



Inflow and Infiltration Study

Private Property Evaluation

City of Chanhassen, Minnesota

City Project 2019-06

SEH Project No. CHANH 150965

Prepared for:



Prepared by:



Building a Better World
for All of Us®

Engineers | Architects | Planners | Scientists



Building a Better World
for All of Us®

December 16, 2019

RE: Inflow and Infiltration Investigation
Private Property Evaluation
City of Chanhassen, Minnesota
SEH No. CHANH 150965 4.00

Mr. Erik R. Hendricksen, EIT
Project Engineer
7700 Market Blvd.
PO Box 147
Chanhassen, MN 55317

Dear Erik:

The following draft technical report presents our findings and recommendations from our Inflow and Infiltration (I/I) investigation and private property evaluation on the Chanhassen sanitary sewer collection system. The report reviews the work completed under our current investigation including a background review of the City of Chanhassen's past I/I investigations and findings, our current flow monitoring program results, a review of potential measures and our recommendations for future I/I investigations for both the private and public Chanhassen infrastructure.

Please have your staff review the document and provide comments back to us. If you would like to meet and discuss any aspect of the report or what we can expect at the Council workshop, let us know and we can setup a preliminary meeting. Look forward to hearing from you.

Sincerely,

Kirby Van Note, PE
Project Manager
(Lic. MN)

SCC
s:\ae\c\chanh\150965\4-prelim-dsgn-rpts\inflow and infiltration investigation_dec_13_2019_scc.docx

Inflow and Infiltration Study

Private Property Evaluation

City of Chanhassen, Minnesota

SEH No. CHANH 150965

December 16, 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.

Kirby Van Note, PE

Date: December 16, 2019

License No.: 16241

Reviewed By: Spencer Cossalter

Date: December 16, 2019

Short Elliott Hendrickson Inc.
3535 Vadnais Center Drive
Saint Paul, MN 55110



Distribution

No. of Copies	Sent to
1	Mr. Erik R. Hendricksen, EIT Project Engineer 7700 Market Blvd. Chanhassen, MN 55317
1	George Bender Assistant City Engineer 7700 Market Boulevard P.O. Box 147 Chanhassen, MN 55317
1	Kevin Crooks Utilities Superintendent 7901 Park Place Chanhassen, MN 55317
1	Lindsey Roberts McKenzie, PE Associate 3535 Vadnais Center Drive Saint Paul, MN 55110

Executive Summary

The objective of this study was to perform an investigation of the existing sanitary sewer collection system, identify the need for establishing private property program and provide recommendations for implementing a long term plan to identify and remove clear water (I/I) from the Chanhassen system. Inflow and infiltration (I/I) is clear water entering the sanitary collection system through pipe defects or improper connections to the system during high groundwater conditions or during wet weather periods.

The Metropolitan Council of Environmental Services (MCES) uses a network of permanent flow meters to establish community wastewater charges for treatment and peak hour discharge requirements. The MCES has identified the City of Chanhassen through their flow metering as a community in need of addressing clear water based on peak hour flow rates established at MCES Meter Station's M413 and M439. MCES over the past fifteen years has been working with communities to develop I/I programs. The programs encourage local communities to implement investigation measures to locate potential sewer defects and remove I/I through effective sewer rehabilitation.

The purpose of this investigation was to assist the City of Chanhassen in developing an I/I study which will help identify specific sewer shed areas with greater I/I contributions rates and identify I/I sources, reduction measures and establish an effective private property program which best fits the communities overall needs.

Ten (10) flow meters manufactured by Teledyne Isco were supplied by SEH and used for the project flow monitoring program to establish wastewater flow conditions at eighteen (18) locations within the City of Chanhassen sanitary sewer collection system. During the first phase of flow monitoring, three wet weather events (May 27th, July 1st and July 15th) produced significant increases in wastewater peak flow rates during daily rainfall periods exceeding 2.0 inches. The highest peak flow rates occurred on May 27, 2019 following the spring rains and when the groundwater typically is higher during the early spring months.

Three sewer districts (5, 5A and 7) produced the highest peak rates during the May 27, 2019 wet weather event and contributed the largest amount of I/I based on peak hour rates. In order to further investigate wastewater flow conditions in the Sewer Districts 5 and 5A, eight flow meters were relocated the last six weeks of the flow monitoring period to capture additional flow data. The result of the additional flow monitoring isolated the highest peak I/I responses during wet weather conditions in Sewer Districts 5-2, 5-3, 5-4, 5A-2 and 5A-3.

Wastewater flow rates during wet weather periods produced significant increases for more than twenty four hours after the rainfall event had ended at a majority of the meter locations. This response is typical of an indirect I/I source such as a sump pump discharge, foundation drain connection or pipe defects in locations exposed to high groundwater conditions. Based on the wastewater response during wet weather periods from each meter location, it seems intuitive that the majority of I/I sources impacting the Chanhassen sanitary sewer collection system would be from private property sources. Wastewater flow responses during wet weather periods not only impacted during the event but increase for days following the event, which is a typical wastewater response influenced by I/I from private property sources.

Executive Summary (continued)

Approximately sixty (60) percent of the City's sanitary infrastructure is located on private property. The majority of the City resources is currently allocated to addressing the public infrastructure and city staff efforts need to continue to maintain a properly functioning sanitary sewer collection system which includes the effective management of I/I within acceptable limits required by the MCES. In order to meet MCES peak hour flow rate requirements and reduce I/I to acceptable levels within the Chanhassen sanitary sewer collection system, additional measures will be necessary on the sanitary sewer infrastructure on public right of way. But the main focus of meeting MCES wastewater requirements should focus on private property inspection (PPI) and repair program.

The recommended PPI program includes a CCTV inspection through the stack cleanouts inside each building with a push style camera. The entire building service lateral would be televised noting any issues or potential I/I defects. Any property inaccessible from the building would include a lateral launch inspection from the main lateral to complete all inspections. In addition, the adoption of a point of sale (POS) program would be recommended. During the sale of property, the owner would need a permit by the City to verify it was in compliance with the sewer ordinance.

The recommendations include focusing on sewer districts (5-2, 5-3, 5-4, 5A-2 and 5A-3) with highest peak hour flow rates and I/I contributions which have the greatest impact on the MCES I/I program policy. Direct connections to the sanitary sewer such as those related to sump pump discharges or foundation drain connections should be removed first because they contribute a rapid I/I response as part of the initial peak hour flow rate and typically deliver the initial I/I response under wet weather conditions.

The following steps are recommended based on the findings of the initial investigation and identify actions to be implemented to address both the public and private portions of the Chanhassen sanitary sewer collection system.

1. Target future CCTV and sewer lining projects on Sewer Districts 5, 5A, 7 and 7A.
2. Incorporate a manhole inspection program into the sewer lining program and in flooding and high groundwater areas.
3. Conduct a smoke testing investigation in Sewer District 5-3.
4. Implement a public education program to educate residents about I/I, current impact on the City's infrastructure and what can be done to successfully manage it.
5. Implement a PPI program which will either be voluntary or mandatory. A mandatory program will require a review and update of the current city sewer ordinance.
6. Continue to review and revise the sewer ordinance as needed in order to provide the proper enforcement language to conduct and gain compliance for any adopted inspection programs.
7. Perform private property inspections which include a service lateral CCTV inspection from the property's stack cleanout to the City's main sanitary sewer lateral. Complete the inspections in Sewer Districts 5-2, 5-4, 5A-2 and 5A-3 first.
8. Update the sewer ordinance to allow for implementation of a POS program.

The overall cost of the recommendations identified in Section 7 of this study is approximately \$415,500. Included in the overall recommendations is the initial private property inspection costs of \$273,000. Additional cost information is listed in Section 7.3 of this study.

Contents

Letter of Transmittal
Certification Page
Title Page
Executive Summary
Contents

1	Introduction	1
1.1	Current I/I Program Background	2
1.2	Purpose and Objectives	2
2	Previous Studies and Data Review	3
3	Flow Monitoring Program	4
3.1	Flow Meter Reconnaissance	5
3.2	Flow Meter Installation and Monitoring	5
3.3	Flow Data Review and Evaluation	8
3.4	Flow Monitoring Summary Results	10
4	Potential I/I Infrastructure Sources	11
4.1	Public Infrastructure I/I	11
4.2	Private Property I/I	13
5	Private Property Program Options	17
5.1	Voluntary Residential Inspections	17
5.2	Mandatory Residential and Commercial Inspections	17
5.3	Point of Sale Inspection Program	17
5.4	Additional Program Options	18
6	Sewer Ordinance Requirements	18
7	Future Program Recommendations	19
7.1	Public Infrastructure Program	19
7.2	Private Property Program	20
7.3	PPI Program Summary	21

Contents (continued)

List of Tables

Table 1 – Sanitary Sewer Infrastructure and Parcel Counts.....	4
Table 2 – Flow Monitoring Locations.....	6
Table 3 – Wet Weather Events - Rainfall Data.....	7
Table 4 – Wet Weather Flow Results.....	9
Table 5 – Table 5 - Program Cost Summary.....	22

List of Figures

Figure 1 – Parcel Development (Sanitary Sewer Construction)
Figure 2 – May 27, 2019 Wet Weather Event
Figure 3 – Follow-up Flow Meter Location
Figure 4 – September 12, 2019 Wet Weather Event
Figure 5 – Future I/I Investigation Area

List of Appendices

Appendix A	Flow Meter Data
Appendix B	Manhole Condition Assessment Reports

Inflow and Infiltration Study

Private Property Evaluation

Prepared for the City of Chanhassen, Minnesota

1 Introduction

Wastewater flow generated by the residents of Chanhassen is conveyed through the City's local sanitary sewer collection system and transported via the Metropolitan Council Environmental Services (MCES) interceptors for treatment at the Blue Lake Wastewater Treatment Plant. The MCES monitors the volume of wastewater through a network of flow meter stations between communities to identify appropriate charges for conveyance and treatment of each city's wastewater contribution.

Inflow and infiltration (I/I) is clear water entering the sanitary collection system through pipe defects or improper connections to the system during high groundwater conditions or during wet weather periods. More specifically, inflow is the result of a direct connection of clear water into the wastewater collection system including a catch basin, area drain or roof leader connection. Infiltration is an indirect connection of clear water into the wastewater collection system which can include water entering through an offset pipe joint or broken section of pipe. Inflow and infiltration does not need treatment and reduces the pipe capacity of the sanitary sewer collection system to convey wastewater for treatment.

During spring months and rainfall periods, I/I can significantly reduce the pipe capacity and under extreme conditions cause wastewater to exit or overflow the sanitary sewer collection system. Raw sewage exiting the sanitary sewer causes environmental health issues concerns and is regulated by state and federal agencies. The MCES is fined by these agencies if any untreated wastewater exits the sanitary sewer collection system. To maintain pipe capacity and reduce the potential for wastewater exiting the sanitary sewer, MCES has established guidelines for acceptable I/I rates for each community in the Twin Cities metropolitan region. Through their I/I program, MCES has established peak hour discharge limits by community or sewer shed if multiple flow meter locations to identify a communities flow contributions to their interceptors are necessary.

The City of Chanhassen has been identified through MCES's I/I flow metering program, as a community in need of addressing clear water based on flows at MCES Meter Station's M413 and M439. The two MCES meter stations are used to establish community wastewater charges for treatment and peak hour discharge requirements within Chanhassen. In order to identify future steps in reducing wastewater flow rates above the MCES peak hour guideline, the City of Chanhassen retained Short Elliott Hendrickson Inc. (SEH). The objective of this study was to perform an investigation of the existing sanitary sewer collection system, identify the need for establishing private property program and provide recommendations for implementing a long term private property program to remove I/I from the Chanhassen collection system.

1.1 Current I/I Program Background

In order to meet future growth projections in the Twin Cities metro area, MCES completed a study to evaluate the capacity of their interceptors supporting the local community sanitary sewer collection systems. The study concluded that the interceptors would need to be upgraded in capacity to meet increase demand in the next thirty years. Pipe capacity in their interceptors would be adequate to meet future demand if I/I could be effectively managed within the communities. The study concluded that proper management of I/I would be less costly than increasing interceptor pipe capacity.

Thus, MCES over the past fifteen years has been working with communities to develop I/I programs. The programs encourage local communities to implement investigation measures to locate potential sewer defects and remove I/I through effective sewer rehabilitation. In addition, MCES established community goals to develop sustainable I/I programs which would be effective in developing short and long range strategies for I/I reduction.

Prior to MCES's programs, the City of Chanhassen conducted their own sump pump inspection program in the late 1990's in an effort to eliminate illicit discharges. In 2002, the City conducted a feasibility study for a sewage flow monitoring program with the goal of achieving fair and equitable allocations of the wastewater treatment costs provided by the MCES. Since then, the City has completed public sanitary sewer infrastructure and appurtenance inspections, repairs and upgrades with the goal of reducing I/I from the sanitary sewer collection system. Although many improvements have been implemented, the wastewater flow data from the MCES meter stations still indicate many areas of the overall Chanhassen sanitary collection system are experiencing I/I issues during wet weather periods.

1.2 Purpose and Objectives

The purpose of this investigation was to assist the City of Chanhassen in developing an I/I study which will help identify specific sewer shed areas with greater I/I contribution rates. In addition, work with the City staff to identify I/I sources, reduction measures and establish an effective private property program which best fits the communities overall needs.

The investigation objectives were as follows:

- Perform necessary flow monitoring to determine greater I/I contribution areas during wet weather flow conditions.
- Establish a baseline for future rehabilitation success.
- Rank areas with high I/I potential so the City can focus on the portion of the collection system with the greatest potential reduction.
- Summarize the findings of the flow monitoring program, identify and evaluate private property alternatives and provide recommendations for a future private property investigation and remediation program.
- Review city ordinances and provide recommendations for ordinance revisions to support future private property program measures.
- Identify a long term flow monitoring program, as needed, to establish future I/I abatement success.
- Work with city staff to develop and prepare educational materials to support future private property program and I/I abatement initiatives.

2 Previous Studies and Data Review

A kick-off meeting with City and SEH staff was completed to collect and review all available information (maps, flow data, manhole/pipe data, GIS database, etc.) provided by the City. In addition, a general background review of local surface soils, land use maps, and any available monitoring well data from state resources were reviewed to help understand local soil moisture conditions over time and the relationship between groundwater and I/I. Overall, the available data proved inconclusive in providing detailed information to use for with proposed I/I investigation(s).

The project team meeting was also used to review operation and maintenance procedures with staff in order to identify sub-basin boundaries based on review of existing sewer maps and GIS data. Based on a preliminary review of the collection system, SEH identified ten (10) sub-basins or sewer districts used for the initial flow monitoring investigation. An eleventh sewer district was established later in the project after obtaining flow data from the MCES permanent M419 meter station referred in this investigation as District 7A. Each of the preliminary flow meter locations were discussed in regards to how they would be effective based on work completed to date on the public infrastructure. After discussion among the project team, a flow monitoring network was agreed to along with establishment of a numbering system with recommendations on the continued use of the numbering format for long-term use.

The project files from the sump pump investigation completed in the late 1990's were made available by the City along with previous closed circuit television (CCTV) inspection tapes. A sampling of data was reviewed by SEH staff to gain a better understanding of the City's sanitary collection system. A meeting with the City's GIS consultant was arranged to gain a better understanding of the GIS data available for future use on this project and I/I investigation projects in the future. Additional information included areas where public infrastructure improvements have been made prior to this investigation and individual parcel data.

Figure 1, included at the end of this document, presents the City's overall sanitary sewer collection system with each specific flow meter location used to collect wastewater flow measurements during study. The two permanent MCES meter stations (M413 and M419) used within the study were also identified in Figure 1 along with city parcel data. The parcel data was obtained from Carver County files and is not complete in some areas. Regardless, the data that was available was helpful in establishing a timeline of city development over the years. In addition, the parcel data was helpful in identifying areas for future flow monitoring based on homes built between 1960 and 1980 when residential development were likely to included provisions for handling groundwater issues.

As discussed in the next section, at the start of the flow monitoring investigation, ten locations were selected for meter installations. Based on the flow data from the first three months, meter equipment was relocated to seven new locations based on the highest I/I contributions (Sewer Districts 4 and 5) during wet weather periods. In addition, a flow meter was installed in the northeast corner of the City of Chanhassen to identify potential I/I contributions from Sewer District 8. This area discharges wastewater into the City of Eden Prairie collection system before connecting into the MCES system. Overall, the flow monitoring program identified flow data results from eighteen separate sewer districts over the course of this study.

Table 1 on the next page identifies the list of sewer districts used to determine wastewater flow conditions at various locations within the City of Chanhassen. The table also presents the

number of sanitary manholes and individual property parcels identified in each sewer district. This information was used to determine the potential costs associated with recommended investigation measures. The parcel data includes residential and commercial data sets and the information was obtained from GIS data as stated above.

Table 1 – Sanitary Sewer Infrastructure and Parcel Counts

Flow Meter District	Manhole Count	Parcel Count
FM 1	395	1245
FM 2	184	653
FM 3	166	474
FM 4	263	1244
FM 4A	243	575
FM 4B	229	952
FM 5	246	439
FM 5-1	38	109
FM 5-2	28	72
FM 5-3	78	70
FM 5-4	46	153
FM 5A-1	99	246
FM 5A-2	150	499
FM 5A-3	65	188
FM 6	163	402
FM 7	261	500
FM 7A	94	251
FM 8	184	434
Unmetered	869	2079
Totals	3801	10585

The city has completed a number of sanitary sewer lining projects since the early 2000s as part of their operation and maintenance program and in more recent years for the specific purpose of addressing I/I issues. A number of sewer lining projects between 2013 through 2016 were completed as part of the operation improvements on the public sanitary infrastructure system. Because of the number of the lining projects which have occurred in Sewer District 5A, future private property investigations in this area could help to identify and quantify I/I sources strictly from the private property portion of the collection system.

3 Flow Monitoring Program

Once the project team (SEH and City staff) was in agreement with the preliminary placement of the flow meter equipment, SEH began the process of determining suitable locations for wastewater flow metering based on pipe hydraulics, manhole configuration, equipment accessibility, etc. This section (Section 3) identifies the process used to determine the final flow monitoring locations in order to isolate I/I in specific pipe sections entering the Chanhassen sanitary sewer collection system.

3.1 Flow Meter Reconnaissance

A field review of each potential flow monitoring site was completed by SEH staff to determine if it was a suitable location for equipment installation. Information collected included, but was not be limited to: the location of the site, diameter of the pipe(s), hydraulics of each manhole, manhole depth, elevation of the pipe flowline (including any drops), material of the manhole, and the material of the all pipes entering and exiting each manhole.

All accessible manholes were inspected at or near where the Chanhassen sanitary sewer collection system connects to the MCES interceptor. In addition to the investigation for possible flow meter installation locations, each identified manhole was visually inspected for signs of I/I or any significant structural conditions that would elicit repair.

Each potential flow meter manhole location was located with GPS using a handheld iPad or laptop computer with sub-meter accuracy. Data from the field review was recorded by field crews using an ESRI collector application software. Each flow meter location was reviewed by the project team based on the information collected during meter reconnaissance. All field data was made available electronically to the City for uploading to the City's GIS software database.

3.2 Flow Meter Installation and Monitoring

Ten (10) flow meters manufactured by Teledyne Isco were supplied by SEH and used for the projects flow monitoring investigation. Flow meter equipment was installed on May 17, 2019 at the locations identified during the meter reconnaissance phase of the project. Each location is depicted in Figure 2.

Ten flow meter locations (FM 1, FM 2, FM 3, FM 4, FM 4A, FM 4B, FM 5, FM 5A, FM 6 and FM 7) were installed on May 17, 2019. All equipment was inspected and evaluated every other week in order to provide any required maintenance and to download the data. Wastewater flow data was transferred from each meter using a laptop computer for further review and analysis. Each flow meter recorded continuous raw monitoring data and summarized in 15 minute intervals to determine maximum and minimum flow rates along with total, average, and peak daily flow rates.

In order to capture the data necessary to determine wet weather flow conditions, the initial ten flow monitoring locations remained in place until a number of wet weather events could be analyzed to determine which sewer shed districts had the highest I/I potential. The wastewater flow data was analyzed to determine both dry weather responses and wet weather peak flow rates. Each of the ten sewer districts were ranked according to their response to rainfall events. A technical report summarizing all the initial meter data was prepared and recommendations were presented to the City staff for additional flow monitoring.

After review by the project team, it was decided to relocate eight of the ten initial flow meter locations to collect additional flow data on two of the original districts (FM 5 and FM 5A) and a previously unmetered sewer district (FM 8) which is located in the northeast corner of the city adjacent to the City of Eden Prairie. Sewer Districts 5 and 5A were selected for additional flow monitoring because they produced the highest I/I peak flow rates under wet weather events. Additional flow monitoring in Sewer District 8 was included because it was an unmetered area of the City discharging into the City of Eden Prairie.

Flow meter locations at FM 5 and FM 5A remained installed along with seven additional sewer district areas (FM 5-1, FM 5-2, FM 5-3, FM 5-4, FM 5A-1, FM 5A-2 and FM 5A-3) were added to

isolate a portion of the sanitary sewer collection system in each area along with the additional flow meter installed at the FM 8 location. On August 26, 2019, the flow meters were relocated to the new locations. Each flow meter was installed and calibrated using the same approach as completed for the initial flow meter locations. The flow meters installed at the second locations collected wastewater data for approximately six weeks until October 10, 2019 when all the meters were removed.

Table 2 below lists each of the flow monitoring locations utilized during the flow monitoring period. The table lists the flow meter street location, pipe size and the sanitary sewer manhole number based on the City of Chanhassen's numbering system for each meter used in the study.

Table 2 – Flow Monitoring Locations

Flow Meter No.	Location	Pipe Size (in)	Manhole ID
FM 1	Great Plains Boulevard just north of Mission Hills Lane	21	35-044
FM 2	Lake Susan Park, South of Lake Drive E	10	34-149
FM 3	South of Park Road near Mallory Court	12	28-027
FM 4	West of Powers Boulevard, North of Lake Drive W	24	34-079
FM 4A	Lyman Boulevard, West of Bluff Creek	21	40-005
FM 4B	Stone Creek Drive, South of Coulter Boulevard	18	27-034
FM 5	North side of Rice Marsh Lake, East of Cheyenne Ave.	21	29-139
FM 5-1	Easement Southeast of Cheyenne Avenue	8	29-138
FM 5-2	Chan View West of Frontier Trail	10	23-105
FM 5-3	East of Great Plains Circle on Frontier Trail	8	23-106
FM 5-4	Frontier Trail near Del Rio Drive	8	23-195
FM 5A	West of Lotus Lake, South of Big Woods Boulevard	18	18-061
FM 5A-1	Big Woods Boulevard and Carver Beach Road	8	18-054
FM 5A-2	Big Woods Boulevard and Carver Beach Road	8	18-154
FM 5A-3	Pontiac Lane East of Pima Lane	10	17-103
FM 6	Majestic Way and Windmill Drive	15	21-067
FM 7	South of Lift Station (LS) No. 3	15	02-021
FM 8	North of Brule Circle, West of Chanhassen Road	15	12-121

On the next page, Table 3 presents the daily rainfall data collected from three sources used for this study. Local rainfall data was collected from private sources and from the MCES rainfall gauge (RG-19) located just outside the northeast corner of the City of Chanhassen. The first location (identified as MCES RG-19) was collected by the Met Council just northeast of the city on Townline Road and the remaining two locations (identified as North and South Chanhassen) are located in the north central and south central areas of the City. The North and South rain gauges are operated and maintained by local sources within the City of Chanhassen through the

Community Collaborative Rain, Hail and Snow Network (CoCoRaHS). The three rain gauge locations were used to identify the daily intensity of each wet weather event and the regional coverage across the City of Chanhassen.

Table 3 – Wet Weather Events - Rainfall Data

Daily Rainfall Totals (in.)			
Date	MCES RG-19	North Chanhassen	South Chanhassen
May 27, 2019	2.04	1.75	1.5
June 4, 2019	0.38	0.10	0.80
June 11, 2019	0.19	n/a	n/a
June 12, 2019	0.08	n/a	n/a
June 14, 2019	0.38	n/a	n/a
June 15, 2019	0.21	n/a	n/a
June 20, 2019	0.54	n/a	n/a
June 23, 2019	0.47	0.60	0.50
June 27, 2019	0.33	n/a	n/a
June 30, 2019	0.89	2.00	2.70
July 1, 2019	2.52	2.00	0.75
July 2, 2019	0.70	n/a	n/a
July 4, 2019	0.24	n/a	n/a
July 5, 2019	0.15	n/a	n/a
July 9, 2019	0.30	n/a	n/a
July 10, 2019	0.20	n/a	n/a
July 15, 2019	2.53	2.00	2.10
July 20, 2019	1.82	0.90	0.90
July 28, 2019	0.47	0.34	0.30
August 5, 2019	1.09	1.10	0.67
August 10, 2019	0.19	0.20	0.72
August 13, 2019	0.87	0.48	0.32
August 15, 2019	0.66	0.63	0.57
August 17, 2019	2.49	2.32	2.52
August 20, 2019	1.49	0.74	0.70
August 26, 2019	1.06	1.06	0.95
September 2, 2019	0.73	0.73	n/a
September 11, 2019	1.12	0.95	0.75
September 18, 2019	0.17	n/a	n/a
September 21, 2019	0.28	0.29	0.23

Notes:

The wet weather dates highlighted were used in the analysis to establish I/I contributions in the study

na – indicates no rainfall was recorded or the data was not available

3.3 Flow Data Review and Evaluation

The following section reviews the rainfall and wastewater flow data collected during the monitoring period and the methods used to identify which sewer districts provide greater evidence of I/I during wet weather periods. A maximum peak hour rate for each sewer district was used as the measure of rating each district to define I/I contribution during the flow monitoring.

During each wet weather event, I/I contribution increases the flow rates resulting in a maximum peak hour flow rate. By comparing the peak hour flow rates during wet weather events to typical flow rates during dry weather day, the amount of I/I contribution in gallons per minute (gpm) can be calculated. In addition, the peak hour flow rates identified on wet weather days can be compared with the average flow rates at each flow meter location to determine a peak flow rate to average flow rate referred to simply as a peak to average flow rate ratio (P/A).

The higher the amount I/I contribution and peak to average flow rate ratio (P/A), the greater potential I/I entering the sanitary sewer collection system. Each of these measures were used to identify which sewer district to focus on for future I/I investigation evaluation and then to further locate and rehabilitate I/I sources. Examples of wastewater flow hydrographs from each district as determined by each flow meter is presented in Appendix A.

3.3.1 Rainfall Monitoring

As previously presented in Table 3, daily rainfall totals from three rain gauge locations in or near the City of Chanhassen were used to determine which wet weather events to focus on during the flow monitoring period. Multiple gauge locations are helpful in determining the amount, intensity and distribution of rainfall in the area and identify if each storm event impacts isolated areas or the entire City of Chanhassen. A number of wet weather events produced rainfall in isolated areas which could make it difficult to determine I/I impact at multiple meter locations during the wet weather event.

Overall, daily rainfall totals for the summer were well above normal but the number of significant (daily wet weather storm events greater than three inches) wet weather events were limited within the Chanhassen city limits. Typically, wet weather events producing greater than three inches of rainfall in a twenty-four (24) period do not occur each year but have the largest impact on I/I contribution regionally. Significant wet weather events were recorded west or north of Chanhassen with only four events producing amounts exceeding two inches of rainfall over a twenty-four (24) hour period. The largest wet weather events recorded during the flow monitoring period occurred on May 27, July 1, July 15 and August 17, 2019. During each of these events, all three of the rain gauges produced similar rainfall totals.

3.3.2 Wet Weather Flow Monitoring

During the first phase of flow monitoring, three wet weather events (May 27th, July 1st and July 15th) produced significant increases in wastewater peak flow rates during daily rainfall periods exceeding 2.0 inches. The highest peak flow rates occurred on May 27, 2019 following the spring rains and when the groundwater typically is higher during the early spring months. None of the later 2019 wet weather events produced greater peak hour wastewater flow results than the initial May 27, 2019 wet weather event.

Thus, the May 27th rainfall event was the basis for determining each sewer districts I/I peak flow rate by subtracting wastewater flow rates at the same time and day of the week during a dry weather period from the peak hour flow rate recorded during the wet weather event. The dry weather period used for the calculation was always the week prior to the wet weather even as presented in the hydrographs included in Appendix A. Each sewer district was calculated in a similar manner along with the peak flow rate compared to the average flow rate (referred to as peak to average or P/A) calculated from the previous week using the methodology described in Section 3.3.

Later in this section, Table 4 presents the overall I/I peak flow rates and P/A results for each sewer district of the flow monitoring investigation. The calculations resulting in the highest I/I concentration and P/A values were used to identify the sewer districts that needed additional flow monitoring. The peak flow rates presented in the first column of Table 4 are the actual wastewater flow rates recorded during the May 27th and September 12th wet weather events. For some of the sewer districts, wastewater enters from other sewer districts, compounding the flow values and represents more than one sewer districts flow. This is the case with Sewer District 5 where FM 5A wastewater flow rates recorded at FM 5A are also included in the wastewater flow rates for FM 5.

During the first phase of the flow monitoring, three flow meters (FM 4, FM 4A and FM 4B) were used to monitor wastewater flow conditions in Sewer District 4 because of the size of the sanitary sewer collection system. Unfortunately during the May 27, 2019 wet weather event, the flow meter at FM 4 did not record accurate data due to an equipment maintenance issue. Since the peak flow rates for the FM 4A meter location were inconsistent based on other wet weather events and could not be verified by the results at the FM 4 meter location, Sewer District 5A was selected for further investigation.

After the flow meter locations were relocated, a number of wet weather events were identified but only the wet weather event on September 12th produced consistent results with close to one inch of rainfall between the three rain gauge stations. This event was used to further isolate I/I contributions from the two sewer districts (5 and 5A) using the same approach identified above. Peak hour I/I rates and P/A values were calculated for comparison purposes at each of the flow meter locations in service at the time of the September 12th event.

Table 4 – Wet Weather Flow Results

Wet Weather Event - May 27, 2019			
Flow Meter District	Peak Flow Rate (gpm)	I/I Flow Rate (gpm)	P/A Ratio (2)
FM 1	458	273	2.15
FM 2	295	<10	1.00
FM 3	350	<10	1.00
FM 4 (1)	na	na	na
FM 4A	595	307	2.44
FM 4B	185	109	2.60
FM 5	2,160	809	2.04

Wet Weather Event - May 27, 2019			
Flow Meter District	Peak Flow Rate (gpm)	I/I Flow Rate (gpm)	P/A Ratio (2)
FM 5A	509	366	2.32
FM 6	216	154	2.92
FM 7	202	162	4.69
FM 7A	326	161	1.76
Wet Weather Event - September 12, 2019			
Flow Meter District	Peak Flow Rate (gpm)	I/I Flow Rate (gpm)	P/A Ratio (2)
FM 5	398	97	1.08
FM 5-1	111	72	3.58
FM 5-2	220	175	5.95
FM 5-3 (3)	335	274	3.72
FM 5-4	204	134	4.00
FM 5A	<10	<10	1.00
FM 5A-1	167	48	2.23
FM 5A-2	316	108	2.29
FM 5A-3	126	105	6.63
FM 8	286	184	3.57

Notes:

- (1) Data error occurred during wet weather period
- (2) P/A - Peak Hour Flow Rate/Average Flow Daily Rate
- (3) Peak increase does not correlate to the same time period as the other locations

3.4 Flow Monitoring Summary Results

Based on the results of the flow monitoring, the following conclusions were identified.

- The majority of wet weather events recorded during the five months of flow monitoring did not produce high intensity storm events. Four wet weather events did approach the 2.0 inches of rainfall over a twenty-four (24) period which is an amount rainfall typically recorded on the average of once each year.
- Sewer Districts 5, 5A and 7 produced the highest peak rates during the May 27, 2019 wet weather event and contributed the largest amount of I/I based on peak hour rates.
- Sewer Districts 5-3, 8, 5-2 and 5-4 contributed the largest amount of I/I during the September 12, 2019 after the majority of the flow meters were relocated to Districts 5 and 5A.
- Although the wastewater flow rates at the M5-3 location (Sewer District 5-3) did increase during the September 12th wet weather event, the peak rate occurred a few hours in

advance of the rainfall and with a short duration of response. This response is typically found from a direct discharge or direct type inflow source, similar to a backwash from a water treatment facility, commercial discharge or a catch basin/area drain direct connection from the sanitary sewer.

- Further review of the flow data from the M5-3 meter location identified additional peak flow rates on non-wet weather days with similar increases over shorter durations. After discussion with City staff it was speculated that the peaks could be the result of an industrial discharge. To date it has not been verified and further investigation is needed to determine whether or not this condition is related to I/I or an illicit discharge.
- Wastewater flow rates during wet weather periods produced significant increases for more than twenty four hours after the rainfall event had ended at a majority of the meter locations. This response is typical of an indirect I/I source such as a sump pump discharge, foundation drain connection or pipe defects in locations exposed to high groundwater conditions.

Based on the age of the system and the wastewater response during wet weather periods from each meter location, it seems intuitive that the majority of I/I sources impacting the Chanhassen sanitary sewer collection system would be from private property sources. Wastewater flow responses during wet weather periods not only impacted during the event but remain elevated for several days following the event, which is a typical wastewater response influenced by I/I from private property sources.

Examples of the I/I response typically resulting from private property defects are indicated on many of the flow hydrographs presented in Appendix A. Most of the flow hydrographs from the flow meter locations in Sewer Districts 5 and 5A during wet weather events present a significant peak hour flow rate response at the beginning of the event but even after the rainfall ends the wastewater flow rates remain high for days following the event. Although other sources of I/I can contribute to the overall problem, the flow monitoring identified in this study does indicate a need for additional I/I investigation with a focus on private property sources of I/I.

4 Potential I/I Infrastructure Sources

The City of Chanhassen's sanitary sewer collection system serving residential, commercial and industrial clients consists of a collection system made up of both private property and public infrastructure. Less than forty (40) percent of a typical city sanitary sewer collection system is on public ROW. In the past, many communities have focused most of their financial resources investigating and conducting sewer repairs to remove I/I from the public infrastructure. Even though they account for the majority of the collection system, historically private property infrastructure has typically not been investigated as thoroughly. This is typically due to the difficulty in locating potential sources on private property and more importantly the investigation measures being more intrusive to property owners.

4.1 Public Infrastructure I/I

Public infrastructure I/I sources can include direct inflow connections to the sanitary sewer collection system from surface water or storm sewer drainage systems such as catch basins or area drains. Indirect inflow and infiltration contributors from cracks and leaking in manholes or mainline sewer piping can also impact public infrastructure. Since the City of Chanhassen has a separate storm sewer collection system which in the past has not been utilized for wastewater

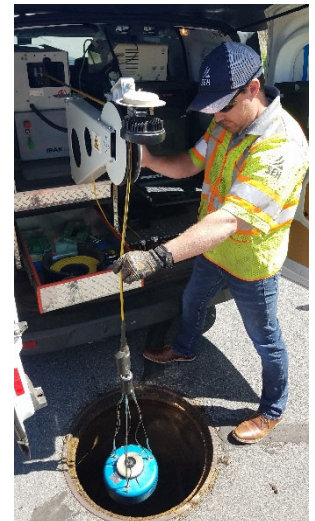
conveyance, the likelihood of a catch basin or area drain connection to the sanitary sewer system is remote. Other common inflow sources can be found through leaking pipe joints or cracks in the sanitary sewer collection system. Over the years, pipe lining and sewer repair projects have been successful in reducing I/I from the private infrastructure portions of the sanitary sewer collection system.

4.1.1 Current City Sanitary Sewer Programs

City staff has focused on the public sanitary sewer collection system by implementing manhole and pipe rehabilitation projects in areas with aging infrastructure. A number of lining projects have been completed over the years including an area in northeast area of the city (Sewer District 5). The sanitary sewer lining projects are selected based on closed circuit television (CCTV) inspection. Based on a structural condition assessment and an operation and maintenance assessment within each pipe segment, identified issues are selected for rehabilitation. In many cases, manhole condition assessments are included during the CCTV inspections and verified with a visual inspection of the manholes. City staff performs visual inspections on approximately one-third of the existing sanitary manholes annually.

4.1.2 Manhole Inspection

During installation of the flow meter equipment, a number of sanitary manholes were found to be leaking or have evidence of leaking through the discovery of mineral deposits on wall or bench sections of the structure. As part of our investigation, on October 1, 2019, eighteen (18) manholes were inspected using a manhole inspection camera manufactured by IBAK which provides a 360 degree scanned image of the interior of the structure. An illustration of this process has been included which identifies the equipment used to perform the manhole inspections completed under this investigation. The data obtained during the manhole inspection investigation has been included in Appendix B.



Typical IBAK Camera Manhole Inspection

Each manhole was inspected and evaluated under the National Association of Sewer Service Companies (NASSCO) Pipeline Assessment Certification Program (PACP) specific for manholes, in this case, Manhole Assessment Certification Program (MACP). The NASSCO program was used to standardize conditional assessment data for all inspections whether it is from sanitary sewer pipes or manholes. Because some of the City's and MCES sanitary manholes are located in easements or in areas with high groundwater, staff should plan on incorporating a manhole inspection program as part of their lining program to complete the sewer rehabilitation on the entire public infrastructure sanitary sewer collection system at the same time.

4.1.3 Future Public Infrastructure Programs

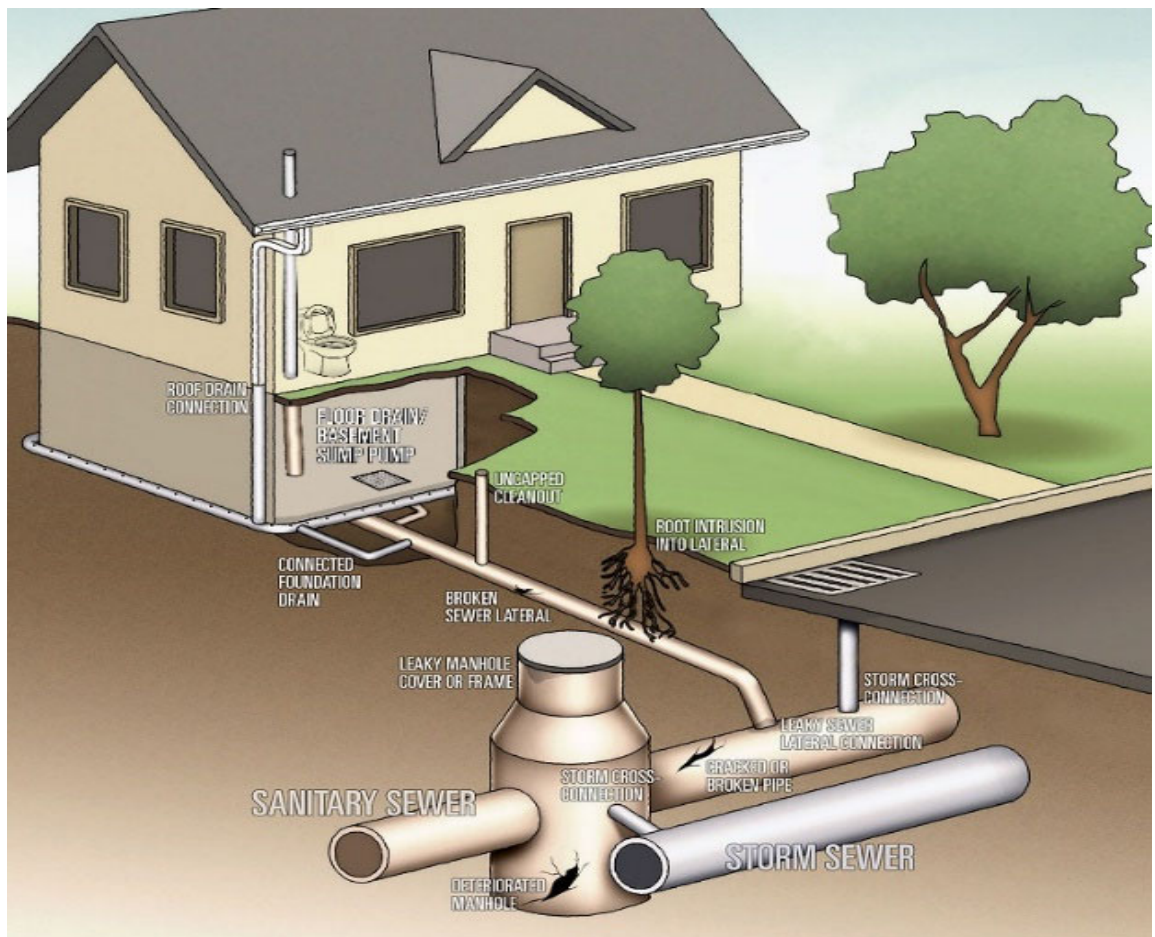
The City of Chanhassen needs to continue their sanitary sewer collection system maintenance program through a comprehensive CCTV and lining program. The program will help the City of Chanhassen to stay in front of aging infrastructure which frequently leads to future I/I issues. In order to incorporate a condition assessment program covering the entire public infrastructure, manhole inspections should be incorporated with the CCTV pipe inspection. Future sewer

rehabilitation can then include both the manhole and pipe repairs together. The City should consider implementing an asset inventory program to manage all the infrastructure data recorded during CCTV and manhole inspections utilizing GIS. The data can be used to track the sanitary and storm sewer collection system condition over time to help develop long term capital improvements.

Asset inventory and condition assessment for manholes is typically between \$100 and \$125 per manhole depending on the location and accessibility of the structure. City manholes located in easement or wetland areas and have the potential to be impacted by surface water ponding or in areas under high groundwater conditions. Targeting these areas for future inspection should be considered to reduce potential I/I through manholes during wet weather events.

4.2 Private Property I/I

Private property I/I sources can include improper sump pump connections, foundation drain connections, drainage to floor drains, roof leader downspouts, stairwell or area drains connected to the sanitary sewer lateral, damaged cleanouts subject to surface drainage and/or damaged sewer service laterals. An illustration identifying many of these possible I/I sources from residential and commercial private property is presented below.



Typical Private Property I/I Sources

Some or all of these potential I/I issues can be located through a variety of investigation and testing measures. There are a number of private property investigation (PPI) programs that can be implemented to locate specific sources. Many of these programs require access through the property owner's residence or business. A more recent investigation method that is being utilized is the investigation of the private service lateral from access within the public main line sewer. The following section reviews each private property measure for potential implementation by the City of Chanhassen.

4.2.1 Potential Investigative Options

Although there may be other investigation approaches, this study focuses on the three potential approaches to locating private property I/I sources which have been successfully implemented by other local area communities. The first two methods would require access to the owner's residence or business and the remaining measures can be performed without property access. Each investigation measure is reviewed in the next sections along with examples of where these methods have been successfully implemented by local communities in the Twin Cities area.

4.2.2 Sump Pump/Building Inspection

A building inspection is the least expensive PPI program but requires approval from the owner to enter the structure in order to complete the inspection. A trained field inspector reviews the exterior of the structure to verify that any surface water drainage connections such as roof leaders/drains or yard drains are not connected the building's sewer lateral. An inspection of the basement is completed to verify any potential sump pumps or basement surface water drainage features are properly discharged outside of the structure and are draining away from the building.

A successful sump pump or building inspection program relies on a well-designed public education program in order to be effective. Education of the public on the merits of the PPI program will increase owner cooperation and allow greater success and buy-in to the program. PPI programs with public education such as city web site articles, letters, community open houses, etc. are generally received with greater cooperation by the public. Public cooperation typically results in a higher success rate of getting a large percentage of completed inspections throughout the program area. The building inspection process can be completed in 20 to 30 minutes but information about the service lateral condition or the presence of sub-surface drainage pipe such as a foundation drain connection will not be located using this investigation measure.

As indicated in Section 2, the City of Chanhassen implemented a sump pump inspection program in the 1990's that was successful in locating a number of sump pump discharges improperly connected to the sanitary sewer. The current project team reviewed the records supplied by City staff on the previous sump pump program and according to City records almost all of the homes were brought into compliance with the current ordinance at the conclusion of the project. It is difficult to determine today if the all properties are still in compliance with the current sewer ordinance. Additionally, the inspection results do not account for all of the structures that have been constructed since the completion of the program.

A number of Twin Cities metro communities have been successful in effectively removing I/I by implementing a building inspection and sump pump disconnect program. The City of Eagan completed a sump pump program requiring the inspection of over 22,000 properties and were

able to reduce their peak I/I flow rates below the allowable peak hour flow rate established by the MCES. A similar program was successfully implemented in the City of Forest Lake as well.

The City of Minnetonka implemented a building inspection program along with a manhole rehabilitation program in order to reduce their I/I problem. To date, Minnetonka has been able to reduce their peak hour discharges by 15 to 20 percent. Portions of the city still remain above the allowable goal established under the MCES I/I program but the city continues to work towards the removal of I/I through the success they have had so far.

4.2.3 Service Lateral CCTV Inspection

A number of first ring cities such as Golden Valley and West St. Paul believe their issue is a combination of sump pump and foundation drain connections to the building sewer service lateral. In order to identify and locate foundation drain connections, a closed circuit television (CCTV) camera is pushed through the building stack cleanout, typically at the basement level, out to the main sewer connection in the public ROW. A CCTV camera technician is able to not only inspect the building but perform a condition assessment of the sewer service lateral to check for improper connections. Additionally, the camera technician is able to check each connection by running water from inside the building to verify it is properly plumbed to the sanitary sewer.

Typically, a PPI program involving a full service lateral inspection can be more difficult to get public support for and usually requires a robust public education program and a strong sewer ordinance for enforcement. Without the proper ordinance, typically less than thirty (30) percent of the property owners agree to allow the inspection to happen under a voluntary program. Other problems in completing a successful inspection can include the lack of access to the lateral or obstructions within the pipe caused by roots or structural pipe failures.

The City of Columbia Heights is presently completing a service lateral inspection project but only on a voluntary basis. The City is using the information gained in the current PPI program to help establish direction for a more comprehensive program which will involve modifications to their existing sewer ordinance for more enforcement. To date, they have only been able to only get into about thirty-five (35) percent of the private properties. More communities have had success implementing a point of sale (POS) inspection program which after updating their sewer ordinance allows the city to perform the service lateral inspection anytime the property changes ownership. The only problem with this program is that it only addresses the properties that change ownership. If the City has a low home turnover rate, it may take too long to effectively remove PPI I/I sources.

