

Chapter 8

Wastewater

- ♦ Introduction
- ♦ System Inventory and Analysis
- ♦ System Needs
- ♦ Operation and Maintenance Plan
- ♦ Capital Improvement Plan

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photo by City staff



Section 1: Introduction

The Metropolitan Council forecasts that by 2030, Golden Valley's population of 20,281 people (2000 United States Census) will increase to approximately 24,000 people (see Land Use Plan in Chapter 3, page 2-3). As a community changes, so does its infrastructure needs. This chapter of Golden Valley's Comprehensive Plan provides the technical documentation to support the City's long-range planning efforts for its sanitary sewer collection system.

Sanitary Sewer System

Golden Valley's sanitary sewage is collected in more than 113 miles of City-owned and -maintained sewer pipe ranging in size from eight to 24 inches in diameter. Three sewage lift stations serve small isolated areas (Figure 8.1).

To evaluate the collection system, this study divided the City into sanitary sewer flow meter districts. The boundaries of the districts are correlated with those defined in the Inflow/Infiltration Study completed in 2005 (see Appendix 8-A). Figure 8.1 shows the City's overall sanitary sewer system, including the sanitary sewer flow meter districts.

Wastewater is treated at the Metropolitan Council Environmental Services' (MCES) Metro Plant in St Paul. MCES collection interceptors extend through Golden Valley east to west (MCES Bassett Creek interceptor) and north to south (MCES

St Louis Park interceptor) to collect and transport a large portion of the City wastewater. Golden Valley's average flow to the MCES system is approximately 3.22 million gallons per day (MGD). Based on MCES projections, Golden Valley will convey an estimated average flow of 3.46 MGD at full capacity in 2030.

Existing Sanitary Sewer Network

Presently, Golden Valley's sanitary sewer collection system appears to have the capacity to handle wastewater flow. However, the system is aging. Portions of the system were installed more than 50 years ago, and more than ¾ of the City's system is more than 47 years old. As the system ages, more maintenance is necessary to help ensure proper operation of the gravity sewers and pumping stations. Deteriorating lift stations and poorly maintained gravity systems are the single biggest cause of sewer claims against a city.

In previous Comprehensive Plan updates, the City indicated there were three Individual Sewage Treatment Systems (ISTS) in Golden Valley. The City currently has no record of any ISTSs within city limits, indicating that all local systems have been connected to the sanitary sewer network.

MCES Facilities

Golden Valley is served by eight miles of gravity interceptors (owned and maintained by MCES) within the city (see Figure 8.2).

The primary MCES forcemain interceptor No. 7027-1 transects the center of Golden Valley and travels along Hwy 55. It transports pumped wastewater from Crystal, Plymouth, and New Hope through Golden Valley, and it discharges east of Meter 117 in Minneapolis, which MCES uses to calculate Golden Valley flows.

When wastewater from Plymouth enters the forcemain, it is metered by MCES Meter 118. When it enters the forcemain from Crystal and New Hope, it is metered by MCES Meter 114.

The MCES maintains two gravity interceptors that collect flows within Golden Valley. Interceptor No. 1-GV-460 enters Golden Valley near the MCES forcemain located near the City's northern boundary with New Hope and Crystal and travels south and southeast to the east side of Golden Valley. The GV-460 line then trends south and its flows pass through MCES Meter 117 on the east side of Golden Valley at it borders with Minneapolis.

The other MCES gravity interceptor (No. 1-GV-461) enters Golden Valley from the City's southern border with St Louis Park. This interceptor collects flows from the south side of Golden Valley and connects with MCES interceptor No.1-GV-460 just north of Wirth Pond. Wastewater entering the interceptor from the St Louis Park line is metered by MCES Meter 120.

Figure 8.2 shows MCES-owned interceptors and flow meters in Golden Valley. The MCES uses flow meters 117 and 120 to measure the City's flow (see formula below).

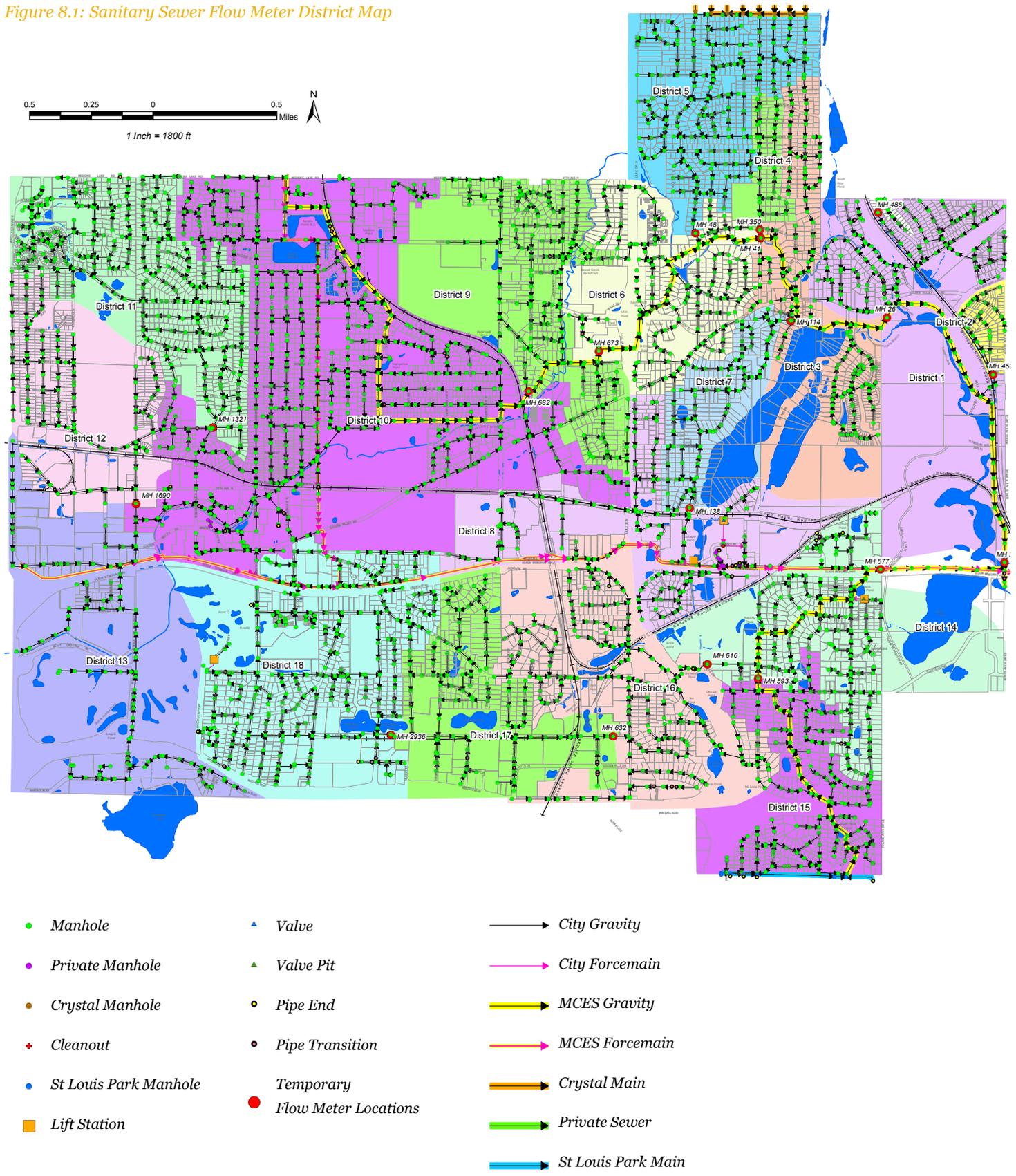
$$\text{Golden Valley Wastewater Flow} = \text{MCES Meter M117 (City of Minneapolis)} - \text{MCES Meter M120 (City of St Louis Park)}$$

Figure 8.3 depicts the City's sewer system that flows to the MCES interceptor shown in Figure 8.2.

A number of small connections from neighboring communities also contribute wastewater flow to the Golden Valley sanitary sewer collection system. These small, unmetered flows enter Golden Valley from Minneapolis at the northeast boundary and from New Hope at three locations along the northern boundary. In addition, Robbinsdale contributes wastewater flow from a number of residential homes on the northeast side of the City.

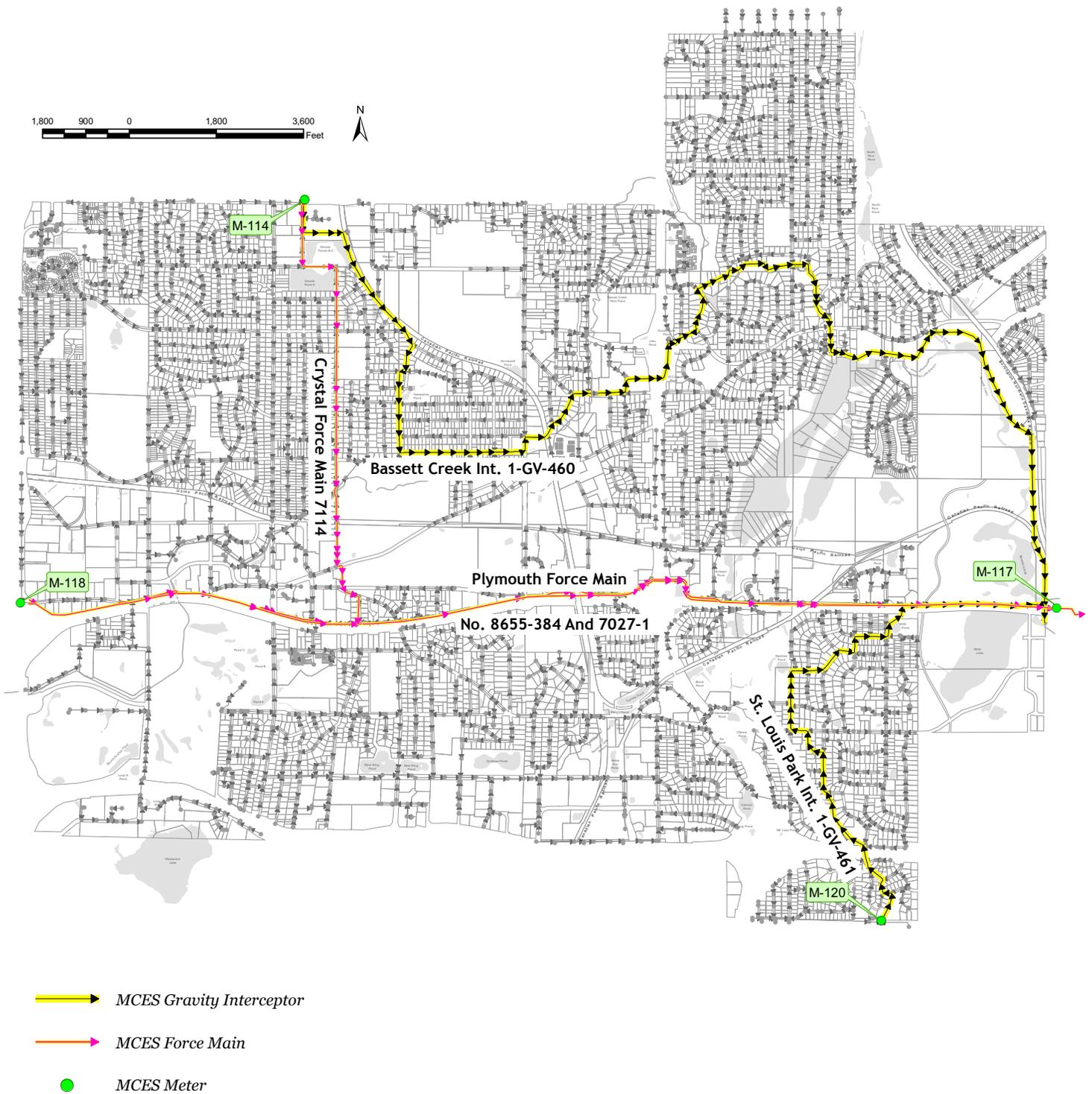
MCES staff installs temporary flow meter equipment at regular intervals to monitor flow and determine the volume of wastewater flow that needs to be subtracted from the City of Golden Valley's annual sewer charges and added to the City of Robbinsdale's charges. Quarterly wastewater flow adjustments total approximately 3.21 million gallons. This volume was found to be consistent with the totals recorded from the temporary flow monitoring completed during the 2005 Inflow and Infiltration Study, which was completed by the City to address the MCES surcharge. 

