2018 Sanitary Sewer Comprehensive Plan

Lakeville Comprehensive Plan

Lakeville, Minnesota

LAKEV 142011 June 27, 2019

SEH

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June 27, 2019

RE: City of Lakeville, MN
2018 Sanitary Sewer Comprehensive Plan
SEH No. LAKEV 142011 4.00

Mr. Zachary Johnson, PE
City Engineer
City of Lakeville
20195 Holyoke Avenue
Lakeville, MN 55044

Dear Zachary,

Please find enclosed our final draft copy of the City of Lakeville Sanitary Sewer Collection System Comprehensive Plan for 2018 as required by the Metropolitan Council. As you know, the City's Comprehensive Plan is the part of a long-range planning document for future development of Lakeville and the regional metropolitan area. This document updates the previous Lakeville Sanitary Sewer Comprehensive Plan so the City can complete the wastewater section of their Metropolitan Council 2040 comprehensive plan update.

Our staff developed this draft based on conversations with your staff, our knowledge of the system and information from the previous comprehensive plan. In addition, we used the following information: the City's GIS database, current and future land use plans, water records and I/I data to update and model the City's current sanitary sewer collection system. The existing sanitary sewer model software (InfoSWMM) product licensed by Innovyze was again used and updated to determine design capacity in the existing collection system and any changes needed to handle future development.

Please review the enclosed draft and after reviewing the document, we can schedule a meeting to review your comments and discuss any future recommendations need to complete the plan. If you have any questions relating to this document, please contact me by email at wlueck@sehinc.com or at 651.490.2174.

Sincerely,

William Lueck, P.E.
Project Manager

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2018 Sanitary Sewer Comprehensive Plan

Lakeville Comprehensive Plan
Lakeville, Minnesota

SEH No. LAKEV 142011

June 27, 2019

I hereby certify that this report was prepared by me or under my direct supervision, and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

William Lueck, P.E.

Date: June 27, 2019 License No.: 40125

Reviewed By: Brendan A. Barnes Date: June 27, 2019

Short Elliott Hendrickson Inc.
3535 Vadnais Center Drive
St. Paul, MN 55110-5196
651.490.2000

Executive Summary

The City of Lakeville sanitary sewer system is part of the overall Minneapolis-Saint Paul Regional wastewater collection and treatment system program managed and operated by the Metropolitan Council Environmental Services (MCES). In addition to the interceptor collection system owned and maintained by the MCES, the local sanitary system is owned and maintained by the City. The MCES is required under state and federal requirements to ensure all wastewater throughout the Twin Cities Metropolitan area does not leave their interceptors and is properly treated before discharge to local receiving streams. In order to ensure the capacity of their interceptors, the MCES adopted a surcharge program to make sure all communities were properly maintaining their sanitary sewer collection systems and managing peak discharges caused by inflow and infiltration (I/I) in their sanitary sewer collection systems. Lakeville's system is adequately handling existing flows. The City continues to maintain its system by implementing an annual maintenance program and capital improvement plan.

Introduction

Lakeville is located in the west central portion of Dakota County about 20 miles south of Minneapolis, Minnesota. The City is bordered by Burnsville and Apple Valley on the north, Farmington and Empire Township on the east, New Market and Eureka Townships on the south, and Credit River Township on the west. The City has an estimated 2016 population of 60,965 and is projected to reach 83,500 residents by 2040, per Metropolitan Council projections. This Sanitary Sewer Comprehensive Plan will aid the City in future planning and development as well as aid the Metropolitan Council with their Capital Improvement Plan for 2040. The Metropolitan Council's 2040 Water Resources Policy Plan goal:

"To protect, conserve, and utilize the region's groundwater and surface water in ways that protect public health, support economic growth and development, maintain habitat and ecosystem health, and provide for recreational opportunities, which are essential to our region's quality of life."

Sanitary sewage is collected in approximately 268 miles of sewer pipe (excluding private and MCES-owned pipes) ranging in size from 4-inches to 48-inches in diameter. There are 20 sewage lift stations and 3 grinder stations which serve areas distributed across the sanitary sewer system.

System Inventory and Analysis

Portions of the infrastructure is reaching the end of its typical useful life and improvements are required to maintain the integrity and function of the system. Years of maintenance and clear water from I/I entering the system reduces the overall service life of the existing infrastructure. As the wastewater system ages, pipes and structures underground crack and break, allowing ground water to enter the system. Groundwater is clean water and does not need to be treated at a wastewater plant. The City's I/I program extends the useful life of pipes and preserves pipe capacity for wastewater, while eliminating unnecessary costs.

Inspections by SEH of 20 sewage lift stations and 3 grinder stations in the City were completed as a part of this update and were found to be in adequate condition. The City's lift stations are generally in better condition than the typical municipal lift station but recommended maintenance is identified in the Plan and should be included in future capital improvement planning.

Wastewater infrastructure system repairs and rehabilitation were identified through various studies, scans, flow monitoring and completed emergency repairs, records and observations. The City's

regular maintenance program includes cleaning, televising, pipe lining and asset scanning for condition status but capital improvements are required for the aging system. The City has upgraded the sanitary sewer system during street reconstruction projects and implemented sewer lining projects. To continue to provide sufficient wastewater capacity, a dedicated effort to repair and rehabilitate the wastewater infrastructure is highly recommended.

Regular system maintenance and capital projects maintain water quality, reduce wastewater overflows and backups, lower wastewater costs, and improve the local economy by promoting future growth and development.

Wastewater treatment for the City is provided by the treatment plants in Empire Township and Eagan. MCES interceptor sewers collect flow through the community from City trunk lines. Average daily flows from 2005 – 2016 were 4.281 MGD.

MCES owned and operated interceptor sewers collect and convey flow through the community from City sewer lines. There are four main trunks that collect flow from Lakeville. The eastern trunk collects flow from Lakeville, Farmington, and Apple Valley. The northern trunk collects flow from Lakeville and Burnsville. The Elko/New Market inceptor collects flow from Lakeville, Elko New Market, and Eureka Township. The Flagstaff/Farmington Outlet collects flow from Lakeville and Farmington.

The eastern trunk connects in 3 locations at the border of Apple Valley and Lakeville at 160th St W. One trunk runs along Cedar Ave and then heads directly east in Lakeville. The other northern trunks generally run southeast of Pilot Knob Rd and meet to the south of 172nd St and east of Pilot Knob Rd in Lakeville. Flows through this trunk from Apple Valley are monitored by MCES meters M643, M648, M644, M641, and flows south from Farmington are monitored by relocated meter M642. The final flow through the trunk downstream is monitored by meter M643A.

The northern trunk connects at the border of Lakeville and Burnsville near Oak Shore Dr. in Lakeville. This flow is taken north to be treated at the Seneca Plant in Eagan and is monitored by meter M630.

The Elko/New Market trunk connects at the borders of Lakeville, Farmington and Eureka Township. The interceptor from Lakeville connects with the Elko/New Market interceptor at the border of Lakeville just north of 200th St W and south of Lakeville Blvd. Flows from the City are monitored by meter M646 and the Elko/New Market interceptor flows with City flows are monitored by meter M649. The Flagstaff/Farmington interceptor connects near the border of Eureka Township and Lakeville on Dodd Blvd. The flows from the Flagstaff/Farmington line connect with the two southern trunks connect on Flagstaff Ave just south of Lakeville Blvd in Farmington.

The flow from the main trunks come together in Empire Township and continue to the Empire plant.

The City's sanitary system was evaluated using a model licensed by Innovyze, called InfoSWMM. The City's existing GIS sewer structure data, as-built information from the City's sewer construction plan sheets, lift station information and lift station inspections were compiled into a GIS database by the City to configure the model. The model calculated the various hydraulic parameters during normal flow, wet weather flow and pumping conditions. The model was used to evaluate current and future sewer capacities and identify required system improvements.

For this analysis, the land use method was used to generate sanitary sewer flows. Parcel acres were multiplied by the sanitary loading rate based on existing land use and then assigned to the manhole

considered most likely to receive those flows. Sanitary land use loading rates were initially used to determine base flow rates from parcels throughout the City. The values were compared to actual metered data. Using the land use method resulted in flow on par with MCES metered average flow. To determine future wastewater flow projections, the same land use method was applied to determine future flows.

Comprehensive Plan with System Needs

The City's population is projected to increase over the next twenty years. The Metropolitan Council predicts a Lakeville population of 83,500 by the year 2040. The Metropolitan Council also projects the number of households will be 30,000 in 2040 with an occupancy of 2.7 people per household. The information contained in this Comprehensive Sewer Plan Update is based on the ultimate land uses contained in the City's 2040 Land Use Plan.

Actual metered water usage was used to calibrate the flow and loading rates to MCES metered flow from Lakeville. Flows from future areas anticipated to undergo development were assigned based on the 2040 land use plan and preliminary future development plans available from the City.

The metered wastewater flow is greater than the water sales, which is typical among metro area communities. MCES staff believes this difference is primarily due to the difference in accuracy between the individual home water meters and the MCES wastewater meters. It can also be explained by the amount of additional clear water which could be entering the sanitary sewer system through groundwater infiltration.

For existing conditions, loading rates were calibrated using metered data from winter months. The same loading rates were then applied to the future land use, to determine future system flows. Densities for different land use types varied from 5 gallons per day per acre to 1,800 gallons per day per acre.

The sanitary sewer modeling results indicate that the City has the capacity to convey the anticipated peak flows with improvements to Lift Station 7 and its forcemain.

Operation and Maintenance Plan

The operation and maintenance section serves as a guide to monitor, maintain, and rehabilitate the City's sanitary sewer collection system. The primary goals include the reduction in potential claims against the City related to sewer backups, continued compliance with local and regional standards and control of I/I entering into the system. Specific recommendations include rehabilitation of system components with concerns related to safety, welfare of City residents and employees; rehabilitation of system components to improve system condition; development or expansion of maintenance programs to help ensure periodic maintenance of the sewer system; establishing policies and ordinances to protect the City's sewer infrastructure; and equipment and staffing needs of the City.

Capital Improvement Plan

The Capital Improvement Plan (CIP) section identifies deficiencies which exist within the sanitary sewer system and lift stations. The plan identifies both operation and maintenance and capital expenditures recommended over the next ten years to correct the deficiencies within the collection system and the associated lift stations. A summary of costs are included in Table 20.

Contents

List of Tables

Contents (continued)

List of Figures

Contents (continued)

List of Appendices

2018 Sanitary Sewer Comprehensive Plan

Lakeville Comprehensive Plan

Prepared for the City of Lakeville

1 System Inventory and Analysis

1.1 Existing Sanitary Sewer Collection System Gravity System

The existing City gravity sewer system is made up of approximately 268 miles of pipe ranging in size from 4-in. to 48-in. diameter. Portions of the sewer system were installed more than 40 years ago, with approximately 13% percent of the system installed prior to 1975. An inventory of pipe based on the material and age of the pipe is shown in table 1. Maps of the sewer size and material are shown in Figures 1 and 2.

Table 1 – Sanitary Sewer Gravity Main by Year of Installation (feet)

Material	Diameter (in)	1960-1964	1966-1969	1970-1974	1975-1979	1980-1984	1985-1989	1990-1994	1995-1999	2000-2004	2005-2009	2010-2015	Unknown	Total (ft)
CIP	4			62										62
	6				140									140
	8		15											15
CIP Total			**15**	**62**	**140**									**217**
DIP	4				40	62								101
	6			32	19		16							66
	8			24	521	109	498	1000	1419	10	18	193		3793
	10			385	166		5493	168	10					6223
	15				258									258
	16						694	122						816
DIP Total				**442**	**1004**	**170**	**6700**	**1291**	**1429**	**10**	**18**	**193**		**11257**
HDPE	6										587			587
	20										473			473
HDPE Total											**1060**			**1060**
PVC	Unknown									1723	857	474	366	3420
	4								165	49		361		575
	6						989	550	1051	2113	1222	63	135	6122
	8	207		680	18557	81173	177808	153645	200849	161559	92384	54541	648	942049
	9				500	521								1021
	10				2556	8253	8309	11005	9444	12427	10966	1222	285	64466
	12					4090	3882	1353	14544	3952	6380			34201
	15					1206		2075	2122	8937	4662			19002
	18					2997	102		2008	4471	3184			12761
	21						314	28			149			492
	24										13537			13537
	28						340							340
	30										341			341
	33	297												297
PVC Total		**504**		**680**	**21613**	**98240**	**191743**	**168656**	**230181**	**195231**	**133683**	**56660**	**1433**	**1098623**
RCP	Unknown												48	48
	4									28				28
	8			1411					389	2971				4771
	9		60											60
	12		2606	18726	14464									35795
	15	1188	4668	2167	2111	413	945			352				11844
	18	980		5052	2374	1125	905		152		85			10674
	21			3448	509	3257		3194		296				10704
	24	3249		3571	1964			988	1136					10908
	27			4716	2357	4878			1173					13124
	30			3944	3347	3069			1178					11539
	33	7960		4646		1902			2781					17289
	36				2801			1646						4447
	42			6870	2915	1682	2075							13543
	48	360			3773									4133
RCP Total		**13736**	**7333**	**54553**	**36617**	**16327**	**3926**	**5828**	**6809**	**3646**	**85**		**48**	**148907**
TRUSS	8				1087	40								1127
TRUSS Total					**1087**	**40**								**1127**
Unknown	Unknown			162					175	332		257	61	988
	4								170					170
	6												265	265
	8								819	3159	108		254	4340
	10									187		225		411
	12									18				18
	15									116				116
	18									128				128
	33												292	292
Total				**162**					**1164**	**3939**	**108**	**482**	**872**	**6728**
VCP	6			12										12
	8	3371		15318	30568	115	460	2418	741					52990
	9	786	34970	57327	1914				225					95221
VCP Total		**4157**	**34970**	**72656**	**32481**	**115**	**460**	**2418**	**966**					**148223**
Grand Total		18396	42318	128555	92943	114892	202829	178193	240549	202826	134954	57335	2354	1416143

The system contains almost 28 miles of pipe classified as Vitrified Clay Pipe (VCP). Aging VCP is commonly associated with 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 was installed in Lakeville prior to the mid 1970's. The City has developed a Pavement Management Program (PMP), which includes a review of all utilities during the process of updating the City's streets. The program includes an inspection of the sanitary sewer collection system in the public right of way and lateral inspections for areas of concerns. 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, the City has developed a successful rehabilitation program for its aging infrastructure using relining or pipe replacement techniques. Corresponding VCP sanitary sewer services are located on private property and right-of-way experience similar maintenance problems and contribute I/I.

1.2 Lift Stations

The City's wastewater system contains 20 large sewage lift stations and three grinder stations. The capacity and physical condition of each station was inspected for this comprehensive plan. The purpose of the inspections was to identify deficiencies of each station and to establish a priority for improvements to the stations. Table 2 identifies the capacity of each station and Table 3 the total detention time, from the inspections performed in July 2017. Appendix A contains the results of the inspections for each lift station.

SEH analyzed the condition of each station and made improvement recommendations for each station. Proposed improvements were divided into six categories:

- **Hydraulic Capacity -** The criteria used for determining adequate hydraulic capacity in compliance with the Minnesota Pollution Control Agency's (MPCA) 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 stations wet well and the average number of starts per hour of operations for each pump.
- **Pumping Capacity -** Adequacy of pumping capacity was based on whether the station is able to pump the peak instantaneous flow with the largest pump out of service. The lift stations ability to reliably handle the range of average daily flow rates to peak flow rates are also considered in the sewer system hydraulic model.
- **Physical Condition -** The physical condition of each station is a subjective analysis by SEH based upon a visual observation of the concrete, steel components, piping and valves. The suitability of the station location is a review of the stations accessibility and aesthetics.
- **Electrical Issues -** The electrical condition of the pumps was based on reviewing the physical condition of the electrical components of the station as well as having discussions with City Public Works Staff.
- **Instrumentation/Control -** Instrumentation and controls review consisted of identifying whether the station alarms are transmitted to the SCADA system at the Water Treatment Facility.
- **Potential for Sewer Back-up -** The potential for sewer backups include two items: (1) whether the stations contain either a standby generator or a receptacle for plugging to a standby generator and, (2) whether the wet well and influent sewer contain adequate storage capacity to allow a response by the City's Public Works staff in the event of a

power outage. A retention time of one hour is assumed to be adequate and a retention time of less than one-half hour is unsatisfactory.

All lift stations have recommended improvements of varying degrees that should be included in future planning. The City has made improvements throughout the years and continues to anticipate future needs. Lift stations are rehabilitated every 15 years. Pumps, controls, and wet wells are regularly inspected.

1.2.1 Station Hydraulic Capacity

The criteria for determining the adequacy of the hydraulic capacity is twofold. One is conformance with the Ten States Standards which the MPCA has adopted as the state's guidelines. This standard requires a 30 minutes hydraulic wet well detention at average daily flow.

The second criterion is that the number of starts for each pump should not exceed four per hour.

Lift station wet well capacities are presented in the tables below.

Table 2 – Lift Station Capacities

Station No.	Avg. Daily W/W Flow (gpd)	Max. Daily W/W Flow (gpd)	MCES Peaking Factor	Peak Hourly W/W Flow (MCES Peaking Factor) (gpd)	Average Pump Rate (gpm)	Wet Well Volume (below influent) (gal)	Wet Well DT (min)	Ten States Standards Requirement	
								DT (min)	Volume (gal)
3	718,826	1,437,653	3.3	2,372,127	499	1,151	2.3	30	14,976
4	313,733	627,466	3.7	1,160,811	218	846	3.9	30	6,536
5	256,536	513,072	3.8	974,837	178	417	2.3	30	5,345
6	1,060,421	2,120,842	3.1	3,287,304	736	4,406	6.0	30	22,092
7	652,882	1,305,763	3.4	2,219,797	453	7,948	17.5	30	13,602
8	94,428	188,856	4.0	377,712	66	952	14.5	30	1,967
9	359,417	718,834	3.7	1,329,842	250	1,430	5.7	30	7,488
10	1,299,586	2,599,171	3.0	3,898,757	902	2,651	2.9	30	27,075
11	490,392	980,784	3.5	1,716,372	341	1,715	5.0	30	10,217
12	118,786	237,571	3.9	463,264	82	876	10.6	30	2,475
13	164,477	328,954	3.9	641,460	114	1,523	13.3	30	3,427
16	155,340	310,680	3.9	605,826	108	1,480	13.7	30	3,236
18	682,279	1,364,558	3.3	2,251,521	474	2,022	4.3	30	14,214
19	82,238	164,477	3.9	320,730	57	1,305	22.8	30	1,713
20	252,814	505,627	3.8	960,692	176	1,043	5.9	30	5,267
21	130,968	261,936	3.9	510,775	91	1,051	11.6	30	2,729
22	167,530	335,059	3.9	653,365	116	835	7.2	30	3,490
23	969,271	1,938,542	3.2	3,101,668	673	2,816	4.2	30	20,193
24	213,214	426,427	3.8	810,212	148	1,102	7.4	30	4,442
25	161,438	322,877	3.9	629,610	112	1,195	10.7	30	3,363

Table 3 – Lift Station Detention Time Calculations

Station No.	Pump Rate 1	Pump Rate 2	Pump Rate 3	Average Pump Rates (gpm)	Average Flow Rate (gpd)	Depth (ft)	*Diameter (ft)	Cross Sectional Area (sf)	Top Elev. (ft)*	As Built top elev	As built wet well invert	As builts Incoming Pipe Invert Elev. (ft)	Wet Well Floor to Influent Sewer Invert (ft)	Wet Well Volume (gal)	Wet Well Detention Time (hr)	Forcemain Diameter (in)	Forcemain Length (ft)	Sewer Line Volume (gal)	Sewer Line Detention Time (hr)	Total Detention Time (hr)
3	497.07	501.30		499	718826	19.1	6	28.3	983.8	983.6	965.2	970.6	5.4	1,151	0.04	6	446	655	0.02	0.06
4	213.64	222.10		218	313733	12.3	6	28.3	983.0	983.6	972.0	976.0	4.0	846	0.06	6	922	1,354	0.10	0.17
5	181.91	174.39		178	256536	14.0	4	12.6	992.0	992.1	979.7	984.2	4.4	417	0.04	6	187	275	0.03	0.06
6	705.07	740.32	763.82	736	1060421	17.7	10	78.5	984.0	984.0	967.0	974.5	7.5	4,406	0.10	12	2,524	14,828	0.34	0.44
7	517.25	402.30	440.62	453	652882	30.2	12x10.67	128.0	991.0	994.5	964.2	972.0	7.8	7,948	0.29	18	13,980	184,791	6.79	7.09
8	63.46	67.69		66	94428	20.2	6	28.3	958.0	101.4	79.8	84.3	4.5	952	0.24	4	1,436	937	0.24	0.48
9	251.71	247.48		250	359417	15.4	6	28.3	951.0	951.0	935.2	942.0	6.8	1,430	0.10	4	2,093	1,366	0.09	0.19
10	913.77	891.21		902	1299586	21.2	8	50.3	983.5	983.0	962.8	969.8	7.0	2,651	0.05	10	2,448	9,987	0.18	0.23
11	350.42	330.68		341	490392	26.8	6	28.3	1011.0	1012.0	984.5	992.6	8.1	1,715	0.08	8	1,289	3,366	0.16	0.25
12	86.72	78.26		82	118786	16.4	6	28.3	1086.4	1089.1	1072.3	1076.4	4.1	876	0.18	4	1,113	727	0.15	0.32
13	118.45	109.99		114	164477	26.2	6	28.3	987.0	987.0	961.0	968.2	7.2	1,523	0.22	4	1,650	1,077	0.16	0.38
16	101.53	114.22		108	155340	24.0	6	28.3	1074.0	1073.6	1049.0	1056.0	7.0	1,480	0.23	4	1,478	965	0.15	0.38
18	475.92	471.69		474	682279	40.9	6	28.3	993.3	996.2	954.0	963.6	9.6	2,022	0.07	8	2,000	5,222	0.18	0.25
19	57.11	57.11		57	82238	24.3	6	28.3	1010.0	1011.7	987.4	993.6	6.2	1,305	0.38	4	760	496	0.14	0.53
20	177.68	173.45		176	252814	17.2	6	28.3	980.0	981.5	964.0	968.9	4.9	1,043	0.10	6	1,192	1,751	0.17	0.27
21	90.95	90.95		91	130968	19.4	6	28.3	995.3	995.4	975.9	980.9	5.0	1,051	0.19	4	1,305	852	0.16	0.35
22	116.34	116.34		116	167530	25.8	6	28.3	1001.7	1001.7	975.9	979.8	4.0	835	0.12	4	627	409	0.06	0.18
23	688.15	658.06		673	969271	40.0	8	50.3	1008.0	1008.4	968.5	976.0	7.5	2,816	0.07	10	2,813	11,476	0.28	0.35
24	141.72	154.41		148	213214	20.7	6	28.3	1010.0	1010.9	990.4	995.6	5.2	1,102	0.12	4	2,813	1,836	0.21	0.33
25	107.88	116.34		112	161438	20.4	6	28.3	1039.1	1039.1	1018.7	1024.3	5.6	1,195	0.18	4	1,300	0	0.00	0.18

- LS7 has two wet wells, calculations are based on both.

1.2.2 Safety

Safety issues affect both the permanent constructed facility and operational procedures. Construction items address ladders, fall protection devices, presence of 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 which the City employs do not necessarily require construction of permanent facilities, but may include use of portable equipment.

1.2.3 Potential for Sewer Back-up

The evaluation of the potential for sewer back-ups include three items: one is a review of the history of problems at the station, two is whether the station contains standby power capability (either a generator or a receptacle for plugging to a standby generator) and three, whether the volume of the wet well plus the influent sewer contains adequate storage capacity to allow the City staff time to connect an emergency generator before wastewater would back-up into houses, in the event of a power outage. A detention time of one hour for the wet well plus gravity sewer is considered excellent. A detention time of 50 to 60 minutes is considered good, time of 40 to 50 minutes considered average, 30 to 40 minutes undesirable, and less than 30 minutes unacceptable. The previously presented table shows the calculated detention time for each station.

1.2.4 Pump Review and Capacity

Pump review is a review of pump capacity, pump age and maintenance record.

Pump capacity is a determination of whether the station has capacity to pump the peak hourly flow with the largest pump out of service.

Pumps are typically designed to operate for a period of fifteen years. Any pumps older than 15 years are subject to failure due to age and wear.

Maintenance review is a summarization by the City staff of the amount of maintenance required on each pump.

1.2.5 Wet Well Physical Condition

The station physical condition evaluation addresses the physical condition of each station's concrete, hatches and miscellaneous metals. Steps into wet wells are considered unacceptable because they can become rusty and are not capable of being retrofitted with full restraints.

1.2.6 Valve Vault or Dry Well, Physical Conditions

The physical condition of the valve vault addresses the condition of the concrete, the steps, access into the station, piping and valves and the overall cleanliness of the structure.

The physical condition of the dry well addresses the condition of the chamber, the ladder, access into the station, piping and valves, and the overall cleanliness of the structure.

1.2.7 Electrical Components

The electrical review evaluates the adequacy of the electrical service to each station, the adequacy of standby power, and the condition and accessibility of the pump control panel. Adequacy of electrical service considers the number of power outages and whether operation of the pumps causes dimming of lights in neighborhood. An unacceptable rating (rating of 5) is given to any station which requires an operator to enter a below ground structure to operate the pumps.

1.2.8 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
- Whether back-up pump controllers exist
- Whether SCADA transmits to the central control station

1.2.9 Suitability of Location

The suitability of location addresses:

- Each station's service area, maintenance accessibility, aesthetics, visibility and proximity to adjacent homes
- Potential for damage by the public
- Position within rights-of-way, easements or City-owned property.

Accessibility from a public street is considered very important. The potential for public damage is a consideration of whether the station is susceptible to being struck by an automobile or to vandalism.

A private driveway to the stations is deemed important to allow City staff to work without being threatened by passing traffic.

For the visibility to neighbors and proximity to homes criteria, it is assumed that a lift station detracts from value or desirability of an adjacent home, and aesthetic treatment at the lift station mitigates this detriment.

1.2.10 Acceptability Ratings

The table below ranks the condition of each station against the nine general parameters, based. The detailed review of all criteria for each of the 20 stations is contained in Appendix A.

Table 4 – Lift Station Acceptability Rating

Rating System
1 - Excellent 2 - Good 3 - Average 4 - Below Average 5 - Unacceptable

Lift Station	Hydraulic Capacity	Safety	Back-Ups	Pump Review	Wetwell Physical Condition	Valve Vault Physical Condition	Electrical	SCADA	Location
Lift Station 3	4	3	3	1	2	2	3	1	2
Lift Station 4	4	3	3	1	3	2	3	1	2
Lift Station 5	4	2	3	1	5	2	1	1	1
Lift Station 6	4	1	1	1	1	1	1	1	1
Lift Station 7	4	1	1	1	2	2	1	1	1
Lift Station 8	2	3	3	1	2	3	2	2	3
Lift Station 9	4	2	3	1	2	3	2	2	2
Lift Station 10	4	2	3	1	4	2	1	1	2
Lift Station 11	4	3	3	1	3	2	1	1	3
Lift Station 12	2	3	3	2	2	2	1	1	1
Lift Station 13	2	4	3	1	2	2	3	2	2
Lift Station 16	2	4	3	1	2	2	1	1	2
Lift Station 18	2	3	3	1	3	2	1	1	1
Lift Station 19	1	2	3	1	3	2	1	1	1
Lift Station 20	4	4	3	1	2	2	2	2	1
Lift Station 21	2	2	3	1	2	2	3	2	2
Lift Station 22	4	2	3	1	3	2	3	2	2
Lift Station 23	4	1	3	1	3	2	2	2	1
Lift Station 24	4	1	3	1	3	2	2	2	2
Lift Station 25	4	1	3	1	1	1	2	1	1

1.3 System Analysis

1.3.1 MCES Sewer Infrastructure

Treatment of wastewater is provided by the MCES at the Empire Plant in Empire Township and the Seneca Plant in Eagan. MCES interceptor sewers collect and convey flow through the City. Flows from Apple Valley, Burnsville, Rosemount, Farmington, Elko New Market Township, and Eureka Township enter Lakeville and are monitored by MCES meters. By analyzing the flow from all meters, it is possible to isolate the flow exclusively from Lakeville.

The current Lakeville flow formula is as follows:

$$Lakeville\ Flow = M630 + M643A + M649 - M641 - M642 - M643 - M644 - M648 - M656$$

Lakeville is divided into three meter districts – M630, M643A, and M649. The meter districts were used to analyze the system and the flow formulas for each are as follow:

$$M630 = M630$$

$$M643A = Flows\ from\ North\ Creek\ District + M641 + M642 + M643 + M644 + M648$$

$$M649 = Flows\ from\ Orchard\ Lake\ District + Flows\ from\ Lake\ Marion + Flows\ from\ South\ Creek + M656$$

1.3.2 Sewer System Modeling

In order to provide the City and the MCES with existing and future planning information, the existing sewer system was evaluated using a hydraulic flow simulation model, InfoSWMM. This model was used to route sewer flows through the developed sewer structure of pipes, manholes, and lift stations. The model calculates various hydraulic parameters during normal flow, surcharge, backflow, flooding and pumping conditions.

The City's existing GIS sewer structure data, as-built information from the City's sewer construction plan sheets, lift station information and lift station inspections were compiled to configure the model. The model evaluated current and future sewer capacities and identified required system improvements.

The land use method was used to generate dry weather sanitary sewer flows. Parcel acres were multiplied by the sanitary loading rate based on existing land use and then assigned to the manhole considered most likely to receive those flows. Sanitary loading rates, listed in the table below were used to determine base flow rates throughout the City.

Table 5 – Sanitary Loading Rates

Land Use Code	Sanitary Loading Rate (Gal/Acre/Day)	Land Use Description
AIRPORT	1000	Airport
C	1000	Commercial
HDR	1700	High Density Residential
I	750	Industrial
L/MDR	660	Low/Medium Density Residential
LDR	400	Low Density Residential
LI/W	1000	Warehouse/Light Industrial
M/HDR	1500	Medium/High Density Residential
MDR	1200	Medium Density Residential
MH	1000	Manufactured Housing
OP	1000	Office Park
ORT	1000	Office/Residential Transition
P	65	Parks
PAQP	125	Public and Quasi-Public
RD	0	Restricted Development
RDR	400	Rural Density Residential
SPA	N/A	Special Plan Area
W	0	Water

Calculations using the land use method resulted in a total flow on par with what metered MCES average daily flow from 2005-2016 of 4.281 MGD. The land use calculations were refined by establishing unique loading rates per meter district. The loading rates were modified based upon the MCES metered flow values for each of the three meter districts. The table below shows the unique land use loading rates for each district.

Table 6 – Sanitary Loading Rates Per Meter District

Land Use Code	Land Use Description	Sanitary Loading Rate (Gal/Acre/Day)		
		M630	M643A	M649
AIRPORT	Airport	N/A	N/A	100
C	Commercial	1200	1200	700
HDR	High Density Residential	1800	1800	1800
I	Industrial	N/A	N/A	500
L/MDR	Low/Medium Density Residential	1000	900	650
LDR	Low Density Residential	550	440	385
LI/W	Warehouse/Light Industrial	N/A	N/A	500
M/HDR	Medium/High Density Residential	1700	1750	1200
MDR	Medium Density Residential	N/A	1600	1000
MH	Manufactured Housing	N/A	1000	750
OP	Office Park	N/A	1000	500
ORT	Office/Residential Transition	1000	1000	500
P	Parks	N/A	5	5
PAQP	Public and Quasi-Public	350	250	75
RD	Restricted Development	0	0	0
RDR	Rural Density Residential	N/A	N/A	100
SPA	Special Plan Area	N/A	N/A	N/A
W	Water	0	0	0

To determine future wastewater flow projections, the same land use method was used with the city's designed future land use. The refined existing loading rates per district were used to calculate future flows for the developed parcels. For undeveloped parcels in the future land use plans, modified loading rates were established assuming new efforts for water conversation and reduced inflow and infiltration. It was also assumed that there would be a 30% reduction in flows due to rights-of-way, wetlands, basins, and other open spaces. The table below shows the modified loading rates for future, undeveloped parcels.

Table 7 – Modified Sanitary Loading Rates for Future, Undeveloped Parcels

Land Use Code	Land Use Description	Sanitary Loading Rate (Gal/Acre/Day)			
		M630	M643A	M649	Farmington Outlet
AIRPORT	Airport	N/A	N/A	50	50
C	Commercial	700	700	700	700
CMU	Corridor Mixed Use*	N/A	896	N/A	1400
HDR	High Density Residential	1485	1485	1400	500
I	Industrial	N/A	N/A	500	540
L/MDR	Low/Medium Density Residential	540	540	540	270
LDR	Low Density Residential	270	270	270	400
LI/W	Warehouse/Light Industrial	N/A	N/A	400	1215
M/HDR	Medium/High Density Residential	1215	1215	1215	742
MDR	Medium Density Residential	742	742	742	750
MH	Manufactured Housing	N/A	750	750	500
OP	Office Park	N/A	N/A	500	500
ORT	Office/Residential Transition	1000	1000	500	5
P	Parks	5	5	5	75
PAQP	Public and Quasi-Public	275	250	75	0
RD	Restricted Development	0	0	0	14
RDR	Rural Density Residential	14	N/A	14	0
SPA	Special Plan Area	N/A	N/A	N/A	0
W	Water	0	0	0	50

To properly model anticipated peak flows, meter data from the largest, metered storm event in June 2014 was analyzed to determine flows for existing and future wet weather conditions. For future conditions, it is assumed that the expanded system is tight and has little to no inflow and infiltration. The wet weather flows along with the calculated dry weather flows generated the total flow for the system during wet weather events.

2 Comprehensive Plan with System Needs

2.1 Population Trends

The population of the City of Lakeville is projected to increase 30% over the next 20 years. Population and household trends are shown in the table below. Metropolitan Council predicts a Lakeville population of 83,500 by the year 2040. The most significant change in Lakeville's population will be the result of increased density from changing land use. Table 8 provides a breakdown of population, households, and employment in 10-year increments for areas tributary to each MCES interceptor and areas that are not presently served by sanitary sewers.

Table 8 – Population, Household and Employment Forecast

Interceptor	Population			Households			Employment		
	2020	2030	2040	2020	2030	2040	2020	2030	2040
3-BV-39	5,513	5,789	6,078	1,885	1,978	2,088	1,271	1,338	1,377
3-LV-610	24,790	28,106	30,734	8,280	9,578	10,756	2,524	2,910	3,209
7103-1	21,901	29,232	32,162	7,758	10,590	11,795	9,846	13,201	14,645
7203	469	1,901	2,644	166	676	953	29	165	228
7409		3,405	4,242		1,194	1,515		73	103
800717		1,690	2,281		716	1003		134	172
8016	5	6	6	1	1	2	1,539	1,667	1,777
9601	1,404	1576	1,714	489	555	611	25	33	47
In City Limits/Not in Sewershed	10,218	2,895	3,640	3,722	1,012	1,277	2,965	779	942
Total	64,300	74,600	83,500	22,300	26,300	30,000	18,200	20,300	22,500

2.2 Future Land Use

The information contained in this Comprehensive Sewer Plan Update is based on the ultimate land uses which are anticipated to occur at full development. The Ultimate Land Use Map is contained in Figure 4.

2.3 Sanitary Sewer Design Criteria

2.3.1 Flow Rates

Anticipated wastewater flows from the various sub-districts were determined by applying flow rates based on land use in each area. Actual metered water usage was used to calibrate the flow to MCES metered flow from Lakeville. Flows from future areas anticipated to undergo redevelopment were assigned based on the current land use plan and preliminary development plans available from the City.

2.3.1.1 Residential Flow Rates

Future flows were calculated using the land use method with the calibrated loading rates per land use from the existing land use. Loading rates were calibrated using metered data from winter months. The same loading rates were then applied to the future land use, to determine future

system flows. Densities for different residential types varied from 270 gallons per day per acre to 1,800 gallons per day per acre.

For undeveloped, residential parcels, loading rates were based upon the loading rates for the existing residential areas. The rates were adjusted down assuming the water conservation efforts and new construction would reduce flows.

2.3.1.2 Non-Residential Flow Rates

Generally, Lakeville's non-residential land use is made up of commercial and industrial users that do not contribute disproportionately to the sewer system in comparison to residential users. The City separates sewer flows from non-sewered water use for major users. The separated information for industries was used for this study.

Model calibrations to assess existing land use loading rates resulted in an industrial rate of 500 Gallons per Acre per Day (GAD) and a commercial rate of 500-700 GAD to estimate flows from other undeveloped properties within the City where future land use is shown to be industrial or commercial. 0 GAD was used for parks and open spaces (noted as Active) and 500-1,200 GAD was used for institutional, commercial and office space.

2.3.2 Design Flows

The sewer design flows were developed based on metered data from MCES. An average daily flow of 4.281 MGD for the City was used in the model. The flow was matched in the model by adjusting dry weather model conditions for each meter district.

To determine ultimate flow rates in year 2040, calibrated loading rates for each land use type were built into the model for future development and land use conditions. Average daily flow rates calculated by the land use method were compared to the MCES projections for the City and can be seen in the table below.

Table 9 – Wastewater Flow Projections for the City of Lakeville

Year	Flow Projection by Population (MGD)	Model Flows by Land Use (MGD)
Existing	4.28	4.28
2040	6.83	7.21

For 2040 values, the flow rates vary due to the method of analysis. The flow projections were calculated by population while the model projections were calculated by the land use method.

Beyond Lakeville's flows, there are flows from surrounding communities that enter the system. The flows are monitored by MCES meters. The metered average flow rates were included in the model to most accurately reflect the full demand on Lakeville's system. The future flows were calculated based upon future population projects and current flow rates. The table below shows the existing and future contributing flows integrated into the model obtained from MCES.

Table 10 – Flow from Contributing Communities

Meter	Existing Flow (MGD)	Future Flow Projection (MGD)
M643	1.406	1.532
M648	0.815	0.889
M644	1.005	1.094
M641	0.307	0.335
M642	0.237	0.327
M656	0.220	0.429
TOTAL	**3.990**	**4.606**

The Lakeville flow and contributing communities' flows together create the complete loading of Lakeville's system. The total flow collected in the meter districts represents the total loading. The flows for each district for existing and future conditions are shown below in the table below.

Table 11 – Existing and Future Average Flow for the Lakeville System

Meter	Existing Flow (MGD)	Future Flow Projection (MGD)
M630	.49	.56
M643A	5.57	6.61
M649	2.17	3.89
Farmington Outlet	N/A	.74
Total Flow	**8.23**	**11.80**

Considering all flows on the Lakeville system, the following table shows the peak flow for existing and future conditions.

Table 12 – Dry and Wet Weather Total Peak Flows

Total Peak Flow (MGD)			
Existing Conditions		Future Conditions	
Dry Weather	Wet Weather	Dry Weather	Wet Weather
14.03	20.81	19.94	27.16

Table 13 – Pipe Capacity and Anticipated 2040 Peak Flow for MCES Interceptor Connections

ID	MCES Meter District	Connects to MCES Interceptor [Yes/No]	Pipe Diameter [ft]	Pipe Capacity [MGD]	Percent Slope [%]	Anticipated 2040 Peak Flow [MGD]	2040 Reserve Capacity [MGD]
11AM011-11BM034	M649	Yes	3	20.26	0.22%	6.548	13.71
11BM021-11BM009	M649	Yes	1.25	1.87	0.20%	0.375	1.50
11BM035-11BM034	M649	Yes	1.333	3.39	0.54%	0.119	3.27
56AM007-56AM004	M643A	Yes	1.5	2.14	0.10%	0.386	1.76
62BM031-62BM027	M643A	Yes	1	1.03	0.20%	0.274	0.76
63AM103-63BM001	M643A	Yes	1	1.75	0.34%	0.158	1.59
63BM068-63BM002	M643A	Yes	1.25	4.49	0.68%	0.173	4.31
64AM0146417-64AM001	M643A	Yes	1	1.80	0.36%	0.371	1.43
69BM026-70AM031	M643A	Yes	1.75	7.41	0.52%	3.006	4.40
70AM021-70AM0246543	M643A	Yes	1	0.92	0.16%	0.213	0.71
70BM034-NODE_277_SEH	M643A	Yes	1.25	1.67	0.16%	0.300	1.37
79BM053-79BM042	M643A	Yes	1	1.23	0.17%	0.230	1.00
75BM007-75BM008	M630	Yes	2	5.08	0.12%	0.234	4.84

2.4 Current and Future System Needs

Three scenarios were modeled for dry and wet weather conditions – existing flows with existing network, future flows with existing network, and future flows with recommended network expansions. Modeling existing flows with existing network analyzes the current capacity of the system. Assessing future flows with existing network scenario isolates the existing system and observes its ability to convey future flows. The future flows with recommended network expansion scenario determines the capacity of the existing system and recommended potential network expansions. Future expansions are based upon the previous Sanitary Comprehensive Plan done by SEH. The potential expansions test possible pipe diameters and locations based upon the surrounding parcels.

The model analyzed the hydraulic capacity and velocity for each scenario. Hydraulic capacity, determined by the d/D ratios, evaluate the percent of the pipe capacity that is utilized. Ratios between 0.6 and 0.7 should be considered to be within a “warning threshold,” meaning that further development or additional flow contributing to these segments should be considered and may not be allowed without pipe upsizing. Ratios greater than 0.7 should be closely looked at to determine whether the pipe capacity restriction at that point will cause a back-up or other potential risk of sewage spill. In terms of velocity, it is ideal for the flow velocity to remain with a range of 2 – 10 ft/s. Velocities smaller than 2 ft/s present the risk of stagnant flows and allow for solids to settle. Velocities greater than 10 ft/s can erode the lining of the pipe and other supporting structures.