The City of Golden Valley has significantly reduced their I/I contributions by implementing a point of sale private property service lateral inspection program. In 2008, the City of Golden Valley implemented a mandatory point of sale program and has inspected more than 6,000 buildings over the past eleven years. A similar program was implemented by the City of West St. Paul within the last five years. West St. Paul started with a voluntary service lateral inspection program but after continuing to exceed their peak hour allowable limits set by the MCES, they expanded their program to a mandatory program with a goal of inspecting 1,400 properties each year. The number of inspections was reduced to approximately 500 private property service laterals every year which they negotiated as part of their work plan with the MCES.

4.2.4 Mainline Launch CCTV Inspection

Recently, advances in technology with sewer inspection and rehabilitation equipment have made it possible to inspect a service lateral by launching the CCTV camera from the City's sanitary sewer mainline connection located in the public right of way. The CCTV camera is attached to a crawler situated in the mainline pipe and positioned at the mainline service tap or wye where the camera is then launched up into the service lateral. Depending on the inspection system, the camera can inspect up to 300 feet of service lateral extending up to the building foundation. Typical service laterals range from 80 to 120 feet.

The mainline inspection approach is a less intrusive process and eliminates the possible inconvenience to the property owner during the testing. The mainline launch approach eliminates the need to enter the structure unless the service lateral has an obstruction which reduces access for the full inspection from the service lateral. This method does not allow access past the building foundation, reducing the possibility of finding improper sump pump or foundation drain connections.

At the completion of the inspection portion of the program, rehabilitation efforts can also extend from the main line all the way up to through the service lateral to the building foundation or transition (clay to cast iron) pipe serving the residential or commercial property. All of the investigation and sewer rehabilitation can be completed with limited impact to the property owner during the entire process. Again, the disadvantage is the lack of potential inspection within the building site where other potential I/I sources could exist.

Even though this PPI program approach can be completed without accessing the home or needing a homeowner to be present, the City may still need to consider how to properly handle the liability of inspecting a private infrastructure without prior authorization from the homeowner. The reality is that no matter how the PPI program is implemented, the property owner's approval will be necessary.

The City of Saint Paul and the MCES, under a three year grant program offered by the MCES, are currently performing a private property pilot project on a small residential area on the West Side of the city. The City of Saint Paul has implemented a flow monitoring and private property inspection program designed to determine the most effective and efficient methods to reduce private property I/I within the pilot area. The flow monitoring program will be used to monitor the effect of implemented private sewer lateral rehabilitation measures once completed. The city started with a voluntary CCTV sewer lateral inspection program originating at the property stack cleanout inside each building which only provided successful inspections in approximately thirty (30) percent of the residential properties. The remaining properties (approximately 70%) were inspected using a mainline launch CCTV camera which increased the percentage of successful inspection to over ninety-five (95) percent.

At this time, the City of Saint Paul is reviewing the data collected during the inspection process and evaluating options for sewer lateral rehabilitation. The repair work will be implemented in 2020 with additional flow monitoring in 2021 to evaluate the impact of I/I reduction.

5 Private Property Program Options

A number of investigative programs have been implemented by communities to identify and remove I/I located on private property. They include the following:

- Voluntary Residential Inspections
- Mandatory Residential and Commercial Inspections
- Point of Sale
- Pilot Studies

Each of these programs have been implemented with various degrees of success depending upon which PPI program method was implemented and the strength of the enforcement language in the sewer ordinance supporting the PPI program. Any of the PPI investigation methods listed above could be implemented in conjunction with a street reconstruction or infrastructure improvement project.

5.1 Voluntary Residential Inspections

Program development based on a voluntary inspection approach by the public are generally the easiest to implement because residents are in control of their response to the issue. They are not required to take action to the City's program request. This program has the least potential for success on a wide scale and typically results in less than thirty (30) percent inspection success. An effective public notification process can potentially increase the success of a voluntary private property program and the number of successful inspections

5.2 Mandatory Residential and Commercial Inspections

Mandatory inspection programs can be more effective but are generally more difficult to implement because a sewer ordinance is required to enforce property owner action to comply with any city request. This program has the highest potential for inspecting all of the target properties but the difficult part is getting public acceptance and the proper ordinances in place to enforce the program. The first key to implementation of this program is an effective public involvement campaign to educate the public on the overall benefits of the program. Public education would consist of articles on the community website, newsletters and public forums to discuss the benefits of the program.

Updating the sewer ordinance would be the next step for implementing a mandatory inspection program. Additions to the sewer ordinance would include requirements for the inspection, results for non-compliance, requirements for repairs, and schedules for compliance. Updating a sewer ordinance will depend on the type of inspection program conducted by the City of Chanhasen.

5.3 Point of Sale Inspection Program

Private property inspections based on a point of sale (POS) program are also mandatory in that they are typically required by the city at the change of ownership from any property owner. Any real estate transaction would require a permit and subsequent inspection issued by the city in order to demonstrate the building's service lateral is not contributing I/I to the city's sanitary sewer collection system.

This program would also require specific language in the sewer ordinance to support the POS program. If any service lateral defects were identified during the inspection, the current property

owner would either need to repair any issue or put the money in escrow so future corrections could be funded by the new property owner. The success of this program is dictated by each City's turnover rate the real estate market and can be coupled with a voluntary or mandatory programs focused on smaller areas of the city.

5.4 Additional Program Options

There are a number of communities locally and nationally which have adopted private property programs in coordination with their street reconstruction programs. Typically, sanitary sewer inspection (CCTV) is completed before any street reconstruction is implemented in order to evaluate all of the infrastructure in the project area to ensure all necessary repairs can be completed at the same time. By incorporating private property service lateral inspection as part of the street reconstruction program, cost can be reduced to repair the private infrastructure and can result in more homeowner buy-in.

Another private property program with a more focused approach is through a pilot study designed to specifically address I/I. Municipalities through initial I/I investigation measures, such as flow monitoring, first locate areas with I/I potential and then complete a private property inspection on all the buildings in the respective area. After repairs are completed, additional flow monitoring determines the effectiveness of the program. Again, this program would need an effective public information process and the proper sewer ordinance to help enforce the program. This program approach is similar to Saint Paul pilot project with the Metropolitan Council grant listed in Section 4.2.4 of this report.

6 Sewer Ordinance Requirements

As stated earlier, determining the private property program that best fits the communities need and can be implemented by private residences and business is the first step. Once the program requirements are determined the following items will need to be addressed to develop an effective sewer ordinance

- Identify the properties in the ordinance impacted by the changes.
- The type of inspection and/or procedures necessary to meet sewer ordinance requirements.
- Identify any permits and/or fees for the inspection required by the city.
- Identify all compliance penalties for non-compliance of the ordinance.
- Identify repair work time lines for completion and ordinance compliance.

Working with city staff and legal authorities is generally needed in order to develop the proper enforceable sewer ordinance. A public education program during the drafting and implementation of the revised ordinance is a key to helping property owners understand why I/I is an important issue and how it directly impacts them and the community.

6.1.1 Private Property Inspection Education

An effective education program will help establish the political will to insure property owner compliance. Property owner acceptance is often an issue with elected officials and city staff who have to approve of the private property investigation (PPI) program. Community education and public outreach can educate everyone on the costs and benefits of implementation of a PPI

program. Some of the methods which can be used to educate the public can include the following:

- Articles posted on the community website
- Community flyers or public mailings to introduce I/I information
- Public meetings to introduce PPI programs
- Public school education – introduction to I/I and how is it important
- Develop frequently asked questions (FAQ) flyers and post on web-site or use community flyers

The most effective education programs are ones that use multiple methods to get information to the public. The Metropolitan Council through their website has information posted on I/I which can be linked to local community sites to help with the education process. In addition, there are many examples available through collaborating with other communities to identify effective I/I educational materials.

6.1.2 Potential PPI Program Costs

Private property program costs vary depending on the type of adopted measures implemented by communities. A building inspection program including the public notification process can range from \$50 to \$75 per building for residential property based on the cost of contracting the service with a private consultant or contractor. A commercial property inspection can range up to four times that amount depending on the number of buildings and size of property. A service lateral CCTV inspection with prior public notification is typically \$300 per residential property with commercial properties again ranging up to four times that amount depending on the number of buildings and size of the property. Inspection costs on a service lateral completed through a main lateral launch program are typically the same amount.

Private property repairs associated with I/I defects can vary depending on the type of repair which can include sump pump and foundation drain disconnects from sanitary sewer laterals, service lateral repairs such as broken cleanouts and/or piping and leaking offset pipe joints. Sump pump disconnects are generally the lowest cost for repair at less than \$500 per property while service lateral lining or replacement costs can range from \$6,000 to \$10,000 depending on the length of lateral and method used to repair or replace the service lateral. Depending on how the PPI program is developed, individual private property owners may be required to share the cost burden of repair to repair their portion of the sanitary sewer collection system.

7 Future Program Recommendations

Based on the results of this investigation, SEH recommends the City enhance their current inflow and infiltration program efforts under their current public infrastructure objectives and by implementing a private property inspection and repair program. The following sections identify measures to be added to complement existing public infrastructure investigations and the development of a new private property program in an effort to reduce peak I/I rates during wet weather conditions

7.1 Public Infrastructure Program

For the public infrastructure portion of the sanitary sewer collection system, the City should continue their CCTV program and identify lining projects in areas where pipe conditions indicate

a need for repair. We would recommend focusing any sanitary sewer project recommendations on the areas identified in Figure 5 (Sewer Districts 5, 5A, 7 and 7A). Each of these sewer districts exhibited the highest peak inflow rates during wet weather periods through the flow monitoring program in 2019.

In addition, we would recommend upgrading the current manhole inspection program using an IBAK camera as part of any sewer lining project and in any of the areas with the largest potential for I/I contribution (Sewer Districts 5, 5A, 7 and 7A). The advantage of using the IBAK camera instead of a visual inspection approach is that it will provide a visual documentation method for asset management with GIS integration to help develop future capital infrastructure improvement projects.

Up to 300 manholes would be identified for inspection each year based on location (low ponding or high groundwater areas which are typically impacted by I/I). A condition assessment rating for both structural and operation & maintenance condition would be completed on each manhole inspected to determine if any future repair measures are required. I/I defects (operation & maintenance issues) would be identified as a priority for manhole repair.

During the flow monitoring, Sewer District 5-3 produced the highest increases in wastewater flows during wet weather events. The peak rates only lasted for as long as the rainfall period lasted which is typical response when the I/I is being contributed by a direct source. The flow data did indicate a possible industrial discharge source that could contribute to the peaks which may require further investigation. Our recommendation in this area would be to conduct a smoke testing investigation to determine if any direct source of inflow is discharging into the sanitary sewer if the flows cannot be fully attributed to an industrial source.

7.2 Private Property Program

Implementing a successful PPI program is a difficult task which may need to be addressed with a couple of options. Our recommendation would be to implement a program which first educates the public on the need to address the I/I issue and its importance to the community. A PPI program starts with public education through methods discussed in Section 6.6.1.

The next step would be to target the areas in the problem districts, where the flow monitoring indicated the highest I/I concentration during wet weather events (Sewer Districts 5-2, 5-4, 5A-2 and 5A-3). We would recommend performing service lateral inspections on individual residential properties either through a voluntary program or revising the sewer ordinance to incorporate the proper language for the enforcement of mandatory inspections. Using a voluntary inspection approach, additional information could be obtained to help identify the specific I/I problems and the scope of the problems. This information could be helpful in drafting sewer ordinance revisions tailored to the type of PPI program approach initiated by the City of Chanhassen.

The PPI program we would recommend includes a CCTV inspection through the stack cleanouts inside each building with a push style camera. The entire building service lateral would be televised noting any issues or potential I/I defects. As stated earlier in this report, approximately thirty (30) percent of residents during voluntary programs allow the inspection to be initiated. The PPI program may need to include a lateral launch inspection from the main lateral to complete all the inspections in the area. The addition of the lateral launch inspection method would increase the inspection success.

We would recommend adopting a point of sale program. During the sale of property, the owner would need a permit by the City to verify it was in compliance with the sewer ordinance. Any improper sewer lateral connections or defects would either need to be repaired prior to sale or escrow funds for any repairs would need to be established for the future owner. Any revisions to the existing sewer ordinance would require enforcement language mandating an inspection permit complying with the sewer ordinance for any property sold within the City of Chanhassen to support the point of sale (POS) program.

We would also recommend prioritizing I/I defects which can have the greatest impact on the MCES I/I program policy. Direct connections to the sanitary sewer such as those related to sump pump discharges or foundation drain connections should be the ones removed first because they contribute a rapid I/I response as part of the initial peak hour flow rate and typically deliver the initial I/I response of the private property defects.

7.3 PPI Program Summary

This section provides an overall summary of our recommendations for locating and removing I/I from the Chanhassen sanitary sewer collection system. The actions proposed are designed to provide future direction for the City to maintain their infrastructure and manage their I/I based on MCES requirements for wastewater discharge into the regional interceptors. The following steps are recommended based on the findings of the initial investigation and identify actions to be implemented to address both the public and private portions of the Chanhassen sanitary sewer collection system.

1. Target future CCTV and sewer lining projects on Sewer Districts 5, 5A, 7 and 7A.
2. Incorporate a manhole inspection program into the sewer lining program and in flooding and high groundwater areas.
3. Conduct a smoke testing investigation in Sewer District 5-3.
4. Implement a public education program to educate residents about I/I, current impact on the City's infrastructure and what can be done to successfully manage it.
5. Implement a PPI program which will either be voluntary or mandatory. A mandatory program will require a review and update of the current city sewer ordinance.
6. Continue to review and revise the sewer ordinance as needed in order to provide the proper enforcement language to conduct and gain compliance for any adopted inspection programs.
7. Perform private property inspections which include a service lateral CCTV inspection from the property's stack cleanout to the City's main sanitary sewer lateral. Complete the inspections in Sewer Districts 5-2, 5-4, 5A-2 and 5A-3 first.
8. Update the sewer ordinance to allow for implementation of a POS program.

The estimate cost of the program will depend on whether a voluntary or mandatory program is initiated. Table 5 on the next page details the costs based on a mandatory program implemented in the recommended sewer districts.

Table 5 – Table 5 - Program Cost Summary

CCTV/Sewer Lining Projects	\$80,000
Manhole Inspection Program	\$37,500
Smoke Testing Investigation	\$12,000
Public Education	\$3,000
Private Property Sewer Lateral Inspections	\$273,000
Sewer Ordinance Revisions	\$10,000

The cost of the private property sewer lateral inspections have been estimated based on the four recommended sewer districts below to begin the program and the number of developed parcels identified in Table 1. The sewer lateral inspection costs listed in Table 5 breakdown as follows:

- Sewer District 5-2 \$22,000
- Sewer District 5-3 \$46,000
- Sewer District 5A-2 \$149,000
- Sewer District 5A-3 \$56,000

The sewer repair costs will depend on the types of problems uncovered as a result of the private property inspections. Since limited grant funds are available currently to fund these programs, the repairs generally are paid by the property owners. The initial inspection can either be paid by the City of Chanhassen or included as a permit fee at the time of inspection. Other communities have paid the initial inspection fee but required the property owner to incur the remaining costs of the repairs.

Figures

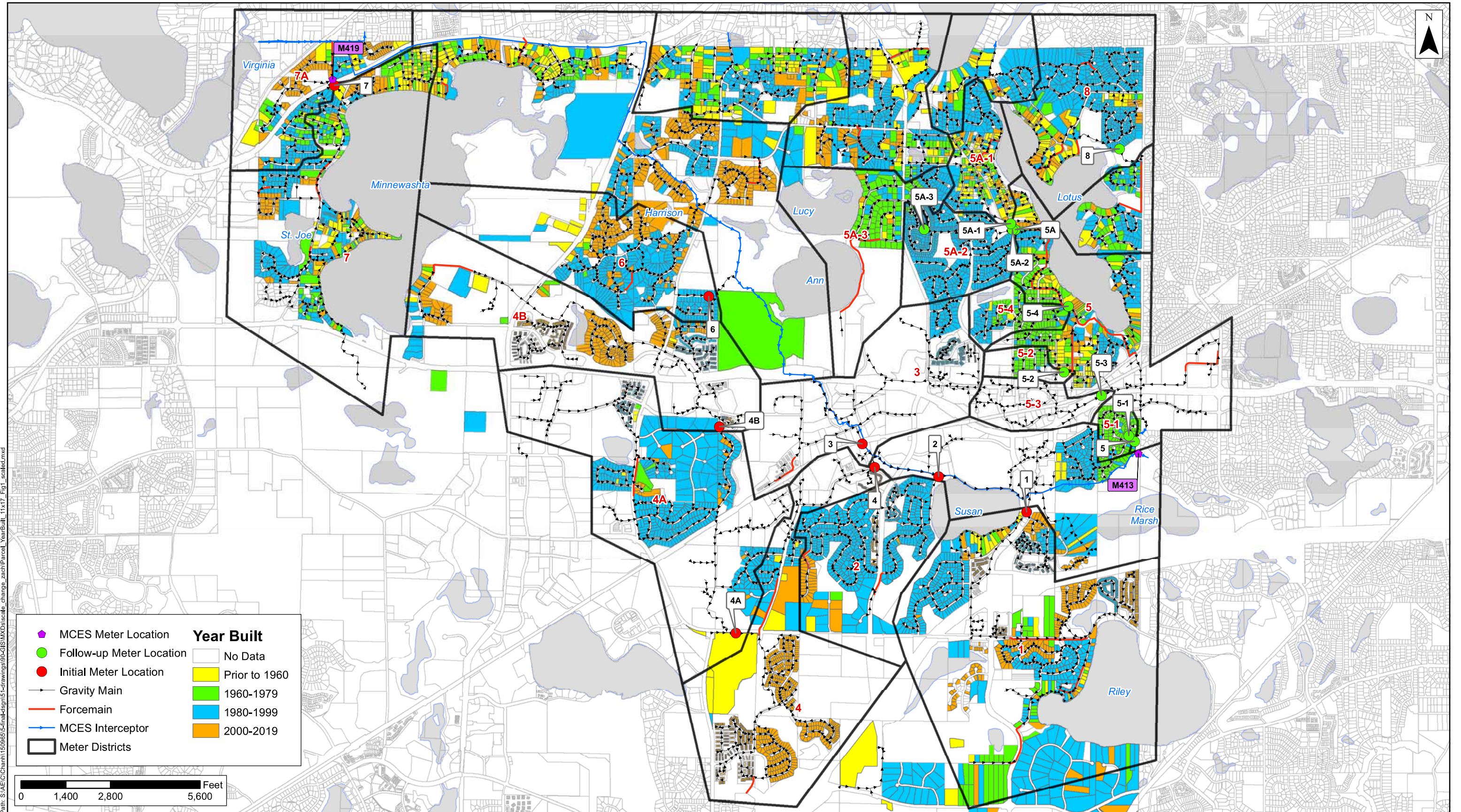
Figure 1 – Parcel Development (Sanitary Sewer Construction)

Figure 2 – May 27, 2019 Wet Weather Event

Figure 3 – Follow-up Flow Meter Location

Figure 4 – September 12, 2019 Wet Weather Event

Figure 5 – Future I/I Investigation Area



Path: S:\AE\C\Chan150965-5-final\design\15-drawings\90-915-MXD\scale_change_zach\Parcel_YearBuilt_11x17_Fig1_scaled.mxd



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

Project: CHANH 150965
Print Date: 12/16/2019

User Name: zborich
Projection: NAD 1983 UTM Zone 15N
Source:

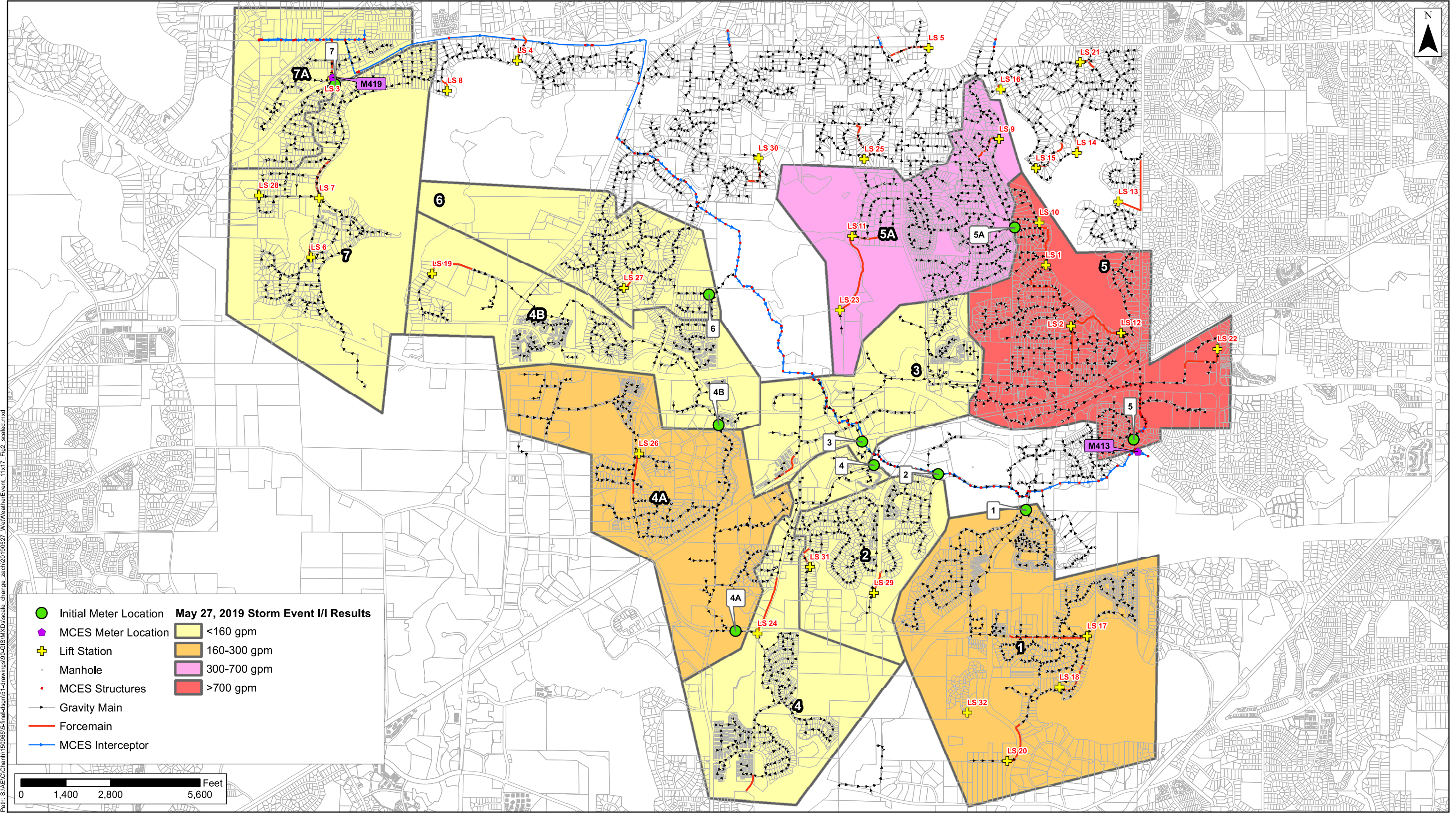
CHANHASSEN FLOW MONITORING

Parcel Development (Sanitary Sewer Construction)

City of Chanhasen, MN

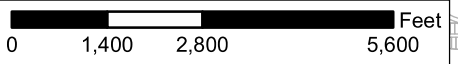
Figure
1

This map is neither a legally recorded map nor a survey map and is not intended to be used as one. This map is a compilation of records, information, and data gathered from various sources listed on this map and is to be used for reference purposes only. SEH does not warrant that the Geographic Information System (GIS) Data used to prepare this map are error free, and SEH does not represent that the GIS Data can be used for navigational, tracking, or any other purpose requiring exacting measurement of distance or direction or precision in the depiction of geographic features. The user of this map acknowledges that SEH shall not be liable for any damages which arise out of the user's access or use of data provided.



Path: S:\AE\C\Chan150965\5-final\design\15-drawings\90-03\15-MXD\scale_change_zach20190527_WeWeatherEvent_11x17_Fig_2_scaled.mxd

	Initial Meter Location	May 27, 2019 Storm Event I/I Results	
	MCES Meter Location		
	Lift Station		
	Manhole		
	MCES Structures		
	Gravity Main		<160 gpm
	Forcemain		160-300 gpm
	MCES Interceptor		300-700 gpm
			>700 gpm



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

Project: CHANH 150965
Print Date: 12/16/2019

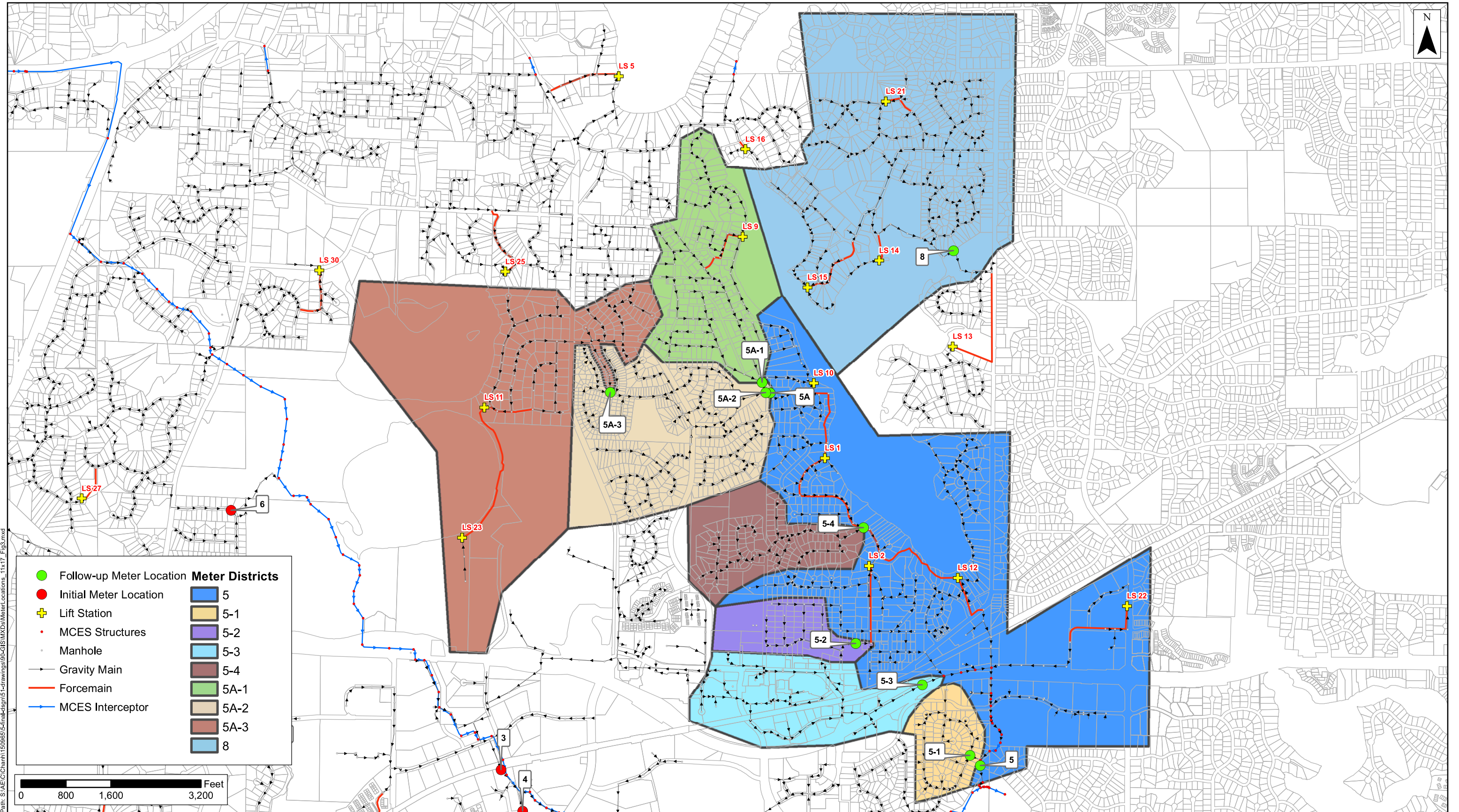
User Name: zborich
Projection: NAD 1983 UTM Zone 15N
Source:

CHANHASSEN FLOW MONITORING

May 27, 2019 Wet Weather Event
City of Chanhassen, MN

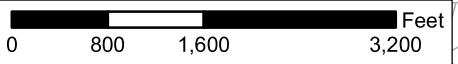
Figure
2

This map is neither a legally recorded map nor a survey map and is not intended to be used as one. This map is a compilation of records, information, and data gathered from various sources listed on this map and is to be used for reference purposes only. SEH does not warrant that the Geographic Information System (GIS) Data used to prepare this map are error free, and SEH does not represent that the GIS Data can be used for navigational, tracking, or any other purpose requiring exacting measurement of distance or direction or precision in the depiction of geographic features. The user of this map acknowledges that SEH shall not be liable for any damages which arise out of the user's access or use of data provided.



Path: S:\AE\C\Chanhasen\150965-5-final\design\15-drawings\15-MXD\15-MeterLocations_11x17_Fig3.mxd

● Follow-up Meter Location	Meter Districts
● Initial Meter Location	 5
+ Lift Station	 5-1
● MCES Structures	 5-2
● Manhole	 5-3
— Gravity Main	 5-4
— Forcemain	 5A-1
— MCES Interceptor	 5A-2
	 5A-3
	 8



Project: CHANH 150965
 Print Date: 12/13/2019

User Name: losowski
 Projection: NAD 1983 UTM Zone 15N
 Source:

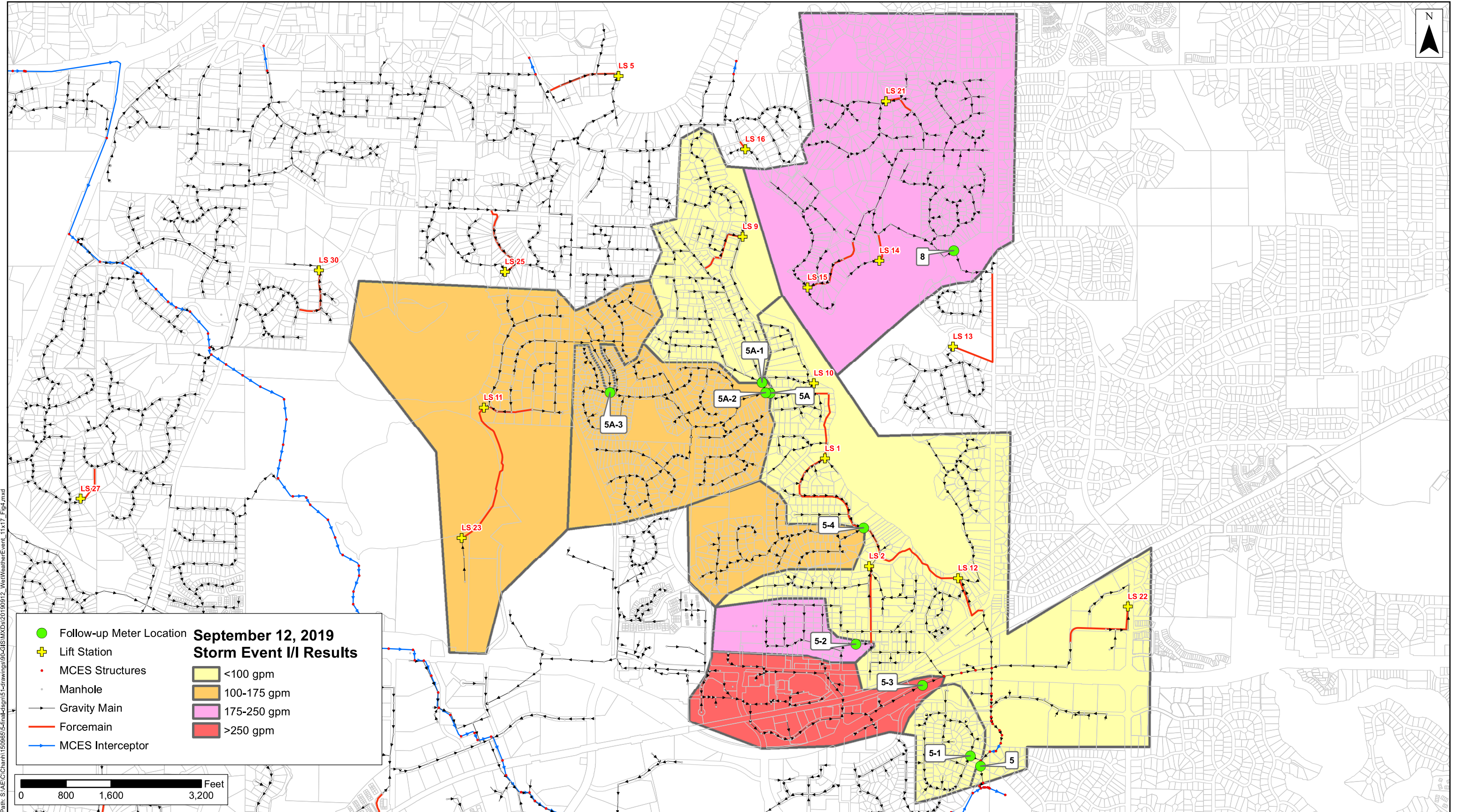
3535 VADNAIS CENTER DR.
 ST. PAUL, MN 55110
 PHONE: (651) 490-2000
 FAX: (888) 908-8166
 TF: (800) 325-2055
 www.sehinc.com

CHANHASSEN FLOW MONITORING

Follow-up Flow Meter Locations City of Chanhasen, MN

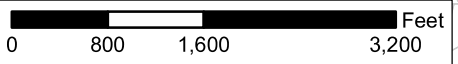
Figure
3

This map is neither a legally recorded map nor a survey map and is not intended to be used as one. This map is a compilation of records, information, and data gathered from various sources listed on this map and is to be used for reference purposes only. SEH does not warrant that the Geographic Information System (GIS) Data used to prepare this map are error free, and SEH does not represent that the GIS Data can be used for navigational, tracking, or any other purpose requiring exacting measurement of distance or direction or precision in the depiction of geographic features. The user of this map acknowledges that SEH shall not be liable for any damages which arise out of the user's access or use of data provided.



Path: S:\AE\C\Chanhassen\150965-5-final\design\15-drawings\15-01-01\15-01-01-1x17-Fig4.mxd

Follow-up Meter Location	September 12, 2019 Storm Event I/I Results
Lift Station	
MCES Structures	<100 gpm
Manhole	100-175 gpm
Gravity Main	175-250 gpm
Forcemain	>250 gpm
MCES Interceptor	



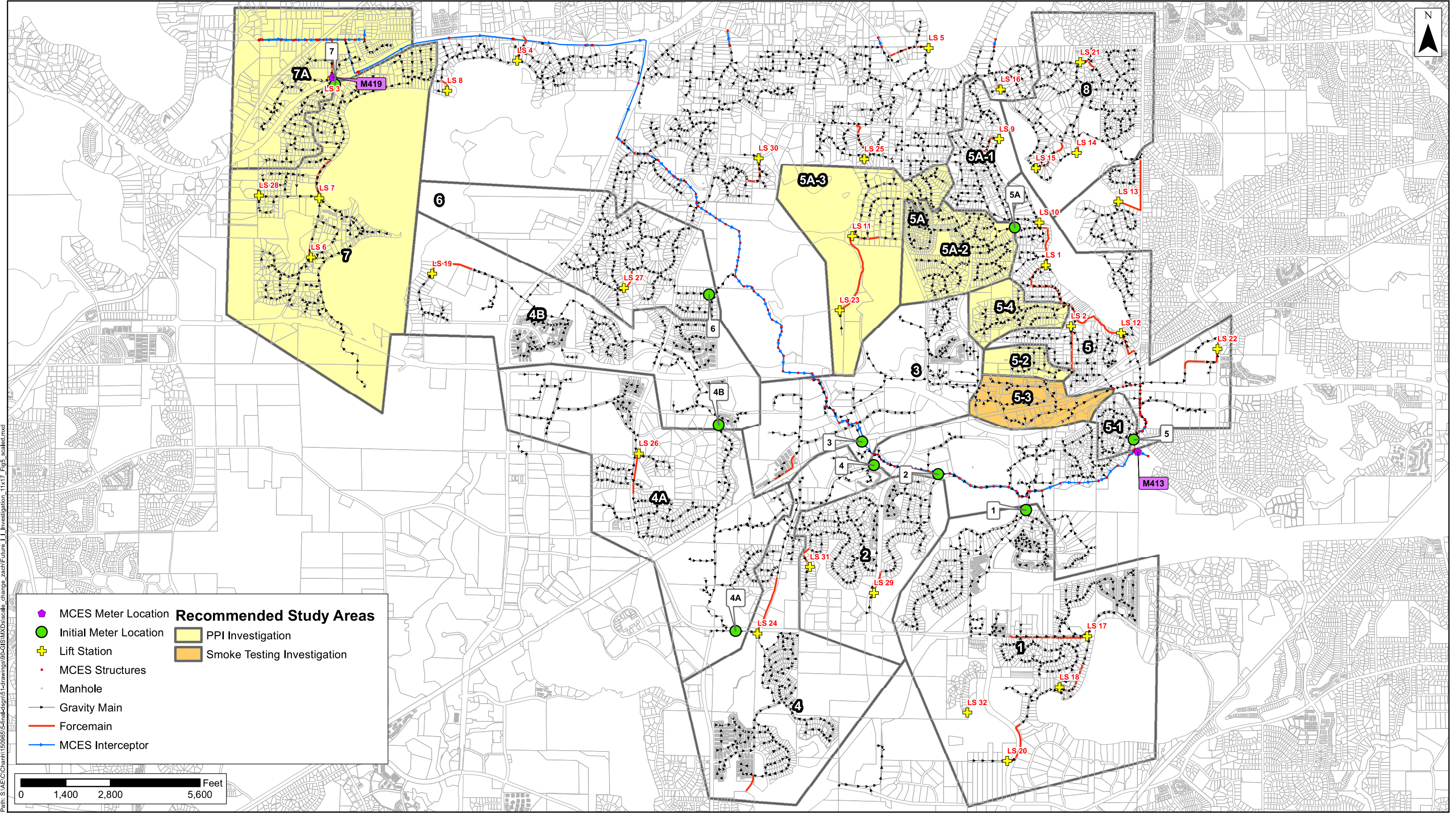
3535 VADNAIS CENTER DR.
ST. PAUL, MN 55110
PHONE: (651) 490-2000
FAX: (888) 908-8166
TF: (800) 325-2055
www.sehinc.com

Project: CHANH 150965
Print Date: 10/10/2019
User Name: losowski
Projection: NAD 1983 UTM Zone 15N
Source:

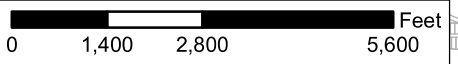
CHANHASSEN FLOW MONITORING
September 12, 2019 Wet Weather Event
City of Chanhassen, MN

Figure
4

This map is neither a legally recorded map nor a survey map and is not intended to be used as one. This map is a compilation of records, information, and data gathered from various sources listed on this map and is to be used for reference purposes only. SEH does not warrant that the Geographic Information System (GIS) Data used to prepare this map are error free, and SEH does not represent that the GIS Data can be used for navigational, tracking, or any other purpose requiring exacting measurement of distance or direction or precision in the depiction of geographic features. The user of this map acknowledges that SEH shall not be liable for any damages which arise out of the user's access or use of data provided.



<ul style="list-style-type: none"> ◆ MCES Meter Location ● Initial Meter Location + Lift Station ● MCES Structures ● Manhole — Gravity Main — Forcemain — MCES Interceptor 	<p>Recommended Study Areas</p> <ul style="list-style-type: none"> PPI Investigation Smoke Testing Investigation
--	--



Path: S:\AE\C\Chan150965\5-final\design\15-drawings\90-01\15-drawings\11x17_Figs_scaled.mxd



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

Project: CHANH 150965
Print Date: 12/16/2019

User Name: zborich
Projection: NAD 1983 UTM Zone 15N
Source:

CHANHASSEN FLOW MONITORING

Future I/I Investigation Area
City of Chanhassen, MN

Figure
5

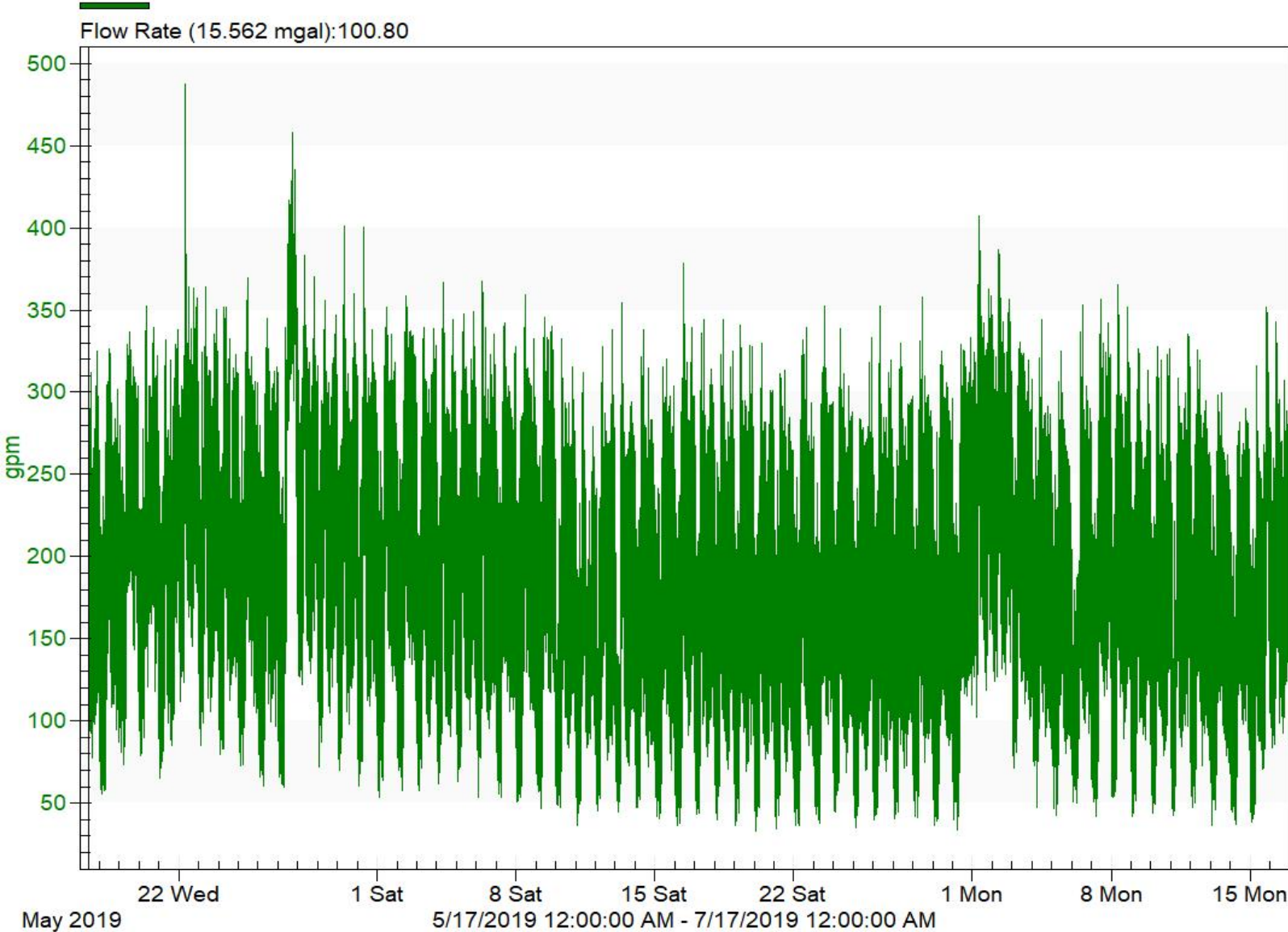
This map is neither a legally recorded map nor a survey map and is not intended to be used as one. This map is a compilation of records, information, and data gathered from various sources listed on this map and is to be used for reference purposes only. SEH does not warrant that the Geographic Information System (GIS) Data used to prepare this map are error free, and SEH does not represent that the GIS Data can be used for navigational, tracking, or any other purpose requiring exacting measurement of distance or direction or precision in the depiction of geographic features. The user of this map acknowledges that SEH shall not be liable for any damages which arise out of the user's access or use of data provided.

