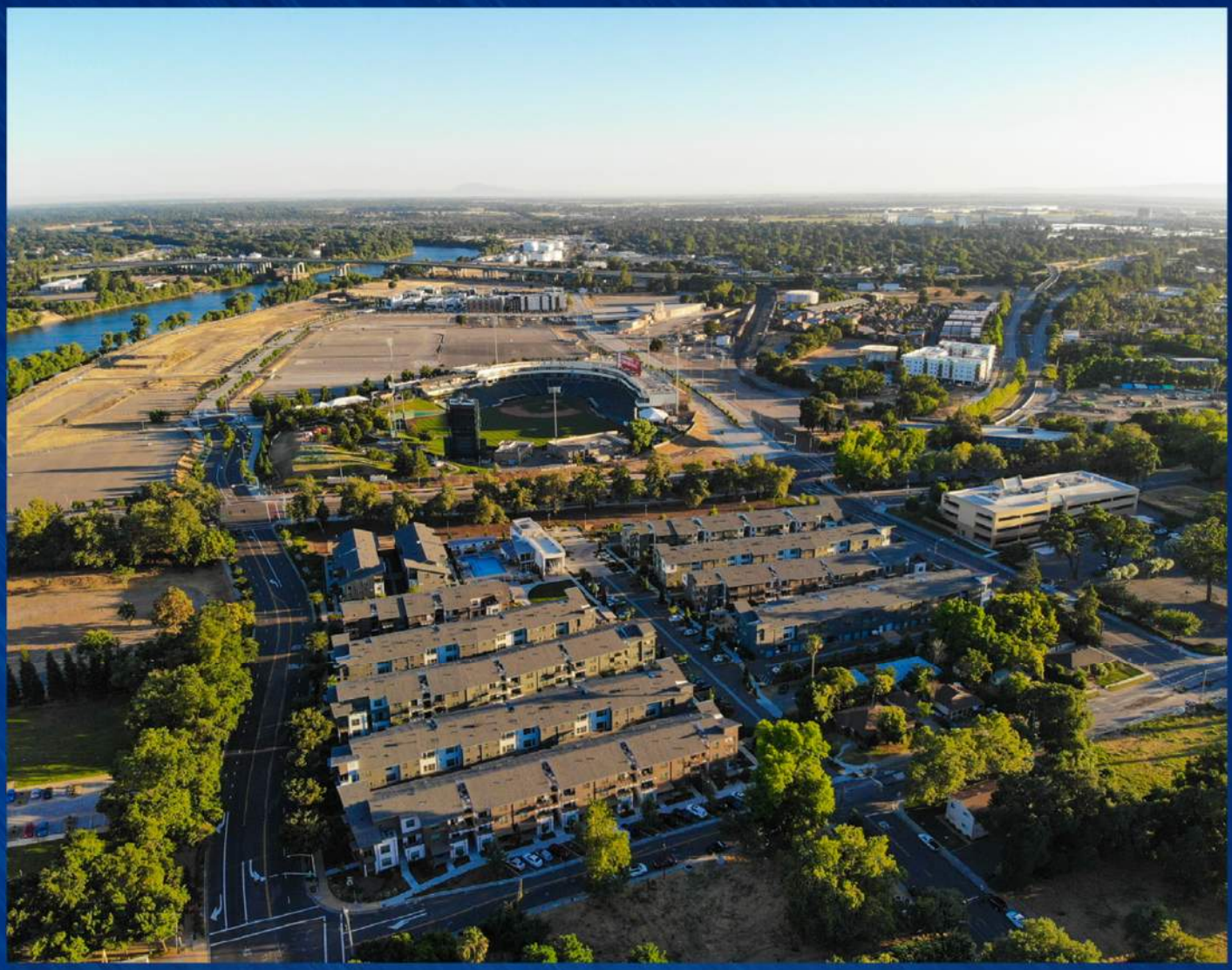
CITY OF WEST SACRAMENTO



October 4, 2024

Revision 1: December 9, 2024

SEWER MASTER PLAN UPDATE

BV PROJECT NO. 413644

BLACK & VEATCH

Prepared by:

Akanksha Kawade
Nicholas Zigler
Elizabeth Diaz-Gunning, PE
Yiran Li
Austin Picano
Clinton McAdams, PE
Katherine Sheehan, PE
Jon Wells, PE, Dopudja & Wells Consulting, Inc.

Professional Engineer:

Lani Good — 10/3/2024
Signature **Date**

Lani Good, PE
Printed Name

C73677
License No.

Approved by:

Signature **Date**

Printed Name



Table of Contents

Executive Summary **1**
1.0 Introduction **1-1**
1.1 Purpose 1-1
1.2 Report Organization 1-1
2.0 Existing System and Land Use **2-1**
2.1 Existing Service Area 2-1
2.2 Population Served and Land Use Characteristics 2-1
2.2.1 Existing Population and Land Use 2-1
2.2.2 General Plan 2035 and Buildout Population and Land Use 2-4
2.3 Existing Collection System Facilities 2-6
2.3.1 Gravity Main Characteristics 2-9
2.3.2 Pump Stations, Lift Stations, and Associated Force Main Characteristics 2-14
3.0 System Performance Criteria **3-1**
3.1 Existing Sewer System Facility Capacity Criteria 3-1
3.2 New or Replacement Gravity Main Design Criteria 3-1
3.2.1 Gravity Main Capacity Standards 3-1
3.2.2 Gravity Main Design Standards 3-2
3.2.2.1 Minimum Slope 3-2
3.2.2.2 Gravity Main Materials 3-2
3.2.2.3 Gravity Main Cover and Clearances 3-3
3.3 New or Replacement Pump Station and Lift Station Design and Operating Criteria 3-3
3.3.1 Pump Station and Lift Station Design Criteria 3-3
3.3.2 Pump Station and Lift Station Operational Criteria 3-3
3.4 New or Replacement Force Main Design and Operating Criteria 3-4
3.5 Design Storm Criteria 3-4
4.0 Planning Scenarios **4-1**
4.1 Existing Conditions 4-1
4.2 Pump and Lift Station Remaining Capacity 4-1
4.3 2035 Growth 4-1
4.4 Buildout Growth 4-1
5.0 Hydraulic Model Update and Calibration **5-1**
5.1 Hydraulic Model Elements 5-1
5.2 Model Infrastructure Updates 5-1
5.3 Load Allocation 5-2
5.4 Flow Monitoring Program Description 5-6
5.4.1 Flow Monitoring Overview 5-6

5.4.2 Site Selection Criteria 5-7
5.4.3 Flow Monitoring Locations 5-7
5.4.4 Rain Gage Locations 5-10
5.4.5 Hydrologic Conditions 5-11
5.4.6 Flow Monitoring Results 5-11
5.5 Dry Weather Flow Calibration 5-12
5.5.1 Existing Dry Weather Flow Allocation 5-12
5.5.1.1 Average Dry Weather Flow Allocation 5-12
5.5.1.2 Diurnal (24-Hour) Flows 5-13
5.5.2 Existing Dry Weather Flow Calibration 5-14
5.5.3 Calibrated Existing Dry Weather Flow Values 5-15
5.6 Wet Weather Flow Calibration 5-16
5.6.1 Wet Weather Flow Components 5-17
5.6.2 Existing Wet Weather Flow Allocation 5-17
5.6.3 Existing Wet Weather Flow Calibration 5-19
6.0 Dry and Wet Weather Flow Projections 6-1
6.1 Future Average Dry Weather Flow Projections 6-1
6.1.1 Development by Model Subcatchment 6-1
6.1.2 Projected 2035 ADWF Values 6-6
6.2 Future Wet Weather Flow Projections 6-6
7.0 Existing System Evaluation 7-1
7.1 Rainfall-Dependent Inflow and Infiltration 7-1
7.2 Gravity Main Hydraulic Evaluation 7-1
7.2.1 Stillwater Road 7-1
7.2.2 Bryte Pump Station Tributary 7-6
7.2.3 Stone Boulevard and Park Boulevard 7-8
7.2.4 Linden Road and Jefferson Boulevard 7-10
7.3 Pump/Lift Station Hydraulic Evaluation 7-12
7.4 Force Main Hydraulic Evaluation 7-13
8.0 Future System Evaluation 8-1
8.1 Future PWWF Scenarios 8-1
8.2 Existing System Hydraulic Evaluation Under Future Flows 8-1
8.2.1 Gravity Sewer Hydraulic Evaluation 8-1
8.2.2 Force Main Hydraulic Evaluation 8-4
8.2.3 Pump/Lift Station Hydraulic Evaluation 8-4
8.2.3.1 Iron Works Lift Station 8-6
8.3 Future System Configuration 8-7
8.3.1 Septic to Sewer Conversions 8-7
8.3.2 Davis Pump Station and Force Main 8-9

8.3.3 Largo Pump Station 8-9
8.3.4 Parlin Ranch Pump Station....8-10
8.3.5 Southport Drainage Areas and System Configuration....8-10
8.3.5.1 Area 1: Burrows Avenue LNWI Connection Basin.... 8-10
8.3.5.2 Area 1a: Bridgeway Lakes 8-10
8.3.5.3 Area 1b: Yarbrough Largo Pump Station Basin 8-10
8.3.5.4 Area 1c: Yarbrough Lift Station Basin.... 8-12
8.3.5.5 Area 1d: Yarbrough East.... 8-12
8.3.5.6 Area 1e: Southeast City 8-13
8.3.5.7 Area 2a: River Park.... 8-13
8.3.5.8 Area 2b: Southeast Village 8-13
8.3.5.9 Area 3: Allan Lift Station Basin of Northwest Village 8-13
8.3.5.10 Area 4a: Parlin Ranch Pump Station Basin 8-15
8.3.5.11 Area 4b: Southern Liberty and Southeast Village.... 8-18
8.3.5.12 Area 4c: Rural Core 8-18
8.3.5.13 Area 5: Central Core.... 8-18
8.3.5.14 Area 6: East Linden Road 8-18
8.3.5.15 Area 7: Southport Business Park and Bridgeway Island 8-19
8.3.5.16 Area 8: Linden Road in Northwest Village 8-19
8.3.5.17 Area 9: Western Seaway.... 8-19
8.3.5.18 Area 10: Eastern Seaway.... 8-19
8.3.5.19 Area 11a: Stone Lock Neighborhood.... 8-19
8.3.5.20 Area 11b: Newport Estates.... 8-20
8.3.5.21 Area 11c: Remaining Newport Estates.... 8-20
8.3.5.22 Area 12: Northern Jefferson Boulevard.... 8-20
8.3.6 Yarbrough Alternatives Analysis 8-20
9.0 Asset Management Plan....9-1
9.1 Introduction to Risk Management....9-1
9.2 Condition Assessment....9-2
9.2.1 Lift/Pump Stations....9-2
9.2.1.1 Scope....9-2
9.2.1.2 Assessment Methodology....9-3
9.2.1.3 Findings....9-4
9.2.2 Manholes & Vaults....9-7
9.2.3 Gravity Sewers....9-7
9.3 Risk Assessment....9-9
9.3.1 Lift Stations/Pump Stations....9-9

9.3.2 Gravity Mains and Manholes 9-9
9.4 Asset Management Plan 9-9
9.4.1 Collection System Levels of Service 9-11
9.4.2 Collection System Asset Inventory 9-11
9.5 Preventative Maintenance Program 9-11
9.5.1 Preventative Maintenance Program 9-11
9.5.2 Rehabilitation/Replacement Program 9-15
10.0 Capital Improvement Program 10-1
10.1 Cost Estimating Assumptions 10-1
10.2 Basis for Capital Improvement Costs 10-2
10.2.1 Pipeline Improvements 10-2
10.2.1.1 Pipeline Construction Method Options 10-2
10.2.1.1.1 Cured in Place Pipe (CIPP) 10-2
10.2.1.1.2 Open Cut Construction 10-3
10.2.1.1.3 Pipe Bursting 10-4
10.2.1.1.4 Pipe Reaming 10-5
10.2.1.2 Pipeline Unit Costs 10-6
10.2.2 Pump Station Improvements 10-6
10.3 Recommended Capital Improvement Program 10-7
10.3.1 Cleaning/Inspection Program 10-7
10.3.2 Rehabilitation/Replacement Projects 10-8
10.3.2.1 Gravity Sewer Rehab/Replacement Projects 10-12
10.3.2.2 Pump/Lift Station Equipment Repairs 10-13
10.3.3 Capacity Improvement Projects 10-13
10.3.3.1 Pipeline Hydraulic Improvement Projects 10-13
10.3.3.2 Pump Station Capacity Upgrade Projects 10-16
10.3.3.3 Septic to Sewer Conversions 10-17
10.3.4 Capacity Improvement Program Summary 10-17
10.4 Other Recommendations 10-19
Appendix A. City of West Sacramento Sewer Flow Monitoring and Inflow/Infiltration Study A-1
Appendix B. Wet Weather Calibration Plots B-1
Appendix C. Pump Station Condition Assessment Technical Memorandum C-1
Appendix D. CIP Project Sheets D-1

LIST OF TABLES

Table 2-1 Zoning Categories by Area 2-4
Table 2-2 Projected 2035 And Buildout Population and Land Use Summary 2-6
Table 2-3 Gravity Mains by Diameter 2-9

Table 2-4 Gravity Mains by Material 2-9
Table 2-5 Gravity Mains by Decade Constructed 2-12
Table 2-6 Wastewater Collection System Pump and Lift Station Summary 2-14
Table 3-1 Recommended Minimum Gravity Main Slopes 3-2
Table 5-1 Pump Station Parameters 5-3
Table 5-2 Flow Monitoring Locations 5-7
Table 5-3 Locations of Precipitation Stations 5-10
Table 5-4 Average Dry Weather Flow Values (MGD) at Each Flow Monitoring Site 5-12
Table 5-5 Calibrated Values for ADWF, GWI, and BWF for Monitoring Sites 5-13
Table 5-6 Wastewater Unit Flow Factors 5-15
Table 5-7 Calibrated RTK Factors for RDII Generation in Hydraulic Model by Basin 5-20
Table 5-8 Wet Weather Calibration Results 5-21
Table 6-1 Existing and Projected Modeled ADWF and PDWF 6-6
Table 6-2 PWWF Values (MGD) for 2035 and Buildout 6-6
Table 7-1 Calibrated RDII by Flow Monitoring Site 7-3
Table 7-2 Existing System Pump/Lift Station Deficiencies 7-13
Table 8-1 Future System Pump/Lift Station Deficiencies Under Buildout PWWF 8-5
Table 9-1 Pumping Facilities Assessed in March 2024 9-2
Table 9-2 Summarized Condition Score Matrix 9-3
Table 9-3 Lift/Pump Station Risk Scores 9-9
Table 9-4 Lift/Pump Station Rehab/Replacement Recommendations 9-16
Table 10-1 Pipeline Unit Construction Costs (2024 Dollars) 10-6
Table 10-2 Recommended Pump/Lift Station Equipment Repairs in 0-5 Years 10-13
Table 10-3 Pump/Lift Station Capacity Upgrade Unit Construction Cost (2024 Dollars) 10-16
Table 10-4 Pump/Lift Station Baseflow from Existing vs New Development at Buildout 10-17
Table 10-5 CIP Cost Summary 10-17
Table 10-6 Capital Improvement Program (2024 Dollars) 10-18

LIST OF FIGURES

Figure ES-1 Rehabilitation/Replacement CIP 6
Figure ES-2 Capacity Improvement CIP 8
Figure 2-1 Sewer System Service Area Map 2-2
Figure 2-2 City Zoning Map 2-3
Figure 2-3 Planned and Projected Development Map 2-7
Figure 2-4 Collection System Facilities Map 2-8
Figure 2-5 Gravity Main Diameter Map 2-10
Figure 2-6 Gravity Main Material Map 2-11
Figure 2-7 Gravity Main Install Year Map 2-13
Figure 2-8 Pump/Lift Station Flow Schematic 2-16

Figure 5-1 Modeled Collection System Facilities 5-4
Figure 5-2 Existing Model Subcatchment Overview 5-5
Figure 5-3 Typical Installation for Flow Monitor with Submerged Sensor 5-6
Figure 5-4 Flow Monitoring Locations and Catchments 5-9
Figure 5-5 Precipitation Gages Used for Calibration 5-10
Figure 5-6 Hourly Precipitation During Monitoring Study 5-11
Figure 5-7 Sample Diurnal Pattern for ADWF (Site 2) 5-14
Figure 5-8 Sample Dry Weather Flow Plot (Site 2) 5-15
Figure 5-9 Conceptual Model of Peak Wet Weather Flow 5-17
Figure 5-10 Components of RTK Hydrograph 5-19
Figure 5-11 Wet Weather Flow Measured and Modeled for Site 8 5-20
Figure 6-1 Residential Development Units Expected by 2035 6-2
Figure 6-2 Non-Residential Development Units Expected by 2035 6-3
Figure 6-3 Residential Development Units Expected by Build Out 6-4
Figure 6-4 Non-Residential Development Units Expected by Build Out 6-5
Figure 7-1 Modeled Rainfall-Dependent Inflow and Infiltration 7-2
Figure 7-2 Capacity Deficiencies Modeled Flow 7-4
Figure 7-3 Stillwater Road/Upstream of Northport PS Capacity Deficiency 7-5
Figure 7-4 Stillwater Road Hydraulic Profile 7-6
Figure 7-5 Bryte Pump Station Tributary Area Capacity Deficiency 7-7
Figure 7-6 Bryte Pump Station Tributary Hydraulic Profile 7-8
Figure 7-7 Stone Blvd/Park Blvd Intersection Capacity Deficiency 7-9
Figure 7-8 Hydraulic Profile Stone Blvd/Park Blvd 7-10
Figure 7-9 Linden Dr/Jefferson Blvd Capacity Deficiency 7-11
Figure 7-10 Hydraulic Profile Linden Drive and Jefferson Blvd 7-12
Figure 8-1 Existing System Capacity Deficiencies 8-2
Figure 8-2 Capacity Improvements 8-3
Figure 8-3 Sewer Extensions 8-8
Figure 8-4 Southport Tributary Areas - Yarbrough 8-11
Figure 8-5 Southport Tributary Areas – River Park 8-14
Figure 8-6 Southport Tributary Areas – Northwest 8-16
Figure 8-7 Southport Tributary Areas – Liberty and Northeast 8-17
Figure 8-8 Yarbrough Sewer Configurations Alternatives 8-22
Figure 9-1 Proactive Risk Management 9-2
Figure 9-2 Allan Lift Station Condition Photos 9-4
Figure 9-3 Bryte Pump Station Condition Photos 9-5
Figure 9-4 Industrial Pump Station Condition Photos 9-5
Figure 9-5 Jefferson Pump Station Condition Photos 9-6
Figure 9-6 South Pump Station Condition Photos 9-6
Figure 9-7 Southport Pump Station Condition Photos 9-7

Figure 9-8 CCTV Results: Structural Defect Severity 9-8
Figure 9-9 Risk Levels for Gravity Mains and Manholes 9-10
Figure 9-10 Cleaning Plan 9-14
Figure 9-10 Inspection Plan 9-18
Figure 10-1 Gravity Sewer Cleaning Priorities 10-9
Figure 10-2 Gravity Sewer Inspection Priorities 10-10
Figure 10-3 Rehab/Replacement Projects 10-11
Figure 10-4 Capacity Improvement Projects 10-15

Appendix A. City of West Sacramento Sewer Flow Monitoring and Inflow/Infiltration Study

Monitoring Site: Site 1

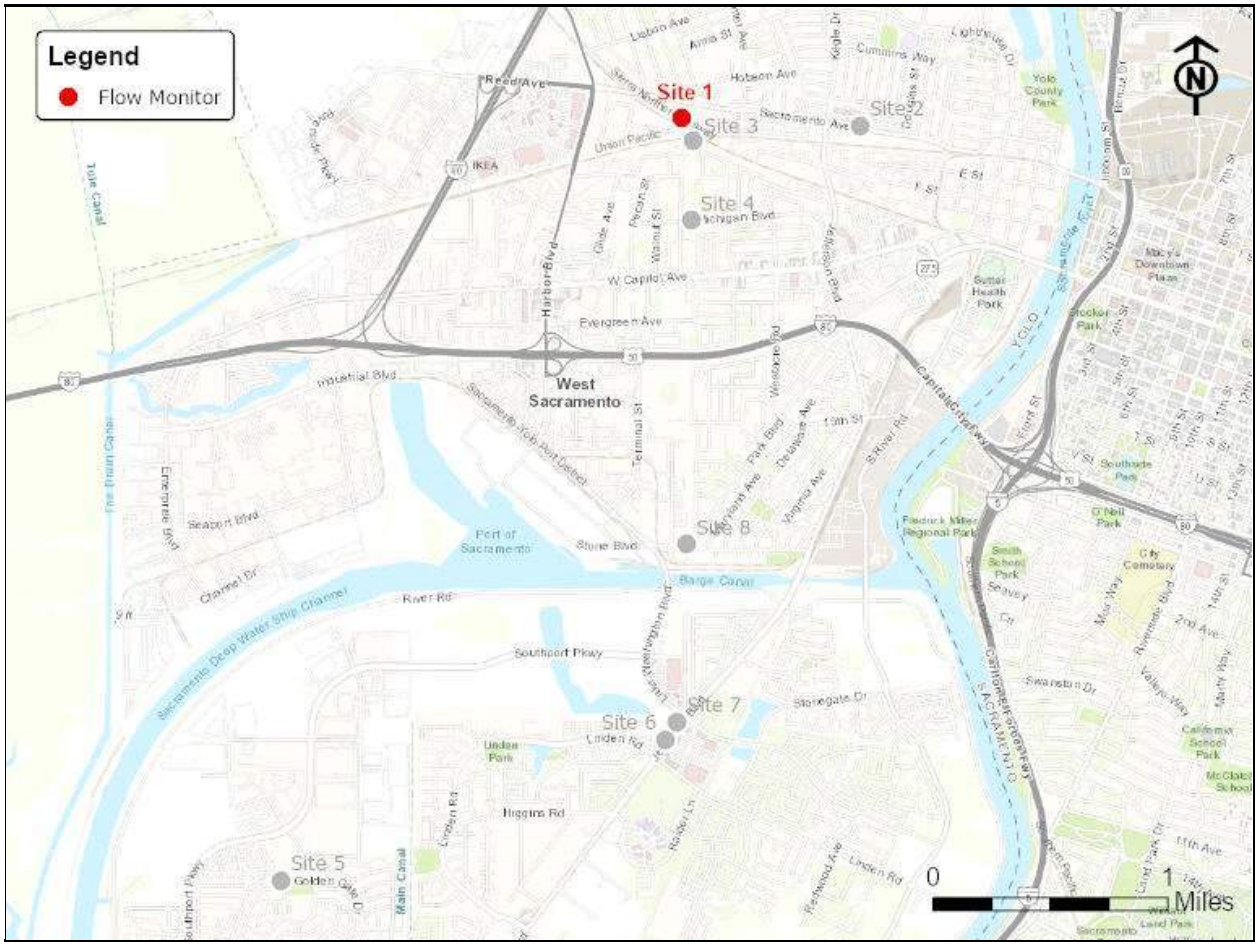
Black & Veatch | West Sacramento, California

Sanitary Sewer Flow Monitoring

January 06, 2023 - February 22, 2023

Location: Intersection of Yolo Street and Mikon Street

Data Summary Report



Vicinity Map: Site 1

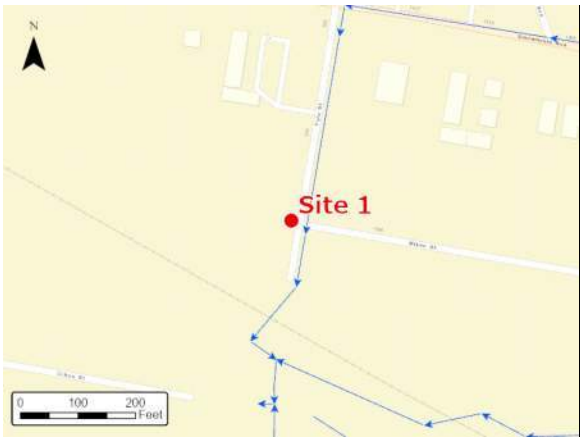
SITE 1

Site Information MH ID: 50150

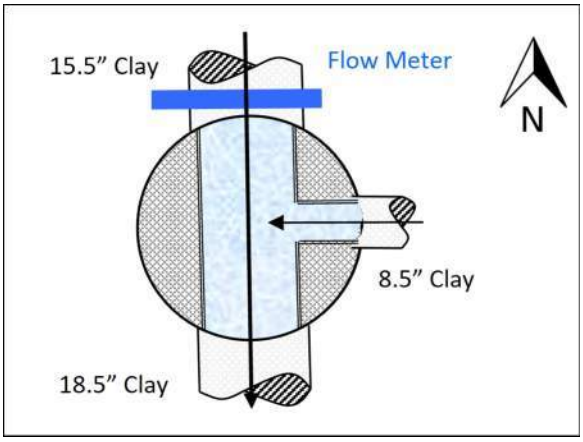
Location:	Intersection of Yolo Street and Mikon Street
Coordinates:	121.5380° W, 38.5897° N
Rim Elevation:	19 feet
Expected Pipe Diameter:	16 inches
Measured Pipe Diameter:	15.5 inches
ADWF:	0.199 mgd
Peak Measured Flow:	1.639 mgd
Sediment:	None



Satellite Map



Sanitary Map



Flow Sketch



Street View



Plan View

SITE 1

Additional Site Photos

Effluent Pipe



East Influent Pipe



SITE 1

Additional Site Photos

Monitored North Influent Pipe

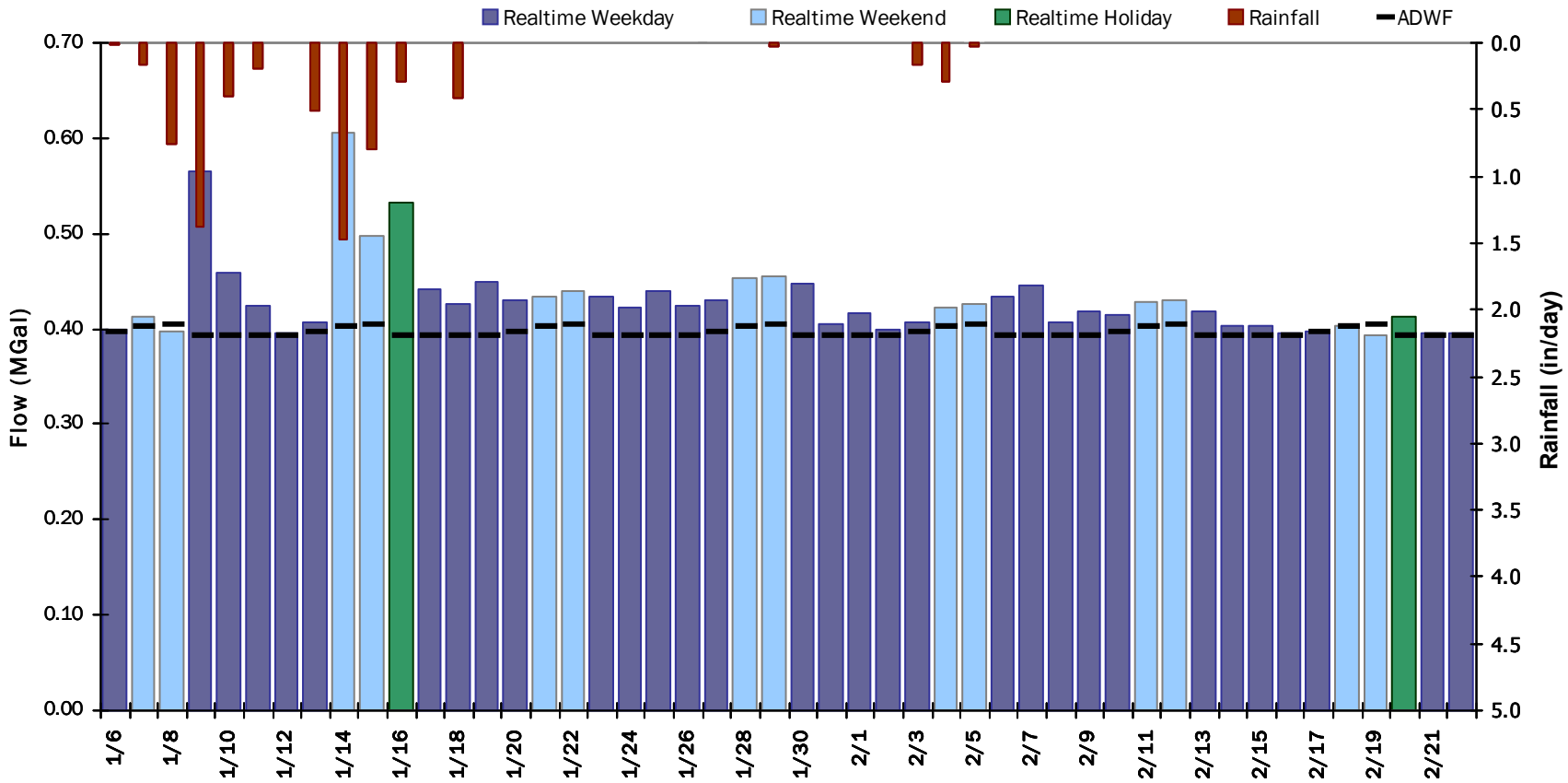


SITE 1

Period Flow Summary: Daily Flow Totals

Avg Daily Flow: 0.433 MGal Peak Daily Flow: 0.605 MGal Min Daily Flow: 0.393 MGal

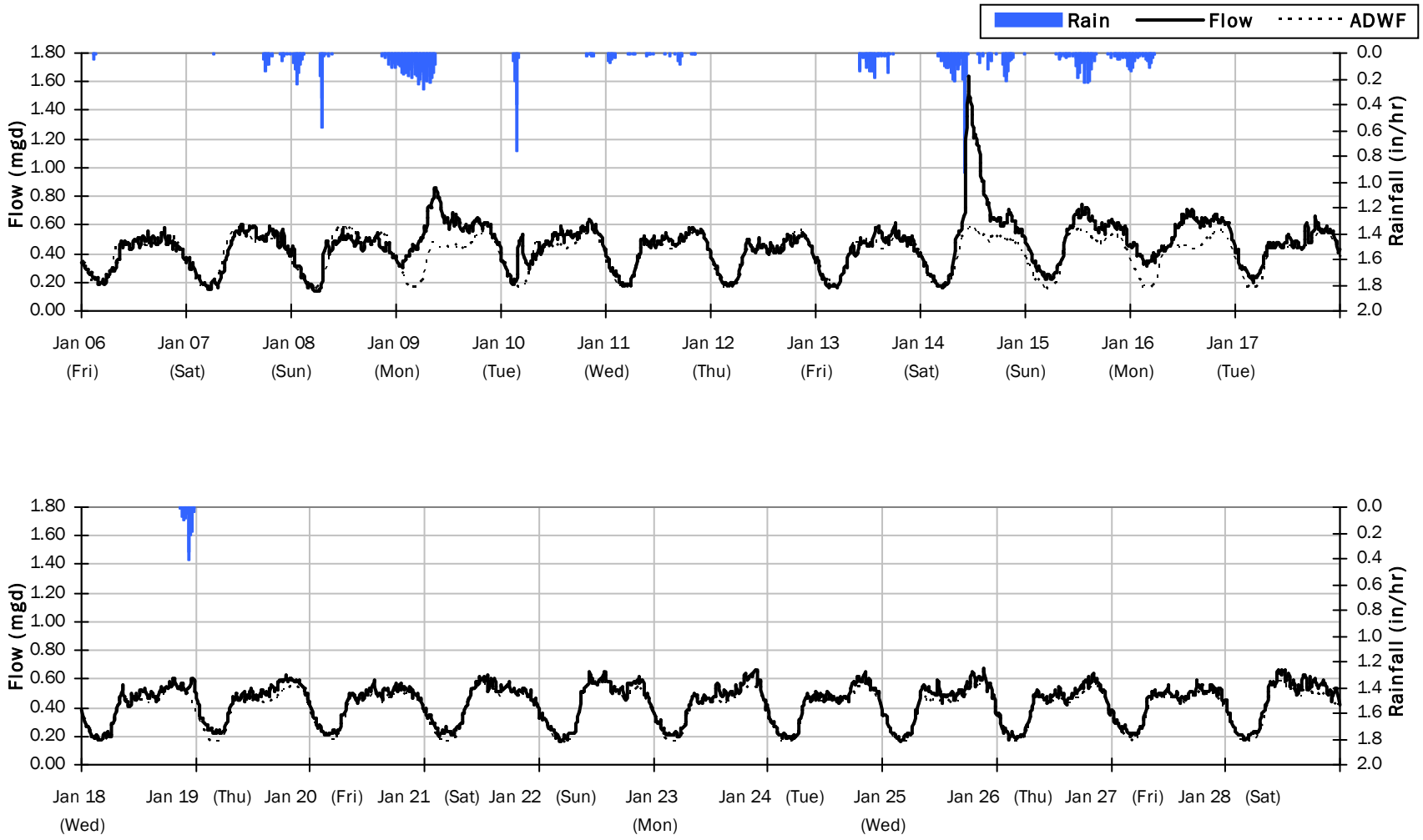
Total Rainfall: 7.22 inches



SITE 1

Flow Summary: 1/6/2023 to 1/28/2023

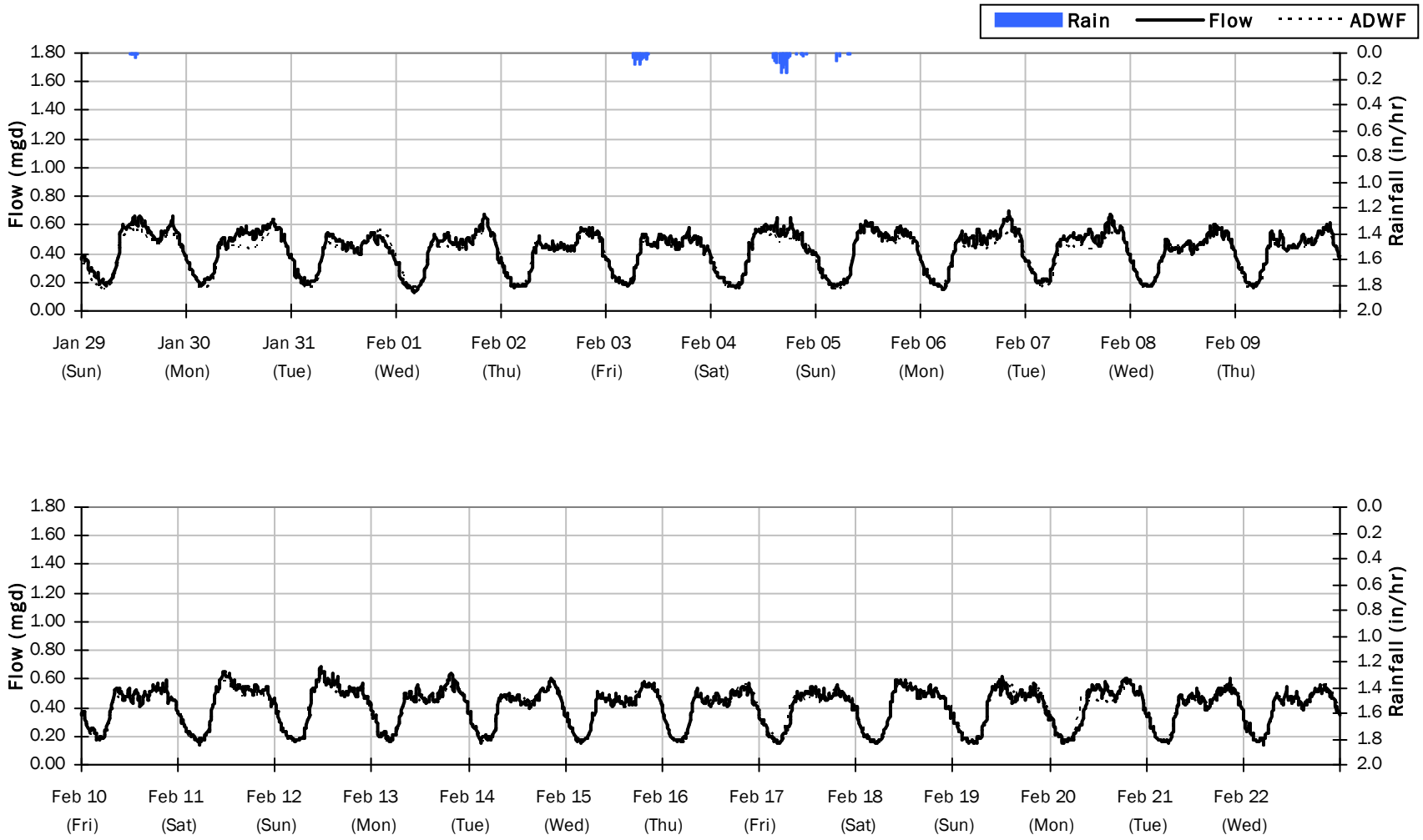
Period Rainfall: 6.40 inches Period Avg Flow: 0.449 mgd Period Peak Flow: 1.639 mgd Period Min Flow: 0.137 mgd



SITE 1

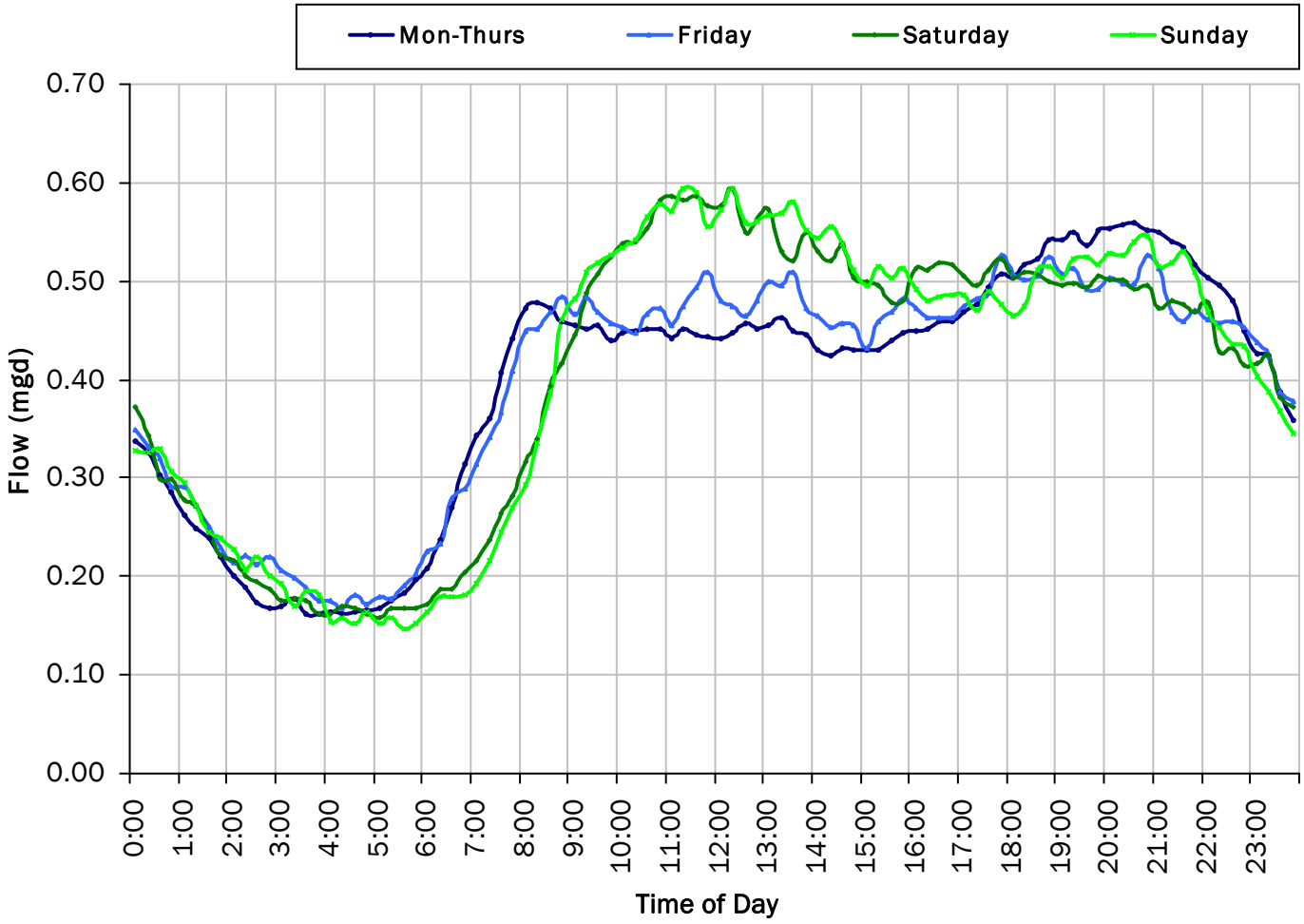
Flow Summary: 1/29/2023 to 2/22/2023

Period Rainfall: 0.51 inches Period Avg Flow: 0.415 mgd Period Peak Flow: 0.698 mgd Period Min Flow: 0.128 mgd



SITE 1

Average Dry Weather Flow Hydrographs



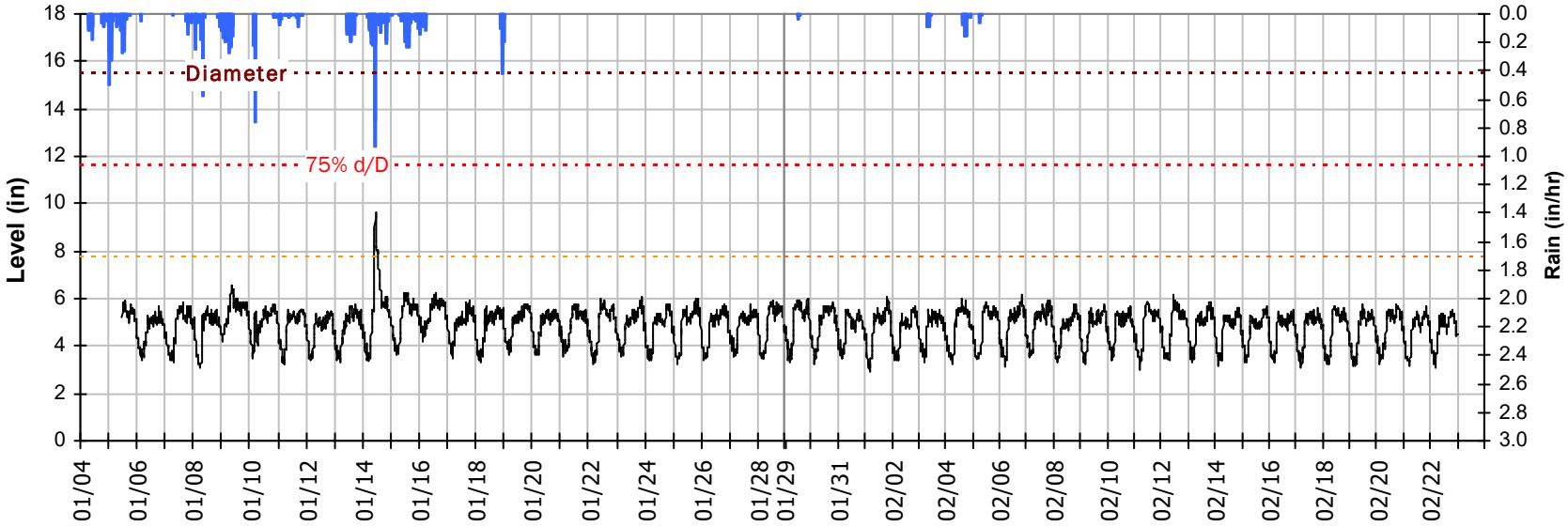
ADWF:

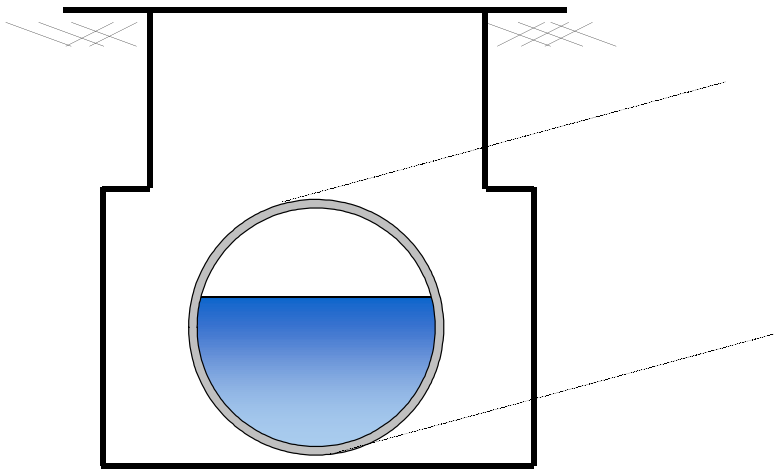
0.398 *mgd*

SITE 1

Site Capacity and Surcharge Summary

Realtime Flow Levels with Rainfall Data over Peak Level Period

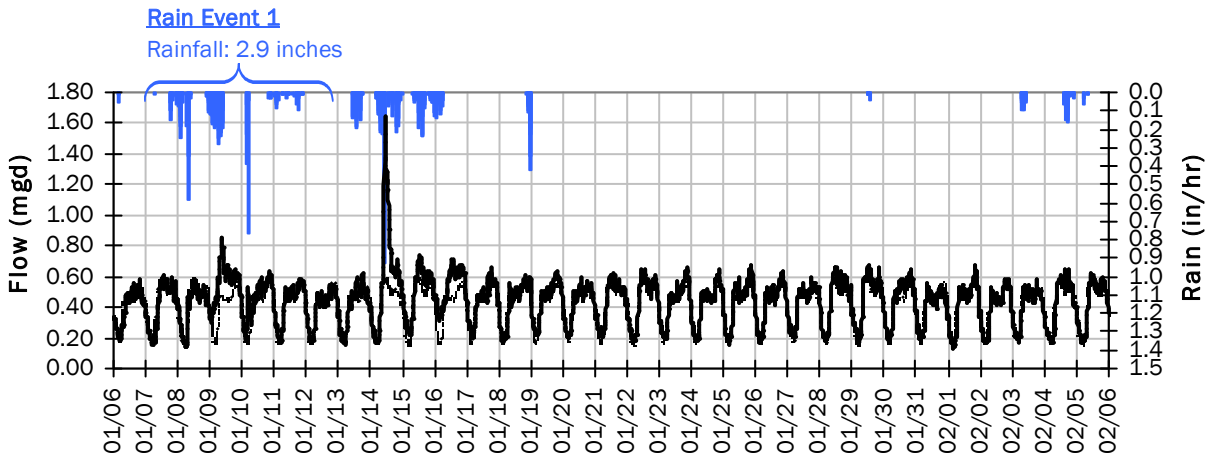




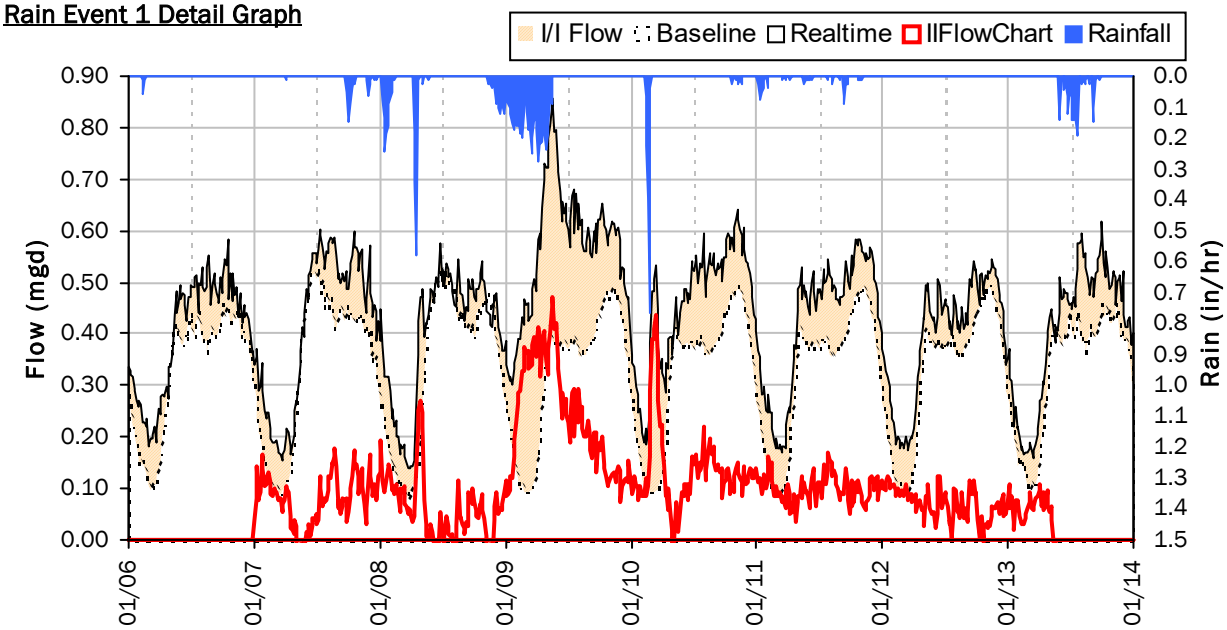
Pipe Diameter:	15.5	*inches*
Peak Measured Level:	9.67	*inches*
Peak d/D Ratio:	0.62	

SITE 1
I/I Summary: Rain Event 1

Baseline and Realtime Flows with Rainfall Data over Monitoring Period



Rain Event 1 Detail Graph

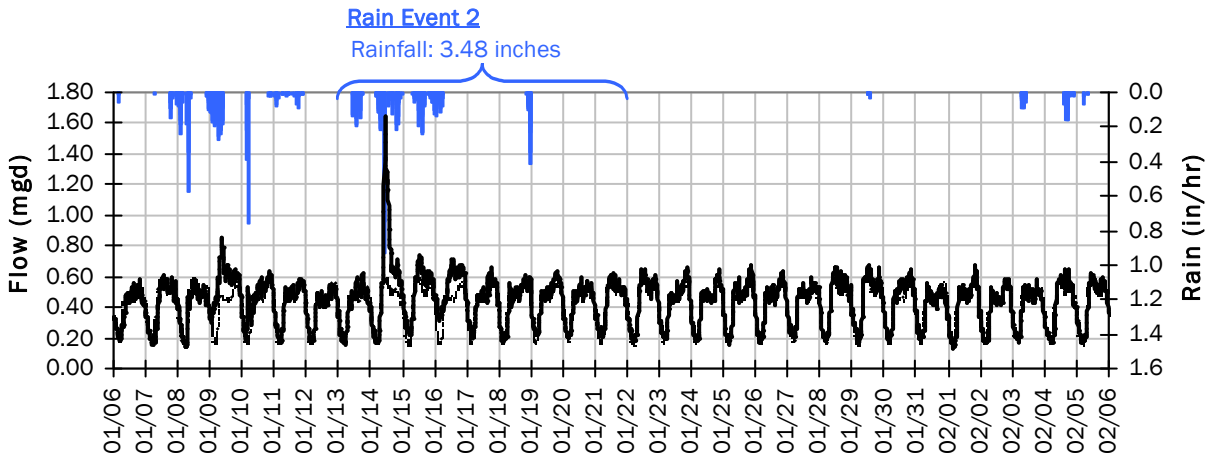


Storm Event I/I Analysis (Rain = 2.90 inches)

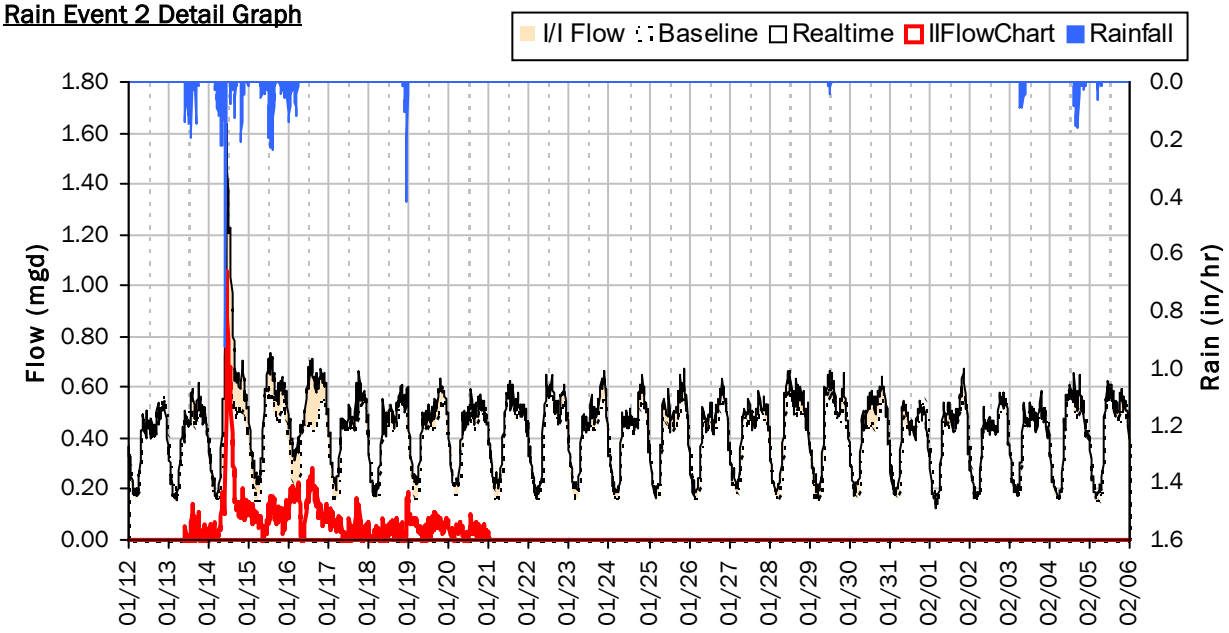
Capacity		Inflow / Infiltration	
Peak Flow:	0.856 *mgd*	**Peak I/I Rate:**	0.471 *mgd*
PF:	2.15	**Total I/I:**	712,000 *gallons*
Peak Level:	6.58 *in*		
d/D Ratio:	0.42		

SITE 1
I/I Summary: Rain Event 2

Baseline and Realtime Flows with Rainfall Data over Monitoring Period



Rain Event 2 Detail Graph

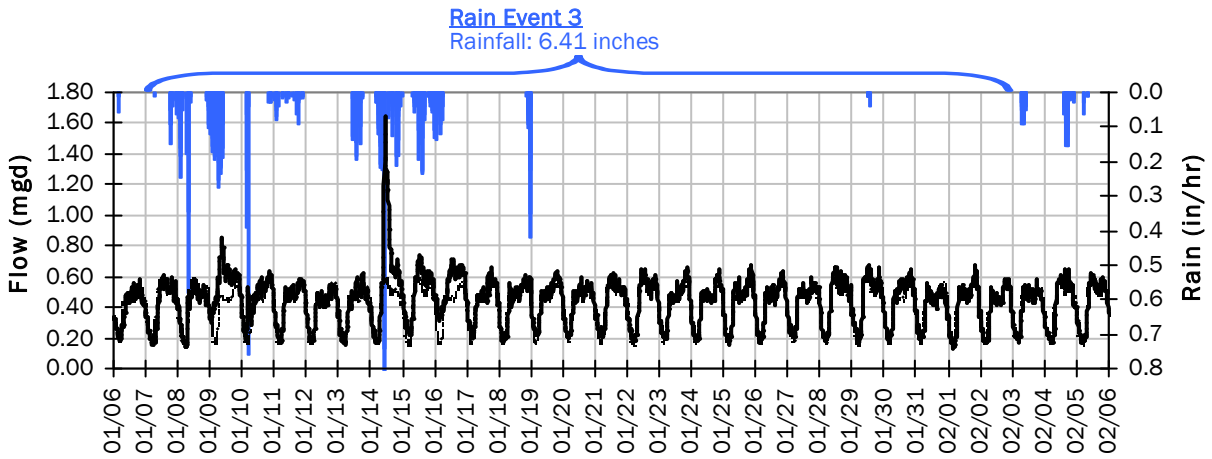


Storm Event I/I Analysis (Rain = 3.48 inches)

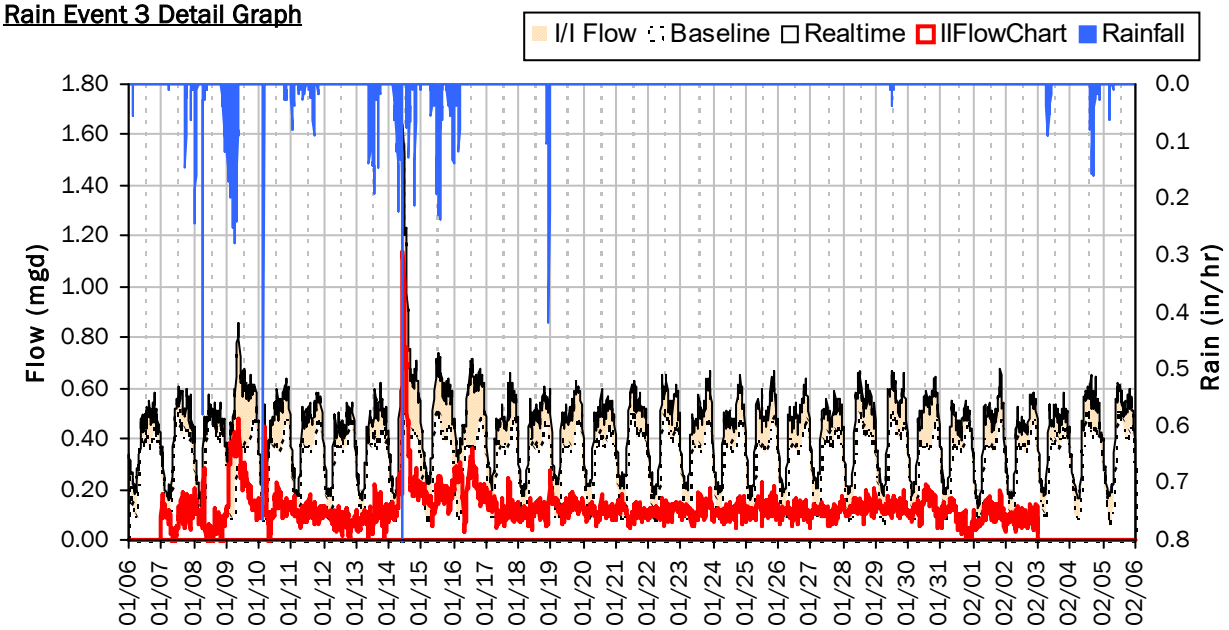
Capacity		Inflow / Infiltration	
Peak Flow:	1.639 *mgd*	**Peak I/I Rate:**	1.057 *mgd*
PF:	4.12	**Total I/I:**	612,000 *gallons*
Peak Level:	9.67 *in*		
d/D Ratio:	0.62		

SITE 1
I/I Summary: Rain Event 3

Baseline and Realtime Flows with Rainfall Data over Monitoring Period



Rain Event 3 Detail Graph



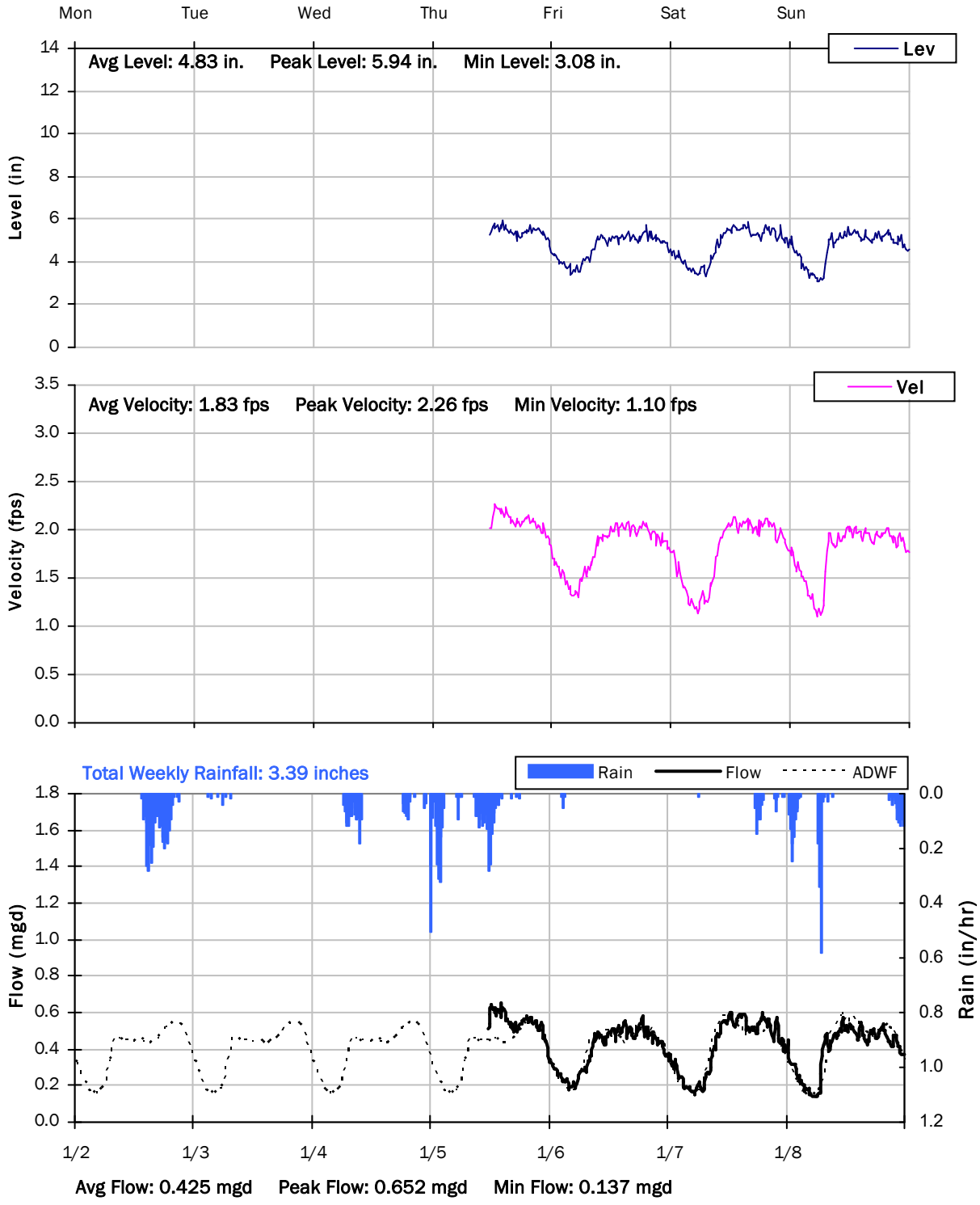
Storm Event I/I Analysis (Rain = 6.41 inches)

Capacity		Inflow / Infiltration	
Peak Flow:	1.64 *mgd*	**Peak I/I Rate:**	1.14 *mgd*
PF:	4.12	**Total I/I:**	3,467,000 *gallons*
Peak Level:	9.67 *in*		
d/D Ratio:	0.62		

SITE 1

Weekly Level, Velocity and Flow Hydrographs

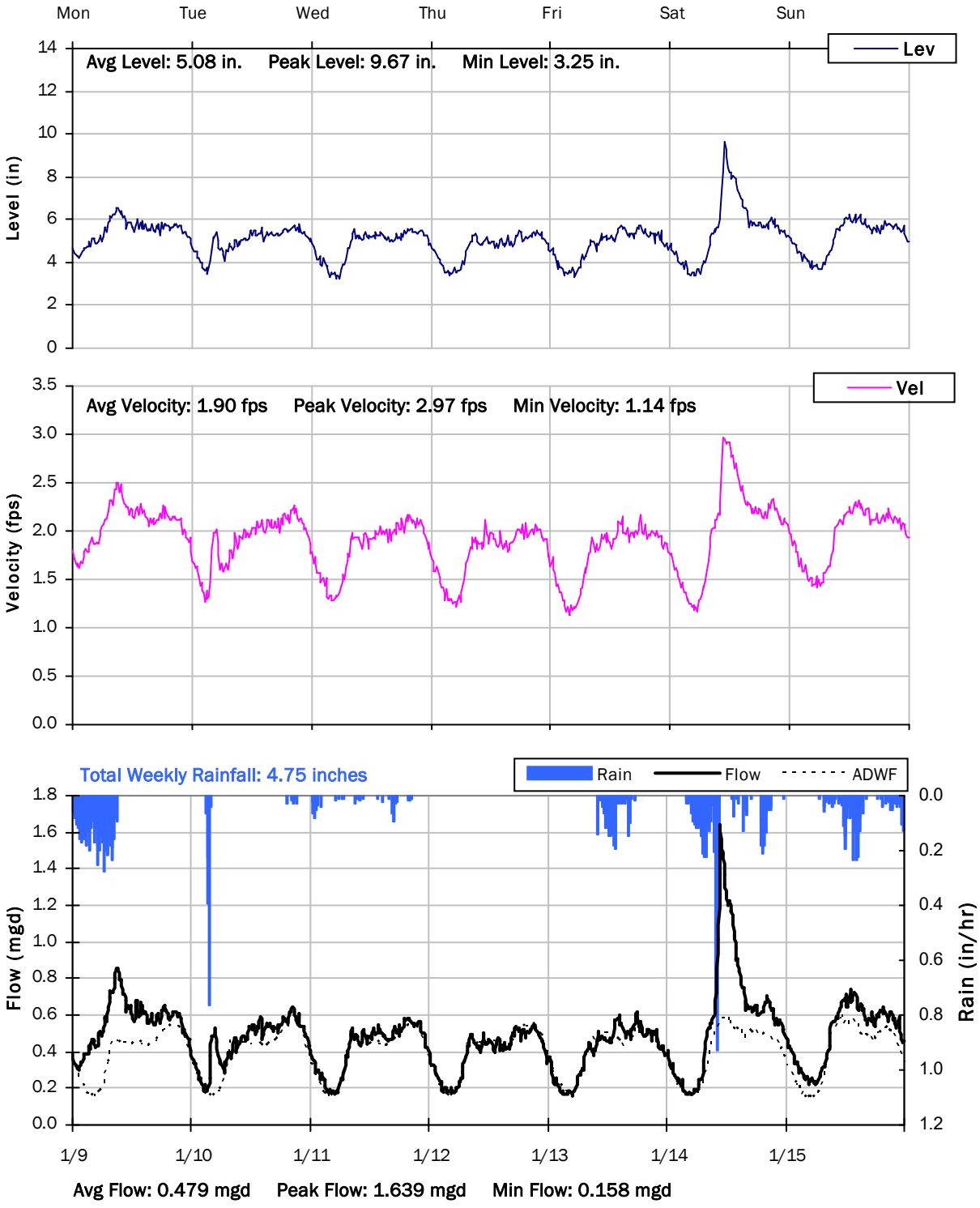
1/2/2023 to 1/9/2023



SITE 1

Weekly Level, Velocity and Flow Hydrographs

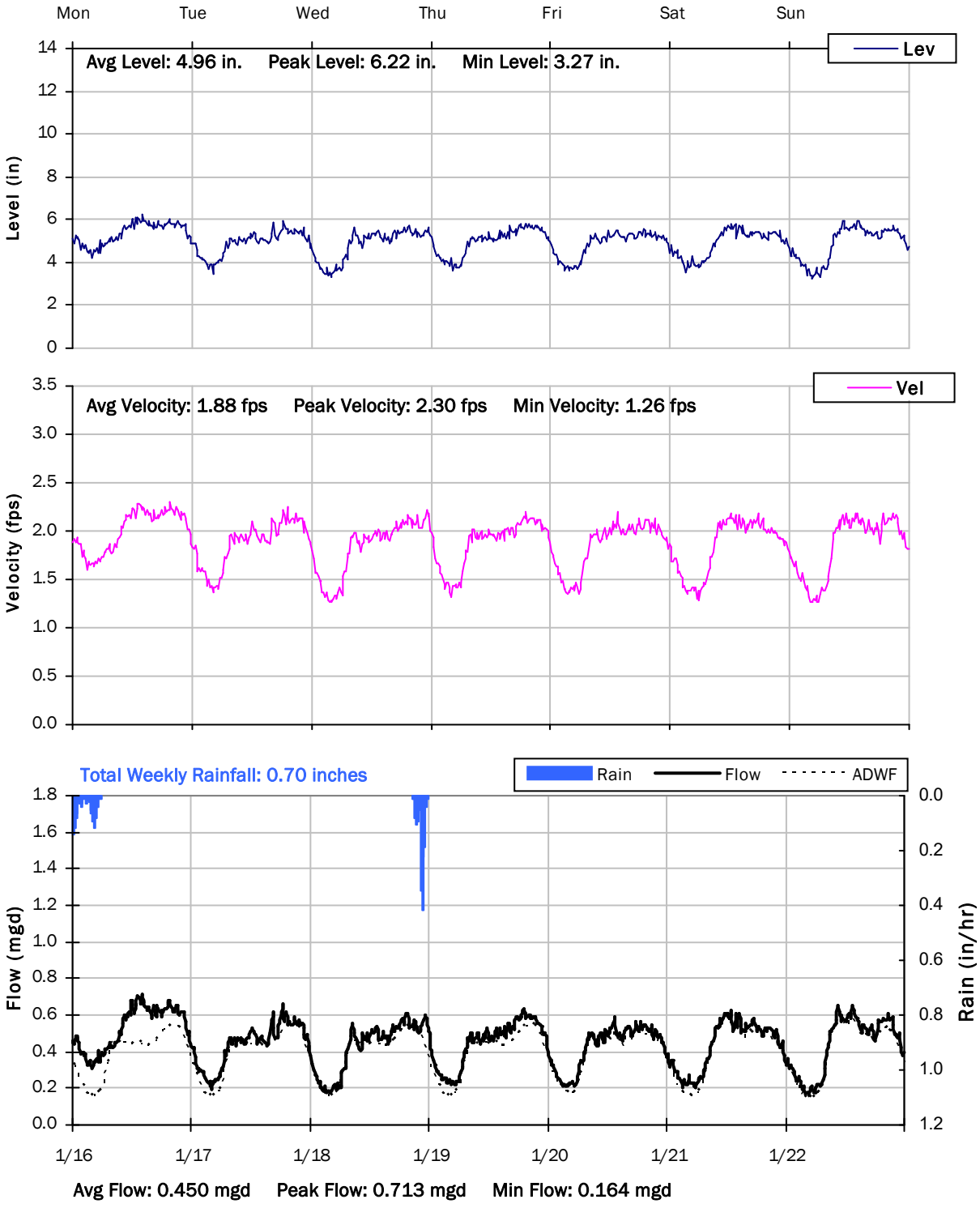
1/9/2023 to 1/16/2023



SITE 1

Weekly Level, Velocity and Flow Hydrographs

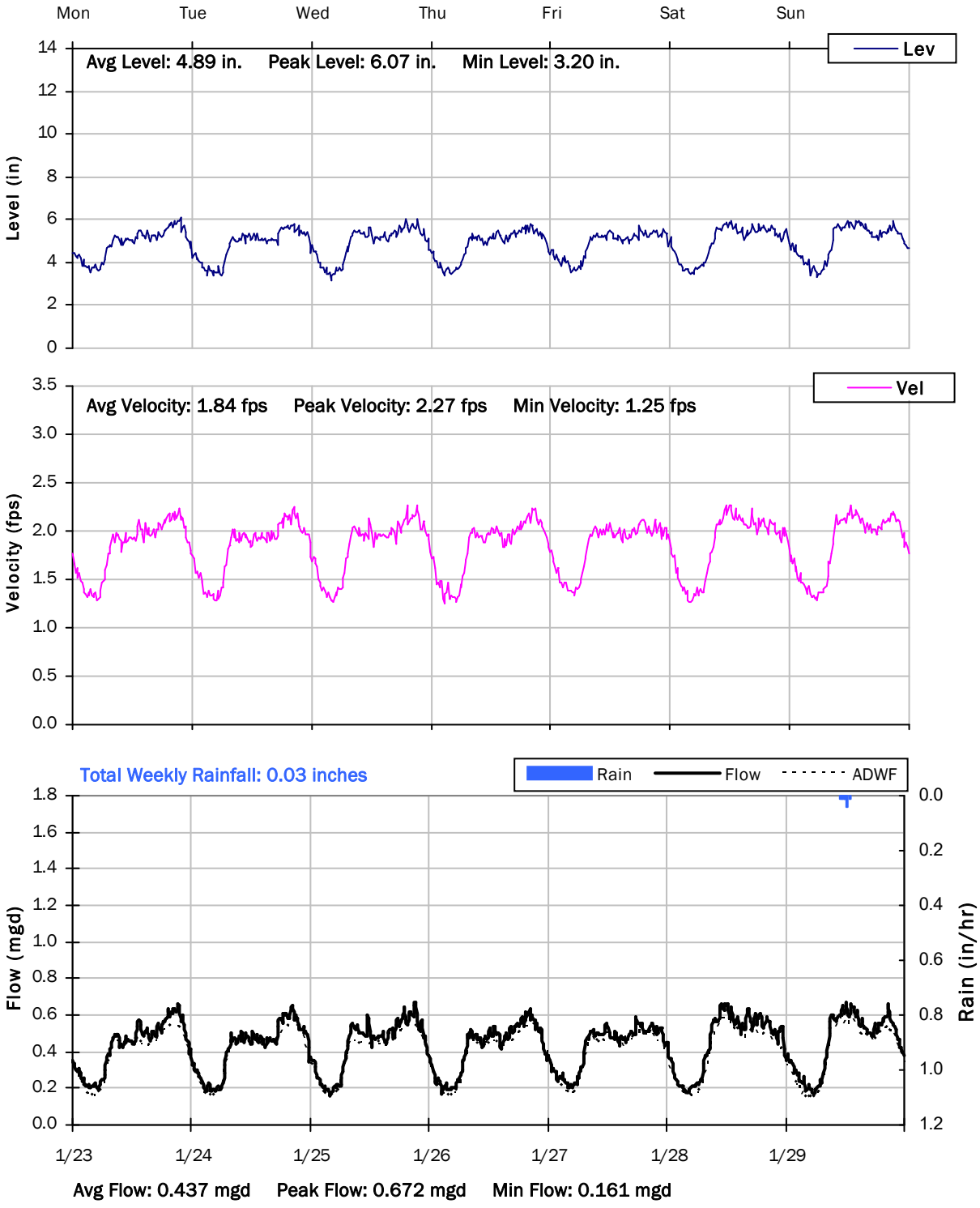
1/16/2023 to 1/23/2023



SITE 1

Weekly Level, Velocity and Flow Hydrographs

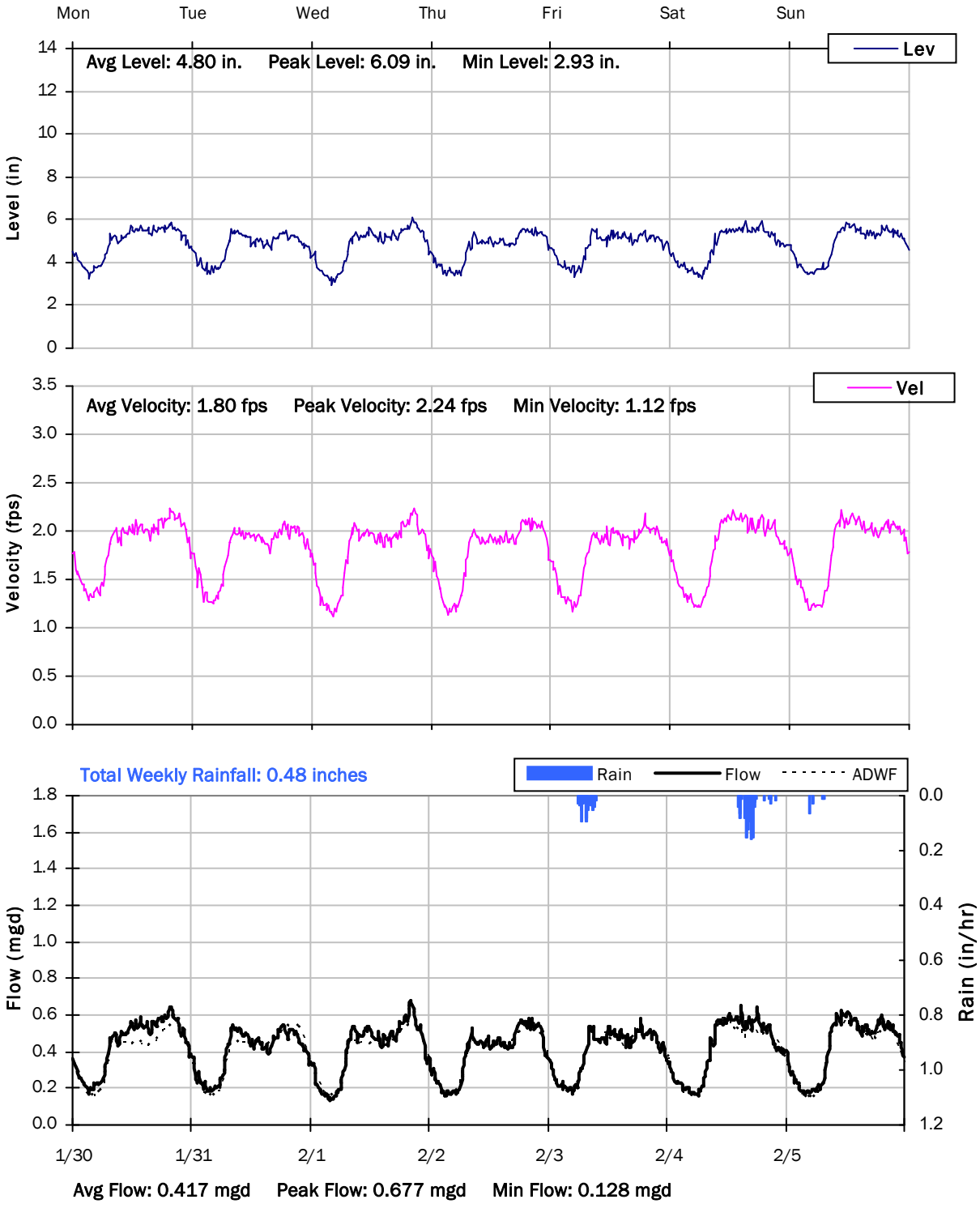
1/23/2023 to 1/30/2023



SITE 1

Weekly Level, Velocity and Flow Hydrographs

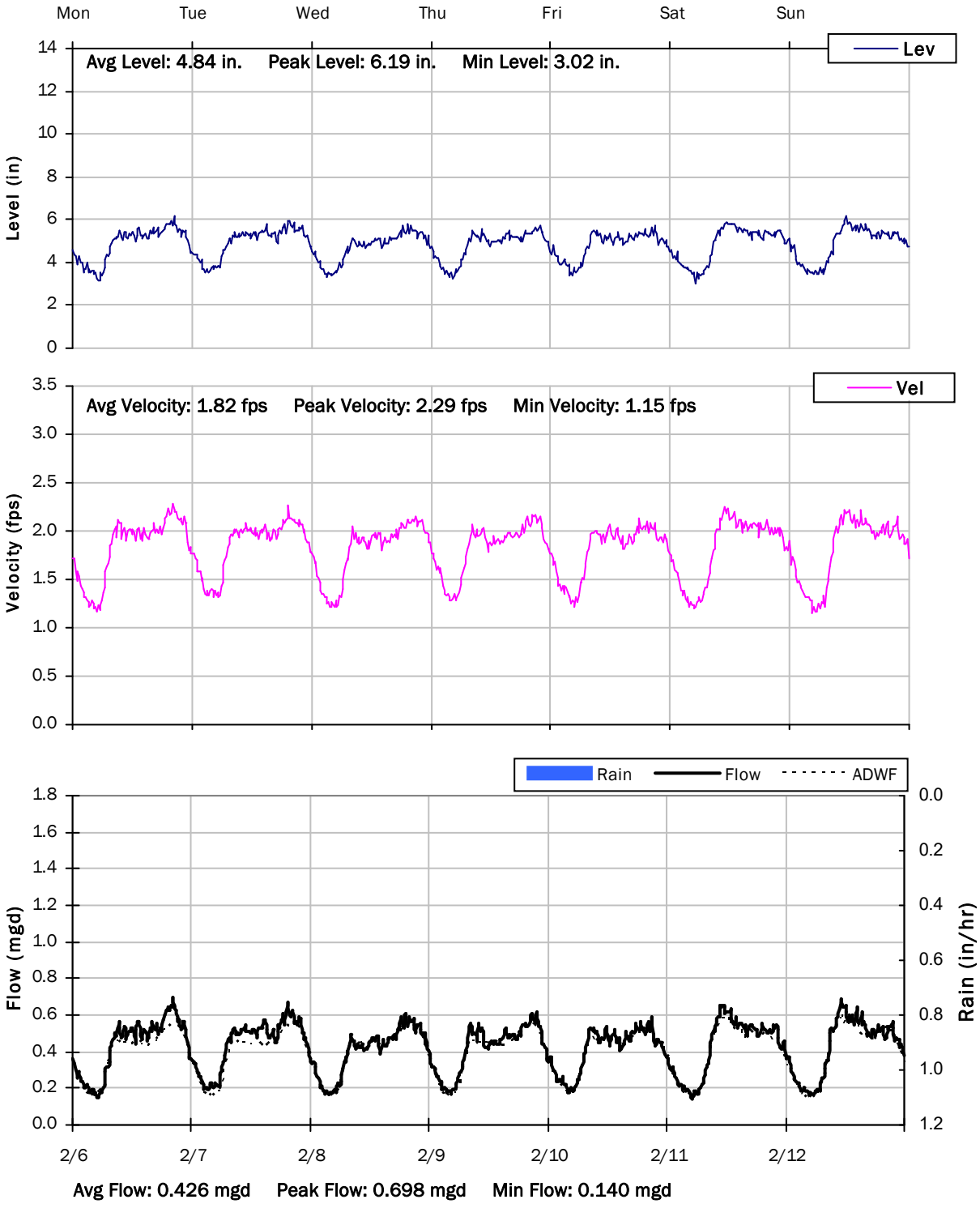
1/30/2023 to 2/6/2023



SITE 1

Weekly Level, Velocity and Flow Hydrographs

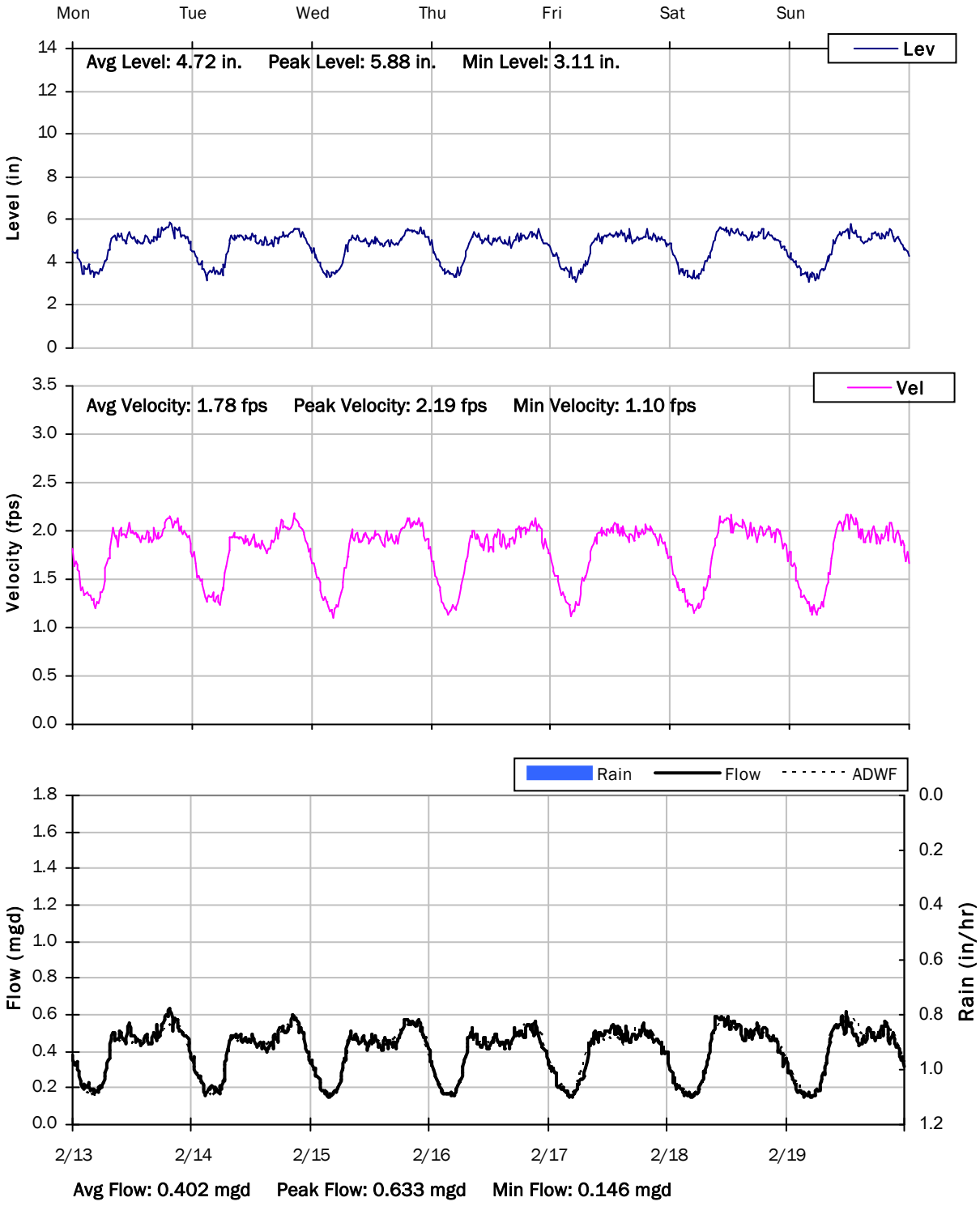
2/6/2023 to 2/13/2023



SITE 1

Weekly Level, Velocity and Flow Hydrographs

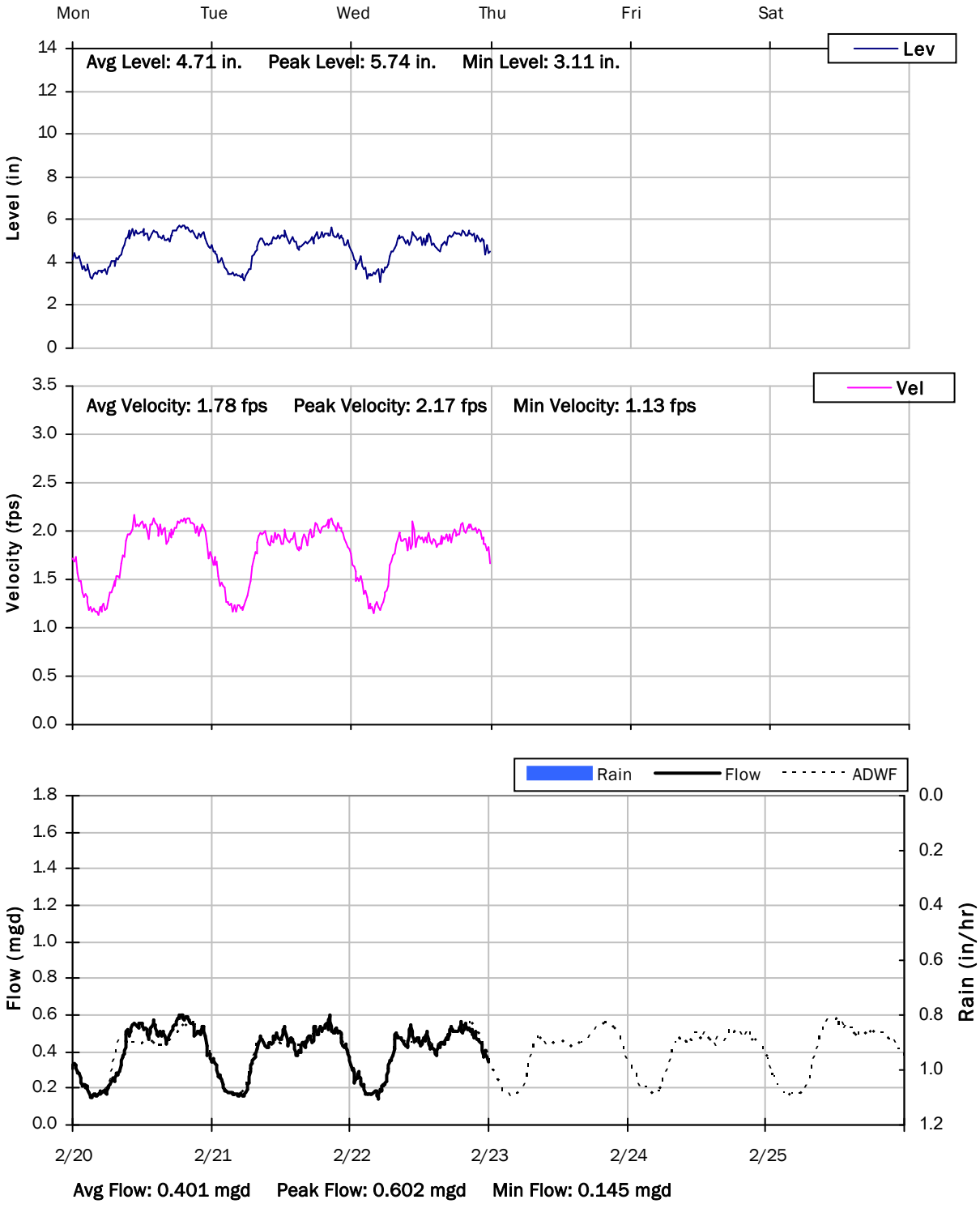
2/13/2023 to 2/20/2023



SITE 1

Weekly Level, Velocity and Flow Hydrographs

2/20/2023 to 2/27/2023



Monitoring Site: Site 2

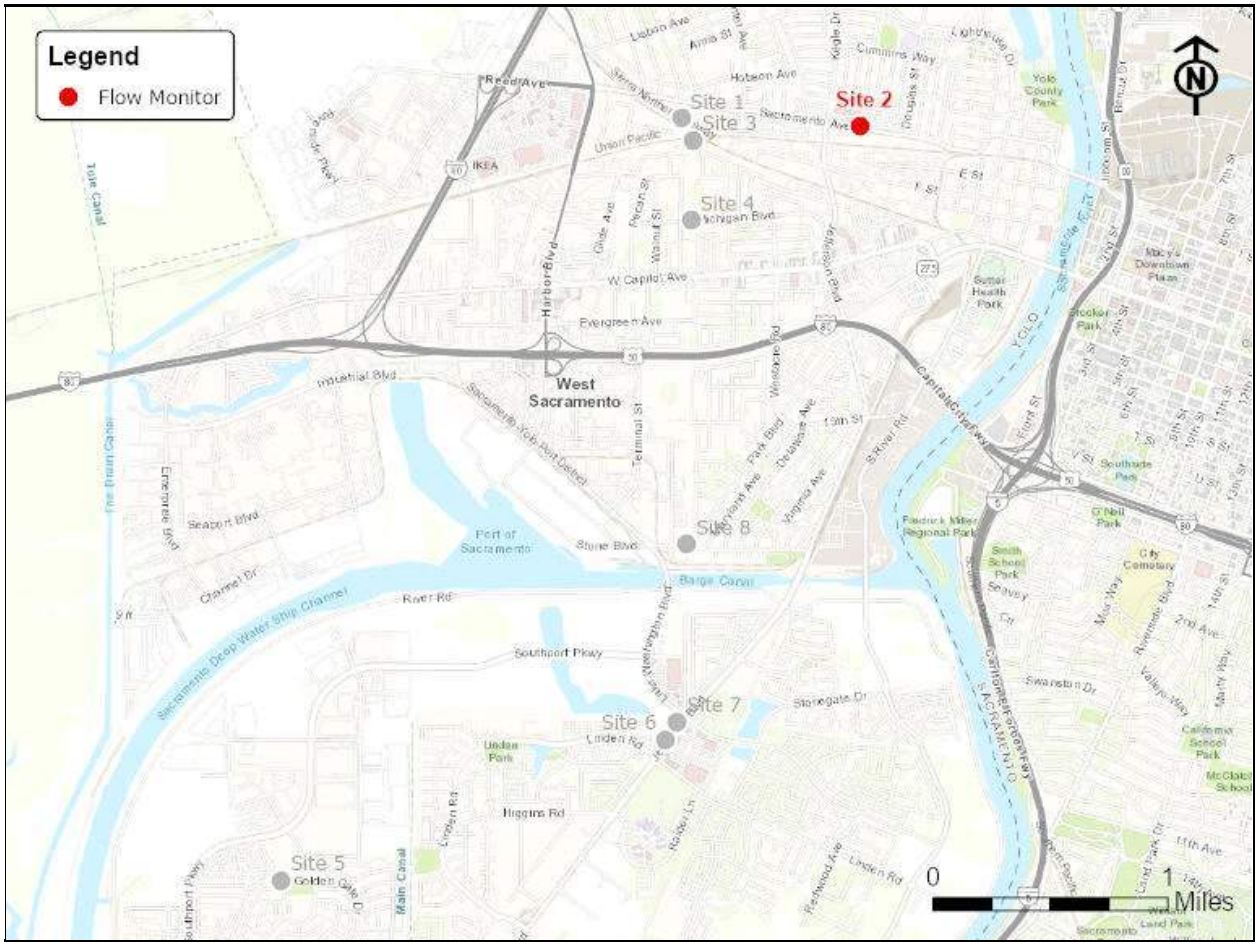
Black & Veatch | West Sacramento, California

Sanitary Sewer Flow Monitoring

January 06, 2023 - February 22, 2023

Location: Grassy Area on Sacramento Avenue, East of Kegle Drive

Data Summary Report

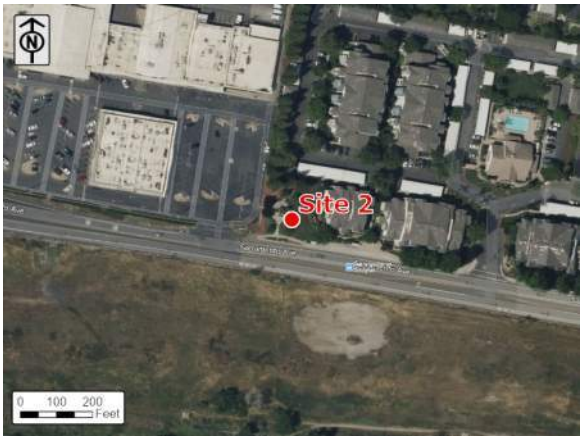


Vicinity Map: Site 2

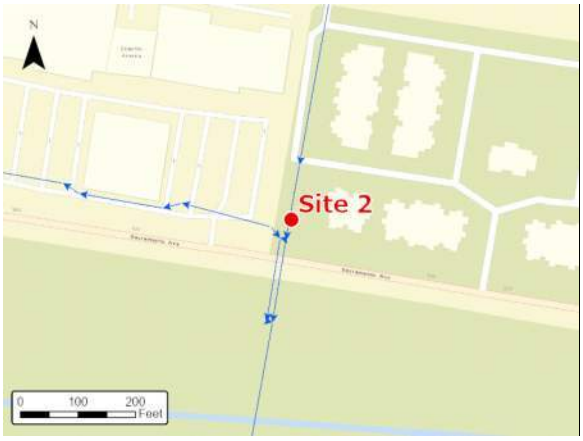
SITE 2

Site Information MH ID: 101201

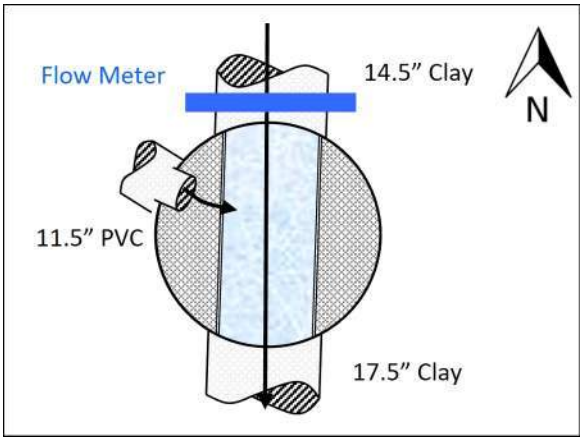
Location:	Grassy Area on Sacramento Avenue, East of Kegle Drive
Coordinates:	121.5240° W, 38.5894° N
Rim Elevation:	21 feet
Expected Pipe Diameter:	14 inches
Measured Pipe Diameter:	14.5 inches
ADWF:	0.165 mgd
Peak Measured Flow:	1.019 mgd
Sediment:	None



Satellite Map



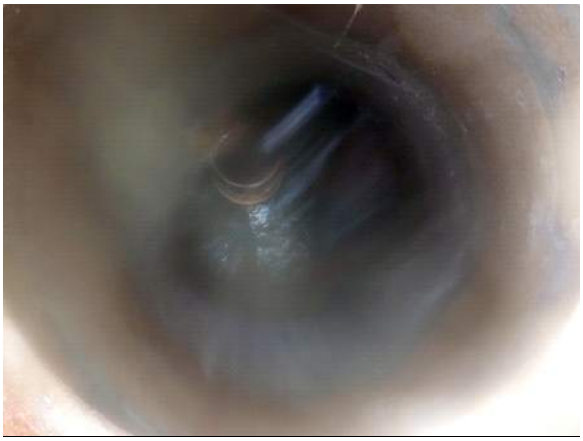
Sanitary Map



Flow Sketch



Street View

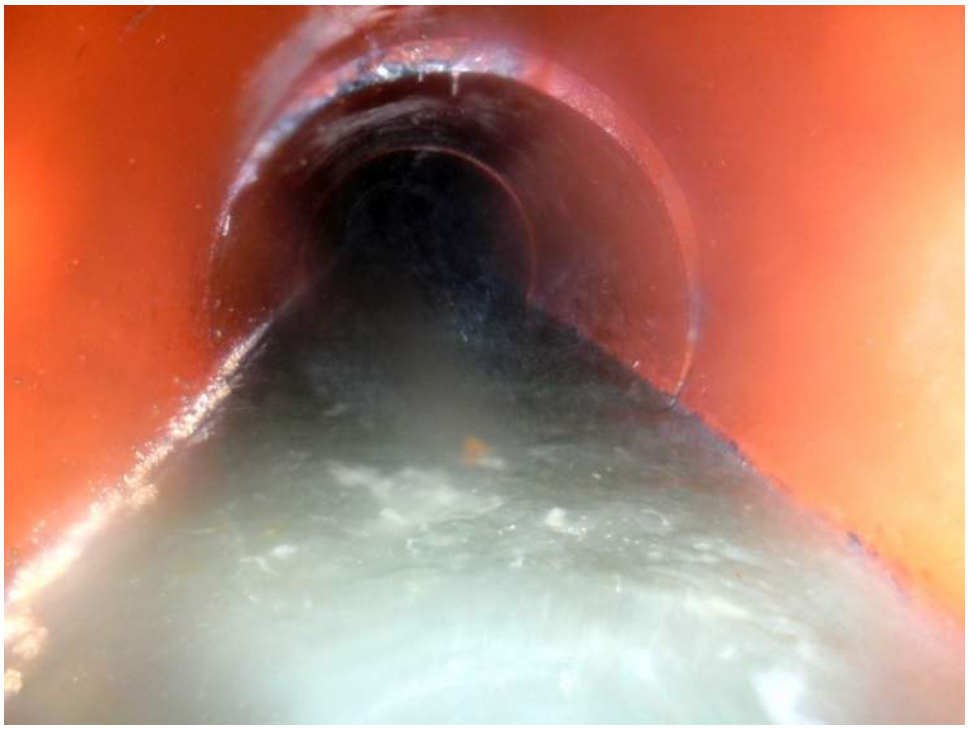


Plan View

SITE 2

Additional Site Photos

Effluent Pipe



Monitored North Influent Pipe



SITE 2

Additional Site Photos

Northwest Influent Pipe

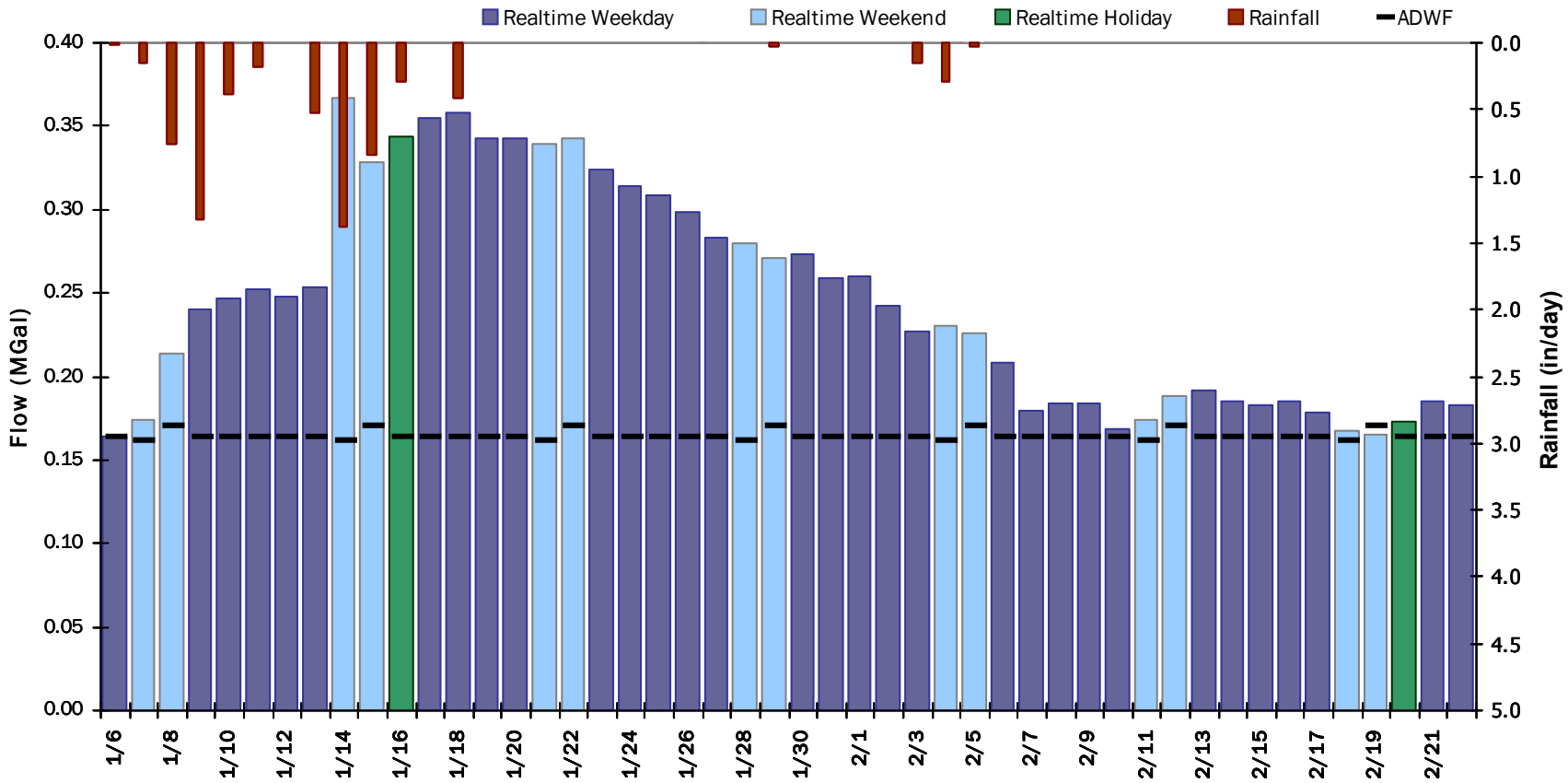


SITE 2

Period Flow Summary: Daily Flow Totals

Avg Daily Flow: 0.245 MGal Peak Daily Flow: 0.367 MGal Min Daily Flow: 0.164 MGal

