned to prepare for large disruptions to the system.

The JWC has also installed backup generators at the Crystal and Golden Valley pump houses to ensure power is available for the pumps to distribute water into the system in the event of a power outage. The emergency backup wells and interconnections with neighboring Cities greatly reduce the risk of a water shortage during an emergency situation.

PHOTO BY CITY OF GOLDEN VALLEY

*Reservoir pump house in Golden Valley*

# Wastewater

## Key Points

- The City will continue the Inflow and Infiltration (I/I) reduction program to meet population growth forecasts, maintain capacity in the sanitary sewer system, and prevent system overflows.
- The majority of Golden Valley's sanitary sewer was installed in the late 1950s and early 1960s and is reaching the end of its useful design life.
- Increased frequency in maintenance is required to better understand the system and prioritize for the IRP.
- The Hwy 55 Lift Station is currently located in the floodplain, which causes operational and environmental issues.
- Fats, oils, and grease (FOG) from restaurant operations can coagulate in the sanitary sewer system and clog pipes, causing maintenance problems and even sewer backups.

## System Conditions And Needs

Golden Valley's sanitary sewer collection system is part of the overall Minneapolis-St Paul regional wastewater collection and treatment system program, which is managed and operated by the Metropolitan Council Environmental Services (MCES). There are no public or private community wastewater treatment facilities in Golden Valley. The MCES is required by state and federal law to ensure all wastewater throughout the Twin Cities metropolitan area does not leave its interceptors and is properly treated before discharge to local receiving streams. Wastewater is treated at the MCES Metro Plant in St Paul.

MCES interceptors extend through Golden Valley east to west (Bassett Creek interceptor) and north to south (St Louis Park interceptor) to collect and transport a large portion of the city's wastewater. Golden Valley's average daily flow to the MCES system is approximately 2.35 million gallons per day (MGD). The local sanitary collection system is jointly owned by private properties and the City of Golden Valley. Wastewater is collected in more than 113 miles of City-owned sewer pipe ranging from 8 to 36 inches in diameter. Figures 5.6 and 5.7 illustrate the location, size, material, and ownership of pipes in the sanitary sewer system.

The following areas are identified as intercommunity flow connections between Golden Valley and neighboring communities. In the northeast portion of the city, Golden Valley has interconnections with Minneapolis and Robbinsdale, where approximately 227 Robbinsdale homes flow into Golden Valley's system and approximately 14 Golden Valley homes flow into Robbinsdale and 22 flow into Minneapolis. In northwest Golden Valley, there are several sewer interconnections with Crystal and New Hope. New Hope's sanitary system serves four Golden Valley properties and Crystal's serves one. Each City reimburses the neighboring community receiving flow for wastewater based on utility billing account information with the exception of Robbinsdale, where flow adjustments are made by the Metropolitan Council to both Golden Valley's and Robbinsdale's totals.

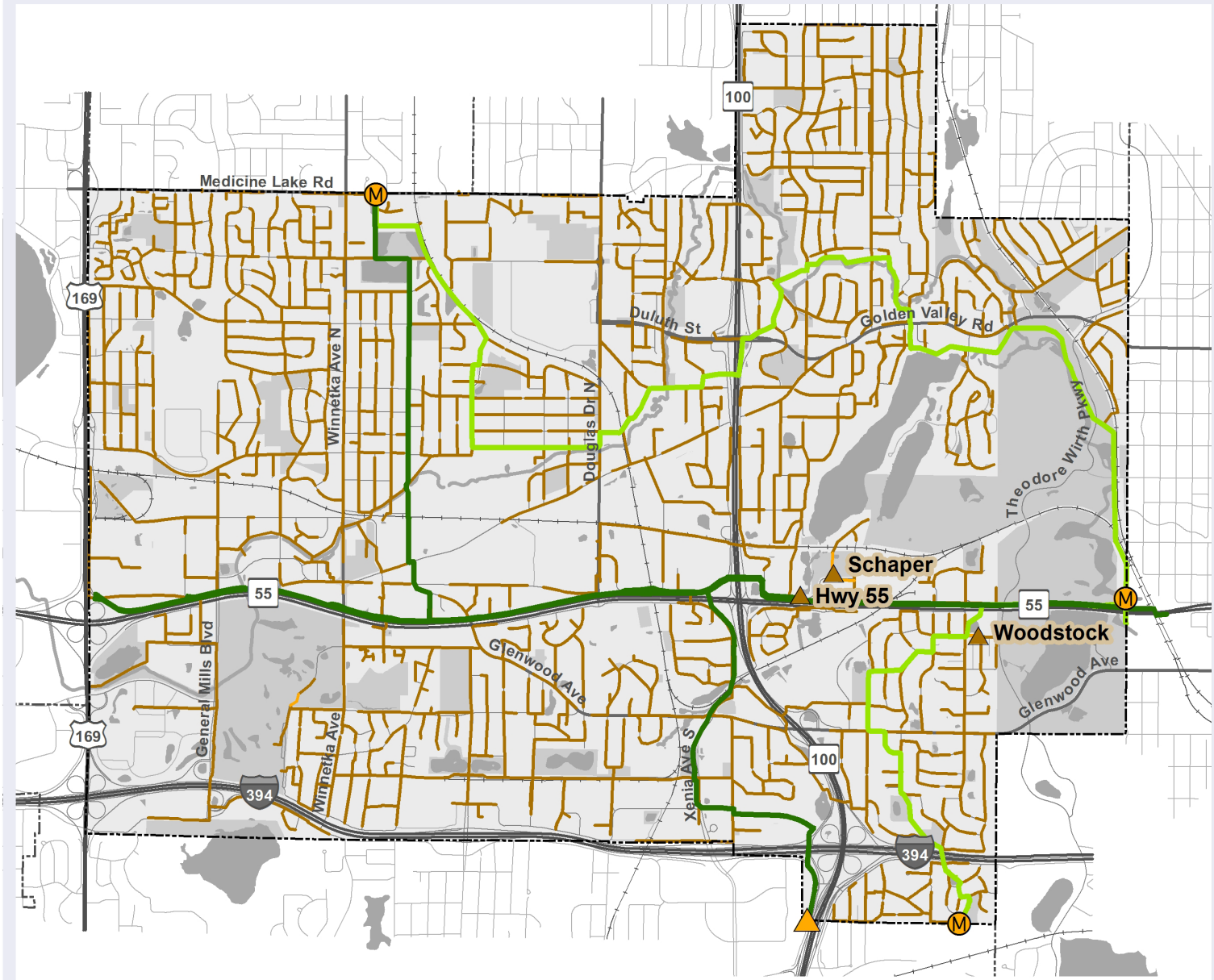
*Sanitary sewer main failure requires maintenance.*