Appendix A

Flow Meter Data

Flow Meter Location M1 (Great Plains Boulevard just north of Mission Hills Lane)

City of Chanhassen, Minnesota

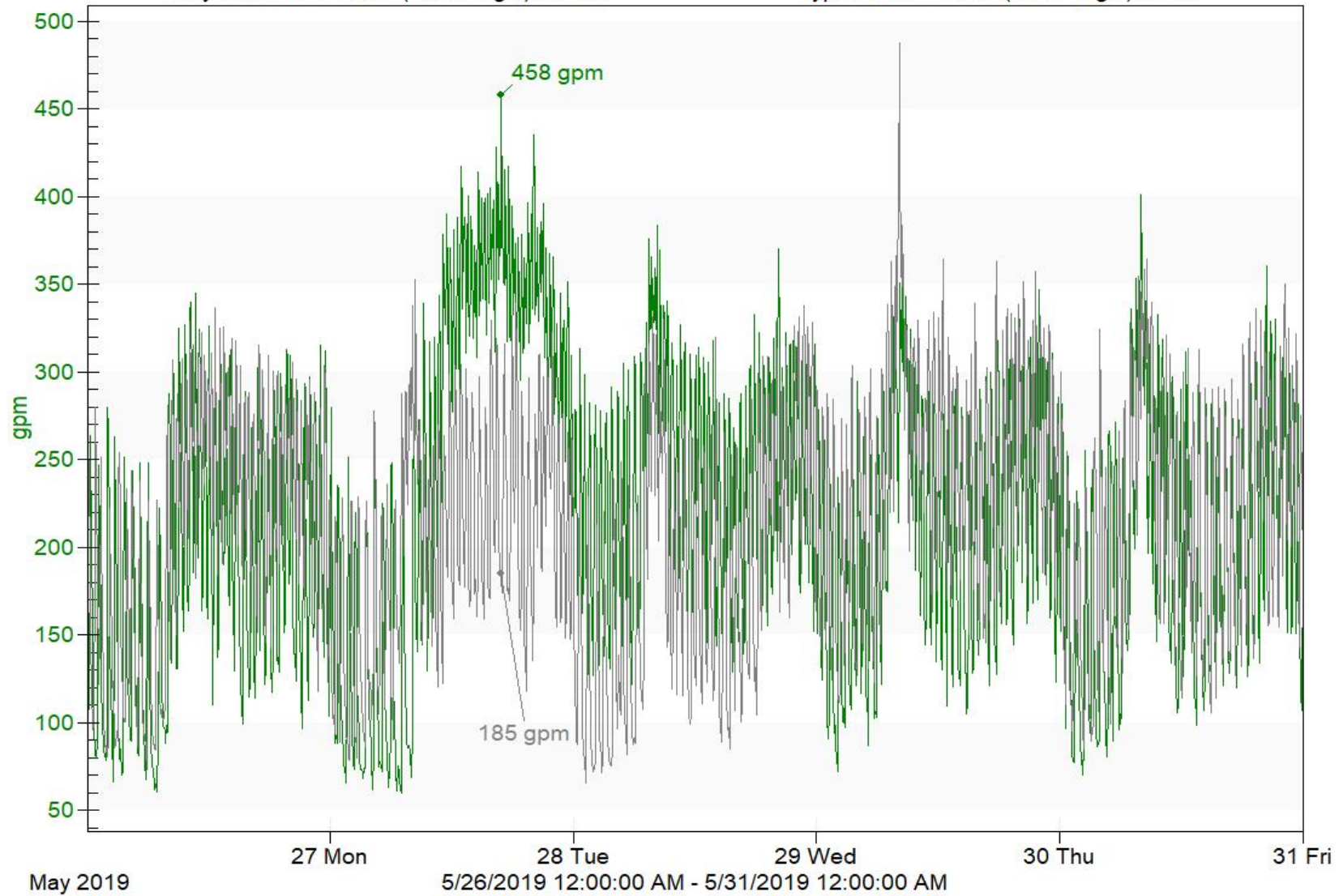


Flow Meter Location M1 (Great Plains Boulevard just north of Mission Hills Lane)

City of Chanhassen, Minnesota

May 27th WWF Event (1.582 mgal):121.11

Typical DWF Week (1.537 mgal):98.73

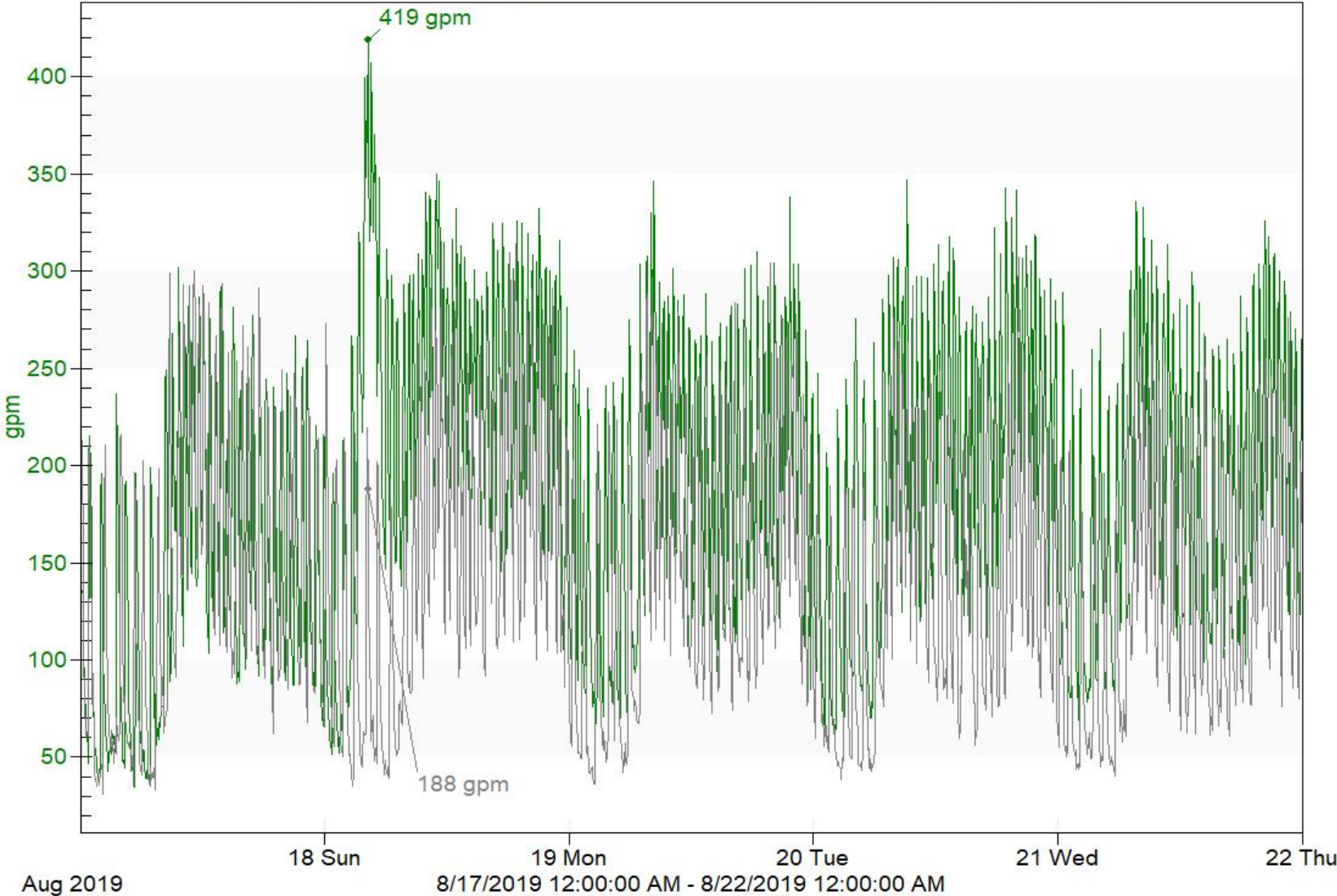


Flow Meter Location M1 (Great Plains Boulevard just north of Mission Hills Lane)

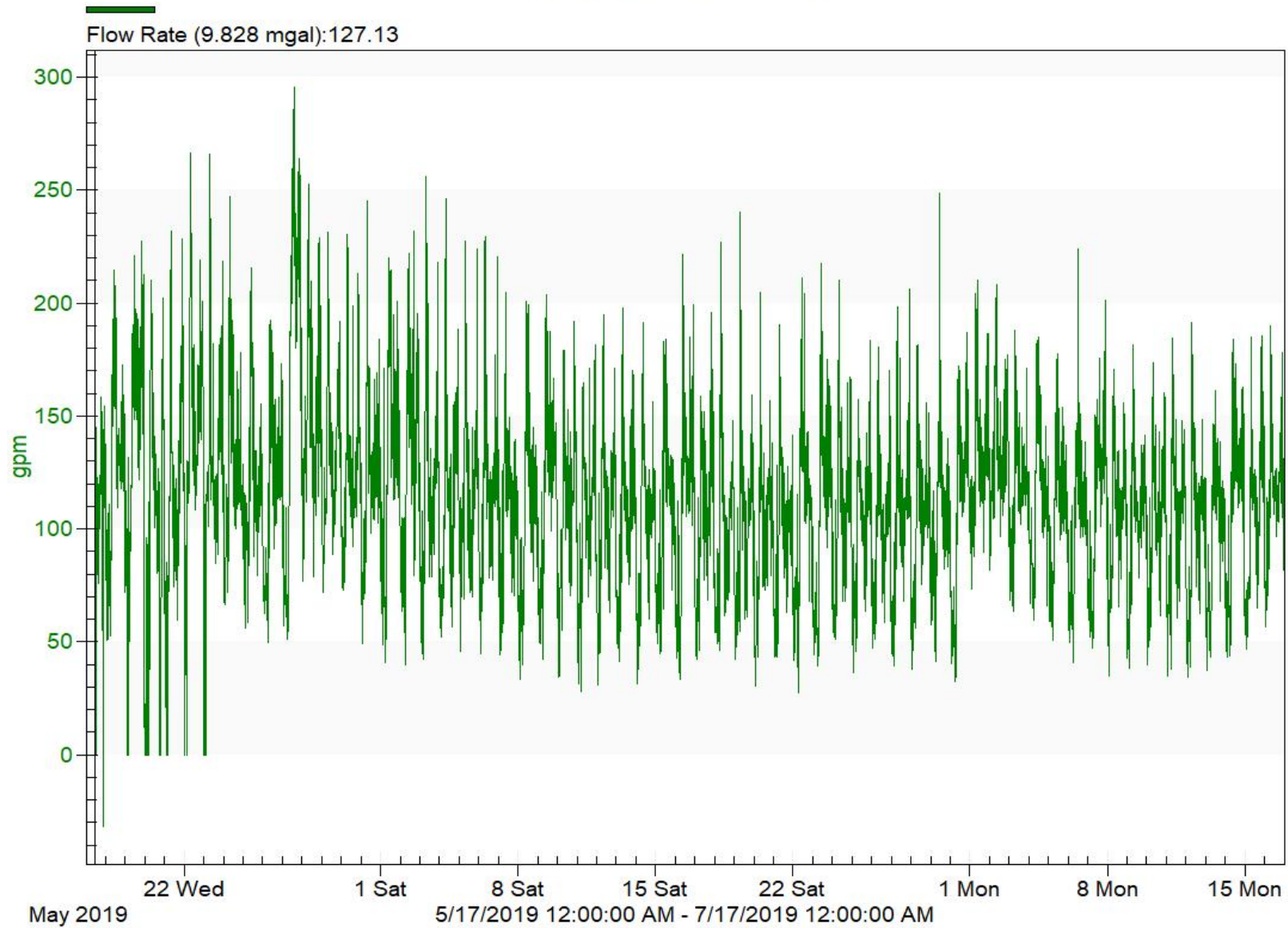
City of Chanhassen, Minnesota

Aug 18th WWF Event (1.364 mgal):172.54

Typical DWF Week (1.025 mgal):107.64



Flow Meter Location M2 (Lake Susan Park, South of Lake Drive E) City of Chanhassen, Minnesota

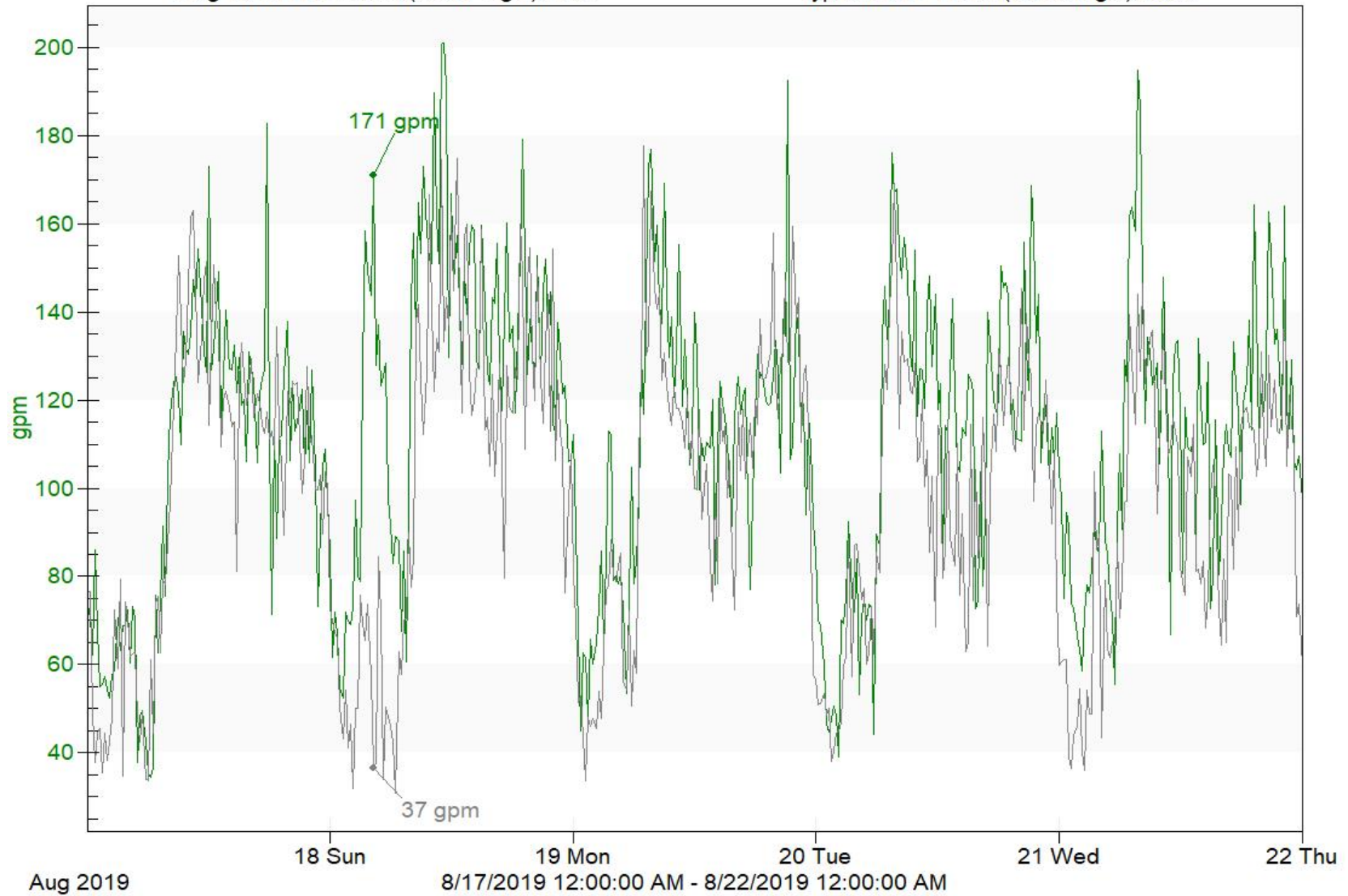


Flow Meter Location M2 (Lake Susan Park, South of Lake Drive E)

City of Chanhassen, Minnesota

Aug 18th WWF Event (0.811 mgal):73.37

Typical DWF Week (0.715 mgal):76.62

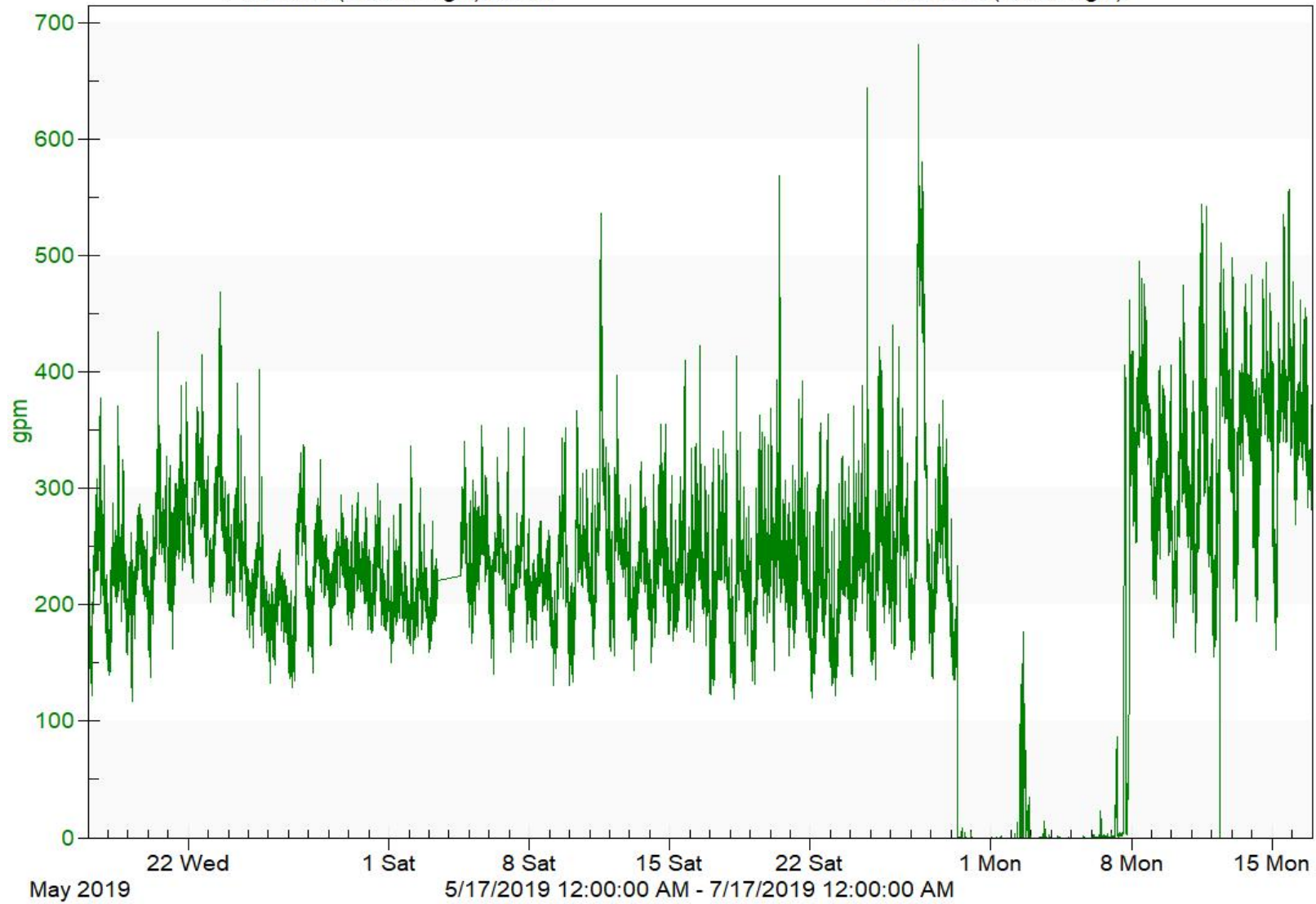


Flow Meter Location M3 (South of Park Road near Mallory Court)

City of Chanhassen, Minnesota

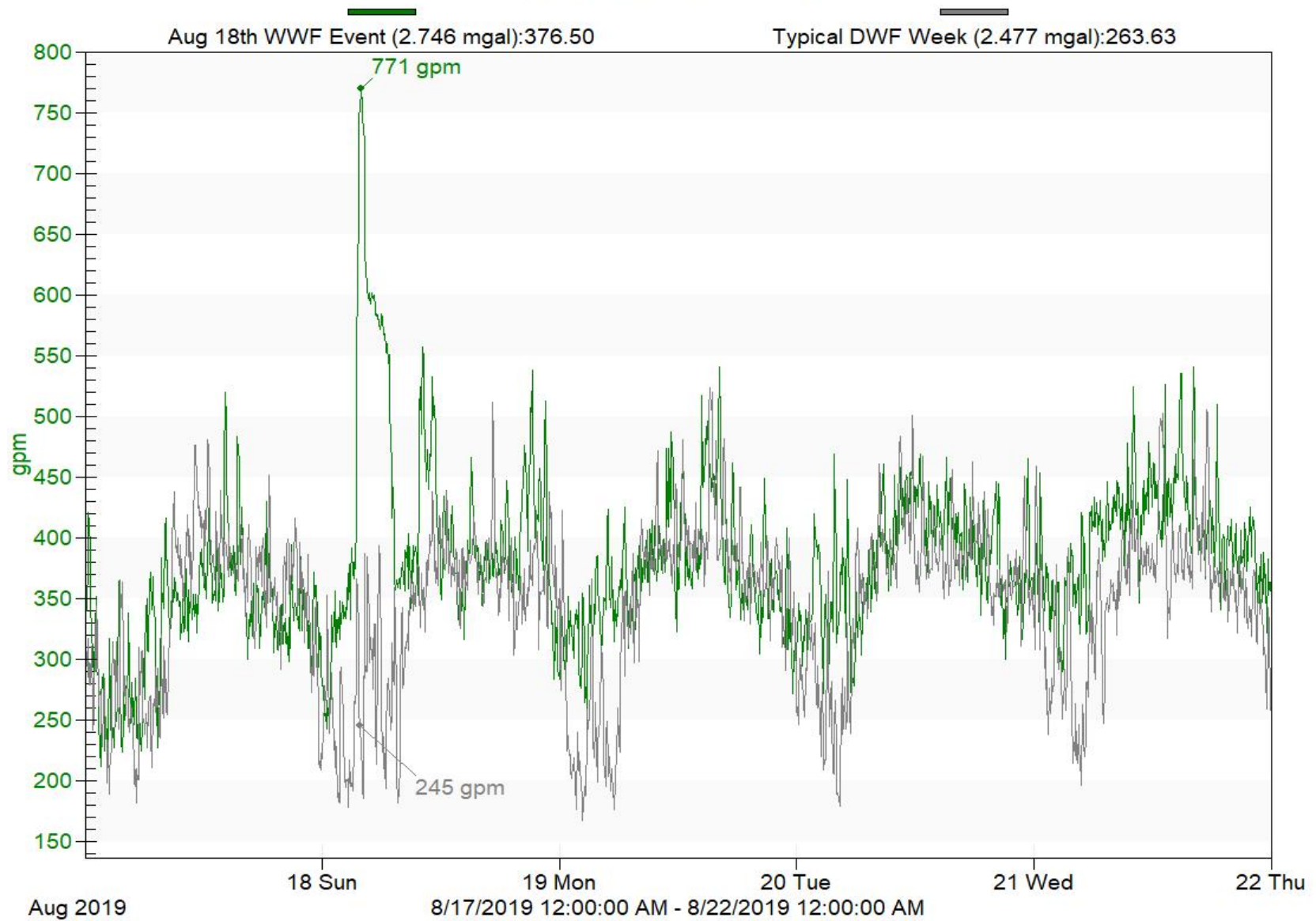
Flow Rate (16.861 mgal):271.27

Flow Rate (4.358 mgal):

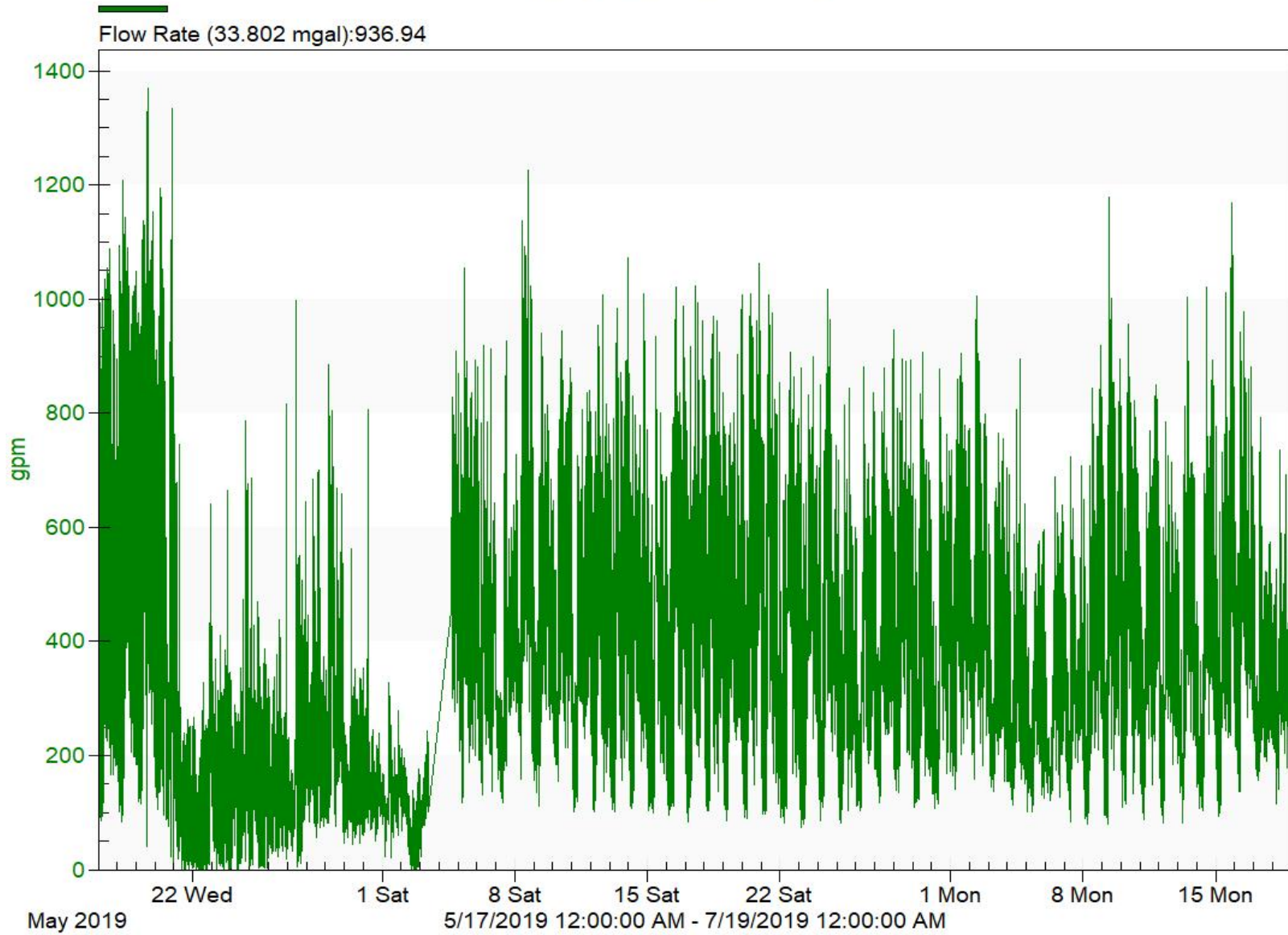


Flow Meter Location M3 (South of Park Road near Mallory Court)

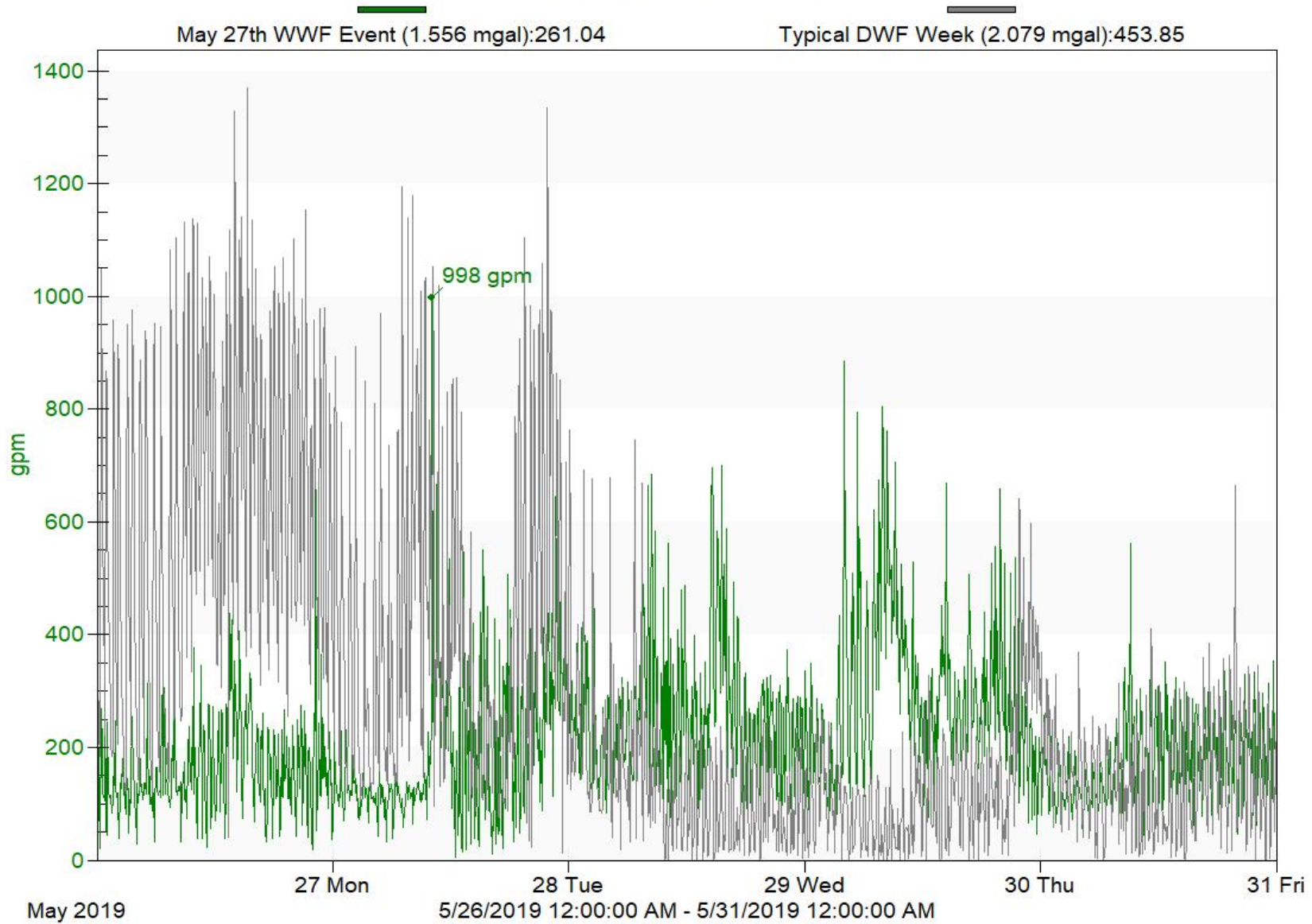
City of Chanhassen, Minnesota



Flow Meter Location M4 (West of Powers Boulevard, North of Lake Drive W)
City of Chanhassen, Minnesota

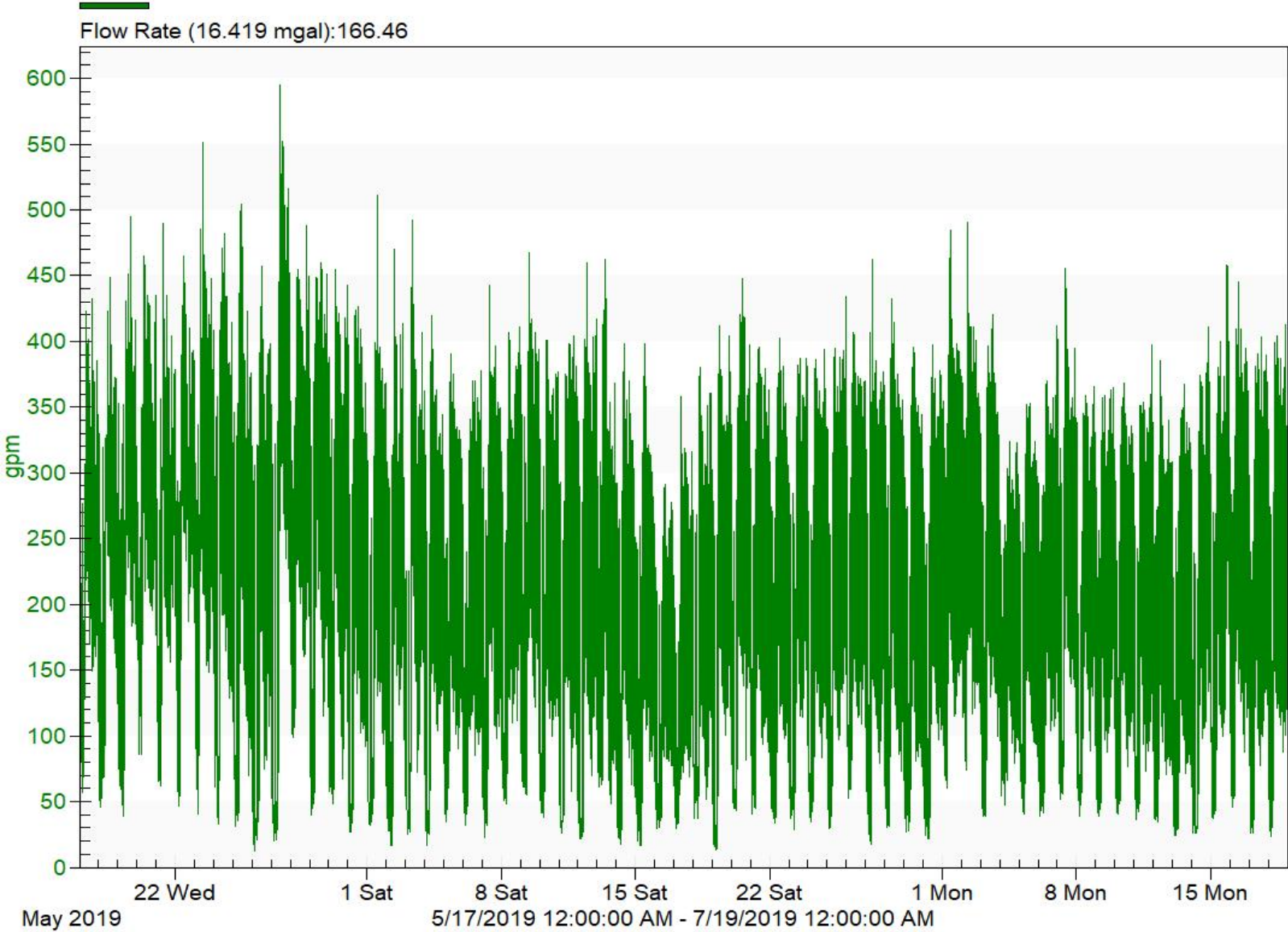


Flow Meter Location M4 (West of Powers Boulevard, North of Lake Drive W)
City of Chanhassen, Minnesota



Flow Meter Location M4A (Lyman Boulevard, West of Bluff Creek)

City of Chanhassen, Minnesota

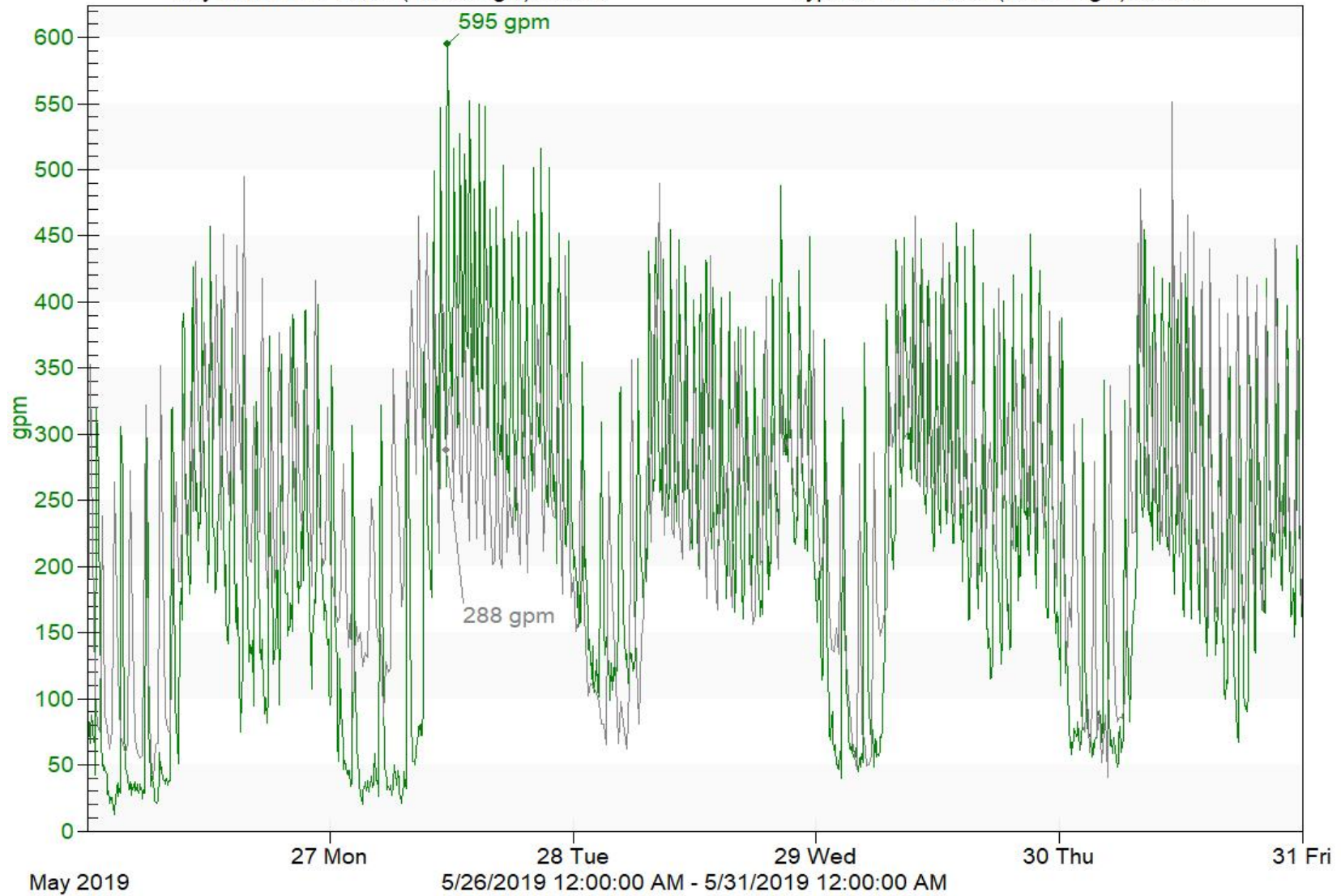


Flow Meter Location M4A (Lyman Boulevard, West of Bluff Creek)

City of Chanhassen, Minnesota

May 27th WWF Event (1.586 mgal): 119.55

Typical DWF Week (1.757 mgal): 136.59

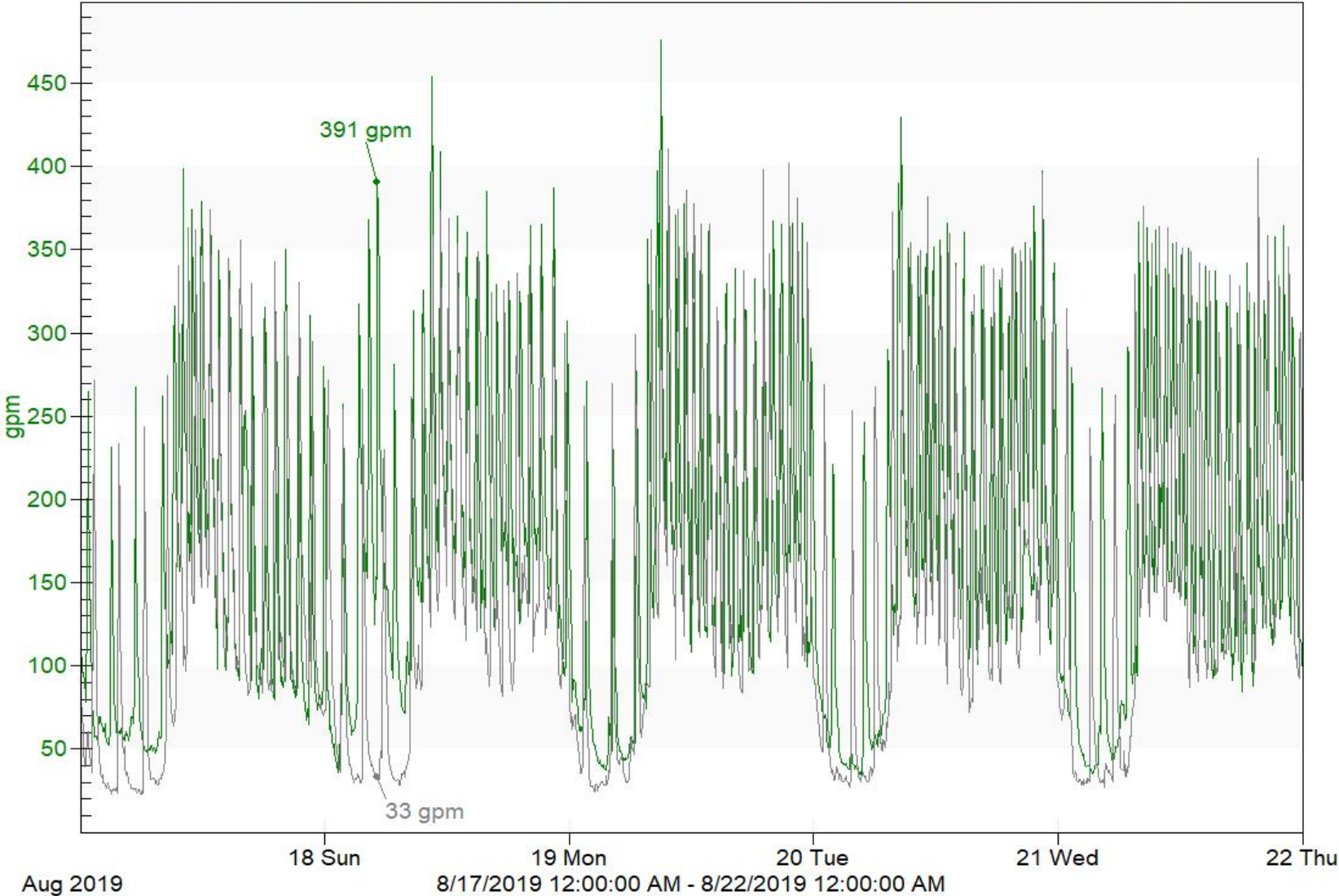


Flow Meter Location M4A (Lyman Boulevard, West of Bluff Creek)