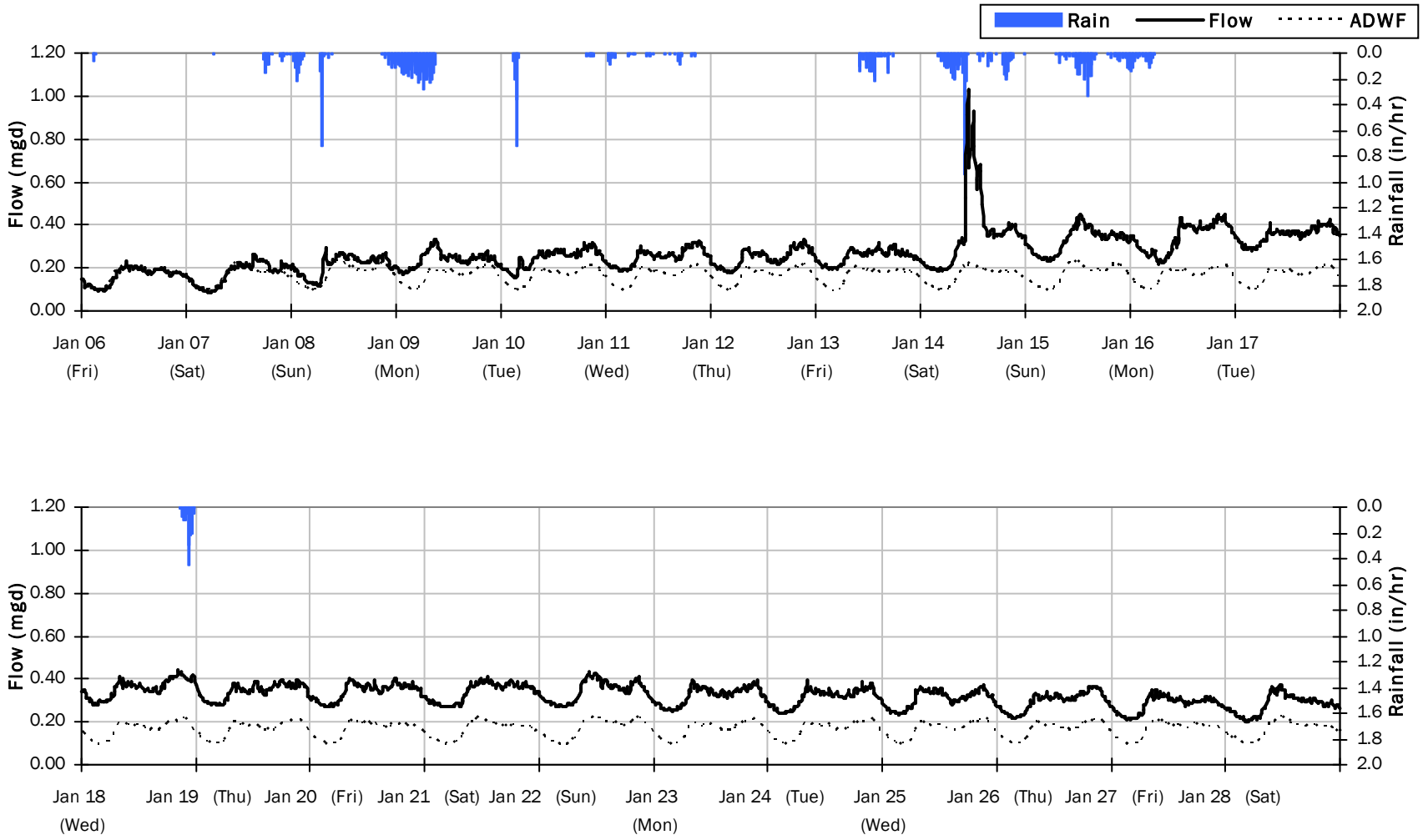
Total Rainfall: 7.04 inches



SITE 2

Flow Summary: 1/6/2023 to 1/28/2023

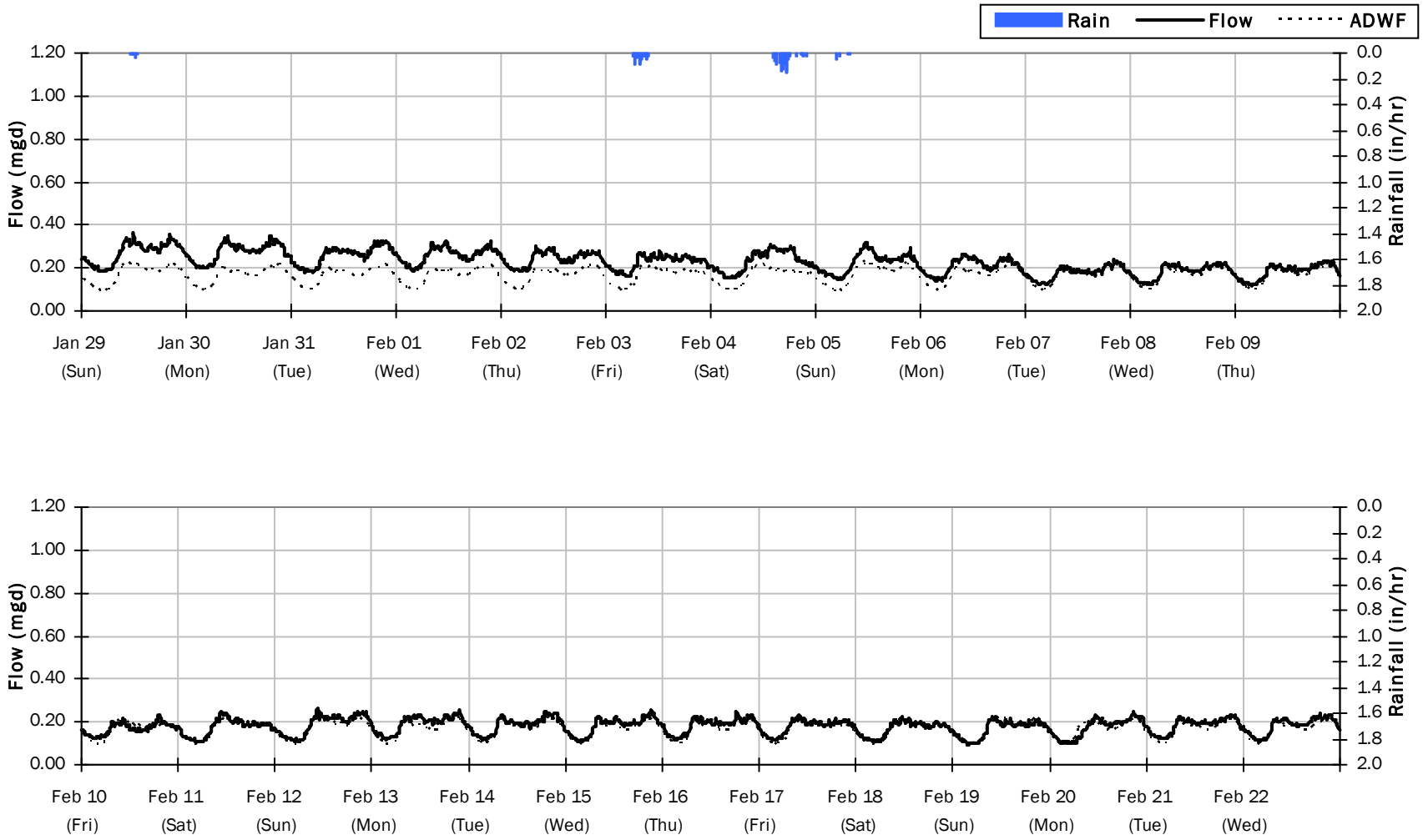
Period Rainfall: 6.26 inches Period Avg Flow: 0.292 mgd Period Peak Flow: 1.019 mgd Period Min Flow: 0.088 mgd



SITE 2

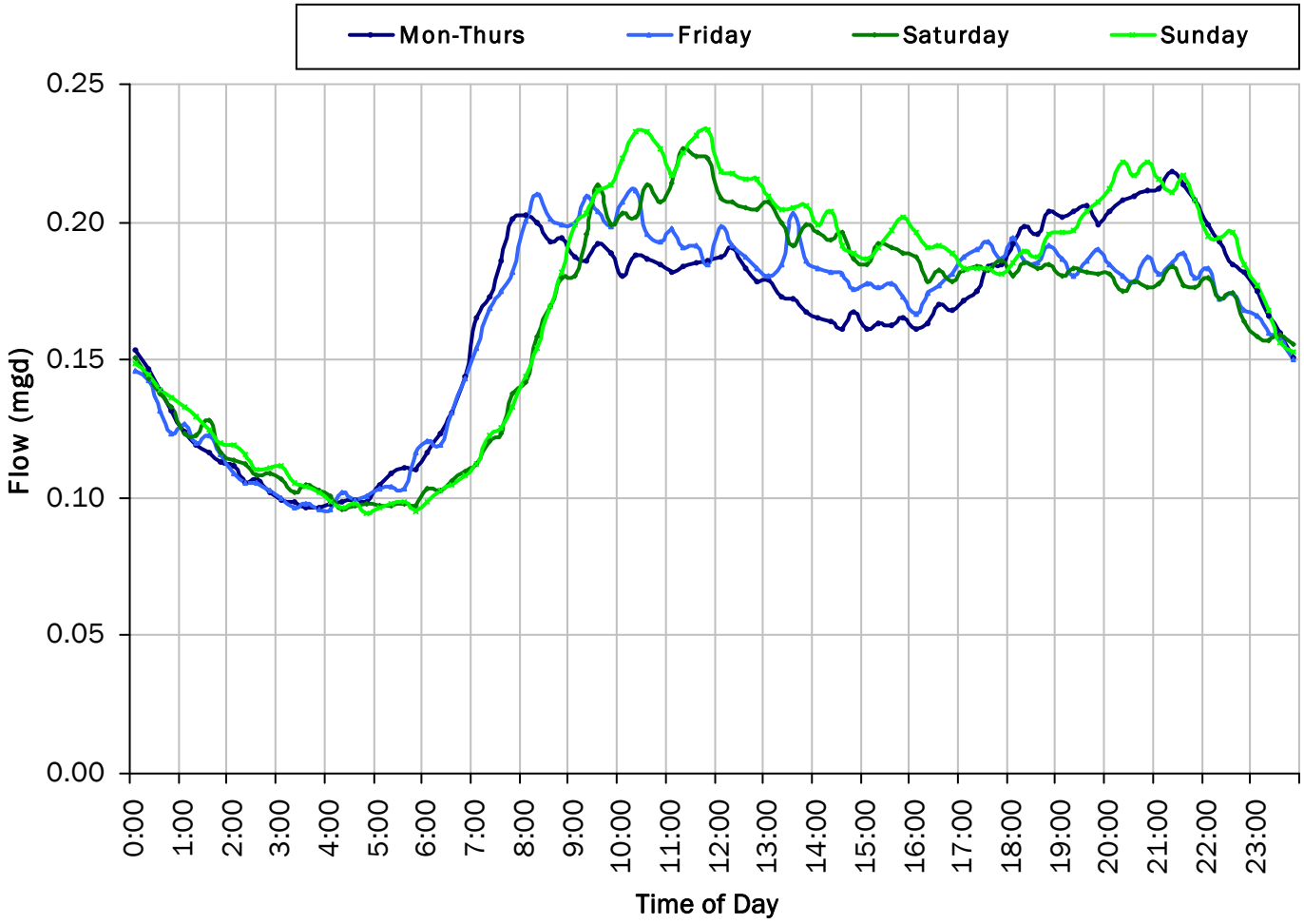
Flow Summary: 1/29/2023 to 2/22/2023

Period Rainfall: 0.49 inches Period Avg Flow: 0.203 mgd Period Peak Flow: 0.362 mgd Period Min Flow: 0.095 mgd



SITE 2

Average Dry Weather Flow Hydrographs



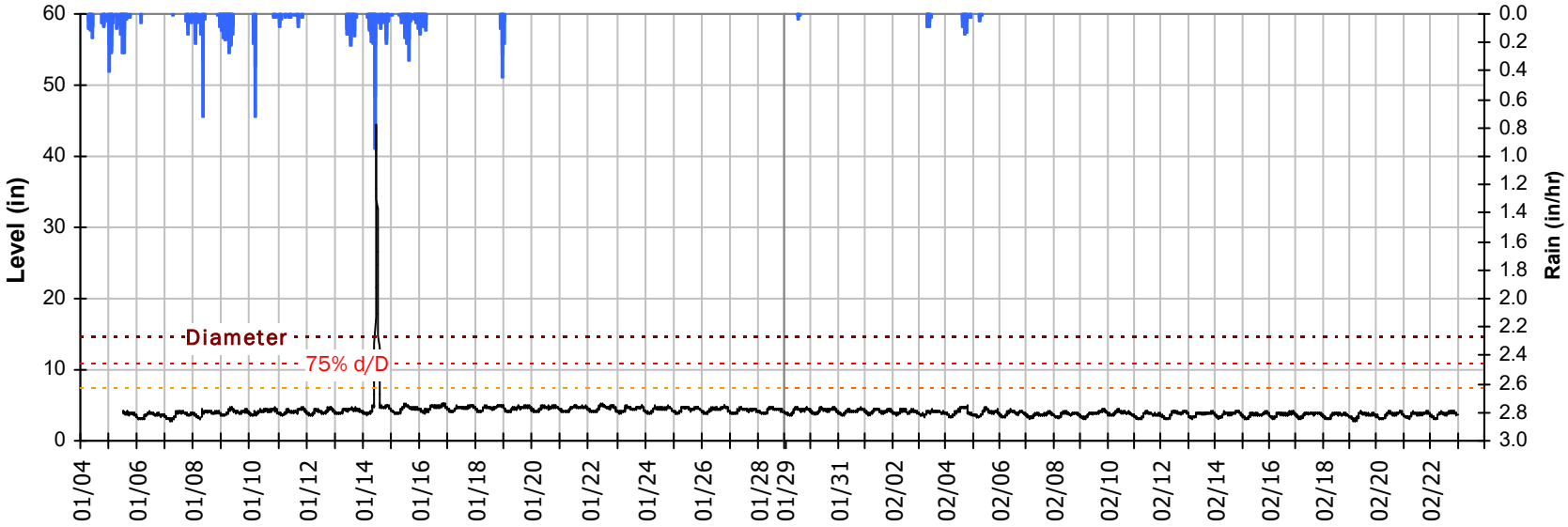
ADWF:

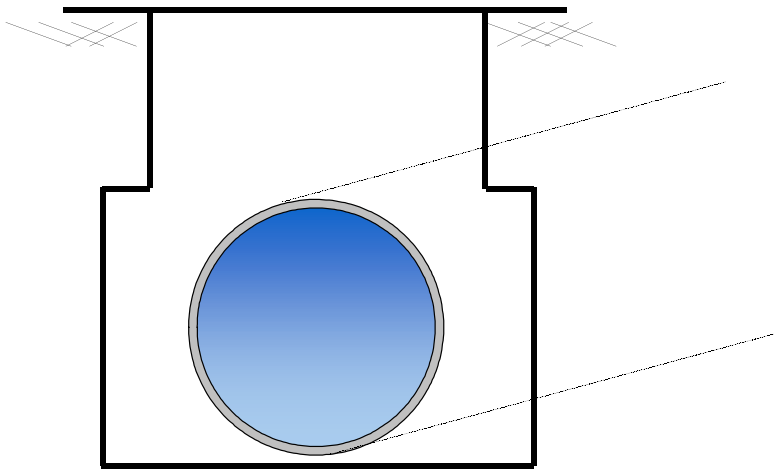
0.165 *mgd*

SITE 2

Site Capacity and Surcharge Summary

Realtime Flow Levels with Rainfall Data over Peak Level Period



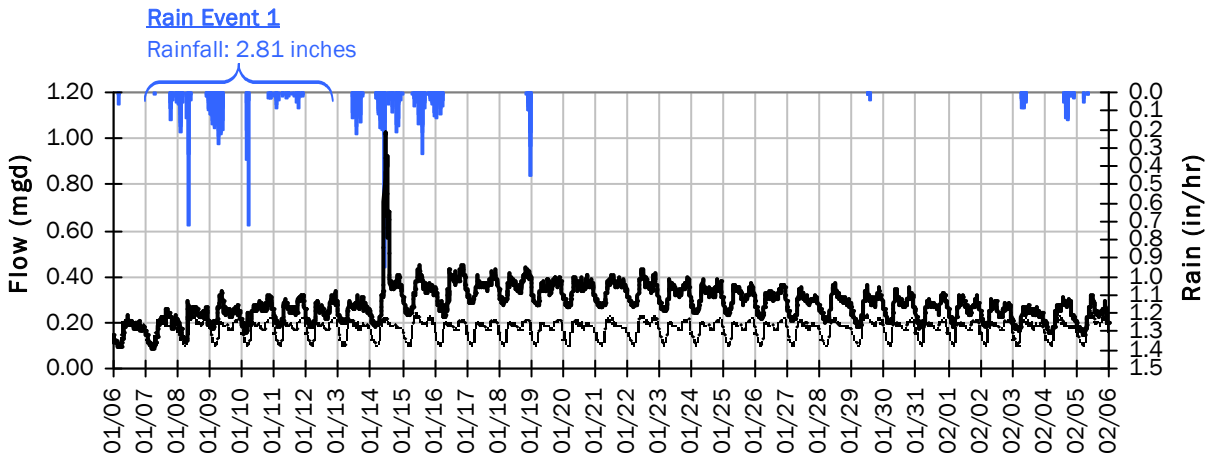


Pipe Diameter:	14.5	*inches*
Peak Measured Level:	44.5	*inches*
Peak d/D Ratio:	3.07	

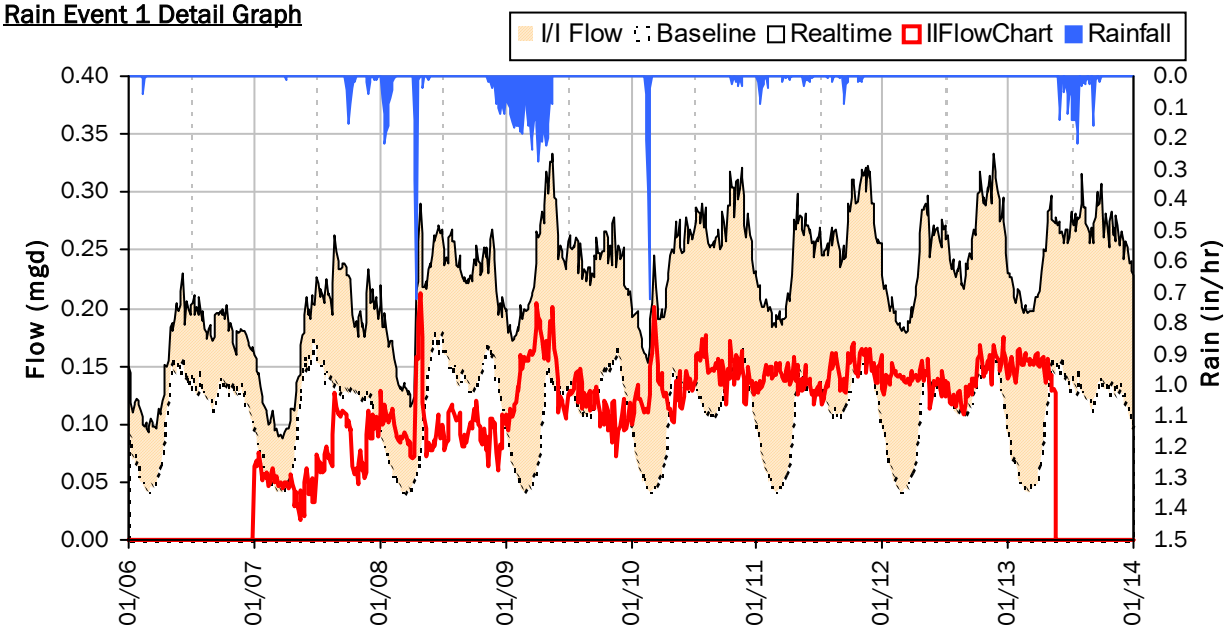
Surcharged 30.0 inches over crown

SITE 2
I/I Summary: Rain Event 1

Baseline and Realtime Flows with Rainfall Data over Monitoring Period



Rain Event 1 Detail Graph

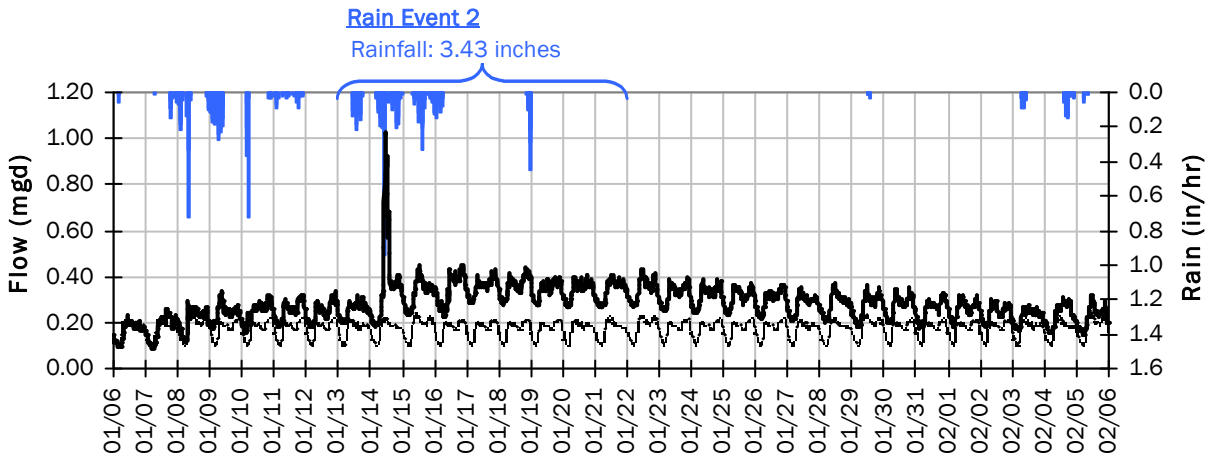


Storm Event I/I Analysis (Rain = 2.81 inches)

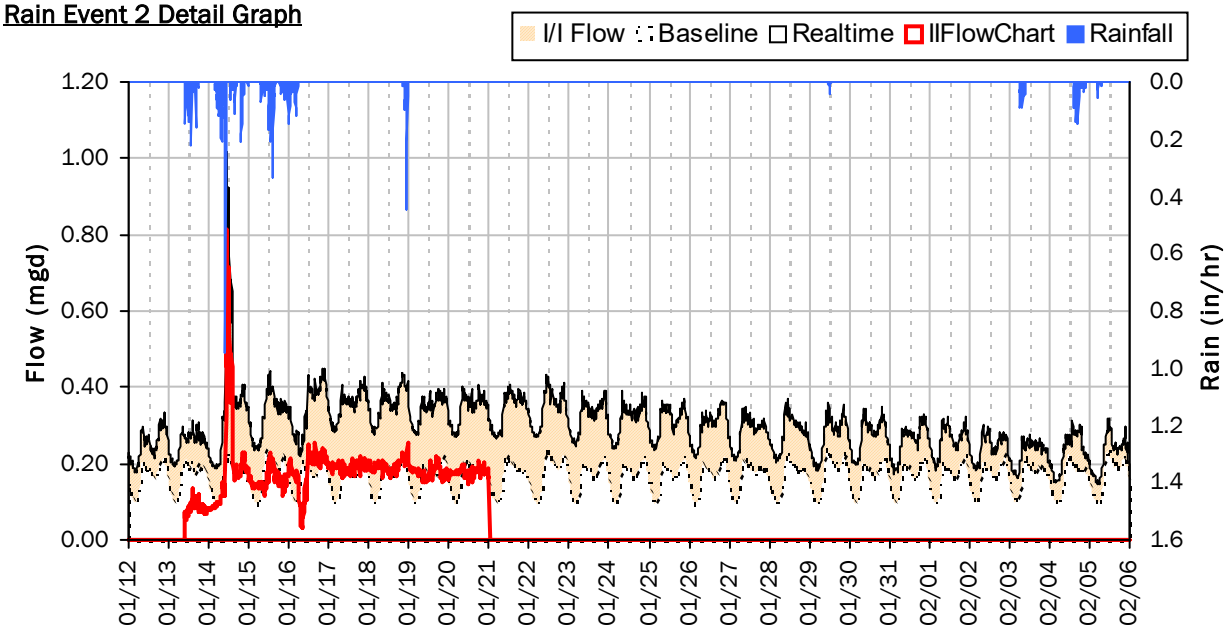
Capacity		Inflow / Infiltration	
Peak Flow:	0.334 *mgd*	**Peak I/I Rate:**	0.213 *mgd*
PF:	2.02	**Total I/I:**	773,000 *gallons*
Peak Level:	4.76 *in*		
d/D Ratio:	0.33		

SITE 2
I/I Summary: Rain Event 2

Baseline and Realtime Flows with Rainfall Data over Monitoring Period



Rain Event 2 Detail Graph

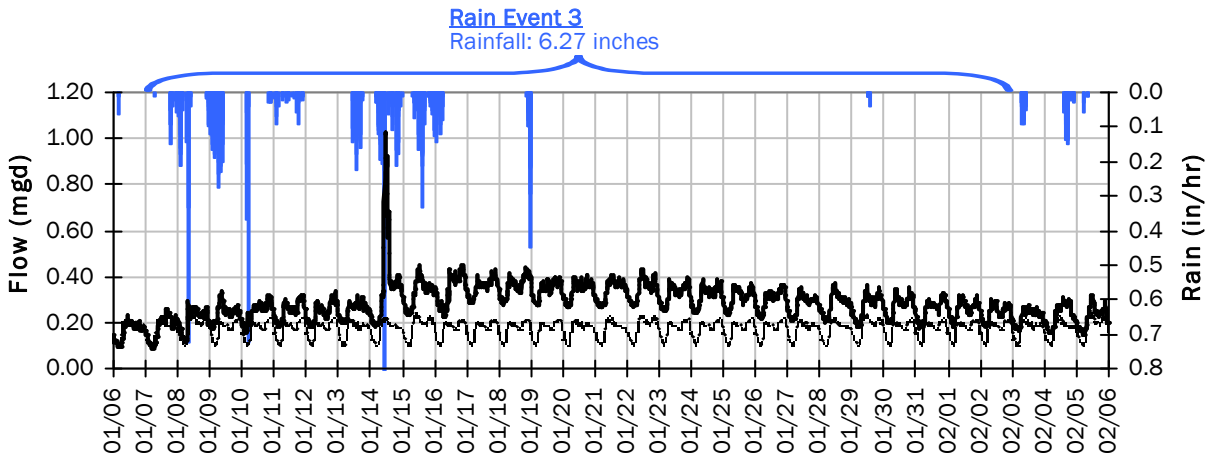


Storm Event I/I Analysis (Rain = 3.43 inches)

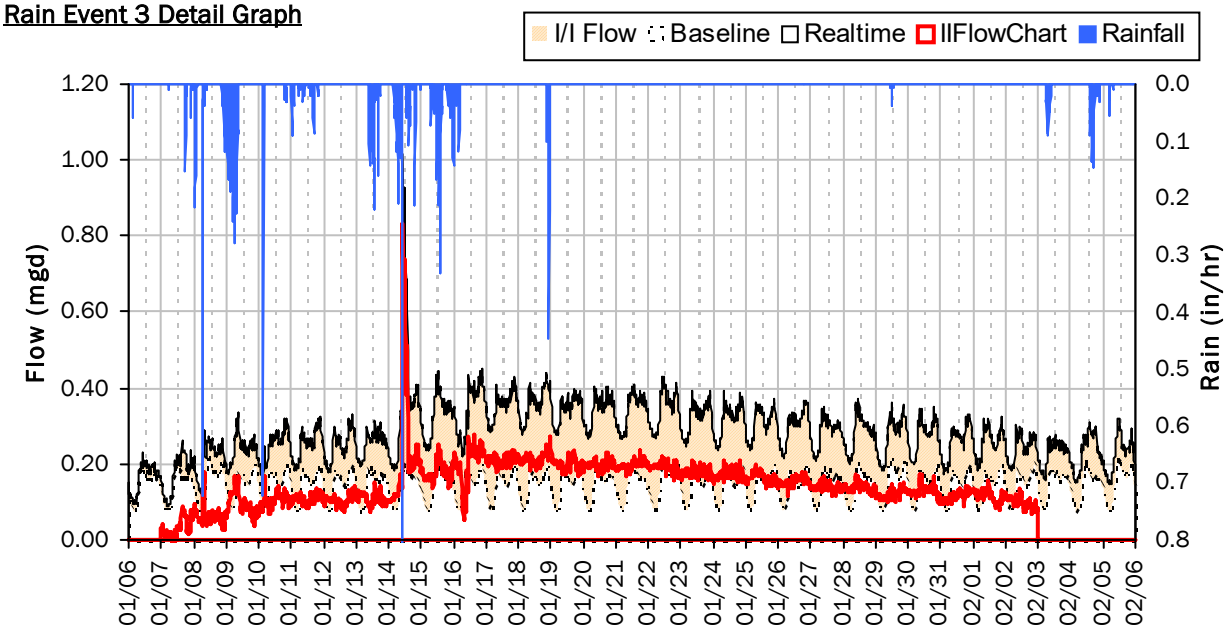
Capacity		Inflow / Infiltration	
Peak Flow:	1.019 *mgd*	**Peak I/I Rate:**	0.812 *mgd*
PF:	6.18	**Total I/I:**	1,338,000 *gallons*
Peak Level:	44.51 *in*		
d/D Ratio:	3.07		

SITE 2
I/I Summary: Rain Event 3

Baseline and Realtime Flows with Rainfall Data over Monitoring Period



Rain Event 3 Detail Graph



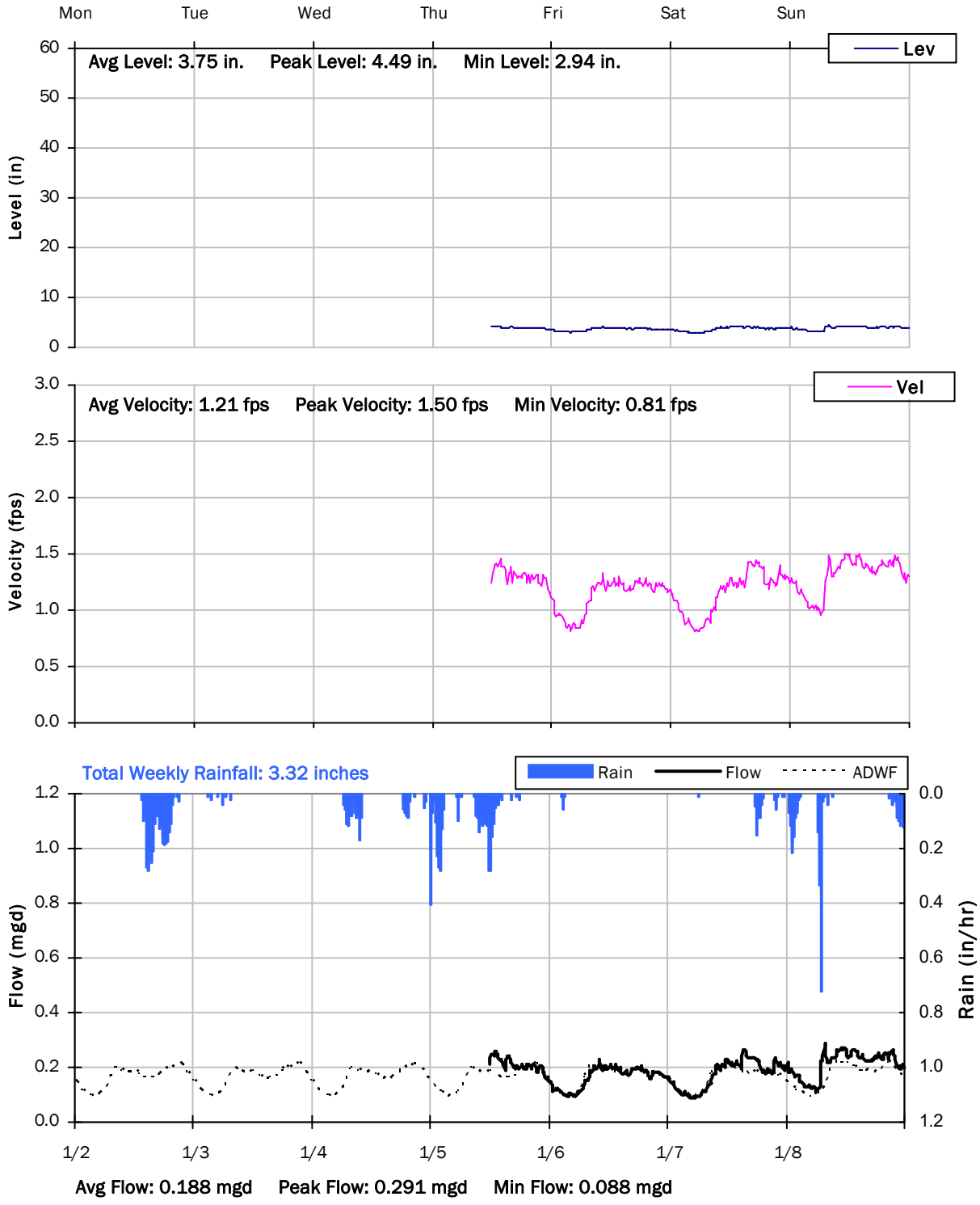
Storm Event I/I Analysis (Rain = 6.27 inches)

Capacity		Inflow / Infiltration	
Peak Flow:	1.02 *mgd*	**Peak I/I Rate:**	0.83 *mgd*
PF:	6.18	**Total I/I:**	3,953,000 *gallons*
Peak Level:	44.51 *in*		
d/D Ratio:	3.07		

SITE 2

Weekly Level, Velocity and Flow Hydrographs

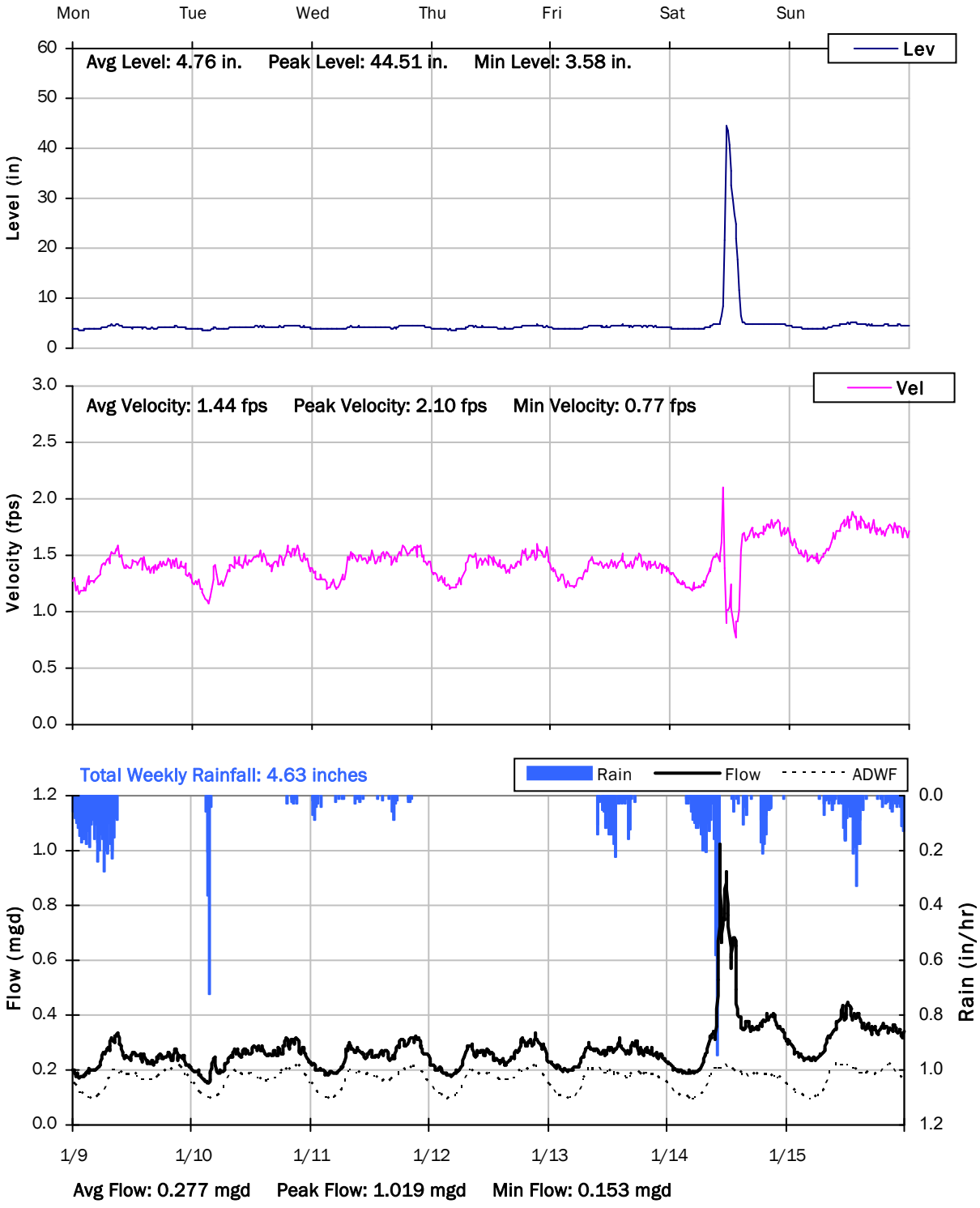
1/2/2023 to 1/9/2023



SITE 2

Weekly Level, Velocity and Flow Hydrographs

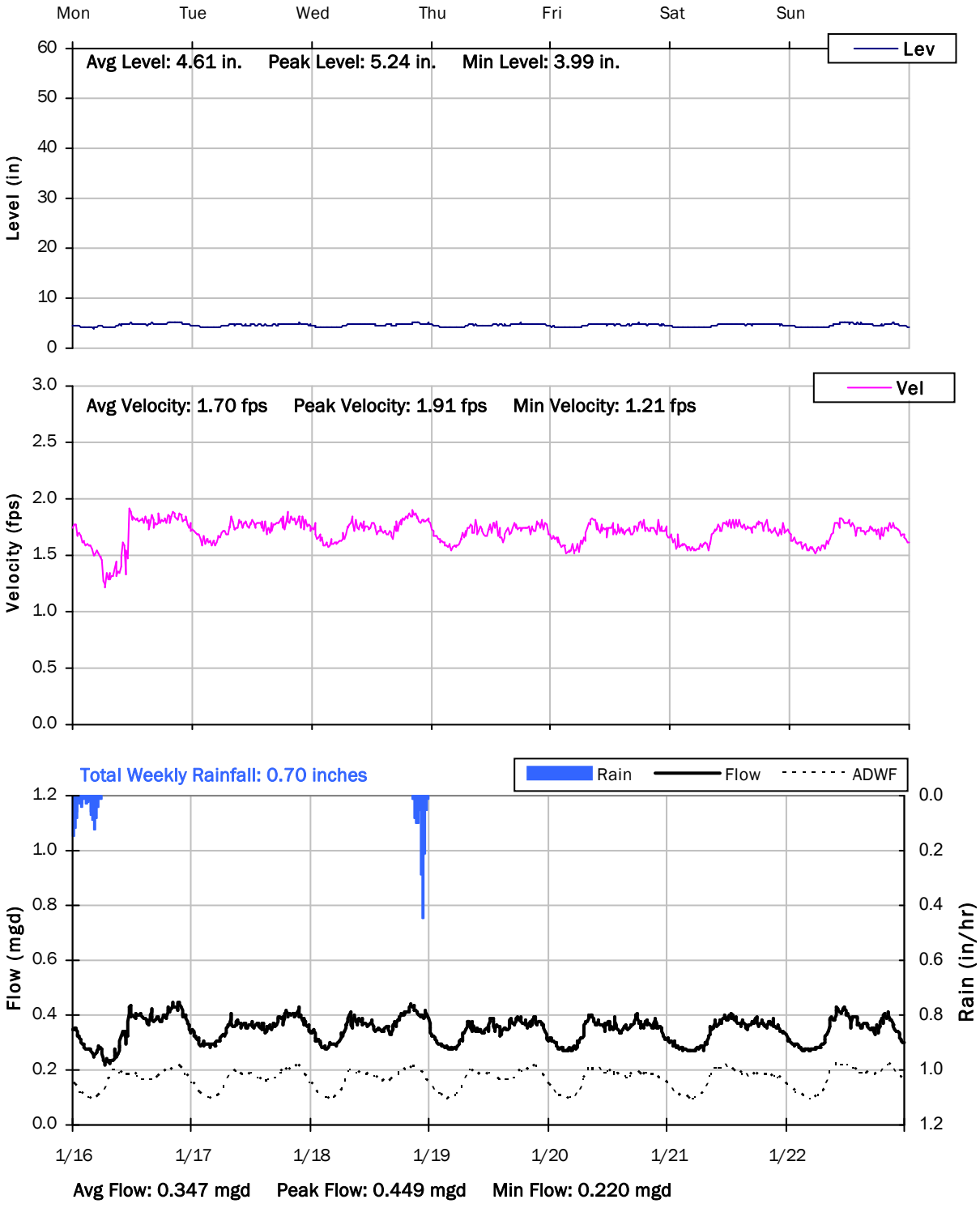
1/9/2023 to 1/16/2023



SITE 2

Weekly Level, Velocity and Flow Hydrographs

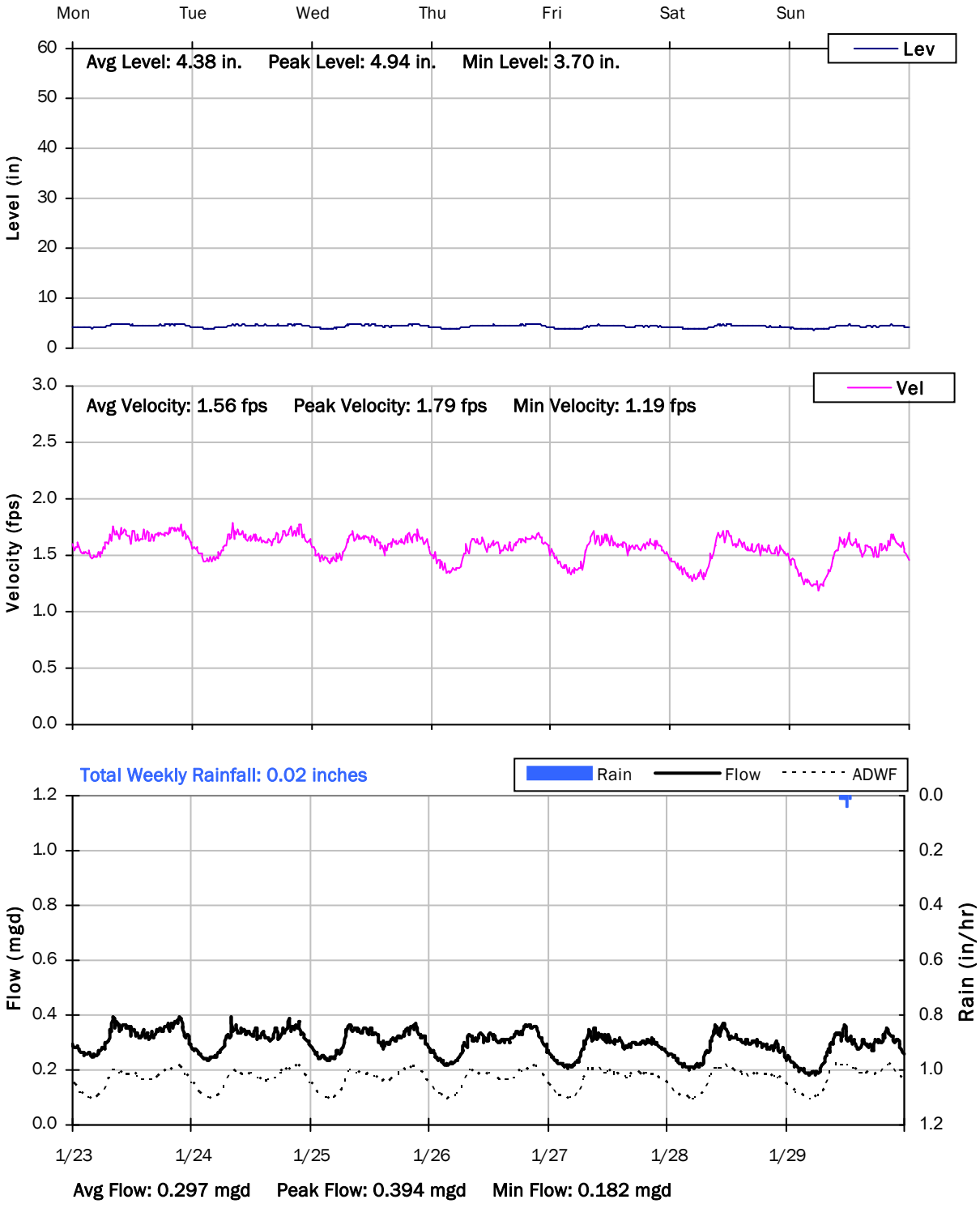
1/16/2023 to 1/23/2023



SITE 2

Weekly Level, Velocity and Flow Hydrographs

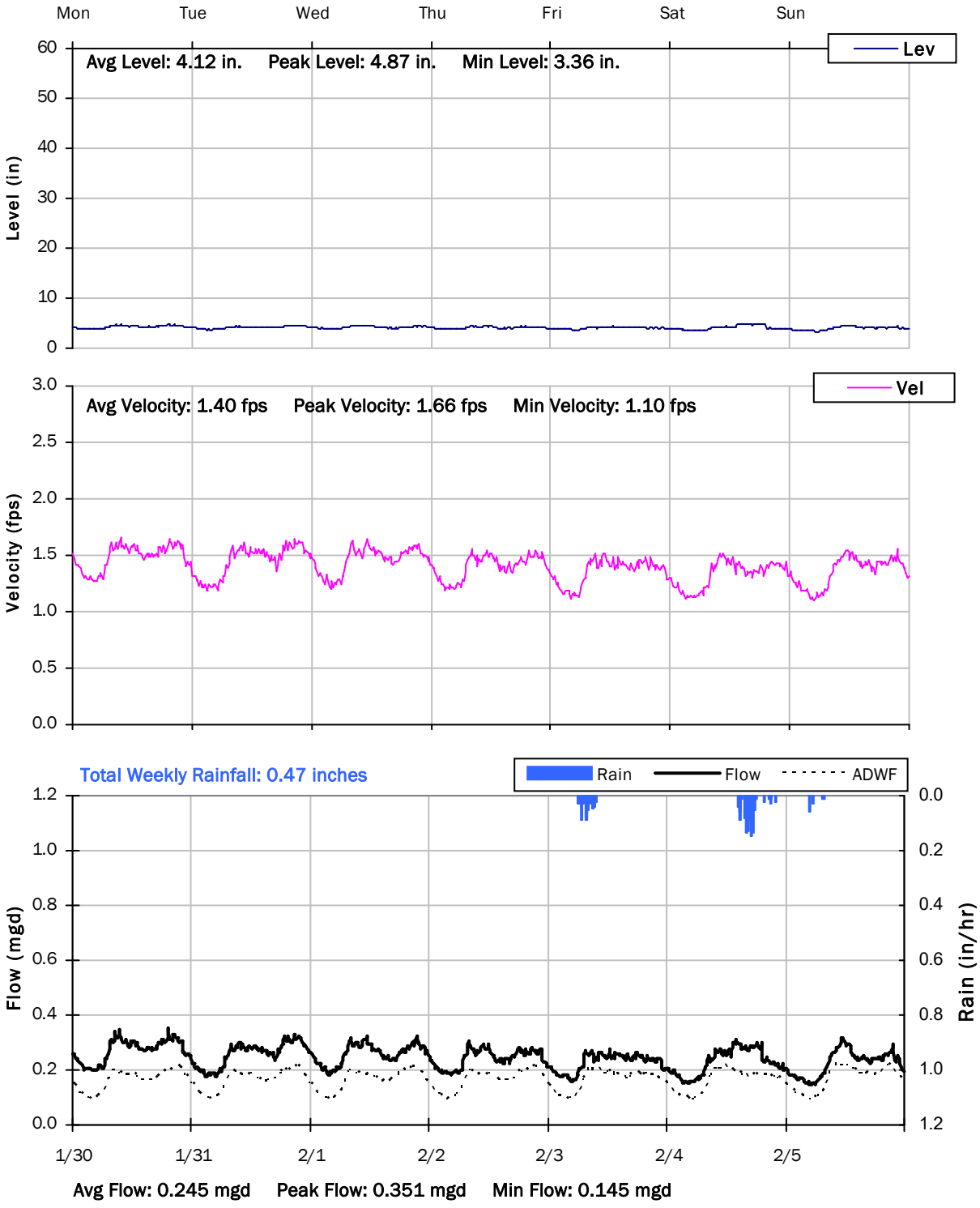
1/23/2023 to 1/30/2023



SITE 2

Weekly Level, Velocity and Flow Hydrographs

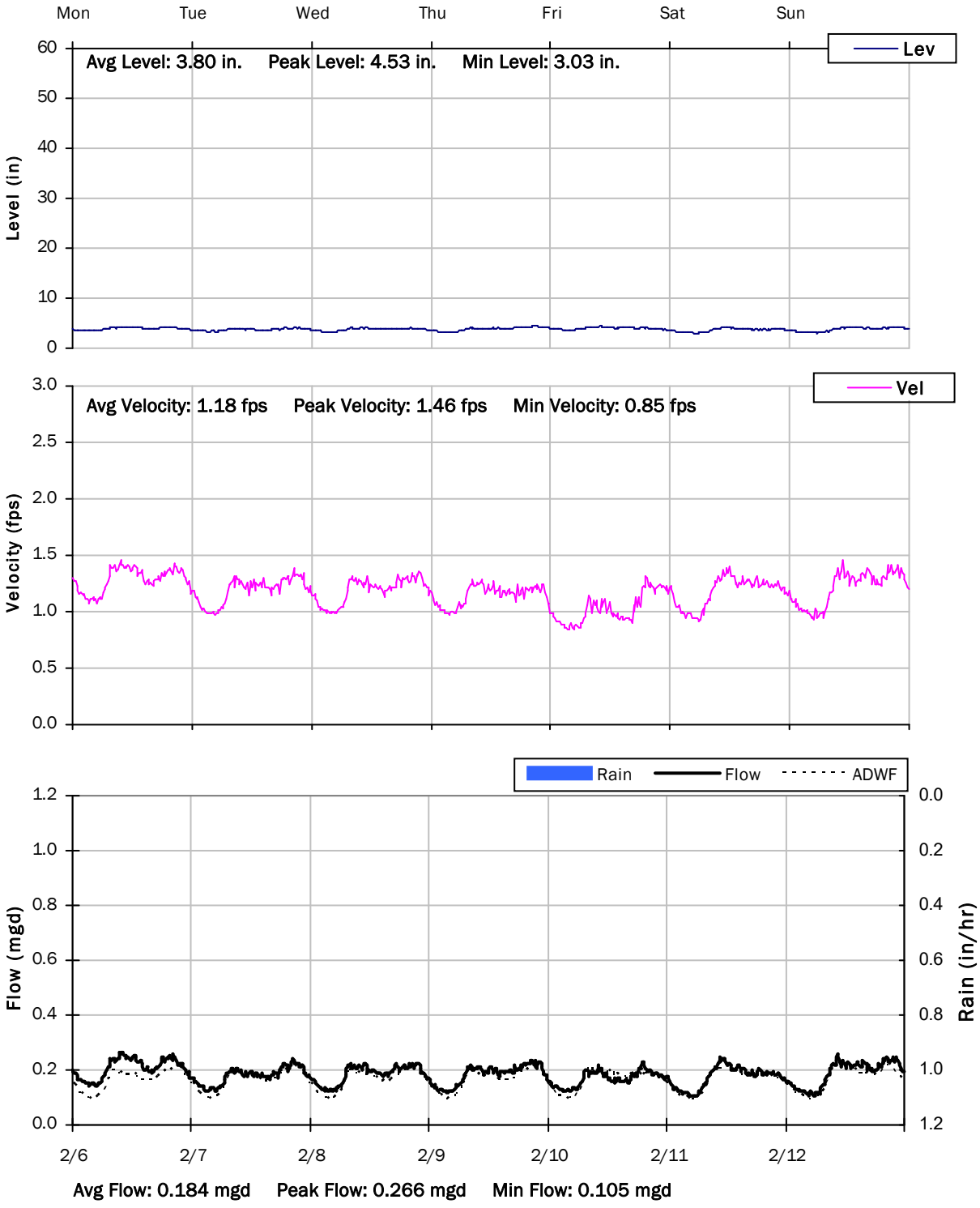
1/30/2023 to 2/6/2023



SITE 2

Weekly Level, Velocity and Flow Hydrographs

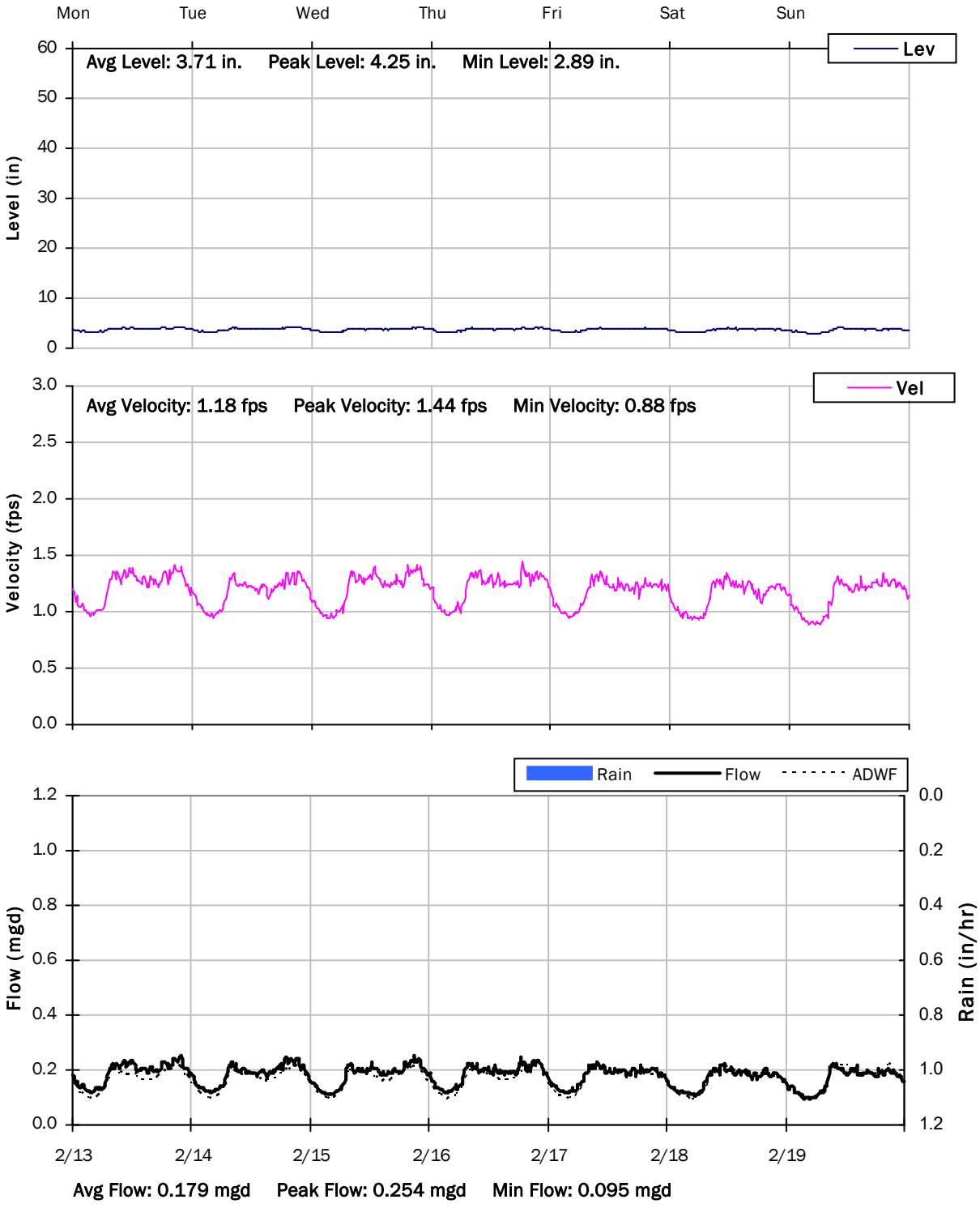
2/6/2023 to 2/13/2023



SITE 2

Weekly Level, Velocity and Flow Hydrographs

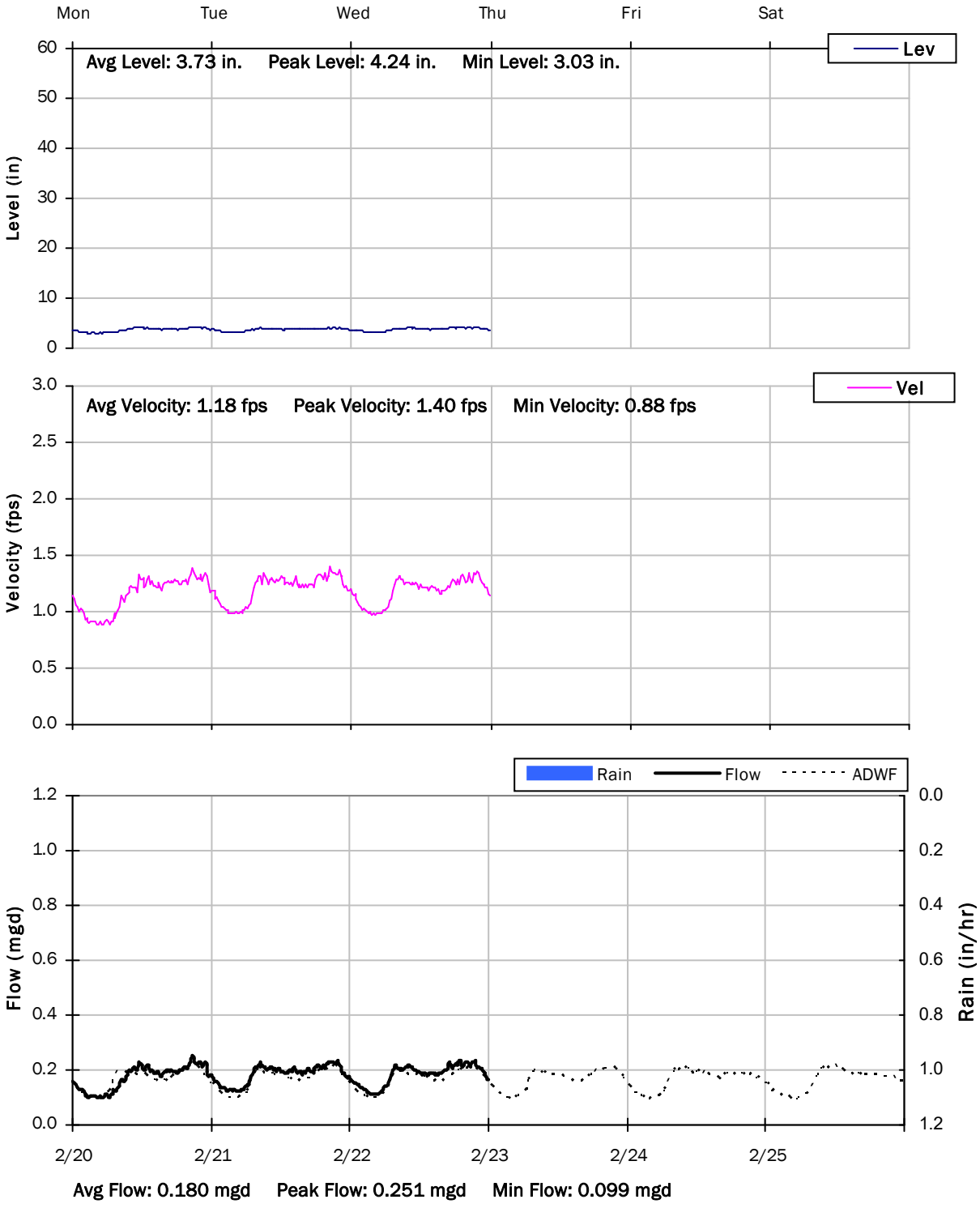
2/13/2023 to 2/20/2023



SITE 2

Weekly Level, Velocity and Flow Hydrographs

2/20/2023 to 2/27/2023



Monitoring Site: Site 3

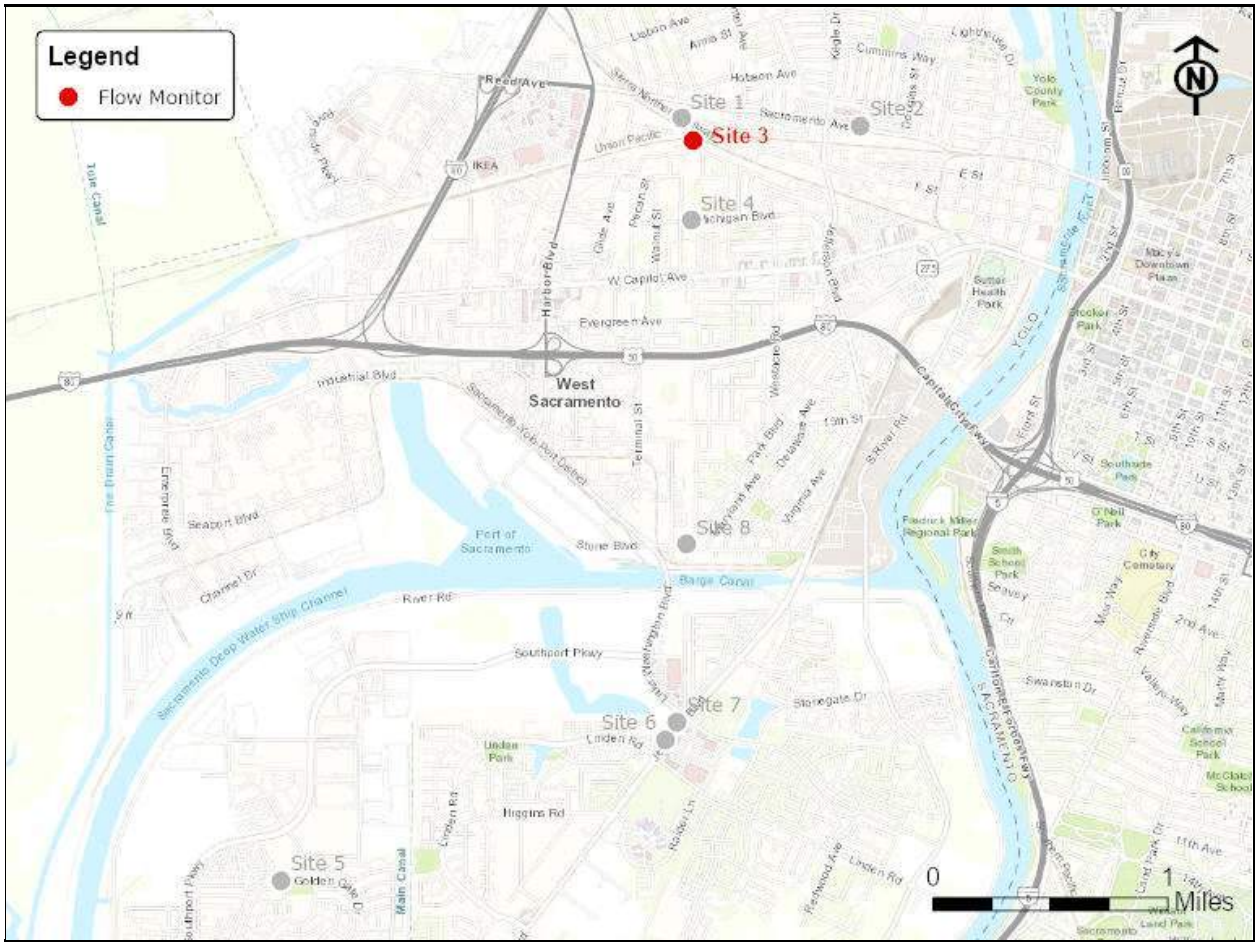
Black & Veatch | West Sacramento, California

Sanitary Sewer Flow Monitoring

January 06, 2023 - February 22, 2023

Location: Dirt Easement behind 412 Washington Avenue

Data Summary Report



Vicinity Map: Site 3

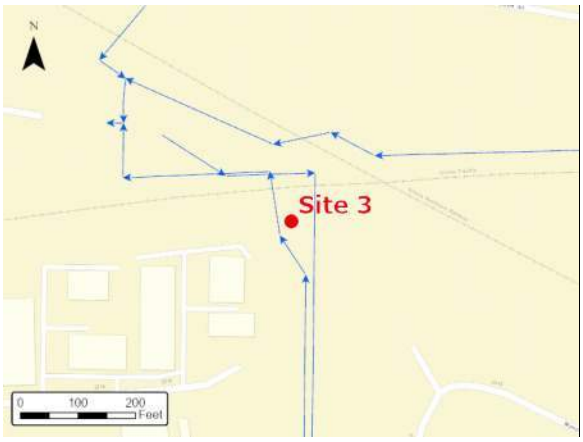
SITE 3

Site Information MH ID: 50158

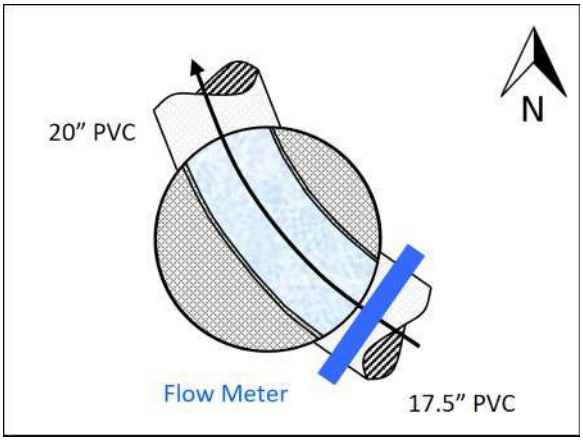
Location:	Dirt Easement behind 412 Washington Avenue
Coordinates:	121.5370° W, 38.5870° N
Rim Elevation:	20 feet
Expected Pipe Diameter:	18 inches
Measured Pipe Diameter:	17.5 inches
ADWF:	0.489 mgd
Peak Measured Flow:	2.670 mgd
Sediment:	None



Satellite Map



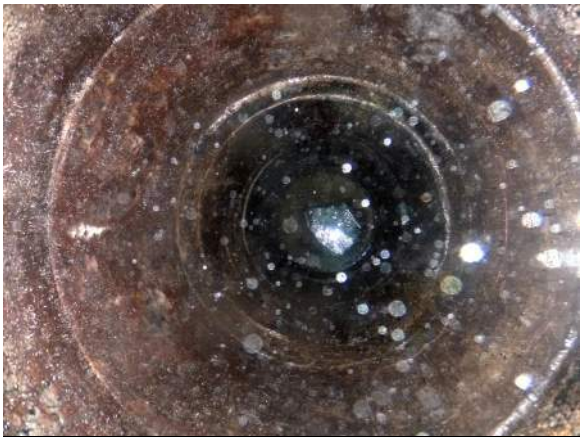
Sanitary Map



Flow Sketch



Street View



Plan View

SITE 3

Additional Site Photos

Effluent Pipe



Monitored Southeast Influent Pipe

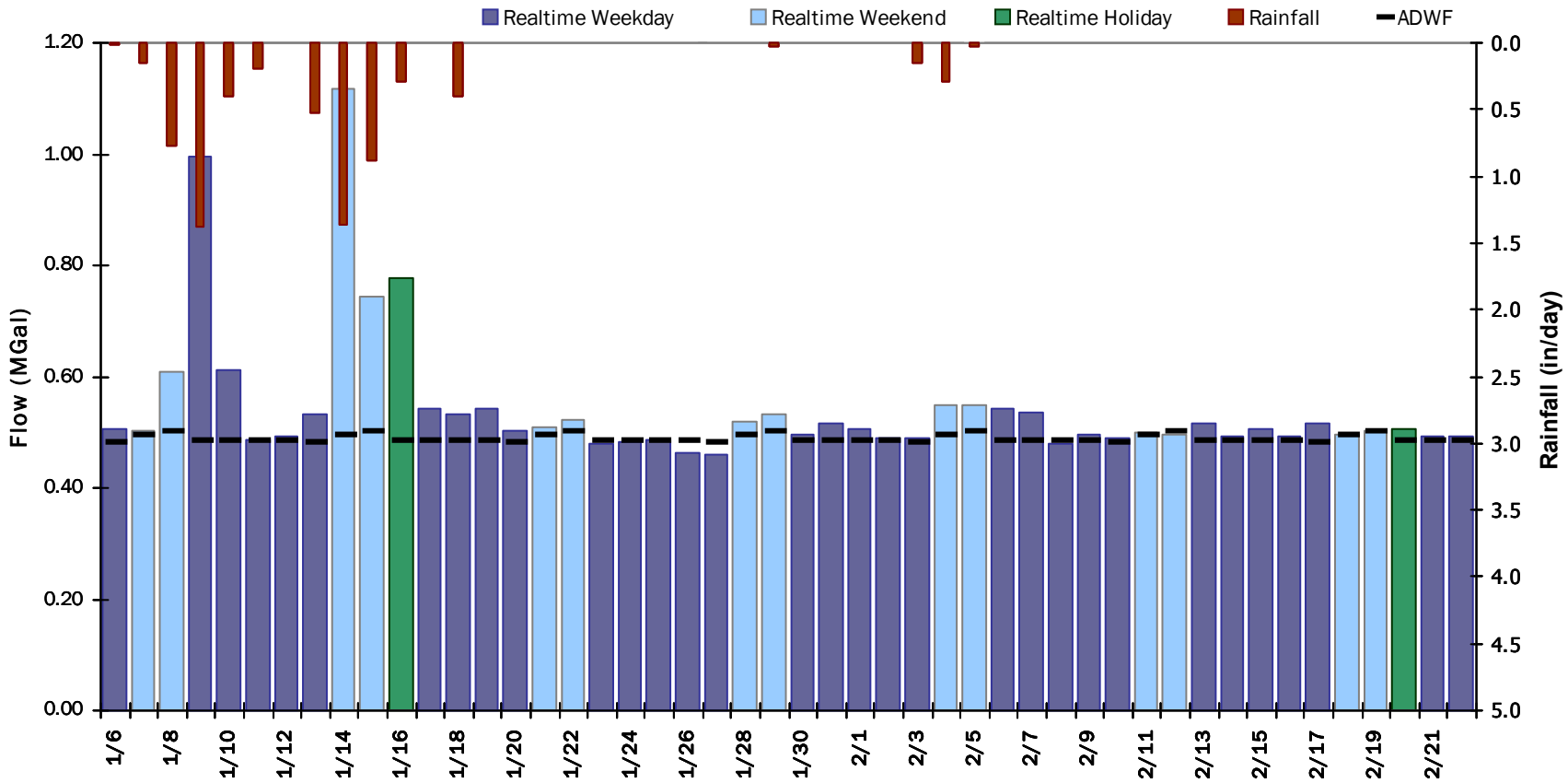


SITE 3

Period Flow Summary: Daily Flow Totals

Avg Daily Flow: 0.550 MGal Peak Daily Flow: 1.116 MGal Min Daily Flow: 0.459 MGal

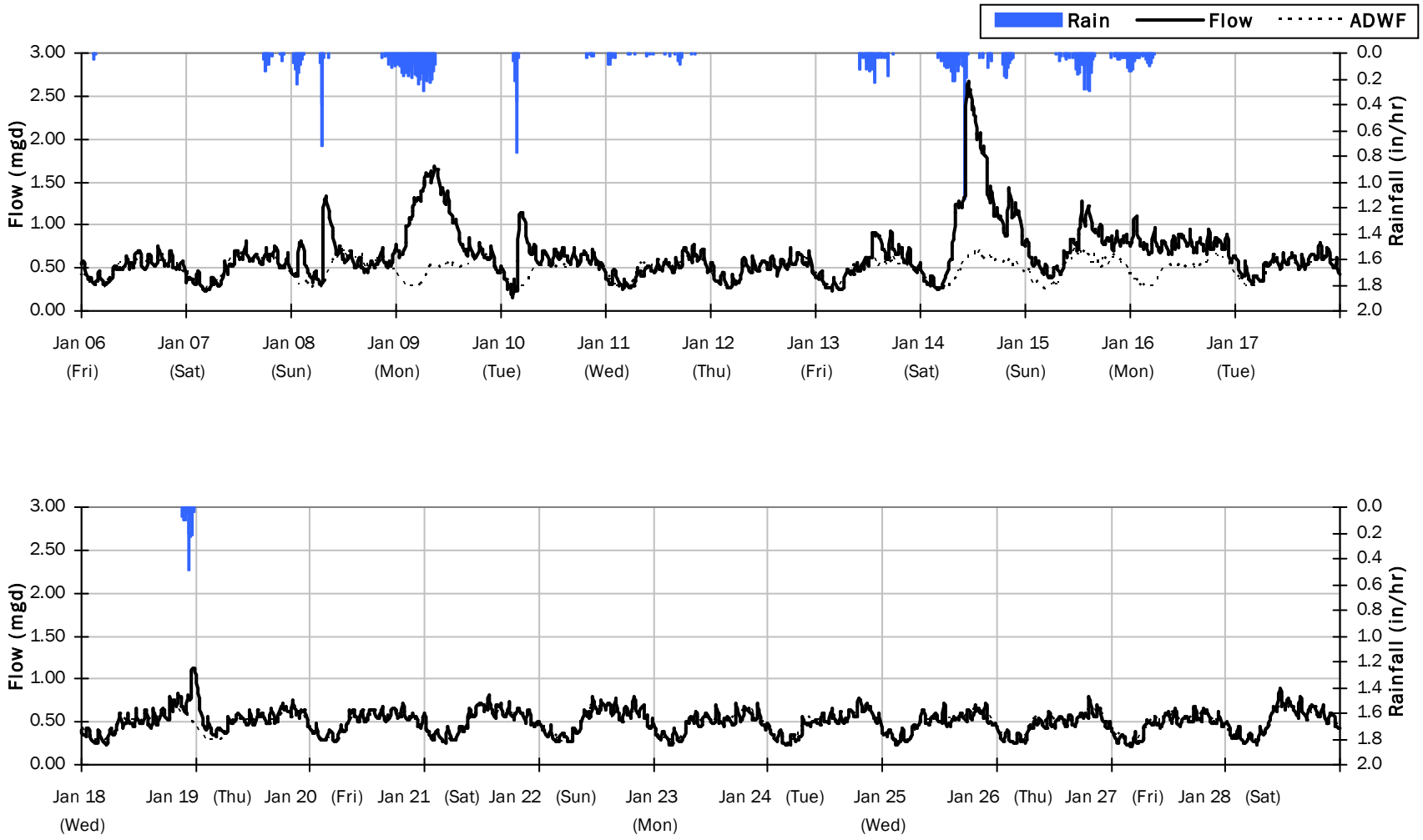
Total Rainfall: 7.22 inches



SITE 3

Flow Summary: 1/6/2023 to 1/28/2023

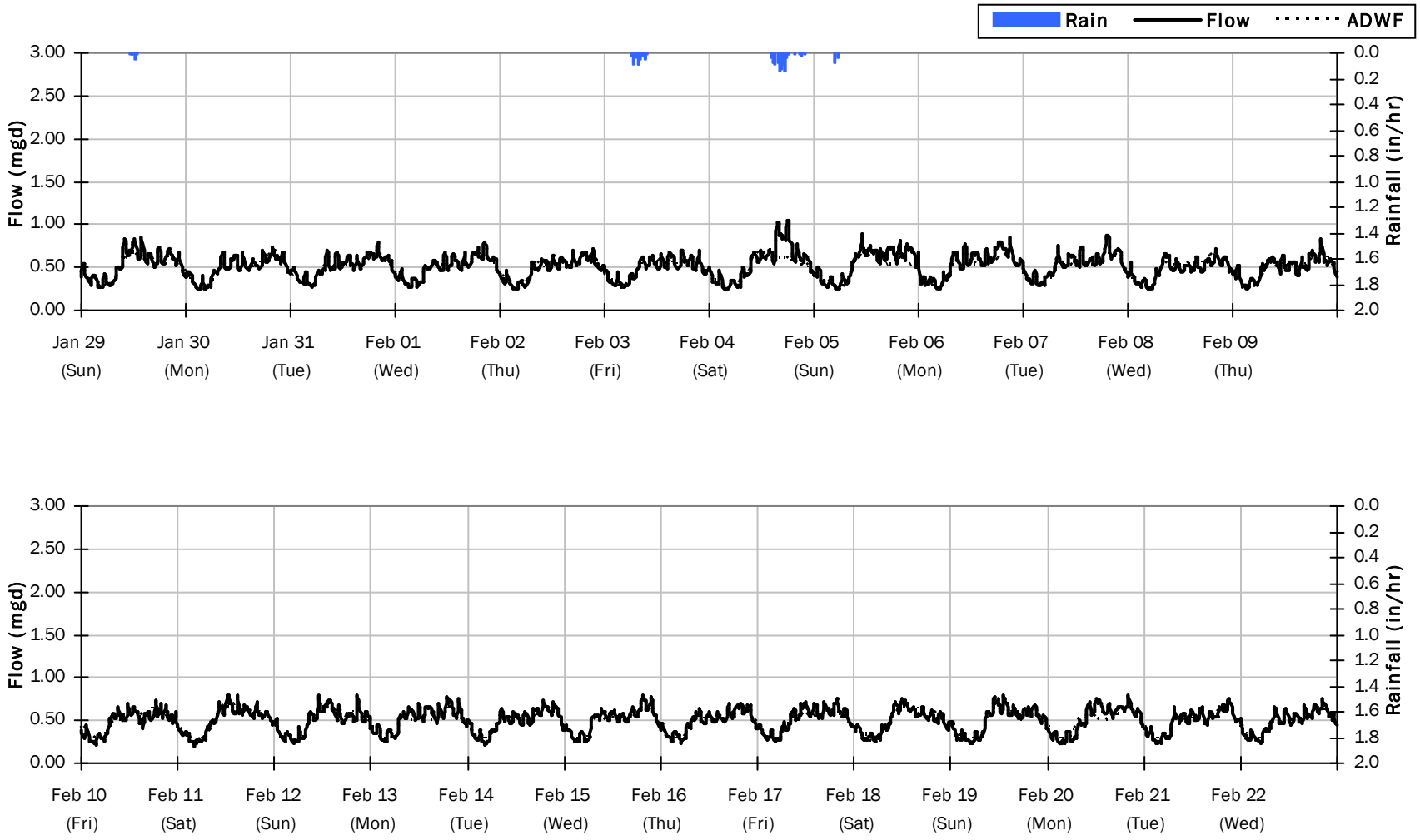
Period Rainfall: 6.36 inches Period Avg Flow: 0.583 mgd Period Peak Flow: 2.670 mgd Period Min Flow: 0.157 mgd



SITE 3

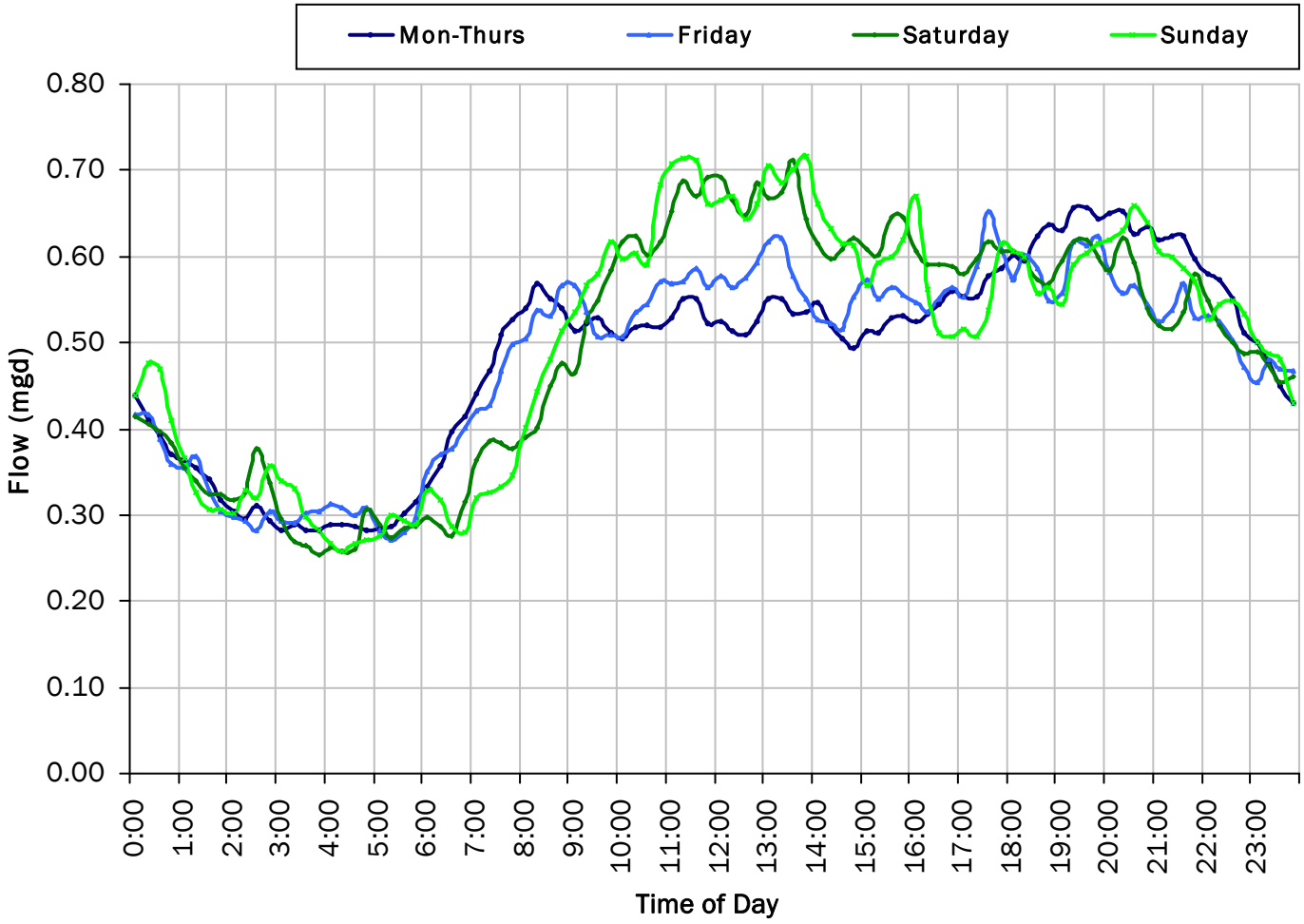
Flow Summary: 1/29/2023 to 2/22/2023

Period Rainfall: 0.51 inches Period Avg Flow: 0.507 mgd Period Peak Flow: 1.050 mgd Period Min Flow: 0.201 mgd



SITE 3

Average Dry Weather Flow Hydrographs



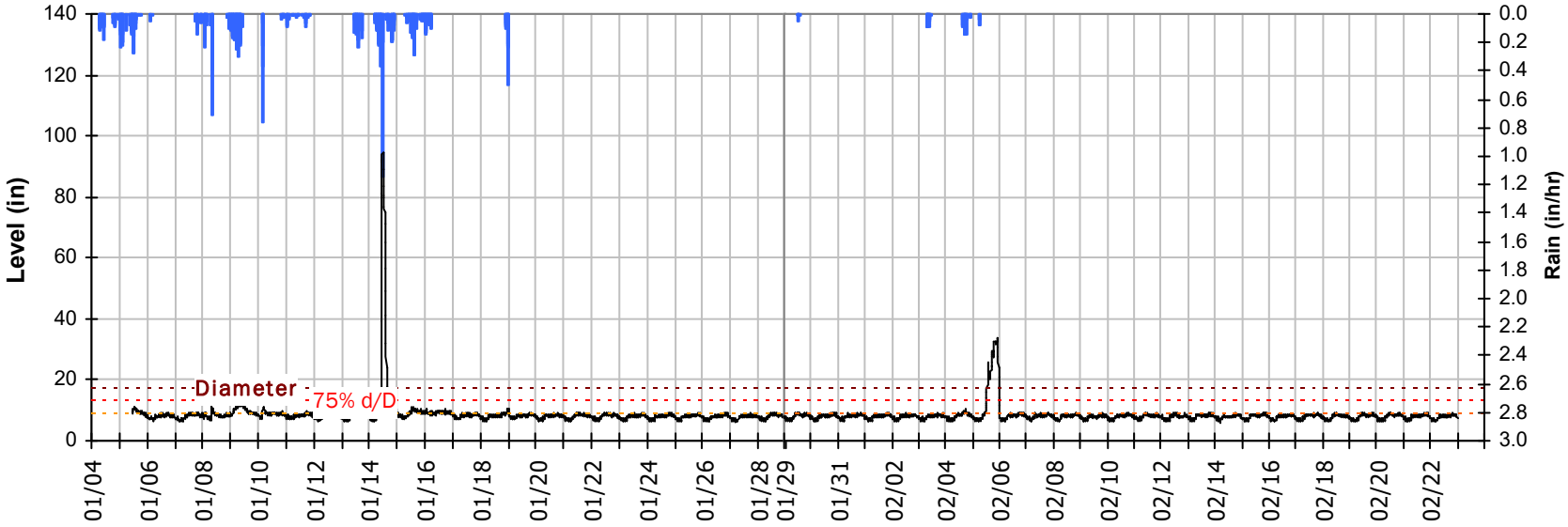
ADWF:

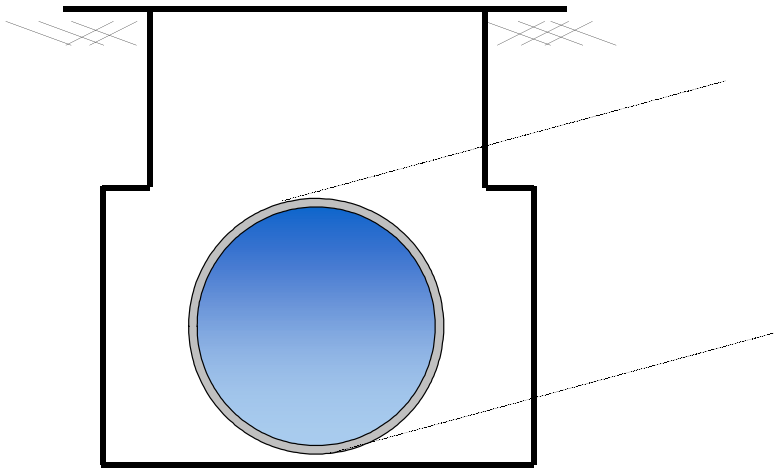
0.489 *mgd*

SITE 3

Site Capacity and Surcharge Summary

Realtime Flow Levels with Rainfall Data over Peak Level Period



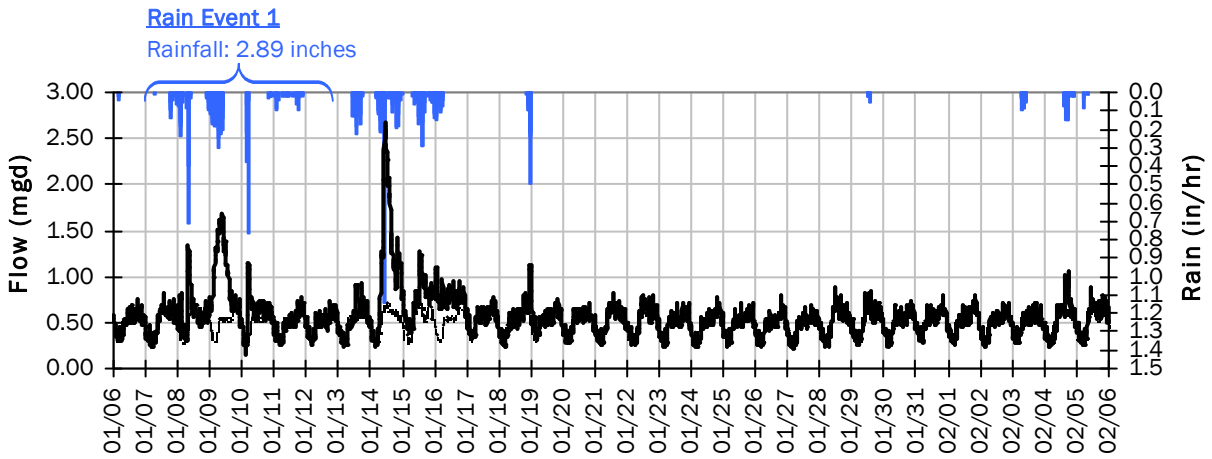


Pipe Diameter:	17.5	*inches*
Peak Measured Level:	94.7	*inches*
Peak d/D Ratio:	5.41	

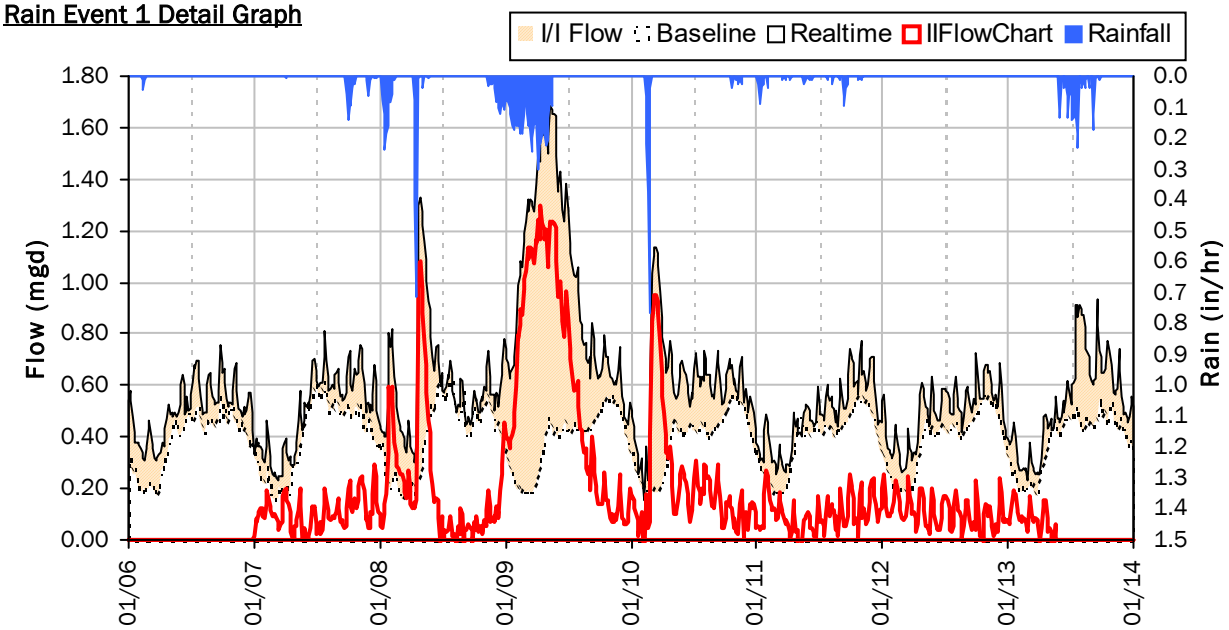
Surcharged 77.2 inches over crown

SITE 3
I/I Summary: Rain Event 1

Baseline and Realtime Flows with Rainfall Data over Monitoring Period



Rain Event 1 Detail Graph

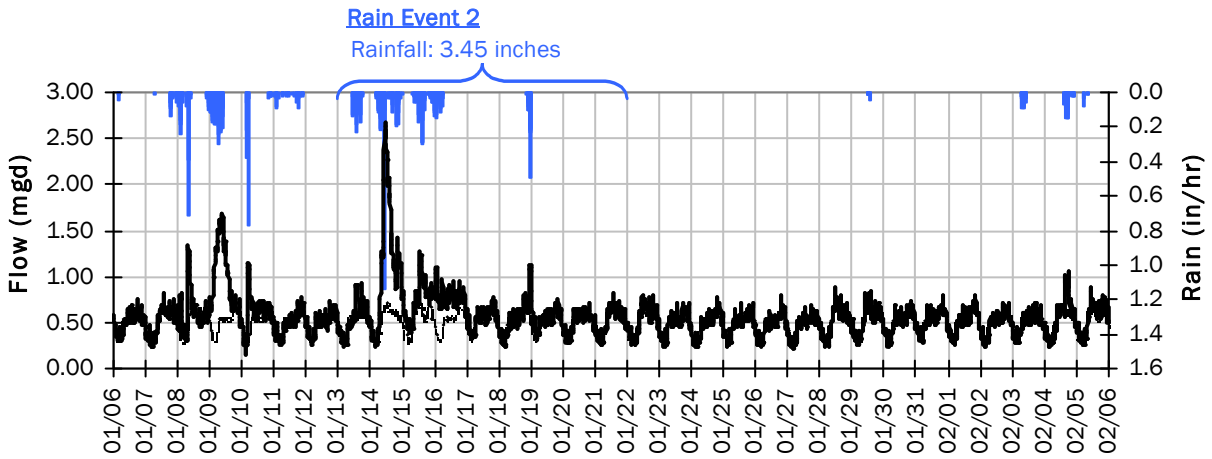


Storm Event I/I Analysis (Rain = 2.89 inches)

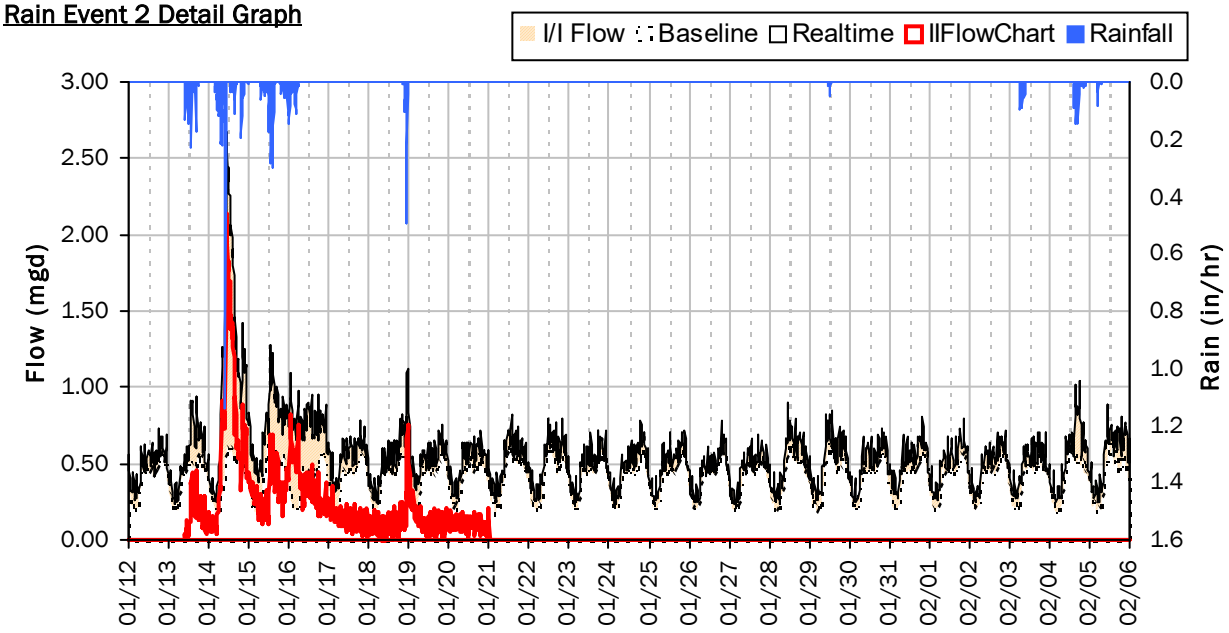
Capacity		Inflow / Infiltration	
Peak Flow:	1.686 *mgd*	**Peak I/I Rate:**	1.294 *mgd*
PF:	3.45	**Total I/I:**	1,393,000 *gallons*
Peak Level:	14.63 *in*		
d/D Ratio:	0.84		

SITE 3
I/I Summary: Rain Event 2

Baseline and Realtime Flows with Rainfall Data over Monitoring Period



Rain Event 2 Detail Graph

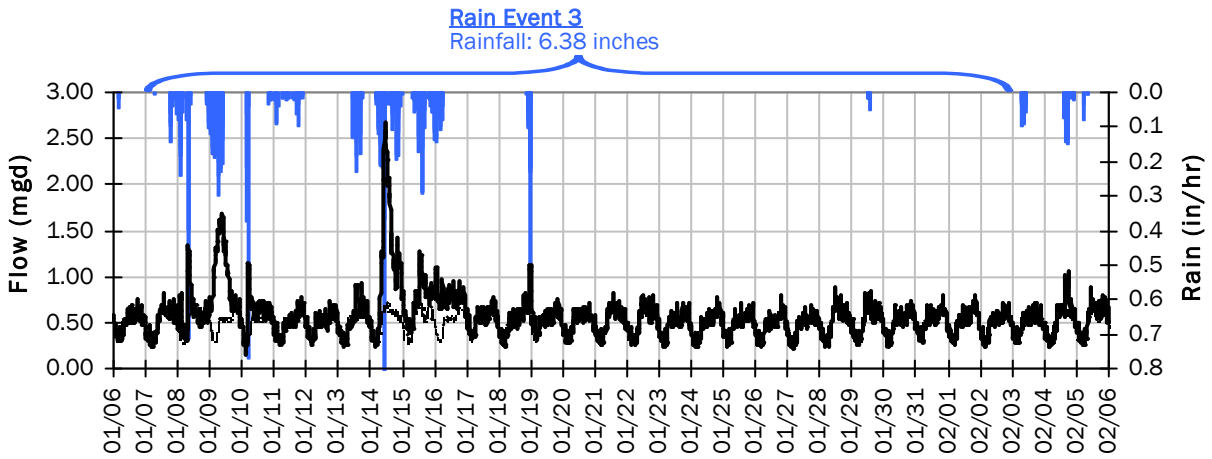


Storm Event I/I Analysis (Rain = 3.45 inches)