For existing and future conditions, flow velocities consistently stay below the 10 ft/s threshold. Along the trunk lines the velocities remain between the ideal range of 2 ft/s – 10 ft/s. However, the majority of the system’s branches remain under 2 ft/s. For the system, it is not of concern that that flow within the branches remains below 2 ft/s. The pipes are small in diameter and convey limited flow compared to other parts of the system. The City’s maintenance program for pipe cleaning is appropriate and based on the history of back-ups, addresses this concern reasonably.

The results show minor concerns with the system’s hydraulic capacity in Figure 6a, Figure 6b, Figure 8, and Figure 10. The majority of the system d/D values remain below 0.6. There are some areas of concern where the d/D ratio exceeds the .7 limit. At Lift Station 7, the upstream and downstream pipes exceed the hydraulic capacity limit. It was found that the pump is undersized. Currently, the pump capacity is .653 mgd. The model shows that approximately 2.2 mgd enters the lift station in existing wet weather conditions and 3.26 under future wet weather conditions. The model was adjusted to reflect a pump capacity of 3.4 mgd assuming improvements were made. The results from the modified pump indicate that the surrounding structures have the capacity to convey increased flow. Results for the existing and corrected pump capacity can be seen in Figure 6a and Figure 6b accordingly. For future flow conditions, the pipes located directly downstream of Lift Station 11 breach the 0.7 limit. It is recommended to upsize these pipes to provide sufficient downstream capacity.

At Dakota Heights Park and along Italy Path the pipe grades transition drastically and flow collects along lengths of lower grade. It is likely that this result is due to limitations to the model and may not fully reflect in-ground conditions. These areas are not seen as a concern but have been included in the figures for reference. It is not recommended to make any structural changes and monitor if necessary.

Insert A

At Falcon Ave, 175th St, and Fairfax Avenue, an upstream manhole has a weir which controls flow of the two downstream branches. The downstream branches have diameters of 8” along Fairfax and 15” along the eastern branch until both converge on the 33” interceptor. Under existing conditions, the 8” pipes have the capacity to handle additional flow which passes over the weir. For future conditions, the additional flow in the manhole along with the flow collected downstream surpasses the capacity of the 8” pipe. The data reveals that the pipes in the section have a grade less than the minimum value allowable. It is recommended to monitor the section during extreme wet weather conditions and possibly relay the pipe.

Insert B

In regards to the potential expansion, the existing and expanded system will overall adequately handle the incoming future flows. During wet weather events, there are locations along the interceptor and the surrounding potential expansions upstream of M643A with limited hydraulic capacity. Since the limited capacity occurs during extreme wet weather events no modifications are recommended and the interceptor should be monitored during such circumstances. The potential expansions pipes have diameters between 8”-10” and tie into the 48” interceptor. The pipes have the same invert elevation as the interceptor (typical design has the center or top of pipes matching with the interceptor which limits potential issues such as this). A high water level

remains constant between the smaller and larger diameter pipes. However, in the smaller pipes the constant water depth causes the pipes to surcharge and have high d/D values. Future detailed design of the potential expansions should take this into account. It is necessary to assess the previous areas of concern and the system will not require significant modifications to support future flows.

Table 14 – Future Pipe Diameters and Lengths

Pipe Diameter (inches)	Total Length (ft)
4	62
8	83,680
10	21,574
12	7,696
15	6,699
18	5,829
Grand Total	**125,540**

Table 15 – Anticipated Construction Year for Future Sanitary Networks

Connection Pipe ID**	Connection Size [in]	Manhole Connection	Anticipated Construction Year*
09AM007-09AS004	15	09AM007	2022-2050
17BS002-17BM010	12	17BM10	2019-2025
CDT-1785	15	14AM009	2022-2040
CDT-1827	12	13BM011	2040-2050
CDT-2267	18	54AM0396572	2022-2023
CDT-2403	30	MCES MH 33 Interceptor 271 Farmington Outlet	2022-2040

* Highly dependent on development pressures and opportunities

** See Figure 15 for map of locations

3 Operation and Maintenance Plan

The purpose of an operation and maintenance plan is to serve as a guide to operate, monitor, maintain, and rehabilitate the City's Sanitary Sewer system. Primary goals of the plan 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.

3.1 Existing Public Works Utility Maintenance Division

Lakeville Public Works has developed over the years as infrastructure additions warranted additional staff and equipment. Public Works staff, management staff and the elected officials of the community have worked together to develop an efficient staff that is cross-trained in various other aspects of duties assigned to all of Public Works.

3.1.1 Sewer Maintenance Districts

3.1.2 Sewer Maintenance Equipment

The City has equipment typical of most communities the size of Lakeville. The list of equipment specific to sewer maintenance includes:

- Jetter Truck
- Vactor Truck
- Closed-Circuit Television (CCTV) Truck
- Rodder Trailer
- Hydraulic Pump (750-1000 GPM)
- Trailer Mounted Generator (2)

The City has sufficient sewer maintenance equipment to maintain its municipal sewer system. There may be times when additional needs require contracting for services. Maintaining the current equipment mix with proper maintenance and rotation of equipment in/out of service will likely serve the community in an efficient manner for many years.

The City does have televising equipment as part of its jetting equipment. The equipment is best used to inspect sewers as they are cleaned to help ensure that all debris have been removed.

3.1.3 City Maintenance Staff

The public works utility staff includes one superintendent, one utilities supervisor, one utilities lead, and 12 staff positions. This staff is cross-trained to assist in other areas of public works. Areas of water system maintenance, snow plowing, and disaster clean-up occasionally require that sewer staff perform duties outside the area of sewer maintenance. Staffing levels for public works utility staff seem appropriate for existing demands but additional staff will be necessary as the systems expands and ages.

The City should evaluate the prioritization process and assign a higher level of importance to the maintenance of the sewer system. The current staff level combined with the current prioritization process creates a situation that makes it impossible to accomplish the goals outlined in the report, on top of regular maintenance duties.

3.2 System Needs

3.2.1 Gravity Sewer

City staff indicates that a significant portion of its time and budget is used in areas constructed of VCP. This is a result of the root intrusion of joints in this type of pipe. This is not unique to the City 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 these types of sewers.

To reduce the strain and work for the sewer maintenance staff, a more aggressive lining program should be undertaken. Rehab of VCP is estimated to cost $5,700,000.

Maintenance in the sewer system typically involves cleaning the sewer using a combination of jetter and vactor trucks to remove debris from the sewer pipes. Root intrusion in joints of the pipe requires cutting and removal to remove obstructions in the pipe and 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. Unmanaged root growth can also cause the VCP pipe to crack, impacting the integrity of the pipe. Cracked pipes allow groundwater and soil into the sewer system, which can cause road collapses. The 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.

The League of Minnesota Cities (LMC) Insurance Trust provides insurance coverage for the City to protect against claims resulting from sewer backups and other claims that may result from 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. LMC have noted increased claims in specific areas of sewer systems throughout the state. One item of notice is VCP sewers having higher than normal claims. They have suggested a cleaning of VCP sewer pipes every three years.

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. Lakeville 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 the City, restaurant grease has been a growing problem, requiring more time and attention from City staff.

3.3 Recommended Maintenance Program

Because of the high percentage of VCP pipe comprising the sewer system in Lakeville, 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.

Proper monitoring and maintenance of the existing system is an important factor in the long-term viability of the system. Maintaining the system 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. It is recommended to create a program specifically for VCP cleaning, televising and rehabilitation to ensure the system lasts and to reduce potential expenses from collapsed/broken sewers or other backups that result from lack of maintenance.

3.3.1 System 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 of cleaning all of its system at least once every five years.

For reasons mentioned above, LMC recommends that cities clean VCP sewers every three years, or more often when conditions require it, to minimize sewer backups. (Lakeville has approximately 28 miles of VCP sewer). Similarly, they recommend that other sewer systems, that are not VCP, be cleaned every five to seven years. Lakeville has over 240 miles of sewers in this category.

Establishing a jetting plan to clean approximately 33 miles per year in perpetuity in Lakeville meets the recommendations and practices of the LMC and other communities. Setting a goal of 33 miles per year allows a combination of lines requiring annual cleaning; VCP on a three-year rotation; and all other on a five-year rotation. The City currently cleans 65 miles of sewer each year plus additional trouble areas. The current program addresses the needs of the portions of the sewer system that are VCP of that are documented problem areas. The production rate per year is primarily controlled by two factors:

1. Number of Staff and Outside Influences including:
    a. Emergency Sewer Needs
    b. Emergency Water Needs
    c. Natural Disaster – Cleanup efforts
2. Options to increase the amount of sewers cleaned would include:
    a. Increase Sewer Maintenance Staff
    b. Double Shift Current Staff
    c. Contract Services

The miles jetted and cleaned per year is based upon the current system size. As sewer is installed for future growth the jetting and cleaning schedule will need to be modified accordingly.

3.3.1.1 System Cleaning Costs

Cleaning costs are estimated at $2,500 per mile when contracted assuming an average of $0.50/ft (may vary based upon pipe size and severity of deposition). A program to clean 65 miles per year results in a contract cost of $162,500 per year. The actual cost to the City may be different depending on the amount of work accomplished with City forces versus private contractors.

3.3.2 System Televising

Lakeville currently has a televising program. The program televises the entire system every 10 years at approximately 250,000 ft/yr. The televising records are digitally attached to GIS information.

The City has established a practice of televising sewers in areas where street rehabilitation or reconstruction is scheduled to occur. This allows the City to be efficient with infrastructure management and to avoid situations that require removing portions of a newly constructed street.

Contracts for new sewer construction should include the televising of the new sewer. A copy of the televising should be provided to the City at the end of the project. Televising provides baseline information for the sewer and validates service locations. It also reduces the need for current deflection testing.

3.3.2.1 System Televising Costs

The most efficient means to do this would be to develop a televising program that coincides with the cleaning program described above. It is recommended that the City televise the entire system every 10 years. Currently, the City televises 27 miles per year, in addition to what is performed during the PMP work. A 10-year schedule equates to 27 miles per year. Televising costs are estimated at $4,000 per mile. A program to televise 27 miles per year results in a contract cost of $108,000 per year.

3.3.2.2 Televising Schedule

Table 16 – Gravity Sewer Maintenance Summary

Activity	Quantity	Cost	Frequency	Program Cost
Cleaning & Jetting	65 miles	$162,500/year	Annually	Annual Expenditure
Televising	27 miles	$108,000/year	Annually[1]	$520,000[2]

[1] Five year baseline development program. Future costs after five years will depend on condition of the system.

[2] One time cost to develop baseline data. Annual cost thereafter will depend on system condition.

3.3.3 Equipment

The City has developed an equipment inventory and replacement plan that satisfies the needs of the community. Additional equipment will be required for the expanding system. The current jetting truck should be replaced by at least one or possibly two combination trucks. Additional needs are often more efficiently contracted rather than owning specialized equipment. Examples of items often contracted for include televising and the jetting and cleaning of larger sewer lines and laterals.

3.3.4 Lift Station Access Procedures

The City should continue to follow written maintenance procedures for accessing the lift stations. The procedures should include the following items:

- Maintain barriers or grating whenever structures are open - either temporary or permanent
- 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

3.3.5 Lift Station Maintenance

It is important that the City maintain an active preventive maintenance program for each station. Currently, the City performs weekly maintenance checks, regular pump inspections, wet well cleaning biannually, pump replacements, and scheduled rehabilitation every 15 years. It is recommended to expand on this program. The program should consist of two parts: actions performed on a twice weekly basis and actions performed annually. A SCADA system would provide more complete recording with less City staff time, however, the City Utilities staff performs 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 implementation of a GIS compatible maintenance record system.

The following maintenance tasks should be performed and recorded twice weekly:

- Visual site inspection.
- Visual inspection of 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 per year each pump should receive a field and shop inspection, by a pump engineer, which covers the following items:

- 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.

3.3.6 Lift Station Improvements

The previous Table 4 contains acceptability ratings for each sewage lift station in the City. Any parameter which received a rating of above average are not listed as requiring improvement during the next 10 years in the capital improvement plan.

Lift Station 3
The following items which are rated average should be corrected within the next 6-10 years:

- Install fall protection at wet well & dry vault
- Replace wet well steps
- Replace controller screen/controller

Lift Station 4
The following items which are rated average will likely require correction within the next 6-10 years:

- Install fall protection at wet well & dry vault
- Replace wet well steps
- Provide H2S resistant lining to protect against corrosion and reduce inflow and infiltration

Lift Station 5
The following items which are rated unacceptable should be corrected within the next 1-2 years:

- Repair concrete in wet well
- Provide H2S resistant lining to protect against corrosion and reduce inflow and infiltration

The following items which are rated average will likely require correction within the next 6-10 years:

- Install fall protection at wet well & dry vault
- Replace wet well steps

Lift Station 6
Lift Station 6 is a new station, constructed in 2016. No suggestions for improvements at this time.

Lift Station 7
Lift Station 7 should be upgraded with new pumps, new forcemain, new valve vault, and new control panel as future flows increase.

Investigate replacing existing hatch and safety netting with aluminum access hatch and steel fall protection, should the hatch ever need replacement/rehabilitation.

Lift Station 8
The following items which are rated average will likely require correction within the next 6-10 years:

- Replace wet well hatch
- Remove and re-attach rails
- Reinstall drain or pour higher valve vault base to allow for water to drain from valve vault

This station was noted to have issues due to rags in the system. Regular cleaning should be performed to minimize back up potential. Installation of new pumps with N-style impellers would be an alternative.

Lift Station 9
The following items which are rated average will likely require correction within the next 6-10 years:

- Grout valve vault base to allow for water to drain from valve vault

Lift Station 10
The following items which are rated unacceptable should be corrected within the next 3-5 years:

- Repair concrete in wet well
- Provide H2S resistant lining to protect against corrosion and reduce inflow and infiltration

The following items which are rated average will likely require correction within the next 6-10 years:

- Install fall protection at wet well & dry vault
- Remove root balls

This station was noted to have roots in the wet well. Regular cleaning and maintenance should be performed to reduce chance of backups or other related issues.

Lift Station 11
The following items which are rated average will likely require correction within the next 6-10 years:

- Investigate replacing existing hatch and safety netting with aluminum access hatch and steel fall protection, should the hatch ever need replacement/rehabilitation.

Lift Station 12
The following items which are rated average will likely require correction within the next 6-10 years:

- Investigate replacing existing hatch and safety netting with steel access hatch and steel fall protection, should the hatch ever need replacement/rehabilitation.

Lift Station 13
The following items which are rated below average will likely require correction within the next 3-5 years:

- Replace wet well hatch latch

The following items which are rated average will likely require correction within the next 6-10 years:

- Update/replace communication system
- Investigate replacing existing hatch and safety netting with aluminum access hatch and steel fall protection, should the hatch ever need replacement/rehabilitation.

Lift Station 16
The only item rated below average was the condition of the access hatch, which was partially upgrade in 2017.

- Remove and re-attach rails

Lift Station 18
The following items which are rated average will likely require correction within the next 6-10 years:

- Provide H2S resistant lining to protect against corrosion and reduce inflow and infiltration
- Investigate replacing existing hatch and safety netting with aluminum access hatch and steel fall protection, should the hatch ever need replacement/rehabilitation

Lift Station 19
The following items which are rated average will likely require correction within the next 6-10 years:

- Provide H2S resistant lining to protect against corrosion and reduce inflow and infiltration
- Investigate replacing existing hatch and safety netting with aluminum access hatch and steel fall protection, should the hatch ever need replacement/rehabilitation

Lift Station 20
The only item rated below average was the condition of the safety hatch, which was upgraded in 2017.

- Replace steel fall protection.

Lift Station 21
The following items which are rated average will likely require correction within the next 6-10 years:

- Replace control panel

Lift Station 22
The following items which are rated below average will likely require correction within the next 3-5 years:

- Raise valve vault MH to grade
- Repair wet well hatch. If hatch needs replacing, recommend install steel safety grating

The following items which are rated average will likely require correction within the next 6-10 years:

- Replace control panel

Lift Station 23
The following items which are rated average will likely require correction within the next 6-10 years:

- Patch concrete around conduit penetrations and lift holes to eliminate I/I

Lift Station 24
No recommendations were made for improvement.

Lift Station 25
As this is a new, temporary lift station, no recommendations were made for improvement.

3.4 Inflow and Infiltration

3.4.1 Background Information

I/I is the amount of clear water entering the collection system. Infiltration is the contribution of flow that is primarily attributable to high groundwater levels, while inflow is attributed to increased surface water amounts. I/I enters the sewer system through cracked or damaged pipe; leaky joints in pipe or manholes; and through other direct connections. It is important that I/I flows be kept to a minimum to maintain pipe capacity and preserve treatment plant capacity.

The efficiency of the sanitary sewer system can be diminished if the outside sources of water are permitted to enter the sewer network. This can happen as a result of sump pumps being illegally connected to the sanitary sewer (inflow) or through the infiltration of ground water into pipes that are damaged or not properly sealed. The volume of wastewater that must be treated can be unnecessarily large during periods of heavy precipitation. The consequences of this are obvious in that the treatment system must accommodate larger volumes of wastewater.

In 2005, MCES implemented a surcharge program to address communities with excessive I/I contributions to their municipal system. The MCES began the program due to the results from an evaluation of its interceptors and treatment capacity for long-term growth. They determined that the design capacity taken up by the addition of inflow and infiltration 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. MCES has developed criteria to determine whether a community has an I/I problem. This criterion is based on comparing a peak hour factor to the I/I component of wet weather peaks.

The following data, provided by MCES, has been utilized to evaluate whether Lakeville is experiencing excessive I/I problem.

Table 17 – Lakeville Monthly Wastewater Flows (Millions of Gallons)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2000	98	97	101	93	100	98	110	103	92	92	94	95
2001	91	79	101	124	121	124	128	124	121	126	125	131
2002	123	112	125	126	126	135	127	132	140	163	133	134
2003	133	117	135	126	146	131	133	130	125	125	124	132
2004	134	126	134	125	134	133	129	120	120	120	116	123
2005	125	113	130	132	131	124	121	121	124	128	114	123
2006	124	111	129	137	149	133	125	130	123	125	120	129
2007	128	115	138	131	131	122	120	130	125	135	125	135
2008	136	128	135	138	143	135	129	124	120	123	121	126
2009	127	115	131	123	127	122	121	129	117	128	123	128
2010	129	117	141	128	130	128	128	136	127	125	118	127
2011	130	118	146	151	167	152	149	134	122	124	120	130
2012	127	118	130	128	143	137	134	134	123	123	121	129
2013	130	115	134	149	153	153	152	143	124	124	121	126
2014	124	110	135	141	155	175	157	136	119	119	117	119
2015	117	106	115	116	120	117	130	123	122	124	139	153
2016	149	131	140	141	143	142	139	144	151	154	142	153
2017	151	135	146	147	169	148	140	138	133	138	133	142

Based on the above table, average daily flow (ADF), base sanitary flow (BSF) and peak flow were determined. Flows from January to April were used to determine the BSF.

Table 18 – Estimating Infiltration and Inflow

Year	Average Daily Flow (ADF) (MGD)	Base Sanitary Flow (BSF) (MGD)	Average I/I Rate	Peak Flow (MGD)	Peak I/I Rate
2000	3.208	3.113	3%	3.54	12%
2001	3.821	2.814	26%	4.22	33%
2002	4.315	3.981	8%	5.26	24%
2003	4.265	4.168	2%	4.72	12%
2004	4.149	4.157	0%	4.34	4%
2005	4.068	4.036	1%	4.38	8%
2006	4.208	3.946	6%	4.79	18%
2007	4.202	4.100	2%	4.45	8%
2008	4.265	4.358	-2%	4.62	6%
2009	4.085	4.103	0%	4.23	3%
2010	4.201	4.165	1%	4.54	8%
2011	4.498	4.194	7%	5.37	22%
2012	4.238	4.100	3%	4.61	11%
2013	4.450	4.107	8%	5.11	20%
2014	4.403	3.943	10%	5.84	32%
2015	4.059	3.716	8%	4.94	25%
2016	4.735	4.513	5%	4.96	9%
2017	4.715	4.703	0%	5.46	14%

Efforts should be continued to reduce and manage I/I through pipeline rehabilitation, manhole sealing and lining as well as addressing private property defects within the system. Further evaluation and discussion is included in subsequent sections regarding potential City ordinance revisions for private property defects.

The City of Lakeville's I/I program includes a number of critical components. The City has a public education program encouraging voluntary compliance for reducing inflow associated with direct connections to the sanitary system. In addition, ordinance 468 requires home owners to connect existing foundation drains to the city storm system where and when publicly owned drain tiles have been installed into a city street or boulevard. In addition, it prohibits storm water discharge to the sanitary sewer.

While the City does not have a specific program solely to inspect for illicit connections, they continue to routinely identify them through water meter replacement and CCTV inspections. At that time, the owner is given 30 days to rectify the situation and remove the illicit connection from the sanitary sewer.

All new manholes are constructed to include gaskets, watertight joints, chimney seals, and concealed pick holes. In addition, the City inspects all manholes every four years to identify and remedy those that contribute to I/I.

The city televises approximately 250,000 feet of sanitary sewer every year, and inspects sanitary sewers that are located in streets subject to reconstruction. The city also inspects all mainline

sewers with CCTV every 10 years. I/I areas are identified from CCTV review and repairs are programmed in conjunction with City street reconstruction projects.

The City has completed numerous I/I studies in the past, and will complete further studies in the future as other areas as identified with I/I. It is assumed that approximately 75% of the City's I/I comes from public sewers and 25% from private sewers. At present, there is no specific schedule to implement these studies, however the City continues to clean, inspect, line and maintain their system, and I/I is continually removed from the system. Maps from a recent project area that will be lined in 2019 is included in Appendix G. The project area was chosen based on the amount of I/I entering the system. The City commits approximately $500,000 per year to projects that reduce system-wide I/I.

The table below identifies the housing inventory by year built and number of homes. Services installed prior to 1970 has to be clay and susceptible to I/I. Only 5% of houses in Lakeville meet this criteria and it is not expected that an inordinate amount of I/I comes from these services, however, they have not been inspected. It is suspected that existing services may contribute up to 25% of the systems total I/I/

Table 19 – House Inventory

House Inventory	
Year Built	**Number of Houses**
1869-1879	2
1880-1890	20
1891-1901	20
1902-1912	23
1913-1923	59
1924-1934	44
1935-1945	36
1946-1956	147
1957-1967	487
1968-1978	2,094
1979-1989	3,421
1990-2000	6,255
2001-2011	3,855
2012-2017	1,883
No Data	3,150
Total	**21,496**

3.4.2 Overall Sanitary Sewer Program Policy

3.4.2.1 Subsurface Sewage Treatment (SSTS)

As public sewers become available, the City has a policy to require residents to connect to the sanitary sewer, and all SSTS are permitted. Figure 13 shows the location of the known SSTS systems in the City of Lakeville. City code 7-5-16 references Dakota County Ordinance 113 Subsurface Sewage Treatment Systems. There are no public or privately owned community wastewater treatment systems in Lakeville. There are presently no known non-conforming SSTS's in Lakeville. As they become known, they are addressed immediately.

3.4.2.2 Local Sanitary Sewer Ordinances

Local Sanitary Sewer Ordinances are listed and described in Appendix A.

3.4.2.2.1 Grease Management

The City, by its permit with MCES, is required to manage grease in the system. The City's utility staff continually monitors the sanitary sewer system in the vicinity of restaurants or other grease producers. The City should verify that grease, oil and sand separators are installed at any additional locations where cleaning and televising identifies fat, oil and grease (FOG) issues.

3.4.2.2.2 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 building or home. This is consistent with many other communities. The City may have experienced some problems related to owner maintenance of sewer services. Most notably, are sewer backups that occur because of debris 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 services. The compliance with this is low and difficult to enforce. Options to address this issue include:

- Require permits for sewer service maintenance activities
- Require private maintenance companies to obtain a City license renewed on an regular basis

This ordinance establishes the requirements for regulation of SSTS to protect public health and safety, groundwater quality, and to prevent or eliminate public nuisances.

Permitting each service maintenance activity would be an added administrative activity that could become laborious. We recommend that the City develop a licensing program that requires maintenance companies to obtain a City license that is renewed periodically. Conditions of the permit should be notification of sewer maintenance staff of all activities on private and public sewers prior to performing the maintenance activity. Failure to comply would result in revoking of the license or prevent renewal in the future.

Another potential problem results after the City rehabilitates mainline sewers as outlined in other portions of this report. The City's line will be restored to a condition superior to most services connected to the rehabilitated sewer pipe. This can result in a continuation of I/I and root intrusion into the mainline sewer via the sewer services. Some cities have developed policies requiring services to be inspected and approved prior to reconnection to a rehabilitated system. We recommend that Lakeville develop a similar policy to coincide with the development of a rehabilitation policy.

3.4.2.3 Potential Sanitary Ordinance Revisions

Ordinance revisions are recommended for grease management and private service laterals. Ordinances are recommended to be modified to include additions of grease trap cleaning and reporting. In addition, the ordinance should include penalties for properties that are not compliant with the ordinance.

City code 7-5-10 should be modified to require residents to maintain compliant service laterals including disconnection of sump pumps and foundation drains. Properties out of compliance should be charged penalties within their sewer bill and should the property be sold, the defects must be repaired or the cost should be placed in escrow by either the current owner or

prospective owner. The City would be notified of an impending sale and be given the right to inspect the property at that time.

3.4.3 Current and Future Measures to Mitigate I/I

The City should develop a private property inspection program to continue efforts to remove I/I from the sanitary sewer system. A large portion of work to reduce I/I has been undertaken, with the completion of VCP lining. Other sources of I/I do exist, in manholes, illegal connections to the sanitary sewer system, service connections, sump pumps and potential leaks/cracks/issues from older homes.

3.4.3.1 Private Property Inspections

Private properties have potential to be high contributors of I/I to the gravity sanitary system. A program to inspect foundation drains, cracks in sewer service, roots in sewer service and sump pump connections is recommended to continue work to remove I/I from the system. Illegal discharges to the system from foundation drains and sump pumps are easy ways to remove consistent I/I contributions. Modifications to the City ordinance should be considered to allow for inspection and require correction of code incompliance related to private property service laterals.

3.4.3.2 VCP Service Connections

It is known that VCP service connections are weak points in the work to remove I/I. A lined gravity segment may still have I/I issues, stemming from cracked VCP service connections and root growth between the service connection and mainline. Root balls also can develop in the service connection and enter the mainline, causing flow issues in lined (and unlined) segments. The cost of rehabilitating service lines will exceed the cost of mainline rehabilitation. The anticipated cost to line sewer services is estimated at $5,000-$10,000 per typical 60-70 foot long service line ($90-150 / linear foot), per recent capital improvement projects in the metro area.

3.4.3.3 Sewer Lining

The program to line VCP sanitary sewer mains needs to be continued. Once complete, the next step will be removing I/I from the gravity mains by focusing on inspection and rehabilitation on RCP sewer. To determine if that would be a fruitful undertaking, a condition inventory of all gravity mains, including RCP, would need to be obtained, to determine any common issues or trouble areas in the system.

3.4.3.4 Manhole Rehabilitation

Another commonly overlooked area in the work to remove I/I is manhole rehabilitation. Manholes also crack and leak, have root growth, etc. and allow I/I to enter the gravity system. There are many options for manhole rehabilitation, ranging from replacement of adjusting rings and casting, full manhole lining to manhole replacement. Within the lining rehabilitation method, many products with different strengths/situational strengths exist on the market and can be installed at a very reasonable price. Manholes age just like pipe segments, it is recommended to assess the condition of the City's manholes with respect to age and then pursue a manhole rehabilitation project.

4 Capital Improvement Plan

The capital improvement plan serves as a guide to monitor, maintain, and rehabilitate the City's sanitary sewer system. Primary goals include the reduction of 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 this plan include:

- rehabilitation of system components with concerns related to safety, health, and welfare of City residents and employees;
- rehabilitation of system components to improve system effectiveness;
- implementation of programs to periodically evaluate system condition;
- development or expansion of maintenance programs to ensure periodic maintenance of the sewer system;
- establishing policies and ordinances to protect the City's sewer infrastructure; and
- equipment and staffing needs of the City.

4.1 Sewers

Rehabilitation of sewers in disrepair improves flow through the sewers and reduces maintenance expenditures on the system. The proper maintenance and rehabilitation of existing sewers extends the life of the sewer and reduces costly reconstruction of the system.

4.1.1 VCP Sewers

4.1.1.1 VCP Sewer Rehabilitation Cost

Rehabilitation costs of VCP sewers is show in the table below:

Table 20 – VCP Rehabilitation Costs

VCP CIPP Lining Costs			
Diameter (in)	Length (ft)	$/LF	Total
6	12	$30	$360
8	52990	$35	$1,854,650
9	95221	$40	$3,808,840
		Total	**$5,663,850**

In addition to rehabilitation of VCP sewers, private VCP services should be rehabilitated in conjunction with gravity main rehabilitation. The table below shows the summary of the costs associated with the rehabilitation efforts.

Table 21 – Sewer Summary

Activity	Quantity	Cost	Frequency	Program Cost
VCP Mainline Sewer Rehabilitation	28 miles	$1.0 mil/year	Annually[1]	$5,700,000[2]
VCP Service Rehab[3]	2,000 services	$7,500 per service	N/A	$15,000,000

[1] 10-year rehabilitation program.

[2] Cost to rehabilitate VCP mainline sanitary sewer. Rehabilitation costs thereafter will depend on system condition.

[3] Assumes 28 miles of mainline and one service every 75 LF. Consistent with majority of homes built pre-1970. Property Owner cost unless subsidized by City.

4.1.2 Estimated Cost of Trunk Facilities

The costs associated with upsizing new trunk facilities to accommodate future growth is estimated as the cost incurred to install a new pipe sized according to ultimate growth. For example, if the City requires a 15-in pipe to be installed at a cost of $55/LF, but the developer would otherwise only need an 8-in pipe at a cost of $30/LF, the actual increased unit cost for the trunk sanitary sewer would be $25/LF. The following table documents the required pipe sizes and lengths for future development. The costs indicate the cost for trunk facilities (does not include cost to install 8-in pipe). The new trunk facilities are shown in Figure 11.

Table 22 – Trunk Sewer Cost

Trunk Sewer Size (in)	Trunk Sewer Length (ft)	Incremental Unit Cost[1]	City Cost
10	21,600	$10.00	$216,000
12	7,700	$15.00	$115,500
15	6,700	$25.00	$167,500
18	5,800	$30.00	$174,000
Total Estimated Cost/Year			**$673,000**

[1] Cost of Trunk Sewer Size less cost of 8-inch sewer

4.2 Lift Stations

The adequacy of each station was evaluated during the last comprehensive plan update against the following nine (9) 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

The criteria by which each of these parameters was evaluated is discussed in Section 2.2]

An acceptability rating scale of 1 to 5 was established for the evaluation criteria listed above for each of the three (3) stations. A rating of 1 is excellent; a rating of 2 is good meaning the station is better than the average lift station in the metropolitan area; a rating of 3 means it is similar to an average station in the metropolitan area; a rating of 4 indicates this parameter is below average, and a rating of 5 is unacceptable and the condition should be corrected in the near future. It must be understood that 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.

4.2.1 Lift Station Improvements

Table 5 contains 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 upon the severity of the individual deficiencies.

The adequacy of each lift station was evaluated against nine parameters, described in Section 2 of this report. A detailed summary of lift station costs is included in Appendix B.

Table 23 – Lift Station Capital Improvements Summary

Lift Station 3	$17,000
Lift Station 4	$17,000
Lift Station 5	$17,000
Lift Station 6	$-
Lift Station 7	$4,550,000
Lift Station 8	$63,000
Lift Station 9	$2,000
Lift Station 10	$30,000
Lift Station 11	$-
Lift Station 12	$-
Lift Station 13	$15,500
Lift Station 16	$11,000
Lift Station 18	$45,000
Lift Station 19	$35,000
Lift Station 20	$10,000
Lift Station 21	$25,000
Lift Station 22	$1,500
Lift Station 23	$1,000
Lift Station 24	$-
Lift Station 25	$-
	$4,840,000

4.3 Ten Year Plan Summary

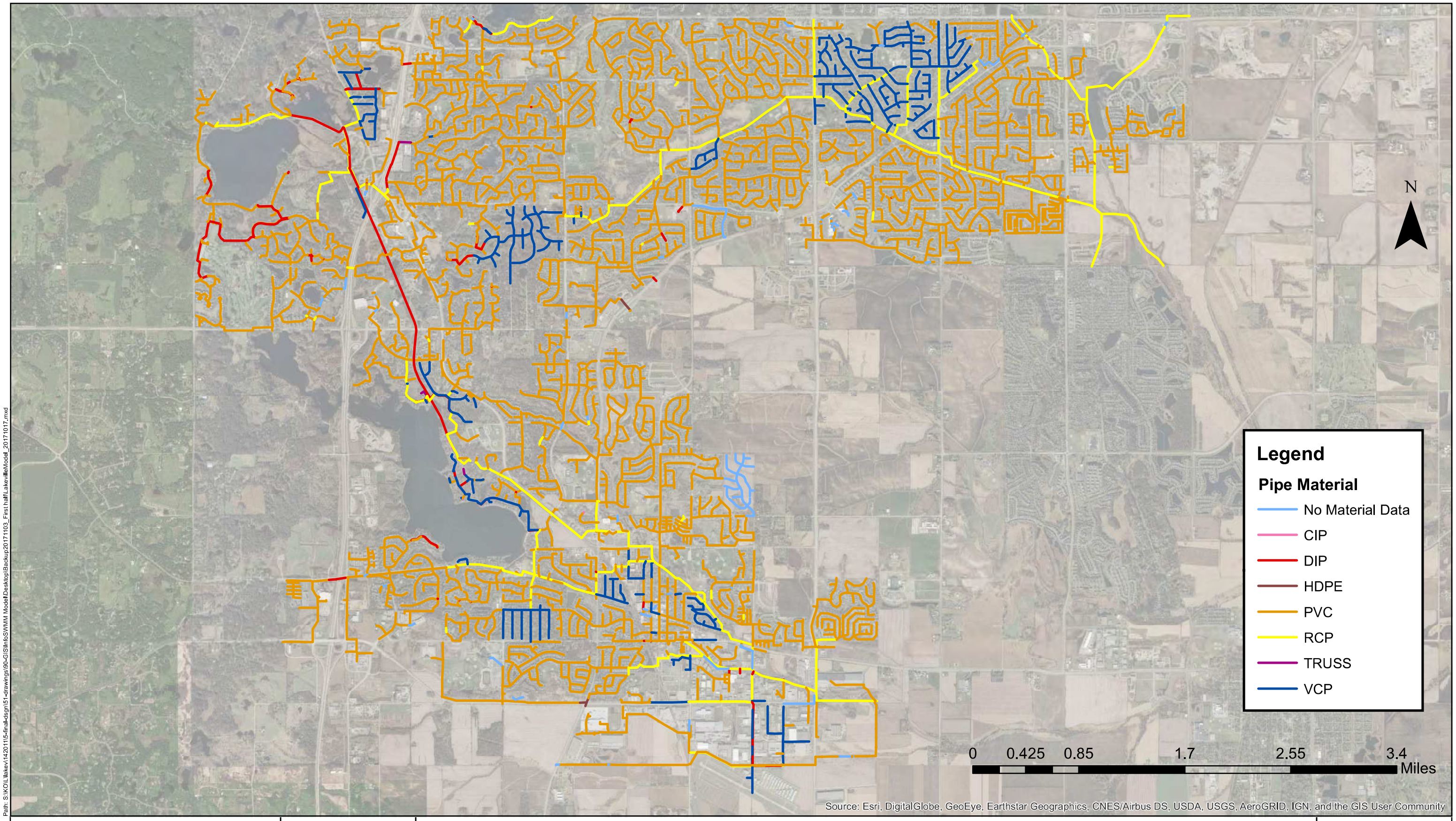
Table 24 – Capital Improvement Plan – Water & Sewer System

	Quantity	Unit Cost	Cost per Year
Gravity Sewer			
Cleaning and Jetting	65 miles	$ 2,500	$ 162,500
Televising	50 miles	$ 4,000	$ 200,000
	Quantity	**Unit Cost**	**Capital Cost**
Lining			
VCP Mainline Sewer Rehabilitation	28 miles	Varies	$5,700,000
VCP Service Connection*			
Service Rehabilitation**	EA	$ 7,500	$ 15,000,000
Total Yearly Maintenance Cost			
Total Capital Cost (excludes maintenance)			**$ 22,700,000**
Total Property Owner Cost			**$ 15,000,000**

*Assumed 50' of rehabilitation
**Costs paid by property owner

dmk

Figures



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FAX: (888) 908-8166
TF: (800) 325-2055
www.sehinc.com

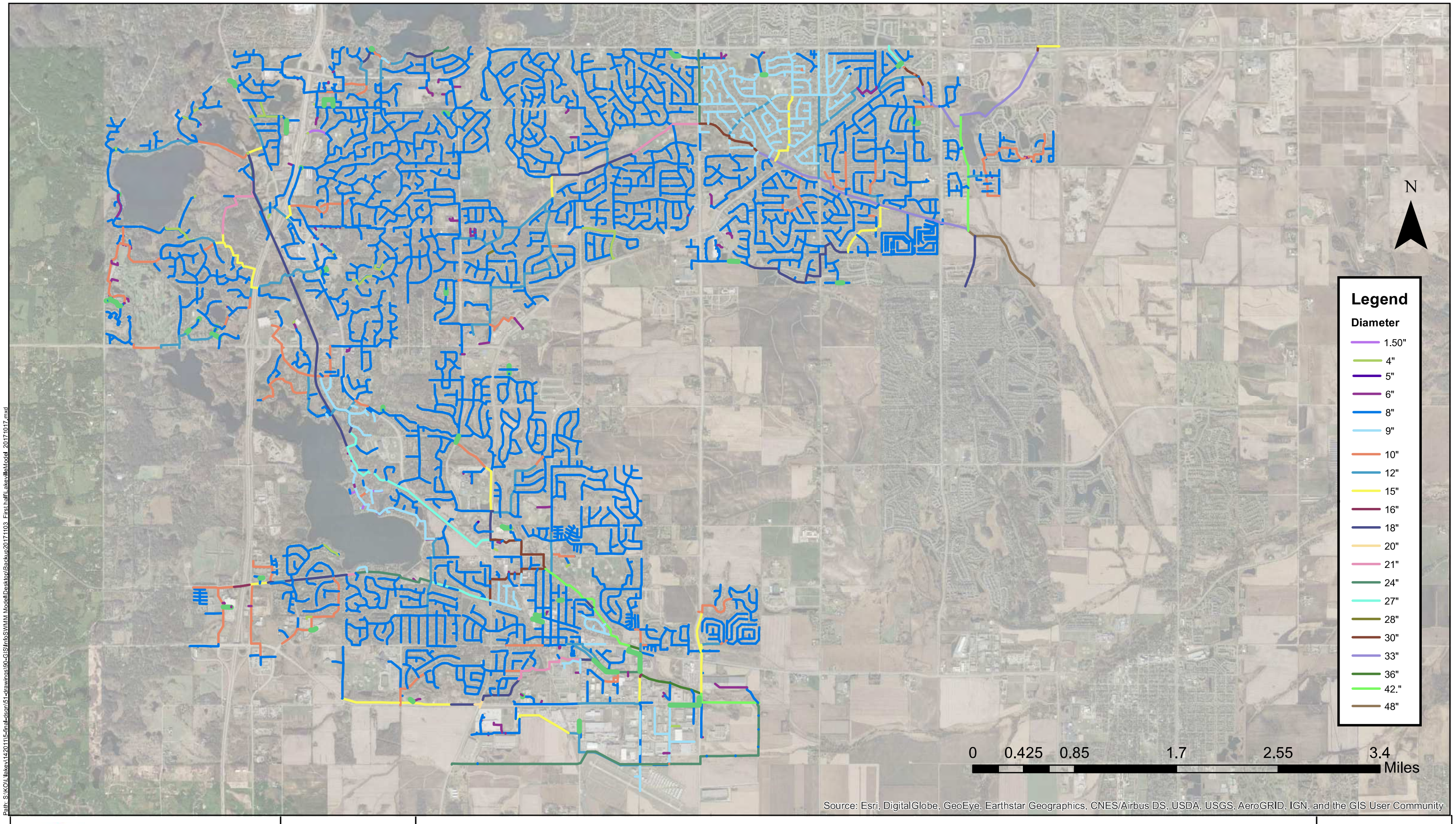
Project: 142011 14.00
Print Date: 1/16/2019

User Name: Kate Holmberg
Projection: NAD 1983 HARN Adj MN Dakota Feet
Source: City of Lakeville and SEH

