City of Gardena

SEWER MASTER PLAN

FINAL | September 2023

City of Gardena

SEWER MASTER PLAN

FINAL | September 2023

Digitally signed by Ryan F. Orgill
Contact Info: Carollo Engineers, Inc.
Date: 2023.09.01 14:24:56-07'00'

Digitally signed by Danielle M. Orgill
Contact Info: Carollo Engineers, Inc.
Date: 2023.09.01 14:52:00-07'00'

Contents

Chapter 2 – Study Area

Chapter 3 – Planning and Evaluation Criteria

Chapter 4 – Wastewater Flows

Chapter 5 – Sanitary Sewer Collection System Facilities and Hydraulic Model

Chapter 6 – Capacity Evaluation and Proposed Improvements

Chapter 7 – Condition Assessment

Chapter 8 – Capital Improvement Program

Appendices

Tables

Figures

Abbreviations

AAF	average annual flow
ADWF	average dry weather flow
ADU	accessory dwelling unit
BWF	base wastewater flow
Carollo	Carollo Engineers
CCI	Construction Cost Index
CCTV	closed-circuit television
cfs	cubic feet per second
CIP	Capital Improvement Program
CIPP	cured-in-place pipe
City/Gardena	City of Gardena
CP	concrete pipe
d/D	depth to diameter
DOF	Department of Finance
DU	dwelling unit
DWF	dry weather flow
ENR	Engineering News Record
F	Fahrenheit
fps	feet per second
ft	feet
FY	fiscal year
GIS	geographic information system
Gpcd	Gallons per capita per day
gpd/ac	gallons per day per acre
gpd	gallons per day
gpm	gallons per minute
GWI	groundwater infiltration
HGL	hydraulic grade line
I-105	Interstate 105
I-110	Interstate 110
I/I	infiltration and inflow
LACSD	Los Angeles County Sanitation Districts
LF	linear feet
Master Plan	Sewer Master Plan
MACP	Manhole Assessment Certification Program
mgd	million gallons per day

MMF	maximum monthly flow
NASSCO	National Association of Sewer Service Companies
NOAA	National Oceanic and Atmospheric Administration
NPS	National Plant Services
O&M	operations and maintenance
PACP	Pipeline Assessment Certification Program
PHF	peak hourly flow
PWWF	peak wet weather flow
QMR	O&M quick rating score
QSR	structural quick rating score
RDI	Rain-Dependent Infiltration
RDII	Rainfall-Derived Inflow and Infiltration
RHNA	Regional Housing Needs Assessment
R&R	rehabilitation and replacement
RTK	real-time kinematic
SCAG	Southern California Association of Governments
sq ft	square feet
SSO	sanitary sewer overflow
TM	technical memorandum
V&A	V&A Consulting
VCP	vitrified clay pipe
WaPUG	Wastewater Planning Users Group
WWF	wet weather flow

EXECUTIVE SUMMARY

The Executive Summary presents a brief background of the City of Gardena's (City's) need for the Sewer Master Plan (Master Plan), a description of the study area, existing collection system, and proposed improvements to mitigate existing and future system deficiencies. A summary of capital improvement program (CIP) costs is also included.

ES.1 Introduction

The purpose of this Master Plan is to provide a planning document for the City's wastewater collection system through fiscal year (FY) 2045. The Master Plan will serve as a guide for collection system operations, existing pipelines and pump stations, and rehabilitation and replacement (R&R) projects through implementation of the CIP. In developing the Master Plan the collection system hydraulic model was updated, a condition assessment of the City's lift station and 89 miles of the collection system was completed, flow monitoring was performed, and an understanding of the system's performance/limitations was obtained from the City.

Prior to the Master Plan report, several technical memoranda (TMs) and other deliverables were submitted to the City as part of this project, and are referenced throughout this report:

- TM 1 – Lift Station Condition Assessment – Summarizes the results of the visual inspection and recommended improvements for the lift station.
- Sanitary Sewer Flow Monitoring and Inflow/Infiltration Study – This is a report provided by V&A Consulting Engineers that summarizes the results of the temporary flow monitoring program, conducted in 2022.

Each of the deliverables listed above is provided in an appendix to this Master Plan report for reference.

ES.2 Study Area

The City is located in the South Bay region of Los Angeles County, California. Interstate 105 (I-105) is to the north, and Interstate 110 (I-110) is to the east of the City. The City limits cover approximately 6.2 square miles.

ES.2.1 Future Growth

Although the City of Gardena is largely built out, there are several components expected to contribute to increased wastewater flows in the future, including known planned developments, accessory dwelling units (ADUs), and the Regional Housing Needs Assessment (RHNA) units allocated by the State. The following summarizes the assumptions used in developing the future growth projections:

- The planned developments provided by the City were assumed to be developed by 2045 and are allocated at the planned location of the development. The total planned residential units are expected to contribute toward the City's RHNA allocation.

- The planned residential units (1,299) were deducted from the City's RHNA allocation (5,735). The remaining RHNA housing units (4,436) were distributed throughout the overlay areas provided in the City's 2023 housing element.
- It was assumed that the City will receive, on average, 50 ADU applications per year, through 2045. This yields an additional 1,150 ADUs by 2045. The ADUs were distributed evenly to the low and medium density residential lots only.
- There are several locations where outside flows enter the City, either through a City pipe or Los Angeles County Sanitation Districts (LACSD) interceptor. The future scenario does not include any additional flows from these outside areas.

Based on the assumptions listed above, the number of residential dwelling units is expected to increase by nearly 31 percent, going from 22,486 existing units to 29,371 units by 2045.

ES.3 Wastewater Flows

ES.3.1 Temporary Flow Monitoring Program

Carollo Engineers (Carollo) contracted with V&A Consulting Engineers (V&A) to conduct a temporary flow monitoring program within the City's wastewater collection system. V&A prepared the stand-alone "Sewer Flow Monitoring and Inflow/Infiltration Study", which is included in Appendix A. Flow monitoring was performed over a 5-week period from March 8 to April 12, 2022, at 15 flow monitoring sites.

V&A collected flow, level, and velocity data at each site. The data collected by V&A was used to calibrate the collection system hydraulic model for dry weather flow (DWF) and wet weather flows (WWF). Additionally, areas of the system with the highest rates of inflow/infiltration (I/I) were identified. The procedure and data analysis used for these flow monitors is detailed in Chapter 4. One major rainfall event was captured during the flow monitoring program which elicited an inflow response throughout the collection system. According to the National Oceanic and Atmospheric Administration Atlas 14, this storm was classified as a 4-year, 15-minute storm event at the Southeast rain gauge. It should be noted that for all other sites, the storm event was classified as either a 1.5-year or less than a 1-year storm event.

ES.3.2 Existing and Projected Flows

Developing an accurate estimate of the future quantity of wastewater generated of the collection system is an important step in maintaining and sizing wastewater collection facilities, for both existing conditions and future developments. The City's existing average dry weather flow (ADWF) is estimated to be 4.8 million gallons per day (mgd). ADWF for future conditions were calculated based on a combination of several factors, including number of planned units, land use type, and/or wastewater generation factors developed from the flow monitoring data. Future flows were based on the following assumptions:

- Future residential flow rates are based on 55 gallons per day per person and commercial flow rates are based on 1,800 gallons per day per acre.
- The calibrated ADWF based on the flow monitoring data was not changed for existing parcels currently connected to the City's wastewater collection system.
- For subcatchments with planned developments, the calibrated wastewater flow was scaled up to match the expected ADWF for the planned development.

- Wastewater flows for subcatchments associated with an overlay area (for the RHNA housing units) or ADU's, were scaled up to include the existing plus future flows.
- No other planned developments, redevelopment, or densification is assumed to occur by the 2045 planning horizon.
- The planned developments, RHNA housing units, and ADU's were assumed to not contribute any I/I in the future.

The peak wet weather flow (PWWF) is the highest observed hourly flow that occurs following a rainfall event. A 10-year, 24-hour synthetic design storm was routed through the model under existing and future conditions. Table ES.1 summarizes the existing and buildout ADWF, PWWF, and peaking factors. The model predicts a PWWF of 20.3 mgd under existing conditions and 21.3 mgd by buildout. The PWWF to ADWF PF drops from 4.2 to 3.6 at buildout due to negligible I/I contribution from future developments.

Table ES.1 Projected Wastewater Flow Summary

Scenario	ADWF (mgd)	PWWF (mgd)	PWWF to ADWF Peaking Factor
Existing	4.79	20.3	4.2
2045 (Buildout)	5.84	21.3	3.6

Notes:
(1) Model-simulated, peak hourly flow generated within City. Excludes flows entering City from outside areas.

ES.4 Wastewater Collection System Facilities and Hydraulic Model

ES.4.1 Existing Collection System

The existing Gardena wastewater collection system is comprised of approximately 89 miles of gravity collection system pipe ranging from 6 to 12 inches, approximately 2,080 manholes, and one lift station and its associated force main. Figure ES.1 shows the City's existing wastewater collection system. The collection system pipes within the City discharge to the LACSD interceptor at over 100 locations. Based on information provided by the City, most pipes in the system are vitrified clay pipes (VCP).

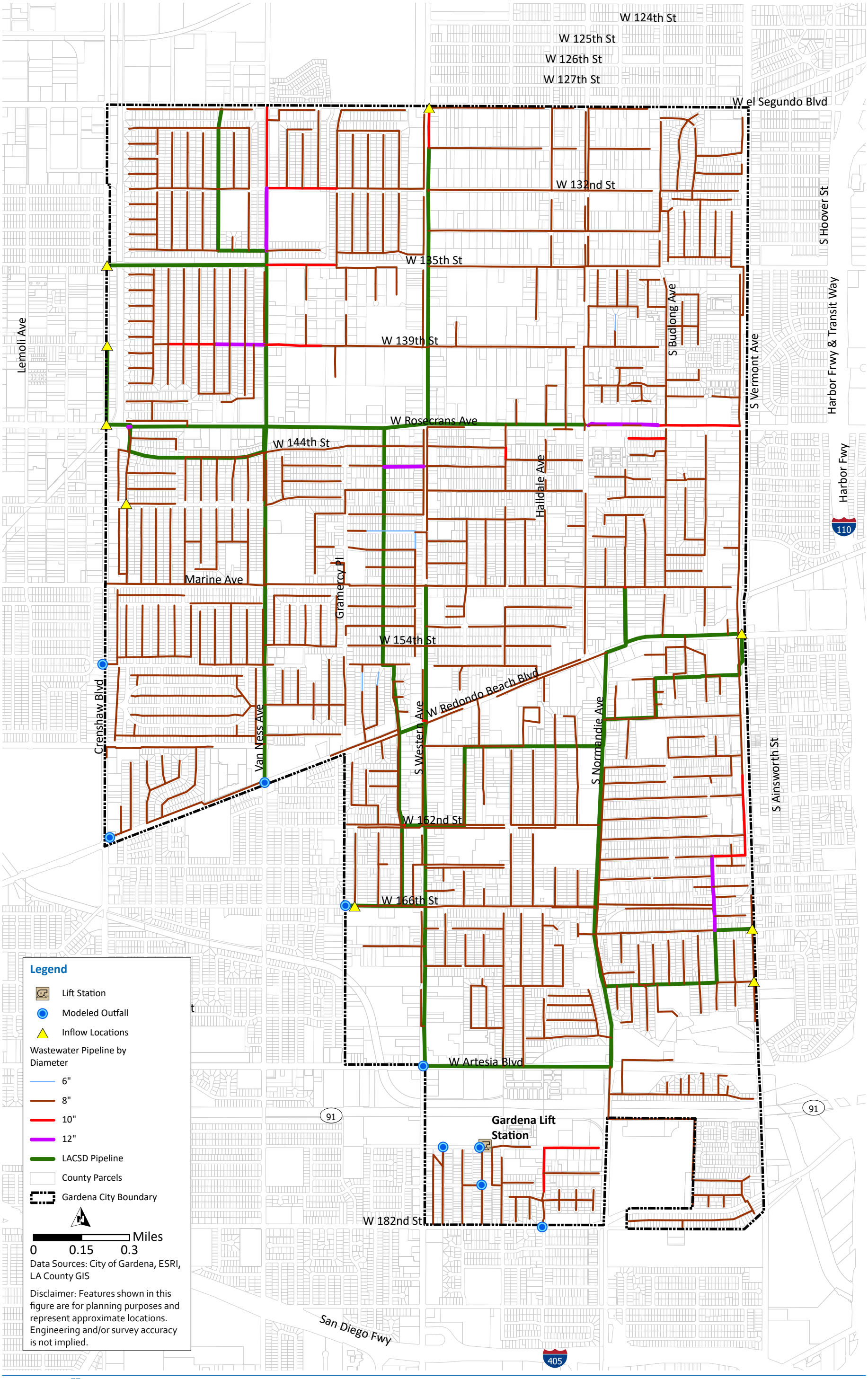


Figure ES.1 Existing Collection System

ES.4.2 Hydraulic Model Development

The City's collection system GIS database was constructed using the City's sewer system mapping in CAD and manhole inspection data. The model was developed in Innovyze's (now AutoDesk) InfoWorks software platform. Detailed steps of the model development process are described in Chapter 5.

ES.4.3 Model Calibration

Hydraulic model calibration is a crucial component of the hydraulic modeling effort. Calibrating the model to match data collected during the flow monitoring program provides the most accurate results possible. The calibration process consisted of calibrating to both dry and wet weather conditions. The DWF calibration provides an accurate depiction of base wastewater flow generated within the study area. The WWF calibration consisted of calibrating the hydraulic model to a specific storm event captured during the temporary flow monitoring program to accurately simulate the peak inflow and total I/I entering the sewer system. The amount of I/I is essentially the difference between the WWF and DWF components.

The model calibration is discussed further in Chapter 5. The calibration results indicate the model predicts conditions similar to those observed in the field. Based on the results presented, it can be concluded that the model is calibrated to dry and wet weather flow conditions and provides an accurate representation of the Gardena wastewater collection system to a level suitable for this Master Plan and for the City's future hydraulic modeling needs.

ES.5 Capacity Evaluation

ES.5.1 Performance Criteria

The wastewater system performance criteria are outlined in Chapter 3. The primary factor for improvements is the peak flow depth criteria, which is represented as the depth to diameter ratio (d/D). Table ES.2 summarizes the flow depth criteria for future proposed pipelines.

Table ES.2 Maximum Flow Depth Criteria

Pipe Diameter (inches)	Maximum Flow Depth Criteria
Existing Pipelines	
All	d/D < 1.0 (No surcharging)
Future or Proposed Pipelines	
≤ 8 inches	d/D = 0.5
> 8 inches	d/D = 0.75

ES.5.2 Capacity Evaluation

Following the dry and wet weather flow calibration, a capacity analysis of the existing and future collection system was performed. The capacity analysis entailed identifying areas in the collection system that did not meet the performance criteria presented in Chapter 3. The results of the capacity evaluation and the recommended improvements are included in Chapter 6.

The existing and future system analysis were both conducted by routing the design storm through the calibrated hydraulic model. In general, most of the City's collection system has sufficient capacity for the existing PWWF without exceeding the flow depth criteria. The existing sewer pipelines where the maximum hydraulic grade line exceeded the maximum flow depth criteria were identified.

The capacity evaluation determined that there is sufficient firm capacity at the lift station to handle PWWF under both existing and future conditions.

ES.5.3 Recommended Capacity Improvements

Following the completion of the existing system analysis, 15 improvement projects were identified to mitigate existing system pipeline capacity deficiencies. The future system evaluation only identified two additional capacity deficiencies. The proposed capacity improvements are illustrated on Figure ES.2.

For the purposes of this study, it was assumed that a capacity deficiency sewer would be upgraded to a larger diameter, rather than combined with a new parallel sewer. The proposed improvements were sized for future 2045 conditions. The specific outlined improvements are detailed in Chapter 6. All improvements are based on maintaining the maximum flow depth criteria stated in Chapter 3.

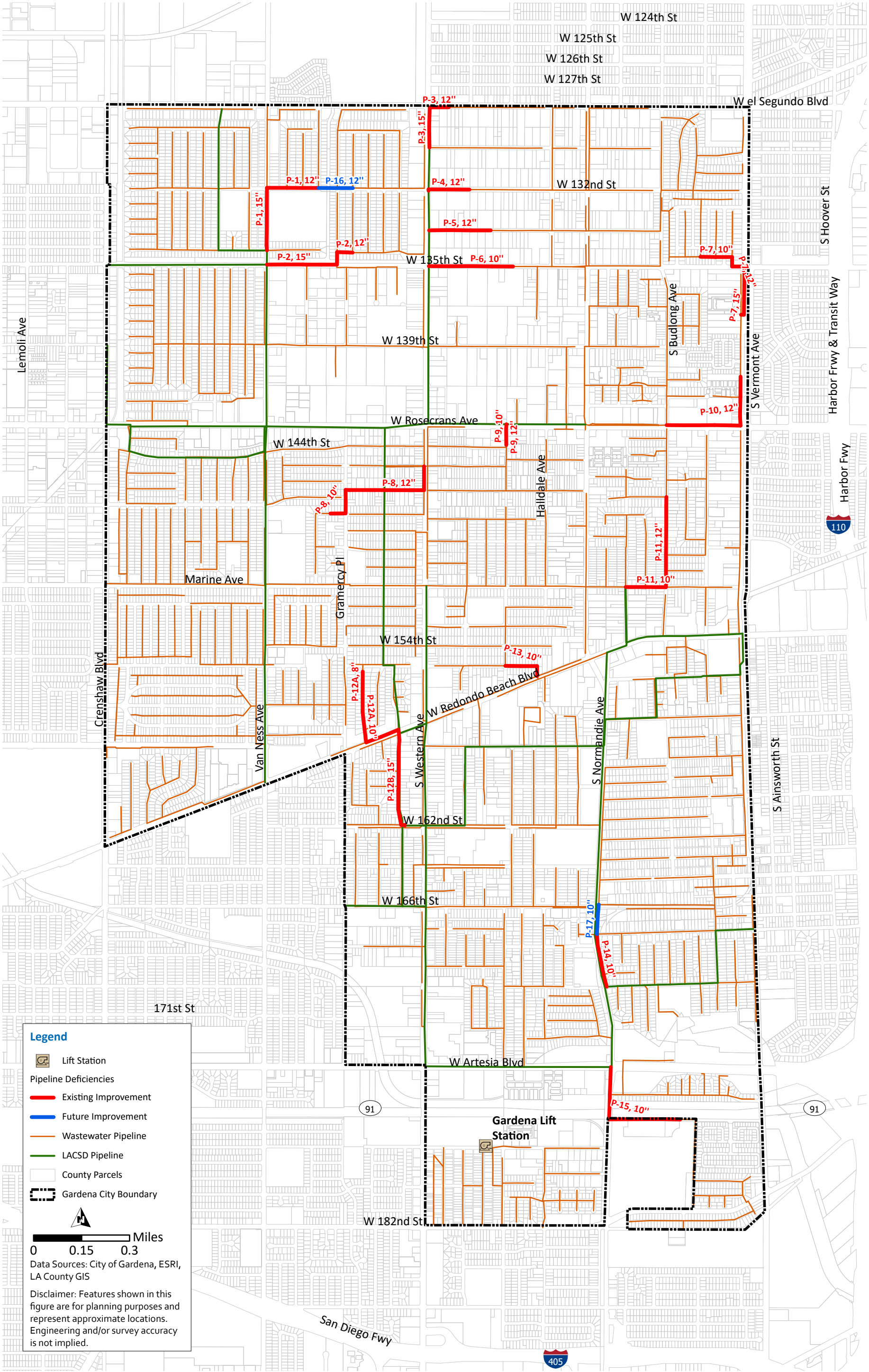


Figure ES.2 Recommended Improvements

ES.6 Condition Assessment

ES.6.1 Gravity Pipelines

A condition assessment was conducted on the gravity sewer, manholes, and lift station. CCTV inspections results from 2019 and 2022 (conducted by National Plant Services [NPS] using the National Association of Sewer Service Companies [NASSCO] coding system) were compiled. The results for 1,857 reaches have been compiled at the time of this final draft report. The following was noted:

- 141 reaches had one or more structural defects with a Condition Grade of 5.
- 791 reaches had one or more structural defects with a Condition Grade of 4.
- 7 reaches had operations and maintenance (O&M) defects with a Condition Grade of 4.
- 76 reaches had O&M defects with a Condition Grade of 5.
- 58 reaches had Condition Grades 4 or 5 for both structural and O&M defects.

Carollo reviewed the inspection reports for all of pipe reaches with Grade 5 defects and a small sample of pipe reaches with Grade 4 defects. Some of the most common defect categories observed in these reports included sags, breaks, fractures, cracks, holes, and surface damage. The specific structural defect categories and codes on these reports were used to estimate the percentage of Grade 4 and 5 pipes that would require full replacement versus lining. For instance, defect codes that indicate soil movement and/or consolidation are assumed to require replacement. Approximately 40 percent of the pipe reaches that were reviewed in detail indicate a full replacement may be needed. Whereas lining may be appropriate for the remaining 60 percent of pipe reaches. For planning purposes, it is assumed that 40 percent of the Grade 4 and 5 defect pipelines will be replaced and the remaining will be lined.

ES.6.2 Manholes

NPS also conducted a Level 1 inspection of the City's manholes. For each manhole inspected, NPS documented the condition of the manhole wall, chimney, bench, and channel. Each were given a rating of sound (S), defective (D), or not known (X). Evidence of I/I was also documented. Based on the results of the Level 1 manhole inspections, the following was noted:

- Although it was not part of this scope to provide detailed defects, NPS did provide some observations, including:
  - Rocks, bricks, gravel, rags, rebar, grease, and pipes or sticks were observed in some manholes. In some cases, debris was partially blocking flow of water.
  - Roots were observed in some manholes, and, in at least one case, they were observed from the top to bottom of the manhole.
  - Surcharging was observed in at least one manhole at the time of inspection.
  - Holes or missing parts of the manhole bench were observed at several locations.
- Only one manhole (MH2207U) was labeled as defective in every category. This manhole did not have evidence of I/I.
- Approximately 93 percent of the manholes inspected received a "Sound" grade for each of the manhole condition categories (wall, cone, chimney, bench, and channel).

Approximately 5 percent of manholes inspected had evidence of I/I. Most of the manholes with evidence of I/I were marked as "Sound" for every condition category.

ES.6.3 Lift Station

As part of the Master Plan Update, Carollo conducted a visual condition assessment of the City's existing lift station to supplement the hydraulic and capacity evaluations of the collection system. Overall, the lift station was found to be in good condition, although some improvements are recommended. Appendix B summarizes the findings of the lift station condition assessment.

ES.7 Capital Improvement Program

The CIP was based on the evaluation of the City's wastewater collection system capacity (as described in Chapter 6), the Lift Station Condition Assessment (as described in Chapter 7 and TM 1), and the gravity pipeline CCTV inspection program (as described in Chapter 7). The costs are based on an *Engineering News Record* Construction Cost Index (ENR CCI) of 13,278 (Los Angeles, October 2022).

Typical construction conditions and schedules have been assumed for the cost estimates. Project cost estimates were calculated based on elements such as the project location, size, and length. The Baseline Construction Cost, Estimated Construction Cost, and Capital Improvement Cost have been estimated and included in the planning budget. The assumptions made for construction costs are detailed in Chapter 8.

ES.7.1 Project Prioritization

As discussed in Chapters 6 and 7, the capital projects identified will allow the City to provide reliable service to its customers through the year 2045. The improvement projects were prioritized based on the following factors:

- Reducing the risk of sanitary sewer overflows (SSOs) in the collection system.
- Implementing projects to reduce the rates of I/I in the collection system.
- Rehabilitating or replacing pipelines to prevent structural failure of aging pipes.

Based on these factors, each project was assigned an implementation year. Critical projects were phased in the earlier phases (years) of the 20-year CIP. Less critical projects were phased into later phases of the 20-year CIP.

ES.7.2 20-Year CIP

The capital improvements were assigned an implementation year and grouped into one of the following phases:

- Near-Term Projects (FY 2023 – 2027): This phase includes projects that are targeted as the highest priority improvements to be implemented within 5 years.
- Intermediate-Term Projects (FY 2028 – 2032): This phase includes projects that are targeted as high priority improvements that may be mitigated or monitored for several years prior to being implemented. These projects would be implemented in the following five years.
- Long-Term Projects (FY 2033 and beyond): This phase generally includes medium priority improvements, to be implemented beyond 10 years of the planning period.

A summary of the capital projects is presented in Table ES.3 and Table ES.4. The projects listed in Table ES.3 and Table ES.4 are broken down by capacity-related improvements, R&R projects, or other projects. Capacity-related improvements were recommended based on the capacity deficiencies described in Chapter 6. The R&R projects were based on the lift station condition assessment and the gravity pipeline CCTV inspection results. Other projects include future master plans, flow monitoring, and smoke testing. Detailed capital improvement sheets for each of the capacity projects is provided in Appendix G.

The improvements proposed in this Master Plan either benefit existing users and/or are required to serve new development and future users. It is estimated that the existing users' share of the costs is approximately 88 percent, while the future user's share of the cost is approximately 12 percent of the proposed improvements.

The City's 10-year CIP, including capacity-related, rehabilitation, and other projects, is estimated to be $24.7 million. Near-term projects, to be implemented in the next five years, account for approximately 62 percent ($15.4 million). Intermediate-term projects, to be implemented between 2028 and 2032, account for approximately 38 percent ($9.4 million) of the recommended improvements within the first 10 years. Only one project (R-2) to rehabilitate the pipelines with Grade 4 defects was included in the long-term phasing (2033 and beyond). This project is estimated to cost $50M, and is not included in the 10-year CIP.

ES.7.3 Alternative 20-Year CIP

It should be noted that the CIP phasing included in the 20-year CIP, and summarized in Tables ES.3 and ES.4, is based on the project prioritization factors described in Section 8.1, and represents the preferred implementation schedule for the proposed improvements. Funding availability will limit the City's ability to implement the proposed projects according to the implementation schedule included in Table ES.3. Carollo worked with the City to develop an alternative 20-year CIP based on the current funding of approximately $10 million over the next 10-years.

Table ES.5 summarizes the alternative 20-year CIP. For the alternative CIP, replacement and rehabilitation of the Grade 5 defect pipelines was given priority in the first 10 years, along with several other projects. The total cost to rehabilitate the Grade 5 defect pipes (Project R-1) is estimated to be $8.6M, where $1M was allocated for years 2024 through 2027 each, and the remaining allocated to the intermediate-term phase (2028-2032). The phasing of projects R-2 and R-3 and the "other" projects did not change from what was presented in Table 8.3. And the capacity-related projects were included in the long-term phase in the alternative CIP. The total CIP amount remains the same at $74.4M, however, the 10-year CIP is only $10.3M.

Table ES.3 Detailed Capital Improvement Program

Project		Deficiency Type (Existing or Future)	Existing Size Diameter (in)	Proposed Size Diameter (in)	Proposed Amount Length (ft)	Baseline Construction Cost[1,2] ($)	Estimated Construction Cost[3] ($)	Total Capital Improvement Cost[4,5,6] ($)	10-Year Capital Improvement Cost[4,5,6] ($)	CIP Phasing ($)[7]						
										Near-Term					Intermediate	Long-Term
										2023	2024	2025	2026	2027	2028-2032	2033 & Beyond
Capacity Related Improvements																
Gravity Mains																
P-1	Gravity Main along 132nd Street and Van Ness Avenue	Existing	10 - 12	12 - 15	1,880	$ 775,200	$ 1,007,700	$ 1,284,800	$ 1,284,800	$ -	$ -	$ -	$ 642,400	$ 642,400	$ -	$ -
P-2	Gravity Main along 135th Street and 134th Place	Existing	8 - 10	12 - 15	1,620	$ 643,300	$ 836,300	$ 1,066,300	$ 1,066,300	$ -	$ -	$ -	$ 533,150	$ 533,150	$ -	$ -
P-3	Gravity Main along El Segundo Boulevard and Western Avenue	Existing	8 - 10	12 - 15	980	$ 400,600	$ 520,800	$ 664,000	$ 664,000	$ 332,000	$ 332,000	$ -	$ -	$ -	$ -	$ -
P-4	Gravity Main along 132nd Street	Existing	8	12	770	$ 269,700	$ 350,700	$ 447,100	$ 447,100	$ -	$ -	$ 223,550	$ 223,550	$ -	$ -	$ -
P-5	Gravity Main along 134th Street	Existing	8	12	1,020	$ 355,600	$ 462,200	$ 589,300	$ 589,300	$ -	$ -	$ -	$ -	$ 294,650	$ 294,650	$ -
P-6	Gravity Main along 135th Street	Existing	8	10	1,390	$ 460,100	$ 598,100	$ 762,500	$ 762,500	$ 381,250	$ 381,250	$ -	$ -	$ -	$ -	$ -
P-7	Gravity Main along Vermont Avenue and 135th Street	Existing	8	10 - 15	1,720	$ 620,600	$ 806,700	$ 1,028,600	$ 1,028,600	$ -	$ -	$ -	$ -	$ 514,300	$ 514,300	$ -
P-8	Gravity Main along 147th Streetand Gramercy Place	Existing	8	10 - 12	2,330	$ 801,000	$ 1,041,300	$ 1,327,600	$ 1,327,600	$ 663,800	$ 663,800	$ -	$ -	$ -	$ -	$ -
P-9	Gravity Main along Denker Avenue	Existing	8	12	340	$ 119,900	$ 155,900	$ 198,800	$ 198,800	$ -	$ -	$ -	$ -	$ -	$ 198,800	$ -
P-10	Gravity Main along Vermont Avenue and Rosecrans Avenue	Existing	8 - 10	12	2,030	$ 709,300	$ 922,100	$ 1,175,700	$ 1,175,700	$ -	$ -	$ 587,850	$ 587,850	$ -	$ -	$ -
P-11	Gravity Main along Budlong Avenue and Marine Avenue	Existing	8	12	2,150	$ 752,800	$ 978,600	$ 1,247,700	$ 1,247,700	$ -	$ -	$ -	$ -	$ -	$ 1,247,700	$ -
P-12A	Gravity Main along Ruthelen Avenue and Redondo Beach Boulevard	Existing	6 - 8	10 - 12	1,740	$ 586,600	$ 762,600	$ 972,300	$ 972,300	$ -	$ 486,150	$ 486,150	$ -	$ -	$ -	$ -
P-12B	Gravity Main along Manhattan Place	Existing	8 - 10	15	1,660	$ 720,700	$ 936,900	$ 1,194,600	$ 1,194,600	$ 597,300	$ 597,300	$ -	$ -	$ -	$ -	$ -
P-13	Gravity Main along 154th Place	Existing	8	10	690	$ 229,600	$ 298,500	$ 380,600	$ 380,600	$ -	$ -	$ -	$ -	$ -	$ 380,600	$ -
P-14	Gravity Main along Normandie Avenue (between 168th and 170th Streets)	Existing	8	10	720	$ 237,600	$ 308,900	$ 393,800	$ 393,800	$ -	$ -	$ 196,900	$ 196,900	$ -	$ -	$ -
P-15	Gravity Main along 177th Street and Normandie Avenue	Existing	8	10	2,040	$ 674,500	$ 876,900	$ 1,118,100	$ 1,118,100	$ 559,050	$ 559,050	$ -	$ -	$ -	$ -	$ -
P-16	Gravity Main along 132nd Street	Future	8 - 10	12	570	$ 198,500	$ 258,000	$ 328,900	$ 328,900	$ -	$ -	$ -	$ -	$ -	$ 328,900	$ -
P-17	Gravity Main along Normandie Avenue (between 166th and 168th Streets)	Future	8	10	490	$ 161,700	$ 210,200	$ 268,100	$ 268,100	$ -	$ -	$ -	$ -	$ -	$ 268,100	$ -
Subtotal Capacity-Related Improvement						**$ 8,717,300**	**$ 11,332,400**	**$ 14,448,800**	**$ 14,448,800**	**$ 2,533,400**	**$ 3,019,550**	**$ 1,494,450**	**$ 2,183,850**	**$ 1,984,500**	**$ 3,233,050**	**$ -**
Rehabilitation Projects																
Gravity Mains																
R-1	Replace Pipelines with Grade 5 Defects					$ 5,176,900	$ 6,730,000	$ 8,580,800	$ 8,580,800	$ -	$ 953,422	$ 953,422	$ 953,422	$ 953,422	$ 4,767,111	$ -
R-2	Replace Pipelines with Grade 4 Defects					$ 29,970,800	$ 38,962,000	$ 49,676,600	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 49,676,600
Lift Station																
LS-1	Rehabilitate City Lift Station							$ 135,800	$ 135,800	$ -	$ 135,800	$ -	$ -	$ -	$ -	$ -
Subtotal Rehabilitation Projects						**$ 35,147,700**	**$ 45,692,000**	**$ 58,393,200**	**$ 8,716,600**	**$ -**	**$ 1,089,222**	**$ 953,422**	**$ 953,422**	**$ 953,422**	**$ 4,767,111**	**$ 49,676,600**
Other Projects																
O-1	Future Flow Monitoring	-	-	-	-	-	-	$ 100,000	$ 100,000	$ -	$ -	$ -	$ -	$ -	$ 100,000	$ -
O-2	Master Plan Updates	-	-	-	-	-	-	$ 250,000	$ 250,000	$ -	$ -	$ -	$ -	$ -	$ 250,000	$ -
O-3	Smoke Testing - Basin 1							$ 75,900	$ 75,900	$ 75,900	$ -	$ -	$ -	$ -	$ -	$ -
O-4	Smoke Testing - Basin 3							$ 61,100	$ 61,100	$ 61,100	$ -	$ -	$ -	$ -	$ -	$ -
O-5	Smoke Testing - Basin 10							$ 44,700	$ 44,700	$ 44,700	$ -	$ -	$ -	$ -	$ -	$ -
O-6	Smoke Testing - Basin 15							$ 41,700	$ 41,700	$ 41,700	$ -	$ -	$ -	$ -	$ -	$ -
O-7	CCTV and Manhole Inspection	-	-	-	-	-	-	$ 1,000,000	$ 1,000,000	$ -	$ -	$ -		$ -	$ 1,000,000	$ -
Subtotal Other Projects						**$ -**	**$ -**	**$ 1,573,400**	**$ 1,573,400**	**$ 223,400**	**$ -**	**$ -**	**$ -**	**$ -**	**$ 1,350,000**	**$ -**
Total CIP						**$ 43,865,000**	**$ 57,024,400**	**$ 74,415,400**	**$ 24,738,800**	**$ 2,756,800**	**$ 4,108,772**	**$ 2,447,872**	**$ 3,137,272**	**$ 2,937,922**	**$ 9,350,161**	**$ 49,676,600**

Notes:
(1) All costs are in 2022 dollars.
(2) Engineering News Report (ENR) Greater LA Construction Cost Index for October 2022 is 13,728.
(3) Estimated Construction Cost includes a 30% contingency of the baseline construction cost.
(4) Cost Estimates do not include costs for land acquisition, easements or ROW acquisition.
(5) Total project costs includes a 10% markup for engineering, a 10% markup for construction management and a 7.5% markup for project administration of the estimated construction cost.
(6) Includes capital costs for projects phased through 2032. Does not include Long Term projects.
(7) Alternative CIP developed based on current funding of $10M over 10-years.

Table ES.4 10-Year CIP Cost Estimate Summary

Improvement Type	CIP Cost Estimate by Phase ($, Millions)[1]		Total[2] ($, Millions)
	Near-Term (2023- 2027)	Intermediate-Term (2028- 2032)	
Capacity	$11.2	$3.2	$14.4
R&R Projects	$3.9	$5.8	$9.7
Other	$0.2	$0.4	$0.6
Total	**$15.4**	**$9.4**	**$24.7**

Notes:
(1) Los Angeles ENR CCI for October 2022 is 13,728.
(2) Only includes projects allocated to the first 10 years of the CIP. Does not include long-term projects.

Table ES.5 Alternative Detailed Capital Improvement Program

Project		Deficiency Type (Existing or Future)	Existing Size Diameter (in)	Proposed Size Diameter (in)	Proposed Amount Length (ft)	Baseline Construction Cost[1,2] ($)	Estimated Construction Cost[3] ($)	Total Capital Improvement Cost[4,5,6] ($)	10-Year Capital Improvement Cost[4,5,6] ($)	CIP Phasing ($)							
										Near-Term					Intermediate	Long-Term
										2023	2024	2025	2026	2027	2028-2032	2033 & Beyond
Capacity Related Improvements																
Gravity Mains																
P-1	Gravity Main along 132nd Street and Van Ness Avenue	Existing	10 - 12	12 - 15	1,880	$ 775,200	$ 1,007,700	$ 1,284,800	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,284,800
P-2	Gravity Main along 135th Street and 134th Place	Existing	8 - 10	12 - 15	1,620	$ 643,300	$ 836,300	$ 1,066,300	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,066,300
P-3	Gravity Main along El Segundo Boulevard and Western Avenue	Existing	8 - 10	12 - 15	980	$ 400,600	$ 520,800	$ 664,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 664,000
P-4	Gravity Main along 132nd Street	Existing	8	12	770	$ 269,700	$ 350,700	$ 447,100	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 447,100
P-5	Gravity Main along 134th Street	Existing	8	12	1,020	$ 355,600	$ 462,200	$ 589,300	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 589,300
P-6	Gravity Main along 135th Street	Existing	8	10	1,390	$ 460,100	$ 598,100	$ 762,500	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 762,500
P-7	Gravity Main along Vermont Avenue and 135th Street	Existing	8	10 - 15	1,720	$ 620,600	$ 806,700	$ 1,028,600	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,028,600
P-8	Gravity Main along 147th Streetand Gramercy Place	Existing	8	10 - 12	2,330	$ 801,000	$ 1,041,300	$ 1,327,600	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,327,600
P-9	Gravity Main along Denker Avenue	Existing	8	12	340	$ 119,900	$ 155,900	$ 198,800	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 198,800
P-10	Gravity Main along Vermont Avenue and Rosecrans Avenue	Existing	8 - 10	12	2,030	$ 709,300	$ 922,100	$ 1,175,700	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,175,700
P-11	Gravity Main along Budlong Avenue and Marine Avenue	Existing	8	12	2,150	$ 752,800	$ 978,600	$ 1,247,700	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,247,700
P-12A	Gravity Main along Ruthelen Avenue and Redondo Beach Boulevard	Existing	6 - 8	10 - 12	1,740	$ 586,600	$ 762,600	$ 972,300	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 972,300
P-12B	Gravity Main along Manhattan Place	Existing	8 - 10	15	1,660	$ 720,700	$ 936,900	$ 1,194,600	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,194,600
P-13	Gravity Main along 154th Place	Existing	8	10	690	$ 229,600	$ 298,500	$ 380,600	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 380,600
P-14	Gravity Main along Normandie Avenue (between 168th and 170th Streets)	Existing	8	10	720	$ 237,600	$ 308,900	$ 393,800	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 393,800
P-15	Gravity Main along 177th Street and Normandie Avenue	Existing	8	10	2,040	$ 674,500	$ 876,900	$ 1,118,100	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,118,100
P-16	Gravity Main along 132nd Street	Future	8 - 10	12	570	$ 198,500	$ 258,000	$ 328,900	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 328,900
P-17	Gravity Main along Normandie Avenue (between 166th and 168th Streets)	Future	8	10	490	$ 161,700	$ 210,200	$ 268,100	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 268,100
Subtotal Capacity-Related Improvement						**$ 8,717,300**	**$ 11,332,400**	**$ 14,448,800**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ 14,448,800**
Rehabilitation Projects																
Gravity Mains																
R-1	Replace Pipelines with Grade 5 Defects					$ 5,176,900	$ 6,730,000	$ 8,580,800	$ 8,580,800	$ -	$ 1,000,000	$ 1,000,000	$ 1,000,000	$ 1,000,000	$ 4,580,800	$ -
R-2	Replace Pipelines with Grade 4 Defects					$ 29,970,800	$ 38,962,000	$ 49,676,600	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 49,676,600
Lift Station																
LS-1	Rehabilitate City Lift Station							$ 135,800	$ 135,800	$ -	$ 135,800	$ -	$ -	$ -	$ -	$ -
Subtotal Rehabilitation Projects						**$ 35,147,700**	**$ 45,692,000**	**$ 58,393,200**	**$ 8,716,600**	**$ -**	**$ 1,135,800**	**$ 1,000,000**	**$ 1,000,000**	**$ 1,000,000**	**$ 4,580,800**	**$ 49,676,600**
Other Projects																
O-1	Future Flow Monitoring	-	-	-	-	-		$ 100,000	$ 100,000	$ -	$ -	$ -	$ -	$ -	$ 100,000	$ -
O-2	Master Plan Updates	-	-	-	-	-		$ 250,000	$ 250,000	$ -	$ -	$ -	$ -	$ -	$ 250,000	$ -
O-3	Smoke Testing - Basin 1							$ 75,900	$ 75,900	$ 75,900	$ -	$ -	$ -	$ -	$ -	$ -
O-4	Smoke Testing - Basin 3							$ 61,100	$ 61,100	$ 61,100	$ -	$ -	$ -	$ -	$ -	$ -
O-5	Smoke Testing - Basin 10							$ 44,700	$ 44,700	$ 44,700	$ -	$ -	$ -	$ -	$ -	$ -
O-6	Smoke Testing - Basin 15							$ 41,700	$ 41,700	$ 41,700	$ -	$ -	$ -	$ -	$ -	$ -
O-7	CCTV and Manhole Inspection							$ 1,000,000	$ 1,000,000	$ -	$ -	$ -	$ -	$ -	$ 1,000,000	$ -
Subtotal Other Projects						**$ -**	**$ -**	**$ 1,573,400**	**$ 1,573,400**	**$ 223,400**	**$ -**	**$ -**	**$ -**	**$ -**	**$ 1,350,000**	**$ -**
Total CIP						**$ 43,865,000**	**$ 57,024,400**	**$ 74,415,400**	**$ 10,290,000**	**$ 223,400**	**$ 1,135,800**	**$ 1,000,000**	**$ 1,000,000**	**$ 1,000,000**	**$ 5,930,800**	**$ 64,125,400**

Notes:

(1) All costs are in 2022 dollars.

(2) Engineering News Report (ENR) Greater LA Construction Cost Index for October 2022 is 13,728.

(3) Estimated Construction Cost includes a 30% contingency of the baseline construction cost.

(4) Cost Estimates do not include costs for land acquisition, easements or ROW acquisition.

(5) Total project costs includes a 10% markup for engineering, a 10% markup for construction management and a 7.5% markup for project administration of the estimated construction cost.

(6) Includes capital costs for projects phased through 2032. Does not include Long Term projects.

Chapter 1

INTRODUCTION

This chapter presents a brief summary of the City of Gardena's (City's or Gardena's) need for this Sewer Master Plan (Master Plan), the objectives of the Master Plan, and a description of the eight chapters that cover the wastewater collection system.

1.1 Background

Gardena is located in the South Bay region of Los Angeles County, California, adjacent to the cities of Torrance, Willowbrook, and Hawthorne, and is approximately 15 minutes from downtown Los Angeles. The City is bounded by Interstate 105 (I-105) to the north and Interstate 110 (I-110) to the east. The City limits comprise approximately 6.2 square miles. Figure 1.1 presents a location map of the City.

The City of Gardena was incorporated on September 11, 1930, where the rural communities of Gardena, Moneta, and Strawberry Park were combined. Gardena started out as a small farming community with approximately 20,000 people. Today, the City is highly developed with a diverse community of nearly 60,000 residents and a variety of commercial businesses.

1.2 Wastewater Collection System Overview

The City provides sewer services to its residential, commercial, and industrial customers within the City limits. The wastewater collection system includes over 88 miles of gravity sewer lines, approximately 2,080 manholes, and one lift station. All wastewater generated in the City's collection system discharges to and is treated by the Los Angeles County Sanitation Districts (LACSD). The City's sewers discharge at over 100 locations along various LACSD interceptors.

1.3 Previous Master Sewer Study

The City's previous Master Sewer Study was completed in February 2008. The purpose of the 2008 Sewer Study was to conduct a condition and hydraulic assessment of the existing collection system and to provide recommendations to alleviate existing deficiencies and accommodate future growth.

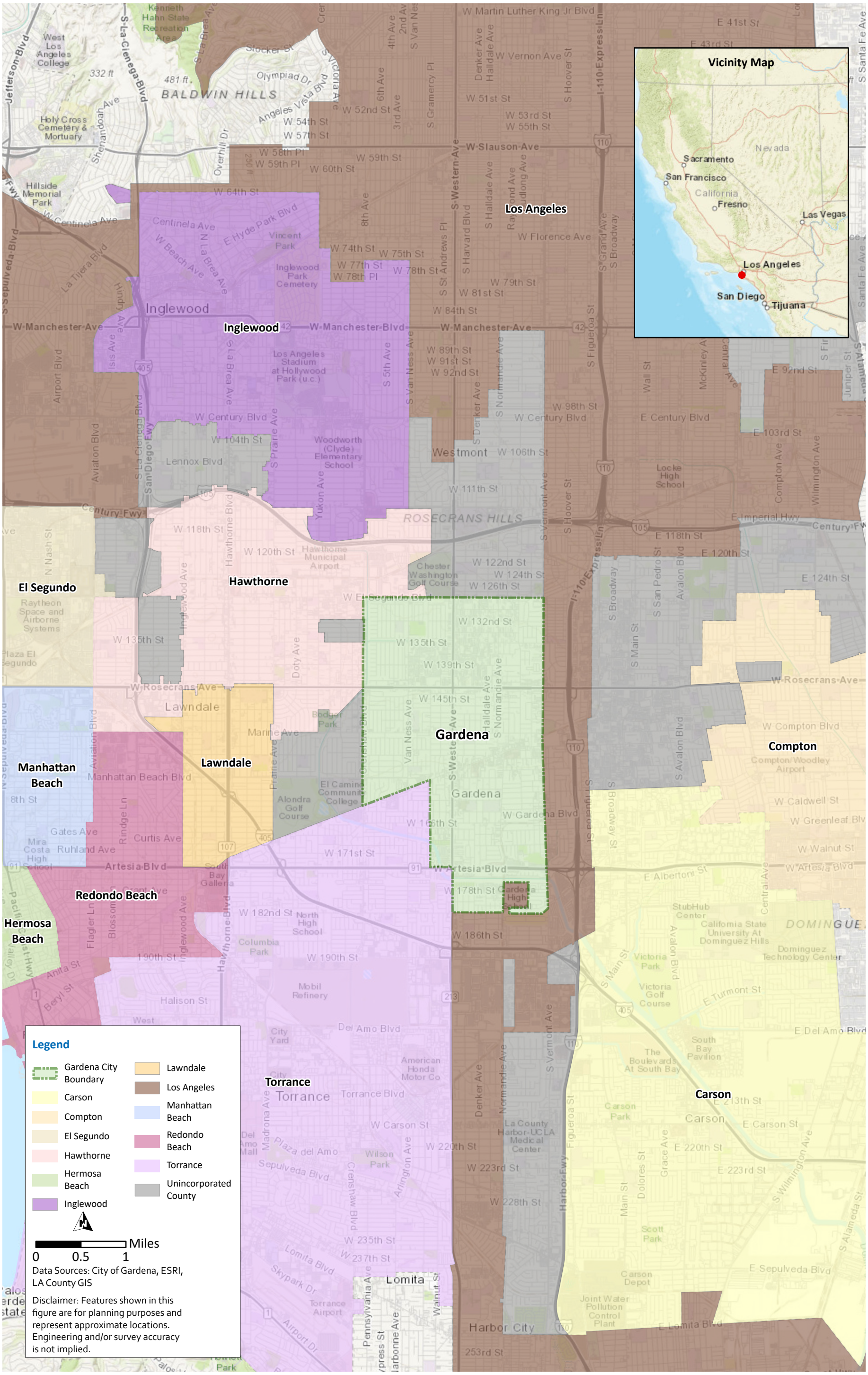


Figure 1.1 Location Map

1.4 Study Purpose, Scope, and Authorization

The purpose of this Master Plan is to develop a hydraulic model of the City's wastewater collection system, gain an understanding of the system's performance, and to provide a planning document for the City's Public Works Department. Overall, the Master Plan will assist the City in their approach to optimize their collection system operations, maximize use of existing pipelines, and focus spending in key areas that need rehabilitation and replacement (R&R) or capacity upgrades.

Carollo Engineers, Inc. (Carollo) was contracted to prepare the Master Plan. The scope of services included the following main tasks:

- Task 1 - Data Collection and Meetings.
- Task 2 - Sewer Closed-Circuit Television (CCTV) Survey.
- Task 3 - Manhole Inspection.
- Task 4 - Flow Monitoring.
- Task 5 - Sewer Flow Projections.
- Task 6 - Lift Station Assessment.
- Task 7 - GIS and Hydraulic Model Development.
- Task 8 - Technical Memorandum on Existing and Future Wastewater Collection System.
- Task 9 - Capital Improvement Program (CIP).
- Task 10 - Sewer Master Plan Report.
- Task 11 - Sewer System Management Plan Update.
- Task 12 - Sewer Design Manual.
- Task 13 - On-Call Hydraulic Analysis.

1.5 Report Organization

The Master Plan contains eight chapters, followed by appendices that provide supporting documentation for the information presented in this report. The chapters are briefly described below:

- Chapter 1 - Introduction. This chapter presents the need for this Master Plan and the objectives of the study.
- Chapter 2 - Study Area. This chapter presents a description of the study area and defines the planning horizon and summarizes the land use classifications and future development of the study area.
- Chapter 3 - Planning and Evaluation Criteria. This chapter presents the planning criteria and methodologies for the analysis used to evaluate the City's existing wastewater collection system and associated facilities, which are utilized to identify existing system deficiencies and to size future improvements.
- Chapter 4 - Wastewater Flows. This chapter summarizes the existing and projected wastewater flows for the City's wastewater collection system. Flow data obtained as part of the temporary flow monitoring program are also presented.
- Chapter 5 - Wastewater Collection System Facilities and Hydraulic Model. This chapter describes the development and calibration of the City's wastewater collection system hydraulic model. A summary of the modeled components is also included.

- Chapter 6 - Capacity Evaluation and Proposed Improvements. This chapter discusses the hydraulic evaluation of the wastewater collection system and the proposed projects that correct existing capacity deficiencies and serve future users.
- Chapter 7 - Condition Assessment. This chapter summarizes the results of the pipeline CCTV inspections as well as the manhole inspections. Recommended rehabilitation and replacement projects are also presented.
- Chapter 8 - Capital Improvement Program. This chapter presents the CIP, a summary of the capital costs, and a basic assessment of the possible financial impacts. The CIP includes projects recommended based on the lift station site visits and the CCTV inspection program, as well as other projects identified by the City.

In addition to this master plan report, the following deliverables have also been completed and provided to the City as part of this project and are included as appendices to this report:

- Flow Monitoring Report. The flow monitoring report was completed by V&A Consulting (V&A) and documents the findings of the collection system flow monitoring program that was conducted in 2022.
- Lift Station Assessment Technical Memorandum (TM) 1. This TM documented the findings and recommendations of the visual inspection of the City's lift station.

1.6 Reference Material

The following documents were referenced in the preparation of this Master Plan:

- LACSD Underground Utilities geographic information system (GIS) database and record drawings.
- City of Gardena Sewer System Management Plan, September 2010.
- City of Gardena City maps and record drawings.
- National Plan Services, CCTV and manhole inspection records and photos.
- City of Gardena General Plan, April 2021.
- City of Gardena Revised 2021-2029 Housing Element, January 2023.

Chapter 2

STUDY AREA

This chapter outlines the planning area for the City's wastewater collection system, defines land use classifications and describes the planned development within the City's service area.

2.1 Study Area

The City's sewer study area consists of the City limits. Figure 2.1 shows the study area boundary. The terms "study area", "service area", and "City limits" are used interchangeably throughout this Master Plan report.

2.2 Planning Horizon

This Master Plan is intended to serve as a guiding document for the planning and implementation of sewer system improvements to address capacity constraints and rehabilitation/replacement of ageing infrastructure and accommodate future growth within the City limits through 2045. For the purposes of this study, the 2045 planning year is synonymous with buildout.

2.3 Climate and Topography

Table 2.1 summarizes the study area's climate. The City's climate is categorized as Mediterranean, with dry summers and wet winters and relatively modest changes in temperature throughout the year. The City receives approximately 13.6 inches of rain annually, with over 80 percent falling between December and March. The City's elevation ranges from approximately 3 feet in the southwestern portion of the City to approximately 157 feet (ft) in the northwestern portion of the City. Figure 2.2 shows a map of the study area topography.

Table 2.1 Study Area Climate

Month	Average Temperature[1] (degrees F)		Average Total Precipitation[1]
	Minimum	Maximum	(inches)
January	47.0	66.8	3.36
February	47.6	66.4	3.66
March	49.8	67.7	1.98
April	51.6	70.2	0.63
May	55.4	71.8	0.26
June	58.5	73.9	0.07
July	61.8	76.9	0.06
August	62.4	78.1	0
September	60.9	78.1	0.09
October	57.1	75.7	0.49
November	50.7	70.7	0.8

Month	Average Temperature[1] (degrees F)		Average Total Precipitation[1]
	Minimum	Maximum	(inches)
December	46.3	66.1	2.24
Average or Total	**54.1**	**71.9**	**13.6**

Note:
Abbreviation: F - Fahrenheit.
(1) Source: National Oceanic and Atmospheric Administration (NOAA) U.S. Climate Normals Quick Access (Torrance, California 1991-2020 average).

2.4 Land Use

Land use information is an integral component in determining the wastewater generation within a given service area. The type of land use in an area will affect both the volume and character of the wastewater produced. Adequately estimating wastewater flow from various land use types is important in sizing and maintaining effective collection system facilities.

An important tool for determining land use projections is the City's General Plan which was last updated in April 2021. The land use assumptions provided in the General Plan were used for the purpose of this Master Plan. Development within the City is classified according to the following major land use designations:

- Low Density Residential.
- Medium Density Residential.
- High Density Residential.
- Commercial.
- Mixed Use (Residential/Commercial).
- Industrial.
- Mobile Home Park.
- Public.
- Vacant.
- Streets and Right of Ways.

Figure 2.3 shows the existing land use within the study area, based on the 2021 General Plan. Table 2.2 provides a summary of the acreage within the study area by land use type.

Table 2.2 Land Use Summary

Land Use Category	Total Area (acre)	Percent of Total Acres
Low Density Residential	992.9	26.5
Medium Density Residential	498.8	13.3
High Density Residential	101.5	2.7
Mix-Use (Residential/Commercial)	37.3	1.0
Specific Plan	92.4	2.5
Neighborhood Commercial	34.8	0.9
General Commercial	419.5	11.2
Industrial	550	14.7
Public/Institutional	211.7	5.6
Streets and Right of Ways	809.9	21.6
Total	**3,749.4**	**100.0**

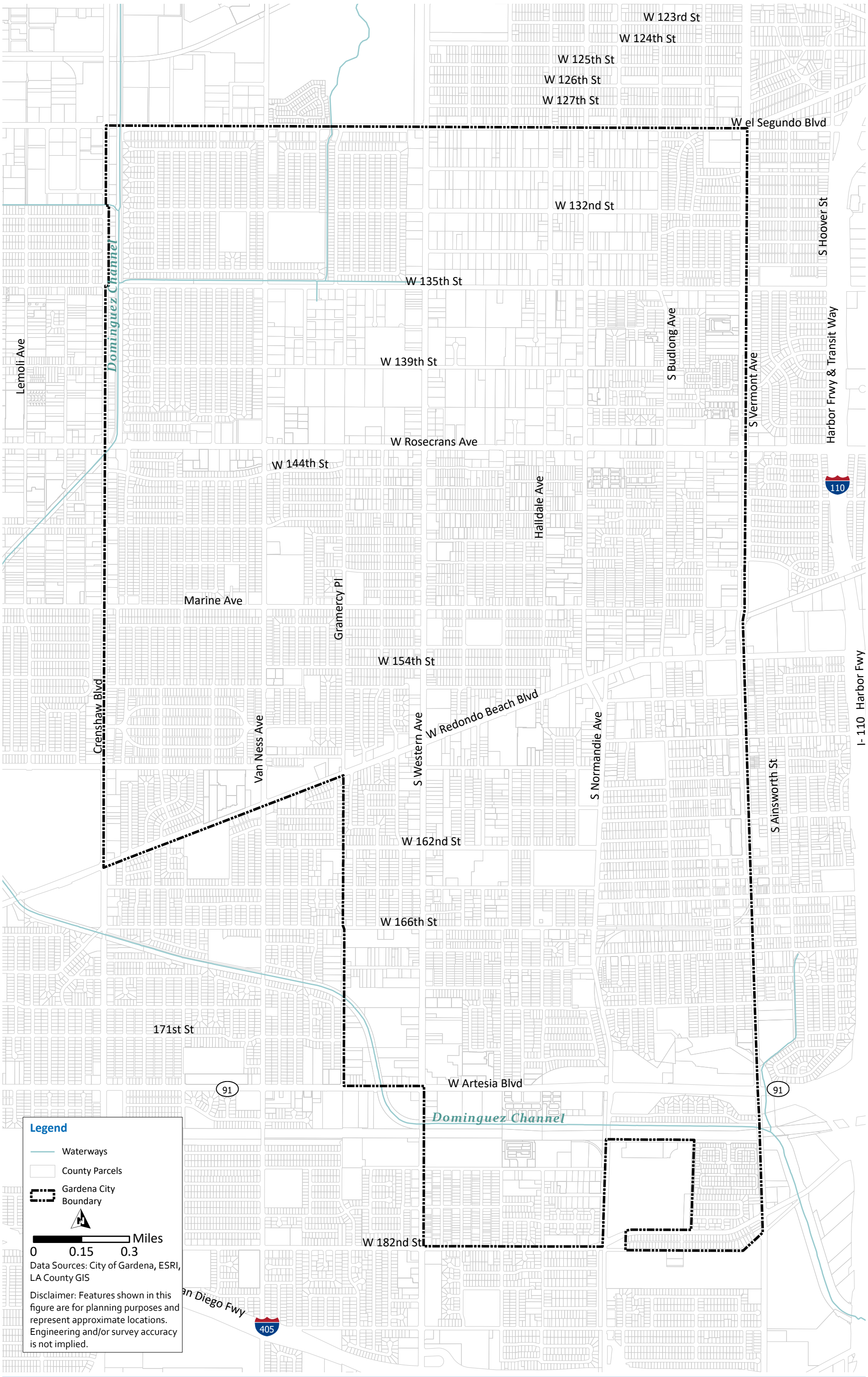


Figure 2.1 Study Area

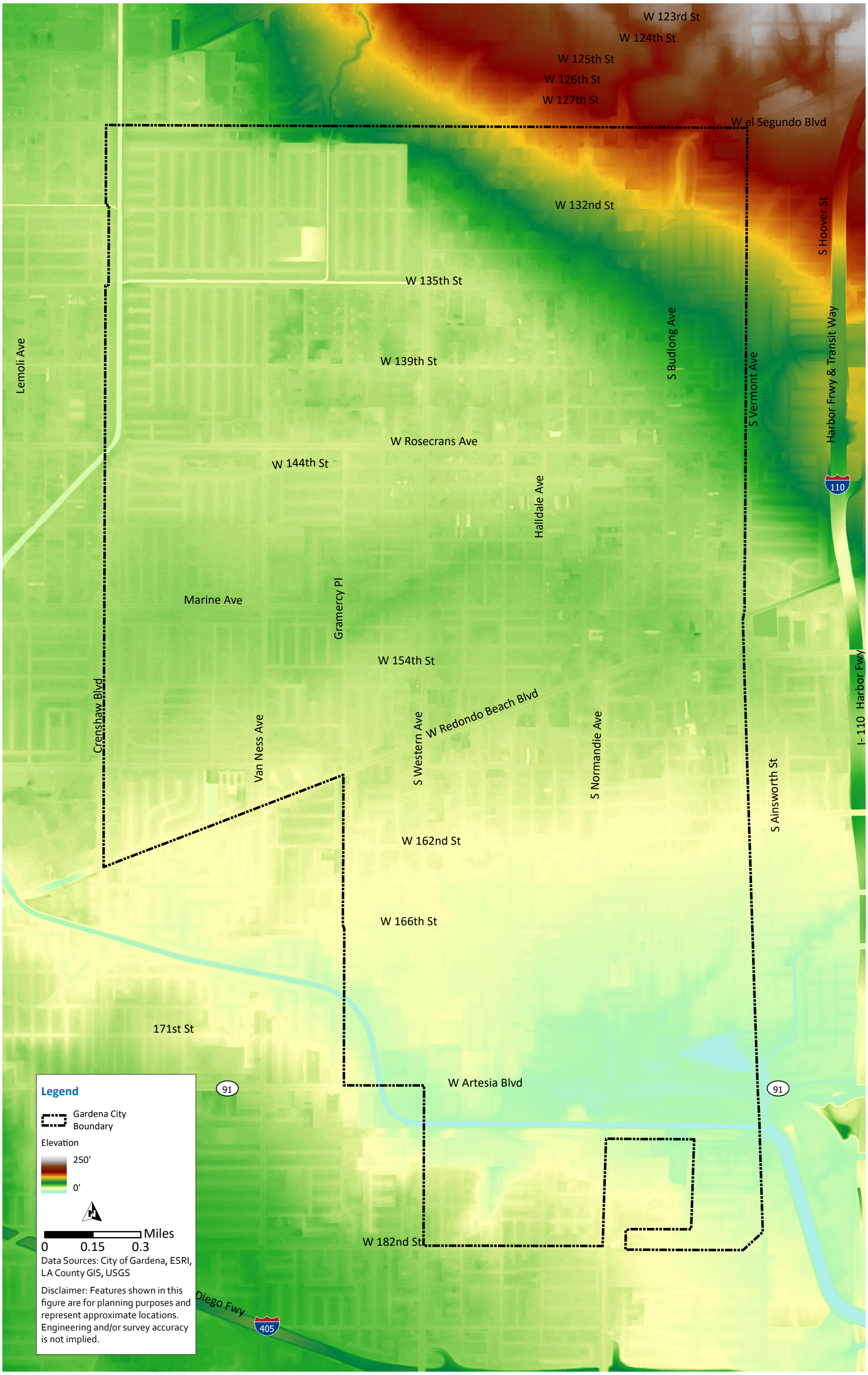


Figure 2.2 Topology

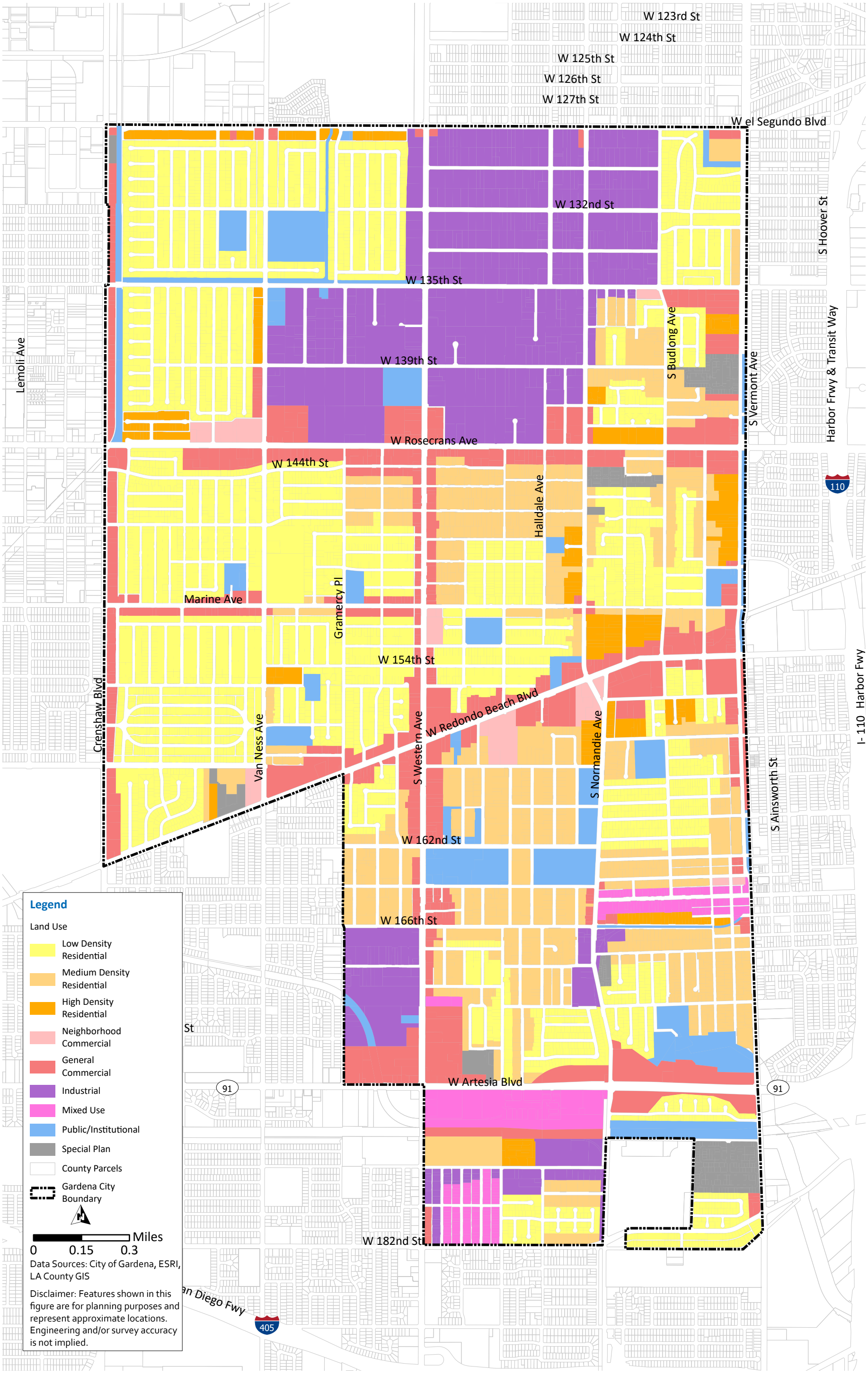


Figure 2.3 General Plan Land Use 2021

2.4.1 Future Growth

Although the City of Gardena is largely built out, there are several components expected to contribute to increased wastewater flows in the future, including known planned developments, accessory dwelling units (ADUs), and the Regional Housing Needs Assessment (RHNA) units allocated by the State. Each of these components are discussed in more detail below.

There are some locations where flows enter the City from other agencies (including City of Hawthorne and unincorporated Los Angeles County). The future scenario does not include any increase in flows from these outside areas.

2.4.1.1 Planned Developments

The City's Planning Department provided Carollo with a list of known/planned developments, which are expected to be developed in the near future. Figure 2.4 shows the planned developments that are expected to contribute to an increase in wastewater flows. Table 2.3 summarizes the planned developments and includes the development name and number of expected dwelling units or commercial acres. The planned developments are expected to add approximately 1,299 residential dwelling units within the study area. Additionally, approximately 9.2 acres of commercial area will be developed or redeveloped.

Table 2.3 Planned Development Summary

Planned Development Name[(1)]	No. of Residential Units	Commercial Area (acres)
U-Haul Redevelopment Project	-	4.1
2545 Marine Avenue	22	
13126 South Western Avenue - SRO	121	
15106 South Western Avenue - 7 Leaves	-	0.5
Normandie Place - 15717 & 15725 South Normandie Avenue	30	
Gardena Transit-Oriented Development Project (Crenshaw Boulevard)	265	
Rosecrans Place (2101 and 2129 Rosecrans Avenue)	113	
Evergreen Residential Project (13615-13633 Vermont Avenue)	84	
1108 West 141st Street GPA & ZC Project	-	4.6
16911 South Normandie Avenue	403	
13919 South Normandie Avenue	20	
1341 Gardena Boulevard	14	
2500 Rosecrans Avenue	50	
1515 West 178th Street	114	
16819 South Normandie Avenue	63	
Total	**1,299**	**9.2**

Note:
(1) Source: City of Gardena Planning Department.

2.4.1.2 Regional Housing Needs Assessment (RHNA)

The RHNA is mandated by California state law to quantify the need for additional housing throughout the state. The City's Housing Element (updated January 2023) addresses the housing needs identified by the Southern California Association of Governments (SCAG) for the City. The SCAG is responsible for overseeing the RHNA process for Southern California.

The City has a final RNHA allocation of 5,735 units to accommodate estimated growth. The 1,299 residential dwelling units are expected to count towards the City's RHNA allocation, leaving 4,436 remaining RHNA housing units. The City's housing element has identified overlay areas where up to 6,586 additional housing units could be accommodated. However, per the City's housing element, only 4,436 units are needed in the overlay areas to meet final RHNA allocation. Figure 2.5 shows the overlay areas.

2.4.1.3 Accessory Dwelling Units (ADUs)

ADUs are also expected to contribute wastewater flows in the future. The number of ADU applications received by the City nearly doubled from 2021 (26 applications) to 2022 (51 applications). For this study, it was assumed that the City would receive on average 50 ADU applications per year through 2045. This yields a total of 1,150 ADU's from 2023 through 2045. Because it is impossible to know the location of future ADU's, they were allocated evenly among the low and medium density residential parcels within the City. The ADU's were added on top of the planned developments and RHNA housing units. For this study, they were not assumed to count toward the RHNA allocation.

2.4.1.4 Future Growth Summary

The following summarizes the assumptions used in developing the future growth projections:

- The planned developments provided by the City were assumed to be developed by 2045 and are allocated at the planned location of the development. The total planned residential units are expected to contribute toward the City's RHNA allocation.
- The planned residential units (1,299) were deducted from the City's RHNA allocation (5,735). The remaining RHNA housing units (4,436) were distributed throughout the overlay areas provided in the City's 2023 housing element.
- It was assumed that the City will receive, on average, 50 ADU applications per year, through 2045. This yields an additional 1,150 ADUs by 2045. The ADUs were distributed evenly to the low and medium density residential lots only.
- There are several locations where outside flows enter the City, either through a City pipe or LACSD interceptor. The future scenario does not include any additional flows from these outside areas.

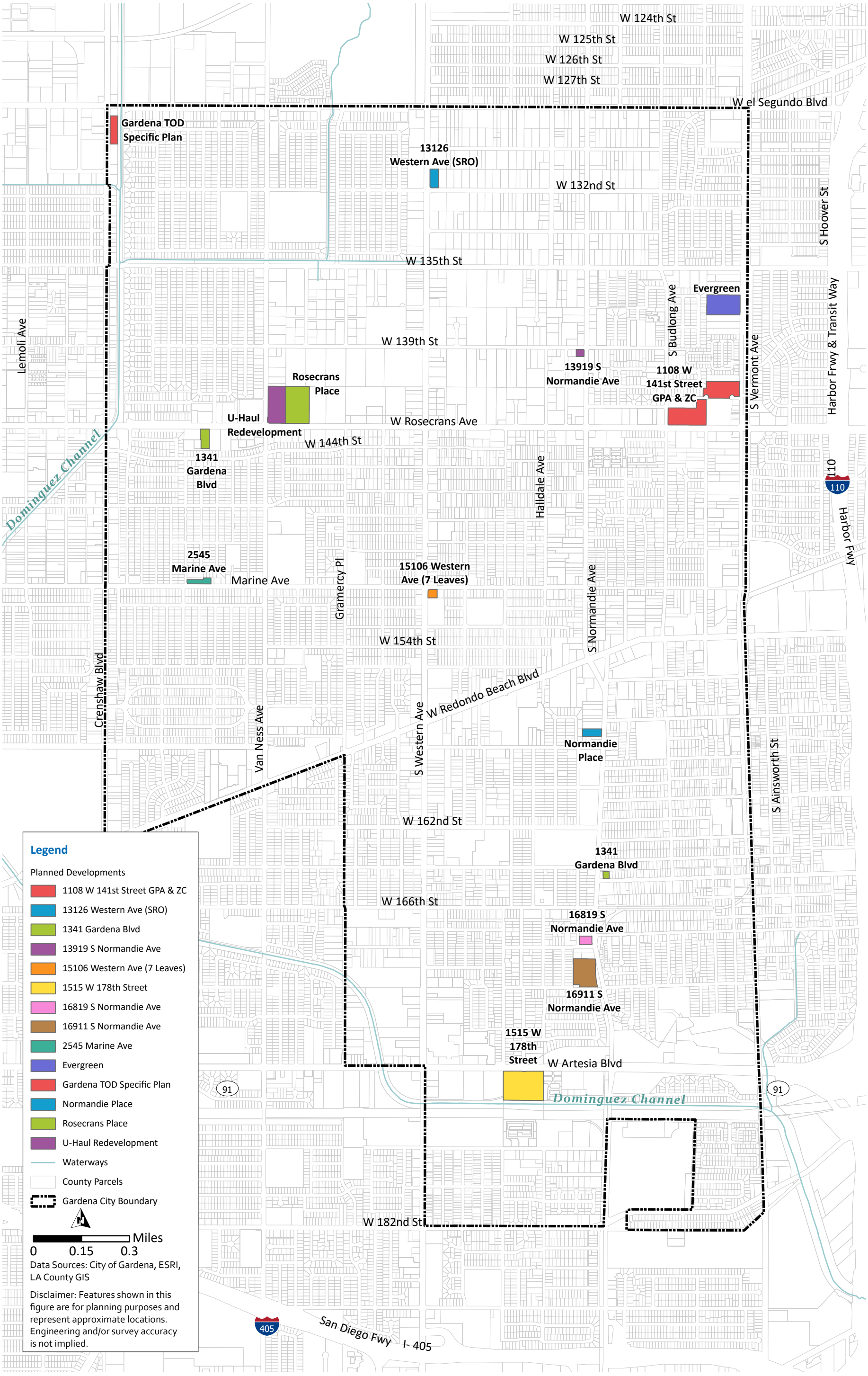


Figure 2.4 Planned Developments

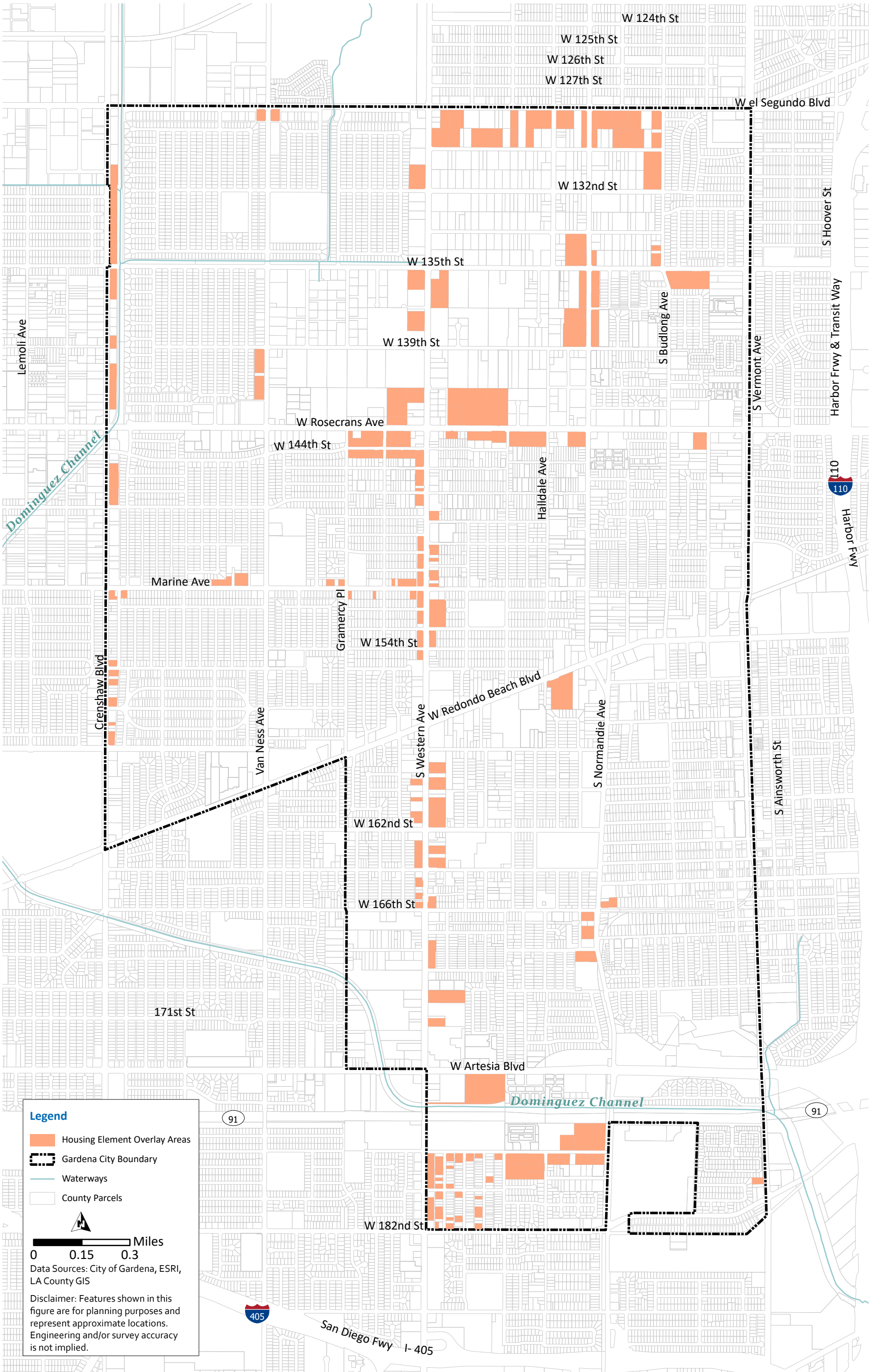


Figure 2.5 Housing Element Overlay Areas

Table 2.4 summarizes the existing and future residential growth within the study area. The planned developments, RHNA housing units, and ADUs are expected to add another 6,885 residential units within the City by 2045. This represents a 30.6 percent increase from the existing 22,486 housing units.

Table 2.4 Future Growth Summary

Component	Residential Units
Existing[1]	**22,486**
Future	
Planned Developments[2]	1,299
RHNA Allocation[3]	4,436
ADUs[4]	1,150
Future Subtotal	**6,685**
Total	**29,371**

Notes:
(1) Source: California Department of Finance (DOF) E-5 Population and Housing Estimates.
(2) Source: City of Gardena Planning Department. Only includes planned residential units. Does not include planned commercial area.
(3) Includes total RHNA allocation (5,735) minus the planned residential units (1,299).
(4) Assumes 50 ADU's per year from 2023 through 2045.

Chapter 3

PLANNING AND EVALUATION CRITERIA

This Chapter summarizes the planning criteria and methodologies used to evaluate the City's existing wastewater collection system and associated facilities. The planning criteria serves as the basis for identifying existing system deficiencies and to size future improvements. The planning criteria address the collection system capacity, acceptable gravity sewer pipe slopes, maximum allowable depth of flow, design velocities, and changes in pipe size.

3.1 Gravity Sewer Criteria

Gravity sewer pipe capacities are dependent on many factors, such as pipe roughness, the chosen maximum allowable depth of flow, pipeline velocity, and slope. The following sections describe the factors that account for the determination of existing and future pipeline capacities in the City's collection system.

3.1.1 Manning's Coefficient (n)

The Manning's coefficient "n" is a friction coefficient that represents resistance to flow, and varies with pipe material and condition, smoothness of joints, root intrusion, and other factors. For sewer pipes, the Manning's coefficient typically ranges between 0.011 and 0.017, with 0.013 being a representative value used for planning purposes. Due to unknown conditions of existing pipelines, a Manning's coefficient of 0.013 was applied to all existing collection system pipelines. The evaluation of all proposed future pipelines was also based on using a Manning's coefficient of 0.013.

3.1.2 Peak Flow Depth Criteria

The primary criterion used to identify pipeline capacity deficiencies or to size new sewer improvements is the peak flow depth criteria, which is represented by the depth to diameter (d/D) ratio (depth of flow, d, to pipe diameter, D, ratio). For example, a maximum d/D of 0.5 means that the maximum flow depth can be half (50 percent) of the pipe diameter. For the existing system analysis, pipelines with a maximum d/D of 1.0 (surcharging) were further evaluated for improvements. Future improvement pipes were then sized to maintain a more stringent d/D criteria (0.5 for pipes 8 inches and smaller, and 0.75 for pipes larger than 8 inches in diameter). The maximum d/D criteria for existing and future pipelines are listed in Table 3.1.

The maximum flow depth criteria listed in Table 3.1 only applies to the City's sewers. The modeled LACSD interceptors were not evaluated for capacity deficiencies. It is possible that the interceptor system may cause surcharging in the City's collection system, which is outside the City's control.

Table 3.1 Maximum Flow Depth Criteria

Pipe Diameter (inches)	Maximum Flow Depth Criteria
Existing Pipelines	
All	d/D < 1.0 (No surcharging)
Future or Proposed Pipelines	
≤ 8 inches	d/D = 0.5
> 8 inches	d/D = 0.75

Maximum flow depth criteria for existing and new sanitary sewers are established based on a number of factors, including the acceptable risk tolerance of the utility, local standards and codes, and other factors. Using a conservative (low) flow depth criteria when evaluating existing sewers may lead to unnecessary replacement of existing pipelines. Conversely, lenient flow depth criteria could increase the risk of sanitary sewer overflows (SSOs). Ultimately, the maximum allowable flow depth criteria should be established to be as cost-effective as possible while at the same time reducing the risk of SSOs to the greatest extent possible. For the City, existing pipelines were flagged based on exceedance of the maximum flow depth criteria listed in Table 3.1.

System bottlenecks raise the hydraulic grade line (HGL) of upstream sewers, leading to backwater conditions and surcharging of manholes. The greater the capacity deficiency, the higher water levels will surcharge upstream of the bottleneck pipeline (or pipelines). The hydraulic model was used to determine "backwater" pipelines in order to specify which specific pipelines are the actual root cause of the capacity deficiency. Capital projects are proposed to provide greater flow capacity for the deficient sewers, which eliminates the backwater conditions that cause surcharging.

3.1.3 Design Velocities and Minimum Slope

To minimize the settlement of sewage solids, it is industry standard to specify a minimum velocity of 2 feet per second (fps). At this velocity, the sewer flow will provide self-cleaning of the pipe. Table 3.2 lists the recommended minimum slopes for new pipes to maintain a minimum velocity of 2 fps.

Table 3.2 Minimum Slope for New Pipes

Pipe Diameter (inches)	Maximum Allowable Depth of Flow (d/D)(1)	Recommended Minimum Slope(2) (ft/ft)
8	0.50	0.0034
10	0.75	0.0020
12	0.75	0.0016
15	0.75	0.0012
18	0.75	0.0009
21	0.75	0.0008
24	0.75	0.0006
27	0.75	0.0006
30	0.75	0.0005

Notes:
(1) Based on criteria outlined in Table 3.1.
(2) Recommended minimum slope to provide a minimum velocity of 2 fps.

3.1.4 Changes in Pipe Size

When a smaller sewer joins a larger one, the invert of the larger sewer should be lowered sufficiently to maintain the same energy gradient. An approximate method for securing these results is to place the 80 percent depth point of both sewers at the same elevation. For planning purposes, sewer crowns for new/proposed pipelines are matched at the manholes.

3.2 Lift Stations and Force Mains

Industry standard practice is to require that sewage lift stations have sufficient capacity to pump peak flows with the largest pump out of service (firm capacity). Force main piping should be sized to provide a velocity between 2.5 and 8 fps at the design flow rate of the lift station. For the determination of head loss, the Hazen-Williams equation is used with a C-factor of 120, which is typical for sewer system master planning purposes.

3.3 Peak Wet Weather Flow (PWWF) Design Storm

Design storms are defined rainfall events, with specific recurrence interval, duration and intensity factors used to analyze the performance of a collection system under extreme wet weather conditions. The impact of the City's defined design storm was simulated using the collection system model to determine peak wet weather flows (PWWFs). The first step in the development of the design storm is to define its recurrence interval and rainfall duration. The recurrence interval is based on the probability that a given rainfall event will occur or be exceeded in any given year. For example, a "100-year storm" means there is a 1 in 100 chance that a storm as large as or larger than this event will occur at a specific location in any year.

Duration is the length of time in which the rainfall occurs. It is industry standard to use the 10 year, 24-hour design storm for analyzing wastewater collection system performance during PWWF conditions. The 10-year, 24-hour design storm volume is approximately 3.8 inches, with a peak hourly intensity of 0.99 inches/hour, as documented by NOAA Atlas 14[1].

Once the design storm recurrence interval, duration, and associated rainfall volume have been determined, the next step in defining the design storm is to distribute the total rainfall over duration of the storm. The Natural Resources Conservation Service synthetic rainfall distribution (Type I for the City) is a commonly used rainfall distribution. Figure 3.1 shows the 10-year, 24-hour design storm and indicates the hourly rainfall intensity.

[1] https://hdsc.nws.noaa.gov/hdsc/pfds/pfds_map_cont.html

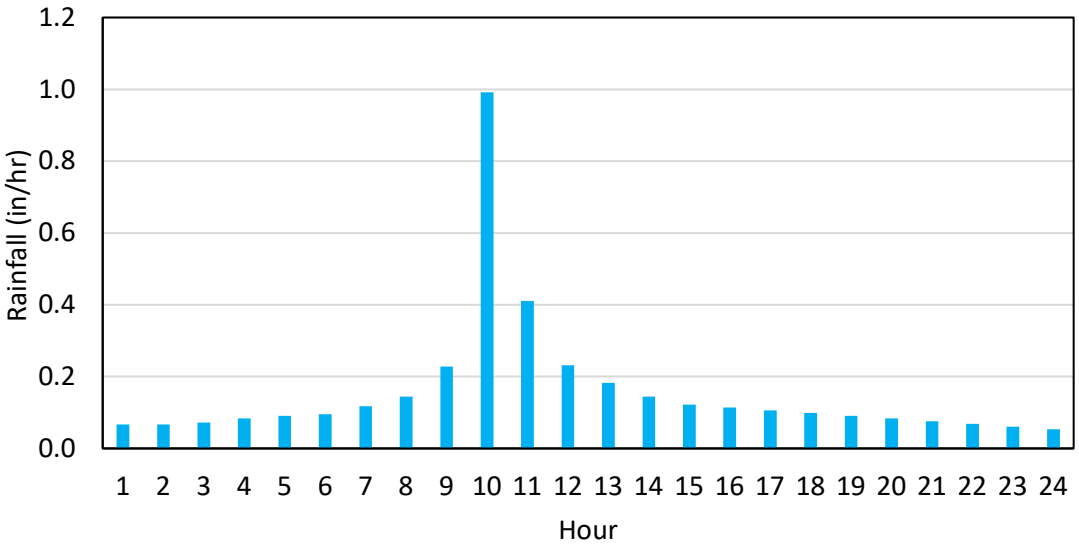


Figure 3.1 10-Year, 24-Hour Design Storm

Chapter 4

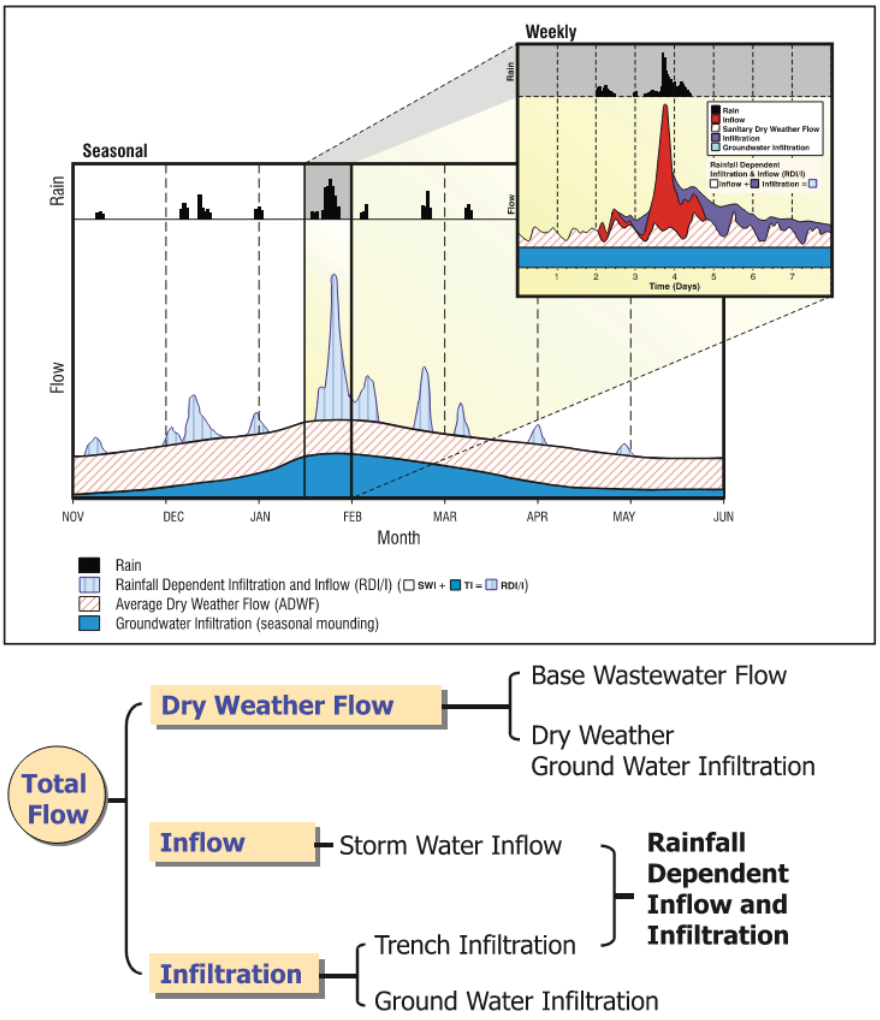
WASTEWATER FLOWS

This chapter summarizes the City's existing and projected wastewater flows. Included is a discussion on various flow components used for the hydraulic analysis of the collection system and a summary of the data collected as part of the temporary flow monitoring program.

4.1 Wastewater Flow Components

The terminology used for the hydraulic analysis of the wastewater collection system is summarized in this section. Wastewater flows vary according to season and generally consist of dry weather flow (DWF) and wet weather flow (WWF). Figure 4.1 illustrates the various flow components of wastewater in general, which are described in detail below:

- Base Wastewater Flow (BWF). The BWF is the flow generated by the City's customers independent of groundwater and wet weather influences. BWF is estimated by measuring flows during dry weather conditions. The flow has a diurnal pattern that varies depending on the type of use. Commercial and industrial patterns, though they vary depending on the type of use, typically have consistently higher flows during business hours and lower flows at night. Furthermore, the diurnal flow pattern experienced during a weekend may vary from the diurnal flow experienced during a weekday.
- Average Annual Flow (AAF). The AAF is the average flow that occurs on a daily basis throughout the year, including both periods of dry and wet weather conditions.
- Average Dry Weather Flow (ADWF). The ADWF is the average flow that occurs on a daily basis during the dry weather season. The ADWF includes the BWF generated by the City's residential and commercial users, plus the dry weather groundwater infiltration (GWI) component.
- Groundwater Infiltration (GWI). GWI is the result of extraneous water entering the sewer system through defects in pipes and manholes. GWI is related to the condition of the sewer pipes, manholes, and groundwater levels. GWI may occur throughout the year, although rates are typically higher in the late winter and early spring. Dry weather GWI (or base infiltration) cannot easily be separated from BWF by flow measurement techniques. Therefore, dry weather GWI is typically grouped with BWF.



Note: This figure is not based on flow data specific to the City or this Master Plan.

Figure 4.1 Typical Wastewater Flow Components

- Rainfall-Derived Inflow and Infiltration (RDII). Wet weather infiltration and inflow (I/I) causes flows in the collection system to increase. Infiltration is defined as storm water flows that enter the sewer system by percolating through the soil and then through defects in pipelines, manholes, and joints. Examples of infiltration entry points are cracks in pipelines, misaligned joints, and root penetration. Inflow is defined as storm water that enters the sewer system via storm drain cross connections, leaky manhole covers, or cleanouts. Examples of inflow entry points are roof drain and downspout connections, leaky manhole covers, and illegal storm drain connections. Some of the most common sources of I/I are shown on Figure 4.2. The adverse effects of I/I entering the sewer system is that it increases both the peak flow as well as the total volume, as illustrated on Figure 4.3.
- PWWF. PWWF is the highest observed flow that occurs following a design storm event and is typically used for designing sewers, lift stations, and some unit processes in a treatment plant. Therefore, the PWWF and the "Design Flow" are synonymous and will be used interchangeably throughout this report.

- Maximum Monthly Flow (MMF). MMF are calculated as the highest consecutive 30-day average daily flow that occurs in a calendar year.
- Peak Hourly Flow (PHF). PHF is the maximum flow rate that occurs in a one-hour period and immediately follows large storm events mainly due to inflow.

4.2 Temporary Flow Monitoring Program

Carollo contracted with V&A to conduct a temporary flow monitoring program within the City's wastewater collection system. V&A prepared the stand-alone "Sanitary Sewer Master Plan Update Flow Monitoring and I/I Study" report, which is included in Appendix A. Flow monitoring was performed over a one month period from March 8 to April 12, 2022, at 15 flow monitoring sites.

The flow monitoring study helped identify baseline and peak sewer flows. Data collected from the flow monitoring program was used to calibrate the collection system hydraulic model for dry weather and wet weather flows and to help to identify areas of the system with the highest rates of I/I.

4.2.1 Flow Monitoring Sites and Tributary Areas

A total of 15 flowmeters were installed at locations selected by Carollo and the City. The meter sites were selected to capture flows entering and leaving the City through the LACSD's interceptor system were also monitored. Additional flowmeters were placed within the City (also on LACSD interceptor pipes). Table 4.1 lists the flow monitoring locations and the pipe diameters where the meters were installed. Figure 4.4 shows the flowmeter locations and their tributary areas. There are a few small areas within the City that were not captured at one of the flowmeters (shown in grey on Figure 4.4). This was due to the numerous connections to the LACSD interceptor system. Figure 4.5 provides a schematic illustration of the flow monitoring locations.

Table 4.1 Flow Monitoring Locations

Monitoring Site	Pipe Diameter (inches)	Location
FM-1	21	Western Avenue and Rosecrans Avenue
FM-2	18	Rosecrans Avenue and South Hobart Boulevard
FM-3	18	Van Ness Avenue and 135th Street
FM-4	15.5	Normandie Avenue (on island) south of 155th Street
FM-5	24	Van Ness Avenue south of 162nd Street
FM-6	18	Normandie Avenue south of 170th Street
FM-7	21	South Vermont Avenue north of West Redondo Beach Boulevard
FM-8	24	Artesia Boulevard west of Western Avenue
FM-9	30	166th Street and Gramercy Place
FM-10	12	Western Avenue north of Redondo Beach Boulevard
FM-11	10	Crenshaw Boulevard (on sidewalk) south of 135th Street
FM-12	18	135th Street and Daphne Avenue
FM-13	25	Van Ness Avenue and 154th Street
FM-14	28	Manhattan Place north of 166th Street
FM-15	18	134th Place and Spring Avenue

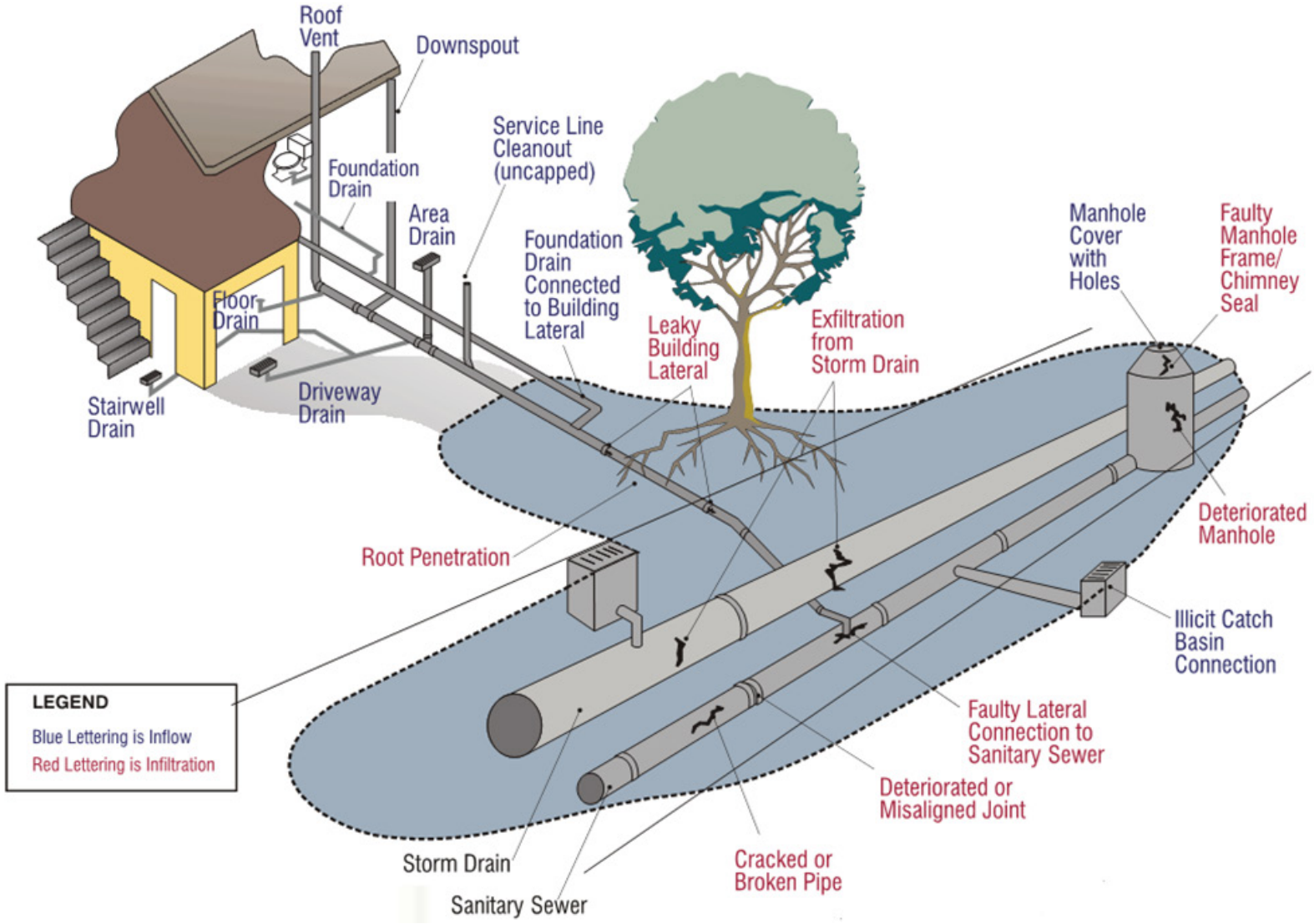


Figure 4.2 Typical Sources of Inflow/Infiltration

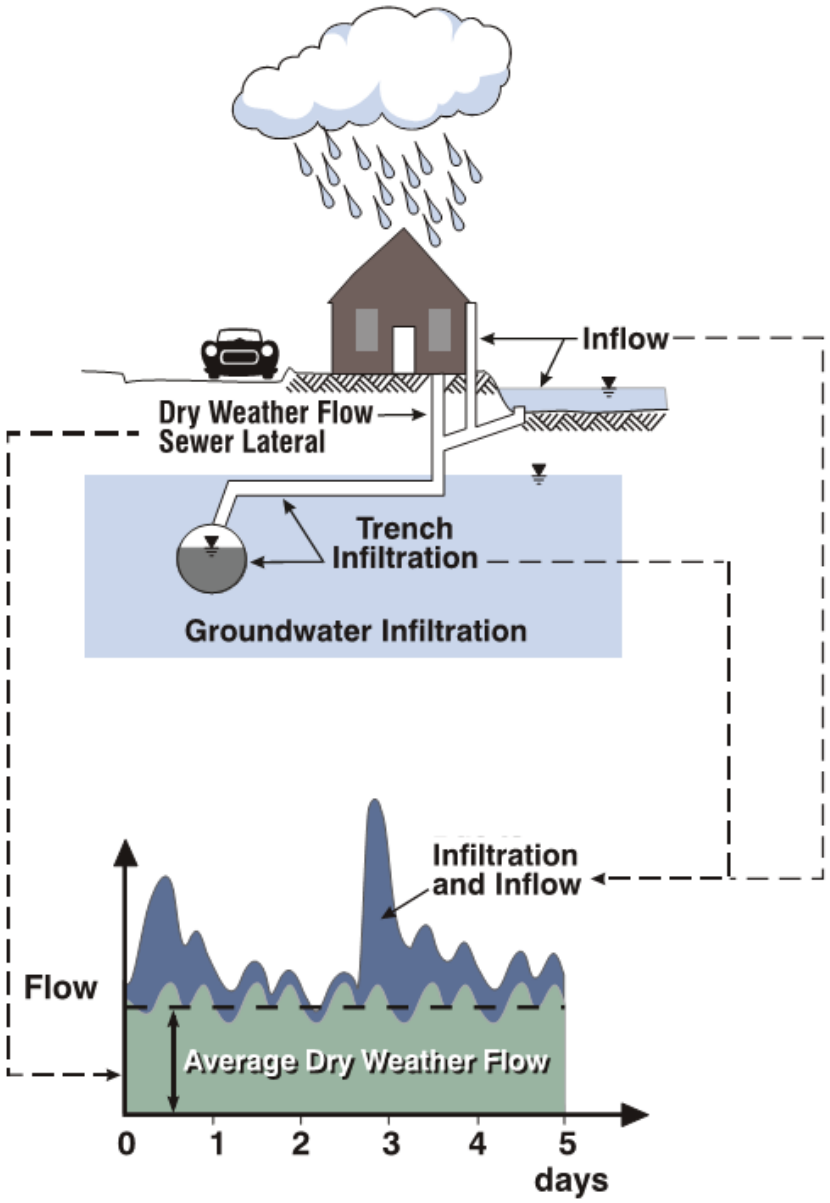


Figure 4.3 Typical Effects of Inflow/Infiltration

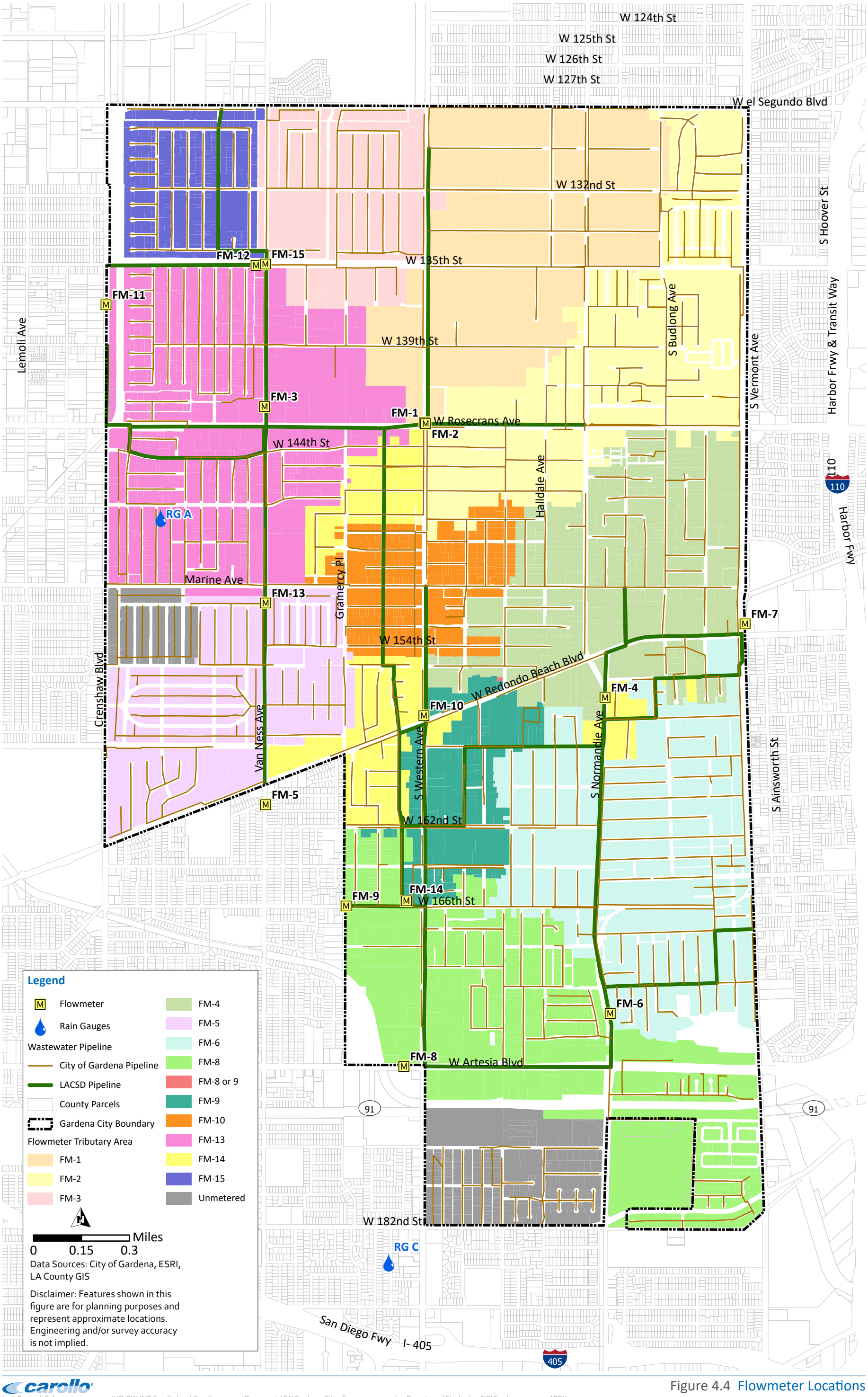


Figure 4.4 Flowmeter Locations

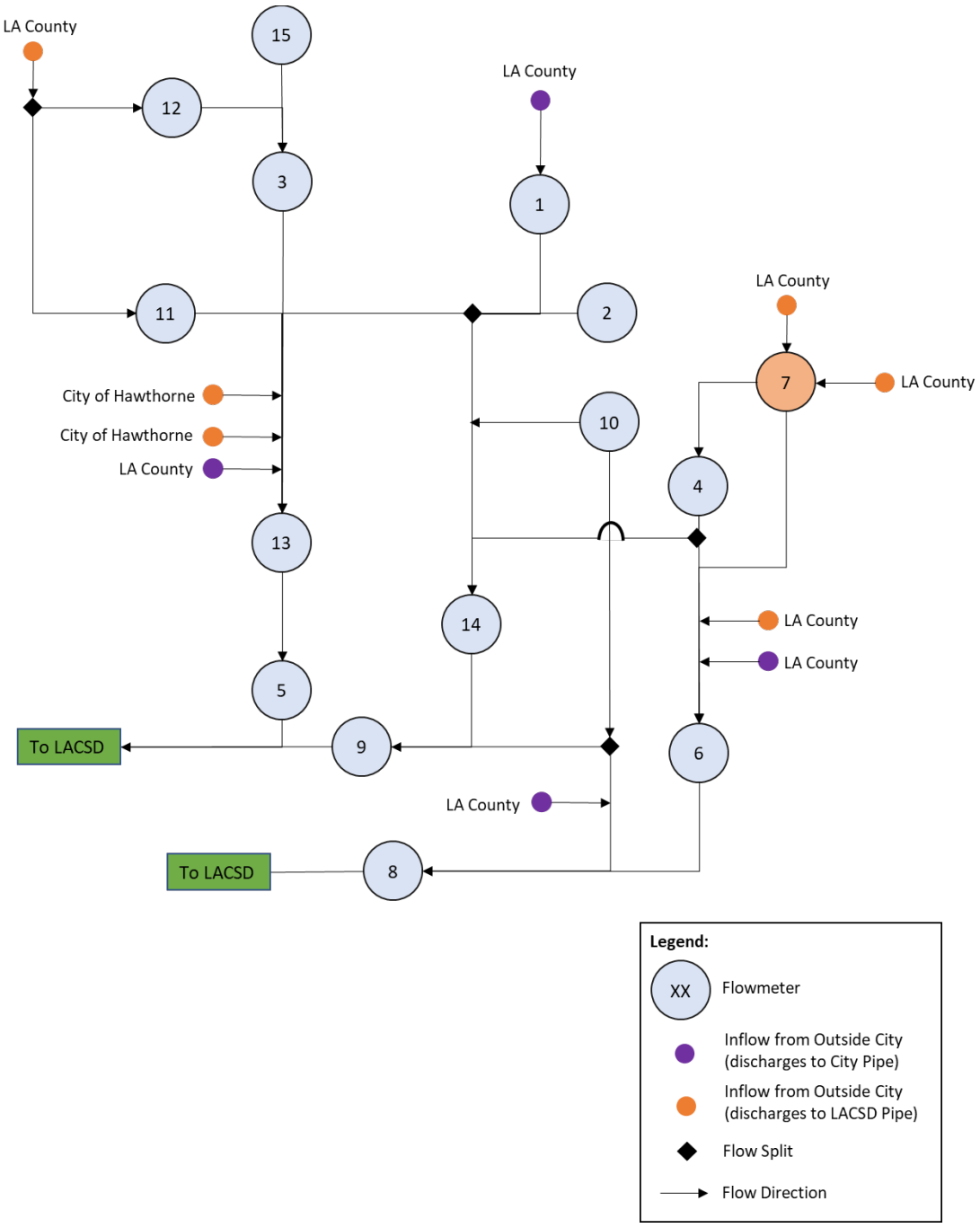


Figure 4.5 Flow Monitoring Schematic

4.2.2 Flowmeter Installation and Flow Calculation

V&A installed 15 HACH FL904 Sigma submerged flowmeters for temporary monitoring within the collection system. The FL904 Sigma submerged sensors use a pressure transducer to collect depth readings and an ultrasonic Doppler sensor to determine the average fluid velocity. The ultrasonic sensor emits high-frequency sound waves, which are reflected by air bubbles and suspended particles in the flow. The sensor receives the reflected signal and determines the Doppler frequency shift, which indicates the estimated average flow velocity. During installation, the sensor may be offset to one side of the sewer to lessen the chances of fouling and sedimentation where these problems are expected to occur. Manual level and velocity measurements were taken during the installation of the flowmeters and again when they were removed and compared to simultaneous level and velocity readings from the flowmeters to provide proper calibration and accuracy.

Data retrieved from the flowmeters were placed into a spreadsheet program for analysis. Data analysis included data comparison to field calibration measurements, as well as necessary geometric adjustments as required for sediment (sediment reduces the pipe's wetted cross-sectional area available to carry flow). The flow at each meter was calculated at 5-minute intervals based on the continuity equation:

$$Q = V \times A = V \times (A_T - A_S)$$

where:

Q = Pipeline flow rate, cubic feet per second (cfs).
V = Average velocity, fps.
A = Cross-sectional flow area, square feet (sq ft).
A_T = Total cross-sectional area with both wastewater and sediment.
A_S = Cross-sectional area of sediment.

Finally, the 5-minute flow, velocity, and level data were aggregated into 15-minute increments.

4.2.3 Rainfall Collection

V&A collected data from 11 publicly available private weather stations on Weather Underground. After performing quality assurance/quality control on the data from those with rain gauge stations, four were identified with good data, allowing for good coverage over the flow monitoring area. The rain gauge sites are shown on Figure 4.4.

4.3 Flow Monitoring Program Results

This section summarizes the results of the flow monitoring program, including DWF data, rainfall data, and WWF data. Appendix A includes additional data summaries and other information associated with the temporary flow monitoring program.

4.3.1 Dry Weather Flow Data

During the seven-week flow monitoring period, flow, depth, and velocity data were collected at each meter at 15-minute intervals. Carollo aggregated the 15-minute data to hourly data for use in the hydraulic model. Characteristic dry weather 24-hour diurnal flow patterns for each site were developed based on the hourly data. This hourly flow data was then used to calibrate the hydraulic model for the observed DWFs during the flow monitoring period.

For this flow monitoring program, V&A developed four ADWF curves for each site location (Monday through Thursday, Friday, Saturday, and Sunday). Hourly patterns were separated this way to better understand how the DWFs vary day to day, as flows often differ on Friday evenings compared to Monday through Thursday. Similarly, Saturday and Sunday flow patterns were unique during the evening. V&A used the data from days least affected by rainfall to estimate the weekday and weekend ADWF.

Figure 4.6 illustrates a typical diurnal variation of Monday through Thursday; Friday, Saturday, and Sunday flows in the City's wastewater collection system, based on the data collected from flowmeter site FM-5.

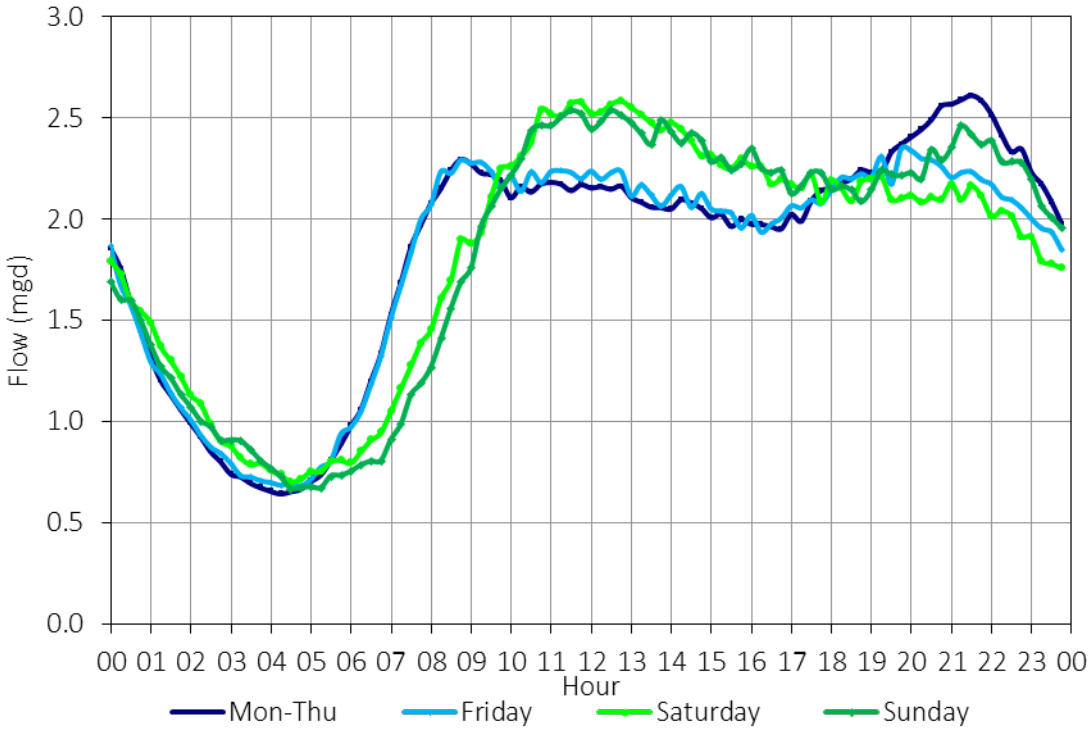


Figure 4.6 Example Dry Weather Flow Variation (Site FM-5)

As shown on Figure 4.6, flow patterns differ according to the day of the week. DWF for Monday through Thursday and Sunday experienced the greatest peak during evening hours, while Friday and Saturday show a decreased evening peak. Also Saturday and Sunday show a delayed morning peak compared to weekdays. Similar graphics associated with the remaining sites are included in Appendix A. In addition, V&A provided estimates for the average weekday and weekend levels and velocities at each site, which are used for dry weather calibration. Table 4.2 summarizes the DWFs at each meter site.

Table 4.2 Dry Weather Flow Summary

Site	Dry Weather Flow (mgd)[1,2]				
	Mon-Thu	Fri	Sat	Sun	Overall[3]
FM-1	0.71	0.72	0.58	0.52	0.66
FM-2	0.43	0.43	0.43	0.44	0.43
FM-3	0.51	0.49	0.51	0.49	0.51
FM-4	0.58	0.55	0.59	0.60	0.58

Site	Dry Weather Flow (mgd)[1,2]				
	Mon-Thu	Fri	Sat	Sun	Overall[3]
FM-5	1.83	1.80	1.82	1.82	1.82
FM-6	0.86	0.85	0.87	0.88	0.86
FM-7	0.52	0.50	0.49	0.43	0.50
FM-8	1.46	1.45	1.45	1.49	1.46
FM-9	2.76	2.77	2.68	2.51	2.72
FM-10	0.09	0.10	0.10	0.10	0.09
FM-11	--[4]	--[4]	--[4]	--[4]	--[4]
FM-12	0.14	0.15	0.14	0.14	0.14
FM-13	1.52	1.50	1.51	1.52	1.52
FM-14	2.73	2.71	2.58	2.46	2.67
FM-15	0.14	0.13	0.12	0.12	0.13

Notes:
Abbreviation: mgd - million gallons per day.
(1) Source: V&A 2022 Sewer Flow Monitoring and Inflow/Infiltration Study (Appendix A).
(2) This is the actual (cumulative) measured flow through each flowmeter and includes flow from any upstream flowmeters.
(3) Overall DWF = [4 x (Monday - Thursday) + (Friday) + 2 x Weekend]/7.
(4) Negligible flow measured through flowmeter FM-11 (less than 1,000 gpd). This is downstream of a flow split, where most flow is routed through site FM-12.

4.3.2 Rainfall Data

The rainfall data collected by V&A was used to correlate the I/I response observed in the collection system to specific storm recurrence intervals. One main rainfall event was captured during the flow monitoring program (March 28-29, 2022), which elicited an I/I response throughout the collection system. The four rain gauges recorded between 1.24 and 1.35 inches during this storm event and a total of 1.24 to 1.39 inches during the entire flow monitoring program. Table 4.3 summarizes the rainfall data.

Table 4.3 Rainfall Summary

Rain Gauge Name	Total Rainfall (Flow Monitoring Program) (inches)	March 28-29, 2022, Storm Event	
		Rainfall (inches)	Storm Event Classification[1]
A	1.30	1.27	Less than 1-Year
B	1.37	1.35	4-Year, 15-minute
C	1.39	1.30	1.5-Year, 1-Hour
D	1.24	1.24	1.5-Year, 2-Hour

Notes:
Source: V&A 2022 Sewer Flow Monitoring and Inflow/Infiltration Study (Appendix A).
(1) Based on NOAA Atlas 14 classification for each location.

It is important to classify the size of any major storm event captured during the flow monitoring period. NOAA Atlas 14 provides precipitation frequency estimates for the United States based on historical rainfall data and serves as the industry standard for determining total rainfall depth at specified frequencies and durations. NOAA Atlas 14 provides precipitation frequency estimates for 5-minute through 60-day durations at average recurrence intervals of 1 year through 1,000 years.

The largest storm event classification for the March 28-29, 2022 storm event is listed in Table 4.3 for each rain gauge site. As shown in Table 4.3, the largest classification recorded was a 4-year, 15-minute storm event at Rain Gauge B. For all other sites, the storm event was classified as either a 1.5-year or less than a 1-year storm event. In terms of a 24-hour duration, the March 2022 rainfall event is classified as a less than 1-year event for all four rain gauges.

4.3.3 Wet Weather Flow Data

The flow monitoring data was also evaluated to determine how the collection system responds to wet weather events. As mentioned above, the most significant rainfall event captured during the flow monitoring program was the March 28-29, 2022 rainfall event, which was used for the I/I analysis and model calibration. Figure 4.7 shows an example of the wet weather response at flowmeter FM-5 during the March 28-29, 2022, storm event. The dashed black line is the calculated ADWF (baseline flow) while the solid black line is the measured flow from the flow monitoring period (real-time flow). The I/I contribution (red line) is essentially the real time flow minus the calculated ADWF. The results show that inflow is the major contributor to I/I within the City, as indicated by the sharp increase in flow in response to rainfall, which then returns to baseline flows quickly after the rainfall stops. Additional wet weather monitoring results for all flowmeter sites can be found in Appendix A.

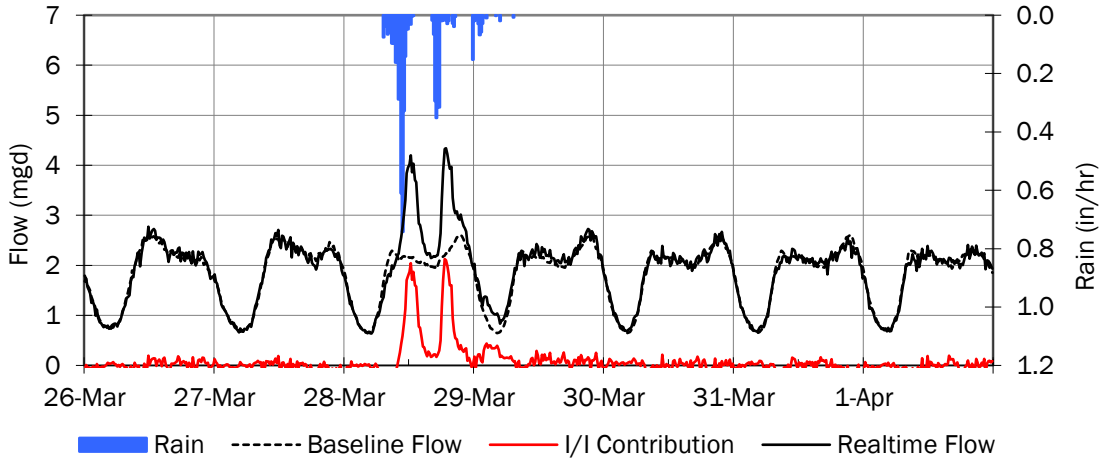


Figure 4.7 Example Wet Weather Flow Response (Site FM-5)

4.3.4 Inflow/Infiltration Analysis

This section summarizes the findings from V&A's I/I analysis, provided in Appendix A, which was completed for the flowmeters installed as part of the temporary flow monitoring program. The I/I analysis was not completed for Basins FM-7, FM-11, and FM-12 because these basins originate from outside the City through the LACSD interceptors. The I/I analysis was also combined for downstream sites FM-13 and FM-14 as well as FM-5 and FM-9 due to upstream flow splits between the two sets of basins.

4.3.4.1 Peak Inflow

As discussed earlier in this chapter, inflow is storm water discharged into the sewer system through direct connections. The corresponding flow rates from these direct connections are closely related to the intensity of the storm. Inflow causes peak flow problems that often dictate downstream pipeline and lift station capacity.

Table 4.4 summarizes the inflow analysis results. Peak inflow rates for all sites were measured for the March 28-29, 2022 storm event, because this was the most significant rain event captured during the flow monitoring program. The peak inflow rate was compared to the ADWF and basin acreage. This "normalizes" the results so that basins can be compared (and ranked) on an apples-to-apples basis, which is helpful in targeting basins for rehabilitation. Based on the inflow analysis, Basins FM-1, FM-3, and FM-10 had the highest, normalized peak I/I rates per acre, indicating these basins have higher inflow compared to other basins.

Table 4.4 Inflow Analysis Summary

Site	ADWF (mgd)[2]	Basin Acreage	Peak Inflow Rate (mgd)	Inflow per IDM Ranking[3]	Inflow per Acre Ranking[3]	Inflow per ADWF Ranking[3]	Final Inflow Ranking[3]
FM-1	0.663	416	2.106	1	3	4	2
FM-2	0.431	618	0.797	7	8	6	7
FM-3	0.233	212	1.042	4	4	1	2
FM-4	0.576	149	0.86	2	2	7	5
FM-6	0.285	373	0.74	6	6	5	6
FM-7	N/A	N/A	N/A	N/A		N/A	N/A
FM-8	0.505	494	0.022	9	9	9	9
FM-10	0.093	43	0.305	3	1	3	1
FM-11	N/A	N/A	N/A	N/A		N/A	N/A
FM-12	N/A	N/A	N/A	N/A		N/A	N/A
FM-15	0.13	123	0.528	5	5	2	4
FM-13 + 14	2.583	756	0.995	8	7	8	8
FM-5 + 9	0.356	32	Negligible	10	10	10	10

Notes:
Abbreviation: gpd/ac - gallons per day per acre.
(1) Source: V&A 2022 Sewer Flow Monitoring and Inflow/Infiltration Study (Appendix A).
(2) This is the ADWF generated within each tributary basin and does not include ADWF generated in upstream flowmeter basins.
(3) Ranking of 1 represents most inflow after normalization.

4.3.4.2 Rain-Dependent Infiltration (RDI)

Rain-Dependent Infiltration (RDI) is water that enters the sanitary sewer system through defects in pipes, joints, and manholes. RDI enters the system indirectly and is characterized by flows that increase gradually, are typically sustained for a period after the rainfall has stopped, and then gradually drop off as soils become less saturated and groundwater levels recede to normal. The major impact of RDI is the cost of pumping and treating the additional volume of water.

During the March 28-29, 2022, rainfall event, the RDI captured at all of the flowmeter sites was negligible; therefore, an RDI analysis was not completed.

4.3.4.3 Combined Inflow/Infiltration

The combined I/I analysis considers the total volume of both inflow and RDI over the period of a storm event. Because there was negligible RDI captured in the flow monitoring program, this analysis is largely based on total inflow volume (not peak inflow rate, which was discussed in Section 4.3.4.1). Table 4.5 summarizes the combined I/I results for the March 28-29, 2022 storm event. Basins FM-1, FM-3, and FM-15 had the highest, normalized total I/I volume per acre and/or ADWF compared to other basins. Note that the rankings for the combined I/I analysis are not necessarily the same as the rankings from the peak inflow analysis. This is because it is possible for a smaller basin with a higher peaking factor to generate less I/I volume than a larger basin, which might have a lower peaking factor, but generates more I/I throughout the basin. This may also occur in basins with more infiltration (even if the peak inflow is lower, a longer response to rainfall may generate more I/I in terms of volume).

4.3.4.4 Groundwater Infiltration

DWF data was also evaluated to determine the impact (if any) of dry weather GWI on the collection system. DWF usually has a predictable diurnal flow pattern. If a site is impacted by GWI, the amplitudes of the peak and low flows will be dampened. Figure 4.8 shows a sample of two flow monitoring sites (A9 and B1), both with the same average daily flow, but the dampened effects of GWI can be seen with Site B1 (red line), where the minimum and maximum flows are closer to the ADWF. Based on the I/I analysis, there was no discernible groundwater detected at any of the flow monitoring sites.

Table 4.5 Combined I/I Analysis Summary

Site	ADWF (mgd)[1]	Basin Acreage	Total Combined I/I Volume (gallons)	R-Value (%)	Combined I/I per IDM Ranking[2]	Combined I/I per Acre Ranking[2]	Combined I/I per ADWF Ranking[2]	Overall Combined I/I Ranking[2]
FM-1	0.663	416	242,901	1.82%	1	4	3	3
FM-2	0.431	618	52,741	0.27%	10	9	7	9
FM-3	0.233	212	133,603	1.95%	4	2	2	2
FM-4	0.576	149	89,265	1.90%	2	3	6	5
FM-6	0.285	373	50,827	0.45%	8	8	5	6
FM-7	N/A	N/A	N/A	N/A		N/A	N/A	
FM-8	0.505	494	37,608	0.26%	9	10	10	10
FM-10	0.093	43	10,641	0.77%	6	7	8	8
FM-11	N/A	N/A	N/A	N/A		N/A	N/A	
FM-12	N/A	N/A	N/A	N/A		N/A	N/A	
FM-15	0.13	123	80,267	2.01%	3	1	1	1
FM-13 + 14	2.583	756	294,957	1.20%	5	5	9	7
FM-5 + 9	0.356	32	91,192	8.88%	7	6	4	4

Notes:
Source: V&A 2022 Sewer Flow Monitoring and Inflow/Infiltration Study (Appendix A).
(1) This is the ADWF generated within each tributary basin and does not include ADWF generated in upstream flowmeter basins.
(2) Ranking of 1 represents highest combined I/I volume after normalization.

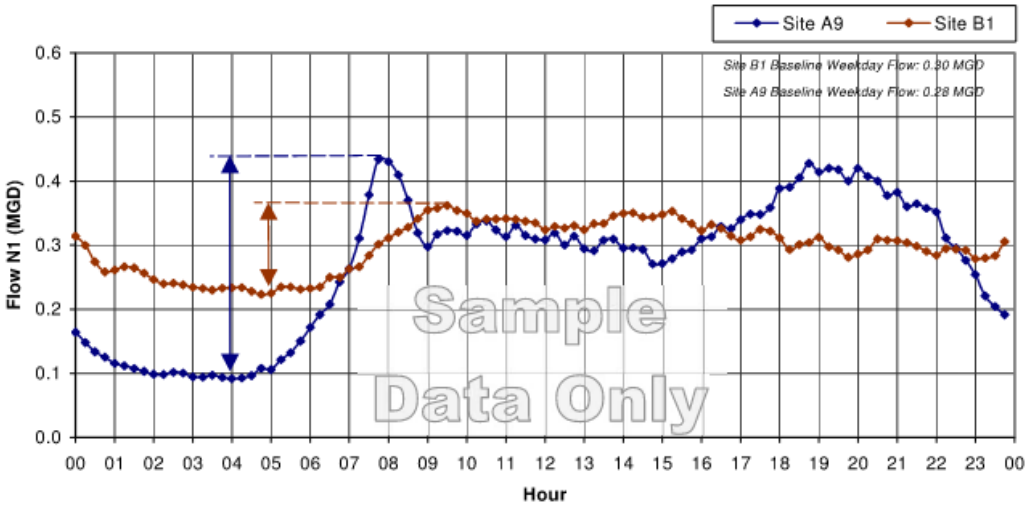


Figure 4.8 Groundwater Infiltration Sample Figure

4.3.5 Peak Measured Flows

Table 4.6 summarizes the peak flow rates and measured depth of flow observed during the flow monitoring period. As shown, four sites had peaking factors greater than 4.0. The highest peaking factor was 5.3 at site FM-15. There were also four sites (FM-1, FM-2, FM-9, and FM-13) with a maximum d/D greater than 1, meaning they surcharged during the flow monitoring program.

Table 4.6 Capacity Analysis Summary

Site	ADWF (mgd)(1)	Peak Measured Flow (mgd)	Peaking Factor	Pipe Diameter, D (inches)	Maximum Depth, d, (inches)	Maximum d/D Ratio
FM-1	0.663	3.04	4.6	21	25.2	1.20
FM-2	0.431	1.26	2.9	18	24.3	1.35
FM-3	0.505	2.32	4.6	18	13.2	0.73
FM-4	0.576	1.48	2.6	16	14.3	0.89
FM-5	1.823	4.34	2.4	24	20.2	0.84
FM-6	0.862	2.48	2.9	18	14.4	0.80
FM-7	0.502	1.18	2.3	21	10.1	0.48
FM-8	1.46	3.42	2.3	24	18.3	0.76
FM-9	2.715	6.09	2.2	30	32.0	1.07
FM-10	0.093	0.42	4.5	12	5.1	0.42
FM-11	n/a	0.02	n/a	10	1.6	0.16
FM-12	0.143	0.33	2.3	18	4.2	0.23
FM-13	1.516	4.13	2.7	25	26.8	1.07
FM-14	2.666	6.47	2.4	28	18.5	0.66
FM-15	0.13	0.69	5.3	18	5.3	0.29

Notes:
Source: V&A 2022 Sewer Flow Monitoring and Inflow/Infiltration Study (Appendix A).
(1) This is the actual (cumulative) measured flow through each flowmeter and includes flow from any upstream flowmeters.

It should also be noted that the values listed in Table 4.6 represent values measured during the flow monitoring period only. Design peak flows, based on a 10-year, 24-hour design storm event (as discussed in Chapter 3), are expected to exceed those provided in Table 4.6.

4.4 Wastewater Flow Projections

The wastewater flow projections were developed by applying wastewater unit flow rates (residential and non-residential) to the planned developments, RHNA housing units, and ADUs. The following assumptions were made when developing the wastewater flow projections.

- The State of California Senate Bill 606 (Hertzberg) and Assembly Bill 1668 (Friedman) established indoor water use standards for new development over time. The initial standard of 55 gallons per capita per day (gpcd) was used to estimate wastewater flows from new development within the City's service area.

4.4.1 Future Wastewater Unit Flow Rates

Wastewater unit flow rates were developed using several methods:

- Residential: Future residential flow rates are based on a wastewater flow of 55 gallons per day (gpd) per person, which is an upcoming state regulation based on maximum indoor water use, and 2.74 people per dwelling unit (DU), which is provided by the California DOF E-5 Population and Housing Estimates for January 2022. This results in a flow rate of 151 gpd per DU, which was applied to all planned residential developments, RHNA housing units, and ADU's.
- Non-Residential: There are a few commercial developments planned for the near future. The historical water billing data (used to load the model) was assigned a land use type. The total water consumption for commercial customers was divided by the total commercial acres to calculate an average flow per acre for commercial areas within the City. This method yielded an average of 1,800 gpd per acre, which was applied to parcels with a planned commercial development.

Table 4.7 summarizes the wastewater unit flow rates that were used in developing the future flow projections.

Table 4.7 Future Wastewater Unit Flow Rates

Land Use Type	Unit Wastewater Flow
Residential	55 gpd per person or 151 gpd per DU(1)
Commercial	1,800 gpd per acre

Note:
(1) Based on the California DOF 2022 E-5 Population and Housing Estimates persons per household of 2.74 for City of Gardena.

4.4.2 Wastewater Flow Projections

Developing an accurate estimate of the future quantity of wastewater generated in the collection system is an important step in maintaining and sizing sewer system facilities, for both existing conditions and future developments.

4.4.2.1 Average Dry Weather Flow

In general, the following assumptions were used for determining the future ADWF for the 2045 planning horizon:

- The calibrated ADWF based on the flow monitoring data was not changed for existing parcels currently connected to the City's wastewater collection system.
- For subcatchments with planned developments, the calibrated wastewater flow was scaled up to match the expected ADWF for the planned development.
- Wastewater flows for subcatchments associated with an overlay area (for the RHNA housing units) or ADU's, the wastewater flows were scaled up to include the existing plus future flows.
- No other planned developments, redevelopment, or densification is assumed to occur by the 2045 planning horizon.

Table 4.8 summarizes the existing and projected ADWF for the study area, based on the methodology and assumptions stated above. The City currently has an estimated existing ADWF of 4.8 mgd. This is expected to increase by 22 percent to 5.8 mgd by 2045, assuming full development of the predicted RHNA housing units and ADU's.

Table 4.8 Projected ADWF Summary

Flow Component	Wastewater Flow (mgd)(1)
Existing	**4.79**
Future	
Planned Developments	0.21
RHNA Allocation (Overlay Areas)	0.67
ADU's	0.17
Future Subtotal	*1.05*
Total	**5.84**

Note:
(1) This is the estimated wastewater flow generated within the City and excludes all flow entering the City from outside sources.

4.4.2.2 Peak Wet Weather Flow (PWWF)

The PWWF is the highest observed hourly flow that occurs following the design storm event (discussed in Chapter 3). Wet weather I/I, which occurs during and after rainfall events, increases flows in the collection system. The City's collection system was evaluated based on its capacity to convey the PWWF.

The existing PWWF was derived based on the hydraulic modeling results. This was accomplished by applying the 10-year, 24-hour design storm to the hydraulic model, which was calibrated to both dry weather and wet weather conditions. The 10-year, 24-hour design storm volume is approximately 3.8 inches, although may vary slightly depending on the specific location within the study area, as documented by NOAA Atlas 14[1].

Similar to the existing PWWF, the future (2045) PWWF was derived by applying the same 10-year, 24-hour design storm to the hydraulic model on top of the future ADWF conditions. Because the City is largely built out (i.e., minimal vacant land), the planned developments, RHNA housing units, and ADUs will consist of densification/redevelopment and are not expected to increase the amount of I/I into the collection system. Therefore, this master plan assumes no additional I/I will be contributed to the system in the future.

Table 4.9 presents a summary of the existing and 2045 ADWF and PWWFs as well as the PWWF peaking factors. The PWWFs presented in Table 4.9 assume there are no capacity constraints in the collection system. This is essentially the PWWF after the recommended improvements are constructed. As shown in Table 4.9, the existing PWWF to ADWF peaking factor decreases from 4.2 to 3.6 in 2045.

Table 4.9 Projected Wastewater Flow Summary

Year	Projected Wastewater Flow (mgd)		
	ADWF	PWWF(1)	PWWF to ADWF Peaking Factor
Existing	4.79	20.3	4.2
2045	5.84	21.3	3.6

Note:
(1) Model-simulated, peak hourly flow generated within City. Excludes flows entering City from outside areas.

[1] https://hdsc.nws.noaa.gov/hdsc/pfds/pfds_map_cont.html

Chapter 5

SANITARY SEWER COLLECTION SYSTEM FACILITIES AND HYDRAULIC MODEL

This chapter describes the update and calibration of the City's wastewater collection system hydraulic model. It provides a description of the wastewater collection system, and an outline of the steps used to develop the model, as well as a detailed summary of the hydraulic model calibration steps and results.

5.1 Collection System Facilities

The City provides sewer services to its residential, commercial, and industrial customers within the City limits. The wastewater collection system includes over 88 miles of gravity sewer lines ranging in size from 6 to 12 inches, approximately 2,080 manholes, and 1 lift station. All wastewater generated in the City's collection system discharges to and is treated by the LACSD. The City's sewers discharge at over 100 locations along various LACSD interceptors. There are also 10 locations where other utilities, including portions of unincorporated Los Angeles County and the City of Hawthorne, flow into the city of Gardena. Four of these locations discharge to a City pipe, whereas the other six locations discharge to a LACSD interceptor. Figure 5.1 presents the City's existing collection system and includes the modeled portion of the LACSD interceptor system. The points of entry for outside flows are also shown.

5.1.1 Gravity Sewers

The City's existing wastewater collection system is comprised of over 88 miles of gravity collection system pipes from 6 to 12 inches in diameter. Table 5.1 presents a summary of the known sewers in the collection system by diameter. As shown in Table 5.1, roughly 96 percent of the City's sewers are 8 inches in diameter.

Table 5.1 Gravity Pipeline Summary by Diameter

Diameter (inches)	Length (miles)	Percentage of System
6	0.2	0.3%
8	85.3	95.9%
10	2.6	2.9%
12	0.8	0.9%
Total	**88.9**	**100%**

Table 5.2 summarizes the gravity collection system by pipe material. As shown in Table 5.2, approximately 91 percent of the system consists of vitrified clay pipe (VCP). And approximately 8.6 percent of the City's VCP and concrete pipe (CP) pipes have been lined with plastic. The remaining few segments of pipe are made of concrete.

Table 5.2 Gravity Pipeline Summary by Material

Material	Length (miles)	Percentage of System
VCP	81.1	91.2%
VCP Lined	0.1	0.2%
CP	0.2	0.2%
CP Lined	7.5	8.4%
Total	**88.9**	**100%**

5.1.1.1 Sewer Condition Assessment

Approximately 80 miles of the City's collection system pipes were previously inspected in 2019. As part of this master planning effort, the remaining 8 miles were inspected in 2022. All of the City's 2,080 manholes were also inspected in 2022. The results and recommendations from the sewer and manhole inspections are provided in Chapter 7.

5.1.2 Lift Station and Force Main

The City operates and maintains one wastewater lift station. Figure 5.1 shows the location of the lift station. The lift station has two submersible pumps, each with 475-gallons-per-minute (gpm) capacity, and serves the commercial and residential areas along Denker Avenue from 178th Street to 182nd Street and the mobile home park and apartment complex north of 178th Street. The wastewater is pumped through a 6-inch steel force main across 178th Street and discharges to a LACSD interceptor.

As part of the Master Plan, Carollo conducted a visual inspection of the lift station to supplement the hydraulic capacity evaluations of the collection system. The findings and recommendations of the lift station condition assessment were provided in TM1, which is provided in Appendix B of this Master Plan report.

5.2 Hydraulic Model Development

A sewer collection system model is a simplified representation of the real sewer system. Sewer system models can assess the conveyance capacity for a collection system and can also be used to perform "what if" scenarios to assess the impacts of future developments and land use changes. The City's collection system hydraulic model was constructed using a multi-step process utilizing data from varying sources. This section summarizes the hydraulic model development process, a description of the modeled collection system, the hydraulic elements and the model review and update process.

5.2.1 Previous Hydraulic Model

The City's previous collection system hydraulic model was developed using the H2OMAP Sewer hydraulic modeling software application. The hydraulic model generally included all City sewer pipes.

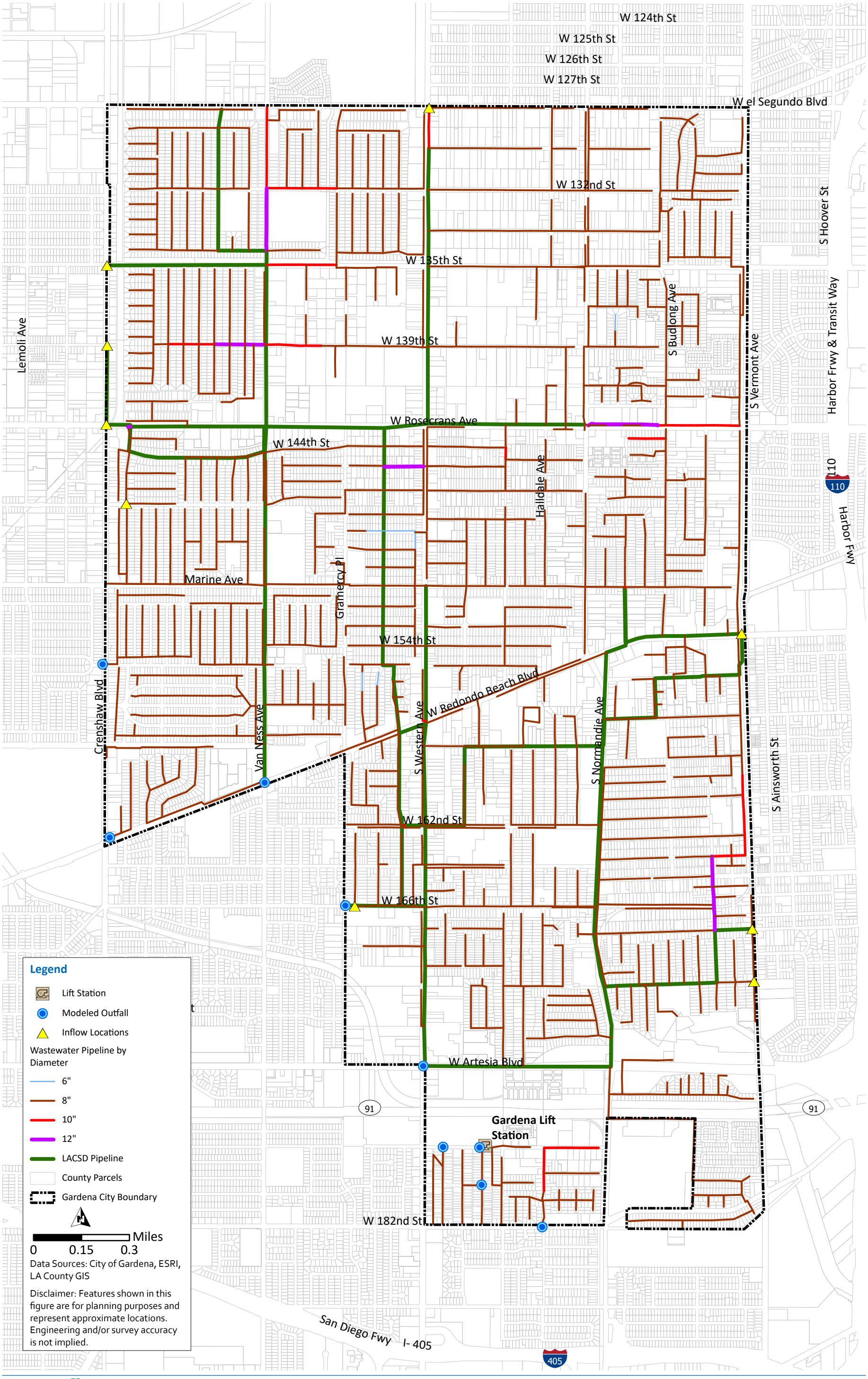


Figure 5.1 Existing Collection System

5.2.2 Hydraulic Modeling Software

There are several software applications for network analysis with a variety of capabilities and features. The selection of a particular model is generally dependent upon user preference, the requirements of the particular collection system, and the cost associated with the software.

The InfoWorks ICM modeling package, developed by Innovyze, was selected as the software platform for the City's hydraulic model. The InfoWorks model routes flow through the collection system to evaluate the capacity of existing pipes and determine where capacity constraints occur using the dynamic wave, representing the full solution to the 1-Dimensional Saint-Venant equation. InfoWorks ICM was recommended to the City for the following reasons:

- Excellent hydraulic calculations.
- GIS capabilities.
- Superior or comparable ease of use (compared to the previous modeling software).
- Excellent data flagging/model tracking features.
- Good scenario management.
- Available internet viewer.
- Responsive customer service.

5.2.3 Elements of the Hydraulic Model

The following provides an overview of the elements of a hydraulic wastewater model and the required input parameters associated with each:

- Manholes: Sewer manholes, cleanouts, as well as other locations where pipe sizes change, where pipelines intersect, or where force mains connect to gravity mains, are represented by manholes in the hydraulic model. Required inputs for manholes include diameter and ground, rim, and floor elevations. Manholes can also be used to represent locations where flows are split or diverted between two or more downstream links.
- Conduits: Gravity sewers are represented as conduits in the hydraulic model. Input parameters for conduits include length, diameter, material, friction factor (Manning's n), and invert elevations.
- Force Mains: Required input parameters are length, diameter, invert elevations, and friction factor (i.e., Hazen-Williams C).
- Breaks: Breaks are included in the hydraulic model as break nodes. Breaks are used to connect multiple force main segments. They are needed when an individual pipe changes in diameter or material and can be used to represent a pressure gauge. Required input includes ground elevations.
- Wet Wells: Wet wells are represented as storage objects in the hydraulic model. Required input parameters for wet wells include wet well base area, ground level, and a storage array that specifies the wet wells bottom and top elevations along with the corresponding area at that elevation.
- Pumps: Pumps are included in the hydraulic model as links. Input parameters for pumps vary based on the type of pump (fixed discharge, variable frequency drive, rotodynamic pump, etc.). For all pump types, operational controls (on/off set points) are required. Other input parameters that are required for the different pump types are pump capacity/head information, nominal speed, minimum/maximum speed,

positive/negative change in speed (rate at which the speed of the pump increases or decreases). Variable frequency drive pumps require real-time controls.

- Outfalls: Outfalls represent areas where flow leaves the system. For sewer system modeling, an outfall typically represents the connection to the influent pump station at a wastewater treatment plant. Outfalls in the City's model generally represent where flow from a City pipe discharges to an LACSD interceptor. Or, in the case where the LACSD interceptors are modeled, it represents where the interceptor exits the city. Required input parameters for outfalls include ground elevation.
- Patterns: Diurnal patterns are represented as trade waste profiles in the hydraulic model. Diurnal patterns are used to simulate the variation in flow throughout the day. Patterns can be established for weekday and weekend and span a 24-hour period.
- Subcatchments: Often referred to as loading polygons, sewer sheds, or manholes /pump station tributary areas, subcatchments are used in the dry and wet weather scenarios. Required input parameters for both scenarios include total and contributing area, outflow element (typically a manhole), rainfall profile (based on rainfall in each flowmeter basin), trade flow (loaded flow for each subcatchment), trade profile (trade waste profile).
  - Wet Weather Parameters: Additional parameters may be required for wet weather scenarios, depending on how the model is set up. The real-time kinematic (RTK) method was used to calculate RDII, and, therefore, those parameters were used to route WWFs through the model. Using the RTK method, the RDII unit hydrograph is the summation of three separate triangular hydrographs (short term, medium term, and long term), which are each defined by three parameters: R, T, and K. R represents the fraction of rainfall over the sewer basin that enters the collection system; T represents the time to peak of the hydrograph; and K represents the ratio of time to recession to the time of peak. Therefore, there are a total of nine separate variables associated with a unit hydrograph.

    The model does have a land use option for routing WWFs, which requires inputting various land use types and surface runoff parameters, however this method was not used for the City's model.

5.2.4 Wastewater Load Allocation

Determining the quantity of dry weather wastewater flows generated by a municipality and how they are distributed throughout the collection system is an important component of the hydraulic modeling process. Various techniques can be used to assign wastewater flows to individual model junctions, depending on the type of data that is available. Adequate estimates of the volume of wastewater are important in maintaining and sizing wastewater collection system facilities, both for existing and future conditions. Baseline wastewater loads were allocated (assigned to specific nodes) in the hydraulic model based on the water billing data provided by Golden State Water Company. The water billing data provide a means to transform the volume of clean water that is provided to the community into an average DWF that will enter the collection system, as described below:

- Step 1: The parcels within the study area were imported into the hydraulic model as subcatchments and assigned to the upstream manhole of the pipe it contributes flow to.

- Step 2: The loads were calculated for each subcatchment using the GIS "spatial join" tool by combining the water billing data points that reside within each subcatchment. This allocates a single combined load for each subcatchment. Water billing data from January-February 2021 was used to load the hydraulic model.
- Step 3: The allocated loads were adjusted as necessary during the DWF calibration process (see Section 5.3) to closely match the actual measured DWFs recorded during the flow monitoring period.

5.2.5 Hydraulic Model Development

Carollo contracted with National Plant Services (NPS) to conduct field surveys of all of the City's manholes. As part of the field work, NPS provided ground elevations and depths for each manhole, which served as the basis for building the City's model. The model construction process consisted of six steps, as described below:

- Step 1: Import the manhole shapefile provided by NPS into InfoWorks using the "Open Data Import Centre" tool.
- Step 2: The City's sewer pipes were digitized and assigned the appropriate attributes (asset ID, diameter, and inverts). LACSD interceptor pipelines within the City limits were digitized based on as-built drawings on LACSD's website.
- Step 3: As-built drawings and other maps provided by the City and/or LACSD were used to confirm questionable areas.
- Step 4: Once all the relevant data was input into the hydraulic model, the model was reviewed to verify that the model data was input correctly and that the flow direction, size, and layout of the modeled pipelines were logical.
- Step 5: Dry weather wastewater flows were then allocated to the appropriate model subcatchments (as discussed in Section 5.2.4).
- Step 6: The hydraulic model contains certain run parameters that need to be set by the user at the beginning of the project. These include run dates, time steps, reporting parameters, output units, and flow routing method. Once the run parameters were established, the model was debugged to ensure that it ran without errors or warnings.

5.3 Hydraulic Model Calibration

Hydraulic model calibration is a crucial component of the hydraulic modeling effort. Calibrating the model to match data collected during the flow monitoring program ensures the most accurate results possible. The calibration process consists of calibrating to both dry and wet weather conditions. This section summarizes the overall methodology employed to calibrate the City's wastewater collection system hydraulic model and the calibration results, including a detailed description of each of the major components of the model calibration process.

For this project, both dry and WWF monitoring were conducted at 15 sites for a one-month period from March 8 to April 12, 2022. DWF calibration ensures an accurate depiction of BWF generated within the study area. The WWF calibration consists of calibrating the hydraulic model to a specific storm event or events to accurately simulate the peak and total I/I volume into the sewer system. The amount of I/I is essentially the difference between the WWF and DWF components.

5.3.1 Calibration Standards

The hydraulic model was calibrated in accordance with international modeling standards. The Wastewater Planning Users Group (WaPUG), a section of the Chartered Institution of Water and Environmental Management, has established generally agreed-upon principles for model verification. The dry weather and wet weather calibration focused on meeting the recommendations on model verification contained in the "Code of Practice for the Hydraulic Modeling of Sewer Systems," published by the WaPUG (WaPUG 2002), as summarized below:

- Dry Weather Calibration Standards: Dry weather calibration should be carried out for two dry weather days, and the modeled flows and depths should be compared to the field-measured flows and depths. Both the modeled and field-measured flow hydrographs should closely follow each other in both shape and magnitude. In addition to the shape, the flow hydrographs should also meet the following criteria as a general guide:
  - The timing of flow peaks and troughs should be within one hour.
  - The peak flow rate should be within the range of ±10 percent.
  - The volume of flow (or the average rate of flow) should be within the range of ±10 percent. If applicable, care should be taken to exclude periods of missing or inaccurate data.
- Wet Weather Calibration Standards: The model simulated flows should be compared to the field measured flows. The flow hydrographs for both events should closely follow each other in both shape and magnitude, until the flow has substantially returned to DWF rates. In addition to the shape, the flow hydrographs should also meet the following criteria, as a general guide:
  - The timing of the peaks and troughs should be similar regarding the duration of the events.
  - The peak flow rates at significant peaks should be in the range of +25 percent to -15 percent and should be generally similar throughout.
  - The volume of flow (or the average flow rate) should be within the range of +20 percent to -10 percent.

5.3.2 Dry Weather Flow (DWF) Calibration

The DWF calibration process consists of several elements, as outlined below:

- Divide the system into areas tributary to each flowmeter. The first step in the calibration process was to divide the City into flowmeter tributary areas, one for each flow monitoring site. Essentially, each subcatchment in the model has a flowmeter number assigned to it. Maps showing the locations of each flow monitoring site and their associated tributary areas are provided in Chapter 4 along with schematics of the flowmeters.
- Define flow volumes within each area. The next step was to define the flow volumes within each area, which was accomplished in the flow allocation step (described in Section 5.2.3).
- Create diurnal patterns to match the temporal distribution of flow. A diurnal curve is a pattern of hourly multipliers that are applied to the base flow to simulate the variation in flow that occurs throughout the day. Two diurnal curves were developed for each flow monitoring tributary area, one representing weekday flow and one representing

weekend flow. The diurnal patterns were initially developed based on the flow monitoring data and adjusted as part of the calibration process until the model simulated flows matched the field measured flows as closely as possible. Figure 5.2 shows the calibrated weekday and weekend diurnal pattern for the area tributary to Site 5. Additional diurnal patterns were developed for all flowmeter tributaries. These diurnal patterns are found on the DWF calibration sheets that are included in Appendix C.

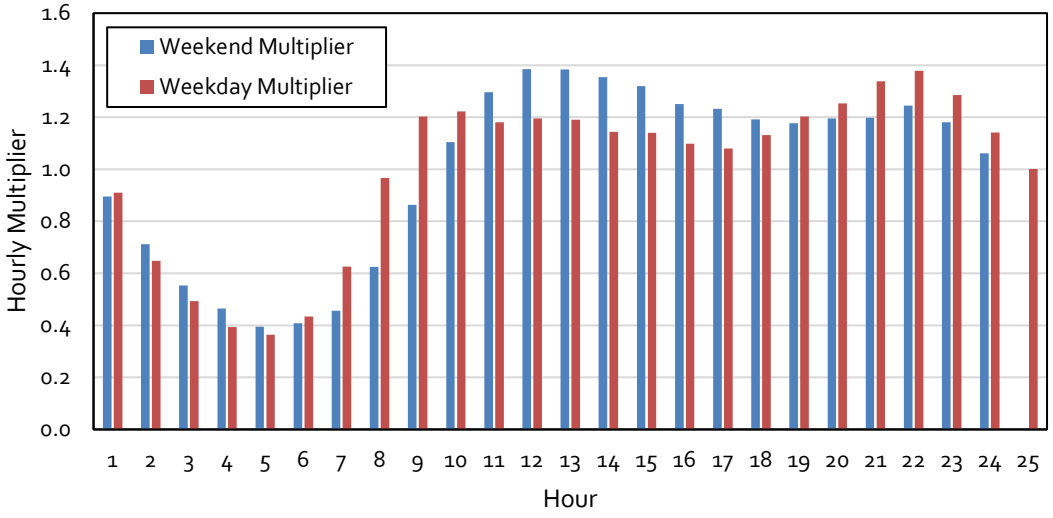


Figure 5.2 Example Weekday and Weekend ADWF Diurnal Patterns (Site 5)

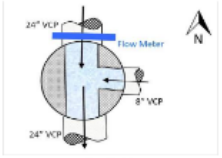
Figure 5.3 is an example DWF calibration sheet for flowmeter Site 5. Calibration sheets provide plots and tables that compare model results with the field-measured results from the calibration period. Appendix C contains detailed DWF calibrations sheets for all meters. Flowmeter Site FM-11 was not included in calibration since this flowmeter was placed on the downstream end of a flow split, where Site FM-11 received negligible ADWF.

Overall, the hydraulic model met the established dry weather calibration standards. One site, FM-10, had modeled flows above the 10 percent of the measured flows. After scaling the water consumption in this basin by 50 percent, the flows in this basin are still a little high. This is a relatively small basin with 90,000 gpd measured ADWF whereas the modeled flows are 110,000 gpd. This discrepancy is not impacting the results of the hydraulic model and all of the downstream flowmeter sites are within the standard range. Overall, the model accurately simulates DWF, and the sites that did not had little impact on the model's overall accuracy. For these reasons, the model is considered calibrated for DWF conditions.

Flow Monitoring Site Site 5, Dry Weather Flow Calibration
Location: Van Ness Avenue south of W 162nd Street
Pipeline Diameter: 24"

Flow Monitor Location

Sanitary Map

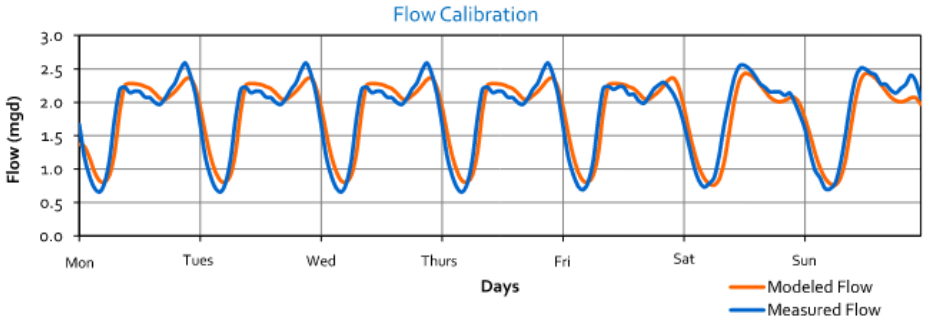


Flow Sketch


Street View


Plan View

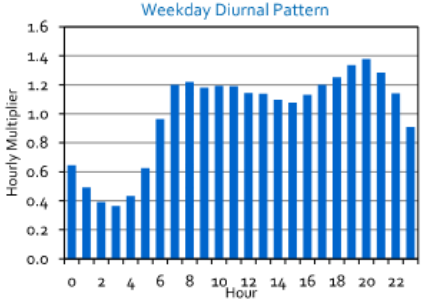
Flow Calibration



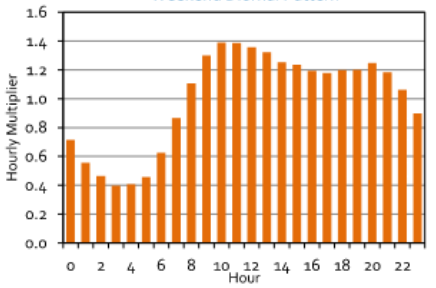
Model Calibration Summary

Day	Measured Data[1] Avg. Flow (mgd)	Measured Data[1] Peak Flow[2] (mgd)	Modeled Data Avg. Flow (mgd)	Modeled Data Peak Flow[2] (mgd)	Percent Error[3] Avg. Flow (%)	Percent Error[3] Peak Flow (%)
Mon.	1.83	2.59	1.84	2.36	0.7%	-8.8%
Tues.	1.83	2.59	1.84	2.36	0.7%	-8.8%
Wed.	1.83	2.59	1.84	2.36	0.7%	-8.8%
Thur.	1.83	2.59	1.84	2.36	0.7%	-8.8%
Fri.	1.80	2.30	1.85	2.36	2.6%	2.6%
Sat.	1.82	2.55	1.75	2.43	-3.8%	-4.8%
Sun.	1.82	2.51	1.74	2.43	-4.7%	-3.1%
Summary						
Weekday	1.82	--	1.84	--	1.1%	--
Weekend	1.82	--	1.74	--	-4.2%	--
ADWF[4]	1.82	--	1.82	--	-0.4%	--

Weekday Diurnal Pattern



Weekend Diurnal Pattern



Notes:
(1) Source: V&A Temporary Flow Monitoring Program (February 7, 2022 through April 12, 2022)
(2) Peak flow is the hourly average hourly peak flow, which was derived based on the 15-minute flow data from V&A.
(3) Percent Error = (Modeled - Measured) /Measured x 100
(4) ADWF = (5xWeekday Average + 2xWeekend Average)/7

carollo

DRAFT | JANUARY 2023

Figure 5.3 Example DWF Calibration Sheet (Site 5)

carollo

5.3.3 Wet Weather Flow (WWF) Calibration (Season 1 and Season 2)

The wet weather calibration enables the hydraulic model to accurately simulate RDII entering the collection system during a large storm event. For this project, the WWF calibration process consists of running model simulations of a historic rainfall event. The goal of any WWF calibration is to capture and characterize a system's response to a significant rainfall event, preferably during wet antecedent moisture conditions where the ground is saturated. The hydraulic model was calibrated to the March 28-29, 2022 storm event, which was the only storm event captured during the flow monitoring program.

For the WWF calibration, RDII flows are superimposed on top of the DWF. The model calculates RDII by assigning "RDII Inflows" to each subcatchment in the model. RDII consist of both an RTK unit hydrograph and the subcatchment area. The tributary area provides a means to transform hourly rainfall depth from the rainfall hyetographs into a rainfall volume. During calibration, the RTK unit hydrograph parameters were adjusted until the modeled WWF closely matched that from the flow monitoring program.

As with the dry weather calibration, the wet weather calibration process compared the measured flow data with the model output. Comparisons were made for average and peak flows as well as the temporal distribution of flow until flows returned to their baseline levels. Figure 5.4 is an example WWF calibration graph for flowmeter Site 5. The WWF calibrations graphs for all sites are provided in Appendix D. Flowmeter Site FM-11 was not included in calibration since this flowmeter was placed on the downstream end of a flow split, where Site FM-11 received negligible WWF. There is good correlation between the model-simulated flows and the flows that were measured at each meter location. Overall, the model accurately simulated the effects of wet weather events and was considered calibrated and ready to use for capacity analysis purposes.

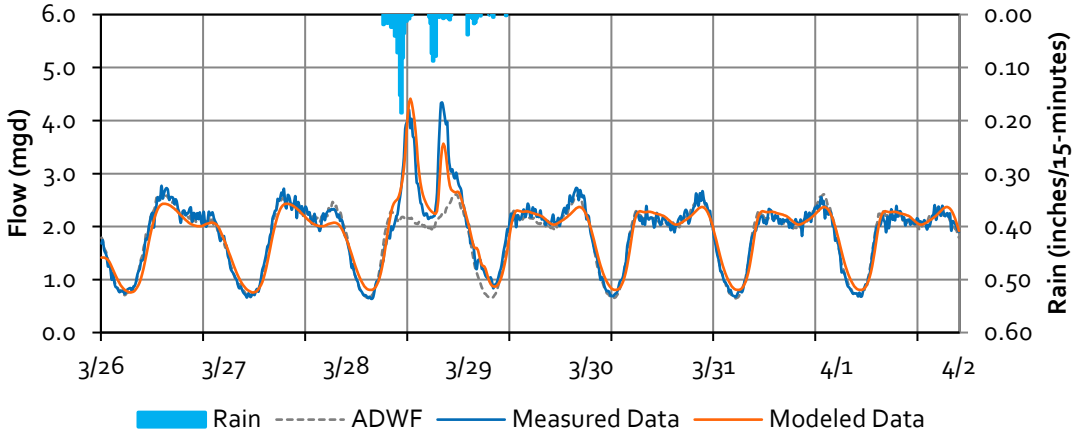


Figure 5.4 Example WWF Calibration Sheet (Site 5)

5.3.4 Collection System Hydraulic Model Calibration Summary

In summary, the calibration results indicate the model predicts conditions similar to those observed in the field. Within a few isolated areas of the model, there are some very minor discrepancies, but the overall collection system is very well represented in the model.

Based on the results presented in this chapter, it can be concluded that the model is calibrated to DWF and WWF conditions. The model provides an accurate representation of the City's sanitary sewer collection system to a level suitable for this Master Plan and for the City's future hydraulic modeling needs.

Chapter 6

CAPACITY EVALUATION AND PROPOSED IMPROVEMENTS

This chapter discusses the hydraulic evaluation of the City's wastewater collection system, and the proposed projects to address capacity deficiencies. Additional recommendations based on the lift station condition assessment are provided in Appendix B and the CCTV inspection of the gravity system are presented in Chapter 7.

6.1 Capacity Evaluation

Following the DWF and WWF calibration, which is summarized in detail in Chapter 5, a capacity analysis of the existing and future collection system was performed. The capacity analysis entailed identifying areas in the sewer system that did not meet the performance criteria presented in Chapter 3.

The system evaluations were performed by routing a 10-year, 24-hour design storm through the hydraulic model and identifying capacity deficiencies based on the performance criteria established in Chapter 3. Improvement projects were identified to alleviate gravity main deficiencies. A desktop analysis was also conducted to determine if the City's lift station has enough firm capacity to convey existing and future flows, which is discussed in Section 6.1.3.

6.1.1 Los Angeles County Sanitation Districts (LACSD) Interceptors

The City's collection system has over 100 discharge sites along the LACSD interceptor system. Although some of the LACSD interceptors within the city were modeled, the City's collection system model does not represent a detailed or calibrated representation of the LACSD interceptor system. The LACSD interceptor was not included in this capacity evaluation. It is important to note that any surcharging in the LACSD interceptor has the potential to impact the City's existing collection system, and based on the flow monitoring data results, it appears that some surcharged conditions may be occurring in the City's system associated with the LACSD interceptor system. The recommended improvements in this Master Plan are sized to accommodate flows from the City's system. Any potential interceptor system capacity limitations can/should be analyzed as part of a separate study.

There are several areas in the southern part of the city that discharge to a non-modeled LACSD sewer. Although there were no deficiencies observed in the hydraulic model, it is possible that the LACSD interceptors could cause surcharging in these areas.

6.1.2 Existing System Evaluation

In accordance with the established flow depth criteria for existing sewers, surcharged pipelines (where the maximum d/D was greater than 1) were flagged. Note that the surcharged pipelines are not necessarily deficient. In some cases, a surcharged condition within a given pipeline is due to backwater effects created by a downstream bottleneck (i.e., upstream surcharging caused by downstream pipeline deficiencies). An illustration of backwater effects is shown on Figure 6.1. For this reason, the hydraulic model was analyzed to identify the pipeline segments that are the cause of the surcharged conditions. Figure 6.2 shows the capacity deficiencies that cause surcharging under existing PWWF conditions.

The existing system evaluation was only performed on the City's pipelines and not the LACSD interceptors. There are several areas in the southern part of the city that discharge to a non-modeled LACSD sewer. Although there were no deficiencies observed in the hydraulic model, it is possible that the LACSD interceptors are causing surcharging in these areas.

Following the completion of the existing system analysis, improvement projects were identified to mitigate pipeline capacity deficiencies. These sewers will need to be replaced by larger diameter sewers or constructed in parallel to bypass flow around hydraulically deficient sewers. The decision on whether to upsize or parallel a particular sewer should be confirmed during preliminary design of each proposed project and is based on a number of factors including the condition of the existing pipeline, pipeline velocities during DWF conditions, pipeline slopes, and other relevant factors. These improvements are discussed in greater detail in Section 6.2.

6.1.3 Future System Evaluation

The goal of the future system analysis is to evaluate the collection system under projected future peak flow and to ensure the existing improvements are sized to convey buildout flows and identify future deficiencies. The analysis of the future system was performed in a similar manner to the existing system analysis, by routing the future PWWF through the hydraulic model. The growth assumptions used to develop the 2045 planning period are outlined in Chapter 4 and do not include any increase in flows from areas outside the city that discharge either to a City pipe or an LACSD interceptor.

As with the existing system evaluation, the future system evaluation was only performed on the City's pipelines and not the LACSD interceptors.

Figure 6.2 shows the future system capacity deficiencies. As shown, only two additional capacity deficiencies were identified in the future system evaluation.

6.1.4 Lift Station Capacity Analysis

The City's lift station was not modeled since it serves a small area and discharges directly to a nearby LACSD interceptor. However, a desktop analysis was performed to determine if the lift station has enough firm capacity to convey existing and future PWWFs. Based on the calibrated model, the lift station service area generates an estimated 30 gpm ADWF and a PWWF of 223 gpm. The future PWWF is expected to increase to 241 gpm. The existing firm capacity of the lift station is 475 gpm, which is sufficient to convey the existing and future PWWFs. Therefore, there are no capacity-related improvements recommended for the lift station at this time.

Condition-related improvements for the lift station are presented in Chapter 7.

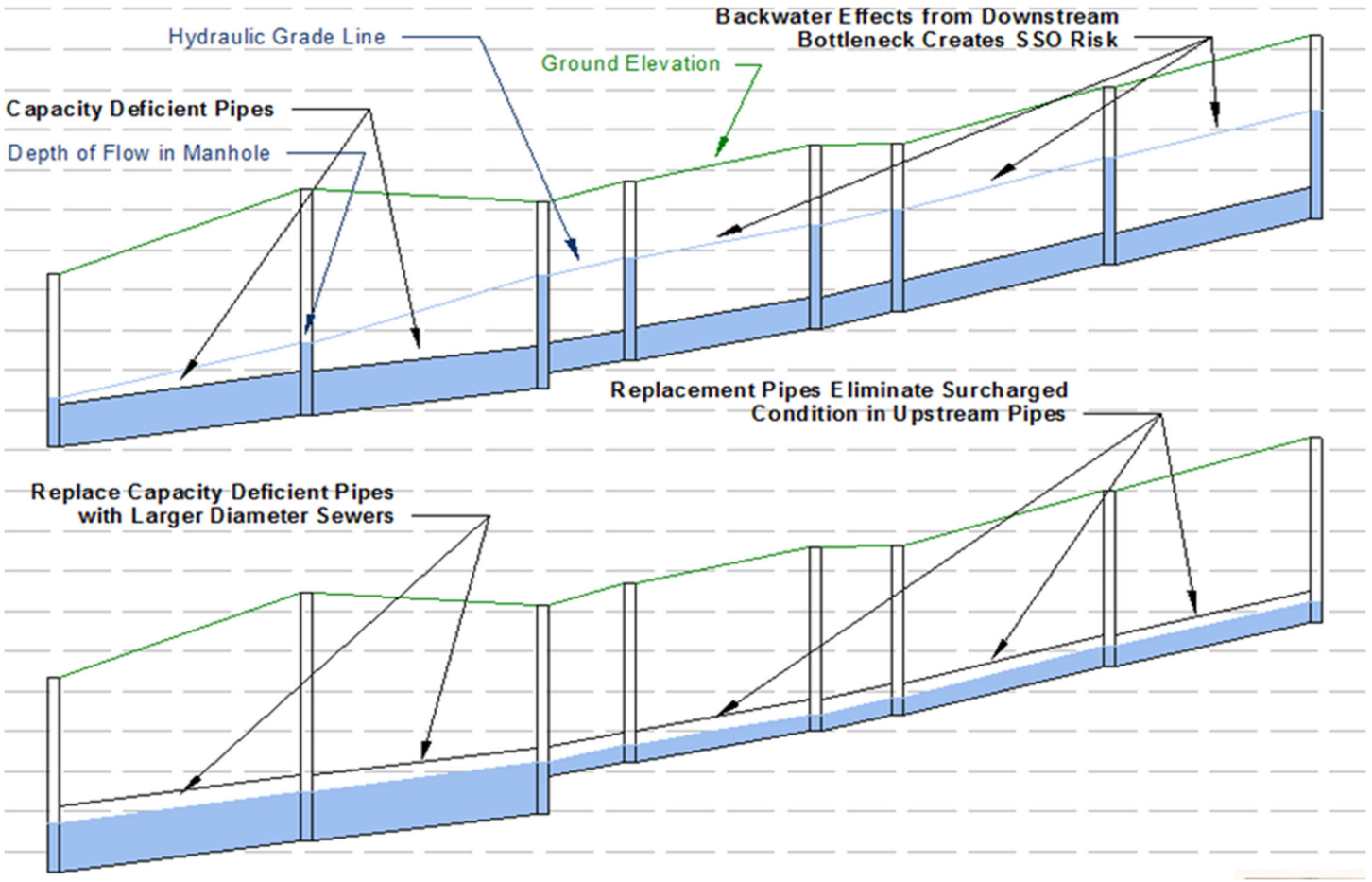


Figure 6.1 Sample Illustration of Backwater Effects in a Sewer

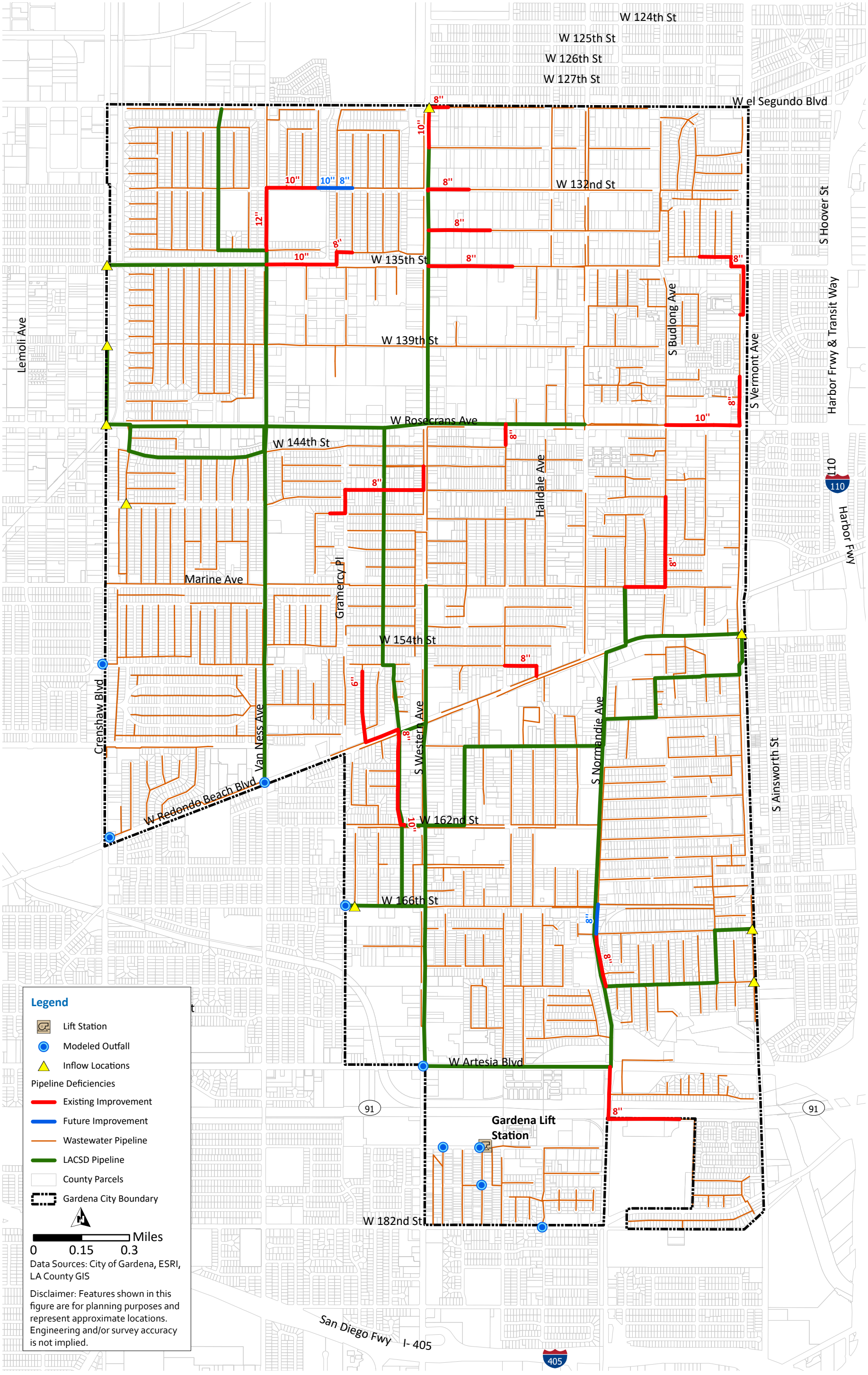


Figure 6.2 Capacity Deficiencies

6.2 Collection System Capacity Improvements

Figure 6.3 illustrates the proposed sewer improvements required to correct existing deficiencies and to serve future users. When an increase to capacity is required, existing sewers can be upsized or a parallel or relief sewer can be constructed. For the purposes of this study, unless otherwise stated, it was assumed that a capacity-deficient sewer would be replaced with a larger diameter. The upsized pipeline generally followed the same slope as the existing pipeline, with the exception where the survey data revealed negative or flat slopes in an existing alignment.

The proposed existing improvements are sized for future (2045) conditions. As the City continues to grow, it is recommended that the proposed improvements be constructed so that the facilities have sufficient capacity for future conditions. The proposed pipe diameter represents the ultimate diameter needed to accommodate anticipated future conditions. For pipeline improvements, building an interim project that does not serve all future users is not recommended.

6.2.1 Existing System Improvements

There are a total of 15 recommended improvements to address existing capacity deficiencies, which are summarized below. All improvements were based on maintaining the maximum flow depth criteria outlined in Chapter 3. Cost estimates for the recommended existing system improvements are provided in Chapter 8.

- Project P-1 (132nd Street and Van Ness Avenue): This project includes replacing approximately 850 ft of 10-inch diameter pipeline along 132nd Street, between Van Ness Avenue and Cimarron Avenue, and replacing approximately 1,030 ft of 12-inch diameter pipeline along Van Ness Avenue, between 132nd Street and 134th Place. The existing pipelines cause surcharging under existing PWWF. To mitigate this capacity deficiency, it is recommended that the existing pipeline be replaced with 12-inch and 15-inch diameter pipeline.
- Project P-2 (135th Street, Wilton Place, and 134th Place): This project includes replacing approximately 460 ft of 8-inch diameter pipeline along 134th Place, between Gramercy Place and Wilton Place, and along Wilton Place, between 134th Place and 135th Street. It also includes replacing 1,160 ft of 10-inch diameter pipeline along 135th Street, between Van Ness Avenue and Wilton Place. These deficient pipes cause surcharging under existing PWWF. To mitigate this capacity deficiency, it is recommended that the existing pipeline be replace with 12-inch and 15-inch diameter pipeline.
- Project P-3 (Western Avenue and El Segundo Boulevard): This project includes replacing 320 ft of 8-inch diameter pipeline along El Segundo Boulevard and Western Avenue with 12-inch pipeline, and 670 ft of 10-inch diameter pipeline along Western Avenue, between El Segundo Boulevard and 130th Street, with a 15-inch pipeline. These deficient pipes cause flooding upstream under the existing PWWF. This project is located downstream from where outside flow from unincorporated Los Angeles County enters the City's collection system.
- Project P-4 (132nd Street East of Western Avenue): This project includes replacing approximately 770 ft of 8-inch diameter pipeline directly east of Western Avenue along 132nd Street with a 12-inch pipeline. These deficient pipes cause surcharging under existing PWWF, therefore the pipelines are recommended to be upsized. A 10-inch diameter is required to convey existing PWWF, however a 12-inch diameter is required for future PWWF.

- Project P-5 (134th Street East of Western Avenue): This project includes replacing approximately 1,020 ft of 8-inch diameter pipeline directly east of Western Avenue along 134th Street with a 12-inch pipeline. These deficient pipes cause surcharging under existing PWWF, therefore the pipelines are recommended to be upsized.
- Project P-6 (135th Street East of Western Avenue): This project includes replacing approximately 1,390 ft of 8-inch diameter pipeline east of Western Avenue along 135th Street with a 10-inch pipeline. These deficient pipes cause surcharging under existing PWWF, therefore, the pipelines are recommended to be upsized.
- Project P-7 (Vermont Avenue and 135th Street): This project includes replacing approximately 880 ft of 8-inch diameter pipeline between 134th Place and 135th Street to Vermont Avenue with 10-inch and 12-inch pipeline. It also includes replacing approximately 840 ft of 8-inch diameter pipeline along Vermont Avenue, between 135th Street and Travelers Motor Inn and Trailer Park, with 12-inch and 15-inch diameter pipeline. These deficient pipes cause surcharging under existing PWWF, therefore, the pipelines are recommended to be upsized. This project is located upstream of project P-10. It is recommended that project P-10 be constructed prior to P-7.
- Project P-8 (146th Street and Gramercy Place): This project includes replacing approximately 280 ft of 8-inch diameter pipeline along 147th Street and west of Gramercy Place, and replacing 390 ft of 8-inch diameter pipeline along Gramercy Place, between 146th Street and 147th Street with a 10-inch pipeline. It includes replacing approximately 1,620 ft of 8-inch diameter pipeline along 146th Street, from Gramercy Place to the connection on 145th Street, with a 12-inch pipeline. These deficient pipes cause surcharging within 2 ft of the manhole rim under existing PWWF, therefore, the pipelines are recommended to be upsized.
- Project P-9 (Denker Avenue): This project includes replacing approximately 340 ft of 8-inch diameter pipeline along Denker Avenue, between 144th Street and Rosecrans Avenue, with a 12-inch pipeline. The existing pipes in this area are very flat and lead to surcharging under existing PWWF.
- Project P-10 (Vermont Avenue and Rosecrans Avenue): This project includes replacing approximately 810 ft of 8-inch pipeline along Vermont Avenue, between Quigley's Market and Rosecrans Avenue, and replacing approximately 1,220 ft of 10-inch diameter pipeline along Rosecrans Avenue, between Vermont Avenue and Budlong Avenue, with 12-inch diameter pipeline. These deficient pipes cause surcharging under existing PWWF, therefore, the pipelines are recommended to be upsized.
- Project P-11 (Budlong Avenue and Marine Avenue): This project includes replacing approximately 2,150 ft of 8-inch pipeline along Budlong Avenue, between 146th Street and Marine Avenue, and along Marine Avenue, between Budlong Avenue and Raymond Avenue. These deficient pipes cause surcharging under existing PWWF. To mitigate this capacity deficiency, it is recommended that the existing pipeline to be replaced with a 12-inch diameter pipeline.

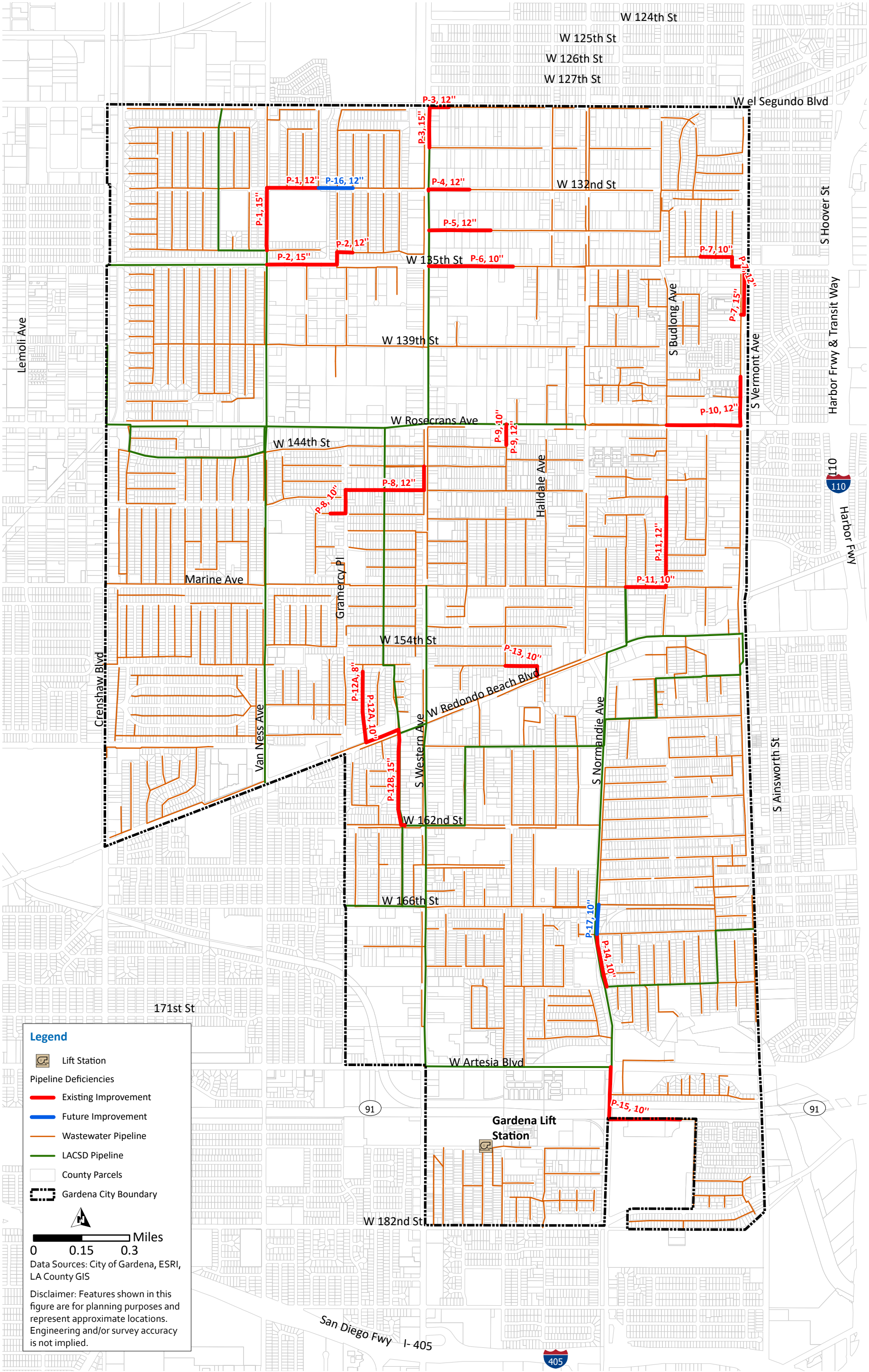


Figure 6.3 Recommended Improvements

- Project P-12A (Ruthelen Avenue and Redondo Beach Boulevard): This project includes replacing approximately 1,170 ft of 6-inch and 8-inch diameter pipeline along Ruthelen Avenue, between 154th Place and Redondo Beach Boulevard, with a 10-inch diameter pipeline. This project also includes replacing approximately 890 ft of 8-inch diameter pipeline along Redondo Beach Boulevard, between Gramercy Place and Manhattan Place, with a 12-inch diameter pipeline. These deficient pipes cause surcharging within 2 ft below the manhole rim under existing PWWF. The proposed 10-inch diameter pipe on Ruthelen Avenue is not only needed to convey existing PWWF, it is also required to maintain a minimum velocity of 2 fps at the current pipe gradient. Project P-12B, which is downstream of this project, is recommended to be constructed prior to P-12A.
- Project P-12B (Manhattan Place): This project includes replacing approximately 1,660 ft of 8-inch and 10-inch diameter pipeline along Manhattan Place, between Redondo Beach Boulevard and the connection to the LACSD interceptor on 162nd Street. These deficient pipes cause surcharging within 2 ft below the manhole under existing PWWF. The maximum d/D within the existing pipelines exceeds the maximum criteria under existing PWWF, therefore, the pipelines are recommended to be upsized.
- Project P-13 (154th Place to Redondo Beach Boulevard): This project includes replacing approximately 690 ft of 8-inch pipeline along 154th Place from Denker Avenue to the connection at Redondo Beach Boulevard with a 10-inch diameter pipeline. These deficient pipes cause surcharging under existing PWWF, therefore, the pipelines are recommended to be upsized.
- Project P-14 (Normandie Avenue Between 168th Street and 170th Street): This project includes replacing approximately 720 ft of 8-inch diameter pipeline along Normandie Avenue, between 168th Street and 170th Street, with a 10-inch pipeline. These deficient pipes cause surcharging under existing PWWF, therefore the pipelines are recommended to be upsized.
- Project P-15 (177th Street and Normandie Avenue): This project includes replacing approximately 2,040 ft of 8-inch diameter pipeline along 177th Street (just west of Budlong Avenue to the intersection of Normandie Avenue) and Normandie Avenue (from 177th Street to Artesia Boulevard). These deficient pipes cause surcharging within 5 ft of the manhole rim under existing PWWF. To mitigate this capacity deficiency, it is recommended that the existing pipeline be replaced with a 10-inch diameter pipeline.

6.2.2 Future System Improvements

This section summarizes the proposed improvements that will serve future users. Two projects that were identified following the future system evaluation are also shown on Figure 6.3, in blue. Both future improvement projects are adjacent to two existing improvement projects. Future recommended capacity improvements are summarized below. Cost estimates for the recommended future system improvements are provided in Chapter 8.

- Project P-16 (132nd Street): This project is upstream of existing improvement P-1, and includes replacing approximately 260 ft of 8-inch diameter pipe and 310 ft of 10-inch diameter pipe, along 132nd Street, between Cimarron Avenue and Gramercy Place. The existing 10-inch pipe crosses under a canal. The maximum d/D within these existing pipelines exceeds the maximum criteria under future PWWF conditions. To mitigate this deficiency, it is recommended that the existing pipes be replaced with 12-inch diameter pipelines.

- Project P-17 (Normandie Avenue between 166th Street and 168th Street): This project is upstream of existing improvement P-14, and includes replacing approximately 490 ft of 8-inch diameter pipe, along Normandie Avenue, between 166th Street and 168th Street. The maximum d/D within these existing pipelines exceeds the maximum criteria under future PWWF conditions. To mitigate this deficiency, it is recommended that the existing pipes be replaced with 10-inch diameter pipelines.

6.3 Additional Recommendations

In addition to the capacity improvements listed above, Carollo recommends several additional projects based on the condition assessment (discussed in Chapter 6) as well as several other miscellaneous projects. Rehabilitation projects begin with an "R" (for pipelines) or "LS" (for the lift station). Other projects begin with "O". The additional recommendations are described briefly below.

- Project R-1 (Replace Pipelines with Grade 5 Defects): Rehabilitate and replace pipelines that had one or more grade 5 structural defects from the condition assessment. For planning purposes, it was assumed that 40 percent of these pipelines would need to be replaced, while the remaining 60 percent would be lined.
- Project R-2 (Replace Pipelines with Grade 4 Defects): Rehabilitate and replace pipelines that had one or more grade 4 structural defects from the condition assessment. For planning purposes, it was assumed that 40 percent of these pipelines would need to be replaced, while the remaining 60 percent would be lined. The grade 5 defects (Project R-1) should be completed first.
- Project LS-1 (Rehabilitate City Lift Station): It is recommended that the City complete the improvements recommended based on the field inspection. The recommended improvements include repairing or replacing corroded equipment, repairing sections of spalling concrete, providing fall protection, installing a pressure gauge on the discharge pipe, and investigating possibility of providing a connection for a backup generator at the control panel. For a detailed list of recommendations, see Table 1.1 in Appendix B.
- Project O-1 (Future Flow Monitoring): It is recommended that the City conduct flow monitoring as part of any future master plan updates, as well as to quantify the reduction of I/I in response to the recommended R&R projects.
- Project O-2 (Master Plan Updates): It is recommended the City plan to update their master plan in 5-10 years. It is important to update the master plan and hydraulic model to reflect changes to the collection system (i.e. completion of capacity and/or R&R projects) or future growth assumptions.
- Projects O-3 through O6 (Smoke Testing): Smoke testing is recommended to potentially identify sources of inflow throughout the collection system. The smoke testing projects are separated by basins (Basin 1, Basin 3, Basin 10, and Basin 15). Based on the results from the flow monitoring program, these basins had higher rates of inflow compared to the rest of the system.
- Project O-7 (CCTV and Manhole Inspection): It is recommended that the City have all pipelines and manholes re-inspected within the next 10 years. The pipelines should be inspected using CCTV and should be graded according to NASSCO's PACP standards. The manholes should have a level 1 NASSCO MACP inspection performed. A level 2 inspection may be performed on those manholes that indicate poor condition.

Chapter 7

CONDITION ASSESSMENT

This chapter presents the findings and recommendations from the City's pipeline and manhole inspections conducted in 2019 and 2022. The results and recommendations from the lift station inspection are provided in Appendix B (TM 1 - Lift Station Condition Assessment). The results of these field inspections serve as the basis for the rehabilitation recommendations presented in Chapter 8.

7.1 Gravity Sewer Inspections

7.1.1 Inspection Methodology

Prior to 2002, the United States lacked a set of standards that limited the value of pipeline inspections. The inconsistent observations made it difficult to compare the condition of one pipe to another. In partnership with the United Kingdom's Water Research Centre, the National Association of Sewer Service Companies (NASSCO) developed a set of standards for the assessment, and coding of underground infrastructure defects. NASSCO has established the Pipeline Assessment Certification Program (PACP), Manhole Assessment Certification Program (MACP), and Lateral Assessment Certification Program, to train personnel in the coding system to identify structural and operations and maintenance (O&M) defects in pipelines, manholes, and laterals constructed from a variety of materials. The NASSCO coding system provides uniformity in terminology and in the degree of structural and O&M defects. The inspection and condition grading of the pipelines for this project were performed by personnel trained and certified in the NASSCO PACP.

The City had previously contracted with NPS to conduct a CCTV inspection of approximately 80 miles (out of 89 miles total) of the City's gravity sewer pipelines. As part of this Master Plan, Carollo contracted with NPS to conduct a condition assessment using NASSCO standards via CCTV inspection of the rest of the City that had not previously been inspected by CCTV. Figure 7.1 shows a map of the City's collection system by inspection year. The system was inspected for general construction, condition, and evidence of inflow, infiltration, or surcharging. Pipe conditions were documented in accordance with the NASSCO's PACP.

7.1.2 Defect Codes and Condition Ratings

The NASSCO PACP condition assessment identifies structural and O&M defects for each pipe reach. A pipe segment is defined as a piece of pipe from one pipe joint to the next pipe joint. A pipe reach is comprised of several pipe segments that begin and end with a manhole. The overall condition of a pipe reach is determined by the operator that records any defects or features found along the pipe reach. between the pipe entry point.

The NASSCO PACP system classifies and standardizes condition grades for various pipe defects. Grading methodology is discussed later.

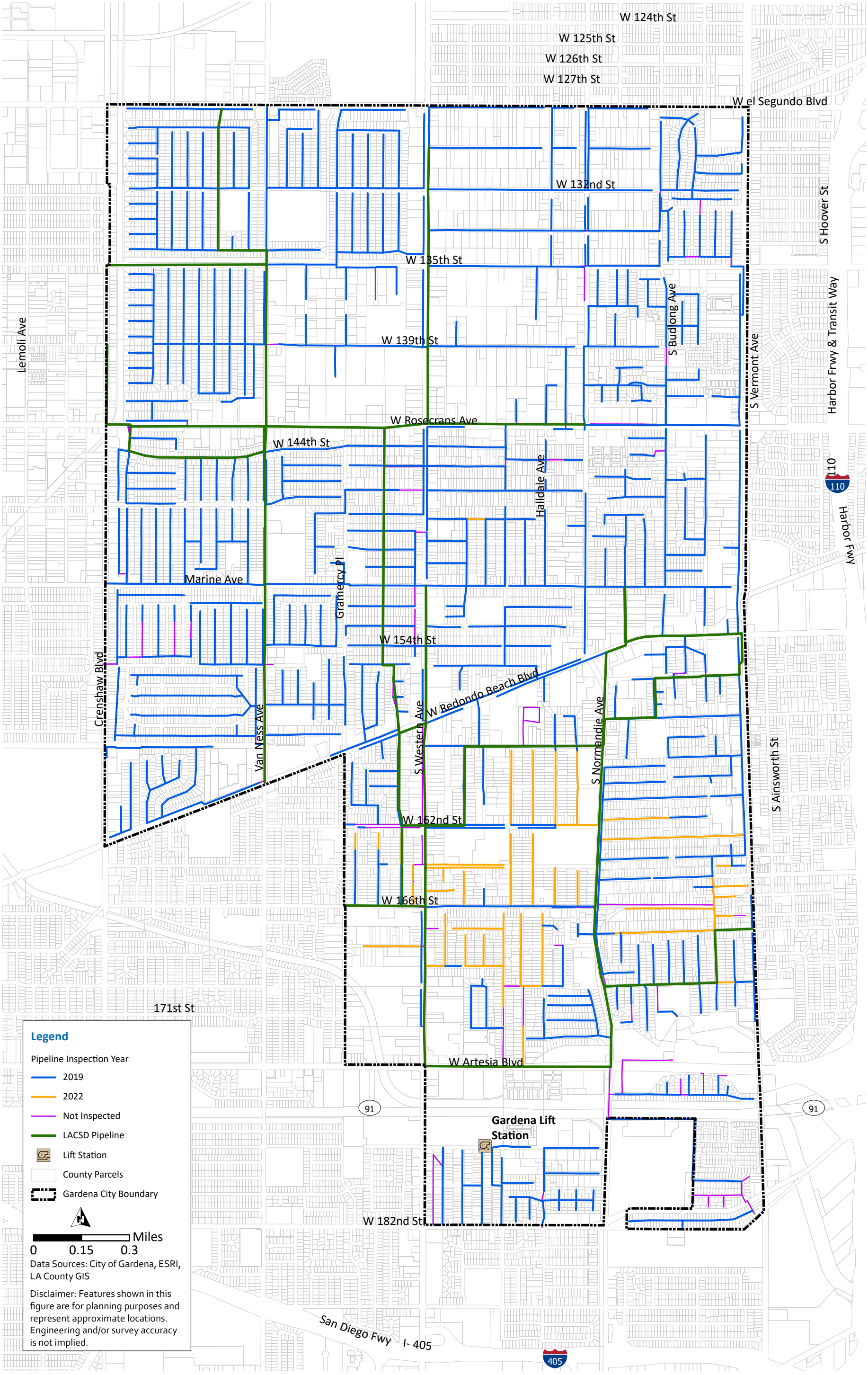


Figure 7.1 Gravity Pipe Inspection by Year

It should be noted that use of the NASSCO's condition assessment system alone is inadequate for determining if a pipe segment or reach should be rehabilitated or replaced. Many other factors in addition to the internal condition of segment or reach should be considered. The fact that a segment or reach has a significant number of Grade 4 or Grade 5 defects does not necessarily mean the pipe segment should be immediately rehabilitated. Such a decision requires the judgment of the professional engineer.

7.1.3 National Association of Sewer Service Companies (NASSCO) Quick Rating

The NASSCO Quick Rating is a shorthand way of expressing the number of occurrences for the two highest-severity condition grades. The quick rating is a four-character score compiled as shown on Figure 7.2, provides a means to summarize the number and severity of the most significant defects found within a pipe segment. The structural quick rating score (QSR) and O&M quick rating score (QMR) were provided by NPS in electronic format.

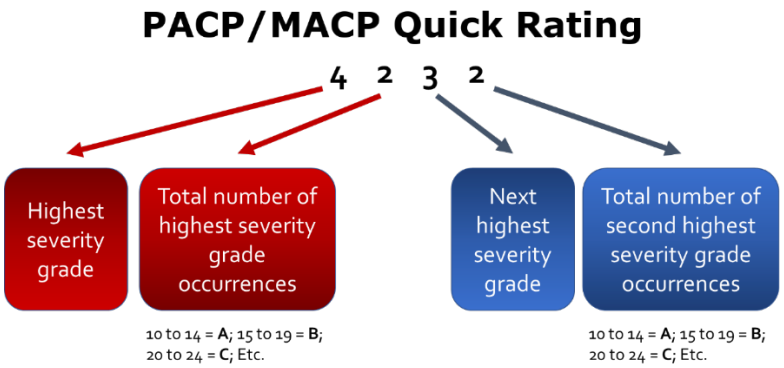


Figure 7.2 NASSCO PACP Quick Rating Four-Character Score

7.1.4 Gravity Sewer System Defects

The NASSCO system classifies defects as structural or O&M flaws. Carollo compiled all the quick rating scores from both inspection periods, which is provided in Appendix E for reference. The results for both types of defects are summarized below.

7.1.4.1 Structural Defects

Table 7.1 summarizes the length of pipe by the by highest structural severity grades. Out of approximately 89 miles of pipe, 8 percent had at least one structural defect with a severity Grade 5, and 46 percent had at least one structural defect with a severity Grade 4. Figure 7.3 shows the City's pipelines color-coded by highest structural severity grade.

Table 7.1 Structural Defect Summary

Highest Structural Severity Grade	Number of Reaches	Length of Pipe (miles)	Percent of System (by Length)
5	141	7.3	8%
4	791	40.8	43%
3	288	14.2	16%
Grade 2 or Lower	637	26.5	34%
Total	**1,857**	**88.8**	**100%**

Based on the results of the QSRs, the following was noted:

- The most Grade 5 defects observed in a single pipe reach were five.
- The most Grade 4 defects observed in a single pipe reach were 26. There were 98 pipe reaches with 16 or more Grade 4 defects.
- Overall, the City's cured-in-place pipe (CIPP) lined pipes received better structural rankings. Of the 119 lined pipes that have been inspected, 83 reaches (70 percent) had a QSR of "0000". There were no Grade 5 defects observed in the CIPP lined pipes that have been inspected. There were two CIPP lined CPs that had one Grade 4 structural defect each.

Carollo reviewed the inspection reports for all of pipe reaches with Grade 5 defects and a small sample of pipe reaches with Grade 4 defects. Some of the most common defect categories observed in these reports included sags, breaks, fractures, cracks, holes, and surface damage.

7.1.4.2 Operational and Maintenance Defects

Table 7.2 summarizes the length of pipe by the highest O&M severity grade. Out of approximately 1,857 pipe reaches, less than 1 percent had at least one Grade 5 O&M defect, and 4 percent had at least one Grade 4 O&M defect as their highest O&M severity grade. Figure 7.4 shows the City's pipelines color-coded by highest structural severity grade.

Table 7.2 O&M Defect Summary

Highest O&M Severity Grade	Number of Reaches	Length of Pipe (miles)	Percent of System (by Length)
5	7	0.3	<1%
4	76	3.9	4%
3	120	6.5	7%
Grade 2 or Lower	1,654	78.0	88%
Total	**1,857**	**88.8**	**100%**

Based on the results of the QMRs, the following was noted:

- The most Grade 5 O&M defects observed in a single pipe were two.
- There were two pipe reaches with eight or more Grade 4 O&M defects.
- Overall, the City's CIPP lined pipes received better rankings. Of the 119 lined pipes that have been inspected, 45 had a QMR of "0000". One Grade 5 O&M defect was observed in one CIPP lined pipe. There were five CIPP lined CPs that had one or two Grade 4 O&M defects each.

7.1.5 Gravity Sewer Inspection Results Summary

The results for 1,857 reaches have been compiled at the time of this draft report. The following was noted:

- 141 reaches had one or more structural defects with a Condition Grade of 5.
- 791 reaches had one or more structural defects with a Condition Grade of 4.
- 7 reaches had O&M defects with a Condition Grade of 4.
- 76 reaches had O&M defects with a Condition Grade of 5.
- 58 reaches had Condition Grades 4 or 5 for both structural and O&M defects.

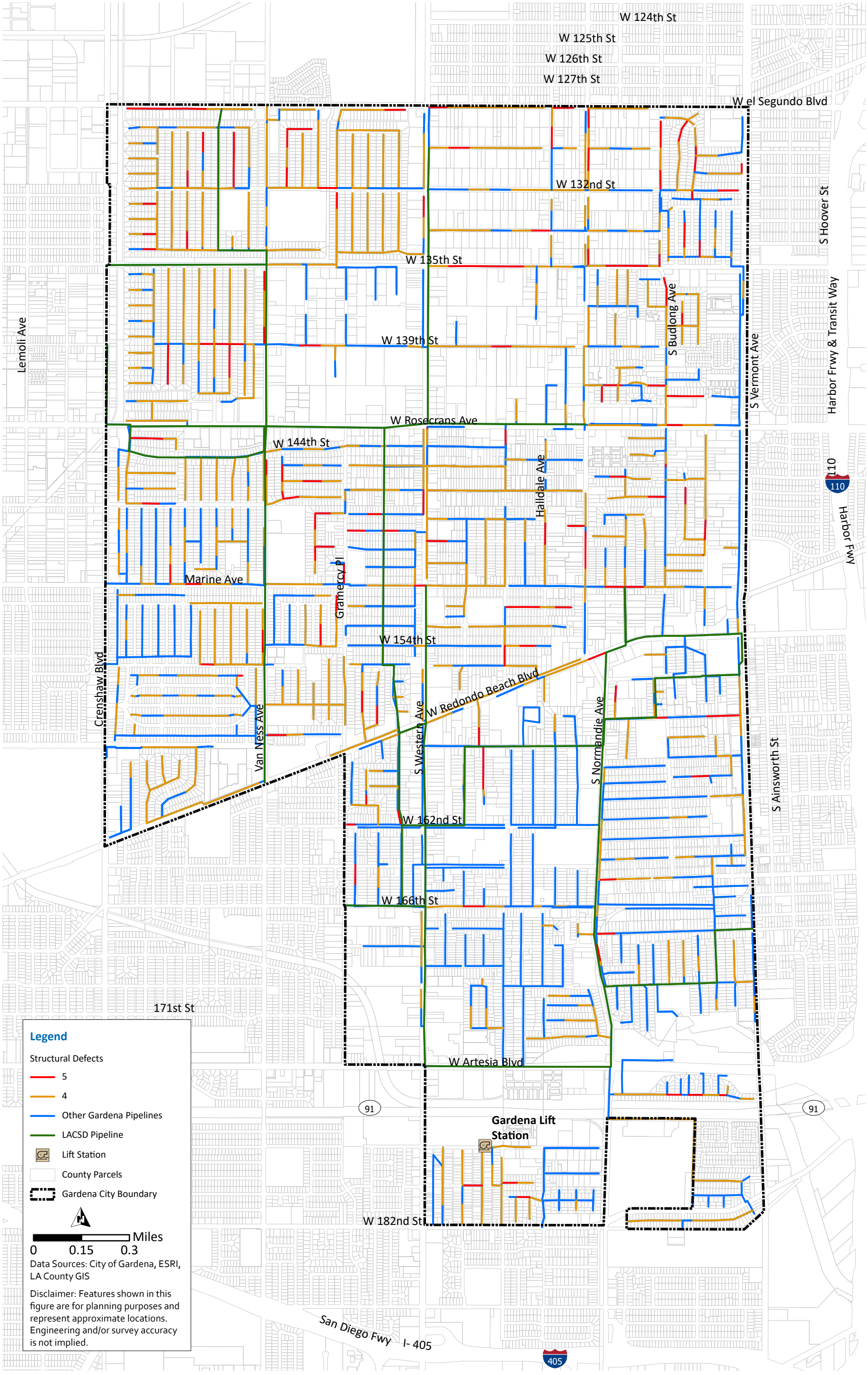


Figure 7.3 Structural Defects

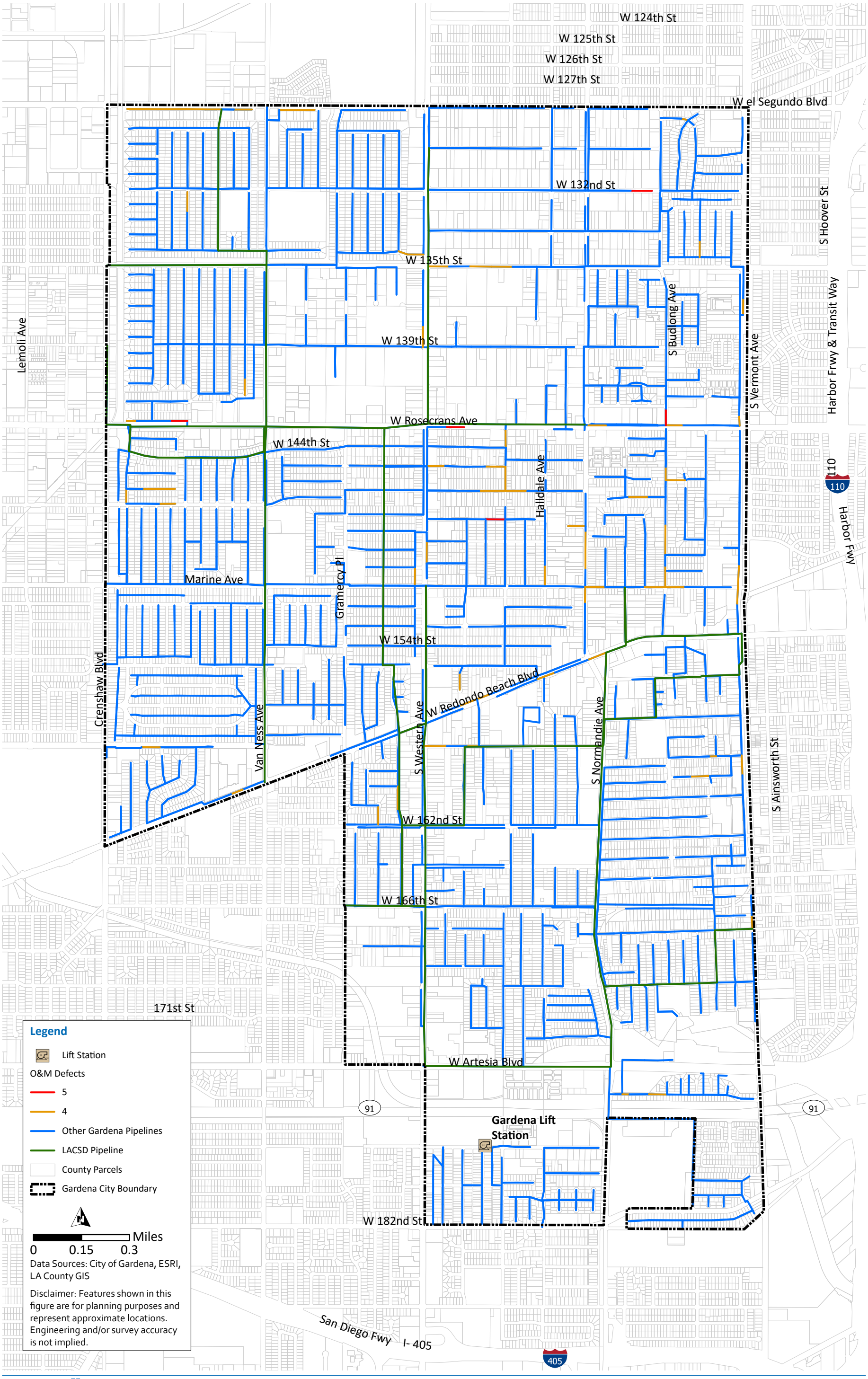


Figure 7.4 O&M Defects

7.1.6 Gravity Sewer Recommendations

As mentioned before, Carollo reviewed the CCTV reports for all pipelines with Grade 5 defects and a small sample of pipelines with Grade 4 defects. The specific structural defect categories and codes on these reports were used to estimate the percentage of Grade 4 and 5 pipes that would require full replacement versus lining. For instance, defect codes that indicate soil movement and/or consolidation are assumed to require replacement. Approximately 40 percent of the pipe reaches that were reviewed in detail indicate a full replacement may be needed. Whereas lining may be appropriate for the remaining 60 percent of pipe reaches. For planning purposes, it is assumed that 40 percent of the Grade 4 and 5 defect pipelines will be replaced and the remaining will be lined. It is possible that some of these pipes would only require point repairs or a 4-foot sectional liner, however a full replacement or pipe lining was assumed. Further review of the individual CCTV videos and/or reports would provide further insight as to the appropriate corrective action for all pipe reaches.

R&R program costs are provided in Chapter 8 and are based on pipes with Grade 5 defects being replaced in the first ten years (2023-2032) and pipes with Grade 4 defects being replaced after that. Capacity improvement pipes with Grade 4 or 5 structural defects were excluded from the R&R program since these are recommended to be replaced and upsized within the first ten years. The following is also recommended:

- The CCTV reports provided for the 2019 inspections include over 1,700 individual folders, each with separate photos and reports. Records for pipelines with Grade 5 defects should be reviewed to determine if point repairs can be done in lieu of full pipe replacement or lining. This will also help prioritize the R&R projects to ensure the most critical pipes are being addressed first.
- Pipelines with Grade 4 or 5 O&M defects should also be reviewed to determine the appropriate mitigation method.
- Pipelines with Grade 4 or 5 structural defects should be re-inspected within five years if they have not been replaced by then.

7.2 Manhole Inspections

7.2.1 Manhole Inspection Methodology

NPS also inspected each of the City's approximately 2,080 manholes for general construction, condition and evidence of inflow, infiltration, and surcharging. Manhole condition was documented in accordance with the NASSCO MACP Level 1 standards. A Level 1 inspection consists of selecting a predefined location, inspection and condition data and completing a Manhole Inspection Header Section and a Manhole Component Observation Section. Level 1 inspection provides basic condition assessment information to determine if a comprehensive Level 2 inspection is needed.

NPS was not able to locate or access some of the City's manholes. For each manhole inspected, NPS documented the condition of the manhole wall, chimney, bench, and channel. Each were given a rating of sound (S), defective (D), or not known (X). Evidence of I/I was also documented. A report by NPS was generated for each manhole, including photos, which were provided to the City.

7.2.2 Level 1 Manhole Inspection Results

Table 7.3 summarizes the manhole condition results. Table 7.4 summarizes the manholes based on evidence of I/I and total number of defective ratings. Appendix F includes detailed results from the manhole inspections. Figure 7.5 shows the manholes with evidence of I/I. Figure 7.6 shows the manhole condition based on the number of defective categories observed.

Table 7.3 Manhole Condition Results

Inspection Component	Condition		
	Sound	Defective	Unknown/Not Provided
Wall Condition	1,715	12	11
Chimney Condition	1,704	24	10
Cone Condition	1,724	8	6
Bench Condition	1,672	52	14
Channel Condition	1,657	67	14

Note:
(1) Source: NPS Level 1 Manhole Inspection scores.

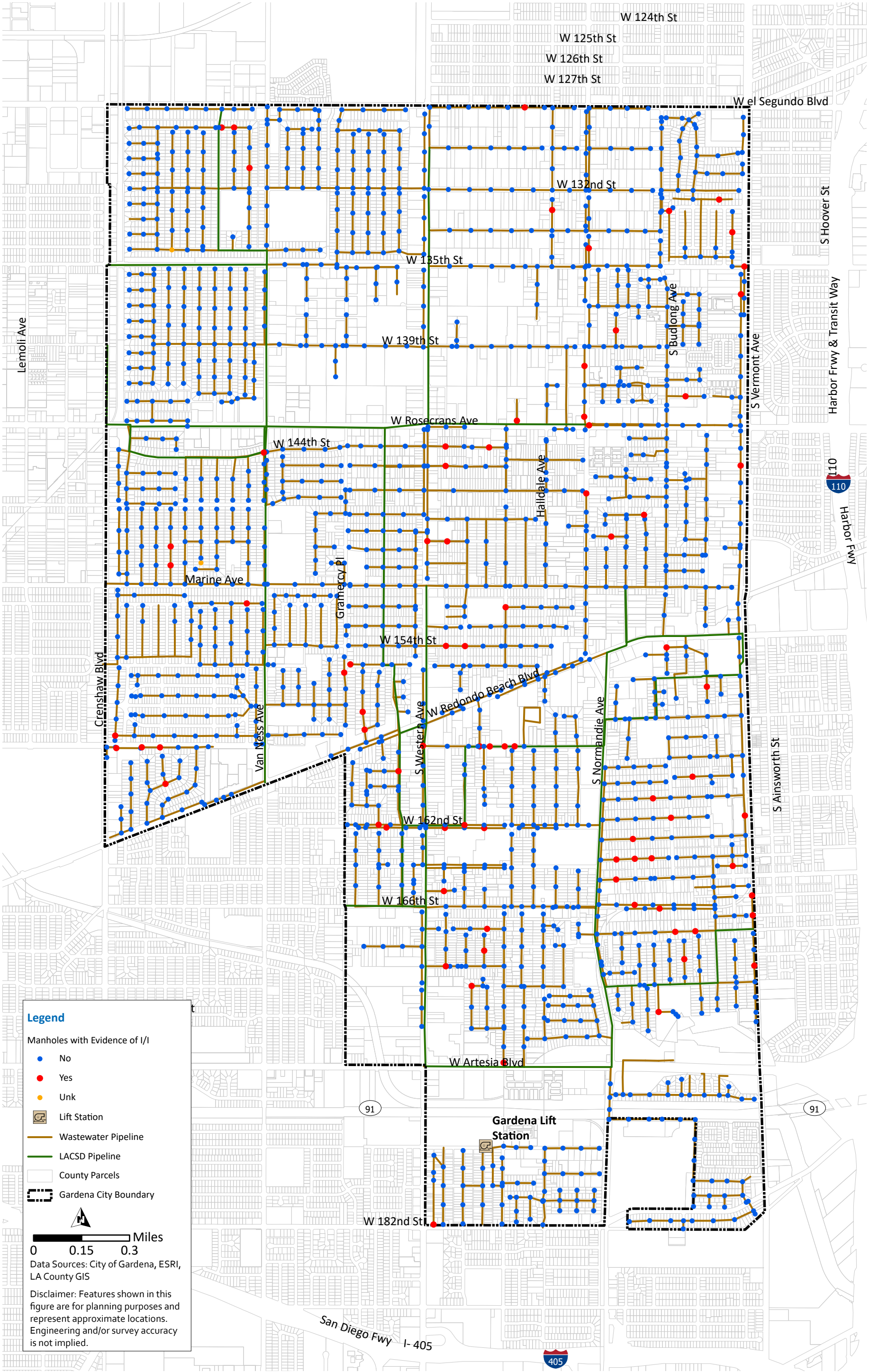
Table 7.4 Manholes with Evidence of I/I

Number of Defective Ratings	Evidence of I/I				
	Yes	No	Unknown	Total	Percent of Total
0	74	1,549	2	1,625	93%
1	8	68	0	76	4%
2	1	28	0	29	2%
3	2	2	0	4	0%
4	1	2	0	3	0%
5	0	1	0	1	0%
Total	**86**	**1,650**	**2**	**1,738**	**100%**

Note:
(1) Source: NPS Level 1 Manhole Inspection scores.