PHOTO BY CITY OF GOLDEN VALLEY

Much of Golden Valley's wastewater system was installed before 1970 and is reaching the end of its typical useful life. More than 86 percent of the wastewater infrastructure is more than 50 years old, and more than half of that total is more than 60 years old (an inventory of pipe based on material and age of pipe is shown in Appendix 5C). Based on various studies, scans, flow monitoring, and emergency repairs, it is apparent the City's wastewater infrastructure needs repair and rehabilitation.

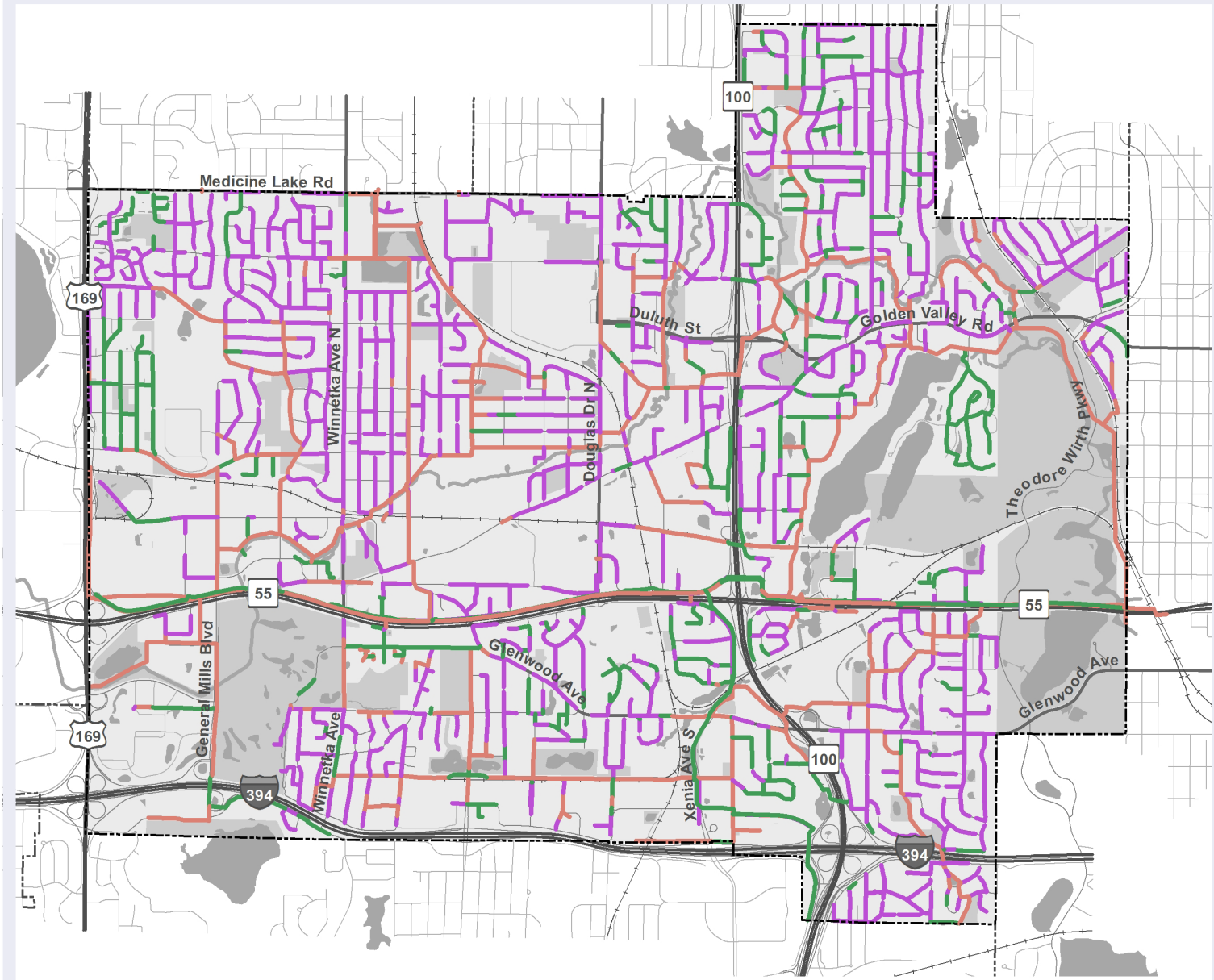
As the wastewater system ages, the pipes and structures crack and break, allowing groundwater to enter the system. Groundwater is clean water and does not need to be treated at a wastewater plant. This I/I takes precious wastewater flow space and results in extra fees to City utility users. Clear water from I/I entering the collection system reduces the overall service life of the existing infrastructure.