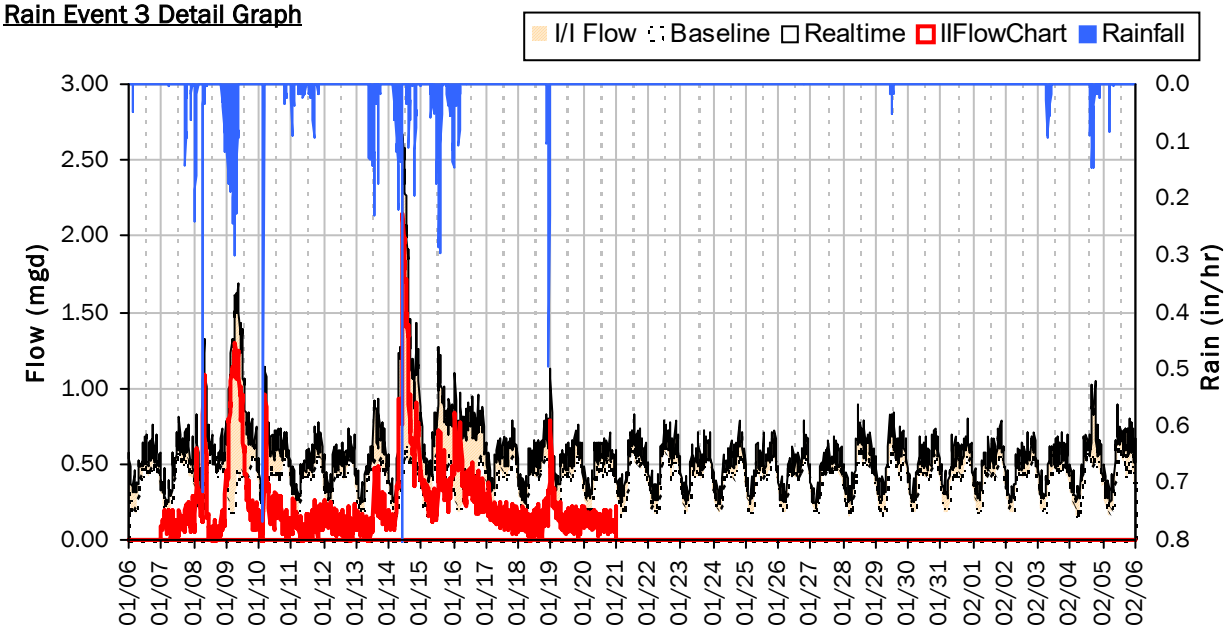
Capacity		Inflow / Infiltration	
Peak Flow:	2.670 *mgd*	**Peak I/I Rate:**	2.134 *mgd*
PF:	5.46	**Total I/I:**	1,996,000 *gallons*
Peak Level:	94.71 *in*		
d/D Ratio:	5.41		

SITE 3
I/I Summary: Rain Event 3

Baseline and Realtime Flows with Rainfall Data over Monitoring Period



Rain Event 3 Detail Graph



Storm Event I/I Analysis (Rain = 6.38 inches)

Capacity

Peak Flow:	2.67 *mgd*
PF:	5.46
Peak Level:	94.71 *in*
d/D Ratio:	5.41

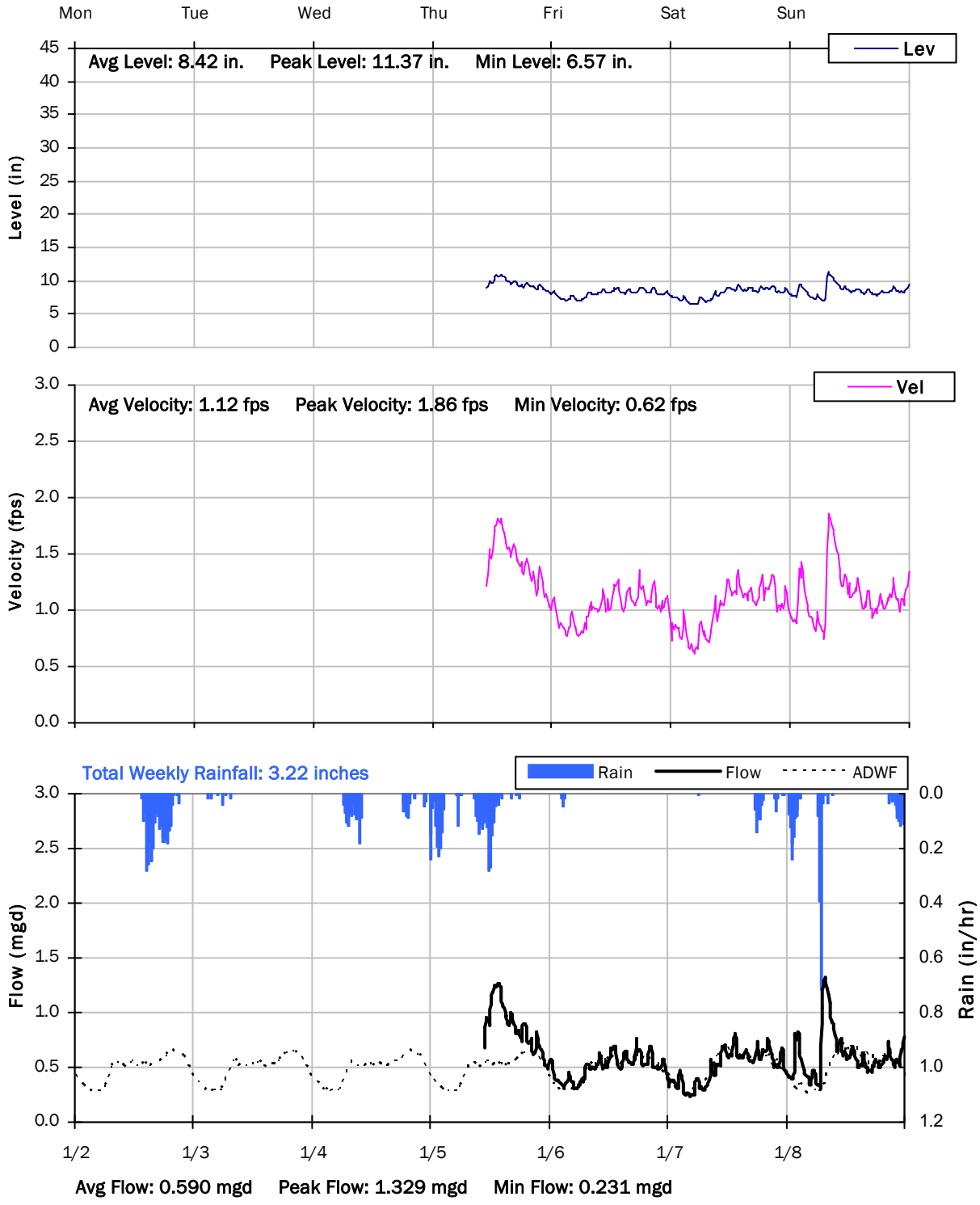
Inflow / Infiltration

Peak I/I Rate:	2.15 *mgd*
Total I/I:	3,542,000 *gallons*

SITE 3

Weekly Level, Velocity and Flow Hydrographs

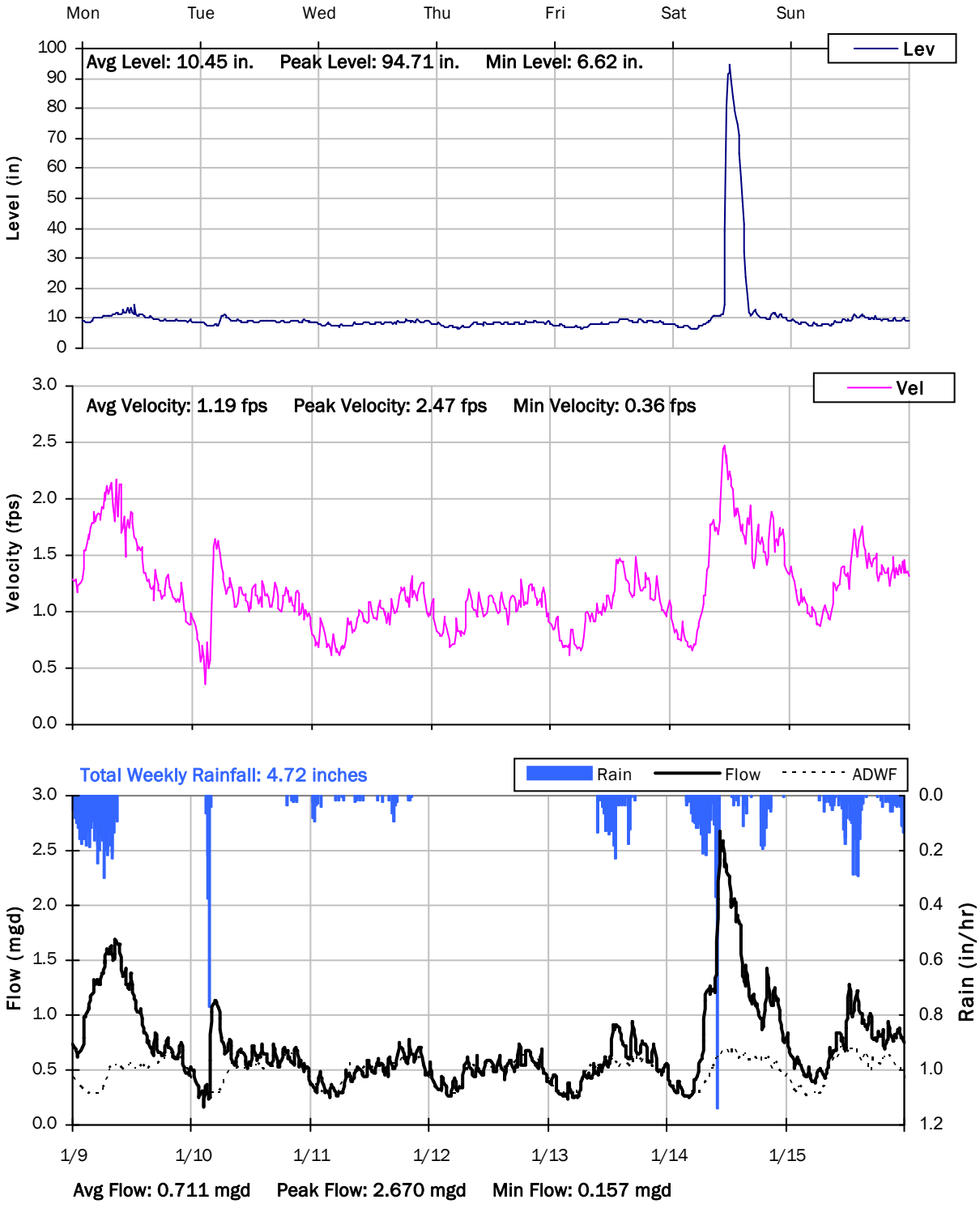
1/2/2023 to 1/9/2023



SITE 3

Weekly Level, Velocity and Flow Hydrographs

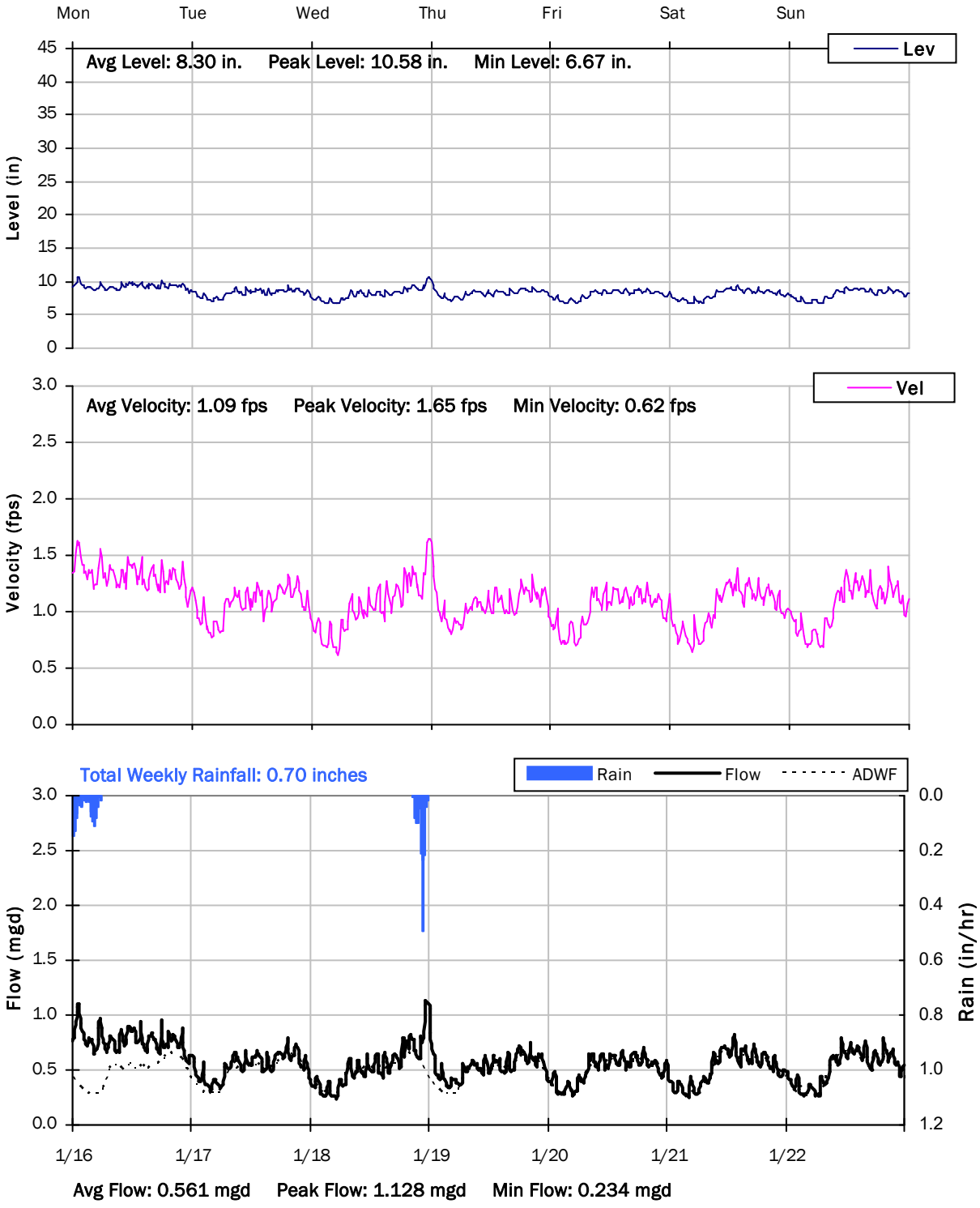
1/9/2023 to 1/16/2023



SITE 3

Weekly Level, Velocity and Flow Hydrographs

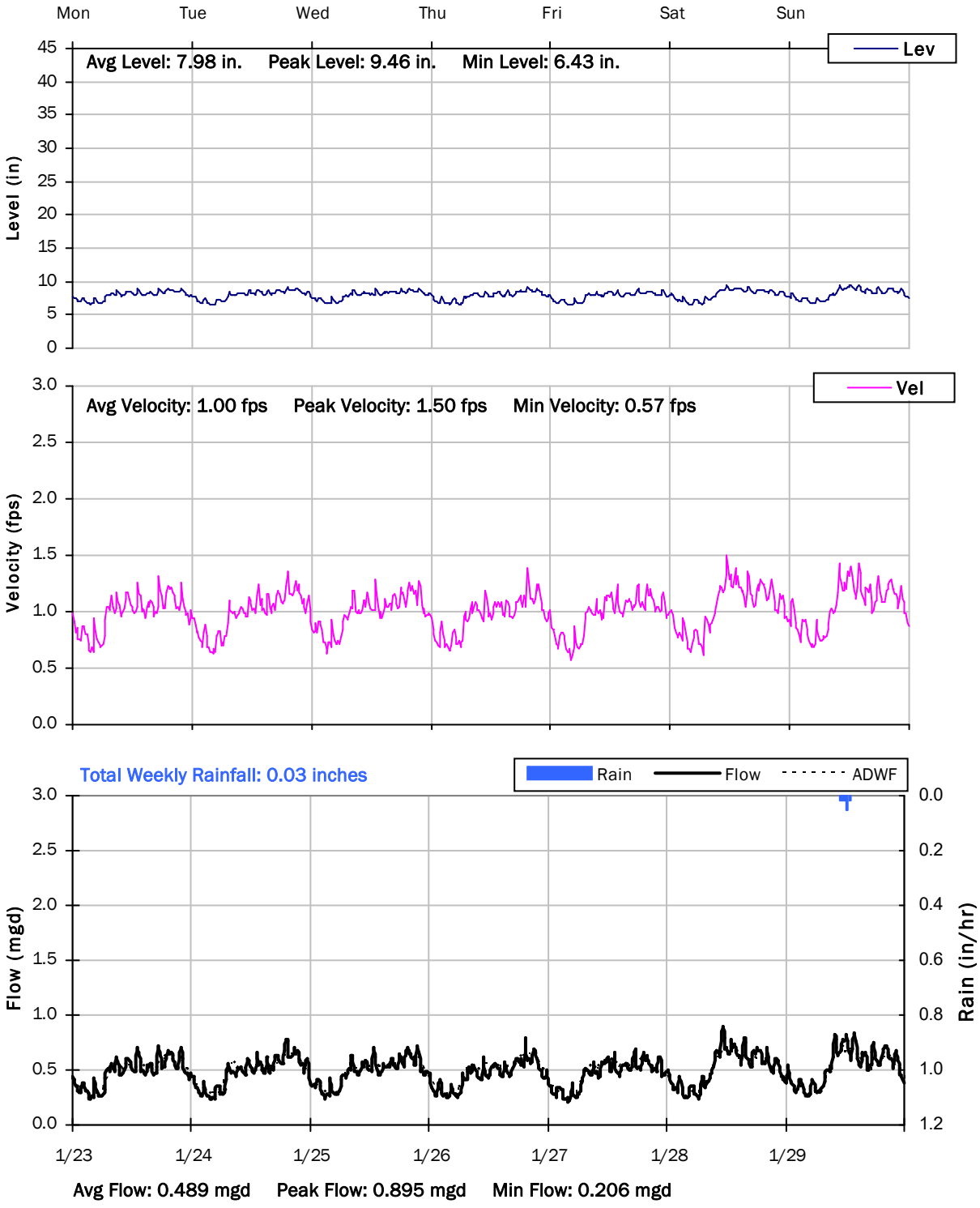
1/16/2023 to 1/23/2023



SITE 3

Weekly Level, Velocity and Flow Hydrographs

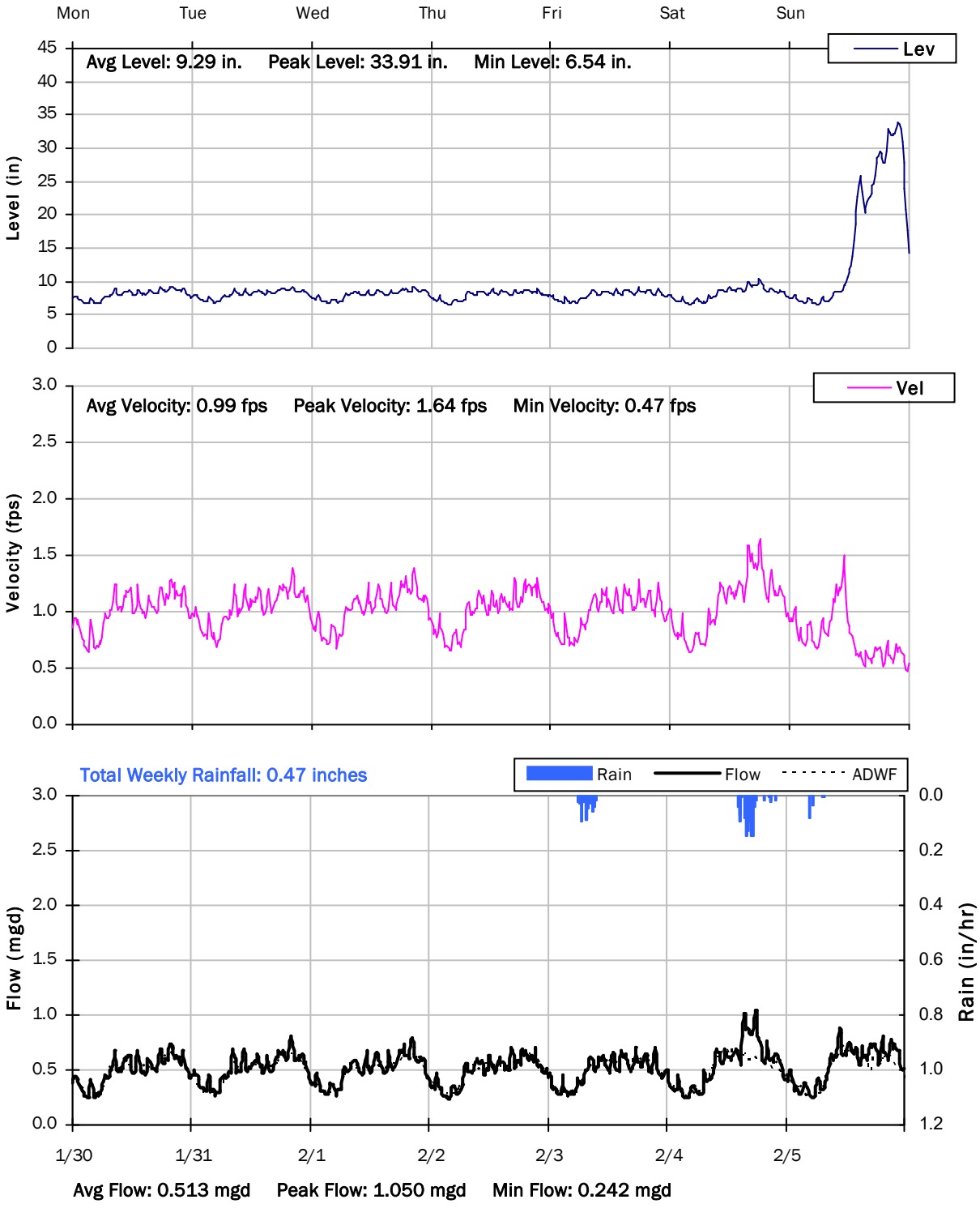
1/23/2023 to 1/30/2023



SITE 3

Weekly Level, Velocity and Flow Hydrographs

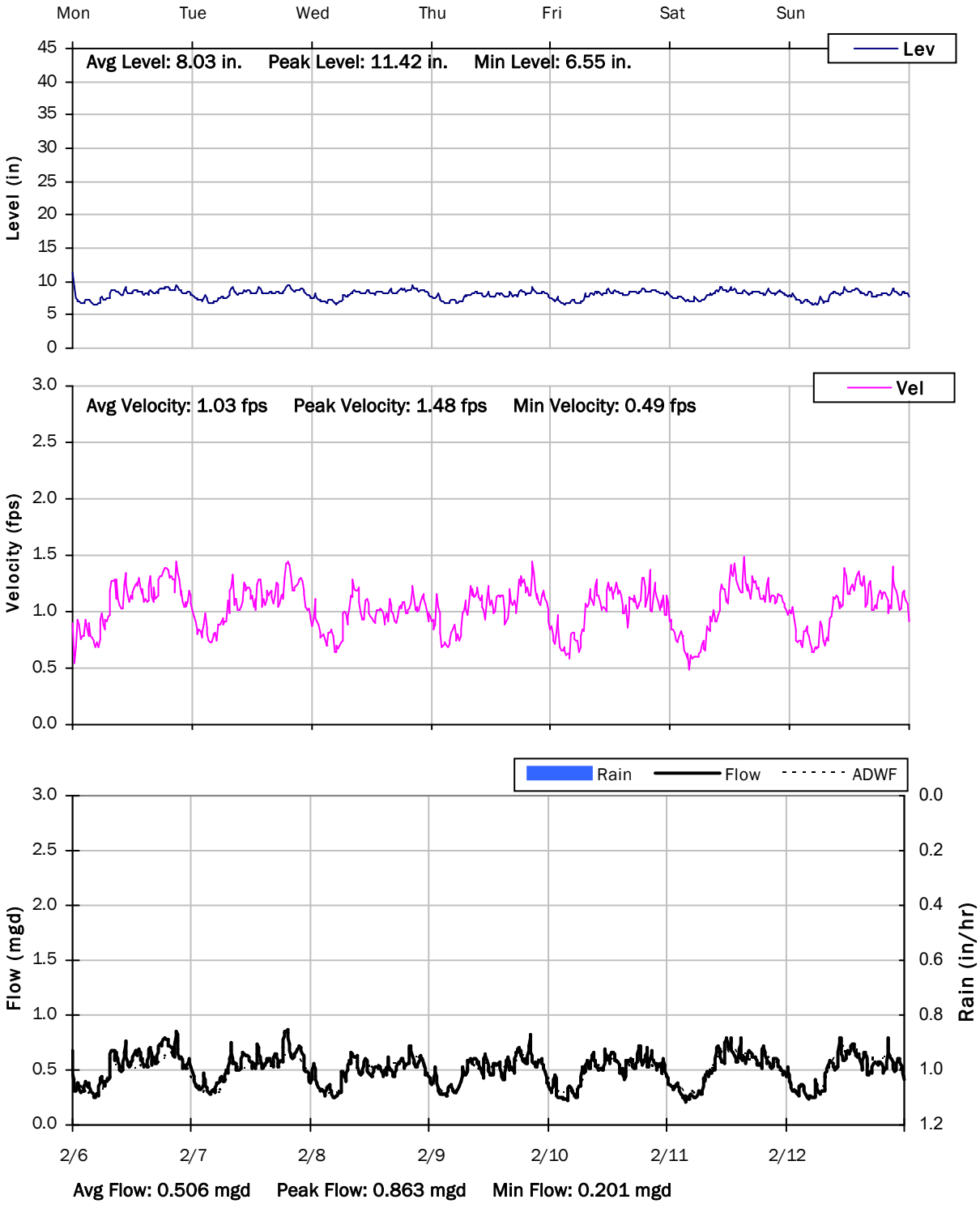
1/30/2023 to 2/6/2023



SITE 3

Weekly Level, Velocity and Flow Hydrographs

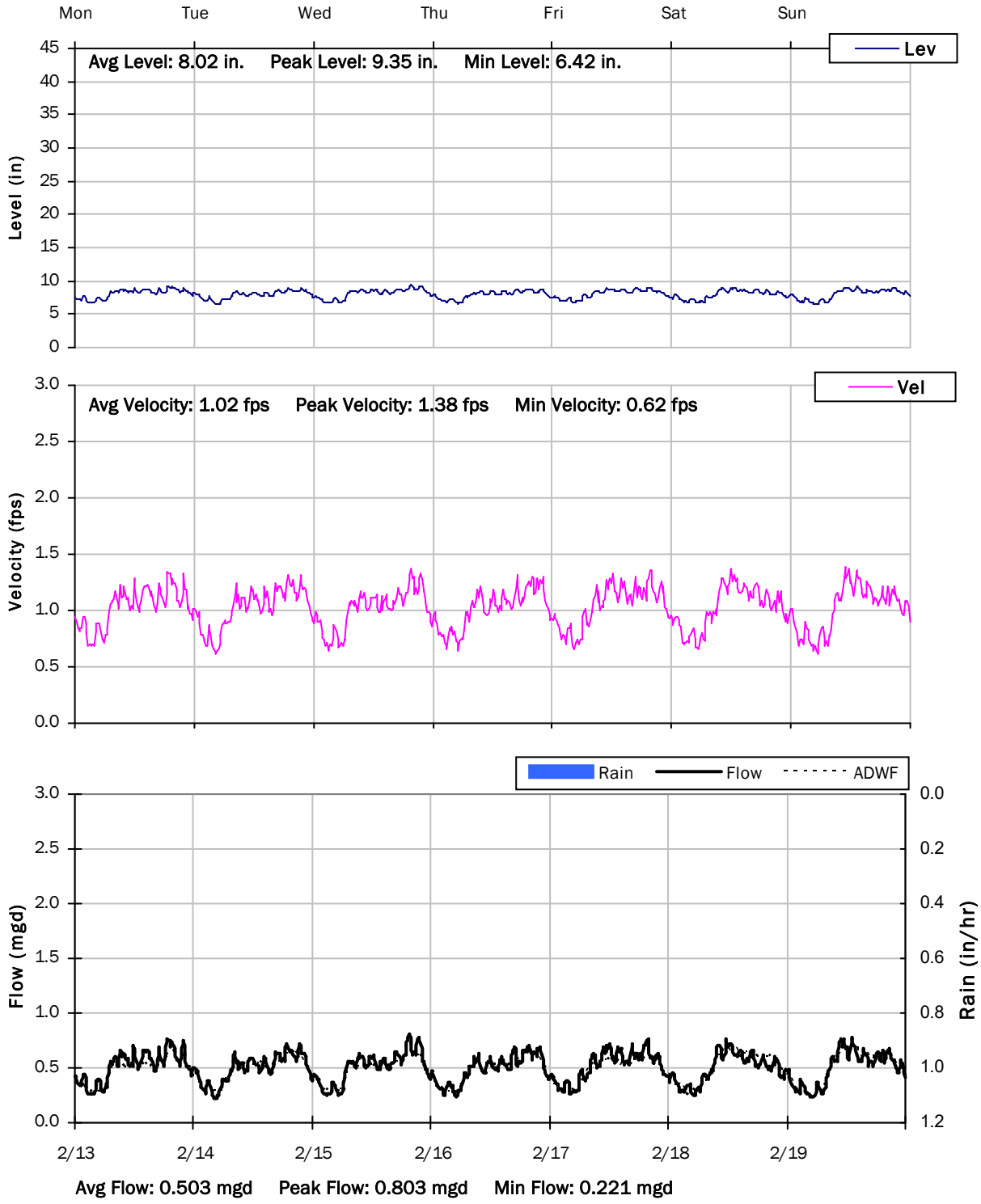
2/6/2023 to 2/13/2023



SITE 3

Weekly Level, Velocity and Flow Hydrographs

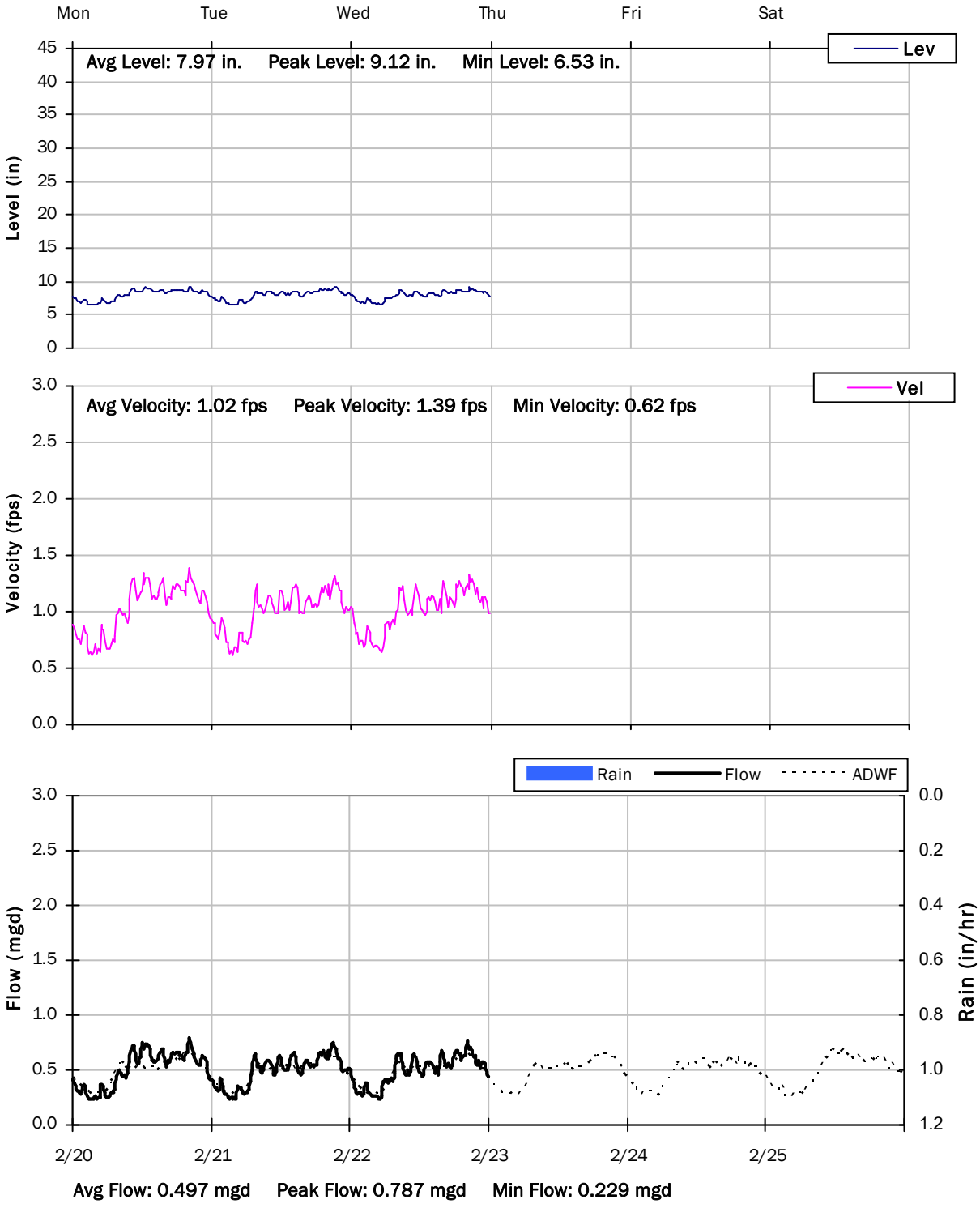
2/13/2023 to 2/20/2023



SITE 3

Weekly Level, Velocity and Flow Hydrographs

2/20/2023 to 2/27/2023



Monitoring Site: Site 4

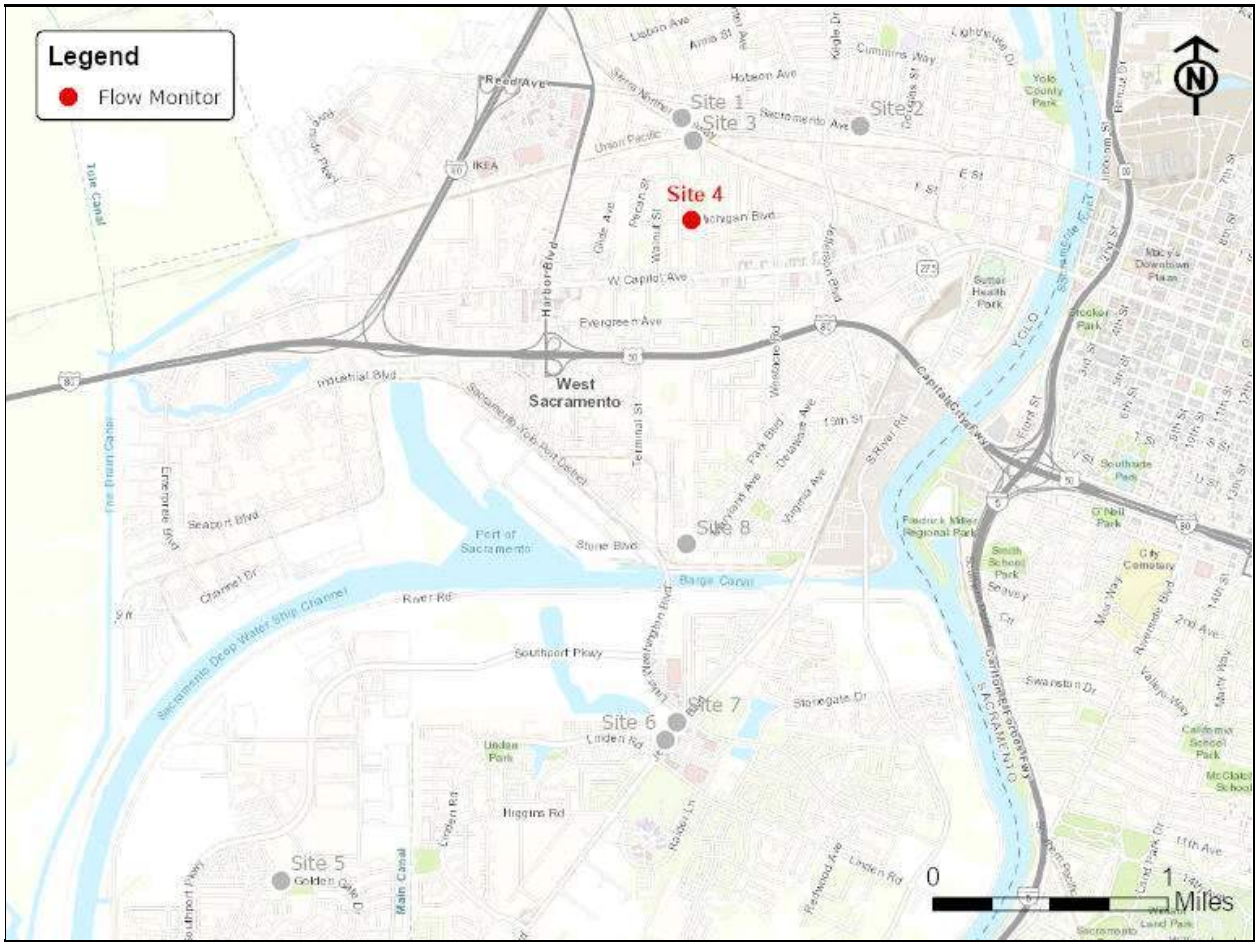
Black & Veatch | West Sacramento, California

Sanitary Sewer Flow Monitoring

January 06, 2023 - February 22, 2023

Location: On Michigan, east of maple st and michigan blvd intersection

Data Summary Report



Vicinity Map: Site 4

SITE 4

Site Information MH ID: 50166

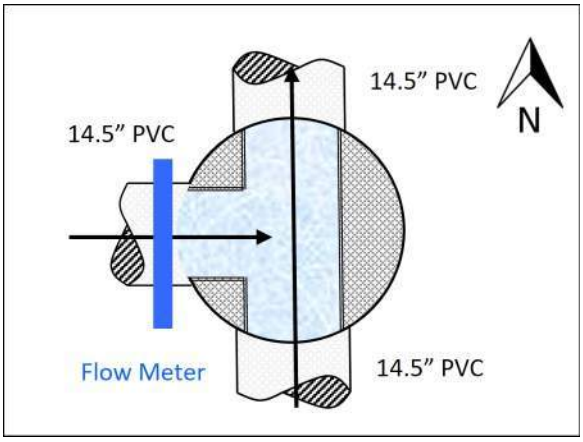
Location:	On Michigan, east of maple st and michigan blvd intersection
Coordinates:	121.5370° W, 38.5834° N
Rim Elevation:	15 feet
Expected Pipe Diameter:	15 inches
Measured Pipe Diameter:	14.5 inches
ADWF:	0.102 mgd
Peak Measured Flow:	2.835 mgd
Sediment:	None



Satellite Map



Sanitary Map



Flow Sketch



Street View



Plan View

SITE 4

Additional Site Photos

Effluent Pipe



Monitored West Influent Pipe



SITE 4

Additional Site Photos

East Influent Pipe

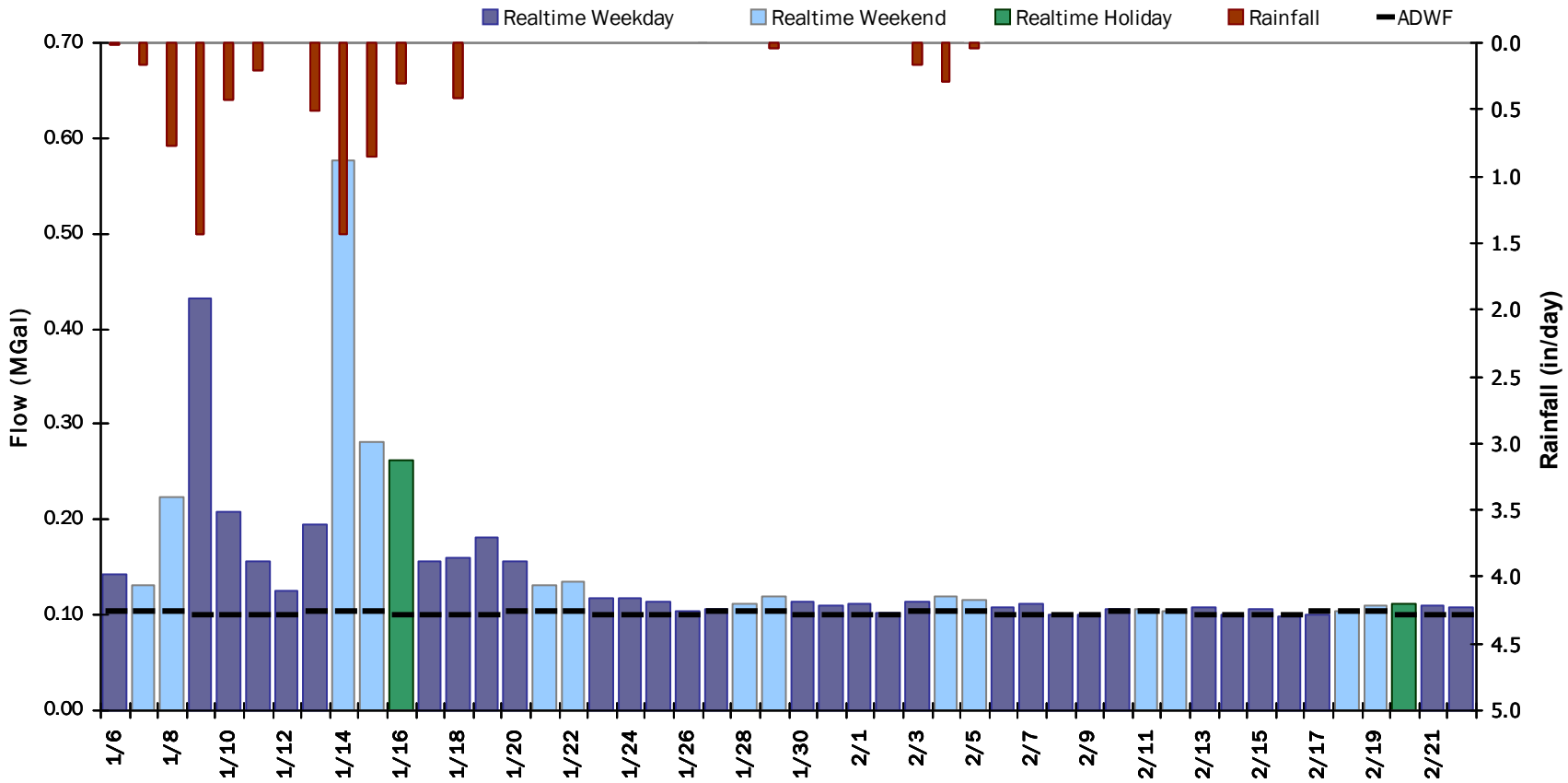


SITE 4

Period Flow Summary: Daily Flow Totals

Avg Daily Flow: 0.150 MGal Peak Daily Flow: 0.577 MGal Min Daily Flow: 0.098 MGal

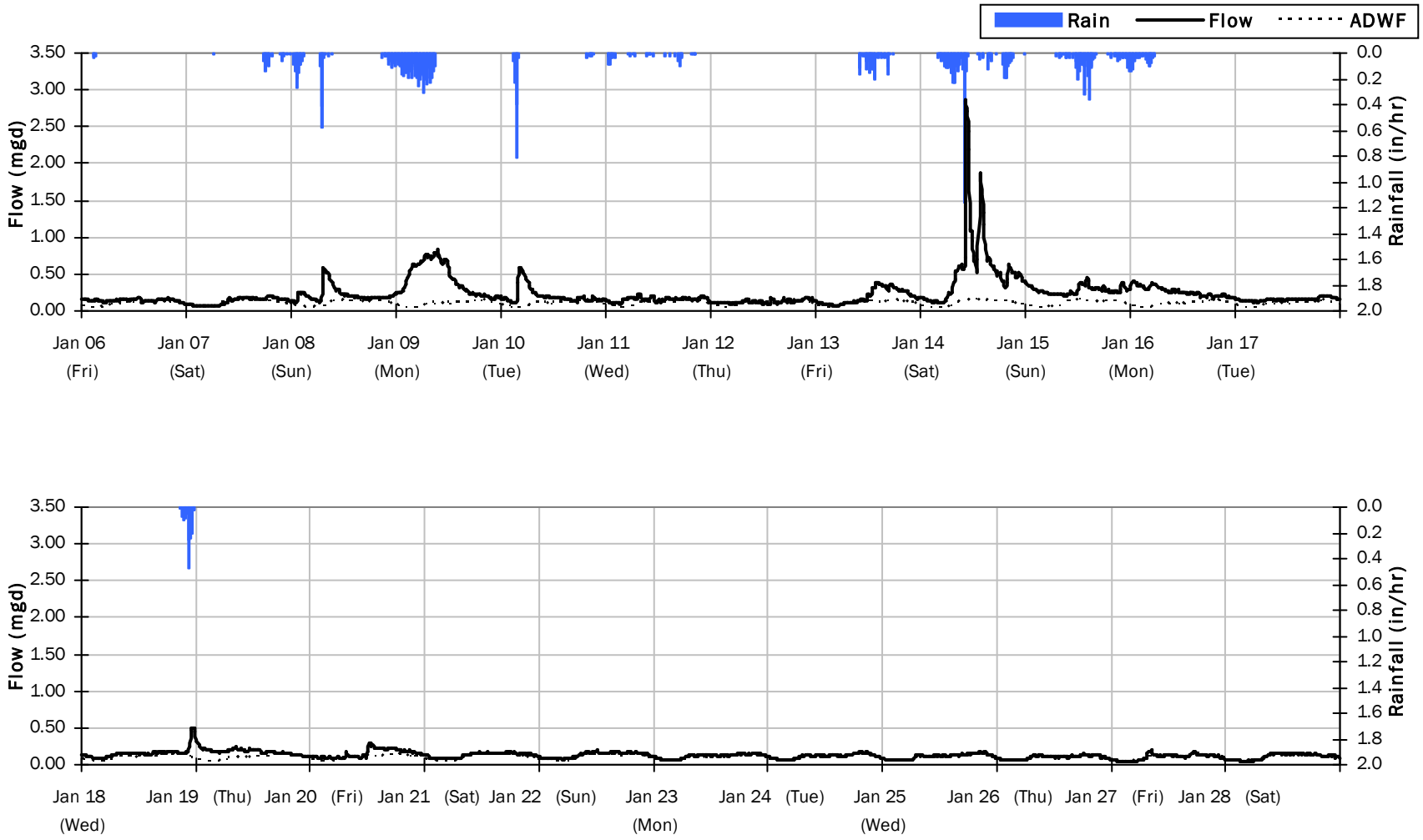
Total Rainfall: 7.45 inches



SITE 4

Flow Summary: 1/6/2023 to 1/28/2023

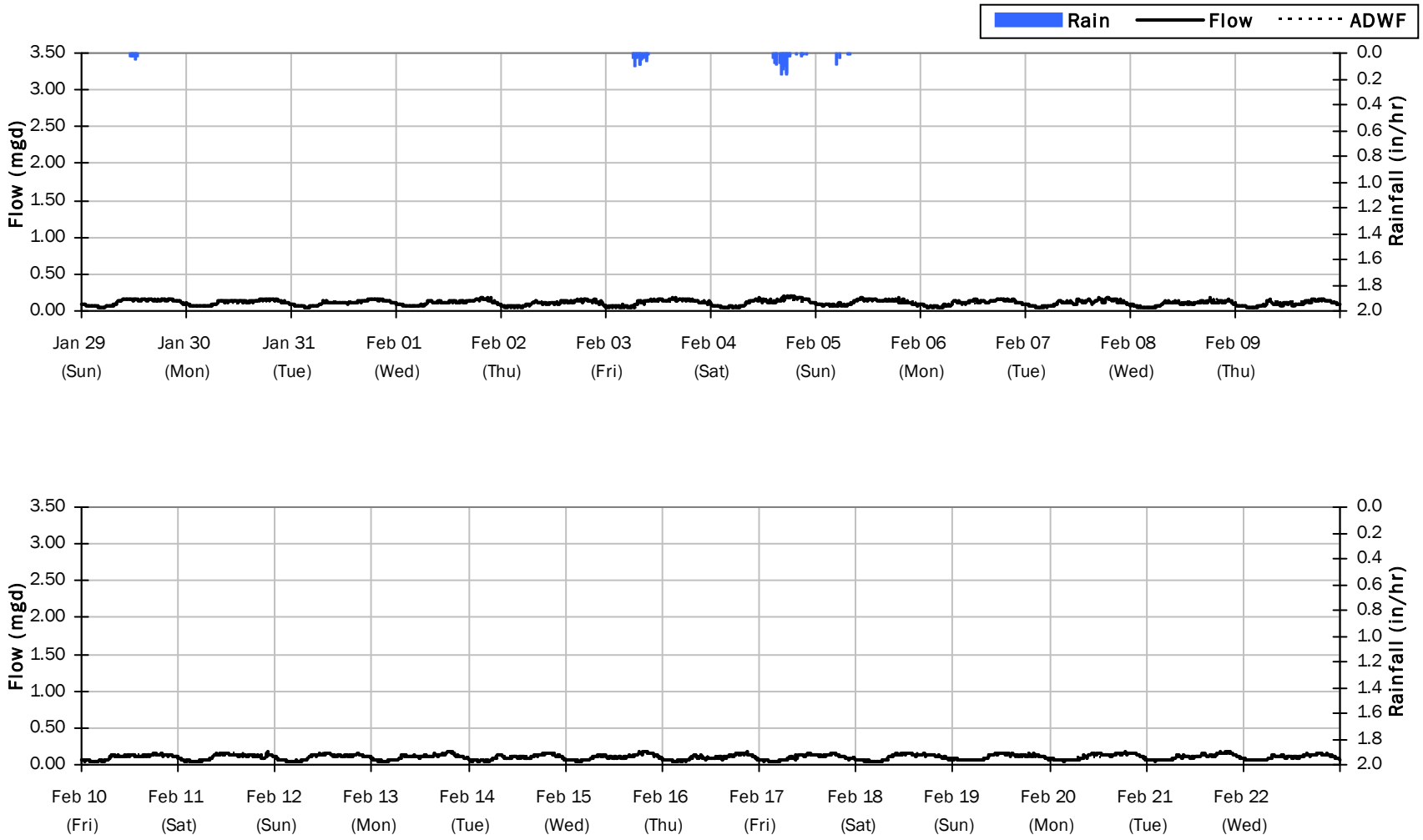
Period Rainfall: 6.52 inches Period Avg Flow: 0.188 mgd Period Peak Flow: 2.835 mgd Period Min Flow: 0.045 mgd



SITE 4

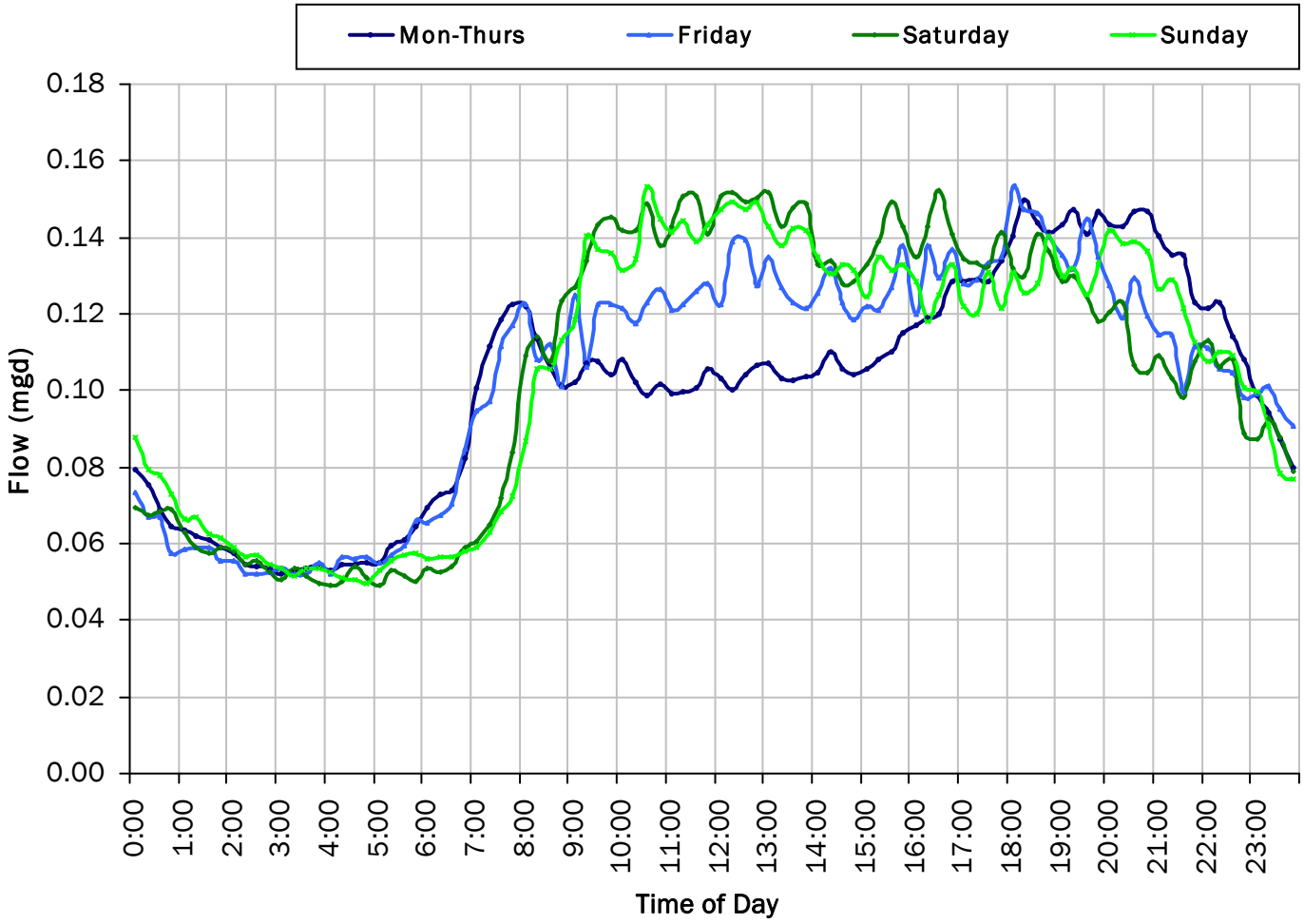
Flow Summary: 1/29/2023 to 2/22/2023

Period Rainfall: 0.53 inches Period Avg Flow: 0.108 mgd Period Peak Flow: 0.213 mgd Period Min Flow: 0.039 mgd



SITE 4

Average Dry Weather Flow Hydrographs



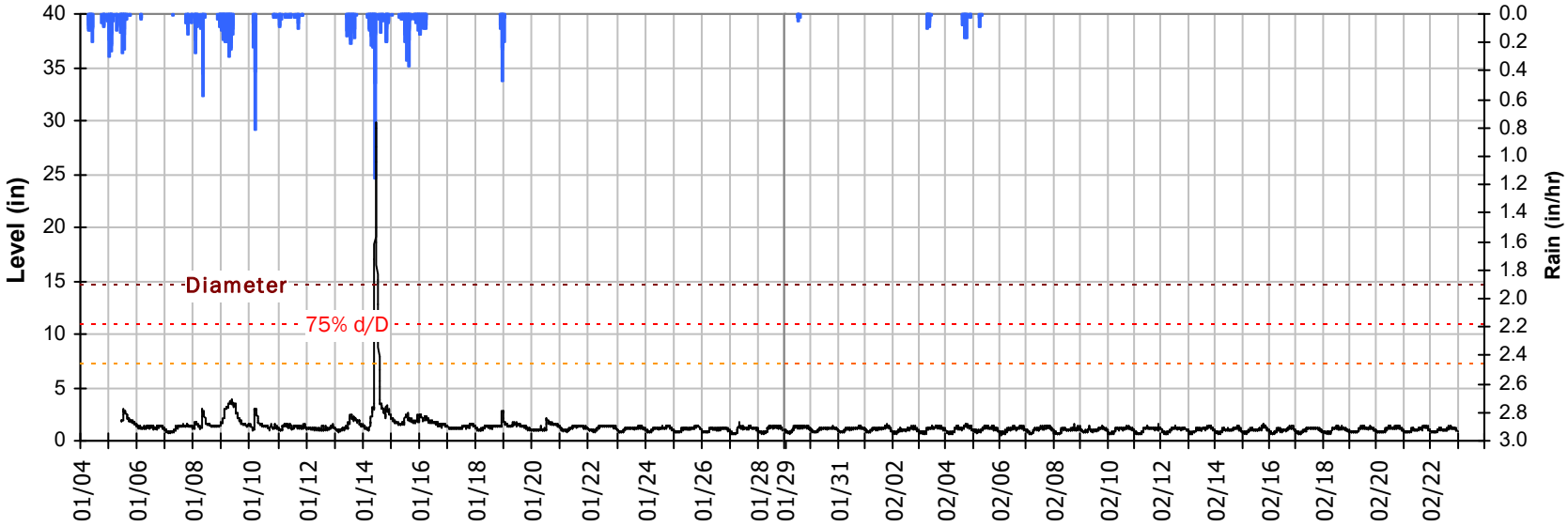
ADWF:

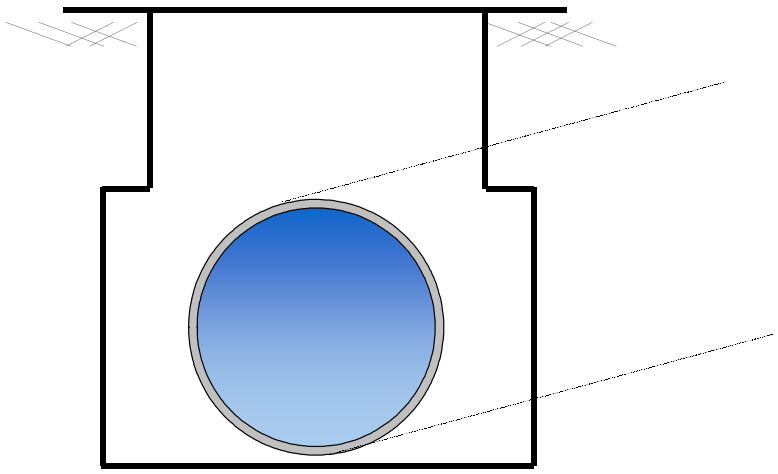
0.102 *mgd*

SITE 4

Site Capacity and Surcharge Summary

Realtime Flow Levels with Rainfall Data over Peak Level Period





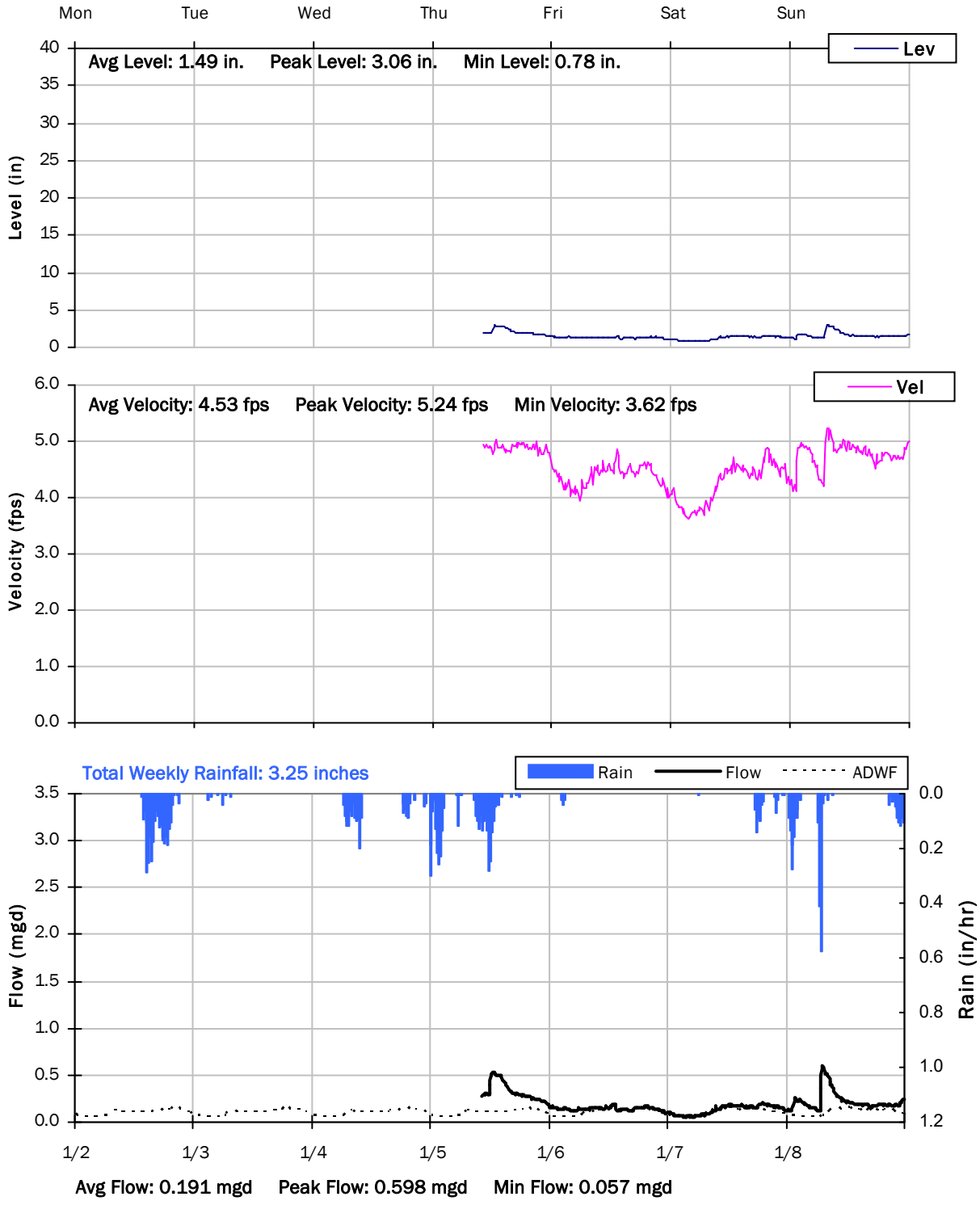
Pipe Diameter:	14.5	*inches*
Peak Measured Level:	29.7	*inches*
Peak d/D Ratio:	2.05	

Surcharged 15.2 inches over crown

SITE 4

Weekly Level, Velocity and Flow Hydrographs

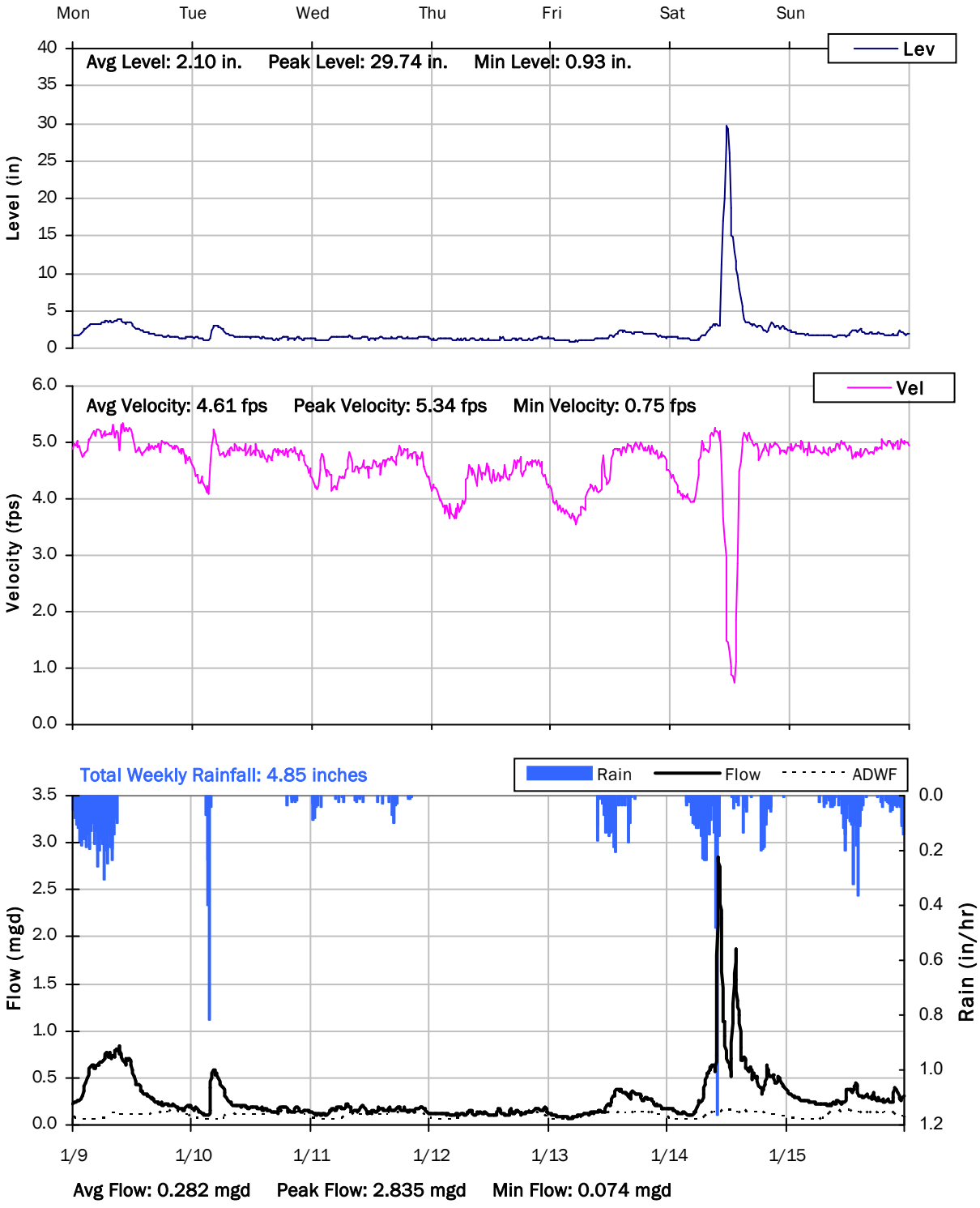
1/2/2023 to 1/9/2023



SITE 4

Weekly Level, Velocity and Flow Hydrographs

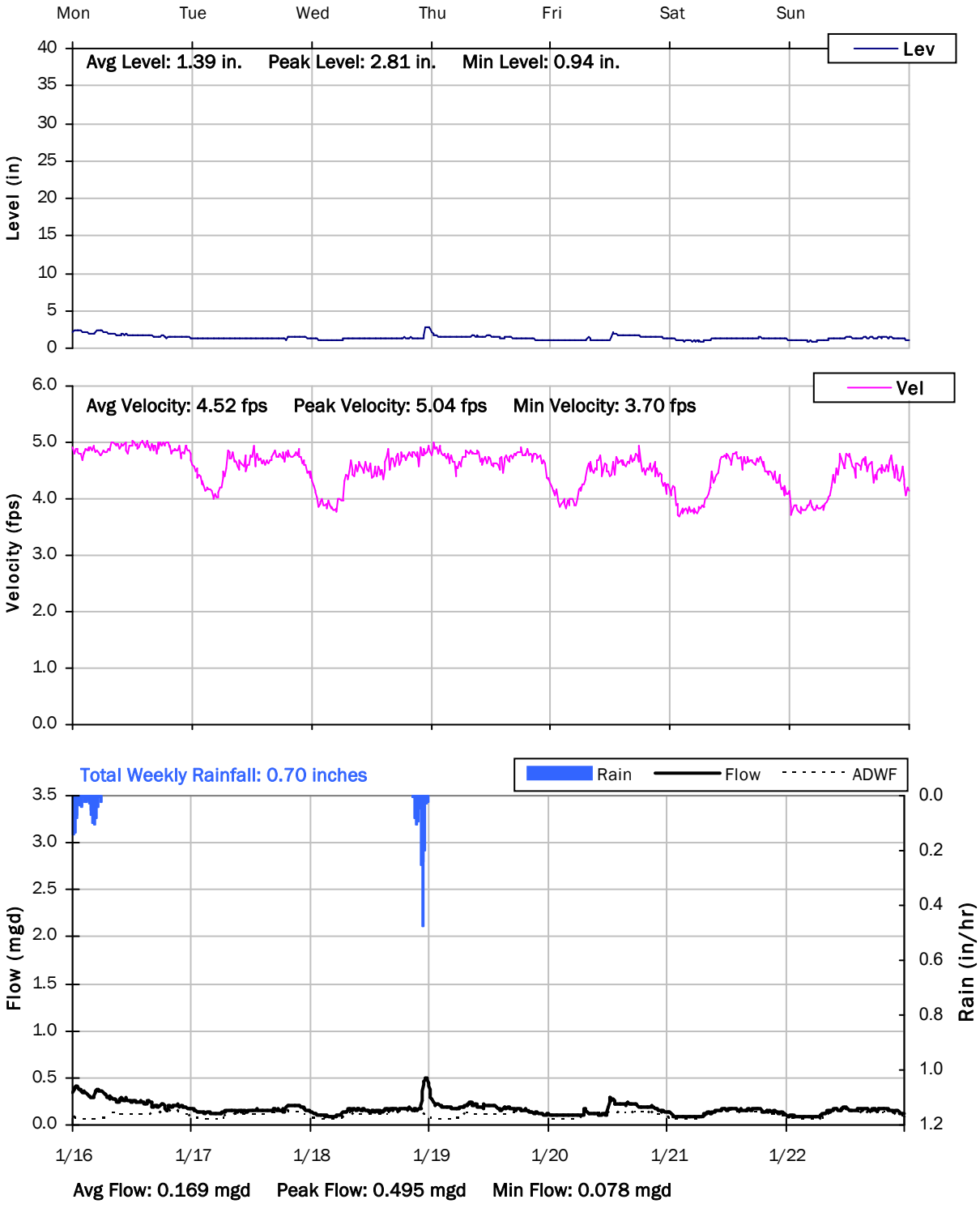
1/9/2023 to 1/16/2023



SITE 4

Weekly Level, Velocity and Flow Hydrographs

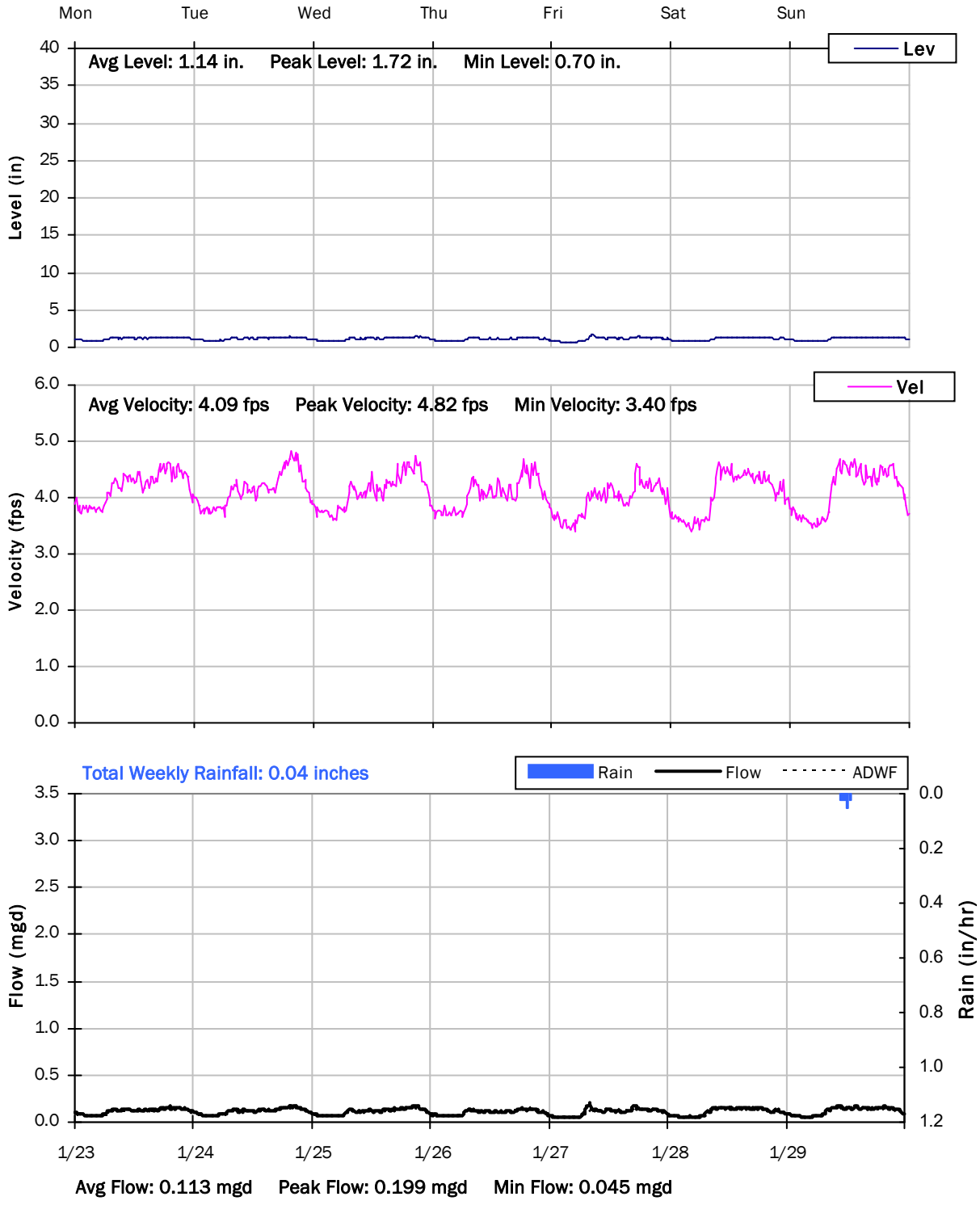
1/16/2023 to 1/23/2023



SITE 4

Weekly Level, Velocity and Flow Hydrographs

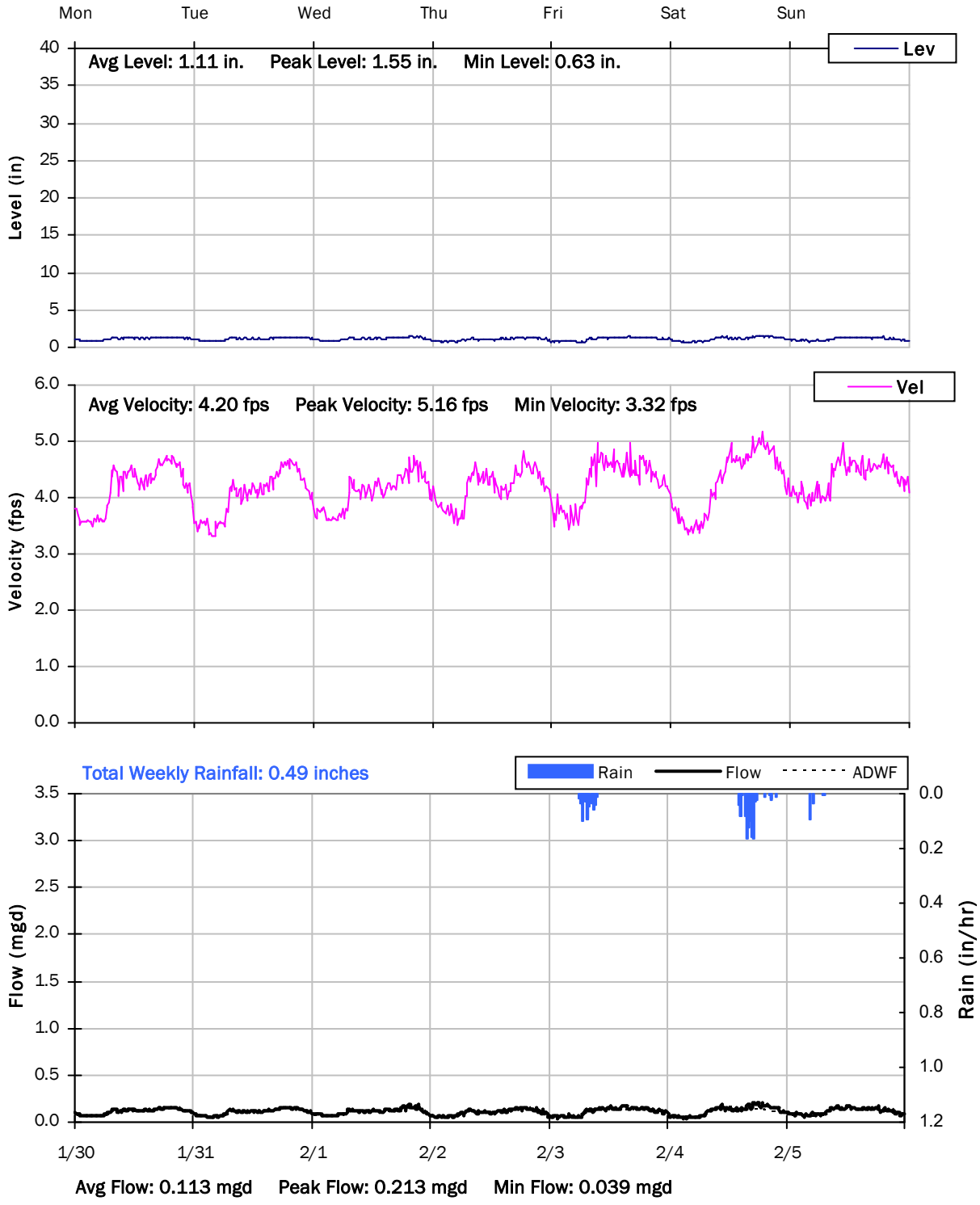
1/23/2023 to 1/30/2023



SITE 4

Weekly Level, Velocity and Flow Hydrographs

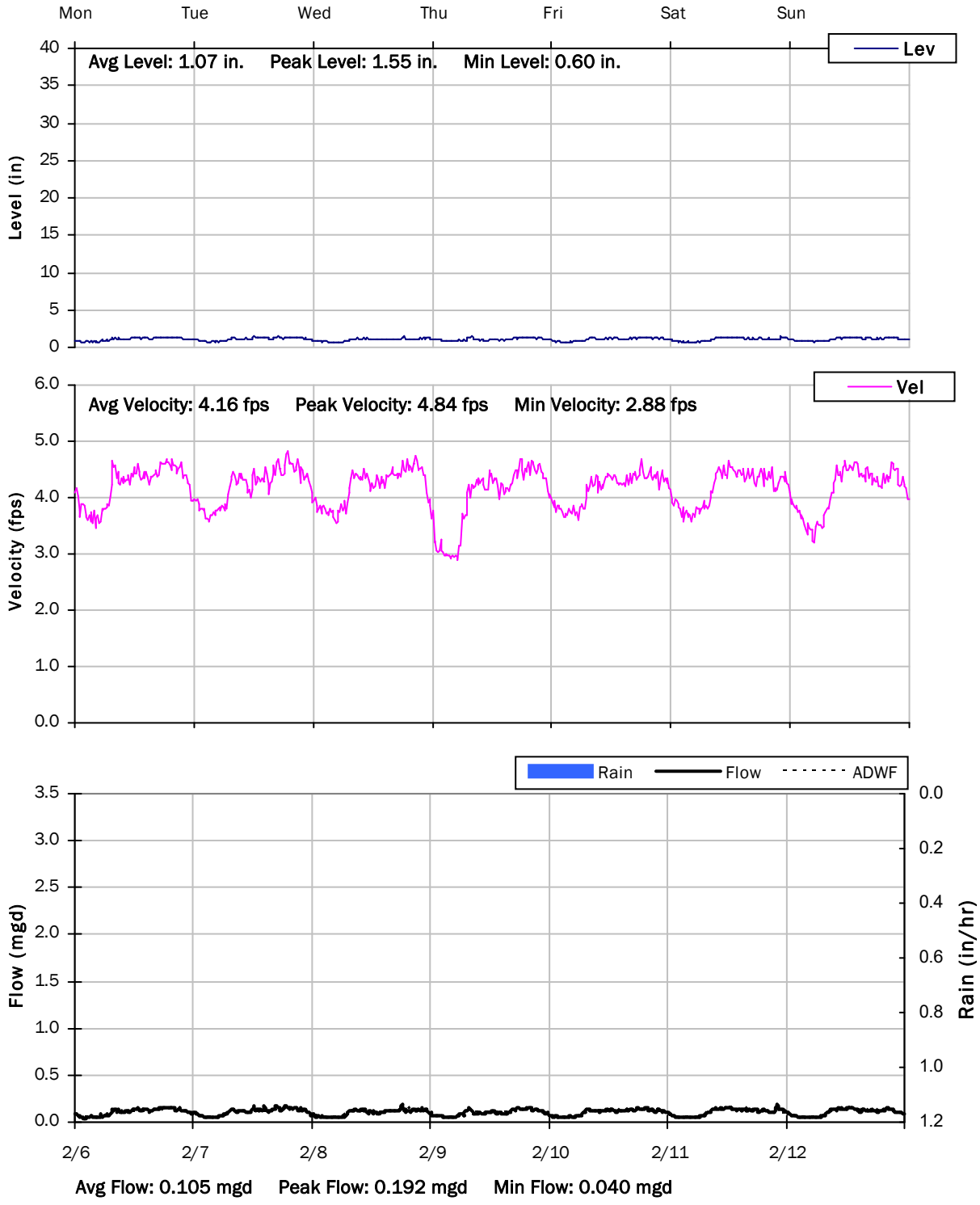
1/30/2023 to 2/6/2023



SITE 4

Weekly Level, Velocity and Flow Hydrographs

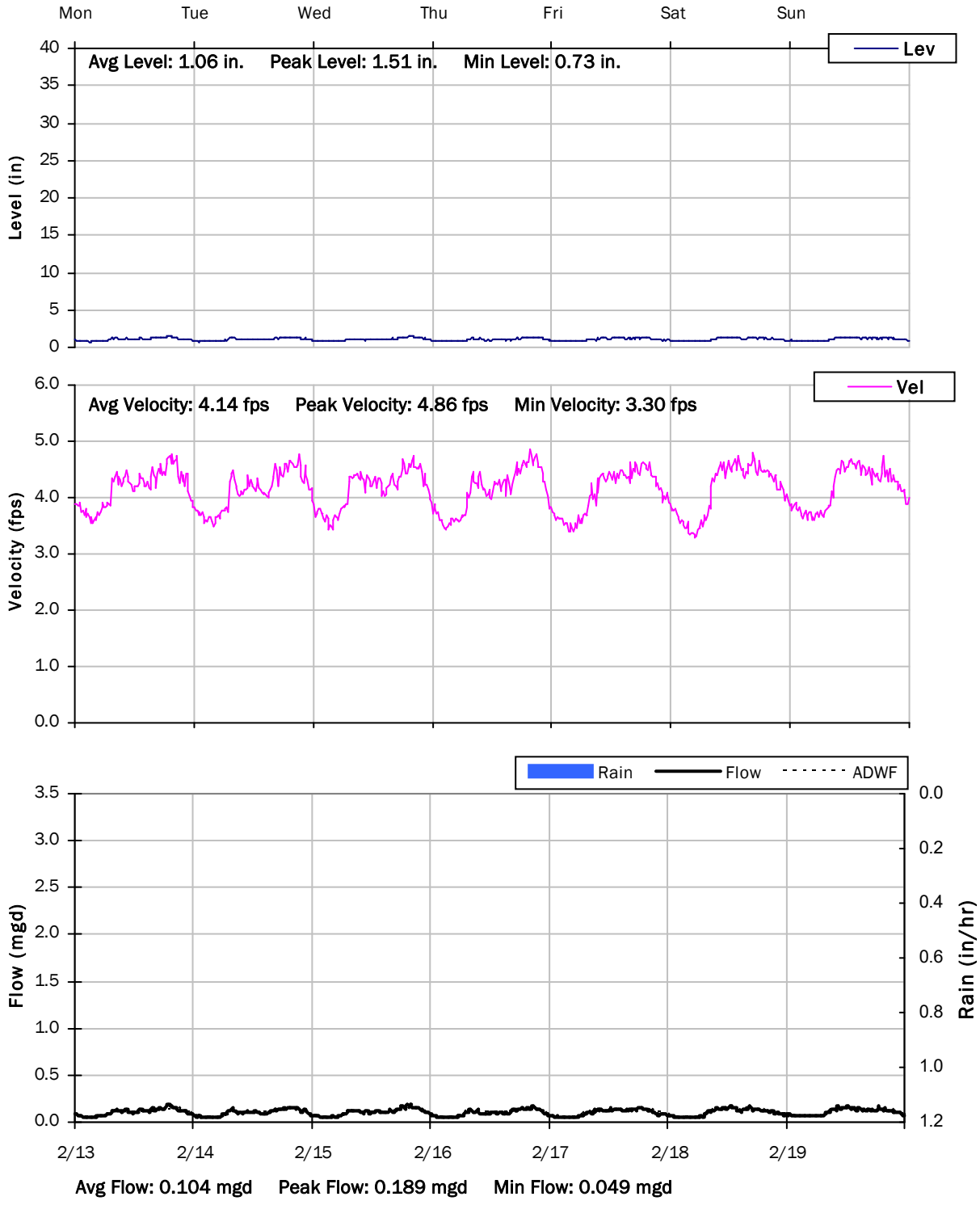
2/6/2023 to 2/13/2023



SITE 4

Weekly Level, Velocity and Flow Hydrographs

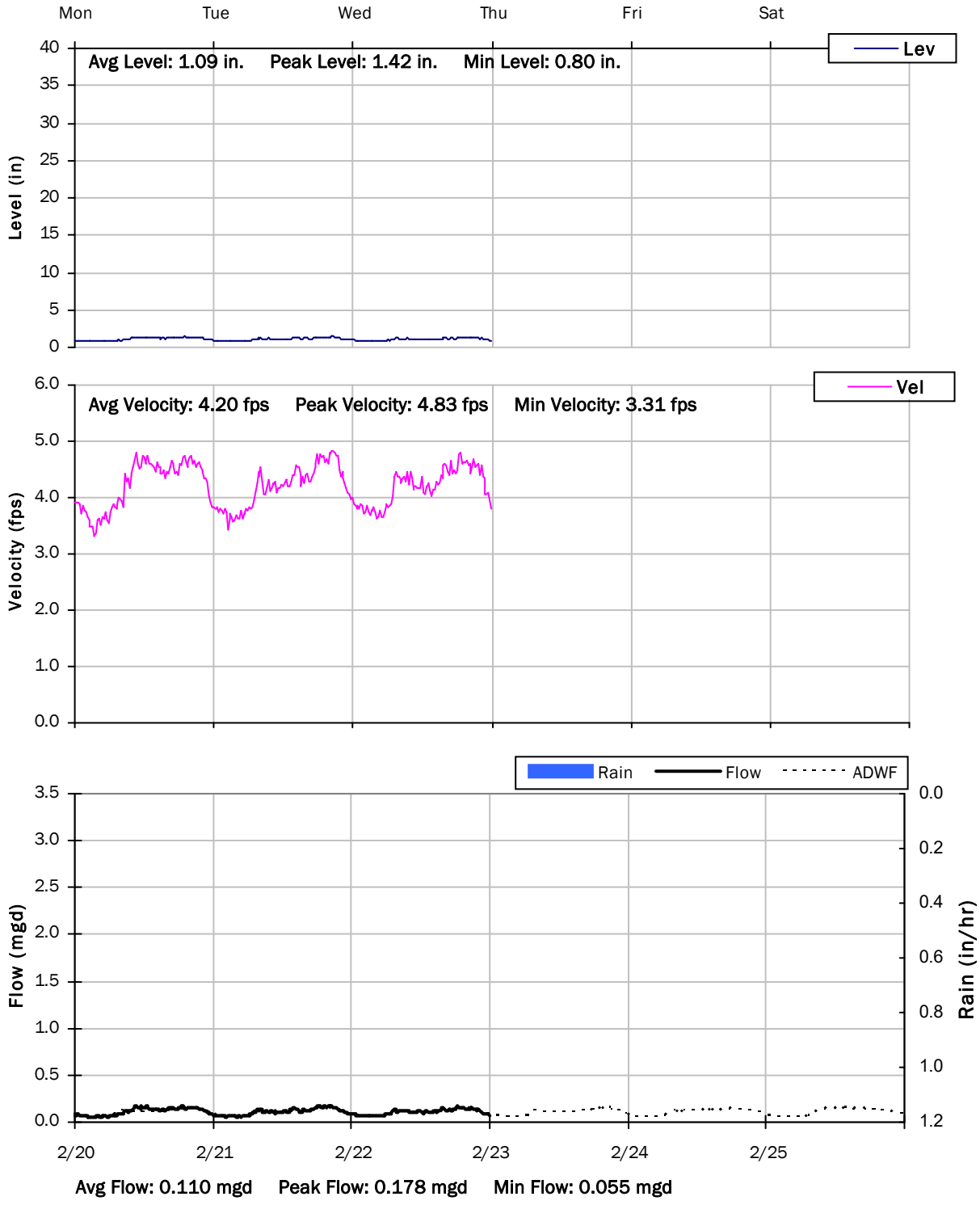
2/13/2023 to 2/20/2023



SITE 4

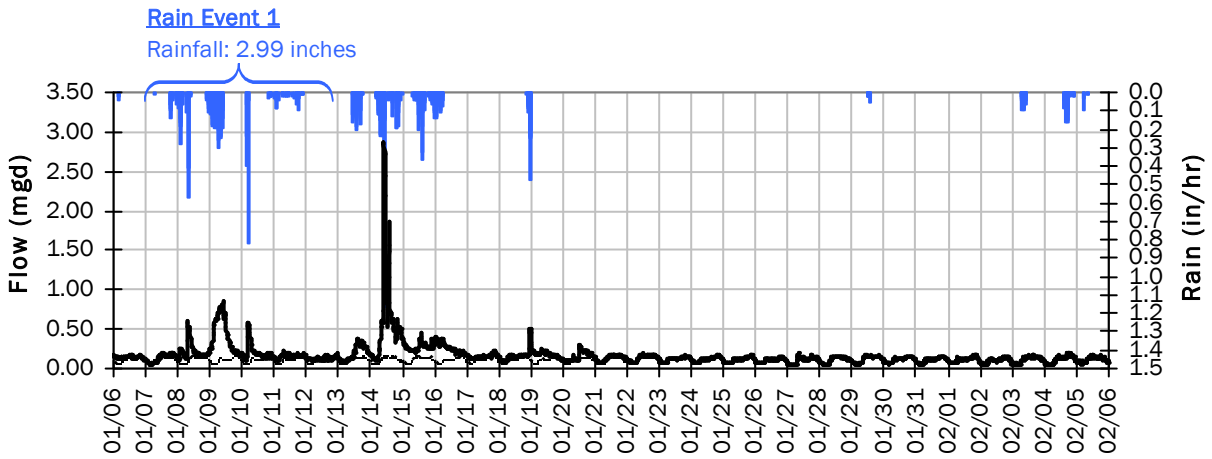
Weekly Level, Velocity and Flow Hydrographs

2/20/2023 to 2/27/2023

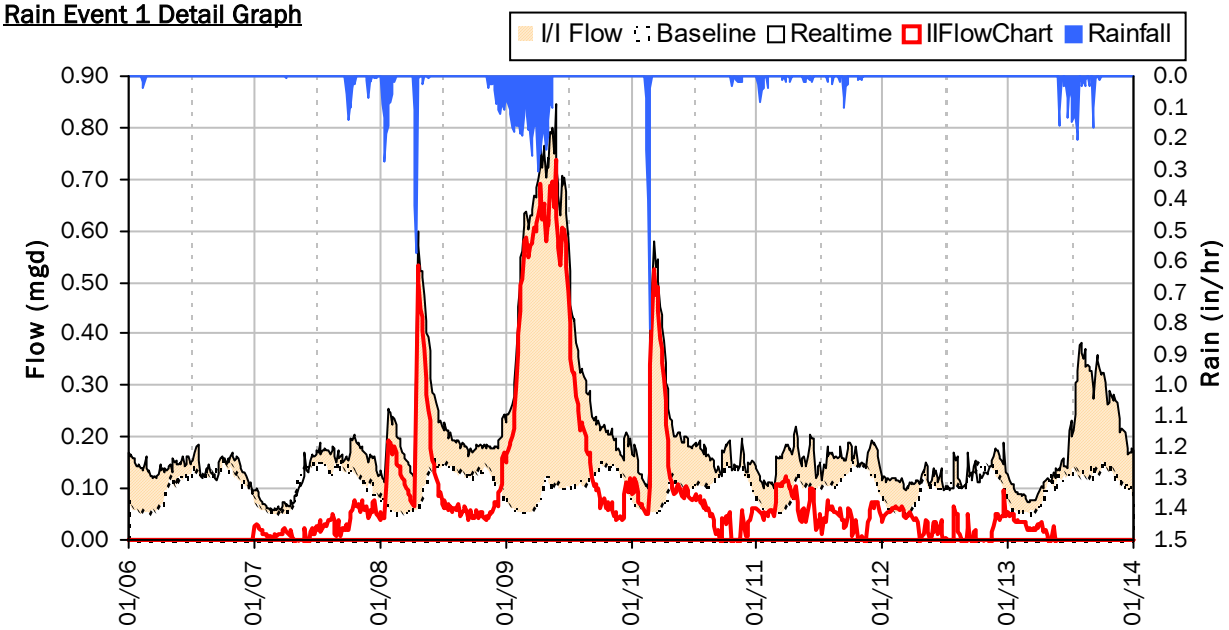


SITE 4
I/I Summary: Rain Event 1

Baseline and Realtime Flows with Rainfall Data over Monitoring Period



Rain Event 1 Detail Graph

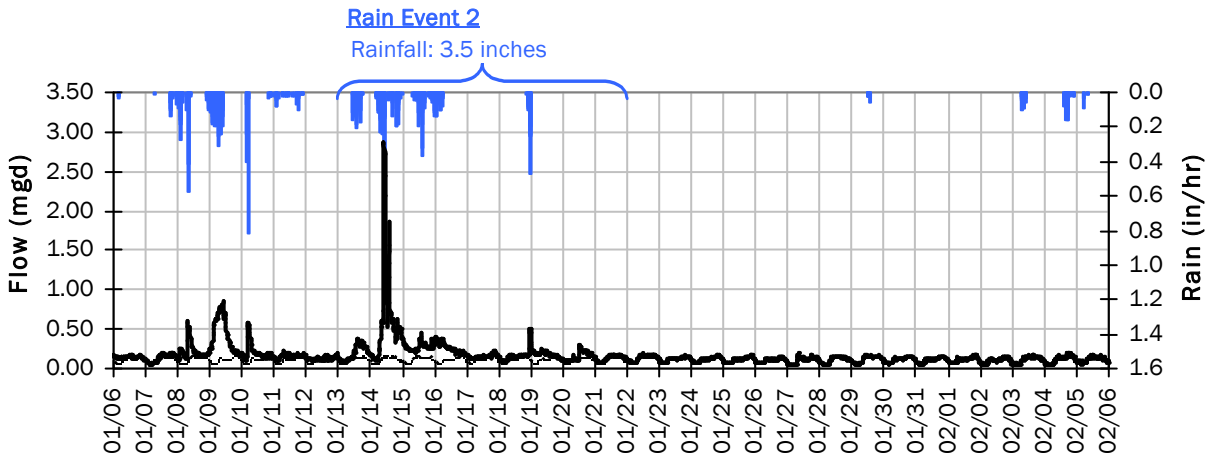


Storm Event I/I Analysis (Rain = 2.99 inches)

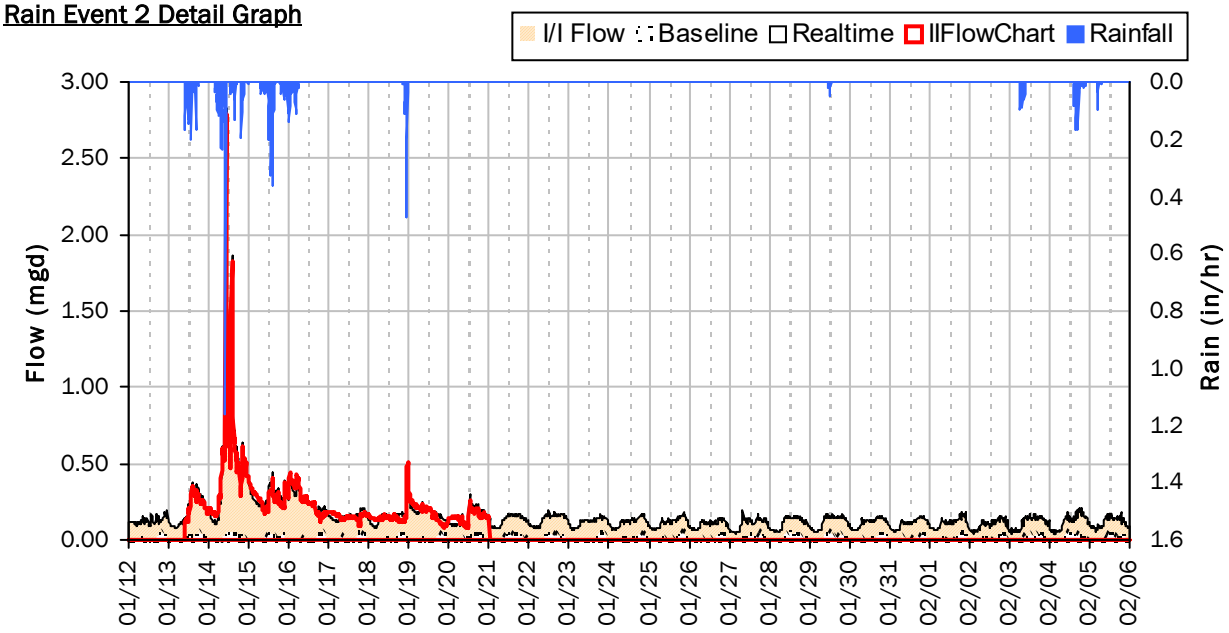
Capacity		Inflow / Infiltration	
Peak Flow:	0.846 *mgd*	**Peak I/I Rate:**	0.738 *mgd*
PF:	8.28	**Total I/I:**	673,000 *gallons*
Peak Level:	3.87 *in*		
d/D Ratio:	0.27		

SITE 4
I/I Summary: Rain Event 2

Baseline and Realtime Flows with Rainfall Data over Monitoring Period



Rain Event 2 Detail Graph

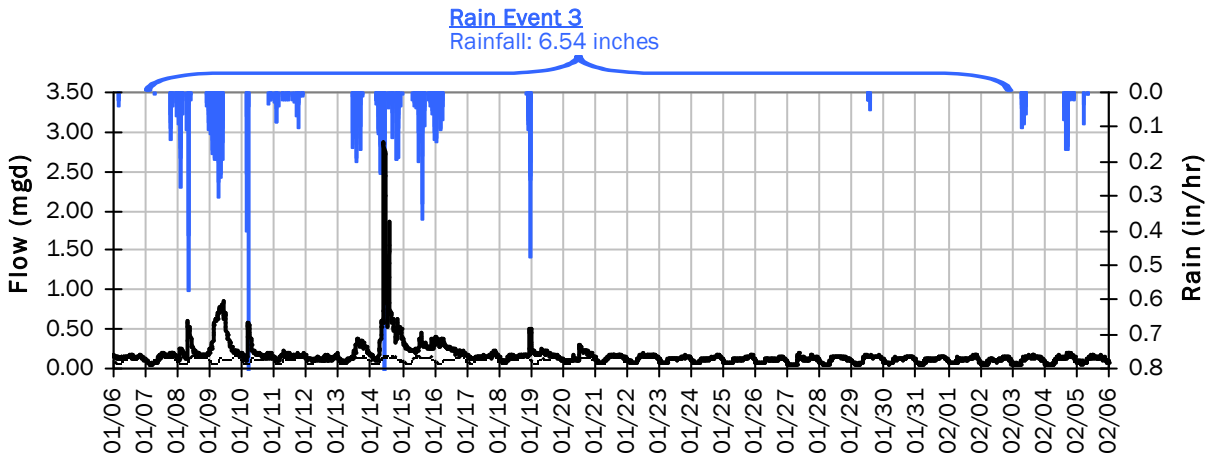


Storm Event I/I Analysis (Rain = 3.50 inches)

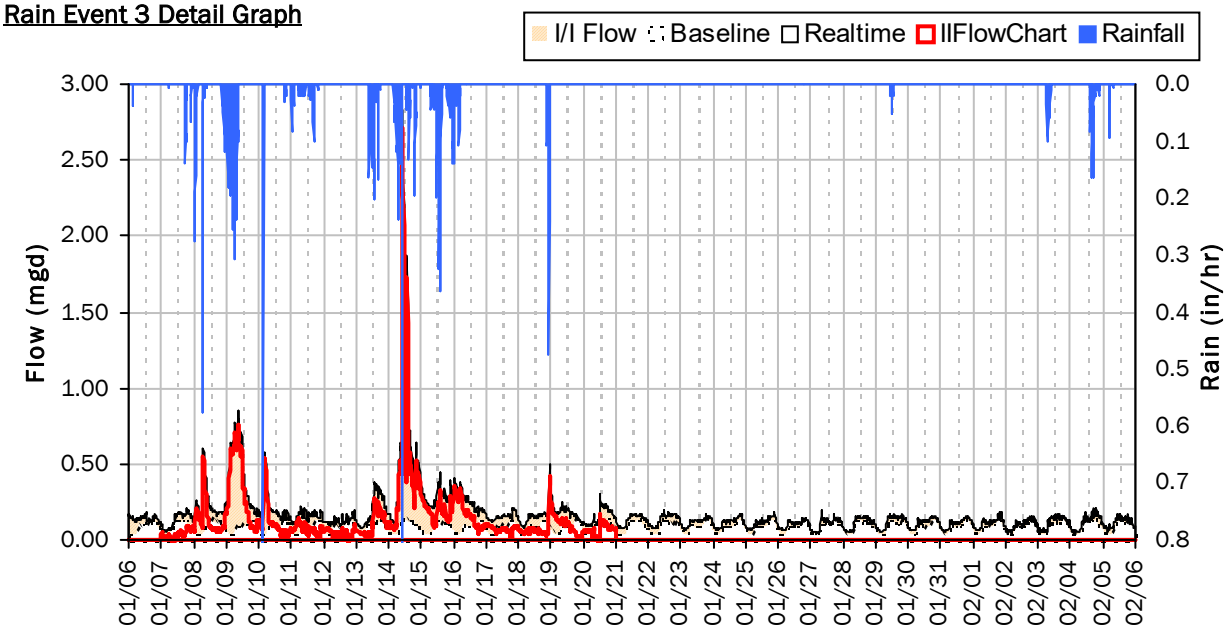
Capacity		Inflow / Infiltration	
Peak Flow:	2.835 *mgd*	**Peak I/I Rate:**	2.794 *mgd*
PF:	27.73	**Total I/I:**	1,900,000 *gallons*
Peak Level:	29.74 *in*		
d/D Ratio:	2.05		

SITE 4
I/I Summary: Rain Event 3

Baseline and Realtime Flows with Rainfall Data over Monitoring Period



Rain Event 3 Detail Graph



Storm Event I/I Analysis (Rain = 6.54 inches)

Capacity		Inflow / Infiltration	
Peak Flow:	2.84 *mgd*	**Peak I/I Rate:**	2.71 *mgd*
PF:	27.73	**Total I/I:**	2,022,000 *gallons*
Peak Level:	29.74 *in*		
d/D Ratio:	2.05		

Monitoring Site: Site 5

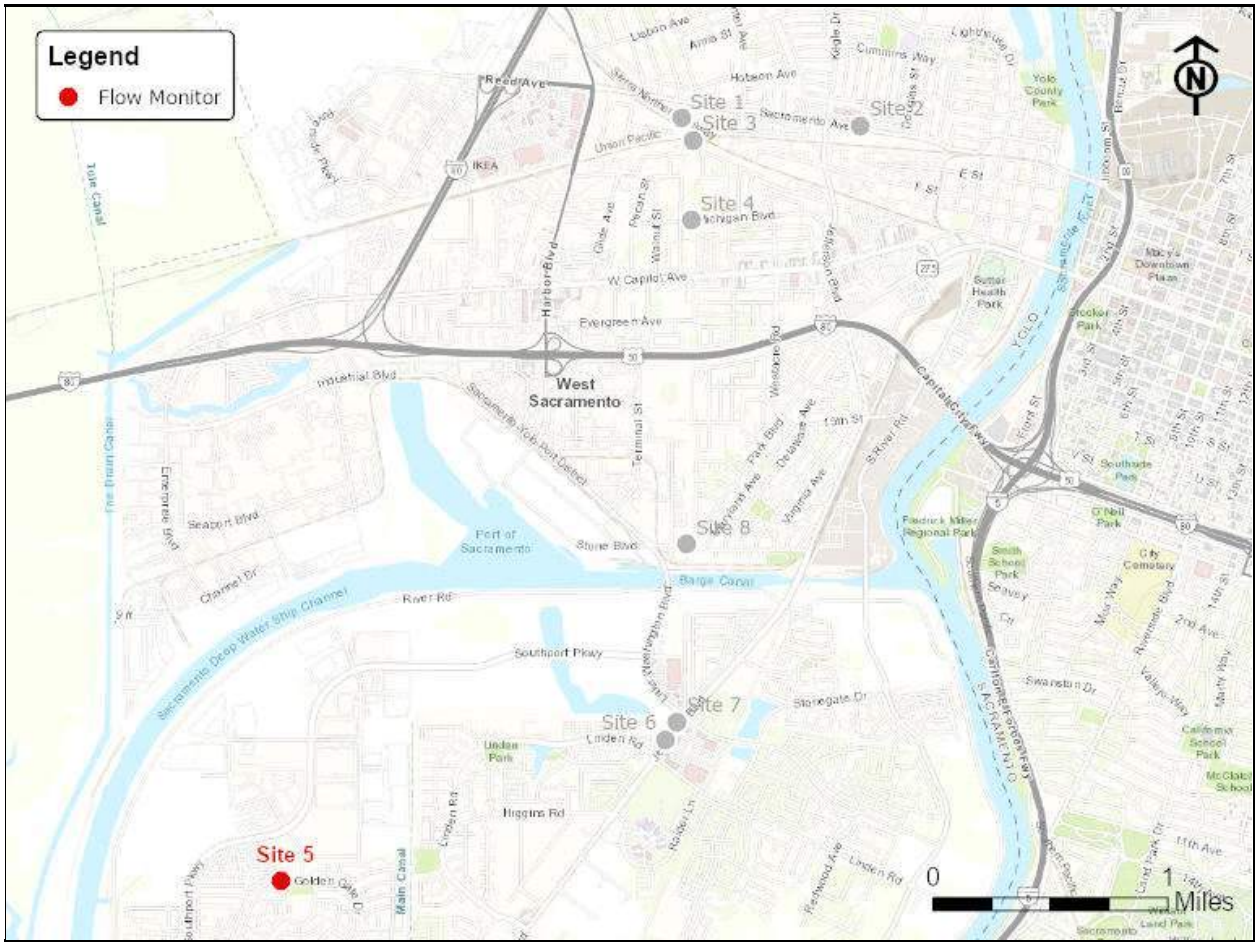
Black & Veatch | West Sacramento, California

Sanitary Sewer Flow Monitoring

January 06, 2023 - February 22, 2023

Location: Golden Gate Dr, East of Audubon Dr and Golden Gate Br intersection

Data Summary Report



Vicinity Map: Site 5

SITE 5

Site Information MH ID: 8377

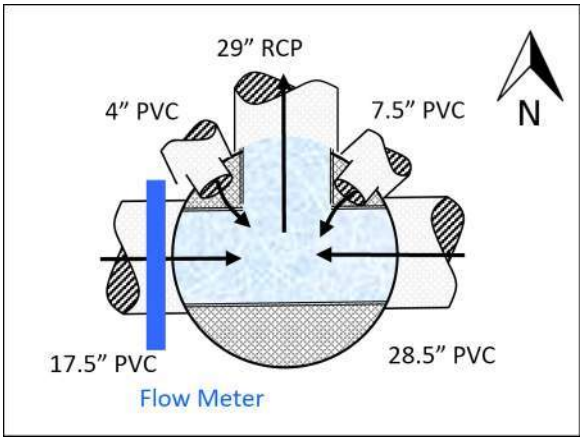
Location:	Golden Gate Dr, East of Audubon Dr and Golden Gate Br intersection
Coordinates:	121.5700° W, 38.5423° N
Rim Elevation:	11 feet
Expected Pipe Diameter:	18 inches
Measured Pipe Diameter:	17.5 inches
ADWF:	0.265 mgd
Peak Measured Flow:	0.916 mgd
Sediment:	None



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

Northeast Upper Influent Pipe



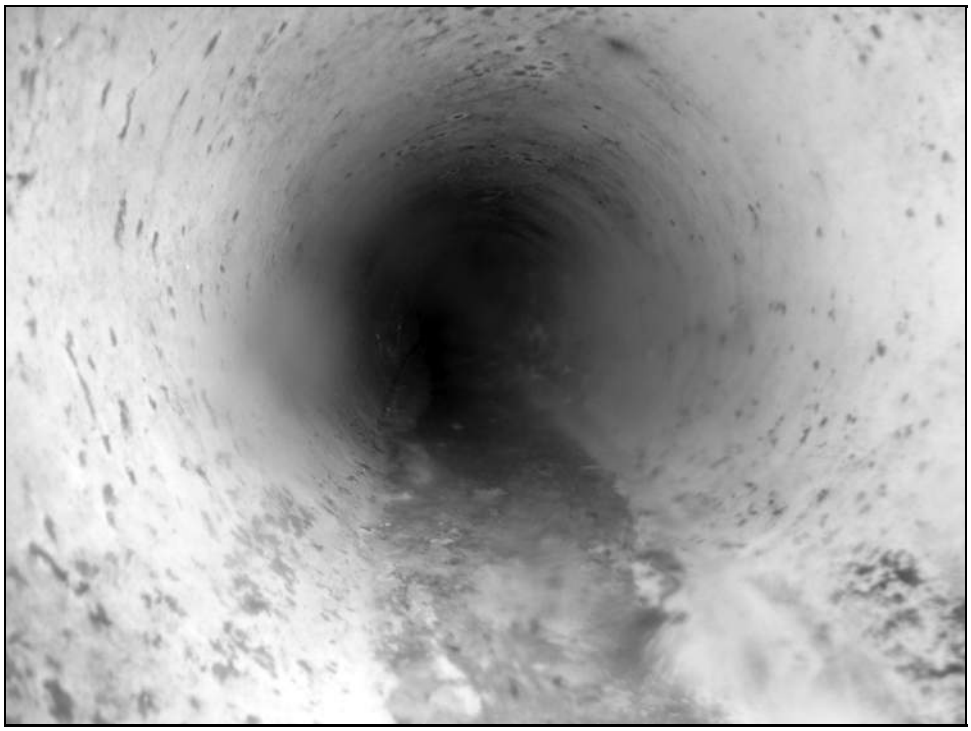
Monitored West Influent Pipe



SITE 5

Additional Site Photos

Northwest Upper Influent Pipe

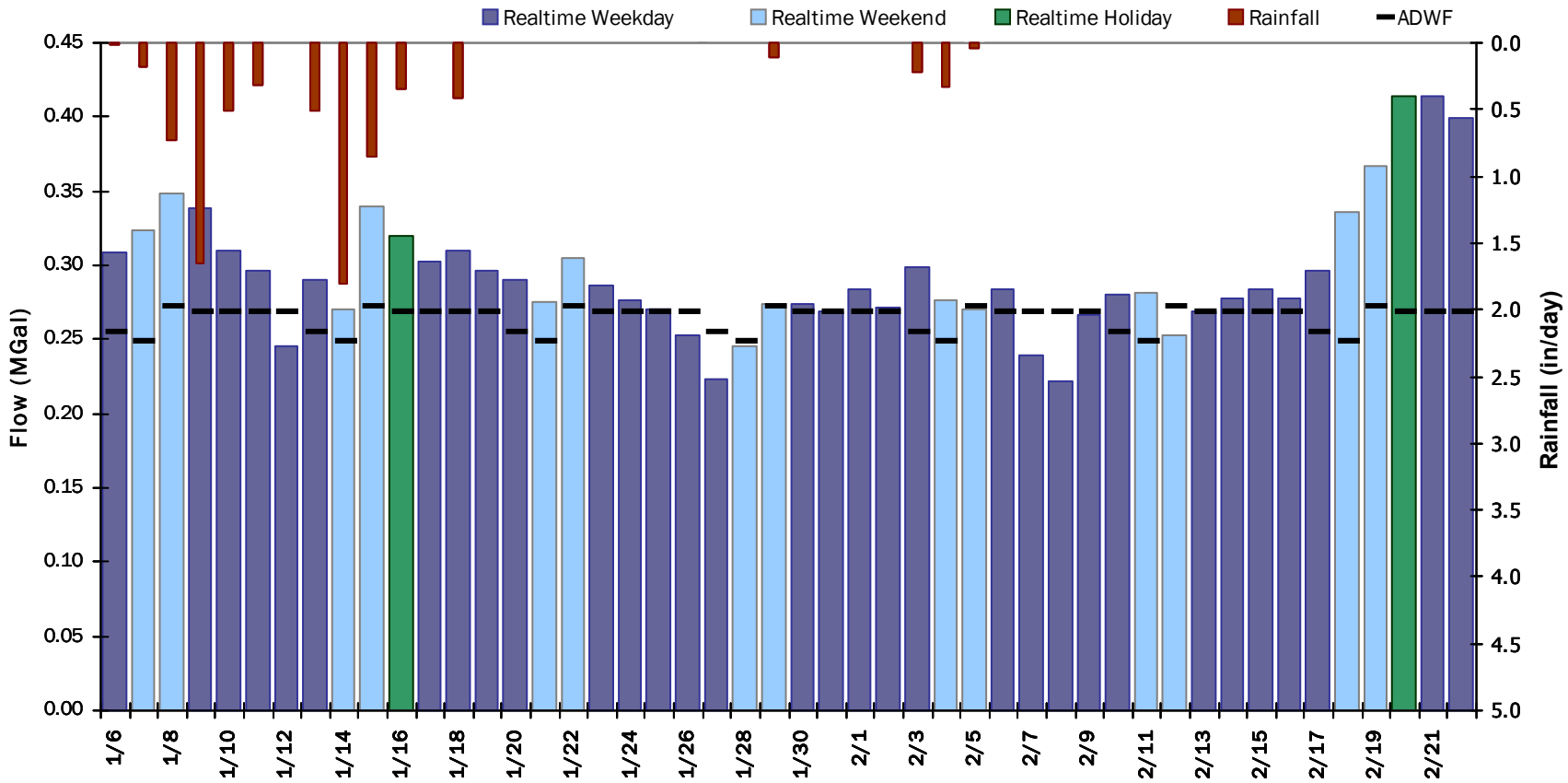


SITE 5

Period Flow Summary: Daily Flow Totals

Avg Daily Flow: 0.296 MGal Peak Daily Flow: 0.414 MGal Min Daily Flow: 0.221 MGal

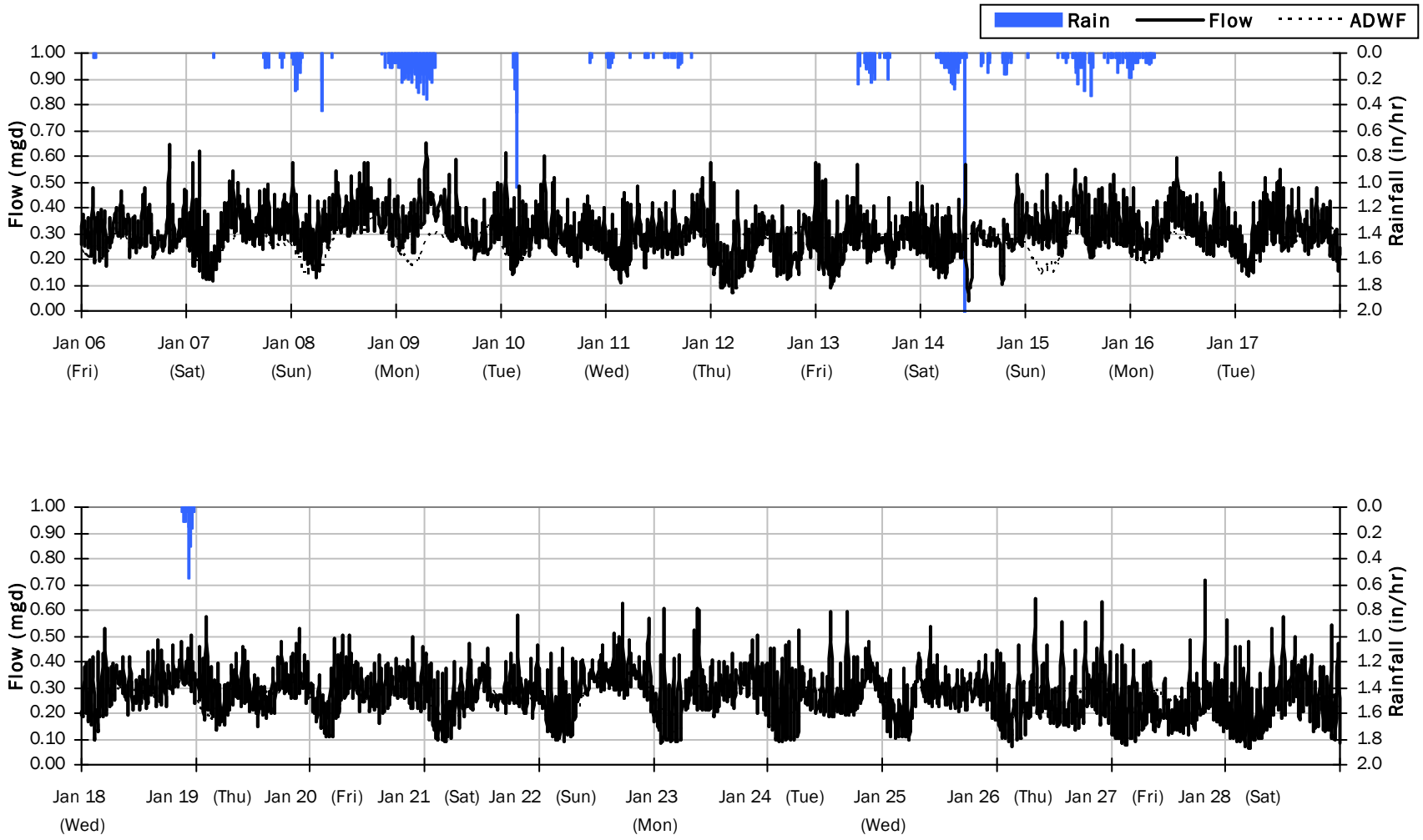
Total Rainfall: 8.47 inches



SITE 5

Flow Summary: 1/6/2023 to 1/28/2023

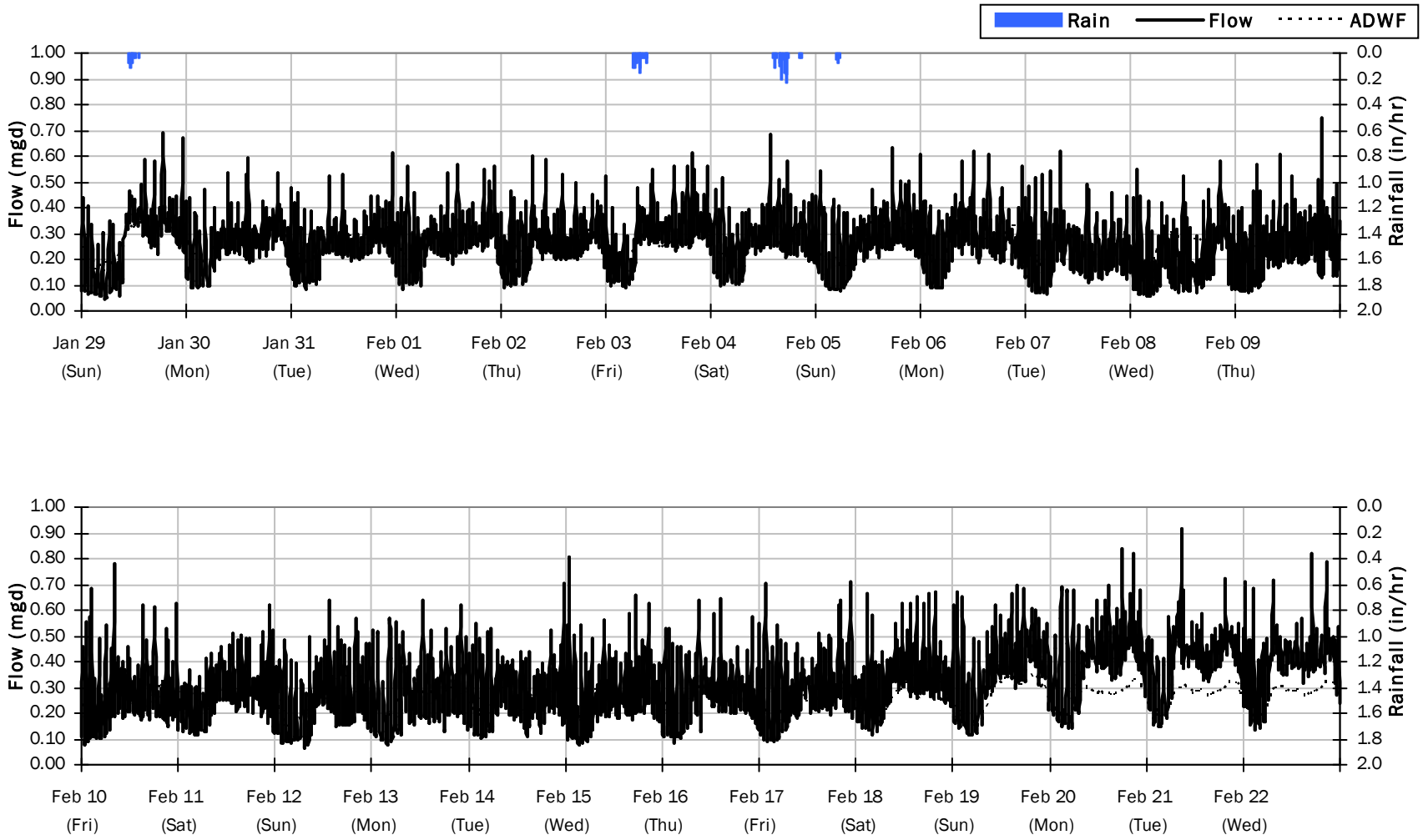
Period Rainfall: 7.34 inches Period Avg Flow: 0.292 mgd Period Peak Flow: 0.719 mgd Period Min Flow: 0.041 mgd



SITE 5

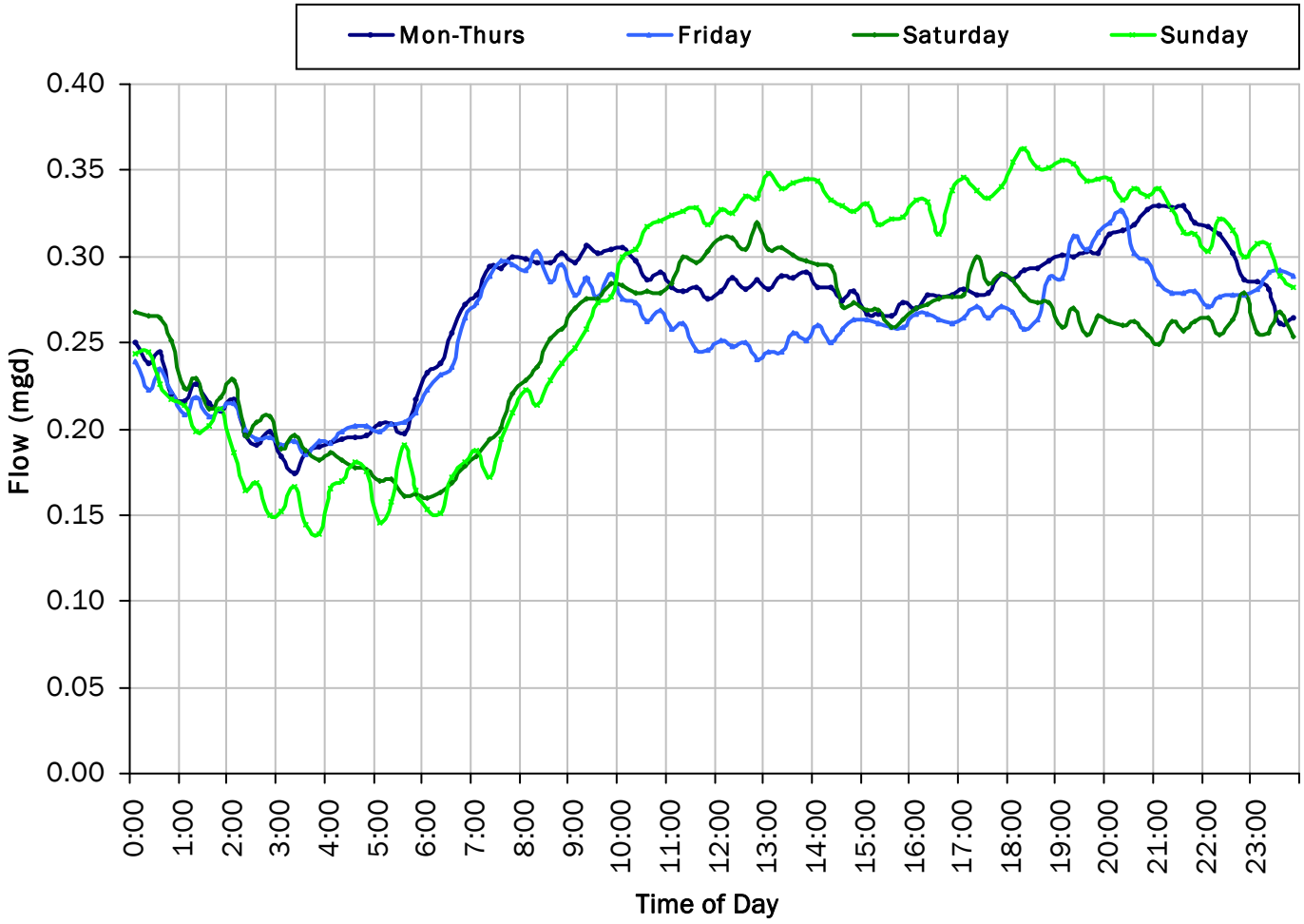
Flow Summary: 1/29/2023 to 2/22/2023

Period Rainfall: 0.69 inches Period Avg Flow: 0.295 mgd Period Peak Flow: 0.916 mgd Period Min Flow: 0.048 mgd



SITE 5

Average Dry Weather Flow Hydrographs



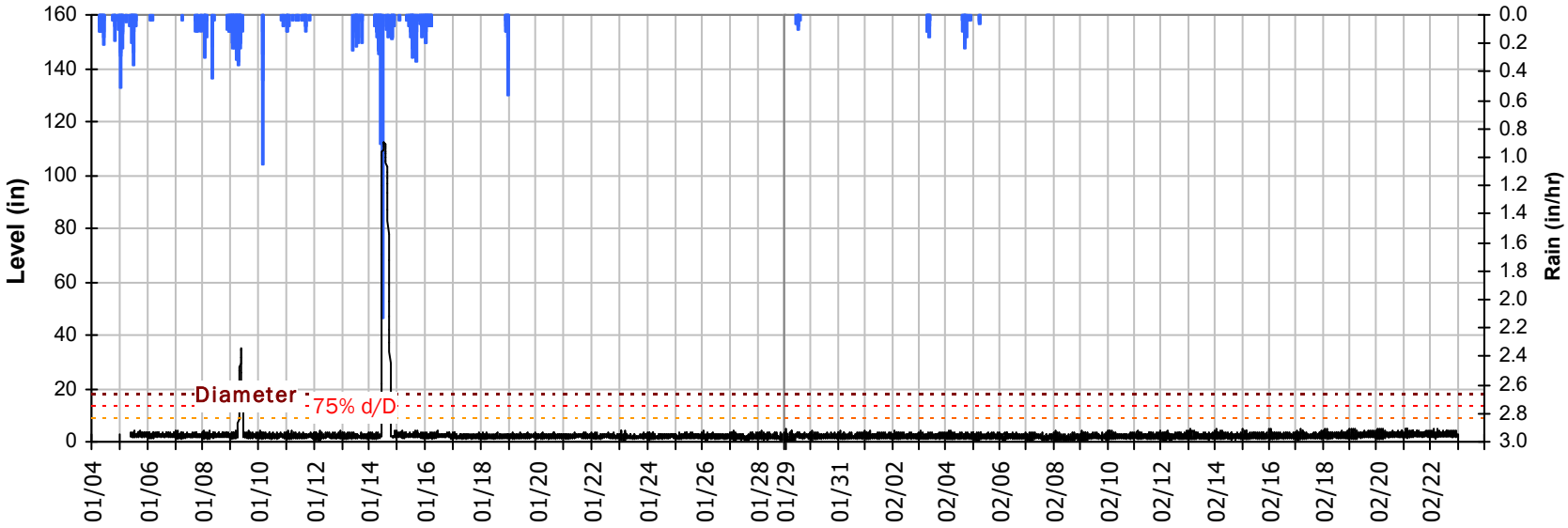
ADWF:

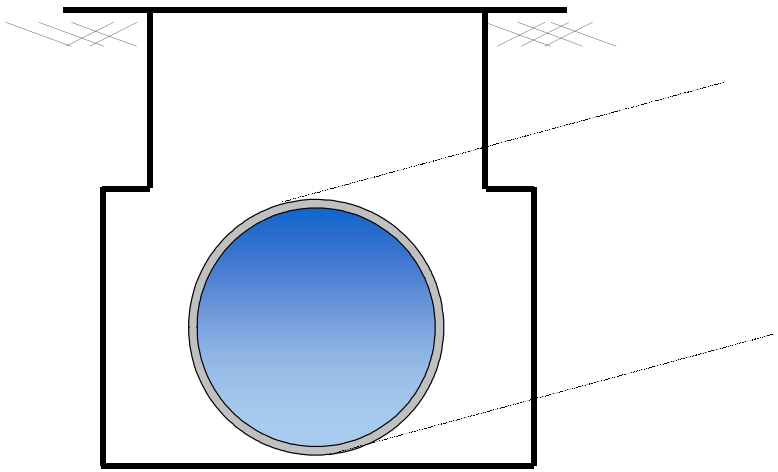
0.265 *mgd*

SITE 5

Site Capacity and Surcharge Summary

Realtime Flow Levels with Rainfall Data over Peak Level Period





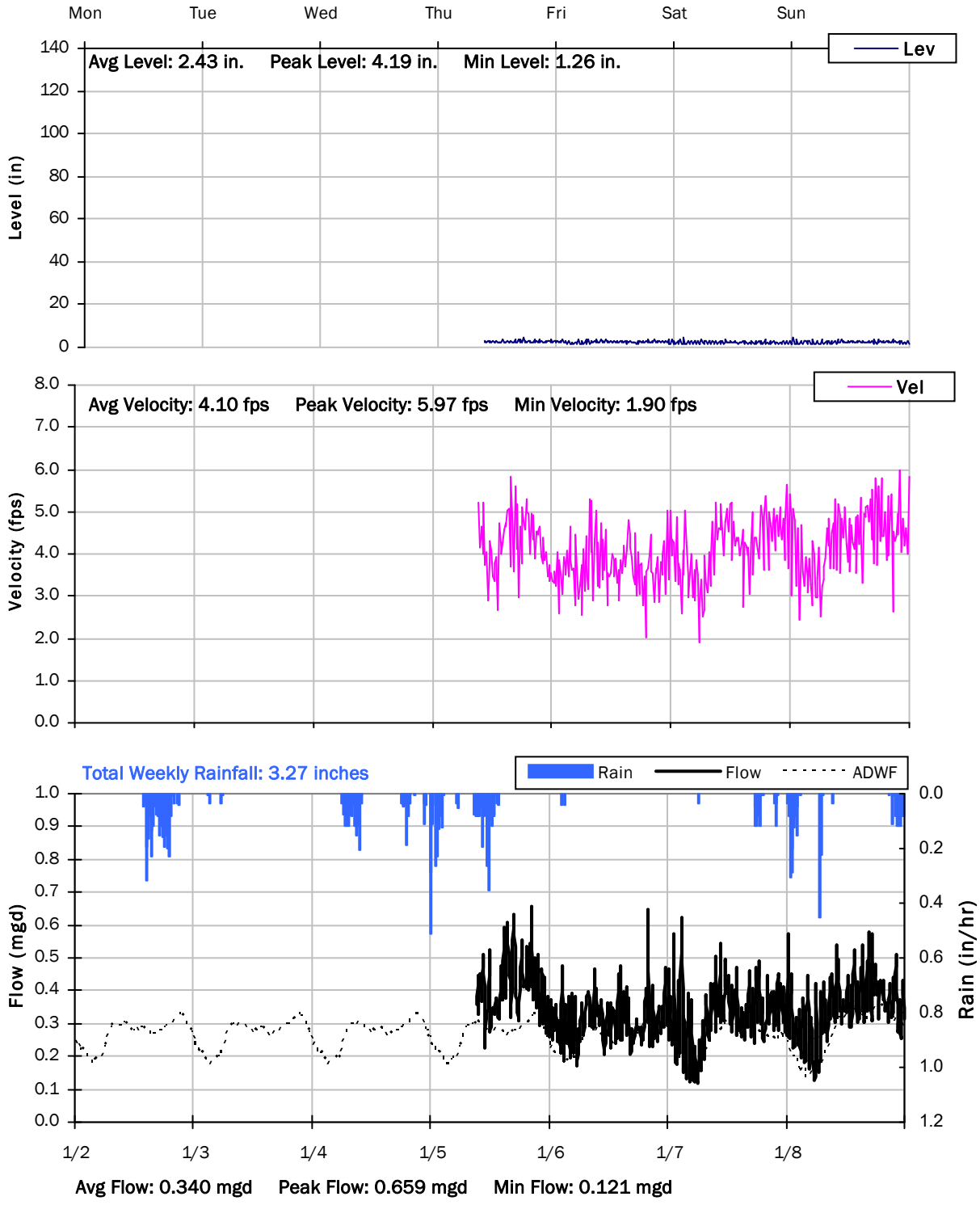
Pipe Diameter:	17.5	*inches*
Peak Measured Level:	112	*inches*
Peak d/D Ratio:	6.41	

Surcharged 94.7 inches over crown

SITE 5

Weekly Level, Velocity and Flow Hydrographs

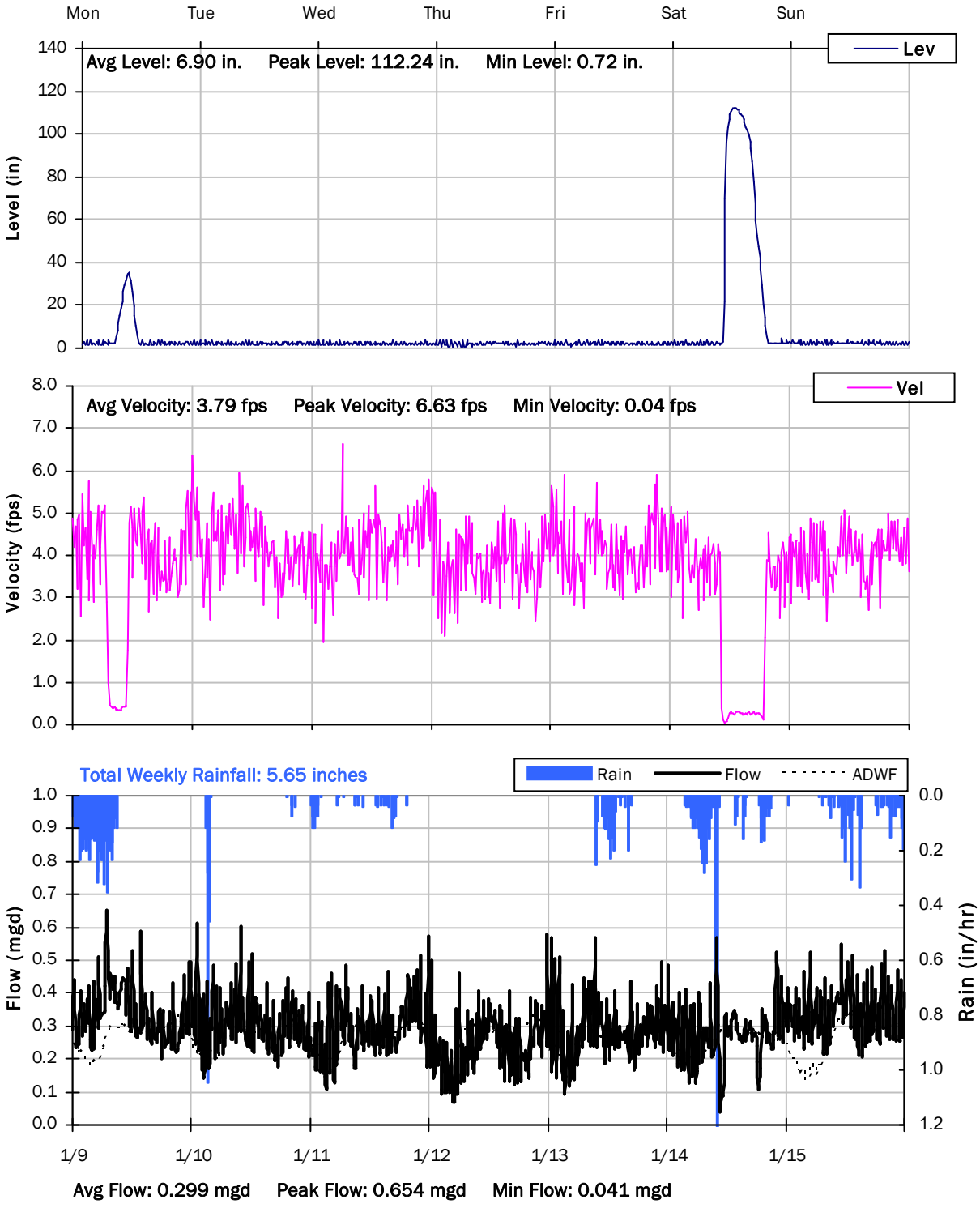
1/2/2023 to 1/9/2023



SITE 5

Weekly Level, Velocity and Flow Hydrographs

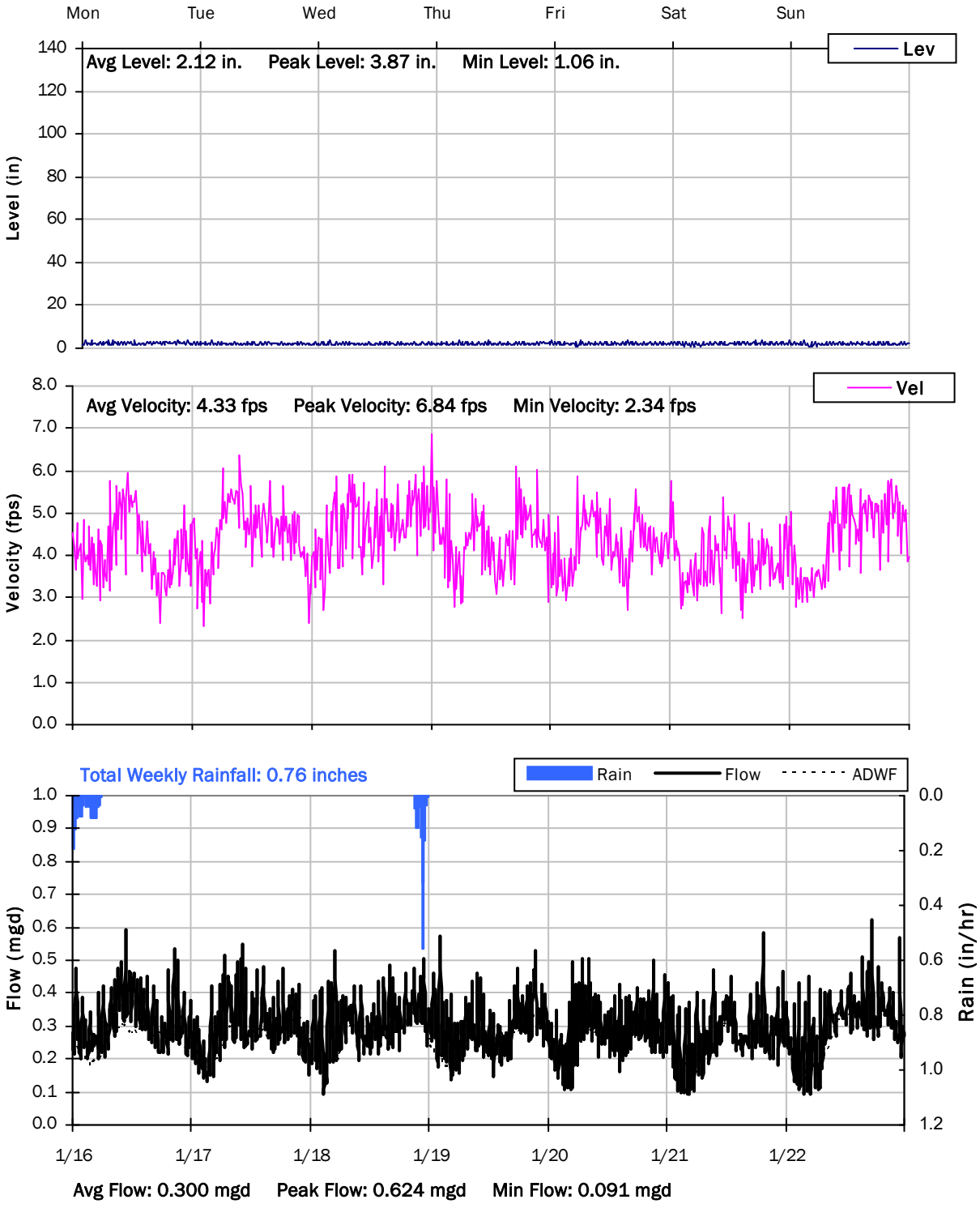
1/9/2023 to 1/16/2023



SITE 5

Weekly Level, Velocity and Flow Hydrographs

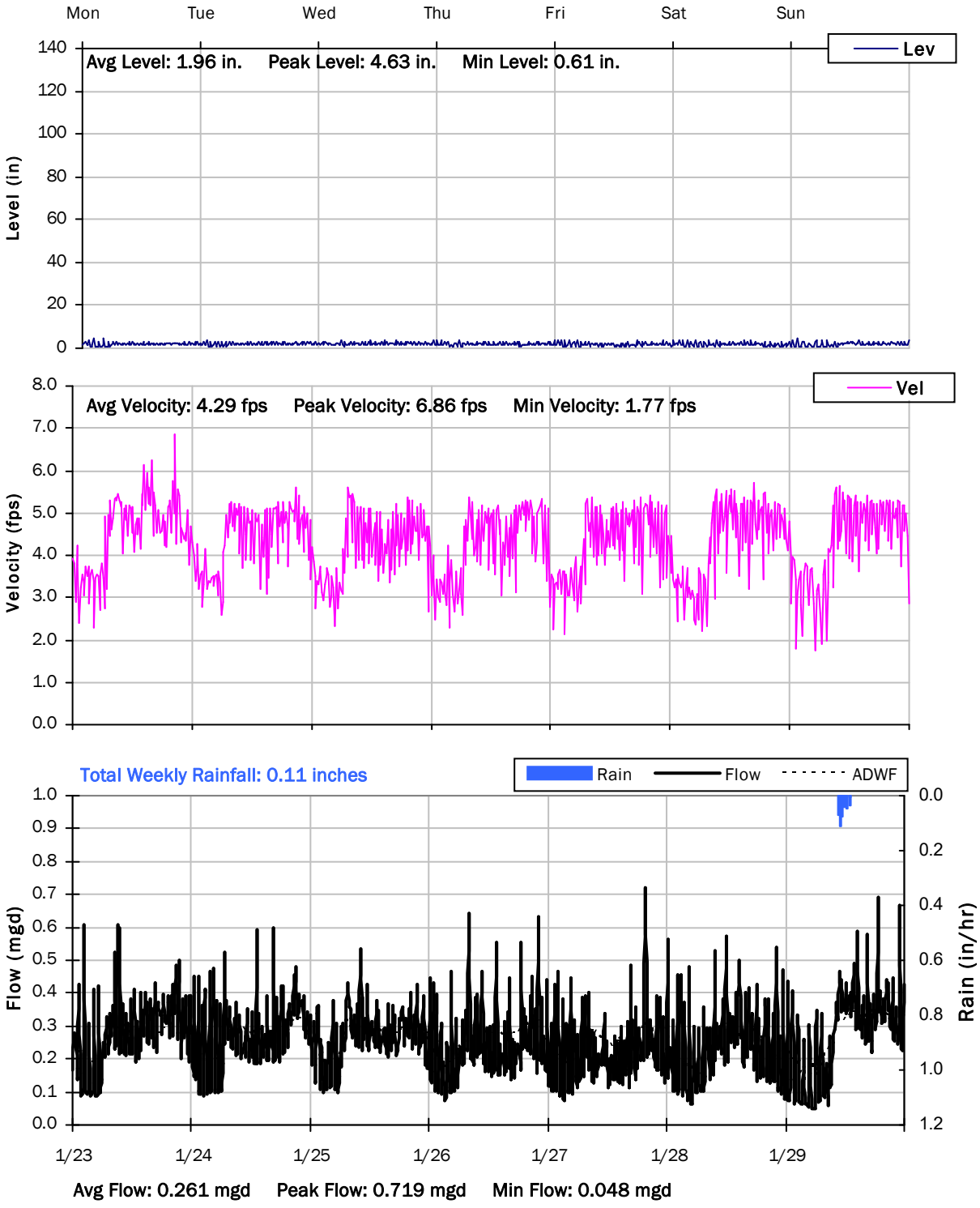
1/16/2023 to 1/23/2023



SITE 5

Weekly Level, Velocity and Flow Hydrographs

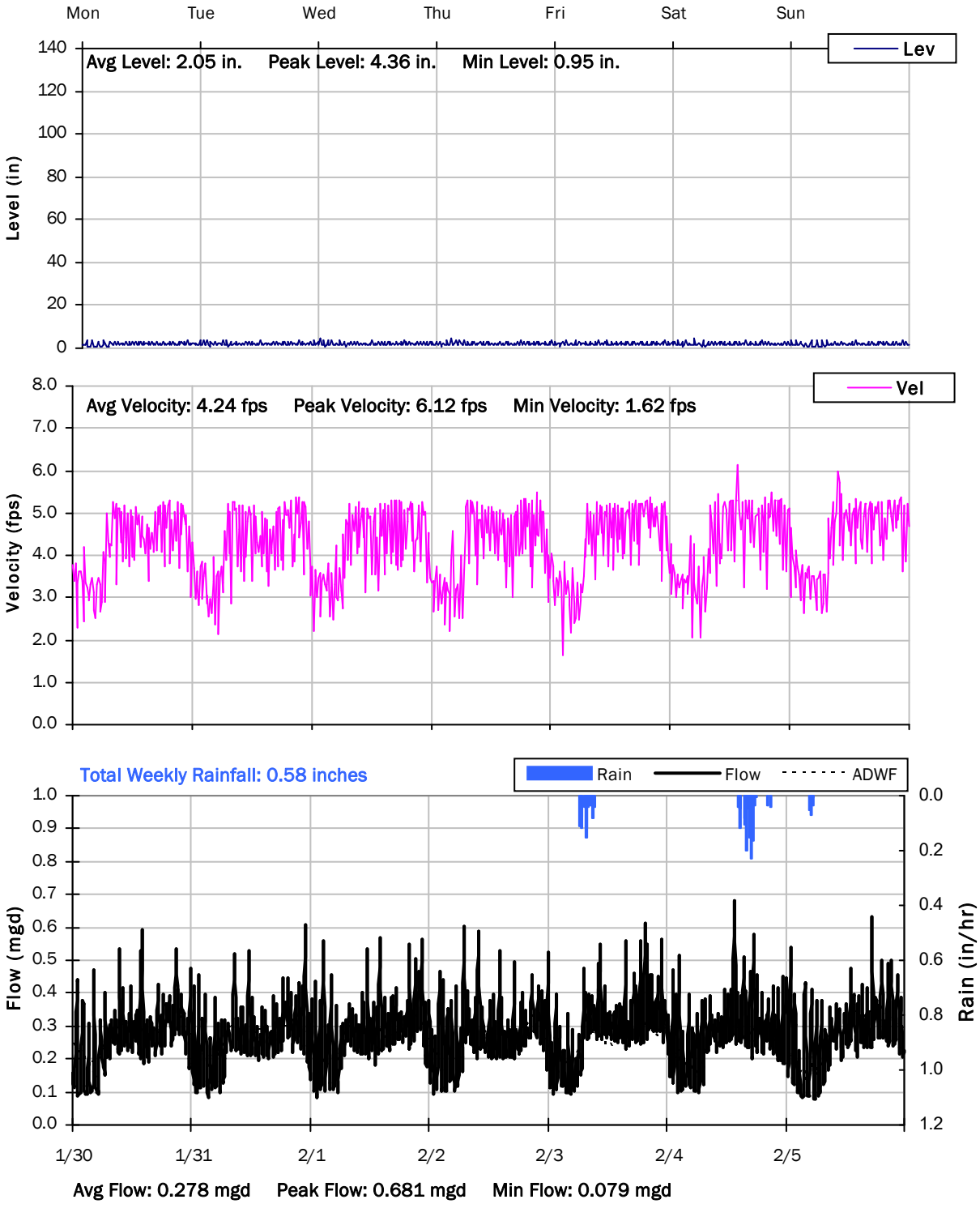
1/23/2023 to 1/30/2023



SITE 5

Weekly Level, Velocity and Flow Hydrographs

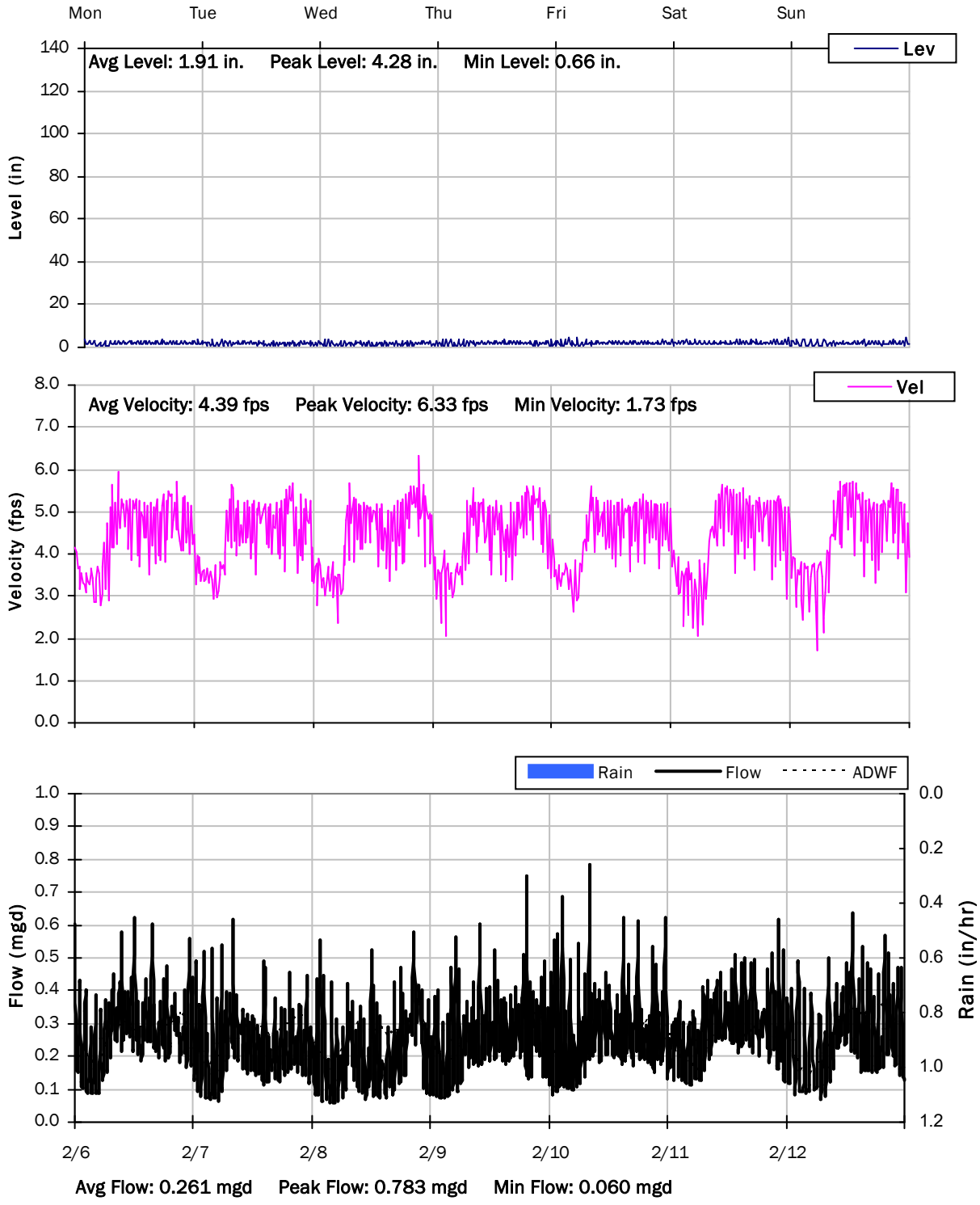
1/30/2023 to 2/6/2023



SITE 5

Weekly Level, Velocity and Flow Hydrographs

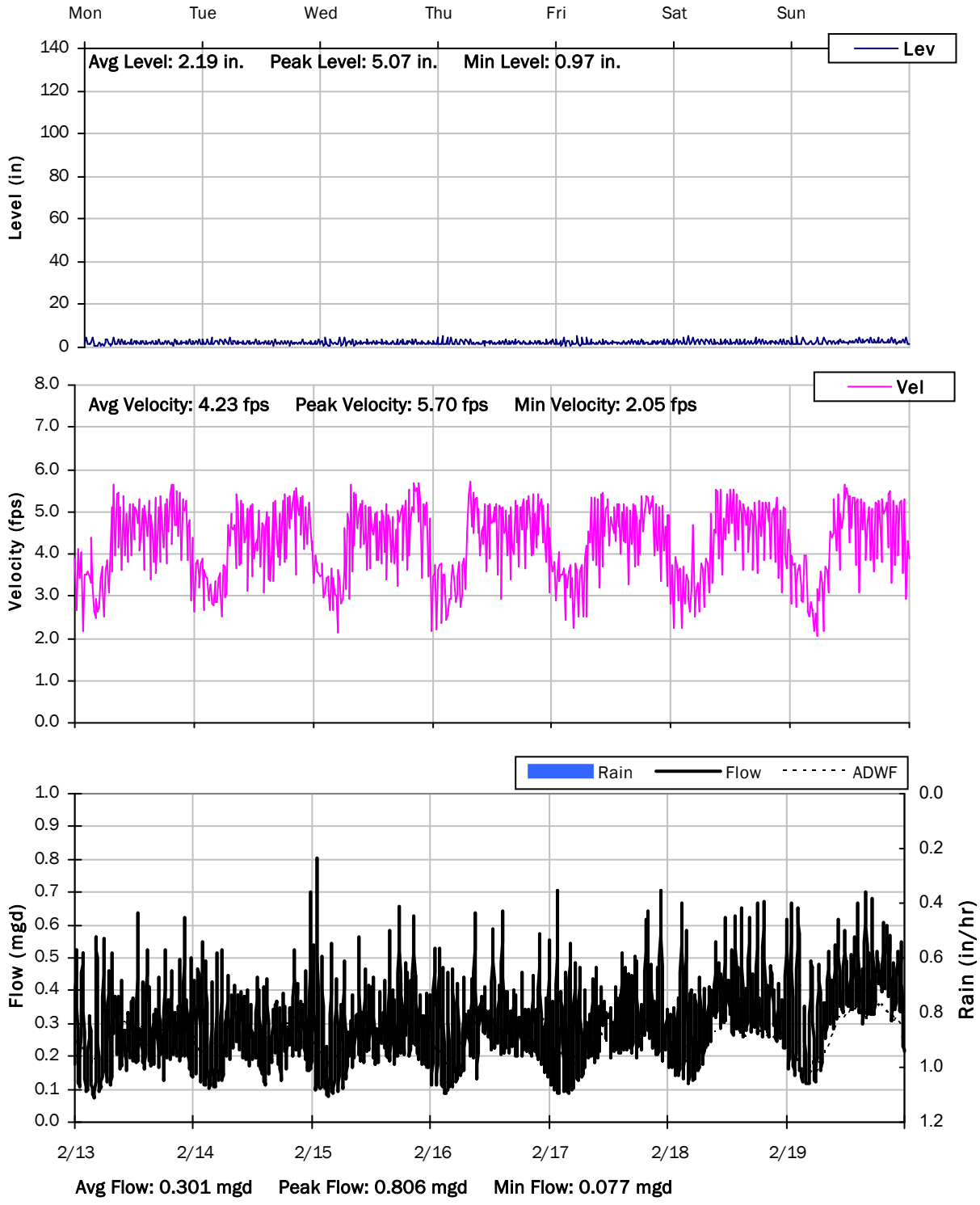
2/6/2023 to 2/13/2023



SITE 5

Weekly Level, Velocity and Flow Hydrographs

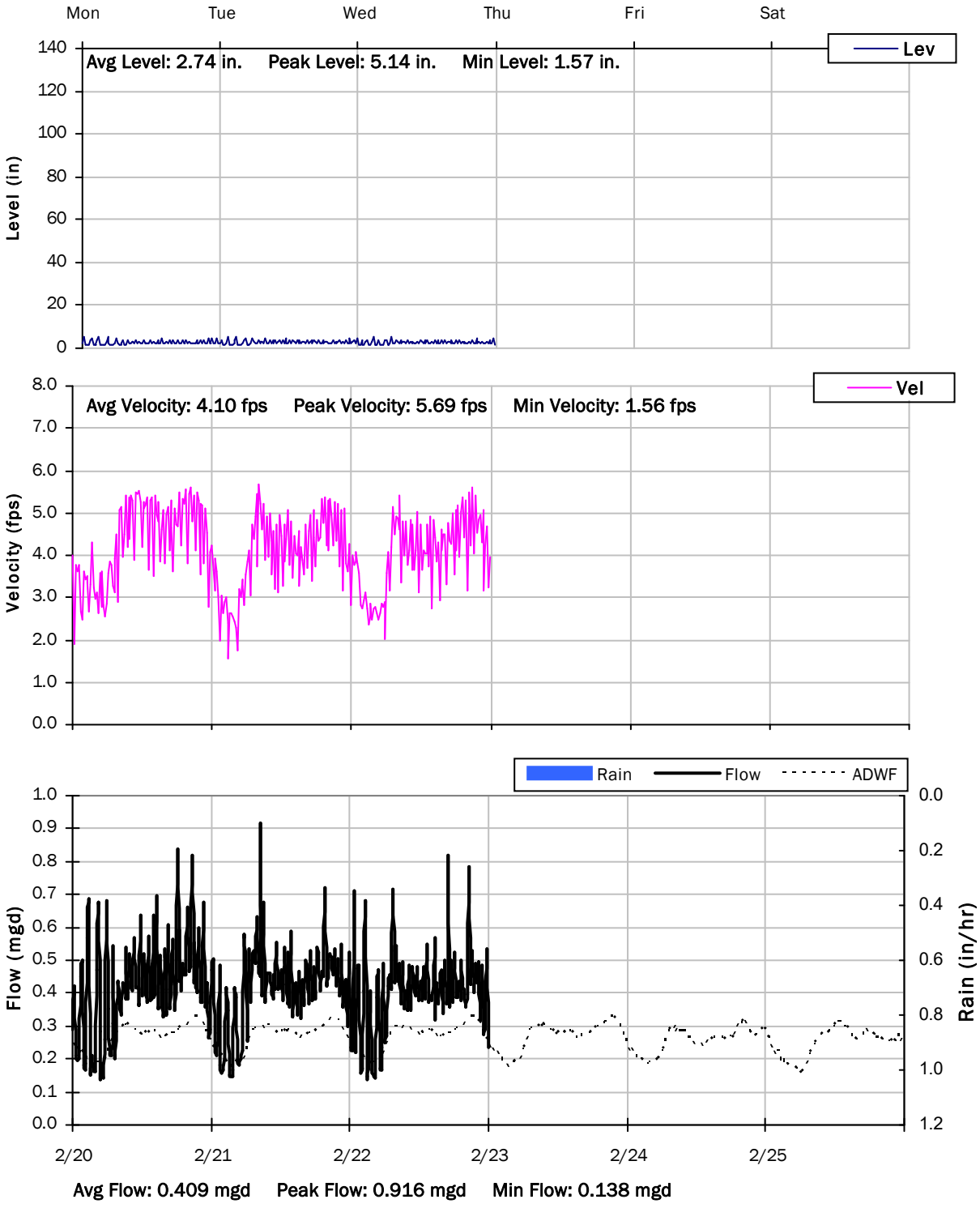
2/13/2023 to 2/20/2023



SITE 5

Weekly Level, Velocity and Flow Hydrographs

2/20/2023 to 2/27/2023



Monitoring Site: Site 6

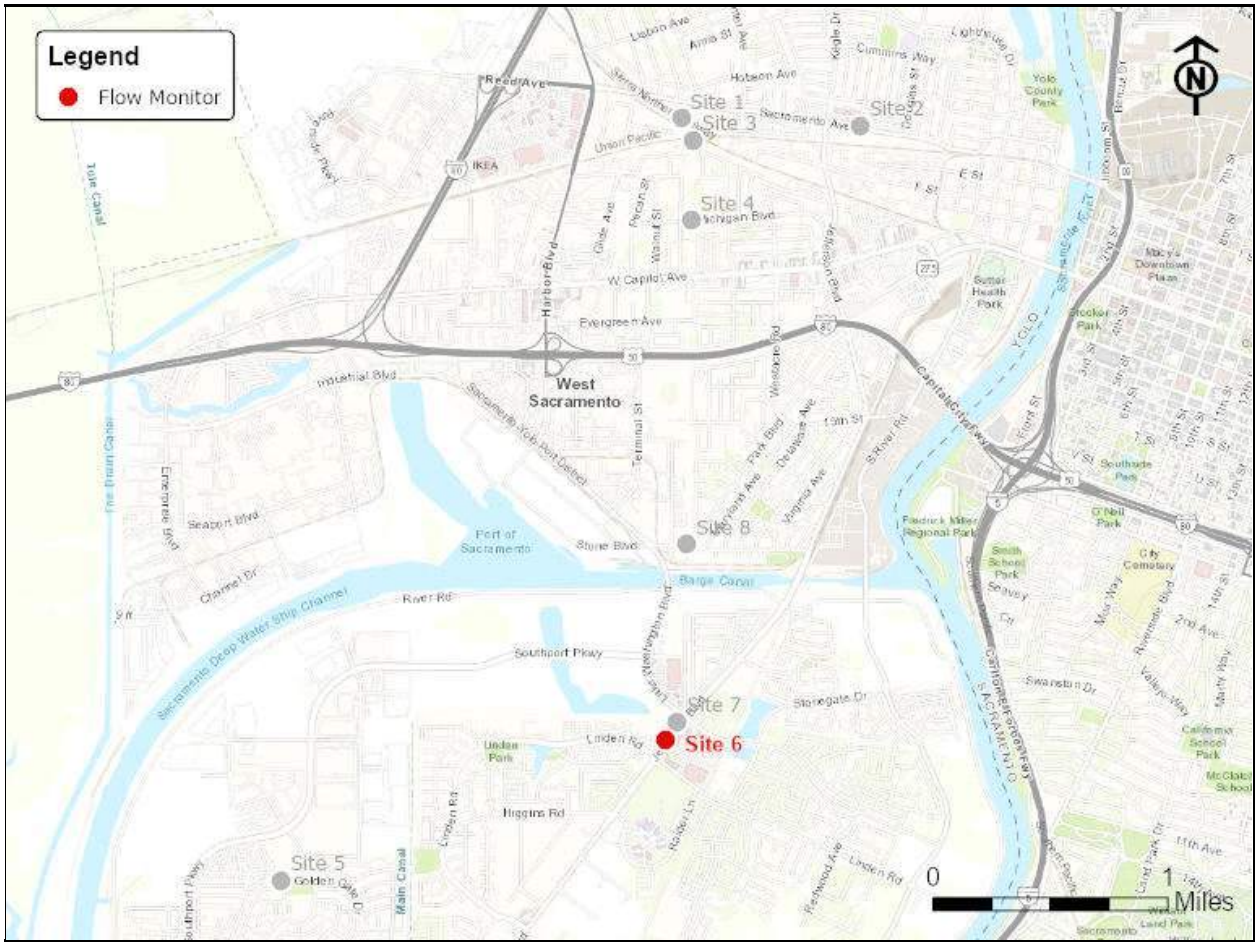
Black & Veatch | West Sacramento, California

Sanitary Sewer Flow Monitoring

January 06, 2023 - February 22, 2023

Location: Jefferson Boulevard Between Linden Road and Lake Washington Boulevard

Data Summary Report

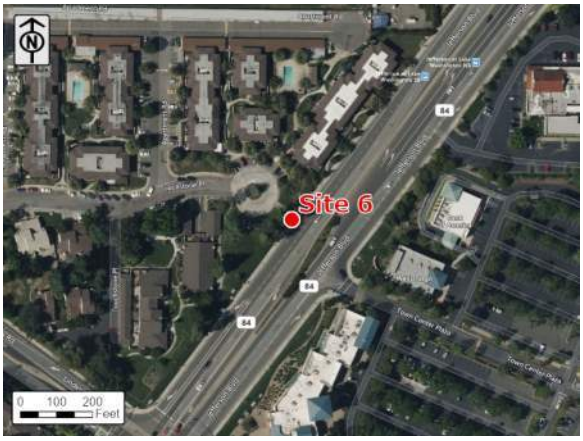


Vicinity Map: Site 6

SITE 6

Site Information MH ID: 643

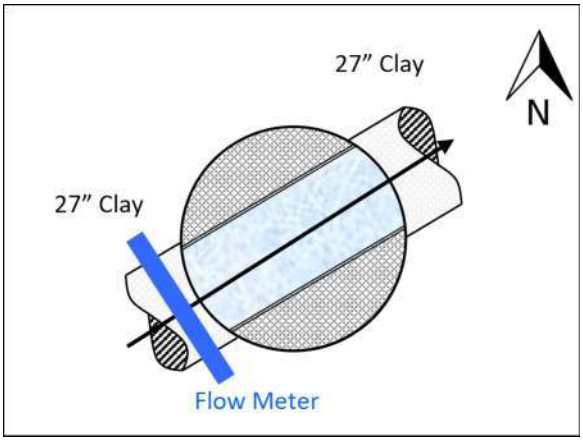
Location:	Jefferson Boulevard Between Linden Road and Lake Washington Boulevard
Coordinates:	121.5390° W, 38.5513° N
Rim Elevation:	15 feet
Expected Pipe Diameter:	27 inches
Measured Pipe Diameter:	27 inches
ADWF:	0.925 mgd
Peak Measured Flow:	4.372 mgd
Sediment:	None



Satellite Map



Sanitary Map



Flow Sketch



Street View



Plan View

SITE 6

Additional Site Photos

Effluent Pipe



Monitored Southwest Influent Pipe

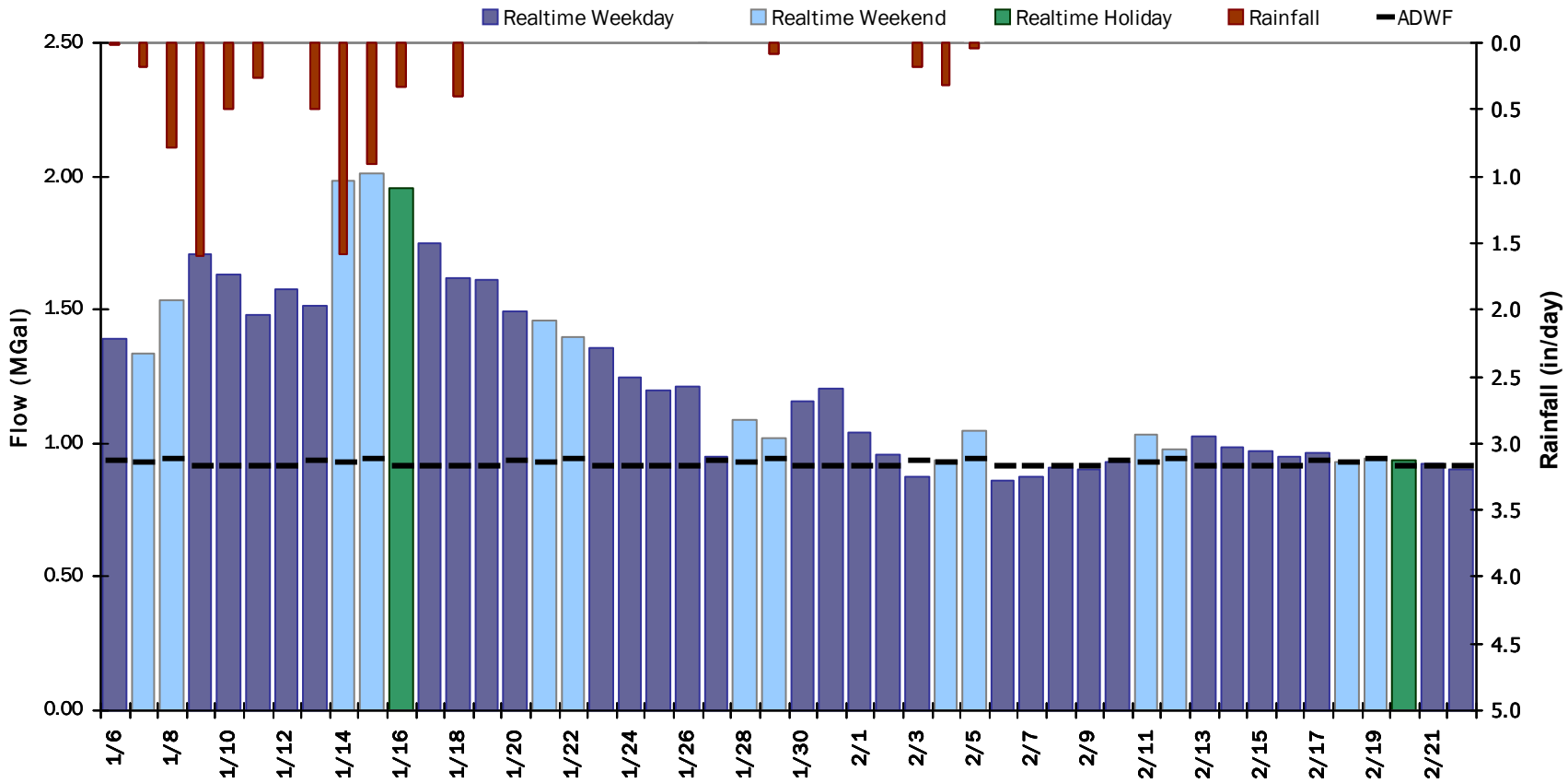


SITE 6

Period Flow Summary: Daily Flow Totals

Avg Daily Flow: 1.230 MGal Peak Daily Flow: 2.008 MGal Min Daily Flow: 0.862 MGal

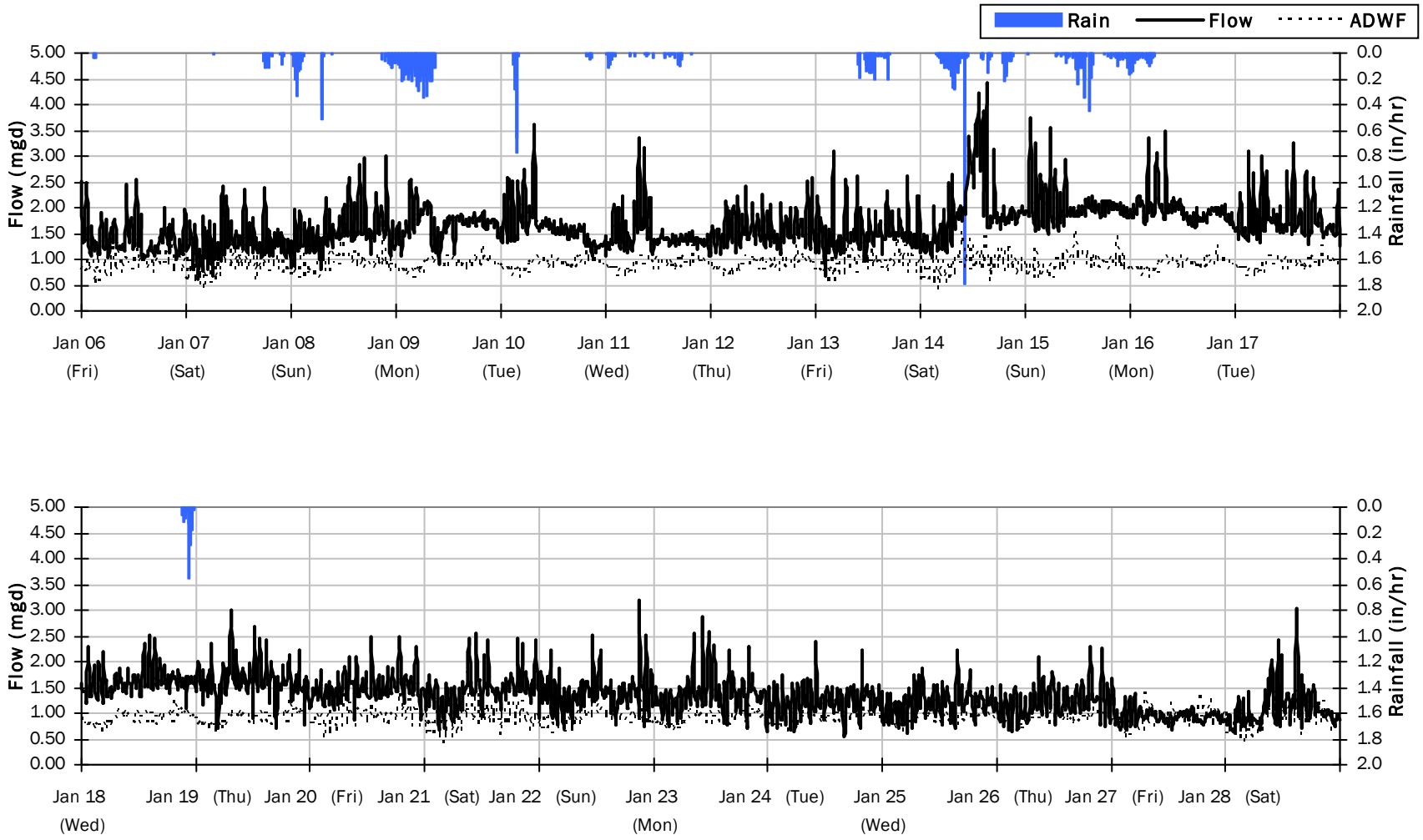
Total Rainfall: 8.15 inches



SITE 6

Flow Summary: 1/6/2023 to 1/28/2023

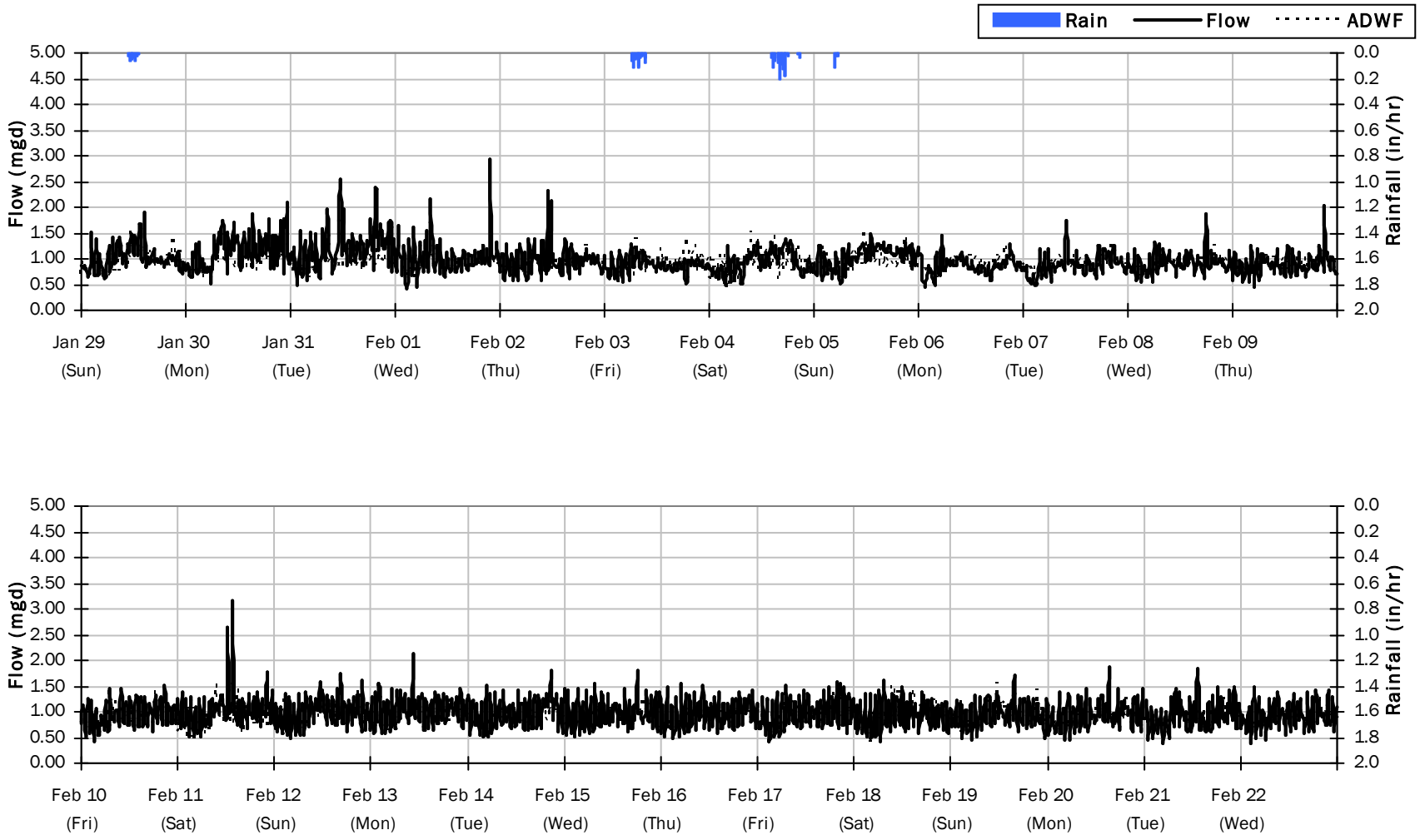
Period Rainfall: 7.04 inches Period Avg Flow: 1.500 mgd Period Peak Flow: 4.372 mgd Period Min Flow: 0.582 mgd



SITE 6

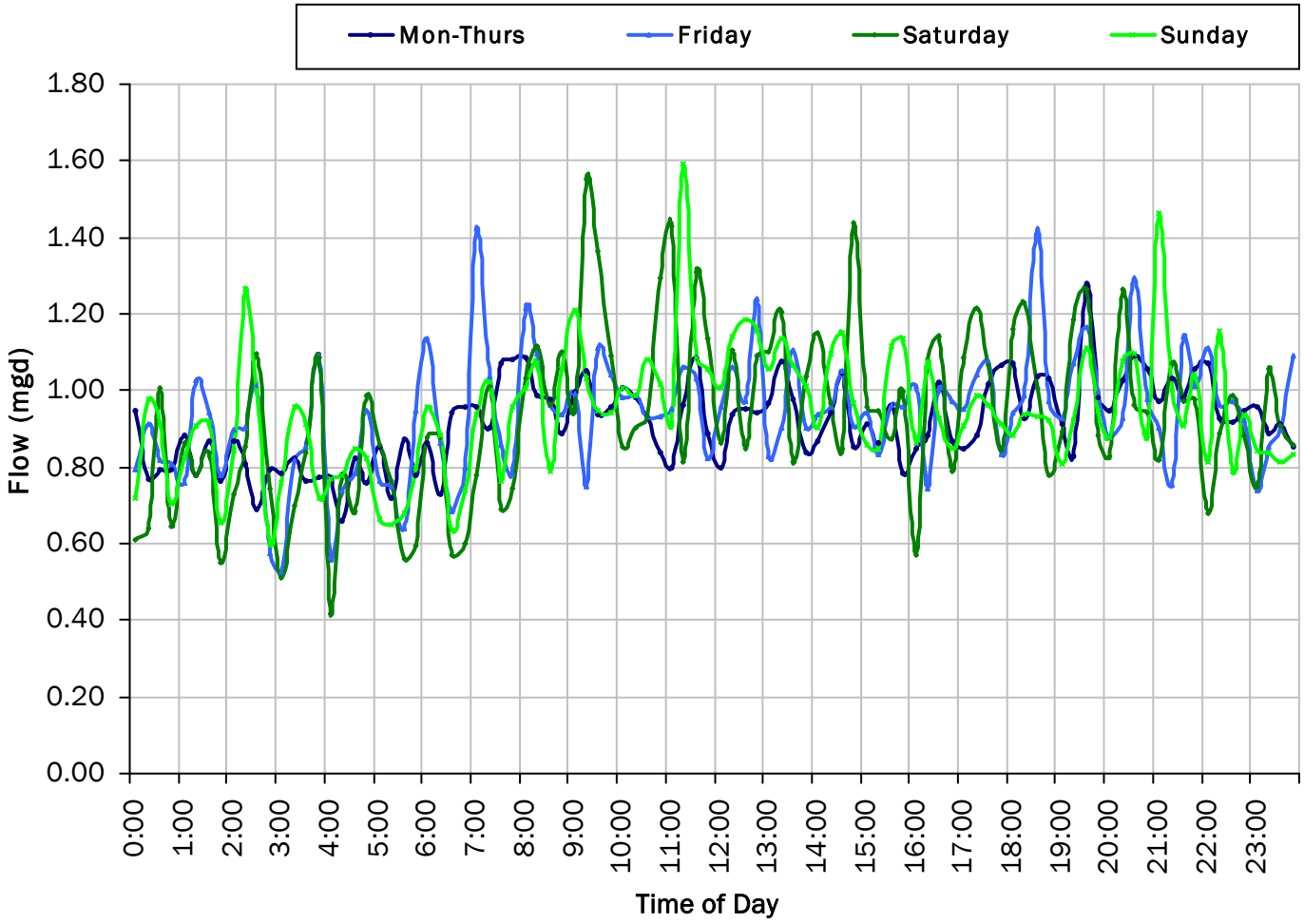
Flow Summary: 1/29/2023 to 2/22/2023

Period Rainfall: 0.63 inches Period Avg Flow: 0.970 mgd Period Peak Flow: 3.161 mgd Period Min Flow: 0.386 mgd



SITE 6

Average Dry Weather Flow Hydrographs



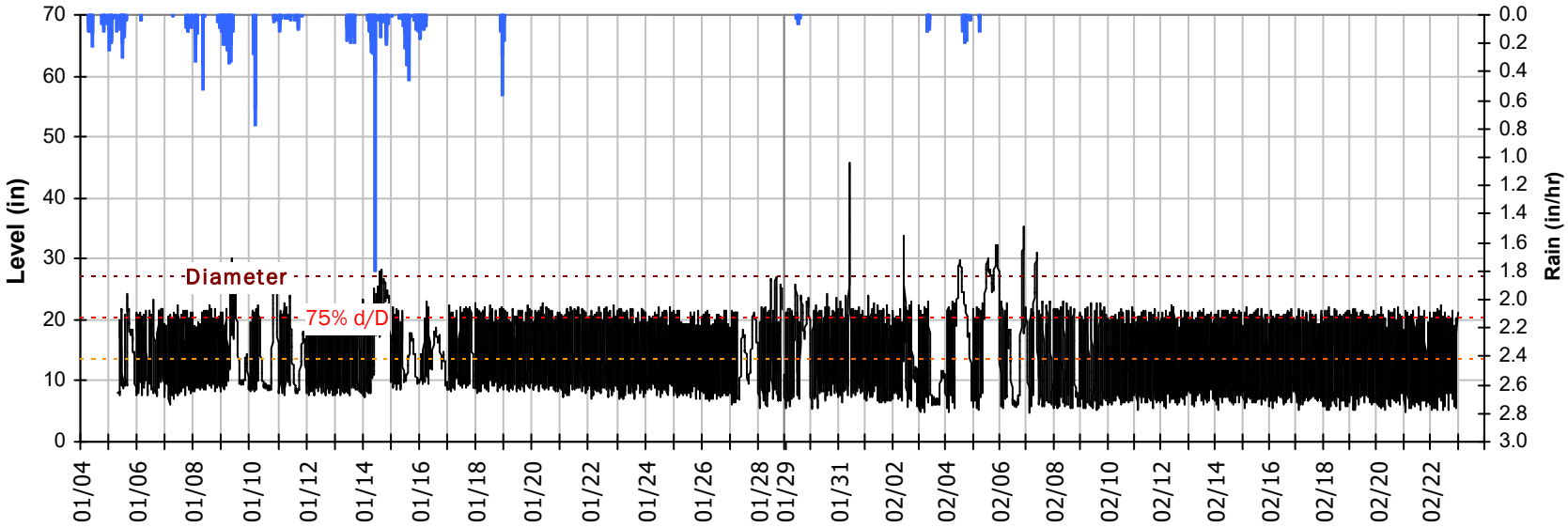
ADWF:

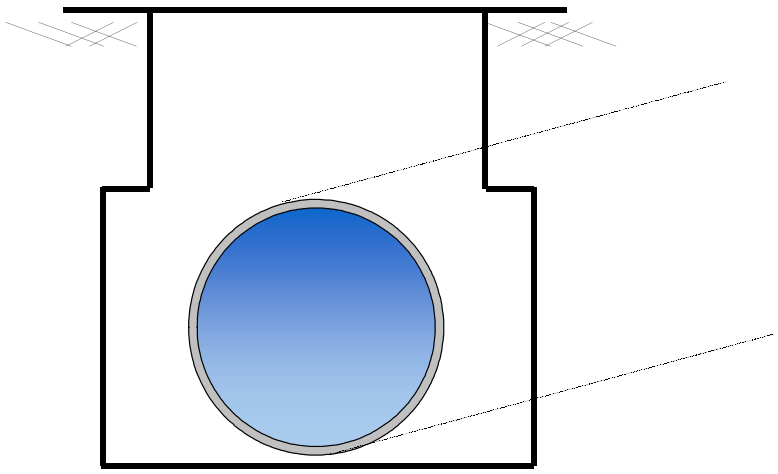
0.925 *mgd*

SITE 6

Site Capacity and Surcharge Summary

Realtime Flow Levels with Rainfall Data over Peak Level Period





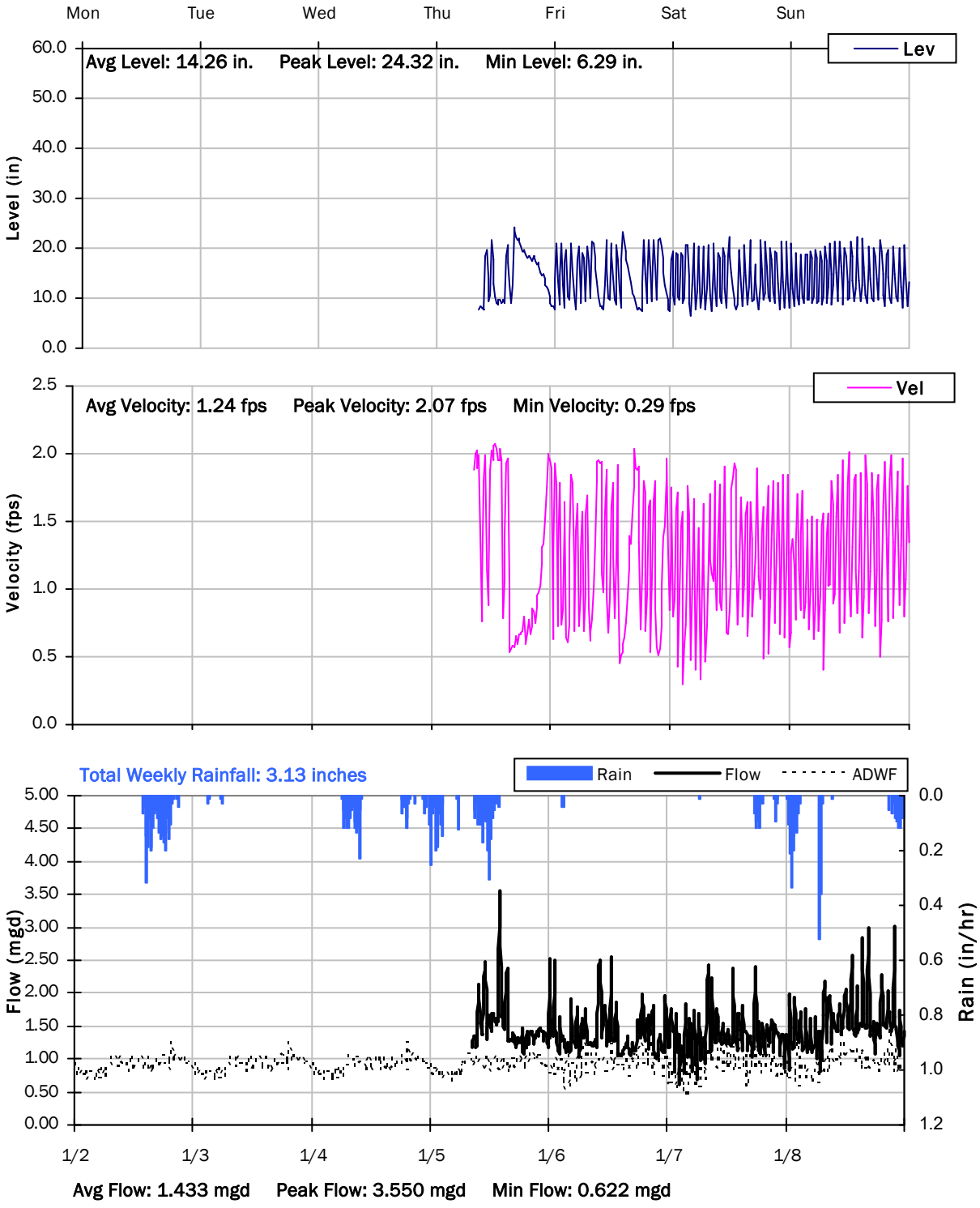
Pipe Diameter:	27	*inches*
Peak Measured Level:	45.9	*inches*
Peak d/D Ratio:	1.70	

Surcharged 18.9 inches over crown

SITE 6

Weekly Level, Velocity and Flow Hydrographs

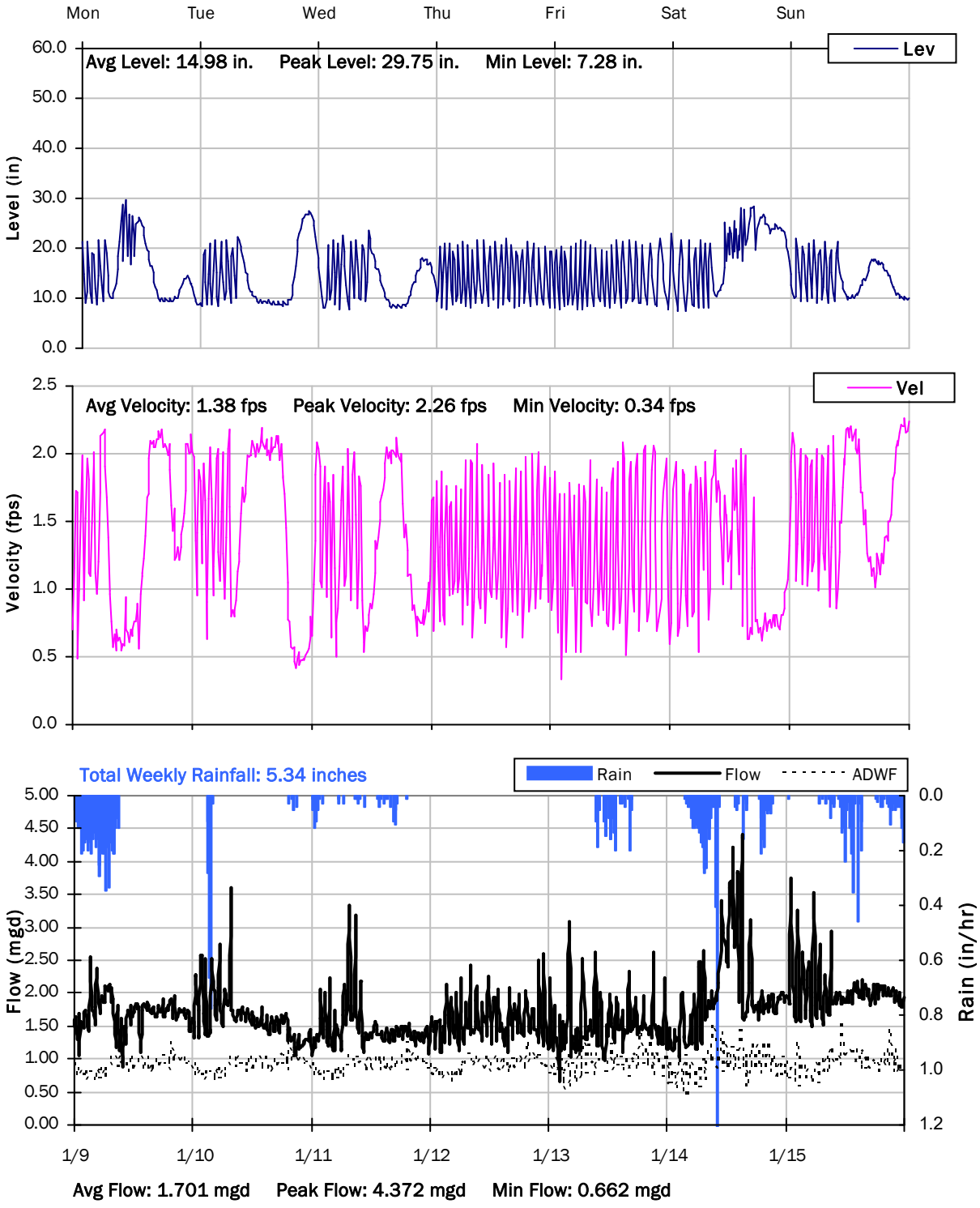
1/2/2023 to 1/9/2023



SITE 6

Weekly Level, Velocity and Flow Hydrographs

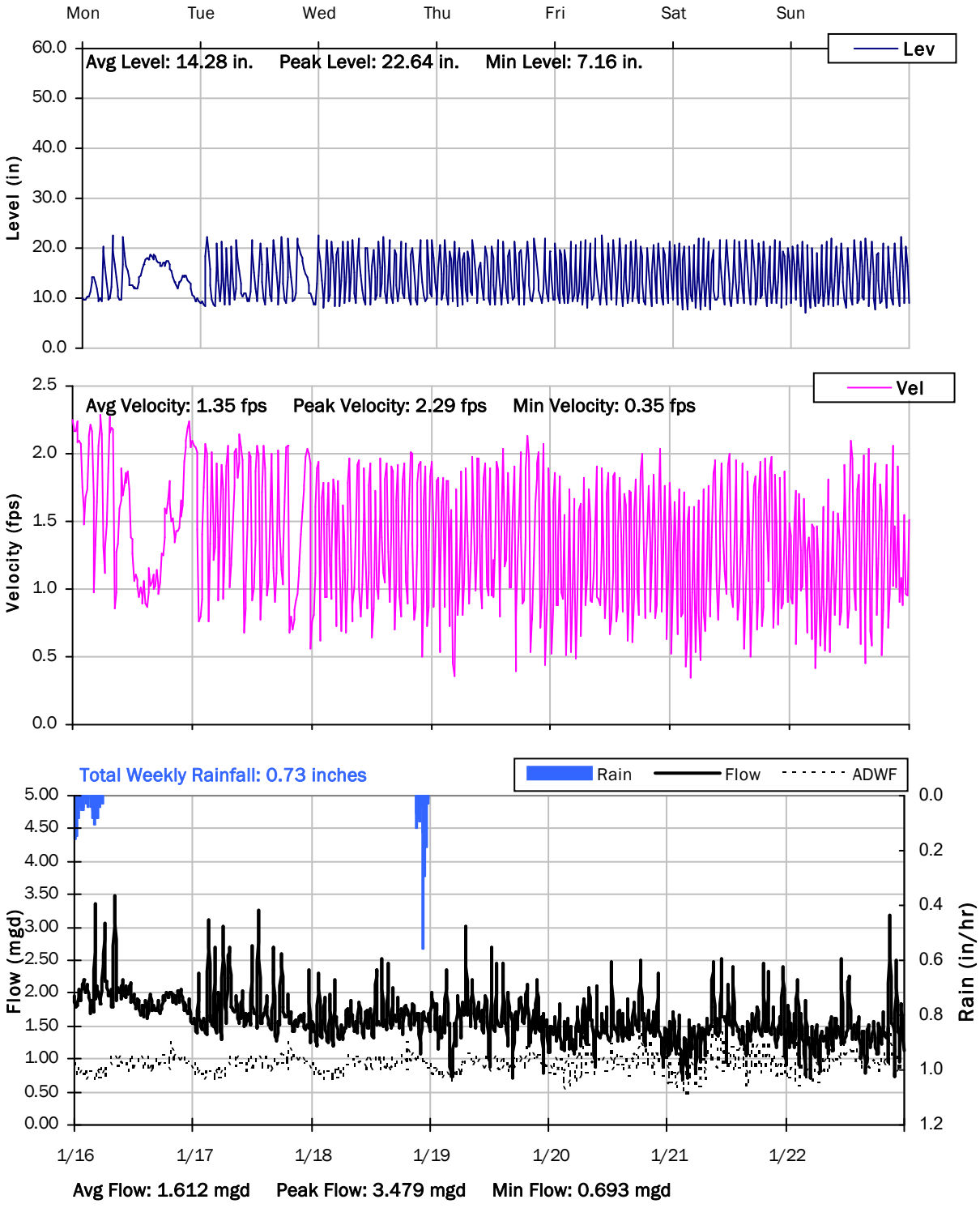
1/9/2023 to 1/16/2023



SITE 6

Weekly Level, Velocity and Flow Hydrographs

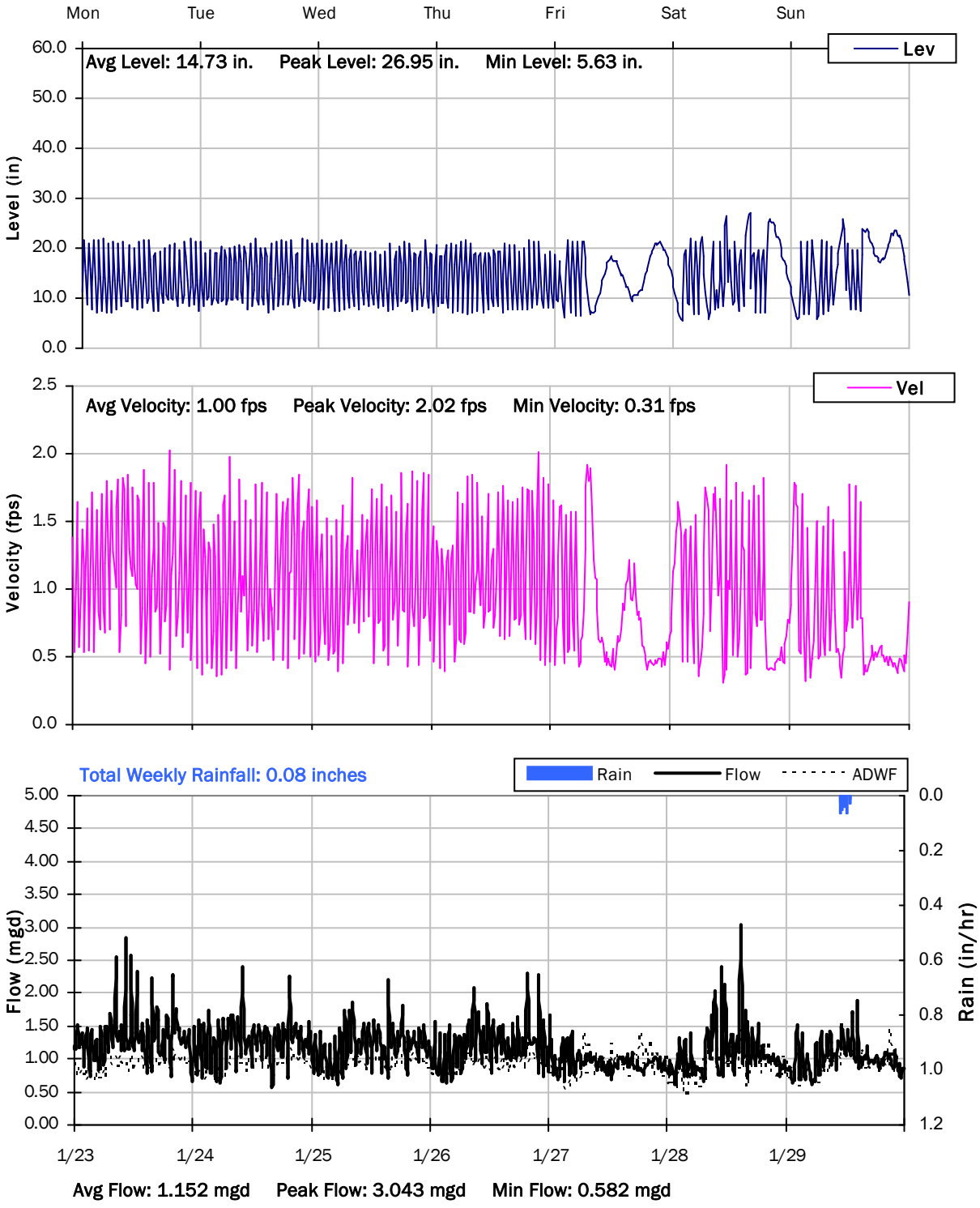
1/16/2023 to 1/23/2023



SITE 6

Weekly Level, Velocity and Flow Hydrographs

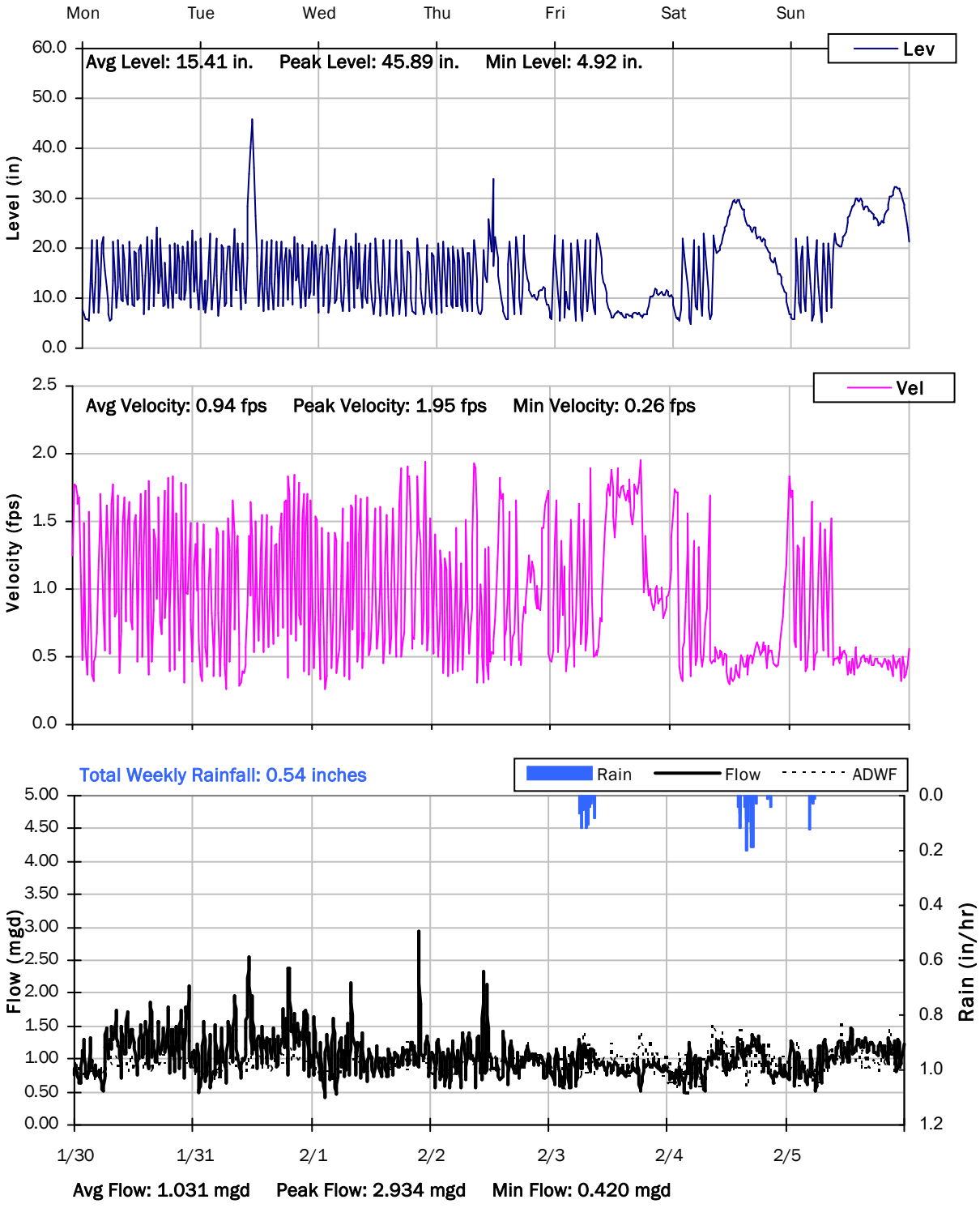
1/23/2023 to 1/30/2023



SITE 6

Weekly Level, Velocity and Flow Hydrographs

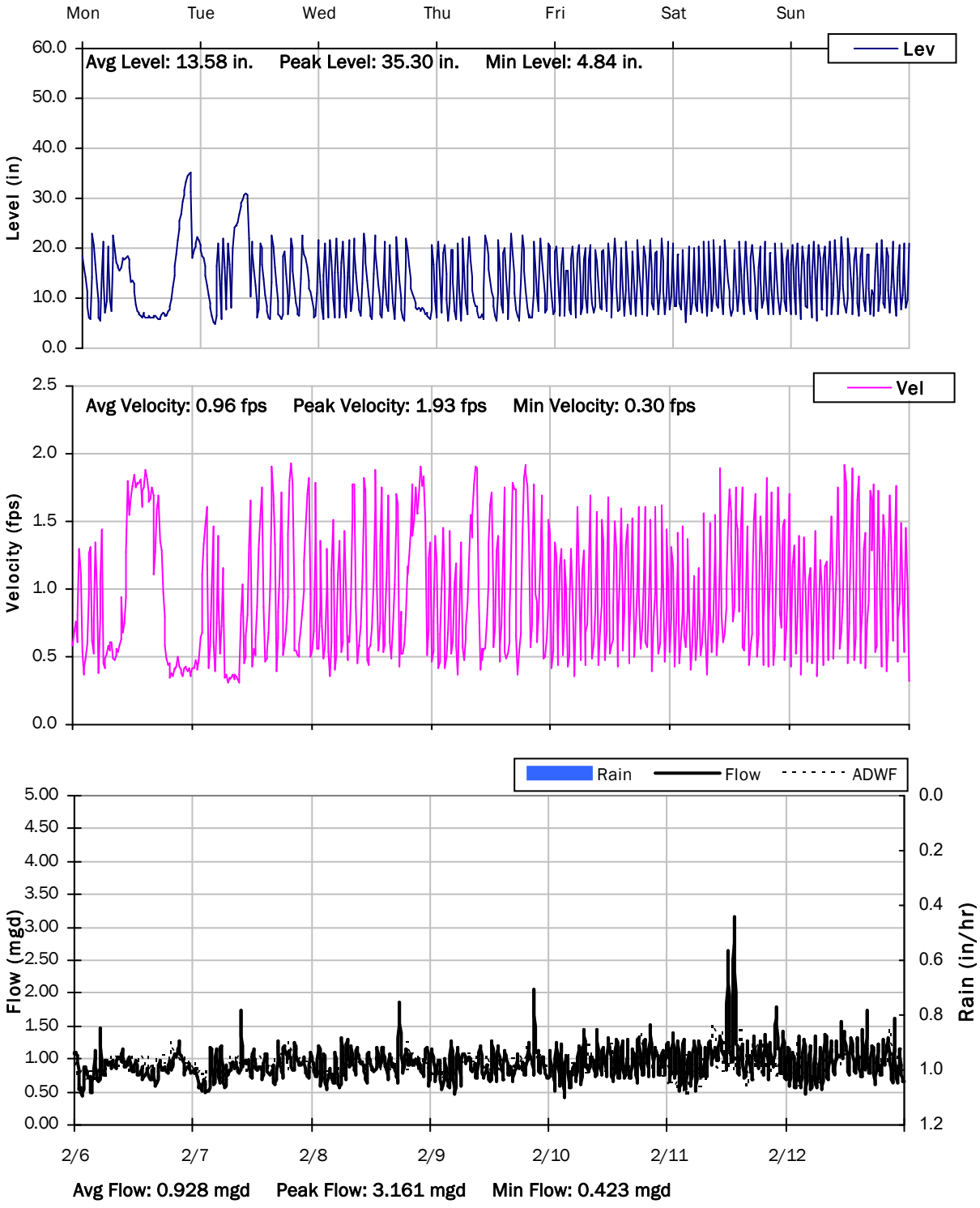
1/30/2023 to 2/6/2023



SITE 6

Weekly Level, Velocity and Flow Hydrographs

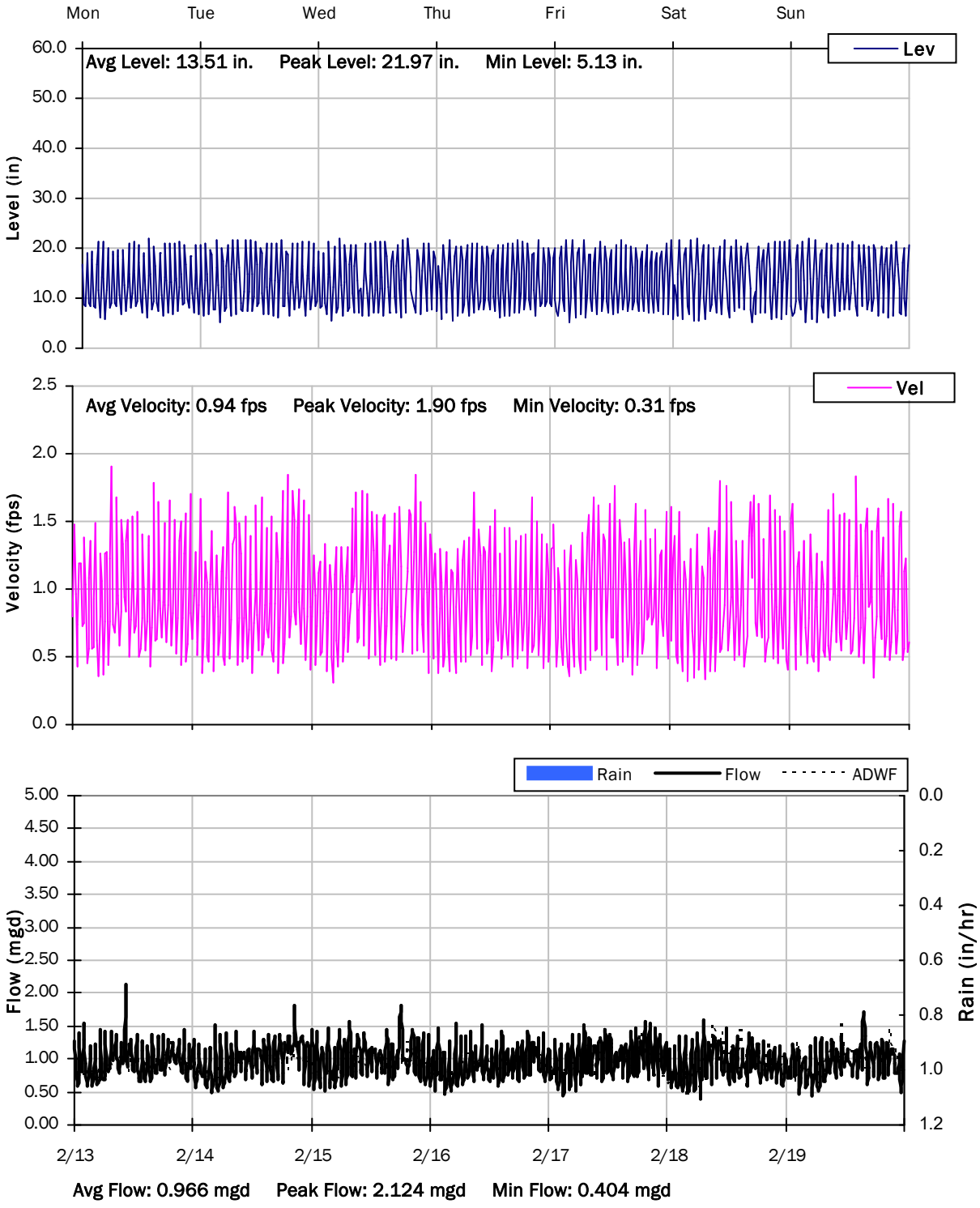
2/6/2023 to 2/13/2023



SITE 6

Weekly Level, Velocity and Flow Hydrographs

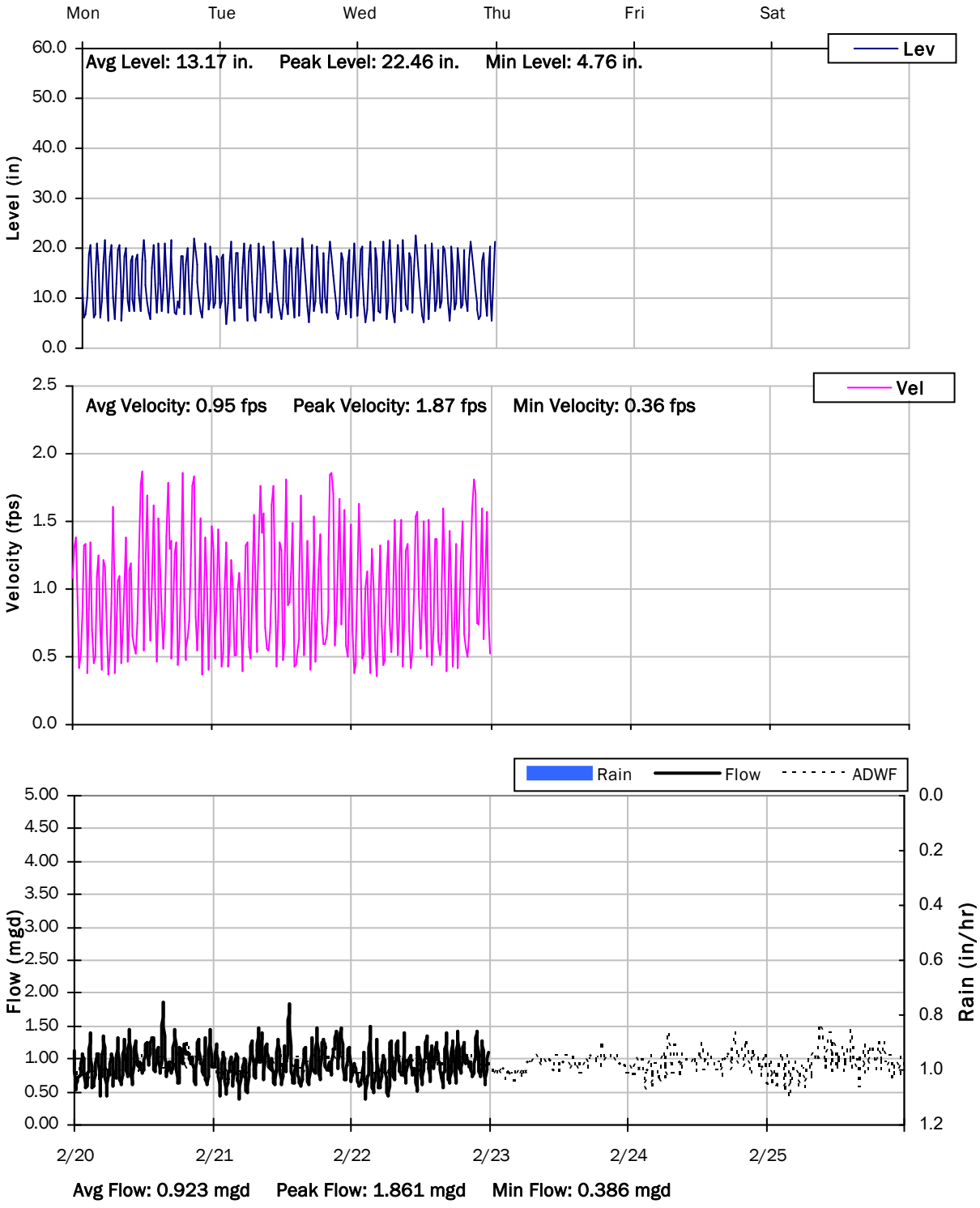
2/13/2023 to 2/20/2023



SITE 6

Weekly Level, Velocity and Flow Hydrographs

2/20/2023 to 2/27/2023



Monitoring Site: Site 7

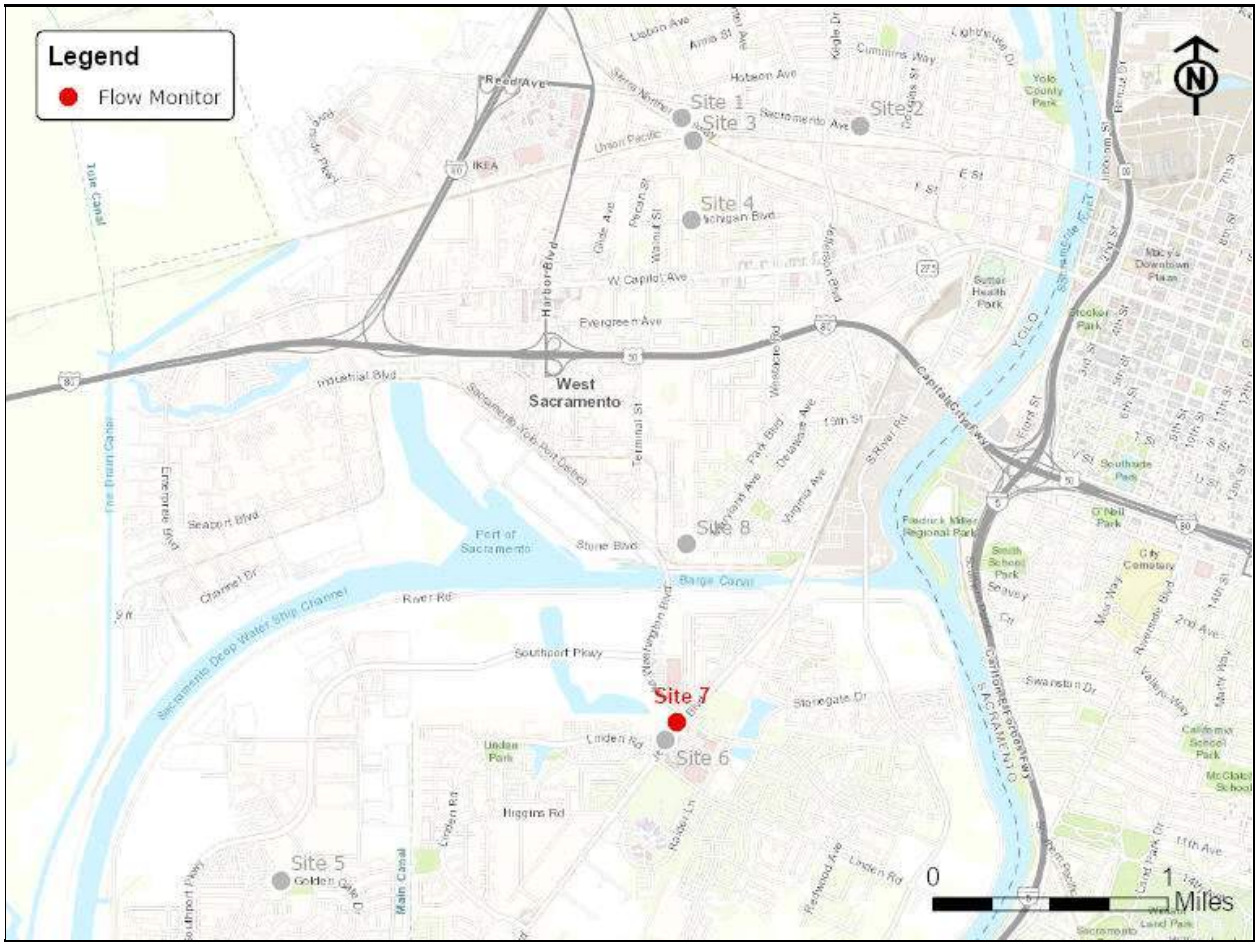
Black & Veatch | West Sacramento, California

Sanitary Sewer Flow Monitoring

January 06, 2023 - February 22, 2023

Location: Intersection of Lake washington Blvd and Jefferson Blvd.

Data Summary Report



Vicinity Map: Site 7

SITE 7

Site Information MH ID: 645

Location: Intersection of Lake washington Blvd and Jefferson Blvd.

Coordinates: 121.5370° W, 38.5524° N

Rim Elevation: 11 feet

Expected Pipe Diameter: 21 inches

Measured Pipe Diameter: 21 inches

ADWF: 0.253 mgd

Peak Measured Flow: 2.308 mgd

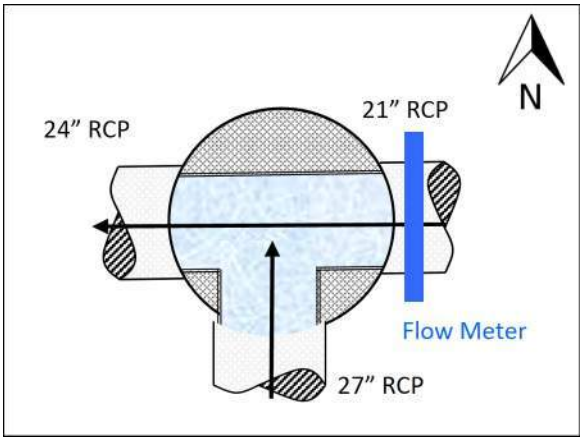
Sediment: None



Satellite Map



Sanitary Map



Flow Sketch



Street View



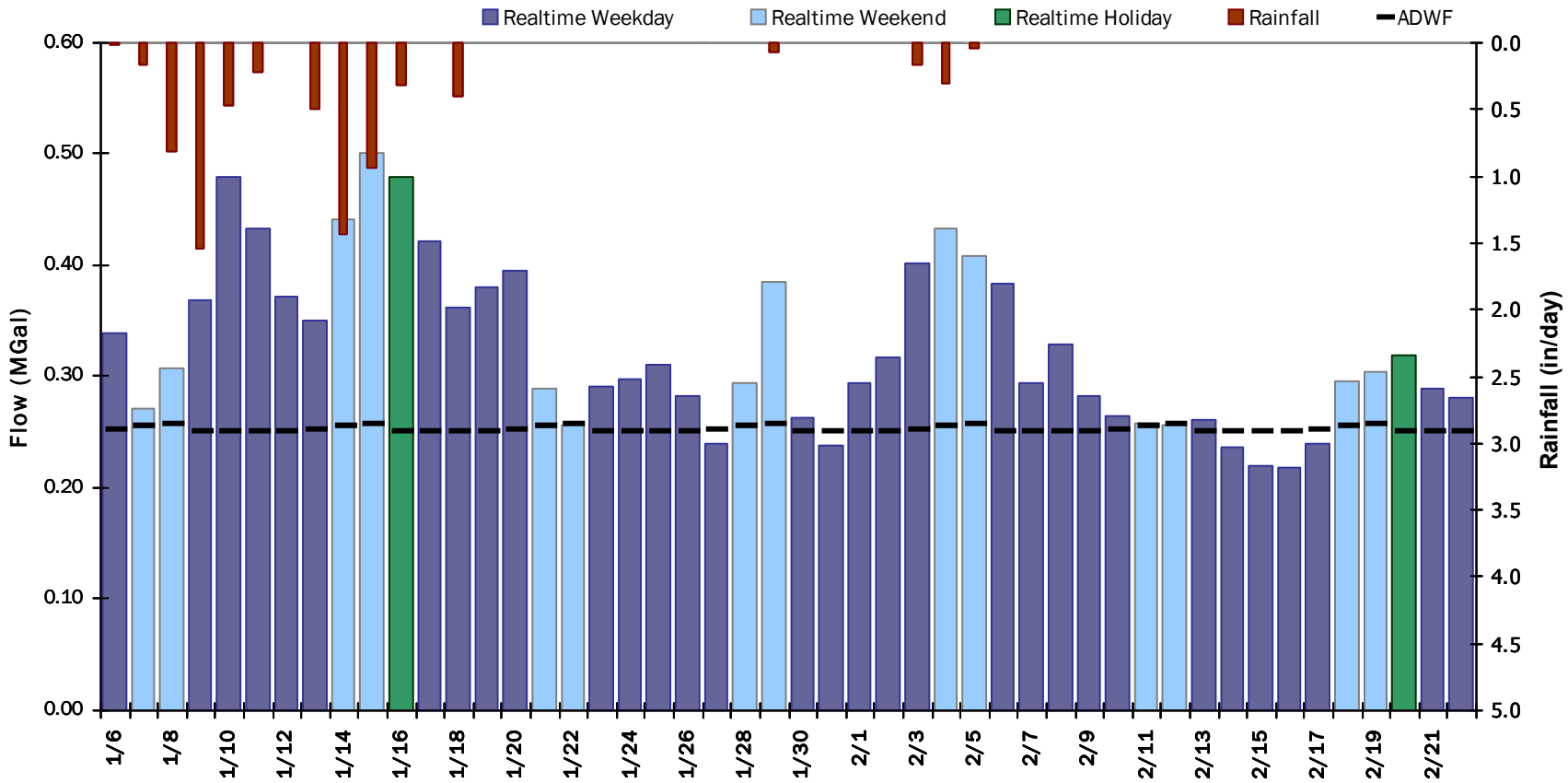
Plan View

SITE 7

Period Flow Summary: Daily Flow Totals

Avg Daily Flow: 0.328 MGal Peak Daily Flow: 0.500 MGal Min Daily Flow: 0.219 MGal

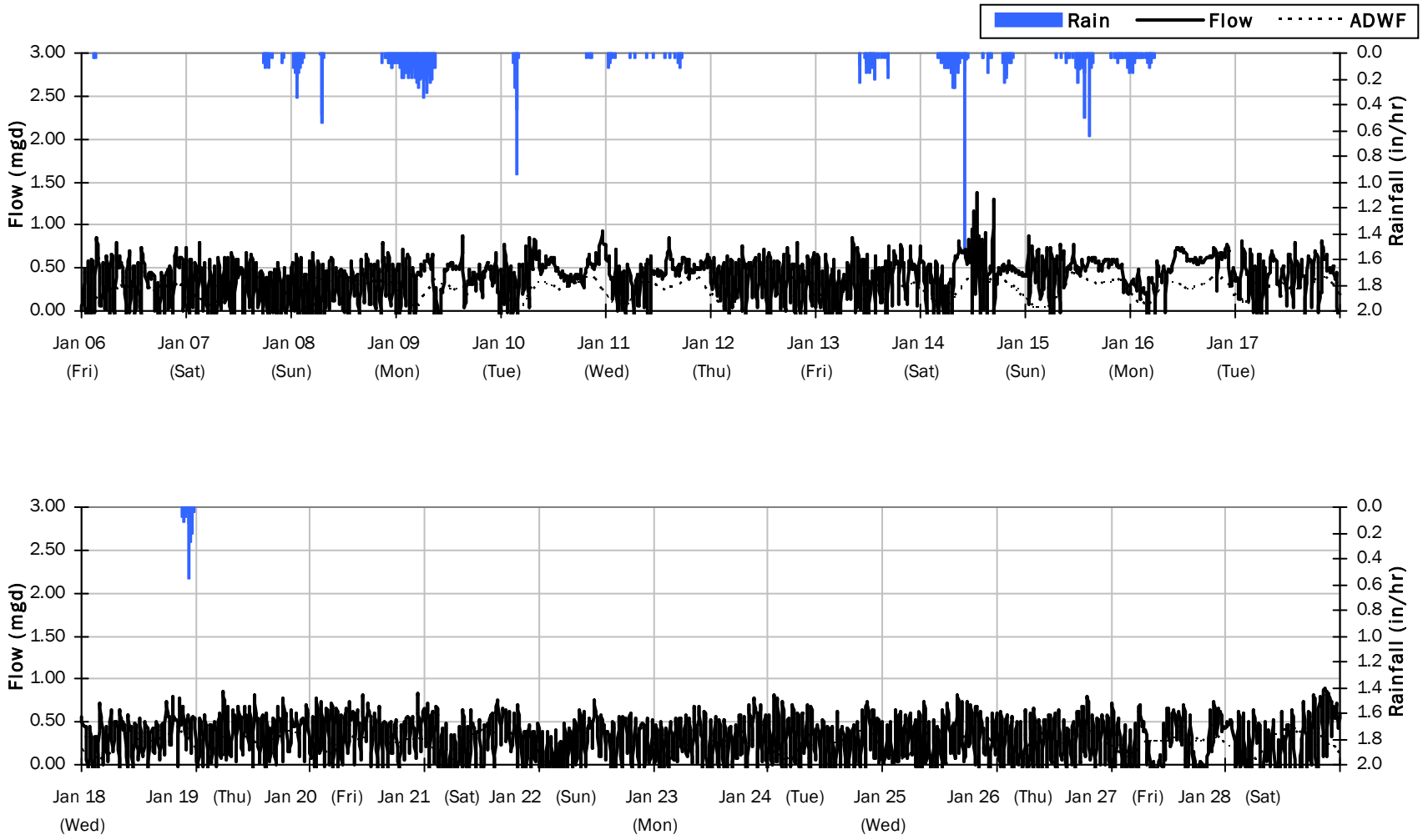
Total Rainfall: 7.89 inches



SITE 7

Flow Summary: 1/6/2023 to 1/28/2023

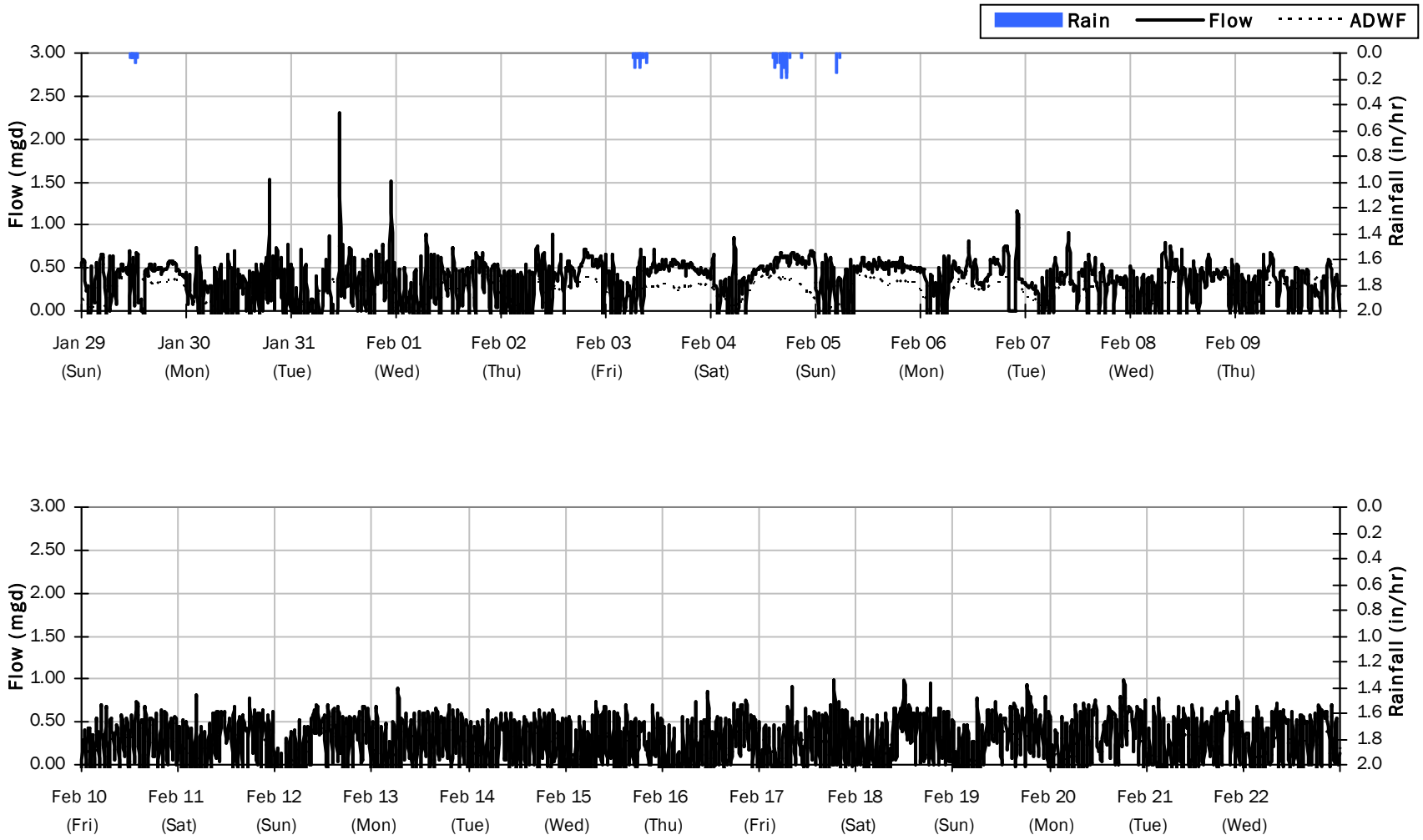
Period Rainfall: 6.82 inches Period Avg Flow: 0.355 mgd Period Peak Flow: 1.375 mgd Period Min Flow: -0.530 mgd



SITE 7

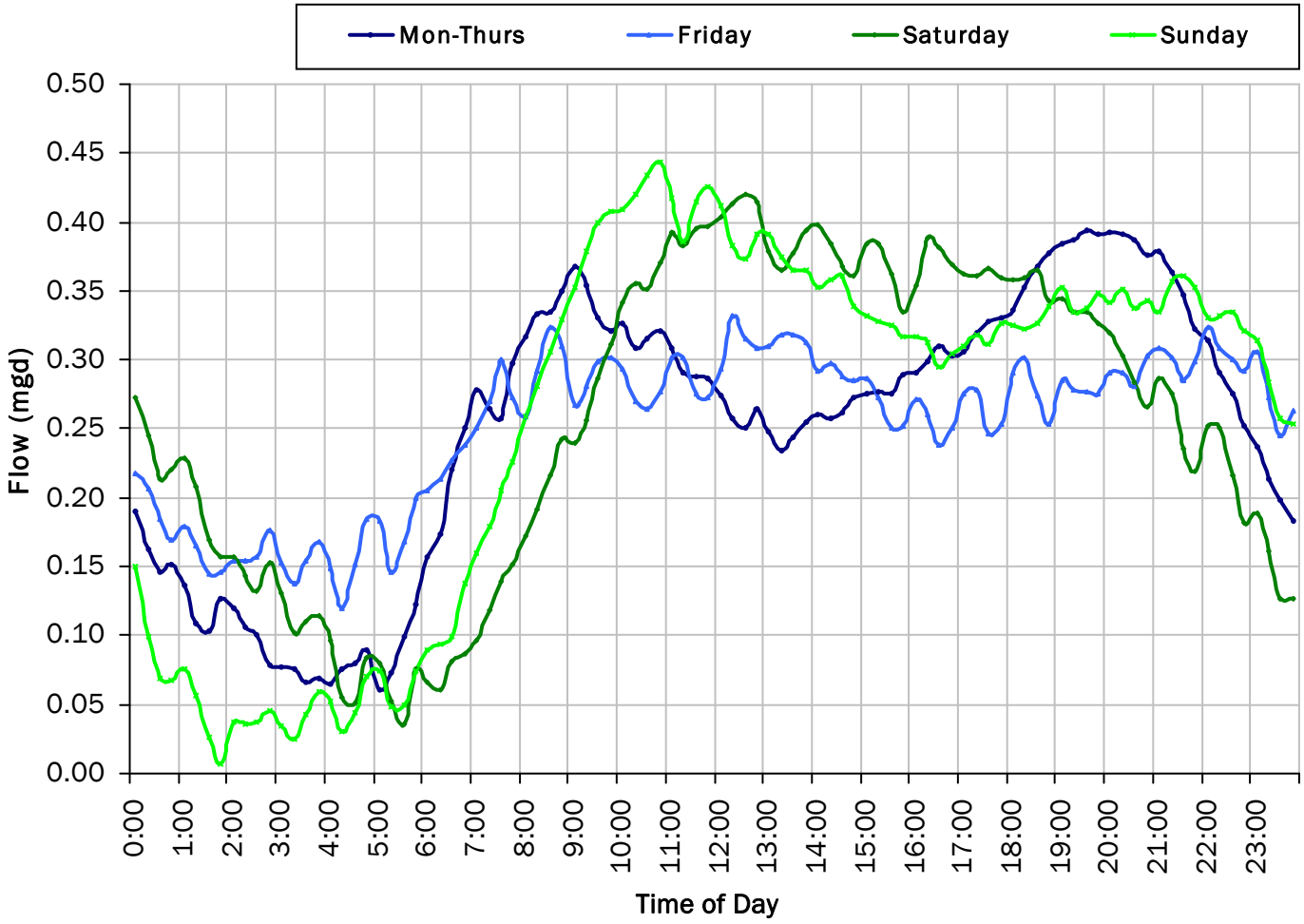
Flow Summary: 1/29/2023 to 2/22/2023

Period Rainfall: 0.58 inches Period Avg Flow: 0.299 mgd Period Peak Flow: 2.308 mgd Period Min Flow: -0.668 mgd



SITE 7

Average Dry Weather Flow Hydrographs



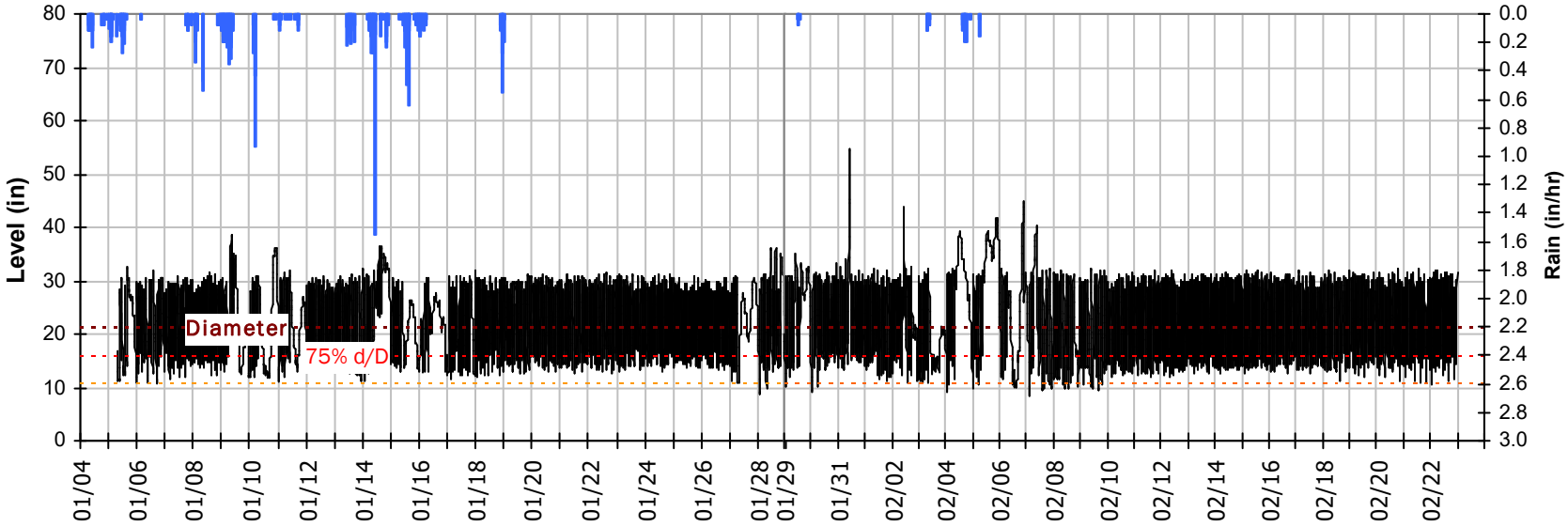
ADWF:

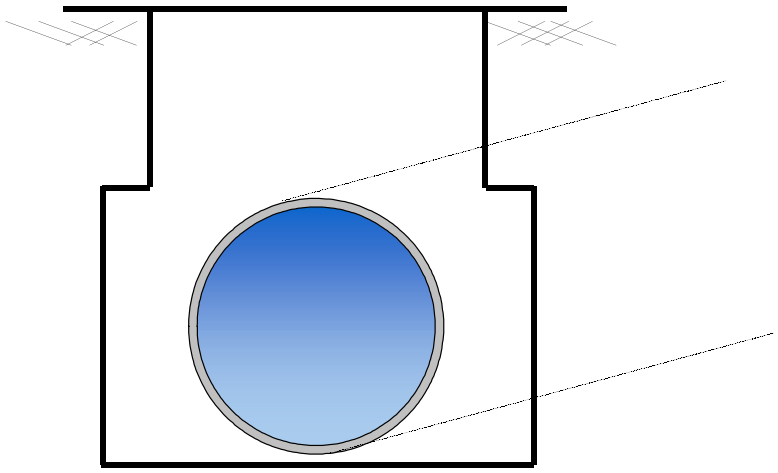
0.253 *mgd*

SITE 7

Site Capacity and Surcharge Summary

Realtime Flow Levels with Rainfall Data over Peak Level Period





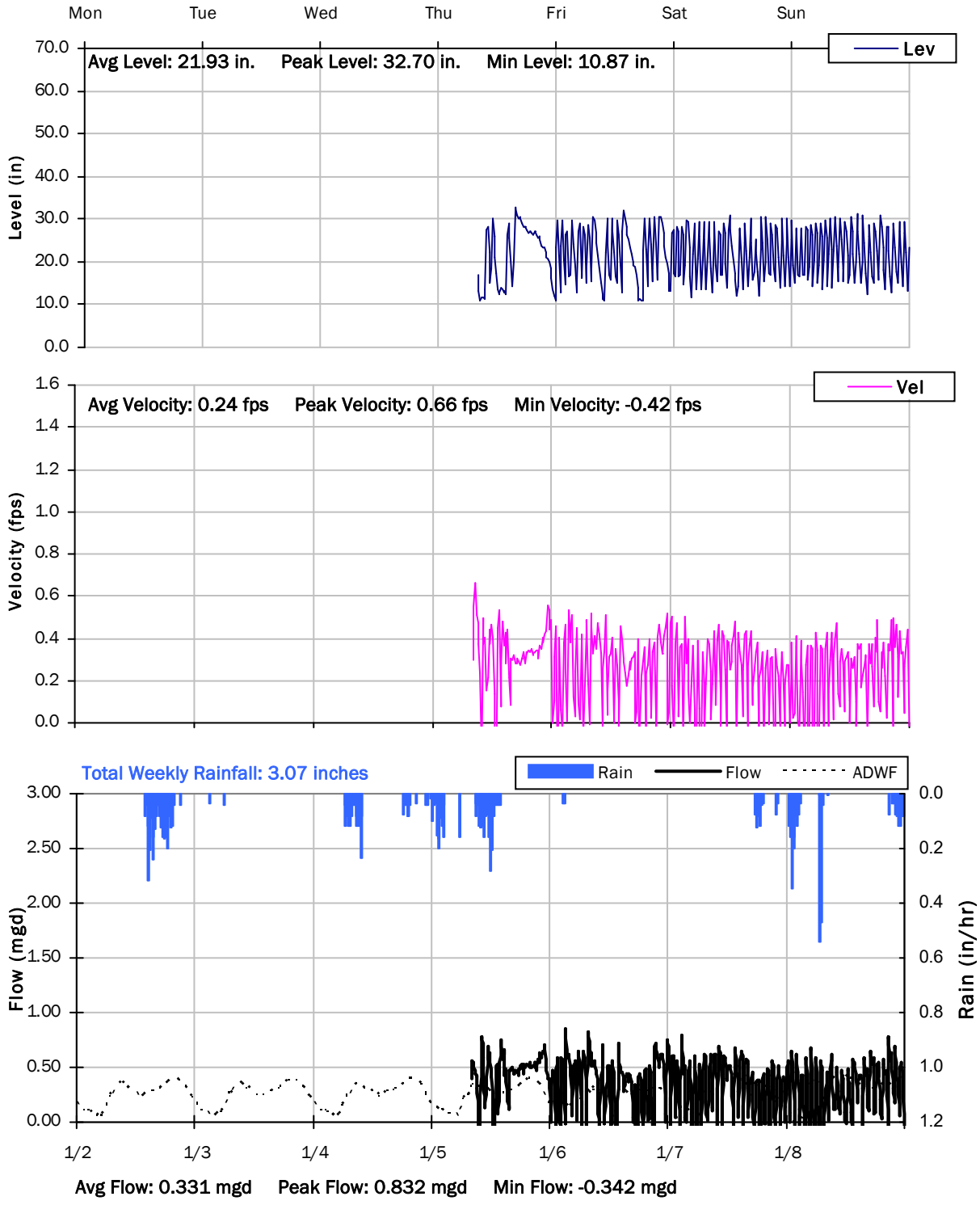
Pipe Diameter:	21	*inches*
Peak Measured Level:	54.7	*inches*
Peak d/D Ratio:	2.60	

Surcharged 33.7 inches over crown

SITE 7

Weekly Level, Velocity and Flow Hydrographs

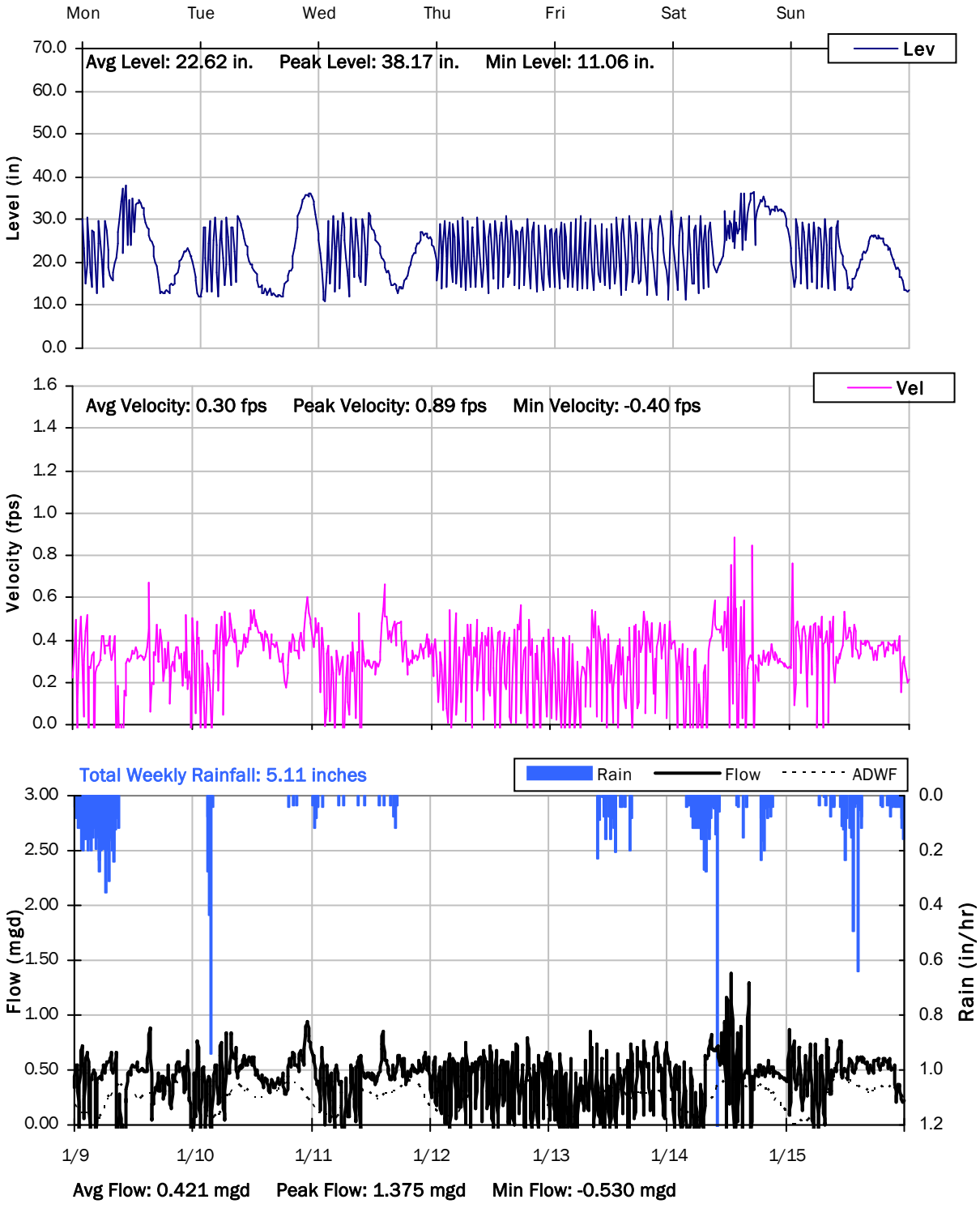
1/2/2023 to 1/9/2023



SITE 7

Weekly Level, Velocity and Flow Hydrographs

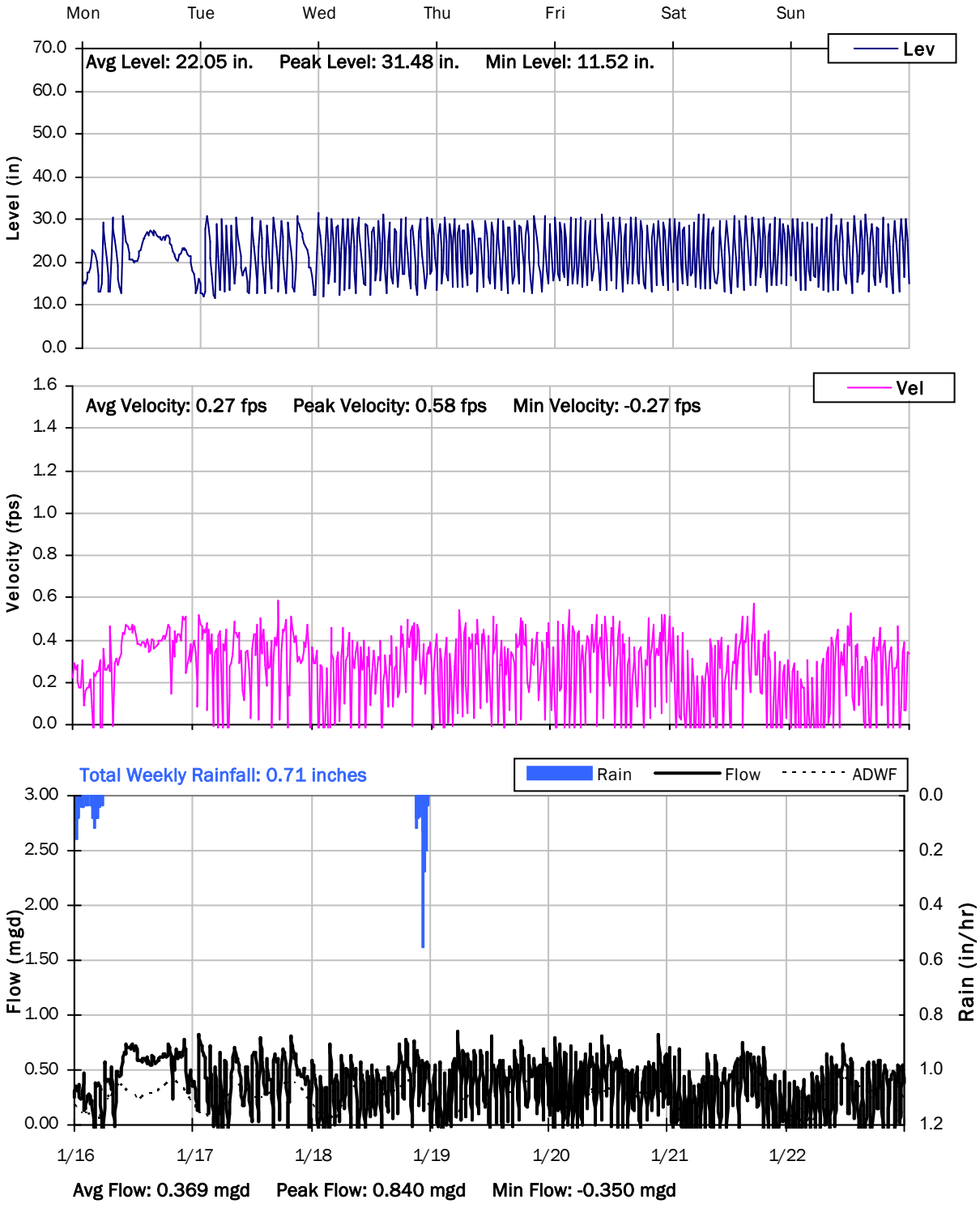
1/9/2023 to 1/16/2023



SITE 7

Weekly Level, Velocity and Flow Hydrographs

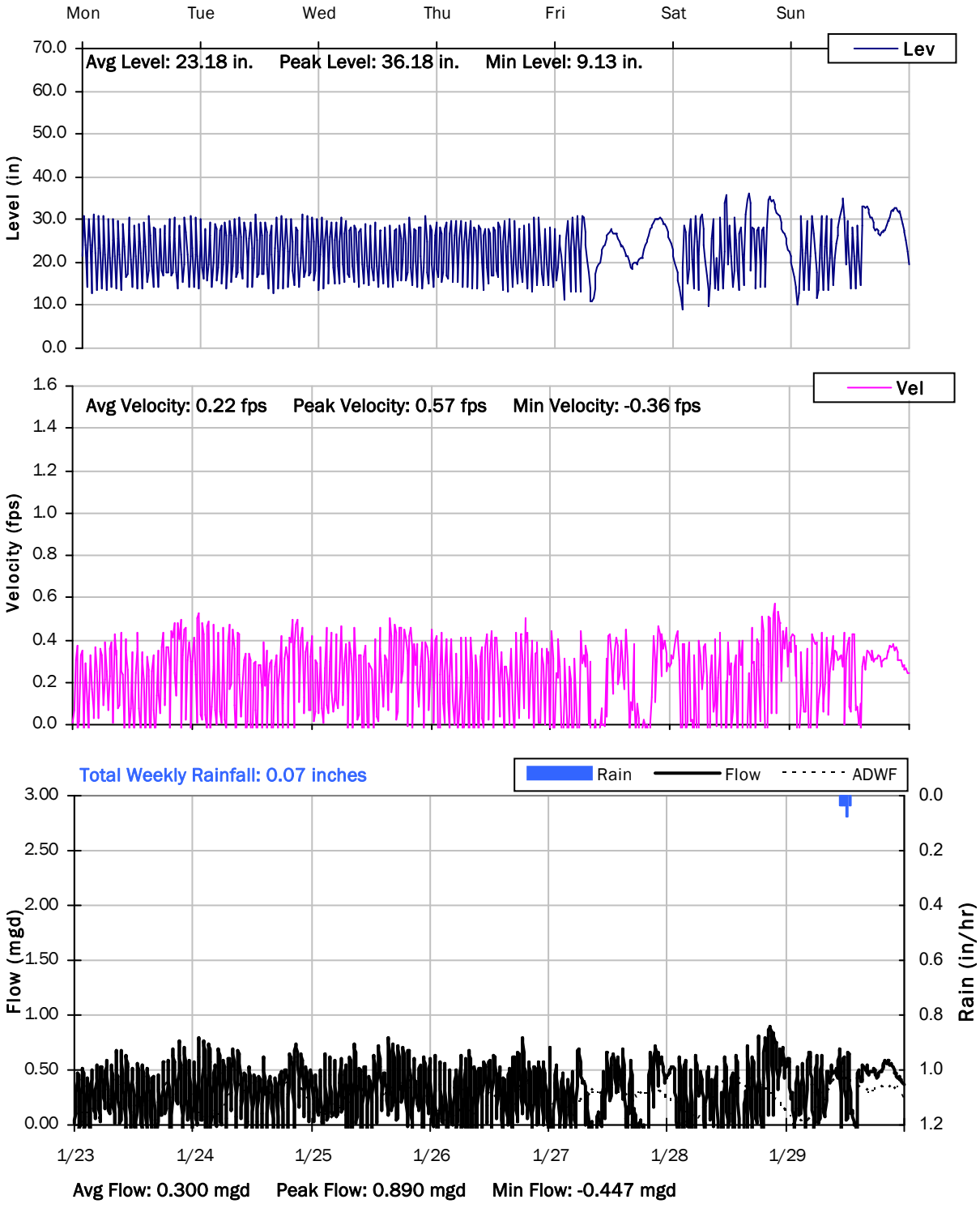
1/16/2023 to 1/23/2023



SITE 7

Weekly Level, Velocity and Flow Hydrographs

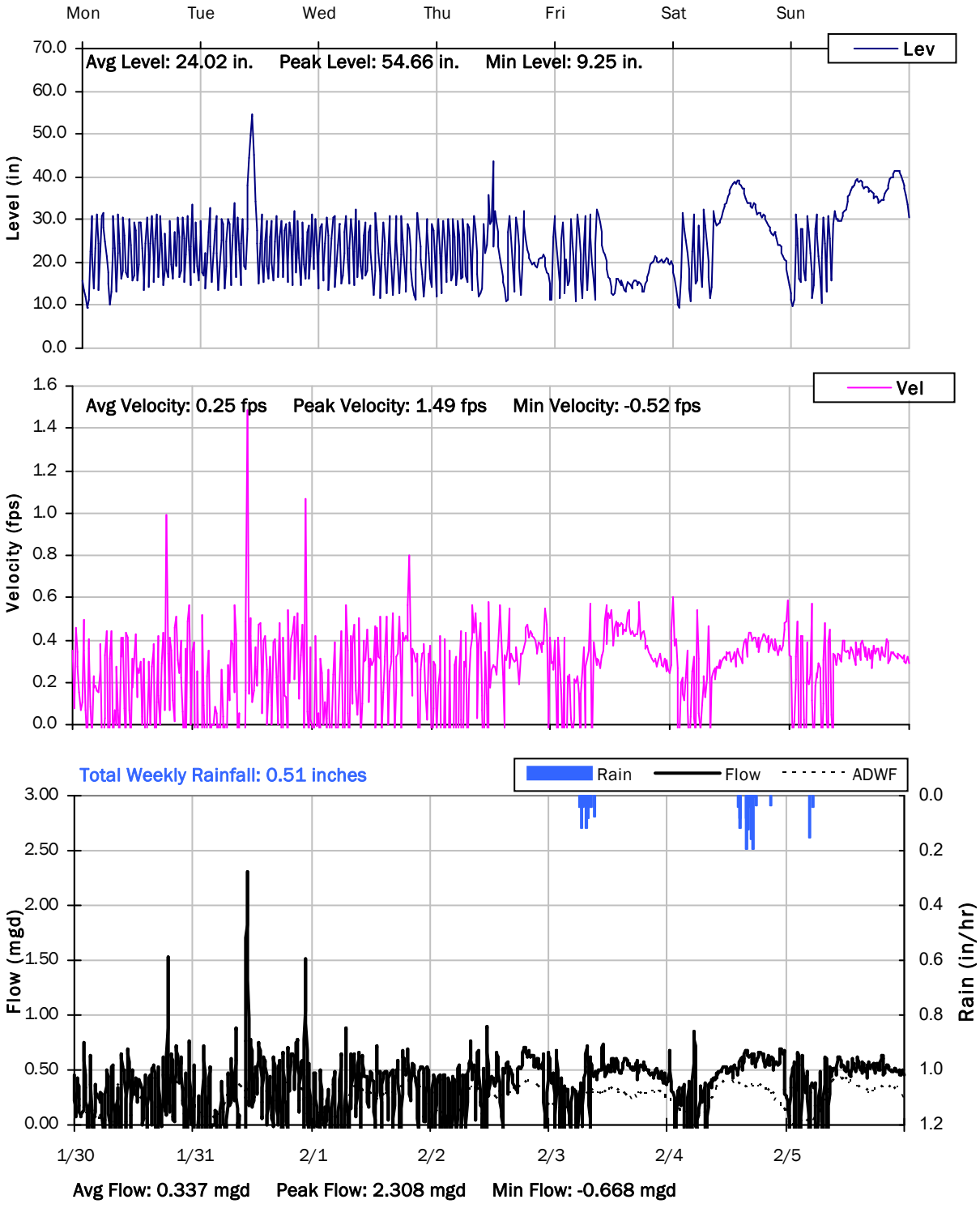
1/23/2023 to 1/30/2023



SITE 7

Weekly Level, Velocity and Flow Hydrographs

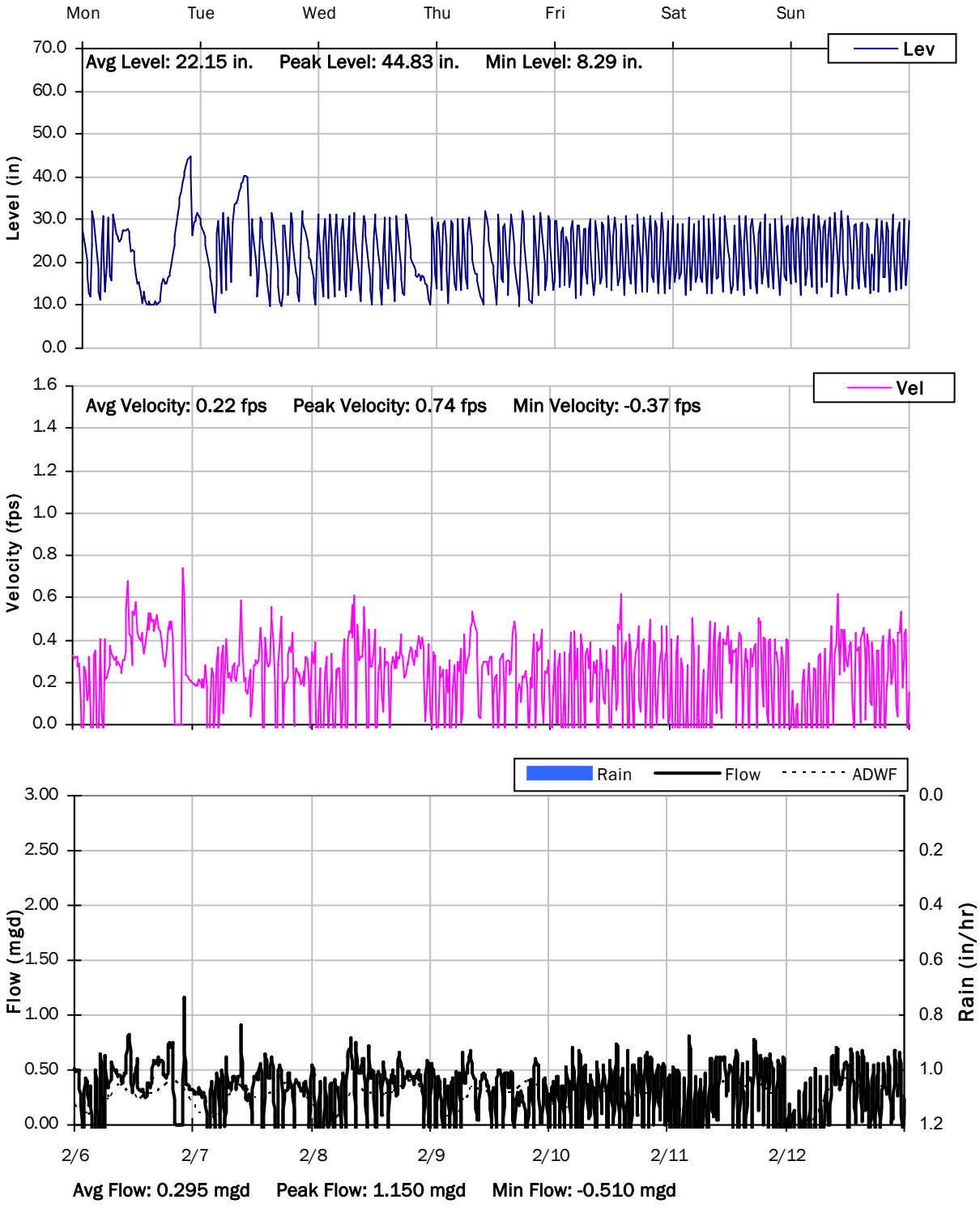
1/30/2023 to 2/6/2023



SITE 7

Weekly Level, Velocity and Flow Hydrographs

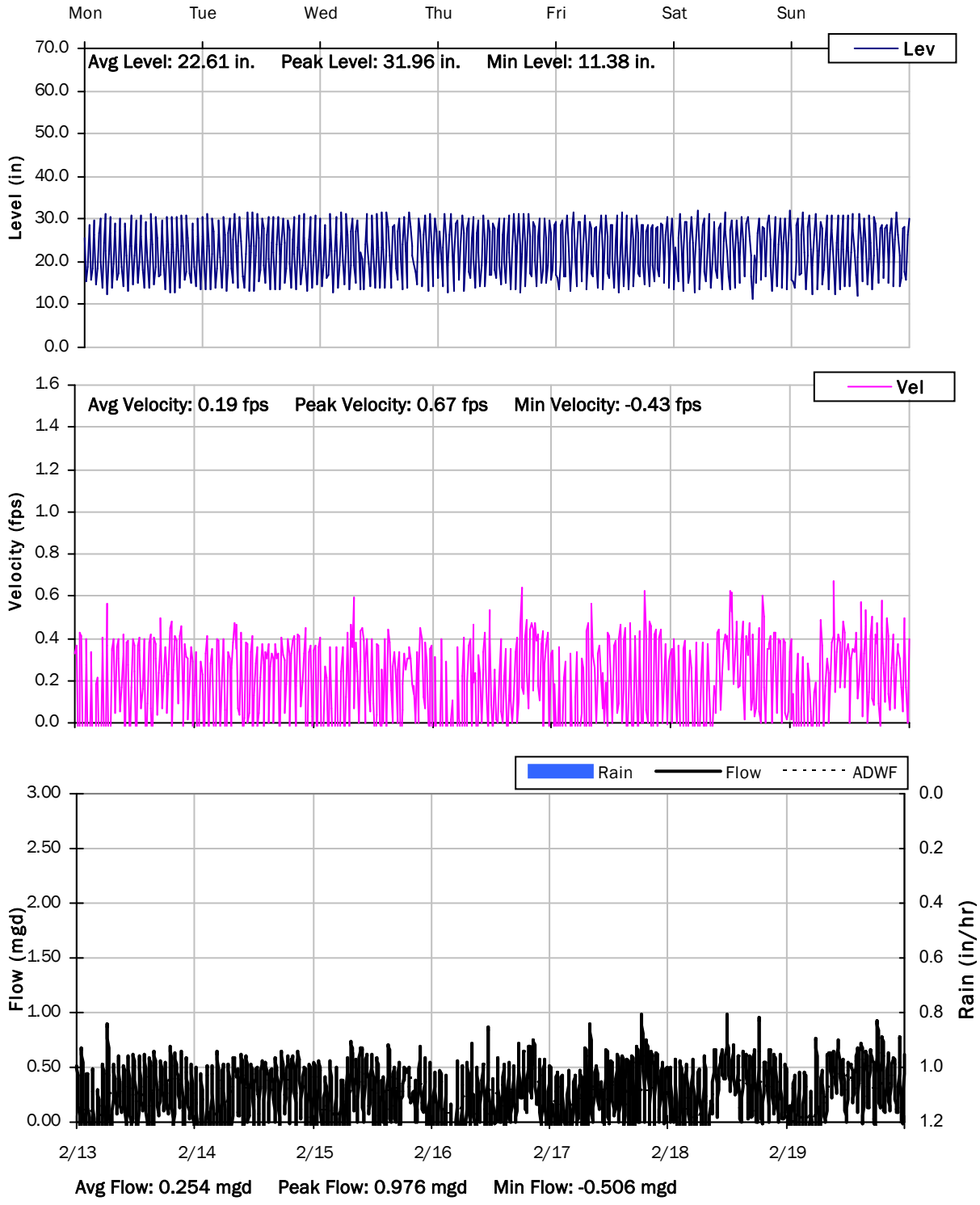
2/6/2023 to 2/13/2023



SITE 7

Weekly Level, Velocity and Flow Hydrographs

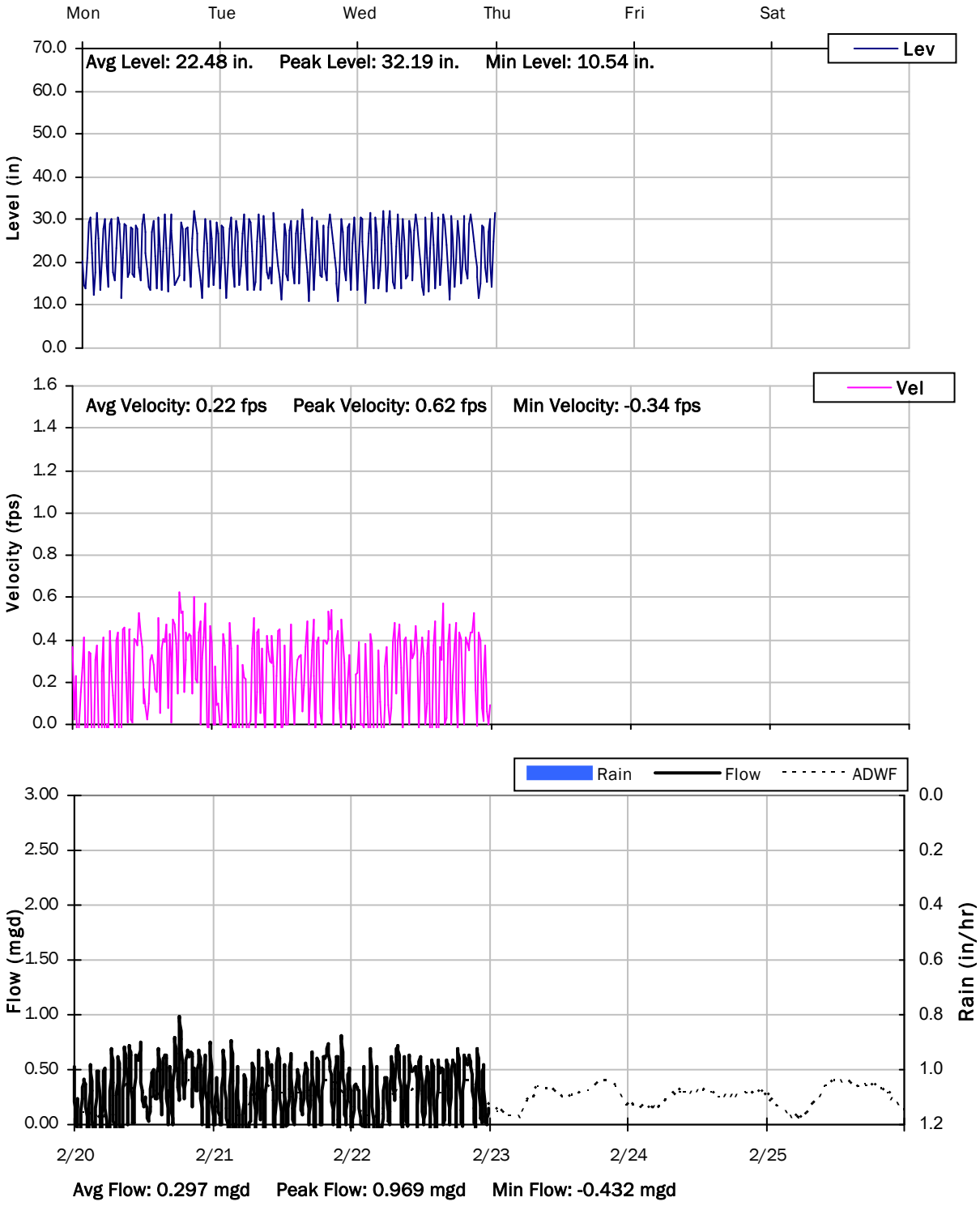
2/13/2023 to 2/20/2023



SITE 7

Weekly Level, Velocity and Flow Hydrographs

2/20/2023 to 2/27/2023



Monitoring Site: Site 8

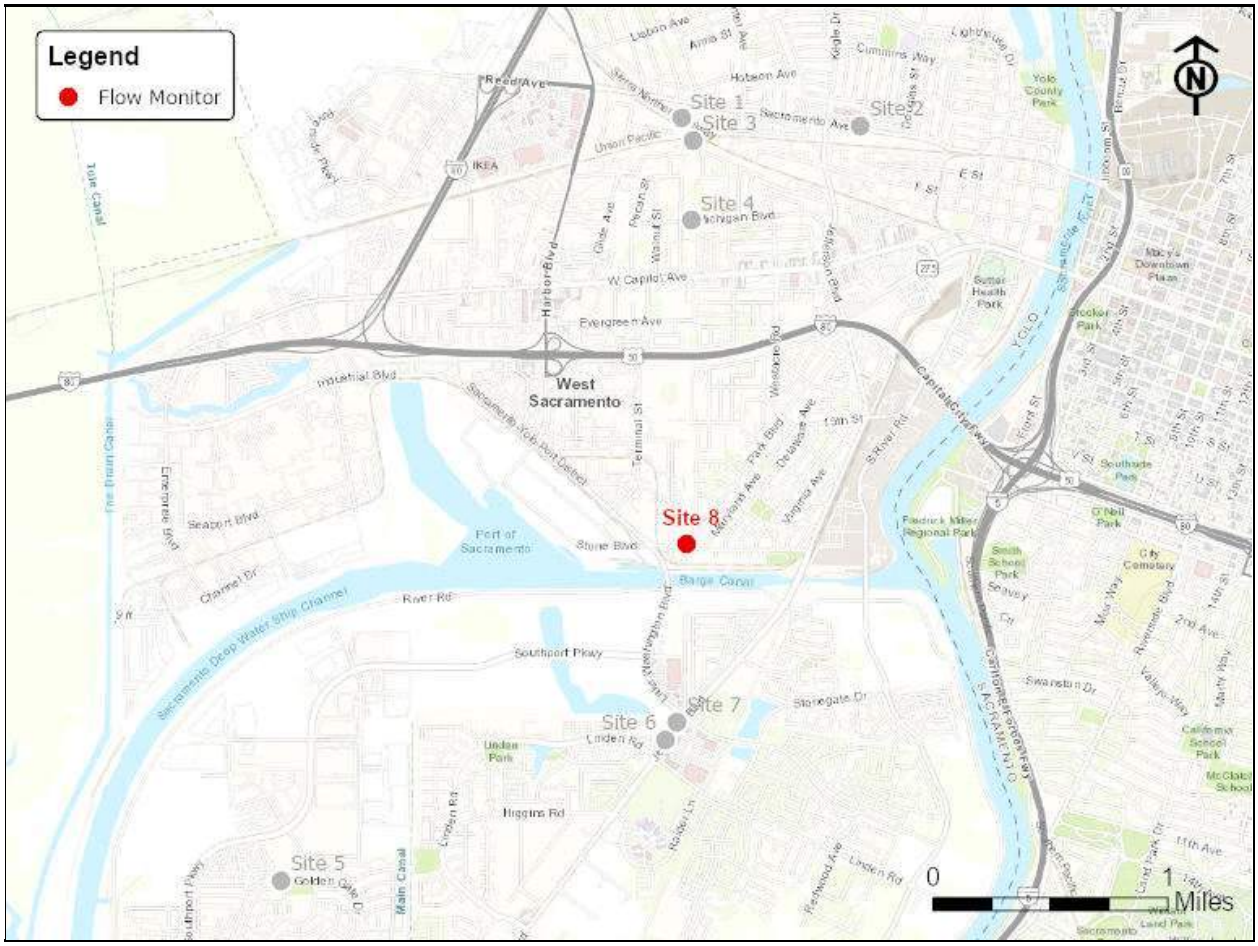
Black & Veatch | West Sacramento, California

Sanitary Sewer Flow Monitoring

January 06, 2023 - February 22, 2023

Location: Grassy area of 2150 Stone Blvd, on the corder of Stone Blvd and Park Blvd

Data Summary Report



Vicinity Map: Site 8

SITE 8

Site Information MH ID: 1178

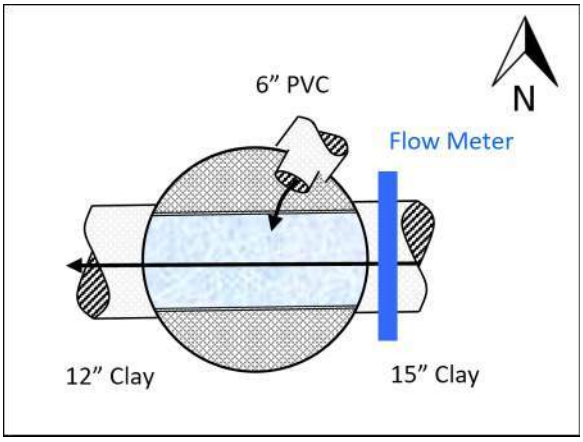
Location:	Grassy area of 2150 Stone Blvd, on the corder of Stone Blvd and Park Blvd
Coordinates:	122.3214° W, 38.3348° N
Rim Elevation:	19 feet
Expected Pipe Diameter:	15 inches
Measured Pipe Diameter:	15 inches
ADWF:	0.255 mgd
Peak Measured Flow:	1.531 mgd
Sediment:	None



Satellite Map



Sanitary Map



Flow Sketch



Street View



Plan View

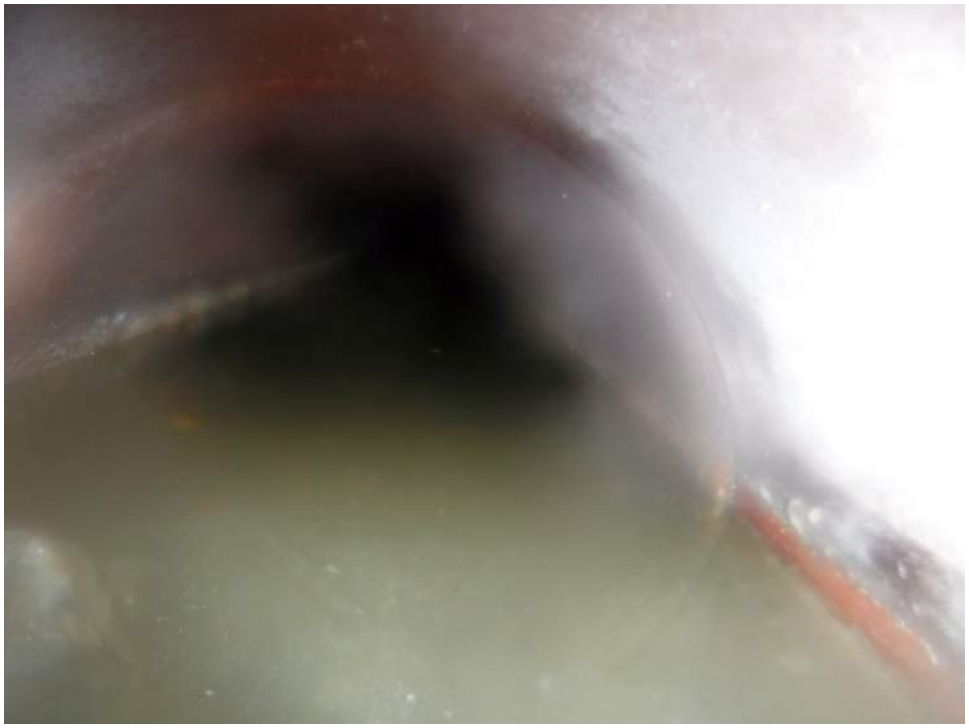
SITE 8

Additional Site Photos

Effluent Pipe



North East Upper Influent Pipe



SITE 8

Additional Site Photos

Monitored East Influent Pipe

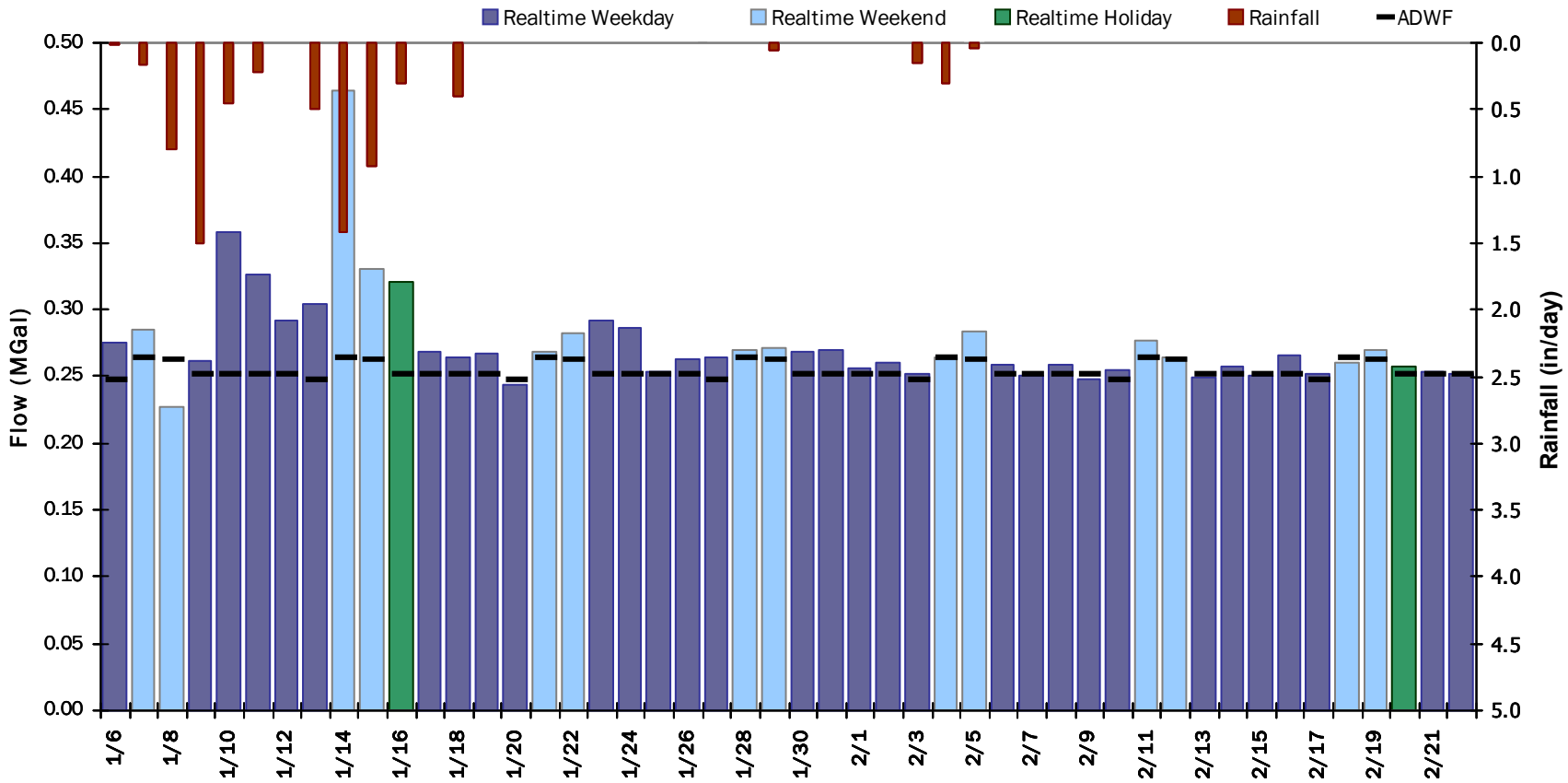


SITE 8

Period Flow Summary: Daily Flow Totals

Avg Daily Flow: 0.276 MGal Peak Daily Flow: 0.465 MGal Min Daily Flow: 0.227 MGal

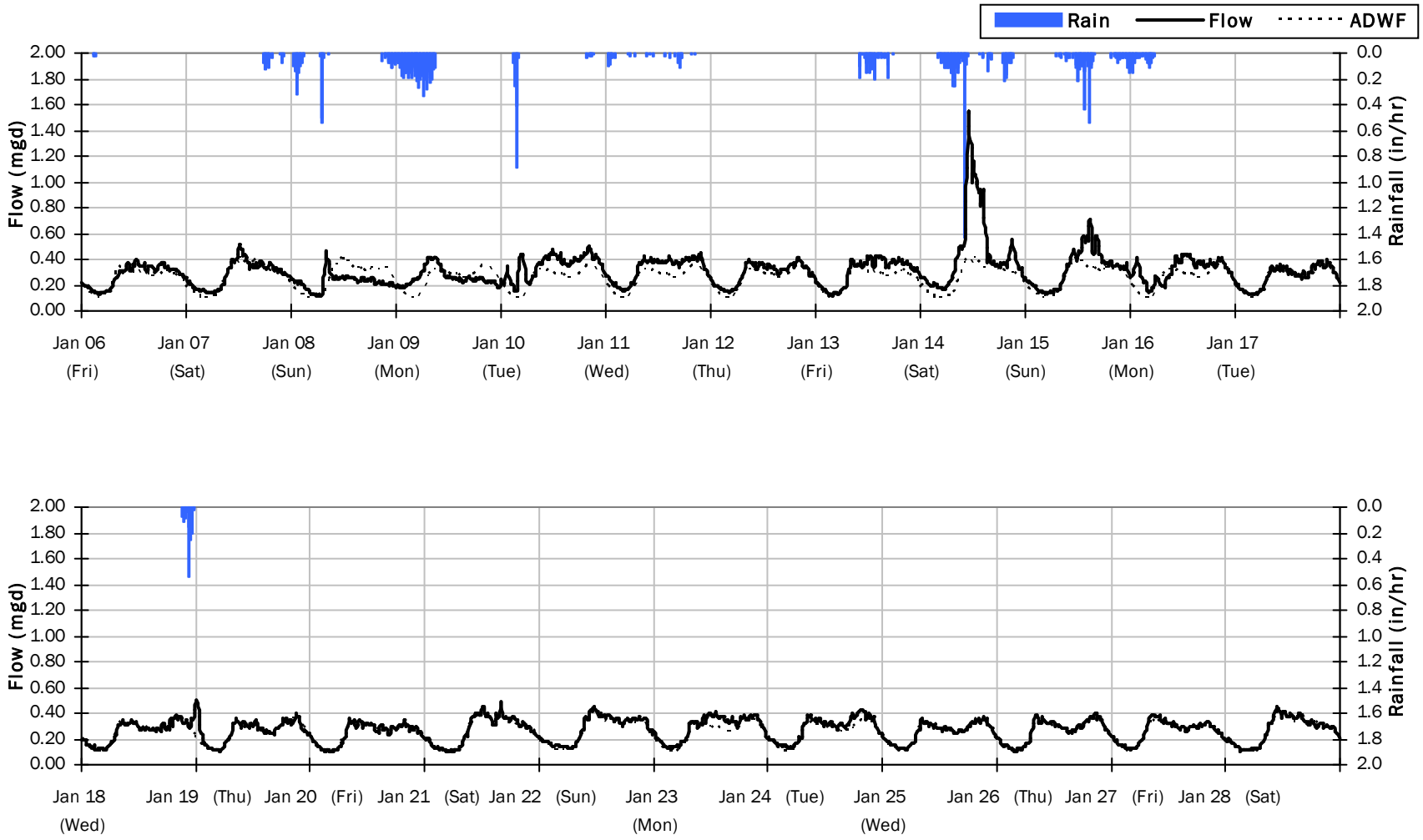
Total Rainfall: 7.35 inches



SITE 8

Flow Summary: 1/6/2023 to 1/28/2023

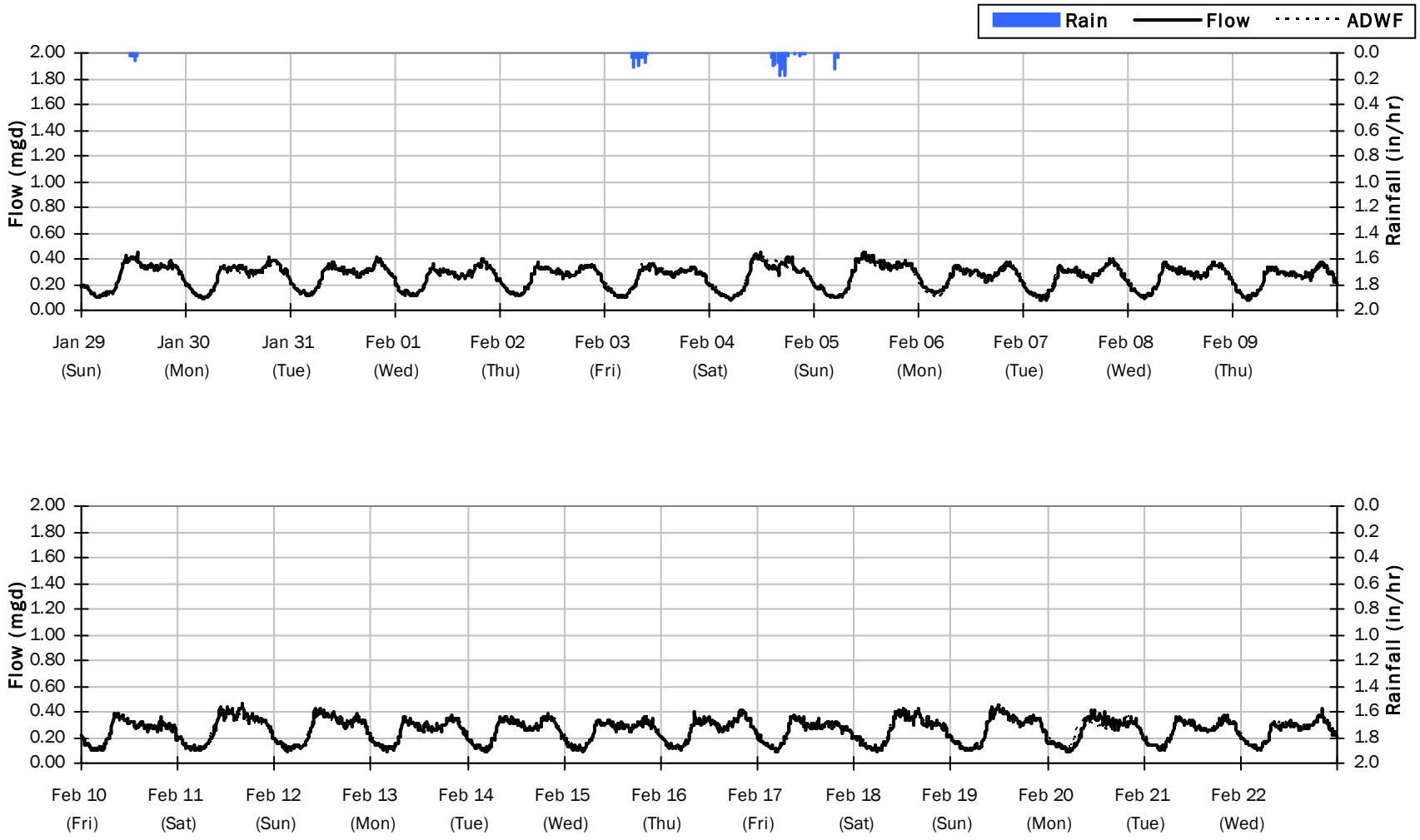
Period Rainfall: 6.69 inches Period Avg Flow: 0.290 mgd Period Peak Flow: 1.531 mgd Period Min Flow: 0.101 mgd



SITE 8

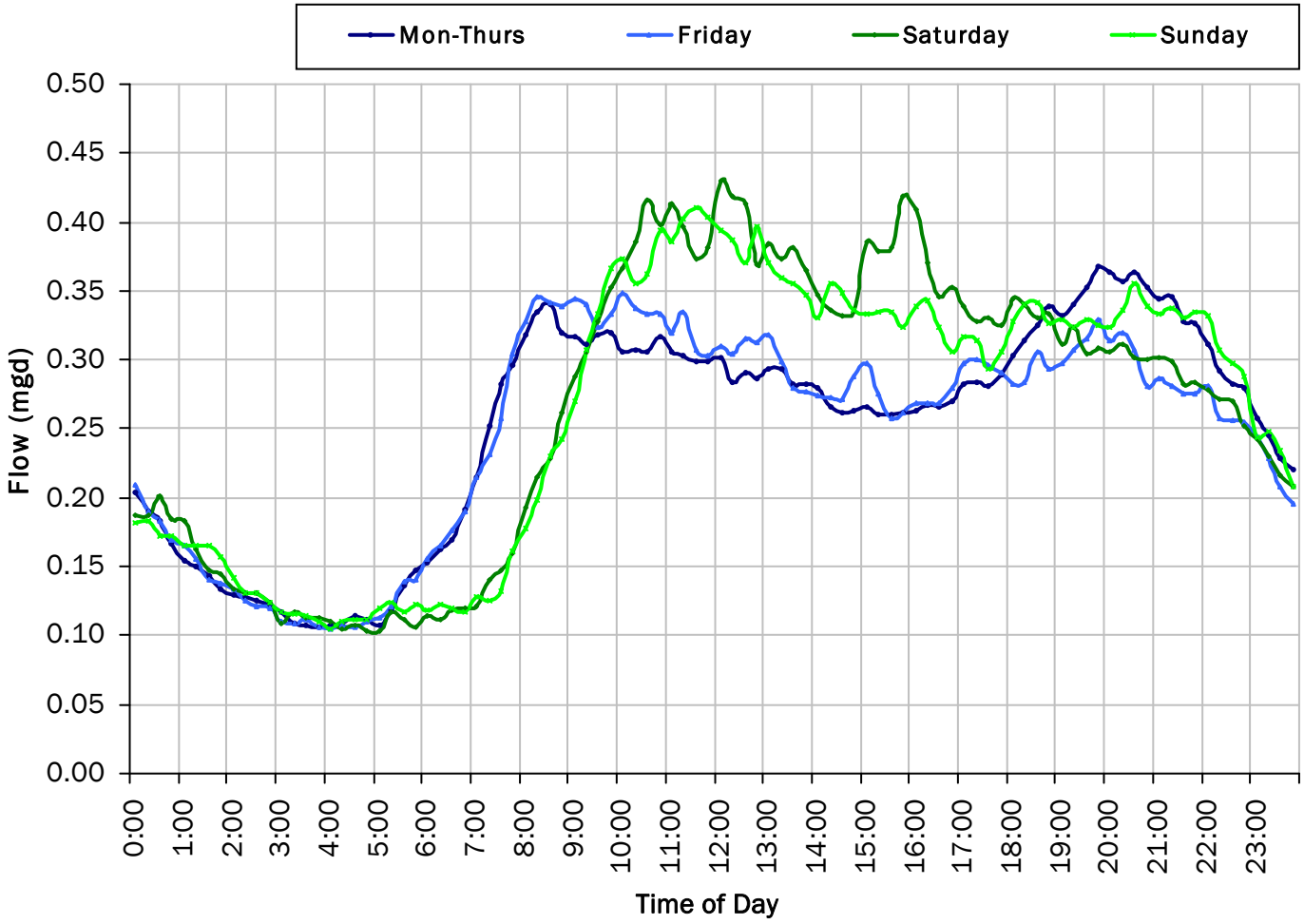
Flow Summary: 1/29/2023 to 2/22/2023

Period Rainfall: 0.56 inches Period Avg Flow: 0.260 mgd Period Peak Flow: 0.464 mgd Period Min Flow: 0.073 mgd



SITE 8

Average Dry Weather Flow Hydrographs



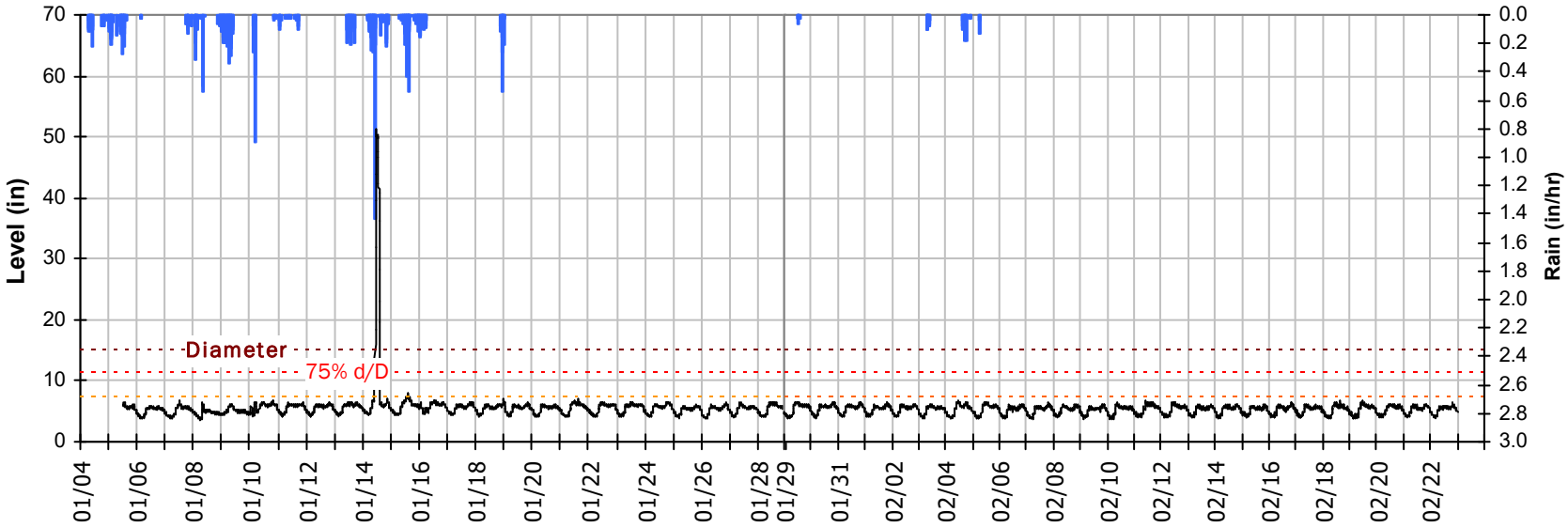
ADWF:

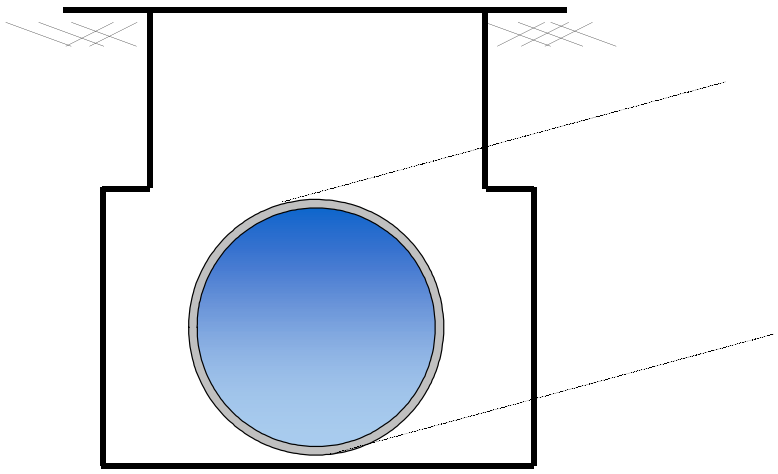
0.255 *mgd*

SITE 8

Site Capacity and Surcharge Summary

Realtime Flow Levels with Rainfall Data over Peak Level Period



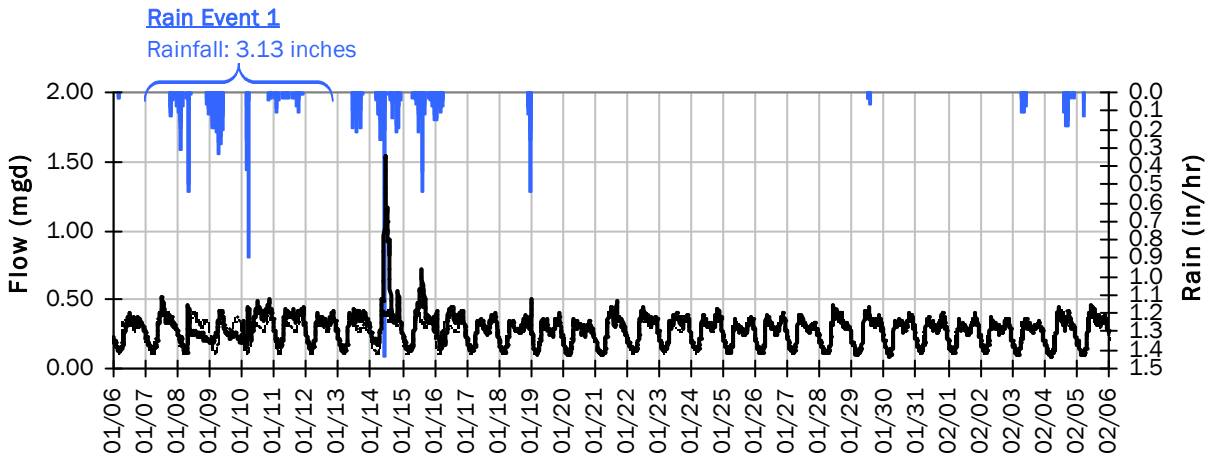


Pipe Diameter:	15	*inches*
Peak Measured Level:	51.3	*inches*
Peak d/D Ratio:	3.42	

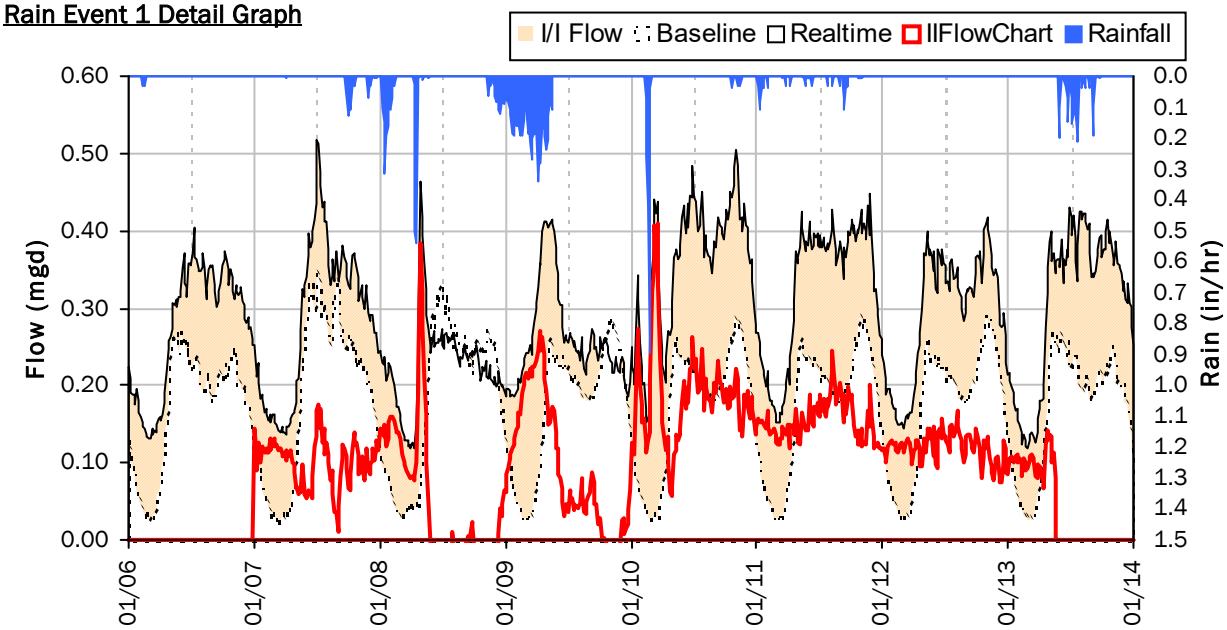
Surcharged 36.3 inches over crown

SITE 8
I/I Summary: Rain Event 1

Baseline and Realtime Flows with Rainfall Data over Monitoring Period



Rain Event 1 Detail Graph

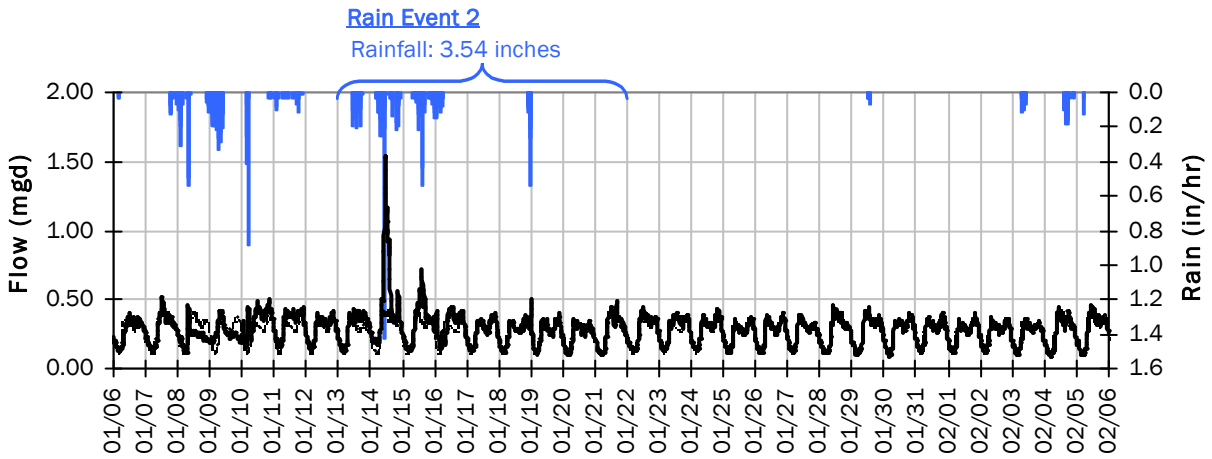


Storm Event I/I Analysis (Rain = 3.13 inches)

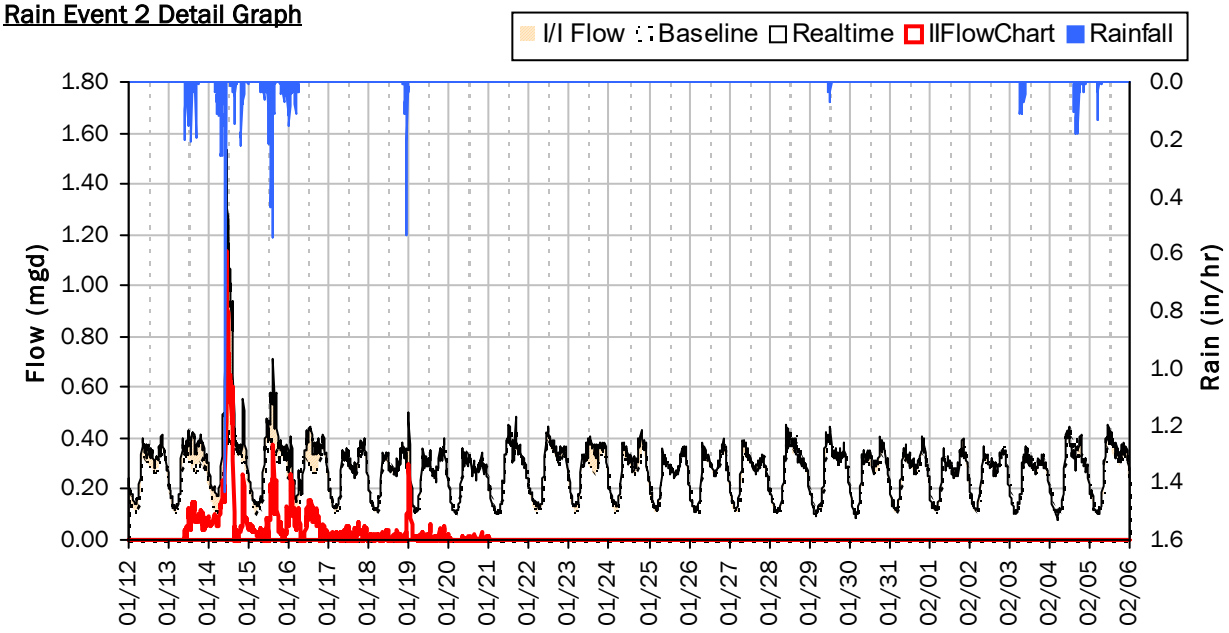
Capacity		Inflow / Infiltration	
Peak Flow:	0.517 *mgd*	**Peak I/I Rate:**	0.410 *mgd*
PF:	2.03	**Total I/I:**	736,000 *gallons*
Peak Level:	6.73 *in*		
d/D Ratio:	0.45		

SITE 8
I/I Summary: Rain Event 2

Baseline and Realtime Flows with Rainfall Data over Monitoring Period



Rain Event 2 Detail Graph

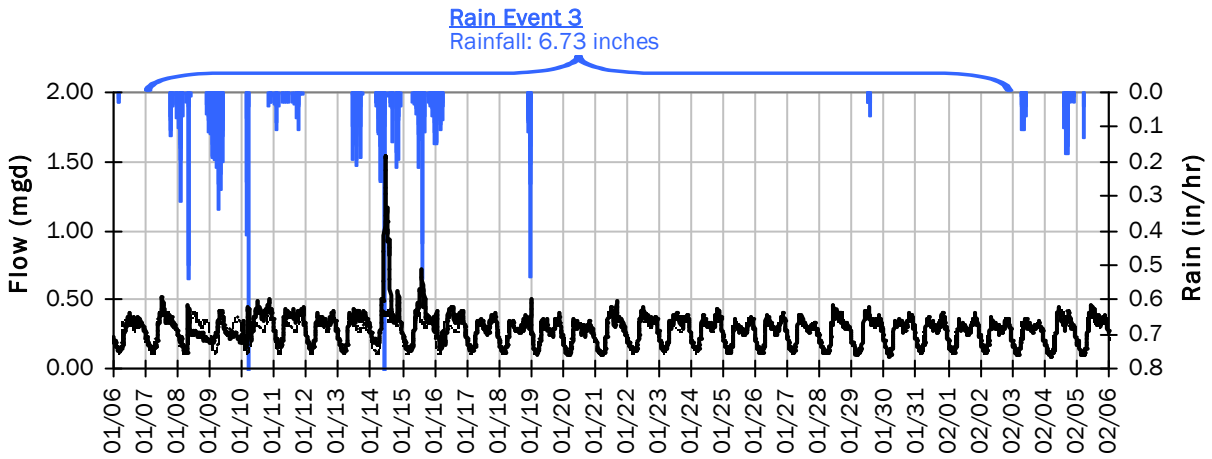


Storm Event I/I Analysis (Rain = 3.54 inches)

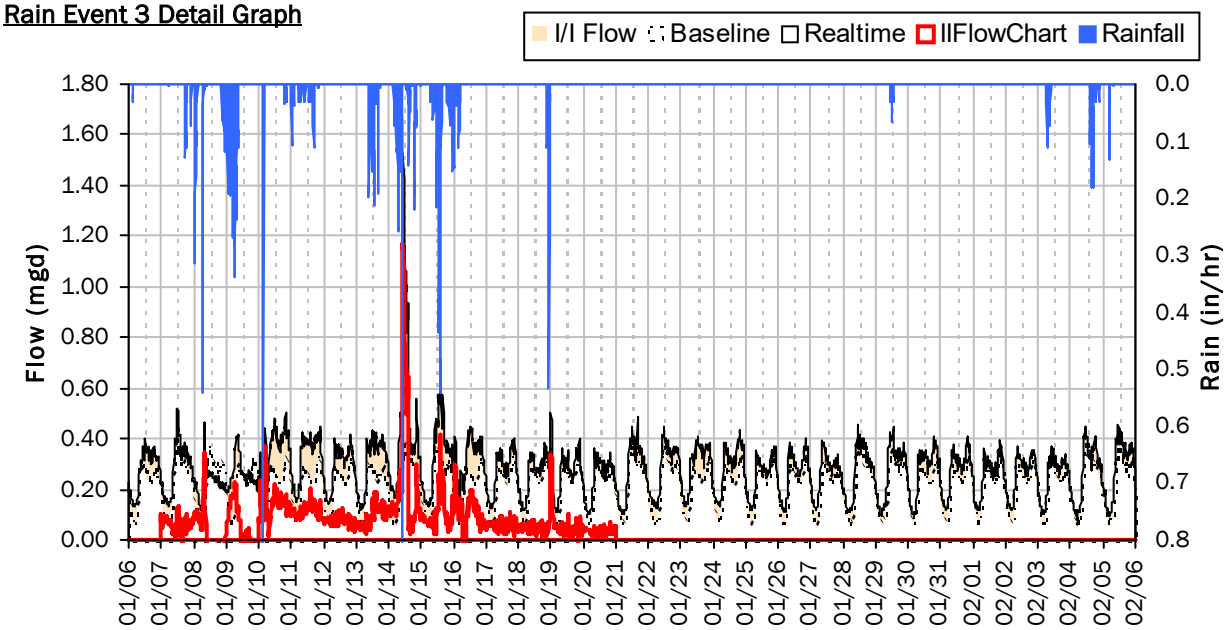
Capacity		Inflow / Infiltration	
Peak Flow:	1.531 *mgd*	**Peak I/I Rate:**	1.133 *mgd*
PF:	6.01	**Total I/I:**	425,000 *gallons*
Peak Level:	51.25 *in*		
d/D Ratio:	3.42		

SITE 8
I/I Summary: Rain Event 3

Baseline and Realtime Flows with Rainfall Data over Monitoring Period



Rain Event 3 Detail Graph



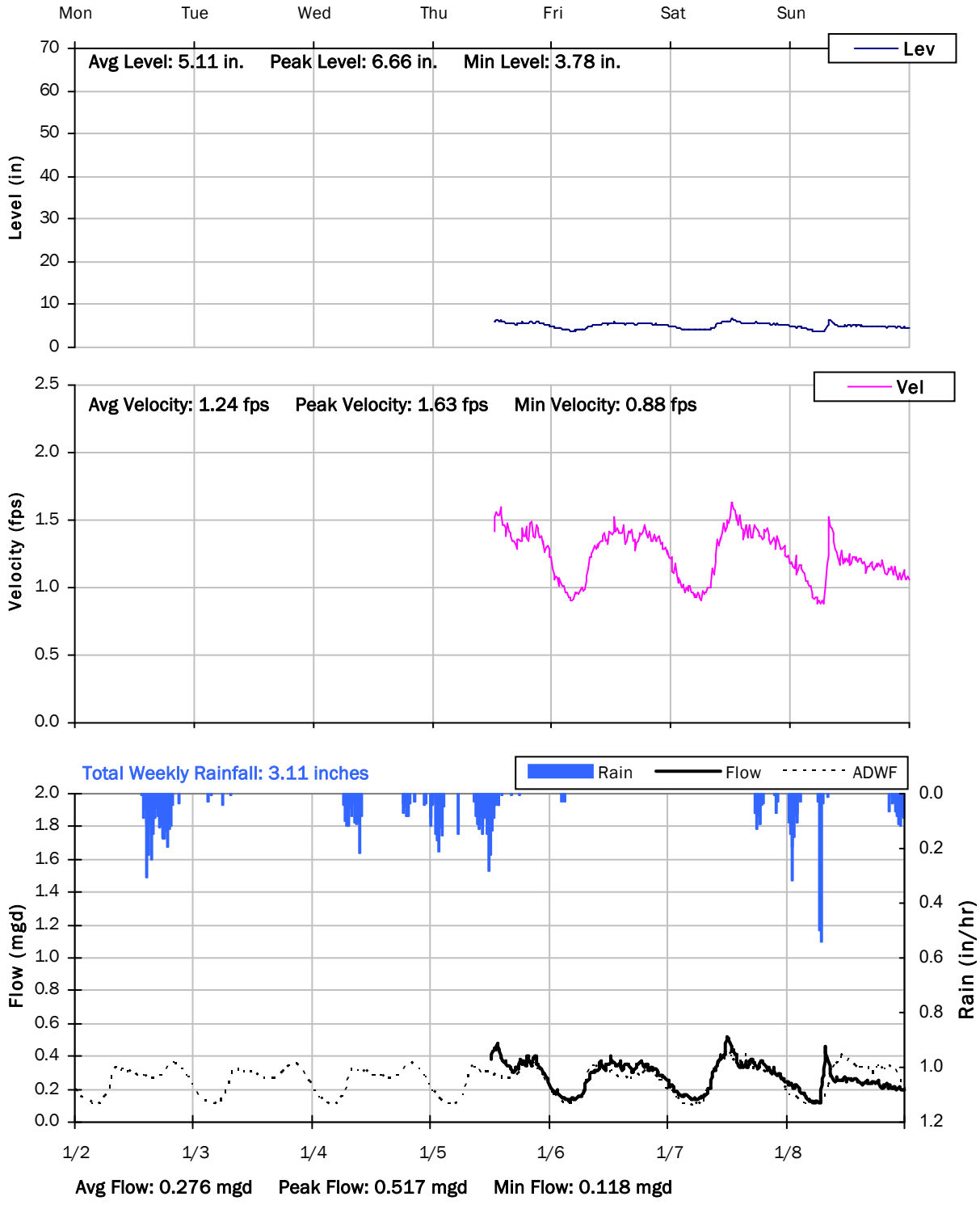
Storm Event I/I Analysis (Rain = 6.73 inches)

Capacity		Inflow / Infiltration	
Peak Flow:	1.53 *mgd*	**Peak I/I Rate:**	1.17 *mgd*
PF:	6.01	**Total I/I:**	1,211,000 *gallons*
Peak Level:	51.25 *in*		
d/D Ratio:	3.42		

SITE 8

Weekly Level, Velocity and Flow Hydrographs

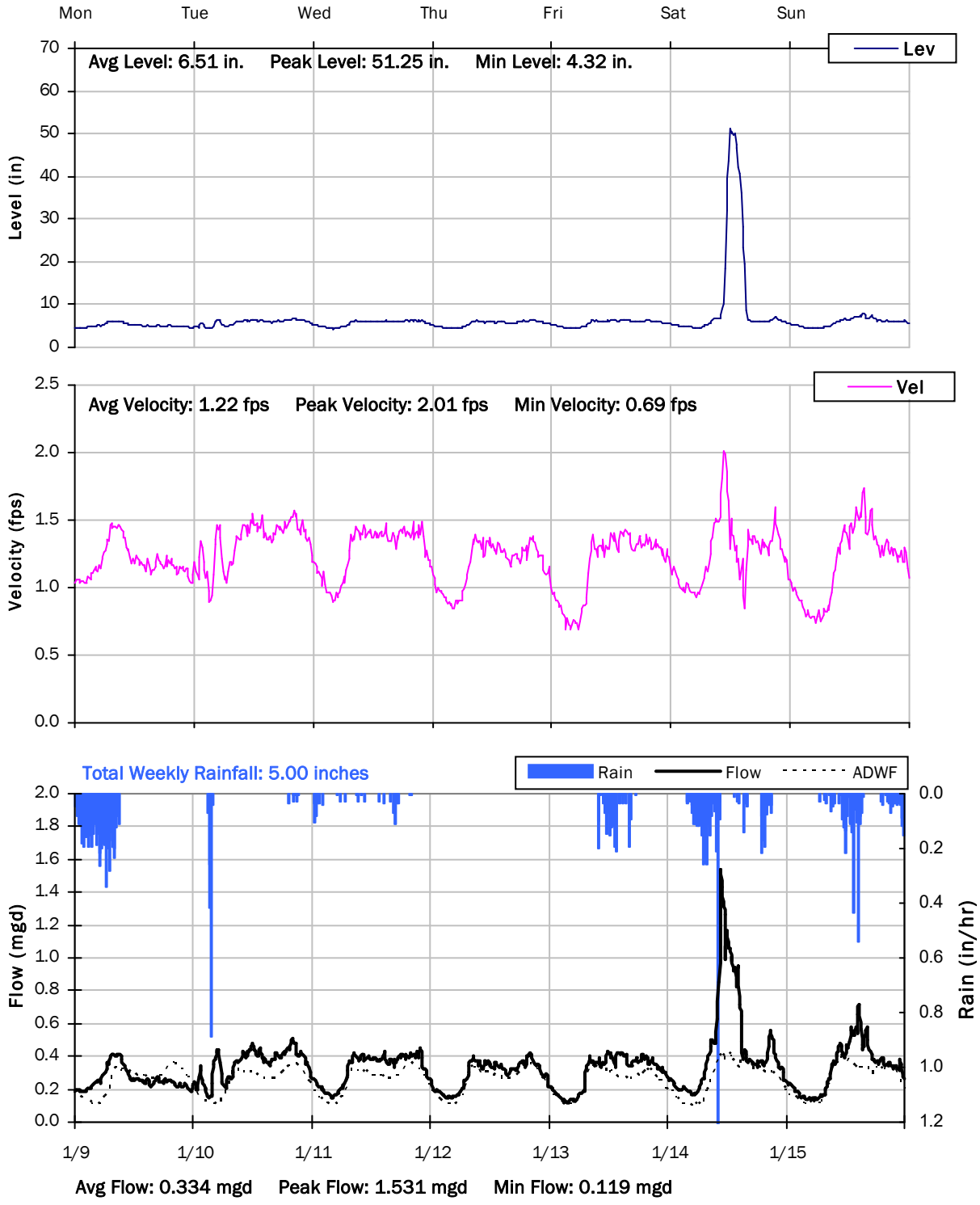
1/2/2023 to 1/9/2023



SITE 8

Weekly Level, Velocity and Flow Hydrographs

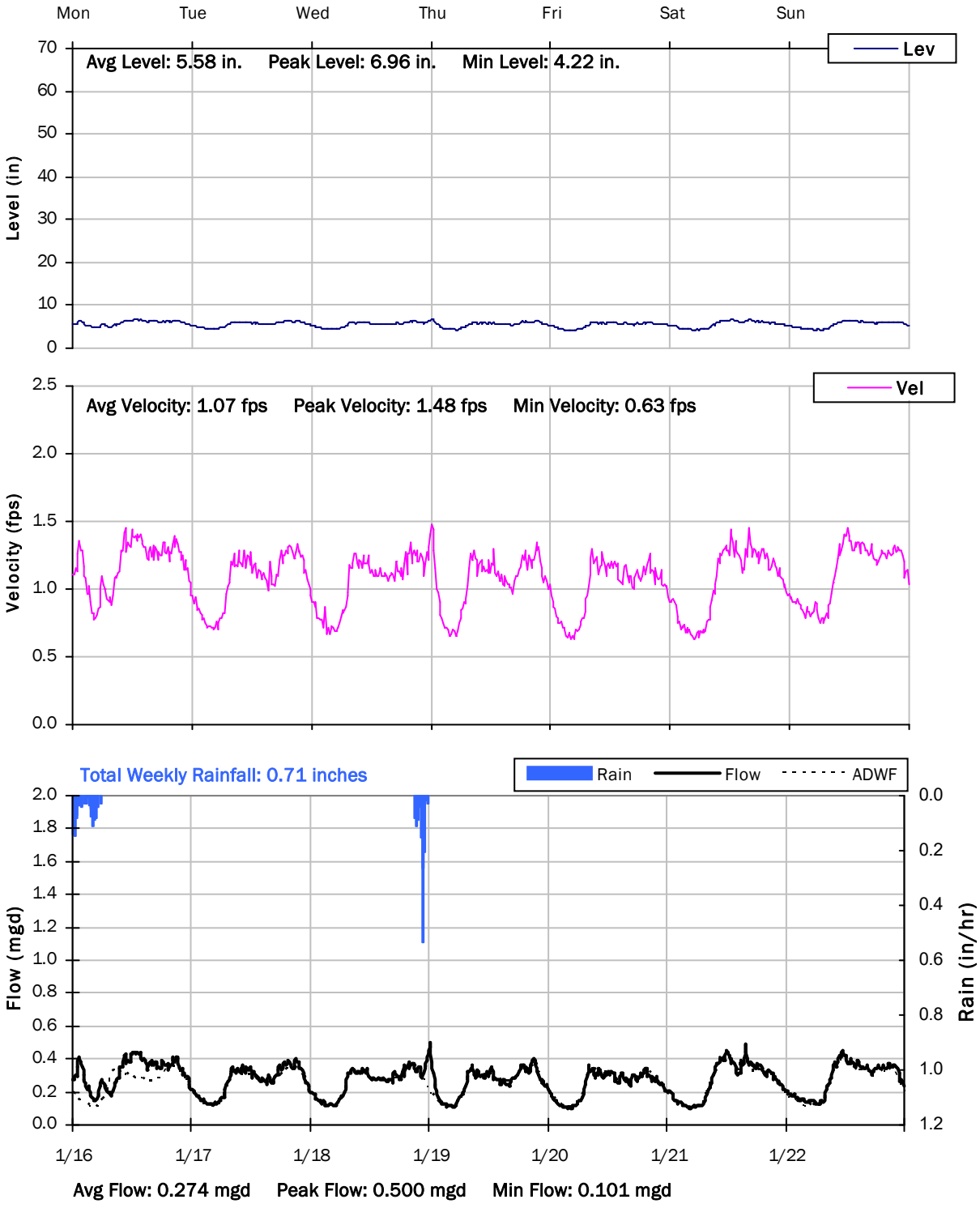
1/9/2023 to 1/16/2023



SITE 8

Weekly Level, Velocity and Flow Hydrographs

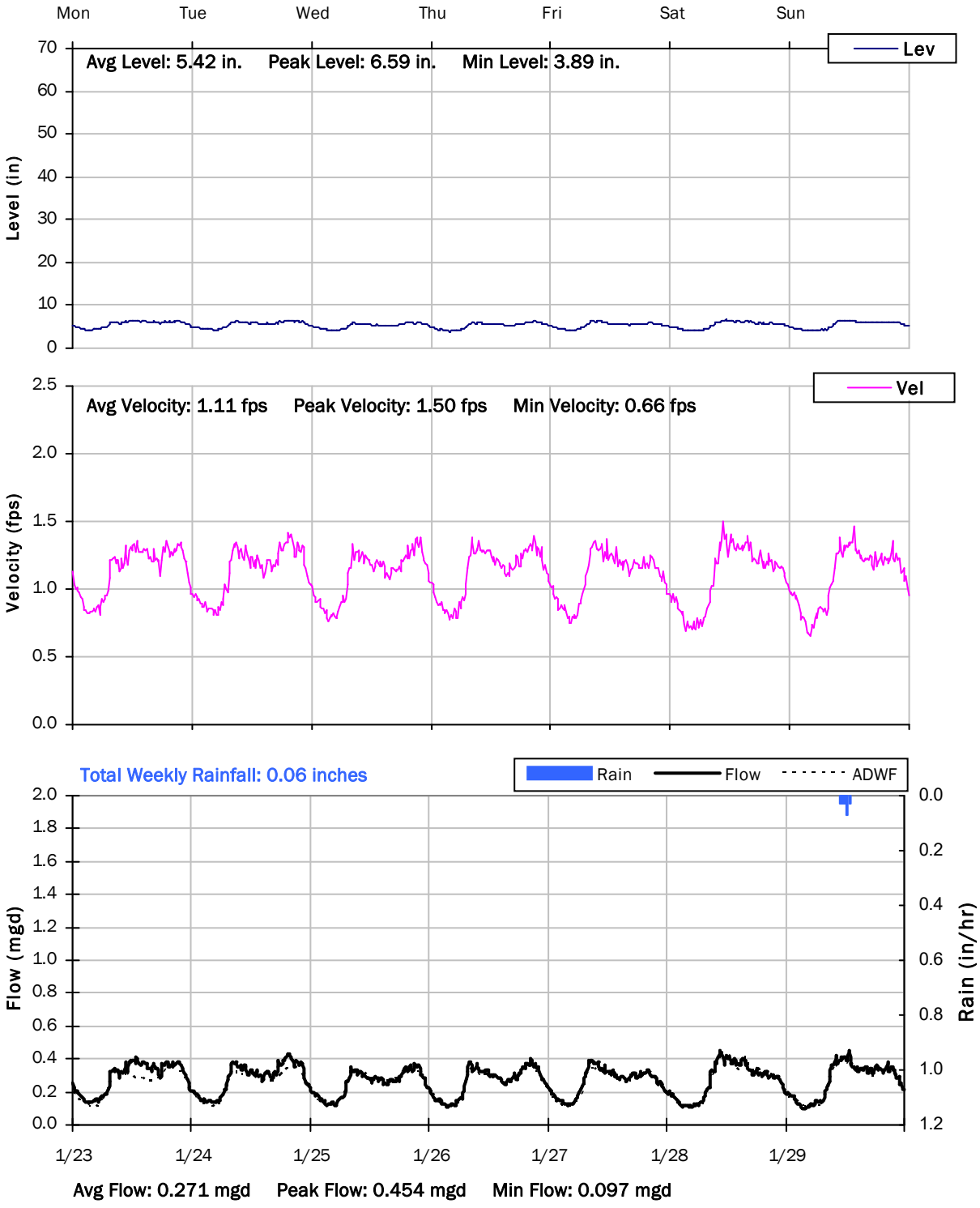
1/16/2023 to 1/23/2023



SITE 8

Weekly Level, Velocity and Flow Hydrographs

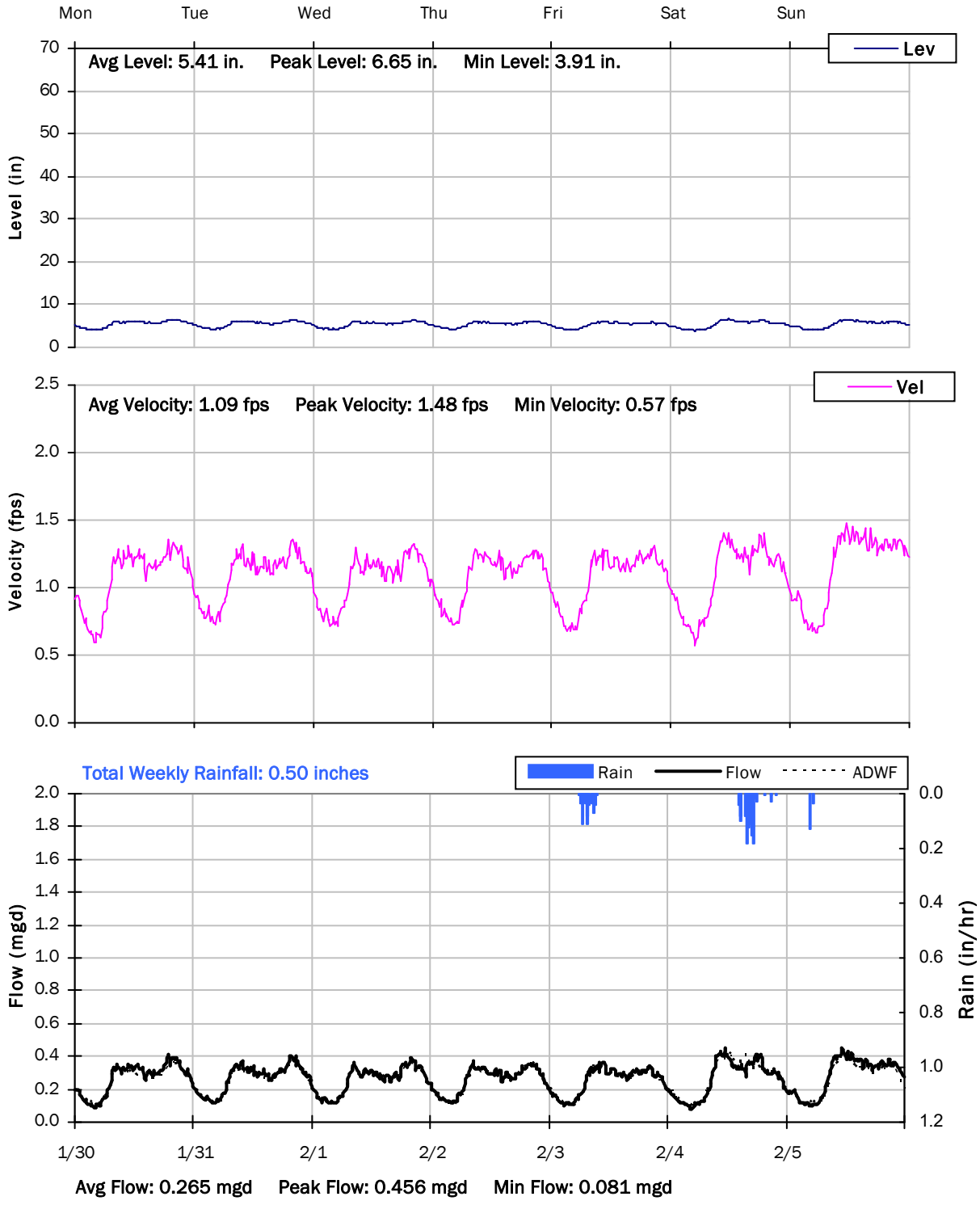
1/23/2023 to 1/30/2023



SITE 8

Weekly Level, Velocity and Flow Hydrographs

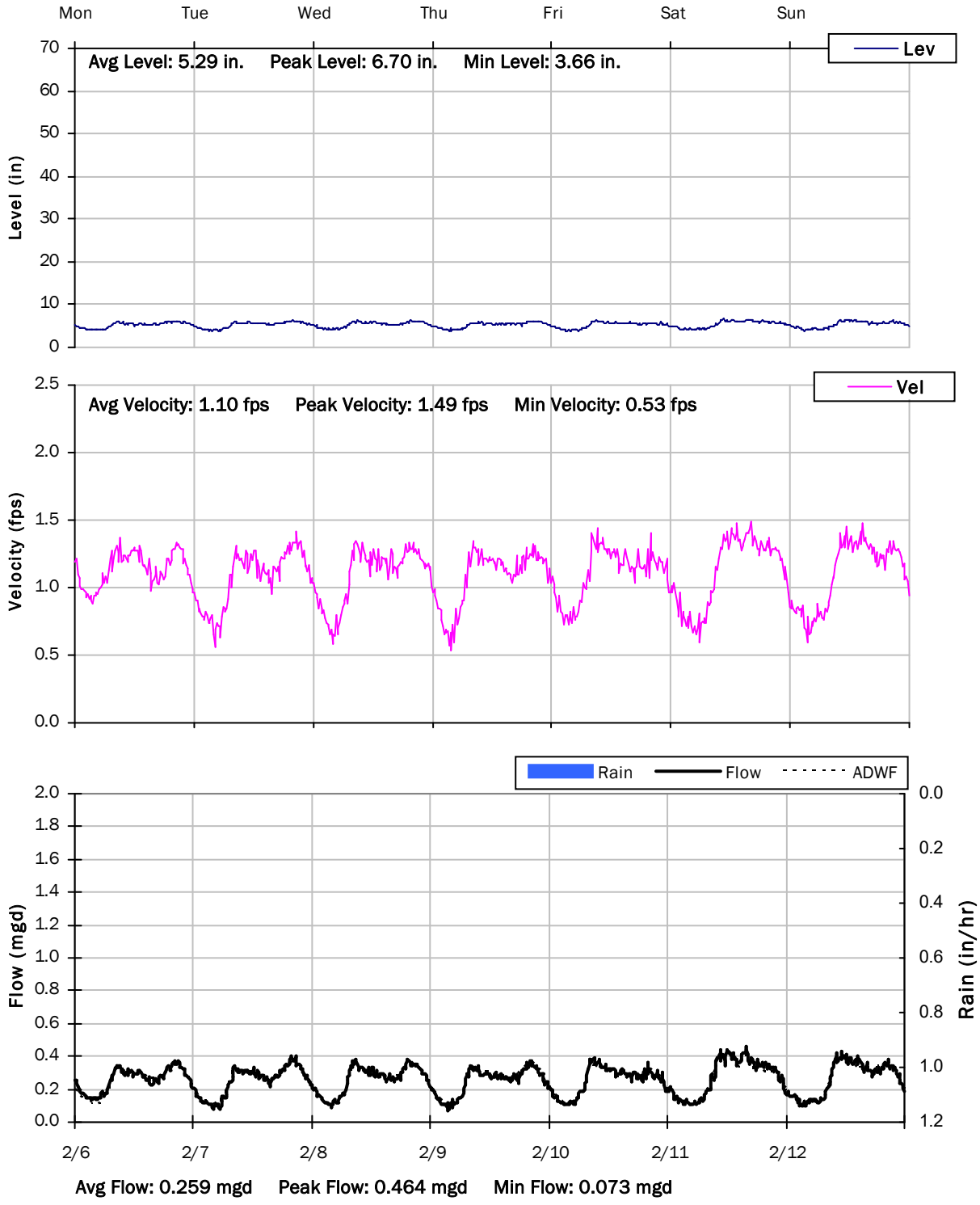
1/30/2023 to 2/6/2023



SITE 8

Weekly Level, Velocity and Flow Hydrographs

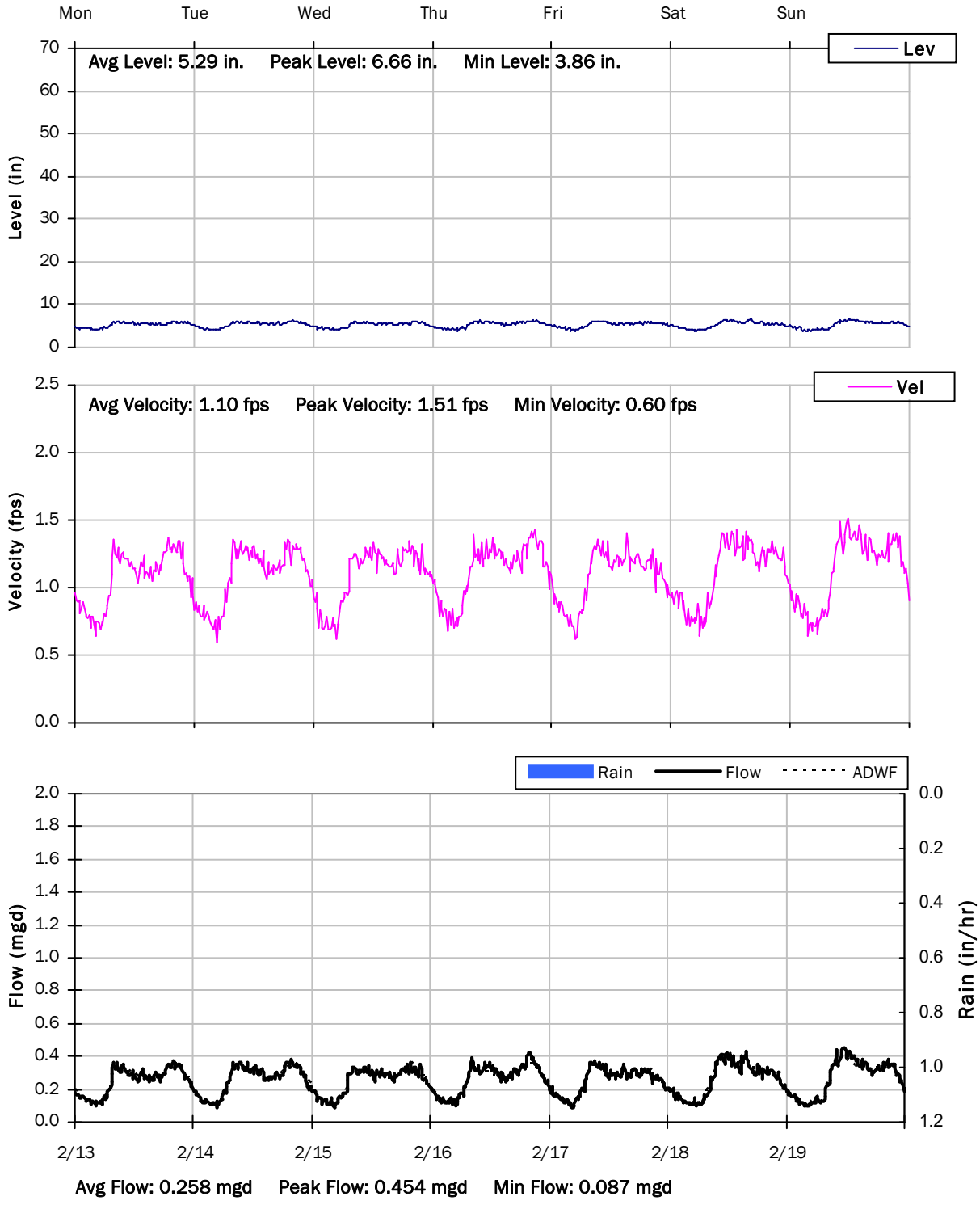
2/6/2023 to 2/13/2023



SITE 8

Weekly Level, Velocity and Flow Hydrographs

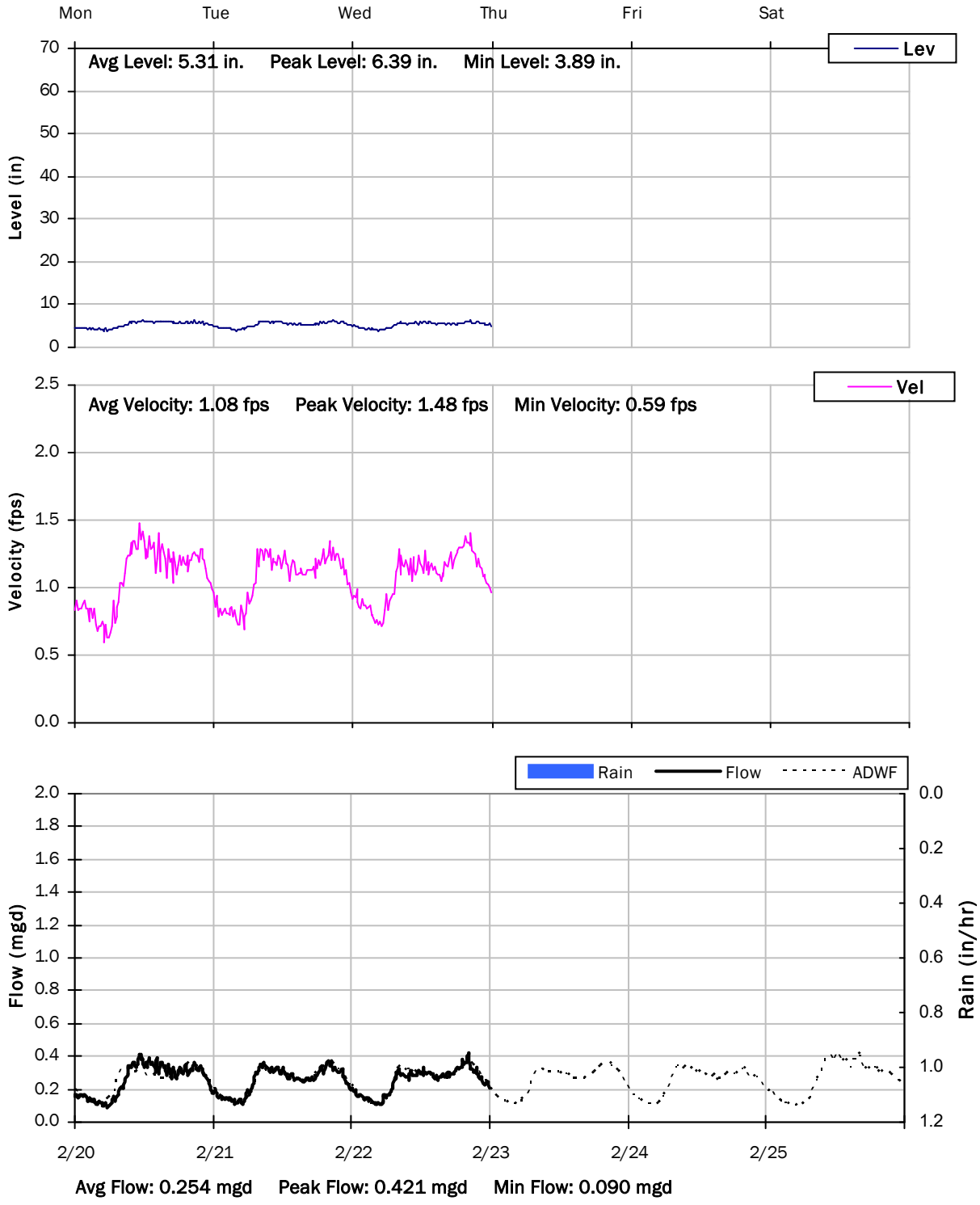
2/13/2023 to 2/20/2023



SITE 8

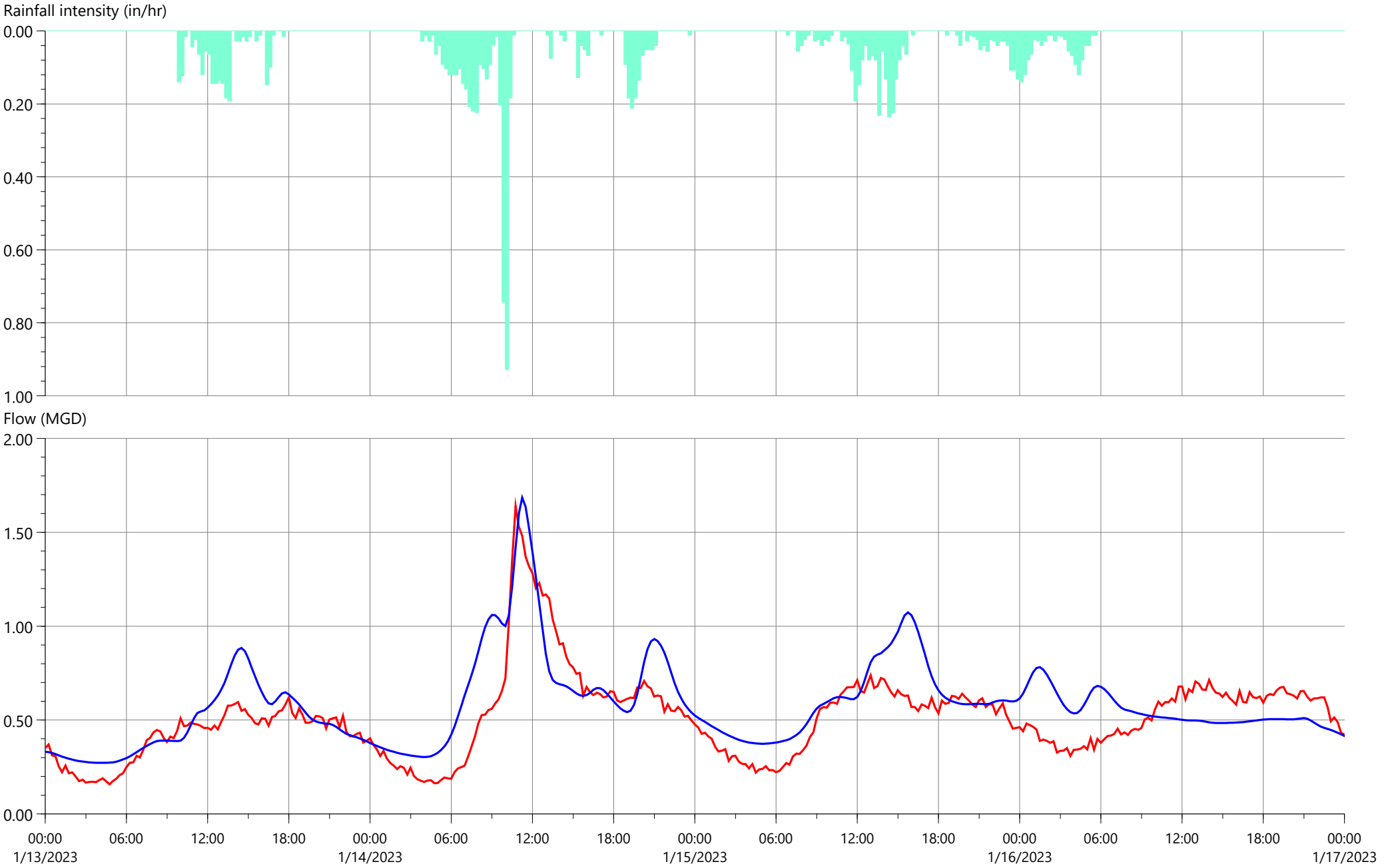
Weekly Level, Velocity and Flow Hydrographs

2/20/2023 to 2/27/2023



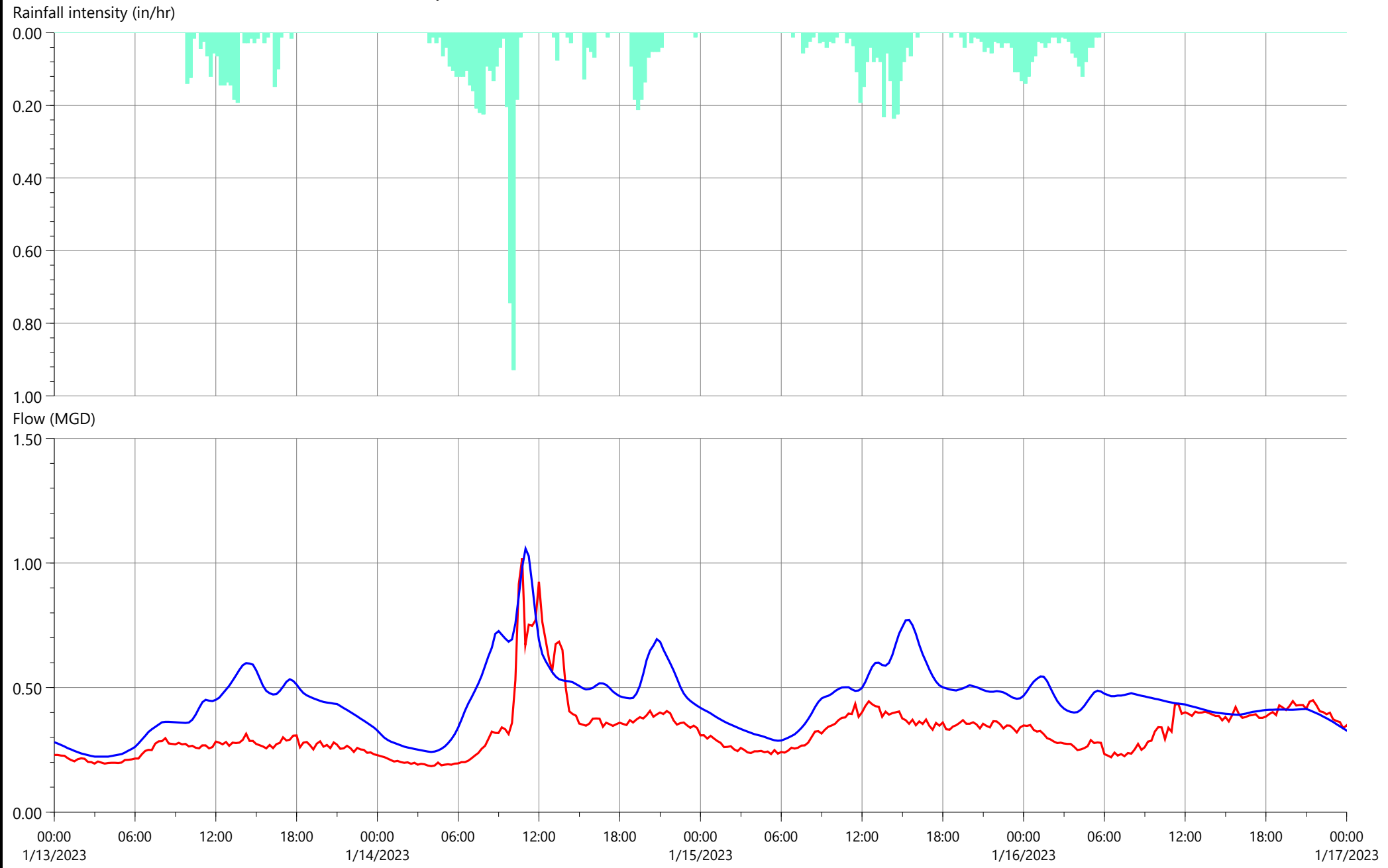
Appendix B. Wet Weather Calibration Plots

Flow Survey Location (Obs.) Site 1, Model Location (Pred.) D/S WY_MHID0090.1, Rainfall Profile: 1



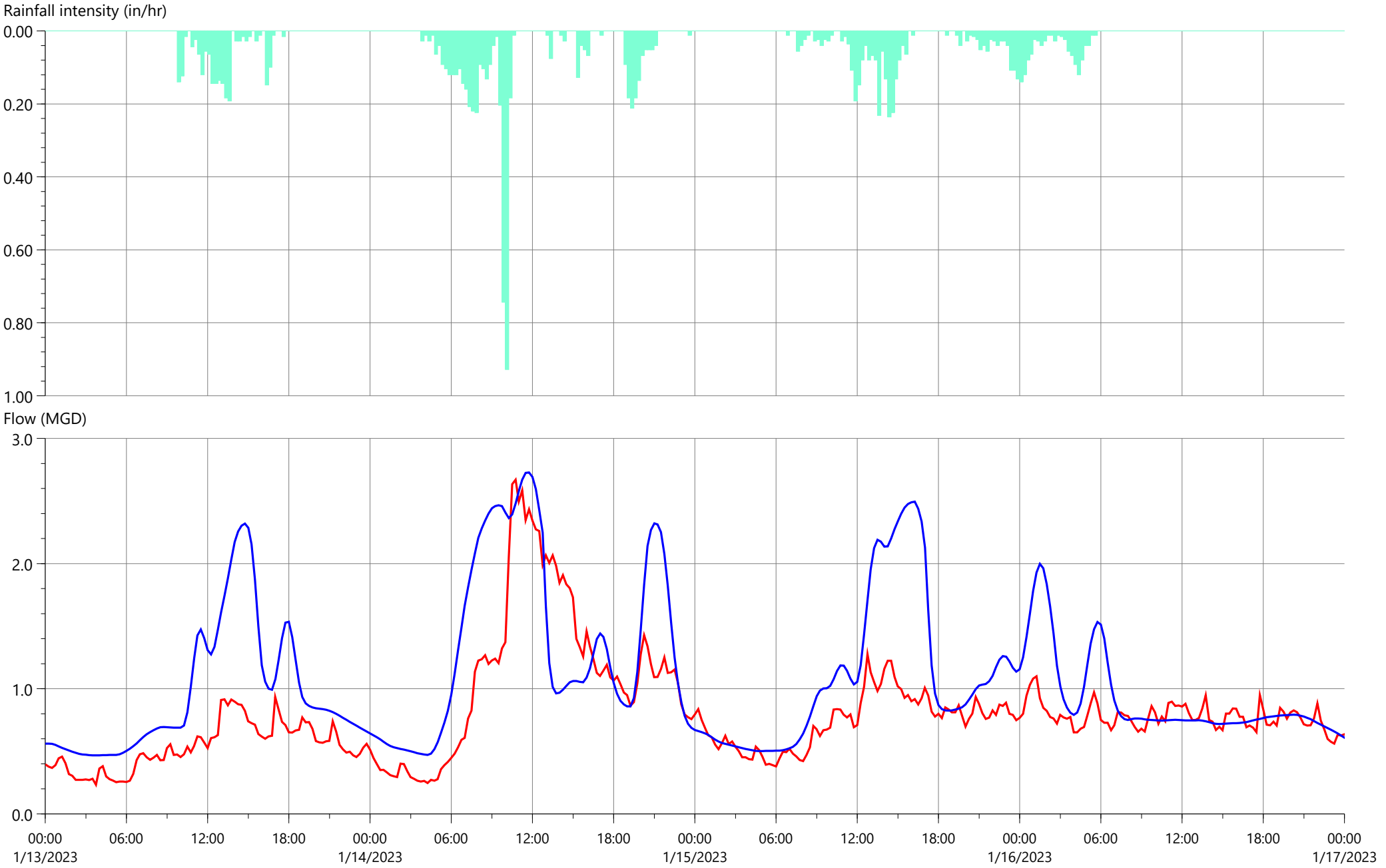
	Rainfall			Flow		
	Depth (in)	Peak (in/hr)	Average (in/hr)	Min (MGD)	Max (MGD)	Volume (US Mgal)
Rain	3.062	0.928	0.032			
Observed				0.158	1.639	2.042
...tions CalibrationStorm				0.272	1.685	2.314

Flow Survey Location (Obs.) Site 2, Model Location (Pred.) D/S WY_MHID0286.1, Rainfall Profile: 1



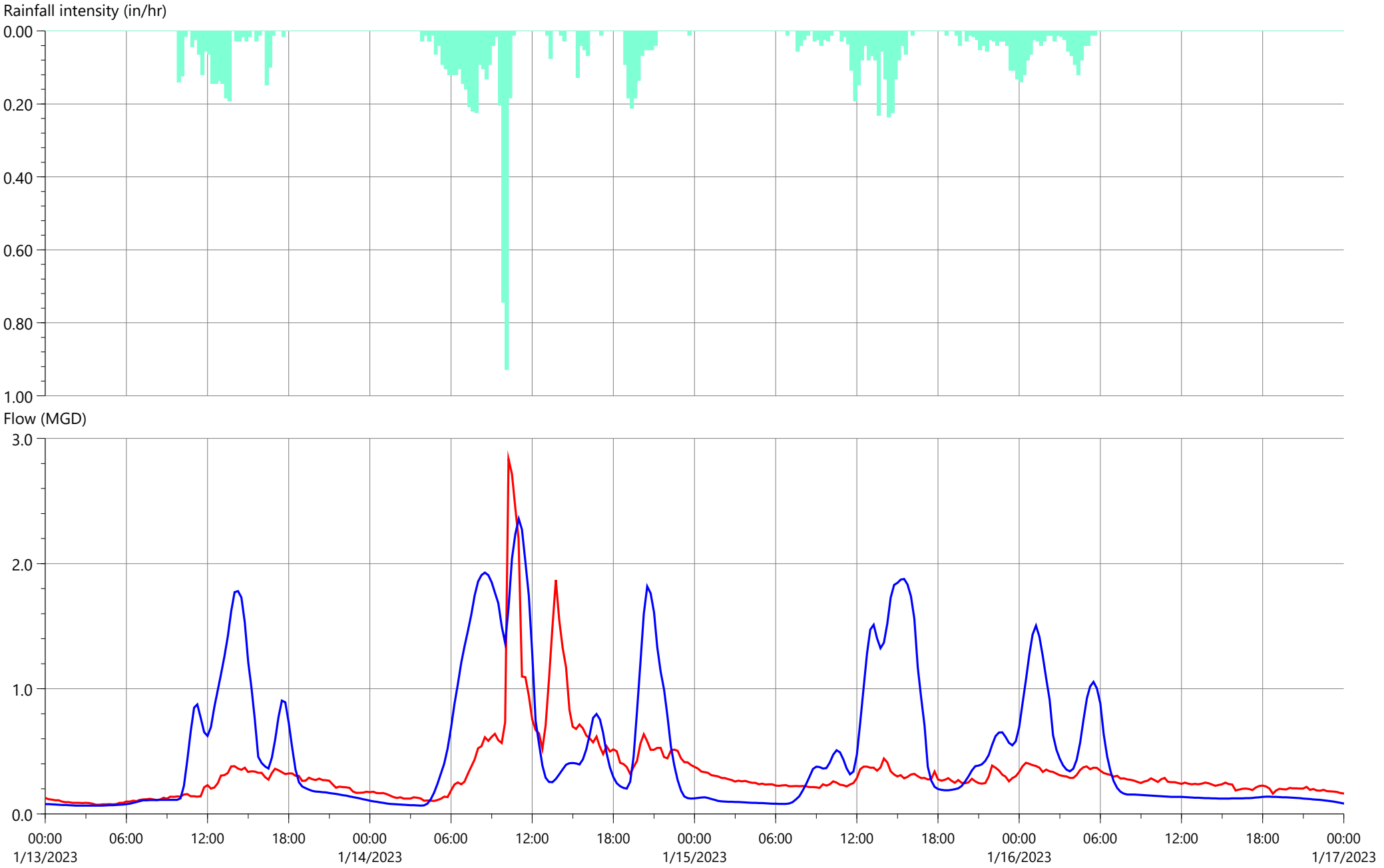
	Rainfall			Flow		
	Depth (in)	Peak (in/hr)	Average (in/hr)	Min (MGD)	Max (MGD)	Volume (US Mgal)
Rain	3.062	0.928	0.032			
Observed				0.185	1.019	1.294
...tions CalibrationStorm				0.223	1.057	1.788

Flow Survey Location (Obs.) Site 3, Model Location (Pred.) D/S WY_MHID0217.1, Rainfall Profile: 1



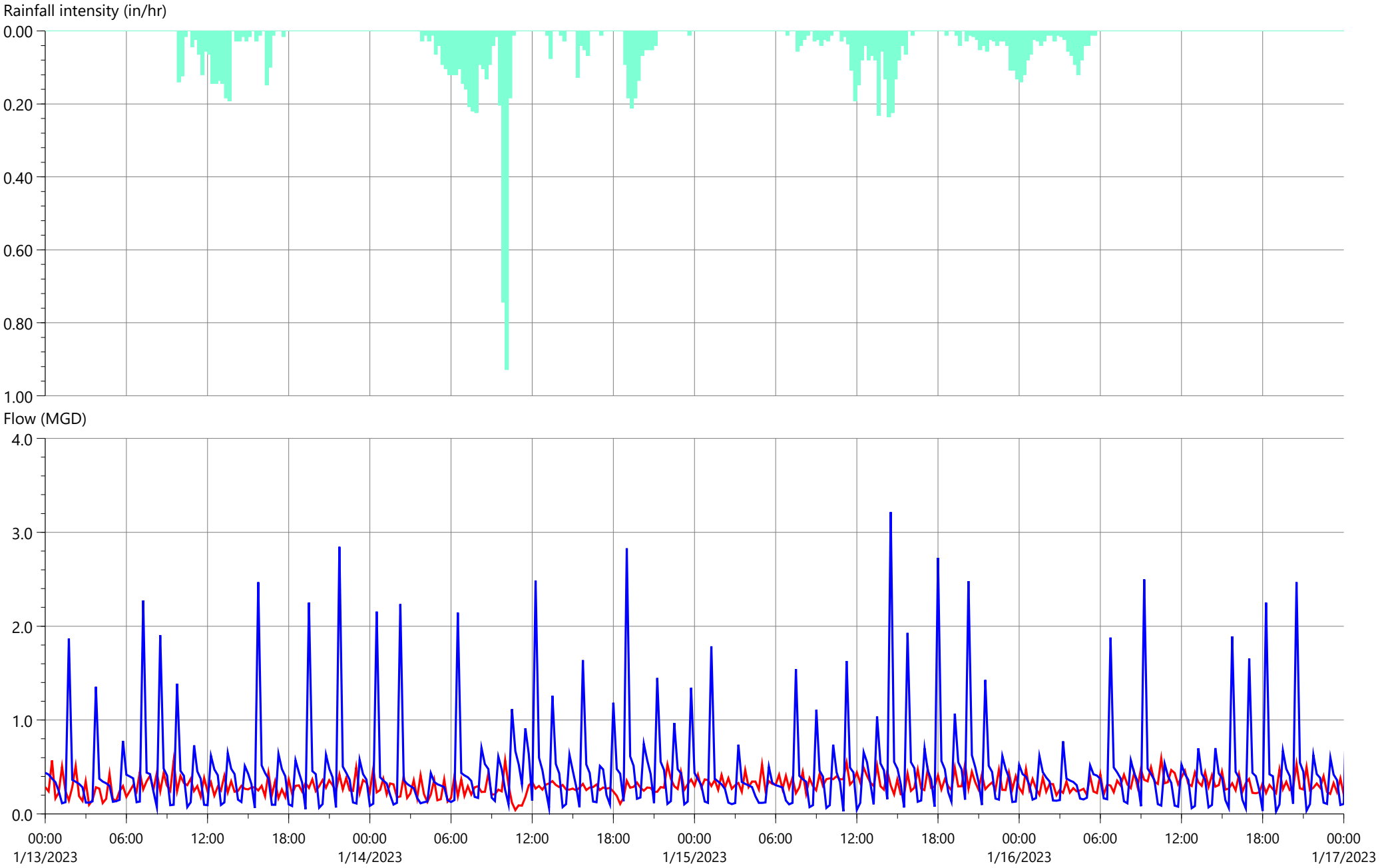
	Rainfall			Flow		
	Depth (in)	Peak (in/hr)	Average (in/hr)	Min (MGD)	Max (MGD)	Volume (US Mgal)
Rain	3.062	0.928	0.032			
Observed				0.233	2.670	3.169
...tions CalibrationStorm				0.468	2.728	4.331

Flow Survey Location (Obs.) Site 4, Model Location (Pred.) D/S WY_MHID0156.1, Rainfall Profile: 1



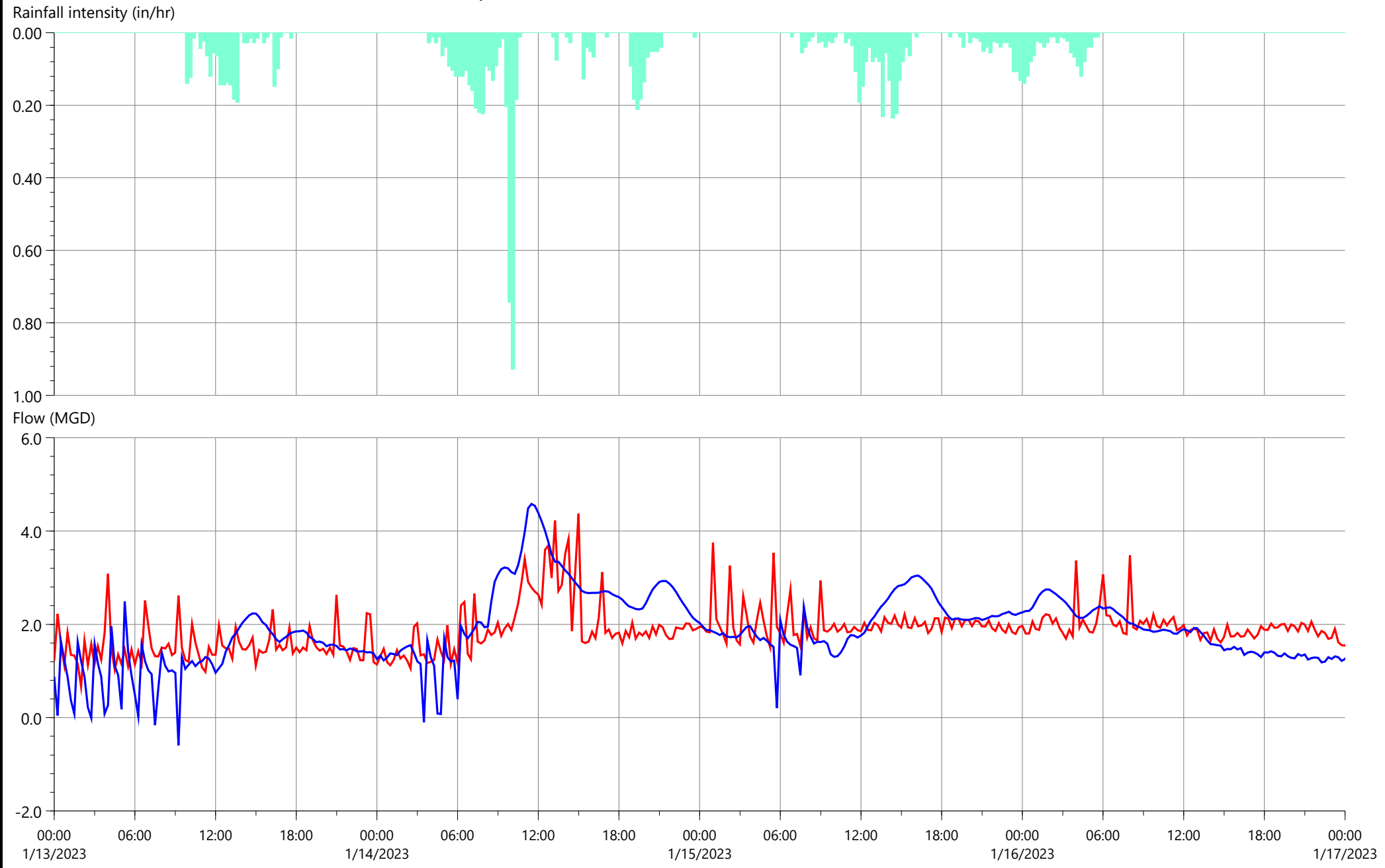
	Rainfall			Flow		
	Depth (in)	Peak (in/hr)	Average (in/hr)	Min (MGD)	Max (MGD)	Volume (US Mgal)
Rain	3.062	0.928	0.032			
Observed				0.074	2.835	1.315
...tions CalibrationStorm				0.066	2.356	1.967

Flow Survey Location (Obs.) Site 5, Model Location (Pred.) D/S 8376.1, Rainfall Profile: 1



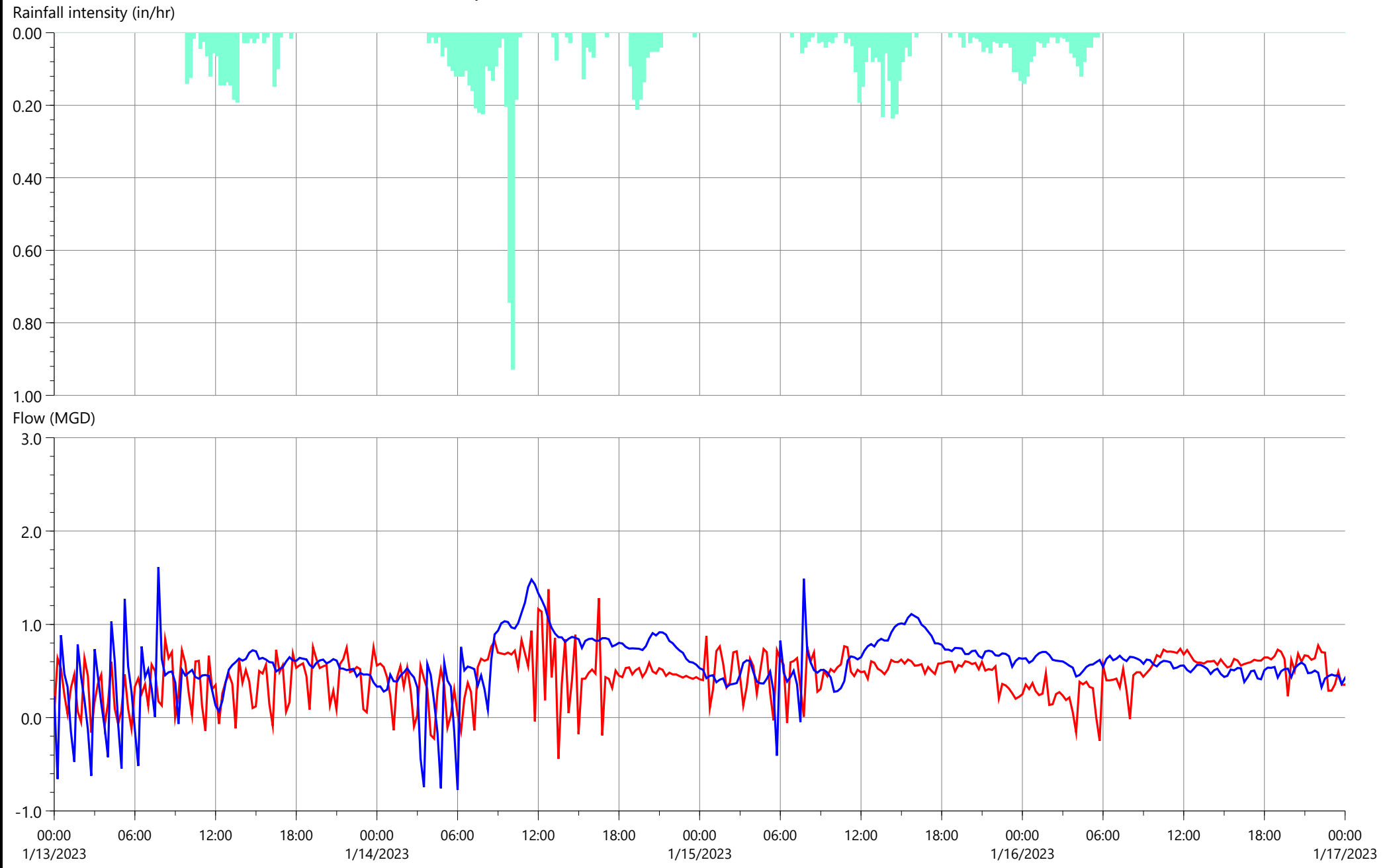
	Rainfall			Flow		
	Depth (in)	Peak (in/hr)	Average (in/hr)	Min (MGD)	Max (MGD)	Volume (US Mgal)
Rain	3.062	0.928	0.032			
Observed				0.041	0.593	1.220
...tions CalibrationStorm				0.025	3.214	1.879

Flow Survey Location (Obs.) Site 6, Model Location (Pred.) D/S 97.1, Rainfall Profile: 1



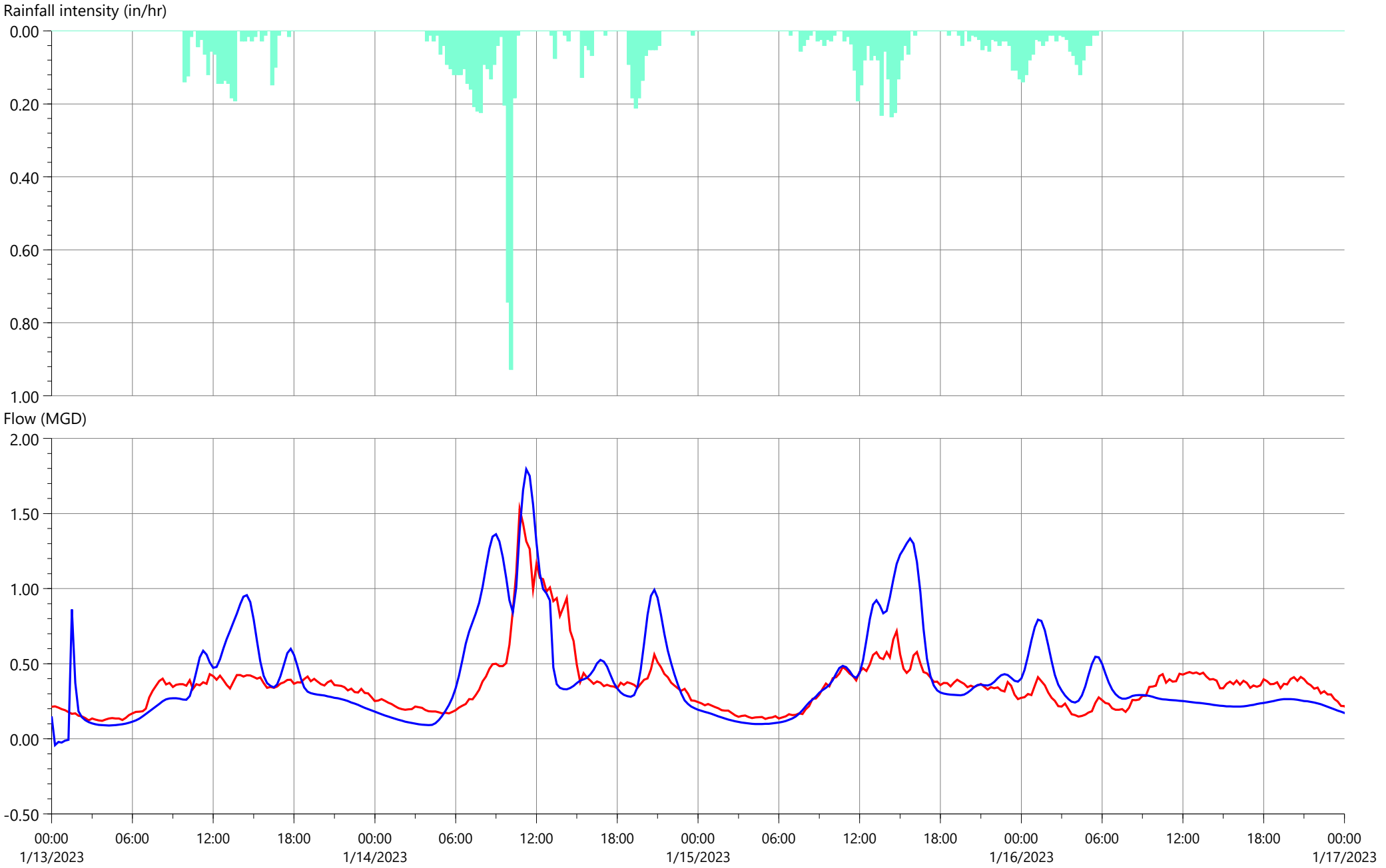
	Rainfall			Flow		
	Depth (in)	Peak (in/hr)	Average (in/hr)	Min (MGD)	Max (MGD)	Volume (US Mgal)
Rain	3.062	0.928	0.032			
Observed				0.662	4.372	7.466
...tions CalibrationStorm				-0.593	4.578	7.548

Flow Survey Location (Obs.) Site 7, Model Location (Pred.) D/S 644.1, Rainfall Profile: 1



	Rainfall			Flow		
	Depth (in)	Peak (in/hr)	Average (in/hr)	Min (MGD)	Max (MGD)	Volume (US Mgal)
Rain	3.062	0.928	0.032			
Observed				-0.442	1.375	1.773
...tions CalibrationStorm				-0.776	1.615	2.266

Flow Survey Location (Obs.) Site 8, Model Location (Pred.) D/S WY_MHID0309.1, Rainfall Profile: 1



	Rainfall			Flow		
	Depth (in)	Peak (in/hr)	Average (in/hr)	Min (MGD)	Max (MGD)	Volume (US Mgal)
Rain	3.062	0.928	0.032			
Observed				0.119	1.531	1.420
...tions CalibrationStorm				-0.041	1.794	1.607

Appendix C. Pump Station Condition Assessment Technical Memorandum

DRAFT

PUMP STATION CONDITION ASSESSMENT

Condition Assessment Technical Memorandum

B&V PROJECT NO. 413644
B&V FILE NO. 40.4000

©Black & Veatch Holding Company 2024. All rights reserved.

PREPARED FOR

City of West Sacramento

13 JUNE 2024

BLACK & VEATCH

Prepared by:

_____ _____
Signature **Date**

Austin Picano
Printed Name

Reviewed by:

_____ _____
Signature **Date**

Clinton McAdams
Printed Name

Professional Engineer:

_____ _____
Signature **Date**

_____
Printed Name

_____
License No.

Approved by:

_____ _____
Signature **Date**

_____
Printed Name

Table of Contents

1.0 Introduction 1-1
2.0 Assessment Approach 2-1
2.1 Record Data Review 2-1
2.2 Electronic Field Forms 2-1
2.3 Condition Scoring Approach 2-1
3.0 Record Review Results 3-1
4.0 Field Assessment 4-1
4.1 Allan Lift Station Field Assessment 4-2
4.2 Bryte Pump Station Field Assessment 4-7
4.3 Industrial Pump Station Field Assessment 4-11
4.4 Jefferson Pump Station Field Assessment 4-15
4.5 South Pump Station Field Assessment 4-19
4.6 Southport Pump Station Field Assessment 4-23
5.0 Results Discussion & Conclusions 5-1
6.0 Recommendations 6-1
Appendix A. Asset Inventory A-1
Appendix B. Risk Assessment Scoring Matrix B-1

LIST OF TABLES

Table 1-1 Pumping Facilities Assessed in March 2024 1-1
Table 2-1 District Provided Background Data 2-1
Table 2-2 Summarized Condition Score Matrix 2-2
Table 4-1 Field Assessment Score Summary for All Pump Stations 4-2
Table 4-2 Field Assessment Score Summary for Allan Lift Station 4-3
Table 4-3 Field Assessment Score Summary for Bryte Pump Station 4-8
Table 4-4 Field Assessment Score Summary for Industrial Pump Station 4-12
Table 4-5 Field Assessment Score Summary for Jefferson Pump Station 4-16
Table 4-6 Field Assessment Score Summary for South Pump Station 4-20
Table 4-7 Field Assessment Score Summary for Southport Pump Station 4-24
Table 6-1 Recommendation Summary 6-2

LIST OF FIGURES

Figure 1-1 West Sacramento Stations Assessed 1-1
Figure 3-1 Total Number of Assets by Discipline 3-1
Figure 3-2 Total Number of Assets by Facility and Discipline 3-1
Figure 4-1 Number of Assets by Likelihood of Failure Score and Facility or Discipline 4-1
Figure 4-2 Aerial View of Allan Lift Station 4-3

Figure 4-3 Station Overview Allan Pump Station 4-4
Figure 4-4 Aerial View of Bryte Pump Station 4-7
Figure 4-5 Station Overview Bryte Pump Station 4-8
Figure 4-6 Aerial View of Industrial Pump Station 4-11
Figure 4-7 Station Overview Industrial Pump Station 4-12
Figure 4-8 Aerial View of Jefferson Pump Station 4-15
Figure 4-9 Station Overview Jefferson Pump Station 4-16
Figure 4-10 Aerial View of South Pump Station 4-19
Figure 4-11 Station Overview South Pump Station 4-20
Figure 4-12 Aerial View of Southport Pump Station 4-23
Figure 4-13 Station Overview Southport Pump Station 4-24
Figure 5-1 Number of Assets by Likelihood of Failure Score 5-1
Figure 5-2 Number of Assets by Likelihood of Failure Score and Discipline 5-1

LIST OF PHOTOS

Photo 4-1 Civil – Minor Asphalt Cracking Within Perimeter Boundaries 4-4
Photo 4-2 Structural – Wet Well Lining Failure 4-4
Photo 4-3 Mechanical – Discharge Piping 4-5
Photo 4-4 Mechanical – Discharge Valves 4-5
Photo 4-5 Electrical – Generator Panel 4-5
Photo 4-6 Electrical – Locked Onsite Cabinets 4-5
Photo 4-7 I&C – Ultrasonic Level Transducer; Top Side of Wet Well 4-6
Photo 4-8 I&C – PLC Cabinet 4-6
Photo 4-10 Civil – Wet Well and Upstream Manhole Access 4-9
Photo 4-11 Structural– Electrical Building 4-9
Photo 4-12 Structural– Damage to Interior Ceiling; Electrical Building 4-9
Photo 4-13 Structural – Reinforcement Exposed; Bypass Vault 4-9
Photo 4-14 Mechanical – Bypass Piping 4-10
Photo 4-15 Mechanical – Generator; Corrosion on Exhaust Stack 4-10
Photo 4-16 Electrical – Separation; Electrical Conduit and Junction Box 4-10
Photo 4-17 Civil – Chain-Link Fencing Cut Open 4-13
Photo 4-18 Civil – Abandoned Surge Tank 4-13
Photo 4-19 Structural – Wet Well General Conditions 4-13
Photo 4-20 Structural – Dry Well General Conditions 4-13
Photo 4-21 Structural – Electrical Building with Gantry Crane 4-14
Photo 4-22 Mechanical – Pump/Motor #3 4-14
Photo 4-23 Mechanical – Wet Well Gate Stem 4-14
Photo 4-24 Mechanical – Discharge Header; General Condition 4-14
Photo 4-25 Civil – Control Building 4-17

Photo 4-26 Civil – Gantry Crane 4-17
Photo 4-27 Structural – Clogged Wet Well Influent Gate 4-17
Photo 4-28 Structural – Dry Well General Conditions 4-17
Photo 4-29 Structural – Discharge Gasket Cracking and Signs of Leakage 4-18
Photo 4-30 Mechanical – Piping Paint Failure and Signs of Leakage 4-18
Photo 4-31 Electrical – Motor Control Cabinets; VFDs 4-18
Photo 4-32 I&C – Pressure Sensor and Flow Monitor; Discharge Header 4-18
Photo 4-33 Civil – General Site Conditions 4-21
Photo 4-34 Structural – Wet Well 4-21
Photo 4-35 Mechanical – Plug Valve Inoperable; Pump #2 4-21
Photo 4-36 Mechanical – Typical Pump Conditions; Pump #1 4-21
Photo 4-37 Mechanical – Sump Pump 4-22
Photo 4-38 Electrical – Motor Control Center 4-22
Photo 4-39 I&C – Inoperable Gas Monitor System 4-22
Photo 4-40 I&C – Interior of PLC Cabinet 4-22
Photo 4-41 Civil– Organic Odor Control Blower 4-25
Photo 4-42 Civil – Crack in Asphalt 4-25
Photo 4-43 Structural– TLock on Wet Well 4-25
Photo 4-44 Structural – Paint Failure and Signs of Leakage in Dry Well and Suction Piping 4-25
Photo 4-45 Mechanical– Paint Failure; Suction Piping 4-26
Photo 4-46 Mechanical – Bypass Piping Air Valve 4-26
Photo 4-47 Mechanical– Generator 4-26
Photo 4-48 I&C– Inoperable Flow Monitor 4-26

1.0 Introduction

The City of West Sacramento (City) took the necessary and responsible steps to further develop its asset management program. Intending to optimize management of assets that support wastewater pumping operations, Black & Veatch (BV) was retained by City to conduct a condition assessment on six wastewater pumping facilities. A list of facilities included in the condition assessment are shown in Figure 1-1 and Table 1-1 below.



Figure 1-1 West Sacramento Stations Assessed

Table 1-1 Pumping Facilities Assessed in March 2024

Pumping Facilities	Year Constructed	No. of Pumps	Existing Capacity	Generator	Onsite Assets
Allan Lift Station	1990, remodeled 2008	2 (15 HP)	600 gpm	Portable hookup	-
Bryte Pump Station	1984, remodeled 2008	3 (200 HP)	5,100 gpm	Onsite	Bypass piping
Industrial Pump Station	1974, remodeled 2008	3 (50 HP)	2,289 gpm	Portable hookup	Surge tank Odor Scrubber
Jefferson Pump Station	1988, remodeled 2008	3 (100 HP)	5,850 gpm	Onsite	Surge tank Odor Scrubber

South Pump Station	1948, remodeled 2008	3 (15 HP)	1,146 gpm	Portable hookup	-
Southport Pump Station	1972, remodeled 2008	4 (50 HP)	9,689 gpm	Onsite	Surge tank Organic Odor Control

Prior to deployment BV created an asset registry which identified the structural, architectural, electrical, process mechanical, building mechanical, and instrumentation and control (I&C) assets to be assessed. Prior to a field assessment, BV analyzed the asset registry and other District-provided data to understand asset background. BV developed a condition scoring approach to use during the field assessment of the assets, applying defendable scores through a consistent process.

Field work was conducted by BV condition assessment and asset management professionals March 26, 2024 & March 27, 2024. Field data was collected using ESRI® Survey123, a custom cloud-based electronic field form. Each asset was scored using a 1 to 5 scale based on its visual, physical condition. Additionally, the field team assessed the performance condition of each asset by interviewing City staff during the site visit regarding asset reliability, operability, and obsolescence. Following field work, BV subject matter experts correlated desktop and field data to assign final physical and performance condition scores for each asset.

Recommendations include high-level alternatives, implementation timing, and high-level opinions of probable cost.

2.0 Assessment Approach

This section discusses the approach used to review the background data, create the electronic field forms, and complete the condition scoring of the pump station assets. Summaries of the findings are discussed in Section 4.0 and 5.0 of this report.

2.1 Record Data Review

The City provided facility background data for BV to analyze prior to a field assessment. Table 2-1 highlights data provided for each pump station and for the overall system.

Table 2-1 District Provided Background Data

Pump Station and Lift Station Background Data
• Drawings • 2017 SSMP CIP Recommendation

Completing a thorough background data review aided the condition assessment by evaluating the feasibility of determining a baseline condition and verifying condition scores assigned during the field assessment. The full asset inventory for all six (6) assessed Stations is presented in Appendix A.

2.2 Electronic Field Forms

The Survey123 application was used to collect conditions on individual assets, including:

- General asset information (process, asset class, description, location)
- Visual condition observations
- Photographs (up to four)
- Performance notes

2.3 Condition Scoring Approach

The City provided their previous 2017 Condition Assessment recommendations to BV prior to the site visit. Referencing this document, BV developed a condition score of 1 to 5 based on the degree of replacement, summarized in Table 2-2. The new matrix incorporates asset disciplines (site/civil, structural, mechanical, electrical, I&C), condition categories (physical, performance) and provides additional details to aid in scoring asset condition. The complete condition score matrix is presented in Appendix B.

The likelihood of failure (LOF) score was assigned based on the maximum condition score (physical, performance) for each asset to ensure LOF scores reflect the worst-case condition. Using the maximum condition score decouples the two scores to prevent underperforming or physically failed assets from being overlooked.

Table 2-2 Summarized Condition Score Matrix

Observed Condition Score	Description	Useful Life Consumed	Level of Maintenance Currently Required	Improvements Implementation Timeframe
1	Like New Condition	< 5%	Normal Preventative / Predictive Maintenance	20-30 years
2	Minor Defects Only (some wear)	5% - 20%	Normal Preventative / Predictive Maintenance / Minor Corrective Maintenance	15-20 years
3	Moderate Deterioration	21% - 50%	Normal Preventative / Predictive Maintenance / Major Corrective Maintenance	10-15 years
4	Significant Deterioration	50% - 75%	Rehabilitate, if Possible	5-10 years
5	Virtually Unserviceable/Failure Concern	> 75%	Consider Replacement	0-5 years

The condition score matrix was referenced to assign condition scores for the field assessment presented in Section 3.0.

3.0 Record Review Results

Existing asset inventories were created by the BV for all facilities. BV added assets to the inventories based on record drawing review and field staff input. The total number of assets for all six assessed stations was 319 assets, as shown in Figure 3-1 and Figure 3-2.

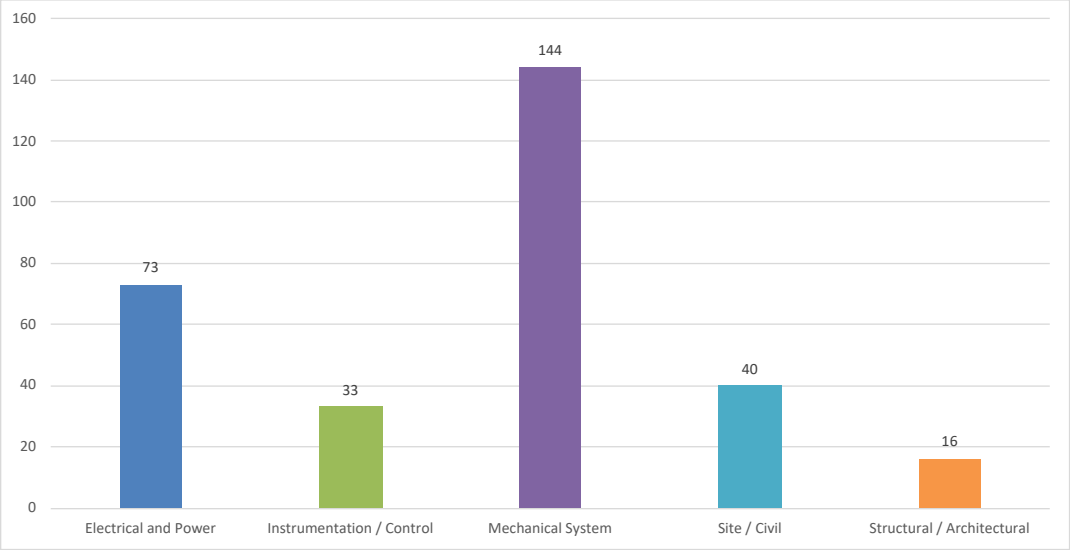


Figure 3-1 Total Number of Assets by Discipline

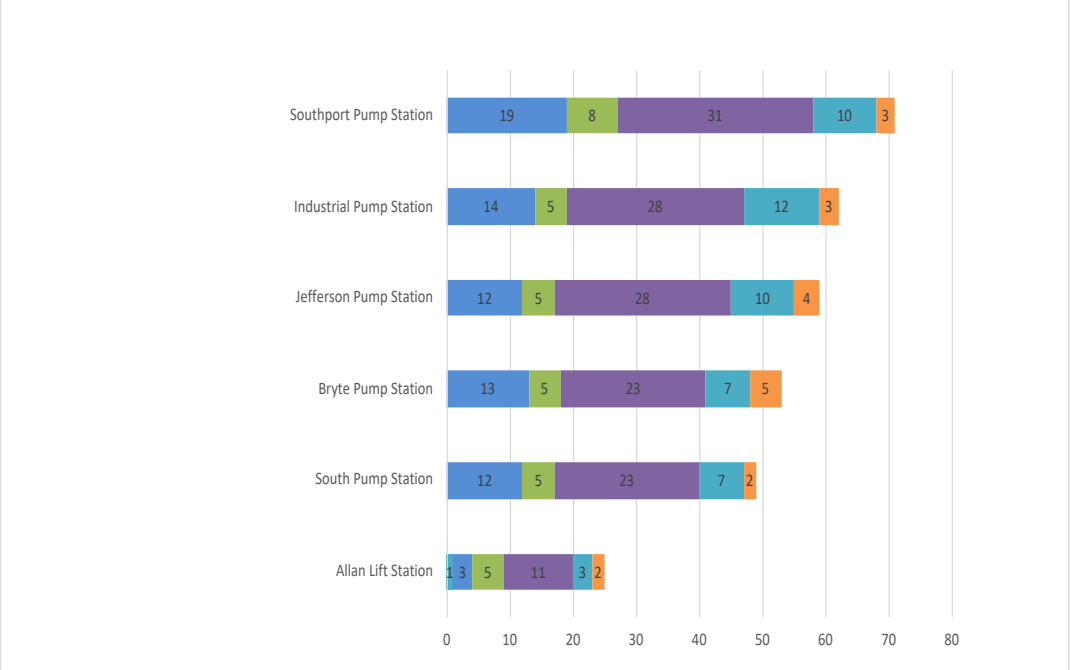


Figure 3-2 Total Number of Assets by Facility and Discipline

The full asset inventory for all six (6) assessed Stations is presented in Appendix A.

4.0 Field Assessment

6On March 23, 2024 & March 24, 2024, BV visited the six (6) pump stations and assessed the condition of each asset with support from City staff. Likelihood of failure score summaries are presented in Figure 4-1. At a facility level, 36 out of the 319 total assets, or approximately 11 percent of the facilities were assigned a condition score 4 or 5, as seen in the red color at the right side of the chart in Figure 4-1. Assets were primarily assigned a condition score 2 or 3, or were midway through their lifecycle.

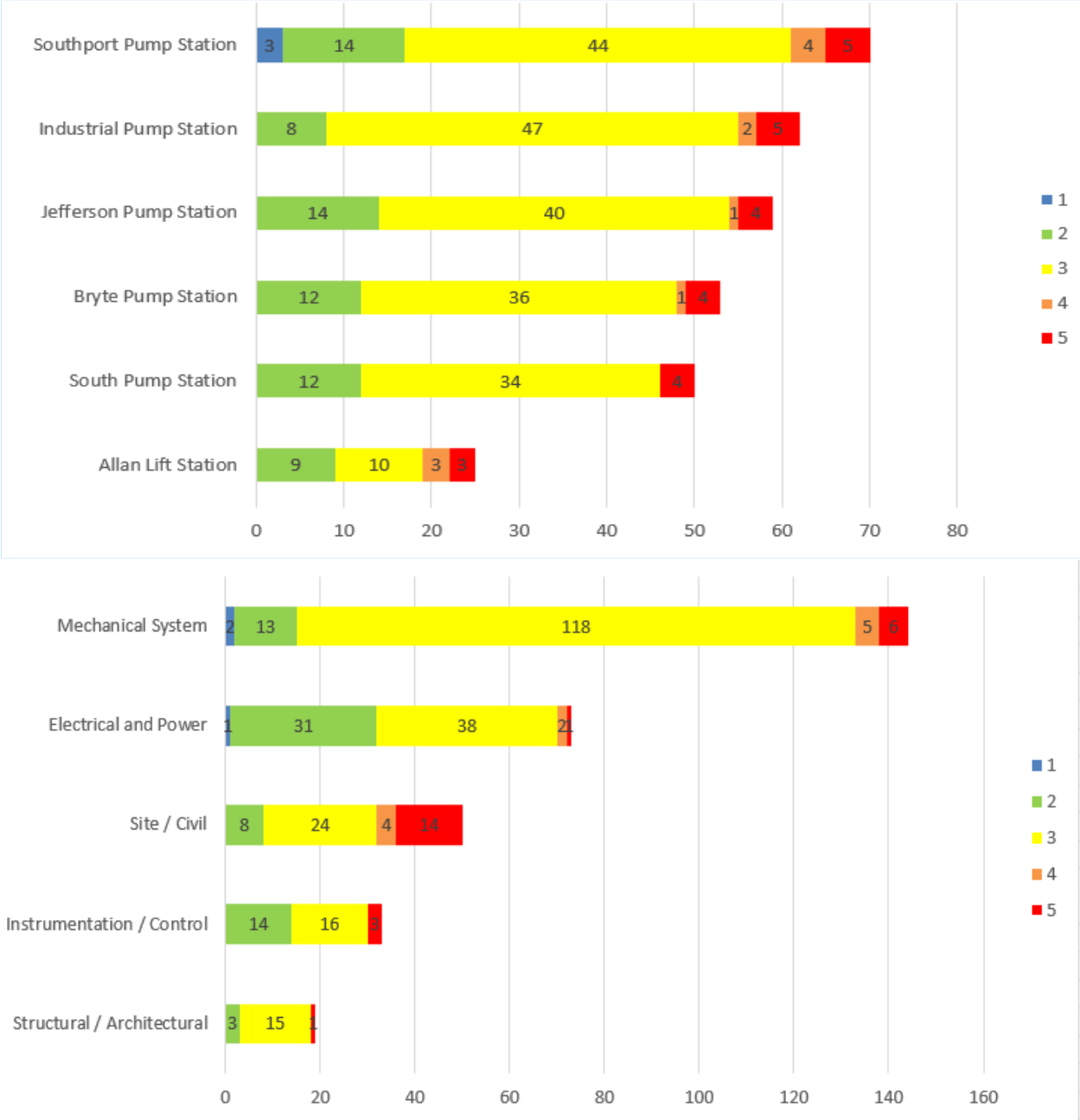


Figure 4-1 Number of Assets by Likelihood of Failure Score and Facility or Discipline

Table 4-1 presents a statistical summary of the condition scores and LOF scores assigned for each asset discipline. Of the 319 total assets, the minimum condition score was 1.0, the average physical condition

score was 2.9 and the average performance condition score was 2.9, and the maximum condition score was 5.0.

Table 4-1 Field Assessment Score Summary for All Pump Stations

Discipline	Electrical	I&C	Mechanical	Site	Structural	Overall
Asset Count	73	33	144	50	19	319
Average Performance Score	2.5	2.8	3.0	3.5	2.6	2.9
Average Physical Score	2.6	2.8	3.0	3.2	2.8	2.9
Minimum LOF Score	1	2	1	2	2	1
Average LOF Score	2.6	2.8	3.0	3.5	2.9	3.0
Maximum LOF Score	5	5	5	5	5	5

The following subsections present a summary of the condition scores and LOF scores by each facility.

4.1 Allan Lift Station Field Assessment

Allan Street Lift Station is a gravity sewer system that feeds the Southport Pump Station located in West Sacramento at the end of Allen Ave. Built in 1990, the pump station has a design capacity of 600 gallons per minute (GPM) via two 4-inch 5 horsepower (hp) submersible Flygt pumps. The lift station was initially fitted with a bubbler level controller but has since been replaced with an ultrasonic level transducer. The bubbler compressor and housing remain onsite but is not utilized. There is no emergency generator onsite, but a portable generator hookup is within the lift station fence boundaries. The asset inventory for the Allan Street Lift Station is presented in Appendix A.

Table 4-2 presents a statistical summary of the condition scores and LOF scores assigned for each asset discipline at the Cajalco Pump Station. Of the 26 total assets, the minimum condition score was 1.0, the average physical condition score was 4.4 and the average performance condition score was 4.4, and the maximum condition score was 6.0. The LOF score was assigned based on the maximum condition score for each asset, resulting in a minimum LOF score of 1.0, an average of 4.4, and a maximum of 6.0.

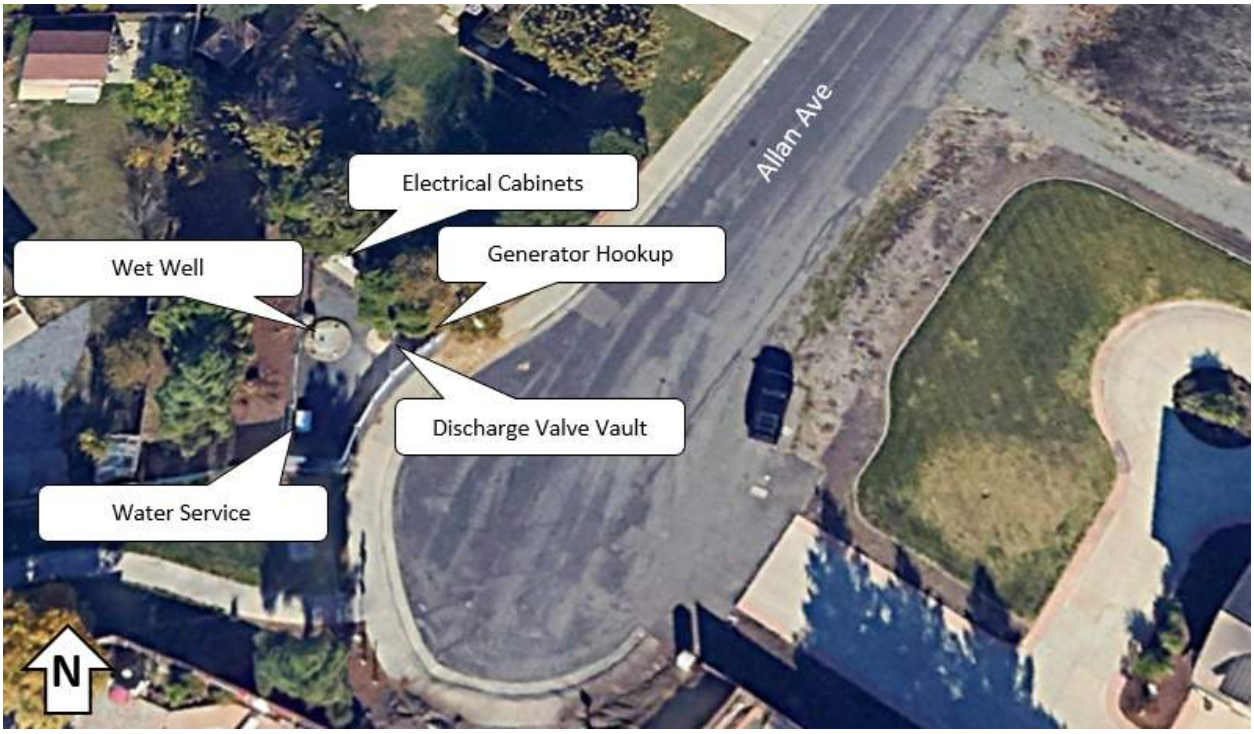


Figure 4-2 **Aerial View of Allan Lift Station**

Table 4-2 **Field Assessment Score Summary for Allan Lift Station**

Discipline	Electrical	I&C	Mechanical	Site	Structural	Overall
Asset Count	3	5	11	4	2	25
Average Performance Score	3	2.7	2.6	2.8	3.8	4.0
Average Physical Score	2.9	2.7	2.6	2.8	3.5	3.0
Minimum LOF Score	2	2	2	2	3	3
Average LOF Score	3	3	3	3	4	4
Maximum LOF Score	5	3	5	4	5	5



Figure 4-3 **Station Overview Allan Pump Station**

The following photographs provide a representation of the asset condition observed during the field assessment.



Photo 4-1 **Civil – Minor Asphalt Cracking Within Perimeter Boundaries**



Photo 4-2 **Structural – Wet Well Lining Failure**



Photo 4-3 Mechanical – Buildup on Discharge Piping



Photo 4-4 Mechanical – Discharge Valves; Limited Access



Photo 4-5 Electrical – Generator Panel; New Instal



Photo 4-6 Electrical – Locked Onsite Cabinets



Photo 4-7 I&C – Ultrasonic Level Transducer; Top Side of Wet Well

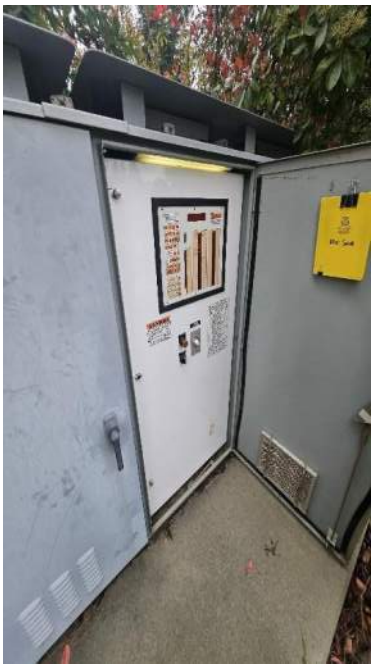


Photo 4-8 I&C – PLC Cabinet

4.2 Bryte Pump Station Field Assessment

Bryte Pump Station is a wastewater pump station located in West Sacramento at the end of Citrus Street. Built in 1984 and expanded in 2008, the pump station has a design capacity of 5,100 gallons per minute (GPM) via three 200 horsepower (hp) centrifugal Smith & Loveless pumps. The lift station utilizes a bubbler level controller which had a compressor replacement in 2018. The site has the capabilities to bypass the wet well via isolation valves and a bypass connect on the east side of the station. There is a functioning emergency generator onsite. Entry was not made into the Bryte Pump Station dry well due to elevator issues. Scoring for assets in the dry well were extrapolated from the other pump stations observed during the deployment. The asset inventory for the Bryte Pump Station is presented in Appendix A.

Table 4-3 presents a statistical summary of the condition scores and LOF scores assigned for each asset discipline at the Elderidge Pump Station. Of the 35 total assets, the minimum condition score was 2.0, the average physical condition score was 4.0 and the average performance condition score was 3.6, and the maximum condition score was 6.0. The LOF score was assigned based on the maximum condition score for each asset, resulting in a minimum LOF score of 2.0, an average of 4.0, and a maximum of 5.0.

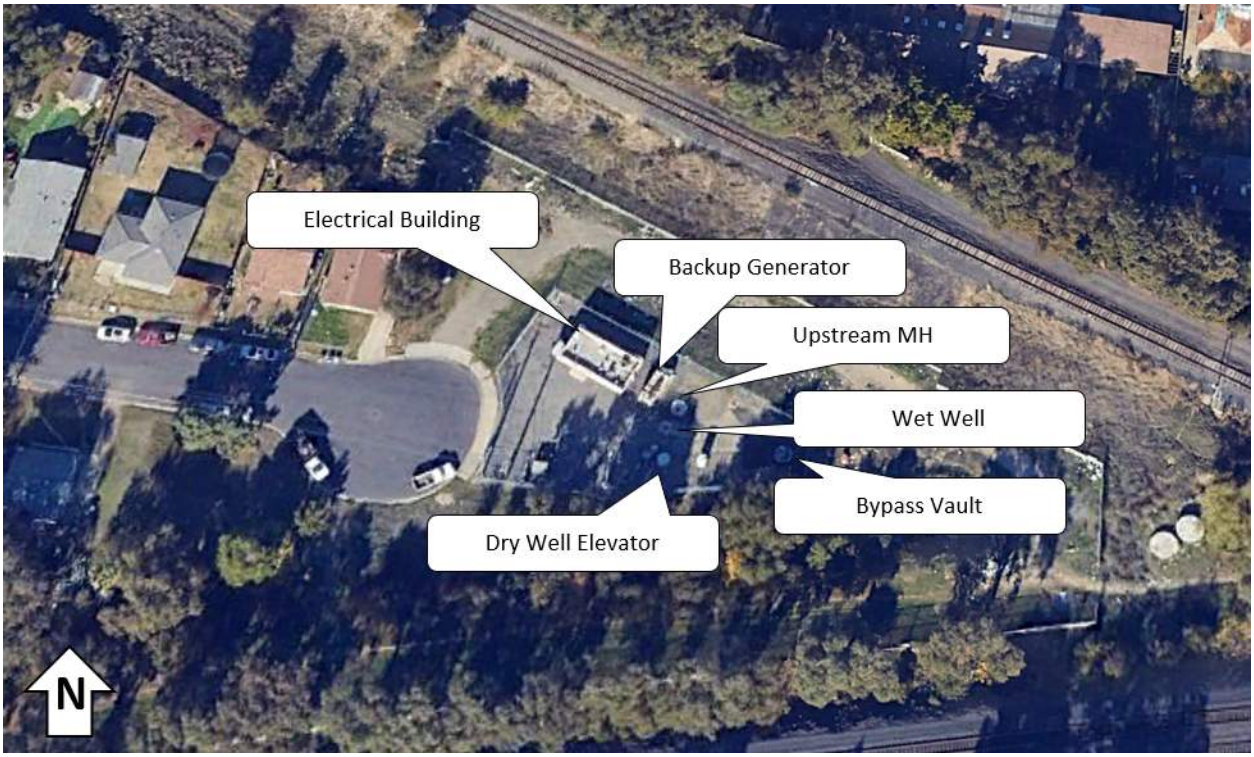


Figure 4-4 Aerial View of Bryte Pump Station

Table 4-3 Field Assessment Score Summary for Bryte Pump Station

Discipline	Electrical	I&C	Mechanical	Site	Structural	Overall
Asset Count	13	5	23	7	5	53
Average Performance Score	2.3	3.0	3.0	3.5	2.5	2.8
Average Physical Score	2.4	3.0	2.5	3.2	3.0	2.8
Minimum LOF Score	2	2	2	2	3	2
Average LOF Score	2	3	3	4	3	3
Maximum LOF Score	4	5	5	5	3	5

The following photographs provide a representation of the asset condition observed during the field assessment.



Figure 4-5 Station Overview Bryte Pump Station



Photo 4-9 Civil – Wet Well and Upstream Manhole Access



Photo 4-10 Structural– Electrical Building



Photo 4-11 Structural– Damage to Interior Ceiling; Electrical Building



Photo 4-12 Structural – Reinforcement Exposed; Bypass Vault



Photo 4-13 Mechanical – Bypass Piping; Minor Rust



Photo 4-14 Mechanical – Generator; Corrosion on Exhaust Stack



Photo 4-15 Electrical – Separation; Electrical Conduit and Junction Box

4.3 Industrial Pump Station Field Assessment

Industrial Pump Station is a wastewater pump station located in West Sacramento on Industrial Ave east of Enterprise Blvd. Built in 1974 and expanded in 2008, the pump station has a design capacity of 2,289 gallons per minute (GPM) via three 50 horsepower (hp) centrifugal Smith & Loveless pumps. The lift station utilizes a bubbler level controller which had a compressor replacement in 2020. The site has both an abandoned surge tank and odor control scrubber within the perimeter fencing. There is no emergency generator onsite, but a portable generator hookup is within the lift station fence boundaries. An overhead gantry crane is onsite adjacent to the electrical room. The asset inventory for the Industrial Pump Station is presented in Appendix A.

Table 4-4 presents a statistical summary of the condition scores and LOF scores assigned for each asset discipline at the Rolling Meadows Pump Station. Of the 34 total assets, the minimum condition score was 1.0, the average physical condition score was 2.8 and the average performance condition score was 2.6, and the maximum condition score was 5.0. The LOF score was assigned based on the maximum condition score for each asset, resulting in a minimum LOF score of 1.0, an average of 2.8, and a maximum of 5.0.

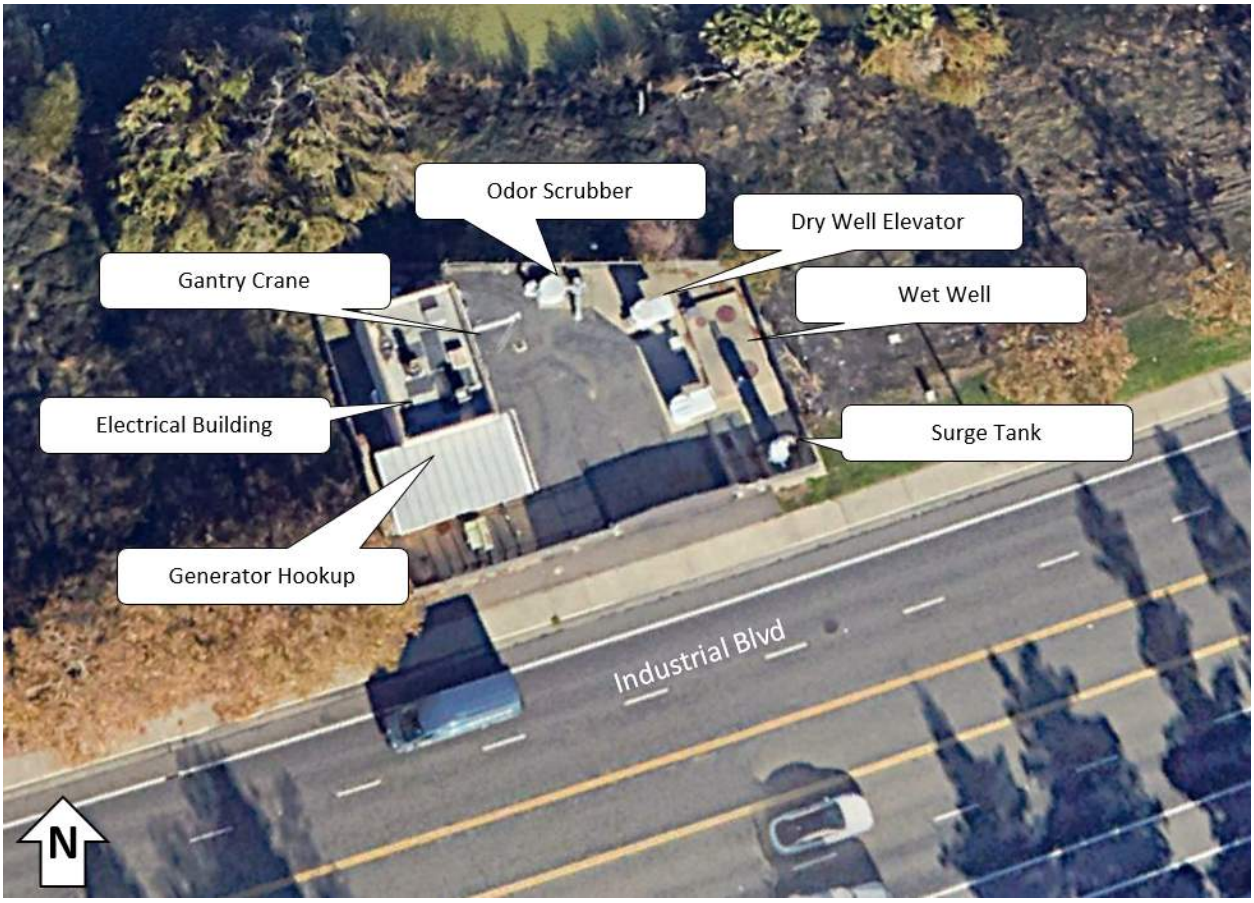


Figure 4-6 **Aerial View of Industrial Pump Station**

Table 4-4 Field Assessment Score Summary for Industrial Pump Station

Discipline	Electrical	I&C	Mechanical	Site	Structural	Overall
Asset Count	14	5	28	12	3	62
Average Performance Score	2.8	2.6	3.0	3.6	2.3	3.0
Average Physical Score	2.7	2.6	3.1	3.3	2.7	3.0
Minimum LOF Score	2	2	2	3	2	2
Average LOF Score	3	3	3	4	3	3
Maximum LOF Score	5	3	5	5	3	5

The following photographs provide a representation of the asset condition observed during the field assessment.



Figure 4-7 Station Overview Industrial Pump Station



Photo 4-16 Civil – Chain-Link Fencing Cut Open



Photo 4-17 Civil – Abandoned Surge Tank



Photo 4-18 Structural – Wet Well General Conditions



Photo 4-19 Structural – Dry Well General Conditions



Photo 4-20 Structural – Electrical Building with Gantry Crane



Photo 4-21 Mechanical – Pump/Motor #3; Good Condition



Photo 4-22 Mechanical – Wet Well Gate Stem; Good Condition



Photo 4-23 Mechanical – Discharge Header; General Condition

4.4 Jefferson Pump Station Field Assessment

Jefferson Pump Station is a wastewater pump station located in West Sacramento on Jefferson Blvd north of West Capitol Ave. Built in 1988 and expanded in 2008, the pump station has a design capacity of 5,850 gallons per minute (GPM) via three 100 horsepower (hp) centrifugal Smith & Loveless pumps. The lift station utilizes a bubbler level controller. The site has both an abandoned surge tank and components of an odor control scrubber within the perimeter fencing. There is a functioning emergency generator onsite. An overhead gantry crane is onsite adjacent to the electrical room. The asset inventory for the Jefferson Pump Station is presented in Appendix A.

Table 4-5 presents a statistical summary of the condition scores and LOF scores assigned for each asset discipline at the Lake Hills 1550 Pump Station. Of the 21 total assets, the minimum condition score was 5.0, the average physical condition score was 5.0 and the average performance condition score was 5.0, and the maximum condition score was 5.0. The LOF score was assigned based on the maximum condition score for each asset, resulting in a minimum LOF score of 5.0, an average of 5.0, and a maximum of 5.0.



Figure 4-8 Aerial View of Jefferson Pump Station

Table 4-5 Field Assessment Score Summary for Jefferson Pump Station

Discipline	Electrical	I&C	Mechanical	Site	Structural	Overall
Asset Count	12	5	28	10	4	59
Average Performance Score	2.5	2.8	3.0	3.3	2.3	2.9
Average Physical Score	2.5	2.8	3.0	3.0	2.5	2.9
Minimum LOF Score	2	2	2	2	2	2
Average LOF Score	3	3	3	3	3	3
Maximum LOF Score	3	3	5	5	3	5



Figure 4-9 Station Overview Jefferson Pump Station

The following photographs provide a representation of the asset condition observed during the field assessment.



Photo 4-24 Civil – Control Building



Photo 4-25 Civil – Gantry Crane in Control Building



Photo 4-26 Structural – Clogged Wet Well Influent Gate



Photo 4-27 Structural – Dry Well General Conditions



Photo 4-28 Structural – Discharge Gasket Cracking and Signs of Leakage



Photo 4-29 Mechanical – Piping Paint Failure and Signs of Leakage



Photo 4-30 Electrical – Motor Control Cabinets; VFDs



Photo 4-31 I&C – Pressure Sensor and Flow Monitor; Discharge Header

4.5 South Pump Station Field Assessment

South Pump Station is a wastewater pump station located in West Sacramento on Jefferson Blvd north of West Capitol Ave. Built in 1948 and expanded in 2008, the pump station has a design capacity of 1,146 gallons per minute (GPM) via three 15 horsepower (hp) centrifugal Smith & Loveless pumps. The lift station utilizes a bubbler level controller. There is no emergency generator onsite, but a portable generator hookup is within the lift station fence boundaries. The asset inventory for the South Pump Station is presented in Appendix A.

Table 4-6 presents a statistical summary of the condition scores and LOF scores assigned for each asset discipline at the South Pump Station. Of the 38 total assets, the minimum condition score was 2.0, the average physical condition score was 3.3 and the average performance condition score was 3.2, and the maximum condition score was 5.0. The LOF score was assigned based on the maximum condition score for each asset, resulting in a minimum LOF score of 2.0, an average of 3.3, and a maximum of 5.0.

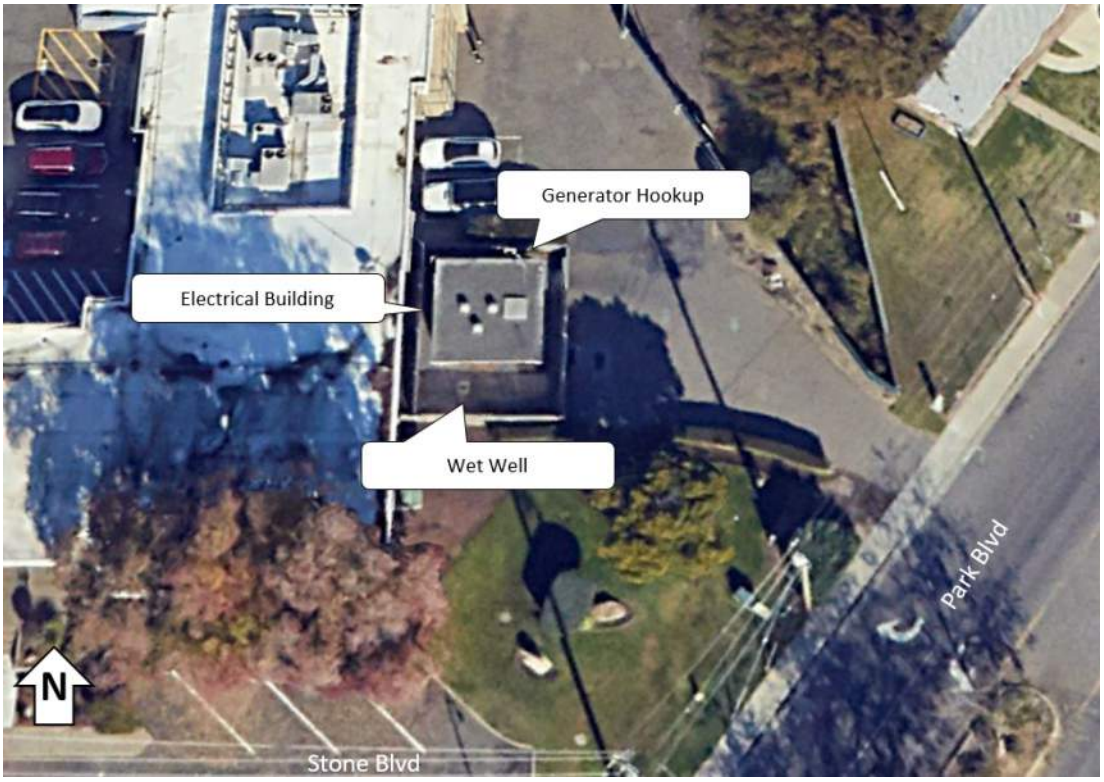


Figure 4-10 Aerial View of South Pump Station

Table 4-6 Field Assessment Score Summary for South Pump Station

Discipline	Electrical	I&C	Mechanical	Site	Structural	Overall
Asset Count	12	5	23	7	2	49
Average Performance Score	2.5	2.6	3.0	3.4	2.5	2.9
Average Physical Score	2.5	2.6	3.0	3.0	3.0	2.8
Minimum LOF Score	2.0	2.0	2.0	2.0	3.0	2
Average LOF Score	2.5	2.6	3.0	3.4	3.0	3
Maximum LOF Score	3.0	3.0	5.0	5.0	3.0	5



Figure 4-11 Station Overview South Pump Station

The following photographs provide a representation of the asset condition observed during the field assessment.



Photo 4-32 Civil – General Site Conditions



Photo 4-33 Structural – Wet Well General Conditions



Photo 4-34 Mechanical – Plug Valve Inoperable; Pump #2



Photo 4-35 Mechanical – Typical Pump Conditions; Pump #1



Photo 4-36 Mechanical – Sump Pump



Photo 4-37 Electrical – Motor Control Center



Photo 4-38 I&C – Inoperable Gas Monitor System



Photo 4-39 I&C – Interior of PLC Cabinet; New Compressor

4.6 Southport Pump Station Field Assessment

Southport Pump Station is a wastewater pump station located in West Sacramento on the corner of Jefferson Blvd and Lake Washington Blvd. Built in 1972 and expanded in 2008, the pump station has a design capacity of 12,918 gallons per minute (GPM) via three 50 horsepower (hp) centrifugal Smith & Loveless pumps. The lift station utilizes a bubbler level controller. The site has an abandoned surge tank within the perimeter fencing. There is a functioning emergency generator onsite, and the site utilizes an organic odor control system. The asset inventory for the Southport Pump Station is presented in Appendix A.

Table 4-7 presents a statistical summary of the condition scores and LOF scores assigned for each asset discipline at the Lake Hills 1945 Pump Station. Of the 31 total assets, the minimum condition score was 1.0, the average physical condition score was 3.1 and the average performance condition score was 3.1, and the maximum condition score was 6.0. The LOF score was assigned based on the maximum condition score for each asset, resulting in a minimum LOF score of 1.0, an average of 3.1, and a maximum of 6.0.

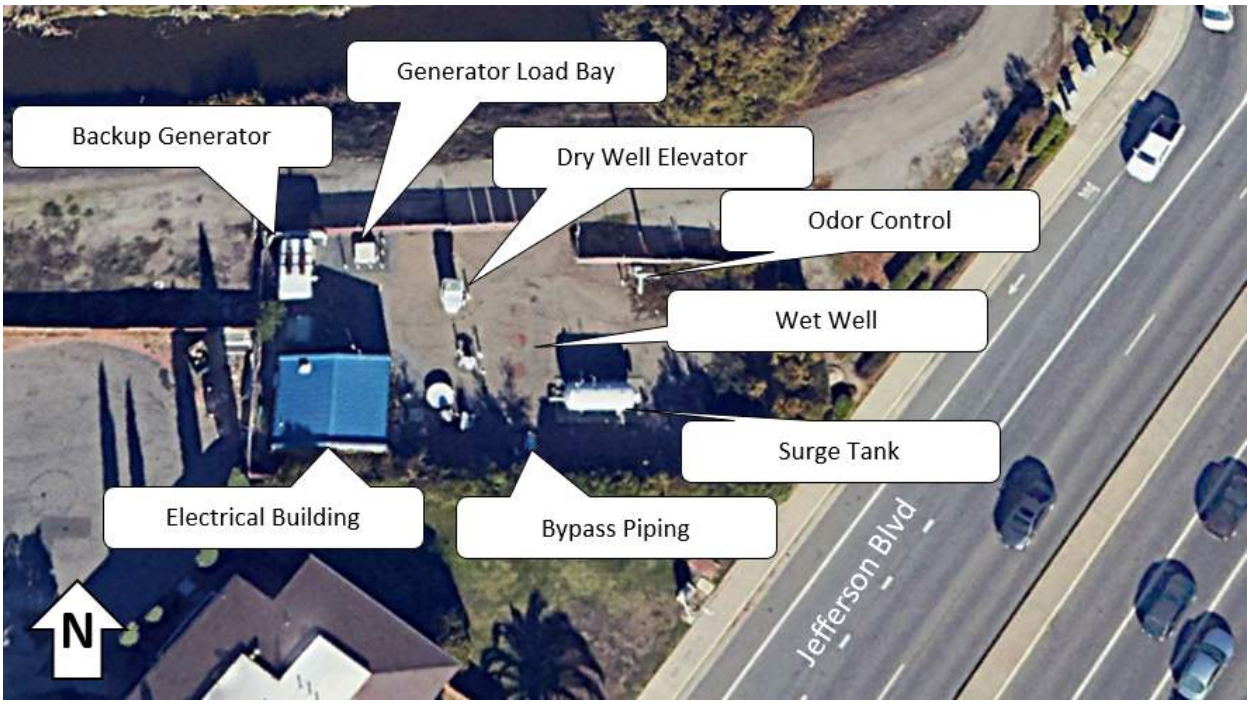


Figure 4-12 Aerial View of Southport Pump Station

Table 4-7 Field Assessment Score Summary for Southport Pump Station

Discipline	Electrical	I&C	Mechanical	Site	Structural	Overall
Asset Count	19	8	31	10	3	71
Average Performance Score	2.5	2.9	3.0	3.5	2.7	2.9
Average Physical Score	2.6	2.9	3.0	3.3	3.0	2.9
Minimum LOF Score	1.0	2.0	1.0	2.0	3.0	1
Average LOF Score	2.6	2.9	3.0	3.5	3.0	3
Maximum LOF Score	4.0	5.0	5.0	5.0	3.0	5

The following photographs provide a representation of the asset condition observed during the field assessment.



Figure 4-13 Station Overview Southport Pump Station



Photo 4-40 Civil– Organic Odor Control Blower



Photo 4-41 Civil – Crack in Asphalt



Photo 4-42 Structural– TLock on Wet Well



Photo 4-43 Structural – Paint Failure and Signs of Leakage in Dry Well and Suction Piping



Photo 4-44 Mechanical– Paint Failure; Suction Piping



Photo 4-45 Mechanical – New Bypass Piping Air Valve



Photo 4-46 Mechanical– Generator; Loud when runs & Blows Dark Smoke



Photo 4-47 I&C– Inoperable Flow Monitor

5.0 Results Discussion & Conclusions

Based on the desktop and field assessment, this section presents data interpretation and correlations along with conclusions.

1. Background data was available to assign desktop physical condition scores for 16 pumps. Background data was not available for the majority of assets.

2. Figure 5-1 shows asset condition scores were primarily 2 and 3 formed a bell curve distribution, which may be attributed to operation and maintenance activities prolonging asset lifecycles.

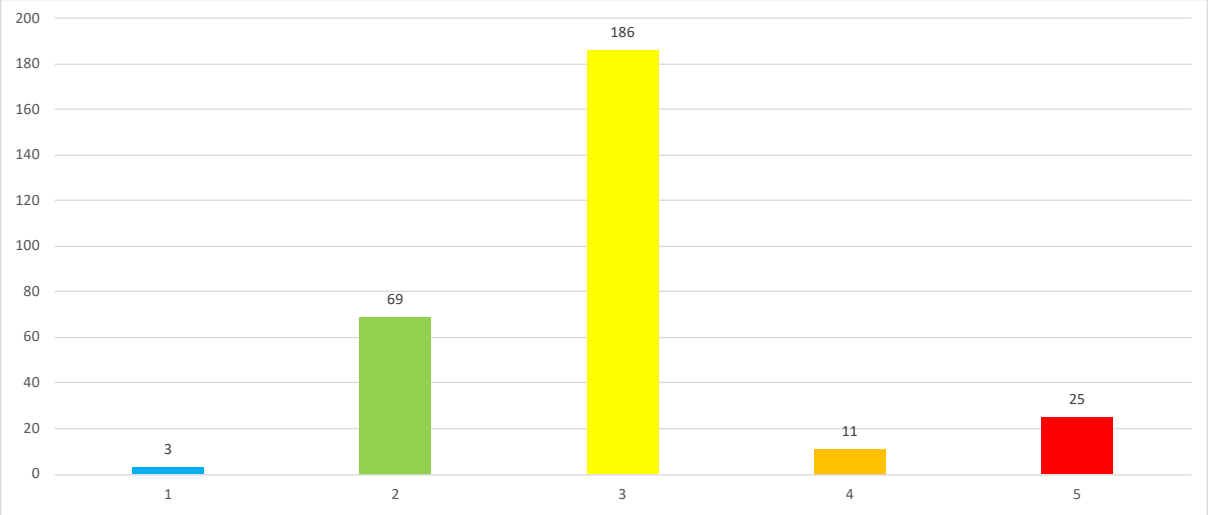


Figure 5-1 Number of Assets by Likelihood of Failure Score

3. A total of 3 assets had an LOF score of 1 since they were installed within the last two years.

4. A total of 25 assets had a LOF score of 5 since they were inoperable or unrepairable. This included the 3 remaining surge tanks that City has indicated will be removed in the future and do not impact station operations.

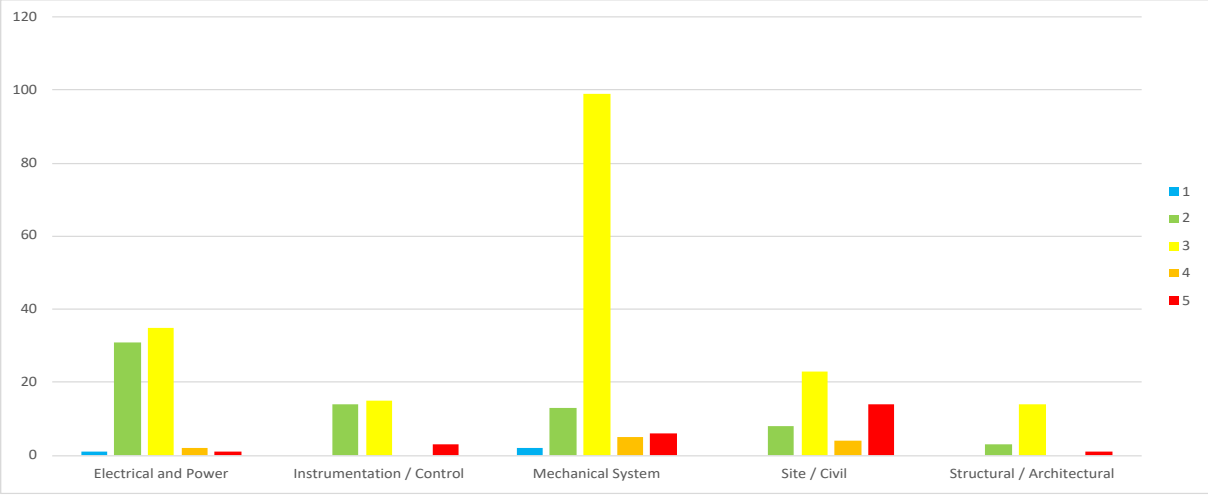


Figure 5-2 Number of Assets by Likelihood of Failure Score and Discipline

5. Figure 5-2 shows asset condition scores grouped by discipline with no clear evidence that one discipline is deteriorating faster than another. Though the electrical components did receive a higher favorable distribution than other disciplines, it should be noted that this was only a visual assessment and that further electrical testing should be performed to further evaluate electrical components.

6.0 Recommendations

Recommendations are currently limited to physical and performance scores which are valuable in identifying the current condition of assets. Based on the results of this condition assessment, Black & Veatch recommends the high-level alternatives as well as opinions of probable construction costs presented in this section and summarized in Table 6-1.

Opinions of probable construction costs (OPCC) were prepared in accordance with Association for the Advancement of Cost Engineering International (AACEi) Class 5 accuracy, or plus 100% to minus 50% of actual cost. Accuracy range is defined per AACEi in Recommended Practice No. 17R, Cost Estimate Classification System, as an "indication of the degree to which the final cost outcome for a given project will vary from the estimated cost. Accuracy is traditionally expressed as a plus or minus percentage range around the point estimate after application of contingency, with a stated level of confidence that the actual cost outcome would fall within this range." Accuracy is different from contingency, which is defined per AACEi Recommended Practice No. 10S, Cost Engineering Terminology, as "an amount added to an estimate to allow for items, conditions, or events for which the state, occurrence, or effect is uncertain and that experience shows will likely result, in aggregate, in additional costs."

Costs were based on information from estimating guides, asset specifications, and construction costs for similar pump stations designed by Black & Veatch. Factors included in the OPCC are summarized as follows:

- Direct costs included equipment, labor, materials, demolition, abatement, and bypass pumping or maintenance of plant operations (MOPO).
- 10% allowance for General conditions (e.g., supervision, temporary facilities, temporary utilities, equipment rentals, permits, and submittals).
- 12% allowance for Prime Contractor's overhead and profit (OH&P).
- 2% allowance for start-up, training, and commissioning.
- 2.5% allowance for risk, liability, and insurance.
- 2% allowance for bonds, such as performance and payment bonds.
- 40% estimate contingency to account for construction unknowns.
- 10% bid contingency for local market adjustments.
- Recommendation costs were shown in 2023 dollars (i.e., no escalation) since funding and exact implementation dates have not been determined by the CIP.

Costs only reflect a one-time investment and do not represent lifecycle costs.

Table 6-1 Recommendation Summary

Facility	Asset Name	No. of Assets	High-Level Recommendations	Opinion of Probable Cost	Implementation Timing per City Staff	City Comments/Notes
Allan Lift Station	Emergency Generator and Automatic Transfer Switch	1		$45,000	0-2 years	City intends to install small site generator.
	Wet Well	1	Repair Lining Within 0-5 years	$92,000	2-5 years	
	Fencing	1	Replace Within 5-10 years	$18,000	2 years	
	Discharge Piping -1	1	Replace Within 5-10 years	$24,000	Inspect after 5 years	
	Discharge Piping -2	1	Replace Within 5-10 years	$24,000	Inspect after 5 years	
	Exterior Security Lighting	1	Replace Within 5-10 years	$18,000	2 years	
	Subtotal			**$221,000**		
Bryte Pump Station	Exterior Security Lighting	1	Replace Within 0-5 years	$18,000	0-1 year	Station receives trespassers 3 to 4 times a month.
	Fencing	1	Replace Within 5-10 years	$49,000	0-1 years	Station receives trespassers 3 to 4 times a month.
	Subtotal			**$67,000**		
Industrial Pump Station	Motor Control Center	1	Replace Within 0-5 years	$261,000	0-3 years	
	Fencing	1	Replace Within 5-10 years	$33,000	0-1 years	Station receives trespassers 2 times a month.
	Exterior Security Lighting	1	Replace Within 5-10 years	$18,000	0-1 years	Station receives trespassers 2 times a month.
	Subtotal			**$312,000**		

Facility	Asset Name	No. of Assets	High-Level Recommendations	Opinion of Probable Cost	Implementation Timing per City Staff	City Comments/Notes
Jefferson Pump Station	Fencing	1	Replace Within 5-10 years	$49,000	0-1 years	Station experiences significant amount of intrusion alarms and requires constant O&M attention to reset.
	Exterior Security Lighting	1	Replace Within 5-10 years	$18,000	0-1 years	Station receives trespassers 3 to 4 times a month.
	Subtotal			**$67,000**		
South Pump Station	D/S Isolation Valve -Pump #2	1	Replace Within 0-5 years	$12,000	0-1 years	
	Fencing	1	Replace Within 5-10 years	$18,000	In Progress	
	Exterior Security Lighting	1	Replace Within 5-10 years	$18,000	In Progress	
	Subtotal			**$48,000**		
Southport Pump Station	Pump 1 -4 Suction Piping	1	Replace Within 0-5 years	$4,000	0-3 years	
	D/S Isolation Valve -4	1	Replace Within 0-5 years	$10,000	0-3 years	
	Flow Meter	1	Replace Within 0-5 years	$60,000	0-3 years	
	Fencing	1	Replace Within 5-10 years	$42,000	0-1 years	Has experienced severe site vandalism from trespassers.
	Exterior Security Lighting	1	Replace Within 5-10 years	$18,000	0-1 years	
	Generator	1	Replace Within 5-10 years	$1,045,000	0-1 years	One of City's oldest active generators.
	Subtotal			**$1,179,000**		
Total		**46**		**$1,894,000**		

Appendix A. Asset Inventory

Lift Station Asset Registry

Facility Name	Discipline	Asset	Description	Asset ID	Original Installation	Major Rehabilitation	Recent Repairs/Improvements/Maintenance	Purchase Source	Manufacturer	Model	Serial No.	Size	Units	Material	HP	Coating	Speed	Voltage	Amps	Duty (GPM)
Allan Lift Station	Electrical and	Motor - Main Pump 1	(Part of submersible pump 1)		1990										5			230		
Allan Lift Station	Electrical and	Motor - Main Pump 2	(Part of submersible pump 2)		1990				Flygt	CP 3102 (From Drawings)					5			230		
Allan Lift Station	Electrical and	Motor Control Center							Tesco											
Allan Lift Station	Instrumentation / Control	Level Element	Bubbler																	
Allan Lift Station	Instrumentation / Control	Level Element	UT Level Sensor						Rosemount											
Allan Lift Station	Instrumentation / Control	Main disconnect																		
Allan Lift Station	Instrumentation / Control	PLC							Tesco											
Allan Lift Station	Instrumentation / Control	SCADA/ Telemetry																		
Allan Lift Station	Mechanical System	Check Valve - 1	Swing		1990							4	In							
Allan Lift Station	Mechanical	Check Valve -2	Swing		1990							4	In							
Allan Lift Station	Mechanical	D/S Isolation Valve -1			1990							4	In							
Allan Lift Station	Mechanical	D/S Isolation Valve -2	Gate		1990							4	In							
Allan Lift Station	Mechanical System	Discharge Piping -1			1990									DI						
Allan Lift Station	Mechanical System	Discharge Piping -2			1990															
Allan Lift Station	Mechanical System	Exhaust Port																		
Allan Lift Station	Mechanical System	Generator hookup																		
Allan Lift Station	Mechanical System	Main Pump 1	Submersible		1990				Flygt	CP 3102 (From Drawings)										220
Allan Lift Station	Mechanical System	Main Pump 2			1990															220
Allan Lift Station	Mechanical System	Pump Guiderails												SS						
Allan Lift Station	Site / Civil	Access			1990															
Allan Lift Station	Site / Civil	Exterior Security Lighting																		
Allan Lift Station	Site / Civil	Fencing	Chain Link		1990															
Allan Lift Station	Site / Civil	Water Service			1990															
Allan Lift Station	Structural / Architectural	Valve Vault			1990							60 and 24	In							
Allan Lift Station	Structural / Architectural	Wet Well			1990							7	Ft			Amor-Plate (per 1990 drawings)				
Bryte Pump Station	Electrical and Power	Automatic Transfer Switch																	1000	
Bryte Pump Station	Electrical and Power	Cathodic Protection																		
Bryte Pump Station	Electrical and Power	Dry well lighting																		
Bryte Pump Station	Electrical and Power	Junction Box																		
Bryte Pump Station	Electrical and Power	Lighting Panel																		
Bryte Pump Station	Electrical and Power	Main Disconnect																		
Bryte Pump Station	Electrical and Power	Motor -1	Vertical		2008				Smith and Loveless						150			480		
Bryte Pump Station	Electrical and Power	Motor 1- VFD																		

Lift Station Asset Registry

Facility Name	Discipline	Asset	Duty (TDH)	Access Constraints	Maintenance Issues	Physical Score2	Performance Score2
Allan Lift Station	Electrical and	Motor - Main Pump 1				3 - Moderate Deterioration	3 - Moderate Deterioration
Allan Lift Station	Electrical and	Motor - Main Pump 2				3 - Moderate Deterioration	3 - Moderate Deterioration
Allan Lift Station	Electrical and	Motor Control Center				2 - Minor Defects Only (some wear)	2 - Minor Defects Only (some wear)
Allan Lift Station	Instrumentation / Control	Level Element				5 - Virtually Unserviceable	5 - Virtually Unserviceable
Allan Lift Station	Instrumentation / Control	Level Element				2 - Minor Defects Only (some wear)	2 - In Service, but Higher the Expected O&M Costs
Allan Lift Station	Instrumentation / Control	Main disconnect				2 - Minor Defects Only (some wear)	2 - In Service, but Higher the Expected O&M Costs
Allan Lift Station	Instrumentation / Control	PLC				2 - Minor Defects Only (some wear)	2 - In Service, but Higher the Expected O&M Costs
Allan Lift Station	Instrumentation / Control	SCADA/ Telemetry				2 - Minor Defects Only (some wear)	2 - In Service, but Higher the Expected O&M Costs
Allan Lift Station	Mechanical System	Check Valve - 1				2 - Minor Defects Only (some wear)	2 - In Service, but Higher the Expected O&M Costs
Allan Lift Station	Mechanical	Check Valve -2				3- In Service, but Function is Impaired	3- In Service, but Function is Impaired
Allan Lift Station	Mechanical	D/S Isolation Valve -1				3 - Moderate Deterioration	3 - Moderate Deterioration
Allan Lift Station	Mechanical	D/S Isolation Valve -2				3 - Moderate Deterioration	3 - Moderate Deterioration
Allan Lift Station	Mechanical System	Discharge Piping -1				4 - Significant Deterioration	4 - In Service, but Function is Highly Impaired
Allan Lift Station	Mechanical System	Discharge Piping -2				4 - Significant Deterioration	4 - In Service, but Function is Highly Impaired
Allan Lift Station	Mechanical System	Exhaust Port				2 - Minor Defects Only (some wear)	2 - In Service, but Higher the Expected O&M Costs
Allan Lift Station	Mechanical System	Generator hookup				2 - Minor Defects Only (some wear)	2 - In Service, but Higher the Expected O&M Costs
Allan Lift Station	Mechanical System	Main Pump 1	30			3 - Moderate Deterioration	3 - Moderate Deterioration
Allan Lift Station	Mechanical System	Main Pump 2	30			3 - Moderate Deterioration	3 - Moderate Deterioration
Allan Lift Station	Mechanical System	Pump Guiderails				2 - Minor Defects Only (some wear)	2 - In Service, but Higher the Expected O&M Costs
Allan Lift Station	Site / Civil	Access				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Allan Lift Station	Site / Civil	Exterior Security Lighting				4 - Significant Deterioration	4 - In Service, but Function is Highly Impaired
Allan Lift Station	Site / Civil	Fencing				4 - Significant Deterioration	5- Component is not Functioning as Intended
Allan Lift Station	Site / Civil	Water Service				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Allan Lift Station	Structural / Architectural	Valve Vault				2 - Minor Defects Only (some wear)	3- In Service, but Function is Impaired
Allan Lift Station	Structural / Architectural	Wet Well				4 - Significant Deterioration	5- Component is not Functioning as Intended
Bryte Pump Station	Electrical and Power	Automatic Transfer Switch				2 - Minor Defects Only (some wear)	2 - In Service, but Higher the Expected O&M Costs
Bryte Pump Station	Electrical and Power	Cathodic Protection				2 - Minor Defects Only (some wear)	2 - In Service, but Higher the Expected O&M Costs
Bryte Pump Station	Electrical and Power	Dry well lighting				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Bryte Pump Station	Electrical and Power	Junction Box				4 - Significant Deterioration	3- In Service, but Function is Impaired
Bryte Pump Station	Electrical and Power	Lighting Panel				2 - Minor Defects Only (some wear)	2 - In Service, but Higher the Expected O&M Costs
Bryte Pump Station	Electrical and Power	Main Disconnect				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Bryte Pump Station	Electrical and Power	Motor -1				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Bryte Pump Station	Electrical and Power	Motor 1- VFD				2 - Minor Defects Only (some wear)	2 - Minor Defects Only (some wear)

Lift Station Asset Registry

Facility Name	Discipline	Asset	Description	Asset ID	Original Installation	Major Rehabilitation	Recent Repairs/Improvements/Maintenance	Purchase Source	Manufacturer	Model	Serial No.	Size	Units	Material	HP	Coating	Speed	Voltage	Amps	Duty (GPM)
Bryte Pump Station	Electrical and Power	Motor -2	Vertical		2008				Smith and Loveless						150			480		
Bryte Pump Station	Electrical and Power	Motor 2- VFD																		
Bryte Pump Station	Electrical and Power	Motor -3	Vertical						Smith and Loveless						150			480		
Bryte Pump Station	Electrical and Power	Motor 3- VFD																		
Bryte Pump Station	Electrical and Power	Motor Control Center																		
Bryte Pump Station	Instrumentation / Control	Flow Meter																		
Bryte Pump Station	Instrumentation / Control	Level Element	Bubbler			2018														
Bryte Pump Station	Instrumentation / Control	PLC																		
Bryte Pump Station	Instrumentation / Control	Pressure Element																		
Bryte Pump Station	Instrumentation / Control	SCADA/ Telemetry																		
Bryte Pump Station	Mechanical System	Bypass piping and valves																		
Bryte Pump Station	Mechanical System	Check Valve -1	Swing with spring		1984				MH			8x10								
Bryte Pump Station	Mechanical System	Check Valve -2	Swing with spring		1984				MH			8x10								
Bryte Pump Station	Mechanical System	Check Valve -3	Swing with spring						MH			8x10								
Bryte Pump Station	Mechanical System	D/S Isolation Valve -1	Gate		1984							12	In							
Bryte Pump Station	Mechanical System	D/S Isolation Valve -2	Gate		1984				**MH**			10	In							
Bryte Pump Station	Mechanical System	D/S Isolation Valve -3	Gate																	
Bryte Pump Station	Mechanical System	Exhaust Fan																		
Bryte Pump Station	Mechanical System	Generator	Diesel		2008				Kohler			500	kW					625		
Bryte Pump Station	Mechanical System	Main Pump 1	Centrifugal		1984	2008			Smith and Loveless											1200
Bryte Pump Station	Mechanical System	Main Pump 2	Centrifugal		1984	2008			Smith and Loveless											1200
Bryte Pump Station	Mechanical System	Main Pump 3	Centrifugal		2008				Smith and Loveless	060186										1700
Bryte Pump Station	Mechanical System	Personnel lift							S/L											
Bryte Pump Station	Mechanical System	Pipe Gallery Discharge Piping			1984							12	In	Steel						
Bryte Pump Station	Mechanical System	Pump Seals -1			2008															
Bryte Pump Station	Mechanical System	Pump Seals -2			2008															
Bryte Pump Station	Mechanical System	Pump Seals -3			2008															
Bryte Pump Station	Mechanical System	Seal Water System																		
Bryte Pump Station	Mechanical System	Sluice Gate			1984															
Bryte Pump Station	Mechanical System	Sump Pump System	Submersible																	
Bryte Pump Station	Mechanical System	U/S Isolation Valve -1	Gate		1984				**MH**			12	In							
Bryte Pump Station	Mechanical System	U/S Isolation Valve -2	Gate		1984							12	In							
Bryte Pump Station	Mechanical System	U/S Isolation Valve -3	Gate		1984				**MH**			12	In							
Bryte Pump Station	Site / Civil	Access	Asphalt		1984	2008	Patched in 2008													
Bryte Pump Station	Site / Civil	Exterior Security Lighting																		

Lift Station Asset Registry

Facility Name	Discipline	Asset	Duty (TDH)	Access Constraints	Maintenance Issues	Physical Score2	Performance Score2
Bryte Pump Station	Electrical and Power	Motor -2				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Bryte Pump Station	Electrical and Power	Motor 2- VFD				2 - Minor Defects Only (some wear)	2 - Minor Defects Only (some wear)
Bryte Pump Station	Electrical and Power	Motor -3				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Bryte Pump Station	Electrical and Power	Motor 3- VFD				2 - Minor Defects Only (some wear)	2 - Minor Defects Only (some wear)
Bryte Pump Station	Electrical and Power	Motor Control Center				2 - Minor Defects Only (some wear)	2 - Minor Defects Only (some wear)
Bryte Pump Station	Instrumentation / Control	Flow Meter				5 - Virtually Unserviceable	5- Component is not Functioning as Intended
Bryte Pump Station	Instrumentation / Control	Level Element				2 - Minor Defects Only (some wear)	2 - In Service, but Higher the Expected O&M Costs
Bryte Pump Station	Instrumentation / Control	PLC				2 - Minor Defects Only (some wear)	2 - In Service, but Higher the Expected O&M Costs
Bryte Pump Station	Instrumentation / Control	Pressure Element				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Bryte Pump Station	Instrumentation / Control	SCADA/ Telemetry				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Bryte Pump Station	Mechanical System	Bypass piping and valves				2 - Minor Defects Only (some wear)	2 - In Service, but Higher the Expected O&M Costs
Bryte Pump Station	Mechanical System	Check Valve -1				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Bryte Pump Station	Mechanical System	Check Valve -2				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Bryte Pump Station	Mechanical System	Check Valve -3				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Bryte Pump Station	Mechanical System	D/S Isolation Valve -1				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Bryte Pump Station	Mechanical System	D/S Isolation Valve -2				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Bryte Pump Station	Mechanical System	D/S Isolation Valve -3				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Bryte Pump Station	Mechanical System	Exhaust Fan				2 - Minor Defects Only (some wear)	2 - In Service, but Higher the Expected O&M Costs
Bryte Pump Station	Mechanical System	Generator				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Bryte Pump Station	Mechanical System	Main Pump 1	175			3 - Moderate Deterioration	3- In Service, but Function is Impaired
Bryte Pump Station	Mechanical System	Main Pump 2	175			3 - Moderate Deterioration	3- In Service, but Function is Impaired
Bryte Pump Station	Mechanical System	Main Pump 3	175			3 - Moderate Deterioration	3- In Service, but Function is Impaired
Bryte Pump Station	Mechanical System	Personnel lift				3 - Moderate Deterioration	5- Component is not Functioning as Intended
Bryte Pump Station	Mechanical System	Pipe Gallery Discharge Piping				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Bryte Pump Station	Mechanical System	Pump Seals -1				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Bryte Pump Station	Mechanical System	Pump Seals -2				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Bryte Pump Station	Mechanical System	Pump Seals -3				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Bryte Pump Station	Mechanical System	Seal Water System				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Bryte Pump Station	Mechanical System	Sluice Gate				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Bryte Pump Station	Mechanical System	Sump Pump System				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Bryte Pump Station	Mechanical System	U/S Isolation Valve -1				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Bryte Pump Station	Mechanical System	U/S Isolation Valve -2				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Bryte Pump Station	Mechanical System	U/S Isolation Valve -3				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Bryte Pump Station	Site / Civil	Access				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Bryte Pump Station	Site / Civil	Exterior Security Lighting				4 - Significant Deterioration	5- Component is not Functioning as Intended

Lift Station Asset Registry

Facility Name	Discipline	Asset	Description	Asset ID	Original Installation	Major Rehabilitation	Recent Repairs/Improvements/Maintenance	Purchase Source	Manufacturer	Model	Serial No.	Size	Units	Material	HP	Coating	Speed	Voltage	Amps	Duty (GPM)
Bryte Pump Station	Site / Civil	Fencing	Chain Link																	
Bryte Pump Station	Site / Civil	Hoists	Chain fall		1984							2.0	Ton							
Bryte Pump Station	Site / Civil	HVAC							Bard											
Bryte Pump Station	Site / Civil	Interior Security Lighting																		
Bryte Pump Station	Site / Civil	Water Service																		
Bryte Pump Station	Structural / Architectural	b			1984															
Bryte Pump Station	Structural / Architectural	Control/Electrical Building	32x16x10 CMU		1984	2008														
Bryte Pump Station	Structural / Architectural	Dry Well			1984															
Bryte Pump Station	Structural / Architectural	Upstream Manhole			1984															
Bryte Pump Station	Structural / Architectural	Wet Well			1984															
Industrial Pump Station	Electrical and Power	Cathodic Protection																		
Industrial Pump Station	Electrical and Power	Dry well Control Panel																		
Industrial Pump Station	Electrical and Power	Dry well lighting																		
Industrial Pump Station	Electrical and Power	Junction Box																		
Industrial Pump Station	Electrical and Power	Lighting Panel																		
Industrial Pump Station	Electrical and Power	Main disconnect																		
Industrial Pump Station	Electrical and Power	Motor -1	Vertical						Smith and Loveless						50			240/480		
Industrial Pump Station	Electrical and Power	Motor 1 disconnect in dry well																		
Industrial Pump Station	Electrical and Power	Motor -1 VFD																		
Industrial Pump Station	Electrical and Power	Motor -2	Vertical						Smith and Loveless						50			240/480		
Industrial Pump Station	Electrical and Power	Motor -2 VFD																		
Industrial Pump Station	Electrical and Power	Motor -3	Vertical						Smith and Loveless						50			240/480		
Industrial Pump Station	Electrical and Power	Motor -3 VFD																		
Industrial Pump Station	Electrical and Power	Motor Control Center																		
Industrial Pump Station	Instrumentation / Control	Flow Meter										10	In							
Industrial Pump Station	Instrumentation / Control	Level Element	Bubbler			2020														
Industrial Pump Station	Instrumentation / Control	PLC																		
Industrial Pump Station	Instrumentation / Control	Pressure Element																		
Industrial Pump Station	Instrumentation / Control	SCADA/ Telemetry																		
Industrial Pump Station	Mechanical System	Check Valve -1	Swing		1987				Clow			12	In							
Industrial Pump Station	Mechanical System	Check Valve -2	Swing		1987				Clow			12	In							
Industrial Pump Station	Mechanical System	Check Valve -3	Swing						Clow			12	In							
Industrial Pump Station	Mechanical System	D/S Isolation Valve -1	Gate						Clow			12	In							

Lift Station Asset Registry

Facility Name	Discipline	Asset	Duty (TDH)	Access Constraints	Maintenance Issues	Physical Score2	Performance Score2
Bryte Pump Station	Site / Civil	Fencing				4 - Significant Deterioration	5- Component is not Functioning as Intended
Bryte Pump Station	Site / Civil	Hoists				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Bryte Pump Station	Site / Civil	HVAC				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Bryte Pump Station	Site / Civil	Interior Security Lighting				2 - Minor Defects Only (some wear)	2 - In Service, but Higher the Expected O&M Costs
Bryte Pump Station	Site / Civil	Water Service				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Bryte Pump Station	Structural / Architectural	b				3 - Moderate Deterioration	2 - In Service, but Higher the Expected O&M Costs
Bryte Pump Station	Structural / Architectural	Control/Electrical Building				3 - Moderate Deterioration	2 - In Service, but Higher the Expected O&M Costs
Bryte Pump Station	Structural / Architectural	Dry Well				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Bryte Pump Station	Structural / Architectural	Upstream Manhole				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Bryte Pump Station	Structural / Architectural	Wet Well				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Industrial Pump Station	Electrical and Power	Cathodic Protection				2 - Minor Defects Only (some wear)	2 - In Service, but Higher the Expected O&M Costs
Industrial Pump Station	Electrical and Power	Dry well Control Panel				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Industrial Pump Station	Electrical and Power	Dry well lighting				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Industrial Pump Station	Electrical and Power	Junction Box				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Industrial Pump Station	Electrical and Power	Lighting Panel				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Industrial Pump Station	Electrical and Power	Main disconnect				3 - Moderate Deterioration	2 - In Service, but Higher the Expected O&M Costs
Industrial Pump Station	Electrical and Power	Motor -1				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Industrial Pump Station	Electrical and Power	Motor 1 disconnect in c				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Industrial Pump Station	Electrical and Power	Motor -1 VFD				2 - Minor Defects Only (some wear)	2 - In Service, but Higher the Expected O&M Costs
Industrial Pump Station	Electrical and Power	Motor -2				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Industrial Pump Station	Electrical and Power	Motor -2 VFD				2 - Minor Defects Only (some wear)	2 - In Service, but Higher the Expected O&M Costs
Industrial Pump Station	Electrical and Power	Motor -3				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Industrial Pump Station	Electrical and Power	Motor -3 VFD				2 - Minor Defects Only (some wear)	2 - In Service, but Higher the Expected O&M Costs
Industrial Pump Station	Electrical and Power	Motor Control Center				3 - Moderate Deterioration	5- Component is not Functioning as Intended
Industrial Pump Station	Instrumentation / Control	Flow Meter				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Industrial Pump Station	Instrumentation / Control	Level Element				2 - Minor Defects Only (some wear)	2 - In Service, but Higher the Expected O&M Costs
Industrial Pump Station	Instrumentation / Control	PLC				2 - Minor Defects Only (some wear)	2 - In Service, but Higher the Expected O&M Costs
Industrial Pump Station	Instrumentation / Control	Pressure Element				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Industrial Pump Station	Instrumentation / Control	SCADA/ Telemetry				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Industrial Pump Station	Mechanical System	Check Valve -1				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Industrial Pump Station	Mechanical System	Check Valve -2				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Industrial Pump Station	Mechanical System	Check Valve -3				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Industrial Pump Station	Mechanical System	D/S Isolation Valve -1				3 - Moderate Deterioration	3- In Service, but Function is Impaired

Lift Station Asset Registry

Facility Name	Discipline	Asset	Description	Asset ID	Original Installation	Major Rehabilitation	Recent Repairs/Improvements/Maintenance	Purchase Source	Manufacturer	Model	Serial No.	Size	Units	Material	HP	Coating	Speed	Voltage	Amps	Duty (GPM)
Industrial Pump Station	Mechanical System	D/S Isolation Valve 2	Gate		1987				Clow			12	In							
Industrial Pump Station	Mechanical System	D/S Isolation Valve 3	Gate						Clow			12	In							
Industrial Pump Station	Mechanical System	Generator hookup																		
Industrial Pump Station	Mechanical System	Main Pump 1	Centrifugal						Smith and Loveless	6D3	871287									763
Industrial Pump Station	Mechanical System	Main Pump 2	Centrifugal		1987				Smith and Loveless	6D3	871289									763
Industrial Pump Station	Mechanical System	Main Pump 3	Centrifugal		1987				Smith and Loveless	6D3	871288									763
Industrial Pump Station	Mechanical System	Personnel lift							S/L											
Industrial Pump Station	Mechanical System	Pipe Gallery Discharge Piping			1987	2008						14	In	DI						
Industrial Pump Station	Mechanical System	Pump 1 Discharge Piping										12	In	DI						
Industrial Pump Station	Mechanical System	Pump 1 Suction Piping										12	In	DI						
Industrial Pump Station	Mechanical System	Pump 2 Discharge Piping			1987							12	In	DI						
Industrial Pump Station	Mechanical System	Pump 2 Suction Piping			1987							12	In	DI						
Industrial Pump Station	Mechanical System	Pump 3 Discharge Piping										12	In	DI						
Industrial Pump Station	Mechanical System	Pump 3 Suction Piping										12	In	DI						
Industrial Pump Station	Mechanical System	Pump Seals -1																		
Industrial Pump Station	Mechanical System	Pump Seals -2																		
Industrial Pump Station	Mechanical System	Pump Seals -3																		
Industrial Pump Station	Mechanical System	Seal Water System			2008															
Industrial Pump Station	Mechanical System	Sluice Gate			1987															
Industrial Pump Station	Mechanical System	Sump Pump System	Submersible																	
Industrial Pump Station	Mechanical System	Surge/Transient Control	Hydropneumatic Tank		1987															
Industrial Pump Station	Mechanical System	U/S Isolation Valve -1	Gate						Clow			12	In							
Industrial Pump Station	Mechanical System	U/S Isolation Valve 2	Gate						Clow			12	In							
Industrial Pump Station	Mechanical System	U/S Isolation Valve 3	Gate						Clow			12	In							
Industrial Pump Station	Site / Civil	Access	Asphalt/Concrete																	
Industrial Pump Station	Site / Civil	Exterior Security Lighting																		
Industrial Pump Station	Site / Civil	Fencing	Chain Link		1987															
Industrial Pump Station	Site / Civil	Gas Detector																		
Industrial Pump Station	Site / Civil	Hoists	Chain fall		1987			Chain Fall				1.5	Ton							
Industrial Pump Station	Site / Civil	HVAC	AC		2008				Fujitsu											
Industrial Pump Station	Site / Civil	Interior Security Lighting																		
Industrial Pump Station	Site / Civil	Motor 2 disconnect in dry well																		
Industrial Pump Station	Site / Civil	Motor 3 disconnect in dry well																		
Industrial Pump Station	Site / Civil	Odor Control	Activated Carbon																	
Industrial Pump Station	Site / Civil	Site Crane																		
Industrial Pump Station	Site / Civil	Water Service	Watts backflow preventer		1987							3/4	IN	GSP						

Lift Station Asset Registry

Facility Name	Discipline	Asset	Duty (TDH)	Access Constraints	Maintenance Issues	Physical Score2	Performance Score2
Industrial Pump Station	Mechanical System	D/S Isolation Valve 2				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Industrial Pump Station	Mechanical System	D/S Isolation Valve 3				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Industrial Pump Station	Mechanical System	Generator hookup				2 - Minor Defects Only (some wear)	2 - In Service, but Higher the Expected O&M Costs
Industrial Pump Station	Mechanical System	Main Pump 1	118			3 - Moderate Deterioration	3- In Service, but Function is Impaired
Industrial Pump Station	Mechanical System	Main Pump 2	118			3 - Moderate Deterioration	3- In Service, but Function is Impaired
Industrial Pump Station	Mechanical System	Main Pump 3	118			3 - Moderate Deterioration	3- In Service, but Function is Impaired
Industrial Pump Station	Mechanical System	Personnel lift				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Industrial Pump Station	Mechanical System	Pipe Gallery Discharge Piping				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Industrial Pump Station	Mechanical System	Pump 1 Discharge Piping				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Industrial Pump Station	Mechanical System	Pump 1 Suction Piping				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Industrial Pump Station	Mechanical System	Pump 2 Discharge Piping				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Industrial Pump Station	Mechanical System	Pump 2 Suction Piping				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Industrial Pump Station	Mechanical System	Pump 3 Discharge Piping				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Industrial Pump Station	Mechanical System	Pump 3 Suction Piping				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Industrial Pump Station	Mechanical System	Pump Seals -1				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Industrial Pump Station	Mechanical System	Pump Seals -2				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Industrial Pump Station	Mechanical System	Pump Seals -3				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Industrial Pump Station	Mechanical System	Seal Water System				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Industrial Pump Station	Mechanical System	Sluice Gate				4 - Significant Deterioration	3- In Service, but Function is Impaired
Industrial Pump Station	Mechanical System	Sump Pump System				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Industrial Pump Station	Mechanical System	Surge/Transient Control				5 - Virtually Unserviceable	5- Component is not Functioning as Intended
Industrial Pump Station	Mechanical System	U/S Isolation Valve -1				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Industrial Pump Station	Mechanical System	U/S Isolation Valve 2				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Industrial Pump Station	Mechanical System	U/S Isolation Valve 3				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Industrial Pump Station	Site / Civil	Access				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Industrial Pump Station	Site / Civil	Exterior Security Lighting				4 - Significant Deterioration	4 - In Service, but Function is Highly Impaired
Industrial Pump Station	Site / Civil	Fencing				4 - Significant Deterioration	5- Component is not Functioning as Intended
Industrial Pump Station	Site / Civil	Gas Detector				5 - Virtually Unserviceable	5- Component is not Functioning as Intended
Industrial Pump Station	Site / Civil	Hoists				2 - Minor Defects Only (some wear)	3- In Service, but Function is Impaired
Industrial Pump Station	Site / Civil	HVAC				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Industrial Pump Station	Site / Civil	Interior Security Lighting				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Industrial Pump Station	Site / Civil	Motor 2 disconnect in c				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Industrial Pump Station	Site / Civil	Motor 3 disconnect in c				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Industrial Pump Station	Site / Civil	Odor Control				5 - Virtually Unserviceable	5- Component is not Functioning as Intended
Industrial Pump Station	Site / Civil	Site Crane				2 - Minor Defects Only (some wear)	3- In Service, but Function is Impaired
Industrial Pump Station	Site / Civil	Water Service				3 - Moderate Deterioration	3- In Service, but Function is Impaired

Lift Station Asset Registry

Facility Name	Discipline	Asset	Description	Asset ID	Original Installation	Major Rehabilitation	Recent Repairs/Improvements/Maintenance	Purchase Source	Manufacturer	Model	Serial No.	Size	Units	Material	HP	Coating	Speed	Voltage	Amps	Duty (GPM)
Industrial Pump Station	Structural / Architectural	Control/Electrical Building	16x26x10 CMU		1987															
Industrial Pump Station	Structural / Architectural	Exhaust Stack and Dry well Port																		
Industrial Pump Station	Structural / Architectural	Wet Well	Cast in place concrete wet well		1987															
Jefferson Pump Station	Electrical and Power	Automatic Transfer Sw	Electrical and Power																	
Jefferson Pump Station	Electrical and Power	cathodic protection																		
Jefferson Pump Station	Electrical and Power	Dry well Control Panel																		
Jefferson Pump Station	Electrical and Power	Dry well lighting																		
Jefferson Pump Station	Electrical and Power	Junction Box																		
Jefferson Pump Station	Electrical and Power	Motor -1	TDS						Smith and Loveless						100			480		
Jefferson Pump Station	Electrical and Power	Motor -2	TDS		1988				Smith and Loveless						100			480		
Jefferson Pump Station	Electrical and Power	Motor -3	TDS		1988				Smith and Loveless						100			480		
Jefferson Pump Station	Electrical and Power	Motor Control Center																		
Jefferson Pump Station	Electrical and Power	Pump 1 VFD	Electrical and Power																	
Jefferson Pump Station	Electrical and Power	Pump 2 VFD	Electrical and Power																	
Jefferson Pump Station	Electrical and Power	Pump 3 VFD	Electrical and Power																	
Jefferson Pump Station	Instrumentation / Control	Flow Meter			2008							12	In							
Jefferson Pump Station	Instrumentation / Control	Level Element	Bubbler																	
Jefferson Pump Station	Instrumentation / Control	PLC																		
Jefferson Pump Station	Instrumentation / Control	Pressure Element																		
Jefferson Pump Station	Instrumentation / Control	SCADA/ Telemetry																		
Jefferson Pump Station	Mechanical System	Check Valve -1	Swing		1988				MH			12	In							
Jefferson Pump Station	Mechanical System	Check Valve -2	Swing						MH			12	In							
Jefferson Pump Station	Mechanical System	Check Valve -3	Swing		1988				MH			12	In							
Jefferson Pump Station	Mechanical System	D/S Isolation Valve -1	Gate		1988				Clow			12	In							
Jefferson Pump Station	Mechanical System	D/S Isolation Valve 2	Gate						Clow			12	In							
Jefferson Pump Station	Mechanical System	D/S Isolation Valve -3	Gate						Clow			12	In							
Jefferson Pump Station	Mechanical System	Generator	Diesel																	
Jefferson Pump Station	Mechanical System	Main Pump 1	Centrifugal		1988				Smith and Loveless	8D4B	890802									1950
Jefferson Pump Station	Mechanical System	Main Pump 2	Centrifugal		1988				Smith and Loveless	8D4B	890801									1950
Jefferson Pump Station	Mechanical System	Main Pump 3	Centrifugal		1988				Smith and Loveless	8D4B	890803									1950
Jefferson Pump Station	Mechanical System	Personnel lift							S/L											
Jefferson Pump Station	Mechanical System	Pipe Gallery Discharge Piping			1988							12	In	DI						
Jefferson Pump Station	Mechanical System	Pump 1 Discharge Piping										12	In	DI						
Jefferson Pump Station	Mechanical System	Pump 1 Suction Piping										12	In	DI						
Jefferson Pump Station	Mechanical System	Pump 2 Discharge Piping																		
Jefferson Pump Station	Mechanical System	Pump 2 Suction Piping																		
Jefferson Pump Station	Mechanical System	Pump 3 Discharge Piping										12	In	DI						
Jefferson Pump Station	Mechanical System	Pump 3 Suction Piping										12	In	DI						
Jefferson Pump Station	Mechanical System	Pump Seals -1																		

Lift Station Asset Registry

Facility Name	Discipline	Asset	Duty (TDH)	Access Constraints	Maintenance Issues	Physical Score2	Performance Score2
Industrial Pump Station	Structural / Architectural	Control/Electrical Building				3 - Moderate Deterioration	2 - In Service, but Higher the Expected O&M Costs
Industrial Pump Station	Structural / Architectural	Exhaust Stack and Dry well Port				2 - Minor Defects Only (some wear)	2 - In Service, but Higher the Expected O&M Costs
Industrial Pump Station	Structural / Architectural	Wet Well				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Jefferson Pump Station	Electrical and Power	Automatic Transfer Sw				2 - Minor Defects Only (some wear)	2 - In Service, but Higher the Expected O&M Costs
Jefferson Pump Station	Electrical and Power	cathodic protection				2 - Minor Defects Only (some wear)	2 - In Service, but Higher the Expected O&M Costs
Jefferson Pump Station	Electrical and Power	Dry well Control Panel				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Jefferson Pump Station	Electrical and Power	Dry well lighting				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Jefferson Pump Station	Electrical and Power	Junction Box				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Jefferson Pump Station	Electrical and Power	Motor -1				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Jefferson Pump Station	Electrical and Power	Motor -2				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Jefferson Pump Station	Electrical and Power	Motor -3				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Jefferson Pump Station	Electrical and Power	Motor Control Center				2 - Minor Defects Only (some wear)	2 - Minor Defects Only (some wear)
Jefferson Pump Station	Electrical and Power	Pump 1 VFD				2 - Minor Defects Only (some wear)	2 - Minor Defects Only (some wear)
Jefferson Pump Station	Electrical and Power	Pump 2 VFD				2 - Minor Defects Only (some wear)	2 - Minor Defects Only (some wear)
Jefferson Pump Station	Electrical and Power	Pump 3 VFD				2 - Minor Defects Only (some wear)	2 - Minor Defects Only (some wear)
Jefferson Pump Station	Instrumentation / Control	Flow Meter				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Jefferson Pump Station	Instrumentation / Control	Level Element				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Jefferson Pump Station	Instrumentation / Control	PLC				2 - Minor Defects Only (some wear)	2 - In Service, but Higher the Expected O&M Costs
Jefferson Pump Station	Instrumentation / Control	Pressure Element				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Jefferson Pump Station	Instrumentation / Control	SCADA/ Telemetry				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Jefferson Pump Station	Mechanical System	Check Valve -1				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Jefferson Pump Station	Mechanical System	Check Valve -2				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Jefferson Pump Station	Mechanical System	Check Valve -3				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Jefferson Pump Station	Mechanical System	D/S Isolation Valve -1				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Jefferson Pump Station	Mechanical System	D/S Isolation Valve 2				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Jefferson Pump Station	Mechanical System	D/S Isolation Valve -3				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Jefferson Pump Station	Mechanical System	Generator				2 - Minor Defects Only (some wear)	2 - In Service, but Higher the Expected O&M Costs
Jefferson Pump Station	Mechanical System	Main Pump 1	122			3 - Moderate Deterioration	3- In Service, but Function is Impaired
Jefferson Pump Station	Mechanical System	Main Pump 2	122			3 - Moderate Deterioration	3- In Service, but Function is Impaired
Jefferson Pump Station	Mechanical System	Main Pump 3	122			3 - Moderate Deterioration	3- In Service, but Function is Impaired
Jefferson Pump Station	Mechanical System	Personnel lift				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Jefferson Pump Station	Mechanical System	Pipe Gallery Discharge Piping				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Jefferson Pump Station	Mechanical System	Pump 1 Discharge Piping				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Jefferson Pump Station	Mechanical System	Pump 1 Suction Piping				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Jefferson Pump Station	Mechanical System	Pump 2 Discharge Piping				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Jefferson Pump Station	Mechanical System	Pump 2 Suction Piping				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Jefferson Pump Station	Mechanical System	Pump 3 Discharge Piping				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Jefferson Pump Station	Mechanical System	Pump 3 Suction Piping				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Jefferson Pump Station	Mechanical System	Pump Seals -1				3 - Moderate Deterioration	3- In Service, but Function is Impaired

Lift Station Asset Registry

Facility Name	Discipline	Asset	Description	Asset ID	Original Installation	Major Rehabilitation	Recent Repairs/Improvements/Maintenance	Purchase Source	Manufacturer	Model	Serial No.	Size	Units	Material	HP	Coating	Speed	Voltage	Amps	Duty (GPM)
Jefferson Pump Station	Mechanical System	Pump Seals -2			1988															
Jefferson Pump Station	Mechanical System	Pump Seals -3			1988															
Jefferson Pump Station	Mechanical System	Seal Water System			2008															
Jefferson Pump Station	Mechanical System	Sluice Gate			2008				Hydro Gate											
Jefferson Pump Station	Mechanical System	Sump Pump System																		
Jefferson Pump Station	Mechanical System	Surge/Transient Control	Hydropneumatic Tank		1988															
Jefferson Pump Station	Mechanical System	U/S Isolation Valve -1	Gate		1988				Clow			12	In							
Jefferson Pump Station	Mechanical System	U/S Isolation Valve 2	Gate						Clow			12	In							
Jefferson Pump Station	Mechanical System	U/S Isolation Valve -3	Gate		1988				Clow			12	In							
Jefferson Pump Station	Site / Civil	Gas Detector																		
Jefferson Pump Station	Site / Civil	Access	Asphalt		1988															
Jefferson Pump Station	Site / Civil	Exterior Security Lighting																		
Jefferson Pump Station	Site / Civil	Fencing	Chain Link		1988															
Jefferson Pump Station	Site / Civil	Hoists	Chain fall - in Dry Well		1988							1.5	Ton							
Jefferson Pump Station	Site / Civil	HVAC	Roof mounted ventilation fans. Wall mounted AC		2008				Fujitsu AC											
Jefferson Pump Station	Site / Civil	Interior Security Lighting																		
Jefferson Pump Station	Site / Civil	Odor Control	Activated Carbon																	
Jefferson Pump Station	Site / Civil	Site Crane																		
Jefferson Pump Station	Site / Civil	Water Service	Febco Backflow preventer		1988							1	In							
Jefferson Pump Station	Structural / Architectural	Control/Electrical Building	16x34x12 CMU		1988															
Jefferson Pump Station	Structural / Architectural	Dry Well	Steel Structure, cathodically protected																	
Jefferson Pump Station	Structural / Architectural	Exhaust Stack and Dry well Port																		
Jefferson Pump Station	Structural / Architectural	Wet Well	Cast in place concrete wet well		1988															
South Pump Station	Electrical and Power	Cathodic Protection																		
South Pump Station	Electrical and Power	Dry well Control Panel																		
South Pump Station	Electrical and Power	Dry well lighting																		
South Pump Station	Electrical and Power	Lighting Panel																		
South Pump Station	Electrical and Power	Main disconnect																		
South Pump Station	Electrical and Power	Motor -1	Vertical ODP		2008				Smith and Loveless						15			208-230/460		
South Pump Station	Electrical and Power	Motor 1 VFD																		
South Pump Station	Electrical and Power	Motor -2	Vertical ODP		2008				Smith and Loveless						15			460		
South Pump Station	Electrical and Power	Motor 2 VFD																		
South Pump Station	Electrical and Power	Motor -3	Vertical ODP		2008				Smith and Loveless						15			460		

Lift Station Asset Registry

Facility Name	Discipline	Asset	Duty (TDH)	Access Constraints	Maintenance Issues	Physical Score2	Performance Score2
Jefferson Pump Station	Mechanical System	Pump Seals -2				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Jefferson Pump Station	Mechanical System	Pump Seals -3				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Jefferson Pump Station	Mechanical System	Seal Water System				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Jefferson Pump Station	Mechanical System	Sluice Gate				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Jefferson Pump Station	Mechanical System	Sump Pump System				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Jefferson Pump Station	Mechanical System	Surge/Transient Control				5 - Virtually Unserviceable	5- Component is not Functioning as Intended
Jefferson Pump Station	Mechanical System	U/S Isolation Valve -1				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Jefferson Pump Station	Mechanical System	U/S Isolation Valve 2				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Jefferson Pump Station	Mechanical System	U/S Isolation Valve -3				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Jefferson Pump Station	Site / Civil	Gas Detector				5 - Virtually Unserviceable	5- Component is not Functioning as Intended
Jefferson Pump Station	Site / Civil	Access				2 - Minor Defects Only (some wear)	2 - In Service, but Higher the Expected O&M Costs
Jefferson Pump Station	Site / Civil	Exterior Security Lighting				4 - Significant Deterioration	4 - In Service, but Function is Highly Impaired
Jefferson Pump Station	Site / Civil	Fencing				4 - Significant Deterioration	5- Component is not Functioning as Intended
Jefferson Pump Station	Site / Civil	Hoists				2 - Minor Defects Only (some wear)	3- In Service, but Function is Impaired
Jefferson Pump Station	Site / Civil	HVAC				2 - Minor Defects Only (some wear)	2 - In Service, but Higher the Expected O&M Costs
Jefferson Pump Station	Site / Civil	Interior Security Lighting				2 - Minor Defects Only (some wear)	2 - In Service, but Higher the Expected O&M Costs
Jefferson Pump Station	Site / Civil	Odor Control				5 - Virtually Unserviceable	5- Component is not Functioning as Intended
Jefferson Pump Station	Site / Civil	Site Crane				2 - Minor Defects Only (some wear)	3- In Service, but Function is Impaired
Jefferson Pump Station	Site / Civil	Water Service				2 - Minor Defects Only (some wear)	2 - In Service, but Higher the Expected O&M Costs
Jefferson Pump Station	Structural / Architectural	Control/Electrical Building				3 - Moderate Deterioration	2 - In Service, but Higher the Expected O&M Costs
Jefferson Pump Station	Structural / Architectural	Dry Well				2 - Minor Defects Only (some wear)	2 - In Service, but Higher the Expected O&M Costs
Jefferson Pump Station	Structural / Architectural	Exhaust Stack and Dry well Port				2 - Minor Defects Only (some wear)	2 - In Service, but Higher the Expected O&M Costs
Jefferson Pump Station	Structural / Architectural	Wet Well				3 - Moderate Deterioration	3- In Service, but Function is Impaired
South Pump Station	Electrical and Power	Cathodic Protection				2 - Minor Defects Only (some wear)	2 - In Service, but Higher the Expected O&M Costs
South Pump Station	Electrical and Power	Dry well Control Panel				3 - Moderate Deterioration	3- In Service, but Function is Impaired
South Pump Station	Electrical and Power	Dry well lighting				3 - Moderate Deterioration	3- In Service, but Function is Impaired
South Pump Station	Electrical and Power	Lighting Panel				2 - Minor Defects Only (some wear)	2 - In Service, but Higher the Expected O&M Costs
South Pump Station	Electrical and Power	Main disconnect				3 - Moderate Deterioration	3- In Service, but Function is Impaired
South Pump Station	Electrical and Power	Motor -1				3 - Moderate Deterioration	3- In Service, but Function is Impaired
South Pump Station	Electrical and Power	Motor 1 VFD				2 - Minor Defects Only (some wear)	2 - In Service, but Higher the Expected O&M Costs
South Pump Station	Electrical and Power	Motor -2				3 - Moderate Deterioration	3- In Service, but Function is Impaired
South Pump Station	Electrical and Power	Motor 2 VFD				2 - Minor Defects Only (some wear)	2 - In Service, but Higher the Expected O&M Costs
South Pump Station	Electrical and Power	Motor -3				3 - Moderate Deterioration	3- In Service, but Function is Impaired

Lift Station Asset Registry

Facility Name	Discipline	Asset	Description	Asset ID	Original Installation	Major Rehabilitation	Recent Repairs/Improvements/Maintenance	Purchase Source	Manufacturer	Model	Serial No.	Size	Units	Material	HP	Coating	Speed	Voltage	Amps	Duty (GPM)
South Pump Station	Electrical and Power	Motor 3 VFD																		
South Pump Station	Electrical and Power	Motor Control Center																		
South Pump Station	Instrumentation / Control	Flow Meter																		
South Pump Station	Instrumentation / Control	Level Element	Bubbler																	
South Pump Station	Instrumentation / Control	PLC																		
South Pump Station	Instrumentation / Control	Pressure Element																		
South Pump Station	Instrumentation / Control	SCADA/ Telemetry																		
South Pump Station	Mechanical System	Air Compressor																		
South Pump Station	Mechanical System	Check Valve -1	Swing with spring lever		1967							6x8	In							
South Pump Station	Mechanical System	Check Valve -2	Swing with spring lever		1967							6x8	In							
South Pump Station	Mechanical System	Check Valve -3	Swing with spring lever									6x8	In							
South Pump Station	Mechanical System	D/S Isolation Valve -1	Gate		2013				DeZurik			10	In							
South Pump Station	Mechanical System	D/S Isolation Valve -2	Gate						Iowa			10	In							
South Pump Station	Mechanical System	D/S Isolation Valve -3	Gate		2013				Mueller			8	In							
South Pump Station	Mechanical System	Exhaust Port																		
South Pump Station	Mechanical System	Generator			2008															
South Pump Station	Mechanical System	Generator hookup																		
South Pump Station	Mechanical System	Main Pump 1	Centrifugal		2008				Smith and Loveless	4B2A	0601104									382
South Pump Station	Mechanical System	Main Pump 2	Centrifugal		2008				Smith and Loveless	4B2A	0601103									382
South Pump Station	Mechanical System	Main Pump 3	Centrifugal		2008				Smith and Loveless	4B2A	0601102									382
South Pump Station	Mechanical System	Personnel lift	Chain drive lift		1967				S/L											
South Pump Station	Mechanical System	Pipe Gallery Discharge Piping			1967															
South Pump Station	Mechanical System	Pump Seals -1																		
South Pump Station	Mechanical System	Pump Seals -2																		
South Pump Station	Mechanical System	Pump Seals -3																		
South Pump Station	Mechanical System	Seal Water System	Filters																	
South Pump Station	Mechanical System	Sump Pump System	Submersible		2008															
South Pump Station	Mechanical System	U/S Isolation Valve -1	Gate		1967				Iowa			10	In							
South Pump Station	Mechanical System	U/S Isolation Valve -2	Gate		1967				Iowa			10	In							
South Pump Station	Mechanical System	U/S Isolation Valve -3	Gate						S/L			10	In							
South Pump Station	Site / Civil	Access	Asphalt																	

Lift Station Asset Registry

Facility Name	Discipline	Asset	Duty (TDH)	Access Constraints	Maintenance Issues	Physical Score2	Performance Score2
South Pump Station	Electrical and Power	Motor 3 VFD				2 - Minor Defects Only (some wear)	2 - In Service, but Higher the Expected O&M Costs
South Pump Station	Electrical and Power	Motor Control Center				2 - Minor Defects Only (some wear)	2 - Minor Defects Only (some wear)
South Pump Station	Instrumentation / Control	Flow Meter				3 - Moderate Deterioration	3- In Service, but Function is Impaired
South Pump Station	Instrumentation / Control	Level Element				3 - Moderate Deterioration	3- In Service, but Function is Impaired
South Pump Station	Instrumentation / Control	PLC				2 - Minor Defects Only (some wear)	2 - In Service, but Higher the Expected O&M Costs
South Pump Station	Instrumentation / Control	Pressure Element				3 - Moderate Deterioration	3- In Service, but Function is Impaired
South Pump Station	Instrumentation / Control	SCADA/ Telemetry				2 - Minor Defects Only (some wear)	2 - In Service, but Higher the Expected O&M Costs
South Pump Station	Mechanical System	Air Compressor				2 - Minor Defects Only (some wear)	2 - In Service, but Higher the Expected O&M Costs
South Pump Station	Mechanical System	Check Valve -1				3 - Moderate Deterioration	3- In Service, but Function is Impaired
South Pump Station	Mechanical System	Check Valve -2				3 - Moderate Deterioration	3- In Service, but Function is Impaired
South Pump Station	Mechanical System	Check Valve -3				3 - Moderate Deterioration	3- In Service, but Function is Impaired
South Pump Station	Mechanical System	D/S Isolation Valve -1				3 - Moderate Deterioration	3- In Service, but Function is Impaired
South Pump Station	Mechanical System	D/S Isolation Valve -2				4 - Significant Deterioration	5- Component is not Functioning as Intended
South Pump Station	Mechanical System	D/S Isolation Valve -3				3 - Moderate Deterioration	3- In Service, but Function is Impaired
South Pump Station	Mechanical System	Exhaust Port				2 - Minor Defects Only (some wear)	2 - In Service, but Higher the Expected O&M Costs
South Pump Station	Mechanical System	Generator				3 - Moderate Deterioration	3- In Service, but Function is Impaired
South Pump Station	Mechanical System	Generator hookup				2 - Minor Defects Only (some wear)	2 - In Service, but Higher the Expected O&M Costs
South Pump Station	Mechanical System	Main Pump 1	58			3 - Moderate Deterioration	3- In Service, but Function is Impaired
South Pump Station	Mechanical System	Main Pump 2	58			3 - Moderate Deterioration	3- In Service, but Function is Impaired
South Pump Station	Mechanical System	Main Pump 3	58			3 - Moderate Deterioration	3- In Service, but Function is Impaired
South Pump Station	Mechanical System	Personnel lift				3 - Moderate Deterioration	3- In Service, but Function is Impaired
South Pump Station	Mechanical System	Pipe Gallery Discharge Piping				3 - Moderate Deterioration	3- In Service, but Function is Impaired
South Pump Station	Mechanical System	Pump Seals -1				3 - Moderate Deterioration	3- In Service, but Function is Impaired
South Pump Station	Mechanical System	Pump Seals -2				3 - Moderate Deterioration	3- In Service, but Function is Impaired
South Pump Station	Mechanical System	Pump Seals -3				3 - Moderate Deterioration	3- In Service, but Function is Impaired
South Pump Station	Mechanical System	Seal Water System				3 - Moderate Deterioration	3- In Service, but Function is Impaired
South Pump Station	Mechanical System	Sump Pump System				3 - Moderate Deterioration	3- In Service, but Function is Impaired
South Pump Station	Mechanical System	U/S Isolation Valve -1				3 - Moderate Deterioration	3- In Service, but Function is Impaired
South Pump Station	Mechanical System	U/S Isolation Valve -2				3 - Moderate Deterioration	3- In Service, but Function is Impaired
South Pump Station	Mechanical System	U/S Isolation Valve -3				3 - Moderate Deterioration	3- In Service, but Function is Impaired
South Pump Station	Site / Civil	Access				3 - Moderate Deterioration	3- In Service, but Function is Impaired

Lift Station Asset Registry

Facility Name	Discipline	Asset	Description	Asset ID	Original Installation	Major Rehabilitation	Recent Repairs/Improvements/Maintenance	Purchase Source	Manufacturer	Model	Serial No.	Size	Units	Material	HP	Coating	Speed	Voltage	Amps	Duty (GPM)
South Pump Station	Site / Civil	Exterior Security Lighting																		
South Pump Station	Site / Civil	Fencing	Chain Link																	
South Pump Station	Site / Civil	Gas Detector																		
South Pump Station	Site / Civil	Hoists	Chain fall		1967							2.5	Ton							
South Pump Station	Site / Civil	HVAC							Fijitsu											
South Pump Station	Site / Civil	HVAC - Dry well							Friedrich											
South Pump Station	Site / Civil	Interior Security Lighting																		
South Pump Station	Structural / Architectural	Control/Electrical Building	16x16x8 CMU		1967															
South Pump Station	Structural / Architectural	Dry Well	Steel can Construction		1967															
Southport Pump Station	Electrical and Power	Automatic Transfer Switch																		
Southport Pump Station	Electrical and Power	Cathodic Protection																		
Southport Pump Station	Electrical and Power	Dry well Control Panel																		
Southport Pump Station	Electrical and Power	Dry well lighting																		
Southport Pump Station	Electrical and Power	Generator Load Bay																		
Southport Pump Station	Electrical and Power	Junction Box																		
Southport Pump Station	Electrical and Power	Lighting Panel																		
Southport Pump Station	Electrical and Power	Main Disconnect																		
Southport Pump Station	Electrical and Power	Motor -1	Vertical ODP		2000				Smith and Loveless						50			230/460		
Southport Pump Station	Electrical and Power	Motor 1 disconnect in dry well																		
Southport Pump Station	Electrical and Power	Motor 1- VFD							Tesco											
Southport Pump Station	Electrical and Power	Motor -2	Vertical ODP		2000				Smith and Loveless						50			230/460		
Southport Pump Station	Electrical and Power	Motor 2 disconnect in dry well																		
Southport Pump Station	Electrical and Power	Motor 2- VFD							Tesco											
Southport Pump Station	Electrical and Power	Motor -3	Vertical ODP		2000				Smith and Loveless						50			230/460		
Southport Pump Station	Electrical and Power	Motor 3 disconnect in dry well																		
Southport Pump Station	Electrical and Power	Motor 3- VFD							Tesco											
Southport Pump Station	Electrical and Power	Motor -4																		
Southport Pump Station	Electrical and Power	Motor Control Center																		
Southport Pump Station	Instrumentation / Control	Flow Element																		
Southport Pump Station	Instrumentation / Control	Flow Meter																		
Southport Pump Station	Instrumentation / Control	Level Element	Bubbler																	
Southport Pump Station	Instrumentation / Control	PLC																		
Southport Pump Station	Instrumentation / Control	Pressure Element																		
Southport Pump Station	Instrumentation / Control	SCADA/ Telemetry																		
Southport Pump Station	Instrumentation / Control	Temp Sensor																		
Southport Pump Station	Instrumentation / Control	Vibration Sensor																		
Southport Pump Station	Mechanical System	Air valve																		
Southport Pump Station	Mechanical System	Bypass piping and valves																		

Lift Station Asset Registry

Facility Name	Discipline	Asset	Duty (TDH)	Access Constraints	Maintenance Issues	Physical Score2	Performance Score2
South Pump Station	Site / Civil	Exterior Security Lighting				4 - Significant Deterioration	5- Component is not Functioning as Intended
South Pump Station	Site / Civil	Fencing				4 - Significant Deterioration	5- Component is not Functioning as Intended
South Pump Station	Site / Civil	Gas Detector				5 - Virtually Unserviceable	5- Component is not Functioning as Intended
South Pump Station	Site / Civil	Hoists				2 - Minor Defects Only (some wear)	3- In Service, but Function is Impaired
South Pump Station	Site / Civil	HVAC				2 - Minor Defects Only (some wear)	2 - In Service, but Higher the Expected O&M Costs
South Pump Station	Site / Civil	HVAC - Dry well				3 - Moderate Deterioration	3- In Service, but Function is Impaired
South Pump Station	Site / Civil	Interior Security Lighting				3 - Moderate Deterioration	3- In Service, but Function is Impaired
South Pump Station	Structural / Architectural	Control/Electrical Building				3 - Moderate Deterioration	2 - In Service, but Higher the Expected O&M Costs
South Pump Station	Structural / Architectural	Dry Well				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Southport Pump Station	Electrical and Power	Automatic Transfer Switch				2 - Minor Defects Only (some wear)	2 - In Service, but Higher the Expected O&M Costs
Southport Pump Station	Electrical and Power	Cathodic Protection				2 - Minor Defects Only (some wear)	2 - In Service, but Higher the Expected O&M Costs
Southport Pump Station	Electrical and Power	Dry well Control Panel				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Southport Pump Station	Electrical and Power	Dry well lighting				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Southport Pump Station	Electrical and Power	Generator Load Bay				4 - Significant Deterioration	3- In Service, but Function is Impaired
Southport Pump Station	Electrical and Power	Junction Box				3 - Moderate Deterioration	2 - In Service, but Higher the Expected O&M Costs
Southport Pump Station	Electrical and Power	Lighting Panel				2 - Minor Defects Only (some wear)	2 - In Service, but Higher the Expected O&M Costs
Southport Pump Station	Electrical and Power	Main Disconnect				1 -Like New condition	1 - Component Functioning as Intended
Southport Pump Station	Electrical and Power	Motor -1				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Southport Pump Station	Electrical and Power	Motor 1 disconnect in c				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Southport Pump Station	Electrical and Power	Motor 1- VFD				2 - Minor Defects Only (some wear)	2 - Minor Defects Only (some wear)
Southport Pump Station	Electrical and Power	Motor -2				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Southport Pump Station	Electrical and Power	Motor 2 disconnect in c				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Southport Pump Station	Electrical and Power	Motor 2- VFD				2 - Minor Defects Only (some wear)	2 - Minor Defects Only (some wear)
Southport Pump Station	Electrical and Power	Motor -3				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Southport Pump Station	Electrical and Power	Motor 3 disconnect in c				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Southport Pump Station	Electrical and Power	Motor 3- VFD				2 - Minor Defects Only (some wear)	2 - Minor Defects Only (some wear)
Southport Pump Station	Electrical and Power	Motor -4				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Southport Pump Station	Electrical and Power	Motor Control Center				2 - Minor Defects Only (some wear)	2 - Minor Defects Only (some wear)
Southport Pump Station	Instrumentation / Control	Flow Element				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Southport Pump Station	Instrumentation / Control	Flow Meter				5 - Virtually Unserviceable	5- Component is not Functioning as Intended
Southport Pump Station	Instrumentation / Control	Level Element				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Southport Pump Station	Instrumentation / Control	PLC				2 - Minor Defects Only (some wear)	2 - In Service, but Higher the Expected O&M Costs
Southport Pump Station	Instrumentation / Control	Pressure Element				2 - Minor Defects Only (some wear)	2 - In Service, but Higher the Expected O&M Costs
Southport Pump Station	Instrumentation / Control	SCADA/ Telemetry				2 - Minor Defects Only (some wear)	2 - In Service, but Higher the Expected O&M Costs
Southport Pump Station	Instrumentation / Control	Temp Sensor				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Southport Pump Station	Instrumentation / Control	Vibration Sensor				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Southport Pump Station	Mechanical System	Air valve				1 -Like New condition	1 - Component Functioning as Intended
Southport Pump Station	Mechanical System	Bypass piping and valves				1 -Like New condition	1 - Component Functioning as Intended

Lift Station Asset Registry

Facility Name	Discipline	Asset	Description	Asset ID	Original Installation	Major Rehabilitation	Recent Repairs/Improvements/Maintenance	Purchase Source	Manufacturer	Model	Serial No.	Size	Units	Material	HP	Coating	Speed	Voltage	Amps	Duty (GPM)
Southport Pump Station	Mechanical System	Check Valve -1	Swing		2000				MH			10x12	In							
Southport Pump Station	Mechanical System	Check Valve -2	Swing						MH			10x12	In							
Southport Pump Station	Mechanical System	Check Valve -3	Swing						MH			10x12	In							
Southport Pump Station	Mechanical System	Check Valve -4	Swing		2000				MH			10x12	In							
Southport Pump Station	Mechanical System	D/S Isolation Valve -1	Gate		2000				MH			12	In							
Southport Pump Station	Mechanical System	D/S Isolation Valve -2	Gate									12	In							
Southport Pump Station	Mechanical System	D/S Isolation Valve -3	Gate						MH			12	In							
Southport Pump Station	Mechanical System	D/S Isolation Valve -4	Gate		2000				MH			12	In							
Southport Pump Station	Mechanical System	Exhaust Fan																		
Southport Pump Station	Mechanical System	Generator	Diesel		2000															
Southport Pump Station	Mechanical System	Main Pump 1	Centrifugal		2000				Smith and Loveless	8D4B	0601071									2153
Southport Pump Station	Mechanical System	Main Pump 2	Centrifugal		2000				Smith and Loveless	8D4B	0601073									2153
Southport Pump Station	Mechanical System	Main Pump 3	Centrifugal		2000				Smith and Loveless	8D4B	0601072									2153
Southport Pump Station	Mechanical System	Main Pump 4	Centrifugal						Smith and Loveless	8D4B										2153
Southport Pump Station	Mechanical System	Personnel lift			2000				S/L											
Southport Pump Station	Mechanical System	Pipe Gallery Discharge Piping																		
Southport Pump Station	Mechanical System	Pump 1 -4 Suction Piping			2000							12	In	DI						
Southport Pump Station	Mechanical System	Pump 1-4 Discharge Piping			2000							12	In	DI						
Southport Pump Station	Mechanical System	Pump Seals -1																		
Southport Pump Station	Mechanical System	Pump Seals -2																		
Southport Pump Station	Mechanical System	Pump Seals -3																		
Southport Pump Station	Mechanical System	Pump Seals -4																		
Southport Pump Station	Mechanical System	Seal Water System	Filters																	
Southport Pump Station	Mechanical System	Sump Pump System	Submersible																	
Southport Pump Station	Mechanical System	Surge/Transient Control	Hydropneumatic Tank		2000															
Southport Pump Station	Mechanical System	U/S Isolation Valve -1	Gate		2000							12	In							
Southport Pump Station	Mechanical System	U/S Isolation Valve -2	Gate									12	In							
Southport Pump Station	Mechanical System	U/S Isolation Valve -3	Gate									12	In							
Southport Pump Station	Mechanical System	U/S Isolation Valve -4	Gate		2000							12	In							
Southport Pump Station	Site / Civil	Access	Asphalt																	
Southport Pump Station	Site / Civil	Exterior Security Lighting																		
Southport Pump Station	Site / Civil	Fencing	Chain Link																	
Southport Pump Station	Site / Civil	Gas Detector																		
Southport Pump Station	Site / Civil	Hoists	Chain fall		2000															
Southport Pump Station	Site / Civil	HVAC	Electrical Building		2013				Fujitsu											
Southport Pump Station	Site / Civil	HVAC	Dry Well		2013				Fujitsu											
Southport Pump Station	Site / Civil	Interior Security Lighting																		
Southport Pump Station	Site / Civil	Odor Control	Biofilter		2000															

Facility Name	Discipline	Asset	Duty (TDH)	Access Constraints	Maintenance Issues	Physical Score2	Performance Score2
Southport Pump Station	Mechanical System	Check Valve -1				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Southport Pump Station	Mechanical System	Check Valve -2				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Southport Pump Station	Mechanical System	Check Valve -3				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Southport Pump Station	Mechanical System	Check Valve -4				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Southport Pump Station	Mechanical System	D/S Isolation Valve -1				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Southport Pump Station	Mechanical System	D/S Isolation Valve -2				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Southport Pump Station	Mechanical System	D/S Isolation Valve -3				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Southport Pump Station	Mechanical System	D/S Isolation Valve -4				4 - Significant Deterioration	5- Component is not Functioning as Intended
Southport Pump Station	Mechanical System	Exhaust Fan				2 - Minor Defects Only (some wear)	2 - In Service, but Higher the Expected O&M Costs
Southport Pump Station	Mechanical System	Generator				4 - Significant Deterioration	4 - Significant Deterioration
Southport Pump Station	Mechanical System	Main Pump 1	69			3 - Moderate Deterioration	3- In Service, but Function is Impaired
Southport Pump Station	Mechanical System	Main Pump 2	69			3 - Moderate Deterioration	3- In Service, but Function is Impaired
Southport Pump Station	Mechanical System	Main Pump 3	69			3 - Moderate Deterioration	3- In Service, but Function is Impaired
Southport Pump Station	Mechanical System	Main Pump 4	69			3 - Moderate Deterioration	3- In Service, but Function is Impaired
Southport Pump Station	Mechanical System	Personnel lift				3 - Moderate Deterioration	3 - Moderate Deterioration
Southport Pump Station	Mechanical System	Pipe Gallery Discharge Piping				2 - Minor Defects Only (some wear)	2 - In Service, but Higher the Expected O&M Costs
Southport Pump Station	Mechanical System	Pump 1 -4 Suction Piping				4 - Significant Deterioration	4 - In Service, but Function is Highly Impaired
Southport Pump Station	Mechanical System	Pump 1-4 Discharge Piping				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Southport Pump Station	Mechanical System	Pump Seals -1				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Southport Pump Station	Mechanical System	Pump Seals -2				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Southport Pump Station	Mechanical System	Pump Seals -3				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Southport Pump Station	Mechanical System	Pump Seals -4				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Southport Pump Station	Mechanical System	Seal Water System				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Southport Pump Station	Mechanical System	Sump Pump System				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Southport Pump Station	Mechanical System	Surge/Transient Control				5 - Virtually Unserviceable	5- Component is not Functioning as Intended
Southport Pump Station	Mechanical System	U/S Isolation Valve -1				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Southport Pump Station	Mechanical System	U/S Isolation Valve -2				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Southport Pump Station	Mechanical System	U/S Isolation Valve -3				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Southport Pump Station	Mechanical System	U/S Isolation Valve -4				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Southport Pump Station	Site / Civil	Access				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Southport Pump Station	Site / Civil	Exterior Security Lighting				4 - Significant Deterioration	4 - In Service, but Function is Highly Impaired
Southport Pump Station	Site / Civil	Fencing				4 - Significant Deterioration	5- Component is not Functioning as Intended
Southport Pump Station	Site / Civil	Gas Detector				5 - Virtually Unserviceable	5- Component is not Functioning as Intended
Southport Pump Station	Site / Civil	Hoists				2 - Minor Defects Only (some wear)	3- In Service, but Function is Impaired
Southport Pump Station	Site / Civil	HVAC				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Southport Pump Station	Site / Civil	HVAC				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Southport Pump Station	Site / Civil	Interior Security Lighting				2 - Minor Defects Only (some wear)	2 - In Service, but Higher the Expected O&M Costs
Southport Pump Station	Site / Civil	Odor Control				2 - Minor Defects Only (some wear)	2 - In Service, but Higher the Expected O&M Costs

Lift Station Asset Registry

Facility Name	Discipline	Asset	Description	Asset ID	Original Installation	Major Rehabilitation	Recent Repairs/Improvements/Maintenance	Purchase Source	Manufacturer	Model	Serial No.	Size	Units	Material	HP	Coating	Speed	Voltage	Amps	Duty (GPM)
Southport Pump Station	Structural / Architectural	Control/Electrical Building	20x20x9 CMU		2000															
Southport Pump Station	Structural / Architectural	Dry Well	Steel Structure, cathodically protected																	
Southport Pump Station	Structural / Architectural	Wet Well	Cast in place concrete wet well		2000											PVC lined				

Lift Station Asset Registry

Facility Name	Discipline	Asset	Duty (TDH)	Access Constraints	Maintenance Issues	Physical Score2	Performance Score2
Southport Pump Station	Structural / Architectural	Control/Electrical Building				3 - Moderate Deterioration	2 - In Service, but Higher the Expected O&M Costs
Southport Pump Station	Structural / Architectural	Dry Well				3 - Moderate Deterioration	3- In Service, but Function is Impaired
Southport Pump Station	Structural / Architectural	Wet Well				3 - Moderate Deterioration	3- In Service, but Function is Impaired

Appendix B. Risk Assessment Scoring Matrix

Condition Grade	Useful Life Consumed	Level of Maintenance Currently Required	Improvements Implementation Timeframe	Structural		Mechanical		Electrical		Instrumentation and Controls	
				Concrete, Steel, Masonry		Piping, Valves, Pumps		VFDs, Motors, Switchgear, MCCs, Transformers, Generators, Transfer Switches		Indicators, Transmitters, Control Panels, Valve Controls, Leak Detection.	
				Physical	Performance	Physical	Performance	Physical	Performance	Physical	Performance
1 – Like New Condition	<5%	Normal Preventative / Predictive Maintenance	-		Adequate design to support current and future loads, ability to address seismic loads. Meets strength and service load design, Up to code. No Leaks or Coating Issues	New condition, minimal signs of wear.	Adequate capacity for average and peak demand conditions, margin for increased capacity. Normal operator involvement during average and peak demand conditions. Very reliable. No reported failures. Equipment is generally available >99% of the time. Parts are quickly and readily available; parts typically in stock.	New condition, minimal signs of wear.	Runs perfectly as new. Adequate capacity for average and peak demand conditions, margin for increased capacity. Normal operator involvement during average and peak demand conditions. Very reliable. No reported failures. Equipment is generally available >99% of the time. Parts are quickly and readily available; parts typically in stock.	New condition.	Adequate performance for normal conditions, ability to update for future conditions. Normal operator involvement to maintain and calibrate systems. Very reliable. No reported failures. Equipment is generally available >99% of the time. Parts are quickly and readily available; parts typically in stock.
2 – Minor Defects Only (some wear)	5% - 20%	Normal Preventative / Predictive Maintenance / Minor Corrective Maintenance	-	CONCRETE/MASONRY ASSETS: Mechanical abrasion or impact dents up to 1 in. General cracks up to 1/16 in. and hairline corrosion cracks. Occasional corrosion stains or small pop-out corrosion spalls. Minor Cosmetic Surface Erosion; No Rebar Exposure STEEL/METALS ASSETS: Few visible defects. Localized surface erosion with slight loss of thickness. No physical deformation	Adequate design to support loads, ability to address seismic loads. Meets strength and service load design.	Some wear or surface corrosion, or not designed to current standards. Minor oil or gland leakage evident. Piping: Minor surface corrosion observed	Adequate capacity for average and peak demand conditions. No margin for increased capacity for peak demand conditions. Normal operator involvement during average demand conditions. Greater than normal operator involvement during peak demand conditions. Good reliability. Infrequent breakdown. Equipment generally available 95%-99% of the time. Parts are generally available with short lead time; parts typically in stock.	Superficial surface wear, no interior corrosion. Major components with >10 years of remaining service. Minor components with >3 years of service.	Adequate capacity for average and peak demand conditions. No margin for increased capacity for peak demand conditions. Normal operator involvement during average demand conditions. Greater than normal operator involvement during peak demand conditions. Good reliability. Infrequent breakdown. Equipment generally available 95%-99% of the time. Parts are generally available with short lead time; parts typically in stock.	Minimal cosmetic surface defects. Normal calibration schedule, minimal adjustment required.	Adequate performance for normal conditions. No ability to update/upgrade current equipment. Normal operator involvement to maintain and calibrate systems. Good reliability. Infrequent breakdown. Equipment generally available 95%-99% of the time. Parts are generally available with short lead time; parts typically in stock.

Condition Grade	Useful Life Consumed	Level of Maintenance Currently Required	Improvements Implementation Timeframe	Structural		Mechanical		Electrical		Instrumentation and Controls	
				Concrete, Steel, Masonry		Piping, Valves, Pumps		VFDs, Motors, Switchgear, MCCs, Transformers, Generators, Transfer Switches		Indicators, Transmitters, Control Panels, Valve Controls, Leak Detection.	
				Physical	Performance	Physical	Performance	Physical	Performance	Physical	Performance
3 – Moderate Deterioration	21 - 50%	Normal Preventative / Predictive Maintenance / Major Corrective Maintenance	-	CONCRETE/MASONRY ASSETS: Structural cracks up to 1/16 in. Corrosion cracks from 1/32 in. up to 1/4 in. wide. Chemical deterioration: Random cracks up to 1/16 in.; "Soft" concrete and rounding or erosion of corners up to 3 in. deep. Some Exposed Rebar, No Structural Damage STEEL/METALS ASSETS: Moderate defects. Moderate surface erosion or corrosion. Some physical deformation or impact damage. Minor movement.	Designed to support existing loads. Meets strength design, does not meet service load design. Excessive deflection, permanent fatigue.	Functionally sound plant and components, moderate wear or surface corrosion. Moderate oil or gland leakage evident, evidence of historic leakage. Evidence of internal wear (sound, smell, temperature, etc.) Roughness when starting / stopping. Piping: Moderate corrosion observed	Maximum capacity for average and peak demand conditions, no margin for increase. Greater than normal operator involvement during average demand conditions. Greater than normal operator involvement during peak demand conditions. Average reliability. Occasional breakdowns. Equipment available generally available >85% of the time. Parts are generally available with a long lead time; parts not typically in stock.	Deteriorating surface wear, some interior corrosion. Major components with 5-10 years of remaining service. Minor components with <3 years of remaining service, with intermittent failures. Low risk safety hazard.	Maximum capacity for average and peak demand conditions, no margin for increase. Greater than normal operator involvement during average and peak demand conditions. Average reliability. Occasional breakdowns. Equipment available generally available >85% of the time. Parts are generally available with a long lead time; parts not typically in stock.	Average physical wear and tear based on asset age. Normal calibration schedule, normal frequency of adjustment required.	No ability to update/upgrade current equipment. Greater than normal operator involvement to maintain and calibrate equipment. Greater than normal operator involvement during peak demand conditions. Average reliability. Occasional breakdowns. Equipment available generally available >85% of the time. Parts are generally available with a long lead time; parts not typically in stock.
4 – Significant Deterioration	50% - 75%	Rehabilitate, if Possible	> 10 years	CONCRETE/MASONRY ASSETS: Structural cracks 1/4 in. to 1/2 in. or complete breakage. Loss of bearing and displacement at connections. Complete loss of concrete cover due to corrosion of reinforcing steel with over 30 percent of diameter loss for any main reinforcing bar. Exposed Rebar, Members Bent, Buckling, Leaning STEEL/METALS ASSETS: Derelict, or structural failure beyond repair. Safety hazard.	Overloaded for current loads, may impact other processes. Begun to fail.	Failing service, beyond repair. Safety hazard. Piping: Significant corrosion observed	Overloaded for average and peak demand conditions, may impact other processes. Excessive operator involvement during normal conditions. Excessive operator involvement during peak conditions. Very poor reliability. Continuous recurrent breakdown (weekly). Equipment out of service for more than 70% of time. Parts are generally no longer available. Technology is obsolete.	Moving parts show excess wear. Failing service, beyond repair. Evidence of arcing.	Overloaded for average and peak demand conditions, may impact other processes. Excessive operator involvement during normal conditions. Excessive operator involvement during peak conditions. Very poor reliability. Continuous recurrent breakdown (weekly). Equipment out of service for more than 70% of time. Parts are generally no longer available. Technology is obsolete.	Significant cosmetic wear or evidence of impact. Unreliable performance after maintenance or calibration.	Overloaded for current conditions, may impact other processes Excessive operator involvement to maintain operation. Highly unreliable. Continuous recurrent breakdown (weekly). Equipment out of service for more than 70% of time. Parts are generally no longer available. Technology is obsolete.
5 – Virtually Unserviceable / Failure Concern	>75%	Consider Replacement	Within 2-10 years	Failed. Safety risk. Immediate action needed.	Unsafe operation, fails to meet code; unable to return to service after breakdown	Failed. Safety risk. Immediate action needed. Piping: Severe Corrosion; Immediate repair/replacement needed (loss of wall thickness >75%)	Dysfunctional for demand conditions and impacting other processes. Excessive operator involvement. Unable to return to service after breakdown.	Failed. Safety risk. Immediate action needed. Condition is beyond acceptable level.	Dysfunctional for demand conditions and impacting other processes. Excessive operator involvement. Unable to return to service after breakdown.	Failed. Safety risk. Immediate action needed.	Dysfunctional for demand conditions and impacting other processes. Highly unreliable. Excessive operator involvement. Unable to return to service after breakdown.

Appendix D. CIP Project Sheets

Washington District Underground Utility Infrastructure Infill and Upgrade

Rehab_1



Project Description

Reason for Improvement

CCTV Inspection determined that the structural condition of the gravity mains requires rehabilitation or repair to meet level of service requirements.

Improvement Description

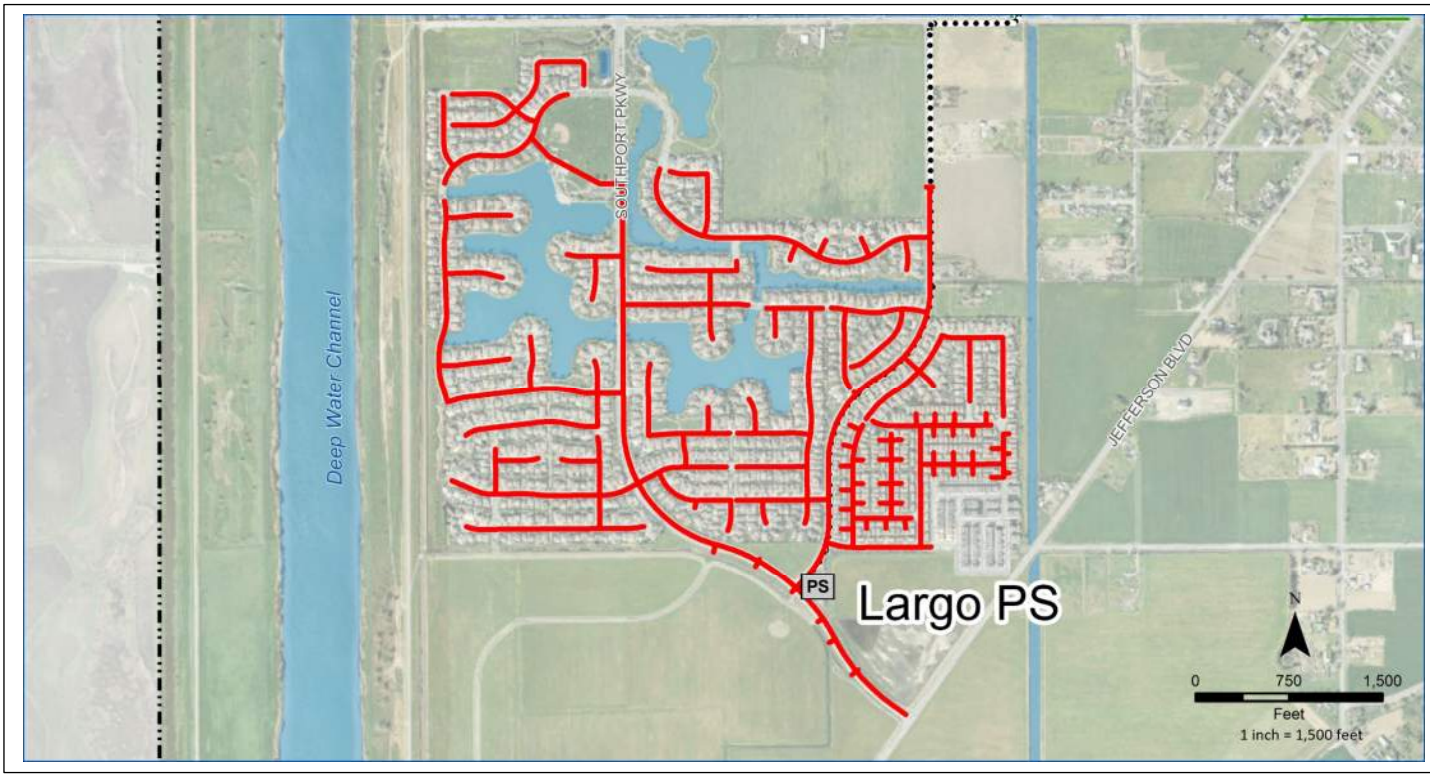
Replace 5,000 feet of 8-inch and 12-inch gravity main with 8-inch and 12-inch gravity main in the vicinity of C St.

Project Element	Estimated Cost ($1,000)
Base Construction	900.00
Construction Contingency (30%)	270.00
Construction Subtotal	*1,170.00*
Eng/CM/Legal/Admin (30%)	351.00
Project Total	**1,521.00**

CITY OF WEST SACRAMENTO

Largo Pump Station Tributary Area I&I Reduction

Rehab_2



Project Description

Reason for Improvement

Reduce high I&I levels into Largo Pump Station and retain capacity to support future development of Yarbrough Master Plan area.

Improvement Description

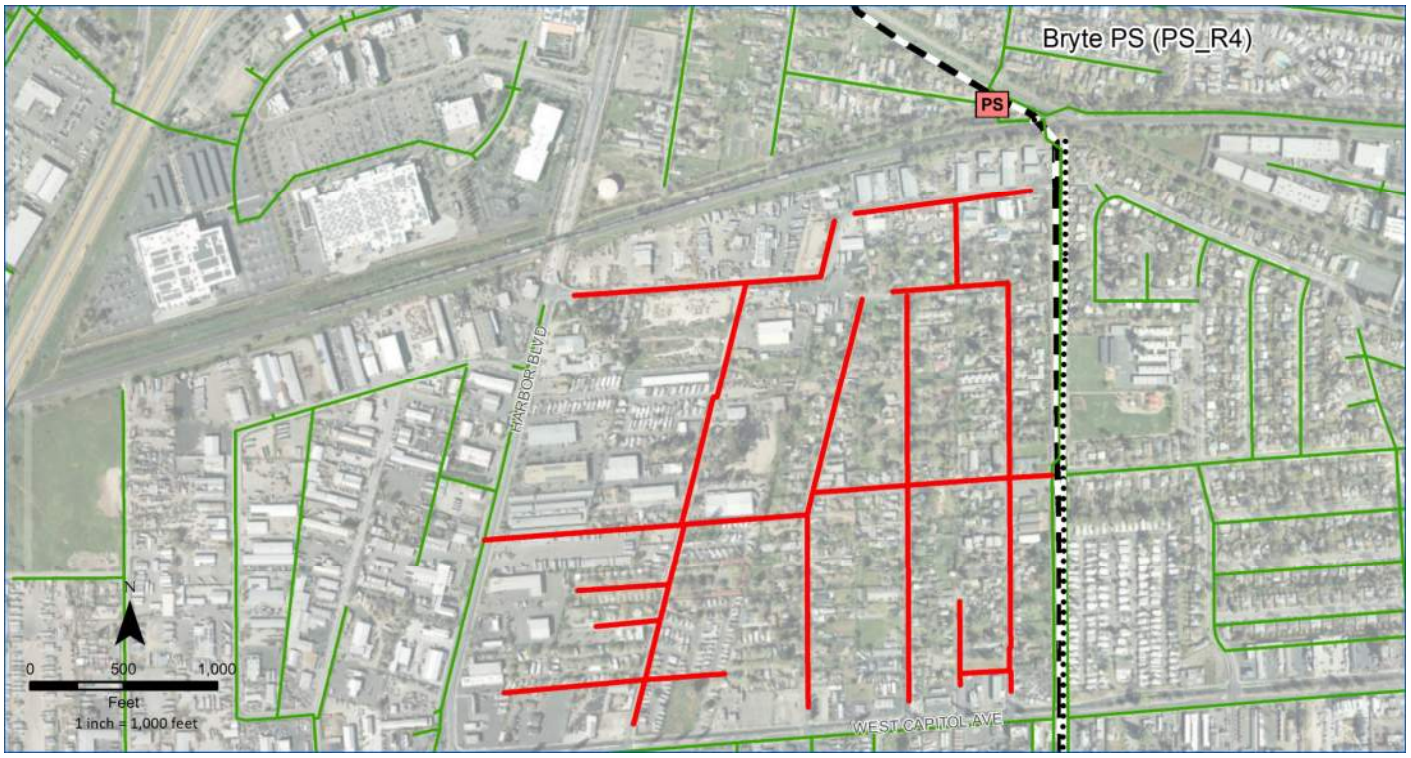
10.5 miles of basin-wide chemical grouting (on a 6-8 year schedule) to seal the system aginst I&I.

Project Element	Estimated Cost ($1,000)
Base Construction	1,292.31
Construction Contingency (30%)	387.69
Construction Subtotal	1,680.00
Eng/CM/Legal/Admin (30%)	504.00
Project Total	**2,184.00**

CITY OF WEST SACRAMENTO

Bryte Pump Station Monitoring Site 4 I&I Reduction

Rehab_3



Project Description

Reason for Improvement

Reduce very high I&I levels into Bryte Pump Station from Monitoring Area 4. CCTV records also indicate poor structural condition in this area.

Improvement Description

Rehabilitation and/or repair of 3.8 miles of existing gravity mains and manholes in high I&I area of Bryte Pump Station tributary area along Michigan Boulevard.

Project Element	Estimated Cost ($1,000)
Base Construction	4,056.15
Construction Contingency (30%)	1,216.85
Construction Subtotal	5,273.00
Eng/CM/Legal/Admin (30%)	1,582.00
Project Total	**6,855.00**

CITY OF WEST SACRAMENTO

Replacement of 6-inch Gravity Main on Hobson Street

Rehab_4



Project Description

Reason for Improvement

CCTV Inspection determined that the structural condition of the gravity mains requires rehabilitation or repair to meet level of service requirements.

Improvement Description

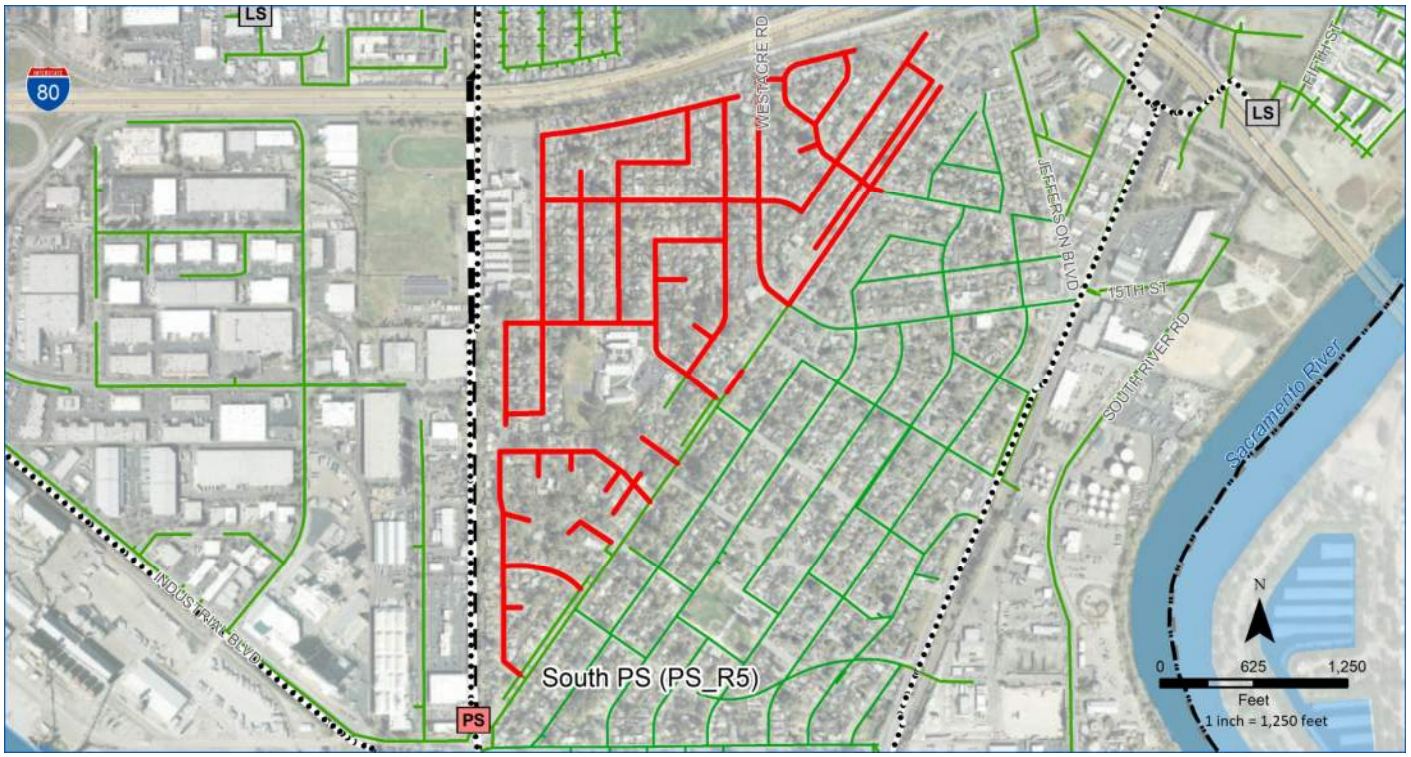
Replace 1,400 feet of 6-inch diameter gravity main with 8-inch diameter gravity main in the vicinity of Hobson Street.

Project Element	Estimated Cost ($1,000)
Base Construction	189.23
Construction Contingency (30%)	56.77
Construction Subtotal	246.00
Eng/CM/Legal/Admin (30%)	74.00
Project Total	**320.00**

CITY OF WEST SACRAMENTO

Westmore Oaks Sewer Rehabilitation

Rehab_5



Project Description

Reason for Improvement

CCTV Inspection determined that the structural condition of the gravity mains requires rehabilitation or repair to meet level of service requirements.

Improvement Description

Rehabilitate/replace 5-miles of high priority gravity main.

Project Element	Estimated Cost ($1,000)
Base Construction	4,983.08
Construction Contingency (30%)	1,494.92
Construction Subtotal	6,478.00
Eng/CM/Legal/Admin (30%)	1,943.00
Project Total	**8,421.00**

CITY OF WEST SACRAMENTO

Backyard Mains

Backyard_1



Project Description

Reason for Improvement

The City has identified backyard mains as a maintenance challenge.

Improvement Description

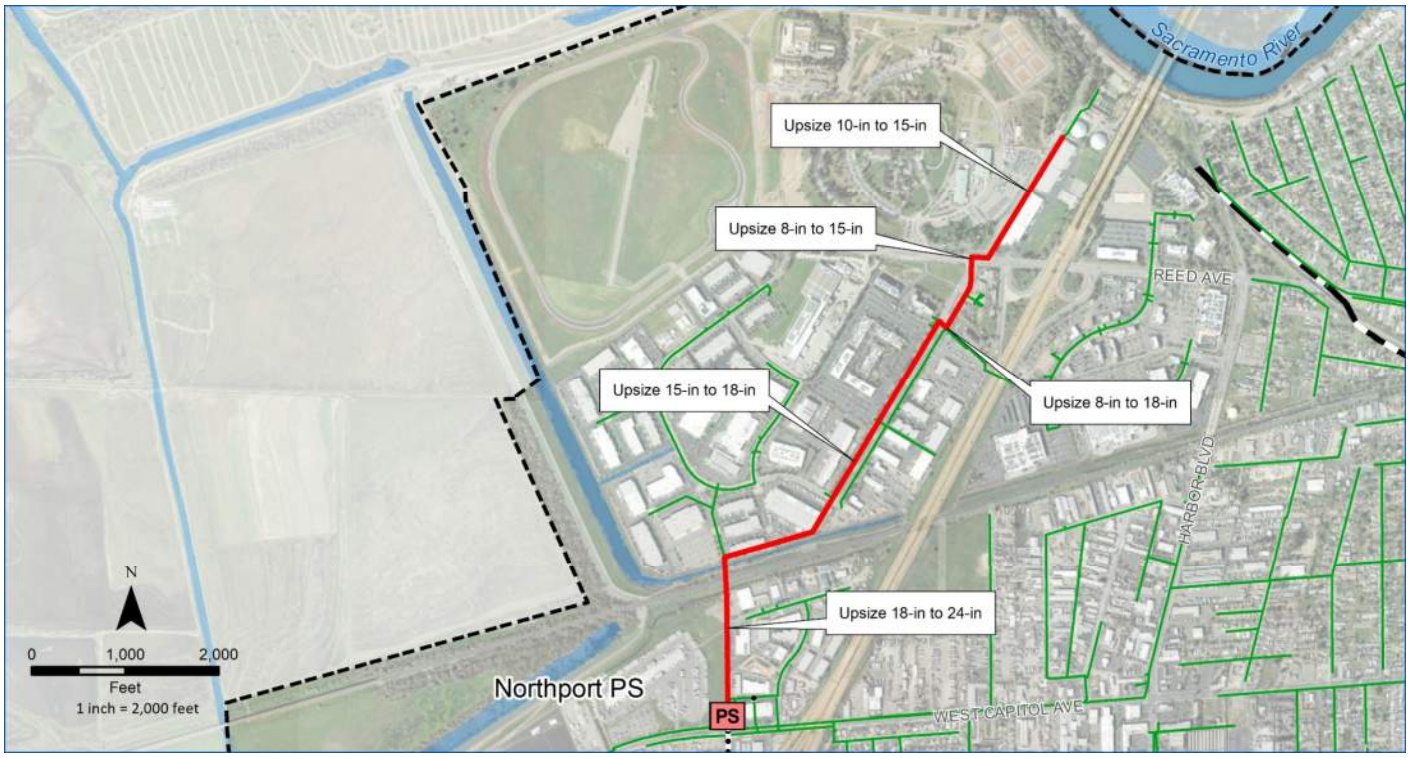
Relocate 3,500 feet of 8-inch diameter gravity main to the public right of way near 8th Street and James Street.

Project Element	Estimated Cost ($1,000)
Base Construction	630.00
Construction Contingency (30%)	189.00
Construction Subtotal	819.00
Eng/CM/Legal/Admin (30%)	246.00
Project Total	**1,065.00**

CITY OF WEST SACRAMENTO

Stillwater Road Trunk Sewer Upsize

GM_1



Project Description

Reason for Improvement

Gravity Main capacity increase required under Existing Conditions.

Improvement Description

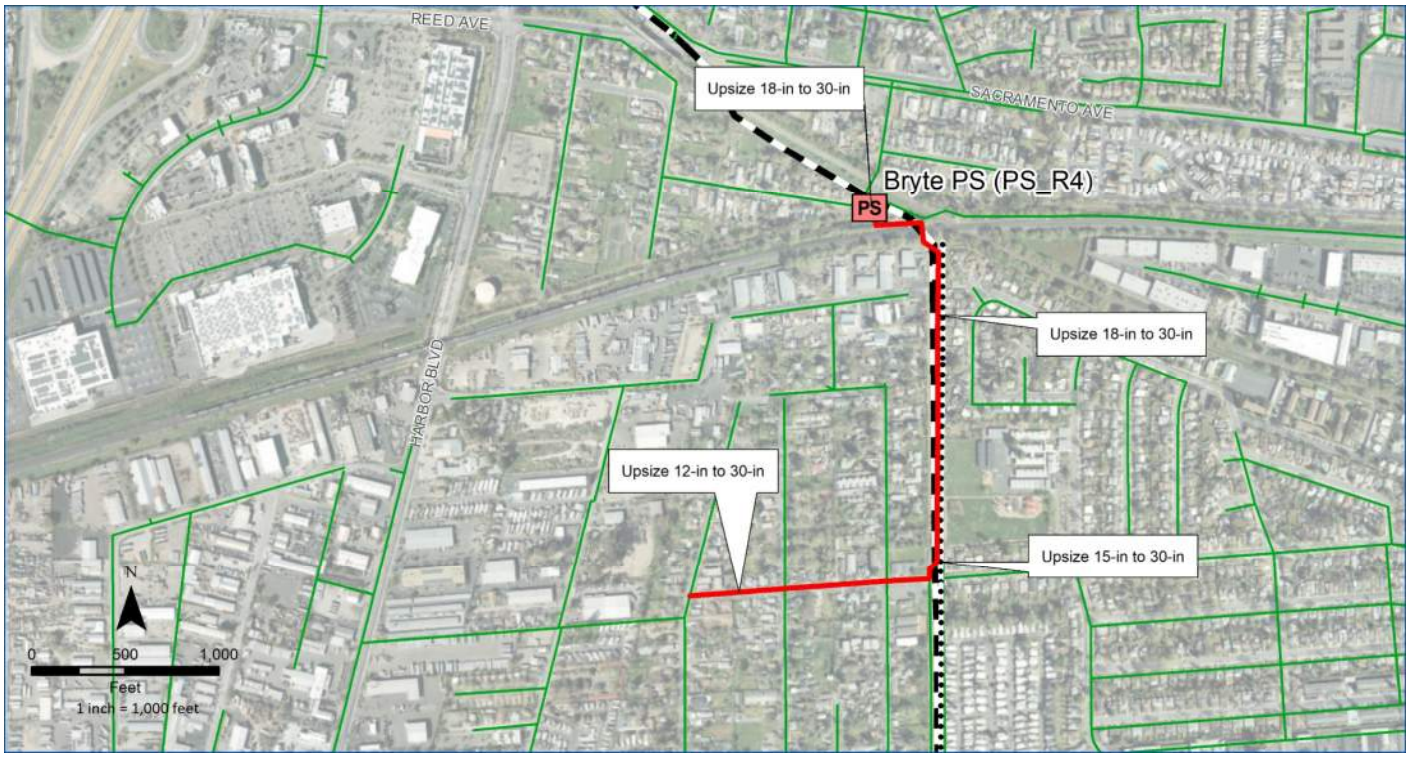
Upsize 7,940 of gravity main along Stillwater Road and upstream of Northport Pump Station.

Project Element	Estimated Cost ($1,000)
Base Construction	3,276.92
Construction Contingency (30%)	983.08
Construction Subtotal	4,260.00
Eng/CM/Legal/Admin (30%)	1,278.00
Project Total	**5,538.00**

CITY OF WEST SACRAMENTO

Bryte Influent Sewer Upsize

GM_2



Project Description

Reason for Improvement

Gravity Main capacity increase required under Existing Conditions.

Improvement Description

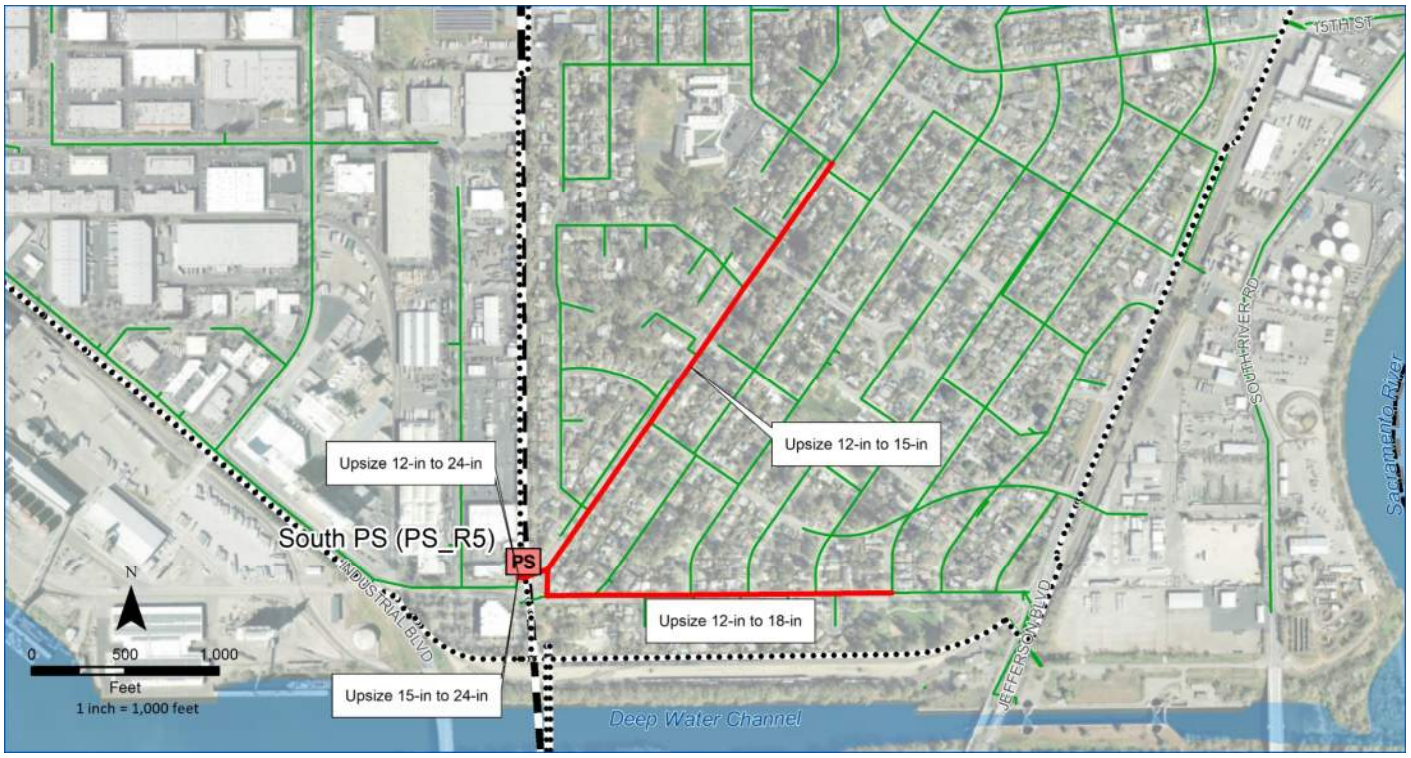
Upsize 3,620 of gravity main upstream of Bryte Pump Station.

Project Element	Estimated Cost ($1,000)
Base Construction	2,443.08
Construction Contingency (30%)	732.92
Construction Subtotal	3,176.00
Eng/CM/Legal/Admin (30%)	953.00
Project Total	**4,129.00**

CITY OF WEST SACRAMENTO

Stone & Park Trunk Sewer Upsize

GM_3



Project Description

Reason for Improvement

Gravity Main capacity increase required under Existing Conditions.

Improvement Description

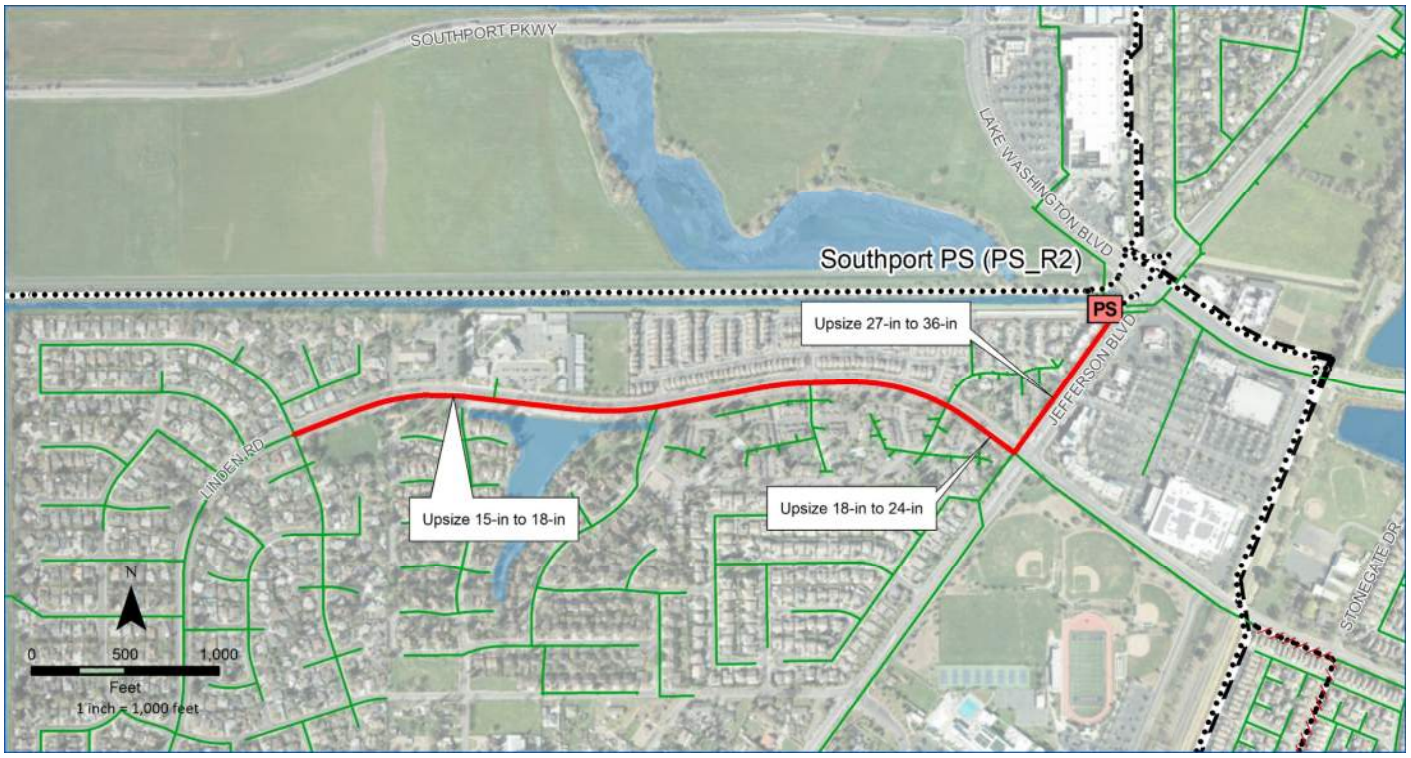
Upsize 4,810 of gravity main along Stone Blvd and Park Blvd upstream of South Pump Station.

Project Element	Estimated Cost ($1,000)
Base Construction	1,793.85
Construction Contingency (30%)	538.15
Construction Subtotal	2,332.00
Eng/CM/Legal/Admin (30%)	700.00
Project Total	**3,032.00**

CITY OF WEST SACRAMENTO

Linden Road Trunk Sewer Upsize

GM_4



Project Description

Reason for Improvement

Gravity Main capacity increase required under Existing Conditions.

Improvement Description

Upsize 5,030 of gravity main along Linden Road upstream of Southport Pump Station.

Project Element	Estimated Cost ($1,000)
Base Construction	2,865.38
Construction Contingency (30%)	859.62
Construction Subtotal	3,725.00
Eng/CM/Legal/Admin (30%)	1,118.00
Project Total	**4,843.00**

CITY OF WEST SACRAMENTO

Davis FM Installation

FM_1



Project Description

Reason for Improvement

Force Main required to connect new Davis Pump Station.

Improvement Description

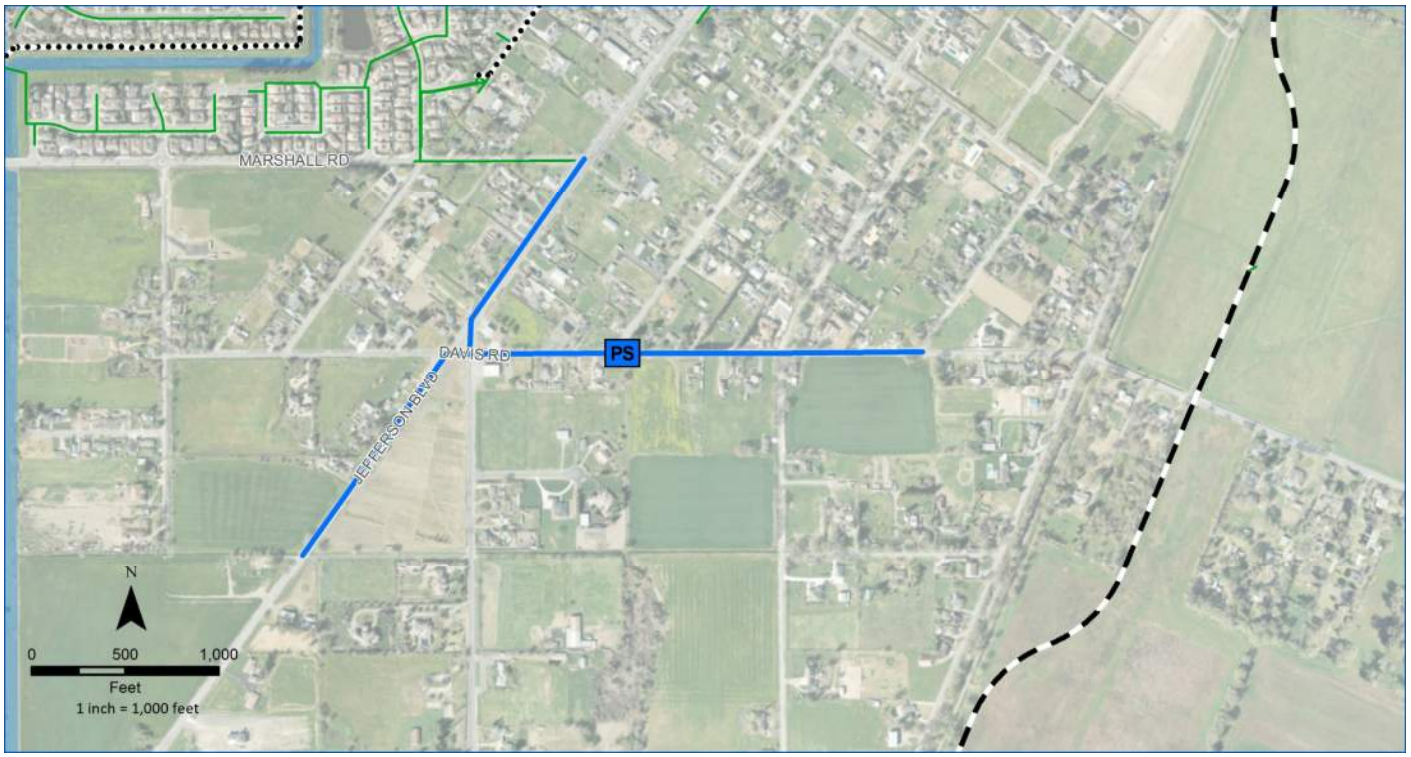
Construct 3,960 of force main along Davis Road from the new Davis Pump Station to the LNWI Connection #1.

Project Element	Estimated Cost ($1,000)
Base Construction	670.00
Construction Contingency (30%)	201.00
Construction Subtotal	871.00
Eng/CM/Legal/Admin (30%)	261.00
Project Total	**1,132.00**

CITY OF WEST SACRAMENTO

Davis Trunk Sewer Installation

GM_5



Project Description

Reason for Improvement

Gravity Main required to connect new Davis Pump Station.

Improvement Description

Construct 5,110 feet of gravity main in Rural Core areas.

Project Element	Estimated Cost ($1,000)
Base Construction	919.23
Construction Contingency (30%)	275.77
Construction Subtotal	1,195.00
Eng/CM/Legal/Admin (30%)	359.00
Project Total	**1,554.00**

CITY OF WEST SACRAMENTO

South Pump Station Upgrades

PS_C1



Project Description

Reason for Improvement

Pump station requires capacity upgrade.

Improvement Description

South Pump Station: Replace pumps with less Total Dynamic Head and increase capacity to 4,505 gpm for existing and future conditions. Less capacity needed depending on extent of R&R projects.

Project Element	Estimated Cost ($1,000)
Base Construction	4,630.77
Construction Contingency (30%)	1,389.23
Construction Subtotal	6,020.00
Eng/CM/Legal/Admin (30%)	1,806.00
Project Total	**7,826.00**

CITY OF WEST SACRAMENTO

Bryte Pump Station Upgrades

PS_C2



Project Description

Reason for Improvement

Pump station requires capacity upgrade.

Improvement Description

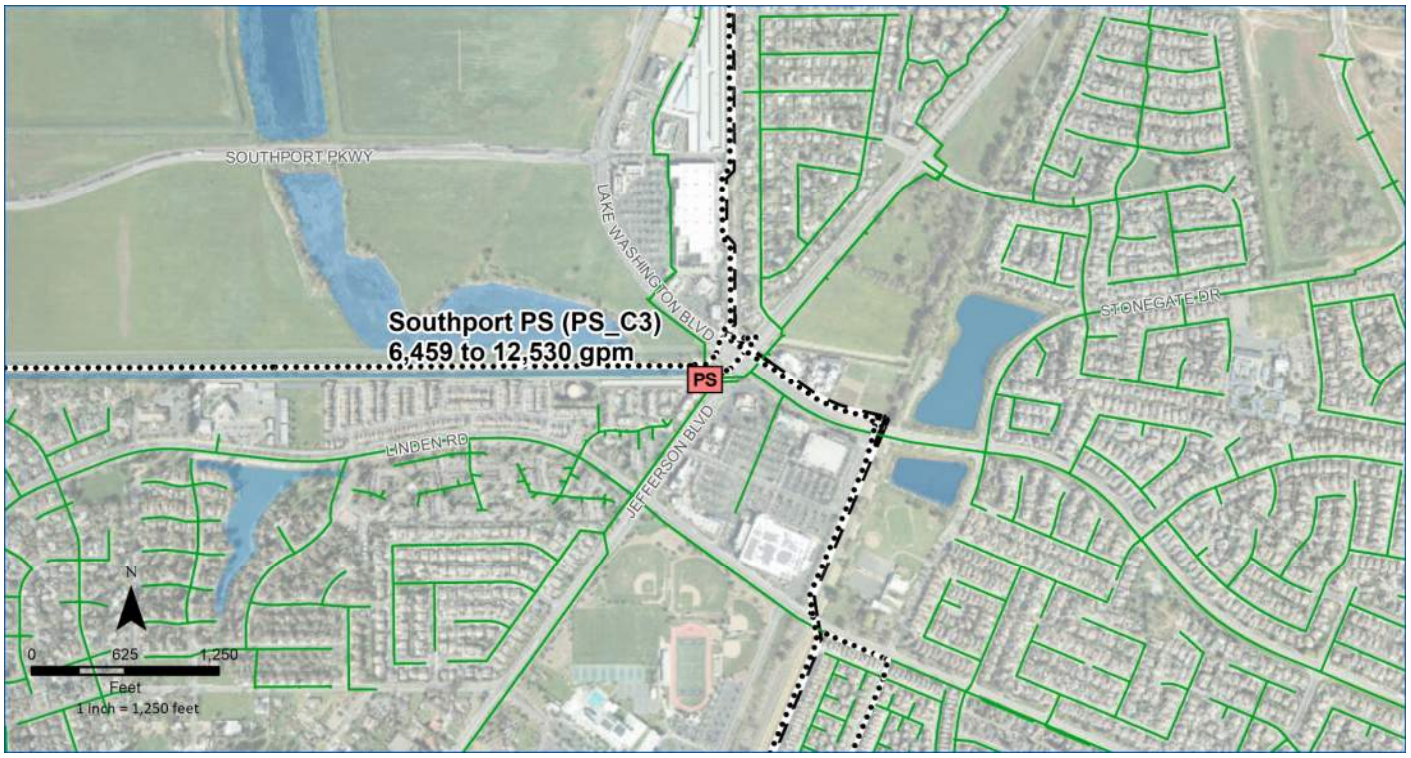
Bryte Pump Station: Replace pump with less Total Dynamic Head and increase capacity to 9,000 gpm for existing conditions. Less capacity needed depending on extend of R&R projects. This assumes that the I&I reduction project is completed and the PWWF has been reduced by that project.

Project Element	Estimated Cost ($1,000)
Base Construction	7,411.54
Construction Contingency (30%)	2,223.46
Construction Subtotal	9,635.00
Eng/CM/Legal/Admin (30%)	2,890.00
Project Total	**12,525.00**

CITY OF WEST SACRAMENTO

Southport Pump Station Upgrades

PS_C3



Project Description

Reason for Improvement

Pump station requires capacity upgrade.

Improvement Description

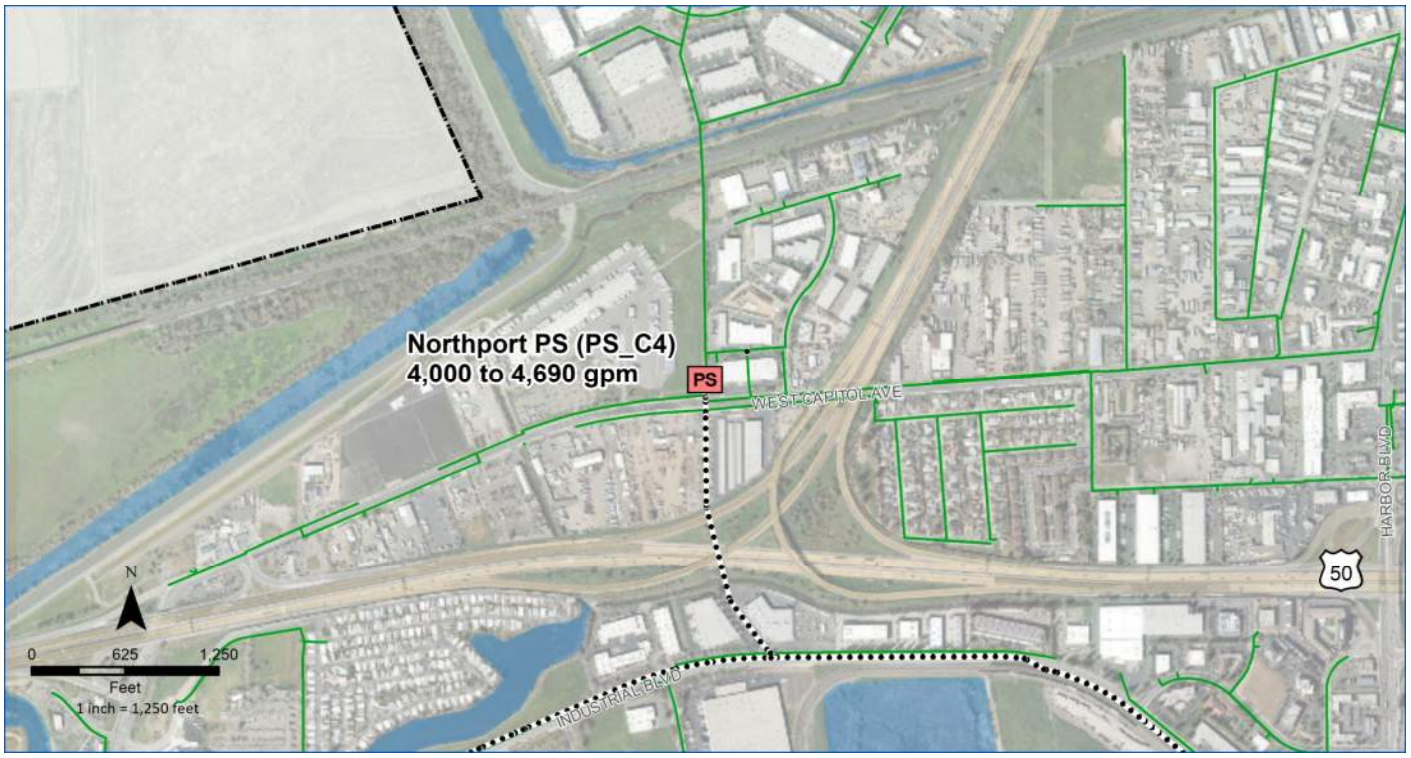
Southport Pump Station: Replace pump with less Total Dynamic Head and increase capacity to 12,530 gpm for existing and future conditions. Less capacity needed depending on extent of R&R projects.

Project Element	Estimated Cost ($1,000)
Base Construction	9,201.54
Construction Contingency (30%)	2,760.46
Construction Subtotal	11,962.00
Eng/CM/Legal/Admin (30%)	3,589.00
Project Total	**15,551.00**

CITY OF WEST SACRAMENTO

Northport Pump Station Upgrades

PS_C4



Project Description

Reason for Improvement

Pump station requires capacity upgrade.

Improvement Description

Northport Pump Station: Replace pumps with less Total Dynamic Head and increase capacity to 4,690 gpm for existing conditions.

Project Element	Estimated Cost ($1,000)
Base Construction	1,543.85
Construction Contingency (30%)	463.15
Construction Subtotal	2,007.00
Eng/CM/Legal/Admin (30%)	602.00
Project Total	**2,609.00**

CITY OF WEST SACRAMENTO

Largo Pump Station Upgrades

PS_C5



Project Description

Reason for Improvement

Pump station requires capacity upgrade.

Improvement Description

Largo Pump Station: Replace pumps with less Total Dynamic Head and increase capacity to 2,170 gpm for future conditions. Less capacity needed depending on extent of R&R projects.

Project Element	Estimated Cost ($1,000)
Base Construction	2,978.46
Construction Contingency (30%)	893.54
Construction Subtotal	3,872.00
Eng/CM/Legal/Admin (30%)	469.00
Project Total	**4,341.00**

CITY OF WEST SACRAMENTO

Davis Pump Station Construction

PS_N1



Project Description

Reason for Improvement

New pump station to serve Rural Core neighborhood.

Improvement Description

Davis Pump Station: Construct new pump station along Davis Road near Jefferson Boulevard with 760 gpm capacity.

Project Element	Estimated Cost ($1,000)
Base Construction	2,128.46
Construction Contingency (30%)	638.54
Construction Subtotal	2,767.00
Eng/CM/Legal/Admin (30%)	830.00
Project Total	**3,597.00**

CITY OF WEST SACRAMENTO

Washington District Underground Utility Infrastructure Infill and Upgrade

Rehab_1



Project Description

Reason for Improvement

CCTV Inspection determined that the structural condition of the gravity mains requires rehabilitation or repair to meet level of service requirements.

Improvement Description

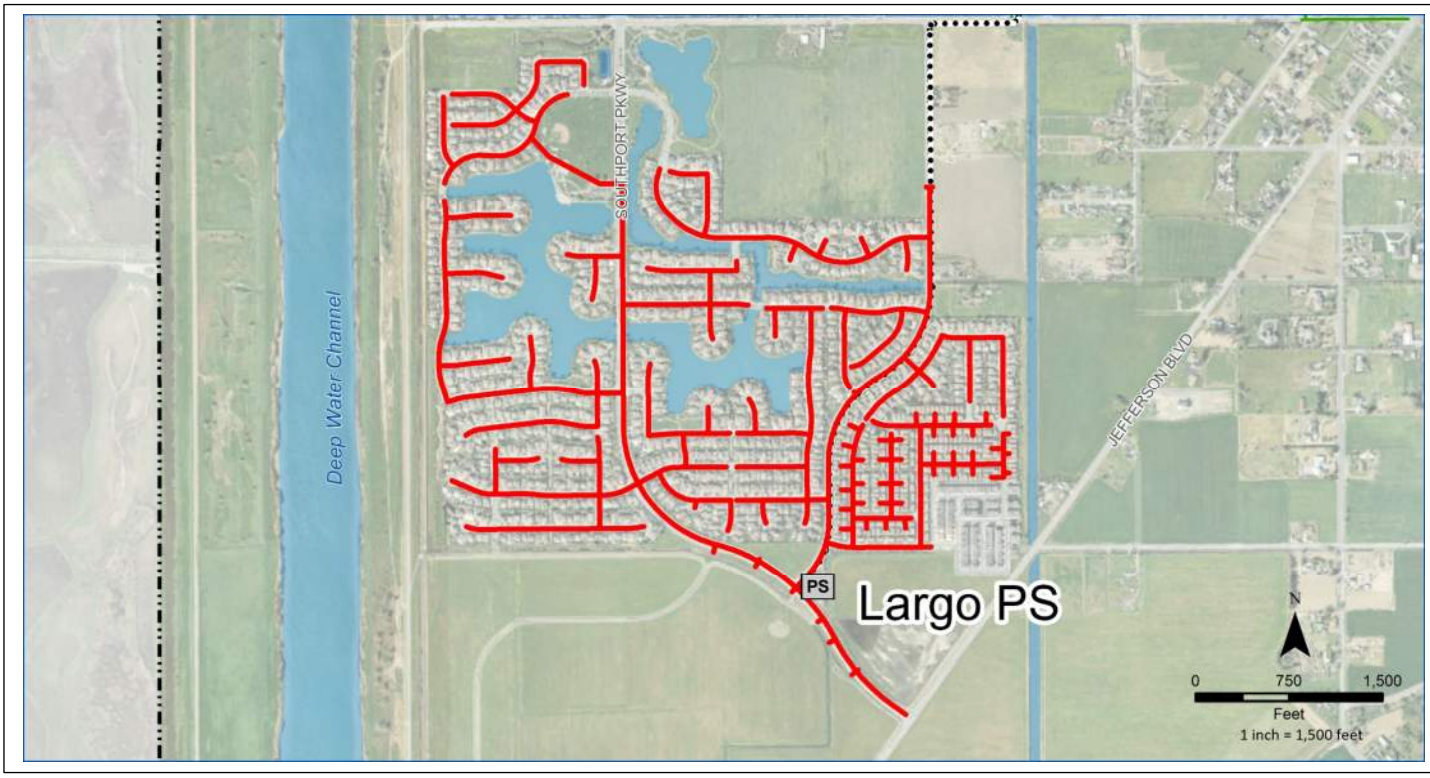
Replace 5,000 feet of 8-inch and 12-inch gravity main with 8-inch and 12-inch gravity main in the vicinity of C St.

Project Element	Estimated Cost ($1,000)
Base Construction	900.00
Construction Contingency (30%)	270.00
Construction Subtotal	*1,170.00*
Eng/CM/Legal/Admin (30%)	351.00
Project Total	**1,521.00**

CITY OF WEST SACRAMENTO

Largo Pump Station Tributary Area I&I Reduction

Rehab_2



Project Description

Reason for Improvement

Reduce high I&I levels into Largo Pump Station and retain capacity to support future development of Yarbrough Master Plan area.

Improvement Description

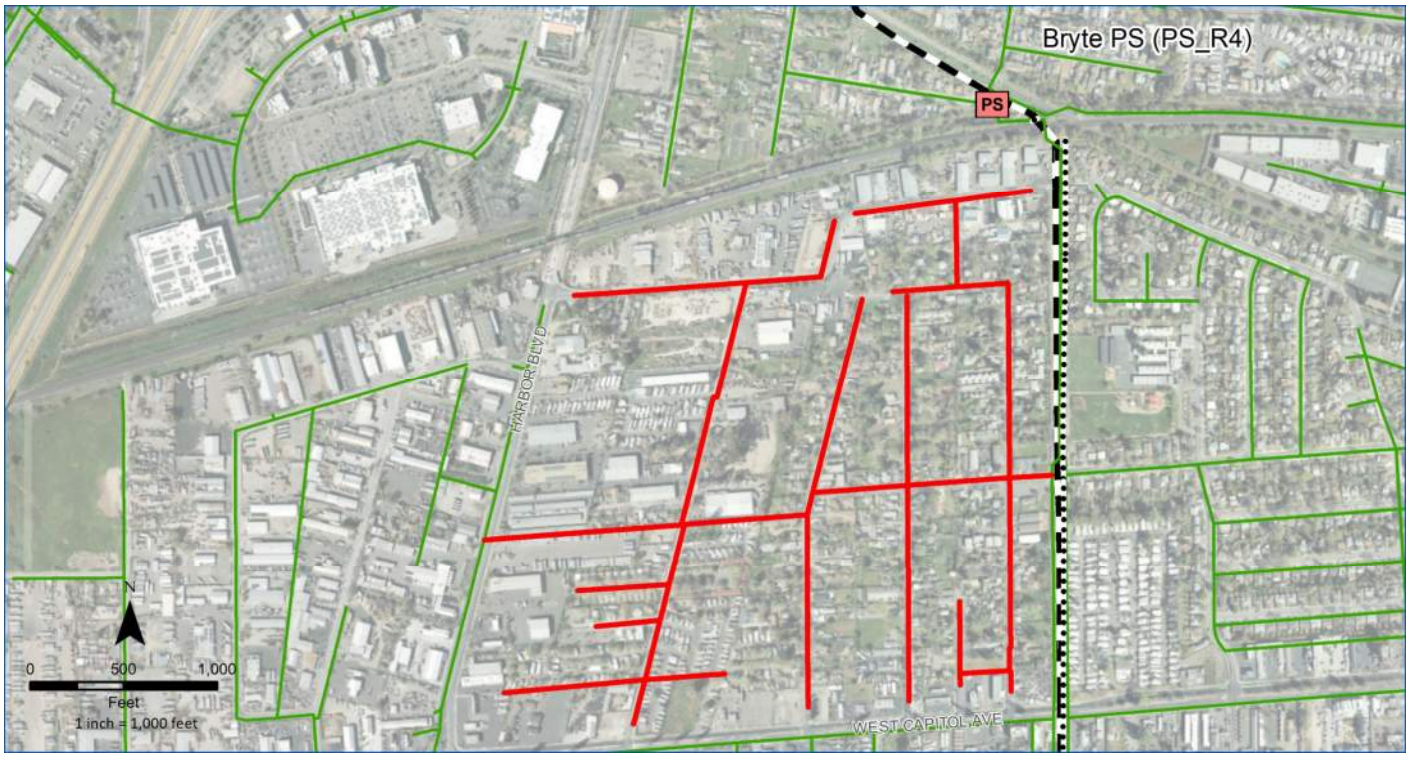
10.5 miles of basin-wide chemical grouting (on a 6-8 year schedule) to seal the system aginst I&I.

Project Element	Estimated Cost ($1,000)
Base Construction	1,292.31
Construction Contingency (30%)	387.69
Construction Subtotal	1,680.00
Eng/CM/Legal/Admin (30%)	504.00
Project Total	**2,184.00**

CITY OF WEST SACRAMENTO

Bryte Pump Station Monitoring Site 4 I&I Reduction

Rehab_3



Project Description

Reason for Improvement

Reduce very high I&I levels into Bryte Pump Station from Monitoring Area 4. CCTV records also indicate poor structural condition in this area.

Improvement Description

Rehabilitation and/or repair of 3.8 miles of existing gravity mains and manholes in high I&I area of Bryte Pump Station tributary area along Michigan Boulevard.

Project Element	Estimated Cost ($1,000)
Base Construction	4,056.15
Construction Contingency (30%)	1,216.85
Construction Subtotal	5,273.00
Eng/CM/Legal/Admin (30%)	1,582.00
Project Total	**6,855.00**

CITY OF WEST SACRAMENTO

Replacement of 6-inch Gravity Main on Hobson Street

Rehab_4



Project Description

Reason for Improvement

CCTV Inspection determined that the structural condition of the gravity mains requires rehabilitation or repair to meet level of service requirements.

Improvement Description

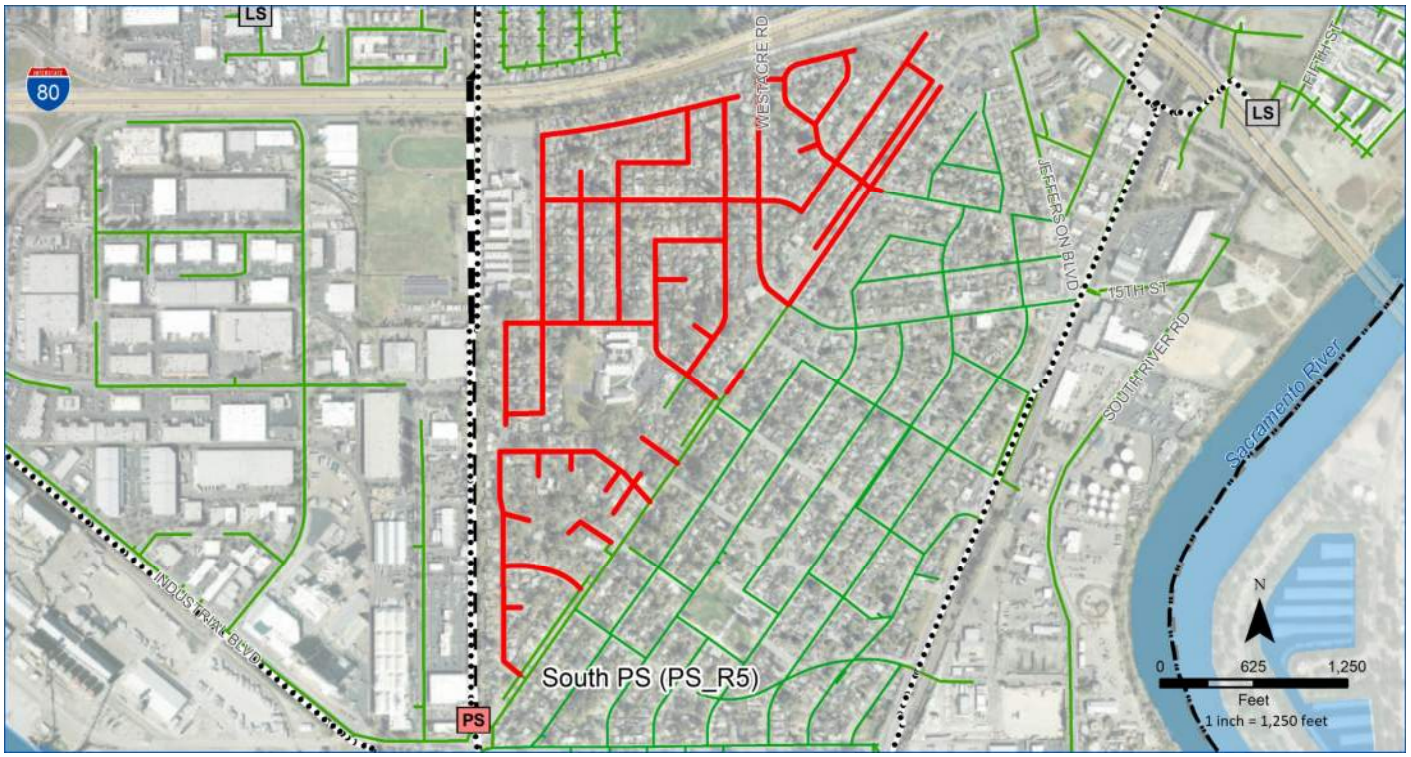
Replace 1,400 feet of 6-inch diameter gravity main with 8-inch diameter gravity main in the vicinity of Hobson Street.

Project Element	Estimated Cost ($1,000)
Base Construction	189.23
Construction Contingency (30%)	56.77
Construction Subtotal	246.00
Eng/CM/Legal/Admin (30%)	74.00
Project Total	**320.00**

CITY OF WEST SACRAMENTO

Westmore Oaks Sewer Rehabilitation

Rehab_5



Project Description

Reason for Improvement

CCTV Inspection determined that the structural condition of the gravity mains requires rehabilitation or repair to meet level of service requirements.

Improvement Description

Rehabilitate/replace 5-miles of high priority gravity main.

Project Element	Estimated Cost ($1,000)
Base Construction	4,983.08
Construction Contingency (30%)	1,494.92
Construction Subtotal	6,478.00
Eng/CM/Legal/Admin (30%)	1,943.00
Project Total	**8,421.00**

CITY OF WEST SACRAMENTO

Backyard Mains

Backyard_1



Project Description

Reason for Improvement

The City has identified backyard mains as a maintenance challenge.

Improvement Description

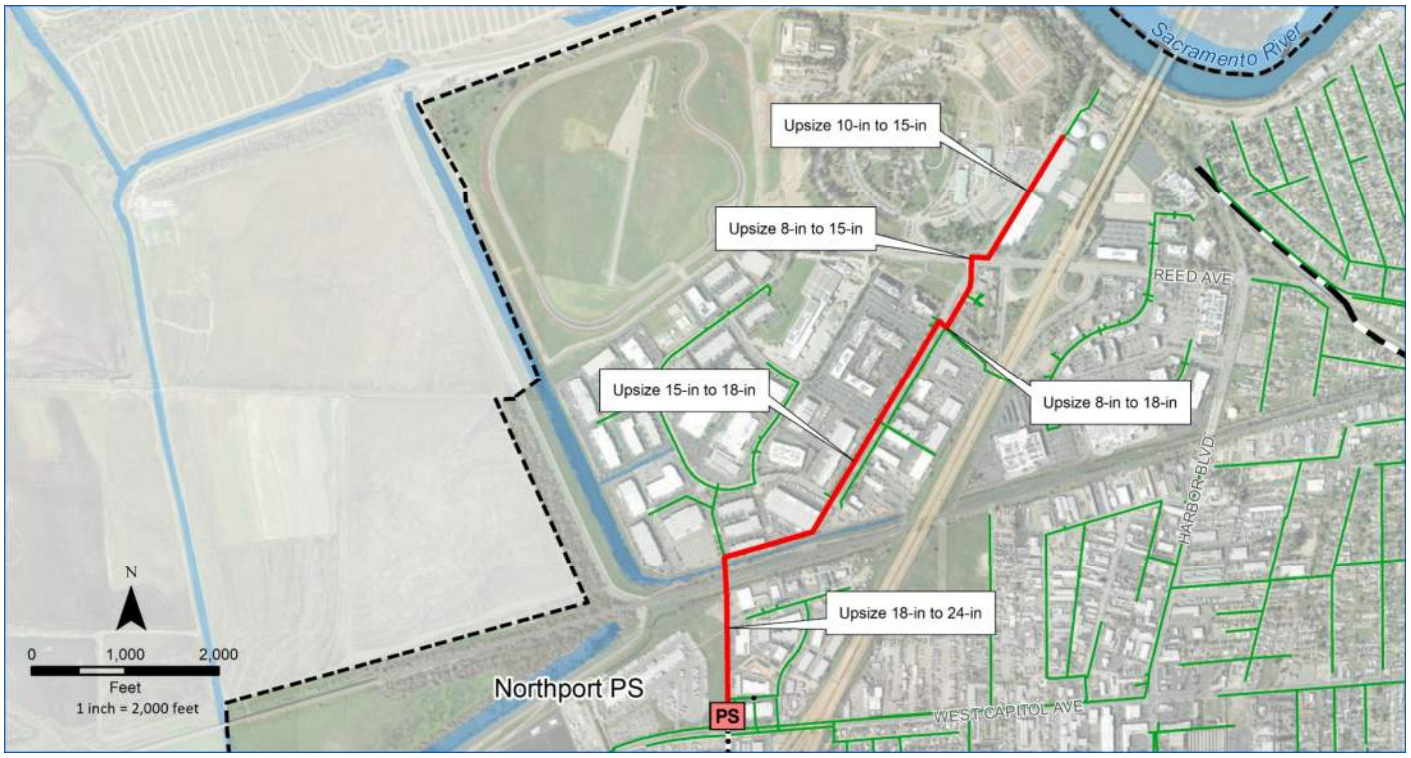
Relocate 3,500 feet of 8-inch diameter gravity main to the public right of way near 8th Street and James Street.

Project Element	Estimated Cost ($1,000)
Base Construction	630.00
Construction Contingency (30%)	189.00
Construction Subtotal	819.00
Eng/CM/Legal/Admin (30%)	246.00
Project Total	**1,065.00**

CITY OF WEST SACRAMENTO

Stillwater Road Trunk Sewer Upsize

GM_1



Project Description

Reason for Improvement

Gravity Main capacity increase required under Existing Conditions.

Improvement Description

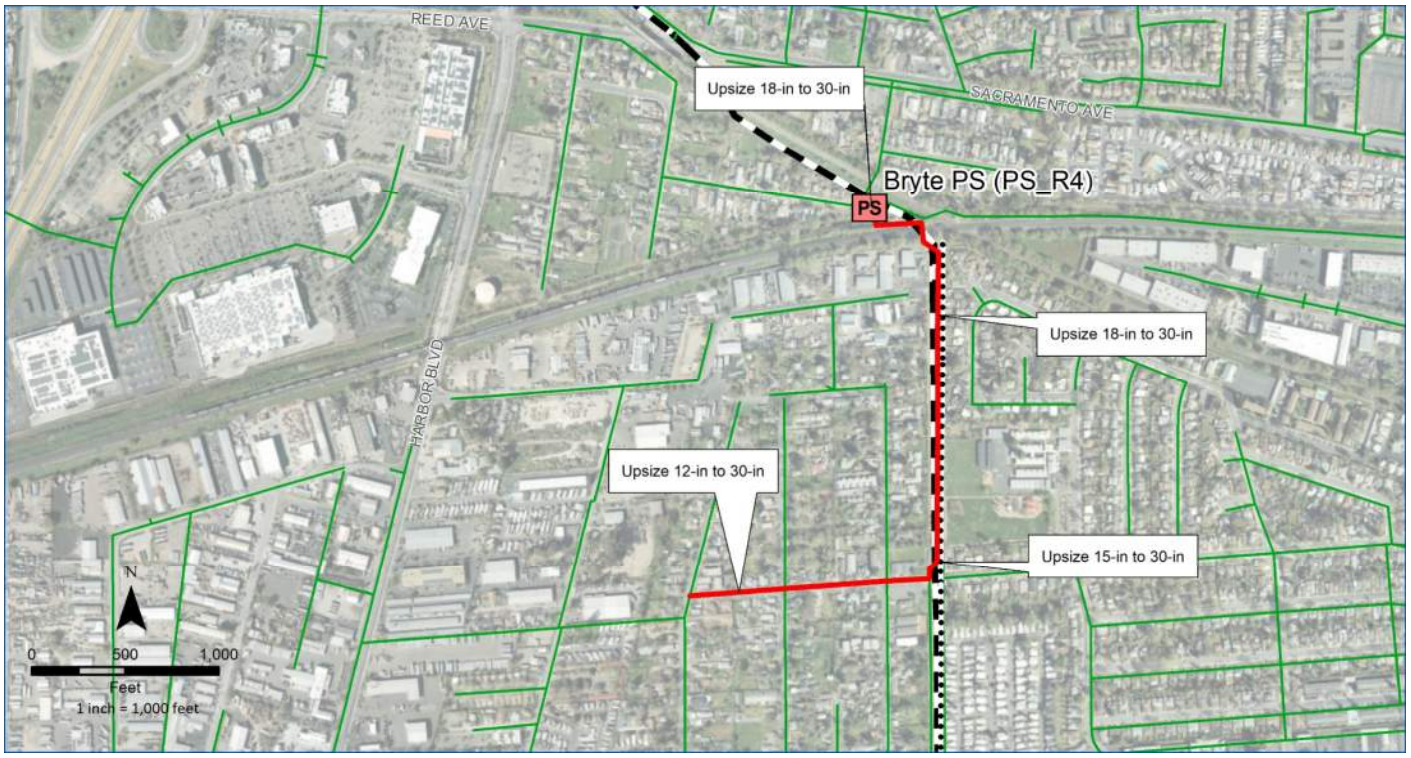
Upsize 7,940 of gravity main along Stillwater Road and upstream of Northport Pump Station.

Project Element	Estimated Cost ($1,000)
Base Construction	3,276.92
Construction Contingency (30%)	983.08
Construction Subtotal	4,260.00
Eng/CM/Legal/Admin (30%)	1,278.00
Project Total	**5,538.00**

CITY OF WEST SACRAMENTO

Bryte Influent Sewer Upsize

GM_2



Project Description

Reason for Improvement

Gravity Main capacity increase required under Existing Conditions.

Improvement Description

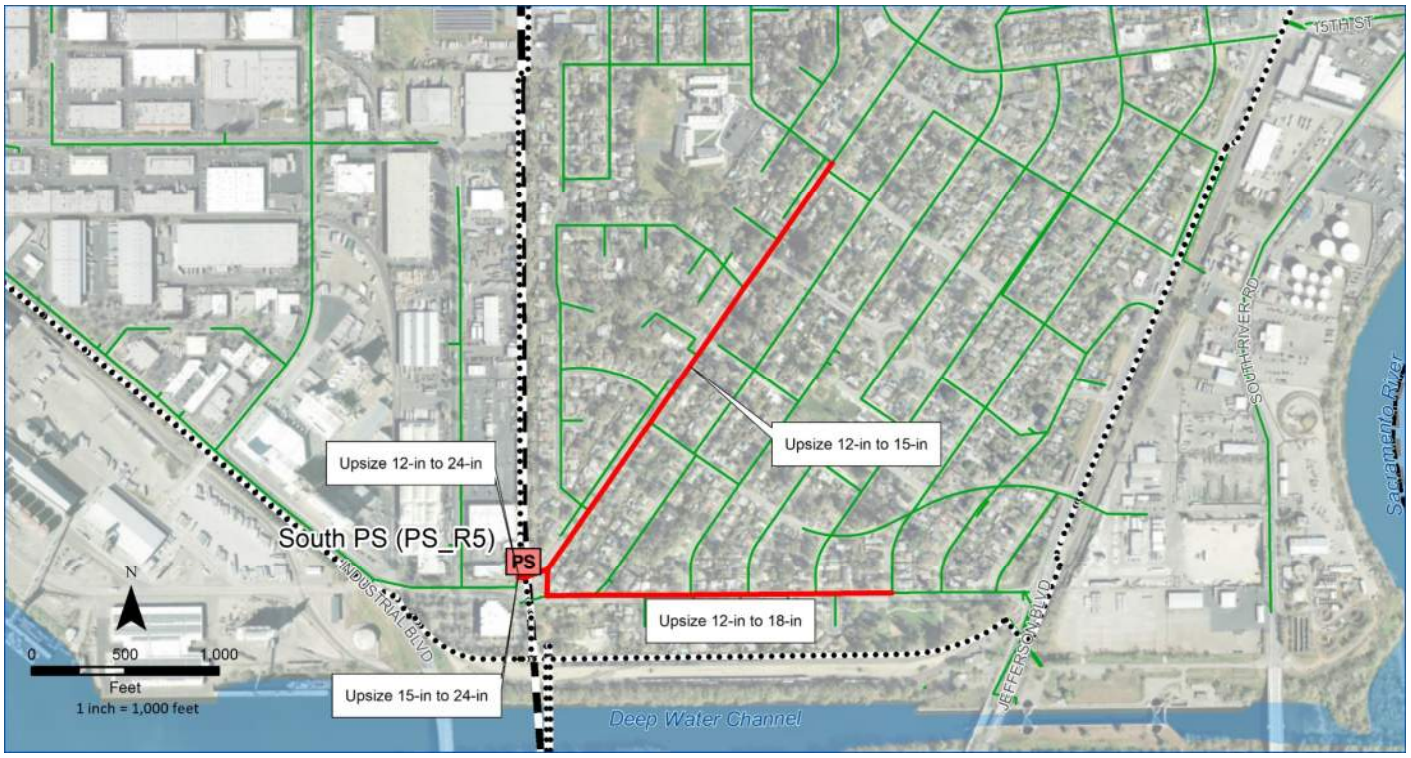
Upsize 3,620 of gravity main upstream of Bryte Pump Station.

Project Element	Estimated Cost ($1,000)
Base Construction	2,443.08
Construction Contingency (30%)	732.92
Construction Subtotal	3,176.00
Eng/CM/Legal/Admin (30%)	953.00
Project Total	**4,129.00**

CITY OF WEST SACRAMENTO

Stone & Park Trunk Sewer Upsize

GM_3



Project Description

Reason for Improvement

Gravity Main capacity increase required under Existing Conditions.

Improvement Description

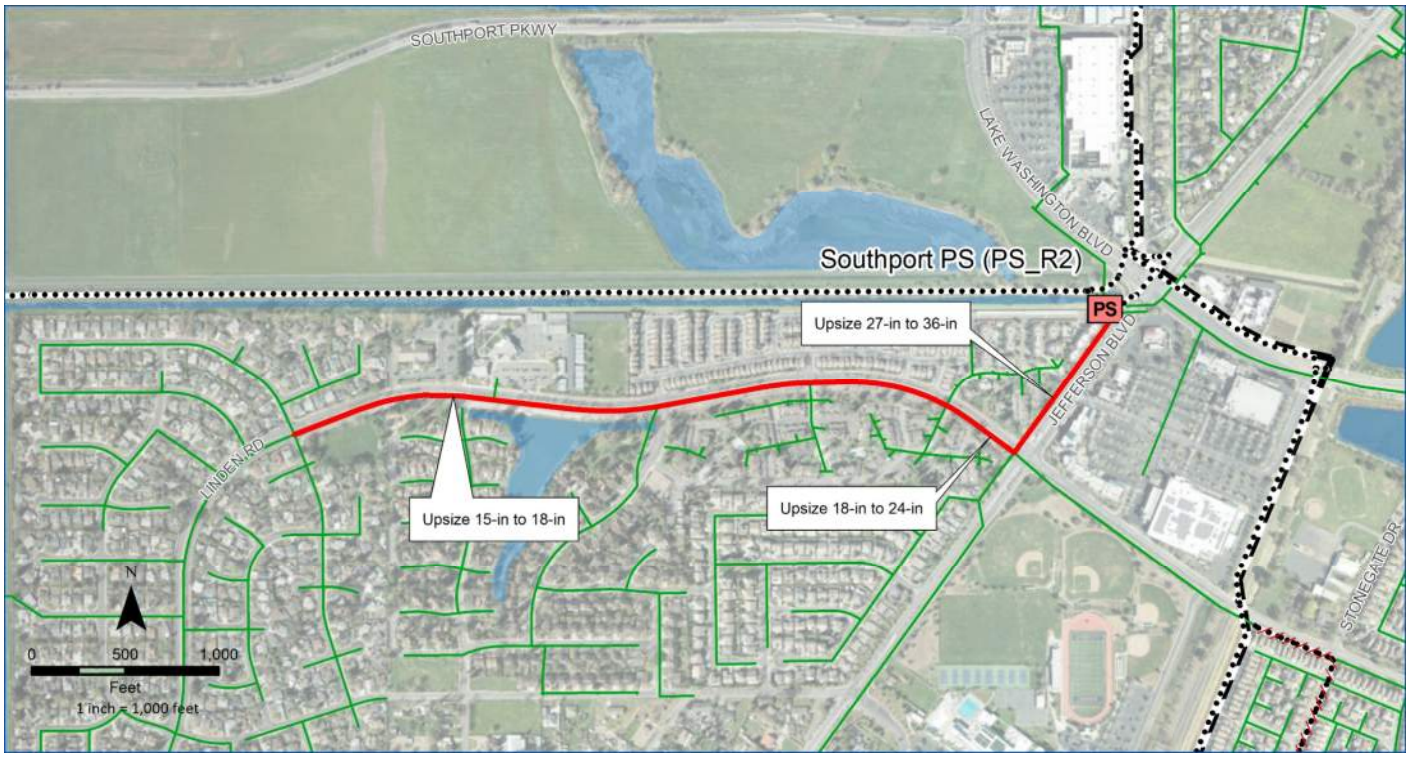
Upsize 4,810 of gravity main along Stone Blvd and Park Blvd upstream of South Pump Station.

Project Element	Estimated Cost ($1,000)
Base Construction	1,793.85
Construction Contingency (30%)	538.15
Construction Subtotal	2,332.00
Eng/CM/Legal/Admin (30%)	700.00
Project Total	**3,032.00**

CITY OF WEST SACRAMENTO

Linden Road Trunk Sewer Upsize

GM_4



Project Description

Reason for Improvement

Gravity Main capacity increase required under Existing Conditions.

Improvement Description

Upsize 5,030 of gravity main along Linden Road upstream of Southport Pump Station.

Project Element	Estimated Cost ($1,000)
Base Construction	2,865.38
Construction Contingency (30%)	859.62
Construction Subtotal	3,725.00
Eng/CM/Legal/Admin (30%)	1,118.00
Project Total	**4,843.00**

CITY OF WEST SACRAMENTO

Davis FM Installation

FM_1



Project Description

Reason for Improvement

Force Main required to connect new Davis Pump Station.

Improvement Description

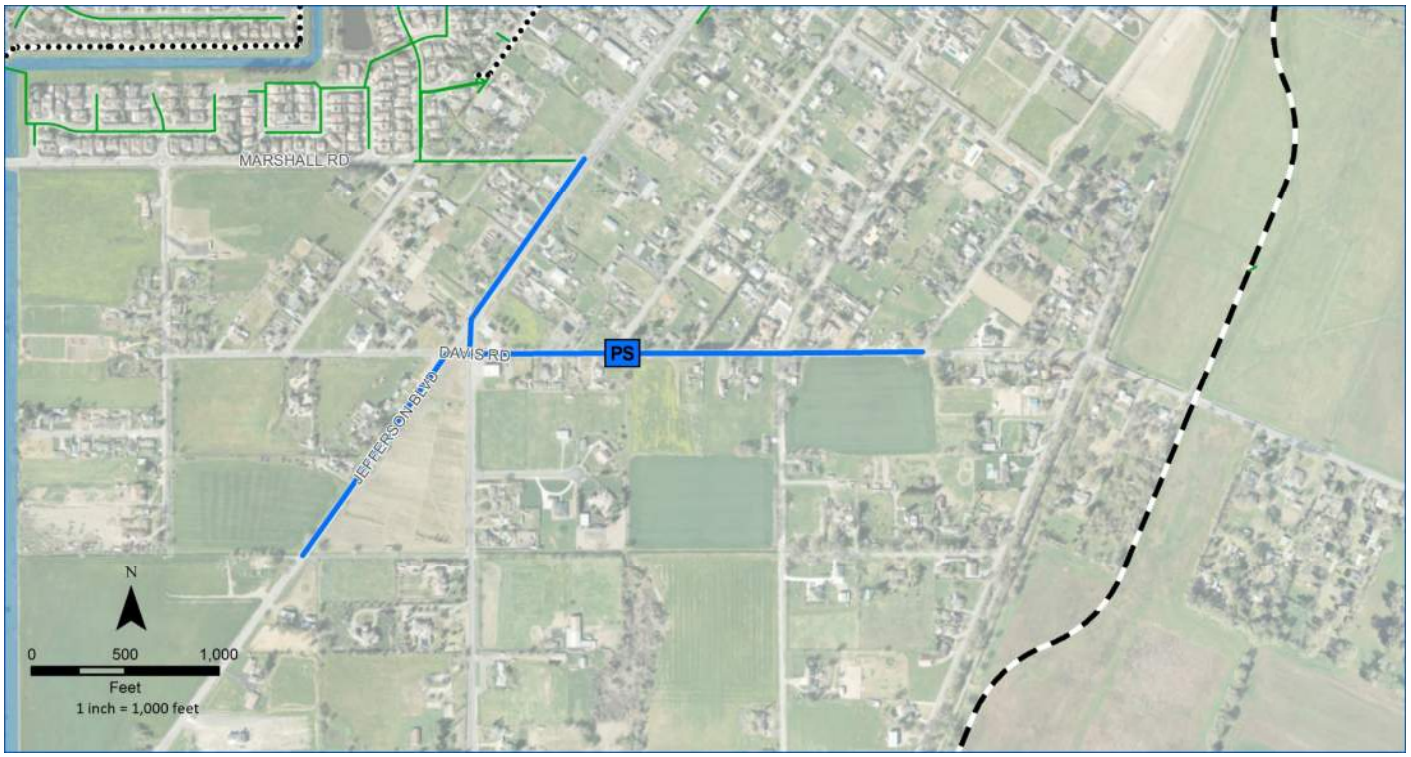
Construct 3,960 of force main along Davis Road from the new Davis Pump Station to the LNWI Connection #1.

Project Element	Estimated Cost ($1,000)
Base Construction	670.00
Construction Contingency (30%)	201.00
Construction Subtotal	871.00
Eng/CM/Legal/Admin (30%)	261.00
Project Total	**1,132.00**

CITY OF WEST SACRAMENTO

Davis Trunk Sewer Installation

GM_5



Project Description

Reason for Improvement

Gravity Main required to connect new Davis Pump Station.

Improvement Description

Construct 5,110 feet of gravity main in Rural Core areas.

Project Element	Estimated Cost ($1,000)
Base Construction	919.23
Construction Contingency (30%)	275.77
Construction Subtotal	1,195.00
Eng/CM/Legal/Admin (30%)	359.00
Project Total	**1,554.00**

CITY OF WEST SACRAMENTO

South Pump Station Upgrades

PS_C1



Project Description

Reason for Improvement

Pump station requires capacity upgrade.

Improvement Description

South Pump Station: Replace pumps with less Total Dynamic Head and increase capacity to 4,505 gpm for existing and future conditions. Less capacity needed depending on extent of R&R projects.

Project Element	Estimated Cost ($1,000)
Base Construction	4,630.77
Construction Contingency (30%)	1,389.23
Construction Subtotal	6,020.00
Eng/CM/Legal/Admin (30%)	1,806.00
Project Total	**7,826.00**

CITY OF WEST SACRAMENTO

Bryte Pump Station Upgrades

PS_C2



Project Description

Reason for Improvement

Pump station requires capacity upgrade.

Improvement Description

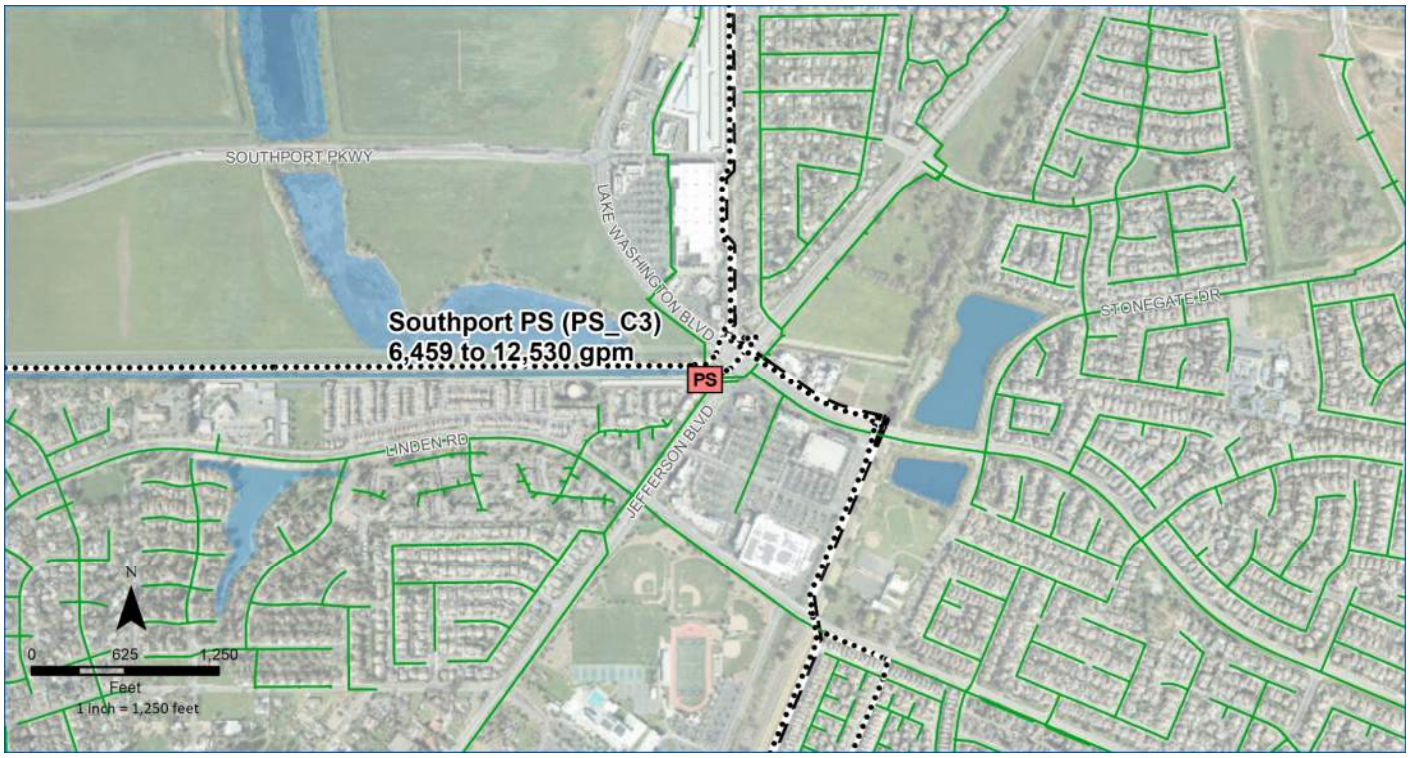
Bryte Pump Station: Replace pump with less Total Dynamic Head and increase capacity to 9,000 gpm for existing conditions. Less capacity needed depending on extend of R&R projects. This assumes that the I&I reduction project is completed and the PWWF has been reduced by that project.

Project Element	Estimated Cost ($1,000)
Base Construction	7,411.54
Construction Contingency (30%)	2,223.46
Construction Subtotal	9,635.00
Eng/CM/Legal/Admin (30%)	2,890.00
Project Total	**12,525.00**

CITY OF WEST SACRAMENTO

Southport Pump Station Upgrades

PS_C3



Project Description

Reason for Improvement

Pump station requires capacity upgrade.

Improvement Description

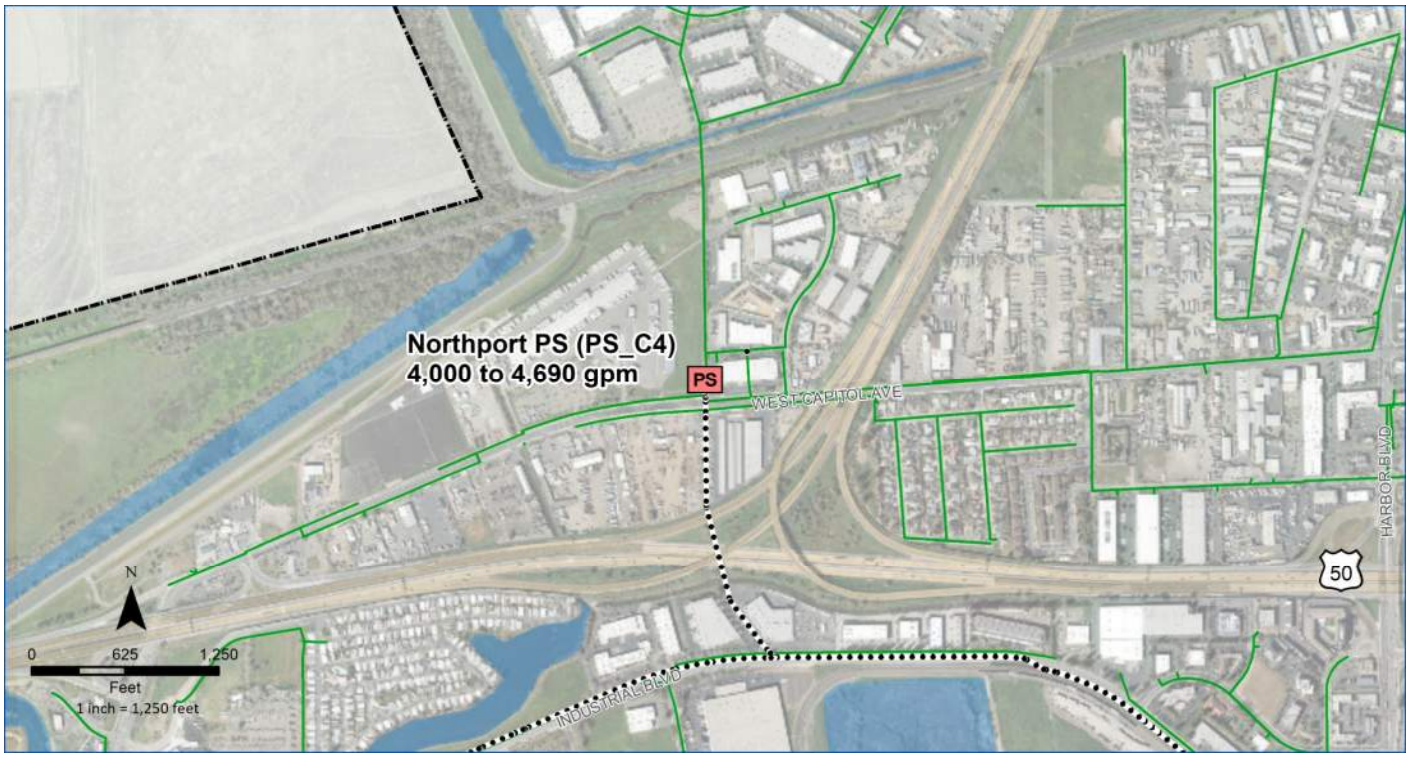
Southport Pump Station: Replace pump with less Total Dynamic Head and increase capacity to 12,530 gpm for existing and future conditions. Less capacity needed depending on extent of R&R projects.

Project Element	Estimated Cost ($1,000)
Base Construction	9,201.54
Construction Contingency (30%)	2,760.46
Construction Subtotal	11,962.00
Eng/CM/Legal/Admin (30%)	3,589.00
Project Total	**15,551.00**

CITY OF WEST SACRAMENTO

Northport Pump Station Upgrades

PS_C4



Project Description

Reason for Improvement

Pump station requires capacity upgrade.

Improvement Description

Northport Pump Station: Replace pumps with less Total Dynamic Head and increase capacity to 4,690 gpm for existing conditions.

Project Element	Estimated Cost ($1,000)
Base Construction	1,543.85
Construction Contingency (30%)	463.15
Construction Subtotal	2,007.00
Eng/CM/Legal/Admin (30%)	602.00
Project Total	**2,609.00**

CITY OF WEST SACRAMENTO

Largo Pump Station Upgrades

PS_C5



Project Description

Reason for Improvement

Pump station requires capacity upgrade.

Improvement Description

Largo Pump Station: Replace pumps with less Total Dynamic Head and increase capacity to 2,170 gpm for future conditions. Less capacity needed depending on extent of R&R projects.

Project Element	Estimated Cost ($1,000)
Base Construction	2,978.46
Construction Contingency (30%)	893.54
Construction Subtotal	3,872.00
Eng/CM/Legal/Admin (30%)	469.00
Project Total	**4,341.00**

CITY OF WEST SACRAMENTO

Davis Pump Station Construction

PS_N1



Project Description

Reason for Improvement

New pump station to serve Rural Core neighborhood.

Improvement Description

Davis Pump Station: Construct new pump station along Davis Road near Jefferson Boulevard with 760 gpm capacity.

Project Element	Estimated Cost ($1,000)
Base Construction	2,128.46
Construction Contingency (30%)	638.54
Construction Subtotal	2,767.00
Eng/CM/Legal/Admin (30%)	830.00
Project Total	**3,597.00**

CITY OF WEST SACRAMENTO