Based on the results of the Level 1 manhole inspections, the following was noted:

- Although it was not part of this scope to provide detailed defects, NPS did provide some observations, including:
  - Rocks, bricks, gravel, rags, rebar, grease, and pipes or sticks were observed in some manholes. In some cases, debris was partially blocking flow of water.
  - Roots were observed in some manholes, and, in at least one case, they were observed from the top to bottom of the manhole.
  - Surcharging was observed in at least one manhole at the time of inspection.
  - Holes or missing parts of the manhole bench were observed at several locations.
- Only one manhole (MH2207U) was labeled as defective in every category. This manhole did not have evidence of I/I.
- Approximately 93 percent of the manholes inspected received a "Sound" grade for each of the manhole condition categories (wall, cone, chimney, bench, and channel).
- Approximately 5 percent of manholes inspected had evidence of I/I. Most of the manholes with evidence of I/I were marked as "Sound" for every condition category.


W 124th St
W 125th St
W 126th St
W 127th St
W el Segundo Blvd
W 132nd St
S Hoover St
W 135th St
Lemoli Ave
S Budlong Ave
W 139th St
S Vermont Ave
Harbor Frwy & Transit Way
W Rosecrans Ave
W 144th St
Halldale Ave
110
Harbor Fwy
Marine Ave
Gramercy Pl
W 154th St
Crenshaw Blvd
Van Ness Ave
W Redondo Beach Blvd
S Western Ave
S Normandie Ave
S Ainsworth St
W 162nd St
W 166th St
W Artesia Blvd
91
Gardena Lift Station
W 182nd St
San Diego Fwy I- 405
405
Legend
Manholes with Evidence of I/I
No
Yes
Unk
Lift Station
Wastewater Pipeline
LACSD Pipeline
County Parcels
Gardena City Boundary
N
Miles
0 0.15 0.3
Data Sources: City of Gardena, ESRI, LA County GIS
Disclaimer: Features shown in this figure are for planning purposes and represent approximate locations. Engineering and/or survey accuracy is not implied.

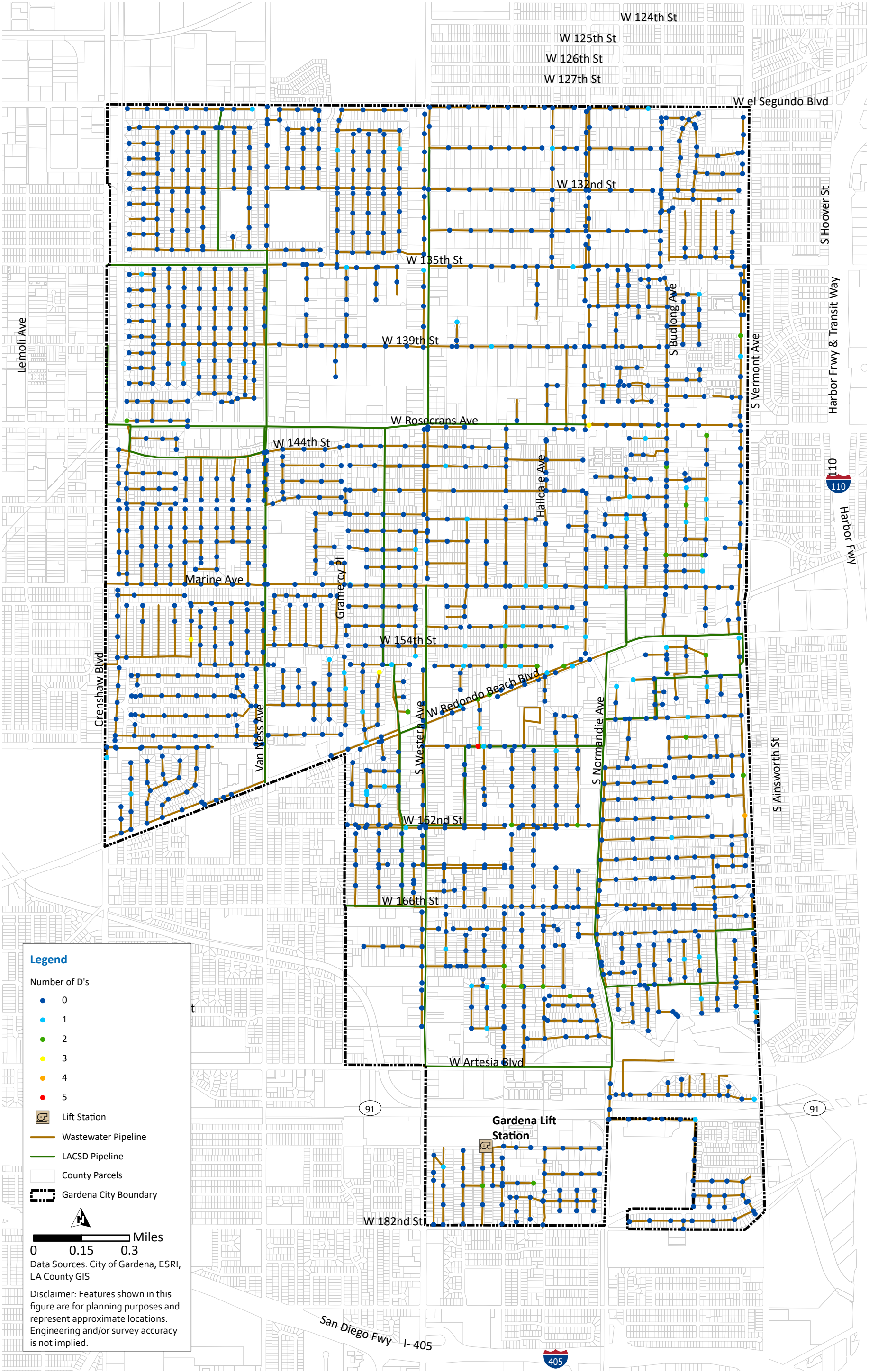


Figure 7.6 Manhole Inspection Results (Manhole Condition)

7.2.3 Manhole Recommendations

The following is recommended based on the Level 1 manhole inspection results:

- Debris should be removed from manholes where noted (see Appendix F for details).
- Manholes where grease was noted should be treated to prevent potential blockages.
- A Level 2 manhole inspection should be conducted on manholes that were defective in two or more categories to determine the extent of damage and to determine the appropriate corrective action.
- Manholes that were defective in any category should be re-inspected within 10 years.

7.3 Lift Station Condition Assessment

As part of the Master Plan Update, Carollo conducted a visual condition assessment of the City's existing lift station to supplement the hydraulic and capacity evaluations of the collection system. The condition assessment of the lift station had the following objectives:

- Visually assess the physical condition of the equipment and structures of the lift station and identify any potential safety/code violations.
- Evaluate the reliability and redundancy and flood resiliency of the lift station.
- Develop condition-related improvement projects for the existing lift station.

Appendix B summarizes the findings of the lift station condition assessment. The following recommendations are provided in the Lift Station Condition Assessment TM:

- Site and Structure:
  - Patch concrete where there are cracks or minor spalling.
  - Replace top ring of wet well as corrosion, exposed aggregate, and rebar is visible.
  - Clean and thoroughly inspect mechanical equipment and piping supports for corrosion and recoat or replace as necessary.
  - Replace existing corroded pipe supports with new Type 316 stainless steel supports.
  - Replace corroded checkered steel plate with new steel cover or concrete cap.
  - Repair spalling around ladder rungs and, if necessary, reinstall rung into repaired concrete.
  - Provide fall protection. This may be achieved with a davit connection, or a fall-restraint system installed with a new ladder.
- Mechanical Equipment:
  - Sand blast corroded piping and valves, and coat with coal tar epoxy or other corrosion-resistant coatings.
  - Install a pressure gauge on discharge pipe side of pumps, outside the wet well, so discharge pressure can be monitored.
  - Investigate the corrosion on the gate valves handwheels. Either replace with new handwheels or install new valves.
  - Explore the possibility of providing a connection for a backup generator at the control panel in case of electrical outage.

Chapter 8

CAPITAL IMPROVEMENT PROGRAM

This chapter presents the City's wastewater collection system CIP and a summary of the capital costs. This chapter is organized to assist the City in making financial decisions. The CIP is based on the evaluation of the City's wastewater collection system capacity (as described in Chapter 6), the Lift Station Condition Assessment (as described in Chapter 7 and TM 1), and the gravity pipeline CCTV inspection program (as described in Chapter 7).

8.1 Project Prioritization

As discussed in Chapters 6 and 7, the capital projects identified will allow the City to provide reliable service to its customers through the year 2045. The improvement projects were prioritized based on the following factors:

- Reducing the risk of SSOs in the collection system.
- Implementing projects to reduce the rates of I/I in the collection system.
- Rehabilitating or replacing pipelines to prevent structural failure of aging pipes.

Based on these factors, each project was assigned an implementation year. Critical projects were phased in the earlier phases (years) of the 20-year CIP. Less critical projects were phased into later phases of the 20-year CIP.

8.2 Capital Improvement Project Costs

The capacity upgrades and other system capital improvements set the foundation for the City's wastewater collection system CIP. The cost estimates presented in this study are opinions developed from bid tabulations, cost curves, information obtained from previous studies, and Carollo's experience on other projects. The costs are based on an Engineering News Record (ENR) Construction Cost Index (CCI) of 13,278 (Los Angeles, October 2022).

8.3 Cost Estimating Accuracy

The cost estimates presented in the CIP have been prepared for general master planning purposes and for guidance in project evaluation and implementation. Final costs of a project will depend on actual labor and materials costs, competitive market conditions, final project scope, implementation schedule, and other variable factors identified during the preliminary and final design stages. For sewer pipes this might include items such as preliminary alignment, investigation of alternative routings, and detailed utility and topography surveys.

The Association for the Advancement of Cost Engineering defines an Order of Magnitude Estimate (Class 5), deemed appropriate for master plan studies as an approximate estimate made without detailed engineering data. It is normally expected that an estimate of this type would be accurate within plus 50 percent to minus 30 percent. This section presents the assumptions used in developing order of magnitude cost estimates for recommended facilities.

8.4 Baseline Construction Unit Costs

The construction costs are representative of wastewater collection system facilities under normal construction conditions and schedules. Costs have been estimated for public works construction.

8.4.1 Gravity Pipeline Replacement Unit Costs

Gravity sewer pipeline improvements range in size from 10 inches to 15 inches in diameter in this study. Unit costs for the construction of gravity sewer pipelines are shown in Table 8.1. The unit costs are based on an open cut construction method and assume "typical" field conditions with construction in stable soil at a depth ranging between 10 ft to 15 ft. Appurtenances (e.g., manholes) are included in the unit costs.

Table 8.1 Gravity Pipeline Replacement Unit Costs

Pipe Size (inches)	Baseline Unit Construction Cost[1,2] ($/LF)
6	$248
8	$267
10	$331
12	$350
15	$435

Notes:
Abbreviation: LF - linear feet.
(1) Los Angeles ENR CCI for October 2022 is 13,278.
(2) Assumes open cut construction method (stable soil between 10-15 feet deep) and includes appurtenances, such as manholes.

8.4.2 Gravity Pipeline Rehabilitation Costs

Recommendations were also developed to address structural and/or I/I defects noted in the CCTV inspection program. As discussed in Chapter 7, it was assumed that 40 percent of the pipes with Grade 4 or 5 defects would have to be replaced, while the remaining would be lined. Based on recent bid tabulation data, lining costs are assumed to be approximately 30 percent of the total replacement costs. Given these two factors, the R&R unit costs are estimated to be 58 percent of the replacement unit costs listed in Table 8.1. The R&R unit costs are listed in Table 8.2.

Table 8.2 Gravity Pipeline R&R Unit Costs

Pipe Size (inches)	Baseline Unit Construction Cost[1,2] ($/LF)
6	$144
8	$155
10	$192
12	$203
15	$252

Notes:
(1) Los Angeles ENR CCI for October 2022 is 13,278.
(2) Based on 75 percent of the replacement costs presented in Table 8.1.

8.4.3 Lift Station Rehabilitation Costs

Costs associated with the lift station condition assessment findings were compiled based on Carollo's cost database and experience on similar projects. The estimated cost to complete the

recommended projects to rehabilitate the lift station is $135,800. Detailed unit cost estimates for the lift station are presented in TM 1 in Appendix B.

8.5 Project Costs and Contingency

Project cost estimates are calculated based on elements, such as the project location, size, length, and other factors. Allowances for project contingencies consistent with an "Order of Magnitude" estimate are also included in the project costs prepared as part of this study, as outlined in this section. Project contingencies were developed as described in the following sections.

8.5.1 Baseline Construction Costs

The Baseline Construction Cost is the total estimated construction cost, in dollars, of the proposed improvements. Baseline Construction Costs were calculated by multiplying the estimated length by the unit construction cost listed in Table 8.1. All costs are presented in 2022 dollars.

8.5.2 Estimated Construction Cost

Contingency costs must be reviewed on a case-by-case basis because they will vary considerably with each project. Consequently, it is appropriate to allow for uncertainties associated with the preliminary planning of a project. Factors such as unexpected construction conditions, the need for unforeseen mechanical items, and variations in final quantities are a few of the items that can increase project costs for which it is wise to make allowances in preliminary estimates. To assist the City in making financial decisions for these future construction projects, contingency costs will be added to the planning budget as percentages of the baseline construction cost.

Since knowledge about site-specific conditions of each proposed project is limited at the master planning stage, a 30 percent contingency was applied to the Baseline Construction Cost to account for unforeseen events and unknown conditions.

8.5.3 Capital Improvement Cost

Other project construction contingency costs include costs associated with project engineering design and services, construction management, and legal services. Engineering services associated with new facilities include preliminary investigation and reports, foundation exploration, preparation of drawings and specifications during construction, surveying and staking, sampling of testing material, and startup services. Construction phase professional services cover items such as construction management, engineering services, materials testing, and inspection during construction. Finally, there are project administration costs, which cover items such as legal fees, environmental compliance requirements, financing expenses, administrative costs, and interest during construction.

The cost of these items can vary, but for the purpose of this study, it is assumed that the other project contingency costs will equal approximately 27.5 percent of the Estimated Construction Cost.

As shown in the following sample calculation of the Capital Improvement Cost, the total cost of all project construction contingencies (construction, engineering design and services, construction management, and project administration) is 166 percent of the Baseline

Construction Cost. Calculation of the 166 percent is the overall markup on the Baseline Construction Cost to arrive at the Capital Improvement Cost. It is not an additional contingency.

Example:

Baseline Construction Cost	**$1,000,000**
Contingency (30 percent)	$300,000
Estimated Construction Subtotal	**$1,300,000**
Engineering Services(10 percent)	$130,000
Construction Management (10 percent)	$130,000
Project Administration (7.5 percent)	$97,500
Capital Improvement Cost	**$1,657,500**

8.6 Capital Improvement Program Implementation

The improvement projects were prioritized based on when the improvement was triggered (existing versus future) and the severity of the deficiency. Based on these factors, each project was assigned an implementation year and the total capital cost was split over a 2-year period. The capital improvements were grouped into one of the following phases:

- Near-Term Projects (2023 - 2027): This phase includes projects that are targeted as the highest priority improvements to be implemented within five years.
- Intermediate-Term Projects (2028 - 2032): This phase includes projects that are targeted as high priority improvements that may be mitigated or monitored for several years prior to being implemented. These projects would be implemented in the following five years.
- Long-Term Projects (2033 and beyond): This phase generally includes medium priority improvements, to be implemented beyond 10 years.

Critical projects were phased in the earlier phases (years) of the CIP. Less critical projects were phased into later phases of the CIP.

Details of the capital projects are presented in Table 8.3. This table provides a brief description of each project, identifies facility sizes (e.g., pipe diameter and length), and provides capital improvement costs. Detailed capital improvement sheets for the capacity-related projects are also included in Appendix G.

It should be noted that the CIP phasing included in the 20-year CIP, and summarized in Table 8.3 is based on the project prioritization factors described in Section 8.1, and represents the preferred implementation schedule for the proposed improvements. Funding availability will limit the City's ability to implement the proposed projects according to the implementation schedule included in Table 8.3 and described in this section. Carollo worked with the City to develop an alternative 20-year CIP based on the current funding of approximately $10 million over the next 10-years. The alternative 20-year CIP is discussed more in Section 8.9.

Table 8.3 Collection System Capital Improvement Program

Project		Deficiency Type (Existing or Future)	Existing Size Diameter (in)	Proposed Size Diameter (in)	Proposed Amount Length (ft)	Baseline Construction Cost[1,2] ($)	Estimated Construction Cost[3] ($)	Total Capital Improvement Cost[4,5,6] ($)	10-Year Capital Improvement Cost[4,5,6] ($)	CIP Phasing ($)[7]						
										Near-Term					Intermediate	Long-Term
										2023	2024	2025	2026	2027	2028-2032	2033 & Beyond
Capacity Related Improvements																
Gravity Mains																
P-1	Gravity Main along 132nd Street and Van Ness Avenue	Existing	10 - 12	12 - 15	1,880	$ 775,200	$ 1,007,700	$ 1,284,800	$ 1,284,800	$ -	$ -	$ -	$ 642,400	$ 642,400	$ -	$ -
P-2	Gravity Main along 135th Street and 134th Place	Existing	8 - 10	12 - 15	1,620	$ 643,300	$ 836,300	$ 1,066,300	$ 1,066,300	$ -	$ -	$ -	$ 533,150	$ 533,150	$ -	$ -
P-3	Gravity Main along El Segundo Boulevard and Western Avenue	Existing	8 - 10	12 - 15	980	$ 400,600	$ 520,800	$ 664,000	$ 664,000	$ 332,000	$ 332,000	$ -	$ -	$ -	$ -	$ -
P-4	Gravity Main along 132nd Street	Existing	8	12	770	$ 269,700	$ 350,700	$ 447,100	$ 447,100	$ -	$ -	$ 223,550	$ 223,550	$ -	$ -	$ -
P-5	Gravity Main along 134th Street	Existing	8	12	1,020	$ 355,600	$ 462,200	$ 589,300	$ 589,300	$ -	$ -	$ -	$ -	$ 294,650	$ 294,650	$ -
P-6	Gravity Main along 135th Street	Existing	8	10	1,390	$ 460,100	$ 598,100	$ 762,500	$ 762,500	$ 381,250	$ 381,250	$ -	$ -	$ -	$ -	$ -
P-7	Gravity Main along Vermont Avenue and 135th Street	Existing	8	10 - 15	1,720	$ 620,600	$ 806,700	$ 1,028,600	$ 1,028,600	$ -	$ -	$ -	$ -	$ 514,300	$ 514,300	$ -
P-8	Gravity Main along 147th Streetand Gramercy Place	Existing	8	10 - 12	2,330	$ 801,000	$ 1,041,300	$ 1,327,600	$ 1,327,600	$ 663,800	$ 663,800	$ -	$ -	$ -	$ -	$ -
P-9	Gravity Main along Denker Avenue	Existing	8	12	340	$ 119,900	$ 155,900	$ 198,800	$ 198,800	$ -	$ -	$ -	$ -	$ -	$ 198,800	$ -
P-10	Gravity Main along Vermont Avenue and Rosecrans Avenue	Existing	8 - 10	12	2,030	$ 709,300	$ 922,100	$ 1,175,700	$ 1,175,700	$ -	$ -	$ 587,850	$ 587,850	$ -	$ -	$ -
P-11	Gravity Main along Budlong Avenue and Marine Avenue	Existing	8	12	2,150	$ 752,800	$ 978,600	$ 1,247,700	$ 1,247,700	$ -	$ -	$ -	$ -	$ -	$ 1,247,700	$ -
P-12A	Gravity Main along Ruthelen Avenue and Redondo Beach Boulevard	Existing	6 - 8	10 - 12	1,740	$ 586,600	$ 762,600	$ 972,300	$ 972,300	$ -	$ 486,150	$ 486,150	$ -	$ -	$ -	$ -
P-12B	Gravity Main along Manhattan Place	Existing	8 - 10	15	1,660	$ 720,700	$ 936,900	$ 1,194,600	$ 1,194,600	$ 597,300	$ 597,300	$ -	$ -	$ -	$ -	$ -
P-13	Gravity Main along 154th Place	Existing	8	10	690	$ 229,600	$ 298,500	$ 380,600	$ 380,600	$ -	$ -	$ -	$ -	$ -	$ 380,600	$ -
P-14	Gravity Main along Normandie Avenue (between 168th and 170th Streets)	Existing	8	10	720	$ 237,600	$ 308,900	$ 393,800	$ 393,800	$ -	$ -	$ 196,900	$ 196,900	$ -	$ -	$ -
P-15	Gravity Main along 177th Street and Normandie Avenue	Existing	8	10	2,040	$ 674,500	$ 876,900	$ 1,118,100	$ 1,118,100	$ 559,050	$ 559,050	$ -	$ -	$ -	$ -	$ -
P-16	Gravity Main along 132nd Street	Future	8 - 10	12	570	$ 198,500	$ 258,000	$ 328,900	$ 328,900	$ -	$ -	$ -	$ -	$ -	$ 328,900	$ -
P-17	Gravity Main along Normandie Avenue (between 166th and 168th Streets)	Future	8	10	490	$ 161,700	$ 210,200	$ 268,100	$ 268,100	$ -	$ -	$ -	$ -	$ -	$ 268,100	$ -
Subtotal Capacity-Related Improvement						**$ 8,717,300**	**$ 11,332,400**	**$ 14,448,800**	**$ 14,448,800**	**$ 2,533,400**	**$ 3,019,550**	**$ 1,494,450**	**$ 2,183,850**	**$ 1,984,500**	**$ 3,233,050**	**$ -**
Rehabilitation Projects																
Gravity Mains																
R-1	Replace Pipelines with Grade 5 Defects					$ 5,176,900	$ 6,730,000	$ 8,580,800	$ 8,580,800	$ -	$ 953,422	$ 953,422	$ 953,422	$ 953,422	$ 4,767,111	$ -
R-2	Replace Pipelines with Grade 4 Defects					$ 29,970,800	$ 38,962,000	$ 49,676,600	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 49,676,600
Lift Station																
LS-1	Rehabilitate City Lift Station							$ 135,800	$ 135,800	$ -	$ 135,800	$ -	$ -	$ -	$ -	$ -
Subtotal Rehabilitation Projects						**$ 35,147,700**	**$ 45,692,000**	**$ 58,393,200**	**$ 8,716,600**	**$ -**	**$ 1,089,222**	**$ 953,422**	**$ 953,422**	**$ 953,422**	**$ 4,767,111**	**$ 49,676,600**
Other Projects																
O-1	Future Flow Monitoring	-	-	-	-	-		$ 100,000	$ 100,000	$ -	$ -	$ -	$ -	$ -	$ 100,000	$ -
O-2	Master Plan Updates	-	-	-	-	-		$ 250,000	$ 250,000	$ -	$ -	$ -	$ -	$ -	$ 250,000	$ -
O-3	Smoke Testing - Basin 1							$ 75,900	$ 75,900	$ 75,900	$ -	$ -	$ -	$ -	$ -	$ -
O-4	Smoke Testing - Basin 3							$ 61,100	$ 61,100	$ 61,100	$ -	$ -	$ -	$ -	$ -	$ -
O-5	Smoke Testing - Basin 10							$ 44,700	$ 44,700	$ 44,700	$ -	$ -	$ -	$ -	$ -	$ -
O-6	Smoke Testing - Basin 15							$ 41,700	$ 41,700	$ 41,700	$ -	$ -	$ -	$ -	$ -	$ -
O-7	CCTV and Manhole Inspection	-	-	-	-	-		$ 1,000,000	$ 1,000,000	$ -	$ -	$ -		$ -	$ 1,000,000	$ -
Subtotal Other Projects						**$ -**	**$ -**	**$ 1,573,400**	**$ 1,573,400**	**$ 223,400**	**$ -**	**$ -**	**$ -**	**$ -**	**$ 1,350,000**	**$ -**
Total CIP						**$ 43,865,000**	**$ 57,024,400**	**$ 74,415,400**	**$ 24,738,800**	**$ 2,756,800**	**$ 4,108,772**	**$ 2,447,872**	**$ 3,137,272**	**$ 2,937,922**	**$ 9,350,161**	**$ 49,676,600**

Notes:
(1) All costs are in 2022 dollars.
(2) Engineering News Report (ENR) Greater LA Construction Cost Index for October 2022 is 13,728.
(3) Estimated Construction Cost includes a 30% contingency of the baseline construction cost.
(4) Cost Estimates do not include costs for land acquisition, easements or ROW acquisition.
(5) Total project costs includes a 10% markup for engineering, a 10% markup for construction management and a 7.5% markup for project administration of the estimated construction cost.
(6) Includes capital costs for projects phased through 2032. Does not include Long Term projects.
(7) Alternative CIP developed based on current funding of $10M over 10-years.

The projects listed in Table 8.3 are broken down by capacity-related improvements, rehabilitation projects, and other projects. The CIP for the Near-Term (2023-2027) projects were broken out by year to show the proposed phasing. The Intermediate-Term (2028-2032) and Long-Term projects (2033 and beyond) were kept as a lump sum. Costs for capacity-related projects were split into two years, where the second year may fall into the long-term phase. The City's 10-year CIP, including capacity-related, rehabilitation, and other projects, is estimated to be $24.7 million.

Capacity-related improvements were recommended based on the capacity deficiencies described in Chapter 6 and includes 17 projects (P-1 through P-17). The total CIP for capacity related improvements is $14.4 million (58 percent of total 10-year CIP), with about $11.2 million allocated in the near-term and about $3.2 million in the intermediate-term. There are no long-term capacity improvement projects.

The rehabilitation projects include two projects to replace/rehabilitate the gravity pipeline Grade 5 and Grade 4 defects (projects R-1 and R-2, respectively). The replacement/rehabilitation of the Grade 5 defects are estimated to cost $8.58 million and are assumed to be replaced or rehabilitated within the first 10 years (2023-2032). The Grade 4 defects are assumed to be replaced in the long-term phasing (2033 or beyond) and are estimated to cost $50 million. This amount is not included in the City's 10-year CIP total. There is also one project to rehabilitate the City's lift station based on the condition assessment findings (summarized in Chapter 7, detailed in Appendix B), which is estimated to cost $135,800. The lift station rehabilitation project (LS-1) was allocated to the near-term phasing (year 2024). And $1M was also included in the long-term phase for future CCTV and manhole inspections. In total, the R&R projects for the first 10 years of the CIP is estimated to be $9.7 million, approximately 39 percent of the 10-year CIP total.

Two other projects are included in the CIP to account for future flow monitoring (project O-1) and future master plan updates (project O-2). Future flow monitoring may be used in conjunction with the future master plan updates or can be used to quantify the reduction in I/I following rehabilitation work. Four smoke testing projects targeting basins with the highest inflow were also included (projects O-3 through O-6). A total of $573,400 is allocated over the next 10 years for the "other" projects. Project O-7 also includes $1M to perform City-wide CCTV and manhole inspections. These recommended other projects account for 6 percent of the total 10-year CIP.

8.7 Existing Versus Future User Cost Share

The capacity-related improvements proposed in this Master Plan either benefit existing users and/or are required to serve new development and future users. Each capacity project's cost was allocated based on the percent ADWF used to serve existing and future customers. A summary of the share of the costs for existing and future users for the proposed capacity-related improvement projects by phase is summarized in Table 8.4. As shown in Table 8.4, the existing user's share of the costs is approximately 88 percent (or $12.7), and the future user's share of the costs is approximately seven percent (or $1.8 million) of the proposed capacity-related improvements. It is anticipated that existing user costs will be paid through existing user fees, while future user costs will be paid through connection fees.

Table 8.4 10-Year CIP Estimate by Reimbursement Category for Capacity Projects

Reimbursement Category	CIP Cost Estimate ($, Millions)[1,2]	Percentage
Existing Users	$12.68	88%
Future Users	$1.77	12%
Total	**$14.45**	**100%**

Notes:
(1) CIP costs based on assumptions outlined in this Chapter.
(2) Only includes capacity-related improvement projects listed in Table 8.3. Does not include rehabilitation or other projects.

8.8 20-Year CIP Summary

A summary of the CIP budget cost is provided in Table 8.5. As listed in Table 8.5, the total 10-year CIP is estimated to be $24.7 million, expressed in 2022 dollars. Near-term projects, to be implemented in the next five years, account for approximately 62 percent ($15.4 million), and intermediate-term projects, to be implemented during the following five years, account for approximately 38 percent ($9.4 million).

Table 8.5 10-Year CIP Cost Estimate Summary

Improvement Type	CIP Cost Estimate by Phase ($, Millions)[1]		Total[2] ($, Millions)
	Near-Term (2023- 2027)	Intermediate-Term (2028- 2032)	
Capacity	$11.2	$3.2	$14.4
R&R Projects	$3.9	$5.8	$9.7
Other	$0.2	$0.4	$0.6
Total	**$15.4**	**$9.4**	**$24.7**

Notes:
(1) Los Angeles ENR CCI for October 2022 is 13,728.
(2) Only includes projects allocated to the first 10 years of the CIP. Does not include long-term projects.

8.9 Alternative 20-Year CIP

As mentioned before, Carollo worked with the City to develop an alternative CIP based on the current funding of $10M over the next 10 years, which is summarized in Table 8.6. For the alternative CIP, replacement and rehabilitation of the Grade 5 defect pipelines was given priority in the first 10 years, along with several other projects. The total cost to rehabilitate the Grade 5 defect pipes (Project R-1) is estimated to be $8.6M, where $1M was allocated for years 2024 through 2027 each, and the remaining allocated to the Intermediate-term phase (2028-2032). The phasing of projects R-2 and R-3 and the "other" projects did not change from what was presented in Table 8.3. And the capacity-related projects were included in the long-term phase in the alternative CIP. The total CIP amount remains the same at $74.4M, however, the 10-year CIP is only $10.3M.

Table 8.6 Alternative Detailed Capital Improvement Program

Project		Deficiency Type (Existing or Future)	Existing Size Diameter (in)	Proposed Size Diameter (in)	Proposed Amount Length (ft)	Baseline Construction Cost[1,2] ($)	Estimated Construction Cost[3] ($)	Total Capital Improvement Cost[4,5,6] ($)	10-Year Capital Improvement Cost[4,5,6] ($)	CIP Phasing ($)							
										Near-Term					Intermediate	Long-Term
										2023	2024	2025	2026	2027	2028-2032	2033 & Beyond
Capacity Related Improvements																
Gravity Mains																
P-1	Gravity Main along 132nd Street and Van Ness Avenue	Existing	10 - 12	12 - 15	1,880	$ 775,200	$ 1,007,700	$ 1,284,800	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,284,800
P-2	Gravity Main along 135th Street and 134th Place	Existing	8 - 10	12 - 15	1,620	$ 643,300	$ 836,300	$ 1,066,300	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,066,300
P-3	Gravity Main along El Segundo Boulevard and Western Avenue	Existing	8 - 10	12 - 15	980	$ 400,600	$ 520,800	$ 664,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 664,000
P-4	Gravity Main along 132nd Street	Existing	8	12	770	$ 269,700	$ 350,700	$ 447,100	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 447,100
P-5	Gravity Main along 134th Street	Existing	8	12	1,020	$ 355,600	$ 462,200	$ 589,300	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 589,300
P-6	Gravity Main along 135th Street	Existing	8	10	1,390	$ 460,100	$ 598,100	$ 762,500	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 762,500
P-7	Gravity Main along Vermont Avenue and 135th Street	Existing	8	10 - 15	1,720	$ 620,600	$ 806,700	$ 1,028,600	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,028,600
P-8	Gravity Main along 147th Streetand Gramercy Place	Existing	8	10 - 12	2,330	$ 801,000	$ 1,041,300	$ 1,327,600	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,327,600
P-9	Gravity Main along Denker Avenue	Existing	8	12	340	$ 119,900	$ 155,900	$ 198,800	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 198,800
P-10	Gravity Main along Vermont Avenue and Rosecrans Avenue	Existing	8 - 10	12	2,030	$ 709,300	$ 922,100	$ 1,175,700	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,175,700
P-11	Gravity Main along Budlong Avenue and Marine Avenue	Existing	8	12	2,150	$ 752,800	$ 978,600	$ 1,247,700	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,247,700
P-12A	Gravity Main along Ruthelen Avenue and Redondo Beach Boulevard	Existing	6 - 8	10 - 12	1,740	$ 586,600	$ 762,600	$ 972,300	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 972,300
P-12B	Gravity Main along Manhattan Place	Existing	8 - 10	15	1,660	$ 720,700	$ 936,900	$ 1,194,600	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,194,600
P-13	Gravity Main along 154th Place	Existing	8	10	690	$ 229,600	$ 298,500	$ 380,600	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 380,600
P-14	Gravity Main along Normandie Avenue (between 168th and 170th Streets)	Existing	8	10	720	$ 237,600	$ 308,900	$ 393,800	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 393,800
P-15	Gravity Main along 177th Street and Normandie Avenue	Existing	8	10	2,040	$ 674,500	$ 876,900	$ 1,118,100	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,118,100
P-16	Gravity Main along 132nd Street	Future	8 - 10	12	570	$ 198,500	$ 258,000	$ 328,900	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 328,900
P-17	Gravity Main along Normandie Avenue (between 166th and 168th Streets)	Future	8	10	490	$ 161,700	$ 210,200	$ 268,100	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 268,100
Subtotal Capacity-Related Improvement						**$ 8,717,300**	**$ 11,332,400**	**$ 14,448,800**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ 14,448,800**
Rehabilitation Projects																
Gravity Mains																
R-1	Replace Pipelines with Grade 5 Defects					$ 5,176,900	$ 6,730,000	$ 8,580,800	$ 8,580,800	$ -	$ 1,000,000	$ 1,000,000	$ 1,000,000	$ 1,000,000	$ 4,580,800	$ -
R-2	Replace Pipelines with Grade 4 Defects					$ 29,970,800	$ 38,962,000	$ 49,676,600	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 49,676,600
Lift Station																
LS-1	Rehabilitate City Lift Station							$ 135,800	$ 135,800	$ -	$ 135,800	$ -	$ -	$ -	$ -	$ -
Subtotal Rehabilitation Projects						**$ 35,147,700**	**$ 45,692,000**	**$ 58,393,200**	**$ 8,716,600**	**$ -**	**$ 1,135,800**	**$ 1,000,000**	**$ 1,000,000**	**$ 1,000,000**	**$ 4,580,800**	**$ 49,676,600**
Other Projects																
O-1	Future Flow Monitoring	-	-	-	-	-		$ 100,000	$ 100,000	$ -	$ -	$ -	$ -	$ -	$ 100,000	$ -
O-2	Master Plan Updates	-	-	-	-	-		$ 250,000	$ 250,000	$ -	$ -	$ -	$ -	$ -	$ 250,000	$ -
O-3	Smoke Testing - Basin 1							$ 75,900	$ 75,900	$ 75,900	$ -	$ -	$ -	$ -	$ -	$ -
O-4	Smoke Testing - Basin 3							$ 61,100	$ 61,100	$ 61,100	$ -	$ -	$ -	$ -	$ -	$ -
O-5	Smoke Testing - Basin 10							$ 44,700	$ 44,700	$ 44,700	$ -	$ -	$ -	$ -	$ -	$ -
O-6	Smoke Testing - Basin 15							$ 41,700	$ 41,700	$ 41,700	$ -	$ -	$ -	$ -	$ -	$ -
O-7	CCTV and Manhole Inspection							$ 1,000,000	$ 1,000,000	$ -	$ -	$ -	$ -	$ -	$ 1,000,000	$ -
Subtotal Other Projects						**$ -**	**$ -**	**$ 1,573,400**	**$ 1,573,400**	**$ 223,400**	**$ -**	**$ -**	**$ -**	**$ -**	**$ 1,350,000**	**$ -**
Total CIP						**$ 43,865,000**	**$ 57,024,400**	**$ 74,415,400**	**$ 10,290,000**	**$ 223,400**	**$ 1,135,800**	**$ 1,000,000**	**$ 1,000,000**	**$ 1,000,000**	**$ 5,930,800**	**$ 64,125,400**

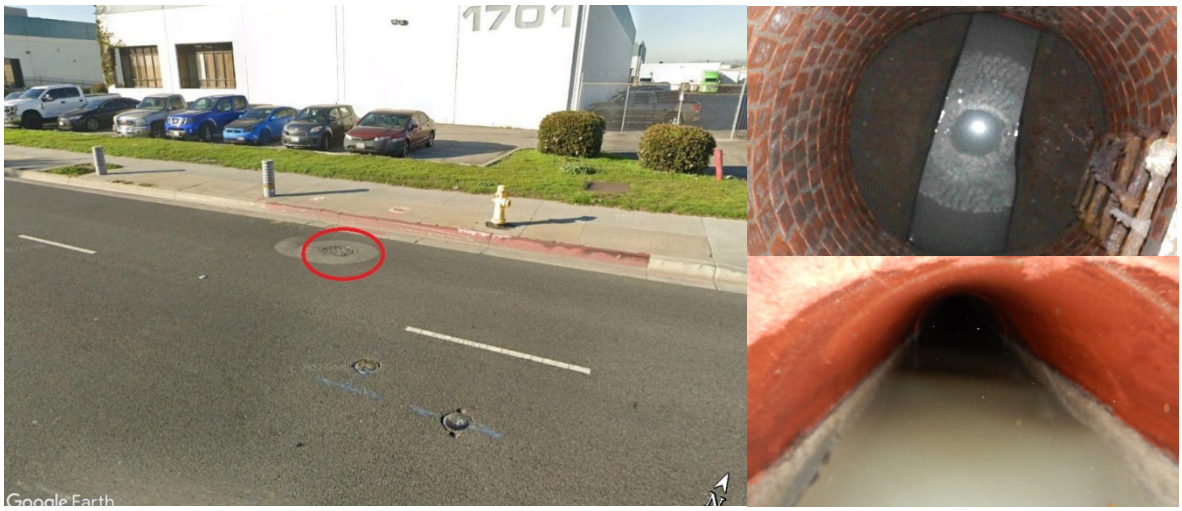
Notes:
(1) All costs are in 2022 dollars.
(2) Engineering News Report (ENR) Greater LA Construction Cost Index for October 2022 is 13,728.
(3) Estimated Construction Cost includes a 30% contingency of the baseline construction cost.
(4) Cost Estimates do not include costs for land acquisition, easements or ROW acquisition.
(5) Total project costs includes a 10% markup for engineering, a 10% markup for construction management and a 7.5% markup for project administration of the estimated construction cost.
(6) Includes capital costs for projects phased through 2032. Does not include Long Term projects.

Appendix A

SEWER FLOW MONITORING AND INFLOW/INFILTRATION STUDY

City of Gardena

Sanitary Sewer Master Plan Update Flow Monitoring



Prepared for:

Carollo Engineers, Inc.
100 West Liberty Street, Suite 740
Reno, NV 89501

Draft Report Date:

October 5, 2022

Prepared by:

V&A consulting engineers

V&A Project No. 21-0243

Table of Contents

Tables

Figures

Photo Log

Abbreviations and Acronyms

Abbreviations/Acronyms	Definition
ADWF	Average Dry Weather Flow
AVG.	Average
CCTV	Closed-Circuit Television
CDEC	California Data Exchange Center
CIP	Capital Improvement Plan
CO	Carbon Monoxide
DIA.	Diameter
d/D	Depth/Diameter Ratio
FPS	Feet/Second
FT.	Feet
FM	Flow Monitor
GPD	Gallons per Day
GPM	Gallons per Minute
GWI	Groundwater Infiltration
H2S	Hydrogen Sulfide
IN.	Inch
I/I	Inflow and Infiltration
IDM	Inch-Diameter Mile
IDW	Inverse Distance Weighting
LEL	Lower Explosive Limit
MAX.	Maximum
MGD	Million Gallons per Day
MIN.	Minimum
NOAA	National Oceanic and Atmospheric Administration
N/A	Not applicable
PF	Peaking Factor
PS	Pump Station
PWS	Personal Weather Station
Q	Flow Rate
QAQC	Quality Assurance Quality Control
RDI	Rainfall-Dependent Infiltration
RG	Rain Gauge
SSO	Sanitary Sewer Overflow
V&A	V&A Consulting Engineers, Inc.
WEF	Water Environment Federation
WRCC	Western Regional Climate Center
WU	Weather Underground

Terms and Definitions

Term	Definition
Average dry weather flow (ADWF)	The average flow rate or pattern from days without noticeable inflow or infiltration response. ADWF usage patterns for weekdays and weekends differ and must be computed separately. ADWF is expressed as a numeric average and may include the influence of normal groundwater infiltration (not related to a rain event).
Basin	Sanitary sewer collection system upstream of a given location (often a flow meter), including all pipelines, inlets, and appurtenances. Also refers to the ground surface area near and enclosed by pipelines. A basin may refer to the entire collection system upstream from a flow meter or exclude separately monitored basins upstream.
Depth/diameter (*d*/*D*) ratio	Depth of water in a pipe as a fraction of the pipe's diameter. A measure of the fullness of the pipe used in the capacity analysis.
Infiltration and inflow	**Infiltration and inflow (I/I)** rates are calculated by subtracting the ADWF flow curve from the instantaneous flow measurements taken during and after a storm event. Flow in excess of the baseline consists of inflow, rainfall-responsive infiltration, and rainfall-dependent infiltration. **Combined I/I** is the total sum in gallons of additional flow attributable to a storm event.
Infiltration, groundwater	**Groundwater infiltration (GWI)** is groundwater that enters the collection system through pipe defects. GWI depends on the depth of the groundwater table above the pipelines as well as the percentage of the system that is submerged. The variation of groundwater levels and subsequent groundwater infiltration rates are seasonal by nature. On a day-to-day basis, groundwater infiltration rates are relatively steady and will not fluctuate greatly.
Infiltration, rainfall-dependent	**Rainfall-dependent infiltration (RDI)** is similar to groundwater infiltration but occurs as a result of storm water. The storm water percolates into the soil, submerges more of the pipe system, and enters through pipe defects. RDI is the slowest component of storm-related infiltration and inflow, beginning gradually and often lasting 24 hours or longer. The response time depends on the soil permeability and saturation levels.
Inflow	Inflow is defined as water discharged into the sewer system, including private sewer laterals, from direct connections such as downspouts, yard, and area drains, holes in manhole covers, cross-connections from storm drains, or catch basins. Inflow creates a peak flow problem in the sewer system and often dictates the required capacity of downstream pipes and transport facilities to carry these peak instantaneous flows. Overflows are often attributable to high inflow rates.
Peak Wet Weather Flow	The highest daily flow during and immediately after a significant storm event. Includes sanitary flow, infiltration, and inflow.
Peaking factor (PF)	PF is the ratio of peak measured flow to average dry weather flow. This ratio expresses the degree of fluctuation in flow rate over the monitoring period and is used in the capacity analysis.
Surcharge	When the flow level is higher than the crown of the pipe, then the pipeline is said to be in a **surcharged** condition. The pipeline is surcharged when the *d*/*D* ratio is greater than 1.0.

Executive Summary

Scope and Purpose

V&A Consulting Engineers (V&A) was retained by Carollo Engineers (Carollo) to perform flow monitoring at 15 locations in the City of Gardena for one month. The purpose of this work is to provide flow monitoring data with capacity and inflow/infiltration analysis. Flow and rainfall monitoring were from March 08, 2022, to April 12, 2022. The following is our detailed scope of work for the subject services.

1. Establish the baseline sanitary sewer flows at the flow monitoring sites
2. Establish the peak flow condition during the rainfall events and indicate relative available sewer capacity at the flow monitoring nodes.
3. Quantify I&I at the applicable flow monitoring sites, isolate flow monitoring basins (where applicable), and conduct I&I analysis to determine basins with the highest relative I&I contributions.

Monitoring Sites and Basins

The flow monitoring site locations were selected and approved by Carollo and the City and are listed in Table ES-1 and shown in Figure ES-1.

Table ES-1. List of Monitoring Sites

Monitoring Site	Monitored Pipe	Pipe Dia (in)	Location
Site 1	N influent	21	S Western Avenue and Rosecrans Avenue
Site 2	E influent	18	Rosecrans Avenue and S Hobart Boulevard
Site 3	S Effluent	18	Van Ness Avenue and W 135th Street
Site 4	N influent	15.5	Normandie Avenue (on island) south of W 155th Street
Site 5	N influent	24	Van Ness Avenue south of W 162nd Street
Site 6	N influent	18	Normandie Avenue south of W 170th St
Site 7	N influent	21	S Vermont Avenue north of W Redondo Beach Boulevard
Site 8	E influent	24	Artesia Boulevard west of S Western Avenue
Site 9	E influent	30	166th Street and Gramercy Place
Site 10	N influent	12	S Western Avenue north of W Redondo Beach Boulevard
Site 11	N influent	10	Crenshaw Boulevard (on sidewalk) south of W 135th Street
Site 12	W influent	18	W 135th Street and Daphne Avenue
Site 13	N influent	25	Van Ness Avenue and W 154th Street
Site 14	N influent	28	S Manhattan Place north of 166th Street
Site 15	W influent	18	W 134th Place and Spring Avenue

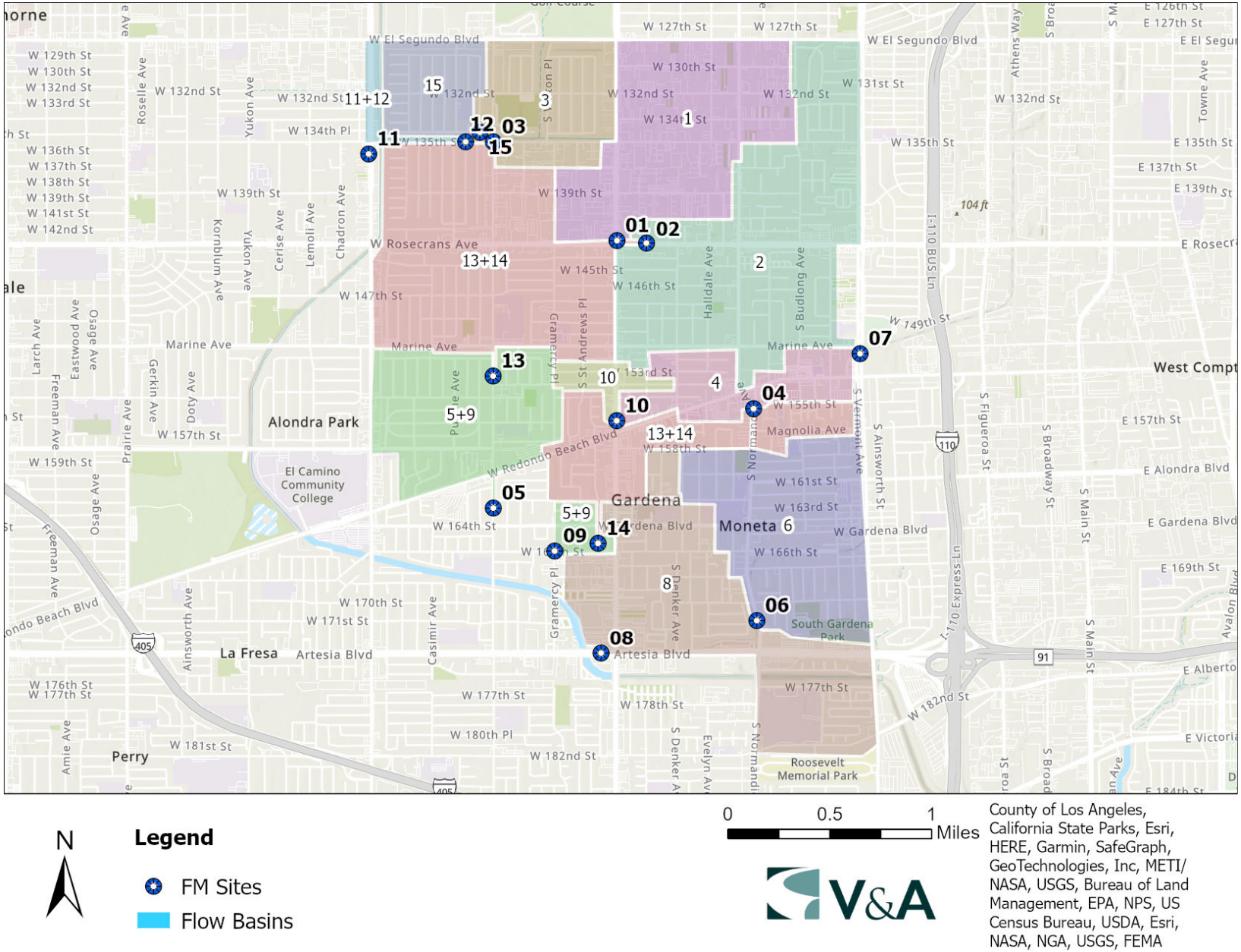


Figure ES-1. Map of Flow Monitoring Sites and Basins

Rainfall Monitoring

There was one main rainfall event that elicited some I/I response over the flow monitoring period, illustrated in Figure ES-2. The cumulative precipitation (triangulated to City of Gardena-Human Services Department) was approximately at 60% of historical precipitation averages over the specific duration of the flow monitoring, and the following classification notes regarding the storm events are identified (refer to Figure ES-3):

- Event 1 was classified ranging between a <1-Yr and 4-Yr, 15-min storm event.

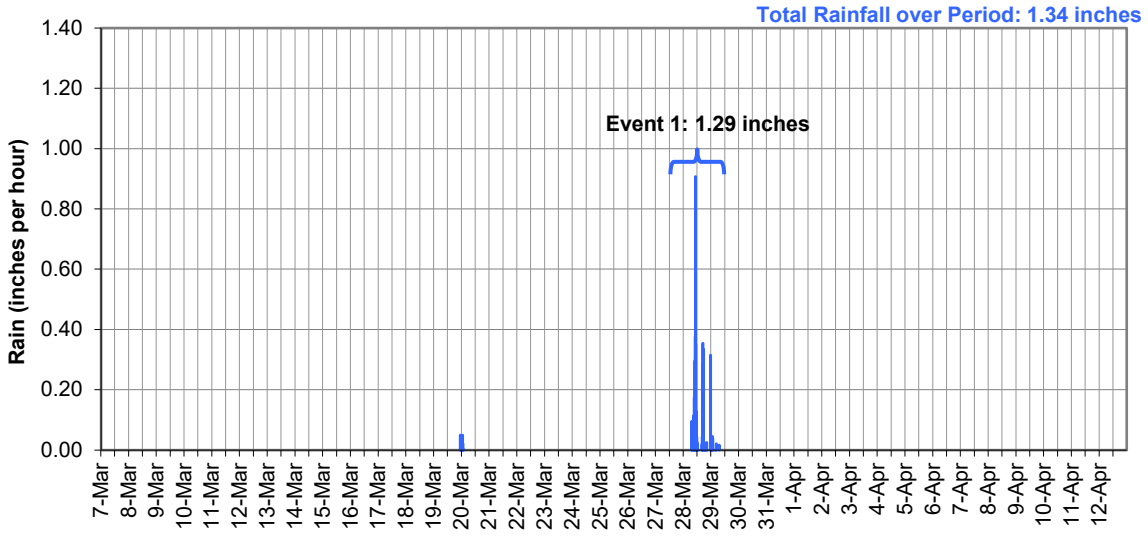


Figure ES-2. Rainfall Monitoring (triangulated to City of Gardena-Human Services Department)

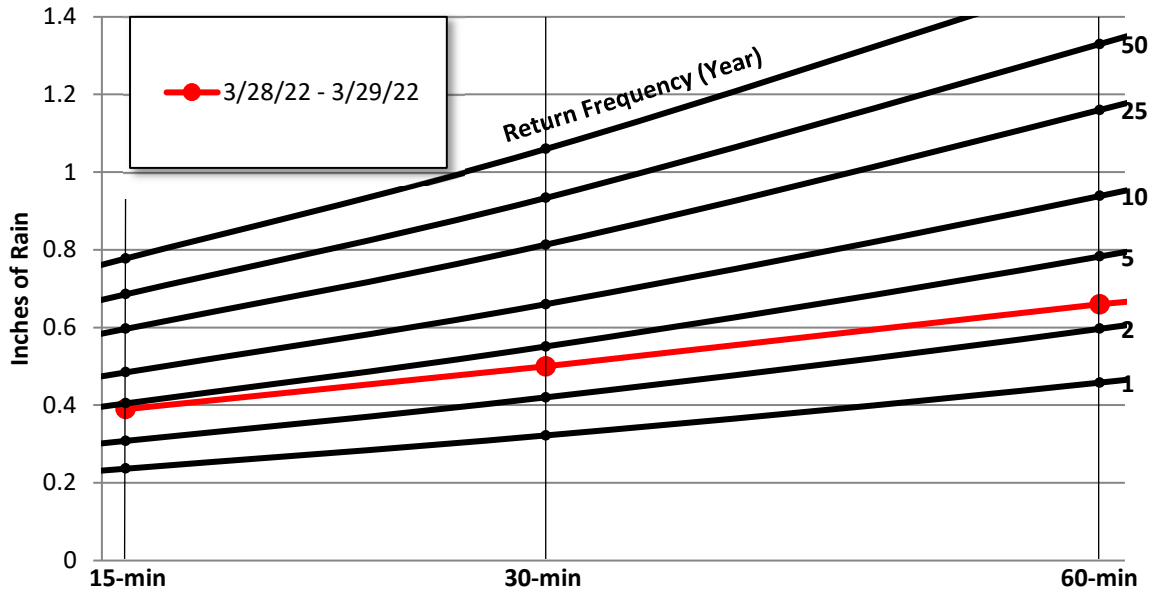


Figure ES-3. Rainfall Event Classification – 60-Min Period (RG B)

Site Flow Monitoring and Capacity Results

Peak measured flows and the hydraulic grade line data (flow depths) are important to understanding the capacity limitations of a collection system. The peak flows and flow levels are the peak measurements taken across the entirety of the flow monitoring period. For this study, peak flows and peak levels corresponded to rainfall events. The following capacity analysis definitions will be used:

- **Peaking Factor (PF)** is defined as the peak measured flow divided by the average dry weather flow (ADWF). Peaking factors are influenced by many factors, including size and topography of tributary area, flow attenuation, flow restrictions, characteristics of I/I entering the collection system, and hydraulic features such as pump stations.
  - For this report, PF > 5 are highlighted in RED[1]; however, the City should refer to City standards when evaluating peaking factors. Peaking factor data should be used at the discretion of the City Engineer.
- **d/D Ratio** is the peak measured depth of flow (d) divided by the pipe diameter (D). The d/D ratio for each site is computed based on the maximum depth of flow for the study. Standards for d/D ratio vary from agency to agency, but typically range between d/D ≤ 0.5 and d/D ≤ 0.75
  - For this report, d/D ratios > 0.75 are highlighted in RED; however, the City should refer to City standards when evaluating d/D ratios, to be used at the discretion of the City Engineer.

Table ES-2 summarizes the peak recorded flows, depths, *d/D* ratios, and peaking factors per site during the flow monitoring period. Capacity analysis data are presented on a site-by-site basis and represents the hydraulic conditions only at the site locations; hydraulic conditions in other areas of the collection system will differ. Figure ES-4 and Figure ES-5 show bar graph summaries of the peaking factors and d/D ratios, respectively. Figure ES-6 shows the schematic diagram of the peak measured flows in each section with peak flow levels.

The following capacity analysis results are noted:

- Peaking Factors
  - Only Site 9 has peaking factor over 5.
  - Site 11 monitors a flow split. Due to the extremely low ADWF number, Site 11's peaking number is highly skewed and thus not shown in the report.
- d/D Ratio:
  - d/D > 0.75: Sites 4, 5, and 6 had d/D ratios greater than 0.75 but did not surcharge during this study.
  - d/D > 1.0: Sites 1, 2, 9, and 13 reached a surcharge condition during this study. Peak flow depths for all sites were less than half a foot above the pipe crown.

[1] WEF Manual of Practice FD-6 and ASCE Manual No. 62 suggests typical peaking factor ratios range between 3 and 4, with higher values possibly indicative of pronounced I/I flows.

Table ES-2. Capacity Analysis Summary

Site	ADWF (MGD)	Peak Measured Flow (MGD)	Peaking Factor	Pipe Diameter, *D* (IN)	Max Depth, *d* (IN)	Max Depth, d(IN)	Surcharge above Pipe Crown (FT)
Site 1	0.663	3.04	4.6	21	25.17	1.20	0.35
Site 2	0.431	1.26	2.9	18	24.34	1.35	0.53
Site 3	0.505	2.32	4.6	18	13.22	0.73	-
Site 4	0.576	1.48	2.6	16	14.25	0.92	-
Site 5	1.823	4.34	2.4	24	20.23	0.84	-
Site 6	0.862	2.48	2.9	18	14.40	0.80	-
Site 7	0.502	1.18	2.3	21	10.10	0.48	-
Site 8	1.460	3.42	2.3	24	18.25	0.76	-
Site 9	2.715	6.09	2.2	30	32.03	1.07	0.17
Site 10	0.093	0.42	4.5	12	5.06	0.42	-
Site 11	n/a	0.02	n/a	10	1.64	0.16	-
Site 12	0.143	0.33	2.3	18	4.20	0.23	-
Site 13	1.516	4.13	2.7	25	26.84	1.07	0.15
Site 14	2.666	6.47	2.4	28	18.49	0.66	-
Site 15	0.130	0.69	5.3	18	5.30	0.29	-
Site 11+12[A]	0.143	n/a	n/a	n/a	n/a	n/a	-
Site 13+14[A]	4.182	n/a	n/a	n/a	n/a	n/a	-
Site 5+9[A]	4.538	n/a	n/a	n/a	n/a	n/a	-

[A] There are splits and cross-connections upstream from Sites 11 and 12, Sites 13 and 14, Sites 5 and 9. So, these sites were shown with combined flow data for an isolated upstream flow basin condition. Flow depth calculations are not applicable (n/a) for these locations.

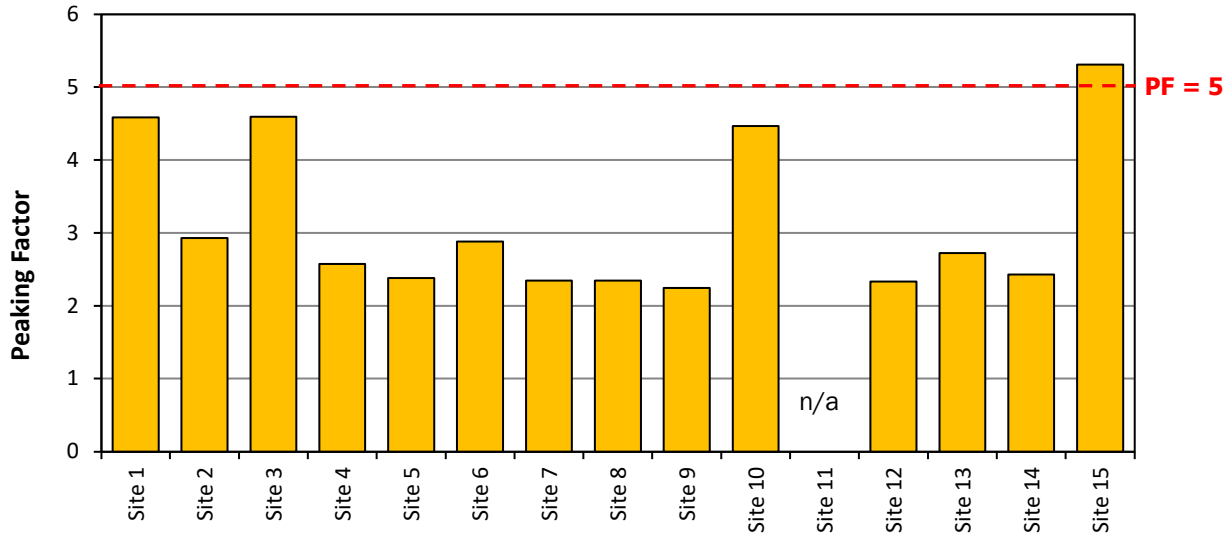


Figure ES-4. Peaking Factors

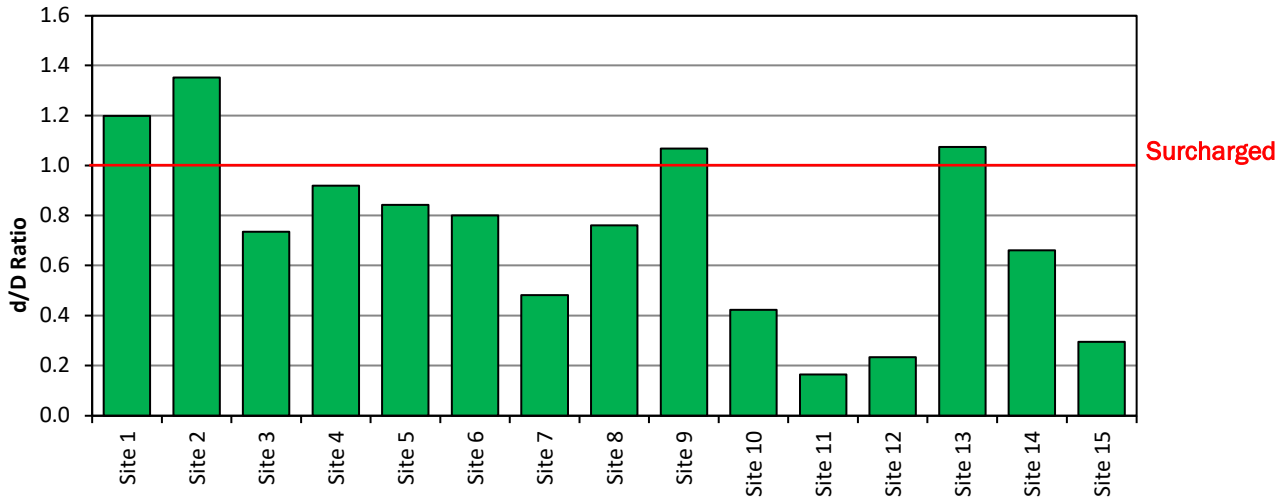


Figure ES-5. Capacity Summary: Max d/D Ratios

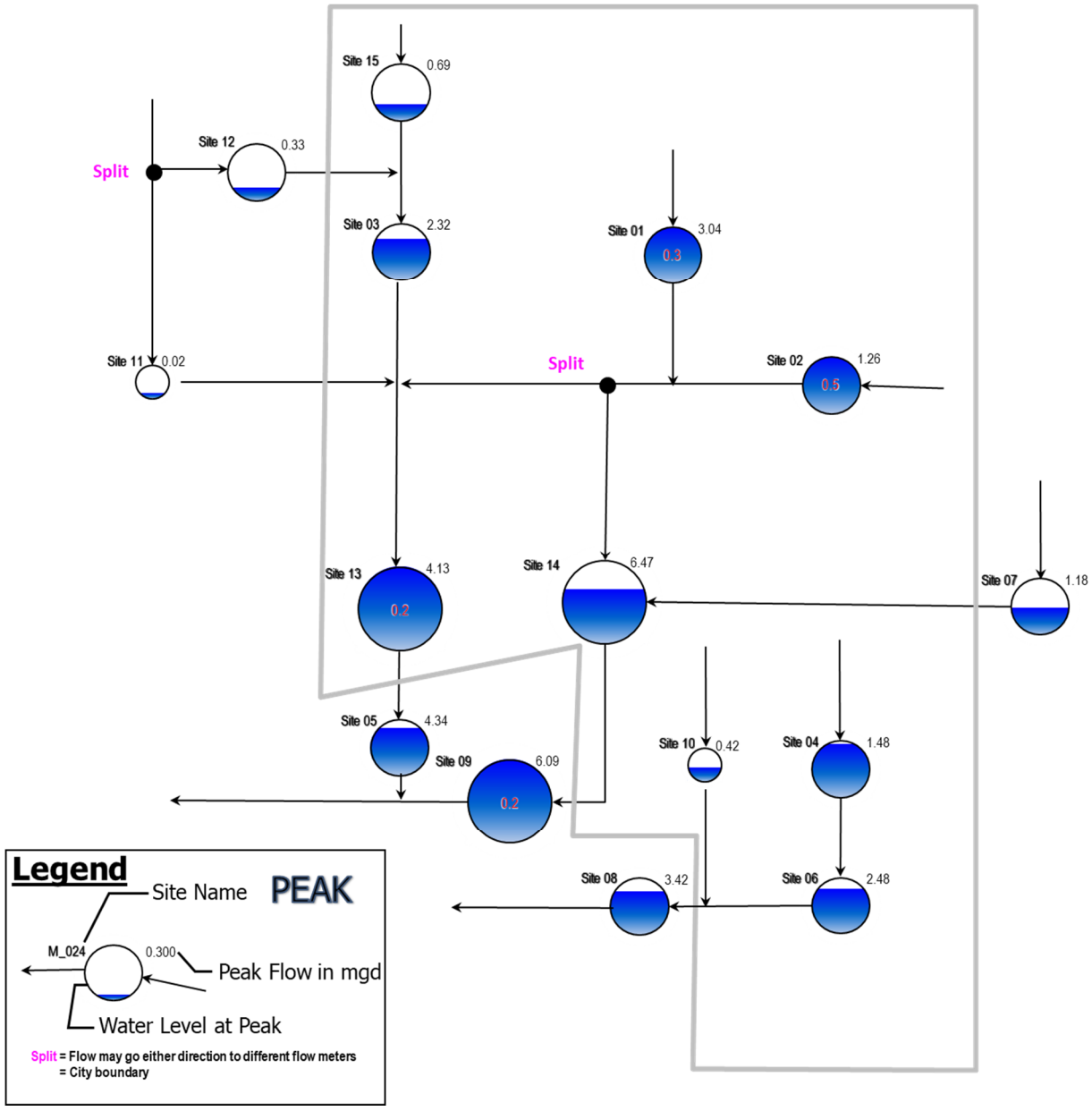


Figure ES-6. Peak Measured Flow (Flow Schematic)

Infiltration and Inflow Analysis

Table ES-3 summarizes the I/I results for this study. The "Top 3" basins for each category have been shaded in RED. Please refer to the I/I Methods section for more information on inflow and infiltration analysis methods and ranking methods. For this study, no RDI and GWI were identified through the study area; thus, they are not included in the report. Temperature maps for the ranked inflow and Total I/I response metrics are shown in Figure ES-7 and Figure ES-8. The following infiltration and inflow results are noted:

- The I/I analysis for Basins 7 and 11+12 are not listed because they originate from outside the City of Gardena. Sites 7, 11, and 12 were employed to monitor boundary conditions into Gardena
- **Inflow**: Basins 1, 3 and 10 had the highest weighted, normalized peak I/I rates, an indicator of high inflow upstream from the flow monitoring basin. Please note that Basins 1 and 3 are both ranked No.2 in the table. Basin 5+9's peak inflow I/I response is neglectable as it is largely contributed by its upstream basins instead of its own isolated flow basin
- **Combined I/I**: Basins 1, 3, and 15 had the highest weighted, normalized combined rates, an indicator of high combined total I/I upstream from the flow monitoring basin.

Table ES-3. I/I Analysis Summary

Monitoring Basin	ADWF (mgd)	Peak Inflow Rate (mgd)	Combined I/I (gallons)	R-Value	Inflow Rank	Combined I/I Rank
Basin 1	0.663	2.106	242,901	1.82%	2	3
Basin 2	0.431	0.797	52,741	0.27%	7	9
Basin 3	0.233	1.042	133,603	1.95%	2	2
Basin 4	0.576	0.860	89,265	1.90%	5	5
Basin 6	0.285	0.740	50,827	0.45%	6	6
Basin 7	n/a	n/a	n/a	n/a	n/a	n/a
Basin 8	0.505	0.022	37,608	0.26%	9	10
Basin 10	0.094	0.305	10,641	0.77%	1	8
Basin 15	0.130	0.528	80,267	2.01%	4	1
Basin 11+12	n/a	n/a	n/a	n/a	n/a	n/a
Basin 13+14	2.583	0.995	294,957	1.20%	8	7
Basin 5+9	0.356	Negligible	91,192	8.88%	10	4

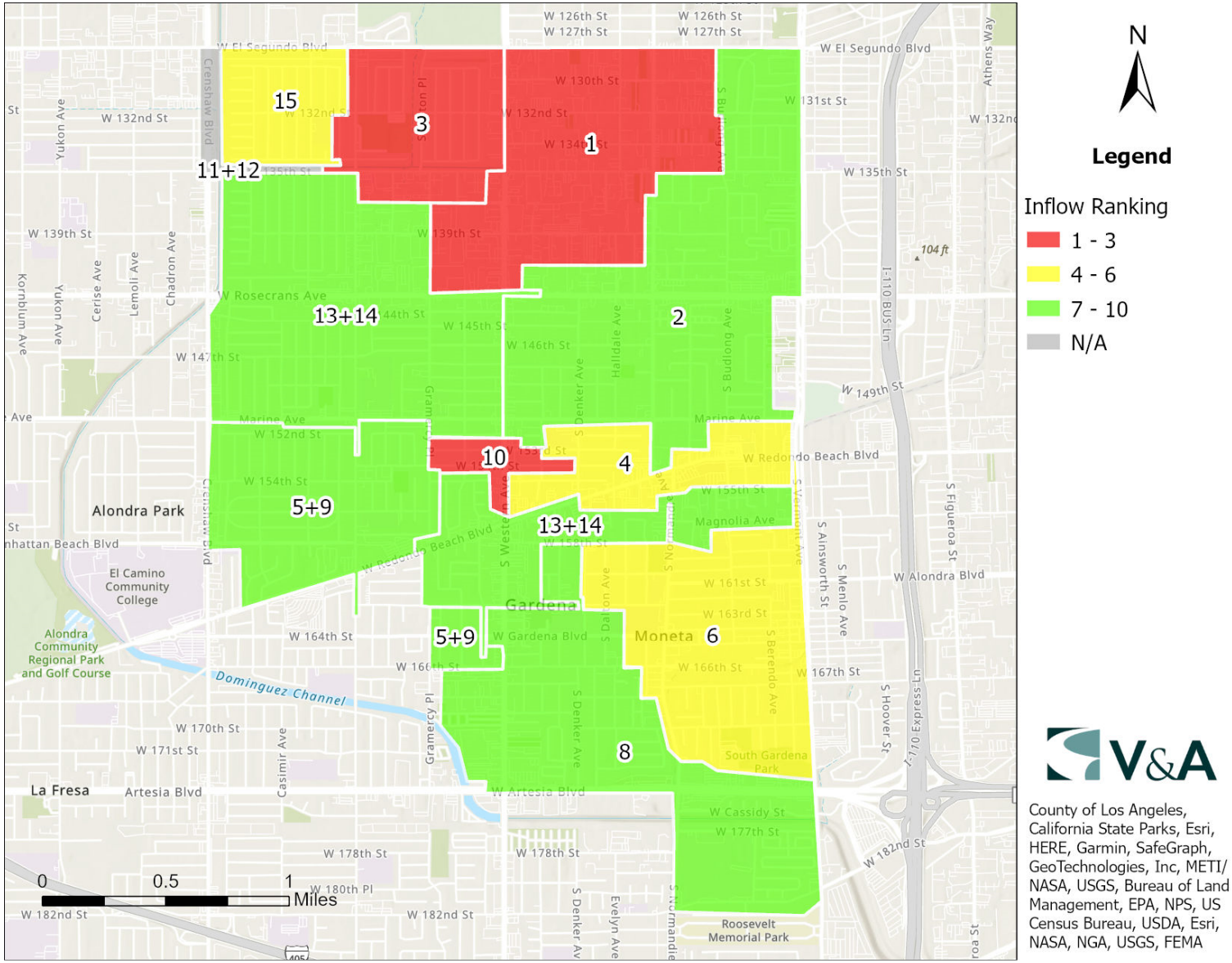


Figure ES-7. Temperature Map: Inflow Final Basin Rankings

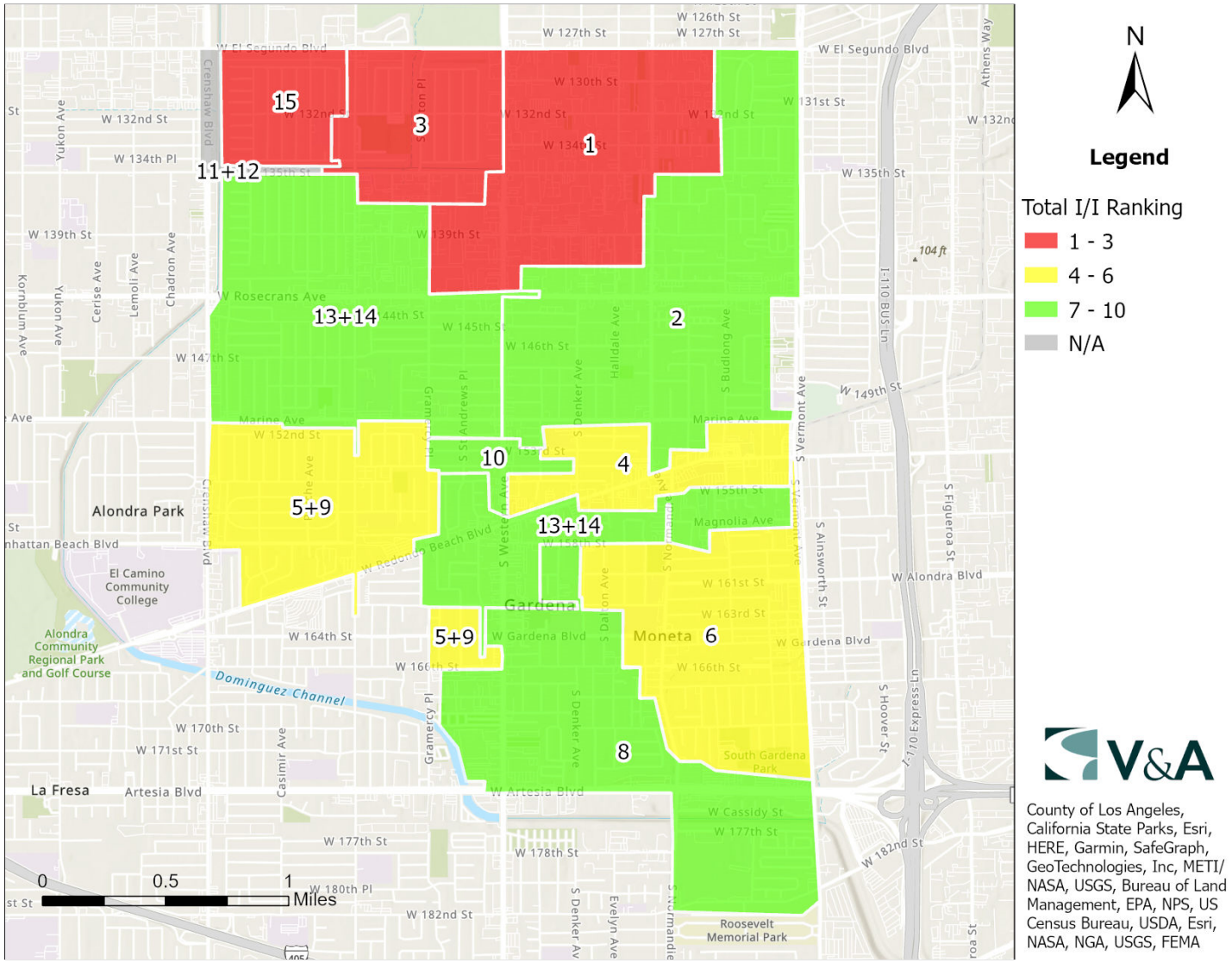


Figure ES-8. Temperature Map: Combined I/I Final Basin Rankings

Recommendations

V&A advises that future I/I reduction plans consider the following recommendations:

1. **Master Plan and Model Implementation**: This study focuses on inflow and infiltration generation; the study results can be used to update the master plan and compare with previous model assumptions and flow monitoring results.
    a. **Verify Interconnections and Overflows**: understanding the interconnections and overflows can help with the master plan, basin isolation, and I/I analysis.
2. **Capacity Analysis**: Four sites surcharged during the monitoring period. Global capacity constraints will be addressed in the updated master plan. The following possible capacity concerns are noted:
    a. **Dry weather**: Sites 4 and 8 exceeded 0.5 d/D Dry Weather. Sites 2, 8, 9 and 14 had from 1 to 1.5 inches of sediment measured in the pipe channel. The City may wish to investigate the cleaning frequency of this line and review headworks operations.
    b. **Wet Weather**: Sites 1, 2, 4, 5, 6, 9, and 13 had d/D ratios greater than 0.75. Sites 1, 2, 9, and 13 reached a surcharge condition during this study.
3. **Determine I/I Reduction Program**: The City should examine its I/I reduction needs to determine their needs and goals for a future I/I reduction program.
    a. If peak flows, sanitary sewer overflows, and pipeline capacity issues are of greater concern, then priority can be given to investigate and reduce sources of inflow within the basins with the greatest inflow problems. The highest inflow occurred within Basins 1, 3, and 10.
    b. If total infiltration and general pipeline deterioration are of greater concern, then the program can be weighted to investigate and reduce sources of infiltration within the basins with the greatest infiltration problems. The highest total infiltration occurred within Basins 1, 3, and 15.
4. **I/I Investigation Methods**: Potential I/I investigation methods include the following:
    a. smoke testing.
    b. mini-basin flow monitoring.
    c. night-time reconnaissance work to (1) investigate and determine direct point sources of inflow, and (2) determine the areas and/or pipe reaches responsible for high levels of infiltration contribution.
    d. CCTV inspection.
5. **I/I Reduction Cost Effective Analysis**: The City should conduct a study to determine which is more cost-effective: (1) locating the sources of inflow/infiltration and systematically rehabilitating or replacing the faulty pipelines; or (2) continued treatment of the additional rainfall dependent I/I flow.

1 Introduction

1.1 Scope and Purpose

V&A Consulting Engineers (V&A) was retained by Carollo Engineers (Carollo) to perform flow monitoring at 15 locations in the City of Gardena for one month. The purpose of this work is to provide flow monitoring data with capacity and inflow/infiltration analysis. Flow and rainfall monitoring were from March 08, 2022, to April 12, 2022. The following is our detailed scope of work for the subject services.

1. Establish the baseline sanitary sewer flows at the flow monitoring sites
2. Establish the peak flow condition during the rainfall events and indicate relative available sewer capacity at the flow monitoring nodes.
3. Quantify I&I at the applicable flow monitoring sites, isolate flow monitoring basins (where applicable), and conduct I&I analysis to determine basins with the highest relative I&I contributions.

1.2 Flow Monitoring Sites and Isolated Sewerage Basins

Flow monitoring sites are defined as the manholes where flow monitors are secured and the pipelines in which flow sensors are placed. Capacity analysis and flow rate information are presented on a site-by-site basis. The flow monitoring sites were selected and approved by Carollo and the City. Information regarding the flow monitoring locations is listed in Table 1-1 and illustrated in Figure 1-1. Detailed descriptions of the individual flow monitoring sites, including photographs, are included in Appendix A.

Flow monitoring site data may include the flows of one or many drainage basins. Flow monitoring basins are localized areas of a sanitary sewer collection system upstream of a given location (often a flow meter), including all pipelines, inlets, and appurtenances. The basin refers to the ground surface area near and enclosed by the pipelines. A basin may refer to the entire collection system upstream from a flow meter or may exclude separately monitored basins upstream, requiring basin isolation (subtraction of upstream flows). The I/I analysis results will be presented on an isolated basin basis. The basins, basin attributes, and basin isolation equations are listed in Table 1-2 and shown in Figure 1-1. The following notes regarding basin isolations are noted:

- Due to cross-connections, Sites 5 and 9 were combined (summed) to define Basin 5+9, same with Basin 11+12 and Basin 13+14, so as to assure basin isolation (refer to Table 1-2).
- Basin 11+12 and Basin 7 were located outside the City, so they won't be analyzed for I/I. These sites were used as boundary conditions for the City's flows.

Table 1-1. List of Monitoring Locations

Monitoring Site	Monitored Pipe	Pipe Dia (in)	Location
Site 1	N influent	21	S Western Avenue and Rosecrans Avenue
Site 2	E influent	18	Rosecrans Avenue and S Hobart Boulevard
Site 3	S Effluent	18	Van Ness Avenue and W 135th Street
Site 4	N influent	15.5	Normandie Avenue (on island) south of W 155th Street
Site 5	N influent	24	Van Ness Avenue south of W 162nd Street
Site 6	N influent	18	Normandie Avenue south of W 170th St
Site 7	N influent	21	S Vermont Avenue north of W Redondo Beach Boulevard
Site 8	E influent	24	Artesia Boulevard west of S Western Avenue
Site 9	E influent	30	166th Street and Gramercy Place
Site 10	N influent	12	S Western Avenue north of W Redondo Beach Boulevard
Site 11	N influent	10	Crenshaw Boulevard (on sidewalk) south of W 135th Street
Site 12	W influent	18	W 135th Street and Daphne Avenue
Site 13	N influent	25	Van Ness Avenue and W 154th Street
Site 14	N influent	28	S Manhattan Place north of 166th Street
Site 15	W influent	18	W 134th Place and Spring Avenue

Table 1-2. Isolated Flow Monitoring Basin Characteristics

Isolated Basin	Flow Isolation Calculation	Area (Acres)
Basin 01	Q1	416
Basin 02	Q2	618
Basin 03	Q3 - Q12 - Q15	212
Basin 04	Q4	149
Basin 06	Q6 -Q4	522
Basin 08	Q8 -Q6	1,059
Basin 05+09	Q5 + Q9 - Q13 - Q14	298
Basin 10	Q10	43
Basin 13 + 14	Q13 + Q14 - Q1 -Q2 - Q3 -Q7 -Q11	756
Basin 15	Q15	123

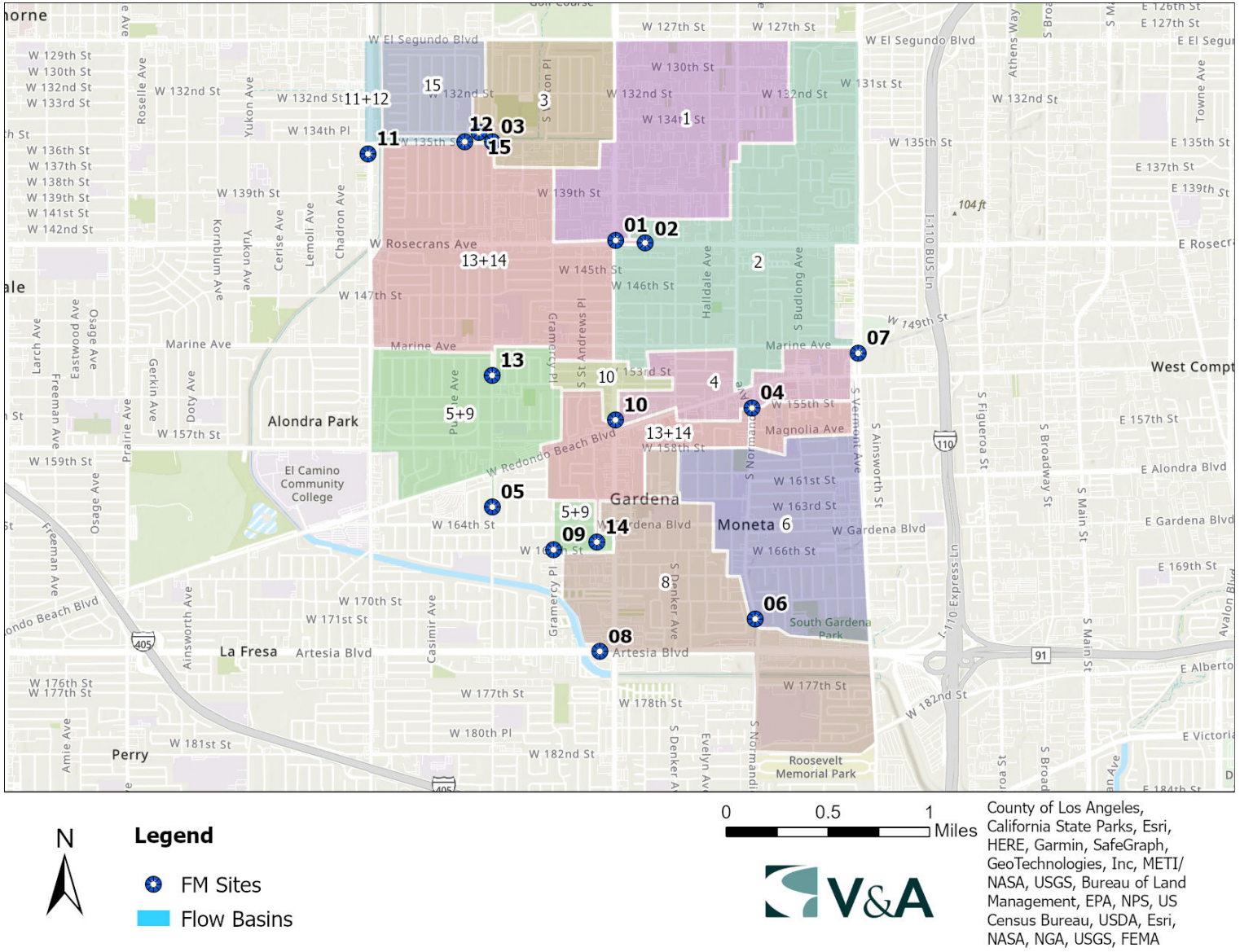


Figure 1-1. Map of Flow Monitoring Sites and Basins – Overall

2 Methods and Procedures

2.1 Confined Space Entry

A confined space (Photo 2-1) is defined as any space that is large enough and so configured that a person can bodily enter and perform assigned work, has limited or restricted means for entry or exit, and is not designed for continuous employee occupancy. In general, the atmosphere must be constantly monitored for sufficient levels of oxygen (19.5% to 23.5%) and the presence of hydrogen sulfide (H_2S) gas, carbon monoxide (CO) gas, and lower explosive limit (LEL) levels. A typical confined space entry crew has members with OSHA-defined responsibilities of Entrant, Attendant, and Supervisor. The Entrant is the individual performing the work. He or she is equipped with the necessary personal protective equipment needed to perform the job safely, including a personal four-gas monitor (Photo 2-2). If it is not possible to maintain line-of-sight with the Entrant, then more Entrants are required until line-of-sight can be maintained. The Attendant is responsible for maintaining contact with the Entrants to monitor the atmosphere using another four-gas monitor and maintaining records of all Entrants if there is more than one. The Supervisor is responsible for developing the safe work plan for the job at hand prior to entering.

Photo 2-1. Confined Space Entry

Photo 2-2. Typical Personal Four-Gas Monitor

2.2 Flow Meter Installation

V&A installed 15 area-velocity flow meters for temporary monitoring within the collection system using a Sigma FL904 equipment. Sigma FL904 meters use submerged sensors with a pressure transducer to collect depth readings, and an ultrasonic Doppler sensor to determine the average fluid velocity. The ultrasonic sensor emits high-frequency sound waves, which are reflected by air bubbles and suspended particles in the flow. The sensor receives the reflected signal and determines the Doppler frequency shift, which indicates the estimated average flow velocity. The sensor is typically mounted at a manhole inlet to take advantage of smoother upstream flow conditions. The sensor may be offset to one side of the pipe to lessen the chances of fouling and sedimentation where these problems are expected to occur. Manual level and velocity measurements were taken during the installation of the flow meters, and again when they were removed, and compared to simultaneous level and velocity readings from the flow meters to ensure proper calibration and accuracy. Figure 2-1 shows a typical installation for a flow meter with a submerged sensor.

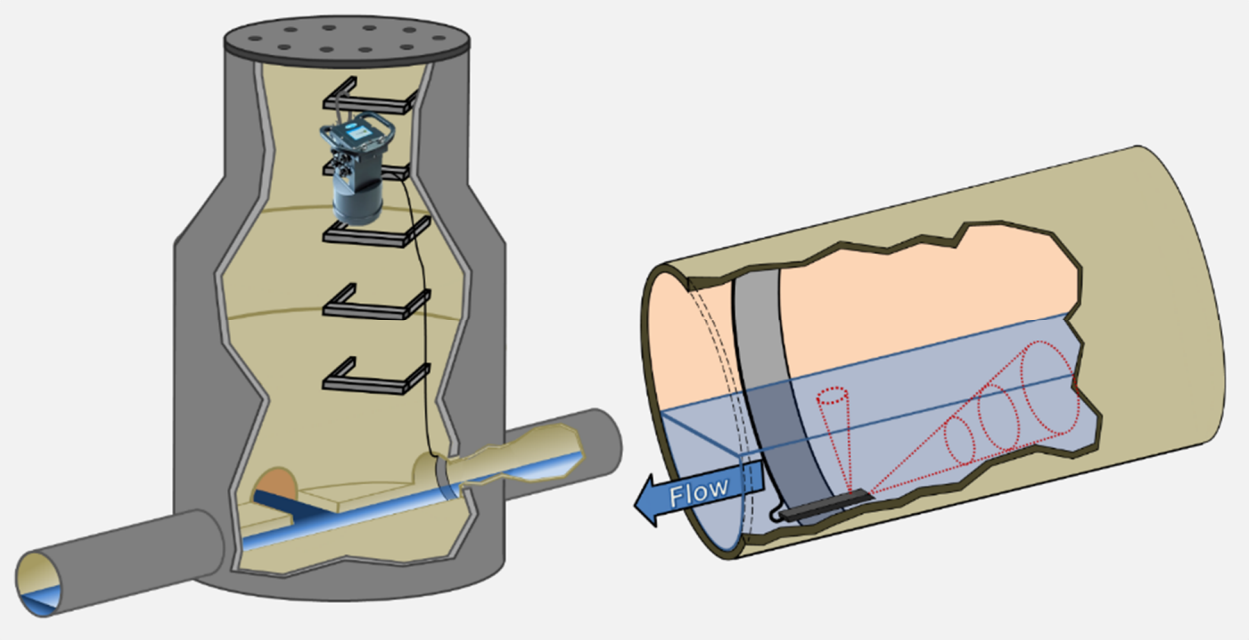


Figure 2-1. Typical Installation for Sigma FL904 Flow Meter with Submerged Sensor

2.3 Flow Calculation

Data retrieved from the flow meters is placed into a spreadsheet program for analysis. Data analysis includes comparison to field calibration measurements as well as necessary geometric adjustments as required for sediment (sediment reduces the pipe's wetted cross-sectional area available to carry flow). Area-velocity flow metering uses the continuity equation,

$$Q = v \cdot A = v \cdot (A_T - A_S)$$

where Q: volume flow rate

v: average velocity as determined by the ultrasonic sensor

A: cross-sectional area available to carry the flow

A_T: total cross-sectional area with both wastewater and sediment

A_S: cross-sectional area of sediment

For circular pipe,

$$A_T = \left[\frac{D^2}{4}\cos^{-1}\left(1-\frac{2d_W}{D}\right)\right] - \left[\left(\frac{D}{2}-d_W\right)\left(\frac{D}{2}\right)\sin\left(\cos^{-1}\left(1-\frac{2d_W}{D}\right)\right)\right]$$

$$A_S = \left[\frac{D^2}{4}\cos^{-1}\left(1-\frac{2d_S}{D}\right)\right] - \left[\left(\frac{D}{2}-d_S\right)\left(\frac{D}{2}\right)\sin\left(\cos^{-1}\left(1-\frac{2d_S}{D}\right)\right)\right]$$

where d_W: distance between wastewater level and pipe invert

d_S: depth of sediment

D: pipe diameter

2.4 Measurement Error and Uncertainty

For traditional engineering applications, measurement "error" is explained as a difference between a computed, estimated, or measured value and the generally accepted true or theoretically correct value. It can also be thought of as a difference between the desired and the actual performance of equipment. For equipment, an error is usually expressed as a percentage relative to accuracy (i.e., "…the velocity sensor has an accuracy of ±2% of the reading…").

However, for this study and flow monitoring applications, the cause of the measurement difference is important, and a distinction will be made between the equipment not performing to industry standards ("error") and expected inaccuracies ("uncertainty") associated with monitoring technology limitations.

Gauging **"error"** occurs when the equipment is not performing to industry standards. This can occur as a result of the following common categories of conditions that can be encountered at a wastewater monitoring site.

- Malfunctioning equipment (i.e., a sensor is damaged, battery life ends, or a desiccant canister becomes saturated)
- Improper equipment choice or maintenance (i.e., the selected gauging equipment technologies are incompatible with hydraulic conditions within the sewer, or excessive gravel deposits are allowed to accumulate around the sensors without being removed)
- Improper equipment calibration (i.e., depth and/or velocity measurements are incorrectly taken within the sewer, or equipment is allowed to drift out of calibration)
- Field conditions within the sewer (i.e., foaming at the water surface that "blinds" an ultrasonic depth sensor, or toilet paper catching and accumulating on a combination sensor, blinding the acoustic Doppler velocity meter)

For flow monitoring applications, gauging **"uncertainty"** is used to describe and quantify the expected inaccuracies that result from the limitations of the technologies that utilize indirect measurements to quantify wastewater flow.

It is important to try and install flow meters in "ideal" flow conditions. Ideal flow conditions are generally defined as laminar flow in a straight-through, constant-slope pipeline with no disturbances (elbows, tees, hydraulic shifts, etc.) 10 diameters upstream and five (5) diameters downstream from the flow monitoring location. If ideal flow conditions are met, then an expected uncertainty of final flow calculation from an open-channel flow meter may be approximately ±5%. For many situations, ideal flow conditions cannot be met, and uncertainties increase.

2.4.1 Flow Addition versus Flow Subtraction

Due to the uncertainties involved in subtracting flows of similar magnitudes, the addition of flows at multiple monitoring sites is usually preferred over subtraction of flows. Subtraction becomes an issue, especially when the flow difference from the subtraction falls within the measurement uncertainty range of the two larger flow data sets (i.e., subtracting a large flow from another large flow to obtain a small difference).

This concept is best demonstrated by the following example:

1. Meter A measures 2.00 MGD of flow and has an expected uncertainty of ±5%; thus, the uncertainty range of the flow measurement is ±0.10 MGD.

2. Meter B measures 2.50 MGD of flow and has an expected uncertainty of ±6%; thus, the uncertainty range of the flow measurement is ±0.15 MGD.
3. Meter C measures 0.50 MGD of flow and has an expected uncertainty of ±8%; thus, the uncertainty range of the flow measurement is ±0.04 MGD.

Scenario 1 – Flow Addition

- Meter A + Meter B = 2.00 MGD (±0.10) + 2.50 MGD (±0.15) = 4.50 MGD (±0.25)
- Overall uncertainty = ±0.25 / 4.50 = ±5.6%
- For flow addition, the final uncertainty is essentially a weighted average of the component uncertainties.

Scenario 2 – Flow Subtraction, Large Flow less Small Flow

- Meter B - Meter C = 2.50 MGD (±0.15) - 0.50 MGD (±0.04) = 2.00 MGD (±0.19)
- Overall uncertainty = ±0.19 / 2.00 = ±9.5%
- For flow subtraction, the final uncertainty will always be greater than the component uncertainties.
- When subtracting a small flow from a large flow, the resulting uncertainties can still be manageable.

Scenario 3 – Flow Subtraction, Large Flow less a similarly Large Flow

- Meter B - Meter A = 2.50 MGD (±0.15) – 2.00 MGD (±0.10) = 0.50 MGD (±0.25)
- Overall uncertainty = ±0.25 / 0.50 = ±50%
- When subtracting similarly sized flow rates, the resulting uncertainties may not be manageable. In this example, an uncertainty of ±50% may be considered unacceptable for confident analyses.

Scenario 3 is a very "real-world" situation. The uncertainties for Meter A and Meter B are extremely reasonable (indeed, most flow monitoring service providers would be extremely pleased with true meter uncertainties of ±5% to ±6%). However, the reality of the math is clear, and the above example demonstrates the concept of flow subtraction and compounding or inflating uncertainty ranges.

The following points are emphasized in relation to the items of this section:

- For subtraction of flows, the overall uncertainty can be an inflated value that far exceeds the component uncertainties.
- The smaller the resultant flow from the subtraction equation, the larger the percentage uncertainty.
- Whenever possible, basins flows should be directly measured rather than calculated as a subtraction of two or more flow meters.
- If flow subtraction cannot be avoided, it is better to have the magnitudes of the component flows be as dissimilar as possible.

2.5 Average Dry Weather Flow Determination

For this study, four distinct average dry weather flow curves were established for each site location:

- Mondays – Thursdays
- Fridays
- Saturdays
- Sundays

Flows for many sites differ on Friday evenings compared to Mondays through Thursdays. Starting around 7 pm, the flows are often decreased (compared to Monday through Thursday). Similarly, flow patterns for Saturday and Sunday were also separated due to their unique evening flow pattern. This type of differentiation can be important when determining I/I response, especially if a rain event occurs on a Friday, Saturday, or Sunday evening.

Figure 2-2 illustrates a sample of varying flow patterns within a typical dry week[2].

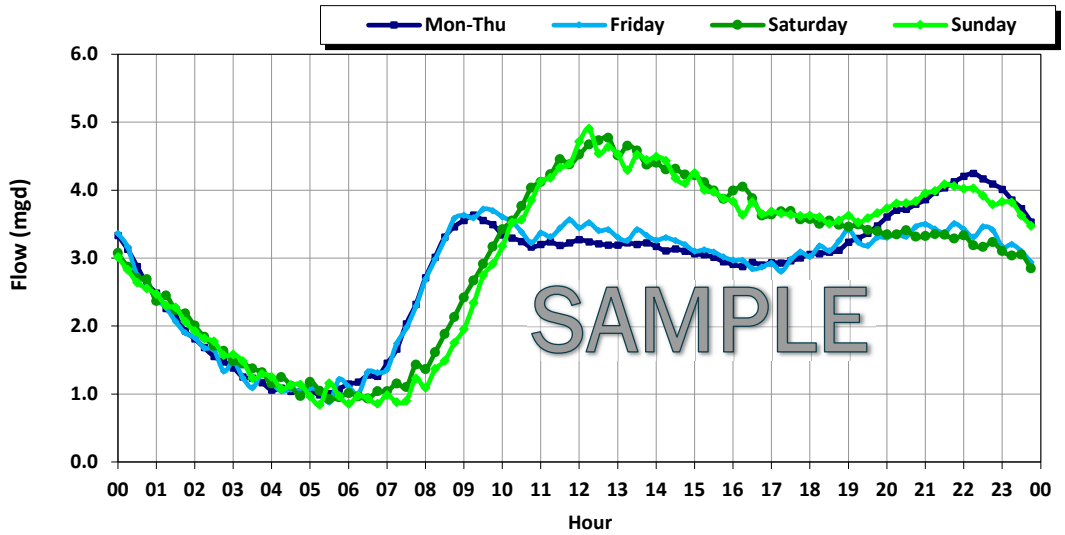


Figure 2-2. Sample ADWF Diurnal Flow Patterns

ADWF curves are taken from "Dry Days" when RDI had the least impact on the baseline flow. The overall average dry weather flow (ADWF) is calculated using the following equation:

$$ADWF = \left(ADWF_{Mon-Thu} \times \frac{4}{7} \right) + \left(ADWF_{Fri} \times \frac{1}{7} \right) + \left(ADWF_{Sat} \times \frac{1}{7} \right) + \left(ADWF_{Sun} \times \frac{1}{7} \right)$$

[2] Holiday flows can be extremely variable. Christmas flows are different from Thanksgiving flows and different from MLK Day flows. See Section 3.3 for details on whether holiday ADWF curves were established for this project's I/I analysis.

2.6 Flow Attenuation

Flow attenuation in a sewer collection system is the natural process of the reduction of the peak flow rate through redistribution of the same volume of flow over a longer period of time. This occurs as a result of friction (resistance), internal storage, and diffusion along the sewer pipes. Fluids are constantly working towards equilibrium. For example, a volume of fluid poured into a static vessel with no outside turbulence will eventually stabilize to a static state, with a smooth fluid surface without peaks and valleys. Attenuation within a sanitary sewer collection system is based upon this concept. A flow profile with a strong peak will tend to stabilize towards equilibrium, as shown in Figure 2-3.

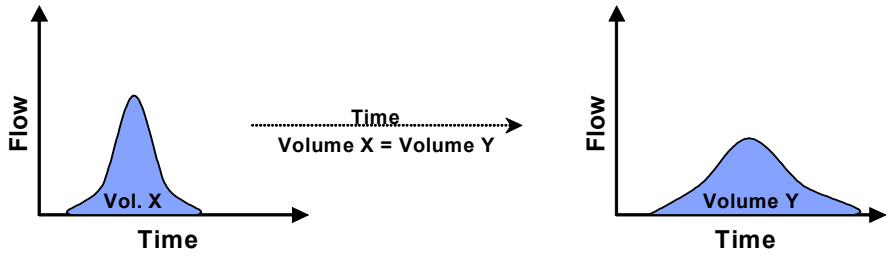


Figure 2-3. Attenuation Illustration

Within a sanitary sewer collection system, each individual basin will have a specific flow profile. As the flows from the basins combine within the trunk sewer lines, the peaks from each basin will not necessarily coincide at the same time, and peak flows may attenuate prior to reaching the treatment facility due to the length and time of travel through the trunk sewers. The sum of the peak flows of the individual basins within a collection system will usually be greater than the peak flows observed at the treatment facility.

2.7 Inflow / Infiltration Analysis: Definitions and Identification

Inflow and infiltration (I/I) consists of storm water and groundwater that enters the sewer system through pipe defects and improper storm drainage connections and is defined as follows:

- **Inflow**: Storm water inflow is defined as water discharged into the sewer system, including private sewer laterals, from direct connections such as downspouts, yard and area drains, holes in manhole covers, cross-connections from storm drains, or catch basins.
- **Infiltration**: Infiltration is defined as water entering the sanitary sewer system through defects in pipes, pipe joints, and manhole walls, which may include cracks, offset joints, root intrusion points, and broken pipes.

Figure 2-4 illustrates the possible sources and components of I/I.

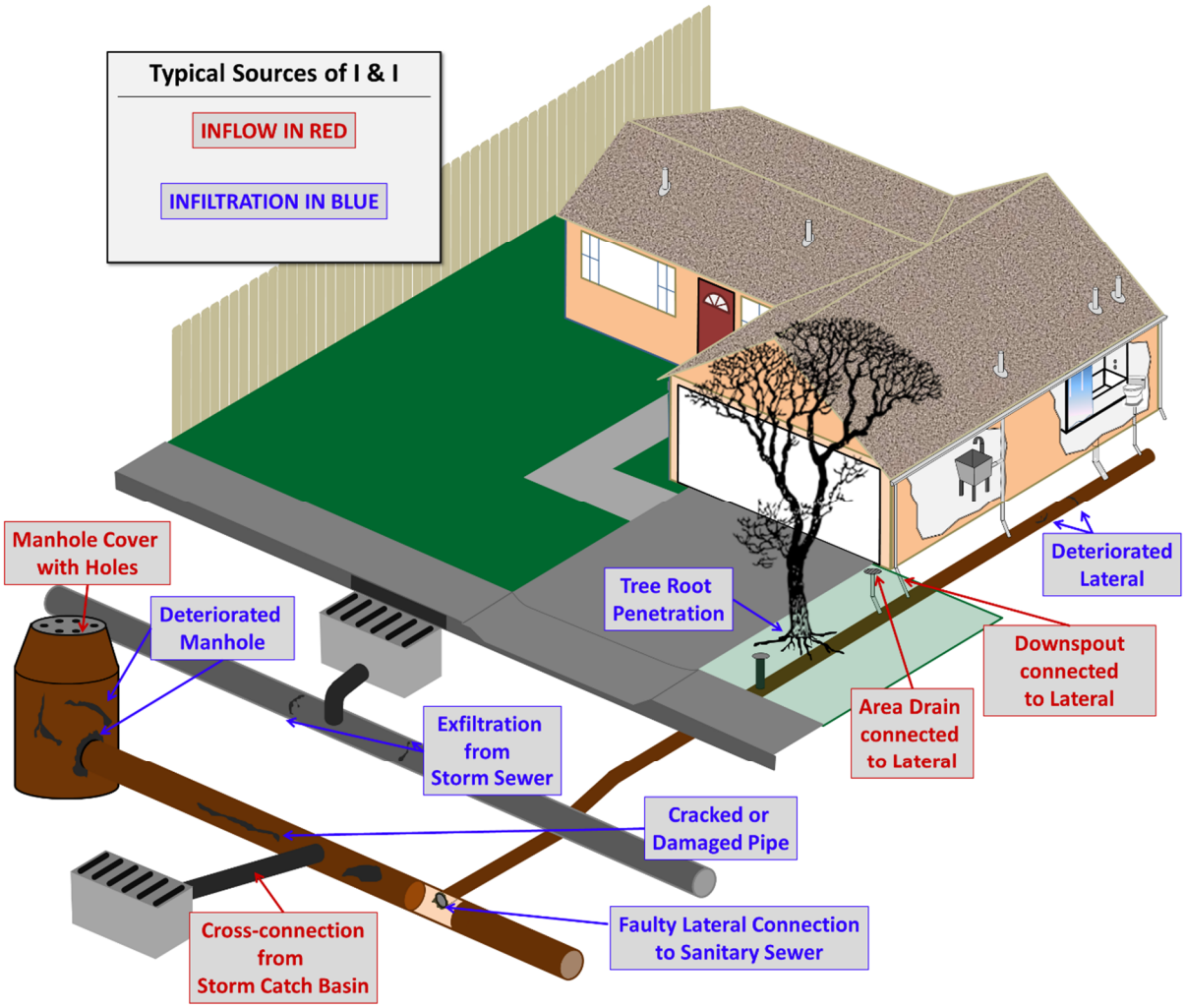


Figure 2-4. Typical Sources of Infiltration and Inflow

2.7.1 Infiltration Components

Infiltration can be further subdivided into components as follows:

- **Groundwater Infiltration**: Groundwater infiltration depends on the depth of the groundwater table above the pipelines as well as the percentage of the system submerged. The variation of groundwater levels and subsequent groundwater infiltration rates are seasonal by nature. On a day-to-day basis, groundwater infiltration rates are relatively steady and will not fluctuate greatly.
- **Rainfall-Dependent Infiltration**: This component occurs as a result of storm water and enters the sewer system through pipe defects, as with groundwater infiltration. The storm water first percolates directly into the soil and then migrates to an infiltration point. Typically, the time of concentration for rainfall-related infiltration may be 24 hours or longer, but this depends on the soil permeability and saturation levels.
- **Rainfall-Responsive Infiltration** is storm water which enters the collection system indirectly through pipe defects, but normally in sewers constructed close to the ground surface such as private laterals. Rainfall-responsive infiltration is independent of the groundwater table and reaches defective sewers via the pipe trench in which the sewer is constructed, particularly if the pipe is placed in impermeable soil and is bedded and backfilled with a granular material. In this case, the pipe trench serves as a conduit similar to a French drain, conveying storm drainage to defective joints and other openings in the system. This type of infiltration can have a quick response and graphically can look very similar to inflow.

2.7.2 Impact and Cost of Source Detection and Removal

- **Inflow**:
  - Impact: Inflow creates a peak flow problem in the sewer system and often dictates the required capacity of downstream pipes and transport facilities to carry these peak instantaneous flows. Because the response and magnitude of inflow are tied closely to the intensity of the storm event, the short-term peak instantaneous flows may result in surcharging and overflows within a collection system. Severe inflow may result in sewage dilution, resulting in upsetting the biological treatment (secondary treatment) at the treatment facility.
  - Cost of Source Identification and Removal: Inflow locations are usually less difficult to find and less expensive to correct. These sources include direct and indirect cross-connections with storm drainage systems, roof downspouts, and various types of surface drains. Generally, the costs to identify and remove sources of inflow are low compared to potential benefits to public health and safety or the costs of building new facilities to convey and treat the resulting peak flows.
- **Infiltration**:
  - Impact: Infiltration typically creates long-term annual volumetric problems. The major impact is the cost of pumping and treating the additional volume of water and of paying for treatment (for municipalities that are billed strictly on flow volume).
  - Cost of Source Detection and Removal: Infiltration sources are usually harder to find and more expensive to correct than inflow sources. Infiltration sources include defects in deteriorated sewer pipes or manholes that may be widespread throughout a sanitary sewer system.

2.7.3 Graphical Identification of I/I

Inflow is usually recognized graphically by large-magnitude, short-duration spikes immediately following a rain event. Infiltration is often recognized graphically by a gradual increase in flow after a wet-weather

event. The increased flow typically sustains for a period after rainfall has stopped and then gradually drops off as soils become less saturated and as groundwater levels recede to normal levels. Real-time flows are plotted against ADWF to analyze the I/I response to rainfall events. Figure 2-5 illustrates a sample of how this analysis is conducted and some of the measurements that are used to distinguish infiltration and inflow. Similar graphs have been generated for the individual flow monitoring sites and can be found in Appendix A.

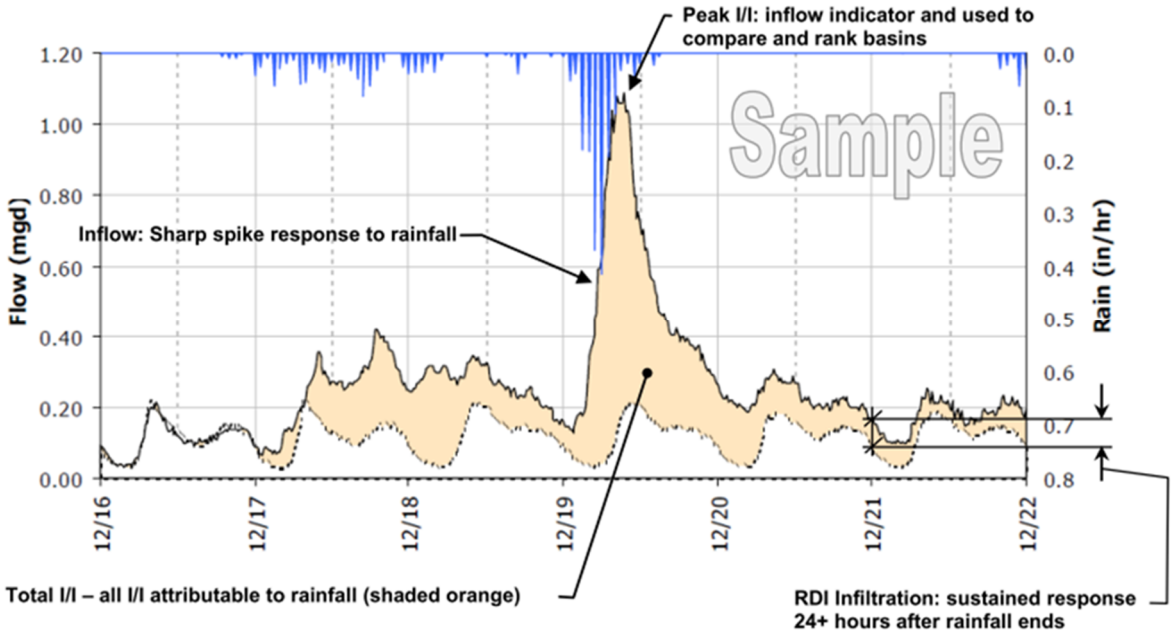


Figure 2-5. Sample Infiltration and Inflow Isolation Graph

2.7.4 Analysis Metrics

After differentiating I/I flows from ADWF flows, various calculations can be made to determine which I/I component (inflow or infiltration) is more prevalent at a particular site and to compare the relative magnitudes of the I/I components between drainage basins and between storm events:

- **Inflow – Peak I/I Flow Rate**: Inflow is characterized by sharp, direct spikes occurring during a rainfall event. Peak I/I rates are used for inflow analysis[3].
- **Groundwater Infiltration (GWI)**: GWI analysis is conducted by looking at minimum dry weather flow to average dry weather flow ratios and comparing them to established standards to quantify the rate of excess groundwater infiltration.
- **Rainfall-Dependent Infiltration (RDI)**: RDI Analysis is conducted by looking at the infiltration rates at set periods after the conclusion of a storm event. Depending on the particular collection system and the time required for flows to return to ADWF levels, different periods may be examined to determine the basins with the greatest or most sustained rainfall-dependent infiltration rates.
- **Combined I/I**: The combined inflow and infiltration is measured in gallons per site and per storm event. Because it is based on combined I/I volume, it is used to identify the overall volumetric influence of I/I within the monitoring basin.

[3] I/I flow rate is the real time flow less the estimated average dry weather flow rate. It is an estimate of flows attributable to rainfall. By using peak measured flow rates (inclusive of ADWF), the I/I flow rate would be skewed higher or lower depending on whether the storm event I/I response occurs during low-flow or high-flow hours.

2.7.5 Normalization Methods

There are three ways to *normalize* the I/I analysis metrics for an "apples-to-apples" comparison among the different drainage basins:

- **per-ADWF**: The metric is divided by the established average dry weather flow rate and typically expressed as a ratio. Peaking Factors are examples of using ADWF to normalize data from different sites.
- **per-IDM**: The metric is divided by the length of pipe (IDM [inch-diameter mile]) contained within the upstream basin. Final units typically are gallons per day (gpd) per IDM.
- **per-ACRE**: The metric is divided by the acreage of the upstream basin. Final units typically are gallons per day (gpd) per ACRE.

The infiltration and inflow indicators were normalized by the per-ADWF and per-ACRE methods in this report and these results will be shown in the following I/I analysis results sections. For the purposes of basin rankings, the following weighting decisions are given:

- **per-ADWF:** Per-ADWF metrics were assigned 40% weighting towards final rankings. It is noted that abnormal waste usage could result in low ADWF values, which could skew results and lend for possible misinterpretation of data.
- **per-ACRE:** Per-ACRE values were assigned 30% weighting towards final rankings. The topography known and should result in valid per-ACRE analyses.

  per-IDM: Per-IDM values were assigned 30% weighting towards final rankings.

3 Results and Analysis

3.1 Rainfall Monitoring

3.1.1 Rain Gauge Locations

V&A analyzed rainfall data from eleven publicly available private weather stations (PWS) on Weather Underground[4], choosing the best four locations, allowing for solid coverage over the collection system which has a diverse range of topographical features. Figure 3-1 illustrates the locations and labeling convention used for the four rain gauges.

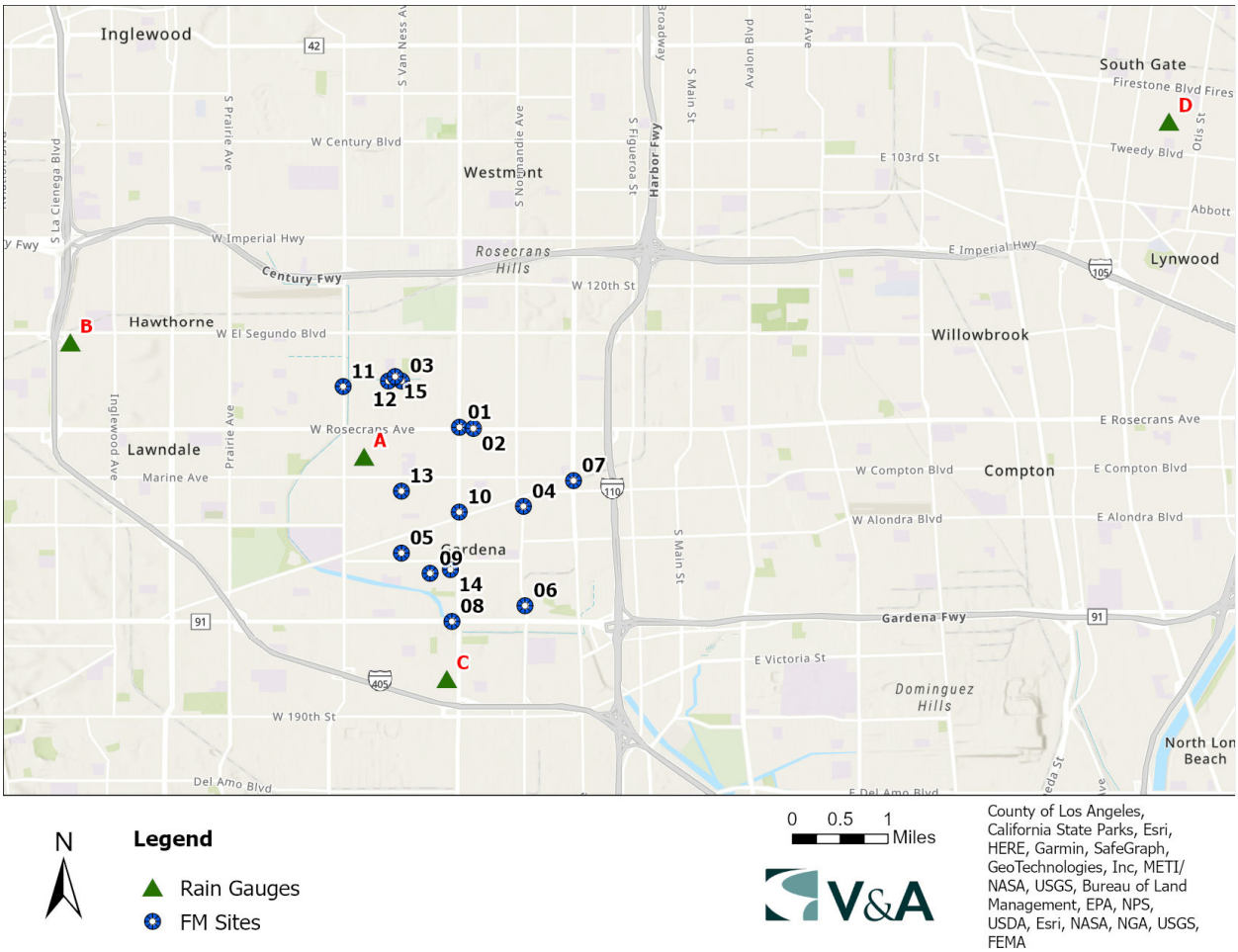


Figure 3-1. Location of Rain Gauges

[4] Weather Underground (wunderground.com) collects data from 180,000+ weather stations across the country, including Automated Surface Observation System (ASOS) at airports, personal weather stations (PWS), and Meteorological Assimilation Data Ingest System (MADIS) managed by the National Oceanic and Atmospheric Administration (NOAA). While V&A has no direct control over the rain gauges, V&A performs additional QA/QC on the data to assure its suitability for use.

3.1.2 Flow Study Rainfall Data

There was one main rainfall event that elicited some I/I response over the flow monitoring period, summarized in Table 3-1 and illustrated in Figure 3-2. Figure 3-3 shows the rain accumulation plot of the period rainfall, as well as the historical average rainfall[5] (City of Gardena-Human Services Department) over the project duration. The cumulative precipitation (triangulated) was approximately at 60% of historical precipitation averages over the specific duration of the flow monitoring.

Table 3-1. Summary of Rainfall Data

Rain Gauge	Rain Event 1 3/28/2022 - 3/29/2022	Monitoring Period Total (in)
A	1.27	*1.30*
B	1.35	*1.37*
C	1.30	*1.39*
D	1.24	*1.24*

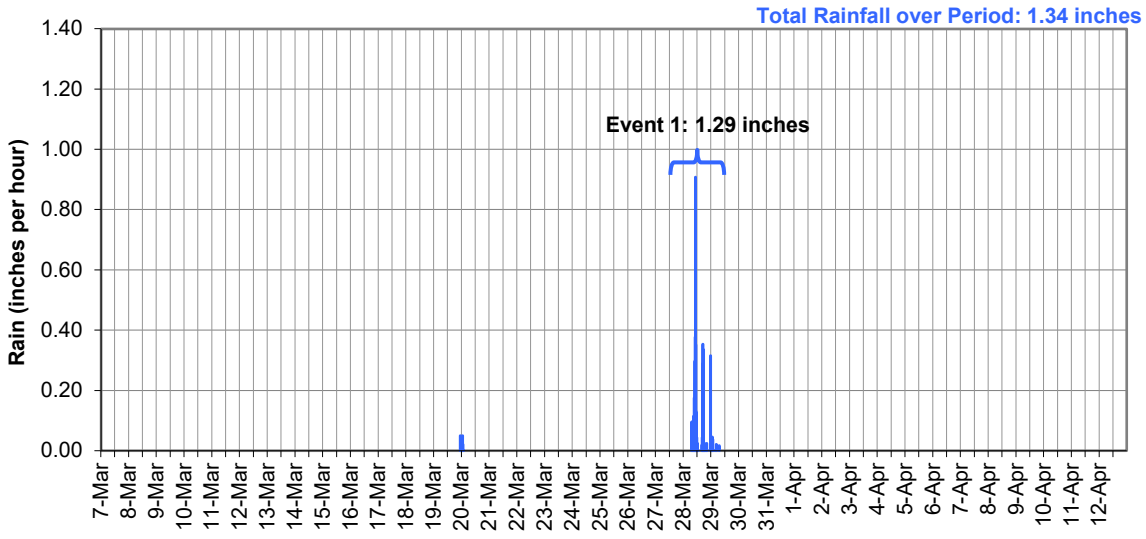


Figure 3-2. Rainfall Monitoring (triangulated to City of Gardena-Human Services Department)

[5] Historical data taken from the WRCC (Station 042493 in Downey, Station 048230 in Signal Hill, and Station 048973 in Torrance): http://www.wrcc.dri.edu/summary/climsmnca.html

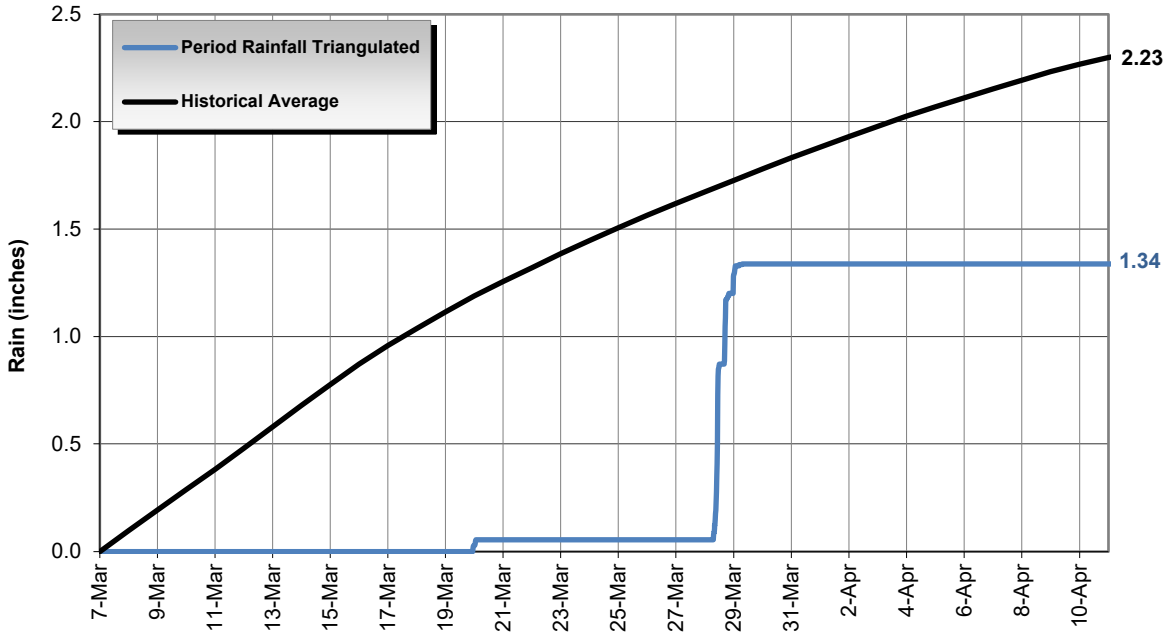


Figure 3-3. Rainfall Accumulation Plot

3.1.3 Regional Rainfall Event Classification

It is important to classify the relative size of a major storm event that occurs over the course of a flow monitoring period[6]. Rainfall events are classified by intensity and duration. Based on historical data, frequency contour maps for storm events of given intensity and duration have been developed by the NOAA for all areas within the continental United States (Figure 3-4).

For example, the NOAA Rainfall Frequency Atlas[7] classifies a 10-year, 24-hour storm event at the rain gauge A as 3.97 inches. This means that in any given year, at this specific location, there is a 10% chance that 3.97 inches of rain will fall in any 24-hour period.

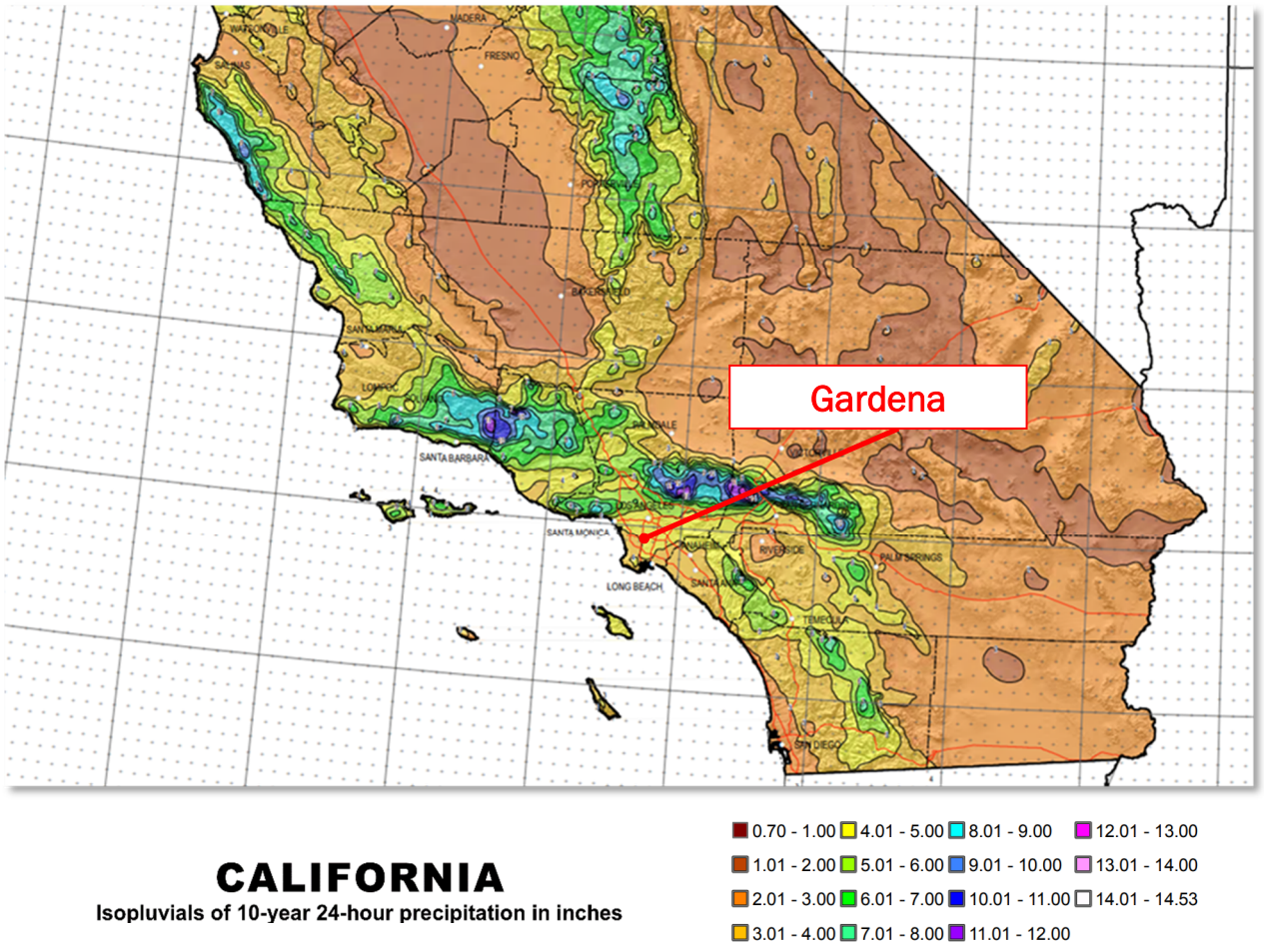


Figure 3-4. NOAA Northern California Rainfall Frequency Map

From the NOAA frequency maps, for a specific latitude and longitude, the rainfall densities for period durations ranging from 1 hour to 20 days are known for rain events ranging from 1-year to 10-year intensities. These are plotted to develop a rain event frequency map specific to each rainfall monitoring

[6] Sanitary sewers are often designed to withstand I/I contribution to sanitary flows for specific-sized "design" storm events.

[7] NOAA Western U.S. Precipitation Frequency Maps Atlas 14, Volume 6, 2011: ftp://hdsc.nws.noaa.gov/pub/hdsc/data/sw/ca10y24h.pdf

site. Superimposing the peak measured densities for the rainfall events on the rain event frequency plot determines the classification of the rainfall event.

Figure 3-5 and Figure 3-6 show the peak classification plot for the rain gauge B. Table 3-2 summarizes the peak classifications for each rain gauge and each rain event of this study.

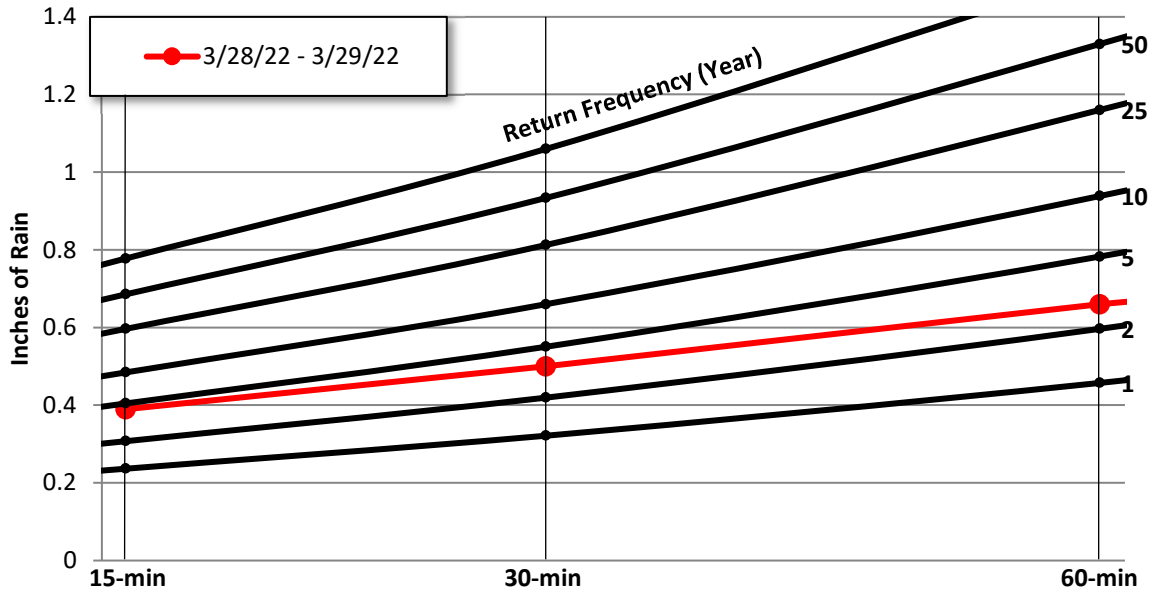


Figure 3-5. Rainfall Event Classification – 60-Min Period (RG B)

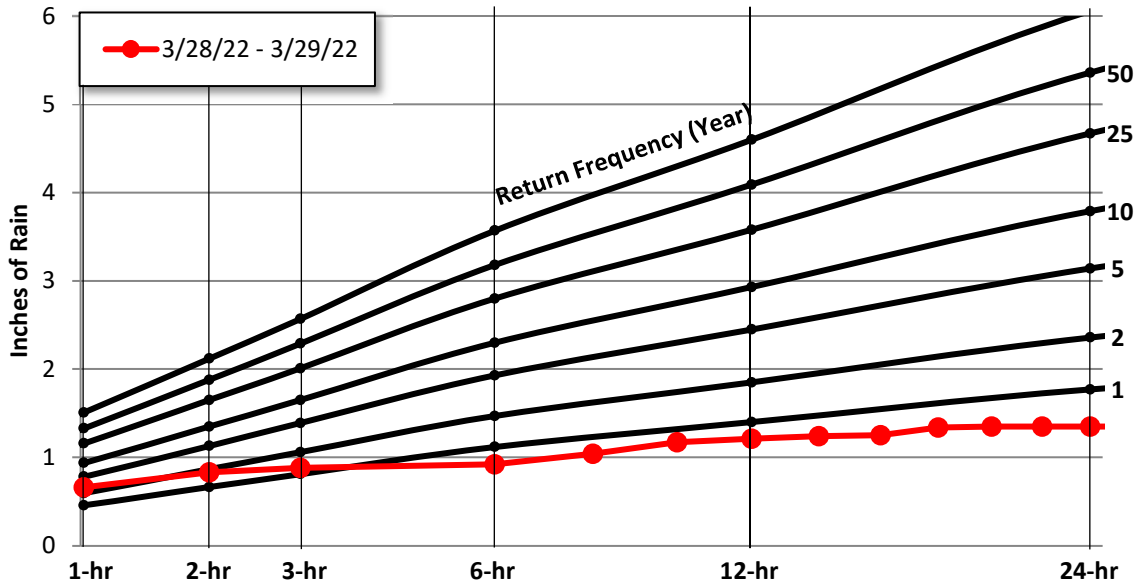


Figure 3-6. Rainfall Event Classification – 24-Hour Period (RG B)

Table 3-2. Rainfall Event Classification Summary

Rain Gauge	Rain Event #1 Classification
A	<1-Yr, 1 Day
B	4-Yr, 15-Min
C	1.5-Yr, 1-Hr
D	1.5-Yr, 2-Hr

3.1.4 Rain Gauge Triangulation Distribution

The rainfall affecting the sanitary sewer collection system basins must be calculated based on the proximity to the rain gauge locations. The mean precipitation for each site's upstream basin was calculated by taking data from the rain gauges and using the inverse distance weighting (IDW) method. IDW is an interpolation method that assumes the influence of each rain gauge location diminishes with distance. The center of an upstream basin[8] is identified, and a weighted triangulated average is taken of the precipitation data from nearby rain gauge locations.

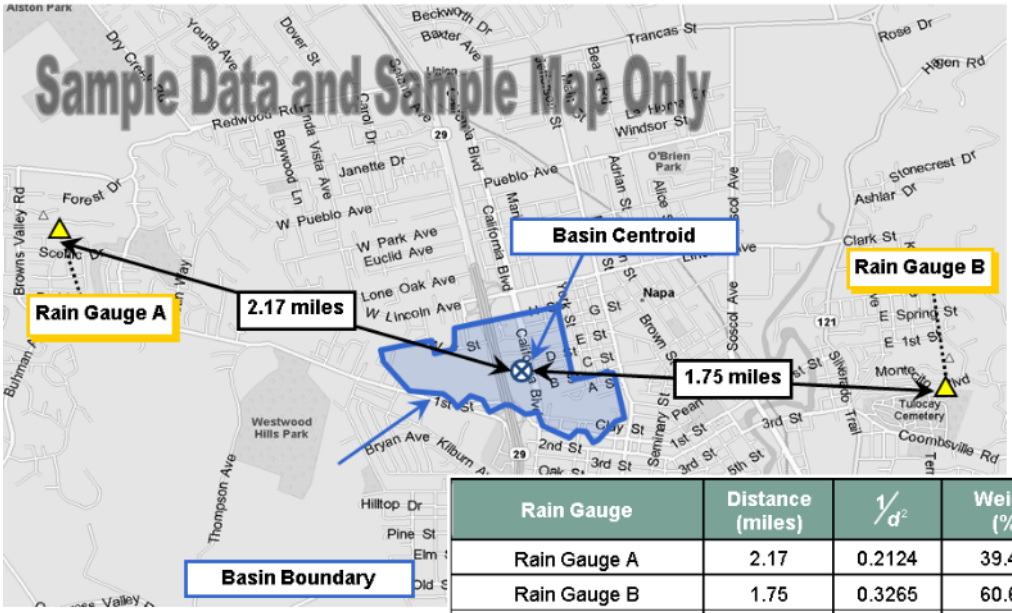
The IDW function is as follows:

$$weight(d) = \frac{1/d^p}{\sum 1/d^p},$$

where: d = distance
p = power ($p > 0$)

The value of p is user defined. The most common choice for hydrological studies of watershed areas is $p = 2$.

Figure 3 6 illustrates the IDW method with sample data. The rain gauge distribution as calculated for each flow monitoring site is shown in Table 3-3.



Rain Gauge	Distance (miles)	$1/d^2$	Weight (%)
Rain Gauge A	2.17	0.2124	39.4%
Rain Gauge B	1.75	0.3265	60.6%
Totals		**0.5389**	**100%**

Figure 3-7. Rainfall Inverse Distance Weighting Method

[8] Note that the full basin upstream of the site was used instead of the isolated basins as the rain data will be compared to the flow at each site

Table 3-3. Rain Gauge Distribution per Monitoring Site

Monitoring Site	A	B	C	D
Site 1	72%	11%	14%	4%
Site 2	66%	10%	20%	5%
Site 3	79%	11%	8%	1%
Site 4	63%	7%	28%	2%
Site 5	88%	6%	6%	0%
Site 6	43%	6%	51%	1%
Site 7	54%	9%	33%	4%
Site 8	32%	5%	63%	0%
Site 9	67%	10%	20%	3%
Site 10	79%	4%	16%	0%
Site 11	81%	13%	7%	0%
Site 12	81%	13%	7%	0%
Site 13	88%	7%	5%	1%
Site 14	68%	10%	19%	4%
Site 15	79%	13%	8%	0%

3.2 Flow Monitoring

3.2.1 Average Flow Analysis

Average dry weather flow (ADWF) curves were established during dry days when I/I had the least impact on the baseline flow. Table 3-4 summarizes the dry weather flow data measured for this study. ADWF curves for each site can be found in Appendix A. Figure 3-8 shows a flow schematic of the average daily flows and levels. The following ADWF analysis results are noted:

- Sites 2, 8, 9, and 14 had 1 to 1.5 inches of sediment measured in the pipe channel.
- Sites 4 and 8 had an average flow level greater than 50% pipe diameter (greater than 0.5 d/D).
- Site 11 was measuring a flow split and had very low ADWF.

Table 3-4. Dry Weather Flow

Monitored Site	Sediment (in.)	Average d/D Ratio	Mon-Thu ADWF (MGD)	Friday ADWF (MGD)	Saturday ADWF (MGD)	Sunday ADWF (MGD)	Overall ADWF (MGD)
Site 1	none	0.40	0.707	0.718	0.576	0.515	0.663
Site 2	1	0.40	0.429	0.432	0.432	0.438	0.431
Site 3	none	0.34	0.512	0.490	0.511	0.486	0.505
Site 4	none	0.54	0.575	0.551	0.585	0.597	0.576
Site 5	none	0.48	1.830	1.804	1.816	1.823	1.823
Site 6	none	0.49	0.860	0.845	0.867	0.876	0.862
Site 7	none	0.29	0.523	0.501	0.486	0.433	0.502
Site 8	1.25	0.50	1.458	1.447	1.445	1.493	1.460
Site 9	1.5	0.28	2.763	2.769	2.676	2.507	2.715
Site 10	none	0.18	0.090	0.099	0.096	0.099	0.093
Site 11	none	0.02	0.0001	0.0001	0.0001	0.0001	0.0001
Site 12	none	0.16	0.143	0.151	0.141	0.136	0.143
Site 13	none	0.47	1.522	1.499	1.508	1.519	1.516
Site 14	1.5	0.34	2.728	2.707	2.576	2.463	2.666
Site 15	none	0.17	0.136	0.129	0.116	0.118	0.130
Site 11+12[A]	none	n/a	0.143	0.151	0.141	0.136	0.143
Site 13+14[A]	none	n/a	4.250	4.206	4.084	3.982	4.182
Site 5+9[A]	none	n/a	4.593	4.573	4.491	4.330	4.538

[A] There are splits and cross-connections upstream from Sites 11 and 12, Sites 13 and 14, Sites 5 and 9. So, these sites were shown with combined flow data for an isolated upstream flow basin condition. Flow depth calculations are not applicable (n/a) for these locations.

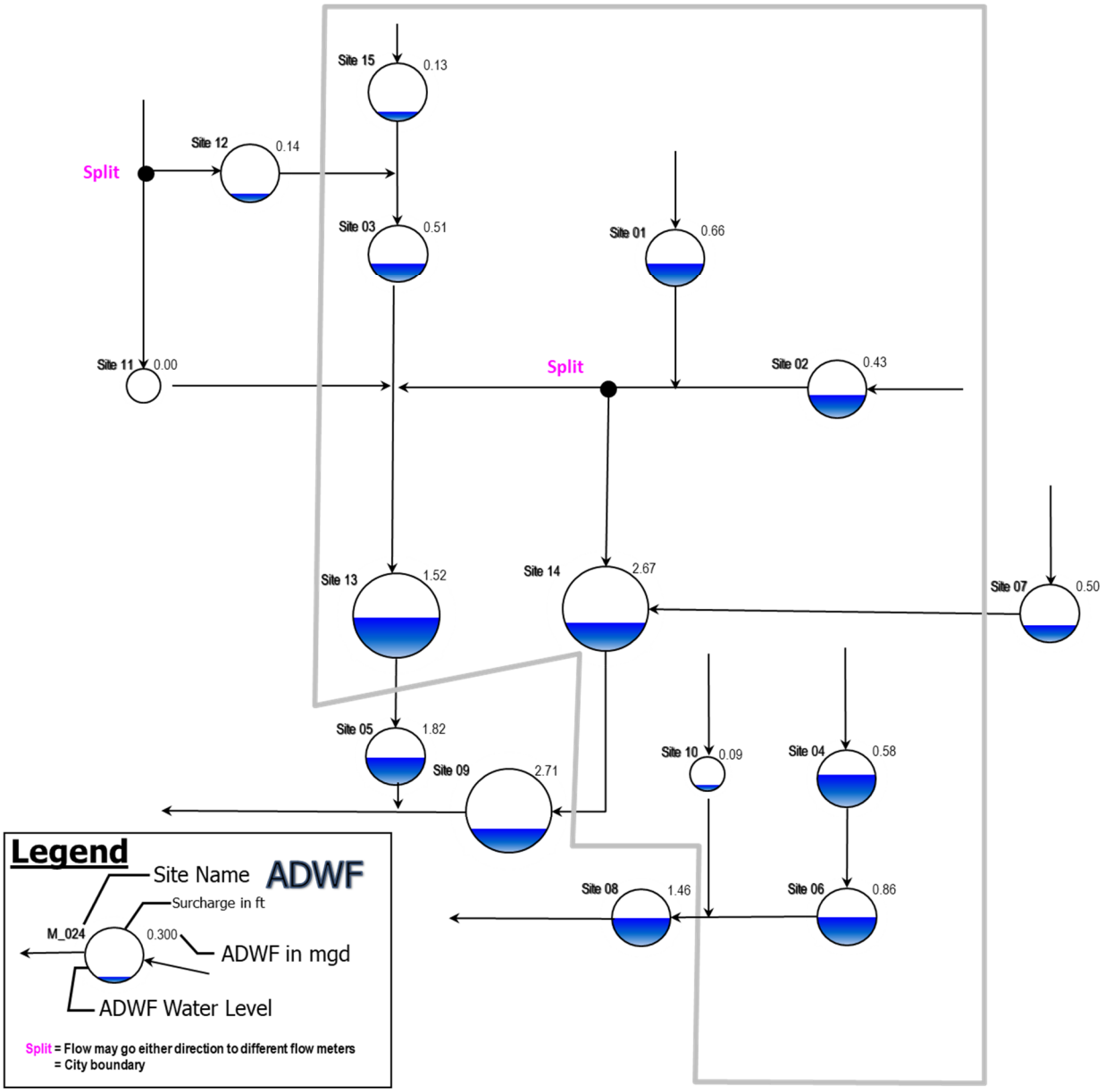


Figure 3-8. Average Dry Weather Flow (Flow Schematic)

3.2.2 Peak Measured Flows and Pipeline Capacity Analysis

Peak measured flows and the hydraulic grade line data (flow depths) are important to understanding the capacity limitations of a collection system. The peak flows and flow levels are the peak measurements taken across the entirety of the flow monitoring period. For this study, peak flows and peak levels corresponded to rainfall events. The following capacity analysis definitions will be used:

- **Peaking Factor (PF)** is defined as the peak measured flow divided by the average dry weather flow (ADWF). Peaking factors are influenced by many factors, including size and topography of tributary area, flow attenuation, flow restrictions, characteristics of I/I entering the collection system, and hydraulic features such as pump stations.
  - For this report, PF > 5 are highlighted in RED[9]; however, the City should refer to City standards when evaluating peaking factors. Peaking factor data should be used at the discretion of the City Engineer.
- **d/D Ratio** is the peak measured depth of flow (d) divided by the pipe diameter (D). The d/D ratio for each site is computed based on the maximum depth of flow for the study. Standards for d/D ratio vary from agency to agency, but typically range between d/D ≤ 0.5 and d/D ≤ 0.75
  - For this report, d/D ratios > 0.75 are highlighted in RED; however, the City should refer to City standards when evaluating d/D ratios, to be used at the discretion of the City Engineer.

Table 3-5 summarizes the peak recorded flows, depths, *d/D* ratios, and peaking factors per site during the flow monitoring period. Capacity analysis data are presented on a site-by-site basis and represents the hydraulic conditions only at the site locations; hydraulic conditions in other areas of the collection system will differ. Figure 3-9 and Figure 3-10 show bar graph summaries of the peaking factors and d/D ratios, respectively. Figure 3-11 shows the schematic diagram of the peak measured flows in each section with peak flow levels.

The following capacity analysis results are noted:

- Peaking Factors
  - Only Site 9 has peaking factor over 5.
  - Site 11 is measuring a flow split. Due to the extremely low ADWF number, Site 11's peaking number is highly skewed thus not shown in the report.
- d/D Ratio:
  - d/D > 0.75: Sites 4, 5, and 6 had d/D ratios greater than 0.75 but did not surcharge during this study.
  - d/D > 1.0: Sites 1, 2, 9, and 13 reached a surcharge condition during this study. Peak flow depths for all sites were less than half a foot above the pipe crown.

[9] WEF Manual of Practice FD-6 and ASCE Manual No. 62 suggests typical peaking factor ratios range between 3 and 4, with higher values possibly indicative of pronounced I/I flows.

Table 3-5. Capacity Analysis Summary

Site	ADWF (MGD)	Peak Measured Flow (MGD)	Peaking Factor	Pipe Diameter, *D* (IN)	Max Depth, *d* (IN)	Max Depth, d(IN)	Surcharge above Pipe Crown (FT)
Site 1	0.663	3.04	4.6	21	25.17	1.20	0.35
Site 2	0.431	1.26	2.9	18	24.34	1.35	0.53
Site 3	0.505	2.32	4.6	18	13.22	0.73	-
Site 4	0.576	1.48	2.6	16	14.25	0.92	-
Site 5	1.823	4.34	2.4	24	20.23	0.84	-
Site 6	0.862	2.48	2.9	18	14.40	0.80	-
Site 7	0.502	1.18	2.3	21	10.10	0.48	-
Site 8	1.460	3.42	2.3	24	18.25	0.76	-
Site 9	2.715	6.09	2.2	30	32.03	1.07	0.17
Site 10	0.093	0.42	4.5	12	5.06	0.42	-
Site 11	n/a	0.02	n/a	10	1.64	0.16	-
Site 12	0.143	0.33	2.3	18	4.20	0.23	-
Site 13	1.516	4.13	2.7	25	26.84	1.07	0.15
Site 14	2.666	6.47	2.4	28	18.49	0.66	-
Site 15	0.130	0.69	5.3	18	5.30	0.29	-
Site 11+12[A]	0.143	n/a	n/a	n/a	n/a	n/a	-
Site 13+14[A]	4.182	n/a	n/a	n/a	n/a	n/a	-
Site 5+9[A]	4.538	n/a	n/a	n/a	n/a	n/a	-

[A] There are splits and cross-connections upstream from Sites 111 and 12, Sites 13 and 14, Sites 5 and 9. So, these sites were shown with combined flow data for an isolated upstream flow basin condition. Flow depth calculations are not applicable (n/a) for these locations.

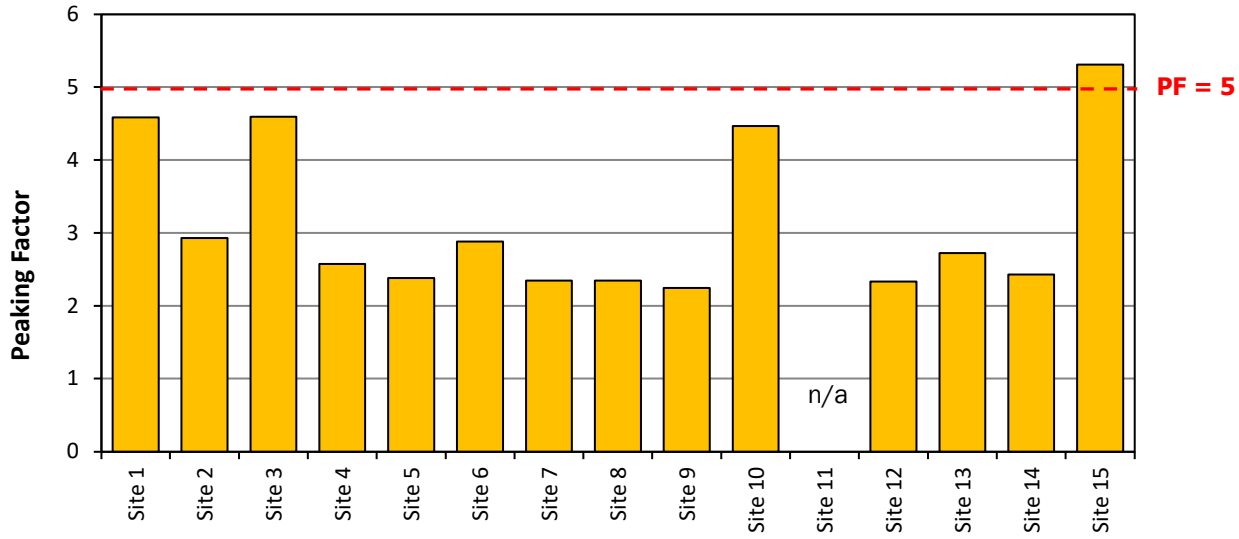


Figure 3-9. Peaking Factors

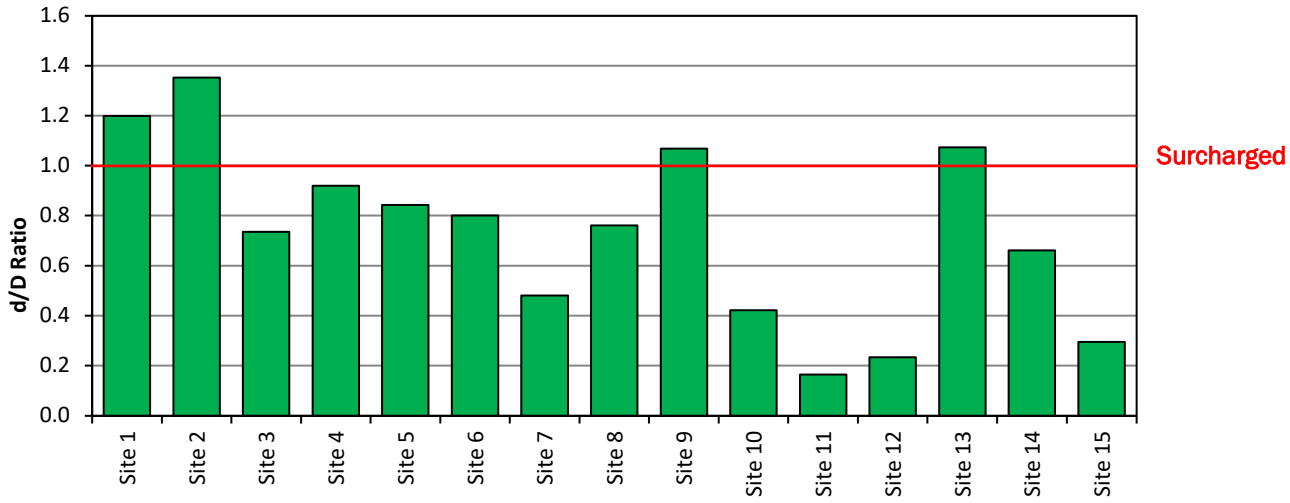


Figure 3-10. Capacity Summary: Max d/D Ratios

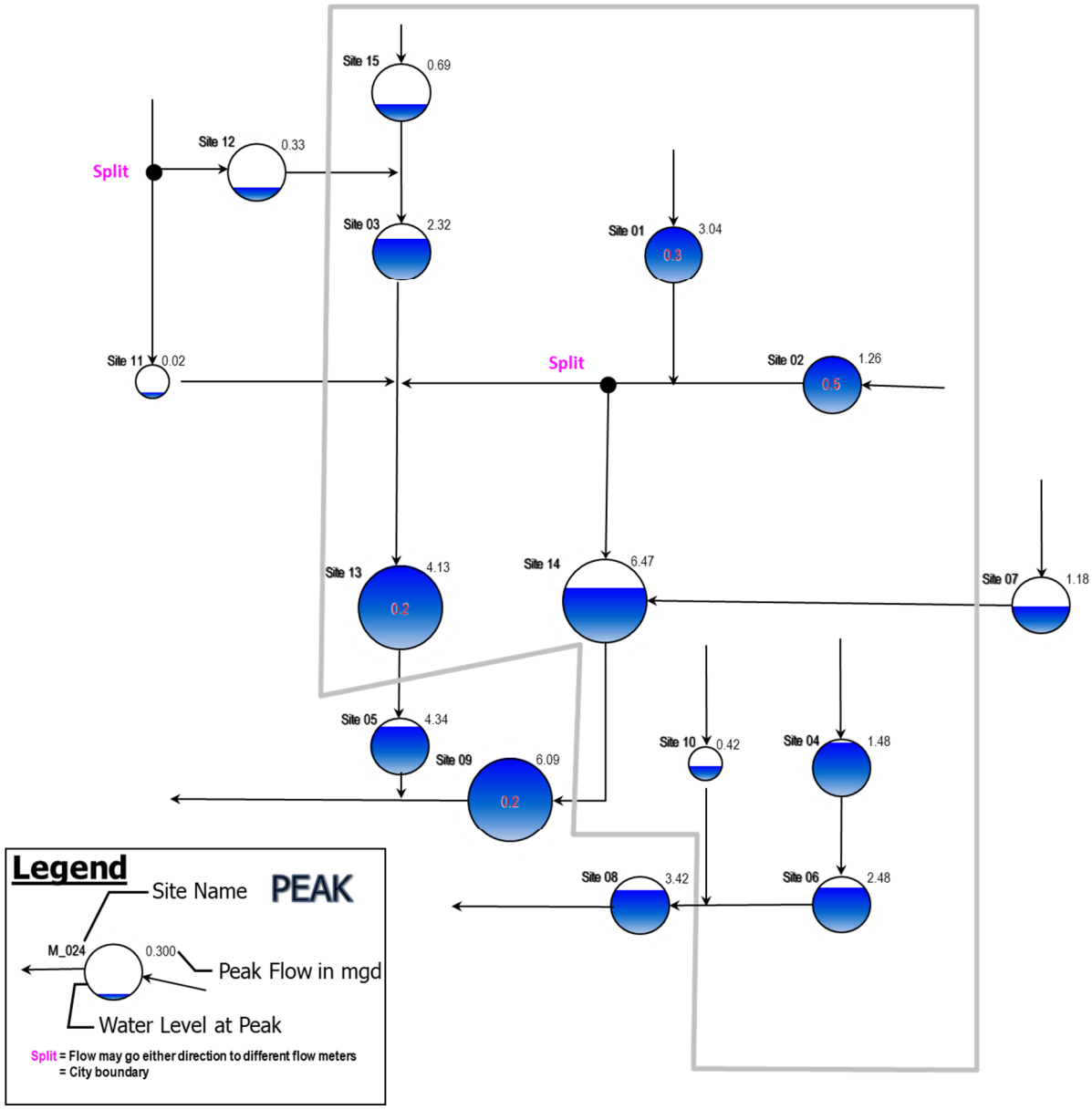


Figure 3-11. Peak Measured Flow (Flow Schematic)

3.3 Inflow and Infiltration: Results

3.3.1 Preface

I/I analyses are presented on a basin-by-basin basis. Items relevant to the analysis in this study are noted below and referenced in Figure 3-12:

- **I/I Isolation**: The I/I flow rate is the real-time flow less the estimated average dry weather flow rate (shown below as the RED line).
- **Inflow**: Inflow is usually recognized graphically by large-magnitude, short-duration spikes immediately following a rain event. The peak inflow rate is the highest spike in the isolated I/I hydrograph immediately following the evaluated rainfall event.
- **RDI**: RDI is typically taken as the average I/I flow rate measured approximately 24 hours after the rainfall event has concluded.
- **Combined I/I**: the totalized volume (in gallons) of both inflow and RDI over the course of a rainfall event (shown below as the shaded orange area).

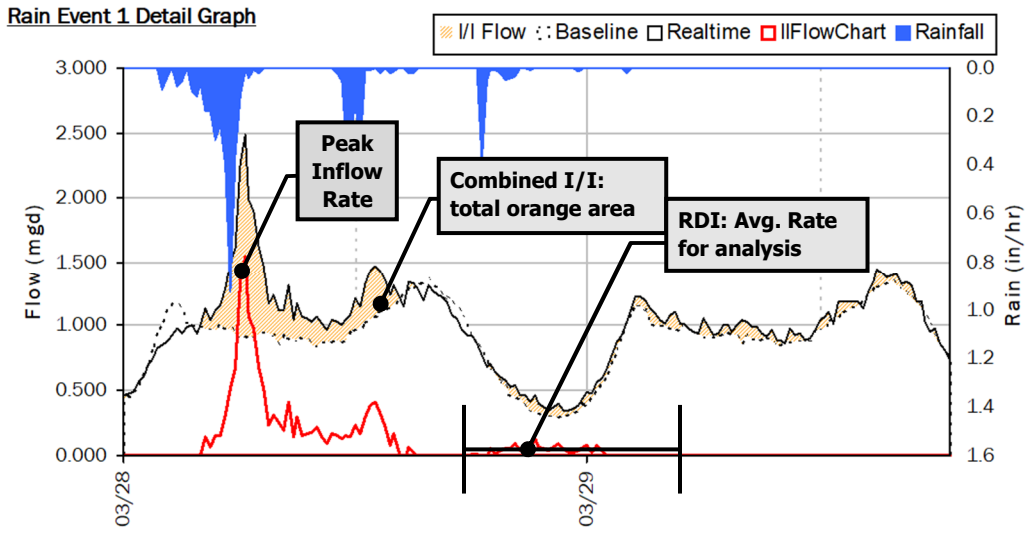


Figure 3-12. I/I Isolation, Site 6, Storm Event 1

To isolate the sewerage areas of some flow monitoring basins, a subtraction of flow(s) was required. It is also noted that Sites 3, 5, 9, 11 ,12, 13 and 14 have multiple contributing upstream flow monitoring sites and are subject to inflating uncertainties. Please reference Section 1.2 and Section 2.4 for information on this subject.

During the study, three sites (Sites 5 ,8 and 9) were installed to monitor flows exiting City of Gardena; meanwhile, another three sites (Site 7, 11 and 12) were chosen to monitor the flows entering City of Gardena.

Please note that RDI was not quantifiable for such a small rain event and GWI was not found during this study, thus they will not be included in the report.

3.3.2 Inflow Results Summary

Inflow is storm water discharged into the sewer system through direct connections such as downspouts, area drains, cross-connections to catch basins, etc. These sources transport rainwater directly into the sewer system, and the corresponding flow rates are tied closely to the intensity of the storm. This component of I/I often causes a peak flow problem in the sewer system and often dictates the required capacity of downstream pipes and transport facilities to carry these peak instantaneous flows.

Table 3-6 summarizes the peak measured inflow and inflow analysis results for the relevant flow monitoring basins. Figure 3-13 shows a temperature map summary of the inflow analysis results per basin. The "Top 3" basins for each category have been shaded in RED. The following inflow results are noted:

- The I/I analysis for Basins 7 and 11+12 are not listed because they originate from outside the City of Gardena. Sites 7, 11, and 12 were employed to monitor the boundary conditions into Gardena
- Basin 5+9's peak inflow I/I response is negligible as it is largely contributed by its upstream basins instead of its own isolated flow basin.
- Basins 1, 3, and 10 had the highest weighted, normalized peak I/I rates, an indicator of high inflow upstream from the flow monitoring basin. Please note that Basins 1 and 3 are both ranked No.2 in the table

Table 3-6. Results and Rankings of Inflow Analysis

Monitoring Basin	ADWF (mgd)	Basin Acreage	Inflow Rate (mgd)	Inflow per-IDM Ranking	Inflow per-Acre Ranking	Inflow per-ADWF Ranking	Final Inflow Ranking
Basin 1	0.663	416	2.106	1	3	4	2
Basin 2	0.431	618	0.797	7	8	6	7
Basin 3	0.233	212	1.042	4	4	1	2
Basin 4	0.576	149	0.860	2	2	7	5
Basin 6	0.285	373	0.740	6	6	5	6
Basin 7	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Basin 8	0.505	494	0.022	9	9	9	9
Basin 10	0.093	43	0.305	3	1	3	1
Basin 15	0.130	123	0.528	5	5	2	4
Basin11+12	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Basin13+14	2.583	756	0.995	8	7	8	8
Basin 5+9	0.356	32	Negligible	10	10	10	10

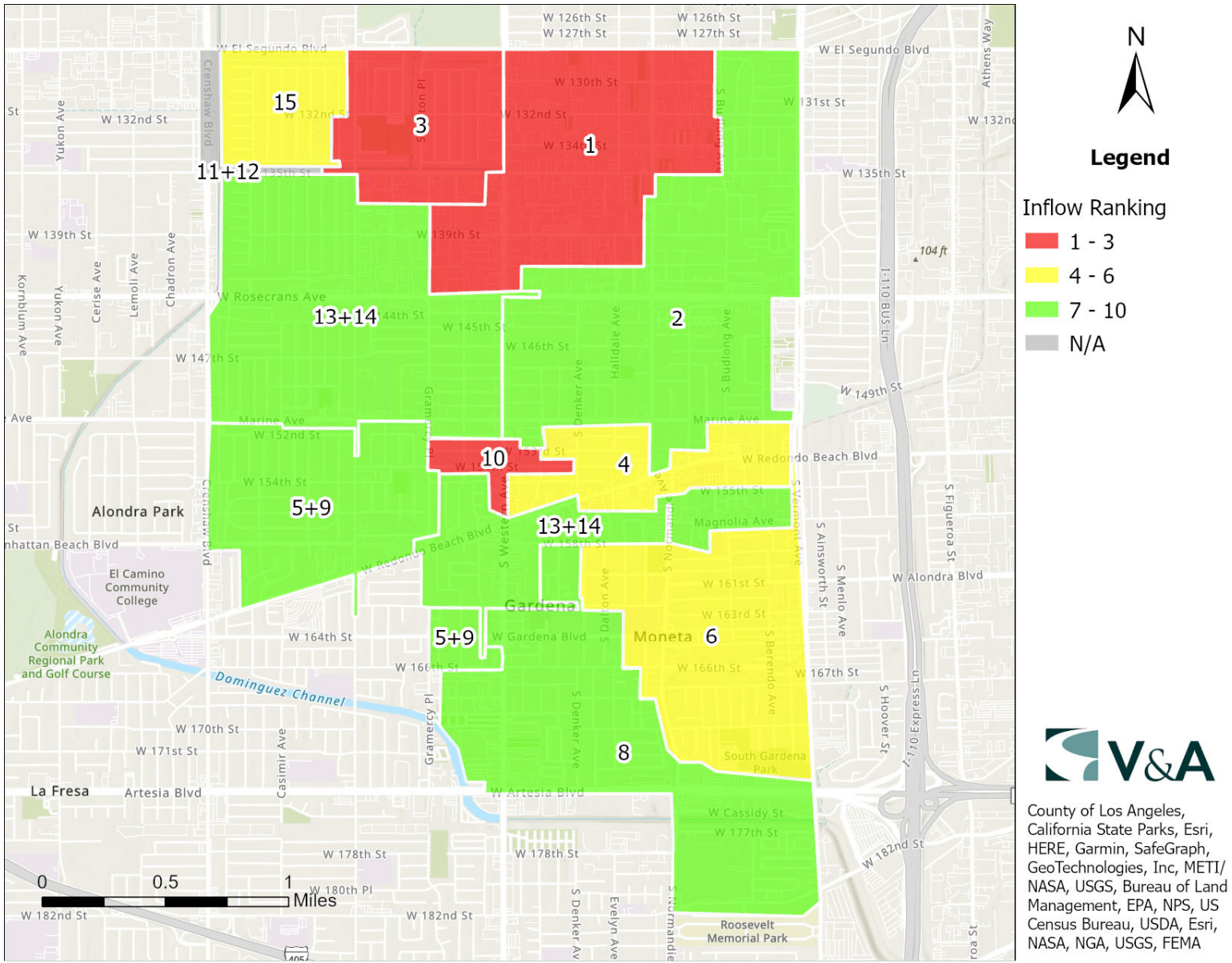


Figure 3-13. Temperature Map: Inflow Final Basin Rankings

3.3.3 Combined I/I Results

Combined I/I analysis considers the totalized volume (in gallons) of both inflow and rainfall-dependent infiltration over the course of a storm event.

Combined I/I results were taken from both Rainfall Events 1 and 2. Table 3-6 summarizes the combined I/I analysis results for the relevant flow monitoring basins. Figure 3-14 shows a temperature map summary of the combined I/I analysis results per basin. The "Top 3" basins for each category have been shaded in RED. The following inflow results are noted:

- The I/I analysis for Basins 7 and 11+12 are not listed because they originate from outside the City of Gardena. Sites 7, 11, and 12 were employed to monitor the boundary conditions into Gardena
- Basins 1, 3, and 15 had the highest weighted, normalized combined rates, an indicator of high combined total I/I upstream from the flow monitoring basin.

Table 3-7. Combined I/I Analysis Summary

Monitoring Basin	ADWF (mgd)	Basin Acreage	Combined I/I (gallons)	R-Value (%)	Combined I/I per IDM Ranking	Combined I/I per Acre Ranking	Combined I/I per ADWF Ranking	Final Combined I/I Ranking
Basin 1	0.663	416	242,901	1.82%	1	4	3	3
Basin 2	0.431	618	52,741	0.27%	10	9	7	9
Basin 3	0.233	212	133,603	1.95%	4	2	2	2
Basin 4	0.576	149	89,265	1.90%	2	3	6	5
Basin 6	0.285	373	50,827	0.45%	8	8	5	6
Basin 7	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Basin 8	0.505	494	37,608	0.26%	9	10	10	10
Basin 10	0.093	43	10,641	0.77%	6	7	8	8
Basin 15	0.130	123	80,267	2.01%	3	1	1	1
Basin11+12	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Basin13+14	2.583	756	294,957	1.20%	5	5	9	7
Basin5+9	0.356	32	91,192	8.88%	7	6	4	4

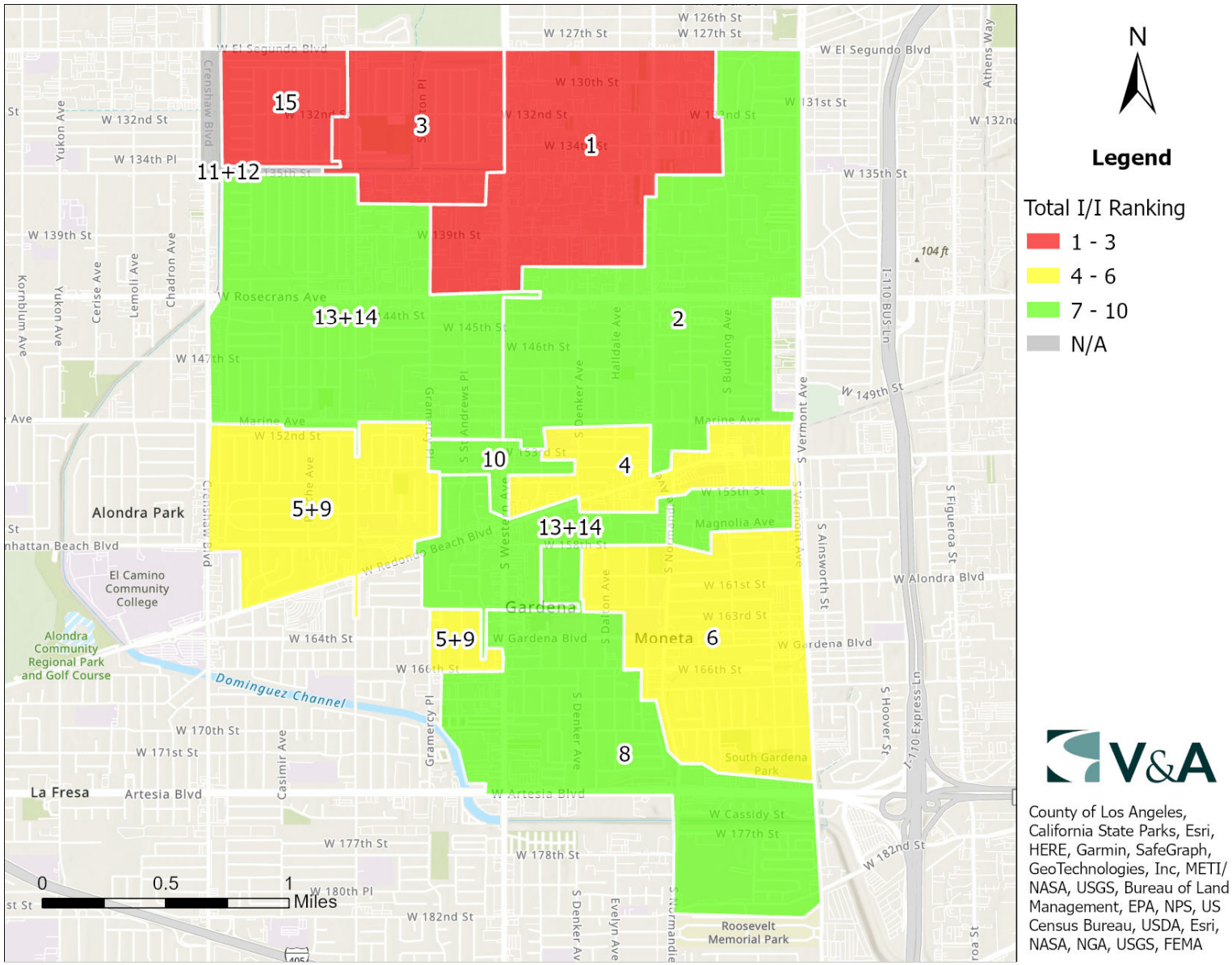


Figure 3-14. Temperature Map: Combined I/I Final Basin Rankings

4 Recommendations

V&A advises that future I/I reduction plans consider the following recommendations:

1. **Master Plan and Model Implementation**: This study focuses on inflow and infiltration generation; the study results can be used to update the master plan and compare with previous model assumptions and flow monitoring results.
    a. **Verify Interconnections and Overflows**: understanding the interconnections and overflows can help with the master plan, basin isolation, and I/I analysis.
2. **Capacity Analysis**: Four sites surcharged during the monitoring period. Global capacity constraints will be addressed in the updated master plan. The following possible capacity concerns are noted:
    a. **Dry weather**: Sites 4 and 8 exceeded 0.5 d/D Dry Weather. Sites 2, 8, 9, and 14 had from 1 to 1.5 inches of sediment measured in the pipe channel. The City may wish to investigate the cleaning frequency of this line and review headworks operations.
    b. **Wet Weather**: Sites 1, 2, 4, 5 ,6 ,9 and 13 had d/D ratios greater than 0.75. Sites 1, 2, 9, and 13 reached a surcharge condition during this study;
3. **Determine I/I Reduction Program**: The City should examine its I/I reduction needs to determine their needs and goals for a future I/I reduction program.
    a. If peak flows, sanitary sewer overflows, and pipeline capacity issues are of greater concern, then priority can be given to investigate and reduce sources of inflow within the basins with the greatest inflow problems. The highest inflow occurred within Basins 1, 3, and 10.
    b. If total infiltration and general pipeline deterioration are of greater concern, then the program can be weighted to investigate and reduce sources of infiltration within the basins with the greatest infiltration problems. The highest total infiltration occurred within Basins 1, 3, and 15.
4. **I/I Investigation Methods**: Potential I/I investigation methods include the following:
    a. Smoke testing.
    b. Mini-basin flow monitoring.
    c. Night-time reconnaissance work to (1) investigate and determine direct point sources of inflow and (2) determine the areas and/or pipe reaches responsible for high levels of infiltration contribution.
    d. CCTV inspection.
5. **I/I Reduction Cost Effective Analysis**: The City should conduct a study to determine which is more cost-effective: (1) locating the sources of inflow/infiltration and systematically rehabilitating or replacing the faulty pipelines; or (2) continued treatment of the additional rainfall dependent I/I flow.

Appendix A
Flow Monitoring Sites: Data, Graphs, Information

X

Monitoring Site: Site 1

Carollo Gardena, California

Sanitary Sewer Flow Monitoring

March 07, 2022 - April 12, 2022

Location: S Western Avenue and Rosecrans Avenue

Data Summary Report

Vicinity Map: Site 1

SITE 1

Site Information MH ID: 05 1151

Location: S Westem Avenue and Rosecrans Avenue

Coordinates: 118.3091° W, 33.9022° N

Rim Elevation (Earth): 48 feet

Expected Pipe Diameter: 18 inches

Measured Pipe Diameter: 21 inches

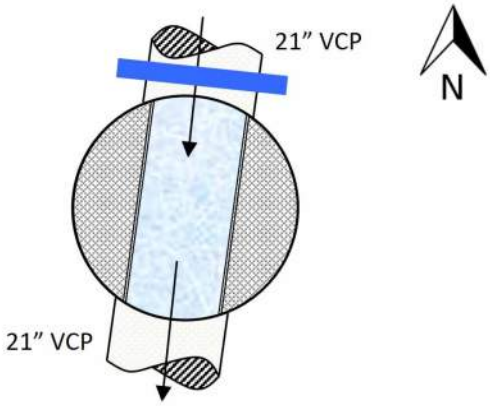
ADWF: 0.665 mgd

Peak Measured Flow: 3.036 mgd

Sediment: None

Satellite Map

Sanitary Map



Flow Sketch

Street View

Plan View

SITE 1

Additional Site Photos

Effluent Pipe

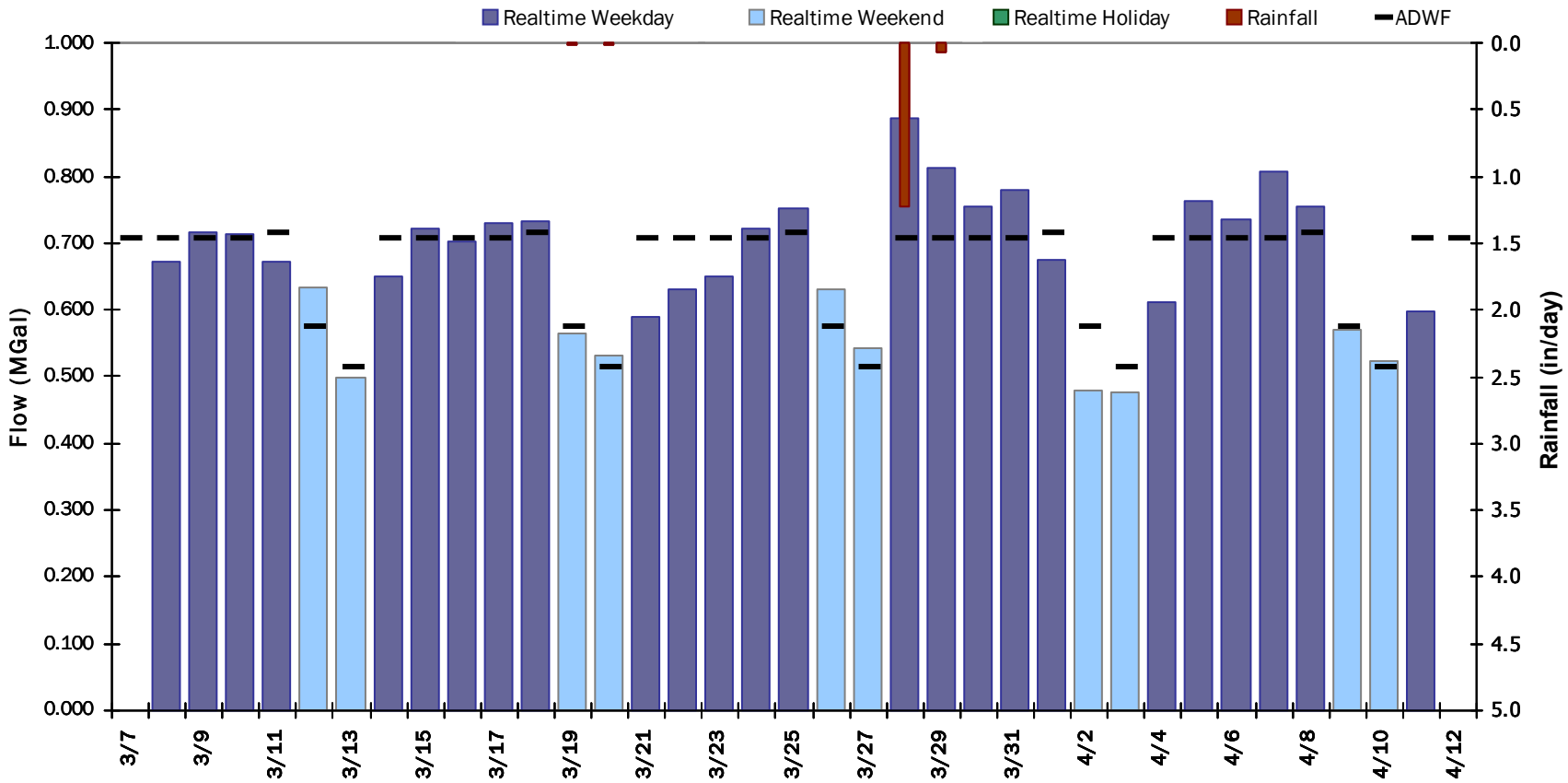
Monitored Influent Pipe

SITE 1

Period Flow Summary: Daily Flow Totals

Avg Daily Flow: 0.667 MGal Peak Daily Flow: 0.888 MGal Min Daily Flow: 0.477 MGal

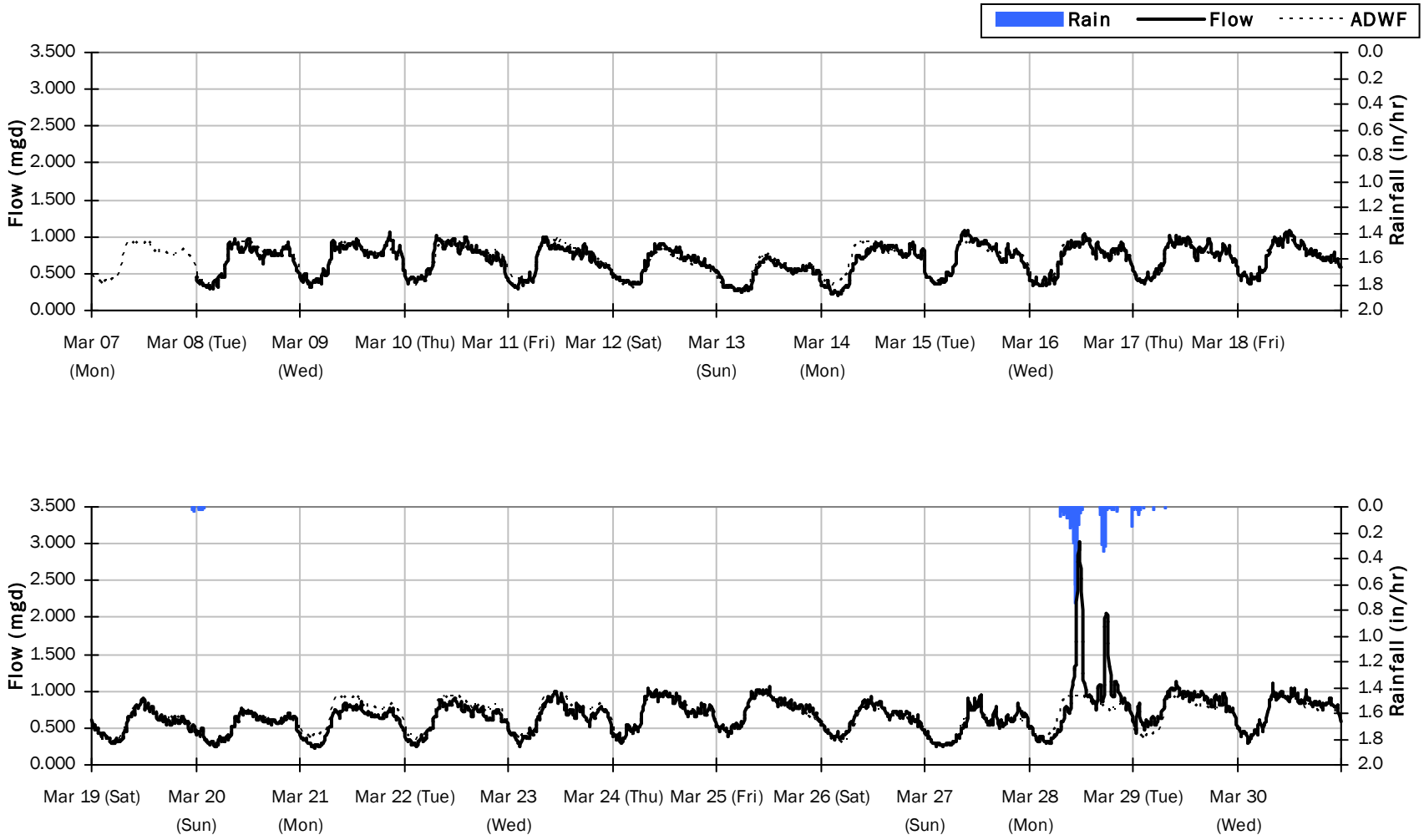
Total Rainfall: 1.33 inches



SITE 1

Flow Summary: 3/7/2022 to 3/30/2022

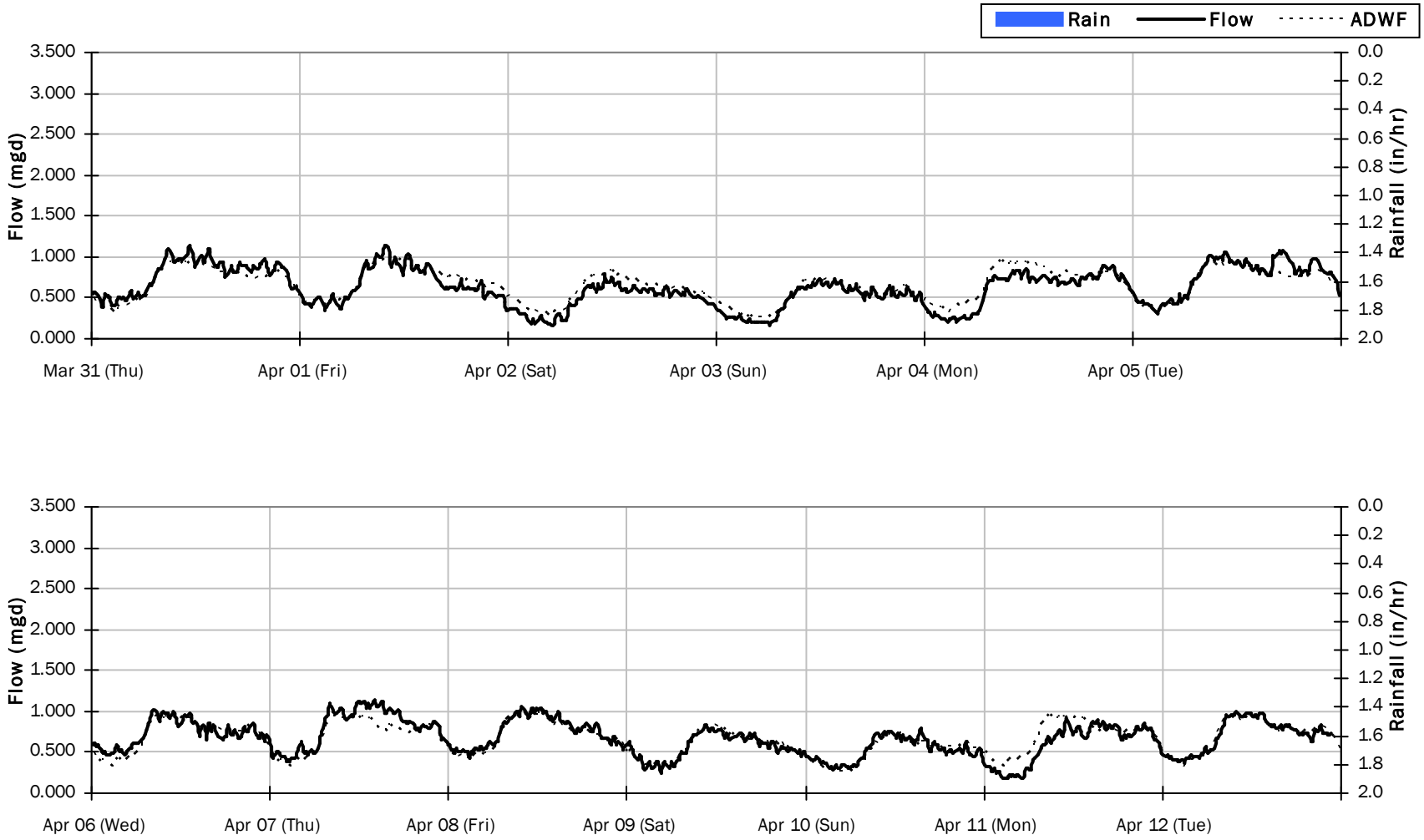
Period Rainfall: 1.33 inches Period Avg Flow: 0.675 mgd Period Peak Flow: 3.036 mgd Period Min Flow: 0.211 mgd



SITE 1

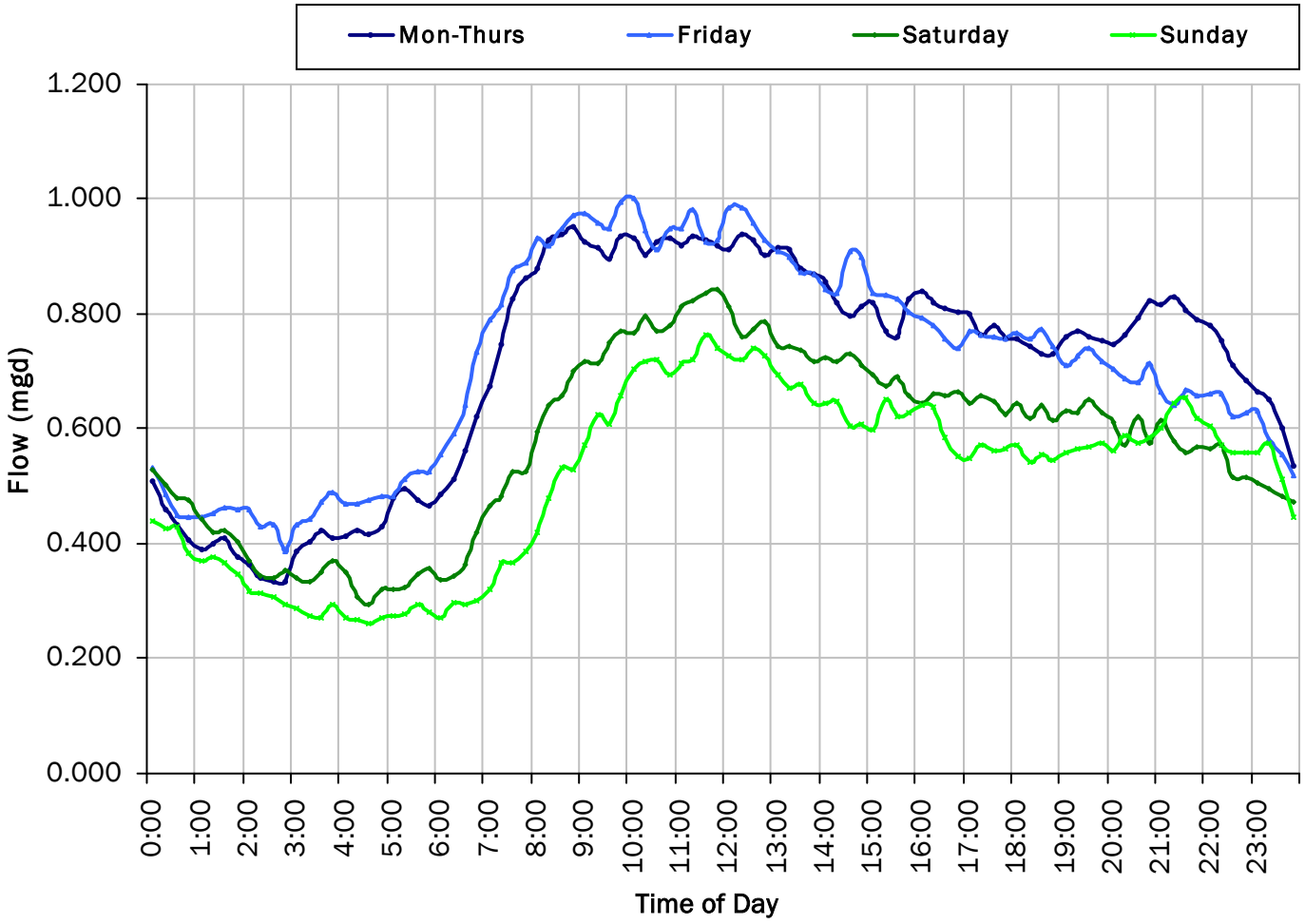
Flow Summary: 3/31/2022 to 4/12/2022

Period Rainfall: 0.00 inches Period Avg Flow: 0.653 mgd Period Peak Flow: 1.137 mgd Period Min Flow: 0.153 mgd



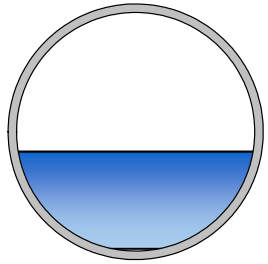
SITE 1

Average Dry Weather Flow Hydrographs



ADWF:

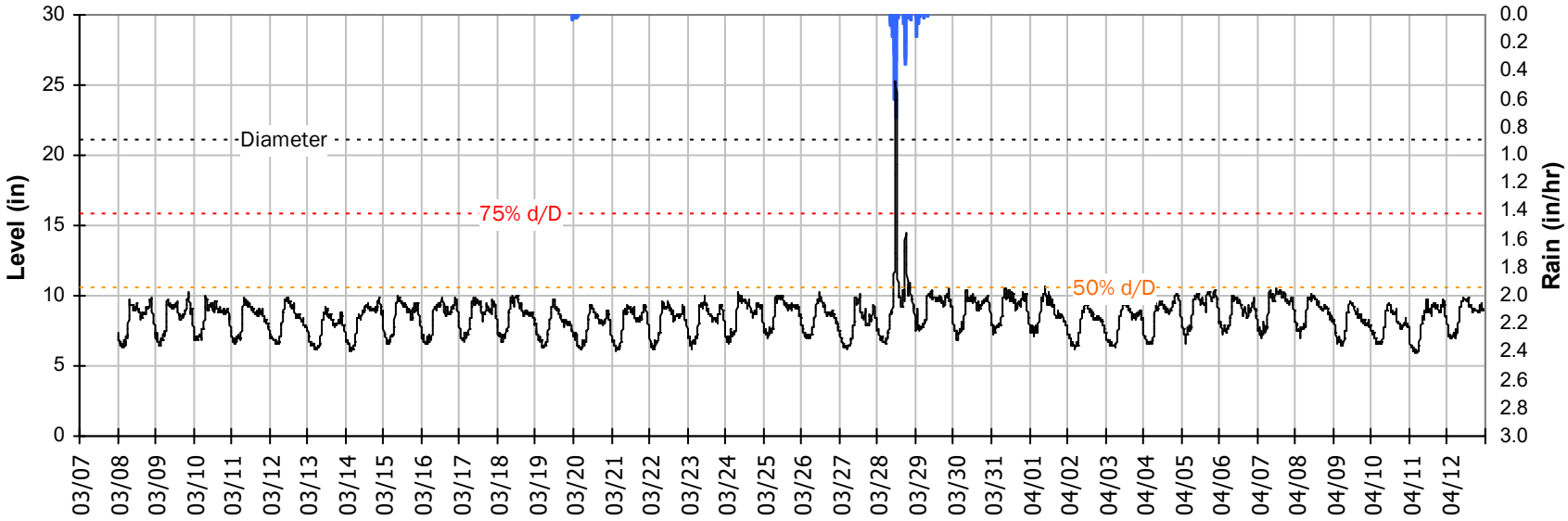
0.665 *mgd*

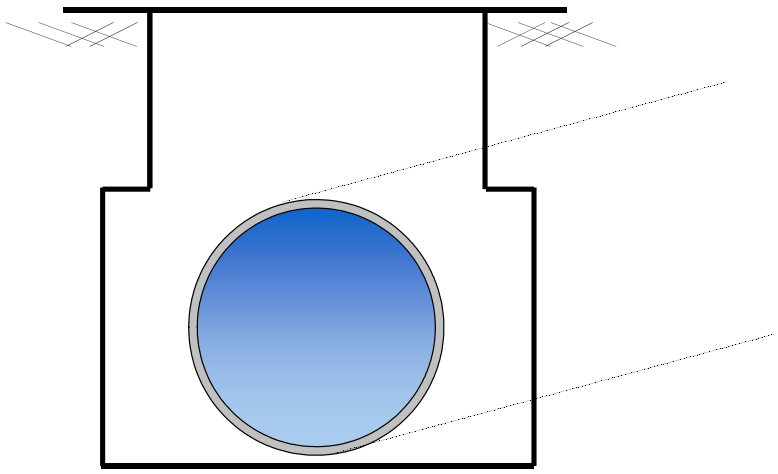


SITE 1

Site Capacity and Surcharge Summary

Realtime Flow Levels with Rainfall Data over Monitoring Period



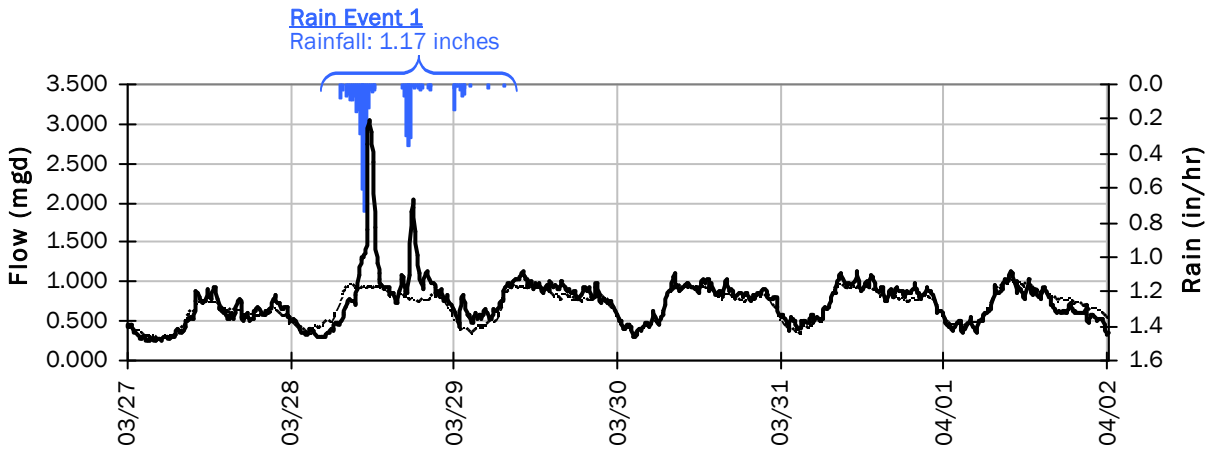


Pipe Diameter:	21	*inches*
Peak Measured Level:	25.2	*inches*
Peak d/D Ratio:	1.20	

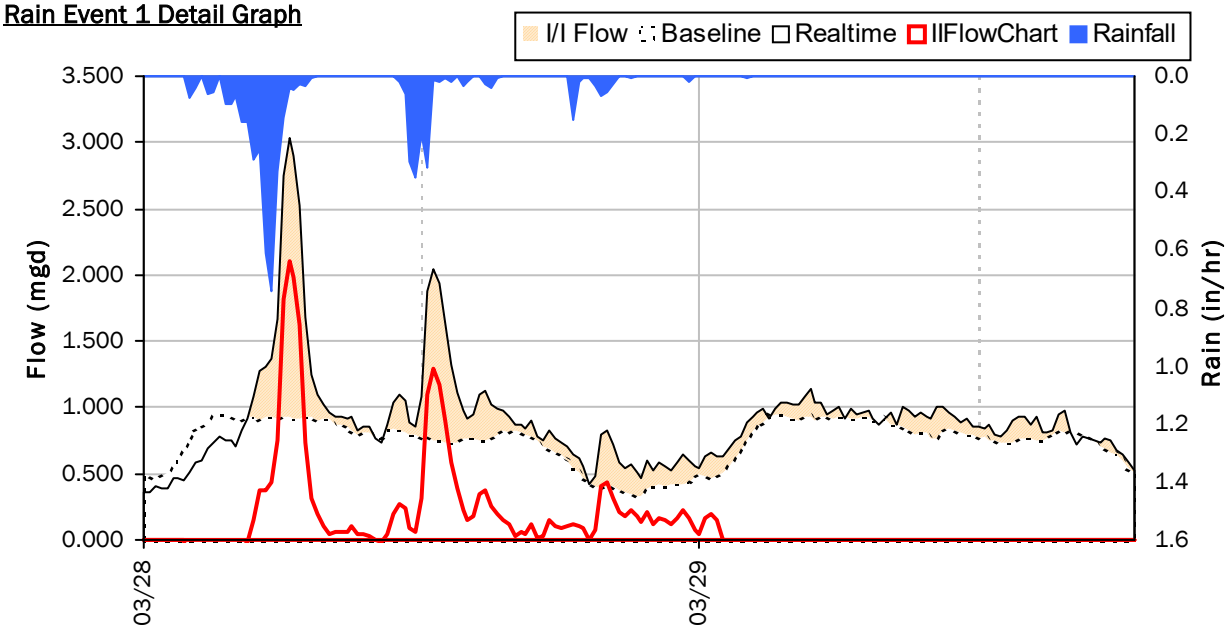
Surcharged 4.2 inches over crown

SITE 1
I/I Summary: Rain Event 1

Baseline and Realtime Flows with Rainfall Data over Monitoring Period



Rain Event 1 Detail Graph



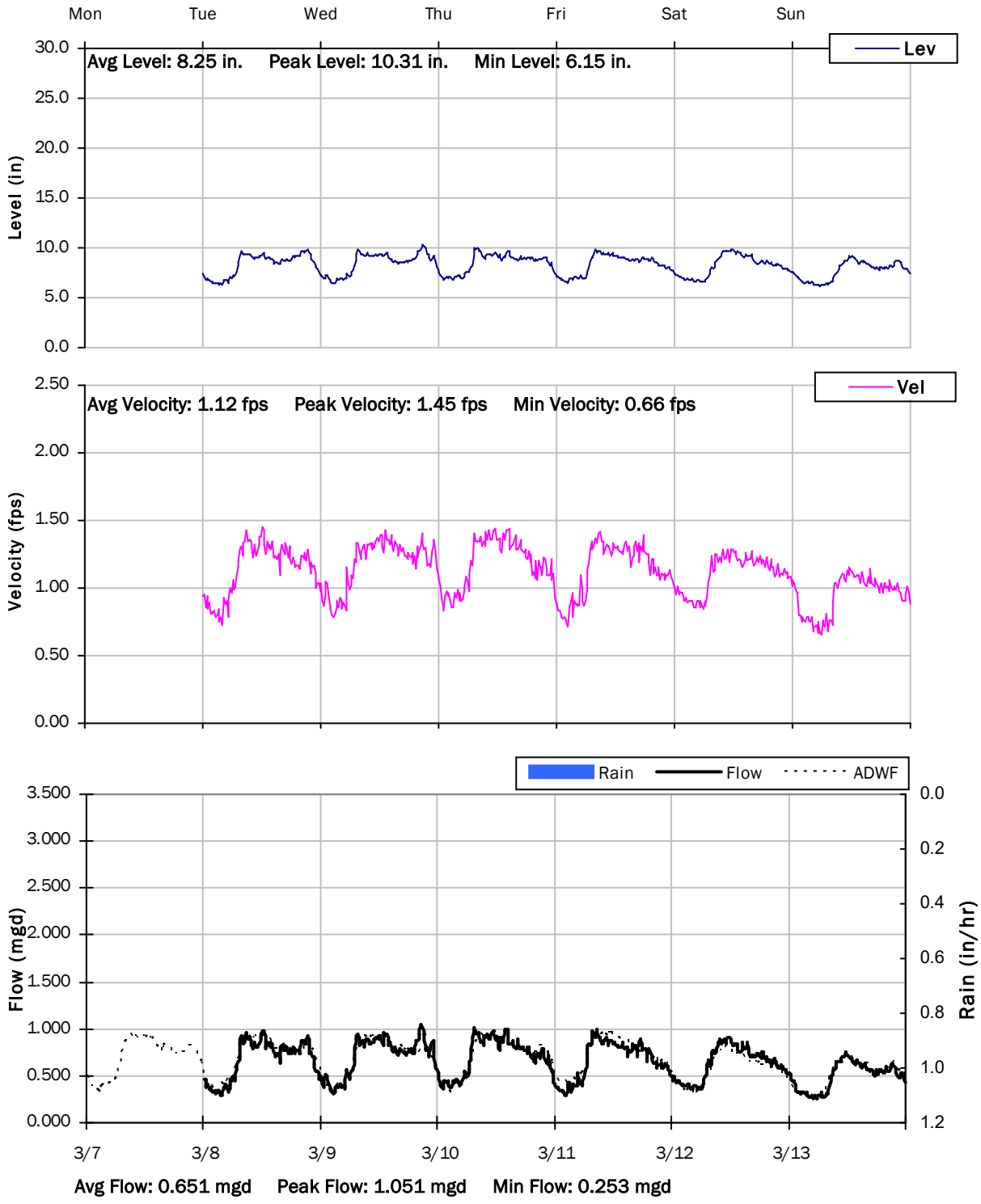
Storm Event I/I Analysis (Rain = 1.17 inches)

Capacity		Inflow / Infiltration	
Peak Flow:	3.036 *mgd*	**Peak I/I Rate:**	2.106 *mgd*
PF:	4.57	**Total I/I:**	243,000 *gallons*
Peak Level:	25.17 *in*		
d/D Ratio:	1.20		

SITE 1

Weekly Level, Velocity and Flow Hydrographs

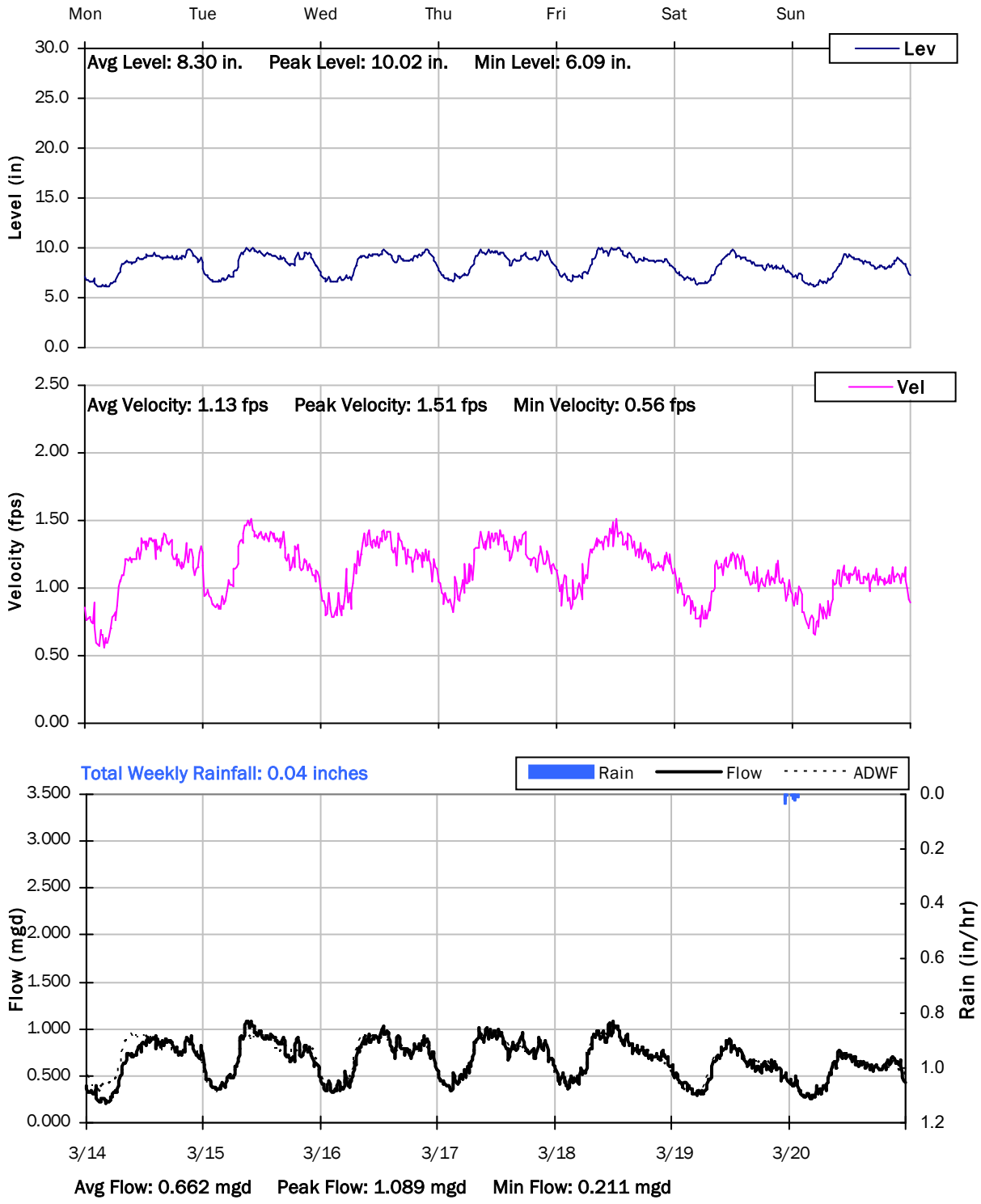
3/7/2022 to 3/14/2022



SITE 1

Weekly Level, Velocity and Flow Hydrographs

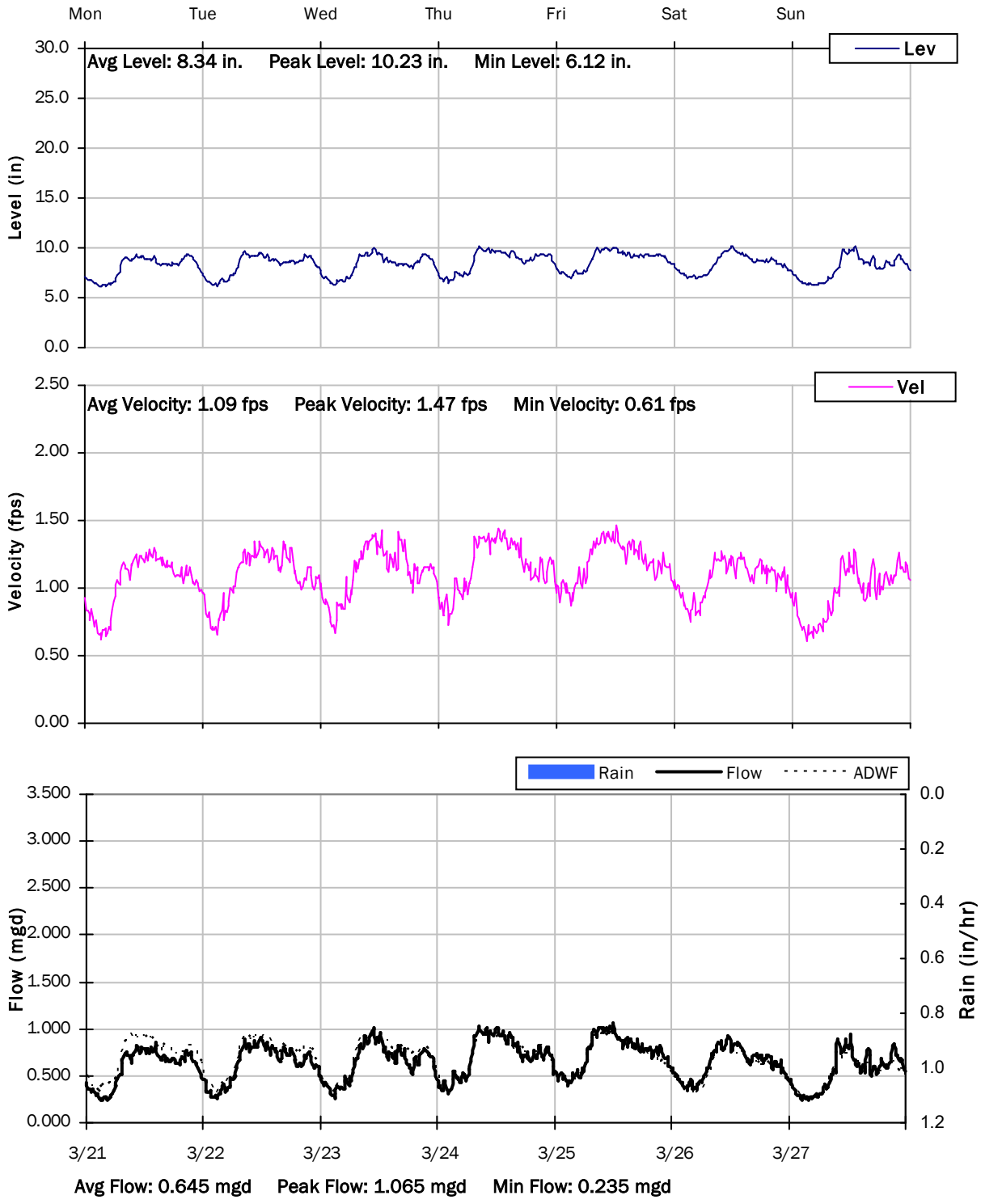
3/14/2022 to 3/21/2022



SITE 1

Weekly Level, Velocity and Flow Hydrographs

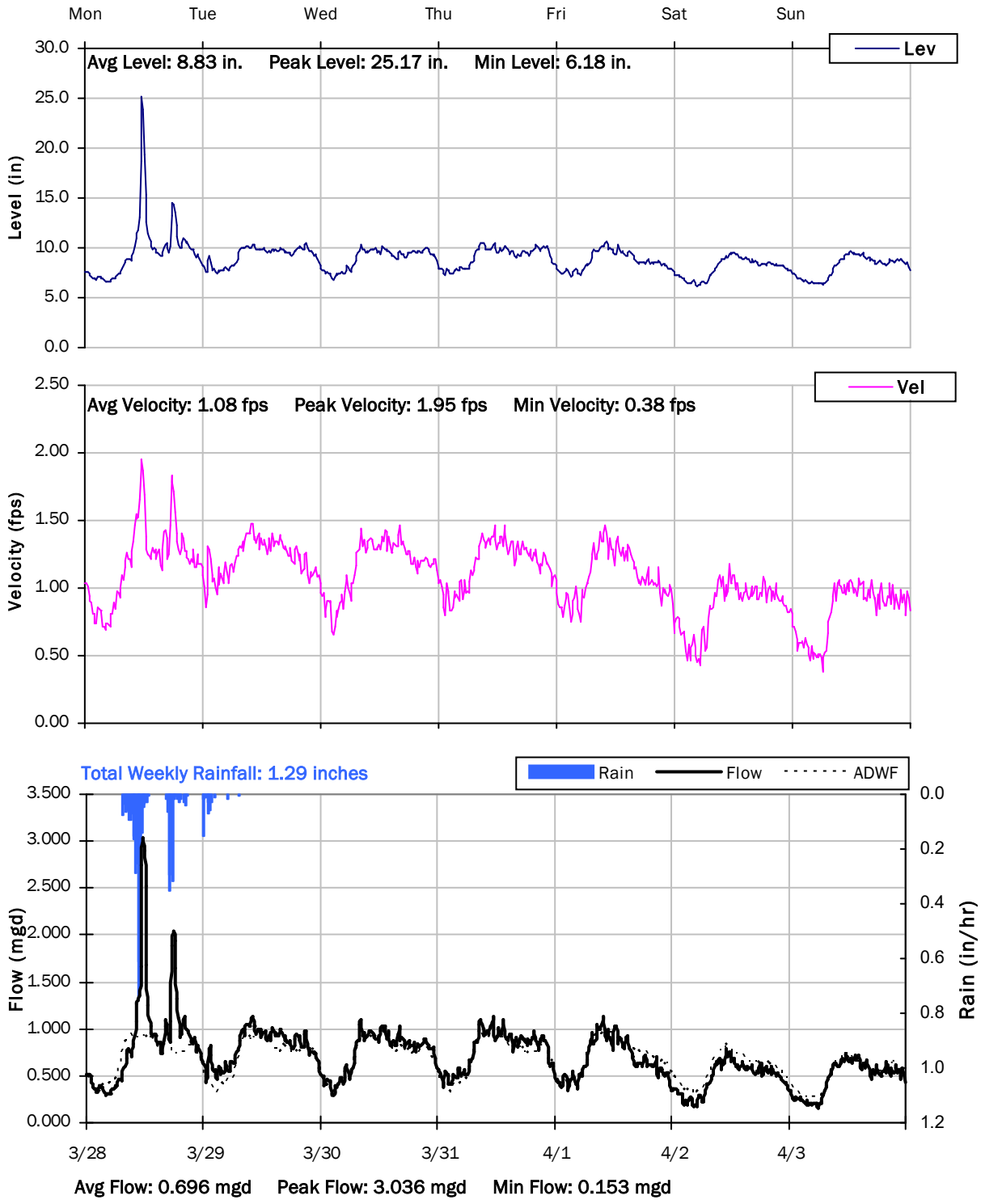
3/21/2022 to 3/28/2022



SITE 1

Weekly Level, Velocity and Flow Hydrographs

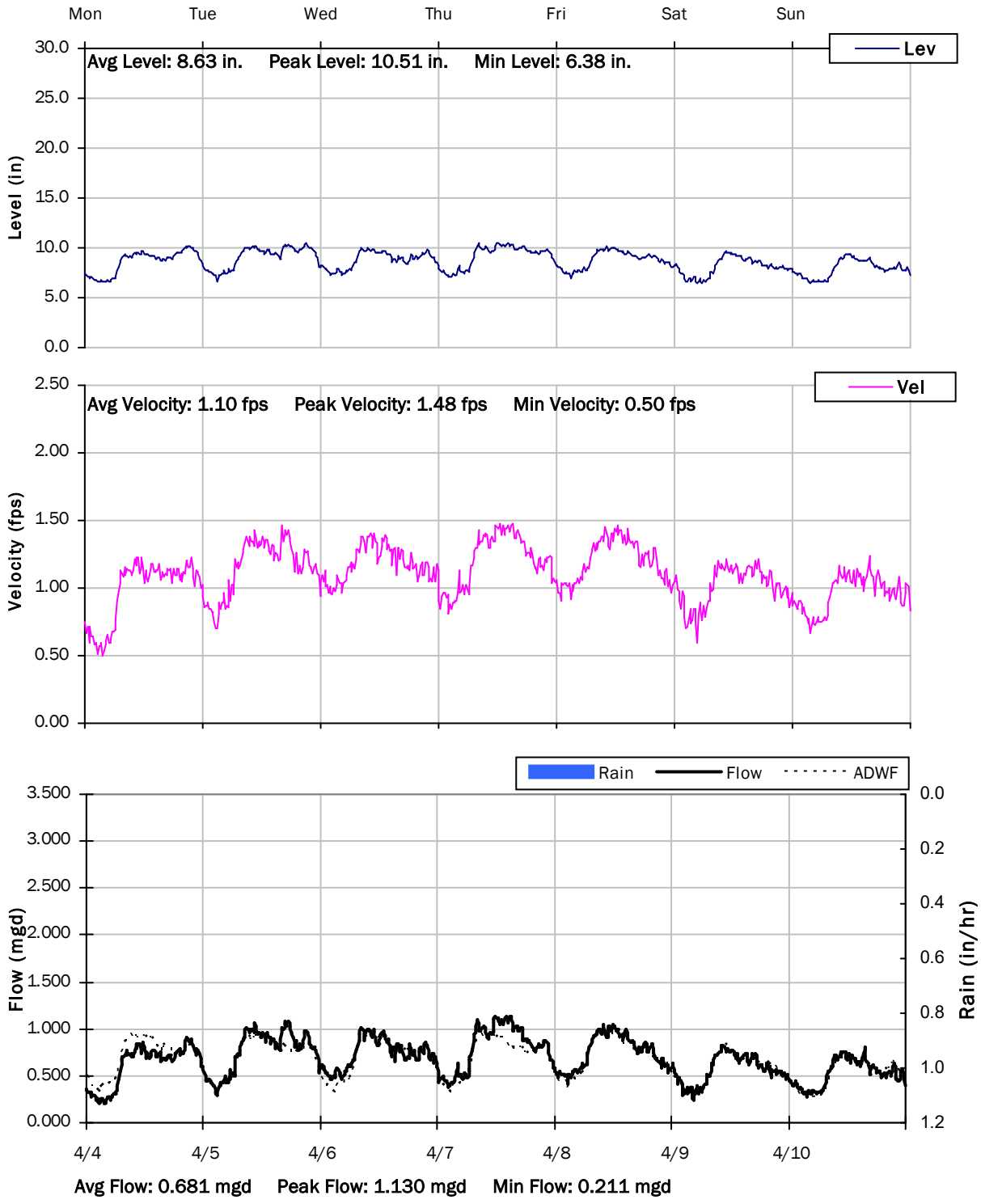
3/28/2022 to 4/4/2022



SITE 1

Weekly Level, Velocity and Flow Hydrographs

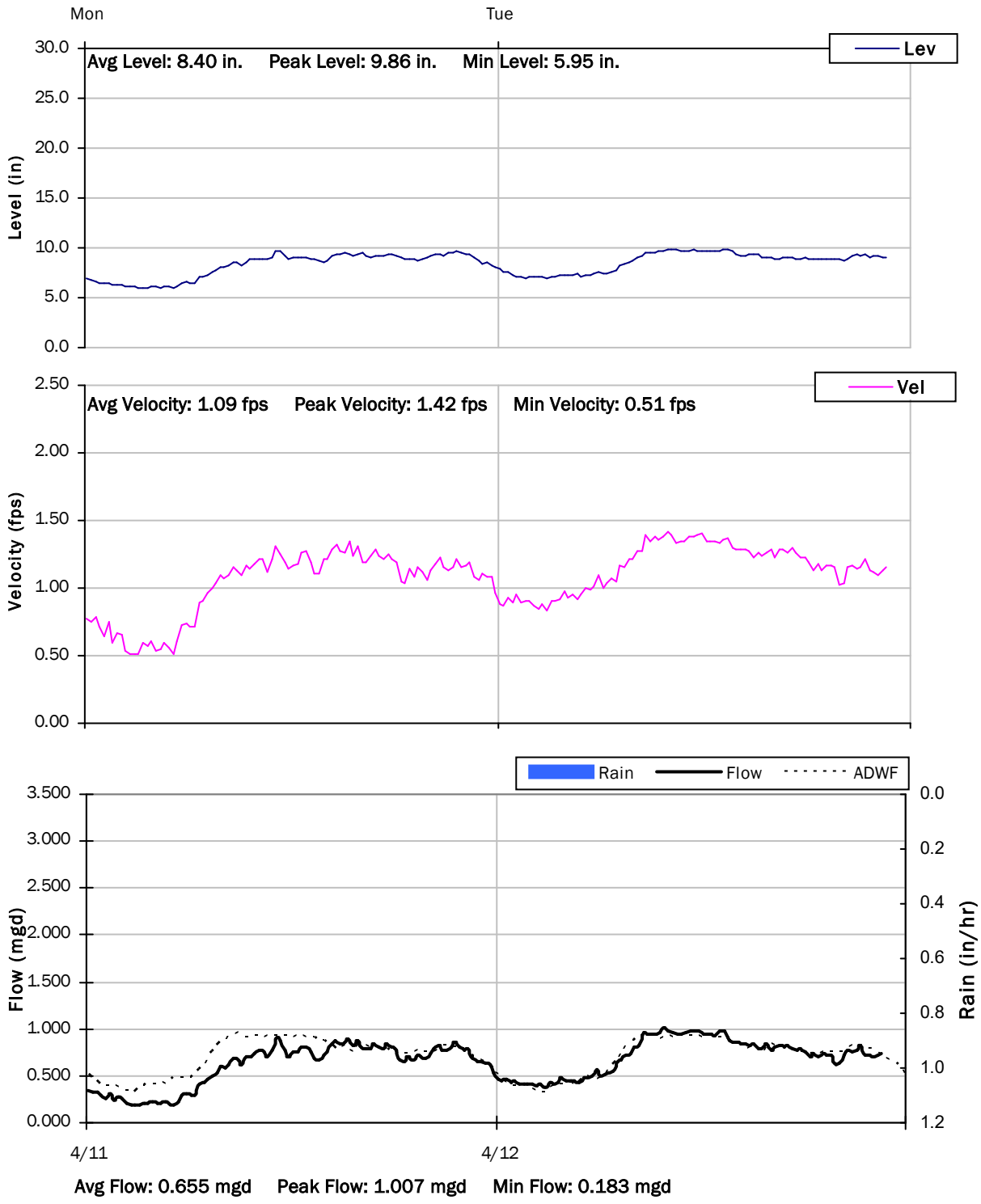
4/4/2022 to 4/11/2022



SITE 1

Weekly Level, Velocity and Flow Hydrographs

4/11/2022 to 4/13/2022



Monitoring Site: Site 2

Carollo Gardena, California

Sanitary Sewer Flow Monitoring

March 07, 2022 - April 12, 2022

Location: Rosecrans Avenue and S Hobart Boulevard

Data Summary Report

Vicinity Map: Site 2

SITE 2

Site Information MH ID: 05 1141

Location: Rosecrans Avenue and S Hobart Boulevard

Coordinates: 118.3081° W, 33.9020° N

Rim Elevation (Earth): 45 feet

Expected Pipe Diameter: 18 inches

Measured Pipe Diameter: 18 inches

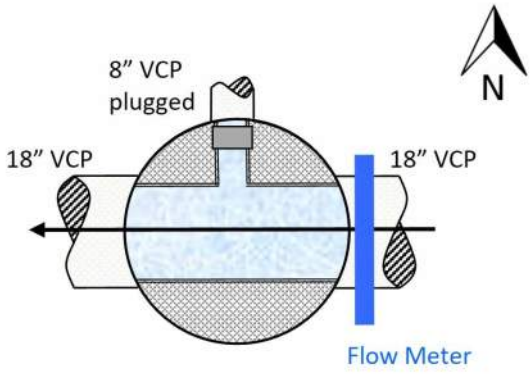
ADWF: 0.431 mgd

Peak Measured Flow: 1.261 mgd

Sediment: 1 inches

Satellite Map

Sanitary Map



Flow Sketch

Street View

Plan View

SITE 2

Additional Site Photos

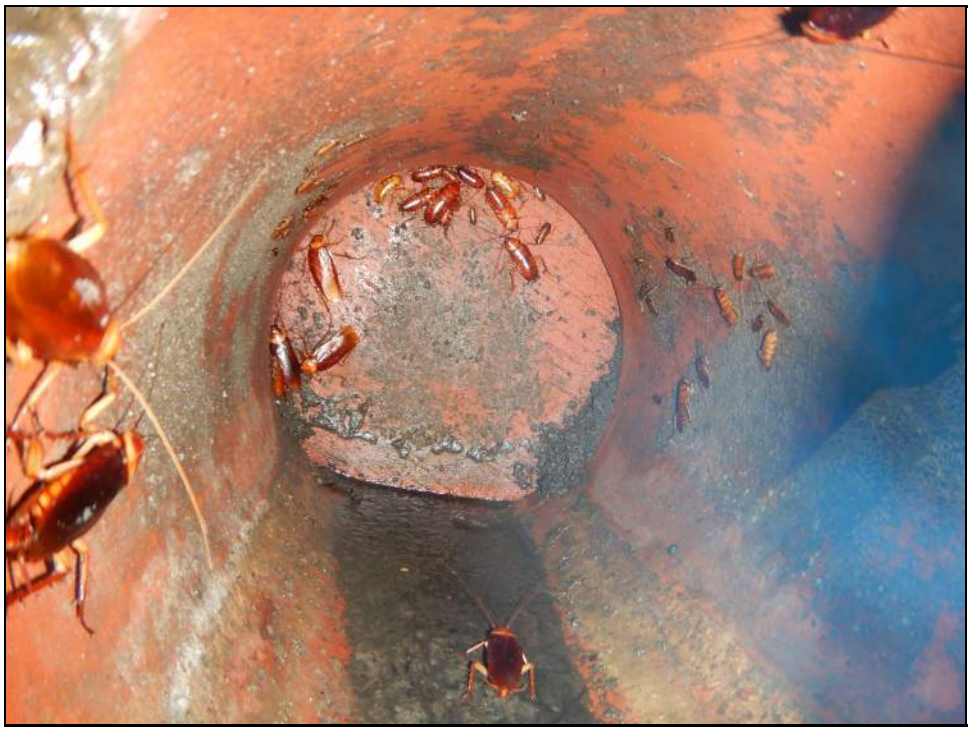
Effluent Pipe

Monitored East Influent Pipe

SITE 2

Additional Site Photos

North Influent Pipe

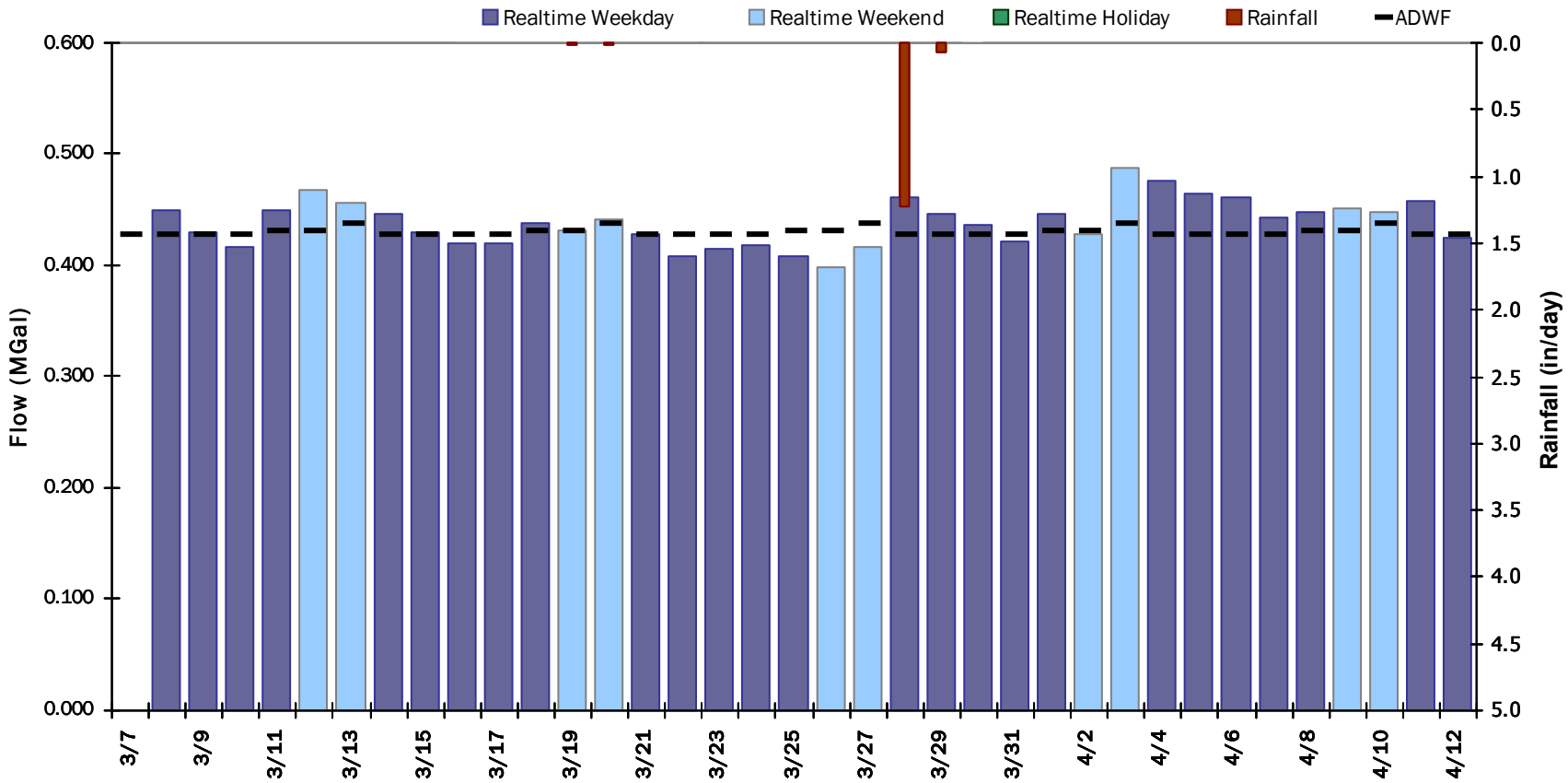


SITE 2

Period Flow Summary: Daily Flow Totals

Avg Daily Flow: 0.439 MGal Peak Daily Flow: 0.487 MGal Min Daily Flow: 0.398 MGal