# Figure 5.6: Sanitary System By Ownership




Sources: Hennepin County Surveyors Office for Property Lines (2017), City of Golden Valley for all other layers (2017).

# Figure 5.7: Sanitary System By Material




**Sanitary Main by Material**

- VCP - Vitrified Clay Pipe (generally over 50 years old)
- RCP, CIP, ICP, LJP, and PCCP (generally over 50 years old)
- PVC, DIP, HDPE, and Cured Liner (generally under 50 years)

0 0.25 0.5 1 Mile

Sources: Hennepin County Surveyors Office for Property Lines (2017), City of Golden Valley for all other layers (2017).

## What is I/I?

Inflow and Infiltration (I/I) is the excess flow of clear water into the City's sanitary sewer system.

- **Inflow** is when clear water from illegal connections of sump pumps, downspouts, and foundation drains is channeled directly into sanitary sewer pipes.
- **Infiltration** is when groundwater seeps into sewer pipes via cracks or leaky joints.

Because the sanitary sewer system was not designed to handle this excess clear water, it becomes overloaded during times of high groundwater or heavy rainfall. This can cause basement flooding or bypassing of raw wastewater to local streams and lakes.

While the City has performed regular maintenance, including pipe lining and asset scanning for condition status, it's not enough to keep up with the aging system. For the wastewater system to continue to provide sufficient capacity to the community, there must be a dedicated push to repair and rehabilitate. A programmed lining project can increase the lifespan of older pipes as well as reduce the amount of I/I entering the wastewater system. Without continued maintenance and renewal, costs will increase due to emergency repairs, surcharge fees, and collapsing infrastructure resulting from cracks and breaks in the system. To maintain the integrity and function of the system, infrastructure renewal is required.

Golden Valley's wastewater system contains almost 70 miles of pipe classified as Vitrified Sewer Pipe (VSP) or Vitrified Clay Pipe (VCP). Aging VCP is commonly associated with I/I problems due to the number of pipe joints in the system, which adds to its susceptibility to root intrusion. The majority of VCP pipe was installed in Golden Valley before the mid-1970s.

The City has developed a successful rehabilitation program for its aging infrastructure using relining or pipe replacement techniques through sanitary sewer closed-circuit television inspection (CCTV) and evaluation of older sewer pipe in the public right-of-way, much of which is VCP sewer. However, significant portions of the City had streets reconstructed before implementation of this practice. Therefore, these areas have significant rehabilitation needs in the public and private systems that will be addressed with the IRP. When streets are reconstructed through the City's PMP, all utilities are reviewed. The PMP includes a voluntary program for sewer lateral inspections on private property.

The Hwy 55 Lift Station is one of three in Golden Valley. This crucial component of the wastewater system will be prioritized for evaluation and reconstruction because it's in the floodplain and, during large rain events, it must be protected with sand bags. If not reconstructed out of the floodplain, there could be a negative environmental impact should a flood event cause the station to backup or overflow. It is very visibly located near Sweeney Lake, Theodore Wirth Regional Park, and the Sweeney Lake branch of Bassett Creek. The City plans to address that as soon as financially possible. In the meantime, the City has installed a grinder pump in the station to reduce the issues caused by flushable wipes and other materials.

An estimated 147 miles of private service lines make up approximately 55 percent of the total sanitary sewer system, exceeding the City-owned sewer system by 35 miles. The portion of the system on private property is similar to the City's system. Nearly 80 percent of the residential housing stock in Golden Valley was constructed pre-1970s, and most have VCP sewer services. The voluntary sewer lateral inspection and repair program, as well as the City's mandatory point of sale program, address these issues on private property.