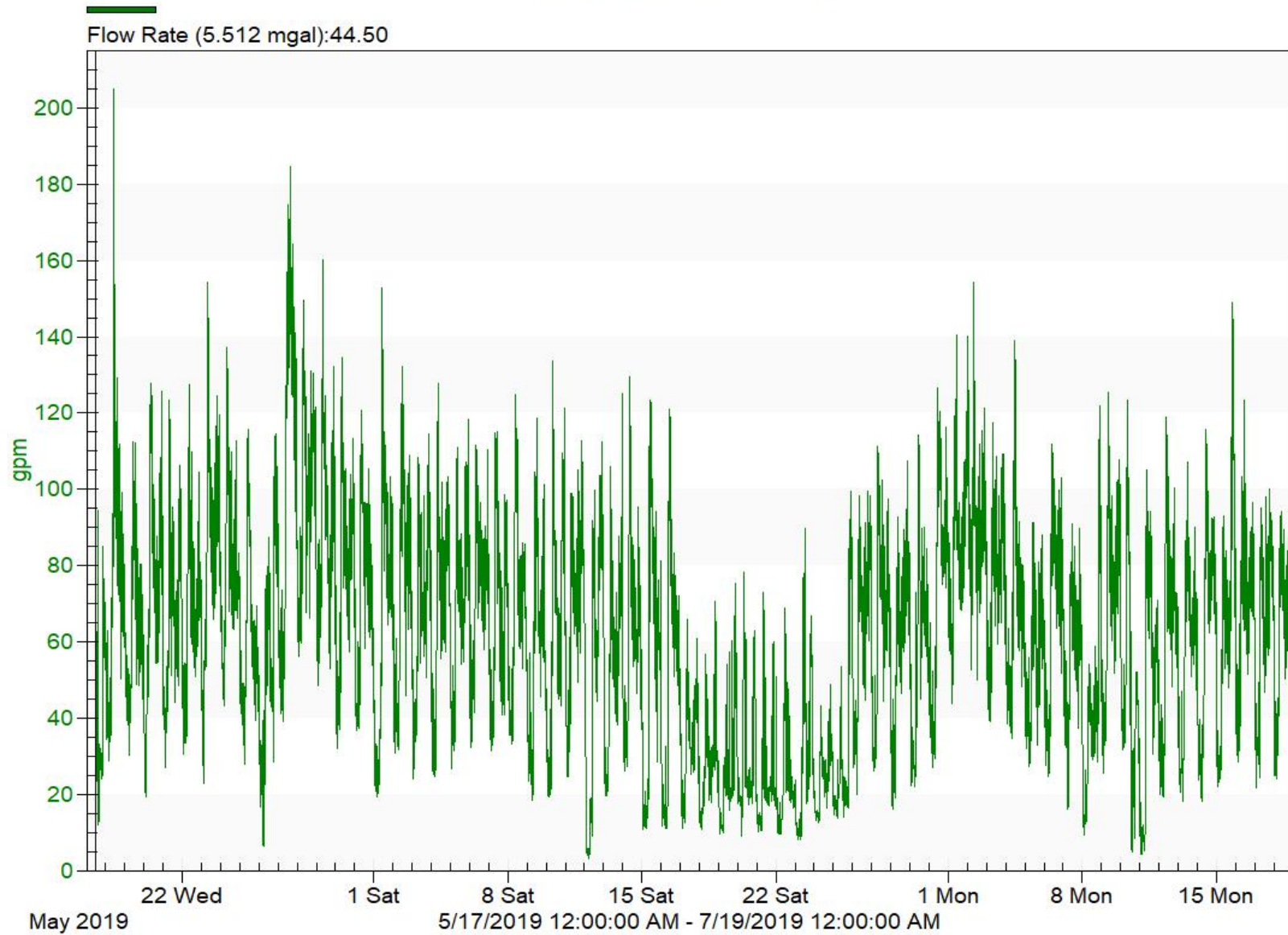
City of Chanhassen, Minnesota

Aug 18th WWF Event (1.189 mgal):126.09

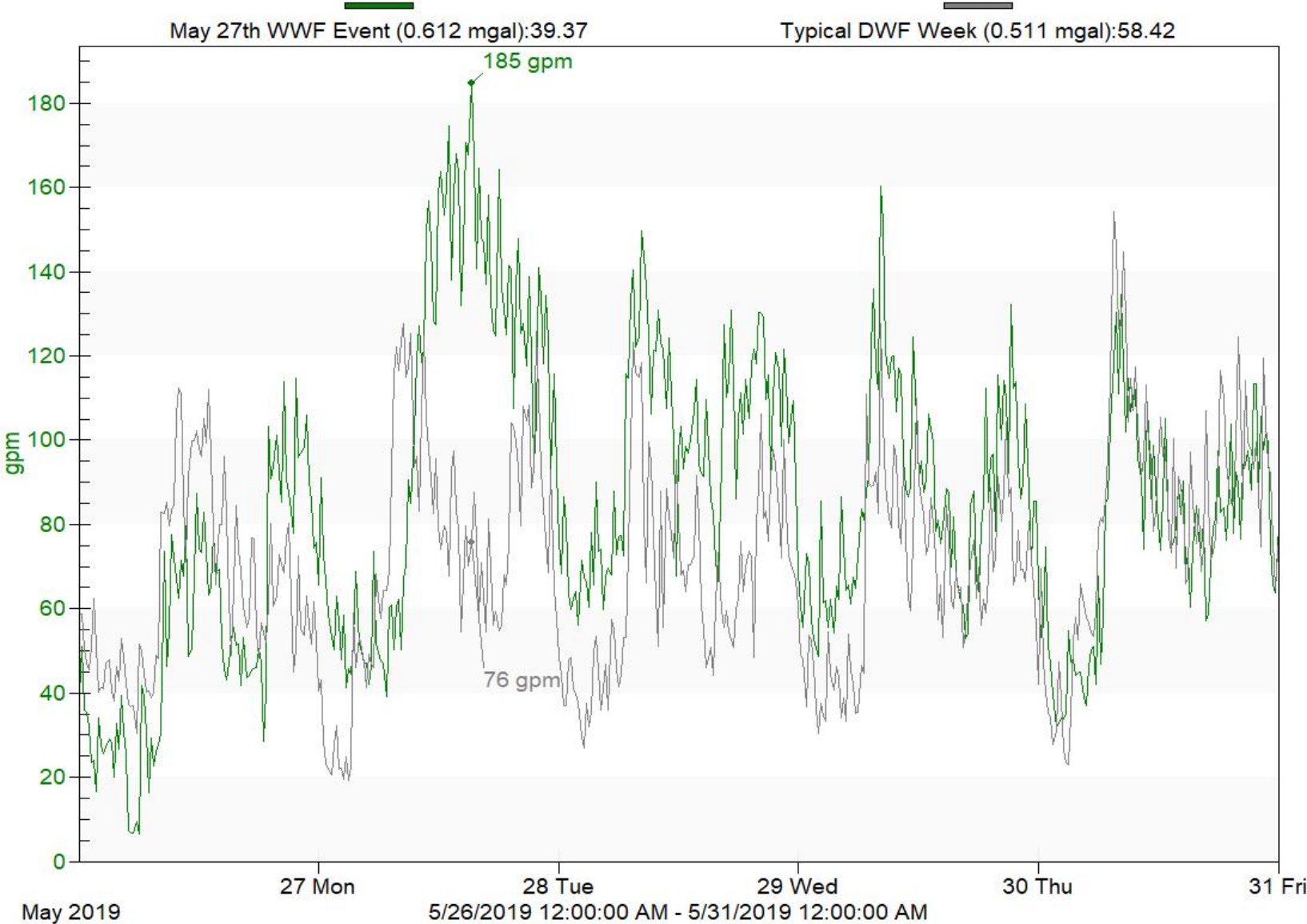
Typical DWF Week (1.050 mgal):124.61



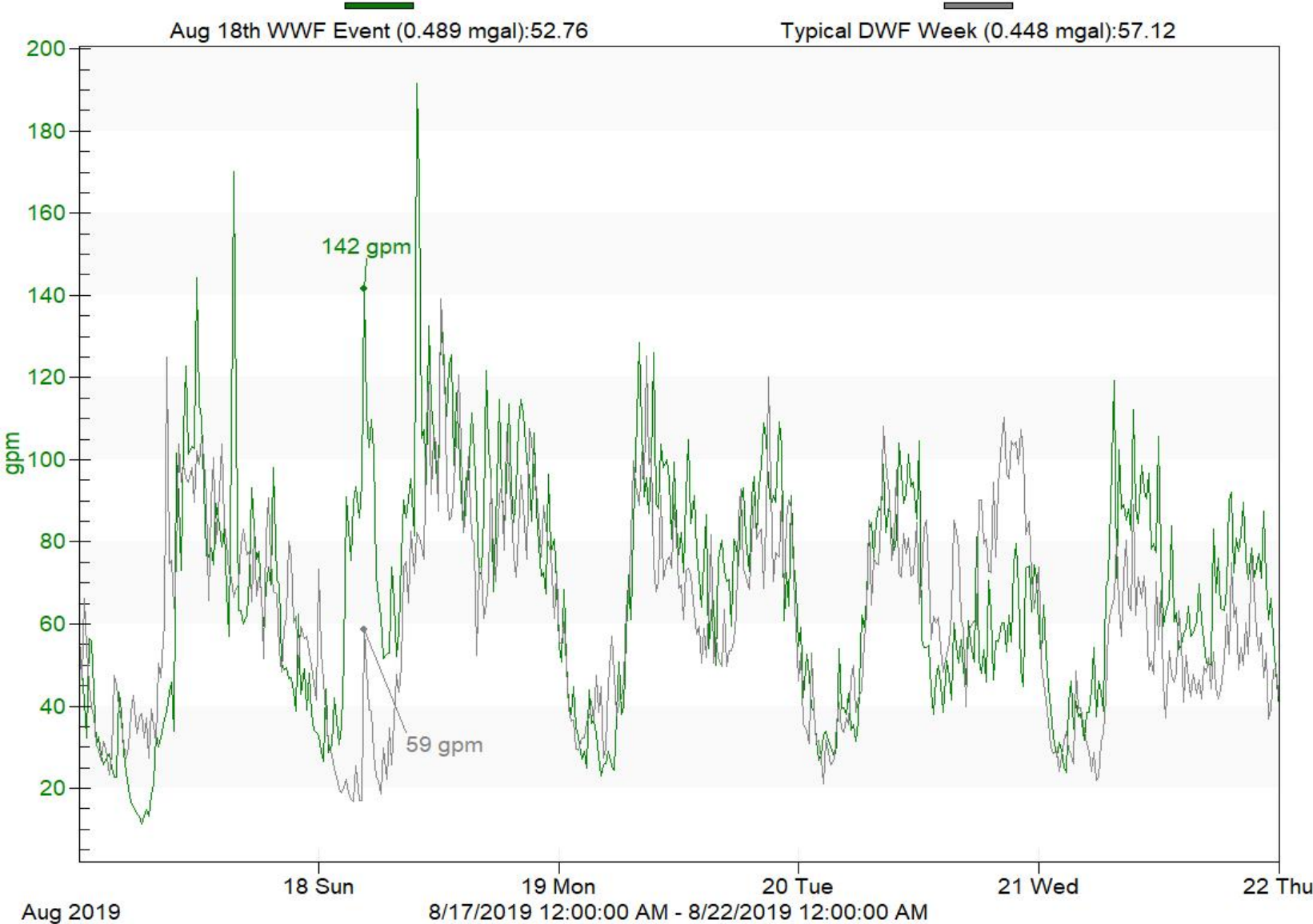
Flow Meter Location M4B (Stone Creek drive, South of Coulter Boulevard) City of Chanhassen, Minnesota



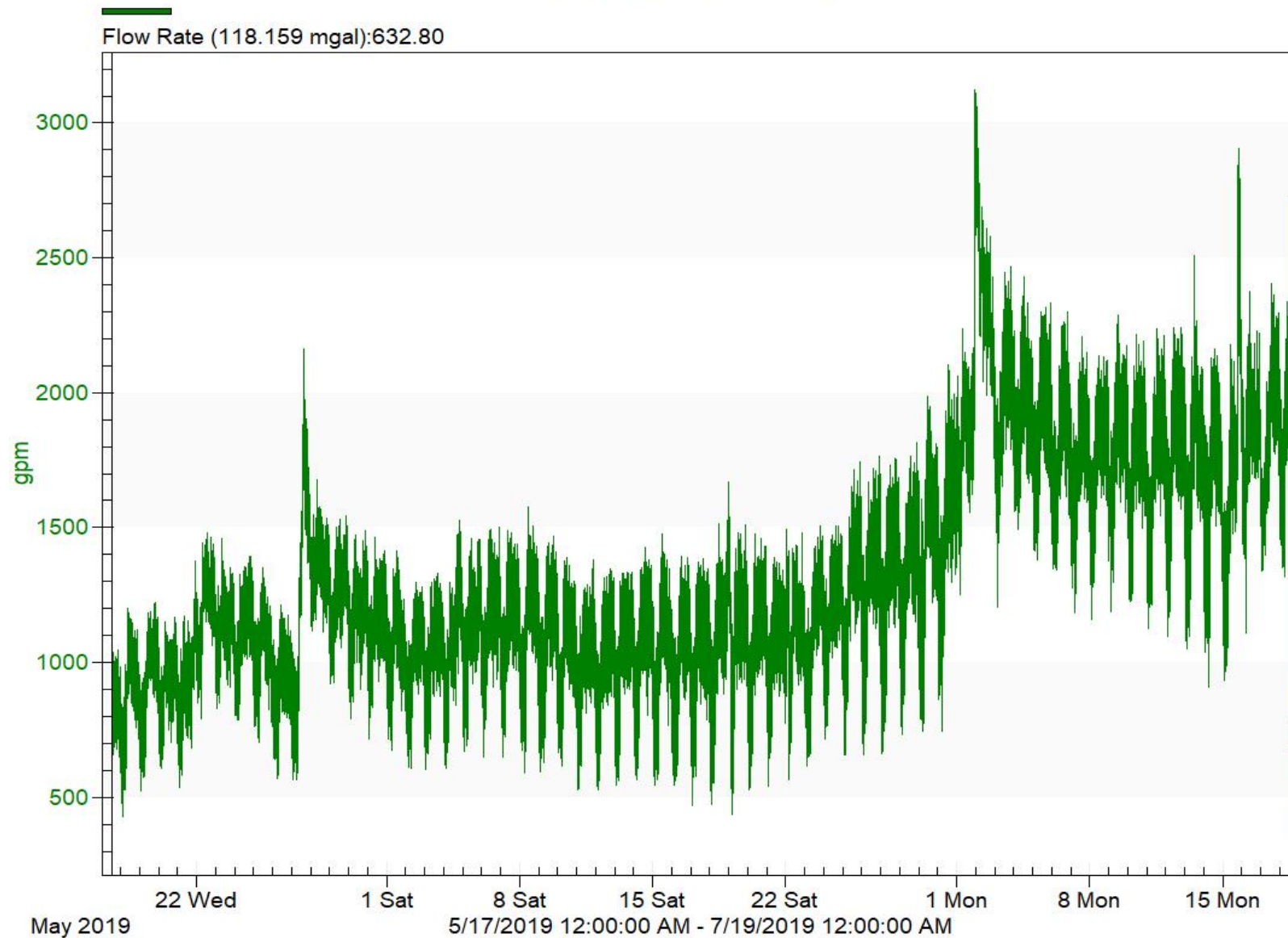
Flow Meter Location M4B (Stone Creek Drive, South of Coulter Boulevard) City of Chanhassen, Minnesota



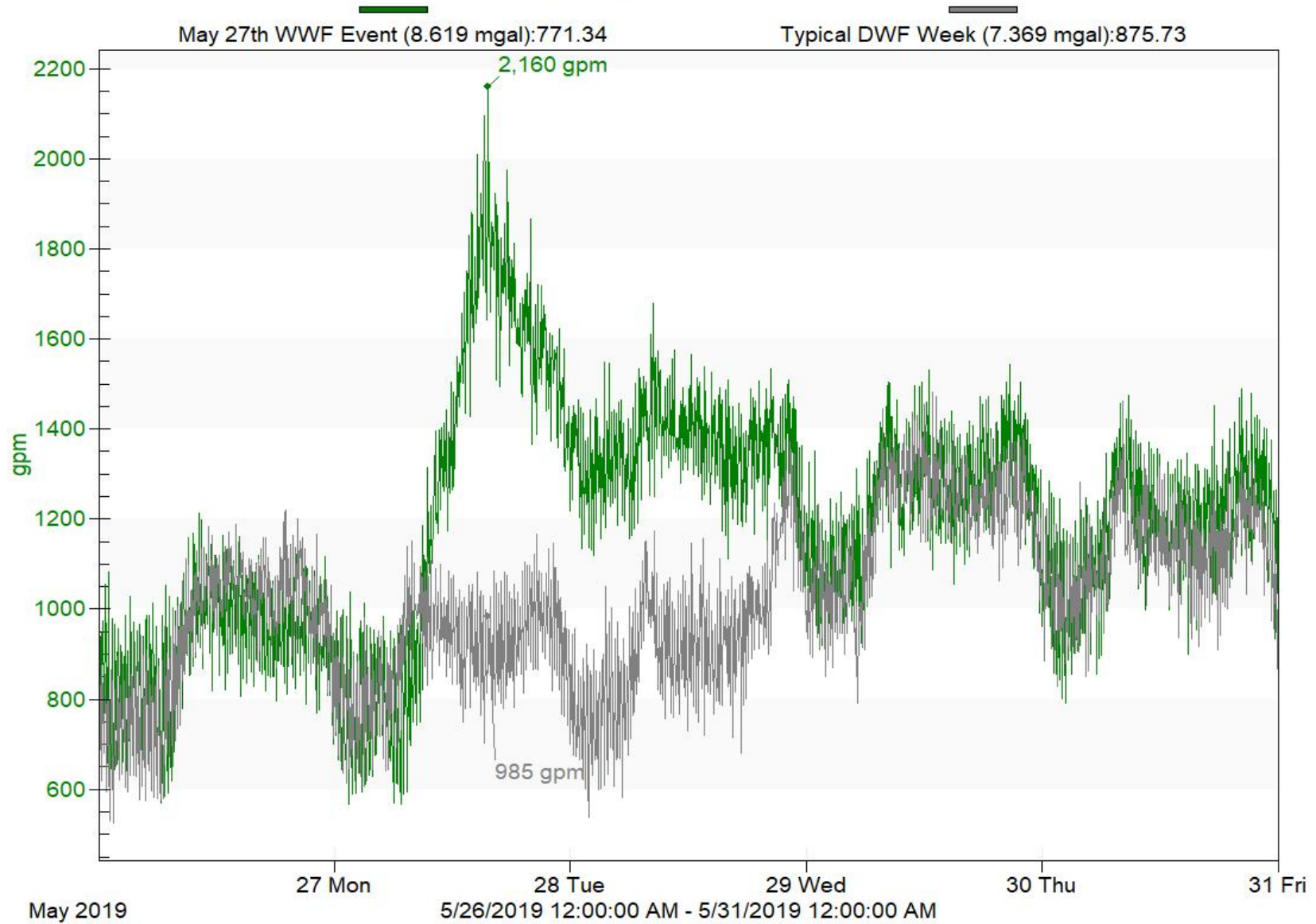
Flow Meter Location M4B (Stone Creek Drive, South of Coulter Boulevard) City of Chanhassen, Minnesota



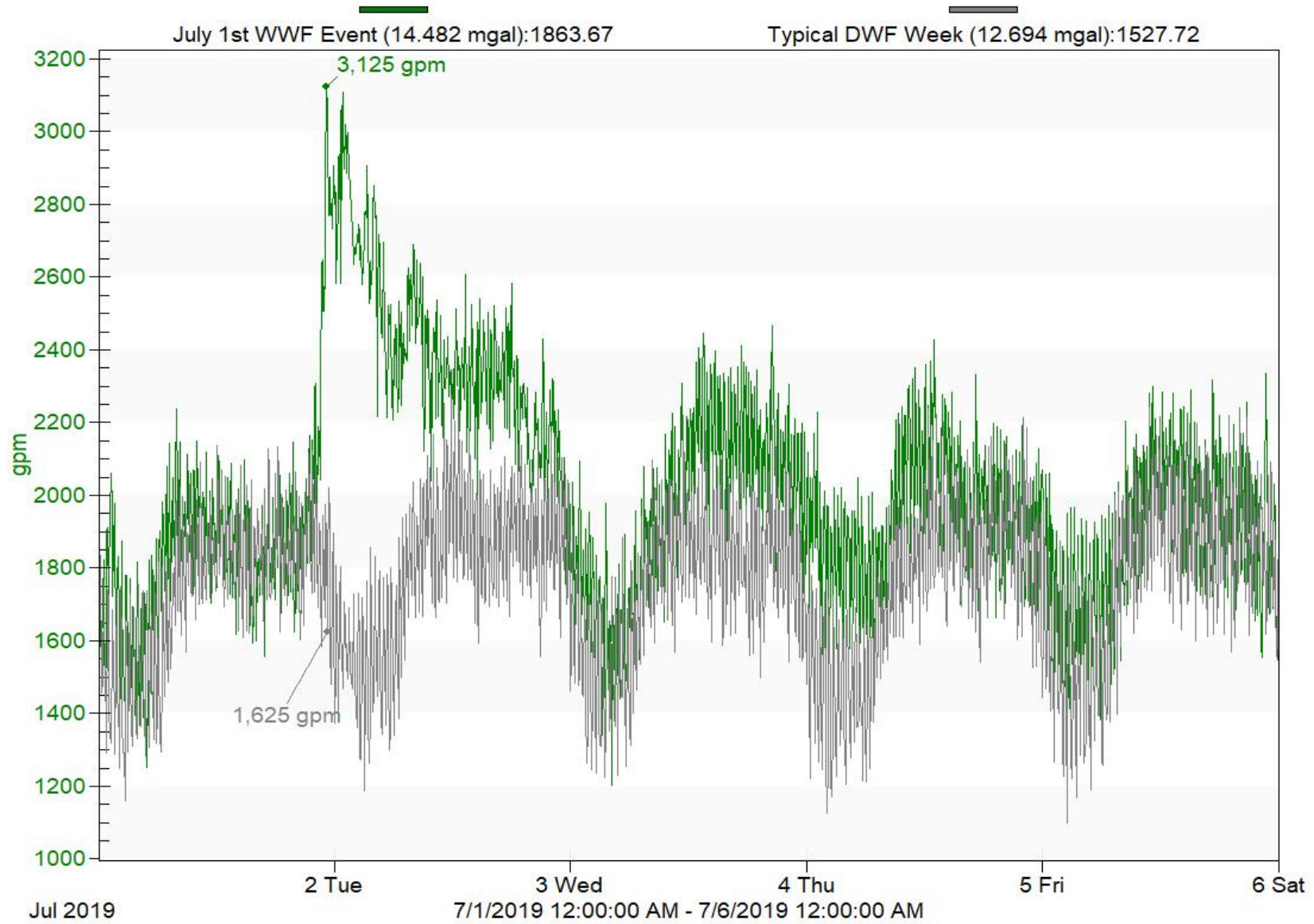
Flow Meter Location M5 (North side of Rice Marsh Lake, East of Cheyenne Avenue)
City of Chanhassen, Minnesota



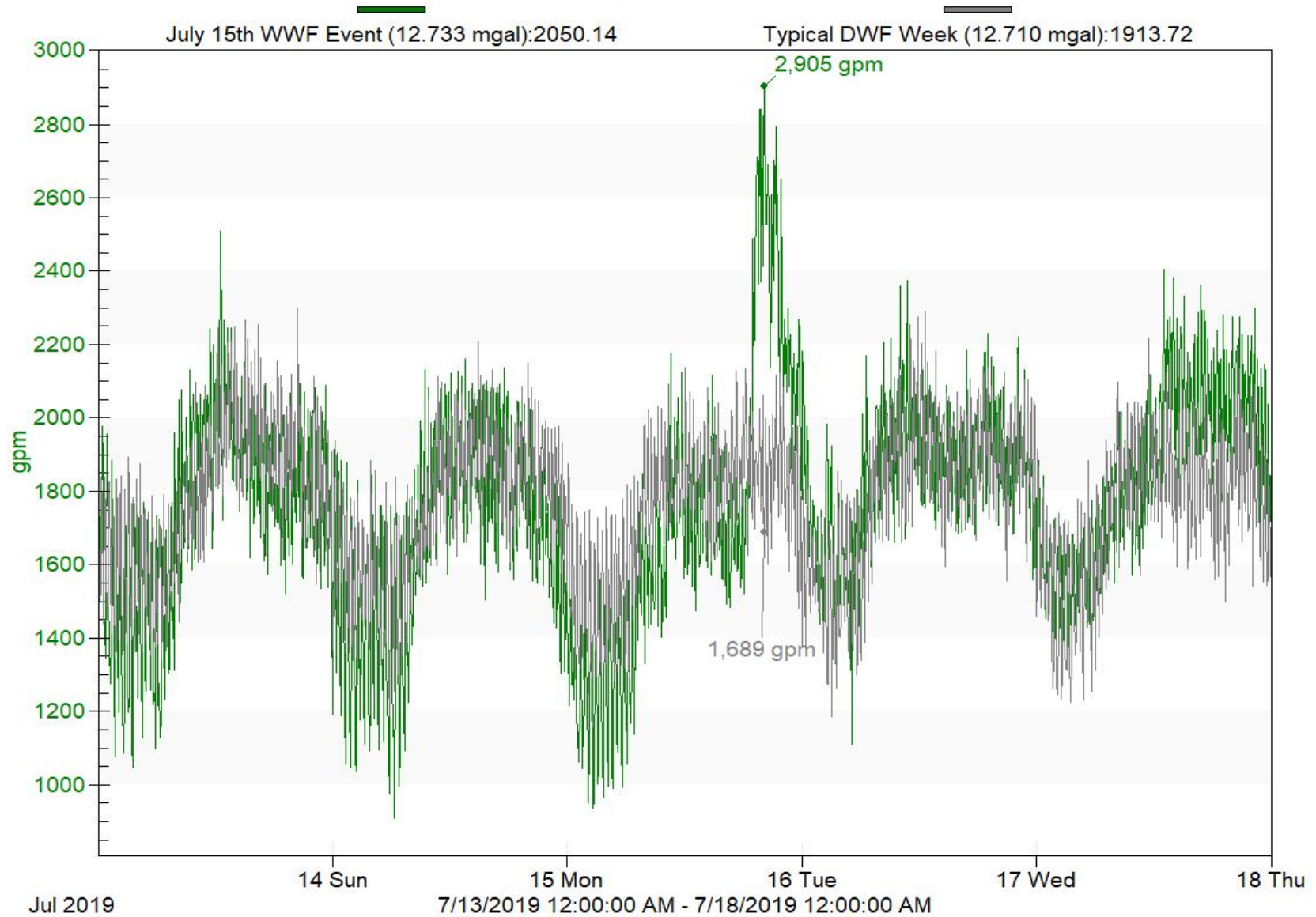
Flow Meter Location M5 (North side of Rice Marsh Lake, East of Cheyenne Avenue)
City of Chanhassen, Minnesota



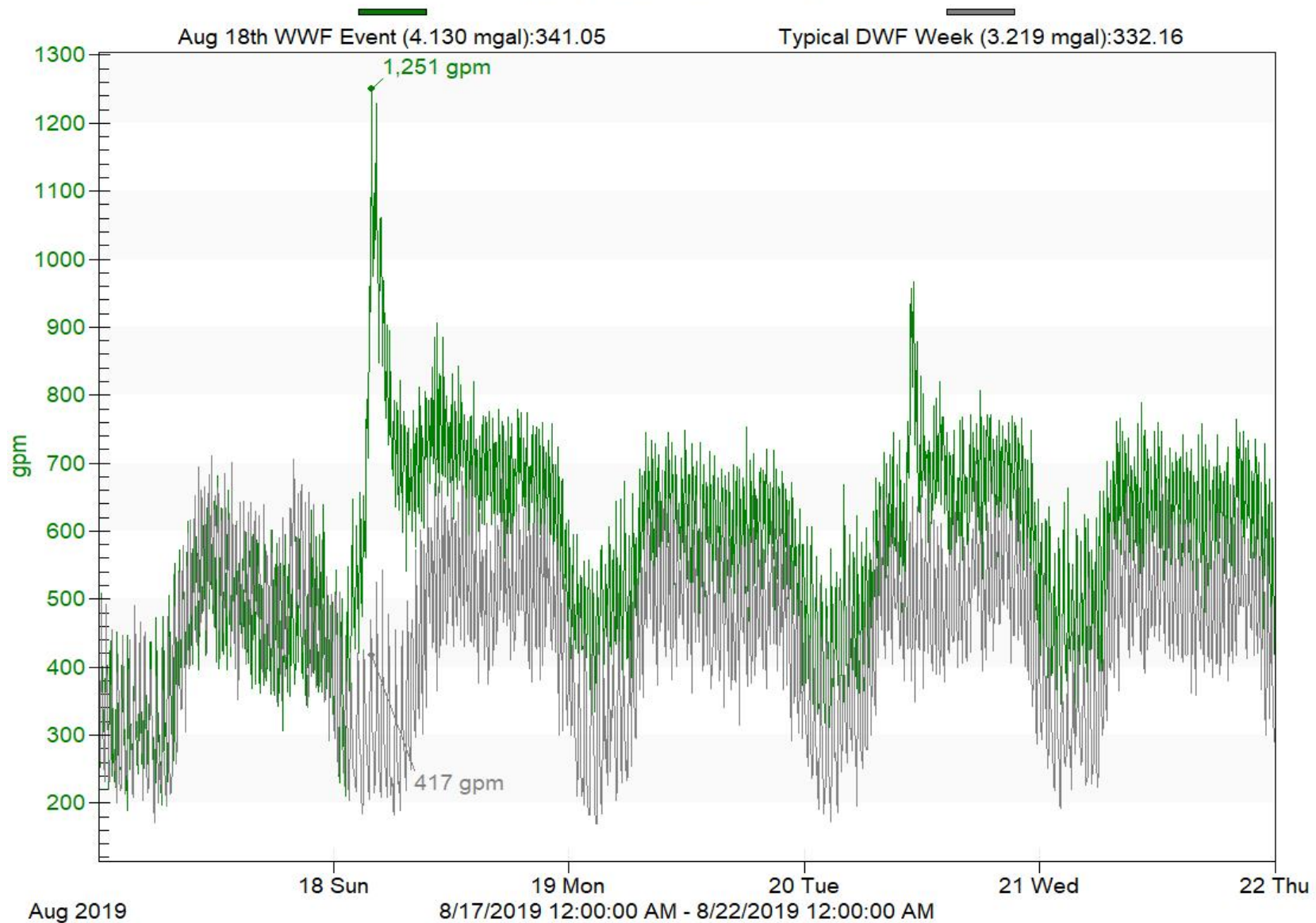
Flow Meter Location M5 (North side of Rice Marsh Lake, East of Cheyenne Avenue)
City of Chanhassen, Minnesota



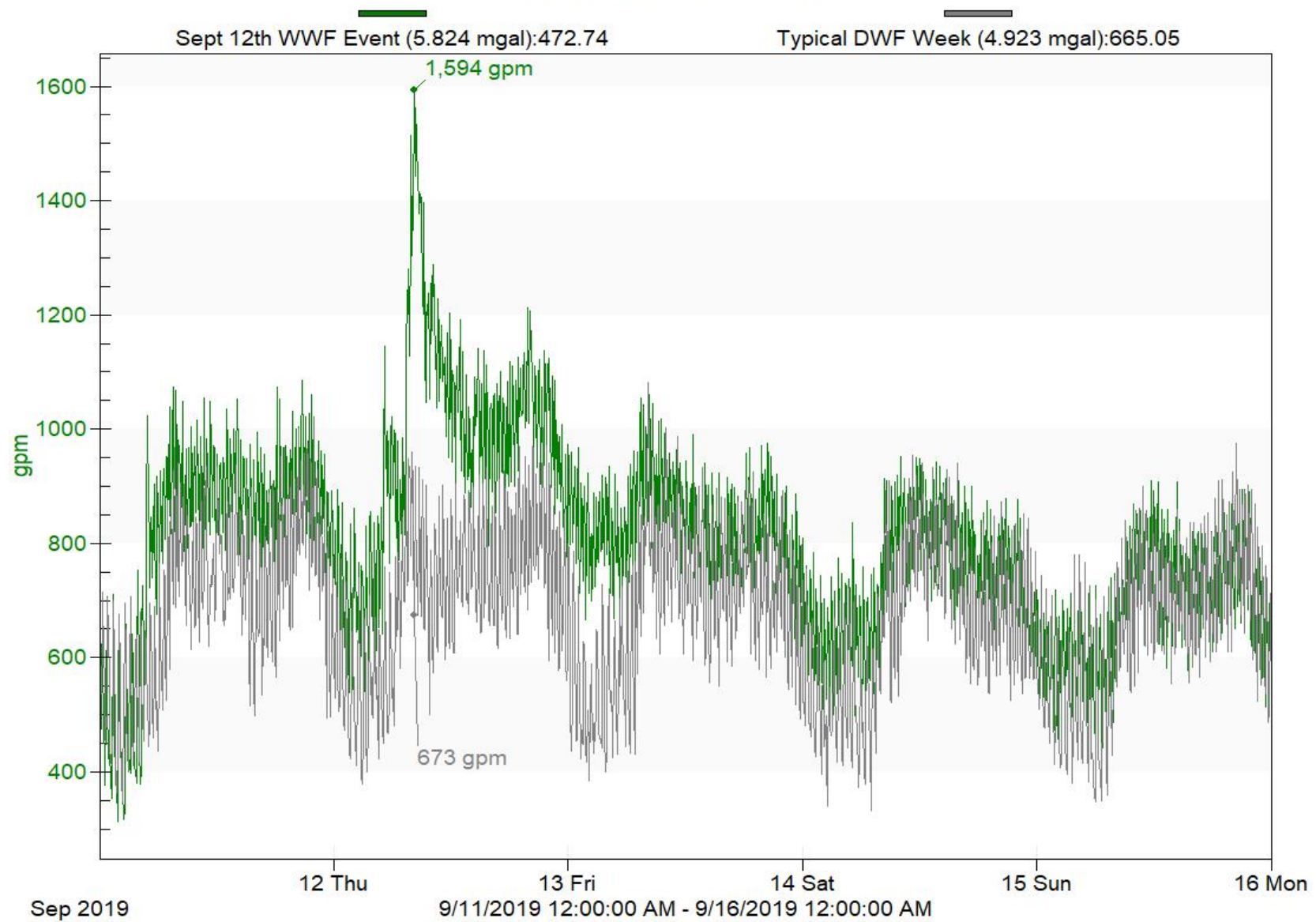
Flow Meter Location M5 (North side of Rice Marsh Lake, East of Cheyenne Avenue) City of Chanhassen, Minnesota



Flow Meter Location M5 (North side of Rice Marrsh Lake, East of Cheyenne Avenue) City of Chanhassen, Minnesota



Flow Meter Location M5 (North side of Rice Marsh Lake, East of Cheyenne Avenue) City of Chanhassen, Minnesota

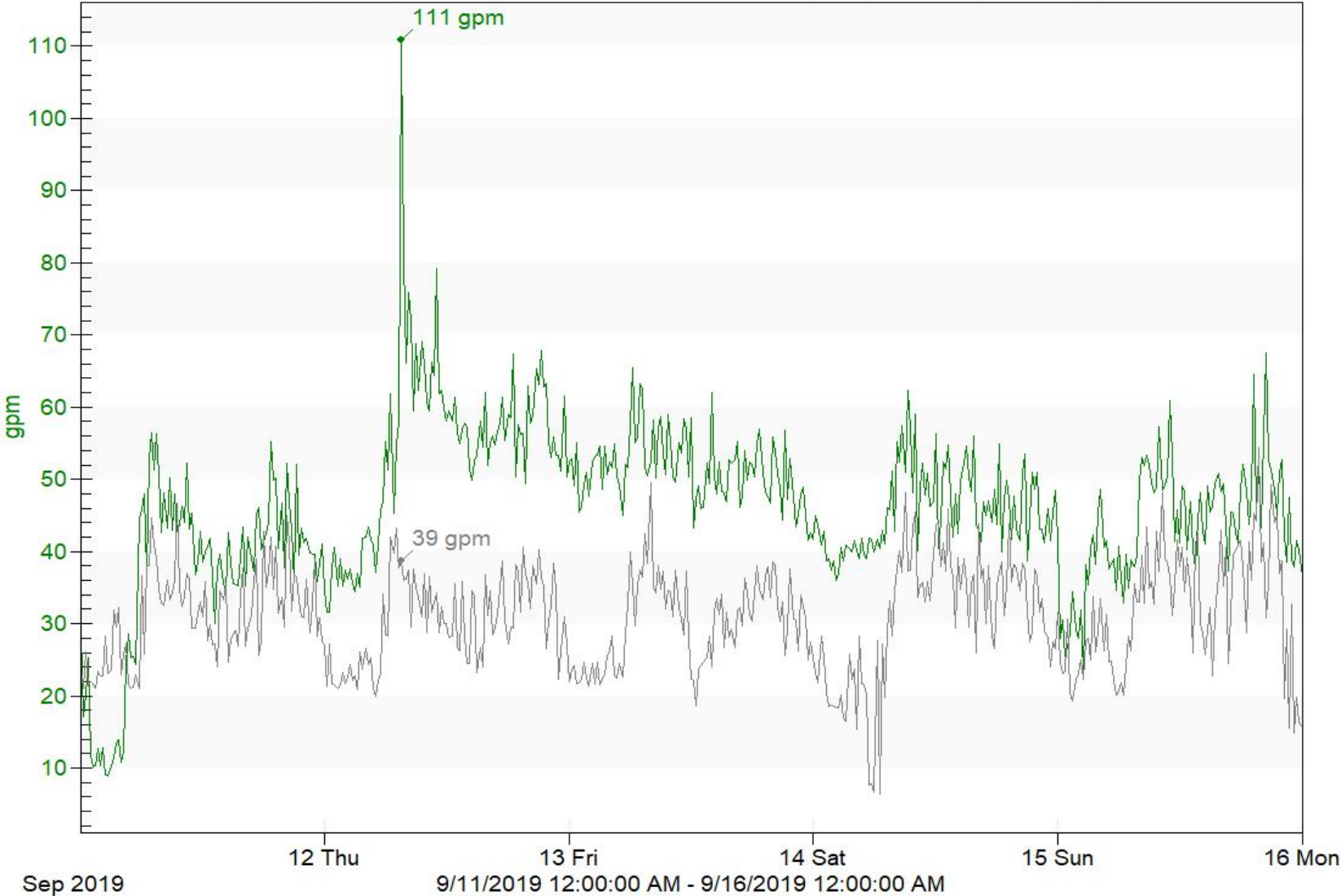


Flow Meter Location M5-1 (Easement Southeast of Cheyenne Avenue)

City of Chanhassen, Minnesota

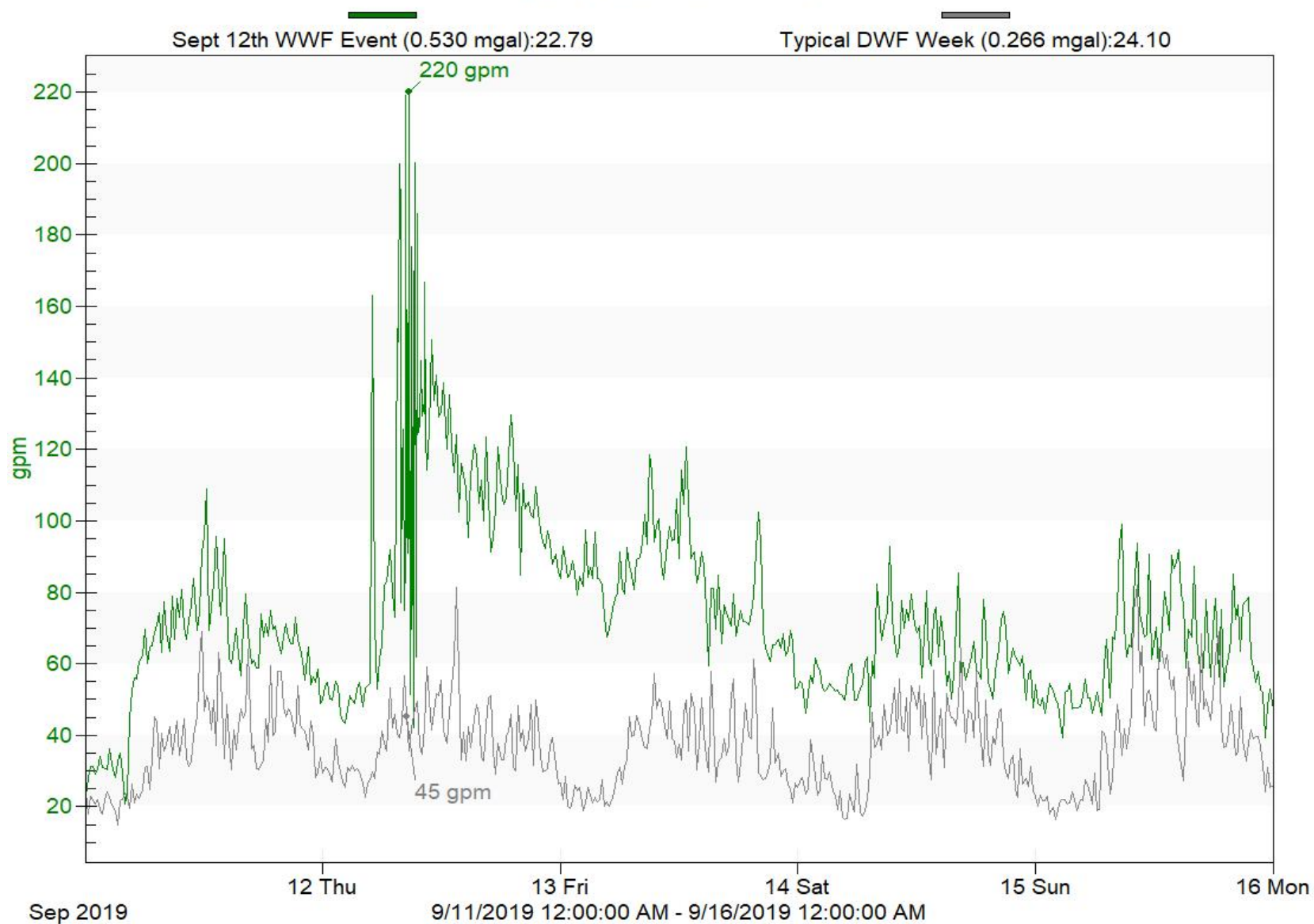
Sept 12th WWF Event (0.334 mgal):29.06

Typical DWF Week (0.222 mgal):23.75



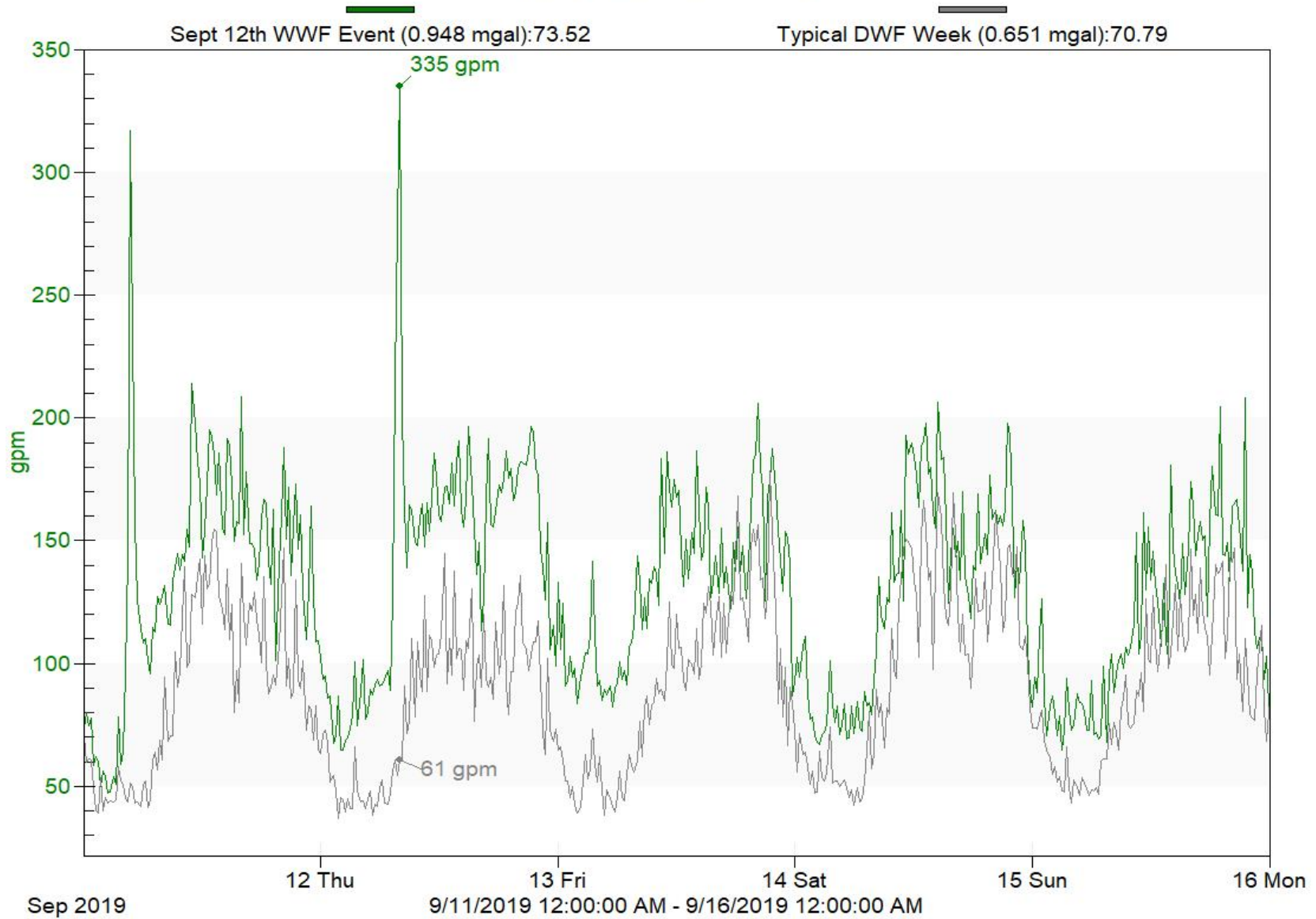
Flow Meter Location M5-2 (Chan View West of Frontier Trail)

City of Chanhassen, Minnesota



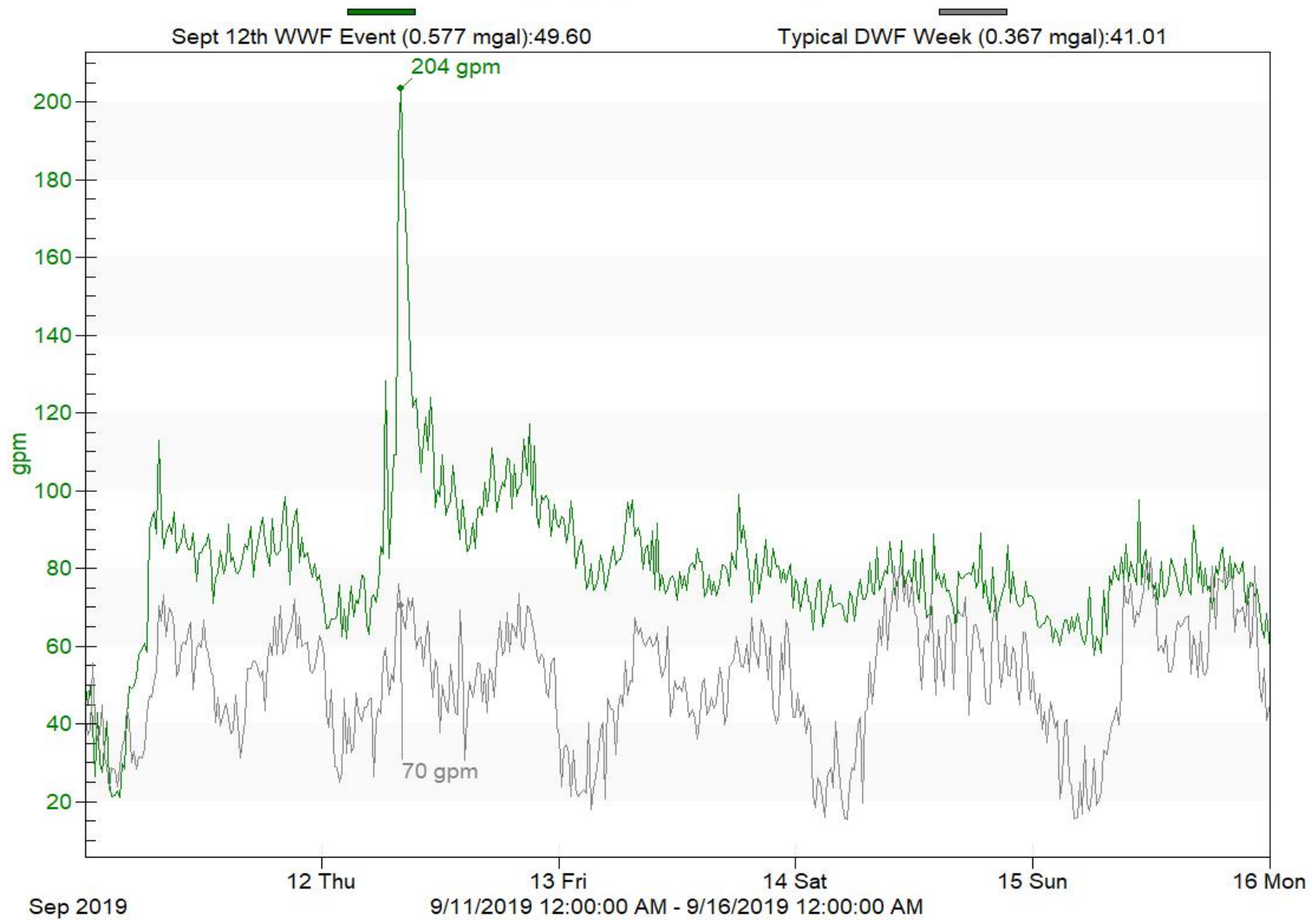
Flow Meter Location M5-3 (East of Great Lakes Circle on Frontier Trail)

City of Chanhassen, Minnesota

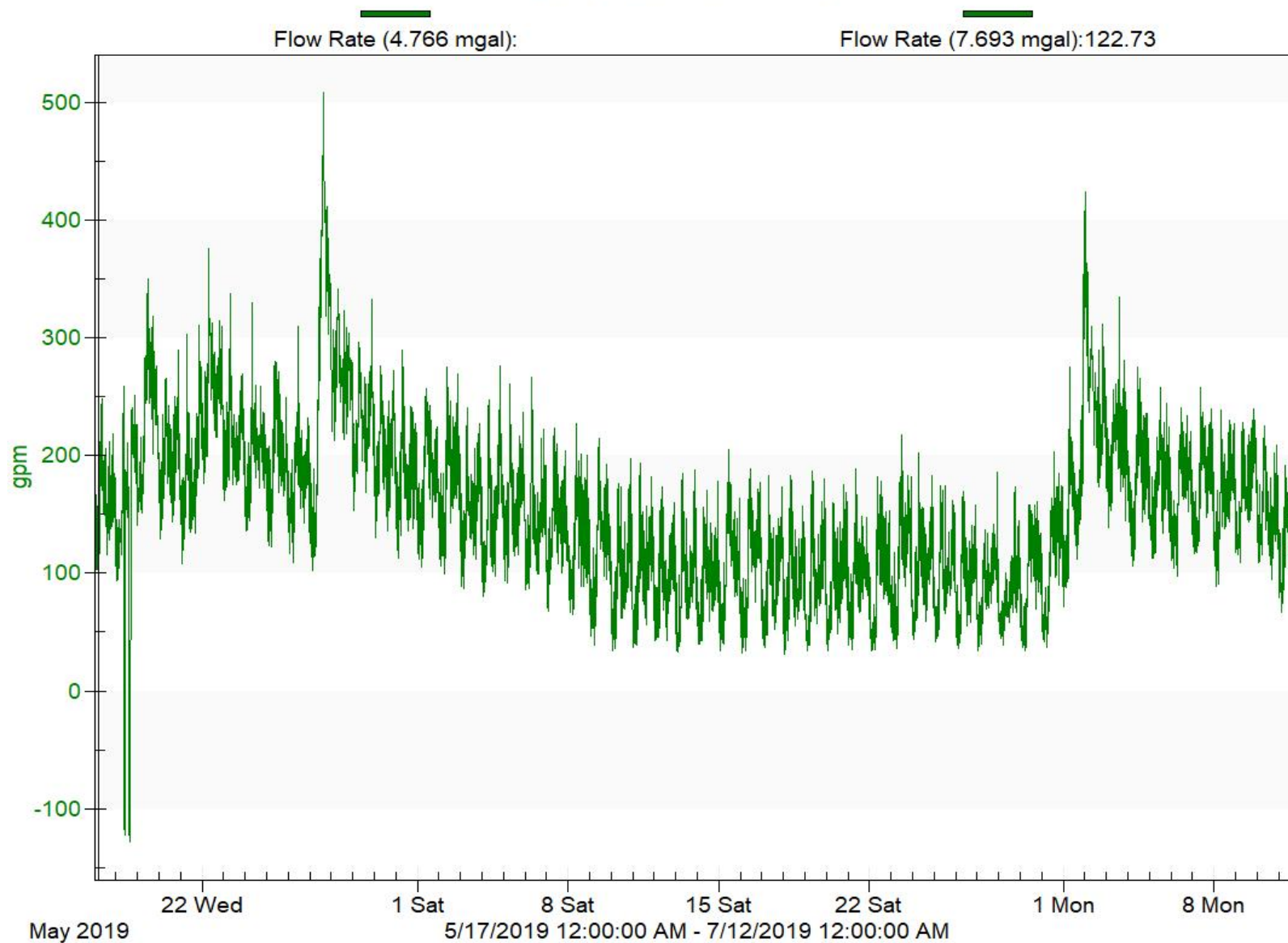


Flow Meter Location M5-4 (Frontier Trail near Del Rio Drive)

City of Chanhassen, Minnesota

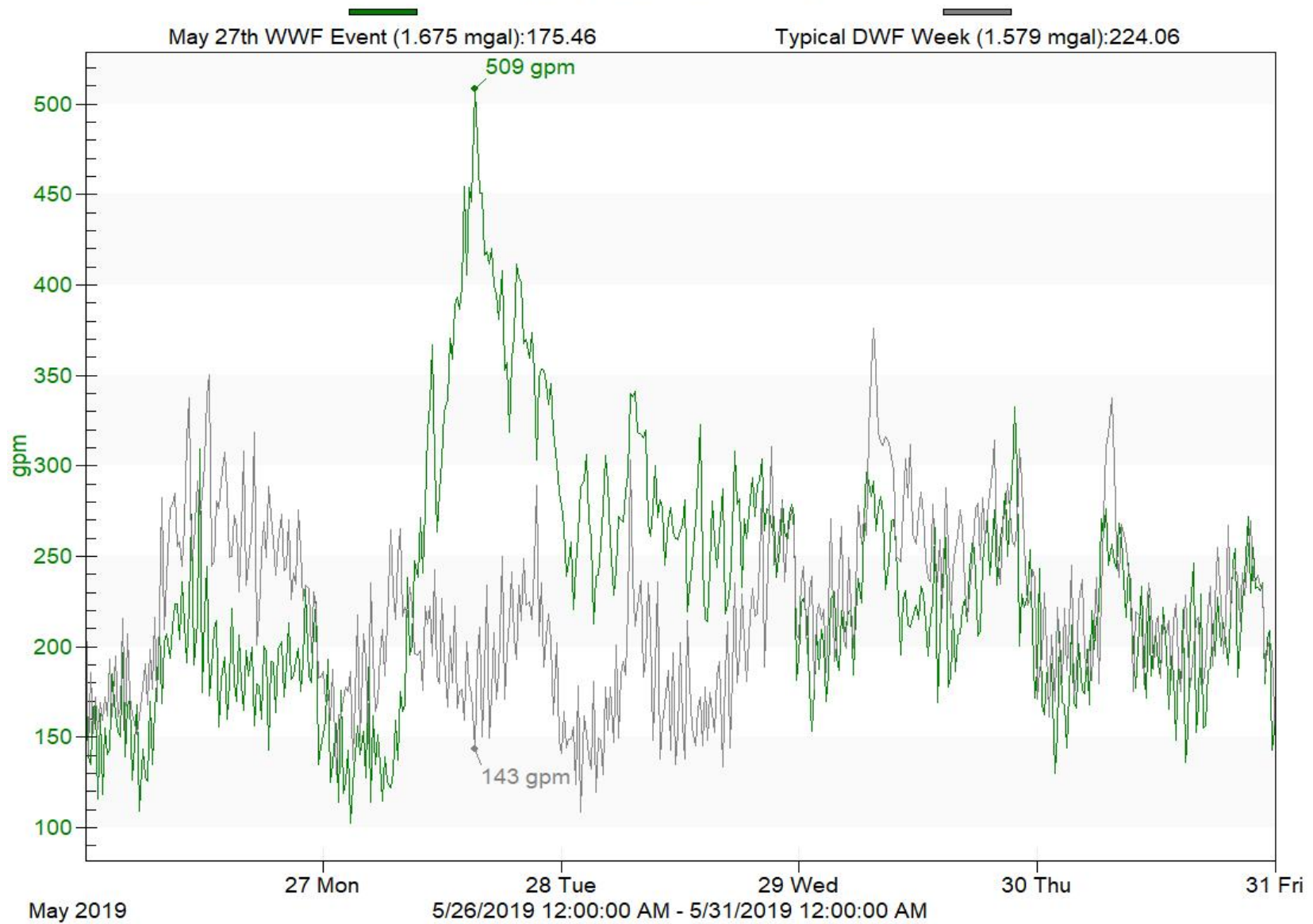


Flow Meter Location M5A (West of Lotus Lake, South of Big Woods Boulevard) City of Chanhassen, Minnesota

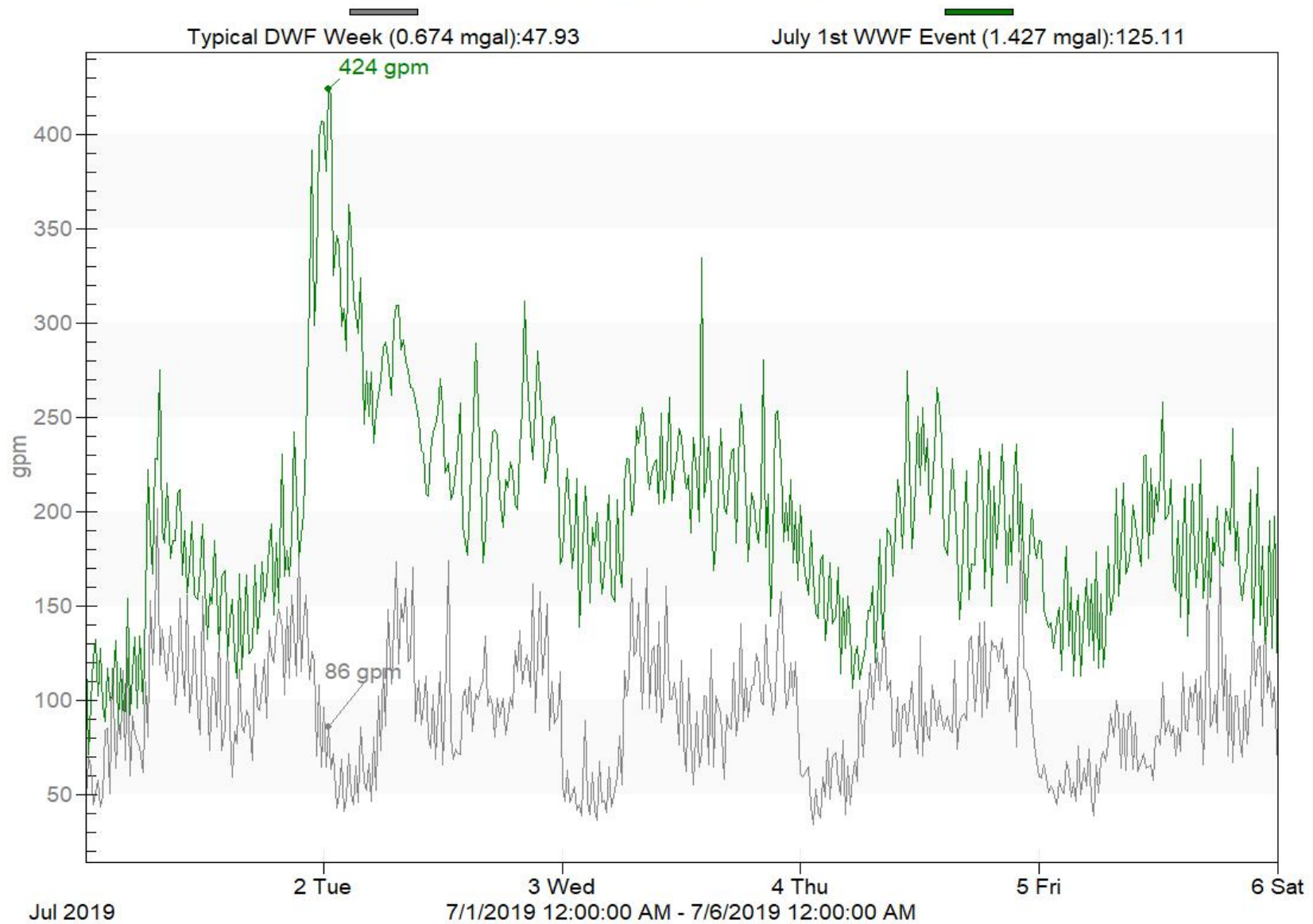


Flow Meter Location M5A (West of Lotus Lake, South of Big Woods Boulevard)

City of Chanhassen, Minnesota

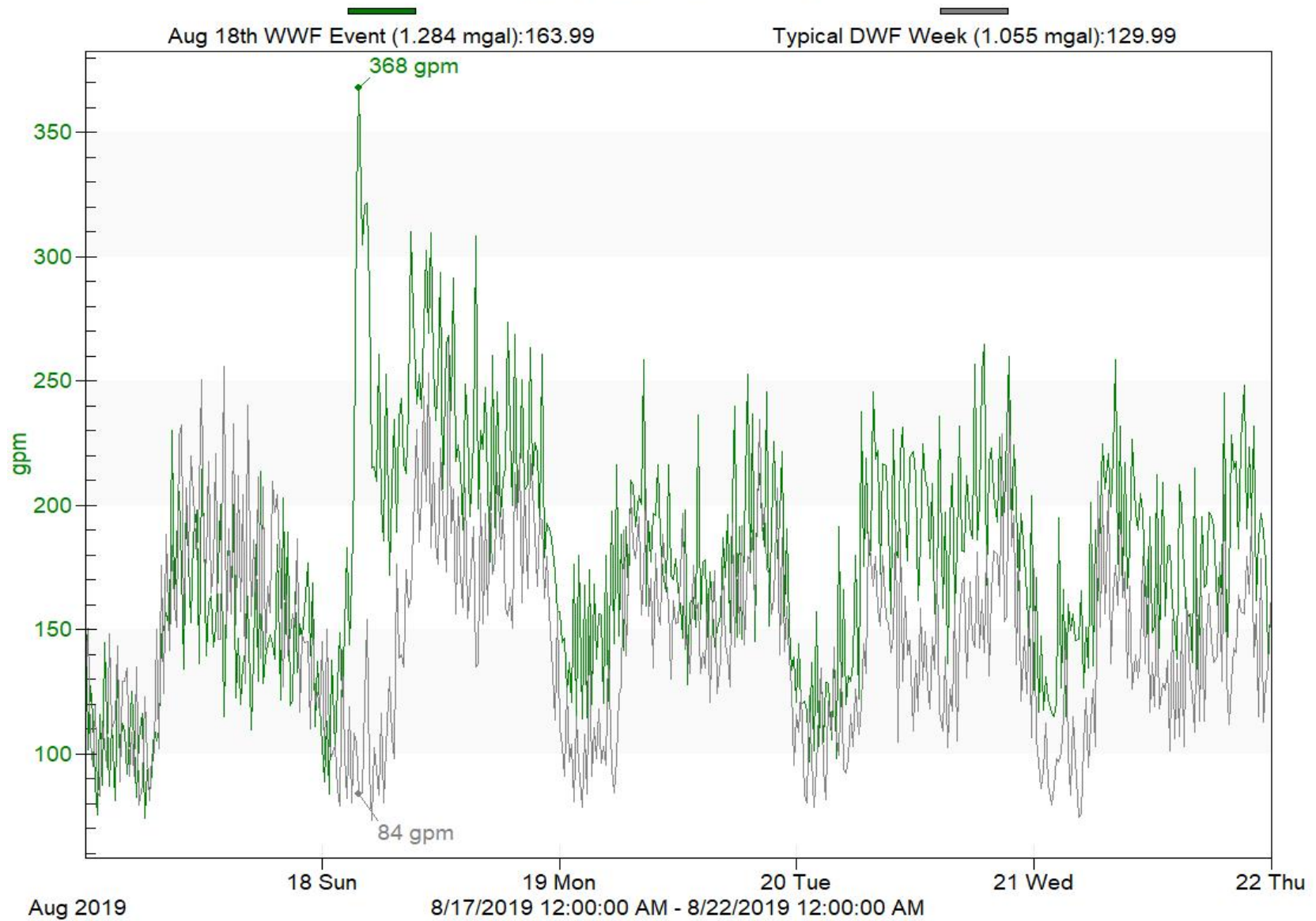


Flow Meter Location M5A (West of Lotus Lake, South of Big Woods Boulevard) City of Chanhassen, Minnesota

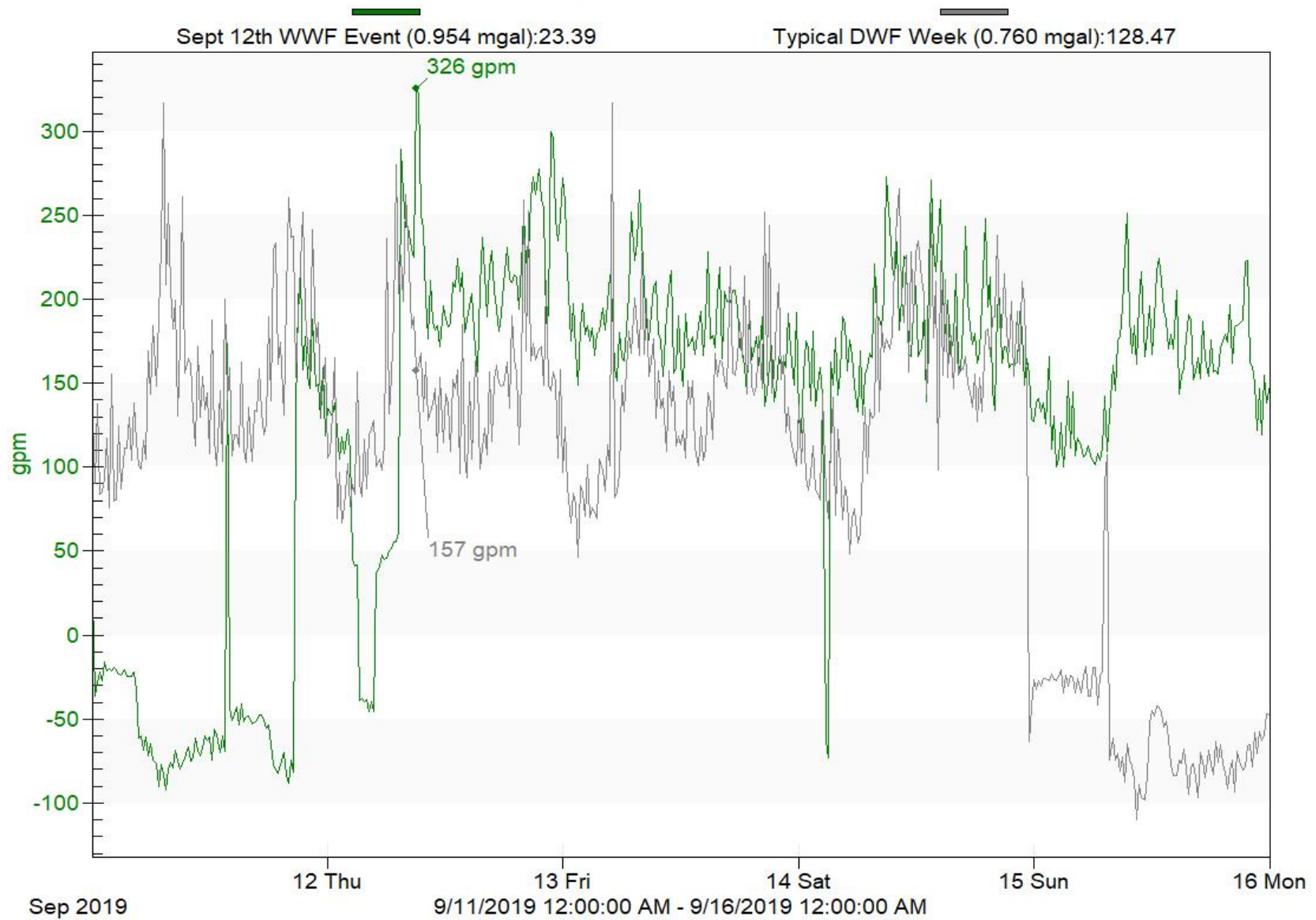


Flow Meter Location M5A (West of Lotus Lake, South of Big Woods Boulevard)

City of Chanhassen, Minnesota



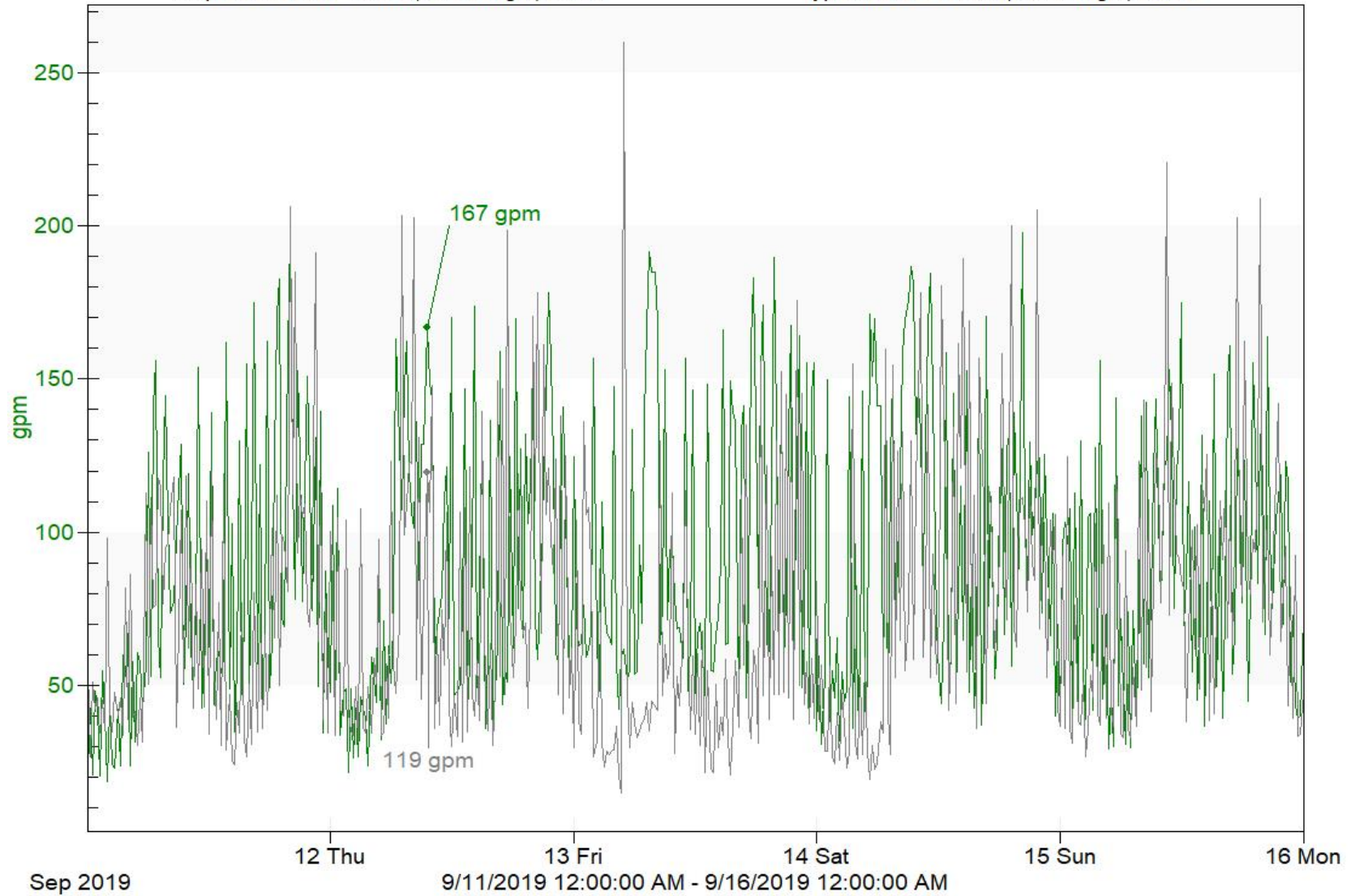
Flow Meter Location M5A (West of Lotus Lake, South of Big Woods Boulevard) City of Chanhassen, Minnesota



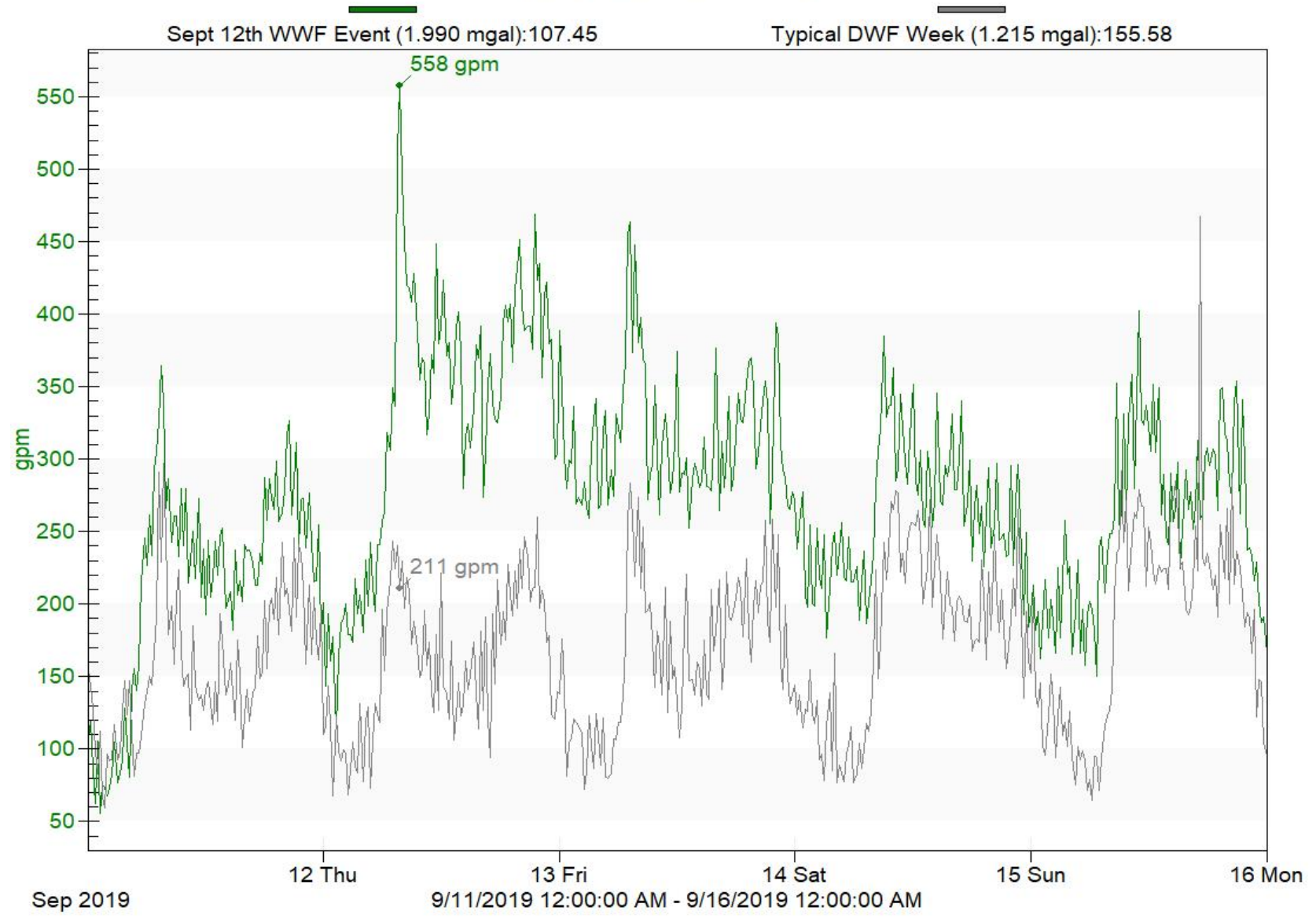
Flow Meter Location M5A-1 (Big Woods Boulevard and Carver Beach Road) City of Chanhassen, Minnesota

Sept 12th WWF Event (0.654 mgal):22.46

Typical DWF Week (0.540 mgal):56.17



Flow Meter Location M5A-2 (Big Woods Boulevard and Carver Beach Road) City of Chanhassen, Minnesota

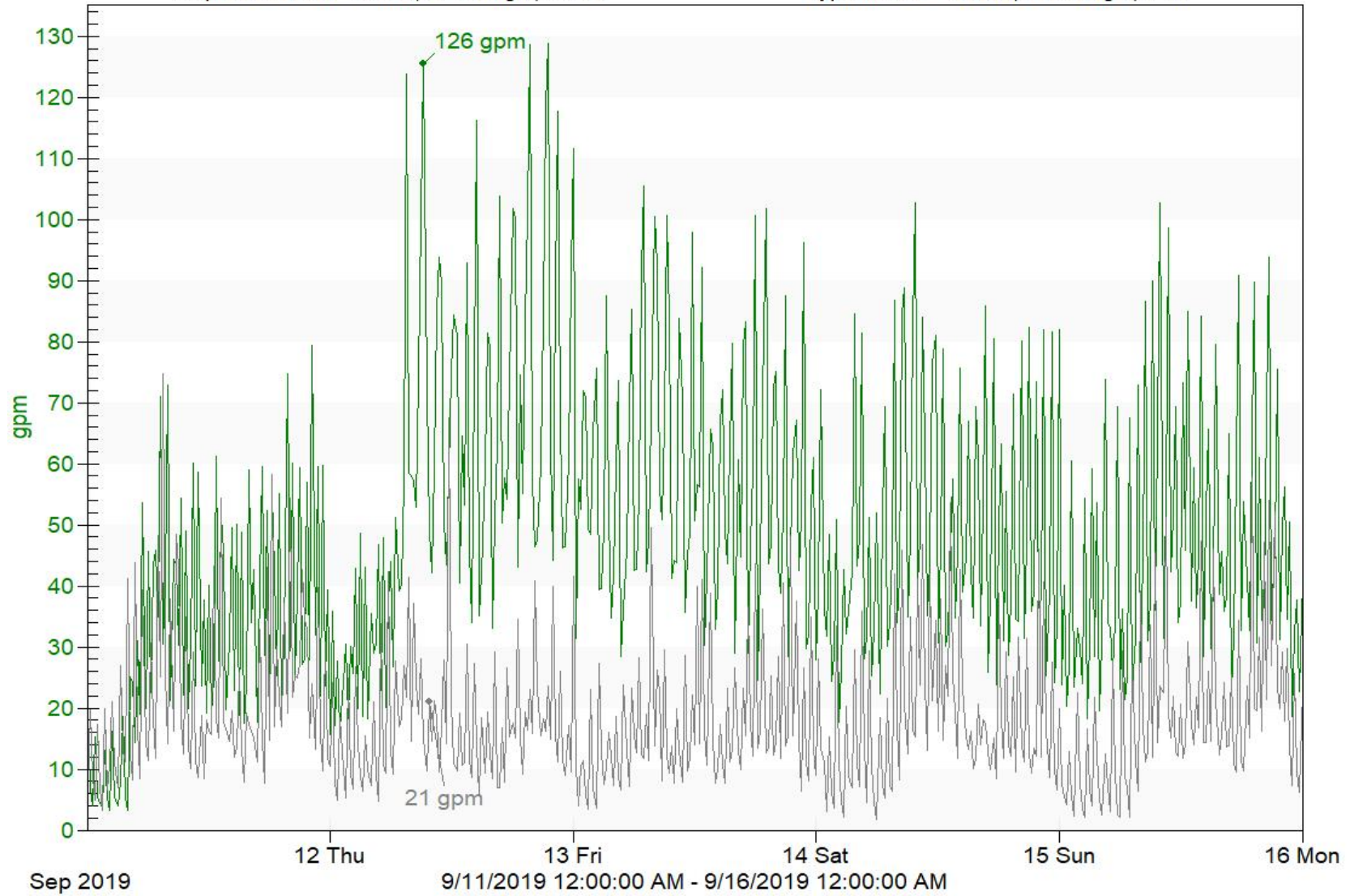


Flow Meter Location M5A-3 (Pontiac Lane East of Pima Lane)

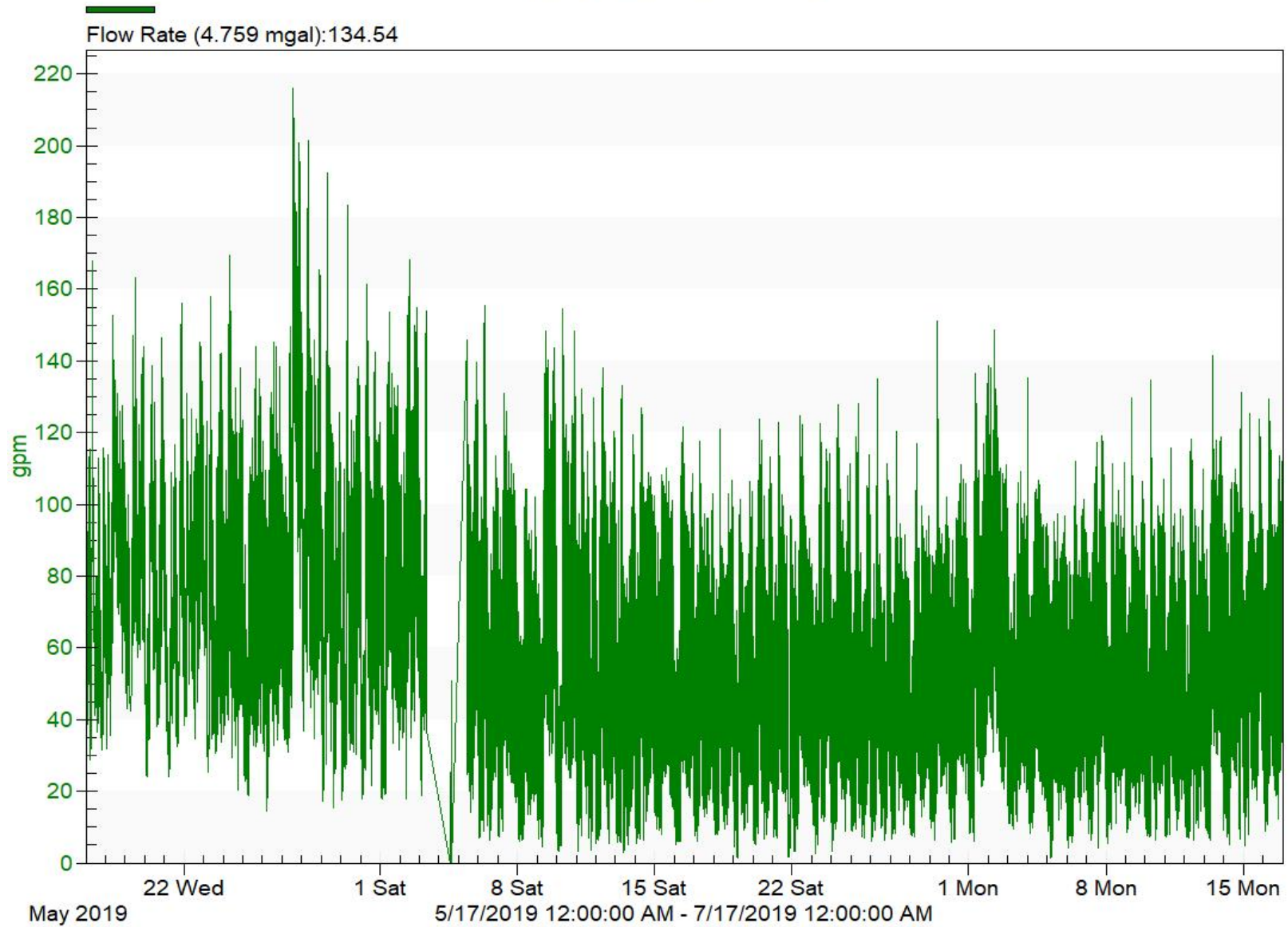
City of Chanhassen, Minnesota

Sept 12th WWF Event (0.355 mgal):19.90

Typical DWF Week (0.136 mgal):6.31

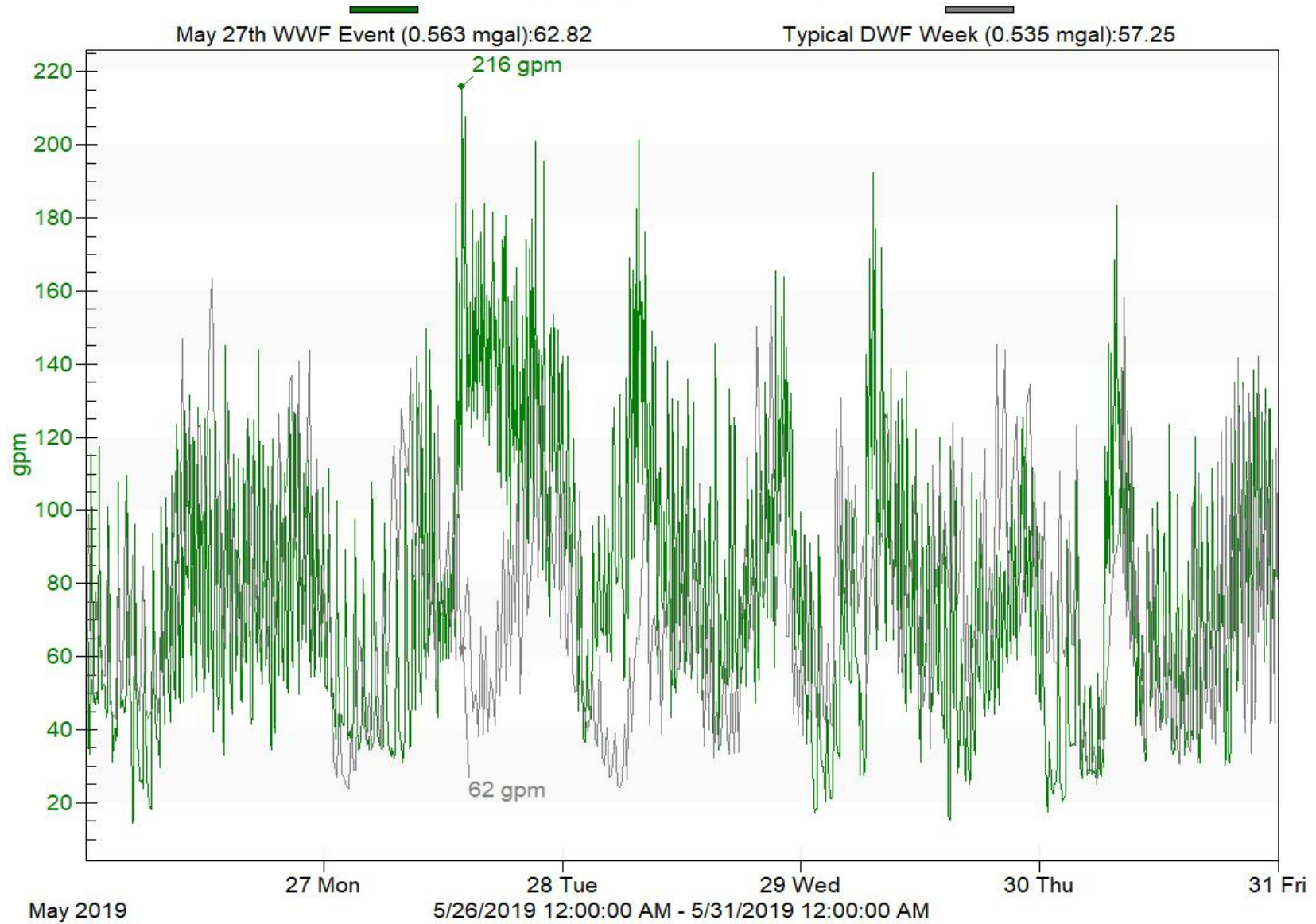


Flow Meter Location M6 (Majestic Way and Windmill Drive) City of Chanhassen, Minnesota



Flow Meter Location M6 (Majestic Way and Windmill Drive)

City of Chanhassen, Minnesota

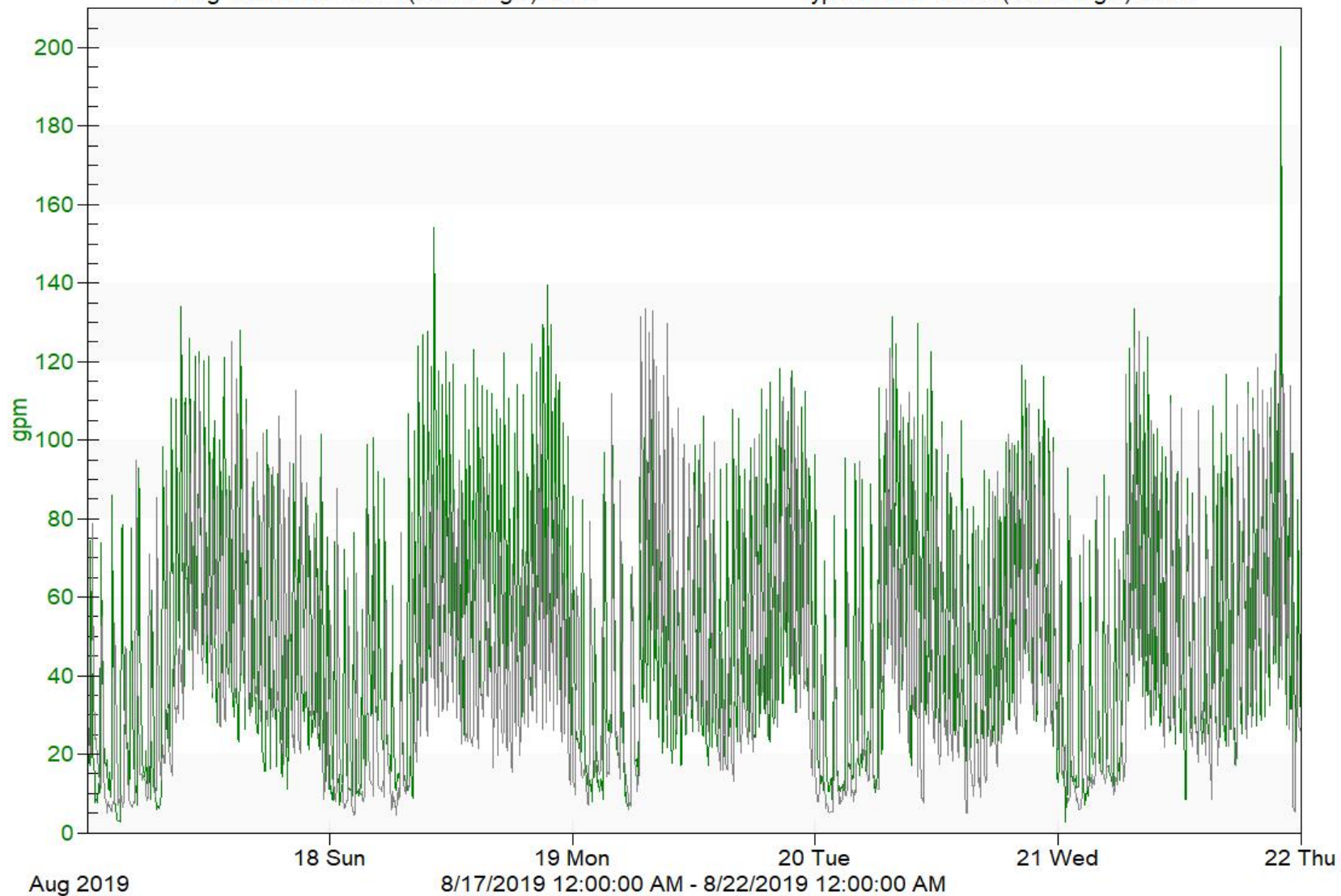


Flow Meter Location M6 (Majestic Way and Windmill Drive)

City of Chanhassen, Minnesota

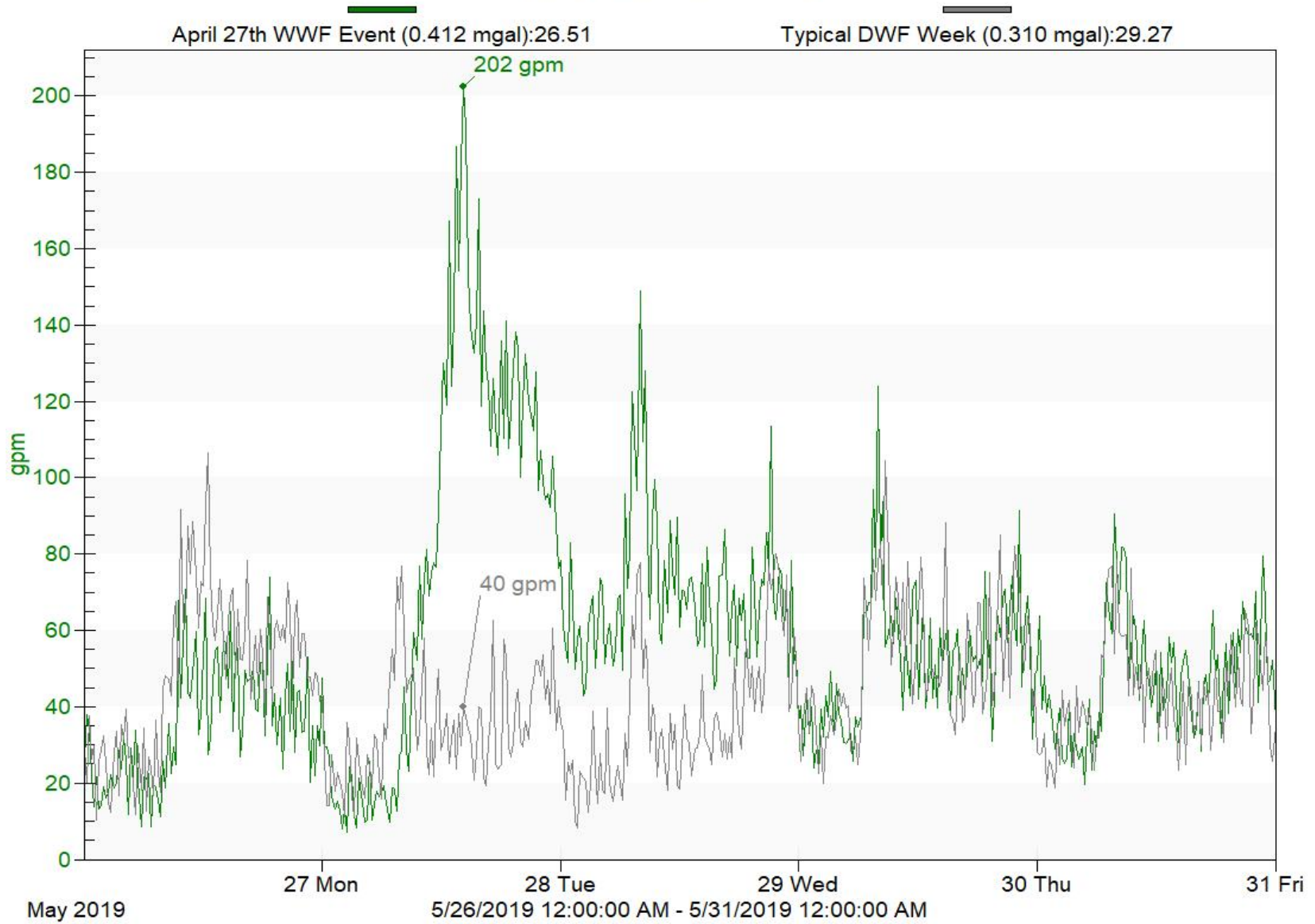
Aug 18th WWF Event (0.358 mgal):15.97

Typical DWF Week (0.316 mgal):47.32



Flow Meter Location M7 (South of LS No. 3)

City of Chanhassen, Minnesota

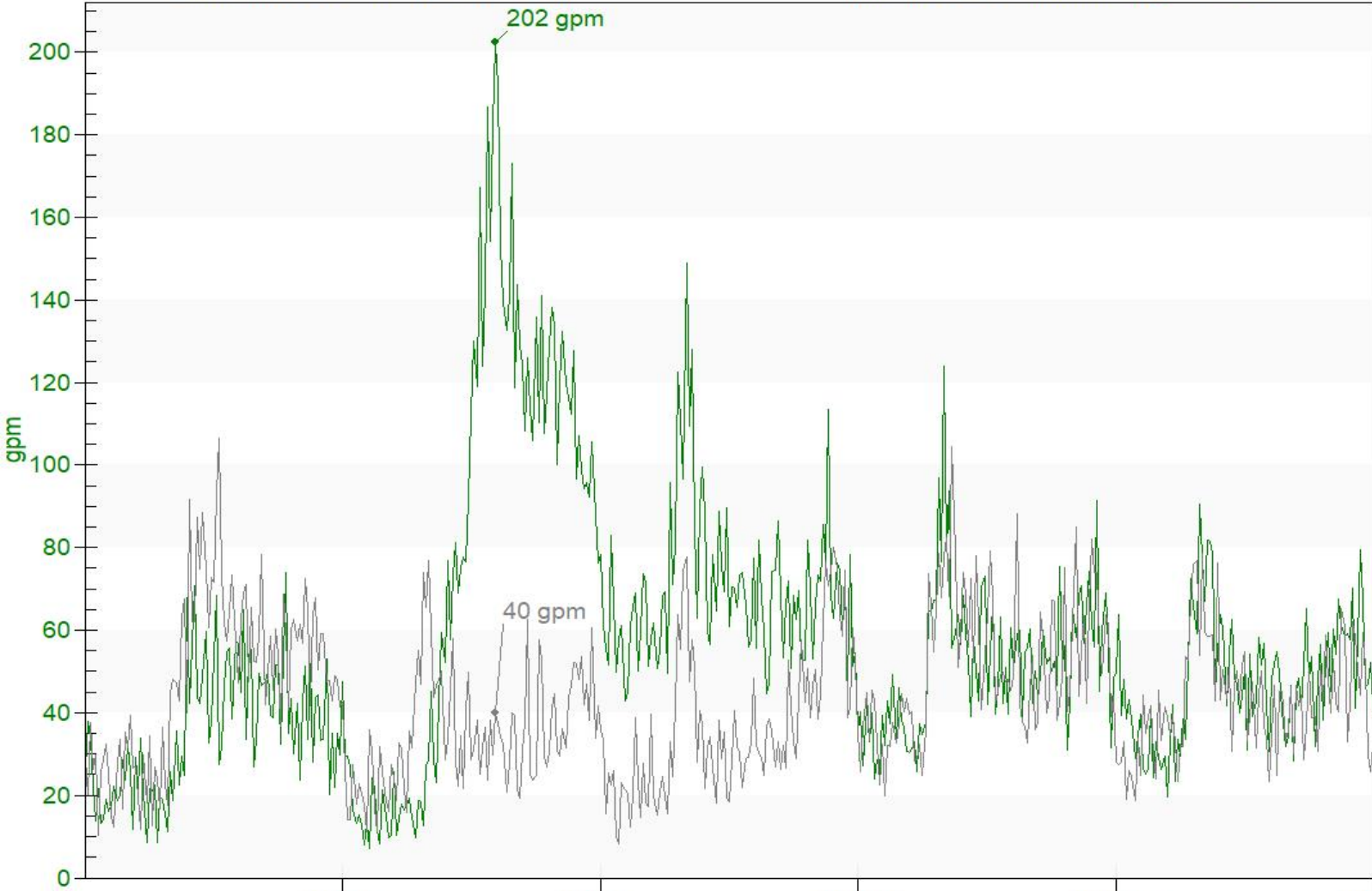


Flow Meter Location M7 (South of LS No. 3)

City of Chanhassen, Minnesota

May 27th WWF Event (0.412 mgal):26.51

Typical DWF Week (0.310 mgal):29.27



May 2019

27 Mon

28 Tue

29 Wed

30 Thu

31 Fri

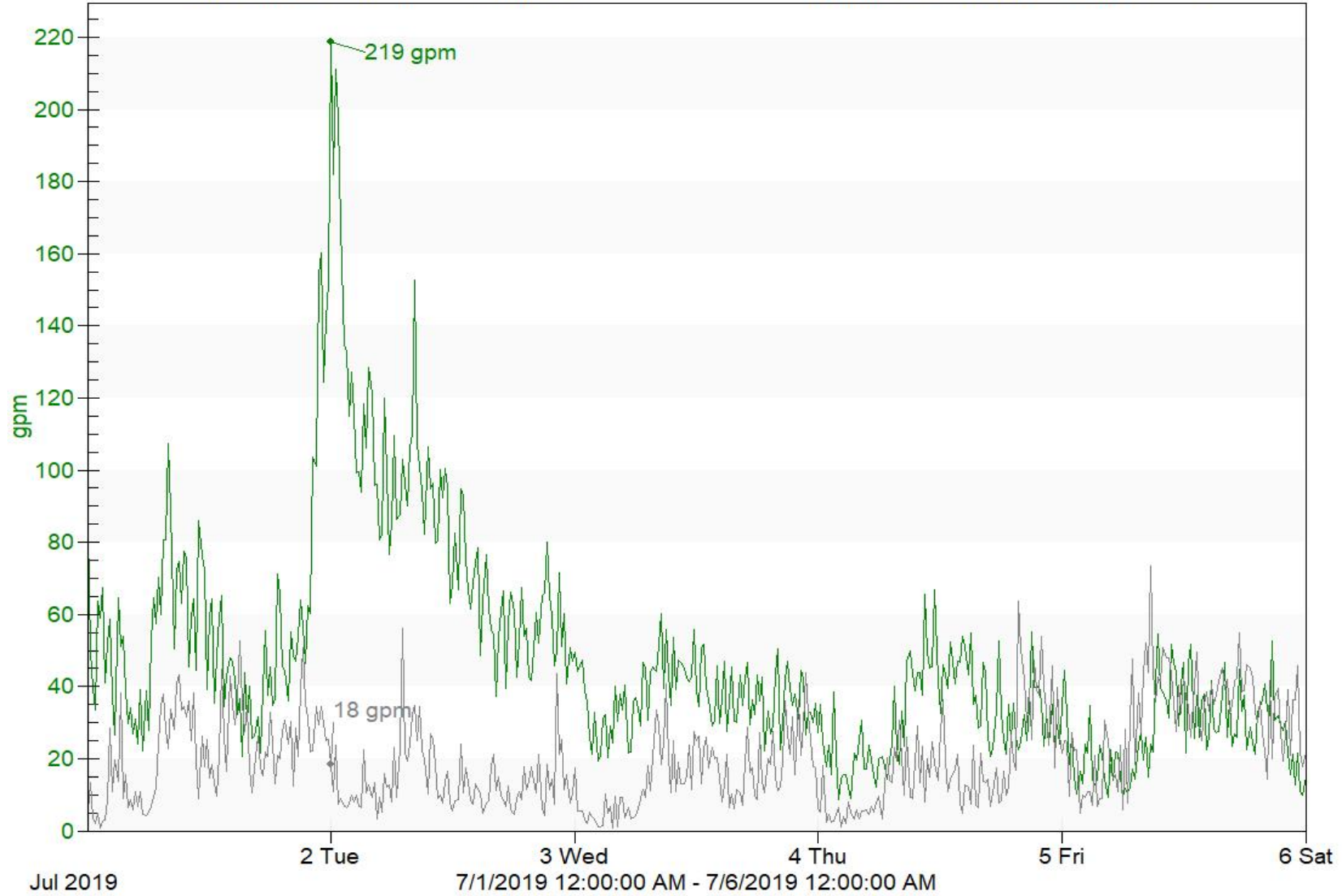
5/26/2019 12:00:00 AM - 5/31/2019 12:00:00 AM

Flow Meter Location M7 (South of LS No. 3)

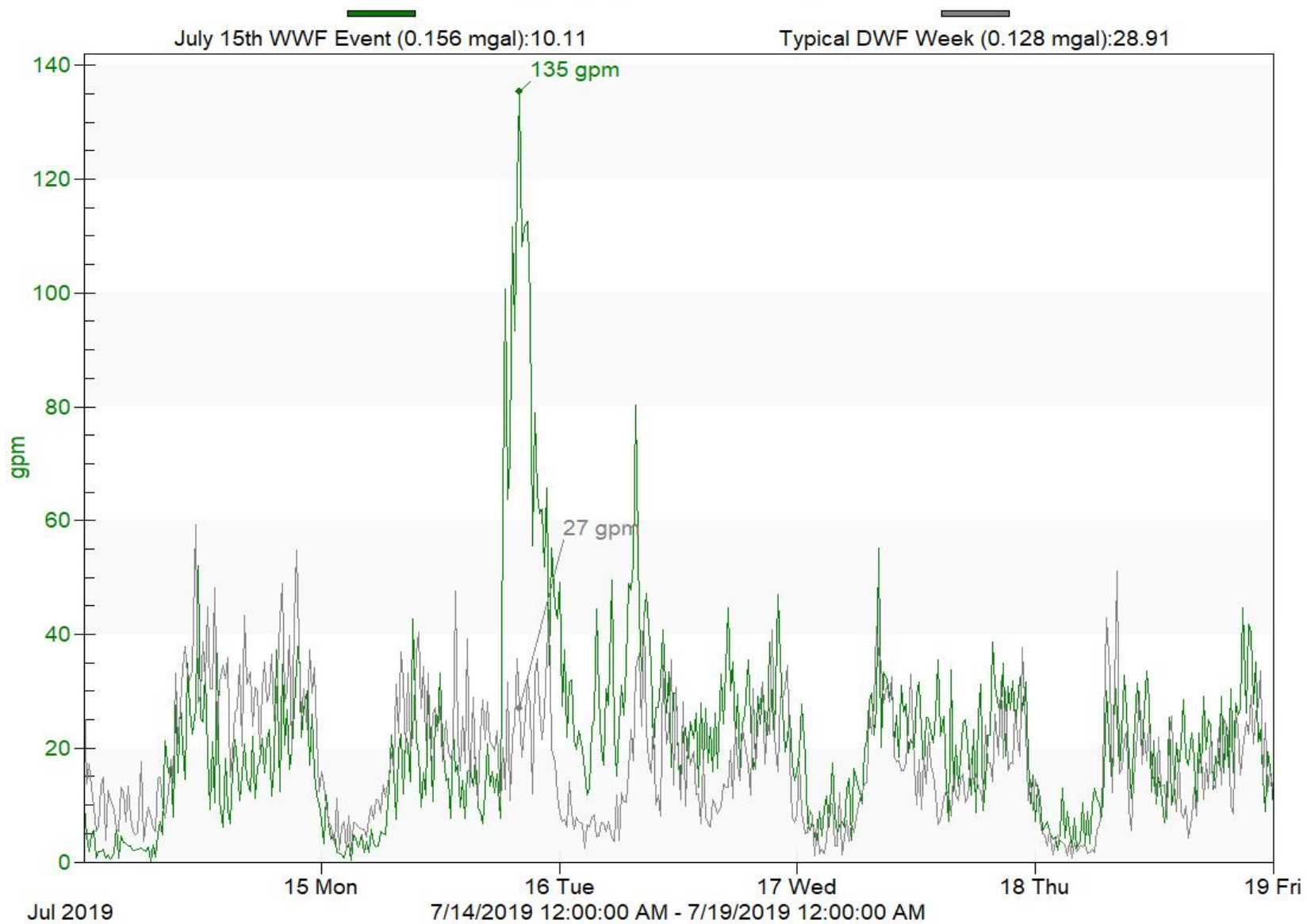
City of Chanhassen, Minnesota

July 1st WWF Event (0.344 mgal):84.03

Typical DWF Week (0.144 mgal):5.43

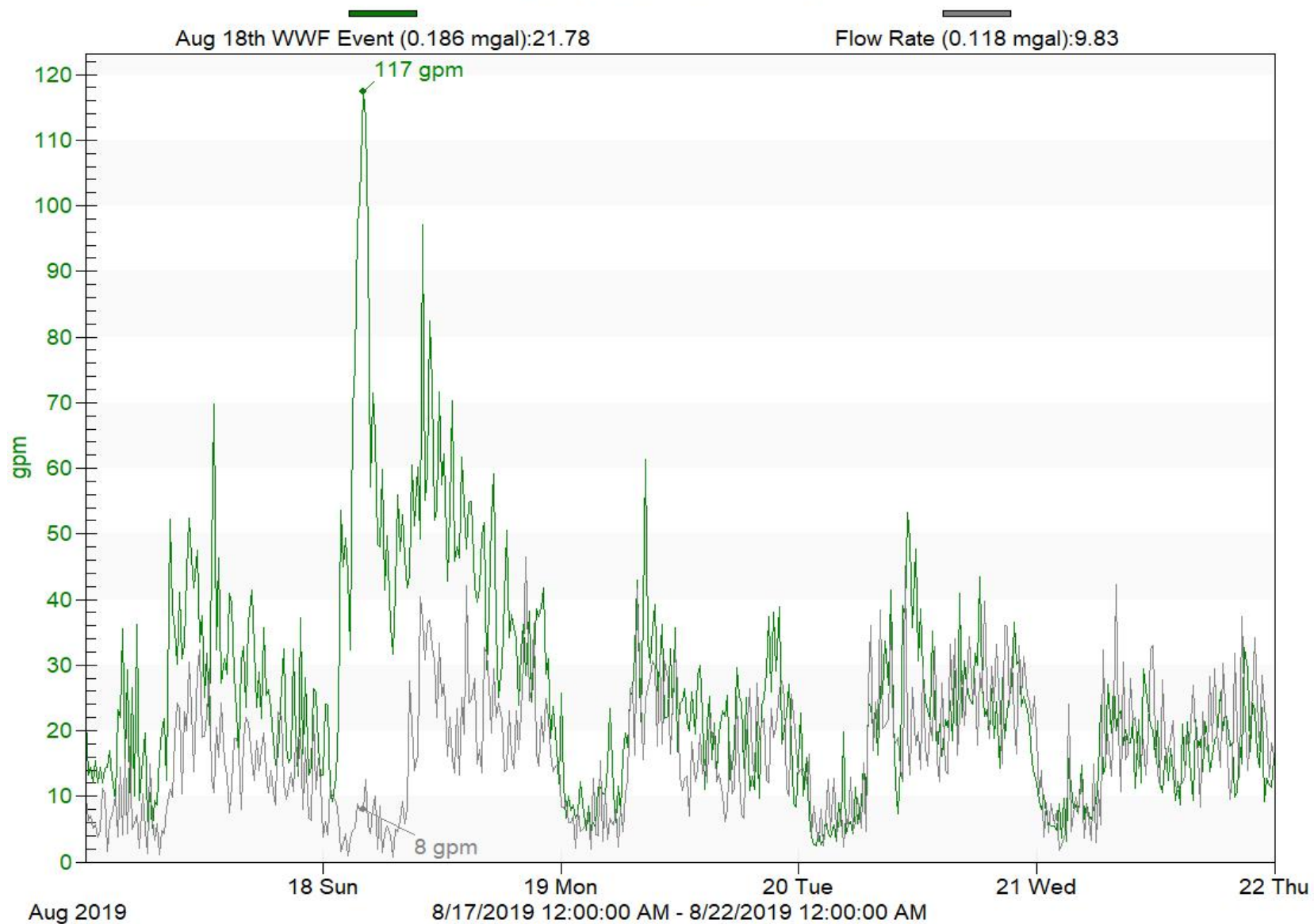


Flow Meter Location M7 (South of LS No. 3) City of Chanhassen, Minnesota



Flow Meter Location M7 (South of LS No. 3)

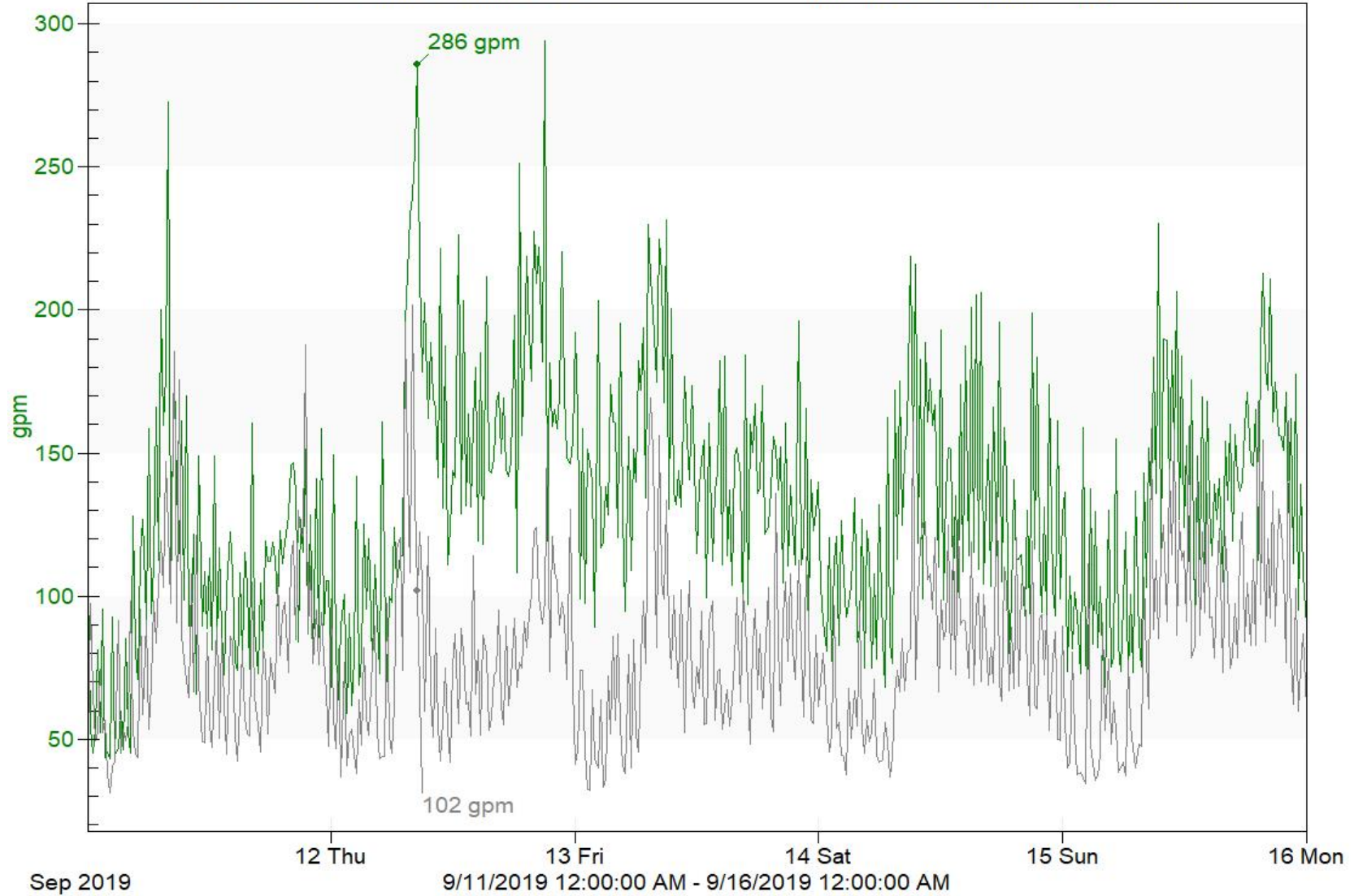
City of Chanhassen, Minnesota



Flow Meter Location M8 (North of Brule Circle, West of Chanhassen Road) City of Chanhassen, Minnesota

Sept 12th WWF Event (0.959 mgal): 106.58

Typical DWF Week (0.579 mgal): 46.15



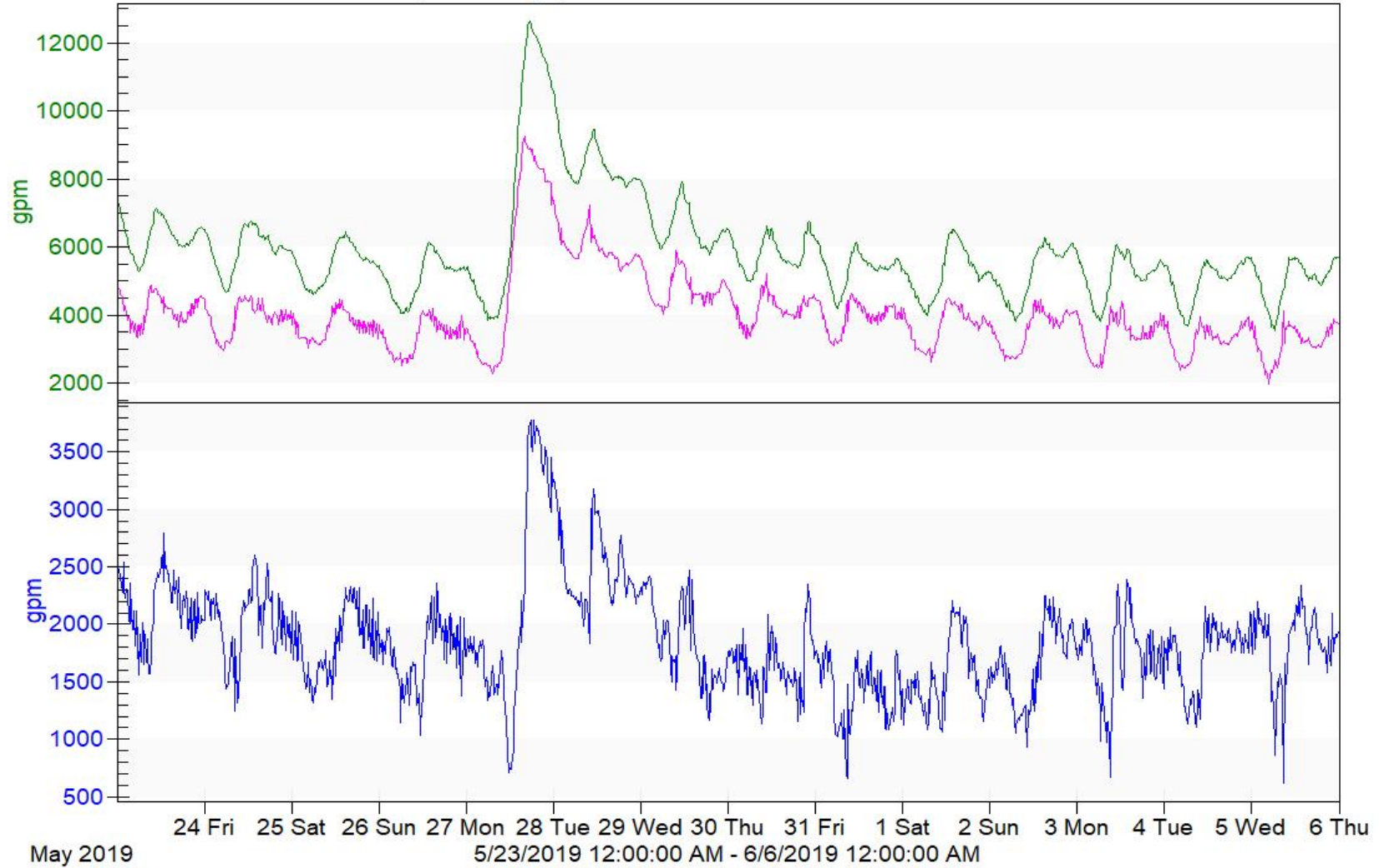
MCES Flow Meter Data

City of Chanhassen

MCES M413 Flow Rate (118.713 mgal):7331.66

MCES M439 Flow Rate (81.581 mgal):4876.71

Subtracted Flow Rate (37.131 mgal):2454.95



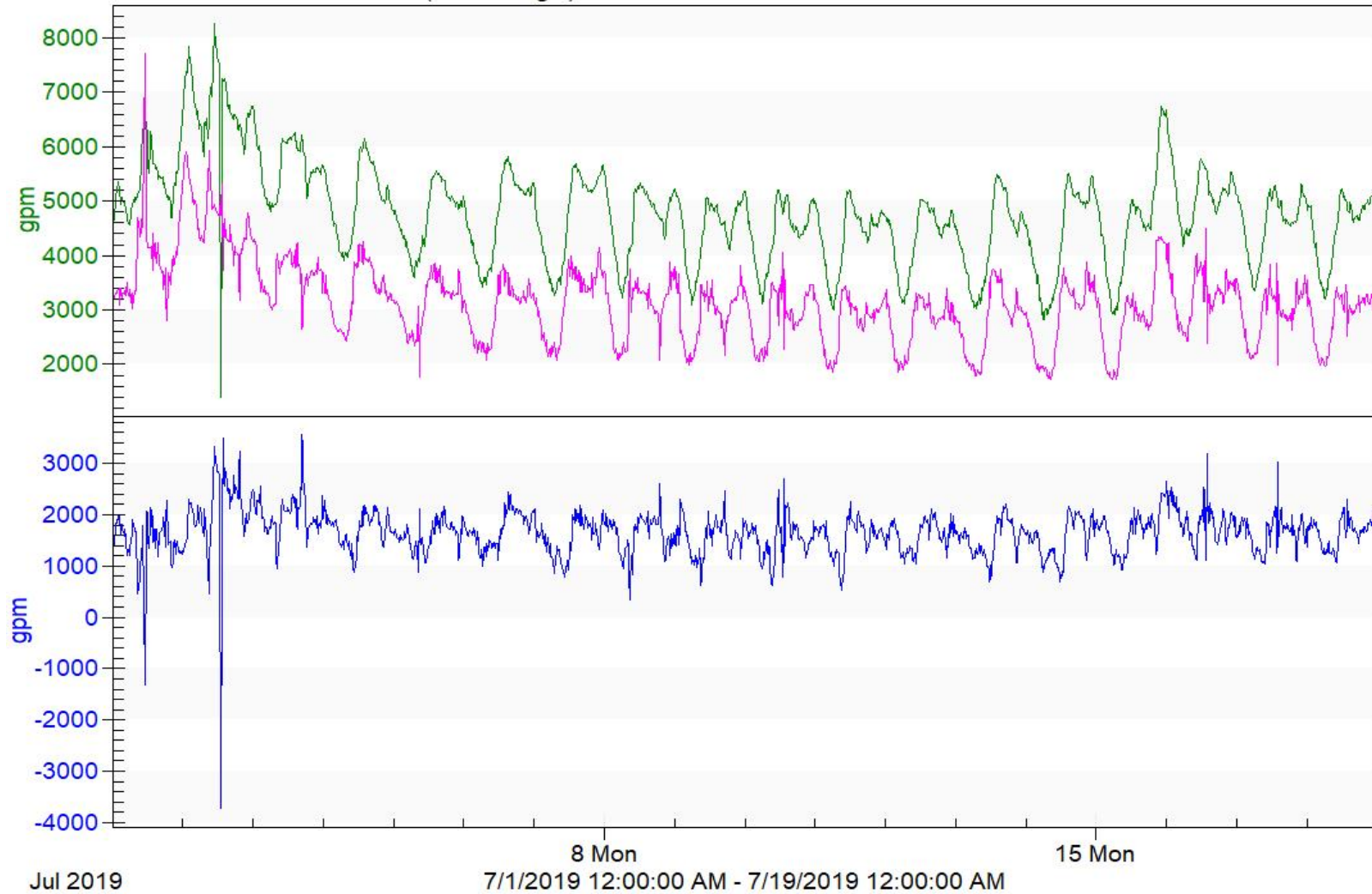
MCES Flow Meter Data

City of Chanhassen

MCES M413 Flow Rate (124.542 mgal):4634.04

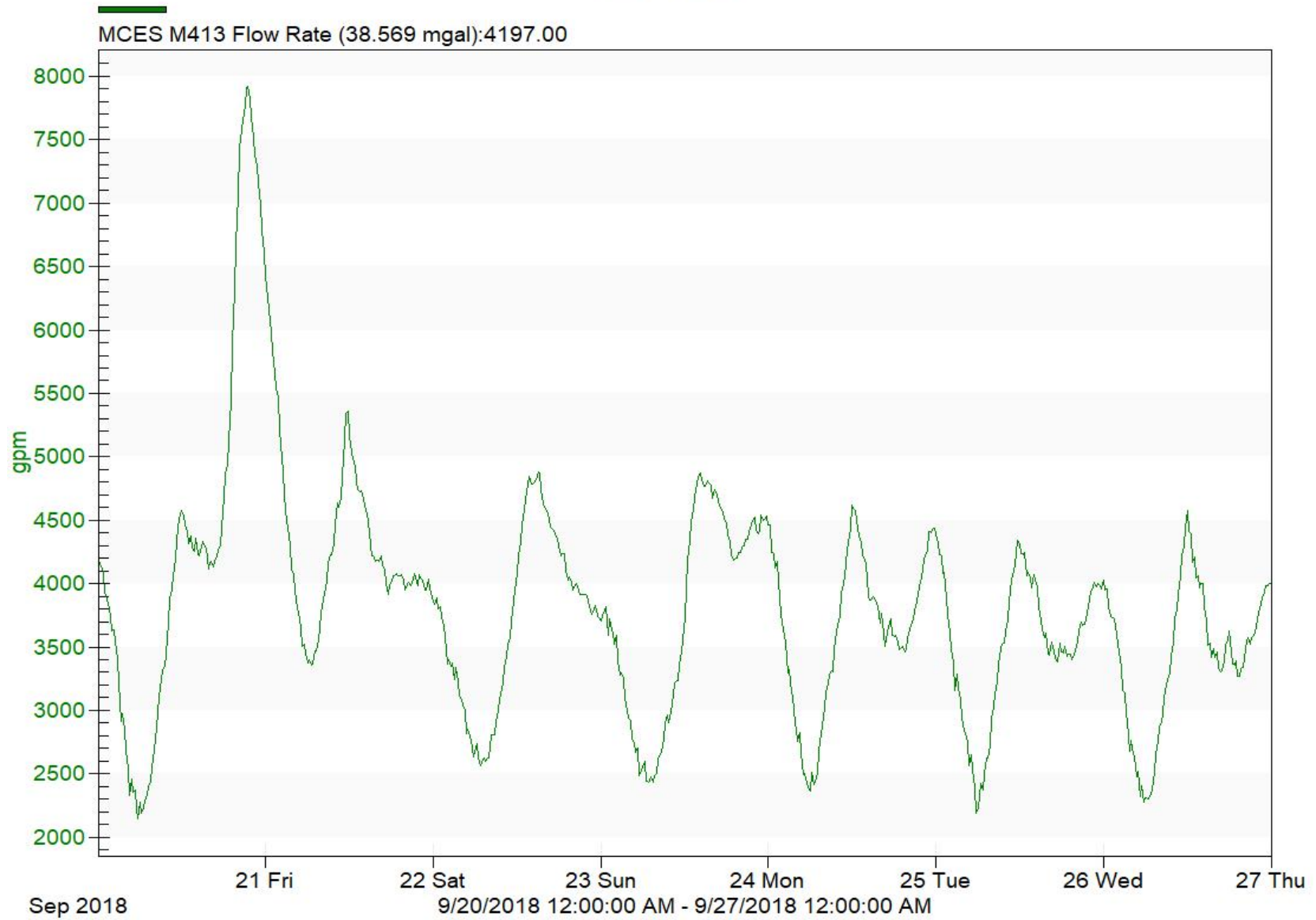
MCES M439 Flow Rate (81.556 mgal):3276.41

Subtracted Flow Rate (42.988 mgal):1357.62



MCES Flow Meter Data

City of Chanhassen



MCES Flow Meter Data

City of Chanhassen

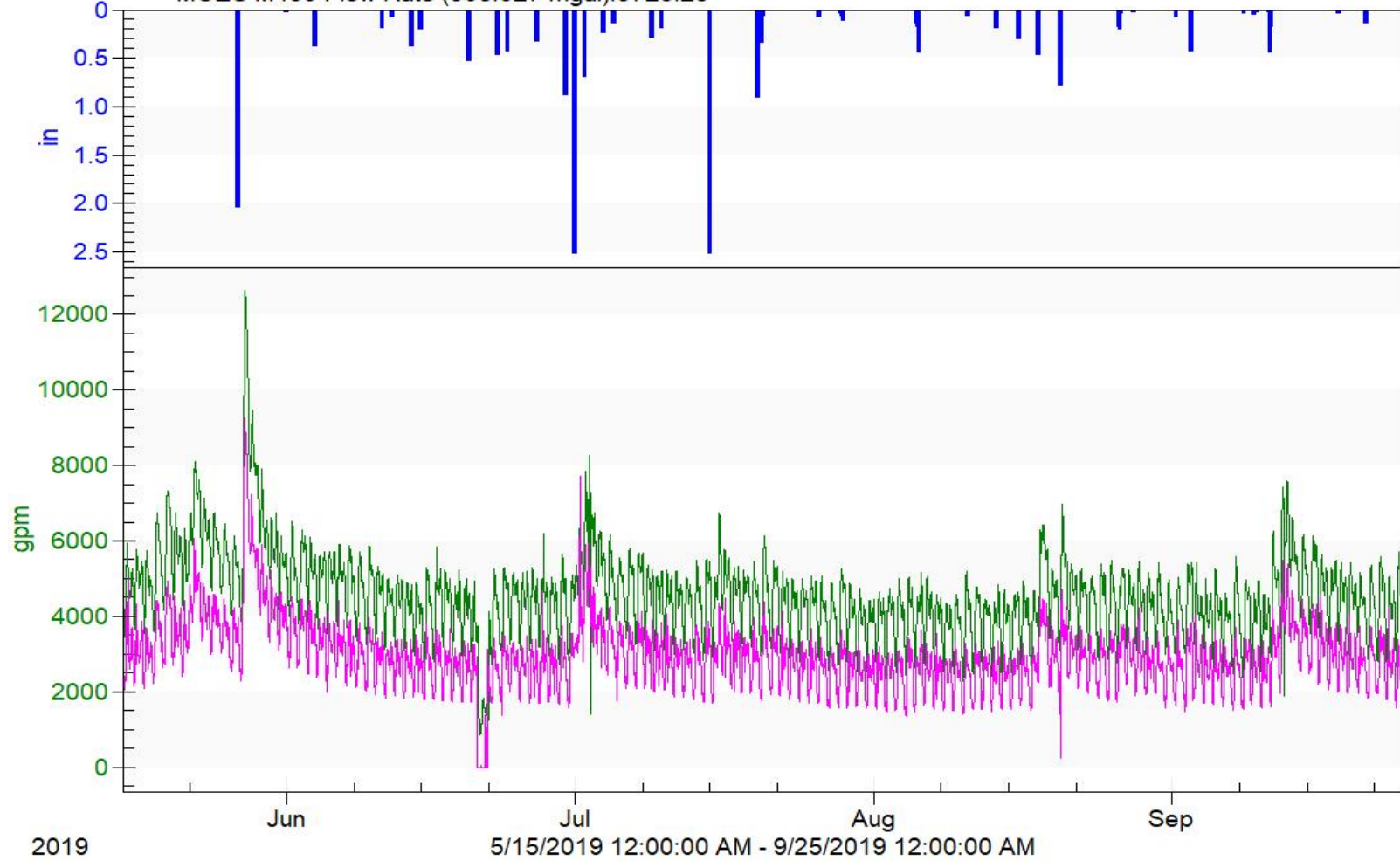
Rainfall (26.047 in):

MCES M413 Flow Rate (415.347 mgal):

MCES M413 Flow Rate (471.375 mgal):5129.51

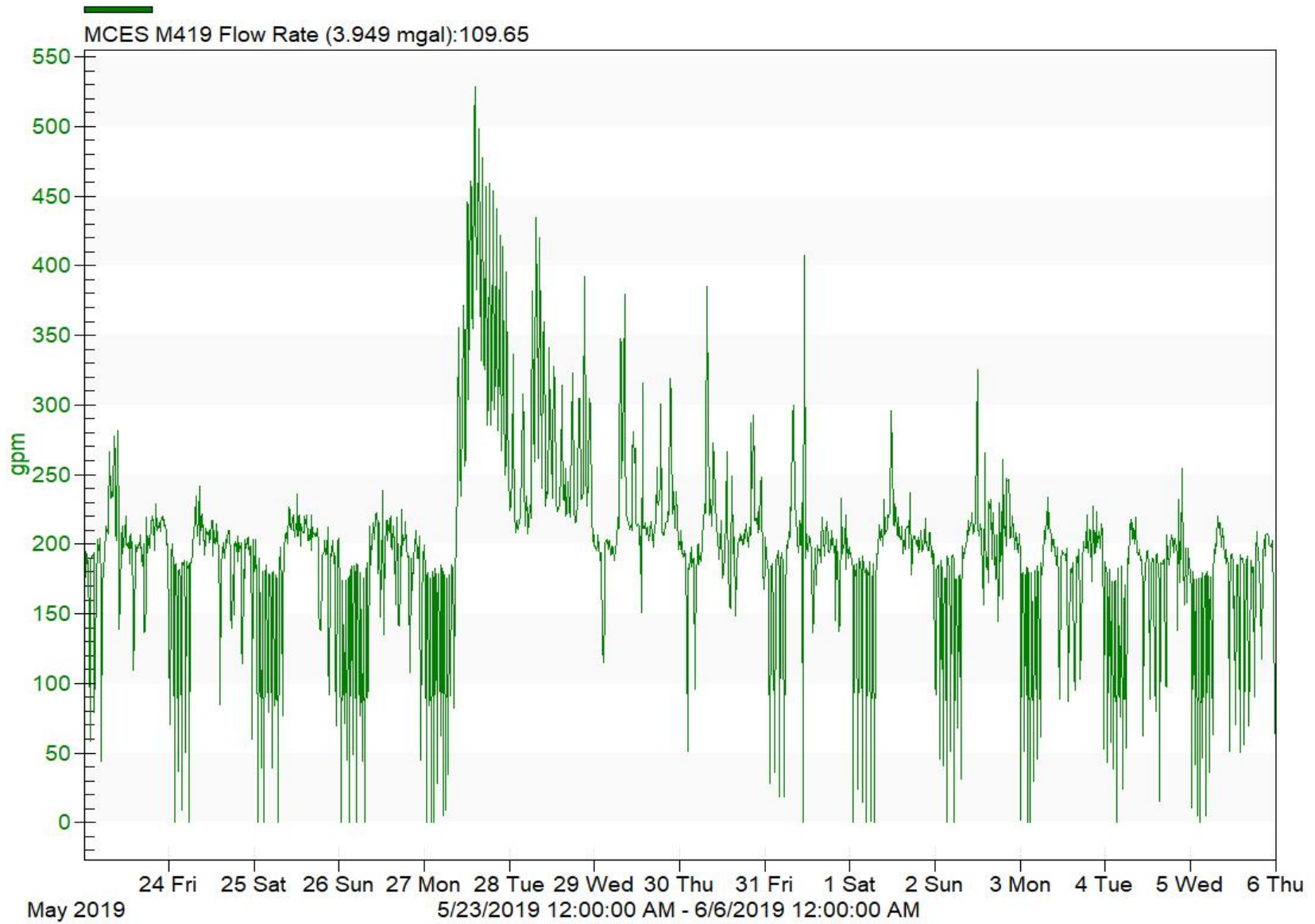
MCES M439 Flow Rate (266.655 mgal):

MCES M439 Flow Rate (306.027 mgal):3723.25



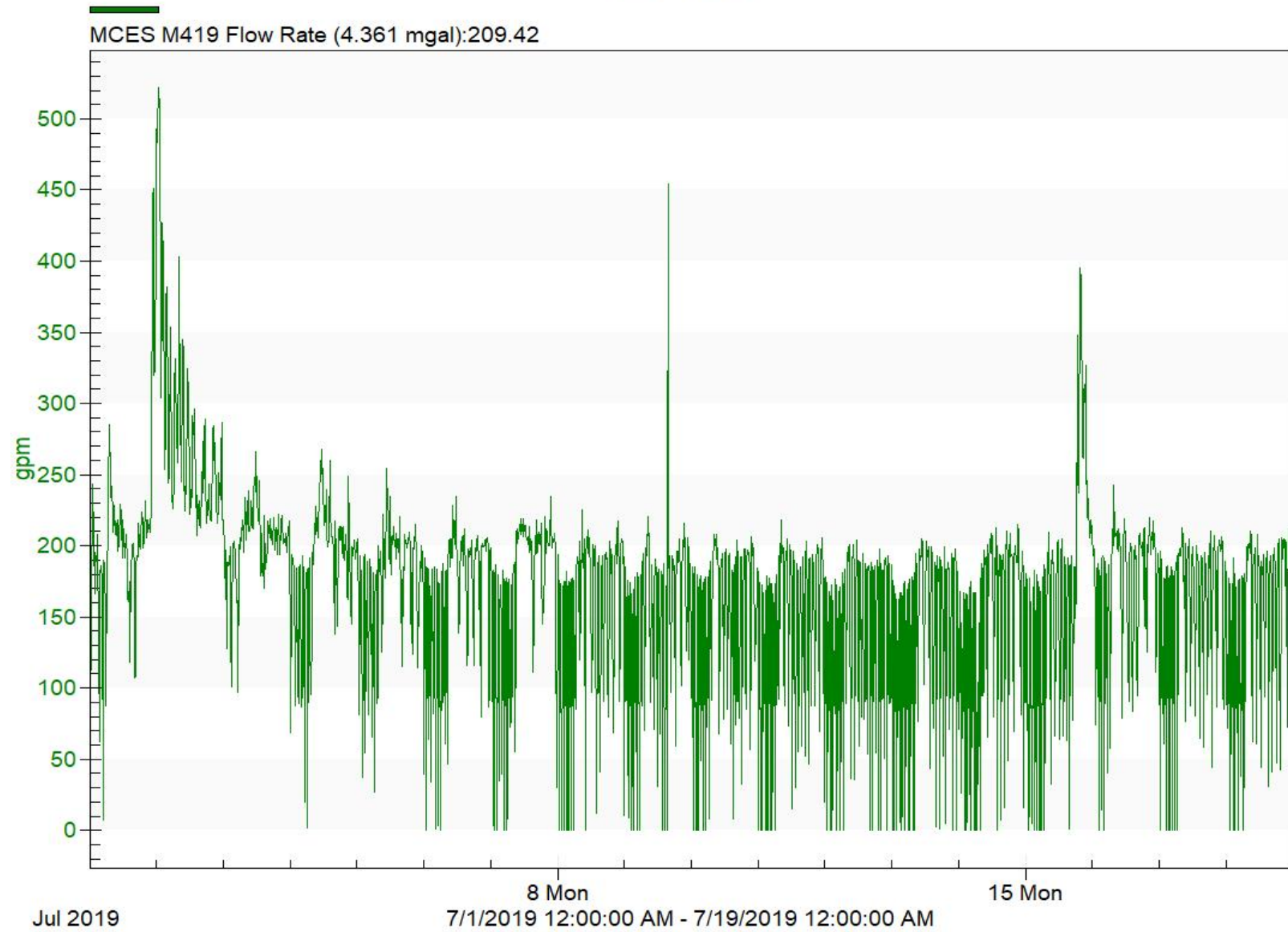
MCES Flow Meter Data

City of Chanhassen



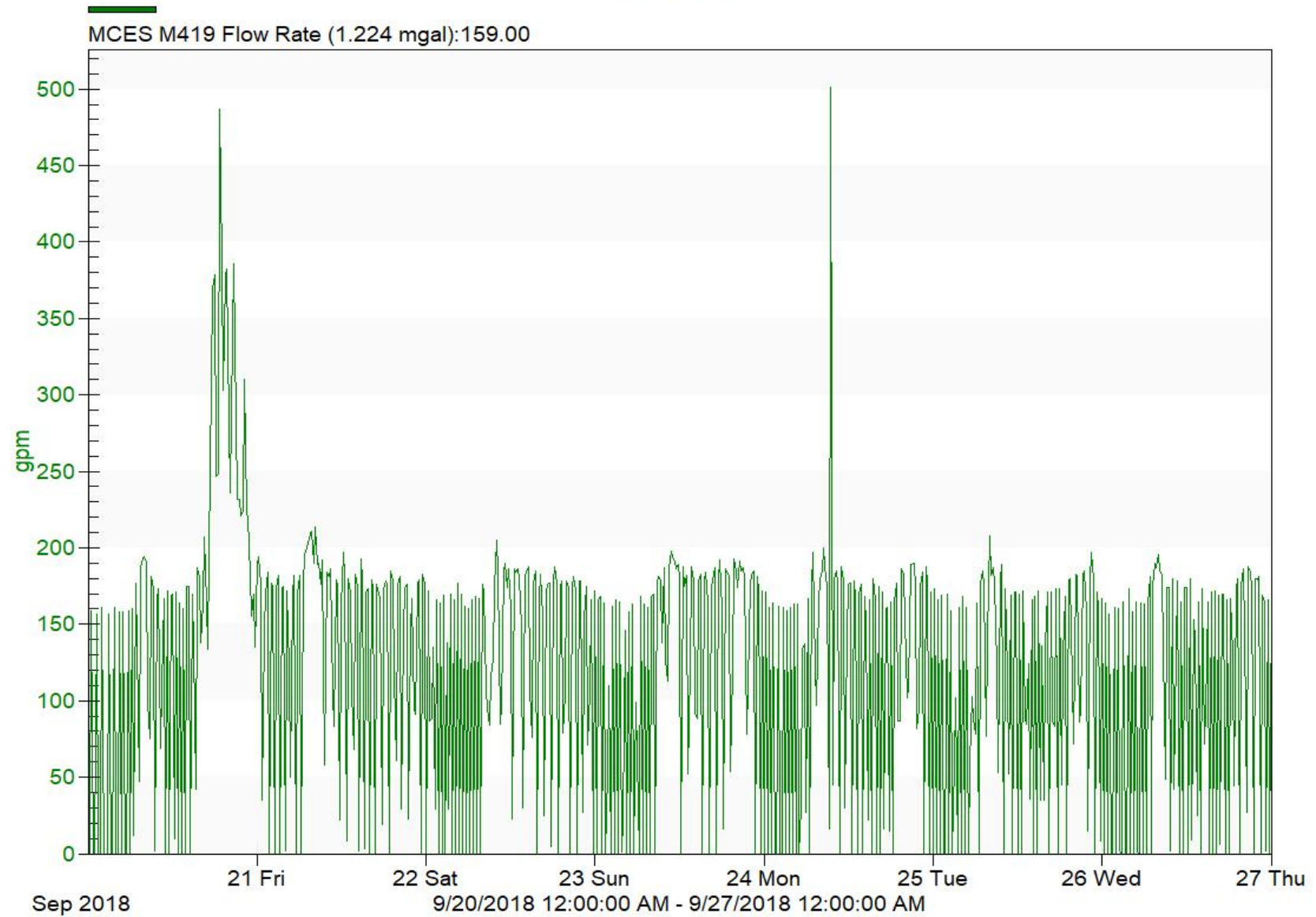
MCES Flow Meter Data

City of Chanhassen



MCES Flow Meter Data

City of Chanhassen

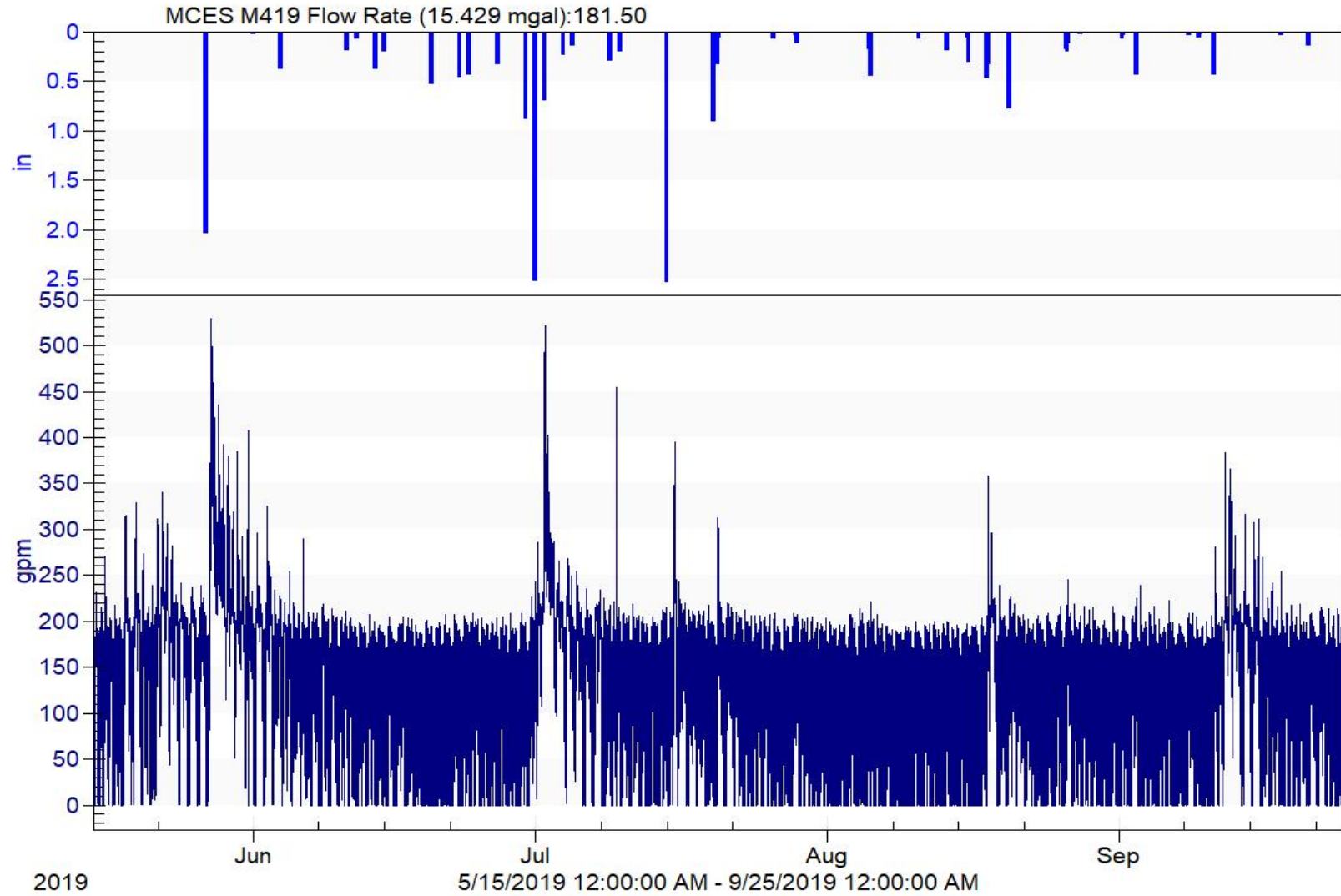


MCES Flow Meter Data

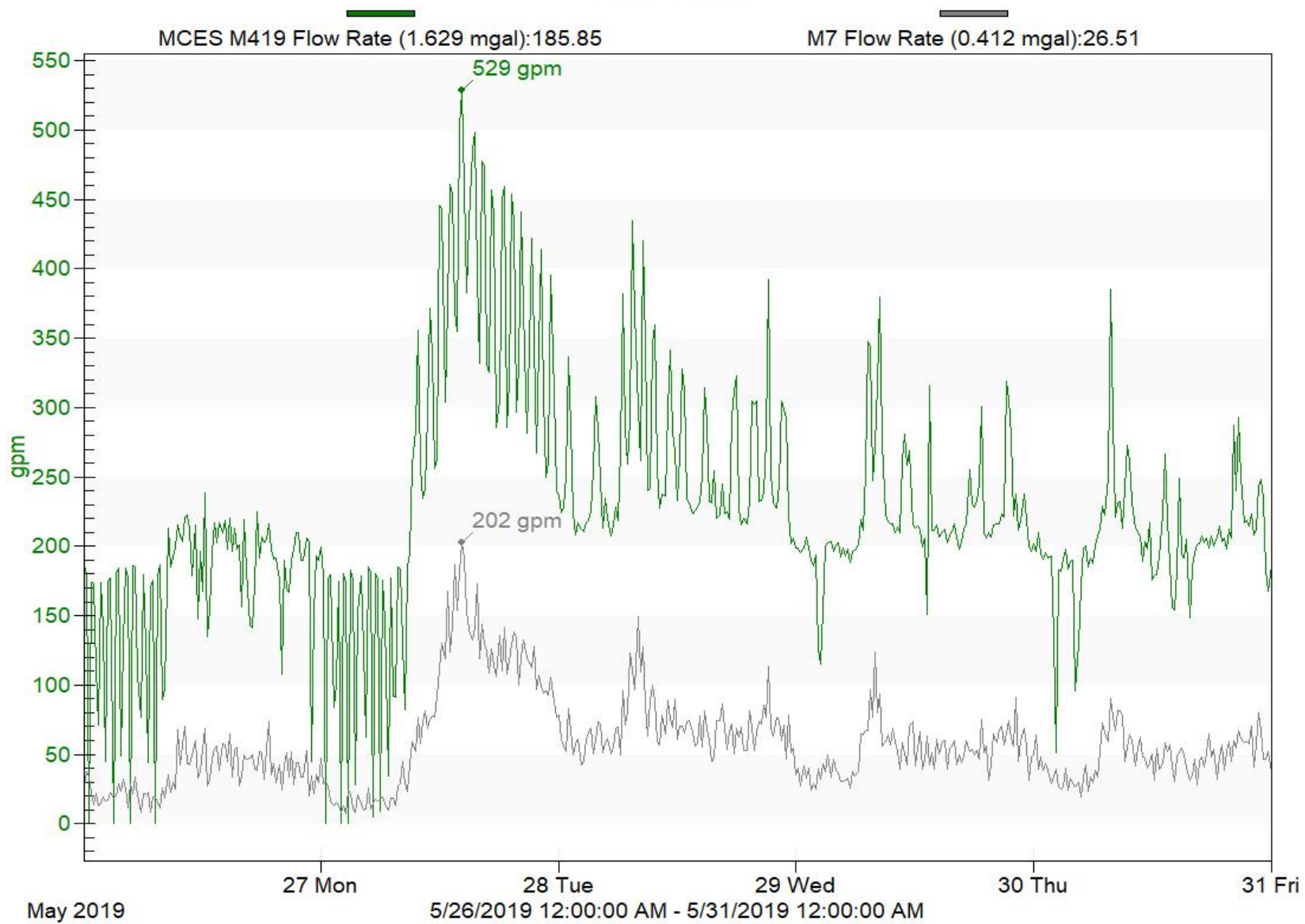
City of Chanhassen

Rainfall (26.047 in):

MCES M419 Flow Rate (13.180 mgal):



Flow Meter M7A (MCES M419 minus M7 Flows) City of Chanhassen

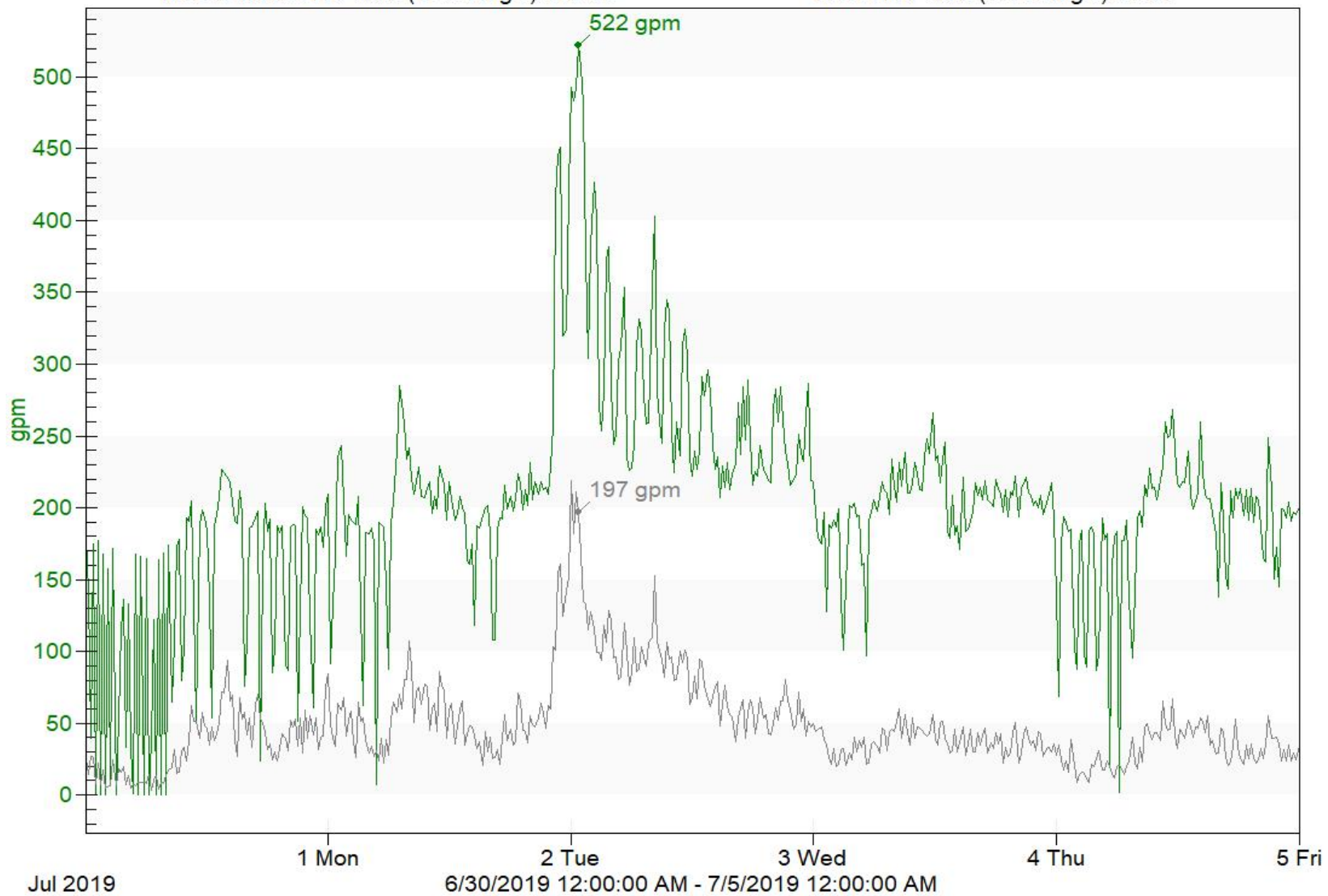


Flow Meter M7A (MCES M419 minus M7 Flows)

City of Chanhassen

MCES M419 Flow Rate (1.458 mgal):179.80

M7A Flow Rate (0.354 mgal):24.98

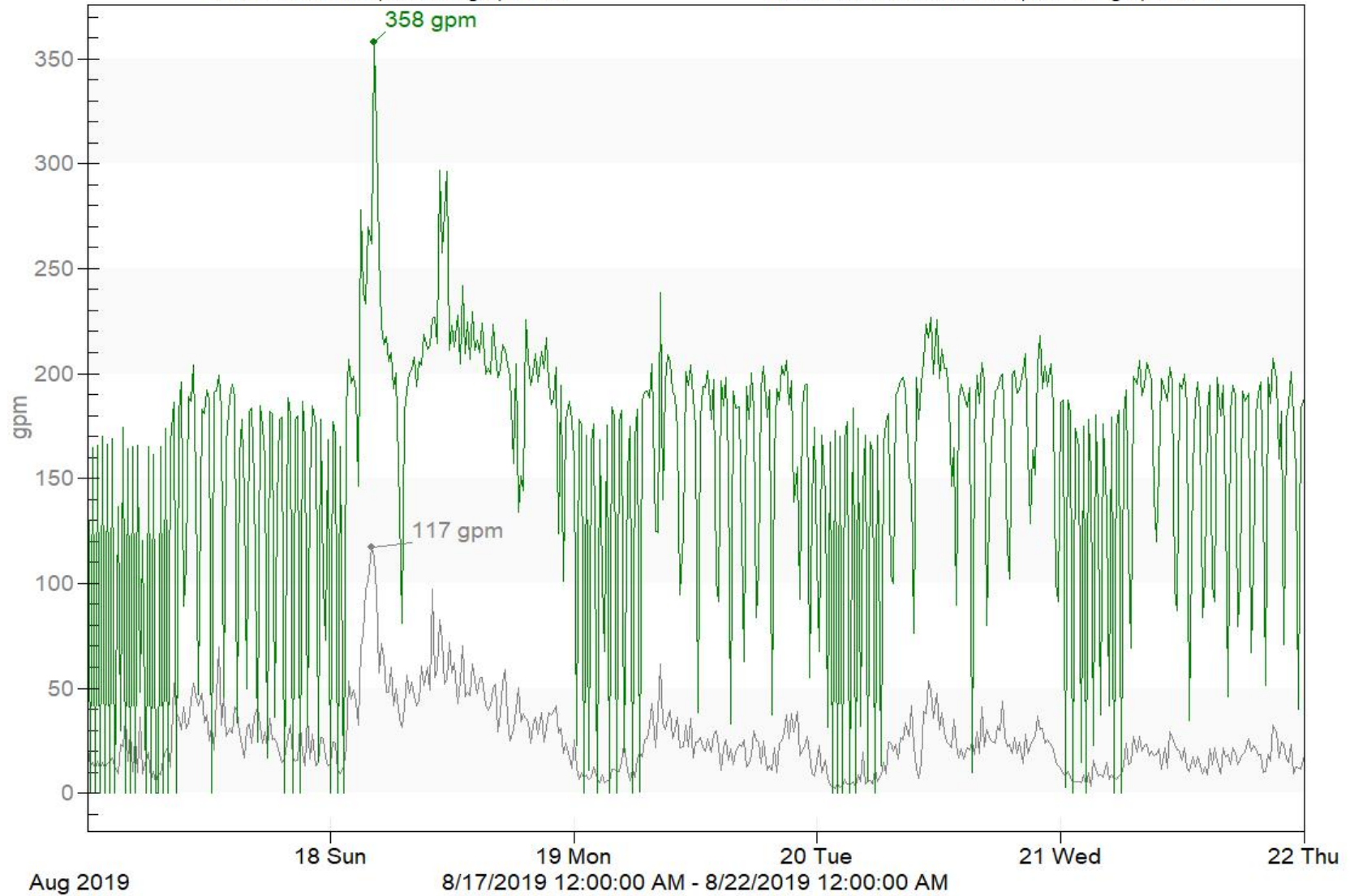


Flow Meter Location M7A (South of LS No. 3)

City of Chanhassen, Minnesota

M7A Flow Rate (0.186 mgal): 21.78

MCES M419 Flow Rate (1.111 mgal): 173.61



Appendix B

Manhole Condition Assessment Reports

Chanhassen Manhole Inspection Report



Asset Information

System Owner:

Structure Number:

Rim to Invert:

Rim to Grade:

Grade to Invert:

Location Code:

Access Point Type:

Access Point Use:

Surface Type:

Street:

City:

Inspection Information

Project:

Surveyed By:

Surveyor Certificate No.:

Reviewed By:

Reviewer Certificate No.:

Inspection Date:

Weather:

Inspection Status:

Inflow Potential from Runoff:

Evidence of Surcharge:

SEH Manhole Rating:

Additional Component Info:

Location Details:

Additional Info:

Cover | Adjustment Ring

Cover Shape:

Cover Material:

Cover Condition:

Cover Type:

Cover/Frame Fit:

Hole Diameter:

Cover Insert Condition:

Cover Rating:

Adjustment Ring Type:

Adjustment Ring Condition:

Adjustment Ring Rating:

Cover Size:

Cover Size Width:

Bearing Surface Diam:

Bearing Surface Width:

Pick Holes:

Cover Insert Type:

Adjustment Ring Height:

Adjustment Ring Material:

Frame

Frame Material:

Frame Bearing Surface Width:

Frame Clear Opening Diam:

Frame Condition:

Frame Seal Inflow:

Frame Rating:

Depth:

Frame Offset Distance:

Frame Clear Opening Width:

Frame Seal Condition:

Frame Depth:

Chimney | Cone

Chimney Present:	<input type="text" value="Yes"/>	Chimney Material:	<input type="text" value="Not Known"/>
Chimney Infiltration/Inflow:	<input type="text" value="None"/>	Chimney Condition:	<input type="text" value="Sound"/>
Chimney Clear Opening:	<input type="text" value="26.70 in."/>	Chimney Depth:	<input type="text" value="0.96 in."/>
Chimney Coating/Liner:	<input type="text" value="Plastic"/>		
Chimney Rating:	<input type="text" value="1 - minor defects - failure unlikely in foreseeable future"/>		

Cone Type:	<input type="text" value="Conical centered"/>	Cone Depth:	<input type="text" value="5.28 in."/>
Cone Material:	<input type="text" value="Concrete (precast)"/>	Cone Condition:	<input type="text" value="Sound"/>
Cone Coating/Liner:	<input type="text" value="None"/>		
Cone Rating:	<input type="text" value="1 - minor defects - failure unlikely in foreseeable future"/>		

Wall | Bench | Channel

Wall Material:	<input type="text" value="Concrete (precast)"/>	Wall Coating/Liner:	<input type="text" value="None"/>
Wall Diameter/Lenght:	<input type="text" value="46.00 in."/>	Wall by Size (width):	
Wall Depth:	<input type="text" value="7.14 in."/>	Wall Condition:	<input type="text" value="Sound"/>
Manhole Steps:	<input type="text" value="5"/>	Step Material:	<input type="text" value="Metal"/>
Wall Rating:	<input type="text" value="2 - minor defects - unlikely to fail for at least 20 years"/>		

Bench Present:	<input type="text" value="Yes"/>	Bench Material:	<input type="text" value="Concrete (cast in place)"/>
Bench Coating/Liner:	<input type="text" value="None"/>	Bench Condition:	<input type="text" value="Sound"/>
Bench Rating:	<input type="text" value="1 - minor defects - failure unlikely in foreseeable future"/>		

Channel Installed:	<input type="text" value="Yes"/>	Channel Type:	<input type="text" value="Formed"/>
Channel Material:	<input type="text" value="Concrete (cast in place)"/>	Channel Exposure:	<input type="text" value="Fully Opened"/>
Channel Condition:	<input type="text" value="Sound"/>		
Channel Rating:	<input type="text" value="1 - minor defects - failure unlikely in foreseeable future"/>		

Connections

Pipe No.	Clock Pos.	Rim To Invert (Ft)	Direction	Material	Shape	Height (In)	Width (In)	Pipe Cond.	Pipe Seal Cond.	Pipe Type	Pipe Comments	Bulk-head	Bulk-head Cond.	Cond. Rating
1	6	7.65	Out	Vitrified Clay Pipe	Circular	8.00		Sound	Sound	Gravity Connection	Lined VCP.	No		1
2	10	6.31	In	Polyvinyl Chloride	Circular	4.00		Sound	Sound	Gravity Connection		No		1
3	2	5.67	In	Cast Iron	Circular	4.00		Sound	Sound	Gravity Connection	Minor cracks and roots in pipe seal.	No		2
4	4	6.67	In	Cast Iron	Circular	4.00		Sound	Defective	Gravity Connection	Roots around pipe seal.	No		3

Chanhassen Manhole Inspection Report



Asset Information

System Owner:

Structure Number:

Rim to Invert:

Rim to Grade:

Grade to Invert:

Location Code:

Access Point Type:

Access Point Use:

Surface Type:

Street:

City:

Inspection Information

Project:

Surveyed By:

Surveyor Certificate No.:

Reviewed By:

Reviewer Certificate No.:

Inspection Date:

Weather:

Inspection Status:

Inflow Potential from Runoff:

Evidence of Surcharge:

SEH Manhole Rating:

Additional Component Info:

Location Details:

Additional Info:

Cover | Adjustment Ring

Cover Shape:

Cover Material:

Cover Condition:

Cover Type:

Cover/Frame Fit:

Hole Diameter:

Cover Insert Condition:

Cover Rating:

Cover Size:

Cover Size Width:

Bearing Surface Diam:

Bearing Surface Width:

Pick Holes:

Cover Insert Type:

Adjustment Ring Type:

Adjustment Ring Height:

Adjustment Ring Condition:

Adjustment Ring Material:

Adjustment Ring Rating:

Frame

Frame Material:

Frame Bearing Surface Width:

Frame Clear Opening Diam:

Frame Condition:

Frame Seal Inflow:

Frame Rating:

Depth:

Frame Offset Distance:

Frame Clear Opening Width:

Frame Seal Condition:

Frame Depth:

Chimney | Cone

Chimney Present:	<input type="text" value="Yes"/>	Chimney Material:	<input type="text" value="Not Known"/>
Chimney Infiltration/Inflow:	<input type="text" value="None"/>	Chimney Condition:	<input type="text" value="Sound"/>
Chimney Clear Opening:	<input type="text" value="26.40 in."/>	Chimney Depth:	<input type="text" value="1.57 in."/>
Chimney Coating/Liner:	<input type="text" value="Plastic"/>		
Chimney Rating:	<input type="text" value="1 - minor defects - failure unlikely in foreseeable future"/>		

Cone Type:	<input type="text" value="Conical centered"/>	Cone Depth:	<input type="text" value="6.06 in."/>
Cone Material:	<input type="text" value="Concrete (precast)"/>	Cone Condition:	<input type="text" value="Sound"/>
Cone Coating/Liner:	<input type="text" value="None"/>		
Cone Rating:	<input type="text" value="1 - minor defects - failure unlikely in foreseeable future"/>		

Wall | Bench | Channel

Wall Material:	<input type="text" value="Concrete (precast)"/>	Wall Coating/Liner:	<input type="text" value="None"/>
Wall Diameter/Length:	<input type="text" value="47.00 in."/>	Wall by Size (width):	
Wall Depth:	<input type="text" value="8.19 in."/>	Wall Condition:	<input type="text" value="Defective"/>
Manhole Steps:	<input type="text" value="5"/>	Step Material:	<input type="text" value="Metal"/>
Wall Rating:	<input type="text" value="3 - moderate defects - deterioration may continue, at a 10 to 20 year timeframe"/>		

Bench Present:	<input type="text" value="Yes"/>	Bench Material:	<input type="text" value="Concrete (cast in place)"/>
Bench Coating/Liner:	<input type="text" value="None"/>	Bench Condition:	<input type="text" value="Sound"/>
Bench Rating:	<input type="text" value="1 - minor defects - failure unlikely in foreseeable future"/>		

Channel Installed:	<input type="text" value="Yes"/>	Channel Type:	<input type="text" value="Formed"/>
Channel Material:	<input type="text" value="Concrete (cast in place)"/>	Channel Exposure:	<input type="text" value="Fully Opened"/>
Channel Condition:	<input type="text" value="Sound"/>		
Channel Rating:	<input type="text" value="1 - minor defects - failure unlikely in foreseeable future"/>		

Connections

Pipe No.	Clock Pos.	Rim To Invert (Ft)	Direction	Material	Shape	Height (In)	Width (In)	Pipe Cond.	Pipe Seal Cond.	Pipe Type	Pipe Comments	Bulk-head	Bulk-head Cond.	Cond. Rating
1	6	9.28	Out	Vitrified Clay Pipe	Circular	8.00		Sound	Sound	Gravity Connection		No		1
2	9	8.87	In	Vitrified Clay Pipe	Circular	8.00		Sound	Sound	Gravity Connection	Lined VCP.	No		1
3	1	8.89	In	Vitrified Clay Pipe	Circular	8.00		Sound	Defective	Gravity Connection	Lined VCP. Infiltration near pipe seal.	No		2
4	2	9.14	In	Vitrified Clay Pipe	Circular	8.00		Sound	Defective	Gravity Connection	Lined VCP. Infiltration near pipe seal.	No		2
5	5	5.10										Yes	Good	1

Chanhassen Manhole Inspection Report



Asset Information

System Owner: Chanhassen
Structure Number: 23-114
Rim to Invert: 7.75 ft.
Rim to Grade: 0.00
Grade to Invert: 7.75 ft.
Location Code: Local Rural Streets - Light traffic, town and city back streets, estate streets and curbside parking areas
Access Point Type: Manhole
Access Point Use: Sanitary
Surface Type: Asphalt
Street:
City:

Inspection Information

Project: 150965
Surveyed By: ZBorich, SEH
Surveyor Certificate No.: U-116-07002549
Reviewed By:
Reviewer Certificate No.:
Inspection Date: 10/1/2019
Weather: Dry Weather/Wet Ground
Inspection Status:
Inflow Potential from Runoff: None
Evidence of Surcharge: No
SEH Manhole Rating: 3 - moderate defects - deterioration may continue, at a 10 to 20 year timeframe
Additional Component Info:
Location Details:
Additional Info:

Cover | Adjustment Ring

Cover Shape: Circular
Cover Material: Cast Iron
Cover Condition: Sound
Cover Type: Solid
Cover/Frame Fit: Good
Hole Diameter:
Cover Insert Condition:
Cover Rating: 1 - minor defects - failure unlikely in foreseeable future
Cover Size: 26.00 in.
Cover Size Width:
Bearing Surface Diam: 26.00 in.
Bearing Surface Width:
Pick Holes: 0
Cover Insert Type: None
Adjustment Ring Type: None
Adjustment Ring Height: 0.00 in.
Adjustment Ring Condition:
Adjustment Ring Material:
Adjustment Ring Rating:

Frame

Frame Material: Cast Iron
Frame Bearing Surface Width: 1.00 in.
Frame Clear Opening Diam: 24.00 in.
Frame Condition: Sound
Frame Seal Inflow: None
Frame Rating: 1 - minor defects - failure unlikely in foreseeable future
Depth: 1.50 in.
Frame Offset Distance: 0.00 in.
Frame Clear Opening Width:
Frame Seal Condition: Sound
Frame Depth: 7.00 in.

Chimney | Cone

Chimney Present:	<input type="text" value="Yes"/>	Chimney Material:	<input type="text" value="Not Known"/>
Chimney Infiltration/Inflow:	<input type="text" value="None"/>	Chimney Condition:	<input type="text" value="Sound"/>
Chimney Clear Opening:	<input type="text" value="26.40 in."/>	Chimney Depth:	<input type="text" value="1.71 in."/>
Chimney Coating/Liner:	<input type="text" value="Plastic"/>		
Chimney Rating:	<input type="text" value="1 - minor defects - failure unlikely in foreseeable future"/>		

Cone Type:	<input type="text" value="Conical centered"/>	Cone Depth:	<input type="text" value="5.98 in."/>
Cone Material:	<input type="text" value="Concrete (precast)"/>	Cone Condition:	<input type="text" value="Sound"/>
Cone Coating/Liner:	<input type="text" value="None"/>		
Cone Rating:	<input type="text" value="1 - minor defects - failure unlikely in foreseeable future"/>		

Wall | Bench | Channel

Wall Material:	<input type="text" value="Concrete (precast)"/>	Wall Coating/Liner:	<input type="text" value="None"/>
Wall Diameter/Lenght:	<input type="text" value="47.00 in."/>	Wall by Size (width):	
Wall Depth:	<input type="text" value="7.02 in."/>	Wall Condition:	<input type="text" value="Defective"/>
Manhole Steps:	<input type="text" value="3"/>	Step Material:	<input type="text" value="Metal"/>
Wall Rating:	<input type="text" value="3 - moderate defects - deterioration may continue, at a 10 to 20 year timeframe"/>		

Bench Present:	<input type="text" value="Yes"/>	Bench Material:	<input type="text" value="Concrete (cast in place)"/>
Bench Coating/Liner:	<input type="text" value="None"/>	Bench Condition:	<input type="text" value="Sound"/>
Bench Rating:	<input type="text" value="1 - minor defects - failure unlikely in foreseeable future"/>		

Channel Installed:	<input type="text" value="Yes"/>	Channel Type:	<input type="text" value="Pipe"/>
Channel Material:	<input type="text" value="Vitrified Clay"/>	Channel Exposure:	<input type="text" value="Fully Opened"/>
Channel Condition:	<input type="text" value="Sound"/>		
Channel Rating:	<input type="text" value="1 - minor defects - failure unlikely in foreseeable future"/>		

Connections

Pipe No.	Clock Pos.	Rim To Invert (Ft)	Direction	Material	Shape	Height (In)	Width (In)	Pipe Cond.	Pipe Seal Cond.	Pipe Type	Pipe Comments	Bulk-head	Bulk-head Cond.	Cond. Rating
1	6	7.75	Out	Vitrified Clay Pipe	Circular	10.00		Defective	Defective	Gravity Connection	Possibly Lined VCP. Deposits covering majority of pipe surface.	No		3
2	9	7.57										Yes	Needs R	3
3	12	7.50	In	Polyvinyl Chloride	Circular	10.00		Sound	Defective	Gravity Connection	Pipe material looks like PVC.	No		2
4	3	7.05	In	Cast Iron	Circular	4.00		Defective	Defective	Gravity Connection	Corrosion/pitting of pipe. Infiltration near pipe seal.	No		3

Chanhassen Manhole Inspection Report



Asset Information

System Owner:

Structure Number:

Rim to Invert:

Rim to Grade:

Grade to Invert:

Location Code:

Access Point Type:

Access Point Use:

Surface Type:

Street:

City:

Inspection Information

Project:

Surveyed By:

Surveyor Certificate No.:

Reviewed By:

Reviewer Certificate No.:

Inspection Date:

Weather:

Inspection Status:

Inflow Potential from Runoff:

Evidence of Surcharge:

SEH Manhole Rating:

Additional Component Info:

Location Details:

Additional Info:

Cover | Adjustment Ring

Cover Shape:

Cover Material:

Cover Condition:

Cover Type:

Cover/Frame Fit:

Hole Diameter:

Cover Insert Condition:

Cover Rating:

Adjustment Ring Type:

Adjustment Ring Condition:

Adjustment Ring Rating:

Cover Size:

Cover Size Width:

Bearing Surface Diam:

Bearing Surface Width:

Pick Holes:

Cover Insert Type:

Adjustment Ring Height:

Adjustment Ring Material:

Frame

Frame Material:

Frame Bearing Surface Width:

Frame Clear Opening Diam:

Frame Condition:

Frame Seal Inflow:

Frame Rating:

Depth:

Frame Offset Distance:

Frame Clear Opening Width:

Frame Seal Condition:

Frame Depth:

Chimney | Cone

Chimney Present:	<input type="text" value="Yes"/>	Chimney Material:	<input type="text" value="Not Known"/>
Chimney Infiltration/Inflow:	<input type="text" value="None"/>	Chimney Condition:	<input type="text" value="Sound"/>
Chimney Clear Opening:	<input type="text" value="23.40 in."/>	Chimney Depth:	<input type="text" value="0.83 in."/>
Chimney Coating/Liner:	<input type="text" value="Plastic"/>		
Chimney Rating:	<input type="text" value="2 - minor defects - unlikely to fail for at least 20 years"/>		

Cone Type:	<input type="text" value="Conical centered"/>	Cone Depth:	<input type="text" value="5.11 in."/>
Cone Material:	<input type="text" value="Concrete (precast)"/>	Cone Condition:	<input type="text" value="Sound"/>
Cone Coating/Liner:	<input type="text" value="None"/>		
Cone Rating:	<input type="text" value="1 - minor defects - failure unlikely in foreseeable future"/>		

Wall | Bench | Channel

Wall Material:	<input type="text" value="Concrete (precast)"/>	Wall Coating/Liner:	<input type="text" value="None"/>
Wall Diameter/Lenght:	<input type="text" value="47.00 in."/>	Wall by Size (width):	
Wall Depth:	<input type="text" value="7.83 in."/>	Wall Condition:	<input type="text" value="Defective"/>
Manhole Steps:	<input type="text" value="5"/>	Step Material:	<input type="text" value="Metal"/>
Wall Rating:	<input type="text" value="3 - moderate defects - deterioration may continue, at a 10 to 20 year timeframe"/>		

Bench Present:	<input type="text" value="Yes"/>	Bench Material:	<input type="text" value="Concrete (cast in place)"/>
Bench Coating/Liner:	<input type="text" value="None"/>	Bench Condition:	<input type="text" value="Sound"/>
Bench Rating:	<input type="text" value="1 - minor defects - failure unlikely in foreseeable future"/>		

Channel Installed:	<input type="text" value="Yes"/>	Channel Type:	<input type="text" value="Formed"/>
Channel Material:	<input type="text" value="Concrete (cast in place)"/>	Channel Exposure:	<input type="text" value="Fully Opened"/>
Channel Condition:	<input type="text" value="Sound"/>		
Channel Rating:	<input type="text" value="1 - minor defects - failure unlikely in foreseeable future"/>		

Connections

Pipe No.	Clock Pos.	Rim To Invert (Ft)	Direction	Material	Shape	Height (In)	Width (In)	Pipe Cond.	Pipe Seal Cond.	Pipe Type	Pipe Comments	Bulk-head	Bulk-head Cond.	Cond. Rating
1	6	8.42	Out	Vitrified Clay Pipe	Circular	10.00		Sound	Sound	Gravity Connection	Lined VCP. Minor cracks in pipe seal.	No		2
2	11	8.28	In	Vitrified Clay Pipe	Circular	10.00		Sound	Defective	Gravity Connection	Lined VCP. Root infiltration protruding through pipe seal.	No		3
3	12	5.54	In	Not Known	Circular	6.00		Sound	Defective	Gravity Connection	Root infiltration protruding through pipe seal.	No		3

Chanhassen Manhole Inspection Report



Asset Information

System Owner:

Structure Number:

Rim to Invert:

Rim to Grade:

Grade to Invert:

Location Code:

Access Point Type:

Access Point Use:

Surface Type:

Street:

City:

Inspection Information

Project:

Surveyed By:

Surveyor Certificate No.:

Reviewed By:

Reviewer Certificate No.:

Inspection Date:

Weather:

Inspection Status:

Inflow Potential from Runoff:

Evidence of Surcharge:

SEH Manhole Rating:

Additional Component Info:

Location Details:

Additional Info:

Cover | Adjustment Ring

Cover Shape:

Cover Material:

Cover Condition:

Cover Type:

Cover/Frame Fit:

Hole Diameter:

Cover Insert Condition:

Cover Rating:

Adjustment Ring Type:

Adjustment Ring Condition:

Adjustment Ring Rating:

Cover Size:

Cover Size Width:

Bearing Surface Diam:

Bearing Surface Width:

Pick Holes:

Cover Insert Type:

Adjustment Ring Height:

Adjustment Ring Material:

Frame

Frame Material:

Frame Bearing Surface Width:

Frame Clear Opening Diam:

Frame Condition:

Frame Seal Inflow:

Frame Rating:

Depth:

Frame Offset Distance:

Frame Clear Opening Width:

Frame Seal Condition:

Frame Depth:

Chimney | Cone

Chimney Present:	<input type="text" value="Yes"/>	Chimney Material:	<input type="text" value="Concrete (precast)"/>
Chimney Infiltration/Inflow:	<input type="text" value="None"/>	Chimney Condition:	<input type="text" value="Sound"/>
Chimney Clear Opening:	<input type="text" value="26.00 in."/>	Chimney Depth:	<input type="text" value="1.65 in."/>
Chimney Coating/Liner:	<input type="text" value="None"/>		
Chimney Rating:	<input type="text" value="1 - minor defects - failure unlikely in foreseeable future"/>		

Cone Type:	<input type="text" value="Conical off centered"/>	Cone Depth:	<input type="text" value="6.03 in."/>
Cone Material:	<input type="text" value="Concrete (precast)"/>	Cone Condition:	<input type="text" value="Sound"/>
Cone Coating/Liner:	<input type="text" value="None"/>		
Cone Rating:	<input type="text" value="1 - minor defects - failure unlikely in foreseeable future"/>		

Wall | Bench | Channel

Wall Material:	<input type="text" value="Concrete (precast)"/>	Wall Coating/Liner:	<input type="text" value="None"/>
Wall Diameter/Lenght:	<input type="text" value="47.40 in."/>	Wall by Size (width):	
Wall Depth:	<input type="text" value="11.47 in."/>	Wall Condition:	<input type="text" value="Sound"/>
Manhole Steps:	<input type="text" value="7"/>	Step Material:	<input type="text" value="Plastic"/>
Wall Rating:	<input type="text" value="2 - minor defects - unlikely to fail for at least 20 years"/>		

Bench Present:	<input type="text" value="Yes"/>	Bench Material:	<input type="text" value="Concrete (cast in place)"/>
Bench Coating/Liner:	<input type="text" value="None"/>	Bench Condition:	<input type="text" value="Sound"/>
Bench Rating:	<input type="text" value="1 - minor defects - failure unlikely in foreseeable future"/>		

Channel Installed:	<input type="text" value="Yes"/>	Channel Type:	<input type="text" value="Formed"/>
Channel Material:	<input type="text" value="Concrete (cast in place)"/>	Channel Exposure:	<input type="text" value="Fully Opened"/>
Channel Condition:	<input type="text" value="Sound"/>		
Channel Rating:	<input type="text" value="1 - minor defects - failure unlikely in foreseeable future"/>		

Connections

Pipe No.	Clock Pos.	Rim To Invert (Ft)	Direction	Material	Shape	Height (In)	Width (In)	Pipe Cond.	Pipe Seal Cond.	Pipe Type	Pipe Comments	Bulk-head	Bulk-head Cond.	Cond. Rating
1	6	11.98	Out	Polyvinyl Chloride	Circular	8.00		Sound	Sound	Gravity Connection		No		1
2	12	11.98	In	Polyvinyl Chloride	Circular	8.00		Sound	Sound	Gravity Connection		No		1
3	3	11.75	In	Polyvinyl Chloride	Circular	10.00		Sound	Sound	Gravity Connection		No		1

Chanhassen Manhole Inspection Report



Asset Information

System Owner:

Structure Number:

Rim to Invert:

Rim to Grade:

Grade to Invert:

Location Code:

Access Point Type:

Access Point Use:

Surface Type:

Street:

City:

Inspection Information

Project:

Surveyed By:

Surveyor Certificate No.:

Reviewed By:

Reviewer Certificate No.:

Inspection Date:

Weather:

Inspection Status:

Inflow Potential from Runoff:

Evidence of Surcharge:

SEH Manhole Rating:

Additional Component Info:

Location Details:

Additional Info:

Cover | Adjustment Ring

Cover Shape:

Cover Material:

Cover Condition:

Cover Type:

Cover/Frame Fit:

Hole Diameter:

Cover Insert Condition:

Cover Rating:

Adjustment Ring Type:

Adjustment Ring Condition:

Adjustment Ring Rating:

Cover Size:

Cover Size Width:

Bearing Surface Diam:

Bearing Surface Width:

Pick Holes:

Cover Insert Type:

Adjustment Ring Height:

Adjustment Ring Material:

Frame

Frame Material:

Frame Bearing Surface Width:

Frame Clear Opening Diam:

Frame Condition:

Frame Seal Inflow:

Frame Rating:

Depth:

Frame Offset Distance:

Frame Clear Opening Width:

Frame Seal Condition:

Frame Depth:

Chimney | Cone

Chimney Present:	<input type="text" value="Yes"/>	Chimney Material:	<input type="text" value="Concrete (precast)"/>
Chimney Infiltration/Inflow:	<input type="text" value="None"/>	Chimney Condition:	<input type="text" value="Sound"/>
Chimney Clear Opening:	<input type="text" value="26.50 in."/>	Chimney Depth:	<input type="text" value="1.98 in."/>
Chimney Coating/Liner:	<input type="text" value="None"/>		
Chimney Rating:	<input type="text" value="2 - minor defects - unlikely to fail for at least 20 years"/>		

Cone Type:	<input type="text" value="Conical off centered"/>	Cone Depth:	<input type="text" value="6.43 in."/>
Cone Material:	<input type="text" value="Concrete (precast)"/>	Cone Condition:	<input type="text" value="Sound"/>
Cone Coating/Liner:	<input type="text" value="None"/>		
Cone Rating:	<input type="text" value="1 - minor defects - failure unlikely in foreseeable future"/>		

Wall | Bench | Channel

Wall Material:	<input type="text" value="Concrete (precast)"/>	Wall Coating/Liner:	<input type="text" value="None"/>
Wall Diameter/Lenght:	<input type="text" value="47.00 in."/>	Wall by Size (width):	
Wall Depth:	<input type="text" value="11.02 in."/>	Wall Condition:	<input type="text" value="Sound"/>
Manhole Steps:	<input type="text" value="6"/>	Step Material:	<input type="text" value="Plastic"/>
Wall Rating:	<input type="text" value="1 - minor defects - failure unlikely in foreseeable future"/>		

Bench Present:	<input type="text" value="Yes"/>	Bench Material:	<input type="text" value="Concrete (cast in place)"/>
Bench Coating/Liner:	<input type="text" value="None"/>	Bench Condition:	<input type="text" value="Sound"/>
Bench Rating:	<input type="text" value="1 - minor defects - failure unlikely in foreseeable future"/>		

Channel Installed:	<input type="text" value="Yes"/>	Channel Type:	<input type="text" value="Formed"/>
Channel Material:	<input type="text" value="Concrete (cast in place)"/>	Channel Exposure:	<input type="text" value="Fully Opened"/>
Channel Condition:	<input type="text" value="Sound"/>		
Channel Rating:	<input type="text" value="1 - minor defects - failure unlikely in foreseeable future"/>		

Connections

Pipe No.	Clock Pos.	Rim To Invert (Ft)	Direction	Material	Shape	Height (In)	Width (In)	Pipe Cond.	Pipe Seal Cond.	Pipe Type	Pipe Comments	Bulk-head	Bulk-head Cond.	Cond. Rating
1	6	11.67	Out	Polyvinyl Chloride	Circular	8.00		Sound	Sound	Gravity Connection		No		1
2	12	11.43	In	Polyvinyl Chloride	Circular	8.00		Sound	Sound	Gravity Connection		No		1

Chanhassen Manhole Inspection Report



Asset Information

System Owner:

Structure Number:

Rim to Invert:

Rim to Grade:

Grade to Invert:

Location Code:

Access Point Type:

Access Point Use:

Surface Type:

Street:

City:

Inspection Information

Project:

Surveyed By:

Surveyor Certificate No.:

Reviewed By:

Reviewer Certificate No.:

Inspection Date:

Weather:

Inspection Status:

Inflow Potential from Runoff:

Evidence of Surcharge:

SEH Manhole Rating:

Additional Component Info:

Location Details:

Additional Info:

Cover | Adjustment Ring

Cover Shape:

Cover Material:

Cover Condition:

Cover Type:

Cover/Frame Fit:

Hole Diameter:

Cover Insert Condition:

Cover Rating:

Adjustment Ring Type:

Adjustment Ring Condition:

Adjustment Ring Rating:

Cover Size:

Cover Size Width:

Bearing Surface Diam:

Bearing Surface Width:

Pick Holes:

Cover Insert Type:

Adjustment Ring Height:

Adjustment Ring Material:

Frame

Frame Material:

Frame Bearing Surface Width:

Frame Clear Opening Diam:

Frame Condition:

Frame Seal Inflow:

Frame Rating:

Depth:

Frame Offset Distance:

Frame Clear Opening Width:

Frame Seal Condition:

Frame Depth:

Chimney | Cone

Chimney Present:	<input type="text" value="Yes"/>	Chimney Material:	<input type="text" value="Concrete (precast)"/>
Chimney Infiltration/Inflow:	<input type="text" value="None"/>	Chimney Condition:	<input type="text" value="Sound"/>
Chimney Clear Opening:	<input type="text" value="26.30 in."/>	Chimney Depth:	<input type="text" value="2.08 in."/>
Chimney Coating/Liner:	<input type="text" value="None"/>		
Chimney Rating:	<input type="text" value="1 - minor defects - failure unlikely in foreseeable future"/>		

Cone Type:	<input type="text" value="Conical off centered"/>	Cone Depth:	<input type="text" value="6.38 in."/>
Cone Material:	<input type="text" value="Concrete (precast)"/>	Cone Condition:	<input type="text" value="Sound"/>
Cone Coating/Liner:	<input type="text" value="None"/>		
Cone Rating:	<input type="text" value="1 - minor defects - failure unlikely in foreseeable future"/>		

Wall | Bench | Channel

Wall Material:	<input type="text" value="Concrete (precast)"/>	Wall Coating/Liner:	<input type="text" value="None"/>
Wall Diameter/Lenght:	<input type="text" value="47.00 in."/>	Wall by Size (width):	
Wall Depth:	<input type="text" value="17.48 in."/>	Wall Condition:	<input type="text" value="Sound"/>
Manhole Steps:	<input type="text" value="11"/>	Step Material:	<input type="text" value="Plastic"/>
Wall Rating:	<input type="text" value="2 - minor defects - unlikely to fail for at least 20 years"/>		

Bench Present:	<input type="text" value="Yes"/>	Bench Material:	<input type="text" value="Concrete (cast in place)"/>
Bench Coating/Liner:	<input type="text" value="None"/>	Bench Condition:	<input type="text" value="Sound"/>
Bench Rating:	<input type="text" value="1 - minor defects - failure unlikely in foreseeable future"/>		

Channel Installed:	<input type="text" value="Yes"/>	Channel Type:	<input type="text" value="Formed"/>
Channel Material:	<input type="text" value="Concrete (cast in place)"/>	Channel Exposure:	<input type="text" value="Fully Opened"/>
Channel Condition:	<input type="text" value="Sound"/>		
Channel Rating:	<input type="text" value="1 - minor defects - failure unlikely in foreseeable future"/>		

Connections

Pipe No.	Clock Pos.	Rim To Invert (Ft)	Direction	Material	Shape	Height (In)	Width (In)	Pipe Cond.	Pipe Seal Cond.	Pipe Type	Pipe Comments	Bulk-head	Bulk-head Cond.	Cond. Rating
1	6	18.00	Out	Polyvinyl Chloride	Circular	8.00		Sound	Sound	Gravity Connection		No		1
2	12	17.92	In	Polyvinyl Chloride	Circular	8.00		Sound	Sound	Gravity Connection		No		1

Chanhassen Manhole Inspection Report



Asset Information

System Owner:

Structure Number:

Rim to Invert:

Rim to Grade:

Grade to Invert:

Location Code:

Access Point Type:

Access Point Use:

Surface Type:

Street:

City:

Inspection Information

Project:

Surveyed By:

Surveyor Certificate No.:

Reviewed By:

Reviewer Certificate No.:

Inspection Date:

Weather:

Inspection Status:

Inflow Potential from Runoff:

Evidence of Surcharge:

SEH Manhole Rating:

Additional Component Info:

Location Details:

Additional Info:

Cover | Adjustment Ring

Cover Shape:

Cover Material:

Cover Condition:

Cover Type:

Cover/Frame Fit:

Hole Diameter:

Cover Insert Condition:

Cover Rating:

Adjustment Ring Type:

Adjustment Ring Condition:

Adjustment Ring Rating:

Cover Size:

Cover Size Width:

Bearing Surface Diam:

Bearing Surface Width:

Pick Holes:

Cover Insert Type:

Adjustment Ring Height:

Adjustment Ring Material:

Frame

Frame Material:

Frame Bearing Surface Width:

Frame Clear Opening Diam:

Frame Condition:

Frame Seal Inflow:

Frame Rating:

Depth:

Frame Offset Distance:

Frame Clear Opening Width:

Frame Seal Condition:

Frame Depth:

Chimney | Cone

Chimney Present:	<input type="text" value="Yes"/>	Chimney Material:	<input type="text" value="Concrete (precast)"/>
Chimney Infiltration/Inflow:	<input type="text" value="None"/>	Chimney Condition:	<input type="text" value="Sound"/>
Chimney Clear Opening:	<input type="text" value="26.20 in."/>	Chimney Depth:	<input type="text" value="1.04 in."/>
Chimney Coating/Liner:	<input type="text" value="None"/>		
Chimney Rating:	<input type="text" value="2 - minor defects - unlikely to fail for at least 20 years"/>		

Cone Type:	<input type="text" value="Conical off centered"/>	Cone Depth:	<input type="text" value="5.45 in."/>
Cone Material:	<input type="text" value="Concrete (precast)"/>	Cone Condition:	<input type="text" value="Sound"/>
Cone Coating/Liner:	<input type="text" value="None"/>		
Cone Rating:	<input type="text" value="1 - minor defects - failure unlikely in foreseeable future"/>		

Wall | Bench | Channel

Wall Material:	<input type="text" value="Concrete (precast)"/>	Wall Coating/Liner:	<input type="text" value="None"/>
Wall Diameter/Lenght:	<input type="text" value="47.00 in."/>	Wall by Size (width):	
Wall Depth:	<input type="text" value="15.17 in."/>	Wall Condition:	<input type="text" value="Sound"/>
Manhole Steps:	<input type="text" value="10"/>	Step Material:	<input type="text" value="Plastic"/>
Wall Rating:	<input type="text" value="2 - minor defects - unlikely to fail for at least 20 years"/>		

Bench Present:	<input type="text" value="Yes"/>	Bench Material:	<input type="text" value="Concrete (cast in place)"/>
Bench Coating/Liner:	<input type="text" value="None"/>	Bench Condition:	<input type="text" value="Sound"/>
Bench Rating:	<input type="text" value="1 - minor defects - failure unlikely in foreseeable future"/>		

Channel Installed:	<input type="text" value="Yes"/>	Channel Type:	<input type="text" value="Formed"/>
Channel Material:	<input type="text" value="Concrete (cast in place)"/>	Channel Exposure:	<input type="text" value="Fully Opened"/>
Channel Condition:	<input type="text" value="Sound"/>		
Channel Rating:	<input type="text" value="1 - minor defects - failure unlikely in foreseeable future"/>		

Connections

Pipe No.	Clock Pos.	Rim To Invert (Ft)	Direction	Material	Shape	Height (In)	Width (In)	Pipe Cond.	Pipe Seal Cond.	Pipe Type	Pipe Comments	Bulk-head	Bulk-head Cond.	Cond. Rating
1	6	15.71	Out	Polyvinyl Chloride	Circular	8.00		Sound	Sound	Gravity Connection		No		1
2	12	15.69	In	Polyvinyl Chloride	Circular	8.00		Sound	Sound	Gravity Connection		No		1

Chanhassen Manhole Inspection Report



Asset Information

System Owner:

Structure Number:

Rim to Invert:

Rim to Grade:

Grade to Invert:

Location Code:

Access Point Type:

Access Point Use:

Surface Type:

Street:

City:

Inspection Information

Project:

Surveyed By:

Surveyor Certificate No.:

Reviewed By:

Reviewer Certificate No.:

Inspection Date:

Weather:

Inspection Status:

Inflow Potential from Runoff:

Evidence of Surcharge:

SEH Manhole Rating:

Additional Component Info:

Location Details:

Additional Info:

Cover | Adjustment Ring

Cover Shape:

Cover Material:

Cover Condition:

Cover Type:

Cover/Frame Fit:

Hole Diameter:

Cover Insert Condition:

Cover Rating:

Adjustment Ring Type:

Adjustment Ring Condition:

Adjustment Ring Rating:

Cover Size:

Cover Size Width:

Bearing Surface Diam:

Bearing Surface Width:

Pick Holes:

Cover Insert Type:

Adjustment Ring Height:

Adjustment Ring Material:

Frame

Frame Material:

Frame Bearing Surface Width:

Frame Clear Opening Diam:

Frame Condition:

Frame Seal Inflow:

Frame Rating:

Depth:

Frame Offset Distance:

Frame Clear Opening Width:

Frame Seal Condition:

Frame Depth:

Chimney | Cone

Chimney Present:	<input type="text" value="Yes"/>	Chimney Material:	<input type="text" value="Concrete (precast)"/>
Chimney Infiltration/Inflow:	<input type="text" value="None"/>	Chimney Condition:	<input type="text" value="Sound"/>
Chimney Clear Opening:	<input type="text" value="26.40 in."/>	Chimney Depth:	<input type="text" value="1.11 in."/>
Chimney Coating/Liner:	<input type="text" value="None"/>		
Chimney Rating:	<input type="text" value="2 - minor defects - unlikely to fail for at least 20 years"/>		

Cone Type:	<input type="text" value="Conical off centered"/>	Cone Depth:	<input type="text" value="5.42 in."/>
Cone Material:	<input type="text" value="Concrete (precast)"/>	Cone Condition:	<input type="text" value="Sound"/>
Cone Coating/Liner:	<input type="text" value="None"/>		
Cone Rating:	<input type="text" value="1 - minor defects - failure unlikely in foreseeable future"/>		

Wall | Bench | Channel

Wall Material:	<input type="text" value="Concrete (precast)"/>	Wall Coating/Liner:	<input type="text" value="None"/>
Wall Diameter/Lenght:	<input type="text" value="46.50 in."/>	Wall by Size (width):	
Wall Depth:	<input type="text" value="13.92 in."/>	Wall Condition:	<input type="text" value="Sound"/>
Manhole Steps:	<input type="text" value="9"/>	Step Material:	<input type="text" value="Plastic"/>
Wall Rating:	<input type="text" value="2 - minor defects - unlikely to fail for at least 20 years"/>		

Bench Present:	<input type="text" value="Yes"/>	Bench Material:	<input type="text" value="Concrete (cast in place)"/>
Bench Coating/Liner:	<input type="text" value="None"/>	Bench Condition:	<input type="text" value="Sound"/>
Bench Rating:	<input type="text" value="1 - minor defects - failure unlikely in foreseeable future"/>		

Channel Installed:	<input type="text" value="Yes"/>	Channel Type:	<input type="text" value="Formed"/>
Channel Material:	<input type="text" value="Concrete (cast in place)"/>	Channel Exposure:	<input type="text" value="Fully Opened"/>
Channel Condition:	<input type="text" value="Sound"/>		
Channel Rating:	<input type="text" value="1 - minor defects - failure unlikely in foreseeable future"/>		

Connections

Pipe No.	Clock Pos.	Rim To Invert (Ft)	Direction	Material	Shape	Height (In)	Width (In)	Pipe Cond.	Pipe Seal Cond.	Pipe Type	Pipe Comments	Bulk-head	Bulk-head Cond.	Cond. Rating
1	6	14.48	Out	Polyvinyl Chloride	Circular	8.00		Sound	Sound	Gravity Connection		No		1
2	11	14.23	In	Polyvinyl Chloride	Circular	8.00		Sound	Sound	Gravity Connection		No		1

Chanhassen Manhole Inspection Report



Asset Information

System Owner:

Structure Number:

Rim to Invert:

Rim to Grade:

Grade to Invert:

Location Code:

Access Point Type:

Access Point Use:

Surface Type:

Street:

City:

Inspection Information

Project:

Surveyed By:

Surveyor Certificate No.:

Reviewed By:

Reviewer Certificate No.:

Inspection Date:

Weather:

Inspection Status:

Inflow Potential from Runoff:

Evidence of Surcharge:

SEH Manhole Rating:

Additional Component Info:

Location Details:

Additional Info:

Cover | Adjustment Ring

Cover Shape:

Cover Material:

Cover Condition:

Cover Type:

Cover/Frame Fit:

Hole Diameter:

Cover Insert Condition:

Cover Rating:

Adjustment Ring Type:

Adjustment Ring Condition:

Adjustment Ring Rating:

Cover Size:

Cover Size Width:

Bearing Surface Diam:

Bearing Surface Width:

Pick Holes:

Cover Insert Type:

Adjustment Ring Height:

Adjustment Ring Material:

Frame

Frame Material:

Frame Bearing Surface Width:

Frame Clear Opening Diam:

Frame Condition:

Frame Seal Inflow:

Frame Rating:

Depth:

Frame Offset Distance:

Frame Clear Opening Width:

Frame Seal Condition:

Frame Depth:

Chimney | Cone

Chimney Present:	<input type="text" value="Yes"/>	Chimney Material:	<input type="text" value="Concrete (precast)"/>
Chimney Infiltration/Inflow:	<input type="text" value="None"/>	Chimney Condition:	<input type="text" value="Sound"/>
Chimney Clear Opening:	<input type="text" value="26.60 in."/>	Chimney Depth:	<input type="text" value="1.08 in."/>
Chimney Coating/Liner:	<input type="text" value="None"/>		
Chimney Rating:	<input type="text" value="2 - minor defects - unlikely to fail for at least 20 years"/>		

Cone Type:	<input type="text" value="Conical off centered"/>	Cone Depth:	<input type="text" value="5.38 in."/>
Cone Material:	<input type="text" value="Concrete (precast)"/>	Cone Condition:	<input type="text" value="Sound"/>
Cone Coating/Liner:	<input type="text" value="None"/>		
Cone Rating:	<input type="text" value="1 - minor defects - failure unlikely in foreseeable future"/>		

Wall | Bench | Channel

Wall Material:	<input type="text" value="Concrete (precast)"/>	Wall Coating/Liner:	<input type="text" value="None"/>
Wall Diameter/Lenght:	<input type="text" value="47.00 in."/>	Wall by Size (width):	
Wall Depth:	<input type="text" value="13.73 in."/>	Wall Condition:	<input type="text" value="Sound"/>
Manhole Steps:	<input type="text" value="9"/>	Step Material:	<input type="text" value="Plastic"/>
Wall Rating:	<input type="text" value="1 - minor defects - failure unlikely in foreseeable future"/>		

Bench Present:	<input type="text" value="Yes"/>	Bench Material:	<input type="text" value="Concrete (cast in place)"/>
Bench Coating/Liner:	<input type="text" value="None"/>	Bench Condition:	<input type="text" value="Sound"/>
Bench Rating:	<input type="text" value="1 - minor defects - failure unlikely in foreseeable future"/>		

Channel Installed:	<input type="text" value="Yes"/>	Channel Type:	<input type="text" value="Formed"/>
Channel Material:	<input type="text" value="Concrete (cast in place)"/>	Channel Exposure:	<input type="text" value="Fully Opened"/>
Channel Condition:	<input type="text" value="Sound"/>		
Channel Rating:	<input type="text" value="1 - minor defects - failure unlikely in foreseeable future"/>		

Connections

Pipe No.	Clock Pos.	Rim To Invert (Ft)	Direction	Material	Shape	Height (In)	Width (In)	Pipe Cond.	Pipe Seal Cond.	Pipe Type	Pipe Comments	Bulk-head	Bulk-head Cond.	Cond. Rating
1	6	14.38	Out	Polyvinyl Chloride	Circular	8.00		Sound	Sound	Gravity Connection		No		1
2	12	14.23	In	Polyvinyl Chloride	Circular	8.00		Sound	Sound	Gravity Connection		No		1

Chanhassen Manhole Inspection Report



Asset Information

System Owner:

Structure Number:

Rim to Invert:

Rim to Grade:

Grade to Invert:

Location Code:

Access Point Type:

Access Point Use:

Surface Type:

Street:

City:

Inspection Information

Project:

Surveyed By:

Surveyor Certificate No.:

Reviewed By:

Reviewer Certificate No.:

Inspection Date:

Weather:

Inspection Status:

Inflow Potential from Runoff:

Evidence of Surcharge:

SEH Manhole Rating:

Additional Component Info:

Location Details:

Additional Info:

Cover | Adjustment Ring

Cover Shape:

Cover Material:

Cover Condition:

Cover Type:

Cover/Frame Fit:

Hole Diameter:

Cover Insert Condition:

Cover Rating:

Adjustment Ring Type:

Adjustment Ring Condition:

Adjustment Ring Rating:

Cover Size:

Cover Size Width:

Bearing Surface Diam:

Bearing Surface Width:

Pick Holes:

Cover Insert Type:

Adjustment Ring Height:

Adjustment Ring Material:

Frame

Frame Material:

Frame Bearing Surface Width:

Frame Clear Opening Diam:

Frame Condition:

Frame Seal Inflow:

Frame Rating:

Depth:

Frame Offset Distance:

Frame Clear Opening Width:

Frame Seal Condition:

Frame Depth:

Chimney | Cone

Chimney Present:	<input type="text" value="Yes"/>	Chimney Material:	<input type="text" value="Concrete (precast)"/>
Chimney Infiltration/Inflow:	<input type="text" value="None"/>	Chimney Condition:	<input type="text" value="Sound"/>
Chimney Clear Opening:	<input type="text" value="23.70 in."/>	Chimney Depth:	<input type="text" value="1.33 in."/>
Chimney Coating/Liner:	<input type="text" value="None"/>		
Chimney Rating:	<input type="text" value="2 - minor defects - unlikely to fail for at least 20 years"/>		

Cone Type:	<input type="text" value="Conical off centered"/>	Cone Depth:	<input type="text" value="5.77 in."/>
Cone Material:	<input type="text" value="Concrete (precast)"/>	Cone Condition:	<input type="text" value="Sound"/>
Cone Coating/Liner:	<input type="text" value="None"/>		
Cone Rating:	<input type="text" value="1 - minor defects - failure unlikely in foreseeable future"/>		

Wall | Bench | Channel

Wall Material:	<input type="text" value="Concrete (precast)"/>	Wall Coating/Liner:	<input type="text" value="None"/>
Wall Diameter/Lenght:	<input type="text" value="47.20 in."/>	Wall by Size (width):	
Wall Depth:	<input type="text" value="17.80 in."/>	Wall Condition:	<input type="text" value="Defective"/>
Manhole Steps:	<input type="text" value="12"/>	Step Material:	<input type="text" value="Metal"/>
Wall Rating:	<input type="text" value="2 - minor defects - unlikely to fail for at least 20 years"/>		

Bench Present:	<input type="text" value="Yes"/>	Bench Material:	<input type="text" value="Concrete (cast in place)"/>
Bench Coating/Liner:	<input type="text" value="None"/>	Bench Condition:	<input type="text" value="Sound"/>
Bench Rating:	<input type="text" value="1 - minor defects - failure unlikely in foreseeable future"/>		

Channel Installed:	<input type="text" value="Yes"/>	Channel Type:	<input type="text" value="Formed"/>
Channel Material:	<input type="text" value="Concrete (cast in place)"/>	Channel Exposure:	<input type="text" value="Fully Opened"/>
Channel Condition:	<input type="text" value="Sound"/>		
Channel Rating:	<input type="text" value="1 - minor defects - failure unlikely in foreseeable future"/>		

Connections

Pipe No.	Clock Pos.	Rim To Invert (Ft)	Direction	Material	Shape	Height (In)	Width (In)	Pipe Cond.	Pipe Seal Cond.	Pipe Type	Pipe Comments	Bulk-head	Bulk-head Cond.	Cond. Rating
1	6	18.30	Out	Vitrified Clay Pipe	Circular	10.00		Sound	Defective	Gravity Connection	Lined VCP. Minor infiltration near pipe seal.	No		2
2	9	9.83	In	Vitrified Clay Pipe	Circular	8.00		Sound	Sound	Outside Drop Upper	Lined VCP.	No		1
3	9	18.06	In	Vitrified Clay Pipe	Circular	8.00		Sound	Sound	Outside Drop Lower		No		1
4	12	18.33	In	Polyvinyl Chloride	Circular	8.00		Sound	Defective	Gravity Connection	Infiltration near pipe seal.	No		2

Chanhassen Manhole Inspection Report



Asset Information

System Owner:

Structure Number:

Rim to Invert:

Rim to Grade:

Grade to Invert:

Location Code:

Access Point Type:

Access Point Use:

Surface Type:

Street:

City:

Inspection Information

Project:

Surveyed By:

Surveyor Certificate No.:

Reviewed By:

Reviewer Certificate No.:

Inspection Date:

Weather:

Inspection Status:

Inflow Potential from Runoff:

Evidence of Surcharge:

SEH Manhole Rating:

Additional Component Info:

Location Details:

Additional Info:

Cover | Adjustment Ring

Cover Shape:

Cover Material:

Cover Condition:

Cover Type:

Cover/Frame Fit:

Hole Diameter:

Cover Insert Condition:

Cover Rating:

Adjustment Ring Type:

Adjustment Ring Condition:

Adjustment Ring Rating:

Cover Size:

Cover Size Width:

Bearing Surface Diam:

Bearing Surface Width:

Pick Holes:

Cover Insert Type:

Adjustment Ring Height:

Adjustment Ring Material:

Frame

Frame Material:

Frame Bearing Surface Width:

Frame Clear Opening Diam:

Frame Condition:

Frame Seal Inflow:

Frame Rating:

Depth:

Frame Offset Distance:

Frame Clear Opening Width:

Frame Seal Condition:

Frame Depth:

Chimney | Cone

Chimney Present:	<input type="text" value="Yes"/>	Chimney Material:	<input type="text" value="Concrete (precast)"/>
Chimney Infiltration/Inflow:	<input type="text" value="None"/>	Chimney Condition:	<input type="text" value="Sound"/>
Chimney Clear Opening:	<input type="text" value="23.60 in."/>	Chimney Depth:	<input type="text" value="1.69 in."/>
Chimney Coating/Liner:	<input type="text" value="None"/>		
Chimney Rating:	<input type="text" value="2 - minor defects - unlikely to fail for at least 20 years"/>		

Cone Type:	<input type="text" value="Conical off centered"/>	Cone Depth:	<input type="text" value="6.07 in."/>
Cone Material:	<input type="text" value="Concrete (precast)"/>	Cone Condition:	<input type="text" value="Sound"/>
Cone Coating/Liner:	<input type="text" value="None"/>		
Cone Rating:	<input type="text" value="1 - minor defects - failure unlikely in foreseeable future"/>		

Wall | Bench | Channel

Wall Material:	<input type="text" value="Concrete (precast)"/>	Wall Coating/Liner:	<input type="text" value="None"/>
Wall Diameter/Lenght:	<input type="text" value="47.30 in."/>	Wall by Size (width):	
Wall Depth:	<input type="text" value="15.73 in."/>	Wall Condition:	<input type="text" value="Sound"/>
Manhole Steps:	<input type="text" value="10"/>	Step Material:	<input type="text" value="Metal"/>
Wall Rating:	<input type="text" value="2 - minor defects - unlikely to fail for at least 20 years"/>		

Bench Present:	<input type="text" value="Yes"/>	Bench Material:	<input type="text" value="Concrete (cast in place)"/>
Bench Coating/Liner:	<input type="text" value="None"/>	Bench Condition:	<input type="text" value="Sound"/>
Bench Rating:	<input type="text" value="1 - minor defects - failure unlikely in foreseeable future"/>		

Channel Installed:	<input type="text" value="Yes"/>	Channel Type:	<input type="text" value="Formed"/>
Channel Material:	<input type="text" value="Concrete (cast in place)"/>	Channel Exposure:	<input type="text" value="Fully Opened"/>
Channel Condition:	<input type="text" value="Sound"/>		
Channel Rating:	<input type="text" value="1 - minor defects - failure unlikely in foreseeable future"/>		

Connections

Pipe No.	Clock Pos.	Rim To Invert (Ft)	Direction	Material	Shape	Height (In)	Width (In)	Pipe Cond.	Pipe Seal Cond.	Pipe Type	Pipe Comments	Bulk-head	Bulk-head Cond.	Cond. Rating
1	6	16.33	Out	Vitrified Clay Pipe	Circular	10.00		Sound	Sound	Gravity Connection	Lined VCP.	No		1
2	10	5.00	In	Not Known	Circular	4.00		Sound	Sound	Gravity Connection		No		1
3	1	16.15	In	Vitrified Clay Pipe	Circular	10.00		Sound	Defective	Gravity Connection	Lined VCP. Infiltration near pipe seal.	No		2

Chanhassen Manhole Inspection Report



Asset Information

System Owner:

Structure Number:

Rim to Invert:

Rim to Grade:

Grade to Invert:

Location Code:

Access Point Type:

Access Point Use:

Surface Type:

Street:

City:

Inspection Information

Project:

Surveyed By:

Surveyor Certificate No.:

Reviewed By:

Reviewer Certificate No.:

Inspection Date:

Weather:

Inspection Status:

Inflow Potential from Runoff:

Evidence of Surcharge:

SEH Manhole Rating:

Additional Component Info:

Location Details:

Additional Info:

Cover | Adjustment Ring

Cover Shape:

Cover Material:

Cover Condition:

Cover Type:

Cover/Frame Fit:

Hole Diameter:

Cover Insert Condition:

Cover Rating:

Adjustment Ring Type:

Adjustment Ring Condition:

Adjustment Ring Rating:

Cover Size:

Cover Size Width:

Bearing Surface Diam:

Bearing Surface Width:

Pick Holes:

Cover Insert Type:

Adjustment Ring Height:

Adjustment Ring Material:

Frame

Frame Material:

Frame Bearing Surface Width:

Frame Clear Opening Diam:

Frame Condition:

Frame Seal Inflow:

Frame Rating:

Depth:

Frame Offset Distance:

Frame Clear Opening Width:

Frame Seal Condition:

Frame Depth:

Chimney | Cone

Chimney Present:	<input type="text" value="Yes"/>	Chimney Material:	<input type="text" value="Not Known"/>
Chimney Infiltration/Inflow:	<input type="text" value="None"/>	Chimney Condition:	<input type="text" value="Sound"/>
Chimney Clear Opening:	<input type="text" value="26.70 in."/>	Chimney Depth:	<input type="text" value="1.92 in."/>
Chimney Coating/Liner:	<input type="text" value="Plastic"/>		
Chimney Rating:	<input type="text" value="1 - minor defects - failure unlikely in foreseeable future"/>		

Cone Type:	<input type="text" value="Conical centered"/>	Cone Depth:	<input type="text" value="6.33 in."/>
Cone Material:	<input type="text" value="Concrete (precast)"/>	Cone Condition:	<input type="text" value="Sound"/>
Cone Coating/Liner:	<input type="text" value="None"/>		
Cone Rating:	<input type="text" value="1 - minor defects - failure unlikely in foreseeable future"/>		

Wall | Bench | Channel

Wall Material:	<input type="text" value="Concrete (precast)"/>	Wall Coating/Liner:	<input type="text" value="None"/>
Wall Diameter/Lenght:	<input type="text" value="47.00 in."/>	Wall by Size (width):	
Wall Depth:	<input type="text" value="8.08 in."/>	Wall Condition:	<input type="text" value="Sound"/>
Manhole Steps:	<input type="text" value="4"/>	Step Material:	<input type="text" value="Metal"/>
Wall Rating:	<input type="text" value="2 - minor defects - unlikely to fail for at least 20 years"/>		

Bench Present:	<input type="text" value="Yes"/>	Bench Material:	<input type="text" value="Concrete (cast in place)"/>
Bench Coating/Liner:	<input type="text" value="None"/>	Bench Condition:	<input type="text" value="Sound"/>
Bench Rating:	<input type="text" value="1 - minor defects - failure unlikely in foreseeable future"/>		

Channel Installed:	<input type="text" value="Yes"/>	Channel Type:	<input type="text" value="Formed"/>
Channel Material:	<input type="text" value="Concrete (cast in place)"/>	Channel Exposure:	<input type="text" value="Fully Opened"/>
Channel Condition:	<input type="text" value="Sound"/>		
Channel Rating:	<input type="text" value="1 - minor defects - failure unlikely in foreseeable future"/>		

Connections

Pipe No.	Clock Pos.	Rim To Invert (Ft)	Direction	Material	Shape	Height (In)	Width (In)	Pipe Cond.	Pipe Seal Cond.	Pipe Type	Pipe Comments	Bulk-head	Bulk-head Cond.	Cond. Rating
1	6	8.64	Out	Vitrified Clay Pipe	Circular	8.00		Sound	Sound	Gravity Connection	Lined VCP.	No		1
2	12	8.50	In	Vitrified Clay Pipe	Circular	8.00		Sound	Sound	Gravity Connection	Lined VCP.	No		1
3	3	8.51	In	Vitrified Clay Pipe	Circular	8.00		Sound	Sound	Gravity Connection	Lined VCP.	No		1

Chanhassen Manhole Inspection Report



Asset Information

System Owner:

Structure Number:

Rim to Invert:

Rim to Grade:

Grade to Invert:

Location Code:

Access Point Type:

Access Point Use:

Surface Type:

Street:

City:

Inspection Information

Project:

Surveyed By:

Surveyor Certificate No.:

Reviewed By:

Reviewer Certificate No.:

Inspection Date:

Weather:

Inspection Status:

Inflow Potential from Runoff:

Evidence of Surcharge:

SEH Manhole Rating:

Additional Component Info:

Location Details:

Additional Info:

Cover | Adjustment Ring

Cover Shape:

Cover Material:

Cover Condition:

Cover Type:

Cover/Frame Fit:

Hole Diameter:

Cover Insert Condition:

Cover Rating:

Adjustment Ring Type:

Adjustment Ring Condition:

Adjustment Ring Rating:

Cover Size:

Cover Size Width:

Bearing Surface Diam:

Bearing Surface Width:

Pick Holes:

Cover Insert Type:

Adjustment Ring Height:

Adjustment Ring Material:

Frame

Frame Material:

Frame Bearing Surface Width:

Frame Clear Opening Diam:

Frame Condition:

Frame Seal Inflow:

Frame Rating:

Depth:

Frame Offset Distance:

Frame Clear Opening Width:

Frame Seal Condition:

Frame Depth:

Chimney | Cone

Chimney Present:	<input type="text" value="Yes"/>	Chimney Material:	<input type="text" value="Not Known"/>
Chimney Infiltration/Inflow:	<input type="text" value="None"/>	Chimney Condition:	<input type="text" value="Sound"/>
Chimney Clear Opening:	<input type="text" value="25.30 in."/>	Chimney Depth:	<input type="text" value="0.96 in."/>
Chimney Coating/Liner:	<input type="text" value="Plastic"/>		
Chimney Rating:	<input type="text" value="1 - minor defects - failure unlikely in foreseeable future"/>		

Cone Type:	<input type="text" value="Conical off centered"/>	Cone Depth:	<input type="text" value="5.37 in."/>
Cone Material:	<input type="text" value="Concrete (precast)"/>	Cone Condition:	<input type="text" value="Sound"/>
Cone Coating/Liner:	<input type="text" value="None"/>		
Cone Rating:	<input type="text" value="1 - minor defects - failure unlikely in foreseeable future"/>		

Wall | Bench | Channel

Wall Material:	<input type="text" value="Concrete (precast)"/>	Wall Coating/Liner:	<input type="text" value="None"/>
Wall Diameter/Lenght:	<input type="text" value="47.00 in."/>	Wall by Size (width):	
Wall Depth:	<input type="text" value="13.20 in."/>	Wall Condition:	<input type="text" value="Sound"/>
Manhole Steps:	<input type="text" value="9"/>	Step Material:	<input type="text" value="Metal"/>
Wall Rating:	<input type="text" value="2 - minor defects - unlikely to fail for at least 20 years"/>		

Bench Present:	<input type="text" value="Yes"/>	Bench Material:	<input type="text" value="Concrete (cast in place)"/>
Bench Coating/Liner:	<input type="text" value="None"/>	Bench Condition:	<input type="text" value="Sound"/>
Bench Rating:	<input type="text" value="1 - minor defects - failure unlikely in foreseeable future"/>		

Channel Installed:	<input type="text" value="Yes"/>	Channel Type:	<input type="text" value="Formed"/>
Channel Material:	<input type="text" value="Concrete (cast in place)"/>	Channel Exposure:	<input type="text" value="Fully Opened"/>
Channel Condition:	<input type="text" value="Sound"/>		
Channel Rating:	<input type="text" value="1 - minor defects - failure unlikely in foreseeable future"/>		

Connections

Pipe No.	Clock Pos.	Rim To Invert (Ft)	Direction	Material	Shape	Height (In)	Width (In)	Pipe Cond.	Pipe Seal Cond.	Pipe Type	Pipe Comments	Bulk-head	Bulk-head Cond.	Cond. Rating
1	6	13.98	Out	Vitrified Clay Pipe	Circular	10.00		Sound	Sound	Gravity Connection		No		1
2	11	12.07	In	Vitrified Clay Pipe	Circular	10.00		Sound	Defective	Gravity Connection	Lined VCP. Original VCP is fractured. Infiltration and deposits present around pipe seal.	No		2
3	5	12.30	In	Not Known	Circular	4.00		Sound	Sound	Gravity Connection		No		1

Chanhassen Manhole Inspection Report



Asset Information

System Owner:

Structure Number:

Rim to Invert:

Rim to Grade:

Grade to Invert:

Location Code:

Access Point Type:

Access Point Use:

Surface Type:

Street:

City:

Inspection Information

Project:

Surveyed By:

Surveyor Certificate No.:

Reviewed By:

Reviewer Certificate No.:

Inspection Date:

Weather:

Inspection Status:

Inflow Potential from Runoff:

Evidence of Surcharge:

SEH Manhole Rating:

Additional Component Info:

Location Details:

Additional Info:

Cover | Adjustment Ring

Cover Shape:

Cover Material:

Cover Condition:

Cover Type:

Cover/Frame Fit:

Hole Diameter:

Cover Insert Condition:

Cover Rating:

Adjustment Ring Type:

Adjustment Ring Condition:

Adjustment Ring Rating:

Cover Size:

Cover Size Width:

Bearing Surface Diam:

Bearing Surface Width:

Pick Holes:

Cover Insert Type:

Adjustment Ring Height:

Adjustment Ring Material:

Frame

Frame Material:

Frame Bearing Surface Width:

Frame Clear Opening Diam:

Frame Condition:

Frame Seal Inflow:

Frame Rating:

Depth:

Frame Offset Distance:

Frame Clear Opening Width:

Frame Seal Condition:

Frame Depth:

Chimney | Cone

Chimney Present:	<input type="text" value="Yes"/>	Chimney Material:	<input type="text" value="Not Known"/>
Chimney Infiltration/Inflow:	<input type="text" value="None"/>	Chimney Condition:	<input type="text" value="Sound"/>
Chimney Clear Opening:	<input type="text" value="26.40 in."/>	Chimney Depth:	<input type="text" value="0.87 in."/>
Chimney Coating/Liner:	<input type="text" value="Plastic"/>		
Chimney Rating:	<input type="text" value="1 - minor defects - failure unlikely in foreseeable future"/>		

Cone Type:	<input type="text" value="Conical off centered"/>	Cone Depth:	<input type="text" value="5.18 in."/>
Cone Material:	<input type="text" value="Concrete (precast)"/>	Cone Condition:	<input type="text" value="Sound"/>
Cone Coating/Liner:	<input type="text" value="None"/>		
Cone Rating:	<input type="text" value="1 - minor defects - failure unlikely in foreseeable future"/>		

Wall | Bench | Channel

Wall Material:	<input type="text" value="Concrete (precast)"/>	Wall Coating/Liner:	<input type="text" value="None"/>
Wall Diameter/Lenght:	<input type="text" value="47.00 in."/>	Wall by Size (width):	
Wall Depth:	<input type="text" value="7.63 in."/>	Wall Condition:	<input type="text" value="Sound"/>
Manhole Steps:	<input type="text" value="5"/>	Step Material:	<input type="text" value="Plastic"/>
Wall Rating:	<input type="text" value="1 - minor defects - failure unlikely in foreseeable future"/>		

Bench Present:	<input type="text" value="Yes"/>	Bench Material:	<input type="text" value="Concrete (cast in place)"/>
Bench Coating/Liner:	<input type="text" value="None"/>	Bench Condition:	<input type="text" value="Sound"/>
Bench Rating:	<input type="text" value="1 - minor defects - failure unlikely in foreseeable future"/>		

Channel Installed:	<input type="text" value="Yes"/>	Channel Type:	<input type="text" value="Pipe"/>
Channel Material:	<input type="text" value="Vitrified Clay"/>	Channel Exposure:	<input type="text" value="Fully Opened"/>
Channel Condition:	<input type="text" value="Sound"/>		
Channel Rating:	<input type="text" value="2 - minor defects - unlikely to fail for at least 20 years"/>		

Connections

Pipe No.	Clock Pos.	Rim To Invert (Ft)	Direction	Material	Shape	Height (In)	Width (In)	Pipe Cond.	Pipe Seal Cond.	Pipe Type	Pipe Comments	Bulk-head	Bulk-head Cond.	Cond. Rating
1	6	8.75	Out	Vitrified Clay Pipe	Circular	10.00		Sound	Sound	Gravity Connection	Lined VCP.	No		1
2	12	8.65	In	Vitrified Clay Pipe	Circular	10.00		Sound	Sound	Gravity Connection	Lined VCP.	No		1
3	2	8.35	In	Polyvinyl Chloride	Circular	8.00		Sound	Sound	Gravity Connection		No		1

Chanhassen Manhole Inspection Report



Asset Information

System Owner:

Structure Number:

Rim to Invert:

Rim to Grade:

Grade to Invert:

Location Code:

Access Point Type:

Access Point Use:

Surface Type:

Street:

City:

Inspection Information

Project:

Surveyed By:

Surveyor Certificate No.:

Reviewed By:

Reviewer Certificate No.:

Inspection Date:

Weather:

Inspection Status:

Inflow Potential from Runoff:

Evidence of Surcharge:

SEH Manhole Rating:

Additional Component Info:

Location Details:

Additional Info:

Cover | Adjustment Ring

Cover Shape:

Cover Material:

Cover Condition:

Cover Type:

Cover/Frame Fit:

Hole Diameter:

Cover Insert Condition:

Cover Rating:

Adjustment Ring Type:

Adjustment Ring Condition:

Adjustment Ring Rating:

Cover Size:

Cover Size Width:

Bearing Surface Diam:

Bearing Surface Width:

Pick Holes:

Cover Insert Type:

Adjustment Ring Height:

Adjustment Ring Material:

Frame

Frame Material:

Frame Bearing Surface Width:

Frame Clear Opening Diam:

Frame Condition:

Frame Seal Inflow:

Frame Rating:

Depth:

Frame Offset Distance:

Frame Clear Opening Width:

Frame Seal Condition:

Frame Depth:

Chimney | Cone

Chimney Present:	<input type="text" value="Yes"/>	Chimney Material:	<input type="text" value="Not Known"/>
Chimney Infiltration/Inflow:	<input type="text" value="None"/>	Chimney Condition:	<input type="text" value="Sound"/>
Chimney Clear Opening:	<input type="text" value="25.60 in."/>	Chimney Depth:	<input type="text" value="1.38 in."/>
Chimney Coating/Liner:	<input type="text" value="Plastic"/>		
Chimney Rating:	<input type="text" value="1 - minor defects - failure unlikely in foreseeable future"/>		

Cone Type:	<input type="text" value="Conical off centered"/>	Cone Depth:	<input type="text" value="4.96 in."/>
Cone Material:	<input type="text" value="Concrete (precast)"/>	Cone Condition:	<input type="text" value="Sound"/>
Cone Coating/Liner:	<input type="text" value="None"/>		
Cone Rating:	<input type="text" value="1 - minor defects - failure unlikely in foreseeable future"/>		

Wall | Bench | Channel

Wall Material:	<input type="text" value="Concrete (precast)"/>	Wall Coating/Liner:	<input type="text" value="None"/>
Wall Diameter/Lenght:	<input type="text" value="47.30 in."/>	Wall by Size (width):	
Wall Depth:	<input type="text" value="10.48 in."/>	Wall Condition:	<input type="text" value="Sound"/>
Manhole Steps:	<input type="text" value="7"/>	Step Material:	<input type="text" value="Plastic"/>
Wall Rating:	<input type="text" value="1 - minor defects - failure unlikely in foreseeable future"/>		

Bench Present:	<input type="text" value="Yes"/>	Bench Material:	<input type="text" value="Concrete (cast in place)"/>
Bench Coating/Liner:	<input type="text" value="None"/>	Bench Condition:	<input type="text" value="Sound"/>
Bench Rating:	<input type="text" value="1 - minor defects - failure unlikely in foreseeable future"/>		

Channel Installed:	<input type="text" value="Yes"/>	Channel Type:	<input type="text" value="Pipe"/>
Channel Material:	<input type="text" value="Polyvinyl Chloride"/>	Channel Exposure:	<input type="text" value="Fully Opened"/>
Channel Condition:	<input type="text" value="Sound"/>		
Channel Rating:	<input type="text" value="1 - minor defects - failure unlikely in foreseeable future"/>		

Connections

Pipe No.	Clock Pos.	Rim To Invert (Ft)	Direction	Material	Shape	Height (In)	Width (In)	Pipe Cond.	Pipe Seal Cond.	Pipe Type	Pipe Comments	Bulk-head	Bulk-head Cond.	Cond. Rating
1	6	11.46	Out	Polyvinyl Chloride	Circular	8.00		Sound	Sound	Gravity Connection		No		1
2	12	11.39	In	Polyvinyl Chloride	Circular	8.00		Sound	Sound	Gravity Connection		No		1
3	2	10.88	In	Not Known	Circular	8.00		Sound	Sound	Not Known		No		1

Chanhassen Manhole Inspection Report



Asset Information

System Owner:

Structure Number:

Rim to Invert:

Rim to Grade:

Grade to Invert:

Location Code:

Access Point Type:

Access Point Use:

Surface Type:

Street:

City:

Inspection Information

Project:

Surveyed By:

Surveyor Certificate No.:

Reviewed By:

Reviewer Certificate No.:

Inspection Date:

Weather:

Inspection Status:

Inflow Potential from Runoff:

Evidence of Surcharge:

SEH Manhole Rating:

Additional Component Info:

Location Details:

Additional Info:

Cover | Adjustment Ring

Cover Shape:

Cover Material:

Cover Condition:

Cover Type:

Cover/Frame Fit:

Hole Diameter:

Cover Insert Condition:

Cover Rating:

Adjustment Ring Type:

Adjustment Ring Condition:

Adjustment Ring Rating:

Cover Size:

Cover Size Width:

Bearing Surface Diam:

Bearing Surface Width:

Pick Holes:

Cover Insert Type:

Adjustment Ring Height:

Adjustment Ring Material:

Frame

Frame Material:

Frame Bearing Surface Width:

Frame Clear Opening Diam:

Frame Condition:

Frame Seal Inflow:

Frame Rating:

Depth:

Frame Offset Distance:

Frame Clear Opening Width:

Frame Seal Condition:

Frame Depth:

Chimney | Cone

Chimney Present:	<input type="text" value="Yes"/>	Chimney Material:	<input type="text" value="Not Known"/>
Chimney Infiltration/Inflow:	<input type="text" value="None"/>	Chimney Condition:	<input type="text" value="Sound"/>
Chimney Clear Opening:	<input type="text" value="26.60 in."/>	Chimney Depth:	<input type="text" value="0.96 in."/>
Chimney Coating/Liner:	<input type="text" value="Plastic"/>		
Chimney Rating:	<input type="text" value="1 - minor defects - failure unlikely in foreseeable future"/>		

Cone Type:	<input type="text" value="Conical centered"/>	Cone Depth:	<input type="text" value="5.29 in."/>
Cone Material:	<input type="text" value="Concrete (precast)"/>	Cone Condition:	<input type="text" value="Sound"/>
Cone Coating/Liner:	<input type="text" value="None"/>		
Cone Rating:	<input type="text" value="1 - minor defects - failure unlikely in foreseeable future"/>		

Wall | Bench | Channel

Wall Material:	<input type="text" value="Concrete (precast)"/>	Wall Coating/Liner:	<input type="text" value="None"/>
Wall Diameter/Lenght:	<input type="text" value="47.50 in."/>	Wall by Size (width):	
Wall Depth:	<input type="text" value="6.12 in."/>	Wall Condition:	<input type="text" value="Sound"/>
Manhole Steps:	<input type="text" value="2"/>	Step Material:	<input type="text" value="Plastic"/>
Wall Rating:	<input type="text" value="1 - minor defects - failure unlikely in foreseeable future"/>		

Bench Present:	<input type="text" value="Yes"/>	Bench Material:	<input type="text" value="Concrete (cast in place)"/>
Bench Coating/Liner:	<input type="text" value="None"/>	Bench Condition:	<input type="text" value="Sound"/>
Bench Rating:	<input type="text" value="1 - minor defects - failure unlikely in foreseeable future"/>		

Channel Installed:	<input type="text" value="Yes"/>	Channel Type:	<input type="text" value="Formed"/>
Channel Material:	<input type="text" value="Concrete (cast in place)"/>	Channel Exposure:	<input type="text" value="Fully Opened"/>
Channel Condition:	<input type="text" value="Sound"/>		
Channel Rating:	<input type="text" value="1 - minor defects - failure unlikely in foreseeable future"/>		

Connections

Pipe No.	Clock Pos.	Rim To Invert (Ft)	Direction	Material	Shape	Height (In)	Width (In)	Pipe Cond.	Pipe Seal Cond.	Pipe Type	Pipe Comments	Bulk-head	Bulk-head Cond.	Cond. Rating
1	6	6.80	Out	Vitrified Clay Pipe	Circular	8.00		Sound	Sound	Gravity Connection	Lined VCP.	No		1
2	12	6.52	In	Not Known	Circular	8.00		Sound	Sound	Gravity Connection	Lined pipe.	No		1
3	3	5.85	In	Vitrified Clay Pipe	Circular	6.00		Sound	Sound	Gravity Connection		No		1

Chanhassen Manhole Inspection Report



Asset Information

System Owner:

Structure Number:

Rim to Invert:

Rim to Grade:

Grade to Invert:

Location Code:

Access Point Type:

Access Point Use:

Surface Type:

Street:

City:

Inspection Information

Project:

Surveyed By:

Surveyor Certificate No.:

Reviewed By:

Reviewer Certificate No.:

Inspection Date:

Weather:

Inspection Status:

Inflow Potential from Runoff:

Evidence of Surcharge:

SEH Manhole Rating:

Additional Component Info:

Location Details:

Additional Info:

Cover | Adjustment Ring

Cover Shape:

Cover Material:

Cover Condition:

Cover Type:

Cover/Frame Fit:

Hole Diameter:

Cover Insert Condition:

Cover Rating:

Adjustment Ring Type:

Adjustment Ring Condition:

Adjustment Ring Rating:

Cover Size:

Cover Size Width:

Bearing Surface Diam:

Bearing Surface Width:

Pick Holes:

Cover Insert Type:

Adjustment Ring Height:

Adjustment Ring Material:

Frame

Frame Material:

Frame Bearing Surface Width:

Frame Clear Opening Diam:

Frame Condition:

Frame Seal Inflow:

Frame Rating:

Depth:

Frame Offset Distance:

Frame Clear Opening Width:

Frame Seal Condition:

Frame Depth:

Chimney | Cone

Chimney Present:

Chimney Material:

Chimney Infiltration/Inflow:

Chimney Condition:

Chimney Clear Opening:

Chimney Depth:

Chimney Coating/Liner:

Chimney Rating:

Cone Type:

Cone Depth:

Cone Material:

Cone Condition:

Cone Coating/Liner:

Cone Rating:

Wall | Bench | Channel

Wall Material:

Wall Coating/Liner:

Wall Diameter/Length:

Wall by Size (width):

Wall Depth:

Wall Condition:

Manhole Steps:

Step Material:

Wall Rating:

Bench Present:

Bench Material:

Bench Coating/Liner:

Bench Condition:

Bench Rating:

Channel Installed:

Channel Type:

Channel Material:

Channel Exposure:

Channel Condition:

Channel Rating:

Connections

Pipe No.	Clock Pos.	Rim To Invert (Ft)	Direction	Material	Shape	Height (In)	Width (In)	Pipe Cond.	Pipe Seal Cond.	Pipe Type	Pipe Comments	Bulk-head	Bulk-head Cond.	Cond. Rating
1	6	10.17	Out	Not Known	Circular	8.00		Sound	Sound	Gravity Connection	Lined pipe.	No		1
2	11	7.71	In	Vitrified Clay Pipe	Circular	8.00		Sound	Sound	Gravity Connection	Flow-monitoring band and probe in pipe.	No		1
3	12	10.17	In	Vitrified Clay Pipe	Circular	10.00		Sound	Sound	Gravity Connection	Lined VCP.	No		1



Building a Better World for All of Us[®]

Sustainable buildings, sound infrastructure, safe transportation systems, clean water, renewable energy and a balanced environment. Building a Better World for All of Us communicates a company-wide commitment to act in the best interests of our clients and the world around us.

We're confident in our ability to balance these requirements.

[Join Our Social Communities](#)