Figure 8.1: Sanitary Sewer Flow Meter District Map



Date: November 9, 2007
 Sources: SEH, Hennepin County Surveyors Office for Property Lines (2006), City of Golden Valley for all other layers

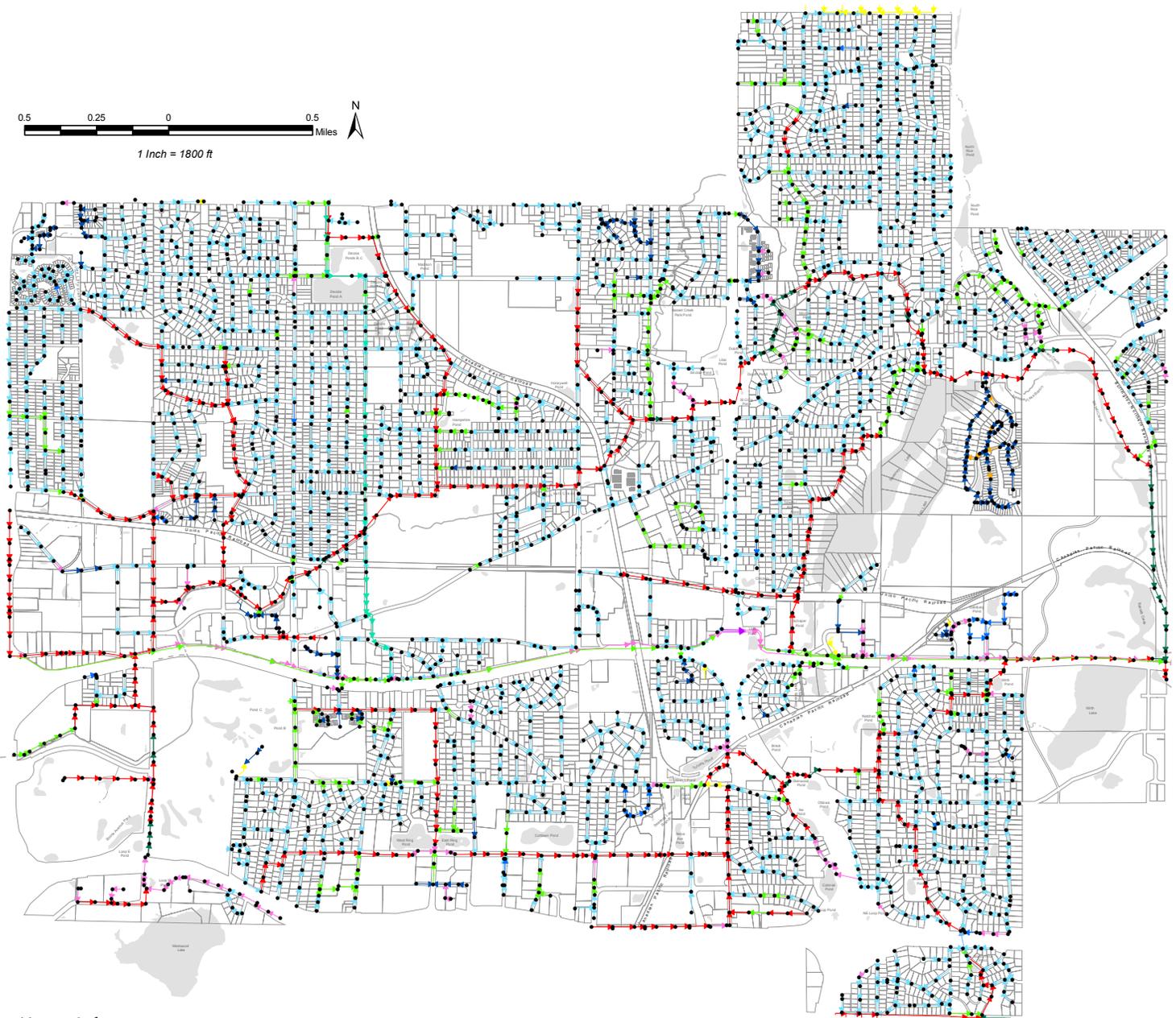
Figure 8.2: Existing MCES Interceptor Map



Date: December 10, 2007

Sources: SEH, MnDOT, Hennepin County Surveyors Office for Property Lines (2006), City of Golden Valley for all other layers

Figure 8.3: Existing Sanitary Sewer Network Map



Material

- | | |
|--|--|
|  CIP (Cast Iron Pipe) |  PVC (Polyvinyl-Chloride) |
|  DIP (Ductile Iron Pipe) |  PVC/DIP |
|  HDPE (High-Density Polyethylene) |  RCP (Reinforced Concrete Pipe) |
|  ICP (Inner Circle Pipe) |  VCP (Vitrified Clay Pipe) |
|  LJP (Lock Joint Pipe) |  VSP (Vitrified Soil Pipe) |
|  PCCP (Pre-stressed Concrete Cylinder Pipe) |  Unknown |

Date: November 9, 2007

Sources: SEH, Hennepin County Surveyors Office for Property Lines (2006), City of Golden Valley for all other layers



photo by City staff

Section 2: System Inventory and Analysis

Golden Valley's sanitary sewer system collection system currently appears to have the capacity to handle wastewater flow. However, the system is aging. Portions were installed more than 50 years ago, with more than 80 percent of the system installed before 1966. An evaluation of the existing sewer system, including pipes, manholes, and lift stations, provided the City and the MCES with information for future planning.

Pipe

Golden Valley's existing gravity sewer system has more than 113 miles of pipe ranging in size from 8 to 24 inches in diameter. The system contains almost 80 miles of pipe classified as vitrified clay pipe (VCP). Aging VCP is commonly associated with inflow and infiltration (I/I) problems due to the number of pipe joints in the system. The number of joints also adds to its susceptibility to root intrusion. The majority of VCP pipe in Golden Valley was installed before the mid-1970s. Appendix 8-B shows an inventory of pipe based on material and age of pipe. Figure 8.3 shows a map of the materials used in each pipe section.

Golden Valley's Pavement Management Program (PMP) includes a review of all utilities during the process of updating the City's streets. The City inspects the sanitary sewer collec-

tion system in the public right-of-way using closed-circuit television inspection (CCTV). It also evaluates older sewer pipe in the public right-of-way, much of which is VCP, and does voluntary sewer lateral inspections on private property. These inspection methods have helped the City develop a successful rehabilitation program for its aging infrastructure using relining or pipe replacement techniques.

Golden Valley’s sanitary sewer collection system includes an estimated 147 miles of private service lines, which exceeds the public service lines by 35 miles. As in the public sewer mains, a significant number of these private sanitary sewer laterals use VCP materials and have the potential to experience similar maintenance problems and contribute to I/I. Thus, the City adopted two methods to address these issues on private property: a voluntary sewer lateral inspection and repair program as part of the PMP and a mandatory point of sale inspection program.

Lift Stations

On September 20, 2007, the City hired Short. Elliot, Hendrickson (SEH), an engineering consulting firm, to inspect each of the City’s three lift stations (Schaper, Hwy 55, and Woodstock). The inspection included a review of the flow capacity, physical condition,



photo by City staff

Inside the Hwy 55 Lift Station

and electrical components of each lift station.

The inspections were conducted to identify deficiencies at each station and establish a priority for improvements. Inspection results are reported in Appendix 8-C.

During the inspections, SEH analyzed each station and recommended improvements of varying degrees for all lift stations that should be included in future planning (see Appendix 8-D). Proposed improvements are divided into the following six categories: hydraulic capacity, pumping capacity, physical condition, electrical issues, instrumentation/control, and potential for sewer back-up.

Hydraulic Capacity

Adequate hydraulic capacity is determined by compliance with the Minnesota Pollution Control Agency’s capacity requirements as published in the Ten States Standards, which are recommended standards for wastewater facilities established by the Great Lakes-Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers. The information of primary importance is the detention time in the individual station’s wet well and each pump’s average number of starts per hour of operations.

Lift station wet well capacities are presented in Table 8.1, and detention times at each lift station are presented in Table 8.2.