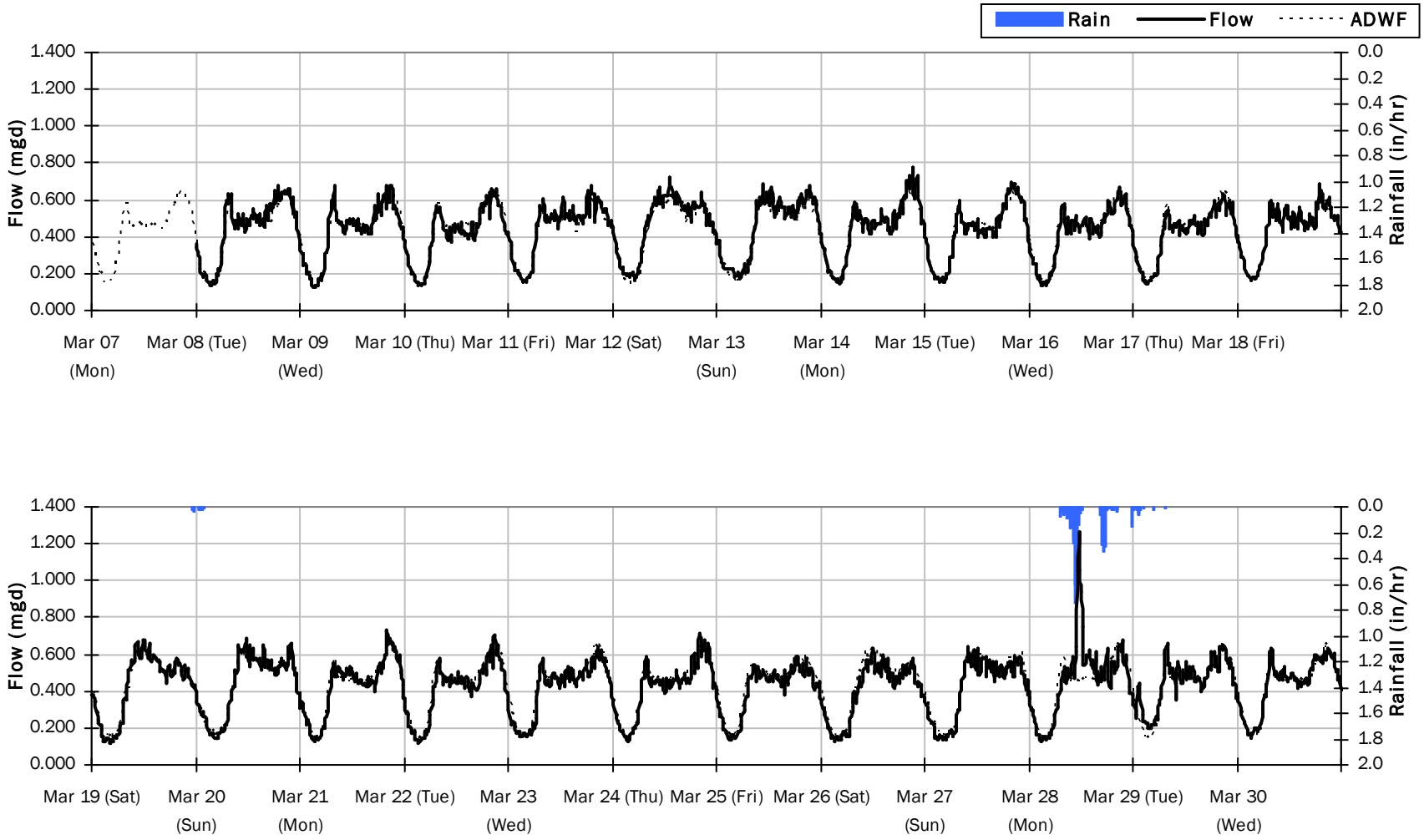
Total Rainfall: 1.33 inches



SITE 2

Flow Summary: 3/7/2022 to 3/30/2022

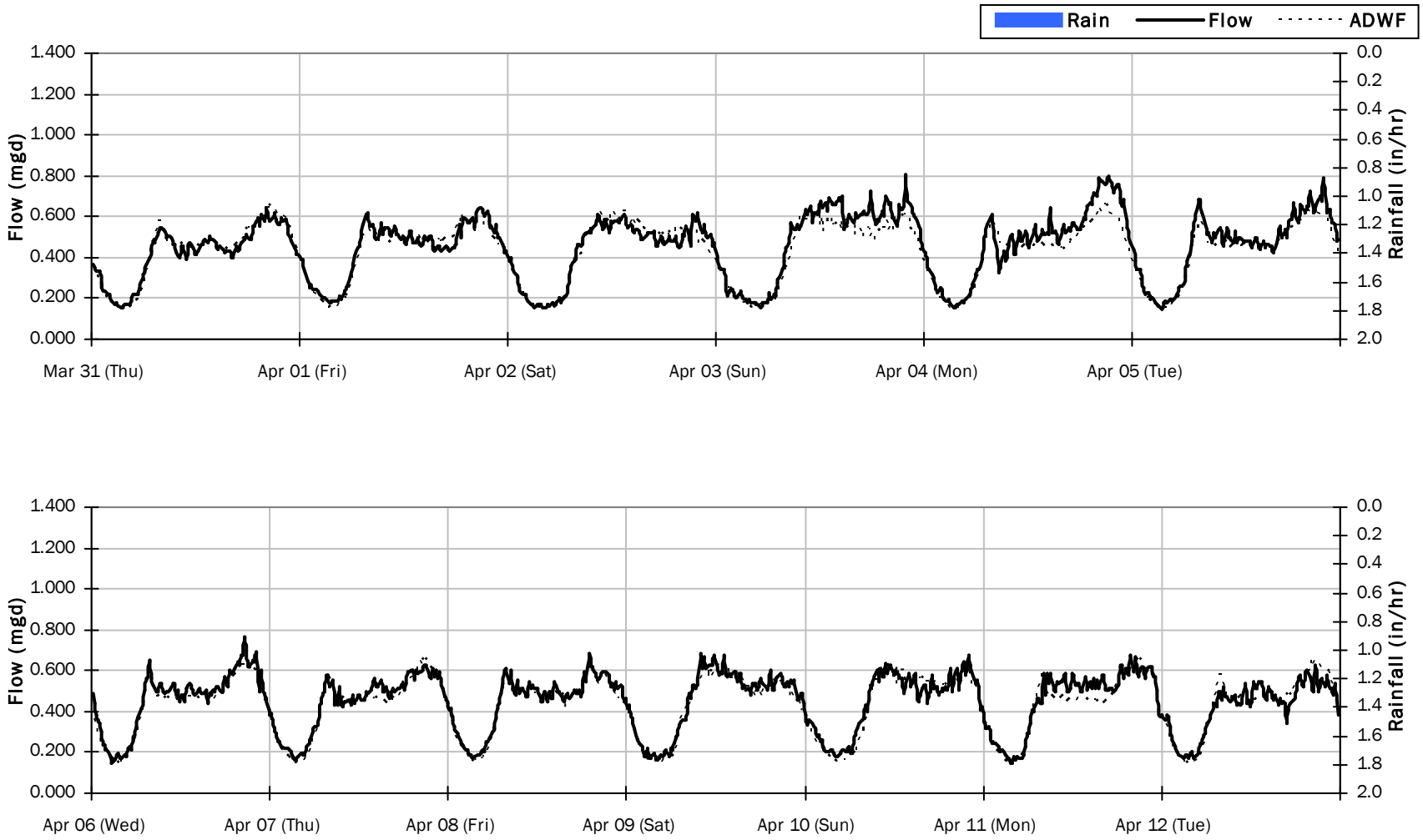
Period Rainfall: 1.33 inches Period Avg Flow: 0.432 mgd Period Peak Flow: 1.261 mgd Period Min Flow: 0.119 mgd



SITE 2

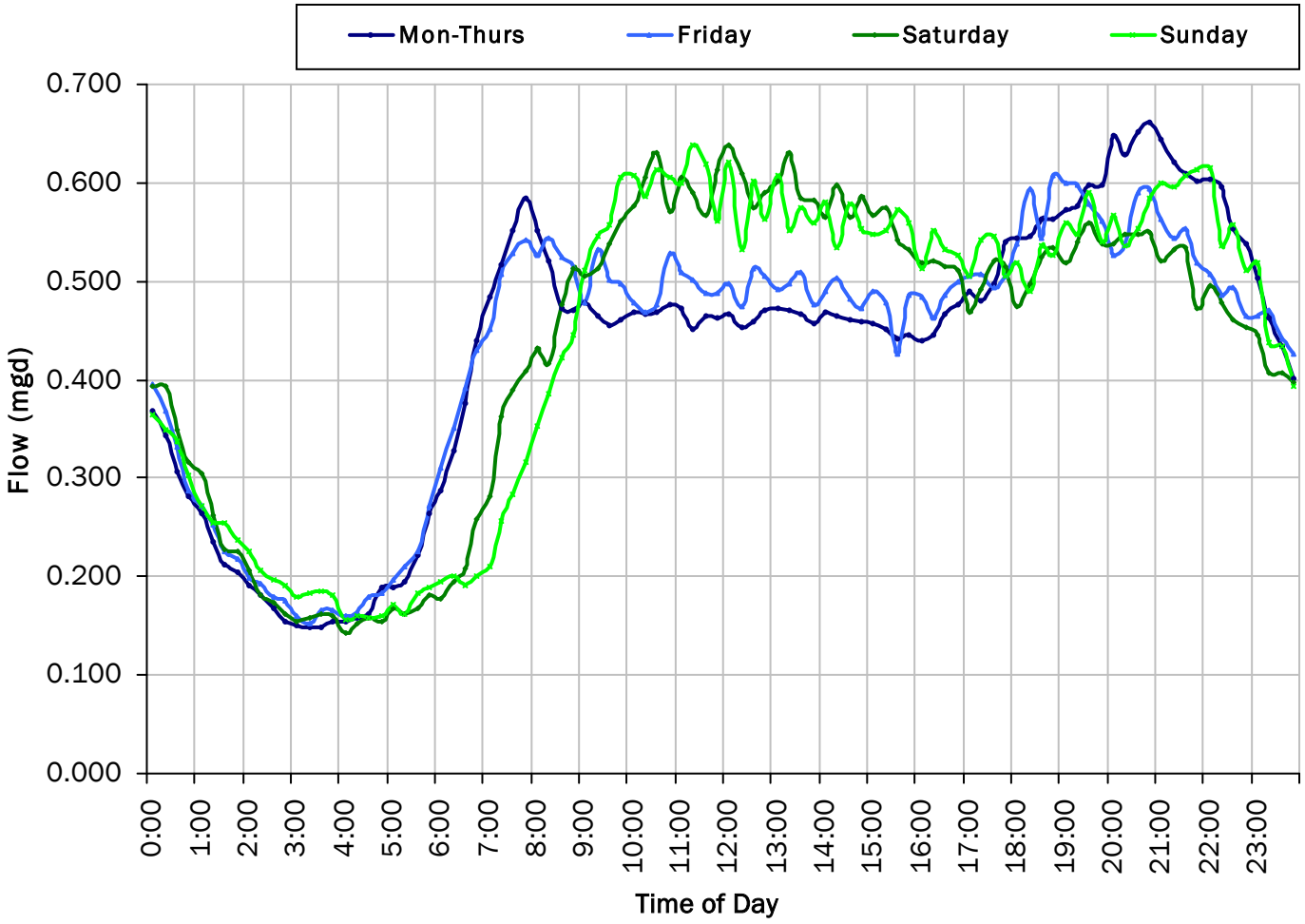
Flow Summary: 3/31/2022 to 4/12/2022

Period Rainfall: 0.00 inches Period Avg Flow: 0.450 mgd Period Peak Flow: 0.803 mgd Period Min Flow: 0.147 mgd



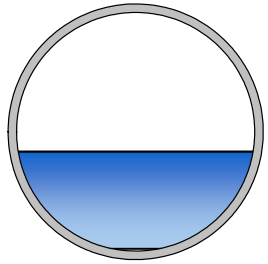
SITE 2

Average Dry Weather Flow Hydrographs



ADWF:

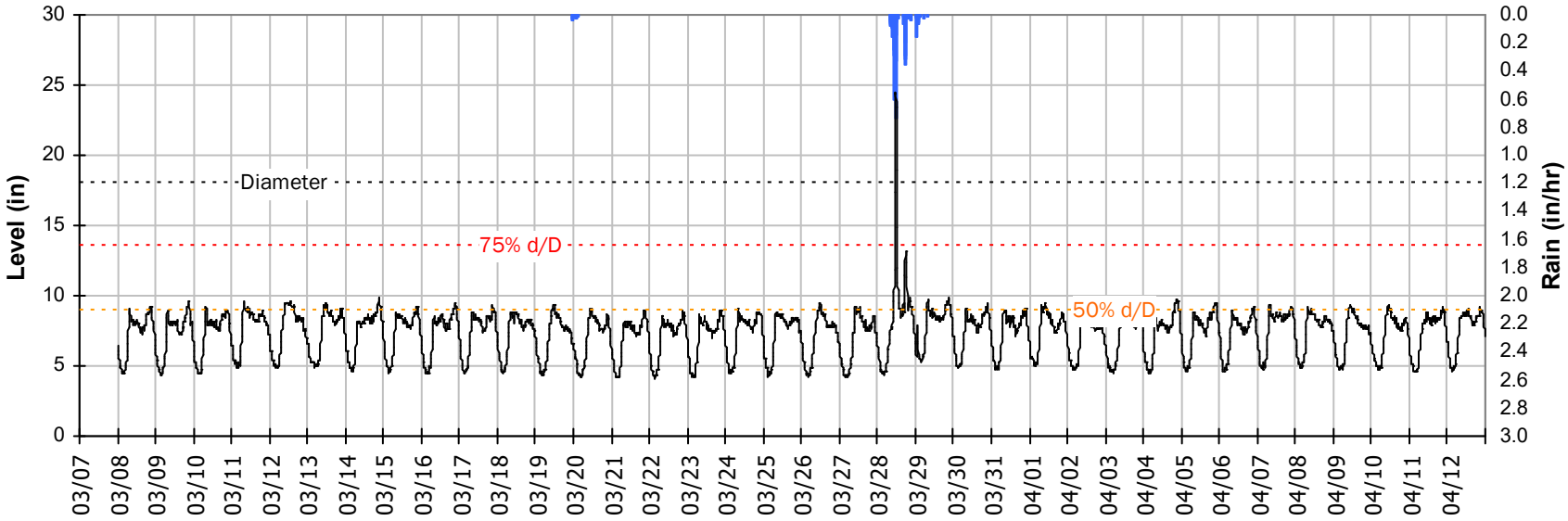
0.431 *mgd*

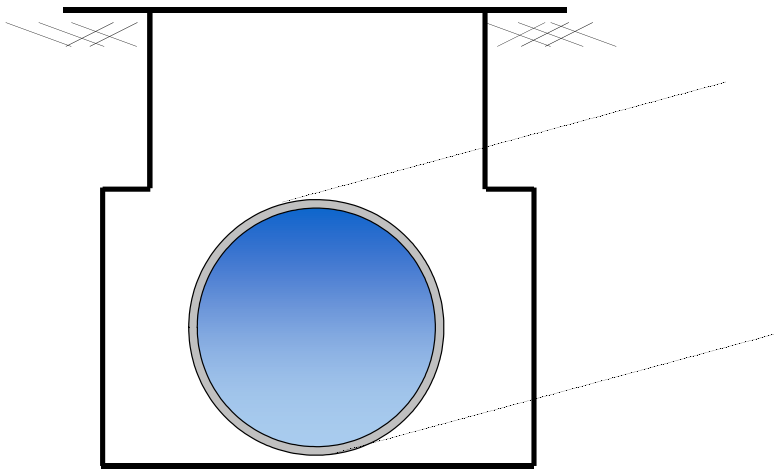


SITE 2

Site Capacity and Surcharge Summary

Realtime Flow Levels with Rainfall Data over Monitoring Period



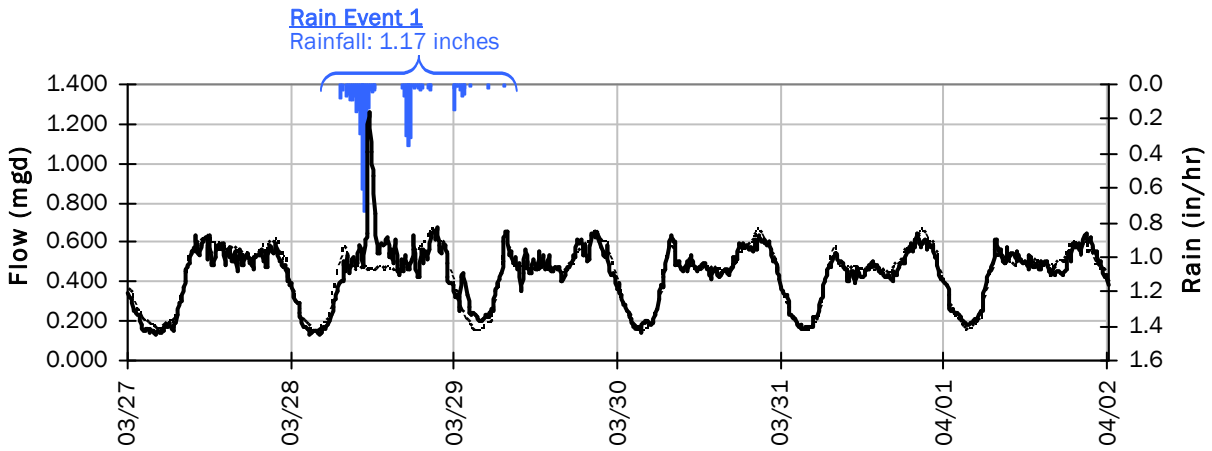


Pipe Diameter:	18	*inches*
Peak Measured Level:	24.3	*inches*
Peak d/D Ratio:	1.35	

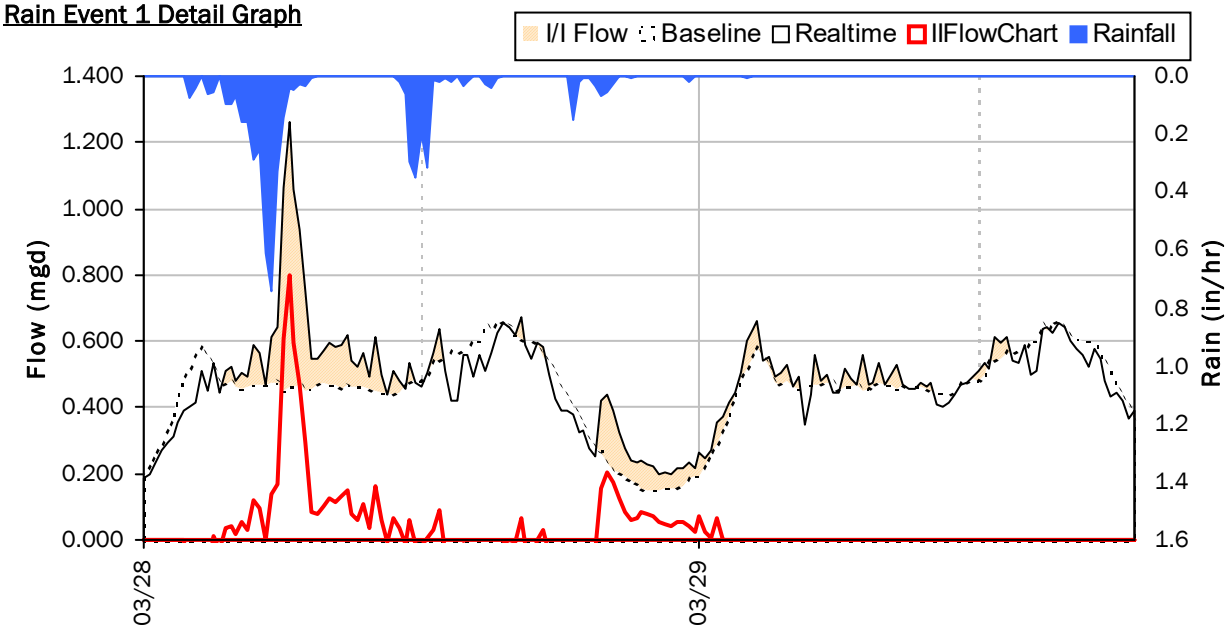
Surcharged 6.3 inches over crown

SITE 2
I/I Summary: Rain Event 1

Baseline and Realtime Flows with Rainfall Data over Monitoring Period



Rain Event 1 Detail Graph



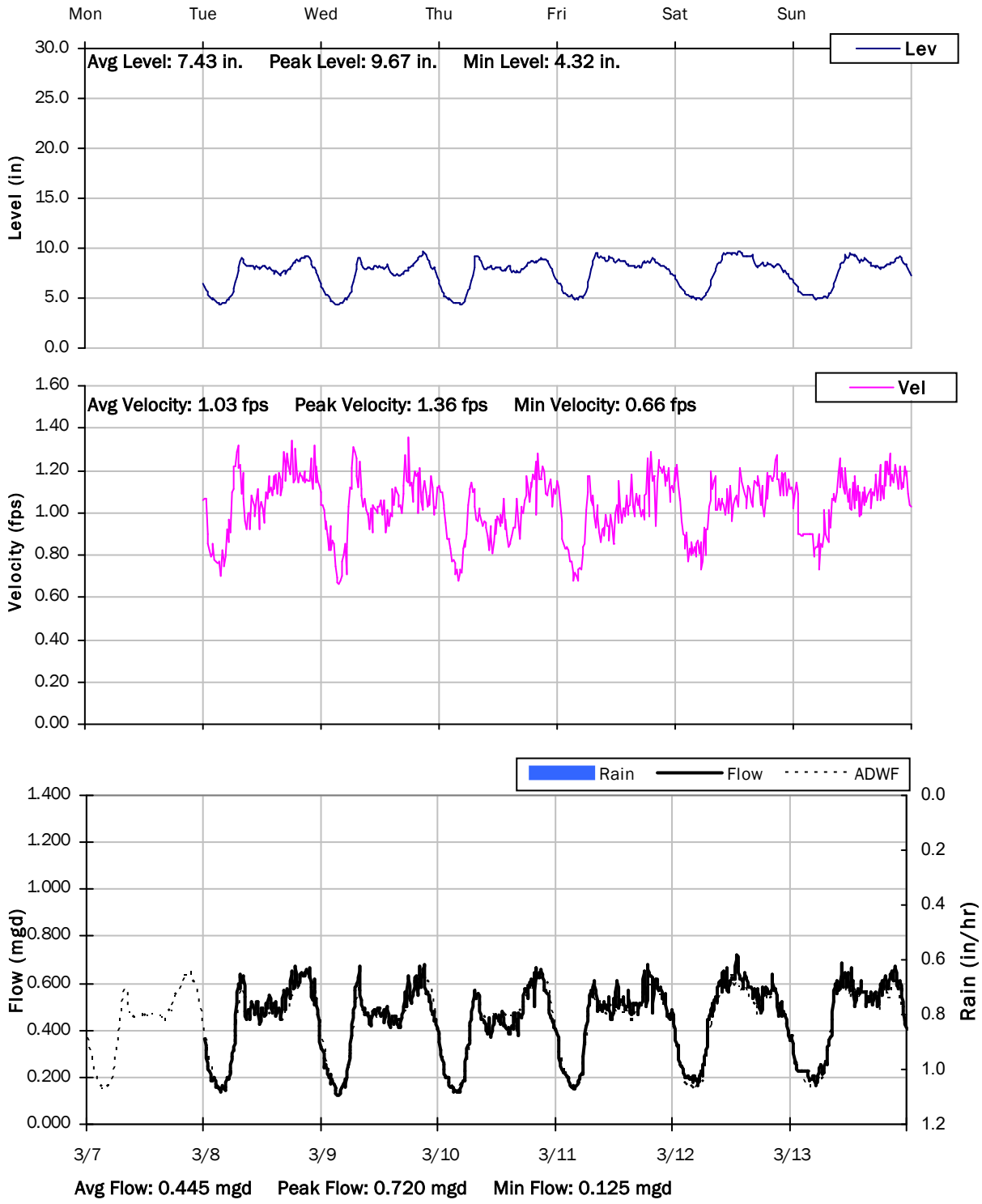
Storm Event I/I Analysis (Rain = 1.17 inches)

Capacity		Inflow / Infiltration	
Peak Flow:	1.261 *mgd*	**Peak I/I Rate:**	0.797 *mgd*
PF:	2.93	**Total I/I:**	53,000 *gallons*
Peak Level:	24.34 *in*		
d/D Ratio:	1.35		

SITE 2

Weekly Level, Velocity and Flow Hydrographs

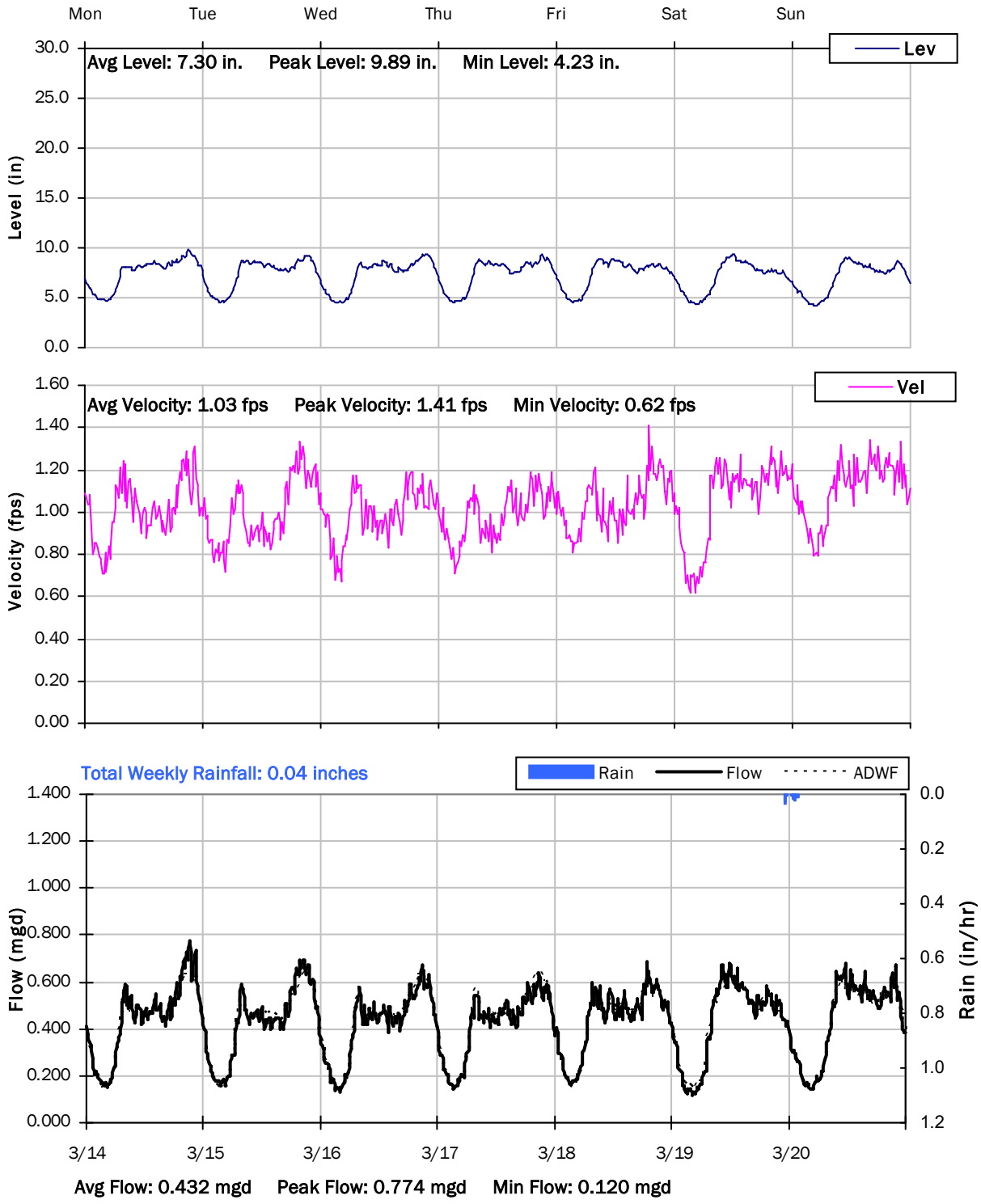
3/7/2022 to 3/14/2022



SITE 2

Weekly Level, Velocity and Flow Hydrographs

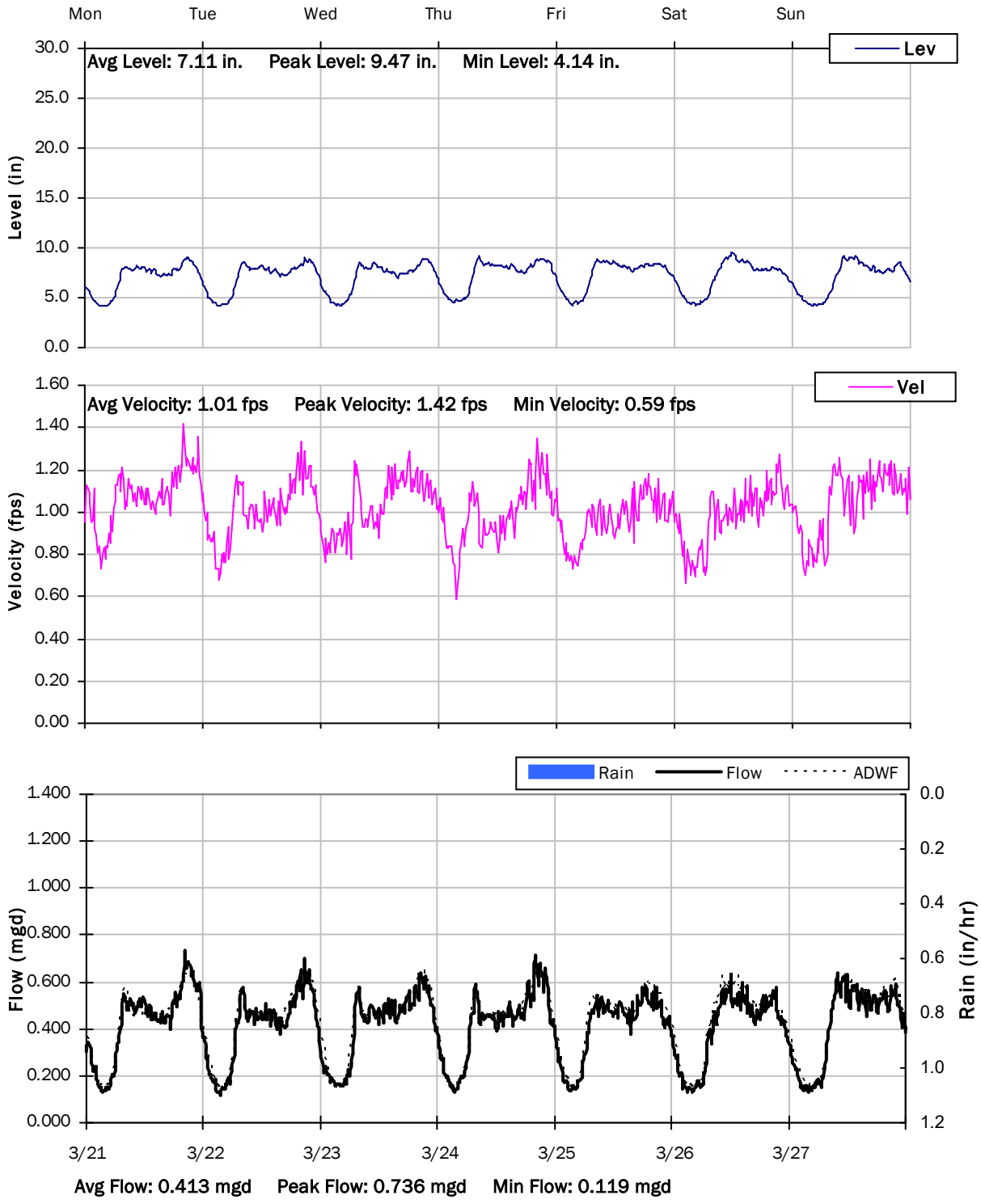
3/14/2022 to 3/21/2022



SITE 2

Weekly Level, Velocity and Flow Hydrographs

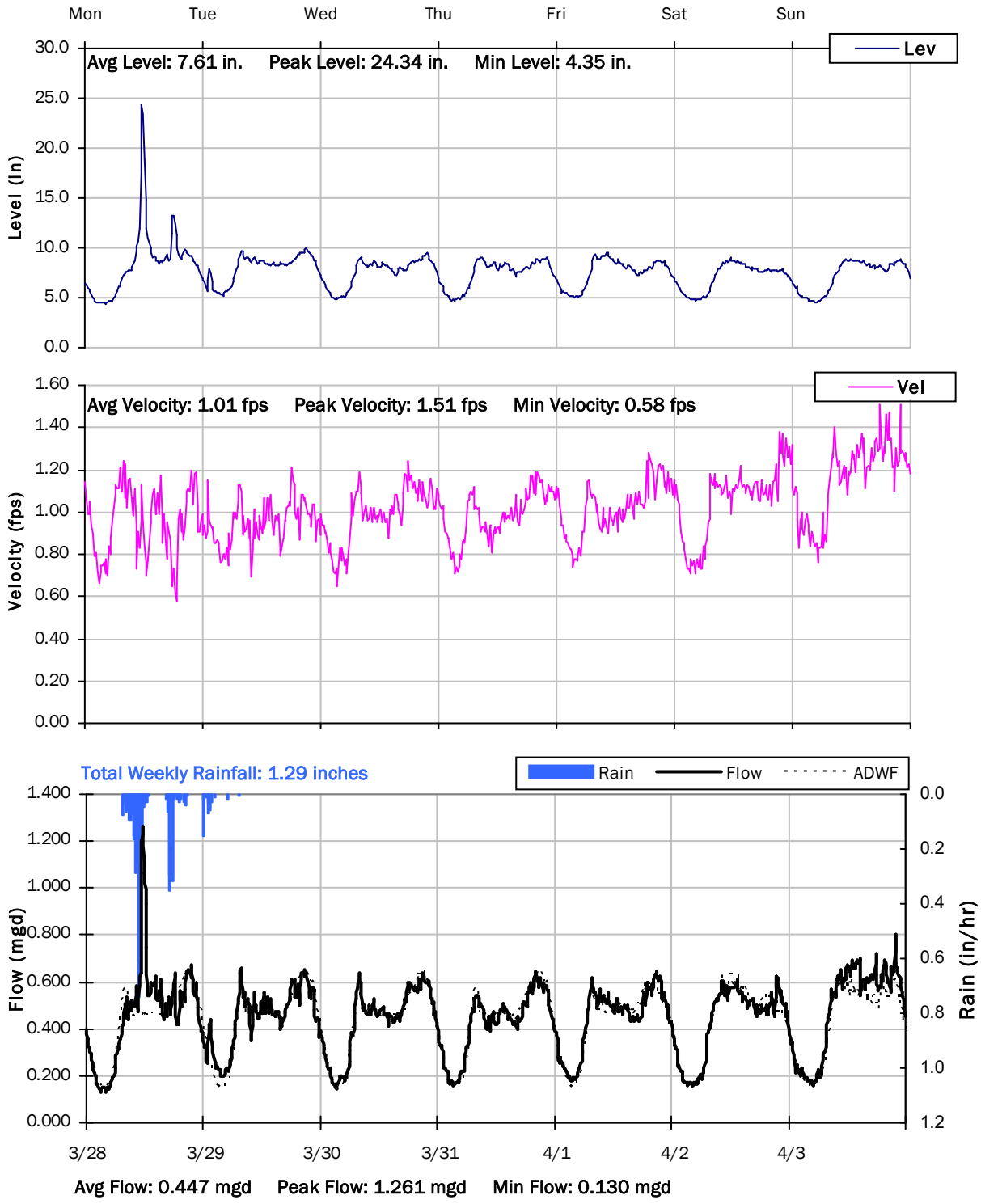
3/21/2022 to 3/28/2022



SITE 2

Weekly Level, Velocity and Flow Hydrographs

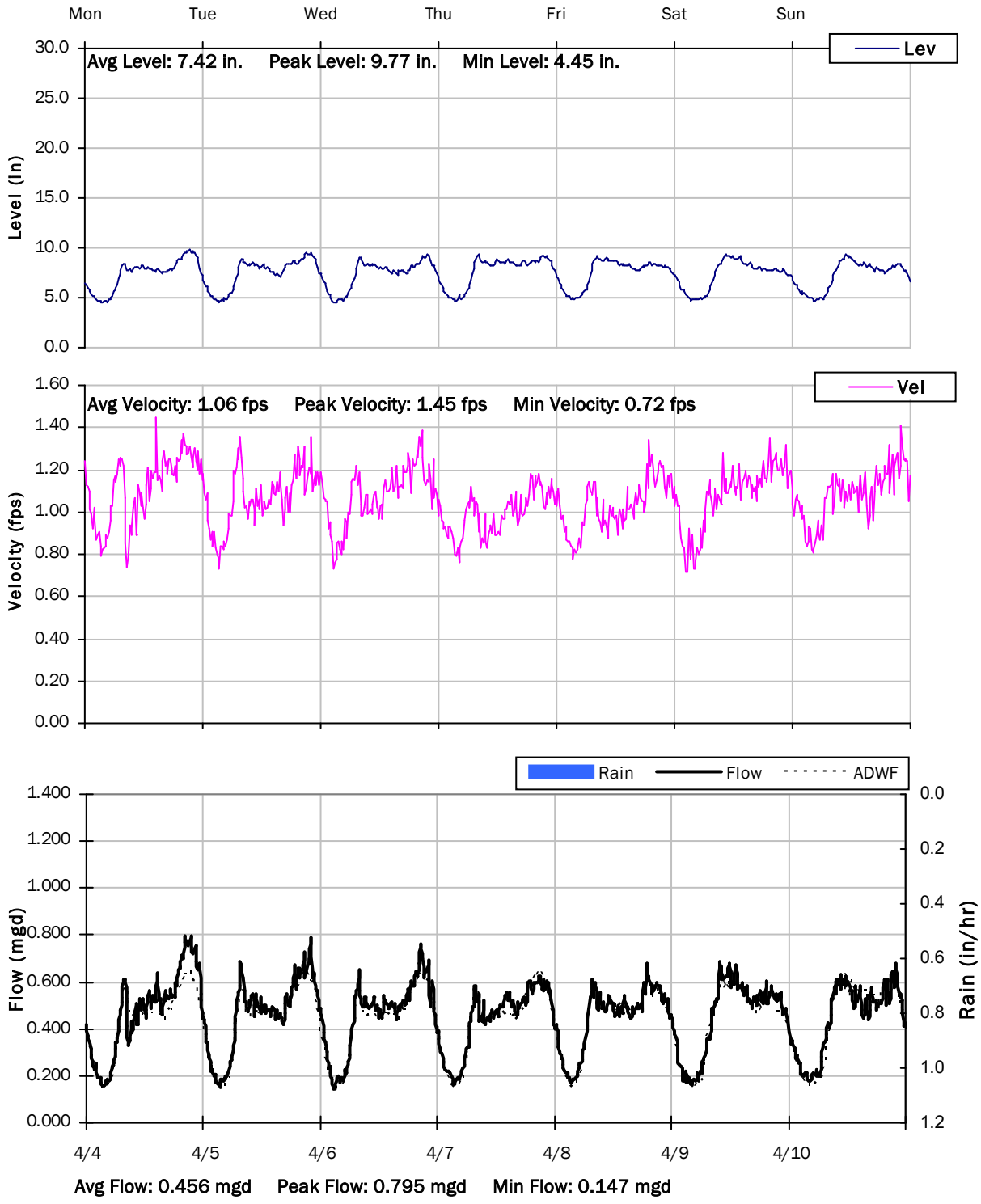
3/28/2022 to 4/4/2022



SITE 2

Weekly Level, Velocity and Flow Hydrographs

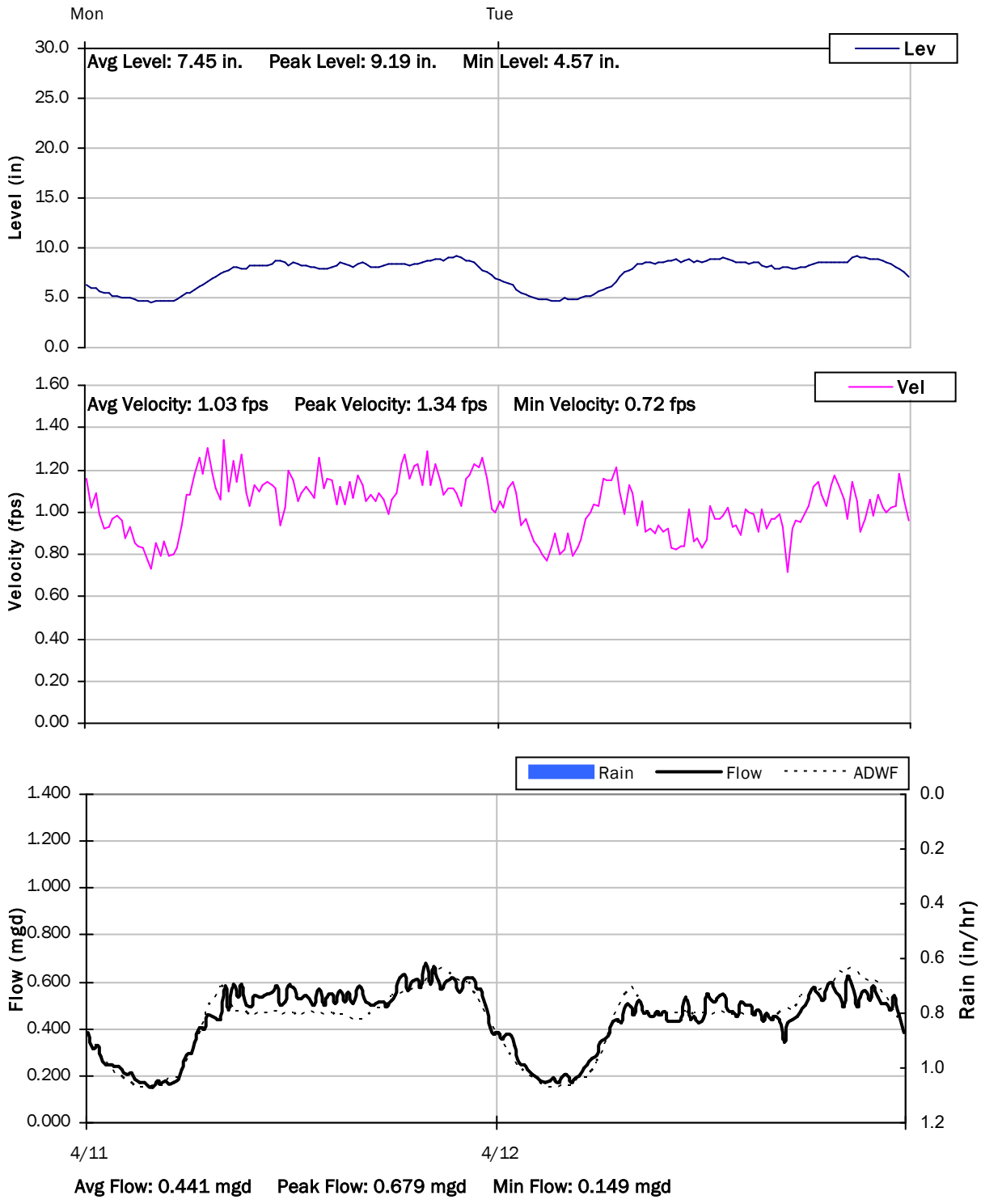
4/4/2022 to 4/11/2022



SITE 2

Weekly Level, Velocity and Flow Hydrographs

4/11/2022 to 4/13/2022



Monitoring Site: Site 3

Carollo Gardena, California

Sanitary Sewer Flow Monitoring

March 07, 2022 - April 12, 2022

Location: Van Ness Avenue and W 135th Street

Data Summary Report

Vicinity Map: Site 3

SITE 3

Site Information MH ID: 05 1114

Location: Van Ness Avenue and W 135th Street

Coordinates: 118.3178° W, 33.9092° N

Rim Elevation (Earth): 49 feet

Expected Pipe Diameter: 18 inches

Measured Pipe Diameter: 18 inches

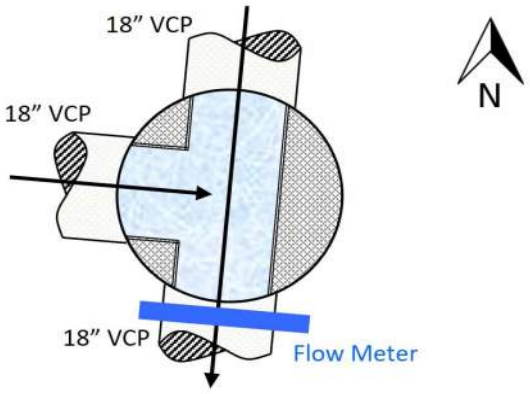
ADWF: 0.506 mgd

Peak Measured Flow: 2.321 mgd

Sediment: None

Satellite Map

Sanitary Map



Flow Sketch

Street View

Plan View

SITE 3

Additional Site Photos

Monitored effluent Pipe

North influent Pipe

SITE 3

Additional Site Photos

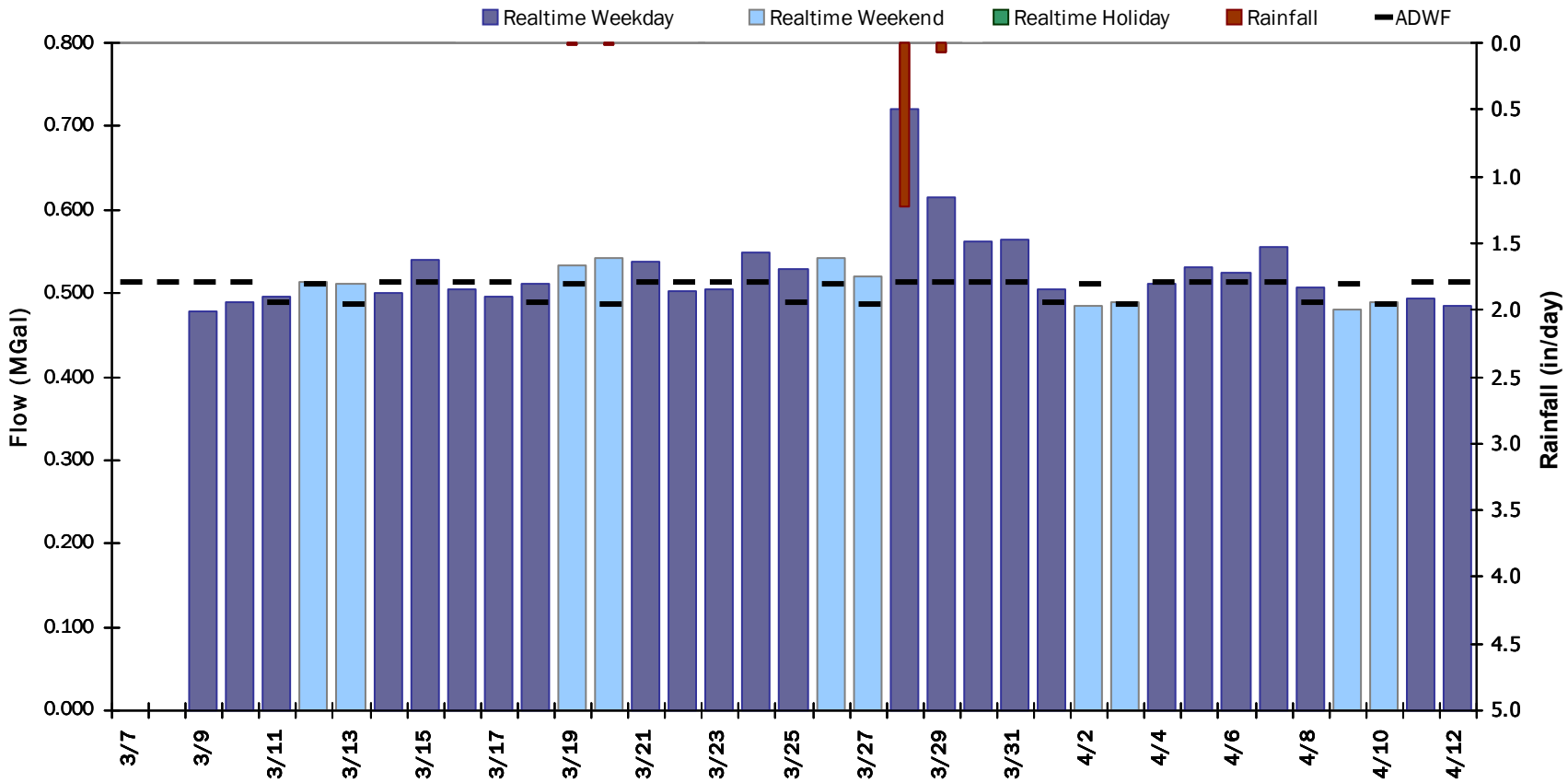
West Influent Pipe

SITE 3

Period Flow Summary: Daily Flow Totals

Avg Daily Flow: 0.524 MGal Peak Daily Flow: 0.720 MGal Min Daily Flow: 0.477 MGal

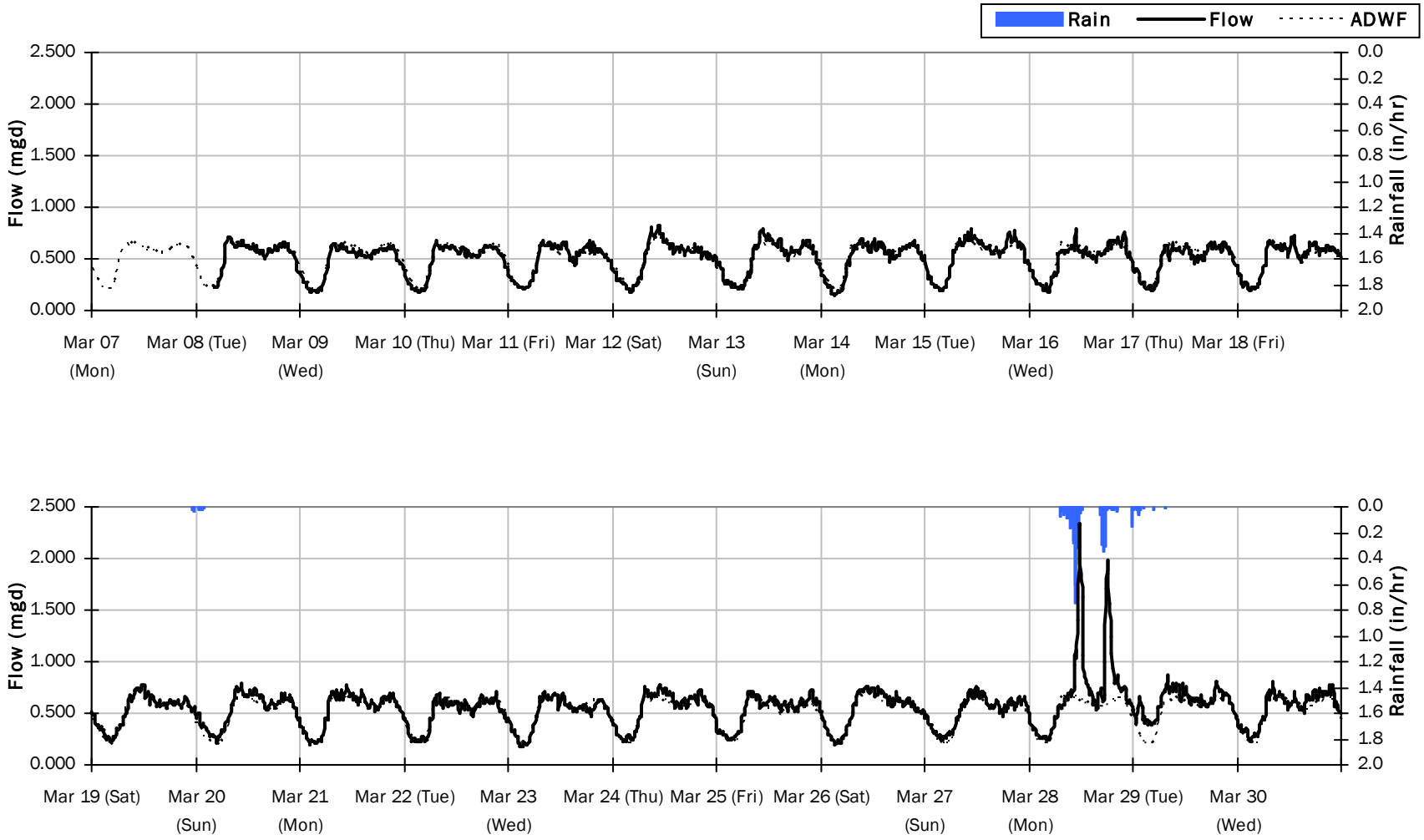
Total Rainfall: 1.33 inches



SITE 3

Flow Summary: 3/7/2022 to 3/30/2022

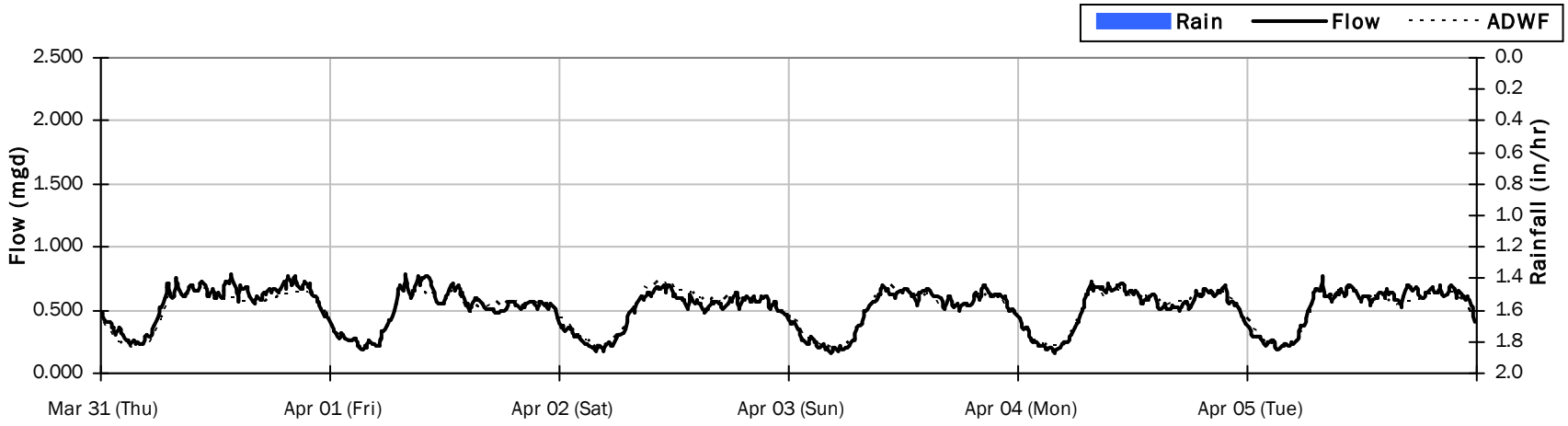
Period Rainfall: 1.33 inches Period Avg Flow: 0.532 mgd Period Peak Flow: 2.321 mgd Period Min Flow: 0.142 mgd

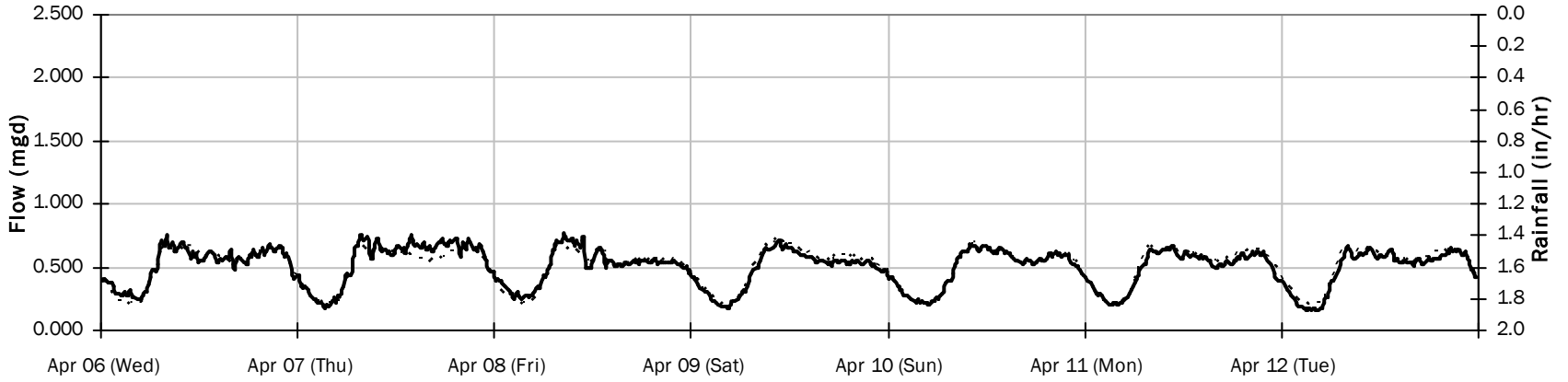


SITE 3

Flow Summary: 3/31/2022 to 4/12/2022

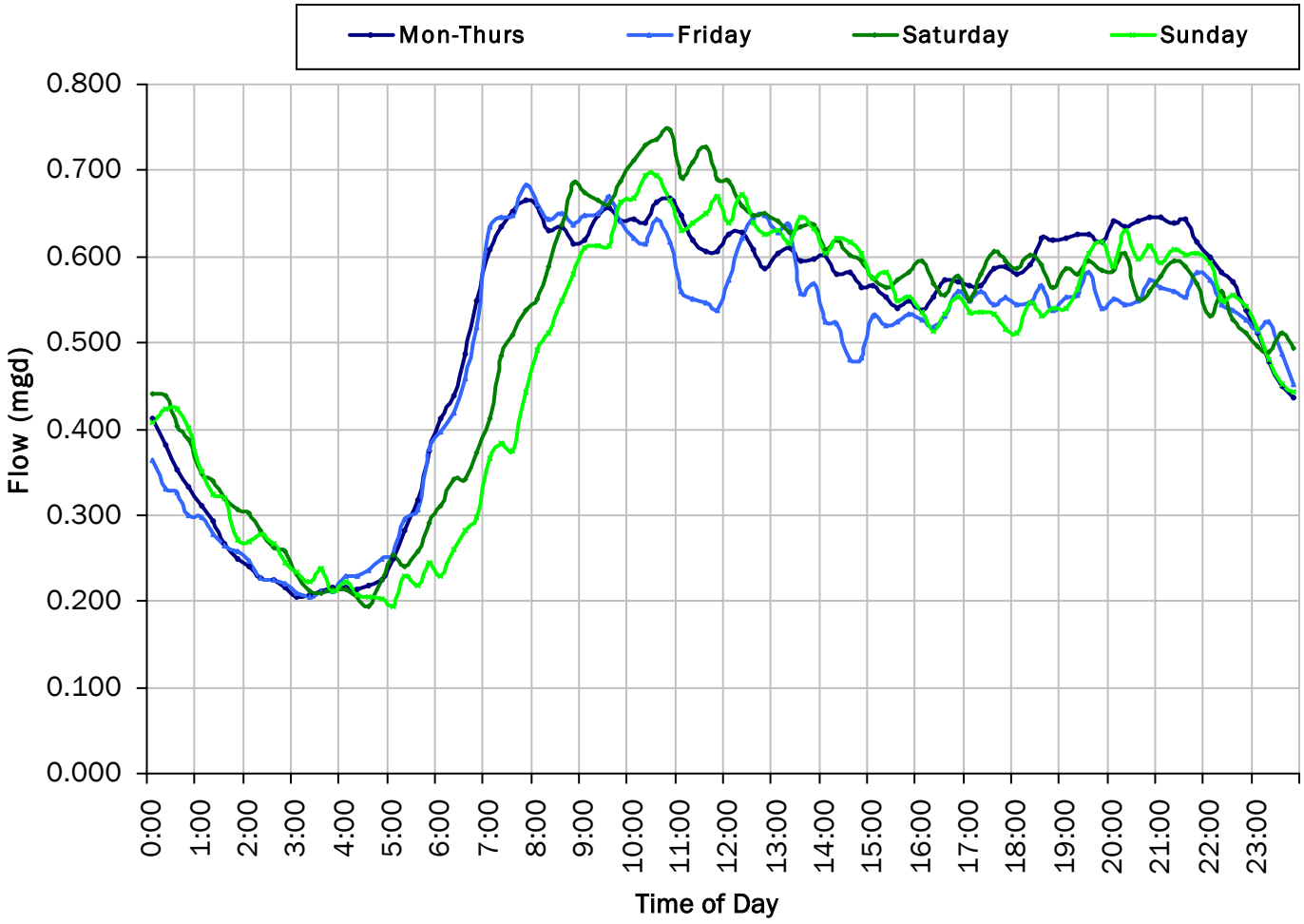
Period Rainfall: 0.00 inches Period Avg Flow: 0.509 mgd Period Peak Flow: 0.790 mgd Period Min Flow: 0.164 mgd





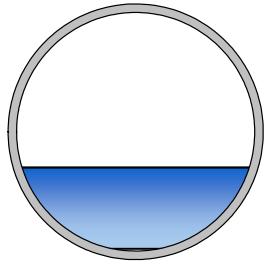
SITE 3

Average Dry Weather Flow Hydrographs



ADWF:

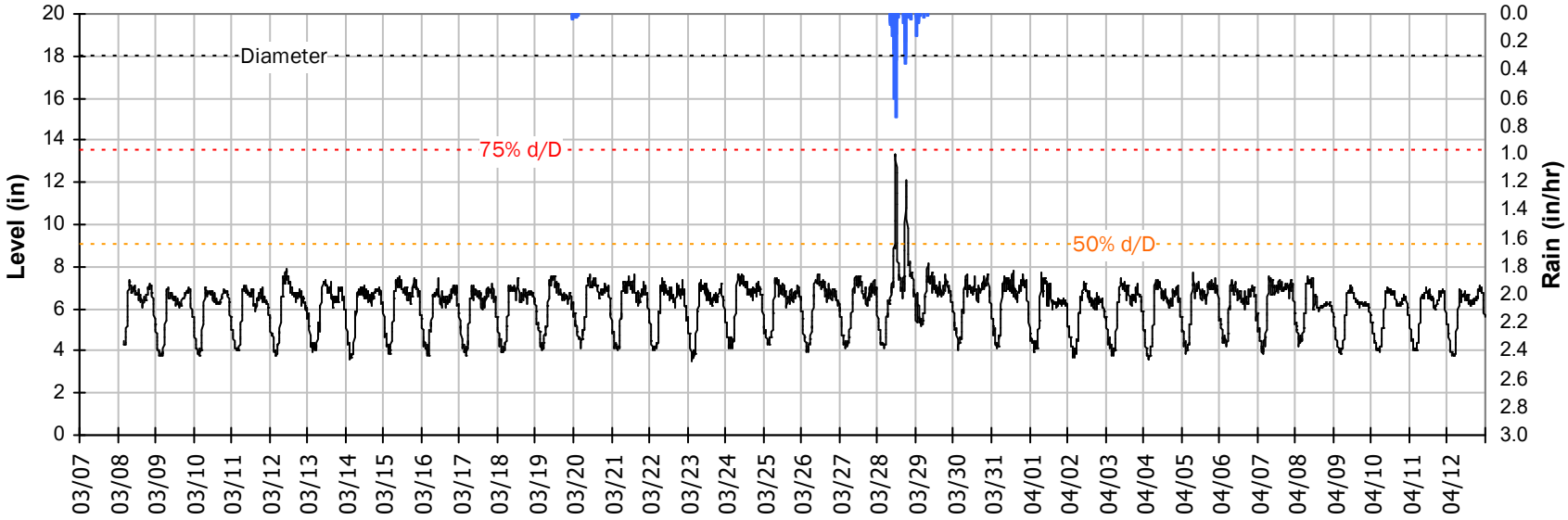
0.506 *mgd*

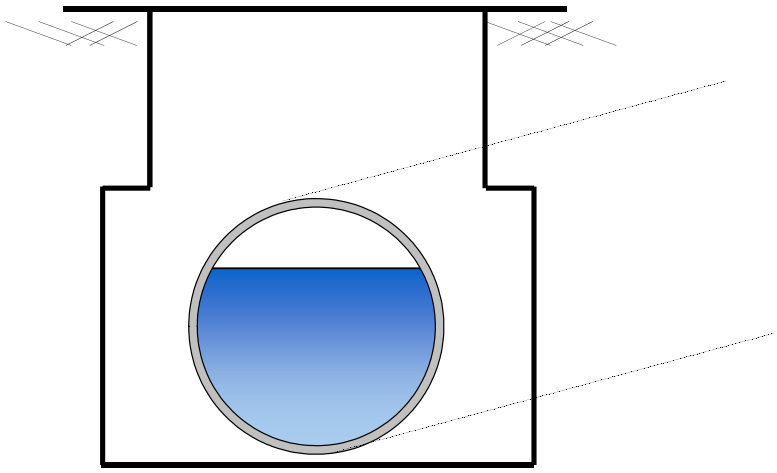


SITE 3

Site Capacity and Surcharge Summary

Realtime Flow Levels with Rainfall Data over Monitoring Period

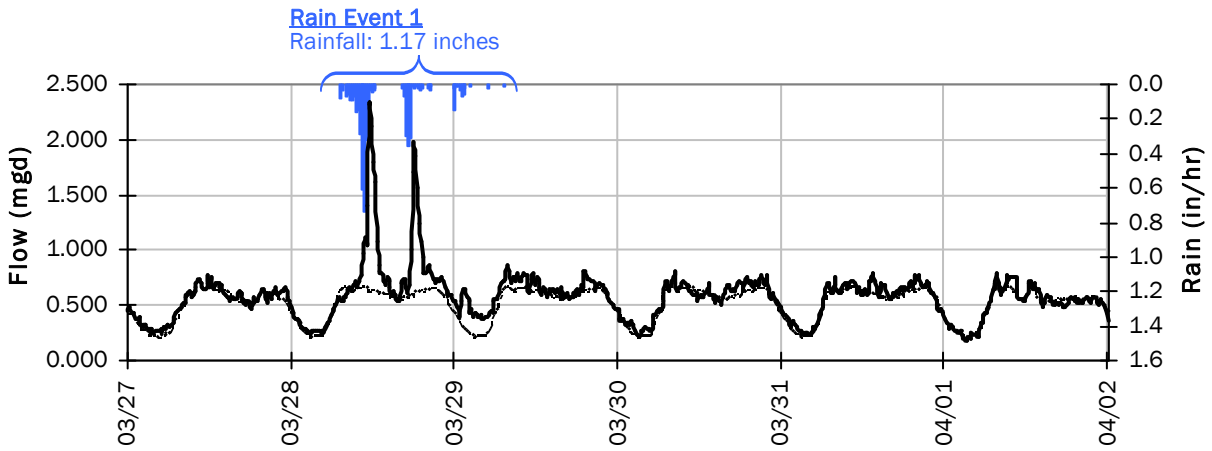




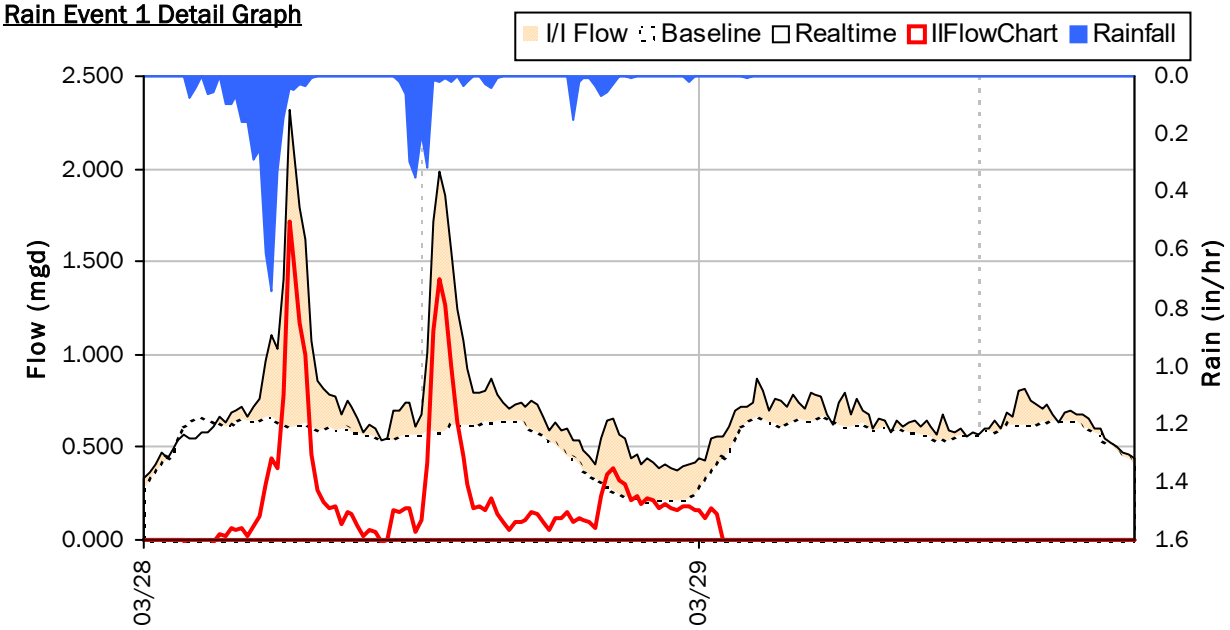
Pipe Diameter:	18	*inches*
Peak Measured Level:	13.2	*inches*
Peak d/D Ratio:	0.73	

SITE 3
I/I Summary: Rain Event 1

Baseline and Realtime Flows with Rainfall Data over Monitoring Period



Rain Event 1 Detail Graph



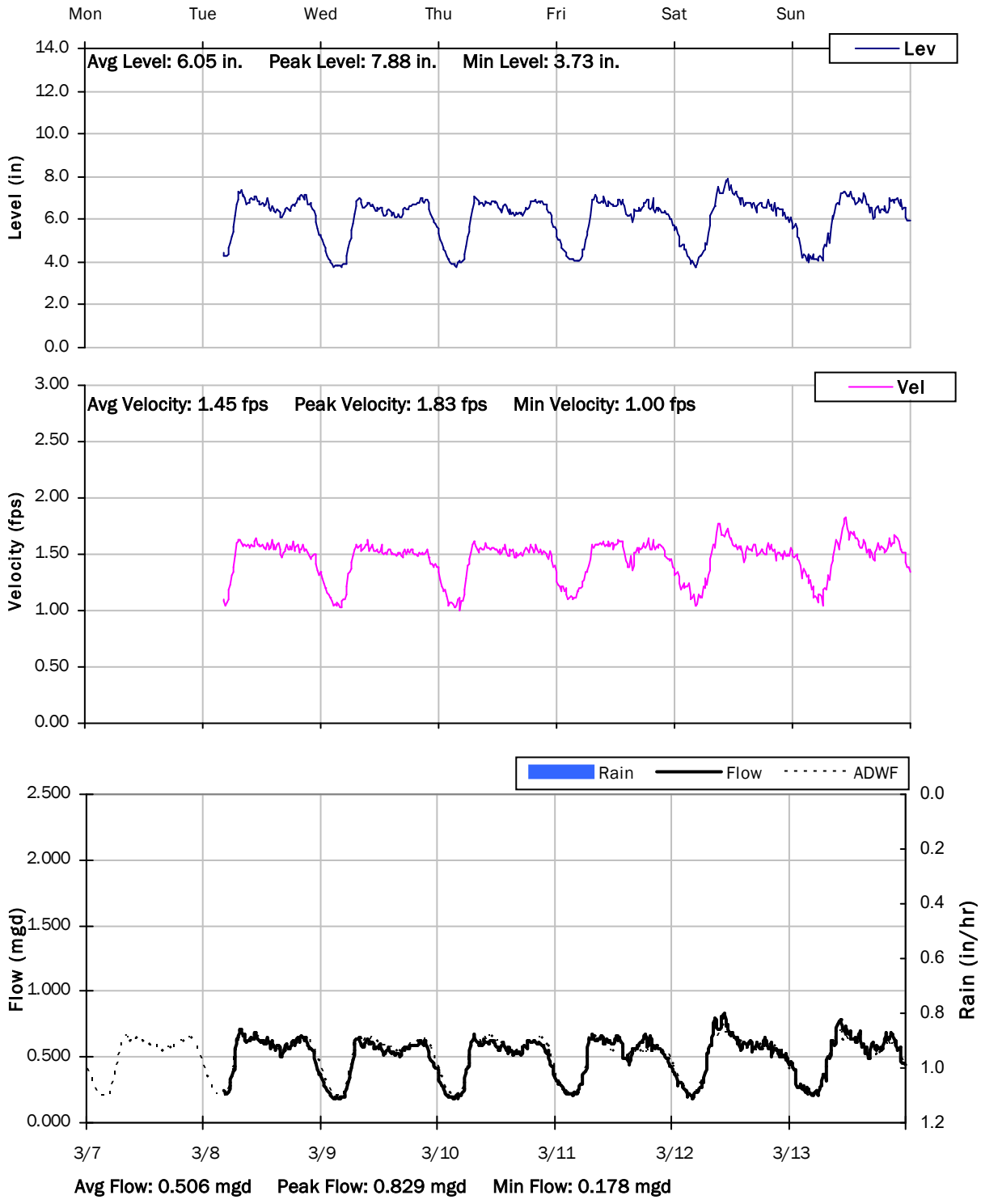
Storm Event I/I Analysis (Rain = 1.17 inches)

Capacity		Inflow / Infiltration	
Peak Flow:	2.321 *mgd*	**Peak I/I Rate:**	1.714 *mgd*
PF:	4.59	**Total I/I:**	247,000 *gallons*
Peak Level:	13.22 *in*		
d/D Ratio:	0.73		

SITE 3

Weekly Level, Velocity and Flow Hydrographs

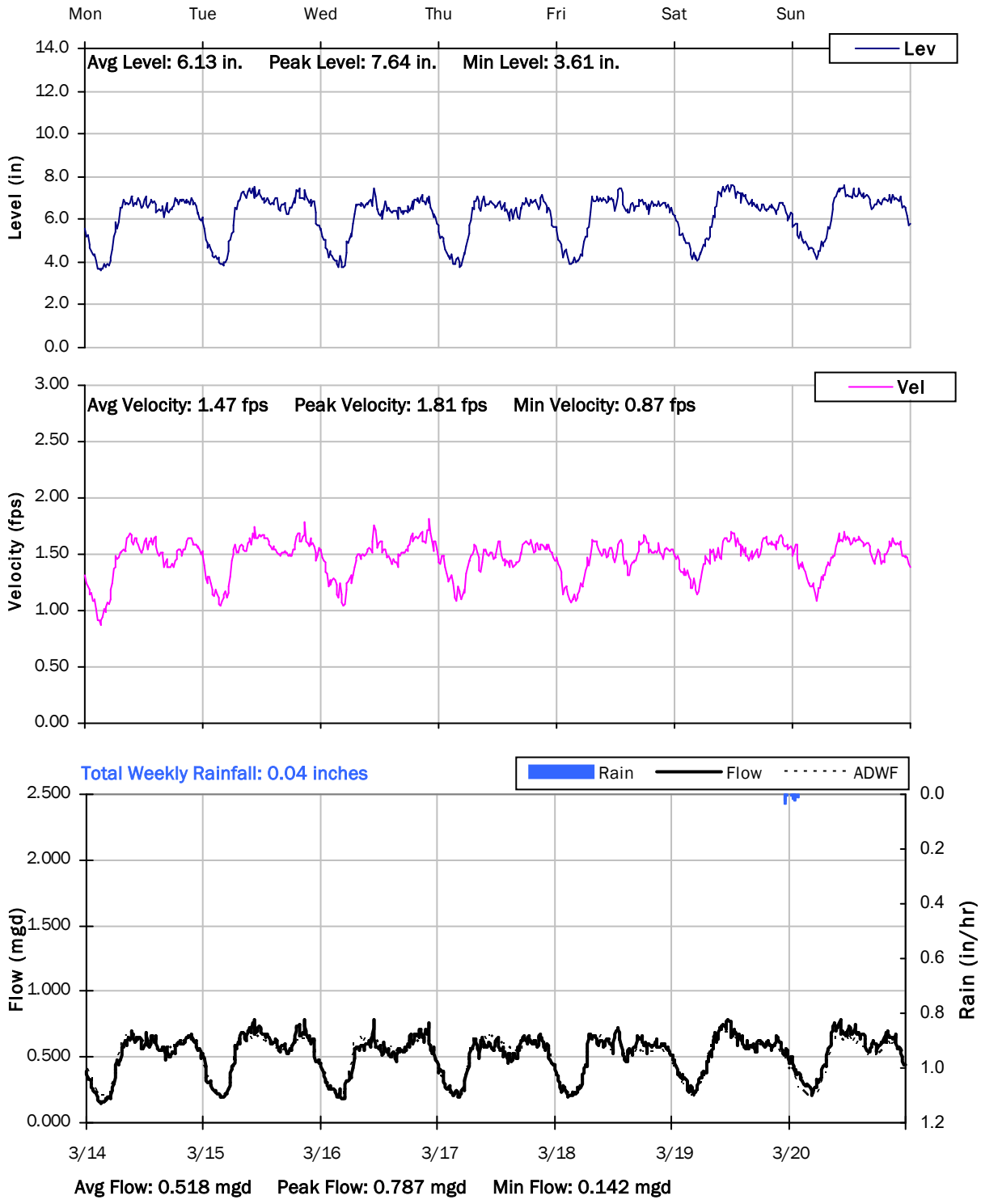
3/7/2022 to 3/14/2022



SITE 3

Weekly Level, Velocity and Flow Hydrographs

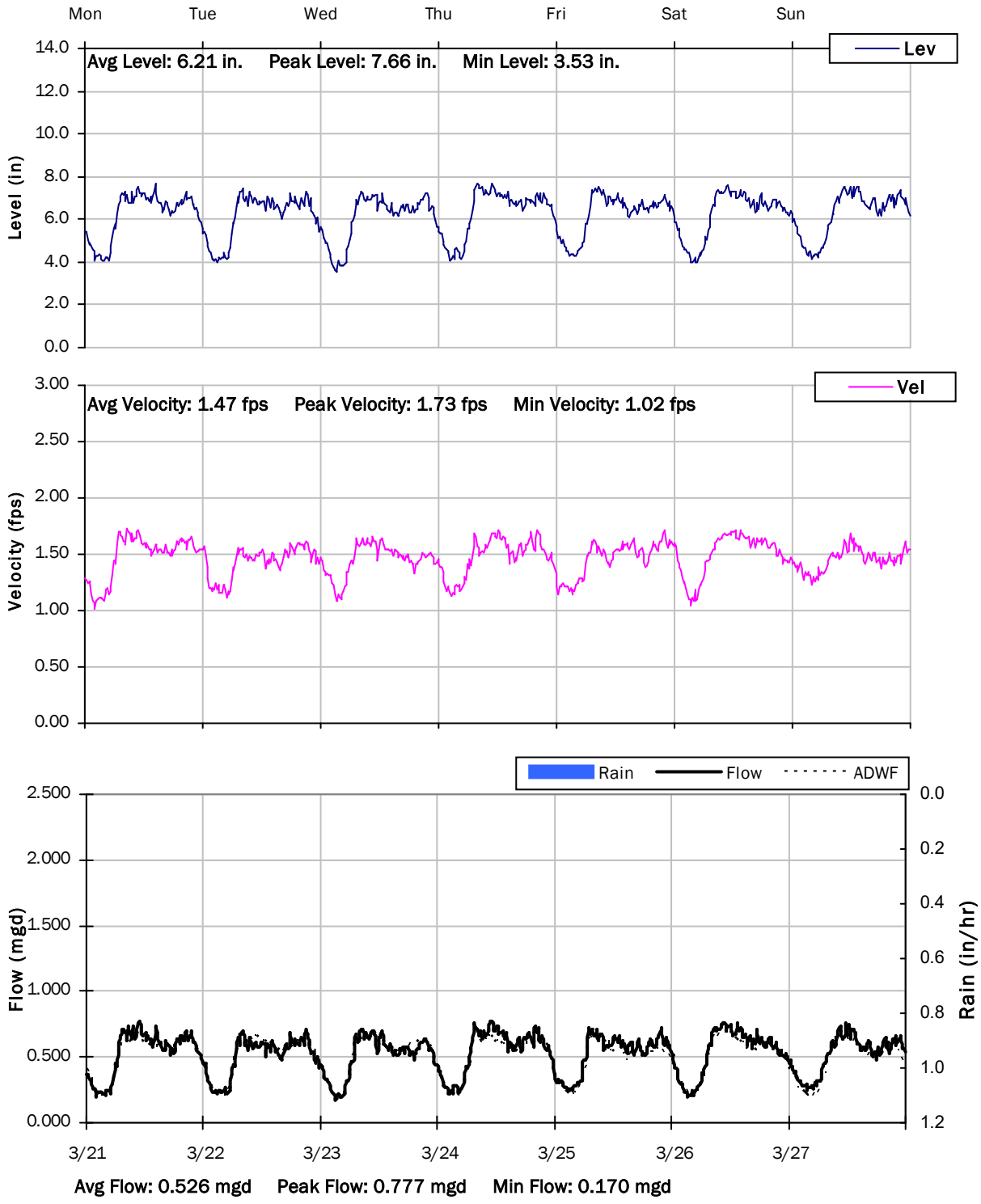
3/14/2022 to 3/21/2022



SITE 3

Weekly Level, Velocity and Flow Hydrographs

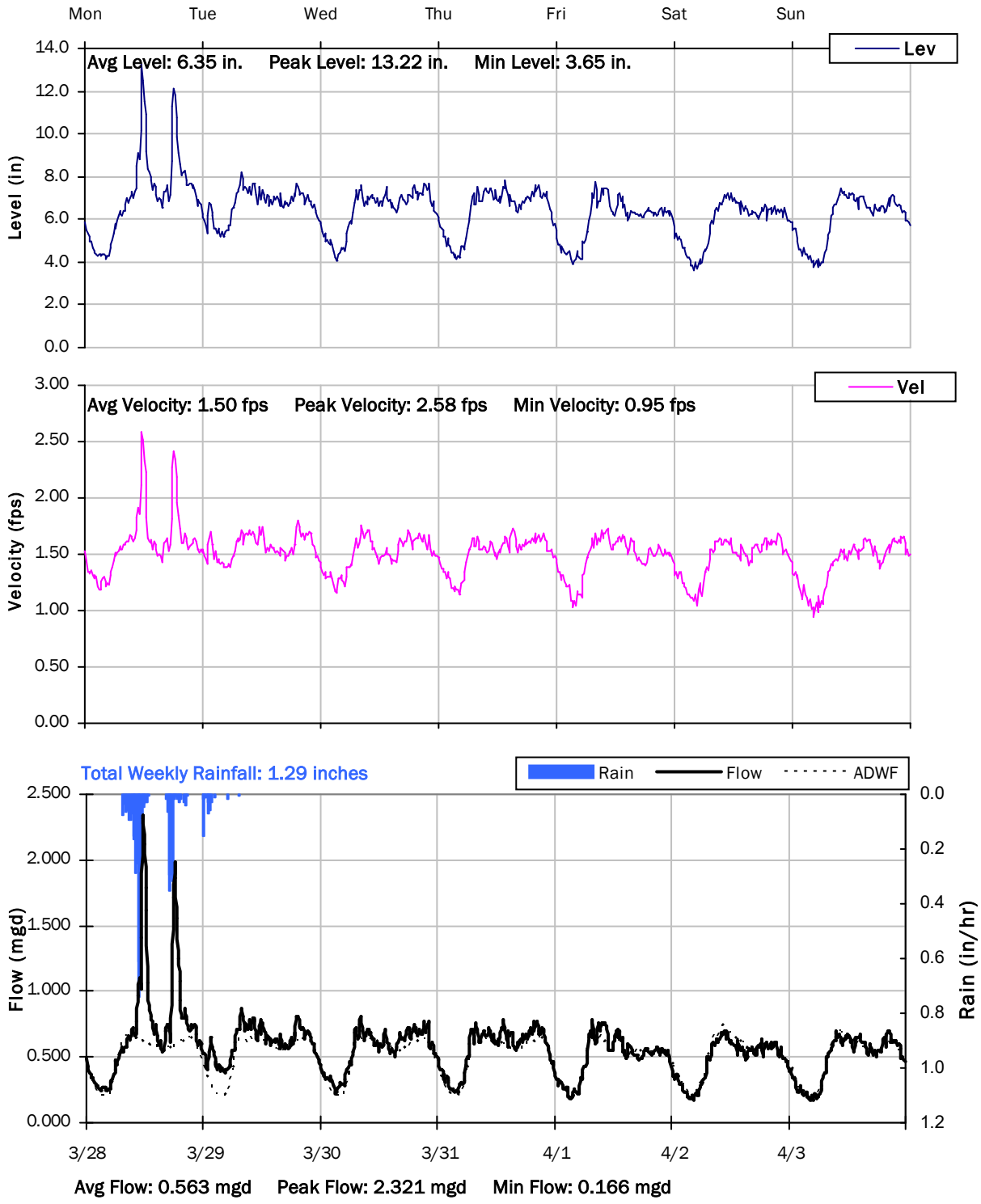
3/21/2022 to 3/28/2022



SITE 3

Weekly Level, Velocity and Flow Hydrographs

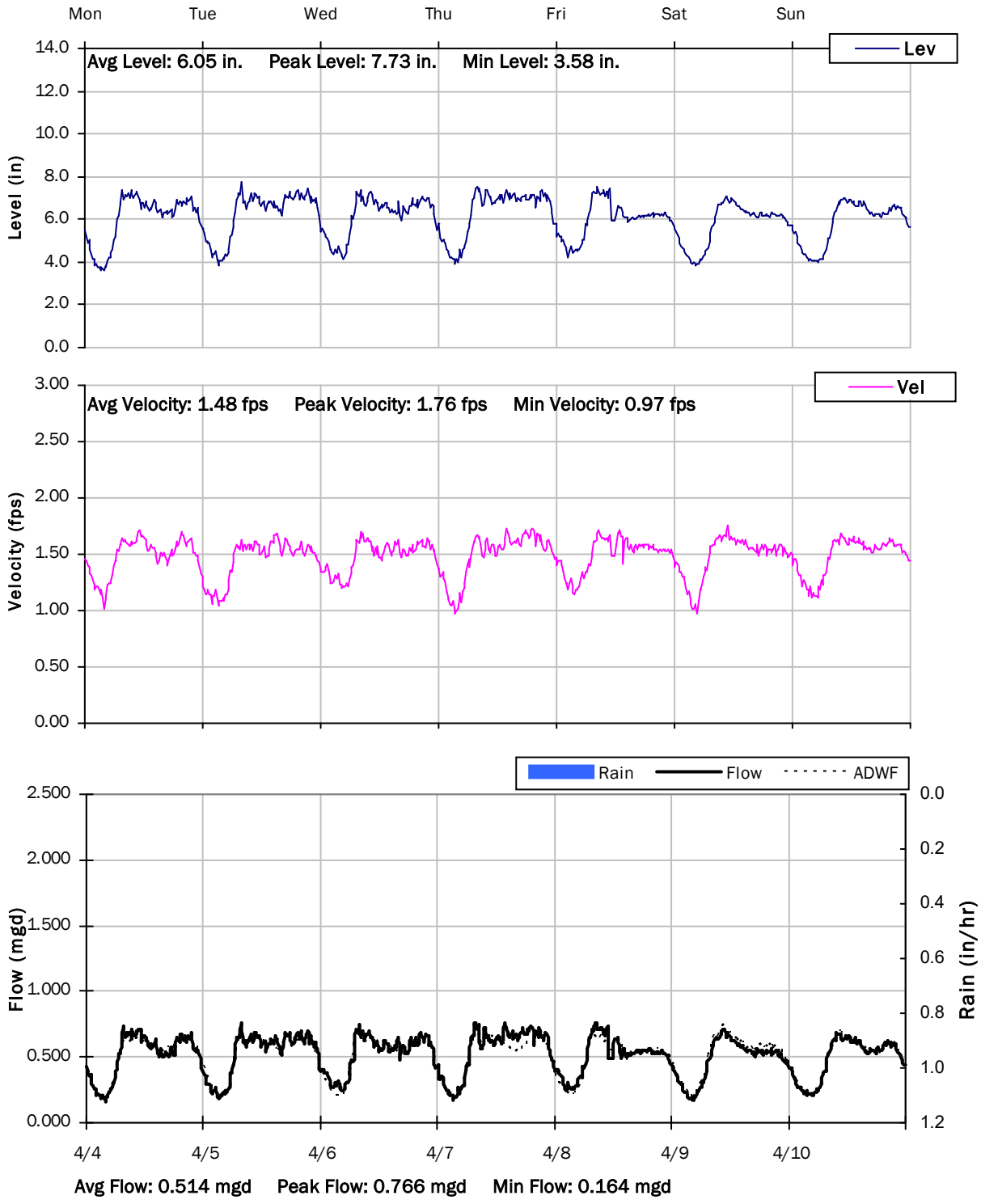
3/28/2022 to 4/4/2022



SITE 3

Weekly Level, Velocity and Flow Hydrographs

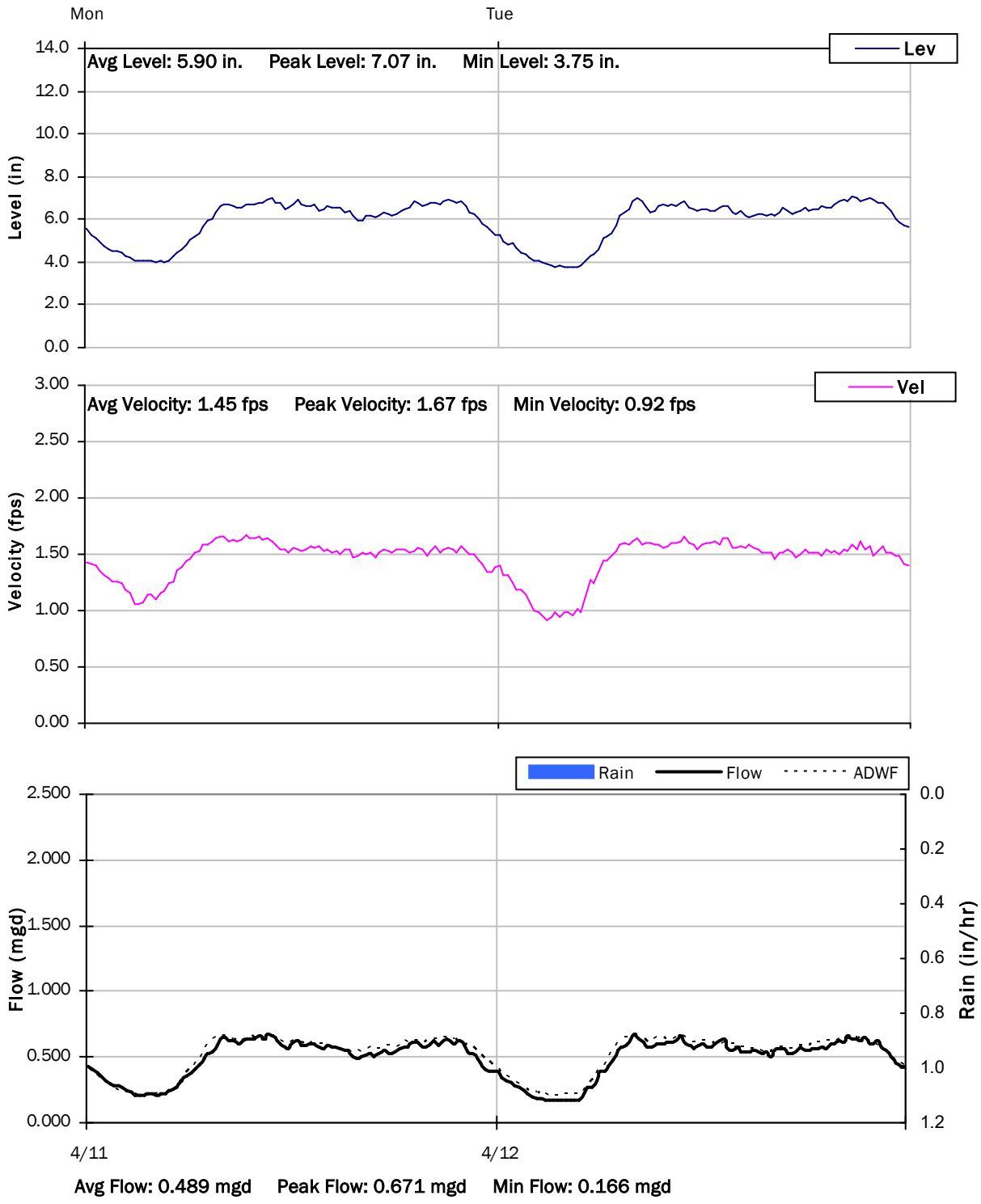
4/4/2022 to 4/11/2022



SITE 3

Weekly Level, Velocity and Flow Hydrographs

4/11/2022 to 4/13/2022



Monitoring Site: Site 4

Carollo Gardena, California

Sanitary Sewer Flow Monitoring

March 07, 2022 - April 12, 2022

Location: Normandie Avenue (on island) south of W 155th Street

Data Summary Report

Vicinity Map: Site 4

SITE 4

Site Information MH ID: 05 1360

Location: Normandie Avenue (on island) south of W 155th Street

Coordinates: 118.2993° W, 33.8902° N

Rim Elevation (Earth): 47 feet

Expected Pipe Diameter: 15 inches

Measured Pipe Diameter: 15.5 inches

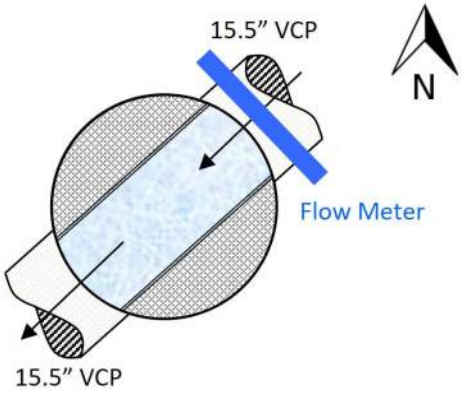
ADWF: 0.576 mgd

Peak Measured Flow: 1.483 mgd

Sediment: None

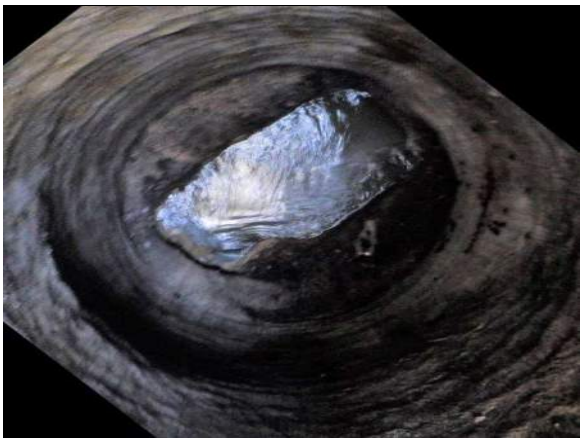
Satellite Map

Sanitary Map



Flow Sketch

Street View



Plan View

SITE 4

Additional Site Photos

Effluent Pipe

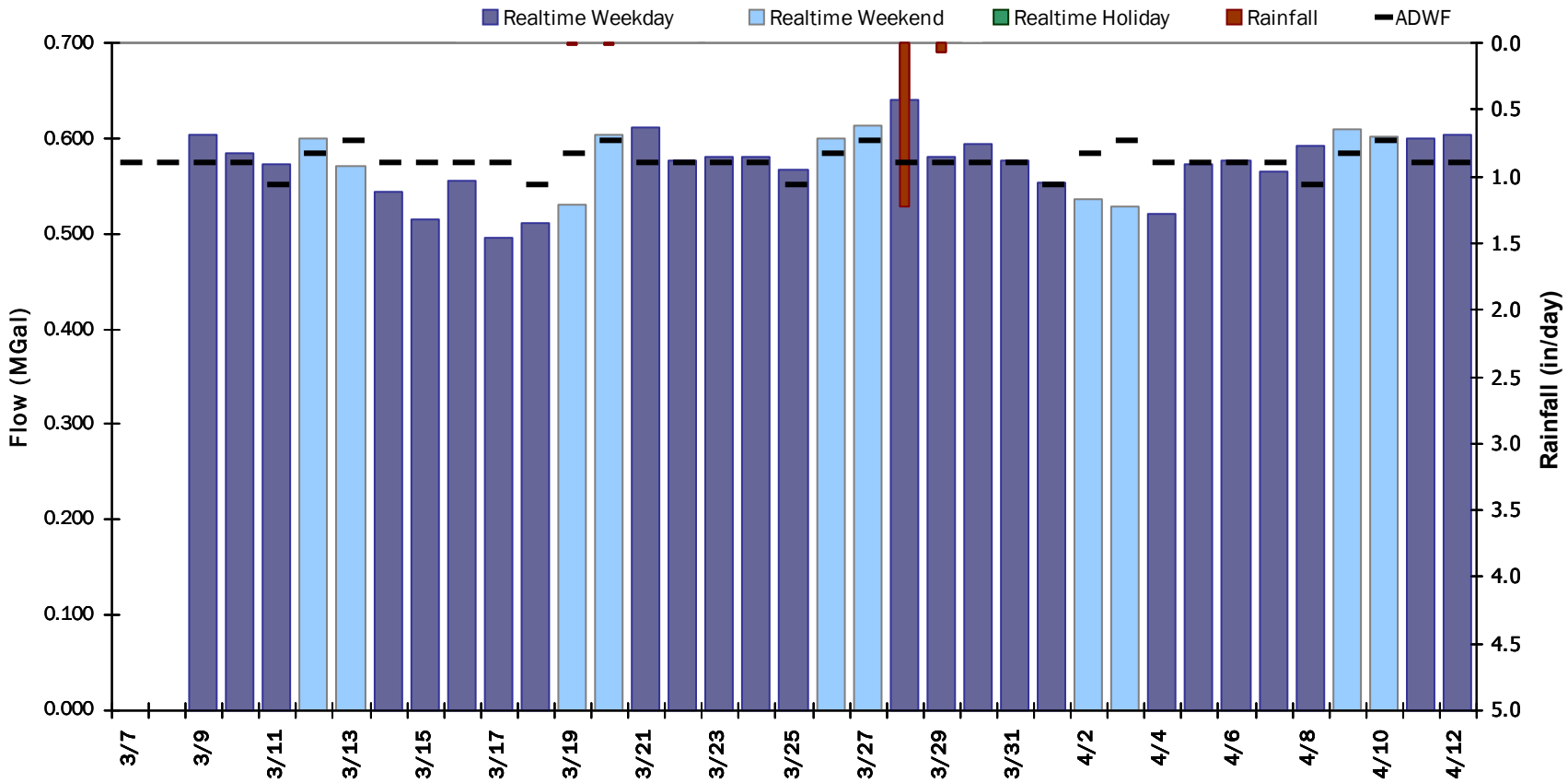
Monitored Influent Pipe

SITE 4

Period Flow Summary: Daily Flow Totals

Avg Daily Flow: 0.577 MGal Peak Daily Flow: 0.693 MGal Min Daily Flow: 0.495 MGal

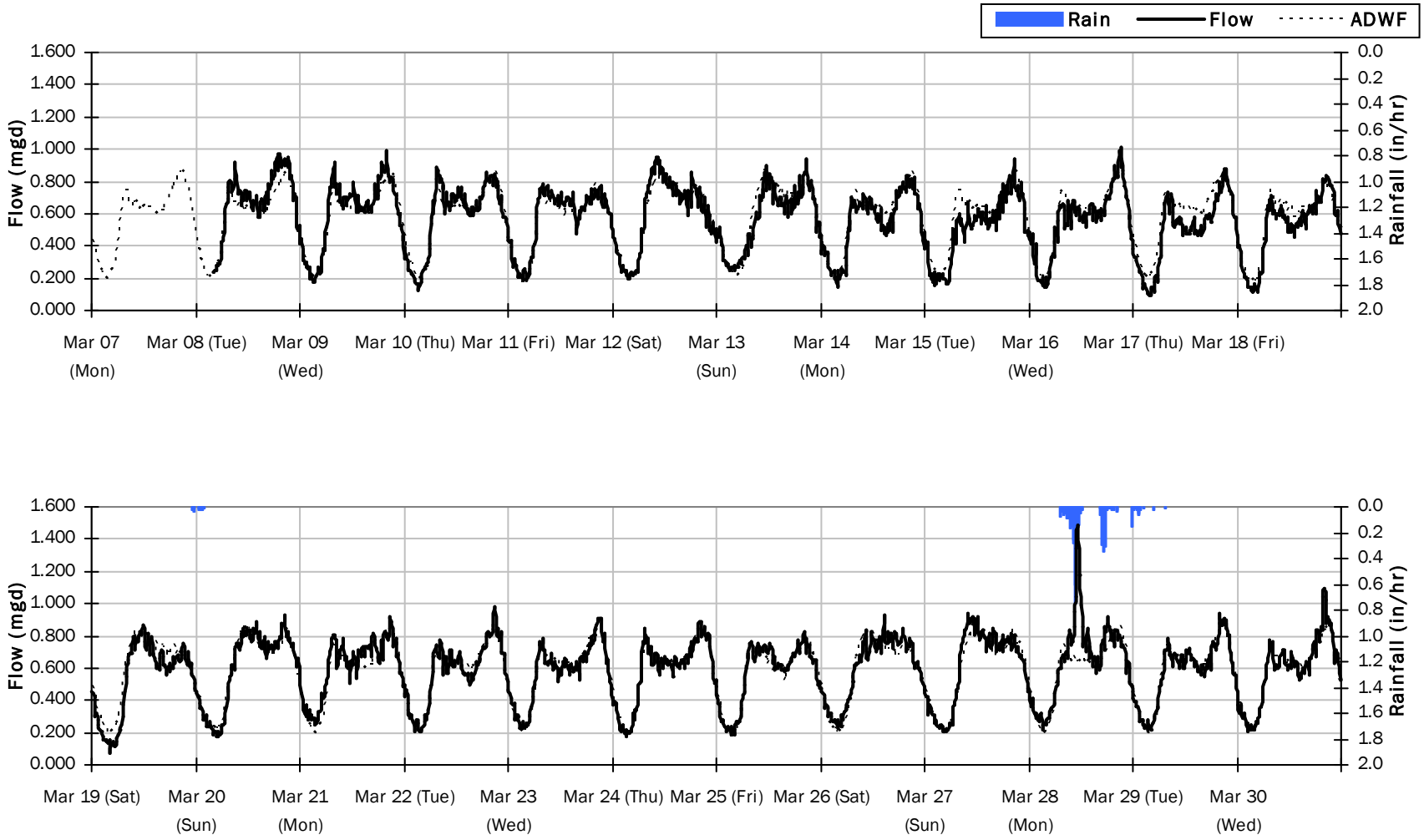
Total Rainfall: 1.33 inches



SITE 4

Flow Summary: 3/7/2022 to 3/30/2022

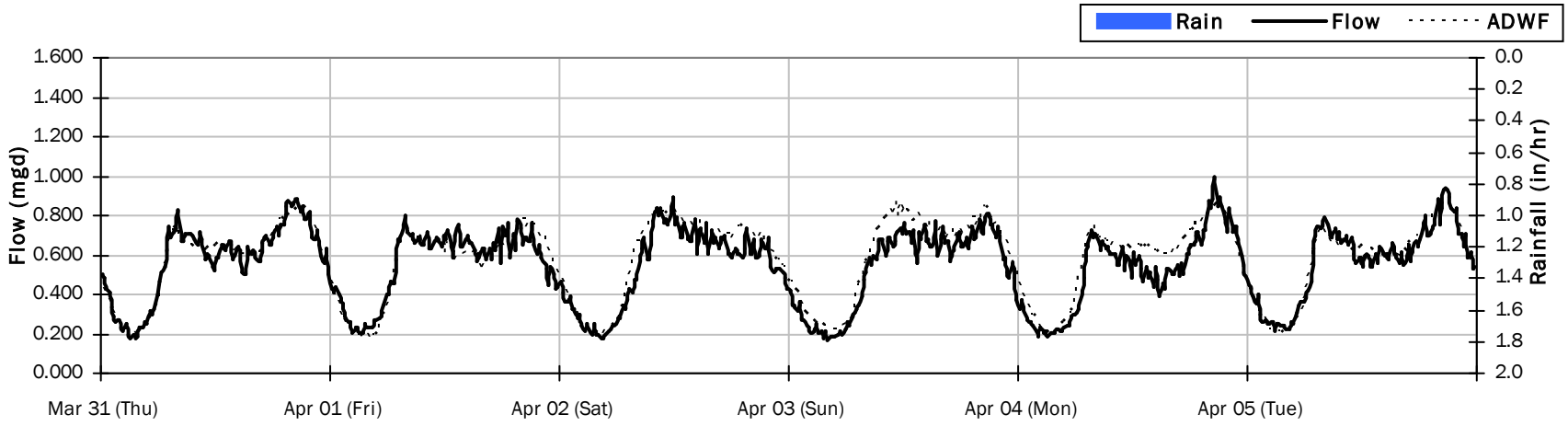
Period Rainfall: 1.33 inches Period Avg Flow: 0.578 mgd Period Peak Flow: 1.483 mgd Period Min Flow: 0.077 mgd

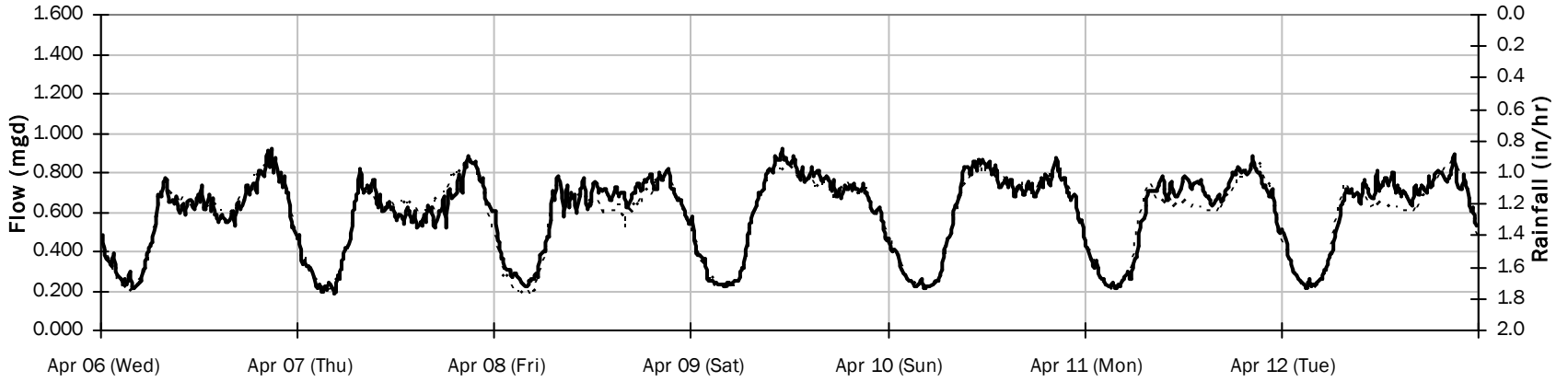


SITE 4

Flow Summary: 3/31/2022 to 4/12/2022

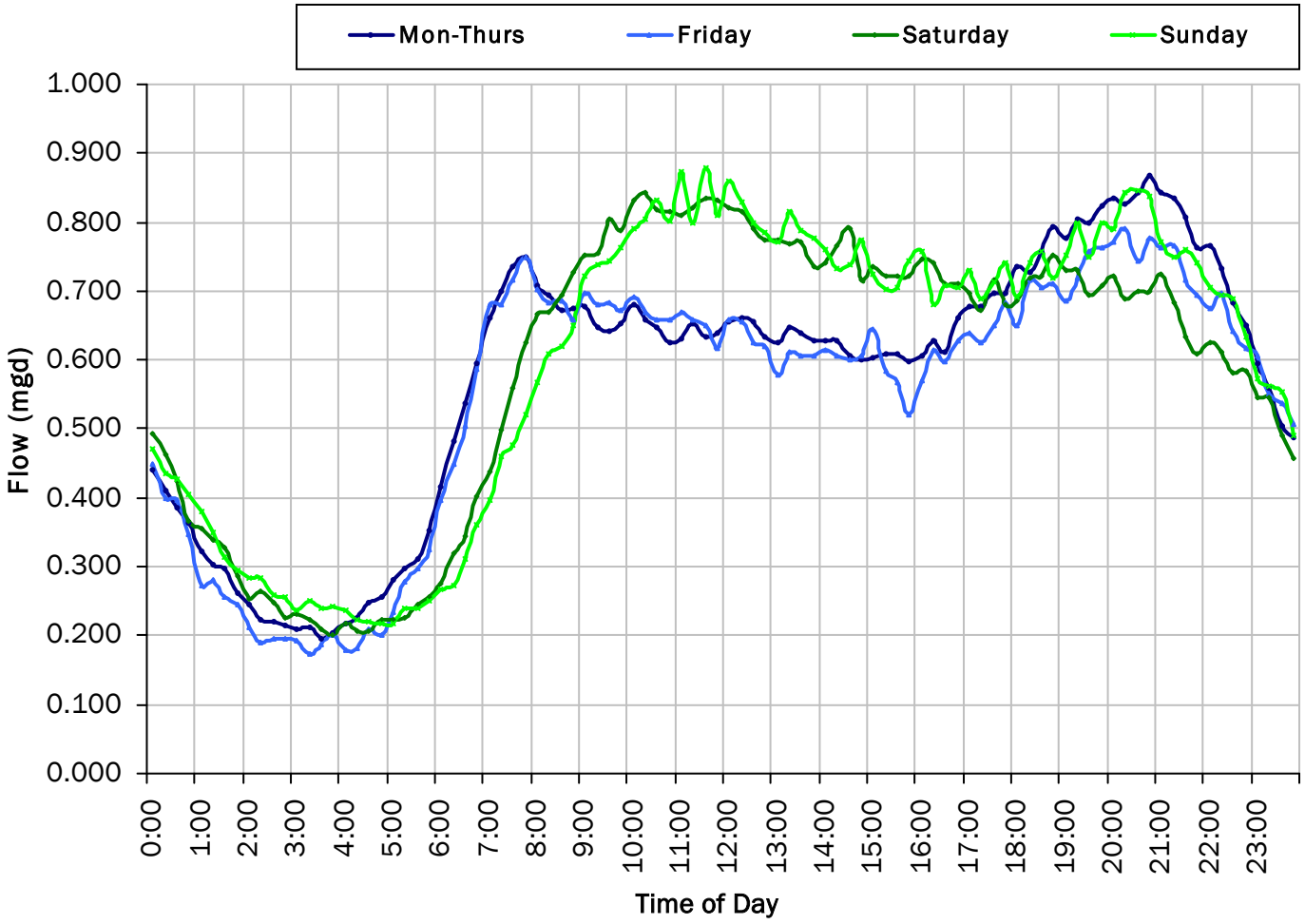
Period Rainfall: 0.00 inches Period Avg Flow: 0.572 mgd Period Peak Flow: 0.994 mgd Period Min Flow: 0.172 mgd





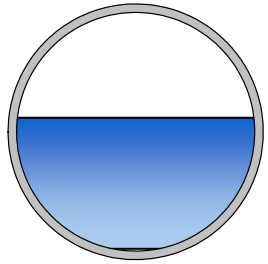
SITE 4

Average Dry Weather Flow Hydrographs



ADWF:

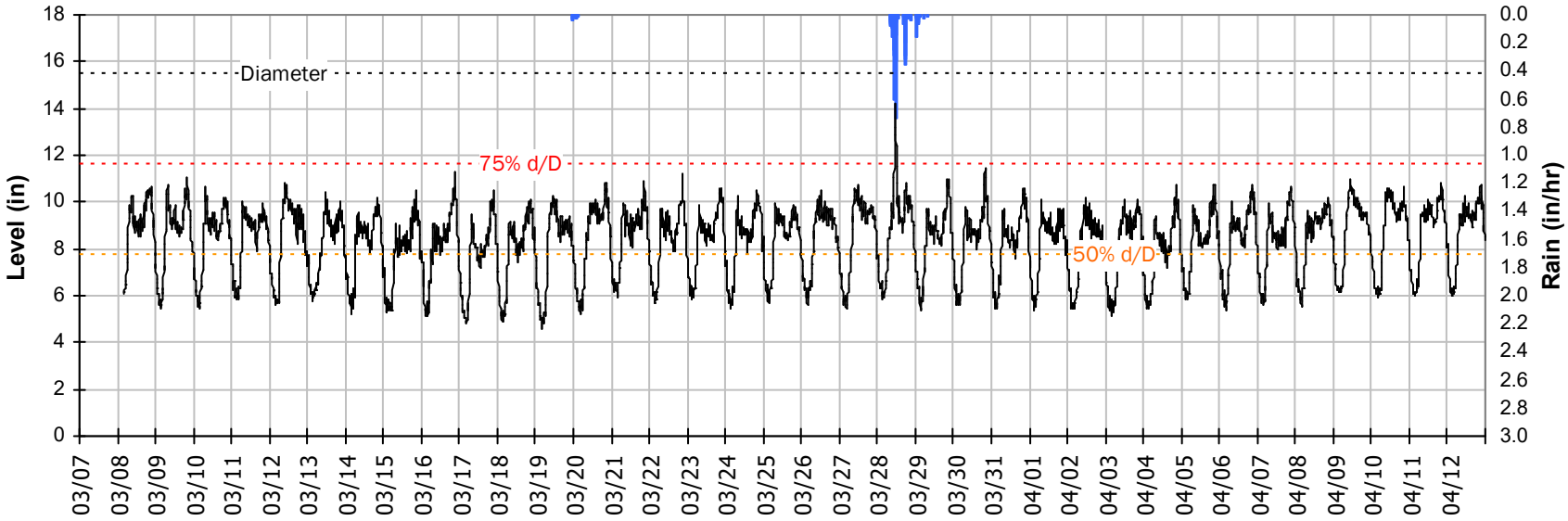
0.576 *mgd*

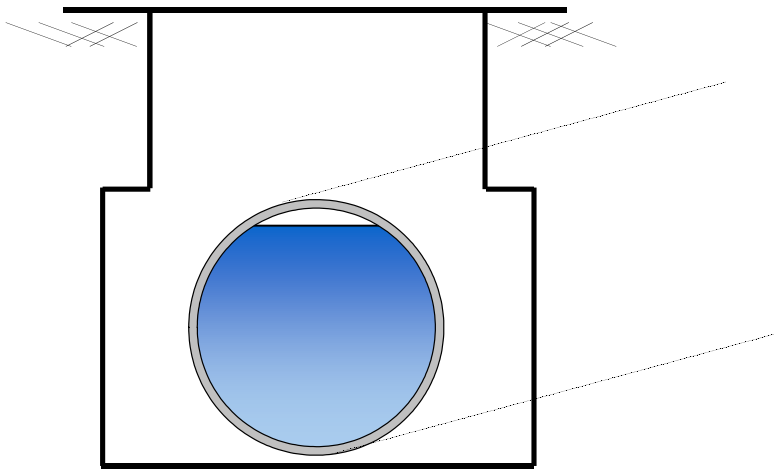


SITE 4

Site Capacity and Surcharge Summary

Realtime Flow Levels with Rainfall Data over Monitoring Period

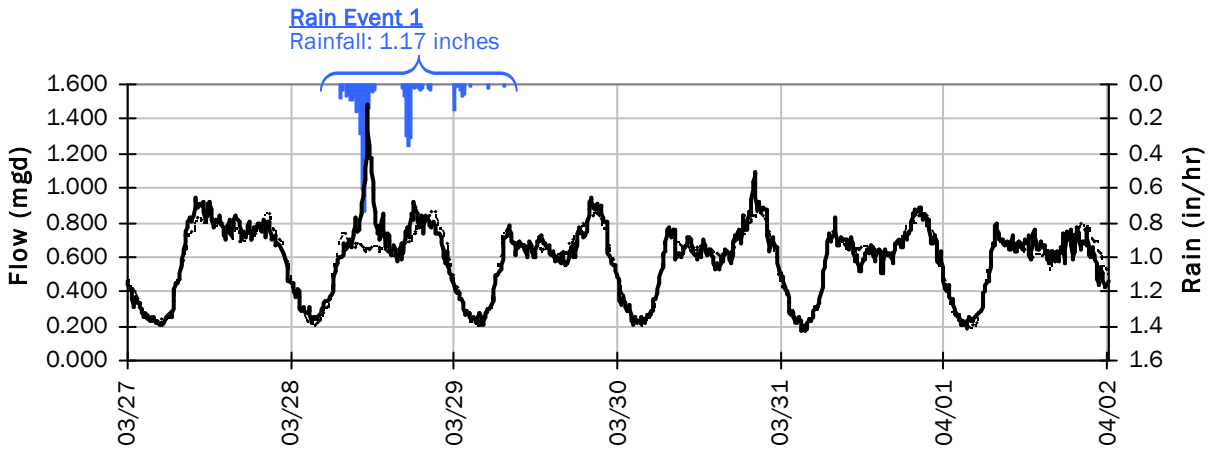




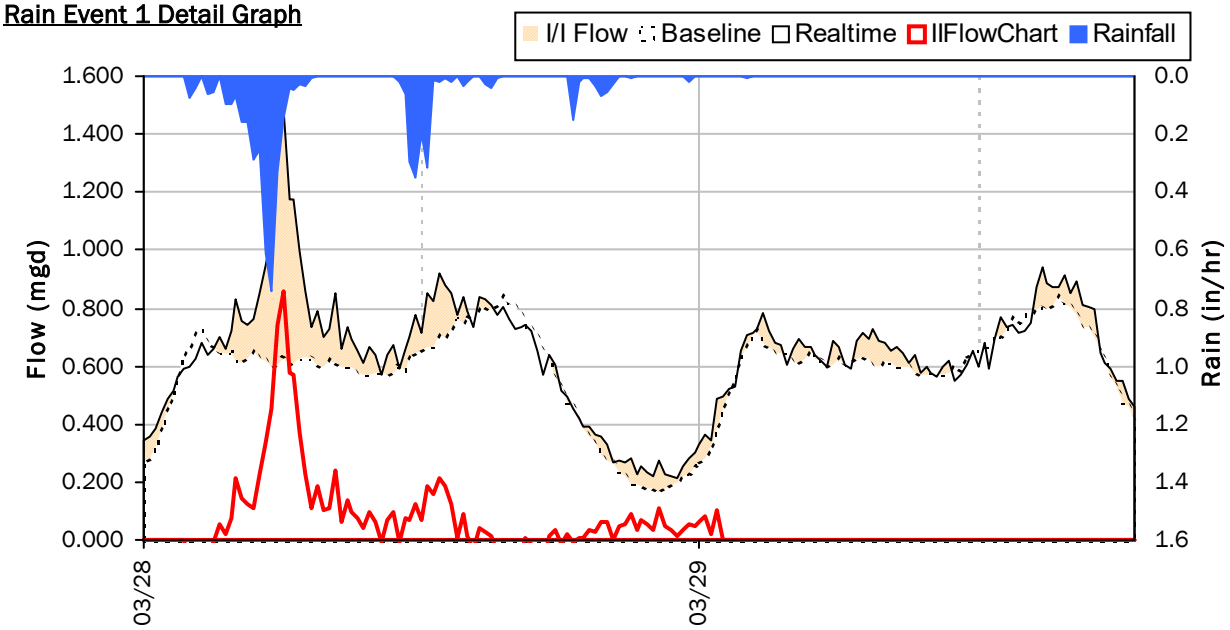
Pipe Diameter:	15.5	*inches*
Peak Measured Level:	14.2	*inches*
Peak d/D Ratio:	0.92	

SITE 4
I/I Summary: Rain Event 1

Baseline and Realtime Flows with Rainfall Data over Monitoring Period



Rain Event 1 Detail Graph



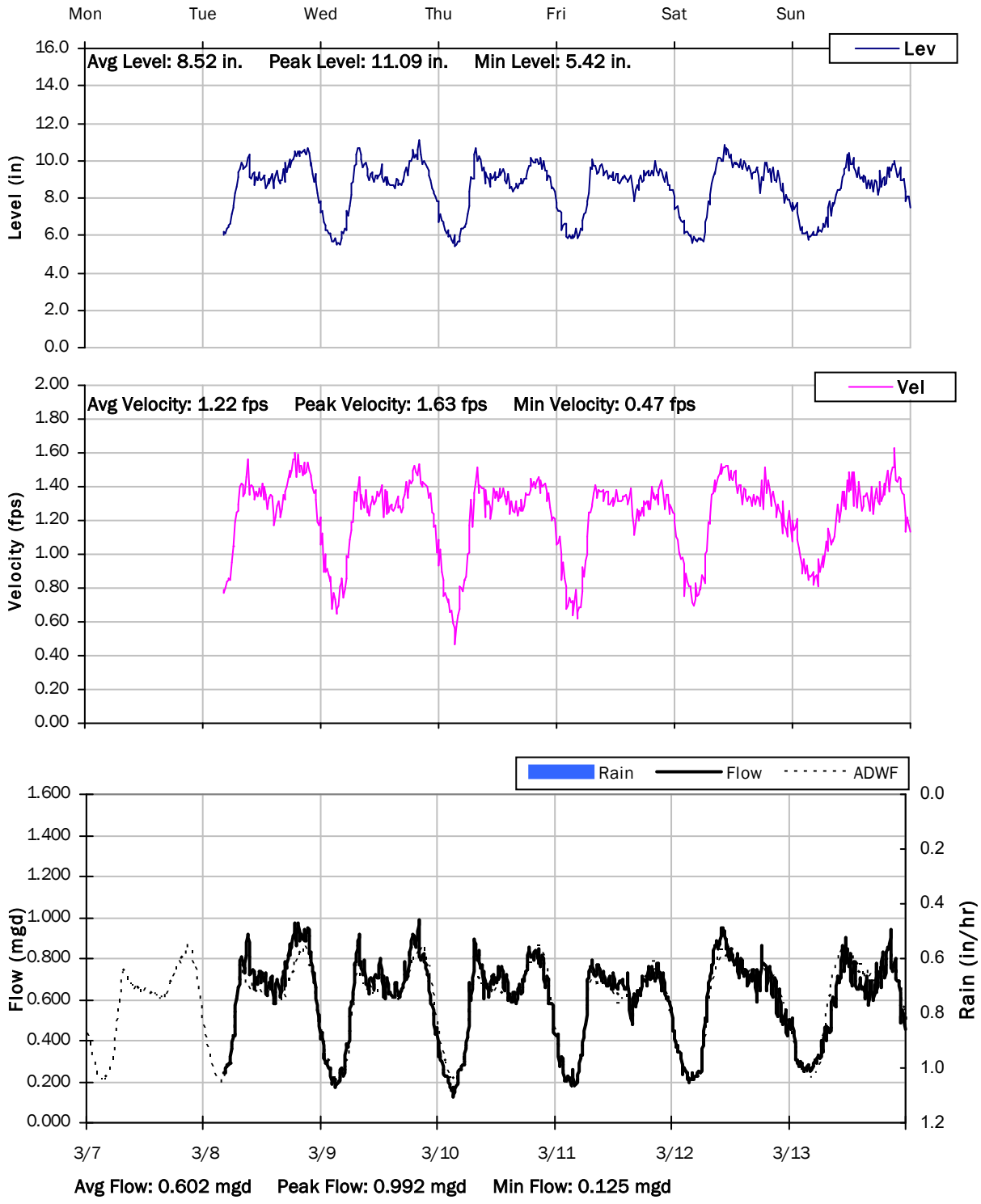
Storm Event I/I Analysis (Rain = 1.17 inches)

Capacity		Inflow / Infiltration	
Peak Flow:	1.483 *mgd*	**Peak I/I Rate:**	0.860 *mgd*
PF:	2.57	**Total I/I:**	89,000 *gallons*
Peak Level:	14.25 *in*		
d/D Ratio:	0.92		

SITE 4

Weekly Level, Velocity and Flow Hydrographs

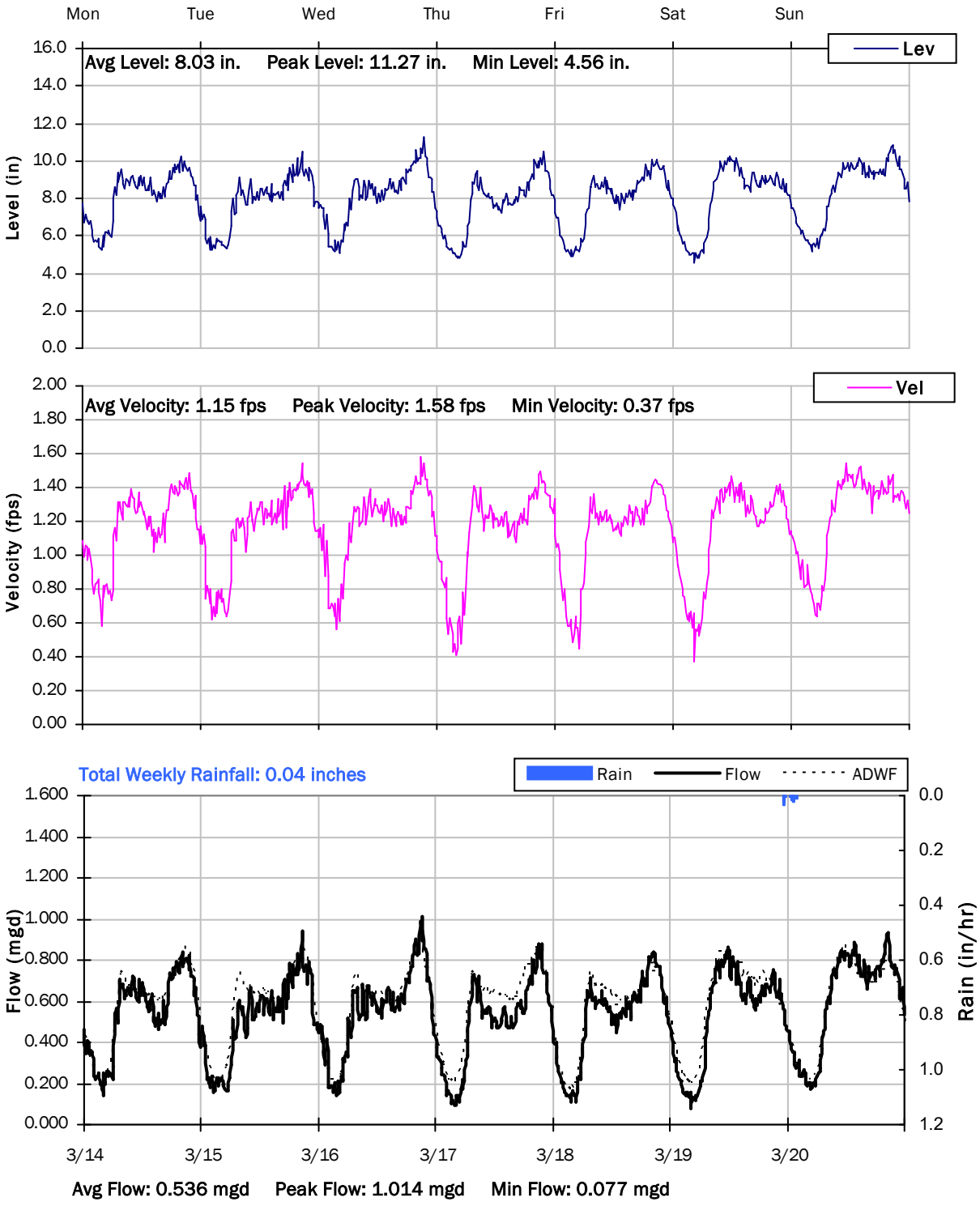
3/7/2022 to 3/14/2022



SITE 4

Weekly Level, Velocity and Flow Hydrographs

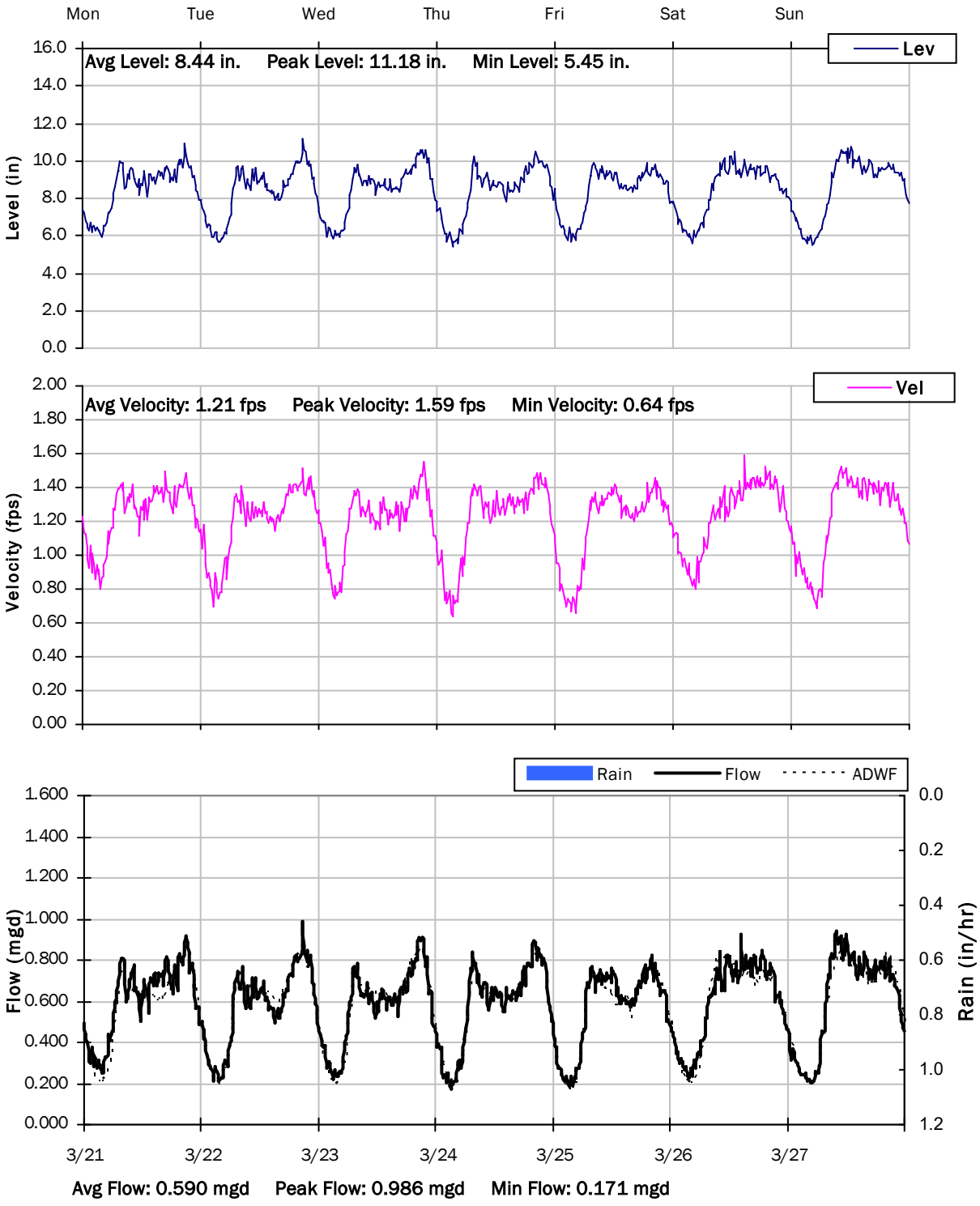
3/14/2022 to 3/21/2022



SITE 4

Weekly Level, Velocity and Flow Hydrographs

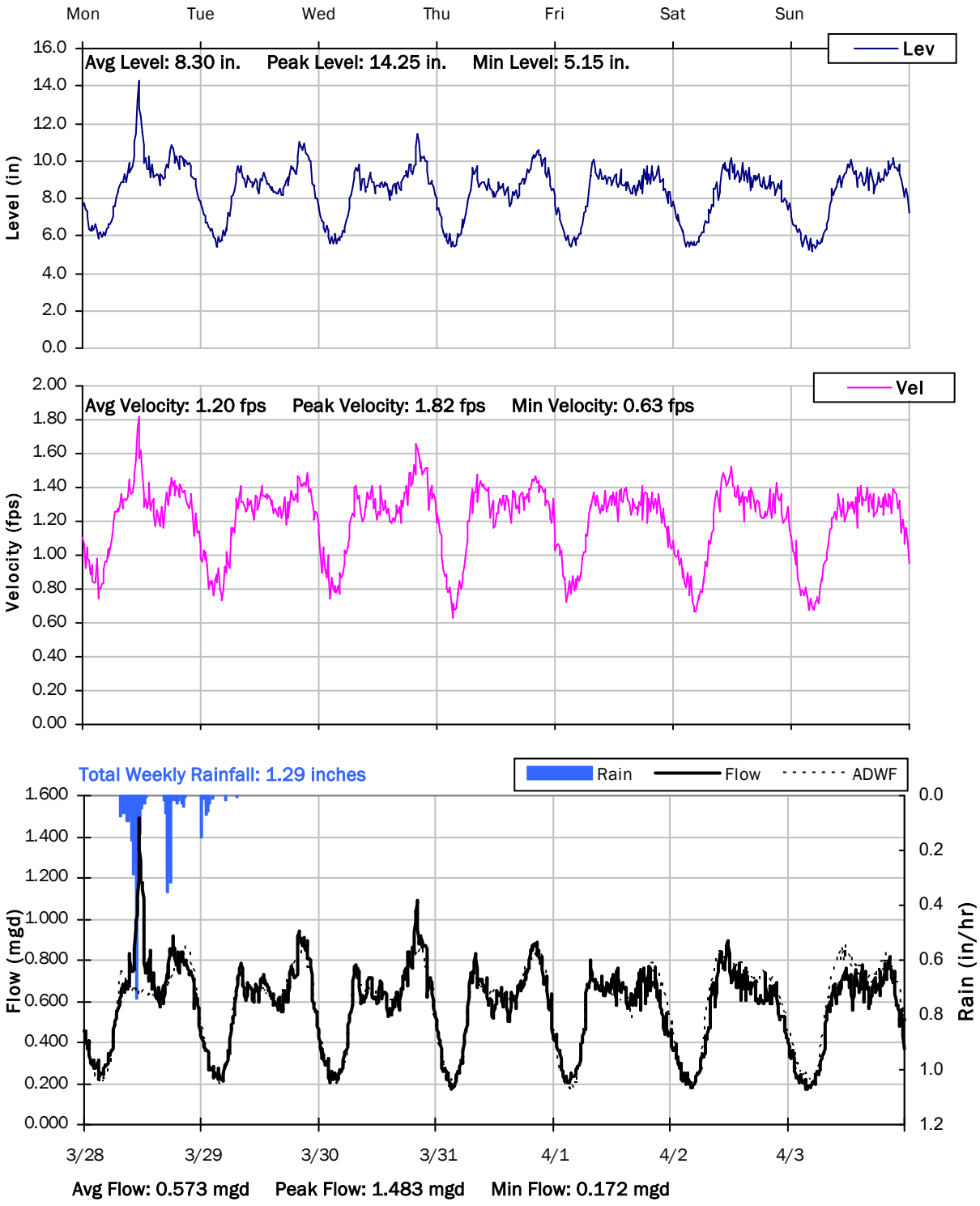
3/21/2022 to 3/28/2022



SITE 4

Weekly Level, Velocity and Flow Hydrographs

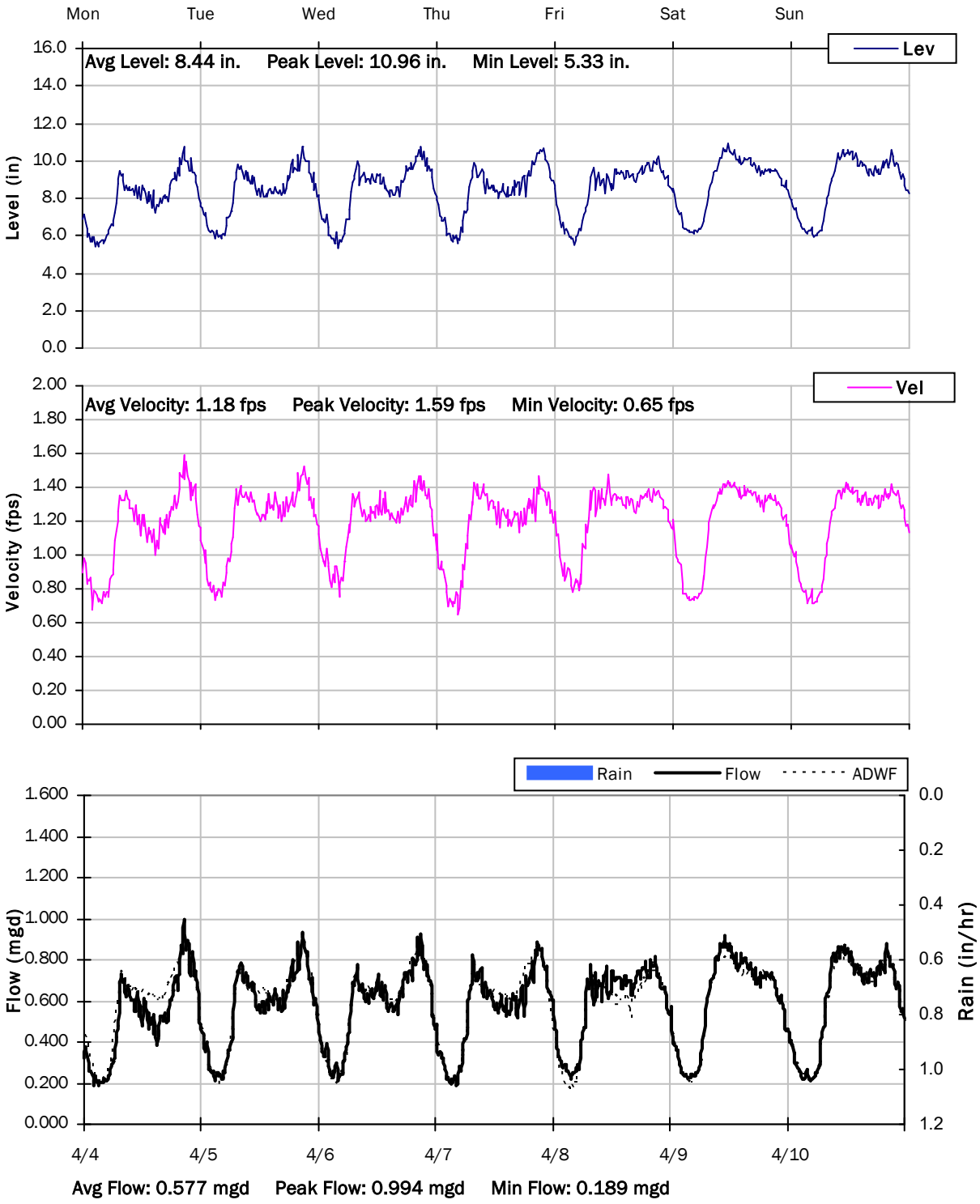
3/28/2022 to 4/4/2022



SITE 4

Weekly Level, Velocity and Flow Hydrographs

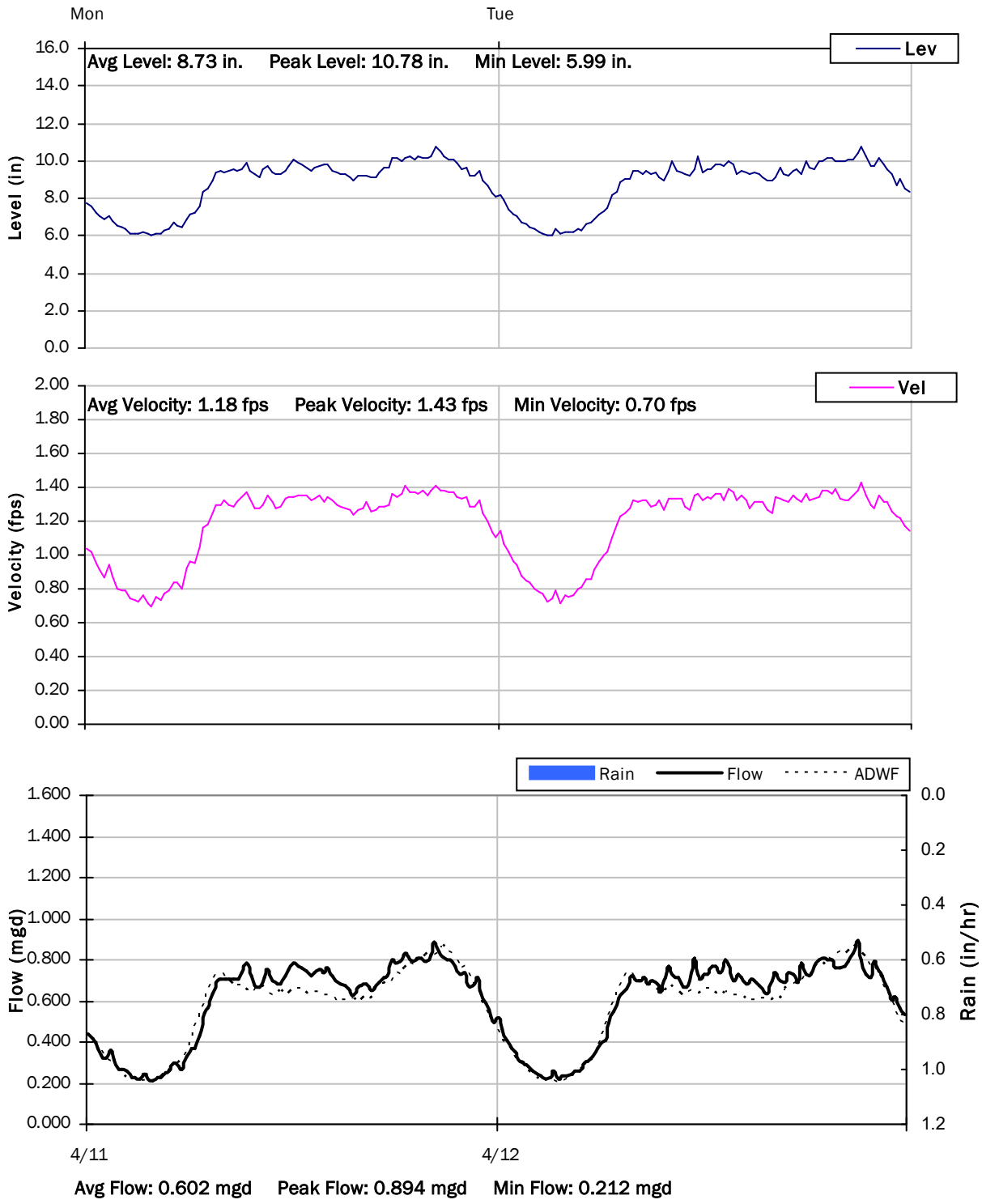
4/4/2022 to 4/11/2022



SITE 4

Weekly Level, Velocity and Flow Hydrographs

4/11/2022 to 4/13/2022



Monitoring Site: Site 5

Carollo Gardena, California

Sanitary Sewer Flow Monitoring

March 07, 2022 - April 12, 2022

Location: Van Ness Avenue south of W 162nd Street

Data Summary Report

Vicinity Map: Site 5

SITE 5

Site Information MH ID: 05 1071

Location: Van Ness Avenue south of W 162nd Street

Coordinates: 118.3178° W, 33.8832° N

Rim Elevation (Earth): 41 feet

Expected Pipe Diameter: 24 inches

Measured Pipe Diameter: 24 inches

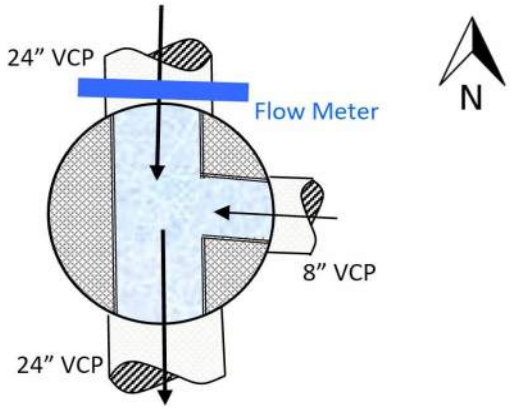
ADWF: 1.823 mgd

Peak Measured Flow: 4.341 mgd

Sediment: None

Satellite Map

Sanitary Map



Flow Sketch

Street View

Plan View

SITE 5

Additional Site Photos

Effluent Pipe

East Influent Pipe

SITE 5

Additional Site Photos

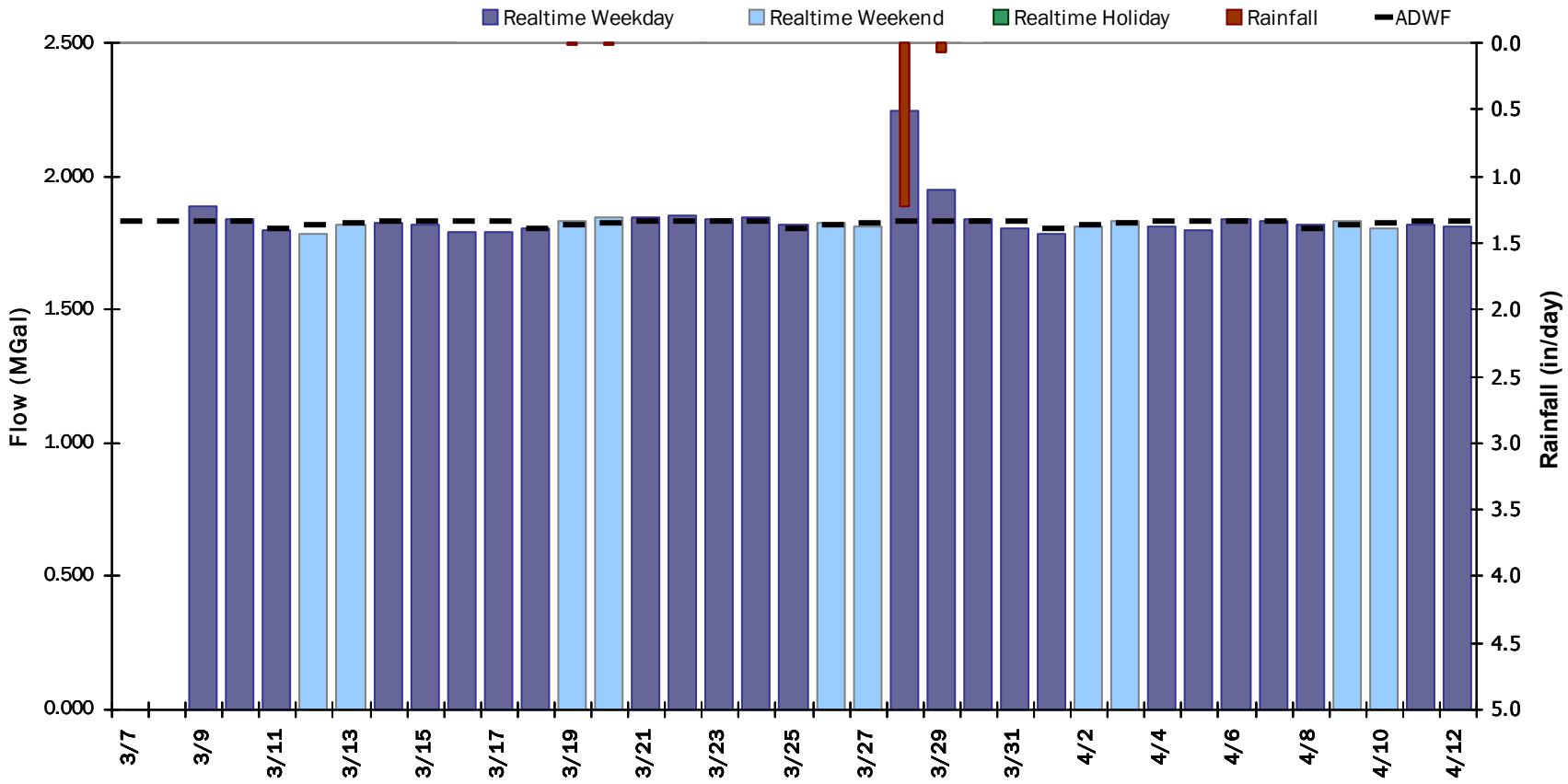
Monitored North Influent Pipe

SITE 5

Period Flow Summary: Daily Flow Totals

Avg Daily Flow: 1.842 MGal Peak Daily Flow: 2.248 MGal Min Daily Flow: 1.784 MGal

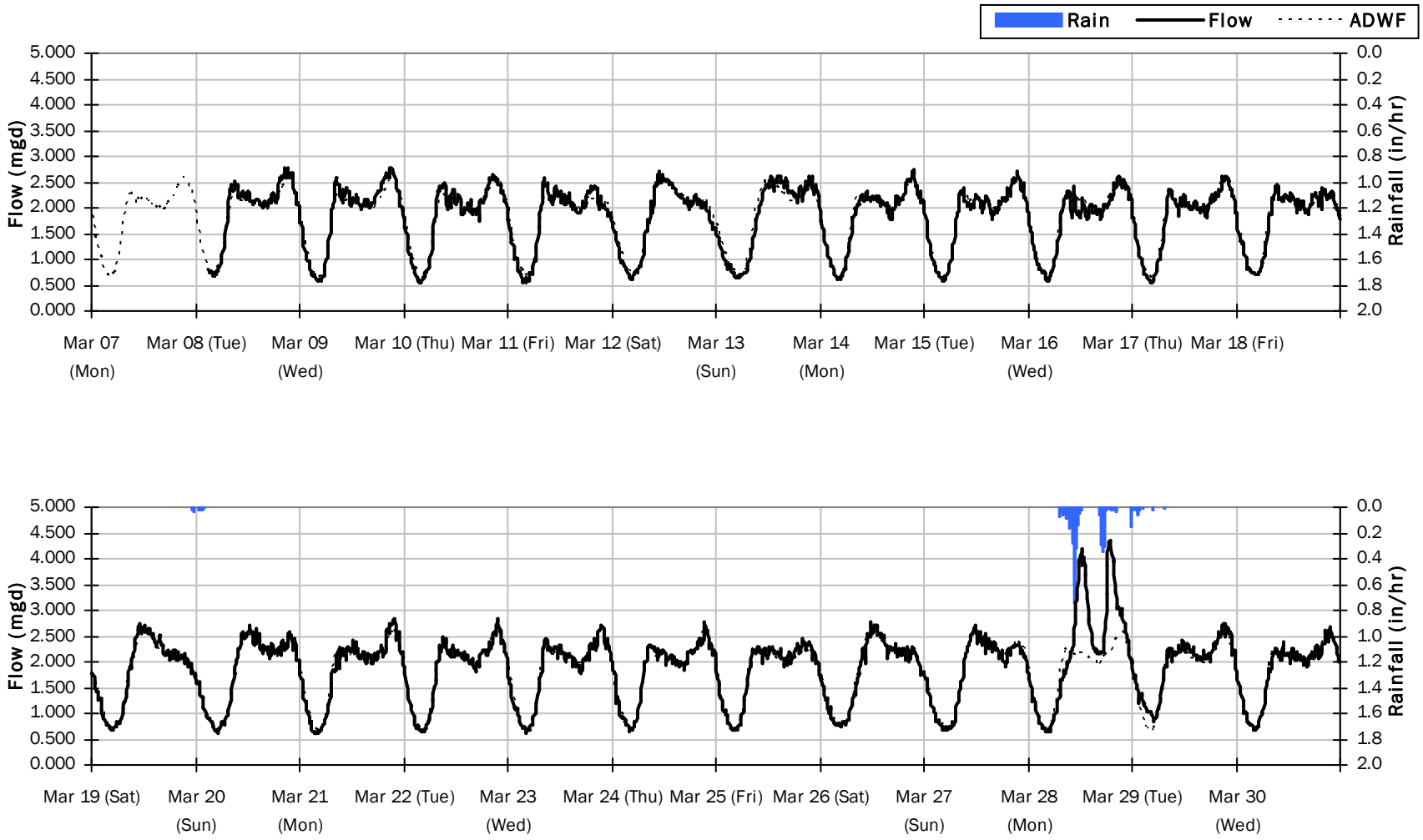
Total Rainfall: 1.33 inches



SITE 5

Flow Summary: 3/7/2022 to 3/30/2022

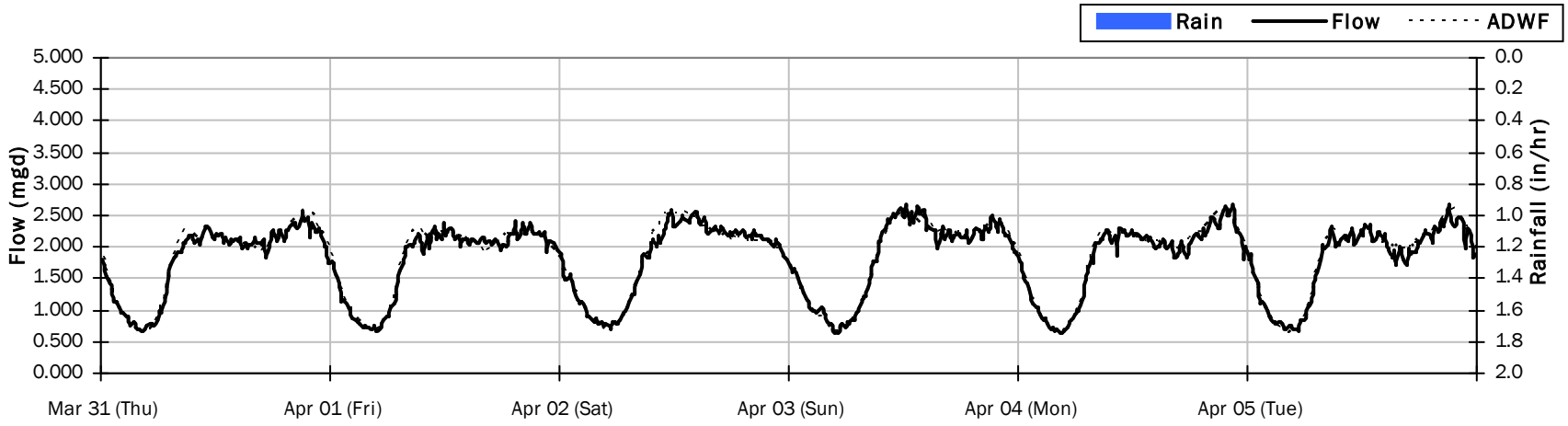
Period Rainfall: 1.33 inches Period Avg Flow: 1.856 mgd Period Peak Flow: 4.341 mgd Period Min Flow: 0.550 mgd

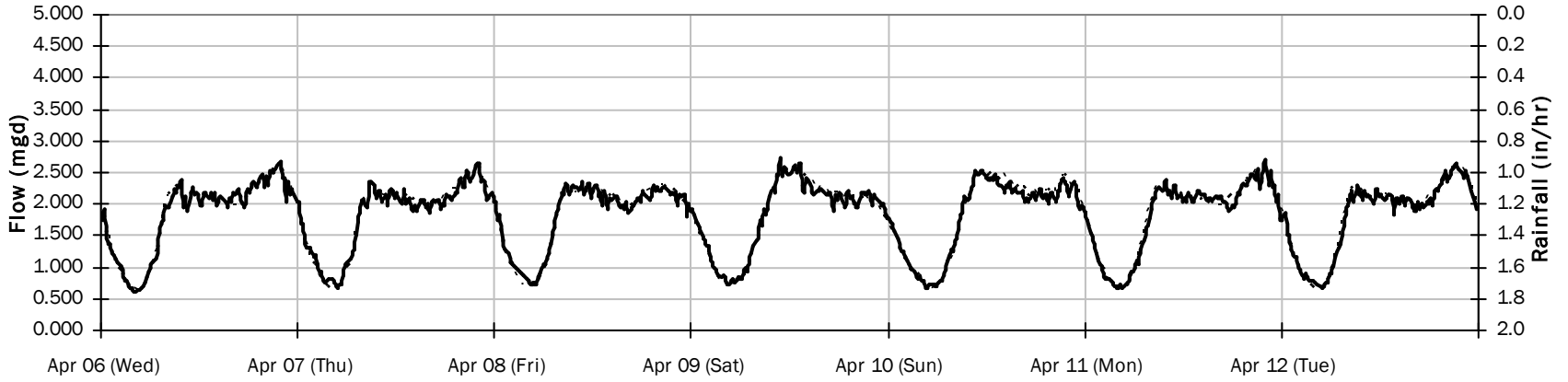


SITE 5

Flow Summary: 3/31/2022 to 4/12/2022

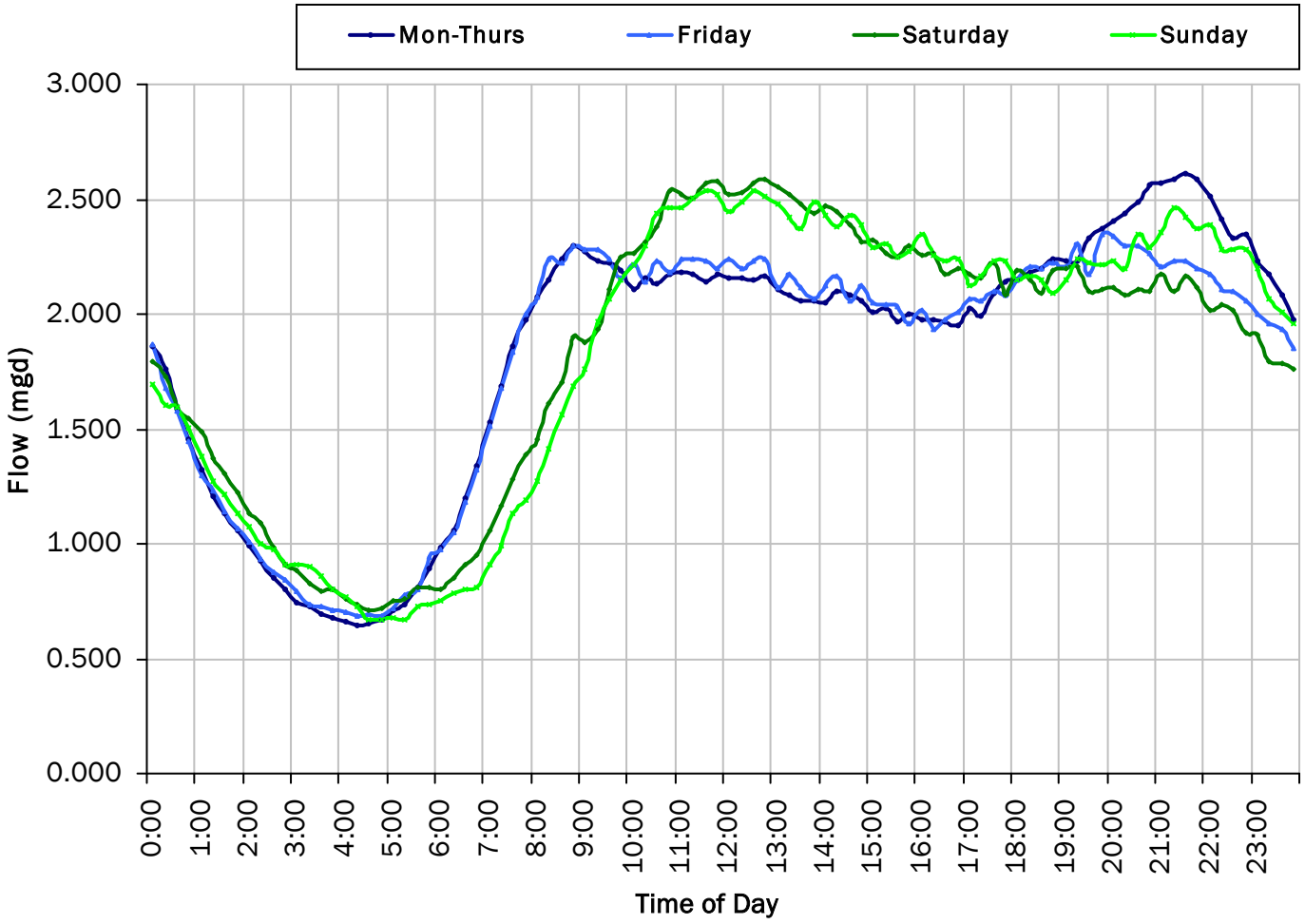
Period Rainfall: 0.00 inches Period Avg Flow: 1.815 mgd Period Peak Flow: 2.721 mgd Period Min Flow: 0.611 mgd





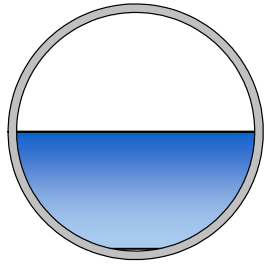
SITE 5

Average Dry Weather Flow Hydrographs



ADWF:

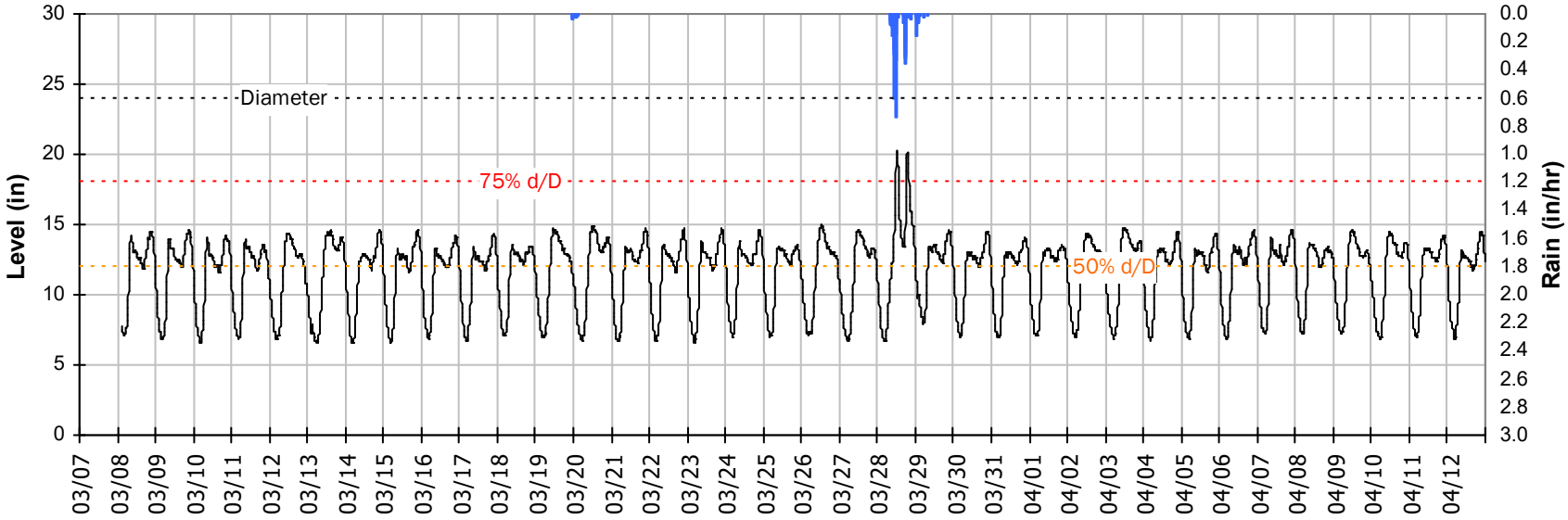
1.823 *mgd*

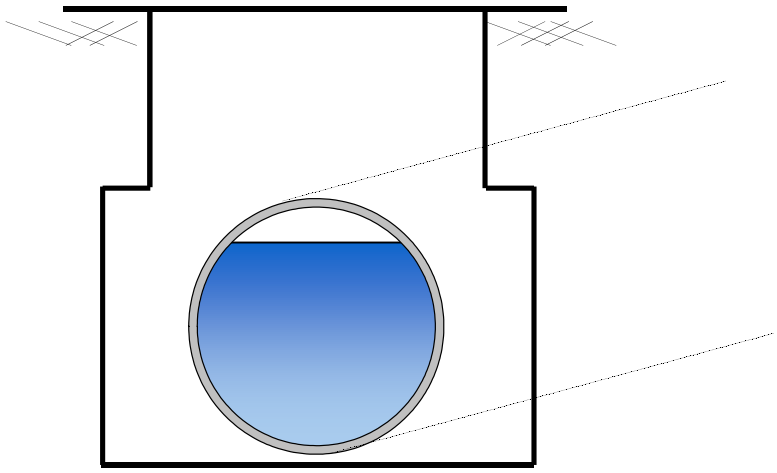


SITE 5

Site Capacity and Surcharge Summary

Realtime Flow Levels with Rainfall Data over Monitoring Period

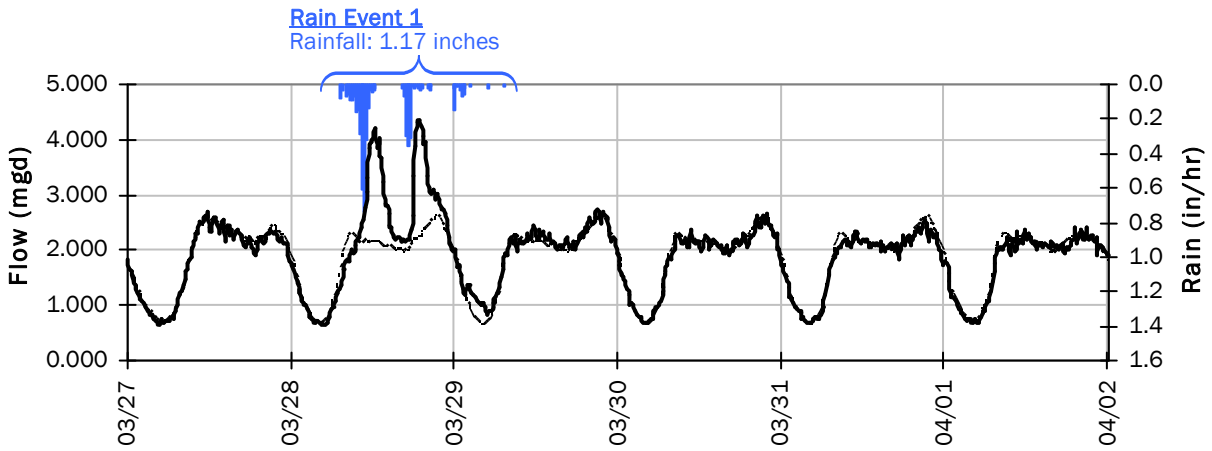




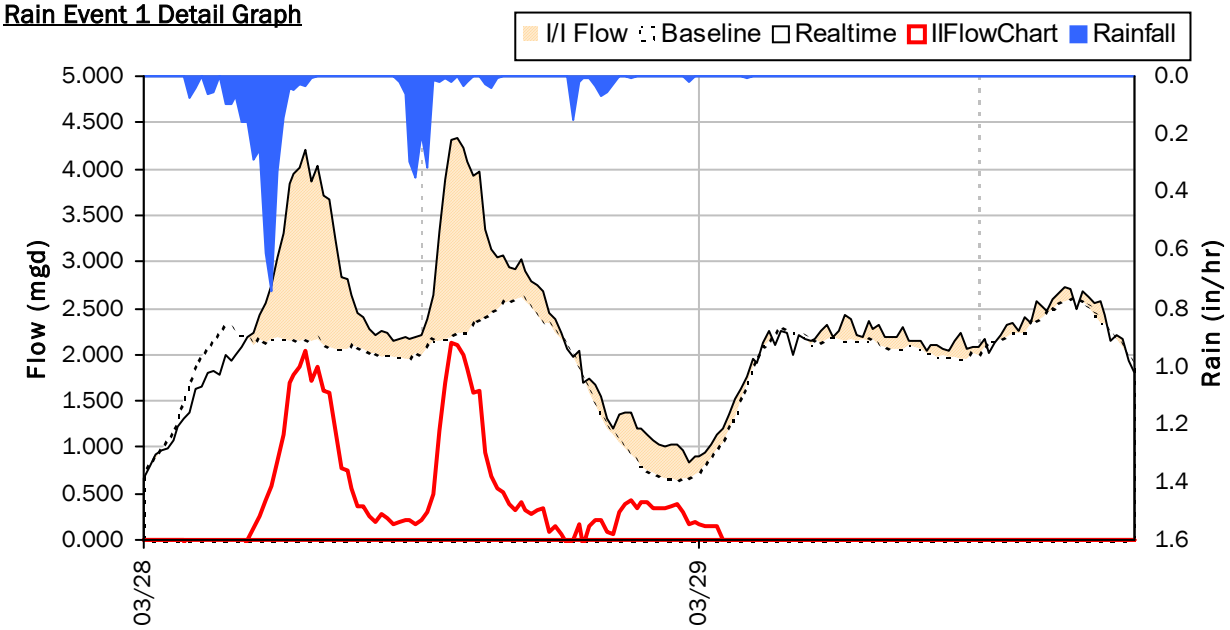
Pipe Diameter:	24	*inches*
Peak Measured Level:	20.2	*inches*
Peak d/D Ratio:	0.84	

SITE 5
I/I Summary: Rain Event 1

Baseline and Realtime Flows with Rainfall Data over Monitoring Period



Rain Event 1 Detail Graph



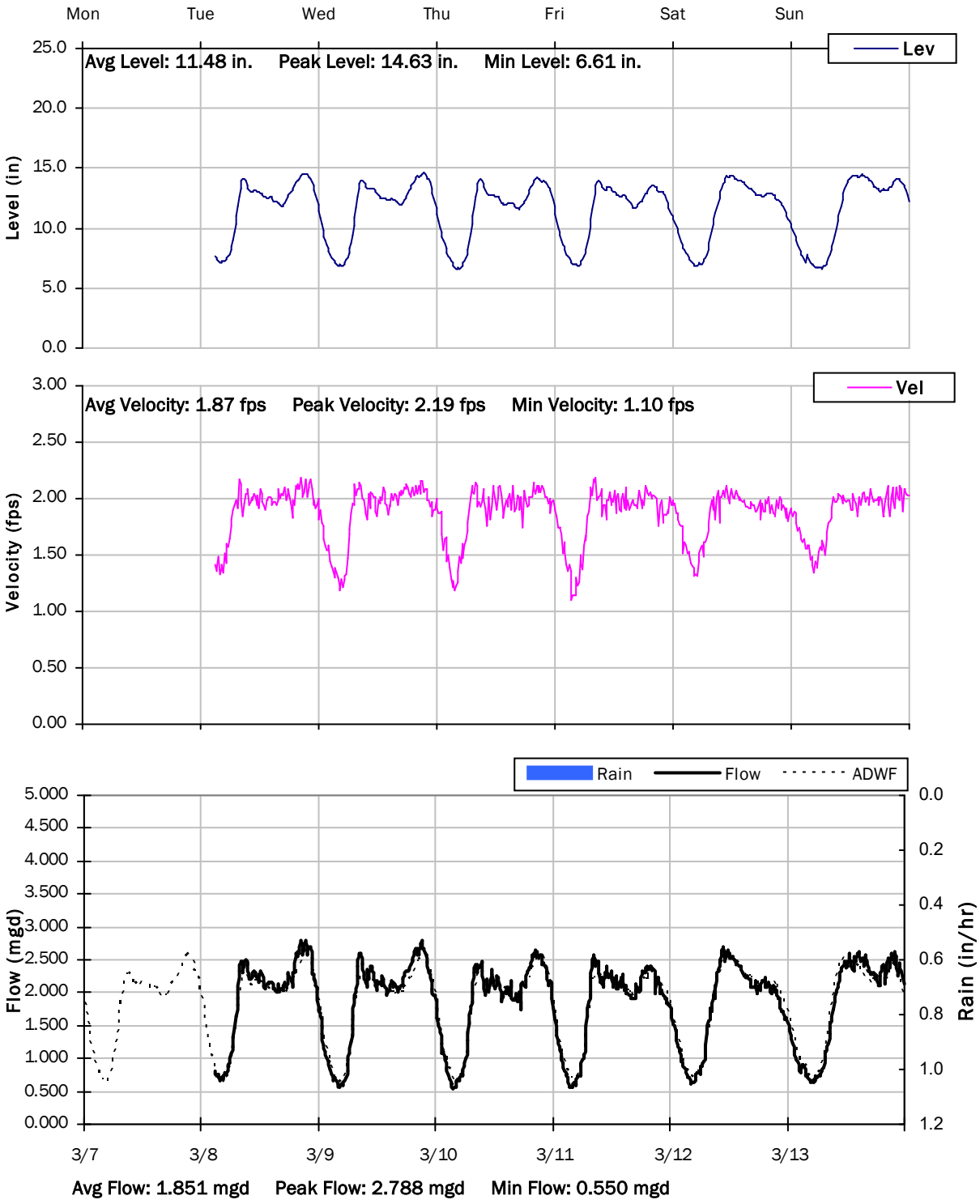
Storm Event I/I Analysis (Rain = 1.17 inches)

Capacity		Inflow / Infiltration	
Peak Flow:	4.341 *mgd*	**Peak I/I Rate:**	2.127 *mgd*
PF:	2.38	**Total I/I:**	492,000 *gallons*
Peak Level:	20.23 *in*		
d/D Ratio:	0.84		

SITE 5

Weekly Level, Velocity and Flow Hydrographs

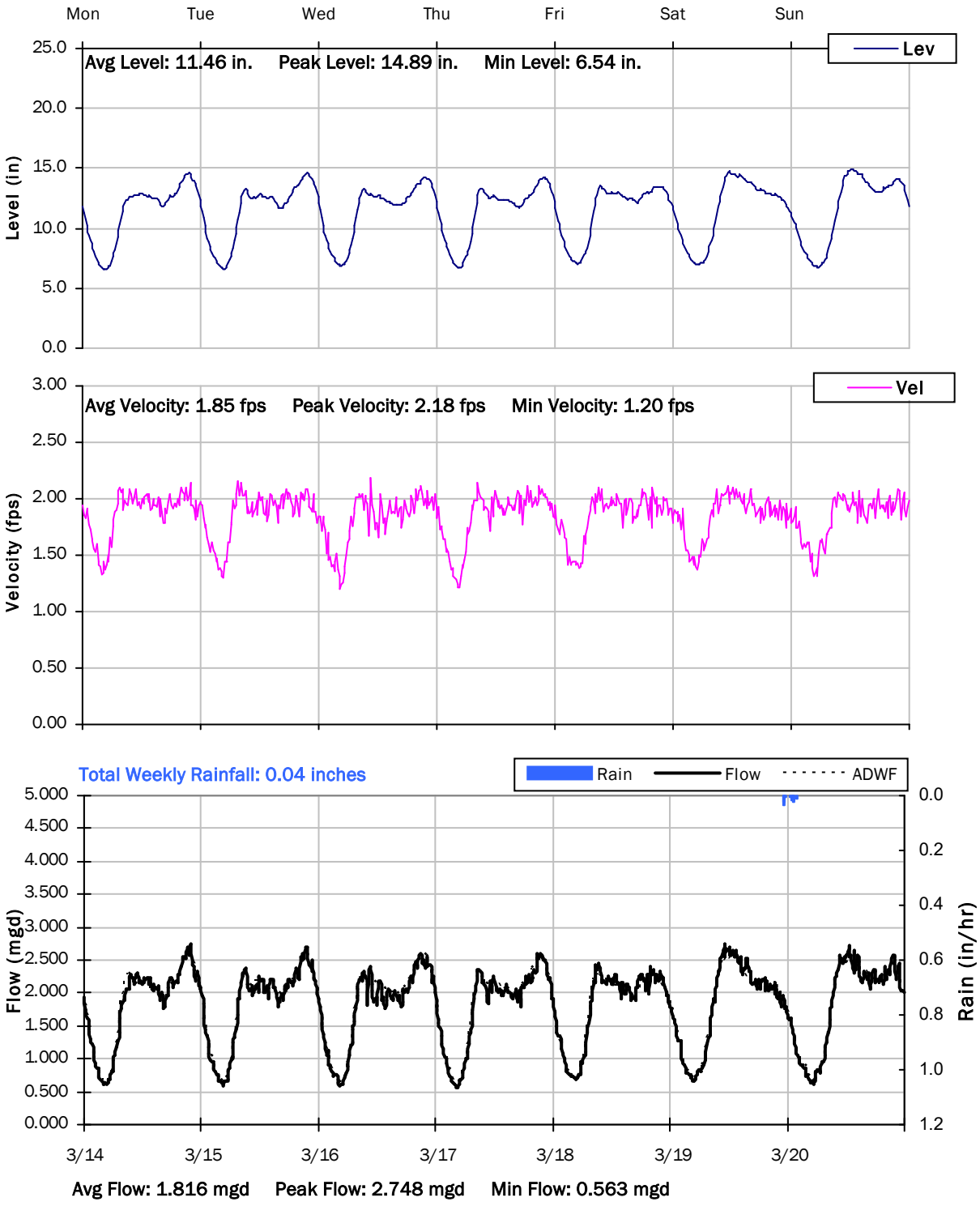
3/7/2022 to 3/14/2022



SITE 5

Weekly Level, Velocity and Flow Hydrographs

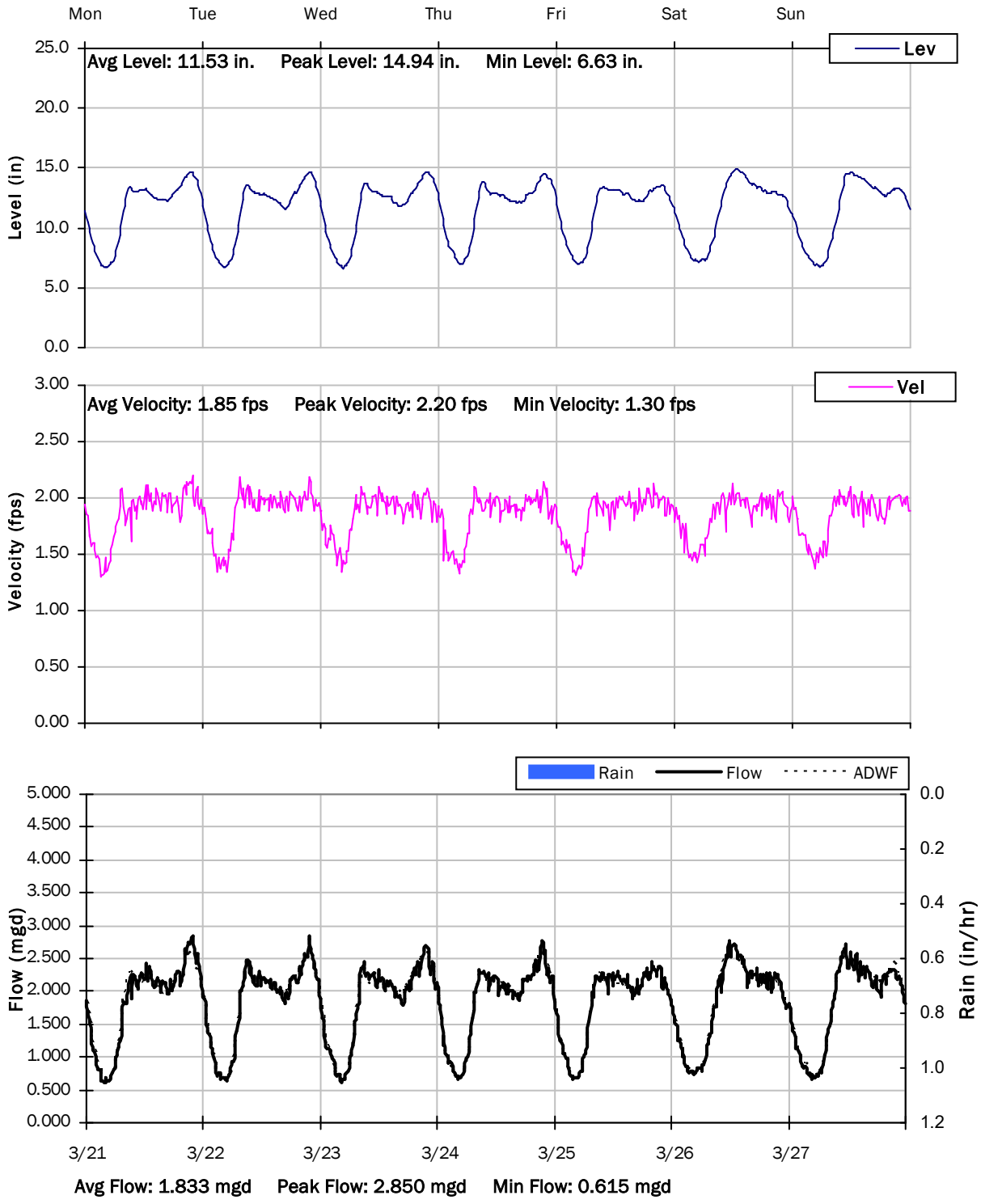
3/14/2022 to 3/21/2022



SITE 5

Weekly Level, Velocity and Flow Hydrographs

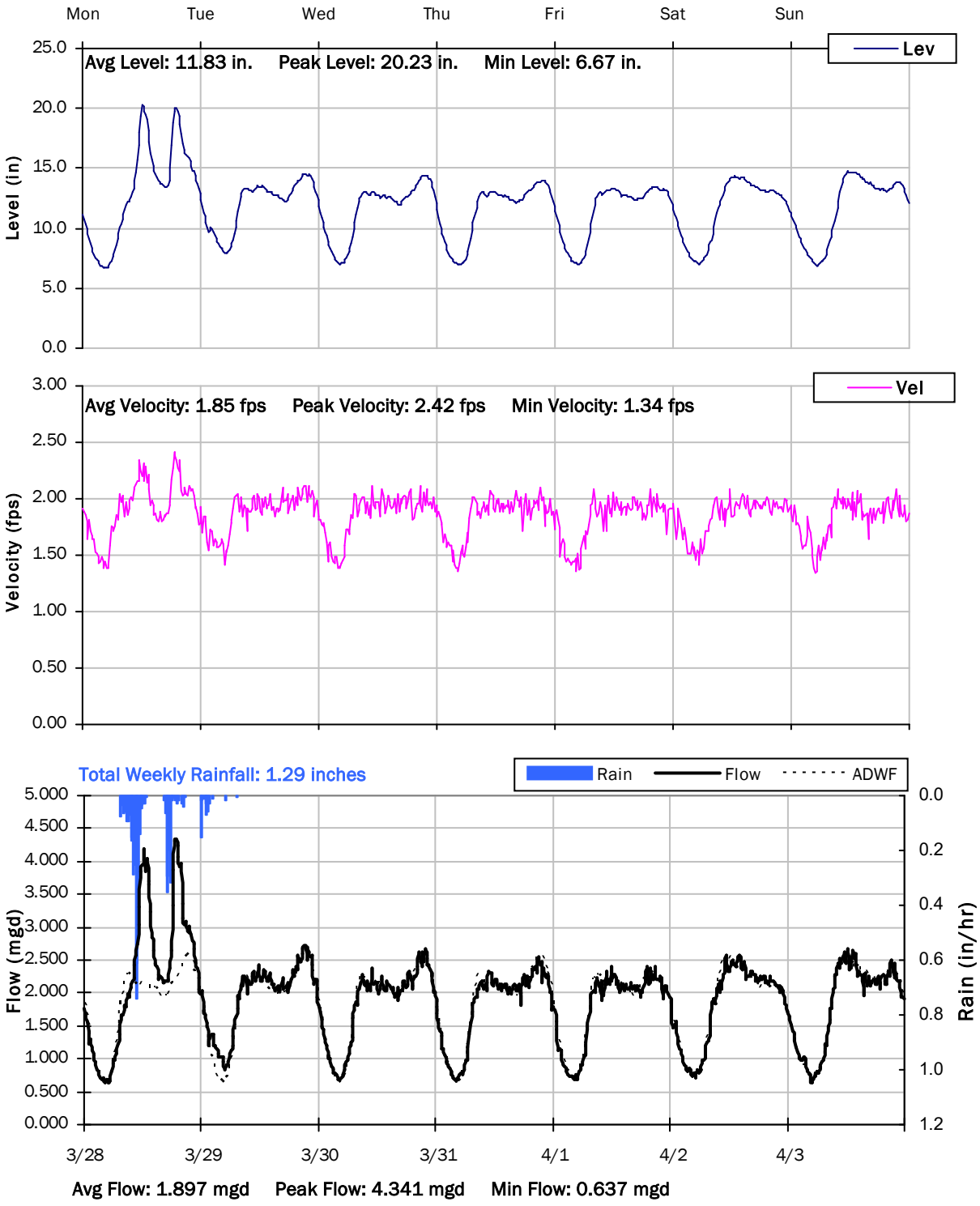
3/21/2022 to 3/28/2022



SITE 5

Weekly Level, Velocity and Flow Hydrographs

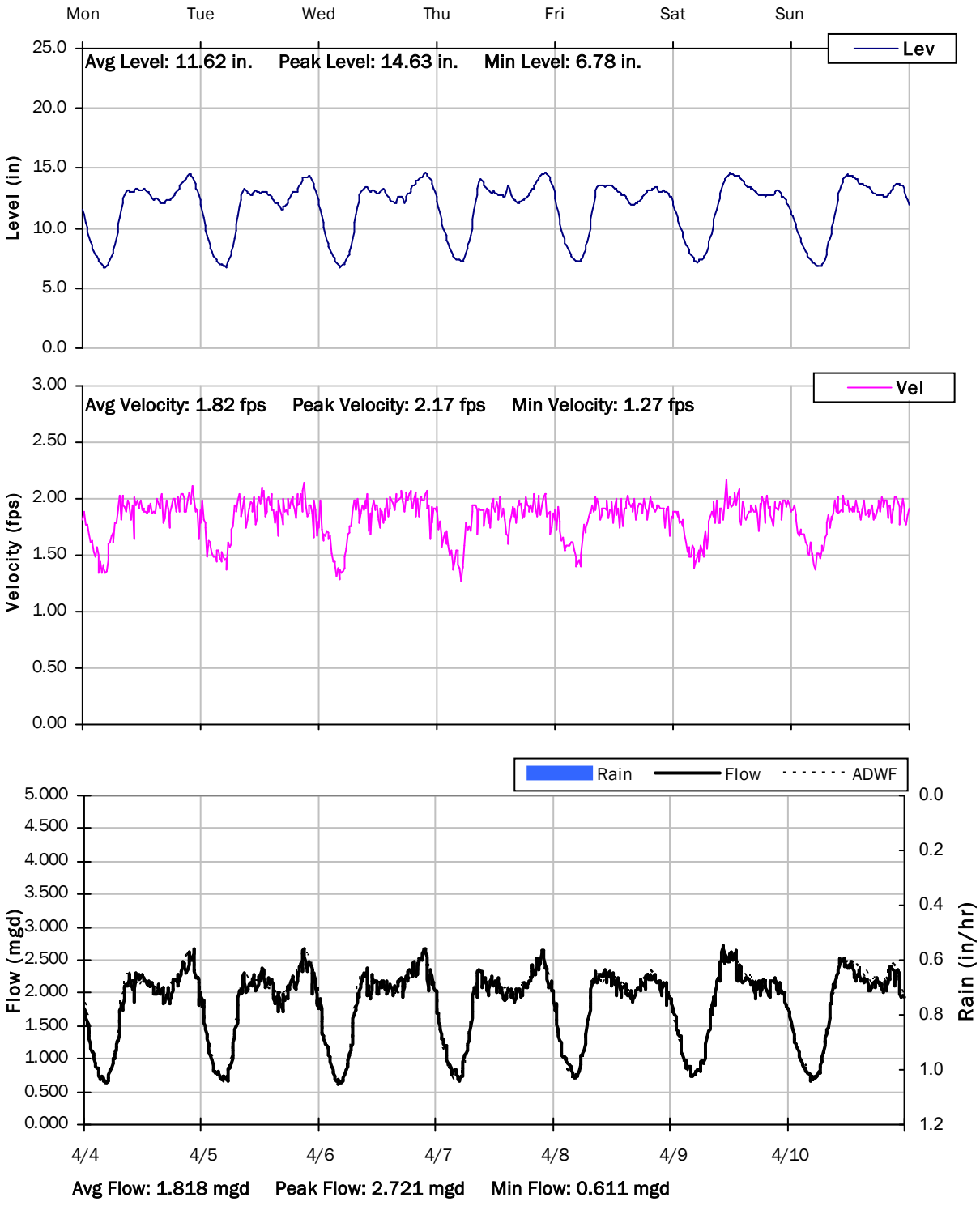
3/28/2022 to 4/4/2022



SITE 5

Weekly Level, Velocity and Flow Hydrographs

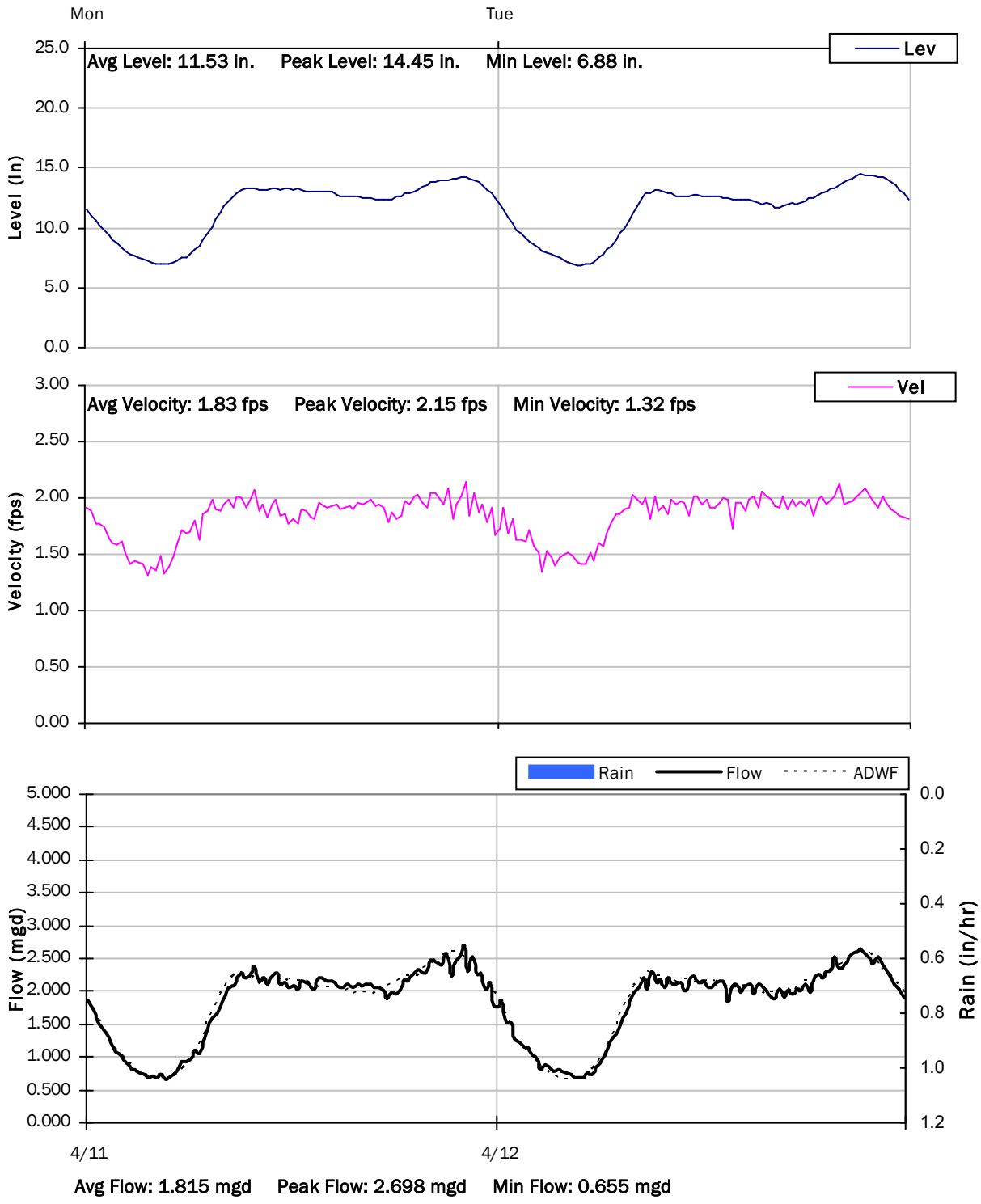
4/4/2022 to 4/11/2022



SITE 5

Weekly Level, Velocity and Flow Hydrographs

4/11/2022 to 4/13/2022



Monitoring Site: Site 6

Carollo Gardena, California

Sanitary Sewer Flow Monitoring

March 07, 2022 - April 12, 2022

Location: Normandie Avenue south of W 170th St

Data Summary Report

Vicinity Map: Site 6

SITE 6

Site Information MH ID: 05 1338

Location: Normandie Avenue south of W 170th St

Coordinates: 118.2991° W, 33.8752° N

Rim Elevation (Earth): 22 feet

Expected Pipe Diameter: 18 inches

Measured Pipe Diameter: 18 inches

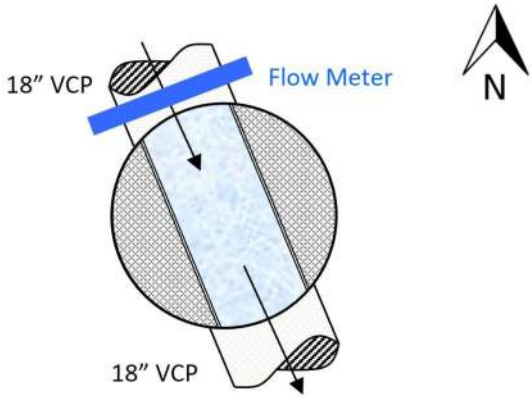
ADWF: 0.861 mgd

Peak Measured Flow: 2.483 mgd

Sediment: None

Satellite Map

Sanitary Map



Flow Sketch

Street View

Plan View

SITE 6

Additional Site Photos

Effluent Pipe

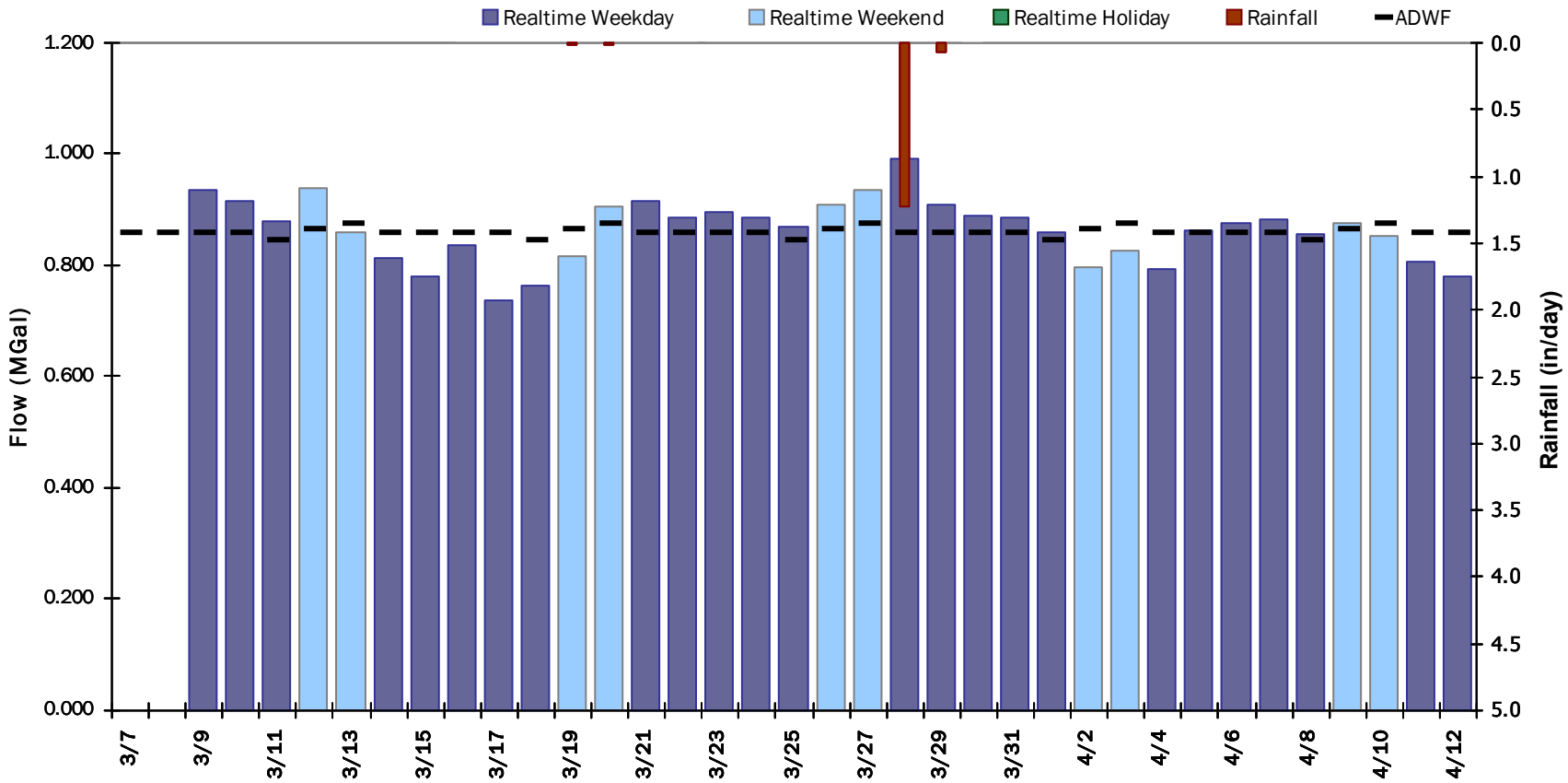
Monitored Influent Pipe

SITE 6

Period Flow Summary: Daily Flow Totals

Avg Daily Flow: 0.867 MGal Peak Daily Flow: 0.991 MGal Min Daily Flow: 0.737 MGal

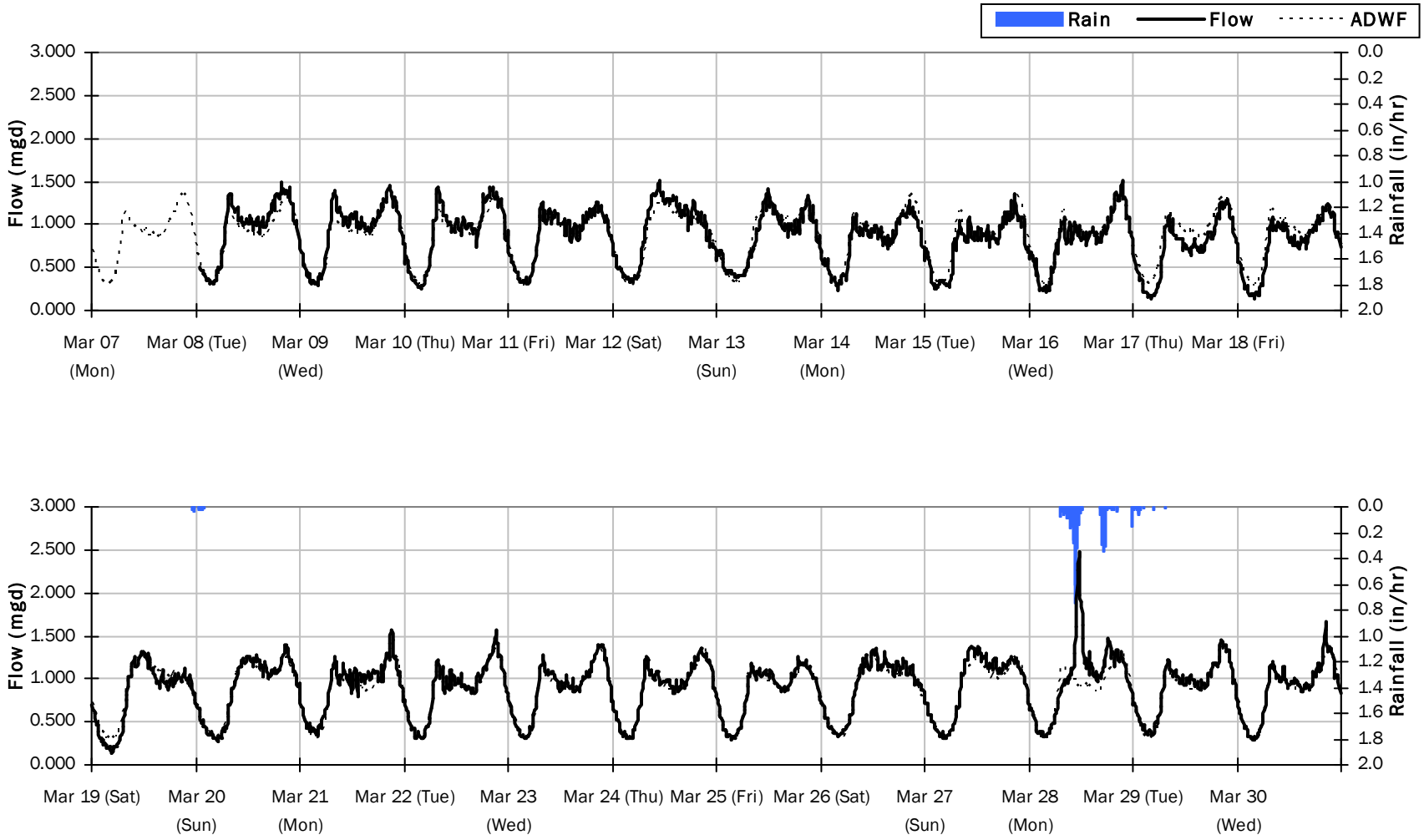
Total Rainfall: 1.33 inches



SITE 6

Flow Summary: 3/7/2022 to 3/30/2022

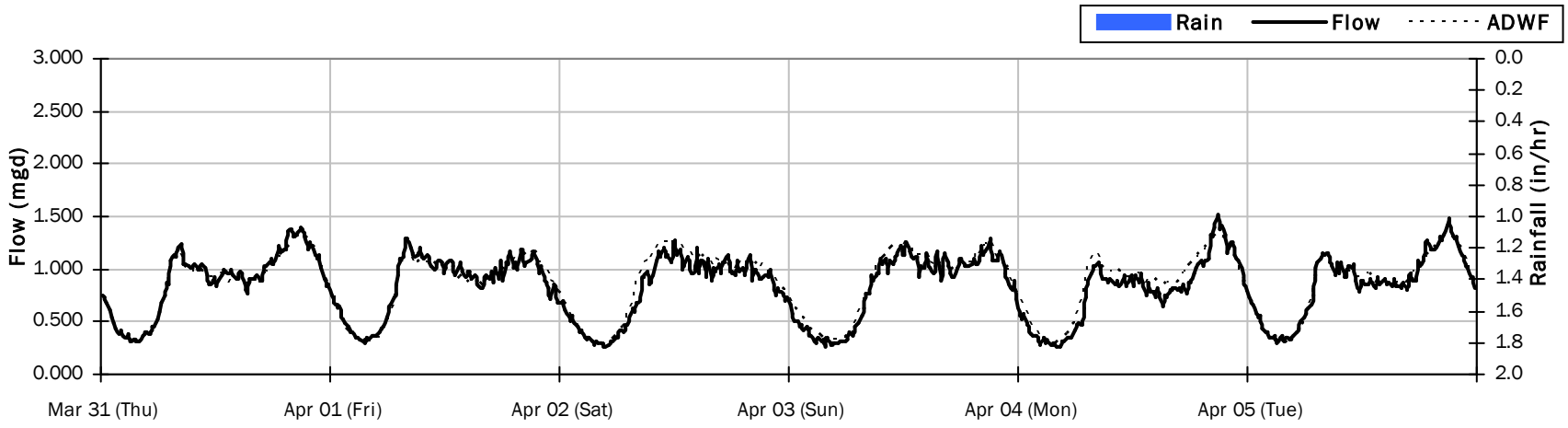
Period Rainfall: 1.33 inches Period Avg Flow: 0.880 mgd Period Peak Flow: 2.483 mgd Period Min Flow: 0.130 mgd