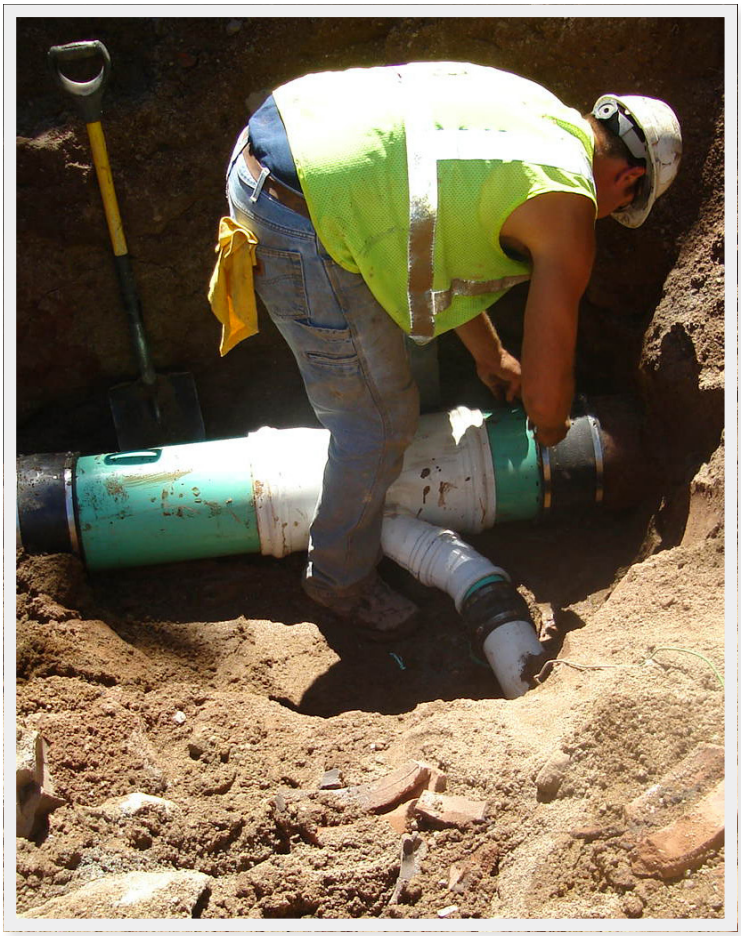


PHOTO BY CITY OF GOLDEN VALLEY

*A worker connects a sanitary sewer lateral pipe to the main pipe.*

## Managing Inflow And Infiltration

The City's goal is to reduce I/I to a manageable level to maintain and reserve wastewater capacity in Golden Valley for future development and reduce operation and maintenance costs each year. The City of Golden Valley, like many communities in the metropolitan area, has spent considerable time and energy managing I/I in its sanitary sewer collection system. Golden Valley's primary source of I/I is VCP, both on the private system and the public system. As these pipes age, they continue to contribute more and more I/I to the sewer system. Another common source of I/I in the private system is subsurface drainage systems in homes that are directly connected to the sanitary sewer system. The MCES surcharge program is designed to encourage communities to reduce inflow entering interceptors to preserve wastewater capacity for daily domestic dry weather demand flows.

Before 2003, the Golden Valley sanitary collection system had a history of measuring high peak wastewater flow rates during rainfall events. The MCES surcharge program identified peak wastewater flow rates above MCES allowances during rainfall events in September and October 2005. I/I flows can inundate sanitary sewer pipes, causing flows to peak at nearly eight times their normal rate. It is estimated that nearly half that amount is attributed to the public system, and the other half (or slightly more) to the private system. It can be estimated that 0.5 MGD of clear water flow is introduced to the wastewater system via I/I during peak events. Using the same public system to private system ratio above, about 0.2 MGD of clear water would be generated from the public system, and slightly more from the public system. Additional flow information can be found in Section 3 of Appendix 5C. After conducting further studies, the City committed to an I/I abatement program to manage and reduce its wastewater contributions to MCES interceptors.

Over the past 12 years, the City has taken an aggressive approach to reducing the impact of I/I on its collection system and has been successful in reducing peak wastewater flow discharges during rainfall events. The City implemented a private property inspection program that consists of two parts—a voluntary program through PMP and a mandatory program through property sales (point of sale). Of the 5,509 residential properties built before 1970, 58 percent have been inspected for I/I. Of those inspected, 85 percent are I/I compliant.

For example, on a typical dry weather day the City would record only 3 MGD on average. In 2003, before the City began its point of sale inspection program, MCES's permanent flow meters recorded peak wastewater flow rates exceeding 19 MGD. In 2014, a similar event with high levels of spring precipitation recorded less than half the peak wastewater flow rate at the same MCES flow meter location.

PHOTO BY CITY OF GOLDEN VALLEY

*The City's I/I reduction program includes voluntary private sewer inspections.*

In addition to these efforts, the City implemented a sewer lining project along Laurel Ave to reduce potential I/I and maintain pipe capacity along the I-394 corridor. The City has also been successful in locating and repairing illegal connections to the wastewater conveyance system, such as foundation drains or basement sumps discharging to the sanitary sewer. Estimated costs for both public and private improvements to the sanitary sewer system can be found in Section 5.1 of Appendix 5C. The City will remain committed to I/I reduction as it makes the transition to the IRP.

## Future Demands

The City is committed to providing adequate capacity in the wastewater system to ensure overflows do not occur. Future development may require the City to evaluate the need for its main collection pipes to be upsized. Due to increased growth and changes in development, certain stretches of wastewater piping may be found to be undersized, which can cause backups in high flow events and result in costly repairs to individual residents, businesses, and the City.

To determine if future development will affect pipe capacity, the City used a hydraulic flow simulation model. Future wastewater flow was projected by adjusting properties in the model to account for increases or decreases in overall wastewater flow rates due to the anticipated change in land use through 2040. Results indicate the system will be capable of conveying average daily flows (ADFs) without any capacity issues. However, there are a few areas along the Hwy 55 and I-394 corridors to monitor and assess as development proposals are received.

## Table 5.5: Sanitary Sewer Collection System Local Trunk Sewer Line Capacity

| Location | MCES Interceptor | MCES Unique MH ID No. | Golden Valley Pipe Size (inches) | Pipe Identifer | 2040 Design Flow (MGD) | Total Capacity (MGD) |
|---|---|---|---|---|---|---|
| Natchez Ave S at Roanoke Rd | 1-GV-461 | 40145 | 24 | 614-591 | 1.320 | 5.908 |
| Golden Valley Rd just east of Bassett Creek Drive | 1-GV-460 | 30485 | 12 | 474-25 | 1.173 | 1.163 |
| East of Major Dr just south of Heathbrooke Circle | 1-GV-460 | N/A (1) | 16 | 2559-114A | 0.751 | 3.408 |
| Regent Ave N just south of Bassett Creek Dr | 1-GV-460 | 30340 | 12 | 48-47 | 0.245 | 1.095 |
| St Croix Ave N at Constance Dr E | 1-GV-460 | 30210 | 15 | 752-679 | 0.109 | 6.287 |
| Plymouth Ave N at Louisiana Ave N | 1-GV-460 | 30120 | 24 | 696-695 | 0.185 | 10.882 |

*MGD: Million Gallons Per Day* *(1) No MH identified between MCES MH ID 30425 and 30430*