Table 8.1: Lift Station Capacities

Station Name	W/W Flow			Firm Pump Capacity	Pump Starts Per Total Run Period (max. April '07)	Wet Well Volume	Wet Well DT	Ten States Standards Req. (30 min. max.)
	Ave. Daily ¹	Max. Daily ¹	Peak Hourly ¹					
	(MGD)	(MGD)	(MGD)	(MGD)	(day)	(gal)	(min)	(min)
Schaper	0.006	0.01	0.02	0.05	43	658	18	30
Hwy 55	0.039	0.054	0.114	0.504	344	3226	9	30
Woodstock	0.011	0.015	0.027	0.216	71	1305	7	30

¹ Flows obtained from InfoSWMM hydraulic model

Table 8.2: Lift Station Detention Time Calculations

Station	Wet Well					Sewer Line					Total Detention Time
	Ave. Max. Daily Flow Rate	Depth	Surface Area	Floor to Influent Sewer Invert	Volume	Detention Time	Surface Area	Length	Volume	Detention Time	
	(MGD)	(ft)	(ft ²)	(ft)	(gal)	(hr)	(ft ²)	(ft)	(gal)	(hr)	(hr)
Schaper	0.009	11.00	12.57	5.60	493.00	1.31	12.6/196 ¹	240	627/8,210 ¹	1.7/21.9 ¹	24.9
Hwy 55	0.054	15.50	75.00	11.75	3226.00	1.43	0.555	107	436	0.19	1.6
Woodstock	0.015	15.20	28.27	10.14	1305.00	2.09	0.349	25	65	0.1	2.2

¹ Adjacent emergency storage vault with valve that must be opened manually for maximum storage and detention time

Pumping Capacity

Pump review evaluates a pump's capacity, age, maintenance record, and amperage draw.

Pump capacity is determined by whether the station is able to pump the peak hourly flow with the largest pump out of service. The lift station's ability to reliably handle the range of average daily flow rates to peak flow rates is also considered in the sewer system hydraulic model (see page 8-12).

Pumps are typically designed to operate for 15 years. Pumps older than 15 years are subject to failure due to age.

During a maintenance review, City staff summarizes the amount of maintenance required on each pump.

Amperage draw is a comparison of the measured draw to theoretical draw required for the particular motor.

Physical Condition

A station's physical condition is a subjective analysis by SEH based on visual observation of the concrete, steel components, hatches, steps, piping, valves, access into the station, and overall cleanliness of the structure. Evaluation includes the valve vault and the wet and dry wells.

Evaluation of the dry well also addresses the steel access tube and/or concrete chamber and the ladder. Steps into wet wells are considered unacceptable because they can become rusty and can't be retrofitted with fall restraints.

Electrical Issues

The electrical review evaluates the:

- ♦ adequacy of the electrical service to each station
- ♦ adequacy of standby power
- ♦ condition and accessibility of the pump control panel

The electrical condition of the pumps was reviewed by observing their amperage draw and the physical condition of the station's electrical components.

Adequacy of electrical service considers the number of power outages and whether operating the pumps causes dimming of lights in neighborhood.

For accessibility, an unacceptable rating (rating of five) is given to any station that requires an operator to enter a below-ground structure to operate the pumps.

Instrumentation/Control/SCADA

For this parameter, each station was reviewed against the following criteria:

- ♦ whether the station has alarms for station high and low levels and whether the station alarms are being transmitted to the central control facility

Table 8.3: Lift Station Electrical Review

Lift Station	Voltage/Phase	Type of Control	Pump Controller	Inrush Current						
				Pump 1			Pump 2			
				Back-up Controller	Phase A	Phase B	Phase C	Phase A	Phase B	Phase C
Schaper	230/1	Floats	Systems Control Technology	N	5.7 A	—	—	13.2 A	—	—
Hwy 55	230/3	Floats	Automatic Pump Control	N	22 A	22 A	20.5 A	19 A	17.5 A	18 A
Woodstock	230/1	Floats	TLC Controls Inc.	N	20.5	—	—	25 A	—	—

- ♦ whether back-up pump controllers exist
- ♦ whether SCADA transmits to the central control station

Electrical data collected during the lift station inspection is presented in Table 8.3.

Potential for Sewer Back-up

Evaluating the potential for sewer back-ups includes:

- ♦ reviewing the history of problems at the station
- ♦ whether the stations contain stand-by power capability (either a generator or a receptacle for plugging to a standby generator)
- ♦ whether the wet well and influent sewer contain adequate storage capacity to allow the sewer utility staff time to connect an emergency generator before wastewater would back-up into houses in the event of a power outage. A one-hour retention time is considered adequate; a retention time of less than one-half hour is unsatisfactory.

Suitability of Location

The suitability of the station location reviews the station’s accessibility and aesthetics, addressing:

- ♦ each station’s service area, maintenance accessibility, aesthetics, visibility, and proximity to adjacent homes

- ♦ potential for damage by the public (a consideration of whether the station is susceptible to being struck by an automobile or to vandalism)
- ♦ position within right-of-ways, easements, or City-owned property, which is particularly significant when stations need improvements

While accessibility from a public street is considered very important, private driveways to the stations are deemed important to allow operation and maintenance staff to function without being threatened by passing traffic.

Since it is assumed that a lift station detracts from value or desirability of an adjacent home, it’s important that aesthetic treatment at the lift station mitigates this detriment.

Acceptability Ratings

The detailed review of all criteria for each of the three stations is outlined in Table 8.4 and detailed in Appendix 8-D.

Safety

Safety issues affect both the permanent constructed facility and operational procedures. Facility items address the presence of ladders, fall protection devices, safety harnesses, safety grating, railings, the need to access subsurface structures during operation, and whether service vehicles and operating personnel can remain

off the public streets during maintenance activities.

The operational procedures the City employs do not necessarily require construction of permanent facilities, but they may include use of portable equipment.

Hydraulic Modeling Process For Sewer System Analysis

To provide the City of Golden Valley and the MCES with existing and future planning information, SEH used a hydraulic flow simulation model (MWH Soft InfoSWMM) to evaluate the existing sewer system. This model routes sewer flows through the developed sewer structure of pipes, manholes, and lift stations and calculates various hydraulic parameters during normal flow, surcharge, backflow, flooding, and pumping conditions.

To configure the model, SEH compiled the City’s existing GIS sewer structure data, as-built information from the sewer construction plan sheets, lift station information, and lift station inspections into a GIS database. The model was then used to evaluate current and future sewer capacities and required system improvements.

For the purpose of the analysis, SEH divided Golden Valley into sanitary sewer flow meter districts (see Figure

Table 8.4: Lift Station Acceptability Rating

Station Name	Hydraulic Capacity	Safety	Potential Back-up	Pump	Station Condition		Electrical	Instrumentation/Control	Location	Total	Ave. Acceptability Points	Points Ranking
					Wet Well	Valve Well						
Schaper	1	3	1	1	1	3	2	5	3	20	2.22	2
Hwy 55	1	3	1	2	1	1	2	4	2	17	1.89	1
Woodstock	1	3	1	2	1	3	1	4	2	18	2.00	3

Acceptability Rating of 1 to 5 (1 = Excellent, 2 = Better than average, 3 = Average, 4 = Below Average, 5 = Unacceptable)

8.1). Analysts assigned a percentage of water record flows to manholes located closest to the respective water record addresses considered likely to receive those flows. To develop the base wastewater flow rates for each property, SEH used existing Golden Valley water sales for the winter and spring quarters of 2007 together with sewer flow rates for major users. Quarterly water records for the dry weather winter months were then calibrated with data from temporary and permanent flow meters installed throughout the Golden Valley sewer network. Using wastewater meter flow data records from the MCES and the data collected during the 2005 I/I Study, analysts assigned each property an additional rate of infiltration to match the average daily flows recorded by the MCES permanent flow meter stations. These average daily flows are used to estab-

lish allowable peak hourly discharge rates for the City.

To determine future wastewater flow projections, properties were adjusted in the model to account for increases or decreases in overall wastewater flow rates due to anticipated changes in land use over the next 20 years. Figure 8.4 presents the location of various parcels identified in the City's Land Use Plan for redevelopment by 2030. The changes were used to adjust sewer flows in future model flow scenarios. Flow rate determinations are discussed on page 8-16.

To calibrate the model, analysts used flows measured by the individual temporary meters installed for the 2005 I/I Study (see Appendix 8-A), together with flows into and out of Golden Valley measured by permanent MCES meters. The basis for the flow meter district discharge points was the

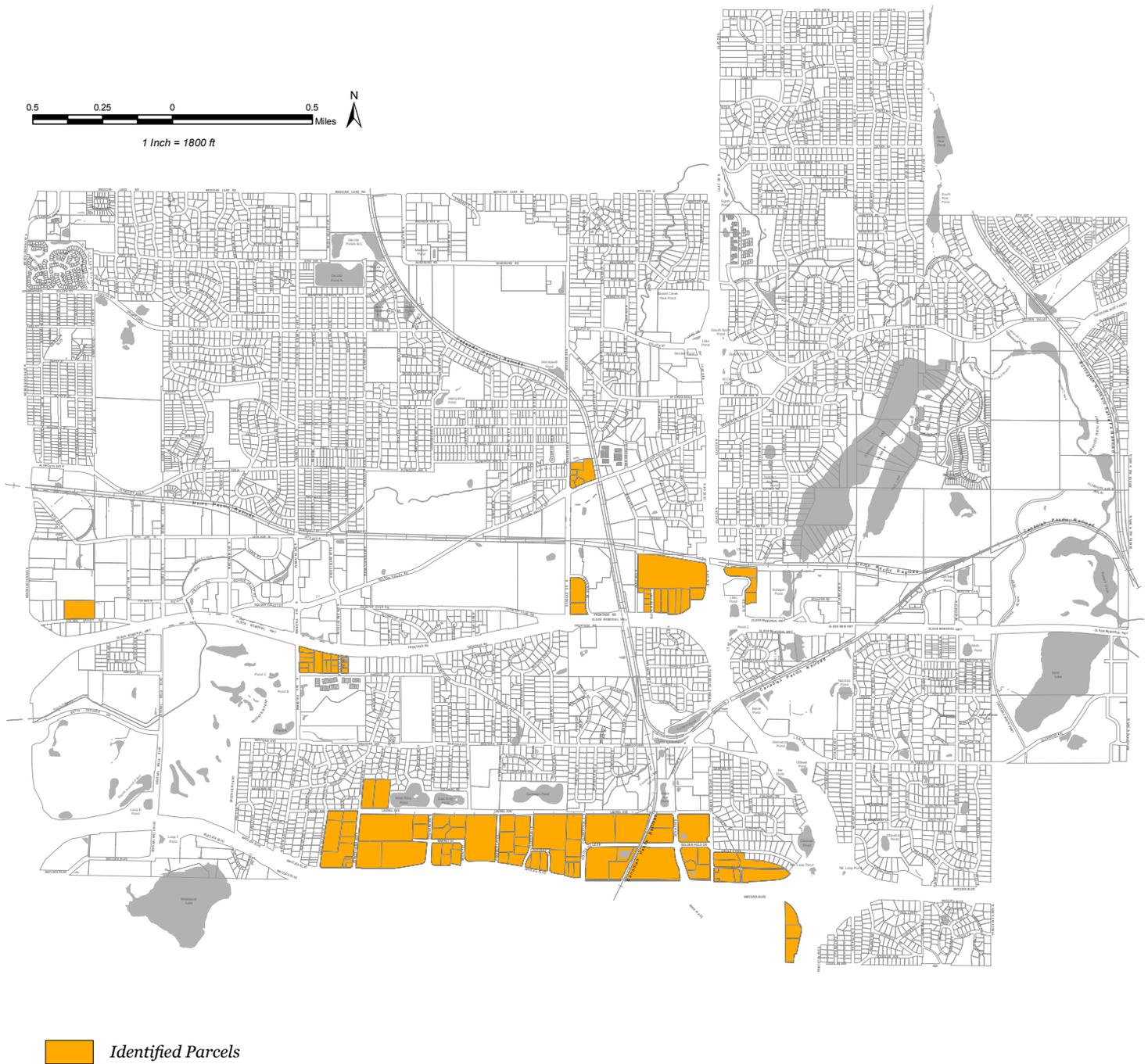
wastewater flow data from the original 19 portable flow meters used during the I/I Study and installed throughout the City (see Figure 8.1 for locations of these temporary meters). A number of days recorded during the flow monitoring period of the I/I Study produced flow volumes similar to the three-year Average Daily Flow (ADF) of 3.22 MGD recorded by the MCES. One of these rain events was used to calibrate the model to average daily flows.

Analysis Results

The results of the InfoSWMM model indicate that the system should be capable of conveying ADFs without any capacity issues. Figure 8.5 represents pipe capacities for the ADF flows. The hydraulic condition of the sewer system under future flow conditions is discussed in the following section.



Figure 8.4: Land Use For Potential Redevelopment



Date: November 21, 2008

Sources: SEH, MnDOT, Hennepin County Surveyors Office for Property Lines (2006), City of Golden Valley for all other layers

Figure 8.5: Sanitary Sewer Modeling Results—Average Daily Flow



Date: November 9, 2007

Sources: SEH, Hennepin County Surveyors Office for Property Lines (2006), City of Golden Valley for all other layers



photo by City staff

Section 3: System Needs

Over the next 20 years, Golden Valley’s population is projected to increase 0.3 percent per year, reaching its fully developed capacity of 24,000 by 2030 (see Table 8.5). To assess future sanitary sewer system capacities and needs, Golden Valley’s system was evaluated using the peak hourly flow rate allowed by the MCES, a storm event that resulted in surcharge assessments against the City, and anticipated flow rates through 2030. The additional flows produced as a result of redevelopment were added to existing peak flows.

Table 8.5: Population and Household Trends

Year	Population ¹	Households ¹	Employment ¹
2010	22,700	9,000	31,650
2020	23,000	9,200	33,100
2030	24,000	9,600	34,500

¹ From Metropolitan Council

Sanitary Sewer Design Criteria

The information in this chapter of the Comprehensive Plan is based on the ultimate land uses anticipated to occur at full development (see the Land Use Map in Chapter 3 and the Sanitary Sewer Flow Meter District Map in Figure 8.1).



Wet well at the Schaper Lift Station

Flow Rates

To determine anticipated wastewater flows from the various flow meter districts, SEH applied flow rates based on current winter quarter water use in each area. Actual metered water use was adjusted to calibrate the flow to MCES metered wastewater flow from Golden Valley. For areas where future redevelopment is anticipated (see Figure 8.4), flows were assigned based on the City's current land use plan and preliminary development plans.

Residential Flow Rates

Based on the Metropolitan Council's projection of 9,000 residential units in 2010, water records used for this study revealed an average water use of 220 gallons per residential unit. The MCES metered wastewater flow from Golden Valley averages 3.22 MGD, which is approximately 360 gallons per residential unit, or 142 gallons per resident per day (based on a projected population of 22,700 in 2010). This does not account for commercial, industrial, or institutional property flows.

The metered wastewater flow is greater than the water sales, which is typical among metro area communities.

MCES staff believes this is primarily due to the difference in accuracy between individual home water meters and MCES wastewater meters. It can also be explained by the amount of additional clear water that could be entering the sanitary sewer system through inflow and infiltration (I/I).

To project future flow, undeveloped areas slated for residential land use were assigned flows based on preliminary plats on the property or anticipated densities based on the proposed land use and re-development patterns in the area. Future flows were calculated based on an industry standard of 275 gallons per day per residential unit, which MCES uses for planning purposes. This is a suitable conservative estimate of flow from residential properties.

Non-Residential Flow Rates

Generally, Golden Valley's non-residential land is occupied by commercial and industrial users that do not contribute disproportionately to the sewer system in comparison to residential users. For major users, the City separates sewer flows from non-sewered water use. The separated in-

formation for industries was used for this study.

To project flow in undeveloped areas where future land use is shown to be commercial or industrial, the City used an industry standard of 2,000 Gallons per Acre per Day (GAD). It used a standard of 250 GAD for parks and open spaces and 1,000 GAD for institutional, commercial, and office space.

Peak Flow Factors

The sanitary sewer system must be capable of handling anticipated peak flows. Peak flow rates can be expressed as a variable ratio applied to the average flow rates. This variable ratio, called the peak flow factor, generally decreases with increasing average flow rates. For peak flow factors applied in this study, see the Peak Flow Factor Chart in Figure 8.6. These MCES values are generally conservative and widely used for planning in the metropolitan area. Golden Valley's average flow is 3.22 MGD and the correlated peak flow factor is 2.6.

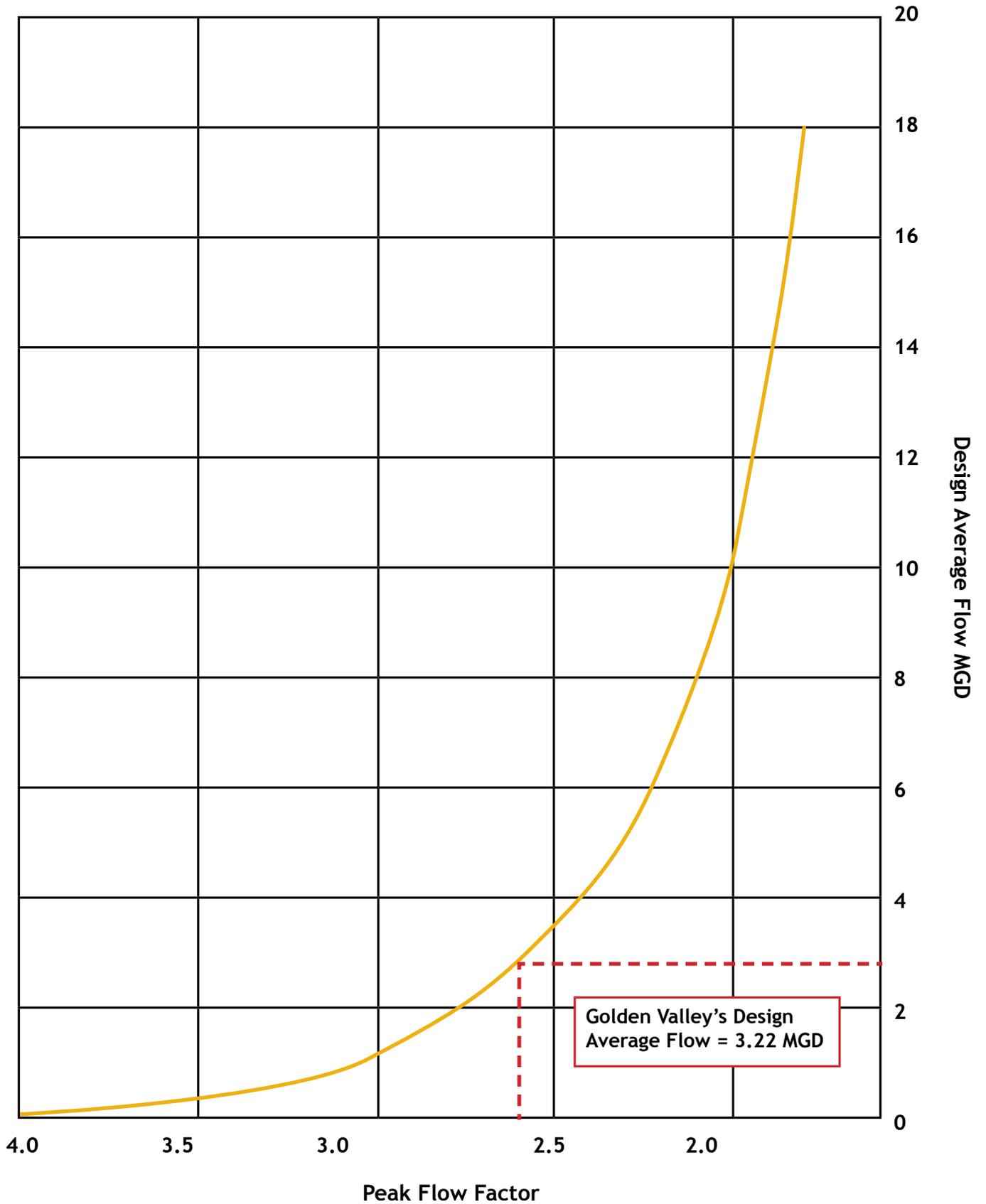
Design Flows

The sewer design flows were developed using current water use data and future flows based on land use projections. As measured by MCES, Golden Valley's current average daily flow is 3.22 MGD, which was matched in the model by adjusting flows from each sanitary sewer flow meter district discussed in Section 2.

To determine ultimate flow rates in 2030, anticipated flows from undeveloped areas were added to respective sanitary sewer flow meter district flows based on land use and associated flow rates used for planning purposes. The result is an average flow of 3.46 MGD for the City under fully developed conditions in 2030. Table 8.6 presents

photo by City staff

Figure 8.6: Peak Flow Factors



**Table 8.6: Flows Originating in Golden Valley
Average Daily Flows (MGD) by Golden Valley Collection Interceptors**

	2010	2015	2020	2025	2030
1-GV-460 (New Hope, Crystal)	2.166	2.169	2.171	2.179	2.188
1-GV-461 (St Louis Park)	1.054	1.079	1.104	1.188	1.272

the anticipated average daily flows for each MCES interceptor through the 20-year planning cycle.

Future System Needs

Future sewer system capacities and needs were evaluated using the peak hourly flow rate allowed by the MCES, a storm event that resulted in surcharge assessments against the City, and anticipated flow rates from through 2030. Additional flows produced as a result of redevelopment were added to existing peak flows.

Peak Hourly Flow Rates

Peaking factors were assigned to individual flow meter districts and cumulative flows to determine the anticipated peak flows in lateral and trunk facilities. Peak flows were compared to existing pipe capacity to determine if the existing system is suitable for conveying future flows.