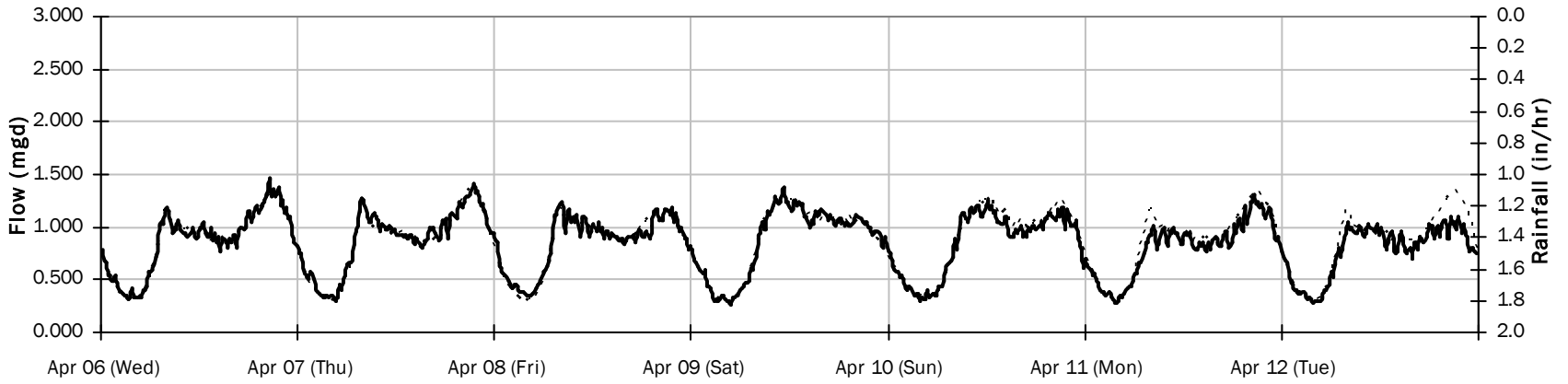


SITE 6

Flow Summary: 3/31/2022 to 4/12/2022

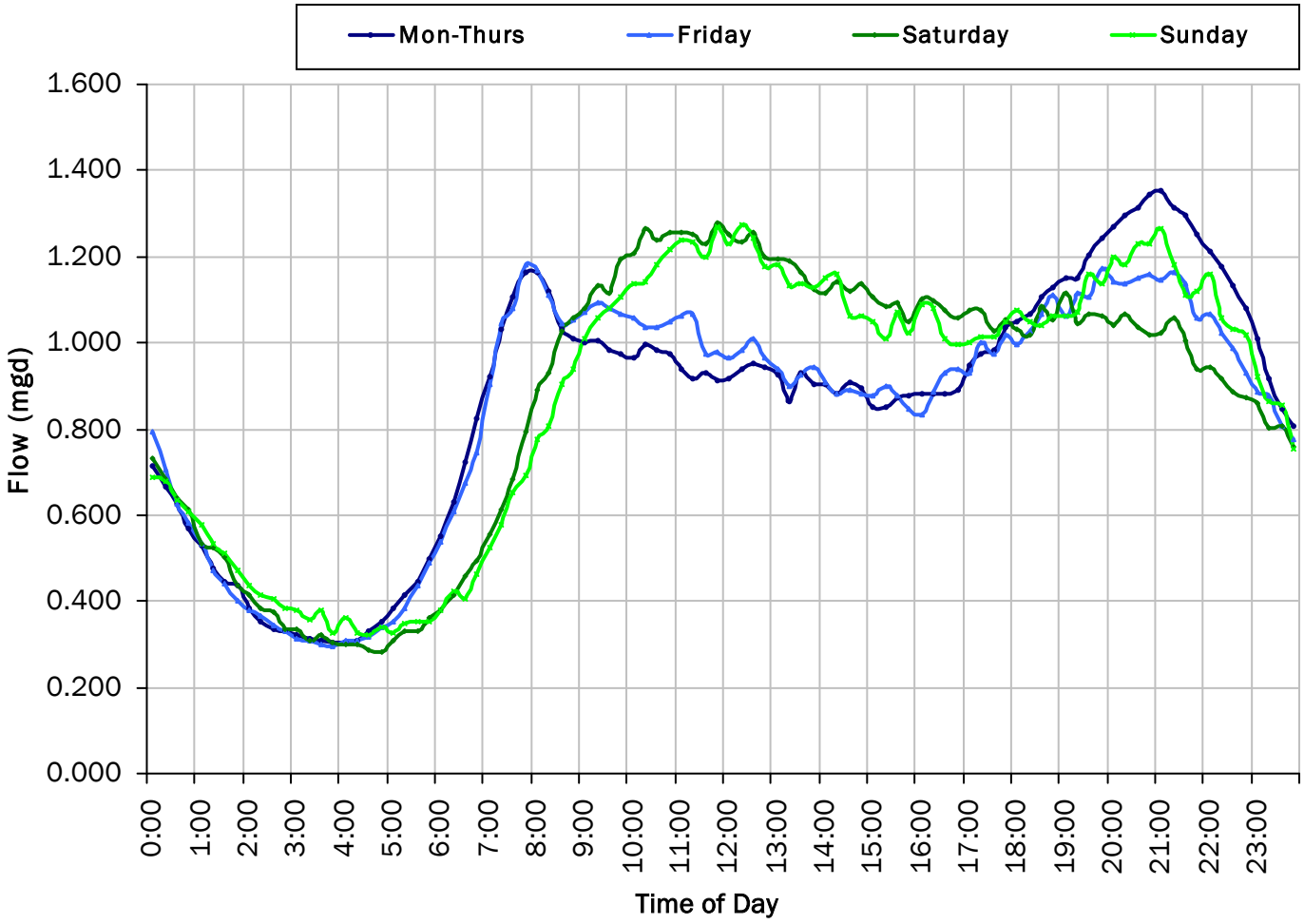
Period Rainfall: 0.00 inches Period Avg Flow: 0.843 mgd Period Peak Flow: 1.523 mgd Period Min Flow: 0.255 mgd





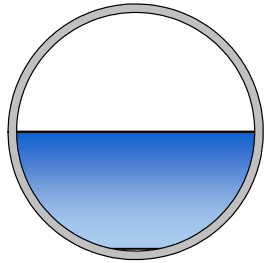
SITE 6

Average Dry Weather Flow Hydrographs



ADWF:

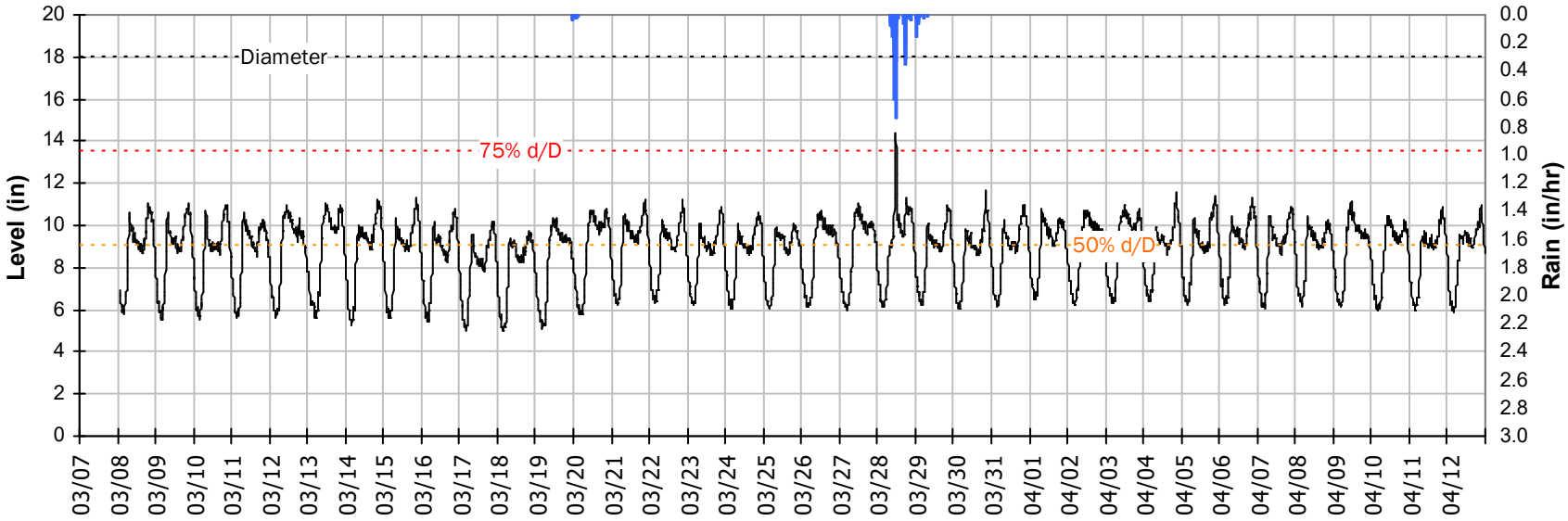
0.861 *mgd*

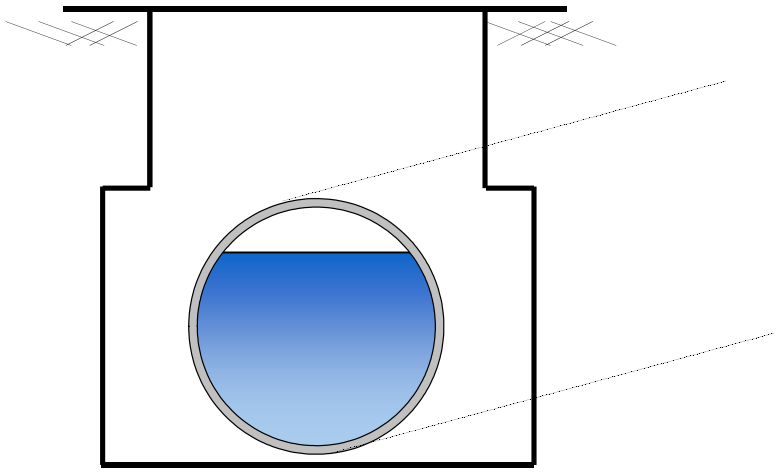


SITE 6

Site Capacity and Surcharge Summary

Realtime Flow Levels with Rainfall Data over Monitoring Period

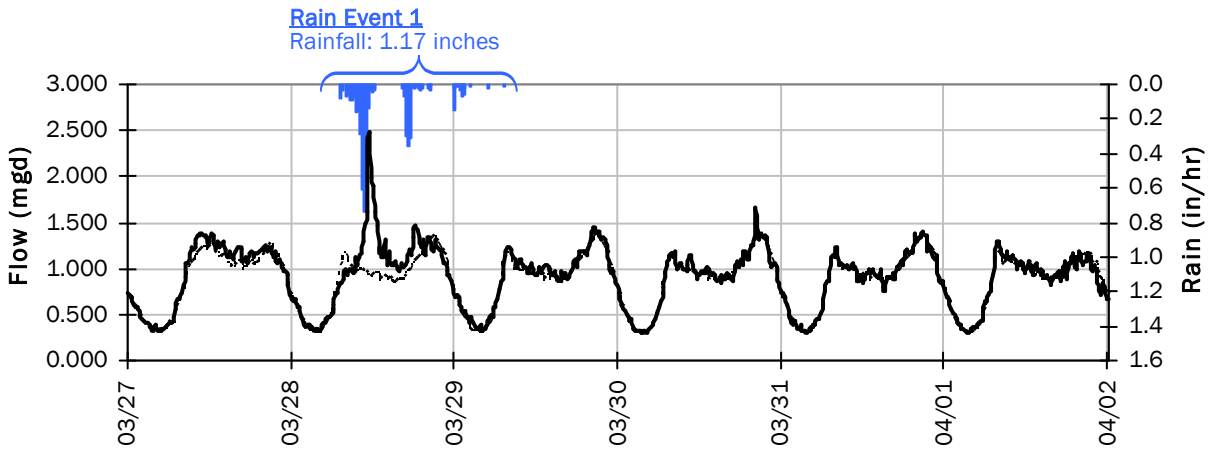




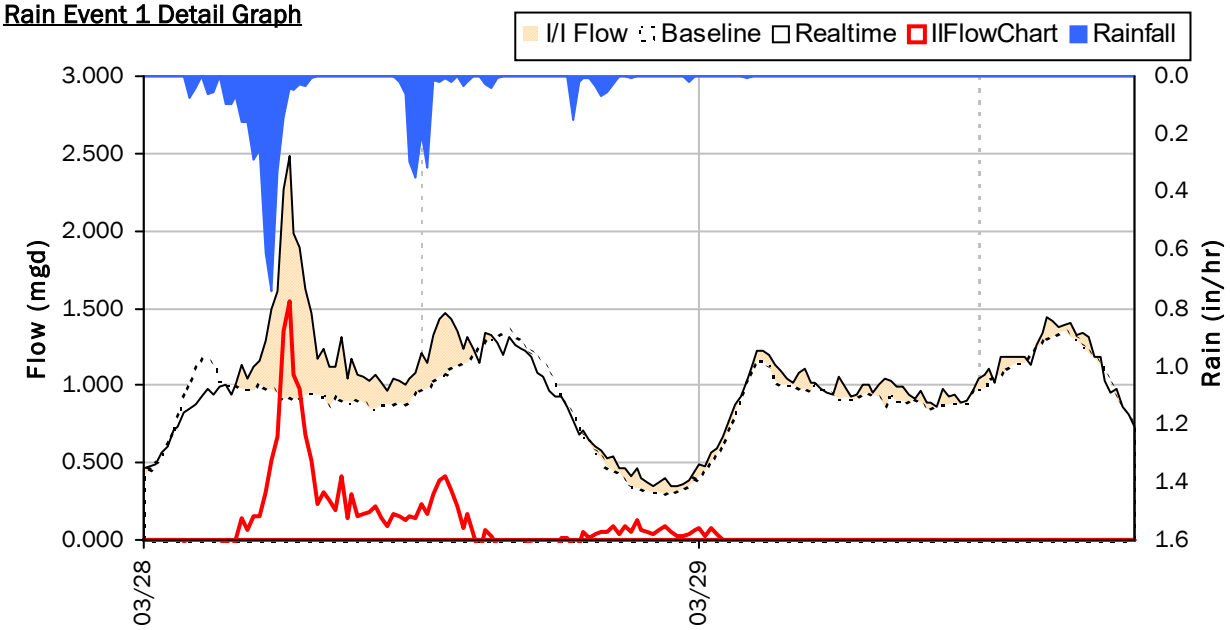
Pipe Diameter:	18	*inches*
Peak Measured Level:	14.4	*inches*
Peak d/D Ratio:	0.80	

SITE 6
I/I Summary: Rain Event 1

Baseline and Realtime Flows with Rainfall Data over Monitoring Period



Rain Event 1 Detail Graph



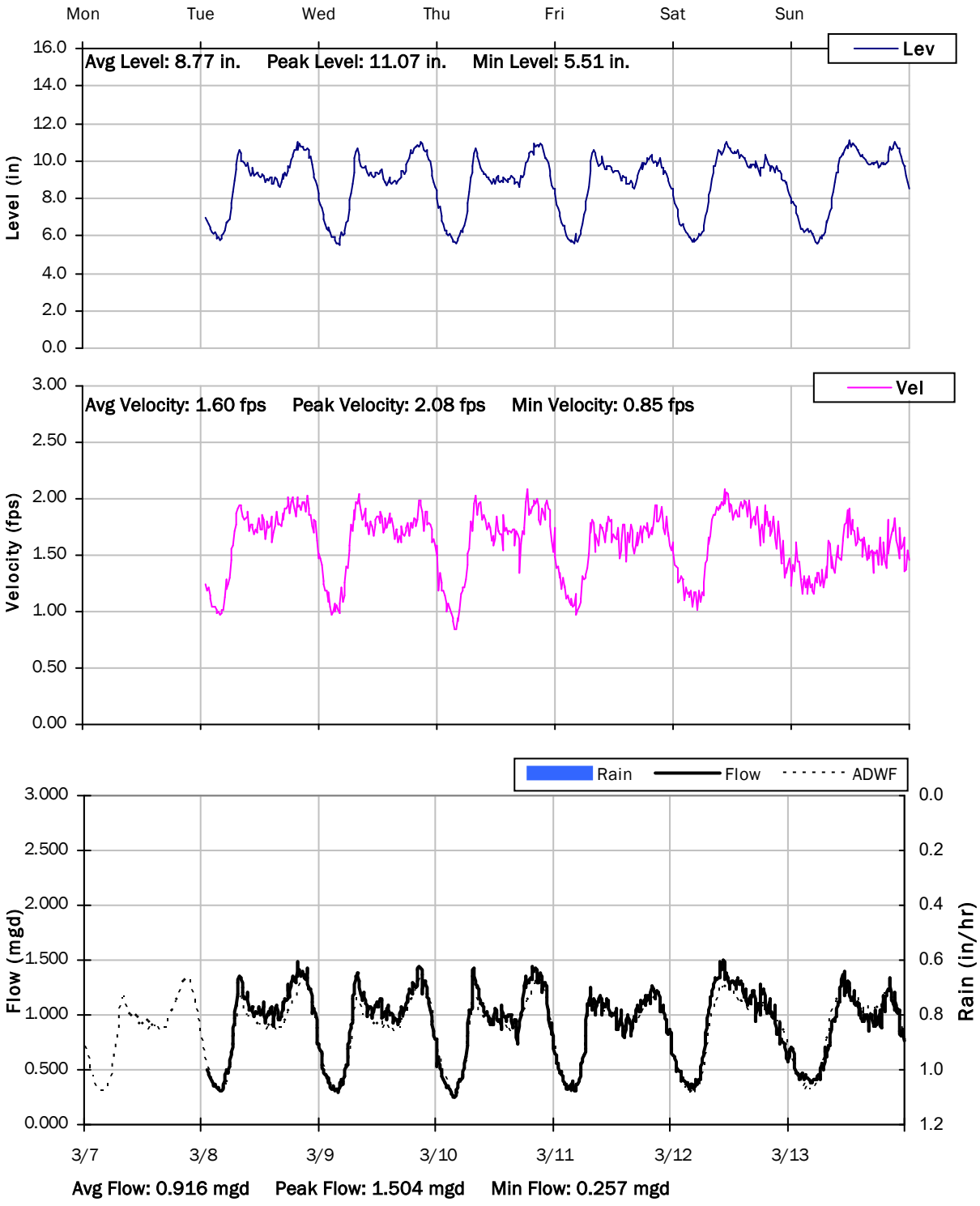
Storm Event I/I Analysis (Rain = 1.17 inches)

Capacity		Inflow / Infiltration	
Peak Flow:	2.483 *mgd*	**Peak I/I Rate:**	1.551 *mgd*
PF:	2.88	**Total I/I:**	140,000 *gallons*
Peak Level:	14.40 *in*		
d/D Ratio:	0.80		

SITE 6

Weekly Level, Velocity and Flow Hydrographs

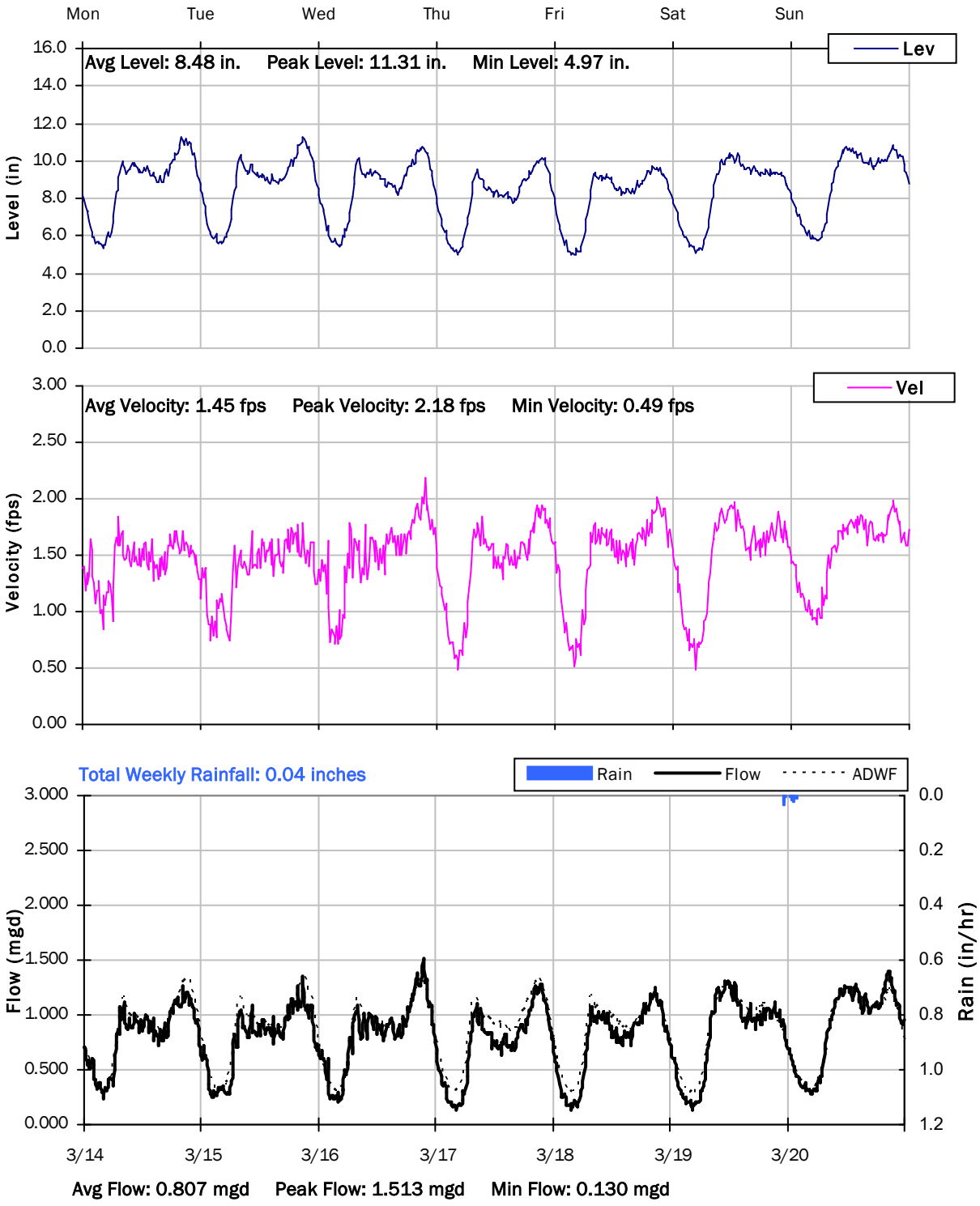
3/7/2022 to 3/14/2022



SITE 6

Weekly Level, Velocity and Flow Hydrographs

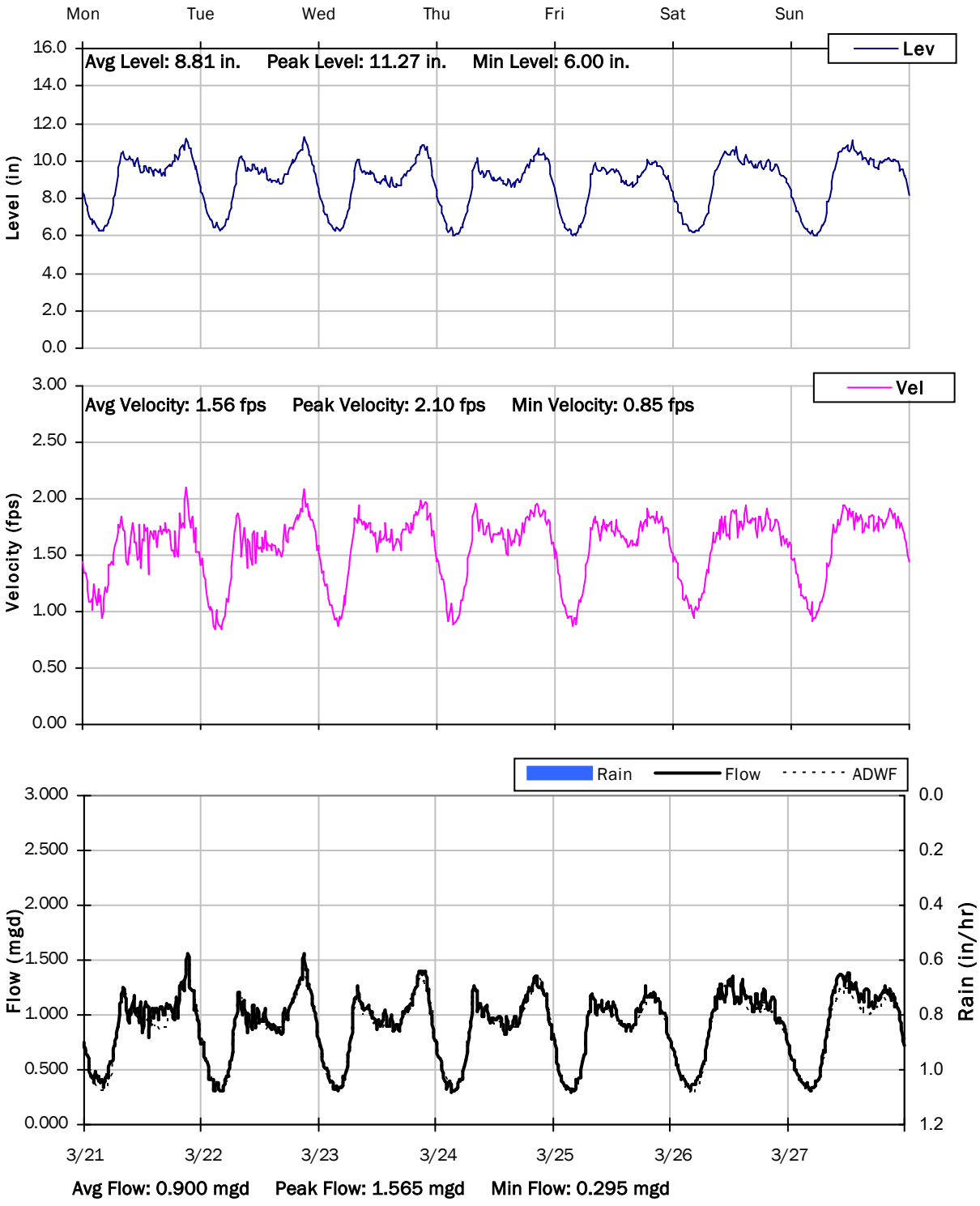
3/14/2022 to 3/21/2022



SITE 6

Weekly Level, Velocity and Flow Hydrographs

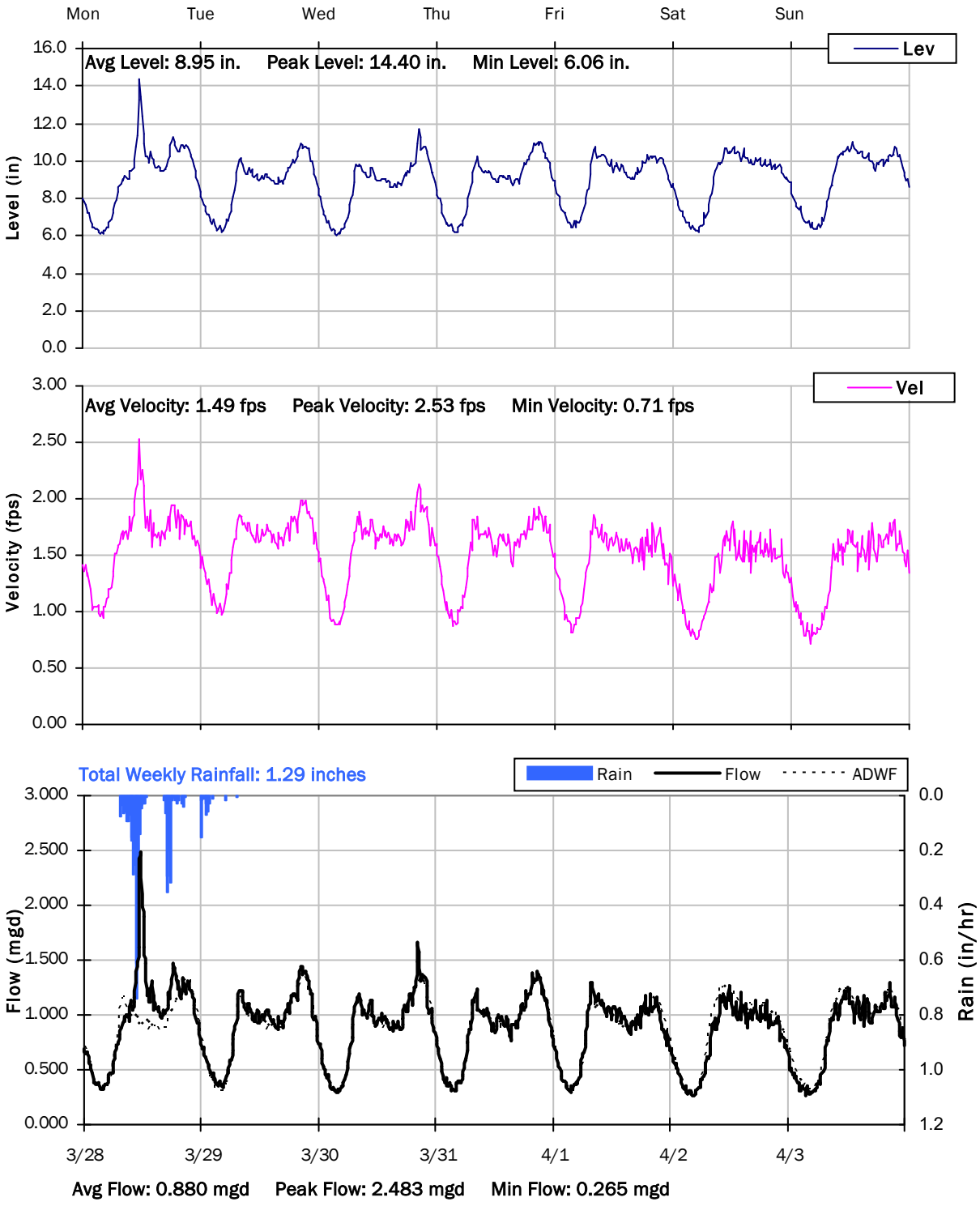
3/21/2022 to 3/28/2022



SITE 6

Weekly Level, Velocity and Flow Hydrographs

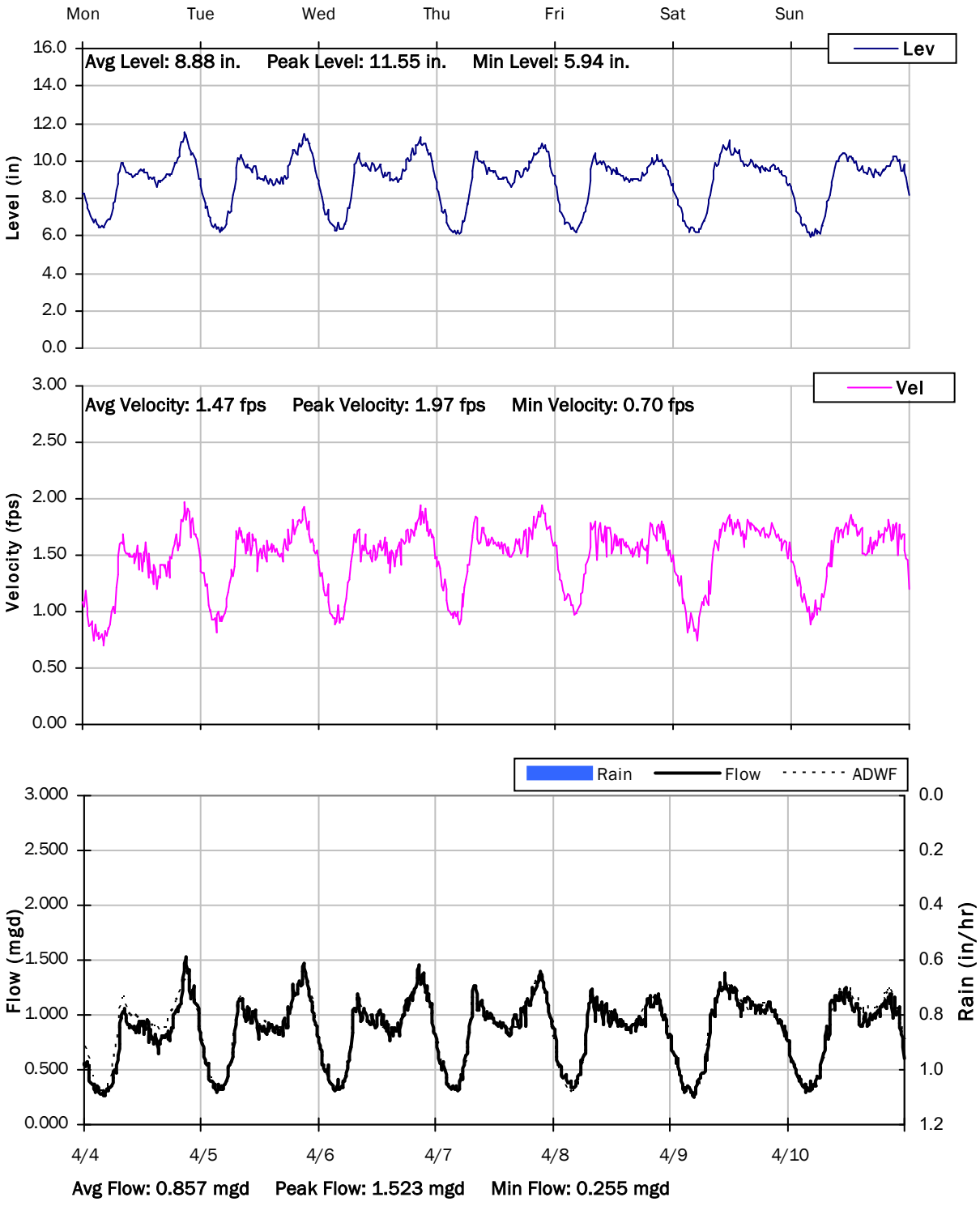
3/28/2022 to 4/4/2022



SITE 6

Weekly Level, Velocity and Flow Hydrographs

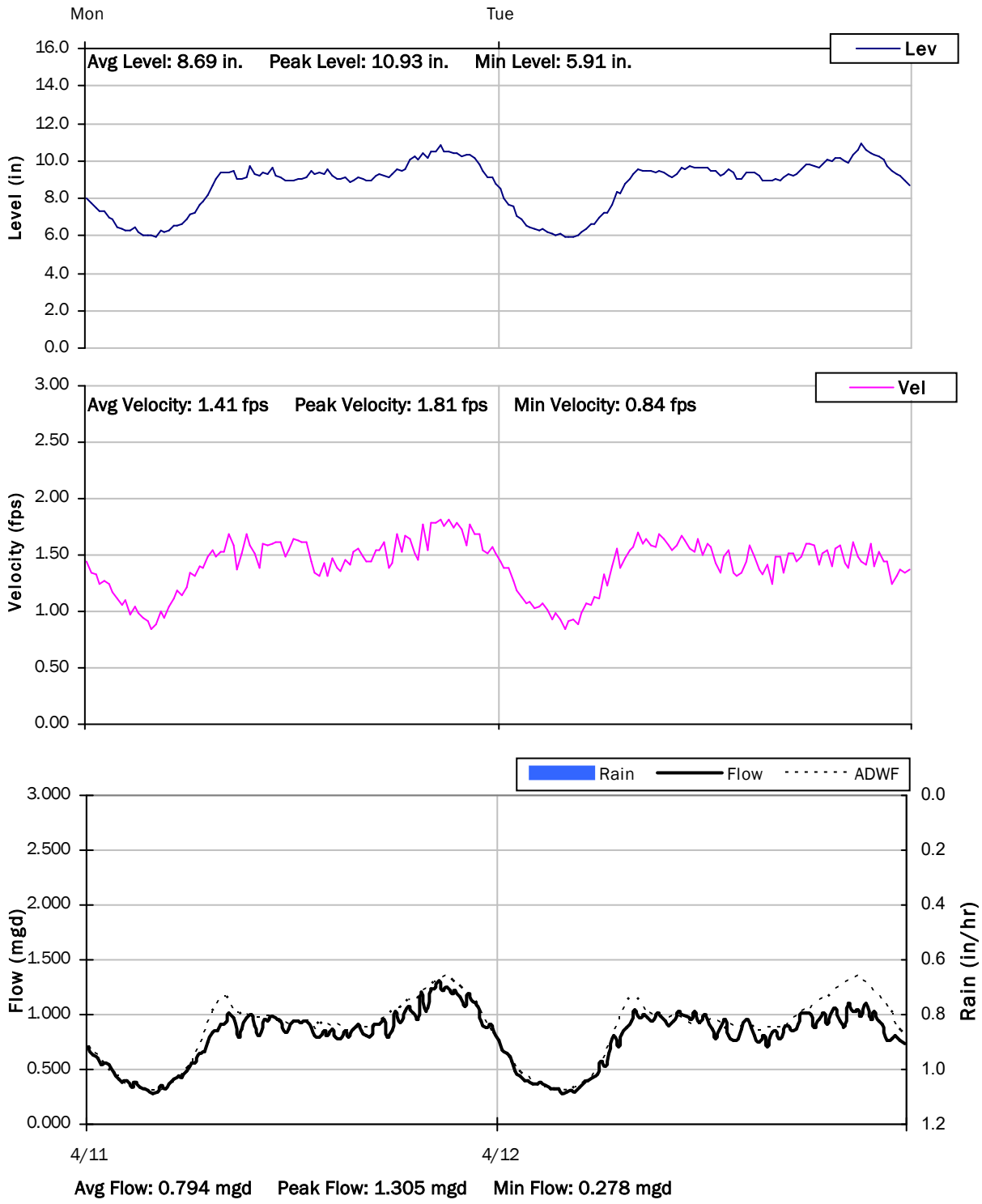
4/4/2022 to 4/11/2022



SITE 6

Weekly Level, Velocity and Flow Hydrographs

4/11/2022 to 4/13/2022



Monitoring Site: Site 7

Carollo Gardena, California

Sanitary Sewer Flow Monitoring

March 07, 2022 - April 12, 2022

Location: S Vermont Avenue north of W Redondo Beach Boulevard

Data Summary Report

Vicinity Map: Site 7

SITE 7

Site Information MH ID: N/A

Location: S Vermont Avenue north of W Redondo Beach Boulevard

Coordinates: 118.2918° W, 33.8941° N

Rim Elevation (Earth): 52 feet

Expected Pipe Diameter: 21 inches

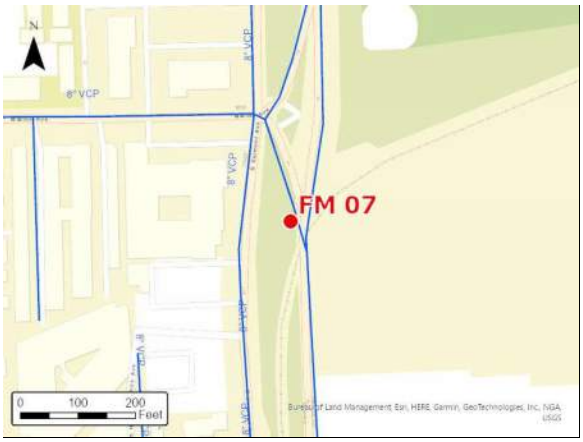
Measured Pipe Diameter: 21 inches

ADWF: 0.503 mgd

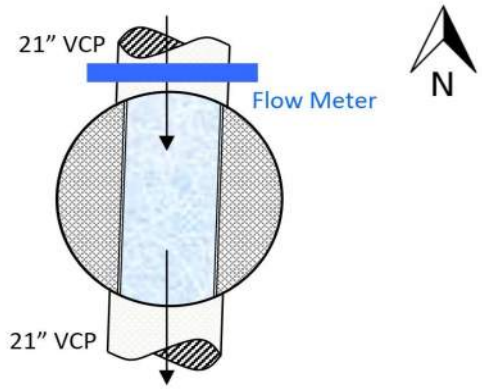
Peak Measured Flow: 1.177 mgd

Sediment: None

Satellite Map



Sanitary Map



Flow Sketch

Street View

Plan View

SITE 7

Additional Site Photos

Effluent Pipe

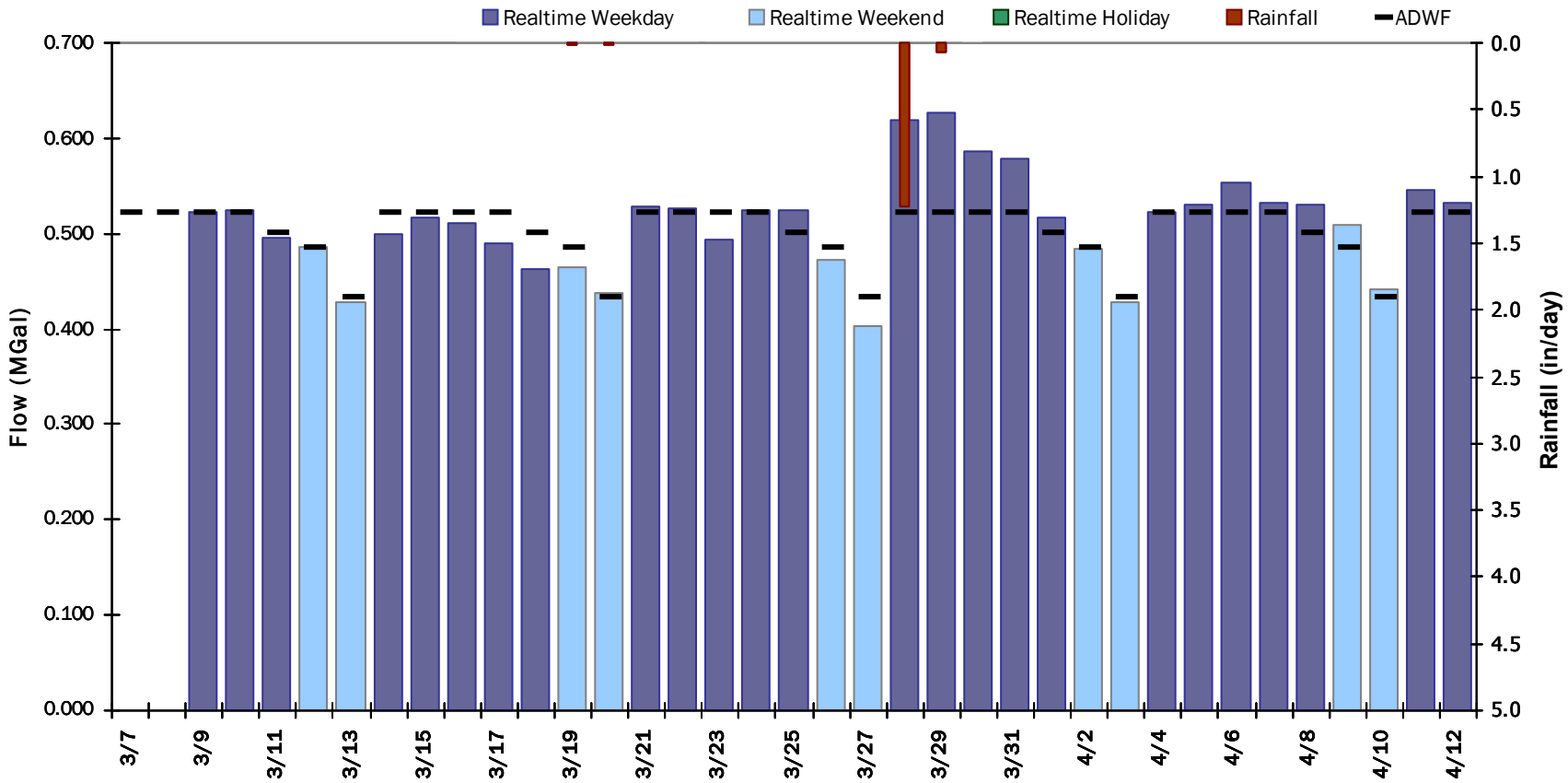
Monitored Influent Pipe

SITE 7

Period Flow Summary: Daily Flow Totals

Avg Daily Flow: 0.510 MGal Peak Daily Flow: 0.626 MGal Min Daily Flow: 0.402 MGal

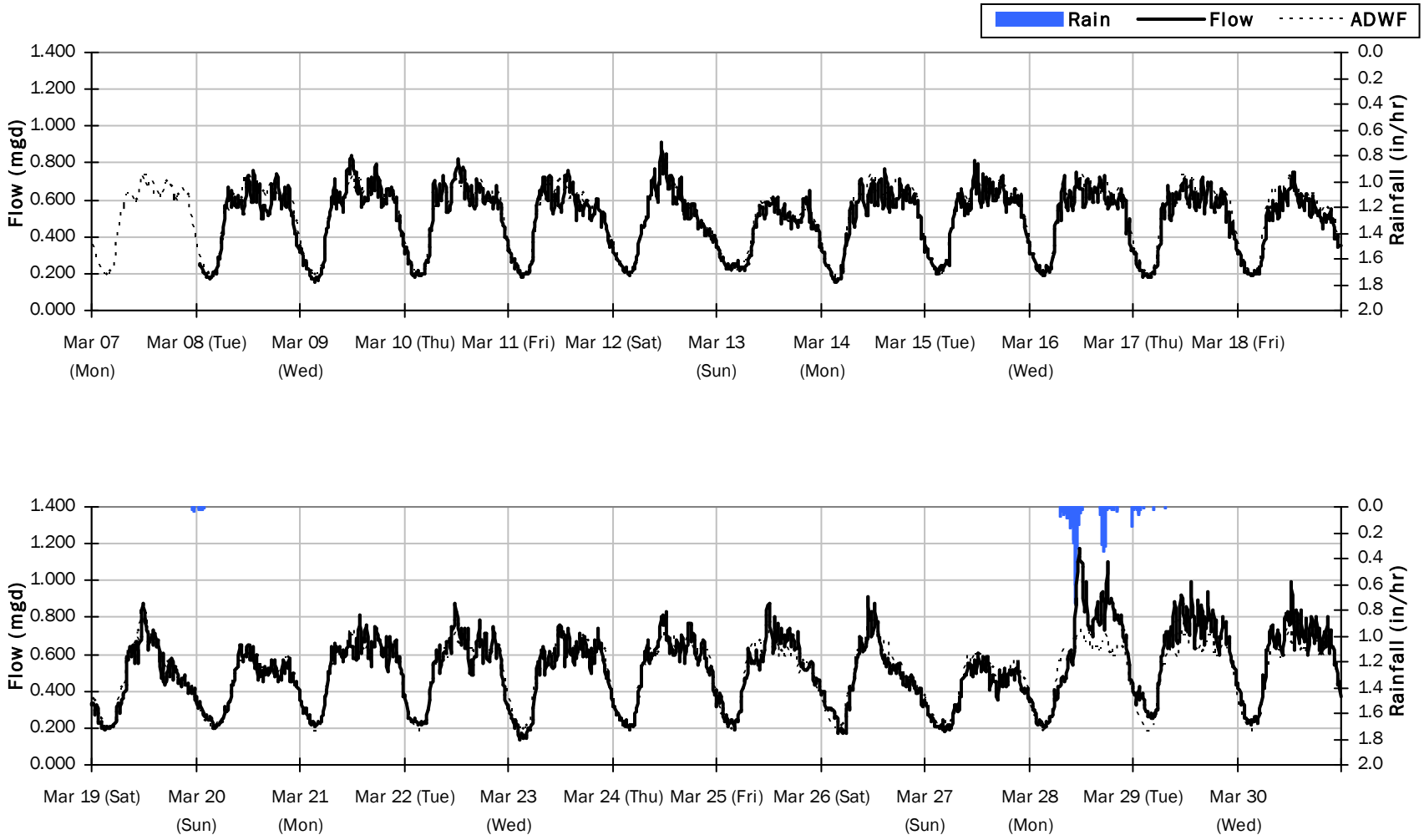
Total Rainfall: 1.33 inches



SITE 7

Flow Summary: 3/7/2022 to 3/30/2022

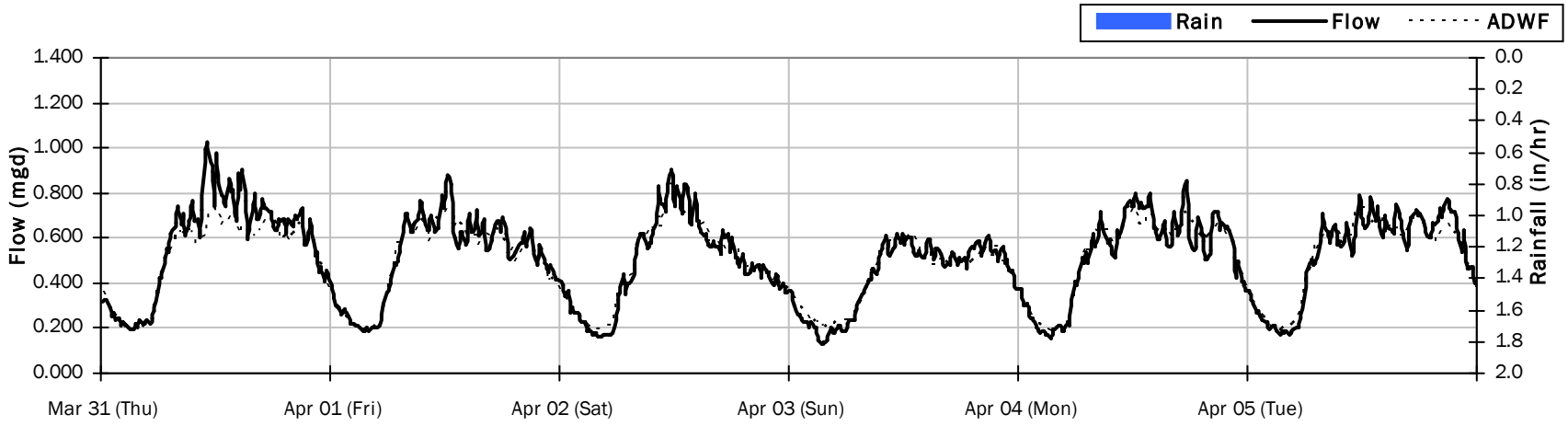
Period Rainfall: 1.33 inches Period Avg Flow: 0.506 mgd Period Peak Flow: 1.177 mgd Period Min Flow: 0.138 mgd

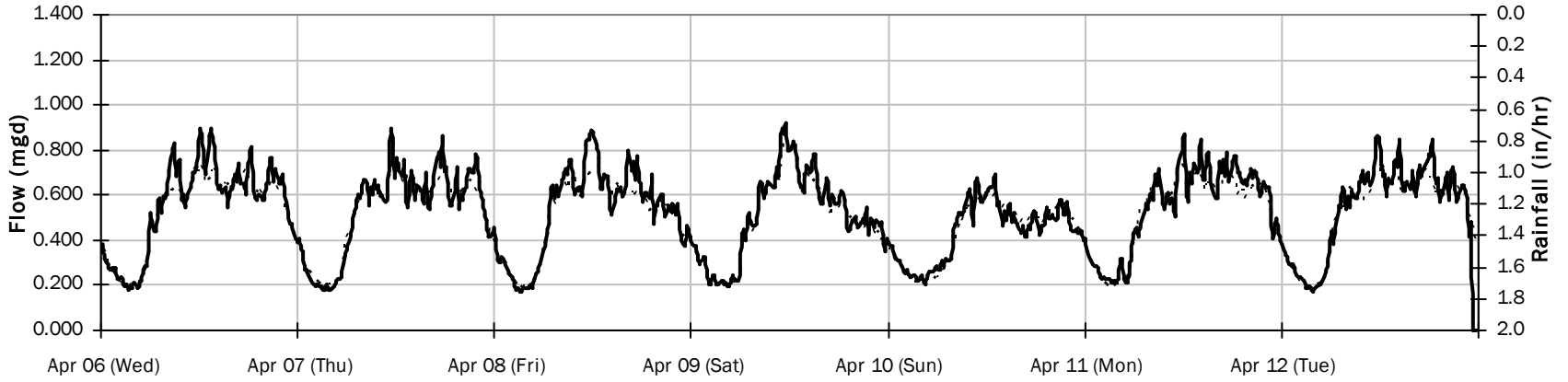


SITE 7

Flow Summary: 3/31/2022 to 4/12/2022

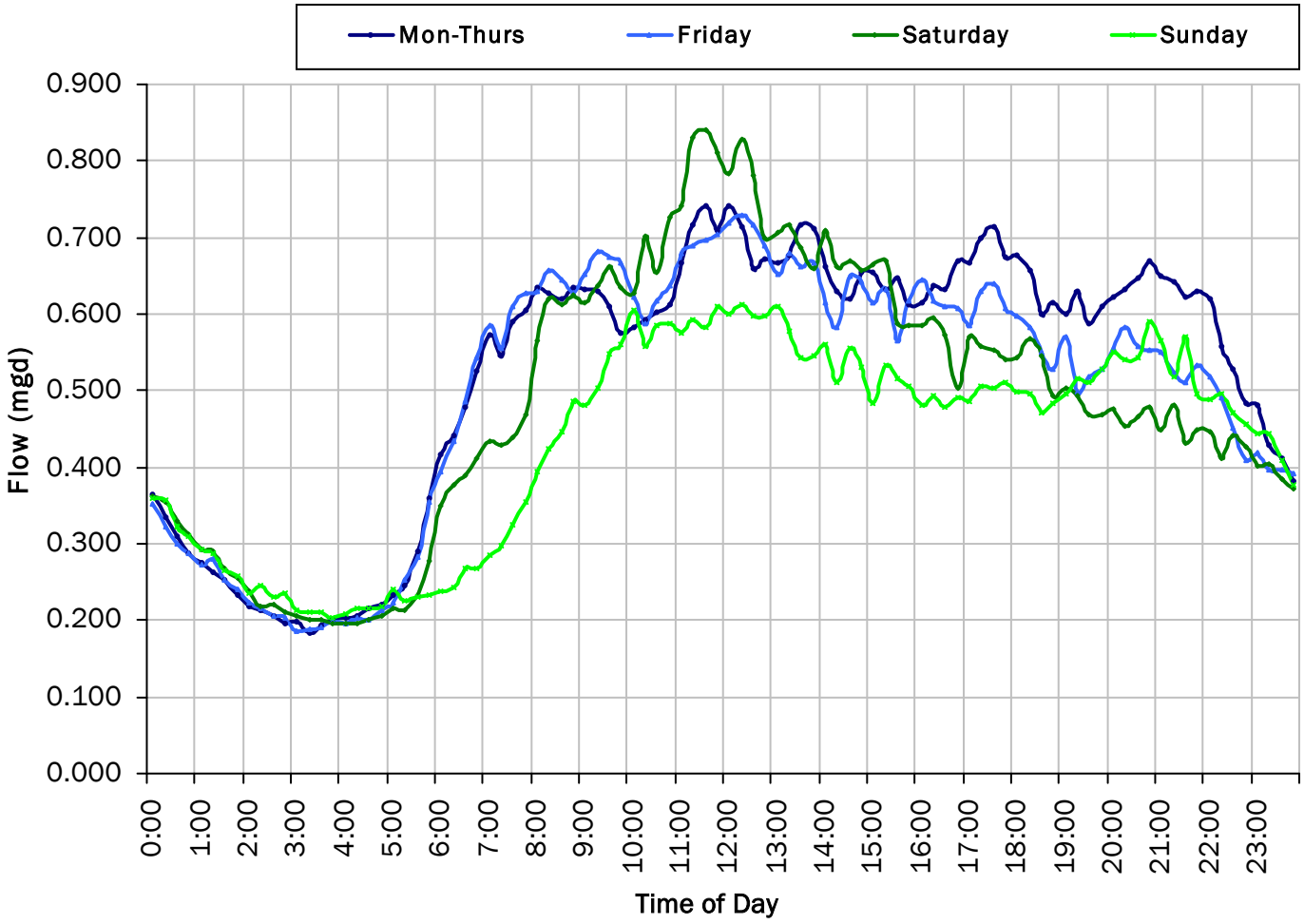
Period Rainfall: 0.00 inches Period Avg Flow: 0.516 mgd Period Peak Flow: 1.029 mgd Period Min Flow: 0.000 mgd





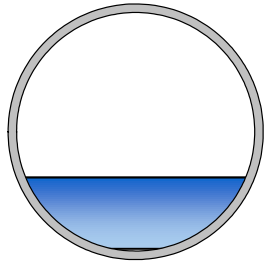
SITE 7

Average Dry Weather Flow Hydrographs



ADWF:

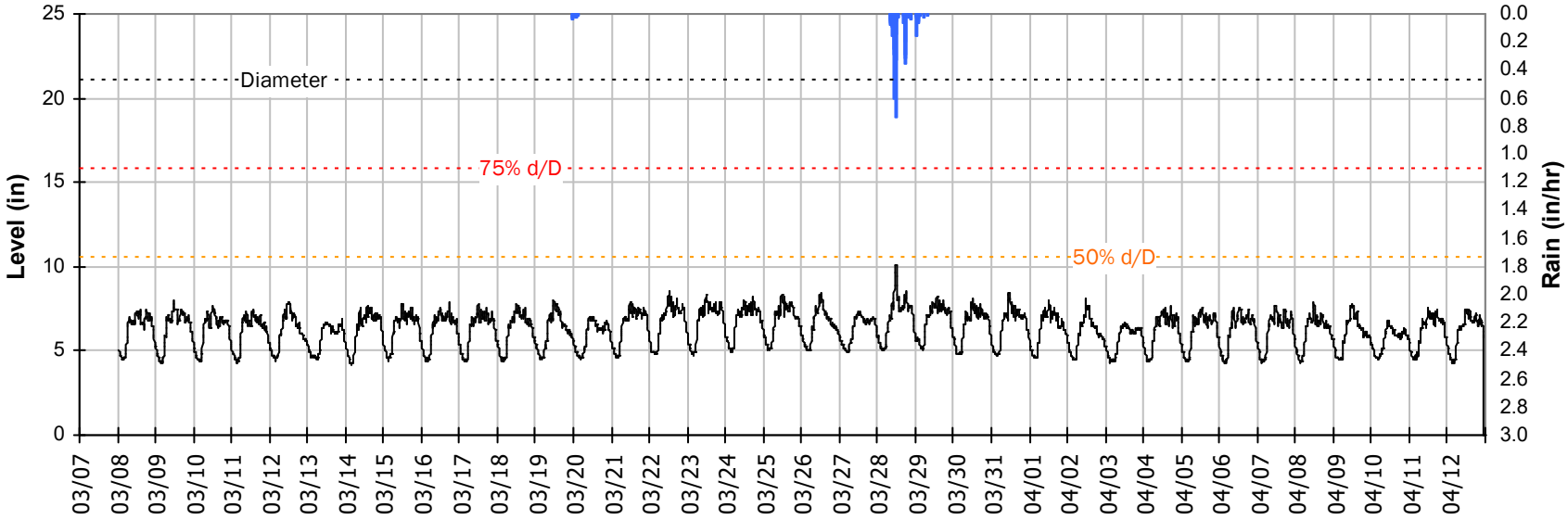
0.503 *mgd*

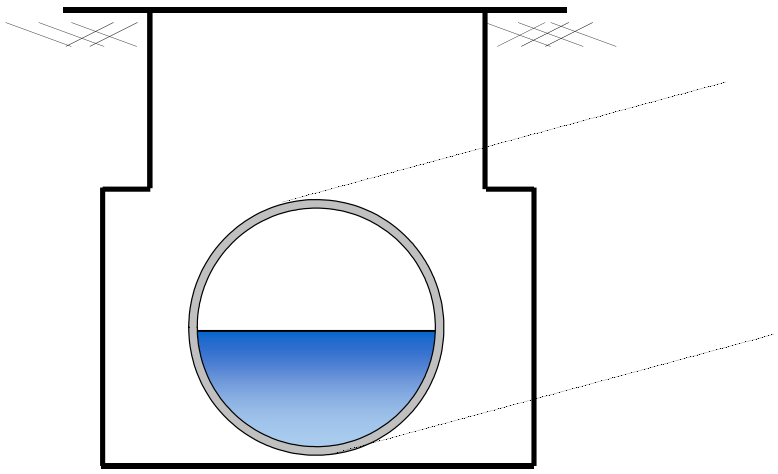


SITE 7

Site Capacity and Surcharge Summary

Realtime Flow Levels with Rainfall Data over Monitoring Period

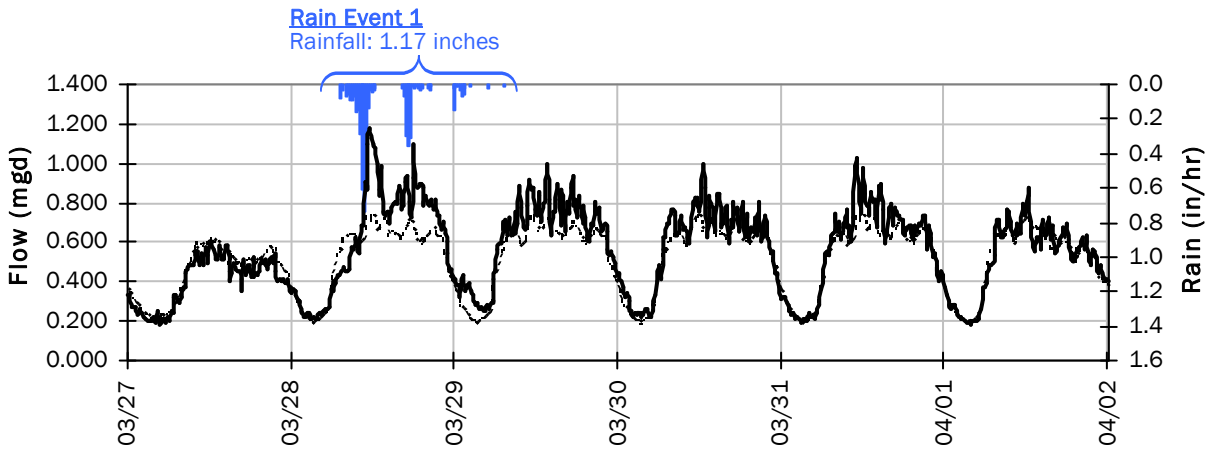




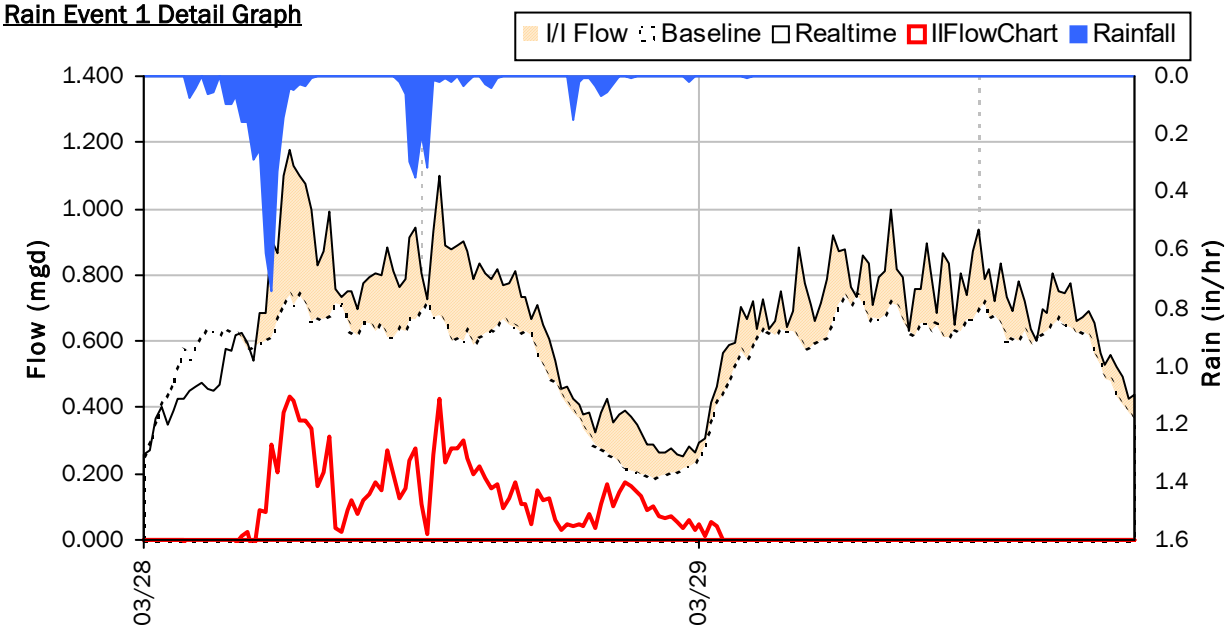
Pipe Diameter:	21	*inches*
Peak Measured Level:	10.1	*inches*
Peak d/D Ratio:	0.48	

SITE 7
I/I Summary: Rain Event 1

Baseline and Realtime Flows with Rainfall Data over Monitoring Period



Rain Event 1 Detail Graph



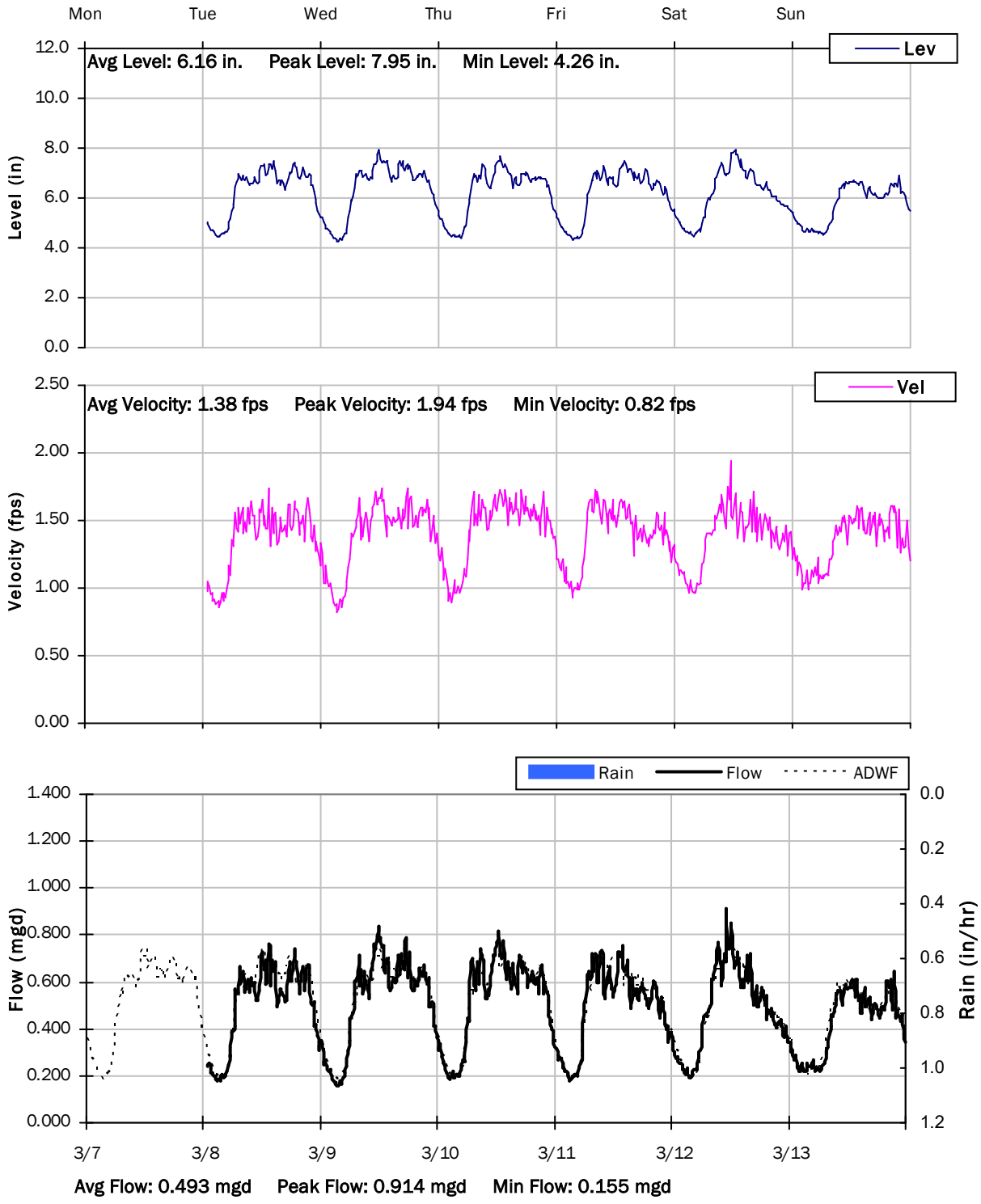
Storm Event I/I Analysis (Rain = 1.17 inches)

Capacity		Inflow / Infiltration	
Peak Flow:	1.177 *mgd*	**Peak I/I Rate:**	0.435 *mgd*
PF:	2.34	**Total I/I:**	117,000 *gallons*
Peak Level:	10.10 *in*		
d/D Ratio:	0.48		

SITE 7

Weekly Level, Velocity and Flow Hydrographs

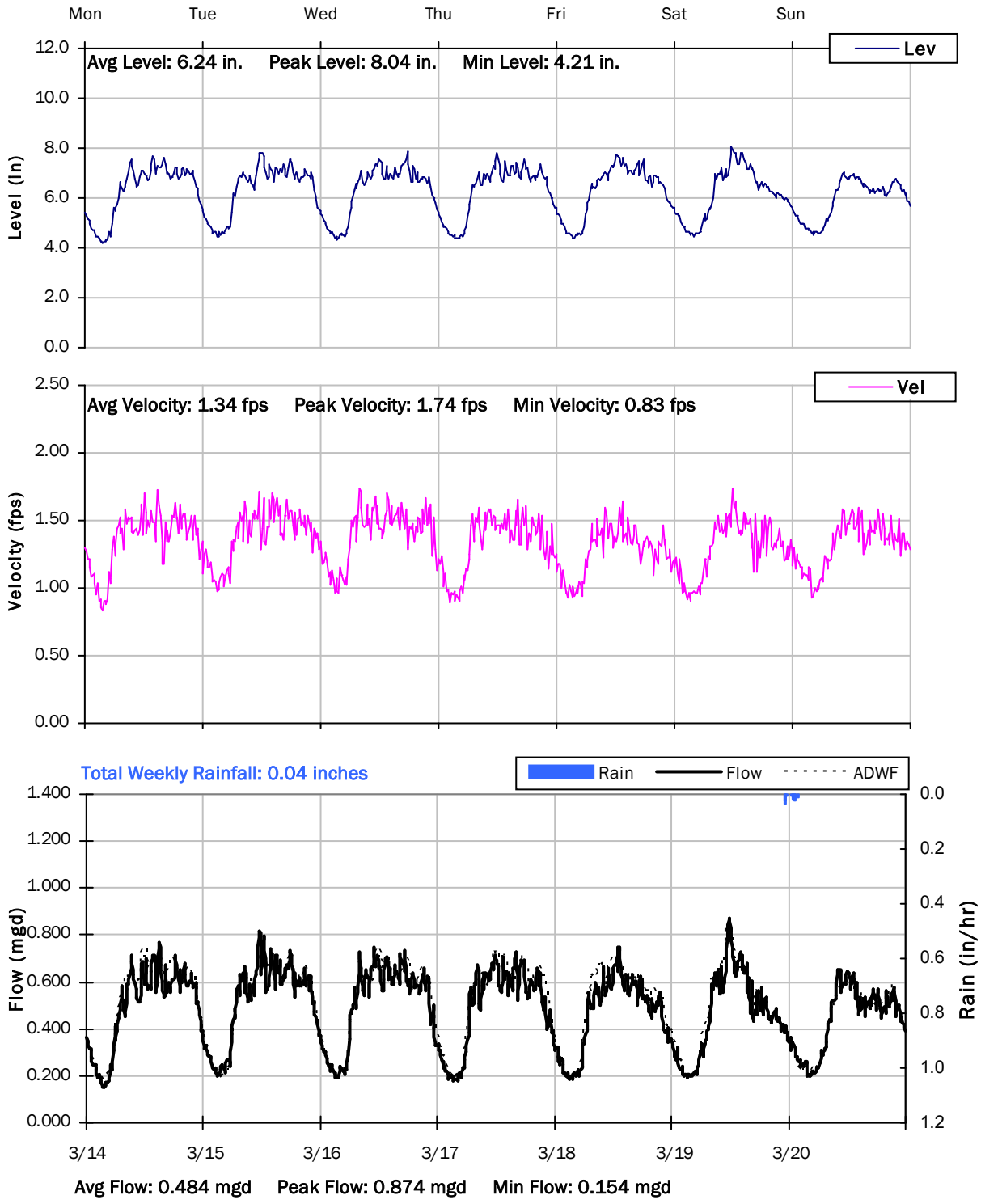
3/7/2022 to 3/14/2022



SITE 7

Weekly Level, Velocity and Flow Hydrographs

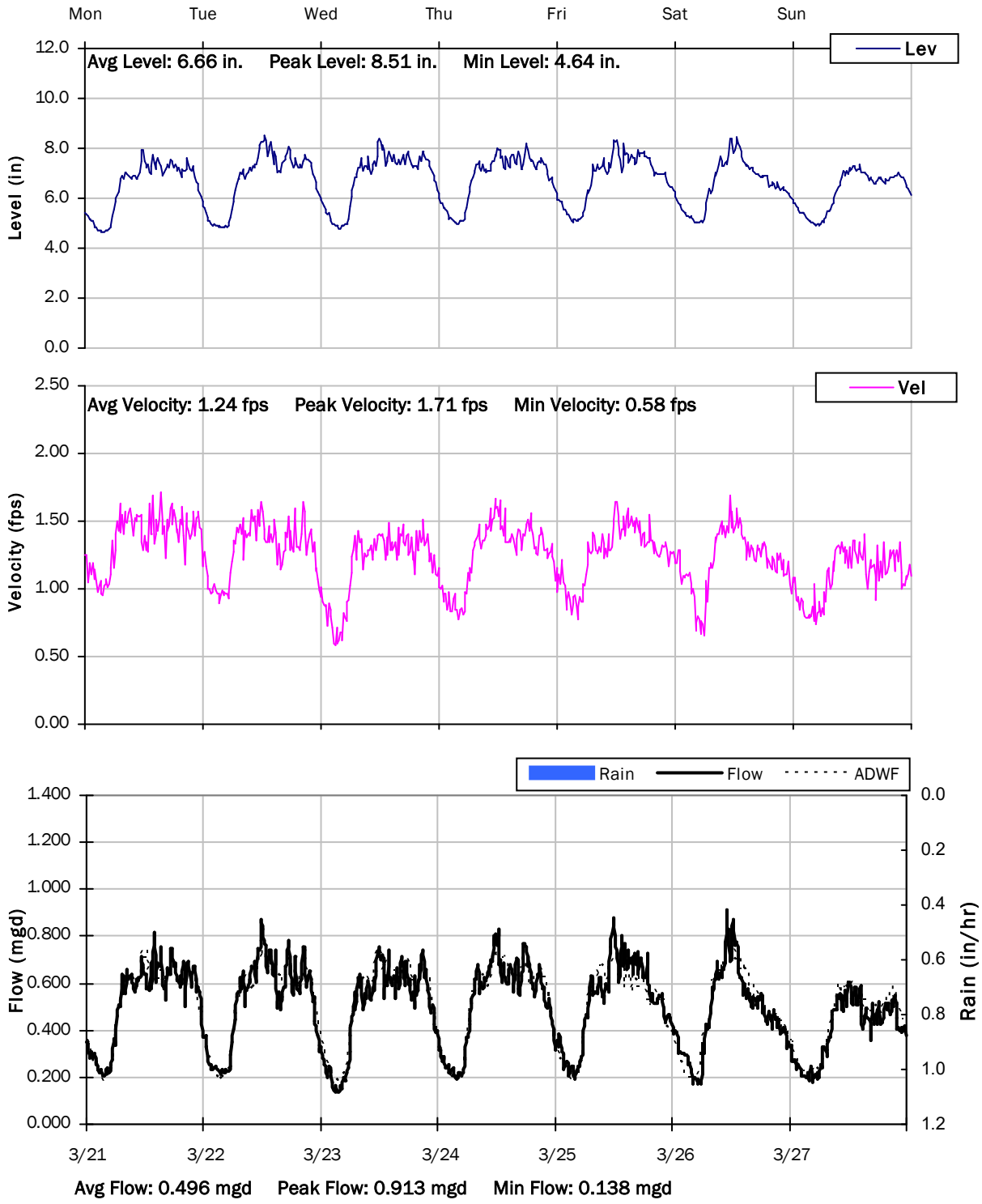
3/14/2022 to 3/21/2022



SITE 7

Weekly Level, Velocity and Flow Hydrographs

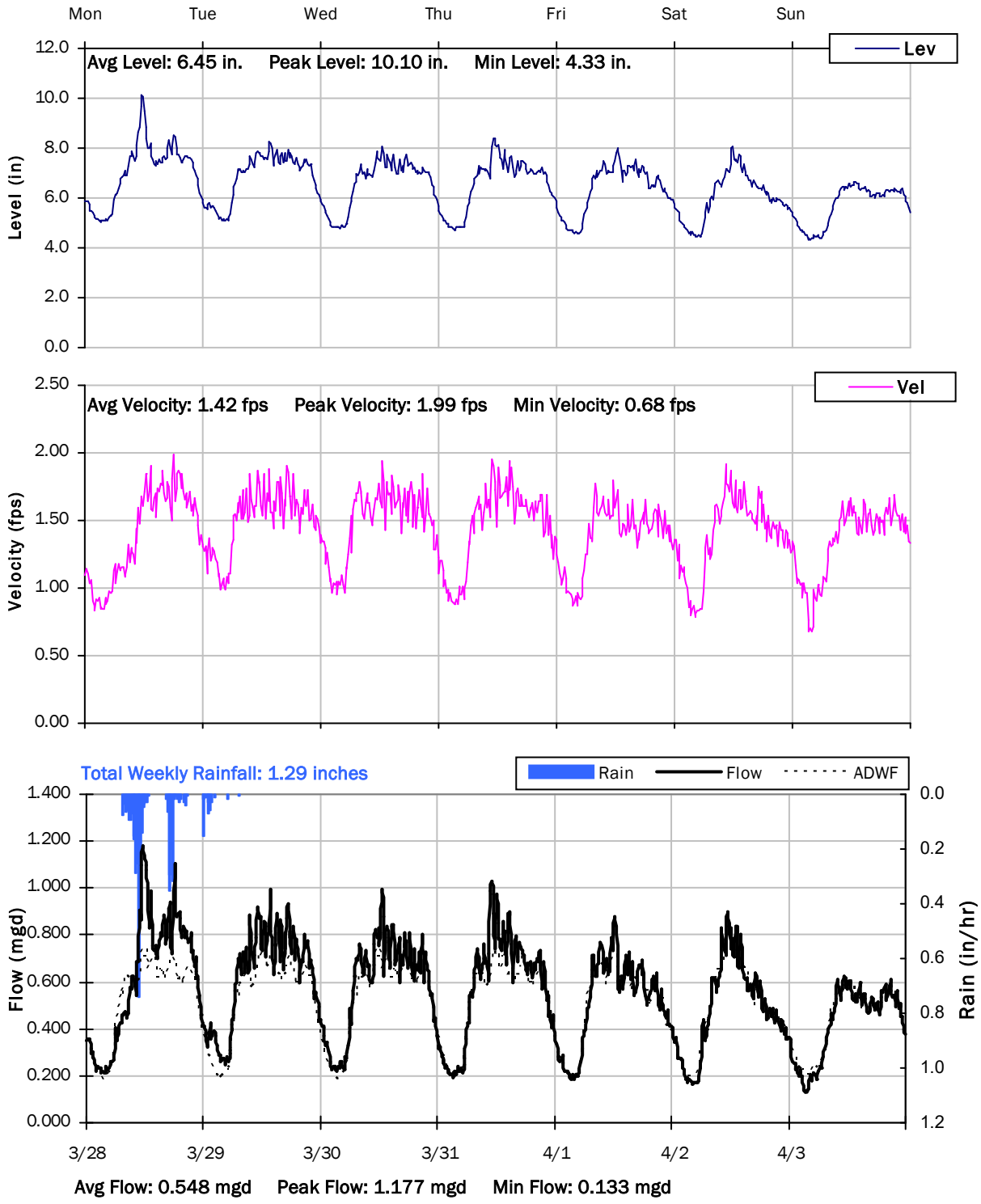
3/21/2022 to 3/28/2022



SITE 7

Weekly Level, Velocity and Flow Hydrographs

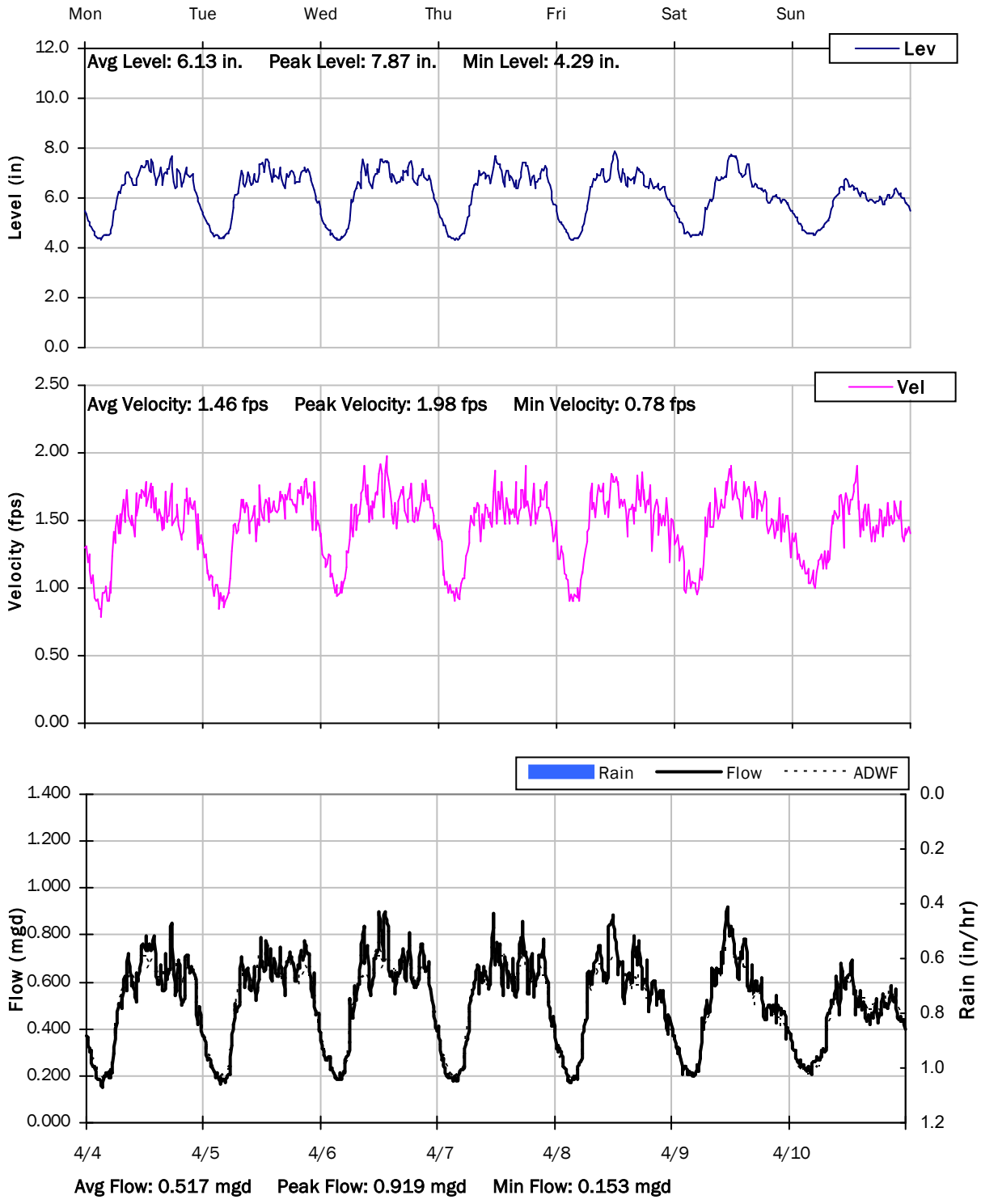
3/28/2022 to 4/4/2022



SITE 7

Weekly Level, Velocity and Flow Hydrographs

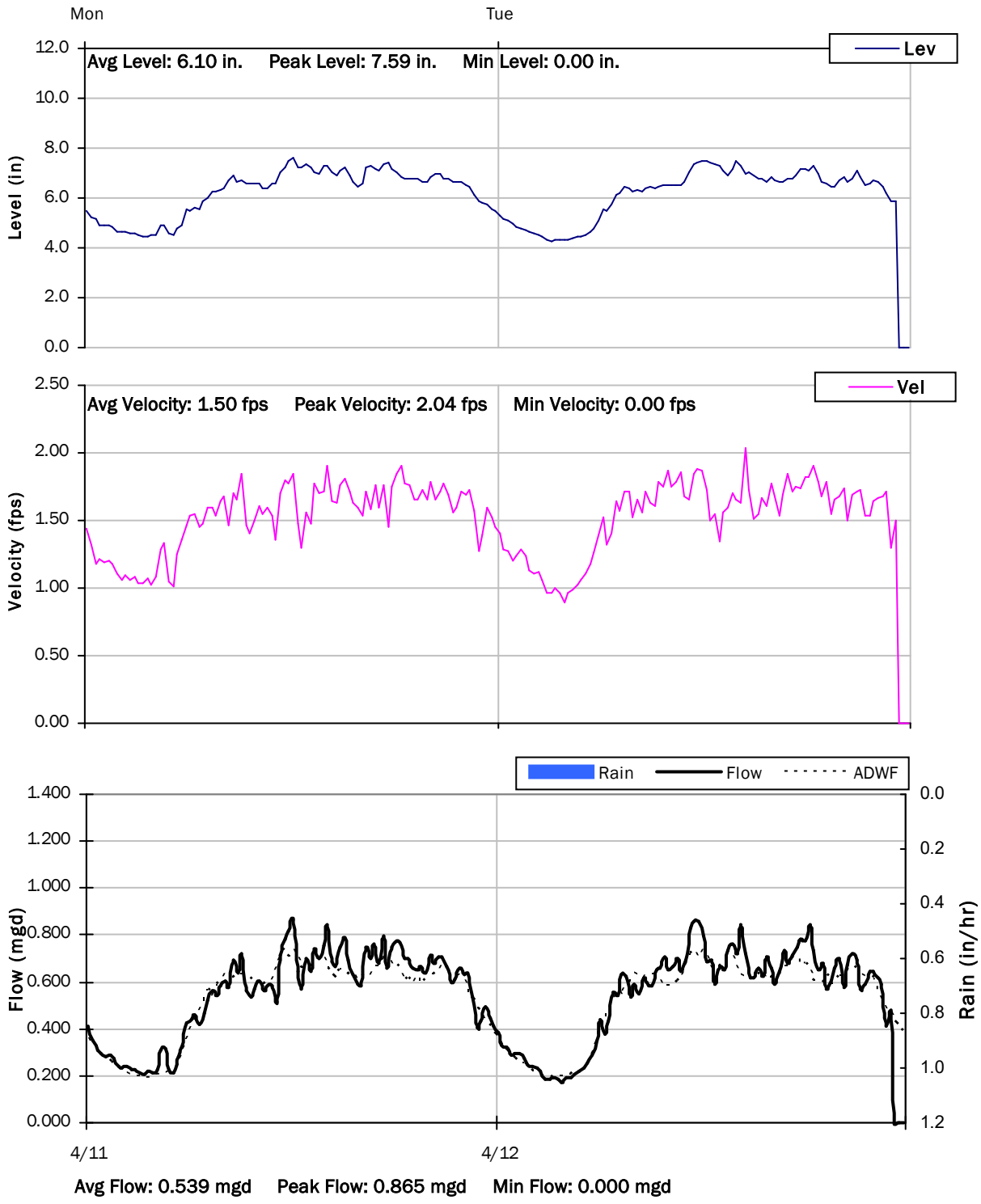
4/4/2022 to 4/11/2022



SITE 7

Weekly Level, Velocity and Flow Hydrographs

4/11/2022 to 4/13/2022



Monitoring Site: Site 8

Carollo Gardena, California

Sanitary Sewer Flow Monitoring

March 07, 2022 - April 12, 2022

Location: Artesia Boulevard west of S Western Avenue

Data Summary Report

Vicinity Map: Site 8

SITE 8

Site Information MH ID: 05 1325

Location: Artesia Boulevard west of S Western Avenue

Coordinates: 118.3102° W, 33.8729° N

Rim Elevation (Earth): 28 feet

Expected Pipe Diameter: 24 inches

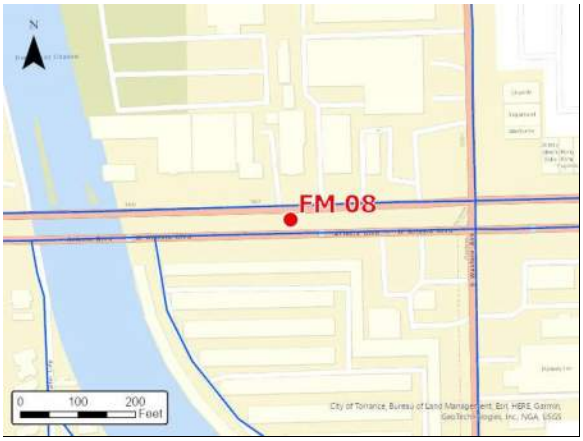
Measured Pipe Diameter: 24 inches

ADWF: 1.459 mgd

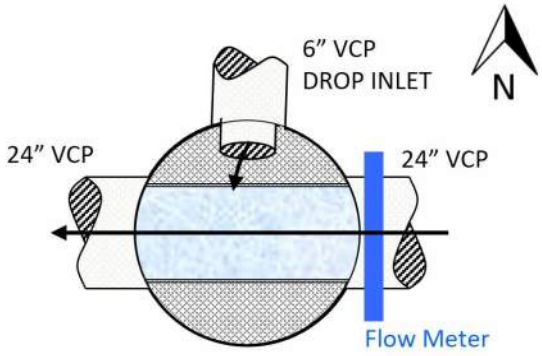
Peak Measured Flow: 3.425 mgd

Sediment: 1.25 inches

Satellite Map



Sanitary Map



Flow Sketch

Street View

Plan View

SITE 8

Additional Site Photos

Effluent Pipe

Monitored East Influent Pipe

SITE 8

Additional Site Photos

North Influent Pipe, Lower

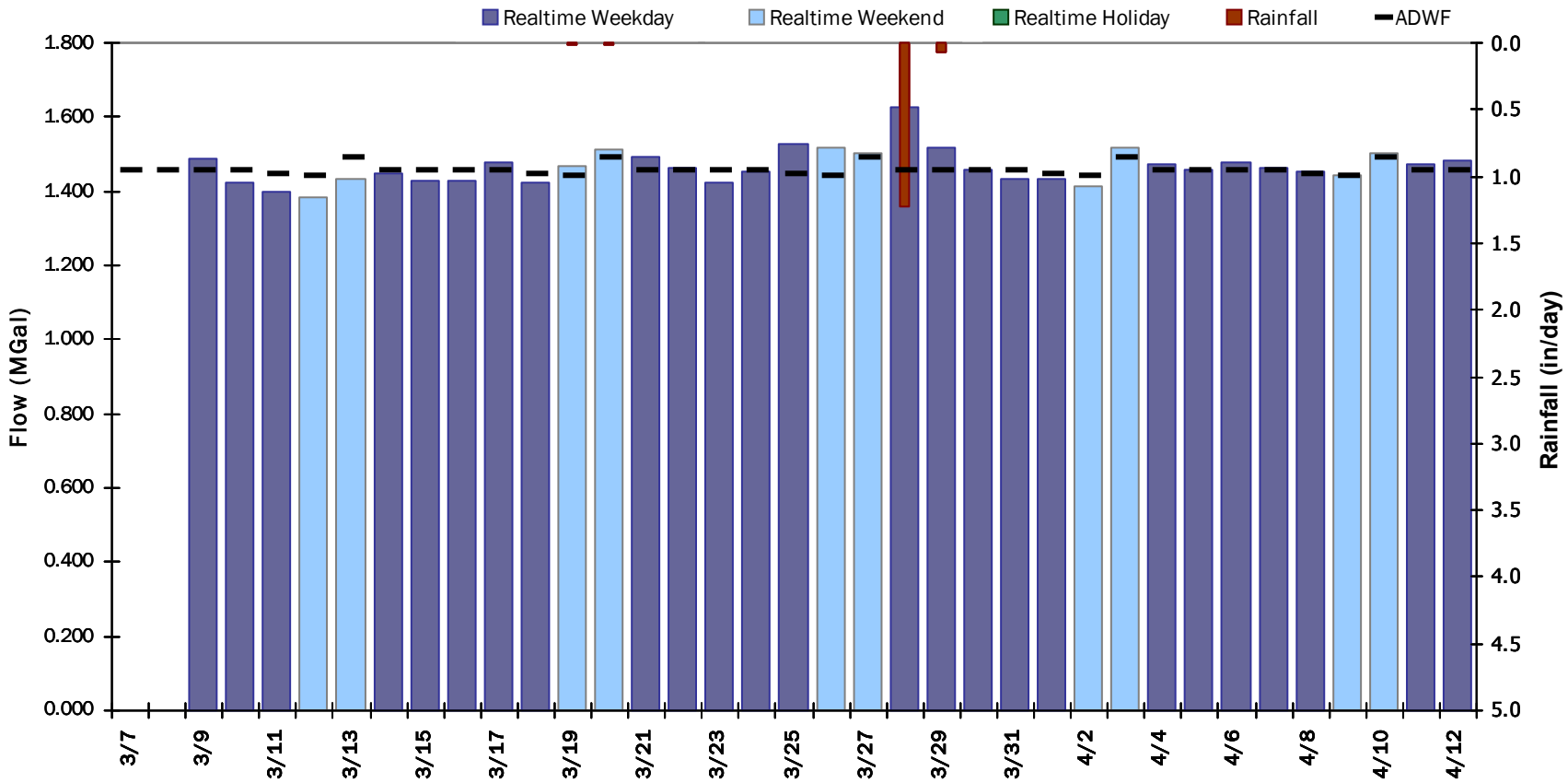
North Influent Pipe, Upper

SITE 8

Period Flow Summary: Daily Flow Totals

Avg Daily Flow: 1.468 MGal Peak Daily Flow: 1.625 MGal Min Daily Flow: 1.386 MGal

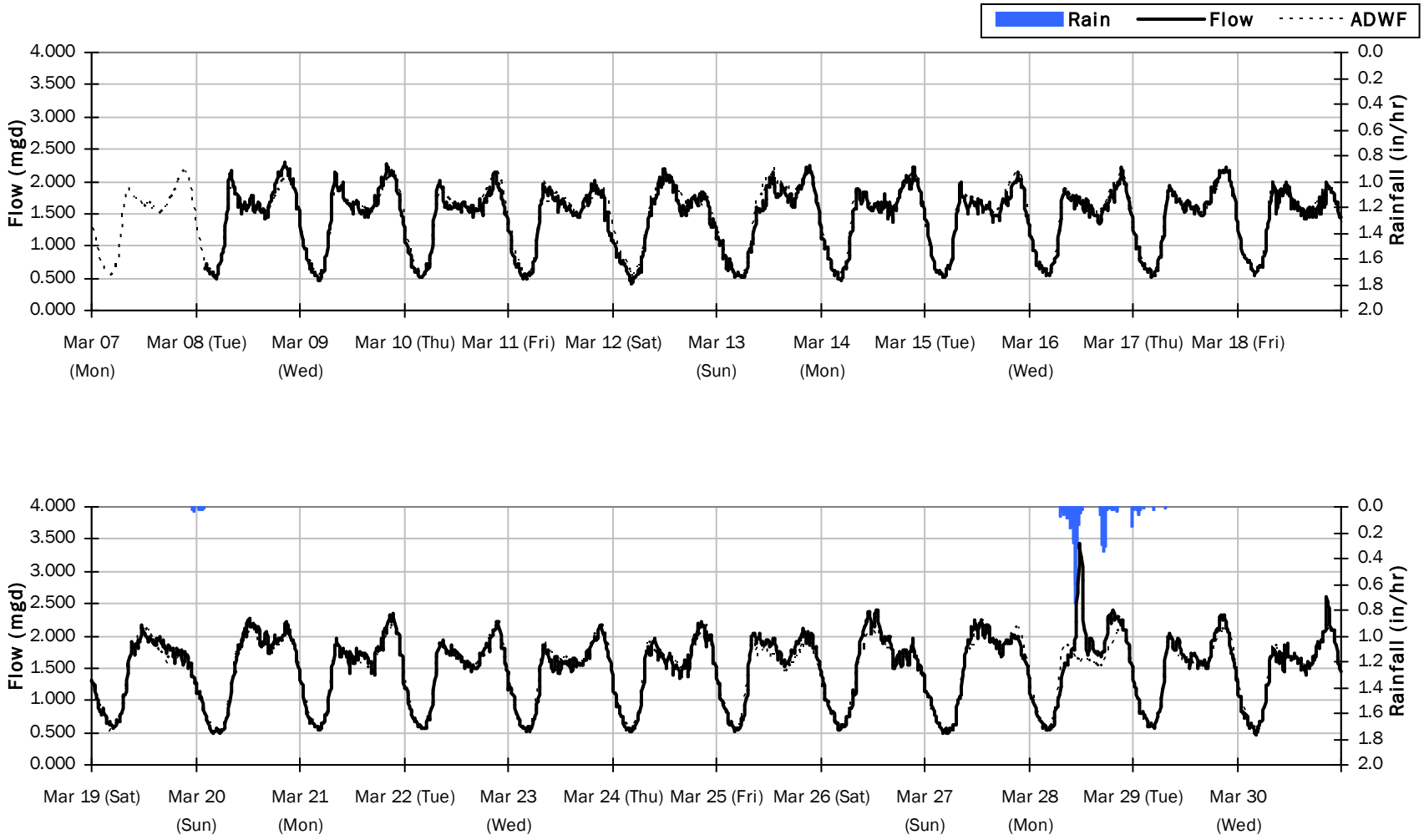
Total Rainfall: 1.33 inches



SITE 8

Flow Summary: 3/7/2022 to 3/30/2022

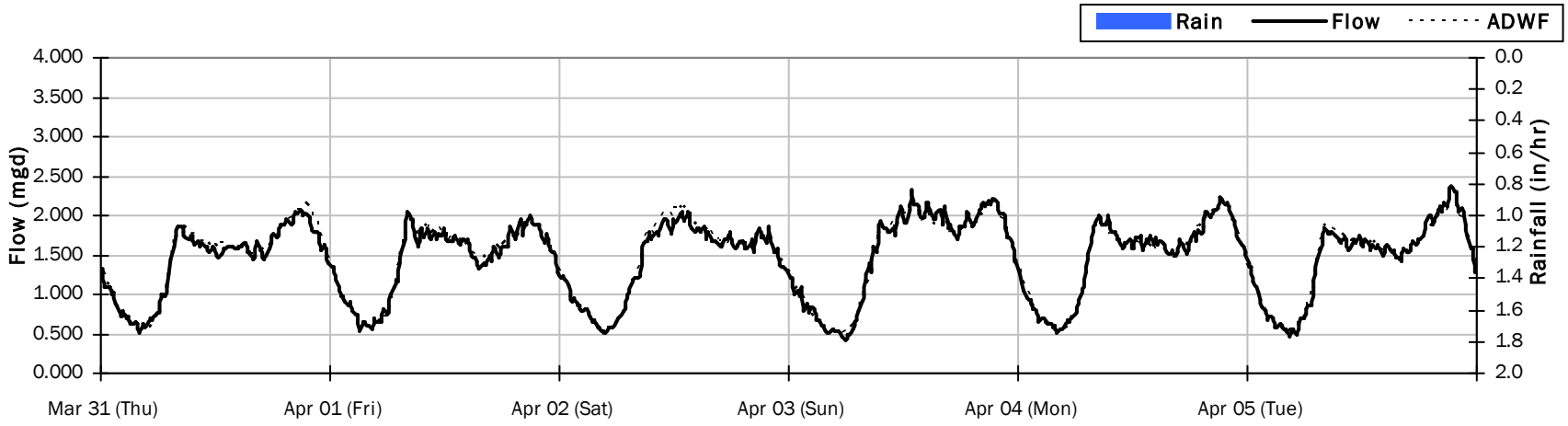
Period Rainfall: 1.33 inches Period Avg Flow: 1.471 mgd Period Peak Flow: 3.425 mgd Period Min Flow: 0.424 mgd

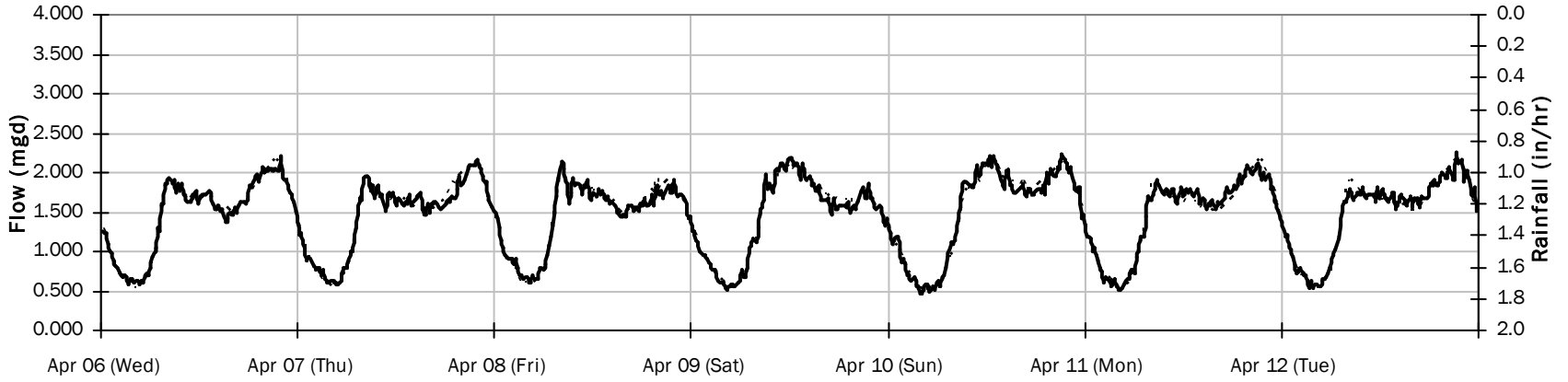


SITE 8

Flow Summary: 3/31/2022 to 4/12/2022

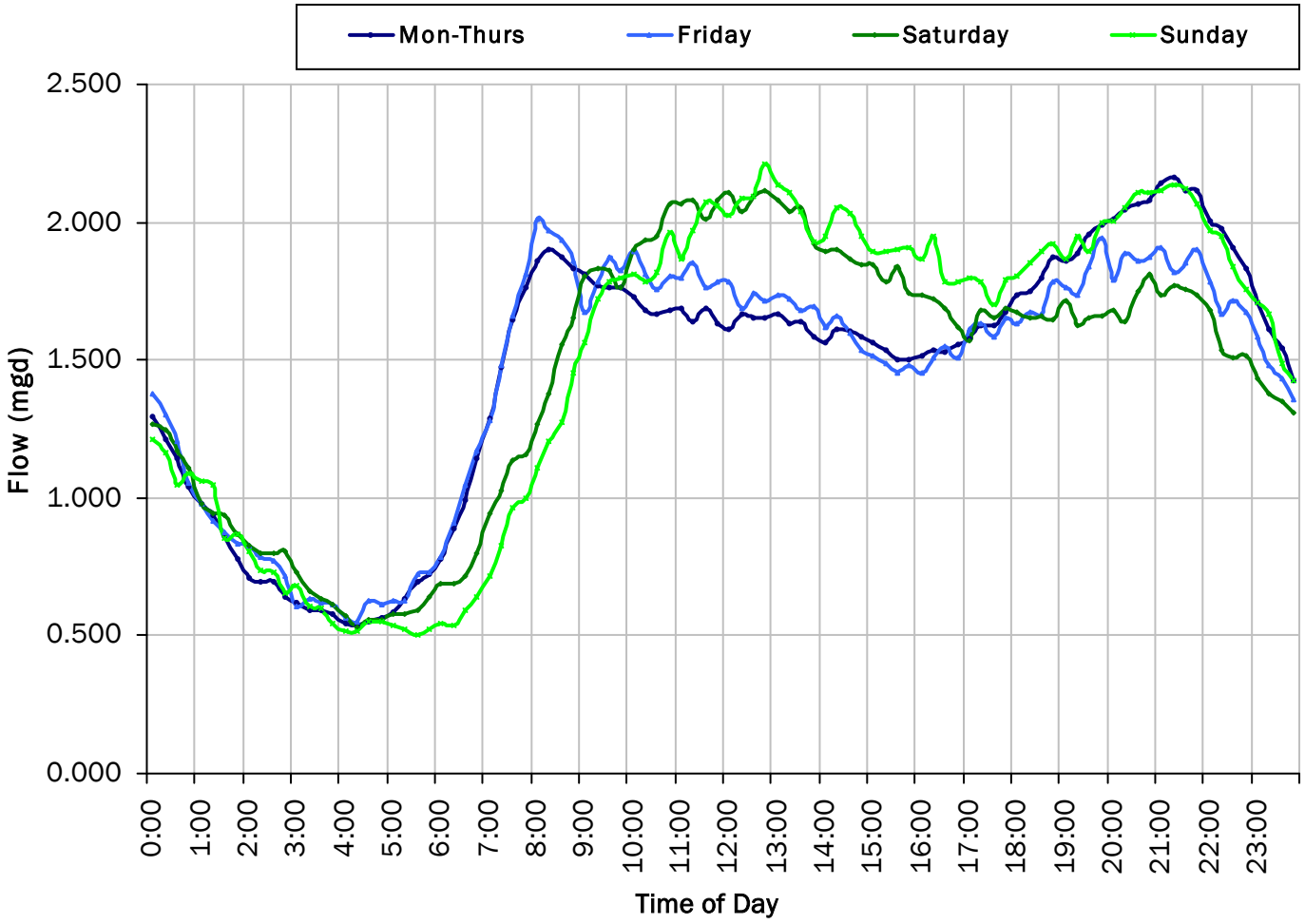
Period Rainfall: 0.00 inches Period Avg Flow: 1.463 mgd Period Peak Flow: 2.382 mgd Period Min Flow: 0.418 mgd





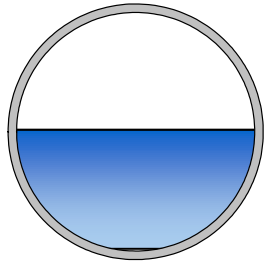
SITE 8

Average Dry Weather Flow Hydrographs



ADWF:

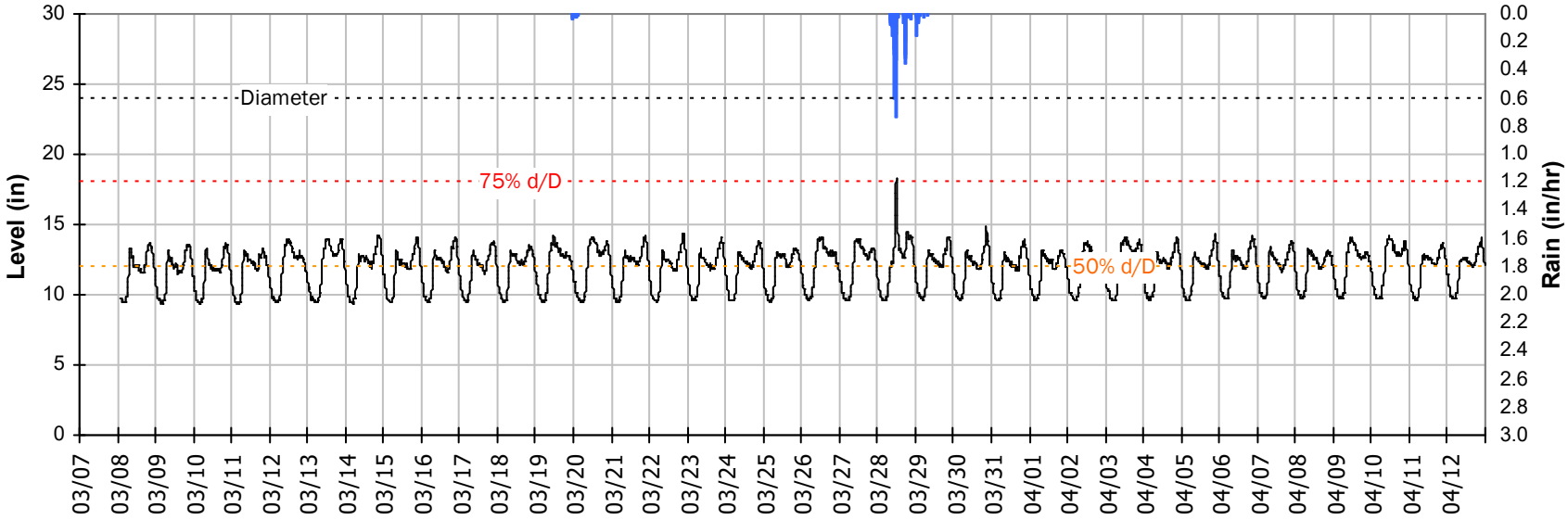
1.459 *mgd*

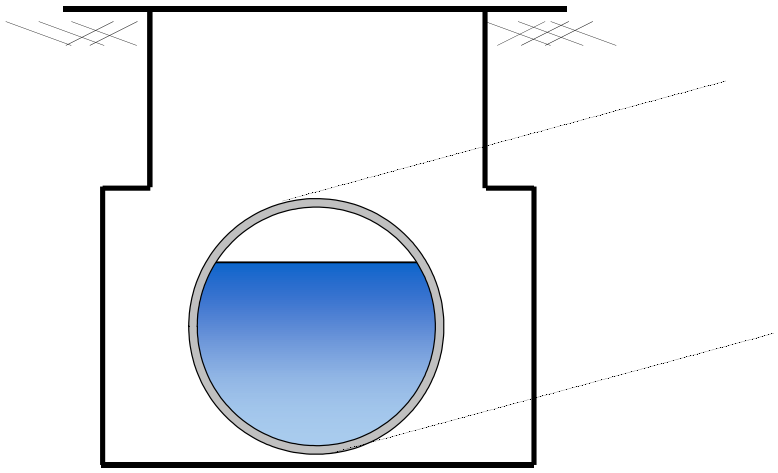


SITE 8

Site Capacity and Surcharge Summary

Realtime Flow Levels with Rainfall Data over Monitoring Period

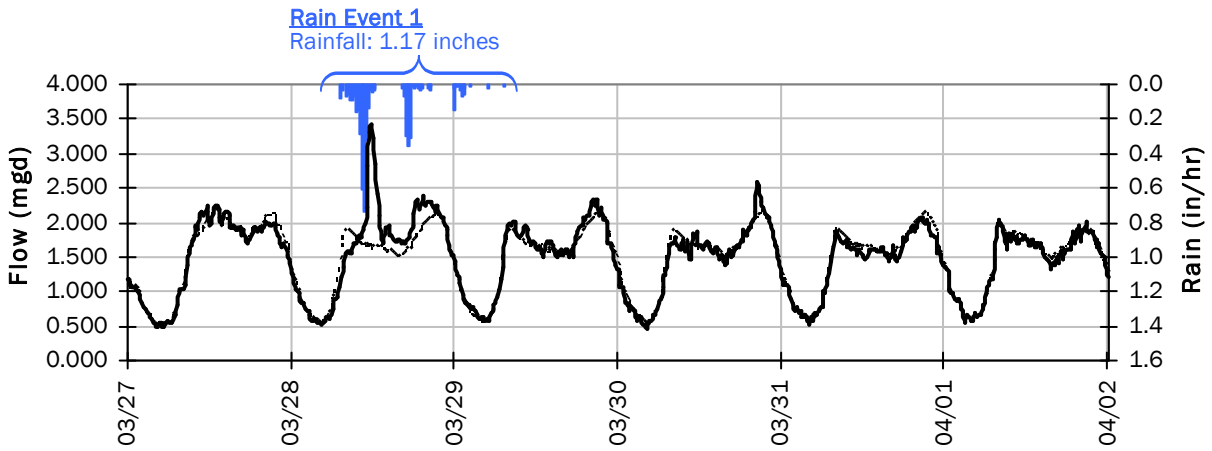




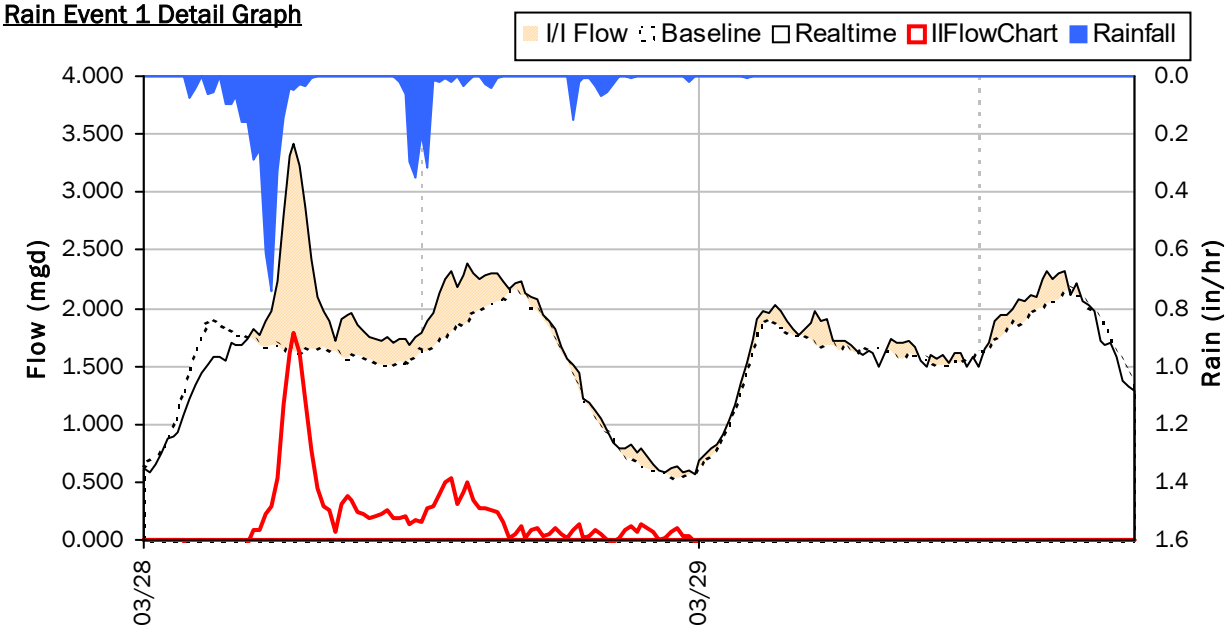
Pipe Diameter:	24	*inches*
Peak Measured Level:	18.3	*inches*
Peak d/D Ratio:	0.76	

SITE 8
I/I Summary: Rain Event 1

Baseline and Realtime Flows with Rainfall Data over Monitoring Period



Rain Event 1 Detail Graph



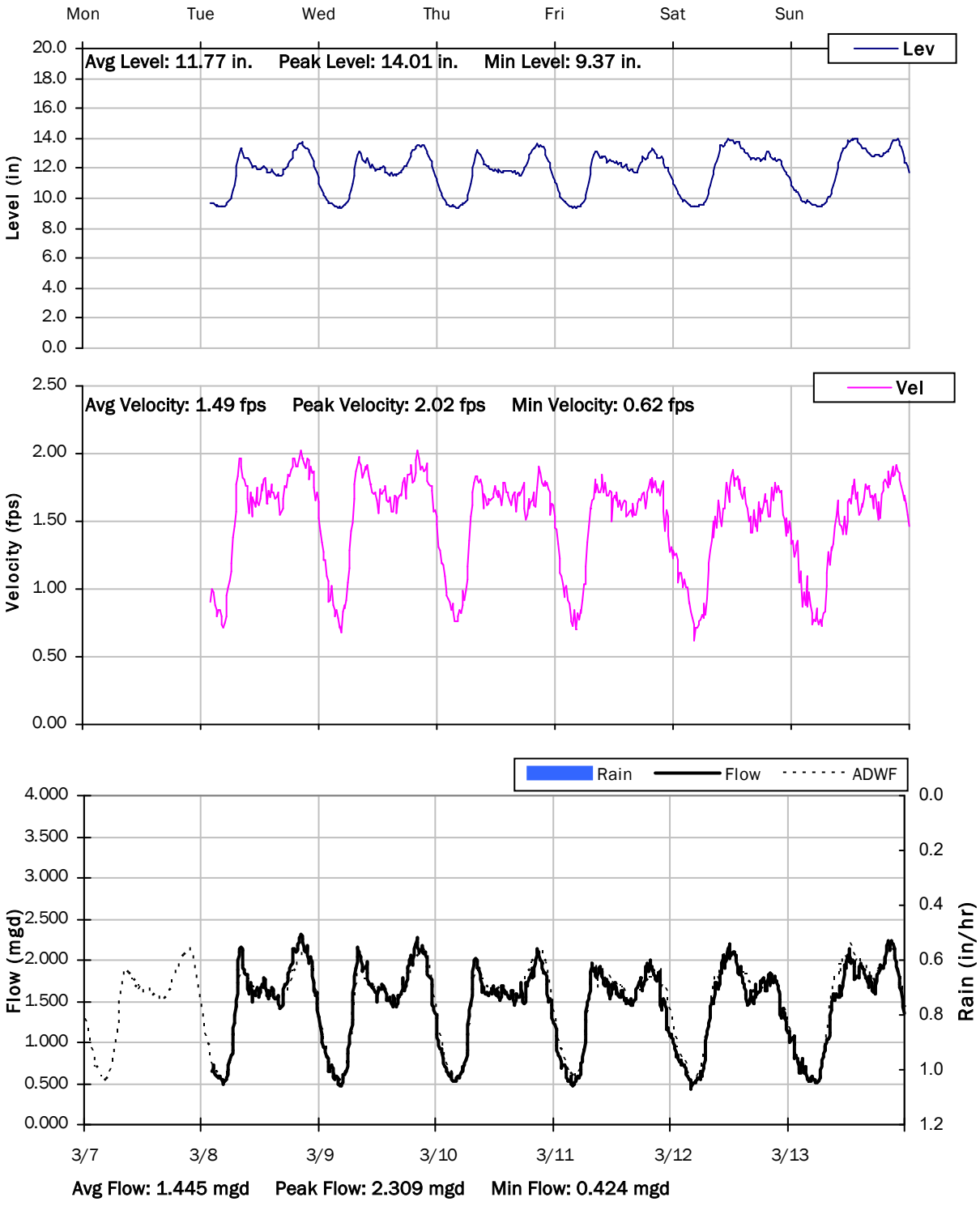
Storm Event I/I Analysis (Rain = 1.17 inches)

Capacity		Inflow / Infiltration	
Peak Flow:	3.425 *mgd*	**Peak I/I Rate:**	1.792 *mgd*
PF:	2.35	**Total I/I:**	188,000 *gallons*
Peak Level:	18.25 *in*		
d/D Ratio:	0.76		

SITE 8

Weekly Level, Velocity and Flow Hydrographs

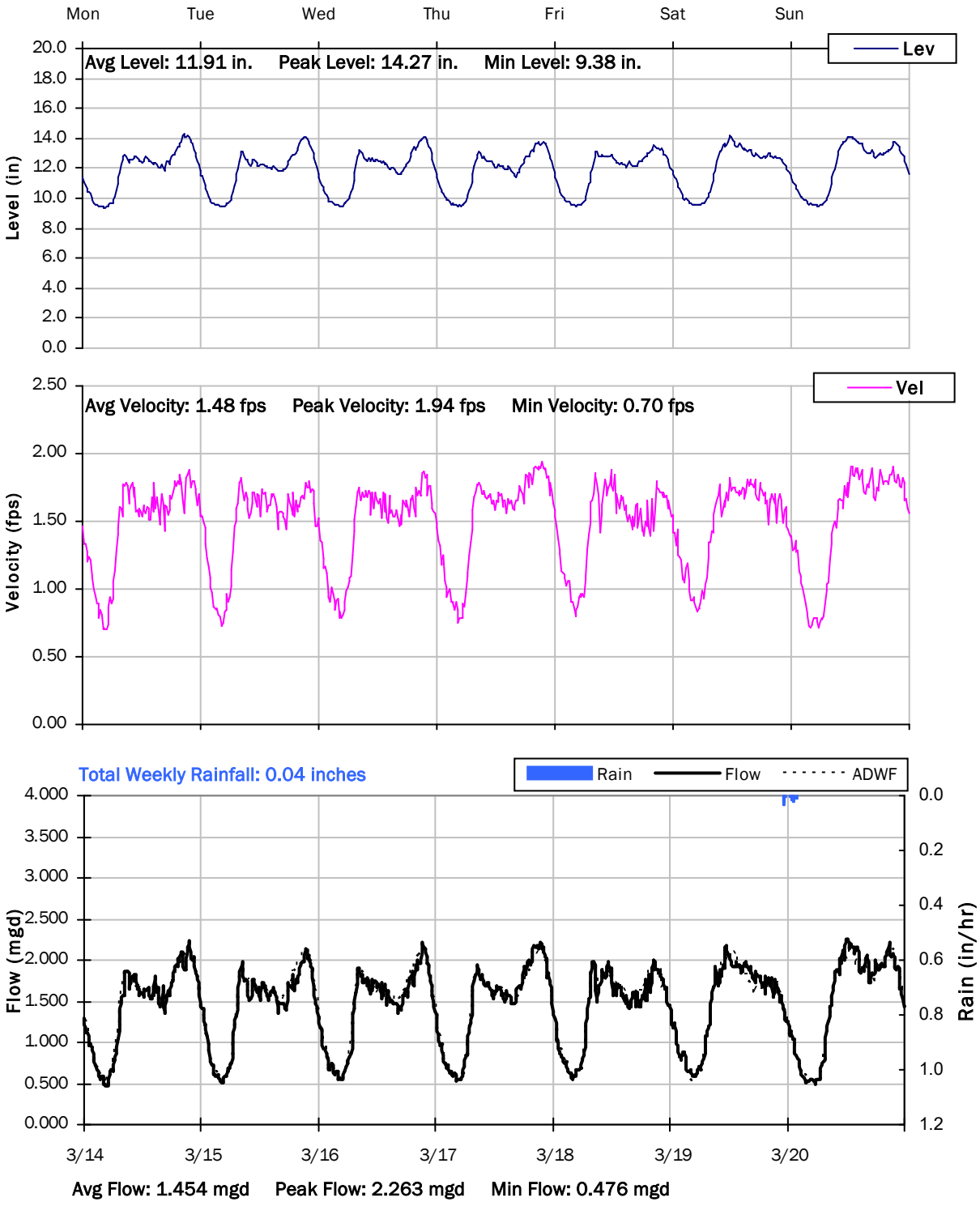
3/7/2022 to 3/14/2022



SITE 8

Weekly Level, Velocity and Flow Hydrographs

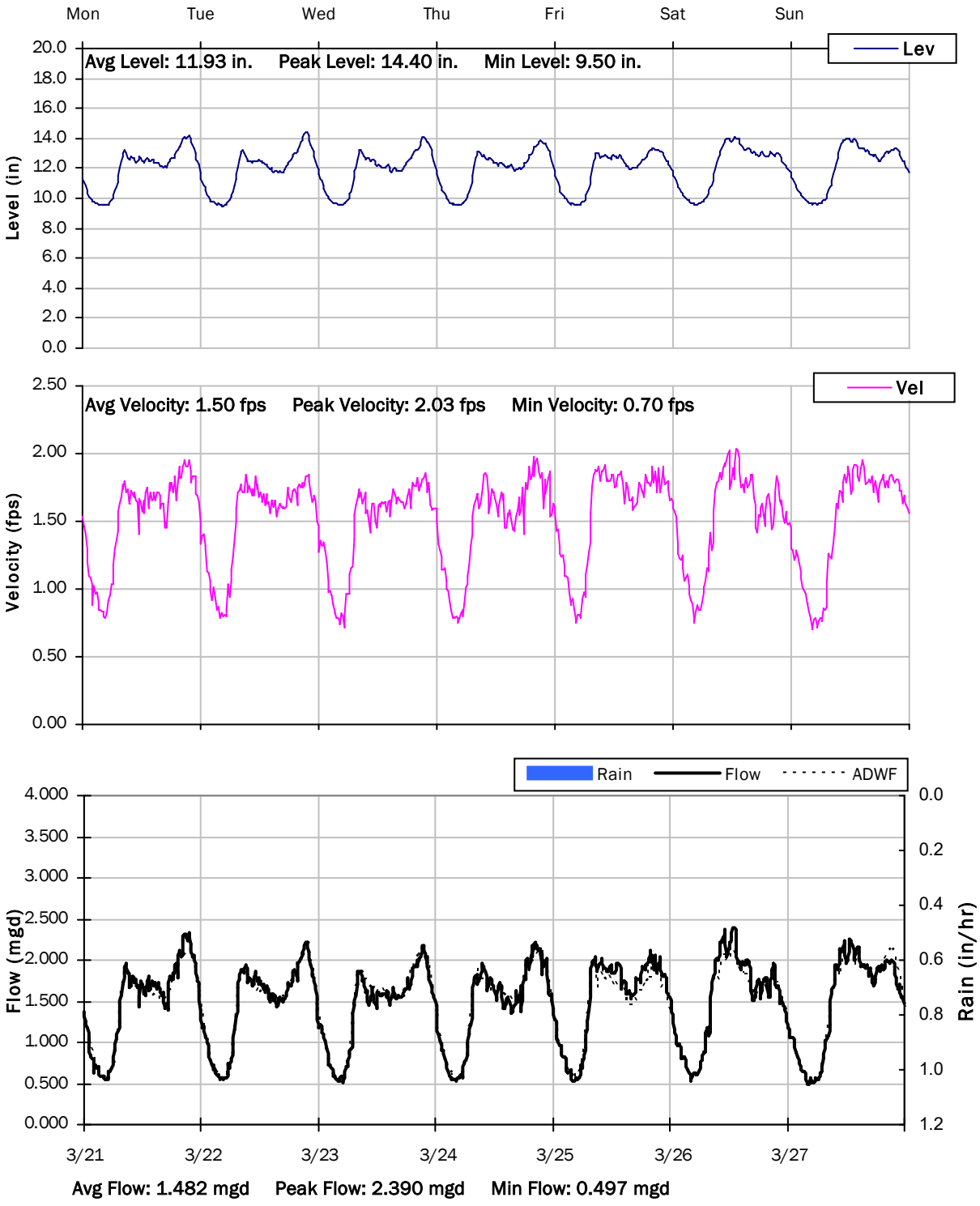
3/14/2022 to 3/21/2022



SITE 8

Weekly Level, Velocity and Flow Hydrographs

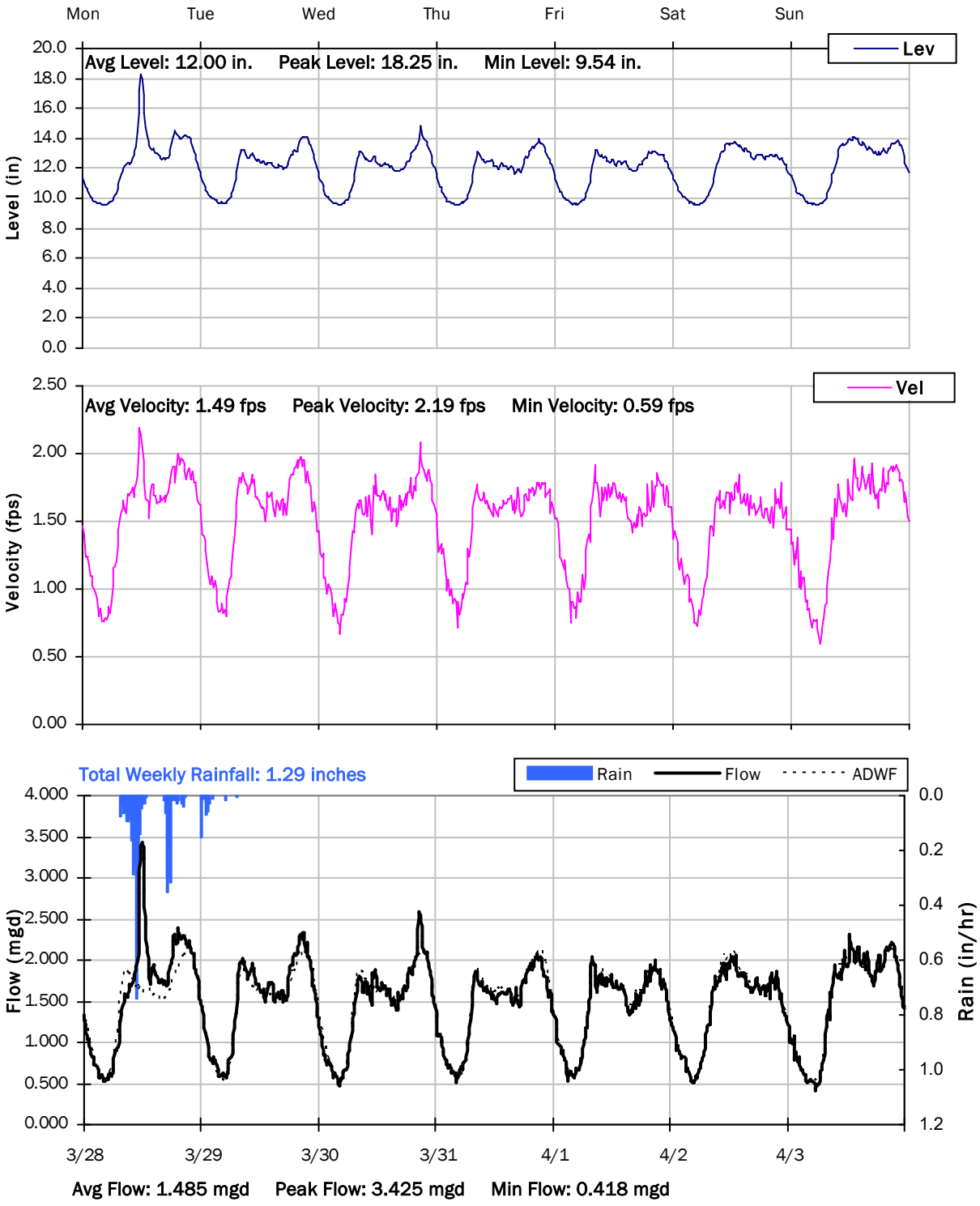
3/21/2022 to 3/28/2022



SITE 8

Weekly Level, Velocity and Flow Hydrographs

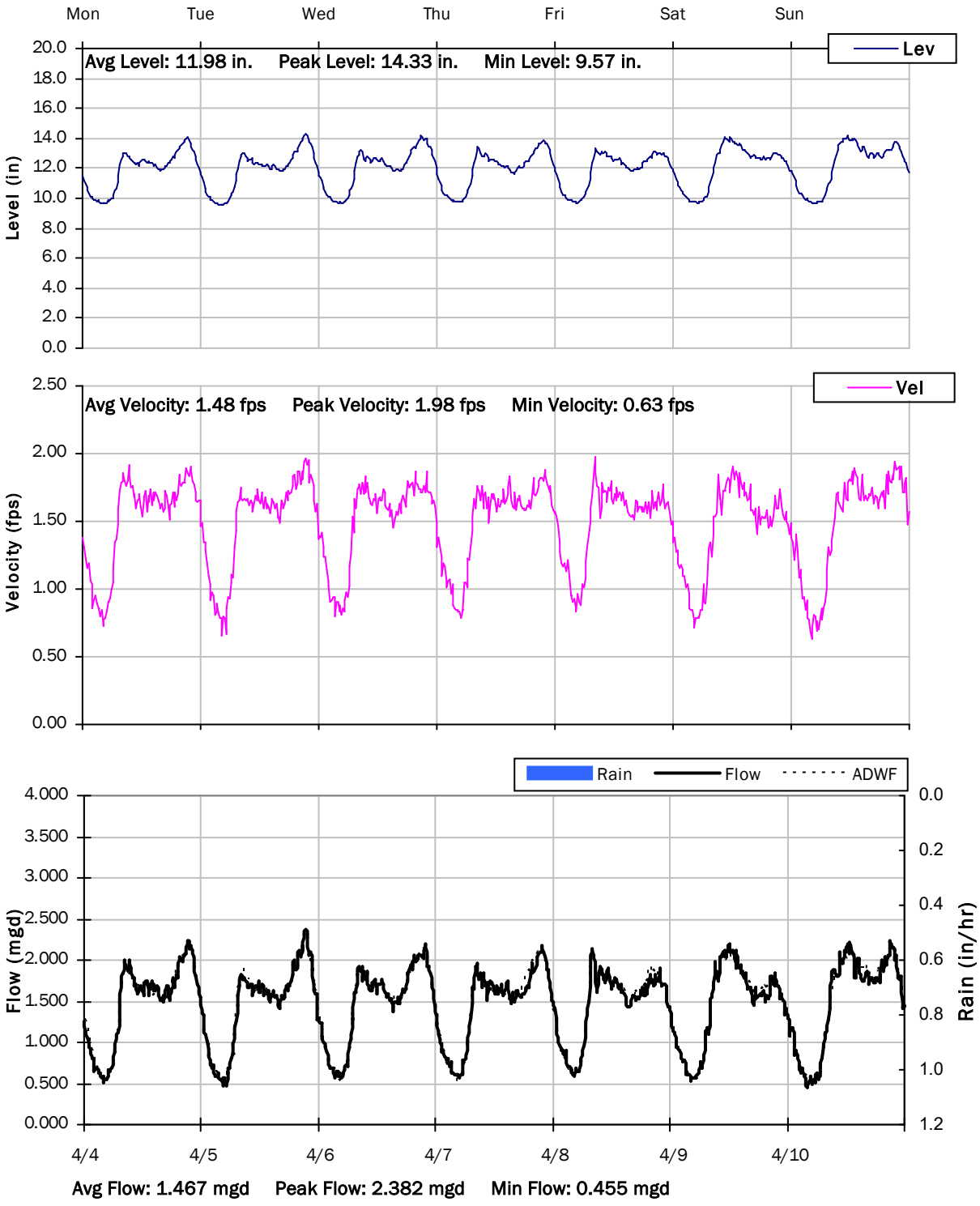
3/28/2022 to 4/4/2022



SITE 8

Weekly Level, Velocity and Flow Hydrographs

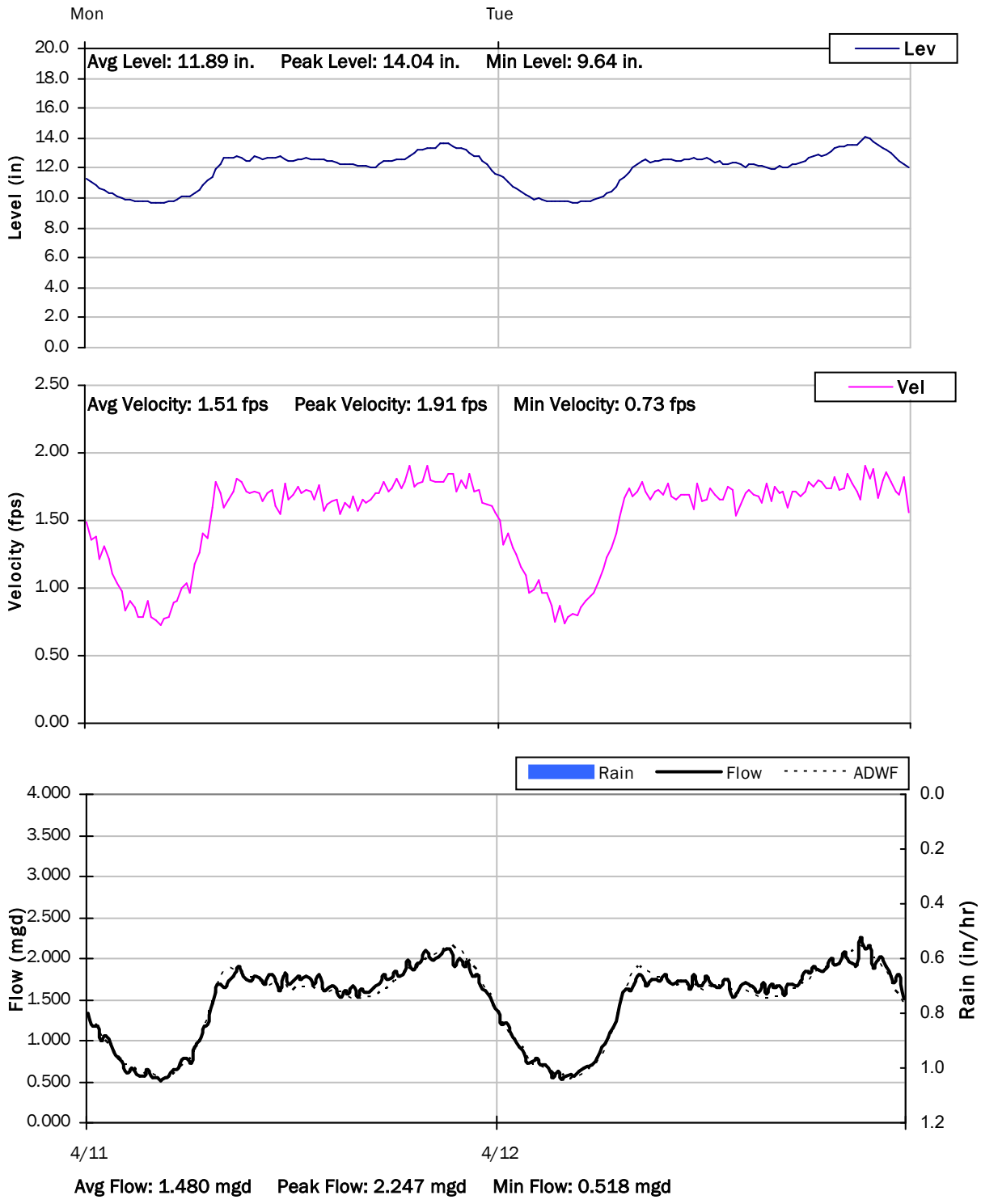
4/4/2022 to 4/11/2022



SITE 8

Weekly Level, Velocity and Flow Hydrographs

4/11/2022 to 4/13/2022



Monitoring Site: Site 9

Carollo Gardena, California

Sanitary Sewer Flow Monitoring

March 07, 2022 - April 12, 2022

Location: 166th Street and Gramercy Place

Data Summary Report

Vicinity Map: Site 9

SITE 9

Site Information MH ID: 05 1292

Location: 166th Street and Gramercy Place

Coordinates: 118.3135° W, 33.8802° N

Rim Elevation (Earth): 39 feet

Expected Pipe Diameter: 30 inches

Measured Pipe Diameter: 30 inches

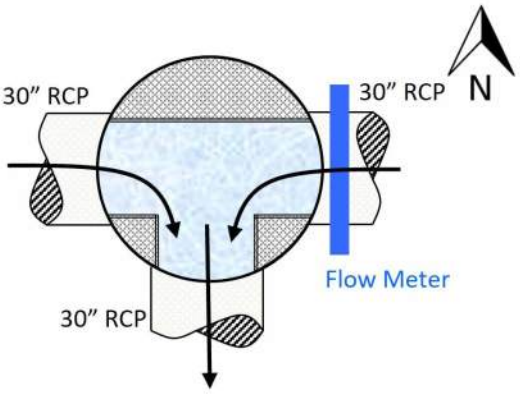
ADWF: 2.717 mgd

Peak Measured Flow: 6.092 mgd

Sediment: 1.5 inches

Satellite Map

Sanitary Map



Flow Sketch

Street View

Plan View

SITE 9

Additional Site Photos

Effluent Pipe

Monitored East Influent Pipe

SITE 9

Additional Site Photos

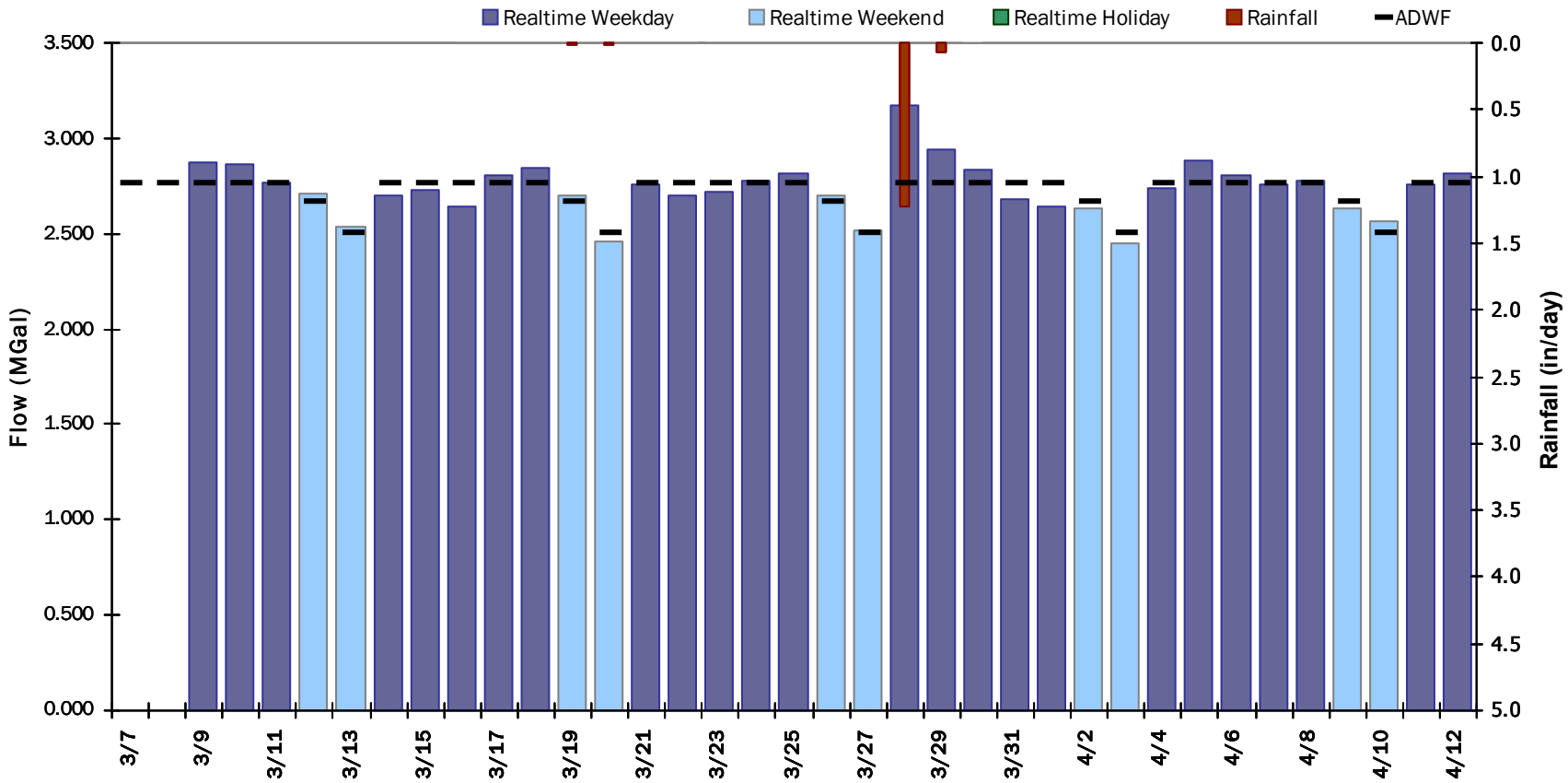
West Influent Pipe

SITE 9

Period Flow Summary: Daily Flow Totals

Avg Daily Flow: 2.740 MGal Peak Daily Flow: 3.169 MGal Min Daily Flow: 2.454 MGal

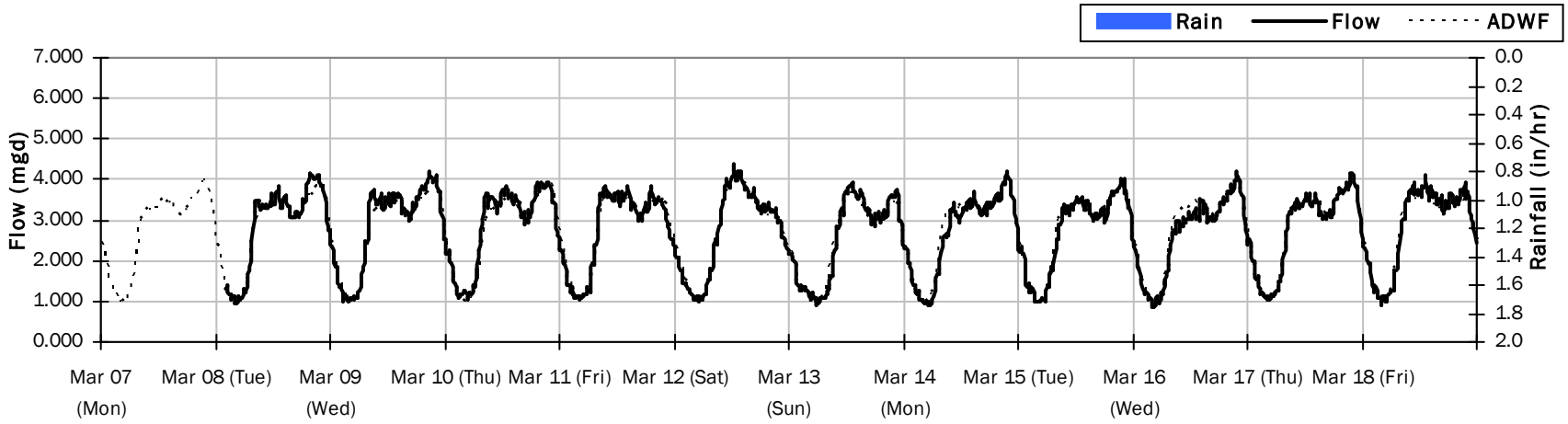
Total Rainfall: 1.33 inches

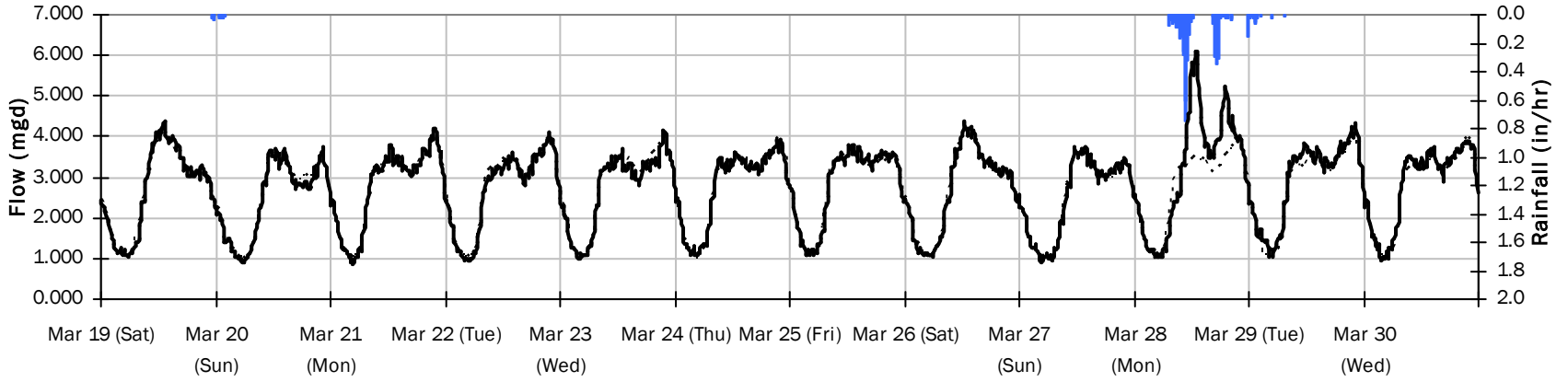


SITE 9

Flow Summary: 3/7/2022 to 3/30/2022

Period Rainfall: 1.33 inches Period Avg Flow: 2.760 mgd Period Peak Flow: 6.092 mgd Period Min Flow: 0.852 mgd

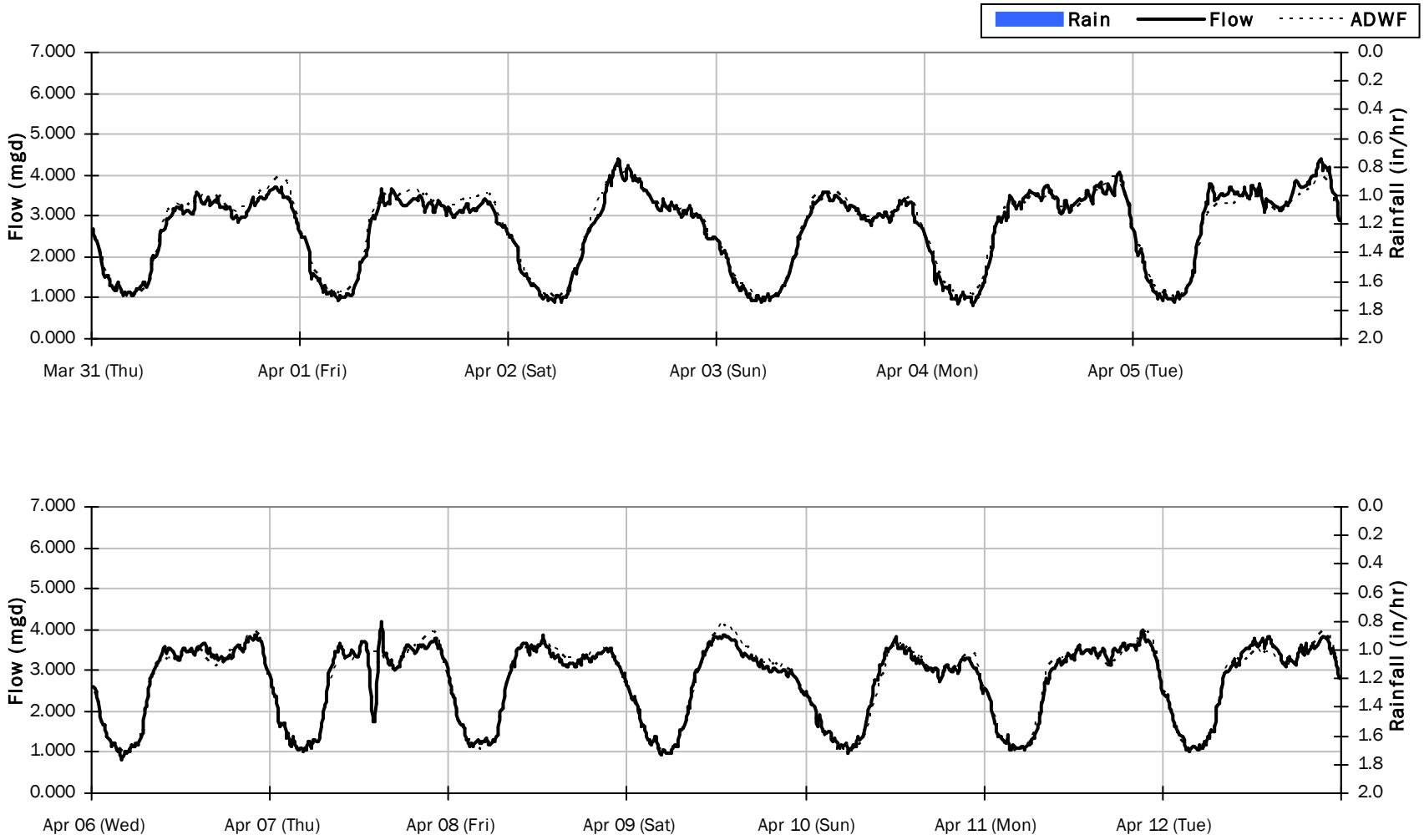




SITE 9

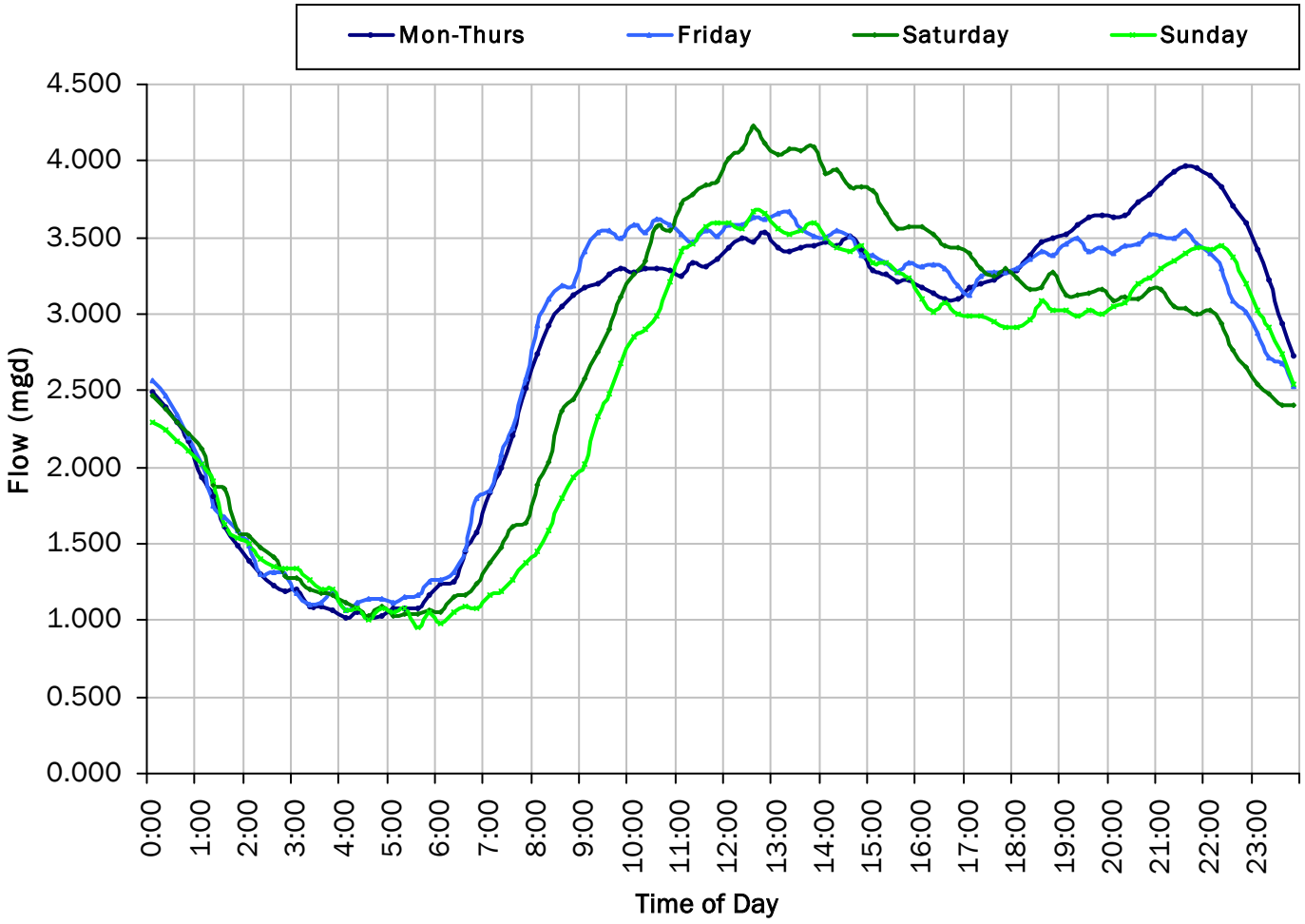
Flow Summary: 3/31/2022 to 4/12/2022

Period Rainfall: 0.00 inches Period Avg Flow: 2.703 mgd Period Peak Flow: 4.391 mgd Period Min Flow: 0.822 mgd



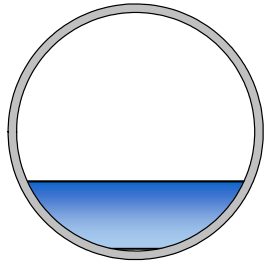
SITE 9

Average Dry Weather Flow Hydrographs



ADWF:

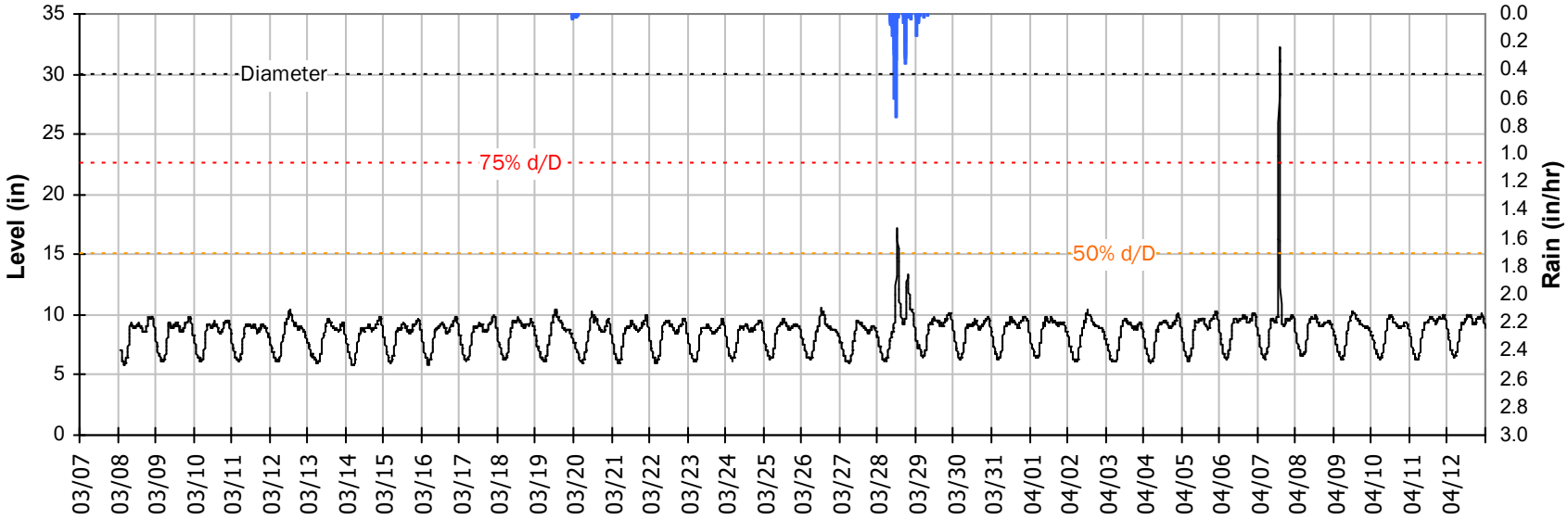
2.717 *mgd*

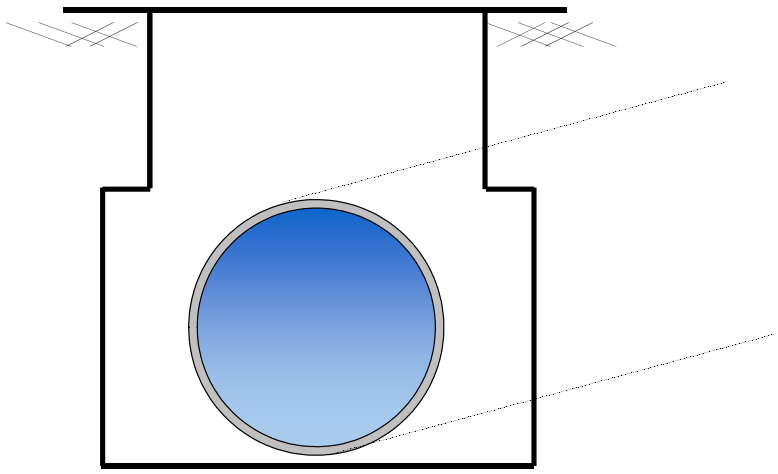


SITE 9

Site Capacity and Surcharge Summary

Realtime Flow Levels with Rainfall Data over Monitoring Period



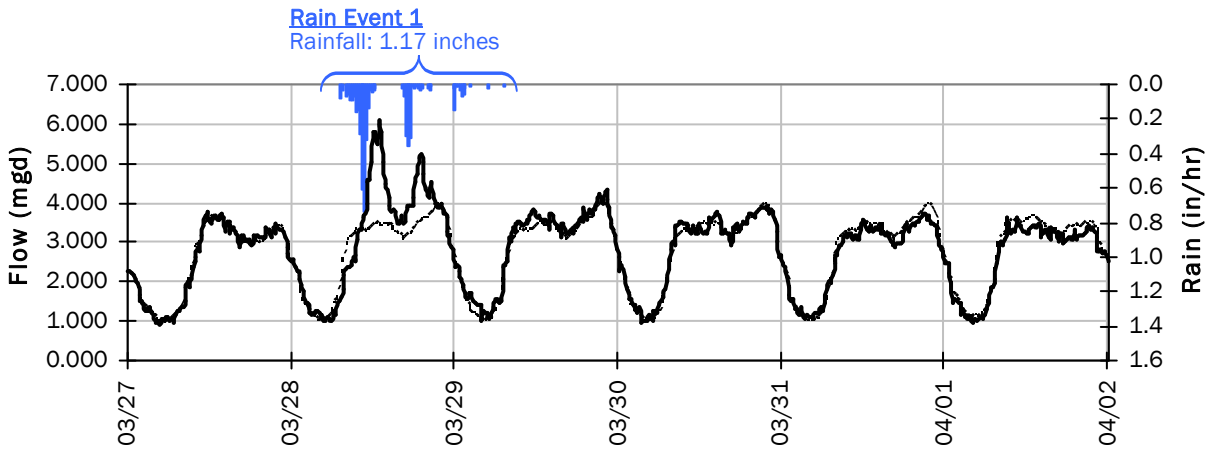


Pipe Diameter:	30	*inches*
Peak Measured Level:	32.0	*inches*
Peak d/D Ratio:	1.07	

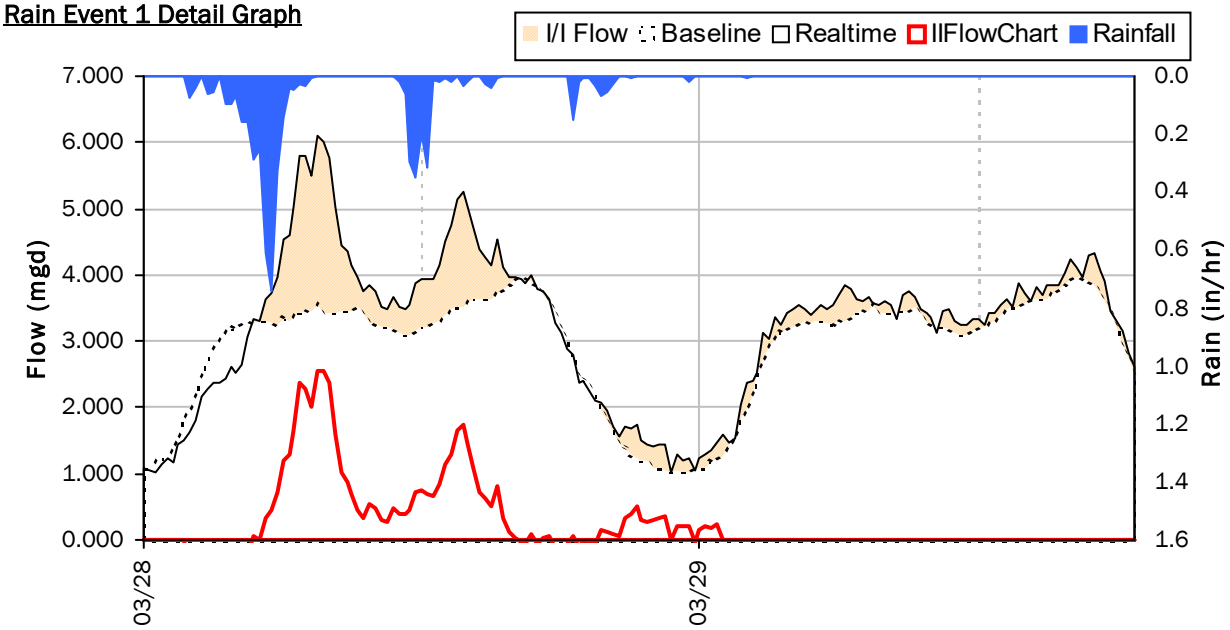
Surcharged 2.0 inches over crown

SITE 9
I/I Summary: Rain Event 1

Baseline and Realtime Flows with Rainfall Data over Monitoring Period



Rain Event 1 Detail Graph



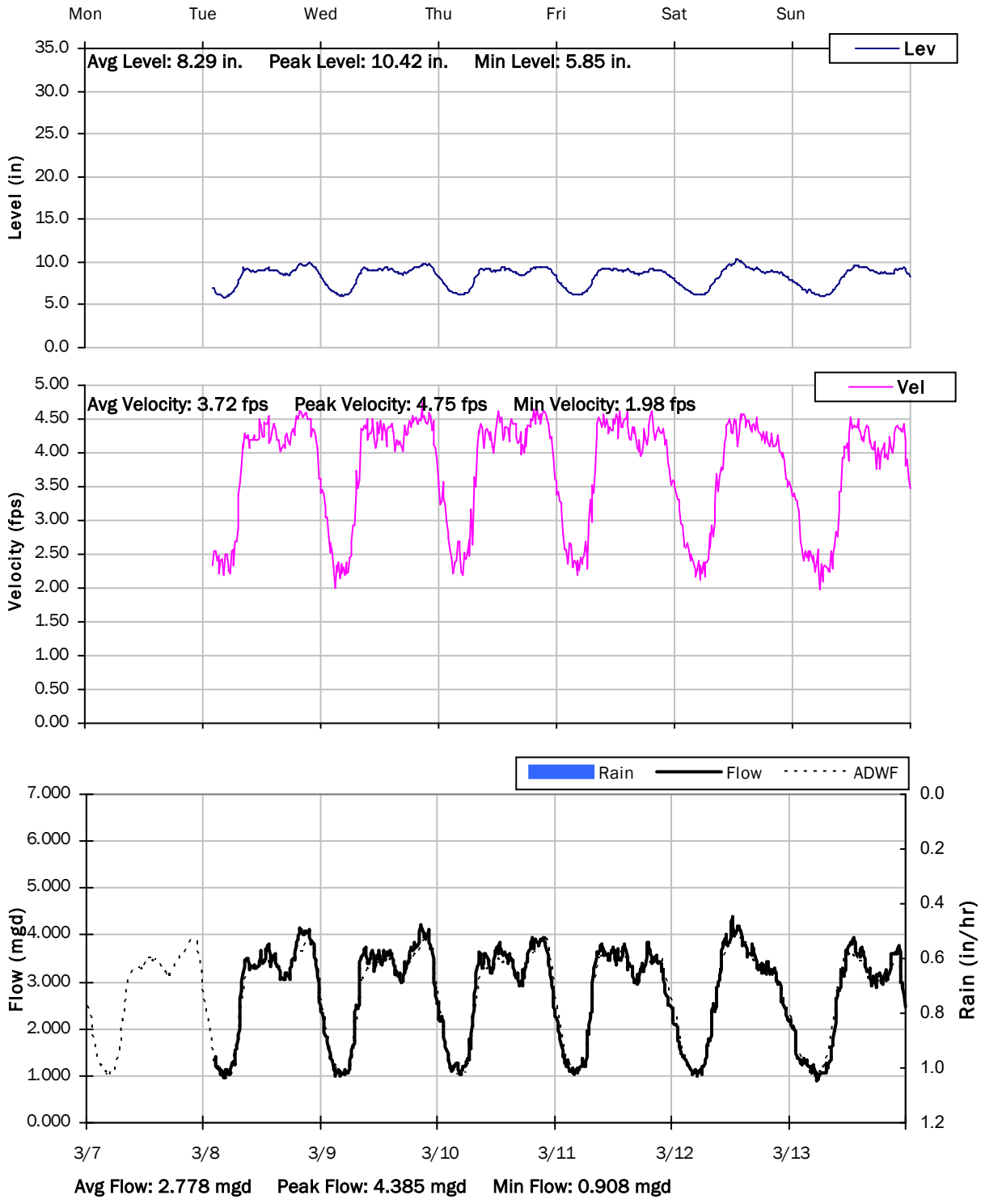
Storm Event I/I Analysis (Rain = 1.17 inches)

Capacity		Inflow / Infiltration	
Peak Flow:	6.092 *mgd*	**Peak I/I Rate:**	2.568 *mgd*
PF:	2.24	**Total I/I:**	437,000 *gallons*
Peak Level:	17.12 *in*		
d/D Ratio:	0.57		

SITE 9

Weekly Level, Velocity and Flow Hydrographs

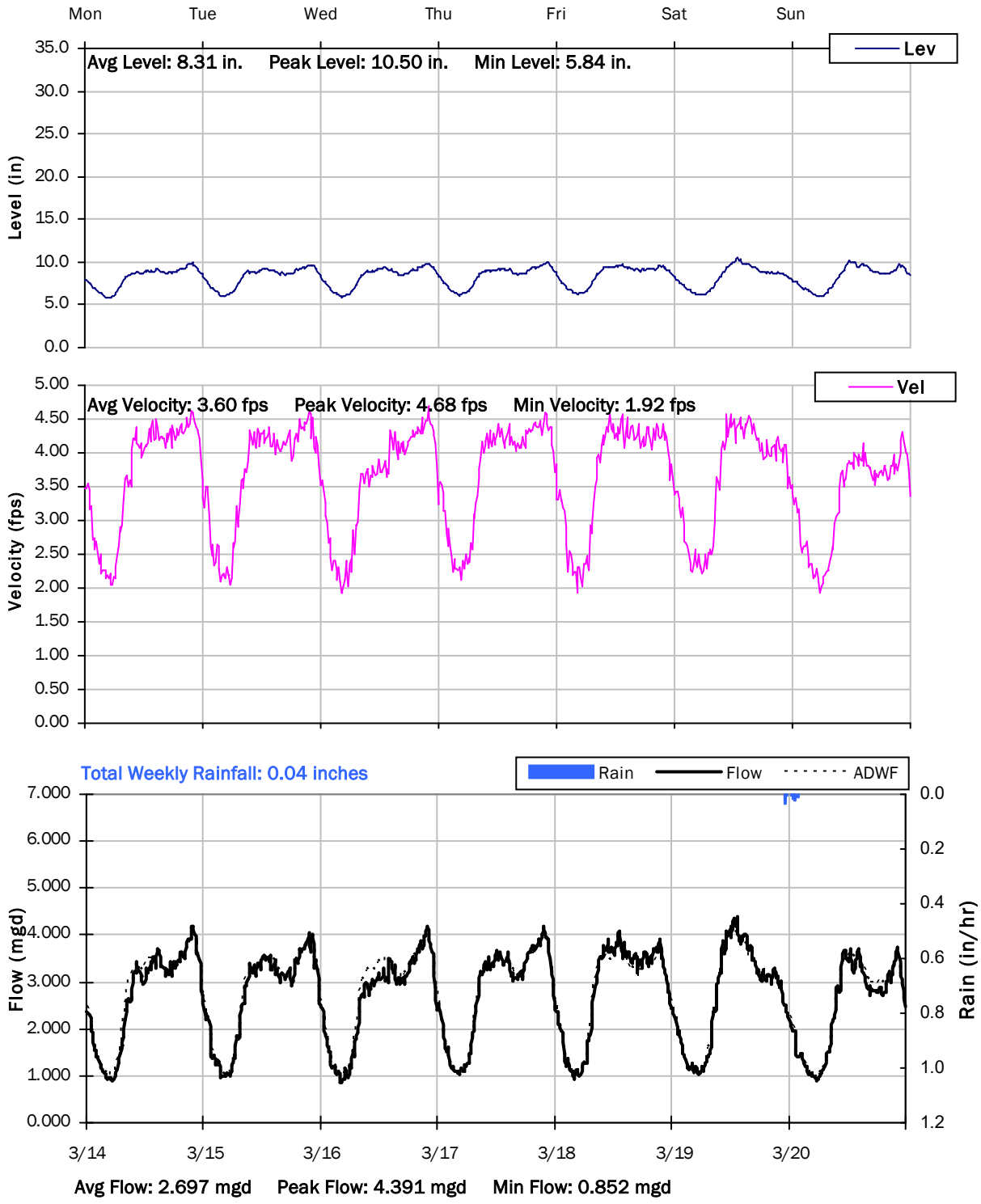
3/7/2022 to 3/14/2022



SITE 9

Weekly Level, Velocity and Flow Hydrographs

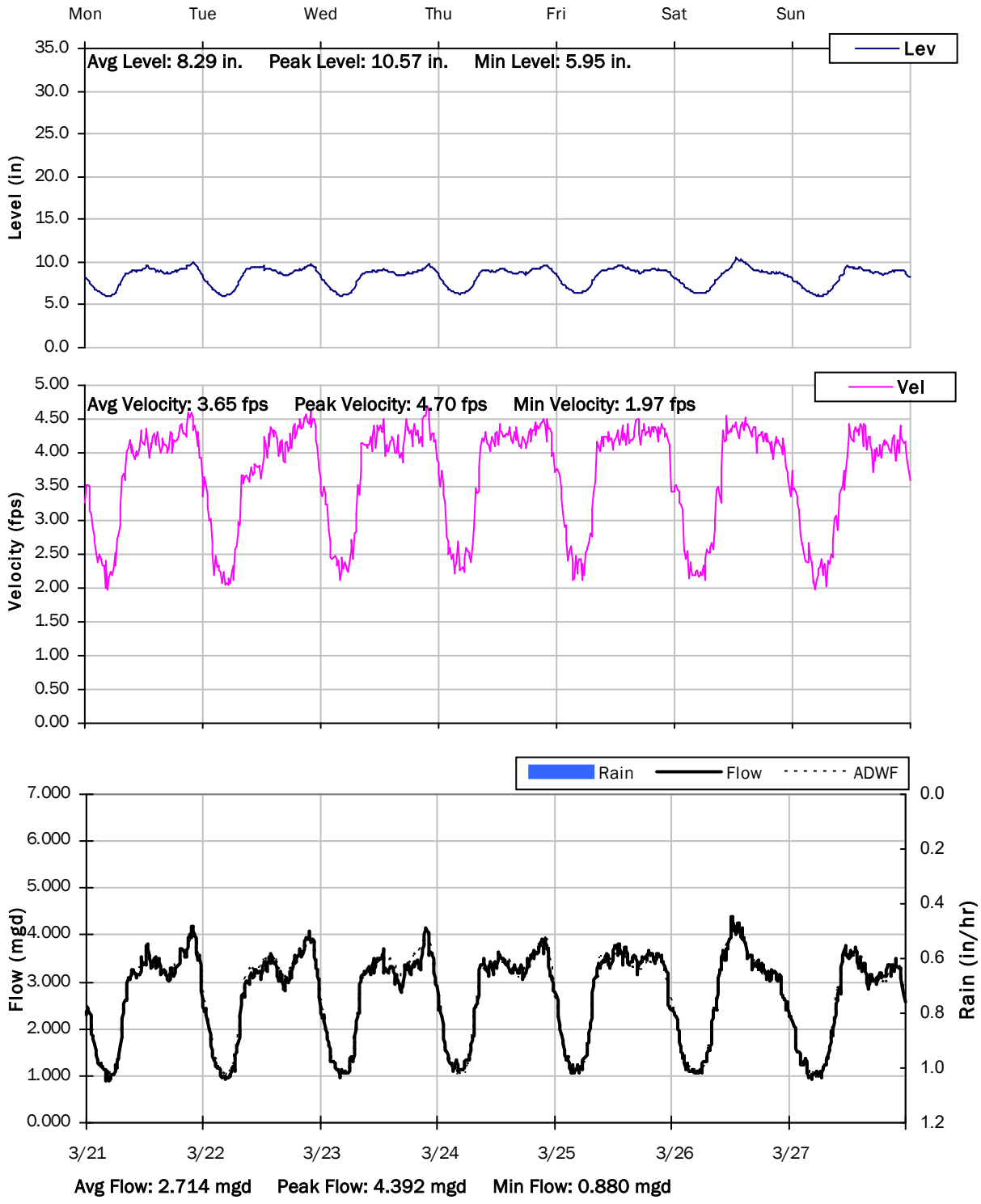
3/14/2022 to 3/21/2022



SITE 9

Weekly Level, Velocity and Flow Hydrographs

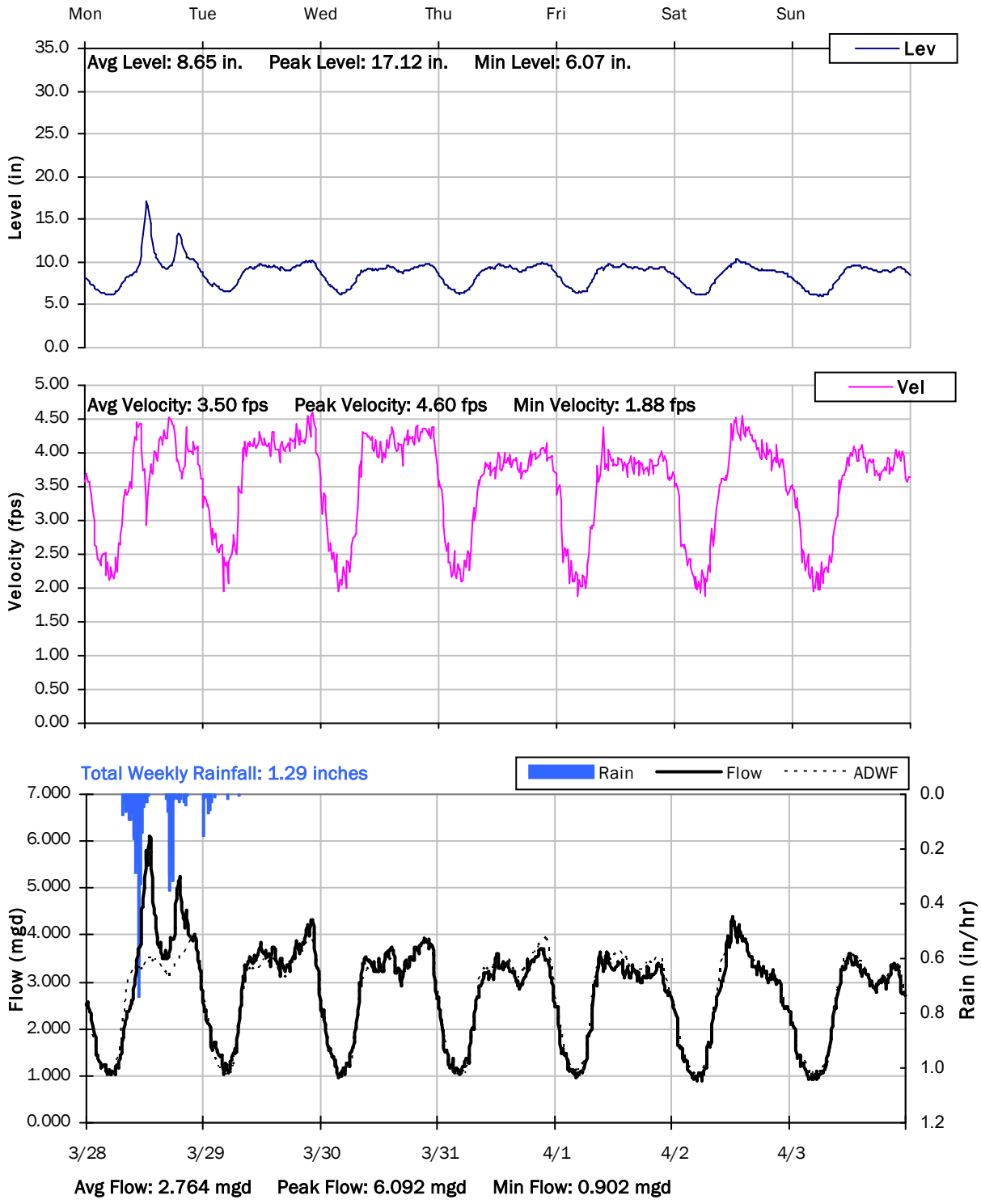
3/21/2022 to 3/28/2022



SITE 9

Weekly Level, Velocity and Flow Hydrographs

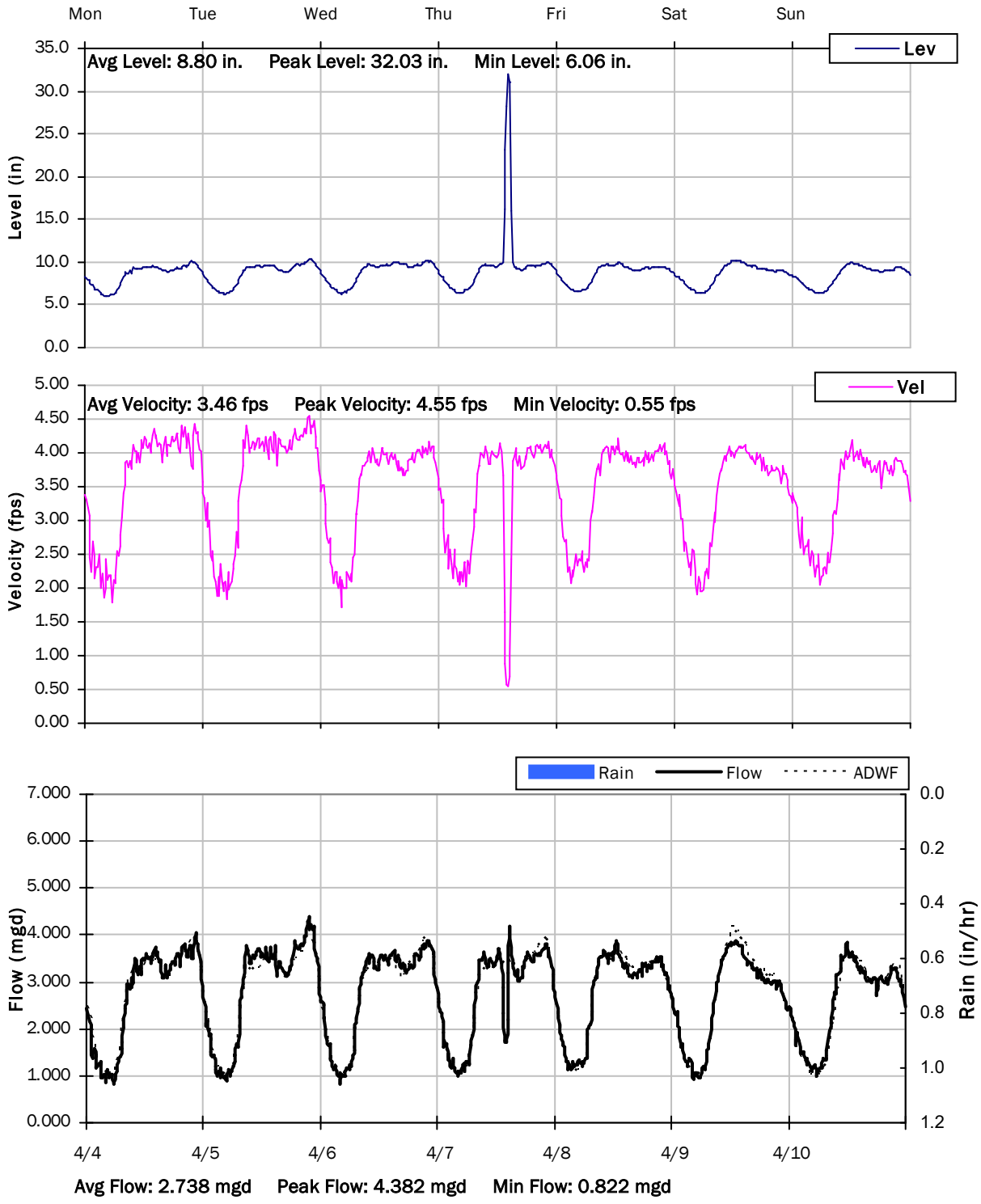
3/28/2022 to 4/4/2022



SITE 9

Weekly Level, Velocity and Flow Hydrographs

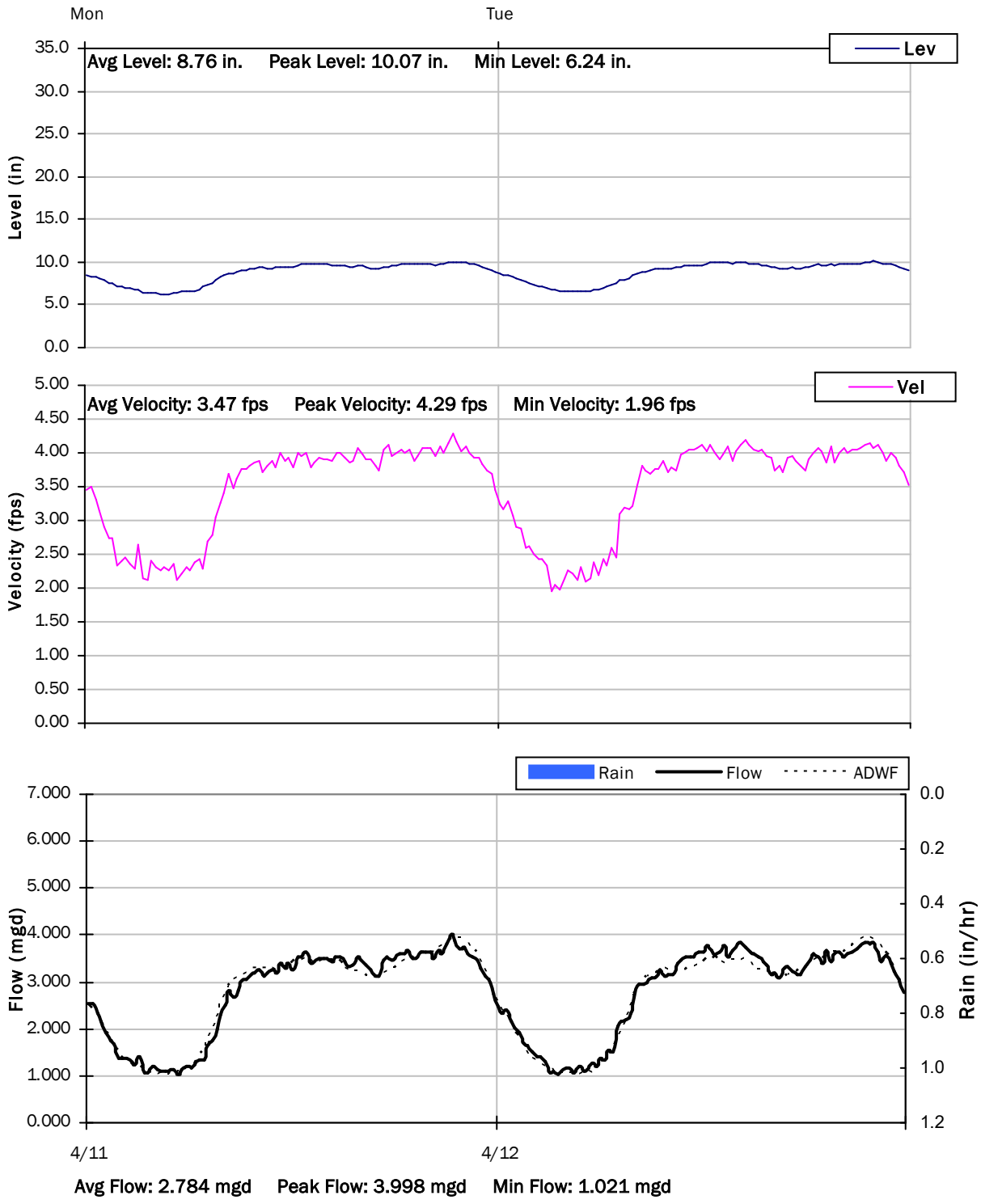
4/4/2022 to 4/11/2022



SITE 9

Weekly Level, Velocity and Flow Hydrographs

4/11/2022 to 4/13/2022



Monitoring Site: Site 10

Carollo Gardena, California

Sanitary Sewer Flow Monitoring

March 07, 2022 - April 12, 2022

Location: S Western Avenue north of W Redondo Beach Boulevard

Data Summary Report

Vicinity Map: Site 10

SITE 10

Site Information MH ID: 05 1393

Location: S Western Avenue north of W Redondo Beach Boulevard

Coordinates: 118.3091° W, 33.8894° N

Rim Elevation (Earth): 49 feet

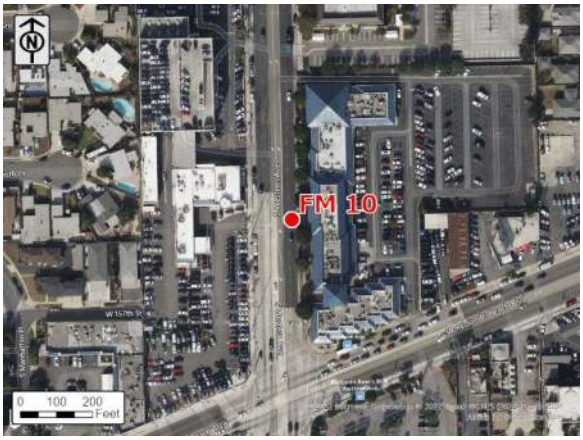
Expected Pipe Diameter: 10 inches

Measured Pipe Diameter: 12 inches

ADWF: 0.093 mgd

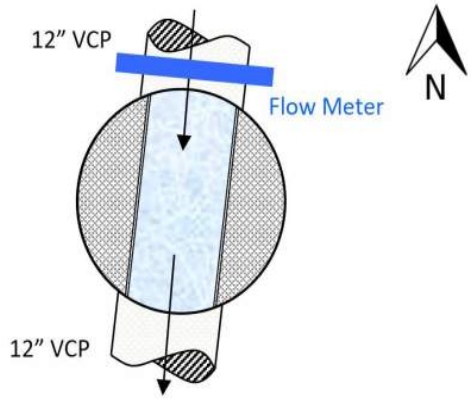
Peak Measured Flow: 0.417 mgd

Sediment: None



Satellite Map

Sanitary Map



Flow Sketch

Street View

Plan View

SITE 10

Additional Site Photos

Effluent Pipe

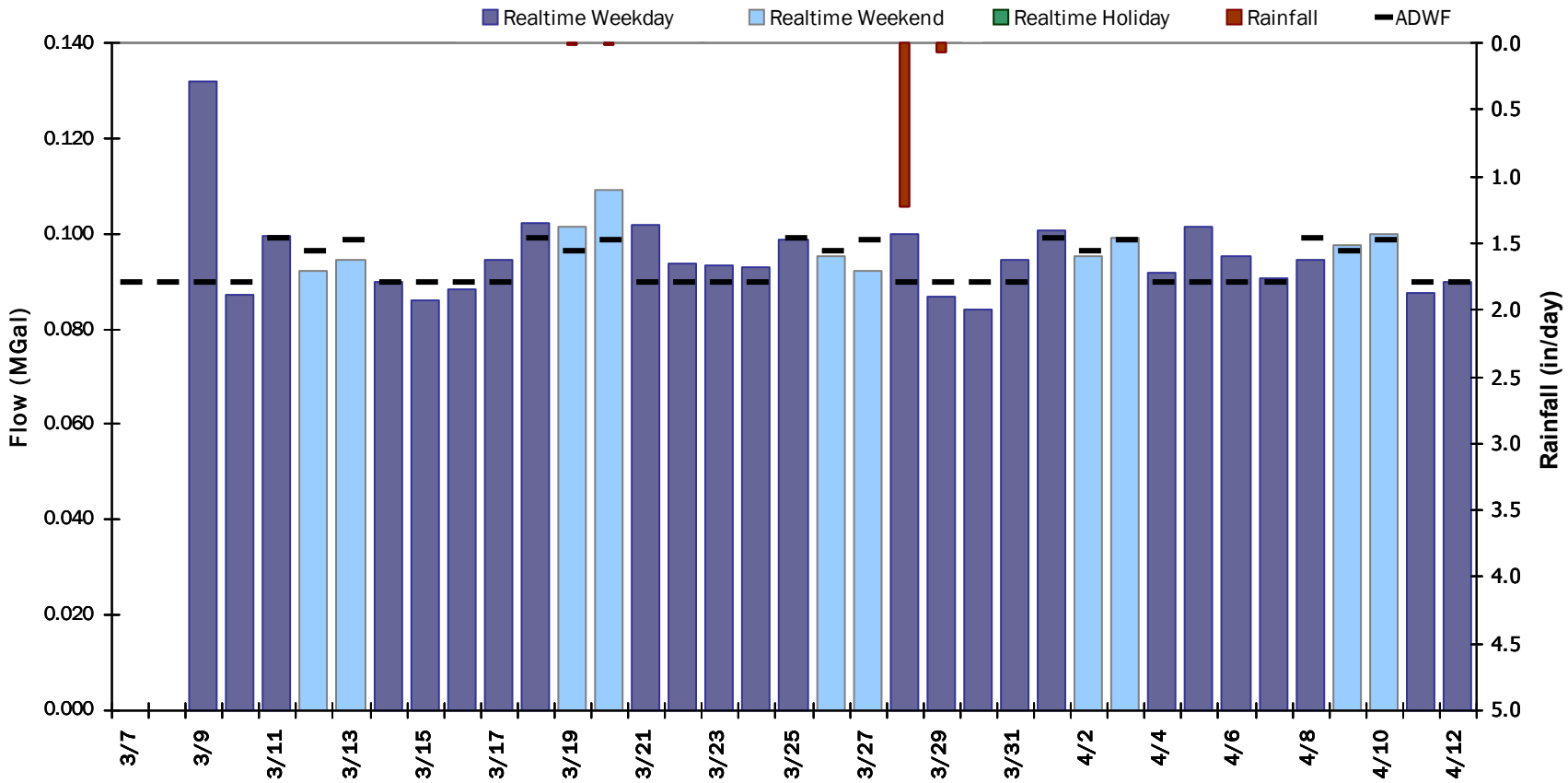
Monitored Influent Pipe

SITE 10

Period Flow Summary: Daily Flow Totals

Avg Daily Flow: 0.098 MGal Peak Daily Flow: 0.182 MGal Min Daily Flow: 0.084 MGal

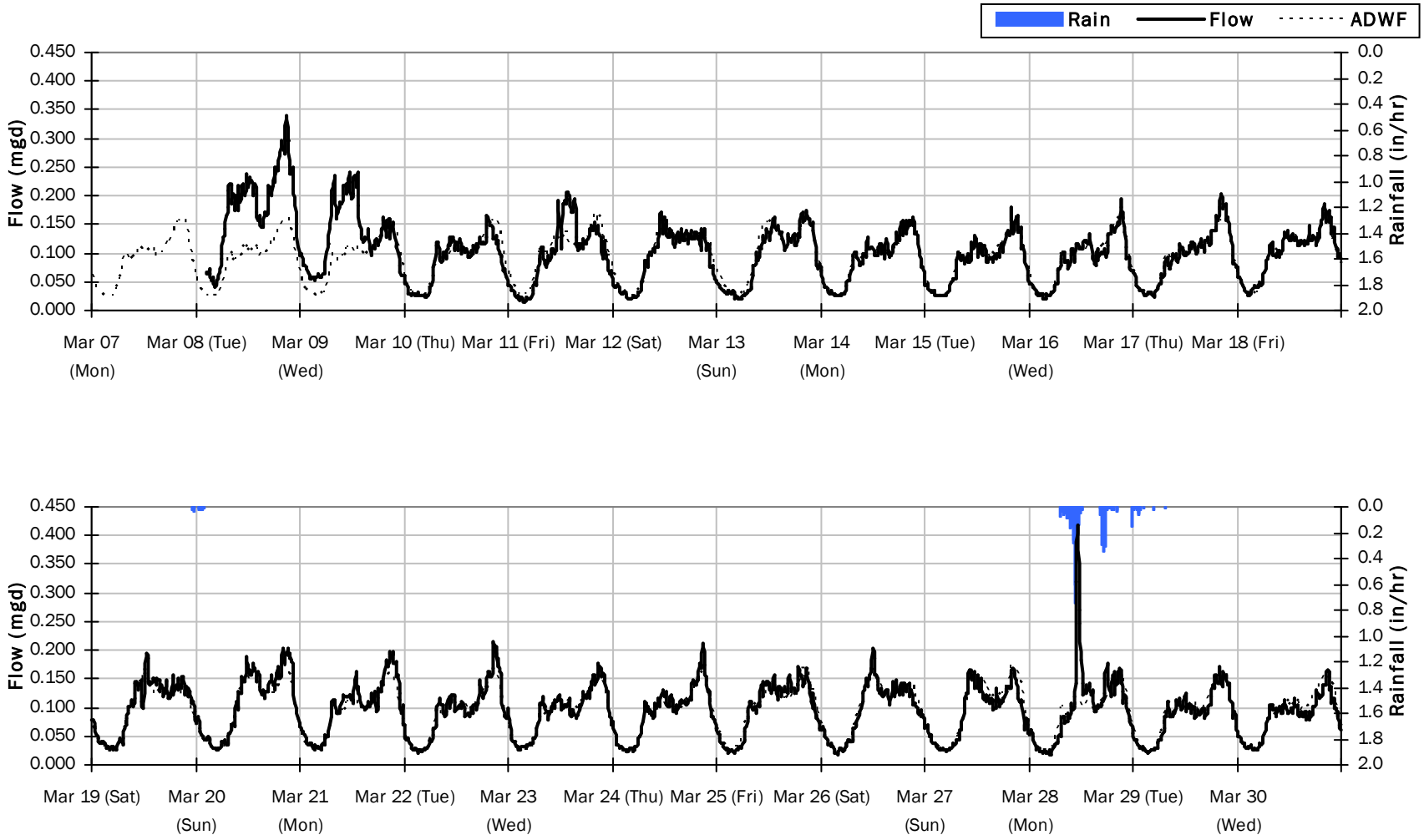
Total Rainfall: 1.33 inches



SITE 10

Flow Summary: 3/7/2022 to 3/30/2022

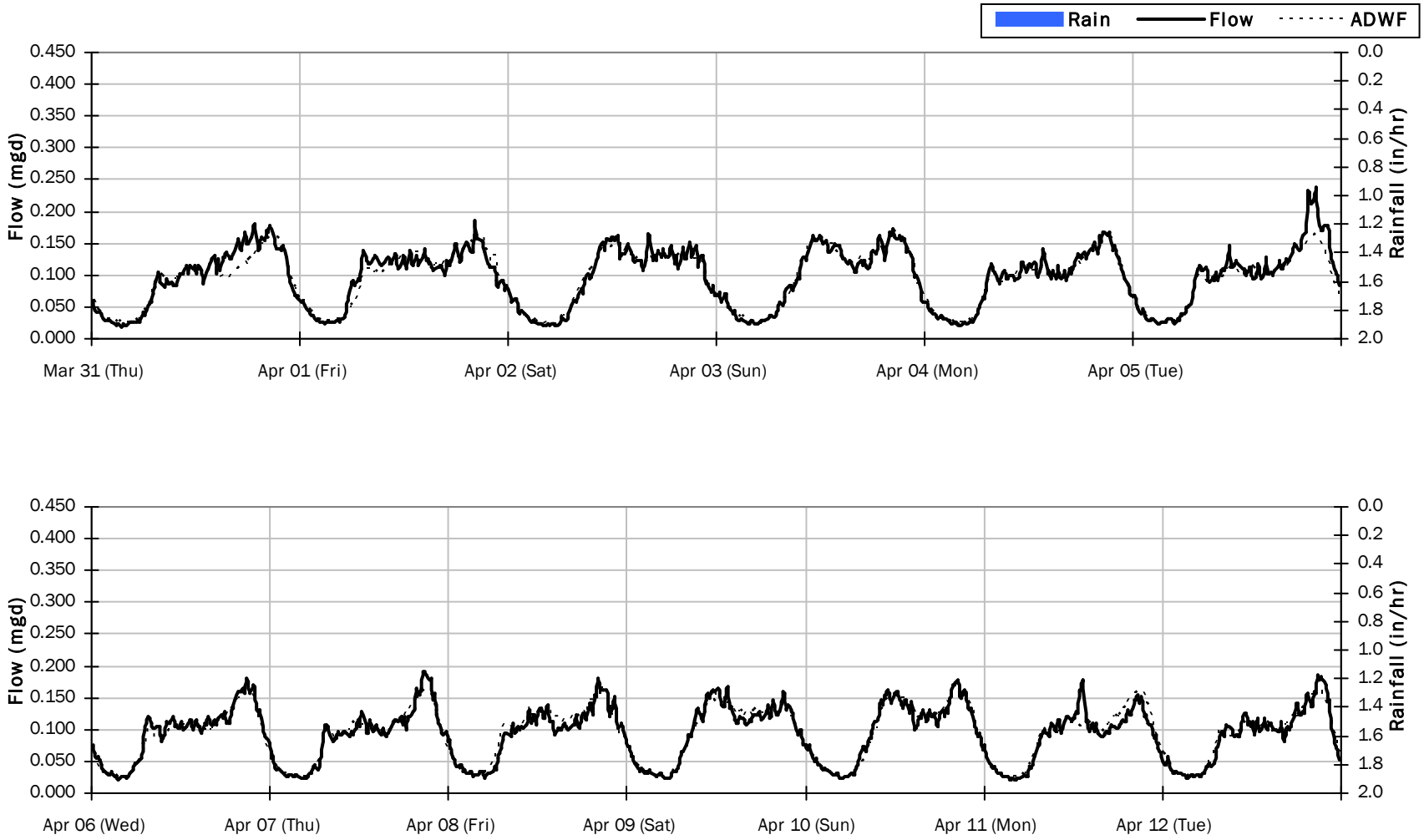
Period Rainfall: 1.33 inches Period Avg Flow: 0.100 mgd Period Peak Flow: 0.417 mgd Period Min Flow: 0.016 mgd



SITE 10

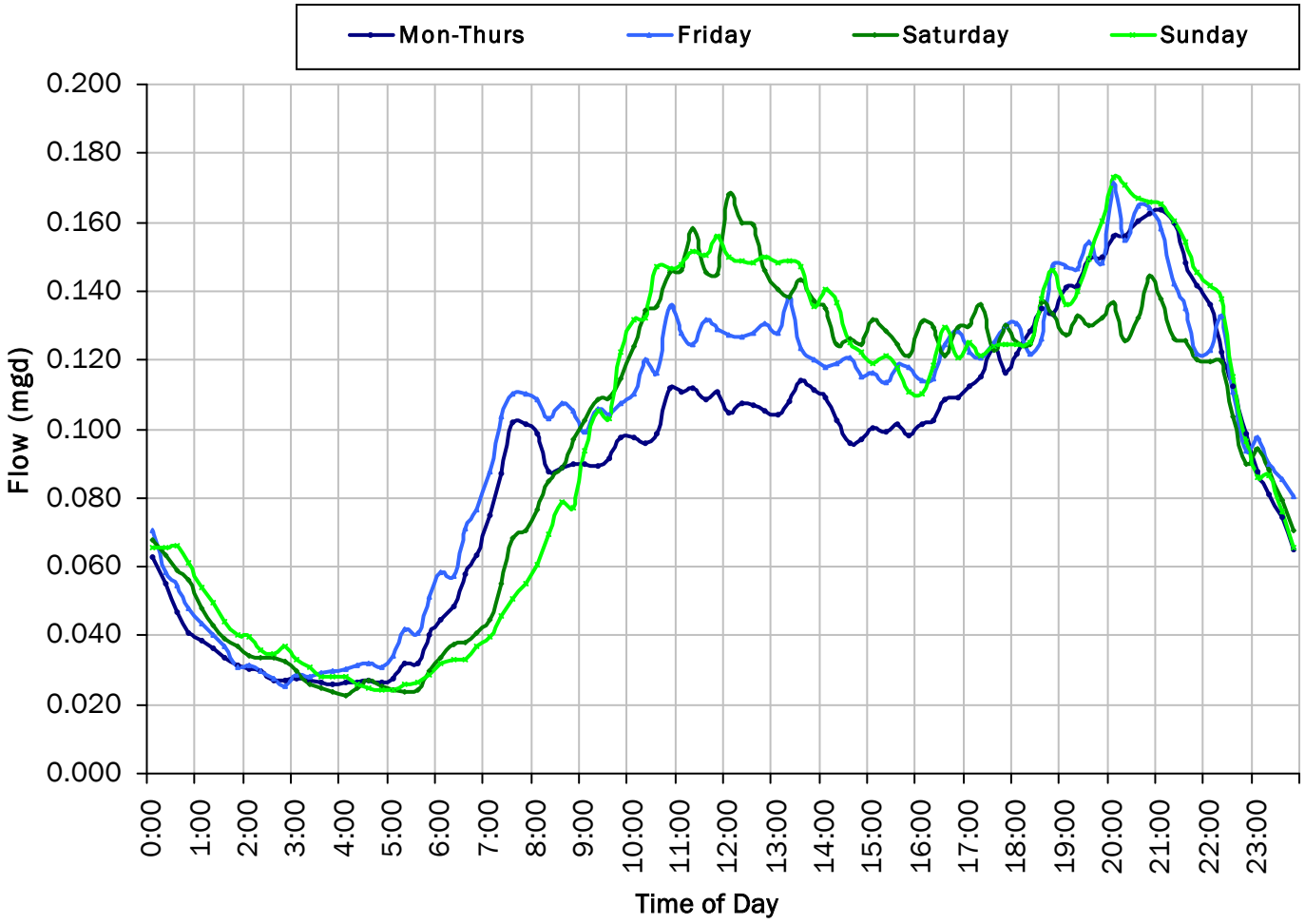
Flow Summary: 3/31/2022 to 4/12/2022

Period Rainfall: 0.00 inches Period Avg Flow: 0.095 mgd Period Peak Flow: 0.237 mgd Period Min Flow: 0.019 mgd



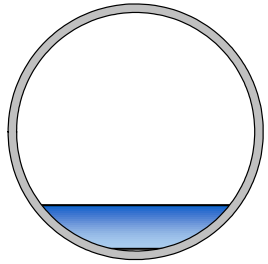
SITE 10

Average Dry Weather Flow Hydrographs



ADWF:

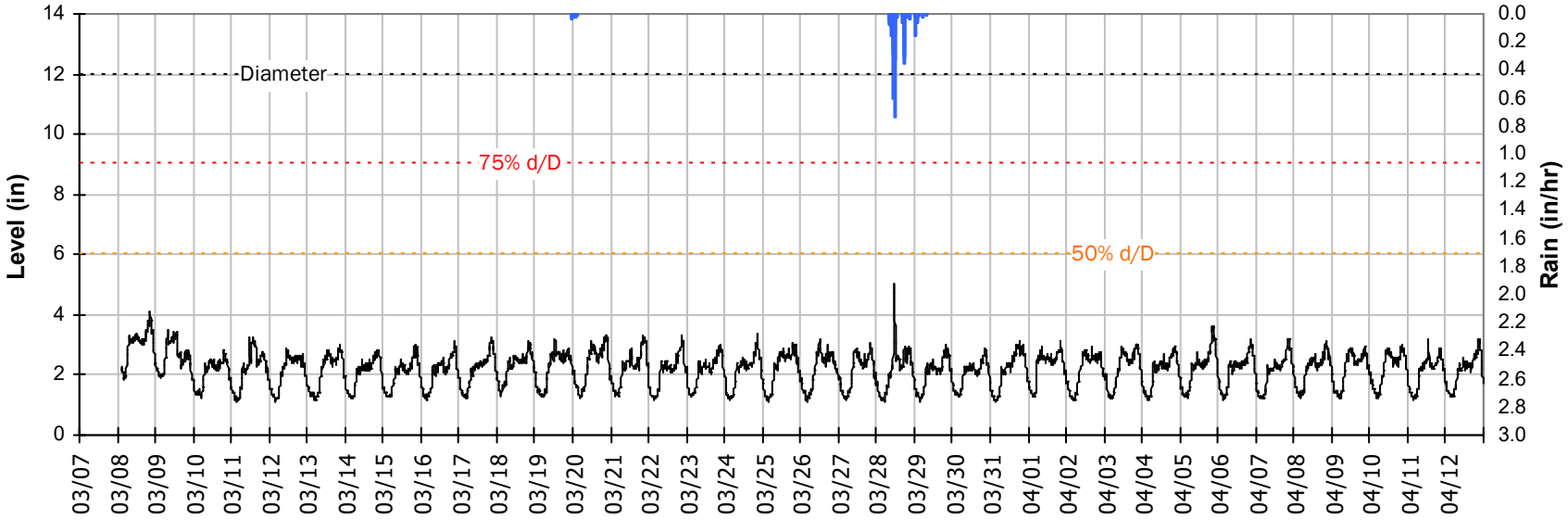
0.093 *mgd*

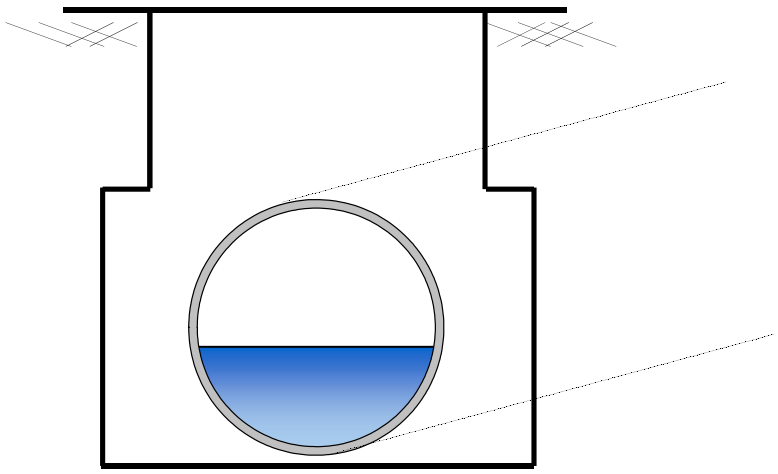


SITE 10

Site Capacity and Surcharge Summary

Realtime Flow Levels with Rainfall Data over Monitoring Period

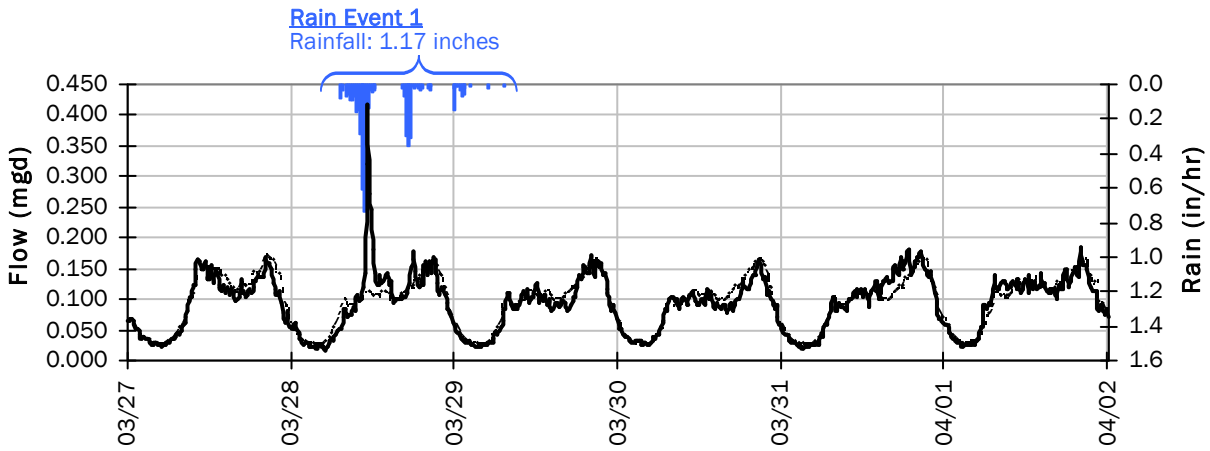




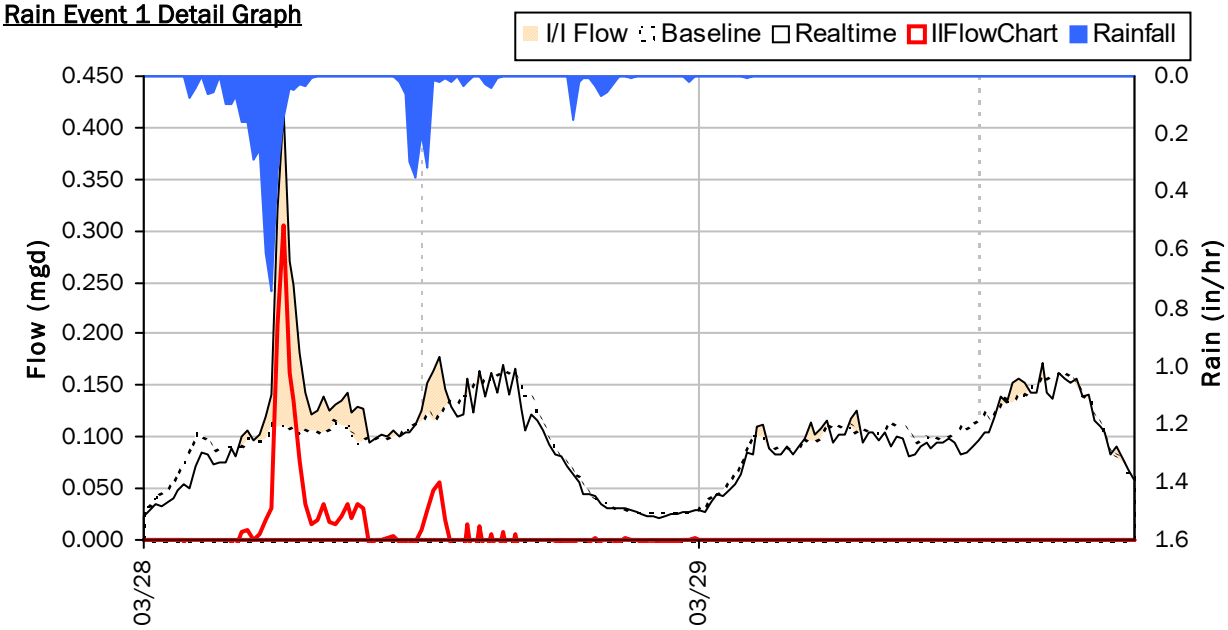
Pipe Diameter:	12	*inches*
Peak Measured Level:	5.06	*inches*
Peak d/D Ratio:	0.42	

SITE 10
I/I Summary: Rain Event 1

Baseline and Realtime Flows with Rainfall Data over Monitoring Period



Rain Event 1 Detail Graph



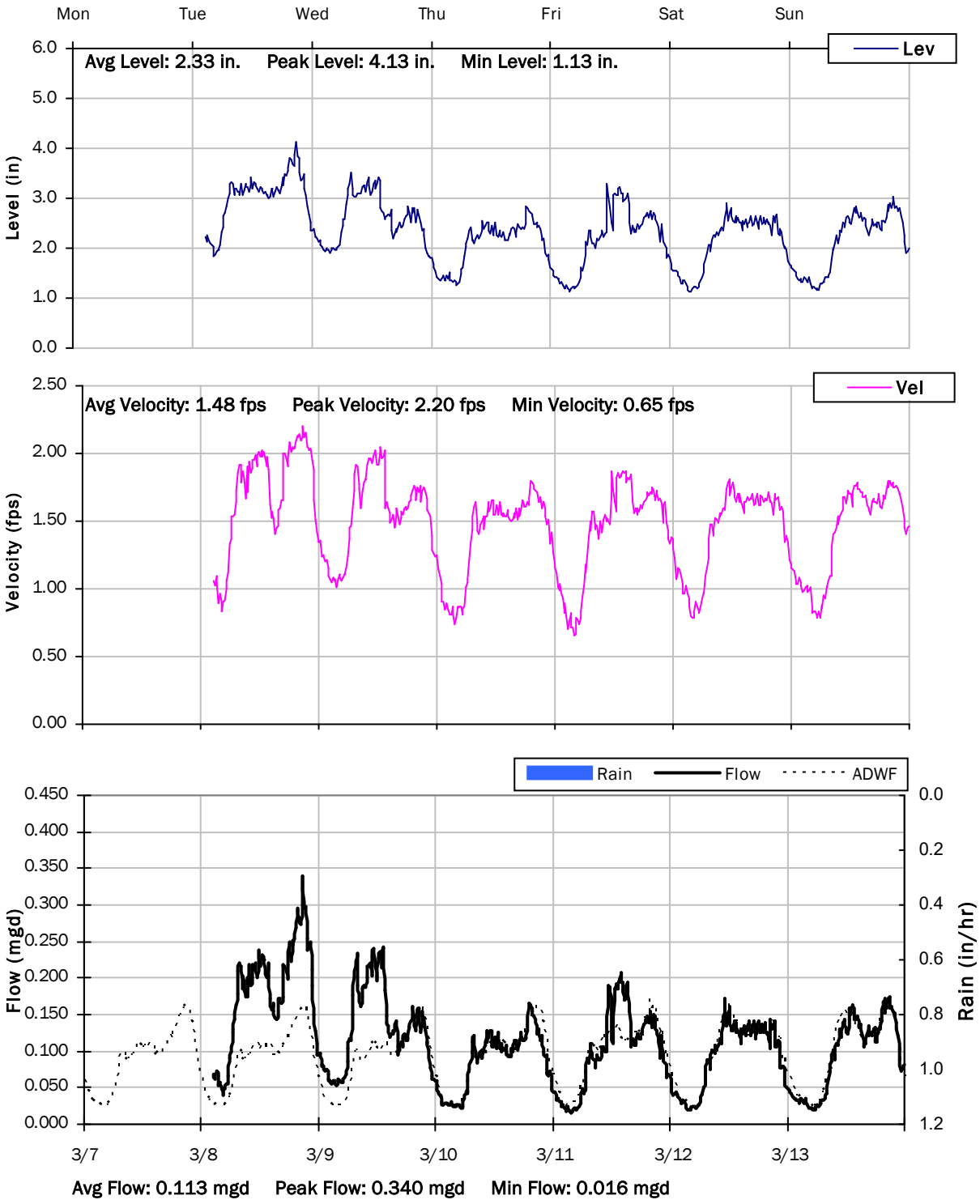
Storm Event I/I Analysis (Rain = 1.17 inches)

Capacity		Inflow / Infiltration	
Peak Flow:	0.418 *mgd*	**Peak I/I Rate:**	0.305 *mgd*
PF:	4.48	**Total I/I:**	11,000 *gallons*
Peak Level:	5.06 *in*		
d/D Ratio:	0.42		