## Table 5.6: Existing and Future Design And Capacity Flows For MCES Interceptor Facilities

| MCES Interceptor Facility | Existing Conditions Design (MGD) | Existing Conditions Capacity (MGD) | Future Conditions Design (MGD) | Future Conditions Capacity (MGD) | 2040 Estimates Households | 2040 Estimates Employment |
|---|---|---|---|---|---|---|
| 1-GV-461 | 3.77 | 14.33 | 9.85 | 14.33 | 7,841 | 20,147 |
| 1-GV-460 | 2.38 | 10.95 | 6.29 | 10.95 | 3,959 | 16,853 |
| | | | | | **11,800** | **37,000** |

*MGD: Million Gallons Per Day*

Although the City's aggressive I/I reduction efforts have reduced capacity issues in the sanitary sewer system, I/I still exists. Continued work in this area will improve life in Golden Valley by maintaining water quality with the reduction of wastewater overflows and backups, lowering wastewater costs to utility customers, and improving the local economy by promoting future growth and development.

Above are existing and future design and capacity flows for both MCES interceptor facilities as well as local Golden Valley trunk lines at connections points to larger MCES infrastructure (see Tables 5.5 and 5.6).

### Restaurant Fats, Oils, And Grease

Restaurant grease has also become an issue in some segments of the wastewater system, and maintenance activities have already been increased in known problem areas. Golden Valley cleans the problem areas in the spring and fall and spot checks and flushes problematic manholes on a weekly and monthly schedule. With increased development in certain areas of Golden Valley, restaurant grease has been a growing problem, requiring more time and attention from City maintenance staff. There have been some efforts to modify ordinances and policies regarding the installation, maintenance, and inspection of grease traps. In 2015, the City adopted an ordinance requiring all Food Service Facilities (FSFs) that produce fats, oils, and grease to install grease collection devices. This should be monitored and promoted to reduce the amount of grease in the wastewater system.

### Operations And Maintenance

The operations and maintenance plan serves as a guide to operate, monitor, maintain, and rehabilitate the City's sanitary sewer system. To reduce claims against the City, comply with local and regional standards, and reduce costs, the City plans to:

- rehabilitate system components
- implement programs to periodically evaluate system conditions
- develop or expand maintenance programs to be more proactive

- establish policies and ordinances to protect its sewer infrastructure
- continually assess it equipment and staffing needs


PHOTO BY CITY OF GOLDEN VALLEY

*Sanitary sewer jetting*

Over the years, increased infrastructure has warranted additional City staff and equipment. To manage maintenance in the system, Golden Valley is divided into three sewer service districts. Each year the City aggressively inspects and/or cleans one third of the system (about 40 miles of sewer) as well as areas needing emergency cleaning. City crews use highly pressurized water to "jet clean" sewer pipes and televising equipment to inspect sewers as they are cleaned to help ensure all debris has been removed.

A significant portion of City time and budget is used in areas of the system constructed of VCP. This is a result of root intrusion, cracked and broken pipe, poor joints and poor seals between pipes. It is not unique to Golden Valley and is typical of VCP throughout the metro area. Many communities have lined or replaced VCP sewer to eliminate the high maintenance needs often associated with them. Golden Valley has undertaken projects to line VCP sewers through the PMP and other sewer rehabilitation projects, but to reduce time and budget, a more aggressive lining program will be considered with the IRP.

Currently, City utility staff levels seem appropriate for the existing maintenance schedule. However, it will be challenging to accomplish the goals outlined through 2040, in addition to regular maintenance duties, at these levels.

Proper monitoring and maintenance of the system is an important factor in long-term viability. Maintenance extends the life of the system and decreases the likelihood of sewer backups, which often lead to property damage claims against the City. This results in increased costs to pay claims and associated increases in insurance premiums. The League of Minnesota Cities Insurance Trust (LMCIT) provides insurance coverage for claims resulting from sewer backups and other problems related to the City's utility services. LMCIT also provides no-fault insurance for private sewer connection to owners whose sewers cause damage to the City's municipal system. LMCIT has noted increased claims in specific areas of sewer systems throughout the state, with VCP sewers having higher than normal claims. Because of the high percentage of VCP pipe comprising Golden Valley's system, those portions should be more closely evaluated for replacement or lining to negate the concerns of root intrusion and to continue the maintenance schedule suggested by LMCIT.

The City's IRP will create a program for total system cleaning, televising, and rehabilitation to ensure the system lasts and to reduce potential expenses from collapsed/broken sewers or other backups that result from deferred maintenance. The televising program will establish a "baseline" database for all sewers in the system. The televising records, currently stored separately, will be digitally attached to the City's GIS system as an additional tool for maintenance and engineering personnel.

An increase in inspections and maintenance of existing sewer lines will be critical as the City moves towards implementation of the IRP. The inspection and maintenance information will be used to help prioritize areas of concern that will require immediate replacement.

PHOTO BY CITY OF GOLDEN VALLEY

# Section 4: Policy Plan

The Policy Plan includes a set of long-term goals and objectives that will be fulfilled through specific actions and policy decisions. This long-range document expresses the values of the community and establishes a vision. It provides direction and guidance for the future of the City in terms of policymaking, improvements, programs, investments, priorities, and work plans. It can be used for decision-making purposes by elected officials, commissions, boards, staff, and other interested members of the community. The Policy Plan is updated every 10 years based on new data and community feedback as required by Minnesota law.

Creating a comprehensive plan in today's uncertain and rapidly evolving world requires preparing for a new climate and weather reality, advancing technologies, and shifting social structures. Golden Valley has already taken several steps to improve its water resources and has identified the importance of building on its previous efforts to become more resilient.

While the City strives to meet its water resource goals and incorporate volume control and green infrastructure practices, it has identified several limitations and restrictions that must be considered, including:

- clay soils and compressible organic soils
- high groundwater table
- presence of contaminated or debris-impacted soils
- location of industrial facilities and vehicle fueling
- inflow and infiltration of clear water into sanitary sewer system

Although these barriers may limit the number and location of green infrastructure projects and strategies, the City will continue to look for opportunities to implement these important water resource practices.


## Sustain And Improve Water Quality

*The quality of water resources is vital to the health, safety, and prosperity of current and future members of the community.*

### Objectives

1. Sustain a healthy drinking water supply
   - 1.1 Continue to purchase water from the City of Minneapolis in partnership with the JWC, which has provided a safe and reliable source of drinking water for several decades
   - 1.2 Implement BMPs to protect groundwater quality
2. Improve quality of surface water
   - 2.1 Achieve BCMWC and MPCA water quality standards in city lakes and streams to preserve beneficial uses
   - 2.2 Achieve pollutant load reductions as required by the state or watershed management organizations
   - 2.3 Minimize hydrologic alterations to Bassett Creek
   - 2.4 Minimize erosion and sedimentation to protect the city's water resources
   - 2.5 Implement soil protection and sedimentation controls whenever necessary to maintain public health, safety, and welfare
3. Improve quality and reduce quantity of stormwater runoff
   - 3.1 Minimize pollutant loading from stormwater runoff through non-point source reduction and treatment
   - 3.2 Minimize the rate and volume of stormwater runoff entering Bassett Creek
   - 3.3 Comply with all applicable stormwater regulations established by the federal government, the State of Minnesota, Hennepin County, the BCWMC, the MCWD, and the Metropolitan Council


## Maintain And Rehabilitate Infrastructure

*Infrastructure renewal must be addressed to maintain the integrity and function of essential services for future generations.*

### Objectives

1. Conduct proactive maintenance and rehabilitation on critical services to improve functionality and effectiveness
   - 1.1 Develop or expand programs to ensure proactive maintenance of the sewer system
   - 1.2 Continually evaluate the condition of infrastructure and system performance
   - 1.3 Continue to reduce the inflow and infiltration of clear water into sanitary sewer system
   - 1.4 Continue to explore and incorporate new and emerging technologies to construct, rehabilitate, maintain, and manage public assets and infrastructure in an efficient, cost effective manner
2. Ensure that new infrastructure is built to be resilient
   - 2.1 Integrate multi-benefit green infrastructure into public capital projects
   - 2.2 Consider emerging climate patterns when designing stormwater infrastructure
   - 2.3 Design infrastructure to minimize environmental and public health impacts
   - 2.4 Develop strategies to fund infrastructure renewal
   - 2.5 Include life cycle costs (eg, operations and maintenance, resource consumption, disposal) when planning projects and selecting construction materials

GOAL 3

## Protect And Enhance Aquatic Resources

*Aquatic resources and their ecological benefits are an integral part of the environment.*

### Objectives

1. Preserve and enhance the quantity and quality of wetlands
   - 1.1 Develop wetland performance standards
   - 1.2 Continue to require wetland delineation with development proposals, and require developers to maximize buffer zones around wetlands where possible
   - 1.3 Continue to develop wetland banking credits as opportunities arise
   - 1.4 Coordinate with other agencies, as necessary, that are also involved in the protection of wetlands
2. Protect and restore natural areas, including fish and wildlife habitats
   - 2.1 Support the goals and policies of the City's Natural Resources Management Plan and reference this plan when reviewing development proposals
   - 2.2 Use an adaptive management approach to protection, preservation, and enhancement of natural areas
   - 2.3 Increase the amount of native vegetation cover, including pollinator habitat
3. Maintain and enhance the integrity and ecological function of shoreland areas
   - 3.1 Continue to enforce shoreland zoning regulations
   - 3.2 Support the voluntary development and maintenance of buffers of native and naturally existing shoreline vegetation on private property
   - 3.3 Encourage landowners to protect non-disturbed shoreland areas and restore disturbed shorelines and streambanks on private property to their natural state where feasible

GOAL 4

## Reduce The Risk And Impact Of Floods

*It is imperative that flood risk be reduced to protect lives, homes, businesses, and infrastructure from flood damage.*

### Objectives

1. Minimize the risk of flooding along Bassett Creek, its tributaries, and other flood-prone areas
   - 1.1 Manage development and redevelopment throughout the watershed to minimize the risk of flooding
   - 1.2 Maintain and repair the Flood Control Project system
   - 1.3 Regulate stormwater runoff discharges and volumes to minimize flood risk, flood damages, and the future costs of stormwater management systems
   - 1.4 Identify and implement additional projects to reduce flood risk along the Bassett Creek trunk system
   - 1.5 Conduct flood proofing on homes remaining in the floodplain as feasible
   - 1.6 Allow only those land uses in the BCWMC-established floodplain that will not be damaged by floodwaters or increase flooding
   - 1.7 Discourage development where the sole access to the site is through the established 100-year floodplain

GOAL 5

## Ensure Systems Capacity Meets Future Needs

*In order to provide essential services for future generations, the City must plan for changes and needs in the future.*

### Objectives

1. Research future needs of the community and assess the condition of all critical services to determine capacity deficiencies
   - 1.1 Ensure land use decisions reflect the opportunities and limitations of existing or planned infrastructure
   - 1.2 Use future growth forecasts in population, households, and employment to ensure adequate system capacity
   - 1.3 Work with the JWC to construct emergency wells if deemed necessary to meet community needs