The MCES allowable peak hourly flow rate for Golden Valley is 8.38 MGD (see Figure 8.7 for an illustration of pipe capacities at this rate). Golden Valley’s sewer system is capable of transporting these flows. For example, the MCES St Louis Park interceptor (1-GV-461) reaches flow capacities greater than 90 percent, and two relatively short reaches of the Bassett Creek interceptor show pipe capacities greater than 80 percent.

These flow conditions do not take into account additional flows from anticipated development within the St Louis Park sanitary sewer collection system.

Based on model results, it appears that if development occurs as planned just south and west of the Hwy 100 and I-394 intersection, the additional sewer discharges may overload the St Louis Park interceptor within Golden Valley. The model also assumed the sewer lines are in perfectly maintained condition, which many times is not the case.

Storm Event Surcharge

An October 4, 2005 storm produced flows of 13.81 MGD from Golden Valley. The wastewater flows measured from each flow meter district, together with MCES permanent meter data, were used to calibrate the model to flows that resulted in a MCES surcharge assessment against the City (Figure 8.8 shows the capacity of the system under these flow conditions). The system shows higher hydraulic stress than the allowable peak hourly flow illustration, particularly within the MCES Bassett Creek and St Louis Park interceptors.

Along one section of the MCES St Louis Park interceptor (intersection of Westwood Dr and Wayzata Blvd), the surcharge, or water level, simulated in the model rises to within less than one foot of overflowing from manholes. Peak flow during rainfall events or debris in the sanitary sewer collection system could reduce the capacity of the pipe, potentially causing sewer overflows from the system. Based on the model results, the existing sanitary sewer collection system has the capacity to handle planned develop-

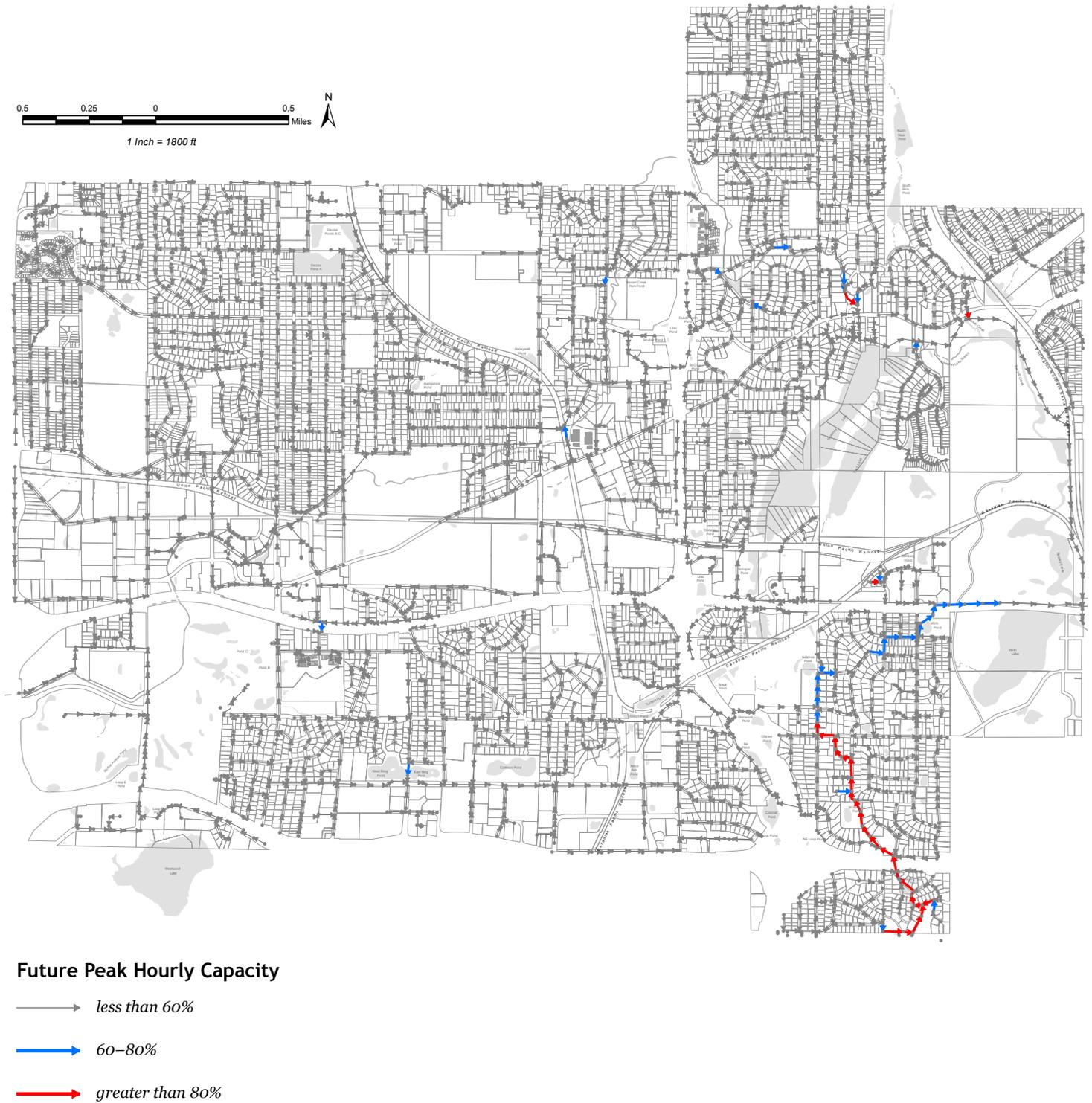
ment, assuming peak flow rates during rainfall events stay within MCES standard allowable limits for both communities (see Figure 8.2). In the late 1990s, the City of Golden Valley observed an event which caused the MCES interceptor pipe to surcharge out of its system in the same area near Strawberry Pond.

The MCES Bassett Creek interceptor capacities show an increase over the allowable peak hour flows and under this historic rainfall event. Flow conditions greater than 80 percent incorporated more of the sewer during the October 2005 event. Sewers in the far northeast corner of the city and along the Bassett Creek interceptor are under surcharge conditions.

The historic rainfall event also placed stress on Golden Valley’s publicly-owned sewer system, with pipe capacities in some locations at greater than 60 percent (see Figure 8.8). One of these locations includes the sewer along the intersection of Laurel Ave and Turners Crossroad, which is just northwest of the Hwy 100 and I-394 intersection. In flow meter district 18 and along Louisiana Ave south of I-394, the flow capacity exceeds 80 percent. Additional sewers in flow meter districts 10 and 12 exhibit flow capacities greater than 60 percent. These locations provide insight into areas that may need monitoring if additional loading is placed on the system.

Modeling results indicate the importance of mitigating inflow and infiltration (I/I) from entering the system. For Golden Valley’s system to provide proper capacities for future flow conditions, I/I will need to be maintained at a level commensurate with MCES allowable peak hourly flows.

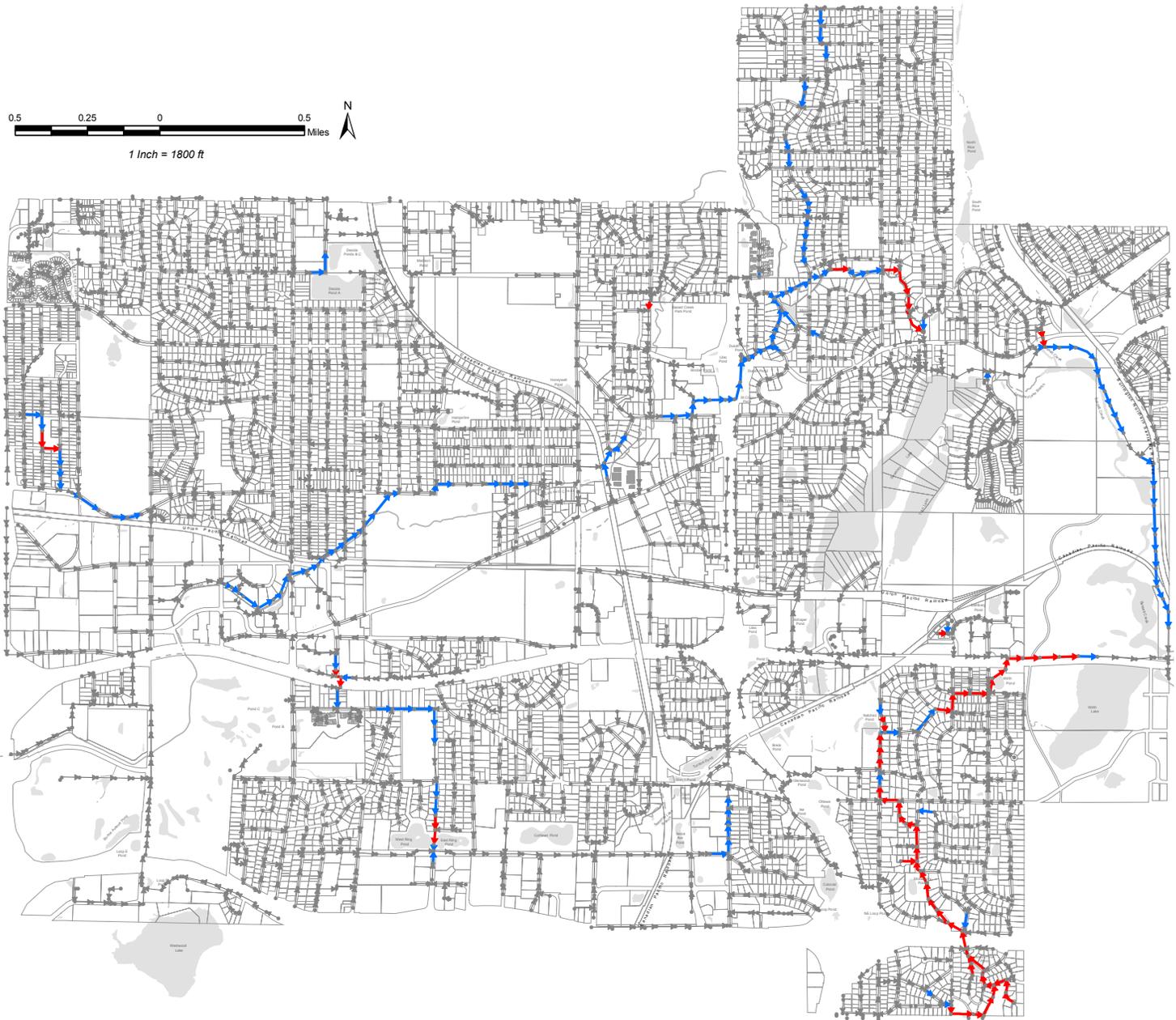
Figure 8.7: Sanitary Sewer Modeling Results—MCES Allowable Peak Hourly Flow



Date: November 9, 2007

Sources: SEH, Hennepin County Surveyors Office for Property Lines (2006), City of Golden Valley for all other layers

Figure 8.8: Sanitary Sewer Modeling Results—Historical Peak Hourly Flow



Historical Peak Hourly Capacity

- less than 60%
- 60–80%
- greater than 80%

Date: November 9, 2007

Sources: SEH, Hennepin County Surveyors Office for Property Lines (2006), City of Golden Valley for all other layers

Inflow and Infiltration (I/I) Issues

In 2005, MCES implemented a financial surcharge program to address communities with excessive I/I contributions to their municipal sanitary sewer systems. The program is based on an evaluation of the capacity of MCES interceptors, treatment, and long-term growth. MCES determined that the design capacity taken up by the addition of I/I in its interceptors is a critical issue and substantially impacts future capital expenditures.