Sanitary Sewer Collection System Pipe Materials

Comprehensive Sanitary Sewer Plan
City of Lakeville

Figure 1



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SEH
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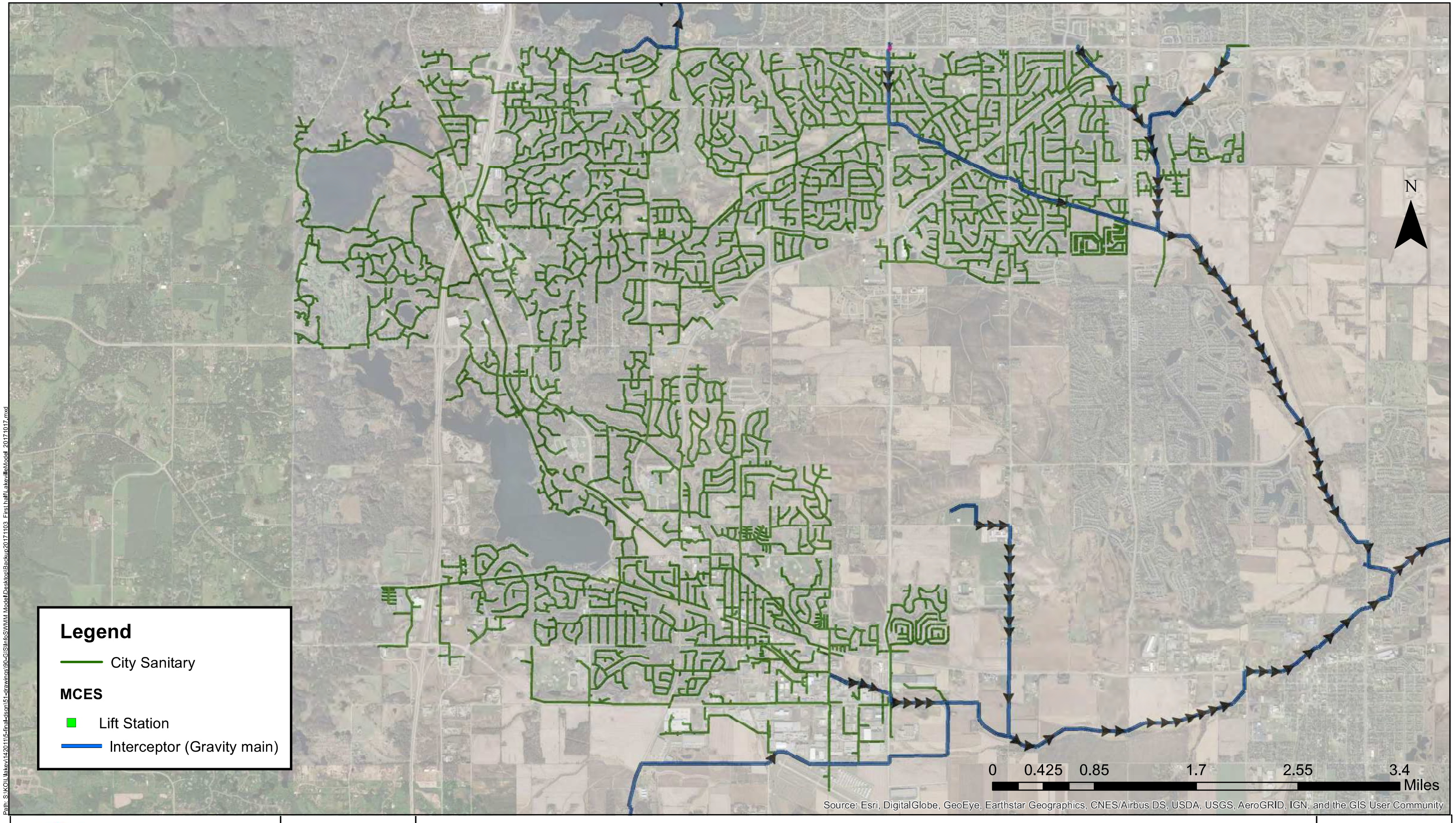
Project: 142011 14.00
Print Date: 1/16/2019

User Name: Kate Holmberg
Projection: NAD 1983 HARN Adj MN Dakota Feet
Source: City of Lakeville and SEH

Sanitary Sewer Collection System Pipe Diameters

Comprehensive Sanitary Sewer Plan
City of Lakeville

Figure 2



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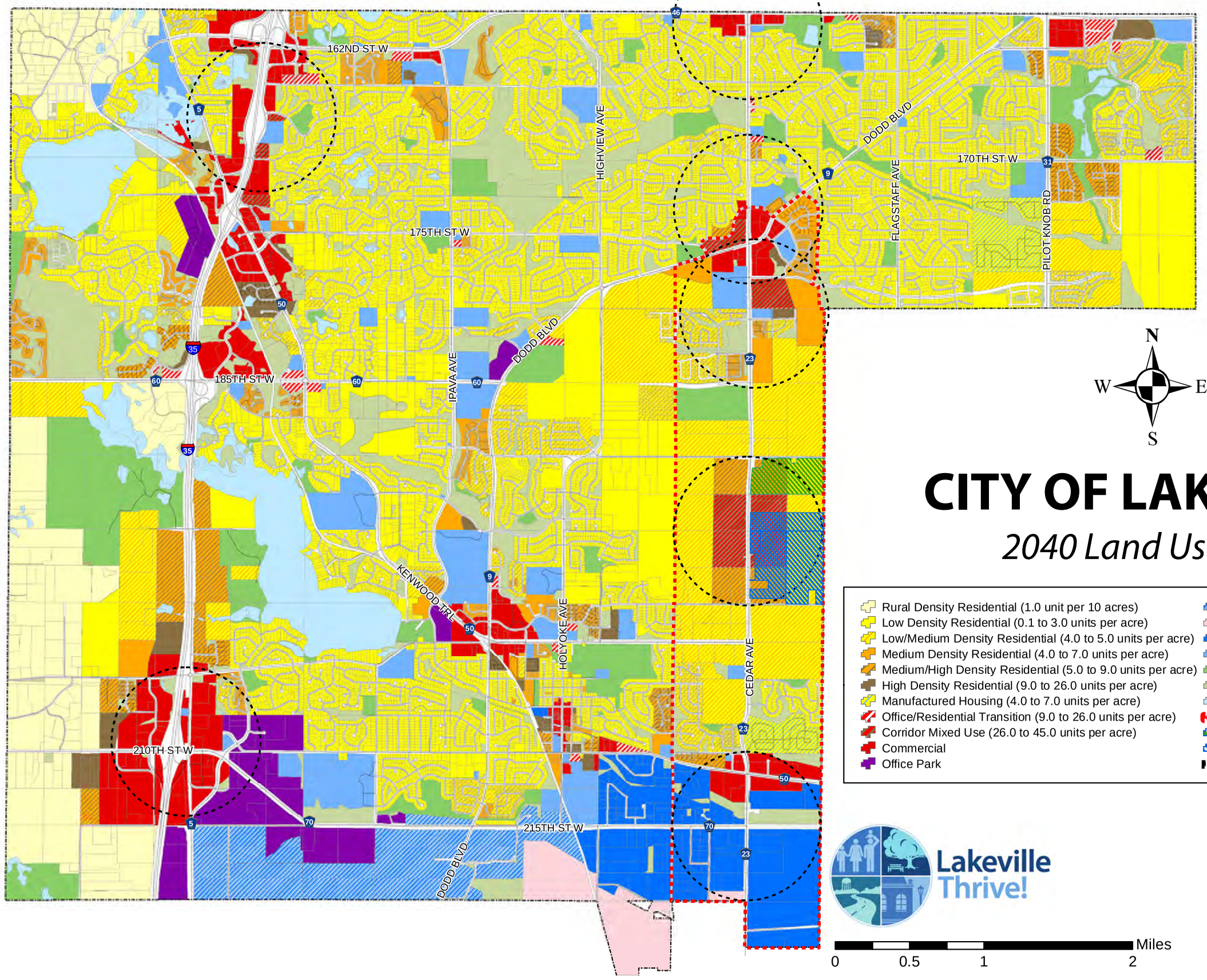
Project: 142011 14.00
Print Date: 1/16/2019

User Name: Kate Holmberg
Projection: NAD 1983 HARN Adj MN Dakota Feet
Source: City of Lakeville and SEH

Sanitary Sewer Collection System with MCES Interceptors

Comprehensive Sanitary Sewer Plan
City of Lakeville

Figure 3



N
W E
S

CITY OF LAKEVILLE

2040 Land Use Plan

- Rural Density Residential (1.0 unit per 10 acres)
- Low Density Residential (0.1 to 3.0 units per acre)
- Low/Medium Density Residential (4.0 to 5.0 units per acre)
- Medium Density Residential (4.0 to 7.0 units per acre)
- Medium/High Density Residential (5.0 to 9.0 units per acre)
- High Density Residential (9.0 to 26.0 units per acre)
- Manufactured Housing (4.0 to 7.0 units per acre)
- Office/Residential Transition (9.0 to 26.0 units per acre)
- Corridor Mixed Use (26.0 to 45.0 units per acre)
- Commercial
- Office Park
- Warehouse/Light Industrial
- Airport
- Industrial
- Public and Quasi-Public
- Parks
- Restricted Development
- Water
- Cedar Corridor
- Agriculture Preserves
- Agriculture Preserves (Expiring in 2020)
- Transit Development Target Area

Lakeville Thrive!

0 0.5 1 2 Miles

Lakeville

Source: City of Lakeville
Date: 12/31/2018

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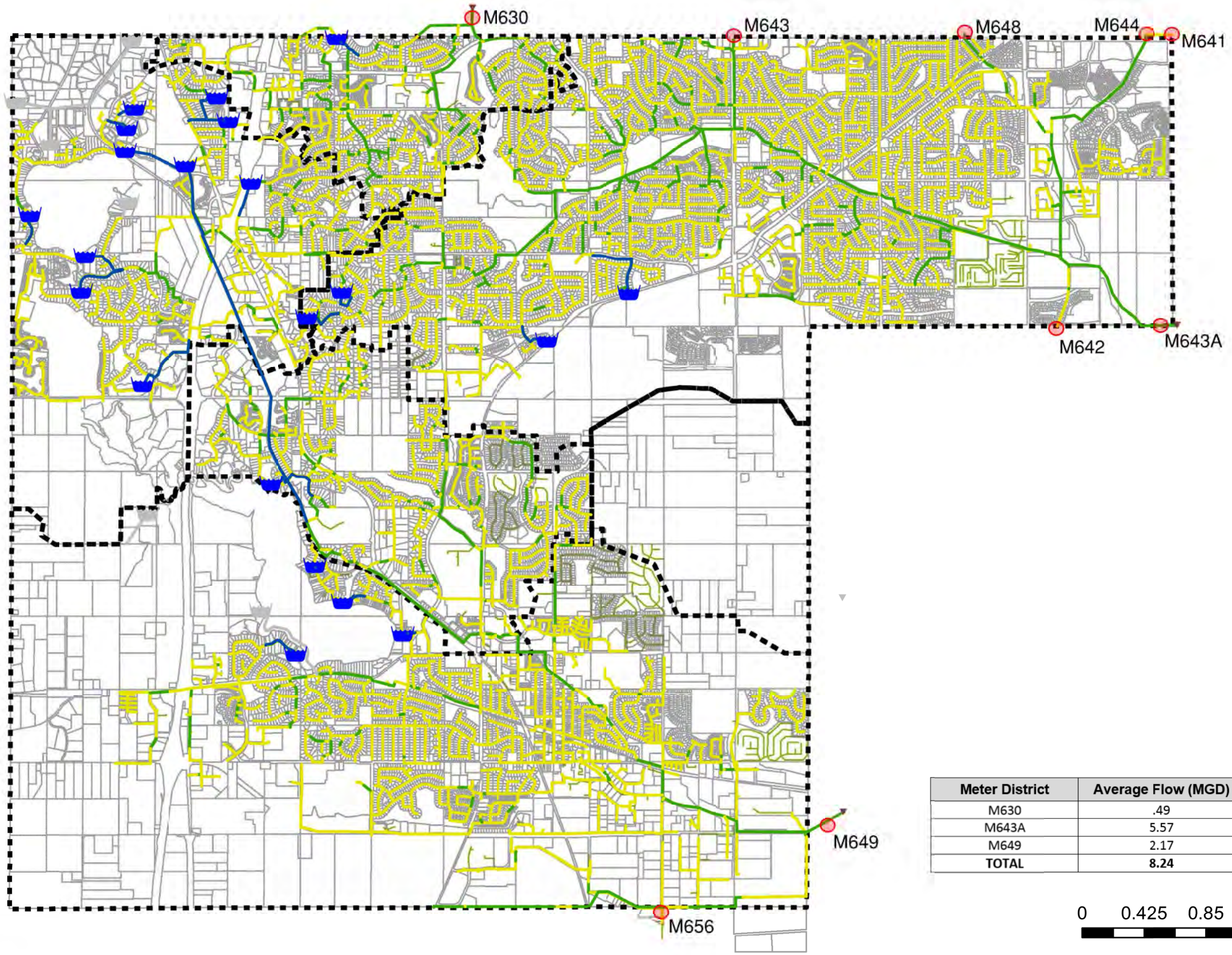
Project: 142011 14.00
Print Date: 1/16/2019

User Name: Kate Holmberg
Projection: NAD 1983 HARN Adj MN Dakota Feet
Source: City of Lakeville and SEH

2040 Future Land Use Plan
Comprehensive Sanitary Sewer Plan
City of Lakeville

Figure
4



N

Legend

Outfall
- Active
- Domain
- Inactive

Storage
- Active
- Domain
- Inactive

Pump
- Active
- Domain
- Inactive

Velocity
- Less than 2 ft/s
- 2~10 ft/s
- Greater than 10 ft/s

- Subdistrict Boundary
- Parcel Boundary

Meter District	Average Flow (MGD)	Peak Flow (MGD)
M630	.49	.91
M643A	5.57	9.61
M649	2.17	3.51
TOTAL	**8.24**	**14.03**

0 0.425 0.85 1.7 2.55 3.4 Miles

Path: S:\KOI\Lakev\142011\5-final-dsgn\51-drawings\90-GIS\Info\SWMM Model\Desktop\Backup\20171103_First half\LakevilleModel_20171017.mxd

SEH

3535 VADNAIS CENTER DR.
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PHONE: (651) 490-2000
FAX: (888) 908-8166
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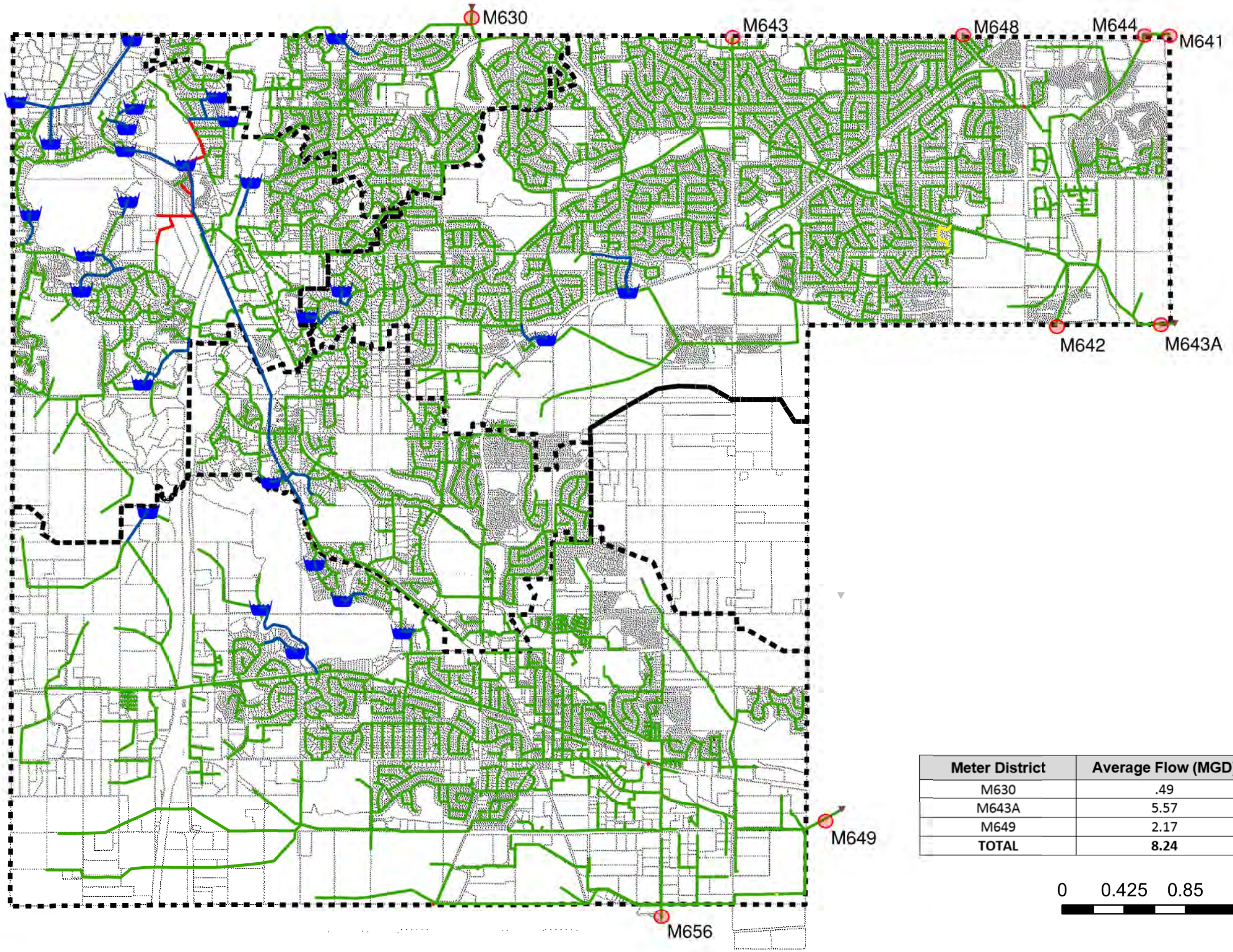
Project: 142011 14.00
Print Date: 6/25/2018

User Name: Kate Holmberg
Projection: NAD 1983 HARN Adj MN Dakota Feet
Source: City of Lakeville and SEH

Dry Weather Flow for Existing Conditions

Comprehensive Sanitary Sewer Plan
City of Lakeville

Figure 5



N

Legend

Storage
- Active
- Domain
- Inactive

Pump
- Active
- Domain
- Inactive

Capacity
- Less than 0.6
- 0.6~0.7
- Greater than 0.7

Outfall
- Active
- Domain
- Inactive

- Subdistrict Boundary
- Parcel Boundary

Meter District	Average Flow (MGD)	Peak Flow (MGD)
M630	.49	1.00
M643A	5.57	12.22
M649	2.17	7.59
TOTAL	**8.24**	**20.81**

0 0.425 0.85 1.7 2.55 3.4 Miles

Path: S:\KOI\Lilaxev\14201115-final-dsgn\51-drawings\90-GIS\mfxSWMM Model\Desktop\Backup\20171103_First half\LakevilleModel_20171017.mxd

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3535 VADNAIS CENTER DR.
ST. PAUL, MN 55110
PHONE: (651) 490-2000
FAX: (888) 908-8166
TF: (800) 325-2055
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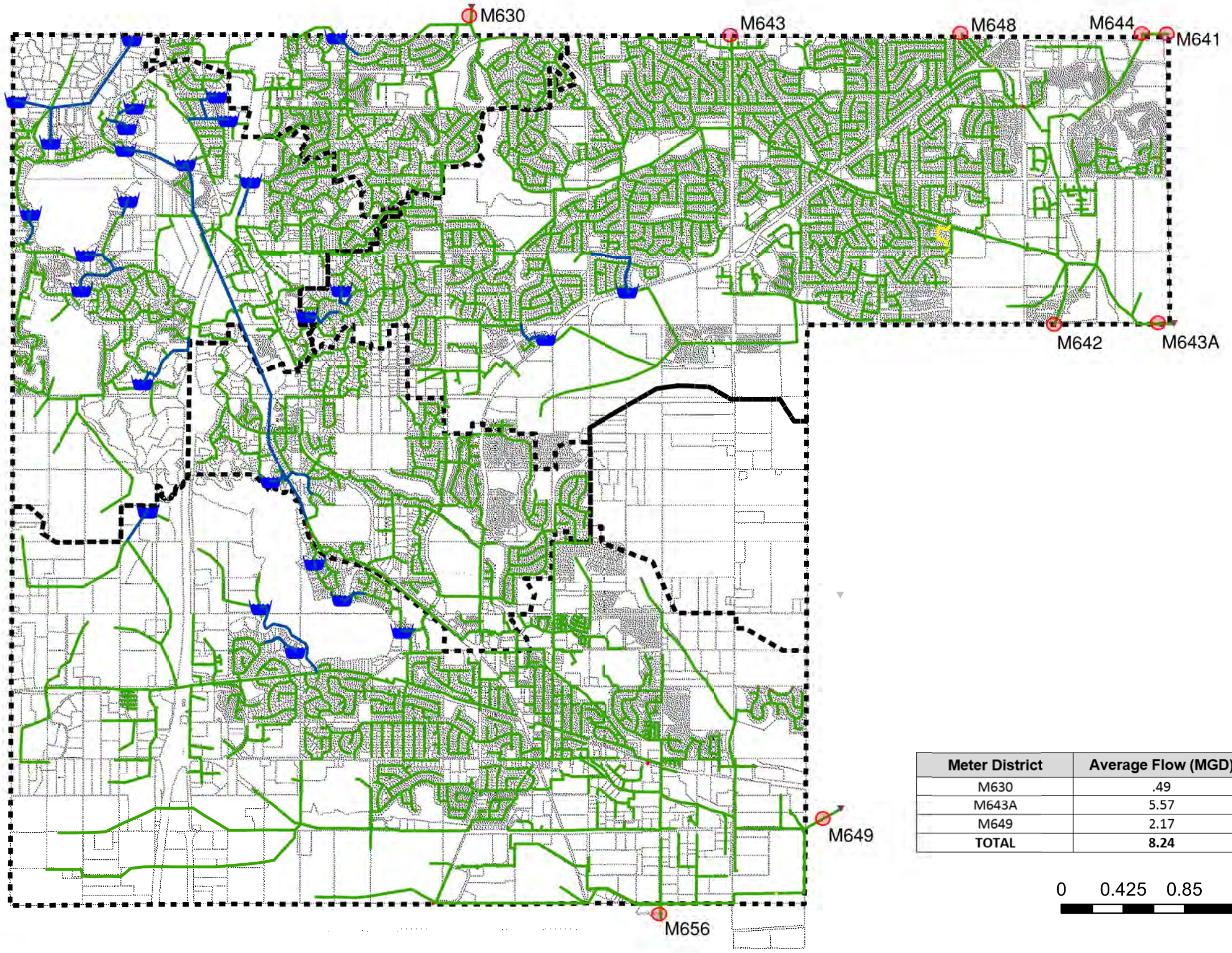
Project: 142011 14.00
Print Date: 2/13/2019

User Name: Kate Holmberg
Projection: NAD 1983 HARN Adj MN Dakota Feet
Source: City of Lakeville and SEH

Wet Weather Flow for Existing Conditions

Comprehensive Sanitary Sewer Plan
City of Lakeville

Figure 6a



Legend

Storage
- Active
- Domain
- Inactive

Pump
- Active
- Domain
- Inactive

Capacity
- Less than 0.6
- 0.6~0.7
- Greater than 0.7

Outfall
- Active
- Domain
- Inactive

Subdistrict Boundary

Parcel Boundary

Meter District	Average Flow (MGD)	Peak Flow (MGD)
M630	.49	1.00
M643A	5.57	12.22
M649	2.17	7.59
TOTAL	**8.24**	**20.81**

0 0.425 0.85 1.7 2.55 3.4 Miles

Path: S:\KOI\Lilaxev\14201115-final-dsgn\51-drawings\90-GIS\mfxSWMM Model\Desktop\Backup\20171103_First half\LakevilleModel_20171017.mxd

SEH
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PHONE: (651) 490-2000
FAX: (888) 908-8166
TF: (800) 325-2055
www.sehinc.com

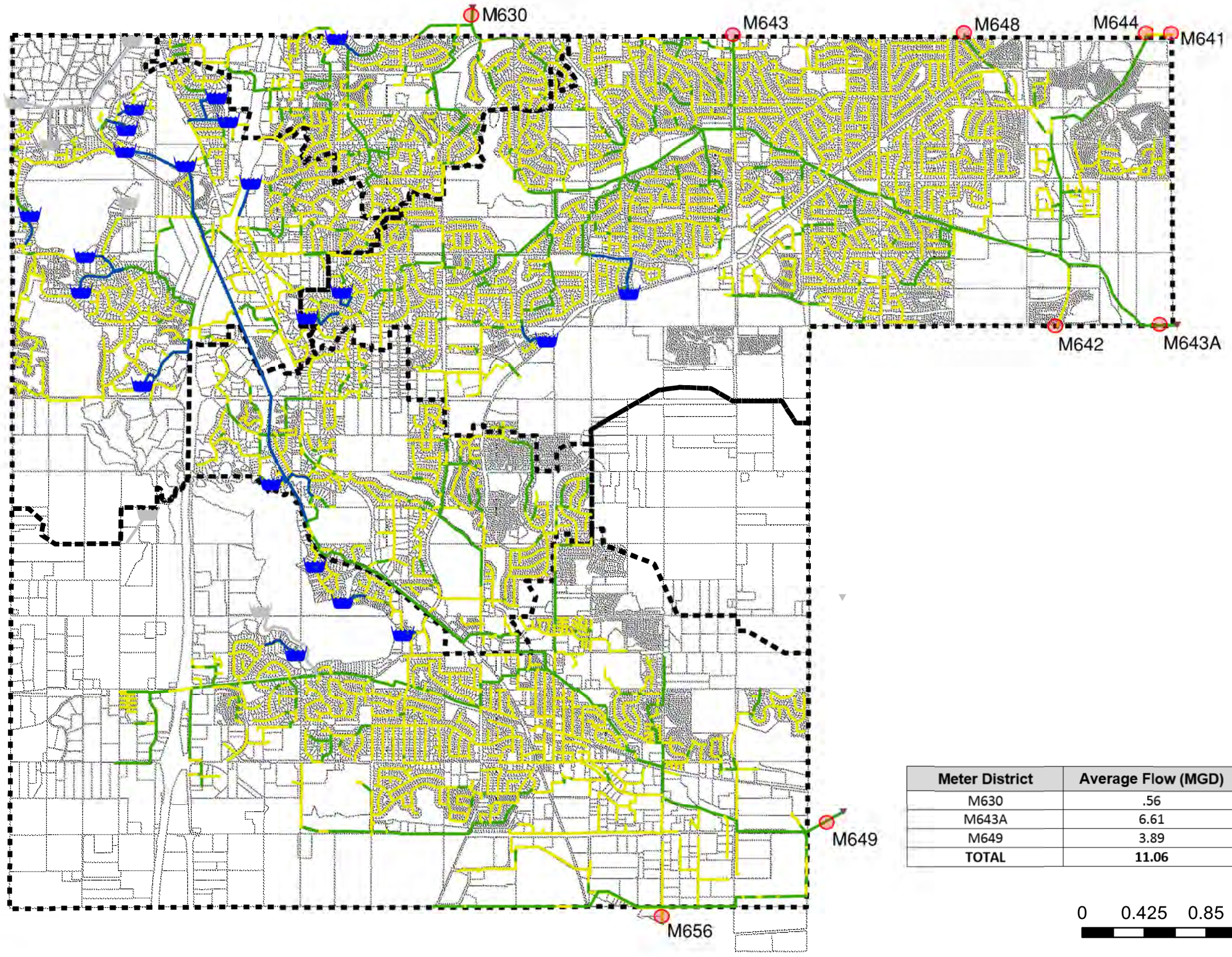
Project: 142011 14.00
Print Date: 2/13/2019

User Name: Kate Holmberg
Projection: NAD 1983 HARN Adj MN Dakota Feet
Source: City of Lakeville and SEH

Wet Weather Flow for Existing Conditions

Comprehensive Sanitary Sewer Plan
City of Lakeville

Figure 6b



N

Legend

Outfall
- Active
- Domain
- Inactive

Storage
- Active
- Domain
- Inactive

Pump
- Active
- Domain
- Inactive

Velocity
- Less than 2 ft/s
- 2~10 ft/s
- Greater than 10 ft/s

Subdistrict Boundary

Parcel Boundary

Meter District	Average Flow (MGD)	Peak Flow (MGD)
M630	.56	.92
M643A	6.61	11.35
M649	3.89	6.34
TOTAL	**11.06**	**18.61**

0 0.425 0.85 1.7 2.55 3.4 Miles

Path: S:\KOL\Lakev\142011\5-final-dsgn\51-drawings\90-GIS\Info\SWMM Model\Desktop\Backup\20171103_First half\LakevilleModel_20171017.mxd

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FAX: (888) 908-8166
TF: (800) 325-2055
www.sehinc.com

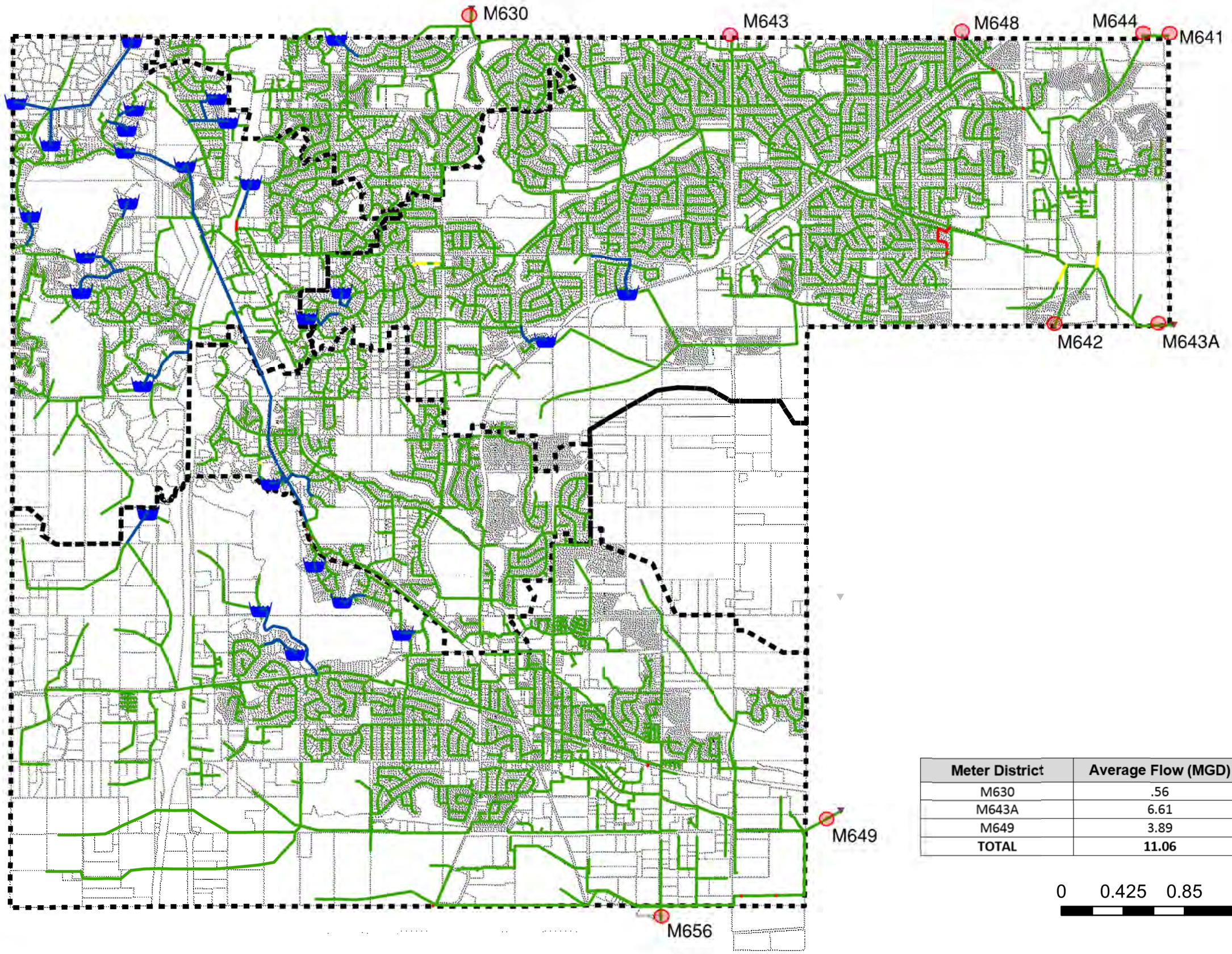
Project: 142011 14.00
Print Date: 6/25/2018

User Name: Kate Holmberg
Projection: NAD 1983 HARN Adj MN Dakota Feet
Source: City of Lakeville and SEH

Dry Weather Flow for Future Conditions

Comprehensive Sanitary Sewer Plan
City of Lakeville

Figure 7



N

Legend

Storage
- Active
- Domain
- Inactive

Pump
- Active
- Domain
- Inactive

Capacity
- Less than 0.6
- 0.6~0.7
- Greater than 0.7

Outfall
- Active
- Domain
- Inactive

- Subdistrict Boundary
- Parcel Boundary

Meter District	Average Flow (MGD)	Peak Flow (MGD)
M630	.56	1.04
M643A	6.61	14.73
M649	3.89	10.07
TOTAL	**11.06**	**25.85**

0 0.425 0.85 1.7 2.55 3.4 Miles

Path: S:\KOL\lakev\142011\5-final-dsgn\51-drawings\90-GIS\mfr\SWMM Model\Desktop\Backup20171103_First half\LakevilleModel_20171017.mxd

SEH
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ST. PAUL, MN 55110
PHONE: (651) 490-2000
FAX: (888) 908-8166
TF: (800) 325-2055
www.sehinc.com

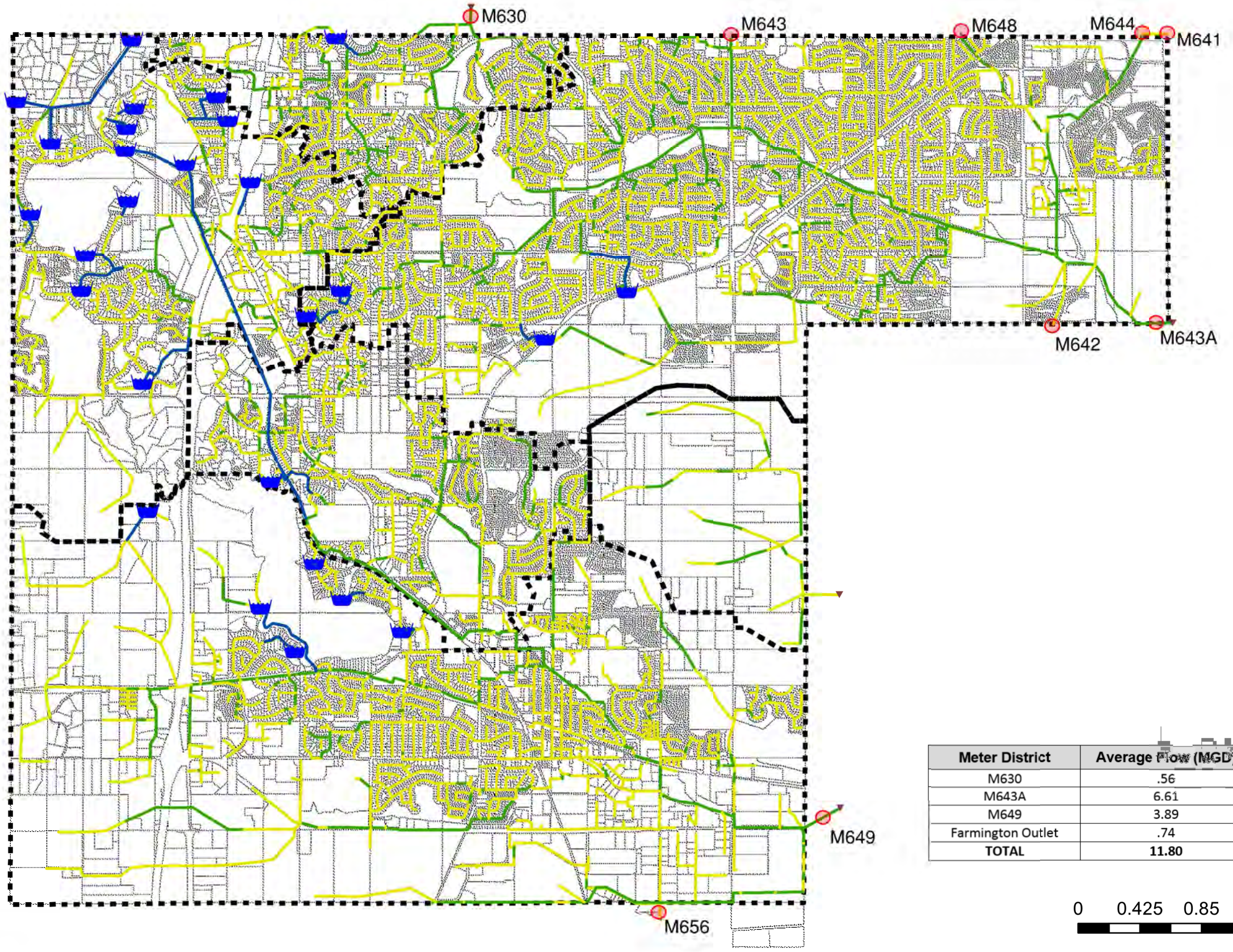
Project: 142011 14.00
Print Date: 2/13/2019

User Name: Kate Holmberg
Projection: NAD 1983 HARN Adj MN Dakota Feet
Source: City of Lakeville and SEH

Wet Weather Flow for Future Conditions

Comprehensive Sanitary Sewer Plan
City of Lakeville

Figure 8



N

Legend

Outfall
- Active
- Domain
- Inactive

Storage
- Active
- Domain
- Inactive

Pump
- Active
- Domain
- Inactive

Velocity
- Less than 2 ft/s
- 2~10 ft/s
- Greater than 10 ft/s

- Subdistrict Boundary
- Parcel Boundary

Meter District	Average Flow (MGD)	Peak Flow (MGD)
M630	.56	.92
M643A	6.61	11.35
M649	3.89	6.34
Farmington Outlet	.74	1.325
TOTAL	**11.80**	**19.94**

0 0.425 0.85 1.7 2.55 3.4 Miles

Path: S:\KOI\Lilasev\14201115-final-dsgn\51-drawings\90-GIS\mfxSWMM Model\Desktop\Backup\20171103_First half\LakevilleModel_20171017.mxd

SEH
3535 VADNAIS CENTER DR.
ST. PAUL, MN 55110
PHONE: (651) 490-2000
FAX: (888) 908-8166
TF: (800) 325-2055
www.sehinc.com

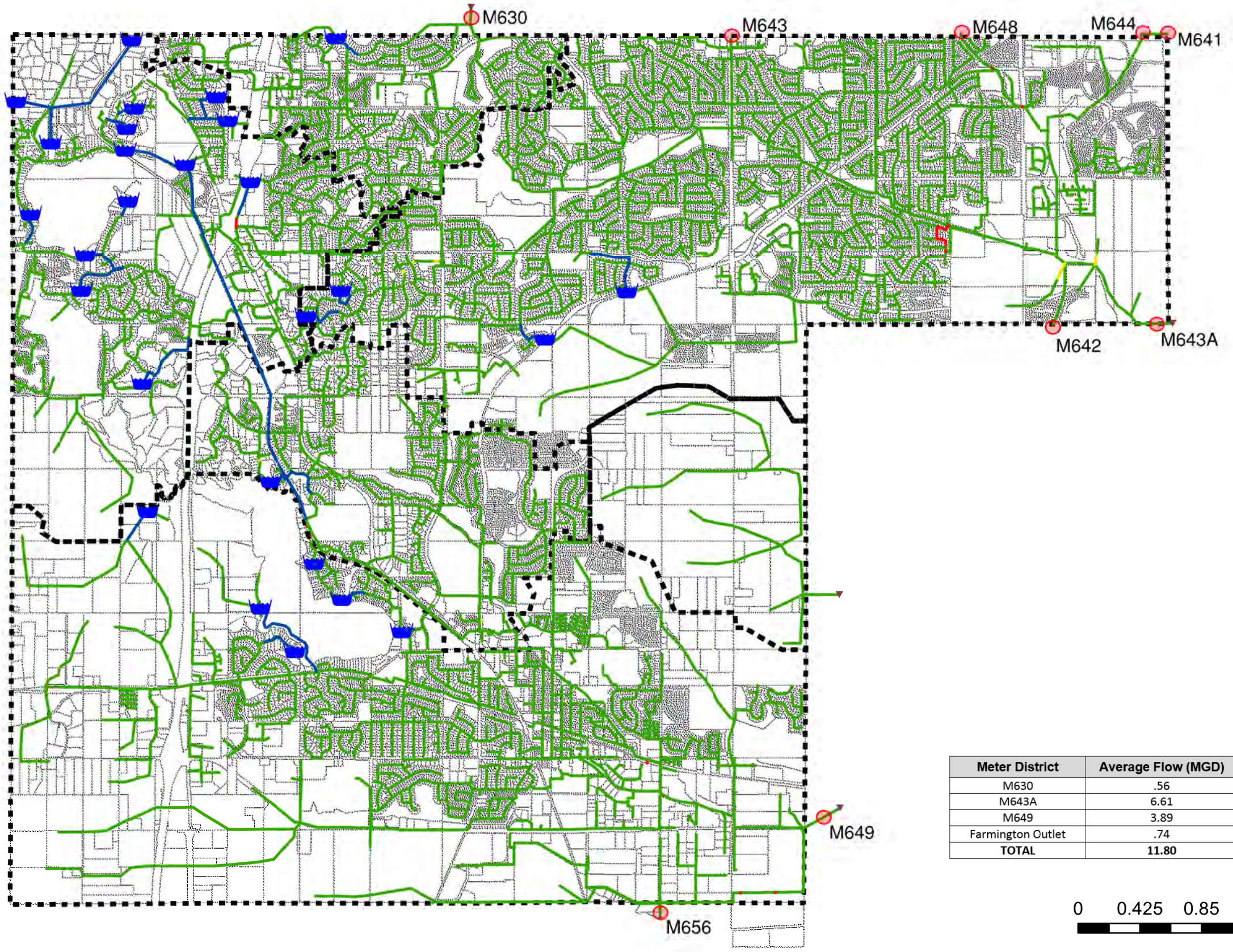
Project: 142011 14.00
Print Date: 6/25/2018

User Name: Kate Holmberg
Projection: NAD 1983 HARN Adj MN Dakota Feet
Source: City of Lakeville and SEH

Dry Weather Flow for Future Conditions with Potential Expansions

Comprehensive Sanitary Sewer Plan
City of Lakeville

Figure 9



N

Legend

Storage
- Active
- Domain
- Inactive

Pump
- Active
- Domain
- Inactive

Capacity
- Less than 0.6
- 0.6~0.7
- Greater than 0.7

Outfall
- Active
- Domain
- Inactive

- Subdistrict Boundary
- Parcel Boundary

Meter District	Average Flow (MGD)	Peak Flow (MGD)
M630	.56	1.04
M643A	6.61	14.73
M649	3.89	10.07
Farmington Outlet	.74	1.325
TOTAL	**11.80**	**27.16**

0 0.425 0.85 1.7 2.55 3.4 Miles

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PHONE: (651) 490-2000
FAX: (888) 908-8166
TF: (800) 325-2055
www.sehinc.com

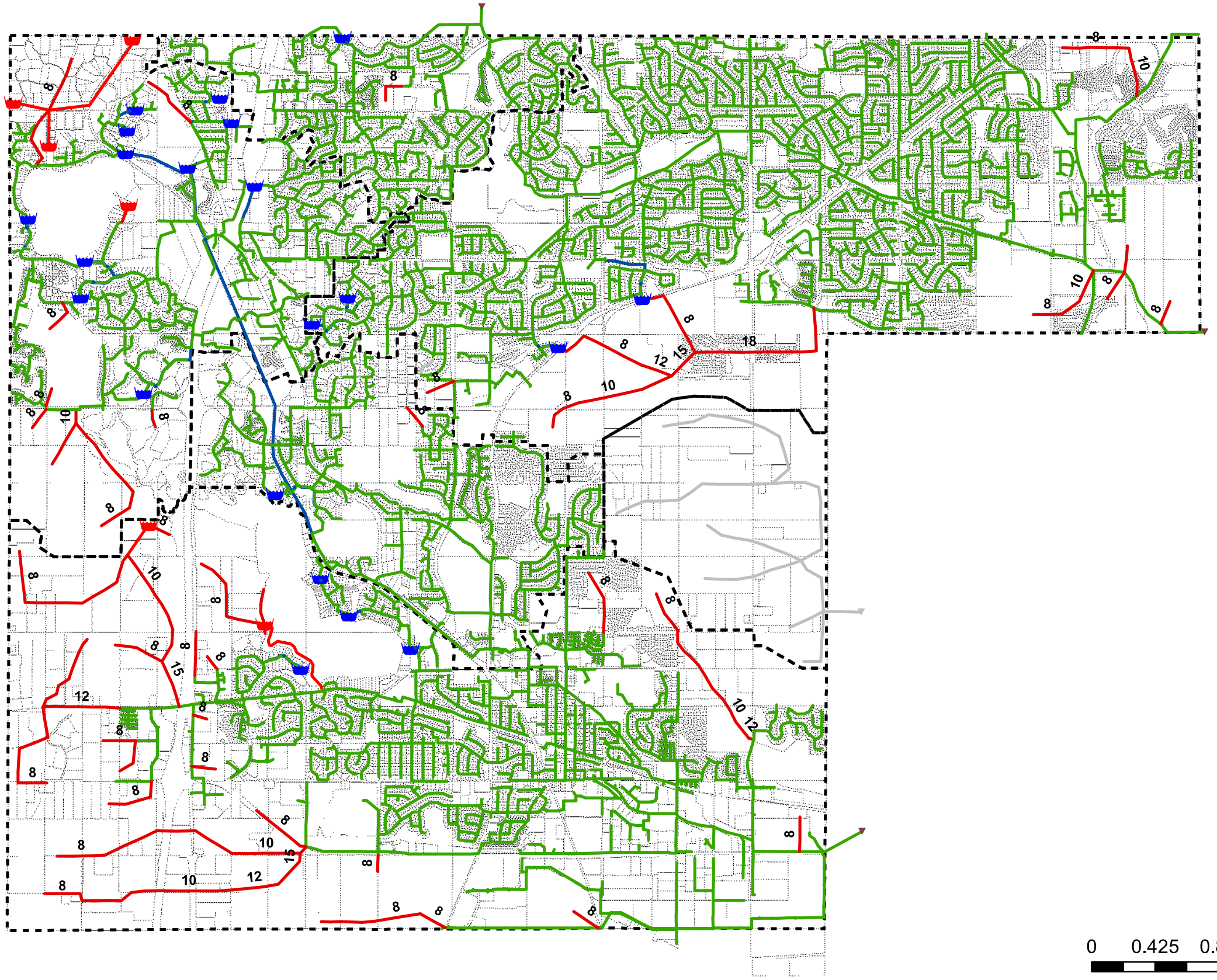
Project: 142011 14.00
Print Date: 6/26/2018

User Name: Kate Holmberg
Projection: NAD 1983 HARN Adj MN Dakota Feet
Source: City of Lakeville and SEH

Wet Weather Flow for Future Conditions with Potential Expansions

Comprehensive Sanitary Sewer Plan
City of Lakeville

Figure 10



N

Legend

Storage
- Existing
- Expansion

Conduit
- Existing
- Expansion

Pump
- Existing
- Expansion

Subdistrict Boundary

Parcel Boundary

0 0.425 0.85 1.7 2.55 3.4 Miles

Path: S:\KOI\Lakeville\142011\5-final-dsgn\51-drawings\90-GIS\mfg\SWMM Model\Desktop\Backup\20171103_First half\LakevilleModel_20171017.mxd

SEH

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ST. PAUL, MN 55110
PHONE: (651) 490-2000
FAX: (888) 908-8166
TF: (800) 325-2055
www.sehinc.com

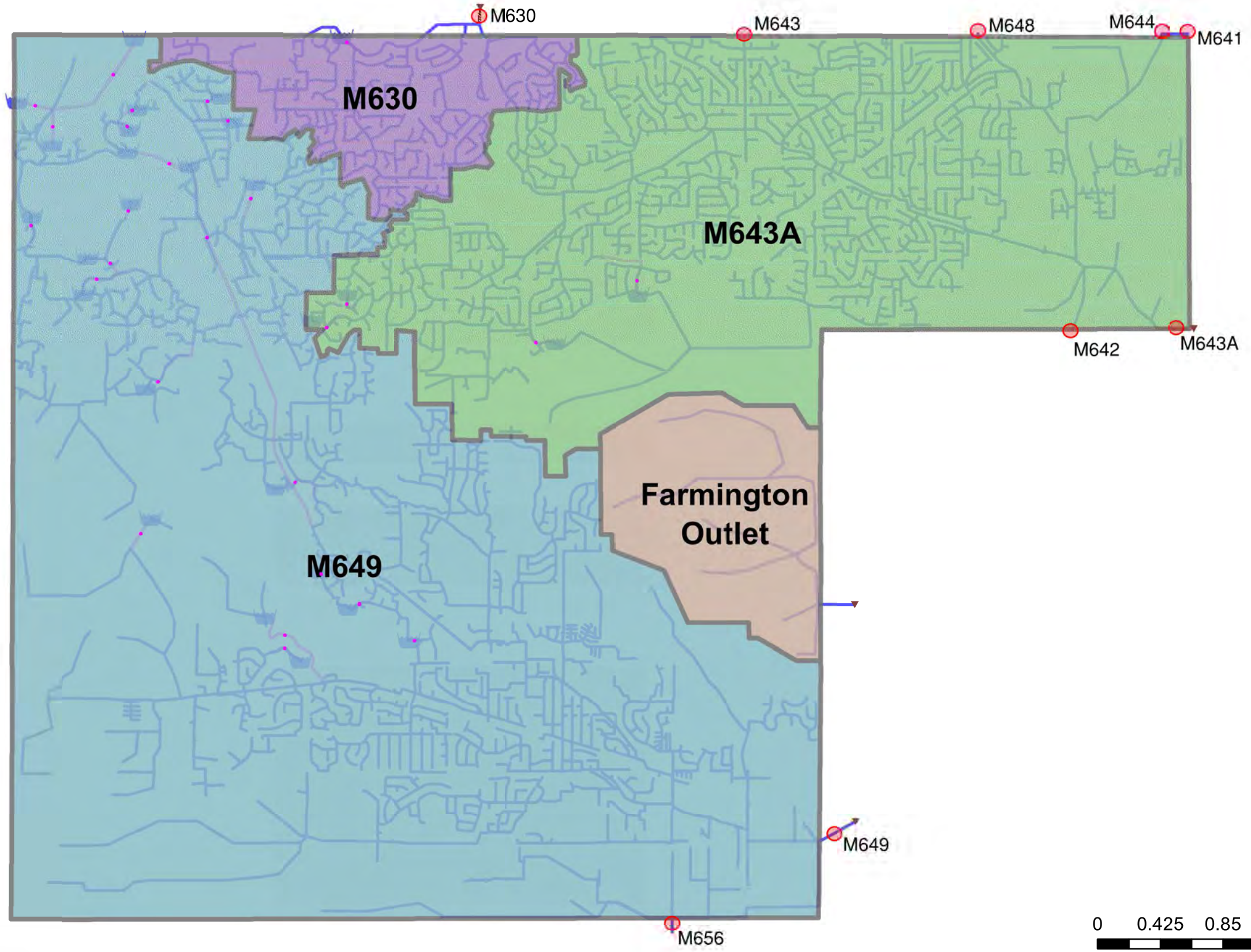
Project: 142011 14.00
Print Date: 5/24/2018

User Name: Kate Holmberg
Projection: NAD 1983 HARN Adj MN Dakota Feet
Source: City of Lakeville and SEH

Existing and Future Expanded Network

Comprehensive Sanitary Sewer Plan
City of Lakeville

Figure 11



N

0 0.425 0.85 1.7 2.55 3.4 Miles

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ST. PAUL, MN 55110
PHONE: (651) 490-2000
FAX: (888) 908-8166
TF: (800) 325-2055
www.sehinc.com

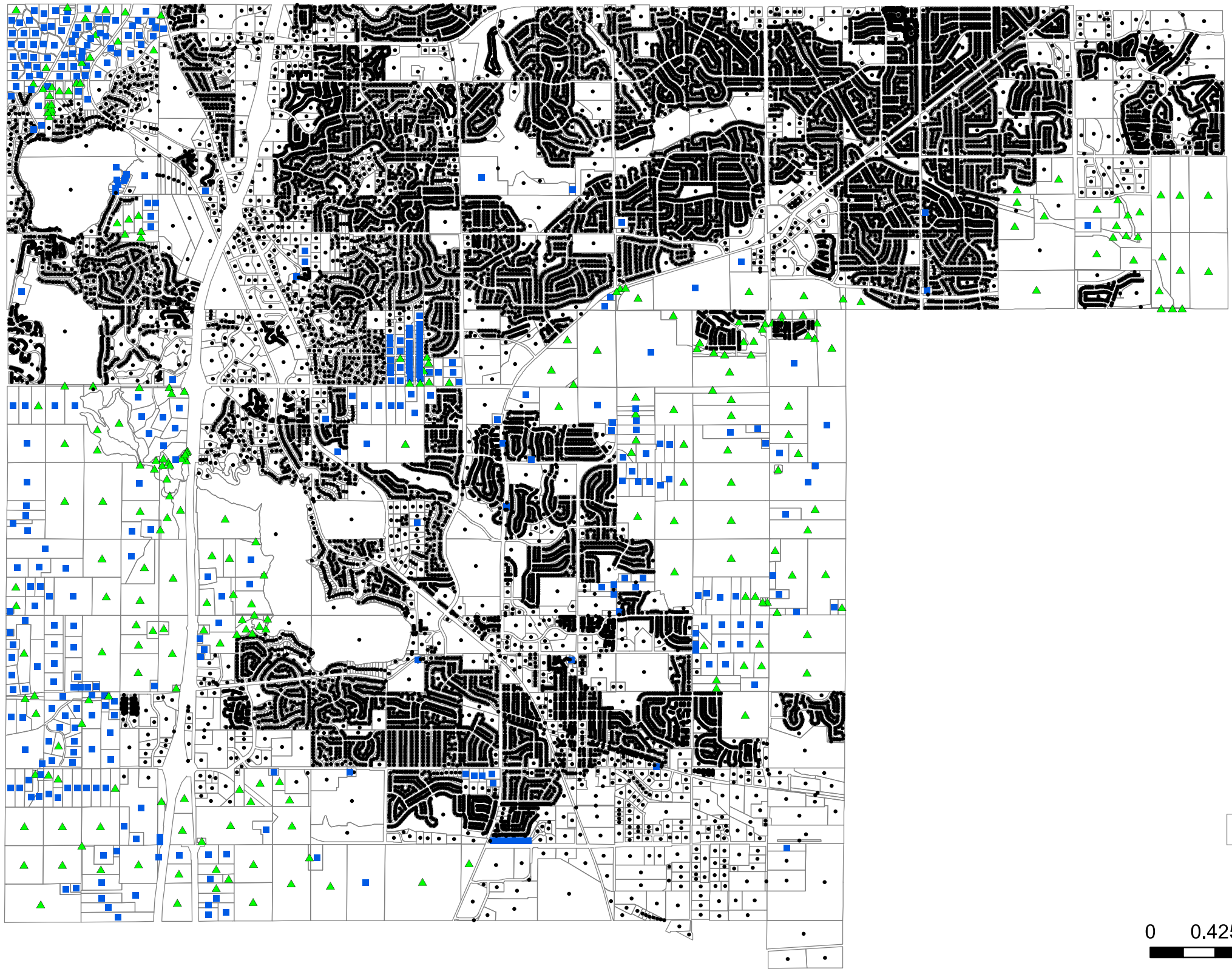
Project: 142011 14.00
Print Date: 6/27/2018

User Name: Kate Holmberg
Projection: NAD 1983 HARN Adj MN Dakota Feet
Source: City of Lakeville and SEH

Meter Districts

Comprehensive Sanitary Sewer Plan
City of Lakeville

Figure 12



N

Legend

- Without Water or Sewer Records
- Connected to System
- Known Septic
- Parcels

0 0.425 0.85 1.7 2.55 3.4 Miles

Path: S:\KOI\Lakev\142011\5-final-design\51-drawings\90-GIS\SEH Model Prep\Analysis\Potential Septic.mxd

SEH

3535 VADNAIS CENTER DR.
ST. PAUL, MN 55110
PHONE: (651) 490-2000
FAX: (888) 908-8166
TF: (800) 325-2055
www.sehinc.com

Project: 142011 14.00
Print Date: 2/13/2019

User Name: Kate Holmberg
Projection: NAD 1983 HARN Adj MN Dakota Feet
Source: City of Lakeville and SEH

Sub-surface Sewage Treatment Systems Locations

Comprehensive Sanitary Sewer Plan
City of Lakeville

Figure 13

2 Outgoing flows to Burnsville
75AM002-75AM001 & 74BM004-74BM030

Incoming flow from Burnsville 75AS002-75AM027
Outgoing flow to Burnsville 75AM016-75AS003

70AM021-70AM0246543

79BM053-79BM042

75BM007-75BM008

64AM0146417-64AM001

62BM031-62BM027

69BM026-70AM031

70BM043-NODE_227_SEH

63AM103-63BM001 Upstream
63BM068-63BM002 Downstream

56AM007-56AM004

Incoming Flow From Farmington 56AM014-56AM015

11AM011-11BM034 North
11BM035-11BM034 South

11BM021-11BM009

N

Legend

- MCES Meters
- MCES Interceptors
- Lakeville Trunk Sewers
- Subdistrict Boundary

0 0.425 0.85 1.7 2.55 3.4 Miles

Path: S:\KOI\Lakev\142011\5-final-dsgn\51-drawings\90-GIS\Info\SWMM Model\Desktop\Backup\20171103_First half\LakevilleModel_20171017.mxd

SEH
3535 VADNAIS CENTER DR.
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PHONE: (651) 490-2000
FAX: (888) 908-8166
TF: (800) 325-2055
www.sehinc.com

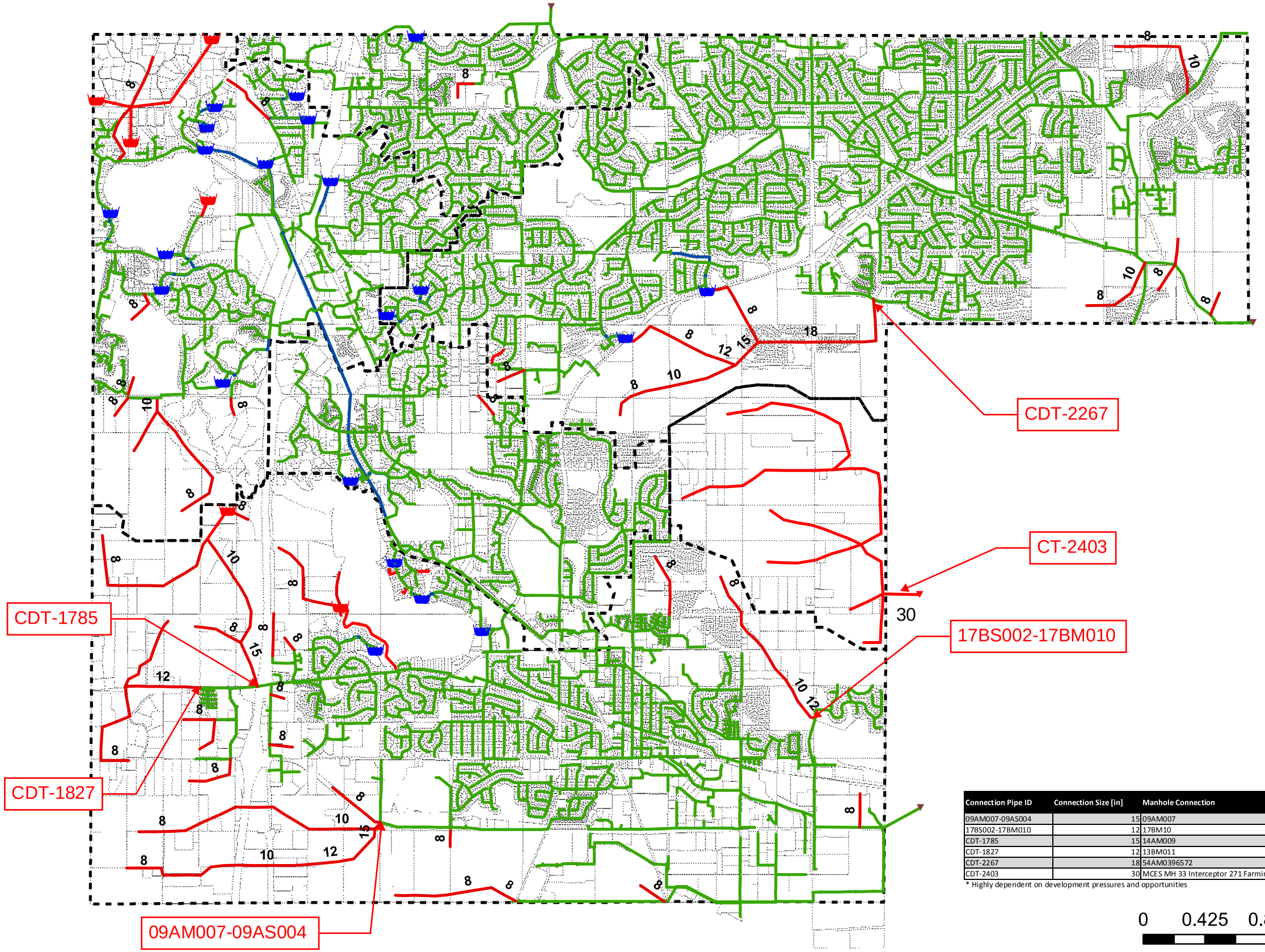
Project: 142011 14.00
Print Date: 4/30/2019

User Name: Kate Holmberg
Projection: NAD 1983 HARN Adj MN Dakota Feet
Source: City of Lakeville and SEH

Lakeville Connections to MCES Interceptors

Comprehensive Sanitary Sewer Plan
City of Lakeville

Figure 14



Connection Pipe ID	Connection Size [in]	Manhole Connection	Anticipated Contruction Year*
09AM007-09AS004	15	09AM007	2022-2050
17BS002-17BM010	12	17BM10	2019-2025
CDT-1785	15	14AM009	2022-2040
CDT-1827	12	13BM011	2040-2050
CDT-2267	18	54AM0396572	2022-2023
CDT-2403	30	MCES MH 33 Interceptor 271 Farmington Outlet	2022-2040

* Highly dependent on development pressures and opportunities

Legend

Storage
- Existing
- Expansion

Conduit
- Existing
- Expansion

Pump
- Existing
- Expansion

Subdistrict Boundary

Parcel Boundary

0 0.425 0.85 1.7 2.55 3.4 Miles

Path: S:\KOI\Lakeville\142011\5-final-design\51-drawings\90-GIS\mfg\SWMM Model\Desktop\Backup\20171103_First half\LakevilleModel_20171017.mxd

SEH
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ST. PAUL, MN 55110
PHONE: (651) 490-2000
FAX: (888) 908-8166
TF: (800) 325-2055
www.sehinc.com

Project: 142011 14.00
Print Date: 6/18/2019

User Name: Kate Holmberg
Projection: NAD 1983 HARN Adj MN Dakota Feet
Source: City of Lakeville and SEH

Future Lakeville Additions to MCES System

Comprehensive Sanitary Sewer Plan
City of Lakeville

Figure 15

Appendix A

Applicable City Ordinances and Revisions to Ordinances

City Ordinance 14:

Regulates the use of sewer and water in the City of Lakeville.

City Ordinance 468:

Requires mandatory connection of sump pumps and foundation drains to publicly owner drain tile systems

City Ordinance 871:

Includes Standards and regulations for siting, design, construction, installation, operation, maintenance, repairs, reconstruction, inspection, and abandonment of septic systems.

Appendix B

NPDES Permit

Minnesota Pollution Control Agency
520 Lafayette Road North | St. Paul, Minnesota 55155-4194 | 651-296-6300
800-657-3864 | 651-282-5332 TTY | www.pca.state.mn.us | Equal Opportunity Employer

April 3, 2014

Chris Petree
City of Lakeville
20195 Holyoke Avenue
Lakeville, MN 55044

RE: Issuance of Coverage under the National Pollutant Discharge Elimination System/State Disposal System (NPDES/SDS) General Permit MNR040000 for Municipal Separate Storm Sewer Systems for City of Lakeville MS4

Dear Mr. Petree:

In accordance with Minn. R. 7001.0140, the Commissioner of the Minnesota Pollution Control Agency (MPCA) has made a final determination to issue coverage under the National Pollutant Discharge Elimination System/State Disposal System (NPDES/SDS) General Permit MNR040000 for Municipal Separate Storm Sewer Systems (MS4 General Permit) to the City of Lakeville MS4, effective April 3, 2014. Please find enclosed a copy of the above referenced MS4 General Permit.

The MPCA's final decision to issue permit coverage is based on the following:

- MPCA staff has reviewed your MS4 General Permit application and Stormwater Pollution Prevention Program (SWPPP) Document.
- Public notice and opportunity for comment on your MS4 General Permit application and SWPPP Document has been provided, and no comments were received.

As you know, it is the responsibility of the MS4 owner and/or operator to comply with the requirements of the MS4 General Permit and your SWPPP Document. This issuance of coverage does not preclude the MPCA from following up with an inspection or audit to verify compliance with the MS4 General Permit and SWPPP Document. Also, be aware that as a condition of recordkeeping, Part IV.C.3. of the MS4 General Permit requires that the permittee retain their SWPPP Document and all records pertinent to it for at least three (3) years beyond the term of the MS4 General Permit.

In addition, for an MS4 that was covered under the previous MS4 General Permit (issuance date June 1, 2006), coverage under that permit is terminated on the coverage date as specified above. An MS4 covered under the new MS4 General Permit is required to report on activities that were required or committed to under the previous permit.

Finally, the MPCA thanks you for your cooperation in the permitting process. Please retain this letter as documentation of your MS4 General Permit coverage under the NPDES/SDS Permit MNR040000.

Please contact MS4 team member Dan Miller at 651-757-2246 with any questions.

Sincerely,

Duane Duncanson

This document has been electronically signed.

Duane Duncanson
Supervisor, Municipal Compliance Unit I
St. Paul Office
Municipal Division

cc: Jeff Peters, WSB & Associates, Inc.
City of Lakeville MS4 File

Appendix C

Intercommunity Agreement with the City of Burnsville

BURNSVILLE - LAKEVILLE SANITARY SEWER SERVICE AGREEMENT

THIS AGREEMENT entered into this 17th day of July, 1972, between the Village of Burnsville, a municipal corporation situated in the County of Dakota, State of Minnesota, hereinafter referred to as "Burnsville", and the Village of Lakeville, a Village situated in the County of Dakota, State of Minnesota, hereinafter referred to as "Lakeville".

WITNESSETH

WHEREAS, Burnsville has constructed and owns and operates various trunk and lateral sanitary sewer lines which serve various land areas in Burnsville, and

WHEREAS, certain areas in Lakeville adjacent to Burnsville can be more efficiently served with sanitary sewer lines by connecting the same to the Burnsville trunk sewer system, and

WHEREAS, the parties hereto are desirous of agreeing that certain areas in Lakeville hereinafter described shall be connected to and served by the Burnsville sanitary sewer system upon the terms and conditions herein expressed.

NOW THEREFORE, it is hereby mutually agreed by and between the parties hereto as follows:

SECTION 1.

Subdivision 1. For the purposes of this agreement the definition of the words and phrases used shall be as set forth in this section.

Subdivision 2. "Sewer" means sanitary sewer.

Subdivision 3. "Lakeville Report" means the engineering report made by the engineering firm of Bonestroo, Rosene, Anderlik & Associates, Inc., to Lakeville, entitled "Report on Orchard Lake and Lake Marion sewer facilities for the Village of Lakeville, Dakota County, Minnesota, September 10, 1969".

Subdivision 4. Exhibit A means the map, bearing that designation, attached hereto outlining the various areas of service.

Subdivision 5. "Crystal Lake District" means the area in Lakeville bearing that designation on Exhibit A.

Subdivision 6. "Burnsville Outlet Point of Interconnection" is the point where the Lakeville Outlet Connecting Sewer enters Burnsville.

Subdivision 7. "Immediate Service Area" means the area in Lakeville within the Burnsville Outlet District colored in red on Exhibit A consisting of 1100± acres.

SECTION 2.

Subdivision 1. Burnsville grants to Lakeville the right and authority, subject to the provisions of this contract to interconnect its sewers, servicing certain areas of Lakeville, with the sewers of Burnsville.

Subdivision 2. The areas of Lakeville which may be served permanently by such interconnecting sewers are limited to the Crystal Lake District consisting of 1100± gross developable acres.

Subdivision 3. Sewer service from the Crystal Lake District shall be through the Burnsville Outlet Connecting Sewer, and the total sewage flow into the Burnsville sewer system at the Burnsville Outlet Point of Interconnection shall never exceed 1.4 million gallons per day average flow.

SECTION 3.

To provide sewer service for the area of Lakeville served through the Burnsville Outlet Point of Interconnection, Lakeville shall, at its own expense, construct the sewer lines within Lakeville. Lakeville shall submit plans and specifications of such sewer to Burnsville before commencing construction, for its review and approval. Such approval shall not be arbitrarily or unreasonably withheld.

SECTION 4.

Subdivision 1. When Lakeville permits any property owners of property in Lakeville to make use of sewer service into Burnsville sewers, as provided in this agreement, Lakeville (not individual property owners) shall pay to Burnsville the hook-up charges for such property or properties in the amount and at the time provided in this section.

Subdivision 2. The trunk sewer hook-up charge shall be $300.00 per gross acre of developable land less the credits provided for in this subdivision. Developable land includes streets and alleys but not interstate highway right-of-way or lake areas.

Against such $300.00 per gross acre hook-up charge Lakeville shall be given a credit for the construction costs of trunk sanitary sewer facilities constructed by Lakeville to serve the Crystal Lake District within ten years of the date of this agreement. "Construction costs of trunk sanitary sewer facilities" as used in this paragraph means (a) the additional costs of constructing sewers over nine inches in diameter, (costs of oversizing), (b) costs of any necessary pumping station to serve the district, and (c) costs of any forcemain or metering station to serve the district.

Such credit for construction costs of trunk sanitary sewer facilities shall be applicable only to the particular district which the facilities serve and shall be subject to verification and approval by Burnsville.

The amount of such credits shall be the actual cost up to a maximum total of $100.00 per acre for the total number of developable acres in the district involved.

Subdivision 3. The hook-up charges for trunks and treatment facilities capital costs shall be as follows:

For each single family lot and each townhouse unit - $160.00

For each multiple residence unit within a multiple residence building - $120.00

For each industrial establishment - A charge equivalent to the charge made against similar establishments in Burnsville based upon the volume and strength of sewage

For every other use - $160.00 for each 15 fixture units, or fraction thereof.

Subdivision 4. The treatment plant and interceptor charges on any property shall be paid at least 10 days prior to the time that such property is connected to a sewer in Lakeville having an outlet through the Burnsville Sewer System. Lakeville shall remit said fees to Burnsville on a quarterly basis.

Subdivision 5. The minimum trunk sewer hook-up charges for any property which is located in the Crystal Lake District, shall be paid (1) within 30 days after such property is platted, provided that if such property is connected to the sewer within 40 days after platting such charge shall be paid at least 10 days before such connection, and (2) at least 10 days before connecting to the sewer in Lakeville if the property is not platted.

Ten years from the date of this agreement Lakeville shall pay to Burnsville in a lump sum the remaining balance, if any, due to Burnsville for trunk sewer hook-up charges on platted or developed land for the Burnsville Outlet District after applying credit provided for in Section 4, Subdivision 2 of this agreement.

Subdivision 6. At the pay-out date, the amount of trunk sewer hook-up charges already paid shall be subtracted from the total amount of such charges payable by Lakeville. (The maximum trunk sewer hook-up charge payable is $300.00 times the total developable acres in the Crystal Lake District. The remainder shall be paid as follows: One-tenth thereof shall be paid on the pay-out date, and one-tenth thereof, together with interest on the unpaid principal balance at the rate of 6% per annum, shall be paid on each

of the next nine anniversaries of the pay-out date; provided that Lakeville shall have the right of pre-payment at any time without penalty.

Subdivision 7. Payments made to Burnsville after the pay-out date pursuant to Subdivision 9 shall be credited towards the amount payable on the next succeeding anniversary of the pay-out date. If the amount of such payments exceeds the amount payable on any such next succeeding anniversary then on such anniversary date the principal remaining unpaid shall be divided by the number of remaining annual installments, and such reduced annual installments, with interest shall constitute the amounts payable.

SECTION 5.

Subdivision 1. A sanitary sewer system only may be connected by Lakeville with the Burnsville sanitary sewer system. It is agreed that no surface water or rain water from roofs, yards, streets, or alleys will be admitted into said sanitary sewers.

Subdivision 2. The sewage being discharged into the Burnsville sanitary sewer is expected to be normal domestic sewage with a five-day B.O.D. and suspended solids content of not to exceed 300 parts per million of each. If other than normal domestic sewage is discharged into the Burnsville system exceeding these concentrations or otherwise deleterious to the sewer system or treatment process, such sewage shall be pretreated or diluted to produce a mutually satisfactory waste.

Subdivision 3. If Burnsville is required to comply with higher standards (lessor strength) for its sewage input into any treatment plant serving Burnsville than are provided in Subdivision 2 of this section then Lakeville shall comply with such higher standards notwithstanding the provisions of such Subdivision 2.

SECTION 6.

Subdivision 1. Before any connections are permitted to

be made with the Burnsville sewer system, plans and specifications for the Lakeville sewers to have outlets through the Burnsville sewer system must be submitted to Burnsville, reviewed and approved by Burnsville as to compliance with the provisions of this agreement. Lakeville shall notify Burnsville in writing immediately after any property in the Crystal Lake District is platted, and shall notify Burnsville before any property in any of such area is connected to a sanitary sewer having its outlet through the sewers of Burnsville.

Subdivision 2. The Burnsville Village Engineer, or any duly authorized representative of said engineer, shall be permitted to inspect the construction or the operation of said sewer system in Lakeville, or the records of Lakeville, at any time to determine that the mutual agreement herein contained is being complied with insofar as it is reasonably necessary to protect the Village of Burnsville.

SECTION 7.

Lakeville shall construct, maintain, and repair at its sole cost and expense all trunk or lateral sewer lines in the limits of Lakeville, subject to the credits provided herein. At or near the points where the Lakeville sanitary sewers connect to the Burnsville sanitary sewer, a suitable metering station shall be installed as part of the trunk system to measure and record continuously the total flow of sewage discharged from Lakeville into the Burnsville sewer system. Plans and specifications for the metering stations shall be subject to review by the Village of Burnsville. Maintenance of equipment in continuous working condition shall be provided by Lakeville. Copies of all sewage flow records will be furnished to Burnsville and duly authorized representatives of Burnsville shall have access to all records and metering facilities. If metering equipment should fail to operate satisfactorily and Lakeville neglects to provide immediate repairs upon notice from duly authorized representative

of Burnsville, Burnsville may order the necessary repairs to be completed and cost of repairs will be paid for by Lakeville. Any such costs shall be paid by Lakeville upon receipt of a verified claim therefor from Burnsville.

SECTION 8.

A sewage treatment and disposal charge shall be paid for the total flow of sewage from Lakeville into the Burnsville sewers on a gallonage basis. Said gallonage shall be the metered flow at the point or points of interconnection of the sewers.

During the first year of the agreement the rate for treatment and disposal will be the current metropolitan sewer rate. Every year thereafter, the rate for treatment and disposal will be the rate speicified by the Metropolitan Sewer Board.

SECTION 9.

It is understood that the above rates and charges are based on the rates and charges currently levied to Burnsville residents by use charges and/or ad valorem taxes. In the event said rates for treatment costs are changed at any time in the future, said charges to be paid by Lakeville herein shall be changed accordingly.

SECTION 10.

All payments for sewage treatment and disposal charges under the provisions of this section shall be made quarterly, beginning on the first day of the first month after Lakeville commences to use the sewage system of Burnsville pursuant to the provisions hereof. Burnsville shall have the right to inspect all records of Lakeville relating to the number of connections to the sanitary sewers, the land use of property served, and the exact legal description of the property, in the area of Lakeville covered by this contract.

SECTION 11.

Any ordinance adopted by Lakeville covering or relating to the use of sanitary sewers and standards of strength and quality of sewage discharged into that part of its system in the area above described shall be equivalent to or in excess of the standards required by Burnsville.

SECTION 12.

Burnsville shall not be responsible for damage claimed by any person, firm or corporation as a result of the backing up of sewers in any basement within the area of Lakeville to be served, and, in the event of any such suit for damages, Lakeville shall immediately intervene and defend against and pay all damages which may be recovered by any such person, firm or corporation. It is further agreed that Lakeville will save and hold harmless Burnsville from any and all costs, expenses and damages and any and all claims, demands or liabilities on account of or by reason of the construction or installation of said sewer trunk lines within the area of Lakeville to be served, the discharge of sewage from the area of Lakeville to be served into Burnsville, including any act or omission negligent or otherwise of Lakeville, or any of its employees. In the event that any proceedings are instituted against Burnsville on account of or arising out of any such claim as herein mentioned, then Lakeville shall defend the same at its own cost and expense, and shall pay any judgment rendered therein against Burnsville. If Lakeville refuses or neglects to defend any and all such actions, it shall pay all costs and expenses, including attorneys' fees, which Burnsville may incur in the defense of same.

SECTION 13.

The permission hereby granted in this agreement shall take effect and be in force from -and after the passage of a resolution by the Village Council of the Village of Burnsville and a resolution

by the Village Council of Lakeville accepting and agreeing to the terms and conditions herein. Certified copies of such resolution, as and when accepted, shall be filed with the Village Clerk of Burnsville and the Village Clerk of Lakeville immediately after such adoption. This permit shall continue until cancelled by mutual agreement of the parties.

SECTION 14.

The parties mutually, in consideration of the provisions of this agreement, hereby accept the privileges, rights and responsibilities hereby granted, subject to the terms and conditions herein, and agree with each other to conform and comply with all acts, matters, things, requirements and conditions herein specified and required of said parties to be done.

IN WITNESS WHEREOF, the parties have caused this agreement to be executed the day and year first above written.

VILLAGE OF BURNSVILLE

By _____
Mayor

By _____
Manager

(Village Seal)

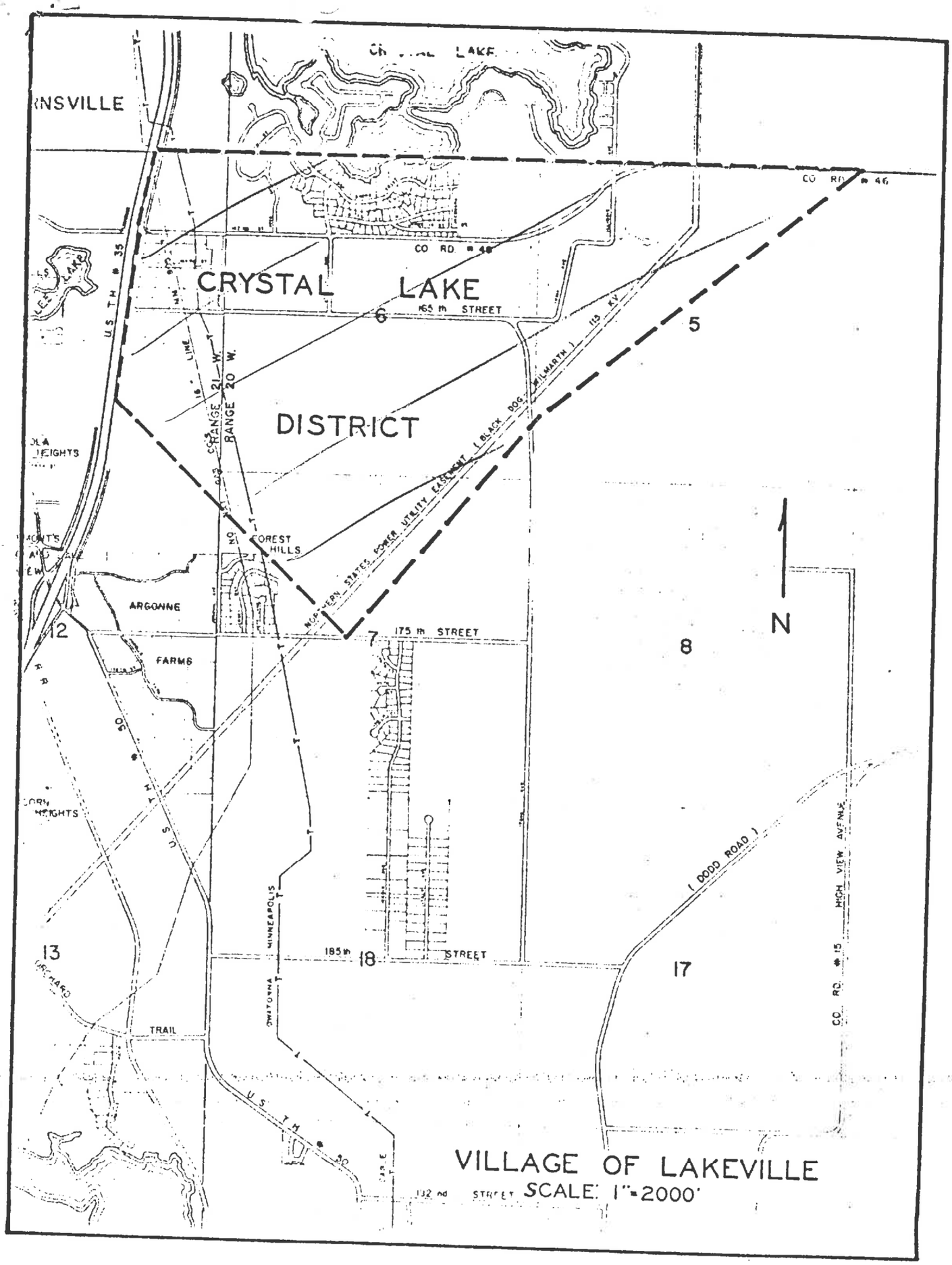
VILLAGE OF LAKEVILLE

By _____
Mayor

By _____
Clerk

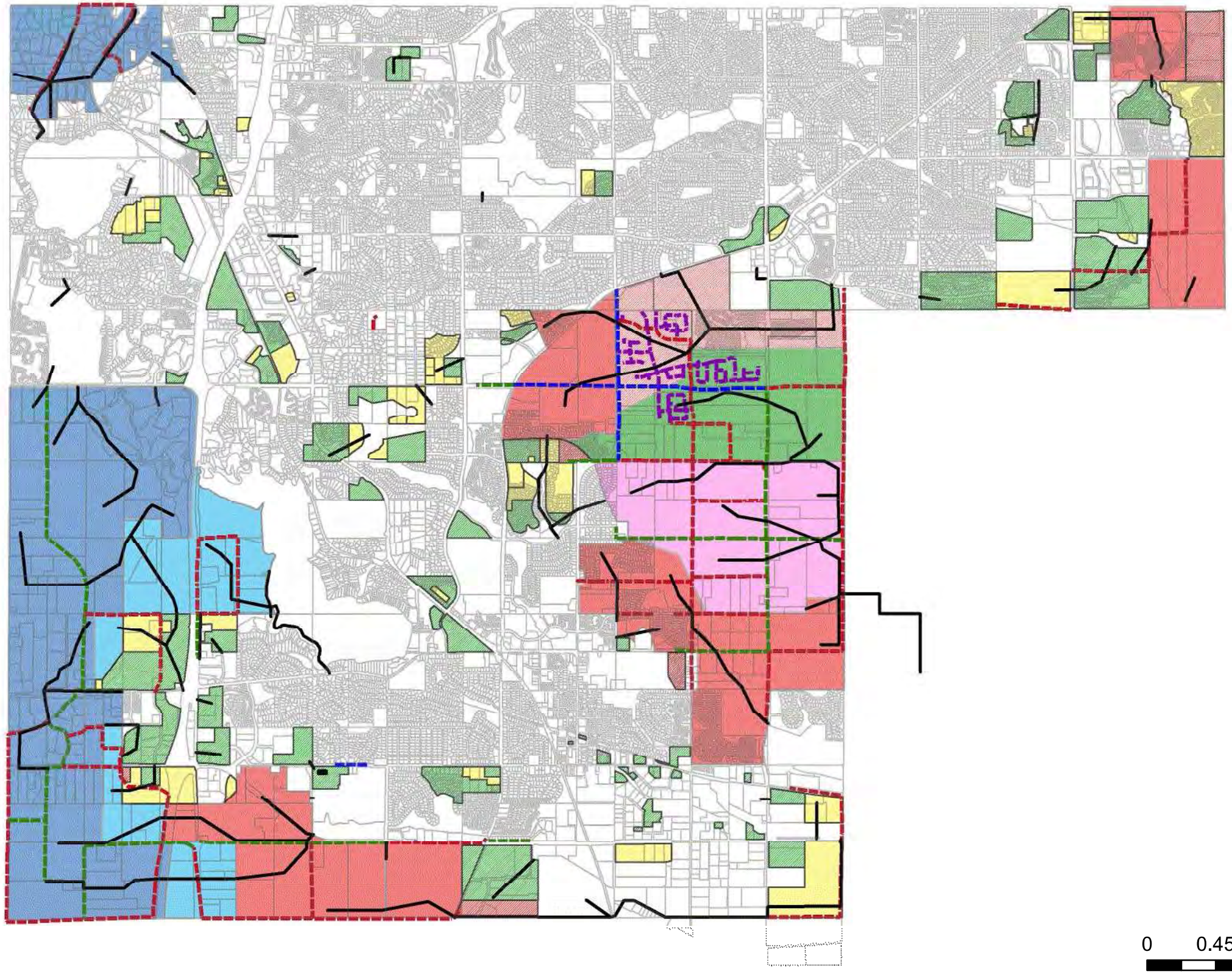
METROPOLITAN SEWER BOARD

By _____


CRYSTAL LAKE
CRYSTAL LAKE
165 th STREET
175 th STREET
185 th STREET
132 nd STREET
CO RD # 46
CO RD # 15
U.S.T.H. # 35
U.S.T.H. # 30
DISTRICT
FOREST HILLS
ARGONNE
FARMS
TRAIL
DODD ROAD
HIGH VIEW AVENUE
NORTHERN STATES POWER UTILITY EASEMENT (BLACK DOG - WILMARTH) 115 KV
RANGE 21 W.
RANGE 20 W.
N
VILLAGE OF LAKEVILLE
SCALE: 1"=2000'

Appendix D

2040 MUSA Staging Plan



N

Legend

Proposed Water Mains

- 8
- 12
- 16
- 20

Proposed Sanitary Pipe

Water and Sewer Serviceability

- Water and Sanitary Available
- Water and/or Sanitary Available with Lateral
- Extension of Trunk Necessary

Staged MUSA Expansion Areas

- Area A (No Sooner than 2010)
- Area B (No Sooner than 2015)
- Permanent Rural
- Urban Reserve (No Sooner than 2020-2025)
- Urban Reserve (No Sooner than 2025-2030)

0 0.45 0.9 1.8 2.7 3.6 Miles

Path: S:\K\OU\lakev\142011\5-final-dsgn\51-drawings\90-GIS\Info\SWMM Model\Desktop\Backup\20171103_First half\LakevilleModel_20171017.mxd

SEH
3535 VADNAIS CENTER DR.
ST. PAUL, MN 55110
PHONE: (651) 490-2000
FAX: (888) 908-8166
TF: (800) 325-2055
www.sehinc.com

Project: 142011 14.00
Print Date: 12/18/2018

User Name: Kate Holmberg
Projection: NAD 1983 HARN Adj MN Dakota Feet
Source: City of Lakeville and SEH

Existing MUSA Serviceability Study with Proposed Water and Sanitary Future Networks
Comprehensive Sanitary Sewer Plan
City of Lakeville

Figure X

Appendix E

Private Septic Systems Table

HOUSE #	STREET 379 SYSTEMS	PID Feb 12, 2019	INSTALL	REPAIR	COMMENTS	COMPLIANCE	LAST PUMPED	ISSUES_WITH	2011	2012	2013	2014	2015	2016	2017	2018	InShoreland
11955	162ND ST W	221360016000		Nov-00	REPAIR/REPLACE EXISTING		10/24/14	NO PROBLEMS KNOWN	1500			1500					Yes
11970	162ND ST W	221360021000	Dec-74		NEW HOME 1974		08/31/18	NO PROBLEMS KNOWN		1000			1000			1000	
11980	162ND ST W	221360037200			NO RECORDS		10/13/16	NO PROBLEMS KNOWN		1000				1000			
12021	**162ND ST W**	**221360023000**			**NO RECORDS**		**04/03/17**	**CESSPOOL OR LEACHING TANK**				**1000**		**2000**	**2000**		
12145	162ND ST W	221360014100	Sep-85		NEW HOME 1985		09/13/17	NO PROBLEMS KNOWN				1200			1200		
12215	162ND ST W	221360012000	Jul-90	2010 JULY	IN COMPLIANCE	2014 July 17	11/03/15	NO PROBLEMS KNOWN		1800			1700				
12265	162ND ST W	221360013000	Feb-89		NEW HOME 1989		04/20/17	NO PROBLEMS KNOWN			1500				2000		
12295	162ND ST W	221360006000	Nov-79	Jun-96	REPAIR/REPLACE EXISTING		07/25/17	NO PROBLEMS KNOWN	1500			1500			1500		
12305	162ND ST W	221360007000	Oct-87		NEW HOME 1987		10/25/18	NO PROBLEMS KNOWN	1500	1500	1500	1500	1500	1500	1500	2000	
12330	162ND ST W	229013004000	Nov-79		IN COMPLIANCE	2003-SEPTEMBER-12	08/20/18	NO PROBLEMS KNOWN			1500					1500	
12335	162ND ST W	221360011000	Aug-85		NEW HOME 1985		10/13/16	NO PROBLEMS KNOWN		1200				1000			
12390	**162ND ST W**	**229013003000**	**Dec-79**		**NEW HOME 1979**		**08/03/16**	**CESSPOOL OR LEACHING TANK**	**1000**		**1000**			**2000**			
12240	**163RD ST W**	**221360035000**	**30987**		**NEW HOME 1984**	**6 YR PUMP SNOWBIRDS**	**09/18/15**	**NO PROBLEMS KNOWN**				**2000**	**1250**				
12275	163RD ST W	221360025100	Nov-83	2010	replaced 2010		10/04/18	NO PROBLEMS KNOWN				2500				2200	
12330	163RD ST W	221360034000	Nov-75	2015	REPAIR/REPLACE EXISTING		08/13/15	NO PROBLEMS KNOWN					1000				
12341	**163RD ST W**	**221360027000**	**Oct-75**		**NEW HOME 1975**	**6 YR PUMP SNOWBIRDS**	**06/14/16**	**NO PROBLEMS KNOWN**			**1000**						
12405	163RD ST W	221360030000	Oct-80		NEW HOME 1980	6 year living by self	07/20/16	NO PROBLEMS KNOWN	gave extention					1000			Yes
11195	172ND ST W	220121001032			NO RECORDS		03/29/16	NO PROBLEMS KNOWN		1250				3000			Yes
11516	172ND ST W	220111001003			NO RECORDS		06/14/17	NO PROBLEMS KNOWN				1000			1000		Yes
11518	172ND ST W	220111001304	Nov-78	Nov-92	IN COMPLIANCE	2008- MAY 8	06/28/18	NO PROBLEMS KNOWN	1250				1250			1000	
11522	172ND ST W	220111001005			NO RECORDS		06/20/17	NO PROBLEMS KNOWN			1000				1000		
11538	**172ND ST W**	**220111001006**			**NO RECORDS**	**PUMPED 2X IN 6 MONTHS**	**07/13/17**	**CESSPOOL OR LEACHING TANK**			**1000**				**300**		**Yes**
8739	172ND ST W	220080001907		May-97	REPAIR/REPLACE EXISTING		07/29/15	NO PROBLEMS KNOWN	1250				1250				
10050	185TH ST W	220180001150	2014	September	New home and new system		09/09/14	NO PROBLEMS KNOWN									
10132	185TH ST W	220180001151		Sep-96	REPAIR/REPLACE EXISTING		06/15/16	NO PROBLEMS KNOWN	1250					1500			
10252	**185TH ST W**	**220180001452**		**Aug-95**	**ACCESS TO SEWER, NOT REQUIRED**	**SEE FILE**	**06/21/18**	**NO PROBLEMS KNOWN**	**1500**				**1500**			**1600**	**Yes**
12110	185TH ST W	220140001577	Jul-85		FIXED REQUIREMENTS OF LETTER	1996	10/15/18	NO PROBLEMS KNOWN			1250					1200	Yes
12240	185TH ST W	220140001477	Nov-93	2014 January	IN COMPLIANCE		08/01/15	NO PROBLEMS KNOWN						1500			
12340	185TH ST W	220140001850	Sep-86	Nov-98	REPAIR/REPLACE EXISTING		05/24/15	NO PROBLEMS KNOWN	1250				1250				
9655	185TH ST W	220180001007	Nov-01		NEW HOME 2001		08/23/16	NO PROBLEMS KNOWN						3000			
9710	185TH ST W	220180001079	Oct-95		NEW HOME 1995		05/14/18	NO PROBLEMS KNOWN			1700			1400		2000	
9715	185TH ST W	220180002006		Nov-84	REPAIR/REPLACE EXISTING		08/01/17	NO PROBLEMS KNOWN				1000			1100		
9798	185TH ST W	220180001080	Aug-93		IN COMPLIANCE	8/3/1998	05/08/17	NO PROBLEMS KNOWN	1500			1500			1000		
9806	185TH ST W	220180002080	Aug-77		IN COMPLIANCE	5/14/1998	05/08/17	NO PROBLEMS KNOWN				1000			1200		
9920	185TH ST W	220180001181	May-88		IN COMPLIANCE	6/6/1998	05/20/15	NO PROBLEMS KNOWN	1250				1500				
9940	185TH ST W	220180001281	Jan-79		IN COMPLIANCE	5/14/2001	07/20/16	NO PROBLEMS KNOWN			1250			1250			Yes
7029	190TH ST W	220150001050			NO RECORDS		07/23/18	NO PROBLEMS KNOWN		2000			1000			1000	Yes
7190	190TH ST W	220220001026		2013-June 8	in cOMPLIANCE		05/31/18	NO PROBLEMS KNOWN	1800			1400				1500	Yes
8016	190TH ST W	220210001226	Oct-80	9/26/1999	REPAIR/REPLACE EXISTING		11/06/15	NO PROBLEMS KNOWN		1500			1500				
8159	190TH ST W	220160001262			NO RECORDS		08/09/18	NO PROBLEMS KNOWN				1000				1000	Yes
8200	190TH ST W	220210001126		7/28/2000	in COMPLIANCE	2018 14th may	05/02/18	NO PROBLEMS KNOWN		1400				2000		2000	
8229	190TH ST W	220160001060		Oct-94	IN COMPLIANCE	2009. May 26	10/04/16	NO PROBLEMS KNOWN			2000			2000			Yes
8280	190TH ST W	220210001328	Jul-94		NEW HOME 1994		11/12/15	NO PROBLEMS KNOWN		1500			1500				Yes
8315	190TH ST W	220160001058		Oct-94	HOUSE		07/15/15	NO PROBLEMS KNOWN	1250		2500		1000				Yes
8315	190TH ST W	220160001059	May-94		HORSE BARN		07/15/15	NO PROBLEMS KNOWN	1250				1000				Yes
8356	190TH ST W	220210001528	Dec-92		NEW HOME 1992		06/22/17	NO PROBLEMS KNOWN			1250				1250		Yes
8400	190TH ST W	220210001029			NO RECORDS		05/26/15	NO PROBLEMS KNOWN	1000				1000				Yes
8445	190TH ST W	220160001058	Oct-73		NEW HOME 1973		09/27/16	NO PROBLEMS KNOWN						1000			Yes
8450	190TH ST W	220210001428		Aug-96	REPAIR/REPLACE EXISTING		11/04/16	NO PROBLEMS KNOWN		1200				1200			
9065	190TH ST W	220170001058		Apr-98	REPAIR/REPLACE EXISTING		12/31/15	NO PROBLEMS KNOWN	1500				1500				
11551	195TH ST W	220230001103	Aug-87		IN COMPLIANCE	2018 september 25	09/25/18	NO PROBLEMS KNOWN		1250				1200		1250	
11560	195TH ST W	220230001175	Nov-90		IN COMPLIANCE	2005 JULY 22	07/12/16	NO PROBLEMS KNOWN		1500				1500			
11675	195TH ST W	220230001203	May-88	Sep-97	IN COMPLIANCE	September 23-2009	06/30/16	NO PROBLEMS KNOWN		2500				2100			
12114	197TH ST W	220230001077	Jun-73		NEW HOME 2009		07/20/16	NO PROBLEMS KNOWN			2750			2850			
12117	197TH ST W	220230001450	2006 JULY		NEW HOME 2006		04/06/17	NO PROBLEMS KNOWN			1500				1600		
12220	197TH ST W	220230001157	Aug-85		IN COMPLIANCE	2012 October 11	11/08/18	NO PROBLEMS KNOWN	1250				1250			1250	
12280	197TH ST W	220230001054	Nov-91		NEW HOME 1991		07/28/17	NO PROBLEMS KNOWN			1500				1350		
12295	197TH ST W	220230001550	Dec-94		NEW HOME 1994	IN COMPLIANCE 11/04/02	07/23/18	NO PROBLEMS KNOWN				1500				1250	
12340	197TH ST W	220230001053		Apr-98	REPAIR/REPLACE EXISTING		04/04/18	NO PROBLEMS KNOWN		1500				1500		2700	
8481	198TH ST W	220210001351			NO RECORDS		10/26/16	NO PROBLEMS KNOWN		1000			1000	2500			
7059	200TH ST W	220220001055	Sep-97		NEW HOME 1997		09/07/16	NO PROBLEMS KNOWN		1500				2000			
7483	200TH ST W	220220002054	Jun-87		NEW HOME 1987		09/20/17	NO PROBLEMS KNOWN				1250			1250		
7570	200TH ST W	220280003001	Sep-95		NEW HOME 1995		07/19/16	NO PROBLEMS KNOWN	2000					1250			
7690	200TH ST W	220280002601	May-89		NEW HOME 1989		06/20/18	NO PROBLEMS KNOWN				1250				1500	
7725	**200TH ST W**	**220210001077**		**Oct-99**	**REPAIR/REPLACE EXISTING**	**in comply 11/2008**	**10/30/08**	**NO PROBLEMS KNOWN**	**vacant and for sale**								
7820	200TH ST W	220280002201	Nov-91		NEW HOME 1991	IN COMPLY 12-7-17	11/07/17	NO PROBLEMS KNOWN			1250			1250	2000		
7947	200TH ST W	220210001576		Jun-96	REPAIR/REPLACE EXISTING		06/21/18	NO PROBLEMS KNOWN		1250						1500	
7953	200TH ST W	220210001478		Jun-96	REPAIR/REPLACE EXISTING		11/13/16	NO PROBLEMS KNOWN			1250			1250			
7975	200TH ST W	220210001276	Jul-90		NEW HOME 1990		06/24/15	NO PROBLEMS KNOWN	1250				1500				
7725	202ND ST W	220280003201	Aug-93		NEW HOME 1993	IN COMPLY 1/98	12/18/15	NO PROBLEMS KNOWN	1500		1800		1500				
7770	202ND ST W	220280002401	Oct-89		NEW HOME 1989		04/04/16	NO PROBLEMS KNOWN				1250		1000			
7825	202ND ST W	220280002601	Apr-90	2002/Aug	REPAIR/REPLACE EXISTING		01/23/15	NO PROBLEMS KNOWN			2750		3000				
7880	202ND ST W	220280001801	Oct-91		NEW HOME 1991		06/05/15	NO PROBLEMS KNOWN	1500				1250				Yes
8780	202ND ST W	220290001008			NO RECORDS		02/12/16	NO PROBLEMS KNOWN				1500		1500			
11513	205TH ST W	220260001004		Jul-91	REPAIR/REPLACE EXISTING		10/12/17	NO PROBLEMS KNOWN			1000				1250		
11768	205TH ST W	220260001579	Jun-83		NEW HOME 1983		07/11/18	NO PROBLEMS KNOWN				1000				1000	
11770	**205TH ST W**	**220260001379**	**Sep-73**		**NO RECORDS**	**vacant home**	**06/20/16**	**NO PROBLEMS KNOWN**		**0**				**700**			
11772	**205TH ST W**	**220260001178**	**1973**	**2009**	**REPLACED 2009**		**04/25/15**	**send letters to 11774 205th st w**	**3750**				**3000**				
11774	205TH ST W	220260001279	Jul-77		NEW HOME 1977		06/20/18	NO PROBLEMS KNOWN		1000				1000			
11840	205TH ST W	220260001176	Aug-95		NEW HOME 1995		06/16/16	NO PROBLEMS KNOWN		1500				1500			
11881	205TH ST W	220260001006			NO RECORDS		06/04/15	NO PROBLEMS KNOWN	1000				1000				
11896	205TH ST W	220260002076	1973	Nov-80	REPAIR/REPLACE EXISTING		04/12/16	NO PROBLEMS KNOWN	1000					1000			
11993	205TH ST W	220260001007		2008-sept	HOLDING TANKS	COMMERCIAL	08/11/16	NO PROBLEMS KNOWN						1000			
12015	205TH ST W	220260001625	Jan-86		NEW HOME 1986		07/11/10	NO PROBLEMS KNOWN									
12030	205TH ST W	220260001150		Oct-97	REPAIR/REPLACE EXISTING		08/30/13	NO PROBLEMS KNOWN			1800						
12031	205TH ST W	220260001425	1979	2013 Sept 26	REPAIR/REPLACE EXISTING		09/26/13	NO PROBLEMS KNOWN			unknown						
12033	205TH ST W	220260001825	Jun-73	2011 Oct	REPAIR/REPLACE EXISTING		11/05/15	NO PROBLEMS KNOWN	500				1500				
12295	205TH ST W	220260001626	Nov-76		NEW HOME 1976		10/05/18	NO PROBLEMS KNOWN		1000				2000		2000	
12393	205TH ST W	220260006028	Sep-72		NEW HOME 1972		06/30/16	NO PROBLEMS KNOWN		2000				1000			
10240	210TH ST W	220310001026		Oct-86	REPAIR/REPLACE EXISTING		06/23/15	NO PROBLEMS KNOWN	1250				1250				
10762	210TH ST W	220360001002		Jun-97	REPAIR/REPLACE EXISTING		08/24/18	NO PROBLEMS KNOWN		1500			1500			1500	
11813	210TH ST W	220260001081			NO FILE		01/20/17	NO PROBLEMS KNOWN	1250	1000					1000		
11850	210TH ST W	220350001104	Oct-77	2002-NOV 19	REPAIR/REPLACE EXISTING		10/20/09	NO PROBLEMS KNOWN									
11897	210TH ST W	220260001080			NO RECORDS		06/26/17	NO PROBLEMS KNOWN			1000				1000		
11900	210TH ST W	220350001405	May-90	1999-AUG 20	NEW HOME 1990	WROTE LTR	04/21/17	NO PROBLEMS KNOWN		1500					1200		
11980	210TH ST W	220350001305	Jul-79	2018	REPAIR/REPLACE EXISTING		08/03/18	NO PROBLEMS KNOWN			1000				2000	?	
12070	210TH ST W	220350001425	Sep-84	2011-sept	REPAIR/REPLACE EXISTING		11/02/18	NO PROBLEMS KNOWN	3000		1500			2000		1000	
12110	210TH ST W	220350001825	Oct-86	2016. may 2	replaced		05/02/16	NO PROBLEMS KNOWN					1000				
12150	210TH ST W	220350001625	Aug-79		NEW HOME 1979		10/01/18	NO PROBLEMS KNOWN				1200				1250	
12230	210TH ST W	220350001225	Nov-76		NEW HOME 1976		06/30/17	NO PROBLEMS KNOWN			1000				1000		
12265	210TH ST W	220260002052	May-77	4/5/2002	REPAIR/REPLACE EXISTING		07/27/16	NO PROBLEMS KNOWN		1000				1000			
12310	210TH ST W	220350001026		9/20/1999	REPAIR/REPLACE EXISTING	IN COMPLIANCE 4-17-07	08/03/18	NO PROBLEMS KNOWN				3000				3300	
12320	210TH ST W	220350004126	2005-AUG		NEW HOME 2005		08/31/18	NO PROBLEMS KNOWN				1500				1200	
12330	210TH ST W	220350004226	Oct-78		IN COMPLIANCE	2003-SEPTEMBER-22	08/03/18	NO PROBLEMS KNOWN			1000	1250				1250	
12350	210TH ST W	220350002026		Aug-98	IN COMPLIANCE	2004. JULY 20	05/22/15	NO PROBLEMS KNOWN	1750				3000				
12400	210TH ST W	220350003026		May-98	IN COMPLIANCE	2005-MAY-17	06/07/18	NO PROBLEMS KNOWN			1250				1000	1000	
12430	210TH ST W	220350001227	Oct-90		IN COMPLIANCE	2008-Oct-29	11/08/18	NO PROBLEMS KNOWN	1000				1250			1200	
12450	210TH ST W	220350001127	Mar-78		NEW HOME 1978		04/27/16	NO PROBLEMS KNOWN		1000		1000		1000			
8231	210TH ST W	220280008053			NO FILE		07/11/16	NO PROBLEMS KNOWN			1000			1000			
9360	210TH ST W	220320003129		May-80	REPAIR/REPLACE EXISTING	2016 august	08/01/16	NO PROBLEMS KNOWN	1000				?				
9410	210TH ST W	220320002129	May-79	Nov-01	2 SYSTEMS ONE INSTALLED 2008	2007 September 20	05/11/18	NO PROBLEMS KNOWN	1000 + 1500		2250	2500		1500+1250	1000	1200	
9446	210TH ST W	220320001029			NO RECORDS		07/11/17	NO PROBLEMS KNOWN			1000				2000		
10222	**215TH ST W**	**220310003150**			**pumped in 2009**	**Seasonal 6 year pump**	**11/07/14**	**NO PROBLEMS KNOWN**		**0**		**1000**					**Yes**
10430	215TH ST W	220310001351			NO FILE												
10821	**215TH ST W**	**220360001307**	**DUNHAM**		**farm house**		**06/02/17**	**NO PROBLEMS KNOWN**			**1000**				**1000**		
10831	**215TH ST W**	**220360001706**	**DUNHAM**		**gold building**	**PUMPED 2X IN 12 MONTHS**	**07/08/15**	**NO PROBLEMS KNOWN**	**1000**				**1000**				
11120	**215TH ST W**	**220360001250**		**2009**	**REPAIR/REPLACE EXISTING**	**HOLDING TANKS**	**02/05/15**	**NO PROBLEMS KNOWN**	**0**				**1500**				
11250	**215TH ST W**	**220360001051**		**2018**	**HOLDING TANKS**		**07/07/16**	**PROBLEMS KNOWN**		**17179**				**2000**			
11356	**215TH ST W**	**220360001554**		**Jun-94**	**IN COMPLIANCE**	**2005-JULY 14**	**11/08/17**	**NO PROBLEMS KNOWN**	**1500**	**6000**	**3000**	**6000**	**6000**	**3100**	**9500**		
11625	215TH ST W	220350001102			NO RECORDS		07/09/18	NO PROBLEMS KNOWN				1000				1000	
11701	215TH ST W	220350001501	Jan-94		in COMPLIANCE	2014-March 24	08/24/17	NO PROBLEMS KNOWN	1000				1250		1250		
11758	215TH ST W	220350001376		Aug-98	IN COMPLIANCE	2004 MAY 8	07/05/18	NO PROBLEMS KNOWN				1250				1000	
11850	215TH ST W	220350001276	Jul-79		NEW HOME 1979		08/28/18	NO PROBLEMS KNOWN	1000				1000			1000	
9065	215TH ST W	220152000100		Oct-79	USING 9049 REPAIR/REPLACE		07/18/16	NO PROBLEMS KNOWN	1000					1000			Yes
9085	215TH ST W	221520002001		Sep-97	IN COMPLIANCE	2011 December 7	08/08/16	NO PROBLEMS KNOWN		1500				1500			Yes
9105	215TH ST W	221520003001		2008-sept	REPAIR/REPLACE EXISTING		07/18/18	NO PROBLEMS KNOWN		1000				1000		1000	Yes
9125	215TH ST W	221520004001		2001-nov	REPAIR/REPLACE EXISTING		10/02/17	NO PROBLEMS KNOWN						1200	300		Yes
9145	215TH ST W	221520005001		Aug-00	IN COMPLIANCE	2012 June 25	08/16/18	NO PROBLEMS KNOWN				1800				1000	Yes
9167	215TH ST W	221520006001	2012 oct	Oct-92	REPAIR/REPLACE EXISTING		05/30/18	NO PROBLEMS KNOWN	pumped	1250			2250			2200	Yes
9175	215TH ST W	221520007001			NO RECORDS		05/30/18	NO PROBLEMS KNOWN	1000	1000			1000			1000	Yes
9189	215TH ST W	221520008001	1977	2002-NOV 22	REPAIR/REPLACE EXISTING	REPLACED TANKS	09/19/16	NO PROBLEMS KNOWN	1500					1000			Yes
9205	215TH ST W	221520009001	1967	2008 sept	vacant till oct 2011 pump in 2014		08/18/16	NO PROBLEMS KNOWN	vacant till 2011					2000			Yes
9225	215TH ST W	221520010001		Oct-98	in COMPLIANCE	2014 June. 14	10/25/16	NO PROBLEMS KNOWN		1000				1000			Yes
9245	215TH ST W	221520011001		2014-June 5	REPAIR/REPLACE EXISTING		08/09/18	NO PROBLEMS KNOWN				1000				1200	Yes
9264	215TH ST W	221520012001		May-78	REPAIR/REPLACE EXISTING		09/21/10	NO PROBLEMS KNOWN									Yes
9285	215TH ST W	221520013001	Mar-77	Mar-00	IN COMPLIANCE	2016 november 8	11/07/16	NO PROBLEMS KNOWN				1500		2000			yes
18476	CEDAR AVE	220150001326	Jun-85		NEW HOME 1985		08/07/18	NO PROBLEMS KNOWN			1000			1000		1000	
18781	CEDAR AVE	220160001078	Sep-81	2018 may 17	REPAIR/REPLACE EXISTING		05/17/18	NO PROBLEMS KNOWN	1250			1000			?		
18875	CEDAR AVE	220160001280		2006-NOV	REPAIR/REPLACE EXISTING		07/20/16	NO PROBLEMS KNOWN	2500	3000				4700			
18863	CEDAR AVE	220160001079		Oct-84	REPAIR/REPLACE EXISTING		10/07/16	NO PROBLEMS KNOWN		1000				1000			Yes
18880	CEDAR AVE	220150001253			NO RECORDS		09/25/15	NO PROBLEMS KNOWN				1000					Yes
19266	CEDAR AVE	220220001425		Oct-91	REPAIR/REPLACE EXISTING		06/02/15	NO PROBLEMS KNOWN	1250				1250				
19362	CEDAR AVE	220220001227		Oct-81	IN COMPLIANCE	5/7/1998	07/15/15	NO PROBLEMS KNOWN	1250				1250				
19740	CEDAR AVE	220220002052	Aug-77		REPAIR/REPLACE EXISTING	2015 Nov 30	11/23/15	NO PROBLEMS KNOWN		1000		?					
19904	CEDAR AVE	220220001251	Dec-99		IN COMPLIANCE	2004-AUGUST 14	10/19/17	NO PROBLEMS KNOWN			1250				1250		
20465	**CEDAR AVE**	**220280001401**	**Jun-84**		**NEW BUILDING 1984**	**DO NOT SEND LETTER**	**04/02/15**	**NO PROBLEMS KNOWN**	**1000**		**1000**	**1000**	**1000**				**Yes**
21558	CEDAR AVE	220340002051					09/17/15	UNABLE TO VERIFY	800					800			Yes

16000	Co Rd 5	220021001001		2014	REPAIR/REPLACE EXISTING	2014	07/24/17	NO PROBLEMS KNOWN		0				1000			
17622	DODD BLVD	220090001179			NO RECORDS		05/27/15	NO PROBLEMS KNOWN	1000				1000				
17680	**DODD BLVD**	**220090001053**			**NO RECORDS**	**seepage pit**	**10/30/14**	**NO PROBLEMS KNOWN**			**500**	**500**					
18580	**DODD BLVD**				**rental**		**03/29/17**	**CESSPOOL OR LEACHING TANK**						**700**			
18630	DODD BLVD	220170001257	1976		OLD HOUSE ON 18630 DODD PARCE	NO RECORDS	09/27/18	NO PROBLEMS KNOWN				1250		1300	1500	1000	
18721	DODD BLVD	220170003055		Sep-95	REPAIR/REPLACE EXISTING		06/28/17	NO PROBLEMS KNOWN		1250					1250		
21063	DODD BLVD	220320004029		Oct-00	REPAIR/REPLACE EXISTING	snow birds	06/19/18	NO PROBLEMS KNOWN		1800						2000	
21103	DODD BLVD	220320002330		Aug-92	REPAIR/REPLACE EXISTING	**not reg to connect 2011**	06/28/16	NO PROBLEMS KNOWN		1000				1000			
17394	**FLAGSTAFF AVE**	**220110001325**		**Oct-89**	**REPAIR/REPLACE EXISTING**		**07/27/15**	**NO PROBLEMS KNOWN**	**measured**					**0**			
17894	**FLAGSTAFF AVE**	**220110001052**		**Dec-97**	**REPAIR/REPLACE EXISTING**		**05/31/17**	**NO PROBLEMS KNOWN**				**1000**			**1000**		
20010	HAMBURG AVE	220280003101	Sep-82		NEW HOME 1982		08/27/18	NO PROBLEMS KNOWN	1500				1500			1500	
20140	HAMBURG AVE	220280001002	Nov-80		NEW HOME 1980		07/20/16	NO PROBLEMS KNOWN		1250				1500			
20160	HAMBURG AVE	220280002002		Aug-98	IN COMPLIANCE	2018 September 4	09/04/18	NO PROBLEMS KNOWN		1800				1700		2000	
17925	HIGHVIEW AVE	220080001076		Jul-76	was 18026 Dodd Blvd	in compliance 8-15-16	08/12/16	NO PROBLEMS KNOWN						2500			
17460	HIGHVIEW AVE	220090001922			NO RECORDS	PUMPED 2X IN 12 MONTHS	06/27/16	PROBLEMS KNOWN						1500			Yes
17965	HIGHVIEW AVE	220080001077	Jun-76		In COMPLIANCE	2013 June 13	08/01/18	PROBLEMS KNOWN		1000		1000		1000		1000	**Yes**
18130	HIGHVIEW AVE	220160001025		Dec-83	NO RECORDS		07/12/18	NO PROBLEMS KNOWN				1000				200	
18650	HIGHVIEW AVE	220160001052	1976		NEW HOME 1976		10/15/16	NO PROBLEMS KNOWN						1000			
18660	HIGHVIEW AVE	220160001254	Mar-80		NEW HOME 1980		12/26/17	NO PROBLEMS KNOWN	1000				1000		2000		
18665	HIGHVIEW AVE	220170003075	Feb-96		NEW HOME 1996		01/26/18	NO PROBLEMS KNOWN	2500				3000			2750	
18741	HIGHVIEW AVE	220170004075		Feb-96	REPAIR/REPLACE EXISTING		08/17/18	NO PROBLEMS KNOWN				1200				1000	
18795	HIGHVIEW AVE	220170001078		Oct-96	in COMPLIANCE	2018 May 3	07/22/16	NO PROBLEMS KNOWN		1250				1500			
18822	HIGHVIEW AVE	220160001255			NO RECORDS		07/06/18	NO PROBLEMS KNOWN				1000				1200	
19837	HIGHVIEW AVE	220200001082			NO RECORDS		07/31/17	NO PROBLEMS KNOWN			2000				1600		
19841	HIGHVIEW AVE	220200001283		May-98	REPAIR/REPLACE EXISTING		08/30/16	NO PROBLEMS KNOWN			1400			1400			
19845	HIGHVIEW AVE	220200001081		Jul-78	NO RECORDS		06/29/18	NO PROBLEMS KNOWN				1500				1500	
19848	HIGHVIEW AVE	220210001053	Sep-01		NEW HOME 2002		09/16/16	NO PROBLEMS KNOWN		2500				2600			
19970	HIGHVIEW AVE	220210001252	Jun-82		NEW HOME 1982		07/22/16	NO PROBLEMS KNOWN		1000				1250			**Yes**
20308	**ICALEE PATH**	**220300002003**			**SEE FILE**	**PUMPED 2X IN 6 MONTHS**	**05/01/18**	**PROBLEMS KNOWN**	**1500**		**1000**		**1000**			**600**	
17100	***IPAVA AVE***	***220080001325***	***Jun-89***		***CITY PROPERTY***	***CITY PROPERTY***	***10/25/17***	***NOT ON COUNTY LIST***							***6000***		**Yes**
18345	IPAVA AVE	220180001209	Aug-94		NEW HOME 1994		05/17/18	NO PROBLEMS KNOWN				1250				1500	
18375	IPAVA AVE	220180001008	Aug-82		IN COMPLIANCE	2016 May 13	07/27/18	NO PROBLEMS KNOWN		200			1250			1200	
18459	IPAVA AVE	220180001109	Oct-94		NEW HOME 1994		08/28/18	NO PROBLEMS KNOWN	2500			2500				3200	
18088	ITALY AVE	227300031000		Jul-88	REPAIR/REPLACE EXISTING		07/21/16	NO PROBLEMS KNOWN		1000				1350			
18100	ITALY AVE	227300015100		2004 OCT	REPAIR/REPLACE EXISTING		07/14/17	NO PROBLEMS KNOWN				1500			1500		
18131	ITALY AVE	227300017000	Jun-74	2004 OCT	REPAIR/REPLACE EXISTING	In COMPLIANCE 2015	06/20/18	NO PROBLEMS KNOWN				1500				1600	
18132	ITALY AVE	227300014000	1965		NEW HOME 1965	CESSPOOL	07/27/16	Measured need to pump 2014		0				1000			
18155	ITALY AVE	227300019000		2003-OCT	REPAIR/REPLACE EXISTING		07/15/16	NO PROBLEMS KNOWN			1400			1000			
18156	ITALY AVE	227300013000		Jul-89	REPAIR/REPLACE EXISTING		08/01/17	NO PROBLEMS KNOWN				1000			1000		
18180	ITALY AVE	227300012000		Aug-00	REPAIR/REPLACE EXISTING		06/23/16	NO PROBLEMS KNOWN		1200				1000			
18218	ITALY AVE	227300011000		Aug-98	REPAIR/REPLACE EXISTING		08/10/17	NO PROBLEMS KNOWN				1500			1600		
18237	ITALY AVE	227300021000		Oct-96	REPAIR/REPLACE EXISTING		07/15/16	NO PROBLEMS KNOWN		1000				1200			
18246	ITALY AVE	227300021100		Jun-86	REPAIR/REPLACE EXISTING		06/09/16	NO PROBLEMS KNOWN	1000				1000				
18267	ITALY AVE	227300022000	Sep-77	Jun-00	REPAIR/REPLACE EXISTING		08/07/16	NO PROBLEMS KNOWN		1800				1600	1800		
18268	ITALY AVE	227300009000	Mar-78		NEW HOME 1978		06/16/16	NO PROBLEMS KNOWN	1000		1000			1000			
18289	ITALY AVE	227300023100	Jul-82	2018	REPAIR/REPLACE EXISTING	2018 Nov 16	10/30/18	NO PROBLEMS KNOWN	1000		1000	1000	1000		2000	2000	
18290	ITALY AVE	227300008000	1971	2002	REPAIR/REPLACE EXISTING		05/26/15	NO PROBLEMS KNOWN	1400				1500				
18328	ITALY AVE	227300000100			IN COMPLIANCE	2004, APRIL 10	10/15/18	NO PROBLEMS KNOWN		1700			1500	1000	1300	1500	
18329	**ITALY AVE**	**227300024100**	**1966**		**NEW HOME 1966**		**07/07/16**	**CESSPOOL OR LEACHING TANK**		**1000**				**2000**			
18350	ITALY AVE	227300006100		Jun-94	in COMPLIANCE	2014, April 21	07/06/18	NO PROBLEMS KNOWN	1500			1500				1600	
18355	ITALY AVE	227300025000	1966	Jun-00	in COMPLIANCE	2012 november	07/21/16	NO PROBLEMS KNOWN		1500				1800			
18379	**ITALY AVE**	**227300026000**			**NO RECORDS**		**06/16/16**	**CESSPOOL OR LEACHING TANK**		**1000**				**1000**			
18398	ITALY AVE	227300005000	1989	SEPT*2002	in COMPLIANCE	2018 June 20	06/02/17	NO PROBLEMS KNOWN			1700				1000		
18412	ITALY AVE	227300004100		Aug-89	IN COMPLIANCE	8/16/2000	07/15/16	NO PROBLEMS KNOWN		1200				1200			
18423	ITALY AVE	227300027000		May-97	REPAIR/REPLACE EXISTING		10/07/15	NO PROBLEMS KNOWN	2000				2000				
18435	ITALY AVE	227300028000		Oct-99	IN COMPLIANCE	2005-JULY 7	07/11/16	NO PROBLEMS KNOWN		1500				1800			
18436	ITALY AVE	227300003000			REPAIR/REPLACE EXISTING	2016 August	08/01/16	NO PROBLEMS KNOWN		1000			1000	?			
18461	ITALY AVE	227300029000		Sep-84	REPAIR/REPLACE EXISTING		04/27/17	NO PROBLEMS KNOWN	1000				1000		500		
18462	ITALY AVE	227300002100		Jul-88			08/24/18	NO PROBLEMS KNOWN		1000				1000			
19390	**ITERI AVE**		**2003, JUN**		**must reinspect 2012**	**IN COMPLIANCE 2009**	**10/26/18**	**NO PROBLEMS KNOWN**		**2450**		**2115**				**2000**	
18291	IXONIA AVE	224740201101	Jun-74	SEPT*2002	REPAIR/REPLACE EXISTING	8/28/2001	10/09/17	NO PROBLEMS KNOWN			3000				1300		
18218	IXONIA AVE	224740002002	1970	27, JULY 2004	REPAIR/REPLACE EXISTING		08/10/15	NO PROBLEMS KNOWN					1400				
18241	IXONIA AVE	224740202001	1973		NO RECORDS		12/21/16	NO PROBLEMS KNOWN		1250				1000			
18275	IXONIA AVE	224740008002		Aug-94	REPAIR/REPLACE EXISTING	8/10/2002	07/20/17	NO PROBLEMS KNOWN			1500				1300		
18276	IXONIA AVE	224740001002	1970	2012 July	REPAIR/REPLACE EXISTING		08/26/16	NO PROBLEMS KNOWN		1000				1800			
18355	IXONIA AVE	224740002003			NO RECORDS	gave 3 years	08/19/16	NO PROBLEMS KNOWN			1000			extension			
18366	**IXONIA AVE**	**220180001010**			**NO RECORDS**	**pump 2016 snowbirds**	**08/01/16**	**NO PROBLEMS KNOWN**						**1000**			
18379	IXONIA AVE	224740001003			NO RECORDS		09/16/14	NO PROBLEMS KNOWN				1000					
18405	IXONIA AVE		2014		new		07/18/17	NO PROBLEMS KNOWN							433		
18462	IXONIA AVE	220180002010		Jun-94	REPAIR/REPLACE EXISTING	2015, Dec 14	12/08/15	NO PROBLEMS KNOWN				1500	1500				
18465	IXONIA AVE	220180001012		May-99	REPAIR/REPLACE EXISTING	HOOKED TO WATER	06/16/16	NO PROBLEMS KNOWN		1500				1350			
16003	JUDICIAL RD	221360005000	May-80		NEW HOME 1980		07/18/16	NO PROBLEMS KNOWN	1000			1000	?				
16009	JUDICIAL RD	221360000043	2018		new home 2018		02/06/18	NO PROBLEMS KNOWN									
16031	JUDICIAL RD	221360004200		2003-Dec	REPAIR/REPLACE EXISTING		08/26/16	NO PROBLEMS KNOWN		1500				1600			**Yes**
16040	JUDICIAL RD	221360002000	Aug-77	May-98	REPAIR/REPLACE EXISTING	SEE FILE	07/15/16	NO PROBLEMS KNOWN		1500				1000			
16071	JUDICIAL RD	221360003000		11-May	REPAIR/REPLACE EXISTING		07/07/16	NO PROBLEMS KNOWN		1500				1500			**Yes**
16120	JUDICIAL RD	221360001000			NO RECORDS		05/14/18	NO PROBLEMS KNOWN	500				500			400	
16196	JUDICIAL RD	221360023100			NO RECORDS		07/06/17	NO PROBLEMS KNOWN	2000		1000				1100		
16225	JUDICIAL RD	221360025200	Nov-82		NEW HOME 1982		07/27/18	NO PROBLEMS KNOWN		1000			1000			1000	
16250	JUDICIAL RD	221360036000			NO RECORDS		09/26/16	NO PROBLEMS KNOWN		1000				400			
16370	**JUDICIAL RD**	**221360046000**			**NO RECORDS**		**07/13/16**	**CESSPOOL OR LEACHING TANK**						**500**			
16415	JUDICIAL RD	221360047000		Oct-99	REPAIR/REPLACE EXISTING		07/15/16	NO PROBLEMS KNOWN		1500				1500			
16448	JUDICIAL RD	221360051000		Sep-93	REPAIR/REPLACE EXISTING		08/16/17	NO PROBLEMS KNOWN				1250			1350		
16485	JUDICIAL RD	221360047200		Oct-79	REPAIR/REPLACE EXISTING		07/12/16	NO PROBLEMS KNOWN		1250				1250			
16499	JUDICIAL RD	221360048200		Jul-94	REPAIR/REPLACE EXISTING		07/17/18	NO PROBLEMS KNOWN				1500				1250	
16530	JUDICIAL RD	221990030104		Jul-91	IN COMPLIANCE	JUNE 2009, 18	05/15/18	NO PROBLEMS KNOWN	2000			2250				2000	
16563	JUDICIAL RD	224430001200		May-92	REPAIR/REPLACE EXISTING		06/21/16	NO PROBLEMS KNOWN		1250				1600			**Yes**
16600	JUDICIAL RD	224430005200	Oct-87		NEW HOME 1987	gave 4 years due 10-24-16	10/26/15	NO PROBLEMS KNOWN		1250				1250			Yes
16810	JUDICIAL RD	224430010000		May-98	REPAIR/REPLACE EXISTING		09/08/16	NO PROBLEMS KNOWN		1800				1400			
16823	JUDICIAL RD	224520006001	1967		NO RECORDS		08/15/17	NO PROBLEMS KNOWN			measured				measured		
18670	JUDICIAL RD	220140001650	Oct-84		NEW HOME 1984		06/06/16	NO PROBLEMS KNOWN		1250				1000			
18720	JUDICIAL RD	220140001051			HORSE BARN	SAME 18670 JUDICI	06/06/16	NO PROBLEMS KNOWN		1000				1250			
19198	JUDICIAL RD	220230001076	Jul-79		GUEST HOUSE		06/06/16	NO PROBLEMS KNOWN		2000				4000			
19198	JUDICIAL RD	220230001026			BARN/SHED		09/27/18	NO PROBLEMS KNOWN		2750				4000		1000	
19198	JUDICIAL RD	220230001026	2002	HOME	REPAIR/REPLACE EXISTING		09/27/18	NO PROBLEMS KNOWN		2000				4000		1000	
19280	JUDICIAL RD	220230001227	Sep-87		NEW HOME 1987		06/02/17	NO PROBLEMS KNOWN	1200			1200			1000		
19300	JUDICIAL RD	220230001127	Oct-84		NEW HOME 1984		08/11/17	NO PROBLEMS KNOWN		1250					1000		
19390	JUDICIAL RD	220230001329		2004, July 28	in compliance	2014 July 28	07/05/17	PROBLEMS KNOWN			2000				1500		
19430	JUDICIAL RD	220230001129	1971		NEW HOME 1971		06/23/16	NO PROBLEMS KNOWN	1000			1000	1000	4200	2000		
19650	JUDICIAL RD	220230001250	Aug-82		NEW HOME 1982		10/10/18	NO PROBLEMS KNOWN	2250			2250				2000	
19730	JUDICIAL RD	220230001650	Sep-93		NEW HOME 1993		09/28/17	NO PROBLEMS KNOWN			1500				1500		
19900	JUDICIAL RD	220230001252	Oct-80		NEW HOME 1980	schjonka ? pumped	10/11/17	NO PROBLEMS KNOWN	1000		?				1000		
19910	JUDICIAL RD	220230001055	Nov-79		NEW HOME 1979		08/08/18	NO PROBLEMS KNOWN				1000				1000	
20060	JUDICIAL RD	220260001627	Jul-99		NEW HOME 1999		10/05/16	NO PROBLEMS KNOWN			1000			2250			
20110	JUDICIAL RD	220260002128		Sep-95	REPAIR/REPLACE EXISTING		08/28/15	NO PROBLEMS KNOWN			1250				1250		
20210	JUDICIAL RD	220260003128	Nov-95		NEW HOME 1995		10/05/16	NO PROBLEMS KNOWN			1250			1000			
20254	JUDICIAL RD	220260001526		May-78	NO RECORDS		05/20/16	NO PROBLEMS KNOWN				1000		1000			
20340	JUDICIAL RD	220260004228			NO RECORDS		05/20/16	NO PROBLEMS KNOWN			1000			1000			
20486	JUDICIAL RD	220260005128		Apr-77	NO RECORDS		06/23/17	NO PROBLEMS KNOWN			1000				1000		
17790	JUNELLE PATH	221185025000	2010 june		NEW HOME 2010		08/30/16	NO PROBLEMS KNOWN				1800				1800	
17732	**JUNELLE PATH**	**221185025100**			**must connect 2/1/2010**		**06/22/15**	**NO PROBLEMS KNOWN**	**1000**				**1000**				
19720	***JUNO TR***	***CITY PROPERTY***					***unknown***	***NOT ON COUNTY LIST***									**Yes**
19799	**JUNO TR**	**220240001077**		**Nov-81**	**DUPLEX 19815 19817 19799 19799A**	**3HOMES SAME PARCE**	**01/19/10**	**NO PROBLEMS KNOWN**									
21985	KAPARA AVE	220360001059			NO RECORDS		06/01/15	NO PROBLEMS KNOWN	700				750				**Yes**
19740	**KENRICK AVE**	**220240001053**			**HOLDING TANKS**		**05/24/18**	**NO PROBLEMS KNOWN**	**4000**	**3000**	**2500**	**2000**		**1500**		**4500**	
19784	**KENRICK AVE**	**220240002490**		**Aug-90**	**IN COMPLIANCE**	**5/13/1997**	**05/03/16**	**NO PROBLEMS KNOWN**	**2000**		**2000**			**1500**			**Yes**
20090	**KENRICK AVE**	**220250001225**	**Oct-85**		**replace with holding tanks**	**2016**	**08/03/15**	**NO PROBLEMS KNOWN**	**1000**	**1000**	**1000**	**1000**	**1250**				**Yes**
20152	**KENRICK AVE**	**220250001026**			**MARKEKS NO RECORDS**	**COMMERCIAL**	**08/26/15**	**NO PROBLEMS KNOWN**		**1000**			**1000**				**Yes**
20230	**KENRICK AVE**	**220250001127**	**Apr-88**		**TERRA NO RECORDS**	**COMMERCIAL**	**07/17/17**	**NO PROBLEMS KNOWN**	**1250**		**1250**	**1250**		**1600**	**1600**		**Yes**
20284	**KENRICK AVE**	**220250001030**	**2003-OCT**		**REPAIR/REPLACE EXISTING**		**07/17/17**	**NO PROBLEMS KNOWN**	**1500**		**1500**			**1000**	**1000**		
21370	**KENRICK AVE**	**220360001706**	**Nov-98**		**DUNHAMS HOLDING TANKS**	**COMMERCIAL**	**05/01/11**	**NOT IN USE**	**0**								**Yes**
21716	**KENRICK AVE**	**220360001052**		**Aug-90**	**ADDED HOLDING TANK TO EXISTIN**	**COMMERCIAL**	**07/07/15**	**NO PROBLEMS KNOWN**						**1000**			**Yes**
21860	**KENRICK AVE**	**220360001057**			**MANHOLE RAISED 09/10/99**	**COMMERCIAL**	**07/12/18**	**NO PROBLEMS KNOWN**	**1000**				**1000**			**1000**	
21860	**KENRICK AVE**	**220360001057**	**2017-dec**		**holding tank for trench drain**	**COMMERCIAL**	**12/07/17**	**NO PROBLEMS KNOWN**							**1000**		
21900	**KENRICK AVE**	**220360001258**		**Nov-01**	**IN COMPLIANCE 2012 november**	**COMMERCIAL**	**06/20/18**	**NO PROBLEMS KNOWN**								**1600**	
21980	**KENRICK AVE**	**220360001158**	**Dec-98**		**NEW SYSTEM 1998**	**COMMERCIAL**	**06/24/16**	**NO PROBLEMS KNOWN**		**1500**				**2000**			
16165	**KENWOOD TR**	**220011001031**			**house**	**HOLDING TANKS**	**09/13/18**	**NO PROBLEMS KNOWN**		**6250**	**3750**	**3750**	**1250**	**1500**		**2750**	
16163	**KENWOOD TR**	**220011001031**			**YOUTH HOUSE**	**HOLDING TANKS**	**09/13/18**	**NO PROBLEMS KNOWN**	**2500**	**1250**	**3750**	**1250**	**1250**	**1500**		**1000**	
16165	**KENWOOD TR**	**220011001031**		**CHURCH**	**REPAIR/REPLACE EXISTING**		**09/13/18**	**NO PROBLEMS KNOWN**	**3000**	**1250**	**1250**	**1250**	**1250**	**4700**		**1000**	
18764	KENWOOD TR	220180001253	Sep-92		In compliance March 17, 2018		09/27/17	NO PROBLEMS KNOWN	1250			1250			1250		
19030	KENWOOD TR						07/13/16							1000			
18430	**Kenyon Ave**	**220130001031**			**no one there per linda 237-3777**	**to be torn down 9-4-18**	**04/30/14**	**CESSPOOL OR LEACHING TANK**				**1000**					**Yes**
21219	**KEOKUK AVE**	**220350001401**			**NO RECORDS**		**07/09/18**	**NO PROBLEMS KNOWN**				**1000**				**1000**	
21480	**KEOKUK AVE**	**220360002027**	**Oct-87**			**05/12/09**	**IN COMPLIANCE**	**07/16/18**	**NO PROBLEMS KNOWN**		**1000**		**2500**			**2854**	
21490	KEOKUK AVE	220360003027			REPLACED 2009		07/19/17	NO PROBLEMS KNOWN			1500				1500		
16123	KEYSTONE CT	223070003001	Oct-85			06/09/02	IN COMPLIANCE	09/08/16	NO PROBLEMS KNOWN	1500		1500			1500		**Yes**
16134	KEYSTONE CT	223070004001	Aug-78	May-97	REPAIR/REPLACE EXISTING			05/26/15	NO PROBLEMS KNOWN	2000				2000			**Yes**
16151	KEYSTONE CT	223070002001	Sep-83		REPAIR/REPLACE EXISTING	1996		08/15/17	NO PROBLEMS KNOWN	2000				2000	2000	2000	**Yes**
16172	KEYSTONE CT	223070005001	Aug-78	May-95	REPAIR/REPLACE EXISTING			07/19/18	NO PROBLEMS KNOWN	1500				1500		2200	**Yes**
16291	KEYSTONE CT	223070001001	Aug-78			03/12/99	IN COMPLIANCE	06/23/17	NO PROBLEMS KNOWN		1250	1250		1250		1000	**Yes**
17107	**KIRBEN AVE**	**221190013000**			**no one living there**	**summer home**	**07/20/16**	**NO PROBLEMS KNOWN**		**1000**				**1000**			**Yes**
17109	KIRBEN AVE	221190012000		2009-June	in compliance	2014 June 16		10/11/18	NO PROBLEMS KNOWN		1500			1500		1000	**Yes**
17110	KIRBEN AVE	221110001001		2004-SEPT 3	REPAIR/REPLACE EXISTING	IN COMPLIANCE		09/08/16	NO PROBLEMS KNOWN			1500		measured			**Yes**
17137	KIRBEN AVE	221190010000		Dec-98	REPAIR/REPLACE EXISTING			10/20/15	NO PROBLEMS KNOWN	1500			1500				**Yes**
17141	KIRBEN AVE	221190006000		Nov-90	NEW HOME 1990			08/10/17	NO PROBLEMS KNOWN	1500			1250		1250		
17155	KIRBEN AVE	221190007000		2006 sep	NEW HOME 2006			10/22/15	NO PROBLEMS KNOWN		2500		2250				**Yes**
17161	KIRBEN AVE	221190006100		1-Oct	2014 Sept 17	NEW HOME 2001	in compliance	06/29/18	NO PROBLEMS KNOWN			2000				unknown	**Yes**
17167	KIRBEN AVE	221190004000		May-95		10/01/02	IN COMPLIANCE	07/16/15	NO PROBLEMS KNOWN		1500		1500				**Yes**
17183	KIRBEN AVE	221190002000		Dec-88	NEW HOME 1988			09/05/18	NO PROBLEMS KNOWN				1250			1250	**Yes**

16229	KLAMATH TR	220021001005	Oct-90		SEE FILE		09/13/18	NO PROBLEMS KNOWN						1500		1500		Yes
16300	KLAMATH TR	220021001007	Dec-87		SEE FILE		06/15/15	NO PROBLEMS KNOWN	1250				1250					Yes
16415	KLAMATH TR	220021001009		May-87	REPAIR/REPLACE EXISTING		06/27/18	NO PROBLEMS KNOWN				1500				1500		Yes
16475	KLAMATH TR	221360044100			NO RECORDS		08/18/16	NO PROBLEMS KNOWN		1000				1000				Yes
11825	KNOLLS PATH	221360018000	Nov-91		SEE FILE		06/27/18	NO PROBLEMS KNOWN				1500				1500		Yes
11840	KNOLLS PATH	221360019000		May-92	SEE FILE		06/21/17	NO PROBLEMS KNOWN				1200			1200			Yes
11849	KNOLLS PATH	221360017000		Oct-01	REPAIR/REPLACE EXISTING		06/22/18	NO PROBLEMS KNOWN				2750				2500		Yes
11898	KNOLLS PATH	221360020000		Oct-96	11, OCTOBER 2004	IN COMPLIANCE	10/13/16	NO PROBLEMS KNOWN		1500				1500				Yes
11901	KNOLLS PATH	221360017100		1997 & 2002	2014 Oct 30	In compliance	10/31/16	NO PROBLEMS KNOWN		2750				2200				Yes
16305	KNOLLS PATH	224240003001	1981		NEW HOME 1981		10/18/17	NO PROBLEMS KNOWN	1250		1250		1250		1000			Yes
16306	KNOLLS PATH	224240002001	Dec-86		NEW HOME 1986		11/17/16	NO PROBLEMS KNOWN			1250			700				Yes
16310	KNOLLS PATH	224240001001	Dec-83	Dec-97	IN COMPLIANCE	2008-MAY 9	08/21/15	NO PROBLEMS KNOWN	1250				1500					Yes
16424	KNOLLS PATH	220021001004	Oct-90		SEE FILE		06/06/18	NO PROBLEMS KNOWN	2500					2500				Yes
16560	KNOLLWOOD CIR	225665009001	Jul-95		NEW HOME 1995		08/18/16	NO PROBLEMS KNOWN		2750				2250				Yes
16561	KNOLLWOOD CIR	225665001001	Jan-92		SEE FILE		11/17/16	NO PROBLEMS KNOWN			1500			1500				Yes
18630	KNOLLWOOD CIR	225665007001	Nov-87	2011-aug	REPAIR/REPLACE EXISTING		03/18/15	NO PROBLEMS KNOWN	1250			2250						Yes
18631	KNOLLWOOD CIR	225665002001	Jun-88	2010	In compliance	sept 18-18	07/25/18	NO PROBLEMS KNOWN				2250				3500		Yes
18641	KNOLLWOOD CIR	225665003001	Dec-88		REPAIR/REPLACE EXISTING		05/20/15	NO PROBLEMS KNOWN	1500			1500						Yes
18756	**KNOLLWOOD CIR**	**225665008001**	**Oct-89**		**18621 KENYON AVE**		**08/27/18**	**NO PROBLEMS KNOWN**	**1500**			**1500**				**1500**		Yes
18751	KNOLLWOOD CIR	225665006001	Dec-89		18751 KENYON AVE		06/12/17	NO PROBLEMS KNOWN			1250				1250			Yes
18835	**KNOLLWOOD CIR**	**225665004001**	**Jun-98**		**18835 KENYON AVE**		**06/14/18**	**NO PROBLEMS KNOWN**	**1500**	**1500**	**1500**	**1500**	**1500**	**1500**	**1000**	**1000**	Yes	
18885	KNOLLWOOD CIR	225665005001	Aug-88	May-98	18885 KENYON AVE	In compliance 6-15-2016	05/22/17	NO PROBLEMS KNOWN	2500			2500			2600			
16075	KRAFTON AVE	221360000021	1998				08/03/12											
16218	LAIGLE AVE						10/26/15	NO PROBLEMS KNOWN					1000					
16227	LAIGLE AVE	221360036100			NO RECORDS		08/24/16	NO PROBLEMS KNOWN			1000			1000				
16369	LAIGLE AVE	221360045000		2017 sept. 6	REPAIR/REPLACE EXISTING		09/06/17	NO PROBLEMS KNOWN	1000				1000					
16380	**LAIGLE AVE**	**221360040000**	**1967**		**NO RECORDS**		**06/06/18**	**CESSPOOL OR LEACHING TANK**		**1000**				**1000**		**2000**		
16438	**LAIGLE AVE**	**221360053100**			**NO RECORDS**		**07/11/18**	**CESSPOOL OR LEACHING TANK**	**1500**			**1000**				**1000**		
16471	LAIGLE AVE	221360052100		Nov-94	04/30/03	IN COMPLIANCE	07/17/18	NO PROBLEMS KNOWN	1500				1500			1000		
16480	LAIGLE AVE	221360052000	Jun-79		NEW HOME 1979		06/01/15	NO PROBLEMS KNOWN	1000				1000					
16535	LAIGLE AVE	221990029001		Jan-92	REPAIR/REPLACE EXISTING		11/14/17	NO PROBLEMS KNOWN	1250			1250			1250			Yes
16560	LAIGLE AVE	221360002000	Oct-89		MARCH 12 2004	IN COMPLIANCE	08/20/14	NO PROBLEMS KNOWN				1500						
21750	LAIGLE AVE	220350001777	Apr-88		NEW HOME 1988	9/3/2002	08/02/16	NO PROBLEMS KNOWN		1250				1000				
21775	LAIGLE AVE	220350001053	Sep-93		09/23/15	IN COMPLIANCE	09/21/16	NO PROBLEMS KNOWN		1250				1800				Yes
21800	LAIGLE AVE	220350002077	Jun-01		NEW HOME 2001		09/28/17	NO PROBLEMS KNOWN				3000			3000			
21821	LAIGLE AVE	220350001252	Aug-93		NEW HOME 1995		09/22/15	NO PROBLEMS KNOWN	1000				1200					
21840	LAIGLE AVE	220350001577	1986	2003. AUGUST	April 24-2018	In compliance	04/20/18	NO PROBLEMS KNOWN			2000			1600		3000		
21900	LAIGLE AVE	220350001576	Nov-88		08/24/15	IN COMPLIANCE	08/31/17	NO PROBLEMS KNOWN	1200			1200			1000			
22000	LAIGLE AVE	220350001676	1984	2016. 25 may	REPAIR/REPLACE EXISTING	IN COMPLIANCE	09/19/18	NO PROBLEMS KNOWN					2000			1200		
20070	LAREDO AVE	225210002002	Mar-88		In compliance 10-26-15	In compliance	08/17/16	NO PROBLEMS KNOWN	1250				1250	1250				
20071	LAREDO AVE	225210003001	Sep-92	May-00	REPAIR/REPLACE EXISTING		07/03/18	NO PROBLEMS KNOWN				1800			2500	2500		
20201	LAREDO AVE	225210002001	Nov-87	SEE FILE	IN COMPLIANCE	2012 January 20	10/21/16	NO PROBLEMS KNOWN		1000				1000				
20220	LAREDO AVE	225210001002	Sep-85		NEW HOME 1995		06/14/16	NO PROBLEMS KNOWN		1800				1500				
20255	LAREDO AVE	225210001101	Nov-89		NEW HOME 1989		06/19/15	NO PROBLEMS KNOWN		1200		1200	1000					
20285	LAREDO AVE	225210001201	Aug-96		NEW HOME 1996		06/27/16	NO PROBLEMS KNOWN		1500				1600				
20715	LAREDO PATH	228420001002	Jul-87		NEW HOME 1987	IN COMPLIANCE 4-13-07	06/27/16	NO PROBLEMS KNOWN			1250			1250				
20740	LAREDO PATH	228420003001	Sep-90		NEW HOME 1990		07/20/17	NO PROBLEMS KNOWN				1250			1000			
20760	LAREDO PATH	228420004001	Feb-84		NEW HOME 1984		07/29/16	NO PROBLEMS KNOWN		1000				1250				
20810	LAREDO PATH	228420005001	Nov-86		NEW HOME 1986		10/05/17	NO PROBLEMS KNOWN				1250			2000			
20880	LAREDO PATH	228420006001	Nov-88		NEW HOME 1986		09/09/16	NO PROBLEMS KNOWN		1200				1200				
20935	LAREDO PATH	228420003002	Sep-87		NEW HOME 1987		06/21/16	NO PROBLEMS KNOWN			2000			2000				
20940	LAREDO PATH	228420007001	Aug-90	Sep-01	REPAIR/REPLACE EXISTING	REPLACED 1999	05/18/17	NO PROBLEMS KNOWN	2000		1500		1703		1800			
16135	LINCH AVE	229013001000	May-80	2018	new system 7-7-18	In compliance	07/07/18	NO PROBLEMS KNOWN	1000			1000			800	1000		
16140	LINCH AVE	221360029200	Jun-76		NEW HOME 1976		07/07/18	NO PROBLEMS KNOWN	1000			1000				1000		
16205	LINCH AVE	229013002000	Jun-78		NEW HOME 1978		06/25/18	NO PROBLEMS KNOWN	1500				1000			1200		
16265	LINCH AVE	221360031000	Dec-77		NEW HOME 1977		05/09/17	NO PROBLEMS KNOWN				1250		1000				
16335	LINCH AVE	221360032100	Jun-80		REPAIR/REPLACE EXISTING	2015. Nov 16	11/14/16	NO PROBLEMS KNOWN				1000	2000					
16350	LINCH AVE	221360033000		Aug-95	REPAIR/REPLACE EXISTING	In compliance 4-18-16	07/10/17	NO PROBLEMS KNOWN							1350			
16415	LINCH AVE	221360049000	Oct-76	Nov-99	REPAIR/REPLACE EXISTING		08/26/15	NO PROBLEMS KNOWN	1500				1500					
16420	**LINCH AVE**	**221360048000**	**Aug-77**		**NEW HOME 1977**		**10/14/15**	**CESSPOOL OR LEACHING TANK**		**1000**			**1000**					
16445	LINCH AVE	221360050100	Nov-77		REPAIR/REPLACE EXISTING	2014 sept.18	08/30/18	NO PROBLEMS KNOWN		1000						1700		
16562	LINCH PATH	224430002000		Dec-98	REPAIR/REPLACE EXISTING		06/08/04	NO PROBLEMS KNOWN										
16601	LINCH PATH	224430003000	1970	Jul-02	REPAIR/REPLACE EXISTING	IN COMPLIANCE	10/24/16	NO PROBLEMS KNOWN		2250				2250				
12050	LUCERNE TR	220260001077	1970	Aug-81	REPAIR/REPLACE EXISTING		10/14/13	NO PROBLEMS KNOWN			1000							
12058	LUCERNE TR	228420001101	Dec-75	Jun-02	REPAIR/REPLACE EXISTING	IN COMPLIANCE 2011	04/24/15	NO PROBLEMS KNOWN	2700	2000			2000					
12119	LUCERNE TR	228420001003	Jul-89		NEW HOME 1989		06/01/15	NO PROBLEMS KNOWN	1250				1250					
12120	LUCERNE TR	228420002101	Aug-93		NEW HOME 1993	IN COMPLIANCE 2006	04/17/15	NO PROBLEMS KNOWN	1250				1250					
12299	LUCERNE TR	220260001151	Sep-97	2011 oct	in compliance 2012 november	in compliance 2018	05/24/18	NO PROBLEMS KNOWN	2500		1500		2750		1300	3200		
12342	LUCERNE TR	220260001052	Aug-73		NO RECORDS		10/21/15	NO PROBLEMS KNOWN		800			1500					
12345	LUCERNE TR	220260001251	Sep-87		NEW HOME 1987		06/19/15	NO PROBLEMS KNOWN	1250				1250					
17600	**PILOT KNOB RD**	**220120001350**			**SEE FILE**	**SEE FILE**	**no home**	**no septic abandoned**										
19300	***RITTER TR***	***CITY PROPERTY***					***10/25/16***	***NOT ON COUNTY LIST***	***1000***					***3000***				
3015	South Loop Road	221360000080			unknown		10/26/18					1000				1000		
18882	DODD BLVD	220170001356		Nov-97	REPAIR/REPLACE EXISTING		04/27/16	NO PROBLEMS KNOWN						4500				
19282	DODD BLVD	220200001027			NO RECORDS		06/02/15	NO PROBLEMS KNOWN	1000				1000					
19300	DODD BLVD	220200001028			NO RECORDS		10/08/15	NO PROBLEMS KNOWN	1000				1000					
17121	KENWOOD TR	220121001229		Apr-94	REPAIR/REPLACE EXISTING	not occupy no pump	07/08/16	NO PROBLEMS KNOWN						1800				
17133	KENWOOD TR	220121001129		Jun-96	REPAIR/REPLACE EXISTING		07/08/16	NO PROBLEMS KNOWN						1000				
18950	**KENWOOD TR**	**220180001059**			**NO RECORDS**	**no one living**	**in**	**home**										Yes
21500	**KEOKUK AVE**	**220360001454**	**Aug-84**		**BUILDING HAS NO PLUMBING PER**	**OWNER MR. YOUNG**	**unknown**	**no septic system**										Yes
10900	195TH ST W	CITY PROPERTY					10/25/18							1000				
17976	JUDICIAL RD	brackets crossing					11/21/18							2000				

Appendix F

Trunk Sewer Capacities Table

ID	MCES Meter District	Connects to MCES Interceptor [Yes/No]	Pipe Diameter [ft]	Pipe Capacity [MGD]	Percent Slope [%]	Anticipated 2040 Peak Flow [MGD]	Reserve Capacity Future [MGD]
CDT-2105	Farmington Outlet	No	2	8.31	0.19%	0.000	8.31
CDT-2107	Farmington Outlet	No	2	8.31	0.19%	0.000	8.31
CDT-2109	Farmington Outlet	No	2	8.31	0.19%	0.000	8.31
CDT-2111	Farmington Outlet	No	2	8.31	0.19%	0.000	8.31
CDT-2117	Farmington Outlet	No	1	1.31	0.19%	0.000	1.31
CDT-2119	Farmington Outlet	No	1	1.31	0.19%	0.000	1.31
CDT-2121	Farmington Outlet	No	1	1.31	0.19%	0.000	1.31
CDT-2123	Farmington Outlet	No	1	1.31	0.19%	0.000	1.31
CDT-2139	Farmington Outlet	No	2	8.31	0.19%	0.000	8.31
CDT-2141	Farmington Outlet	No	2	8.31	0.19%	0.000	8.31
CDT-2143	Farmington Outlet	No	1.75	5.82	0.19%	0.000	5.82
CDT-2145	Farmington Outlet	No	1.75	5.82	0.19%	0.000	5.82
CDT-2147	Farmington Outlet	No	1.75	5.82	0.19%	0.000	5.82
CDT-2149	Farmington Outlet	No	1.75	5.82	0.19%	0.000	5.82
CDT-2167	Farmington Outlet	No	1	1.31	0.19%	0.000	1.31
CDT-2169	Farmington Outlet	No	1	1.31	0.19%	0.000	1.31
CDT-2171	Farmington Outlet	No	1	1.31	0.19%	0.000	1.31
CDT-2173	Farmington Outlet	No	1	1.31	0.19%	0.000	1.31
CDT-2175	Farmington Outlet	No	1.75	5.82	0.19%	0.000	5.82
CDT-2177	Farmington Outlet	No	1.75	5.82	0.19%	0.000	5.82
CDT-2179	Farmington Outlet	No	1.75	5.82	0.19%	0.000	5.82
CDT-2181	Farmington Outlet	No	1	1.31	0.19%	0.000	1.31
CDT-2183	Farmington Outlet	No	1	1.31	0.19%	0.000	1.31
CDT-2185	Farmington Outlet	No	1	1.31	0.19%	0.000	1.31
CDT-2187	Farmington Outlet	No	1	1.31	0.19%	0.000	1.31
CDT-2403	Farmington Outlet	No	2.5	N/A	0.00%	0.014	N/A
75BM007-75BM008	M630	Yes	2	5.08	0.12%	0.234	4.84
75AM009-NODE_38_SEH	M630	No	1.5	2.08	0.09%	0.210	1.87
75AM015-75AM016	M630	No	1.5	N/A	0.00%	0.213	N/A
75AM017-75AM016	M630	No	1	4.87	4.44%	0.124	4.74
75AM019-75AM017	M630	No	1	2.57	1.24%	0.123	2.45
75AM020-75AM019	M630	No	1	2.49	1.16%	0.121	2.37
75AM021-75AM020	M630	No	1	2.14	0.86%	0.120	2.02
75AM022-75AM021	M630	No	1	4.22	1.98%	0.117	4.11
75AM023-75AM022	M630	No	1	4.22	1.98%	0.116	4.11
75AM024-75AM023	M630	No	1	1.59	0.28%	0.104	1.48
75AM027-75AM028	M630	No	1	6.80	8.68%	0.001	6.80
75AM028-75AM029	M630	No	1	3.40	2.17%	0.013	3.39
75AM029-75BM001	M630	No	1	2.83	1.50%	0.089	2.74
75AM033-75AM009	M630	No	1	1.31	0.19%	0.206	1.10
75AM0356319-NODE_39_SEH	M630	No	1	1.41	0.22%	0.205	1.20
75AM036-75AM0356319	M630	No	1	1.56	0.27%	0.204	1.36
75AM069-75AS008	M630	No	1	1.50	0.25%	0.103	1.40
75AS001-75AM024	M630	No	1	1.41	0.22%	0.000	1.41
75AS008-75AM024	M630	No	1	1.75	0.34%	0.103	1.65
75BM001-75BM002	M630	No	1	2.83	1.50%	0.130	2.70
75BM002-75BM003	M630	No	1	3.06	1.76%	0.300	2.76
75BM003-75BM004	M630	No	1.5	2.36	0.12%	0.549	1.81
75BM004-75BM005	M630	No	1.5	2.36	0.12%	0.902	1.46
75BM005-75BM006	M630	No	1.5	2.36	0.12%	0.676	1.68
75BM006-75BM007	M630	No	1.5	0.62	0.01%	0.379	0.24
CDT-2365	M630	No	2	4.68	0.10%	0.238	4.44
CDT-2369	M630	No	2	11.84	0.39%	0.257	11.58
CDT-2371	M630	No	2	8.35	0.19%	0.335	8.01
CDT-2373	M630	No	2	22.40	1.38%	0.373	22.02
CDT-2375	M630	No	2	8.72	0.21%	0.530	8.19
CDT-2377	M630	No	2.5	24.10	0.49%	0.622	23.48
CDT-2393	M630	No	1.5	N/A	0.00%	0.015	N/A

ID	MCES Meter District	Connects to MCES Interceptor [Yes/No]	Pipe Diameter [ft]	Pipe Capacity [MGD]	Percent Slope [%]	Anticipated 2040 Peak Flow [MGD]	Reserve Capacity Future [MGD]
CDT-2395	M630	No	1.5	N/A	0.00%	0.015	N/A
CDT-2397	M630	No	1.5	N/A	0.00%	0.015	N/A
CDT-2399	M630	No	1.5	N/A	0.00%	0.001	N/A
CDT-2401	M630	No	1.5	N/A	0.00%	0.014	N/A
NODE_38_SEH-NODE_40_SEH	M630	No	1.5	2.95	0.19%	0.068	2.88
NODE_39_SEH-75AM033	M630	No	1	1.39	0.21%	0.205	1.18
NODE_40_SEH-75AM015	M630	No	1.5	3.85	0.32%	0.211	3.64
56AM007-56AM004	M643A	Yes	1.5	2.14	0.10%	0.386	1.76
62BM031-62BM027	M643A	Yes	1	1.03	0.20%	0.274	0.76
63AM103-63BM001	M643A	Yes	1	1.75	0.34%	0.158	1.59
63BM068-63BM002	M643A	Yes	1.25	4.49	0.68%	0.173	4.31
64AM0146417-64AM001	M643A	Yes	1	1.80	0.36%	0.371	1.43
69BM026-70AM031	M643A	Yes	1.75	7.41	0.52%	3.006	4.40
70AM021-70AM0246543	M643A	Yes	1	0.92	0.16%	0.213	0.71
70BM034-NODE_277_SEH	M643A	Yes	1.25	1.67	0.16%	0.300	1.37
79BM053-79BM042	M643A	Yes	1	1.23	0.17%	0.230	1.00
102-NODE_76_SEH	M643A	No	1	1.55	0.27%	0.010	1.54
104-102	M643A	No	1	1.10	0.13%	0.002	1.10
117-80BM001	M643A	No	2.75	20.09	0.34%	1.608	18.48
46AM002-46AM0016510	M643A	No	1	3.24	1.16%	0.223	3.01
46AM003-46AM002	M643A	No	1	1.67	0.31%	0.220	1.45
46AM004-46AM003	M643A	No	1	1.56	0.27%	0.162	1.40
46AM005-46AM004	M643A	No	1	1.32	0.19%	0.160	1.16
46AM0066366-46AM005	M643A	No	1	1.53	0.26%	0.156	1.37
46AM0076367-46AM0066366	M643A	No	1	1.42	0.23%	0.154	1.27
46AM008-46AM0076367	M643A	No	1	1.36	0.21%	0.127	1.23
46AM009-46AM008	M643A	No	1	1.47	0.24%	0.125	1.35
51BM047-52AM001	M643A	No	1	2.42	1.10%	0.383	2.04
52AM001-52AM002	M643A	No	1	1.76	0.58%	0.524	1.23
52AM002-52AM003	M643A	No	1	2.97	1.65%	0.527	2.44
52AM003-52AS017	M643A	No	1	2.75	1.42%	0.535	2.22
52AM005-52AM007	M643A	No	1	2.19	0.90%	0.547	1.64
52AM007-52AM008	M643A	No	1	2.60	1.27%	0.550	2.05
52AM008-52AM009	M643A	No	1	2.27	0.97%	0.553	1.72
52AM009-52AM012	M643A	No	1	2.06	0.80%	0.561	1.50
52AM012-52AM013	M643A	No	1	2.58	1.25%	0.563	2.02
52AM013-52AM014	M643A	No	1	1.95	0.71%	0.576	1.37
52AM014-52AM016	M643A	No	1	2.53	1.20%	0.660	1.87
52AM016-52AM019	M643A	No	1	2.53	1.20%	0.667	1.86
52AM019-52AM020	M643A	No	1	2.20	0.91%	0.668	1.53
52AM020-52AM021	M643A	No	1	2.24	0.94%	0.669	1.57
52AM021-52AM022	M643A	No	1	2.24	0.94%	0.748	1.49
52AM022-52AM023	M643A	No	1	3.86	2.80%	0.749	3.11
52AM023-60BM001	M643A	No	1	2.69	1.36%	0.769	1.92
52AM032-52AM028	M643A	No	2.333	44.89	2.44%	0.058	44.83
52AS017-52AM005	M643A	No	1	1.08	0.22%	0.538	0.55
52BM004-52BS004	M643A	No	1	0.47	0.02%	0.434	0.03
52BM005-52BM004	M643A	No	1	1.63	0.30%	0.399	1.23
52BM0066522-52BM005	M643A	No	1	1.44	0.23%	0.397	1.04
52BM0076521-52BM0066522	M643A	No	1	1.27	0.18%	0.395	0.88
52BM0086520-52BM0076521	M643A	No	1	1.41	0.22%	0.377	1.03
52BM009-52BM0086520	M643A	No	1	1.08	0.13%	0.312	0.77
52BM010-52BM009	M643A	No	1	1.70	0.32%	0.309	1.39
52BM011-52BM010	M643A	No	1	1.34	0.20%	0.304	1.04
52BM012-52BM011	M643A	No	1	1.27	0.18%	0.296	0.98
52BM013-52BM012	M643A	No	1	1.70	0.32%	0.294	1.40
52BM014-52BM013	M643A	No	1	1.44	0.23%	0.292	1.15
52BM015-52BM014	M643A	No	1	1.53	0.26%	0.289	1.24

ID	MCES Meter District	Connects to MCES Interceptor [Yes/No]	Pipe Diameter [ft]	Pipe Capacity [MGD]	Percent Slope [%]	Anticipated 2040 Peak Flow [MGD]	Reserve Capacity Future [MGD]
52BM016-52BM015	M643A	No	1	1.44	0.23%	0.287	1.15
52BM017-52BM016	M643A	No	1	1.16	0.15%	0.279	0.88
52BM018-52BM017	M643A	No	1	1.12	0.14%	0.271	0.85
52BM019-52BM018	M643A	No	1	1.87	0.39%	0.269	1.61
52BS004-60BM0396523	M643A	No	1	0.35	0.01%	0.436	-0.08
54AM0396572-54AM040	M643A	No	1.5	3.96	0.20%	0.404	3.56
54AM040-54BM072	M643A	No	1.5	4.06	0.21%	0.437	3.62
54BM049-55AM049	M643A	No	1.5	3.76	0.18%	0.512	3.24
54BM0506579-54BM049	M643A	No	1.5	3.07	0.12%	0.510	2.56
54BM0526606-54BM0536607	M643A	No	1.5	1.77	0.04%	0.480	1.29
54BM0536607-54BM054	M643A	No	1.5	4.43	0.25%	0.482	3.94
54BM054-54BM0556608	M643A	No	1.5	3.75	0.18%	0.485	3.27
54BM0556608-54BM0566577	M643A	No	1.5	4.43	0.25%	0.492	3.94
54BM0566577-54BM0576578	M643A	No	1.5	4.42	0.25%	0.494	3.93
54BM0576578-54BM0506579	M643A	No	1.5	4.34	0.24%	0.496	3.84
54BM0586573-54BM0596574	M643A	No	1.5	4.25	0.23%	0.468	3.78
54BM0596574-54BM0606575	M643A	No	1.5	2.35	0.07%	0.470	1.88
54BM0606575-54BM0616576	M643A	No	1.5	2.80	0.10%	0.472	2.33
54BM0616576-54BM0526606	M643A	No	1.5	2.50	0.08%	0.475	2.03
54BM072-54BM0736604	M643A	No	1.5	3.43	0.15%	0.439	2.99
54BM0736604-54BM0586573	M643A	No	1.5	2.12	0.06%	0.442	1.68
55AM002-55AM001	M643A	No	1.25	3.92	0.52%	0.765	3.15
55AM003-55AM002	M643A	No	1.25	5.44	1.00%	0.760	4.68
55AM004-55AM003	M643A	No	1.25	3.81	0.49%	0.756	3.05
55AM005-55AM004	M643A	No	1.25	4.18	0.59%	0.754	3.43
55AM006-55AM005	M643A	No	1.25	3.96	0.53%	0.752	3.21
55AM007-55AM006	M643A	No	1.25	4.65	0.73%	0.719	3.93
55AM008-55AM007	M643A	No	1.25	12.23	5.05%	0.717	11.51
55AM009-55AM008	M643A	No	1.25	4.04	0.55%	0.714	3.32
55AM010-55AM009	M643A	No	1.25	3.96	0.53%	0.712	3.25
55AM0176585-55AM018	M643A	No	1.5	3.43	0.15%	0.699	2.73
55AM018-55AM019	M643A	No	1.5	3.42	0.15%	0.701	2.72
55AM019-55AM020	M643A	No	1.5	4.68	0.28%	0.703	3.98
55AM020-55AM010	M643A	No	1.5	3.43	0.15%	0.706	2.72
55AM0226581-55AM0176585	M643A	No	1.5	3.43	0.15%	0.692	2.74
55AM0236582-55AM0226581	M643A	No	1.5	3.42	0.15%	0.573	2.85
55AM024-55AM0236582	M643A	No	1.5	3.65	0.17%	0.570	3.08
55AM025-55AM024	M643A	No	1.5	3.43	0.15%	0.519	2.91
55AM026-55AM025	M643A	No	1.5	3.42	0.15%	0.517	2.91
55AM038-55AM001	M643A	No	1.25	3.27	0.36%	0.160	3.11
55AM038-55BM081	M643A	No	1.25	3.44	0.40%	0.162	3.28
55AM048-55AM026	M643A	No	1.5	3.06	0.12%	0.514	2.55
55AM049-55AM048	M643A	No	1.5	N/A	0.00%	0.513	N/A
55BM081-63BM071	M643A	No	1.25	4.49	0.68%	0.164	4.32
56AM001-56AM002	M643A	No	2.75	15.33	0.20%	8.397	6.93
56AM002-56AM003	M643A	No	2.75	15.33	0.20%	8.402	6.93
56AM003-56AM004	M643A	No	4	41.64	0.20%	12.213	29.43
56AM004-56AM005	M643A	No	4	32.25	0.12%	12.619	19.63
56AM005-56AM006	M643A	No	4	32.25	0.12%	12.645	19.61
56AM006-56BM001	M643A	No	4	32.24	0.12%	12.663	19.58
56AM008-56AM007	M643A	No	1.5	2.16	0.10%	0.384	1.78
56AM009-56AM008	M643A	No	1.5	2.15	0.10%	0.382	1.77
56AM010-56AM009	M643A	No	1.5	2.15	0.10%	0.373	1.78
56AM011-56AM010	M643A	No	1.5	2.15	0.10%	0.371	1.78
56AM012-56AM011	M643A	No	1.5	N/A	0.00%	0.363	N/A
56AM013-56AM012	M643A	No	1.5	2.15	0.10%	0.351	1.80
56AM014-56AM015	M643A	No	1.5	2.15	0.10%	0.342	1.81
56AM015-56AM013	M643A	No	1.5	2.15	0.10%	0.346	1.81

ID	MCES Meter District	Connects to MCES Interceptor [Yes/No]	Pipe Diameter [ft]	Pipe Capacity [MGD]	Percent Slope [%]	Anticipated 2040 Peak Flow [MGD]	Reserve Capacity Future [MGD]
56BM001-56BM002	M643A	No	4	32.25	0.12%	12.694	19.55
56BM002-56BM003	M643A	No	4	32.25	0.12%	12.722	19.53
56BM003-56BM004	M643A	No	4	32.26	0.12%	12.754	19.50
56BM004-56BM005	M643A	No	4	32.25	0.12%	12.792	19.46
60BM001-60BM002	M643A	No	1	2.68	1.35%	0.771	1.91
60BM002-60BM003	M643A	No	1	2.69	1.36%	0.773	1.92
60BM003-60BM004	M643A	No	1	2.69	1.36%	0.776	1.92
60BM004-60BM005	M643A	No	1	2.68	1.35%	1.243	1.44
60BM005-60BM006	M643A	No	1.25	4.64	1.23%	1.276	3.37
60BM006-60BM007	M643A	No	1.25	4.59	1.20%	1.278	3.31
60BM007-60BM008	M643A	No	1.25	4.51	1.16%	1.281	3.23
60BM008-60BM009	M643A	No	1.5	6.16	0.82%	1.444	4.72
60BM009-60BM010	M643A	No	1.5	6.16	0.82%	1.543	4.62
60BM010-61AM001	M643A	No	1.5	5.82	0.73%	1.545	4.27
60BM0396523-60BM040	M643A	No	1	2.06	0.47%	0.438	1.62
60BM040-60BM041	M643A	No	1	5.03	2.80%	0.440	4.59
60BM041-60BM042	M643A	No	1	6.20	4.26%	0.443	5.75
60BM042-60BM0436525	M643A	No	1	4.73	2.48%	0.445	4.28
60BM0436525-60BM0456531	M643A	No	1	1.38	0.21%	0.447	0.93
60BM0446532-60BM004	M643A	No	1	6.27	4.36%	0.464	5.80
60BM0456531-60BM0446532	M643A	No	1	4.32	2.07%	0.462	3.86
61AM001-61AM002	M643A	No	1.5	6.94	1.04%	1.547	5.40
61AM002-61AM003	M643A	No	1.5	5.86	0.74%	1.548	4.31
61AM003-61AM004	M643A	No	1.5	6.01	0.78%	1.549	4.46
61AM004-69AM001	M643A	No	1.5	6.24	0.84%	1.550	4.69
62BM027-63AM001	M643A	No	2.75	15.28	0.20%	6.992	8.29
62BM028-62BM027	M643A	No	2.75	15.33	0.20%	6.717	8.61
62BM029-62BM028	M643A	No	2.75	15.32	0.20%	6.717	8.61
62BM030-62BM057	M643A	No	2.75	15.33	0.20%	6.362	8.97
62BM057-62BM029	M643A	No	2.75	15.32	0.20%	6.363	8.96
63AM001-63AM002	M643A	No	2.75	7.71	0.05%	6.993	0.72
63AM002-63AM003	M643A	No	2.75	15.33	0.20%	6.993	8.33
63AM003-63AM004	M643A	No	2.75	15.33	0.20%	6.994	8.33
63AM004-63AM005	M643A	No	2.75	15.33	0.20%	7.055	8.27
63AM005-63AM014	M643A	No	2.75	15.33	0.20%	7.145	8.18
63AM014-63AM015	M643A	No	2.75	15.32	0.20%	7.145	8.18
63AM015-63AM016	M643A	No	2.75	15.33	0.20%	7.145	8.18
63AM016-63BM001	M643A	No	2.75	15.33	0.20%	7.144	8.19
63AM092-63AM093	M643A	No	1	1.72	0.33%	0.146	1.58
63AM093-63AM094	M643A	No	1	1.31	0.19%	0.149	1.16
63AM094-63AM095	M643A	No	1	1.31	0.19%	0.153	1.16
63AM095-63AM103	M643A	No	1	1.75	0.34%	0.156	1.60
63BM001-63BM002	M643A	No	2.75	15.32	0.20%	7.988	7.34
63BM002-63BM003	M643A	No	2.75	15.46	0.20%	8.160	7.30
63BM003-63BM004	M643A	No	2.75	15.33	0.20%	8.261	7.07
63BM004-63BM007	M643A	No	2.75	15.33	0.20%	8.263	7.07
63BM007-63BM008	M643A	No	2.75	15.32	0.20%	8.263	7.06
63BM008-63BM043	M643A	No	2.75	16.84	0.24%	8.367	8.47
63BM009-7270	M643A	No	2.75	21.89	0.24%	8.370	13.52
63BM043-63BM009	M643A	No	2.75	16.83	0.24%	8.369	8.47
63BM069-63BM068	M643A	No	1.25	4.49	0.68%	0.171	4.32
63BM070-63BM069	M643A	No	1.25	4.49	0.68%	0.169	4.32
63BM071-63BM070	M643A	No	1.25	4.49	0.68%	0.166	4.32
64AM001-64AM002	M643A	No	3.5	18.45	0.08%	3.641	14.81
64AM002-64AM003	M643A	No	3.5	18.43	0.08%	3.730	14.70
64AM003-64AM004	M643A	No	3.5	18.45	0.08%	3.747	14.70
64AM004-64AM005	M643A	No	3.5	18.43	0.08%	3.773	14.66
64AM005-56AM003	M643A	No	3.5	18.45	0.08%	3.793	14.66

ID	MCES Meter District	Connects to MCES Interceptor [Yes/No]	Pipe Diameter [ft]	Pipe Capacity [MGD]	Percent Slope [%]	Anticipated 2040 Peak Flow [MGD]	Reserve Capacity Future [MGD]
64AM006-56AM001	M643A	No	2.75	15.33	0.20%	8.379	6.95
64AM0116411-64AM012	M643A	No	1	1.80	0.36%	0.337	1.46
64AM012-64AM0136416	M643A	No	1	1.97	0.43%	0.341	1.63
64AM0136416-64AM0146417	M643A	No	1	1.88	0.39%	0.359	1.52
69AM001-69AM005	M643A	No	1.5	4.55	0.45%	2.162	2.38
69AM002-69AM0036540	M643A	No	1.5	5.81	0.73%	2.358	3.45
69AM0036540-69AM004	M643A	No	1.5	6.09	0.80%	2.364	3.72
69AM004-69BM030	M643A	No	1.75	7.26	0.50%	2.383	4.88
69AM005-69AM002	M643A	No	1.5	6.24	0.84%	2.356	3.88
69AM017-69AM001	M643A	No	1	1.41	0.22%	0.285	1.12
69AM018-69AM017	M643A	No	1	1.75	0.34%	0.283	1.47
69AM020-69AM018	M643A	No	1	1.41	0.22%	0.267	1.14
69AM021-69AM020	M643A	No	1	1.53	0.26%	0.264	1.27
69AM022-69AM021	M643A	No	1	1.31	0.19%	0.230	1.08
69AM023-69AM022	M643A	No	1	1.56	0.27%	0.228	1.33
69AM024-69AM023	M643A	No	1	1.64	0.30%	0.226	1.42
69AM079-69AM024	M643A	No	1	1.41	0.22%	0.217	1.19
69BM023-69BM024	M643A	No	1.75	7.26	0.50%	3.005	4.26
69BM024-69BM025	M643A	No	1.75	7.33	0.51%	3.006	4.33
69BM025-69BM026	M643A	No	1.75	7.19	0.49%	3.005	4.18
69BM027-69BM023	M643A	No	1.75	6.96	0.46%	2.391	4.57
69BM0286541-69BM027	M643A	No	1.75	7.40	0.52%	2.391	5.01
69BM030-NODE_246_SEH	M643A	No	1.75	7.11	0.48%	2.387	4.73
70AM009-70AM015	M643A	No	1	1.01	0.19%	0.171	0.84
70AM010-70AM009	M643A	No	1	1.03	0.20%	0.100	0.93
70AM011-70AM010	M643A	No	1	0.95	0.17%	0.093	0.86
70AM012-70AM011	M643A	No	1	1.13	0.24%	0.091	1.04
70AM013-70AM012	M643A	No	1	1.03	0.20%	0.079	0.95
70AM015-70AM016	M643A	No	1	1.08	0.22%	0.175	0.91
70AM016-70AM018	M643A	No	1	0.77	0.11%	0.180	0.59
70AM018-70AM019	M643A	No	1	1.15	0.25%	0.183	0.97
70AM019-70AM020	M643A	No	1	1.01	0.19%	0.205	0.80
70AM020-70AM021	M643A	No	1	1.08	0.22%	0.207	0.88
70AM0246543-70AM032	M643A	No	2.5	11.90	0.20%	5.792	6.11
70AM0256542-70AM0246543	M643A	No	2.5	11.90	0.20%	5.578	6.32
70AM026-70AM085	M643A	No	2.5	11.89	0.20%	5.575	6.31
70AM027-70AM026	M643A	No	2.5	11.89	0.20%	5.573	6.31
70AM028-70AM027	M643A	No	2.5	11.89	0.20%	5.571	6.32
70AM029-70AM028	M643A	No	2.5	11.89	0.20%	5.570	6.32
70AM031-70AM029	M643A	No	2.5	11.88	0.20%	5.558	6.33
70AM032-70AM033	M643A	No	2.5	11.89	0.20%	5.798	6.09
70AM033-70AM034	M643A	No	2.5	11.89	0.20%	5.799	6.09
70AM034-70AM035	M643A	No	2.5	11.89	0.20%	5.801	6.09
70AM035-70AM041	M643A	No	2.5	11.89	0.20%	5.802	6.09
70AM041-NODE_270_SEH	M643A	No	2.5	11.89	0.20%	5.846	6.04
70AM083-70AM031	M643A	No	2	6.56	0.20%	2.535	4.02
70AM085-70AM0256542	M643A	No	2.5	11.89	0.20%	5.577	6.31
70BM003-70BM004	M643A	No	1.25	1.67	0.16%	0.193	1.48
70BM004-70BM015	M643A	No	1.25	1.51	0.13%	0.225	1.28
70BM015-70BM016	M643A	No	1.25	1.32	0.10%	0.235	1.09
70BM016-70BM023	M643A	No	1.25	2.02	0.23%	0.257	1.77
70BM023-70BM024	M643A	No	1.25	1.32	0.10%	0.259	1.07
70BM024-70BM025	M643A	No	1.25	1.32	0.10%	0.262	1.06
70BM025-70BM030	M643A	No	1.25	1.78	0.18%	0.287	1.49
70BM030-70BM031	M643A	No	1.25	1.87	0.20%	0.290	1.58
70BM031-70BM032	M643A	No	1.25	1.39	0.11%	0.291	1.10
70BM032-70BM033	M643A	No	1.25	1.39	0.11%	0.296	1.09
70BM033-70BM034	M643A	No	1.25	1.57	0.14%	0.298	1.27

ID	MCES Meter District	Connects to MCES Interceptor [Yes/No]	Pipe Diameter [ft]	Pipe Capacity [MGD]	Percent Slope [%]	Anticipated 2040 Peak Flow [MGD]	Reserve Capacity Future [MGD]
70BM036-62BM030	M643A	No	2.75	15.33	0.20%	6.363	8.97
70BM040-NODE_277_SEH	M643A	No	2.75	15.33	0.20%	6.063	9.27
70BM071-70BM072	M643A	No	1	1.01	0.19%	0.123	0.88
70BM072-70BM073	M643A	No	1	1.08	0.22%	0.126	0.96
70BM073-70BM074	M643A	No	1	1.13	0.24%	0.182	0.95
70BM074-70BM075	M643A	No	1	1.25	0.29%	0.185	1.06
70BM075-70BM076	M643A	No	1	0.92	0.16%	0.186	0.74
70BM076-70BM091	M643A	No	1	1.11	0.23%	0.189	0.92
70BM077-62BM031	M643A	No	1	1.03	0.20%	0.272	0.76
70BM090-70BM077	M643A	No	1	1.03	0.20%	0.242	0.79
70BM091-70BM090	M643A	No	1	1.01	0.19%	0.238	0.77
71AM006-71AM007	M643A	No	1	1.01	0.19%	0.050	0.96
71AM007-71AM008	M643A	No	1	1.06	0.21%	0.052	1.01
71AM008-70BM073	M643A	No	1	1.03	0.20%	0.054	0.98
71AM009-71AM006	M643A	No	1	1.08	0.22%	0.017	1.07
71AM010-71AM009	M643A	No	1	1.01	0.19%	0.014	0.99
7270-64AM006	M643A	No	2.75	15.33	0.20%	8.377	6.95
72AM001-72AM002	M643A	No	2.75	10.84	0.10%	1.681	9.16
72AM002-72AM003	M643A	No	2.75	10.84	0.10%	1.683	9.16
72AM003-72AM004	M643A	No	2.75	10.83	0.10%	1.685	9.15
72AM004-72AM005	M643A	No	2.75	10.84	0.10%	1.687	9.15
72AM005-72AM006	M643A	No	3.5	13.05	0.04%	1.689	11.36
72AM006-72AM014	M643A	No	3.5	N/A	0.00%	1.691	N/A
72AM007-72AM008	M643A	No	3.5	18.45	0.08%	3.174	15.28
72AM009-72AM010	M643A	No	3.5	18.46	0.08%	3.257	15.21
72AM010-64AM001	M643A	No	3.5	18.44	0.08%	3.262	15.18
72AM011-72AM012	M643A	No	2.75	8.39	0.06%	1.470	6.92
72AM012-72AM013	M643A	No	2.75	9.07	0.07%	1.471	7.59
72AM013-72AM014	M643A	No	2.75	20.93	0.37%	1.477	19.45
72AM014-72AM007	M643A	No	3.5	8.28	0.02%	3.170	5.11
78AM002-78AM007	M643A	No	2	6.56	0.20%	2.202	4.36
78AM007-78AM087	M643A	No	2	6.56	0.20%	2.387	4.17
78AM011-78AM012	M643A	No	2	6.55	0.20%	2.436	4.12
78AM012-78AM013	M643A	No	2	6.56	0.20%	2.438	4.12
78AM013-78AM014	M643A	No	2	6.56	0.20%	2.440	4.12
78AM014-78AM088	M643A	No	2	6.55	0.20%	2.532	4.02
78AM087-78AM011	M643A	No	2	7.26	0.25%	2.435	4.83
78AM088-70AM083	M643A	No	2	6.56	0.20%	2.533	4.02
78BM054-78BM067	M643A	No	1.25	2.65	0.40%	0.172	2.48
78BM058-78BM059	M643A	No	1	1.31	0.32%	0.011	1.29
78BM059-78BM064	M643A	No	1	1.01	0.19%	0.048	0.96
78BM064-78BM065	M643A	No	1	1.01	0.19%	0.050	0.96
78BM065-78BM066	M643A	No	1	0.92	0.16%	0.075	0.85
78BM066-70AM013	M643A	No	1	1.08	0.22%	0.077	1.01
78BM067-78BM0686550	M643A	No	1.25	1.73	0.17%	0.174	1.55
78BM0686550-78BM0696551	M643A	No	1.25	2.01	0.23%	0.176	1.83
78BM0696551-78BM070	M643A	No	1.25	1.31	0.10%	0.179	1.14
78BM070-70BM003	M643A	No	1.25	1.73	0.17%	0.181	1.54
78BM085-78BM086	M643A	No	1	1.03	0.20%	0.118	0.91
78BM086-70BM071	M643A	No	1	1.03	0.20%	0.120	0.91
79AM046-79AM047	M643A	No	1	1.01	0.19%	0.002	1.00
79AM047-79AM056	M643A	No	1	1.03	0.20%	0.005	1.03
79AM054-71AM010	M643A	No	1	1.01	0.19%	0.012	0.99
79AM055-79AM054	M643A	No	1	1.03	0.20%	0.009	1.02
79AM056-79AM055	M643A	No	1	1.03	0.20%	0.007	1.03
79AM072-79BM049	M643A	No	1	1.50	0.25%	0.194	1.31
79BM036-79BM037	M643A	No	2.25	8.98	0.20%	0.891	8.09
79BM037-79BM038	M643A	No	2.25	7.77	0.15%	0.894	6.88

ID	MCES Meter District	Connects to MCES Interceptor [Yes/No]	Pipe Diameter [ft]	Pipe Capacity [MGD]	Percent Slope [%]	Anticipated 2040 Peak Flow [MGD]	Reserve Capacity Future [MGD]
79BM038-79BM039	M643A	No	2.25	7.79	0.15%	0.916	6.87
79BM039-79BM040	M643A	No	2.5	12.18	0.21%	0.920	11.26
79BM040-79BM041	M643A	No	2.5	10.29	0.15%	0.931	9.36
79BM041-79BM042	M643A	No	2.5	7.10	0.07%	0.935	6.17
79BM042-79BM043	M643A	No	2.5	8.41	0.10%	1.171	7.23
79BM043-79BM044	M643A	No	2.75	10.28	0.09%	1.173	9.10
79BM044-79BM045	M643A	No	2.75	10.28	0.09%	1.178	9.10
79BM045-79BM046	M643A	No	2.75	10.28	0.09%	1.180	9.10
79BM046-79BM047	M643A	No	2.75	8.01	0.05%	1.372	6.64
79BM047-72AM011	M643A	No	2.75	11.38	0.11%	1.377	10.01
79BM049-79BM050	M643A	No	1	1.53	0.26%	0.196	1.33
79BM050-79BM051	M643A	No	1	1.38	0.21%	0.199	1.18
79BM051-79BM052	M643A	No	1	1.31	0.19%	0.201	1.11
79BM052-79BM053	M643A	No	1	1.53	0.26%	0.229	1.30
80BM001-80BM002	M643A	No	2.75	10.84	0.10%	1.610	9.23
80BM002-80BM003	M643A	No	2.75	10.84	0.10%	1.616	9.23
80BM003-80BM004	M643A	No	2.75	10.83	0.10%	1.652	9.18
80BM004-80BM005	M643A	No	2.75	10.83	0.10%	1.663	9.17
80BM005-80BM006	M643A	No	2.75	10.84	0.10%	1.673	9.17
80BM006-72AM001	M643A	No	2.75	10.84	0.10%	1.678	9.16
80BM007-117	M643A	No	2.5	15.59	0.34%	1.606	13.98
CDT-2229	M643A	No	1	3.41	1.29%	0.117	3.30
CDT-2233	M643A	No	1	3.41	1.29%	0.117	3.30
CDT-2235	M643A	No	1.25	2.04	0.14%	0.117	1.92
CDT-2237	M643A	No	1.25	2.04	0.14%	0.117	1.92
CDT-2253	M643A	No	1.5	6.59	0.56%	0.117	6.48
CDT-2255	M643A	No	1.5	2.93	0.11%	0.117	2.82
CDT-2257	M643A	No	1.5	2.94	0.11%	0.118	2.82
CDT-2259	M643A	No	1.5	2.94	0.11%	0.119	2.82
CDT-2261	M643A	No	1.5	2.93	0.11%	0.121	2.81
CDT-2263	M643A	No	1.5	2.93	0.11%	0.122	2.81
CDT-2265	M643A	No	1.5	2.94	0.11%	0.122	2.81
CDT-2267	M643A	No	1.5	2.93	0.11%	0.123	2.81
CDT-2367	M643A	No	4	65.12	0.29%	12.805	52.31
CDT-91	M643A	No	1	1.43	0.23%	0.260	1.17
CDT-93	M643A	No	1	0.72	0.06%	0.263	0.45
CDT-95	M643A	No	1	1.50	0.25%	0.265	1.24
CDT-97	M643A	No	1	2.35	0.61%	0.267	2.08
NODE_246_SEH-69BM0286541	M643A	No	1.75	7.40	0.52%	2.390	5.01
NODE_270_SEH-70BM040	M643A	No	2.75	62.88	1.99%	0.002	62.88
NODE_277_SEH-70BM036	M643A	No	2.75	62.88	1.99%	0.002	62.88
NODE_291_SEH-NODE_292_SEH	M643A	No	3.5	17.03	0.07%	3.251	13.78
NODE_310_SEH-80BM007	M643A	No	1.25	1.62	0.15%	0.413	1.21
NODE_76_SEH-NODE_81_SEH	M643A	No	1	1.39	0.22%	0.055	1.34
NODE_81_SEH-46AM009	M643A	No	1	1.41	0.22%	0.056	1.35
79BM035-79BM036	M643A	No	2.25	10.23	0.26%	0.889	9.34
11AM011-11BM034	M649	Yes	3	20.26	0.22%	6.548	13.71
11BM021-11BM009	M649	Yes	1.25	1.87	0.20%	0.375	1.50
11BM035-11BM034	M649	Yes	1.333	3.39	0.54%	0.119	3.27
04AM001B-04BM011	M649	No	1.25	2.18	0.16%	0.065	2.11
04AM002B-04AM001B	M649	No	1.25	2.18	0.16%	0.063	2.11
04AM003B-04AM002B	M649	No	1.25	2.18	0.16%	0.004	2.17
04BM001-04BM002	M649	No	1	1.64	0.30%	0.092	1.55
04BM002-04BM003	M649	No	1	1.64	0.30%	0.100	1.54
04BM003-04BM004	M649	No	1	1.64	0.30%	0.117	1.53
04BM004-04BM005	M649	No	1	1.57	0.27%	0.119	1.45
04BM005-05AM001	M649	No	1	8.79	8.58%	0.121	8.67
04BM006-04BM001	M649	No	1.25	2.18	0.16%	0.091	2.09

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04BM007-04BM006	M649	No	1.25	0.52	0.01%	0.089	0.43
04BM008-04BM007	M649	No	1.25	2.18	0.16%	0.080	2.10
04BM009-04BM008	M649	No	1.25	2.18	0.16%	0.076	2.10
04BM010-04BM009	M649	No	1.25	2.18	0.16%	0.074	2.10
04BM011-04BM010	M649	No	1.25	2.18	0.16%	0.072	2.11
04BS002-04BM002	M649	No	1	1.64	0.30%	0.002	1.64
05AM001-05AM002	M649	No	1	0.69	0.09%	0.123	0.57
05AM002-05AM003	M649	No	1	1.20	0.27%	0.124	1.08
05AM003-05AM004	M649	No	1	1.06	0.21%	0.127	0.93
05AM004-05AM005	M649	No	1	1.12	0.23%	0.129	0.99
05AM005-05AM006	M649	No	1	1.01	0.19%	0.131	0.88
05AM006-05AM007	M649	No	1	1.08	0.22%	0.133	0.95
05AM007-05AM008	M649	No	1	1.22	0.28%	0.135	1.09
05AM008-05BM017	M649	No	1	1.01	0.19%	0.136	0.87
05BM013-05BM010	M649	No	1.25	2.58	0.38%	0.179	2.40
05BM014-05BM013	M649	No	1.25	2.25	0.29%	0.177	2.08
05BM015-05BM014	M649	No	1.25	2.38	0.32%	0.176	2.20
05BM016-05BM015	M649	No	1.25	2.35	0.31%	0.174	2.18
05BM017-05BM016	M649	No	1	1.08	0.22%	0.138	0.95
09AM002-09AM003	M649	No	1.25	3.88	0.51%	0.143	3.73
09AM004-09AM003	M649	No	1.25	4.42	0.66%	0.141	4.28
09AM005-09AM004	M649	No	1.25	1.96	0.13%	0.139	1.82
09AM006-09AM005	M649	No	1.25	3.53	0.42%	0.119	3.41
09AM007-09AM006	M649	No	1.25	3.53	0.42%	0.114	3.41
09AM007-09AS004	M649	No	1.25	3.85	0.50%	0.027	3.83
09AS001-09BM004	M649	No	1.25	5.50	1.02%	0.148	5.36
09BM004-09BS002	M649	No	1.25	2.88	0.28%	0.350	2.53
09BM058-09BM059	M649	No	1.25	4.65	0.73%	0.353	4.30
09BM059-09BM060	M649	No	1.25	3.81	0.49%	0.358	3.45
09BM060-09BM061	M649	No	1.25	4.04	0.55%	0.362	3.67
09BM061-09BM062	M649	No	1.25	3.65	0.45%	0.408	3.24
09BM062-09BM063	M649	No	1.25	4.00	0.54%	0.410	3.59
09BM063-09BM064	M649	No	1.25	3.65	0.45%	0.412	3.24
09BM064-09BM065	M649	No	1.5	4.68	0.28%	0.415	4.27
09BM065-10AM071	M649	No	1.5	4.60	0.27%	0.417	4.18
09BS002-09BM058	M649	No	1.25	4.60	0.72%	0.352	4.25
10AM049-10BM052	M649	No	1.75	3.78	0.08%	0.495	3.29
10AM051-10AM049	M649	No	1.5	6.49	0.54%	0.465	6.03
10AM052-10AM051	M649	No	1.5	11.05	1.56%	0.463	10.59
10AM053-10AM052	M649	No	1.5	3.43	0.15%	0.461	2.97
10AM054-10AM053	M649	No	1.5	5.87	0.44%	0.459	5.41
10AM055-10AM054	M649	No	1.5	3.65	0.17%	0.457	3.19
10AM056-10AM055	M649	No	1.5	5.73	0.42%	0.454	5.28
10AM057-10AM056	M649	No	1.5	4.68	0.28%	0.452	4.23
10AM058-10AM059	M649	No	1.5	4.43	0.25%	0.433	3.99
10AM059-10AM060	M649	No	1.5	4.15	0.22%	0.436	3.72
10AM060-10AM061	M649	No	1.5	4.42	0.25%	0.444	3.98
10AM061-10AM062	M649	No	1.5	4.06	0.21%	0.446	3.61
10AM062-10AM057	M649	No	1.5	3.75	0.18%	0.450	3.30
10AM070-10AM058	M649	No	1.5	5.31	0.36%	0.432	4.88
10AM071-10AM072	M649	No	1.5	7.61	0.74%	0.424	7.19
10AM072-10AM073	M649	No	1.667	10.29	0.77%	0.427	9.86
10AM073-10AM070	M649	No	1.667	11.12	0.90%	0.429	10.70
10BM010-10BM011	M649	No	1.75	4.59	0.20%	0.666	3.93
10BM011-10BM012	M649	No	1.75	5.03	0.24%	0.672	4.36
10BM012-10BM014	M649	No	1.75	4.48	0.19%	0.676	3.80
10BM014-10BM015	M649	No	1.75	5.34	0.27%	0.678	4.66
10BM015-10BM016	M649	No	1.75	5.13	0.25%	0.682	4.45

ID	MCES Meter District	Connects to MCES Interceptor [Yes/No]	Pipe Diameter [ft]	Pipe Capacity [MGD]	Percent Slope [%]	Anticipated 2040 Peak Flow [MGD]	Reserve Capacity Future [MGD]
10BM016-11AM052	M649	No	1.75	4.48	0.19%	0.684	3.79
10BM018-10BM010	M649	No	1.75	4.82	0.22%	0.664	4.15
10BM019-10BM018	M649	No	1.75	4.82	0.22%	0.663	4.15
10BM021-10BM019	M649	No	1.75	4.11	0.16%	0.661	3.45
10BM022-10BM021	M649	No	1.75	3.08	0.09%	0.659	2.42
10BM023-10BM022	M649	No	1.75	5.90	0.33%	0.657	5.24
10BM024-10BM023	M649	No	1.75	6.72	0.43%	0.635	6.08
10BM025-10BM024	M649	No	1.75	5.55	0.29%	0.632	4.91
10BM026-10BM025	M649	No	1.75	6.66	0.42%	0.624	6.04
10BM046-10BM023	M649	No	1.75	26.27	3.87%	0.021	26.25
10BM052-10BM026	M649	No	1.75	3.84	0.14%	0.496	3.35
11AM001-11AM002	M649	No	1	1.27	0.18%	0.374	0.90
11AM002-11AM066	M649	No	1	1.62	0.29%	0.378	1.24
11AM003-11AM004	M649	No	1	1.03	0.20%	0.015	1.02
11AM004-11AM067	M649	No	1.5	14.76	4.70%	0.715	14.04
11AM007-11AS004	M649	No	2	4.86	0.11%	1.186	3.67
11AM008-11AM011	M649	No	2	5.08	0.12%	1.186	3.89
11AM009-11AM010	M649	No	3	19.80	0.21%	5.357	14.45
11AM010-11AM011	M649	No	3	47.15	1.19%	5.359	41.79
11AM013-11BM035	M649	No	1.333	16.98	13.54%	0.117	16.86
11AM014-11AM013	M649	No	1.25	2.65	0.40%	0.115	2.54
11AM015-11AM014	M649	No	1.25	1.67	0.16%	0.114	1.56
11AM016-11AM015	M649	No	1.25	1.67	0.16%	0.112	1.56
11AM017-11AM016	M649	No	1.25	1.67	0.16%	0.105	1.57
11AM018-11AS002	M649	No	1.25	1.67	0.16%	0.098	1.58
11AM019-11AM018	M649	No	1	1.11	0.23%	0.097	1.01
11AM020-11AM019	M649	No	1	1.11	0.23%	0.095	1.01
11AM021-11AM020	M649	No	1	1.11	0.23%	0.086	1.02
11AM022-11AM021	M649	No	1	1.08	0.22%	0.084	1.00
11AM023-11AM022	M649	No	1	1.15	0.25%	0.078	1.08
11AM024-11AM023	M649	No	1	1.15	0.25%	0.074	1.08
11AM025-11AM024	M649	No	1	1.08	0.22%	0.070	1.01
11AM026-11AM025	M649	No	1	1.08	0.22%	0.060	1.02
11AM027-11AM026	M649	No	1	1.08	0.22%	0.058	1.03
11AM028-11AM027	M649	No	1	1.08	0.22%	0.044	1.04
11AM029-11AM009	M649	No	3	24.45	0.32%	5.361	19.09
11AM030-11AM029	M649	No	3	22.04	0.26%	5.356	16.69
11AM051-11AM004	M649	No	1.5	2.72	0.16%	0.697	2.03
11AM052-11AM051	M649	No	1.5	2.72	0.16%	0.695	2.03
11AM062-11AM063	M649	No	3	140.87	10.62%	4.992	135.87
11AM063-11AM030	M649	No	3	20.73	0.23%	4.989	15.74
11AM066-11AM067	M649	No	1	3.64	1.47%	0.379	3.26
11AM067-11AM068	M649	No	2	4.40	0.09%	1.097	3.30
11AM068-11AM069	M649	No	2	4.40	0.09%	1.098	3.30
11AM069-11AM070	M649	No	2	5.08	0.12%	1.133	3.95
11AM070-11AM007	M649	No	2	6.04	0.17%	1.135	4.91
11AS002-11AM017	M649	No	1.25	1.47	0.12%	0.102	1.37
11AS004-11AM008	M649	No	2	9.15	0.39%	1.187	7.97
11BM001-11BM002	M649	No	3	27.34	0.40%	6.664	20.67
11BM002-11BM003	M649	No	3	30.03	0.48%	6.672	23.36
11BM003-11BM004	M649	No	3	23.39	0.29%	6.704	16.69
11BM004-11BM005	M649	No	3	27.92	0.42%	6.702	21.22
11BM005-11BM009	M649	No	3	27.34	0.40%	6.716	20.62
11BM008-11BS003	M649	No	3.5	28.42	0.19%	7.122	21.30
11BM009-11BM008	M649	No	3.5	28.41	0.19%	7.089	21.32
11BM010-11BM021	M649	No	1.25	1.87	0.20%	0.374	1.50
11BM011-7376	M649	No	1.25	1.87	0.20%	0.367	1.51
11BM012-11BM011	M649	No	1.25	2.05	0.24%	0.350	1.70

ID	MCES Meter District	Connects to MCES Interceptor [Yes/No]	Pipe Diameter [ft]	Pipe Capacity [MGD]	Percent Slope [%]	Anticipated 2040 Peak Flow [MGD]	Reserve Capacity Future [MGD]
11BM013-11BM012	M649	No	1.25	2.13	0.26%	0.348	1.79
11BM014-11BM013	M649	No	1.25	1.78	0.18%	0.347	1.43
11BM015-11BM014	M649	No	1.25	2.05	0.24%	0.002	2.05
11BM034-11BM001	M649	No	3	24.10	0.31%	6.666	17.43
11BM038-11AM030	M649	No	1	1.27	0.18%	0.365	0.91
11BS003-7242	M649	No	3.5	36.94	0.19%	7.117	29.83
14AM009-20AM001	M649	No	1.333	2.40	0.27%	0.404	1.99
14AM010-14AM009	M649	No	1.333	1.85	0.16%	0.402	1.44
15BM015-15BM023	M649	No	1	1.11	0.23%	0.278	0.83
15BM017-15BM015	M649	No	1	1.88	0.66%	0.223	1.65
15BM023-15BM024	M649	No	1	1.11	0.23%	0.327	0.78
15BM024-15BM025	M649	No	1	1.22	0.28%	0.329	0.89
15BM025-15BM027	M649	No	1	1.30	0.32%	0.345	0.96
15BM027-21BM014	M649	No	1	1.39	0.36%	0.346	1.04
15BM061-15BM089	M649	No	2.25	10.81	0.29%	1.869	8.94
15BM089-16AM040	M649	No	2.25	10.04	0.25%	1.874	8.16
164-7189	M649	No	2	13.47	0.50%	0.431	13.04
167-17AM0466622	M649	No	1	1.20	0.16%	0.358	0.84
16AM001-22AM032	M649	No	2.5	11.89	0.20%	2.013	9.88
16AM002-16AM001	M649	No	2.5	14.06	0.28%	1.991	12.07
16AM039-16AM002	M649	No	2.25	12.85	0.41%	1.948	10.90
16AM040-16AM039	M649	No	2.25	12.04	0.36%	1.879	10.16
16BM025-16BM0266383	M649	No	1	1.31	0.19%	0.340	0.97
16BM0266383-167	M649	No	1	1.27	0.18%	0.345	0.93
16BM027-16BM028	M649	No	1	0.80	0.12%	0.002	0.80
16BM028-11AM003	M649	No	1	1.03	0.20%	0.012	1.02
16BM041-16BM045	M649	No	3.5	20.61	0.10%	4.951	15.66
16BM043-16BM041	M649	No	3.5	25.11	0.15%	4.953	20.15
16BM045-17AM001	M649	No	3.5	25.26	0.15%	4.947	20.31
17AM001-17AM002	M649	No	3.5	29.15	0.20%	4.947	24.21
17AM002-17AM003	M649	No	3.5	22.57	0.12%	4.946	17.63
17AM003-17AM004	M649	No	3.5	19.57	0.09%	4.945	14.63
17AM004-17AM005	M649	No	3.5	24.40	0.14%	4.966	19.43
17AM005-17AM006	M649	No	3.5	19.56	0.09%	4.962	14.60
17AM006-17AM007	M649	No	3.5	15.61	0.06%	5.002	10.61
17AM007-17AM008	M649	No	3.5	15.38	0.06%	5.000	10.38
17AM008-17AM009	M649	No	3.5	15.02	0.05%	4.999	10.02
17AM009-17AM010	M649	No	3.5	16.92	0.07%	4.998	11.92
17AM010-17AM011	M649	No	3.5	26.09	0.16%	4.995	21.09
17AM011-11AM062	M649	No	3.5	19.55	0.09%	4.991	14.56
17AM038-17AM004	M649	No	1.5	4.43	0.25%	0.024	4.40
17AM042-17AM038	M649	No	1.5	2.84	0.17%	0.006	2.83
17AM0466622-11AM001	M649	No	1	1.38	0.21%	0.373	1.00
17BM001-11BM038	M649	No	1	1.62	0.29%	0.310	1.31
17BM004-11BM014	M649	No	1.25	7.09	1.70%	0.322	6.77
17BM005-17BM004	M649	No	1.25	4.93	0.82%	0.258	4.67
17BM006-17BM005	M649	No	1.25	1.89	0.12%	0.254	1.63
17BM007-17BM006	M649	No	1.25	1.96	0.13%	0.252	1.71
17BM008-17BM007	M649	No	1.25	2.67	0.24%	0.250	2.42
17BM009-17BM008	M649	No	1.25	1.96	0.13%	0.226	1.74
17BM010-17BM009	M649	No	1.25	1.72	0.10%	0.224	1.50
17BS002-17BM010	M649	No	1	1.59	0.28%	0.000	1.59
20AM001-20AM002	M649	No	1.25	N/A	-0.03%	0.406	N/A
20AM002-20AM003	M649	No	1.25	2.18	0.16%	0.540	1.64
20AM003-20AM004	M649	No	1.25	2.18	0.16%	0.549	1.63
20AM004-20AM014	M649	No	1.5	3.54	0.16%	0.553	2.99
20AM005-20BM001	M649	No	1	0.90	0.09%	0.731	0.17
20AM014-20AM005	M649	No	1.5	3.54	0.16%	0.730	2.81

ID	MCES Meter District	Connects to MCES Interceptor [Yes/No]	Pipe Diameter [ft]	Pipe Capacity [MGD]	Percent Slope [%]	Anticipated 2040 Peak Flow [MGD]	Reserve Capacity Future [MGD]
20BM001-20BM002	M649	No	1.5	4.85	0.30%	0.733	4.11
20BM002-20BM003	M649	No	1.5	3.76	0.18%	0.879	2.88
20BM003-20BM004	M649	No	1.5	3.19	0.13%	0.884	2.31
20BM004-20BM005	M649	No	1.5	3.65	0.17%	0.900	2.75
20BM005-20BM006	M649	No	1.5	3.65	0.17%	0.908	2.74
20BM006-20BM021	M649	No	1.5	3.65	0.17%	0.918	2.73
20BM007-20BM008	M649	No	1.5	11.19	1.60%	1.106	10.09
20BM008-21AM001	M649	No	1.5	3.96	0.20%	1.111	2.85
20BM021-20BM007	M649	No	1.5	3.65	0.17%	1.103	2.55
21AM001-21AM002	M649	No	1.5	3.96	0.20%	1.142	2.82
21AM002-21AM007	M649	No	1.75	4.59	0.20%	1.146	3.45
21AM007-21AM008	M649	No	1.75	4.59	0.20%	1.149	3.44
21AM008-21AM013	M649	No	2	10.47	0.51%	1.158	9.31
21AM013-21AM014	M649	No	2	10.05	0.47%	1.168	8.88
21AM014-21AM015	M649	No	2	11.13	0.58%	1.169	9.97
21AM015-21BM020	M649	No	2	9.21	0.39%	1.166	8.04
21BM002-21BM017	M649	No	2	10.05	0.47%	1.303	8.75
21BM004-21BM005	M649	No	1	1.29	0.31%	0.141	1.14
21BM005-21BM006	M649	No	1	1.35	0.34%	0.188	1.16
21BM006-21BM007	M649	No	1	1.39	0.36%	0.168	1.22
21BM007-21BM011	M649	No	1	1.08	0.22%	0.174	0.91
21BM011-21BM012	M649	No	1	0.93	0.16%	0.183	0.75
21BM012-21BM013	M649	No	1	1.08	0.22%	0.188	0.89
21BM013-21BM014	M649	No	1	0.98	0.18%	0.189	0.79
21BM014-21BM015	M649	No	2.25	10.99	0.30%	1.846	9.15
21BM015-15BM061	M649	No	2.25	10.99	0.30%	1.849	9.14
21BM016-21BM014	M649	No	2	10.16	0.48%	1.307	8.85
21BM017-21BM016	M649	No	2	9.83	0.45%	1.304	8.53
21BM018-21BM002	M649	No	2	10.05	0.47%	1.300	8.75
21BM0196644-22AM0096643	M649	No	2.25	13.76	0.47%	1.514	12.25
21BM020-21BM023	M649	No	2	10.04	0.47%	1.171	8.87
21BM021-21BM018	M649	No	2	10.47	0.51%	1.299	9.17
21BM023-21BM021	M649	No	2	10.05	0.47%	1.300	8.75
22AM005-22AM006	M649	No	1.5	2.55	0.14%	0.999	1.55
22AM006-22AM0127045	M649	No	2.5	13.82	0.27%	2.537	11.28
22AM007-22AM006	M649	No	2.25	22.44	1.25%	1.534	20.91
22AM0086642-22AM007	M649	No	2.25	19.15	0.91%	1.530	17.62
22AM0096643-22AM0086642	M649	No	2.25	13.76	0.47%	1.528	12.23
22AM0127045-22AM0137047	M649	No	2.5	6.96	0.07%	2.542	4.42
22AM0137047-22AM066	M649	No	2.5	14.70	0.18%	2.551	12.15
22AM0147050-22AM015	M649	No	2.5	13.29	0.25%	2.563	10.73
22AM015-22AM016	M649	No	2.5	12.47	0.22%	2.576	9.90
22AM016-22AM017	M649	No	2.5	16.17	0.37%	2.576	13.59
22AM017-22BM023	M649	No	2.5	12.75	0.23%	2.575	10.17
22AM024-22BM028	M649	No	2.5	9.58	0.13%	2.078	7.50
22AM025-22AM024	M649	No	2.5	12.47	0.22%	2.055	10.42
22AM027-22AM025	M649	No	2.5	9.59	0.13%	2.049	7.54
22AM028-22AM027	M649	No	2.5	12.47	0.22%	2.043	10.42
22AM029-22AM028	M649	No	2.5	10.29	0.15%	2.042	8.25
22AM030-22AM029	M649	No	2.5	7.96	0.09%	2.041	5.92
22AM031-22AM030	M649	No	2.5	16.81	0.40%	2.039	14.77
22AM032-22AM031	M649	No	2.5	11.89	0.20%	2.029	9.86
22AM066-22AM0677046	M649	No	2.5	14.66	0.18%	2.560	12.10
22AM0677046-22AM073	M649	No	2.5	14.65	0.18%	2.561	12.09
22AM073-22AM074	M649	No	2.5	14.51	0.18%	2.562	11.94
22AM074-22AM0147050	M649	No	2.5	12.47	0.22%	2.562	9.91
22AS001-22AM005	M649	No	1	1.41	0.22%	0.002	1.41
22BM001-22BM002	M649	No	1	2.56	0.73%	0.059	2.51

ID	MCES Meter District	Connects to MCES Interceptor [Yes/No]	Pipe Diameter [ft]	Pipe Capacity [MGD]	Percent Slope [%]	Anticipated 2040 Peak Flow [MGD]	Reserve Capacity Future [MGD]
22BM002-22BM003	M649	No	1	2.62	0.76%	0.245	2.37
22BM003-22BM004	M649	No	1	2.33	0.60%	0.247	2.08
22BM004-22BM009	M649	No	1	1.50	0.25%	0.263	1.24
22BM009-22BM010	M649	No	1	1.31	0.19%	0.265	1.04
22BM010-22BM011	M649	No	1	2.01	0.45%	0.268	1.75
22BM011-22BM012	M649	No	3.5	20.62	0.10%	4.948	15.67
22BM012-16BM043	M649	No	3.5	23.52	0.13%	4.946	18.57
22BM013-22BM011	M649	No	3.5	23.36	0.13%	4.682	18.68
22BM017-22BM013	M649	No	3.5	24.39	0.14%	4.676	19.72
22BM021-22BM017	M649	No	2.5	17.63	0.44%	2.575	15.05
22BM022-22BM021	M649	No	2.5	13.21	0.25%	2.575	10.63
22BM023-22BM022	M649	No	2.5	19.53	0.54%	2.574	16.96
22BM027-22BM017	M649	No	2.5	11.59	0.19%	2.096	9.49
22BM028-22BM027	M649	No	2.5	11.59	0.19%	2.090	9.50
22BS001-22BM001	M649	No	1	2.68	0.80%	0.002	2.68
27AM041-27AM042	M649	No	2.25	12.85	0.41%	1.492	11.36
27AM042-27AM043	M649	No	2.25	22.63	1.27%	1.493	21.13
27AM048-27AM050	M649	No	2.25	11.53	0.33%	1.438	10.09
27AM050-27AM051	M649	No	2.25	11.87	0.35%	1.412	10.46
27AM051-27AM052	M649	No	2.25	9.83	0.24%	1.395	8.44
27AM052-27AM053	M649	No	2.25	10.23	0.26%	1.395	8.83
27AM053-27AM055	M649	No	2.25	12.04	0.36%	1.417	10.62
27AM055-27AM056	M649	No	2.25	10.99	0.30%	1.434	9.56
27AM056-27BM0016650	M649	No	2.25	10.81	0.29%	1.506	9.30
27BM0016650-27BM0026649	M649	No	2.25	10.62	0.28%	1.509	9.11
27BM0026649-27BM0036648	M649	No	2.25	10.43	0.27%	1.510	8.92
27BM0036648-27BM0046647	M649	No	2.25	11.18	0.31%	1.503	9.67
27BM0046647-27BM0056646	M649	No	2.25	11.00	0.30%	1.502	9.49
27BM0056646-27BM0066645	M649	No	2.25	10.81	0.29%	1.502	9.31
27BM0066645-21BM0196644	M649	No	2.25	10.43	0.27%	1.512	8.92
28AM001-22AM005	M649	No	1.5	2.45	0.13%	0.984	1.47
28AM002-28AM001	M649	No	1.5	2.81	0.17%	0.983	1.82
28AM003-28AM002	M649	No	1.5	2.81	0.17%	0.981	1.83
28AM004-28AM003	M649	No	1.25	3.85	0.50%	0.477	3.37
28AM005-28AM004	M649	No	1.25	3.85	0.50%	0.476	3.37
28AM006-28AM005	M649	No	1.25	3.85	0.50%	0.468	3.38
28AM007-28AM006	M649	No	1.25	3.85	0.50%	0.467	3.38
28AM008-28AM007	M649	No	1.25	3.85	0.50%	0.416	3.43
28AM020-28AM008	M649	No	1	2.12	0.50%	0.414	1.71
28AM022-28AM003	M649	No	1.5	16.64	5.98%	0.411	16.23
28AM023-28AM022	M649	No	1	1.47	0.24%	0.409	1.06
28AM024-28AM023	M649	No	1	1.08	0.13%	0.407	0.68
28AM025-28AM024	M649	No	1	1.56	0.27%	0.406	1.15
28AM026-28AM025	M649	No	1	1.56	0.27%	0.377	1.18
28AM027-28AM026	M649	No	1	1.67	0.31%	0.375	1.30
28AM028-28AM027	M649	No	1	1.83	0.37%	0.354	1.47
28AM029-28AM028	M649	No	1	1.44	0.23%	0.352	1.09
28AM030-28AM029	M649	No	1	1.37	0.21%	0.350	1.02
28AM031-28AM030	M649	No	1	1.27	0.18%	0.347	0.93
28AM032-28AM031	M649	No	1	1.47	0.24%	0.345	1.13
28AM033-28AM032	M649	No	1	1.31	0.19%	0.343	0.97
28AM034-28AM033	M649	No	1	1.99	0.44%	0.316	1.67
28AM035-28AM034	M649	No	1	1.53	0.26%	0.314	1.22
28AM036-28AM035	M649	No	1	1.56	0.27%	0.299	1.26
28AM037-28AM036	M649	No	1	1.27	0.18%	0.297	0.98
28BM015-28AM037	M649	No	1	1.08	0.13%	0.295	0.79
28BM016-28BM015	M649	No	1	1.72	0.33%	0.279	1.45
28BM017-28BM016	M649	No	1	1.38	0.21%	0.277	1.10

ID	MCES Meter District	Connects to MCES Interceptor [Yes/No]	Pipe Diameter [ft]	Pipe Capacity [MGD]	Percent Slope [%]	Anticipated 2040 Peak Flow [MGD]	Reserve Capacity Future [MGD]
28BM018-28BM017	M649	No	1	1.24	0.17%	0.275	0.96
32BM001-32BM002	M649	No	1	1.22	0.28%	0.524	0.70
32BM002-32BM003	M649	No	1	1.22	0.28%	0.526	0.70
32BM003-32BM004	M649	No	1	1.22	0.28%	0.528	0.69
32BM004-32BW015	M649	No	1	2.13	0.85%	0.727	1.40
32BM009-32BM008	M649	No	1	1.08	0.22%	0.182	0.90
33AM007-33AM008	M649	No	1.5	5.27	0.60%	1.022	4.25
33AM008-33AM009	M649	No	2.25	11.53	0.33%	0.988	10.54
33AM009-33AM010	M649	No	2.25	10.80	0.29%	0.748	10.06
33AM010-33AM011	M649	No	2.25	13.76	0.47%	0.551	13.21
33AM011-33AM012	M649	No	2.25	12.49	0.39%	0.517	11.97
33AM012-33AM013	M649	No	2.25	13.46	0.45%	1.244	12.22
33AM013-33AM014	M649	No	2.25	13.76	0.47%	1.361	12.40
33AM014-27AM041	M649	No	2.25	12.54	0.39%	1.478	11.06
33AM030-33AM002	M649	No	1	1.08	0.22%	0.120	0.96
37AM004-43AM061	M649	No	1	1.48	0.24%	0.090	1.39
37BM001-43BM029	M649	No	1	0.43	0.02%	0.002	0.43
38BM001-38BM002	M649	No	1	1.22	0.28%	0.074	1.15
38BM002-38BM003	M649	No	1	1.22	0.28%	0.395	0.83
38BM003-38BM004	M649	No	1	2.99	1.68%	0.397	2.60
38BM004-38BM005	M649	No	1	3.50	2.30%	0.401	3.10
38BM005-38BM006	M649	No	1	1.22	0.28%	0.508	0.71
38BM006-38BM009	M649	No	1	1.22	0.28%	0.516	0.70
38BM009-38BM010	M649	No	1	1.22	0.28%	0.520	0.70
38BM010-32BM001	M649	No	1	1.22	0.28%	0.522	0.70
39AM018-39AM022	M649	No	1	8.75	8.49%	0.112	8.63
39AM021-39AM018	M649	No	1	4.87	2.63%	0.042	4.83
39AM022-33AM030	M649	No	1	4.18	1.94%	0.114	4.07
43AM061-43AM062	M649	No	1	1.20	0.16%	0.092	1.11
43AM062-43BM029	M649	No	1	1.20	0.16%	0.094	1.11
43BM028-43BM035	M649	No	1	1.34	0.20%	0.159	1.18
43BM029-43BM030	M649	No	1	1.38	0.21%	0.103	1.27
43BM030-43BM028	M649	No	1	1.36	0.20%	0.105	1.25
43BM032-43BM049	M649	No	1	1.13	0.24%	0.302	0.83
43BM033-43BM032	M649	No	1	1.51	0.25%	0.206	1.30
43BM033-43BM034	M649	No	1	1.56	0.27%	0.205	1.35
43BM035-43BM036	M649	No	1	1.35	0.20%	0.161	1.19
43BM036-43BM037	M649	No	1	1.44	0.23%	0.163	1.28
43BM037-43BM038	M649	No	1	1.44	0.23%	0.176	1.26
43BM038-43BM039	M649	No	1	1.78	0.35%	0.177	1.60
43BM039-43BM040	M649	No	1	1.34	0.20%	0.179	1.16
43BM040-43BM041	M649	No	1	1.44	0.23%	0.181	1.26
43BM041-43BM042	M649	No	1	1.38	0.21%	0.183	1.19
43BM042-43BM043	M649	No	1	1.38	0.21%	0.184	1.19
43BM043-43BM044	M649	No	1	1.34	0.20%	0.186	1.16
43BM044-43BM045	M649	No	1	1.34	0.20%	0.192	1.15
43BM045-43BM034	M649	No	1	1.44	0.23%	0.203	1.24
43BM047-43BM032	M649	No	1	1.94	0.42%	0.024	1.92
43BM049-43BLS01	M649	No	1	1.97	0.73%	0.304	1.67
44AM001-50AM043	M649	No	1.25	2.77	0.26%	0.421	2.35
44AM002-44AM001	M649	No	1.25	1.92	0.21%	0.275	1.64
44AM002-50AM042	M649	No	1	0.92	0.09%	0.268	0.65
44AM016-44AM017	M649	No	1	2.77	0.85%	0.054	2.71
44AM017-44AM001	M649	No	1	2.23	0.55%	0.069	2.16
49BM012-49BM014	M649	No	1	1.83	0.37%	0.681	1.14
49BM014-49BM015	M649	No	1	1.92	0.41%	0.682	1.24
49BM015-49BM016	M649	No	1	1.72	0.33%	0.650	1.07
49BM016-49BM017	M649	No	1	3.11	1.08%	0.645	2.47

ID	MCES Meter District	Connects to MCES Interceptor [Yes/No]	Pipe Diameter [ft]	Pipe Capacity [MGD]	Percent Slope [%]	Anticipated 2040 Peak Flow [MGD]	Reserve Capacity Future [MGD]
49BM017-49BM018	M649	No	1.25	5.78	1.13%	0.650	5.13
49BM018-49BM022	M649	No	1.25	6.28	2.25%	1.313	4.96
49BM022-49BM028	M649	No	1.75	20.01	2.25%	1.280	18.73
49BM028-58AM010	M649	No	1.75	5.03	0.24%	1.245	3.78
50AM018-49BM018	M649	No	1.25	6.21	1.30%	0.702	5.50
50AM019-50AM018	M649	No	1.25	10.28	3.57%	0.698	9.58
50AM020-50AM019	M649	No	1.25	2.59	0.23%	0.694	1.90
50AM021-50AM020	M649	No	1.25	4.65	0.73%	0.686	3.96
50AM022-50AM021	M649	No	1.25	3.49	0.41%	0.679	2.81
50AM023-50AM022	M649	No	1.25	7.85	2.08%	0.665	7.18
50AM024-50AM023	M649	No	1.25	3.53	0.42%	0.659	2.87
50AM025-50AM024	M649	No	1.25	2.98	0.30%	0.632	2.35
50AM026-50AM025	M649	No	1.25	3.44	0.40%	0.635	2.81
50AM027-50AM026	M649	No	1.25	3.31	0.37%	0.646	2.66
50AM028-50AM027	M649	No	1.25	2.98	0.30%	0.673	2.31
50AM029-50AM028	M649	No	1.25	3.48	0.41%	0.681	2.80
50AM030-50AM029	M649	No	1.25	2.24	0.17%	0.678	1.57
50AM031-50AM030	M649	No	1.25	3.73	0.47%	0.642	3.09
50AM043-50AM031	M649	No	1.25	2.93	0.29%	0.527	2.40
50BM015-50BM016	M649	No	1	1.72	0.33%	0.085	1.64
50BM016-50BM017	M649	No	1	1.41	0.22%	0.087	1.32
50BM017-50BM018	M649	No	1	1.41	0.22%	0.092	1.32
50BM018-50BM024	M649	No	1	2.19	0.53%	0.201	1.98
50BM024-50BM025	M649	No	1	2.27	0.57%	0.203	2.06
50BM025-50BM026	M649	No	1	1.90	0.40%	0.205	1.69
50BM026-50BM027	M649	No	1	1.83	0.37%	0.206	1.62
50BM027-50BM047	M649	No	1	1.41	0.22%	0.221	1.19
50BM047-50BM048	M649	No	1	1.85	0.38%	0.223	1.63
50BM048-50BM049	M649	No	1	1.90	0.40%	0.225	1.67
50BM049-50BM050	M649	No	1	0.95	0.10%	0.227	0.72
50BM050-50BM051	M649	No	1	1.27	0.18%	0.259	1.01
50BM051-50BM052	M649	No	1	1.38	0.21%	0.261	1.11
50BM052-50BM053	M649	No	1	1.34	0.20%	0.262	1.08
50BM053-50BM054	M649	No	1	1.41	0.22%	0.264	1.14
50BM054-50AM042	M649	No	1	1.12	0.14%	0.266	0.86
58AM001-66AM042	M649	No	2	6.22	0.18%	2.223	4.00
58AM0026255-58AM001	M649	No	2	6.22	0.18%	2.217	4.00
58AM003-58AM0026255	M649	No	1.75	5.13	0.25%	2.158	2.98
58AM004-58AM003	M649	No	1.75	5.53	0.29%	1.411	4.12
58AM005-58AM004	M649	No	1.75	4.82	0.22%	1.395	3.42
58AM006-58AM005	M649	No	1.75	4.36	0.18%	1.386	2.97
58AM007-58AM006	M649	No	1.75	4.36	0.18%	1.379	2.98
58AM008-58AM007	M649	No	1.75	4.98	0.24%	1.369	3.61
58AM009-58AM008	M649	No	1.75	4.36	0.18%	1.364	2.99
58AM010-58AM009	M649	No	1.75	4.59	0.20%	1.355	3.24
58AM012-58AM003	M649	No	1	3.94	2.91%	0.731	3.21
58AM013-58AM026	M649	No	1	1.71	0.55%	0.683	1.03
58AM017-58AM013	M649	No	1	1.60	0.48%	0.630	0.97
58AM018-58AM034	M649	No	1	1.60	0.48%	0.596	1.00
58AM019-58AM018	M649	No	1	2.33	1.02%	0.577	1.75
58AM026-58AM012	M649	No	1	1.68	0.53%	0.715	0.97
58AM034-58AM017	M649	No	1	1.64	0.50%	0.608	1.03
58BM0296240-58BM0306254	M649	No	1.25	1.10	0.08%	0.618	0.48
58BM0306254-58BM031	M649	No	1.25	1.87	0.20%	0.668	1.21
58BM031-58BM032	M649	No	1.25	2.33	0.31%	0.681	1.65
58BM032-58BM036	M649	No	1.25	2.33	0.31%	0.668	1.66
58BM037-58BM036	M649	No	1	1.50	0.42%	0.063	1.43
58BM040-58BM041	M649	No	1	2.84	1.51%	0.642	2.19

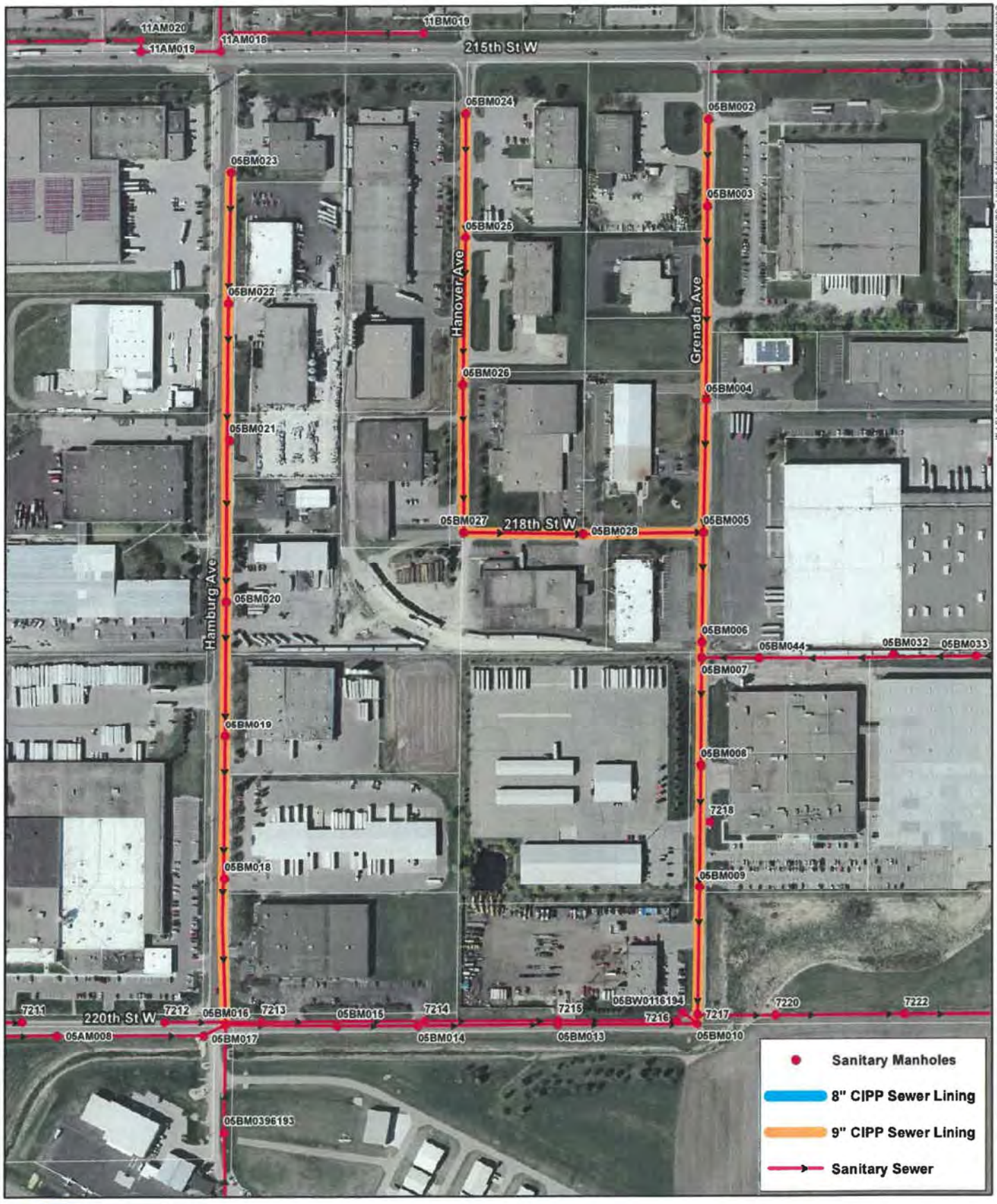
ID	MCES Meter District	Connects to MCES Interceptor [Yes/No]	Pipe Diameter [ft]	Pipe Capacity [MGD]	Percent Slope [%]	Anticipated 2040 Peak Flow [MGD]	Reserve Capacity Future [MGD]
58BM041-58AM019	M649	No	1	3.83	2.75%	0.600	3.23
58BM060-58BM036	M649	No	1	1.84	0.63%	0.685	1.15
58BM060-58BM040	M649	No	1	4.57	3.92%	0.658	3.91
65AM001-65AM002	M649	No	1	1.08	0.22%	0.016	1.07
65AM002-65AM003	M649	No	1	1.01	0.19%	0.019	0.99
65AM003-65AM004	M649	No	1	1.01	0.19%	0.021	0.99
65AM004-65AM005	M649	No	1	1.01	0.19%	0.023	0.98
65AM005-65AM010	M649	No	1	0.90	0.15%	0.035	0.86
65AM009-65BM017	M649	No	1	0.98	0.18%	0.054	0.93
65AM010-65AM009	M649	No	1	0.98	0.18%	0.053	0.93
65AS002-65AM001	M649	No	1	2.29	0.98%	0.000	2.29
65BM013-NODE_3_SEH	M649	No	1	0.46	0.04%	0.067	0.39
65BM014-65BM013	M649	No	1	1.03	0.20%	0.065	0.97
65BM015-65BM014	M649	No	1	1.31	0.32%	0.063	1.24
65BM016-65BM015	M649	No	1	1.03	0.20%	0.059	0.97
65BM017-65BM016	M649	No	1	1.03	0.20%	0.056	0.98
66AM009-66AM0106269	M649	No	1	1.70	0.54%	0.128	1.57
66AM0106269-66AM0206267	M649	No	1	1.39	0.36%	0.134	1.25
66AM0206267-66AM0216266	M649	No	1	1.37	0.35%	0.140	1.23
66AM0216266-66AM0226265	M649	No	1	1.38	0.36%	0.140	1.24
66AM0226265-66AM0236264	M649	No	1	1.39	0.36%	0.141	1.25
66AM0236264-66AM0246278	M649	No	1	1.67	0.52%	0.142	1.52
66AM0246278-66AM039	M649	No	1.25	2.41	0.33%	0.188	2.22
66AM039-66AM040	M649	No	1.25	1.96	0.22%	-1.645	3.61
66AM040-66AM041	M649	No	1.25	1.93	0.21%	-1.639	3.57
66AM041-66ALS07	M649	No	2.5	15.63	0.40%	0.618	15.01
66AM042-66AM041	M649	No	2	3.73	0.06%	2.229	1.50
7189-7190	M649	No	2	11.39	0.36%	0.433	10.96
7190-7191	M649	No	2	13.48	0.50%	0.434	13.04
7191-7192	M649	No	2	14.13	0.55%	0.436	13.70
7192-7193	M649	No	2	13.34	0.49%	0.449	12.89
7193-NODE_85_SEH	M649	No	2	13.34	0.49%	0.452	12.89
7194-7195	M649	No	2	13.48	0.50%	0.456	13.02
7195-NODE_95_SEH	M649	No	2	7.77	0.17%	0.457	7.31
7196-7197	M649	No	2	12.79	0.45%	0.461	12.32
7197-7198	M649	No	2	13.47	0.50%	0.463	13.01
7198-7243	M649	No	2	13.87	0.53%	0.464	13.41
7199-7200	M649	No	2	13.61	0.51%	0.468	13.14
7200-NODE_159_SEH	M649	No	2	12.64	0.44%	0.475	12.17
7201-7202	M649	No	2	13.34	0.49%	0.478	12.86
7202-NODE_163_SEH	M649	No	2	14.01	0.54%	0.480	13.53
7203-7204	M649	No	2	11.72	0.38%	0.484	11.23
7204-7205	M649	No	2	18.96	0.99%	0.485	18.48
7205-7206	M649	No	2	10.61	0.31%	0.487	10.13
7206-NODE_181_SEH	M649	No	2	9.71	0.26%	0.503	9.20
7207-7208	M649	No	2	8.94	0.22%	0.507	8.43
7208-7209	M649	No	2	9.53	0.25%	0.509	9.02
7209-NODE_202_SEH	M649	No	2	10.09	0.28%	0.517	9.57
7210-7211	M649	No	2	10.44	0.30%	0.521	9.92
7211-7212	M649	No	2	9.34	0.24%	0.532	8.80
7212-7213	M649	No	2	9.34	0.24%	0.534	8.81
7213-7214	M649	No	2	8.94	0.22%	0.536	8.40
7214-7215	M649	No	2	7.38	0.15%	0.541	6.84
7215-7216	M649	No	2	8.31	0.19%	0.544	7.76
7220-7222	M649	No	2	9.34	0.24%	0.820	8.52
7222-7223	M649	No	2	9.34	0.24%	0.823	8.51
7223-7224	M649	No	2	8.52	0.20%	0.828	7.69
7224-7225	M649	No	2	9.31	0.24%	0.832	8.48

ID	MCES Meter District	Connects to MCES Interceptor [Yes/No]	Pipe Diameter [ft]	Pipe Capacity [MGD]	Percent Slope [%]	Anticipated 2040 Peak Flow [MGD]	Reserve Capacity Future [MGD]
7225-7226	M649	No	2	26.20	1.89%	0.835	25.37
7226-7228	M649	No	2	6.87	0.13%	0.843	6.03
7228-7229	M649	No	2	5.05	0.07%	0.848	4.20
7229-7230	M649	No	2	5.70	0.09%	0.872	4.83
7230-7231	M649	No	2	6.03	0.10%	0.876	5.16
7231-NODE_268_SEH	M649	No	2	N/A	0.00%	0.883	N/A
7232-7233	M649	No	2	5.72	0.09%	0.891	4.83
7233-7234	M649	No	2	5.71	0.09%	0.895	4.82
7234-NODE_273_SEH	M649	No	2	5.38	0.08%	0.898	4.48
7235-7236	M649	No	2	5.72	0.09%	0.906	4.81
7236-7237	M649	No	2	7.13	0.14%	0.908	6.23
7237-7238	M649	No	2	3.30	0.03%	0.951	2.35
7238-7239	M649	No	2	6.03	0.10%	0.953	5.07
7239-7240	M649	No	2	6.87	0.13%	0.957	5.91
7240-7241	M649	No	2	4.68	0.06%	0.959	3.72
7241-7242	M649	No	2	14.64	0.59%	0.960	13.68
7242-12AS004	M649	No	4	73.77	0.37%	8.097	65.67
7243-7199	M649	No	2	13.61	0.51%	0.466	13.14
7376-11BM010	M649	No	1.25	1.61	0.15%	0.373	1.24
CDT-1653	M649	No	1.25	2.04	0.14%	0.000	2.04
CDT-1765	M649	No	1.25	2.04	0.14%	0.000	2.04
CDT-1767	M649	No	1.25	2.04	0.14%	0.000	2.04
CDT-1769	M649	No	1.25	2.04	0.14%	0.000	2.04
CDT-1779	M649	No	1.25	2.04	0.14%	0.000	2.04
CDT-1781	M649	No	1.25	2.04	0.14%	0.000	2.04
CDT-1783	M649	No	1.25	2.04	0.14%	0.000	2.04
CDT-1785	M649	No	1.25	2.04	0.14%	0.000	2.04
CDT-1817	M649	No	1	1.31	0.19%	0.000	1.31
CDT-1819	M649	No	1	1.31	0.19%	0.000	1.31
CDT-1821	M649	No	1	1.31	0.19%	0.000	1.31
CDT-1823	M649	No	1	1.31	0.19%	0.000	1.31
CDT-1825	M649	No	1	1.31	0.19%	0.000	1.31
CDT-1827	M649	No	1	1.31	0.19%	0.000	1.31
CDT-1931	M649	No	1	1.31	0.19%	0.000	1.31
CDT-1933	M649	No	1	1.31	0.19%	0.000	1.31
CDT-1935	M649	No	1	1.31	0.19%	0.000	1.31
CDT-1937	M649	No	1	1.31	0.19%	0.000	1.31
CDT-1939	M649	No	1	1.31	0.19%	0.000	1.31
CDT-1941	M649	No	1.25	2.04	0.14%	0.000	2.04
CDT-1943	M649	No	1.25	2.04	0.14%	0.000	2.04
CDT-2013	M649	No	3.5	36.95	0.19%	7.103	29.85
CDT-2073	M649	No	1	1.31	0.19%	0.000	1.31
CDT-2151	M649	No	1	1.31	0.19%	0.000	1.31
CDT-2355	M649	No	1	1.47	0.24%	0.088	1.38
CDT-2409	M649	No	1	1.30	0.19%	0.000	1.30
CDT-2411	M649	No	1	1.41	0.22%	0.000	1.41
CDT-2417	M649	No	1	1.41	0.22%	0.000	1.41
CDT-2423	M649	No	1	1.41	0.22%	0.000	1.41
CDT-41	M649	No	1.25	2.48	0.21%	0.181	2.30
CDT-47	M649	No	2	10.05	0.28%	0.815	9.23
CDT-51	M649	No	2	8.50	0.20%	0.548	7.96
CDT-73	M649	No	2.25	12.54	0.23%	1.463	11.08
CDT-83	M649	No	2.25	13.38	0.26%	1.485	11.90
DISCHARGE	M649	No	4	60.95	0.25%	8.092	52.85
JCT-886-09AS001	M649	No	1.25	2.89	0.28%	0.075	2.82
NODE_159_SEH-7201	M649	No	2	18.52	0.94%	-0.003	18.52
NODE_163_SEH-7203	M649	No	2	14.01	0.54%	0.482	13.52
NODE_181_SEH-7207	M649	No	2	9.61	0.25%	0.505	9.10

ID	MCES Meter District	Connects to MCES Interceptor [Yes/No]	Pipe Diameter [ft]	Pipe Capacity [MGD]	Percent Slope [%]	Anticipated 2040 Peak Flow [MGD]	Reserve Capacity Future [MGD]
NODE_202_SEH-7210	M649	No	2	10.73	0.32%	0.519	10.21
NODE_249_SEH-7220	M649	No	2	53.91	8.00%	0.012	53.89
NODE_268_SEH-7232	M649	No	2	6.58	0.12%	0.886	5.69
NODE_273_SEH-7235	M649	No	2	5.26	0.08%	0.901	4.36
NODE_3_SEH-65BW010	M649	No	1	1.94	0.42%	0.004	1.94
NODE_49_SEH-09AM002	M649	No	1.25	5.50	1.02%	0.144	5.36
NODE_71_SEH-164	M649	No	2	13.49	0.50%	0.429	13.06
NODE_85_SEH-7194	M649	No	2	14.00	0.54%	0.454	13.55
NODE_95_SEH-7196	M649	No	2	13.61	0.51%	0.459	13.15

Appendix G

2019 Sanitary Sewer Lining Map



Lakeville

Figure 1 - Sanitary Sewer Improvement Map

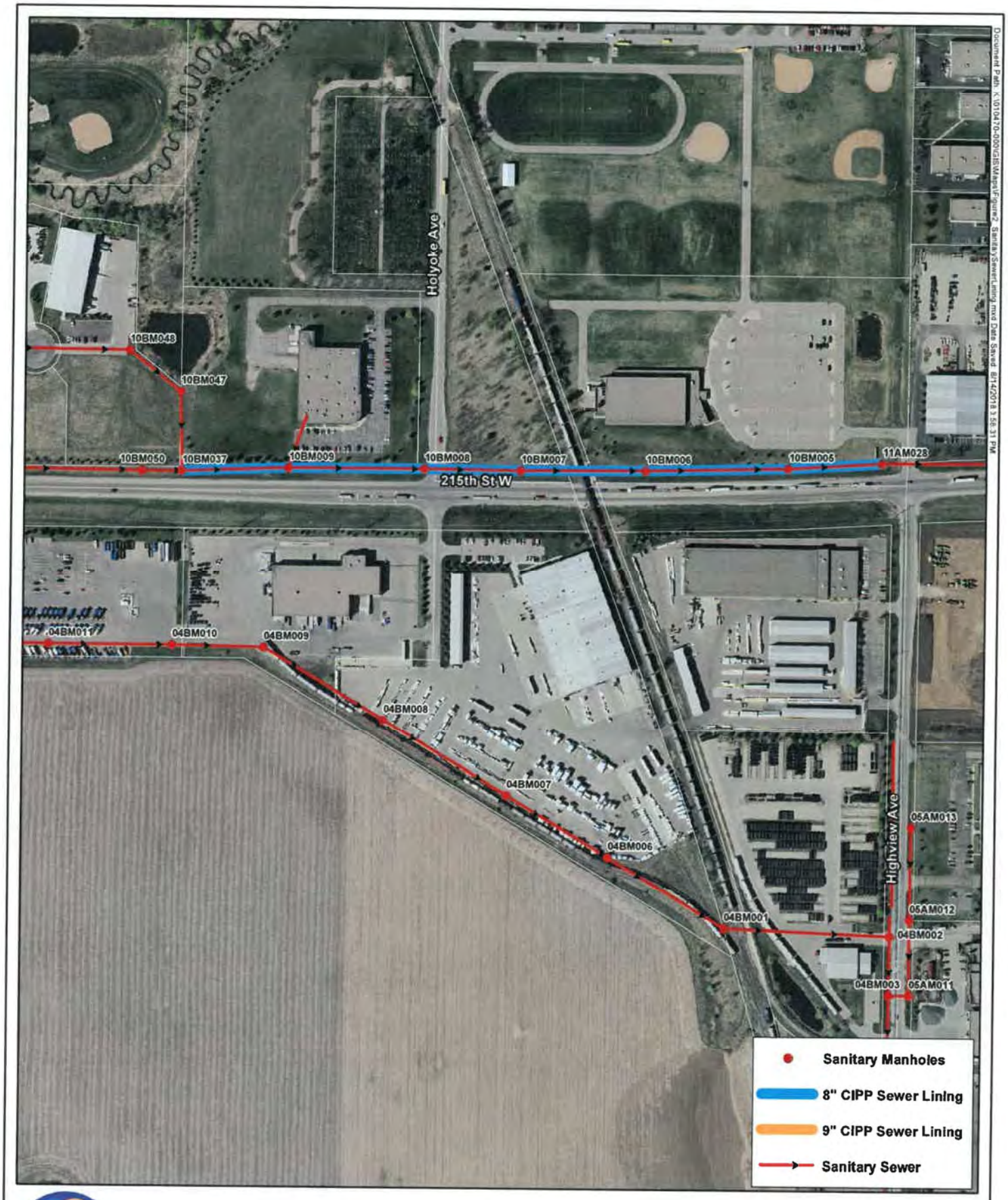
2018 Sanitary Sewer Lining Project
Lakeville, MN

N

0 350 Feet

1 inch = 350 feet

WSB



Lakeville

Figure 2 - Sanitary Sewer Improvement Map

2018 Sanitary Sewer Lining Project
Lakeville, MN

N

0 350 Feet

1 inch = 350 feet

WSB

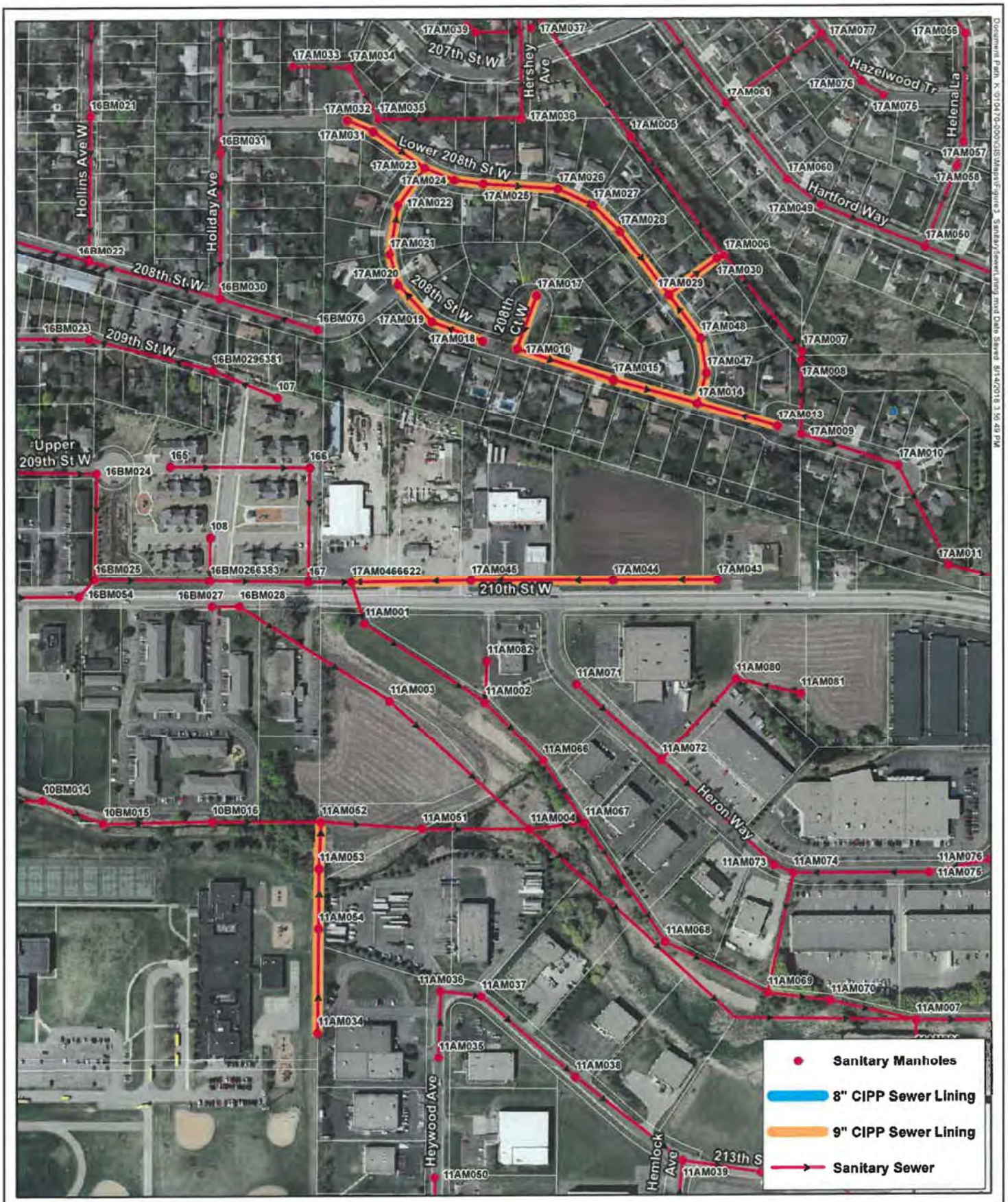


Figure 3 - Sanitary Sewer Improvement Map

2018 Sanitary Sewer Lining Project
Lakeville, MN

N

0 350 Feet

1 inch = 350 feet

Lakeville

Figure 4 - Sanitary Sewer Improvement Map

2018 Sanitary Sewer Lining Project
Lakeville, MN

N

0 350 Feet

1 inch = 350 feet

WSB

Lakeville

Figure 5 - Sanitary Sewer Improvement Map

2018 Sanitary Sewer Lining Project
Lakeville, MN

N

0 350 Feet

1 inch = 350 feet

WSB

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Lakeville

Figure 6 - Sanitary Sewer Improvement Map

2018 Sanitary Sewer Lining Project
Lakeville, MN

N

0 350 Feet

1 inch = 350 feet

WSB

Figure 7 - Sanitary Sewer Improvement Map
2018 Sanitary Sewer Lining Project
Lakeville, MN

N

0 350 Feet
1 inch = 350 feet

WSB

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SEH