PHOTO BY CITY OF GOLDEN VALLEY

GOAL 6

## Balance Water Usage And Conservation

*The City must reduce water consumption in a manner that minimizes financial impact.*

### Objectives

1. Reduce water consumption in the community
   - 1.1 Limit per capita residential demand for water
   - 1.2 Limit peak daily demand for water and total peak daily purchases of water from Minneapolis
   - 1.3 Limit unaccounted-for water in the system
   - 1.4 Manage active and ongoing water meter replacement repair and testing programs
   - 1.5 Avoid unnecessary water consumption associated with excessive hydrant flushing
   - 1.6 Maintain an active water conservation public education program
   - 1.7 Consider new water pricing schemes that could reduce water consumption

GOAL 7

## Involve And Educate The Public In Water Resource Management

*It is important the community is enabled with knowledge and tools to improve the environment.*

### Objectives

1. Increase public awareness of individual property owner's impacts on water quality
   - **1.1** Maintain the Golden Valley Environmental Commission to raise awareness about environmental responsibility, and create a sense of collaboration in the spirit of making and keeping Golden Valley an environmentally healthy city
   - **1.2** Use demonstration projects as a means of educating the public about water resource issues and opportunities
   - **1.3** Assist other agencies in the development and distribution of educational materials
2. Build community capacity to implement stormwater best management practices at a local level
   - **2.1** Use volunteer groups to the greatest extent possible for public service projects
   - **2.2** Maintain a public education program to develop and distribute educational materials about stormwater issues through a variety of media
   - **2.3** Perform outreach activities that inform the community about the impacts of stormwater discharges on water bodies and best practices to promote watershed health
   - **2.4** Work with other agencies to develop an education program for schools in the city

PHOTO BY CITY OF GOLDEN VALLEY

# Section 5: Implementation Plan

The Implementation Plan includes a set of specific actions to accomplish the goals and objectives set forth in the Policy Plan. It differs from the Policy Plan in that it provides the opportunity to easily measure progress and note tangible outcomes from each task. Each task provides an approximate cost estimate for the work and notes a time frame in which the specific action should take place. Tasks are prioritized based on financial feasibility, staff capacity, importance or urgency for action, and other factors. The Implementation Plan is updated every five years (mid-cycle of the 10-year Policy Plan) based on progress and new opportunities.

GOAL 1

## Sustain And Improve Water Quality

*The quality of water resources is vital to the health, safety, and prosperity of current and future members of the community.*

### Implementation Actions:

- **Support water quality monitoring efforts** performed by other agencies and organizations.
- **Cooperate with neighboring cities regarding wellhead protection programs and activities.**
- **Share groundwater elevation data with the BCWMC** when available.
- **Continue requiring infiltration practices be implemented** in accordance with federal, state, and watershed guidelines.
- **Implement improvement projects identified in the BCWMC's capital improvement program** based on feasibility, prioritization, and available funding.
- **Prioritize projects that are most effective at achieving water quality goals,** including non-structural BMPs and education.
- **Implement BMPs that reduce phosphorus loading to receiving water within the MCWD** by 2 lbs per year and report progress to the MCWD.

PHOTO BY CITY OF GOLDEN VALLEY

GOAL 2

## Maintain And Rehabilitate Infrastructure

*Infrastructure renewal must be addressed to maintain the integrity and function of essential services for future generations.*

### Implementation Actions:

- **Transition to the Infrastructure Renewal Program (IRP)** and establish districts in the city for implementation of maintenance, preservation, and rehabilitation projects.
- **Provide long-term and sustainable funding for rehabilitation and maintenance** staff, equipment, and related resources to allow restoration and improvement of aged or worn infrastructure.
- **Address infrastructure funding in the City's legislative priorities** to encourage the state legislature to provide stable, long-term funding for capital improvements and maintenance.
- **Continue to reduce the inflow and infiltration of clear water into the sanitary sewer system** through a variety of programs and redevelopment opportunities.
- **Research ways emerging technologies can reduce life cycle costs** in water system construction, rehabilitation, maintenance, and management.

GOAL 3

## Protect And Enhance Aquatic Resources

*Aquatic resources and their ecological benefits are an integral part of the environment.*

### Implementation Actions:

- **Update shoreland management zoning regulations** to be consistent with state requirements.
- **Implement the Stormwater Management Plan and Natural Resource Management Plan.** Monitor progress, report on success, and ensure the implementation plan is adaptive, flexible, and adequately funded.
- **Develop wetland performance standards** and wetland banking credits as opportunities arise.
- **Require developers to maximize buffer zones around wetlands where possible.**
- **Increase the amount of native vegetation buffers that include pollinator habitat.**
- **Encourage landowners to protect non-disturbed shoreland areas** and restore disturbed shorelines and streambanks on private property to their natural state where feasible.

GOAL 4

## Reduce The Risk And Impact Of Floods

*It is imperative that flood risk be reduce to protect lives, homes, businesses, and infrastructures from flood damage.*

### Implementation Actions:

- **Evaluate known and potential flood issues** and pursue opportunities to minimize flood risk through capital improvement projects, structural flood proofing, and/or voluntary acquisition of at-risk structures.
- **Continue to implement floodplain management zoning regulations** and maintain consistency with BCWMC and MCWD floodplain management policies.
- **Design new municipal stormwater facilities based on Atlas 14 precipitation data,** conveying no less than the 10-year, 24-hour rainfall event (ie, the event with a 10 percent chance of occurring in any year).
- **Perform routine inspection, maintenance, and repair of BCWMC Flood Control Project (FCP) features** located in the city and formally notify the BCWMC of any maintenance and repair action on any FCP feature.
- **Implement damage reduction and flood-proofing projects.**
- **Obtain property land dedication and easements** for stormwater ponds and drainage systems with new development to provide permanent protection.