SITE 10

Weekly Level, Velocity and Flow Hydrographs

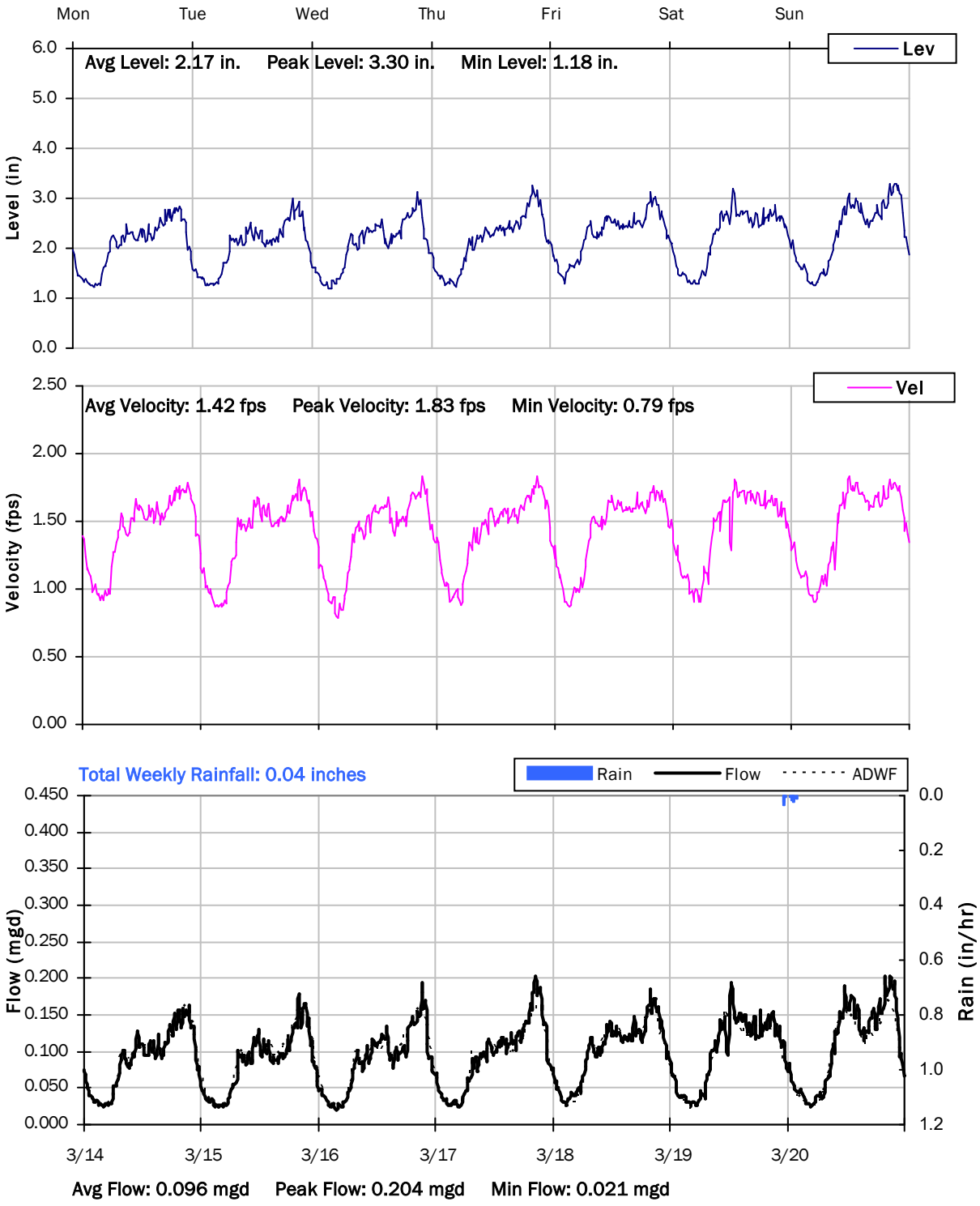
3/7/2022 to 3/14/2022



SITE 10

Weekly Level, Velocity and Flow Hydrographs

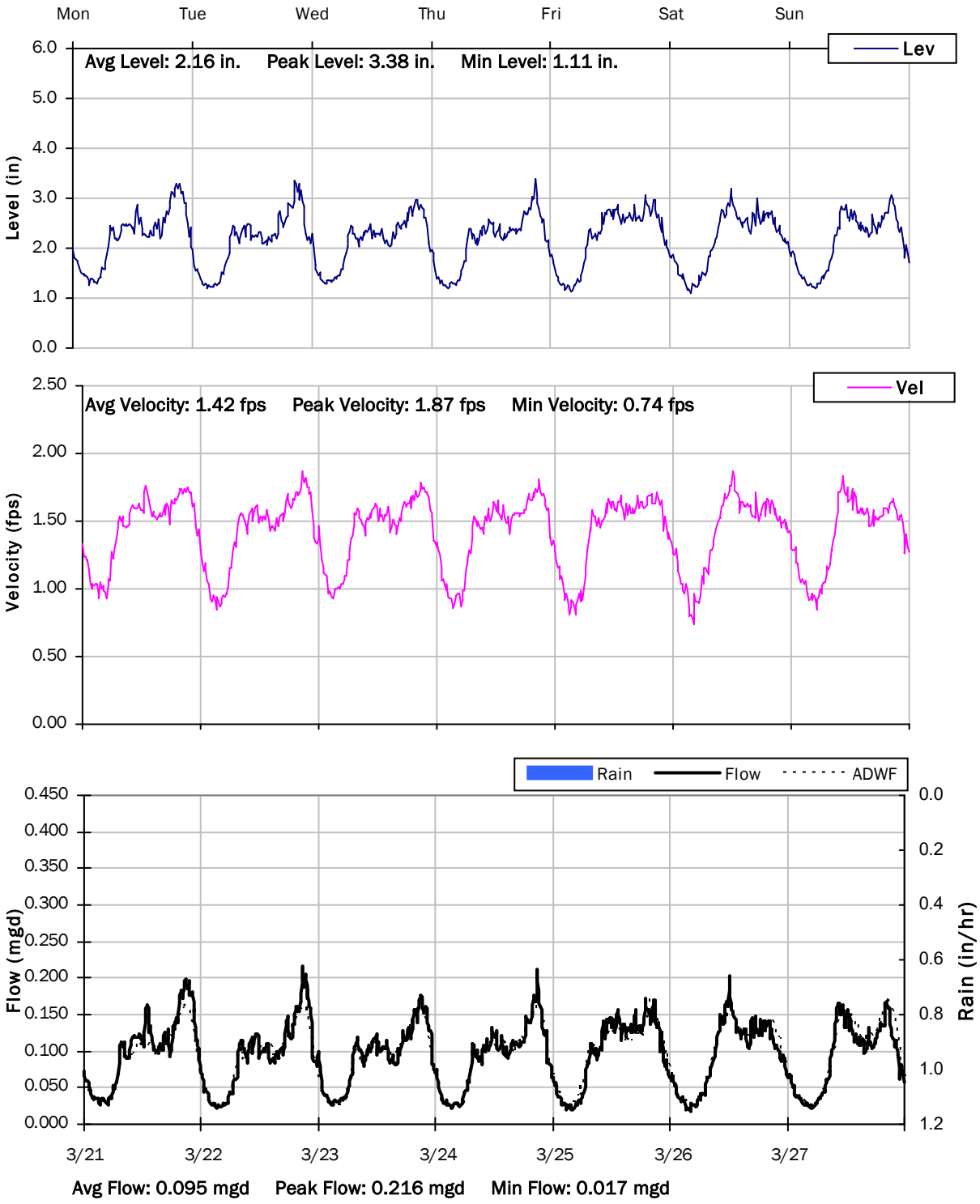
3/14/2022 to 3/21/2022



SITE 10

Weekly Level, Velocity and Flow Hydrographs

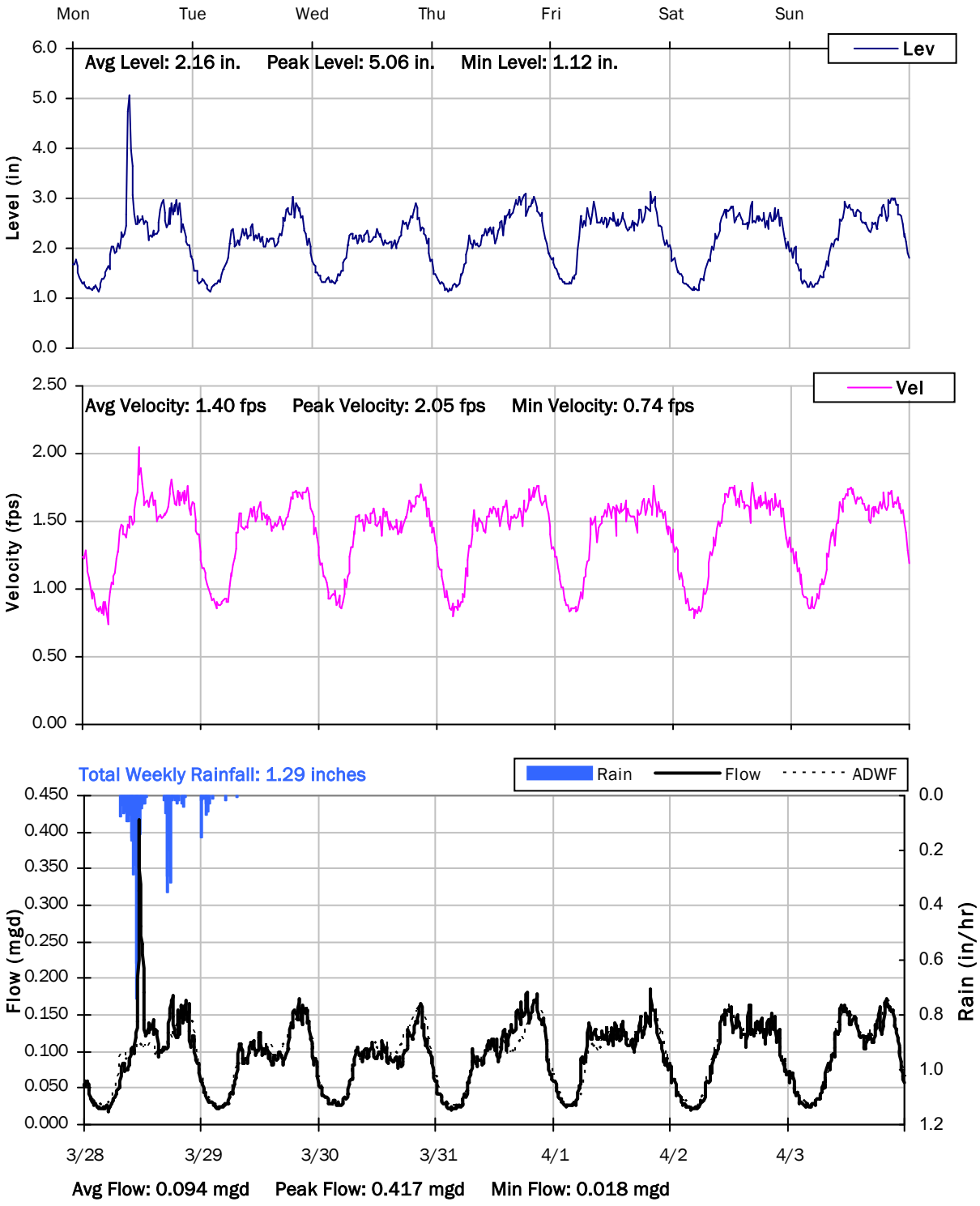
3/21/2022 to 3/28/2022



SITE 10

Weekly Level, Velocity and Flow Hydrographs

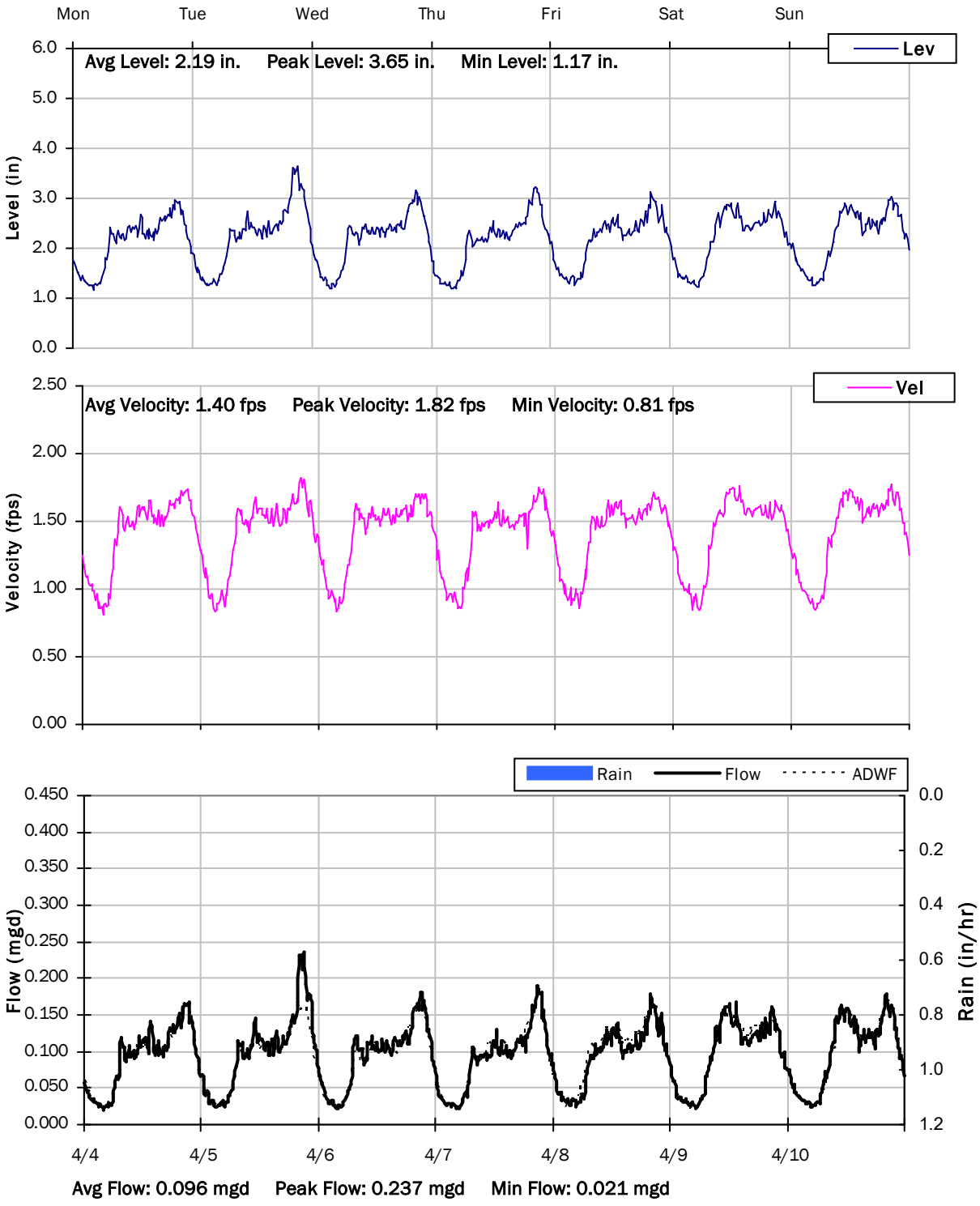
3/28/2022 to 4/4/2022



SITE 10

Weekly Level, Velocity and Flow Hydrographs

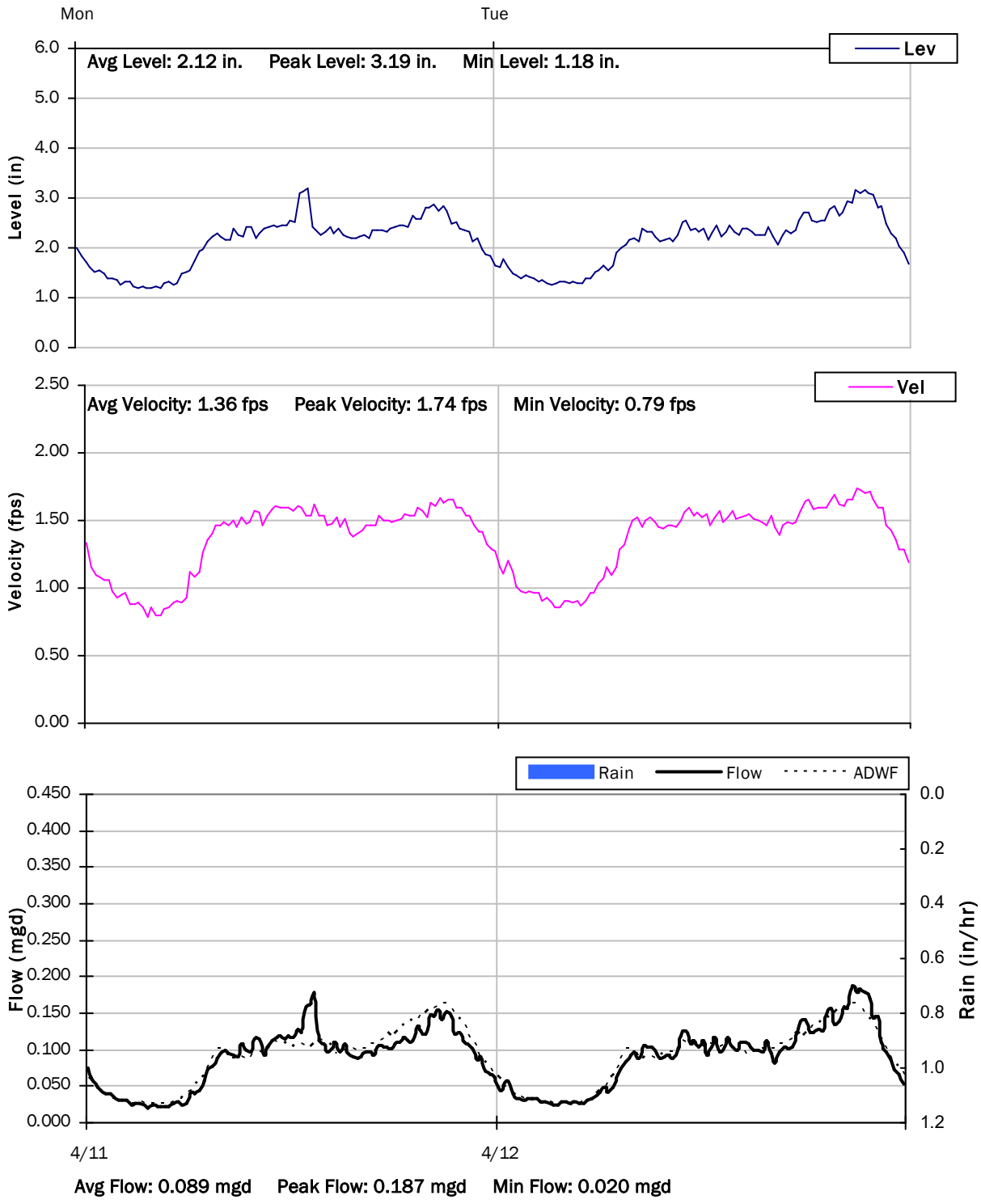
4/4/2022 to 4/11/2022



SITE 10

Weekly Level, Velocity and Flow Hydrographs

4/11/2022 to 4/13/2022



Monitoring Site: Site 11

Carollo Gardena, California

Sanitary Sewer Flow Monitoring

March 07, 2022 - April 12, 2022

Location: Crenshaw Boulevard (on sidewalk) south of W 135th Street

Data Summary Report

Vicinity Map: Site 11

SITE 11

Site Information MH ID: 05 1110

Location: Crenshaw Boulevard (on sidewalk) south of W 135th Street

Coordinates: 118.3267° W, 33.9083° N

Rim Elevation (Earth): 48 feet

Expected Pipe Diameter: 10 inches

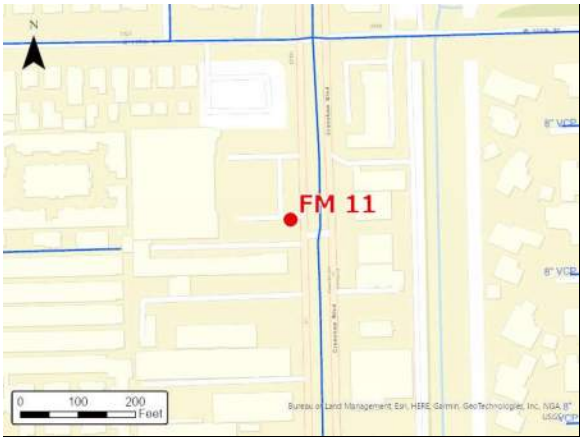
Measured Pipe Diameter: 10 inches

ADWF: 0.000 mgd

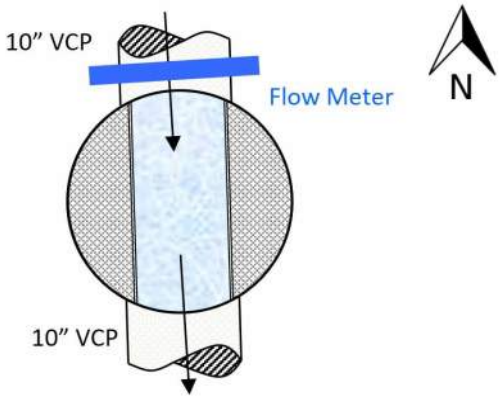
Peak Measured Flow: 0.019 mgd

Sediment: None

Satellite Map



Sanitary Map



Flow Sketch

Street View

Plan View

SITE 11

Additional Site Photos

Effluent Pipe

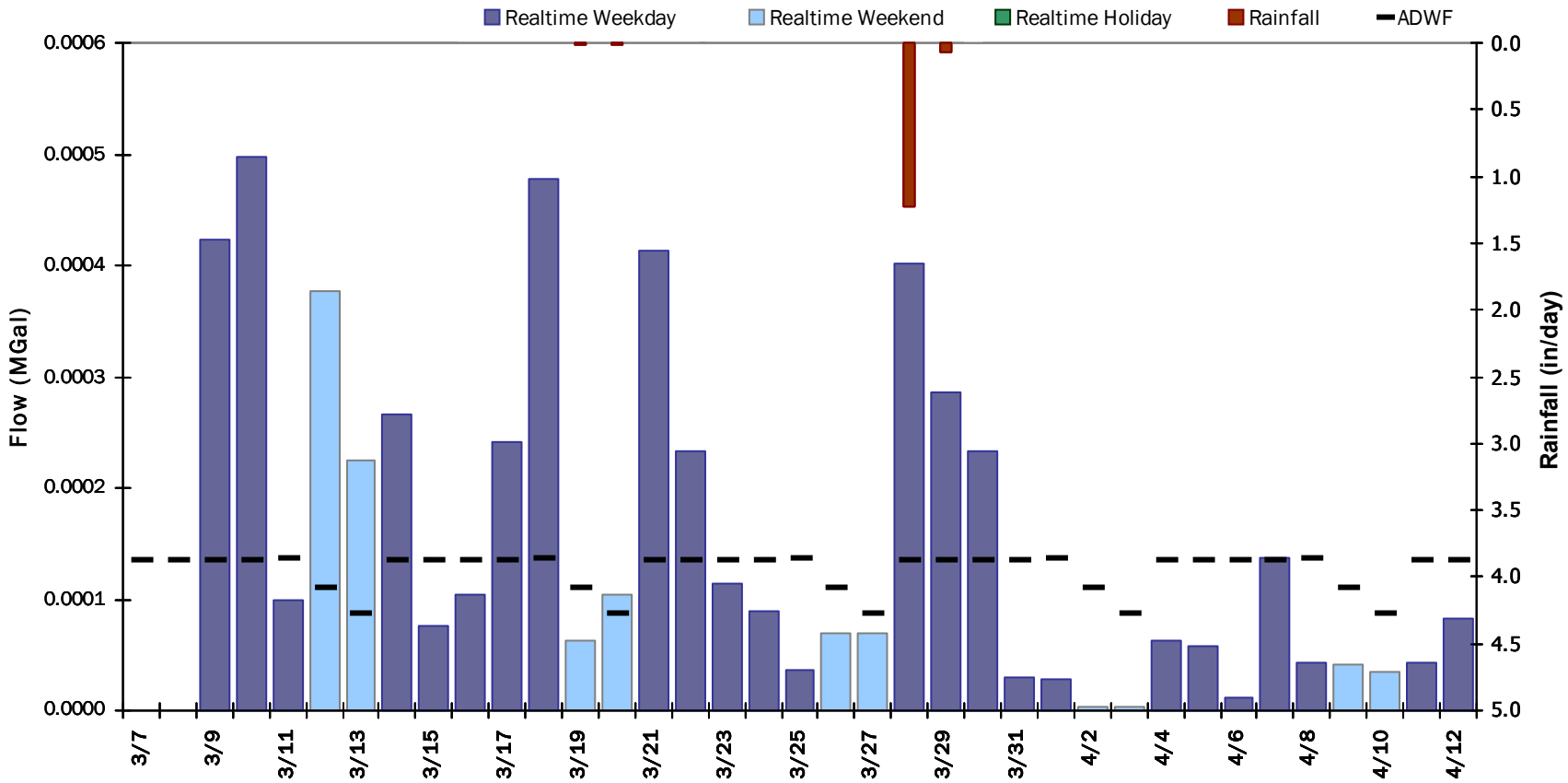
Monitored Influent Pipe

SITE 11

Period Flow Summary: Daily Flow Totals

Avg Daily Flow: 0.000 MGal **Peak Daily Flow: 0.000 MGal** **Min Daily Flow: 0.000 MGal**

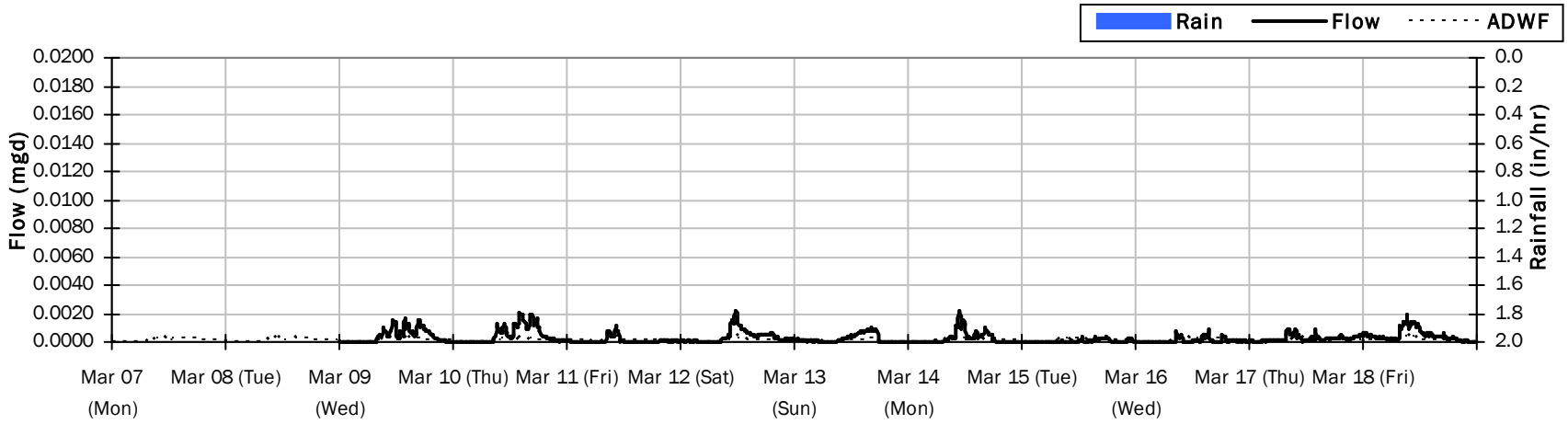
Total Rainfall: 1.33 inches

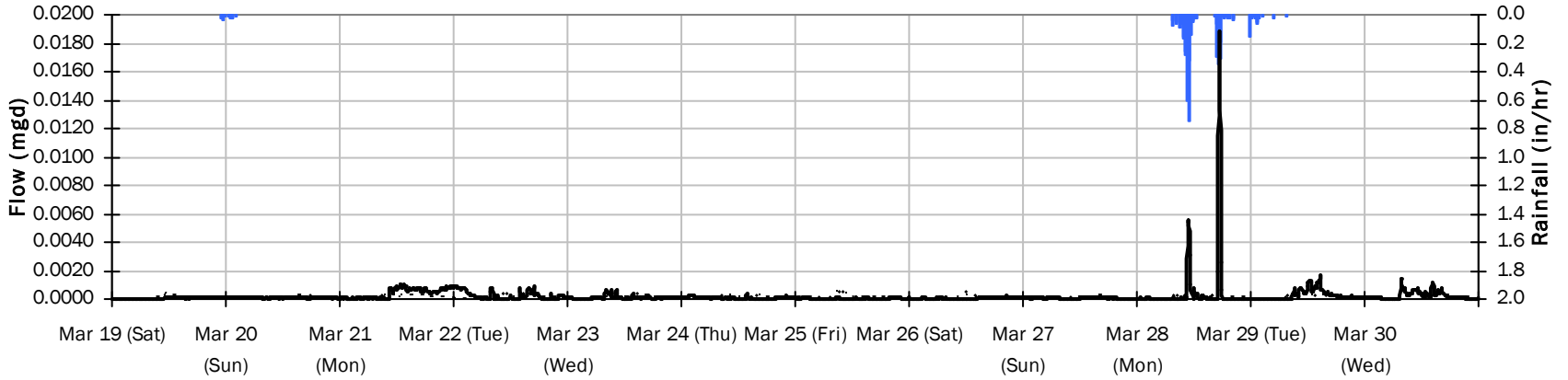


SITE 11

Flow Summary: 3/7/2022 to 3/30/2022

Period Rainfall: 1.33 inches Period Avg Flow: 0.000 mgd Period Peak Flow: 0.019 mgd Period Min Flow: 0.000 mgd

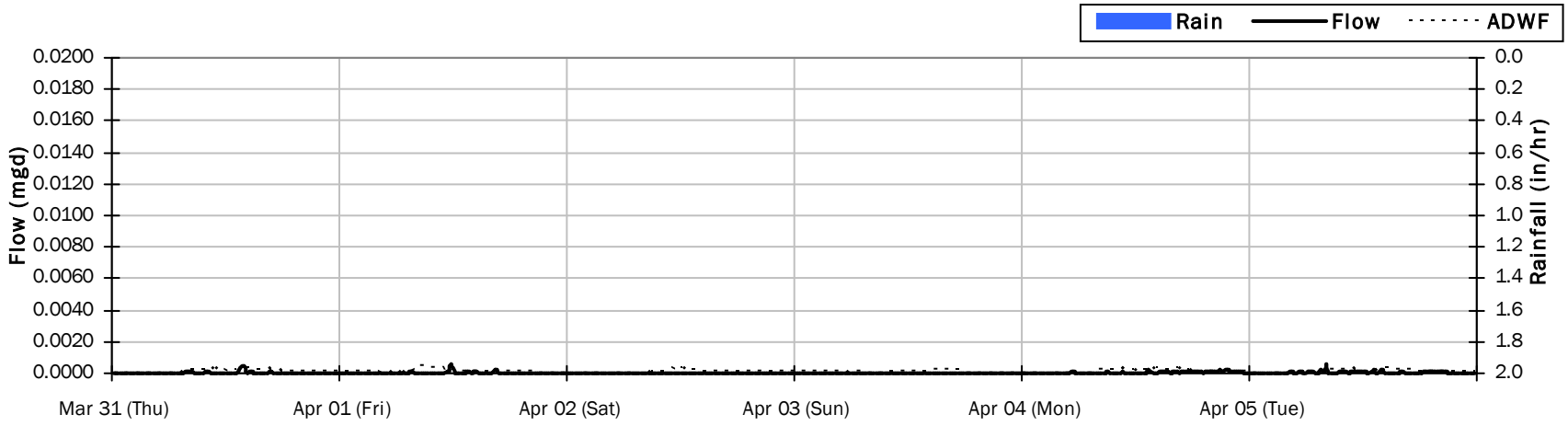


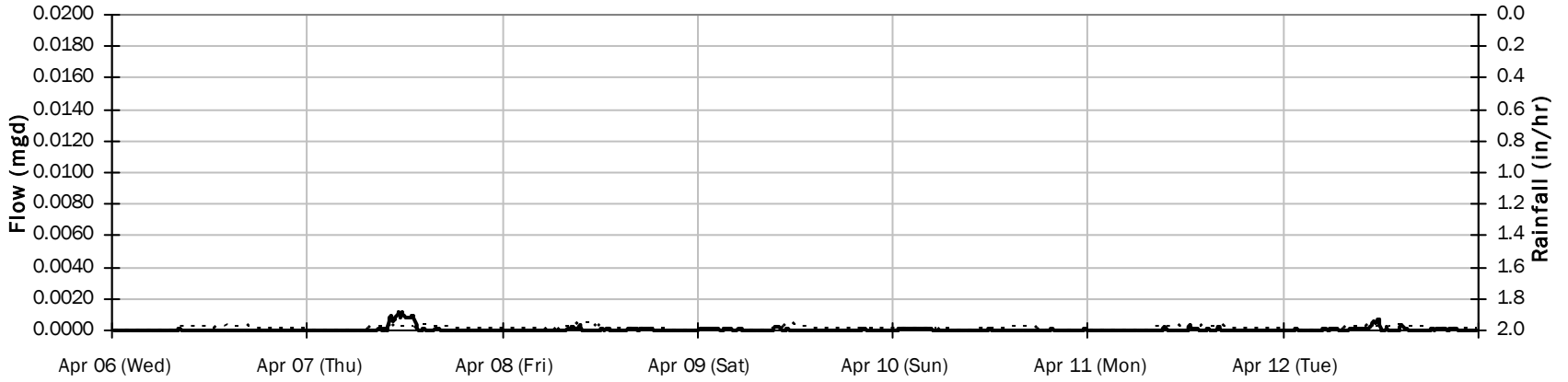


SITE 11

Flow Summary: 3/31/2022 to 4/12/2022

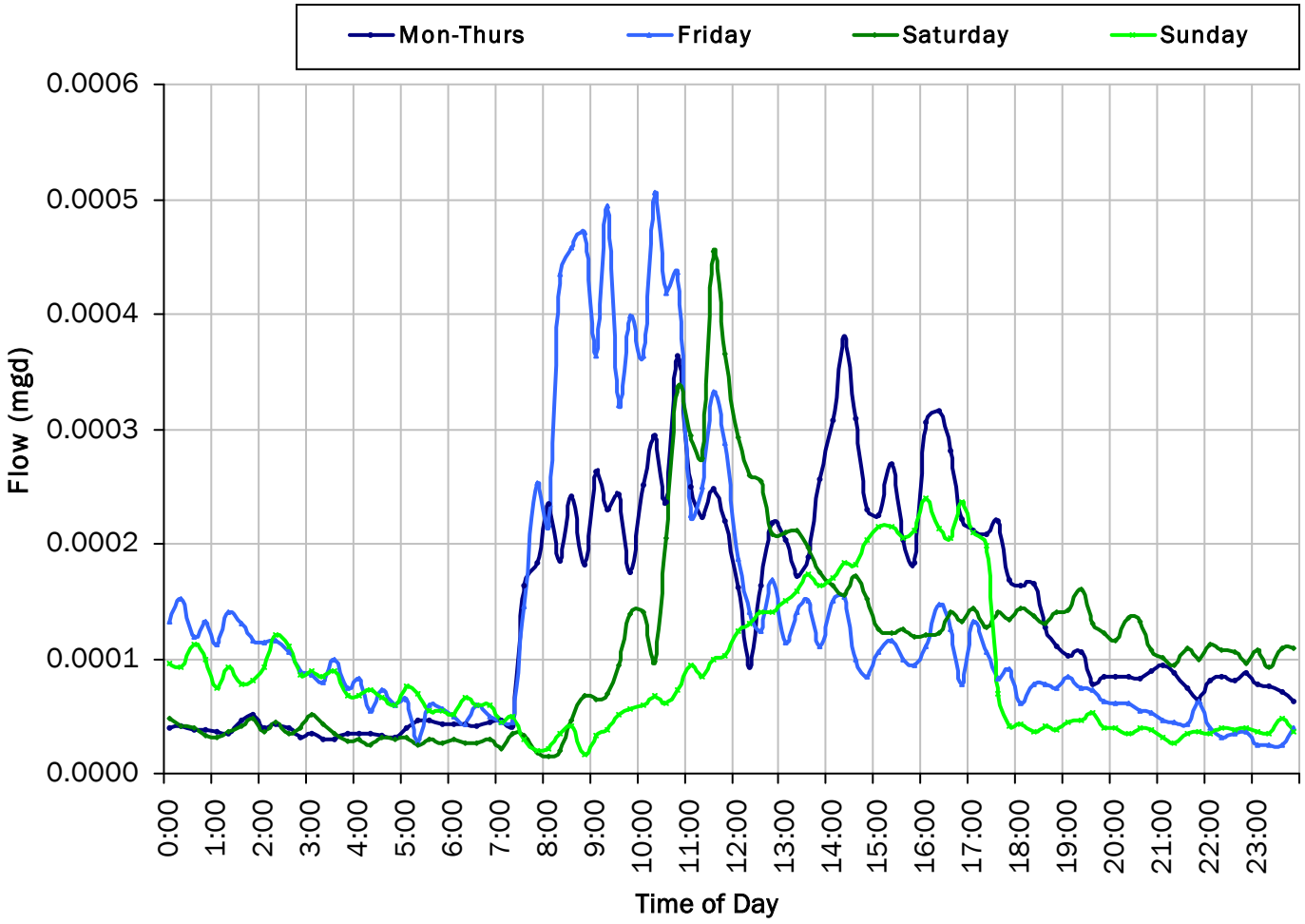
Period Rainfall: 0.00 inches Period Avg Flow: 0.000 mgd Period Peak Flow: 0.001 mgd Period Min Flow: 0.000 mgd





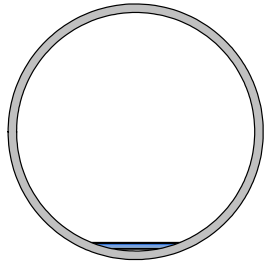
SITE 11

Average Dry Weather Flow Hydrographs



ADWF:

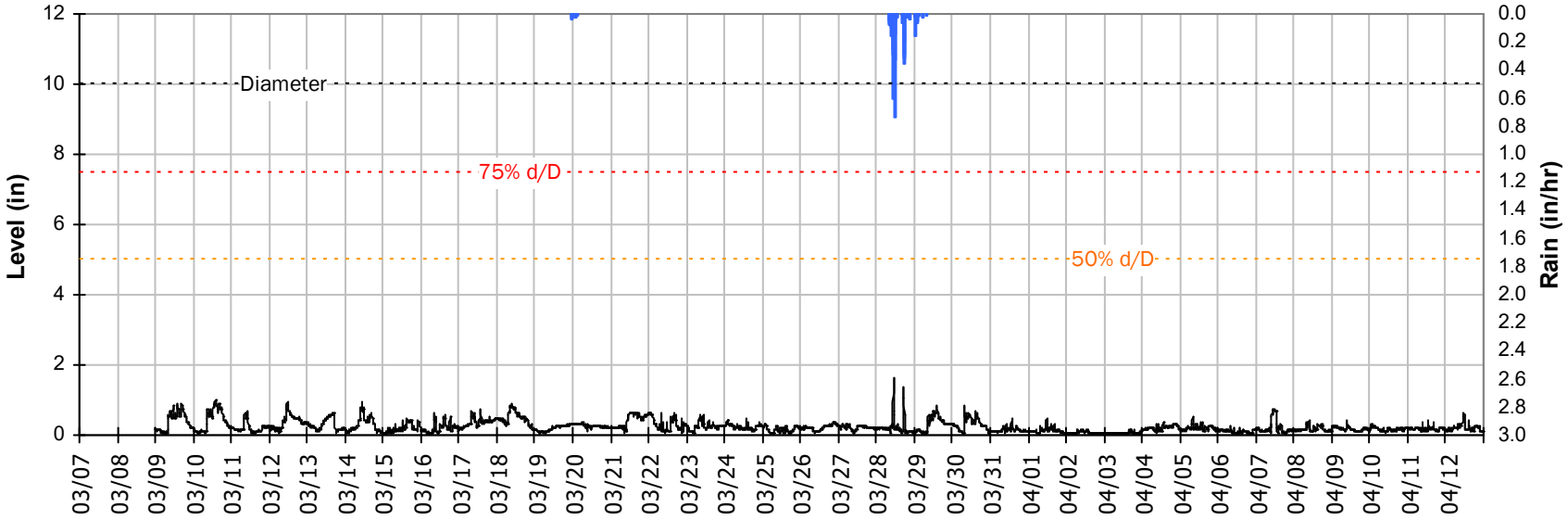
0.0001 *mgd*

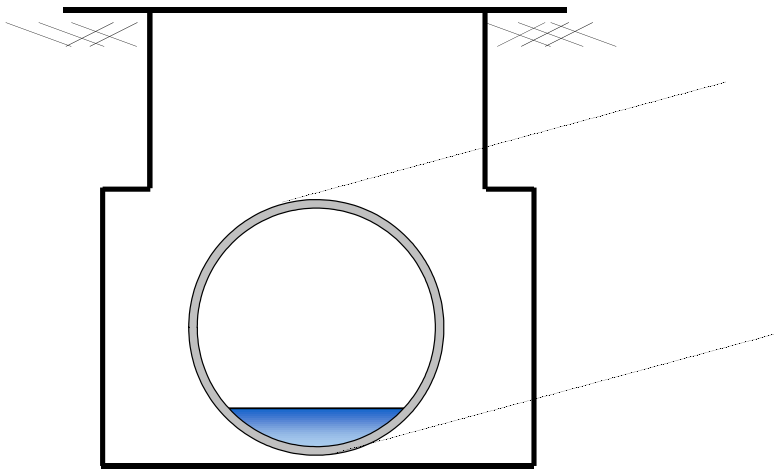


SITE 11

Site Capacity and Surcharge Summary

Realtime Flow Levels with Rainfall Data over Monitoring Period

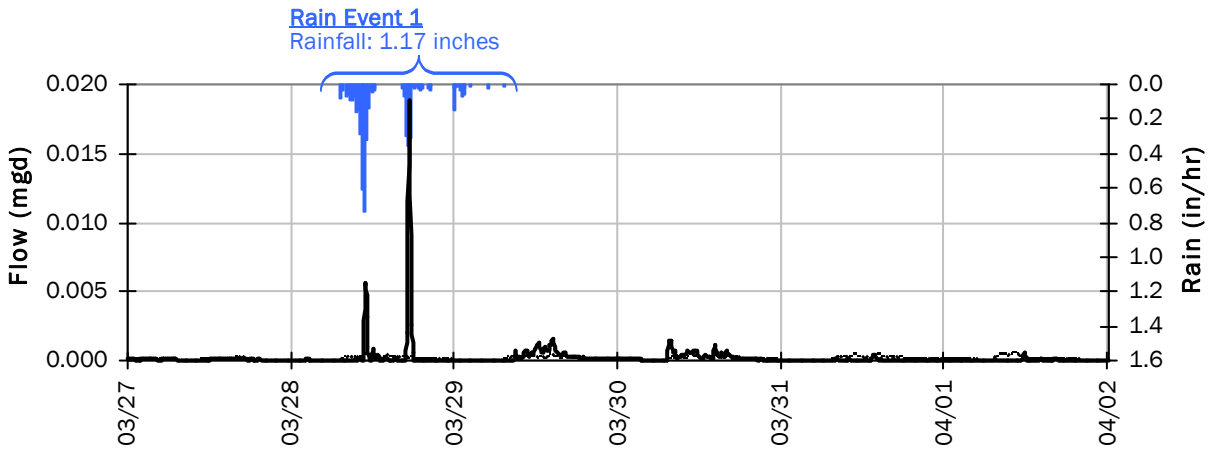




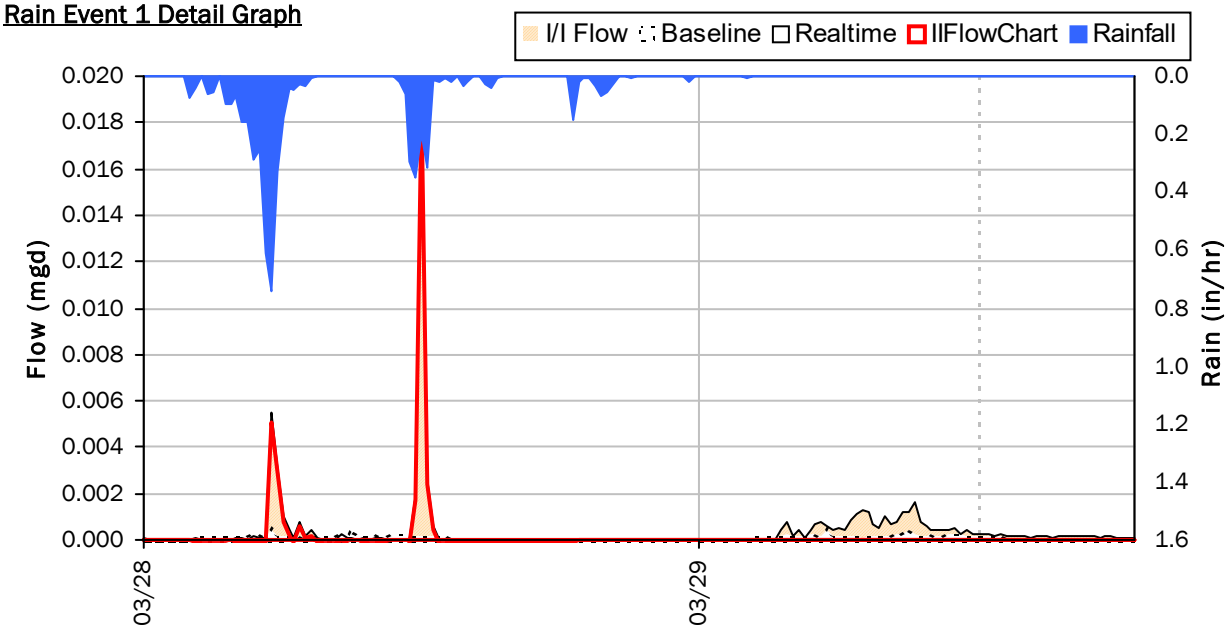
Pipe Diameter:	10	*inches*
Peak Measured Level:	1.64	*inches*
Peak d/D Ratio:	0.16	

SITE 11
I/I Summary: Rain Event 1

Baseline and Realtime Flows with Rainfall Data over Monitoring Period



Rain Event 1 Detail Graph



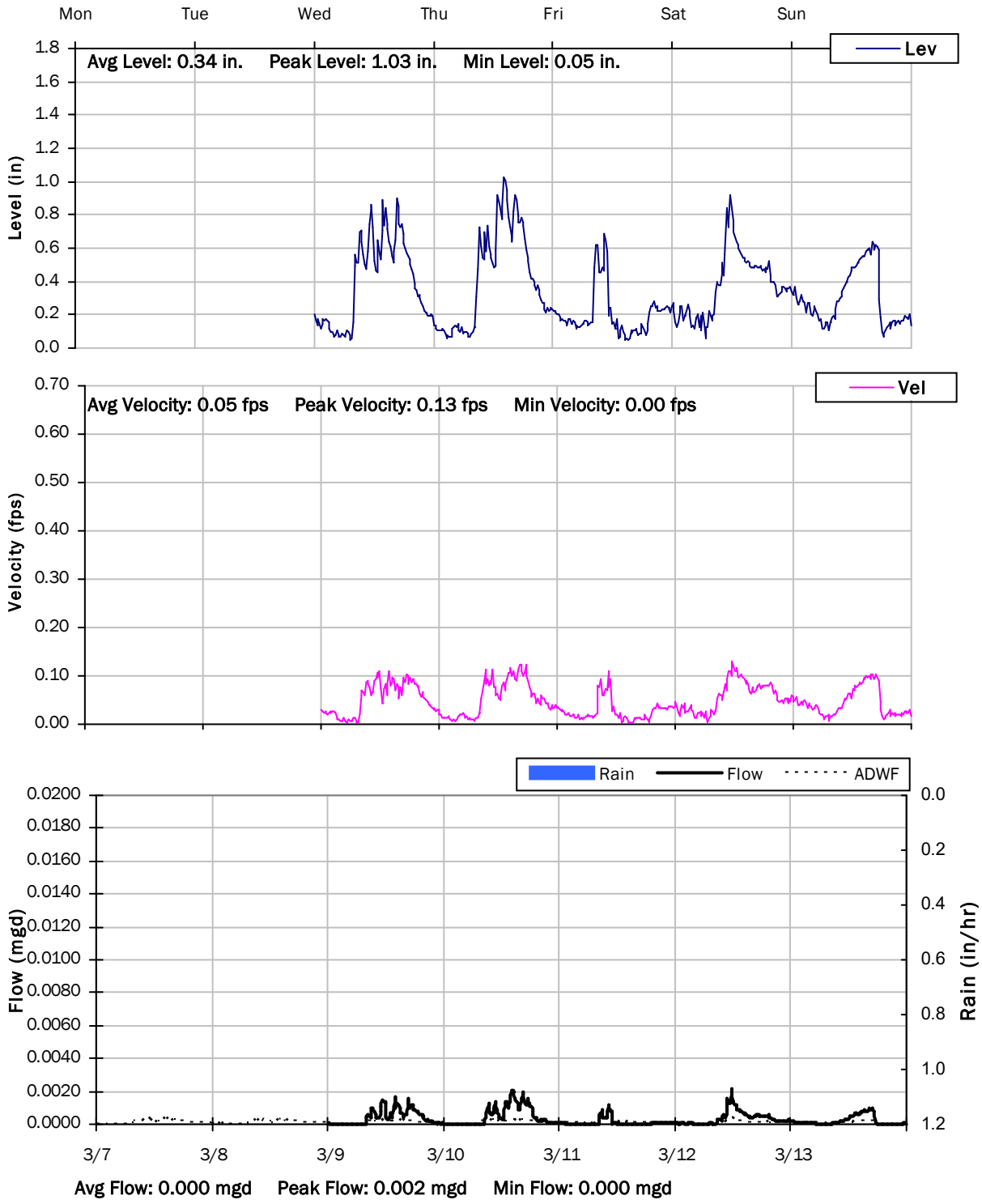
Storm Event I/I Analysis (Rain = 1.17 inches)

Capacity		Inflow / Infiltration	
Peak Flow:	0.019 *mgd*	**Peak I/I Rate:**	0.019 *mgd*
PF:	149.72	**Total I/I:**	258 *gallons*
Peak Level:	1.64 *in*		
d/D Ratio:	0.16		

SITE 11

Weekly Level, Velocity and Flow Hydrographs

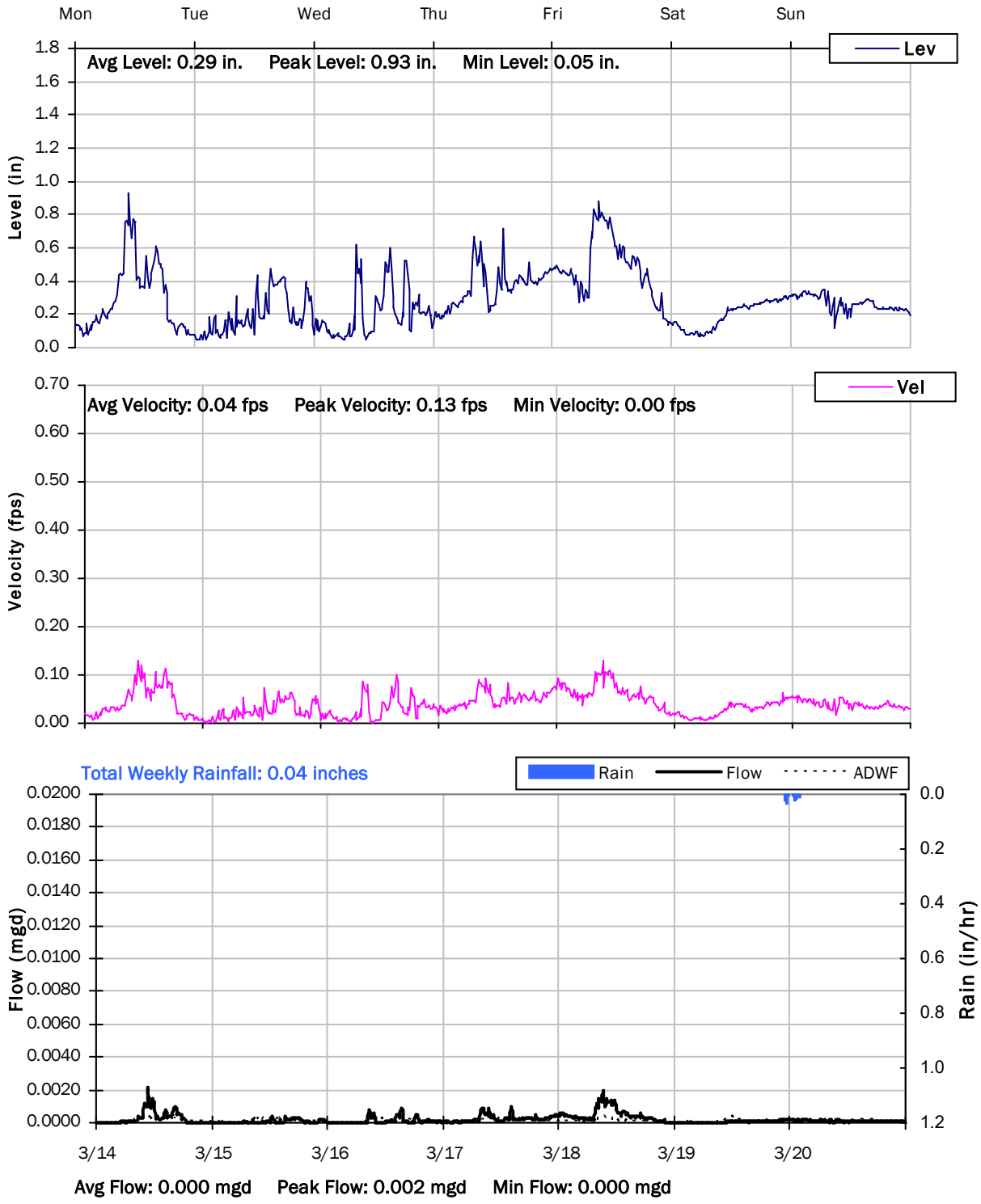
3/7/2022 to 3/14/2022



SITE 11

Weekly Level, Velocity and Flow Hydrographs

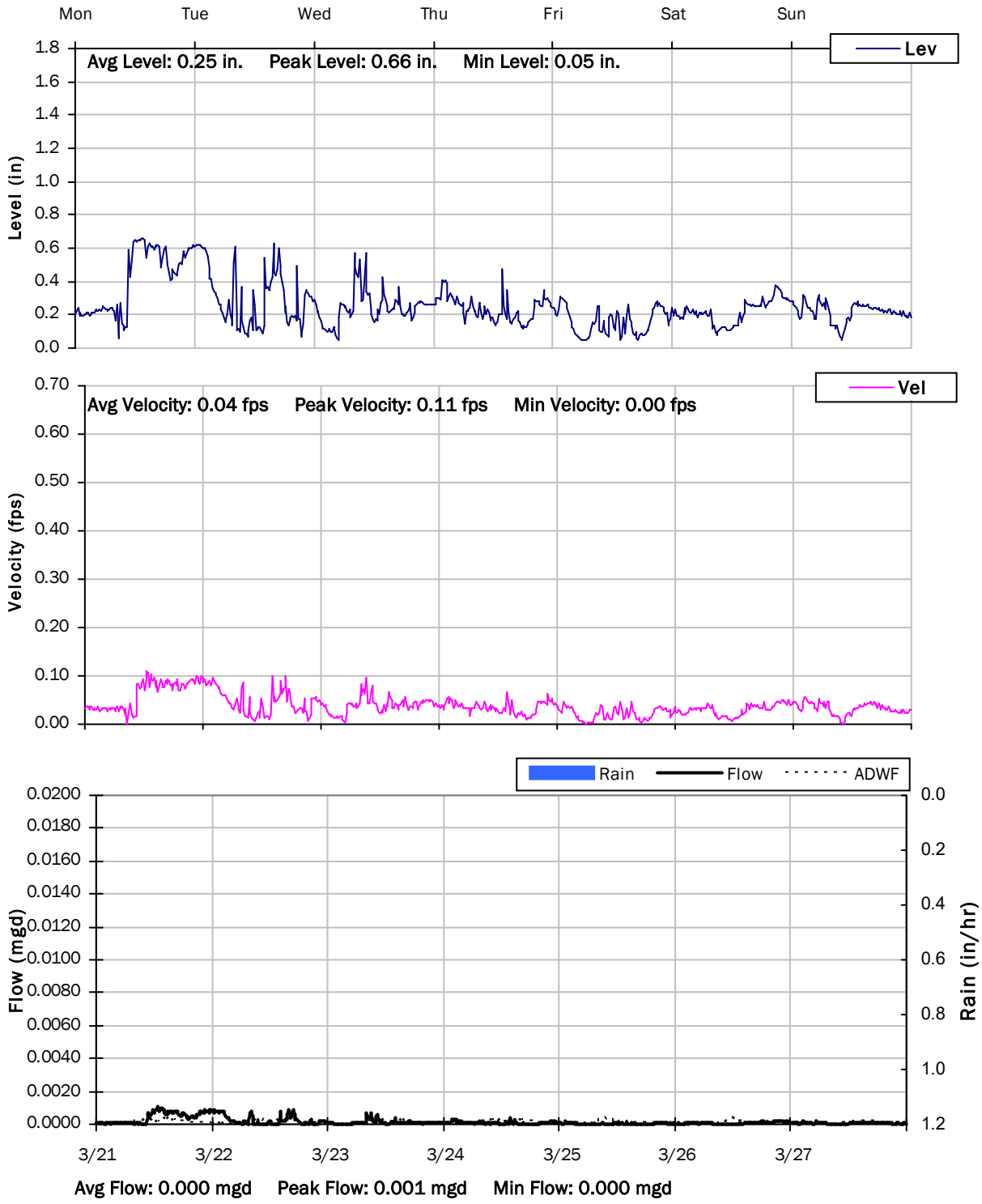
3/14/2022 to 3/21/2022



SITE 11

Weekly Level, Velocity and Flow Hydrographs

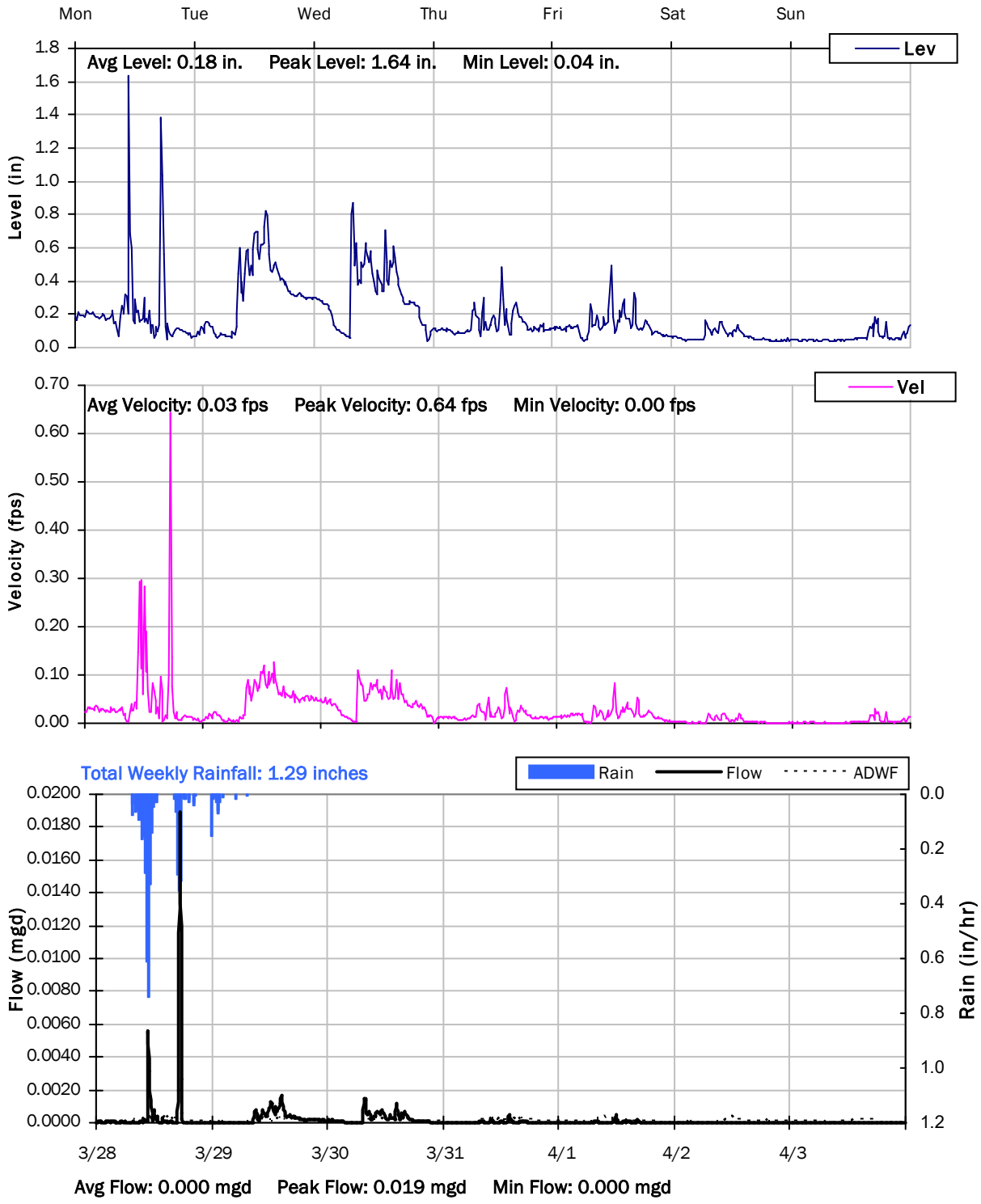
3/21/2022 to 3/28/2022



SITE 11

Weekly Level, Velocity and Flow Hydrographs

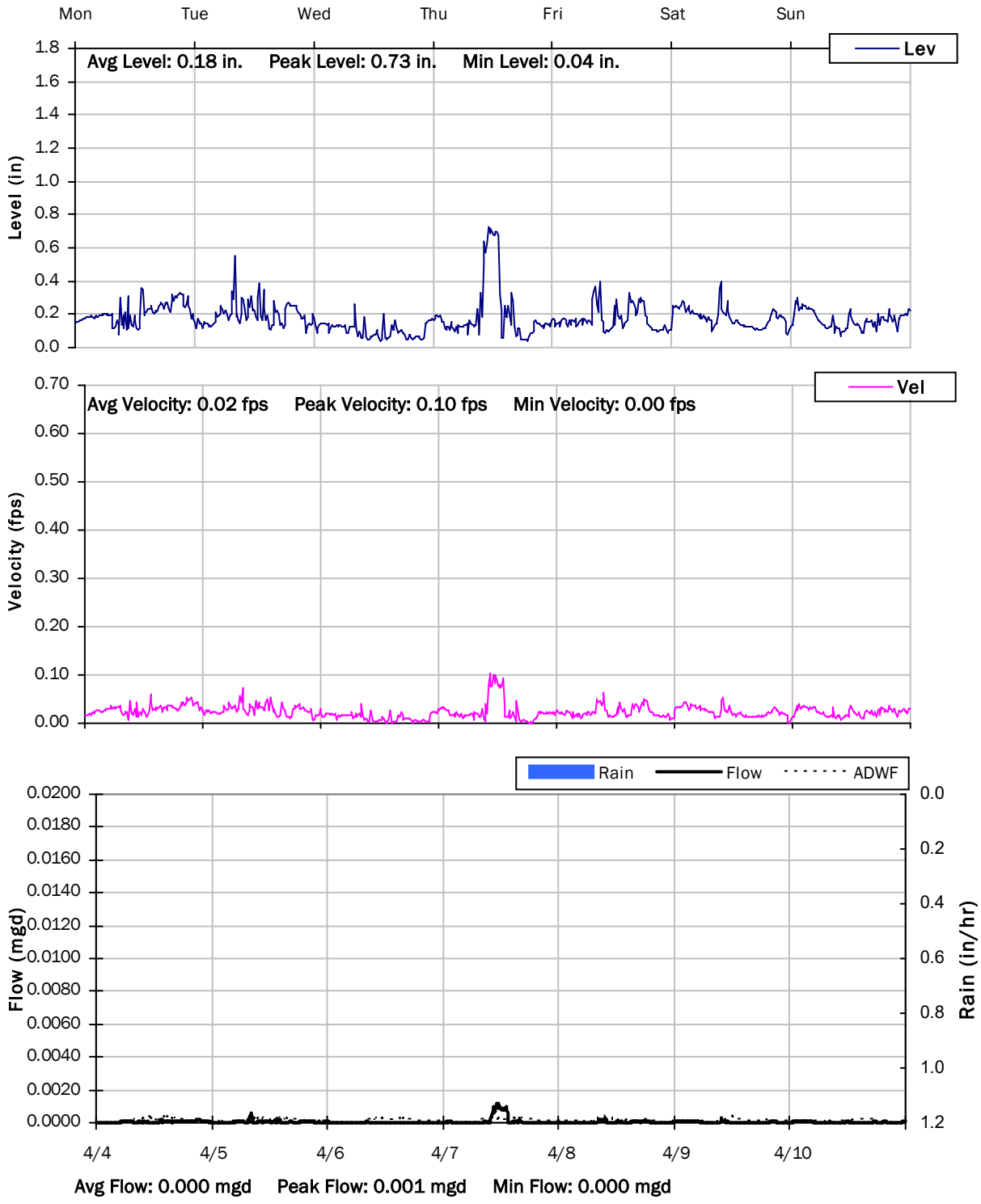
3/28/2022 to 4/4/2022



SITE 11

Weekly Level, Velocity and Flow Hydrographs

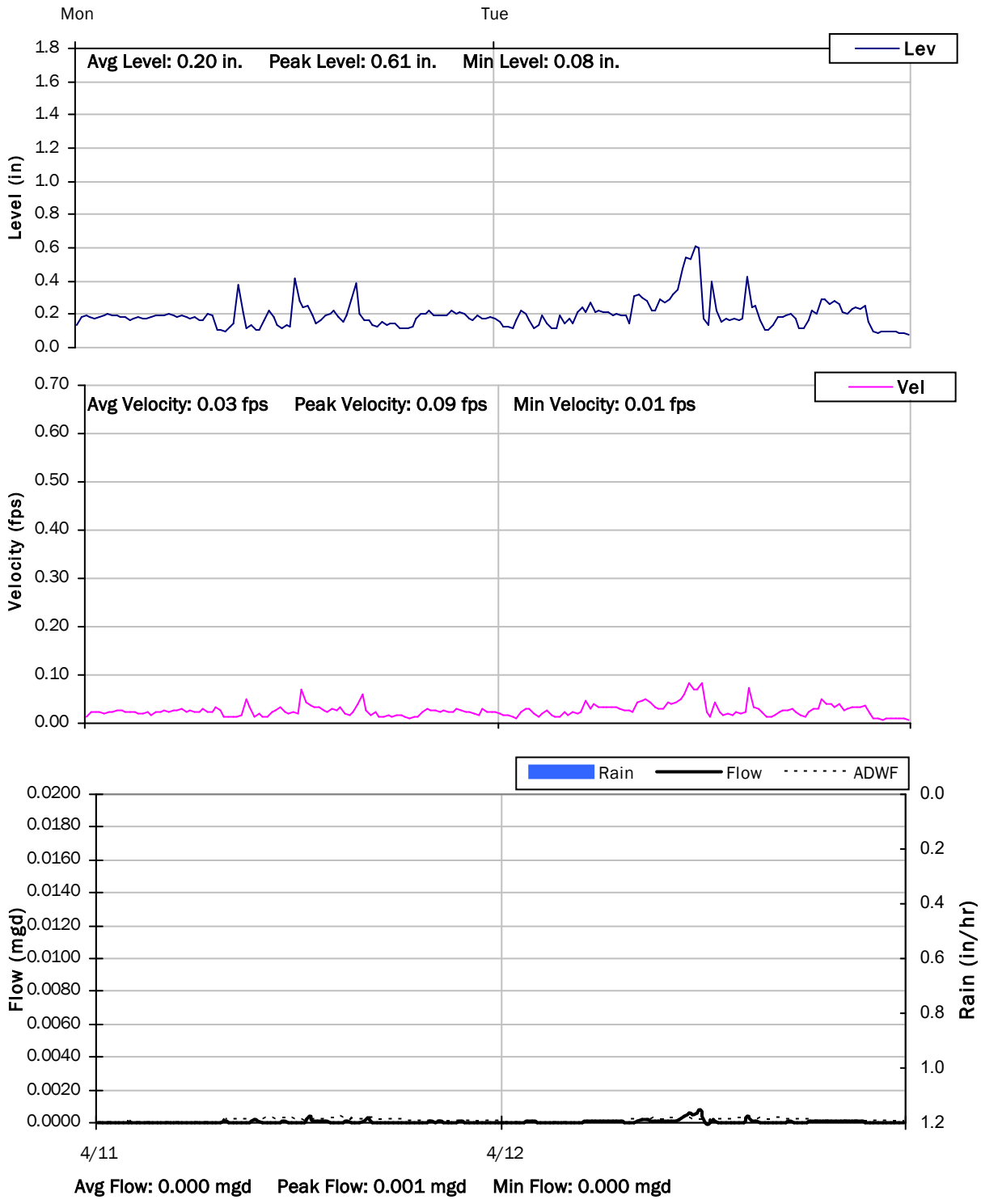
4/4/2022 to 4/11/2022



SITE 11

Weekly Level, Velocity and Flow Hydrographs

4/11/2022 to 4/13/2022



Monitoring Site: Site 12

Carollo Gardena, California

Sanitary Sewer Flow Monitoring

March 07, 2022 - April 12, 2022

Location: W 135th Street and Daphne Avenue

Data Summary Report

Vicinity Map: Site 12

SITE 12

Site Information MH ID: 05 1169

Location: W 135th Street and Daphne Avenue

Coordinates: 118.3198° W, 33.9092° N

Rim Elevation (Earth): 46 feet

Expected Pipe Diameter: 18 inches

Measured Pipe Diameter: 18 inches

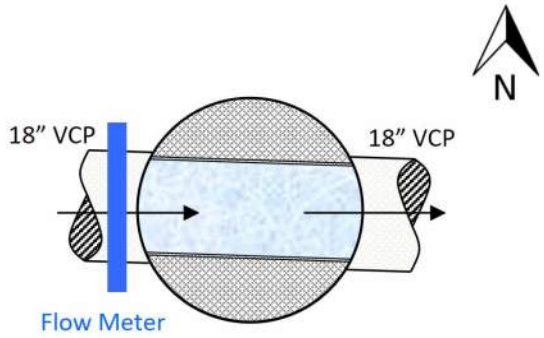
ADWF: 0.143 mgd

Peak Measured Flow: 0.333 mgd

Sediment: None

Satellite Map

Sanitary Map



Flow Sketch

Street View

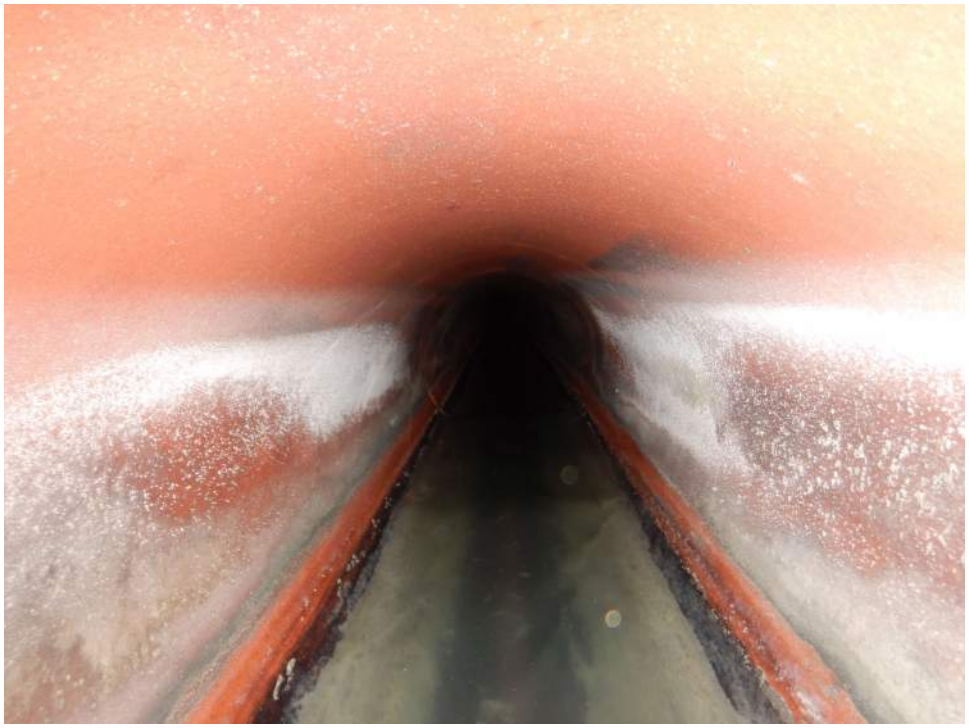
Plan View

SITE 12

Additional Site Photos

Effluent Pipe

Monitored Influent Pipe

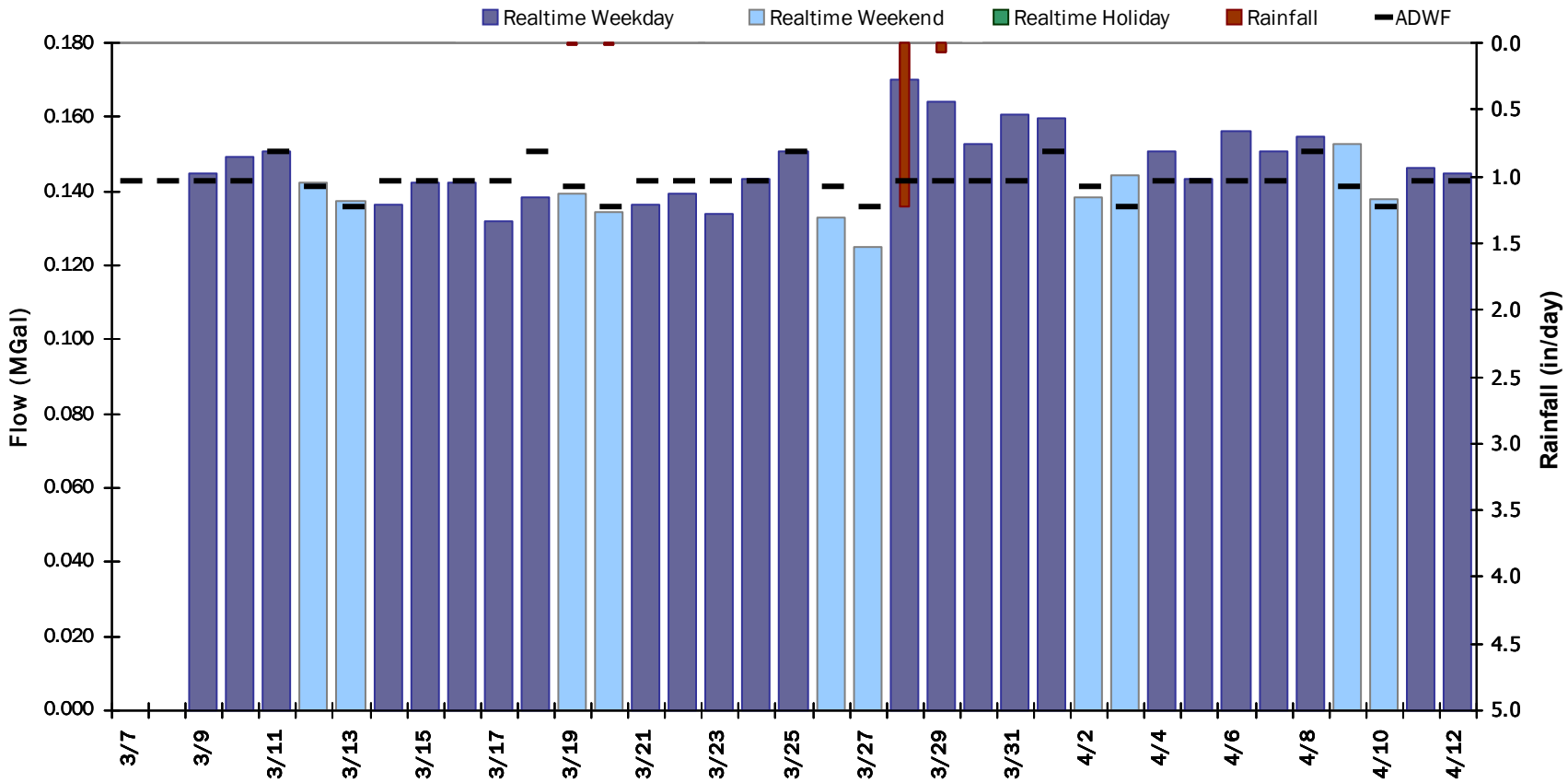


SITE 12

Period Flow Summary: Daily Flow Totals

Avg Daily Flow: 0.146 MGal Peak Daily Flow: 0.170 MGal Min Daily Flow: 0.125 MGal

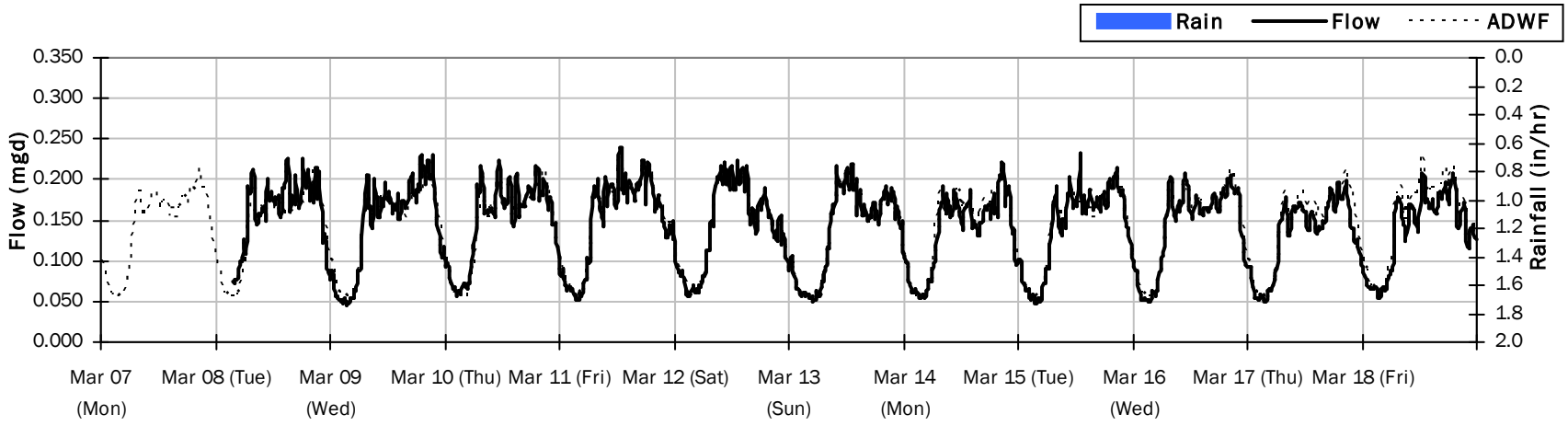
Total Rainfall: 1.33 inches

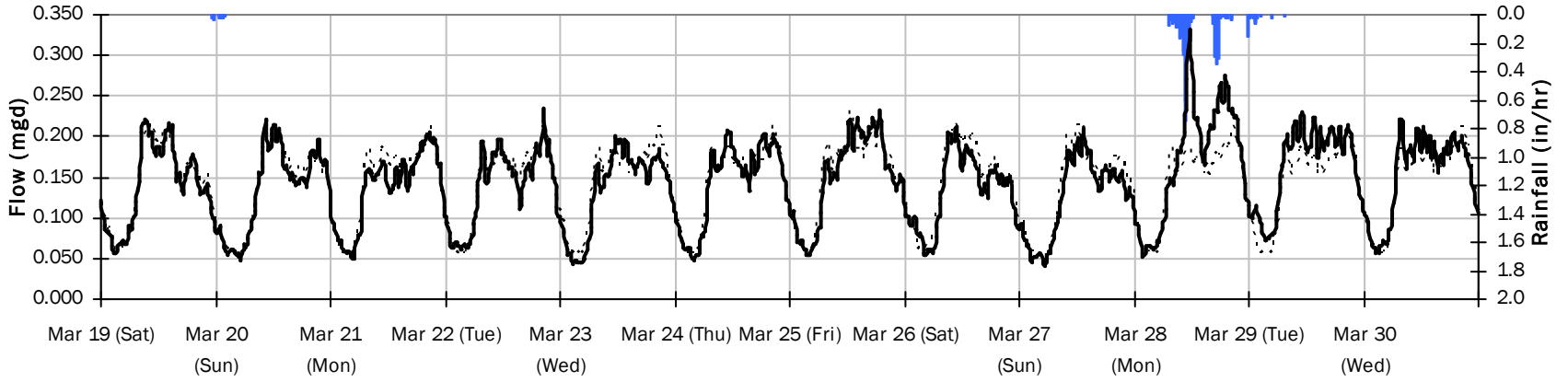


SITE 12

Flow Summary: 3/7/2022 to 3/30/2022

Period Rainfall: 1.33 inches Period Avg Flow: 0.143 mgd Period Peak Flow: 0.333 mgd Period Min Flow: 0.042 mgd

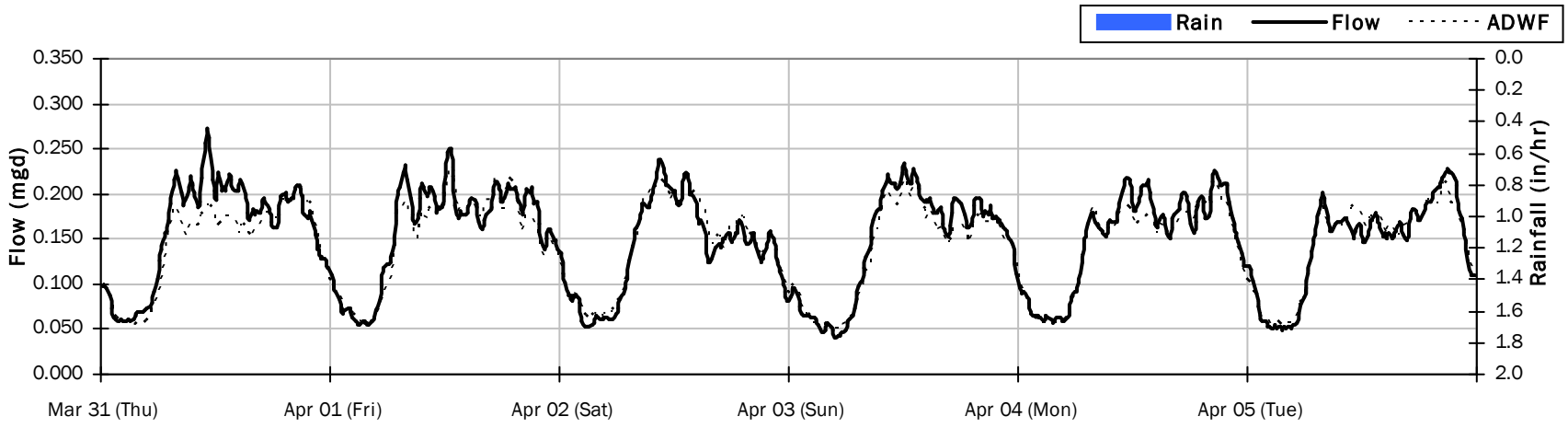


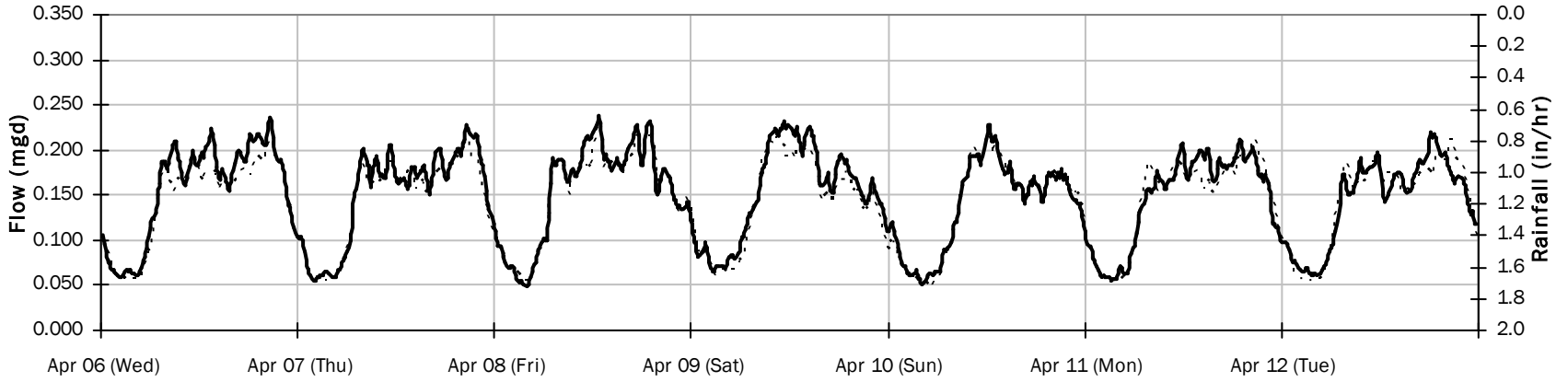


SITE 12

Flow Summary: 3/31/2022 to 4/12/2022

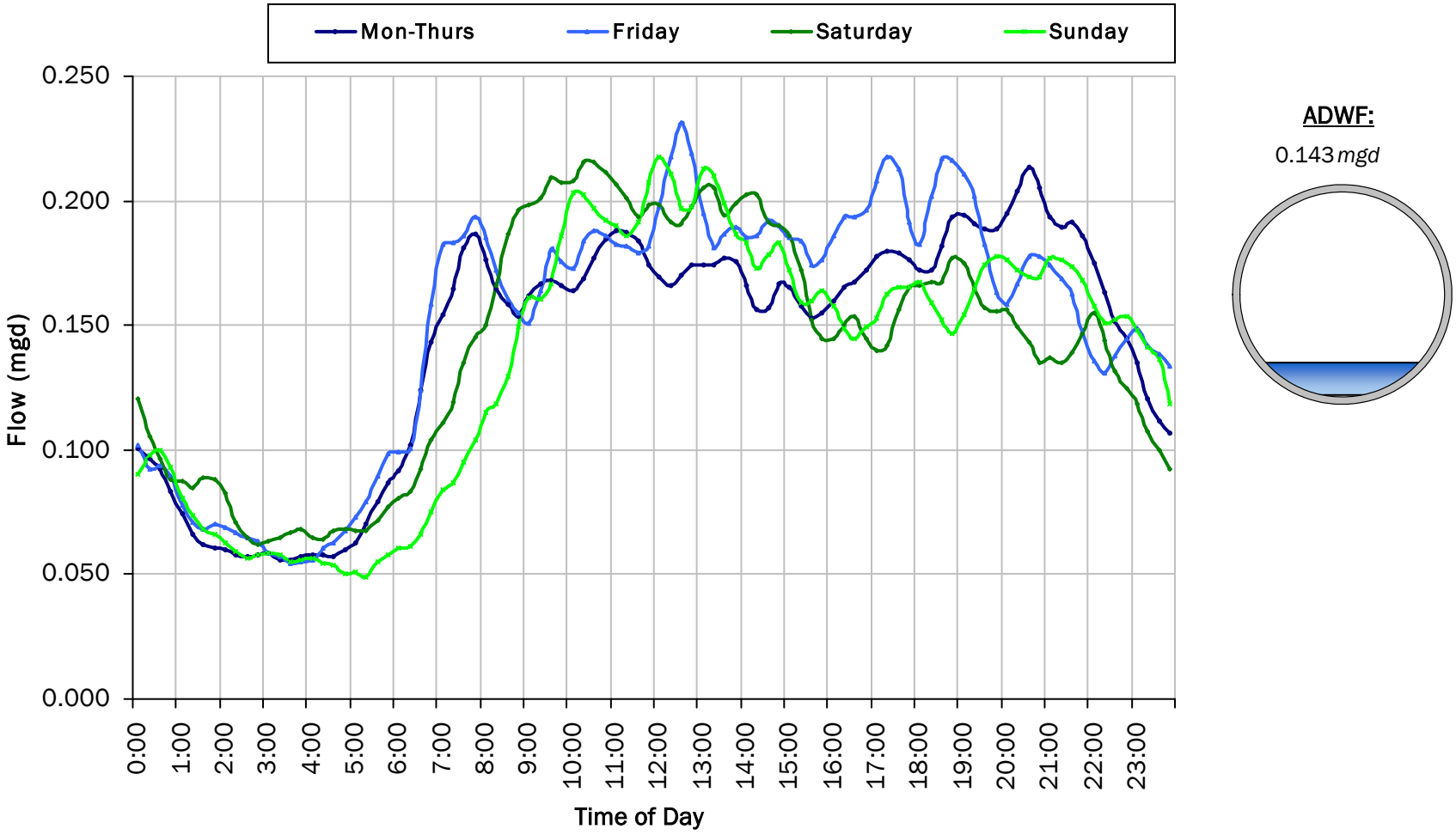
Period Rainfall: 0.00 inches Period Avg Flow: 0.149 mgd Period Peak Flow: 0.273 mgd Period Min Flow: 0.041 mgd





SITE 12

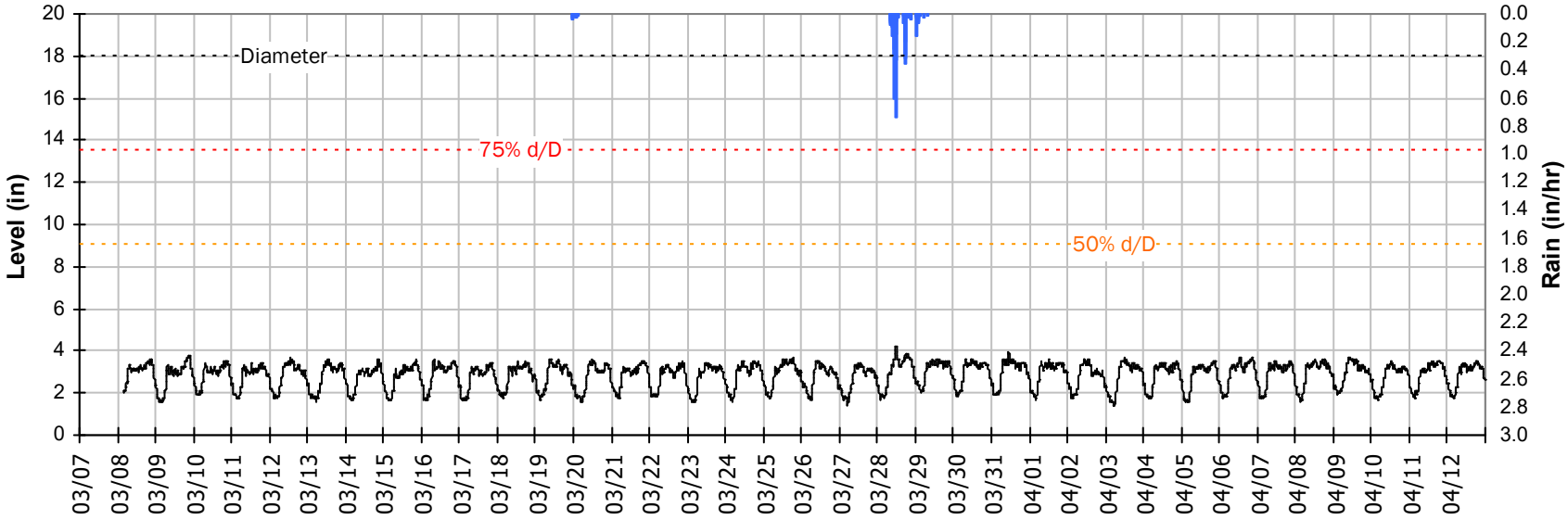
Average Dry Weather Flow Hydrographs

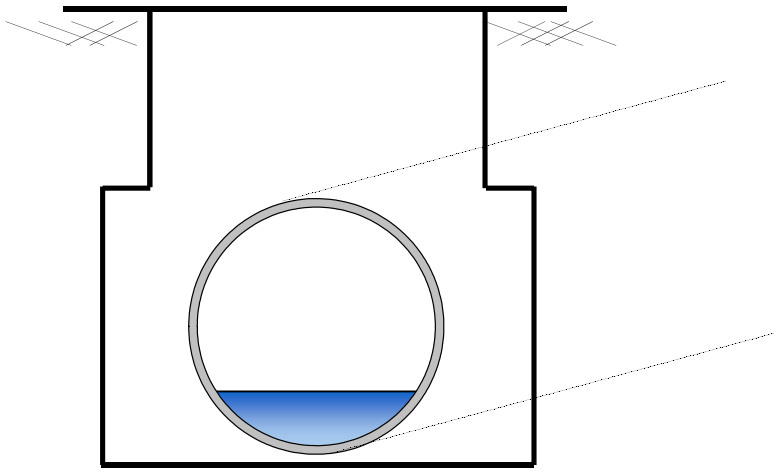


SITE 12

Site Capacity and Surcharge Summary

Realtime Flow Levels with Rainfall Data over Monitoring Period

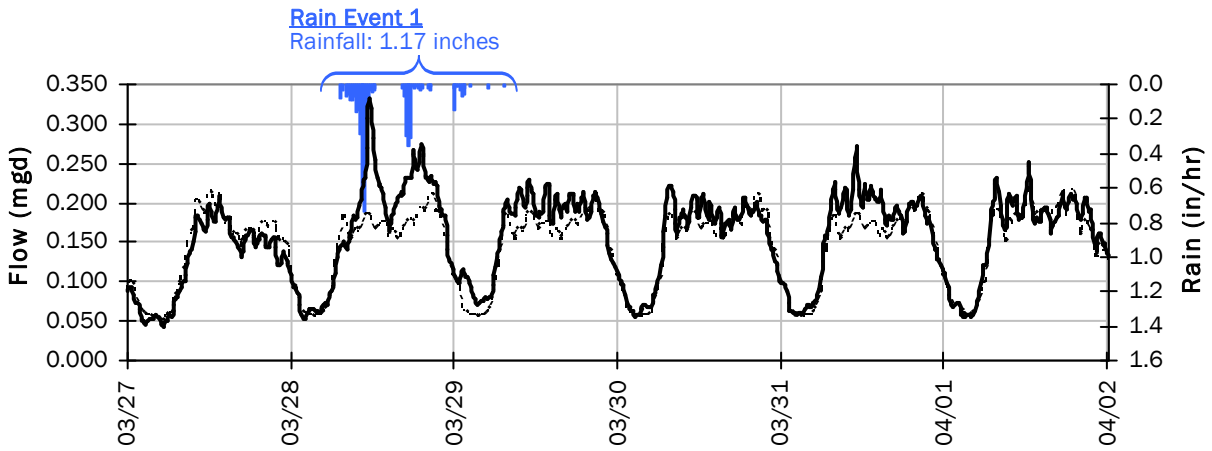




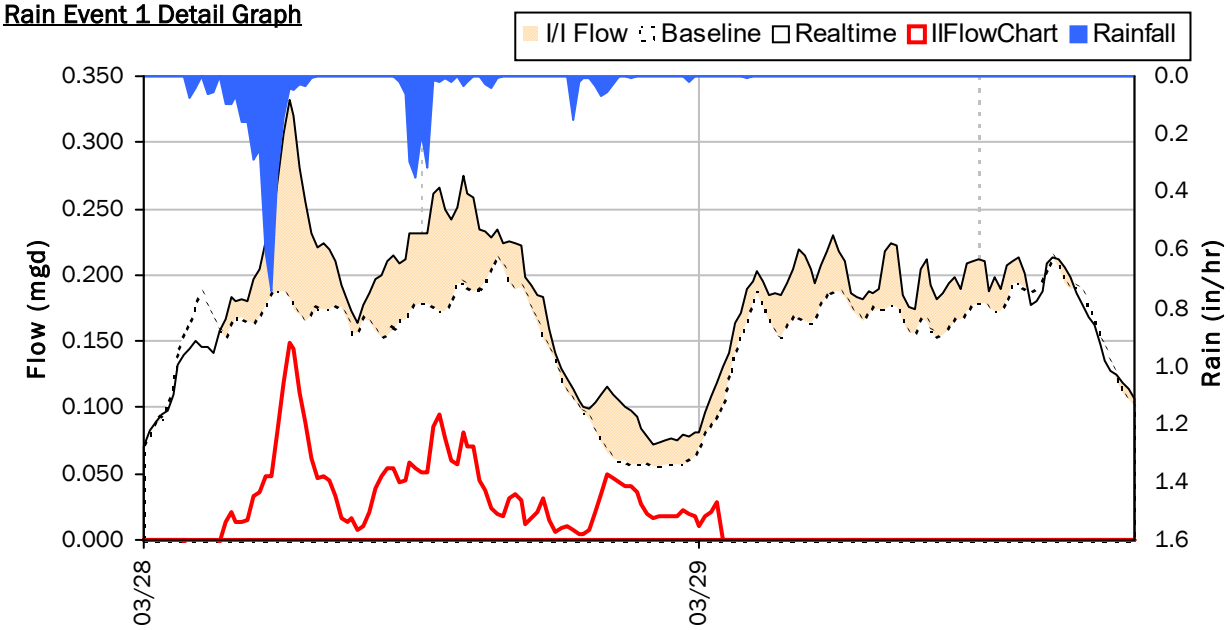
Pipe Diameter:	18	*inches*
Peak Measured Level:	4.20	*inches*
Peak d/D Ratio:	0.23	

SITE 12
I/I Summary: Rain Event 1

Baseline and Realtime Flows with Rainfall Data over Monitoring Period



Rain Event 1 Detail Graph



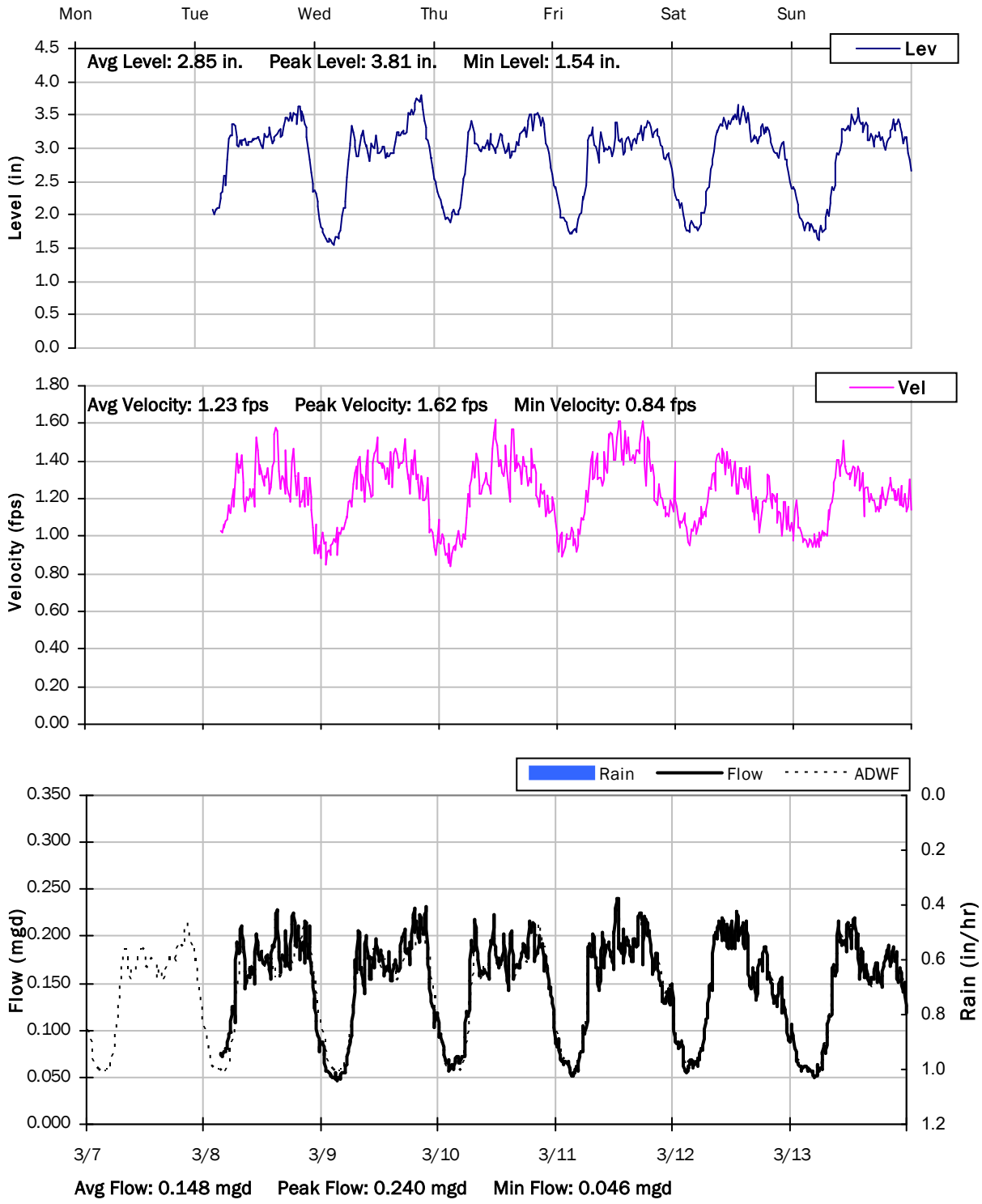
Storm Event I/I Analysis (Rain = 1.17 inches)

Capacity		Inflow / Infiltration	
Peak Flow:	0.333 *mgd*	**Peak I/I Rate:**	0.149 *mgd*
PF:	2.33	**Total I/I:**	33,000 *gallons*
Peak Level:	4.20 *in*		
d/D Ratio:	0.23		

SITE 12

Weekly Level, Velocity and Flow Hydrographs

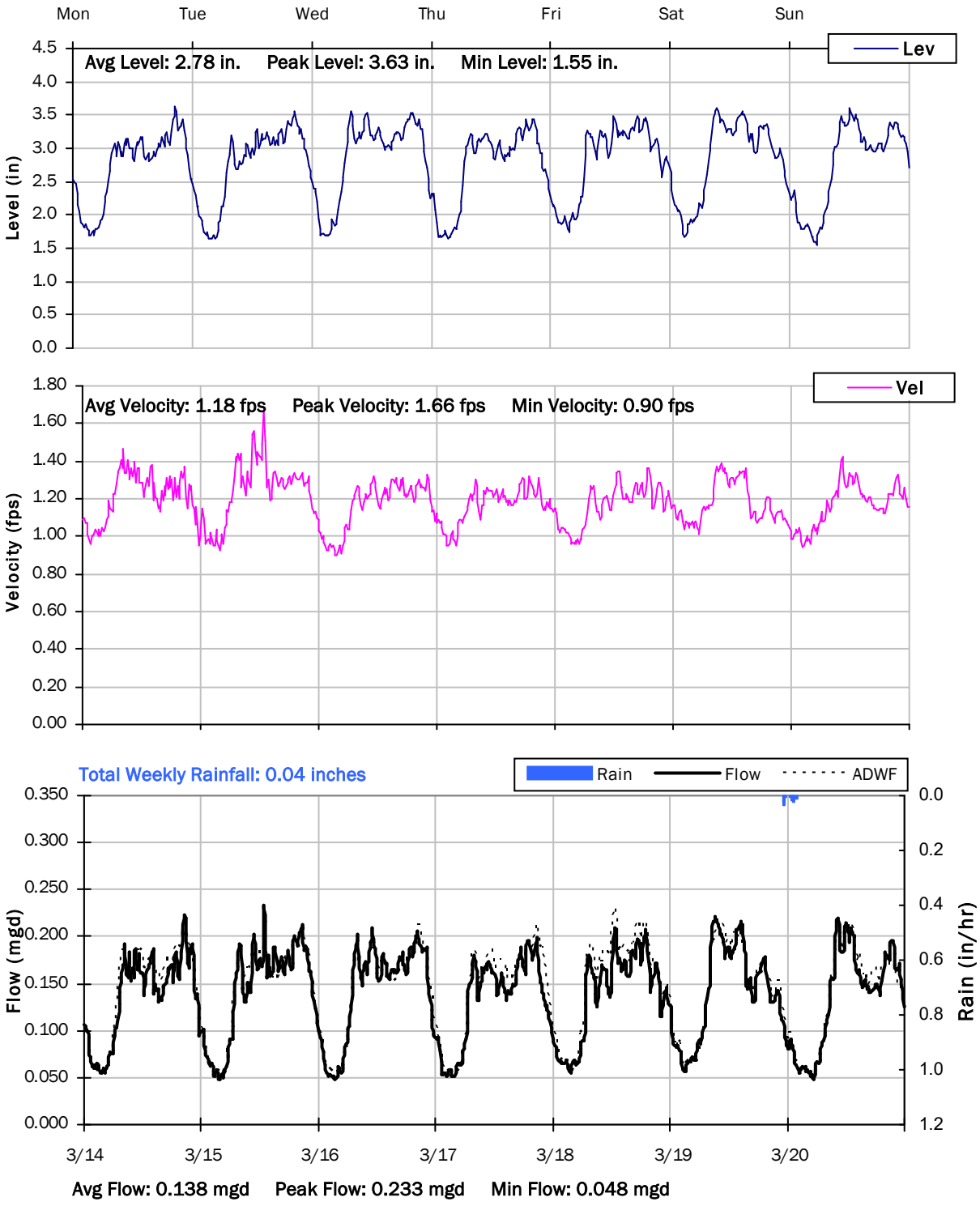
3/7/2022 to 3/14/2022



SITE 12

Weekly Level, Velocity and Flow Hydrographs

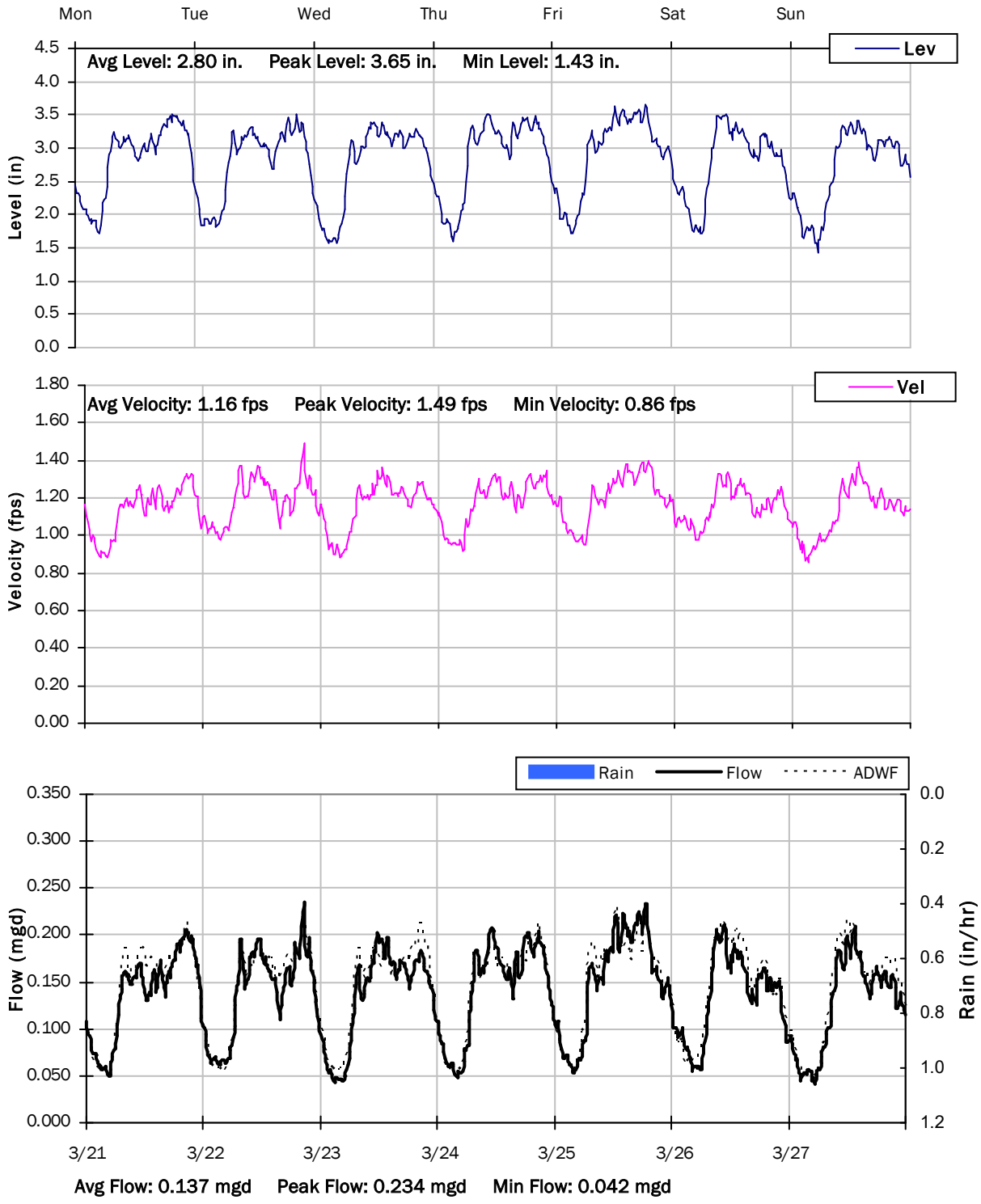
3/14/2022 to 3/21/2022



SITE 12

Weekly Level, Velocity and Flow Hydrographs

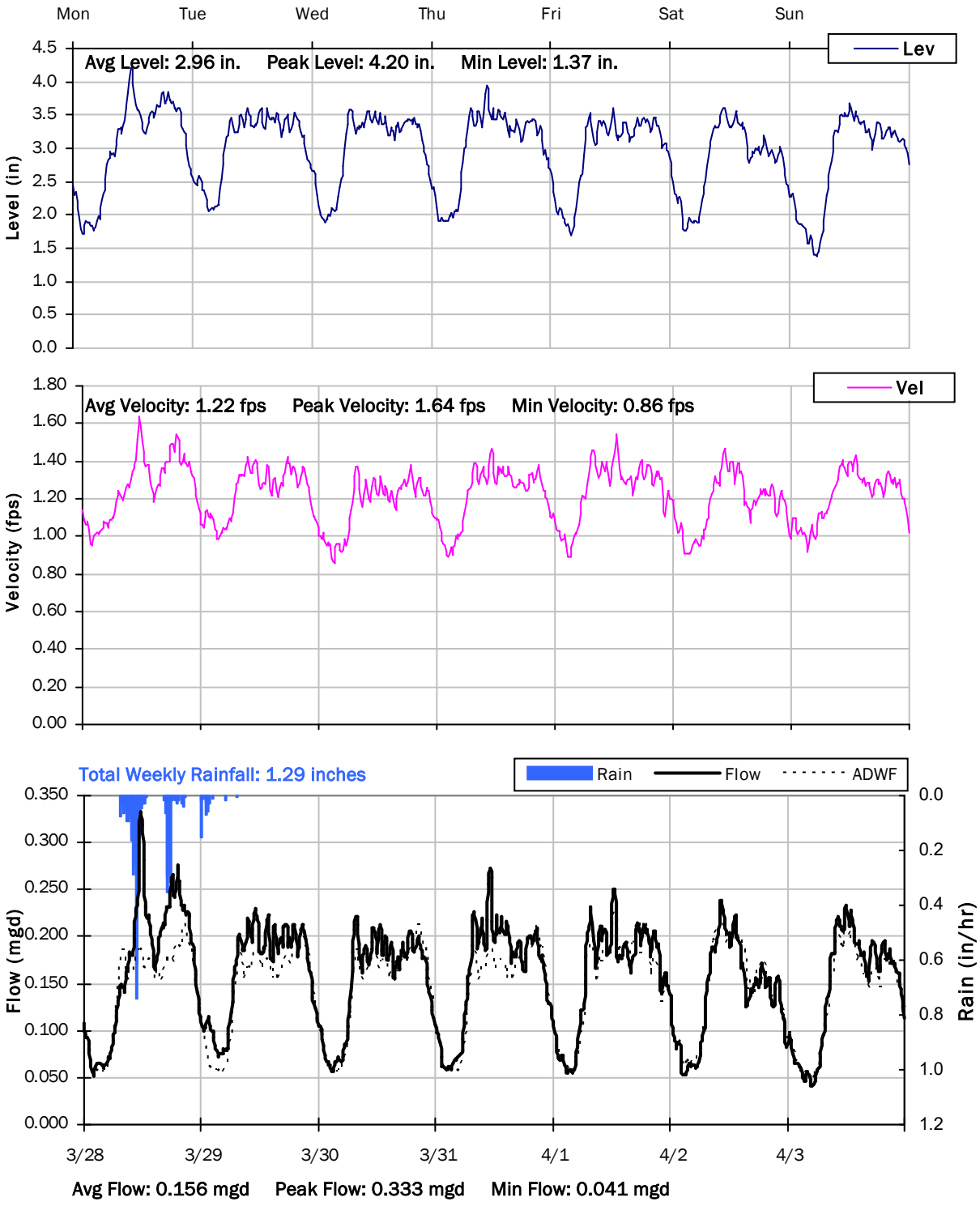
3/21/2022 to 3/28/2022



SITE 12

Weekly Level, Velocity and Flow Hydrographs

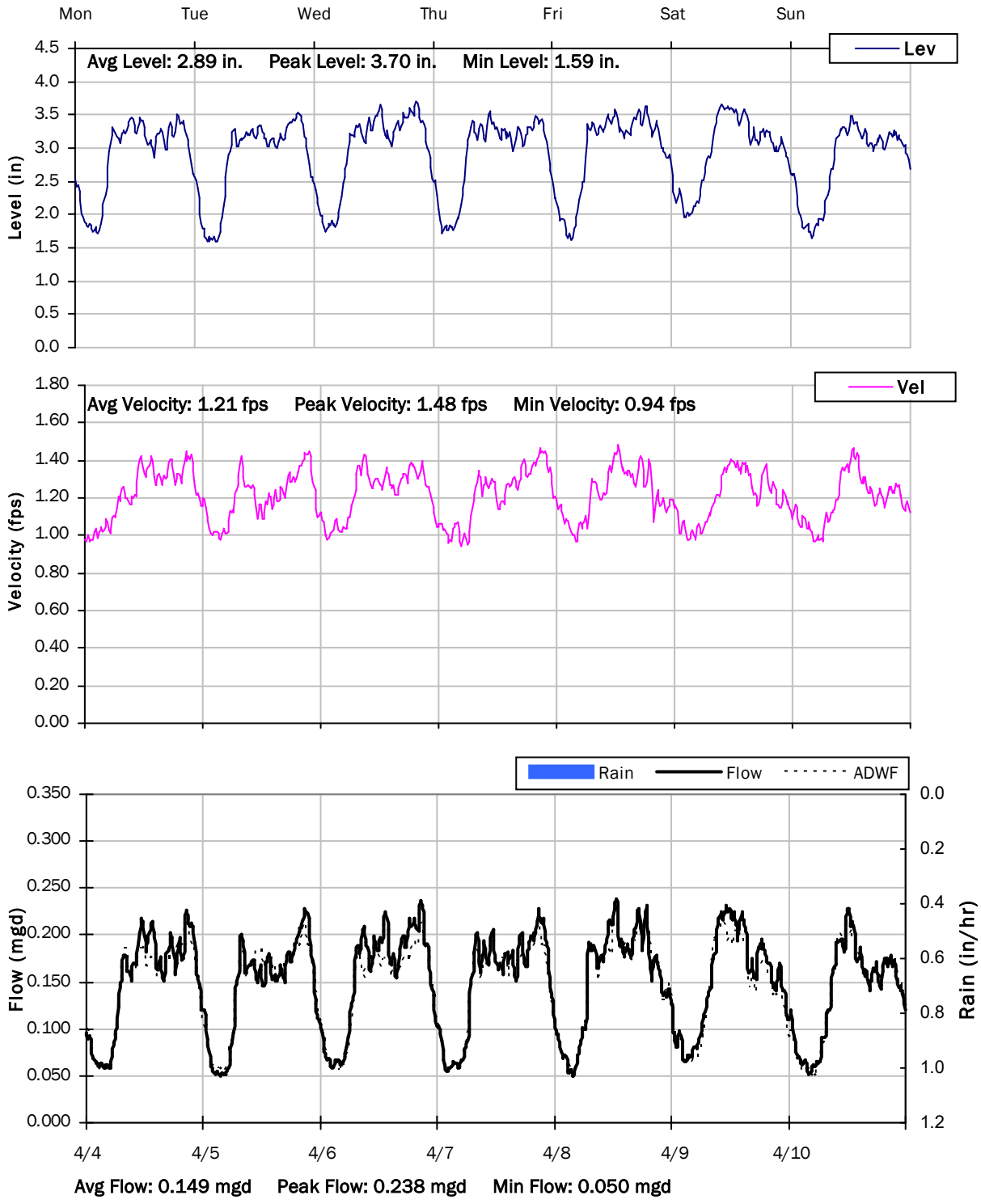
3/28/2022 to 4/4/2022



SITE 12

Weekly Level, Velocity and Flow Hydrographs

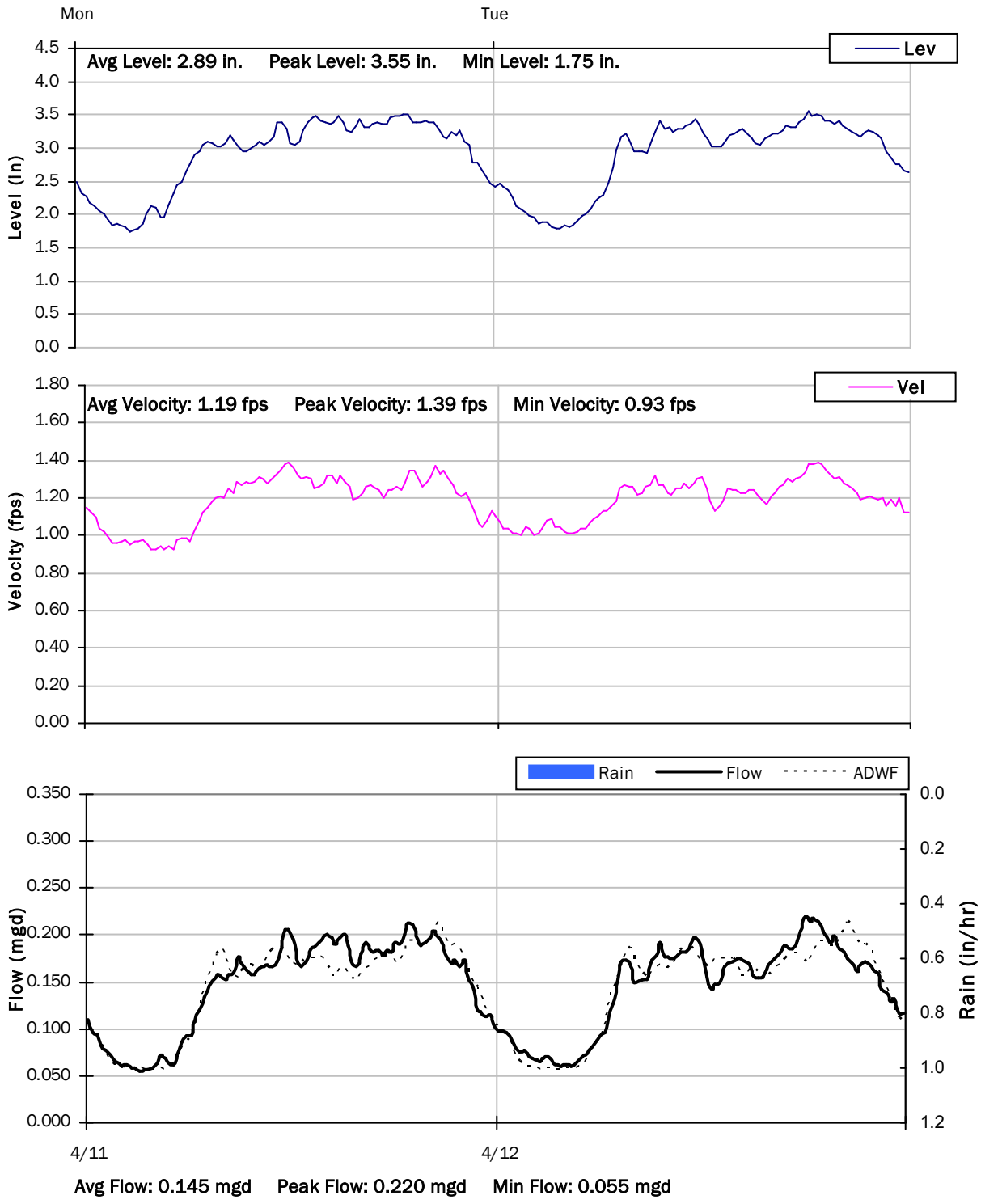
4/4/2022 to 4/11/2022



SITE 12

Weekly Level, Velocity and Flow Hydrographs

4/11/2022 to 4/13/2022



Monitoring Site: Site 13

Carollo Gardena, California

Sanitary Sewer Flow Monitoring

March 07, 2022 - April 12, 2022

Location: Van Ness Avenue and W 154th Street

Data Summary Report

Vicinity Map: Site 13

SITE 13

Site Information MH ID: 05 1084

Location: Van Ness Avenue and W 154th Street

Coordinates: 118.3179° W, 33.8925° N

Rim Elevation (Earth): 51 feet

Expected Pipe Diameter: 24 inches

Measured Pipe Diameter: 25 inches

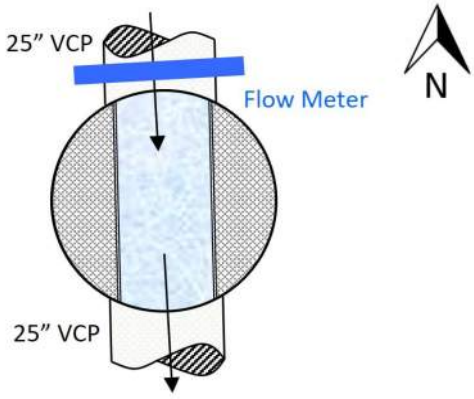
ADWF: 1.516 mgd

Peak Measured Flow: 4.127 mgd

Sediment: None

Satellite Map

Sanitary Map



Flow Sketch

Street View

Plan View

SITE 13

Additional Site Photos

Effluent Pipe

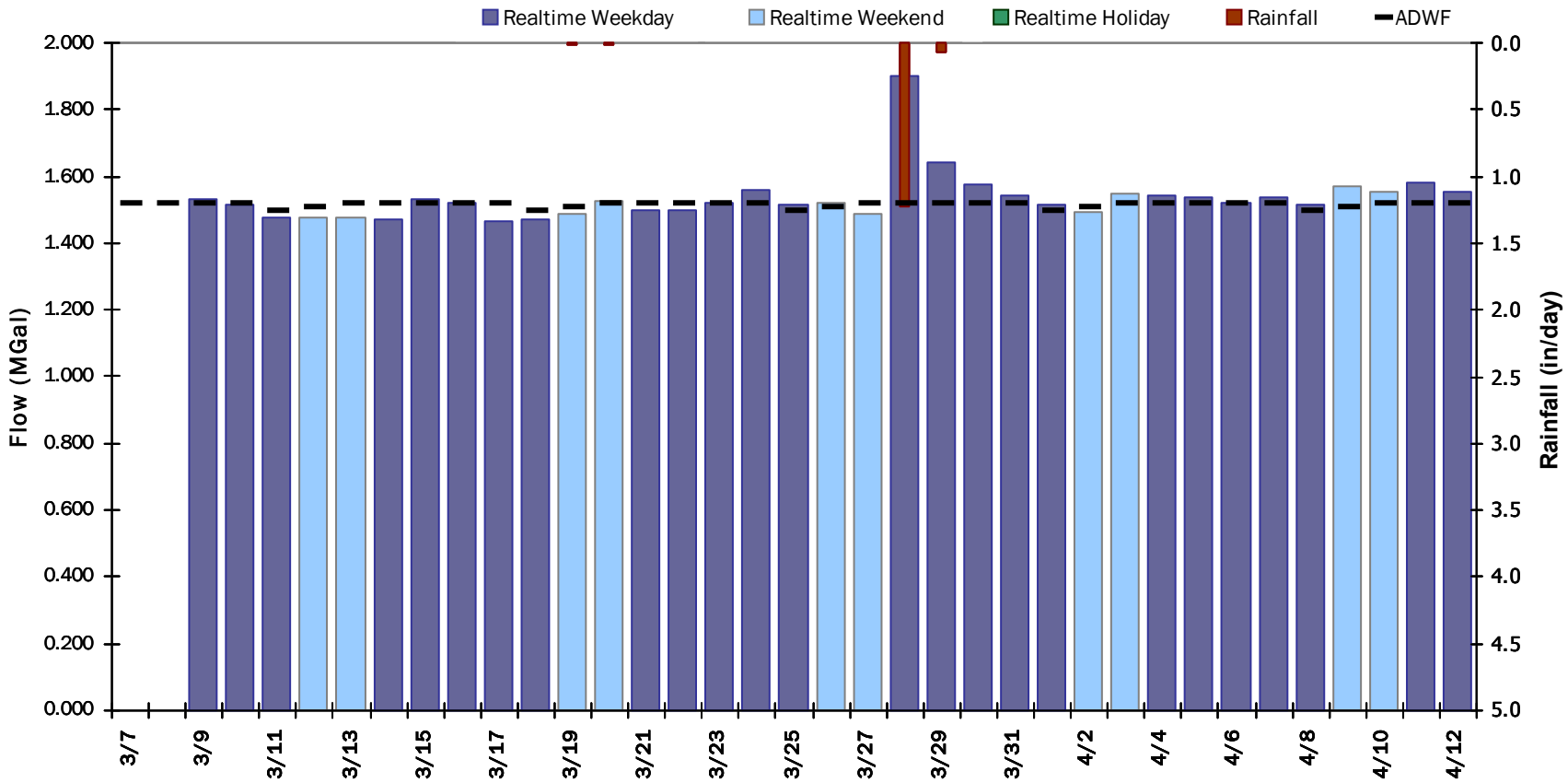
Monitored Influent Pipe

SITE 13

Period Flow Summary: Daily Flow Totals

Avg Daily Flow: 1.537 MGal Peak Daily Flow: 1.901 MGal Min Daily Flow: 1.464 MGal

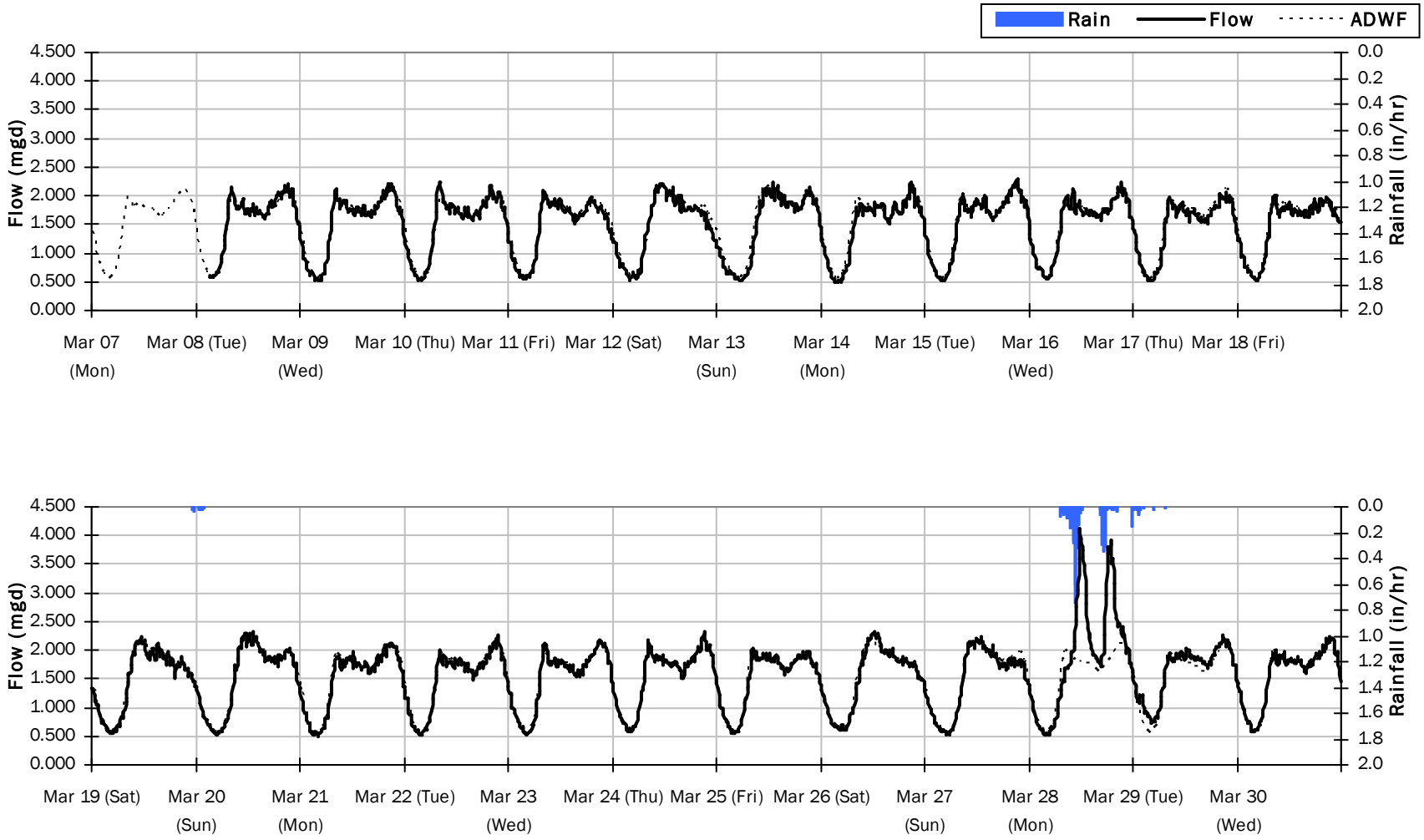
Total Rainfall: 1.33 inches



SITE 13

Flow Summary: 3/7/2022 to 3/30/2022

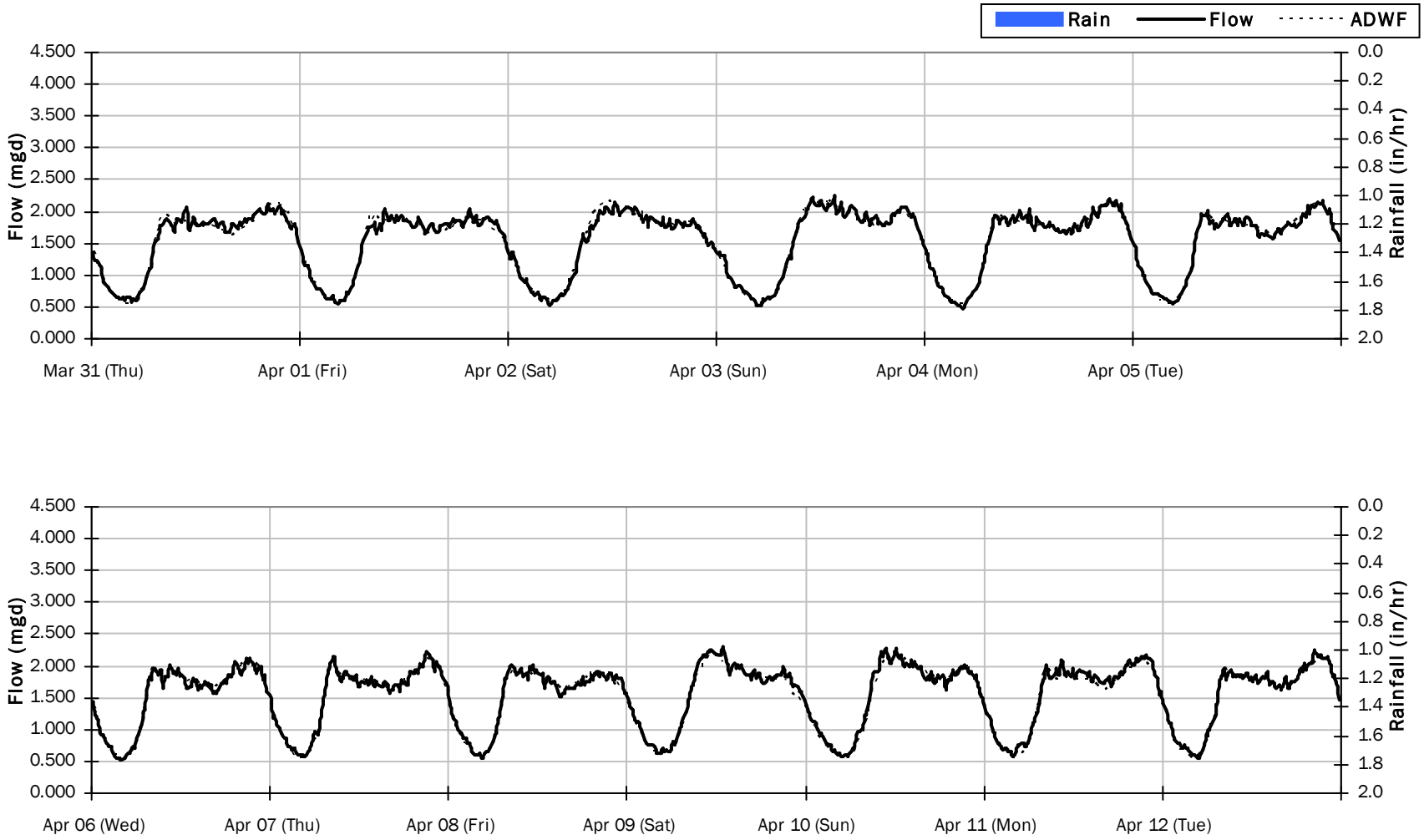
Period Rainfall: 1.33 inches Period Avg Flow: 1.534 mgd Period Peak Flow: 4.127 mgd Period Min Flow: 0.483 mgd



SITE 13

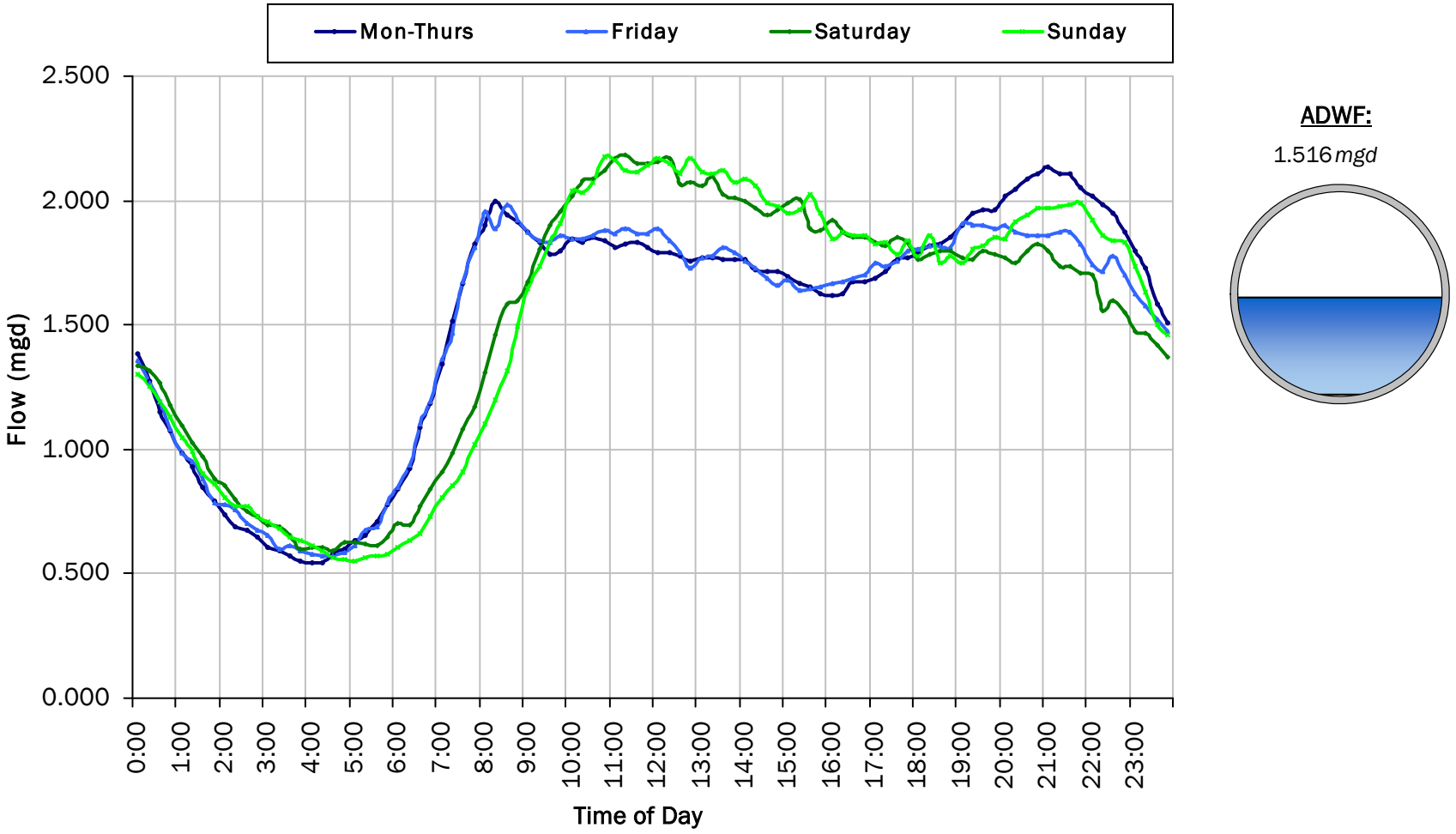
Flow Summary: 3/31/2022 to 4/12/2022

Period Rainfall: 0.00 inches Period Avg Flow: 1.540 mgd Period Peak Flow: 2.297 mgd Period Min Flow: 0.474 mgd



SITE 13

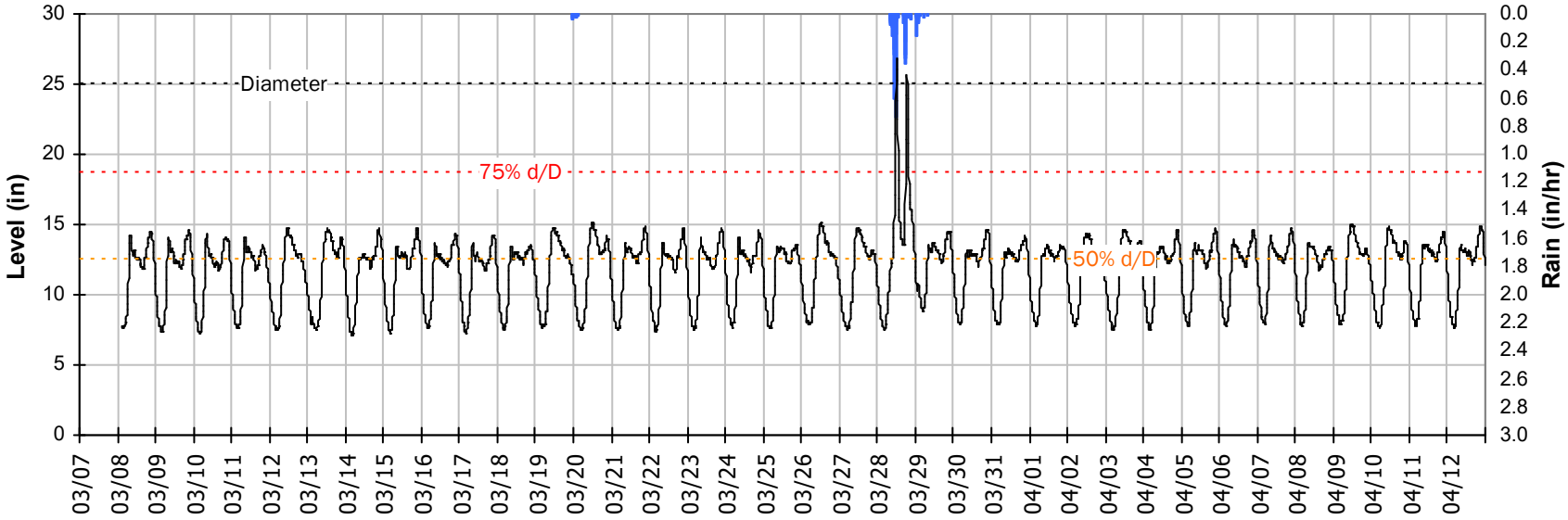
Average Dry Weather Flow Hydrographs

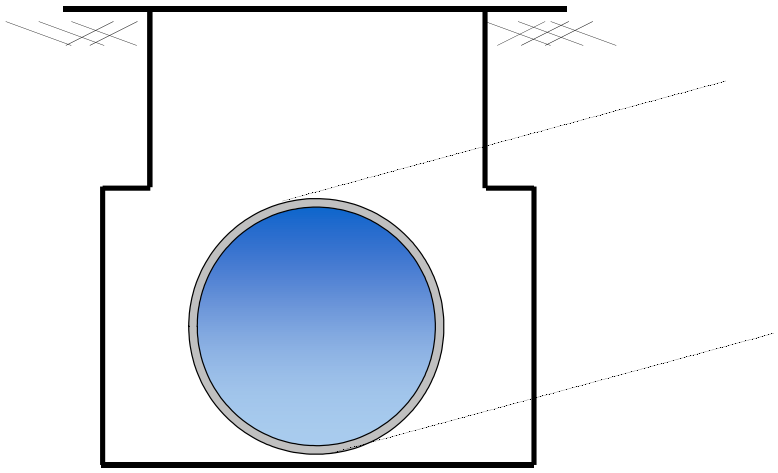


SITE 13

Site Capacity and Surcharge Summary

Realtime Flow Levels with Rainfall Data over Monitoring Period



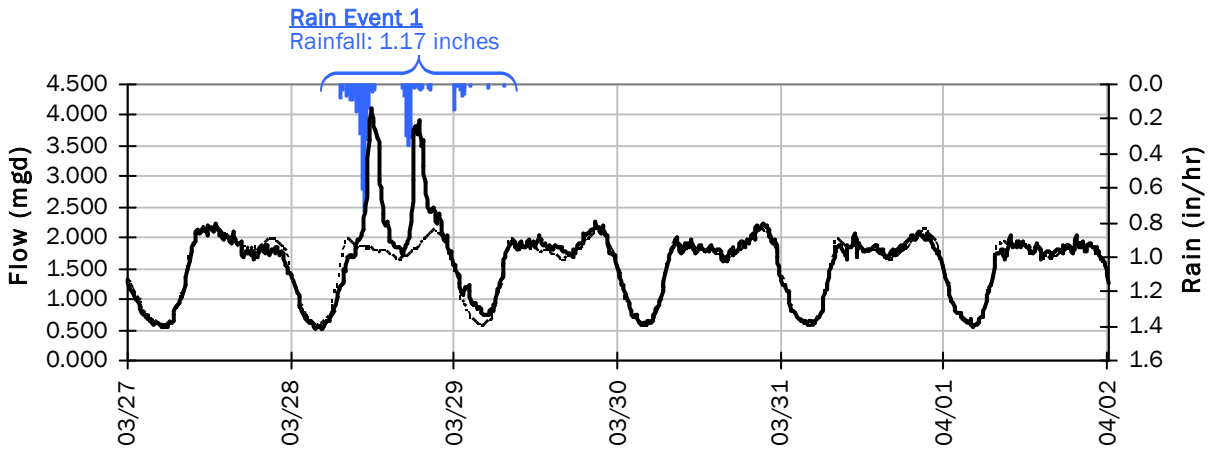


Pipe Diameter:	25	*inches*
Peak Measured Level:	26.8	*inches*
Peak d/D Ratio:	1.07	

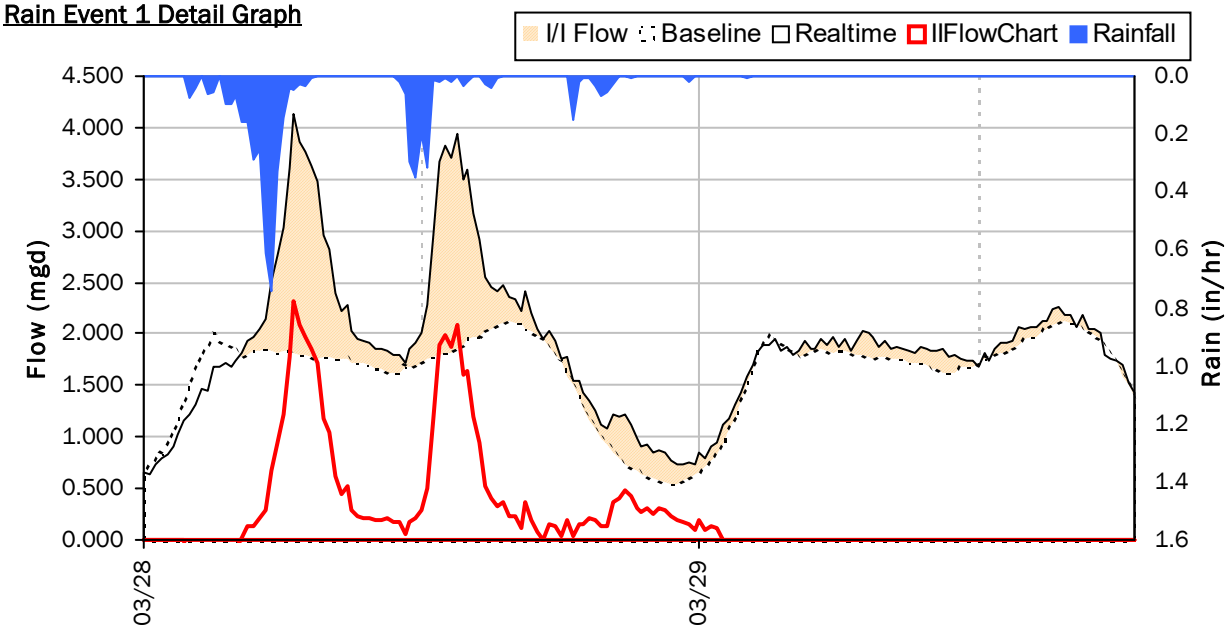
Surcharged 1.8 inches over crown

SITE 13
I/I Summary: Rain Event 1

Baseline and Realtime Flows with Rainfall Data over Monitoring Period



Rain Event 1 Detail Graph



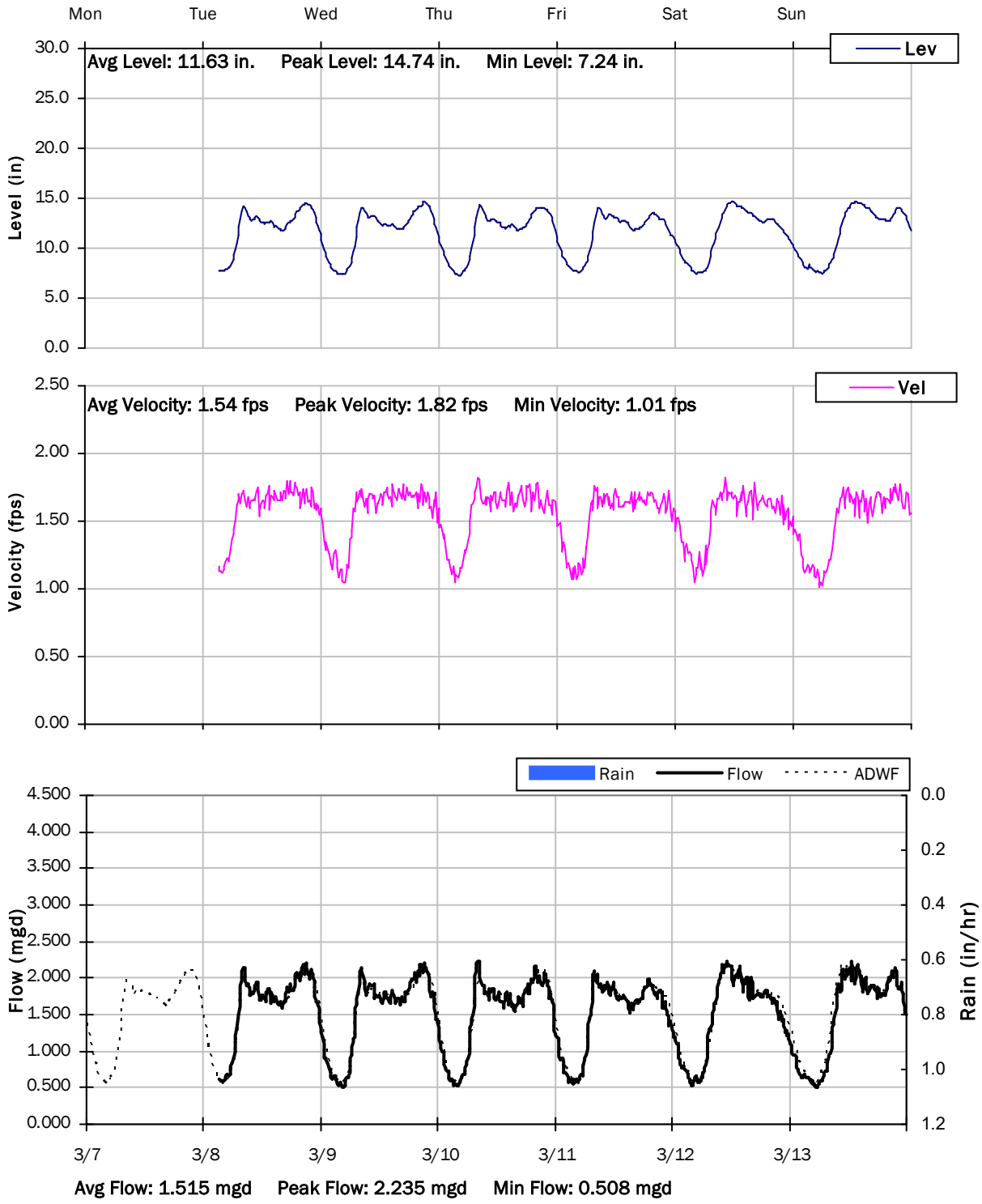
Storm Event I/I Analysis (Rain = 1.17 inches)

Capacity		Inflow / Infiltration	
Peak Flow:	4.127 *mgd*	**Peak I/I Rate:**	2.315 *mgd*
PF:	2.72	**Total I/I:**	451,000 *gallons*
Peak Level:	26.84 *in*		
d/D Ratio:	2.06		

SITE 13

Weekly Level, Velocity and Flow Hydrographs

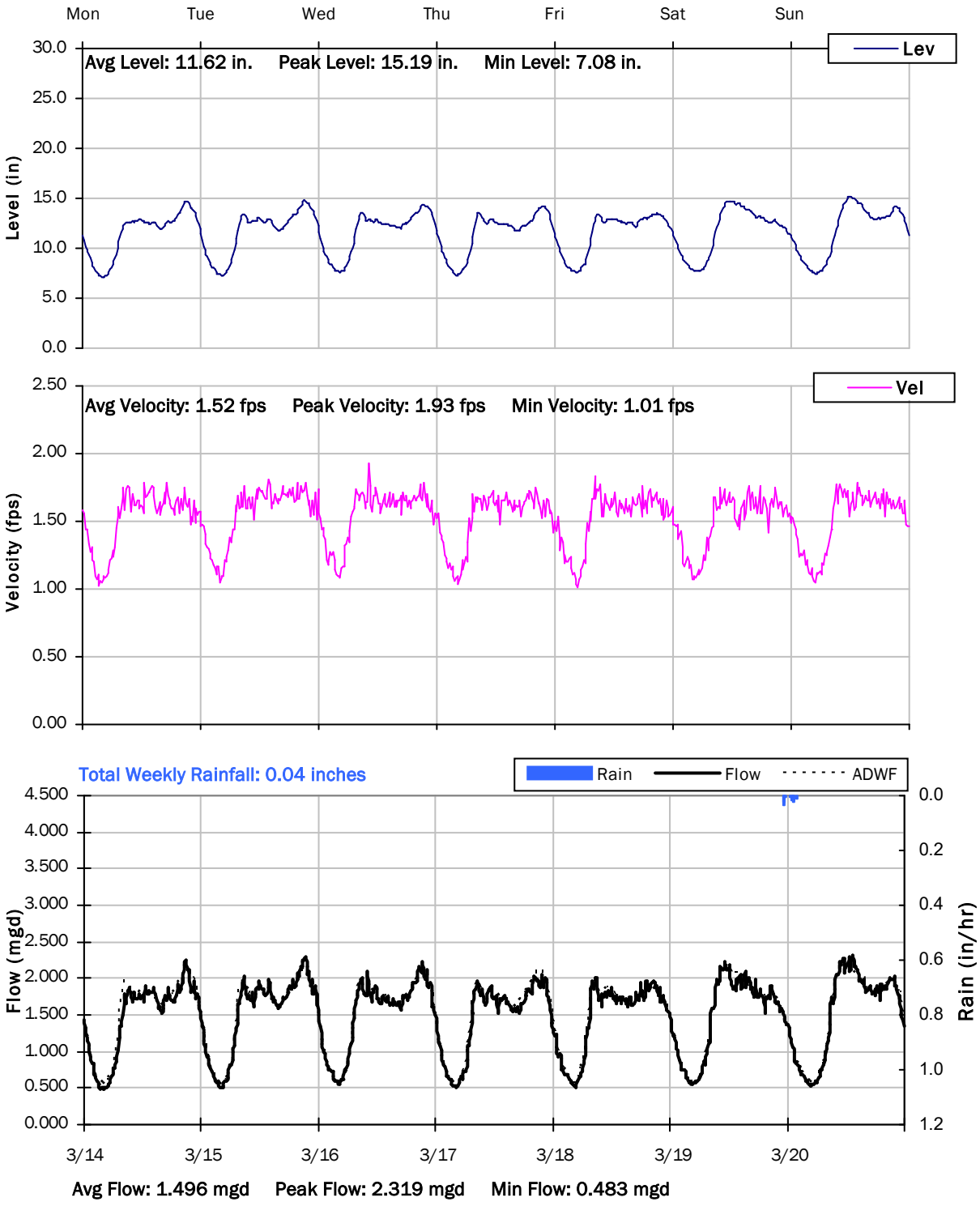
3/7/2022 to 3/14/2022



SITE 13

Weekly Level, Velocity and Flow Hydrographs

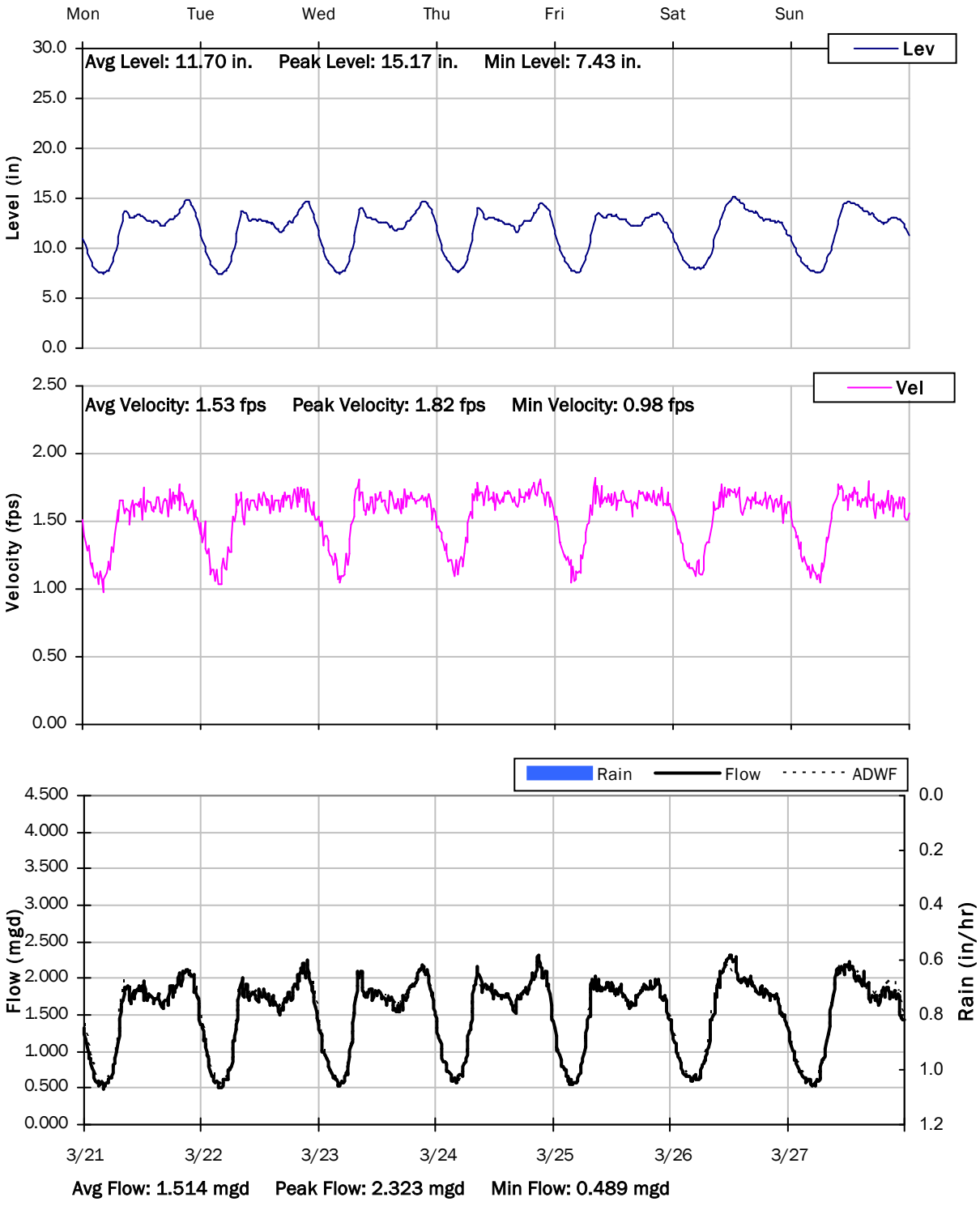
3/14/2022 to 3/21/2022



SITE 13

Weekly Level, Velocity and Flow Hydrographs

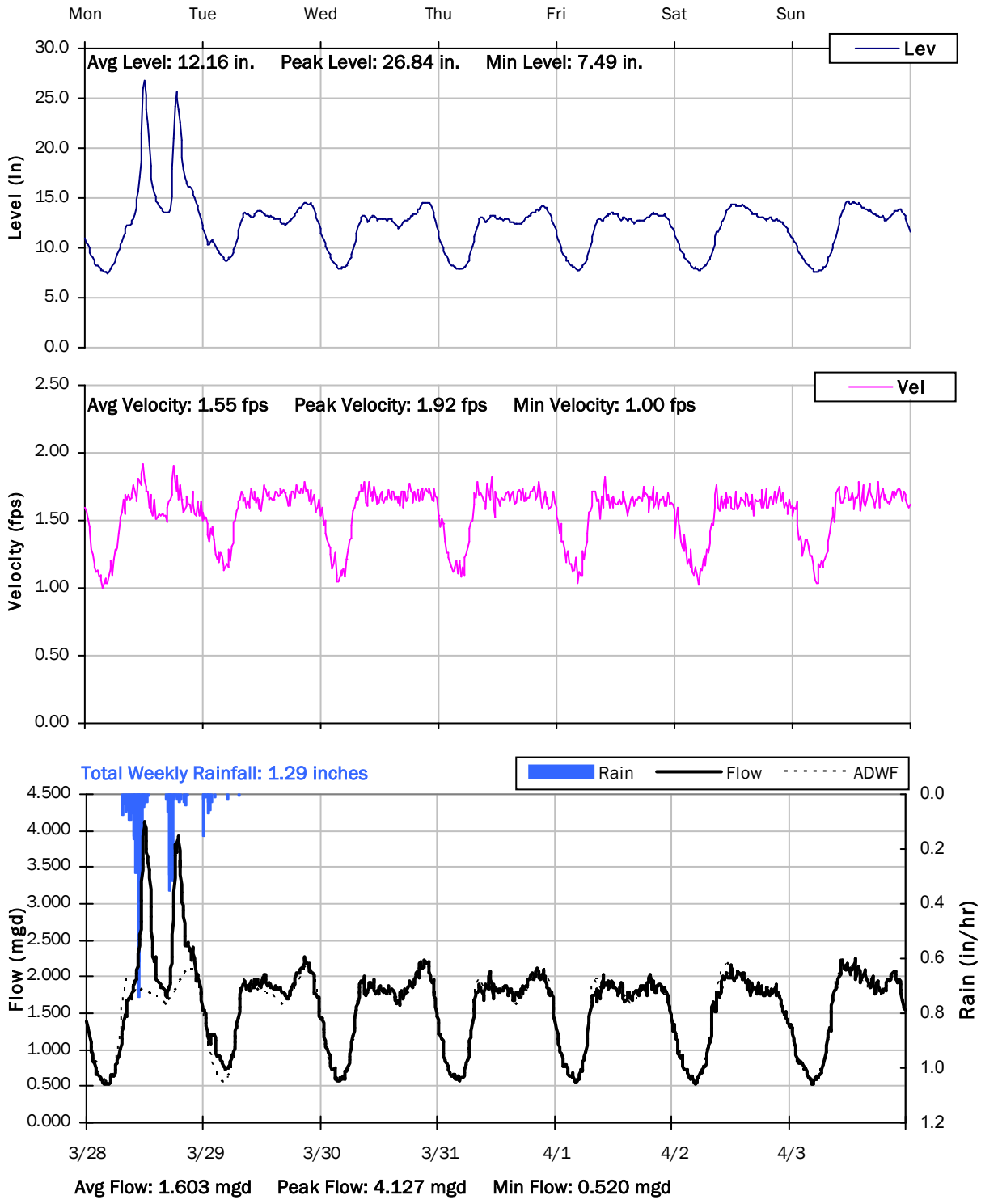
3/21/2022 to 3/28/2022



SITE 13

Weekly Level, Velocity and Flow Hydrographs

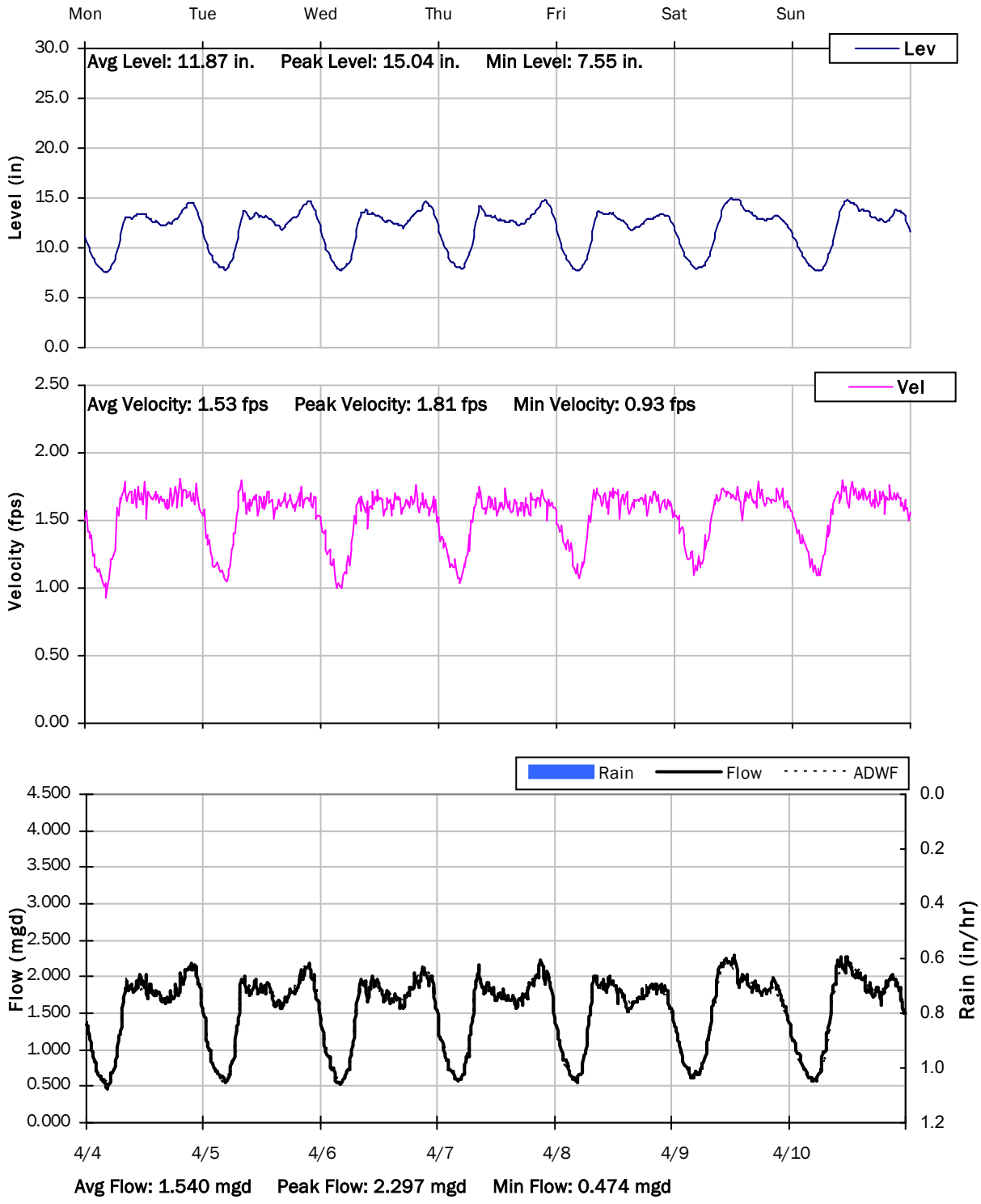
3/28/2022 to 4/4/2022



SITE 13

Weekly Level, Velocity and Flow Hydrographs

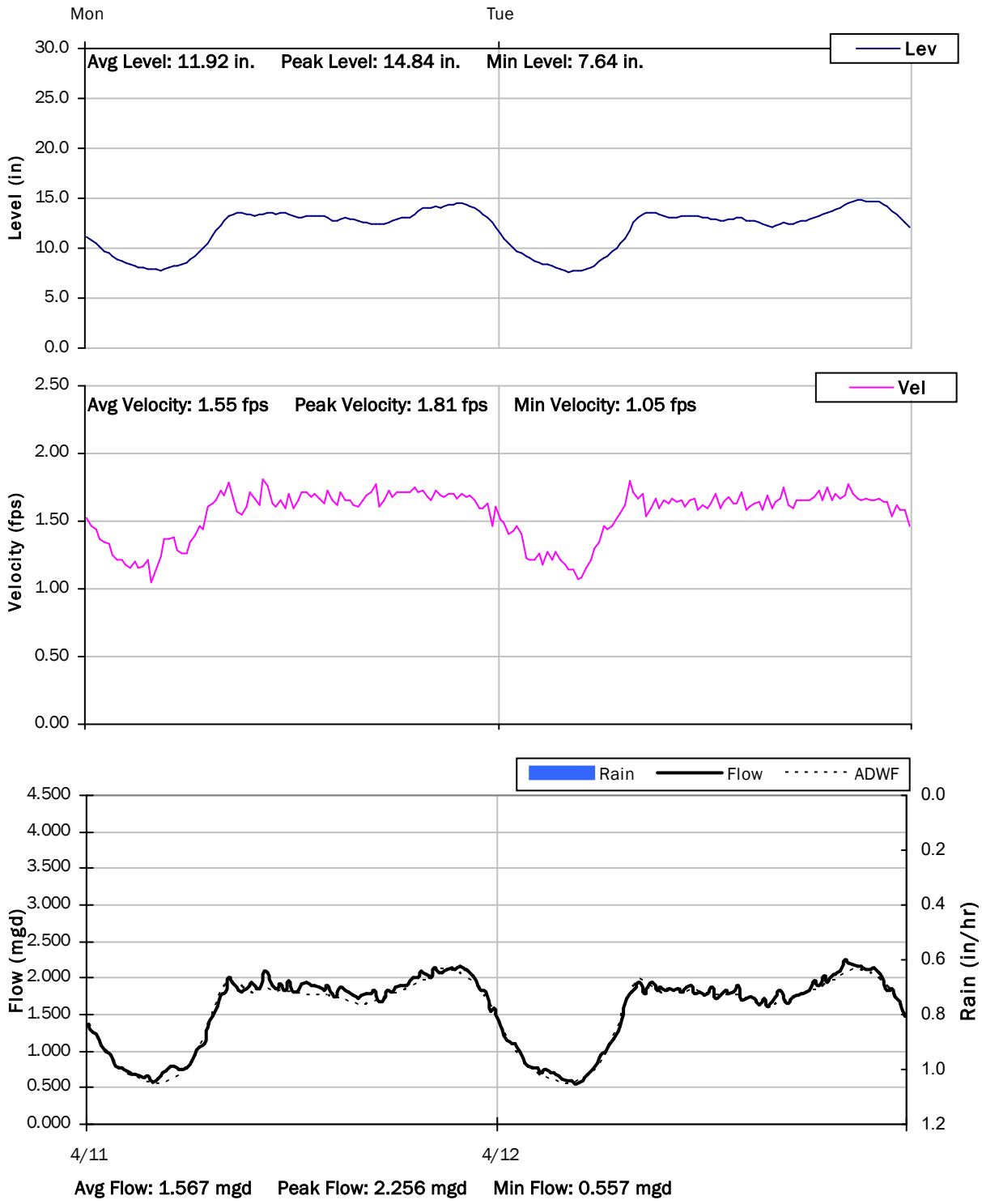
4/4/2022 to 4/11/2022



SITE 13

Weekly Level, Velocity and Flow Hydrographs

4/11/2022 to 4/13/2022



Monitoring Site: Site 14

Carollo Gardena, California

Sanitary Sewer Flow Monitoring

March 07, 2022 - April 12, 2022

Location: S Manhattan Place north of 166th Street

Data Summary Report

Vicinity Map: Site 14

SITE 14

Site Information MH ID: 05 1299

Location: S Manhattan Place north of 166th Street

Coordinates: 118.3104° W, 33.8807° N

Rim Elevation (Earth): 39 feet

Expected Pipe Diameter: 27 inches

Measured Pipe Diameter: 28 inches

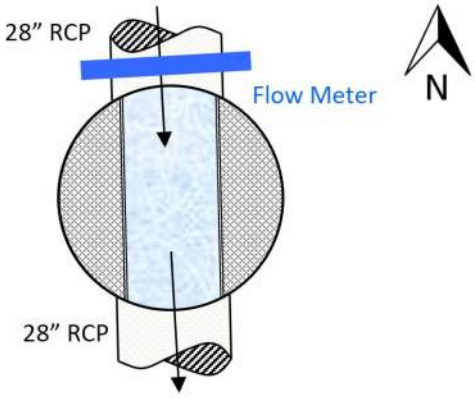
ADWF: 2.669 mgd

Peak Measured Flow: 6.470 mgd

Sediment: 1.5 inches

Satellite Map

Sanitary Map



Flow Sketch

Street View

Plan View

SITE 14

Additional Site Photos

Effluent Pipe

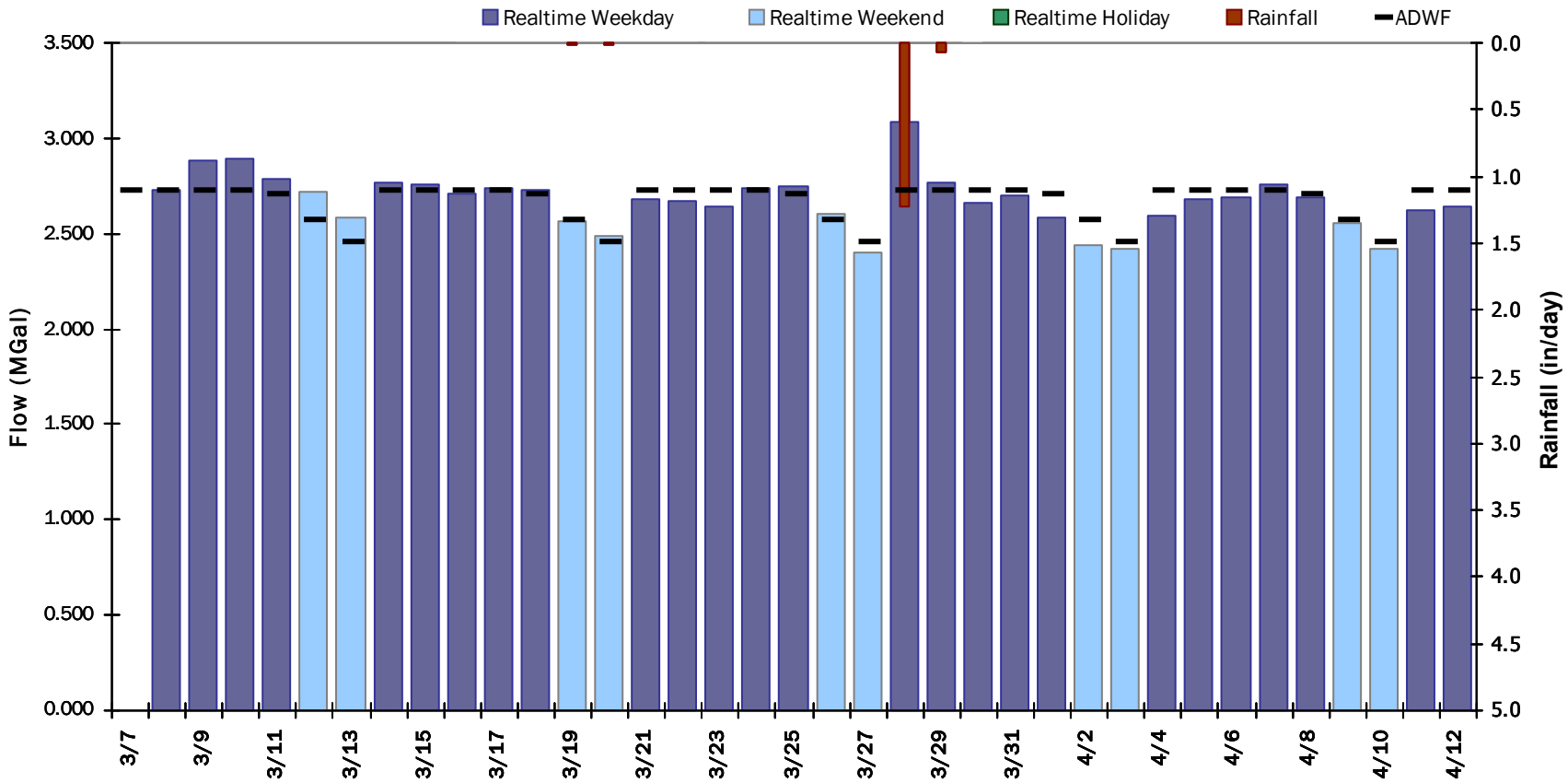
Monitored Influent Pipe

SITE 14

Period Flow Summary: Daily Flow Totals

Avg Daily Flow: 2.671 MGal Peak Daily Flow: 3.087 MGal Min Daily Flow: 2.402 MGal

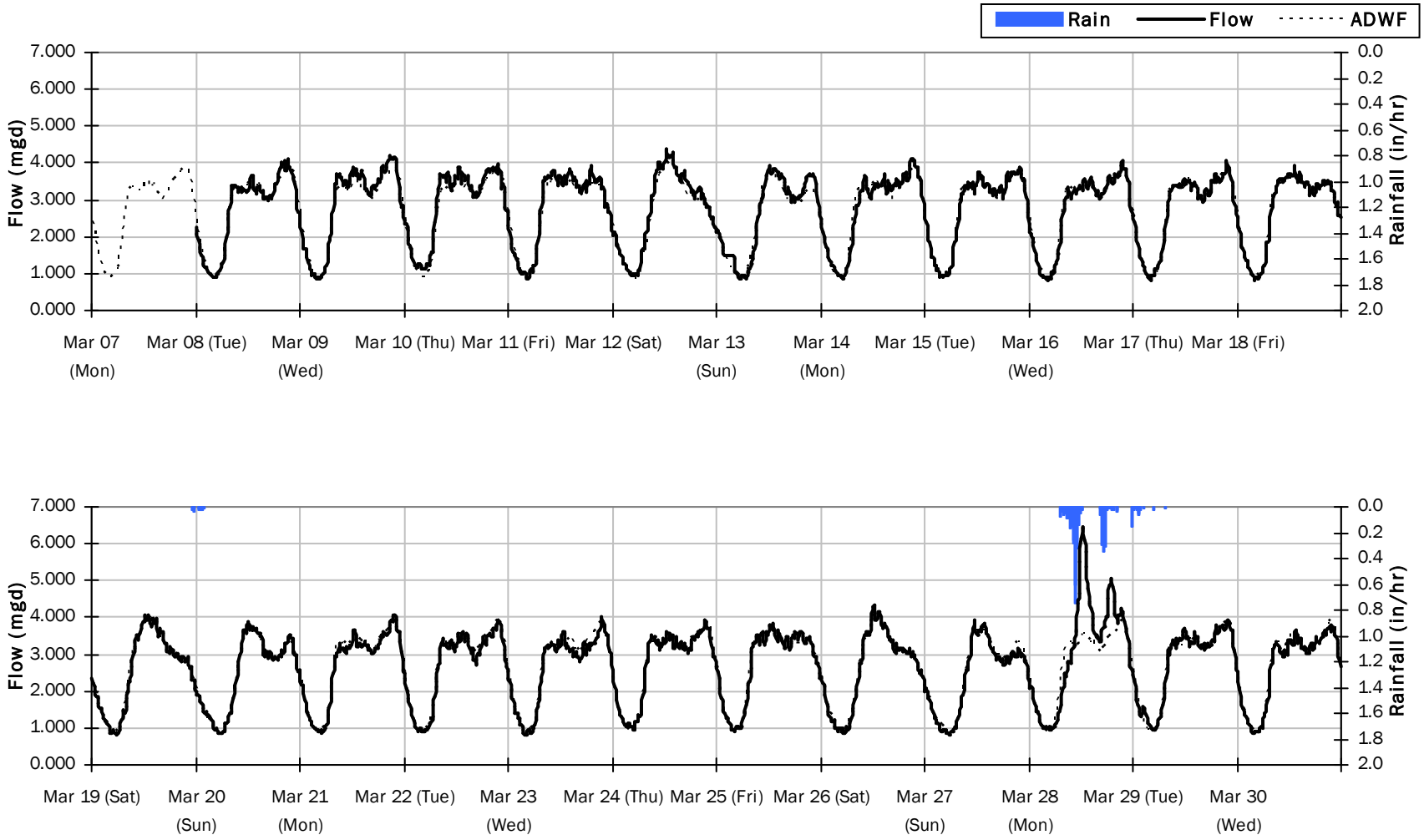
Total Rainfall: 1.33 inches



SITE 14

Flow Summary: 3/7/2022 to 3/30/2022

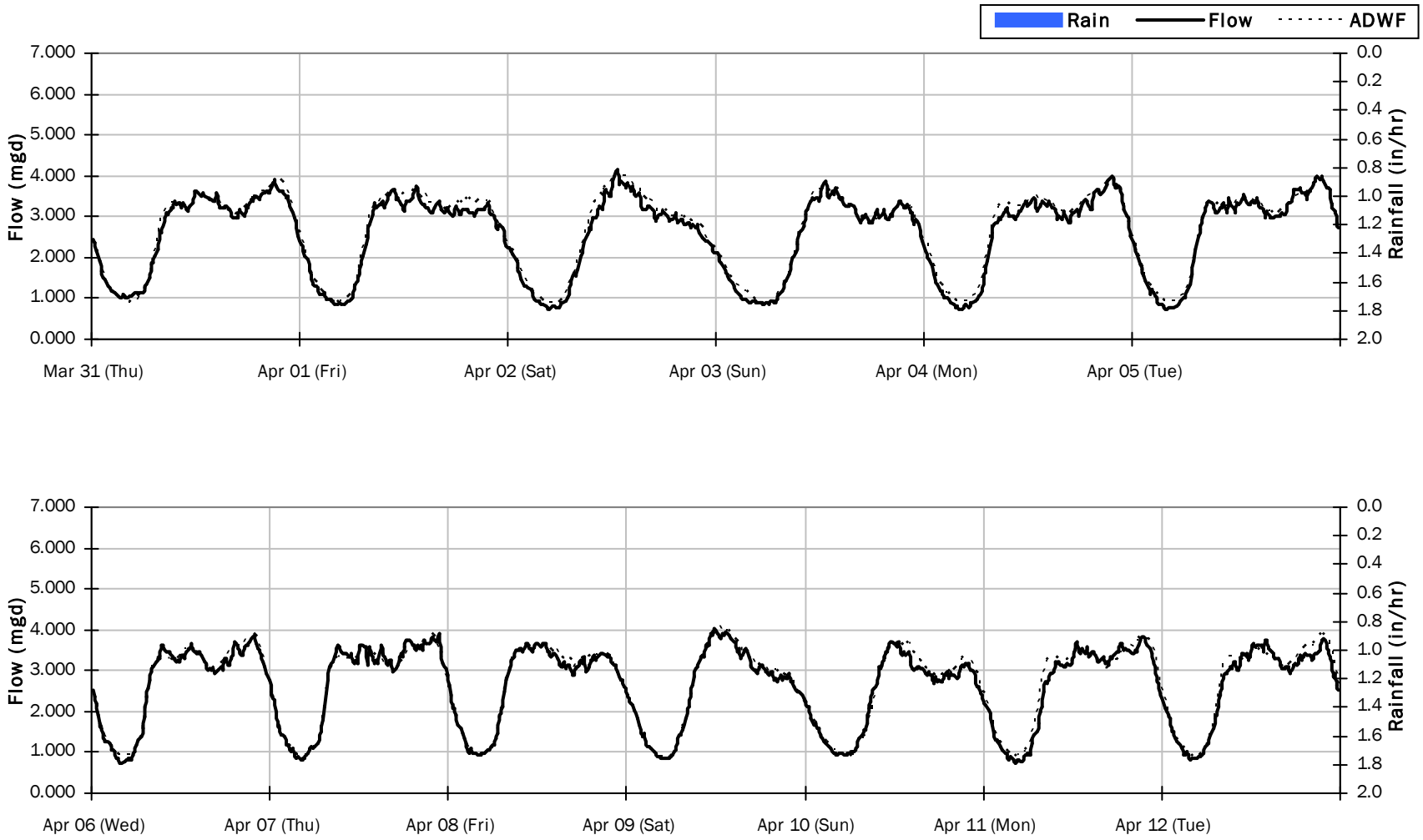
Period Rainfall: 1.33 inches Period Avg Flow: 2.712 mgd Period Peak Flow: 6.470 mgd Period Min Flow: 0.791 mgd



SITE 14

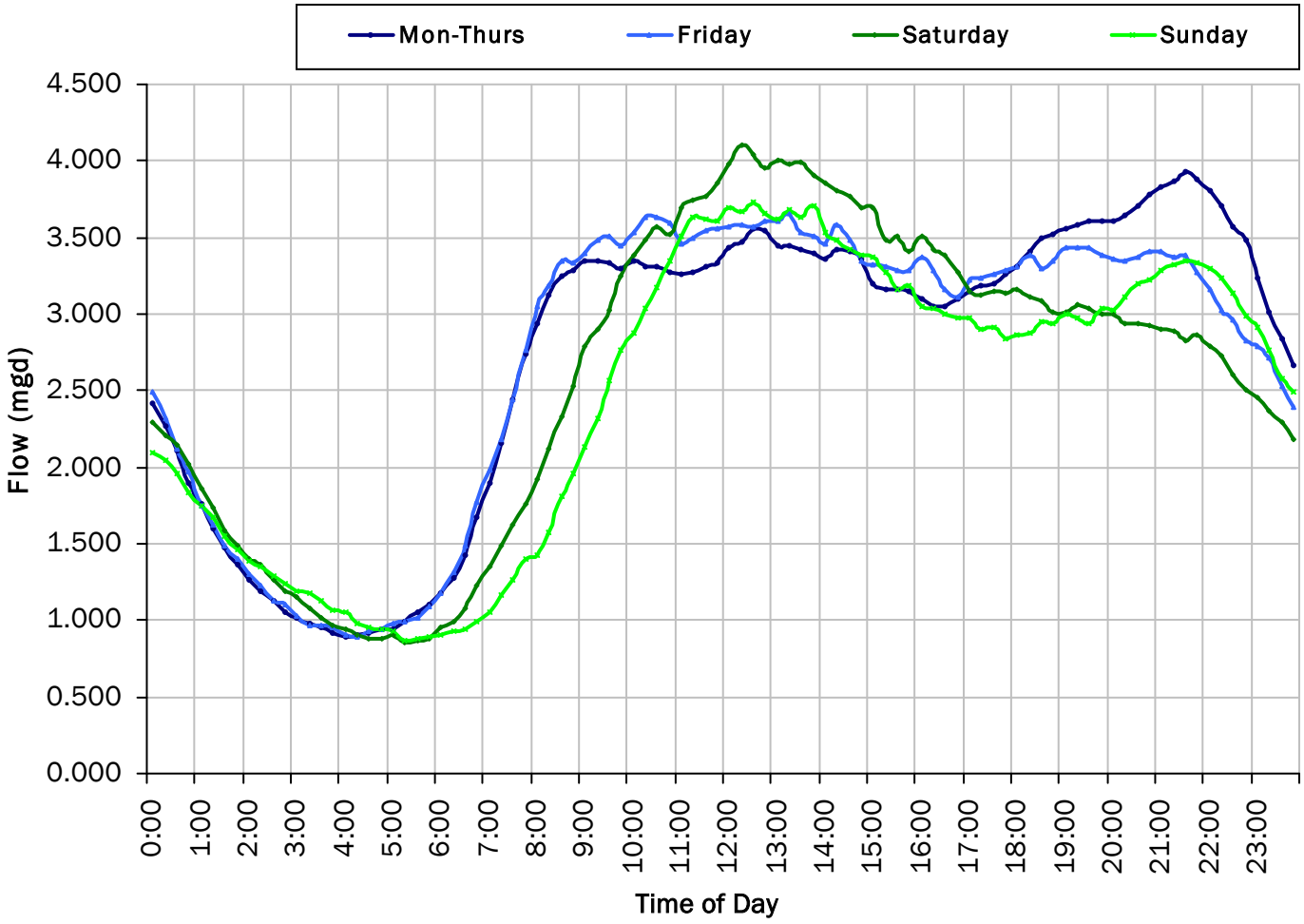
Flow Summary: 3/31/2022 to 4/12/2022

Period Rainfall: 0.00 inches Period Avg Flow: 2.600 mgd Period Peak Flow: 4.161 mgd Period Min Flow: 0.719 mgd



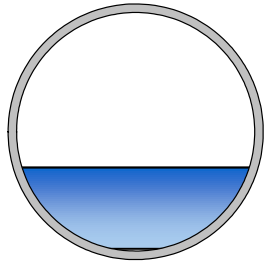
SITE 14

Average Dry Weather Flow Hydrographs



ADWF:

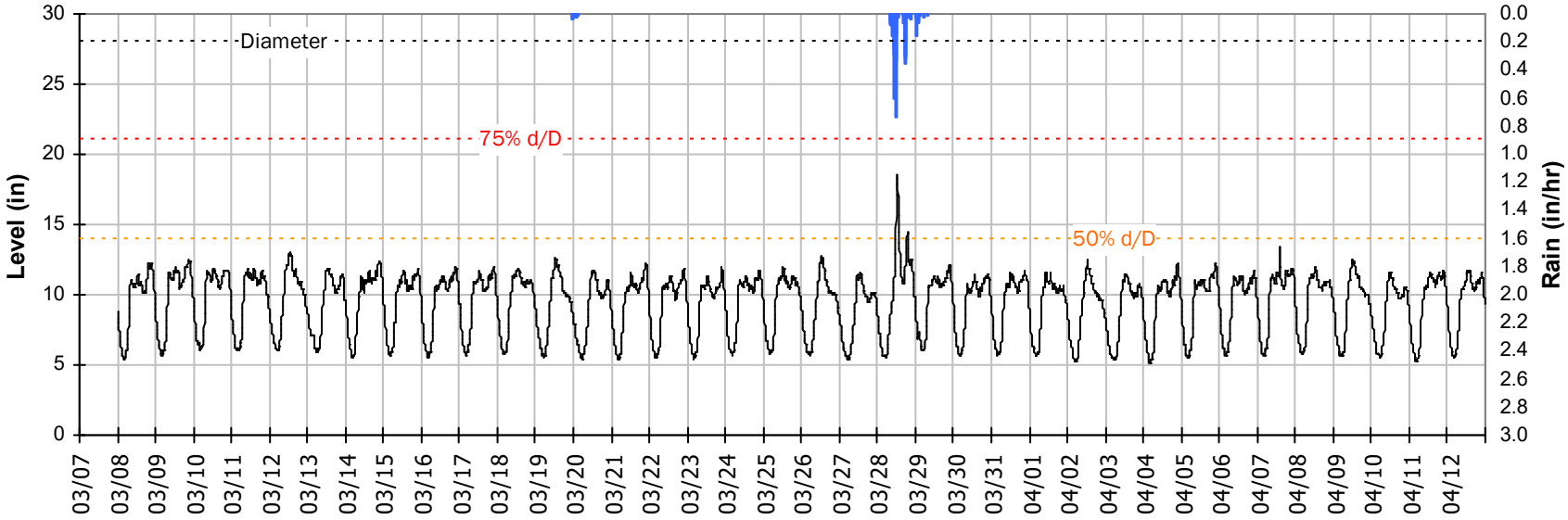
2.669 *mgd*

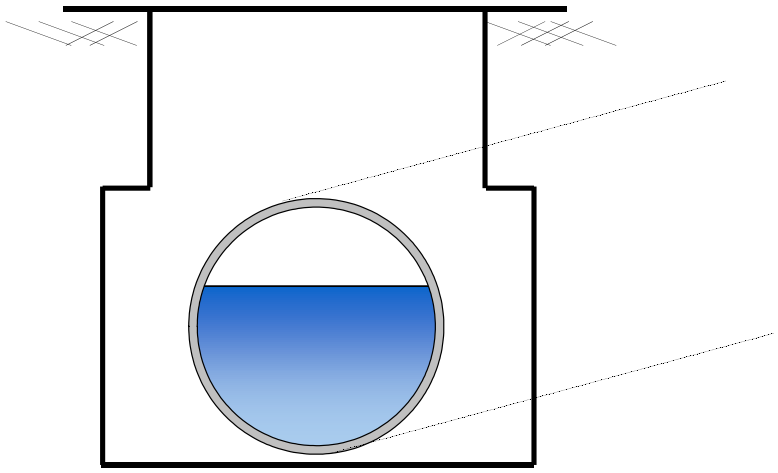


SITE 14

Site Capacity and Surcharge Summary

Realtime Flow Levels with Rainfall Data over Monitoring Period

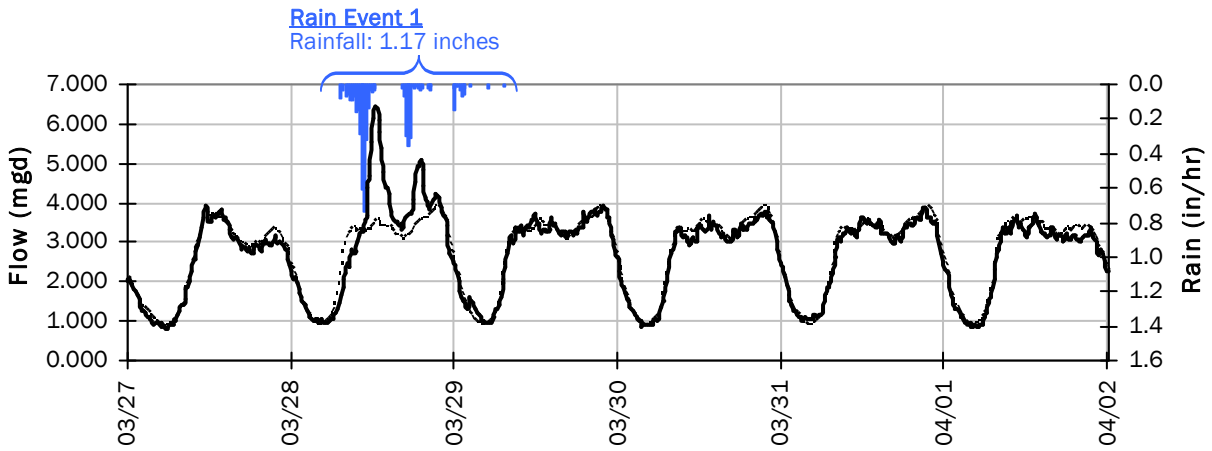




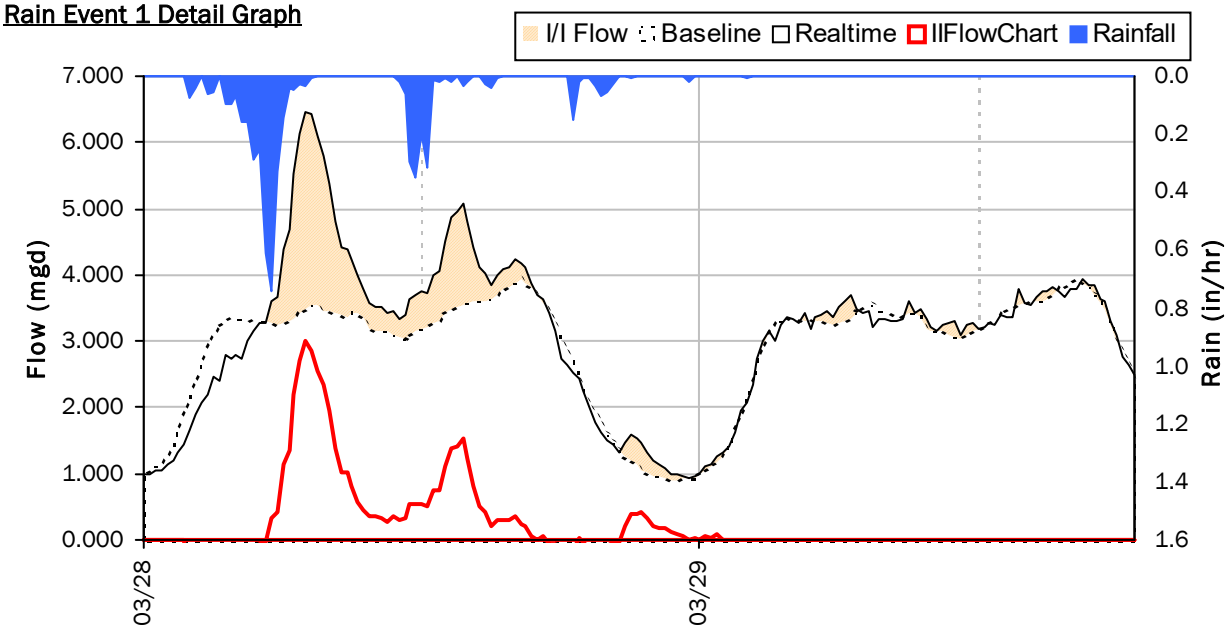
Pipe Diameter:	28	*inches*
Peak Measured Level:	18.5	*inches*
Peak d/D Ratio:	0.66	

SITE 14
I/I Summary: Rain Event 1

Baseline and Realtime Flows with Rainfall Data over Monitoring Period



Rain Event 1 Detail Graph



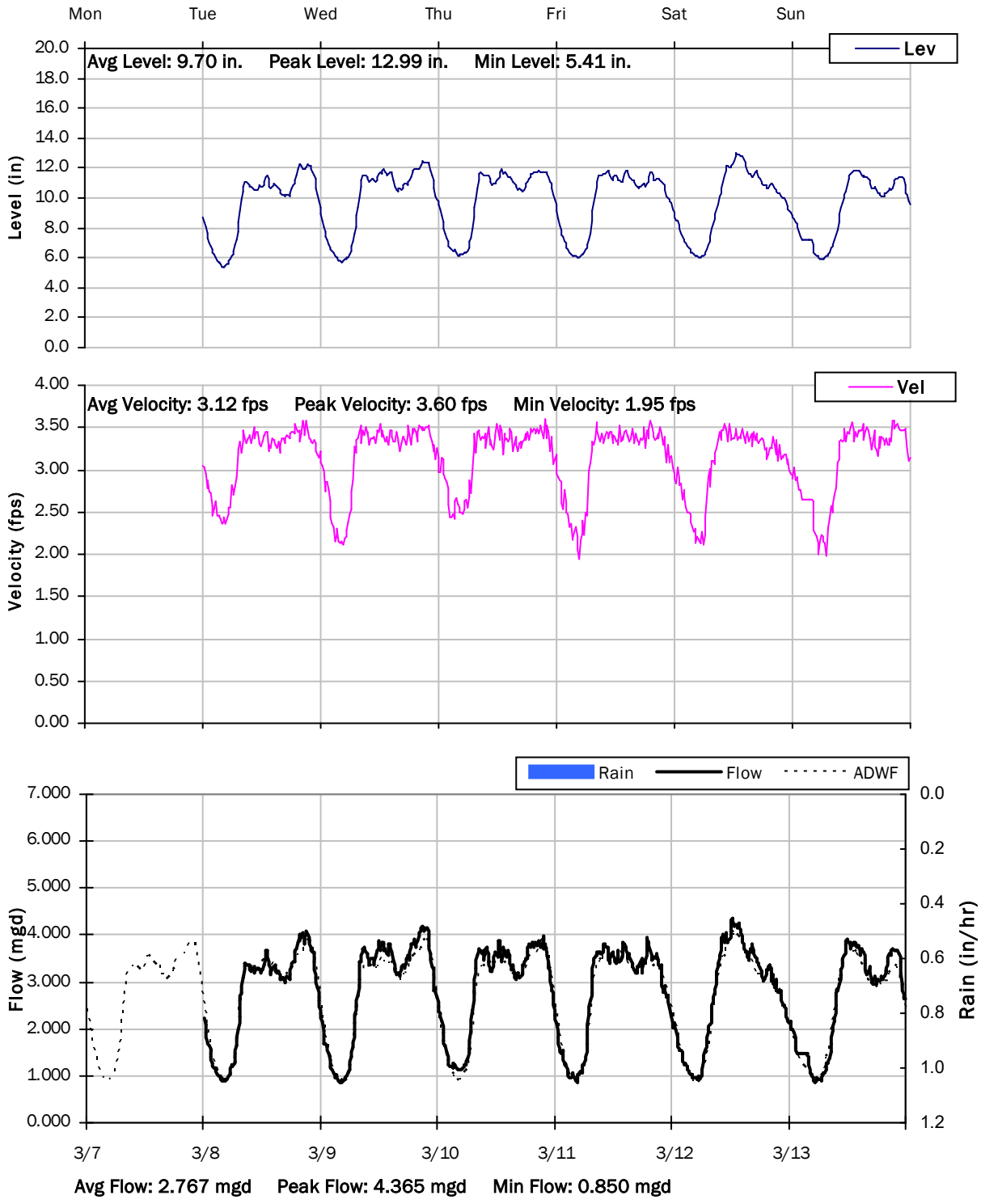
Storm Event I/I Analysis (Rain = 1.17 inches)

Capacity		Inflow / Infiltration	
Peak Flow:	6.470 *mgd*	**Peak I/I Rate:**	2.996 *mgd*
PF:	2.42	**Total I/I:**	386,000 *gallons*
Peak Level:	18.49 *in*		
d/D Ratio:	0.66		

SITE 14

Weekly Level, Velocity and Flow Hydrographs

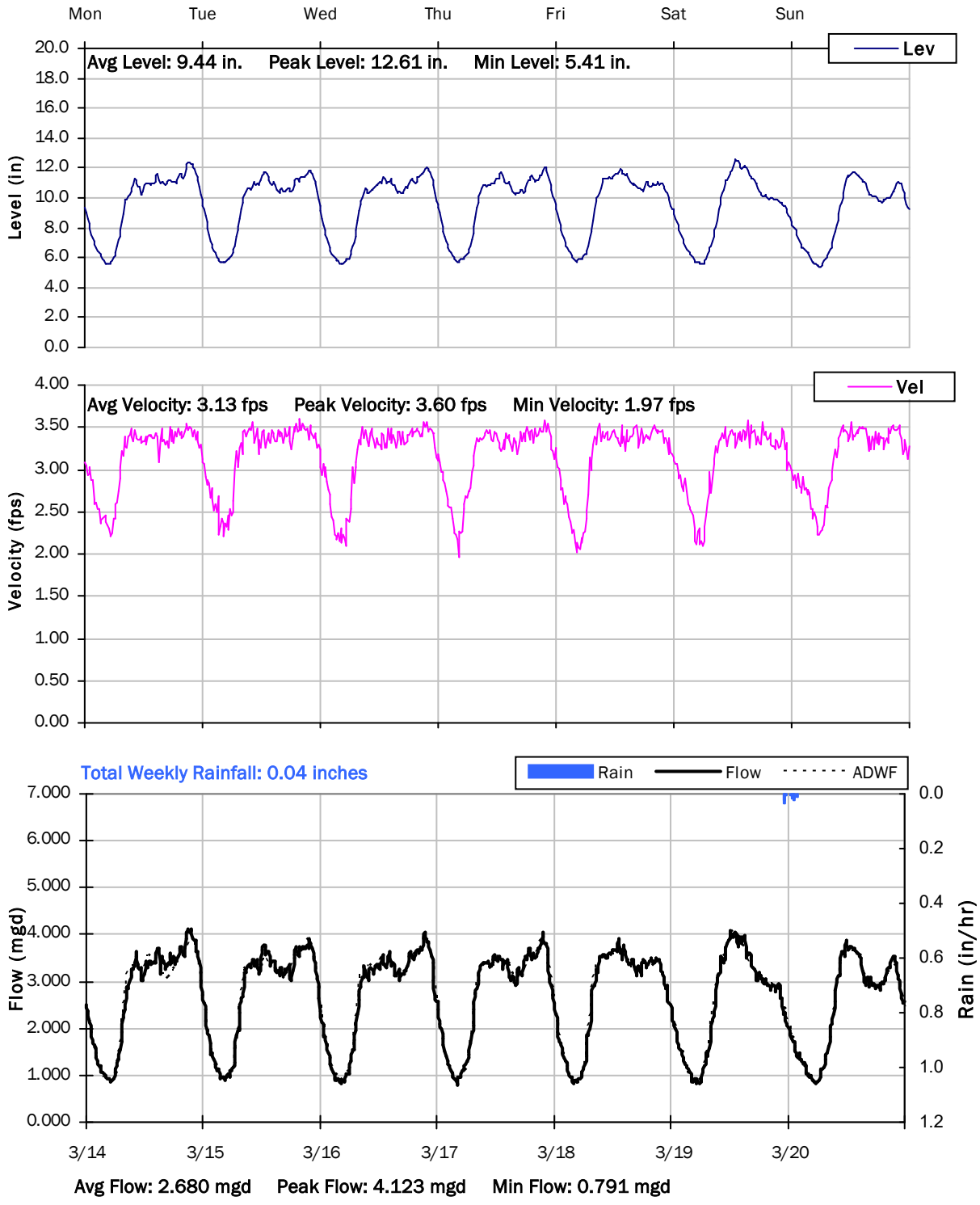
3/7/2022 to 3/14/2022



SITE 14

Weekly Level, Velocity and Flow Hydrographs

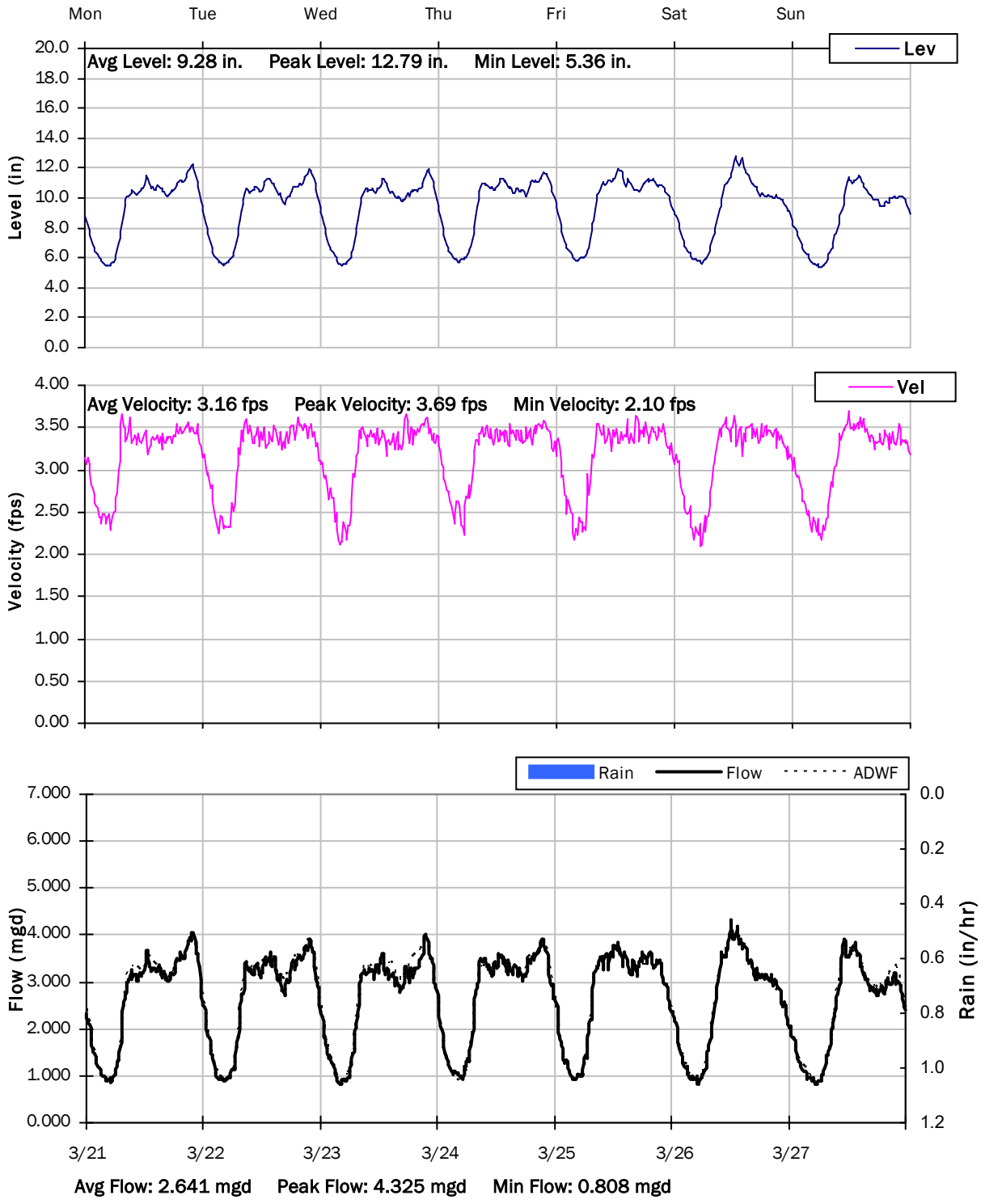
3/14/2022 to 3/21/2022



SITE 14

Weekly Level, Velocity and Flow Hydrographs

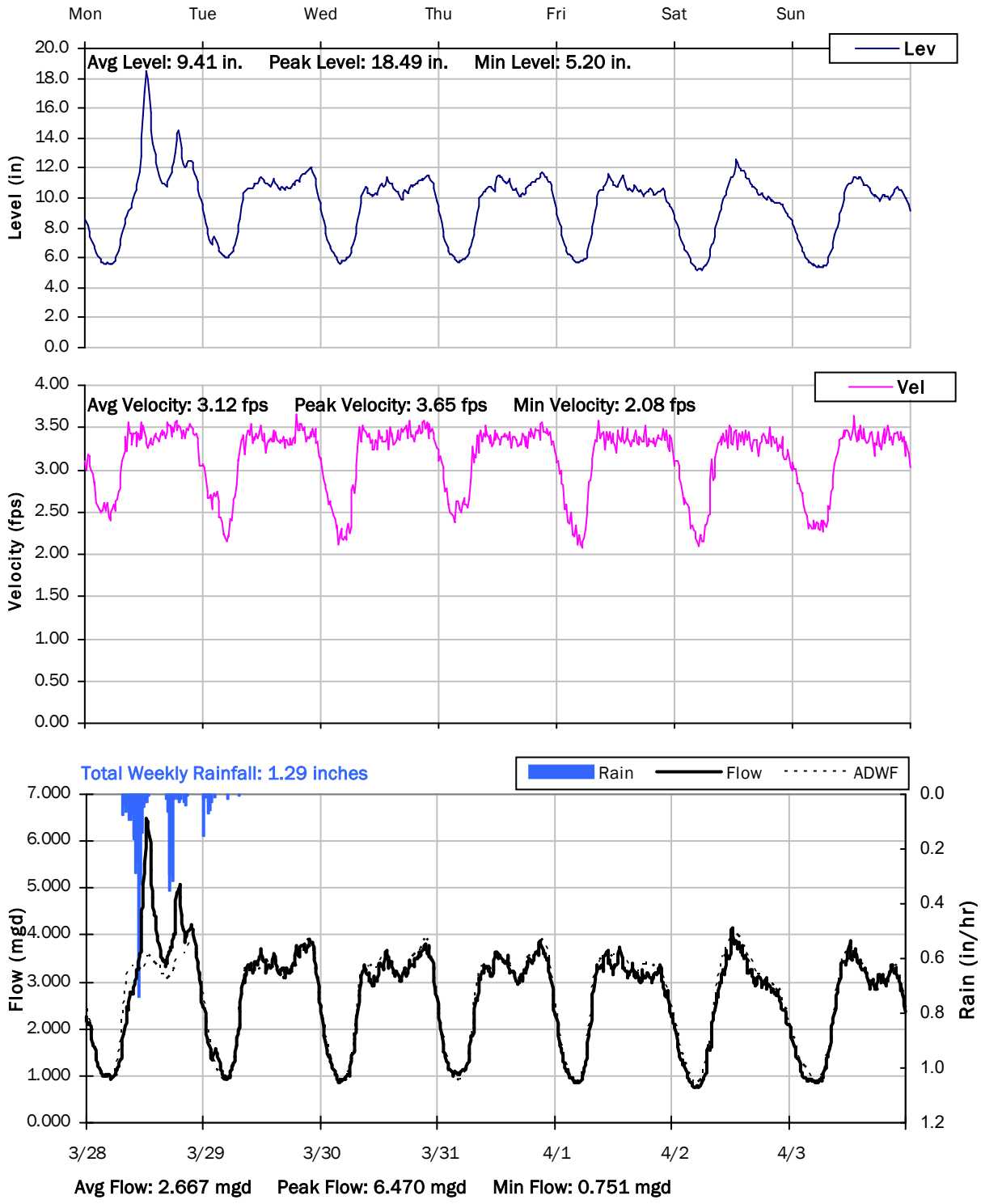
3/21/2022 to 3/28/2022



SITE 14

Weekly Level, Velocity and Flow Hydrographs

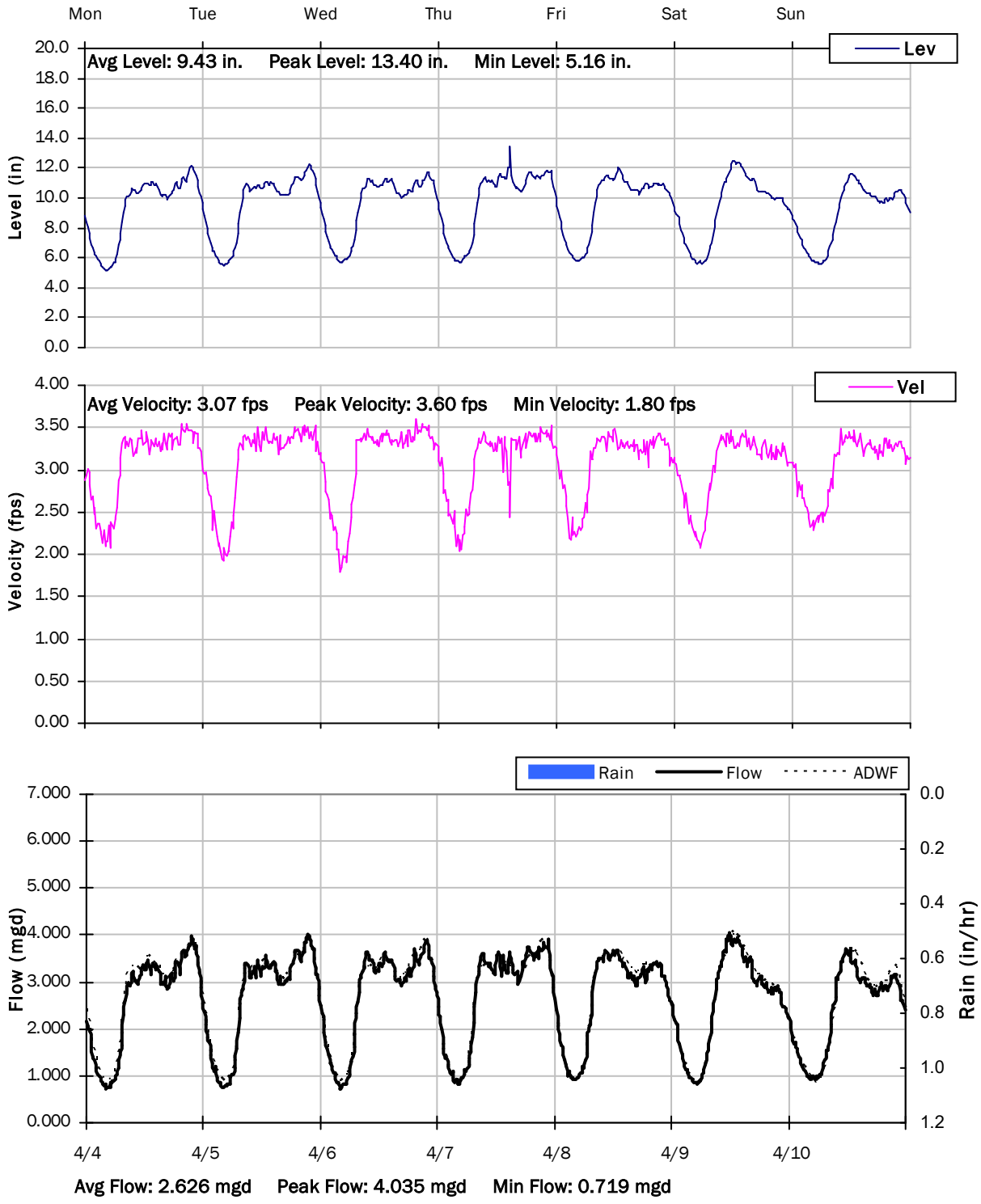
3/28/2022 to 4/4/2022



SITE 14

Weekly Level, Velocity and Flow Hydrographs

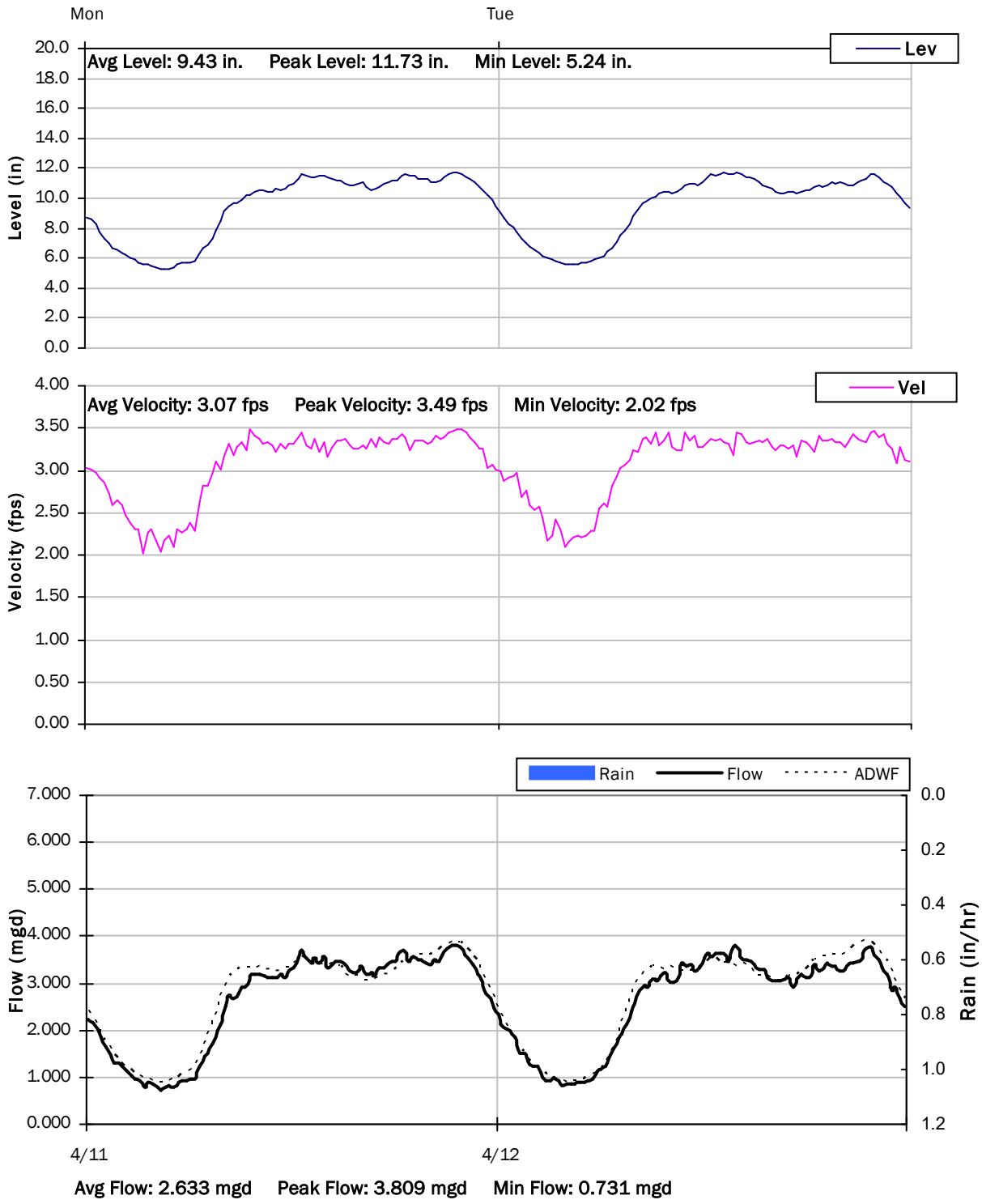
4/4/2022 to 4/11/2022



SITE 14

Weekly Level, Velocity and Flow Hydrographs

4/11/2022 to 4/13/2022



Monitoring Site: Site 15

Carollo Gardena, California

Sanitary Sewer Flow Monitoring

March 07, 2022 - April 12, 2022

Location: W 134th Place and Spring Avenue

Data Summary Report

Vicinity Map: Site 15

SITE 15

Site Information MH ID: 05 1168

Location: W 134th Place and Spring Avenue

Coordinates: 118.3188° W, 33.9099° N

Rim Elevation (Earth): 48 feet

Expected Pipe Diameter: 15 inches

Measured Pipe Diameter: 18 inches

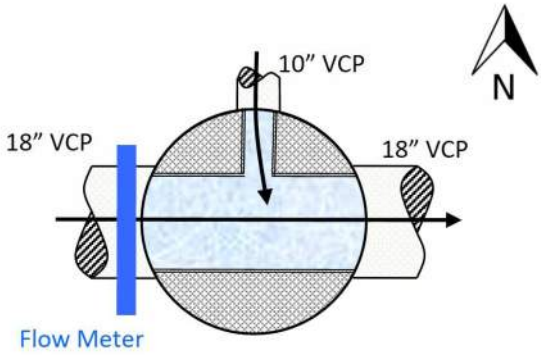
ADWF: 0.130 mgd

Peak Measured Flow: 0.690 mgd

Sediment: None

Satellite Map

Sanitary Map



Flow Sketch

Street View

Plan View

SITE 15

Additional Site Photos

Effluent Pipe

North Influent Pipe

SITE 15

Additional Site Photos

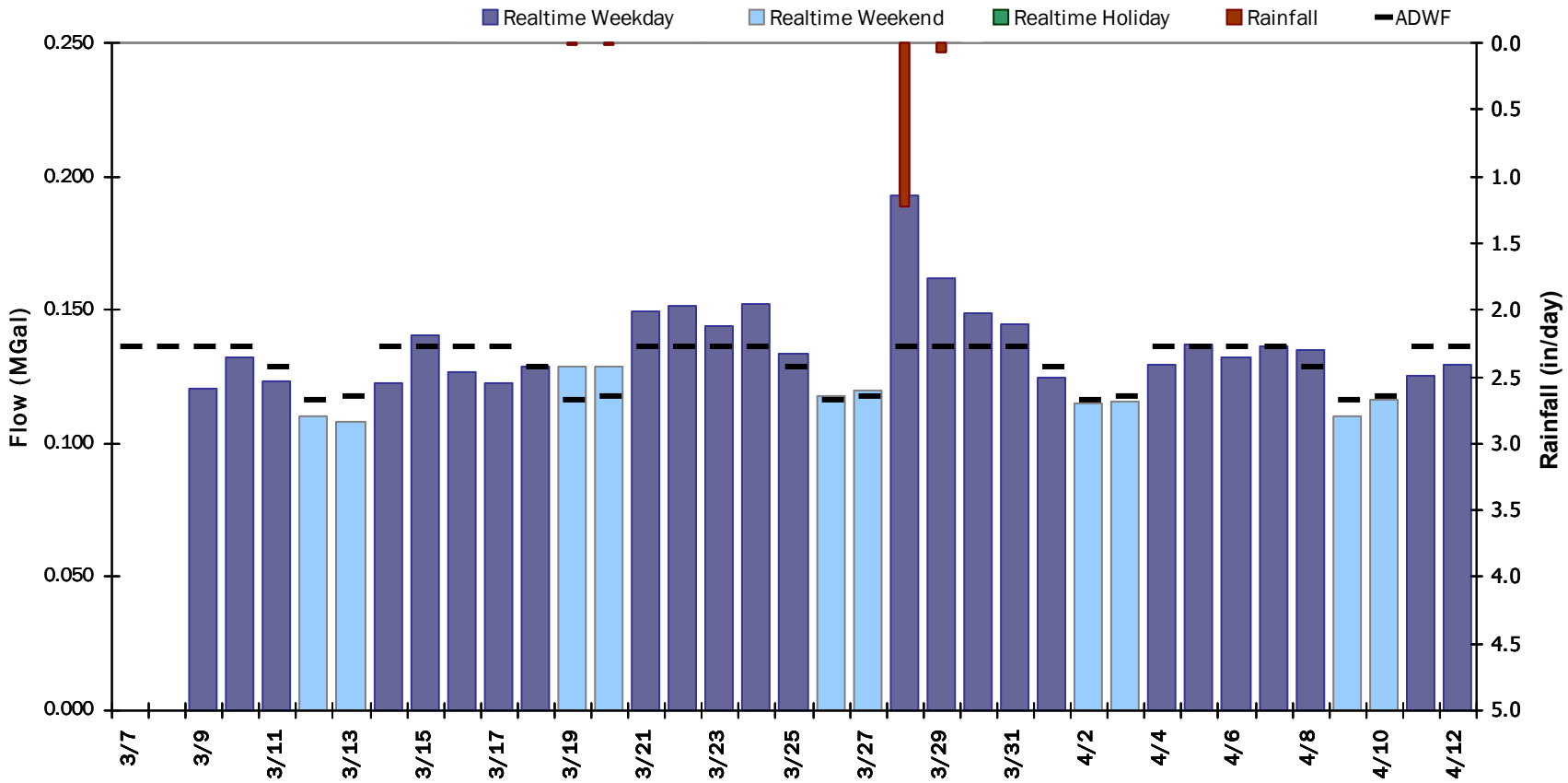
Monitored West Influent Pipe

SITE 15

Period Flow Summary: Daily Flow Totals

Avg Daily Flow: 0.132 MGal Peak Daily Flow: 0.193 MGal Min Daily Flow: 0.108 MGal