MCES routinely monitors flows from each metro area community and compares peak flows during and after rain events to dry weather flows. It has developed criteria to determine whether a community has an I/I problem. This criteria is based on the peak hour factor as discussed on page 8-16.

Golden Valley's I/I Experience

In the past 10 years, the City of Golden Valley exceeded its allowable peak hour flow rate of 8.38 MGD during a number of rainfall events. For example, on October 4, 2005 it was 13.8 MGD, which is 5.43 MGD above the MCES allowable peak hour flow rate. During an April 2003 rain event, MCES recorded Golden Valley's peak hour discharge at 19.32 MGD.

To address the MCES surcharge and the I/I issue, the City of Golden Valley began a program to locate and remove I/I, particularly inflow that was causing the City to exceed its peak allowable wastewater flow rates during rainfall events. The first step was an I/I Study (see Appendix 8-A) to isolate the source of the inflow and, with further investigation, identify and remove specific sources of inflow. It was completed in 2005 and included the tasks listed below.

- ♦ Review past Sewer System Evaluation Survey (SSES) and maintenance work completed by the City during the past 10 years.
- ♦ Evaluate MCES flow rates and all calculations used to determine the volume of I/I generated in Golden Valley.
- ♦ Review the City's sanitary lift station pumping records.
- ♦ Implement a flow monitoring program to determine, if possible, which areas have a higher potential for I/I entering the collection system.
- ♦ Install a recording rain gauge to monitor rainfall intensity and daily storm events locally.
- ♦ Install monitoring wells or piezometers to monitor groundwater elevations around the City.
- ♦ Review the existing building inspection and compliance program.
- ♦ Review and evaluate the City's current sump drainage collection system.
- ♦ Perform a sump pump inspection program in the city's Manor area neighborhood.
- ♦ Update the geographic information system (GIS) database with additional attribute information for the City's sanitary sewer collection system.
- ♦ Evaluate the flow monitoring data to establish a priority for future SSES activities and quantify potential I/I impacts within the Golden Valley sanitary sewer collection system.
- ♦ Develop an I/I abatement plan to cost-effectively eliminate I/I from the City's wastewater collection system.

Following study recommendations, the City initiated the second step in the program, which included the following tasks (some tasks are completed and others are ongoing).

- ♦ Continue the City's cleaning and closed-circuit televising (CCTV) program, with an emphasis on Flow Meter Districts 9, 10, 13, 16, and 17. Monitor the piezometer and conduct CCTV during periods of higher groundwater or after significant rainfall events.
- ♦ Meet with the City of Robbinsdale to redevelop a plan to address I/I measured by a temporary flow meter located in Manhole 486 (see Figure 8.1).
- ♦ Develop a strategy for performing private property inspections.
- ♦ Develop a strategy for a building inspection program for private property sources.
- ♦ Determine financing options for the City and/or residents.
- ♦ Continue with the sump drainage collection system program.
- ♦ Meet with MCES and work with staff to update the St Louis Park and the Bassett Creek Interceptor. Periodically check with MCES staff to discuss the status of the MCES



photo by City staff

The City's I/I inspection program is part of its effort to reduce I/I.

meter locations and its maintenance history to see if station performance improves in the future.

- ♦ Review MCES flow monitoring results to determine if there are any significant trends during peak hour flows or I/I, since MCES surcharges will be based on data collected from future rainfall events.
- ♦ Continue to maintain records and document all I/I investigation and sewer rehabilitation expenses in the event of an MCES surcharge in the future.

- ♦ Implement a program based on the above-mentioned elements to reduce I/I in Golden Valley's sanitary sewer system.

Golden Valley's revised sewer ordinance strengthens the enforcement of removing clear water (I/I) from the sanitary sewer system. For private properties, the City offers voluntary sewer lateral inspections during Pavement Management Program (PMP) activities in future street construction areas. The City's point of sale (POS) program requires property owners to have their sewers inspected for I/I

and to be I/I compliant before selling their property. The City has focused its maintenance and repair efforts on the public portion of the sanitary sewer system. It also purchased flow monitoring equipment for ongoing evaluation of the sanitary sewer system in the public right-of-way.

The City met with MCES officials to review the potential of I/I entering its portion of the sanitary sewer system running through Golden Valley along Bassett Creek. The MCES agreed to repair its interceptors that may be contributing I/I to MCES Meter 117. 



photo by City staff

Section 4: Operation and Maintenance Plan

The operation and maintenance plan is a guide to operating, monitoring, maintaining, and rehabilitating the City's sanitary sewer system. Primary goals include reducing claims against the City related to sewer backups and continued compliance with local and regional standards for wastewater, including the control of inflow and infiltration (I/I) to the system.

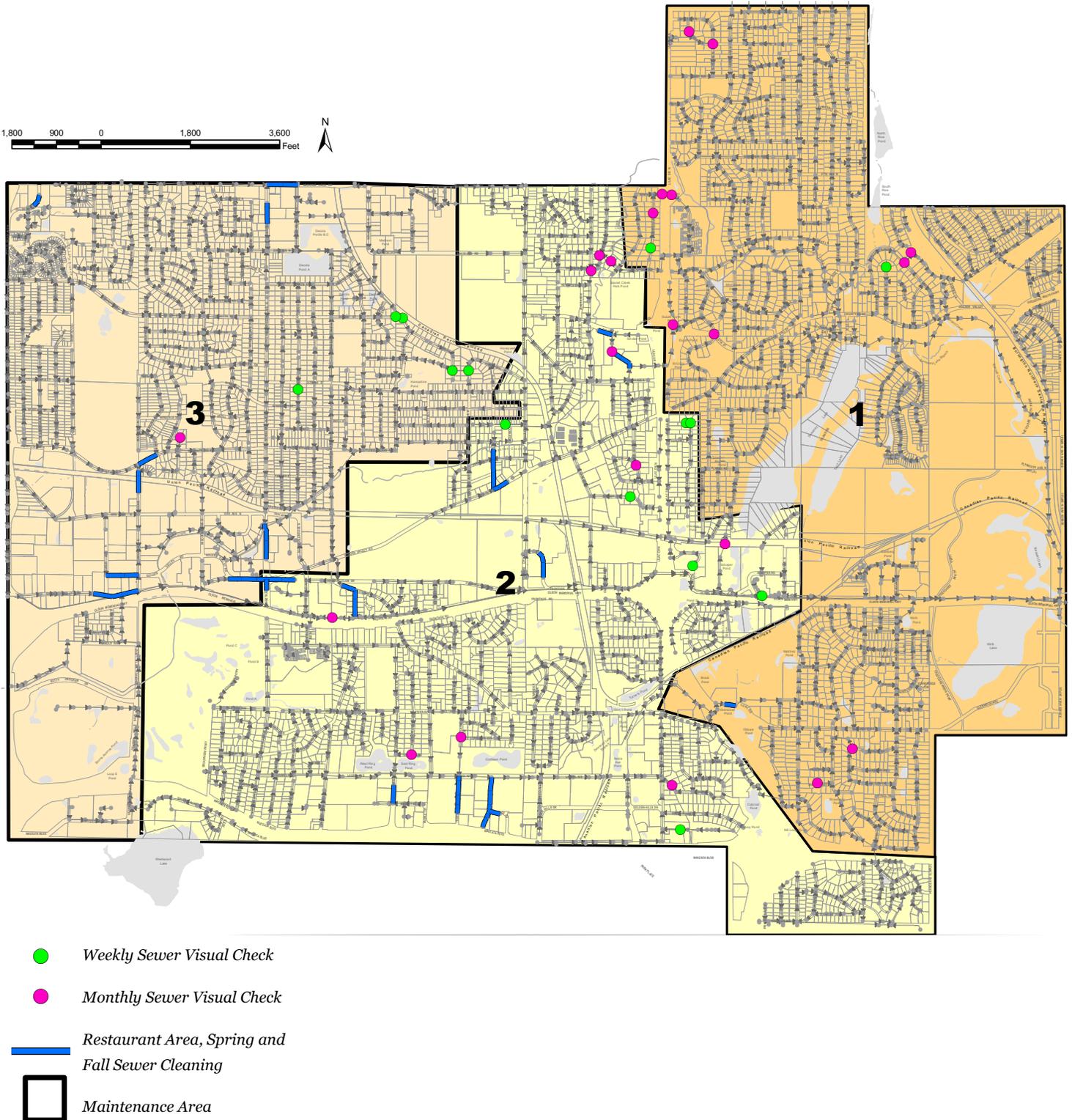
Specific recommendations in Golden Valley's sanitary sewer system operation and maintenance plan include:

- ♦ rehabilitating system components with concerns related to safety and welfare of City residents and employees
- ♦ rehabilitating system components to improve system effectiveness
- ♦ implementing programs to periodically evaluate system condition
- ♦ developing or expanding programs to help ensure periodic maintenance of the sewer system
- ♦ establishing policies and ordinances to protect the City's sewer infrastructure
- ♦ determining the City's equipment and staffing needs

Sewer Operations

To manage maintenance activities in the system, City maintenance staff divided Golden Valley into three sewer service maintenance districts (see Figure 8.9).

Figure 8.9: Sanitary Sewer Maintenance Map—Areas Of Concern



Date: December 10, 2007

Sources: SEH, MnDOT, Hennepin County Surveyors Office for Property Lines (2006), City of Golden Valley for all other layers

Equipment

The City of Golden Valley has sewer maintenance equipment typical of most communities its size, including:

- ♦ jetter truck
- ♦ vactor truck
- ♦ closed-circuit television (CCTV) truck
- ♦ rodder truck
- ♦ service lateral camera
- ♦ service lateral cleaning equipment
- ♦ hydraulic pump (750-1000 GPM)
- ♦ trailer-mounted generator

The City also owns flow metering equipment to continue investigating high peak hour flows in areas identified during the I/I Study.

The City has sufficient sewer maintenance equipment to maintain its municipal sewer system, but there may be times when additional needs require contracting for services. This is often more efficient than owning specialized equipment.

In general, the City has developed an equipment inventory and replacement plan that satisfies the needs of the community. With proper maintenance and rotation of equipment in/out of service, the current equipment mix will likely serve the community efficiently for many years.

Staffing

Golden Valley's Public Works Utilities Maintenance Division developed over the years as infrastructure additions warranted additional staff and equipment. The City's management staff and elected officials worked together to develop an efficient maintenance staff that is cross-trained to assist in other areas of public works. Areas of water system maintenance, snow plowing, and disaster clean-up occa-

sionally require that utilities maintenance staff perform duties other than sewer maintenance.

The Public Works Utilities Maintenance staff includes one utilities supervisor, one utilities lead, and seven staff positions. Staffing levels seem appropriate.

Gravity Sewer Maintenance

Sewer system maintenance typically includes cleaning using a combination of jetter and vactor trucks to remove debris from the sewer pipes. Root intrusion in pipe joints requires cutting and removal to allow flow of the sewage through the system. Once roots begin to enter sewers, it is very difficult to eliminate the recurring growth. The simple cutting of roots often promotes additional growth. Continued efforts to cut roots in the VCP portions of the system annually results in other portions of the City's sewer system having a lower priority for maintenance.

Utilities Maintenance staff indicates that a significant portion of its time and budget is used in areas constructed of VCP. This 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 it.

The League of Minnesota Cities (LMC) Insurance Trust provides insurance coverage to protect the City against claims resulting from sewer backups and other problems related to the City's utility services. LMC also provides no-fault insurance for private sewer connection to owners whose sewers cause damage to the City's municipal system.

The LMC offers its no-fault insurance only to cities considered to have an exemplary maintenance program. After noting increased claims in areas of sewer systems throughout the state (specifically, VCP sewer systems had higher than normal claims), the LMC suggested cleaning VCP sewer pipes every three years. Each year in conjunction with its Pavement Management Program (PMP), Golden Valley televises sewers in PMP areas and rehabilitates all sub-standard sewers. This equates to televising approximately three to five miles of sewers per year. Sewers in need of rehabilitation in those areas are relined or rebuilt.

Restaurant grease has also become an issue in some areas of the system. Maintenance activities have increased in known problem areas. There have also been some efforts to modify ordinances and policies regarding the installation, maintenance, and inspection of grease traps. This should be monitored and promoted to reduce the amount of grease in the system. Utilities Maintenance staff cleans the problem areas in the spring and fall and spot checks and flushes manholes in those areas on a weekly and monthly schedule (see Figure 8.9 for areas that require additional cleaning).

Recommended Maintenance Program

Proper monitoring and maintenance is important to the long-term viability of the system. It extends the life of the system and decreases the likelihood of sewer backups. Sewer backups often lead to property damage claims against the City. This results in increased costs to the City to pay those claims, with associated increases in insurance premiums.

Because of the high percentage of VCP pipe comprising Golden Valley's sewer system, those portions of the system should be more closely evaluated for replacement or lining to negate the concerns of root intrusion and to implement the maintenance schedule suggested by LMC.

Cleaning

Cleaning practices vary from city to city, depending on available budgets and the condition of the sewer system. Practices range from annual cleaning of all sewers to inconsistent cleaning of known problem areas. Many communities have set goals to clean their entire system at least once every five years.

As mentioned earlier, the LMC recommends that cities clean VCP sewers every three years, or more often when conditions require it, to minimize sewer back-ups (Golden Valley has approximately 80 miles of VCP sewer). Similarly, the LMC recommends that sewer systems that are not VCP be cleaned every five to seven years.



photo by City staff

The City televises sanitary sewers as part of its maintenance program.

Golden Valley has more than 33 miles of sewers in this category.

Golden Valley's jetting plan cleans approximately 40 miles of sewers per year, which exceeds the LMC recommendations. It allows a combination of lines that require annual cleaning, plus VCP on a three-year rotation and all others on a five-year rotation.

The City also cleans additional areas of concern each year (see Figure 8.9). The current sewer cleaning program addresses the needs of the VCP areas and documented areas of concern. The production rate per year is primarily controlled by two factors. One is the number of staff and outside influences including:

- ♦ emergency sewer needs
- ♦ emergency water needs
- ♦ natural disaster (clean-up efforts)

The other factor involves the options to increase the amount of sewers cleaned, including:

- ♦ increased sewer maintenance staff
- ♦ double shift current staff
- ♦ contract services

Televising

The City televises sewers in areas where street rehabilitation or reconstruction is scheduled. This allows the City to be efficient with infrastructure management and to avoid situations that require removing portions of a newly constructed street. Currently, the City televises approximately five miles of sewer per year, pre- and post-construction program, for a total of 10 miles of televising.

In addition, the City televises newly constructed sewers prior to acceptance. This provides baseline information for the sewer and validates service

locations. It also reduces the need for deflection testing.

Recommendations For Televising And Cleaning

It is recommended that Golden Valley establish a program to televise all sewers and develop a baseline televising database for all sewers in the community. The televising records should be digitally attached to existing GIS information as a tool for use by City maintenance and engineering staff.

It is recommended that the City televise the entire system every 10 years, which equates to 11.3 miles per year. The LMC recommends cleaning 33 miles of sewer per year. The City cleans an additional two miles of sewer twice per year in areas of concern, which equates to 37 miles of sewer cleaning per year.

Because of the City's commitment to its Pavement Management Program (PMP), this is currently not possible. Until the City substantially completes its PMP (scheduled for 2014), it will not be able to adjust its sewer televising program due to staffing levels.

Beginning as soon as fiscally possible, the City should:

- ♦ develop an ongoing sanitary sewer televising program (10-year cycle) to coincide with sewer cleaning activities
- ♦ televise 11.3 miles of sewer each year
- ♦ televise sewers in streets slated for rehabilitation or reconstruction
- ♦ schedule repeat televising as necessary in high risk areas
- ♦ require digital televising of all new sewer pipe installation

I/I

The City should continue its I/I inspection programs to help ensure compliance with current ordinances and regional policies. This includes rehabilitating City sewers as part of the Pavement Management Program (PMP) as well as the current private property inspection program, which includes rehabilitating the sanitary sewer laterals. Together, these programs address aging infrastructure and reduce direct connections of sump pumps and foundation drains.

The City should continue to document the findings of the inspections, both private and public, through its GIS database. The inspection information should be compared with the future wastewater flow data collected from the portable flow meters currently owned by the City to document I/I effectiveness. The reoccurring examination of the sanitary sewer collection system will help the City determine any necessary changes to the program that may be required to develop a stronger, more effective program.

Lift Station Maintenance

Lift stations represent a vulnerable component of the sanitary sewer collection system. It is important that the City follow an active preventive maintenance program for each station consisting of two parts: actions performed and recorded twice a week and actions performed and recorded annually.

Twice weekly maintenance tasks include the following:

- ♦ visually inspect site
- ♦ visually inspect wet well
- ♦ observe pump operation cycle
- ♦ record pump run times

- ♦ monitor system alarms
- ♦ inspect auxiliary equipment in dry well such as sump pump, dehumidifier, etc

Once a year a pump engineer should do a field and shop inspection on each pump to:

- ♦ check electrical condition of insulation on power cable
- ♦ check for function of control panel and any loose or faulty electrical connections
- ♦ check voltage supply between all phases on the line side of the electrical control panel with pump off
- ♦ check amperage draw on all phases of the pump motor
- ♦ check voltage between all phases on the load side of the pump motor starter
- ♦ check control power
- ♦ check condition and operation of motor thermal protectors.
- ♦ remove submersible pumps from lift station for physical inspection
- ♦ check condition of upper shaft seals and inspect condition oil
- ♦ check condition and operation of moisture sensors
- ♦ check lower shaft seals and inspect condition of oil
- ♦ change oil
- ♦ check whether impeller is loose or worn
- ♦ check all impeller wear rings
- ♦ check for noisy upper and lower bearings
- ♦ check damaged or cut pump cable
- ♦ clean, reset, and check operation of the pump alternator and level sensors
- ♦ check for correct shaft rotation

- ♦ reinstall pump and check for leakage at the discharge connection
- ♦ observe one operating cycle
- ♦ prepare inspection report

A SCADA system (a computerized system that helps monitor the City's sewer facilities) would provide more complete recording with less City staff time; however, the City Utilities Maintenance staff does a good job of documenting the pump run times and lift station maintenance needs. With the City's significant GIS database and the current detail in lift station maintenance, it is recommended that the City consider implementing a GIS-compatible maintenance record system.

Lift Station Improvements

Table 8.4 and Appendix 8-D show acceptability ratings for each sewage lift station in the City.

Lift Station Access Procedures

The City should maintain written procedures for accessing the lift stations, and they should include the items listed below.

- ♦ Maintain barriers or grating (either temporary or permanent) whenever structures are open.
- ♦ Never enter a subsurface structure without a partner present.
- ♦ Follow confined space requirements.
- ♦ Check for applicable gases with appropriate meter.
- ♦ Operate appropriate ventilation, either portable or permanent.
- ♦ Maintain required light levels.
- ♦ Make sure temporary lighting is intrinsically safe.
- ♦ Make sure temporary ladders meet safety codes and are properly secured.

- ♦ Use fall protection and safety harnesses.
- ♦ Carry an electronic communication device, such as a radio.

Policy and Ordinance Review

Recent revisions to the sewer ordinance resolved a number of operations and maintenance issues, but many sanitary sewer collection system issues are best resolved through a review and revision of simple maintenance policies at the staff level.

Grease Management

The City, by its permit with MCES, is required to manage grease in the sewer system. The City's Utility Maintenance staff continually monitors the sanitary sewer collection system in the vicinity of each Golden Valley restaurant. City ordinances should reference MCES requirements to install grease traps and service and monitor the traps.