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GOAL 5

## Ensure Systems Capacity Meets Future Needs

*To provide essential services for future generations, the City must plan for changes and needs in the future.*

### Implementation Actions:

- **Continue to incorporate infrastructure considerations with land use decisions.**
- **Monitor accuracy of growth forecasts** to determine whether population growth could exceed infrastructure capacity in the future.
- **Work with the JWC to monitor water supply needs.** It may become necessary to construct emergency in Golden Valley in the future in order to meet community needs.


PHOTO BY CITY OF GOLDEN VALLEY

GOAL 6

## Balance Water Usage And Conservation

*The City must reduce water consumption in a manner that minimizes financial impact.*

### Implementation Actions:

- **Continue the meter maintenance program** to continue improving billing accuracy and efficiency and to track water losses.
- **Monitor unmetered water use** by annually reviewing water billings, and compare with Minneapolis metered water delivery volumes.
- **Maintain a program of water reduction measures for emergencies,** including voluntary and mandatory requirements.
- **Research options for tiered water pricing to reduce water demand,** including possible implementation of seasonal rates or surcharges that increase the cost for excess water use during the summer peak usage season.
- **Adopt an ordinance governing installation and operation of commercial landscape irrigation systems.** Include minimum design standards, a link between system design approval to overall development approvals, and a focus on reducing peak summer demands, water waste, and overall landscape water consumption
- **Educate and inform the public about water conservation,** including how to sprinkle lawns more efficiently to reduce peak water demand in the summer.


## Involve And Educate The Public In Water Resource Management

*It is important that the community is enabled with knowledge and tools to improve the environment.*

### Implementation Actions:

- **Develop a volunteer program** by working with community leaders from every neighborhood, and help groups conduct localized public outreach and education, encourage volunteerism, and coordinate within their neighborhoods.
- **Develop education materials about stormwater management techniques,** particularly reducing the use of chemicals that have potentially negative impacts on natural resources and human health.
- **Cooperate with efforts of other agencies that educate the public** regarding the importance of implementing BMPs to protect groundwater quality and quantity.

# Summary Of Implementation Actions

| Strategy | Estimated Cost | Time Frame |
|---|---|---|
| **Sustain And Improve Water Quality** | | |
| Support water quality monitoring efforts | $ | Ongoing |
| Cooperate with neighboring cities regarding wellhead protection programs and activities | $ | Ongoing |
| Share groundwater elevation data with the BCWMC | $ | Ongoing |
| Continue requiring stormwater runoff infiltration practices be implemented | $ | Ongoing |
| Prioritize projects that are most effective at achieving water quality goals | $$ | Ongoing |
| Implement improvement projects identified in the BCWMC's capital improvement program | $$$ | Ongoing |
| Implement BMPs that reduce phosphorus loading to receiving water within the MCWD | $$$ | Ongoing |
| **Maintain And Rehabilitate Infrastructure** | | |
| Transition to the Infrastructure Renewal Program (IRP) | $$$ | 0–5 years |
| Provide long-term and sustainable funding for rehabilitation and maintenance | $$$ | Ongoing |
| Address infrastructure funding in the City's legislative priorities | $ | 0–5 years |
| Continue to reduce the inflow and infiltration of clear water into sanitary sewer system | $$$ | Ongoing |
| Research ways that emerging technologies can reduce life cycle costs | $ | 0–5 years |
| **Protect And Enhance Aquatic Resources** | | |
| Update shoreland management zoning regulations | $ | 0–5 years |
| Implement Stormwater Management Plan and Natural Resource Management Plan | $$$ | 0–5 years |
| Develop wetland performance standards | $ | 0–5 years |
| Increase the amount of native vegetation buffers that include pollinator habitat | $$ | 0–5 years |
| Encourage landowners to protect non-disturbed shoreland areas | $ | 0–5 years |
| **Reduce The Risk And Impact Of Floods** | | |
| Evaluate known and potential flood issues | $ | Ongoing |
| Continue to implement floodplain management zoning regulations | $ | Ongoing |
| Design new municipal stormwater facilities based on Atlas 14 precipitation data | $ | Ongoing |
| Perform routine inspection, maintenance, and repair of BCWMC Flood Control Project (FCP) features | $$$ | Ongoing |
| Implement damage reduction and flood-proofing projects | $$$ | Ongoing |
| Obtain land dedication and easements for flood storage | $ | Ongoing |
| **Ensure Systems Capacity Meets Future Needs** | | |
| Continue to incorporate infrastructure considerations with land use decisions | $ | Ongoing |
| Monitor accuracy of growth forecasts | $ | Ongoing |
| Work with the JWC to monitor water supply needs | $ | Ongoing |
| **Balance Water Usage And Conservation** | | |
| Continue the meter maintenance program | $$$ | Ongoing |
| Monitor unmetered water use | $$ | Ongoing |
| Maintain a program of water reduction measures for emergencies | $ | Ongoing |
| Research options for tiered water pricing to reduce water demand | $ | 5–10 years |
| Adopt an ordinance governing installation and operation of commercial landscape irrigation systems | $ | 5–10 years |
| Enact an education program to inform public about water conservation | $ | 0–5 years |
| **Involve And Educate The Public In Water Resource Management** | | |
| Implement a volunteer program | $ | 0–5 years |
| Develop education materials about stormwater management techniques | $ | 0–5 years |
| Cooperate with efforts of the other agencies that educate the general public | $ | Ongoing |