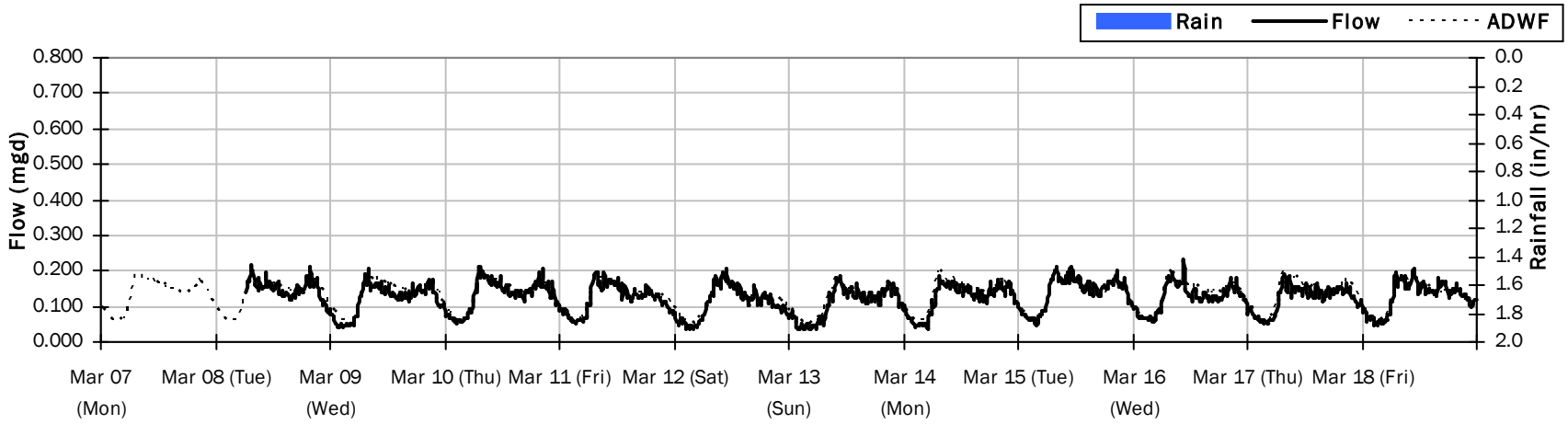
Total Rainfall: 1.33 inches

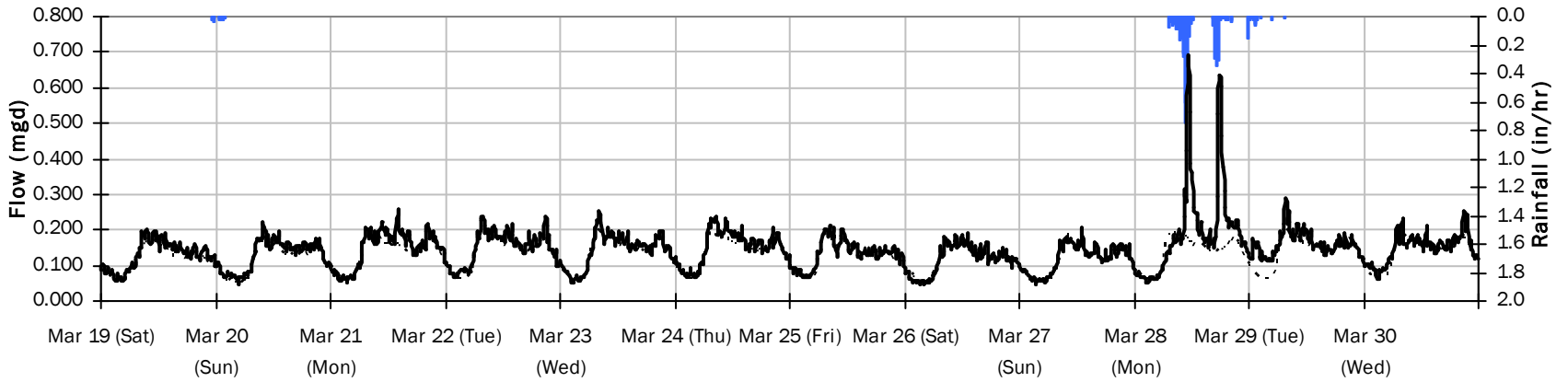


SITE 15

Flow Summary: 3/7/2022 to 3/30/2022

Period Rainfall: 1.33 inches Period Avg Flow: 0.135 mgd Period Peak Flow: 0.690 mgd Period Min Flow: 0.035 mgd

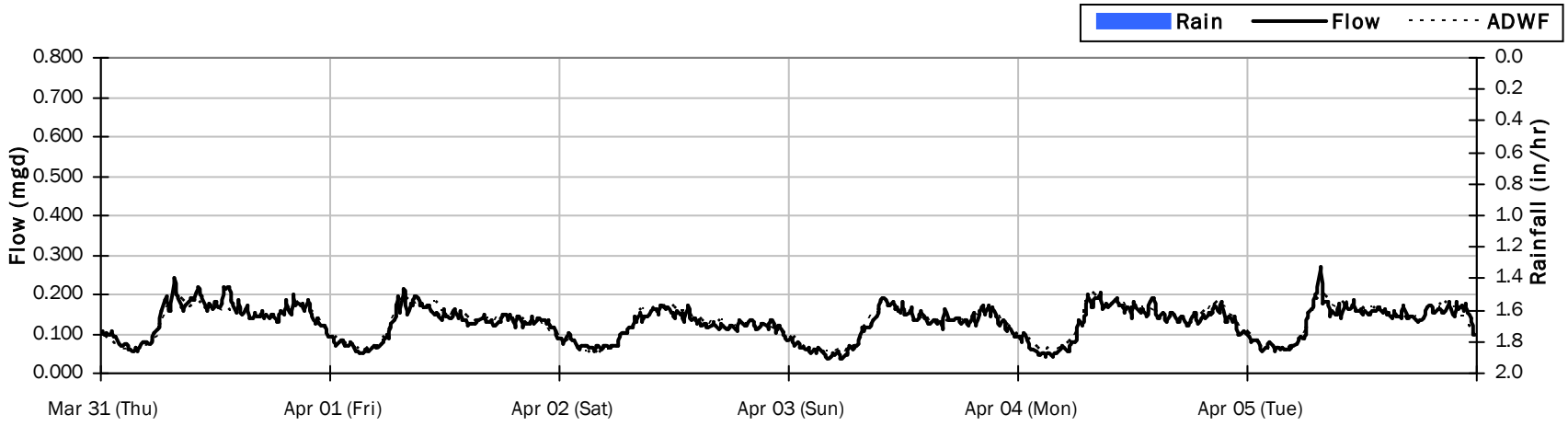


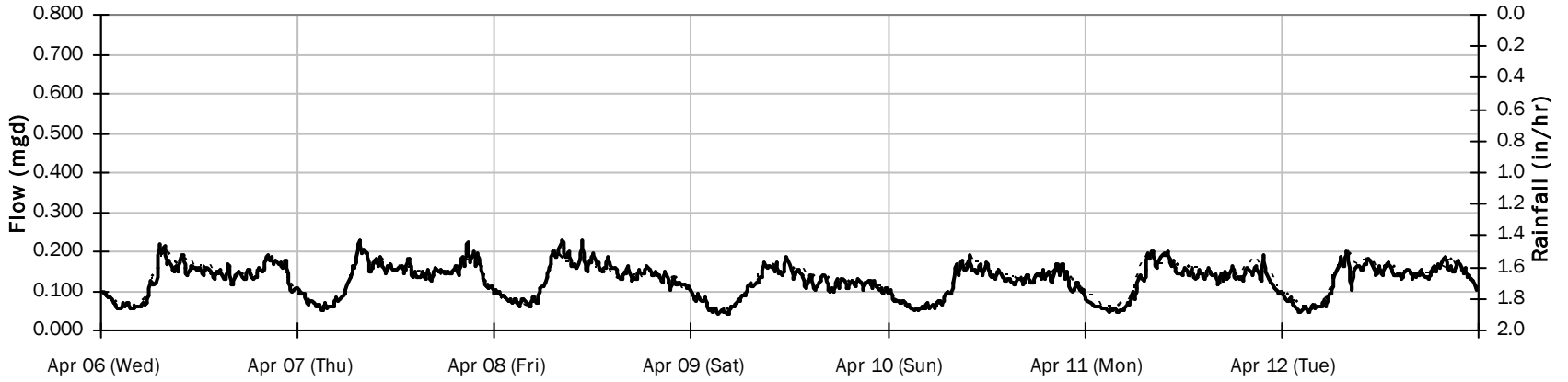


SITE 15

Flow Summary: 3/31/2022 to 4/12/2022

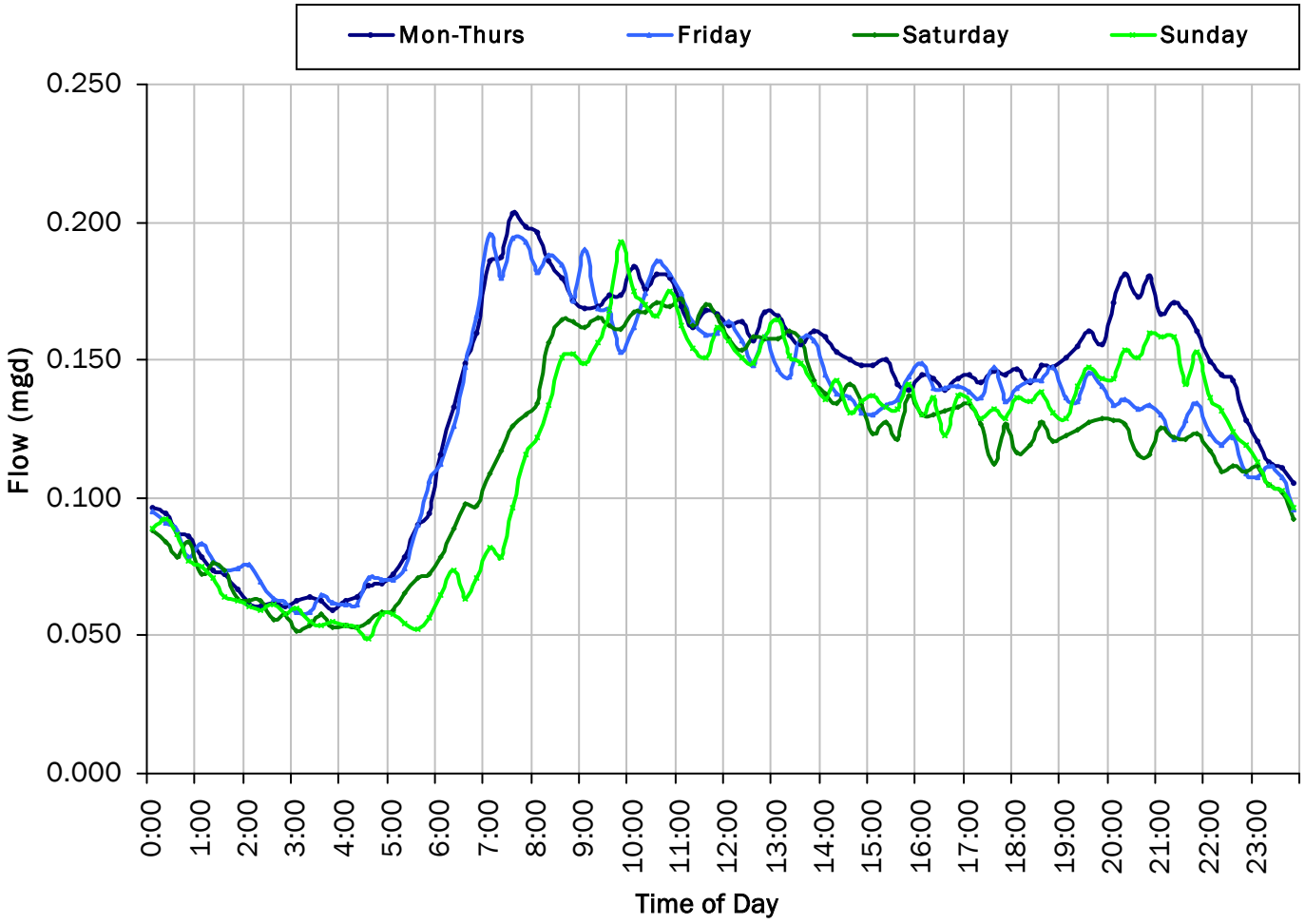
Period Rainfall: 0.00 inches Period Avg Flow: 0.127 mgd Period Peak Flow: 0.272 mgd Period Min Flow: 0.038 mgd





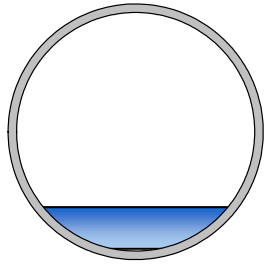
SITE 15

Average Dry Weather Flow Hydrographs



ADWF:

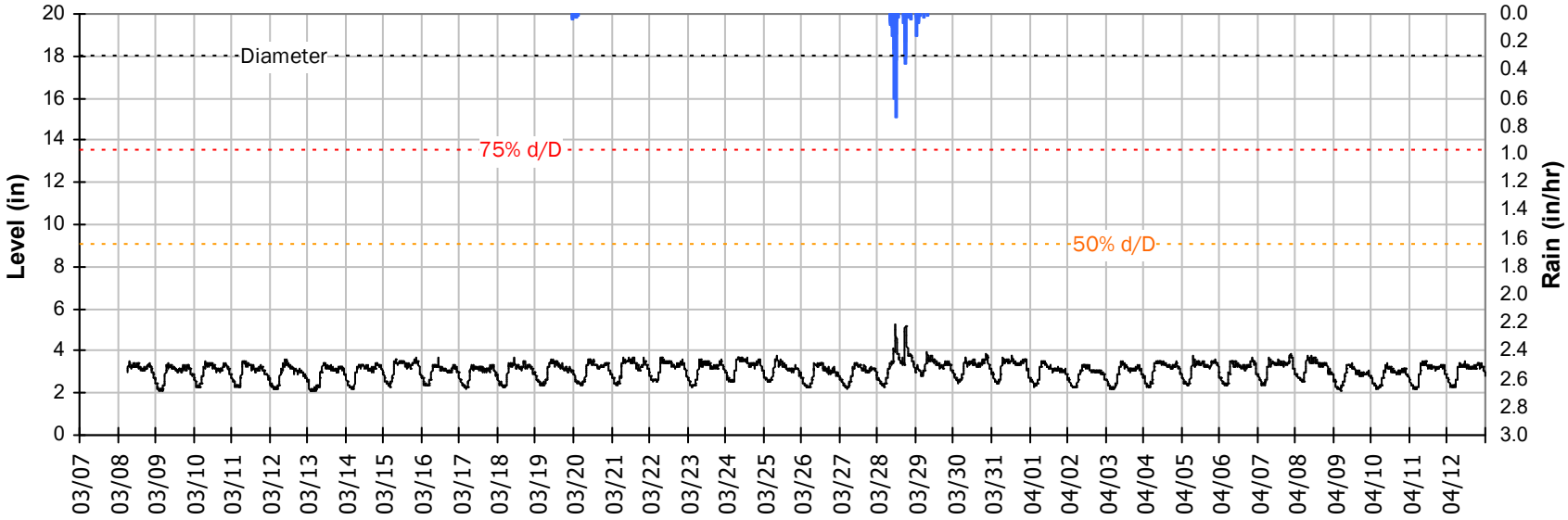
0.130 *mgd*

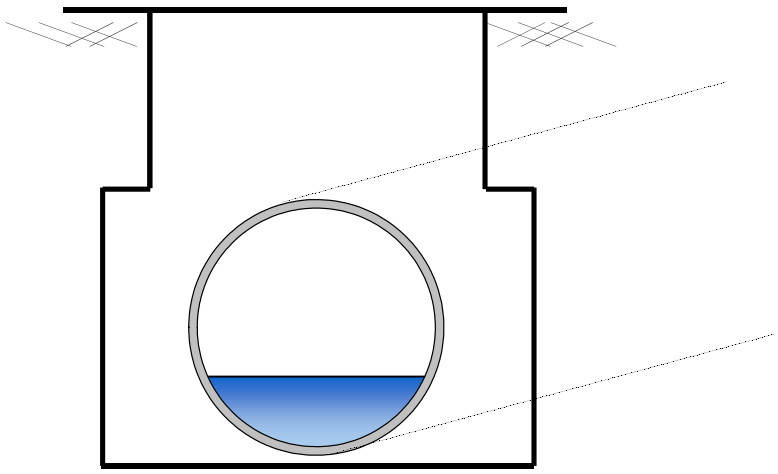


SITE 15

Site Capacity and Surcharge Summary

Realtime Flow Levels with Rainfall Data over Monitoring Period

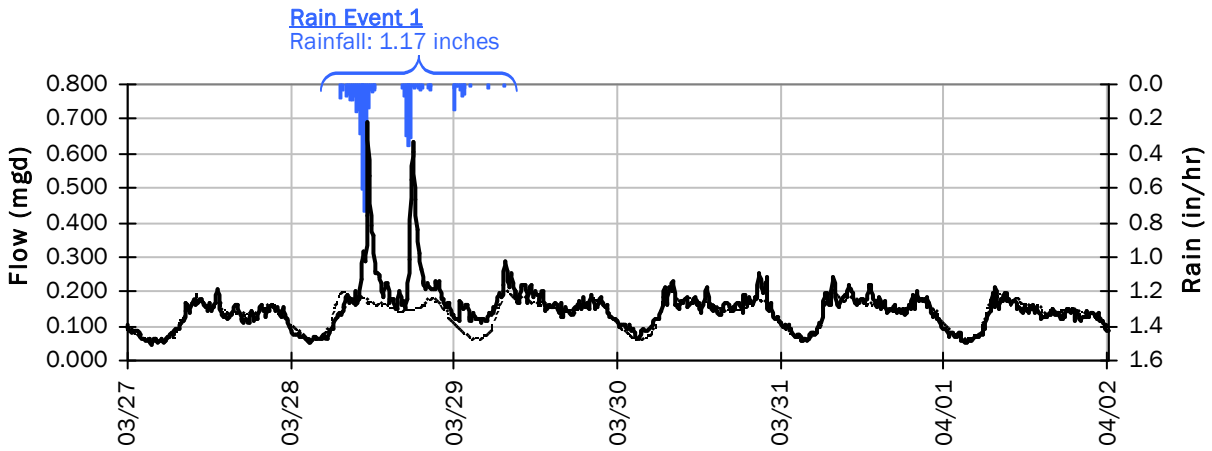




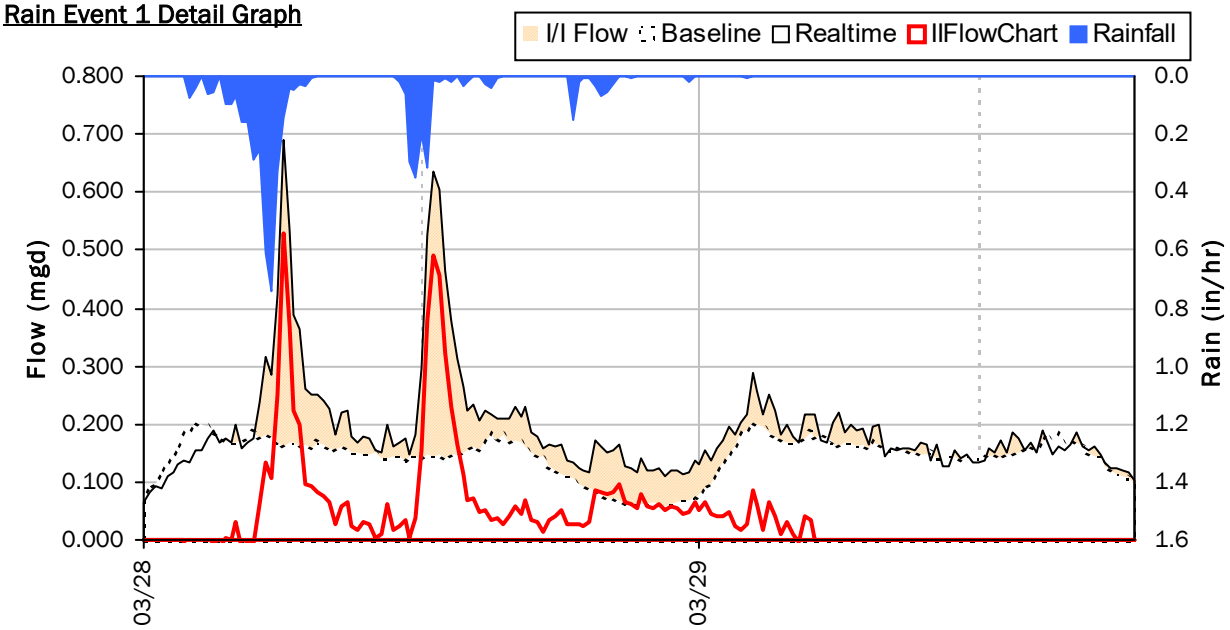
Pipe Diameter:	18	*inches*
Peak Measured Level:	5.30	*inches*
Peak d/D Ratio:	0.29	

SITE 15
I/I Summary: Rain Event 1

Baseline and Realtime Flows with Rainfall Data over Monitoring Period



Rain Event 1 Detail Graph



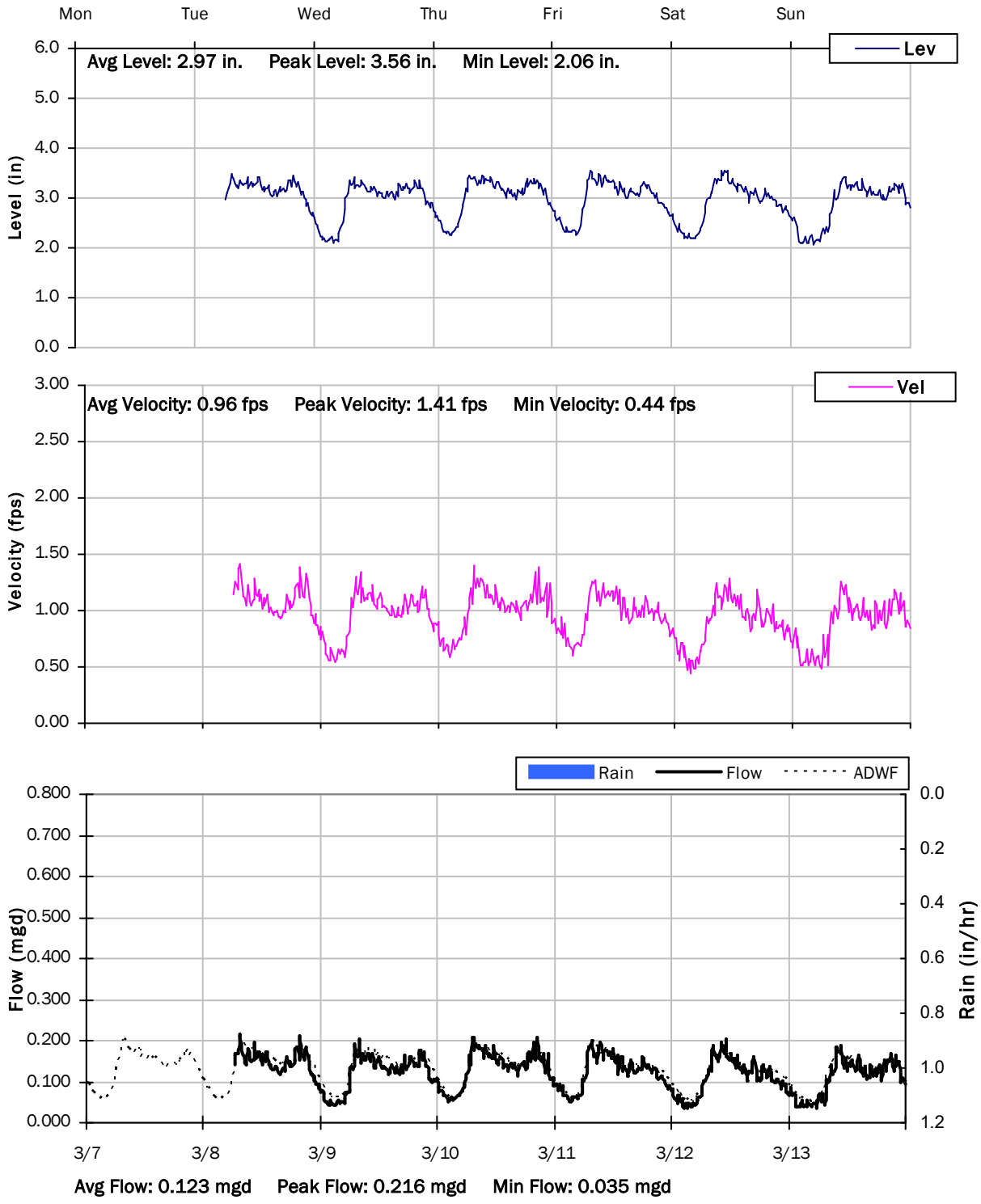
Storm Event I/I Analysis (Rain = 1.17 inches)

Capacity		Inflow / Infiltration	
Peak Flow:	0.690 *mgd*	**Peak I/I Rate:**	0.528 *mgd*
PF:	5.29	**Total I/I:**	80,000 *gallons*
Peak Level:	5.30 *in*		
d/D Ratio:	0.29		

SITE 15

Weekly Level, Velocity and Flow Hydrographs

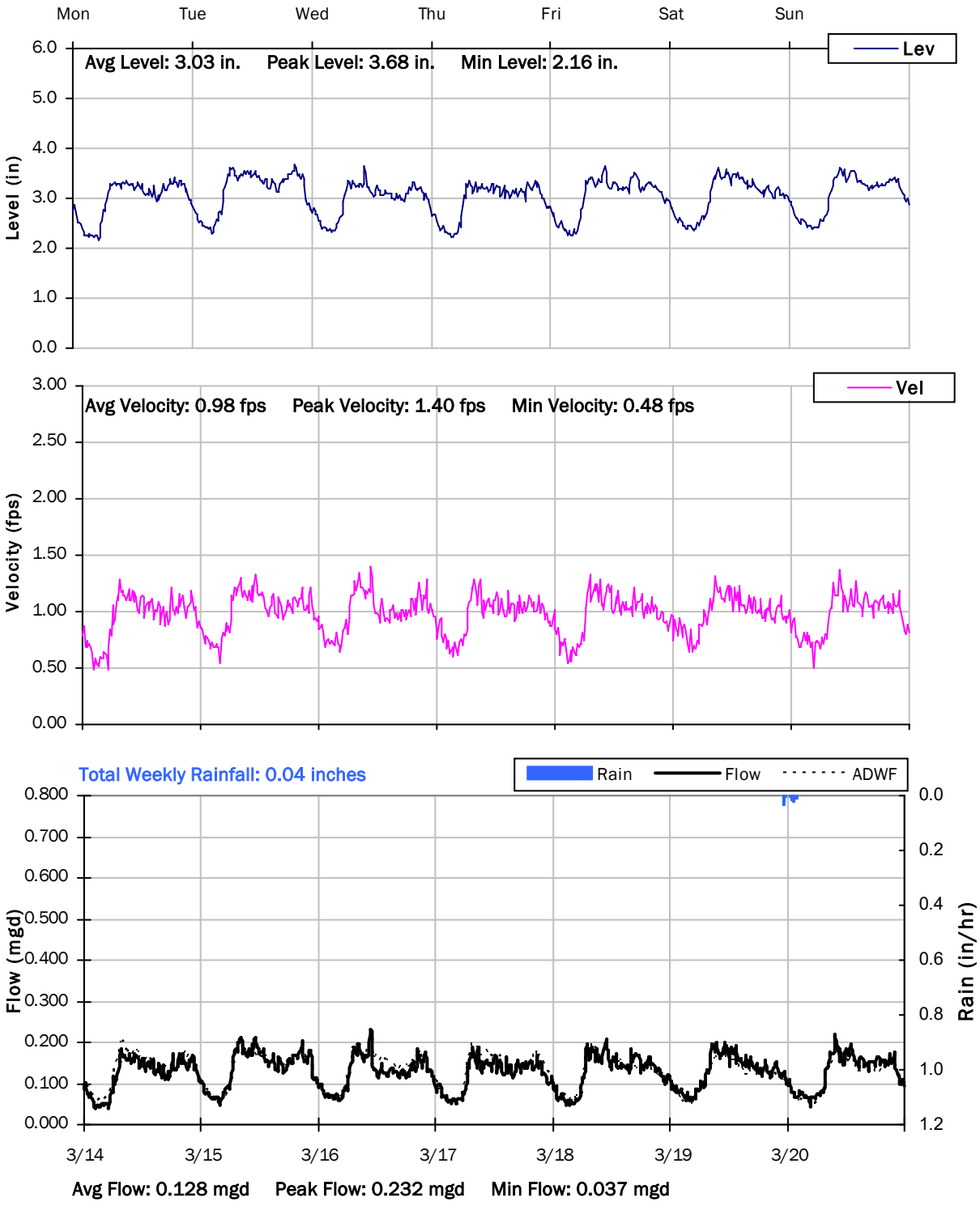
3/7/2022 to 3/14/2022



SITE 15

Weekly Level, Velocity and Flow Hydrographs

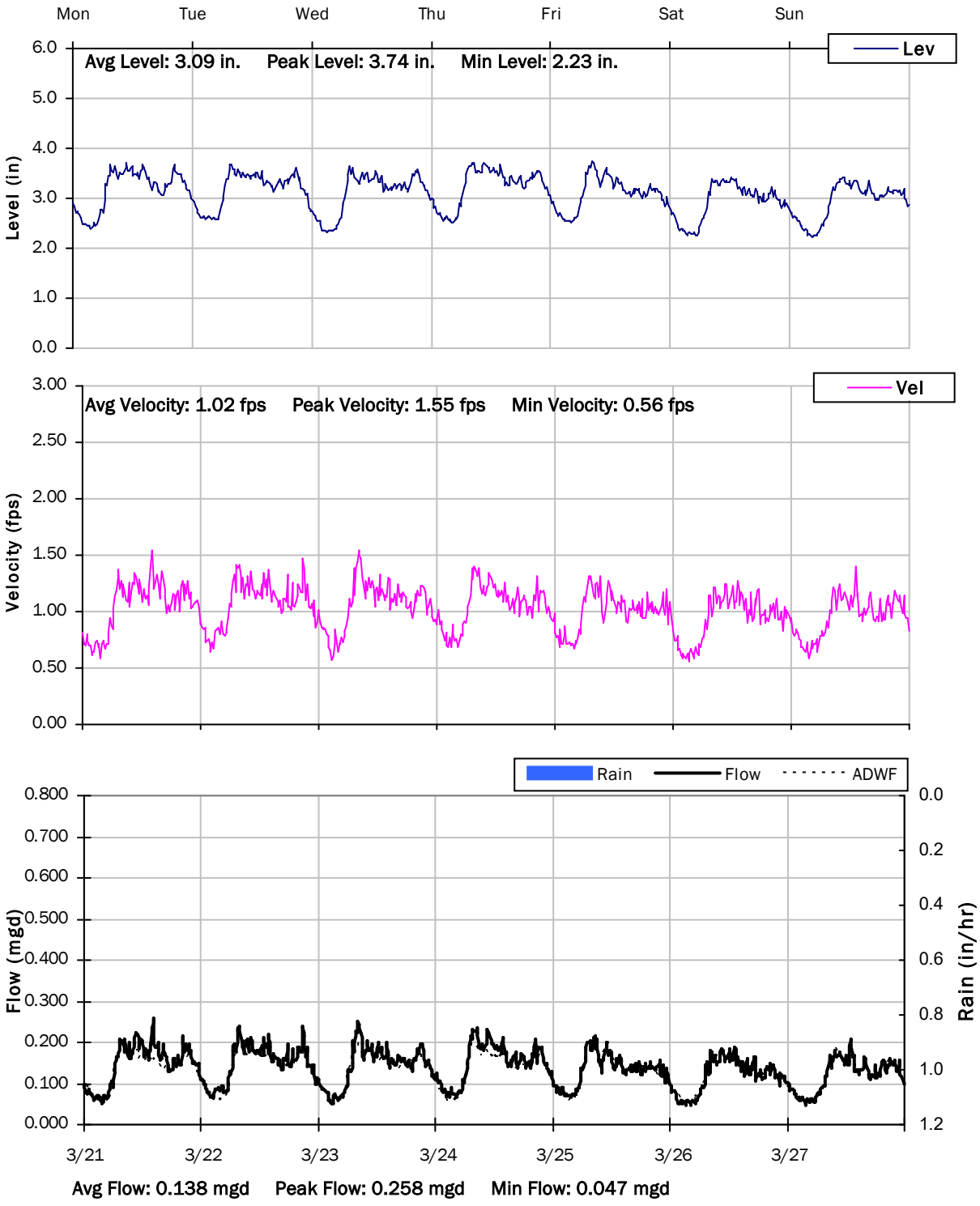
3/14/2022 to 3/21/2022



SITE 15

Weekly Level, Velocity and Flow Hydrographs

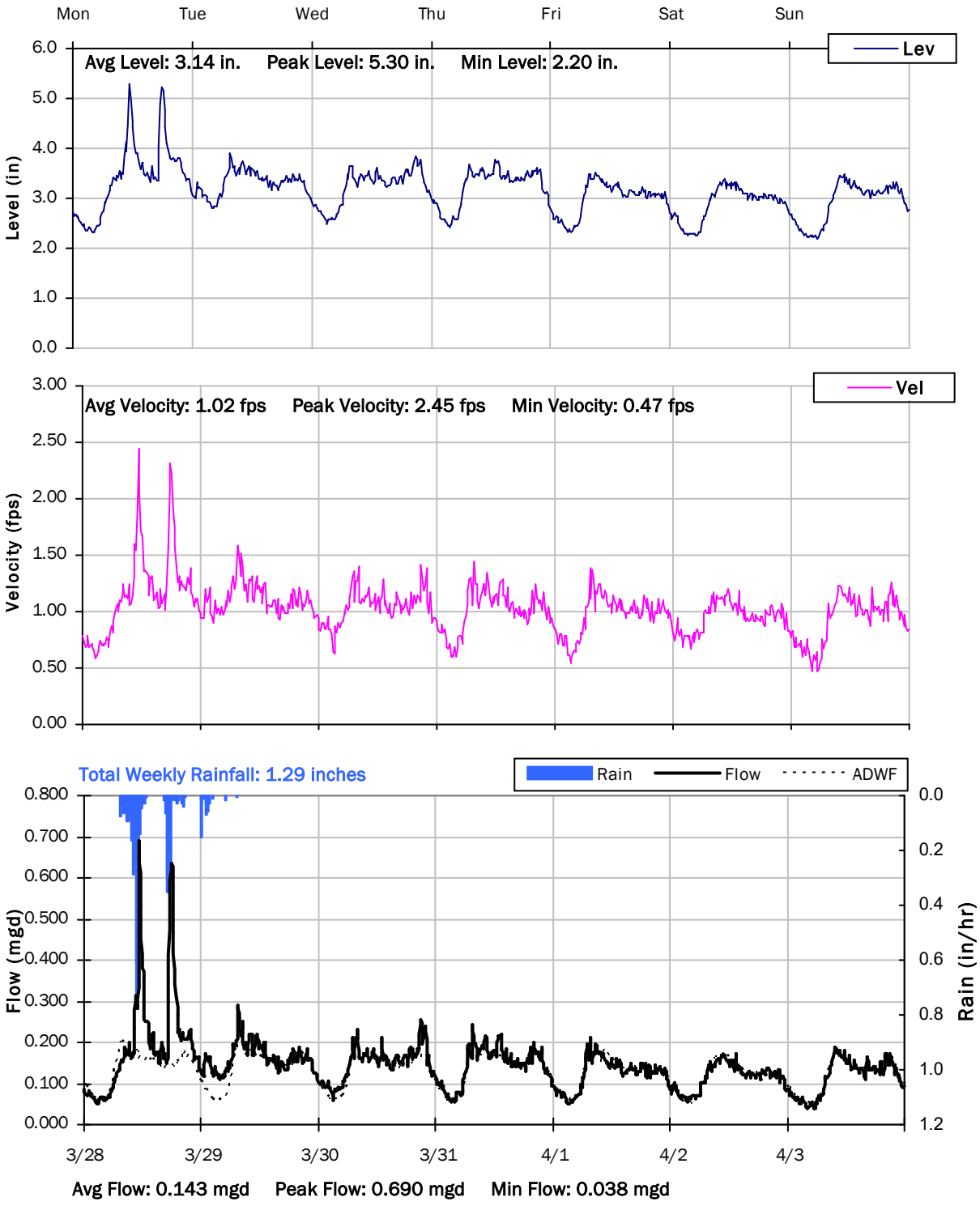
3/21/2022 to 3/28/2022



SITE 15

Weekly Level, Velocity and Flow Hydrographs

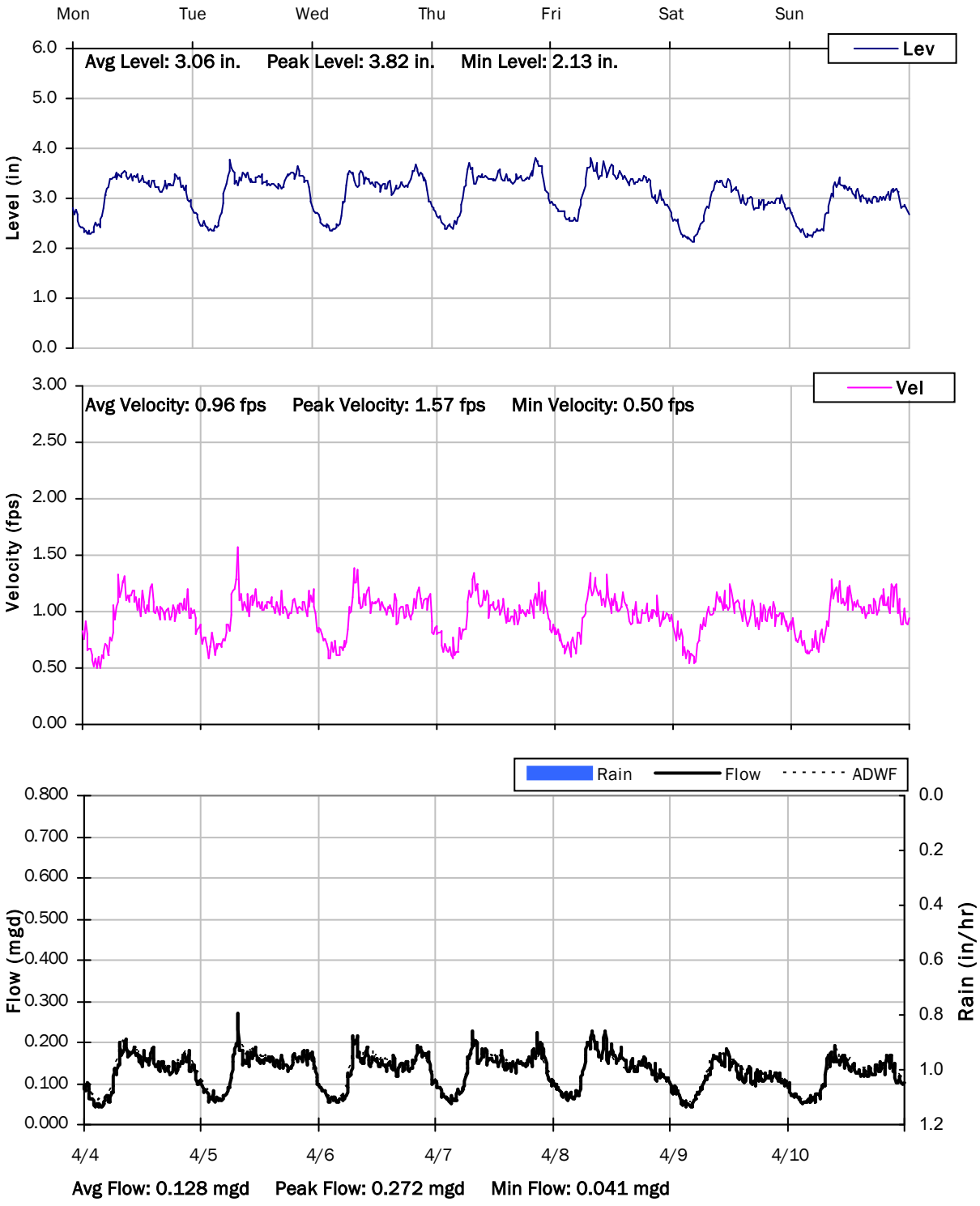
3/28/2022 to 4/4/2022



SITE 15

Weekly Level, Velocity and Flow Hydrographs

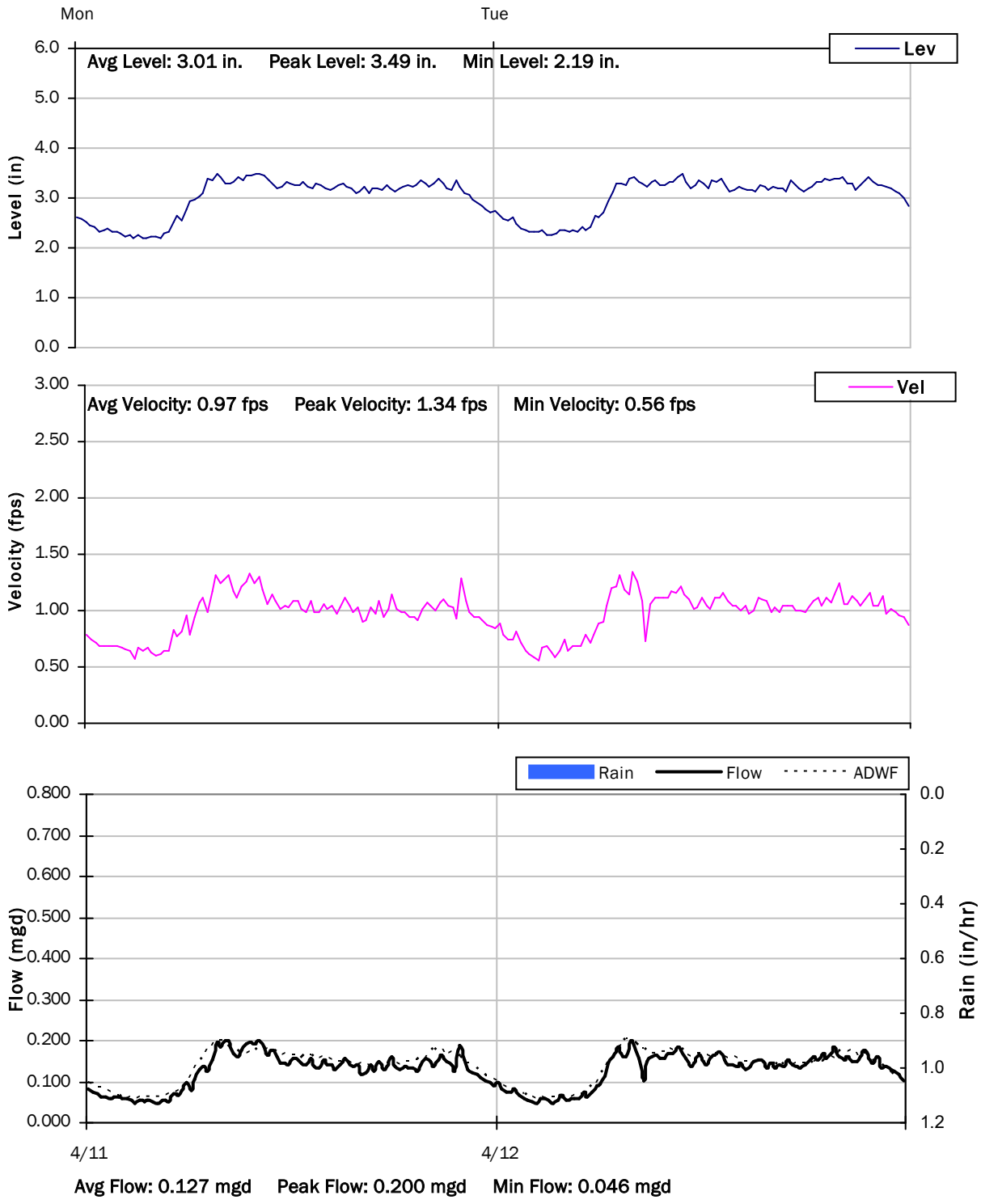
4/4/2022 to 4/11/2022



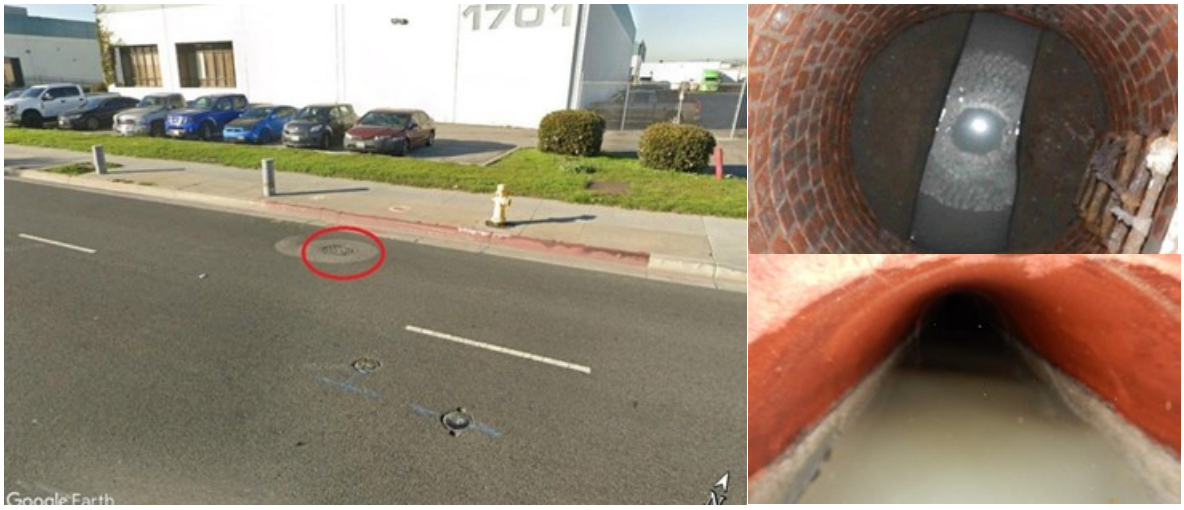
SITE 15

Weekly Level, Velocity and Flow Hydrographs

4/11/2022 to 4/13/2022



V&A Project No. 21-0243



V&A
consulting engineers
1000 Broadway
Suite 320
Oakland, CA 94607
510.903.6600
510.903.6601, Fax

Appendix B

TECHNICAL MEMORANDUM 1 – LIFT STATION CONDITION ASSESSMENT

City of Gardena
2021 Sewer Master Plan

Technical Memorandum 1
LIFT STATION CONDITION ASSESSMENT

FINAL | April 2023

City of Gardena
2021 Sewer Master Plan

Technical Memorandum 1
LIFT STATION CONDITION ASSESSMENT

FINAL | April 2023

Digitally signed by Khalil A. Kairouz
Contact Info: Carollo Engineers, Inc
Date: 2023.04.19 11:11:25-07'00'

REGISTERED PROFESSIONAL ENGINEER
KHALIL ANTOUN KAIROUZ
No. 28941
MECHANICAL
STATE OF CALIFORNIA

Contents

Technical Memorandum 1 - Lift Station Condition Assessment

Appendices

Tables

Figures

Abbreviations

Carollo	Carollo Engineers
CIP	capital improvement program
City	City of Gardena
gpm	gallons per minute
LACSD	Los Angeles County Sanitation District
Master Plan	2021 Sewer Master Plan
TDH	total dynamic head
TM	technical memorandum

Technical Memorandum 1

LIFT STATION CONDITION ASSESSMENT

This technical memorandum (TM) presents a summary of the visual condition assessment of the sewer lift station for the City of Gardena (City) 2021 Sewer Master Plan (Master Plan) project. This TM is the basis for the lift station improvement recommendations presented in the City's Master Plan report.

1.1 Introduction

The City's Public Works department currently operates and maintains a wastewater collection system that includes one sewer lift station. As part of the Master Plan Update, Carollo Engineers (Carollo) conducted a visual condition assessment of the City's existing lift station to supplement the hydraulic and capacity evaluations of the collection system. The condition assessment of the lift station had the following objectives:

- Visually assess the physical condition of the equipment and structures of the lift station and identify any potential safety/code violations.
- Evaluate the reliability and redundancy and flood resiliency of the lift station.
- Develop condition-related improvement projects for the existing lift station.

The assessment was intended as a high-level screening for significant issues, not a comprehensive condition evaluation of all facility components and maintenance needs. The capacity of the lift station will be evaluated separately, and any capacity-related deficiencies will be documented in the Master Plan report. The findings from the lift station condition assessment will be included in the capital improvement program (CIP) that combines capacity and condition-related improvements required to provide adequate sewer system service to existing and future City customers through buildout of the City's general plan.

1.2 Condition Assessment Methodology

A visual condition assessment was conducted on July 18, 2022, at the Lift Station on 178th Street at La Salle Avenue. The lift station assessment consisted of a visual inspection to determine condition as well as information gathered from the City's maintenance system, record drawings, and input from City staff. The visual condition assessment process was tailored for the purpose of developing capital projects for inclusion in the Master Plan report. The workflow on Figure 1.1 summarizes the overall condition assessment process.

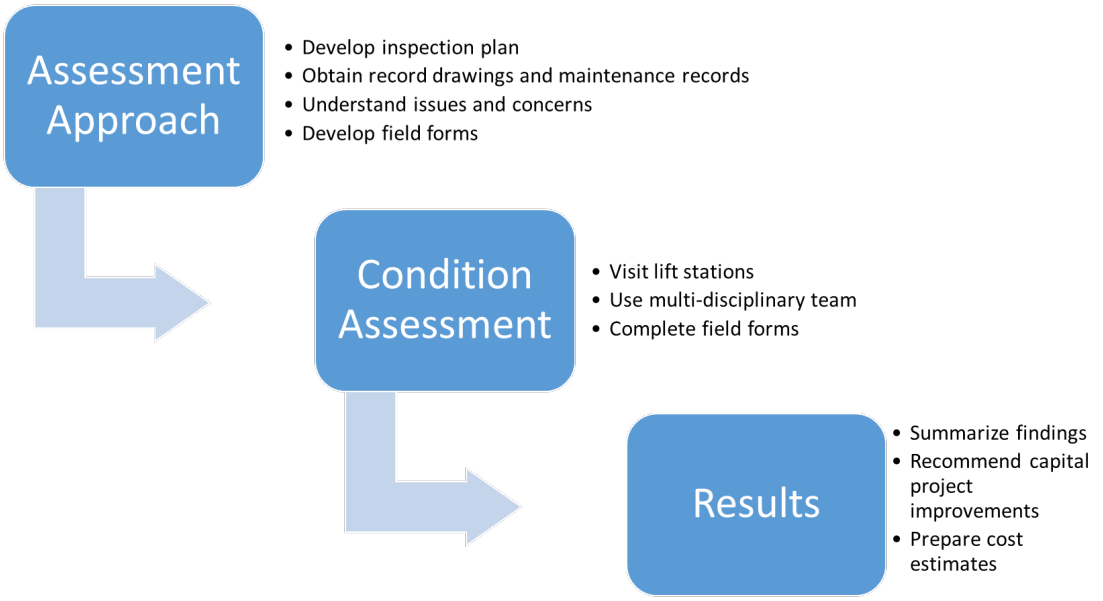


Figure 1.1 Condition Assessment Workflow

The assessment was performed only on lift station components which were readily visible at the time of the site visit, including site improvements, buildings, gates, pipes, valves, pumps, motors, electrical equipment, station configuration, and appurtenances. Associated force mains were not included in the assessment.

The assessment team separated their findings and recommendations for the lift station into two components:

- **Site and Structures**: This includes any pavement or concrete, perimeter fencing or walls, and security features, as well as findings related to safety of the City staff and public, potential code violations, and concerns of flooding. This also includes any wet wells, dry well valve and meter vaults, buildings, roofs, and hatches.
- **Mechanical Equipment**: This includes condition and operation of any pumps, motors, piping, valves, odor control systems, anchorage, and other miscellaneous equipment at the station.

1.2.1 Assessment Team

The assessment included two City staff members with two engineers from Carollo:

- John M. Scherer - Public Works Lead (City).
- Jun De Castro - Associate Engineer (City).
- Khalil Kairouz - Mechanical Engineer (Carollo).
- Kiko Antunovich - Structural Engineer (Carollo).

1.2.2 Available Information and Field Forms

Prior to visiting the lift station, the Carollo team met with City staff to learn the background of the station and gather information about any problems or deficiencies from an operational perspective. Record drawings were also provided prior to the site visit.

A field form was developed to document the findings of the lift station inspection. A list of assets was available prior to the assessment and was attached to the field forms developed by Carollo and the City. The Carollo team documented the major assets while at the site as well as observations and recommendations. The completed inspection form is included in Appendix 1A.

1.3 Assessment Observations and Findings

This section contains the key observations and condition assessment findings for the lift station. Overall, the lift station was found to be in good condition. Good condition implies a relatively new installation or construction with no current issues and no major improvements needed for the next 10 years. A more detailed description of the lift station is provided below.

1.3.1 Gardena Lift Station

The sewer lift station, shown on Figure 1.2, is located at the northwest corner of 178th Street and La Salle Avenue, within the Garden West Estates mobile home park. The station was constructed in 1992 and refurbished in 2020. It consists of a five-by-five-foot diameter, 24.5-foot deep inground cast-in-place concrete wet well with a steel metal plate cover. There are no above-ground building structures. There is a three-foot-high retaining wall with a chain-link fence separating the site from the main street. Access to the lift station is provided by a locked gate on 178th Street. It would be possible to set up a crane on 178th Street to access the Lift Station for repairs and removal of equipment. The wet well is in a grassy area within the backyard of a mobile home as shown in Figure 1.3. It is currently covered with a turf carpet and a bird bath to reduce any foot traffic that would load the steel plate cover.

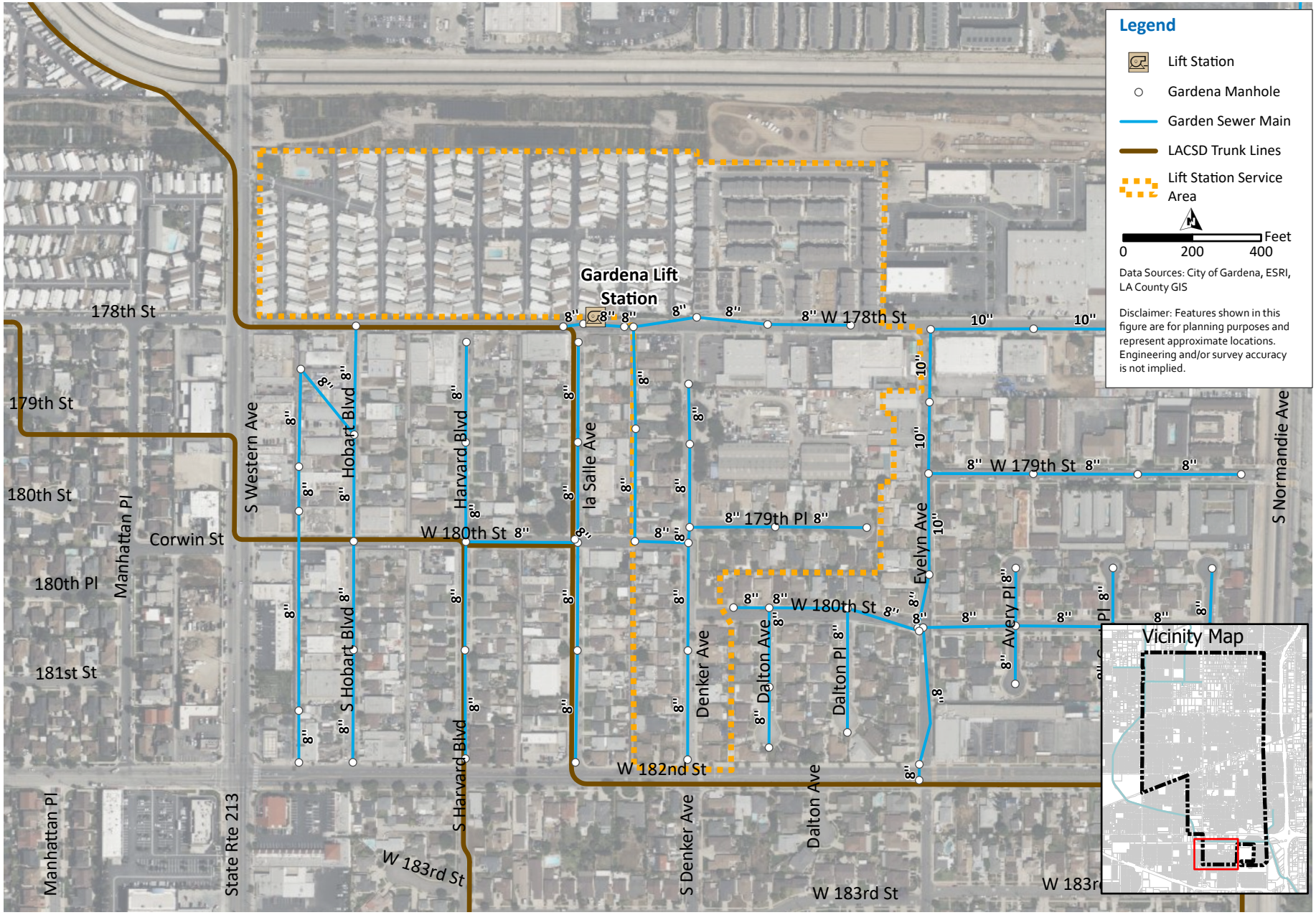


Figure 1.2 Lift Station Service Area

Figure 1.3 Lift Station Location

The wet well houses a total of two five horsepower pumps with constant speed, explosion proof motors, associated discharge piping, swing check valves, and isolation wedge gate valves. The pumps are non-clog submersibles manufactured by Barnes, series 4XSHD, each with a capacity of 475 gallons per minute (gpm), at 15 feet of total dynamic head (TDH). The pumps are controlled by level float switches. The discharge valves are located inside the wet well, toward the top. Entry to the wet well is comprised of a 24-inch by 27-inch access hatch within a quarter inch thick checkered steel plate cover. A ladder provides access to the piping, valves, and pumps. At the bottom of the ladder, there is a steel grating platform with a safety handrail.

A control panel that houses the electrical controls with antenna wireless communications for monitoring and alarms is located adjacent to the wet well. The wastewater is pumped through a 6-inch steel force main to a nearby Los Angeles County Sanitation District (LACSD) interceptor pipe.

Observations from the lift station inspection are summarized below.

1.3.1.1 Site and Structure

- The wet well concrete is in acceptable condition with minor cracking around ring joints with exposed aggregate throughout.
- Spalling and exposed reinforcement were observed around the overflow drain.
- Corrosion and rust were found at most locations where metals are present in the upper rings of the wet well.

- Pipe supports in the wet well show corrosion and rust.
- The underside of the checkered steel plate as well as the support brackets are corroded (See Figures 1.4 and 1.5).

Figure 1.4 Corrosion at Underside of Checkered Steel Plate

Figure 1.5 Corrosion at Underside of Checkered Steel Plate Hatch

- The ladder rungs look to be in good condition (See Figure 1.6). Several rungs are embedded into concrete that is spalling. This could compromise the embedment and cause the rung to loosen and ultimately lose its capacity.
- From a distant observation, the lower platform and handrail appear to be in fair condition (See Figure 1.7). It was difficult to see any corrosion. There appears to be minor corrosion around the bracket connections to the concrete.
- There is no fall protection at the wet well.

Figure 1.6 Spalling Concrete Around Ladder Rungs

Figure 1.7 Buildup and Signs of Minor Corrosion Around Handrail and Platform Connection to Concrete

1.3.1.2 Mechanical Equipment

- The pumps and motors are two years old and are in good operating condition. The City has not had any previous capacity issues here.
- Wet well storage capacity appears to be sufficient to prevent excessive pump cycling.
- It was not possible to see the condition of all mechanical equipment within the wet well to confirm if corrosion was present (See Figure 1.8).

Image A

Image B

Figure 1.8 Buildup on Piping and Equipment

- The pump discharge piping and swing check valves are also two years old and are in good condition.
- The piping downstream of the swing check valves has corrosion on the surface.
- The discharge gate valves have substantial corrosion on their handwheels and on the valves' surfaces.
- There is no pressure gauge on the discharge side of the pumps.
- There is no emergency standby generator.

City staff indicated that providing a connection for a backup generator at the control panel in case of electrical outage would be beneficial.

1.3.1.3 Recommended Improvements

The improvements recommended for the lift station, based on the observations noted above, are listed in Table 1.1.

Table 1.1 Station Recommendations

Component	Recommendations
Site and Structure	• Patch concrete where there are cracks or minor spalling. • Replace top ring of wet well as corrosion, exposed aggregate, and rebar is visible. • Clean and thoroughly inspect mechanical equipment and piping supports for corrosion and recoat or replace as necessary. • Replace existing corroded pipe supports with new 316 stainless steel supports. • Replace corroded checkered steel plate with new steel cover or concrete cap. • Repair spalling around ladder rungs and if necessary, reinstall rung into repaired concrete. • Provide fall protection. This may be achieved with a davit connection, or a fall restraint system installed with a new ladder.
Mechanical Equipment	• Sand blast corroded piping and valves, and coat with coal tar epoxy or other corrosion resistant coatings. • Install a pressure gage on discharge pipe side of pumps, outside the wet well, so discharge pressure can be monitored. • Investigate the corrosion on the gate valves handwheels. Either replace with new handwheels or install new valves. • City staff requested exploring the possibility of providing a connection for a backup generator at the control panel in case of electrical outage.

1.4 Cost Estimate

This section provides a summary of the costs associated with the recommendations outlined in Table 1.1. The cost estimates presented in this study are opinions developed from bid tabulations, cost curves, information obtained from previous studies, and Carollo's experience on other projects. The costs are based on an Engineering News-Record Construction Cost Index of 13,990 (Los Angeles, January 2023).

1.4.1 Cost Methodology and Accuracy

The costs shown herein are estimates and are prepared as guidance for project planning purposes using limited information available at the time of the estimate. Final costs of a project will depend on actual labor and materials costs, competitive market conditions, final project scope, implementation schedule, and other variable factors. The cost estimates presented in this TM are based on an AACE International Class 4 estimate. It is normally expected that an estimate of this type would be accurate within plus 30 percent to minus 15 percent.

1.4.2 Project Costs and Assumptions

Project cost estimates are calculated based on elements, such as the project location, size, length, and other factors. For the purposes of this TM, only estimated construction costs were developed. It is assumed that engineering, legal, construction management and permitting costs will not apply to the recommended lift station improvements.

The project costs for the lift station recommended improvements consist of all the items that will be constructed/purchased as well as a 20 percent installation factor. The following factors and contingencies are applied to the project cost to obtain the total construction cost:

- **General Conditions**: A 10 percent factor for general conditions was applied to account for the costs of mobilization/demobilization, bonds and insurance, contractor temporary project facilities and supervisory personnel, testing, start-up, and other constraints.
- **Construction Contingency**: A construction contingency of 35 percent was added to provide for undefined project elements and to reduce the risk for underestimation.
- **Contractor Overhead and Profit**: An additional 15 percent was added to include the general contractor's home office overhead and profit.

As shown in the following sample calculation, the total estimated construction cost is 192 percent of the Baseline Equipment Cost.

Example:

Baseline Equipment Cost	**$100,000**
Installation Factor (20 percent)	$20,000
Estimated Project Cost Subtotal	**$120,000**
General Conditions (10 percent)	$12,000
Construction Contingency (35 percent)	$42,000
Contractor Overhead and Profit (15 percent)	$18,000
Total Estimated Construction Cost	**$192,000**

1.5 Recommended CIP

The estimated cost (construction cost) to implement the recommended lift station improvements is approximately $135,800. A detailed cost breakdown is provided in Appendix 1B. For the purposes of this TM, it is assumed that all recommended improvements discussed in this TM would be completed through a CIP project, however, it is possible that City staff may be able to complete some of the improvements in-house. The recommended lift station improvement project will be incorporated with other capacity-related improvements in the final CIP presented in the Master Plan report.

Appendix 1A

COMPILED FIELD NOTES

CITY OF GARDENA
INSPECTED BY: CAROLLO ENGINEERS
DATE: JULY 18, 2022

Sewer Lift Station Facility Checklist

Lift Station Name: **Gardena Sewer Pump Station**	Address/Location: **178th Street at La Salle Avenue**
Firm Capacity: **475 gallons per minute (gpm)**	Year of Construction: **1992 (Rehabilitated in 2020)**
Overall Condition: **The lift station appears to be in good condition with minor improvements needed.**	

Site and Grounds

	Design Criteria	Status	Comments
1	General pavement condition.	YES NO Investigate n/a	It is in a grass area.
2	Protection of site improvements from vehicle impact and vehicle loads.	YES NO Investigate n/a	Located on the side/backyard of a mobile home. A three-foot high retaining wall between the lift station site and 178th Street.
3	Condition of fencing, site lights, and other features.	YES NO Investigate n/a	Locked gate with three-foot high retaining walls with a chain-link fence in good condition.
4	Evidence of erosion, poor drainage, roof intrusion, etc.	YES NO Investigate n/a	No evidence of poor drainage during time of inspection.
5	Sufficient clearance of improvements from vegetation.	YES NO Investigate n/a	
6	Any retaining walls? Construction type, condition, etc.	YES NO Investigate n/a	There is an approximately three-foot high retaining wall in good condition.
7	Animal control needed?	YES NO Investigate n/a	
8	Is site secure?	YES NO Investigate n/a	There is a locked gate with monitoring and alarms.
9	Adequate size to provide access for trucks and vactor trucks.	YES NO Investigate n/a	It would be possible to set up a crane on 178th Street to access the Pump Station for repairs and removal of equipment.

Other Notes

- None.

Lift Station Name: Gardena Sewer Pump Station	Assessor / Discipline:

Pumps and Piping

	Design Criteria	Status	Comments
1	Minimum of two identical pumps each sized for 100% station capacity shall be installed.	YES NO Investigate n/a	Two 475 gpm pumps with five horsepower (HP) constant speed.
2	Serve a minimum of 20 distribution uniformity (DU).	YES NO Investigate n/a	Serves mobile home park.
3	Provide 100% redundancy.	YES NO Investigate n/a	There is redundancy with pumps.
4	Minimum four-inch discharge.	YES NO Investigate n/a	6-inch force main.
5	Cleanouts on the pump discharge header at each lift station at intervals of no more than 300 feet and be the same size as force main.	YES NO Investigate n/a	The force main was not inspected.
6	Discharge piping within the wet well coated with coal tar epoxy.	YES NO Investigate n/a	Discharge piping is two years old and in good condition.
7	Discharge from each pump exit the wet well and enter a concrete valve vault with easy access to valves, piping, and flow meter.	YES NO Investigate n/a	Discharge valves are inside the wet well. Piping downstream of the swing check valves have corrosion on the surface. No flowmeter or pressure transducer.
8	Each pump provided with 150-pound swing check valve and shut-off valves.	YES NO Investigate n/a	Discharge gate valves have substantial corrosion on their handwheels and on the valves' surfaces.
9	Surge relief valves installed if needed to relieve water hammer pressure surges.	YES NO Investigate n/a	
10	A bypass connection to the force main shall be provided.	YES NO Investigate n/a	
11	A standby generator sized to meet peak demand.	YES NO Investigate n/a	There is no emergency standby generator.
12	Diesel engine-driven with 24 hours of fuel storage.	YES NO Investigate n/a	
13	Trailer mounted - Air Compressor.	YES NO Investigate n/a	
14	Each pump station shall be equipped with shower, toilets, and sinks.	YES NO Investigate n/a	

Other Notes

- Pumps and motors are two years old and are in good operating conditions.
- Wet well storage capacity appears to be sufficient to prevent pump cycling.
- Staff indicated that the electrical panel be provided with an alternate power feed source for connection to an emergency generator that powers the pumps and associated electrical panel in case of utility power failure.

Lift Station Name: Gardena Sewer Pump Station	Assessor / Discipline:

Wet Well and Structures

	Design Criteria	Status	Comments
1	Construction type (precast, cast-in-place, shape, etc.).	YES NO Investigate n/a	24.5-foot deep inground cast-in-place concrete with steel metal plate cover.
2	General structural condition (cracking, spalls, damage, etc.).	YES NO Investigate n/a	General condition is acceptable.
3	Presence of any interior protective coatings and the condition of the coating.	YES NO Investigate n/a	No interior coating.
4	Corrosion of metals.	YES NO Investigate n/a	Corrosion and rust found where metals are present in the upper rings of the wet well. Due to excessive buildup on mechanical equipment and piping, it was not possible to see the condition of the metal or if corrosion was present.
5	Condition of concrete at the interior and exterior.	YES NO Investigate n/a	Minor cracking around ring joints with exposed aggregate throughout. Spalling and exposed reinforcement around the overflow drain.
6	Sized to limit the pump cycle time to six cycles per hour and max detention time to 30 minutes	YES NO Investigate n/a	Appears to be sufficient
7	Covers and hatches (material, condition, load capacity, safety features).	YES NO Investigate n/a	The steel plate cover has corrosion on the underside. The brackets preventing the steel plate from buckling is corroded.
8	Pipe supports, brackets, and all other equipment and fasteners within the wet well shall be Type 316 stainless steel.	YES NO Investigate n/a	Pipe supports are corroded.
9	Provide rail-type guide system with intermediate supports to allow pump removal without removal of discharge piping or entering the wet well. All materials to be Type 316 stainless steel.	YES NO Investigate n/a	There is no rail guide system.
10	Access? Any ladders? Material of ladder is FRP or SST?	YES NO Investigate n/a	Wet well is accessed by ladder. Overall ladder is in good condition. There are a couple rungs that are embedded into parts of the concrete that is spalling.
11	Valve vault shall be precast concrete vault with concrete floor.	YES NO Investigate n/a	There is no valve vault.
12	Vault cover shall be galvanized checkered plate in easily removable sections designed for parkway loading, if applicable.	YES NO Investigate n/a	
13	Evidence of any settlement.	YES NO Investigate n/a	No evidence of settling.
14	Overflow (how does the wet well overflow? Where does it drain?)	YES NO Investigate n/a	Overflow drain inside wet well. Unknown discharge point.

Lift Station Name: Gardena Sewer Pump Station	Assessor / Discipline:

	Design Criteria	Status	Comments
15	Fall Protection when the hatch is open.	YES NO Investigate n/a	There is no fall protection.

Other Notes

- At the bottom of the ladder, there is a steel grating platform with a safety handrail. From distant observation, this platform and handrail appear to be in fair condition. It was difficult to see any corrosion. There appears to be minor corrosion around the bracket connections to the concrete.

Lift Station Name: Gardena Sewer Pump Station	Assessor / Discipline:

Emergency Power

	Design Criteria	Status	Comments
1	Provide a prefabricated skid-mounted diesel engine driven, radiator-cooled, automatic emergency standby generator to power the lift station during normal power failure. Manufactured by Caterpillar, Onan, or Generac.	YES NO Investigate n/a	City requested exploring the possibility of providing a connection for a backup generator at the control panel in case of electrical outage.
2	Generator set shall automatically start upon failure of normal power and be sized to operate lighting loads, and both pumping units (duty and standby) with maximum voltage DIP of 20 percent.	YES NO Investigate n/a	
3	Generator set is equipped with all sound attenuating equipment, enclosures, and devices necessary to conform with applicable city or county noise ordinances	YES NO Investigate n/a	
4	Fuel tank for generator is above ground mounted. Tank shall be double walled welded steel sized for a minimum of 24 hours of continuous operation at 100% of generator capacity.	YES NO Investigate n/a	
5	Tank shall have secondary containment and alarm floats for low fuel and fuel in secondary containment area.	YES NO Investigate n/a	

Other Notes

- There is no emergency standby generator.
- The staff indicated that the electrical panel be provided with an alternate power feed source for connection to an emergency generator that powers the pumps and associated electrical panel in case of utility power failure.

Appendix 1B

DETAILED COST BREAKDOWN

DETAILED COST ESTIMATE

PROJECT Sewer Lift Station 178 St at Lasalle Ave
CLIENT City of Gardena
AREA City of gardena - 178 St at Lasalle Ave

Date: January 23, 2023
By: Khalil Kairouz

TASK	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
	Mechanical				
	Install entrance ladder fall protection safety system	1.00	LS	$4,500.00	$4,500
	Paint corroded piping	1.00	LS	$1,250.00	$1,250
	Install pressure gage & 316 SST tubing on common discharge piping	1.00	LS	$750.00	$750
	Replace existing 6" gate valves with new 6" PVC flanged gate valves	2.00	LS	$3,950.00	$7,900
	Subtotal Mechanical				**$14,400**
	Civil & Structural				
	Demolition and removal of concrete ring and steel plate cover	1.00	LS	$2,200.00	$2,200
	Replace exisitng corroded pipe and railing supports with new 316 SSt supports	1.00	LS	$3,350.00	$3,350
	Install new precast concrete 5'6" diameter manhole ring to replace damaged top ring	1.00	LS	$5,200.00	$5,200
	Install new cover plate with hatch and supports (option 1, not included)	1.00	LS	$1,500.00	
	Install precast concrete slab with hatch (option 2, included)	1.00	LS	$3,850.00	$3,850
	Concrete crack repair	15.00	LF	$100.00	$1,500
	Concrete spall repair	2.00	SF	$150.00	$300
	Concrete surface repair	6.00	SF	$100.00	$600
	Subtotal Civil & Structural				**$17,000**
	Electrical				
	Install alternate power feed source for connection to emergency generator	1.00	LS	$5,500.00	$5,500
	Subtotal Electrical				**$5,500**
	Baseline Equipment Cost				**$36,900**
	Installation factor (30%)				$48,000
	Estimated Project Cost Subtotal				**$84,900**
	General Conditions @10%				$8,500
	Construction Contingency @ 35%				$29,700
	Contractor Overhead and Profit Markups @15%				$12,700
	Total Estimated Construction cost				**$135,800**

Appendix C

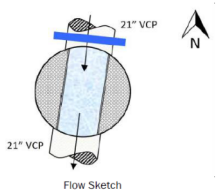
DRY WEATHER CALIBRATION SUMMARY

Flow Monitoring Site Site 1, Dry Weather Flow Calibration

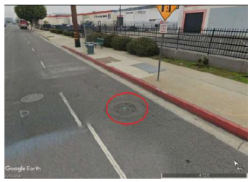
Location: S Western Avenue and Rosecrans Avenue
Pipeline Diameter: 21"

Flow Monitor Location

Sanitary Map

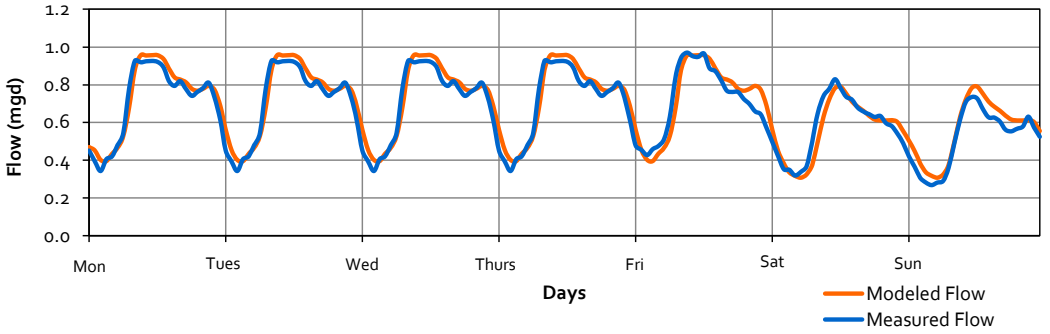


Flow Sketch


Street View


Plan View

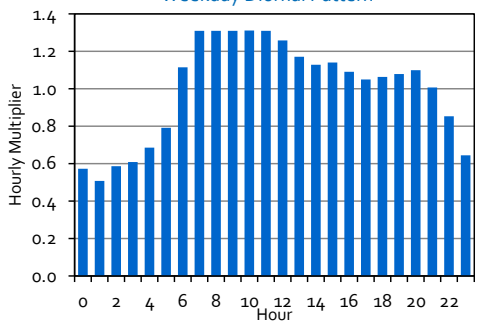
Flow Calibration



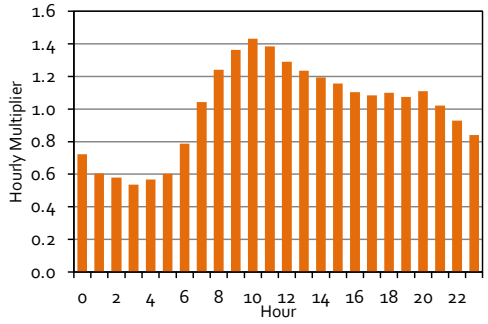
Model Calibration Summary

Day	Measured Data[1] Avg. Flow (mgd)	Measured Data[1] Peak Flow[2] (mgd)	Modeled Data Avg. Flow (mgd)	Modeled Data Peak Flow[2] (mgd)	Percent Error[3] Avg. Flow (%)	Percent Error[3] Peak Flow (%)
Mon.	0.71	0.93	0.73	0.96	3.0%	3.3%
Tues.	0.71	0.93	0.73	0.96	3.0%	3.3%
Wed.	0.71	0.93	0.73	0.96	3.0%	3.3%
Thur.	0.71	0.93	0.73	0.96	3.0%	3.3%
Fri.	0.72	0.97	0.73	0.96	1.6%	-1.4%
Sat.	0.58	0.83	0.56	0.79	-2.2%	-4.7%
Sun.	0.52	0.73	0.56	0.79	8.9%	7.7%
Summary						
Weekday	0.71	--	0.73	--	2.70%	--
Weekend	0.55	--	0.56	--	3.04%	--
ADWF[4]	0.66	--	0.68	--	2.78%	--

Weekday Diurnal Pattern



Weekend Diurnal Pattern



Notes:

(1) Source: V&A Temporary Flow Monitoring Program (February 7, 2022 through April 12, 2022)

(2) Peak flow is the hourly average hourly peak flow, which was derived based on the 15-minute flow data from V&A.

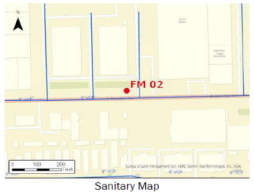
(3) Percent Error = (Modeled - Measured) /Measured x 100

(4) ADWF = (5xWeekday Average + 2xWeekend Average)/7

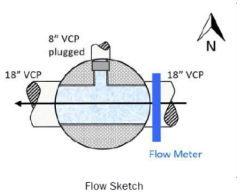
Flow Monitoring Site Site 2, Dry Weather Flow Calibration

Location: Rosecrans Avenue and S Hobart Boulevard
Pipeline Diameter: 18"

Flow Monitor Location



Sanitary Map

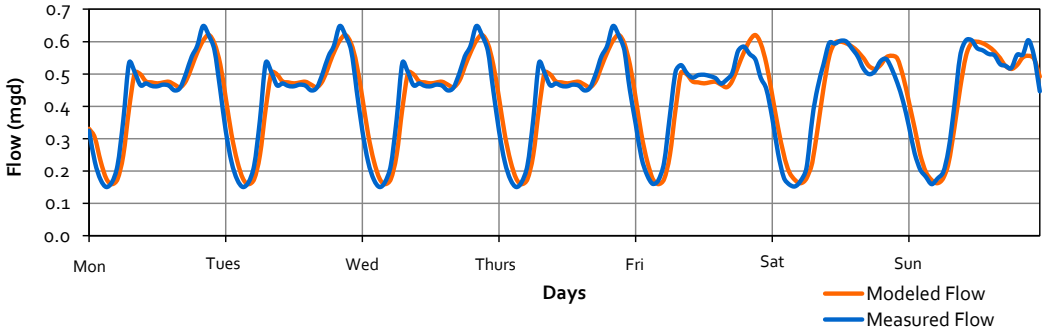


Flow Sketch


Street View


Plan View

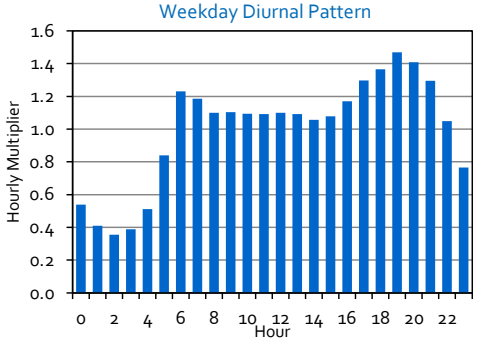
Flow Calibration



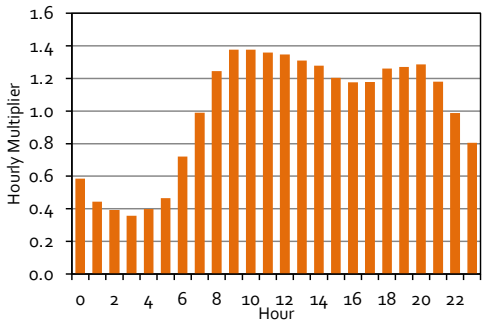
Model Calibration Summary

Day	Measured Data[1] Avg. Flow (mgd)	Measured Data[1] Peak Flow[2] (mgd)	Modeled Data Avg. Flow (mgd)	Modeled Data Peak Flow[2] (mgd)	Percent Error[3] Avg. Flow (%)	Percent Error[3] Peak Flow (%)
Mon.	0.43	0.65	0.43	0.62	0.2%	-4.2%
Tues.	0.43	0.65	0.43	0.62	0.2%	-4.2%
Wed.	0.43	0.65	0.43	0.62	0.2%	-4.2%
Thur.	0.43	0.65	0.43	0.62	0.2%	-4.2%
Fri.	0.43	0.58	0.43	0.62	-0.3%	6.1%
Sat.	0.43	0.60	0.44	0.60	1.2%	-0.6%
Sun.	0.44	0.60	0.44	0.60	-0.3%	-0.8%
Summary						
Weekday	0.43	--	0.43	--	0.13%	--
Weekend	0.44	--	0.44	--	0.44%	--
ADWF[4]	0.43	--	0.43	--	0.22%	--

Weekday Diurnal Pattern



Weekend Diurnal Pattern



Notes:

(1) Source: V&A Temporary Flow Monitoring Program (February 7, 2022 through April 12, 2022)

(2) Peak flow is the hourly average hourly peak flow, which was derived based on the 15-minute flow data from V&A.

(3) Percent Error = (Modeled - Measured) /Measured x 100

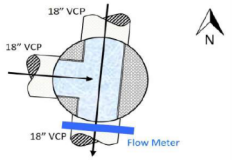
(4) ADWF = (5xWeekday Average + 2xWeekend Average)/7

Flow Monitoring Site Site 3, Dry Weather Flow Calibration

Location: Van Ness Avenue and W 135th Street
Pipeline Diameter: 18"

Flow Monitor Location

Sanitary Map

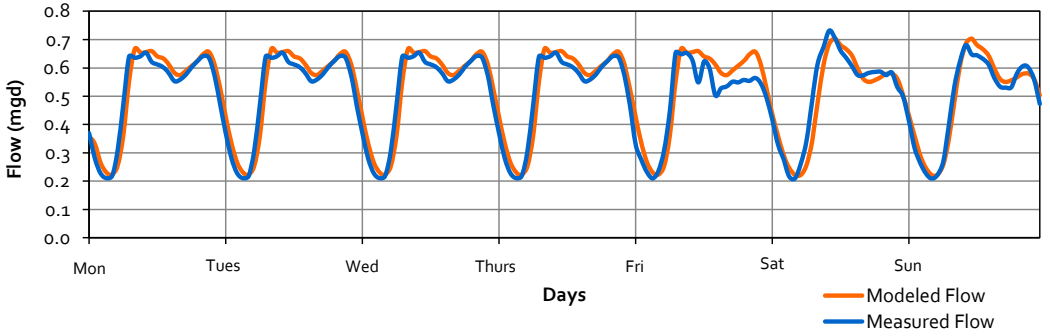


Flow Sketch


Street View


Plan View

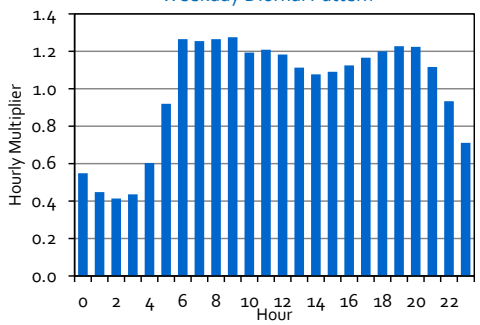
Flow Calibration



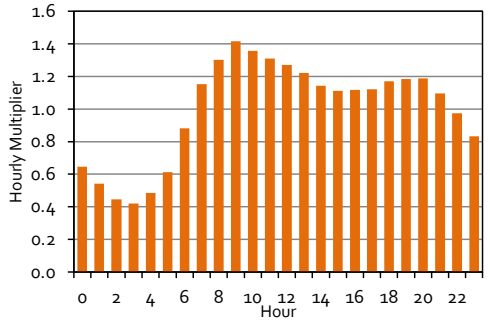
Model Calibration Summary

Day	Measured Data[1] Avg. Flow (mgd)	Measured Data[1] Peak Flow[2] (mgd)	Modeled Data Avg. Flow (mgd)	Modeled Data Peak Flow[2] (mgd)	Percent Error[3] Avg. Flow (%)	Percent Error[3] Peak Flow (%)
Mon.	0.51	0.65	0.52	0.67	2.2%	2.1%
Tues.	0.51	0.65	0.52	0.67	2.2%	2.1%
Wed.	0.51	0.65	0.52	0.67	2.2%	2.1%
Thur.	0.51	0.65	0.52	0.67	2.2%	2.1%
Fri.	0.49	0.65	0.52	0.67	7.0%	2.1%
Sat.	0.51	0.73	0.50	0.70	-2.9%	-4.0%
Sun.	0.49	0.68	0.50	0.70	1.9%	3.4%
Summary						
Weekday	0.51	--	0.52	--	3.12%	--
Weekend	0.50	--	0.50	--	-0.55%	--
ADWF[4]	0.51	--	0.52	--	2.08%	--

Weekday Diurnal Pattern



Weekend Diurnal Pattern



Notes:

(1) Source: V&A Temporary Flow Monitoring Program (February 7, 2022 through April 12, 2022)

(2) Peak flow is the hourly average hourly peak flow, which was derived based on the 15-minute flow data from V&A.

(3) Percent Error = (Modeled - Measured) /Measured x 100

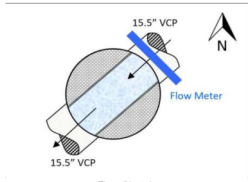
(4) ADWF = (5xWeekday Average + 2xWeekend Average)/7

Flow Monitoring Site Site 4, Dry Weather Flow Calibration

Location: Normandie Avenue (on island) south of W 155th Street
Pipeline Diameter: 15.5"

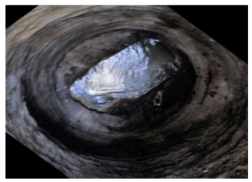
Flow Monitor Location

Sanitary Map

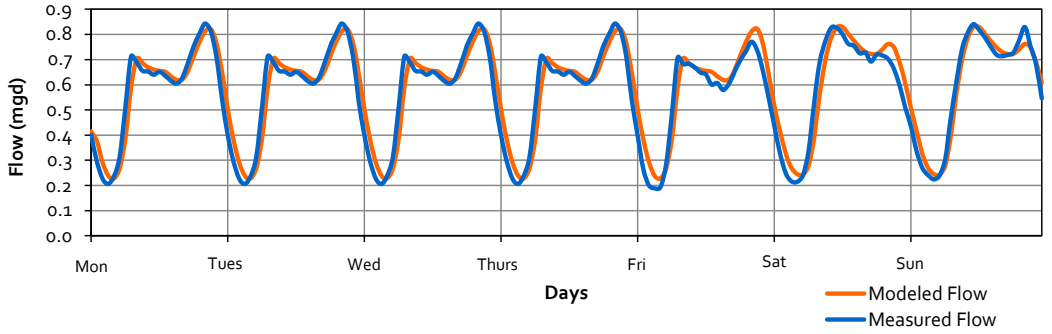


Flow Sketch


Street View


Plan View

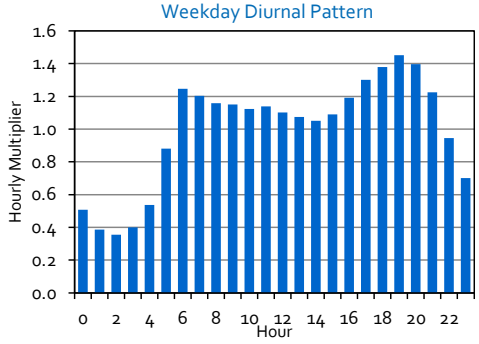
Flow Calibration



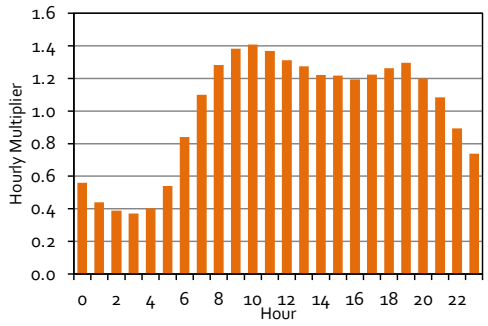
Model Calibration Summary

Day	Measured Data[1] Avg. Flow (mgd)	Measured Data[1] Peak Flow[2] (mgd)	Modeled Data Avg. Flow (mgd)	Modeled Data Peak Flow[2] (mgd)	Percent Error[3] Avg. Flow (%)	Percent Error[3] Peak Flow (%)
Mon.	0.58	0.84	0.58	0.82	0.9%	-2.6%
Tues.	0.58	0.84	0.58	0.82	0.9%	-2.6%
Wed.	0.58	0.84	0.58	0.82	0.9%	-2.6%
Thur.	0.58	0.84	0.58	0.82	0.9%	-2.6%
Fri.	0.55	0.77	0.58	0.82	5.6%	6.5%
Sat.	0.58	0.83	0.60	0.83	2.9%	0.3%
Sun.	0.60	0.84	0.60	0.83	0.7%	-1.4%
Summary						
Weekday	0.57	--	0.58	--	1.84%	--
Weekend	0.59	--	0.60	--	1.81%	--
ADWF[4]	0.58	--	0.59	--	1.83%	--

Weekday Diurnal Pattern



Weekend Diurnal Pattern



Notes:

(1) Source: V&A Temporary Flow Monitoring Program (February 7, 2022 through April 12, 2022)

(2) Peak flow is the hourly average hourly peak flow, which was derived based on the 15-minute flow data from V&A.

(3) Percent Error = (Modeled - Measured) /Measured x 100

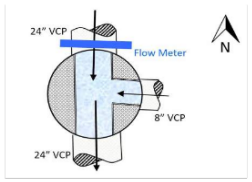
(4) ADWF = (5xWeekday Average + 2xWeekend Average)/7

Flow Monitoring Site Site 5, Dry Weather Flow Calibration

Location: Van Ness Avenue south of W 162nd Street
Pipeline Diameter: 24"

Flow Monitor Location

Sanitary Map

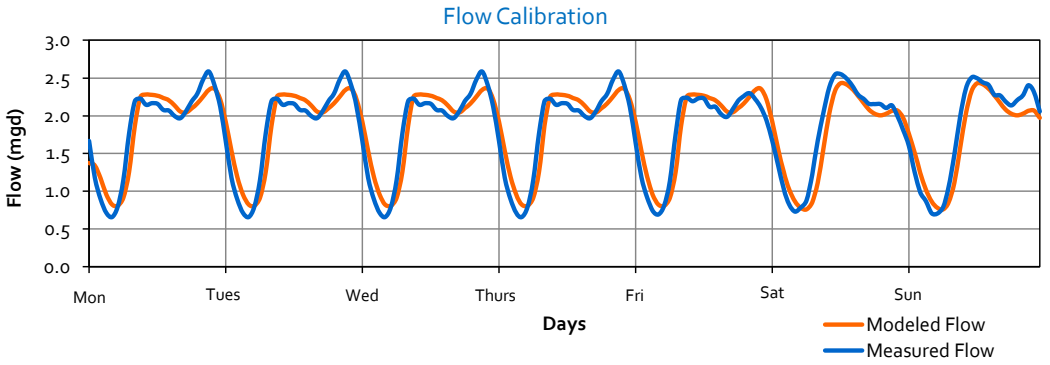


Flow Sketch


Street View


Plan View

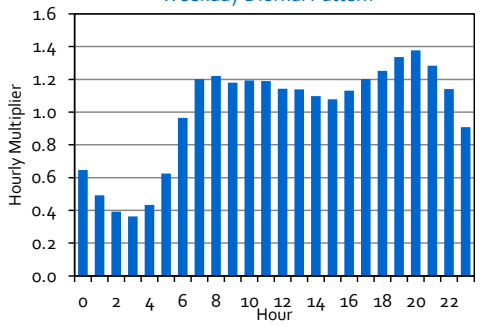
Flow Calibration



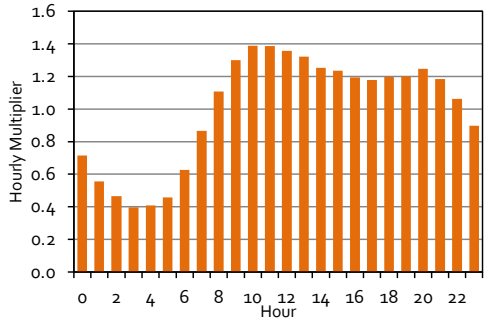
Model Calibration Summary

Day	Measured Data[1] Avg. Flow (mgd)	Measured Data[1] Peak Flow[2] (mgd)	Modeled Data Avg. Flow (mgd)	Modeled Data Peak Flow[2] (mgd)	Percent Error[3] Avg. Flow (%)	Percent Error[3] Peak Flow (%)
Mon.	1.83	2.59	1.84	2.36	0.7%	-8.8%
Tues.	1.83	2.59	1.84	2.36	0.7%	-8.8%
Wed.	1.83	2.59	1.84	2.36	0.7%	-8.8%
Thur.	1.83	2.59	1.84	2.36	0.7%	-8.8%
Fri.	1.80	2.30	1.85	2.36	2.6%	2.6%
Sat.	1.82	2.55	1.75	2.43	-3.8%	-4.8%
Sun.	1.82	2.51	1.74	2.43	-4.7%	-3.1%
Summary						
Weekday	1.82	--	1.84	--	1.10%	--
Weekend	1.82	--	1.74	--	-4.23%	--
ADWF[4]	1.82	--	1.82	--	-0.42%	--

Weekday Diurnal Pattern



Weekend Diurnal Pattern



Notes:

(1) Source: V&A Temporary Flow Monitoring Program (February 7, 2022 through April 12, 2022)

(2) Peak flow is the hourly average hourly peak flow, which was derived based on the 15-minute flow data from V&A.

(3) Percent Error = (Modeled - Measured) /Measured x 100

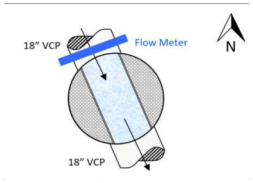
(4) ADWF = (5xWeekday Average + 2xWeekend Average)/7

Flow Monitoring Site Site 6, Dry Weather Flow Calibration

Location: Normandie Avenue south of W 170th St
Pipeline Diameter: 18"

Flow Monitor Location

Sanitary Map

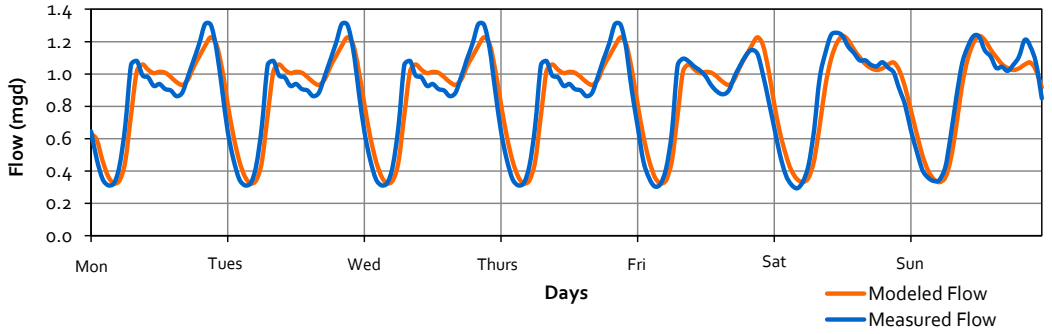


Flow Sketch


Street View


Plan View

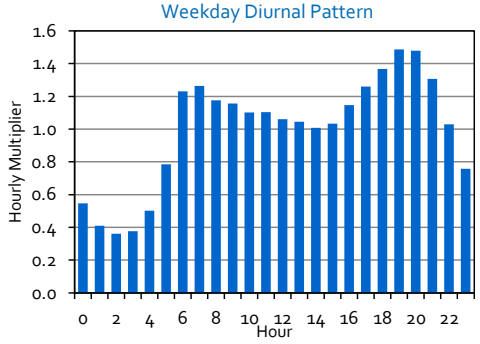
Flow Calibration



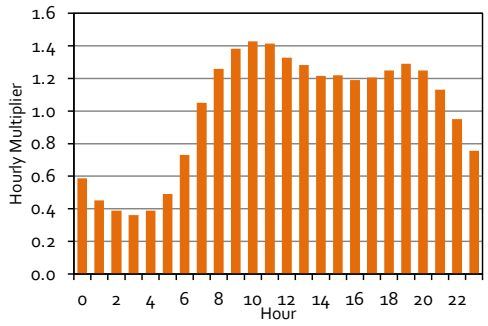
Model Calibration Summary

Day	Measured Data[1] Avg. Flow (mgd)	Measured Data[1] Peak Flow[2] (mgd)	Modeled Data Avg. Flow (mgd)	Modeled Data Peak Flow[2] (mgd)	Percent Error[3] Avg. Flow (%)	Percent Error[3] Peak Flow (%)
Mon.	0.86	1.31	0.87	1.23	0.7%	-6.1%
Tues.	0.86	1.31	0.87	1.23	0.7%	-6.1%
Wed.	0.86	1.31	0.87	1.23	0.7%	-6.1%
Thur.	0.86	1.31	0.87	1.23	0.7%	-6.1%
Fri.	0.85	1.15	0.87	1.23	2.8%	6.8%
Sat.	0.87	1.25	0.86	1.23	-0.7%	-1.5%
Sun.	0.88	1.24	0.86	1.23	-1.9%	0.0%
Summary						
Weekday	0.86	--	0.87	--	1.10%	--
Weekend	0.87	--	0.86	--	-1.27%	--
ADWF[4]	0.86	--	0.87	--	0.42%	--

Weekday Diurnal Pattern



Weekend Diurnal Pattern



Notes:

(1) Source: V&A Temporary Flow Monitoring Program (February 7, 2022 through April 12, 2022)

(2) Peak flow is the hourly average hourly peak flow, which was derived based on the 15-minute flow data from V&A.

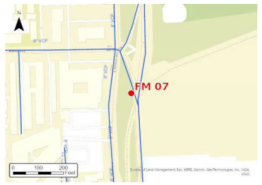
(3) Percent Error = (Modeled - Measured) /Measured x 100

(4) ADWF = (5xWeekday Average + 2xWeekend Average)/7

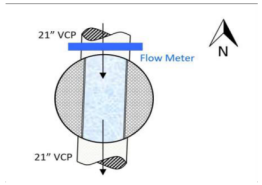
Flow Monitoring Site Site 7, Dry Weather Flow Calibration

Location: S Vermont Avenue north of W Redondo Beach Boulevard
Pipeline Diameter: 21"

Flow Monitor Location



Sanitary Map

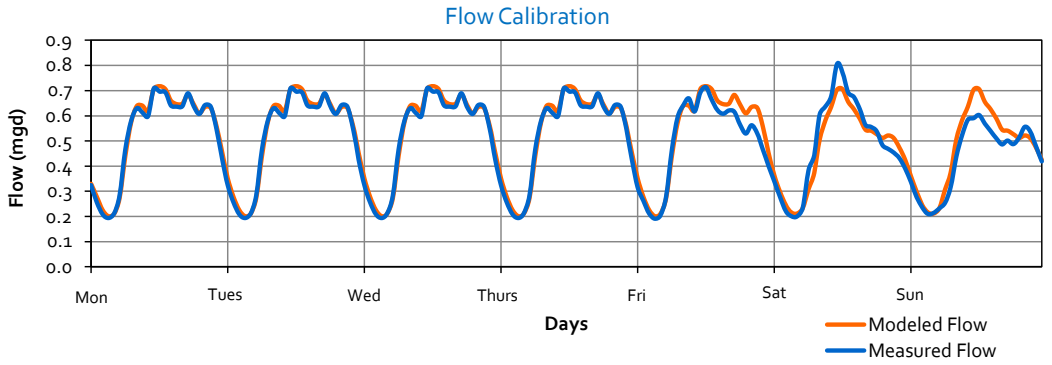


Flow Sketch


Street View


Plan View

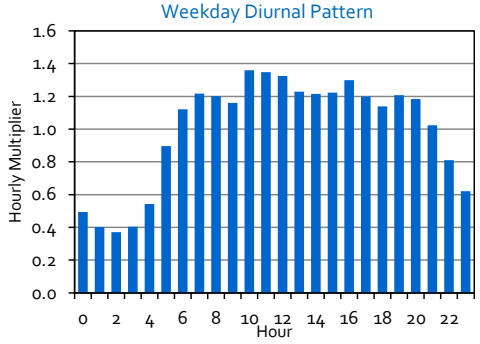
Flow Calibration



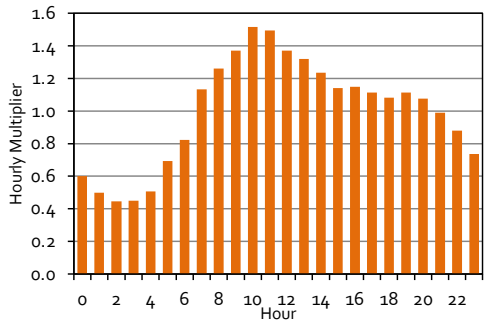
Model Calibration Summary

Day	Measured Data[1] Avg. Flow (mgd)	Measured Data[1] Peak Flow[2] (mgd)	Modeled Data Avg. Flow (mgd)	Modeled Data Peak Flow[2] (mgd)	Percent Error[3] Avg. Flow (%)	Percent Error[3] Peak Flow (%)
Mon.	0.52	0.71	0.53	0.72	1.5%	1.2%
Tues.	0.52	0.71	0.53	0.72	1.5%	1.2%
Wed.	0.52	0.71	0.53	0.72	1.5%	1.2%
Thur.	0.52	0.71	0.53	0.72	1.5%	1.2%
Fri.	0.50	0.71	0.53	0.72	5.9%	0.5%
Sat.	0.49	0.81	0.47	0.71	-3.2%	-12.4%
Sun.	0.43	0.60	0.47	0.71	8.6%	17.1%
Summary						
Weekday	0.52	--	0.53	--	2.33%	--
Weekend	0.46	--	0.47	--	2.39%	--
ADWF[4]	0.50	--	0.51	--	2.34%	--

Weekday Diurnal Pattern



Weekend Diurnal Pattern



Notes:

(1) Source: V&A Temporary Flow Monitoring Program (February 7, 2022 through April 12, 2022)

(2) Peak flow is the hourly average hourly peak flow, which was derived based on the 15-minute flow data from V&A.

(3) Percent Error = (Modeled - Measured) /Measured x 100

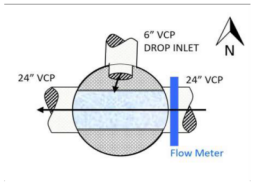
(4) ADWF = (5xWeekday Average + 2xWeekend Average)/7

Flow Monitoring Site Site 8, Dry Weather Flow Calibration

Location: Artesia Boulevard west of S Western Avenue
Pipeline Diameter: 24"

Flow Monitor Location

Sanitary Map

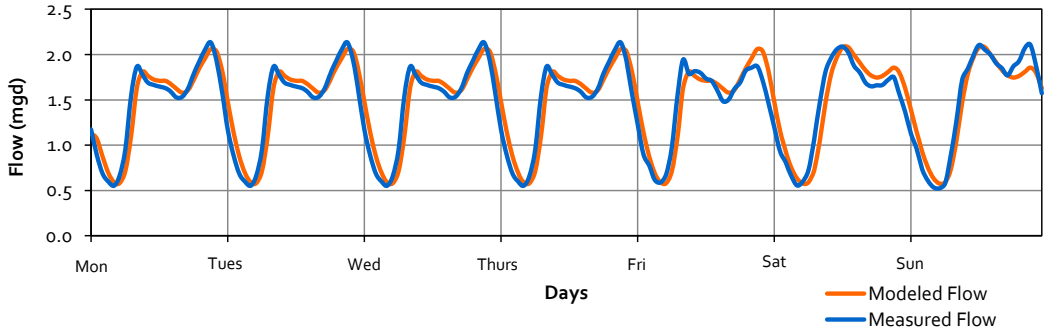


Flow Sketch


Street View


Plan View

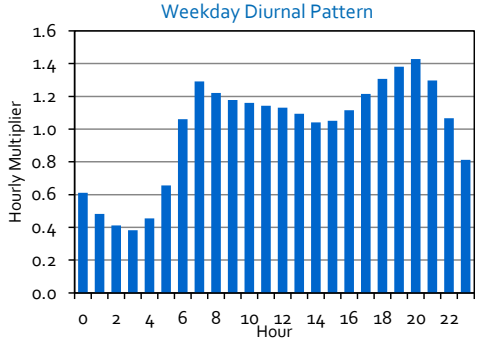
Flow Calibration



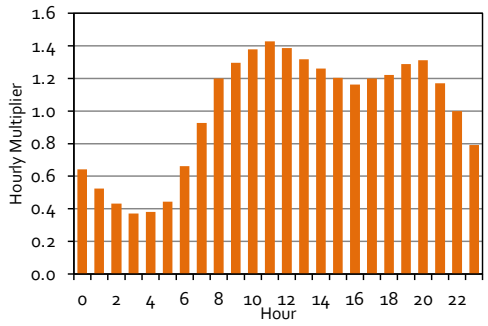
Model Calibration Summary

Day	Measured Data[1] Avg. Flow (mgd)	Measured Data[1] Peak Flow[2] (mgd)	Modeled Data Avg. Flow (mgd)	Modeled Data Peak Flow[2] (mgd)	Percent Error[3] Avg. Flow (%)	Percent Error[3] Peak Flow (%)
Mon.	1.46	2.13	1.47	2.06	1.0%	-3.4%
Tues.	1.46	2.13	1.47	2.06	1.0%	-3.4%
Wed.	1.46	2.13	1.47	2.06	1.0%	-3.4%
Thur.	1.46	2.13	1.47	2.06	1.0%	-3.4%
Fri.	1.45	1.94	1.48	2.06	2.0%	6.1%
Sat.	1.44	2.09	1.47	2.08	2.0%	-0.3%
Sun.	1.49	2.11	1.47	2.08	-1.6%	-1.3%
Summary						
Weekday	1.46	--	1.47	--	1.17%	--
Weekend	1.47	--	1.47	--	0.17%	--
ADWF[4]	1.46	--	1.47	--	0.88%	--

Weekday Diurnal Pattern



Weekend Diurnal Pattern



Notes:

(1) Source: V&A Temporary Flow Monitoring Program (February 7, 2022 through April 12, 2022)

(2) Peak flow is the hourly average hourly peak flow, which was derived based on the 15-minute flow data from V&A.

(3) Percent Error = (Modeled - Measured) /Measured x 100

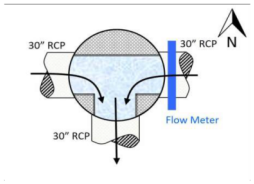
(4) ADWF = (5xWeekday Average + 2xWeekend Average)/7

Flow Monitoring Site Site 9, Dry Weather Flow Calibration

Location: 166th Street and Gramercy Place
Pipeline Diameter: 30"

Flow Monitor Location

Sanitary Map

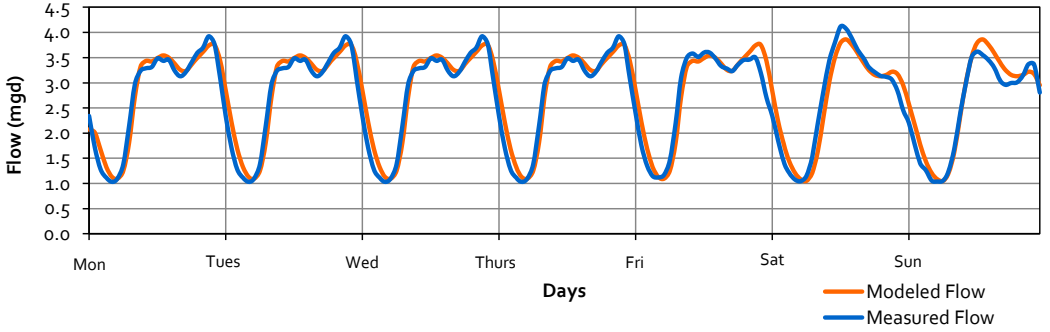


Flow Sketch


Street View


Plan View

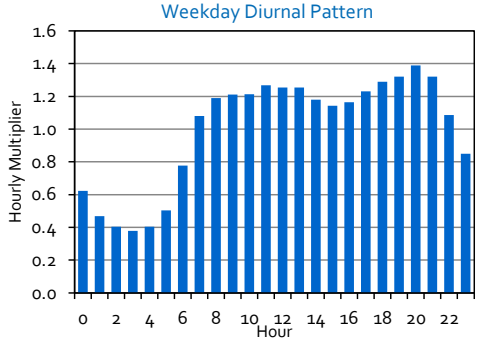
Flow Calibration



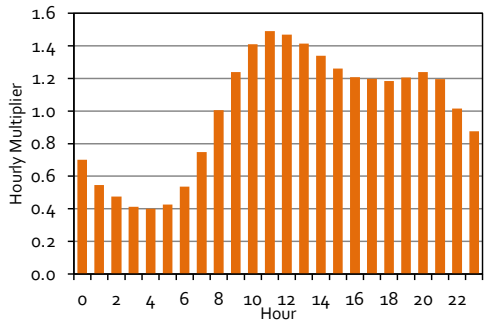
Model Calibration Summary

Day	Measured Data[1] Avg. Flow (mgd)	Measured Data[1] Peak Flow[2] (mgd)	Modeled Data Avg. Flow (mgd)	Modeled Data Peak Flow[2] (mgd)	Percent Error[3] Avg. Flow (%)	Percent Error[3] Peak Flow (%)
Mon.	2.76	3.92	2.82	3.75	2.2%	-4.3%
Tues.	2.76	3.92	2.82	3.75	2.2%	-4.3%
Wed.	2.76	3.92	2.82	3.75	2.2%	-4.3%
Thur.	2.76	3.92	2.82	3.75	2.2%	-4.3%
Fri.	2.77	3.60	2.83	3.75	2.4%	4.2%
Sat.	2.68	4.11	2.65	3.86	-0.8%	-6.1%
Sun.	2.51	3.62	2.64	3.86	5.3%	6.7%
Summary						
Weekday	2.76	--	2.83	--	2.24%	--
Weekend	2.59	--	2.65	--	2.17%	--
ADWF[4]	2.71	--	2.78	--	2.22%	--

Weekday Diurnal Pattern



Weekend Diurnal Pattern



Notes:

(1) Source: V&A Temporary Flow Monitoring Program (February 7, 2022 through April 12, 2022)

(2) Peak flow is the hourly average hourly peak flow, which was derived based on the 15-minute flow data from V&A.

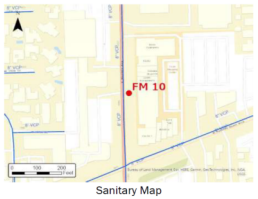
(3) Percent Error = (Modeled - Measured) /Measured x 100

(4) ADWF = (5xWeekday Average + 2xWeekend Average)/7

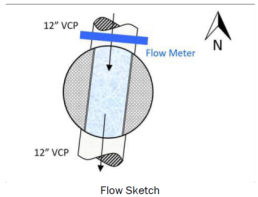
Flow Monitoring Site Site 10, Dry Weather Flow Calibration

Location: S Western Avenue north of W Redondo Beach Boulevard
Pipeline Diameter: 12"

Flow Monitor Location



Sanitary Map

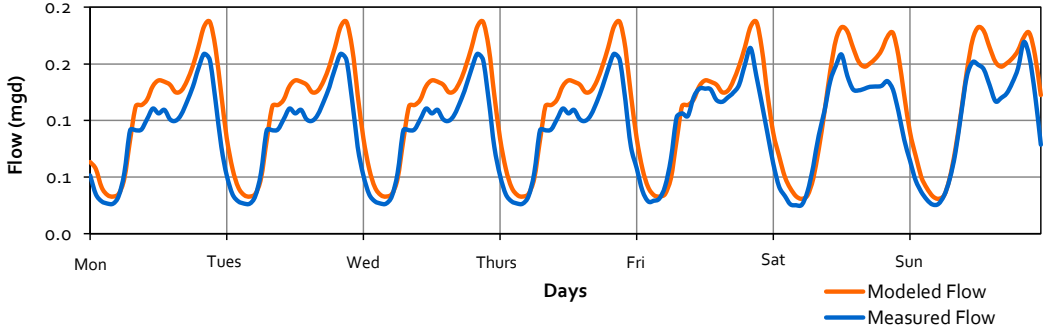


Flow Sketch


Street View


Plan View

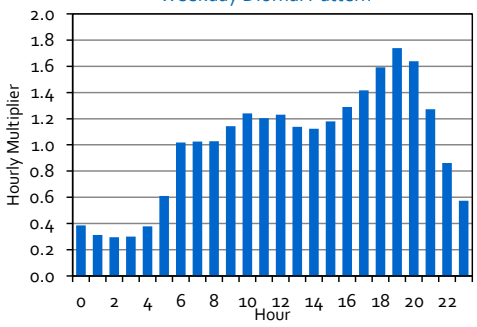
Flow Calibration



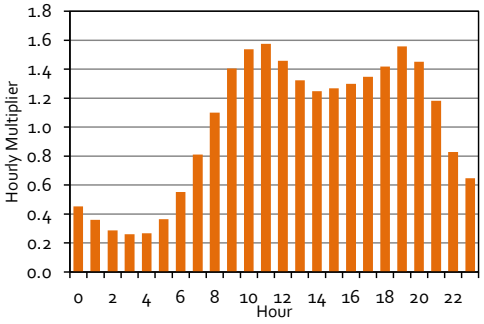
Model Calibration Summary

Day	Measured Data[1] Avg. Flow (mgd)	Measured Data[1] Peak Flow[2] (mgd)	Modeled Data Avg. Flow (mgd)	Modeled Data Peak Flow[2] (mgd)	Percent Error[3] Avg. Flow (%)	Percent Error[3] Peak Flow (%)
Mon.	0.09	0.16	0.11	0.19	22.3%	17.9%
Tues.	0.09	0.16	0.11	0.19	22.3%	17.9%
Wed.	0.09	0.16	0.11	0.19	22.3%	17.9%
Thur.	0.09	0.16	0.11	0.19	22.3%	17.9%
Fri.	0.10	0.16	0.11	0.19	11.5%	14.2%
Sat.	0.10	0.16	0.12	0.18	21.7%	15.2%
Sun.	0.10	0.17	0.12	0.18	18.6%	7.7%
Summary						
Weekday	0.09	--	0.11	--	19.98%	--
Weekend	0.10	--	0.12	--	20.16%	--
ADWF[4]	0.09	--	0.11	--	20.03%	--

Weekday Diurnal Pattern



Weekend Diurnal Pattern



Notes:

(1) Source: V&A Temporary Flow Monitoring Program (February 7, 2022 through April 12, 2022)

(2) Peak flow is the hourly average hourly peak flow, which was derived based on the 15-minute flow data from V&A.

(3) Percent Error = (Modeled - Measured) /Measured x 100

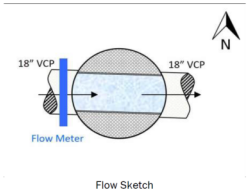
(4) ADWF = (5xWeekday Average + 2xWeekend Average)/7

Flow Monitoring Site Site 12, Dry Weather Flow Calibration

Location: W 135th Street and Daphne Avenue
Pipeline Diameter: 18"

Flow Monitor Location

Sanitary Map

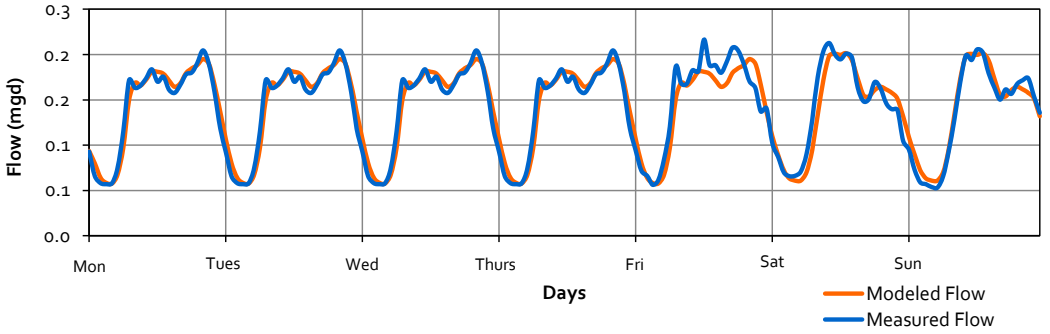


Flow Sketch


Street View


Plan View

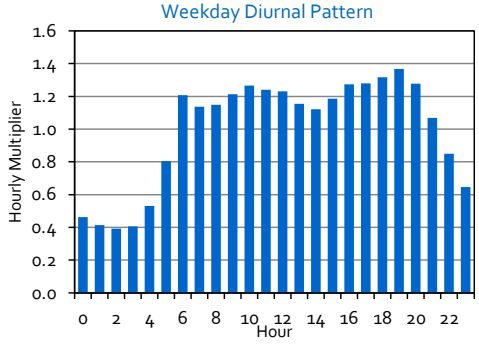
Flow Calibration



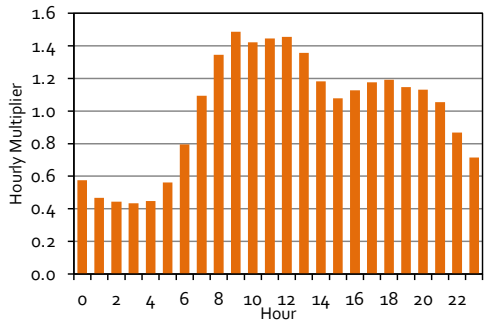
Model Calibration Summary

Day	Measured Data[1] Avg. Flow (mgd)	Measured Data[1] Peak Flow[2] (mgd)	Modeled Data Avg. Flow (mgd)	Modeled Data Peak Flow[2] (mgd)	Percent Error[3] Avg. Flow (%)	Percent Error[3] Peak Flow (%)
Mon.	0.14	0.20	0.14	0.19	1.2%	-4.7%
Tues.	0.14	0.20	0.14	0.19	1.2%	-4.7%
Wed.	0.14	0.20	0.14	0.19	1.2%	-4.7%
Thur.	0.14	0.20	0.14	0.19	1.2%	-4.7%
Fri.	0.15	0.22	0.14	0.19	-4.0%	-10.0%
Sat.	0.14	0.21	0.14	0.20	-1.7%	-5.3%
Sun.	0.14	0.21	0.14	0.20	2.2%	-2.0%
Summary						
Weekday	0.14	--	0.14	--	0.10%	--
Weekend	0.14	--	0.14	--	0.19%	--
ADWF[4]	0.14	--	0.14	--	0.12%	--

Weekday Diurnal Pattern



Weekend Diurnal Pattern



Notes:

(1) Source: V&A Temporary Flow Monitoring Program (February 7, 2022 through April 12, 2022)

(2) Peak flow is the hourly average hourly peak flow, which was derived based on the 15-minute flow data from V&A.

(3) Percent Error = (Modeled - Measured) /Measured x 100

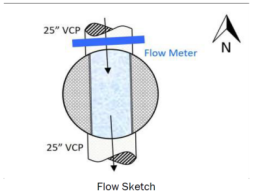
(4) ADWF = (5xWeekday Average + 2xWeekend Average)/7

Flow Monitoring Site Site 13, Dry Weather Flow Calibration

Location: Van Ness Avenue and W 154th Street
Pipeline Diameter: 25"

Flow Monitor Location

Sanitary Map

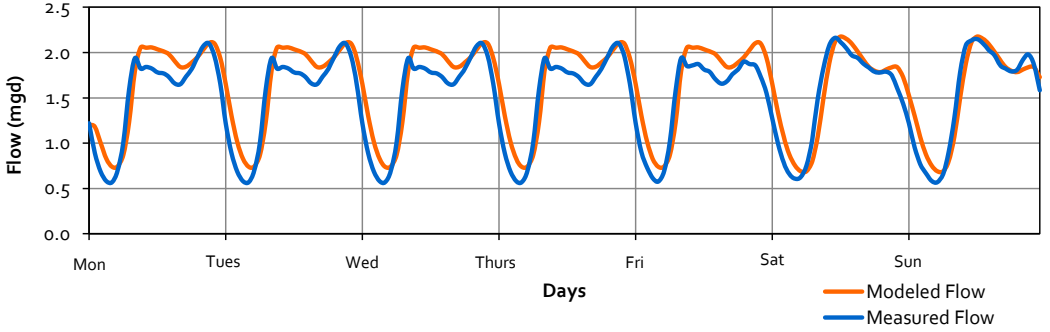


Flow Sketch


Street View


Plan View

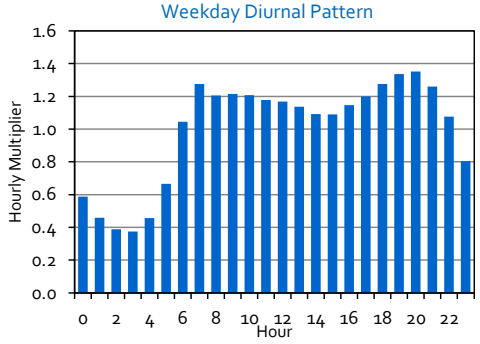
Flow Calibration



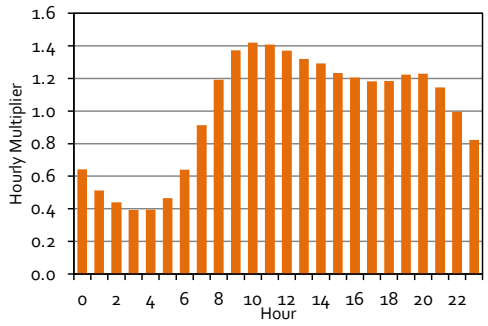
Model Calibration Summary

Day	Measured Data[1] Avg. Flow (mgd)	Measured Data[1] Peak Flow[2] (mgd)	Modeled Data Avg. Flow (mgd)	Modeled Data Peak Flow[2] (mgd)	Percent Error[3] Avg. Flow (%)	Percent Error[3] Peak Flow (%)
Mon.	1.52	2.10	1.66	2.10	9.0%	0.1%
Tues.	1.52	2.10	1.66	2.10	9.0%	0.1%
Wed.	1.52	2.10	1.66	2.10	9.0%	0.1%
Thur.	1.52	2.10	1.66	2.10	9.0%	0.1%
Fri.	1.50	1.94	1.66	2.10	11.0%	8.7%
Sat.	1.51	2.16	1.56	2.17	3.3%	0.6%
Sun.	1.52	2.15	1.55	2.17	2.1%	1.2%
Summary						
Weekday	1.52	--	1.66	--	9.39%	--
Weekend	1.51	--	1.56	--	2.73%	--
ADWF[4]	1.52	--	1.63	--	7.49%	--

Weekday Diurnal Pattern



Weekend Diurnal Pattern



Notes:

(1) Source: V&A Temporary Flow Monitoring Program (February 7, 2022 through April 12, 2022)

(2) Peak flow is the hourly average hourly peak flow, which was derived based on the 15-minute flow data from V&A.

(3) Percent Error = (Modeled - Measured) /Measured x 100

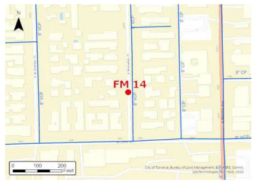
(4) ADWF = (5xWeekday Average + 2xWeekend Average)/7

Flow Monitoring Site Site 14, Dry Weather Flow Calibration

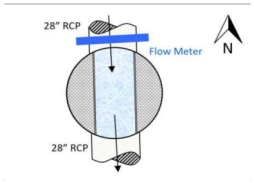
Location: S Manhattan Place north of 166th Street

Pipeline Diameter: 28"

Flow Monitor Location



Sanitary Map

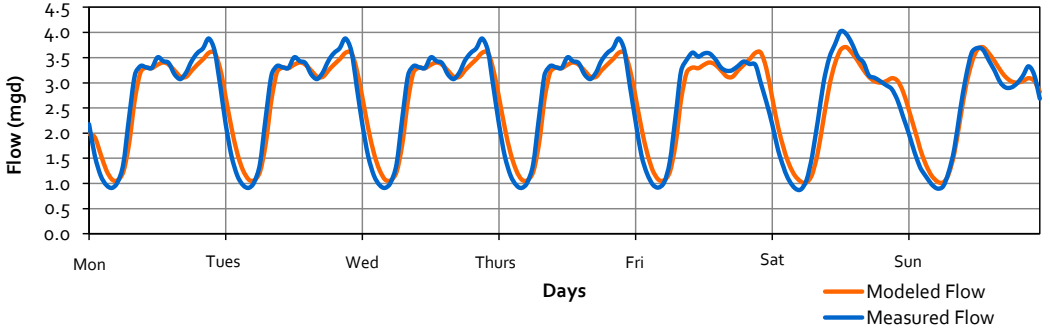


Flow Sketch


Street View


Plan View

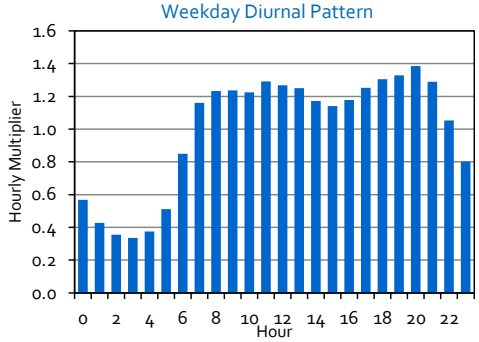
Flow Calibration



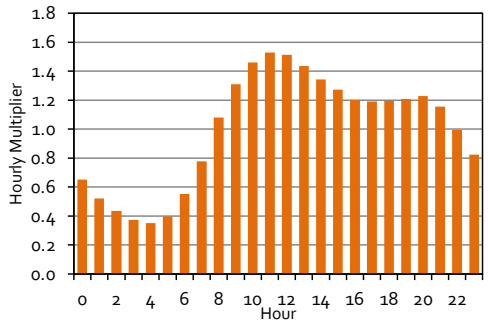
Model Calibration Summary

Day	Measured Data[1] Avg. Flow (mgd)	Measured Data[1] Peak Flow[2] (mgd)	Modeled Data Avg. Flow (mgd)	Modeled Data Peak Flow[2] (mgd)	Percent Error[3] Avg. Flow (%)	Percent Error[3] Peak Flow (%)
Mon.	2.73	3.88	2.72	3.60	-0.4%	-7.3%
Tues.	2.73	3.88	2.72	3.60	-0.4%	-7.3%
Wed.	2.73	3.88	2.72	3.60	-0.4%	-7.3%
Thur.	2.73	3.88	2.72	3.60	-0.4%	-7.3%
Fri.	2.71	3.60	2.73	3.60	0.7%	0.0%
Sat.	2.58	4.02	2.55	3.70	-1.0%	-7.8%
Sun.	2.46	3.69	2.54	3.70	3.0%	0.4%
Summary						
Weekday	2.72	--	2.72	--	-0.22%	--
Weekend	2.52	--	2.54	--	0.98%	--
ADWF[4]	2.67	--	2.67	--	0.11%	--

Weekday Diurnal Pattern



Weekend Diurnal Pattern



Notes:

(1) Source: V&A Temporary Flow Monitoring Program (February 7, 2022 through April 12, 2022)

(2) Peak flow is the hourly average hourly peak flow, which was derived based on the 15-minute flow data from V&A.

(3) Percent Error = (Modeled - Measured) /Measured x 100

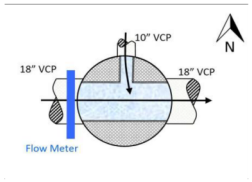
(4) ADWF = (5xWeekday Average + 2xWeekend Average)/7

Flow Monitoring Site Site 15, Dry Weather Flow Calibration

Location: W 134th Place and Spring Avenue
Pipeline Diameter: 18"

Flow Monitor Location

Sanitary Map

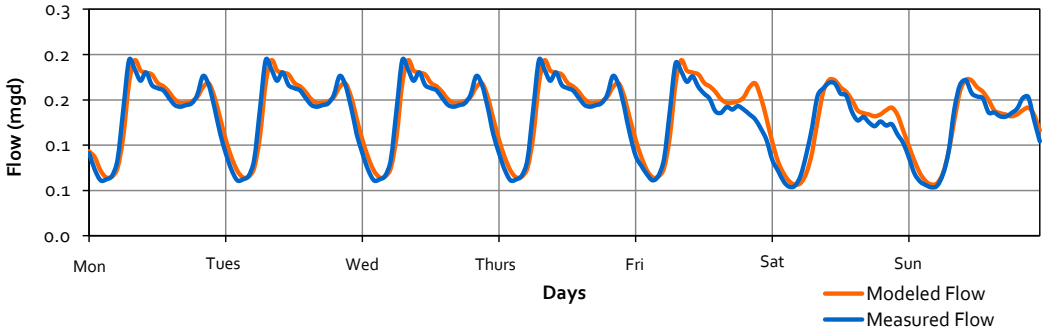


Flow Sketch


Street View


Plan View

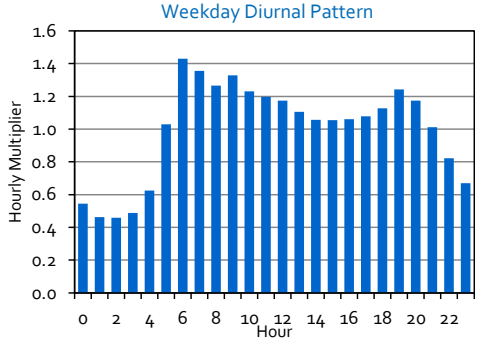
Flow Calibration



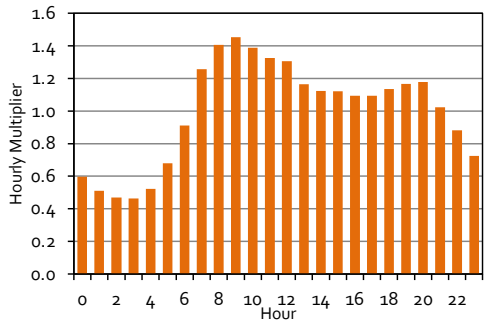
Model Calibration Summary

Day	Measured Data[1] Avg. Flow (mgd)	Measured Data[1] Peak Flow[2] (mgd)	Modeled Data Avg. Flow (mgd)	Modeled Data Peak Flow[2] (mgd)	Percent Error[3] Avg. Flow (%)	Percent Error[3] Peak Flow (%)
Mon.	0.14	0.19	0.14	0.19	1.6%	-0.2%
Tues.	0.14	0.19	0.14	0.19	1.6%	-0.2%
Wed.	0.14	0.19	0.14	0.19	1.6%	-0.2%
Thur.	0.14	0.19	0.14	0.19	1.6%	-0.2%
Fri.	0.13	0.19	0.14	0.19	7.6%	1.6%
Sat.	0.12	0.17	0.12	0.17	3.7%	1.9%
Sun.	0.12	0.17	0.12	0.17	2.3%	0.2%
Summary						
Weekday	0.13	--	0.14	--	2.79%	--
Weekend	0.12	--	0.12	--	2.97%	--
ADWF[4]	0.13	--	0.13	--	2.84%	--

Weekday Diurnal Pattern



Weekend Diurnal Pattern



Notes:

(1) Source: V&A Temporary Flow Monitoring Program (February 7, 2022 through April 12, 2022)

(2) Peak flow is the hourly average hourly peak flow, which was derived based on the 15-minute flow data from V&A.

(3) Percent Error = (Modeled - Measured) /Measured x 100

(4) ADWF = (5xWeekday Average + 2xWeekend Average)/7

Appendix D

WET WEATHER CALIBRATION SUMMARY

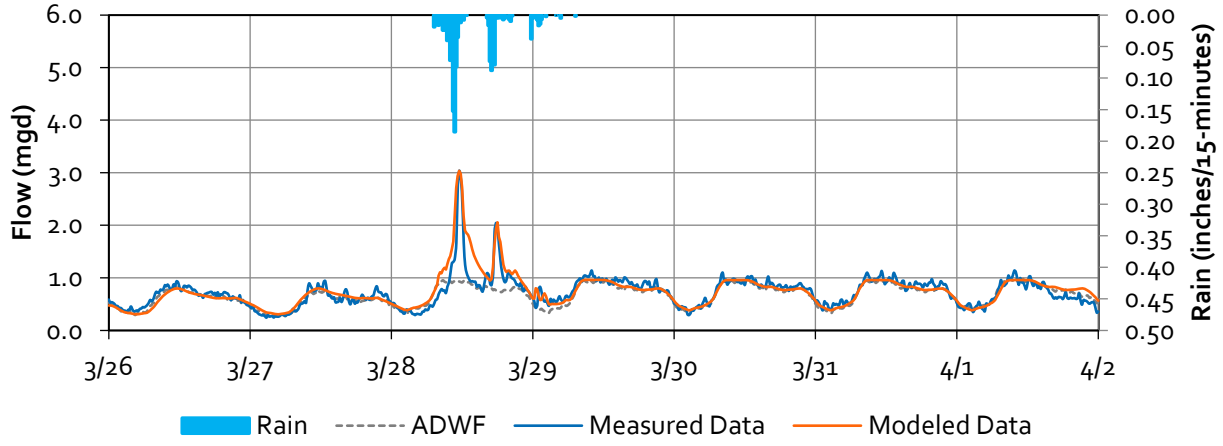


Figure D.1 Wet Weather Calibration (Site 1)

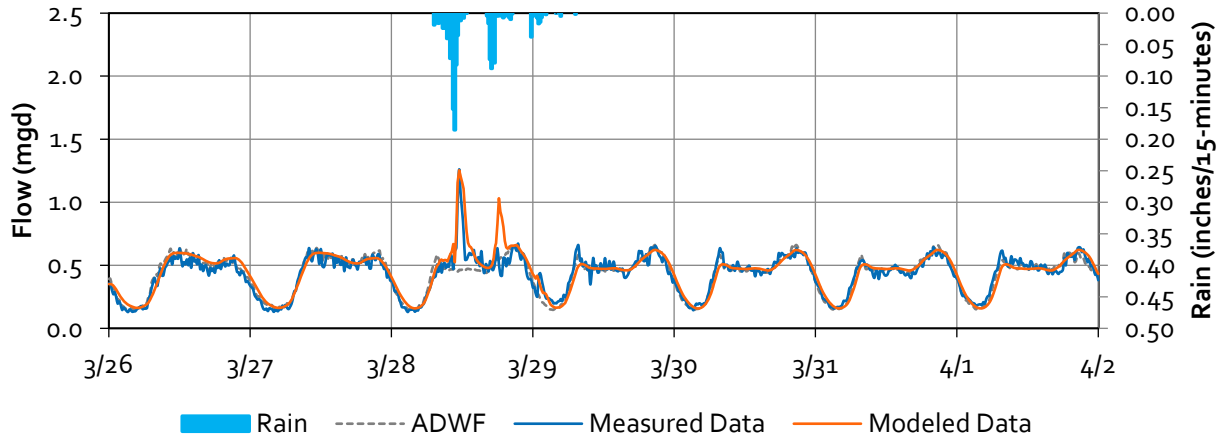


Figure D.2 Wet Weather Calibration (Site 2)

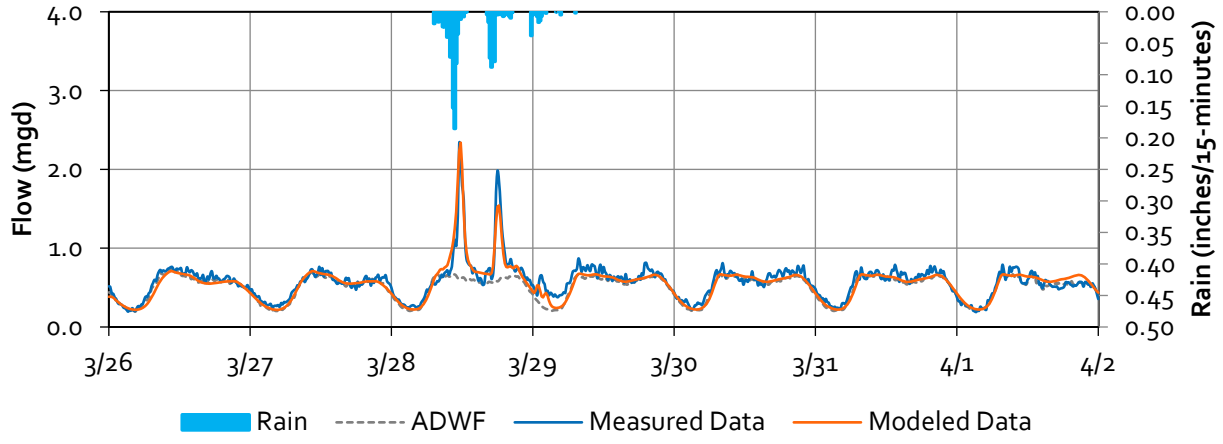


Figure D.3 Wet Weather Calibration (Site 3)

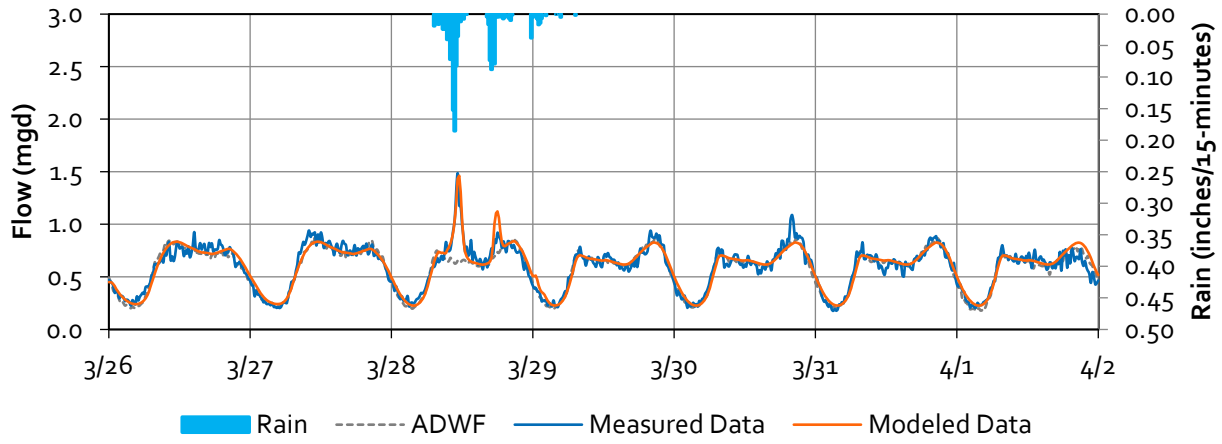


Figure D.4 Wet Weather Calibration (Site 4)

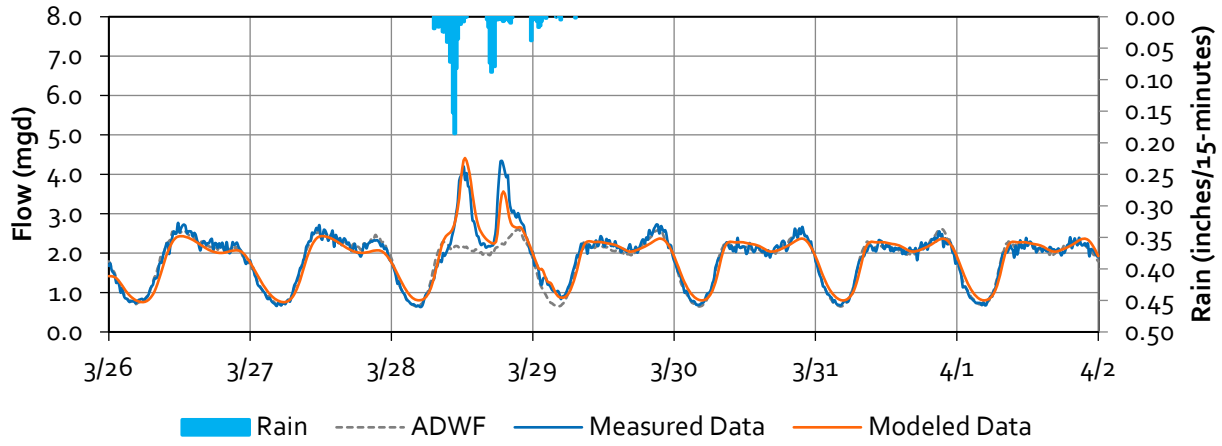


Figure D.5 Wet Weather Calibration (Site 5)

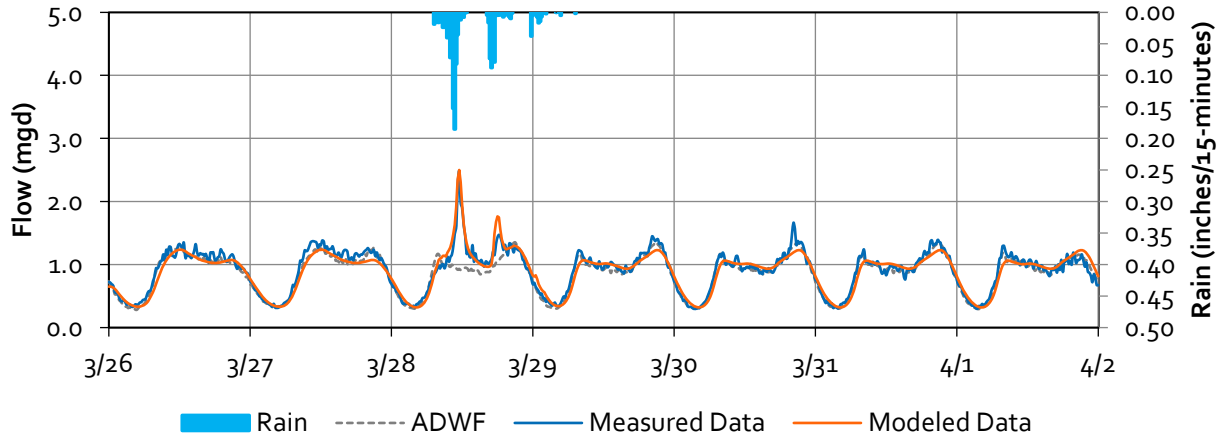


Figure D.6 Wet Weather Calibration (Site 6)

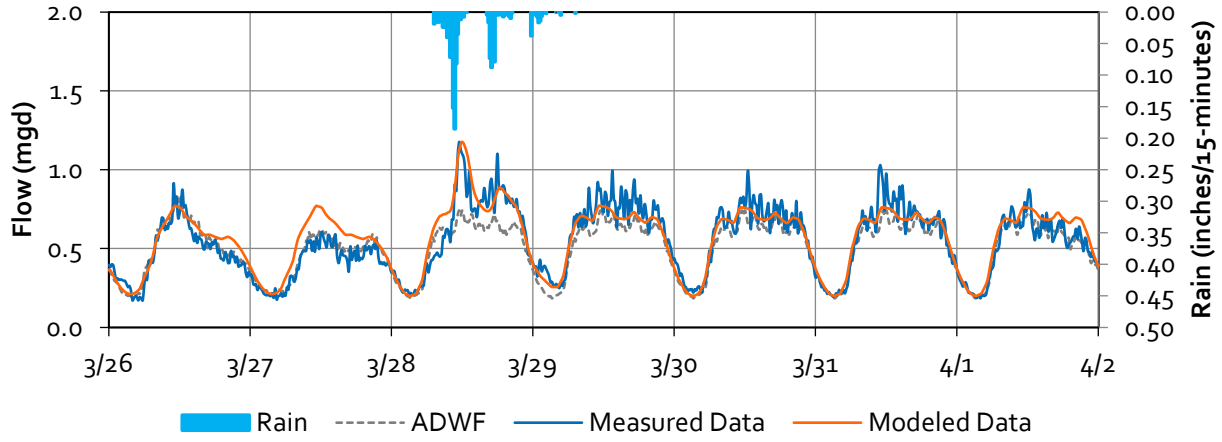


Figure D.7 Wet Weather Calibration (Site 7)

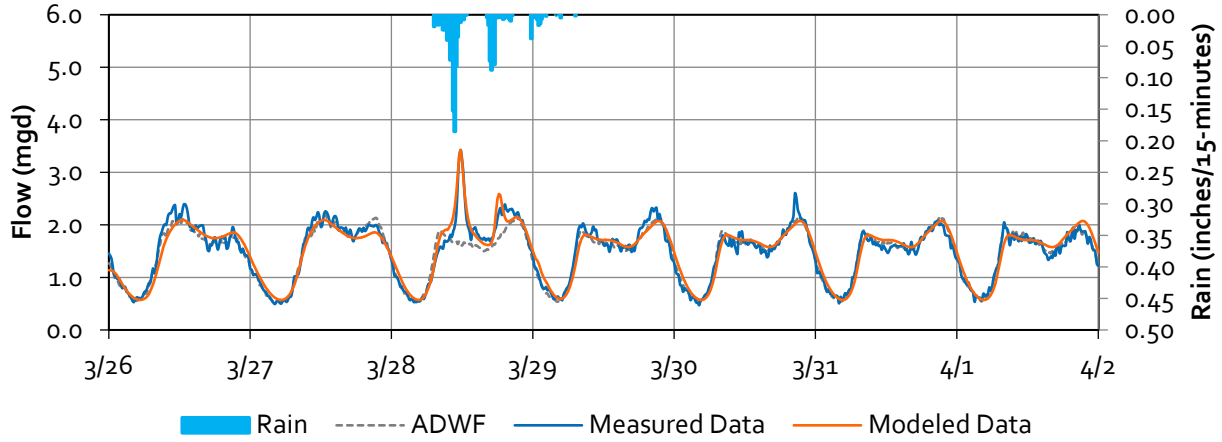


Figure D.8 Wet Weather Calibration (Site 8)

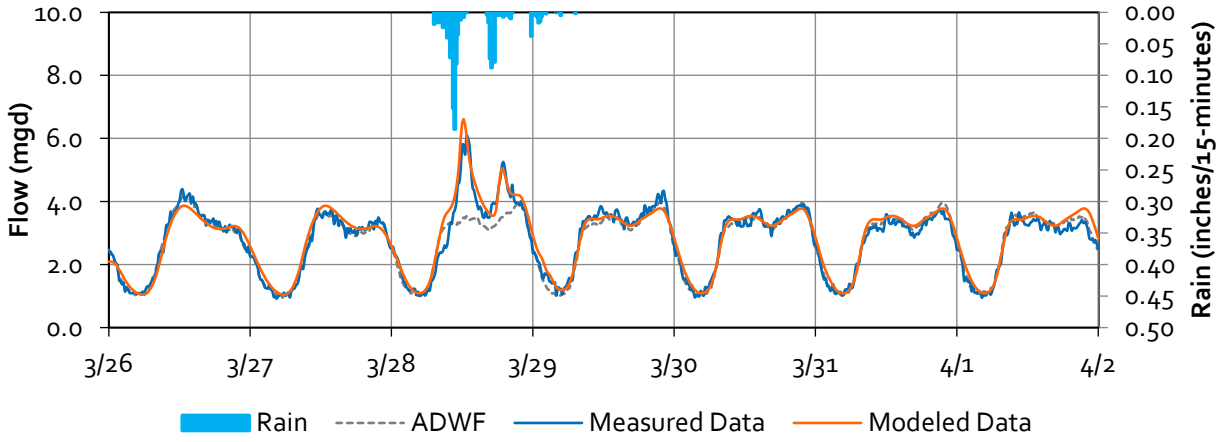


Figure D.9 Wet Weather Calibration (Site 9)

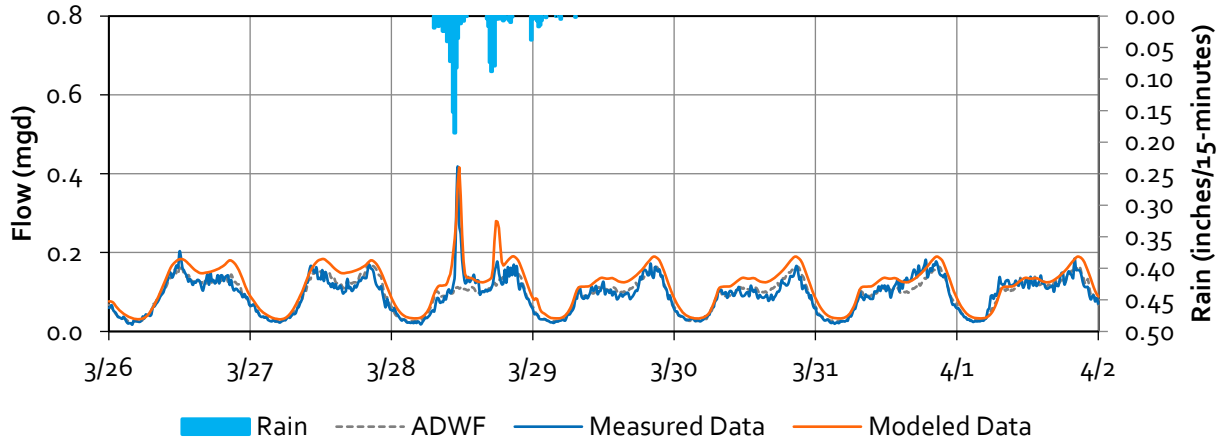


Figure D.10 Wet Weather Calibration (Site 10)

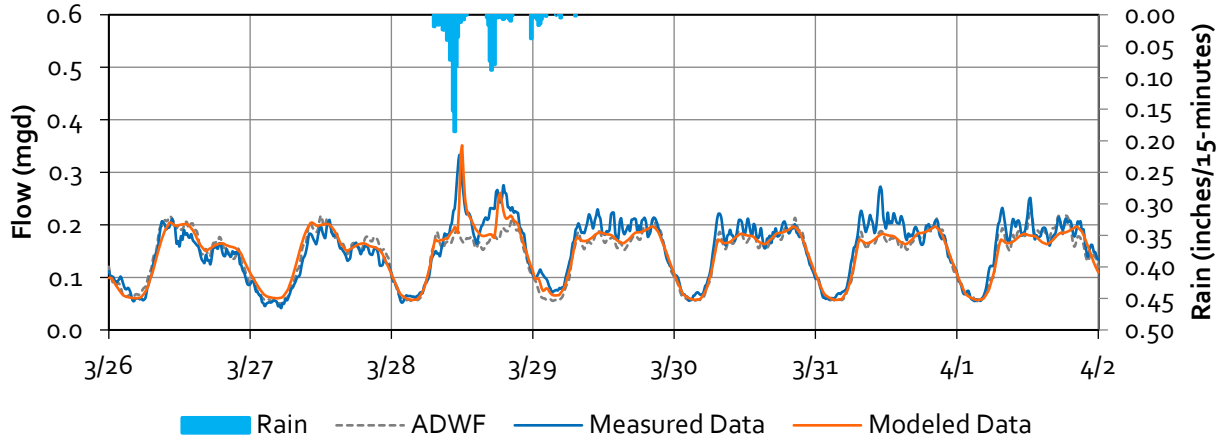


Figure D.11 Wet Weather Calibration (Site 12)

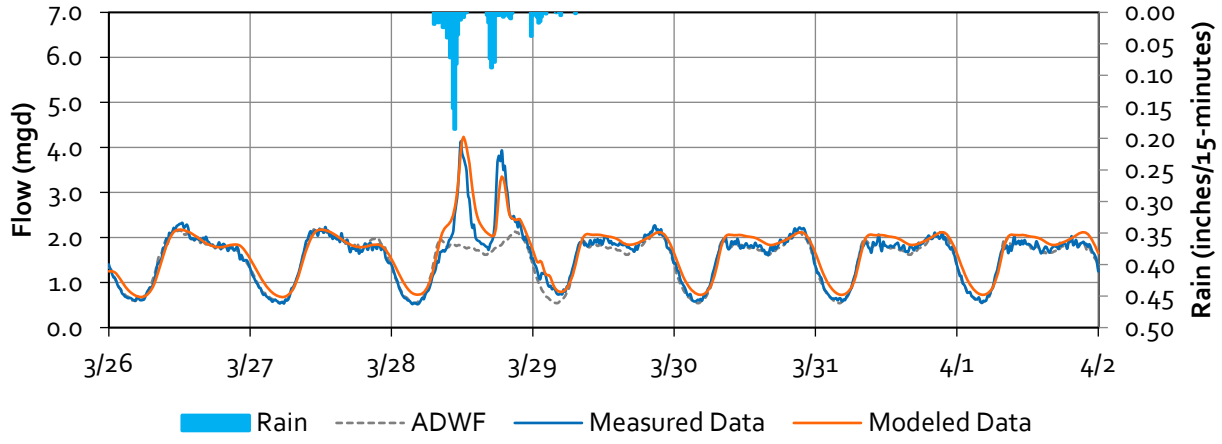


Figure D.13 Wet Weather Calibration (Site 13)

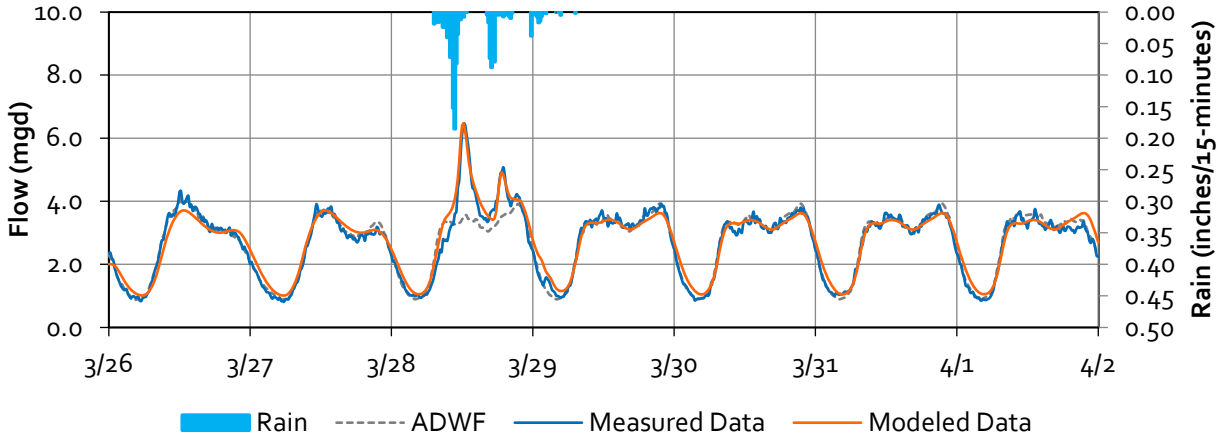


Figure D.14 Wet Weather Calibration (Site 14)

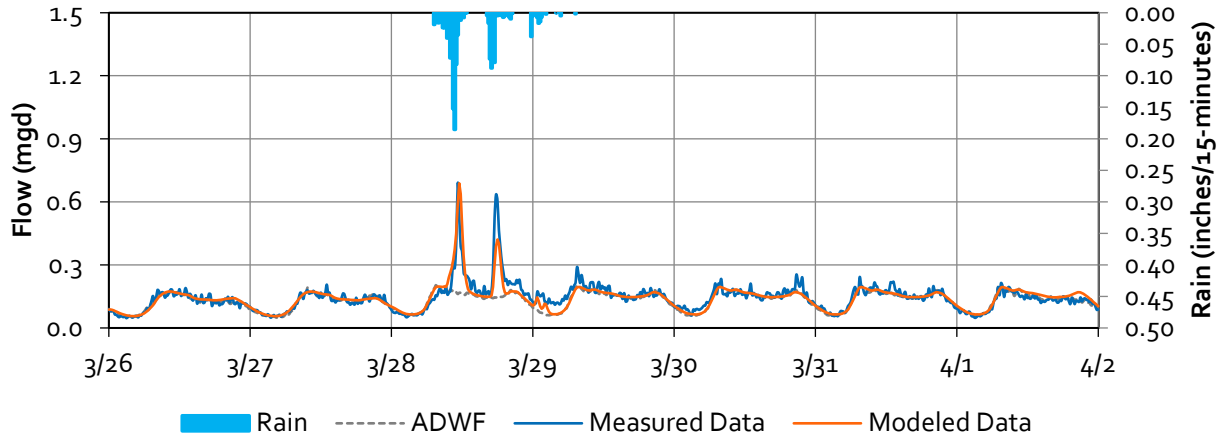


Figure D.15 Wet Weather Calibration (Site 15)

Appendix E

PIPELINE INSPECTION RESULTS

Pipe ID	Location	Material	Diameter (in)	Verified Length (ft)	Capacity Improvement	Capacity Project Number	Structural Inpsection						O&M Inspection					
							2019 Structural Quick Rating	2022 Structural Quick Rating	Maximum Severity Grade	Occurrences of Max Severity Grade[1]	Next Highest Severity	Occurrences of Next Highest Severity	2019 O&M Quick Rating	2022 O&M Quick Rating	Maximum Severity Grade	Occurrences of Max Severity Grade[1]	Next Highest Severity	Occurrences of Next Highest Severity
4006	Manhattan Pl.	CP Lined	8	234	No			3123	3	1	2	3		3100	3	1	0	0
0013	129 St	VCP	8	256.9	No		4235		4	2	3	5	0000		0	0	0	0
0015	129 St	VCP	8	205.4	No		3200		3	2	0	0	0000		0	0	0	0
0017	129 St	VCP	8	49	No		0000		0	0	0	0	0000		0	0	0	0
0019	129 St	VCP	8	48	No		3211		3	2	1	1	0000		0	0	0	0
0021	129 St	VCP	8	326	No		423H		4	2	3	H	2100		2	1	0	0
0023	129 St	VCP	8	324.2	No		413A		4	1	3	A	0000		0	0	0	0
0025	129 St	VCP	8	306	No		2100		2	1	0	0	0000		0	0	0	0
0027	129 St	VCP	8	301	No		4431		4	4	3	1	0000		0	0	0	0
0029	129 St	VCP	8	167.8	No		0000		0	0	0	0	0000		0	0	0	0
0031	Spinning Ave	VCP	8	333.1	No		4135		4	1	3	5	0000		0	0	0	0
0033	Daphne Ave	VCP	8	299	No		5142		5	1	4	2	2100		2	1	0	0
0035	Spinning Ave	VCP	8	342.3	No		423A		4	2	3	A	3112		3	1	1	2
0037	Spinning Ave	VCP	8	339.2	No		3L00		3	L	0	0	1200		1	2	0	0
0039	Daphne Ave	VCP	8	300	No		5141		5	1	4	1	0000		0	0	0	0
0041	Daphne Ave	VCP	8	321	No		5242		5	2	4	2	0000		0	0	0	0
0043	Arcturus Ave	VCP	8	298.2	No		483H		4	8	3	H	0000		0	0	0	0
0045	Arcturus Ave	VCP	8	300.2	No		3I21		3	I	2	1	0000		0	0	0	0
0047	Arcturus Ave	VCP	8	315	No		5142		5	1	4	2	0000		0	0	0	0
0049	Casimir Ave	VCP	8	303.1	No		5245		5	2	4	5	0000		0	0	0	0
0051	Casimir Ave	VCP	8	307.4	No		443G		4	4	3	G	0000		0	0	0	0
0053	Casimir Ave	VCP	8	328	No		4431		4	4	3	1	0000		0	0	0	0
0055	Wilkie Ave	VCP	8	298.3	No		4434		4	4	3	4	1200		1	2	0	0
0057	Wilkie Ave	VCP	8	300	No		4231		4	2	3	1	0000		0	0	0	0
0059	Wilkie Ave	VCP	8	325	No		4121		4	1	2	1	0000		0	0	0	0
0061	129 Pl	VCP	8	239	No		4433		4	4	3	3	0000		0	0	0	0
0063	129 Pl	VCP	8	230.1	No		3521		3	5	2	1	0000		0	0	0	0
0065	130 St	VCP	8	241.1	No		4433		4	4	3	3	0000		0	0	0	0
0067	130 St	VCP	8	227.5	No		4135		4	1	3	5	0000		0	0	0	0
0069	131 St	VCP	8	239	No		423C		4	2	3	C	2100		2	1	0	0
0071	131 St	VCP	8	230.1	No		4134		4	1	3	4	0000		0	0	0	0
0073	132 Pl	VCP	8	230.1	No		413G		4	1	3	G	0000		0	0	0	0
0075	132 Pl	VCP	8	224.8	No		5243		5	2	4	3	0000		0	0	0	0
0077	133 St	VCP	8	229.1	No		423G		4	2	3	G	0000		0	0	0	0
0079	133 St	VCP	8	224.9	No		4833		4	8	3	3	1100		1	1	0	0
0081	134 St	VCP	8	230.1	No		483D		4	8	3	D	0000		0	0	0	0
0083	134 St	VCP	8	223.5	No		5241		5	2	4	1	0000		0	0	0	0
0085	Ardath Av	VCP	8	264.3	No		4234		4	2	3	4	0000		0	0	0	0
0087	Ardath Av	VCP	8	250	No		4134		4	1	3	4	0000		0	0	0	0
0089	Ardath Av	VCP	8	200.3	No		4C31		4	C	3	1	0000		0	0	0	0
0091	Ardath Av	VCP	8	176	No		4432		4	4	3	2	0000		0	0	0	0
0095	Ardath Av	VCP	8	250	No		4537		4	5	3	7	0000		0	0	0	0
0097	Ardath Av	VCP	8	250.1	No		413E		4	1	3	E	0000		0	0	0	0
0099	Ardath Av	VCP	8	250	No		423D		4	2	3	D	0000		0	0	0	0
0101	Wilkie Av	VCP	8	325	No		433J		4	3	3	J	0000		0	0	0	0
0103	Wilkie Av	VCP	8	325	No		443F		4	4	3	F	0000		0	0	0	0
0105	Wilkie Av	VCP	8	311	No		473F		4	7	3	F	0000		0	0	0	0
0107	Casimir Av	VCP	8	331.1	No		5141		5	1	4	1	0000		0	0	0	0
0109	Casimir Av	VCP	8	326.9	No		4736		4	7	3	6	2100		2	1	0	0

Pipe ID	Location	Material	Diameter (in)	Verified Length (ft)	Capacity Improvement	Capacity Project Number	Structural Inpsection						O&M Inspection					
							2019 Structural Quick Rating	2022 Structural Quick Rating	Maximum Severity Grade	Occurrences of Max Severity Grade[1]	Next Highest Severity	Occurrences of Next Highest Severity	2019 O&M Quick Rating	2022 O&M Quick Rating	Maximum Severity Grade	Occurrences of Max Severity Grade[1]	Next Highest Severity	Occurrences of Next Highest Severity
0111	Casimir Av	VCP	8	316.2	No		4233		4	2	3	3	4132		4	1	3	2
0113	Arcturus Av	VCP	8	49.4	No		3200		3	2	0	0	0000		0	0	0	0
0115	Arcturus Av	VCP	8	328.3	No		483H		4	8	3	H	3100		3	1	0	0
0117	Arcturus Av	VCP	8	250	No		4121		4	1	2	1	0000		0	0	0	0
0119	Arcturus Av	VCP	8	307	No		463G		4	6	3	G	2100		2	1	0	0
0121	Daphne Av	VCP	8	50.1	No		0000		0	0	0	0	0000		0	0	0	0
0123	Spinning Av	VCP	8	61.3	No		0000		0	0	0	0	0000		0	0	0	0
0125	Spinning Av	VCP	8	252	No		4335		4	3	3	5	2600		2	6	0	0
0127	Spinning Av	VCP	8	327.4	No		4133		4	1	3	3	0000		0	0	0	0
0129	Spinning Av	VCP	8	317.9	No		4236		4	2	3	6	2200		2	2	0	0
0141	Van Ness Av	VCP	10	351	No		4F22		4	F	2	2	0000		0	0	0	0
0143	Van Ness Av	VCP	10	351	No		4L21		4	L	2	1	0000		0	0	0	0
0145	Van Ness Av	VCP	10	349	No		4I00		4	I	0	0	0000		0	0	0	0
0147	Cimarron St	VCP	8	163.4	No		3500		3	5	0	0	0000		0	0	0	0
0149	132nd St	VCP	10	260	Existing Improvement	P-1	4A22		4	A	2	2	0000		0	0	0	0
0151	129th St	VCP	8	142	No		5143		5	1	4	3	0000		0	0	0	0
0153	Haas Av	VCP	8	319	No		524I		5	2	4	I	1200		1	2	0	0
0155	Daleside Av	VCP	8	244.4	No		4432		4	4	3	2	2100		2	1	0	0
0157	Cimarron St	VCP	8	143.7	No		413D		4	1	3	D	0000		0	0	0	0
0159	Cimarron St	VCP	8	319.7	No		423J		4	2	3	J	1600		1	6	0	0
0161	129th St	VCP	8	256.3	No		514H		5	1	4	H	1200		1	2	0	0
0163	Daleside Av	VCP	8	321.4	No		4431		4	4	3	1	1600		1	6	0	0
0165	Cimarron St	VCP	8	326.6	No		4235		4	2	3	5	1300		1	3	0	0
0167	Haas Av	VCP	8	325	No		4K31		4	K	3	1	1500		1	5	0	0
0169	Haas Av	VCP	8	324	No		514K		5	1	4	K	1100		1	1	0	0
0171	132nd St	VCP	10	334.2	Existing Improvement	P-1	4J11		4	J	1	1	1200		1	2	0	0
0173	132nd St	VCP	10	258	Existing Improvement	P-1	4131		4	1	3	1	0000		0	0	0	0
0175	Daleside Av	VCP	8	324.1	No		413K		4	1	3	K	1700		1	7	0	0
0177	Cimarron St	VCP	8	326.4	No		413H		4	1	3	H	1100		1	1	0	0
0181	Van Ness Av	VCP	12	324.1	Existing Improvement	P-1	3I2A		3	I	2	A	2L00		2	L	0	0
0183	Van Ness Av	VCP	12	326	Existing Improvement	P-1	4B22		4	B	2	2	2L00		2	L	0	0
0185	Van Ness Av	VCP	12	300.1	Existing Improvement	P-1	0000		0	0	0	0	2K00		2	K	0	0
0187	134th Pl	VCP	8	283.1	No		4F31		4	F	3	1	0000		0	0	0	0
0189	134th Pl	VCP	8	281.1	No		4631		4	6	3	1	0000		0	0	0	0
0191	134th Pl	VCP	8	277.4	No		4631		4	6	3	1	1100		1	1	0	0
0193	Daphne Av	VCP	8	173	No		4733		4	7	3	3	0000		0	0	0	0
0195	135th St	VCP	10	298	Existing Improvement	P-2	412G		4	1	2	G	2K00		2	K	0	0
0197	135th St	VCP	10	258	Existing Improvement	P-2	452D		4	5	2	D	2H00		2	H	0	0
0199	135th St	VCP	10	242.1	Existing Improvement	P-2	4131		4	1	3	1	2H00		2	H	0	0
0201	135th St	VCP	10	61	Existing Improvement	P-2	0000		0	0	0	0	2A00		2	A	0	0
0203	Wilton Pl	VCP	8	217.1	Existing Improvement	P-2	4300		4	3	0	0	0000		0	0	0	0
0205	Wilton Pl	VCP	8	282.1	No		514C		5	1	4	C	0000		0	0	0	0
0207	Wilton Pl	VCP	8	358	No		4J31		4	J	3	1	0000		0	0	0	0
0209	Wilton Pl	VCP	8	360	No		4A32		4	A	3	2	0000		0	0	0	0
0211	Gramercy Pl	VCP	8	325	No		4531		4	5	3	1	0000		0	0	0	0
0213	Gramercy Pl	VCP	8	325	No		4833		4	8	3	3	0000		0	0	0	0
0215	Gramercy Pl	VCP	8	325	No		4J31		4	J	3	1	211A		2	1	1	A
0217	Ruthelen St	VCP	8	325	No		4J00		4	J	0	0	0000		0	0	0	0
0219	Ruthelen St	VCP	8	325	No		4I32		4	I	3	2	0000		0	0	0	0

Pipe ID	Location	Material	Diameter (in)	Verified Length (ft)	Capacity Improvement	Capacity Project Number	Structural Inpsection						O&M Inspection					
							2019 Structural Quick Rating	2022 Structural Quick Rating	Maximum Severity Grade	Occurrences of Max Severity Grade[1]	Next Highest Severity	Occurrences of Next Highest Severity	2019 O&M Quick Rating	2022 O&M Quick Rating	Maximum Severity Grade	Occurrences of Max Severity Grade[1]	Next Highest Severity	Occurrences of Next Highest Severity
0221	Ruthelen St	VCP	8	325	No		4J33		4	J	3	3	0000		0	0	0	0
0223	St Andrews Pl	VCP	8	325	No		4534		4	5	3	4	0000		0	0	0	0
0225	St Andrews Pl	VCP	8	325	No		4731		4	7	3	1	0000		0	0	0	0
0227	St Andrews Pl	VCP	8	323	No		4G33		4	G	3	3	3100		3	1	0	0
0229	Manhattan Pl	VCP	8	323.2	No		443J		4	4	3	J	0000		0	0	0	0
0231	Manhattan Pl	VCP	8	323.1	No		433G		4	3	3	G	0000		0	0	0	0
0233	Manhattan Pl	VCP	8	297.2	No		453F		4	5	3	F	311D		3	1	1	D
0235	134th Pl	VCP	8	257.1	Existing Improvement	P-2	4G00		4	G	0	0	3100		3	1	0	0
0237	134th Pl	VCP	8	260	No		4H00		4	H	0	0	0000		0	0	0	0
0239	134th Pl	VCP	8	254	No		4H00		4	H	0	0	0000		0	0	0	0
0241	134th Pl	VCP	8	254.1	No		4H31		4	H	3	1	1300		1	3	0	0
0245	Wilton Pl	VCP	8	161	No		3100		3	1	0	0	0000		0	0	0	0
0247	Wilton Pl	VCP	8	329	No		4L00		4	L	0	0	2100		2	1	0	0
0249	Wilton Pl	VCP	8	324.1	No		4H31		4	H	3	1	0000		0	0	0	0
0253	Gramercy Pl	VCP	8	300.3	No		4I31		4	I	3	1	3122		3	1	2	2
0255	Gramercy Pl	VCP	8	288.4	No		473J		4	7	3	J	231A		2	3	1	A
0257	Gramercy Pl	VCP	8	300	No		4J31		4	J	3	1	1800		1	8	0	0
0259	Ruthelen St	VCP	8	298.1	No		4G21		4	G	2	1	0000		0	0	0	0
0261	Ruthelen St	VCP	8	300.1	No		4835		4	8	3	5	0000		0	0	0	0
0263	Ruthelen St	VCP	8	290.1	No		4H31		4	H	3	1	0000		0	0	0	0
0265	St Andrews Pl	VCP	8	298.1	No		4I33		4	I	3	3	2100		2	1	0	0
0267	St Andrews Pl	VCP	8	300.2	No		4H32		4	H	3	2	0000		0	0	0	0
0269	St Andrews Pl	VCP	8	290	No		4J31		4	J	3	1	0000		0	0	0	0
0271	Manhattan Pl	VCP	8	325	No		4J31		4	J	3	1	1B00		1	B	0	0
0273	Manhattan Pl	VCP	8	324	No		4J31		4	J	3	1	1100		1	1	0	0
0275	Manhattan Pl	VCP	8	304	No		433I		4	3	3	I	2100		2	1	0	0
0277	132nd St	VCP	8	253.5	No		413F		4	1	3	F	2E00		2	E	0	0
0279	132nd St	VCP	8	257	No		3H00		3	H	0	0	2H00		2	H	0	0
0281	132nd St	VCP	8	255	No		3H00		3	H	0	0	2I00		2	I	0	0
0283	129th St	VCP	8	350.1	No		4L31		4	L	3	1	2111		2	1	1	1
0285	129th St	VCP	8	324	No		413K		4	1	3	K	211A		2	1	1	A
0287	129th St	VCP	8	348	No		4J31		4	J	3	1	0000		0	0	0	0
0289	Wilton Pl	VCP	8	187	No		4238		4	2	3	8	1A00		1	A	0	0
0291	El Segundo Blvd	VCP	8	349	No		4G35		4	G	3	5	0000		0	0	0	0
0293	Western Av	VCP	8	329.1	No		2300		2	3	0	0	2800		2	8	0	0
0295	132nd St	VCP	8	209.1	No		3E00		3	E	0	0	2G00		2	G	0	0
0297	132nd St	VCP	8	200.1	No		3F00		3	F	0	0	2G00		2	G	0	0
0299	Western Av	VCP	8	305.1	No		493C		4	9	3	C	1F00		1	F	0	0
0301	Western Av	VCP	8	303.3	No		4237		4	2	3	7	2J17		2	J	1	7
0303	Western Av	VCP	8	303.7	No		4338		4	3	3	8	2B00		2	B	0	0
0305	El Segundo Blvd	VCP	8	350	No		524H		5	2	4	H	2111		2	1	1	1
0307	El Segundo Blvd	VCP	8	349	No		4J31		4	J	3	1	1400		1	4	0	0
0309	Western Av	VCP	10	318	Existing Improvement	P-3	2100		2	1	0	0	1200		1	2	0	0
0311	Western Av	VCP	8	355	No		5142		5	1	4	2	0000		0	0	0	0
0313	Western Av	VCP	8	353.1	No		433B		4	3	3	B	2L00		2	L	0	0
0315	Western Av	VCP	8	251.5	No		3A2E		3	A	2	E	2500		2	5	0	0
0317	134th Pl	VCP	8	280.1	No		4200		4	2	0	0	412B		4	1	2	B
0319	134th Pl	VCP	8	140.1	No		4100		4	1	0	0	411A		4	1	1	A
0321	135th St	VCP	8	160.7	No		2100		2	1	0	0	2E00		2	E	0	0

Pipe ID	Location	Material	Diameter (in)	Verified Length (ft)	Capacity Improvement	Capacity Project Number	Structural Inpsection						O&M Inspection					
							2019 Structural Quick Rating	2022 Structural Quick Rating	Maximum Severity Grade	Occurrences of Max Severity Grade[1]	Next Highest Severity	Occurrences of Next Highest Severity	2019 O&M Quick Rating	2022 O&M Quick Rating	Maximum Severity Grade	Occurrences of Max Severity Grade[1]	Next Highest Severity	Occurrences of Next Highest Severity
0323	135th St	VCP	8	163.7	No		2A00		2	A	0	0	2E00		2	E	0	0
0325	St andrews Pl	VCP	8	268	No					0		0				0		0
0327	St andrews Pl	VCP	8	268.1	No					0		0				0		0
0329	135th St	VCP	8	8.8	No		0000		0	0	0	0	2I00		2	I	0	0
0329R	135th St	VCP	8	283.8	No					0		0				0		0
0331	135th St	VCP	8	22	No		2100		2	1	0	0	0000		0	0	0	0
0333	135th St	VCP	8	324	No		0000		0	0	0	0	0000		0	0	0	0
0335	ESMT. W/O Western	VCP	8	250.5	No		0000		0	0	0	0	2A00		2	A	0	0
0337	Wilton Pl	VCP	8	46	No		4100		4	1	0	0	2900		2	9	0	0
0338	134th St	VCP	8	46.6	No		3321		3	3	2	1	0000		0	0	0	0
0339	ESMT. W/O Western	VCP	8	213.8	No		0000		0	0	0	0	2F00		2	F	0	0
0351	Van Ness Av	VCP	12	80.1	Existing Improvement	P-1	4131		4	1	3	1	0000		0	0	0	0
0353	135th St	VCP	10	300.1	Existing Improvement	P-2	4233		4	2	3	3	2K00		2	K	0	0
0355	139th St	VCP	12	171	No		2C00		2	C	0	0	2A00		2	A	0	0
0357	139th St	VCP	8	243.9	No		3H21		3	H	2	1	0000		0	0	0	0
0359	139th St	VCP	10	254.8	No		3F00		3	F	0	0	1C00		1	C	0	0
0361	139th St	VCP	10	253.5	No		4532		4	5	3	2	0000		0	0	0	0
0363	139th St	VCP	12	142.1	No		413A		4	1	3	A	0000		0	0	0	0
0365	139th St	VCP	12	255	No		5141		5	1	4	1	2I00		2	I	0	0
0367	139th St	VCP	12	255.1	No		513F		5	1	3	F	2G00		2	G	0	0
0369	139th St	VCP	10	255	No		5142		5	1	4	2	2I00		2	I	0	0
0371	Ardath Av	VCP	8	123	No		4121		4	1	2	1	0000		0	0	0	0
0373	139th St	VCP	8	200	No		4300		4	3	0	0	0000		0	0	0	0
0375	Ardath Av	VCP	8	256.4	No		3223		3	2	2	3	0000		0	0	0	0
0377	135th Pl	VCP	8	202.5	No		4700		4	7	0	0	0000		0	0	0	0
0379	136th St	VCP	8	200.3	No		2100		2	1	0	0	0000		0	0	0	0
0381	137th St	VCP	8	201.1	No		4131		4	1	3	1	1200		1	2	0	0
0383	138th St	VCP	8	199.5	No		4231		4	2	3	1	0000		0	0	0	0
0385	139th St	VCP	8	200	No		4221		4	2	2	1	0000		0	0	0	0
0387	Ardath Av	VCP	8	257	No		4133		4	1	3	3	312C		3	1	2	C
0389	138th St	VCP	8	200	No		0000		0	0	0	0	0000		0	0	0	0
0391	Ardath Av	VCP	8	256	No		4335		4	3	3	5	1100		1	1	0	0
0393	137th St	VCP	8	205	No		4500		4	5	0	0	3211		3	2	1	1
0395	Ardath Av	VCP	8	257	No		4G34		4	G	3	4	0000		0	0	0	0
0395A	Ardath Av	VCP	8	88.1	No		3100		3	1	0	0	0000		0	0	0	0
0397	136th St	VCP	8	205.1	No		4100		4	1	0	0	0000		0	0	0	0
0399	135th Pl	VCP	8	205	No		3100		3	1	0	0	0000		0	0	0	0
0401	Wilkie Av	VCP	8	308	No		423K		4	2	3	K	0000		0	0	0	0
0403	Wilkie Av	VCP	8	310	No		413I		4	1	3	I	0000		0	0	0	0
0405	Wilkie Av	VCP	8	310	No		443D		4	4	3	D	0000		0	0	0	0
0407	Wilkie Av	VCP	8	310	No		423J		4	2	3	J	0000		0	0	0	0
0409	Casimir Av	VCP	8	314.8	No		4A3A		4	A	3	A	1100		1	1	0	0
0411	Casimir Av	VCP	8	314.1	No		4D39		4	D	3	9	3200		3	2	0	0
0413	Casimir Av	VCP	8	315.1	No		4I32		4	I	3	2	3211		3	2	1	1
0415	Casimir Av	VCP	8	314.1	No		4E35		4	E	3	5	3100		3	1	0	0
0417	Arcturus Av	VCP	8	267.3	No		4A34		4	A	3	4	1100		1	1	0	0
0419	Arcturus Av	VCP	8	330	No		4B39		4	B	3	9	1200		1	2	0	0
0421	Arcturus Av	VCP	8	329.8	No		4332		4	3	3	2	3111		3	1	1	1
0423	Arcturus Av	VCP	8	328.1	No		4733		4	7	3	3	2A00		2	A	0	0

Pipe ID	Location	Material	Diameter (in)	Verified Length (ft)	Capacity Improvement	Capacity Project Number	Structural Inpsection						O&M Inspection					
							2019 Structural Quick Rating	2022 Structural Quick Rating	Maximum Severity Grade	Occurrences of Max Severity Grade[1]	Next Highest Severity	Occurrences of Next Highest Severity	2019 O&M Quick Rating	2022 O&M Quick Rating	Maximum Severity Grade	Occurrences of Max Severity Grade[1]	Next Highest Severity	Occurrences of Next Highest Severity
0425	Purche Av	VCP	8	262.5	No		433A		4	3	3	A	0000		0	0	0	0
0427	Purche Av	VCP	8	326	No		3I00		3	I	0	0	0000		0	0	0	0
0429	Purche Av	VCP	8	324.2	No		443F		4	4	3	F	0000		0	0	0	0
0431	Purche Av	VCP	8	323	No		4321		4	3	2	1	0000		0	0	0	0
0433	Daphne Av	VCP	8	263	No		4G31		4	G	3	1	0000		0	0	0	0
0435	Daphne Av	VCP	8	325	No		413F		4	1	3	F	1100		1	1	0	0
0437	Daphne Av	VCP	8	326	No		4B35		4	B	3	5	3100		3	1	0	0
0439	Daphne Av	VCP	8	323.1	No		4335		4	3	3	5	0000		0	0	0	0
0441	Spinning Av	VCP	8	263	No		413G		4	1	3	G	3200		3	2	0	0
0443	Spinning Av	VCP	8	325	No		4438		4	4	3	8	2E00		2	E	0	0
0445	Spinning Av	VCP	8	324.1	No		413A		4	1	3	A	3100		3	1	0	0
0447	Spinning Av	VCP	8	324.1	No		4134		4	1	3	4	0000		0	0	0	0
0449	Ardath Av	VCP	8		No					0		0				0		0
0451	141st St	VCP	8	190.1	No		423F		4	2	3	F	0000		0	0	0	0
0453	141st St	VCP	8	199	No		4C21		4	C	2	1	0000		0	0	0	0
0455	140th St	VCP	8	199.1	No		3F00		3	F	0	0	0000		0	0	0	0
0457	140th St	VCP	8	200.3	No		4533		4	5	3	3	0000		0	0	0	0
0459	139th Pl	VCP	8	199.1	No		4235		4	2	3	5	0000		0	0	0	0
0461	139th Pl	VCP	8	200.2	No		4A32		4	A	3	2	2100		2	1	0	0
0463	Ardath Ave	VCP	8	250.3	No		3H00		3	H	0	0	0000		0	0	0	0
0465	Ardath Ave	VCP	8	139.7	No		443A		4	4	3	A	0000		0	0	0	0
0467	Ardath Ave	VCP	8	250	No		423A		4	2	3	A	2C00		2	C	0	0
0469	Wilkie Ave	VCP	8	333.1	No		513J		5	1	3	J	0000		0	0	0	0
0471	Wilkie Ave	VCP	8	326	No		5147		5	1	4	7	2300		2	3	0	0
0473	Casimir Ave	VCP	8	329.1	No		4B34		4	B	3	4	0000		0	0	0	0
0475	Casimir Ave	VCP	8	330	No		3423		3	4	2	3	3112		3	1	1	2
0477	Daphne Ave	VCP	8	269.2	No		433I		4	3	3	I	0000		0	0	0	0
0479	Daphne Ave	VCP	8	271.9	No		5343		5	3	4	3	3121		3	1	2	1
0481	Daphne Ave	VCP	8	268.5	No		5144		5	1	4	4	0000		0	0	0	0
0483	Arcturus Ave	VCP	8	274.1	No		3D00		3	D	0	0	0000		0	0	0	0
0485	Purche Ave	VCP	8	274	No		3E22		3	E	2	2	0000		0	0	0	0
0487	141st St	VCP	8	256.1	No		413D		4	1	3	D	0000		0	0	0	0
0489	Arcturus Ave	VCP	8	272.1	No		3G21		3	G	2	1	0000		0	0	0	0
0491	Arcturus Ave	VCP	8	270.7	No		4337		4	3	3	7	0000		0	0	0	0
0493	Purche Ave	VCP	8	268.1	No		413A		4	1	3	A	0000		0	0	0	0
0495	Purche Ave	VCP	8	269.8	No		4236		4	2	3	6	1100		1	1	0	0
0497	141st St	VCP	8	254.6	No		443G		4	4	3	G	1100		1	1	0	0
0499	Spinning Ave	VCP	8	285.6	No		423H		4	2	3	H	4131		4	1	3	1
0501	Spinning Ave	VCP	8	275	No		413A		4	1	3	A	1100		1	1	0	0
0503	Spinning Ave	VCP	8	274	No		3I00		3	I	0	0	0000		0	0	0	0
0505	Alley N/O Rosecrans	VCP	8	161	No		0000		0	0	0	0	2A00		2	A	0	0
0507	Alley N/O Rosecrans	VCP	8	110.1	No		2211		2	2	1	1	0000		0	0	0	0
0509	Alley N/O Rosecrans	VCP	8	270	No		4234		4	2	3	4	0000		0	0	0	0
0511	Alley E/O Spinning	VCP	8	291.7	No		423I		4	2	3	I	3121		3	1	2	1
0513	Alley E/O Spinning	VCP	8	299.6	No		433H		4	3	3	H	0000		0	0	0	0
0517	Alley E/O Spinning	VCP	8	297.1	No		433G		4	3	3	G	0000		0	0	0	0
0519	141st St	VCP	8	210	No		0000		0	0	0	0	1A00		1	A	0	0
0521	141st St	VCP	8	280.1	No		4733		4	7	3	3	0000		0	0	0	0
0523	141st St	VCP	8	299	No		4633		4	6	3	3	0000		0	0	0	0

Pipe ID	Location	Material	Diameter (in)	Verified Length (ft)	Capacity Improvement	Capacity Project Number	Structural Inpsection						O&M Inspection					
							2019 Structural Quick Rating	2022 Structural Quick Rating	Maximum Severity Grade	Occurrences of Max Severity Grade[1]	Next Highest Severity	Occurrences of Next Highest Severity	2019 O&M Quick Rating	2022 O&M Quick Rating	Maximum Severity Grade	Occurrences of Max Severity Grade[1]	Next Highest Severity	Occurrences of Next Highest Severity
0525	141st St	VCP	8	249.3	No		4234		4	2	3	4	0000		0	0	0	0
0527	141st St	VCP	8	170	No		3E00		3	E	0	0	2100		2	1	0	0
0529	Rosecrans Ave	VCP	8	169.4	No		4D21		4	D	2	1	4131		4	1	3	1
0531	Ardath Ave	VCP	8	323	No		4834		4	8	3	4	2215		2	2	1	5
0533	Rosecrans Ave	VCP	8	280.3	No		443J		4	4	3	J	5133		5	1	3	3
0535	Rosecrans Ave	VCP	8	301.6	No		4A34		4	A	3	4	3316		3	3	1	6
0537	Rosecrans Ave	VCP	8	249.5	No		473G		4	7	3	G	311H		3	1	1	H
0539	139th St	VCP	10	256.6	No		5131		5	1	3	1	2800		2	8	0	0
0541	139th St	VCP	8	119.4	No		4133		4	1	3	3	0000		0	0	0	0
0543	Wilton Pl	VCP	8	256	No		4100		4	1	0	0	0000		0	0	0	0
0545	Wilton Pl	VCP	8	254.5	No		0000		0	0	0	0	0000		0	0	0	0
0547	139th St	VCP	10	215.1	No					0		0				0		0
0549	139th St	VCP	10	350.4	No		342J		3	4	2	J	312M		3	1	2	M
0551	139th St	VCP	10	93.6	No		512C		5	1	2	C	2B00		2	B	0	0
0553	139th St	VCP	8	230.1	No		4300		4	3	0	0	3100		3	1	0	0
0555	139th St	VCP	8	55	No		4123		4	1	2	3	0000		0	0	0	0
0557	Western Ave	VCP	8	76	No		0000		0	0	0	0	0000		0	0	0	0
0561	139th St	VCP	8	296.4	No		3A2A		3	A	2	A	0000		0	0	0	0
0563	139th St	VCP	8	270	No		4132		4	1	3	2	0000		0	0	0	0
0565	139th St	VCP	8	349	No		312A		3	1	2	A	3111		3	1	1	1
0567	139th St	VCP	8	353.4	No		3A2A		3	A	2	A	0000		0	0	0	0
0569	Western Ave	VCP	8	276	No		2300		2	3	0	0	261G		2	6	1	G
0571	Western Ave	VCP	8	341	No		2G00		2	G	0	0	0000		0	0	0	0
0573	Western Ave	VCP	8	335.1	No		2L00		2	L	0	0	4800		4	8	0	0
0575	Western Ave	VCP	8	320	No		312C		3	1	2	C	1500		1	5	0	0
0577	Kingsley Dr	VCP	8	57.6	No					0		0				0		0
0579	Rosecrans Ave	VCP	8	305.1	No		0000		0	0	0	0	5100		5	1	0	0
0581	Rosecrans Ave	VCP	8	45.2	No		5141		5	1	4	1	0000		0	0	0	0
0583	Kingsley Dr	VCP	8	349.4	No		4121		4	1	2	1	2200		2	2	0	0
0585	Rosecrans Ave	VCP	8	294.1	No		0000		0	0	0	0	0000		0	0	0	0
0587	Halldale Ave	VCP	8	267.5	No		2100		2	1	0	0	0000		0	0	0	0
0589	Halldale Ave	VCP	8	324.2	No		0000		0	0	0	0	0000		0	0	0	0
0591	141st St	VCP	8	166.8	No		0000		0	0	0	0	0000		0	0	0	0
0593	Brighton Ave	VCP	8	323.3	No		0000		0	0	0	0	0000		0	0	0	0
0595	Brighton Ave	VCP	8	324.8	No		423B		4	2	3	B	2900		2	9	0	0
0597	Brighton Ave	VCP	8	322.3	No		382A		3	8	2	A	0000		0	0	0	0
0599	Brighton Ave	VCP	8	170.3	No		2300		2	3	0	0	0000		0	0	0	0
0599R	Brighton Ave	VCP	8	150	No					0		0				0		0
0601	139th St	VCP	8	135.4	No		423A		4	2	3	A	2100		2	1	0	0
0603	Harvard Ave	VCP	8	98	No		0000		0	0	0	0	0000		0	0	0	0
0605	139th St	VCP	8	81	No		4333		4	3	3	3	1100		1	1	0	0
0607	139th St	VCP	8	349.2	No		443A		4	4	3	A	0000		0	0	0	0
0609	139th St	VCP	8	318.2	No		473B		4	7	3	B	2100		2	1	0	0
0611	139th St	VCP	8	304	No		423B		4	2	3	B	0000		0	0	0	0
0613	139th St	VCP	8	305.3	No		5148		5	1	4	8	0000		0	0	0	0
0617	139th St	VCP	8	328.3	No		413C		4	1	3	C	0000		0	0	0	0
0619	139th St	VCP	8	245.6	No		453A		4	5	3	A	1400		1	4	0	0
0621	Normandie Ave	VCP	8	87.1	No		3100		3	1	0	0	0000		0	0	0	0
0623	Rosecrans Ave	VCP	8	111	No		2100		2	1	0	0	0000		0	0	0	0

Pipe ID	Location	Material	Diameter (in)	Verified Length (ft)	Capacity Improvement	Capacity Project Number	Structural Inpsection						O&M Inspection					
							2019 Structural Quick Rating	2022 Structural Quick Rating	Maximum Severity Grade	Occurrences of Max Severity Grade[1]	Next Highest Severity	Occurrences of Next Highest Severity	2019 O&M Quick Rating	2022 O&M Quick Rating	Maximum Severity Grade	Occurrences of Max Severity Grade[1]	Next Highest Severity	Occurrences of Next Highest Severity
0625	Rosecrans Ave	VCP	8	196	No		2100		2	1	0	0	0000		0	0	0	0
0627	Brighton Ave	VCP	8	79.2	No					0		0				0		0
0631	Normandie Ave	VCP	8	126	No		423C		4	2	3	C	0000		0	0	0	0
0633	Normandie Ave	VCP	8	322	No		413G		4	1	3	G	0000		0	0	0	0
0635	Normandie Ave	VCP	8	321	No		4G31		4	G	3	1	2100		2	1	0	0
0637	Normandie Ave	VCP	8	271	No		3I2F		3	I	2	F	0000		0	0	0	0
0639	Normandie Ave	VCP	8	250.1	No		4533		4	5	3	3	3300		3	3	0	0
0641	Normandie Ave	VCP	8	354.1	No		4132		4	1	3	2	1200		1	2	0	0
0643	Normandie Ave	VCP	8	322.2	No		4423		4	4	2	3	0000		0	0	0	0
0645	Normandie Ave	VCP	8	217	No					0		0				0		0
0647	Normandie Ave	VCP	8	198	No					0		0				0		0
0649	Normandie Ave	VCP	8	70	No		4300		4	3	0	0	0000		0	0	0	0
0651	Normandie Ave	VCP	8	26.3	No					0		0				0		0
0653	135th St	VCP	8	196.7	No		0000		0	0	0	0	0000		0	0	0	0
0657	135th St	VCP	8	354.5	No		473A		4	7	3	A	0000		0	0	0	0
0659	135th St	VCP	8	342	Existing Improvement	P-6	4K21		4	K	2	1	4100		4	1	0	0
0661	135th St	VCP	8	351.1	Existing Improvement	P-6	524D		5	2	4	D	0000		0	0	0	0
0663	135th St	VCP	8	350.1	Existing Improvement	P-6	514L		5	1	4	L	4121		4	1	2	1
0665	135th St	VCP	8	350.1	Existing Improvement	P-6	514H		5	1	4	H	4127		4	1	2	7
0667	135th St	VCP	8	202	No		524F		5	2	4	F	0000		0	0	0	0
0669	135th St	VCP	8	199	No		463B		4	6	3	B	0000		0	0	0	0
0671	135th St	VCP	8	242.2	No		463B		4	6	3	B	0000		0	0	0	0
0673	Alma Ave	VCP	8	298.2	No		3725		3	7	2	5	2D00		2	D	0	0
0675	Alma Ave	VCP	8	334.9	No		4237		4	2	3	7	0000		0	0	0	0
0677	Halldale Ave	VCP	8	156	No		3100		3	1	0	0	2200		2	2	0	0
0679	Halldale Ave	VCP	8	352.4	No		4532		4	5	3	2	2100		2	1	0	0
0681	Normandie Ave	VCP	8		No					0		0				0		0
0683	Normandie Ave	VCP	8	199.1	No		4535		4	5	3	5	0000		0	0	0	0
0685	Normandie Ave	VCP	8	290.4	No		5146		5	1	4	6	2H00		2	H	0	0
0687	134th St	VCP	8	342.1	Existing Improvement	P-5	4K2D		4	K	2	D	2J00		2	J	0	0
0689	Halldale Ave	VCP	8	340	No		0000		0	0	0	0	0000		0	0	0	0
0691	Halldale Ave	VCP	8	175	No		4231		4	2	3	1	0000		0	0	0	0
0693	134th St	VCP	8	335.1	No		5134		5	1	3	4	0000		0	0	0	0
0695	134th St	VCP	8	327	No		4135		4	1	3	5	0000		0	0	0	0
0697	134th St	VCP	8	344.3	No		332C		3	3	2	C	0000		0	0	0	0
0699	134th St	VCP	8	328	Existing Improvement	P-5	4H32		4	H	3	2	0000		0	0	0	0
0701	134th St	VCP	8	351	Existing Improvement	P-5	4I2G		4	I	2	G	0000		0	0	0	0
0703	134th St	VCP	8	261	No		332F		3	3	2	F	0000		0	0	0	0
0705	134th St	VCP	8	291	No		352B		3	5	2	B	0000		0	0	0	0
0707	Normandie Ave	VCP	8	79	No		3322		3	3	2	2	0000		0	0	0	0
0709	Normandie Ave	VCP	8	205	No		3424		3	4	2	4	0000		0	0	0	0
0711	Normandie Ave	VCP	8	330.4	No		423B		4	2	3	B	0000		0	0	0	0
0713	Normandie Ave	VCP	8	343.3	No		443B		4	4	3	B	1400		1	4	0	0
0715	132nd St	VCP	8	319	Existing Improvement	P-4	372D		3	7	2	D	0000		0	0	0	0
0717	132nd St	VCP	8	288	No		4331		4	3	3	1	2I00		2	I	0	0
0719	132nd St	VCP	8	354.3	Existing Improvement	P-4	342A		3	4	2	A	0000		0	0	0	0
0721	132nd St	VCP	8	354	No		433A		4	3	3	A	0000		0	0	0	0
0723	132nd St	VCP	8	354	No		352B		3	5	2	B	1100		1	1	0	0
0725	132nd St	VCP	8	351	No		4531		4	5	3	1	2M00		2	M	0	0

Pipe ID	Location	Material	Diameter (in)	Verified Length (ft)	Capacity Improvement	Capacity Project Number	Structural Inpsection						O&M Inspection					
							2019 Structural Quick Rating	2022 Structural Quick Rating	Maximum Severity Grade	Occurrences of Max Severity Grade[1]	Next Highest Severity	Occurrences of Next Highest Severity	2019 O&M Quick Rating	2022 O&M Quick Rating	Maximum Severity Grade	Occurrences of Max Severity Grade[1]	Next Highest Severity	Occurrences of Next Highest Severity
0727	132nd St	VCP	8	313	No		4631		4	6	3	1	2K00		2	K	0	0
0729	132nd St	VCP	8	272.1	No		443A		4	4	3	A	2I00		2	I	0	0
0731	130th St	VCP	8	314.1	No		4232		4	2	3	2	2K00		2	K	0	0
0733	Halldale Ave	VCP	8	350	No		3421		3	4	2	1	2M00		2	M	0	0
0735	130th St	VCP	8	195.1	No		3121		3	1	2	1	0000		0	0	0	0
0737	Halldale Ave	VCP	8	340	No		0000		0	0	0	0	2D00		2	D	0	0
0739	130th St	VCP	8	292	No		4331		4	3	3	1	2F00		2	F	0	0
0741	130th St	VCP	8	250	No		4B32		4	B	3	2	2I00		2	I	0	0
0743	130th St	VCP	8	300	No		4I00		4	I	0	0	2J00		2	J	0	0
0745	130th St	VCP	8	350	No		4L00		4	L	0	0	2L00		2	L	0	0
0747	130th St	VCP	8	350	No		5145		5	1	4	5	2M00		2	M	0	0
0749	El Segundo Blvd	VCP	8	353	No		514H		5	1	4	H	0000		0	0	0	0
0751	Halldale Ave	VCP	8	315	No		4221		4	2	2	1	0000		0	0	0	0
0753	Halldale Ave	VCP	8	351	No		5143		5	1	4	3	0000		0	0	0	0
0755	Normandie Ave	VCP	8	256.7	No		4A3A		4	A	3	A	2I00		2	I	0	0
0757	Normandie Ave	VCP	8	352.3	No		433B		4	3	3	B	2K00		2	K	0	0
0759	Normandie Ave	VCP	8	342.9	No		3127		3	1	2	7	2E00		2	E	0	0
0761	Normandie Ave	VCP	8	352.6	No		4A3B		4	A	3	B	2L00		2	L	0	0
0763	Normandie Ave	VCP	8	345	No		4L00		4	L	0	0	0000		0	0	0	0
0765	Normandie Ave	VCP	8	344	No		524K		5	2	4	K	0000		0	0	0	0
0767	Normandie Ave	VCP	8	351	No		4K31		4	K	3	1	0000		0	0	0	0
0769	Normandie Ave	VCP	8	313	No		524E		5	2	4	E	2A00		2	A	0	0
0771	El Segundo Blvd	VCP	8	319	Existing Improvement	P-3	5143		5	1	4	3	0000		0	0	0	0
0773	El Segundo Blvd	VCP	8	328	No		4300		4	3	0	0	1300		1	3	0	0
0773A	El Segundo Blvd	VCP	8	2.8	No		0000		0	0	0	0	0000		0	0	0	0
0775	El Segundo Blvd	VCP	8	277	No		4332		4	3	3	2	1E00		1	E	0	0
0777	El Segundo Blvd	VCP	8	325	No		4J00		4	J	0	0	0000		0	0	0	0
0779	El Segundo Blvd	VCP	8	324	No		4500		4	5	0	0	0000		0	0	0	0
0781	El Segundo Blvd	VCP	8	325	No		4431		4	4	3	1	0000		0	0	0	0
0783	El Segundo Blvd	VCP	8	349.1	No		4331		4	3	3	1	1A00		1	A	0	0
0785	El Segundo Blvd	VCP	8	349	No		4D33		4	D	3	3	0000		0	0	0	0
0787	El Segundo Blvd	VCP	8	276	No		4J34		4	J	3	4	0000		0	0	0	0
0789	130th St	VCP	8	351.3	No		4133		4	1	3	3	1F00		1	F	0	0
0791	130th St	VCP	8	310	No		4137		4	1	3	7	1900		1	9	0	0
0793	130th St	VCP	8	348	No		3425		3	4	2	5	1100		1	1	0	0
0795	132nd St	VCP	8	354.1	No		413B		4	1	3	B	2L1G		2	L	1	G
0797	132nd St	VCP	8	347.1	No		0000		0	0	0	0	5113		5	1	1	3
0799	132nd St	VCP	8	350.4	No		3100		3	1	0	0	1F00		1	F	0	0
0801	134th St	VCP	8	332	No		4131		4	1	3	1	0000		0	0	0	0
0803	134th St	VCP	8	300.1	No		4133		4	1	3	3	0000		0	0	0	0
0805	134th St	VCP	8	296.3	No		3221		3	2	2	1	0000		0	0	0	0
0807	135th St	VCP	8	203	No		4438		4	4	3	8	2F00		2	F	0	0
0809	135th St	VCP	8	256	No		4337		4	3	3	7	0000		0	0	0	0
0811	135th St	VCP	8	353	No		5148		5	1	4	8	2400		2	4	0	0
0813	135th St	VCP	8	327.2	No		5247		5	2	4	7	0000		0	0	0	0
0815	Budlong Ave	VCP	8	214	No		5341		5	3	4	1	0000		0	0	0	0
0817	Budlong Ave	VCP	8	207	No		423B		4	2	3	B	0000		0	0	0	0
0819	Budlong Ave	VCP	8	309.3	No		413J		4	1	3	J	0000		0	0	0	0
0821	Budlong Ave	VCP	8	306	No		3I21		3	I	2	1	0000		0	0	0	0

Pipe ID	Location	Material	Diameter (in)	Verified Length (ft)	Capacity Improvement	Capacity Project Number	Structural Inpsection						O&M Inspection					
							2019 Structural Quick Rating	2022 Structural Quick Rating	Maximum Severity Grade	Occurrences of Max Severity Grade[1]	Next Highest Severity	Occurrences of Next Highest Severity	2019 O&M Quick Rating	2022 O&M Quick Rating	Maximum Severity Grade	Occurrences of Max Severity Grade[1]	Next Highest Severity	Occurrences of Next Highest Severity
0823	133rd St	VCP	8	119	No		0000		0	0	0	0	0000		0	0	0	0
0825	133rd St	VCP	8	80.9	No		4100		4	1	0	0	1400		1	4	0	0
0827	Budlong Ave	VCP	8	212.1	No		0000		0	0	0	0	2112		2	1	1	2
0829	Budlong Ave	VCP	8	344.1	No		5141		5	1	4	1	1100		1	1	0	0
0831	Budlong Ave	VCP	8	104.1	No		5132		5	1	3	2	0000		0	0	0	0
0833	Budlong Ave	VCP	8	335.1	No		5142		5	1	4	2	2119		2	1	1	9
0835	Budlong Ave	VCP	8	345.7	No		423L		4	2	3	L	1A00		1	A	0	0
0837	132nd St	VCP	8	279.7	No		3321		3	3	2	1	2100		2	1	0	0
0839	132nd St	VCP	8	250	No		3400		3	4	0	0	1800		1	8	0	0
0841	132nd St	VCP	8	250.2	No		3200		3	2	0	0	1A00		1	A	0	0
0843	132nd St	VCP	8	253.1	No		5141		5	1	4	1	1A00		1	A	0	0
0845	132nd St	VCP	8	245	No		4536		4	5	3	6	0000		0	0	0	0
0847	Esmnt. E/O Budlong	VCP	8	48.3	No		2100		2	1	0	0	2111		2	1	1	1
0849	Esmnt. E/O Budlong	VCP	8	355.7	No		0000		0	0	0	0	312G		3	1	2	G
0851	Esmnt. E/O Budlong	VCP	8	352.9	No		4100		4	1	0	0	1100		1	1	0	0
0853	Esmnt. E/O Budlong	VCP	8	77.2	No		4131		4	1	3	1	0000		0	0	0	0
0855	Esmnt. E/O Catalina	VCP	8	261.1	No		0000		0	0	0	0	2G00		2	G	0	0
0857	Alley N/O 135th St	VCP	8	255.1	No					0		0				0		0
0859	Alley N/O 135th St	VCP	8	266.4	No		2B00		2	B	0	0	2213		2	2	1	3
0861	Esmnt. N/O 135th St	VCP	8	271	Existing Improvement	P-7	0000		0	0	0	0	0000		0	0	0	0
0863	Alley N/O 135th St	VCP	8	250	Existing Improvement	P-7	4134		4	1	3	4	2400		2	4	0	0
0865	Esmnt. E/O Catalina	VCP	8	337.96	No		5100		5	1	0	0	2A00		2	A	0	0
0867	Esmnt. E/O Catalina	VCP	8	146.2	No		4131		4	1	3	1	2812		2	8	1	2
0869	Esmnt. E/O Berendo	VCP	8	252	No		5100		5	1	0	0	412C		4	1	2	C
0871	Esmnt. E/O Berendo	VCP	8	351	No		3100		3	1	0	0	0000		0	0	0	0
0873	Esmnt. N/O 133rd St	VCP	8	328.7	No		0000		0	0	0	0	3100		3	1	0	0
0875	Esmnt. N/O 133rd St	VCP	8	301.6	No		4132		4	1	3	2	0000		0	0	0	0
0877	Esmnt. N/O 133rd St	VCP	8	131.1	No		0000		0	0	0	0	0000		0	0	0	0
0879	Esmnt. N/O 133rd St	VCP	8	141.7	No		0000		0	0	0	0	1100		1	1	0	0
0881	Esmnt. N/O 133rd St	VCP	8	135.4	No		0000		0	0	0	0	0000		0	0	0	0
0883	Berendo Ave	VCP	8	145	No		514C		5	1	4	C	0000		0	0	0	0
0885	Normandie Ave	VCP	8	354.5	No		463A		4	6	3	A	2G00		2	G	0	0
0887	Esmnt. E/O Kansas	VCP	8	148.3	No		0000		0	0	0	0	2615		2	6	1	5
0889	Alley W/O Vermont	VCP	8	340.5	No		0000		0	0	0	0	0000		0	0	0	0
0891	Alley W/O Vermont	VCP	8	324.7	No		1100		1	1	0	0	1100		1	1	0	0
0893	Alley W/O Vermont	VCP	8	80.9	No		4131		4	1	3	1	1100		1	1	0	0
0895	Esmnt. E/O Kansas	VCP	8	263.3	No		0000		0	0	0	0	2H11		2	H	1	1
0897	Esmnt. E/O Kansas	VCP	8	337	No		4121		4	1	2	1	2L1B		2	L	1	B
0899	Esmnt. N/O Berendo	VCP	8	350.9	No					0		0				0		0
0901	Catalina Ave	VCP	8	26.7	No		4332		4	3	3	2	1100		1	1	0	0
0901R	Catalina Ave	VCP	8	215.7	No					0		0				0		0
0903	Catalina Ave	VCP	8	296	No		4935		4	9	3	5	1A00		1	A	0	0
0905	Catalina Ave	VCP	8	277.6	No		493I		4	9	3	I	1E00		1	E	0	0
0907	Catalina Ave	VCP	8	209.1	No		5444		5	4	4	4	1B00		1	B	0	0
0909	Catalina Ave	VCP	8	179.1	No		5347		5	3	4	7	0000		0	0	0	0
0911	129th St	VCP	8	80.1	No		0000		0	0	0	0	1100		1	1	0	0
0913	129th St	VCP	8	110.1	No		4A32		4	A	3	2	4121		4	1	2	1
0915	Catalina Ave	VCP	8	185.9	No		453F		4	5	3	F	1900		1	9	0	0
0917	129th St	VCP	8	268	No		4B32		4	B	3	2	1A00		1	A	0	0

Pipe ID	Location	Material	Diameter (in)	Verified Length (ft)	Capacity Improvement	Capacity Project Number	Structural Inpsection						O&M Inspection					
							2019 Structural Quick Rating	2022 Structural Quick Rating	Maximum Severity Grade	Occurrences of Max Severity Grade[1]	Next Highest Severity	Occurrences of Next Highest Severity	2019 O&M Quick Rating	2022 O&M Quick Rating	Maximum Severity Grade	Occurrences of Max Severity Grade[1]	Next Highest Severity	Occurrences of Next Highest Severity
0919	Berendo Ave	VCP	8	315	No		4D32		4	D	3	2	231B		2	3	1	B
0921	Berendo Ave	VCP	8	145	No		514A		5	1	4	A	1300		1	3	0	0
0923	Berendo Ave	VCP	8	275	No		524C		5	2	4	C	1C00		1	C	0	0
0925	Berendo Ave	VCP	8	301	No		4F33		4	F	3	3	1200		1	2	0	0
0927	Vermont Ave	VCP	8	285	No		0000		0	0	0	0	2L00		2	L	0	0
0929	130th St	VCP	8	71.9	No		3100		3	1	0	0	2112		2	1	1	2
0931	130th St	VCP	8	312.7	No		0000		0	0	0	0	0000		0	0	0	0
0931R	131st St	VCP	8	18.1	No					0		0				0		0
0933	130th St	VCP	8	343.1	No		4A39		4	A	3	9	1400		1	4	0	0
0935	Vermont Ave	VCP	8	157.4	No		5142		5	1	4	2	1300		1	3	0	0
0937	131st St	VCP	8	326	No		4A36		4	A	3	6	1200		1	2	0	0
0939	131st St	VCP	8	256	No		4335		4	3	3	5	0000		0	0	0	0
0941	131st St	VCP	8	193	No		3321		3	3	2	1	0000		0	0	0	0
0943	135th St	VCP	8	202.2	Existing Improvement	P-7	2500		2	5	0	0	0000		0	0	0	0
0945	Alley W/O Mariposa	VCP	8	256	No		3111		3	1	1	1	0000		0	0	0	0
0947	137th St	VCP	8	145.7	No		3221		3	2	2	1	0000		0	0	0	0
0949	137th St	VCP	8	328	No		2712		2	7	1	2	2114		2	1	1	4
0951	Raymond Ave	VCP	8	341	No		4239		4	2	3	9	0000		0	0	0	0
0953	Alley W/O Raymond	VCP	8	256.2	No		4135		4	1	3	5	0000		0	0	0	0
0955	Alley W/O Mariposa	VCP	8	342.4	No		4231		4	2	3	1	1400		1	4	0	0
0957	Alley W/O Raymond	VCP	8	342	No		4433		4	4	3	3	0000		0	0	0	0
0959	137th St	VCP	8	173.3	No		3124		3	1	2	4	0000		0	0	0	0
0961	Raymond Ave	VCP	8	255.6	No		4137		4	1	3	7	0000		0	0	0	0
0963	Van Buren Ave	VCP	8	175.9	No		0000		0	0	0	0	2100		2	1	0	0
0965	137th St	VCP	8	166.7	No		0000		0	0	0	0	0000		0	0	0	0
0967	Alley (Between 135th & 137th)	VCP	8	127.5	No		362A		3	6	2	A	291A		2	9	1	A
0969	Alley (Between 135th & 137th)	VCP	8	118.9	No		4234		4	2	3	4	1800		1	8	0	0
0971	Alley N/O Van Buren	VCP	8	190.1	No		3C12		3	C	1	2	1100		1	1	0	0
0973	Van Buren Ave	VCP	8	330	No		413K		4	1	3	K	2I1G		2	I	1	G
0975	Van Buren&137th	VCP	8	308.9	No		4338		4	3	3	8	1700		1	7	0	0
0977	Budlong Ave	VCP	8	300.7	No		5143		5	1	4	3	0000		0	0	0	0
0979	Budlong Ave	VCP	8	182.4	No		5543		5	5	4	3	0000		0	0	0	0
0981	Budlong Ave	VCP	8	127.2	No		4234		4	2	3	4	0000		0	0	0	0
0983	Budlong Ave	VCP	8	339.8	No		433G		4	3	3	G	0000		0	0	0	0
0985	Budlong Ave	VCP	8	323	No					0		0				0		0
0987	Budlong Ave	VCP	8	226	No		423F		4	2	3	F	1A00		1	A	0	0
0989	139th St	VCP	8	308	No		3A22		3	A	2	2	1100		1	1	0	0
0991	Mariposa Ave	VCP	8	270.3	No		433A		4	3	3	A	1300		1	3	0	0
0993	139th St	VCP	8	206.1	No		3621		3	6	2	1	0000		0	0	0	0
0995	139th St	VCP	8	311	No		413B		4	1	3	B	0000		0	0	0	0
0997	139th St	VCP	8	101.6	No		3624		3	6	2	4	0000		0	0	0	0
0999	Mariposa Ave	VCP	8	270	No		453A		4	5	3	A	1200		1	2	0	0
1001	139th St	VCP	8	244	No		3422		3	4	2	2	0000		0	0	0	0
1003	Teton St.	VCP	8	209.4	No		4331		4	3	3	1	3100		3	1	0	0
1003A	Teton St.	VCP	8	7.6	No		3100		3	1	0	0	0000		0	0	0	0
1005	Berendo Ave	VCP	8	251	No		4535		4	5	3	5	1100		1	1	0	0
1009	Catalina Ave	VCP	8	203	No		4422		4	4	2	2	2C00		2	C	0	0
1011	138th St	VCP	8	262.1	No		4133		4	1	3	3	0000		0	0	0	0
1013	138th St	VCP	8	263	No		4332		4	3	3	2	0000		0	0	0	0