Service Lines

Current City ordinances and policies indicate that the property owner is responsible for the sewer service line between the mainline in the street and the building or home. This is consistent with many other communities. The City has experienced some problems related to owner maintenance of sewer services. Most notably are sewer backups that occur because of debris



photo by City staff

The City rehabilitates sanitary sewer lines as part of its Pavement Management Program (PMP).

left in mainline sewers after service cleaning. The City already requires property owners or their contractors to notify the City when maintenance is performed on sewer services. Compliance with this is law and is difficult to enforce. Options to address this issue include:

- ♦ requiring permits for sewer service maintenance activities
- ♦ requiring private maintenance companies to obtain a City license that is renewed on a regular basis

Providing permits for each service maintenance activity would be an added administrative activity that could become laborious. It is recommended that the City develop a licensing program that requires maintenance companies to obtain a City license that is renewed periodically. The permit should require companies to notify City Utilities Maintenance staff before performing any maintenance activity on private and public sewers. Failure to comply would result in license revocation loss of renewal in the future.





photo by City staff

Section 5: Implementation

The capital improvement plan guides the funding needed to construct and rehabilitate a City's sanitary sewer system. Primary goals include reducing claims against the City related to sewer backups and continued compliance with local and regional standards for wastewater, including the control of inflow and infiltration (I/I) to the system.

Specific recommendations include:

- ♦ rehabilitating system components related to safety, health, and welfare of City residents and employees
- ♦ rehabilitating system components to improve system effectiveness
- ♦ implementing programs to periodically evaluate system condition
- ♦ developing or expanding programs to help ensure periodic maintenance of the sewer system
- ♦ establishing policies and ordinances to protect the City's sewer infrastructure
- ♦ implementing programs to periodically evaluate the City's equipment and staffing needs

Sewers

Proper maintenance and rehabilitation extends the life of the sewer and reduces costly reconstruction of the system. Rehabilitating sewers in disrepair improves flow through the sew-



photo by City staff

The City's sanitary sewer undergoes rehabilitation at a lateral Y connection.

ers and reduces maintenance expenditures.

VCP Sewer Repair and Rehabilitation

The City repairs and replaces its sanitary sewer collection system in conjunction with its Pavement Management Program (PMP). Because a large percentage of the collection system contains VCP pipe and a significant amount of this pipe experiences significant root intrusion, an additional rehabilitation program may be needed to address this issue. Golden Valley will continue to rehabilitate VCP sewers in conjunction with the PMP as well as throughout the city.

Methods

Most VCP sewers can be successfully rehabilitated through in-place lining. This process installs a liner inside the pipe; excavations are seldom necessary. The liner typically provides minimal increase in the pipe's structural strength. More importantly, the liner seals joints and removes points

of access for roots and I/I. Installing a liner typically does not affect the flow through the sewer or reduce the pipe's capacity

Some areas may not be suitable for lining. For example, pipes with sags that limit flow or areas that have broken and/or damaged pipe may require spot repairs that include excavation and replacement. Larger areas that are unsuitable for lining would require reconstruction. These areas will be identified and quantified through the sewer televising program.

Recommendations

To set priorities for the rehabilitation program, it is recommended that televising be concentrated in VCP areas for the first three years. The rehabilitation program could conceivably begin the year after the first areas are televised. It may be reduced for the first years as the City televises areas and develops priorities. Once priorities are developed, the City may complete

larger portions of the program annually to accelerate rehabilitation.

Cost

Much of the City's sanitary sewer system rehabilitation has or will be addressed through the PMP. Costs would be borne by the City; maintenance and rehabilitation of existing sewers typically can not be assessed. Possible funding sources include sewer enterprise funds and rate increases to all users of the system. Sewer reconstruction costs are often five to six times the cost of lining.

A budgetary number of \$150,000-165,000 per mile was used to estimate the cost of lining VCP sewers (includes only relining the pipe and does not include associated construction appurtenances or tasks such as manholes, street repairs, etc). Below are examples of the time frame the City can expect based on annual expenditures for the rehabilitation:

- ♦ \$500,000 per year achieves three miles per year (18+ year program)
- ♦ \$1 million per year achieves six miles/year (9+ year program, slightly above the current rehabilitation rate)
- ♦ \$1.5 million per year achieves nine miles/year (6+ year program)

The City currently relines sewers in conjunction with the PMP. Appendix 8-D, Pavement Management Capital Improvement Program, identifies future zones that will be televised and reconstructed, if required. The City prioritizes the reconstruction in accordance with available funds.

The City should televise and inspect areas scheduled for rehabilitation before contracting for the work. This will identify areas that may need re-

construction, spot repairs, or manhole rehabilitation.

VCP Sewer Service Repair and Rehabilitation

Golden Valley has experienced root problems within sewer services similar to those in the City's main sewer lines. The property owner owns sewer services from the building to the sewer main and is responsible for the maintenance and rehabilitation of its service. Rehabilitation options include lining or excavation.

The PMP and POS programs have been developed out of need to reduce I/I, but they also become part of a program for VCP mainline sewer rehabilitation. The result will be a rehabilitated system that reduces maintenance costs for both the City and property owners. The City will benefit from rehabilitated sewer services through reduced I/I and minimization of root cuttings from service maintenance that end up in the mainline sewer, often creating additional maintenance needs for the City or, in some cases, sewer backups.

Cost

Rehabilitation costs for sewer service lines exceed rehabilitation costs for sewer mains. Estimated cost to line a typical 60- to 70-foot-long sewer ser-

vice is approximately \$6,000, depending on the length of the services.

Property owners own the sewer service lines from the house to the wye, or connection location on the main, and are responsible for maintaining them. The City has worked with local and state officials to develop a method to help property owners deal with the cost of rehabilitating their sanitary sewer service lines. To date, only limited funds are available to help property owners deal with this cost.

Trunk Facilities

The City of Golden Valley has constructed the necessary trunk facilities to serve the community. The remaining undeveloped land in the community will be served by existing sanitary sewer mains. The City typically installs the necessary sanitary sewer pipes to serve a development area, and the cost is usually borne by the developer through special assessments, without expense to the City.

Lift Station Evaluations

The adequacy of each lift station was evaluated against the following nine parameters:

- ♦ station hydraulic capacity
- ♦ safety
- ♦ potential for sewer back-up
- ♦ pump review and capacity
- ♦ wet well physical condition
- ♦ valve vault, or dry well, physical condition
- ♦ electrical components
- ♦ instrumentation/control issues
- ♦ suitability of location

Appendix 8-E details the criteria by which each of these parameters was evaluated.

The following acceptability rating scale of 1 to 5 was established for approximately 45 evaluation criteria for each of the three stations:

- ♦ 1 = Excellent
- ♦ 2 = Good (the station is better than the average lift station in the metropolitan area)
- ♦ 3 = Average (similar to an average station in the metropolitan area)
- ♦ 4 = Below Average
- ♦ 5 = Unacceptable (the condition should be corrected in the near future)

Rating scores are subjective, and different individuals would likely give different scores for any given parameter. Also, no universal standard exists. However, since the goal of the rating system is to establish a sense of relative need rather than concise determinations, the evaluations are deemed suitable for this study.

Lift Station Improvements

Table 8.4 shows acceptability ratings for each sewage lift station in the City. All the stations have an overall rating of better than the industry average. Individual parameters in each of the stations contain a range of moderate to unacceptable ratings. Such deficiencies can most likely be corrected individually at each station. The decision of which to pursue depends on the severity of the individual deficiencies. The following is a summary of the evaluations and recommended improvements for each station.

Schaper Lift Station

The following items are rated unacceptable and should be addressed within the next two years:

- ♦ provide low level pump shut off protection



photo by City staff

Rehabilitating VCP sanitary sewer pipes reduces maintenance costs for the City and property owners.

- ♦ provide SCADA
- ♦ provide additional relays for power down notification and backup pump control when controller is malfunctioning.
- ♦ provide security from public damage

The following items are rated below average and should be corrected within the next three to five years:

- ♦ install a concrete valve vault to contain the station’s valves, require an access hatch on the structure
- ♦ add safety railing around wet well or provide safety grating on wet well

The following items are rated average and will likely require correction within the next six to 10 years:

- ♦ replace the piping and valves

Parameters that received a rating of above average are not listed as requiring improvement during the next 10 years in the capital improvement plan.

Highway 55 Lift Station

The Highway 55 lift station is located within the 100-year floodplain and should be waterproofed or relocated. Relocating the lift station south of Hwy 55 may be the best long-term solution, but it is not feasible at this time. A bermed barrier would be the least expensive option and would also provide access to the lift station during a flood event. However, environmental concerns prevent this option from being recommended.

Before a berm could be constructed, a routing analysis is needed to verify that additional berm fill material would not raise the flood elevation during a 100-year flood event. Schaper Pond is also designated by the MnD-



photo by City staff

Electrical controls at the Schaper Lift Station

NR as a Protected Water. Permission would be needed from the MnDNR to proceed with the project, and mitigation may be necessary. The MnDNR would also need to assess whether the project would negatively impact the associated water flowage that is classified as a Protected Water. Another environmental concern is that the City of Golden Valley uses Schaper Pond within its storm water storage and treatment network. The City would need to determine whether the berming could negatively affect the storm water clarification process.

For these reasons, it is recommended that the existing lift station be modified to maintain function during a flood event. This could be accomplished by raising the control panels in the building to at least 2 feet 7 inches plus a freeboard distance above the floor slab grade. The existing pumps should be replaced with dry pit submersible pumps that would be unaffected by flooding conditions. Water tight castings should be installed to prevent exchange of sanitary sewage with flood waters.

The following items are rated unacceptable and should be addressed within the next two years:

- ♦ flood proof or relocate to protect against 100-year flood occurrence
- ♦ provide low level pump shut off protection
- ♦ provide SCADA
- ♦ provide additional relays for power down notification and backup pump control when controller is malfunctioning.
- ♦ remove tree growth from power line locations

The following items are rated below average and should be corrected within the next three to five years:

- ♦ provide safety grating on wet well

The following items are rated average and will likely require correction within the next six to 10 years:

- ♦ increase access area to valve and pump location

Parameters that received a rating of above average quality are not listed as requiring improvement during the next 10 years in the capital improvement plan.

Woodstock Lift Station

The following items are rated unacceptable and should be addressed within the next two years:

- ♦ provide low level pump shut off protection
- ♦ provide SCADA
- ♦ provide additional relays for power down notification and backup pump control when controller is malfunctioning.

The following items are rated below average and should be corrected within the next three to five years:

- ♦ provide safety grating on wet well

The following items are rated average and will likely require correction within the next six to 10 years:

- ♦ replace the piping and valves

- ♦ provide drive-up service access
- ♦ replace pumps

Parameters that received a rating of above average quality are not listed as requiring improvement during the next 10 years in the capital improvement plan.

Ten-Year Plan Summary

Appendix 8.F summarizes the costs related to the proposed operation, maintenance, and capital improvements plan (CIP) for Golden Valley's sanitary sewer system. The costs are based on existing program requirements and maintenance and proposed activities to address future capital improvements, including aging infrastructure, lift station improvements, and I/I reduction. 