Pipe ID	Location	Material	Diameter (in)	Verified Length (ft)	Capacity Improvement	Capacity Project Number	Structural Inpsection						O&M Inspection					
							2019 Structural Quick Rating	2022 Structural Quick Rating	Maximum Severity Grade	Occurrences of Max Severity Grade[1]	Next Highest Severity	Occurrences of Next Highest Severity	2019 O&M Quick Rating	2022 O&M Quick Rating	Maximum Severity Grade	Occurrences of Max Severity Grade[1]	Next Highest Severity	Occurrences of Next Highest Severity
1015	Catalina Ave	VCP	8	302	No		4100		4	1	0	0	3100		3	1	0	0
1017	Berendo Ave	VCP	8	300.2	No		4D32		4	D	3	2	1500		1	5	0	0
1019	Berendo Ave	VCP	8	237.2	No		4432		4	4	3	2	1900		1	9	0	0
1019A	Berendo Ave	VCP	8	34.1	No		4100		4	1	0	0	2111		2	1	1	1
1021	Teton St.	VCP	8	191	No		4100		4	1	0	0	1100		1	1	0	0
1023	Catalina Ave	VCP	8	197.1	No		5141		5	1	4	1	2G11		2	G	1	1
1025	140th St	VCP	8	329	No		2700		2	7	0	0	2213		2	2	1	3
1027	Berendo Ave	VCP	8	170.7	No		2A00		2	A	0	0	2100		2	1	0	0
1029	140th St	VCP	8	209.5	No		2B00		2	B	0	0	0000		0	0	0	0
1031	141st St	VCP	8	83.3	No		5141		5	1	4	1	1A00		1	A	0	0
1033	Raymond Ave	VCP	8	68	No		4229		4	2	2	9	0000		0	0	0	0
1035	Raymond Ave	VCP	8	227	No		4100		4	1	0	0	0000		0	0	0	0
1037	140th St	VCP	8	275.3	No		4332		4	3	3	2	0000		0	0	0	0
1039	140th St	VCP	8	53	No		4200		4	2	0	0	0000		0	0	0	0
1041	141st St	VCP	8	310.2	No		5241		5	2	4	1	3111		3	1	1	1
1043	141st St	VCP	8	310.2	No		413E		4	1	3	E	0000		0	0	0	0
1045	141st St	VCP	8	217.3	No		2D11		2	D	1	1	0000		0	0	0	0
1047	Esmnt. Van Buren Ct	VCP	8	241.1	No		312D		3	1	2	D	0000		0	0	0	0
1049	Deanna Ct	VCP	8	156.4	No		2700		2	7	0	0	0000		0	0	0	0
1051	Van Buren Ct	VCP	8	150.3	No		2B00		2	B	0	0	0000		0	0	0	0
1053	140th St	VCP	8	102.2	No		2100		2	1	0	0	0000		0	0	0	0
1055	Budlong Ave	VCP	8	97.5	No		3A2B		3	A	2	B	0000		0	0	0	0
1057	141st St	VCP	8	309.8	No		5141		5	1	4	1	1600		1	6	0	0
1059	Vermont Ave	VCP	8	317.1	Existing Improvement	P-10	2C00		2	C	0	0	0000		0	0	0	0
1061	Rosecrans Ave	VCP	10	162	Existing Improvement	P-10	2800		2	8	0	0	0000		0	0	0	0
1063	Budlong Ave	VCP	8	247.1	No		4E39		4	E	3	9	512F		5	1	2	F
1065	141st St	VCP	8	270	No		0000		0	0	0	0	0000		0	0	0	0
1067	141st St	VCP	8	306.3	No		5141		5	1	4	1	1600		1	6	0	0
1069	Budlong Ave	VCP	8	174	No		433D		4	3	3	D	0000		0	0	0	0
1071	Vermont Ave	VCP	8	152	Existing Improvement	P-10	2811		2	8	1	1	4111		4	1	1	1
1073	141st St	VCP	8	272	No		0000		0	0	0	0	2211		2	2	1	1
1075	Rosecrans Ave	VCP	10	266.2	Existing Improvement	P-10	2B00		2	B	0	0	0000		0	0	0	0
1077	Rosecrans Ave	VCP	10	266	Existing Improvement	P-10	4H00		4	H	0	0	0000		0	0	0	0
1079	Rosecrans Ave	VCP	10	265	Existing Improvement	P-10	4G31		4	G	3	1	0000		0	0	0	0
1081	Rosecrans Ave	VCP	10	265	Existing Improvement	P-10	544H		5	4	4	H	4100		4	1	0	0
1083	Budlong Ave	VCP	8	146.2	No		4D31		4	D	3	1	0000		0	0	0	0
1083A	Budlong Ave	VCP	8	86	No		4100		4	1	0	0	2100		2	1	0	0
1085	141st St	VCP	8	238.6	No		5142		5	1	4	2	1300		1	3	0	0
1087	Raymond	VCP	8	256.5	No		423E		4	2	3	E	1G00		1	G	0	0
1089	Mariposa Ave	VCP	8	268.1	No		5143		5	1	4	3	0000		0	0	0	0
1091	141st St	VCP	8	299.1	No		423J		4	2	3	J	0000		0	0	0	0
1093	141st St	VCP	8	25.3	No		3300		3	3	0	0	0000		0	0	0	0
1095	Rosecrans Ave	VCP	10	133.1	No		4431		4	4	3	1	0000		0	0	0	0
1097	Rosecrans Ave	VCP	8	8.1	No		0000		0	0	0	0	0000		0	0	0	0
1099	Rosecrans Ave	VCP	8	283.3	No		4133		4	1	3	3	4100		4	1	0	0
1101	Rosecrans Ave	VCP	8	286.1	No		413D		4	1	3	D	0000		0	0	0	0
1103	Rosecrans Ave	VCP	8	287	No		4134		4	1	3	4	0000		0	0	0	0
1105	Rosecrans Ave	VCP	8	284.1	No		0000		0	0	0	0	0000		0	0	0	0
1111	Vermont Ave	VCP	8	340.2	Existing Improvement	P-10	2C00		2	C	0	0	0000		0	0	0	0

Pipe ID	Location	Material	Diameter (in)	Verified Length (ft)	Capacity Improvement	Capacity Project Number	Structural Inpsection						O&M Inspection					
							2019 Structural Quick Rating	2022 Structural Quick Rating	Maximum Severity Grade	Occurrences of Max Severity Grade[1]	Next Highest Severity	Occurrences of Next Highest Severity	2019 O&M Quick Rating	2022 O&M Quick Rating	Maximum Severity Grade	Occurrences of Max Severity Grade[1]	Next Highest Severity	Occurrences of Next Highest Severity
1113	Vermont Ave	VCP	8	340.1	No		0000		0	0	0	0	0000		0	0	0	0
1115	Vermont Ave	VCP	8	342	No		2300		2	3	0	0	1200		1	2	0	0
1117	Vermont Ave	VCP	8	343	No		0000		0	0	0	0	0000		0	0	0	0
1119	Vermont Ave	VCP	8	340.1	No		3126		3	1	2	6	2100		2	1	0	0
1121	Vermont Ave	VCP	8	332.1	No		0000		0	0	0	0	2100		2	1	0	0
1123	Vermont Ave	VCP	8	272	Existing Improvement	P-7	2E00		2	E	0	0	4100		4	1	0	0
1125	Vermont Ave	VCP	8	249.1	Existing Improvement	P-7	2300		2	3	0	0	0000		0	0	0	0
1127	Vermont Ave	VCP	8	277	Existing Improvement	P-7	4132		4	1	3	2	0000		0	0	0	0
1129	Vermont Ave	VCP	8	51.6	Existing Improvement	P-7	0000		0	0	0	0	0000		0	0	0	0
1137	Wadshaw Al	VCP	8	359	No		4131		4	1	3	1	0000		0	0	0	0
1139	Wadshaw Al	VCP	8	131.5	No					0		0				0		0
1141	Wadkins Ave	VCP	8	361.9	No		332E		3	3	2	E	0000		0	0	0	0
1143	Wadshaw Al	VCP	8	355.7	No		422M		4	2	2	M	0000		0	0	0	0
1145	Wadshaw Al	VCP	8	359	No		372L		3	7	2	L	2A00		2	A	0	0
1147	Wadkins Ave	VCP	8	361.4	No		4124		4	1	2	4	1C00		1	C	0	0
1149	Wadkins Ave	VCP	8	362	No		3123		3	1	2	3	2100		2	1	0	0
1151	Miller Ave	VCP	8	313.1	No		3113		3	1	1	3	0000		0	0	0	0
1153	Marine Ave	VCP	8	241	No		2B11		2	B	1	1	0000		0	0	0	0
1155	Wadkins Ave	VCP	8	166.9	No		2D00		2	D	0	0	0000		0	0	0	0
1157	Marigold Ave	VCP	8	312	No		3121		3	1	2	1	1A00		1	A	0	0
1161	Marine Ave	VCP	8	241.1	No		2100		2	1	0	0	0000		0	0	0	0
1163	Miller Ave	VCP	8	312	No		4132		4	1	3	2	1200		1	2	0	0
1165	Marigold Ave	VCP	8	311.4	No		3324		3	3	2	4	1100		1	1	0	0
1167	Marigold Ave	VCP	8	313.3	No		342A		3	4	2	A	0000		0	0	0	0
1169	Miller Ave	VCP	8	312.7	No		3227		3	2	2	7	1B00		1	B	0	0
1171	Miller Ave	VCP	8	311.5	No		3122		3	1	2	2	1200		1	2	0	0
1173	Marigold Ave	VCP	8	311.4	No		2700		2	7	0	0	2K1C		2	K	1	C
1177	Sutro Ave	VCP	8	311.4	No		5141		5	1	4	1	0000		0	0	0	0
1179	Dublin Ave	VCP	8	312.1	No		0000		0	0	0	0	2100		2	1	0	0
1181	Roxton Ave	VCP	8	310	No		0000		0	0	0	0	1A00		1	A	0	0
1183	150th St	VCP	8	349.1	No		423J		4	2	3	J	2311		2	3	1	1
1185	Purche Ave	VCP	8	205	No		3E2B		3	E	2	B	2D12		2	D	1	2
1187	Atkinson Ave	VCP	8	86.1	No		2A00		2	A	0	0	0000		0	0	0	0
1189	149th St	VCP	8	261	No		4131		4	1	3	1	2300		2	3	0	0
1191	149th St	VCP	8	258.7	No		412G		4	1	2	G	2200		2	2	0	0
1193	Spinning Ave	VCP	8	229.2	No		312G		3	1	2	G	1100		1	1	0	0
1195	Daphne Ave	VCP	8	310	No		4131		4	1	3	1	211D		2	1	1	D
1197	Spinning Ave	VCP	8	353.1	No		322M		3	2	2	M	2100		2	1	0	0
1199	Marine Ave	VCP	8	266.1	No		2500		2	5	0	0	0000		0	0	0	0
1203	Spinning Ave	VCP	8	350.1	No		4131		4	1	3	1	2D00		2	D	0	0
1205	Purche Ave	VCP	8	226.6	No		4132		4	1	3	2	2215		2	2	1	5
1207	Purche Ave	VCP	8	253.9	No		4126		4	1	2	6	3122		3	1	2	2
1209	Roxton Ave	VCP	8	270	No		0000		0	0	0	0	0000		0	0	0	0
1209A	Roxton Ave	VCP	8	81	No		2400		2	4	0	0	0000		0	0	0	0
1211	Dublin Ave	VCP	8	353	No		4200		4	2	0	0	1300		1	3	0	0
1213	Dublin Ave	VCP	8	349	No		3126		3	1	2	6	0000		0	0	0	0
1217	Marine Ave	VCP	8	260.1	No		4431		4	4	3	1	0000		0	0	0	0
1219	Marine Ave	VCP	8	260.1	No		4328		4	3	2	8	0000		0	0	0	0
1221	Sutro Ave	VCP	8	315.1	No		3224		3	2	2	4	0000		0	0	0	0

Pipe ID	Location	Material	Diameter (in)	Verified Length (ft)	Capacity Improvement	Capacity Project Number	Structural Inpsection						O&M Inspection					
							2019 Structural Quick Rating	2022 Structural Quick Rating	Maximum Severity Grade	Occurrences of Max Severity Grade[1]	Next Highest Severity	Occurrences of Next Highest Severity	2019 O&M Quick Rating	2022 O&M Quick Rating	Maximum Severity Grade	Occurrences of Max Severity Grade[1]	Next Highest Severity	Occurrences of Next Highest Severity
1223	Sutro Ave	VCP	8	313.1	No		4124		4	1	2	4	1400		1	4	0	0
1227	Purche Ave	VCP	8	310	No		2A00		2	A	0	0	2111		2	1	1	1
1229	Roxton Ave	VCP	8	226.9	No		0000		0	0	0	0	0000		0	0	0	0
1231	Dublin Ave	VCP	8	226	No		4332		4	3	3	2	0000		0	0	0	0
1233	Sutro Ave	VCP	8	310.4	No		2211		2	2	1	1	0000		0	0	0	0
1235	Daphne Ave	VCP	8	226.3	No		2800		2	8	0	0	1A00		1	A	0	0
1237	Spinning Ave	VCP	8	310	No		372G		3	7	2	G	0000		0	0	0	0
1239	152nd St	VCP	8	353	No		4B3C		4	B	3	C	2A11		2	A	1	1
1241	Van Ness Ave	VCP	8	207	No		4F31		4	F	3	1	1100		1	1	0	0
1243	Daphne Ave	VCP	8	312.2	No		463A		4	6	3	A	1400		1	4	0	0
1245	154th St	VCP	8	266	No		4E3B		4	E	3	B	2G11		2	G	1	1
1247	Spinning Ave	VCP	8	200.1	No		3B00		3	B	0	0	0000		0	0	0	0
1249	154th St	VCP	8	261.8	No		4A3E		4	A	3	E	2I12		2	I	1	2
1251	154th St	VCP	8	266.1	No		4E3D		4	E	3	D	2I11		2	I	1	1
1253	Arcturus Ave	VCP	8	260.6	No		473C		4	7	3	C	1100		1	1	0	0
1255	Purche Ave	VCP	8	308	No		473A		4	7	3	A	1300		1	3	0	0
1257	Spinning Ave	VCP	8	350.3	No		413K		4	1	3	K	1200		1	2	0	0
1259	Spinning Ave	VCP	8	354	No		423K		4	2	3	K	1100		1	1	0	0
1261	152nd St	VCP	8	258.3	No		4A38		4	A	3	8	0000		0	0	0	0
1263	Van Ness Ave	VCP	8	352.1	No		4K33		4	K	3	3	2111		2	1	1	1
1265	Van Ness Ave	VCP	8	351.1	No		514H		5	1	4	H	0000		0	0	0	0
1267	Daphne Ave	VCP	8	352.1	No		4A37		4	A	3	7	0000		0	0	0	0
1269	Daphne Ave	VCP	8	352.8	No		4B3C		4	B	3	C	0000		0	0	0	0
1271	152nd St	VCP	8	251.2	No		473A		4	7	3	A	1100		1	1	0	0
1273	152nd St	VCP	8	326.4	No		4A3C		4	A	3	C	2112		2	1	1	2
1275	Purche Ave	VCP	8	301.4	No		4A3B		4	A	3	B	1300		1	3	0	0
1277	Purche Ave	VCP	8	302.3	No		4B3A		4	B	3	A	0000		0	0	0	0
1279	154th St	VCP	8	249.2	No		514F		5	1	4	F	3100		3	1	0	0
1281	Arcturus Ave	VCP	8	299.4	No		4B3C		4	B	3	C	3111		3	1	1	1
1283	Arcturus Ave	VCP	8	322.7	No		4B3C		4	B	3	C	332J		3	3	2	J
1285	Manhattan Beach Blvd	VCP	8	39.6	No		0000		0	0	0	0	1100		1	1	0	0
1287	Alley W/O Van Ness	VCP	8	133	No					0		0				0		0
1289	Alley W/O Van Ness	VCP	8	324.8	No		4231		4	2	3	1	2K14		2	K	1	4
1291	Alley W/O Van Ness	VCP	8	292.1	No		4132		4	1	3	2	2I11		2	I	1	1
1293	Alley W/O Van Ness	VCP	8	252	No		332C		3	3	2	C	1100		1	1	0	0
1295	Alley W/O Van Ness	VCP	8	240.2	No		2B00		2	B	0	0	2800		2	8	0	0
1297	Manhattan Beach Blvd	VCP	8	107	No		0000		0	0	0	0	0000		0	0	0	0
1299	157th St	VCP	8	208.1	No		2600		2	6	0	0	2C00		2	C	0	0
1301	155th St	VCP	8	215	No		312F		3	1	2	F	2J00		2	J	0	0
1303	155th St	VCP	8	168	No		312C		3	1	2	C	0000		0	0	0	0
1305	Alley N/O 155th St	VCP	8	195.1	No		412C		4	1	2	C	0000		0	0	0	0
1307	Alley W/O Spinning	VCP	8	90.1	No		5100		5	1	0	0	0000		0	0	0	0
1309	Alley N/O 155th St	VCP	8	325	No		3E00		3	E	0	0	1100		1	1	0	0
1311	Alley N/O 155th St	VCP	8	154.2	No		3200		3	2	0	0	1600		1	6	0	0
1313	Alley N/O 156th St	VCP	8	137.3	No		4128		4	1	2	8	2C00		2	C	0	0
1315	Alley N/O 156th St	VCP	8	58	No		2A00		2	A	0	0	0000		0	0	0	0
1317	Alley N/O 156th St	VCP	8	290.1	No		4432		4	4	3	2	2I00		2	I	0	0
1319	Alley N/O 156th St	VCP	8	80.5	No		3200		3	2	0	0	0000		0	0	0	0
1321	Alley N/O 156th St	VCP	8	68	No		4131		4	1	3	1	3100		3	1	0	0

Pipe ID	Location	Material	Diameter (in)	Verified Length (ft)	Capacity Improvement	Capacity Project Number	Structural Inpsection						O&M Inspection					
							2019 Structural Quick Rating	2022 Structural Quick Rating	Maximum Severity Grade	Occurrences of Max Severity Grade[1]	Next Highest Severity	Occurrences of Next Highest Severity	2019 O&M Quick Rating	2022 O&M Quick Rating	Maximum Severity Grade	Occurrences of Max Severity Grade[1]	Next Highest Severity	Occurrences of Next Highest Severity
1323	Alley N/O 155th St	VCP	8	324.3	No		4135		4	1	3	5	2A11		2	A	1	1
1325	Alley N/O 156th St	VCP	8	291	No		312D		3	1	2	D	2I13		2	I	1	3
1327	Alley N/O 156th St	VCP	8	302	No		4235		4	2	3	5	1100		1	1	0	0
1329	Alley N/O 155th St	VCP	8	325	No		3H2D		3	H	2	D	1100		1	1	0	0
1331	Alley N/O 156th St	VCP	8	272.5	No		3423		3	4	2	3	0000		0	0	0	0
1333	Alley N/O 156th St	VCP	8	352.3	No		4431		4	4	3	1	2H1A		2	H	1	A
1335	Alley N/O 155th St	VCP	8	335.1	No		413C		4	1	3	C	0000		0	0	0	0
1337	Alley N/O 155th St	VCP	8	108	No		3221		3	2	2	1	2B1A		2	B	1	A
1339	Alley N/O 157th St	VCP	8	66	No		4100		4	1	0	0	0000		0	0	0	0
1341	Alley N/O 157th St	VCP	8	124	No		4100		4	1	0	0	0000		0	0	0	0
1343	Alley N/O 157th St	VCP	8	355.4	No		3227		3	2	2	7	1200		1	2	0	0
1345	Alley N/O 157th St	VCP	8	112.3	No		261A		2	6	1	A	2A00		2	A	0	0
1347	Alley N/O 157th St	VCP	8	130.8	No		4431		4	4	3	1	1200		1	2	0	0
1349	Alley N/O 157th St	VCP	8	356.3	No		4331		4	3	3	1	1200		1	2	0	0
1351	Alley N/O 157th St	VCP	8	356.1	No		4233		4	2	3	3	2M00		2	M	0	0
1353	Alley N/O/ 157th	VCP	8	356	No		4631		4	6	3	1	2M13		2	M	1	3
1355	Alley W/O Spinning	VCP	8	171.7	No		0000		0	0	0	0	1C00		1	C	0	0
1357	Alley N/O Manhattan	VCP	8	314	No		322D		3	2	2	D	2G00		2	G	0	0
1359	Alley S/O 157th	VCP	8	335.1	No		342I		3	4	2	I	1300		1	3	0	0
1361	Alley E/O Crenshaw	VCP	8	274.4	No		4121		4	1	2	1	1E00		1	E	0	0
1363	Alley E/O Crenshaw	VCP	8	274	No		4132		4	1	3	2	1300		1	3	0	0
1365	Alley E/O Crenshaw	VCP	8	277	No		3200		3	2	0	0	0000		0	0	0	0
1367	Alley E/O Crenshaw	VCP	8	297.1	No		4131		4	1	3	1	2200		2	2	0	0
1369	Alley E/O Crenshaw	VCP	8	76.6	No		0000		0	0	0	0	0000		0	0	0	0
1371	Alley E/O Crenshaw	VCP	8	179.1	No		4132		4	1	3	2	0000		0	0	0	0
1373	Alley S/O 157th	VCP	8	349.1	No		372K		3	7	2	K	1200		1	2	0	0
1375	Alley N/O Manhattan	VCP	8	349.8	No		332K		3	3	2	K	0000		0	0	0	0
1377	Alley N/O Manhattan	VCP	8	349.5	No		322C		3	2	2	C	0000		0	0	0	0
1379	Alley N/O Manhattan	VCP	8	306.1	No		372A		3	7	2	A	1100		1	1	0	0
1381	Alley N/O Manhattan	VCP	8	314	No		3200		3	2	0	0	2A00		2	A	0	0
1383	Western Ave	VCP	8	275	No		4C32		4	C	3	2	0000		0	0	0	0
1385	147th St	VCP	8	335	No		2400		2	4	0	0	0000		0	0	0	0
1387	146th St	VCP	8	71.5	Existing Improvement	P-8	3A2A		3	A	2	A	0000		0	0	0	0
1389	144th St	VCP	8	310	No		0000		0	0	0	0	0000		0	0	0	0
1391	145th St	VCP	8	400.1	No		4531		4	5	3	1	0000		0	0	0	0
1393	145th St	VCP	8	414.4	No		443A		4	4	3	A	0000		0	0	0	0
1395	Gramercy Pl	VCP	8	194	Existing Improvement	P-8	4F00		4	F	0	0	2100		2	1	0	0
1397	147th St	VCP	8	249	Existing Improvement	P-8	4G31		4	G	3	1	0000		0	0	0	0
1399	147th St	VCP	8	270	No		5100		5	1	0	0	0000		0	0	0	0
1401	Western Ave	VCP	8	326	No		4333		4	3	3	3	0000		0	0	0	0
1403	144th St	VCP	8	310	No		0000		0	0	0	0	0000		0	0	0	0
1405	Western Ave	VCP	8	394.1	Existing Improvement	P-8	413G		4	1	3	G	0000		0	0	0	0
1407	145th St	VCP	8	413.6	No		4237		4	2	3	7	2C00		2	C	0	0
1409	Western Ave	VCP	8	404.1	No		5246		5	2	4	6	0000		0	0	0	0
1411	146th St	VCP	8	400.7	Existing Improvement	P-8				0		0				0		0
1413	146th St	VCP	8	401.1	No		3N2M		3	N	2	M	2200		2	2	0	0
1415	146th St	VCP	8	411.6	Existing Improvement	P-8	433N		4	3	3	N	0000		0	0	0	0
1417	Gramercy Pl	VCP	8	193.9	Existing Improvement	P-8	3F2C		3	F	2	C	0000		0	0	0	0
1419	147th St	VCP	8	287	No		2500		2	5	0	0	0000		0	0	0	0

Pipe ID	Location	Material	Diameter (in)	Verified Length (ft)	Capacity Improvement	Capacity Project Number	Structural Inpsection						O&M Inspection					
							2019 Structural Quick Rating	2022 Structural Quick Rating	Maximum Severity Grade	Occurrences of Max Severity Grade[1]	Next Highest Severity	Occurrences of Next Highest Severity	2019 O&M Quick Rating	2022 O&M Quick Rating	Maximum Severity Grade	Occurrences of Max Severity Grade[1]	Next Highest Severity	Occurrences of Next Highest Severity
1421	147th St	VCP	8	337	No		0000		0	0	0	0	0000		0	0	0	0
1423	147th St	VCP	8	245	No		514F		5	1	4	F	0000		0	0	0	0
1425	Parron Ave	VCP	8	273.1	No		534I		5	3	4	I	0000		0	0	0	0
1427	Parron Ave	VCP	8	220	No		4F31		4	F	3	1	221C		2	2	1	C
1429	Parron Ave	VCP	8	220	No		514F		5	1	4	F	2112		2	1	1	2
1431	Parron Ave	VCP	8	275	No		4I11		4	I	1	1	3100		3	1	0	0
1433	Gramercy Pl	VCP	8	354.1	No		5147		5	1	4	7	0000		0	0	0	0
1435	150th St	VCP	8	215	No		0000		0	0	0	0	0000		0	0	0	0
1437	149th St	VCP	8	310	No		514E		5	1	4	E	0000		0	0	0	0
1439	149th St	VCP	8	270	No		1100		1	1	0	0	0000		0	0	0	0
1441	Alley W/O Western	VCP	8	289.5	No		413I		4	1	3	I	2A12		2	A	1	2
1443	148th St	VCP	8	307	No		5141		5	1	4	1	281D		2	8	1	D
1445	150th St	VCP	8	271	No		0000		0	0	0	0	0000		0	0	0	0
1447	148th St	VCP	6	267.2	No		342F		3	4	2	F	0000		0	0	0	0
1449	148th St	VCP	6	274	No		5141		5	1	4	1	1C00		1	C	0	0
1451	148th St	VCP	6	257.2	No		312E		3	1	2	E	211D		2	1	1	D
1453	Alley W/O Western	VCP	8	20	No					0		0				0		0
1455	149th St	VCP	8	270.7	No		2100		2	1	0	0	1200		1	2	0	0
1457	149th St	VCP	8	266	No		2200		2	2	0	0	2811		2	8	1	1
1459	Marine Ave	VCP	10	361	No		2200		2	2	0	0	1100		1	1	0	0
1461	Marine Ave	VCP	10	455.2	No		4F21		4	F	2	1	1100		1	1	0	0
1463	150th St	VCP	8	270	No		0000		0	0	0	0	1200		1	2	0	0
1465	150th St	VCP	8	265	No		0000		0	0	0	0	1300		1	3	0	0
1467	Alley W/O Western	VCP	8	304	No		4131		4	1	3	1	412J		4	1	2	J
1469	Alley W/O Western	VCP	8	291.1	No		3I2J		3	I	2	J	1100		1	1	0	0
1471	Marine Ave	VCP	8	260.1	No		4334		4	3	3	4	0000		0	0	0	0
1473	Marine Ave	VCP	8	276	No		4231		4	2	3	1	0000		0	0	0	0
1475	Marine Ave	VCP	8	273	No		4132		4	1	3	2	0000		0	0	0	0
1477	Marine Ave	VCP	8	274	No		3200		3	2	0	0	0000		0	0	0	0
1479	Marine Ave	VCP	8	172.3	No		5244		5	2	4	4	1200		1	2	0	0
1481	145th St	VCP	12	56	No		4100		4	1	0	0	0000		0	0	0	0
1483	Marine Ave	VCP	8	92.1	No		0000		0	0	0	0	0000		0	0	0	0
1483A	Marine Ave	VCP	8	17.1	No		0000		0	0	0	0	0000		0	0	0	0
1485	Western Ave	VCP	8	274	No		413F		4	1	3	F	2100		2	1	0	0
1487	Western Ave	VCP	8	280.1	No		3H00		3	H	0	0	0000		0	0	0	0
1489	Western Ave	VCP	8	279	No		4I32		4	I	3	2	0000		0	0	0	0
1491	Alley W/O Western	VCP	8	172	No		0000		0	0	0	0	1100		1	1	0	0
1493	Alley W/O Western	VCP	8	272.3	No					0		0				0		0
1495	Alley W/O 153rd St	VCP	8	322.4	No					0		0				0		0
1497	152nd St	VCP	8	267	No		2100		2	1	0	0	1100		1	1	0	0
1499	153rd St	VCP	8	266.1	No		0000		0	0	0	0	0000		0	0	0	0
1501	154th St	VCP	8	267	No		0000		0	0	0	0	0000		0	0	0	0
1503	152nd St	VCP	8	280.1	No		4100		4	1	0	0	221A		2	2	1	A
1505	152nd St	VCP	8	280.1	No		0000		0	0	0	0	1900		1	9	0	0
1507	152nd St	VCP	8	268	No		2300		2	3	0	0	1A00		1	A	0	0
1509	153rd St	VCP	8	287	No		0000		0	0	0	0	0000		0	0	0	0
1511	153rd St	VCP	8	283.1	No		0000		0	0	0	0	0000		0	0	0	0
1513	153rd St	VCP	8	268	No		0000		0	0	0	0	0000		0	0	0	0
1515	154th St	VCP	8	284	No		0000		0	0	0	0	0000		0	0	0	0

Pipe ID	Location	Material	Diameter (in)	Verified Length (ft)	Capacity Improvement	Capacity Project Number	Structural Inpsection						O&M Inspection					
							2019 Structural Quick Rating	2022 Structural Quick Rating	Maximum Severity Grade	Occurrences of Max Severity Grade[1]	Next Highest Severity	Occurrences of Next Highest Severity	2019 O&M Quick Rating	2022 O&M Quick Rating	Maximum Severity Grade	Occurrences of Max Severity Grade[1]	Next Highest Severity	Occurrences of Next Highest Severity
1517	154th St	VCP	8	283	No		0000		0	0	0	0	0000		0	0	0	0
1519	154th St	VCP	8	268	No		2400		2	4	0	0	2215		2	2	1	5
1521	154th Pl	VCP	8	203.5	No		423C		4	2	3	C	1A00		1	A	0	0
1523	154th Pl	VCP	8	327.6	No		3J2D		3	J	2	D	1400		1	4	0	0
1525	Gramercy Pl	VCP	8	151	No		0000		0	0	0	0	2312		2	3	1	2
1527	153rd St	VCP	8	34	No		0000		0	0	0	0	0000		0	0	0	0
1529	Alley W/O Western	VCP	8	338.5	No					0		0				0		0
1531	154th St	VCP	8	181	No		4A23		4	A	2	3	0000		0	0	0	0
1533	Alley S/O Marine Ave	VCP	8	192	No		2A00		2	A	0	0	1400		1	4	0	0
1535	Alley W/O Hass	VCP	8	273.5	No		312A		3	1	2	A	2I12		2	I	1	2
1537	154th St	VCP	8	258	No		2F1I		2	F	1	I	2I00		2	I	0	0
1539	154th St	VCP	8	256.1	No		4A3A		4	A	3	A	2H00		2	H	0	0
1541	154th St	VCP	8	256.7	No		4C3A		4	C	3	A	2E12		2	E	1	2
1543	Esmnt. W/O Gramercy	VCP	8	279.2	No		413E		4	1	3	E	211B		2	1	1	B
1545	Esmnt. W/O Cimarron	VCP	8	328.7	No		0000		0	0	0	0	1H00		1	H	0	0
1547	Esmnt. W/O Parron	VCP	8	327.9	No		4636		4	6	3	6	2L18		2	L	1	8
1549	Esmnt. W/O Wilton	VCP	8	338.1	No		513K		5	1	3	K	1A00		1	A	0	0
1551	Alley W/O Hass	VCP	8	272.1	No		2A00		2	A	0	0	1700		1	7	0	0
1553	Alley W/O Hass	VCP	8	272.1	No		312B		3	1	2	B	2A1A		2	A	1	A
1555	Alley S/O Marine Ave	VCP	8	193.1	No		2500		2	5	0	0	1B00		1	B	0	0
1557	Esmnt. W/O Cimarron	VCP	8	333.3	No		3124		3	1	2	4	3123		3	1	2	3
1559	154th St	VCP	8	263	No		322A		3	2	2	A	2I00		2	I	0	0
1561	Esmnt. W/O Parron	VCP	8	331	No		4A34		4	A	3	4	221B		2	2	1	B
1563	Alley S/O Marine Ave	VCP	8	269.1	No		413I		4	1	3	I	2213		2	2	1	3
1565	Alley S/O Marine Ave	VCP	8	269	No		3G00		3	G	0	0	1600		1	6	0	0
1567	Esmnt. W/O Gramercy	VCP	8	275	No		5144		5	1	4	4	3121		3	1	2	1
1569	Esmnt. W/O Gramercy	VCP	8	280.4	No		433F		4	3	3	F	211B		2	1	1	B
1571	Esmnt. W/O Wilton	VCP	8	337.1	No		433K		4	3	3	K	241B		2	4	1	B
1573	154th St	VCP	8	106	No		281B		2	8	1	B	2C00		2	C	0	0
1575	156th St	VCP	8	258.1	No		4I2F		4	I	2	F	0000		0	0	0	0
1577	156th St	VCP	8	255	No		4332		4	3	3	2	0000		0	0	0	0
1579	Wilton Pl	VCP	8	249.1	No		4421		4	4	2	1	0000		0	0	0	0
1581	Haas Ave	VCP	8	278.1	No		0000		0	0	0	0	1100		1	1	0	0
1583	Cimarron Ave	VCP	8	282	No		4135		4	1	3	5	0000		0	0	0	0
1585	Parron Ave	VCP	8	240.4	No		4232		4	2	3	2	0000		0	0	0	0
1587	Wilton Pl	VCP	8	283.3	No		4334		4	3	3	4	0000		0	0	0	0
1589	Parron Ave	VCP	8	354.8	No		4232		4	2	3	2	0000		0	0	0	0
1591	156th St	VCP	8	255	No		4327		4	3	2	7	2800		2	8	0	0
1593	Wilton Pl	VCP	8	252	No		4532		4	5	3	2	0000		0	0	0	0
1595	Wilton Pl	VCP	8	239.1	No		4100		4	1	0	0	0000		0	0	0	0
1597	Haas Ave	VCP	8	291.9	No		4132		4	1	3	2	0000		0	0	0	0
1599	156th St	VCP	8	255	No		4231		4	2	3	1	2A00		2	A	0	0
1601	Cimarron Ave	VCP	8	291	No		4437		4	4	3	7	1100		1	1	0	0
1603	Gramercy Pl	VCP	8	335.1	No		4532		4	5	3	2	1100		1	1	0	0
1605	156th St	VCP	8	270	No		412C		4	1	2	C	0000		0	0	0	0
1607	Gramercy Pl	VCP	8	263	No		4D32		4	D	3	2	2100		2	1	0	0
1609	Gramercy Pl	VCP	8	267	No		4B23		4	B	2	3	0000		0	0	0	0
1611	Gramercy Pl	VCP	8	260	No		4125		4	1	2	5	0000		0	0	0	0
1613	157th St	VCP	8	48.1	No		2100		2	1	0	0	0000		0	0	0	0

Pipe ID	Location	Material	Diameter (in)	Verified Length (ft)	Capacity Improvement	Capacity Project Number	Structural Inpsection						O&M Inspection					
							2019 Structural Quick Rating	2022 Structural Quick Rating	Maximum Severity Grade	Occurrences of Max Severity Grade[1]	Next Highest Severity	Occurrences of Next Highest Severity	2019 O&M Quick Rating	2022 O&M Quick Rating	Maximum Severity Grade	Occurrences of Max Severity Grade[1]	Next Highest Severity	Occurrences of Next Highest Severity
1615	157th St	VCP	8	300.6	No		4533		4	5	3	3	0000		0	0	0	0
1617	157th St	VCP	8	113	No		2400		2	4	0	0	0000		0	0	0	0
1617R	157th St	VCP	8	190.2	No					0		0				0		0
1619	157th St	VCP	8	304.2	No		3221		3	2	2	1	0000		0	0	0	0
1621	157th St	VCP	8	300.9	No		5142		5	1	4	2	0000		0	0	0	0
1623	Ruthelen Ave	VCP	6	333.4	Existing Improvement	P-12A	4C3A		4	C	3	A	2K00		2	K	0	0
1625	Ruthelen Ave	VCP	8	335.4	Existing Improvement	P-12A	514B		5	1	4	B	2L13		2	L	1	3
1627	Ruthelen Ave	VCP	8	303	Existing Improvement	P-12A	4D3C		4	D	3	C	2K1A		2	K	1	A
1629	St. Andrews St	VCP	8	225.4	No		413C		4	1	3	C	1A00		1	A	0	0
1631	St. Andrews St	VCP	8	324.4	No		5137		5	1	3	7	1C00		1	C	0	0
1633	St. Andrews St	VCP	6	219.2	No		443G		4	4	3	G	1D00		1	D	0	0
1635	St. Andrews St	VCP	8	324.3	No		3F2C		3	F	2	C	1F00		1	F	0	0
1637	Ruthelen Ave	VCP	8	118.3	No		2400		2	4	0	0	0000		0	0	0	0
1639	Ruthelen Ave	VCP	8	209.9	Existing Improvement	P-12A	4E3A		4	E	3	A	2G12		2	G	1	2
1641	Redondo Beach Blvd	VCP	8	301	No		4I31		4	I	3	1	0000		0	0	0	0
1643	Redondo Beach Blvd	VCP	8	265	Existing Improvement	P-12A	4I2B		4	I	2	B	1100		1	1	0	0
1645	Redondo Beach Blvd	VCP	8	265	Existing Improvement	P-12A	4I2A		4	I	2	A	0000		0	0	0	0
1647	Redondo Beach Blvd	VCP	8	321	No		4H33		4	H	3	3	0000		0	0	0	0
1649	157th Ct	VCP	8	171.6	No		4533		4	5	3	3	2D17		2	D	1	7
1651	156th Ct	VCP	8	172	No		4123		4	1	2	3	0000		0	0	0	0
1653	155th Ct	VCP	8	174.3	No		312A		3	1	2	A	1900		1	9	0	0
1655	156th St	VCP	8	81.2	No		312A		3	1	2	A	1100		1	1	0	0
1657	Crenshaw Blvd	VCP	8	174.1	No		2900		2	9	0	0	0000		0	0	0	0
1659	Manhattan Beach Blvd	VCP	8	143.1	No		0000		0	0	0	0	2400		2	4	0	0
1659A	Manhattan Beach Blvd	VCP	8	20	No		0000		0	0	0	0	2200		2	2	0	0
1659B	Manhattan Beach Blvd	VCP	8	404.1	No		0000		0	0	0	0	2N00		2	N	0	0
1659C	Manhattan Beach Blvd	VCP	8	22	No		0000		0	0	0	0	2400		2	4	0	0
1661	Manhattan Beach Blvd	VCP	8	56.1	No		2100		2	1	0	0	0000		0	0	0	0
1663	Manhattan Beach Blvd	VCP	8	195.1	No		2100		2	1	0	0	2A16		2	A	1	6
1665	Manhattan Beach Blvd	VCP	8	300	No		4J24		4	J	2	4	0000		0	0	0	0
1667	Manhattan Beach Blvd	VCP	8	303	No		4K00		4	K	0	0	0000		0	0	0	0
1669	Manhattan Beach Blvd	VCP	8	303	No		4K00		4	K	0	0	4100		4	1	0	0
1671A	Denker Ave	VCP	10	262.1	Existing Improvement	P-9	5141		5	1	4	1	412I		4	1	2	I
1671B	Denker Ave	VCP	10	78.3	Existing Improvement	P-9	2B00		2	B	0	0	2B00		2	B	0	0
1673	144th St	VCP	8	287	No		0000		0	0	0	0	2100		2	1	0	0
1675	144th St	VCP	8	283.1	No		3100		3	1	0	0	0000		0	0	0	0
1677	144th St	VCP	8	130.2	No		3123		3	1	2	3	0000		0	0	0	0
1679	144th St	VCP	8	311.2	No		382C		3	8	2	C	2100		2	1	0	0
1681	144th St	VCP	8	296.2	No		362F		3	6	2	F	321C		3	2	1	C
1683	145th St	VCP	8	291.6	No		3F2B		3	F	2	B	0000		0	0	0	0
1687	Halldale Ave	VCP	8	210	No		2300		2	3	0	0	0000		0	0	0	0
1689	145th St	VCP	8	335	No		372H		3	7	2	H	0000		0	0	0	0
1691	145th St	VCP	8	315.3	No		322A		3	2	2	A	3K00		3	K	0	0
1693	145th St	VCP	8	332.6	No		423D		4	2	3	D	0000		0	0	0	0
1697	Denker Ave	VCP	8	107.1	No					0		0				0		0
1699	145th St	VCP	8	335.2	No		4131		4	1	3	1	412E		4	1	2	E
1701	145th St	VCP	8	333.8	No		423B		4	2	3	B	2F00		2	F	0	0
1703	Halldale Ave	VCP	8	310.6	No					0		0				0		0
1705	146th St	VCP	8	301	No		4100		4	1	0	0	2100		2	1	0	0

Pipe ID	Location	Material	Diameter (in)	Verified Length (ft)	Capacity Improvement	Capacity Project Number	Structural Inpsection						O&M Inspection					
							2019 Structural Quick Rating	2022 Structural Quick Rating	Maximum Severity Grade	Occurrences of Max Severity Grade[1]	Next Highest Severity	Occurrences of Next Highest Severity	2019 O&M Quick Rating	2022 O&M Quick Rating	Maximum Severity Grade	Occurrences of Max Severity Grade[1]	Next Highest Severity	Occurrences of Next Highest Severity
1707	Halldale Ave	VCP	8	181.1	No		2100		2	1	0	0	0000		0	0	0	0
1709	146th St	VCP	8	333.1	No		4H31		4	H	3	1	2A11		2	A	1	1
1711	146th St	VCP	8	303	No		4400		4	4	0	0	1200		1	2	0	0
1713	Denker Ave	VCP	8	400.1	No		4J26		4	J	2	6	4100		4	1	0	0
1715	146th St	VCP	8	331.2	No		4A3C		4	A	3	C	4A00		4	A	0	0
1717	146th St	VCP	8	431	No		4237		4	2	3	7	4600		4	6	0	0
1719	146th St	VCP	8	432	No		4I31		4	I	3	1	2F00		2	F	0	0
1721	146th St	VCP	8	433.1	No		453D		4	5	3	D	2600		2	6	0	0
1723	Halldale Ave	VCP	8	165.1	No		4122		4	1	2	2	0000		0	0	0	0
1727	Denker Ave	VCP	8	202.1	No		3322		3	3	2	2	0000		0	0	0	0
1729	147th St	VCP	8	158.1	No		3422		3	4	2	2	1100		1	1	0	0
1731	147th St	VCP	8	330.3	No		3K2C		3	K	2	C	2600		2	6	0	0
1733	147th St	VCP	8	321	No		4100		4	1	0	0	5111		5	1	1	1
1735	147th St	CP Lined	8	318	No			3300	3	3	0	0		3311	3	3	1	1
1737	147th St	VCP	8	326.8	No		3I2E		3	I	2	E	0000		0	0	0	0
1739	147th St	VCP	8	330	No		443L		4	4	3	L	0000		0	0	0	0
1741	Harvard Blvd	VCP	8	367	No		352A		3	5	2	A	0000		0	0	0	0
1743	149th St	VCP	8	329.1	No		352A		3	5	2	A	2111		2	1	1	1
1745	Harvard Blvd	VCP	8	367.4	No		332A		3	3	2	A	0000		0	0	0	0
1747	Marine Ave	VCP	8	345	No		4L2A		4	L	2	A	0000		0	0	0	0
1749	150th St	VCP	8	328.1	No		4I31		4	I	3	1	0000		0	0	0	0
1751	149th St	VCP	8	330	No		5141		5	1	4	1	2L12		2	L	1	2
1753	Harvard Blvd	VCP	8	377.4	No		413N		4	1	3	N	0000		0	0	0	0
1755	150th St	VCP	8	328	No		4J00		4	J	0	0	0000		0	0	0	0
1757	Marine Ave	VCP	8	327	No		4I31		4	I	3	1	0000		0	0	0	0
1759	La Salle Ave	VCP	8	364	No		4J33		4	J	3	3	0000		0	0	0	0
1761	Marine Ave	VCP	8	323	No		4I21		4	I	2	1	0000		0	0	0	0
1763	Marine Ave	VCP	8	316	No		4K2A		4	K	2	A	0000		0	0	0	0
1765	La Salle Ave	VCP	8	367	No		4L28		4	L	2	8	0000		0	0	0	0
1767	La Salle Ave	VCP	8	374	No		4J2B		4	J	2	B	0000		0	0	0	0
1769	Denker Ave	VCP	8	384.4	No		4K31		4	K	3	1	2500		2	5	0	0
1771	Marine Ave	VCP	8	264	No		3H23		3	H	2	3	0000		0	0	0	0
1773	Halldale Ave	VCP	8		No					0		0				0		0
1775	Kinglsey Dr	VCP	8	366	No		413M		4	1	3	M	0000		0	0	0	0
1777	Kinglsey Dr	VCP	8	370.1	No		3I2K		3	I	2	K	0000		0	0	0	0
1779	Denker Ave	VCP	8	366.1	No		4D34		4	D	3	4	2100		2	1	0	0
1781	Denker Ave	VCP	8	354	No		4K31		4	K	3	1	0000		0	0	0	0
1783	Marine Ave	VCP	8	328.3	No		3L2B		3	L	2	B	0000		0	0	0	0
1785	Kinglsey Dr	VCP	8	370.2	No		3G2J		3	G	2	J	2816		2	8	1	6
1787	Marine Ave	VCP	8	333.4	No		3K2G		3	K	2	G	1100		1	1	0	0
1789	Normandie Ave	VCP	8	306.1	No		4D32		4	D	3	2	2A00		2	A	0	0
1793	Normandie Ave	VCP	8	309	No		5143		5	1	4	3	4100		4	1	0	0
1795	Normandie Ave	VCP	8	308	No		5142		5	1	4	2	4100		4	1	0	0
1797	Normandie Ave	VCP	8	228	No		4231		4	2	3	1	0000		0	0	0	0
1799	Normandie Ave	VCP	8	80.1	No		0000		0	0	0	0	0000		0	0	0	0
1801	Normandie Ave	VCP	8	312.1	No		4131		4	1	3	1	0000		0	0	0	0
1803	Marine Ave	VCP	8	335.1	No		3221		3	2	2	1	4100		4	1	0	0
1805	Raymond Ave	VCP	8	329	No		4100		4	1	0	0	0000		0	0	0	0
1807	Raymond Ave	VCP	8	168	No		4432		4	4	3	2	0000		0	0	0	0

Pipe ID	Location	Material	Diameter (in)	Verified Length (ft)	Capacity Improvement	Capacity Project Number	Structural Inpsection						O&M Inspection					
							2019 Structural Quick Rating	2022 Structural Quick Rating	Maximum Severity Grade	Occurrences of Max Severity Grade[1]	Next Highest Severity	Occurrences of Next Highest Severity	2019 O&M Quick Rating	2022 O&M Quick Rating	Maximum Severity Grade	Occurrences of Max Severity Grade[1]	Next Highest Severity	Occurrences of Next Highest Severity
1809	149th St	VCP	8	251.1	No		4400		4	4	0	0	2100		2	1	0	0
1811	Mariposa Ave	VCP	8	330	No		4131		4	1	3	1	0000		0	0	0	0
1813	Marine Ave	VCP	8	322	No		514J		5	1	4	J	2200		2	2	0	0
1815	Mariposa Ave	VCP	8	303	No		0000		0	0	0	0	2315		2	3	1	5
1817	149th St	VCP	8	289	No		4331		4	3	3	1	2B15		2	B	1	5
1819	Raymond Ave	VCP	8	326	No		0000		0	0	0	0	0000		0	0	0	0
1821	Raymond Ave	VCP	8	294	No		4921		4	9	2	1	2F00		2	F	0	0
1823	147th St	VCP	8	351	No		0000		0	0	0	0	1800		1	8	0	0
1825	Mariposa Ave	VCP	8	155	No		0000		0	0	0	0	1200		1	2	0	0
1827	Raymond Ave	VCP	8	65	No		2100		2	1	0	0	2A00		2	A	0	0
1829	147th St	VCP	8	289	No		4100		4	1	0	0	0000		0	0	0	0
1831	Van Buren Ave	VCP	8	246.1	No		4432		4	4	3	2	0000		0	0	0	0
1833	Van Buren Ave	VCP	8	247	No		433H		4	3	3	H	0000		0	0	0	0
1835	Van Buren Ave	VCP	8	300.6	No		0000		0	0	0	0	0000		0	0	0	0
1837	Van Buren Ave	VCP	8	329	No		0000		0	0	0	0	2100		2	1	0	0
1839	Marine Ave	VCP	8	329.1	Existing Improvement	P-11	514K		5	1	4	K	0000		0	0	0	0
1841	Marine Ave	VCP	8	337.1	Existing Improvement	P-11	4G31		4	G	3	1	412A		4	1	2	A
1843	Budlong Ave	VCP	8	80.1	Existing Improvement	P-11	4621		4	6	2	1	4100		4	1	0	0
1843A	Budlong Ave	VCP	8	269	No		4H00		4	H	0	0	0000		0	0	0	0
1845	144th St	VCP	10	350	No		4333		4	3	3	3	0000		0	0	0	0
1847	144th Pl	VCP	8	202	No		4E31		4	E	3	1	0000		0	0	0	0
1849	144th Pl	VCP	8	62.6	No					0		0				0		0
1851	144th Pl	VCP	8	182.1	No					0		0				0		0
1853	144th St	VCP	10	266	No		4121		4	1	2	1	0000		0	0	0	0
1855	Budlong Ave	VCP	8	156.1	No		2300		2	3	0	0	0000		0	0	0	0
1857	Budlong Ave	VCP	8	149.2	No		2D00		2	D	0	0	0000		0	0	0	0
1857A	Budlong Ave	VCP	8	52.7	No		2900		2	9	0	0	0000		0	0	0	0
1859	144th Pl	VCP	8	200	No		4E22		4	E	2	2	2113		2	1	1	3
1861	Budlong Ave	VCP	8	104.1	No		322B		3	2	2	B	0000		0	0	0	0
1863	Budlong Ave	VCP	8	217.1	No		372B		3	7	2	B	4200		4	2	0	0
1865	Budlong Ave	VCP	8	322	Existing Improvement	P-11	2B00		2	B	0	0	3100		3	1	0	0
1867	Budlong Ave	VCP	8	147.1	Existing Improvement	P-11	2A00		2	A	0	0	0000		0	0	0	0
1869	Budlong Ave	VCP	8	175	No		2700		2	7	0	0	0000		0	0	0	0
1871	Budlong Ave	VCP	8	202.2	No		412D		4	1	2	D	0000		0	0	0	0
1871A	Budlong Ave	VCP	8	66.1	No		5131		5	1	3	1	0000		0	0	0	0
1873	Budlong Ave	VCP	8	322.1	Existing Improvement	P-11	2100		2	1	0	0	4100		4	1	0	0
1877	Budlong Ave	VCP	8	167	Existing Improvement	P-11	2200		2	2	0	0	2C00		2	C	0	0
1877A	Budlong Ave	VCP	8	181.2	Existing Improvement	P-11	4B00		4	B	0	0	4100		4	1	0	0
1879	145th Pl	VCP	8	274	No		4D32		4	D	3	2	0000		0	0	0	0
1881	145th Pl	VCP	8	138.9	No		4A00		4	A	0	0	0000		0	0	0	0
1883	Raymond Ave	VCP	8	121	No		0000		0	0	0	0	0000		0	0	0	0
1885	145th Pl	VCP	8	254	No		3400		3	4	0	0	0000		0	0	0	0
1887	Raymond Ave	VCP	8	336.1	No		4231		4	2	3	1	2400		2	4	0	0
1889	146th St	VCP	8	61.9	No		4131		4	1	3	1	0000		0	0	0	0
1893	146th St	VCP	8	287	No		4200		4	2	0	0	0000		0	0	0	0
1897	146th St	VCP	8	303	No		5146		5	1	4	6	0000		0	0	0	0
1899	146th St	VCP	8	300.1	No		4200		4	2	0	0	4115		4	1	1	5
1901	145th Pl	VCP	8	246	No		5144		5	1	4	4	0000		0	0	0	0
1903	Marine Ave	VCP	8	331.1	No		4E31		4	E	3	1	4326		4	3	2	6

Pipe ID	Location	Material	Diameter (in)	Verified Length (ft)	Capacity Improvement	Capacity Project Number	Structural Inpsection						O&M Inspection					
							2019 Structural Quick Rating	2022 Structural Quick Rating	Maximum Severity Grade	Occurrences of Max Severity Grade[1]	Next Highest Severity	Occurrences of Next Highest Severity	2019 O&M Quick Rating	2022 O&M Quick Rating	Maximum Severity Grade	Occurrences of Max Severity Grade[1]	Next Highest Severity	Occurrences of Next Highest Severity
1905	Vermont Ave	VCP	8	351	No		2I00		2	I	0	0	0000		0	0	0	0
1907	149th St	VCP	8	250	No		4B32		4	B	3	2	0000		0	0	0	0
1909	150th St	VCP	8	298	No		4I21		4	I	2	1	2312		2	3	1	2
1911	149th St	VCP	8	301.1	No		4B21		4	B	2	1	0000		0	0	0	0
1913	Berendo Ave	VCP	8	258.1	No		4E31		4	E	3	1	2911		2	9	1	1
1915	145th St	VCP	8	283.2	No		4I31		4	I	3	1	0000		0	0	0	0
1917	145th St	VCP	8	58	No		4228		4	2	2	8	2100		2	1	0	0
1919	Catalina Ave	VCP	8	112	No		3200		3	2	0	0	0000		0	0	0	0
1921	Catalina Ave	VCP	8	60.4	No		0000		0	0	0	0	0000		0	0	0	0
1923	148th St	VCP	8	333.1	No		4532		4	5	3	2	0000		0	0	0	0
1925	Vermont Ave	VCP	8	302.1	No		2C00		2	C	0	0	2100		2	1	0	0
1927	Marine Ave	VCP	8	217	No		3100		3	1	0	0	0000		0	0	0	0
1929	Marine Ave	VCP	8	213	No		2100		2	1	0	0	2400		2	4	0	0
1931	Marine Ave	VCP	8	326	No		3200		3	2	0	0	2L15		2	L	1	5
1933	150th St	VCP	8	301	No		4F00		4	F	0	0	2114		2	1	1	4
1935	149th St	VCP	8	300	No		4I31		4	I	3	1	1500		1	5	0	0
1937	Berendo Ave	VCP	8	333.3	No		514G		5	1	4	G	1C00		1	C	0	0
1939	Catalina Ave	VCP	8	281.9	No		524I		5	2	4	I	0000		0	0	0	0
1941	Catalina Ave	VCP	8	279	No		4H31		4	H	3	1	0000		0	0	0	0
1943	Catalina Ave	VCP	8	288	No		433D		4	3	3	D	0000		0	0	0	0
1945	Berendo Ave	VCP	8	333.1	No		4D21		4	D	2	1	0000		0	0	0	0
1947	Berendo Ave	VCP	8	332.2	No		4J21		4	J	2	1	0000		0	0	0	0
1949	Berendo Ave	VCP	8	238.1	No		4B34		4	B	3	4	1300		1	3	0	0
1951	Berendo Ave	VCP	8	241	No		4B31		4	B	3	1	1700		1	7	0	0
1953	Berendo Ave	VCP	8	240.1	No		4731		4	7	3	1	1100		1	1	0	0
1955	Vermont Ave	VCP	8	352	No		2D00		2	D	0	0	2100		2	1	0	0
1955A	Vermont Ave	VCP	8	49.1	No		1100		1	1	0	0	0000		0	0	0	0
1957	Vermont Ave	VCP	8	284.2	No		2B00		2	B	0	0	2B12		2	B	1	2
1959	Vermont Ave	VCP	8	326	No		2600		2	6	0	0	2600		2	6	0	0
1961	Vermont Ave	VCP	8	351.1	No		2F00		2	F	0	0	0000		0	0	0	0
1963	Vermont Ave	VCP	8	289.1	No		3121		3	1	2	1	0000		0	0	0	0
1965	Vermont Ave	VCP	8	286	No		2100		2	1	0	0	2B00		2	B	0	0
1967	Harvard Blvd	VCP	8	276	No		4H00		4	H	0	0	4111		4	1	1	1
1969	Harvard Blvd	VCP	8	129	No		4100		4	1	0	0	0000		0	0	0	0
1971	154th Pl	VCP	8	109	No		0000		0	0	0	0	0000		0	0	0	0
1973	154th Pl	VCP	8	183	No		2100		2	1	0	0	0000		0	0	0	0
1975	154th St	VCP	8	325	No		2600		2	6	0	0	0000		0	0	0	0
1977	154th St	VCP	8	259	No		4600		4	6	0	0	1300		1	3	0	0
1979	153rd St	VCP	8	319.9	No		4H31		4	H	3	1	1600		1	6	0	0
1981	153rd St	VCP	8	353	No		4432		4	4	3	2	0000		0	0	0	0
1983	Harvard Blvd	VCP	8	164	No		4200		4	2	0	0	0000		0	0	0	0
1985	152nd St	VCP	8	284.1	No		4231		4	2	3	1	2114		2	1	1	4
1987	Esmnt. N/O 153rd St	VCP	8	283	No		0000		0	0	0	0	0000		0	0	0	0
1989	152nd St	VCP	8	293	No		5144		5	1	4	4	1100		1	1	0	0
1991	Denker Ave	VCP	8	328	No		514I		5	1	4	I	2600		2	6	0	0
1993	154th Pl	VCP	8	291	No		4100		4	1	0	0	1100		1	1	0	0
1995	154th St	VCP	8	313	No		0000		0	0	0	0	2318		2	3	1	8
1997	154th St	VCP	8	305	No		0000		0	0	0	0	0000		0	0	0	0
1999	154th Pl	VCP	8	290	No		0000		0	0	0	0	0000		0	0	0	0

Pipe ID	Location	Material	Diameter (in)	Verified Length (ft)	Capacity Improvement	Capacity Project Number	Structural Inpsection						O&M Inspection					
							2019 Structural Quick Rating	2022 Structural Quick Rating	Maximum Severity Grade	Occurrences of Max Severity Grade[1]	Next Highest Severity	Occurrences of Next Highest Severity	2019 O&M Quick Rating	2022 O&M Quick Rating	Maximum Severity Grade	Occurrences of Max Severity Grade[1]	Next Highest Severity	Occurrences of Next Highest Severity
2001	154th Pl	VCP	8	285.3	No		2100		2	1	0	0	0000		0	0	0	0
2001R	154th Pl	VCP	8	4.9	No					0		0				0		0
2003	153rd St	VCP	8	246	No		4F31		4	F	3	1	2113		2	1	1	3
2005	154th St	VCP	8	301	No		0000		0	0	0	0	0000		0	0	0	0
2007	Denker Ave	VCP	8	328	No		4K31		4	K	3	1	1E00		1	E	0	0
2009	Denker Ave	VCP	8	316	No		3100		3	1	0	0	0000		0	0	0	0
2011	153rd St	VCP	8	290	No		4I21		4	I	2	1	1100		1	1	0	0
2013	154th Pl	VCP	8	272	Existing Improvement	P-13	4F21		4	F	2	1	0000		0	0	0	0
2015	154th Pl	VCP	8	255	Existing Improvement	P-13	4B2A		4	B	2	A	0000		0	0	0	0
2017	153rd St	VCP	8	290	No		4631		4	6	3	1	0000		0	0	0	0
2019	153rd St	VCP	8	221	No		4E32		4	E	3	2	1800		1	8	0	0
2021	153rd St	VCP	8	206	No		0000		0	0	0	0	0000		0	0	0	0
2023	154th St	VCP	8	250	No		0000		0	0	0	0	0000		0	0	0	0
2025	154th St	VCP	8	257.1	No		5143		5	1	4	3	1300		1	3	0	0
2027	152nd St	VCP	8	299	No		5147		5	1	4	7	1300		1	3	0	0
2029	152nd St	VCP	8	249	No		4H31		4	H	3	1	0000		0	0	0	0
2031	152nd St	VCP	8	260	No		514D		5	1	4	D	0000		0	0	0	0
2033	Harvard Blvd	VCP	8	339	No		4G32		4	G	3	2	2600		2	6	0	0
2035	Redondo Beach Blvd	VCP	8	206.1	No		4232		4	2	3	2	0000		0	0	0	0
2037	Redondo Beach Blvd	VCP	8	121	No		4331		4	3	3	1	0000		0	0	0	0
2039	Redondo Beach Blvd	VCP	8	315	No		4A00		4	A	0	0	0000		0	0	0	0
2041	Redondo Beach Blvd	VCP	8	314	No		4H00		4	H	0	0	4100		4	1	0	0
2043	Redondo Beach Blvd	VCP	8	203.1	No		413C		4	1	3	C	412C		4	1	2	C
2045	Redondo Beach Blvd	VCP	8	341.1	No		4129		4	1	2	9	0000		0	0	0	0
2047	Redondo Beach Blvd	VCP	8	191	No		0000		0	0	0	0	0000		0	0	0	0
2049	Redondo Beach Blvd	VCP	8	231.1	No		4121		4	1	2	1	0000		0	0	0	0
2051	Redondo Beach Blvd	VCP	8	248	No		0000		0	0	0	0	2900		2	9	0	0
2053	Nuanu Dr	VCP	8	221	No		4F31		4	F	3	1	0000		0	0	0	0
2055	Nuanu Dr	VCP	8	185	No		433C		4	3	3	C	0000		0	0	0	0
2057	Redondo Beach Blvd	VCP	8	118	No		0000		0	0	0	0	4100		4	1	0	0
2059	Redondo Beach Blvd	VCP	8	227.1	No		4333		4	3	3	3	0000		0	0	0	0
2061	Redondo Beach Blvd	VCP	8	244.1	No		4F31		4	F	3	1	4113		4	1	1	3
2063	Redondo Beach Blvd	VCP	8	241	No		4H00		4	H	0	0	0000		0	0	0	0
2065	Redondo Beach Blvd	VCP	8	173	No		433B		4	3	3	B	0000		0	0	0	0
2067	Redondo Beach Blvd	VCP	8	187	No		4B31		4	B	3	1	4100		4	1	0	0
2069	Redondo Beach Blvd	VCP	8	304.1	No		4F32		4	F	3	2	0000		0	0	0	0
2071	Redondo Beach Blvd	VCP	8	303	No		413B		4	1	3	B	0000		0	0	0	0
2073	Redondo Beach Blvd	VCP	8	300	No		4J31		4	J	3	1	0000		0	0	0	0
2075	Redondo Beach Blvd	VCP	8	303.3	No		423H		4	2	3	H	0000		0	0	0	0
2077	Esmnt. E/O Denker	VCP	8	171	Existing Improvement	P-13	412A		4	1	2	A	0000		0	0	0	0
2079	Redondo Beach Blvd	VCP	8	306	No		514F		5	1	4	F	4121		4	1	2	1
2083	Budlong Ave	VCP	8	350	No		0000		0	0	0	0	0000		0	0	0	0
2091	Pvt. Drive	VCP	8	353	No		433J		4	3	3	J	2G00		2	G	0	0
2097	New Hampshire Ave	VCP	8	235.6	No		3222		3	2	2	2	0000		0	0	0	0
2099	Berendo Ave	VCP	8	282.1	No		0000		0	0	0	0	2100		2	1	0	0
2101	Berendo Ave	VCP	8	350	No		4632		4	6	3	2	0000		0	0	0	0
2103	New Hampshire Ave	VCP	8	95	No		0000		0	0	0	0	0000		0	0	0	0
2105	Vermont Ave	VCP	8	271	No		2B00		2	B	0	0	4126		4	1	2	6
2107	Vermont Ave	VCP	8	251	No		0000		0	0	0	0	0000		0	0	0	0

Pipe ID	Location	Material	Diameter (in)	Verified Length (ft)	Capacity Improvement	Capacity Project Number	Structural Inpsection						O&M Inspection					
							2019 Structural Quick Rating	2022 Structural Quick Rating	Maximum Severity Grade	Occurrences of Max Severity Grade[1]	Next Highest Severity	Occurrences of Next Highest Severity	2019 O&M Quick Rating	2022 O&M Quick Rating	Maximum Severity Grade	Occurrences of Max Severity Grade[1]	Next Highest Severity	Occurrences of Next Highest Severity
2109	Vermont Ave	VCP	8	247.1	No		4G26		4	G	2	6	0000		0	0	0	0
2111	Budlong Ave	VCP	8	75	No		0000		0	0	0	0	0000		0	0	0	0
2113	Budlong Ave	VCP	8	120	No		0000		0	0	0	0	2700		2	7	0	0
2115	Catalina Ave	VCP	8	133.1	No		2A1A		2	A	1	A	0000		0	0	0	0
2117	Alley S/O Redondo	VCP	8	327	No		3222		3	2	2	2	0000		0	0	0	0
2121	Catalina Ave	VCP	8	150.8	No		0000		0	0	0	0	1B00		1	B	0	0
2123	Catalina Ave	VCP	8	349.1	No		2500		2	5	0	0	312L		3	1	2	L
2127	New Hampshire Ave	VCP	8	294	No		0000		0	0	0	0	0000		0	0	0	0
2129	155th St	VCP	8	230.1	No		3100		3	1	0	0	0000		0	0	0	0
2131	Berendo Ave	VCP	8	167.1	No		3100		3	1	0	0	1700		1	7	0	0
2131A	Berendo Ave	VCP	8	75	No		3122		3	1	2	2	0000		0	0	0	0
2133	Berendo Ave	VCP	8	243.8	No		2100		2	1	0	0	1200		1	2	0	0
2135	Berendo Ave	VCP	8	283.3	No		0000		0	0	0	0	0000		0	0	0	0
2137	Budlong Ave	VCP	8	351	No		3125		3	1	2	5	0000		0	0	0	0
2139	Van Buren Ave	VCP	8	219	No		4300		4	3	0	0	3122		3	1	2	2
2141	156th St	VCP	8	155	No		4132		4	1	3	2	1600		1	6	0	0
2143	Van Buren Ave	VCP	8	207	No		2100		2	1	0	0	0000		0	0	0	0
2145	156th St	VCP	8	121.6	No		3129		3	1	2	9	2112		2	1	1	2
2147	Vermont Ave	VCP	8	330	No		4521		4	5	2	1	0000		0	0	0	0
2149	Magnolia Ave	VCP	8	275	No		544G		5	4	4	G	2311		2	3	1	1
2151	Magnolia Ave	VCP	8	200	No		5100		5	1	0	0	0000		0	0	0	0
2153	Alley E/O Normandie	VCP	8	274.2	No		4137		4	1	3	7	1200		1	2	0	0
2155	Van Buren Ave	VCP	8	223	No		4723		4	7	2	3	3124		3	1	2	4
2157	Magnolia Ave	VCP	8	159.1	No		2100		2	1	0	0	0000		0	0	0	0
2159	Alley E/O Normandie	VCP	8	275.1	No		5142		5	1	4	2	0000		0	0	0	0
2161	Magnolia Ave	VCP	8	151.1	No		4126		4	1	2	6	0000		0	0	0	0
2163	Magnolia Ave	VCP	8	329	No		312E		3	1	2	E	1200		1	2	0	0
2165	Magnolia Ave	VCP	8	337	No		2200		2	2	0	0	2C14		2	C	1	4
2167	Magnolia Ave	VCP	8	288.1	No		514F		5	1	4	F	2111		2	1	1	1
2169	Vermont Ave	VCP	8	322	No		4C11		4	C	1	1	0000		0	0	0	0
2171	155th St	VCP	8	350	No		2B00		2	B	0	0	2800		2	8	0	0
2187	Halldale Ave	VCP	8	221	No		0000		0	0	0	0	211E		2	1	1	E
2187A	Halldale Ave	VCP	8	74	No		0000		0	0	0	0	2A00		2	A	0	0
2189	Brighton Ave	VCP	8	326	No		0000		0	0	0	0	311C		3	1	1	C
2191	Brighton Ave	VCP	8	243	No		0000		0	0	0	0	1100		1	1	0	0
2193	Halldale Ave	VCP	8	299	No		4132		4	1	3	2	1D00		1	D	0	0
2195	157th St	VCP	8	200	No		0000		0	0	0	0	3121		3	1	2	1
2197	La Salle Ave	VCP	8	184.1	No		413D		4	1	3	D	0000		0	0	0	0
2199	La Salle Ave	VCP	8	302.6	No		473H		4	7	3	H	0000		0	0	0	0
2201	La Salle Ave	VCP	8	300.9	No		513H		5	1	3	H	0000		0	0	0	0
2203	158th St	VCP	8	159	No		1100		1	1	0	0	2100		2	1	0	0
2205	158th St	VCP	8	96.1	No		2B11		2	B	1	1	2B00		2	B	0	0
2207	158th St	VCP	8	154	No		2900		2	9	0	0	4100		4	1	0	0
2209	158th St	VCP	8	351	No		2C00		2	C	0	0	0000		0	0	0	0
2211	158th St	VCP	8	350.1	No		2G00		2	G	0	0	4400		4	4	0	0
2213	Western Ave	CP Lined	8	330	No					0		0				0		0
2215	Western Ave	CP Lined	8	330	No					0		0				0		0
2217	Western Ave	CP Lined	8	328	No					0		0				0		0
2219	Western Ave	CP Lined	8	328	No					0		0				0		0

Pipe ID	Location	Material	Diameter (in)	Verified Length (ft)	Capacity Improvement	Capacity Project Number	Structural Inpsection						O&M Inspection					
							2019 Structural Quick Rating	2022 Structural Quick Rating	Maximum Severity Grade	Occurrences of Max Severity Grade[1]	Next Highest Severity	Occurrences of Next Highest Severity	2019 O&M Quick Rating	2022 O&M Quick Rating	Maximum Severity Grade	Occurrences of Max Severity Grade[1]	Next Highest Severity	Occurrences of Next Highest Severity
2221	Western Ave	CP Lined	8	326	No					0		0				0		0
2223	Vermont Ave	VCP	8	332.2	No		4A22		4	A	2	2	0000		0	0	0	0
2225	159th St	VCP	8	179.1	No		3100		3	1	0	0	1100		1	1	0	0
2227	Berendo Ave	VCP	8	332	No		413L		4	1	3	L	0000		0	0	0	0
2229	158th St	VCP	8	309	No		4100		4	1	0	0	2E13		2	E	1	3
2231	Budlong Ave	VCP	8	329	No		0000		0	0	0	0	2A00		2	A	0	0
2233	159th St	VCP	8	339.1	No		0000		0	0	0	0	1400		1	4	0	0
2235	Vermont Ave	VCP	8	332.1	No		0000		0	0	0	0	0000		0	0	0	0
2237	159th St	VCP	8	241	No		4500		4	5	0	0	1100		1	1	0	0
2239	158th St	VCP	8	289	No		4131		4	1	3	1	0000		0	0	0	0
2241	159th St	VCP	8	116	No		2E00		2	E	0	0	4311		4	3	1	1
2243	159th St	VCP	8	336	No		2600		2	6	0	0	0000		0	0	0	0
2245	Raymond Ave	VCP	8	328	No		4E35		4	E	3	5	0000		0	0	0	0
2247	Raymond Ave	VCP	8	330.1	No		483D		4	8	3	D	0000		0	0	0	0
2249	159th St	VCP	8	264.1	No		0000		0	0	0	0	2I11		2	I	1	1
2251	160th St	VCP	8	269.1	No		0000		0	0	0	0	2I00		2	I	0	0
2253	161st St	VCP	8	290.3	No		3824		3	8	2	4	2J12		2	J	1	2
2255	162nd St	CP Lined	8	289.7	No			4100	4	1	0	0		3211	3	2	1	1
2257	162nd St	CP Lined	8	247.2	No			0000	0	0	0	0		3100	3	1	0	0
2259	162nd St	CP Lined	8	290.5	No			0000	0	0	0	0		3100	3	1	0	0
2261	162nd St	CP Lined	8	295.3	No			0000	0	0	0	0		0000	0	0	0	0
2263	161st St	VCP	8	290	No		3124		3	1	2	4	2L11		2	L	1	1
2265	161st St	VCP	8	288.8	No		3421		3	4	2	1	2J00		2	J	0	0
2267	161st St	VCP	8	240.7	No		3223		3	2	2	3	2H00		2	H	0	0
2269	160th St	VCP	8	220	No		2A00		2	A	0	0	2G00		2	G	0	0
2271	160th St	VCP	8	268	No		2A00		2	A	0	0	2I1C		2	I	1	C
2273	159th St	VCP	8	214.2	No		2100		2	1	0	0	2J00		2	J	0	0
2275	159th St	VCP	8	263	No		0000		0	0	0	0	2J00		2	J	0	0
2277	159th St	VCP	8	264	No		1100		1	1	0	0	2I00		2	I	0	0
2279	160th St	VCP	8	267.5	No		0000		0	0	0	0	2I00		2	I	0	0
2281	160th St	VCP	8	295	No		2100		2	1	0	0	0000		0	0	0	0
2283	Alley s/o 159th St	VCP	8	325	No		4300		4	3	0	0	1400		1	4	0	0
2285	Vermont Ave	VCP	8	329	No		2500		2	5	0	0	4122		4	1	2	2
2287	161st St	VCP	8	265	No		4233		4	2	3	3	2A13		2	A	1	3
2289	161st St	VCP	8	306.3	No		3121		3	1	2	1	2J00		2	J	0	0
2291	160th St	VCP	8	355	No		2200		2	2	0	0	1200		1	2	0	0
2293	Vermont Ave	VCP	10	335.3	No		2C00		2	C	0	0	2A1B		2	A	1	B
2295	160th St	VCP	8	302	No		5100		5	1	0	0	4100		4	1	0	0
2297	161st St	VCP	8	308.6	No		3B27		3	B	2	7	2K13		2	K	1	3
2299	161st St	VCP	8	271	No		4134		4	1	3	4	1300		1	3	0	0
2301	Berendo Ave	VCP	8	117	No		0000		0	0	0	0	1900		1	9	0	0
2303	162nd St	VCP	8	303	No		4100		4	1	0	0	2F11		2	F	1	1
2305	162nd St	VCP	8	301	No		1100		1	1	0	0	1400		1	4	0	0
2307	Vermont Ave	VCP	10	331.1	No		422A		4	2	2	A	312F		3	1	2	F
2309	163rd St	VCP Lined	8	224.5	No			3100	3	1	0	0		3312	3	3	1	2
2311	Vermont Ave	VCP	10	330	No		4K00		4	K	0	0	1A00		1	A	0	0
2313	163rd St	CP Lined	8	334.1	No			0000	0	0	0	0		1100	1	1	0	0
2315	163rd St	CP Lined	8	329.7	No			0000	0	0	0	0		3100	3	1	0	0
2317	163rd St	CP Lined	8	321.4	No			0000	0	0	0	0		3100	3	1	0	0

Pipe ID	Location	Material	Diameter (in)	Verified Length (ft)	Capacity Improvement	Capacity Project Number	Structural Inpsection						O&M Inspection					
							2019 Structural Quick Rating	2022 Structural Quick Rating	Maximum Severity Grade	Occurrences of Max Severity Grade[1]	Next Highest Severity	Occurrences of Next Highest Severity	2019 O&M Quick Rating	2022 O&M Quick Rating	Maximum Severity Grade	Occurrences of Max Severity Grade[1]	Next Highest Severity	Occurrences of Next Highest Severity
2319	163rd St	CP Lined	8	317.6	No			0000	0	0	0	0		3500	3	5	0	0
2321	163rd St	CP Lined	8	235.3	No			0000	0	0	0	0		3211	3	2	1	1
2323	163rd St	CP Lined	8	276.6	No			0000	0	0	0	0		3200	3	2	0	0
2325	163rd St	CP Lined	8	320.5	No			0000	0	0	0	0		3100	3	1	0	0
2327	162nd St	VCP	8	182.08	No			0000	0	0	0	0		0000	0	0	0	0
2329	Denker Ave	CP Lined	8	319	No			0000	0	0	0	0		3200	3	2	0	0
2331	Dalton Ave	CP Lined	8	295.3	No			0000	0	0	0	0		3311	3	3	1	1
2333	Halldale Ave	CP Lined	8	293.2	No			0000	0	0	0	0		0000	0	0	0	0
2335	Brighton Ave	CP Lined	8	292.2	No			0000	0	0	0	0		0000	0	0	0	0
2337	Halldale Ave	CP Lined	8	294.5	No			0000	0	0	0	0		0000	0	0	0	0
2339	Halldale Ave	CP Lined	8	316.6	No			0000	0	0	0	0		0000	0	0	0	0
2341	Brighton Ave	CP Lined	8	315.3	No			0000	0	0	0	0		0000	0	0	0	0
2343	Brighton Ave	CP Lined	8	294.4	No			0000	0	0	0	0		0000	0	0	0	0
2345	Dalton Ave	CP Lined	8	316.4	No			0000	0	0	0	0		0000	0	0	0	0
2347	Dalton Ave	CP Lined	8	296.5	No			0000	0	0	0	0		3600	3	6	0	0
2349	Denker Ave	CP Lined	8	291.6	No			0000	0	0	0	0		3100	3	1	0	0
2351	Denker Ave	CP Lined	8	297.3	No			0000	0	0	0	0		413A	4	1	3	A
2353	162nd St	VCP	8	185.18	No			0000	0	0	0	0		0000	0	0	0	0
2355	162nd St	VCP	8	181.18	No			0000	0	0	0	0		0000	0	0	0	0
2357	Brighton Ave	CP Lined	8	315.9	No			3200	3	2	0	0		3100	3	1	0	0
2359	162nd St	VCP	8	185	No		2C00		2	C	0	0	0000		0	0	0	0
2361	162nd St	VCP	8	180.98	No			0000	0	0	0	0		0000	0	0	0	0
2363	Halldale Ave	CP Lined	8	319.6	No			0000	0	0	0	0		0000	0	0	0	0
2365	Dalton Ave	CP Lined	8	318.5	No			0000	0	0	0	0		3121	3	1	2	1
2367	162nd St	VCP	8	180.1	No		2800		2	8	0	0	0000		0	0	0	0
2369	162nd St	VCP	8	185	No		2C00		2	C	0	0	0000		0	0	0	0
2371	Denker Ave	CP Lined	8	314.4	No			0000	0	0	0	0		3111	3	1	1	1
2373	162nd St	VCP	8	182.1	No		0000		0	0	0	0	2500		2	5	0	0
2375	Harvard Blvd	VCP	8	170	No		4131		4	1	3	1	0000		0	0	0	0
2377	La Salle Ave	VCP	8	352.3	No		5147		5	1	4	7	0000		0	0	0	0
2379	Harvard Blvd	VCP	8	267	No		4233		4	2	3	3	3100		3	1	0	0
2381	Harvard Blvd	VCP	8	279	No		0000		0	0	0	0	0000		0	0	0	0
2383	Harvard Blvd	VCP	8	281.1	No		0000		0	0	0	0	0000		0	0	0	0
2385	La Salle Ave	VCP	8	350.9	No		5147		5	1	4	7	0000		0	0	0	0
2387	La Salle Ave	VCP	8	121.6	No		4135		4	1	3	5	2A00		2	A	0	0
2391	162nd St	VCP	8	305	No		2100		2	1	0	0	0000		0	0	0	0
2393	162nd St	VCP	8	305	No		0000		0	0	0	0	0000		0	0	0	0
2397	Redondo Beach Blvd	VCP	8	169	No		2900		2	9	0	0	0000		0	0	0	0
2403	Ardath Ave	VCP	8	328.1	No		433A		4	3	3	A	2L1B		2	L	1	B
2405	Ardath Ave	VCP	8	219	No		4436		4	4	3	6	2H12		2	H	1	2
2407	Chanera Ave	VCP	8	140.4	No		421B		4	2	1	B	2D00		2	D	0	0
2409	Chanera Ave	VCP	8	352.9	No		4234		4	2	3	4	2811		2	8	1	1
2411	Redondo Beach Blvd	VCP	8	275.4	No		493A		4	9	3	A	2I1B		2	I	1	B
2413	Arcturus Ave	VCP	8	200.1	No		3F22		3	F	2	2	0000		0	0	0	0
2415	Arcturus Ave	VCP	8	136.4	No		3D2A		3	D	2	A	0000		0	0	0	0
2417	Arcturus Ave	VCP	8	326	No		3L2F		3	L	2	F	2900		2	9	0	0
2419	Arcturus Ave	VCP	8	178.9	No		413E		4	1	3	E	2A00		2	A	0	0
2421	Arcturus Ave	VCP	8	271	No		413I		4	1	3	I	2611		2	6	1	1
2423	Ardath Ave	VCP	8	272.7	No		4538		4	5	3	8	2I19		2	I	1	9

Pipe ID	Location	Material	Diameter (in)	Verified Length (ft)	Capacity Improvement	Capacity Project Number	Structural Inpsection						O&M Inspection					
							2019 Structural Quick Rating	2022 Structural Quick Rating	Maximum Severity Grade	Occurrences of Max Severity Grade[1]	Next Highest Severity	Occurrences of Next Highest Severity	2019 O&M Quick Rating	2022 O&M Quick Rating	Maximum Severity Grade	Occurrences of Max Severity Grade[1]	Next Highest Severity	Occurrences of Next Highest Severity
2425	Marigold Ave	VCP	8	163	No		4137		4	1	3	7	2E1A		2	E	1	A
2427	Marigold Ave	VCP	8	298.2	No		413H		4	1	3	H	211A		2	1	1	A
2429	Casmir Ave	VCP	8	249.1	No		4726		4	7	2	6	1400		1	4	0	0
2431	Casmir Ave	VCP	8	281.3	No		4635		4	6	3	5	2617		2	6	1	7
2433	Esmnt. W/O Atkinson	VCP	8	232.1	No		2A00		2	A	0	0	1100		1	1	0	0
2435	Atkinson Ave	VCP	8	293.1	No		3J2A		3	J	2	A	1C00		1	C	0	0
2437	Atkinson Ave	VCP	8	293.4	No		3I2C		3	I	2	C	241B		2	4	1	B
2439	Atkinson Ave	VCP	8	262	No		423I		4	2	3	I	1H00		1	H	0	0
2441	Atkinson Ave	VCP	8	249.1	No		3H23		3	H	2	3	2114		2	1	1	4
2443	Arcturus Ave	VCP	8	350.1	No		423L		4	2	3	L	2A00		2	A	0	0
2445	Redondo Beach Blvd	VCP	8	352.7	No		4E3D		4	E	3	D	2I15		2	I	1	5
2447	Redondo Beach Blvd	VCP	8	59	No		4100		4	1	0	0	0000		0	0	0	0
2449	Redondo Beach Blvd	VCP	8	208.1	No		4F00		4	F	0	0	0000		0	0	0	0
2449A	Redondo Beach Blvd	VCP	8	131.2	No		4C31		4	C	3	1	0000		0	0	0	0
2451	Redondo Beach Blvd	VCP	8	351	No		4M00		4	M	0	0	1200		1	2	0	0
2453	Redondo Beach Blvd	VCP	8	135.1	No		4D00		4	D	0	0	0000		0	0	0	0
2453A	Redondo Beach Blvd	VCP	8	217	No		4G22		4	G	2	2	4100		4	1	0	0
2455	Redondo Beach Blvd	VCP	8	32.7	No					0		0				0		0
2457	Redondo Beach Blvd	VCP	8	339.1	No		4L00		4	L	0	0	0000		0	0	0	0
2459	Gramercy Pl	VCP	8	349.2	No		322C		3	2	2	C	221A		2	2	1	A
2461	Gramercy Pl	VCP	8	353.6	No		3126		3	1	2	6	2L18		2	L	1	8
2463	161st St	VCP	8	248	No		4331		4	3	3	1	2G00		2	G	0	0
2465	St. Andrews Pl	VCP	8	183.8	No		5142		5	1	4	2	0000		0	0	0	0
2467	St. Andrews Pl	VCP	8	353.1	No		4235		4	2	3	5	1900		1	9	0	0
2469	160th St	VCP	8	232.3	No		443A		4	4	3	A	0000		0	0	0	0
2471	St. Andrews Pl	VCP	8	314	No		432B		4	3	2	B	412B		4	1	2	B
2473	Redondo Beach Blvd	VCP	8	332.1	No		3122		3	1	2	2	0000		0	0	0	0
2473A	Redondo Beach Blvd	VCP	8	52	No		0000		0	0	0	0	0000		0	0	0	0
2475	St. Andrews Pl	VCP	8	291.9	No		1800		1	8	0	0	2F12		2	F	1	2
2477	Redondo Beach Blvd	VCP	8	277	No		423H		4	2	3	H	0000		0	0	0	0
2479	161st St	VCP	8	198.3	No		4335		4	3	3	5	2F00		2	F	0	0
2481	St. Andrews Pl	VCP	8	51	No		2200		2	2	0	0	0000		0	0	0	0
2483	159th St	VCP	8	237	No		4D32		4	D	3	2	0000		0	0	0	0
2485	159th St	VCP	8	235.1	No		3C22		3	C	2	2	0000		0	0	0	0
2487	160th St	VCP	8	232.8	No		4639		4	6	3	9	0000		0	0	0	0
2489	Western Ave	CP Lined	8	272.9	No					0		0				0		0
2491	Western Ave	CP Lined	8	276.8	No					0		0				0		0
2493	Alley W/O Western	CP Lined	8	229.5	No			0000	0	0	0	0		3100	3	1	0	0
2495	St. Andrews Pl	VCP	8	320.4	No		2D00		2	D	0	0	0000		0	0	0	0
2497	Gardena Blvd	VCP	8	147.6	No		0000		0	0	0	0	0000		0	0	0	0
2499	Alley W/O Western	CP Lined	8	247.3	No			3100	3	1	0	0		0000	0	0	0	0
2503	Alley W/O Western	CP Lined	8	143.9	No			0000	0	0	0	0		3100	3	1	0	0
2505	St. Andrews Pl	VCP	8	229.3	No		0000		0	0	0	0	0000		0	0	0	0
2507	St. Andrews Pl	VCP	8	56.5	No		2300		2	3	0	0	0000		0	0	0	0
2509	St. Andrews Pl	CP Lined	8	279.6	No			0000	0	0	0	0		3100	3	1	0	0
2511	St. Andrews Pl	VCP	8	316.7	No		412D		4	1	2	D	3111		3	1	1	1
2513	Gramercy Pl	CP Lined	8	278.9	No			0000	0	0	0	0		0000	0	0	0	0
2515	Gramercy Pl	VCP	8	236	No		0000		0	0	0	0	0000		0	0	0	0
2517	Gramercy Pl	VCP	8	344	No		5146		5	1	4	6	2100		2	1	0	0

Pipe ID	Location	Material	Diameter (in)	Verified Length (ft)	Capacity Improvement	Capacity Project Number	Structural Inpsection						O&M Inspection					
							2019 Structural Quick Rating	2022 Structural Quick Rating	Maximum Severity Grade	Occurrences of Max Severity Grade[1]	Next Highest Severity	Occurrences of Next Highest Severity	2019 O&M Quick Rating	2022 O&M Quick Rating	Maximum Severity Grade	Occurrences of Max Severity Grade[1]	Next Highest Severity	Occurrences of Next Highest Severity
2519	Gramercy Pl	VCP	8	338	No		3K00		3	K	0	0	0000		0	0	0	0
2521	164th St	VCP	10	325.7	No		3J2I		3	J	2	I	2100		2	1	0	0
2523	New Hampshire Ave	VCP	8	185.1	No		3322		3	3	2	2	2F00		2	F	0	0
2525	New Hampshire Ave	VCP	8	167.2	No		4239		4	2	3	9	2E00		2	E	0	0
2527	164th St	VCP	10	231	No		3G2F		3	G	2	F	0000		0	0	0	0
2529	Vermont Ave	VCP	10	330	No		4L2G		4	L	2	G	0000		0	0	0	0
2533	Alley N/O Gardena	CP Lined	8	251	No			0000	0	0	0	0		3300	3	3	0	0
2535	Alley N/O Gardena	CP(95%)	8	210.8	No		1B00		1	B	0	0	0000		0	0	0	0
2537	Berendo Ave	VCP	12	331.1	No		4D31		4	D	3	1	0000		0	0	0	0
2539	164th St	VCP	8	298.1	No		3422		3	4	2	2	2J00		2	J	0	0
2541	Gardena Blvd	VCP	8	330	No		3121		3	1	2	1	1100		1	1	0	0
2543	Gardena Blvd	VCP	8	333.2	No		3321		3	3	2	1	0000		0	0	0	0
2545	164th St	VCP	8	300.2	No		4135		4	1	3	5	2717		2	7	1	7
2547	164th St	VCP	8	259.7	No		3123		3	1	2	3	2I11		2	I	1	1
2549	164th St	VCP	8	280	No		2200		2	2	0	0	2I00		2	I	0	0
2551	Gardena Blvd	VCP	8	303	No		413E		4	1	3	E	1100		1	1	0	0
2553	Gardena Blvd	VCP	8	251.2	No		4231		4	2	3	1	2100		2	1	0	0
2555	Gardena Blvd	VCP	8	317.4	No		423F		4	2	3	F	0000		0	0	0	0
2557	164th St	VCP	8	281.1	No		3525		3	5	2	5	2J00		2	J	0	0
2559	164th St	VCP	8	305.5	No		4128		4	1	2	8	2J00		2	J	0	0
2561	Gardena Blvd	VCP	8	271.5	No		5142		5	1	4	2	0000		0	0	0	0
2563	Berendo Ave	CP Lined	12	169	No			0000	0	0	0	0		3100	3	1	0	0
2565	165th St	CP Lined	8	355	No			0000	0	0	0	0		3421	3	4	2	1
2567	Berendo Ave	CP Lined	12	117	No			0000	0	0	0	0		0000	0	0	0	0
2569	Alley at Berendo	CP	8	297.2	No		3G00		3	G	0	0	0000		0	0	0	0
2571	Berendo Ave	CP Lined	12	173	No			0000	0	0	0	0		3200	3	2	0	0
2573	Alley at New Hamshire	CP Lined	8	326	No			0000	0	0	0	0		0000	0	0	0	0
2575	Alley at New Hamshire	CP Lined	8	252	No			0000	0	0	0	0		0000	0	0	0	0
2577	166th St	CP Lined	8	340.2	No					0		0				0		0
2579	166th St	CP Lined	8	290	No					0		0				0		0
2581	166th St	CP Lined	8	300	No					0		0				0		0
2583	166th St	CP Lined	8	297	No					0		0				0		0
2585	166th St	CP Lined	8	342.8	No					0		0				0		0
2587	166th St	CP Lined	8	329.5	No					0		0				0		0
2589	Berendo Ave	CP Lined	12	60	No			0000	0	0	0	0		0000	0	0	0	0
2591	166th St	CP Lined	8	248.03	No			0000	0	0	0	0		3200	3	2	0	0
2593	166th St	CP Lined	8	241.58	No			0000	0	0	0	0		5133	5	1	3	3
2595	166th St	CP Lined	8	300.9	No			0000	0	0	0	0		4134	4	1	3	4
2597	166th St	CP Lined	8	328.1	No			0000	0	0	0	0		3224	3	2	2	4
2599	166th St	CP Lined	8	236.2	No			0000	0	0	0	0		0000	0	0	0	0
2603	Brighton Ave	CP Lined	8	292	No			4132	4	1	3	2		3100	3	1	0	0
2605	166th St	VCP	8	283.3	No		3100		3	1	0	0	0000		0	0	0	0
2607	166th St	VCP	8	186.1	No		3E24		3	E	2	4	0000		0	0	0	0
2609	Halldale Ave	CP Lined	8	329.1	No			2100	2	1	0	0		0000	0	0	0	0
2611	Dalton Ave	CP Lined	8	261.2	No			3600	3	6	0	0		0000	0	0	0	0
2613	166th St	VCP	8	165.1	No		4732		4	7	3	2	1200		1	2	0	0
2615	166th St	VCP	8	205	No		3F26		3	F	2	6	2200		2	2	0	0
2619	Denker Ave	CP Lined	8	302.5	No			0000	0	0	0	0		3222	3	2	2	2
2621	166th St	VCP	8	99.1	No		0000		0	0	0	0	0000		0	0	0	0

Pipe ID	Location	Material	Diameter (in)	Verified Length (ft)	Capacity Improvement	Capacity Project Number	Structural Inpsection						O&M Inspection					
							2019 Structural Quick Rating	2022 Structural Quick Rating	Maximum Severity Grade	Occurrences of Max Severity Grade[1]	Next Highest Severity	Occurrences of Next Highest Severity	2019 O&M Quick Rating	2022 O&M Quick Rating	Maximum Severity Grade	Occurrences of Max Severity Grade[1]	Next Highest Severity	Occurrences of Next Highest Severity
2625	Denker Ave	CP Lined	8	246.4	No			0000	0	0	0	0		4137	4	1	3	7
2627	Denker Ave	CP Lined	8	304.2	No			0000	0	0	0	0		3724	3	7	2	4
2629	Dalton Ave	CP Lined	8	353	No			2400	2	4	0	0		1100	1	1	0	0
2631	Dalton Ave	CP Lined	8	242.3	No			0000	0	0	0	0		0000	0	0	0	0
2637	Halldale Ave	CP Lined	8	305.3	No			3500	3	5	0	0		0000	0	0	0	0
2639	166th St	VCP	8	185.1	No		4A33		4	A	3	3	0000		0	0	0	0
2641	Brighton Ave	CP Lined	8	295.4	No			2100	2	1	0	0		0000	0	0	0	0
2643	Dalton Ave	CP Lined	8	330.2	No			3321	3	3	2	1		0000	0	0	0	0
2645	166th St	VCP	8	190.9	No		3D00		3	D	0	0	0000		0	0	0	0
2647	Denker Ave	CP Lined	8	324.4	No			2100	2	1	0	0		2100	2	1	0	0
2649	Gardena Blvd	CP Lined	8	300	No			0000	0	0	0	0		3122	3	1	2	2
2651	Gardena Blvd	CP Lined	8	330	No			0000	0	0	0	0		3200	3	2	0	0
2653	Gardena Blvd	CP Lined	8	330	No			2400	2	4	0	0		3200	3	2	0	0
2655	Gardena Blvd	CP Lined	8	330	No			0000	0	0	0	0		3200	3	2	0	0
2657	Gardena Blvd	CP Lined	8	335	No			2700	2	7	0	0		3100	3	1	0	0
2659	Gardena Blvd	CP Lined	8	335	No			0000	0	0	0	0		3100	3	1	0	0
2661	Gardena Blvd	CP Lined	8	330	No			2200	2	2	0	0		3100	3	1	0	0
2663	Gardena Blvd	CP Lined	8	300	No			0000	0	0	0	0		3300	3	3	0	0
2665	Harvard Blvd	CP Lined	8	297.2	No			2200	2	2	0	0		0000	0	0	0	0
2667	La Salle Ave	VCP	8	288.1	No		0000		0	0	0	0	0000		0	0	0	0
2669	165th Pl	VCP Lined	8	170.1	No			0000	0	0	0	0		3300	3	3	0	0
2671	165th Pl	CP Lined	8	301.9	No			2300	2	3	0	0		4234	4	2	3	4
2673	Harvard Blvd	CP Lined	8	271.1	No			0000	0	0	0	0		0000	0	0	0	0
2675	166th St	VCP	8	328	No		413K		4	1	3	K	2K00		2	K	0	0
2677	166th St	VCP	8	120.2	No		3421		3	4	2	1	2C00		2	C	0	0
2681	Western Ave	VCP	8	288.1	No		4232		4	2	3	2	2412		2	4	1	2
2683	Western Ave	VCP	8	285	No		4G31		4	G	3	1	2B17		2	B	1	7
2685	Western Ave	VCP	8	271	No		3100		3	1	0	0	2114		2	1	1	4
2687	Western Ave	VCP	8	331.1	No		413I		4	1	3	I	1200		1	2	0	0
2689	Western Ave	VCP	8	304.4	No		3121		3	1	2	1	2J14		2	J	1	4
2691	Western Ave	VCP	8	303	No		423I		4	2	3	I	0000		0	0	0	0
2693	169th St	CP Lined	8	333.2	No			0000	0	0	0	0		3400	3	4	0	0
2695	Hobart Blvd	CP Lined	8	280.5	No			0000	0	0	0	0		0000	0	0	0	0
2697	168th St	CP Lined	8	277.1	No			0000	0	0	0	0		3100	3	1	0	0
2699	Denker Ave	CP Lined	8	287.1	No			2400	2	4	0	0		3200	3	2	0	0
2701	169th Pl	CP Lined	8	326	No			0000	0	0	0	0		3200	3	2	0	0
2703	La Salle Ave	CP Lined	8	256	No			0000	0	0	0	0		0000	0	0	0	0
2705	169th Pl	CP Lined	8	298.4	No			0000	0	0	0	0		0000	0	0	0	0
2707	Harvard Blvd	CP Lined	8	257	No			0000	0	0	0	0		3100	3	1	0	0
2711	Denker Ave	CP Lined	8	248.4	No			0000	0	0	0	0		3100	3	1	0	0
2713	Hobart Blvd	CP Lined	8	282.6	No			0000	0	0	0	0		0000	0	0	0	0
2715	Hobart Blvd	CP Lined	8	287.8	No			0000	0	0	0	0		3300	3	3	0	0
2717	Harvard Blvd	CP Lined	8	252.9	No			3100	3	1	0	0		0000	0	0	0	0
2719	168th St	CP Lined	8	280.4	No			0000	0	0	0	0		0000	0	0	0	0
2721	La Salle Ave	CP Lined	8	252.3	No			3100	3	1	0	0		0000	0	0	0	0
2723	168th St	CP Lined	8	276.2	No			0000	0	0	0	0		3100	3	1	0	0
2725	Denker Ave	CP Lined	8	327	No			0000	0	0	0	0		3400	3	4	0	0
2727	169th St	CP Lined	8	320	No			0000	0	0	0	0		0000	0	0	0	0
2729	169th St	CP Lined	8	322	No			0000	0	0	0	0		3100	3	1	0	0

Pipe ID	Location	Material	Diameter (in)	Verified Length (ft)	Capacity Improvement	Capacity Project Number	Structural Inpsection						O&M Inspection					
							2019 Structural Quick Rating	2022 Structural Quick Rating	Maximum Severity Grade	Occurrences of Max Severity Grade[1]	Next Highest Severity	Occurrences of Next Highest Severity	2019 O&M Quick Rating	2022 O&M Quick Rating	Maximum Severity Grade	Occurrences of Max Severity Grade[1]	Next Highest Severity	Occurrences of Next Highest Severity
2731	169th St	CP Lined	8	322	No			0000	0	0	0	0		3100	3	1	0	0
2733A	Denker Ave	CP Lined	8	206.8	No					0		0				0		0
2733B	Denker Ave	CP	8	60	No					0		0				0		0
2735	172nd Pl	VCP	8	280.6	No		473D		4	7	3	D	0000		0	0	0	0
2737	La Salle Ave	VCP	8	342.1	No		4235		4	2	3	5	1200		1	2	0	0
2739	170th St	VCP	8	67	No		0000		0	0	0	0	0000		0	0	0	0
2741	La Salle Ave	VCP	8	112	No		4200		4	2	0	0	0000		0	0	0	0
2743	170th St	VCP	8	188.1	No		0000		0	0	0	0	0000		0	0	0	0
2745	Harvard Blvd	VCP	8	349	No		0000		0	0	0	0	3129		3	1	2	9
2747	172nd Pl	VCP	8	254.9	No		3122		3	1	2	2	1500		1	5	0	0
2749	Denker Ave	CP Lined	8	330.5	No			0000	0	0	0	0		3700	3	7	0	0
2751	Denker Ave	CP Lined	8	331.3	No			3300	3	3	0	0		3700	3	7	0	0
2753	Denker Ave	CP Lined	8	351.8	No					0		0				0		0
2755	Denker Ave	CP Lined	8	309.1	No					0		0				0		0
2757	Harvard Blvd	VCP	8	348	No		4J31		4	J	3	1	1300		1	3	0	0
2759	La Salle Ave	VCP	8	343.1	No		2500		2	5	0	0	2A00		2	A	0	0
2761	Dalton Ave	CP Lined	8	266	No			2100	2	1	0	0		3100	3	1	0	0
2763	Halldale Ave	CP Lined	8	189.4	No			0000	0	0	0	0		0000	0	0	0	0
2765	168th St	VCP	8	174.2	No		4234		4	2	3	4	0000		0	0	0	0
2767	168th St	VCP	8	92.1	No		0000		0	0	0	0	0000		0	0	0	0
2769	170th St	CP	8	290	No					0		0				0		0
2771	Dalton Ave	CP Lined	8	329.3	No			0000	0	0	0	0		2100	2	1	0	0
2773	170th St	CP Lined	8	314	No			2200	2	2	0	0		1100	1	1	0	0
2775	Brighton Way	VCP	8	301.8	No		3726		3	7	2	6	312J		3	1	2	J
2777	169th St	VCP	8	135.2	No					0		0				0		0
2779	Halldale Ave	CP Lined	8	76.7	No			0000	0	0	0	0		0000	0	0	0	0
2781	Halldale Ave	CP Lined	8	268.3	No			3100	3	1	0	0		4135	4	1	3	5
2783	Dalton Ave	CP Lined	8	270.7	No			3100	3	1	0	0		0000	0	0	0	0
2785	Brighton Ave	VCP	8	86	No					0		0				0		0
2785A	Brighton Way	VCP	8	293.3	No		3123		3	1	2	3	2J14		2	J	1	4
2787	Halldale Ave	CP Lined	8	324.7	No			2400	2	4	0	0		1200	1	2	0	0
2789	Halldale Ave	CP Lined	8	322.8	No			2B00	2	B	0	0		0000	0	0	0	0
2791	Dalton Ave	CP Lined	8	325.7	No			3500	3	5	0	0		3100	3	1	0	0
2793	170th St	VCP	8	336.1	No		2100		2	1	0	0	0000		0	0	0	0
2795	Dalton Ave	CP Lined	8	333.5	No			3800	3	8	0	0		3200	3	2	0	0
2797	Halldale Ave	VCP	8	312	No		3100		3	1	0	0	0000		0	0	0	0
2799	Halldale Ave	VCP	8	342	No		3300		3	3	0	0	0000		0	0	0	0
2801	173rd St	VCP	8	290	No		4400		4	4	0	0	2I00		2	I	0	0
2803	173rd St	VCP	8	350.1	No		4231		4	2	3	1	2713		2	7	1	3
2805	173rd St	VCP	8	350.1	No		4532		4	5	3	2	2900		2	9	0	0
2807	172nd St	VCP	8	272.01	No		4136		4	1	3	6	0000		0	0	0	0
2809	Brighton Way	VCP	8	257.4	No		423G		4	2	3	G	2300		2	3	0	0
2811	171st St	VCP	8	253	No		4A33		4	A	3	3	0000		0	0	0	0
2813	Alley S/O 170th St	VCP	8	351	No		3928		3	9	2	8	1200		1	2	0	0
2815	Brighton Way	VCP	8	107	No		1100		1	1	0	0	2200		2	2	0	0
2817	Brighton Way	VCP	8	159.3	No		0000		0	0	0	0	2B00		2	B	0	0
2819	171st St	VCP	8	246	No		3100		3	1	0	0	1200		1	2	0	0
2821	Alley S/O 170th St	VCP	8	346	No		4123		4	1	2	3	1100		1	1	0	0
2823	171st St	VCP	8	246	No		0000		0	0	0	0	0000		0	0	0	0

Pipe ID	Location	Material	Diameter (in)	Verified Length (ft)	Capacity Improvement	Capacity Project Number	Structural Inpsection						O&M Inspection					
							2019 Structural Quick Rating	2022 Structural Quick Rating	Maximum Severity Grade	Occurrences of Max Severity Grade[1]	Next Highest Severity	Occurrences of Next Highest Severity	2019 O&M Quick Rating	2022 O&M Quick Rating	Maximum Severity Grade	Occurrences of Max Severity Grade[1]	Next Highest Severity	Occurrences of Next Highest Severity
2825	172nd St	VCP	8	271.1	No		4131		4	1	3	1	0000		0	0	0	0
2827	172nd St	VCPX	8	277.6	No		3423		3	4	2	3	0000		0	0	0	0
2829	Dalton Ave	CP Lined	8	330.6	No					0		0				0		0
2831	Dalton Ave	CP Lined	8	333.1	No					0		0				0		0
2833	Dalton Ave	CP Lined	8	330.1	No			3100	3	1	0	0		3200	3	2	0	0
2835	Brighton Way	VCP	8	167.1	No		4100		4	1	0	0	0000		0	0	0	0
2837	169th St	VCP	8	260.9	No		4131		4	1	3	1	0000		0	0	0	0
2837R	169th St	VCP	8	3.1	No					0		0				0		0
2839	Brighton Ave	VCP	8	42.3	No		0000		0	0	0	0	0000		0	0	0	0
2841	166th St	VCP	8	340.1	No		1200		1	2	0	0	0000		0	0	0	0
2843	166th St	VCP	8	24	No		4100		4	1	0	0	0000		0	0	0	0
2847	Brighton Way	VCP	8	251.5	No		4139		4	1	3	9	3500		3	5	0	0
2849	173rd St	VCP	8	199	No		2B11		2	B	1	1	2300		2	3	0	0
2851	173rd St	VCP	8	206.1	No		4A24		4	A	2	4	1100		1	1	0	0
2853	Mariposa Ave	VCP	8	323	No		4326		4	3	2	6	0000		0	0	0	0
2855	168th St	CP Lined	8	223	No			0000	0	0	0	0		0000	0	0	0	0
2857	Mayflower Cr	VCP	8	242	No		0000		0	0	0	0	0000		0	0	0	0
2859	169th Pl	VCP	8	206	No		0000		0	0	0	0	0000		0	0	0	0
2861	169th Pl R/W	VCP	8	101.2	No		0000		0	0	0	0	0000		0	0	0	0
2863	169th Pl	VCP	8	206.1	No		2700		2	7	0	0	0000		0	0	0	0
2865	Mariposa Ave	VCP	8	330	No		0000		0	0	0	0	0000		0	0	0	0
2867	168th St	VCP	8	294.1	No		514I		5	1	4	I	221A		2	2	1	A
2869	168th St	CP Lined	8	336	No			0000	0	0	0	0		0000	0	0	0	0
2871	168th St	CP Lined	8	335	No			0000	0	0	0	0		3100	3	1	0	0
2873	Berendo Ave	CP Lined	12	229	No			0000	0	0	0	0		0000	0	0	0	0
2875	168th St	CP Lined	8	335	No			2200	2	2	0	0		0000	0	0	0	0
2877	168th St	CP Lined	8	335	No			0000	0	0	0	0		3221	3	2	2	1
2879	Berendo Ave	CP Lined	12	128	No			0000	0	0	0	0		0000	0	0	0	0
2883	Raymond Pl	VCP	8	354.2	No		3311		3	3	1	1	2800		2	8	0	0
2885	Steven St	VCP	8	304.2	No		0000		0	0	0	0	0000		0	0	0	0
2887	Komori Cir.	VCP	8	231.3	No		0000		0	0	0	0	0000		0	0	0	0
2889	Steven St	VCP	8	302.5	No		2300		2	3	0	0	0000		0	0	0	0
2891	Komori Cir.	VCP	8	148	No		2200		2	2	0	0	0000		0	0	0	0
2893	Raymond Pl	VCP	8	354.4	No		3223		3	2	2	3	0000		0	0	0	0
2895	170th St	VCP	8	71.7	No		0000		0	0	0	0	0000		0	0	0	0
2897	Raymond Pl	VCP	8	327.6	No		3122		3	1	2	2	0000		0	0	0	0
2899	Berendo Ave	VCP	8	186.1	No		4131		4	1	3	1	0000		0	0	0	0
2901	Catalina Ave	VCP	8	236.1	No		3321		3	3	2	1	1100		1	1	0	0
2903	Raymond Pl	VCP	8	320.2	No		4332		4	3	3	2	0000		0	0	0	0
2905	Budlong Ave	VCP	8	301	No		4121		4	1	2	1	1D00		1	D	0	0
2907	Catalina Ave	VCP	8	231.1	No		4131		4	1	3	1	0000		0	0	0	0
2909	South Park Ln	VCP	8	64.1	No		2300		2	3	0	0	2100		2	1	0	0
2909A	South Park Ln	VCP	8	49	No		0000		0	0	0	0	0000		0	0	0	0
2911	South Park Ln	VCP	8	241.6	No		312B		3	1	2	B	0000		0	0	0	0
2913/2917	South Park Ln	VCP	8	447.1	No					0		0				0		0
2915	170th St	VCP	8	170	No		0000		0	0	0	0	0000		0	0	0	0
2919	Raymond Ave	VCP	8	84.2	No		4232		4	2	3	2	0000		0	0	0	0
2923	Budlong Ave	VCP	8	301	No		4100		4	1	0	0	0000		0	0	0	0
2925	Budlong Ave	VCP	8	107	No		3100		3	1	0	0	0000		0	0	0	0

Pipe ID	Location	Material	Diameter (in)	Verified Length (ft)	Capacity Improvement	Capacity Project Number	Structural Inpsection						O&M Inspection					
							2019 Structural Quick Rating	2022 Structural Quick Rating	Maximum Severity Grade	Occurrences of Max Severity Grade[1]	Next Highest Severity	Occurrences of Next Highest Severity	2019 O&M Quick Rating	2022 O&M Quick Rating	Maximum Severity Grade	Occurrences of Max Severity Grade[1]	Next Highest Severity	Occurrences of Next Highest Severity
2927	Raymond Ave	VCP	8	321.2	No		453A		4	5	3	A	0000		0	0	0	0
2929	Raymond Pl	VCP	8	332.5	No		3100		3	1	0	0	1100		1	1	0	0
2931	Berendo Ave	VCP	8	252	No		3121		3	1	2	1	0000		0	0	0	0
2933	Catalina Ave	VCP	8	254.6	No		3123		3	1	2	3	0000		0	0	0	0
2935	New Hampshire Ave	VCP	8	305.1	No		3100		3	1	0	0	2G00		2	G	0	0
2937	New Hampshire Ave	VCP	8	90.2	No		2500		2	5	0	0	0000		0	0	0	0
2939	New Hampshire Ave	VCP	8	90.8	No		4132		4	1	3	2	0000		0	0	0	0
2941	New Hampshire Ave	VCP	8	301.1	No		4338		4	3	3	8	0000		0	0	0	0
2943	170th St	CP Lined	8	324	No			3600	3	6	0	0		0000	0	0	0	0
2945	170th St	VCP	8	306	No		4K3K		4	K	3	K	0000		0	0	0	0
2947	Vermont Ave	VCP	8	265.1	No		3100		3	1	0	0	0000		0	0	0	0
2949	Vermont Ave	VCP	8	267	No		0000		0	0	0	0	1200		1	2	0	0
2951	Vermont Ave	VCP	8	267.1	No		2500		2	5	0	0	2100		2	1	0	0
2953	167th St	CP Lined	8	315	No			3100	3	1	0	0		0000	0	0	0	0
2955	167th St	CP Lined	8	200	No					0		0				0		0
2957	New Hampshire Ave	VCP	8	304.2	No		4436		4	4	3	6	1100		1	1	0	0
2959	Vermont Ave	VCP	8	250.4	No		3121		3	1	2	1	2I00		2	I	0	0
2961	Vermont Ave	VCP	8	253.3	No		4134		4	1	3	4	2H00		2	H	0	0
2965	Vermont Ave	VCP	8	224	No		2100		2	1	0	0	412A		4	1	2	A
2973	Vermont Ave	VCP	8	332.1	No		3100		3	1	0	0	2B00		2	B	0	0
2979	Cassidy St	VCP	8	116	No		4B28		4	B	2	8	1600		1	6	0	0
2985	Cassidy St	VCP	8	117	No		4124		4	1	2	4	4115		4	1	1	5
2987	Cassidy St	VCP	8	318	No		4K24		4	K	2	4	1700		1	7	0	0
2989	Cassidy St	VCP	8	304	No		4A32		4	A	3	2	412E		4	1	2	E
2991	Broadwell Ave	VCP	8	146.4	No		4131		4	1	3	1	3100		3	1	0	0
2993	Esmnt. W/O Boradwell	VCP	8	272.4	No		2G00		2	G	0	0	1200		1	2	0	0
2995	Esmnt. W/O Berendo	VCP	8	323.3	No					0		0				0		0
2997	Esmnt. W/O Berendo	VCP	8		No					0		0				0		0
2999	Esmnt. W/O Catalina	VCP	8	310.3	No		2312		2	3	1	2	1A00		1	A	0	0
3001	Budlong Ave	VCP	8	256.7	No					0		0				0		0
3003	Valmeyer Ave	VCP	8	203	No		2400		2	4	0	0	0000		0	0	0	0
3007	Normandie Ave	VCP	8	177	Existing Improvement	P-15				0		0				0		0
3009	Cassidy St	VCP	8	241	No		5142		5	1	4	2	0000		0	0	0	0
3011	Cassidy St	VCP	8	134	No		3222		3	2	2	2	0000		0	0	0	0
3013	Cassidy St	VCP	8	224.6	No		5341		5	3	4	1	0000		0	0	0	0
3015	Cassidy St	VCP	8	143.1	No		5131		5	1	3	1	0000		0	0	0	0
3017	Cassidy St	VCP	8	250	No		4331		4	3	3	1	2A11		2	A	1	1
3019	Cassidy St	VCP	8	237.1	No		0000		0	0	0	0	0000		0	0	0	0
3021	Cassidy St	VCP	8	204	No		4127		4	1	2	7	0000		0	0	0	0
3023	Esmnt. S/O Artesia	VCP	8		No					0		0				0		0
3025	Normandie Ave	VCP	8	50	Existing Improvement	P-15				0		0				0		0
3027	177th St	VCP	8	320.7	Existing Improvement	P-15	4K00		4	K	0	0	0000		0	0	0	0
3029	Normandie Ave	VCP	8	164.2	Existing Improvement	P-15				0		0				0		0
3031	Normandie Ave	VCP	8	12.1	Existing Improvement	P-15				0		0				0		0
3033	177th St	VCP	8	333.2	Existing Improvement	P-15	4J3A		4	J	3	A	0000		0	0	0	0
3035	177th St	VCP	8	213	Existing Improvement	P-15	4E3A		4	E	3	A	0000		0	0	0	0
3037	177th St	VCP	8	298.3	Existing Improvement	P-15	4G35		4	G	3	5	0000		0	0	0	0
3039	177th St	VCP	8	248.1	No		433B		4	3	3	B	0000		0	0	0	0
3041	Budlong Ave	VCP	8	326	No		4L00		4	L	0	0	2500		2	5	0	0

Pipe ID	Location	Material	Diameter (in)	Verified Length (ft)	Capacity Improvement	Capacity Project Number	Structural Inpsection						O&M Inspection					
							2019 Structural Quick Rating	2022 Structural Quick Rating	Maximum Severity Grade	Occurrences of Max Severity Grade[1]	Next Highest Severity	Occurrences of Next Highest Severity	2019 O&M Quick Rating	2022 O&M Quick Rating	Maximum Severity Grade	Occurrences of Max Severity Grade[1]	Next Highest Severity	Occurrences of Next Highest Severity
3043	Budlong Ave	VCP	8	337	No		4K00		4	K	0	0	1F00		1	F	0	0
3045	Budlong Ave	VCP	8	350	No		4L00		4	L	0	0	1H00		1	H	0	0
3047	Esmnt. E/O FELDER ST	VCP	8	139	No					0		0				0		0
3049	Felder St	VCP	8	223.1	No					0		0				0		0
3051	Felder St	VCP	8	295.3	No					0		0				0		0
3053	Felder St	VCP	8	251.8	No					0		0				0		0
3055	Rumbold St	VCP	8	257	No		4H22		4	H	2	2	1300		1	3	0	0
3057	Berendo Ave	VCP	8	183	No					0		0				0		0
3059	Broadwell Ave	VCP	8	183.1	No					0		0				0		0
3061	Felder St	VCP	8	254	No					0		0				0		0
3063	Rumbold St	VCP	8	250.1	No		4H2A		4	H	2	A	1F00		1	F	0	0
3065	Rumbold St	VCP	8	303	No		4I00		4	I	0	0	1B00		1	B	0	0
3067	W. 182nd St	VCP	8	126.2	No					0		0				0		0
3069	W. 182nd St	VCP	8	33	No					0		0				0		0
3071	Alley N/O Vermont	VCP	8	181.5	No					0		0				0		0
3073	Alley N/O Vermont	VCP	8	54.1	No					0		0				0		0
3075	Budlong Ave	VCP	8	178.1	No					0		0				0		0
3077	Alley 182nd St	VCP	8	347	No		4K28		4	K	2	8	1400		1	4	0	0
3079	Alley 182nd St	VCP	8	350	No		4C35		4	C	3	5	2100		2	1	0	0
3081	Alley 182nd St	VCP	8	350	No		4E31		4	E	3	1	0000		0	0	0	0
3083	Alley 182nd St	VCP	8	336.4	No		4433		4	4	3	3	1100		1	1	0	0
3085	Budlong Ave	VCP	8	135	No		0000		0	0	0	0	0000		0	0	0	0
3087	Alley 182nd St	VCP	8	208.2	No		4239		4	2	3	9	0000		0	0	0	0
3089	Alley 182nd St	VCP	8	142.6	No		3211		3	2	1	1	0000		0	0	0	0
3091	Alley 182nd St	VCP	8	351.9	No		413J		4	1	3	J	0000		0	0	0	0
3093	Brighton Way	VCP	8	168.5	No		0000		0	0	0	0	0000		0	0	0	0
3095	Curt Pl	VCP	8	167.8	No		0000		0	0	0	0	0000		0	0	0	0
3097	180th St	VCP	8	283.1	No		2100		2	1	0	0	1100		1	1	0	0
3099	Avery Pl	VCP	8	168.6	No		0000		0	0	0	0	1500		1	5	0	0
3101	Evelyn Ave	VCP	10	293	No		3100		3	1	0	0	0000		0	0	0	0
3103	179th St	VCP	8	303.6	No		0000		0	0	0	0	0000		0	0	0	0
3105	178th St	VCP	10	302.1	No		0000		0	0	0	0	0000		0	0	0	0
3107	178th St	VCP	8	240	No		4132		4	1	3	2	2E00		2	E	0	0
3109	178th St	VCP	8	210	No		4531		4	5	3	1	1300		1	3	0	0
3111	Brighton Way	VCP	8	168.2	No		0000		0	0	0	0	0000		0	0	0	0
3113	180th St	VCP	8	283.1	No		0000		0	0	0	0	1E00		1	E	0	0
3115	Curt Pl	VCP	8	168.7	No		4100		4	1	0	0	0000		0	0	0	0
3117	Avery Pl	VCP	8	168.8	No		0000		0	0	0	0	1900		1	9	0	0
3119	Evelyn Ave	VCP	10	211	No		0000		0	0	0	0	2200		2	2	0	0
3121	179th St	VCP	8	303	No		0000		0	0	0	0	0000		0	0	0	0
3123	179th St	VCP	8	304.6	No		3129		3	1	2	9	0000		0	0	0	0
3125	178th St	VCP	10	297.1	No		0000		0	0	0	0	2E00		2	E	0	0
3127	178th St	VCP	10	144	No		0000		0	0	0	0	2C00		2	C	0	0
3127A	178th St	VCP	10	154	No		0000		0	0	0	0	2C00		2	C	0	0
3129	Evelyn Ave	VCP	10	208	No		0000		0	0	0	0	2E00		2	E	0	0
3131	Dalton Pl	VCP	8	361	No		4600		4	6	0	0	0000		0	0	0	0
3133	180th St	VCP	8	230.1	No		514D		5	1	4	D	2112		2	1	1	2
3135	Dalton Ave	VCP	8	230.1	No		4400		4	4	0	0	0000		0	0	0	0
3137	180th St	VCP	8	104	No		3321		3	3	2	1	0000		0	0	0	0

Pipe ID	Location	Material	Diameter (in)	Verified Length (ft)	Capacity Improvement	Capacity Project Number	Structural Inpsection						O&M Inspection					
							2019 Structural Quick Rating	2022 Structural Quick Rating	Maximum Severity Grade	Occurrences of Max Severity Grade[1]	Next Highest Severity	Occurrences of Next Highest Severity	2019 O&M Quick Rating	2022 O&M Quick Rating	Maximum Severity Grade	Occurrences of Max Severity Grade[1]	Next Highest Severity	Occurrences of Next Highest Severity
3139	Denker Ave	VCP	8	318	No		4111		4	1	1	1	0000		0	0	0	0
3141	Denker Ave	VCP	8	45.1	No		3100		3	1	0	0	0000		0	0	0	0
3143	179th Pl	VCP	8	248	No		514A		5	1	4	A	0000		0	0	0	0
3145	Denker Ave	VCP	8	245	No		4C31		4	C	3	1	1100		1	1	0	0
3147	Dalton Ave	VCP	8	178	No		4331		4	3	3	1	0000		0	0	0	0
3151	179th Pl	VCP	8	267	No		4331		4	3	3	1	0000		0	0	0	0
3153	Denker Ave	VCP	8	172	No		4100		4	1	0	0	0000		0	0	0	0
3157	178th St	VCP	8	176	No		4C32		4	C	3	2	1100		1	1	0	0
3159	Alley E/O La Salle	VCP	8	325.1	No		2B12		2	B	1	2	0000		0	0	0	0
3161	La Salle Ave	VCP	8	317	No		4133		4	1	3	3	0000		0	0	0	0
3163	178th St	VCP	8	37	No		4131		4	1	3	1	0000		0	0	0	0
3165	178th St	VCP	8	174	No		322D		3	2	2	D	0000		0	0	0	0
3167	Alley W/O Denker	VCP	8	327	No		4131		4	1	3	1	2800		2	8	0	0
3169	La Salle Ave	VCP	8	291.4	No		4331		4	3	3	1	0000		0	0	0	0
3171	La Salle Ave	VCP	8	313	No		4431		4	4	3	1	1100		1	1	0	0
3175	Harvard Blvd	VCP	8	293.1	No		4E33		4	E	3	3	1100		1	1	0	0
3177	Hobart Blvd	VCP	8	313.1	No		3225		3	2	2	5	0000		0	0	0	0
3179	Harvard Blvd	VCP	8	290.1	No		4H33		4	H	3	3	2100		2	1	0	0
3181	Hobart Blvd	VCP	8	313	No		4J32		4	J	3	2	0000		0	0	0	0
3183	Hobart Blvd	VCP	8	310	No		4I25		4	I	2	5	2100		2	1	0	0
3185	Hobart Blvd	VCP	8	318	No		4I35		4	I	3	5	0000		0	0	0	0
3187	Alley E/O Western	VCP	8	150.4	No					0		0				0		0
3187A	Alley E/O Western	VCP	8	122.5	No					0		0				0		0
3191	Alley E/O Western	VCP	8	284.3	No					0		0				0		0
3199	Chaner Ave. R/W	VCP	8	260.1	No		0000		0	0	0	0	2119		2	1	1	9
3201	Chaner Ave. R/W	VCP	8	300.7	No		412A		4	1	2	A	3213		3	2	1	3
3203	Chaner Ave. R/W	VCP	8	299.2	No		2A00		2	A	0	0	2D11		2	D	1	1
3205	Atkinson Ave.	VCP	8	343.1	No		2K00		2	K	0	0	2G00		2	G	0	0
3207	Atkinson Ave.	VCP	8	340.2	No		312L		3	1	2	L	2F00		2	F	0	0
3209	Atkinson Ave.	VCP	8	343.1	No		332L		3	3	2	L	2D1D		2	D	1	D
3211	Atkinson Ave.	VCP	8	110.6	No		2C00		2	C	0	0	0000		0	0	0	0
3213	R/W 154th St.	VCP	8	145.8	No		2500		2	5	0	0	0000		0	0	0	0
3215	Easement N/O 152N	VCP	8	278.8	No		412A		4	1	2	A	2I16		2	I	1	6
3217	Easement N/O 152N	VCP	8	277.9	No		3129		3	1	2	9	2B1A		2	B	1	A
3219	Easement N/O 152N	VCP	8	277.7	No		3227		3	2	2	7	2G1A		2	G	1	A
3221	Easement N/O 152N	VCP	8	281.1	No		312B		3	1	2	B	2I1D		2	I	1	D
3223	Ardath Ave. R/W	VCP	8	33.8	No		0000		0	0	0	0	2400		2	4	0	0
3225	Ardath Ave. R/W	VCP	8	301	No					0		0				0		0
3227	Esmnt. E/O Chaner	VCP	8	298.3	No					0		0				0		0
3229	Wilkie Ave. R/W	VCP	8	261.4	No		0000		0	0	0	0	2A19		2	A	1	9
3231	Wilkie Ave. R/W	VCP	8	301.2	No		2900		2	9	0	0	3119		3	1	1	9
3233	Wilkie Ave. R/W	VCP	8	297	No		2900		2	9	0	0	1600		1	6	0	0
3235	Casimir Ave. R/W	VCP	8	257	No		312A		3	1	2	A	221E		2	2	1	E
3237	Casimir Ave. R/W	VCP	8	301.4	No					0		0				0		0
3239	Esmnt. W/O Casimir	VCP	8	304.5	No					0		0				0		0
3241	154th St. R/W	VCP	8	264.3	No					0		0				0		0
3243	Esmnt. N/O 154th St.	VCP	8	263.2	No		2800		2	8	0	0	0000		0	0	0	0
3245	Esmnt. N/O 154th St.	VCP	8	264.2	No		0000		0	0	0	0	0000		0	0	0	0
3247	Esmnt. W/O 154th St.	VCP	8	251.7	No		3B2C		3	B	2	C	2B1B		2	B	1	B

Pipe ID	Location	Material	Diameter (in)	Verified Length (ft)	Capacity Improvement	Capacity Project Number	Structural Inpsection						O&M Inspection					
							2019 Structural Quick Rating	2022 Structural Quick Rating	Maximum Severity Grade	Occurrences of Max Severity Grade[1]	Next Highest Severity	Occurrences of Next Highest Severity	2019 O&M Quick Rating	2022 O&M Quick Rating	Maximum Severity Grade	Occurrences of Max Severity Grade[1]	Next Highest Severity	Occurrences of Next Highest Severity
3249	Esmnt. W/O 154th St.	VCP	8	301	No					0		0				0		0
3251	Esmnt. W/O 154th St.	VCP	8	298.7	No		2A00		2	A	0	0	1800		1	8	0	0
3253	Esmnt. N/O 154th St.	VCP	8	272	No		2500		2	5	0	0	1700		1	7	0	0
3255	Wilkie Ave.	VCP	8	172.8	No		4231		4	2	3	1	1700		1	7	0	0
3257	143rd St.	VCP	8	220	No		413B		4	1	3	B	2200		2	2	0	0
3259	143rd St.	VCP	8	268.2	No		5144		5	1	4	4	2413		2	4	1	3
3261	143rd St.	VCP	8	271	No		5145		5	1	4	5	2300		2	3	0	0
3263	144th St.	VCP	8	161.4	No		3E22		3	E	2	2	2A11		2	A	1	1
3265	Wadkins Ave.	VCP	8	350	No		4J22		4	J	2	2	2K00		2	K	0	0
3267	145th St.	VCP	8	262.1	No		4535		4	5	3	5	3321		3	3	2	1
3269	145th St.	VCP	8	266.3	No		423I		4	2	3	I	2212		2	2	1	2
3271	145th St.	VCP	8	266.3	No		4232		4	2	3	2	3122		3	1	2	2
3273	146th St.	VCP	8	265.3	No		453E		4	5	3	E	4131		4	1	3	1
3275	146th St.	VCP	8	264.1	No		443C		4	4	3	C	4231		4	2	3	1
3277	146th St.	VCP	8	264.5	No		3I2A		3	I	2	A	3222		3	2	2	2
3279	Alley E/O Crenshaw	VCP	8	278	No		413I		4	1	3	I	271I		2	7	1	I
3281	Alley E/O Crenshaw	VCP	8	278.2	No		423I		4	2	3	I	211B		2	1	1	B
3283	Alley E/O Crenshaw	VCP	8	276	No		3I29		3	I	2	9	0000		0	0	0	0
3285	Dublin Ave.	VCP	8	351.1	No		4431		4	4	3	1	0000		0	0	0	0
3287	147th St.	VCP	8	265	No		4135		4	1	3	5	2100		2	1	0	0
3289	147th St.	VCP	8	265.7	No		513I		5	1	3	I	2200		2	2	0	0
3291	147th St.	VCP	8	265.7	No		3E21		3	E	2	1	4123		4	1	2	3
3293	Wadkins Ave.	VCP	8	248.1	No		432A		4	3	2	A	4121		4	1	2	1
3295	Dublin Ave.	VCP	8	354	No		4B32		4	B	3	2	1500		1	5	0	0
3297	Van Ness	VCP	8	186.1	No		4131		4	1	3	1	0000		0	0	0	0
3299	Van Ness	VCP	8	303	No		4531		4	5	3	1	1200		1	2	0	0
3303	Van Ness	VCP	8	234.4	No		5142		5	1	4	2	0000		0	0	0	0
3305	Van Ness	VCP	8	253.5	No		4334		4	3	3	4	0000		0	0	0	0
3307	Van Ness	VCP	8	250	No		4136		4	1	3	6	0000		0	0	0	0
3309	Van Ness Ave.	VCP	8	23	No		4300		4	3	0	0	0000		0	0	0	0
3311	Van Ness Ave.	VCP	8	24	No					0		0				0		0
3313	Roxton Ave.	VCP	8	352	No		4E00		4	E	0	0	0000		0	0	0	0
3315	Roxton Ave.	VCP	8	353.1	No		4332		4	3	3	2	0000		0	0	0	0
3317	Purche Ave.	VCP	8	348.1	No		4421		4	4	2	1	0000		0	0	0	0
3319	Purche Ave.	VCP	8	355.2	No		4E33		4	E	3	3	0000		0	0	0	0
3321	Daphne Ave.	VCP	8	348	No		4823		4	8	2	3	1200		1	2	0	0
3323	Daphne Ave.	VCP	8	354	No		4A31		4	A	3	1	0000		0	0	0	0
3325	Spinning Ave.	VCP	8	242.2	No		413E		4	1	3	E	2213		2	2	1	3
3327	Spinning Ave.	VCP	8	242.1	No		3C23		3	C	2	3	0000		0	0	0	0
3329	144th St.	VCP	8	268	No		4234		4	2	3	4	2200		2	2	0	0
3331	144th St.	VCP	8	352.1	No		332B		3	3	2	B	0000		0	0	0	0
3333	144th St.	VCP	8	350.2	No		423B		4	2	3	B	0000		0	0	0	0
3335	144th St.	VCP	8	243.1	No		3E2C		3	E	2	C	0000		0	0	0	0
3337	145th St.	VCP	8	315	No		3A2E		3	A	2	E	2112		2	1	1	2
3339	145th St.	VCP	8	325	No		4339		4	3	3	9	0000		0	0	0	0
3341	145th St.	VCP	8	325.5	No		372C		3	7	2	C	0000		0	0	0	0
3343	Haas Ave.	VCP	8	142	No		0000		0	0	0	0	0000		0	0	0	0
3345	146th St.	VCP	8	325.1	No		4331		4	3	3	1	0000		0	0	0	0
3347	146th St.	VCP	8	322.1	No		5246		5	2	4	6	2100		2	1	0	0

Pipe ID	Location	Material	Diameter (in)	Verified Length (ft)	Capacity Improvement	Capacity Project Number	Structural Inpsection						O&M Inspection					
							2019 Structural Quick Rating	2022 Structural Quick Rating	Maximum Severity Grade	Occurrences of Max Severity Grade[1]	Next Highest Severity	Occurrences of Next Highest Severity	2019 O&M Quick Rating	2022 O&M Quick Rating	Maximum Severity Grade	Occurrences of Max Severity Grade[1]	Next Highest Severity	Occurrences of Next Highest Severity
3349	146th St.	VCP	8	320.1	No		4711		4	7	1	1	0000		0	0	0	0
3351	146th St.	VCP	8	351.1	No		4211		4	2	1	1	2900		2	9	0	0
3353	146th St.	VCP	8	351	No		4631		4	6	3	1	0000		0	0	0	0
3355	146th St.	VCP	8	246.1	No		5143		5	1	4	3	1100		1	1	0	0
3357	146th St.	VCP	8	106	No		4331		4	3	3	1	0000		0	0	0	0
3359	146th St.	VCP	8	194.1	No		4331		4	3	3	1	0000		0	0	0	0
3361	Van Ness	VCP	8	300.3	No		4B34		4	B	3	4	1200		1	2	0	0
3363	Haas Ave.	VCP	8	183.1	No		4E22		4	E	2	2	0000		0	0	0	0
3365	Haas Ave.	VCP	8	262	No		514I		5	1	4	I	0000		0	0	0	0
3366	Haas Ave.	VCP	8	111.1	No		514B		5	1	4	B	3112		3	1	1	2
3367	144th St.	VCP	8	29.5	No		4100		4	1	0	0	2500		2	5	0	0
3369	144th St.	VCP	8	87.6	No		4100		4	1	0	0	2400		2	4	0	0
3371	Cimarron Ave.	VCP	8	231.6	No		3221		3	2	2	1	0000		0	0	0	0
3373	Cimarron Ave.	VCP	8	355.3	No		2F00		2	F	0	0	2I00		2	I	0	0
3375	Cimarron	VCP	8	352.2	No		2200		2	2	0	0	0000		0	0	0	0
3377	Cimarron	VCP	8	160.4	No		0000		0	0	0	0	0000		0	0	0	0
3379	Gramercy Pl.	VCP	8	100	No		0000		0	0	0	0	2B00		2	B	0	0
3379R	Gramercy Pl.	VCP	8	80.9	No					0		0				0		0
3381	Gramercy Pl.	VCP	8	351.4	No		2G00		2	G	0	0	2C00		2	C	0	0
3383	Gramercy Pl.	VCP	8	352.6	No		3121		3	1	2	1	0000		0	0	0	0
3385	Gramercy Pl.	VCP	8	162.1	No		0000		0	0	0	0	0000		0	0	0	0
3387	134th St	VCP	8	48.1	No					0		0				0		0
3389	132nd St.	VCP	8	47.1	No		3323		3	3	2	3	2700		2	7	0	0
3393	134th St.	VCP	8	249	No		3121		3	1	2	1	0000		0	0	0	0
3395	Normandie Ave	VCP	8	48	No					0		0				0		0
3399	Rosecrans Ave.	VCP	8	86.7	No					0		0				0		0
3401	Gramercy Pl.	VCP	8	91	No		0000		0	0	0	0	0000		0	0	0	0
3403	Alley E/O Western	VCP	8	126.9	No					0		0				0		0
3407	180th St	VCP	8	151.3	No		4100		4	1	0	0	0000		0	0	0	0
3411	170th St	VCP	8	37.6	No			0000	0	0	0	0		0000	0	0	0	0
3415	Western Ave.	VCP	8	44.1	No					0		0				0		0
3417	158th St.	VCP	8	24.5	No		2600		2	6	0	0	0000		0	0	0	0
3419	158th St.	VCP	8	71	No		2A00		2	A	0	0	0000		0	0	0	0
3421	162nd St.	VCP Lined	8	46.2	No					0		0				0		0
3425	Gardena Blvd	CP Lined	8	151.2	No					0		0				0		0
3427	Gardena Blvd	CP Lined	8	154.5	No					0		0				0		0
3431	Esmnt. E.O Western	CP Lined	8	212	No			3200	3	2	0	0		331A	3	3	1	A
3439	Hobart Blvd	CP Lined	8	212	No			0000	0	0	0	0		2100	2	1	0	0
3443	Redondo. Beach Blvd	VCP	8	51	No		3200		3	2	0	0	0000		0	0	0	0
3447	Evelyn Ave.	VCP	8	156.2	No					0		0				0		0
3449	Evelyn Ave.	VCP	8	12.8	No					0		0				0		0
3455	180th St	VCP	8	216.1	No		4232		4	2	3	2	1100		1	1	0	0
3457	180th St	VCP	8	267.1	No		0000		0	0	0	0	1300		1	3	0	0
3463	Berendo Ave	VCP	8	283.3	No		1I00		1	I	0	0	1100		1	1	0	0
3467	158th St.	VCP	8	247.1	No		2F00		2	F	0	0	0000		0	0	0	0
3469	Marine Ave.	VCP	10	457.1	No		4Q00		4	Q	0	0	3100		3	1	0	0
3471	Marine Ave.	VCP	8	45	No		0000		0	0	0	0	0000		0	0	0	0
3473	Wadkins Ave.	VCP	8	257	No		4C2B		4	C	2	B	0000		0	0	0	0
3475	162nd St.	VCP	8	47	No		0000		0	0	0	0	0000		0	0	0	0

Pipe ID	Location	Material	Diameter (in)	Verified Length (ft)	Capacity Improvement	Capacity Project Number	Structural Inpsection						O&M Inspection					
							2019 Structural Quick Rating	2022 Structural Quick Rating	Maximum Severity Grade	Occurrences of Max Severity Grade[1]	Next Highest Severity	Occurrences of Next Highest Severity	2019 O&M Quick Rating	2022 O&M Quick Rating	Maximum Severity Grade	Occurrences of Max Severity Grade[1]	Next Highest Severity	Occurrences of Next Highest Severity
3477	154th Pl.	VCP	8	292.1	No		3H27		3	H	2	7	1900		1	9	0	0
3477A	155th Pl.	VCP	8	148.1	No		3C2B		3	C	2	B	2113		2	1	1	3
3481	Alley N of 155th S	VCP	8	325	No		4132		4	1	3	2	0000		0	0	0	0
3483	130th St.	VCP	8	205	No		4131		4	1	3	1	0000		0	0	0	0
3485	Berendo Ave	VCP	8	120	No		4300		4	3	0	0	2113		2	1	1	3
3487	Spinning Ave.	VCP	8	242.1	No		4137		4	1	3	7	0000		0	0	0	0
3489	Alley E/O Van Ness	VCP	8	200.1	No		4332		4	3	3	2	0000		0	0	0	0
3491	Alley E/O Van Ness	VCP	8	172	No		3100		3	1	0	0	2113		2	1	1	3
3493	El Segundo Blvd	VCP	8	294.7	No		4I21		4	I	2	1	4131		4	1	3	1
3495	El Segundo Blvd	VCP	8	283.4	No		423G		4	2	3	G	4331		4	3	3	1
3497	132nd St.	VCP	10	311	Future Improvement	P-16	514K		5	1	4	K	0000		0	0	0	0
3499	139th St.	VCP	12		No					0		0				0		0
3501	Redondo. Beach Blvd	VCP	12	94	No					0		0				0		0
3503	149th St.	VCP	8	50.1	No		5121		5	1	2	1	0000		0	0	0	0
3505	Raymond Ave	VCP	8	10	No		0000		0	0	0	0	0000		0	0	0	0
3507	Marine Ave.	VCP	8	332.1	No		3H2C		3	H	2	C	0000		0	0	0	0
3509	Halldale Ave	VCP	8	349.1	No		4234		4	2	3	4	4100		4	1	0	0
3511	Halldale Ave	VCP	8	341	No		4131		4	1	3	1	2F00		2	F	0	0
3513	Halldale Ave	VCP	8	345	No		524G		5	2	4	G	2K00		2	K	0	0
3515	Halldale Ave	VCP	8	313.5	No		423B		4	2	3	B	0000		0	0	0	0
3517	Esmnt. W. of Halldale	VCP	8	259	No		0000		0	0	0	0	0000		0	0	0	0
3519	Alma Ave.	VCP	8	295.3	No		3729		3	7	2	9	0000		0	0	0	0
3521	Vermont Ave	VCP	8	21.6	No		0000		0	0	0	0	0000		0	0	0	0
3523	Vermont Ave	VCP	8	286.4	No		0000		0	0	0	0	2500		2	5	0	0
3525	Harvard Ave	VCP	8	300.8	No		0000		0	0	0	0	2J00		2	J	0	0
3527	146th St.	VCP	8	411.7	Existing Improvement	P-8	433O		4	3	3	O	2E00		2	E	0	0
3529	153rd St.	VCP	8	247	No		4733		4	7	3	3	1300		1	3	0	0
3535	158th St.	VCP	8	163	No		2D11		2	D	1	1	0000		0	0	0	0
3537	168th St	CP Lined	8	112	No			0000	0	0	0	0		0000	0	0	0	0
3539	Catalina Ave	VCP	8	346	No		0000		0	0	0	0	0000		0	0	0	0
3541	Mayflower Cr.	VCP	8	242	No		2100		2	1	0	0	0000		0	0	0	0
3545	Western Ave.	VCP	8	273	No		4H00		4	H	0	0	0000		0	0	0	0
3547	Western Ave.	VCP	8	324	No		3G00		3	G	0	0	0000		0	0	0	0
3549	Western Ave.	VCP	8	402	No		4O31		4	O	3	1	0000		0	0	0	0
3551	Western Ave.	VCP	8	472	No		4P21		4	P	2	1	0000		0	0	0	0
3553	Western Ave.	VCP	8	190	No		4127		4	1	2	7	2B00		2	B	0	0
3557	Western Ave.	VCP	8	366	No		4E31		4	E	3	1	4100		4	1	0	0
3559	Western Ave.	VCP	8	248	No		4100		4	1	0	0	0000		0	0	0	0
3561	132nd St.	VCP	8	255	No		3H21		3	H	2	1	2100		2	1	0	0
3563	132nd St.	VCP	8	253	No		413H		4	1	3	H	0000		0	0	0	0
3565	132nd St.	VCP	8	250.1	No		4H00		4	H	0	0	1100		1	1	0	0
3567	132nd St.	VCP	8	254	No		413C		4	1	3	C	0000		0	0	0	0
3569	132nd St.	VCP	8	255	No		413C		4	1	3	C	0000		0	0	0	0
3571	132nd St.	VCP	8	235	No		4233		4	2	3	3	2100		2	1	0	0
3573	134th Pl.	VCP	8	230.1	No		423D		4	2	3	D	0000		0	0	0	0
3575	134th Pl.	VCP	8	254.1	No		433F		4	3	3	F	0000		0	0	0	0
3577	134th Pl.	VCP	8	255	No		413H		4	1	3	H	0000		0	0	0	0
3579	134th Pl.	VCP	8	245.1	No		4H21		4	H	2	1	0000		0	0	0	0
3581	134th Pl.	VCP	8	226.1	No		5342		5	3	4	2	0000		0	0	0	0

Pipe ID	Location	Material	Diameter (in)	Verified Length (ft)	Capacity Improvement	Capacity Project Number	Structural Inpsection						O&M Inspection					
							2019 Structural Quick Rating	2022 Structural Quick Rating	Maximum Severity Grade	Occurrences of Max Severity Grade[1]	Next Highest Severity	Occurrences of Next Highest Severity	2019 O&M Quick Rating	2022 O&M Quick Rating	Maximum Severity Grade	Occurrences of Max Severity Grade[1]	Next Highest Severity	Occurrences of Next Highest Severity
3583	134th Pl.	VCP	8	228.1	No		0000		0	0	0	0	0000		0	0	0	0
3585	166th St	VCP	8	338.1	No		5244		5	2	4	4	2L11		2	L	1	1
3587	166th St	VCP	8	300.7	No		423H		4	2	3	H	2K00		2	K	0	0
3589	166th St	VCP	8	338.1	No		413J		4	1	3	J	2L00		2	L	0	0
3591	Normandie Ave	VCP	8	274	No		4331		4	3	3	1	4100		4	1	0	0
3593	Normandie Ave	VCP	8	277	No		0000		0	0	0	0	1300		1	3	0	0
3595	Normandie Ave	VCP	8	277	No		0000		0	0	0	0	0000		0	0	0	0
3597	Normandie Ave	VCP	8	276	No		1100		1	1	0	0	0000		0	0	0	0
3599	Western Ave.	VCP	10	350	Existing Improvement	P-3	3123		3	1	2	3	1500		1	5	0	0
3601	162nd St.	VCP	8	335.1	No		0000		0	0	0	0	0000		0	0	0	0
3603	162nd St.	VCP	8	327	No		2611		2	6	1	1	0000		0	0	0	0
3605	162nd St.	VCP	8	319	No		2F00		2	F	0	0	0000		0	0	0	0
3607	162nd St.	VCP	8	317	No		2B00		2	B	0	0	0000		0	0	0	0
3609	162nd St.	VCP	8	287.2	Existing Improvement	P-12B	0000		0	0	0	0	0000		0	0	0	0
3611	162nd St.	VCP	8	192.05	No					0		0				0		0
3613	162nd St.	VCP	8	192.15	No					0		0				0		0
3615	162nd St.	VCP	8	192.25	No					0		0				0		0
3617	162nd St.	CP Lined	8	189.72	No					0		0				0		0
3619	162nd St.	VCP	8	140.1	No		514B		5	1	4	B	2B00		2	B	0	0
3623	162nd St.	VCP	8	117.4	No		0000		0	0	0	0	0000		0	0	0	0
3625	162nd St.	VCP	8	328.3	No		2A00		2	A	0	0	0000		0	0	0	0
3627	162nd St.	VCP	8	323.7	No		2400		2	4	0	0	0000		0	0	0	0
3629	162nd St.	VCP	8	316	No		0000		0	0	0	0	0000		0	0	0	0
3631	Western Ave.	VCP	10	48	No					0		0				0		0
3633	162nd St.	VCP Lined	8	65.4	No					0		0				0		0
3635	162nd St.	VCP Lined	8	225.7	No					0		0				0		0
3637	162nd St.	CP Lined	8	333.4	No					0		0				0		0
3639	162nd St.	CP Lined	8	345.4	No					0		0				0		0
3641	162nd St.	VCP	8	115.1	No		0000		0	0	0	0	0000		0	0	0	0
3647	Ardath Ave.	VCP	8	235	No		4135		4	1	3	5	0000		0	0	0	0
3649	132nd St.	VCP	8	223	No		413F		4	1	3	F	1300		1	3	0	0
3651	132nd St.	VCP	8	244	No		3G21		3	G	2	1	0000		0	0	0	0
3653	145th St.	VCP	8	300.1	No		413F		4	1	3	F	4100		4	1	0	0
3655	145th St.	VCP	8	333	No		413A		4	1	3	A	2C00		2	C	0	0
3657	Marine Ave.	VCP	8	20.1	No					0		0				0		0
3659	Redondo. Beach Blvd	VCP	8	98.3	No		0000		0	0	0	0	2200		2	2	0	0
3661	Atkinson Ave.	VCP	8		No					0		0				0		0
3663	Esmnt. W. of Atkinson	VCP	8	202.6	No		2900		2	9	0	0	0000		0	0	0	0
3665	Budlong Ave	VCP	8	235	No		1C00		1	C	0	0	1100		1	1	0	0
3667	Budlong Ave	VCP	8	337	No		0000		0	0	0	0	2113		2	1	1	3
3669	Vermont Ave	VCP	8	307	No		0000		0	0	0	0	0000		0	0	0	0
3671	Vermont Ave	VCP	8	322	No		0000		0	0	0	0	2100		2	1	0	0
3673	Evelyn Ave.	VCP	8	346	No		2D00		2	D	0	0	0000		0	0	0	0
3675	Denker Ave	VCP	8	312	No		4A32		4	A	3	2	0000		0	0	0	0
3677	LaSalle Av.	VCP	8	289	No		4B35		4	B	3	5	0000		0	0	0	0
3679	Catalina Ave	VCP	8	186	No		2B00		2	B	0	0	2100		2	1	0	0
3687	155th St	VCP	8	156	No		4131		4	1	3	1	0000		0	0	0	0
3689	Magnolia Ave	VCP	8	76	No		0000		0	0	0	0	0000		0	0	0	0
3691	Magnolia Ave	VCP	8	276.1	No		0000		0	0	0	0	0000		0	0	0	0

Pipe ID	Location	Material	Diameter (in)	Verified Length (ft)	Capacity Improvement	Capacity Project Number	Structural Inpsection						O&M Inspection					
							2019 Structural Quick Rating	2022 Structural Quick Rating	Maximum Severity Grade	Occurrences of Max Severity Grade[1]	Next Highest Severity	Occurrences of Next Highest Severity	2019 O&M Quick Rating	2022 O&M Quick Rating	Maximum Severity Grade	Occurrences of Max Severity Grade[1]	Next Highest Severity	Occurrences of Next Highest Severity
3693	Western Ave.	VCP	8	144.1	No		4B00		4	B	0	0	0000		0	0	0	0
3695	149th St.	VCP	8	291.5	No		0000		0	0	0	0	0000		0	0	0	0
3701	Van Ness Ave.	VCP	8	298.1	No		514J		5	1	4	J	2200		2	2	0	0
3703	Van Ness Ave.	VCP	8	301	No		4J32		4	J	3	2	2100		2	1	0	0
3705	Van Ness Ave.	VCP	8	300	No		4J00		4	J	0	0	0000		0	0	0	0
3707	Van Ness Ave.	VCP	8	299	No		514J		5	1	4	J	0000		0	0	0	0
3715	Van Ness Ave.	VCP	8	311	No		2700		2	7	0	0	1300		1	3	0	0
3717	Van Ness Ave.	VCP	8	313	No		4123		4	1	2	3	0000		0	0	0	0
3719	Van Ness Ave.	VCP	8	310	No		2100		2	1	0	0	2100		2	1	0	0
3721	Van Ness Ave.	VCP	8	307.3	No		3121		3	1	2	1	0000		0	0	0	0
3723	Wilton Pl	VCP	8	299	No		4J00		4	J	0	0	0000		0	0	0	0
3725	132nd St.	VCP	8	257	Future Improvement	P-16	3I2A		3	I	2	A	0000		0	0	0	0
3727	149th St.	VCP	8	261	No		0000		0	0	0	0	2200		2	2	0	0
3751	148th St.	VCP	8	291	No		514I		5	1	4	I	4100		4	1	0	0
3753	Steven St. R/W	VCP	8	180.1	No		0000		0	0	0	0	2E00		2	E	0	0
3755	Denker Ave	VCP	10	310	No		2200		2	2	0	0	2K00		2	K	0	0
3757	Marine Ave.	VCP	8	241	No		4132		4	1	3	2	0000		0	0	0	0
3759	Marine Ave.	VCP	8	241	No		352A		3	5	2	A	0000		0	0	0	0
3761	Marine Ave.	VCP	8	238.1	No		4132		4	1	3	2	0000		0	0	0	0
3763	Marine Ave.	VCP	8	264.1	No		5142		5	1	4	2	2100		2	1	0	0
3765	Marine Ave.	VCP	8	261.1	No		2200		2	2	0	0	0000		0	0	0	0
3769	Denker Ave	VCP Lined	8	23.7	No			0000	0	0	0	0		3500	3	5	0	0
3773	Normandie Ave	VCP	8	273.1	Existing Improvement	P-15				0		0				0		0
3775	El Segundo Blvd	VCP	8	321.2	No		514C		5	1	4	C	4327		4	3	2	7
3777	El Segundo Blvd	VCP	8	321.3	No		524L		5	2	4	L	4134		4	1	3	4
3779	El Segundo	VCP	8	321.3	No		514J		5	1	4	J	4333		4	3	3	3
3781	El Segundo	VCP	8	321.3	No		514K		5	1	4	K	4331		4	3	3	1
3783	El Segundo Blvd	VCP	8	207.5	No		4D3B		4	D	3	B	4331		4	3	3	1
3785	El Segundo	VCP	8	296.5	No		423I		4	2	3	I	4333		4	3	3	3
3787	El Segundo	VCP	8	200.3	No		4732		4	7	3	2	2A11		2	A	1	1
3789	El Segundo	VCP	8	49.1	No		4231		4	2	3	1	2300		2	3	0	0
4000	Manhattan Pl.	VCP	8	97	Existing Improvement	P-12B	2500		2	5	0	0	0000		0	0	0	0
4001	Manhattan Pl.	VCP	8	315	Existing Improvement	P-12B	2A00		2	A	0	0	0000		0	0	0	0
4002	Manhattan Pl.	VCP	8	251	Existing Improvement	P-12B	2E00		2	E	0	0	0000		0	0	0	0
4002A	Manhattan Pl.	VCP	8	66	Existing Improvement	P-12B	4A00		4	A	0	0	4100		4	1	0	0
4003	Manhattan Pl.	VCP	8	316.1	Existing Improvement	P-12B	322H		3	2	2	H	4111		4	1	1	1
4004	Manhattan Pl.	VCP	8	260	Existing Improvement	P-12B	522C		5	2	2	C	0000		0	0	0	0
4005	Manhattan Pl.	CP Lined	8	285	No			0000	0	0	0	0		0000	0	0	0	0
4007	Manhattan Pl.	VCP	8	335.1	No		2511		2	5	1	1	0000		0	0	0	0
4008	Manhattan Pl.	VCP	8	348	No		0000		0	0	0	0	0000		0	0	0	0
5001	Harvard Blvd	VCP	8	302.1	No		3100		3	1	0	0	0000		0	0	0	0
5001R	Harvard Blvd	VCP	8	9.5	No					0		0				0		0
5002	Harvard Blvd	VCP	8	317	No		4H31		4	H	3	1	0000		0	0	0	0
5003	169th Pl	VCP	8	67.5	No		0000		0	0	0	0	0000		0	0	0	0
5004	169th Pl	VCP	8	131.8	No		0000		0	0	0	0	0000		0	0	0	0
5005	LaSalle Av.	VCP	8	137.3	No		0000		0	0	0	0	0000		0	0	0	0
5008	St Andrews Pl.	VCP	8		No					0		0				0		0
5011	Van Ness Ave	VCP	10	74	No		3300		3	3	0	0	0000		0	0	0	0
5012	Van Ness Ave.	VCP	10	214	No		4131		4	1	3	1	0000		0	0	0	0

Pipe ID	Location	Material	Diameter (in)	Verified Length (ft)	Capacity Improvement	Capacity Project Number	Structural Inpsection						O&M Inspection					
							2019 Structural Quick Rating	2022 Structural Quick Rating	Maximum Severity Grade	Occurrences of Max Severity Grade[1]	Next Highest Severity	Occurrences of Next Highest Severity	2019 O&M Quick Rating	2022 O&M Quick Rating	Maximum Severity Grade	Occurrences of Max Severity Grade[1]	Next Highest Severity	Occurrences of Next Highest Severity
5014	Cassidy St/Normandie	VCP	8	26.2	No					0		0				0		0
5015	Esmnt W. of Hobart Bd	VCP	8	160.7	No					0		0				0		0
5016	139th St.	VCP	8	2.1	No					0		0				0		0
5018	Esmnt No. of Teton St	VCP	8	125	No		0000		0	0	0	0	0000		0	0	0	0
5019	Alley s/o Marine w/o Gramercy	VCP	8	63.5	No		0000		0	0	0	0	0000		0	0	0	0
5020	168th St	CP	8	215.2	No					0		0				0		0
5021	169th Pl	VCP	8	64.8	No		1100		1	1	0	0	0000		0	0	0	0
5022	Raymond Place	VCP	8	73.2	No		0000		0	0	0	0	0000		0	0	0	0
5023	180th St	VCP	8	308	No		514I		5	1	4	I	0000		0	0	0	0
5024	Normandie Ave	VCP	8	266.9	No		4135		4	1	3	5	0000		0	0	0	0
5025	Normandie Ave	VCP	8	266.8	No		382B		3	8	2	B	1100		1	1	0	0
5026	Normandie Ave	VCP	8	332.2	No		2B00		2	B	0	0	0000		0	0	0	0
5027	Normandie Ave	VCP	8	332	No		4631		4	6	3	1	0000		0	0	0	0
5028	Normandie Ave	VCP	8	331	No		4F35		4	F	3	5	0000		0	0	0	0
5029	Normandie Ave	VCP	8	331.1	No		4J2I		4	J	2	I	1100		1	1	0	0
5030	Normandie Ave	VCP	8	175.3	No		3D21		3	D	2	1	1200		1	2	0	0
5031	Normandie Ave	VCP	8	231.1	No		3D2G		3	D	2	G	0000		0	0	0	0
5032	Normandie Ave	VCP	8	193	Future Improvement	P-17	413D		4	1	3	D	0000		0	0	0	0
5033	Normandie Ave	VCP	8	292.5	Future Improvement	P-17	3H2J		3	H	2	J	0000		0	0	0	0
5034	Normandie Ave	VCP	8	177.1	Existing Improvement	P-14	3E2D		3	E	2	D	0000		0	0	0	0
5035	Normandie Ave	VCP	8	285.1	Existing Improvement	P-14	5141		5	1	4	1	0000		0	0	0	0
5035A	Normandie Ave	VCP	8	65.5	Existing Improvement	P-14	4137		4	1	3	7	0000		0	0	0	0
5036	Normandie Ave	VCP	8	150	Existing Improvement	P-14	3D2A		3	D	2	A	0000		0	0	0	0
5037	El Segundo	VCP	8	3	No		0000		0	0	0	0	5200		5	2	0	0
5038	Ardath Ave.	VCP	8	89.1	No					0		0				0		0
5039	154th Pl.	VCP	8	47.1	No					0		0				0		0
5040	154th Pl.	VCP	8	88.1	No					0		0				0		0
5042	166th St	VCP	8	341.1	No		2711		2	7	1	1	0000		0	0	0	0
5044	Vermont Ave	VCP	8	158.1	No		0000		0	0	0	0	0000		0	0	0	0
5046	Denker Ave	VCP	10	41	No		0000		0	0	0	0	4126		4	1	2	6
5048	Budlong Pl	VCP	8	52.2	No		0000		0	0	0	0	0000		0	0	0	0
6000	Easement Catalina-Budlong	VCP	8	322.7	No		4G38		4	G	3	8	4323		4	3	2	3
6003	141st St	VCP	8	83.9	No		0000		0	0	0	0	0000		0	0	0	0
6004	Halldale Ave	VCP	8	26.1	No					0		0				0		0
6004A	Halldale Ave	VCP	8	85.4	No					0		0				0		0
6005	Gramercy Pl	VCP	8	316.9	No		1200		1	2	0	0	1100		1	1	0	0
6006	144th St	VCP	8	214	No		3D2D		3	D	2	D	0000		0	0	0	0
6007	144th St	VCP	8	75	No		2800		2	8	0	0	0000		0	0	0	0
6008	144th St	VCP	8	96.1	No		4126		4	1	2	6	2100		2	1	0	0
6009	Rosecrans Ave	VCP	12	387.1	No					0		0				0		0
6010	Rosecrans Ave	VCP	12	401.2	No					0		0				0		0
6011	Rosecrans Ave	VCP	12	355.1	No					0		0				0		0
6012	Rosecrans Ave	VCP	12	66	No					0		0				0		0
6013	Alley W/O Vermont	VCP	8	154.5	Existing Improvement	P-7				0		0				0		0

Notes:
1. Letters represent occurrences above 9 (A = 10 to 14, B = 15 to 19, C = 20 to 24, etc.).

Appendix F

MANHOLE INSPECTION RESULTS

Manhole Number	Street	Inspection Date	Pre-Cleaning	Surfact Type	Access Type	Cover Condition	Cover Size	Number of Vents	Evidence of I/I	Manhole Condition[1]						Survey Comments
										Chimney	Cone	Wall	Bench	Channel	Total Number of Defective Grades	
MH0002U	Steven Ave	7/26/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	Trees near by
MH0013U	129th st and Daphne Ave	5/18/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	Yes	S	S	S	S	S	0	
MH0015U	129th st and Purche Ave	5/18/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	Yes	S	S	S	S	S	0	
MH0017U	129th st and Purche Ave	5/18/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	Steps are corroded
MH0019U	129th st	5/18/22	No Pre-Cleaning	Asphalt	AMH	8	24in	2	No	S	S	S	S	S	0	
MH0021U	129 th st	5/18/22	No Pre-Cleaning	Asphalt	Manhole	8	24in	2	No	S	S	S	S	S	0	
MH0023U	129th st	5/18/22	No Pre-Cleaning	Asphalt	Manhole	8	24	1	No	S	S	S	S	S	0	All good
MH0025U	129th st and Ardath ave	5/18/22	No Pre-Cleaning	Asphalt	Manhole	8	24	1	No	S	S	S	S	S	0	All good
MH0027U	129th St	5/18/22	No Pre-Cleaning	Asphalt	Manhole	8	24	1	No	S	S	S	S	S	0	
MH0029U	129th St	5/18/22	No Pre-Cleaning	crete/Paver	AMH	8	24	1	No	S	S	S	S	S	0	
MH0031U	129th St And Spinning ave	5/18/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0033U	Daphne Ave	5/19/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0035U	Spinning Ave	5/18/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0037U	Spinning Ave	5/18/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	Yes	S	S	S	S	S	0	
MH0039U	DaphneAve	5/19/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0041U	Daphne Ave	5/19/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0043U	Arcturus Ave	5/19/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0045U	Arcturus Ave	5/19/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0047U	Arcturus Ave	5/19/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0049U	Casimir Ave	5/19/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0051U	Casimir Ave	5/19/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0053U	Casimir Ave	5/19/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0055U	Wilkie Ave	5/19/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0057U	Wilkie ave	5/19/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0059U	Wilkie Ave	5/19/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0061U	129th Pl	5/19/22	No Pre-Cleaning	crete/Paver	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0063U	129th St	5/19/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No						0	
MH0065U	130th St	5/19/22	No Pre-Cleaning	crete/Paver	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0067U	130th St	5/19/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0069U	131th st	5/19/22	No Pre-Cleaning	crete/Paver	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0071U	131st st	5/19/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0073U	132th Pl	5/18/22	No Pre-Cleaning	crete/Paver	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0075U	132th Pl	5/18/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
Mh0077U	133rd St	5/18/22	No Pre-Cleaning	crete/Paver	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0079U	133rd St	5/18/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0081U	134th st	5/18/22	No Pre-Cleaning	crete/Paver	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0083U	134th st	5/18/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0085U	Ardath ave and 129th Pl	5/19/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0087U	Ardath ave and 130th st	5/19/22	Not Known	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0089U	Ardath ave	5/18/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0091U	Ardath Ave	5/19/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0095U	Ardath Ave	5/18/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0097U	Ardath st and 133rd St	5/18/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0099U	Ardath Ave and 134th st	5/18/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0101U	Wilkie St	5/18/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0103U	Wilkie St	5/18/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0105U	Wilkie ave	5/18/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0107U	Casimir Ave	5/19/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0109U	Casimir Ave	5/19/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0111U	Casimir Ave	5/19/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0113U	Arcturus Ave	5/18/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	

Manhole Number	Street	Inspection Date	Pre-Cleaning	Surfact Type	Access Type	Cover Condition	Cover Size	Number of Vents	Evidence of I/I	Manhole Condition[1]						Survey Comments
										Chimney	Cone	Wall	Bench	Channel	Total Number of Defective Grades	
MH0115U	Arcturus Ave	5/19/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0117U	Arcturus Ave	5/19/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0119U	Arcturus ave	5/19/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0123U	Spinning Ave	5/18/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	X	S	0	
MH0125U	Spinning Ave	5/18/22	No Pre-Cleaning	Asphalt	Manhole	8	24		No	S	S	S	S	S	0	
MH0127U	Spinning Ave	5/18/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0129U	Spinninng Ave	5/18/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0141U	Van Ness Ave	5/20/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0143U	Van Ness Ave	5/20/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0145U	Van Ness Ave	5/20/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0147U	Cimarron Ave	5/20/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0149U	132nd st and Cimarron Ave	5/20/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0151U	129th st	5/20/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0153U	Haas ave and 129th St	5/20/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0155U	Dalesise Ave	5/20/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0157U	Cimarron Ave	5/20/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0159U	Cimarron Ave	5/20/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0161U	129th st and Daleside Ave	5/20/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0163U	Daleside Ave	5/20/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0165U	Cimarron ave	5/20/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0167U	Haas Ave	5/20/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No					S	0	
MH0169U	Haas Ave	5/20/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0171U	132nd st and Haas Ave	5/20/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0173U	131nd St and Daleside Ave	5/20/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0175U	Daleside Ave	5/20/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	X	S	S	0	
MH0177U	Cimarron Ave	5/20/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0181U	Van Ness Ave	5/20/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0183U	Van Ness Ave	5/20/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0185U	Va n Ness and 132nd st	5/20/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0187U	134th Pl	5/20/22	No Pre-Cleaning	crete/Paver	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0189U	134th Pl	5/20/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0191U	134th Pl	5/20/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0193U	Daphe Ave	5/18/22	No Pre-Cleaning	Grass/Dirt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0195U	135th St	5/27/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0197U	135th St	5/27/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0199U	135th St	5/27/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0201U	135th St	5/27/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0203U	Wilton Pl and 134th Pl	5/23/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0205U	Wilton Pl	5/23/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0207U	Wilton Pl	5/23/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0209U	Wilton Pl	5/23/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0211U	Gramercy Pl	5/23/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0213U	Gramercy Pl	5/23/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0215U	Gramercy Pl	5/23/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0217U	Ruthelen St	5/23/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0219U	Ruthelen St	5/23/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0221U	Ruthelen St	5/23/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0223U	St.Andrews Pl	5/23/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0225U	St.Andrews Pl	5/23/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	X	S	0	
MH0227U	St.Andrews Pl	5/23/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0229U	Manhattan pl	5/23/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	

Manhole Number	Street	Inspection Date	Pre-Cleaning	Surfact Type	Access Type	Cover Condition	Cover Size	Number of Vents	Evidence of I/I	Manhole Condition[1]						Survey Comments
										Chimney	Cone	Wall	Bench	Channel	Total Number of Defective Grades	
MH0231U	Manhattan Pl	5/23/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0233U	Manhattan pl	5/23/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0235U	134th Pl and Gramercy Pl	5/23/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0239U	134th Pl and St Andrews Pl	5/23/22	No Pre-Cleaning	Asphalt	Manhole	8	24""		No	S	S	S	S	S	0	
MH0241U	134th Pl and Ruthelen St	5/23/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0245U	Wilton Pl	5/23/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0247U	Wilton Pl and 129th st	5/23/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0249U	Wilton Pl	5/23/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	D	1	
MH0253U	Gramercy Pl	5/23/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0255U	Gramercy Pl	5/23/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0257U	Gramercy Pl	5/23/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0259U	Ruthelen St	5/23/22	No Pre-Cleaning	Asphalt	Manhole	8	24		No	S	S	S	S	S	0	
MH0261U	Ruthelen St	5/23/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0263U	Ruthelen St	5/23/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0265U	St.Andrews Pl	5/23/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0267U	St.Andrews Pl	5/23/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0269U	St.Andrews Pl	5/23/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0271U	Manhattan Pl	5/23/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0273U	Manhattan Pl	5/23/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	D	S	1	Bench has a hole
MH0275U	Manhattan Pl and 129th St	5/23/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	2 outlets starting points.
MH0277U	132nd St and Ruthelen St	5/23/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0279U	132nd St and Manhattan Pl	5/23/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0281U	St Adrews Pl and 132nd St	5/23/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0285U	129th St and St. Andrews pl	5/23/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0287U	129th st	5/23/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0289U	Wilton Pl	5/20/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0291U	El Segundo Blvd	5/20/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S		S	0	Roots med 20% in the invert from 7-10.
MH0293U	Western Ave	7/5/22	No Pre-Cleaning	crete/Paver	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0295U	132nd st	7/5/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0297U	132nd St and Western Ave	5/23/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0299U	Western ave	7/5/22	No Pre-Cleaning	crete/Paver	Manhole	8	24""	2	No	S	S	S	S	S	0	Roots fine in chimney
MH0301U	Western Ave	7/5/22	No Pre-Cleaning	crete/Paver	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0303U	Western Ave	7/5/22	No Pre-Cleaning	t,Concrete/	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0305U	El Segundo Blvd	5/20/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0307U	El Segundo Blvd	5/20/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0309U	El Segundo	7/15/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0311U	Western Ave	7/5/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0313U	Western Ave	7/5/22	No Pre-Cleaning	crete/Paver	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0315U	Western Ave	7/5/22	No Pre-Cleaning	crete/Paver	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0317U	Western Ave	7/5/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0319U	134rh Pl and Manhattan Pl	5/23/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0321U	135th St	5/27/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	D	S	S	S	S	1	Infiltration stain on chimney
MH0323U	135th St	5/27/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH0325U	St Andres Pl	5/27/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH0327U	St Andrews Pl	5/27/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH0329U	135th St and St Andrews Pl	5/27/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH0331U	135th St and St Andrews Pl	5/27/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0333U	135th St	5/27/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0335U	ESTM W/O Western	5/27/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S		S	S	0	Infiltration stain on walls
MH0337U	Wilton pl	5/27/22	No Pre-Cleaning	crete/Paver	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0351U	Van Ness Ave	5/20/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	

Manhole Number	Street	Inspection Date	Pre-Cleaning	Surfact Type	Access Type	Cover Condition	Cover Size	Number of Vents	Evidence of I/I	Manhole Condition[1]						Survey Comments
										Chimney	Cone	Wall	Bench	Channel	Total Number of Defective Grades	
MH0353U	135th st	5/27/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0355U	139th st	5/25/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0357U	Ardath ave and 139th st	5/24/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0359U	139th st and Wilkie ave	5/24/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0361U	139th st and Casimir Ave	5/24/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0363U	Spinning Ave And 139th St	5/25/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0365U	139th St and Daphne Ave	5/24/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0367U	139th st and Purche Ave	5/24/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	Debris in the invert.
MH0369U	139th St and Arcturus Ave	5/24/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0371U	Ardath ave and 139th st	5/24/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0373U	139th st	5/24/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0375U	Ardath st and 138th st	5/24/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0377U	135th Pl	5/24/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	D	S	S	S	S	1	
MH0379U	136th st	5/24/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	Rebar at the bench
MH0381U	137th St	5/24/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0383U	138th st	5/24/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0385U	139th st	5/24/22	No Pre-Cleaning	crete/Paver	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0387U	Ardath Ave	5/24/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0389U	138th st	5/24/22	No Pre-Cleaning	crete/Paver	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0391U	Ardath ave and 136th st	5/24/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0393U	137th st	5/24/22	No Pre-Cleaning	crete/Paver	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0395U	Ardath ave and 135th St	5/24/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0397U	136th st	5/24/22	No Pre-Cleaning	crete/Paver	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0399U	135th St	5/24/22	No Pre-Cleaning	crete/Paver	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0401U	Wilkie ave	5/24/22	No Pre-Cleaning	Asphalt	Manhole	8	29""	2	No	S	S	S	S	S	0	
MH0403U	Wilkie ave	5/24/22	No Pre-Cleaning	Asphalt	Manhole	8	29""	26	No	S	S	S	S	S	0	
MH0405U	Wilkie Ave	5/24/22	No Pre-Cleaning	Asphalt	Manhole	8	29""	2	No	S	S	S	S	S	0	
MH0407U	Wilkie ave	5/24/22	No Pre-Cleaning	Asphalt	Manhole	8	29""	2	No	S	S	S	S	S	0	
MH0409U	Casimir Ave	5/24/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0411U	Casimir Ave	5/24/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0413U	Casimir Ave	5/24/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0415U	Casimir Ave	5/24/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0417U	Arcturus Ave	5/24/22	No Pre-Cleaning	Asphalt	Manhole	8	29""	2	No	S	S	S	S	S	0	
MH0419U	Arcturus Ave	5/24/22	No Pre-Cleaning	Asphalt	Manhole	8	29""	2	No	S	S	S	S	S	0	
MH0421U	Arcturus ave	5/24/22	No Pre-Cleaning	Asphalt	Manhole	8	29""	2	No	S	S	S	S	S	0	
MH0423U	Arcturus Ave	5/24/22	No Pre-Cleaning	Asphalt	Manhole	8	29""	2	No	S	S	S	S	S	0	
MH0425U	Purche Ave	5/24/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0427U	Purche Ave	5/24/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No		S	S	S	S	0	
MH0429U	Purche Ave	5/24/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0431U	Purche Ave	5/24/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0433U	Daphne Ave	5/24/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0435U	Daphne Ave	5/24/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0437U	Daphne Ave	5/24/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0439U	Daphne Ave	5/24/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0441U	Spinning Ave	5/25/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0443U	Spinning Ave	5/25/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0445U	Spinning Ave	5/25/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0447U	Spinning Ave	5/25/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	Piece of concrete in the invert
MH0451U	141st st	5/25/22	No Pre-Cleaning	crete/Paver	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0453U	141st St	5/25/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0455U	140th St	5/25/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	Debris in the bench

Manhole Number	Street	Inspection Date	Pre-Cleaning	Surfact Type	Access Type	Cover Condition	Cover Size	Number of Vents	Evidence of I/I	Manhole Condition[1]						Survey Comments
										Chimney	Cone	Wall	Bench	Channel	Total Number of Defective Grades	
MH0457U	140th st	5/25/22	No Pre-Cleaning	crete/Paver	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0459U	139th Pl	5/25/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0461U	139th Pl	5/25/22	No Pre-Cleaning	crete/Paver	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0463U	141st St and Ardath Ave	5/25/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0465U	Ardath Ave	5/25/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0467U	Ardath Ave	5/26/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0469U	Wilkie Ave	5/25/22	No Pre-Cleaning	crete/Paver	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0471U	Wilkie Ave	5/25/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0473U	Casimir Ave	5/25/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	D	1	Holes on channel walls
MH0475U	Casimir Ave	5/25/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0477U	Daphne Ave and 141st st	5/25/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0479U	Daphne Ave	5/25/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0481U	Daphne Ave	5/25/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0483U	Arcturus Ave	5/25/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0485U	Purche Ave	5/25/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0487U	Arcturus Ave and 141st st	5/25/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0489U	Arcturus Ave	5/25/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0495U	Purche Ave	5/25/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0497U	141st St and Purche Ave	5/25/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0499U	Spinning Ave	5/25/22	No Pre-Cleaning	crete/Paver	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0501U	Spinning Ave	5/25/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0503U	Spinning Ave	5/25/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0505U	Alley N/O RosecransAve	6/6/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH0507U	Alley N/O RosecransAve	6/6/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH0509U	Alley N/O RosecransAve	6/6/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH0511U	Alley E/O Spinning Ave	6/6/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0513U	Alley E/O Spinni g Ave	6/6/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0517U	Alley E/O Spinning Ave	6/6/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0519U	141st Pl	5/26/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0521U	141st Pl	5/26/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0523U	141st Pl	5/26/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0525U	141st Pl	5/26/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0527U	141st pl	5/26/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0529U	Rosecrans Ave	5/25/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	D	S	D	S	S	2	Roots in the MH
MH0531U	Rosecrans A e and Ardath Ave	5/25/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0533U	ROSECRANS AVE	5/25/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0535U	ROSECRANS AVE	5/25/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	1	No	S	S	S	S	S	0	
MH0537U	Rosecrans Ave	5/25/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0539U	139th St	5/27/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0541U	139th St	5/27/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0543U	Wilton Pl	5/27/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0545U	Wilton Pl	5/27/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0547U	139th St	5/27/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0549U	139th St	5/27/22	No Pre-Cleaning	Asphalt	Manhole	8	10""	2	No	S	S	S	S	S	0	
MH0551U	139th St and Cimarron Ave	5/27/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0553U	139th St	5/27/22	No Pre-Cleaning	Asphalt	Manhole	8	8""	2	No	S	S	S	S	S	0	
MH0555U	139th St	5/27/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0557U	Westetn ave	7/5/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	X	0	
MH0561U	139th St	5/27/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0563U	139 th st	7/5/22	No Pre-Cleaning	Asphalt	Manhole	8	8""	2	No	S	S	S	S	S	0	
MH0565U	139th St	5/27/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	

Manhole Number	Street	Inspection Date	Pre-Cleaning	Surfact Type	Access Type	Cover Condition	Cover Size	Number of Vents	Evidence of I/I	Manhole Condition[1]						Survey Comments
										Chimney	Cone	Wall	Bench	Channel	Total Number of Defective Grades	
MH0567U	139th St	5/27/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	Infiltration on walls
MH0569U	Wrstern Ave	7/5/22	No Pre-Cleaning	crete/Paver	Manhole	8	27""	1	No	D	S	S	S	S	1	Roots in chimney
MH0571U	Western Ave	7/5/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH0573U	Western Ave	7/5/22	No Pre-Cleaning	crete/Paver	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH0575U	Western ave	7/5/22	No Pre-Cleaning	e/Pavemen	Manhole	8	27""	1	No	S	S	S	S	S	0	Roots from top to bottom of MH
MH0577U	Kingsley Dr	7/12/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	Yes	S	S	S	S	S	0	
MH0579U	Rosecrans Ave	7/15/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH0581U	Western av	7/15/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
Mh0583U	Kingsley Dr	7/12/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0585U	Rosecrans	7/15/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0587U	Halldale Ave	6/17/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0589U	Halldale Ave	6/17/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0591U	141st St	6/17/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
Mh0593U	Brighton Ave	6/17/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0595U	Brighton Ave	6/17/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	D	1	
MH0597U	Brighton Ave	6/17/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0601U	139th st	7/12/22	No Pre-Cleaning	Asphalt	Manhole	8	24”	2	No	S	S	S	S	S	0	
MH0603U	Harvard Ave	6/17/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0605U	139th St	6/17/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0607U	139th St	6/17/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0609U	139th st	7/12/22	No Pre-Cleaning	Asphalt	Manhole	8	24”	2	No	S	S	S	S	S	0	
MH0611U	139th st	7/12/22	No Pre-Cleaning	Asphalt	Manhole	8	24”	2	No	S	S	S	S	S	0	
MH0613U	139th st	7/12/22	No Pre-Cleaning	Asphalt	Manhole	8	24”	2	No	S	S	S	S	S	0	
MH0617U	139th st	7/12/22	No Pre-Cleaning	Asphalt	Manhole	8	24”	2	No	D	S	S	S	S	1	
MH0619U	139th st	7/12/22	No Pre-Cleaning	Asphalt	Manhole	8	24”	2	No	S	S	S	S	S	0	
MH0621U	Normandie Ave	7/15/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH0623U	Rosecrans Ave	7/13/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH0625U	Rosecrans Ave	7/13/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH0627U	Brighton Ave	7/13/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH0631U	Normandie Ave	6/17/22	No Pre-Cleaning	crete/Paver	Manhole	8	24""	2	Yes	S	S	S	S	S	0	
MH0633U	Normandie Ave	6/16/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0635U	Normandie Ave	6/17/22	No Pre-Cleaning	crete/Paver	Manhole	8	24""	2	Yes	S	S	S	S	S	0	
MH0637U	Normandie Ave	6/17/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0639U	Normandie Ave	6/17/22	No Pre-Cleaning	crete/Paver	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0641U	Normamdie	7/13/22	No Pre-Cleaning	crete/Paver	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0643U	Normandie	7/13/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0645U	Normandie	7/13/22	No Pre-Cleaning	crete/Paver	Manhole	8	24""	2	No	S	S	S	S	S	0	Debris /sand on bench
MH0647U	Normandie	7/13/22	No Pre-Cleaning	crete/Paver	Manhole	8	9.9		No	S	S	S			0	
MH0649U	Normandie Ave	6/16/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0651U	135th St	7/15/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0653U	135th St	7/13/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0657U	135thSt	6/15/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	D	S	1	Lateral at 3 looks abandan
MH0659U	135th St	6/15/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0661U	135th St	6/15/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0663U	135th st	6/15/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0665U	135th St	6/15/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0667U	135th St	6/15/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH0669U	135th St	6/15/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0671U	135th St	6/15/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0675U	Alma Ave	6/30/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0677U	Halldale Ave	6/15/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	

Manhole Number	Street	Inspection Date	Pre-Cleaning	Surfact Type	Access Type	Cover Condition	Cover Size	Number of Vents	Evidence of I/I	Manhole Condition[1]						Survey Comments
										Chimney	Cone	Wall	Bench	Channel	Total Number of Defective Grades	
MH0679U	HalldaleAve	6/15/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0683U	Normandie Ave	6/30/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0685U	Normandie Ave	6/30/22	No Pre-Cleaning	Asphalt	Manhole	8	24:	2	Yes	S	S	S	S	S	0	Rock in channel
MH0687U	134th St	6/15/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0689U	Halldale Ave.	6/15/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	Yes	S	S	S	S	S	0	
MH0691U	Halldale Ave	6/15/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH0693U	134th St	6/15/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH0695U	134th St	6/15/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0697U	134th St	6/15/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0699U	134th St	6/15/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0701U	134th St	6/15/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0703U	134th st	6/15/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0705U	134th St	6/15/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0707U	Normandie Ave	6/15/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0709U	Normandie Ave	6/30/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0711U	Normandie Ave	6/15/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0713U	Normandie Ave	6/30/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0715U	132nd St	6/15/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0717U	132nd St	6/15/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	5	No	S	S	S	S	S	0	
MH0719U	132nd st	6/15/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0721U	132nd St	6/15/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0723U	132nd St	6/15/22	No Pre-Cleaning	Asphalt	Manhole	2	24""	2	No	S	S	S	S	S	0	
MH0725U	132nd St	6/15/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0727U	132nd st	6/15/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH0729U	132nd st	6/30/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0731U	130th St	6/15/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0733U	Halldale Ave	6/15/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH0735U	130th St	6/15/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0737U	Halldale Ave	6/15/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	D	S	S	S	1	
MH0739U	130th St	6/15/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0741U	130th ave	6/15/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0743U	130th ave	6/15/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0745U	130th Ave	6/15/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0747U	130th St	6/15/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0749U	El Segundo blvd	6/30/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0751U	Halldale Ave	6/30/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0753U	Halldale Ave	6/15/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0755U	Normandie Ave	6/15/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0757U	Normandie Ave	6/15/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0759U	Normandie Ave	6/30/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	26	No	S	S	S	S	S	0	
MH0761U	Normandie Ave	6/15/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0765U	Normandie Ave	6/30/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0767U	Normandie Ave	6/30/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0769U	El Segundo	7/15/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0771U	El Segundo Blvd	7/12/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0773U	El segundo Blvd	7/12/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0775U	El segundo Blvd	7/12/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	Yes	S	S	S	S	S	0	
MH0777U	El Segundo Blvd	7/12/22	No Pre-Cleaning	Asphalt	Manhole	8	24'	2	No	S	S	S	S	S	0	
MH0779U	El Segundo Blvd	7/12/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0781U	El Segundo Blvd	7/12/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0783U	El Segundo Blvd	6/30/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	

Manhole Number	Street	Inspection Date	Pre-Cleaning	Surfact Type	Access Type	Cover Condition	Cover Size	Number of Vents	Evidence of I/I	Manhole Condition[1]						Survey Comments
										Chimney	Cone	Wall	Bench	Channel	Total Number of Defective Grades	
MH0785U	El Segundo Blvd	6/30/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	D	S	1	
MH0787U	El Segundo Blvd	6/30/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0789U	130th st	6/14/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0791U	130th St	6/14/22	Heavy Cleaning	Asphalt	Manhole	2	24""	2	No	S	S	S	S	S	0	
MH0793U	130th St	6/14/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH0795U	132 nd st	6/30/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	Cover frame cracked
MH0797U	132nd st	6/30/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	3	No	S	S	S	S	S	0	Debris in channel
MH0799U	132nd sto	6/30/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0801U	134 st	6/30/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0803U	134 st	6/30/22	No Pre-Cleaning	Asphalt	Manhole	8	24""		No	S	S	S	S	S	0	
MH0805U	134 st	6/30/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0807U	135th st	7/15/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0809U	135th St	7/13/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0811U	135th St	7/13/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0813U	135th st	7/13/22	No Pre-Cleaning	Asphalt	Manhole	8	24	2	No	S	S	S	S	S	0	
MH0815U	Budlong Ave	7/12/22	No Pre-Cleaning	Asphalt	Manhole	8	24”	2	No	S	S	S	S	S	0	
MH0817U	Budlong Ave	7/12/22	No Pre-Cleaning	Asphalt	Manhole	8	24”	2	No	S	S	S	S	S	0	
MH0819U	Budlong Ave	7/12/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0821U	Budlong Ave	7/12/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH0823U	133rd st	6/30/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0825U	133rd st	6/30/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	Frame ctacked
MH0827U	Budlong ave	6/30/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0829U	Budlong Ave	6/14/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0831U	Budlong Ave	6/14/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0833U	Budlong Ave	6/14/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0835U	Budlong Ave	6/14/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0837U	Budlong Ave	6/14/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0843U	132nd St	6/14/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0845U	132nd St	6/14/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0847U	Easement E/O Budlong	6/30/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	Yes	S	S	S	S	S	0	
MH0857U	Alley n/o 135th st	7/12/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0861U	Alley n/o 135th st	7/12/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0863U	Alley n/o135th st	7/12/22	No Pre-Cleaning	Asphalt	Manhole	8	24""		No	S	S	S	S	S	0	
MH0867U	Easement e/o Catalina ave	6/30/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0875U	Esmnt n/o 133rd st	7/14/22	No Pre-Cleaning	Grass/Dirt	Manhole	8	24""	2	Yes	S	S	S	S	S	0	
MH0877U	Esmnt n/o 133rd st	6/14/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0883U	132nd St	6/14/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0885U	Normandie Ave	6/30/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	Gravel in channel
MH0887U	Easement E/O Kansas	6/30/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0889U	Alley W/O Vermont Ave	6/30/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0891U	Alley W/O Vermont Ave	6/30/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	Yes	S	S	S	S	S	0	
MH0893U	Alley W/O Vermont Ave	6/30/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0901U	Catalina Ave	6/14/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0903U	Catalina Ave	6/14/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0905U	Catalina Ave	6/14/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0907U	Catalina Ave	6/14/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0909U	Catalina Ave	6/14/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0911U	129th st	6/14/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No		S	S	S	S	0	
MH0913U	129th St	6/14/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0915U	Catalina Ave	6/14/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0917U	129th St	6/14/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	

Manhole Number	Street	Inspection Date	Pre-Cleaning	Surfact Type	Access Type	Cover Condition	Cover Size	Number of Vents	Evidence of I/I	Manhole Condition[1]						Survey Comments
										Chimney	Cone	Wall	Bench	Channel	Total Number of Defective Grades	
MH0919U	Berendo Ave	6/14/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0921U	Berendo Ave	6/14/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0923U	Berendo Ave	6/14/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0925U	Berendo Ave	6/14/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0929U	130th St	6/14/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	Pipe or stick in the MH
MH0931U	130th st	6/14/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0933U	130th st	6/14/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0935U	Vermont Ave	6/14/22	No Pre-Cleaning	crete/Paver	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0937U	131st st	6/14/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0939U	131st st	6/14/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0941U	131st St	6/14/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0943U	135th st	7/13/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0945U	Alley w/o Mariposa Ave	6/16/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0947U	137th St	6/16/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0949U	137th St	6/16/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0951U	Raymond Ave	6/16/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0953U	Alley W/o Raymond Ave	6/16/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0957U	Alley w/o Raymond Ave	6/16/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0959U	137th St	6/16/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0961U	Raymond Ave	6/16/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0963U	Van Buren Ave	6/16/22	Heavy Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0965U	137th st	6/16/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0967U	Alley Between 135th and 137t	6/16/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0969U	Alley berween 135th and 137t	6/16/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0971U	Alley n/o Van Buren Ave	6/16/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0973U	Vsn Buren Ave	6/16/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0975U	Van Buren Ave and 137th St	6/16/22	No Pre-Cleaning	crete/Paver	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0977U	Budlong Ave	6/16/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0979U	Budlong Ave	6/16/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0981U	Budlong Ave	6/16/22	No Pre-Cleaning	Asphalt	AJB	8	24""	2	No	S	S	S	S	S	0	
MH0983U	BudlongAve	6/16/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0985U	Budlong Ave	6/16/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	Line on 9oclock looks abandon
MH0987U	Budlong ave	6/17/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0989U	139TH ST	6/16/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0991U	Mariposa Ave	6/16/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	Yes	S	S	S	S	S	0	
MH0993U	139th St	6/16/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0995U	139th St	6/16/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0997U	139Th St	6/16/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH0999U	Mariposa Ave	6/16/22	No Pre-Cleaning	crete/Paver	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1001U	139th St	6/16/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1003AU	Teton st	6/16/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1003U	Teton St	6/16/22	No Pre-Cleaning	Asphalt	Manhole	8	25""	2	No	S	S	S	S	S	0	
MH1005U	Berendo Ave	6/16/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	D	S	S	S	1	
MH1009U	Catalina Ave	6/16/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1011U	138th st	6/16/22	No Pre-Cleaning	Asphalt	AMH	8	24'	2	No	S	S	S	S	S	0	
MH1013U	138th St	6/16/22	No Pre-Cleaning	Asphalt	Manhole	8	8""	2	No	S	S	S	S	S	0	
MH1015U	Catalina Ave	6/16/22	Light Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1017U	Berendo Ave	6/16/22	No Pre-Cleaning	Asphalt	Manhole	8	12x12	2	No	S	S	S	S	S	0	
MH1019AU	Berendo Ave	6/16/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1019U	Berendo Ave	6/16/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1021U	Teton St	6/16/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	

Manhole Number	Street	Inspection Date	Pre-Cleaning	Surfact Type	Access Type	Cover Condition	Cover Size	Number of Vents	Evidence of I/I	Manhole Condition[1]						Survey Comments
										Chimney	Cone	Wall	Bench	Channel	Total Number of Defective Grades	
MH1023U	Catalina Ave	6/16/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1025U	140th St	6/17/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1027U	Berendo Ave	6/17/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1029U	140th St	6/17/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH1031U	141st St	6/17/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1033U	Raymond Ave	6/17/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1035U	140th St	6/17/22	No Pre-Cleaning	Asphalt	Manhole	8	24""7	2	No	S	S	S	S	S	0	
MH1037U	140th St	6/17/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1039U	140th St	6/17/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1041U	141st st	6/17/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
Mh1045U	141st St	6/17/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	2'x2'
MH1049U	Deanna Ct	6/17/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	2'x2'
MH1051U	Van Buren Ct	6/17/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1055U	Budlong Ave	6/17/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1057U	141st St	6/17/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	Yes	S	S	S	S	S	0	
MH1059U	Vermont Ave	7/5/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1061U	Rosecrans Ave	7/15/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1063U	Budlong Ave	6/17/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1067U	141st st	6/17/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1069U	141st st	6/17/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1071U	Vermont ave	7/5/22	No Pre-Cleaning	crete/Paver	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1073U	141st st	7/1/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1075U	Rosecrans	7/15/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
Mh1077U	Rosecrans Ave	7/15/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	Yes	D	S	S	D	D	3	
MH1079U	Rosecrans	7/15/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S		S	S	0	
MH1081U	Rosecrans	7/15/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1083AU	Budlong Ave	6/17/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1085U	141st St	6/17/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1087U	Raymond Ave	6/17/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1089U	Mariposa Ave	6/17/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1091U	141st St	6/17/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1093U	141st st	6/17/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	D	1	
MH1095U	Rosecrans	7/15/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1097U	Normandie Avr	7/15/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	Yes	D	S	S	D	D	3	
MH1099U	Rosecrans Ave	7/15/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1101U	Rpsecrans Ave	7/15/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1103U	Rosecrans Ave	7/15/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH1105U	Rosecrans Ave	7/15/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	D	D	2	
MH1111U	Vermont Ave	7/5/22	No Pre-Cleaning	crete/Paver	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1113U	Vermont Ave	7/5/22	No Pre-Cleaning	Grass/Dirt	Manhole	8	24""	2	No	D	S	S	S	S	1	Root in MH top to bottom roots fine brick missing at chimney
MH1115U	Vermont Ave	7/5/22	No Pre-Cleaning	Grass/Dirt	Manhole	8	24""	2	No	D	S	D	S	S	2	Roots present
MH1117U	Vermont Ave	7/5/22	No Pre-Cleaning	oncreteColl	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1119U	Vermont ave	7/5/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	Yes	S	S	S	S	S	0	
MH1121U	Vermont ave	7/5/22	No Pre-Cleaning	crete/Paver	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1123U	Vermont Ave	7/1/22	No Pre-Cleaning	halt,Grass/	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1125U	Vermont	7/15/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	Yes	S	S	S	S	S	0	
MH1127U	Vermont Ave	7/1/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1129U	Vermont Ave	7/1/22	No Pre-Cleaning	halt,Grass/	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1137U	Wadshaw Al	6/6/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1139U	Wadshaw Al	6/6/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	

Manhole Number	Street	Inspection Date	Pre-Cleaning	Surfact Type	Access Type	Cover Condition	Cover Size	Number of Vents	Evidence of I/I	Manhole Condition[1]						Survey Comments
										Chimney	Cone	Wall	Bench	Channel	Total Number of Defective Grades	
MH1141U	Wadkins Ave	5/26/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1143U	Wadshaw Al	6/6/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S		S	S	S	0	
MH1145U	Wadshaw Al	6/6/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1147U	Wadkins Ave	5/26/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1149U	Wadkins Ave	5/26/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1151U	Miller Ave	5/26/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1153U	Marine Ave	6/1/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1155U	Wadkins Ave	5/26/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1157U	Marigold Ave	5/31/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	Looks like piece of pipe in the bench
MH1163U	Miller Ave	5/26/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1165U	Marigold Ave	5/31/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1167U	Marigold Ave	5/31/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1169U	Miller Ave	5/26/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	Gravel on the bench
MH1171U	Miller Ave	5/26/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1173U	Marigold Ave	5/31/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1177U	Sutro Ave	5/31/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	Yes	S	S	S	S	S	0	
MH1179U	Dublin Ave	5/31/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1181U	Roxton Ave	5/31/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1183U	150th St	5/31/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH1185U	Purche Ave and 150th st	5/31/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH1187U	Atkinson Ave	6/6/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1189U	Purche ave and 149th St	5/31/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1191U	Daphne ave and 149th st	5/31/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1193U	Spinning Ave	5/31/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1195U	Daphne Ave	5/31/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1197U	Spinning Ave	5/31/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1199U	Marine Ave	6/1/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1203U	Spinning Ave	5/31/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1205U	Purche Ave	5/31/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1207U	Purch Ave	5/31/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH1209AU	Roxton Ave	5/31/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	Unk	S	S	S	S	S	0	
MH1209U	Roxton Ave	5/31/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1211U	Dublun Ave and 149th St	5/31/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1213U	Dublin Ave	5/31/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1217U	Marine Ave	6/1/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	Capped at 3oclock
MH1219U	Marine Ave	6/1/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1221U	Sutro Ave	5/31/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1223U	Sutro Ave	5/31/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	Yes	S	S	S	S	S	0	
MH1227U	Purche Ave	5/31/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1229U	Roxton Ave	5/31/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1231U	Dublin Ave	5/31/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1233U	Sutro Ave	5/31/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	Water is being held back
MH1235U	Daphne Ave	5/31/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1237U	Spinning Ave	5/31/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1239U	152nd st	6/6/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1241U	Van Ness Ave	6/3/22	No Pre-Cleaning	crete/Paver	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH1243U	152nd St	6/3/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH1245U	Daphne Ave	6/3/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	Gravel on bench
MH1247U	Spinning Ave	6/6/22	No Pre-Cleaning	Asphalt	Manhole	8	27	2	No	S	S	S	S	S	0	
MH1249U	154th st and Spinning Ave	6/3/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH1251U	154th St and Purche Ave	6/3/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	

Manhole Number	Street	Inspection Date	Pre-Cleaning	Surfact Type	Access Type	Cover Condition	Cover Size	Number of Vents	Evidence of I/I	Manhole Condition[1]						Survey Comments
										Chimney	Cone	Wall	Bench	Channel	Total Number of Defective Grades	
MH1253U	Arcturus Ave	6/3/22	No Pre-Cleaning	Grass/Dirt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH1255U	Purche Ave	6/3/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH1257U	Spinning Ave	6/3/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH1259U	Spinning Ave	6/3/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH1261U	152nd St	6/3/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH1263U	Van Ness ave	6/3/22	No Pre-Cleaning	crete/Paver	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH1265U	Van Ness Ave	6/3/22	No Pre-Cleaning	Grass/Dirt	Manhole	8	27	2	No	S	S	S	S	S	0	Water held back due to debris
MH1267U	Daphne Ave	6/3/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH1269U	Daphne Ave	6/3/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH1271U	152nd St and Spinning Ave	6/8/22	No Pre-Cleaning	Asphalt	Manhole	4	27""	2	Yes	S	S	S	S	S	0	
MH1273U	152nd St	6/3/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH1275U	Purche Ave	6/3/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH1277U	Purche ave	6/3/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH1279U	Arcturus Ave and 154th St	6/3/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH1281U	Arcturus Ave	6/3/22	No Pre-Cleaning	Grass/Dirt	Manhole	8	27""	2	No	S	S	S	S	S	0	Debris on the bench
MH1283U	Arcturus Ave	6/3/22	No Pre-Cleaning	Grass/Dirt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH1285U	Manhatan Beach	6/14/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S		0	
MH1287U	Alley w/o Van Ness	6/7/22	No Pre-Cleaning	Asphalt	Manhole				No	S	S	S	S	S	0	
MH1289U	Alley w/o Van Ness	6/7/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1291U	Alley W/O Van Ness	6/7/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No		S	S	S	S	0	
MH1293U	Alley w/o Van Ness	6/7/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1295U	Alley w/o Van Ness	6/7/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1297U	Manhattan Beach blvd	6/7/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
Mh1299U	157th St	6/10/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1301U	155th St	6/8/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1303U	155th st	6/7/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1305U	Alley n/o 155th st	6/7/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1307U	Alley w/o Spinning	6/7/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1309U	Alley N/O 155th st	6/7/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1311U	Alley n/o 155th st	6/7/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1313U	Alley n/o 156th st	6/8/22	No Pre-Cleaning	crete/Paver	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1315U	Alley n/o 156th St	6/8/22	No Pre-Cleaning	crete/Paver	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1317U	Alley n/o 156th st	6/8/22	No Pre-Cleaning	crete/Paver	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1319U	Alley n/o 156th st	6/8/22	No Pre-Cleaning	crete/Paver	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1321U	Alley N/O 156TH ST	6/8/22	No Pre-Cleaning	crete/Paver	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1323U	Alley n/o155th st	6/7/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1325U	Alley n/o 156th st	6/8/22	No Pre-Cleaning	crete/Paver	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1327U	Alley n/o156th st	6/8/22	No Pre-Cleaning	crete/Paver	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1329U	Alley n/o 155th st	6/7/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1331U	Alley n/o156th st	6/8/22	No Pre-Cleaning	crete/Paver	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1333U	Alley N/O 156th St	6/8/22	No Pre-Cleaning	crete/Paver	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1335U	Alley n/o 155th st	6/7/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1337U	Alley n/o 155th st	6/7/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1339U	Alley N/O 157th st	6/10/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	Debris on the bench
MH1341U	Alley N/O 157th st	6/10/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1343U	Alley n/o 157th st	6/10/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1345U	Alley n/o 157th st	6/10/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1347U	Alley N/O 157th st	6/10/22	No Pre-Cleaning	crete/Paver	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1349U	Alley n/o 157th st	6/10/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1351U	Alley n/o 157th st	6/10/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1353U	Alley n/o 157th St	6/10/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	

Manhole Number	Street	Inspection Date	Pre-Cleaning	Surfact Type	Access Type	Cover Condition	Cover Size	Number of Vents	Evidence of I/I	Manhole Condition[1]						Survey Comments
										Chimney	Cone	Wall	Bench	Channel	Total Number of Defective Grades	
MH1355U	Alley w/o Spinning Ave	6/7/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH1357U	Alley s/o 157th st	6/7/22	No Pre-Cleaning	Asphalt	Manhole				No	S	S	S	S	S	0	
MH1359U	Alley S/O 157th St	6/7/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1361U	Alley e/o Crenshaw Blvd	6/7/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1363U	Alley e/o Crenshaw Blvd	6/7/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1365U	Allet e/o Crenshaw	6/7/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH1367U	Alley e/o Crenshaw blvd	6/7/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH1369U	Alley E/O Crenshaw blvd	6/7/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1371U	Alley e/o Crenshaw Blvd	6/7/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1373U	Alley n/o Manhattan Ave	6/7/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1375U	Alley n/o Manhattan Ave	6/7/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1377U	Alley n/o Manhattan Ave	6/7/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1379U	Alley n/o Manhattan Ave	6/7/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1381U	Alley n/o Manhattan	6/7/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	Yes	S	S	S	S	S	0	
MH1383U	Western St	7/15/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1385U	147th St	6/1/22	No Pre-Cleaning	Asphalt	Manhole	8			No	S	S	S	S	S	0	
MH1387U	Gramercy Ave	6/1/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1389U	144th St	5/31/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1391U	145th St	6/1/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	Debris in the invert
MH1393U	145th st	6/1/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1395U	Gramercy Ave	6/1/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	Gravel on the bench
MH1397U	147th St	6/1/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1399U	147th St	6/1/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	1	No	S	S	S	S	S	0	
MH1401U	Western Ave	7/14/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH1403U	144th st	5/31/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1405U	Western Ave	7/14/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH1407U	145th St	6/1/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH1409U	WesternAve	7/14/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH1413U	146st St	6/1/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH1415U	146th st	6/1/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH1417U	Gramercy Pl And 147th St	6/1/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1419U	147th St	6/1/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH1421U	147th St and St.ANDREWS Pl	6/1/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH1423U	147th St and Parron Ave	6/1/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1425U	Parron Ave	6/1/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1427U	Parron Ave	6/1/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1429U	Parron Ave	6/1/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1431U	Parron Ave and 149th St	6/1/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1433U	150th St and Gramercy Pl	6/2/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1435U	150th st	6/2/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1437U	149th St	6/1/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1439U	149th St	6/2/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1441U	Alley W/o Western	7/14/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1443U	148th st	6/2/22	No Pre-Cleaning	crete/Paver	Manhole	8	27""	1	No	S	S	S	S	S	0	Root med in the chimney
MH1445U	150th St	6/2/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1447U	148th St	6/2/22	No Pre-Cleaning	crete/Paver	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1449U	148th St and St.ANDREWS	6/2/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1451U	148th St	6/2/22	No Pre-Cleaning	crete/Paver	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1453U	Alley w/o Western Ave	6/2/22	No Pre-Cleaning	crete/Paver	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1455U	149th St	6/2/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1457U	149th St and St.ANDREWS PL	6/2/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	

Manhole Number	Street	Inspection Date	Pre-Cleaning	Surfact Type	Access Type	Cover Condition	Cover Size	Number of Vents	Evidence of I/I	Manhole Condition[1]						Survey Comments
										Chimney	Cone	Wall	Bench	Channel	Total Number of Defective Grades	
MH1459U	Marine Ave	6/3/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH1461U	Marine Ave	6/3/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH1463U	150th St	6/2/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1465U	150th St and St.ANDREWS Pl	6/2/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1467U	Alley w/o Western	7/14/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH1469U	Alley w/o Western	7/14/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	D	S	1	
MH1471U	Marine Ave	6/3/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH1473U	MarineAve	6/3/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH1475U	Marine Ave	6/3/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH1477U	Marine Ave	6/3/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH1479U	Marine Ave	6/3/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH1483AU	Marinel Ave	6/3/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH1483U	Marine Ave	6/3/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	D	1	
MH1485U	Western Ave	7/22/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	Trees in the area
MH1489U	Western Ave	7/22/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH1491U	Alley W/O Western Ave	7/1/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	D	S	S	S	S	1	Crack in chimney rebar in channel
MH1493U	Alley w/o Western	7/14/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH1495U	Alley w/o 153rd st	7/14/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH1497U	152nd St	6/2/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH1499U	153rd St	6/2/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH1501U	154th st	6/2/22	Heavy Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH1503U	152nd St	6/2/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH1505U	152nd st	6/2/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH1507U	152nd St	6/2/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH1509U	153rd St	6/2/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH1511U	153rd st	6/2/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH1513U	153rd St and St Andrews Pl	6/2/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH1515U	154th St	6/6/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH1517U	154th st	6/2/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH1519U	154th St and St.ANDREWS PL	6/2/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH1521U	154th Pl	6/6/22	No Pre-Cleaning	Grass/Dirt	Manhole	8	24	2	Yes	S	S	S	S	S	0	
MH1523U	St Andrews and 154th pl	6/6/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1525U	Gramercy Pl	6/2/22	No Pre-Cleaning	Grass/Dirt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1527U	153rd St	6/2/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1529U	Alley w/o Western	7/14/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH1531U	154th st	7/14/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1533U	Alley s/o Marine Ave	6/2/22	No Pre-Cleaning	crete/Paver	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1535U	Alley w/o Haas St	6/2/22	No Pre-Cleaning	crete/Paver	Manhole	8	27	2	No	S	S	S	S	S	0	
MH1537U	154th St	6/2/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	Broken clay on bench
MH1539U	154th St	6/2/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1541U	154th St	6/2/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1551U	Alley w/o Haas St	6/2/22	No Pre-Cleaning	crete/Paver	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1553U	Alley w/o Haas St	6/2/22	No Pre-Cleaning	crete/Paver	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1555U	Alley s/oMarine Ave	6/2/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	Lid is on Cimarron Ave
MH1557U	Esmnt W/O Cimarron St	6/2/22	No Pre-Cleaning	crete/Paver	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1559U	154th St	6/2/22	No Pre-Cleaning	Asphalt	Manhole	8	24	2	No	S	S	S	S	S	0	
MH1561U	Esmnt W/O Parron Ave	6/2/22	No Pre-Cleaning	crete/Paver	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1563U	Alley s/o Marine Ave	6/2/22	No Pre-Cleaning	crete/Paver	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1565U	Alley s/o Marine Ave	6/2/22	No Pre-Cleaning	crete/Paver	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1567U	Alley s/o Marine w/o Gramerc	6/2/22	No Pre-Cleaning	crete/Paver	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1571U	Esmnt W/O Wilton Pl	6/2/22	No Pre-Cleaning	crete/Paver	Manhole	8	24""	2	No	S	S	S	S	S	0	

Manhole Number	Street	Inspection Date	Pre-Cleaning	Surfact Type	Access Type	Cover Condition	Cover Size	Number of Vents	Evidence of I/I	Manhole Condition[1]						Survey Comments
										Chimney	Cone	Wall	Bench	Channel	Total Number of Defective Grades	
MH1573U	154th st	6/2/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1575U	156th St and Haas Ave	6/6/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1577U	156th St and Cimarron St	6/6/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1579U	Wilton Pl	6/6/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1581U	Haas Ave	6/6/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1583U	Cimarron St	6/6/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1585U	Parron Ave	6/8/22	No Pre-Cleaning	crete/Paver	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1587U	Wilton Pl	6/8/22	No Pre-Cleaning	crete/Paver	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1589U	Parron Ave	6/8/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1591U	Wilton Pl	6/8/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1593U	Wilton Pl	6/6/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1595U	Wilton Pl	6/6/22	No Pre-Cleaning	crete/Paver	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1597U	Haas Ave	6/6/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1599U	156th St and ParronAve	6/8/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1601U	Cimarron st	6/6/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1603U	Gramercy PL	6/14/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1605U	Gramercy Pl and 156th st.	6/8/22	Heavy Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1607U	Gramercy Pl	6/8/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	D	1	
MH1609U	Gramercy pl	6/6/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	Yes	S	S	S	S	D	1	Rags on the inlet.
MH1611U	Gramercy Ave	6/6/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1613U	157th St	6/8/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH1615U	157th St	6/8/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1617U	157th St	6/8/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1619U	157th st	6/8/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1621U	157th St	6/8/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH1623U	Ruthelen St	6/6/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1625U	Ruthelen St	6/8/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1627U	Ruthelen st	6/8/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	Yes	S	S	S	D	S	1	
MH1629U	St.ANDREWS Pl	6/8/22	No Pre-Cleaning	crete/Paver	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1631U	St.ANDREWS Pl	6/8/22	No Pre-Cleaning	crete/Paver	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1633U	St Andrews Pl	6/8/22	No Pre-Cleaning	crete/Paver	Manhole	8	24""	2	No	D	D	S	D	S	3	
MH1635U	St. Andrews Pl	6/8/22	No Pre-Cleaning	crete/Paver	Manhole	8	24""	2	No		S	S	S	S	0	
MH1637U	154th Pl and Ruthelen St	6/6/22	No Pre-Cleaning	Grass/Dirt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1639U	Ruthelen St and St.AndrewsPl	6/8/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	Yes	S	S	S	S	S	0	
MH1641U	Redondo Beach Blvd	6/14/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1643U	Redondo beach blvd	6/14/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1645U	Redondo Beach Blvd	6/14/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	D	S	1	
MH1647U	Redondo Beach Blvd	7/12/22	No Pre-Cleaning	Asphalt	Manhole	8	24”	2	No	S	S	S	S	S	0	
MH1649U	157th St	6/8/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	D	D	2	Grease on the channel
MH1651U	156th Ct	6/8/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S		S	S	0	
MH1653U	155th Ct	6/8/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1655U	156th St and Spinning Ave	6/8/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1657U	Crenshaw Blvd	7/15/22	No Pre-Cleaning	Asphalt	Manhole	8	2'x2'	2	No	S	S	D	S	S	1	
MH1659AU	Manhattan Beach Blvd	6/10/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1659BU	Manhattan Beach Blvd	6/10/22	No Pre-Cleaning	crete/Paver	Manhole	8	24""	2	Yes	S	S	S	S	S	0	
MH1659CU	Manhattan Beach blvd	6/10/22	No Pre-Cleaning	crete/Paver	Manhole	8	24""	2	No	S	S	S	S	S	0	Grease on the channel
MH1659U	Crenshaw Blv	7/15/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1663U	Manhattan beach blvd	6/10/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1665U	Manhattan Beach Blvd	6/10/22	No Pre-Cleaning	Asphalt	Manhole	8	24""		No	S	S	S	S	S	0	
MH1667U	Manhattan Beach Blvd	6/10/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	Yes	S	S	S	S	S	0	Debris on the bench and grease in the channel.
MH1669U	Manhattan Beach Blvd	6/10/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	Yes	S	S	S	S	S	0	Grease in channel

Manhole Number	Street	Inspection Date	Pre-Cleaning	Surfact Type	Access Type	Cover Condition	Cover Size	Number of Vents	Evidence of I/I	Manhole Condition[1]						Survey Comments
										Chimney	Cone	Wall	Bench	Channel	Total Number of Defective Grades	
MH1671AU	Denker Ave	6/24/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1671BU	Denker ave	6/24/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1673U	144th St	6/24/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	Yes	S	S	S	S	S	0	
MH1675U	144th St	6/24/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1679U	144th St	6/24/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S		S	S	0	
MH1681U	144th St	6/24/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	Yes	S	S	S	S	S	0	
MH1683U	145th st	6/24/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1687U	Halldale Ave	6/24/22	No Pre-Cleaning	Asphalt	ACOH	8	24""	2	No	S	S	S	S	S	0	
MH1693U	145th St	6/24/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1697U	145th st	6/24/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	1	No	S	S	S	S	S	0	
MH1699U	145Th st	6/24/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1701U	145th St	6/24/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1705U	146th St	6/24/22	No Pre-Cleaning	Asphalt	Manhole	8	8""	2	No	S	S	S	S	S	0	
MH1707U	Halldale Ave	6/24/22	No Pre-Cleaning	Asphalt	ACOM	8	10""	1	No	S	S	S	S	S	0	
MH1709U	146th St	6/24/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1711U	146Th St	6/24/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1713U	Denker Ave	6/24/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1719U	146th St	6/24/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1727U	Denker A	6/24/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1729U	147th St	6/24/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1731U	147th St	6/24/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1733U	147th St	6/24/22	No Pre-Cleaning	Asphalt	Manhole	4	24""	2	No	S	S	S	S	S	0	2nd ouet is 5.10'
MH1737U	147th st	6/24/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	D	S	1	
MH1739U	147th st	6/24/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1741U	149th St and Harvard	6/27/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1743U	149th St	6/27/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	Yes	S	S	S	S	S	0	
MH1747U	Harvard Blvd	6/27/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1753U	Harvard Blvd and 150th st	6/27/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1757U	Marine Ave	6/27/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1759U	147th st	6/24/22	No Pre-Cleaning	Asphalt	Manhole	8	36""	1	No	S	S	S	S	S	0	
MH1761U	Denker Ave	7/13/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	1	No	S	S	S	S	S	0	
MH1763U	Marine Ave	7/13/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH1765U	LA Salle Ave and 149th St	6/27/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1767U	La Salle Ave	6/27/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1769U	Denker Ave	7/1/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH1771U	Marine Ave	7/13/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	0	No	S	S	S	S	S	0	
MH1781U	Denker Ave	7/1/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1783U	Marine Ave	7/13/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	D	S	S	S	S	1	
MH1785U	Kingey Dr	7/1/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH1787U	Marine Ave	7/13/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	D	S	S	S	S	1	
MH1789U	Normandie Ave	6/30/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1793U	Normandie Ave	6/30/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1795U	Normandie Ave	6/30/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1797U	Normandie Ave	6/30/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1799U	Normandie Ave	6/30/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1801U	Normandie Ave	6/30/22	No Pre-Cleaning	Asphalt	Manhole	8			Yes	S	S	S	S	S	0	Frame chippes
MH1803U	Marine Ave	7/13/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1805U	Raymond Ave	6/20/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH1807U	Raymond Ave	6/20/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1809U	Q49Th st	6/20/22	No Pre-Cleaning	Asphalt	Manhole	8	24	2	Yes	S	S	S	S	S	0	
MH1811U	Mariposa Ave	6/20/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	

Manhole Number	Street	Inspection Date	Pre-Cleaning	Surfact Type	Access Type	Cover Condition	Cover Size	Number of Vents	Evidence of I/I	Manhole Condition[1]						Survey Comments
										Chimney	Cone	Wall	Bench	Channel	Total Number of Defective Grades	
MH1813U	Marine Ave	7/13/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	D	S	S	S	S	1	
MH1815U	Mariposa Ave	6/20/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH1817U	149th St	6/20/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1819U	Raymond Ave	6/20/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1821U	Raymond Ave	6/20/22	No Pre-Cleaning	Asphalt	ACOM	8	24""	2	No	S	S	S	S	D	1	
MH1823U	147th St	6/20/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1825U	Mariposa Ave	6/20/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1827U	Raymond Ave	6/20/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1829U	147th St	6/20/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	Yes	S	S	S	S		0	Debris in the bench
MH1831U	Van Buren Ave	6/20/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH1833U	Van Buren Ave	6/20/22	Heavy Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1835U	Van Buren Ave	6/20/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH1837U	Van Buren Ave	6/20/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH1839U	Marine Ave	7/13/22	Heavy Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1841U	Marine Ave	7/13/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH1843U	Budlong Ave	7/12/22	No Pre-Cleaning	Asphalt	Manhole	8	24”	2	No	S	S	S	S	S	0	
MH1845U	144th St	6/20/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	D	1	
MH1847U	144th Pl	6/20/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH1853U	144th St	6/20/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	Grease in the channel
MH1857AU	Budlong Ave	7/12/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH1857U	Budlong Ave	6/20/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1859U	144th Pl	6/20/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH1861U	Budlong Ave	7/12/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH1863U	Budlong Ave	7/12/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1865U	Budlong Ave	7/12/22	Not Known	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH1867U	Budlong Ave	7/12/22	Heavy Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH1869U	Budlong Ave	7/12/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1871AU	Budlong Ave	7/12/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	1	No	S	S	S	D	D	2	
MH1871U	Budlong ave	7/12/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1873U	Budlong Ave	7/12/22	No Pre-Cleaning	Asphalt	Manhole	8	24”	2	No	S	S	S	S	S	0	
MH1877AU	Budlong Ave	7/12/22	No Pre-Cleaning	Asphalt	Manhole	8	24”	2	No	S	S	S	S	S	0	
MH1877U	Budlong Ave	7/12/22	No Pre-Cleaning	Asphalt	Manhole	8	24”	2	No	S	S	S	D	D	2	Piece of bench and channel are missing
MH1879U	145th Pl	6/20/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1881U	145th Pl	6/20/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1883U	Raymond Ave	6/20/22	No Pre-Cleaning	Asphalt	Manhole	8	32""	1	No	S	S	S	S	S	0	
MH1885U	145th Pl	6/20/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1887U	Raymond Ave	6/20/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
Mh1889U	146th st	6/20/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1893U	146th St	6/20/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1897U	146th st	6/20/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1899U	146th st	6/20/22	Not Known	Asphalt	Manhole	8	8""	2	No	S	S	S	S	D	1	
MH1901U	145th Pl	6/20/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1903U	Marine Ave	7/13/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH1905U	Vermont ave	7/5/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH1907U	149th St	7/1/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1909U	150th st	7/1/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1911U	149th st	7/1/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1913U	Berendo Ave	7/1/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1915U	Berendo Ave	6/20/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1917U	145th St	6/20/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1919U	Catalina Ave	6/20/22	No Pre-Cleaning	crete/Paver	Manhole	8	24""	2	No	S	S	S	S	S	0	

Manhole Number	Street	Inspection Date	Pre-Cleaning	Surfact Type	Access Type	Cover Condition	Cover Size	Number of Vents	Evidence of I/I	Manhole Condition[1]						Survey Comments
										Chimney	Cone	Wall	Bench	Channel	Total Number of Defective Grades	
MH1921U	Catalina Ave	6/20/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	D	1	
MH1925U	Vermont ave.	7/5/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1927U	Marine Ave	7/13/22	No Pre-Cleaning	Asphalt	Manhole	8	27""		No	S	S	S	S	S	0	
MH1929U	Marine Ave	7/13/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	12	No	S	S	S	S	S	0	
MH1931U	Marine Ave	7/13/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1933U	150th st	7/1/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	D	1	Pieces missng
MH1935U	149th st	7/1/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	D	D	2	Parts of bench missing
MH1937U	berendo Ave	6/20/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	D	1	
MH1939U	Catalina Ave	6/20/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	D	D	2	
MH1941U	Catalina Ave	6/20/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	D	1	
MH1943U	Catalina Ave	6/20/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1945U	Berendo Ave	6/20/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	D	S	1	
MH1949U	Brendo Ave	7/13/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	Debris o. Bench
MH1951U	Berendo Ave	7/13/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	Debris bench
MH1953U	Berendo Ave	7/13/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	D	D	2	
MH1955AU	Vermont ave	7/5/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	Brick on bench
MH1955U	Vermont Ave	7/5/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	Rocks on bench
MH1957U	Vermont Ave	7/5/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	Yes	S	S	S	S	S	0	line is currently surcharged
MH1959U	Vermont ave	7/5/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH1961U	Vermont Ave	7/5/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH1963U	Vermont ave	7/5/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH1965U	Vermont Ave	7/5/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1967U	Harvard Blvd	6/27/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1969U	Harvard Blvd	6/27/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1971U	154th Pl and Harvard Blvd	6/27/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	D	1	
MH1973U	154th Pl	6/27/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1975U	154rd st	6/27/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	Yes	S	S	S	S	S	0	
MH1977U	154th st	6/27/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1979U	153rd st	6/27/22	No Pre-Cleaning	Grass/Dirt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1981U	153rd st	6/27/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1983U	Harvard blvd	6/27/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1985U	152nd St	6/27/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1989U	152nd st	6/27/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1991U	Denker Ave and 154th St	6/27/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	D	D	2	
MH1993U	154th Pl	6/27/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	Piece of wood in the MH
MH1995U	Harvard Blvd and 154th St	6/27/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	Yes	S	S	S	S	D	1	
MH1997U	154th St	6/27/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH1999U	154th Pl	6/27/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2001U	154th Pl	6/27/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2003U	153rd St	6/27/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2005U	154th St	6/27/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	Debris in the MH
MH2007U	Denker Ave and 153rd St	6/27/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	D	1	
MH2009U	Denker Ave	6/27/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	Yes	S	S	S	S	S	0	
MH2011U	153rd st	6/27/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	D	1	
MH2013U	154th Pl	6/27/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	D	1	
MH2015U	154th Pl and Denker Ave	6/27/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	D	1	
MH2017U	153rd st	6/27/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2019U	153rd st	6/27/22	No Pre-Cleaning	Asphalt	Manhole	8	8""	2	No	S	S	S	S	S	0	Debris in the bench
MH2021U	153rd St	6/27/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	D	1	
MH2023U	154th St	6/27/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2025U	154th St	6/27/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	

Manhole Number	Street	Inspection Date	Pre-Cleaning	Surfact Type	Access Type	Cover Condition	Cover Size	Number of Vents	Evidence of I/I	Manhole Condition[1]						Survey Comments
										Chimney	Cone	Wall	Bench	Channel	Total Number of Defective Grades	
MH2027U	152nd St	6/27/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2029U	152nd St	6/27/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2031U	152nd st	6/27/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2033U	Harvard Blvd and 152nd st	6/27/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2035U	Redondo Beach blvd	7/22/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2039U	Redondo Beach blvd	7/22/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2041U	Redondo Beach blvd	7/22/22	Not Known	Asphalt	Manhole	8	24""	2	No	S	S	S	S	D	1	Building near by
MH2043U	Redondo Beach Blvd	7/22/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	D	D	2	
MH2045U	Redondo Beach blvd	7/22/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH2047U	Redondo Beach blvd	7/22/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2049U	Redondo Beach blvd	7/22/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2051U	Redondo Beach blvd	7/22/22	No Pre-Cleaning	crete/Paver	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2053U	Nuanu	7/19/22	No Pre-Cleaning	crete/Paver	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2055U	NuanuAve	7/19/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2057U	Redondo beach Blvd	7/22/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2059U	Redondo beach blvd	7/22/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2063U	Redondo Beach Blvd	7/22/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2065U	Redondo beach blvd	7/22/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	D	1	
MH2067U	Redondo Beach blvd	7/22/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2069U	Redondo Beach blvd	7/22/22	No Pre-Cleaning	Asphalt	Manhole	8	24""		No	D	S	S	S	S	1	
MH2071U	Redondo beach blvd	7/22/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2073U	Redondo beach blvd	7/22/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	D	D	2	
MH2075U	Redondo Beach blvd	7/22/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2077U	Esmnt e/o Denker Ave	6/27/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	D	D	2	
MH2079U	Normandie And Redondo	7/15/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2083U	Budlong Ave	7/12/22	No Pre-Cleaning	Asphalt	Manhole	8	24”	2	No	S	S	S	S	S	0	
MH2091U	Private prkway	7/12/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2097U	New Hamshire Ave	7/1/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	Bricks on bench
MH2099U	Berendo Ave	7/1/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2101U	Berendo Ave	7/1/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2107U	Vermont ave	7/5/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH2109U	Vermont Ave	7/5/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH2111U	Budlong Ave	7/12/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	Debris on the bench
MH2113U	Budlong Ave	7/12/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2115U	Catalina Ave	7/12/22	No Pre-Cleaning	Asphalt	Manhole	8	24	2	No	S	S	S	S	S	0	Grease on line at 3
MH2117U	Alley s/o Redondo	7/12/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	Yes	S	S	S	D	S	1	
MH2121U	Catalina Ave	7/12/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH2127U	New Hamshire Ave	7/1/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2129U	155th st	7/1/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2131AU	Berendo Ave	7/1/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	Yes	S	S	S	S	D	1	Part of bootom of channel missing
MH2133U	Berendo Ave	7/1/22	No Pre-Cleaning	halt,Grass/	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2135U	Berebdo Ave	7/1/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	D	D	2	Pieces missing
MH2137U	Budling Pl	8/1/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	Buildings on both sides
MH2139U	Van Buren ave	7/13/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH2141U	156th st	7/13/22	Not Known	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	Debris in channel and bench
MH2143U	Van Buren Ave	7/13/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2145U	156th Pl	7/13/22	No Pre-Cleaning	crete/Paver	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2147U	Vermont Ave	7/14/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH2149U	Magnolia Ave	7/14/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH2151U	Magnolia Ave	7/22/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2153U	Alley e/o Normandie	7/14/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	

Manhole Number	Street	Inspection Date	Pre-Cleaning	Surfact Type	Access Type	Cover Condition	Cover Size	Number of Vents	Evidence of I/I	Manhole Condition[1]						Survey Comments
										Chimney	Cone	Wall	Bench	Channel	Total Number of Defective Grades	
MH2155U	Van Buren Ave	7/13/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2157U	Magnolia Ave	7/22/22	No Pre-Cleaning	Asphalt	Manhole	8	24 ""	2	No	S	S	S	S	S	0	
MH2159U	Alley e/o Normandie	7/14/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	D	S	1	
MH2161U	Magnolia Ave	7/22/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2163U	Magnolia Ave	7/14/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	D	1	Debris in the bench
MH2165U	Magnolia Ave	6/28/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2167U	Magnolia Ave	7/14/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2169U	Vermont Ave	7/14/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2171U	155th st	7/13/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	D	1	Channel damaged at 6 o' clock position
MH2187U	Hallde ave	6/29/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2189U	Brigthton Ave	6/29/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2191U	Brighton ave	6/29/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2193U	Halldale ave	6/29/22	No Pre-Cleaning	Asphalt	Manhole	8			No	S	S	S	S	S	0	
MH2195U	157 th St	6/29/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2197U	Redondo Beach blvd	7/22/22	No Pre-Cleaning	Asphalt	Manhole	8	24""I	2	No	S	S	S	D	D	2	Building near by
MH2199U	La Salle Ave	7/11/22	No Pre-Cleaning	Asphalt	Manhole	4	24""	2	No	S	S	S	S	S	0	
MH2201U	La Salle Ave	7/11/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	D	1	
MH2203U	158th St	8/2/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2205U	158th St	7/11/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	Yes	S	S	S	S	S	0	
MH2207U	158th St	7/11/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	D	D	D	D	D	5	
MH2209U	158th st	8/2/22	Heavy Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH2211U	158th St	7/11/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2213U	Redondo beach blvd	8/1/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH2215U	Western Ave	7/21/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	Yes	S	S	S	S	S	0	
MH2217U	Western Ave	7/21/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2219U	Western Ave	7/21/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH2221U	Western Ave	7/21/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	Rock in the channel next to the downstream
MH2223U	Vermont Ave	7/14/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH2225U	159th st	6/28/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2227U	Berendo ave	6/28/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2229U	158th St	6/28/22	No Pre-Cleaning	oncreteColl	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2231U	Budlong Ave	6/28/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2233U	Budlong ave	6/28/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2235U	Vermont Ave	7/14/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH2237U	159th St	6/28/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2239U	158th St	6/28/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	D	D	2	
MH2241U	159th St and Berendo Ave	6/28/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2243U	159Th st	6/28/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2245U	Raymond	7/14/22	No Pre-Cleaning	Grass/Dirt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2247U	Raymond Ave	7/14/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2249U	159th St	6/28/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2251U	160th st	6/28/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2253U	Budlong Ave and 161st st	6/28/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2255U	162nd St and Budlong Ave	6/28/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	Yes	S	S	S	S	S	0	
MH2257U	162nd st	6/28/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH2259U	162nd st	6/28/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH2261U	162nd St	6/28/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH2263U	161st st	6/28/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	Yes	S	S	S	S	S	0	
MH2265U	161st st	6/28/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH2267U	161st st	6/28/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH2269U	160th St	6/28/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	

Manhole Number	Street	Inspection Date	Pre-Cleaning	Surfact Type	Access Type	Cover Condition	Cover Size	Number of Vents	Evidence of I/I	Manhole Condition[1]						Survey Comments
										Chimney	Cone	Wall	Bench	Channel	Total Number of Defective Grades	
MH2271U	160th st	6/28/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2273U	159th St	6/28/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH2275U	159th st	6/28/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2277U	159th St	6/28/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2279U	160th st	6/28/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2281U	160th St	6/28/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH2283U	Alley s/o 159th St	6/28/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH2285U	Vermont Ave	6/28/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2287U	161st St	6/28/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH2289U	161st st	6/28/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2291U	160th St and Berendo Ave	6/28/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2293U	Vermont Ave	7/14/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	D	D	2	Roots on the wall down to the channel
MH2295U	160th st	6/28/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	Yes	S	S	S	S	S	0	
MH2297U	161st st	6/28/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2299U	161st Sy	6/28/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH2301U	Berrndo	8/2/22	No Pre-Cleaning	crete/Paver	ACOM	8	12""		No	S	S	S	S	S	0	
MH2303U	162nd St	6/28/22	Heavy Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH2305U	162nd St	6/28/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2307U	Vermont Ave	8/2/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	D	D	D	D	S	4	Roots in the walls
MH2309U	163rd st	6/28/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	D	S	D	S	S	2	
MH2311U	Vermont Ave	7/14/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	Yes	D	S	D	D	D	4	Bricks spaced out and roots in the walls as well as the channel
MH2315U	163rd st	6/28/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH2317U	163rd St and Berendo Ave	6/28/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH2319U	163rd st	7/14/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	D	S	1	
Mh2321U	163rd St	7/14/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH2323U	163rd St	7/14/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	Yes	S	S	S	S	S	0	
MH2325U	163rd St	7/14/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH2327U	162nd st	7/22/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH2329U	Denker Ave	6/29/22	No Pre-Cleaning	Asphalt	Manhole	8			No	S	S	S	S	S	0	
MH2331U	Dalton Ave	6/29/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2333U	Halldale Ave	6/29/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	D		S	S	S	1	
MH2335U	Brighton ave	6/29/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2337U	Halldale VE	6/29/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2339U	Halldale ave	6/29/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2341U	Brighton ave	6/29/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2343U	Brighton ave	6/29/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2345U	Dalton Ave	6/29/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2347U	Dalton Ave	6/29/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2349U	Denker Ave	6/29/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2351U	Denker Ave	6/29/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2353U	162nd st	6/29/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	D	D	2	
MH2355U	162nd st	6/29/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH2357U	Birghton ave	6/29/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2359U	162Nd St	8/2/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	Car near the lid
MH2361U	162nd st	6/29/22	No Pre-Cleaning	Asphalt	Manhole	8		2	No	S	S	S	S	S	0	
MH2363U	Halldale ave	6/29/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2365U	Dalton Ave	6/29/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2367U	162nd st	6/29/22	No Pre-Cleaning	Asphalt	Manhole	8	27""		No	S	S	S	S	S	0	
MH2369U	162nd sy	6/29/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH2371U	Denker Ave	6/29/22	No Pre-Cleaning	Asphalt	Manhole	8			No	S	S	S	S	S	0	

Manhole Number	Street	Inspection Date	Pre-Cleaning	Surfact Type	Access Type	Cover Condition	Cover Size	Number of Vents	Evidence of I/I	Manhole Condition[1]						Survey Comments
										Chimney	Cone	Wall	Bench	Channel	Total Number of Defective Grades	
MH2373U	162nd st	6/29/22	No Pre-Cleaning	Asphalt	Manhole	8	27""		No	S	S	S	D	D	2	Hole
MH2375U	Harvard Ave	7/11/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2377U	La Salle Ave	7/11/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2379U	Harvard Ave	7/11/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2385U	La Salle Ave	7/11/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2387U	La Salle Ave	7/11/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2391U	162nd st	6/29/22	No Pre-Cleaning	Asphalt	Manhole	8	27""		No	S	S	S	S		0	
MH2393U	162nd st	6/29/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH2397U	Redondo beCh Blvd	6/10/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2403U	Ardath St	6/10/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2405U	Ardath Ave	6/10/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2407U	Chanera Ave	6/10/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2409U	Chanera Ave	6/10/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2411U	Redondo beach blvd	6/10/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2413U	Arcturus Ave	6/10/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2415U	Arcturus ave	6/10/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2417U	Arcturus Ave	6/10/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2419U	Arcturus Ave	6/10/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2421U	Arcturus ave	6/10/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2423U	Ardath ave	6/10/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	Yes	S	S	S	S	S	0	
MH2425U	Marigold Ave	6/10/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2427U	MarigoldAve	6/10/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2429U	Casimir Ave	6/10/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2431U	Casimir Ave	6/10/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2433U	Esmnt	8/1/22	No Pre-Cleaning	Asphalt	Manhole	8	14""	2	No	S	S	S	S	S	0	Next to wall in plant area
MH2435U	Atkinson Ave	6/10/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2437U	Atkinson Ave	6/10/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	D	S	S	S	S	1	
MH2439U	Atkinson Ave	6/10/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2441U	Atkinson Ave	6/10/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2443U	Arcturus Ave	6/10/22	Heavy Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	Clay bricks on channel
MH2445U	Redondo Beach blvd	6/10/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2447U	Redondo Beach Blvd	6/10/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2449AU	Redondo Beach Blvd	6/14/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	Roots in the wall
MH2449U	Redondo Beach Blvd	6/14/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2451U	Redondo Beach Blvd	6/10/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2453AU	Redodndo beach blvd	6/10/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH2453U	Redondo Beach Blvd	6/14/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2457U	Redodndo Beach blvd	6/10/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH2459U	Gramercy pl	6/13/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2461U	Gramercy pl	6/13/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2463U	161st st	6/13/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2465U	St Andrews Pl	6/13/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	D	1	
MH2467U	St.ANDREWS pl	6/13/22	No Pre-Cleaning	Asphalt	Manhole	8	8	2	No	S	S	S	S	S	0	
MH2469U	160th st	6/13/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	D	1	
MH2471U	St Andrews pl	6/13/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2473AU	Redondo Beach blvd	6/13/22	No Pre-Cleaning	crete/Paver	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2473U	Redodndo Beach blvd	6/13/22	No Pre-Cleaning	crete/Paver	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2475U	St.ANDREWS pl	6/13/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2477U	Redondo Beach Blvd	6/13/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2479U	161st st	6/13/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2481U	St Andrews Pl	6/13/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	D	1	

Manhole Number	Street	Inspection Date	Pre-Cleaning	Surfact Type	Access Type	Cover Condition	Cover Size	Number of Vents	Evidence of I/I	Manhole Condition[1]						Survey Comments
										Chimney	Cone	Wall	Bench	Channel	Total Number of Defective Grades	
MH2483U	159th St	6/13/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2485U	159th st	6/13/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2487U	160th st	6/13/22	No Pre-Cleaning	Asphalt	Manhole		24""	2	No	S	S	S	S	S	0	
MH2489U	Western ave	7/21/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH2491U	Western Ave	7/21/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	Dewbris in the channel
MH2493U	Alley w/o Western Ave	7/21/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	Between building walls
MH2495U	St.ANDREWS pl	6/13/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2497U	Gardena Blvd	6/13/22	No Pre-Cleaning	crete/Paver	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2499U	Alley w/o Western Ave	7/21/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH2503U	Alley w/o Western Ave	7/21/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	Between apartment buildings
MH2505U	St Andrews Pl	6/13/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2507U	St.ANDREWS pl	6/13/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2509U	St.ANDREWS pl	6/13/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2511U	St Andrews Pl	6/13/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2513U	Gramercy pl	6/13/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2515U	Gramercy Pl	6/13/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2517U	Grqmercy Pl	6/13/22	Heavy Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2519U	Gramercy Pl	6/13/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2521U	164th st	7/19/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH2523U	Ne Hampshire Ave	7/19/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH2527U	164th St	7/19/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH2529U	Vermont Ave	7/14/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH2533U	Alley n/o Gardena	7/19/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH2535U	Alley w/o Vermont	8/1/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH2537U	Berendo Ave	7/1/22	No Pre-Cleaning	crete/Paver	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH2539U	164th st	7/1/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH2541U	Gardena Ave	7/21/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH2543U	Gardena Blvd	7/1/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2545U	164th st	7/1/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH2547U	164th st	7/1/22	No Pre-Cleaning	crete/Paver	Manhole	8	27""	1	Yes	S	S	S	S	S	0	
MH2549U	164th st	7/1/22	No Pre-Cleaning	crete/Paver	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH2551U	Gardena Ave	7/21/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH2553U	Gardena Ave	7/21/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH2555U	Gardena blvd	7/1/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH2557U	164th st	7/1/22	No Pre-Cleaning	crete/Paver	Manhole	8	27""	1	Yes	S	S	S	S	S	0	
MH2559U	164th st	7/1/22	No Pre-Cleaning	crete/Paver	Manhole	8	27""	1	Yes	S	S	S	S	S	0	
MH2561U	Gardena Ave	7/21/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	Yes	S	S	S	S	S	0	
MH2563U	Berendo Blvd	7/1/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2565U	165th st	7/19/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH2567U	Berendo Ave	7/19/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH2571U	Berendo	7/19/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH2573U	Alley at New Hampshire Ave	7/19/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH2575U	Alley at New Hampshire	7/19/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH2577U	166th St	7/21/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH2579U	176th st	7/21/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH2581U	166th St	7/21/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	Yes	S	S	S	S	S	0	
MH2585U	166th st	7/21/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH2587U	166th St	7/21/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	Truck was parked next to the lid
MH2589U	Berendo St	7/19/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH2591U	166th St	7/19/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH2593U	166th st	7/19/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	

Manhole Number	Street	Inspection Date	Pre-Cleaning	Surfact Type	Access Type	Cover Condition	Cover Size	Number of Vents	Evidence of I/I	Manhole Condition[1]						Survey Comments
										Chimney	Cone	Wall	Bench	Channel	Total Number of Defective Grades	
MH2595U	166th st	7/19/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH2597U	166th st	7/19/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH2599U	166th St	7/19/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	Yes	S	S	S	S	S	0	
MH2603U	Brighton ave	6/29/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2605U	166tst st	7/18/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH2607U	166th st	7/18/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No				S	S	0	
MH2609U	Halldale ave	6/29/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2611U	Dalton ave	6/29/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2613U	166th St	7/18/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH2615U	166th st	7/18/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH2619U	Denker ave	6/29/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2621U	166th st	7/19/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH2625U	Denker ave	6/29/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	Debris in channel
MH2627U	Denker ave	6/29/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2629U	Dalton ave	6/29/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2631U	Dalton ave	6/29/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2637U	Halldale ave	6/29/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2639U	166th st	7/18/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH2641U	Brighton ave	6/29/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2643U	Dalton ave	6/29/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH2645U	166th St	7/18/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH2647U	Denker ave	6/29/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2649U	GARDENA blvd	7/11/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH2651U	Gardena Blvd	7/11/22	No Pre-Cleaning	Grass/Dirt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH2653U	Gardena blvd	7/11/22	No Pre-Cleaning	Grass/Dirt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH2655U	Gardena Blvd	7/11/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH2657U	Gardena Blvd	7/11/22	No Pre-Cleaning	crete/Paver	Manhole	8			No	S	S	S	S	S	0	
MH2659U	Gardena Blvd	7/11/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH2661U	Gardena Blvd	7/11/22	No Pre-Cleaning	crete/Paver	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH2663U	Gardena Blvd	7/11/22	No Pre-Cleaning	crete/Paver	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2665U	Harvard Blvd	7/11/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH2667U	La Salle Ave	7/19/22	No Pre-Cleaning	Asphalt	Manhole	8	32""	1	No	S	S			S	0	
MH2669U	165th St	7/11/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH2671U	165th St	7/11/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	Yes	S	S	S	S	S	0	
MH2673U	Harvard Blvd	7/11/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH2675U	166th st	7/19/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH2677U	166th St	7/18/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2681U	Redondo Beach blvd	8/1/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2683U	Western Ave	7/21/22	No Pre-Cleaning	Asphalt	Manhole	8	27""""	2	No	S	S	S	S	S	0	
MH2685U	Western Ave	7/21/22	No Pre-Cleaning	Grass/Dirt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH2687U	Western Ave	7/21/22	No Pre-Cleaning	crete/Paver	Manhole	8	27""	2	No	S	S	S	S	S	0	Next to building by sidewalk
MH2689U	Western Ave	7/21/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH2691U	Western ave	7/21/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	Building near
MH2693U	169th Pl	7/18/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	Yes	S	S	S	S	S	0	
MH2695U	Hobart Blvd	7/18/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	D	S	S	S	1	
MH2697U	168th st	7/19/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH2699U	Denker Ave	7/18/22	No Pre-Cleaning	Asphalt	Manhole	8	27""		No	S	S	S	S	S	0	
MH2701U	169th St	7/18/22	Heavy Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH2703U	La Salle Ave	7/19/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	Yes	S	S	S	S	S	0	
MH2705U	169th st	7/18/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH2707U	Harvard Blvd	7/18/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	

Manhole Number	Street	Inspection Date	Pre-Cleaning	Surfact Type	Access Type	Cover Condition	Cover Size	Number of Vents	Evidence of I/I	Manhole Condition[1]						Survey Comments
										Chimney	Cone	Wall	Bench	Channel	Total Number of Defective Grades	
MH2711U	Denker Ave	7/18/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH2713U	Hobart Blvd	7/18/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH2715U	Hobart Blvd	7/18/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH2717U	Harvard Blvd	7/18/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH2719U	168th st	7/19/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH2721U	La Salle Ave	7/19/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH2723U	168th St	7/19/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	Yes	S	S	S	S	S	0	
MH2725U	Denker Ave	7/18/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH2727U	169th st	7/12/22	No Pre-Cleaning	Asphalt	Manhole	8	24”	2	No	S	S	S	S	S	0	
MH2729U	169th st	7/12/22	No Pre-Cleaning	Asphalt	Manhole	8	24”	2	No	S	S	S	S	S	0	
MH2731U	169th st	7/12/22	No Pre-Cleaning	Asphalt	Manhole	8	24”	2	No	S	S	S	S	S	0	
MH2733AU	Denker Ave	7/18/22	Heavy Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH2733BU	Denker Ave	7/18/22	No Pre-Cleaning	Asphalt	Manhole	8	32""	1	Yes	S	S	S	S	S	0	
MH2735U	172nd Pl	7/8/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	D	S	1	Bench is missing material at the 6 and 12 o'clock positions
MH2737U	La Salle Ave	7/8/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2739U	170th st	7/8/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2741U	La Salle Ave	7/8/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2743U	170th st	7/8/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	Yes	S	S	S	D	S	1	Material missing from bench at 6 o'clock position
MH2747U	Harvard Blvd	7/8/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2749U	Denker Ave	7/18/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	D	D	2	
MH2751U	Denker Ave	7/18/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH2755U	Denker Ave	7/18/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH2757U	Harvard Blvd	7/8/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2759U	La Salle Ave	7/8/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	D	S	1	Bench is missing some material at the 6 o'clock position
MH2761U	Dalton Ave	7/18/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH2763U	Halldale Ave	7/8/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2765U	168th st	7/8/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH2767U	168th st	7/8/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH2769U	Denker Ave	7/18/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	D	D	2	
MH2771U	Dalton Ave	7/18/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH2773U	170th st	7/22/22	No Pre-Cleaning	Asphalt	Manhole	8	27'	2	No	S	S	S	D	D	2	
MH2777U	169th st	7/8/22	No Pre-Cleaning	crete/Paver	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2779U	Brighton Ave	7/8/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	6	No	S	S	S	S	S	0	
MH2781U	Halldale Ave	8/2/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH2783U	Dalton Ave	7/18/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH2785U	Brighton Ave	7/8/22	No Pre-Cleaning	Pavement,	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2787U	Halldale Ave	7/22/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH2789U	Halldale ave	7/22/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH2791U	Dalton Ave	7/18/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH2793U	Brighton Ave	7/8/22	No Pre-Cleaning	Asphalt	Manhole	8	24:	2	No	S	S	S	S	S	0	
MH2795U	Dalton Ave	7/18/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH2797U	Halldale Ave	7/8/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2799U	Halldale Ave	7/8/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2801U	173rd st	7/8/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2803U	173rd st	7/8/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2805U	173rd st	7/8/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2807U	172nd st	7/8/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2809U	Brighton Way	8/2/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2811U	171st st	7/8/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	

Manhole Number	Street	Inspection Date	Pre-Cleaning	Surfact Type	Access Type	Cover Condition	Cover Size	Number of Vents	Evidence of I/I	Manhole Condition[1]						Survey Comments
										Chimney	Cone	Wall	Bench	Channel	Total Number of Defective Grades	
MH2813U	Alley S/O 170th st	7/8/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	D	D	2	Piece of channel and bench are missing near 12 o'clock pipe
MH2815U	Brighton Way	7/8/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2817U	.Brighton Way	7/8/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2819U	171st st	7/8/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2821U	Alley S/O 170th st	7/8/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2823U	171st st	7/8/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2825U	172nd st	7/8/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2827U	172nd st	7/8/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2829U	Dalton Ave	7/18/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH2831U	Dalton Ave	7/18/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH2833U	Dalton Ave	7/18/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH2835U	Brighton Ave	7/8/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2837U	Brighton Ave	7/8/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2839U	Brighton Ave	7/8/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2841U	166th.St	7/18/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
Mh2843U	166th st	7/18/22	No Pre-Cleaning	Asphalt	Manhole	8	27'		No	S	S	S	D	D	2	
MH2847U	Brighton Way	7/8/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2849U	173rd st	7/8/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2851U	173rd st	7/8/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2853U	Mariposa Ave	7/8/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2855U	168th st	7/21/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH2857U	Mayflower Cr	7/8/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2859U	169th Pl	7/26/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2861U	169th Pl	7/26/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2863U	169th Pl	7/26/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	Van near by
MH2865U	Mariposa Ave	7/8/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH2867U	168th St	7/26/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH2869U	168th St	7/21/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH2871U	168th st	7/21/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	Yes	S	S	S	S	S	0	
MH2873U	Berendo Ave	7/19/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH2875U	168th St	7/21/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	Yes	S	S	S	S	S	0	
MH2879U	Berendo Ave	7/19/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH2883U	Raymond Pl	7/26/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2887U	Komori Cr	7/26/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2889U	Steven St	7/26/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2891U	Komori cr	7/26/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2893U	Raymond pl	7/26/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2895U	170th st	8/2/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2897U	Raymond Pl	7/26/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2899U	Berendo Ave	7/26/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2901U	Catalina Ave	7/26/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2903U	Raymond Ave	7/26/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	Debris in the channel
MH2905U	Budlong Ave	7/19/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	Rebar in the mh
MH2907U	Catalina Ave	7/19/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	D	S	1	
MH2909AU	Sputh ParkLna54	7/26/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2909U	South Park Ln	7/26/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	Wall near by
MH2911U	South Park Ln	7/26/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	Wall near by
MH2913/2917U	South Park Ln	7/26/22	No Pre-Cleaning	Grass/Dirt	Manhole	8	24""	2	Yes	S	S	S	S	S	0	Bushes around the area on sidewalk
MH2915U	170th st	8/2/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2919U	Raymond Ave	7/26/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	Wooden fence and big truck near by

Manhole Number	Street	Inspection Date	Pre-Cleaning	Surfact Type	Access Type	Cover Condition	Cover Size	Number of Vents	Evidence of I/I	Manhole Condition[1]						Survey Comments
										Chimney	Cone	Wall	Bench	Channel	Total Number of Defective Grades	
MH2923U	Budlong Ave	7/19/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	Yes	S	S	S	S	D	1	
MH2925U	Budlong Ave	7/19/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2927U	Raymond Ave	7/26/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2929U	Raymond Pl	7/26/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH2931U	Berendo Ave	7/26/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2933U	Catalina Ave	7/26/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	D	1	
MH2935U	New Hampshire Ave	7/21/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	Looks like rock in the channel
MH2937U	New Hampshire Ave	7/21/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2939U	New Hampshire Ave	7/21/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH2941U	New Hampshire Ave	7/21/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH2943U	170th st	8/1/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2945U	Vermont	8/1/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH2947U	Vermot Ave	8/2/22	Heavy Cleaning	Asphalt	Manhole	8	27""	2	Yes	S	S	S	S	S	0	
MH2949U	Vermont Ave	8/1/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	Building near by
MH2951U	Vermont	8/1/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH2953U	167th St	7/19/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH2955U	167th st	7/19/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH2957U	New Hampshire Ave	7/21/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	1	No	S	S	S	S	S	0	
MH2959U	Vermont Ave	8/1/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	Building near by
MH2961U	Vermont Ave	8/1/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	D	S	S	1	
MH2965U	Vermont Ave	8/1/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	Yes	S	S	S	X	X	0	Surcharge
MH2973U	Vermont Ave	7/19/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	Yes	S	S	S	S	S	0	
MH2979U	Cassidy St	7/11/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2985U	Cassidy St	7/11/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2987U	Cassidy Ave	7/11/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2989U	Cassidy St	7/11/22	No Pre-Cleaning	crete/Paver	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH2991U	Broadwell Ave	7/11/22	No Pre-Cleaning	crete/Paver	Manhole	8	6 by 54 inch	4	No	S	S	S	S	S	0	
MH3001U	Budlong Ave	7/11/22	No Pre-Cleaning	crete/Paver	Manhole	8	6 by 54 inch	4	No	S	S	S	S	S	0	
MH3003U	Valmeyer ave	7/11/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3007U	Normandie	7/11/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH3009U	Cassidy St	7/11/22	No Pre-Cleaning	crete/Paver	Manhole	8	6 by 54 inch	4	No	S	S	S	S	S	0	
MH3011U	Cassidy St	7/11/22	No Pre-Cleaning	crete/Paver	Manhole	8	6 by 54 inch	4	No	S	S	S	S	S	0	
MH3013U	Cassidy St	7/11/22	No Pre-Cleaning	crete/Paver	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3015U	Cassidy St	7/11/22	No Pre-Cleaning	t,Concrete/	Manhole	8	26 by 54	2	No	S	S	S	S	S	0	
MH3017U	Cassidy St	7/11/22	No Pre-Cleaning	crete/Paver	Manhole	8	6 by 54 inch	2	No	S	S	S	S	S	0	
MH3019U	Cassidy Ave	8/2/22	No Pre-Cleaning	e/Pavemen	Manhole	8	24×24	2	No	S	S	S	S	S	0	
MH3021U	Cassidy St	7/11/22	No Pre-Cleaning	crete/Paver	Manhole	8	26 by 54		No	S	S	D	S	S	1	concrete around steps loose
MH3025U	Normandie	7/11/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH3027U	w 177th st	7/11/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3029U	177th st	7/11/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3031U	Normandie	7/11/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3033U	w 177th st	7/11/22	No Pre-Cleaning	Asphalt	Manhole	2	24""	2	No	S	S	S	S	S	0	
MH3035U	w 177th st	7/11/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3037U	w 177th st	7/11/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3039U	Budlong Ave	7/11/22	No Pre-Cleaning	Asphalt	Manhole	8	6 by 54 inches		No	S	S	S	S	D	1	
MH3041U	Budlong Ave	7/11/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3043U	Rumbold St	7/11/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	debris build up on bench
MH3045U	Budlong Ave	7/11/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	debris on bench
MH3049U	Felder Ave	7/27/22	No Pre-Cleaning	Asphalt	AMH	8	2'x2'	2	No	S	S	S	S	S	0	
MH3051U	FelderAve	7/26/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3053U	Felder Ave	7/26/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	Big tree near by

Manhole Number	Street	Inspection Date	Pre-Cleaning	Surfact Type	Access Type	Cover Condition	Cover Size	Number of Vents	Evidence of I/I	Manhole Condition[1]						Survey Comments
										Chimney	Cone	Wall	Bench	Channel	Total Number of Defective Grades	
MH3055U	Rumbold St	7/27/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	Debris on the bench
MH3057U	Berendo Ave	7/26/22	No Pre-Cleaning	Asphalt	Manhole	8	24'	2	No	S	S	S	S	S	0	
MH3059U	Broadwell Ave	7/26/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3061U	Felder Ave	7/27/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	Tall tree near by
MH3063U	Rumbold St	7/27/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	Debris on the bench/ car parked near by
MH3065U	Rumbold St	7/11/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	debris on bench
MH3067U	182nd st	7/11/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3069U	182nd st	7/11/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	debris on bench
MH3071U	alley n/o Vermont Ave	7/11/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3073U	alley n/o vermont ave	7/11/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3075U	Budlong Ave	7/27/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	Tall trees near by
MH3077U	alley 182nd at	7/11/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3079U	alley 182nd st	7/11/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3081U	alley 18nd st	7/11/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3083U	alley 182nd st	7/11/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3085U	Budlong Ave	8/2/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3087U	alley 182nd st	7/11/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3089U	alley 18nd st	7/11/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3091U	alley 182nd st	7/11/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3093U	Brighton Way	7/27/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH3095U	Curt pl	7/27/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH3097U	180th st	7/27/22	No Pre-Cleaning	Asphalt	Manhole	8	28""	1	No	S	S	S	S	S	0	
MH3099U	Avery Pl	7/27/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH3101U	Evelyn Ave	7/27/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH3103U	179th St	7/27/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH3105U	178th st	7/28/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	Buildings near by
MH3107U	179th st	7/28/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	Building near by
MH3109U	178th st	7/28/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH3111U	Brighton Way	7/27/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH3113U	180th St	7/27/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH3115U	Cirt Pl	7/27/22	Not Known	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH3117U	Avery Pl	7/27/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH3119U	Evelyn Ave	7/27/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	Building near by
MH3121U	179th st	7/27/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH3123U	179th st	7/27/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH3125U	178th st	7/28/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH3127U	178th st	7/28/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH3129U	Evenlyn Ave	7/28/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	Building near by
MH3131U	Dalton Pl	7/27/22	No Pre-Cleaning	Pavement,	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3133U	180th st	7/27/22	No Pre-Cleaning	Pavement,	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3135U	Dalton Ave	7/27/22	No Pre-Cleaning	Asphalt	Manhole	4	24""	2	No	S	S	S	S	S	0	
MH3137U	180th st	7/27/22	No Pre-Cleaning	crete/Paver	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3139U	Denker Ave	7/27/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3141U	Denker Ave	7/27/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	Tree near by
MH3143U	179th St	7/28/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3145U	Denker Ave	7/27/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	Debris on the bench./ tall trees near by
MH3147U	Dalton Ave	7/27/22	No Pre-Cleaning	Pavement,	Manhole	8	24""	2	No	S	S	S	S	S	0	Tall tree near by
MH3151U	179th Pl	7/28/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	D	D	2	
MH3153U	Denker Ave	7/27/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3157U	178th St	7/28/22	No Pre-Cleaning	crete/Paver	Manhole	8	27""	1	No	S	S	S	S	S	0	Fence and building near by
MH3159U	Alle e/o LaSalle Ave	7/28/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	Fence and a couple of buildings in the area

Manhole Number	Street	Inspection Date	Pre-Cleaning	Surfact Type	Access Type	Cover Condition	Cover Size	Number of Vents	Evidence of I/I	Manhole Condition[1]						Survey Comments
										Chimney	Cone	Wall	Bench	Channel	Total Number of Defective Grades	
MH3167U	Alley w/o Denker ave	7/28/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3169U	La Salle Ave	7/28/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	Building near by
MH3171U	LaSalle Ave	7/28/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3175U	Harvard blvd	7/5/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3177U	Hobart Ave	7/28/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3179U	Harvard blvd	7/5/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3181U	Hobart Ave	7/28/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	D	1	
MH3183U	Hobart Ave	7/28/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3185U	Hobart Ave	7/28/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	Looks like grease on the inlet
MH3187Au	Alley	7/28/22	Light Cleaning	Concrete/P	Manhole	8	24""	2	No	S	S	S	S	D	1	Grease in the channel/ fence near by
MH3191U	Alley e/o Western	7/28/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3199U	Chanera Ave R/W	6/6/22	No Pre-Cleaning	Grass/Dirt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH3205U	Atkinson Ave	6/6/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH3207U	Atkinson Ave	6/6/22	Heavy Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH3209U	Atkinson Ave	6/6/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH3211U	AtkinsonAve	6/6/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S		0	
MH3213U	154th St r/w	6/8/22	No Pre-Cleaning	Grass/Dirt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3215U	Easmt n/o 152nd st	6/7/22	No Pre-Cleaning	Grass/Dirt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3221U	Easement N/O152th st	6/6/22	No Pre-Cleaning	Grass/Dirt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH3223U	Ardath ave R/W	6/6/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH3225U	Ardath ave r/w	6/8/22	No Pre-Cleaning	Grass/Dirt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3235U	Casimir Ave R/W	6/6/22	No Pre-Cleaning	Grass/Dirt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH3237U	Wilkie R/W	6/7/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3247U	Esmnt w/o 154th st	6/6/22	No Pre-Cleaning	Grass/Dirt	Manhole	8	24""	2	No	S	S	S	S	S	0	There are 2 pipes coming out walls
MH3249U	Esmnt w/o 154th st	6/7/22	No Pre-Cleaning	Grass/Dirt	Manhole	8	24""	2	No	S	S	S	S	S	0	Mh in backyard shed and neighbors wall southside
MH3251U	Asmnt w/o 154th st	6/7/22	No Pre-Cleaning	Grass/Dirt	Manhole	8	24""	2	No	D	S	D	D	S	3	
MH3255U	Wilkie ave	5/26/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3257U	143rd Pl and Wilkie Ave	5/26/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3259U	143rd pl	5/26/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3261U	143rd Pl	5/26/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3263U	144th st	5/26/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3265U	Wadkins Ave and 145th St	5/26/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	Attached other on invert out
MH3267U	145th St	5/26/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3269U	145th St	5/26/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3271U	145th st	5/26/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3273U	146th St	5/26/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3275U	146th St	5/26/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3277U	146th St	5/26/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3279U	Alley e/o Crenshaw Ave	5/26/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3281U	Alley e/o Crenshaw blvd	5/26/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3283U	Alley e/o Crenshaw	5/26/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3285U	Dublin Ave	5/26/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3287U	147th st and Miller Ave	5/27/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3289U	147th St	5/26/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3291U	147TH Ave	5/26/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3293U	147th St	5/26/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	Grease on the 3 invert walls
MH3295U	Dublin Ave	5/26/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3297U	VAN NESS AVE	6/6/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3299U	Van Ness Ave	6/6/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3303U	Van Ness Ave	6/3/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3305U	Van Ness Ave	6/3/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	

Manhole Number	Street	Inspection Date	Pre-Cleaning	Surfact Type	Access Type	Cover Condition	Cover Size	Number of Vents	Evidence of I/I	Manhole Condition[1]						Survey Comments
										Chimney	Cone	Wall	Bench	Channel	Total Number of Defective Grades	
MH3307U	Van Ness Ave	6/3/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3309U	Van Ness Ave	6/3/22	No Pre-Cleaning	Asphalt	Manhole	8	8""	2	Yes	S	S	S	S	S	0	
MH3311U	Van Ness Ave	6/3/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3313U	Roxton Ave	5/26/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	8	No	S	S	S	S	S	0	
MH3315U	Roxton Ave	5/26/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3317U	Purche Ave	5/26/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	Debris on the bench
MH3319U	Purche Ave	5/26/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3321U	Daphne Ave	5/26/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3323U	Daphne Ave	5/26/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3325U	Spinning Ave	5/26/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3327U	Spinning Ave	5/26/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3329U	Van Ness St	6/3/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3331U	144TH ST AND HAAS AVE	5/31/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3333U	144th st	5/31/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3335U	144th st	5/31/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3337U	145th st	6/1/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3339U	145th st	6/1/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	Debris at the 12oclock in the invert
MH3343U	Haas Ave	5/31/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3345U	146th St	6/1/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3347U	146th st	6/1/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3349U	146th St	6/1/22	No Pre-Cleaning	Asphalt	Manhole	8	23""	2	No	S	S	S	S	S	0	
MH3351U	146th pl	6/1/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3353U	146th St	6/1/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3355U	146th St	6/1/22	No Pre-Cleaning	Asphalt	Manhole	8	24""		No	S	S	S	S	S	0	
MH3357U	146th St	6/1/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3359U	146th St	6/1/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3361U	VAN Ness Ave	6/3/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3363U	Haas Ave	5/31/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3365U	Haas Ave and 145th St	5/31/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3366U	HAAS Ave	5/31/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3367U	144th St	5/31/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3369U	144th st	5/31/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3371U	Cimarron Pl	5/27/22	No Pre-Cleaning	Asphalt	Manhole	8	23""	2	No	S	S	S	S	S	0	
MH3373U	Cimarron Pl	5/27/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3375U	Cimarron Pl	5/27/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3377U	Cimarron Ave	5/27/22	No Pre-Cleaning	Asphalt	Manhole	8	24""p	2	No	S	S	S	S	S	0	
MH3379U	Gramercy Pl	5/27/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3381U	Gramercy Pl	5/27/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3383U	Gramercy Pl	5/27/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3385U	Gramery Pl	5/27/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3387U	134th st	6/30/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3389U	132nd st	6/30/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3393U	Budlong Ave and 134th st	7/12/22	No Pre-Cleaning	Asphalt	Manhole	8	24”	2	No	S	S	S	S	S	0	
MH3395U	135th st	7/15/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3399U	Rosecrans Ave	5/25/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3407U	Denker Ave	7/27/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3411U	170th St	7/18/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	D	D	2	
MH3415U	Western Ave	7/21/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH3417U	158th St	7/11/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	Yes	S	S	S	D	D	2	Debris
MH3419U	158th st	7/11/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	D	1	
MH3425U	Gardena Blvd	7/21/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	

Manhole Number	Street	Inspection Date	Pre-Cleaning	Surfact Type	Access Type	Cover Condition	Cover Size	Number of Vents	Evidence of I/I	Manhole Condition[1]						Survey Comments
										Chimney	Cone	Wall	Bench	Channel	Total Number of Defective Grades	
MH3427U	Gardena Blvd	7/21/22	No Pre-Cleaning	Grass/Dirt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH3439U	Hobart Blvd	7/11/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH3443U	Redondo Beach blvd	7/22/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	D	D	D	S	D	4	
MH3447U	Evelyn Ave	7/27/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	Tree near by
MH3449U	Evelyn Ave	7/27/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH3455U	180th st	7/27/22	No Pre-Cleaning	Pavement,(	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3457U	180th st	7/27/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH3463U	Berendo Ave	7/1/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH3467U	158th St	8/2/22	No Pre-Cleaning	Asphalt	Manhole	8	27""		Yes	S	S	S	X	X	0	
MH3469U	Marine ave.	8/2/22	No Pre-Cleaning	Asphalt	Manhole	8	24 in.	2	No	S	S	S	S	S	0	
MH3471U	Marine Ave and Van Ness ave	6/3/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH3473U	Wadkins Ave and 146th st	5/26/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3475U	162nd st	6/29/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3477AU	154th Pl	6/6/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3477U	154th Pl	6/6/22	No Pre-Cleaning	Grass/Dirt	Manhole	8	24""	2	No	S	S	S	D	S	1	
MH3481U	Alley w/o 155th st	6/7/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3483U	130th St	6/15/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3485U	Berendo Ave	6/14/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3487U	Spinni g Ave	5/26/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3489U	Alley E/O Van Ness	5/20/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3491U	Alley e/o Van Ness	5/20/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3493U	El Segundo Blvd	5/20/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S		S	S	0	
MH3495U	El Segudo blvd	5/20/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3497U	Wilton Pl and 132nd st	5/23/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3503U	149th st	7/1/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH3505U	Raymond Ave	6/20/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3507U	Marine Ave	7/13/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH3509U	Halldale Ave	7/1/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH3511U	Halldale Ave	7/1/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	3	No	S	S	S	S	S	0	
MH3513U	Halldale Ave	6/24/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3515U	Halldale Ave	6/24/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3519U	Alma Ave	6/30/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3521U	Vermont	7/13/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3523U	Vermont	7/13/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	Debris in channel. And bench
MH3525U	Harvard Ave	6/17/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	D	S	S	1	Wall looks like infiltrasion stain
MH3527U	146th St	6/1/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH3529U	153rd St	6/27/22	Not Known	Grass/Dirt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3535U	158th St	8/2/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	Yes	S	S	S	X	X	0	
MH3537U	168th St	7/21/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3539U	Catalina Ave	7/19/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3541U	Mayflower Cr	7/8/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3545U	Western Ave	7/15/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH3551U	Western ave	7/12/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	Grease in the channel
MH3553U	Western Ave	7/12/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH3557U	Western Ave	7/12/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH3559U	Western Ave	7/12/22	No Pre-Cleaning	Asphalt	Manhole	4	24""	2	No	S	S	S	S	S	0	
MH3561U	Spinning Ave and 132th St	5/18/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3563U	132th st And Daphne Ave	5/19/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3565U	132nd St and Arcturus St	5/19/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3567U	132nd st and Casimir Ave	5/18/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
Mh3569U	132nd st and Wilkie ave	5/18/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	

Manhole Number	Street	Inspection Date	Pre-Cleaning	Surfact Type	Access Type	Cover Condition	Cover Size	Number of Vents	Evidence of I/I	Manhole Condition[1]						Survey Comments
										Chimney	Cone	Wall	Bench	Channel	Total Number of Defective Grades	
MH3571U	132th st	5/18/22	No Pre-Cleaning	crete/Paver	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3573U	134th Pl and Arcturus Ave	5/18/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3575U	134th Pl and Casaimir Ave	5/18/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	X	S	0	
MH3577U	134th Pl and Wilkie Ave	5/18/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	Unk	S	S	S	S	S	0	
MH3579U	134th pl and Ardath Ave	5/18/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
Mh3581U	134th Pl	5/18/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No		S	S	S	S	0	
MH3583U	134th Pl	5/18/22	No Pre-Cleaning	crete/Paver	Manhole	8	24""	2	No	S	S	S	S	X	0	
MH3585U	166th st	7/19/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH3587U	166th st	7/19/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH3589U	166th st	7/19/22	No Pre-Cleaning	Asphalt	Manhole	8	27	2	No	S	S	S	S	S	0	
MH3591U	Normandie Ave	7/15/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3593U	Normandie Ave	7/15/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3595U	Normandie Ave	7/15/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	D	S	S	S	S	1	
MH3597U	Normandie Ave	7/15/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3599U	Western Ave	7/5/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3601U	162nd st	7/11/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH3603U	162nd St	7/11/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH3605U	162nd st	7/11/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	Yes	S	S	S	S	S	0	
MH3607U	162nd st	7/22/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH3609U	166th st and Manhattan Pl	7/12/22	No Pre-Cleaning	Asphalt	Manhole	8	24”	2	No	S	S	S	S	S	0	
MH3611U	162nd st	6/13/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	X	X	0	
MH3613U	162nd St	6/13/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	Yes	S	S	S	S	S	0	
MH3615U	162nd St	6/13/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3617U	162nd St	6/13/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3619U	162nd st	6/13/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3625U	162nd st	7/11/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	Yes	S	S	S	S	S	0	
MH3627U	162nd st	7/11/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH3629U	162nd st	7/22/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	Yes	S	S	S	S	S	0	
MH3631U	162nd st	7/21/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH3633U	162nd st	7/22/22	No Pre-Cleaning	Asphalt	Manhole	8	27'	2	No	S	S	S	S	S	0	
MH3635U	162nd st	7/22/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	D	S	1	
MH3637U	162nd st	6/13/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	Yes	S	S	S	X	X	0	
MH3639U	162nd St	6/13/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3641U	162nd st	8/1/22	No Pre-Cleaning	Asphalt	Manhole	8	14""	1	No	S	S	S	S	S	0	
MH3647U	Ardath ave and 131st st	5/19/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3649U	132th st	5/18/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	X	0	
MH3651U	Ardath ave and 132th st	5/18/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3653U	Western Ave	6/24/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3655U	145th st	6/24/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	Yes	S	D	S	S	S	1	
MH3659U	Redodndo Beach Blvd	6/10/22	No Pre-Cleaning	halt,Grass/	Manhole	8	24""	2	No	S	S	S	S	S	0	Debris in the bench
MH3663U	Vermont Ave	8/1/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	Back of church near a fence and a building
MH3665U	Budlong Ave	7/12/22	No Pre-Cleaning	Asphalt	Manhole	8	24	2	No	S	S	S	S	S	0	
MH3667U	Budlong Ave	7/12/22	No Pre-Cleaning	Asphalt	Manhole	8	24”	2	No	S	S	S	S	S	0	
MH3669U	Vermont ave	7/15/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	D	S	1	
MH3671U	Vermont Ave	7/5/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH3673U	Evelyn Ave	7/27/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3675U	Denker Ave	7/27/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3677U	La Salle Ave	7/28/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3679U	Catalina Ave	7/19/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3689U	Magnolia Ave	7/22/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	Trees in the area
MH3691U	Magnolia Ave	7/22/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	Trees in the area

Manhole Number	Street	Inspection Date	Pre-Cleaning	Surfact Type	Access Type	Cover Condition	Cover Size	Number of Vents	Evidence of I/I	Manhole Condition[1]						Survey Comments
										Chimney	Cone	Wall	Bench	Channel	Total Number of Defective Grades	
MH3693U	Western Ave	7/12/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	Yes	S	S	S	S	S	0	Grease in the channel
MH3695U	149th St	6/2/22	No Pre-Cleaning	crete/Paver	Manhole	8	27""	1	No	S	S	S	S	S	0	Heavy roots in the MH
MH3701U	Van Ness Ave	5/25/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	Gravel in the invert
MH3703U	Van Ness Ave	5/25/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3705U	VAN NESS AVE	5/25/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3707U	VAN NESS AVE	5/25/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3715U	Van Ness	7/15/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH3717U	Van Ness Ave	6/3/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3719U	Van Ness Ave	6/3/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3721U	Van Ness Ave	6/3/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3723U	Wilton Pl	5/23/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3725U	132nd st and Gramercy Pl	5/23/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3727U	Roxton Ave and 149th st	5/31/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3751U	148th st	7/12/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	1	No	S	S	S	S	S	0	
MH3757U	Marine Ave	6/1/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3759U	Marine Ave	6/1/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3761U	Marine Ave	6/1/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3763U	Marine Ave	6/1/22	No Pre-Cleaning	Asphalt	Manhole	8	24""		No	S	S	S	S	S	0	
MH3765U	Marine ave	6/1/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH3769U	Denker Ave	7/18/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH3773U	Normandie Ave	8/2/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH3775U	El Segundo Blvd	5/19/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3777U	El Segundo Blvd	5/19/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3779U	El Segundo Blvd	5/19/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3781U	El Segundo Blvd	5/19/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3783U	El Segundo Blvd	5/19/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH3785U	El Segundo Blvd	5/19/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	D	S	1	
MH3787U	ElSegundo Blvd	5/19/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	Flow Meter on the lid.
MH3789U	El Segundo Blvd	5/19/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH4001U	Manhattan Pl	6/13/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No		S	S	S	S	0	
MH4002AU	Manhattan Pl	6/13/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH4002U	Manhattan Pl	6/13/22	No Pre-Cleaning	Asphalt	Manhole		24""	2	Yes					S	0	
MH4003U	Manhattan Pl	6/13/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
Mh4004U	Manhattan Pl	6/13/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH4005U	Manhattan Pl	6/13/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH4006U	Manhattan Pl	6/13/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH4007U	Manhattan Pl	6/13/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH4008U	Manhattan Pl	6/13/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH5001U	Harvard blvd	7/5/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH5002U	Harvard blvd	7/5/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH5003U	169th st	7/18/22	No Pre-Cleaning	Asphalt	ACOM	8	12""	0	No	S	S	S	S	S	0	
MH5004U	169th St	7/18/22	No Pre-Cleaning	Asphalt	ACOM	8	10""	1	No	S	S	S	S	S	0	
MH5005U	La Salle Ave	7/11/22	No Pre-Cleaning	Asphalt	ACOM	8	10""	1	No	S	S	S	S	S	0	
MH5011U	Van Ness ave	5/20/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH5012U	Van Ness avd and El Segundo I	5/20/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH5014U	Cassidy St	7/11/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH5015U	Esmnt w/o Hobart	7/28/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	Buildings near by
MH5020U	168th st	7/19/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH5021U	169th st	7/18/22	No Pre-Cleaning	Asphalt	ACOM	8	10""	1	No	S	S	S	S	S	0	
MH5022U	Raymond Pl	7/26/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH5023U	180th st	7/5/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	

Manhole Number	Street	Inspection Date	Pre-Cleaning	Surfact Type	Access Type	Cover Condition	Cover Size	Number of Vents	Evidence of I/I	Manhole Condition[1]						Survey Comments
										Chimney	Cone	Wall	Bench	Channel	Total Number of Defective Grades	
MH5024U	159th St and NormandieAve	6/28/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH5025U	160th st	6/28/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH5026U	Normandie Ave	6/28/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH5027U	162nd St	6/28/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH5028U	Normandie Ave	7/14/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH5029U	Normandie Ave	7/21/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH5030U	Normandie Ave	7/21/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH5031U	Normandie ave	7/21/22	No Pre-Cleaning	crete/Paver	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH5032U	Normandie Ave	7/21/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH5033U	Normandie Ave	7/26/22	No Pre-Cleaning	Grass/Dirt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH5034U	NormandieAve	7/26/22	No Pre-Cleaning	sphalt,Grav	Manhole	8	24""	2	No	S	S	S	S	S	0	Gravel by train tracks next to sidewalk
MH5035AU	Normandie Ave	7/26/22	No Pre-Cleaning	crete/Paver	Manhole	8	27""	1	No	S	S	S	S	S	0	Next to building and wall
MH5035U	Normandie Ave	7/26/22	No Pre-Cleaning	crete/Paver	Manhole	8	24""	1	No	S	S	S	S	S	0	
MH5036U	Normandie Ave	7/26/22	No Pre-Cleaning	crete/Paver	Manhole	8	24""	2	No	S	S	S	S	S	0	Wall near by
MH5038U	Ardath Ave	5/24/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH5039U	154th St	6/6/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH5040U	154th st	6/6/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH5042U	166th st	7/18/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	1	No	S	S	S	S	S	0	
MH5044U	Vermont Ave	8/1/22	No Pre-Cleaning	Asphalt	ACOM	8	12""	1	No	S	S	S	S	S	0	Building Near by
MH5046U	Denker Ave	6/24/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH6000U	Catalina Ave	6/20/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH6001U	Denker Ave 145th St	6/24/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH6003U	141st St	6/17/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH6004AU	Halldale Ave	6/24/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH6004U	Halldale Ave	6/24/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH6005U	Gramercy Ave	8/1/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH6006U	144th St	5/31/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH6007U	144th st	5/31/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH6009U	Rosecrans Ave	7/15/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
Mh6011U	Rosecrans Ave	7/15/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	Debris in the bench
MH6013U	Alley W/O Vermont ave	6/30/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	Grease in channel
MH7000U	Van Ness Ave and 154th St	6/3/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH7001U	Van Ness Ave	6/3/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	Yes	S	S	S	S	S	0	
MH7002U	154th st and Atkinson Ave	6/7/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	Yes	S	S	S	S	S	0	
MH7003U	BudlongAve	6/16/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH7004U	Berendo Ave	6/16/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH7005U	141st	6/17/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH7006U	145th St	6/24/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH7007U	139th st	7/12/22	No Pre-Cleaning	Asphalt	Manhole	8	24”	2	No	S	S	S	S	S	0	Uncharted
MH7008U	169th st	7/12/22	No Pre-Cleaning	Asphalt	Manhole	8	24”	2	No	S	S	S	S	S	0	No number assigned (uncharted)
MH7009U	Western Ave	7/12/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH7010U	Evelyn Ave	7/27/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	12oclock line looks abandon
MH7011U	Evenlyn Ave and 182nd st	7/12/22	No Pre-Cleaning	oncreteColl	Manhole	8	24”	2	No	S	S	S	S	S	0	
MH7012U	New Hampshire Ave	7/19/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	Yes	S	S	S	S	S	0	
MH7013U	Western Ave	7/14/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH7014U	Western Ave	7/14/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH7015U	Alley w/oWestern	7/14/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH7016U	DALTON ave	7/18/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH7018U	New Hampshire Ave	7/19/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	
MH7019U	Western Ave	7/21/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH7020U	Noormandie Ave	7/26/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	

Manhole Number	Street	Inspection Date	Pre-Cleaning	Surfact Type	Access Type	Cover Condition	Cover Size	Number of Vents	Evidence of I/I	Manhole Condition[1]						Survey Comments
										Chimney	Cone	Wall	Bench	Channel	Total Number of Defective Grades	
MH7021U	180th st	7/28/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	D	D	2	
MH7022U	Alley e/o Western	7/28/22	No Pre-Cleaning	Asphalt	ACOM	8	12""	1	No	S	S	S	S	S	0	Fence and building near by
MH7023U	182nd st	7/28/22	No Pre-Cleaning	crete/Paver	Manhole	8	24""	2	Yes	S	S	S	S	S	0	
MH7024U	Alley e/o Western	7/28/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	Yes	S	S	S	S	S	0	Grease in the channel/ building near by
MH7025U	Redondo beach blvd	8/1/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH7026U	Western Ave	8/1/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH7027U	Western	8/1/22	No Pre-Cleaning	Asphalt	Manhole	8	27""	2	No	S	S	S	S	S	0	
MH7028U	168th St	8/1/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	Yes	S	S	S	S	S	0	Needs cleaning
MH7029U	170th st	8/2/22	No Pre-Cleaning	Asphalt	Manhole	8	24""	2	No	S	S	S	S	S	0	Trees near by

Notes:
1. Condition rated as Sound (S), Defective (D), or Unknown (X).

Appendix G

CIP DETAIL SHEETS

Project Number: P-1

Project Name: Gravity Main along 132nd Street and Van Ness Avenue

Project Description:

This project includes replacing approximately 850 ft of 10-inch diameter pipeline along 132nd Street, between Van Ness Avenue and Cimarron Avenue, and replacing approximately 1,030 ft of 12 inch diameter pipeline along Van Ness Avenue, between 132nd Street and 134th Place. The existing pipelines cause surcharging under existing PWWF. To mitigate this capacity deficiency, it is recommended that the existing pipeline be replaced with 12 inch and 15 inch diameter pipeline.

Project Details:

Project Element	Diameter (in)	Diameter (in)	Length (ft)	Baseline Construction Cost[2]	Estimated Construction Cost[3]	Improvement Cost[4]	Project Schedule
Gravity Main	10 - 12	12 - 15	1,880	$775,200	$1,007,700	$1,284,800	2026

Notes:

(1) Engineering News Report (ENR) Greater LA Construction Cost Index for October 2022 is 13,728.

(2) Baseline Construction Cost is based on multiplying the unit cost by length of each proposed diameter.

(3) Estimated Construction Cost includes a 30% contingency of the baseline construction cost.

(4) Total project costs includes a 10% markup for engineering, a 10% markup for construction management and a 7.5% markup for project administration of the estimated construction cost.

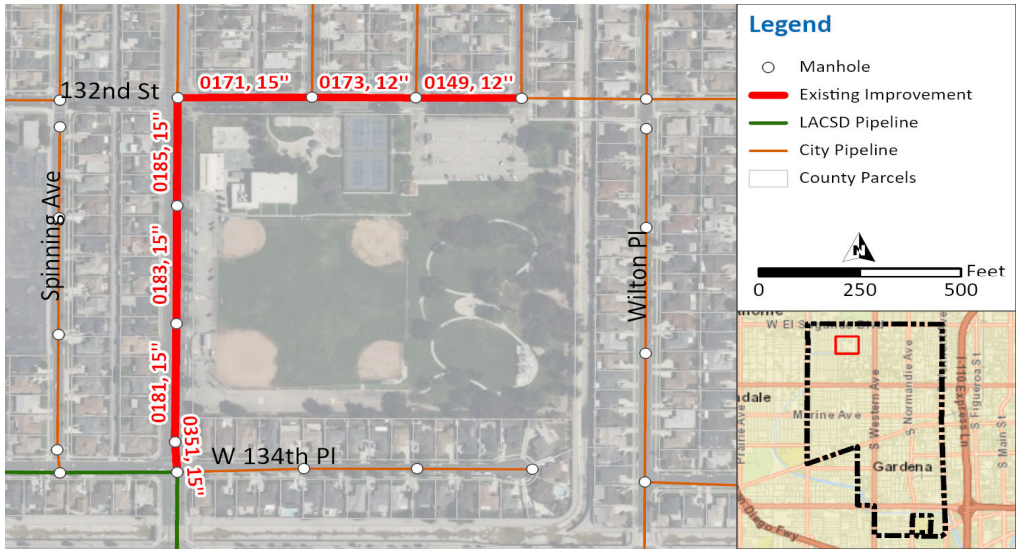
Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	91%	$ 1,173,048
Future Users	9%	$ 111,752
Total	100%	$ 1,284,800

Notes on Cost Estimation:

This project is an existing improvement. A cost percentage has been assigned to future users as a combination of existing and future users benefit from this improvement.

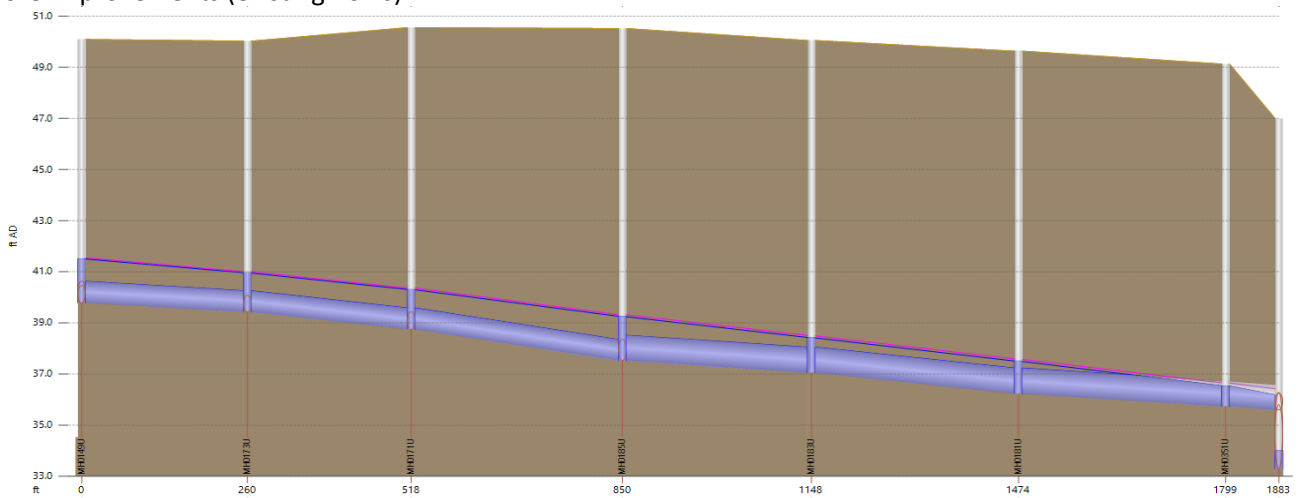
Project Detail:



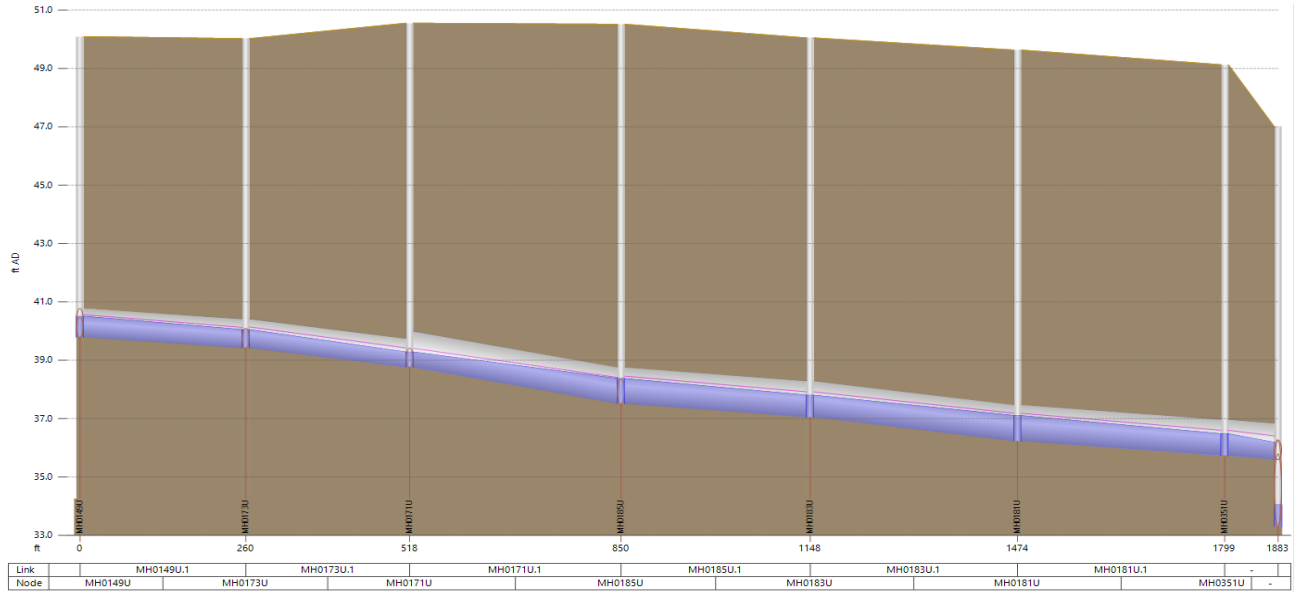
Project Number: P-1

Project Name: Gravity Main along 132nd Street and Van Ness Avenue

Profile Before Improvements (existing flows):



Profile After Improvements (with future flows):



Project Number: P-2

Project Name: Gravity main along 135th Street and 134th Place

Project Description:

This project includes replacing approximately 460 ft of 8-inch diameter pipeline along 134th Place, between Gramercy Place and Wilton Place, and along Wilton Place, between 134th Place and 135th Street. It also includes replacing 1,160 ft of 10-inch diameter pipeline along 135th Street, between Van Ness Avenue and Wilton Place. These deficient pipes cause surcharging under existing PWWF. To mitigate this capacity deficiency, it is recommended that the existing pipeline be replace with 12-inch and 15-inch diameter pipeline.

Project Details:

Project Element	Diameter (in)	Diameter (in)	Length (ft)	Baseline Construction Cost[2]	Estimated Construction Cost[3]	Improvement Cost[4]	Project Schedule
Gravity Main	8 - 10	12 - 15	1,620	$643,300	$836,300	$1,066,300	2026

Notes:

(1) Engineering News Report (ENR) Greater LA Construction Cost Index for October 2022 is 13,728.

(2) Baseline Construction Cost is based on multiplying the unit cost by length of each proposed diameter.

(3) Estimated Construction Cost includes a 30% contingency of the baseline construction cost.

(4) Total project costs includes a 10% markup for engineering, a 10% markup for construction management and a 7.5% markup for project administration of the estimated construction cost.

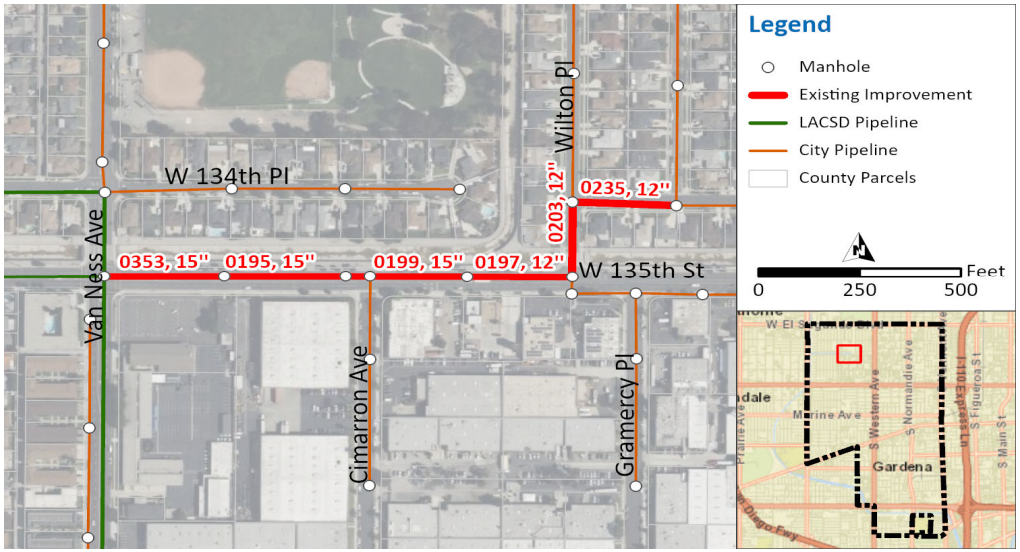
Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	94%	$ 1,003,901
Future Users	6%	$ 62,399
Total	100%	$ 1,066,300

Notes on Cost Estimation:

This project is an existing improvement. A cost percentage has been assigned to future users as a combination of existing and future users benefit from this improvement.

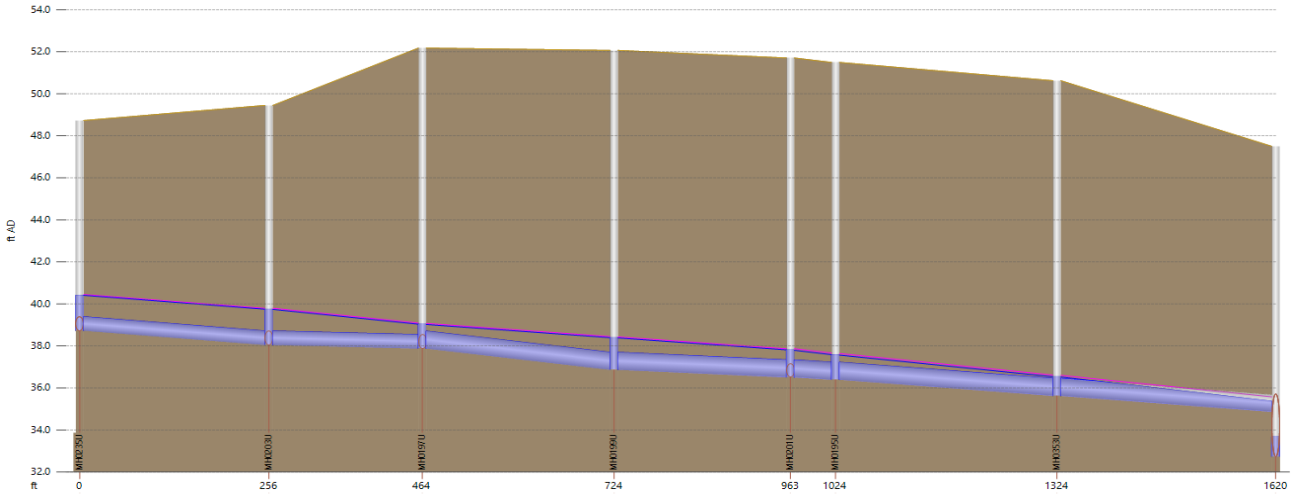
Project Detail:



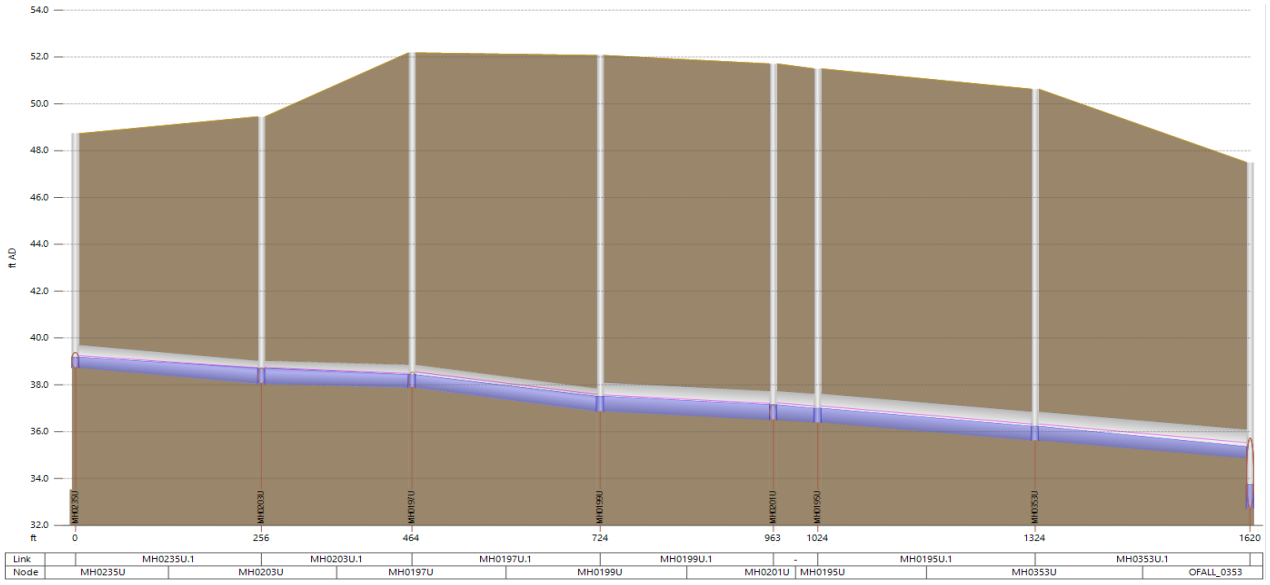
Project Number: P-2

Project Name: Gravity main along 135th Street and 134th Place

Profile Before Improvements (existing flows):



Profile After Improvements (with future flows):



Project Number: P-3

Project Name: Gravity main along El Segundo Boulevard and Western Avenue

Project Description:

This project includes replacing 320 ft of 8-inch diameter pipeline along El Segundo Boulevard and Western Avenue with 12-inch pipeline, and 670 ft of 10-inch diameter pipeline along Western Avenue, between El Segundo Boulevard and 130th Street, with a 15-inch pipeline. These deficient pipes cause flooding upstream under the existing PWWF. This project is located downstream from where outside flow from unincorporated Los Angeles County enters the City's collection system.

Project Details:

Project Element	Diameter (in)	Diameter (in)	Length (ft)	Baseline Construction Cost[2]	Estimated Construction Cost[3]	Improvement Cost[4]	Project Schedule
Gravity Main	8 - 10	12 - 15	980	$400,600	$520,800	$664,000	2023

Notes:

(1) Engineering News Report (ENR) Greater LA Construction Cost Index for October 2022 is 13,728.

(2) Baseline Construction Cost is based on multiplying the unit cost by length of each proposed diameter.

(3) Estimated Construction Cost includes a 30% contingency of the baseline construction cost.

(4) Total project costs includes a 10% markup for engineering, a 10% markup for construction management and a 7.5% markup for project administration of the estimated construction cost.

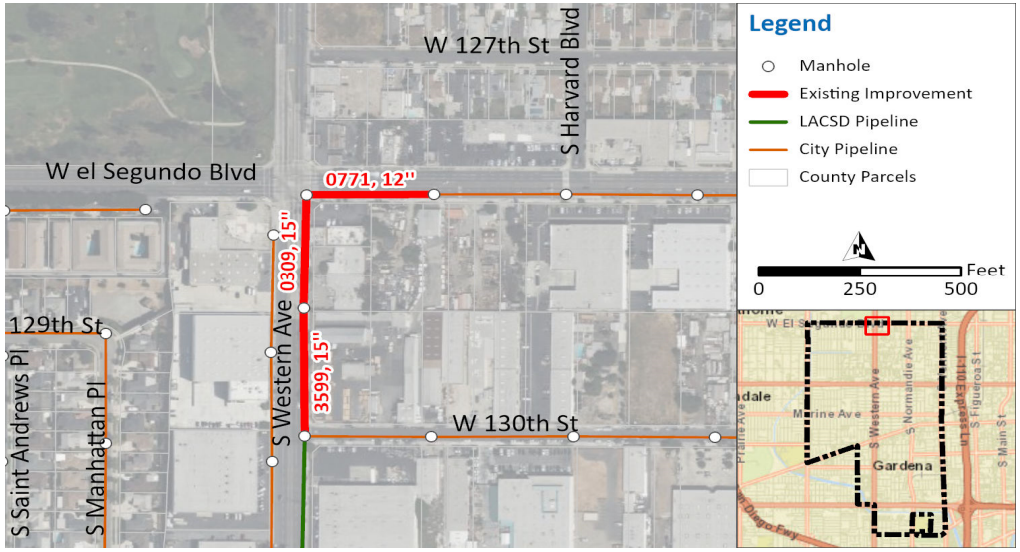
Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	91%	$ 606,839
Future Users	9%	$ 57,161
Total	100%	$ 664,000

Notes on Cost Estimation:

This project is an existing improvement. A cost percentage has been assigned to future users as a combination of existing and future users benefit from this improvement.

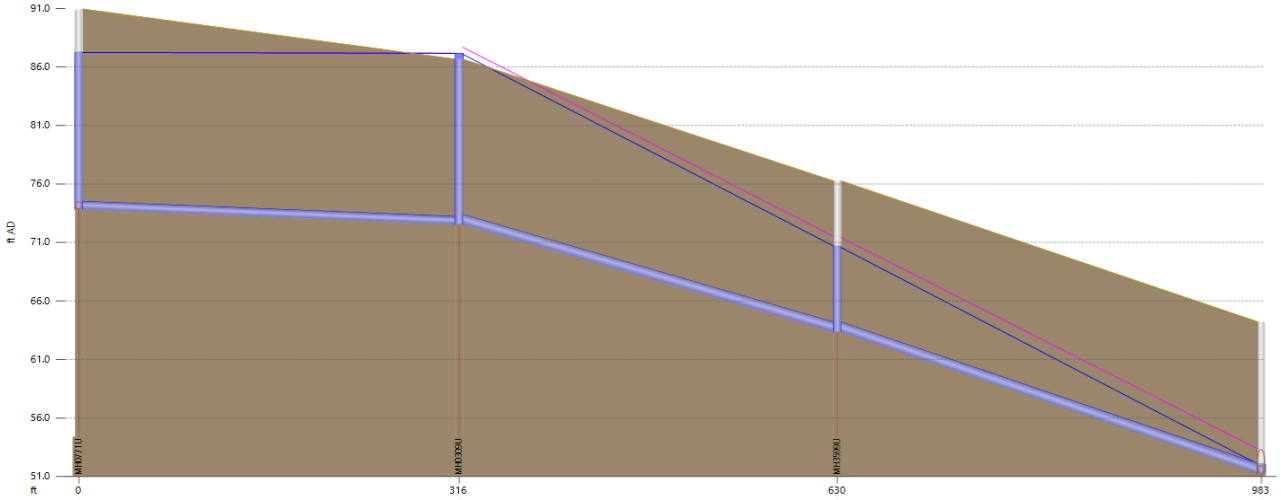
Project Detail:



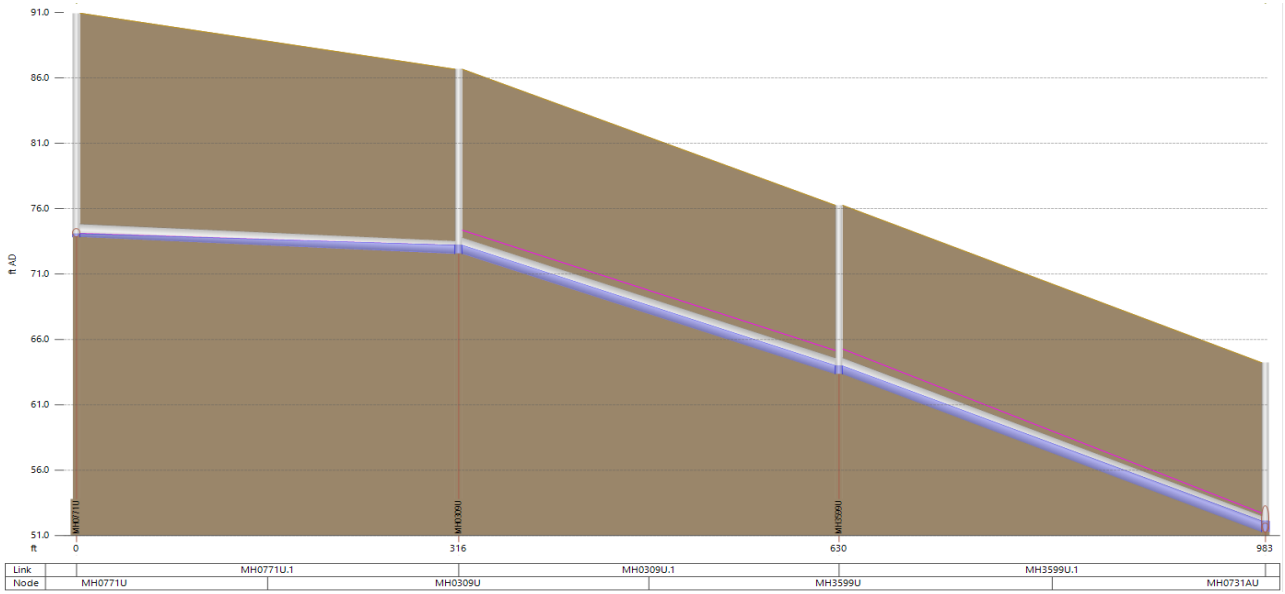
Project Number: P-3

Project Name: Gravity main along El Segundo Boulevard and Western Avenue

Profile Before Improvements (existing flows):



Profile After Improvements (with future flows):



Project Number: P-4

Project Name: Gravity main along 132nd Street

Project Description:

This project includes replacing approximately 770 ft of 8-inch diameter pipeline directly east of Western Avenue along 132nd Street with a 12-inch pipeline. These deficient pipes cause surcharging under existing PWWF, therefore the pipelines are recommended to be upsized. A 10 inch diameter is required to convey existing PWWF, however a 12-inch diameter is required for future PWWF.

Project Details:

Project Element	Diameter (in)	Diameter (in)	Length (ft)	Baseline Construction Cost[2]	Estimated Construction Cost[3]	Improvement Cost[4]	Project Schedule
Gravity Main	8	12	770	$269,700	$350,700	$447,100	2025

Notes:

(1) Engineering News Report (ENR) Greater LA Construction Cost Index for October 2022 is 13,728.

(2) Baseline Construction Cost is based on multiplying the unit cost by length of each proposed diameter.

(3) Estimated Construction Cost includes a 30% contingency of the baseline construction cost.

(4) Total project costs includes a 10% markup for engineering, a 10% markup for construction management and a 7.5% markup for project administration of the estimated construction cost.

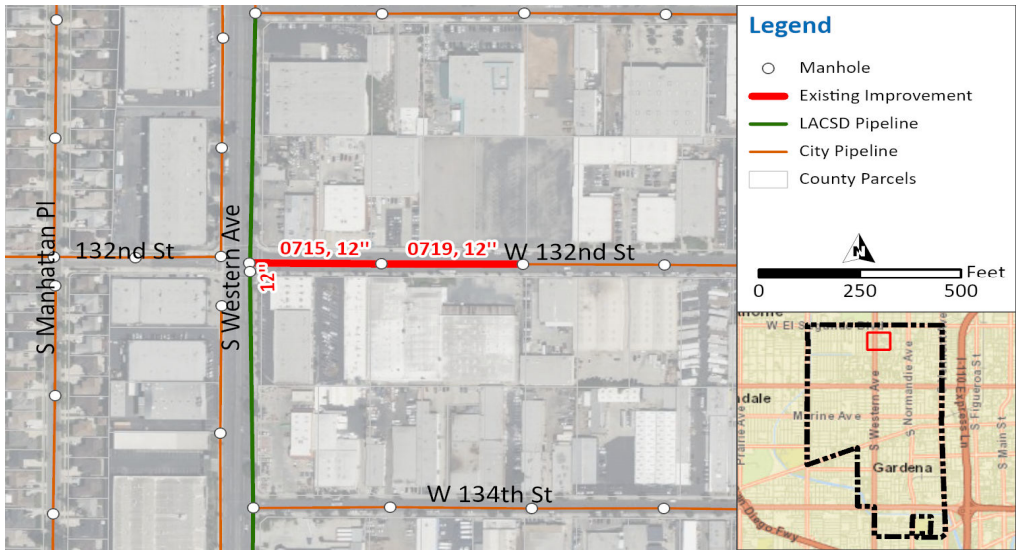
Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	48%	$ 215,237
Future Users	52%	$ 231,863
Total	100%	$ 447,100

Notes on Cost Estimation:

This project is an existing improvement. A cost percentage has been assigned to future users as a combination of existing and future users benefit from this improvement.

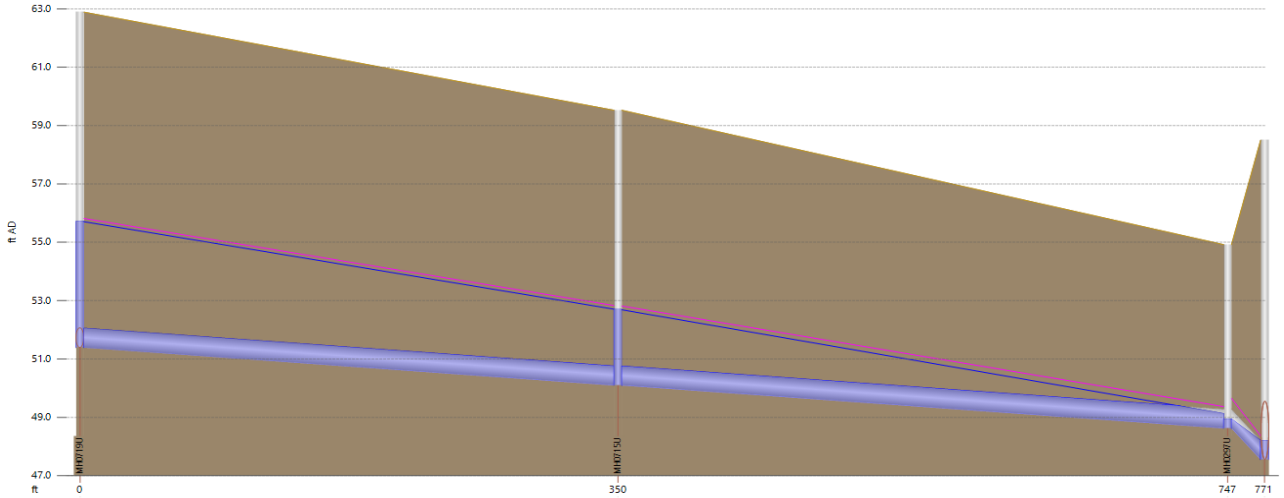
Project Detail:



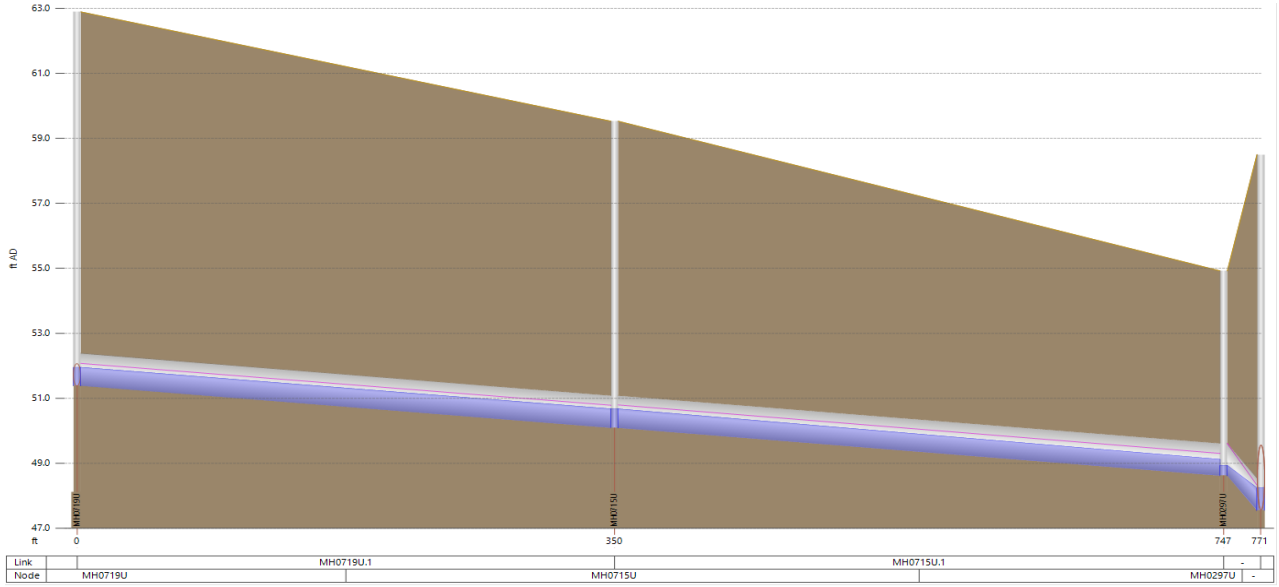
Project Number: P-4

Project Name: Gravity main along 132nd Street

Profile Before Improvements (existing flows):



Profile After Improvements (with future flows):



Project Number: P-5

Project Name: Gravity main along 134th Street

Project Description:

This project includes replacing approximately 1,020 ft of 8-inch diameter pipeline directly east of Western Avenue along 134th Street with a 12-inch pipeline. These deficient pipes cause surcharging under existing PWWF, therefore the pipelines are recommended to be upsized.

Project Details:

Project Element	Diameter (in)	Diameter (in)	Length (ft)	Baseline Construction Cost[2]	Estimated Construction Cost[3]	Improvement Cost[4]	Project Schedule
Gravity Main	8	12	1,020	$355,600	$462,200	$589,300	2027

Notes:

(1) Engineering News Report (ENR) Greater LA Construction Cost Index for October 2022 is 13,728.

(2) Baseline Construction Cost is based on multiplying the unit cost by length of each proposed diameter.

(3) Estimated Construction Cost includes a 30% contingency of the baseline construction cost.

(4) Total project costs includes a 10% markup for engineering, a 10% markup for construction management and a 7.5% markup for project administration of the estimated construction cost.

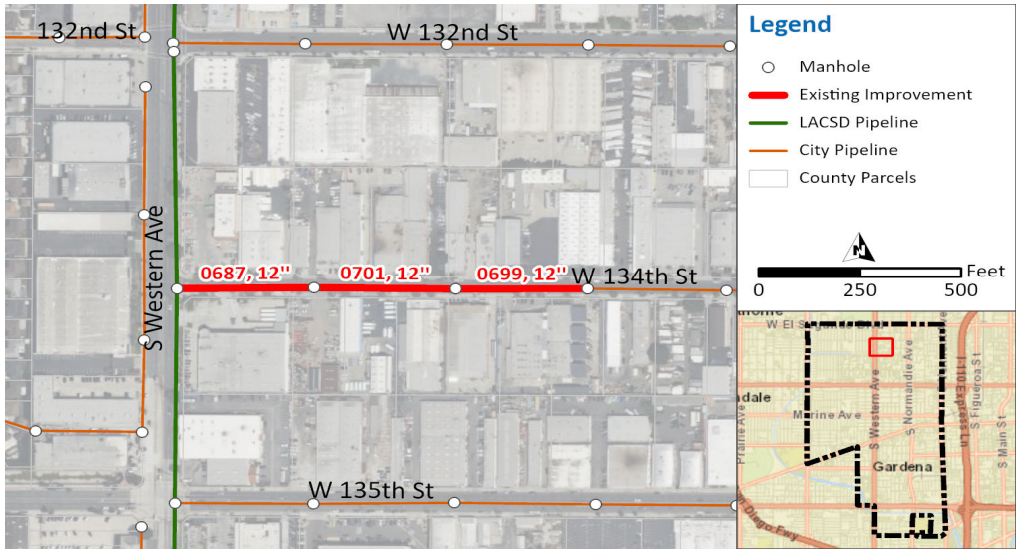
Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	89%	$ 522,592
Future Users	11%	$ 66,708
Total	100%	$ 589,300

Notes on Cost Estimation:

This project is an existing improvement. A cost percentage has been assigned to future users as a combination of existing and future users benefit from this improvement.

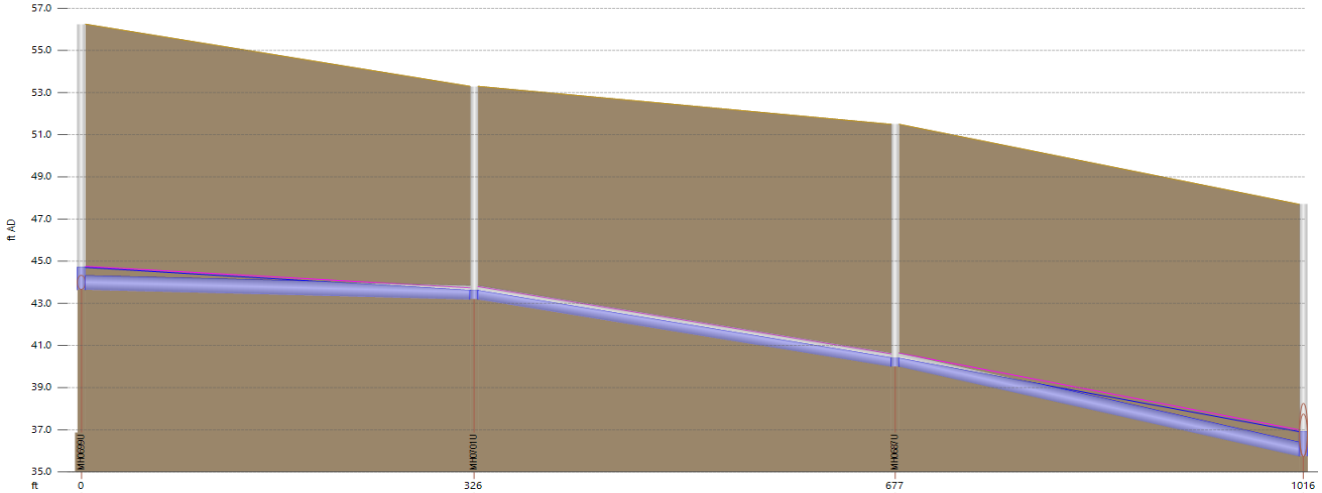
Project Detail:



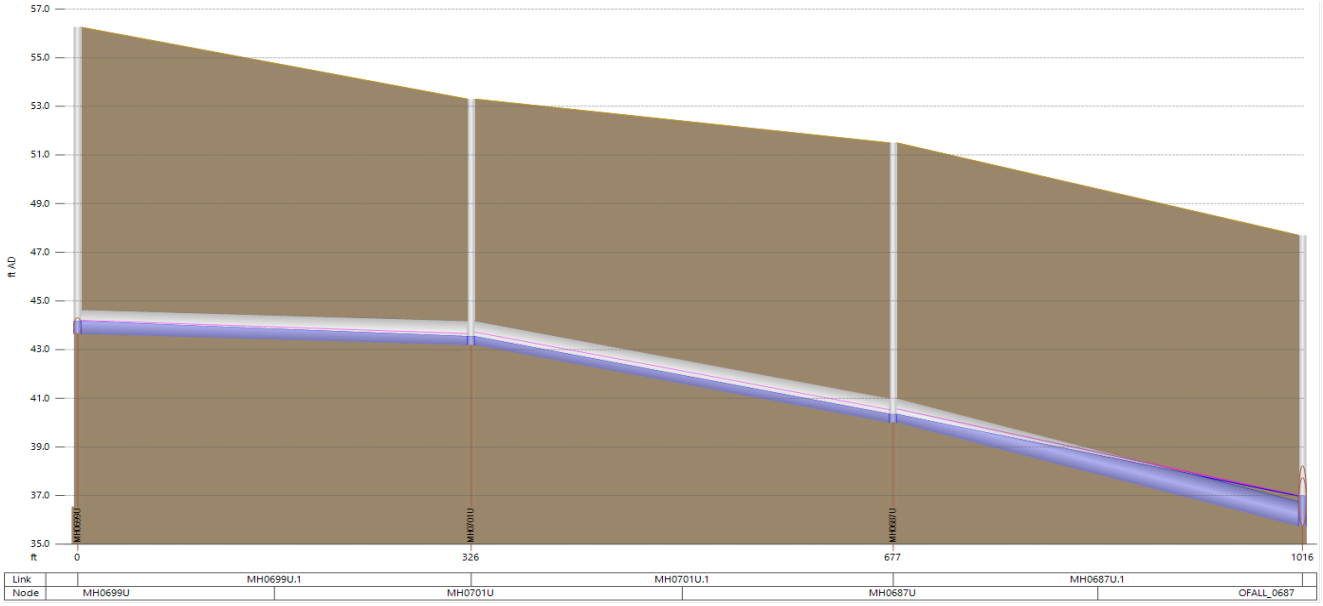
Project Number: P-5

Project Name: Gravity main along 134th Street

Profile Before Improvements (existing flows):



Profile After Improvements (with future flows):



Project Number: P-6

Project Name: Gravity main along 135th Street

Project Description:

This project includes replacing approximately 1,390 ft of 8-inch diameter pipeline east of Western Avenue along 135th Street with a 10-inch pipeline. These deficient pipes cause surcharging under existing PWWF, therefore, the pipelines are recommended to be upsized.

Project Details:

Project Element	Diameter (in)	Diameter (in)	Length (ft)	Baseline Construction Cost[2]	Estimated Construction Cost[3]	Improvement Cost[4]	Project Schedule
Gravity Main	8	10	1,390	$460,100	$598,100	$762,500	2023

Notes:

(1) Engineering News Report (ENR) Greater LA Construction Cost Index for October 2022 is 13,728.

(2) Baseline Construction Cost is based on multiplying the unit cost by length of each proposed diameter.

(3) Estimated Construction Cost includes a 30% contingency of the baseline construction cost.

(4) Total project costs includes a 10% markup for engineering, a 10% markup for construction management and a 7.5% markup for project administration of the estimated construction cost.

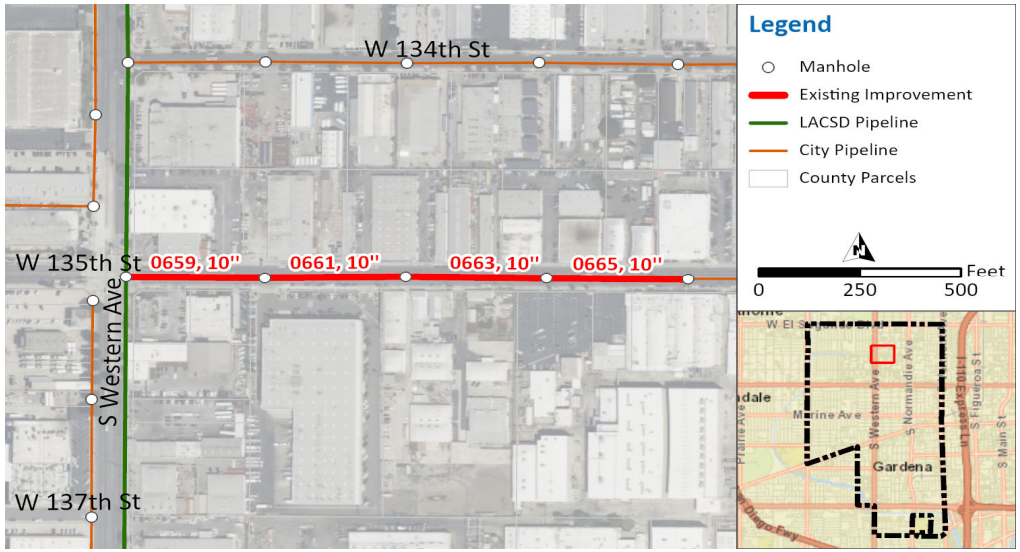
Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	79%	$ 605,998
Future Users	21%	$ 156,502
Total	100%	$ 762,500

Notes on Cost Estimation:

This project is an existing improvement. A cost percentage has been assigned to future users as a combination of existing and future users benefit from this improvement.

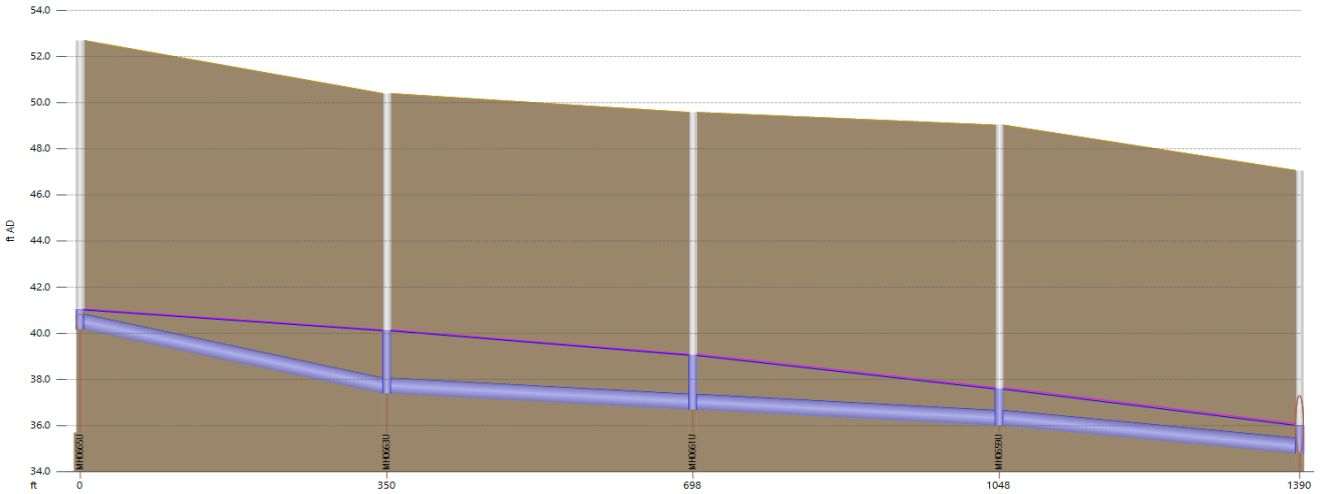
Project Detail:



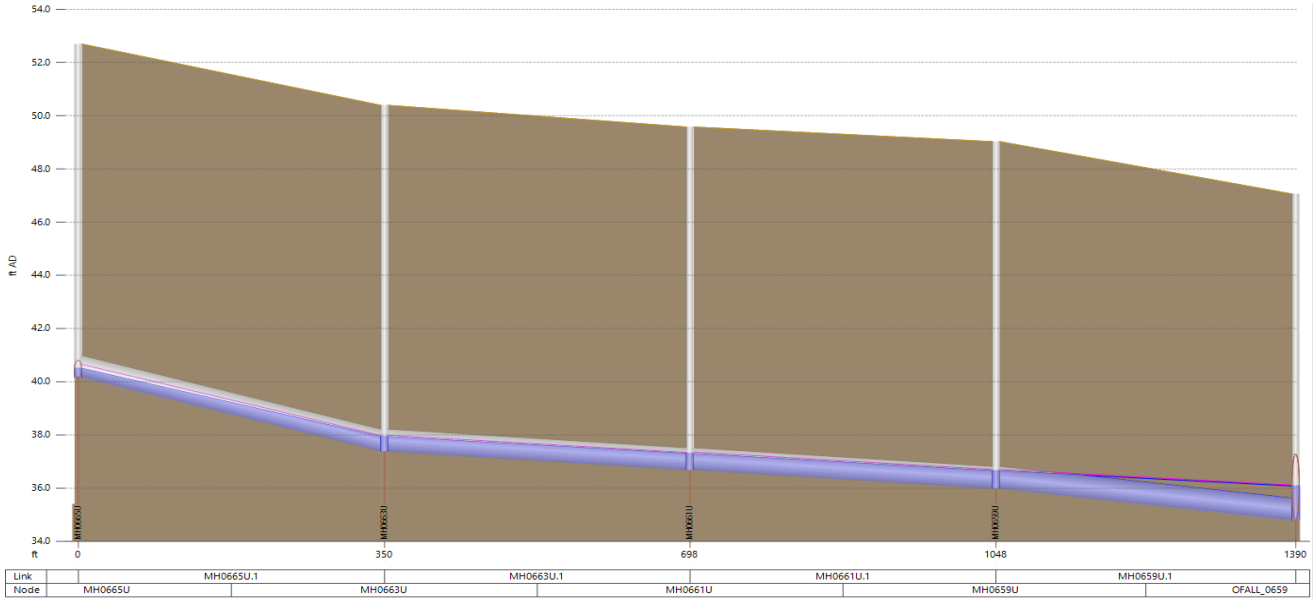
Project Number: P-6

Project Name: Gravity main along 135th Street

Profile Before Improvements (existing flows):



Profile After Improvements (with future flows):



Project Number: P-7

Project Name: Gravity main along Vermont Avenue and 135th Street

Project Description:

This project includes replacing approximately 880 ft of 8-inch diameter pipeline between 134th Place and 135th Street to Vermont Avenue with 10-inch and 12-inch pipeline. It also includes replacing approximately 840 ft of 8-inch diameter pipeline along Vermont Avenue, between 135th Street and Travelers Motor Inn and Trailer Park, with 12-inch and 15-inch diameter pipeline. These deficient pipes cause surcharging under existing PWWF, therefore, the pipelines are recommended to be upsized. This project is located upstream of project P 10. It is recommended that project P-10 be constructed prior to P 7.

Project Details:

Project Element	Diameter (in)	Diameter (in)	Length (ft)	Baseline Construction Cost[2]	Estimated Construction Cost[3]	Improvement Cost[4]	Project Schedule
Gravity Main	8	10 - 15	1,720	$620,600	$806,700	$1,028,600	2027

Notes:

(1) Engineering News Report (ENR) Greater LA Construction Cost Index for October 2022 is 13,728.

(2) Baseline Construction Cost is based on multiplying the unit cost by length of each proposed diameter.

(3) Estimated Construction Cost includes a 30% contingency of the baseline construction cost.

(4) Total project costs includes a 10% markup for engineering, a 10% markup for construction management and a 7.5% markup for project administration of the estimated construction cost.

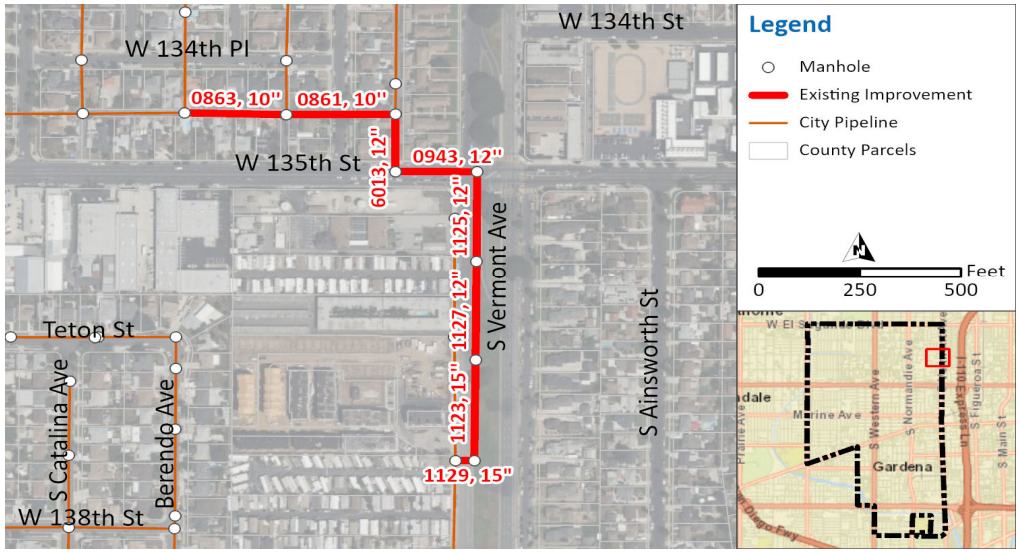
Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	94%	$ 961,790
Future Users	6%	$ 66,810
Total	100%	$ 1,028,600

Notes on Cost Estimation:

This project is an existing improvement. A cost percentage has been assigned to future users as a combination of existing and future users benefit from this improvement.

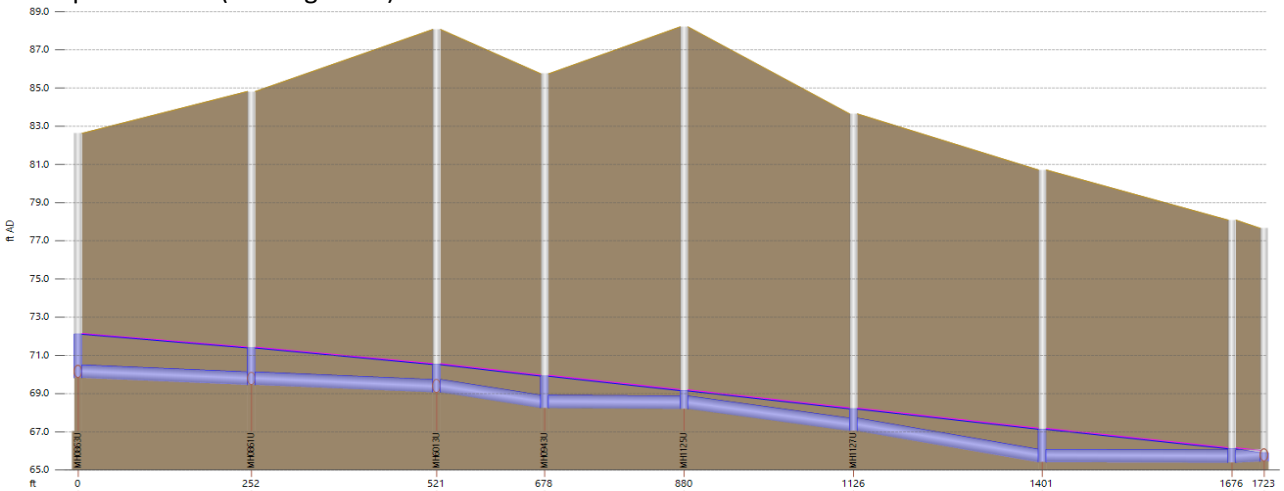
Project Detail:



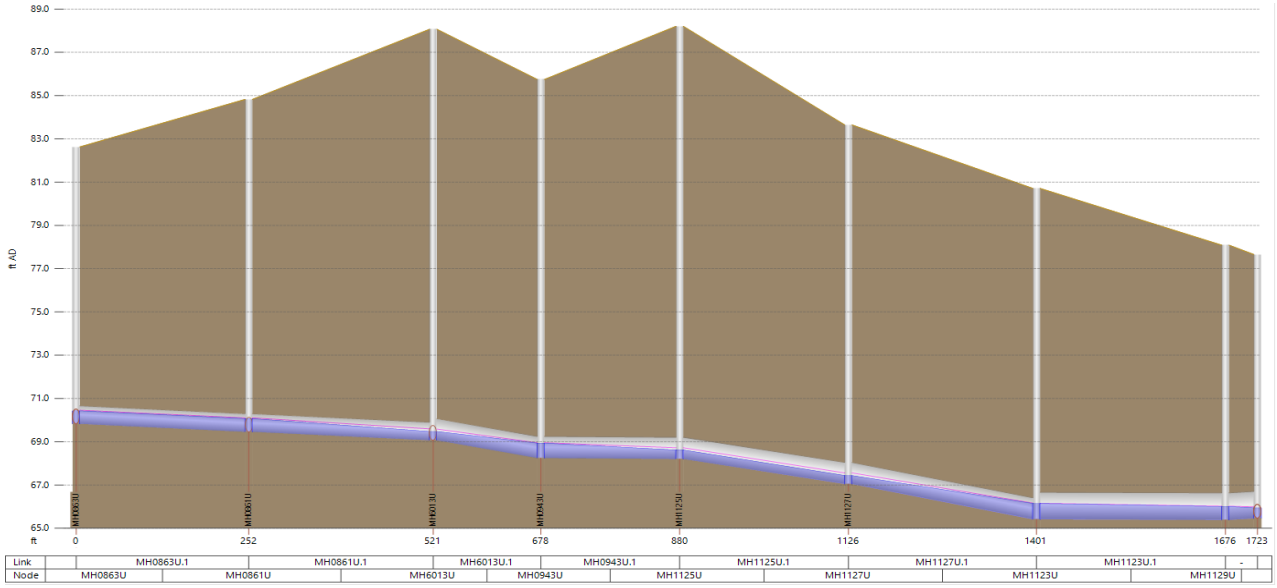
Project Number: P-7

Project Name: Gravity main along Vermont Avenue and 135th Street

Profile Before Improvements (existing flows):



Profile After Improvements (with future flows):



Project Number: P-8

Project Name: Gravity main along 147th Streetand Gramercy Place

Project Description:

This project includes replacing approximately 280 ft of 8-inch diameter pipeline along 147th Street and west of Gramercy Place, and replacing 390 ft of 8-inch diameter pipeline along Gramercy Place, between 146th Street and 147th Street with a 10-inch pipeline. It includes replacing approximately 1,620 ft of 8-inch diameter pipeline along 146th Street, from Gramercy Place to the connection on 145th Street, with a 12-inch pipeline. These deficient pipes cause surcharging within 2 ft of the manhole rim under existing PWWF, therefore, the pipelines are recommended to be upsized.

Project Details:

Project Element	Diameter (in)	Diameter (in)	Length (ft)	Baseline Construction Cost[2]	Estimated Construction Cost[3]	Improvement Cost[4]	Project Schedule
Gravity Main	8	10 - 12	2,330	$801,000	$1,041,300	$1,327,600	2023

Notes:

(1) Engineering News Report (ENR) Greater LA Construction Cost Index for October 2022 is 13,728.

(2) Baseline Construction Cost is based on multiplying the unit cost by length of each proposed diameter.

(3) Estimated Construction Cost includes a 30% contingency of the baseline construction cost.

(4) Total project costs includes a 10% markup for engineering, a 10% markup for construction management and a 7.5% markup for project administration of the estimated construction cost.

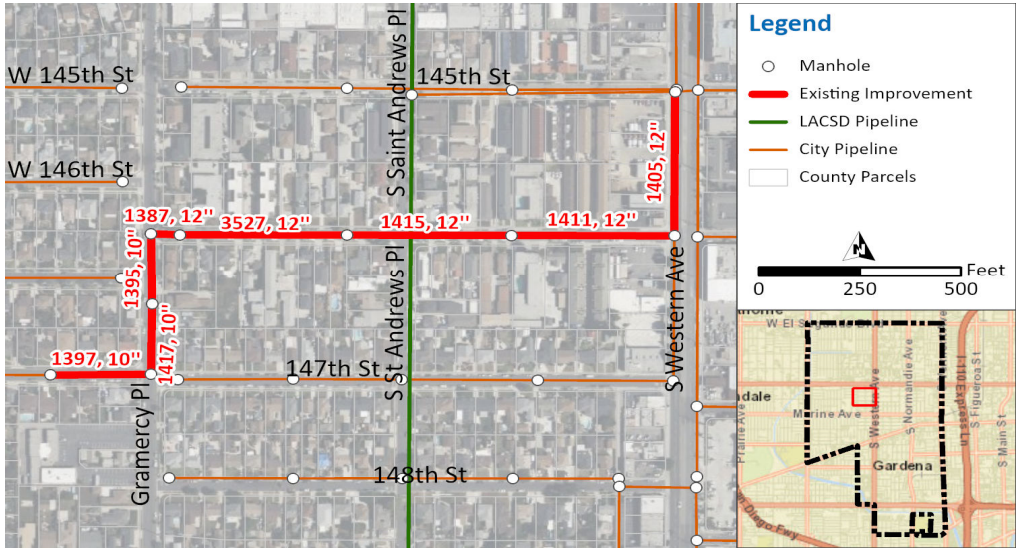
Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	99%	$ 1,309,064
Future Users	1%	$ 18,536
Total	100%	$ 1,327,600

Notes on Cost Estimation:

This project is an existing improvement. A cost percentage has been assigned to future users as a combination of existing and future users benefit from this improvement.

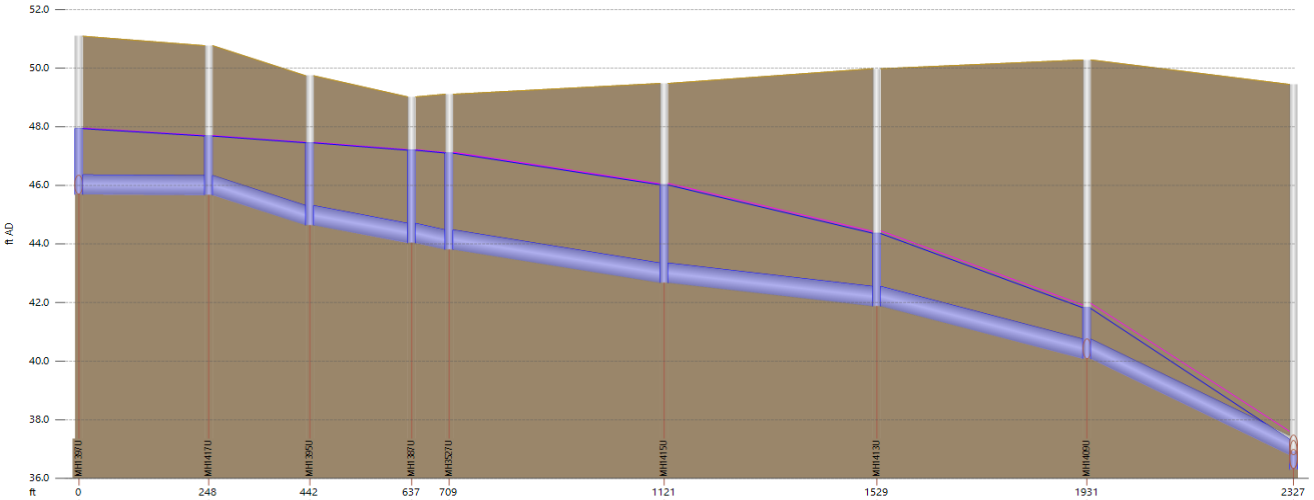
Project Detail:



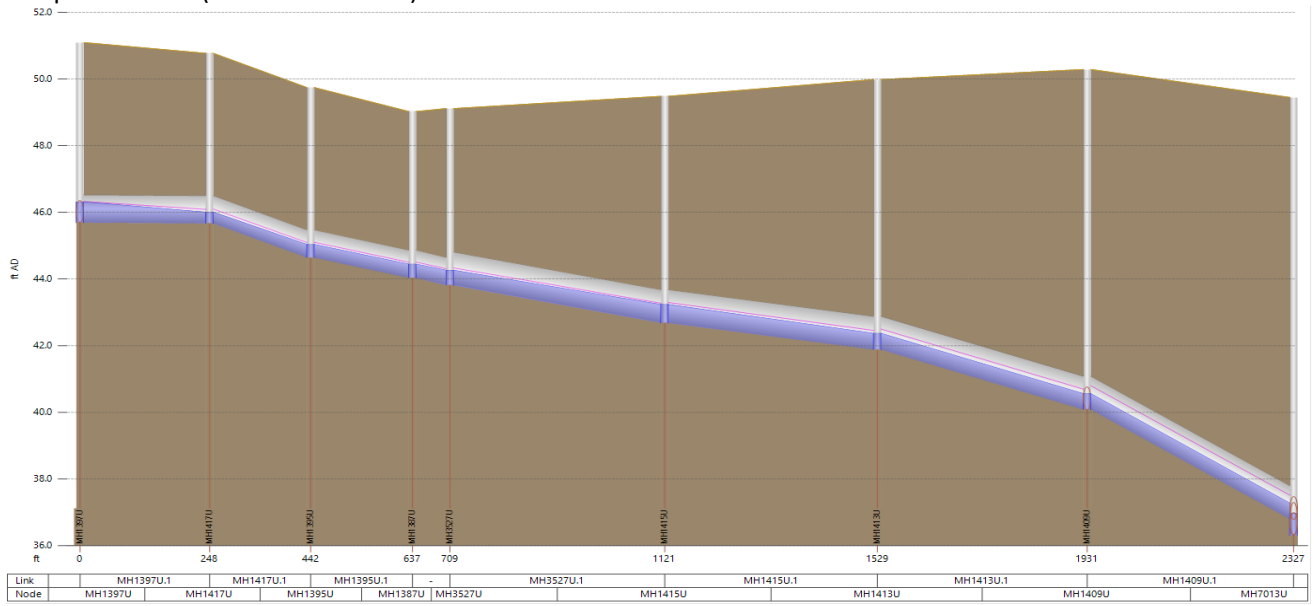
Project Number: P-8

Project Name: Gravity main along 147th Streetand Gramercy Place

Profile Before Improvements (existing flows):



Profile After Improvements (with future flows):



Project Number: P-9

Project Name: Gravity main along Denker Avenue

Project Description:

This project includes replacing approximately 340 ft of 8 inch diameter pipeline along Denker Avenue, between 144th Street and Rosecrans Avenue, with a 12-inch pipeline. The existing pipes in this area are very flat and lead to surcharging under existing PWWF.

Project Details:

Project Element	Diameter (in)	Diameter (in)	Length (ft)	Baseline Construction Cost[2]	Estimated Construction Cost[3]	Improvement Cost[4]	Project Schedule
Gravity Main	8	12	340	$119,900	$155,900	$198,800	Intermediate-Term

Notes:

(1) Engineering News Report (ENR) Greater LA Construction Cost Index for October 2022 is 13,728.

(2) Baseline Construction Cost is based on multiplying the unit cost by length of each proposed diameter.

(3) Estimated Construction Cost includes a 30% contingency of the baseline construction cost.

(4) Total project costs includes a 10% markup for engineering, a 10% markup for construction management and a 7.5% markup for project administration of the estimated construction cost.

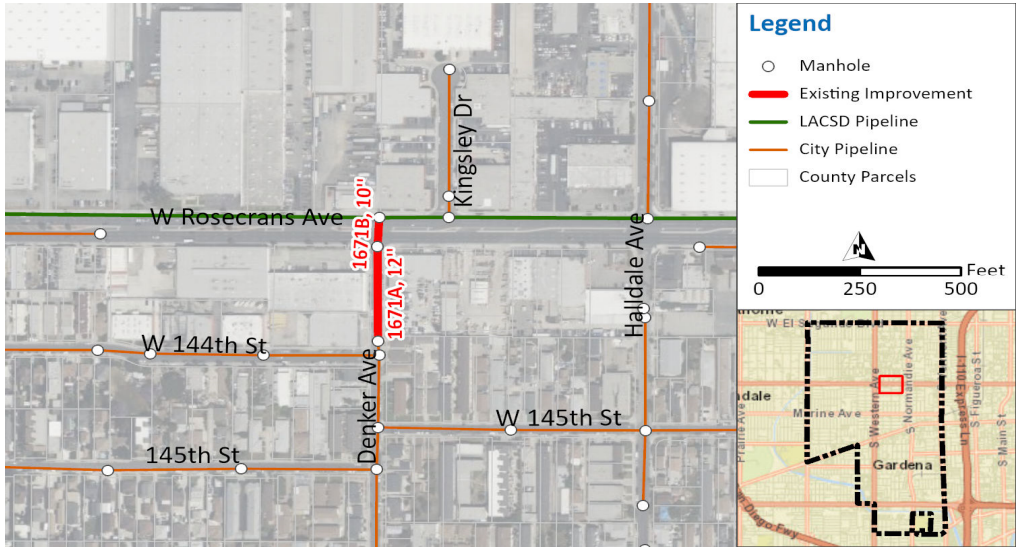
Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	83%	$ 164,320
Future Users	17%	$ 34,480
Total	100%	$ 198,800

Notes on Cost Estimation:

This project is an existing improvement. A cost percentage has been assigned to future users as a combination of existing and future users benefit from this improvement.

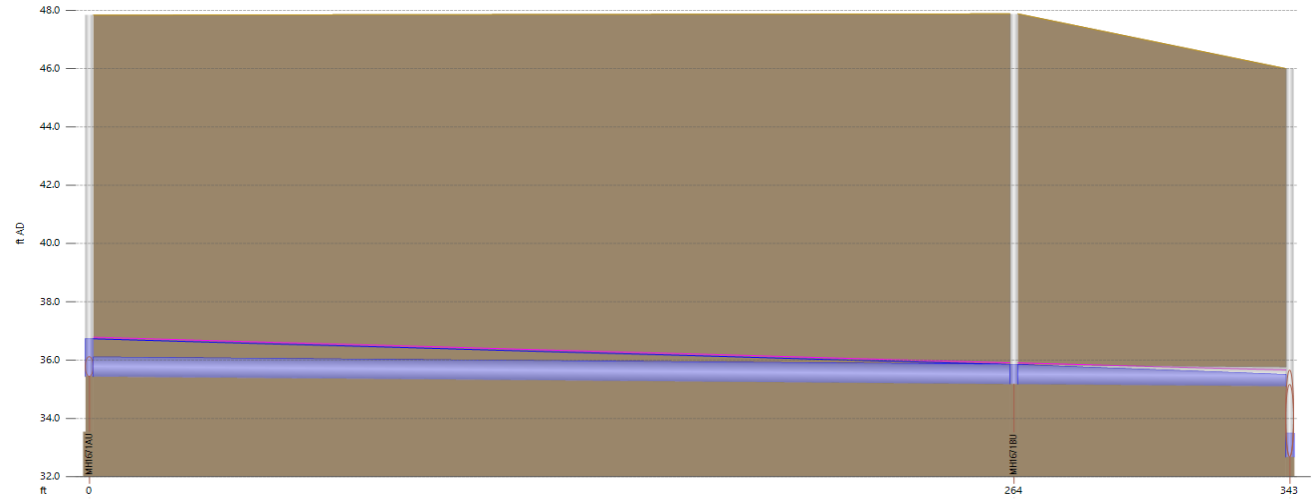
Project Detail:



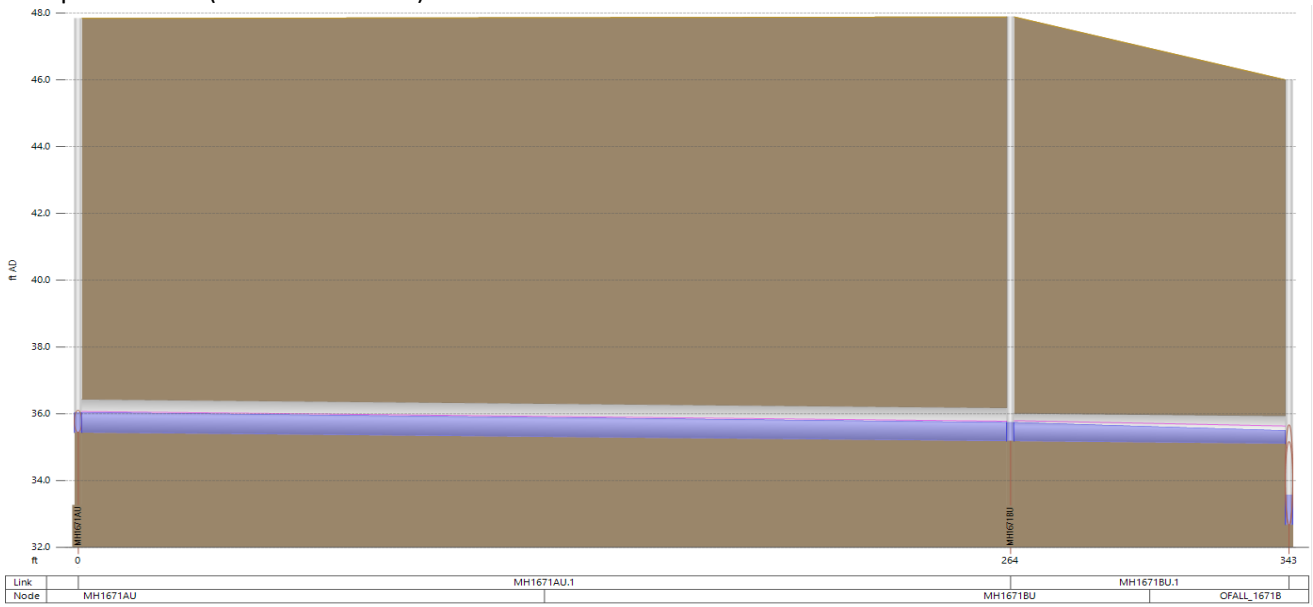
Project Number: P-9

Project Name: Gravity main along Denker Avenue

Profile Before Improvements (existing flows):



Profile After Improvements (with future flows):



Project Number: P-10

Project Name: Gravity main along Vermont Avenue and Rosecrans Avenue

Project Description:

This project includes replacing approximately 810 ft of 8-inch pipeline along Vermont Avenue, between Quigley's Market and Rosecrans Avenue, and replacing approximately 1,220 ft of 10-inch diameter pipeline along Rosecrans Avenue, between Vermont Avenue and Budlong Avenue, with 12-inch diameter pipeline. These deficient pipes cause surcharging under existing PWWF, therefore, the pipelines are recommended to be upsized.

Project Details:

Project Element	Diameter (in)	Diameter (in)	Length (ft)	Baseline Construction Cost[2]	Estimated Construction Cost[3]	Improvement Cost[4]	Project Schedule
Gravity Main	8 - 10	12	2,030	$709,300	$922,100	$1,175,700	2025

Notes:

(1) Engineering News Report (ENR) Greater LA Construction Cost Index for October 2022 is 13,728.

(2) Baseline Construction Cost is based on multiplying the unit cost by length of each proposed diameter.

(3) Estimated Construction Cost includes a 30% contingency of the baseline construction cost.

(4) Total project costs includes a 10% markup for engineering, a 10% markup for construction management and a 7.5% markup for project administration of the estimated construction cost.

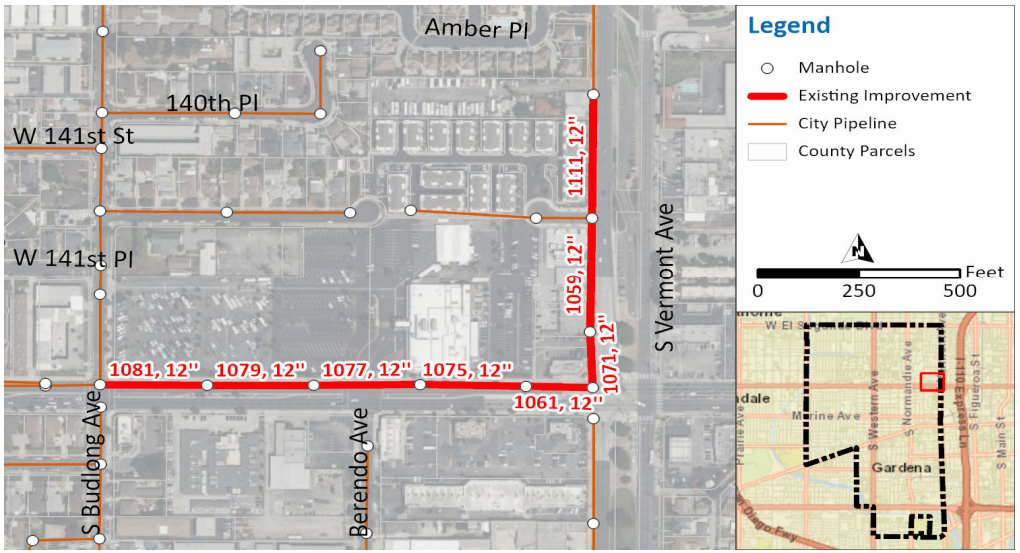
Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	88%	$ 1,030,949
Future Users	12%	$ 144,751
Total	100%	$ 1,175,700

Notes on Cost Estimation:

This project is an existing improvement. A cost percentage has been assigned to future users as a combination of existing and future users benefit from this improvement.

Project Detail:

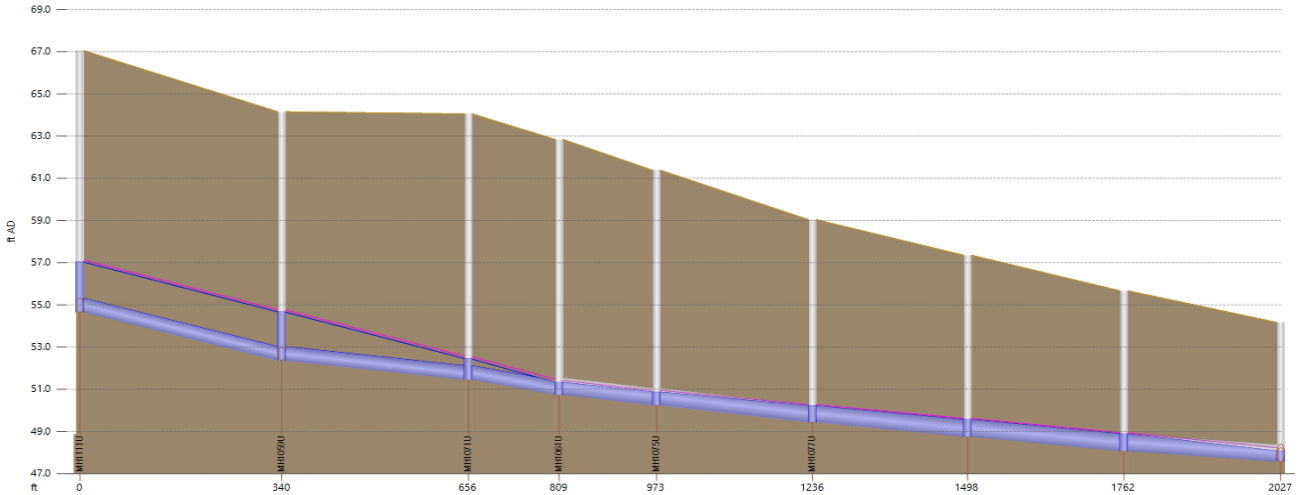


carollo

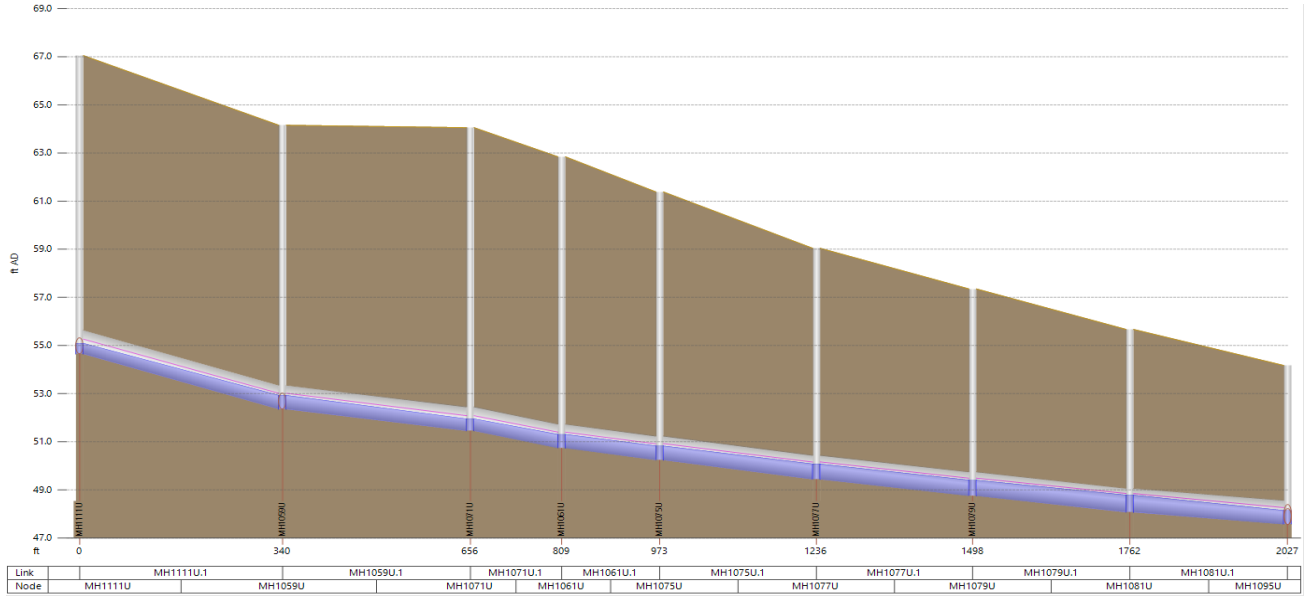
Project Number: P-10

Project Name: Gravity main along Vermont Avenue and Rosecrans Avenue

Profile Before Improvements (existing flows):



Profile After Improvements (with future flows):



Project Number: P-11

Project Name: Gravity main along Budlong Avenue and Marine Avenue

Project Description:

This project includes replacing approximately 2,150 ft of 8-inch pipeline along Budlong Avenue, between 146th Street and Marine Avenue, and along Marine Avenue, between Budlong Avenue and Raymond Avenue. These deficient pipes cause surcharging under existing PWWF. To mitigate this capacity deficiency, it is recommended that the existing pipeline to be replaced with a 12-inch diameter pipeline.

Project Details:

Project Element	Diameter (in)	Diameter (in)	Length (ft)	Baseline Construction Cost[2]	Estimated Construction Cost[3]	Improvement Cost[4]	Project Schedule
Gravity Main	8	12	2,150	$752,800	$978,600	$1,247,700	Intermediate-Term

Notes:

(1) Engineering News Report (ENR) Greater LA Construction Cost Index for October 2022 is 13,728.

(2) Baseline Construction Cost is based on multiplying the unit cost by length of each proposed diameter.

(3) Estimated Construction Cost includes a 30% contingency of the baseline construction cost.

(4) Total project costs includes a 10% markup for engineering, a 10% markup for construction management and a 7.5% markup for project administration of the estimated construction cost.

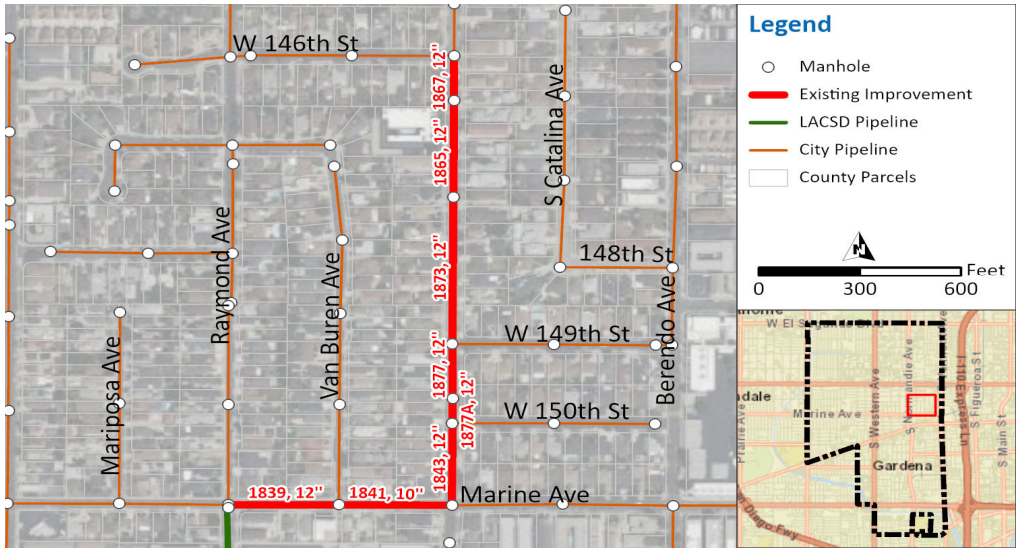
Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	93%	$ 1,164,457
Future Users	7%	$ 83,243
Total	100%	$ 1,247,700

Notes on Cost Estimation:

This project is an existing improvement. A cost percentage has been assigned to future users as a combination of existing and future users benefit from this improvement.

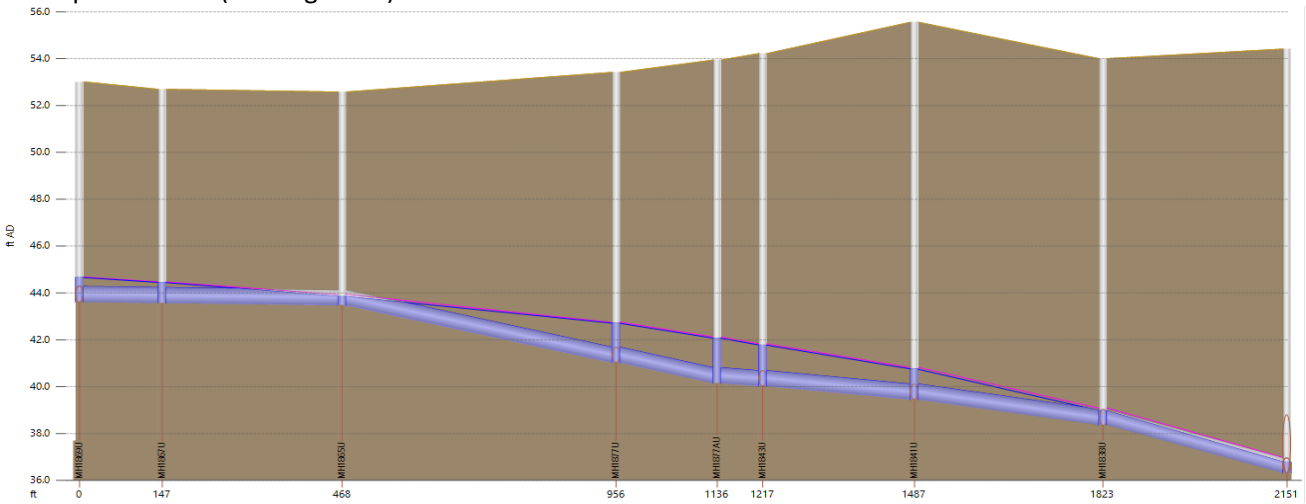
Project Detail:



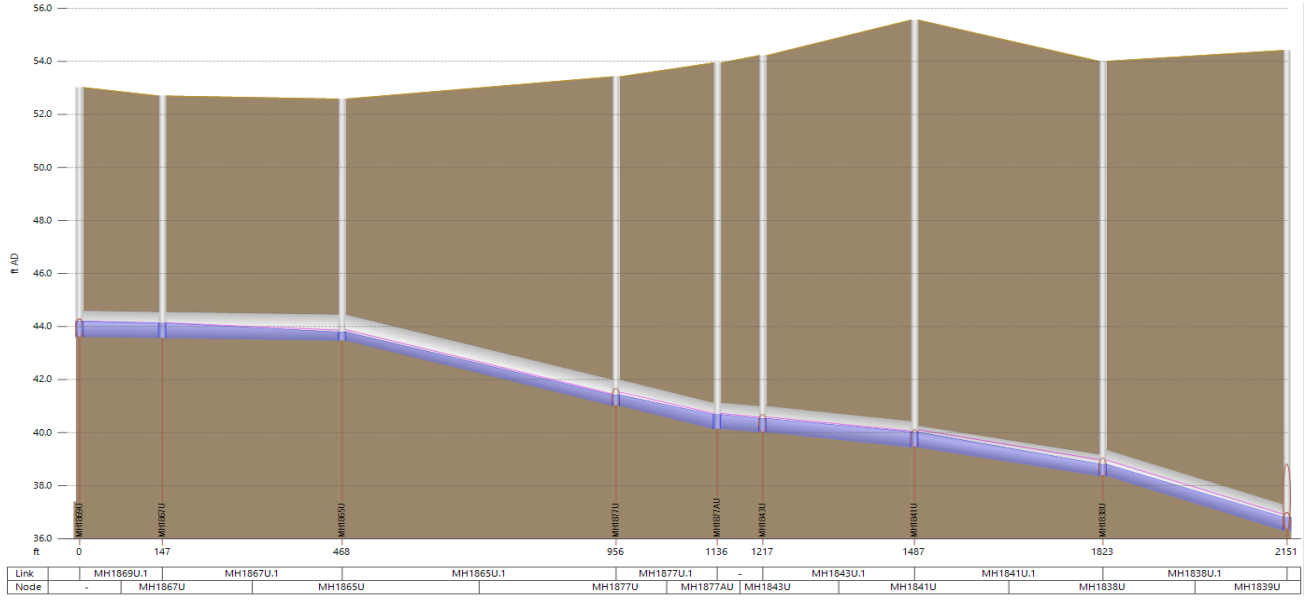
Project Number: P-11

Project Name: Gravity main along Budlong Avenue and Marine Avenue

Profile Before Improvements (existing flows):



Profile After Improvements (with future flows):



Project Number: P-12A

Project Name: Gravity main along Ruthelen Avenue and Redondo Beach Boulevard

Project Description:

This project includes replacing approximately 1,170 ft of 6-inch and 8-inch diameter pipeline along Ruthelen Avenue, between 154th Place and Redondo Beach Boulevard, with a 10-inch diameter pipeline. This project also includes replacing approximately 890 ft of 8-inch diameter pipeline along Redondo Beach Boulevard, between Gramercy Place and Manhattan Place, with a 12-inch diameter pipeline. These deficient pipes cause surcharging within 2 ft below the manhole rim under existing PWWF. The proposed 10-inch diameter pipe on Ruthelen Avenue is not only needed to convey existing PWWF, it is also required to maintain a minimum velocity of 2 fps at the current pipe gradient. Project P-12B, which is downstream of this project, is recommended to be constructed prior to P-12A.

Project Details:

Project Element	Diameter (in)	Diameter (in)	Length (ft)	Baseline Construction Cost[2]	Estimated Construction Cost[3]	Improvement Cost[4]	Project Schedule
Gravity Main	6 - 8	10 - 12	1,740	$586,600	$762,600	$972,300	2024

Notes:

(1) Engineering News Report (ENR) Greater LA Construction Cost Index for October 2022 is 13,728.

(2) Baseline Construction Cost is based on multiplying the unit cost by length of each proposed diameter.

(3) Estimated Construction Cost includes a 30% contingency of the baseline construction cost.

(4) Total project costs includes a 10% markup for engineering, a 10% markup for construction management and a 7.5% markup for project administration of the estimated construction cost.

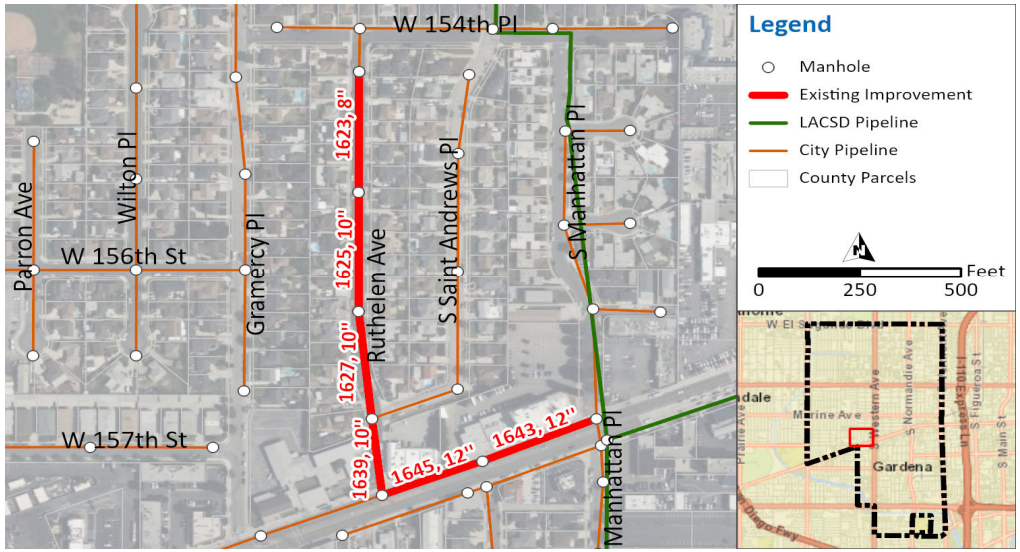
Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	99%	$ 962,089
Future Users	1%	$ 10,211
Total	100%	$ 972,300

Notes on Cost Estimation:

This project is an existing improvement. A cost percentage has been assigned to future users as a combination of existing and future users benefit from this improvement.

Project Detail:

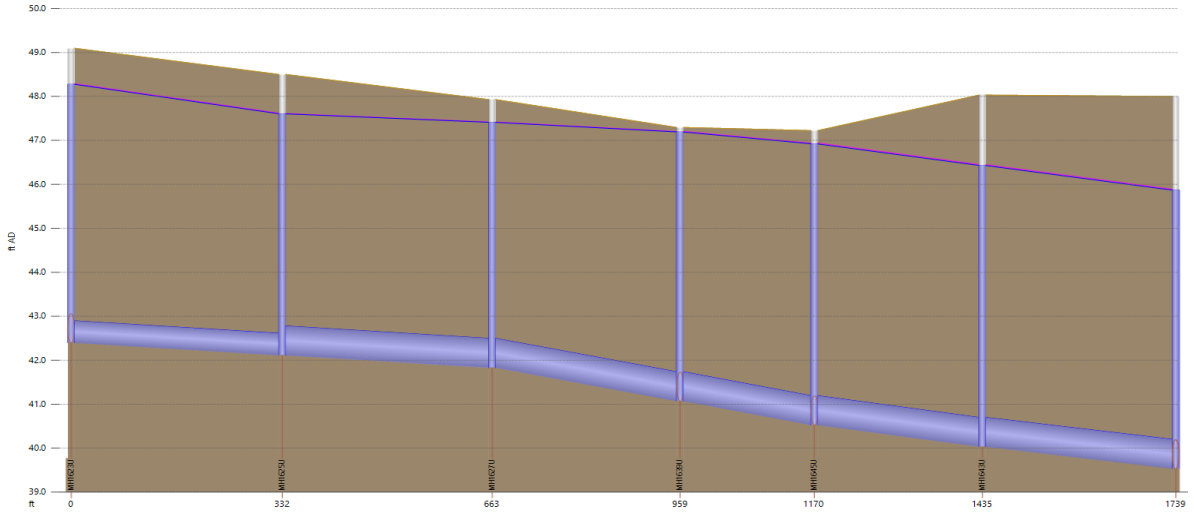


carollo

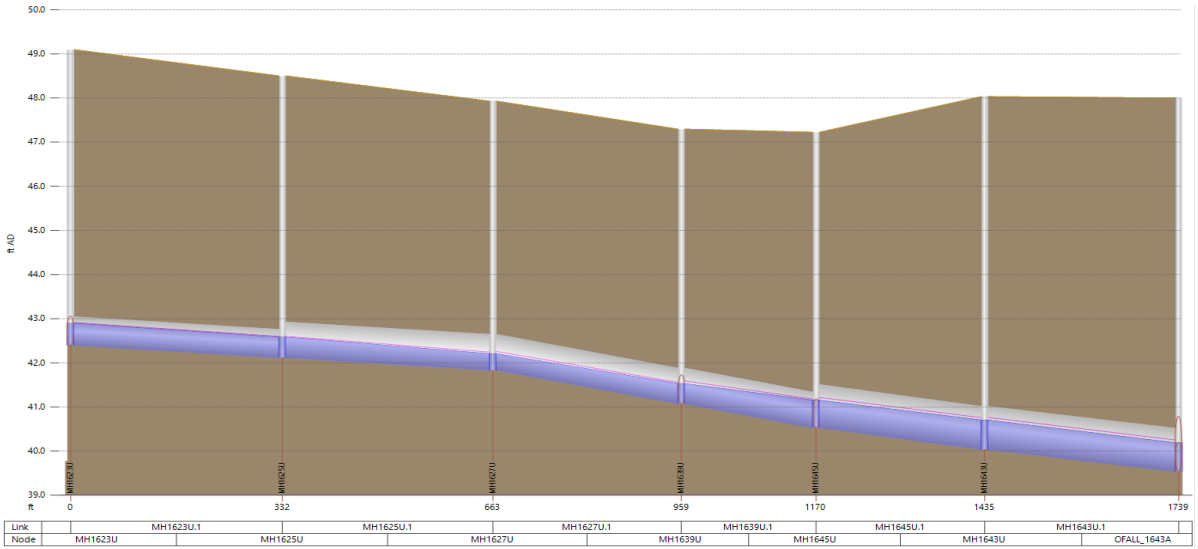
Project Number: P-12A

Project Name: Gravity main along Ruthelen Avenue and Redondo Beach Boulevard

Profile Before Improvements (existing flows):



Profile After Improvements (with future flows):



Project Number: P-12B

Project Name: Gravity main along Manhattan Place

Project Description:

This project includes replacing approximately 1,660 ft of 8-inch and 10-inch diameter pipeline along Manhattan Place, between Redondo Beach Boulevard and the connection to the LACSD interceptor on 162nd Street. These deficient pipes cause surcharging within 2 ft below the manhole under existing PWWF. The maximum d/D within the existing pipelines exceeds the maximum criteria under existing PWWF, therefore, the pipelines are recommended to be upsized.

Project Details:

Project Element	Diameter (in)	Diameter (in)	Length (ft)	Baseline Construction Cost[2]	Estimated Construction Cost[3]	Improvement Cost[4]	Project Schedule
Gravity Main	8 - 10	15	1,660	$720,700	$936,900	$1,194,600	2023

Notes:

(1) Engineering News Report (ENR) Greater LA Construction Cost Index for October 2022 is 13,728.

(2) Baseline Construction Cost is based on multiplying the unit cost by length of each proposed diameter.

(3) Estimated Construction Cost includes a 30% contingency of the baseline construction cost.

(4) Total project costs includes a 10% markup for engineering, a 10% markup for construction management and a 7.5% markup for project administration of the estimated construction cost.

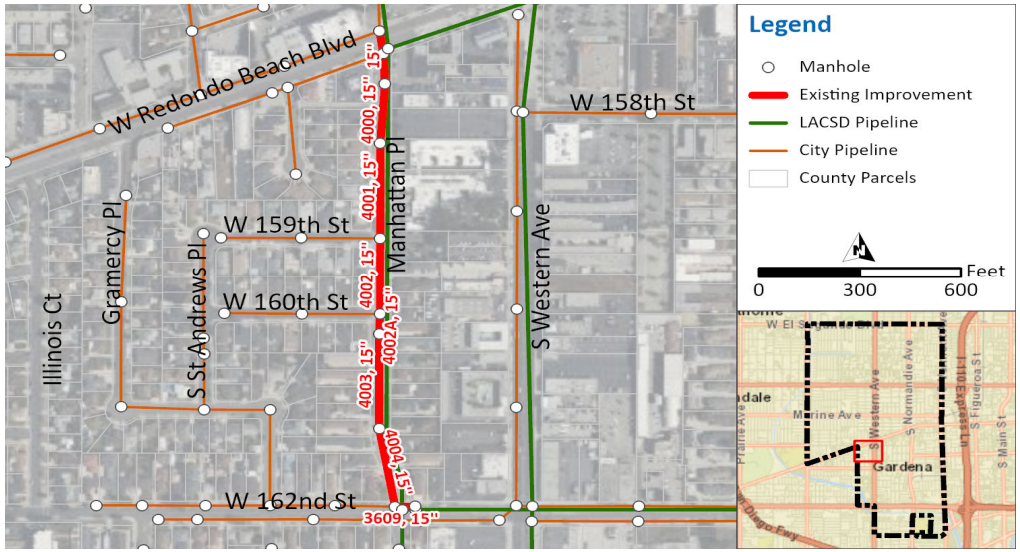
Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	99%	$ 1,182,324
Future Users	1%	$ 12,276
Total	100%	$ 1,194,600

Notes on Cost Estimation:

This project is an existing improvement. A cost percentage has been assigned to future users as a combination of existing and future users benefit from this improvement.

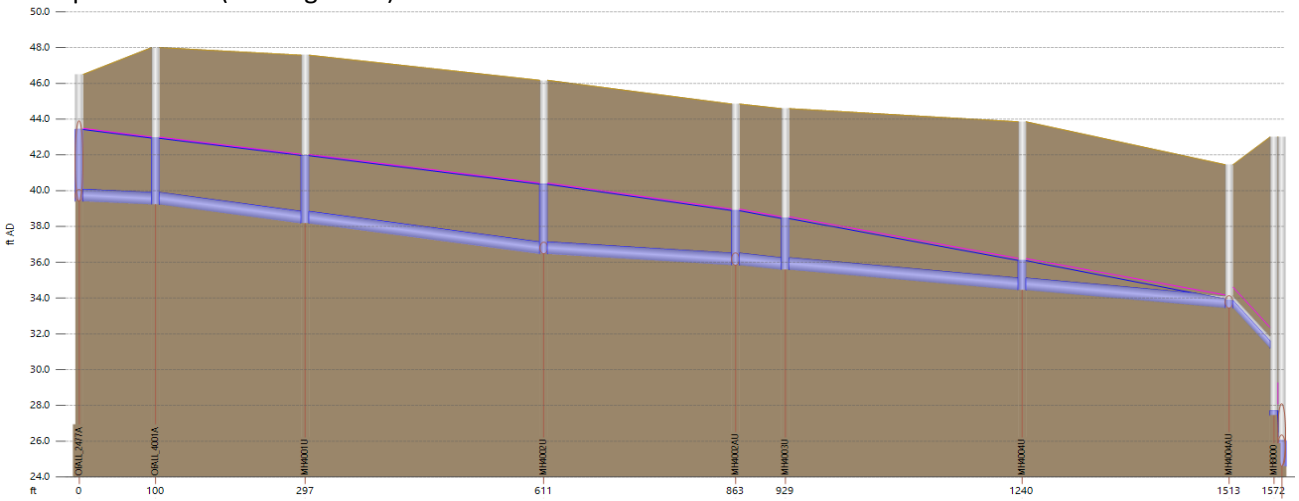
Project Detail:



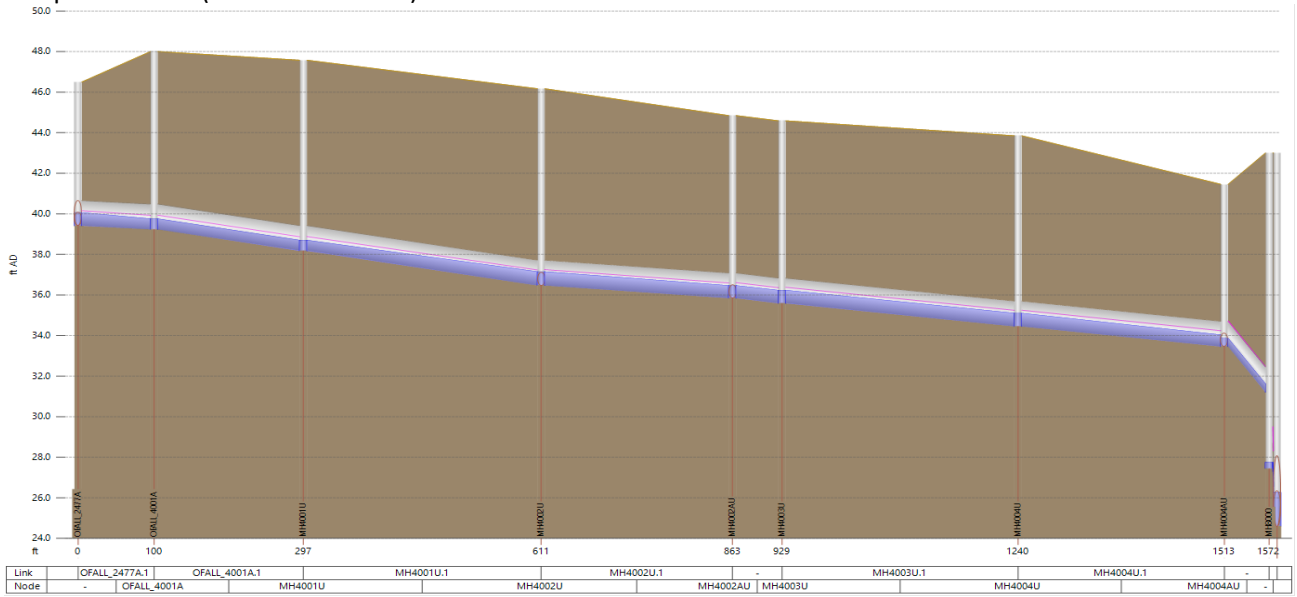
Project Number: P-12B

Project Name: Gravity main along Manhattan Place

Profile Before Improvements (existing flows):



Profile After Improvements (with future flows):



Project Number: P-13

Project Name: Gravity main along 154th Place

Project Description:

This project includes replacing approximately 690 ft of 8-inch pipeline along 154th Place from Denker Avenue to the connection at Redondo Beach Boulevard with a 10-inch diameter pipeline. These deficient pipes cause surcharging under existing PWWF, therefore, the pipelines are recommended to be upsized.

Project Details:

Project Element	Diameter (in)	Diameter (in)	Length (ft)	Baseline Construction Cost[2]	Estimated Construction Cost[3]	Improvement Cost[4]	Project Schedule
Gravity Main	8	10	690	$229,600	$298,500	$380,600	Intermediate-Term

Notes:

(1) Engineering News Report (ENR) Greater LA Construction Cost Index for October 2022 is 13,728.

(2) Baseline Construction Cost is based on multiplying the unit cost by length of each proposed diameter.

(3) Estimated Construction Cost includes a 30% contingency of the baseline construction cost.

(4) Total project costs includes a 10% markup for engineering, a 10% markup for construction management and a 7.5% markup for project administration of the estimated construction cost.

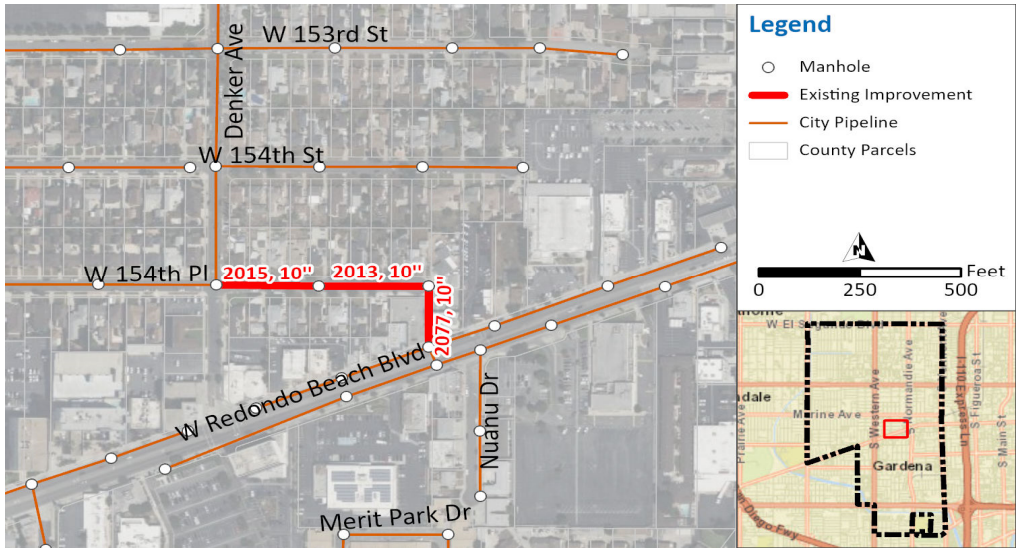
Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	92%	$ 351,699
Future Users	8%	$ 28,901
Total	100%	$ 380,600

Notes on Cost Estimation:

This project is an existing improvement. A cost percentage has been assigned to future users as a combination of existing and future users benefit from this improvement.

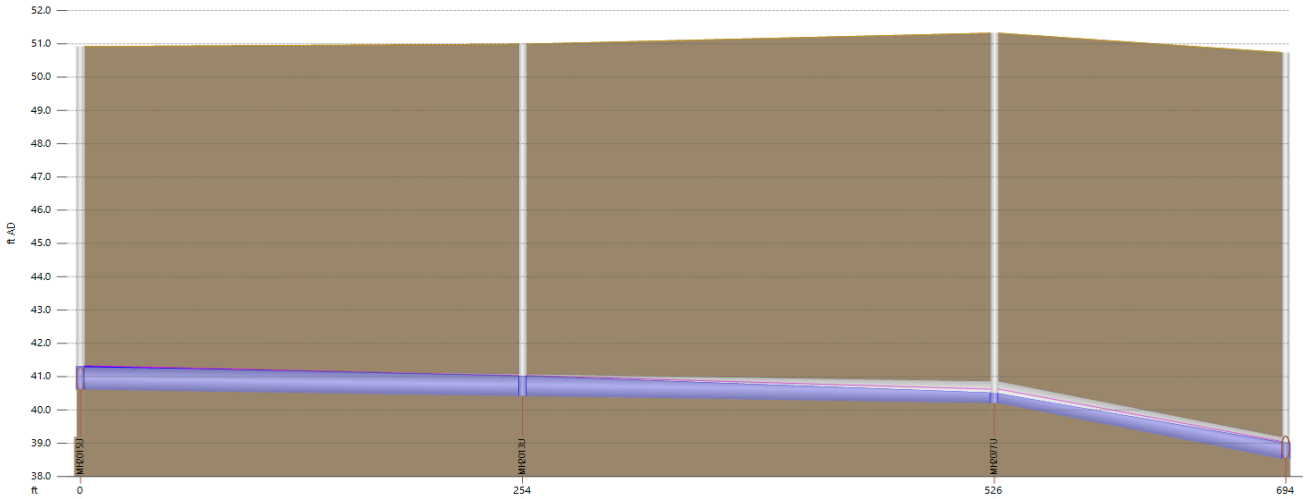
Project Detail:



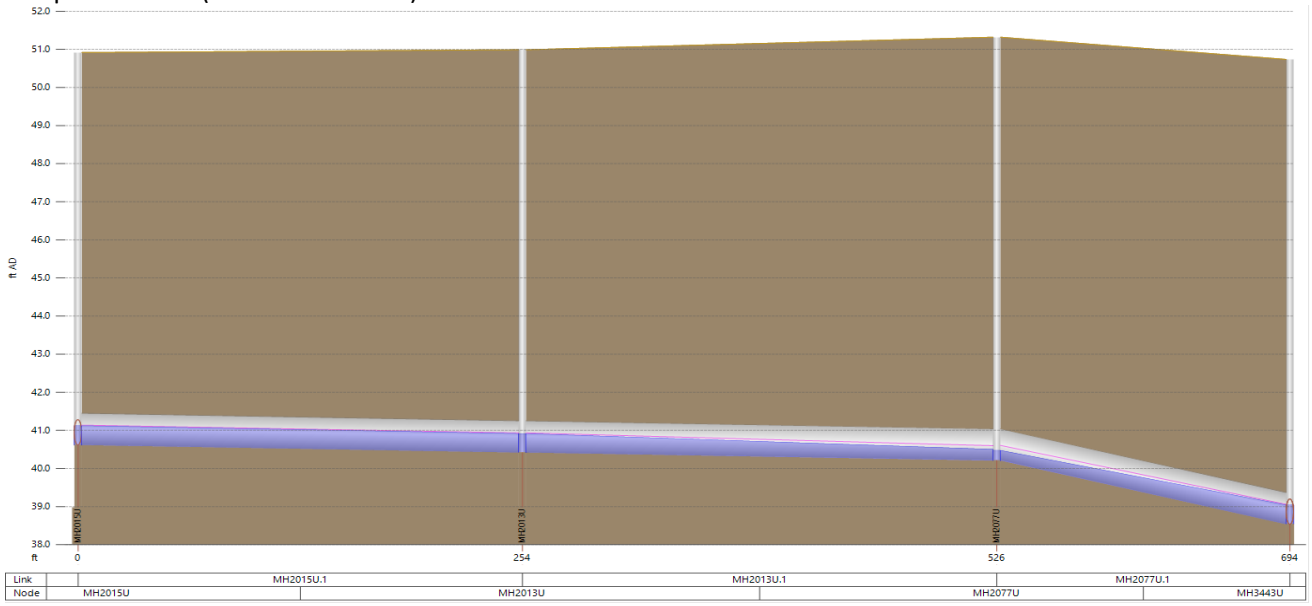
Project Number: P-13

Project Name: Gravity main along 154th Place

Profile Before Improvements (existing flows):



Profile After Improvements (with future flows):



Project Number: P-14

Project Name: Gravity main along Normandie Avenue (between 168th and 170th Streets)

Project Description:

This project includes replacing approximately 720 ft of 8-inch diameter pipeline along Normandie Avenue, between 168th Street and 170th Street, with a 10-inch pipeline. These deficient pipes cause surcharging under existing PWWF, therefore the pipelines are recommended to be upsized.

Project Details:

Project Element	Diameter (in)	Diameter (in)	Length (ft)	Baseline Construction Cost[2]	Estimated Construction Cost[3]	Improvement Cost[4]	Project Schedule
Gravity Main	8	10	720	$237,600	$308,900	$393,800	2025

Notes:

(1) Engineering News Report (ENR) Greater LA Construction Cost Index for October 2022 is 13,728.

(2) Baseline Construction Cost is based on multiplying the unit cost by length of each proposed diameter.

(3) Estimated Construction Cost includes a 30% contingency of the baseline construction cost.

(4) Total project costs includes a 10% markup for engineering, a 10% markup for construction management and a 7.5% markup for project administration of the estimated construction cost.

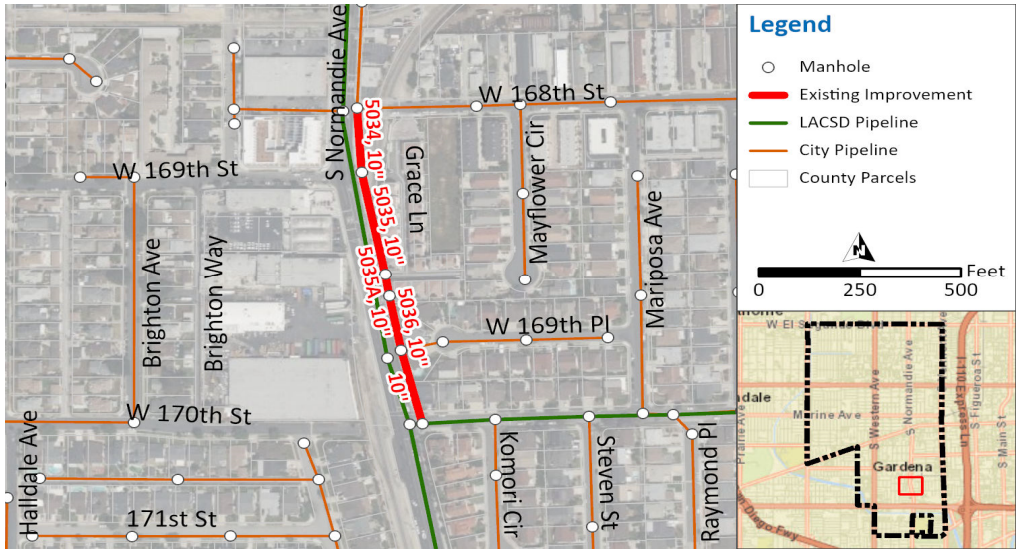
Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	87%	$ 342,304
Future Users	13%	$ 51,496
Total	100%	$ 393,800

Notes on Cost Estimation:

This project is an existing improvement. A cost percentage has been assigned to future users as a combination of existing and future users benefit from this improvement.

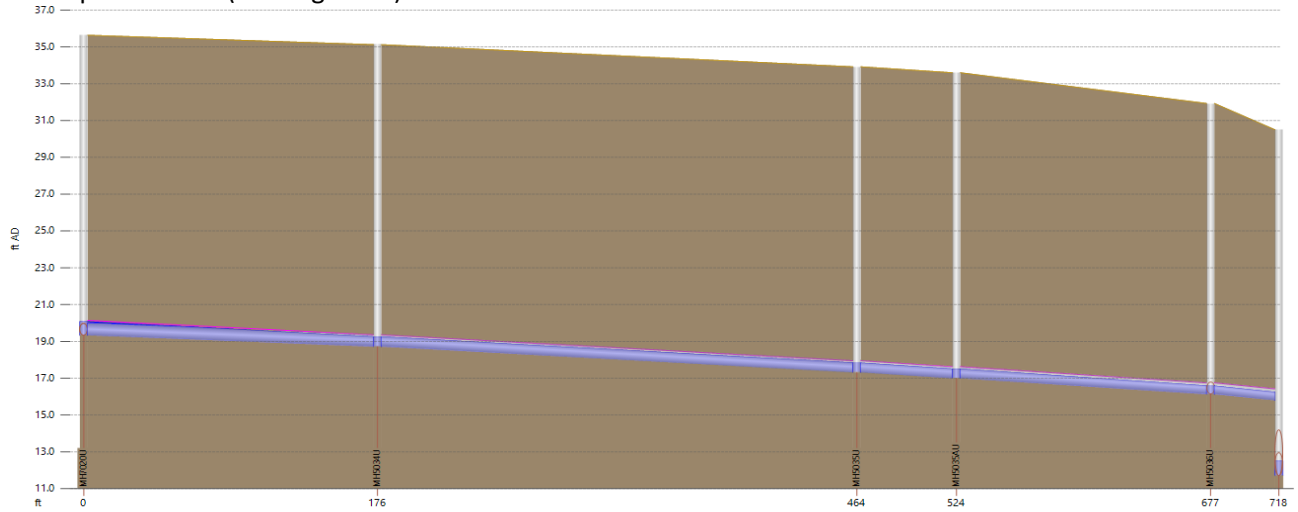
Project Detail:



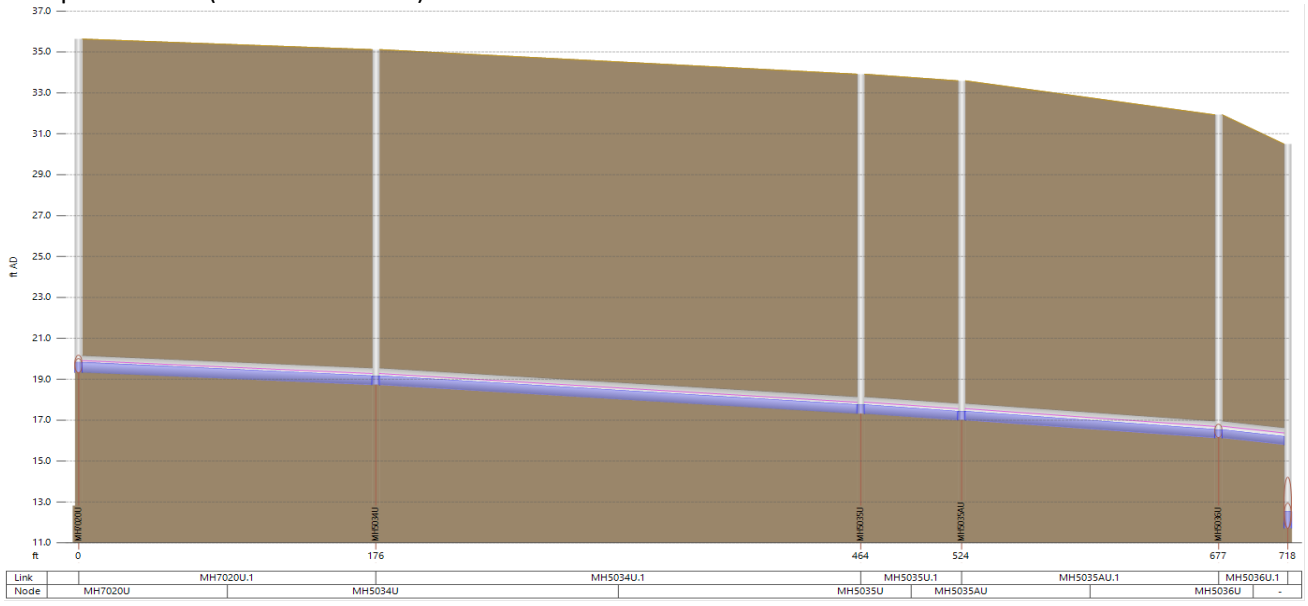
Project Number: P-14

Project Name: Gravity main along Normandie Avenue (between 168th and 170th Streets)

Profile Before Improvements (existing flows):



Profile After Improvements (with future flows):



Project Number: P-15

Project Name: Gravity main along 177th Street and Normandie Avenue

Project Description:

This project includes replacing approximately 2,040 ft of 8-inch diameter pipeline along 177th Street (just west of Budlong Avenue to the intersection of Normandie Avenue) and Normandie Avenue (from 177th Street to Artesia Boulevard). These deficient pipes cause surcharging within 5 ft of the manhole rim under existing PWWF. To mitigate this capacity deficiency, it is recommended that the existing pipeline be replaced with a 10-inch diameter pipeline.

Project Details:

Project Element	Diameter (in)	Diameter (in)	Length (ft)	Baseline Construction Cost[2]	Estimated Construction Cost[3]	Improvement Cost[4]	Project Schedule
Gravity Main	8	10	2,040	$674,500	$876,900	$1,118,100	2023

Notes:

(1) Engineering News Report (ENR) Greater LA Construction Cost Index for October 2022 is 13,728.

(2) Baseline Construction Cost is based on multiplying the unit cost by length of each proposed diameter.

(3) Estimated Construction Cost includes a 30% contingency of the baseline construction cost.

(4) Total project costs includes a 10% markup for engineering, a 10% markup for construction management and a 7.5% markup for project administration of the estimated construction cost.

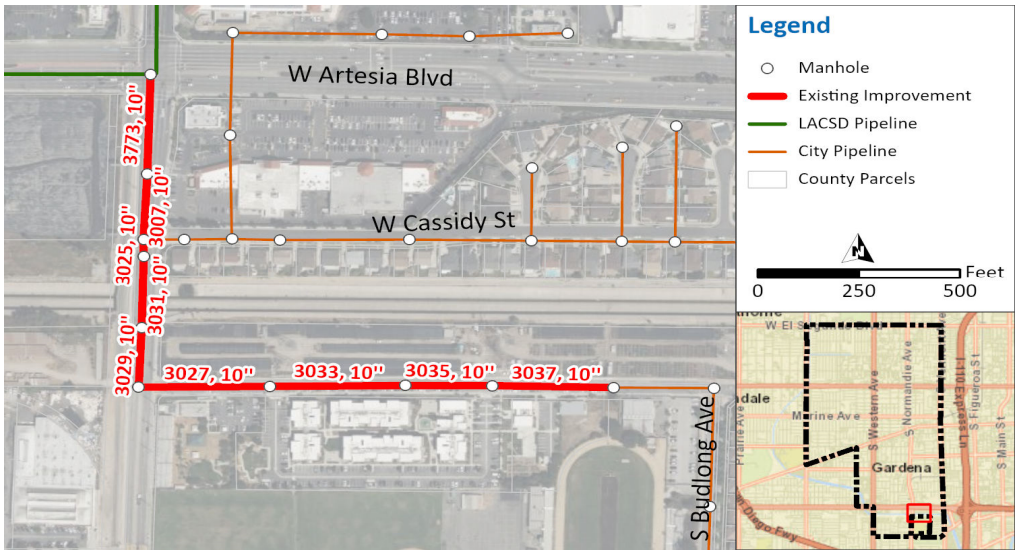
Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	97%	$ 1,079,964
Future Users	3%	$ 38,136
Total	100%	$ 1,118,100

Notes on Cost Estimation:

This project is an existing improvement. A cost percentage has been assigned to future users as a combination of existing and future users benefit from this improvement.

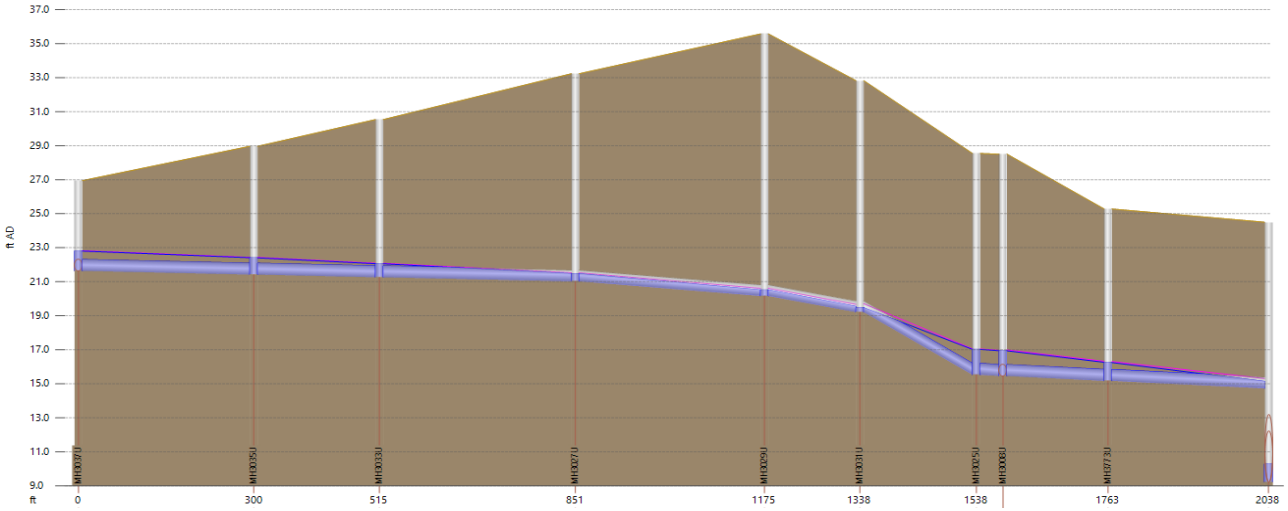
Project Detail:



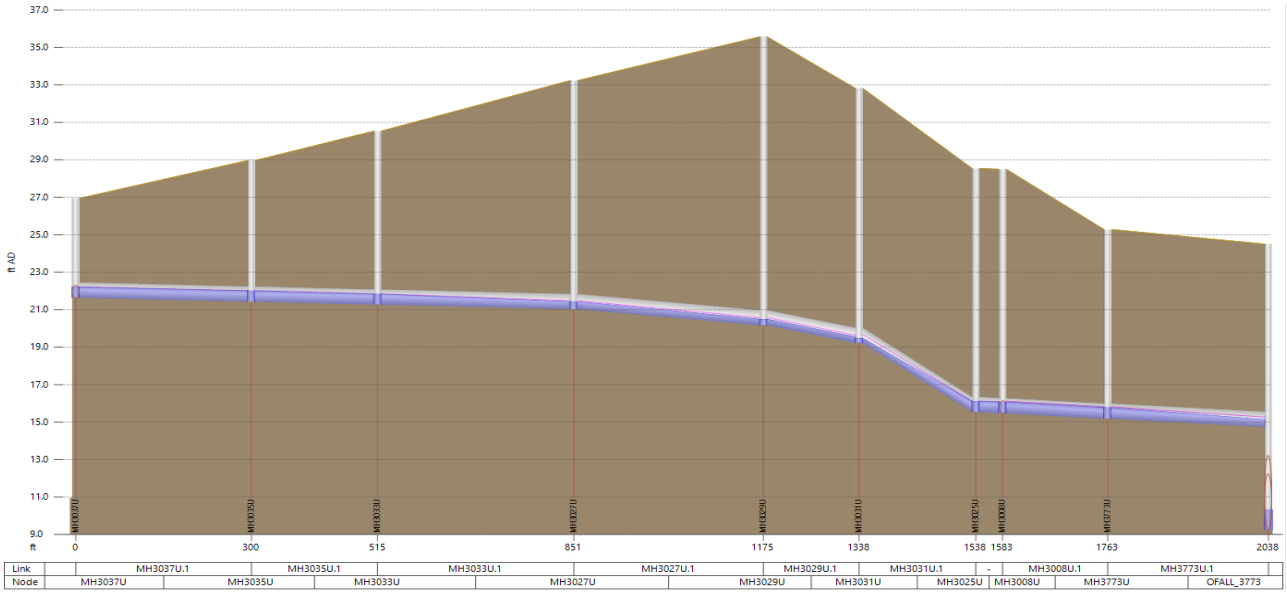
Project Number: P-15

Project Name: Gravity main along 177th Street and Normandie Avenue

Profile Before Improvements (existing flows):



Profile After Improvements (with future flows):



Project Number: P-16

Project Name: Gravity main along 132nd Street

Project Description:

This project is upstream of existing improvement P-1, and includes replacing approximately 260 ft of 8 inch diameter pipe and 310 ft of 10 inch diameter pipe, along 132nd Street, between Cimarron Avenue and Gramercy Place. The existing 10-inch pipe crosses under a canal. The maximum d/D within these existing pipelines exceeds the maximum criteria under future PWWF conditions. To mitigate this deficiency, it is recommended that the existing pipes be replaced with 12 inch diameter pipelines.

Project Details:

Project Element	Diameter (in)	Diameter (in)	Length (ft)	Baseline Construction Cost[2]	Estimated Construction Cost[3]	Improvement Cost[4]	Project Schedule
Gravity Main	8 - 10	12	570	$198,500	$258,000	$328,900	Intermediate-Term

Notes:

(1) Engineering News Report (ENR) Greater LA Construction Cost Index for October 2022 is 13,728.

(2) Baseline Construction Cost is based on multiplying the unit cost by length of each proposed diameter.

(3) Estimated Construction Cost includes a 30% contingency of the baseline construction cost.

(4) Total project costs includes a 10% markup for engineering, a 10% markup for construction management and a 7.5% markup for project administration of the estimated construction cost.

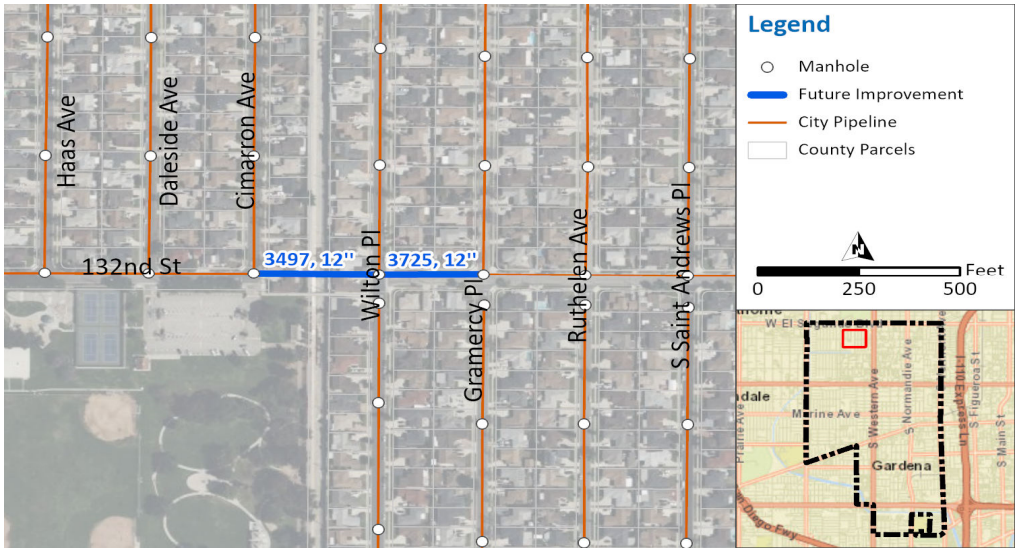
Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	0%	$ -
Future Users	100%	$ 328,900
Total	100%	$ 328,900

Notes on Cost Estimation:

This project is an existing improvement. A cost percentage has been assigned to future users as a combination of existing and future users benefit from this improvement.

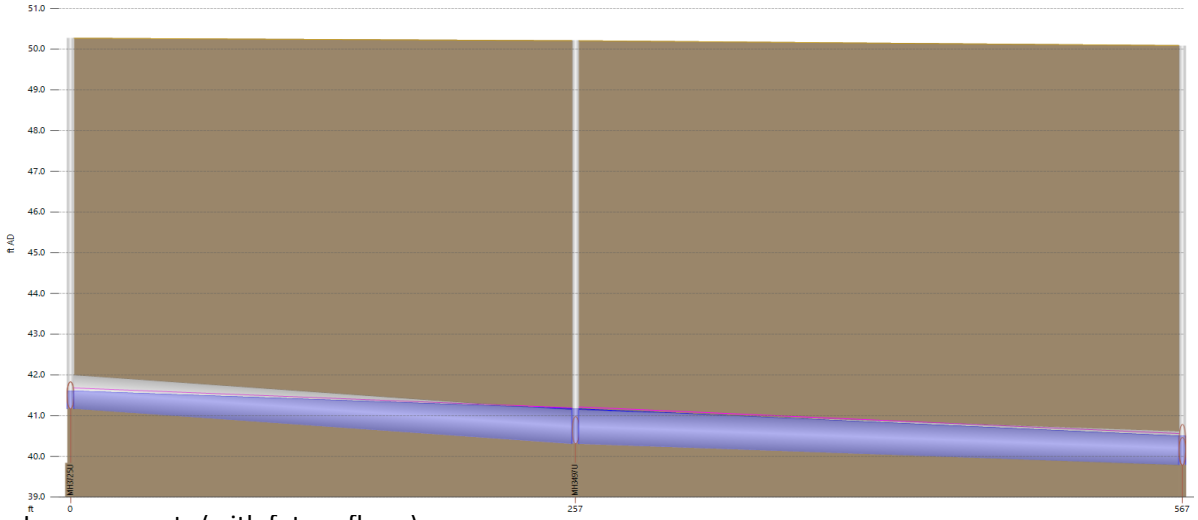
Project Detail:



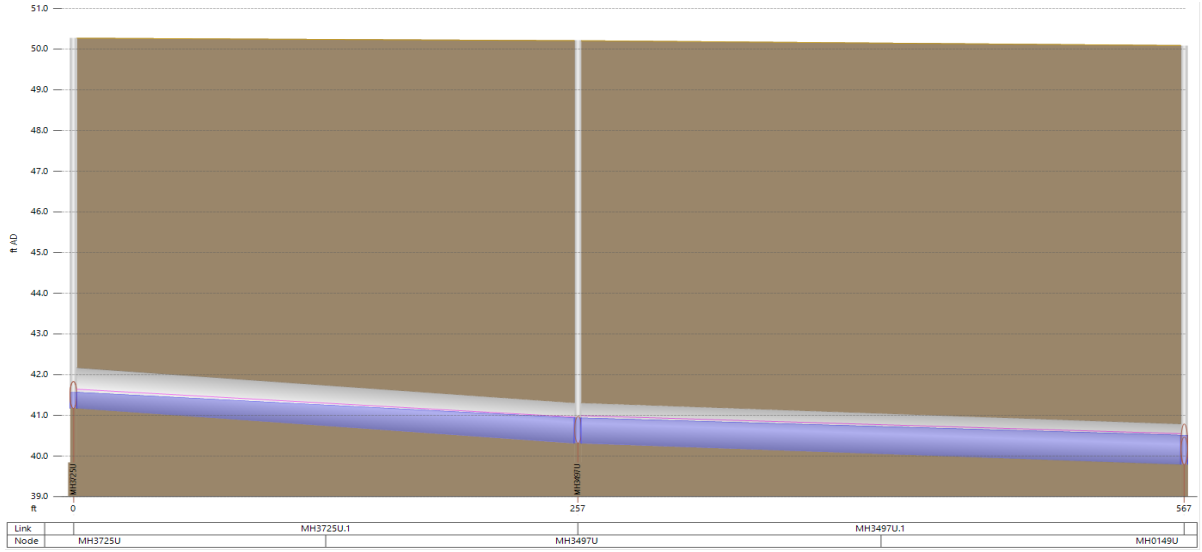
Project Number: P-16

Project Name: Gravity main along 132nd Street

Profile Before Improvements (with future flows):



Profile After Improvements (with future flows):



Project Number: P-17

Project Name: Gravity main along Normandie Avenue (between 166th and 168th Streets)

Project Description:

This project is upstream of existing improvement P-14, and includes replacing approximately 490 ft of 8 inch diameter pipe, along Normandie Avenue, between 166th Street and 168th Street. The maximum d/D within these existing pipelines exceeds the maximum criteria under future PWWF conditions. To mitigate this deficiency, it is recommended that the existing pipes be replaced with 10-inch diameter pipelines.

Project Details:

Project Element	Diameter (in)	Diameter (in)	Length (ft)	Baseline Construction Cost[2]	Estimated Construction Cost[3]	Improvement Cost[4]	Project Schedule
Gravity Main	8	10	490	$161,700	$210,200	$268,100	Intermediate-Term

Notes:

(1) Engineering News Report (ENR) Greater LA Construction Cost Index for October 2022 is 13,728.

(2) Baseline Construction Cost is based on multiplying the unit cost by length of each proposed diameter.

(3) Estimated Construction Cost includes a 30% contingency of the baseline construction cost.

(4) Total project costs includes a 10% markup for engineering, a 10% markup for construction management and a 7.5% markup for project administration of the estimated construction cost.

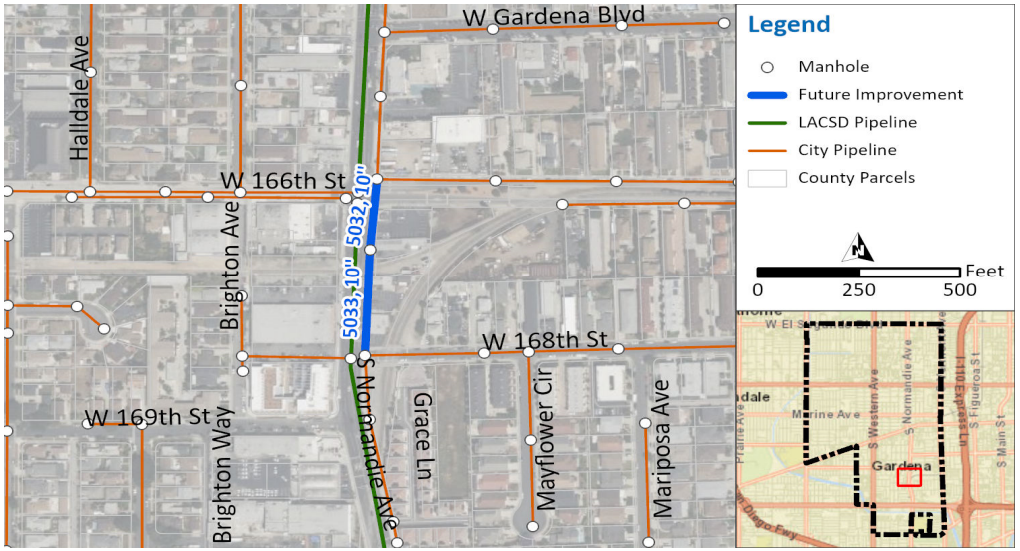
Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	0%	$ -
Future Users	100%	$ 268,100
Total	100%	$ 268,100

Notes on Cost Estimation:

This project is an existing improvement. A cost percentage has been assigned to future users as a combination of existing and future users benefit from this improvement.

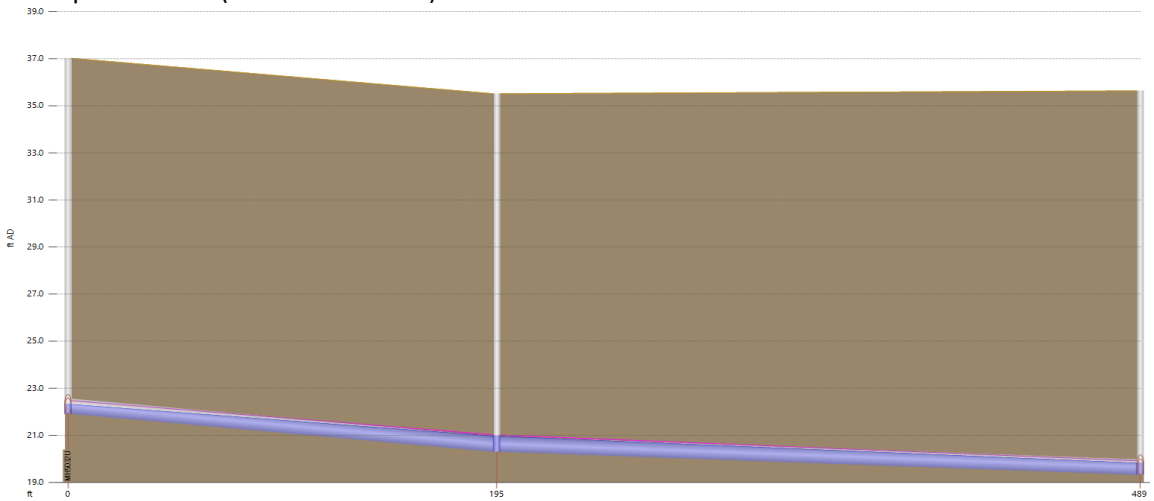
Project Detail:



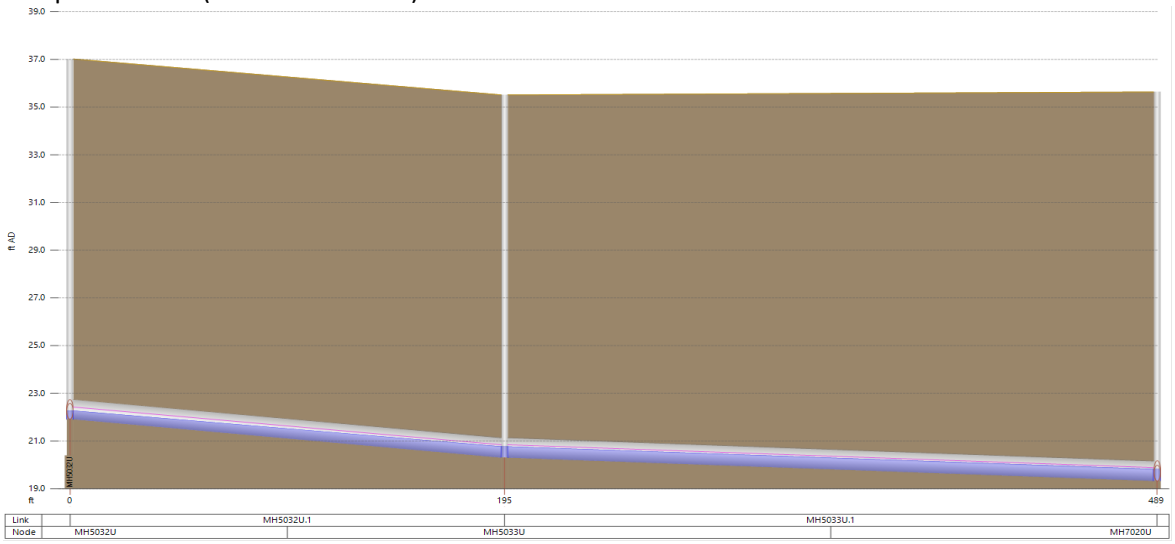
Project Number: P-17

Project Name: Gravity main along Normandie Avenue (between 166th and 168th Streets)

Profile Before Improvements (with future flows):



Profile After Improvements (with future flows):



Project Number: R-1

Project Name: Replace Pipelines with Grade 5 Defects

Project Description:

Rehabilitate and replace pipelines that had one or more grade 5 structural defects from the condition assessment. For planning purposes, it was assumed that 40 percent of these pipelines would need to be replaced, while the remaining 60 percent would be lined.

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Length (ft)	Baseline Construction Cost[2]	Estimated Construction Cost[3]	Capital Improvement Cost[4]	Project Schedule
Gravity Main	varies	n/a	38,544	$5,176,900	$6,730,000	$8,580,800	2024-2032

Notes:

(1) Engineering News Report (ENR) Greater LA Construction Cost Index for October 2022 is 13,728.

(2) Baseline Construction Cost is based on multiplying the unit cost by length of each proposed diameter.

(3) Estimated Construction Cost includes a 30% contingency of the baseline construction cost.

(4) Total project costs includes a 10% markup for engineering, a 10% markup for construction management and a 7.5% markup for project administration of the estimated construction cost.

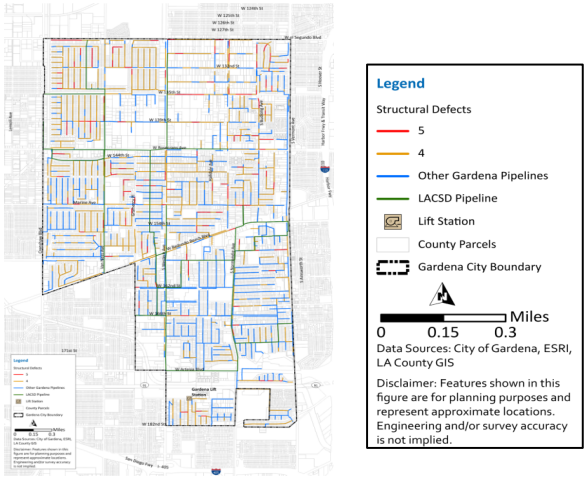
Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 8,580,800
Future Users	0%	$ -
Total	100%	$ 8,580,800

Notes on Cost Estimation:

This project is an existing improvement. A cost percentage has been assigned to future users as a combination of existing and future users benefit from this improvement.

Project Detail:



Project Number: R-2

Project Name: Replace Pipelines with Grade 4 Defects

Project Description:

Rehabilitate and replace pipelines that had one or more grade 4 structural defects from the condition assessment. For planning purposes, it was assumed that 40 percent of these pipelines would need to be replaced, while the remaining 60 percent would be lined. The grade 5 defects (Project R-1) should be completed first.

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Length (ft)	Baseline Construction Cost[2]	Estimated Construction Cost[3]	Capital Improvement Cost[4]	Project Schedule
Gravity Main	varies	n/a	215,424	$29,970,800	$38,962,000	$49,676,600	Long-Term

Notes:

(1) Engineering News Report (ENR) Greater LA Construction Cost Index for October 2022 is 13,728.

(2) Baseline Construction Cost is based on multiplying the unit cost by length of each proposed diameter.

(3) Estimated Construction Cost includes a 30% contingency of the baseline construction cost.

(4) Total project costs includes a 10% markup for engineering, a 10% markup for construction management and a 7.5% markup for project administration of the estimated construction cost.

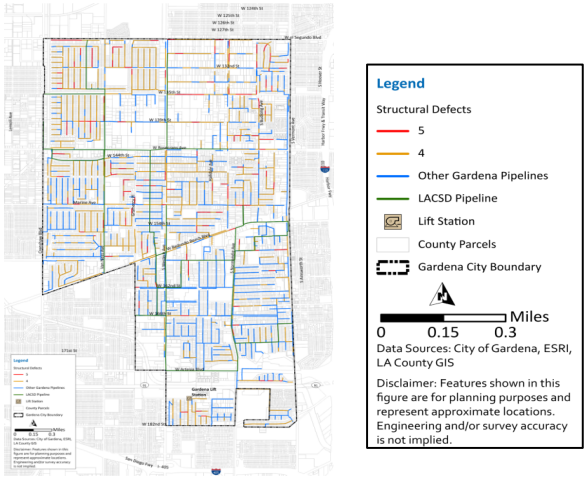
Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	#######
Future Users	0%	$ -
Total	100%	#######

Notes on Cost Estimation:

This project is an existing improvement. A cost percentage has been assigned to future users as a combination of existing and future users benefit from this improvement.

Project Detail:



Project Number: LS-1

Project Name: Rehabilitate City Lift Station

Project Description:

It is recommended that the City complete the improvements recommended based on the field inspection. The recommended improvements include repairing or replacing corroded equipment, repairing sections of spalling concrete, providing fall protection, installing a pressure gauge on the discharge pipe, and investigating possibility of providing a connection for a backup generator at the control panel. For a detailed list of recommendations, refer to Technical Memorandum 1 (Lift Station Condition Assessment), included in Appendix B in the Master Plan report.

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Length (ft)	Baseline Construction Cost[2]	Estimated Construction Cost[3]	Capital Improvement Cost[4]	Project Schedule
Gravity Main	n/a	n/a	n/a	n/a	n/a	$135,800	2024

Notes:

(1) Engineering News Report (ENR) Greater LA Construction Cost Index for October 2022 is 13,728.

(2) Baseline Construction Cost is based on multiplying the unit cost by length of each proposed diameter.

(3) Estimated Construction Cost includes a 30% contingency of the baseline construction cost.

(4) Total project costs includes a 10% markup for engineering, a 10% markup for construction management and a 7.5% markup for project administration of the estimated construction cost.

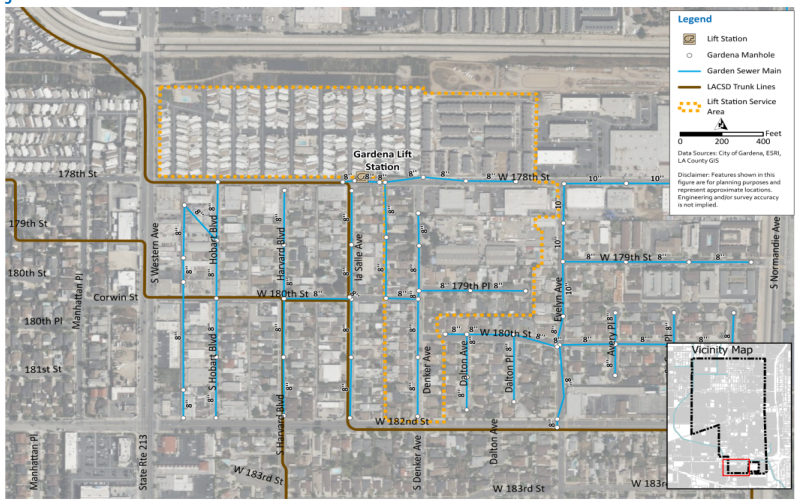
Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 135,800
Future Users	0%	$ -
Total	100%	$ 135,800

Notes on Cost Estimation:

This project is an existing improvement. A cost percentage has been assigned to future users as a combination of existing and future users benefit from this improvement.

Project Detail:



carollo

Project Number: O-1
Project Name: Future Flow Monitoring
Project Description:
It is recommended that the City conduct flow monitoring as part of any future master plan updates, as well as to quantify the reduction of I/I in response to the recommended R&R projects.

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Length (ft)	Baseline Construction Cost[2]	Estimated Construction Cost[3]	Capital Improvement Cost[4]	Project Schedule
Gravity Main	n/a	n/a	n/a	n/a	n/a	$100,000	Intermediate-Term

Notes:

(1) Engineering News Report (ENR) Greater LA Construction Cost Index for October 2022 is 13,728.

(2) Baseline Construction Cost is based on multiplying the unit cost by length of each proposed diameter.

(3) Estimated Construction Cost includes a 30% contingency of the baseline construction cost.

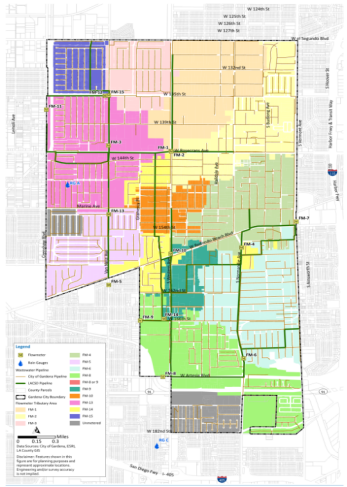
(4) Total project costs includes a 10% markup for engineering, a 10% markup for construction management and a 7.5% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 100,000
Future Users	0%	$ -
Total	100%	$ 100,000

Notes on Cost Estimation:
This project is an existing improvement. A cost percentage has been assigned to future users as a combination of existing and future users benefit from this improvement.

Project Detail:



Project Number: O-2
Project Name: Master Plan Updates
Project Description:

It is recommended the City plan to update their master plan in 5-10 years. It is important to update the master plan and hydraulic model to reflect changes to the collection system (i.e. completion of capacity and/or R&R projects) or future growth assumptions.

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Length (ft)	Baseline Construction Cost[2]	Estimated Construction Cost[3]	Capital Improvement Cost[4]	Project Schedule
Gravity Main	n/a	n/a	n/a	n/a	n/a	$250,000	Intermediate-Term

Notes:

(1) Engineering News Report (ENR) Greater LA Construction Cost Index for October 2022 is 13,728.

(2) Baseline Construction Cost is based on multiplying the unit cost by length of each proposed diameter.

(3) Estimated Construction Cost includes a 30% contingency of the baseline construction cost.

(4) Total project costs includes a 10% markup for engineering, a 10% markup for construction management and a 7.5% markup for project administration of the estimated construction cost.

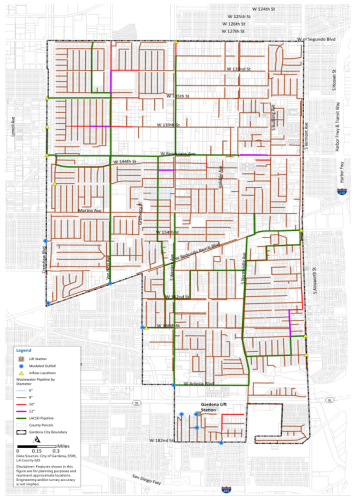
Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 250,000
Future Users	0%	$ -
Total	100%	$ 250,000

Notes on Cost Estimation:

This project is an existing improvement. A cost percentage has been assigned to future users as a combination of existing and future users benefit from this improvement.

Project Detail:



Project Number: O-3
Project Name: Smoke Testing - Basin 1
Project Description:

Smoke testing is recommended to potentially identify sources of inflow throughout the collection system. Based on the results from the flow monitoring program, this basin had higher rates of inflow compared to the rest of the system.

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Length (ft)	Baseline Construction Cost[2]	Estimated Construction Cost[3]	Capital Improvement Cost[4]	Project Schedule
Gravity Main	n/a	n/a	n/a	n/a	n/a	$75,900	2023

Notes:

(1) Engineering News Report (ENR) Greater LA Construction Cost Index for October 2022 is 13,728.

(2) Baseline Construction Cost is based on multiplying the unit cost by length of each proposed diameter.

(3) Estimated Construction Cost includes a 30% contingency of the baseline construction cost.

(4) Total project costs includes a 10% markup for engineering, a 10% markup for construction management and a 7.5% markup for project administration of the estimated construction cost.

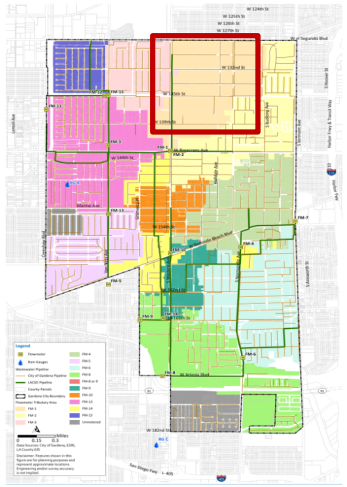
Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 75,900
Future Users	0%	$ -
Total	100%	$ 75,900

Notes on Cost Estimation:

This project is an existing improvement. A cost percentage has been assigned to future users as a combination of existing and future users benefit from this improvement.

Project Detail:



Project Number: O-4
Project Name: Smoke Testing - Basin 3
Project Description:

Smoke testing is recommended to potentially identify sources of inflow throughout the collection system. Based on the results from the flow monitoring program, this basin had higher rates of inflow compared to the rest of the system.

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Length (ft)	Baseline Construction Cost[2]	Estimated Construction Cost[3]	Capital Improvement Cost[4]	Project Schedule
Gravity Main	n/a	n/a	n/a	n/a	n/a	$61,100	2023

Notes:

(1) Engineering News Report (ENR) Greater LA Construction Cost Index for October 2022 is 13,728.

(2) Baseline Construction Cost is based on multiplying the unit cost by length of each proposed diameter.

(3) Estimated Construction Cost includes a 30% contingency of the baseline construction cost.

(4) Total project costs includes a 10% markup for engineering, a 10% markup for construction management and a 7.5% markup for project administration of the estimated construction cost.

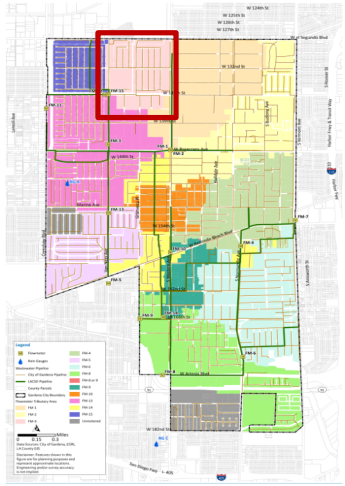
Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 61,100
Future Users	0%	$ -
Total	100%	$ 61,100

Notes on Cost Estimation:

This project is an existing improvement. A cost percentage has been assigned to future users as a combination of existing and future users benefit from this improvement.

Project Detail:



Project Number: O-5
Project Name: Smoke Testing - Basin 10
Project Description:

Smoke testing is recommended to potentially identify sources of inflow throughout the collection system. Based on the results from the flow monitoring program, this basin had higher rates of inflow compared to the rest of the system.

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Length (ft)	Baseline Construction Cost(2)	Estimated Construction Cost(3)	Capital Improvement Cost(4)	Project Schedule
Gravity Main	n/a	n/a	n/a	n/a	n/a	$44,700	2023

Notes:

(1) Engineering News Report (ENR) Greater LA Construction Cost Index for October 2022 is 13,728.

(2) Baseline Construction Cost is based on multiplying the unit cost by length of each proposed diameter.

(3) Estimated Construction Cost includes a 30% contingency of the baseline construction cost.

(4) Total project costs includes a 10% markup for engineering, a 10% markup for construction management and a 7.5% markup for project administration of the estimated construction cost.

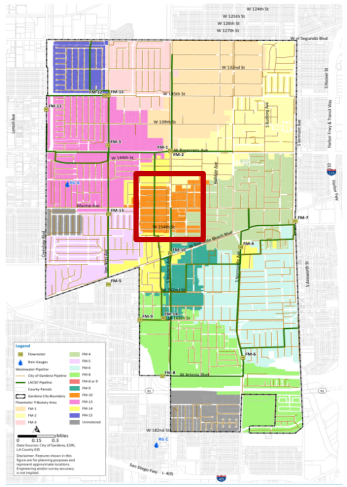
Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 44,700
Future Users	0%	$ -
Total	100%	$ 44,700

Notes on Cost Estimation:

This project is an existing improvement. A cost percentage has been assigned to future users as a combination of existing and future users benefit from this improvement.

Project Detail:



Project Number: O-6
Project Name: Smoke Testing - Basin 15
Project Description:

Smoke testing is recommended to potentially identify sources of inflow throughout the collection system. Based on the results from the flow monitoring program, this basin had higher rates of inflow compared to the rest of the system.

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Length (ft)	Baseline Construction Cost[2]	Estimated Construction Cost[3]	Capital Improvement Cost[4]	Project Schedule
Gravity Main	n/a	n/a	n/a	n/a	n/a	$41,700	2023

Notes:

(1) Engineering News Report (ENR) Greater LA Construction Cost Index for October 2022 is 13,728.

(2) Baseline Construction Cost is based on multiplying the unit cost by length of each proposed diameter.

(3) Estimated Construction Cost includes a 30% contingency of the baseline construction cost.

(4) Total project costs includes a 10% markup for engineering, a 10% markup for construction management and a 7.5% markup for project administration of the estimated construction cost.

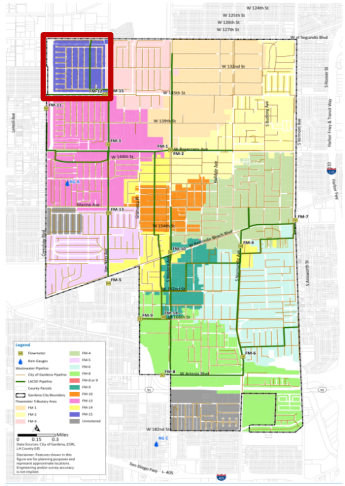
Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 41,700
Future Users	0%	$ -
Total	100%	$ 41,700

Notes on Cost Estimation:

This project is an existing improvement. A cost percentage has been assigned to future users as a combination of existing and future users benefit from this improvement.

Project Detail:



Project Number: O-7
Project Name: CCTV and Manhole Inspection
Project Description:

It is recommended that the City have all pipelines and manholes re-inspected within the next 10 years. The pipelines should be inspected using CCTV and should be graded according to NASSCO's PACP standards. The manholes should have a level 1 NASSCO MACP inspection performed. A level 2 inspection may be performed on those manholes that indicate poor condition.

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Length (ft)	Baseline Construction Cost[2]	Estimated Construction Cost[3]	Capital Improvement Cost[4]	Project Schedule
Gravity Main	n/a	n/a	n/a	n/a	n/a	$1,000,000	Intermediate-Term

Notes:

(1) Engineering News Report (ENR) Greater LA Construction Cost Index for October 2022 is 13,728.

(2) Baseline Construction Cost is based on multiplying the unit cost by length of each proposed diameter.

(3) Estimated Construction Cost includes a 30% contingency of the baseline construction cost.

(4) Total project costs includes a 10% markup for engineering, a 10% markup for construction management and a 7.5% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 1,000,000
Future Users	0%	$ -
Total	100%	$ 1,000,000

Notes on Cost Estimation:

This project is an existing improvement. A cost percentage has been assigned to future users as a combination of existing and future users benefit from this improvement.

Project Detail: