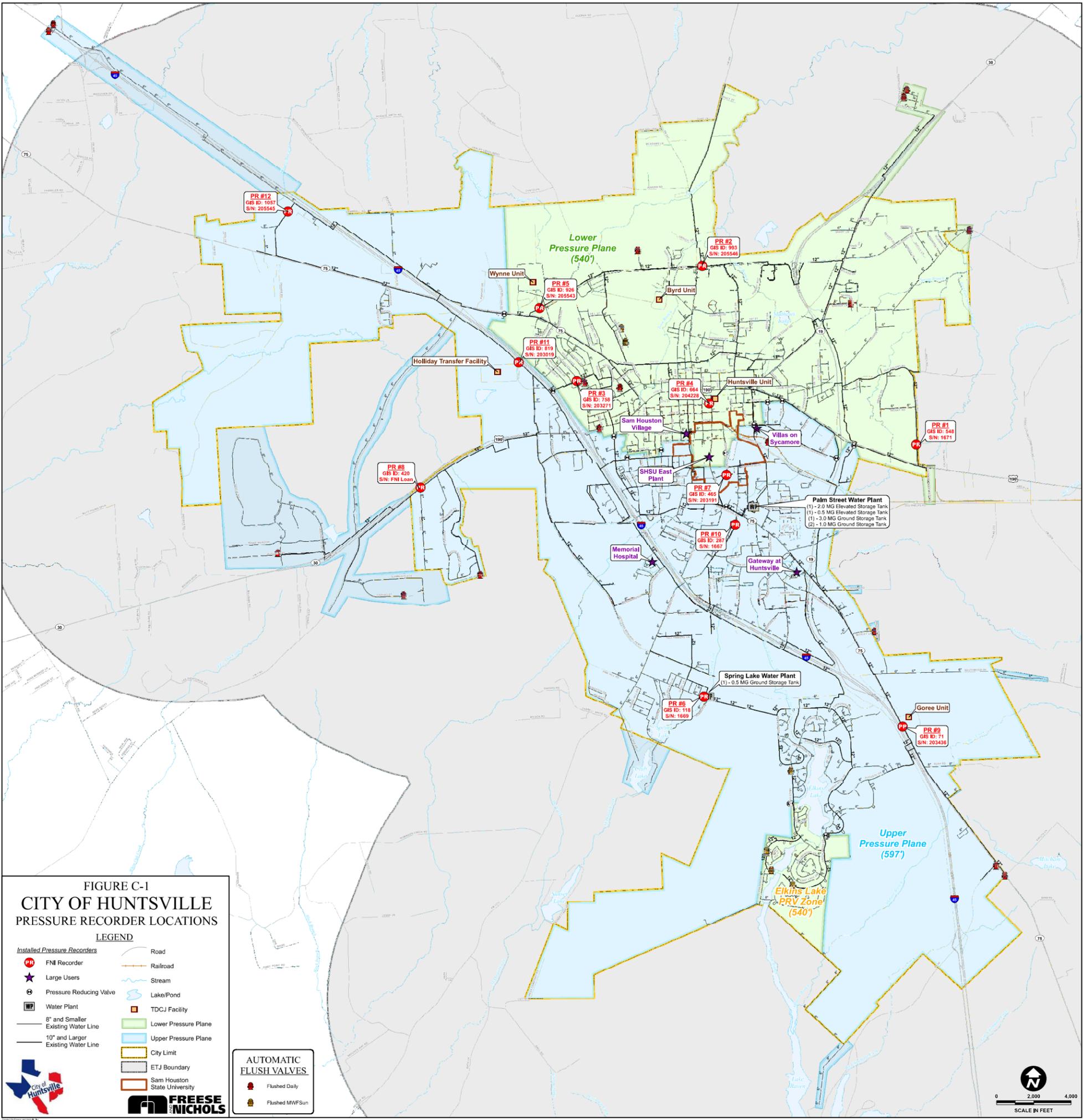




## **APPENDIX C**

### **Water System Field Testing Results**



**FIGURE C-1  
CITY OF HUNTSVILLE  
PRESSURE RECORDER LOCATIONS**

**LEGEND**

*Installed Pressure Recorders*

- FNI Recorder
- Large Users
- Pressure Reducing Valve
- Water Plant
- 8" and Smaller Existing Water Line
- 10" and Larger Existing Water Line

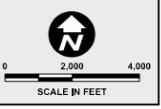
*Other Features*

- Road
- Railroad
- Stream
- Lake/Pond
- TDCJ Facility
- Lower Pressure Plane
- Upper Pressure Plane
- City Limit
- ETJ Boundary
- Sam Houston State University

**AUTOMATIC FLUSH VALVES**

- Flushed Daily
- Flushed MWF/Sun

**FREES NICHOLS**

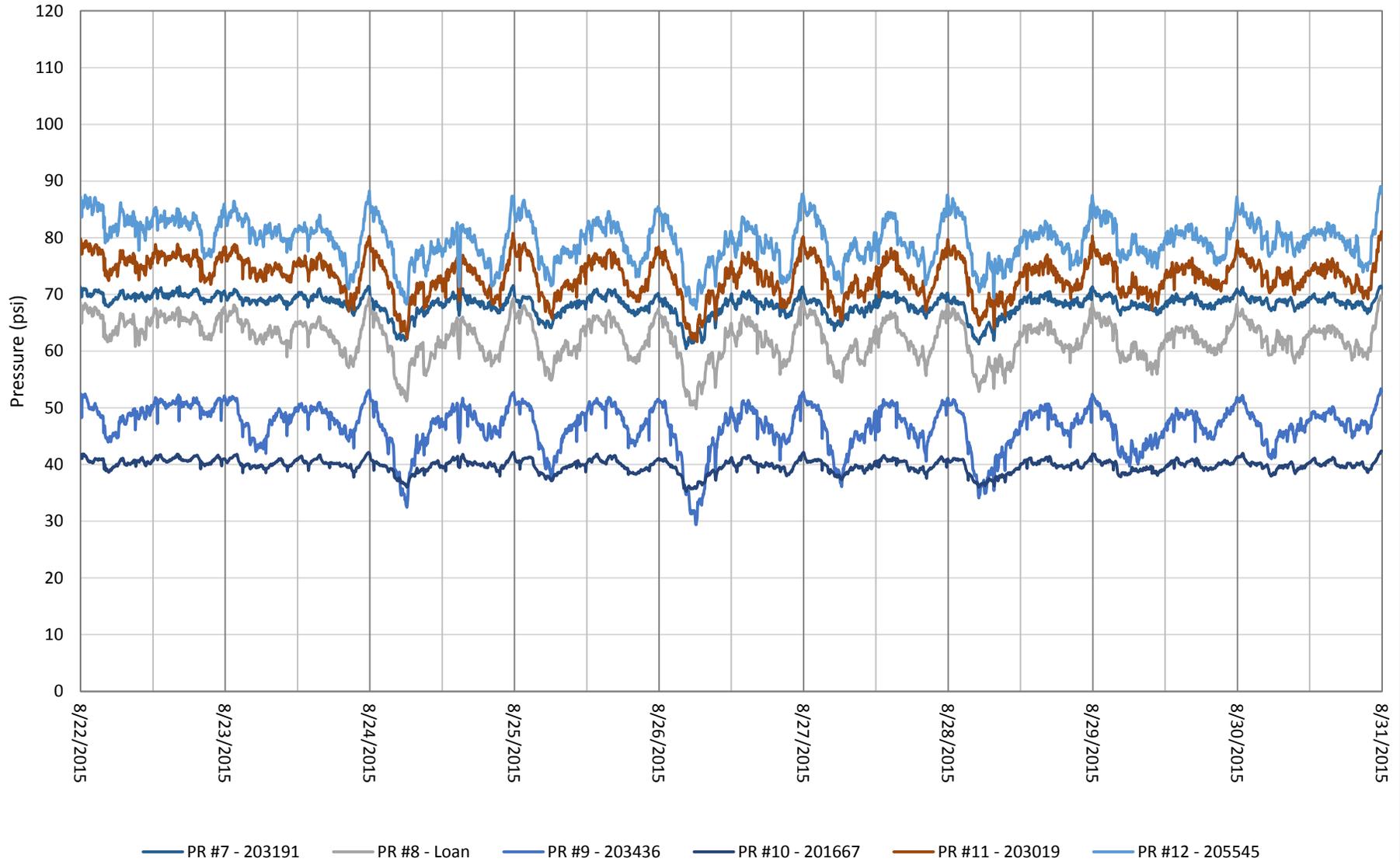


# City of Huntsville Pressure Testing Results

August 22 – August 31, 2015



Upper Pressure Plane - Overflow Elevation 597'

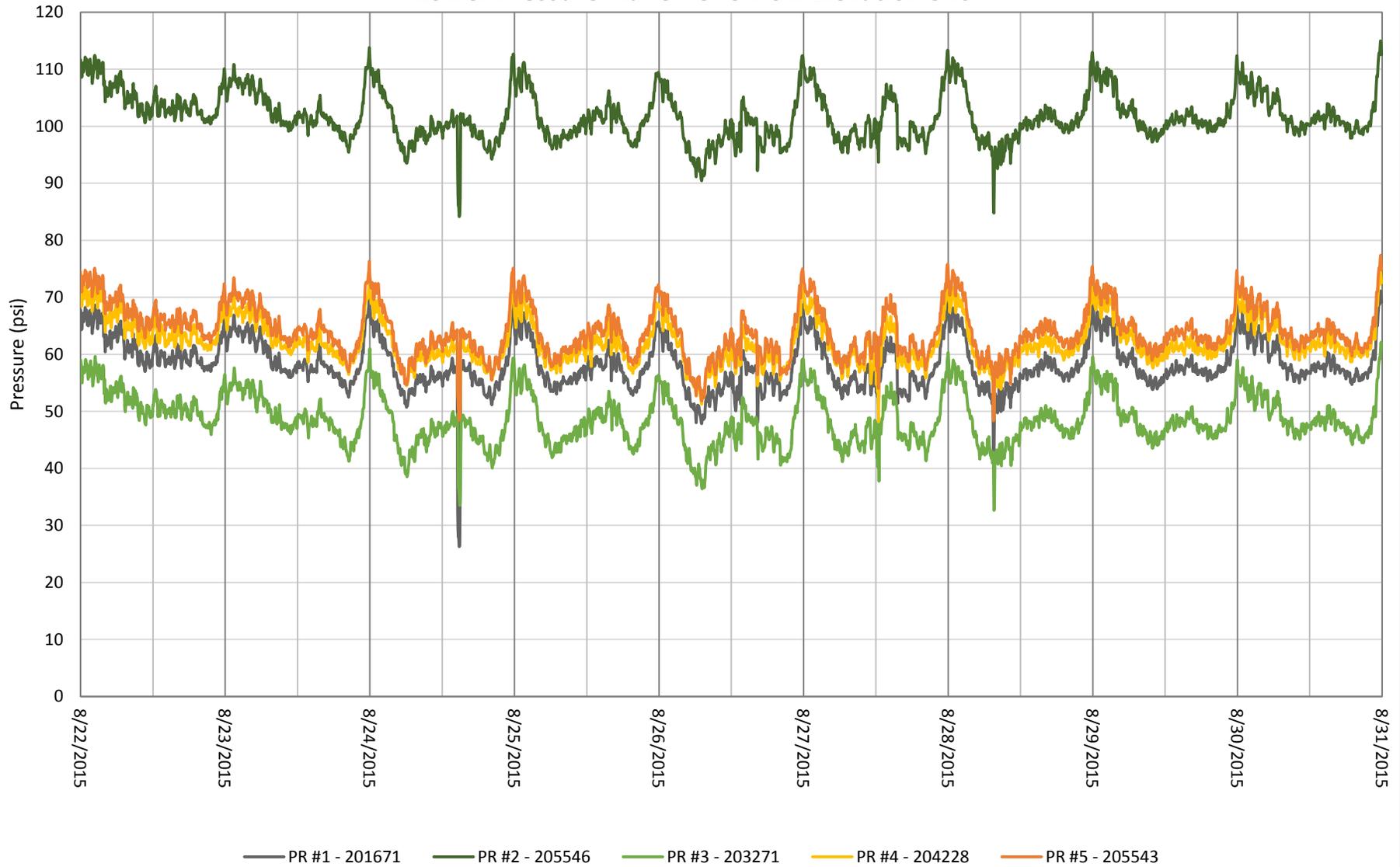


# City of Huntsville Pressure Testing Results

August 22 – August 31, 2015



Lower Pressure Plane - Overflow Elevation 540'

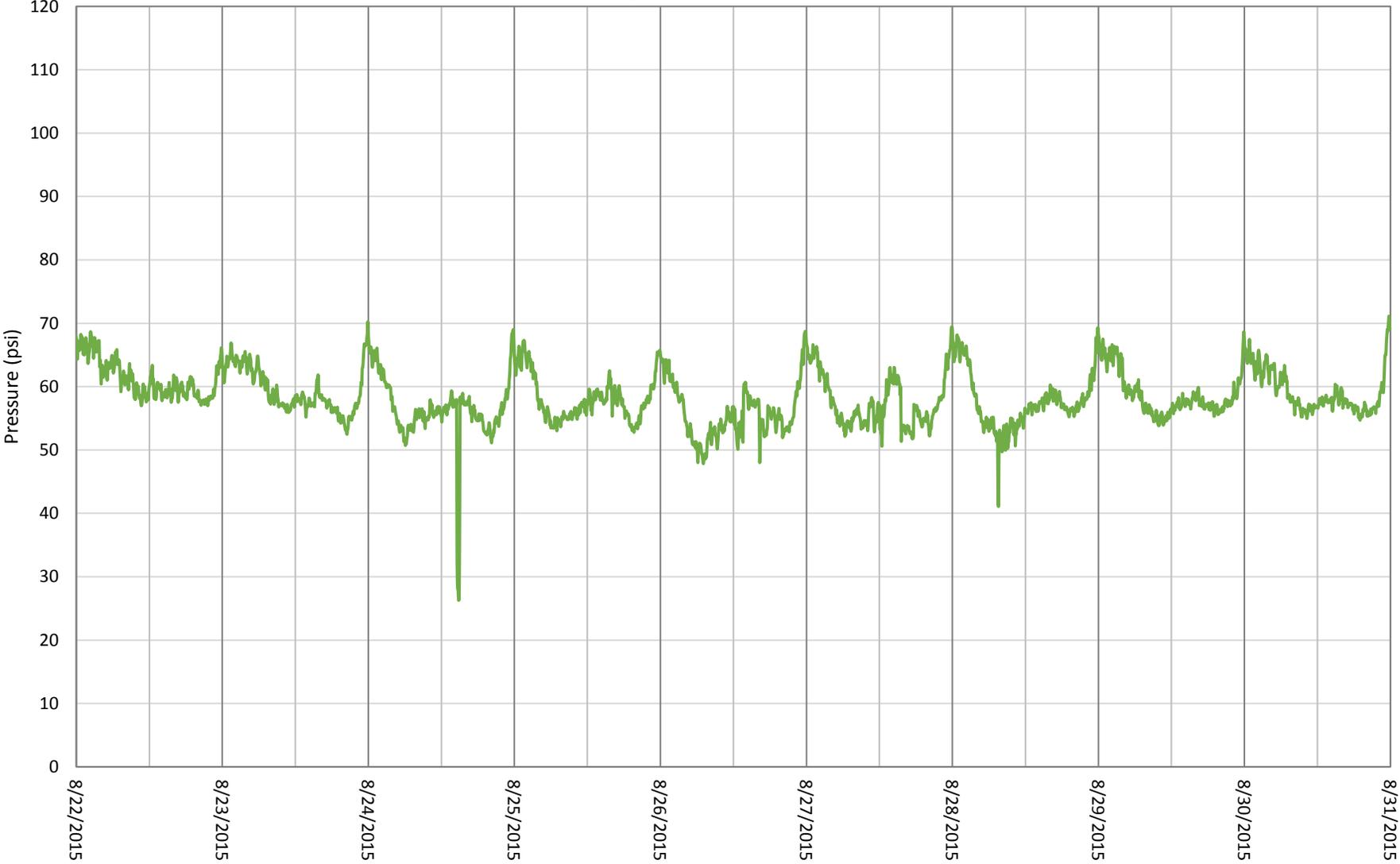


# City of Huntsville

Location #1: 301 Geneva Road - Lower Pressure Plane  
Pressure Recorder ID: 201671 - **Ground Elevation 396'**



August 22 - 31, 2015

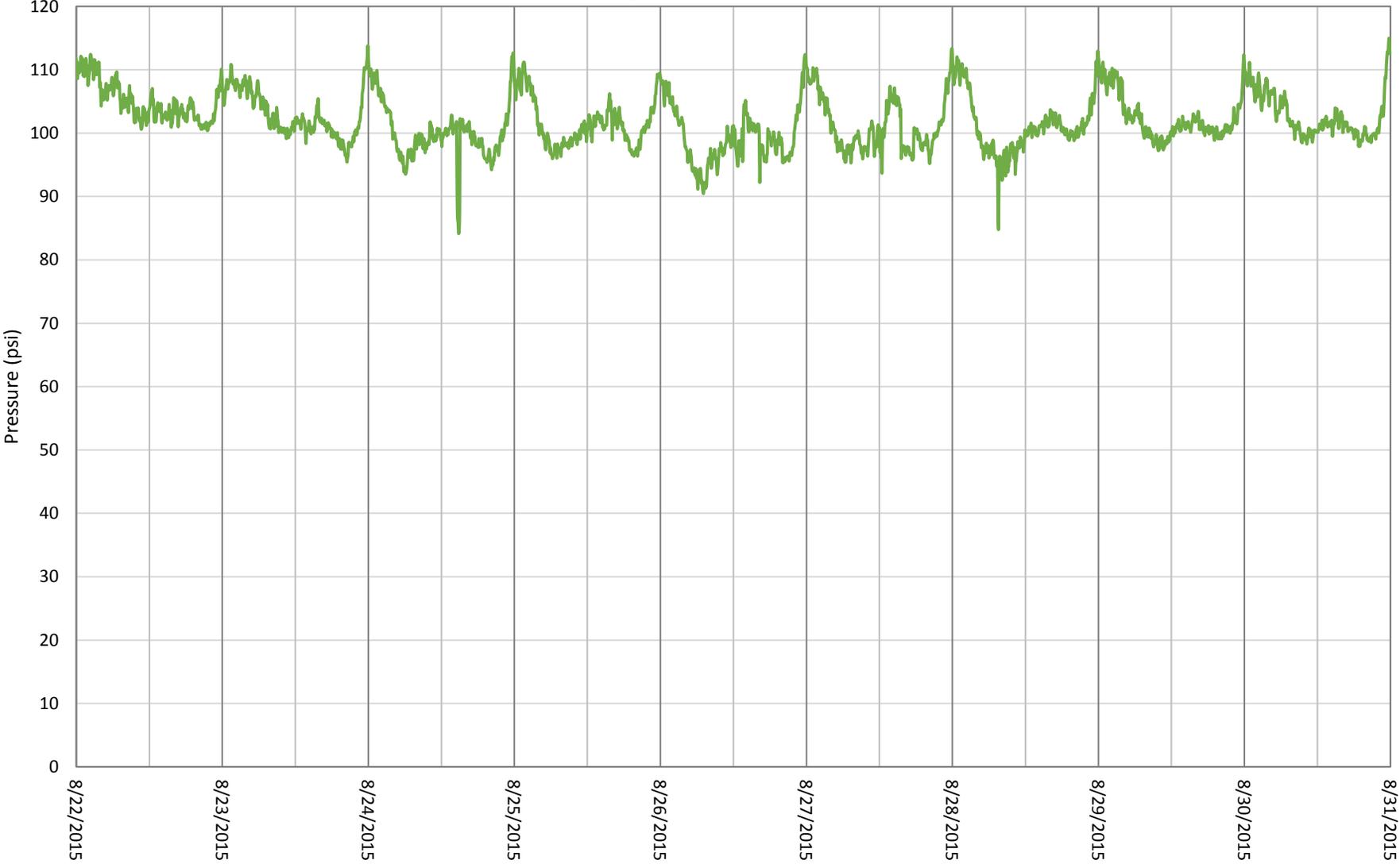


# City of Huntsville

Location #2: FM 247 and FM 2821 Road East - Lower Pressure Plane

Pressure Recorder ID: 205546 - **Ground Elevation 294'**

August 22 - 31, 2015

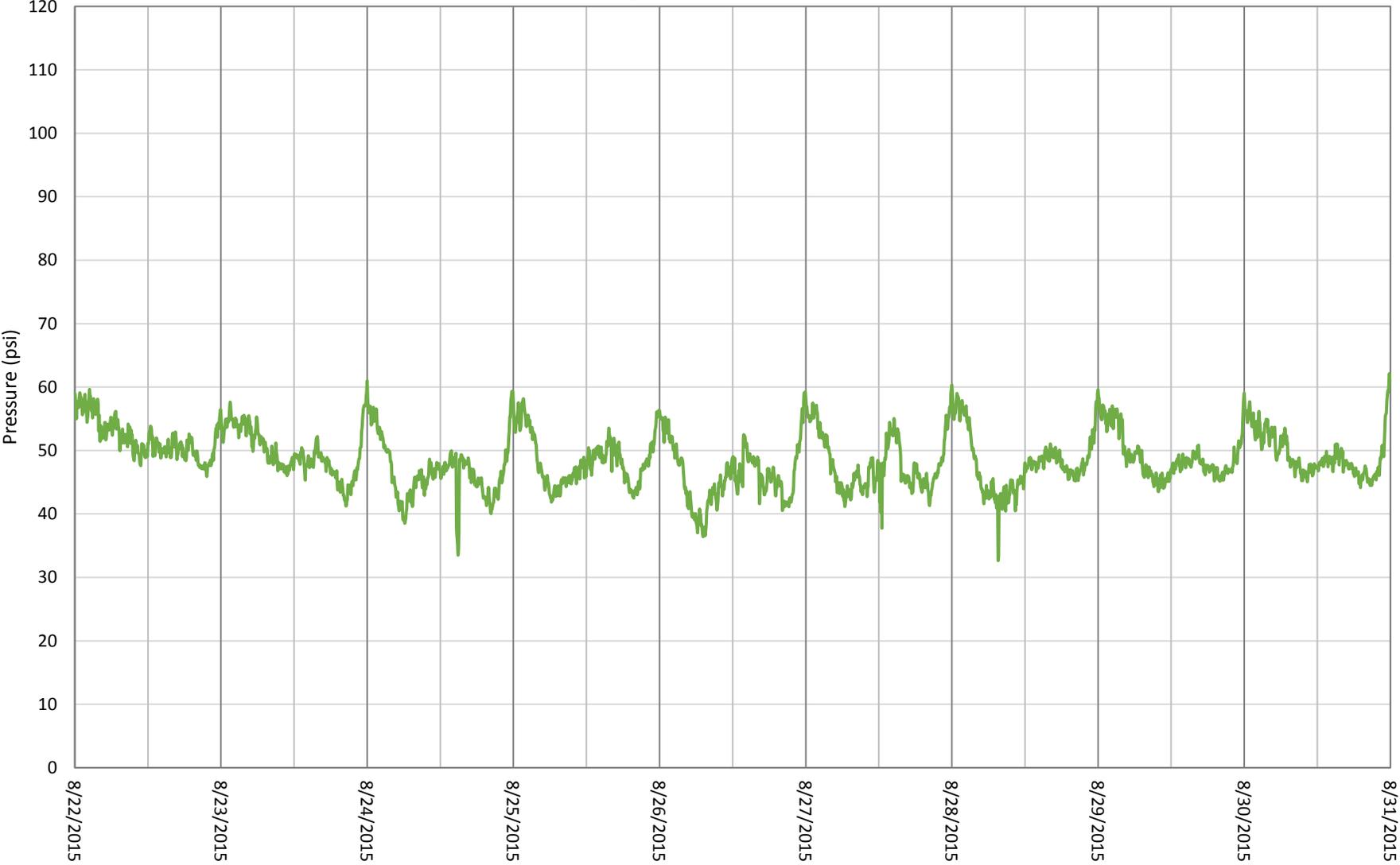


# City of Huntsville

Location #3: 2411 Crosstimbers Street - Lower Pressure Plane

Pressure Recorder ID: 203271 - **Ground Elevation 418'**

August 22 - 31, 2015

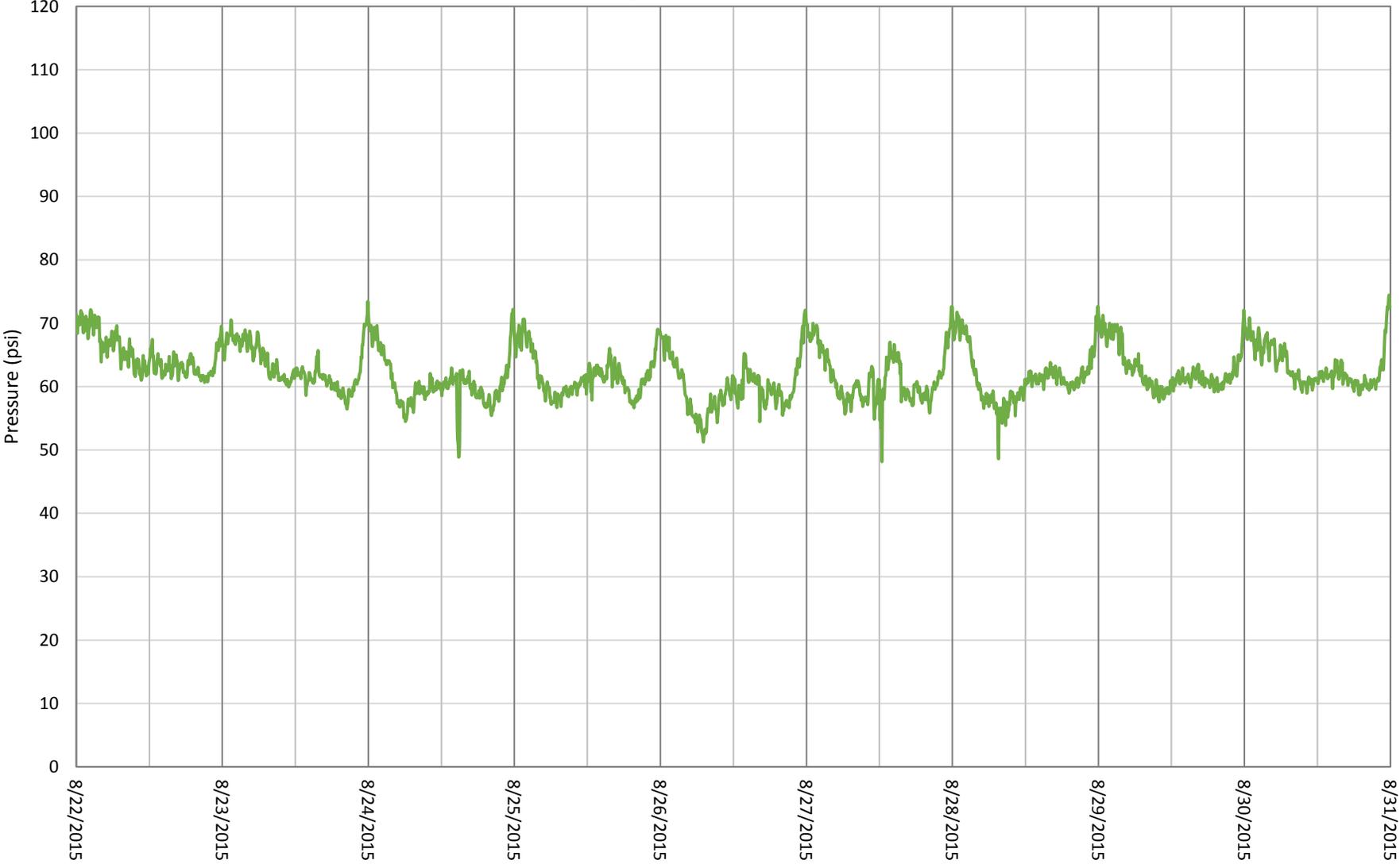


# City of Huntsville

Location #4: 13th Street and Avenue I (Huntsville Unit) - Lower Pressure Plane

Pressure Recorder ID: 204228 - **Ground Elevation 392'**

August 22 - 31, 2015

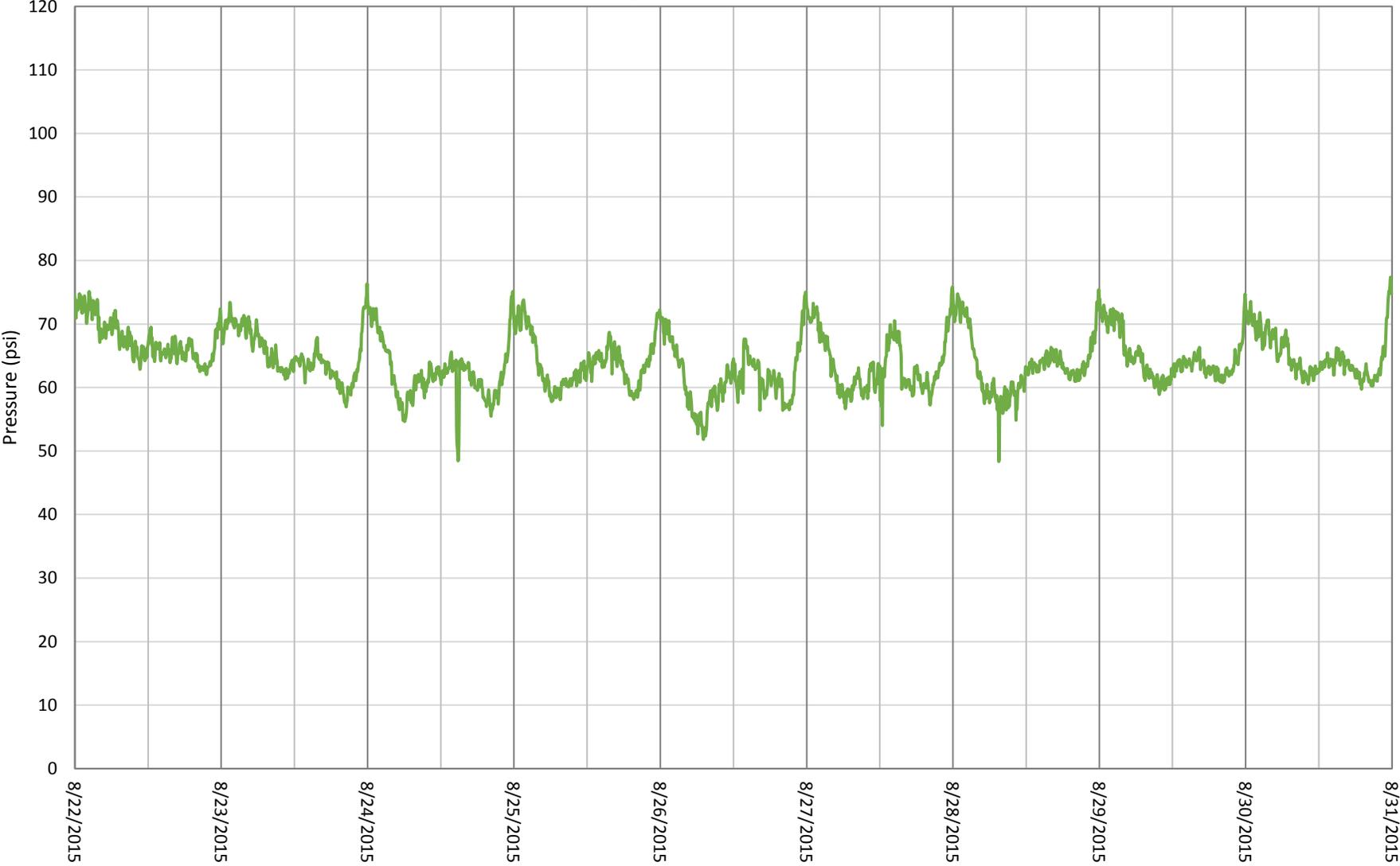


# City of Huntsville

Location #5: 810 FM 2821 Road West (Wynne Unit) - Lower Pressure Plane

Pressure Recorder ID: 205543 - **Ground Elevation 382'**

August 22 - 31, 2015

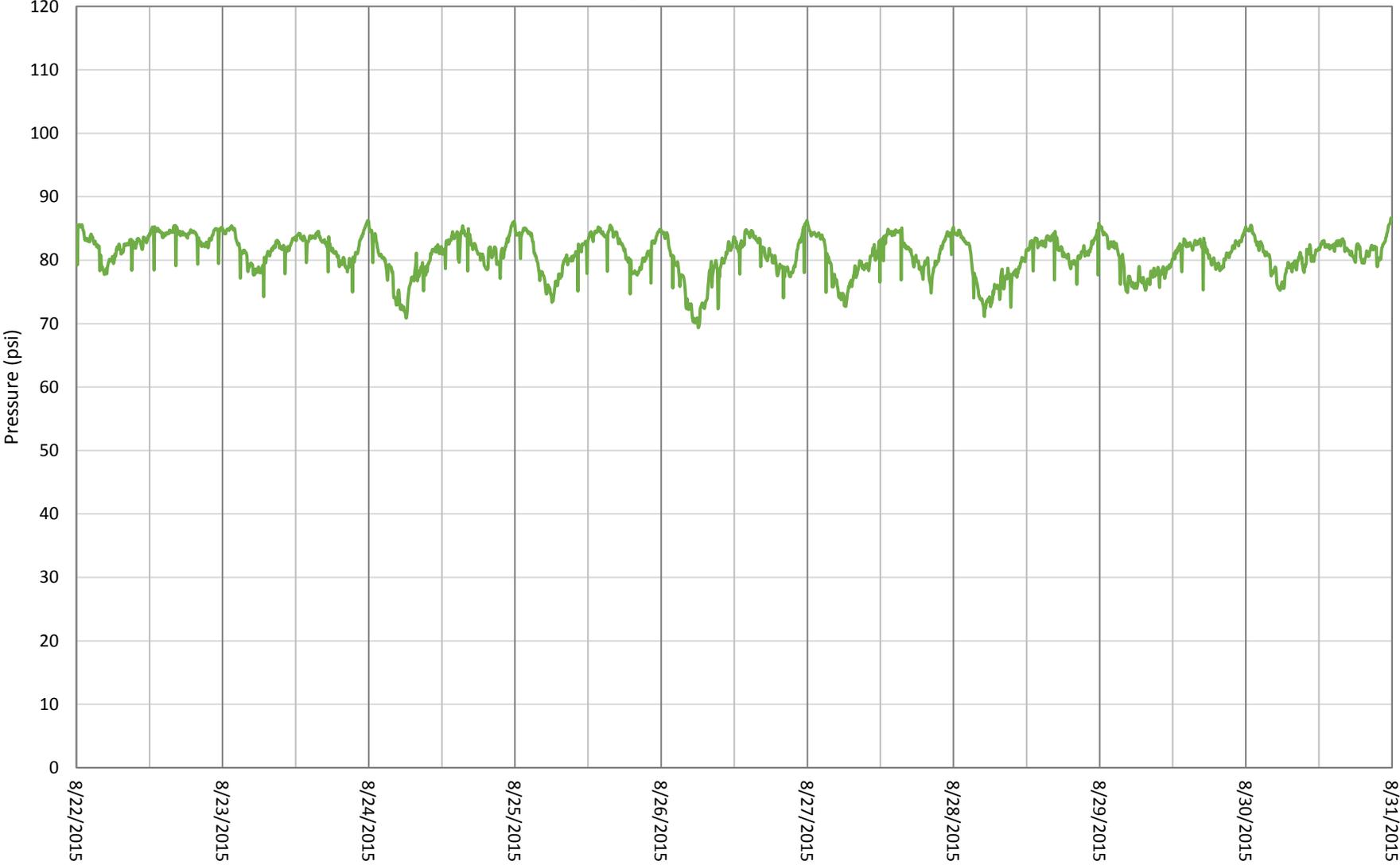


# City of Huntsville

Location #6: Autumn Road and Marigold Lane (Spring Lake Water Plant) - Lower Pressuer Plane

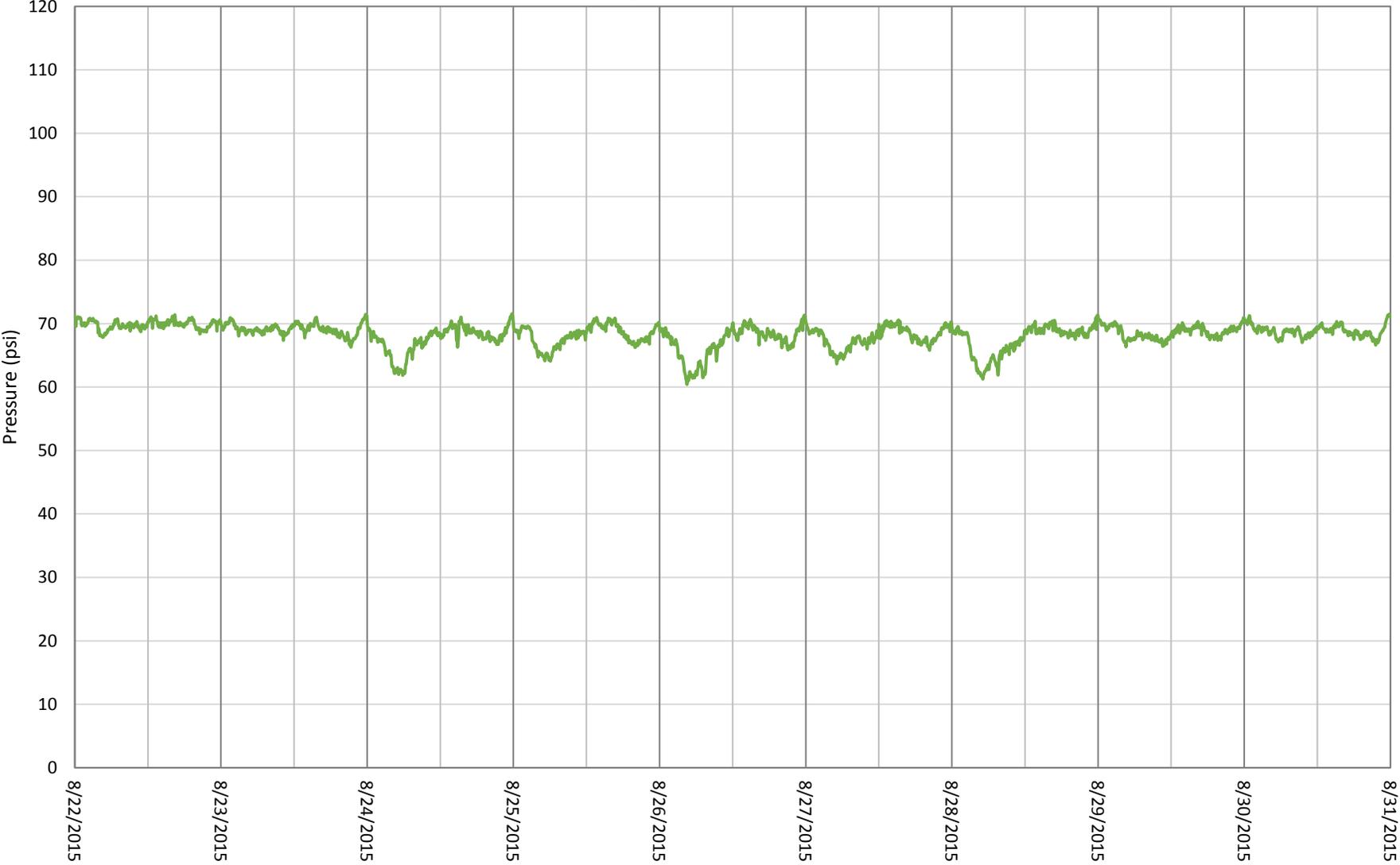
Pressure Recorder ID: 201669 - **Ground Elevation 382'**

August 22 - 31, 2015



# City of Huntsville

Location #7: 2052 Avenue H - Upper Pressure Plane  
Pressure Recorder ID: 203191 - **Ground Elevation 418'**  
August 22 - 31, 2015

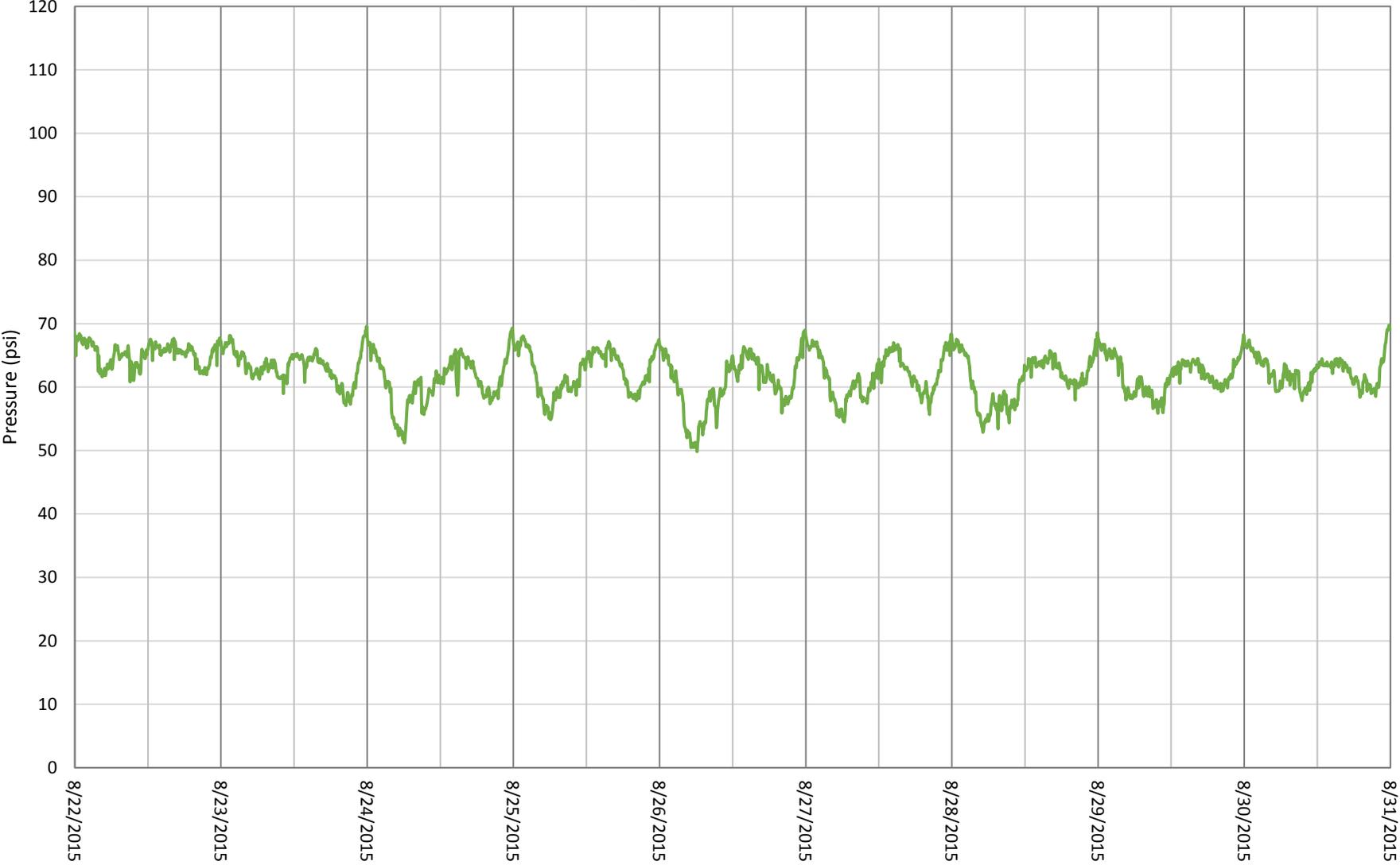


# City of Huntsville

Location #8: Sumac Road and SH 30/190 - Upper Pressure Plane

Pressure Recorder ID: Loan - **Ground Elevation 414'**

August 22 - 31, 2015

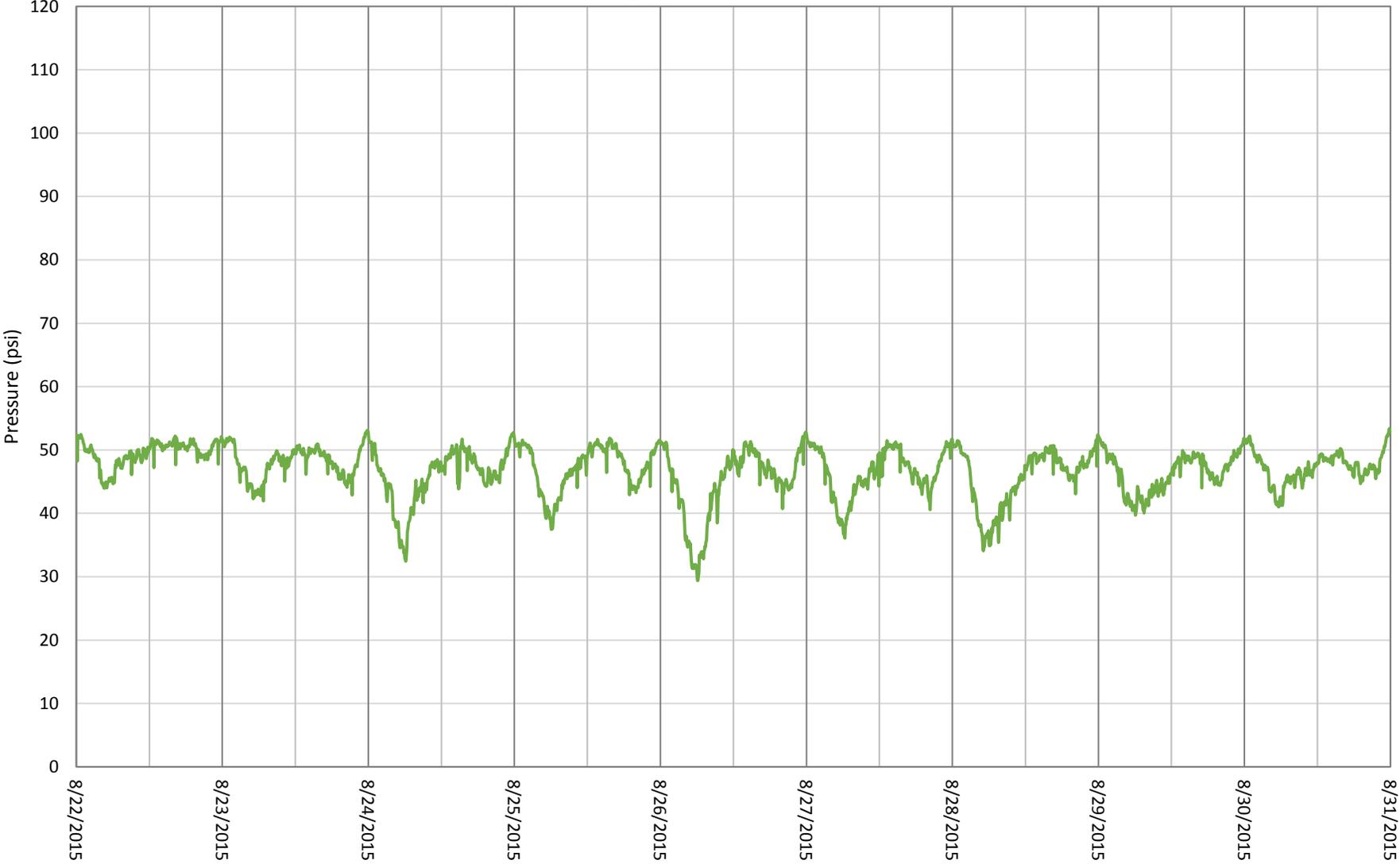


# City of Huntsville

Location #9: 7405 TX-75 (Goree Unit) - Upper Pressure Plane

Pressure Recorder ID: 203436 - **Ground Elevation 456'**

August 22 - 31, 2015

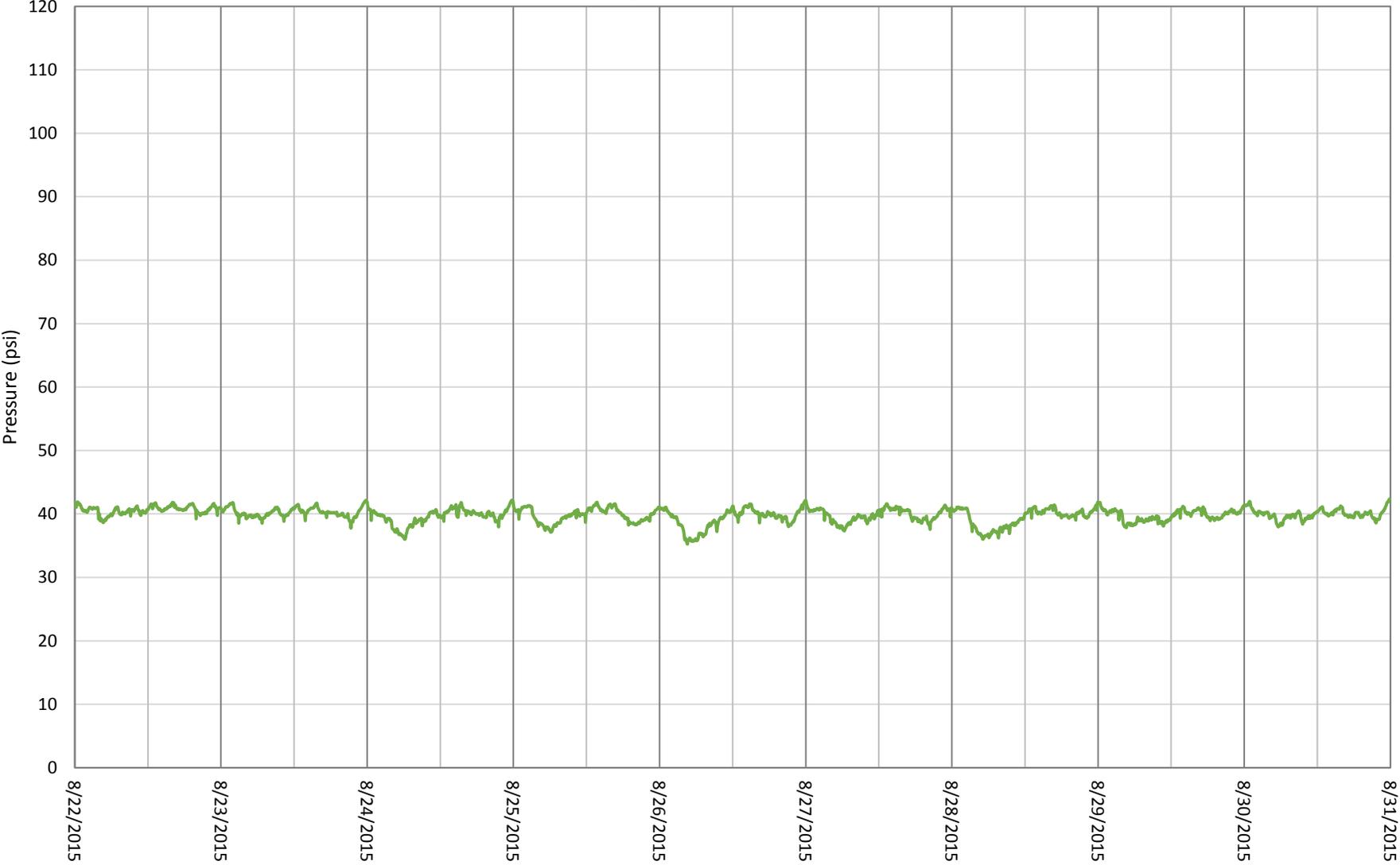


# City of Huntsville

Location #10: FM 1374 and Baker Street - Upper Pressure Plane

Pressure Recorder ID: 201667 - Ground Elevation 490'

August 22 - 31, 2015

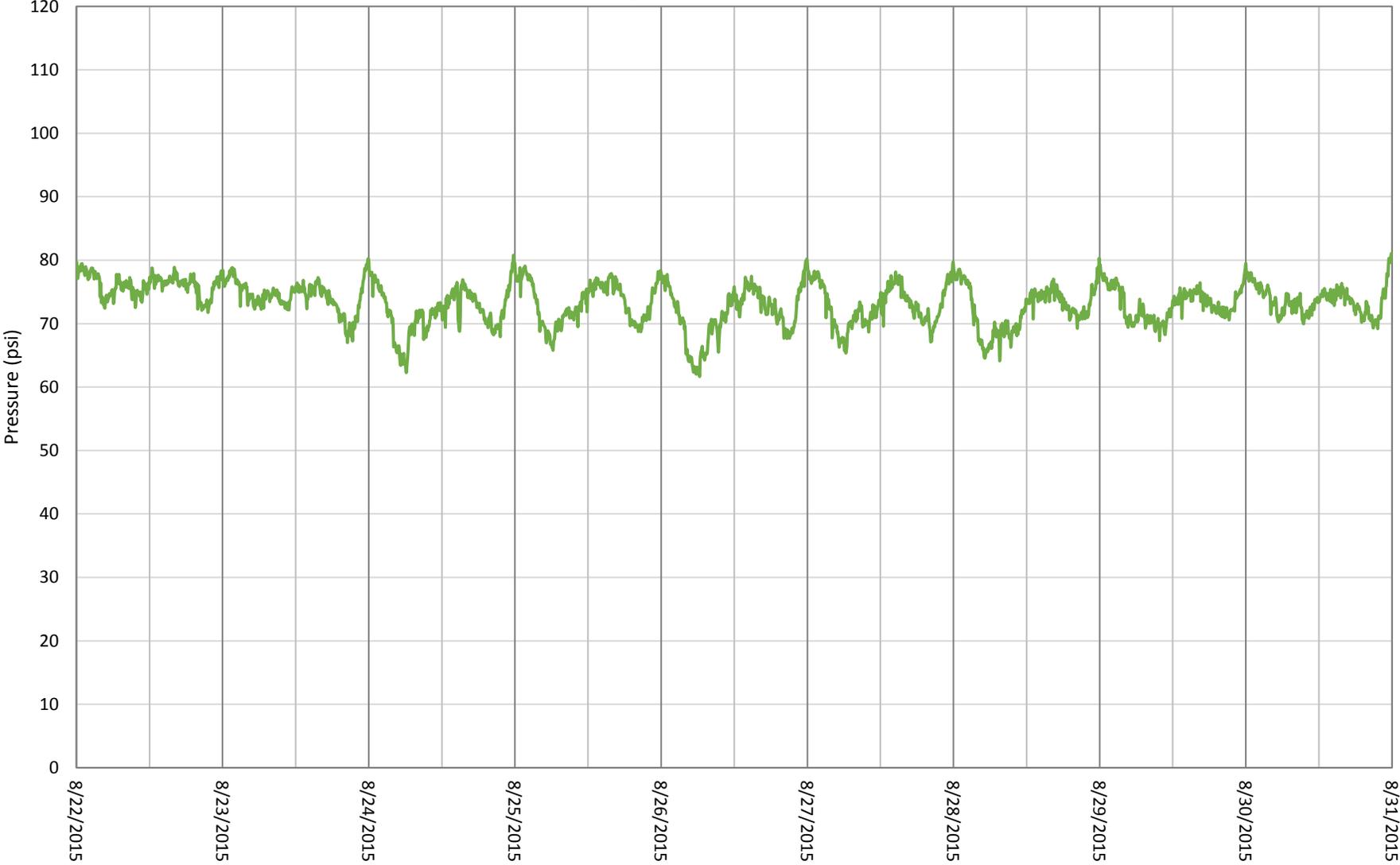


# City of Huntsville

Location #11: 295 North Freeway Service Road (Holiday Unit) - Upper Pressure Plane  
Pressure Recorder ID: 203019 - **Ground Elevation 388'**



August 22 - 31, 2015

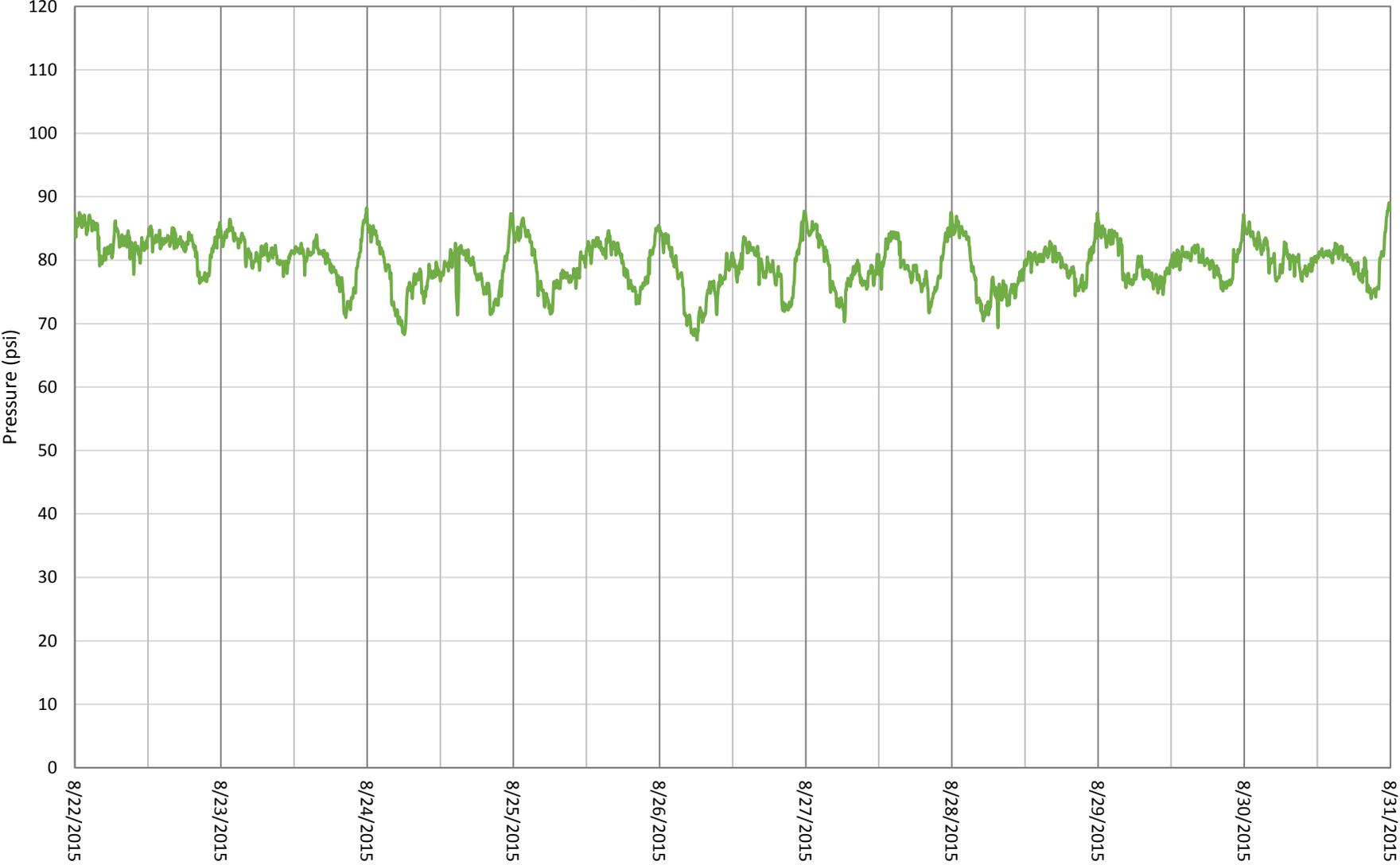


# City of Huntsville

Location #12: 861 I-45 (Near TDCJ Facility) - Upper Pressure Plane

Pressure Recorder ID: 205545 - **Ground Elevation 362'**

August 22 - 31, 2015



**City of Huntsville**  
**Average Daily SCADA Data**  
**August 22 - August 30, 2015**



Date	Peak Hour Demand (MGD)	City Demand (MGD)	Palm Street								Spring Lake		
			1 MG GST 1 Level (feet)	1 MG GST 2 Level (feet)	3 MG GST 3 Level (feet)	2 MG EST Level (feet)	0.5 MG EST Level (feet)	Old Pump Station Flow (gpm)	New Pump Station Flow (gpm)	Pump Station Discharge Pressure (psi)	GST Level (feet)	Pump Station Flow (gpm)	Hydro Tank Pressure (psi)
8/22/2015	15.16	9.19	24.40	25.20	26.88	34.49	34.75	2,557	2,827	42.16	26.03	752	80.99
8/23/2015	15.16	9.19	23.23	24.06	25.72	34.59	34.85	2,765	3,018	42.16	26.05	753	79.89
8/24/2015	15.84	10.27	23.22	24.19	25.67	34.54	34.85	3,015	3,275	42.14	25.61	968	78.41
8/25/2015	14.45	9.60	23.79	24.61	26.29	34.00	34.40	2,666	3,264	42.16	26.11	821	79.20
8/26/2015	20.95	10.32	23.01	23.90	25.55	34.36	34.69	2,845	3,615	42.16	25.40	975	77.30
8/27/2015	15.02	9.86	23.47	24.37	26.02	34.78	35.08	2,839	3,226	42.16	25.93	792	78.76
8/28/2015	16.08	10.01	23.23	24.19	25.86	33.88	34.34	2,937	3,331	42.16	25.58	903	78.03
8/29/2015	15.09	9.91	23.54	24.41	26.10	34.59	34.91	2,782	3,221	42.16	25.97	752	78.27
8/30/2015	15.01	9.75	23.88	24.74	26.40	34.60	34.90	2,809	3,121	42.16	25.86	781	79.31
<b>Average</b>		<b>9.79</b>	<b>23.53</b>	<b>24.41</b>	<b>26.05</b>	<b>34.42</b>	<b>34.75</b>	<b>2,802</b>	<b>3,211</b>	<b>42.16</b>	<b>25.84</b>	<b>833</b>	<b>78.91</b>
<b>Minimum</b>		<b>9.19</b>	<b>23.01</b>	<b>23.90</b>	<b>25.55</b>	<b>33.88</b>	<b>34.34</b>	<b>2,557</b>	<b>2,827</b>	<b>42.14</b>	<b>25.40</b>	<b>752</b>	<b>77.30</b>
<b>Maximum</b>		<b>10.32</b>	<b>24.40</b>	<b>25.20</b>	<b>26.88</b>	<b>34.78</b>	<b>35.08</b>	<b>3,015</b>	<b>3,615</b>	<b>42.16</b>	<b>26.11</b>	<b>975</b>	<b>80.99</b>

**Monday August 24, 2015, will be water model calibration day.**

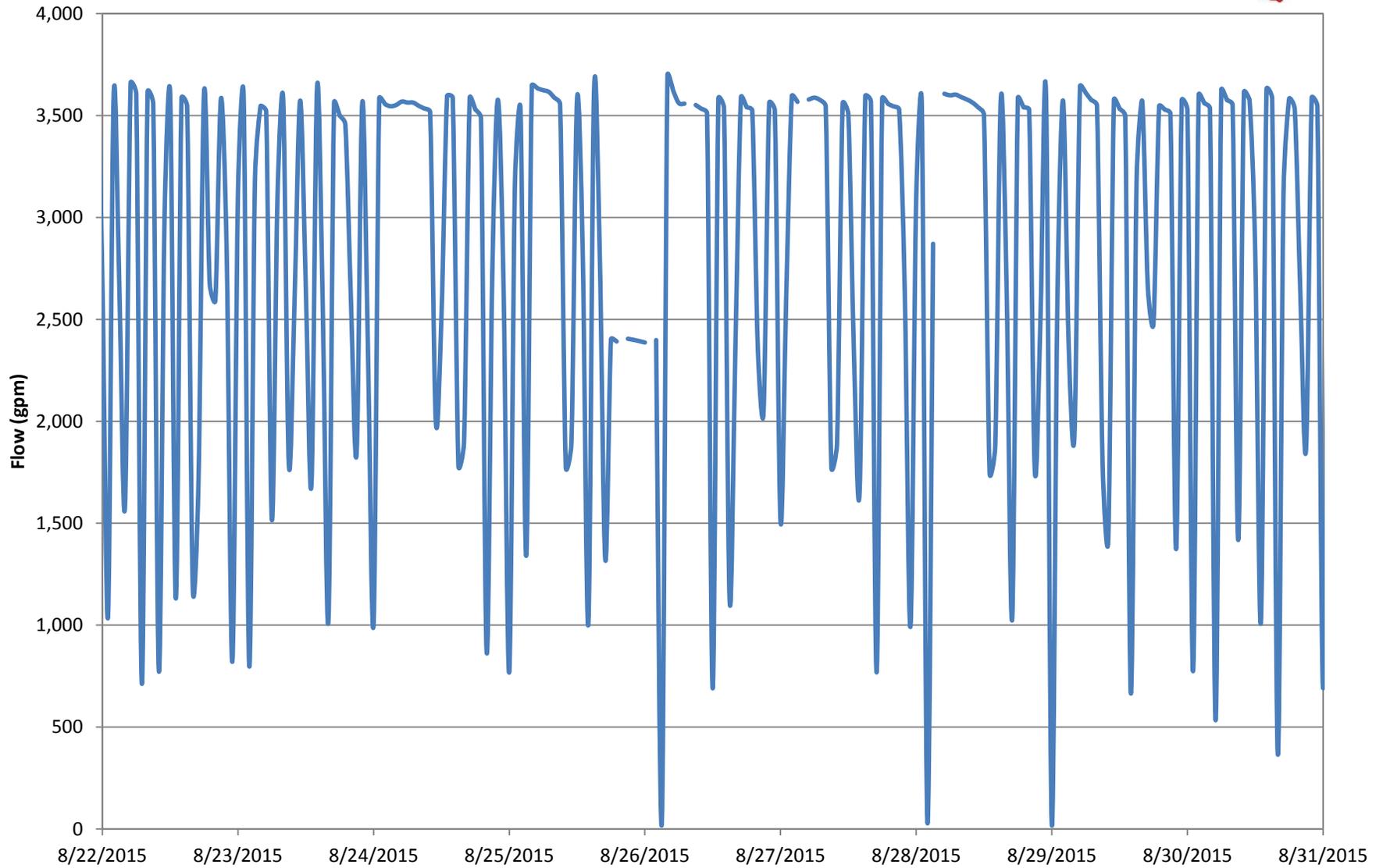
Weekend

Unusual Operational Pattern

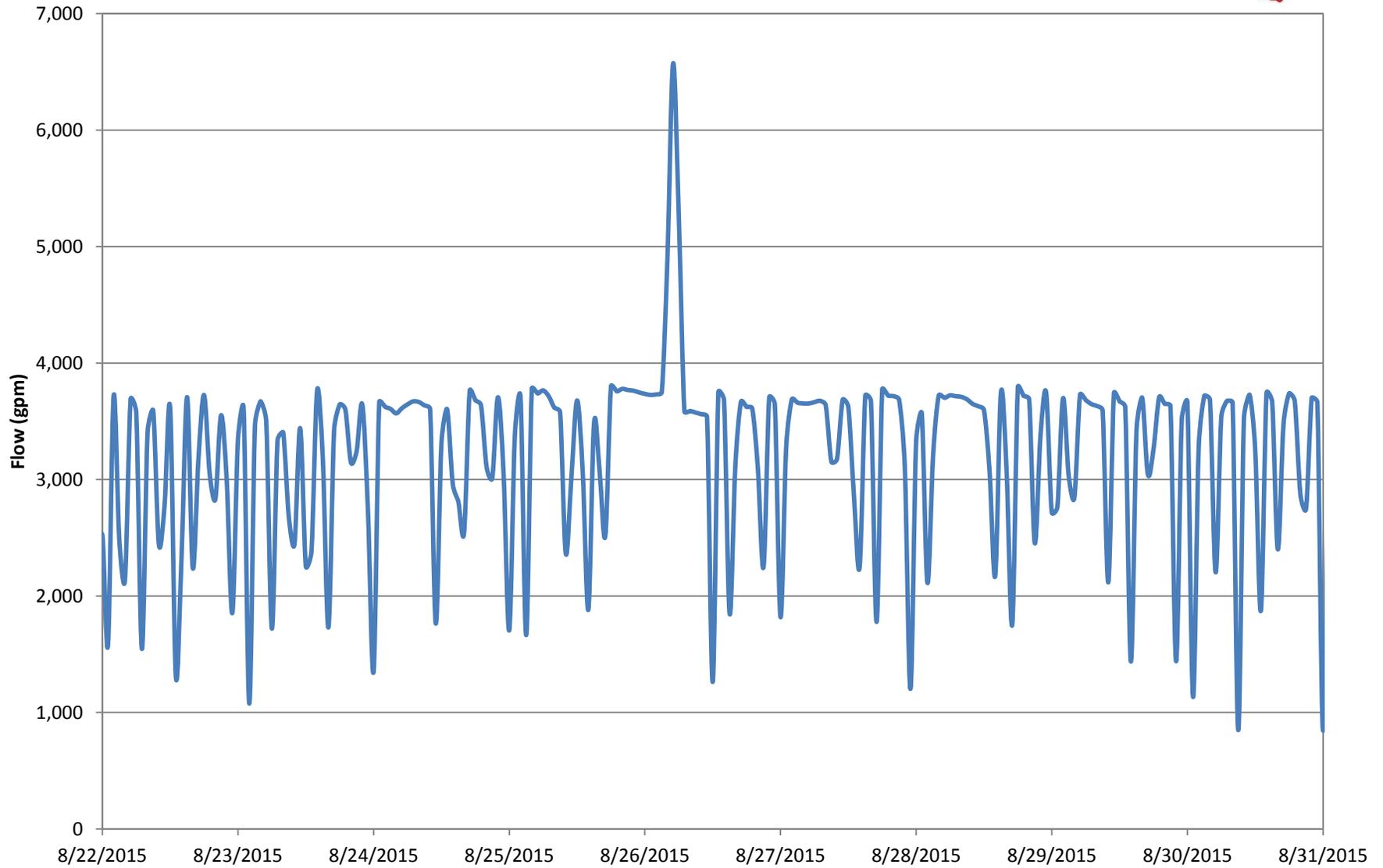
# City of Huntsville

## Old Palm Street Pump Station Flow

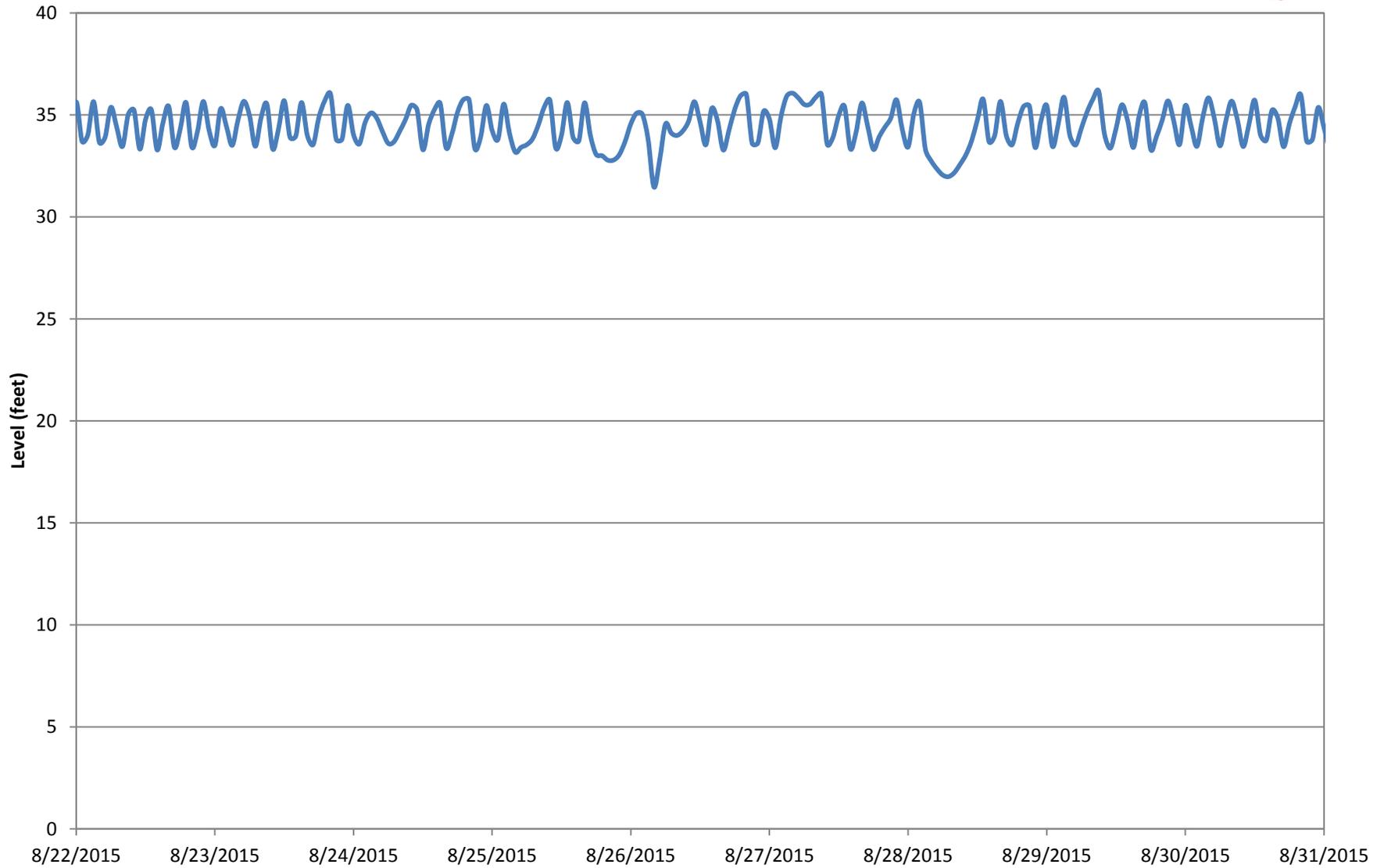
August 22 - August 30, 2015



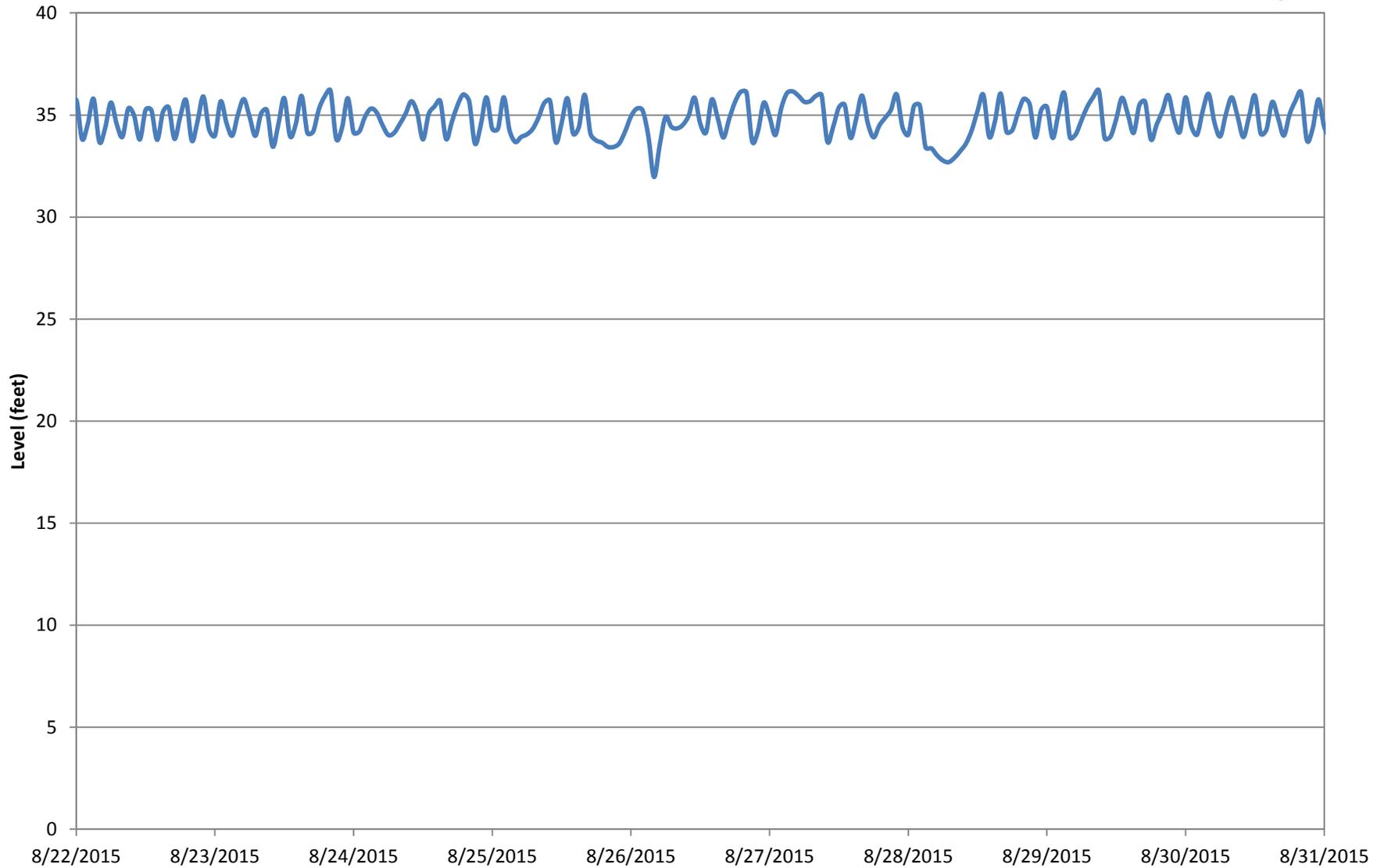
**City of Huntsville**  
**New Palm Street Pump Station Flow**  
**August 22 - August 30, 2015**



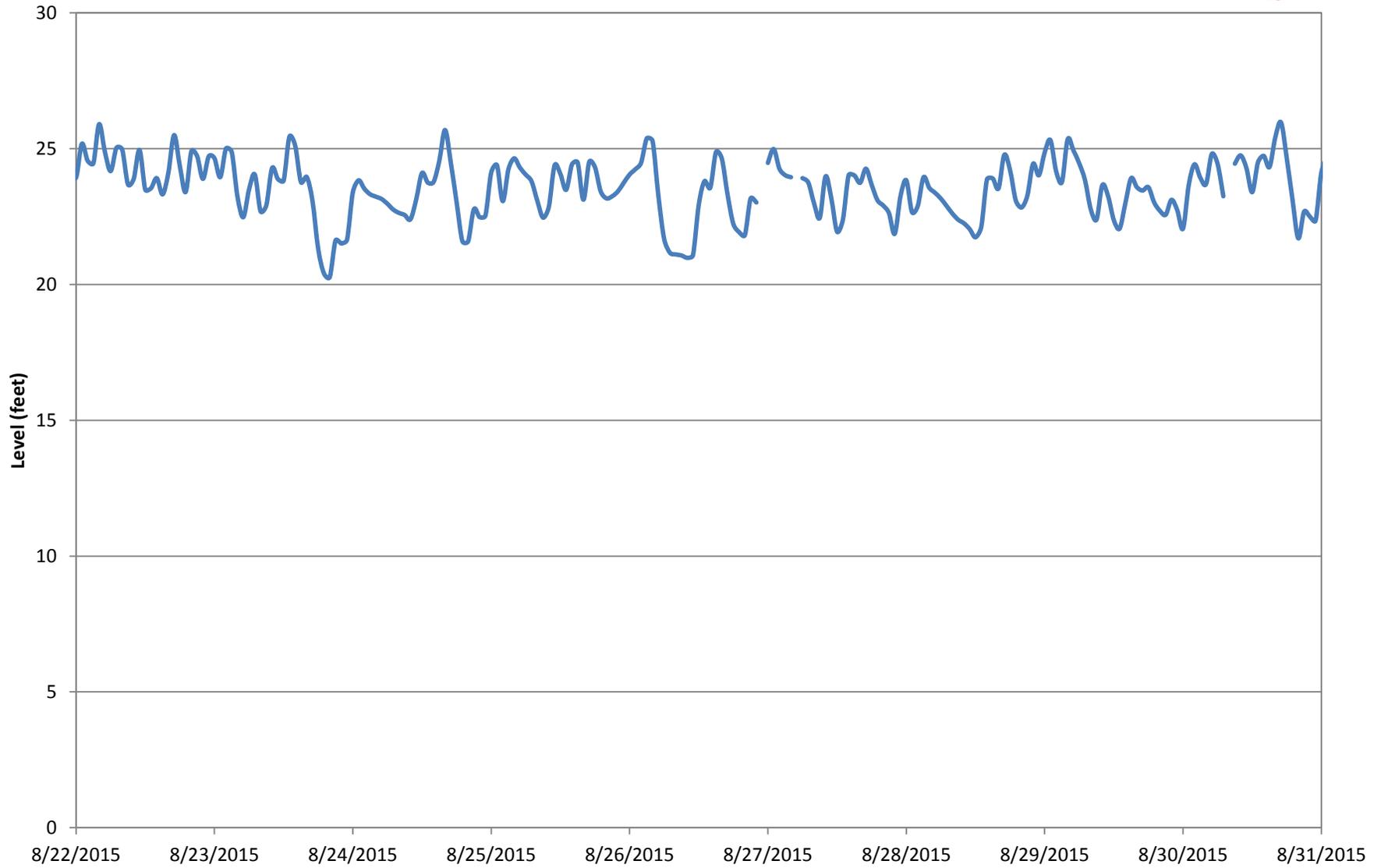
**City of Huntsville**  
**Palm Street 2 MG EST Level**  
**August 22 - August 30, 2015**



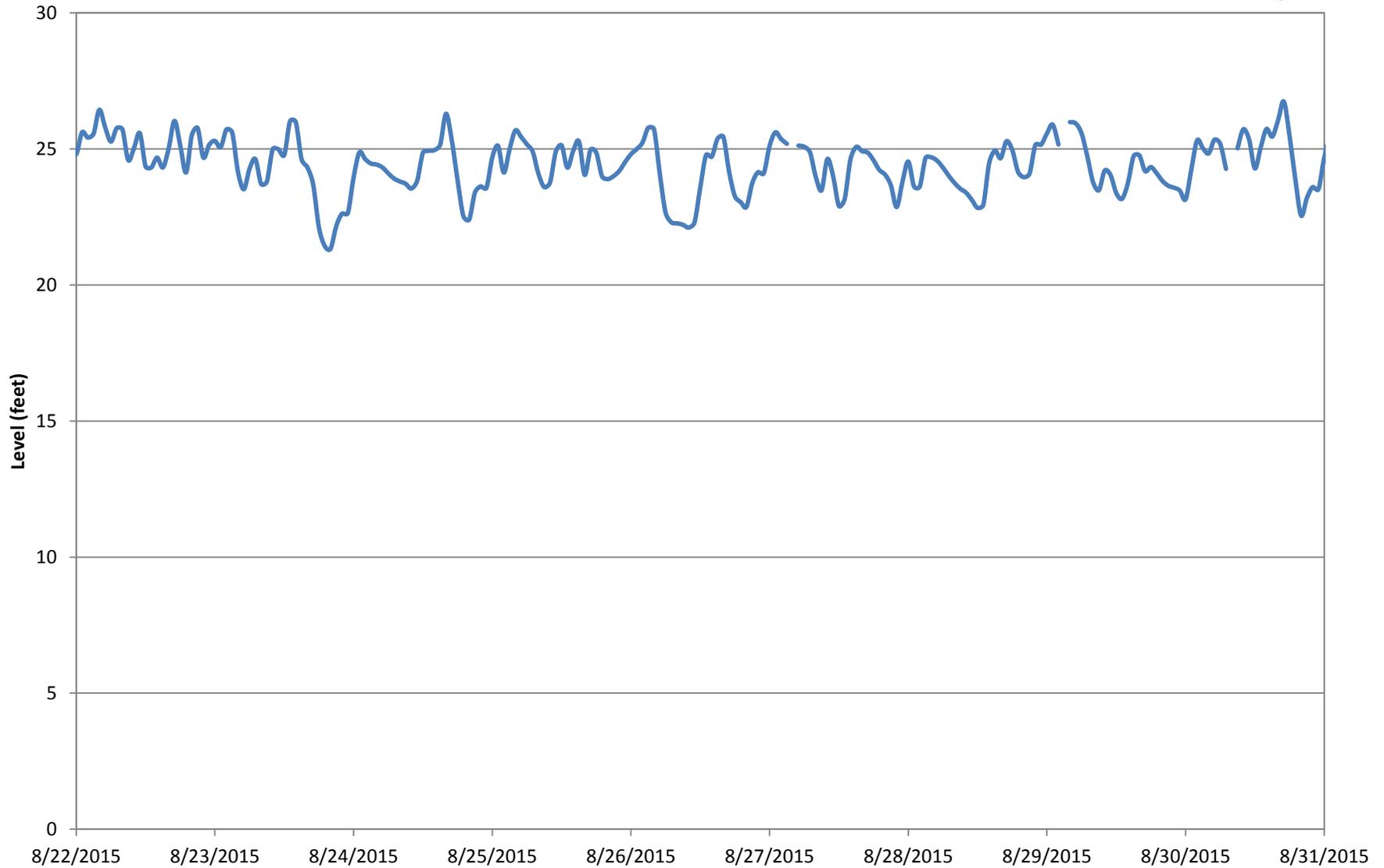
**City of Huntsville**  
**Palm Street 0.5 MG EST Level**  
**August 22 - August 30, 2015**



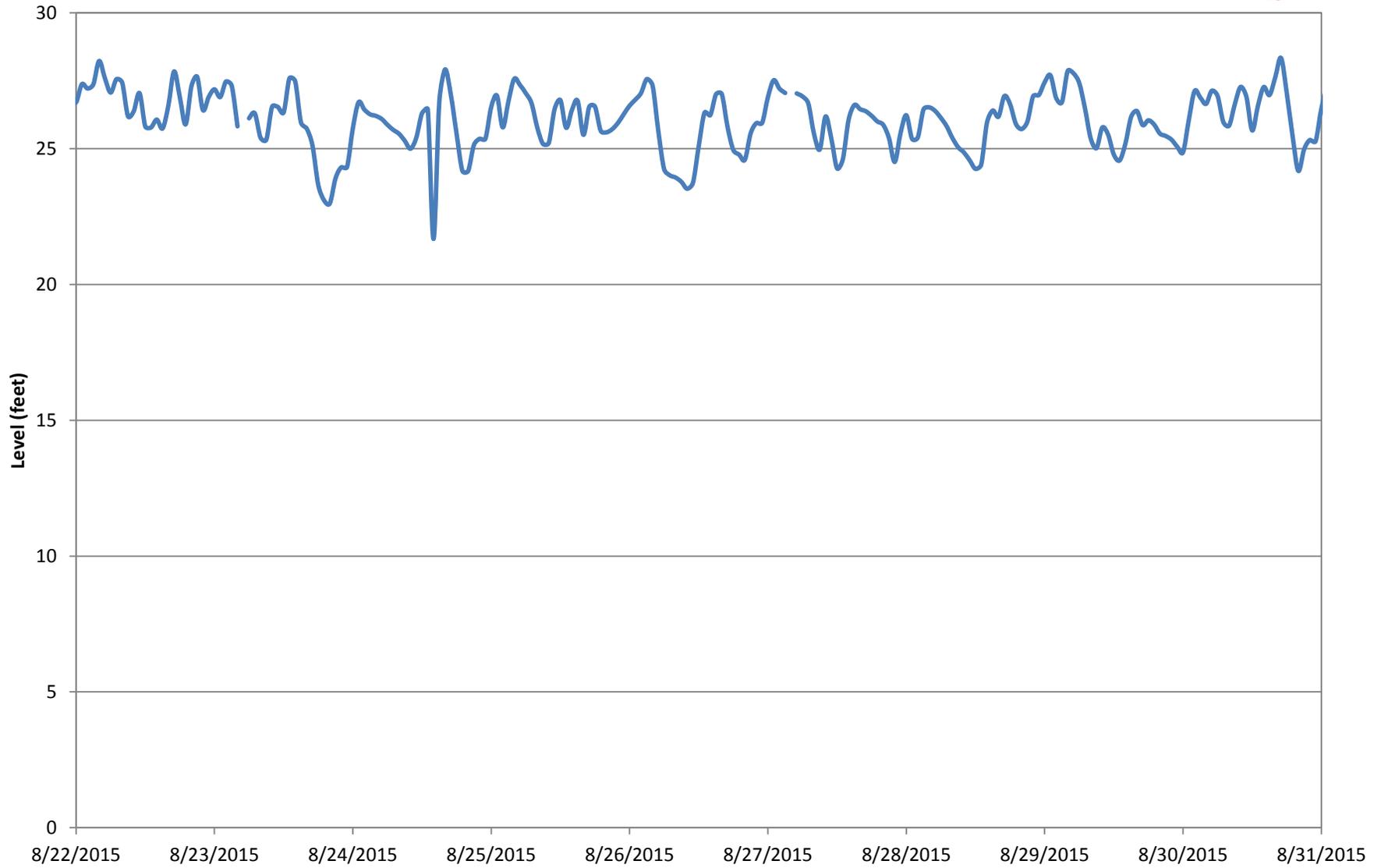
**City of Huntsville**  
**Palm Street 1 MG GST 1 Level**  
**August 22 - August 30, 2015**



**City of Huntsville**  
**Palm Street 1 MG GST 2 Level**  
**August 22 - August 30, 2015**

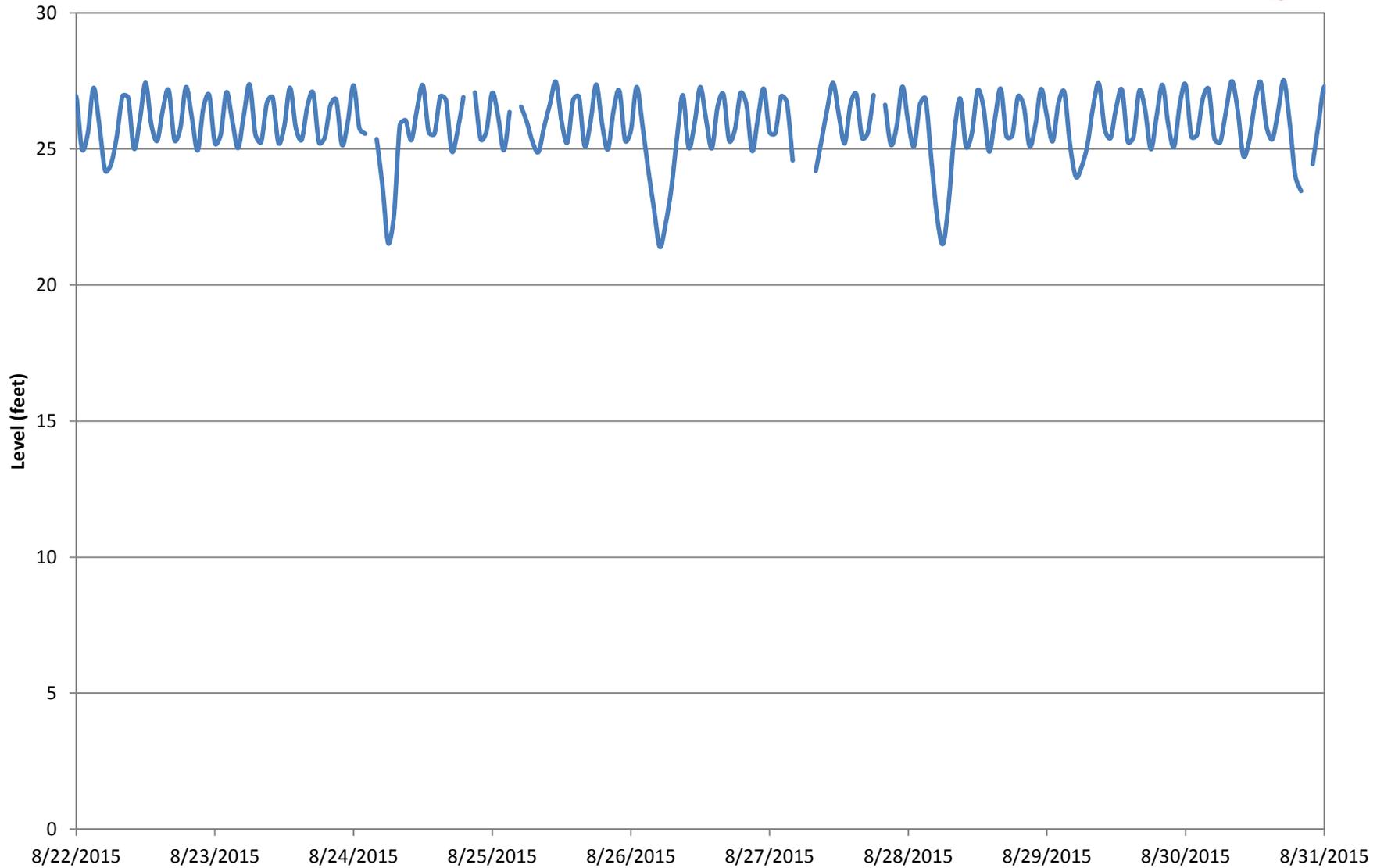


**City of Huntsville**  
**Palm Street 3 MG GST 3 Level**  
**August 22 - August 30, 2015**





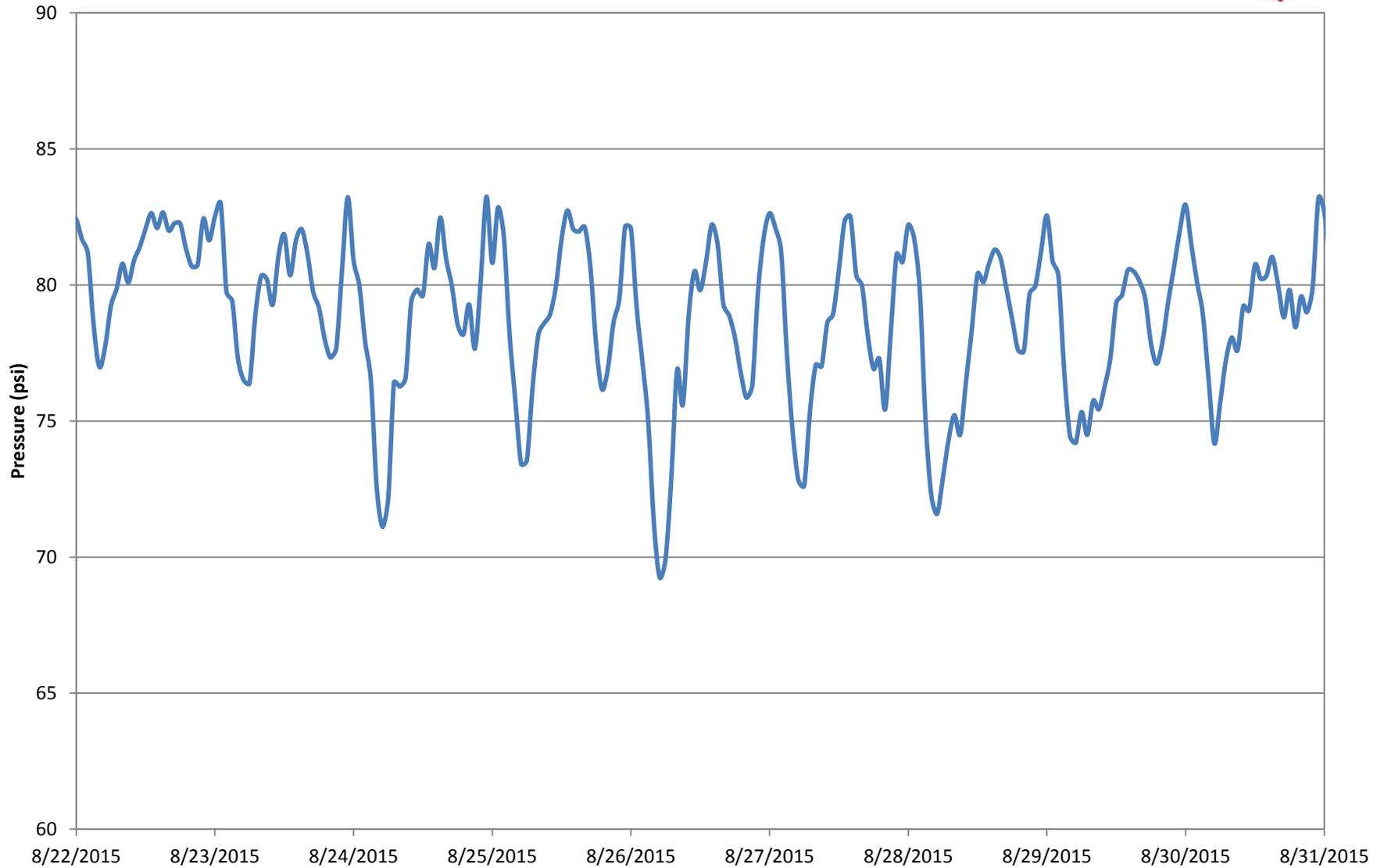
**City of Huntsville**  
**Spring Lake GST Level**  
**August 22 - August 30, 2015**



# City of Huntsville

## Spring Lake Hydropneumatic Tank Pressure

August 22 - August 30, 2015





# City of Huntsville

## Pump Performance Testing



**Facility:** Spring Lake Water Plant  
**Location:** 3391 Autumn Drive  
**Type:** Water Plant  
**Test Date:** 10/1/2015

Pump ID	Rated Head (feet)	Rated Flow (GPM)	Rated Horsepower (HP)	Pump Type
No. 1	220	500	50	Horizontal Split Case
No. 2	220	500	50	Horizontal Split Case
No. 3	225	1,000	75	Horizontal Split Case

Test Number	Operating Point	Time Start	Flow (GPM)	Discharge Pressure (psi)	Clearwell Level (feet)	Throttled Valve (Yes/No?)	Approximate Valve Position	Time End	Comments
1  Pump # 1	1	10:08	0	83.5	24.5	N	Open	10:10	500 gpm pump info: Head - 220' RPM = 3500 SN: 84-09423-2411-BF Model: 4x5x10B 18 turns to close 6" GV GV normally throttled by 15 turns
	2	10:10	830	89	24.4	N	Open	10:12	
	3	10:12	725	91	24.3	Y	15 turns	10:14	
	4	10:14	675	95	24.2	Y	16 turns	10:16	
	5	10:18	585	100	24.3	Y	16 3/4 turns	10:20	
	6								
2  Pump # 1, 2	1	10:28	1305	93/93	24.4	N	Open	10:32	20 turns to close 6" GV (P #2)
	2								
	3								
	4								
	5								
	6								
3  Pump # 2	1	10:34	650	88	24.4	N	Open	10:36	GV normally throttled by 17 turns
	2	10:36	585	93	24.5	Y	17 turns	10:40	
	3	10:40	487	98	24.6	Y	18 turns	10:42	
	4	10:42	400	101	24.7	Y	19 turns	10:45	
	5								
	6								
4  Pump # 2, 3	1	10:50	1270	92/95	24.8	N	Open	10:52	
	2								
	3								
	4								
	5								
	6								



**TO:** Y.S. “Ram” Ramachandra, P.E., City of Huntsville  
Carol Reed, City of Huntsville  
Joyce Hubbard, City of Huntsville

**FROM:** Clay Herndon, P.E., Freese and Nichols, Inc.  
Jason Ward, P.E., Freese and Nichols, Inc.

**SUBJECT:** Pump Testing Protocol and Guidelines

**DATE:** October 1, 2015

**PROJECT:** Water and Wastewater Condition and Capacity Assessment Studies  
Spring Lake Water Plant Pump Testing

---

### Goals of the Pump Testing

- Determine where pumps operate in relation to original specifications.
- Develop updated curves for use in the water model update.

### Operational Considerations

- Conduct test after morning peak demands so pumps can run individually and keep up.
- Allow elevated storage tanks to drain to City’s comfortable minimum level to allow room for testing flow.
- Have Spring Lake GST as full as possible.
- Prepare Spring Lake groundwater wells to keep up with pump testing demand.

### Pre-Testing Items

1. With pump off, operate discharge valve through full open/close cycle to determine number of turns from full open to full close.
2. Determine number of turns for each testing point for each pump.
3. Locate pressure gauges to be read. Assign person to take measurement and define precision expected.
4. Note pipe size where pressure gauge is mounted for calculating velocity head.
5. Measure and note distance from ground to center of gauge.
6. Locate flow meter readout. Assign person to take measurement and define method for determining reported flow. For example, note high and low flows over a 30 second period and use average.

### **Pump Testing Procedure**

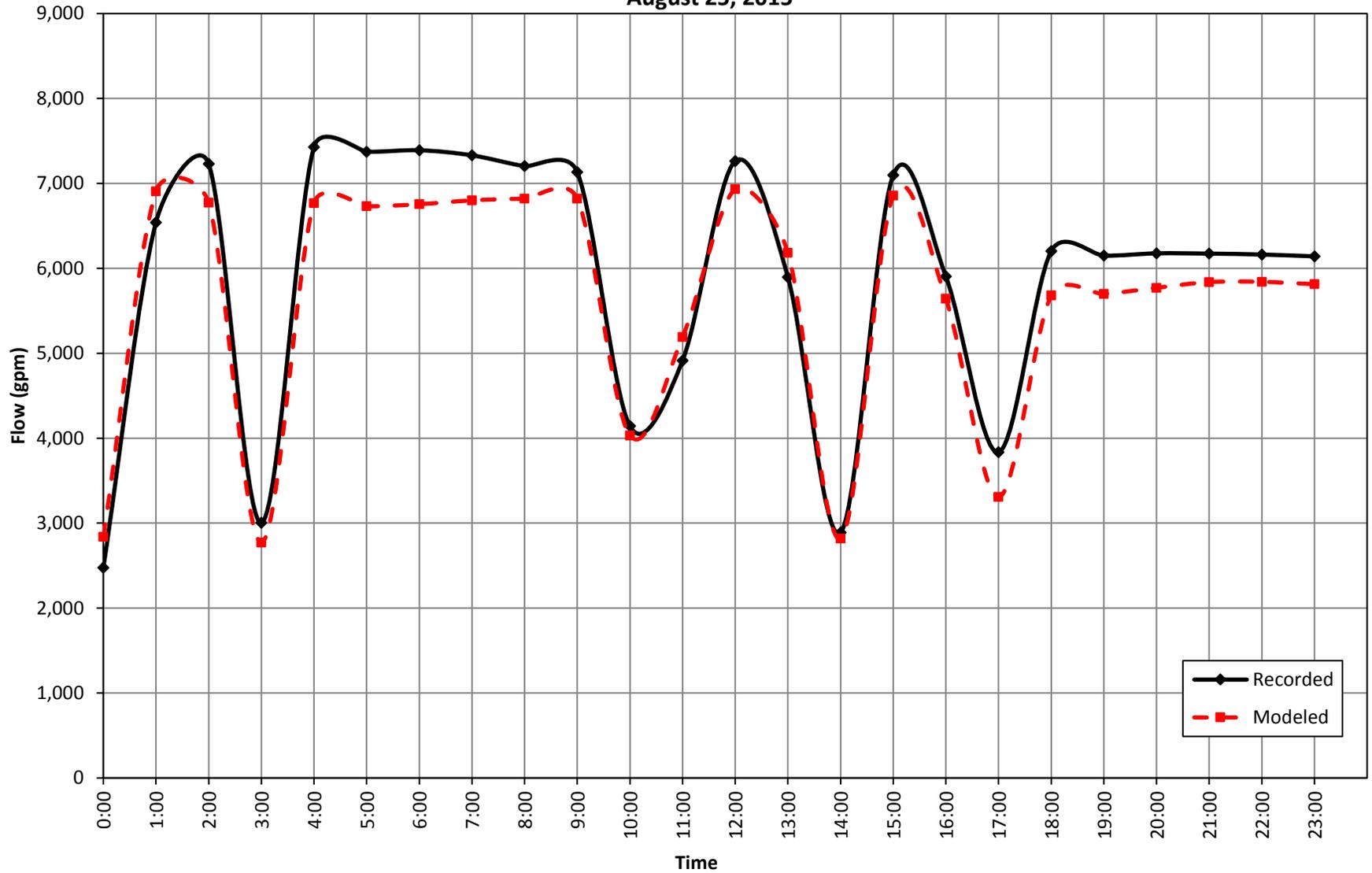
1. Document start and end time of each test.
2. Test each pump individually to get updated curve information.
  - a. Each pump should run from startup until the flow is stabilized, anywhere from 5-20 minutes.
  - b. Maintain at least one pump running at all times to minimize surges.
  - c. Obtain multiple data points for each pump (preferably 5 or more) by closing discharge butterfly valve.
    - i. If pump starts against a closed valve, record discharge pressure at zero flow to determine shutoff head.
    - ii. Begin measurements with discharge valve fully open.
    - iii. Close valve to 50% and take second measurement.
    - iv. Close valve incrementally and record 3 or 4 additional points.
  - d. Open pump discharge valve fully.
  - e. Start next pump to be tested using normal start-up procedures.
  - f. Take head and flow measurements with both pumps running.
  - g. Stop previous pump using normal shut-down procedures.



## **APPENDIX D**

### **Water Model Calibration Results**

**City of Huntsville**  
**Palm Street Water Plant**  
**Combined Pump Station Flow**  
**August 25, 2015**

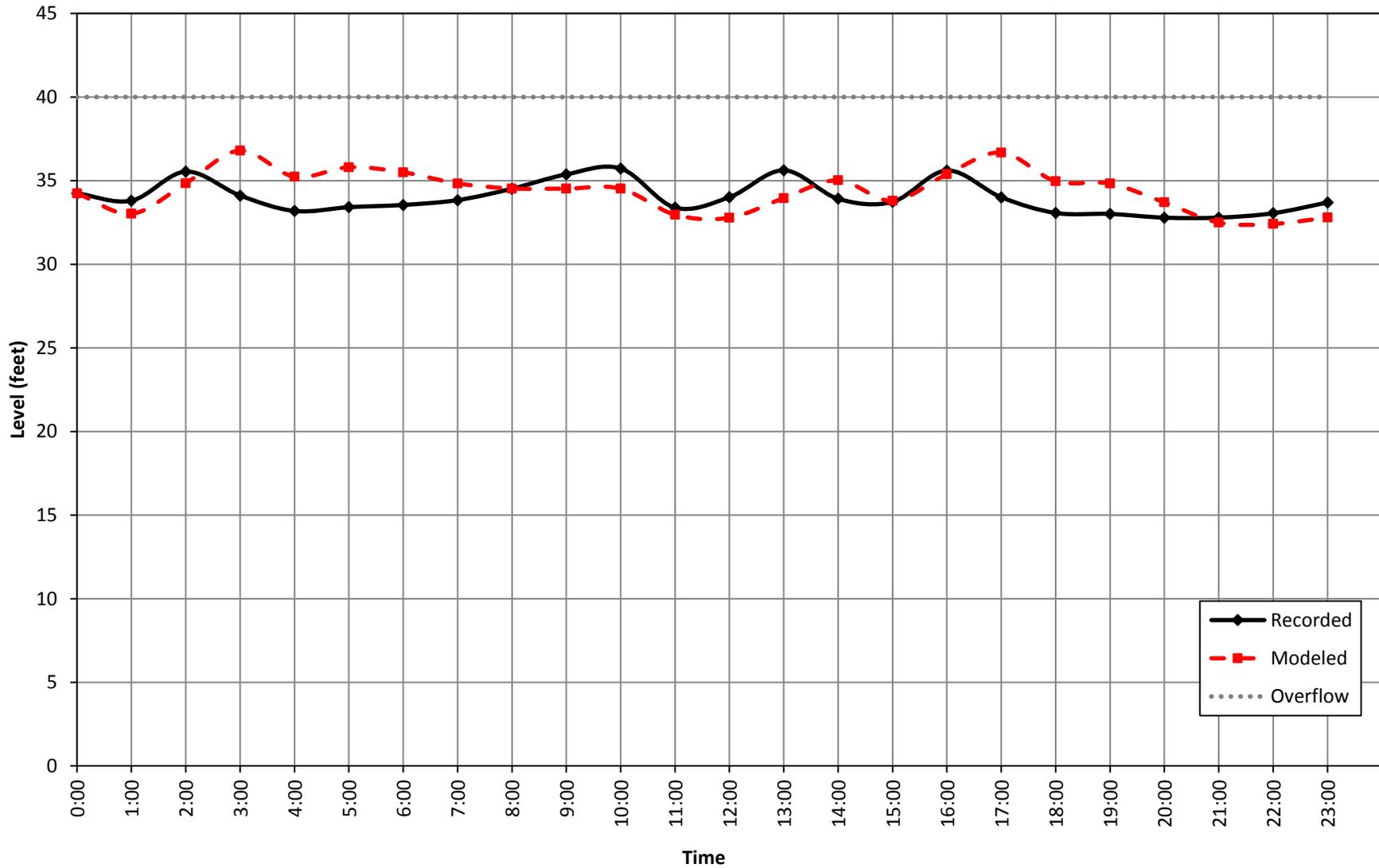


# City of Huntsville

Palm Street Water Plant 2.0 and 0.5 MG EST (Modeled as single 2.5 MG EST)

Overflow Elevation 597'

August 25, 2015

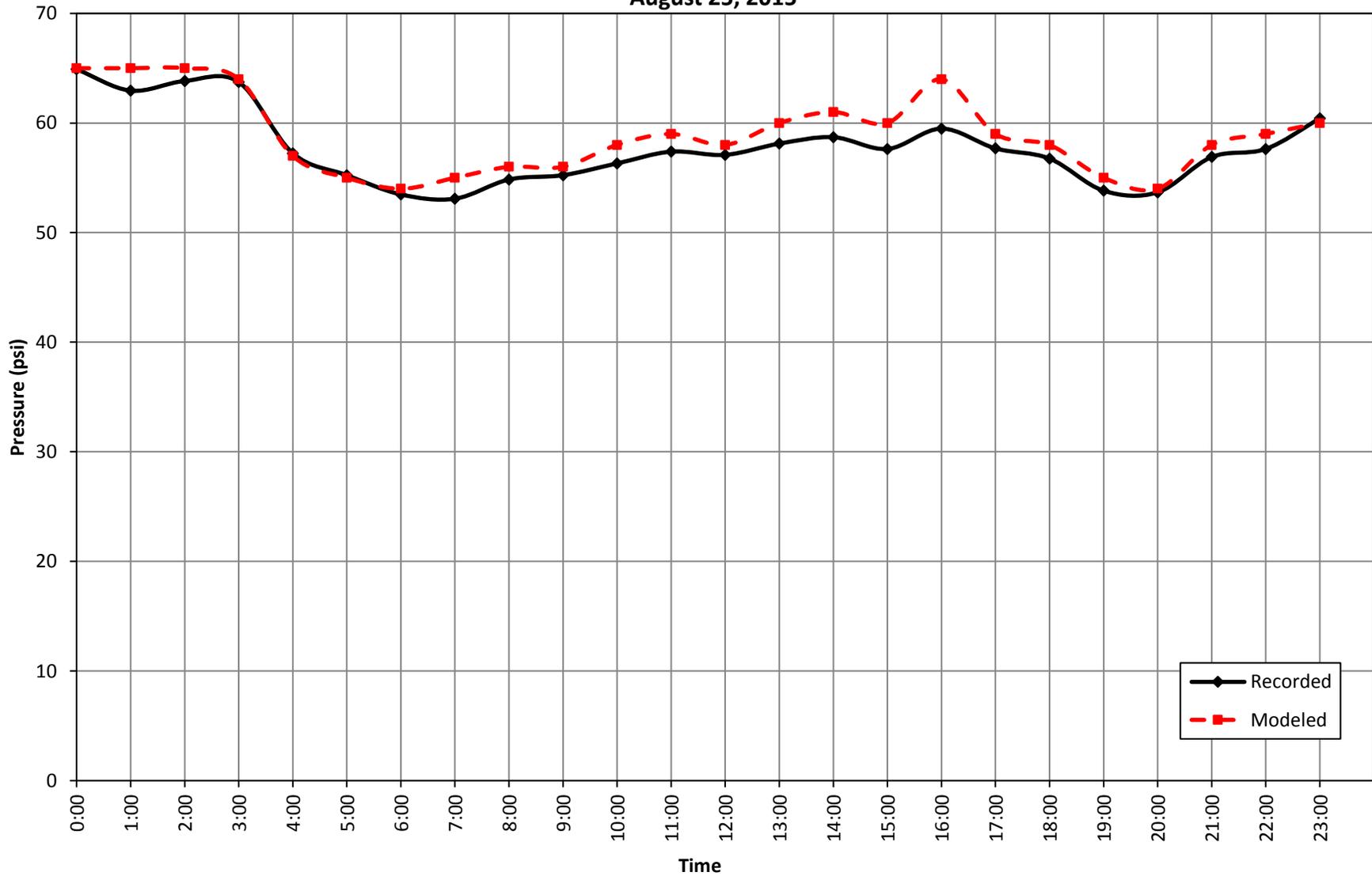


# City of Huntsville

Lower Pressure Plane

Pressure Recorder #1 - 201671 - Ground Elevation 399'

August 25, 2015

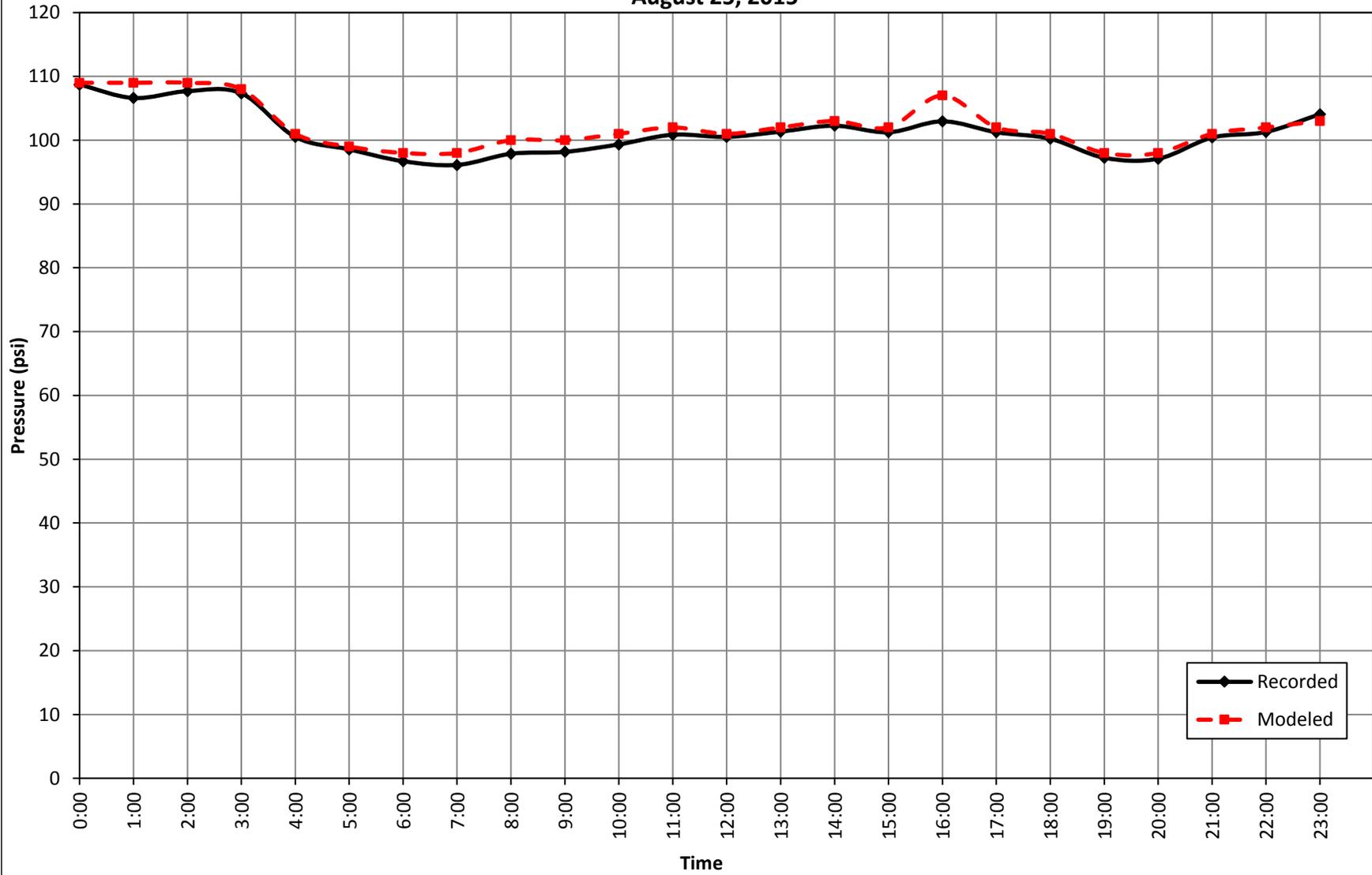


# City of Huntsville

Lower Pressure Plane

Pressure Recorder #2 - 205546 - Ground Elevation 295'

August 25, 2015

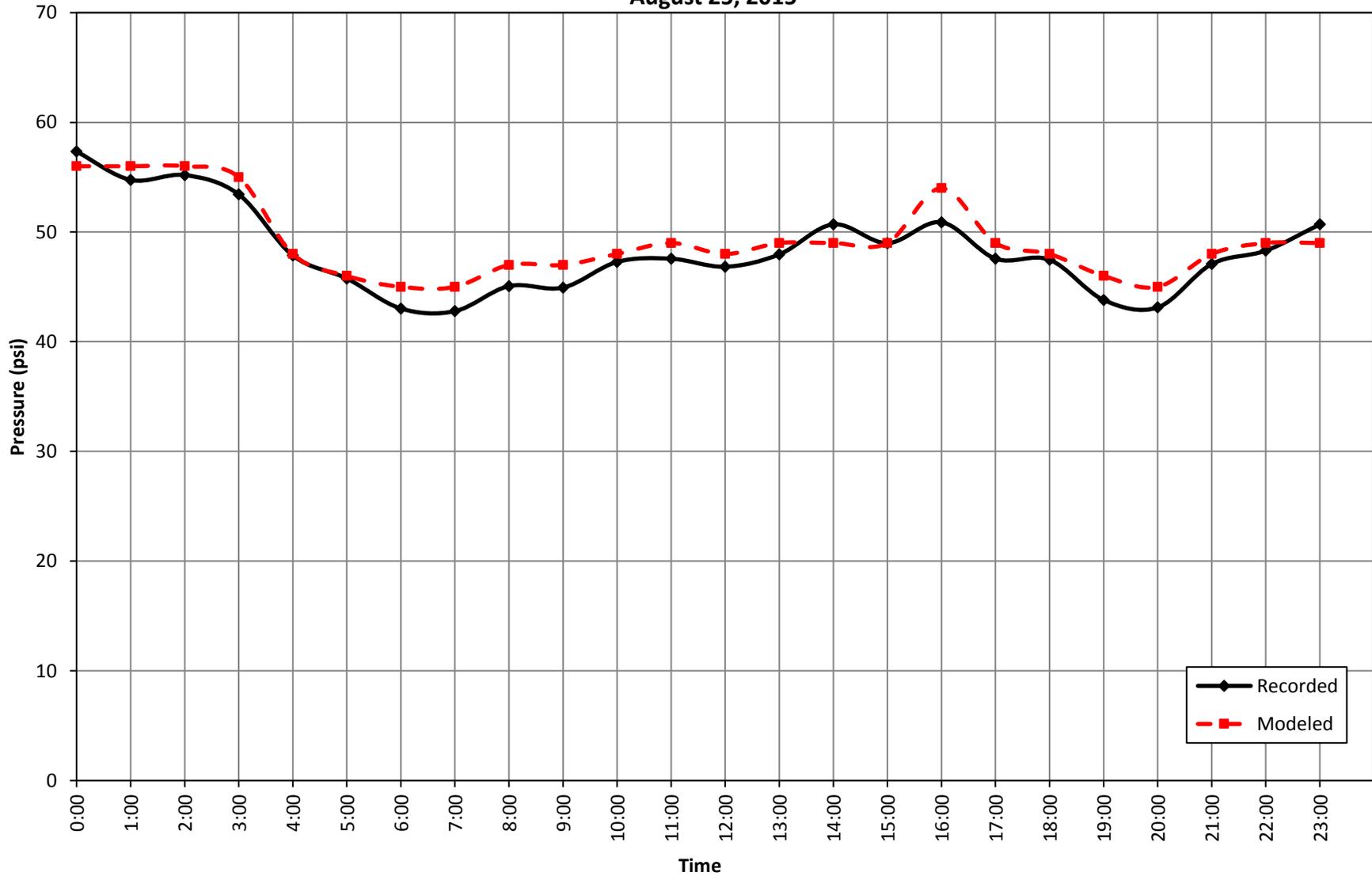


# City of Huntsville

Lower Pressure Plane

Pressure Recorder #3 - 203271 - Ground Elevation 418'

August 25, 2015

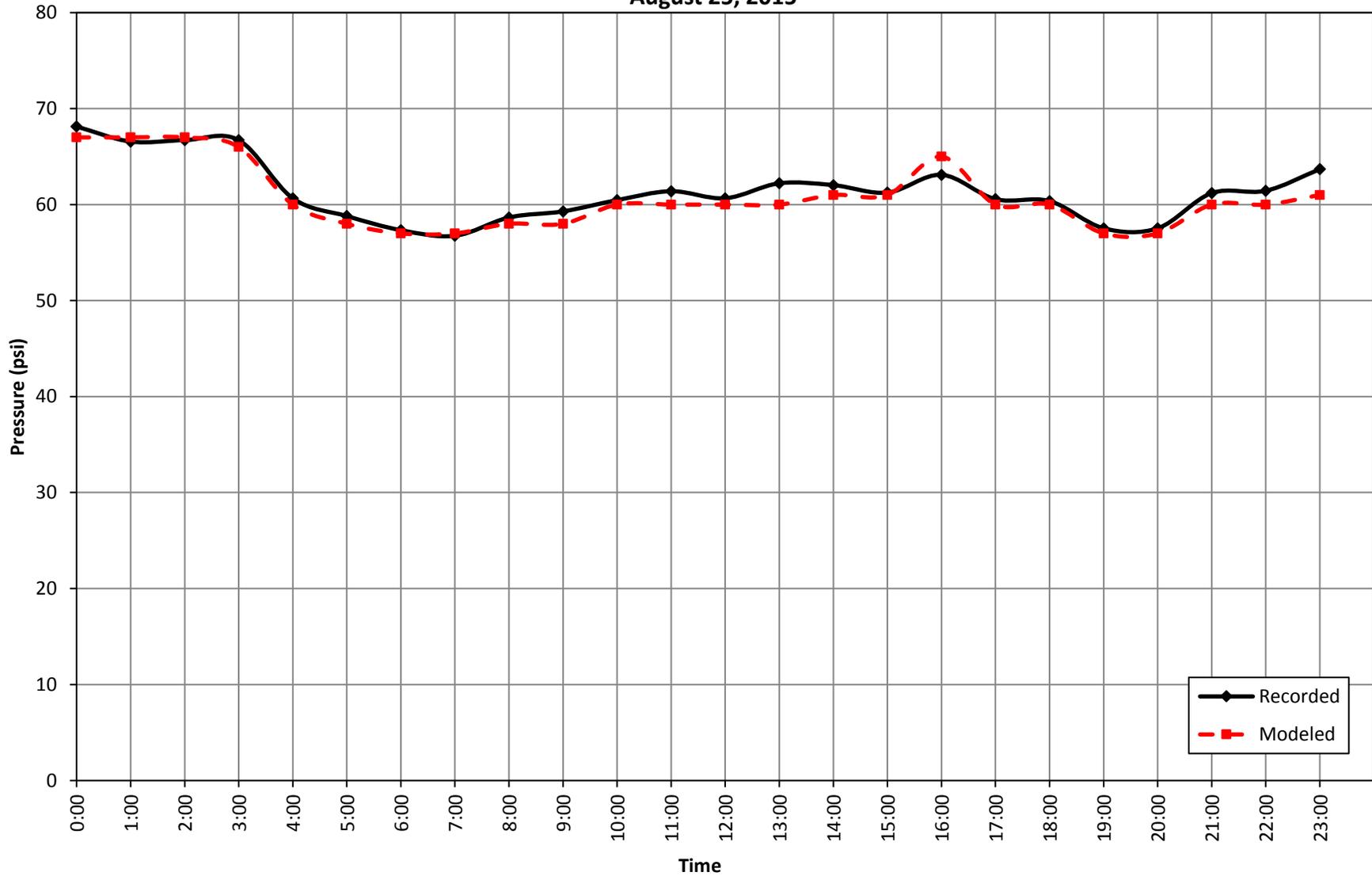


# City of Huntsville

Lower Pressure Plane

Pressure Recorder #4 - 204228 - Ground Elevation 391'

August 25, 2015

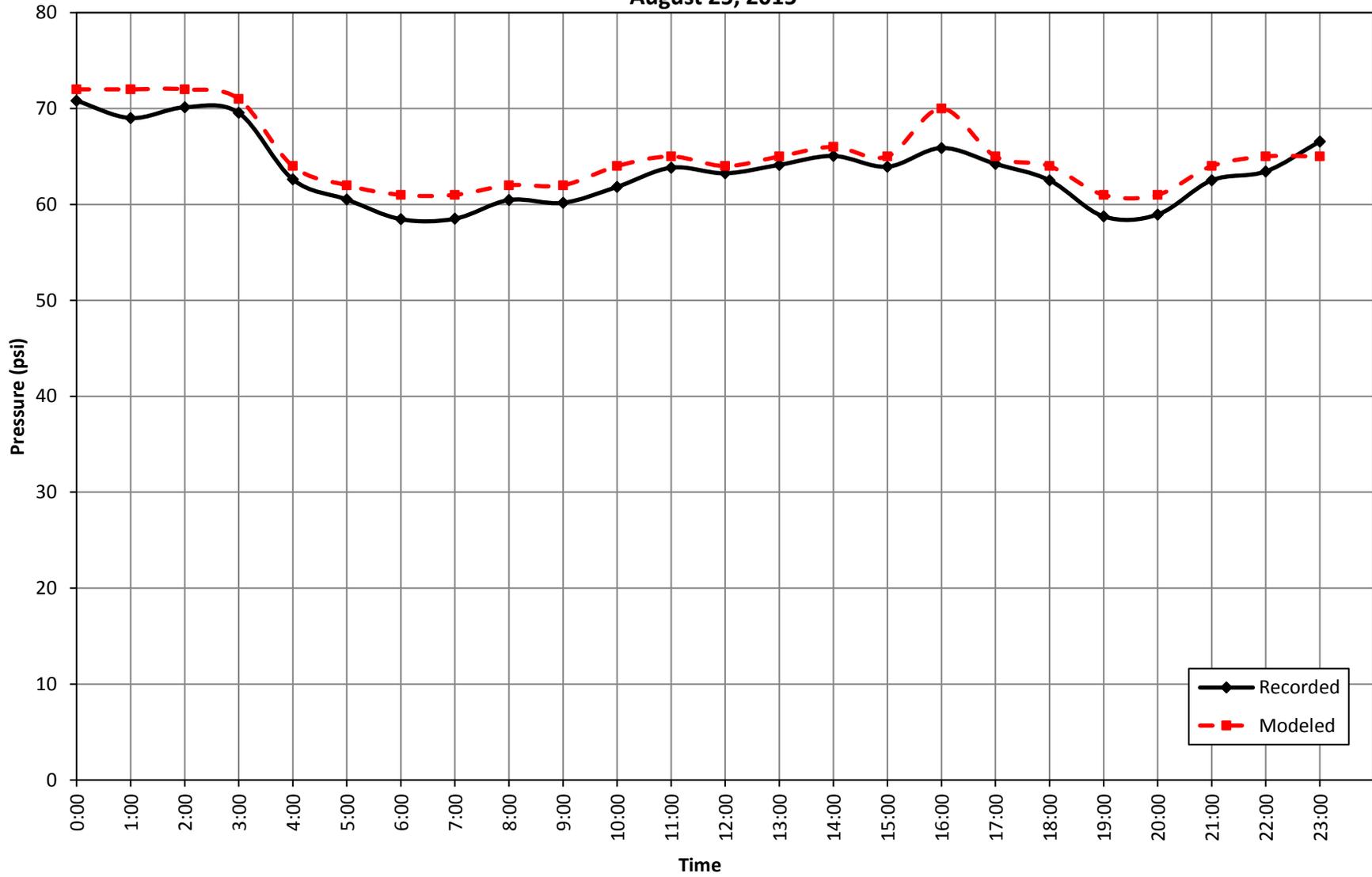


# City of Huntsville

Lower Pressure Plane

Pressure Recorder #5 - 205543 - Ground Elevation 382'

August 25, 2015

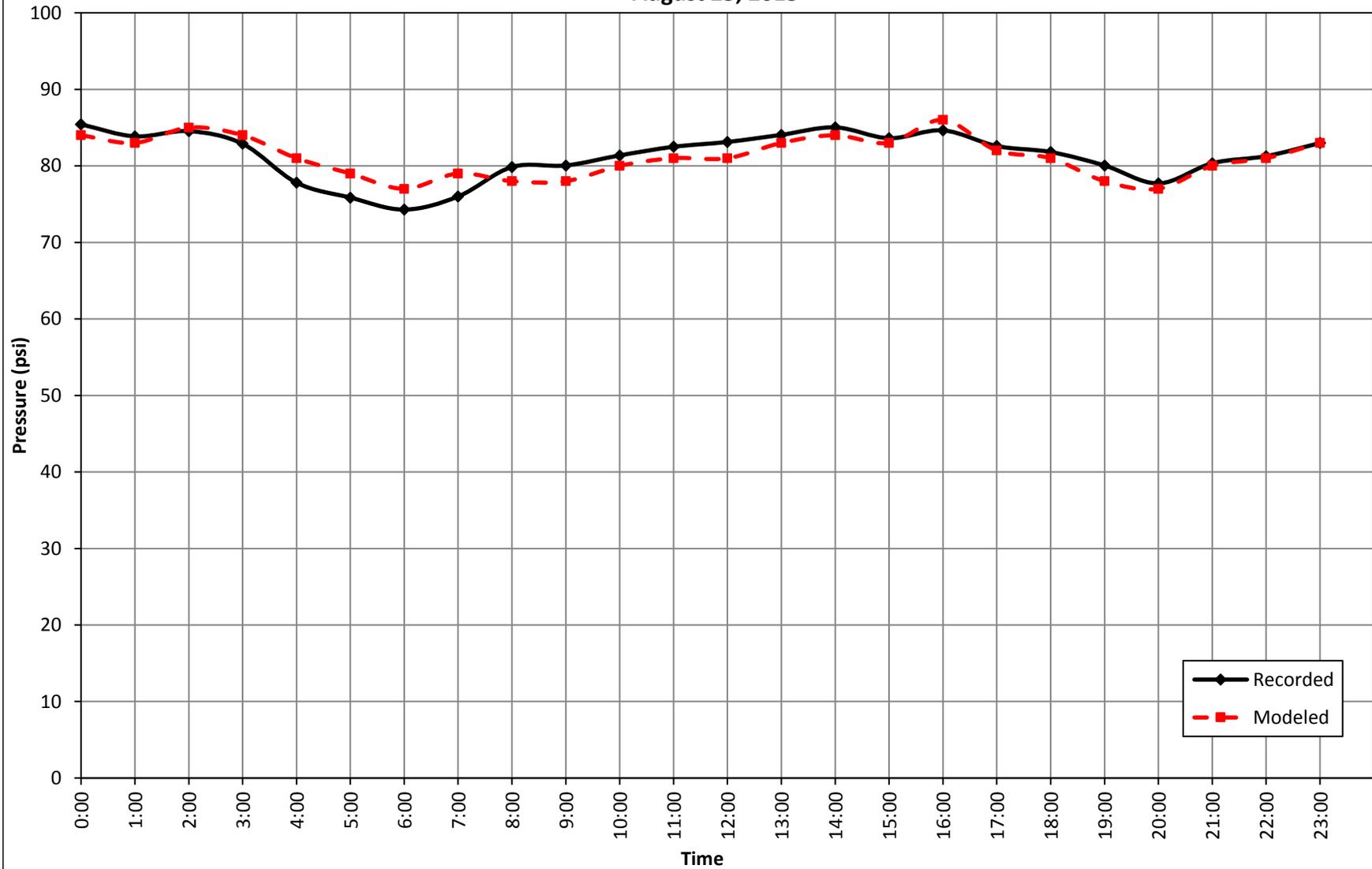


# City of Huntsville

Upper Pressure Plane

Pressure Recorder #6 - 201669 - Ground Elevation 380'

August 25, 2015

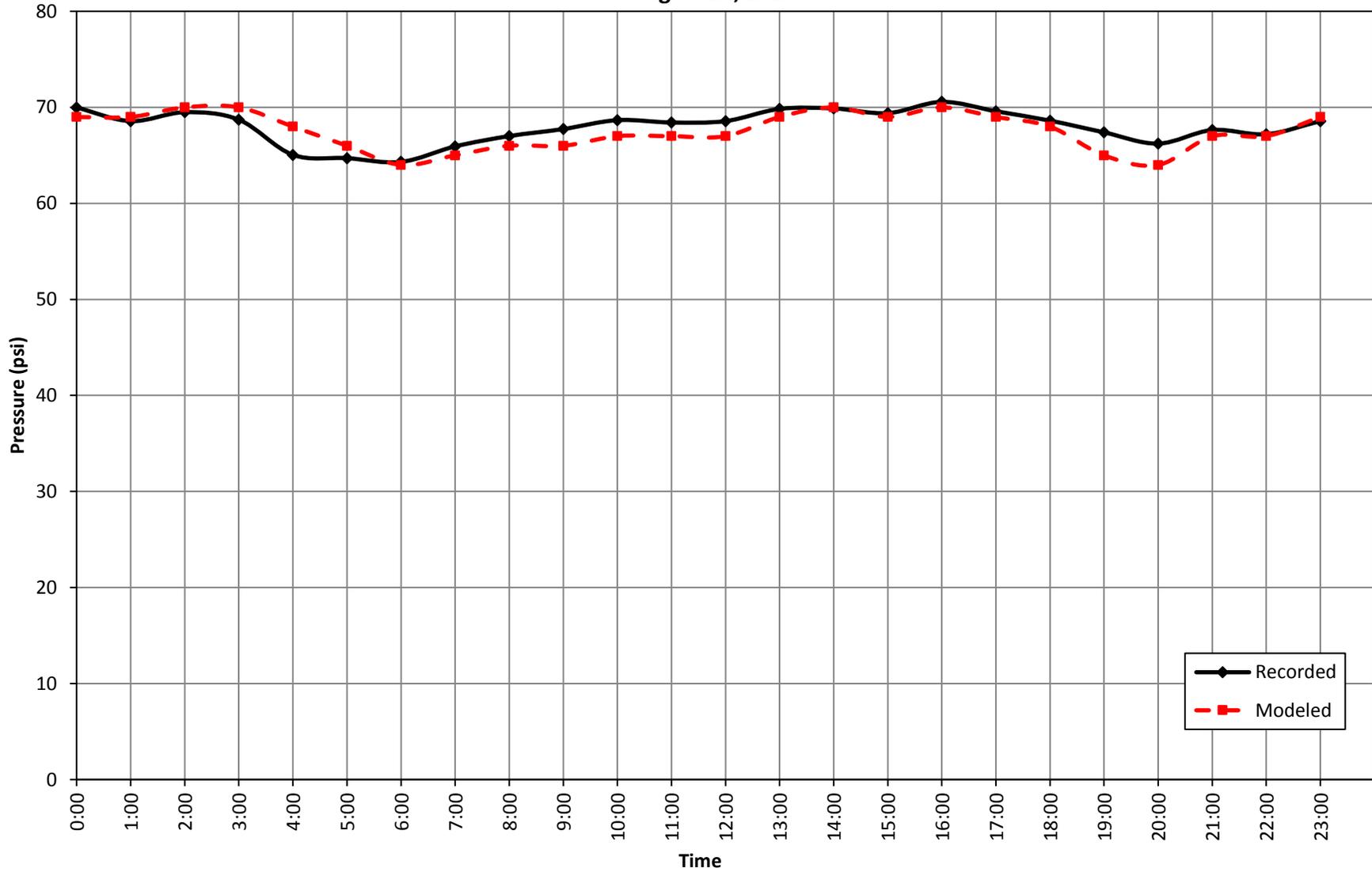


# City of Huntsville

Upper Pressure Plane

Pressure Recorder #7 - 203191 - Ground Elevation 426'

August 25, 2015

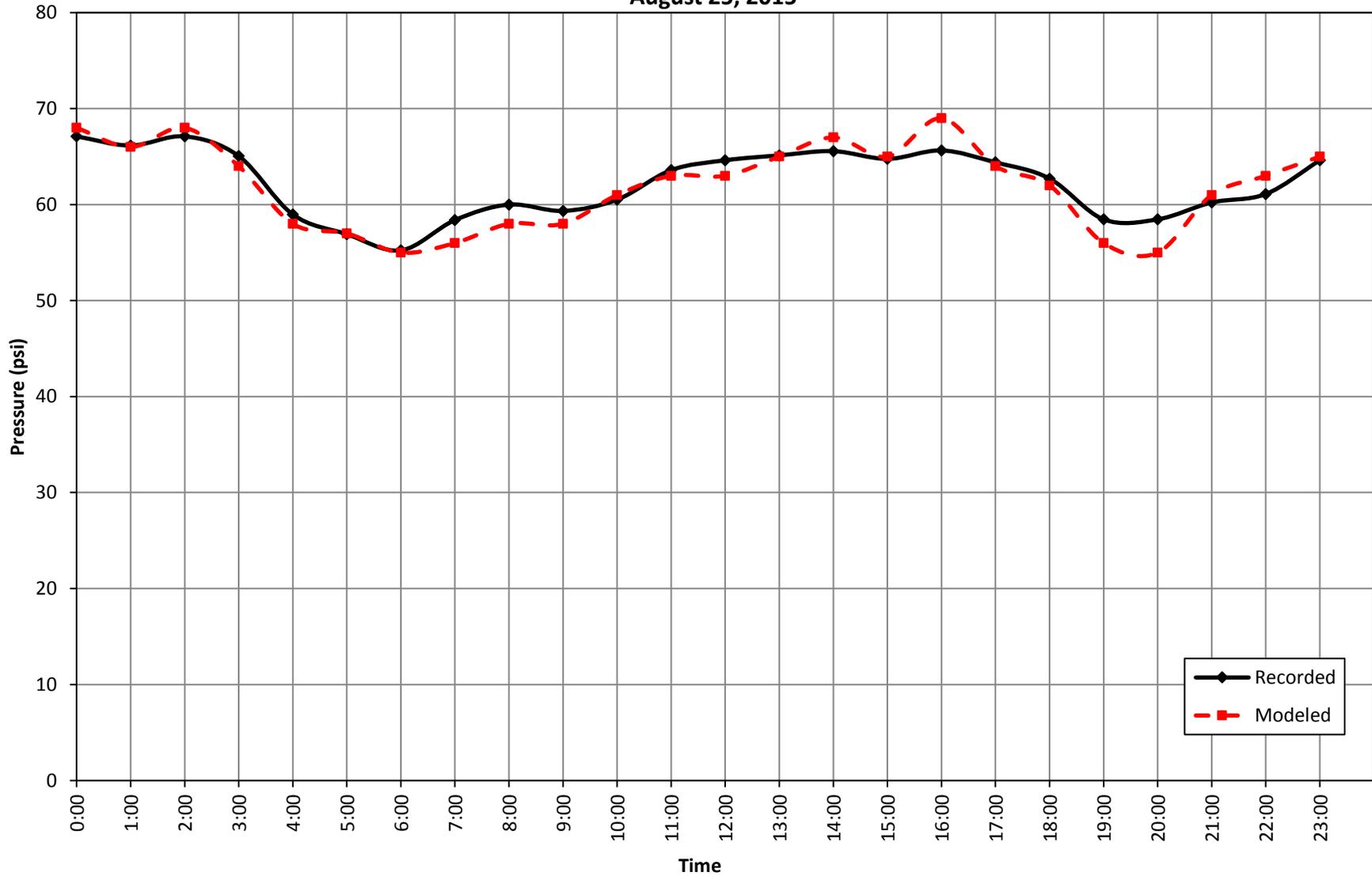


# City of Huntsville

Upper Pressure Plane

Pressure Recorder #8 - Loan - Ground Elevation 413'

August 25, 2015

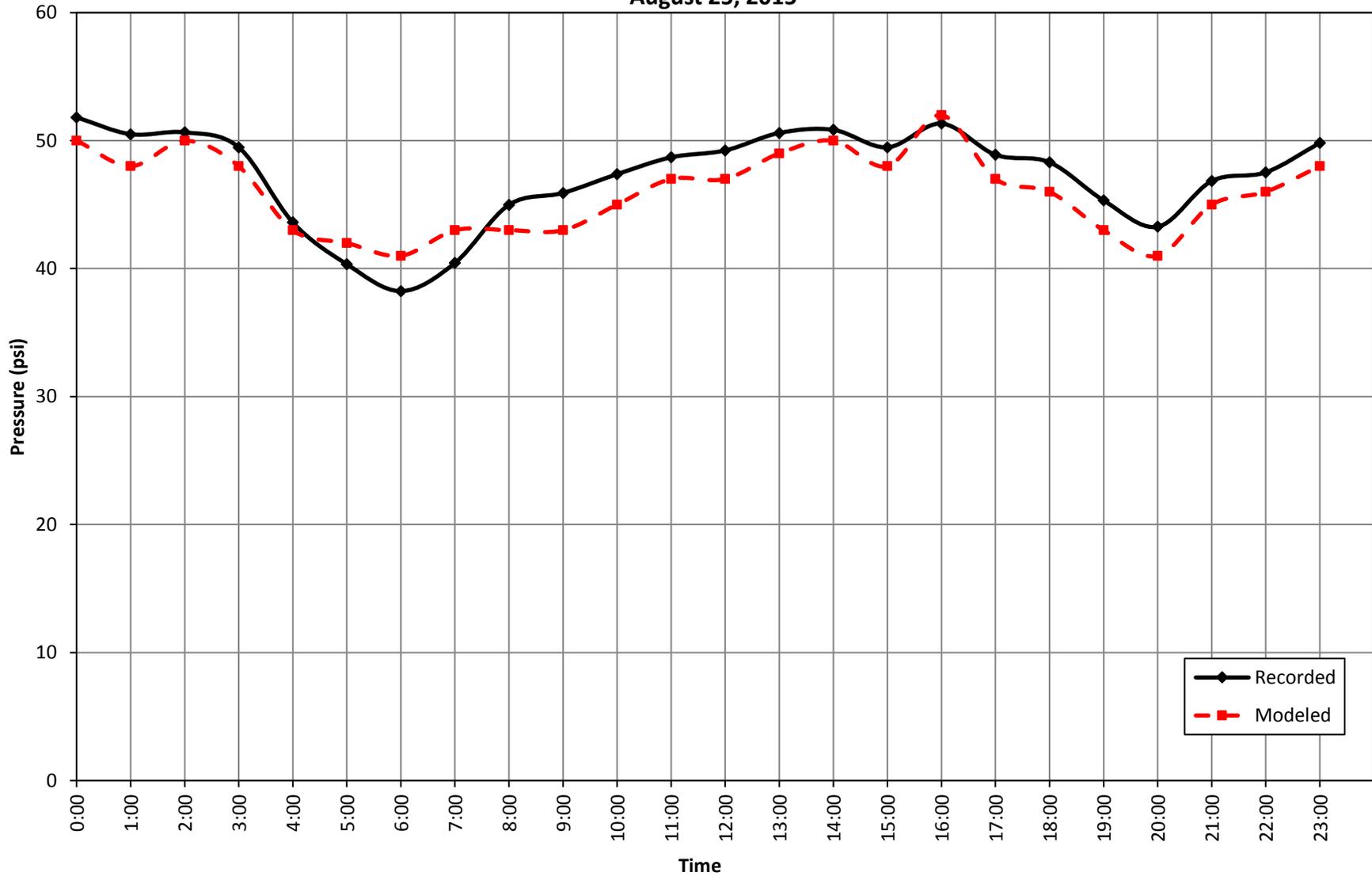


# City of Huntsville

Upper Pressure Plane

Pressure Recorder #9 - 203436 - Ground Elevation 445'

August 25, 2015

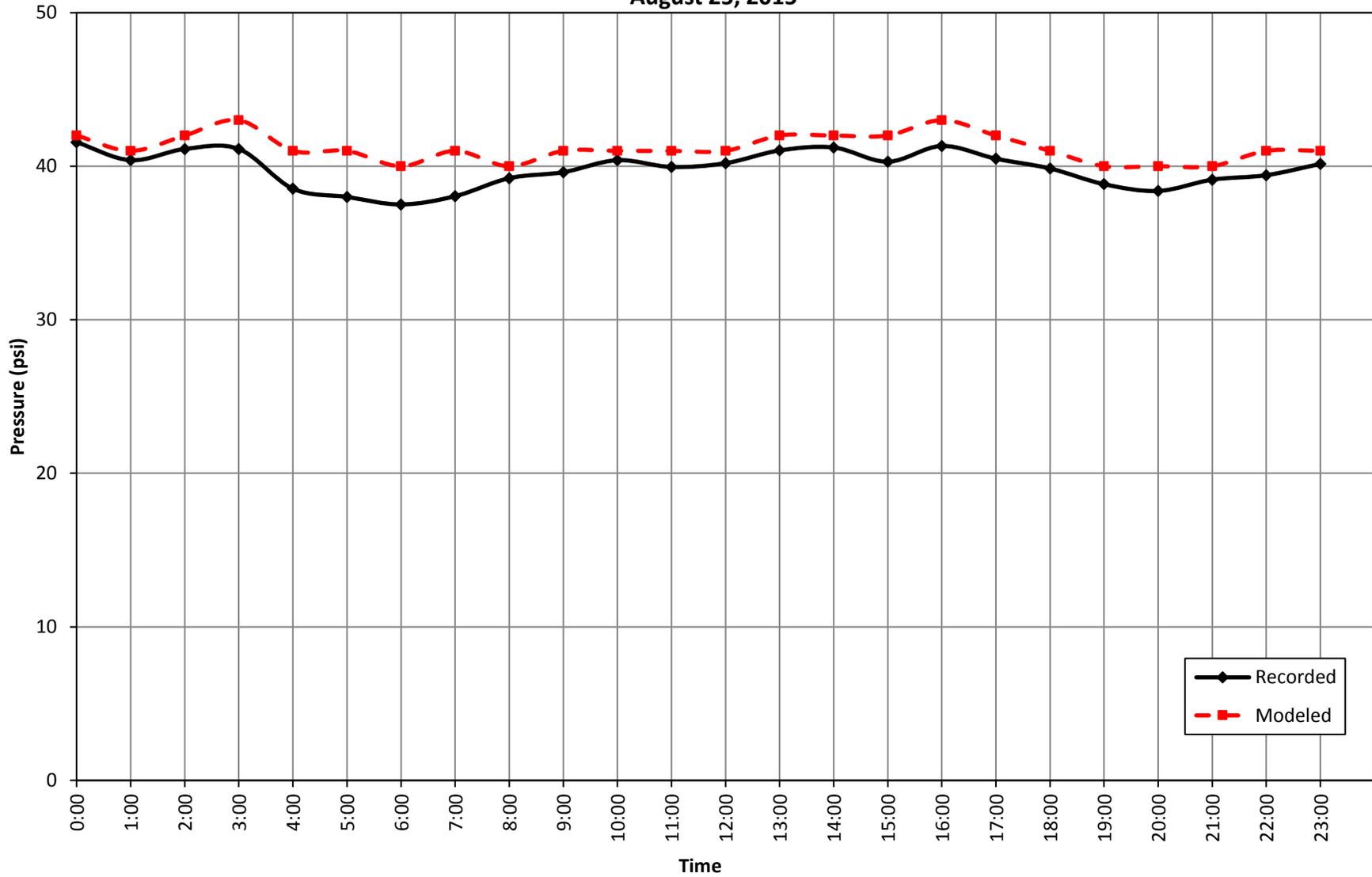


# City of Huntsville

Upper Pressure Plane

Pressure Recorder #10 - 201667 - Ground Elevation 491'

August 25, 2015

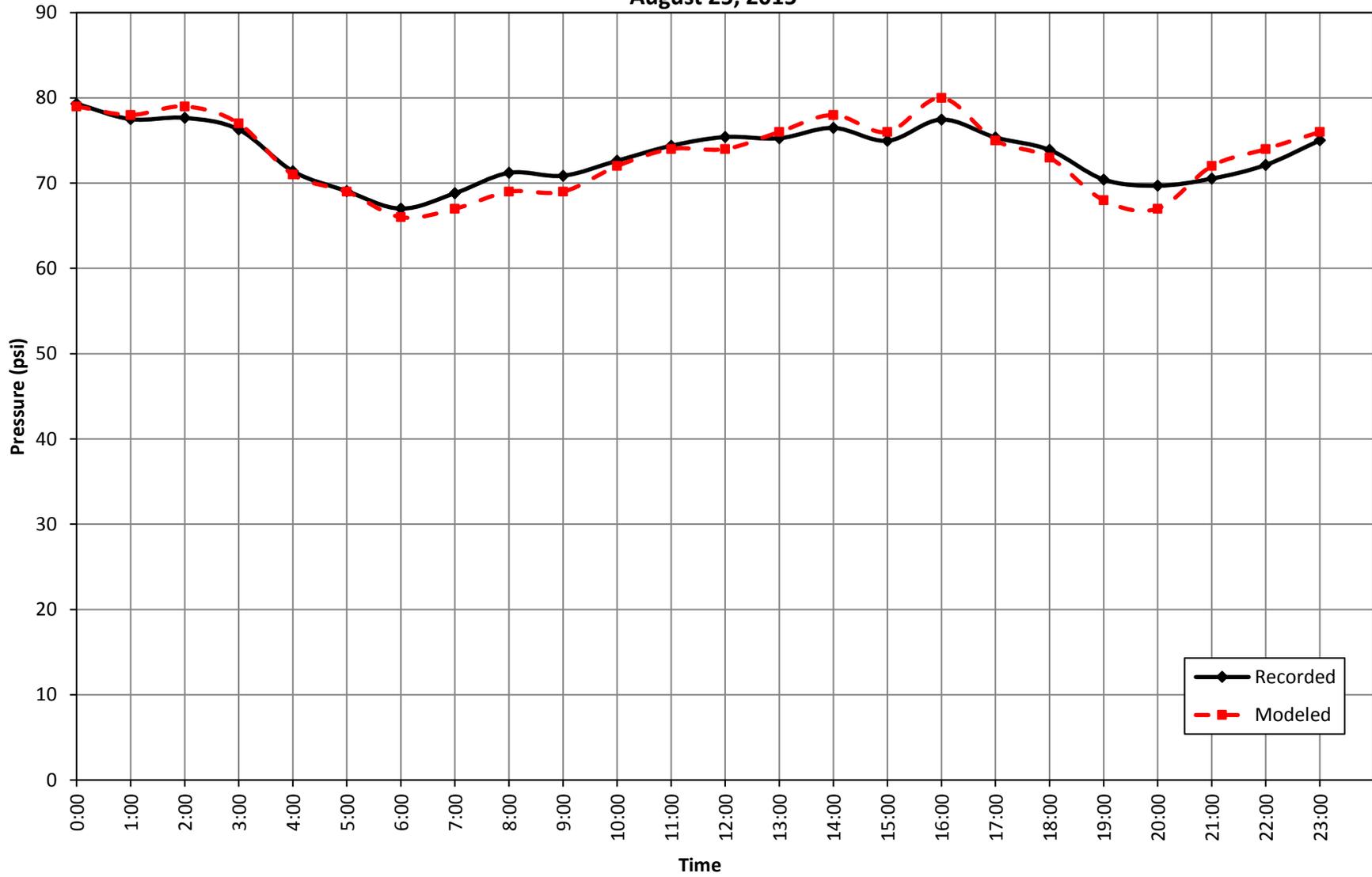


# City of Huntsville

Upper Pressure Plane

Pressure Recorder #11 - 203019 - Ground Elevation 386'

August 25, 2015

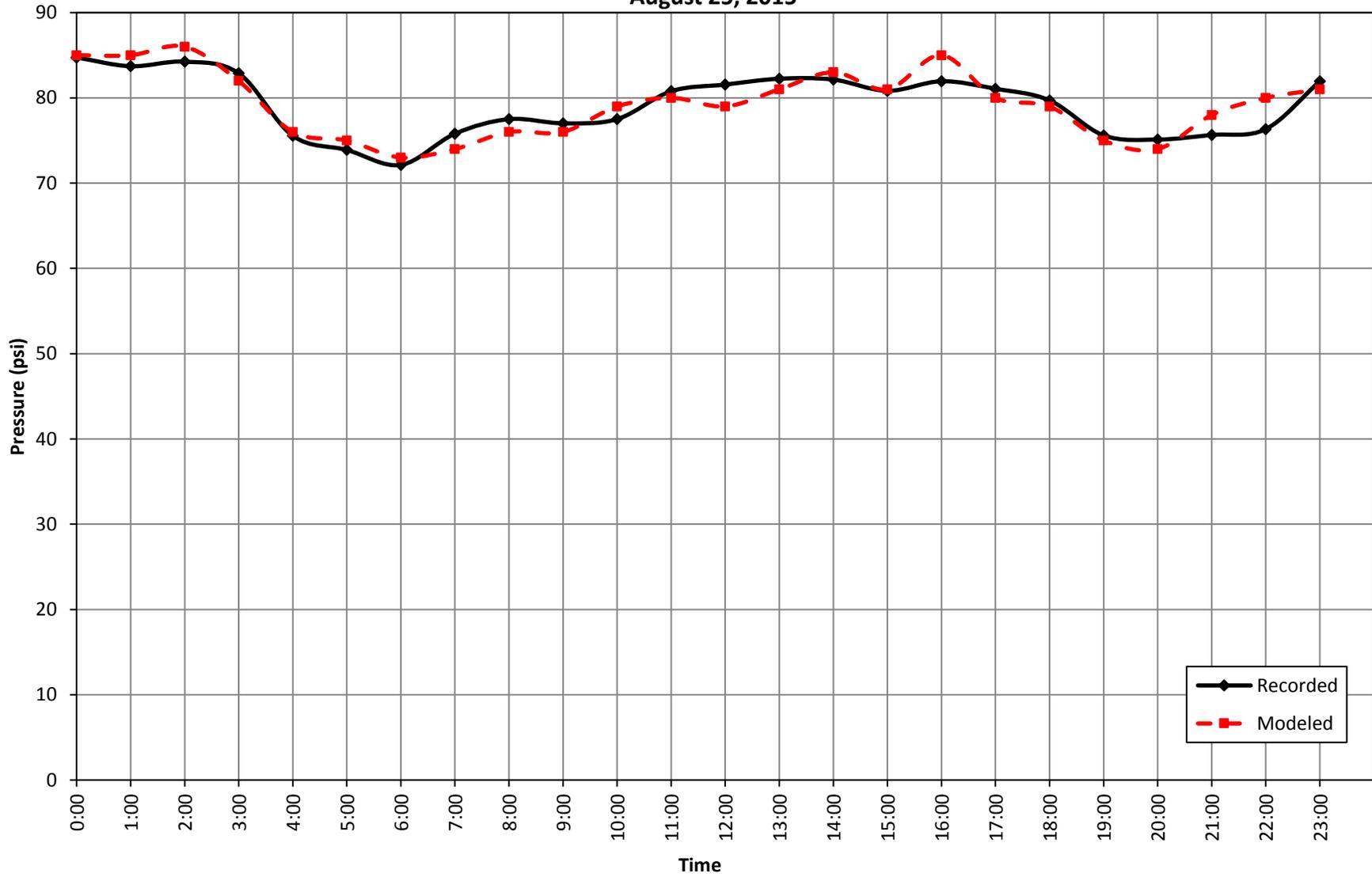


# City of Huntsville

Upper Pressure Plane

Pressure Recorder #12 - 205545 - Elevation 361'

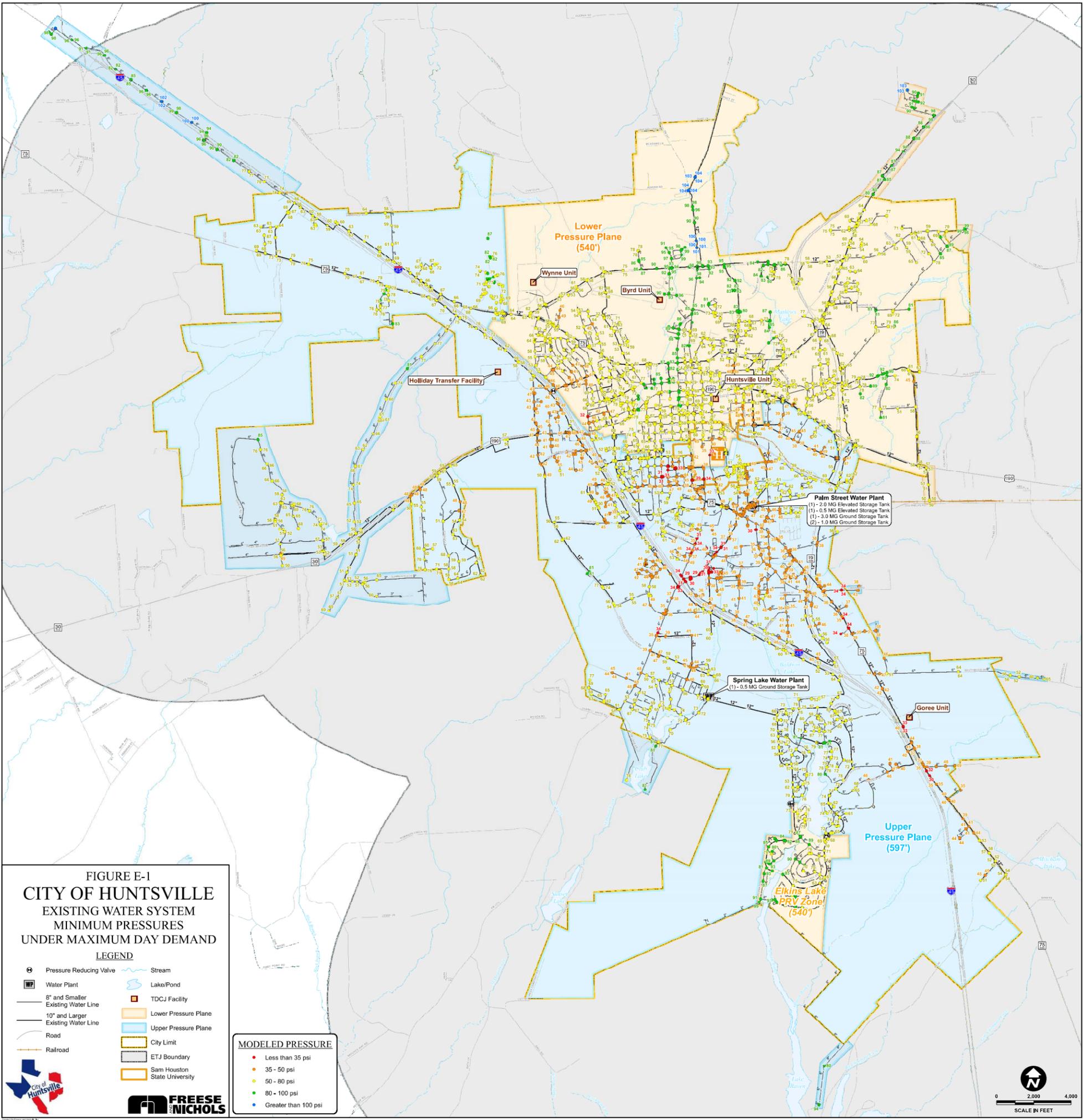
August 25, 2015



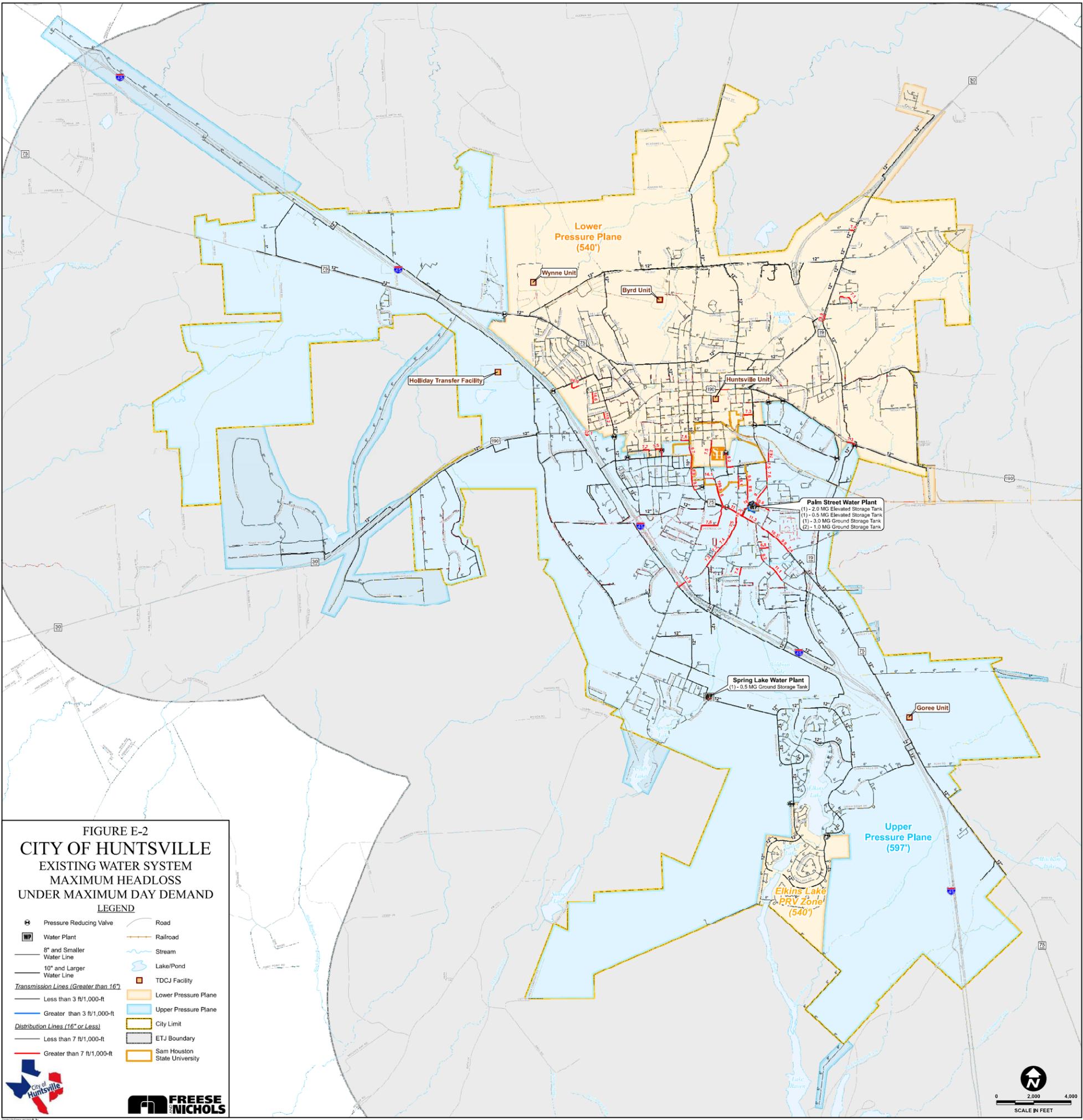


## **APPENDIX E**

### **Water System Modeling Results**



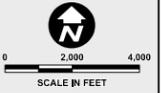
City of Huntsville, 2024. All rights reserved. This map is a technical drawing and should not be used for legal or engineering purposes without the appropriate professional seal and signature. The information is provided for informational purposes only and is not intended to constitute an offer of any financial product or service. The City of Huntsville is not responsible for any errors or omissions in this map. The City of Huntsville is not responsible for any damages or losses resulting from the use of this map. The City of Huntsville is not responsible for any claims or liabilities arising from the use of this map. The City of Huntsville is not responsible for any claims or liabilities arising from the use of this map.

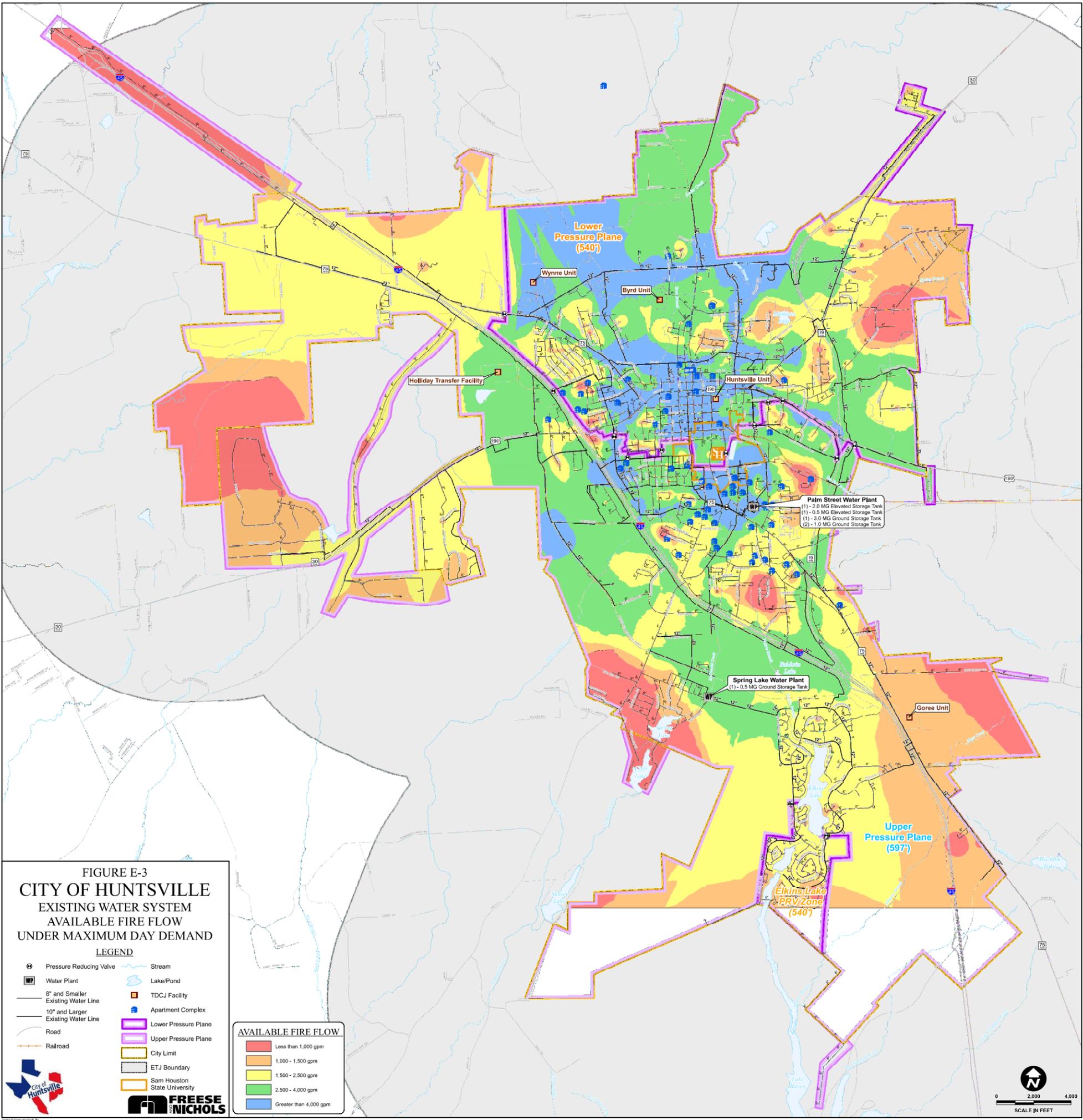


**FIGURE E-2**  
**CITY OF HUNTSVILLE**  
 EXISTING WATER SYSTEM  
 MAXIMUM HEADLOSS  
 UNDER MAXIMUM DAY DEMAND

**LEGEND**

- Pressure Reducing Valve
- Water Plant
- 8" and Smaller Water Line
- 10" and Larger Water Line
- Transmission Lines (Greater than 16")*
- Less than 3 ft/1,000-ft
- Greater than 3 ft/1,000-ft
- Distribution Lines (16" or Less)*
- Less than 7 ft/1,000-ft
- Greater than 7 ft/1,000-ft
- Road
- Railroad
- Stream
- Lake/Pond
- TDCJ Facility
- Lower Pressure Plane
- Upper Pressure Plane
- City Limit
- ETJ Boundary
- Sam Houston State University



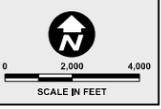


**FIGURE E-3**  
**CITY OF HUNTSTVILLE**  
**EXISTING WATER SYSTEM**  
**AVAILABLE FIRE FLOW**  
**UNDER MAXIMUM DAY DEMAND**

**LEGEND**

- Pressure Reducing Valve
- Water Plant
- 8" and Smaller Existing Water Line
- 10" and Larger Existing Water Line
- Road
- Railroad
- Stream
- Lake/Pond
- TDCJ Facility
- Apartment Complex
- Lower Pressure Plane
- Upper Pressure Plane
- City Limit
- ETJ Boundary
- Sam Houston State University

AVAILABLE FIRE FLOW	
	Less than 1,000 gpm
	1,000 - 1,500 gpm
	1,500 - 2,500 gpm
	2,500 - 4,000 gpm
	Greater than 4,000 gpm



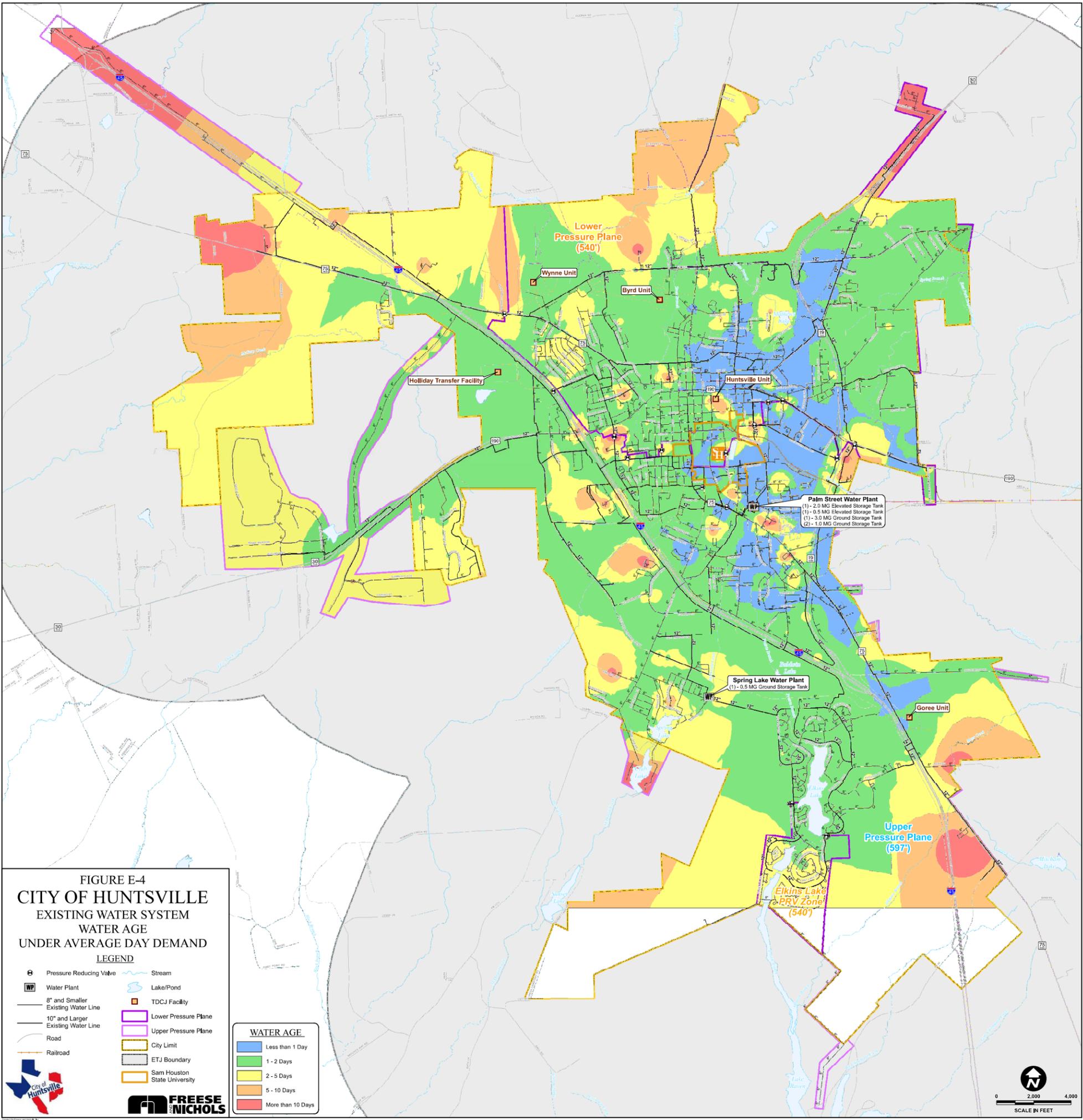


FIGURE E-4  
**CITY OF HUNTSVILLE**  
 EXISTING WATER SYSTEM  
 WATER AGE  
 UNDER AVERAGE DAY DEMAND

**LEGEND**

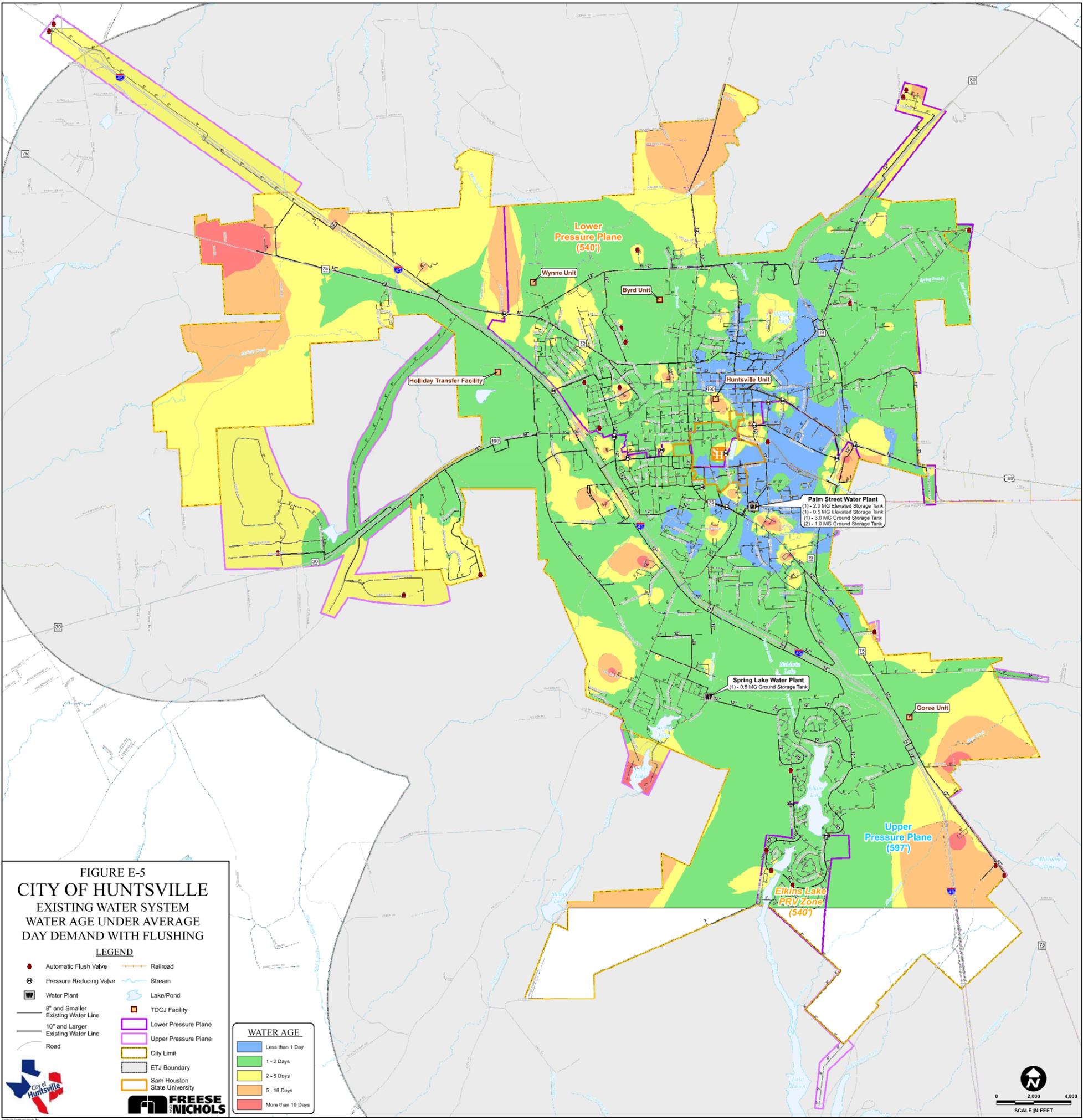
	Pressure Reducing Valve		Stream
	Water Plant		Lake/Pond
	8\" and Smaller Existing Water Line		TDCJ Facility
	10\" and Larger Existing Water Line		Lower Pressure Plane
	Road		Upper Pressure Plane
	Railroad		City Limit
			ETJ Boundary
			Sam Houston State University

**WATER AGE**

	Less than 1 Day
	1 - 2 Days
	2 - 5 Days
	5 - 10 Days
	More than 10 Days

SCALE IN FEET

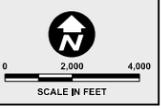


**FIGURE E-5**  
**CITY OF HUNTSVILLE**  
 EXISTING WATER SYSTEM  
 WATER AGE UNDER AVERAGE  
 DAY DEMAND WITH FLUSHING

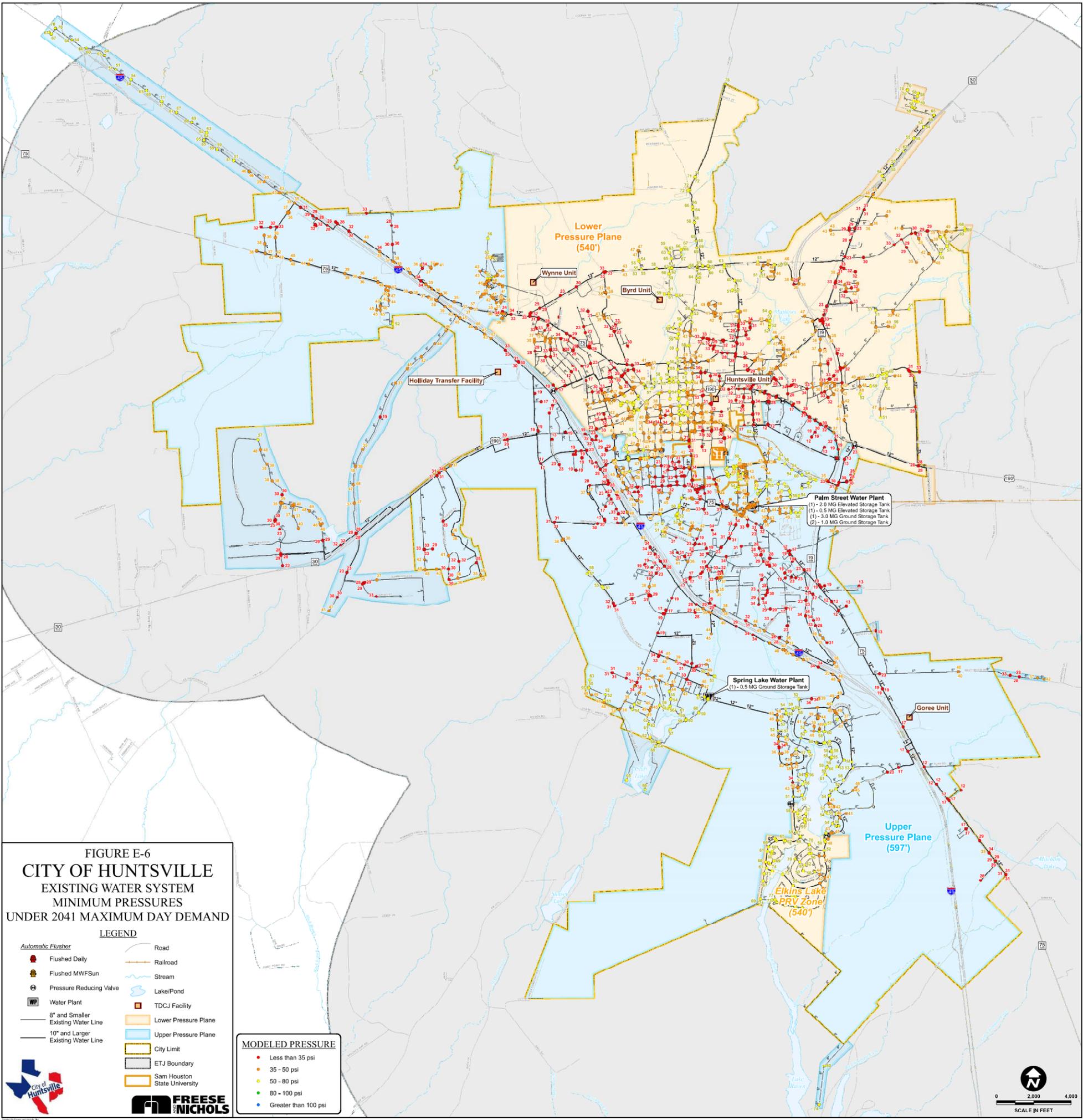
**LEGEND**

- Automatic Flush Valve
- ⊕ Pressure Reducing Valve
- WP Water Plant
- 8" and Smaller Existing Water Line
- 10" and Larger Existing Water Line
- Road
- Railroad
- Stream
- Lake/Pond
- TDCJ Facility
- Lower Pressure Plane
- Upper Pressure Plane
- City Limit
- ETJ Boundary
- Sam Houston State University

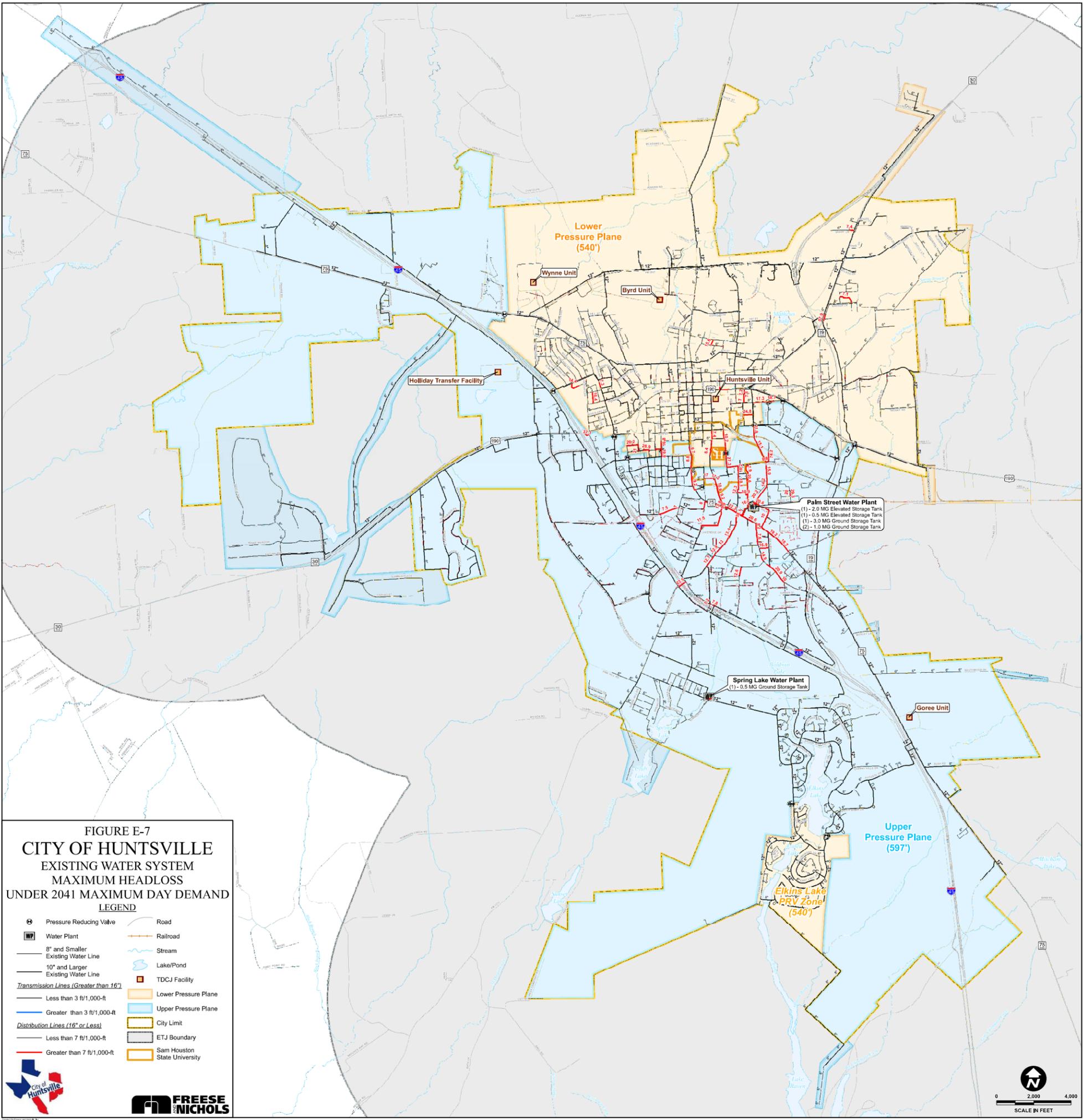
WATER AGE	
	Less than 1 Day
	1 - 2 Days
	2 - 5 Days
	5 - 10 Days
	More than 10 Days



DATE: 08/11/2014 10:58:11 AM  
 PROJECT: HUNTSVILLE WATER SYSTEM  
 DRAWING: WATER AGE UNDER AVERAGE DAY DEMAND WITH FLUSHING  
 SHEET: 1 OF 1



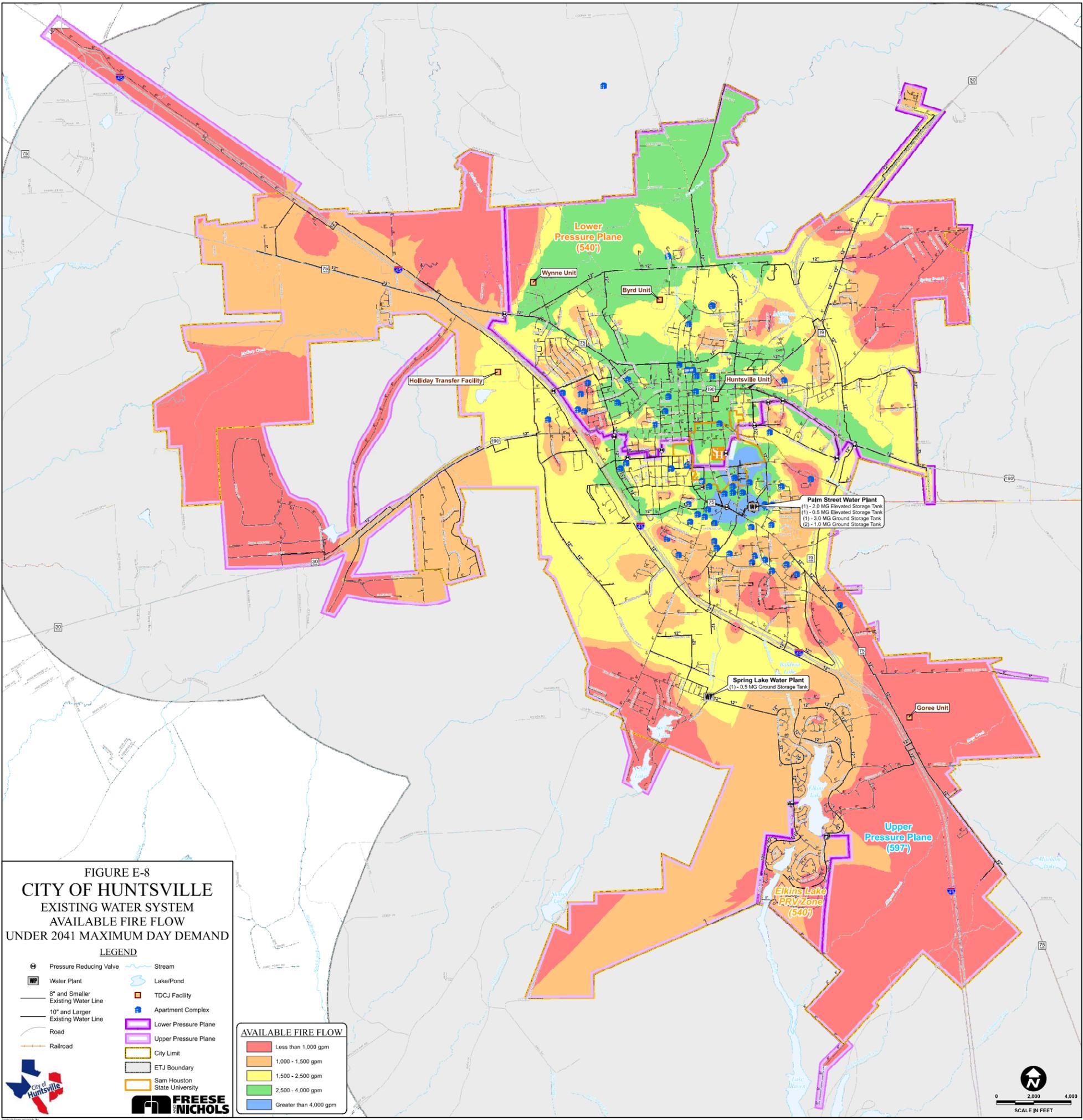
City of Huntsville, Texas  
 10/15/2024  
 10/15/2024  
 10/15/2024



**FIGURE E-7**  
**CITY OF HUNTSVILLE**  
 EXISTING WATER SYSTEM  
 MAXIMUM HEADLOSS  
 UNDER 2041 MAXIMUM DAY DEMAND

**LEGEND**

	Pressure Reducing Valve		Road
	Water Plant		Railroad
	8" and Smaller Existing Water Line		Stream
	10" and Larger Existing Water Line		Lake/Pond
	Transmission Lines (Greater than 16")		TDCJ Facility
	Less than 3 ft/1,000-ft		Lower Pressure Plane
	Greater than 3 ft/1,000-ft		Upper Pressure Plane
	Distribution Lines (16" or Less)		City Limit
	Less than 7 ft/1,000-ft		ETJ Boundary
	Greater than 7 ft/1,000-ft		Sam Houston State University



**FIGURE E-8**  
**CITY OF HUNTSVILLE**  
**EXISTING WATER SYSTEM**  
**AVAILABLE FIRE FLOW**  
**UNDER 2041 MAXIMUM DAY DEMAND**

**LEGEND**

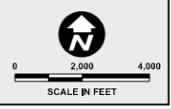
	Pressure Reducing Valve		Stream
	Water Plant		Lake/Pond
	8" and Smaller Existing Water Line		TDCJ Facility
	10" and Larger Existing Water Line		Apartment Complex
	Road		Lower Pressure Plane
	Railroad		Upper Pressure Plane
			City Limit
			ETJ Boundary
			Sam Houston State University

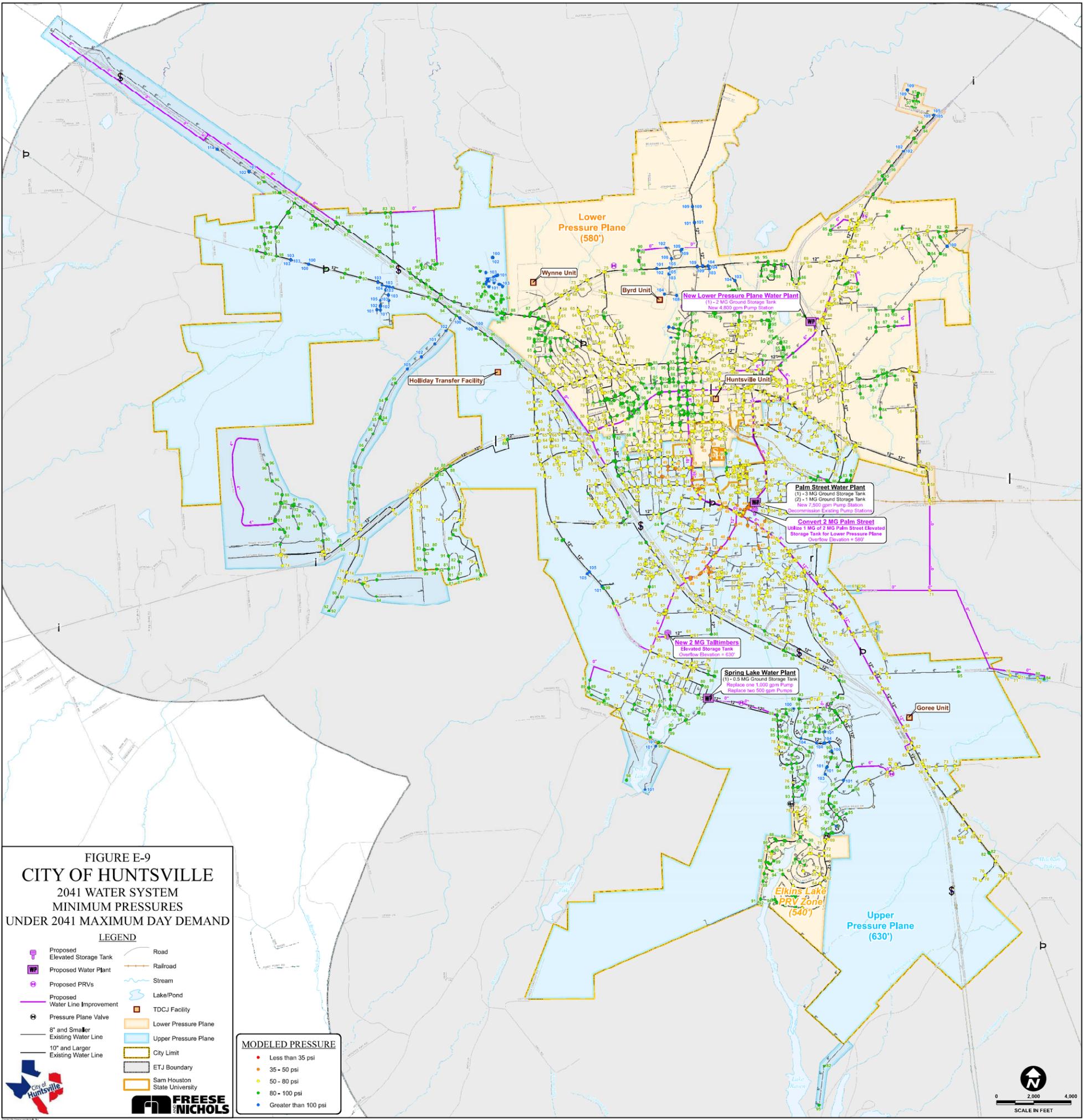
**AVAILABLE FIRE FLOW**

	Less than 1,000 gpm
	1,000 - 1,500 gpm
	1,500 - 2,500 gpm
	2,500 - 4,000 gpm
	Greater than 4,000 gpm

**City of Huntsville**

**FREESSE & NICHOLS**





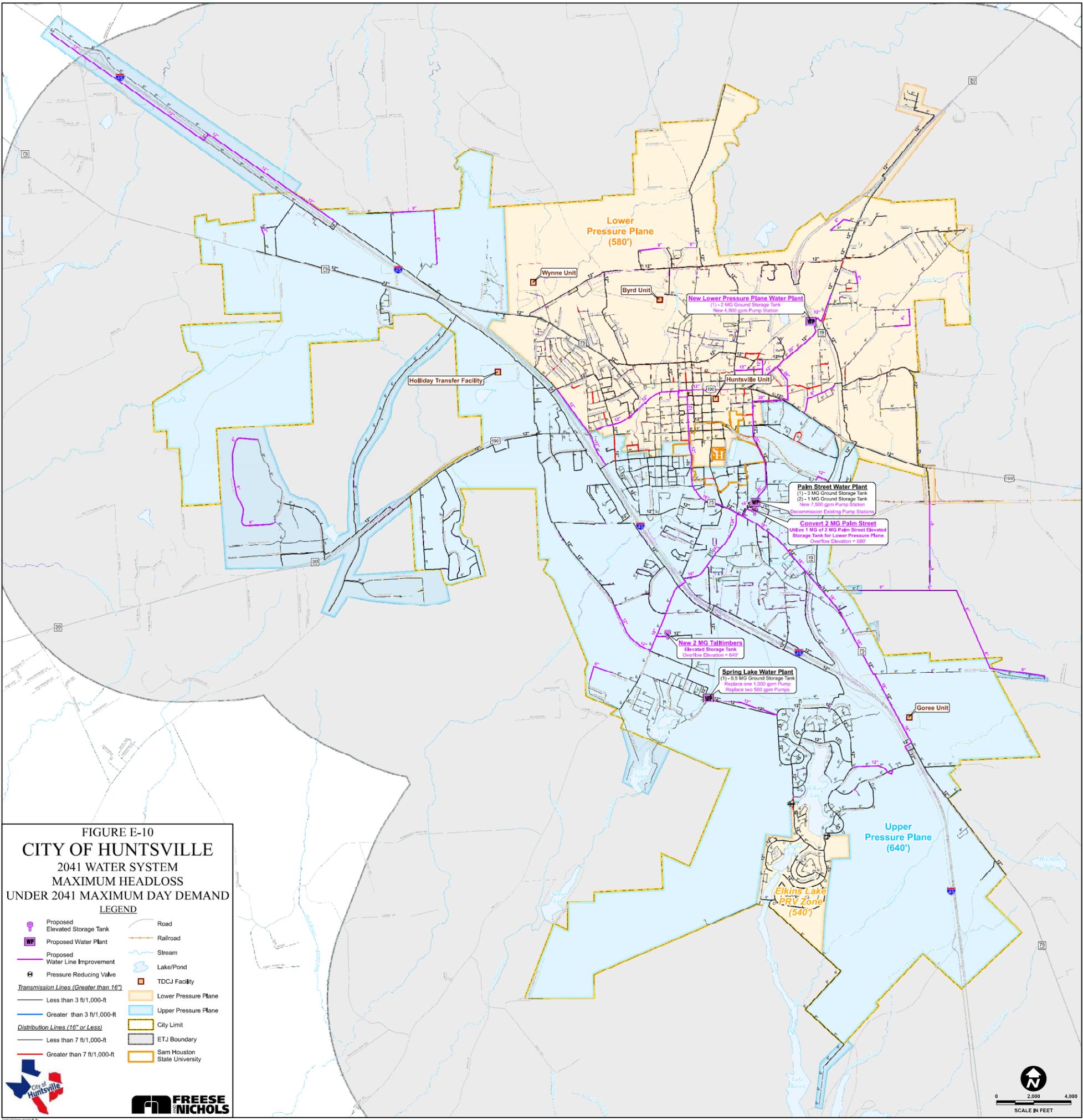
**FIGURE E-9**  
**CITY OF HUNTSVILLE**  
 2041 WATER SYSTEM  
 MINIMUM PRESSURES  
 UNDER 2041 MAXIMUM DAY DEMAND

**LEGEND**

- Proposed Elevated Storage Tank
- Proposed Water Plant
- Proposed PRVs
- Proposed Water Line Improvement
- Pressure Plane Valve
- 8" and Smaller Existing Water Line
- 10" and Larger Existing Water Line
- Road
- Railroad
- Stream
- Lake/Pond
- TDCJ Facility
- Lower Pressure Plane
- Upper Pressure Plane
- City Limit
- ETJ Boundary
- Sam Houston State University

**MODELED PRESSURE**

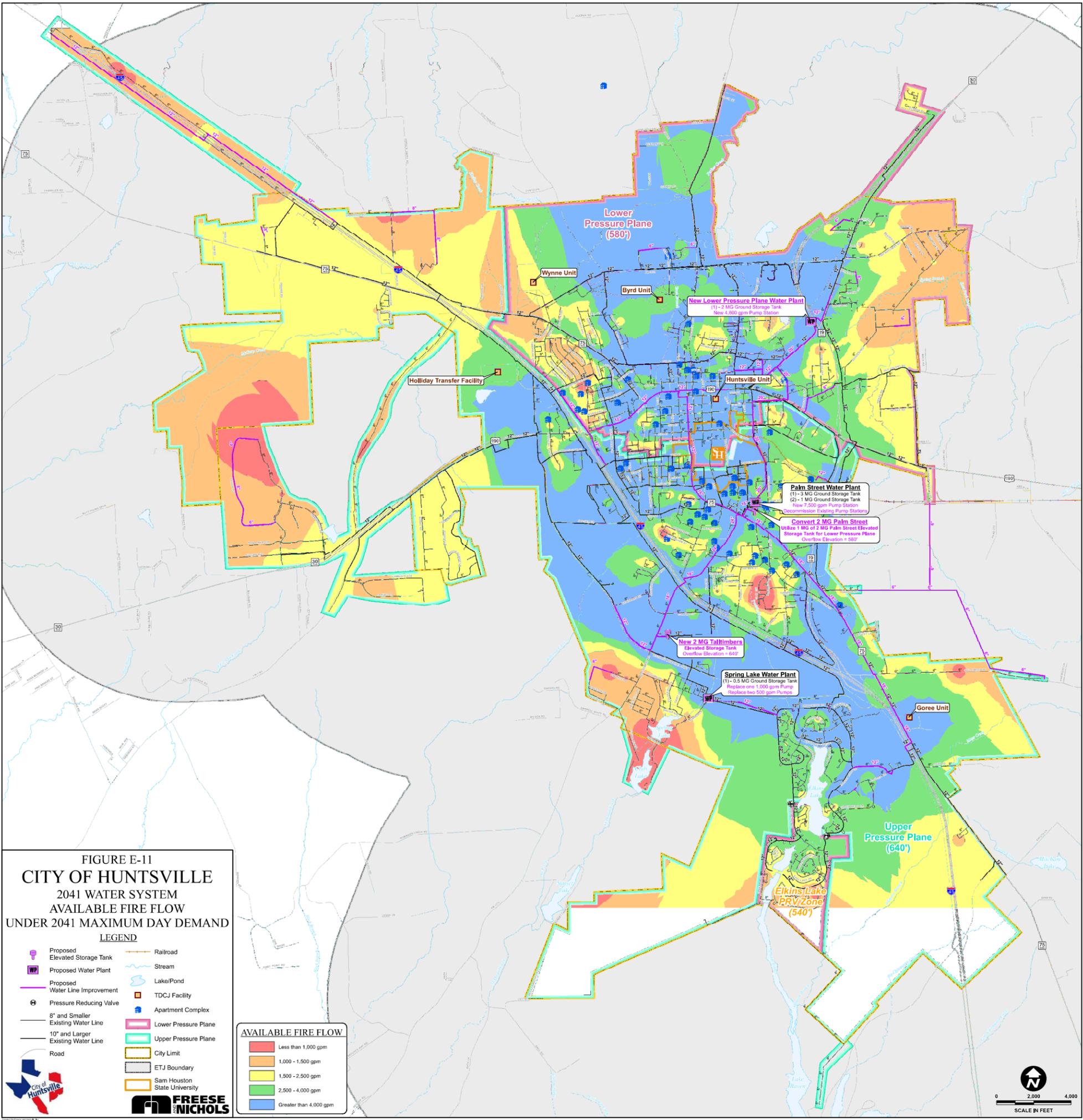
- Less than 35 psi
- 35 - 50 psi
- 50 - 80 psi
- 80 - 100 psi
- Greater than 100 psi



**FIGURE E-10**  
**CITY OF HUNTSVILLE**  
**2041 WATER SYSTEM**  
**MAXIMUM HEADLOSS**  
**UNDER 2041 MAXIMUM DAY DEMAND**

**LEGEND**

	Proposed Elevated Storage Tank		Road
	Proposed Water Plant		Railroad
	Proposed Water Line Improvement		Stream
	Pressure Reducing Valve		Lake/Pond
	Transmission Lines (Greater than 16")		TDCJ Facility
	Less than 3 ft/1,000-ft		Lower Pressure Plane
	Greater than 3 ft/1,000-ft		Upper Pressure Plane
	Distribution Lines (16" or Less)		City Limit
	Less than 7 ft/1,000-ft		ETJ Boundary
	Greater than 7 ft/1,000-ft		Sam Houston State University



**FIGURE E-11**  
**CITY OF HUNTSVILLE**  
**2041 WATER SYSTEM**  
**AVAILABLE FIRE FLOW**  
**UNDER 2041 MAXIMUM DAY DEMAND**

**LEGEND**

- Proposed Elevated Storage Tank
- Proposed Water Plant
- Proposed Water Line Improvement
- Pressure Reducing Valve
- 
- 
- Road
- Railroad
- Stream
- Lake/Pond
- TDCJ Facility
- Apartment Complex
- Lower Pressure Plane
- Upper Pressure Plane
- City Limit
- ETJ Boundary
- Sam Houston State University

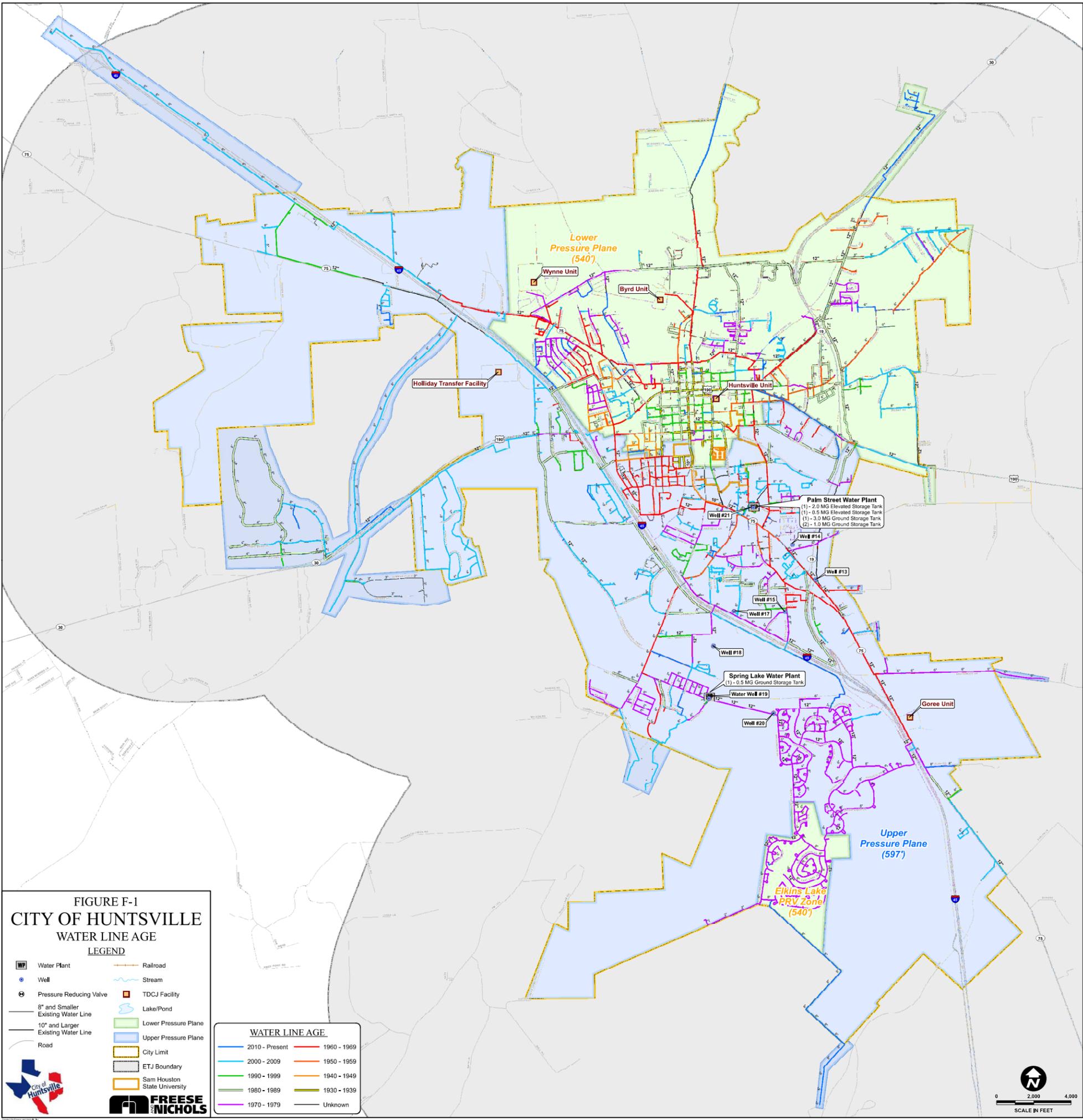
**AVAILABLE FIRE FLOW**

- Less than 1,000 gpm
- 1,000 - 1,500 gpm
- 1,500 - 2,500 gpm
- 2,500 - 4,000 gpm
- Greater than 4,000 gpm

0 2,000 4,000  
 SCALE IN FEET



**APPENDIX F**  
**Water Line RBA Mapping**

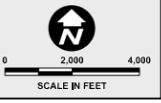


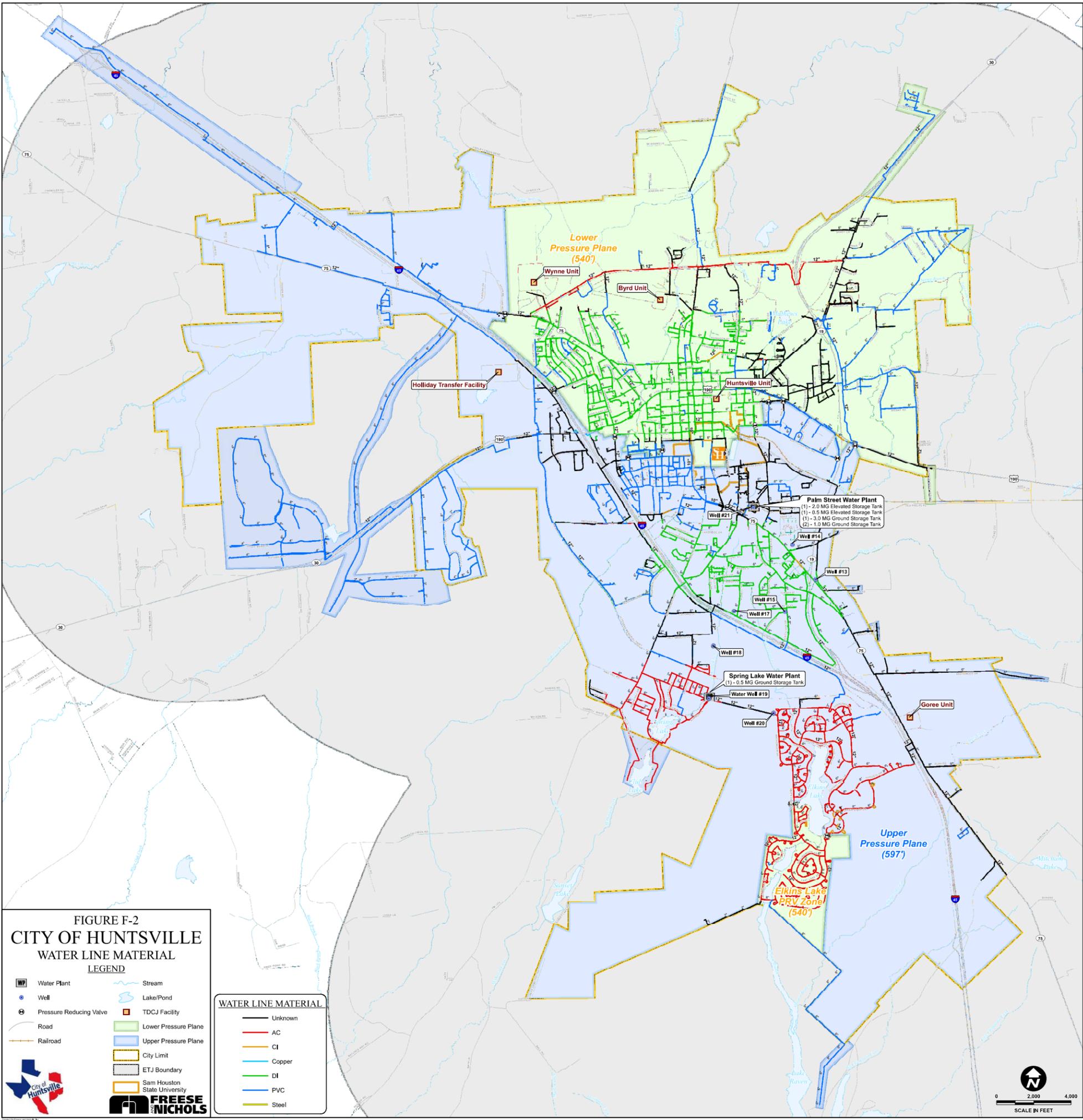
**FIGURE F-1  
CITY OF HUNTSVILLE  
WATER LINE AGE**

**LEGEND**

- Water Plant
- Well
- Pressure Reducing Valve
- 8" and Smaller Existing Water Line
- 10" and Larger Existing Water Line
- Road
- Railroad
- Stream
- TDCJ Facility
- Lake/Pond
- Lower Pressure Plane
- Upper Pressure Plane
- City Limit
- ETJ Boundary
- Sam Houston State University

WATER LINE AGE	
2010 - Present	1960 - 1969
2000 - 2009	1950 - 1959
1990 - 1999	1940 - 1949
1980 - 1989	1930 - 1939
1970 - 1979	Unknown

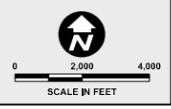


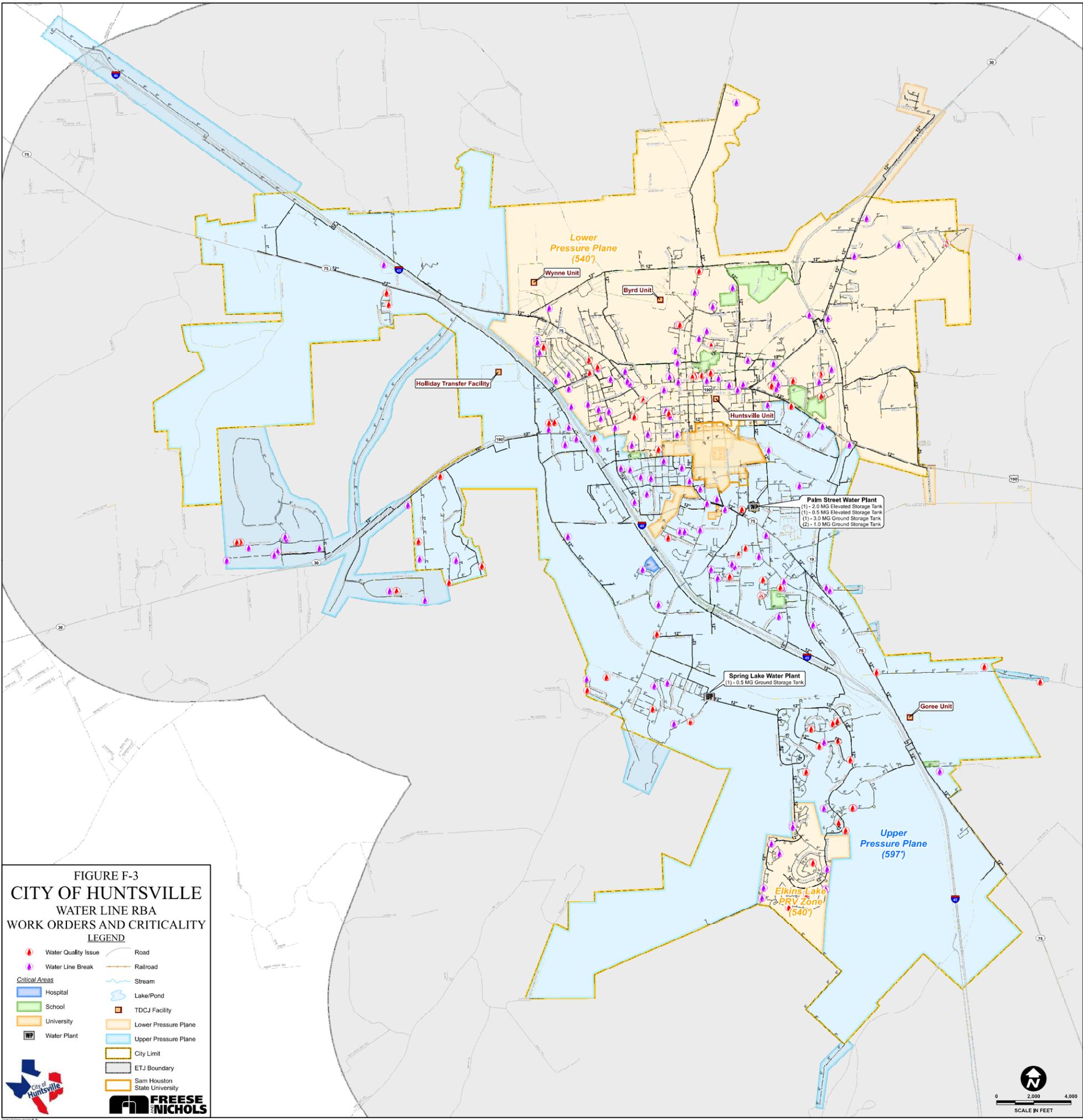


**FIGURE F-2**  
**CITY OF HUNTSVILLE**  
**WATER LINE MATERIAL**  
**LEGEND**

- |                              |                       |
|------------------------------|-----------------------|
| Water Plant                  | Stream                |
| Well                         | Lake/Pond             |
| Pressure Reducing Valve      | TDCJ Facility         |
| Road                         | Lower Pressure Plane  |
| Railroad                     | Upper Pressure Plane  |
| City Limit                   | ETJ Boundary          |
| Sam Houston State University | <b>FREESE NICHOLS</b> |

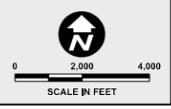
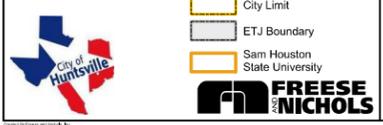
- WATER LINE MATERIAL**
- Unknown
  - AC
  - CI
  - Copper
  - DI
  - PVC
  - Steel





**FIGURE F-3**  
**CITY OF HUNTSVILLE**  
**WATER LINE RBA**  
**WORK ORDERS AND CRITICALITY**  
**LEGEND**

- Water Quality Issue
- Water Line Break
- Critical Areas**
- Hospital
- School
- University
- Water Plant
- Road
- Railroad
- Stream
- Lake/Pond
- TDCJ Facility
- Lower Pressure Plane
- Upper Pressure Plane
- City Limit
- ETJ Boundary
- Sam Houston State University





**APPENDIX G**  
**Lift Station Inventory**

## City of Huntsville

### Water and Wastewater System Condition and Capacity Studies

#### Lift Station Inventory

	Lift Station	Location	Firm Capacity (MGD)	Force Main Diameter (in)	Incoming Line Size (in)	Invert Depth From Slab (ft)	Wet Well Depth (ft)	Wet Well Diameter (ft)	No. of Pumps	Pump #	Pump Manf.	Pump Model No.	Pump Serial No.	Impeller Designation	Pump Power (hp)
A. J. Brown WWTP	Bearkat Blvd	219 Bearkat Blvd	0.63	6	8	13.25	22	6	2	1	Gorman-Rupp	T6A3-B	1509449		25
										2	Gorman-Rupp				25
	Highway 190	623 SH 190	0.29	3	12	8	12	5	2	1					7.5
										2					7.5
	Mallery Lake	414 SH 19	0.35	4	8	11.5	20	5	2	1	Gorman-Rupp	T4A3 - B	946348	STD	5
										2	Gorman-Rupp				5
	Simmons	3021 Simmons St		4	8	11.5	15	5	2	1					15
										2					15
	Tanyard Creek	1489 Fish Hatchery Rd	2.59	10	15	16	30	8	2	1					65
										2					65
N. B. Davidson WWTP	Bayes	260 Rush Rd	0.89	8	12	5.7	14	10	2	1	KSB				
										2	KSB				
	Brook Hollow	214 Brook Hollow Dr	1.08	12	18	10	12	6	2	1	Gorman-Rupp	T8A35-3	1357652	STD	50
										2	Gorman-Rupp				50
	Elkins Lake #1	806A Overbrook Dr		4	12	7	9	6	2	1					
										2					
	Elkins Lake #2	833A Overbrook Dr		6	8	15	18	6	2	1	KSB				15
										2	KSB				15
	Elkins Lake #3	1440 River Oaks Dr	0.86	6	10	9.8	12	6	2	1	Hydromatic				
										2	Hydromatic				
	Elkins Lake Dam	1861 Camelia Dr	1.43	18	30	11	15	24 x 9	2	1	Gorman-Rupp	T8A3-3	1073622	STD	75
										2	Gorman-Rupp	T3A35 - B / WW	1304468	STD	75
	Elkins Lake Equestrian Center	1933 Greentree Dr	0.22	4	8 / 4	14 / 2.7	18	5	2	1					5
										2					5
Elkins Lake Post Office	642 Cherry Hills Dr	1.22	12	21	19.25	21	8	2	1						
									2						
Huntsville State Park	142 State Park Maintenance Rd		4	8	4.5	11	6	2	1						
									2						
McCoy's	202A Graham Rd		4	8	5.3	9	5	2	1	Gorman-Rupp					
									2	Gorman-Rupp					
Park Road	7757 SH 75 S		6	12	7.3	15	10	2	1					36	
									2					36	
Southwood Drive	149 Southwood Dr	0.36	3	10	5.3	12	6	2	1		T3A35 - B/F	1410547	STD	10	
									2					10	
Sterlingbrook	5060 Sam Houston Ave	0.34	4	8	13	18	6	2	1	Gorman-Rupp	T3A35 - B / WW	1300251	STD	3	
									2	Gorman-Rupp				3	
Waters Edge	294 Brook Hollow Dr	1.21	8	18	10.5	15	20 x 8	2	1	KSB					
									2	KSB					
Robinson Creek WWTP	Airport	186 Kevin Williams Rd	0.09	4	8	6.2	10.5	5	2	1	Gorman-Rupp	T3A3 - B1	15881661	STD	15
										2	Gorman-Rupp	T3A3 - B1	15881662	STD	15
	Hitchin' Post	536 IH 45 N	0.15	6	8	9.5	16	7	2	1	Gorman-Rupp	T3A35-B	1399218	STD	7.5
										2	Gorman-Rupp	T3A35-B	1399218	STD	7.5
	McDonald Creek	259 W. Sunset Dr	1.44	12	18	15	25	8	2	1	ABS				
										2	ABS				
	McGary Creek	1009 SH 75 N	2.95	14	18	13.7	25	8	2	1	Flygt	CP3300 / 675		390 mm	160
										2	Flygt	CP3300 / 675		390 mm	160
Transfer Station	590B IH 45 N		2	10	3.5		3	2	1	Hydromatic					
									2	Hydromatic					
TXDOT #1	1576 IH 45 N		4	6 / 6	9 / 10	14	6	2	1	ABS	PE125/2			9.4	
									2	ABS	PE125/2			9.4	
TXDOT #2	1270 IH 45 N		4	6	5	14	6	2	1	ABS	PE125/2			16.7	
									2	ABS	PE125/2			16.7	

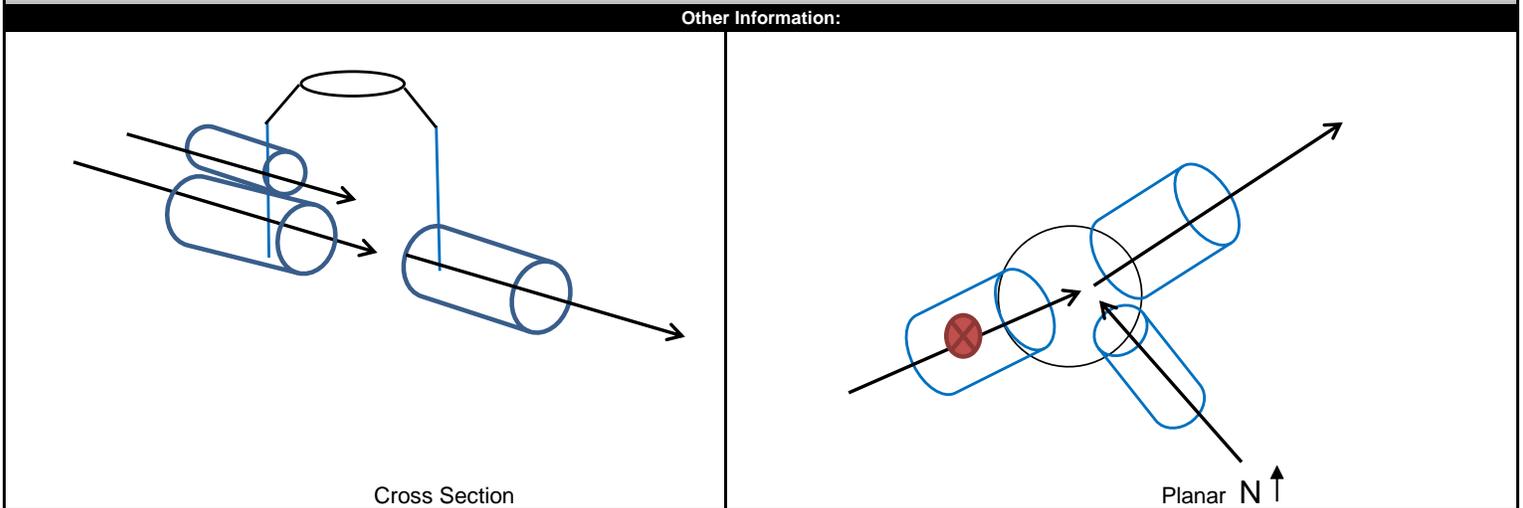


**APPENDIX H**  
**Wastewater Flow Monitor and Rain Gauge Site Installation Reports**

Project Name: Huntsville		City/State: Huntsville, TX		FM Initials: DM	
Site Name: AJ-08		Monitor Series: Triton		Monitor S/N#:	
Address / Location: NorthWest of Jct. HWY 19 and HWY 30				Manhole #:	
Access: walk				Map Page #:	
Type of System:		Sanitary <input checked="" type="checkbox"/>	Storm <input type="checkbox"/>	Combined <input type="checkbox"/>	Pipe Height: 30"
					Pipe Width: 30"
					Phone Number:



Manhole Information:					
Date/Time of Investigation:	4/23/15 9:00PM		Manhole Depth:	12 Feet	
Site Hydraulics:	Good hydraulics		Manhole Material / Condition:	Concrete	
Upstream Input: (L/S, P/S)	DNI		Pipe Material / Condition:	Concrete Fair	
Upstream Manhole:	DNI		Mini System Character:	Residential <input checked="" type="checkbox"/>	Commercial <input checked="" type="checkbox"/>
Downstream Manhole:	Jct. MH		Industrial	<input type="checkbox"/>	
			Other	<input type="checkbox"/>	
			<b>Telephone Information:</b> N/A		
Depth of Flow (Wet Dof):	11"	+/-	Access Pole #:	N/A	
Range (Air Dof):		+/-	Distance From Manhole:	N/A Feet	
Peak Velocity:	3	fps	Road Cut Length:	N/A Feet	
Silt:	0	Inches	Trenche Length:	N/A Feet	



Installation Information		Backup	Yes	No	?	Distance
Installation Type:	Ring Crank	Trunk		X		
Sensors / Devices:	IJVP	Lift/Pump Station		X		
Surcharge Height:	8 Feet	WWTP			X	3000'
Rain Gauge Zone:		Other		X		

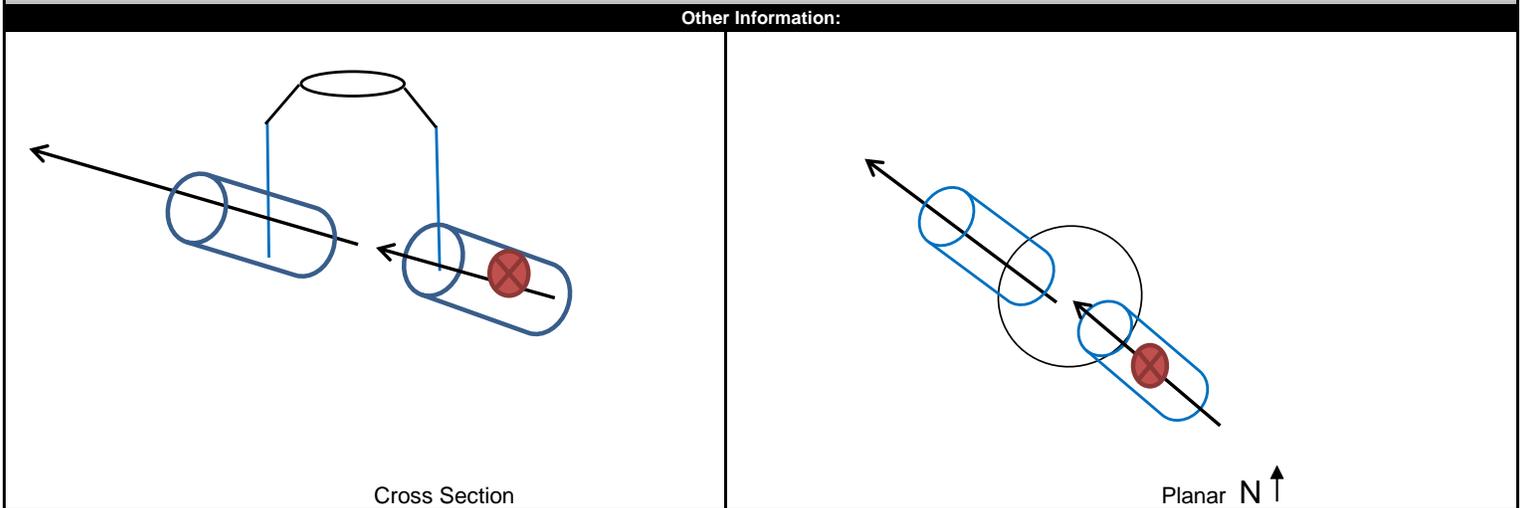
**Additional Site Information / Comments:**

GPS: N30°44'39.60" W095°32'45.08"

Project Name: Huntsville		City/State: Huntsville, TX		FM Initials: DM	
Site Name: AJ-09		Monitor Series: Triton		Monitor S/N#:	
Address / Location: NorthWest of Jct. HWY 19 and HWY 30				Manhole #:	
Access: walk				Map Page #:	
Type of System:		Sanitary <input checked="" type="checkbox"/>	Storm <input type="checkbox"/>	Pipe Height: 9.75"	
		Combined <input type="checkbox"/>		Pipe Width: 9.75"	
Phone Number:					



Manhole Information:					
Date/Time of Investigation:	5/5/15 17:15:00PM		Manhole Depth:	7 Feet	
Site Hydraulics:	Good hydraulics		Manhole Material / Condition:	Concrete	
Upstream Input: (L/S, P/S)	DNI		Pipe Material / Condition:	Concrete Fair	
Upstream Manhole:	DNI		Mini System Character:	Residential <input checked="" type="checkbox"/>	Commercial <input checked="" type="checkbox"/>
Downstream Manhole:	Jct. MH		Industrial	<input type="checkbox"/>	
			Other	<input type="checkbox"/>	
<b>Telephone Information:</b> N/A					
Depth of Flow (Wet Dof):	1.75"	+/-	Access Pole #:	N/A	
Range (Air Dof):		+/-	Distance From Manhole:	N/A Feet	
Peak Velocity:	1.36	fps	Road Cut Length:	N/A Feet	
Silt:	0	Inches	Trenche Length:	N/A Feet	

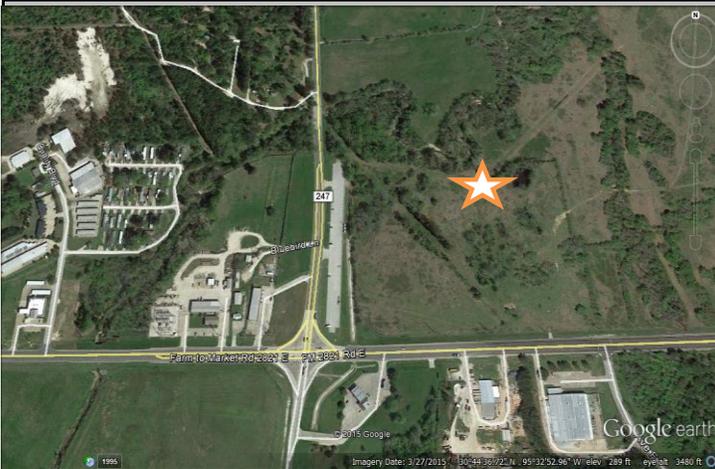


Installation Information		Backup	Yes	No	?	Distance
Installation Type:	Ring Crank	Trunk		X		
Sensors / Devices:	IJVP	Lift/Pump Station		X		
Surcharge Height:	7 Feet	WWTP			X	3000'
Rain Gauge Zone:		Other		X		

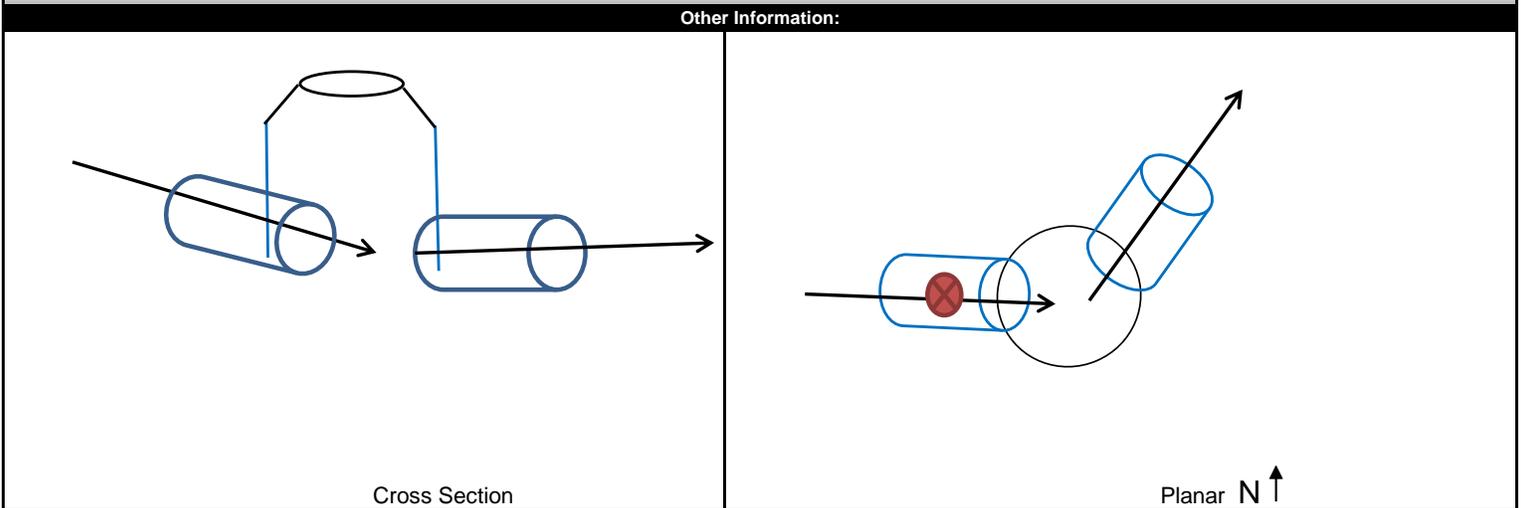
**Additional Site Information / Comments:**

**GPS: N30°44'39.60" W095°32'45.08" \* You will need a city key to access gate locks**

Project Name: Huntsville		City/State: Huntsville, TX		FM Initials: DM	
Site Name: AJ-10		Monitor Series: Triton		Monitor S/N#:	
Address / Location: 162 HWY 247, Walk 200yds from HWY				Manhole #:	
Access: walk				Map Page #:	
Type of System:		Sanitary <input checked="" type="checkbox"/>	Storm <input type="checkbox"/>	Pipe Height: 30"	
				Pipe Width: 30"	
				Phone Number:	



Manhole Information:					
Date/Time of Investigation:	4/23/15 9:00PM		Manhole Depth:	18 Feet	
Site Hydraulics:	Good hydraulics		Manhole Material / Condition:	Concrete	
Upstream Input: (L/S, P/S)	DNI		Pipe Material / Condition:	Concrete Fair	
Upstream Manhole:	DNI		Mini System Character:	Residential <input checked="" type="checkbox"/>	Commercial <input checked="" type="checkbox"/>
Downstream Manhole:	Jct. MH		Industrial	<input type="checkbox"/>	
			Other	<input type="checkbox"/>	
			Telephone Information: N/A		
Depth of Flow (Wet Dof):	10"	+/-	Access Pole #:	N/A	
Range (Air Dof):		+/-	Distance From Manhole:	N/A Feet	
Peak Velocity:	2	fps	Road Cut Length:	N/A Feet	
Silt:	0	Inches	Trenche Length:	N/A Feet	



Installation Information		Backup	Yes	No	?	Distance
Installation Type:	Ring Crank	Trunk		X		
Sensors / Devices:	IJVP	Lift/Pump Station		X		
Surcharge Height:	8 Feet	WWTP			X	3000'
Rain Gauge Zone:		Other		X		

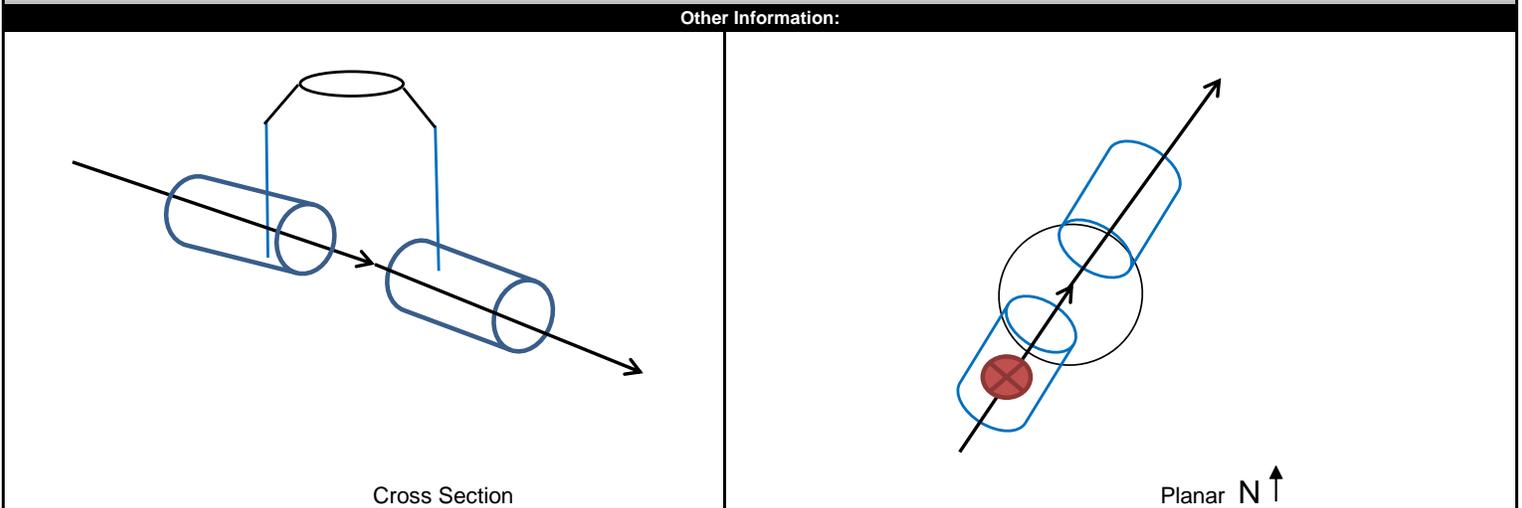
**Additional Site Information / Comments:**

GPS: N30°44'39.60" W095°32'45.08"

Project Name: Huntsville		City/State: Huntsville, TX		FM Initials: DM	
Site Name: AJ-11		Monitor Series: Triton		Monitor S/N#:	
Address / Location: FM 2821, Northeast of MLK Jr. Dr.				Manhole #:	
Access: Drive/walk				Map Page #:	
Type of System:		Sanitary <input checked="" type="checkbox"/>	Storm <input type="checkbox"/>	Combined <input type="checkbox"/>	Pipe Height: 12"
					Pipe Width: 12"
					Phone Number:



Manhole Information:					
Date/Time of Investigation:	4/28/15 12:00PM		Manhole Depth:	6.5 Feet	
Site Hydraulics:	Good hydraulics		Manhole Material / Condition:	Concrete	
Upstream Input: (L/S, P/S)	DNI		Pipe Material / Condition:	Concrete Fair	
Upstream Manhole:	DNI		Mini System Character:	Residential <input checked="" type="checkbox"/>	Commercial <input checked="" type="checkbox"/>
Downstream Manhole:	OK		Industrial	<input type="checkbox"/>	
			Other	<input type="checkbox"/>	
			Telephone Information:	N/A	
Depth of Flow (Wet Dof):	6"	+/-	Access Pole #:	N/A	
Range (Air Dof):		+/-	Distance From Manhole:	N/A Feet	
Peak Velocity:	2	fps	Road Cut Length:	N/A Feet	
Silt:	0	Inches	Trenche Length:	N/A Feet	



Installation Information		Backup	Yes	No	?	Distance
Installation Type:	Ring Crank	Trunk			X	1500'
Sensors / Devices:	IJVP	Lift/Pump Station		X		
Surcharge Height:	4 Feet	WWTP		X		
Rain Gauge Zone:		Other		X		

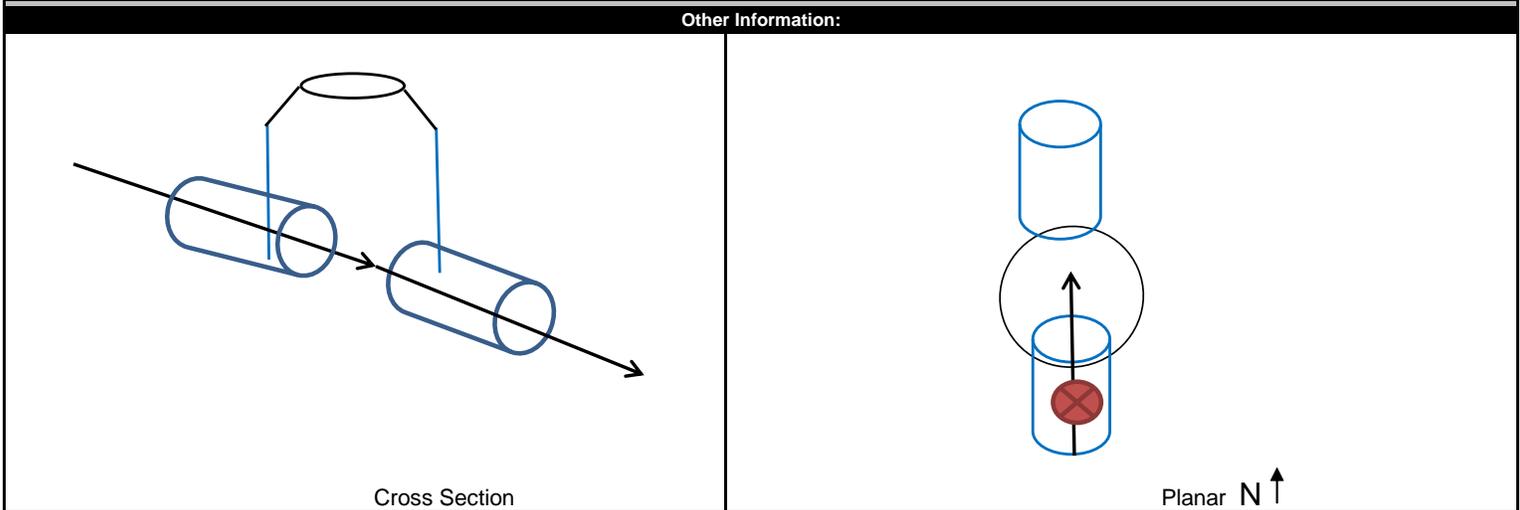
**Additional Site Information / Comments:**

GPS: N30°44'31.55" W095°03'09.38"

Project Name: Huntsville		City/State: Huntsville, TX		FM Initials: DM	
Site Name: AJ-12		Monitor Series: Triton		Monitor S/N#:	
Address / Location: 1354 Ave M				Manhole #:	
				Map Page #:	
Access: Drive		Type of System:		Pipe Height: 12"	
		Sanitary <input checked="" type="checkbox"/>		Storm <input type="checkbox"/>	
		Combined <input type="checkbox"/>		Pipe Width: 12"	
Phone Number:					



Manhole Information:					
Date/Time of Investigation: 4/30/15 13:00PM		Manhole Depth: 4.5		Feet	
Site Hydraulics: Good hydraulics		Manhole Material / Condition: Concrete			
Upstream Input: (L/S, P/S) DNI		Pipe Material / Condition: Concrete		Fair	
Upstream Manhole: HVY Traffic DNI		Mini System	Residential	Commercial	Industrial
Downstream Manhole: HVY Traffic DNI		Character: X	X	X	Other
Telephone Information: N/A					
Depth of Flow (Wet Dof): 6 +/-		Access Pole #:		N/A	
Range (Air Dof): +/-		Distance From Manhole:		N/A Feet	
Peak Velocity: 3 fps		Road Cut Length:		N/A Feet	
Silt: 0 Inches		Trenche Length:		N/A Feet	

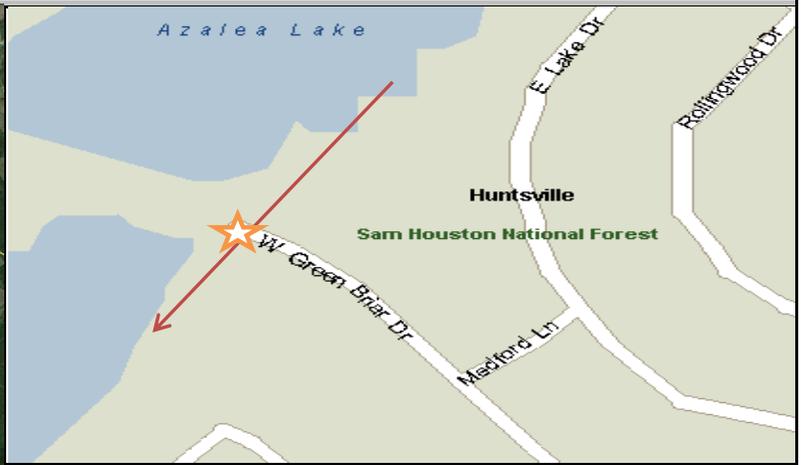
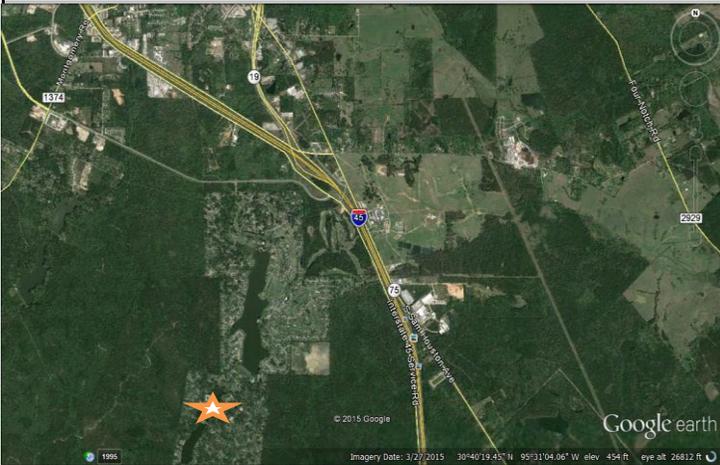


Installation Information		Backup	Yes	X	Distance
Installation Type:	Ring Crank	Trunk		X	1500'
Sensors / Devices:	IJVP	Lift/Pump Station		X	
Surcharge Height:	4 Feet	WWTP		X	
Rain Gauge Zone:		Other		X	

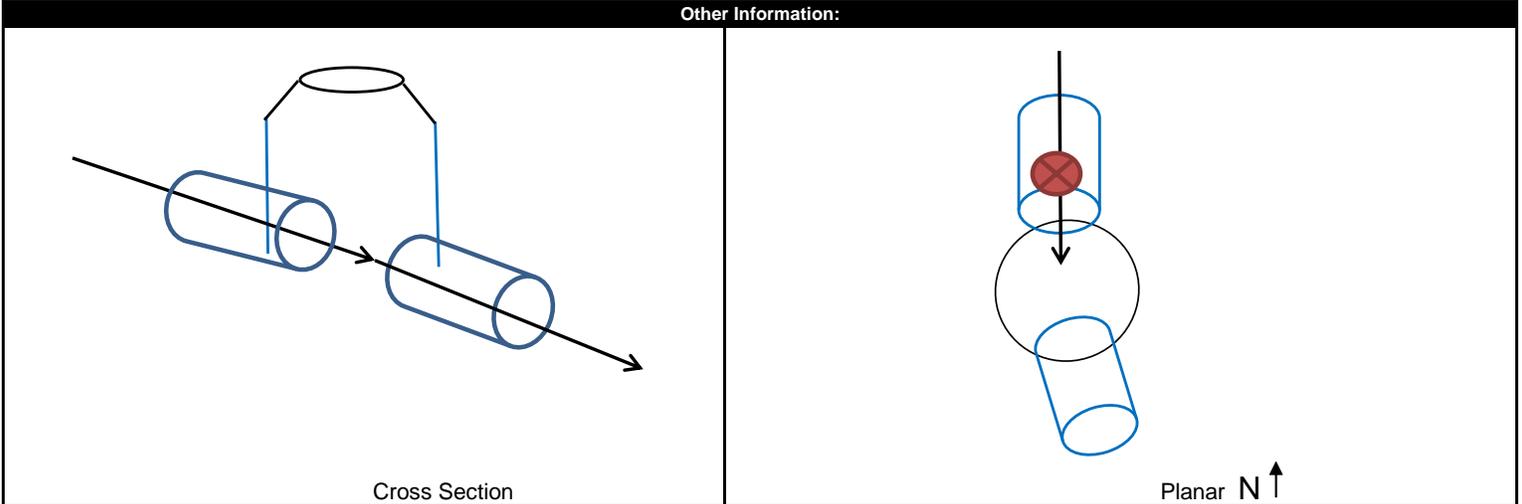
**Additional Site Information / Comments:**

GPS: N30°43'16.58" W095°33'10.47"

Project Name: Huntsville		City/State: Huntsville, TX		FM Initials: DM		
Site Name: NB-06		Monitor Series: Triton		Monitor S/N#:		
Address / Location: 2096 w. Green Briar Dr.				Manhole #:		
				Map Page #:		
Access: Drive	Type of System:	Sanitary	Storm	Combined	Pipe Height: 27.25"	
		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Pipe Width: 27.25"	
					Phone Number:	



Manhole Information:					
Date/Time of Investigation:	4/30/15 16:30PM		Manhole Depth:	16.5	Feet
Site Hydraulics:	Good hydraulics		Manhole Material / Condition:	Concrete	
Upstream Input: (L/S, P/S)	DNI		Pipe Material / Condition:	PCC	Fair
Upstream Manhole:	DNL		Mini System Character:	Residential X	Commercial X
Downstream Manhole:	In the lake, CAN		Industrial		Other
			Telephone Information:	N/A	
Depth of Flow (Wet Dof):	4	+/-	Access Pole #:	N/A	
Range (Air Dof):		+/-	Distance From Manhole:	N/A	Feet
Peak Velocity:	3	fps	Road Cut Length:	N/A	Feet
Silt:	0	Inches	Trenche Length:	N/A	Feet



Installation Information		Backup	Yes	X	Distance
Installation Type:	Ring Crank	Trunk		X	1500'
Sensors / Devices:	IJVP	Lift/Pump Station		X	
Surcharge Height:	4 Feet	WWTP		X	
Rain Gauge Zone:		Other		X	

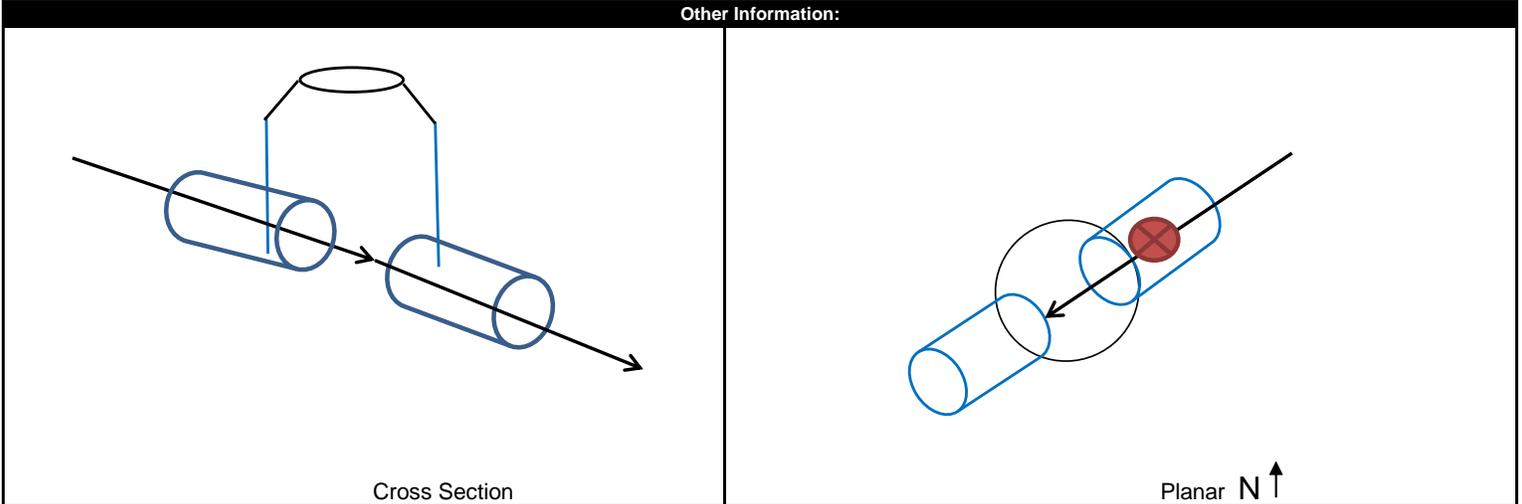
**Additional Site Information / Comments:**

GPS: N30°39'06.52" W095°32'19.47"

Project Name: Huntsville		City/State: Huntsville, TX		FM Initials: DM		
Site Name: NB-07		Monitor Series: Triton		Monitor S/N#:		
Address / Location: Elkins Lake at Golf Club parking Lot				Manhole #:		
				Map Page #:		
Access: Drive	Type of System:	Sanitary	Storm	Combined	Pipe Height: 21"	
		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Pipe Width: 21"	
					Phone Number:	



Manhole Information:					
Date/Time of Investigation:	5/15/15 16:30PM		Manhole Depth:	12 Feet	
Site Hydraulics:	Good hydraulics		Manhole Material / Condition:	Concrete	
Upstream Input: (L/S, P/S)	DNI		Pipe Material / Condition:	PCC Fair	
Upstream Manhole:	DNL		Mini System Character:	Residential X	Commercial X
Downstream Manhole:	In the lake, CAN		Industrial	Other	
			<b>Telephone Information:</b> N/A		
Depth of Flow (Wet Dof):	4	+/-	Access Pole #:	N/A	
Range (Air Dof):		+/-	Distance From Manhole:	N/A Feet	
Peak Velocity:	3	fps	Road Cut Length:	N/A Feet	
Silt:	0	Inches	Trenche Length:	N/A Feet	

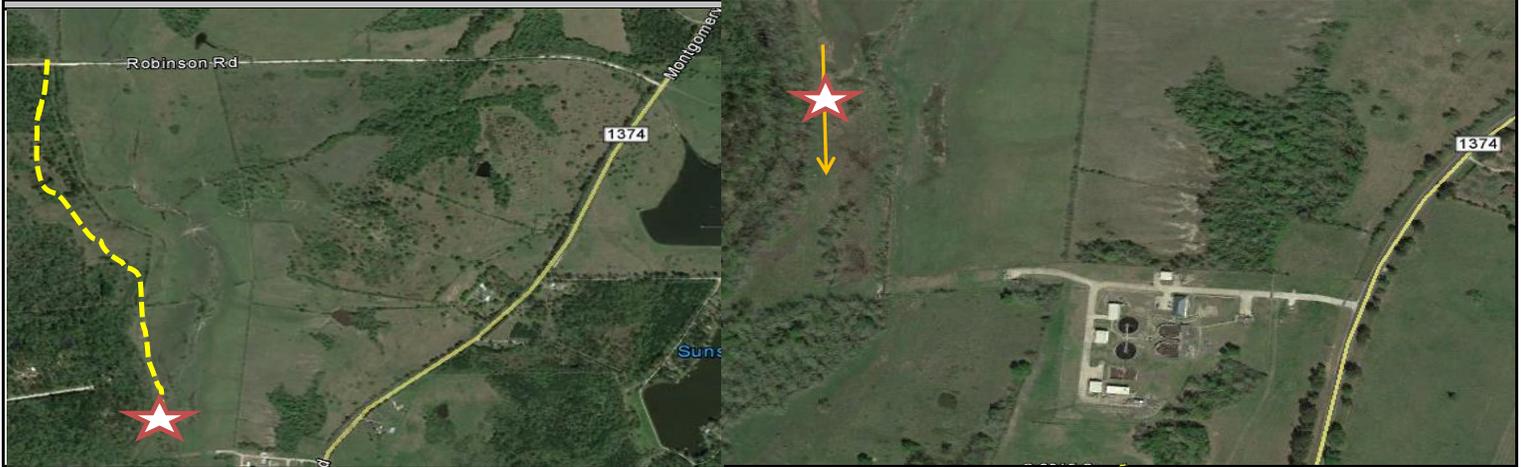


Installation Information		Backup	Yes	X	Distance
Installation Type:	Ring Crank	Trunk		X	1500'
Sensors / Devices:	IJVP	Lift/Pump Station		X	
Surcharge Height:	4 Feet	WWTP		X	
Rain Gauge Zone:		Other		X	

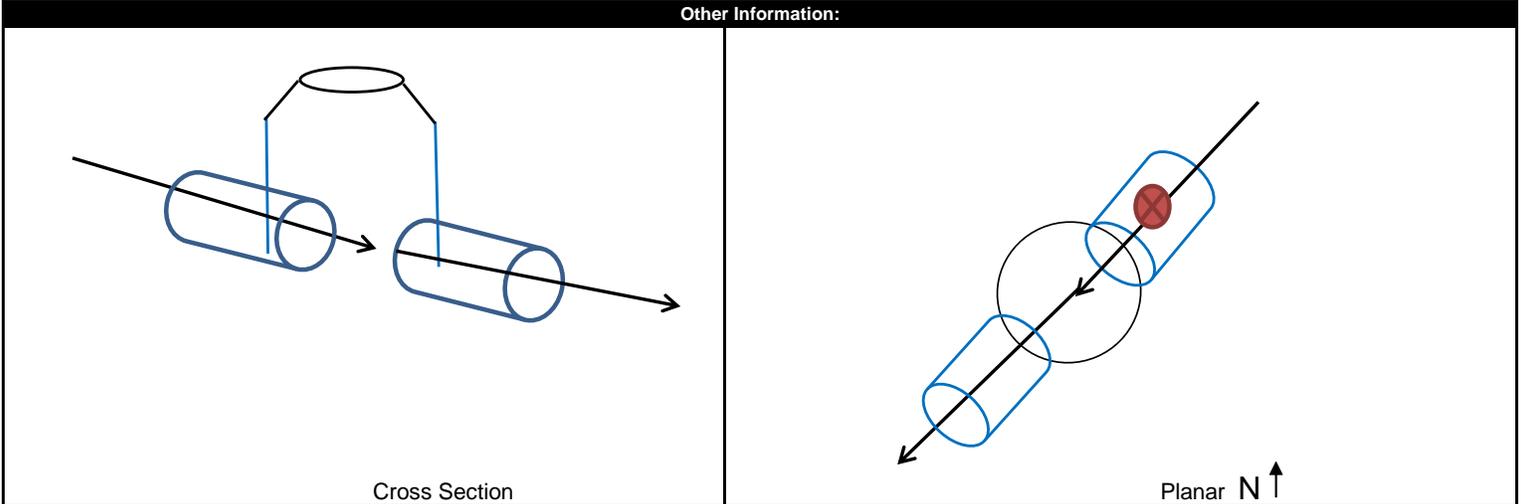
**Additional Site Information / Comments:**

GPS: N30°39'52.23" W095°31'42.36"

Project Name: Huntsville		City/State: Huntsville, TX		FM Initials: DM	
Site Name: RC-01		Monitor Series: Triton		Monitor S/N#:	
Address / Location: Easement NW of WWTP				Manhole #:	
Access: Drive UTV				Map Page #:	
Type of System:		Sanitary <input checked="" type="checkbox"/>	Storm <input type="checkbox"/>	Pipe Height: 35"	
		Combined <input type="checkbox"/>		Pipe Width: 35"	
Phone Number:					



Manhole Information:					
Date/Time of Investigation:	5/19/15 8:20PM		Manhole Depth:	12 Feet	
Site Hydraulics:	Good hydraulics		Manhole Material / Condition:	Concrete	
Upstream Input: (L/S, P/S)	DNI		Pipe Material / Condition:	Concrete Fair	
Upstream Manhole:	DNI		Mini System Character:	Residential <input checked="" type="checkbox"/>	Commercial <input checked="" type="checkbox"/>
Downstream Manhole:	Jct. MH		Industrial	<input type="checkbox"/>	
			Other	<input type="checkbox"/>	
<b>Telephone Information:</b> N/A					
Depth of Flow (Wet Dof):	09.13"	+/-	Access Pole #:	N/A	
Range (Air Dof):		+/-	Distance From Manhole:	N/A Feet	
Peak Velocity:	1.7	fps	Road Cut Length:	N/A Feet	
Silt:	0	Inches	Trenche Length:	N/A Feet	

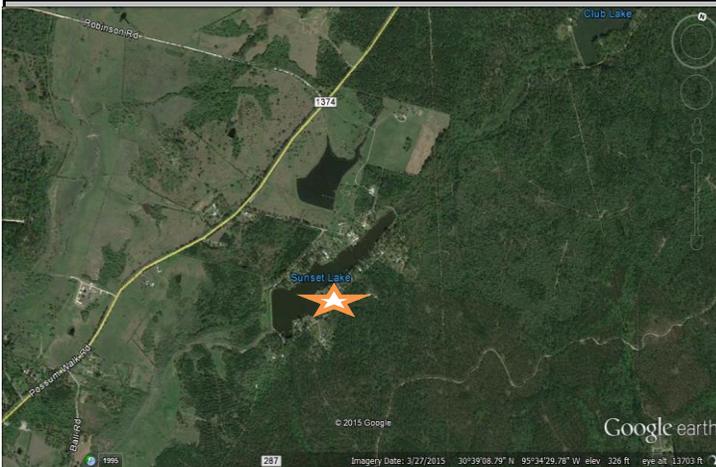


Installation Information		Backup	Yes	No	?	Distance
Installation Type:	Ring Crank	Trunk		X		
Sensors / Devices:	IJVP	Lift/Pump Station		X		
Surcharge Height:	12 Feet	WWTP			X	3000'
Rain Gauge Zone:		Other		X		

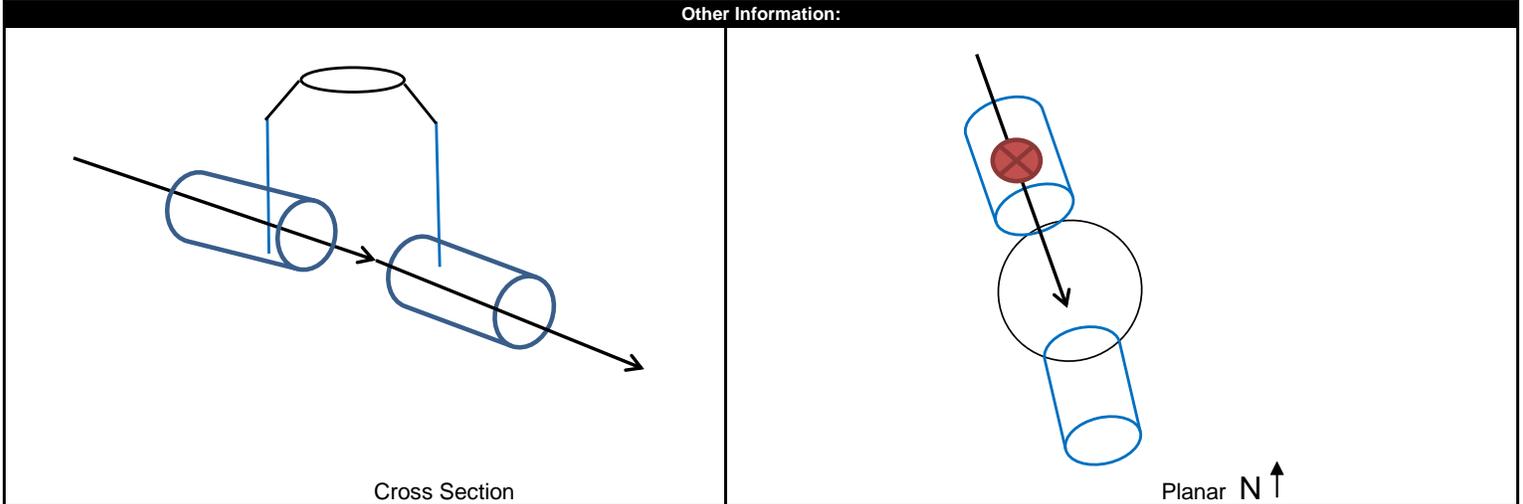
**Additional Site Information / Comments:**

GPS: N30°44'39.60" W095°32'45.08"

Project Name: Huntsville		City/State: Huntsville, TX		FM Initials: DM	
Site Name: RC-02		Monitor Series: Triton		Monitor S/N#:	
Address / Location: 188 Sunset Lake Road				Manhole #:	
				Map Page #:	
Access: Drive/Walk		Type of System:	Sanitary <input checked="" type="checkbox"/>	Storm <input type="checkbox"/>	Combined <input type="checkbox"/>
				Pipe Height:	16.75"
				Pipe Width:	17.25"
				Phone Number:	



Manhole Information:					
Date/Time of Investigation:	4/28/15 15:00PM		Manhole Depth:	7.5	Feet
Site Hydraulics:	Good hydraulics		Manhole Material / Condition:	Concrete	
Upstream Input: (L/S, P/S)	DNI		Pipe Material / Condition:	PVC	Fair
Upstream Manhole:	DNI		Mini System Character:	Residential <input checked="" type="checkbox"/>	Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Other <input type="checkbox"/>
Downstream Manhole:	OK		Telephone Information:	N/A	
Depth of Flow (Wet Dof):	4"	+/-	Access Pole #:	N/A	
Range (Air Dof):		+/-	Distance From Manhole:	N/A	Feet
Peak Velocity:	1.5	fps	Road Cut Length:	N/A	Feet
Silt:	0	Inches	Trenche Length:	N/A	Feet

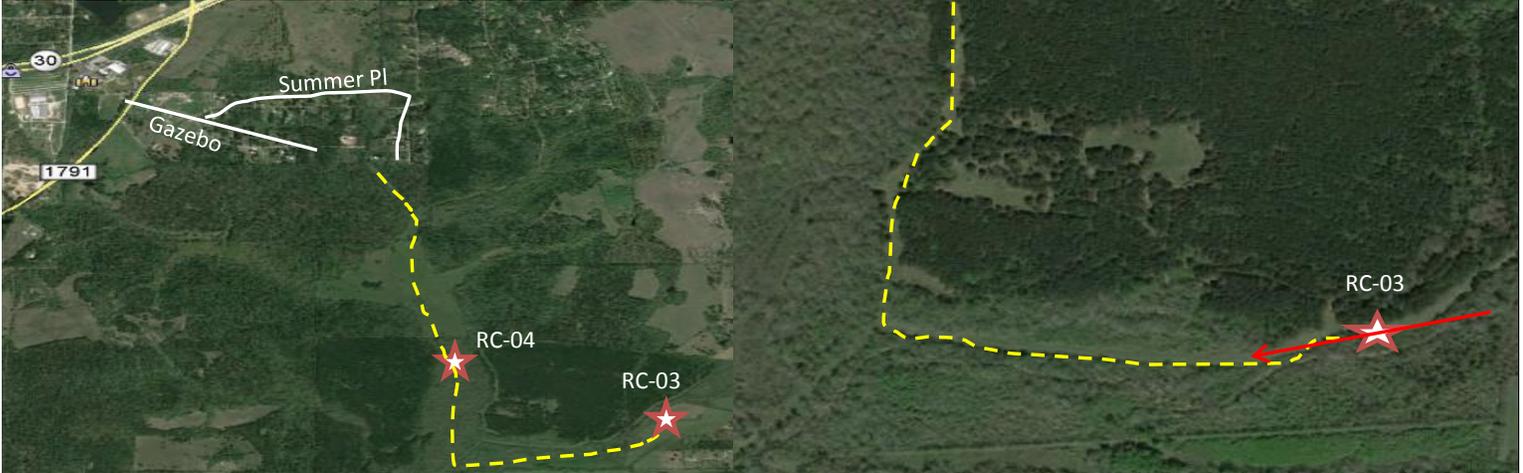


Installation Information		Backup	Yes	No	?	Distance
Installation Type:	Ring Crank	Trunk		X		
Sensors / Devices:	IJVP	Lift/Pump Station		X		
Surcharge Height:	4 Feet	WWTP		X		
Rain Gauge Zone:		Other		X		

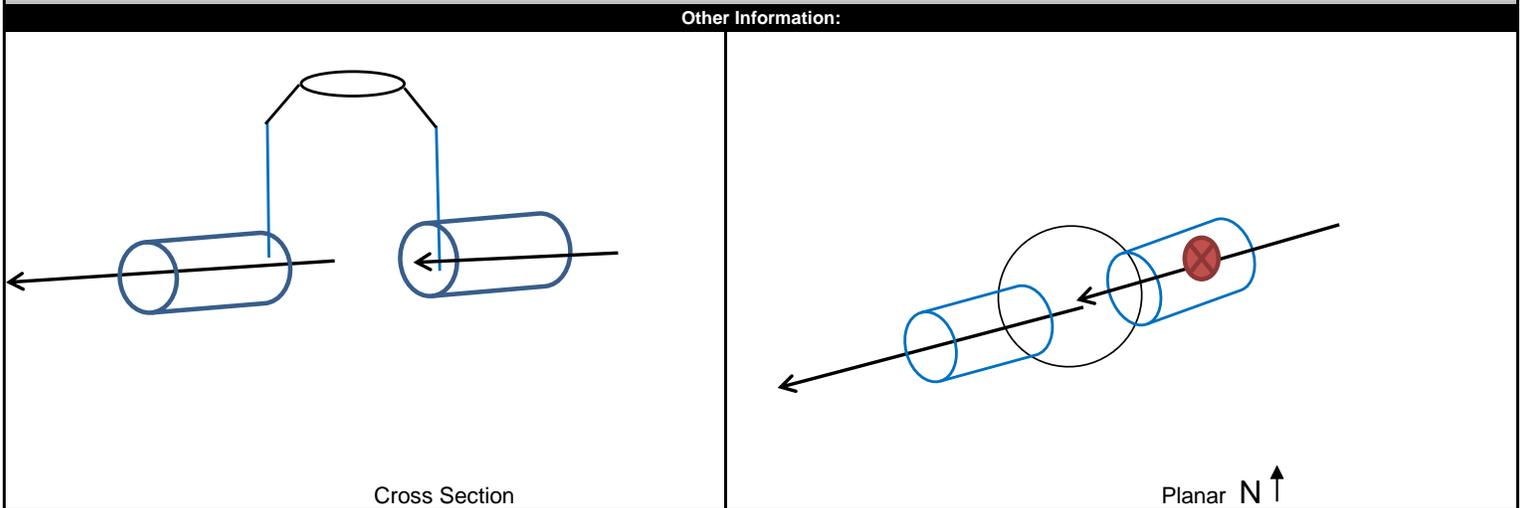
**Additional Site Information / Comments:**

GPS: N30°38'53.83" W095°34'35.39"

Project Name: Huntsville		City/State: Huntsville, TX		FM Initials: DM	
Site Name: RC-03		Monitor Series: Triton		Monitor S/N#:	
Address / Location: Easement off Summer Place				Manhole #:	
Access: Drive UTV				Map Page #:	
Type of System:		Sanitary <input checked="" type="checkbox"/>	Storm <input type="checkbox"/>	Pipe Height: 22.5"	
		Combined <input type="checkbox"/>		Pipe Width: 22.5"	
Phone Number:					



		Manhole Information:			
Date/Time of Investigation:	5/5/15 7:20PM	Manhole Depth:	8 Feet		
Site Hydraulics:	Good hydraulics	Manhole Material / Condition:	Concrete		
Upstream Input: (L/S, P/S)	DNI	Pipe Material / Condition:	Concrete	Fair	
Upstream Manhole:	DNI	Mini System Character:	Residential <input checked="" type="checkbox"/>	Commercial <input checked="" type="checkbox"/>	Industrial <input type="checkbox"/>
Downstream Manhole:	Jct. MH	Other	<input type="checkbox"/>		
		Telephone Information: N/A			
Depth of Flow (Wet Dof):	7.00" +/-	Access Pole #:	N/A		
Range (Air Dof):	+/-	Distance From Manhole:	N/A Feet		
Peak Velocity:	1.87 fps	Road Cut Length:	N/A Feet		
Silt:	0 Inches	Trenche Length:	N/A Feet		



Installation Information		Backup	Yes	No	?	Distance
Installation Type:	Ring Crank	Trunk			X	1500
Sensors / Devices:	IJVP	Lift/Pump Station		X		
Surcharge Height:	12 Feet	WWTP		X		
Rain Gauge Zone:		Other		X		

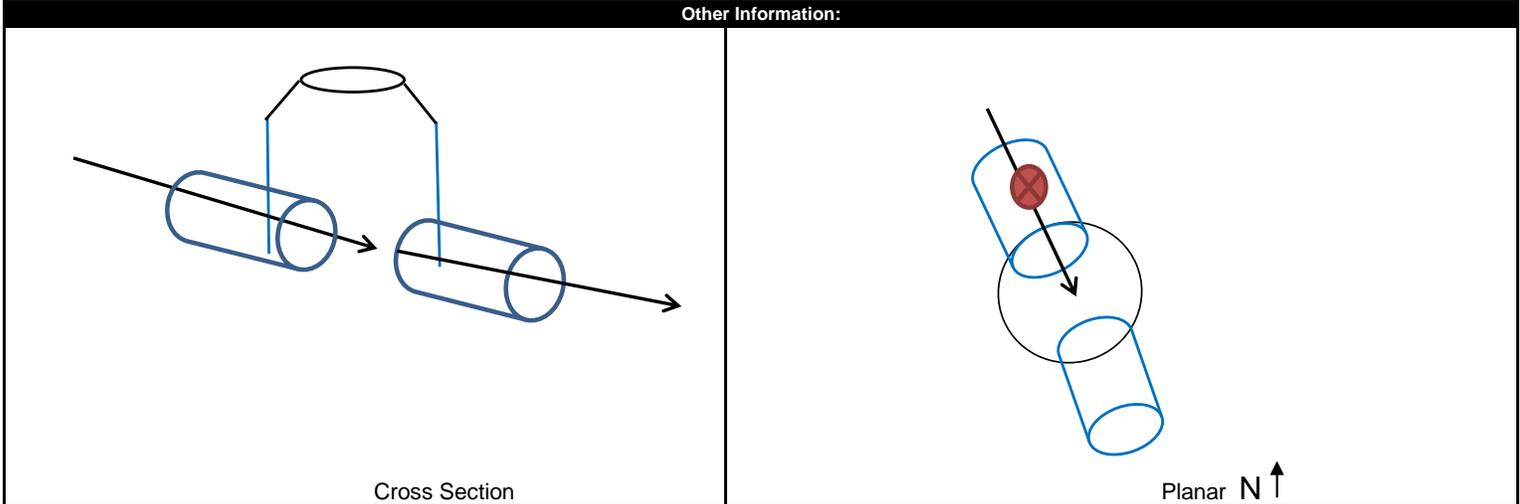
**Additional Site Information / Comments:**

GPS: N30°44'39.60" W095°32'45.08"

Project Name: Huntsville		City/State: Huntsville, TX		FM Initials: DM	
Site Name: RC-04		Monitor Series: Triton		Monitor S/N#:	
Address / Location: Easement off Summer Place				Manhole #:	
Access: Drive UTV				Map Page #:	
Type of System:		Sanitary <input checked="" type="checkbox"/>	Storm <input type="checkbox"/>	Pipe Height: 29.25"	
		Combined <input type="checkbox"/>		Pipe Width: 29.25"	
Phone Number:					



Manhole Information:					
Date/Time of Investigation:	5/5/15 7:20PM		Manhole Depth:	10	Feet
Site Hydraulics:	Good hydraulics		Manhole Material / Condition:	Concrete	
Upstream Input: (L/S, P/S)	DNI		Pipe Material / Condition:	Concrete	Fair
Upstream Manhole:	DNI		Mini System Character:	Residential <input checked="" type="checkbox"/>	Commercial <input checked="" type="checkbox"/>
Downstream Manhole:	Jct. MH		Industrial	<input type="checkbox"/>	Other <input type="checkbox"/>
<b>Telephone Information:</b> N/A					
Depth of Flow (Wet Dof):	05.38"	+/-	Access Pole #:	N/A	
Range (Air Dof):		+/-	Distance From Manhole:	N/A	Feet
Peak Velocity:	2	fps	Road Cut Length:	N/A	Feet
Silt:	0	Inches	Trenche Length:	N/A	Feet

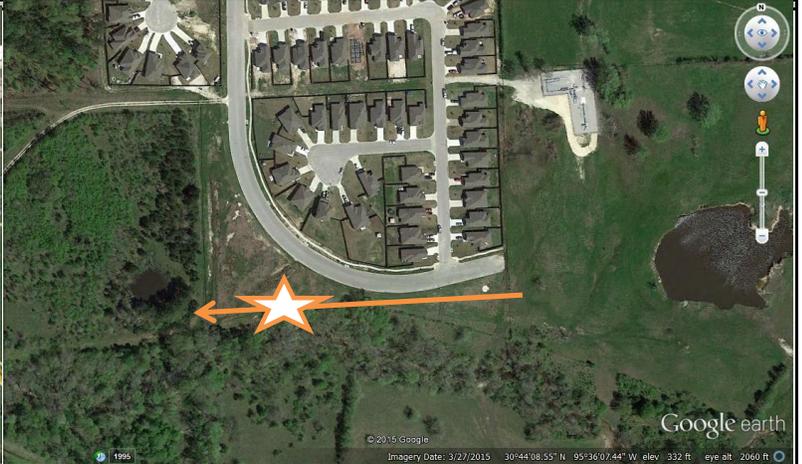
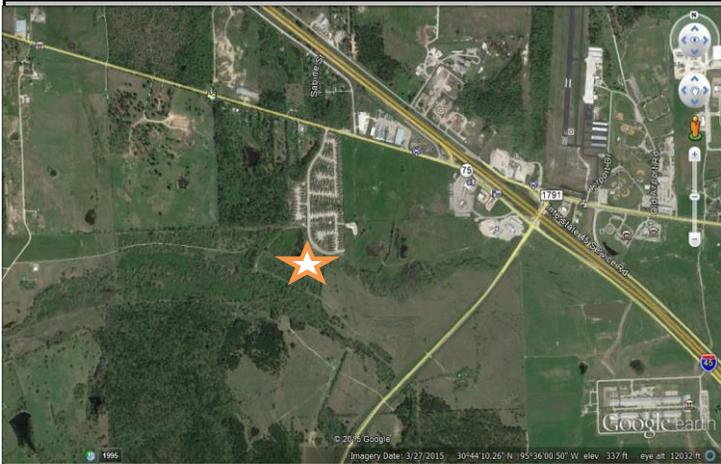


Installation Information		Backup	Yes	No	?	Distance
Installation Type:	Ring Crank	Trunk		X		
Sensors / Devices:	IJVP	Lift/Pump Station		X		
Surcharge Height:	12 Feet	WWTP			X	3000'
Rain Gauge Zone:		Other		X		

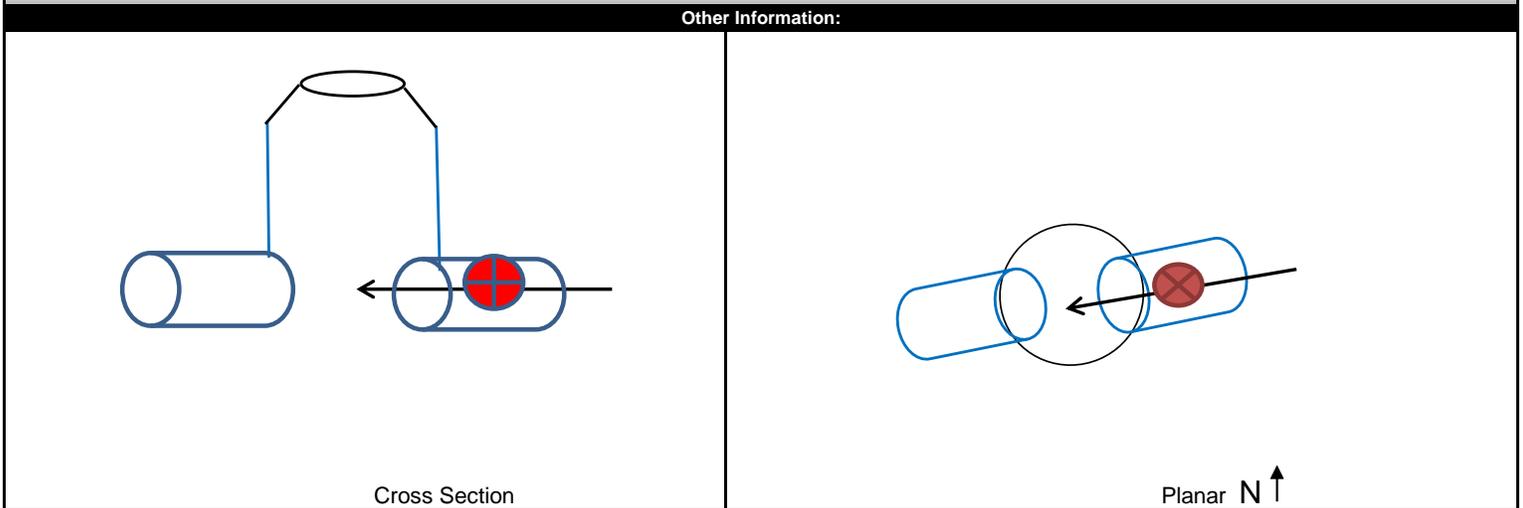
**Additional Site Information / Comments:**

GPS: N30°44'39.60" W095°32'45.08" Need key for locked gates

Project Name: Huntsville		City/State: Huntsville, TX		FM Initials: DM	
Site Name: RC-05		Monitor Series: Triton		Monitor S/N#:	
Address / Location: BROOKSIDE DRIVE				Manhole #:	
				Map Page #:	
Access: Drive/walk	Type of System:	Sanitary <input checked="" type="checkbox"/>	Storm <input type="checkbox"/>	Combined <input type="checkbox"/>	Pipe Height: 18"
				Pipe Width: 18"	
Phone Number:					



Manhole Information:					
Date/Time of Investigation:	4/29/15 18:00PM		Manhole Depth:	10.5	Feet
Site Hydraulics:	Good hydraulics		Manhole Material / Condition:	Concrete	
Upstream Input: (L/S, P/S)	DNI		Pipe Material / Condition:	PVC	Fair
Upstream Manhole:	DNI		Mini System Character:	Residential <input checked="" type="checkbox"/>	Commercial <input checked="" type="checkbox"/> Industrial <input type="checkbox"/> Other <input type="checkbox"/>
Downstream Manhole:	OK. DIFFICULT ACCESS		Telephone Information: N/A		
Depth of Flow (Wet Dof):	6"	+/-	Access Pole #:	N/A	
Range (Air Dof):		+/-	Distance From Manhole:	N/A Feet	
Peak Velocity:	1.5	fps	Road Cut Length:	N/A Feet	
Silt:	0	Inches	Trenche Length:	N/A Feet	



Installation Information		Backup	Yes	No	?	Distance
Installation Type:	Ring Crank	Trunk			X	1500'
Sensors / Devices:	IJVP	Lift/Pump Station		X		
Surcharge Height:	4 Feet	WWTP		X		
Rain Gauge Zone:		Other		X		

**Additional Site Information / Comments:**

GPS: N30°44'06.89" W095°36'11.38"

Project Name: Huntsville		City/State: Huntsville, TX		FM Initials: DM	
Site Name: RG-01		Monitor Series: Triton		Monitor S/N#:	
Address / Location: HWY 75 @ HWY 45, Shell Truck Stop				Manhole #:	
				Map Page #:	
Access: Drive/Ladder	Type of System:	Sanitary <input checked="" type="checkbox"/>	Storm <input type="checkbox"/>	Combined <input type="checkbox"/>	Pipe Height:
				Pipe Width:	
				Phone Number:	



Manhole Information:					
Date/Time of Investigation:	4/23/15 9:00PM		Manhole Depth:		Feet
Site Hydraulics:	Good hydraulics		Manhole Material / Condition:		
Upstream Input: (L/S, P/S)	DNI		Pipe Material / Condition:		Concrete Fair
Upstream Manhole:	DNI		Mini System	Residential	Commercial Industrial Other
Downstream Manhole:	Jct. MH		Character:	X	X
			<b>Telephone Information:</b> N/A		
Depth of Flow (Wet Dof):	+/-		Access Pole #:		N/A
Range (Air Dof):	+/-		Distance From Manhole:		N/A Feet
Peak Velocity:	fps		Road Cut Length:		N/A Feet
Silt:	0	Inches	Trenche Length:		N/A Feet

Other Information:	
Cross Section	Planar <b>N</b> ↑

Installation Information		Backup	Yes	No	?	Distance
Installation Type:		Trunk		X		
Sensors / Devices:		Lift/Pump Station		X		
Surcharge Height:	8 Feet	WWTP		X		
Rain Gauge Zone:		Other		X		

**Additional Site Information / Comments:**

GPS: N30°44'21.20" W095°32'45.08"

Project Name: Huntsville		City/State: Huntsville, TX		FM Initials: DM	
Site Name: RG-02		Monitor Series: Triton		Monitor S/N#:	
Address / Location: Old Colony Rd, @ HWY 19				Manhole #:	
				Map Page #:	
Access: Drive/Ladder	Type of System:	Sanitary	Storm	Combined	Pipe Height:
		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Pipe Width:
					Phone Number:



Manhole Information:					
Date/Time of Investigation:	4/23/15 9:00PM		Manhole Depth:	Feet	
Site Hydraulics:	Good hydraulics		Manhole Material / Condition:		
Upstream Input: (L/S, P/S)	DNI		Pipe Material / Condition:	Concrete	Fair
Upstream Manhole:	DNI		Mini System Character:	Residential	Commercial
Downstream Manhole:	Jct. MH			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
			Industrial		Other
			Telephone Information:	N/A	
Depth of Flow (Wet Dof):	+/-		Access Pole #:	N/A	
Range (Air Dof):	+/-		Distance From Manhole:	N/A	Feet
Peak Velocity:	fps		Road Cut Length:	N/A	Feet
Silt:	0	Inches	Trenche Length:	N/A	Feet

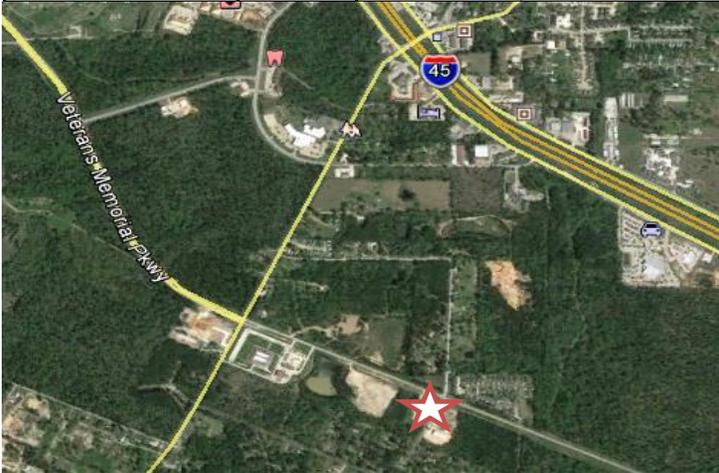
Other Information:	
Cross Section	Planar <b>N</b> ↑

Installation Information		Backup	Yes	No	?	Distance
Installation Type:		Trunk		<input checked="" type="checkbox"/>		
Sensors / Devices:		Lift/Pump Station		<input checked="" type="checkbox"/>		
Surcharge Height:	Feet	WWTP		<input checked="" type="checkbox"/>		
Rain Gauge Zone:		Other		<input checked="" type="checkbox"/>		

**Additional Site Information / Comments:**

GPS: N30°43'24.79" W095°31'34.79" Need City Key to Old Colony LS Gate

Project Name: Huntsville		City/State: Huntsville, TX		FM Initials: DM	
Site Name: RG-03		Monitor Series: Triton		Monitor S/N#:	
Address / Location: Fire Station #1, Veteran's Memorial Pkwy. S				Manhole #:	
Access: Drive				Map Page #:	
Type of System:		Sanitary <input checked="" type="checkbox"/>	Storm <input type="checkbox"/>	Combined <input type="checkbox"/>	
				Pipe Height:	
				Pipe Width:	
				Phone Number:	



Manhole Information:					
Date/Time of Investigation:	4/23/15 9:00PM		Manhole Depth:		Feet
Site Hydraulics:	Good hydraulics		Manhole Material / Condition:		
Upstream Input: (L/S, P/S)	DNI		Pipe Material / Condition:		Concrete Fair
Upstream Manhole:	DNI		Mini System	Residential	Commercial Industrial Other
Downstream Manhole:	Jct. MH		Character:	X	X
			<b>Telephone Information:</b> N/A		
Depth of Flow (Wet Dof):	+/-		Access Pole #:		N/A
Range (Air Dof):	+/-		Distance From Manhole:		N/A Feet
Peak Velocity:	fps		Road Cut Length:		N/A Feet
Silt:	0	Inches	Trenche Length:		N/A Feet

Other Information:	
Cross Section	Planar <b>N</b> ↑

Installation Information		Backup	Yes	No	?	Distance
Installation Type:		Trunk		X		
Sensors / Devices:		Lift/Pump Station		X		
Surcharge Height:	Feet	WWTP		X		
Rain Gauge Zone:		Other		X		

**Additional Site Information / Comments:**

GPS: N30°40'56.60" W095°33'13.45"



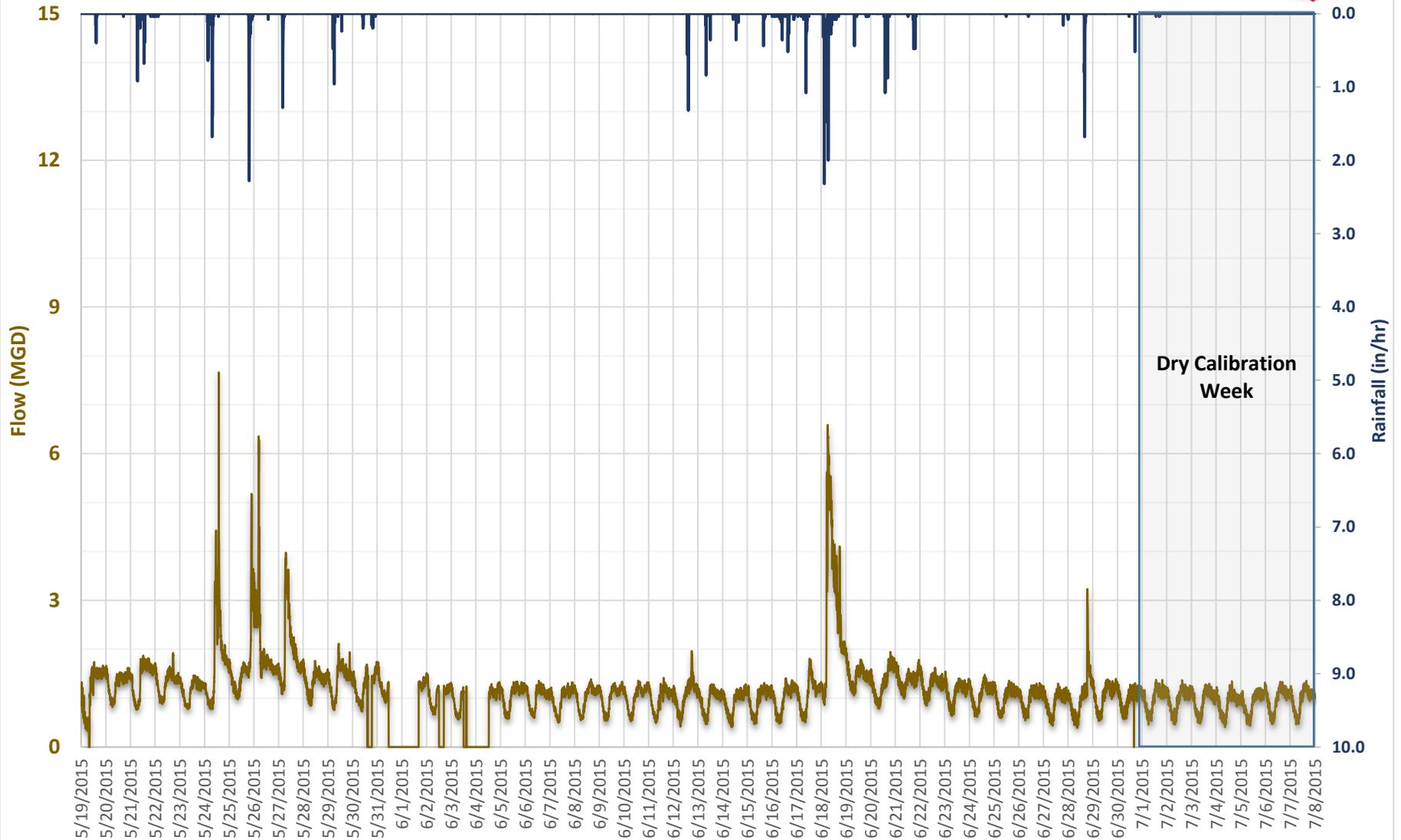
**APPENDIX I**  
**Wastewater Flow Monitor Hydrographs and Flow Depth Plots**



City of Huntsville  
Wastewater System Field Testing  
Flow Monitor Data  
Flow monitor ID: RC-01



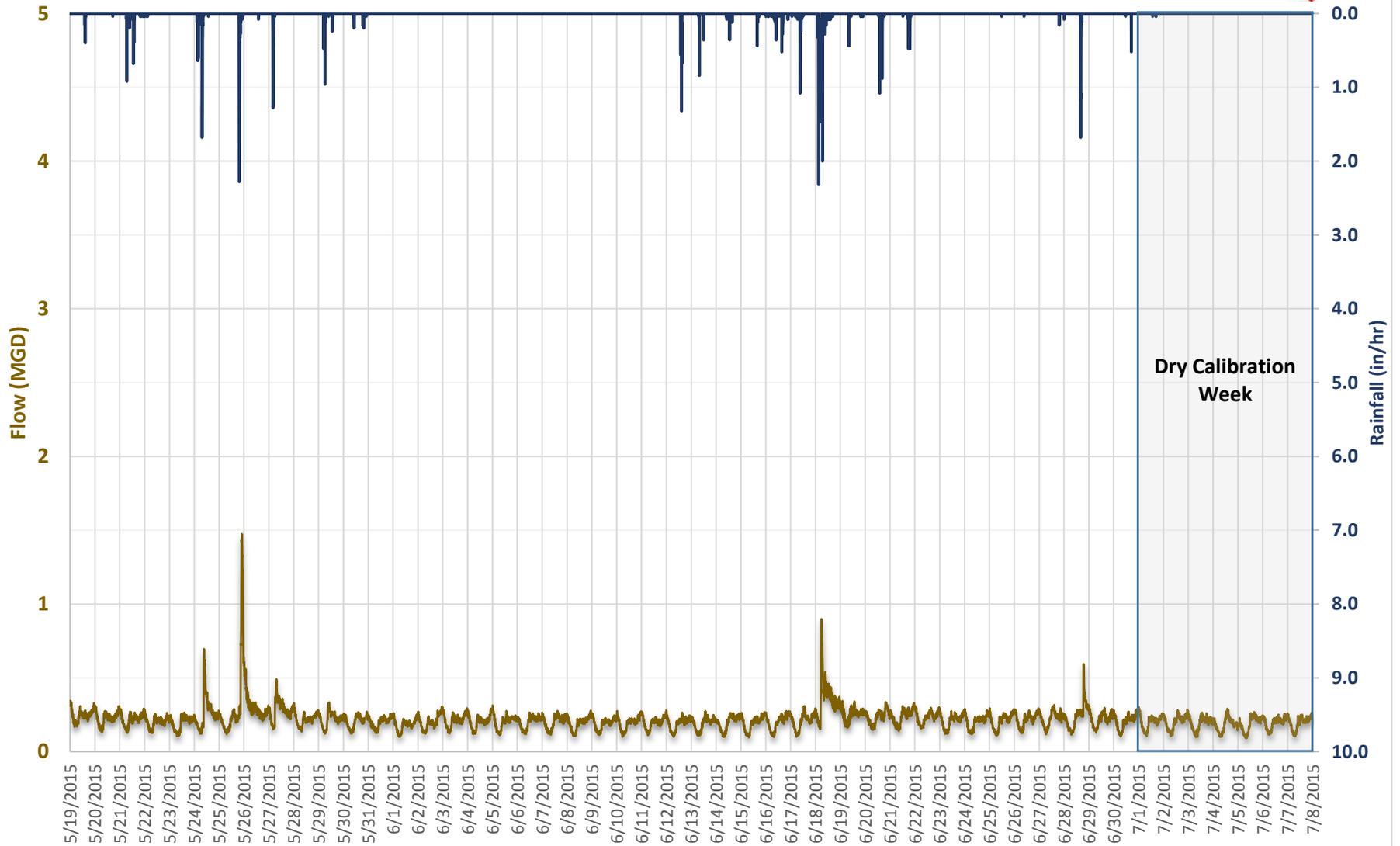
Recorded Flow Rate



City of Huntsville  
Wastewater System Field Testing  
Flow Monitor Data  
Flow monitor ID: **RC-02**



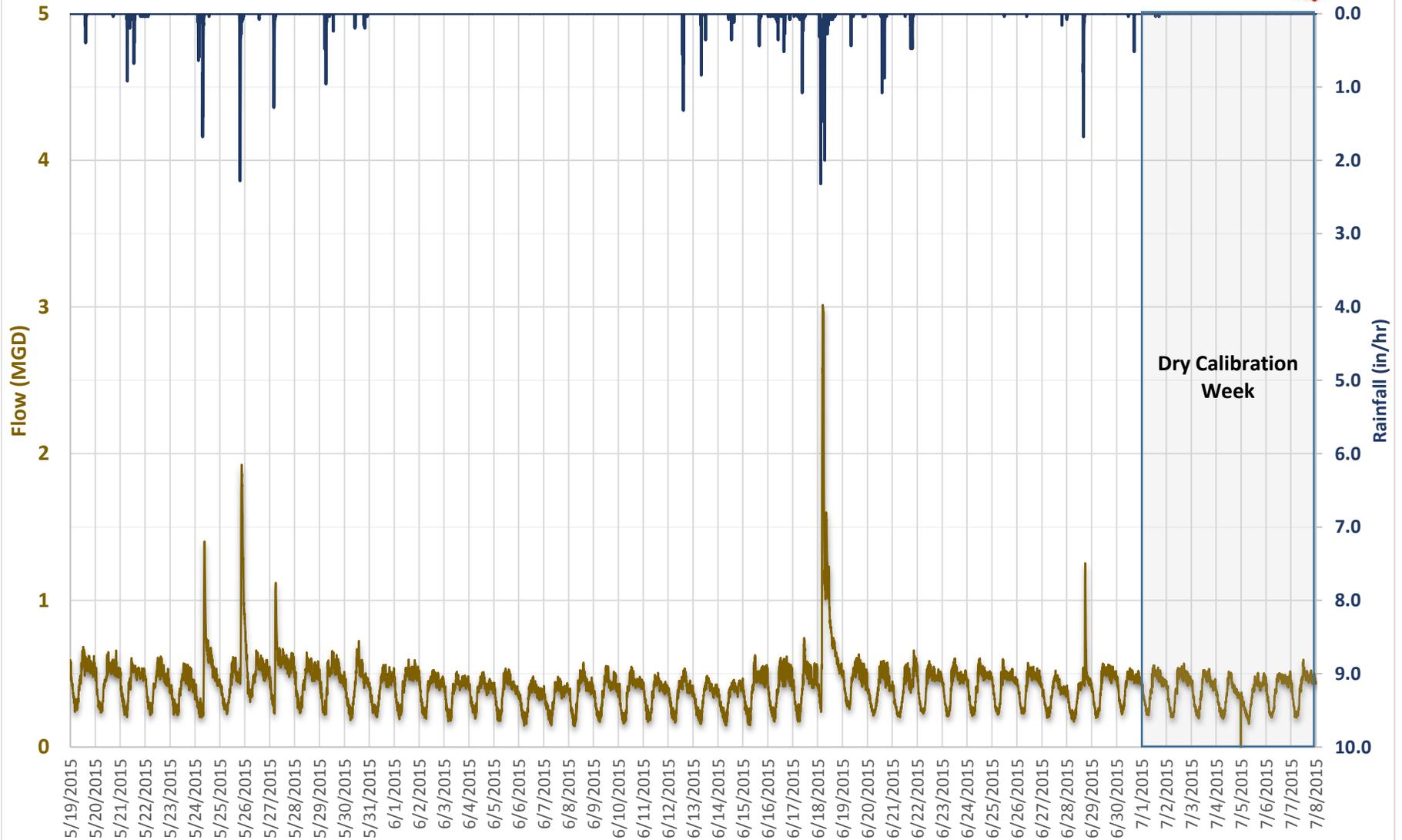
**Recorded Flow Rate**



City of Huntsville  
Wastewater System Field Testing  
Flow Monitor Data  
Flow monitor ID: **RC-03**



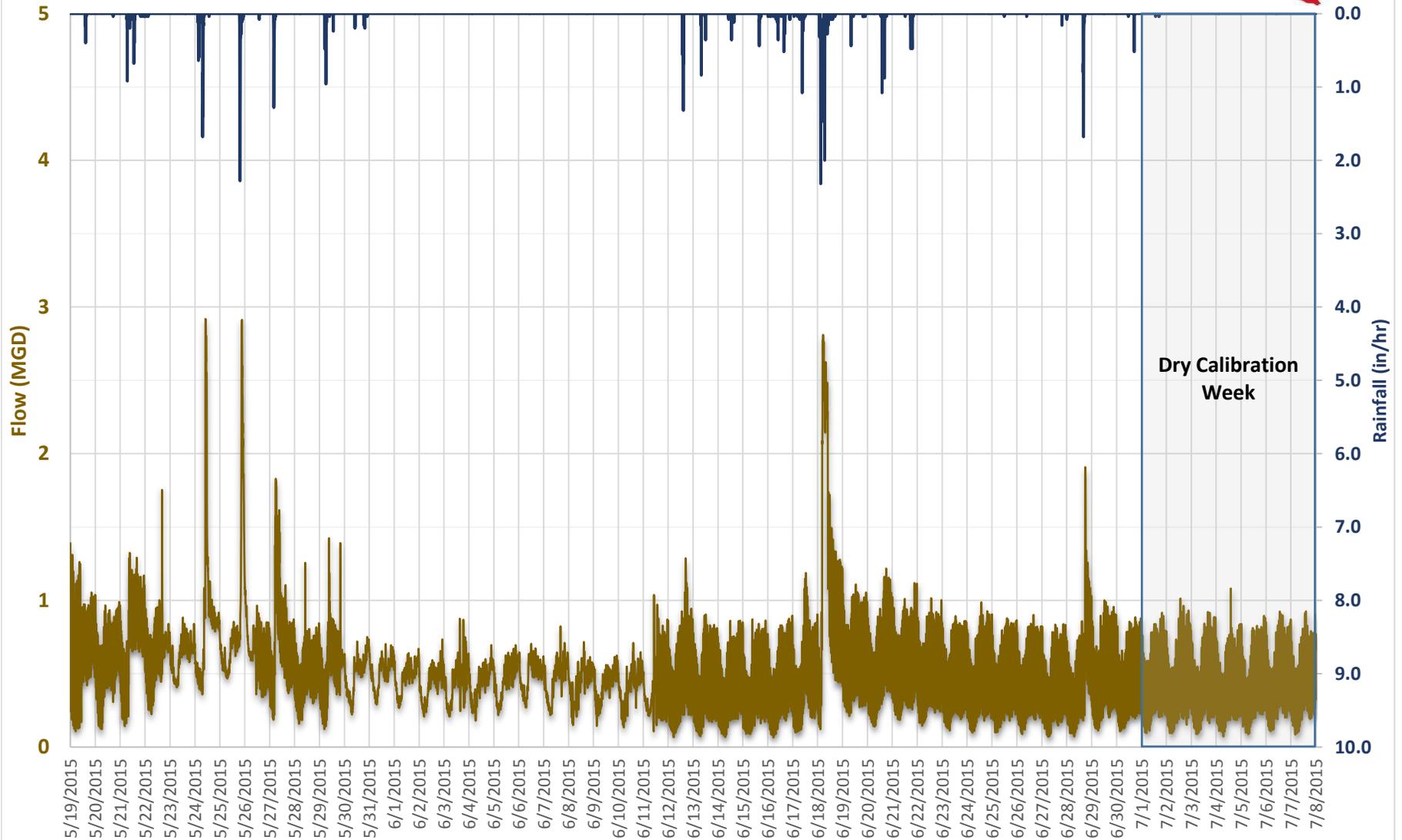
**Recorded Flow Rate**



City of Huntsville  
Wastewater System Field Testing  
Flow Monitor Data  
Flow monitor ID: **RC-04**



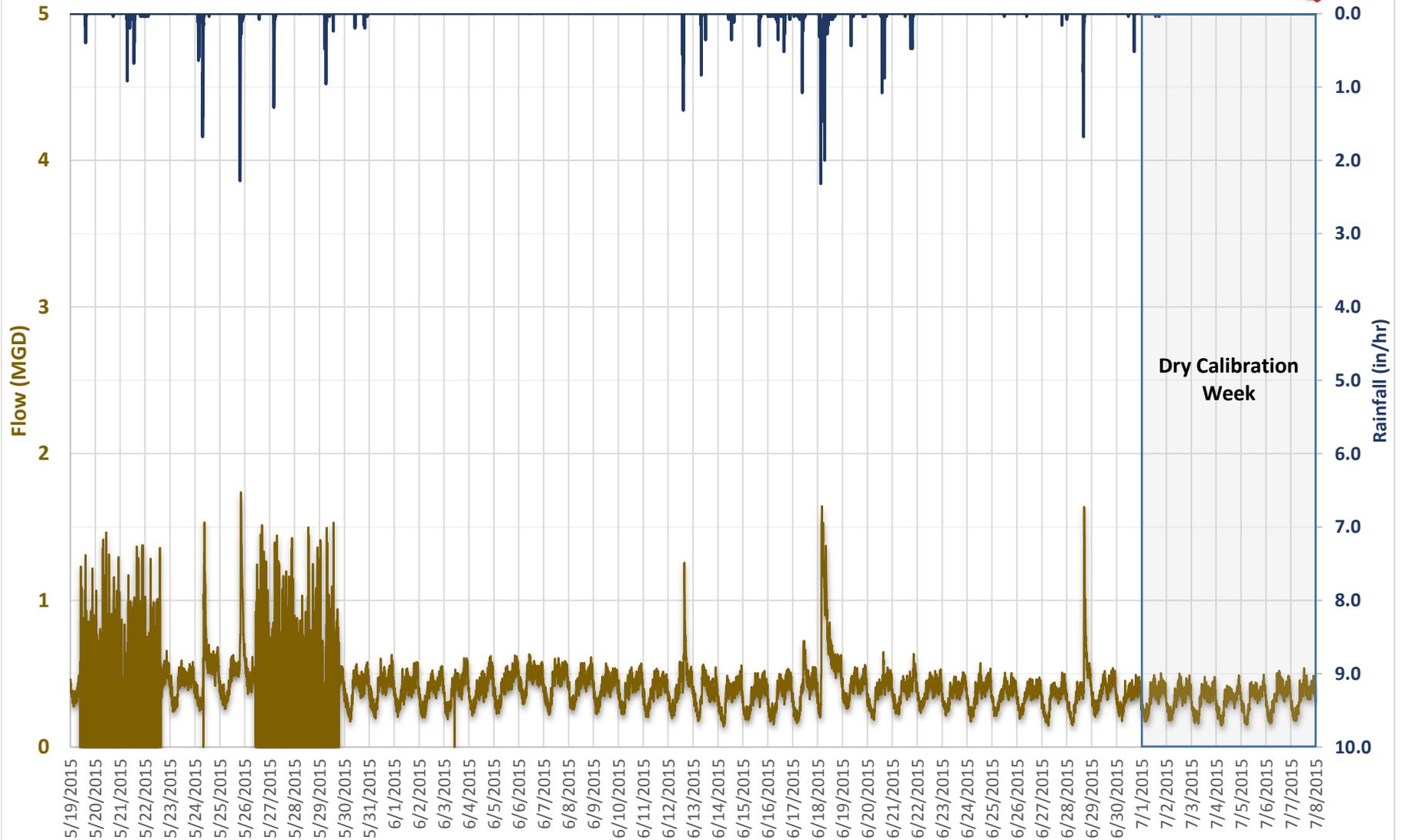
**Recorded Flow Rate**



City of Huntsville  
Wastewater System Field Testing  
Flow Monitor Data  
Flow monitor ID: **RC-05**



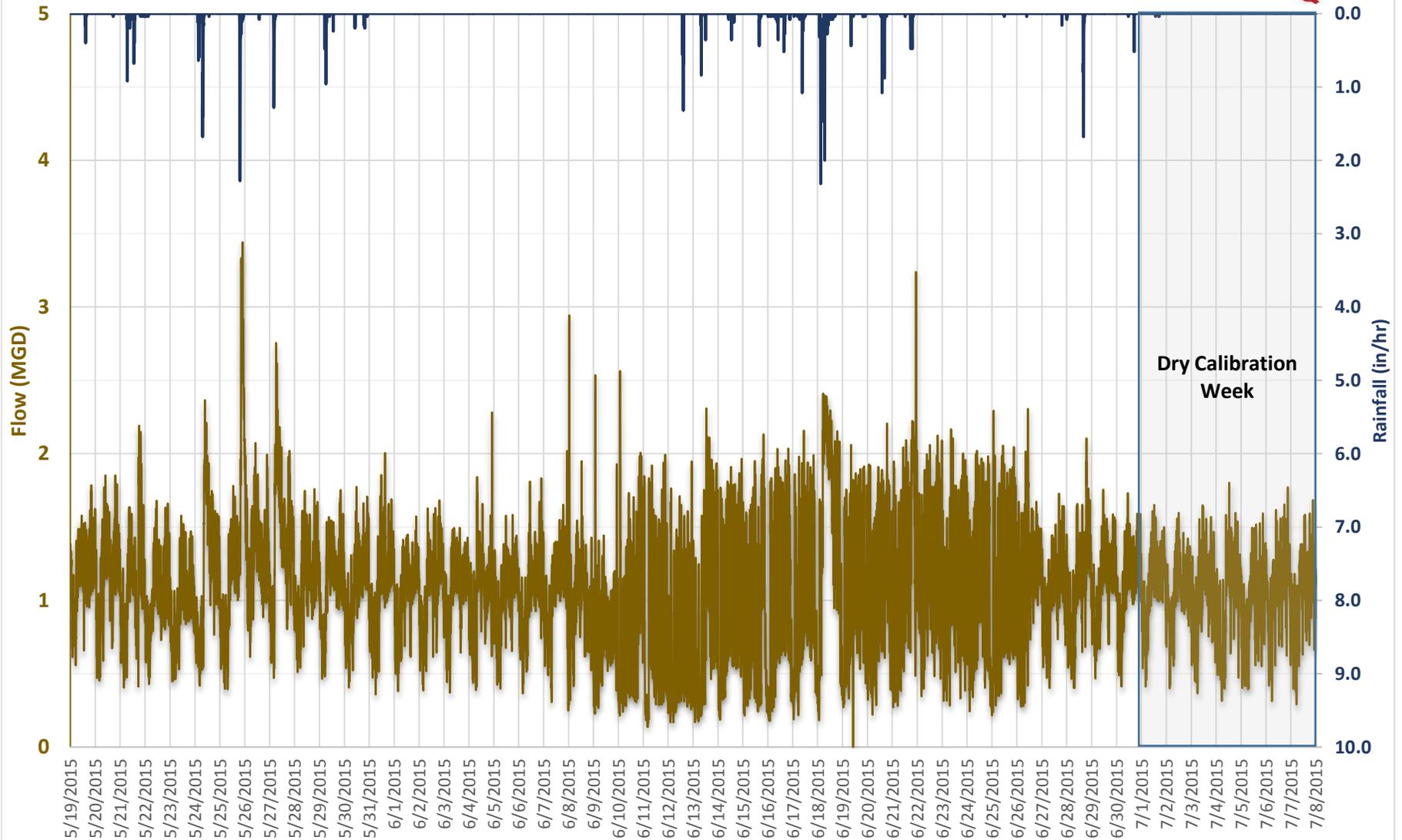
**Recorded Flow Rate**



City of Huntsville  
Wastewater System Field Testing  
Flow Monitor Data  
Flow monitor ID: **NB-06**



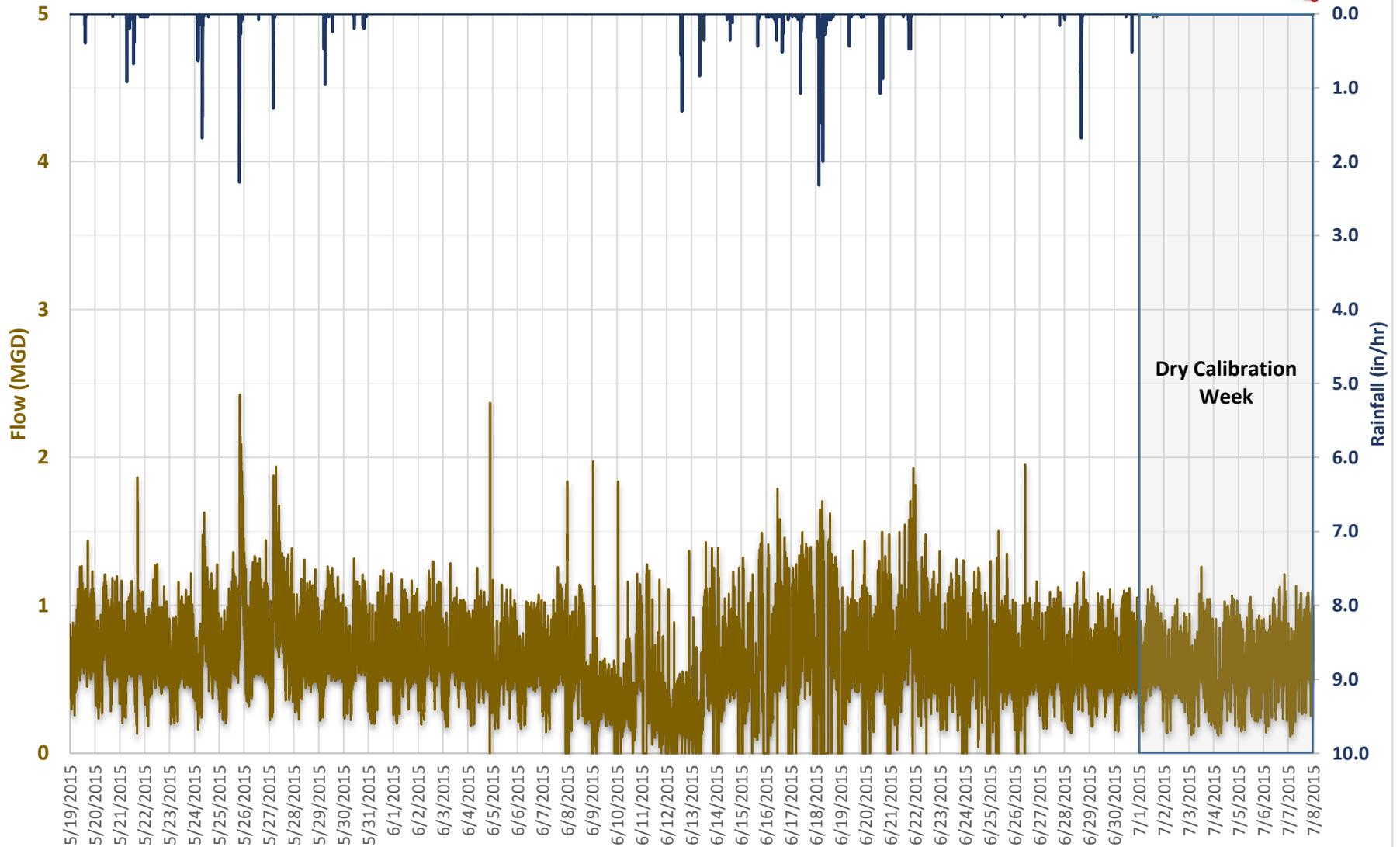
**Recorded Flow Rate**



City of Huntsville  
Wastewater System Field Testing  
Flow Monitor Data  
Flow monitor ID: **NB-07**



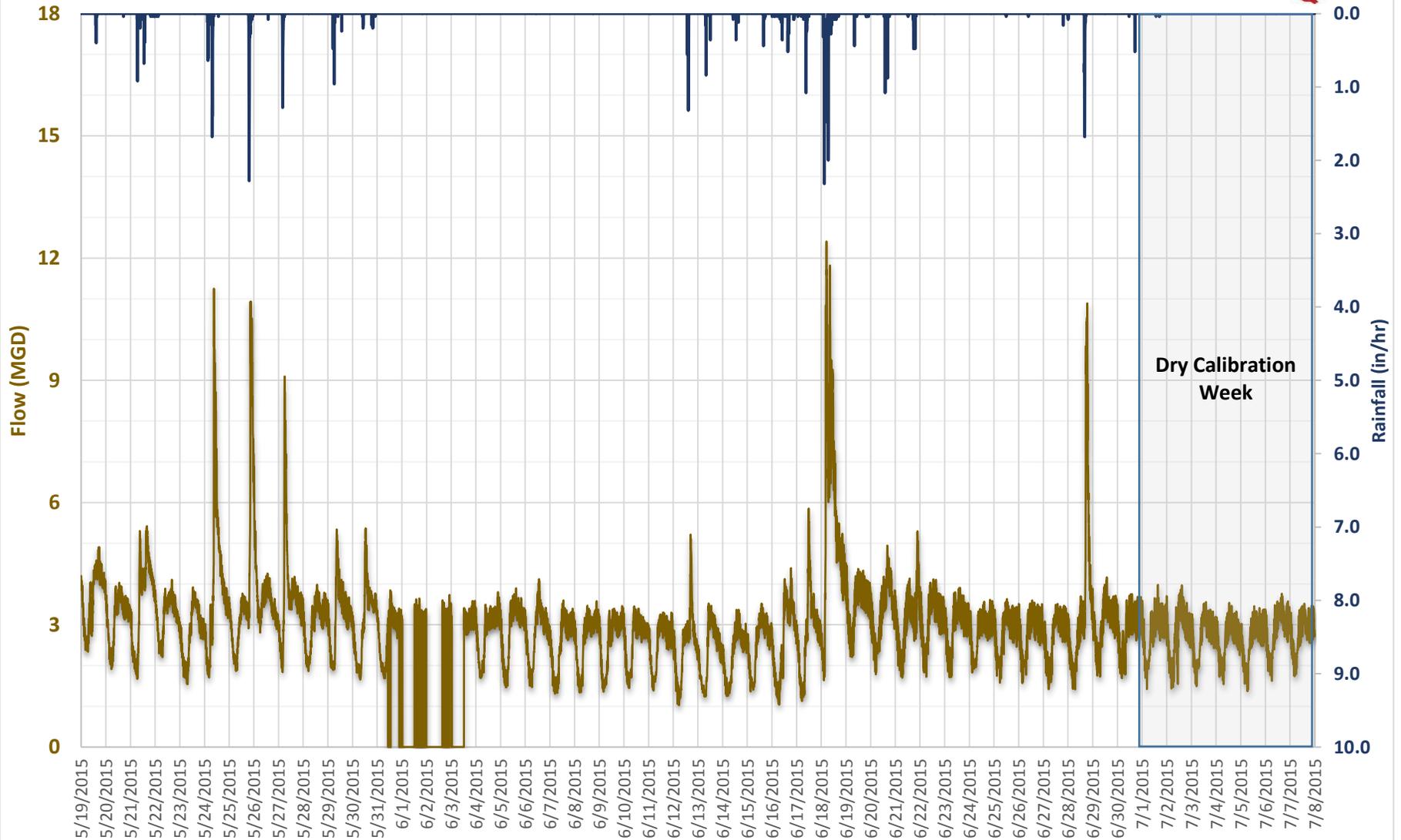
**Recorded Flow Rate**



City of Huntsville  
Wastewater System Field Testing  
Flow Monitor Data  
Flow monitor ID: **AJ-08**



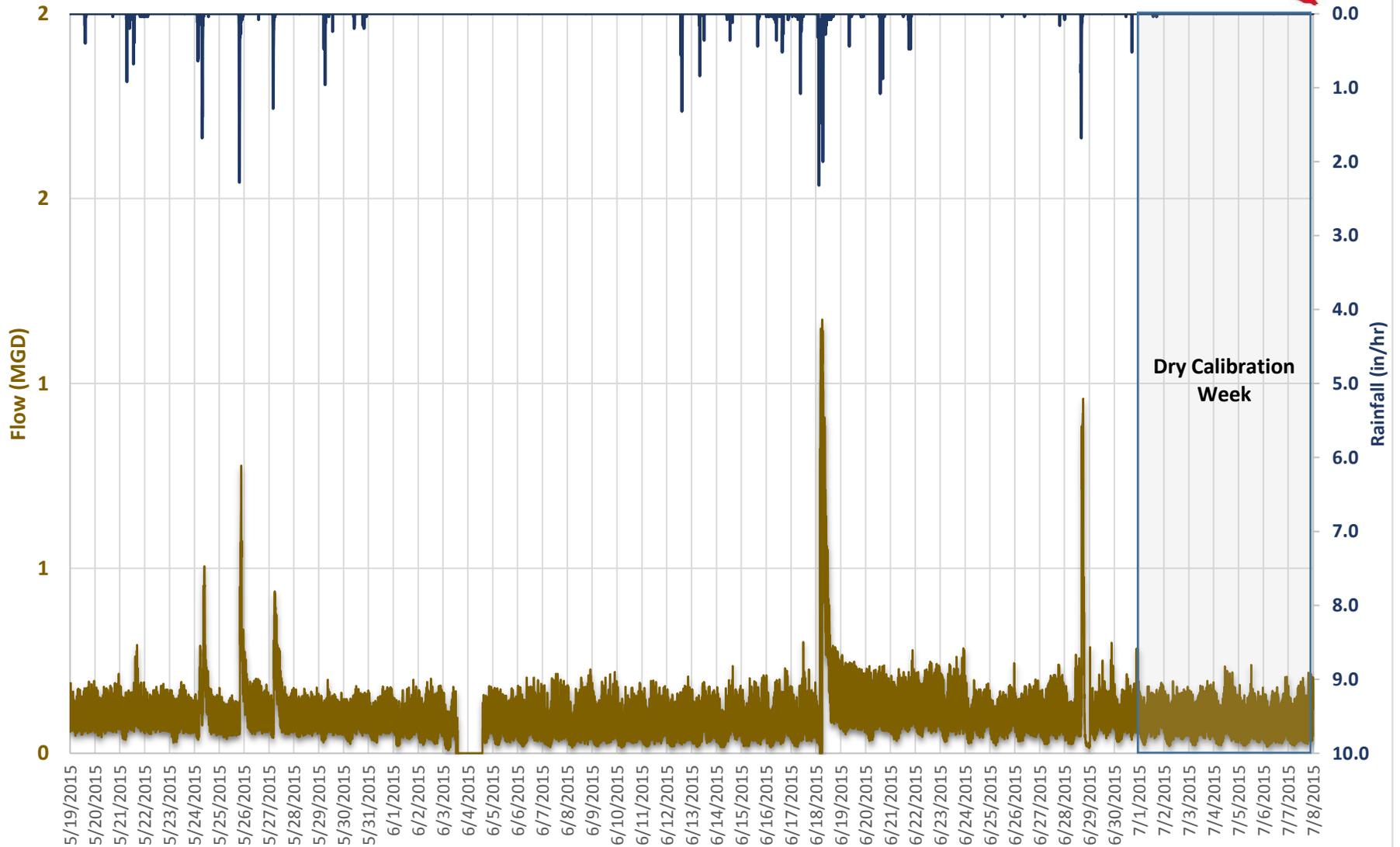
**Recorded Flow Rate**



City of Huntsville  
Wastewater System Field Testing  
Flow Monitor Data  
Flow monitor ID: **AJ-09**



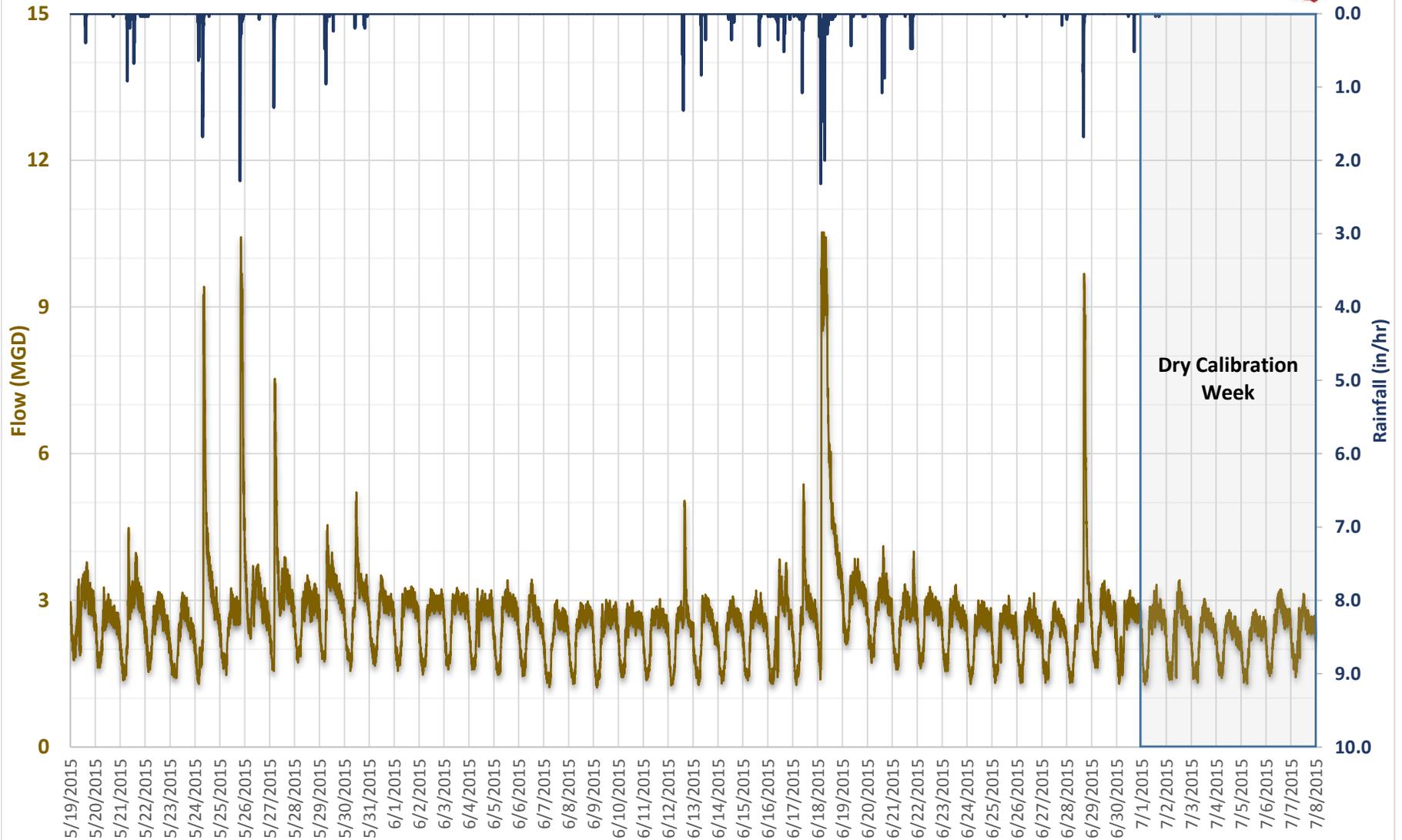
**Recorded Flow Rate**



City of Huntsville  
 Wastewater System Field Testing  
 Flow Monitor Data  
 Flow monitor ID: **AJ-10**



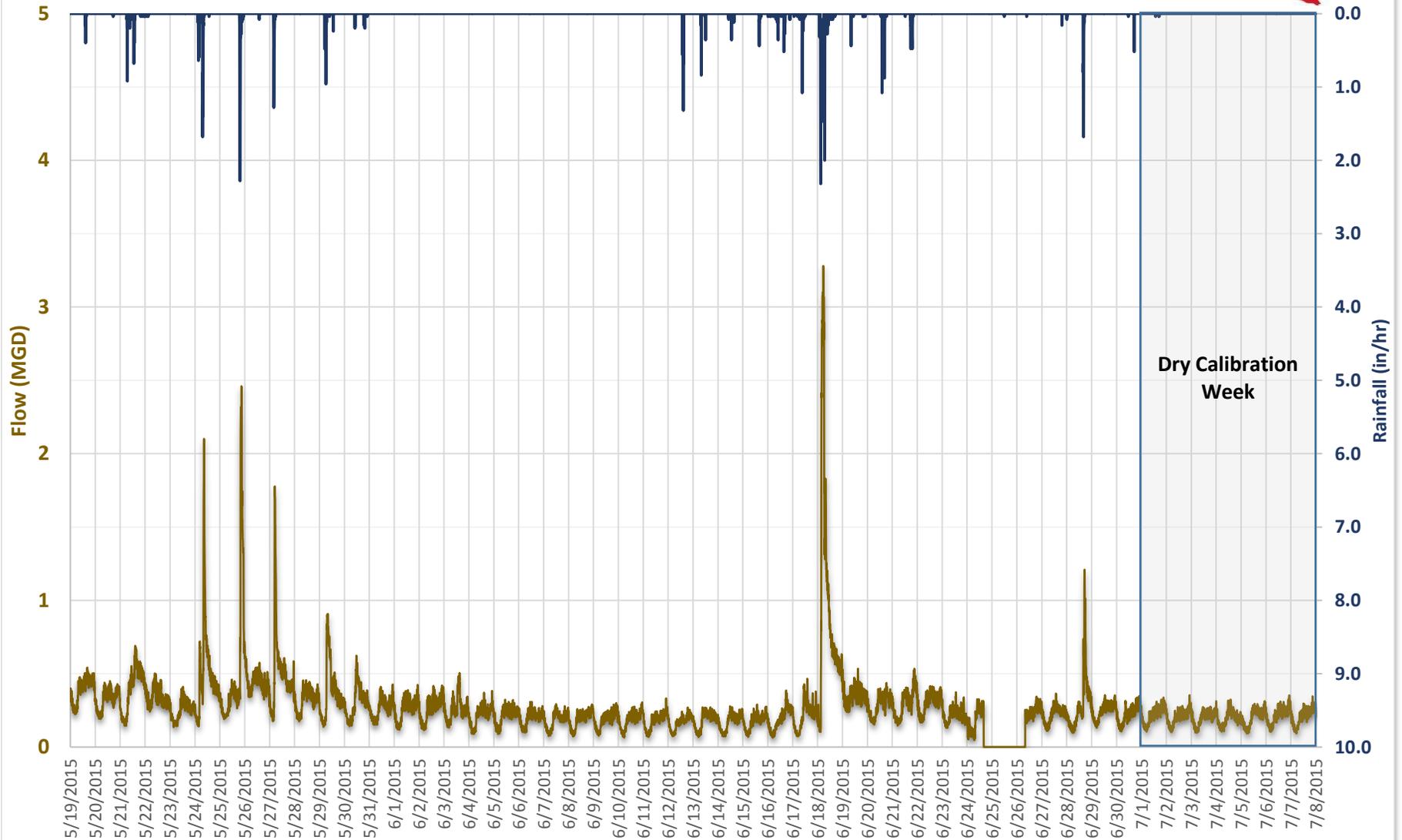
**Recorded Flow Rate**



City of Huntsville  
Wastewater System Field Testing  
Flow Monitor Data  
Flow monitor ID: **AJ-11**



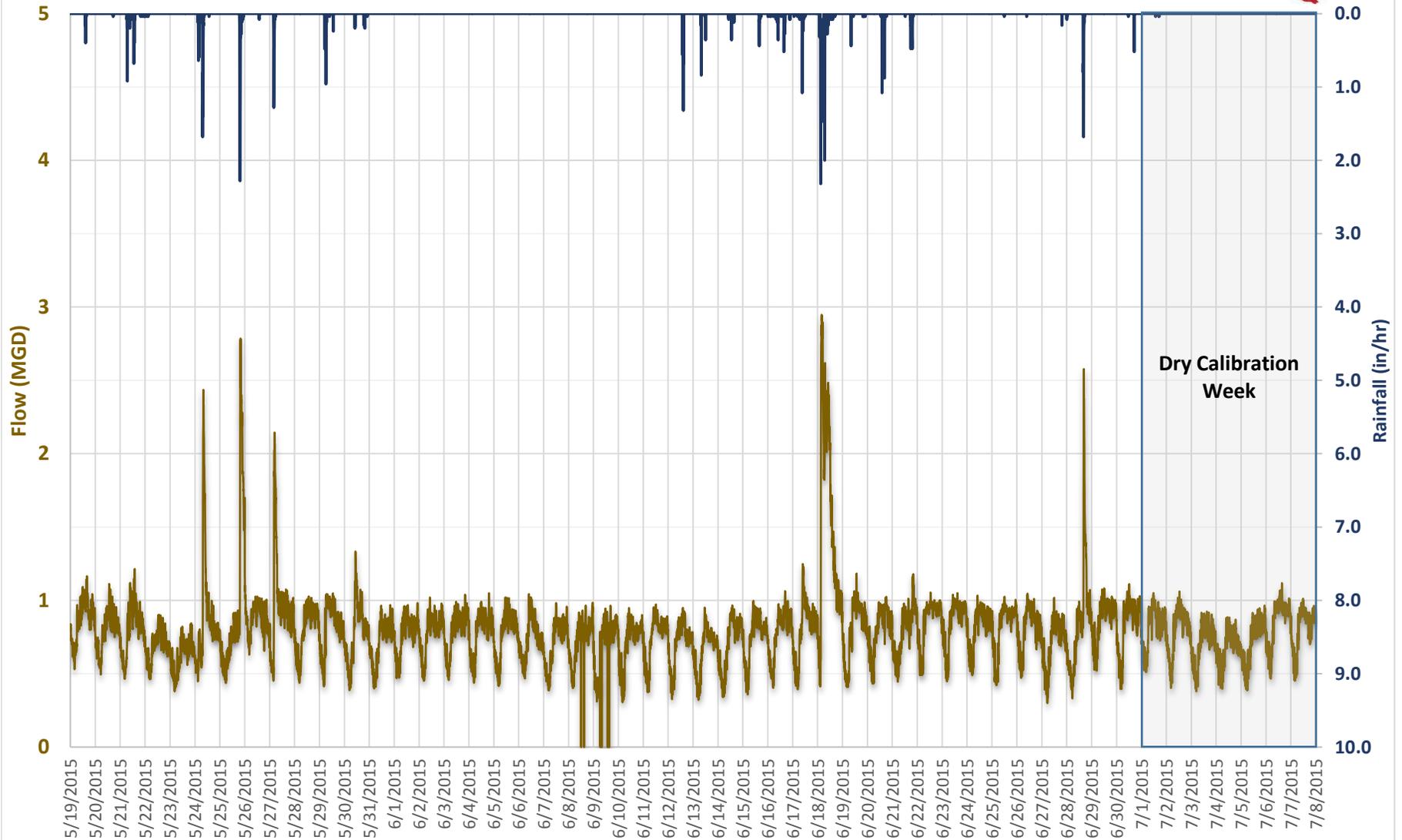
**Recorded Flow Rate**



City of Huntsville  
Wastewater System Field Testing  
Flow Monitor Data  
Flow monitor ID: **AJ-12**



**Recorded Flow Rate**

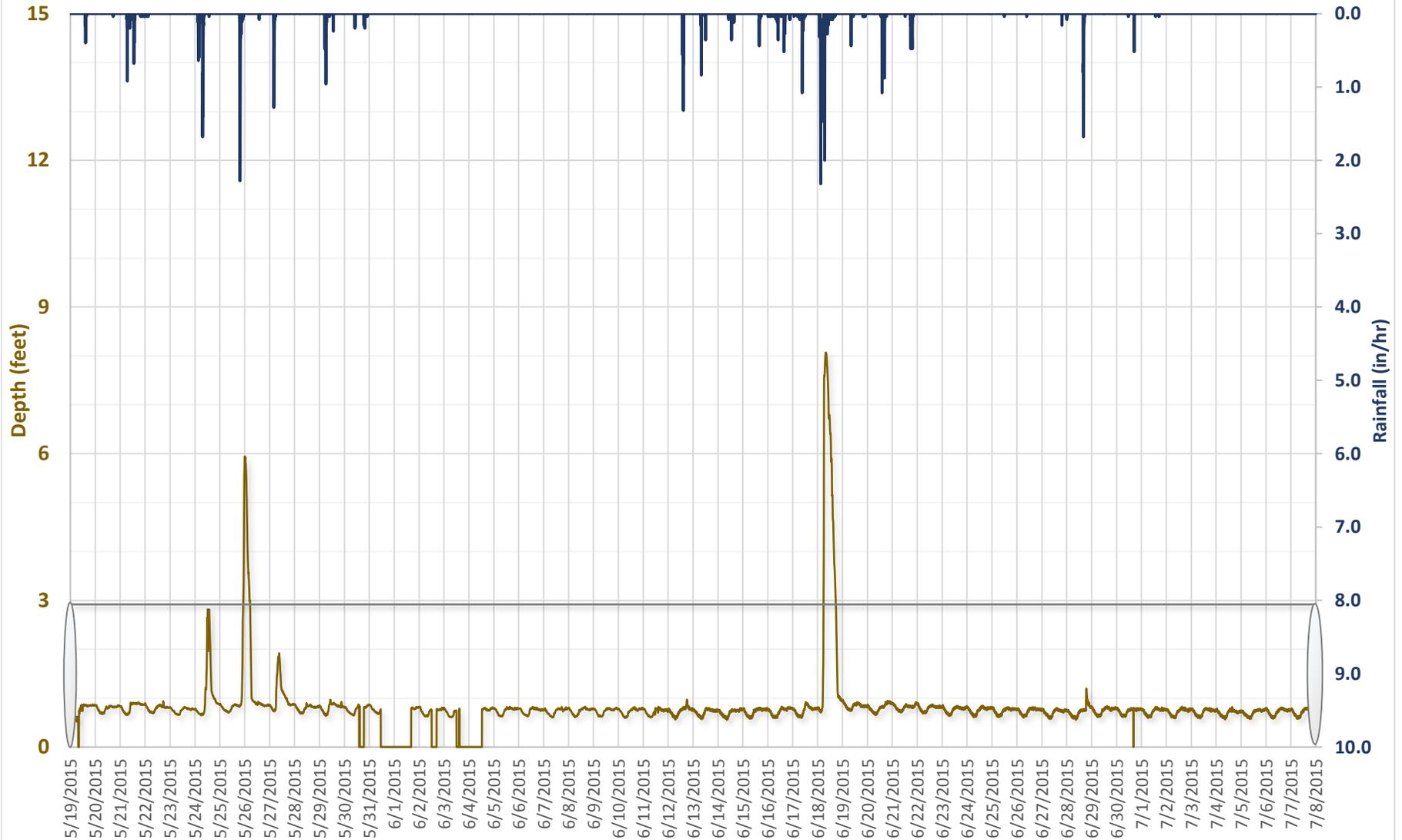




City of Huntsville  
Wastewater System Field Testing  
Flow Monitor Data  
Flow monitor ID: RC-01



Recorded Depth of Flow

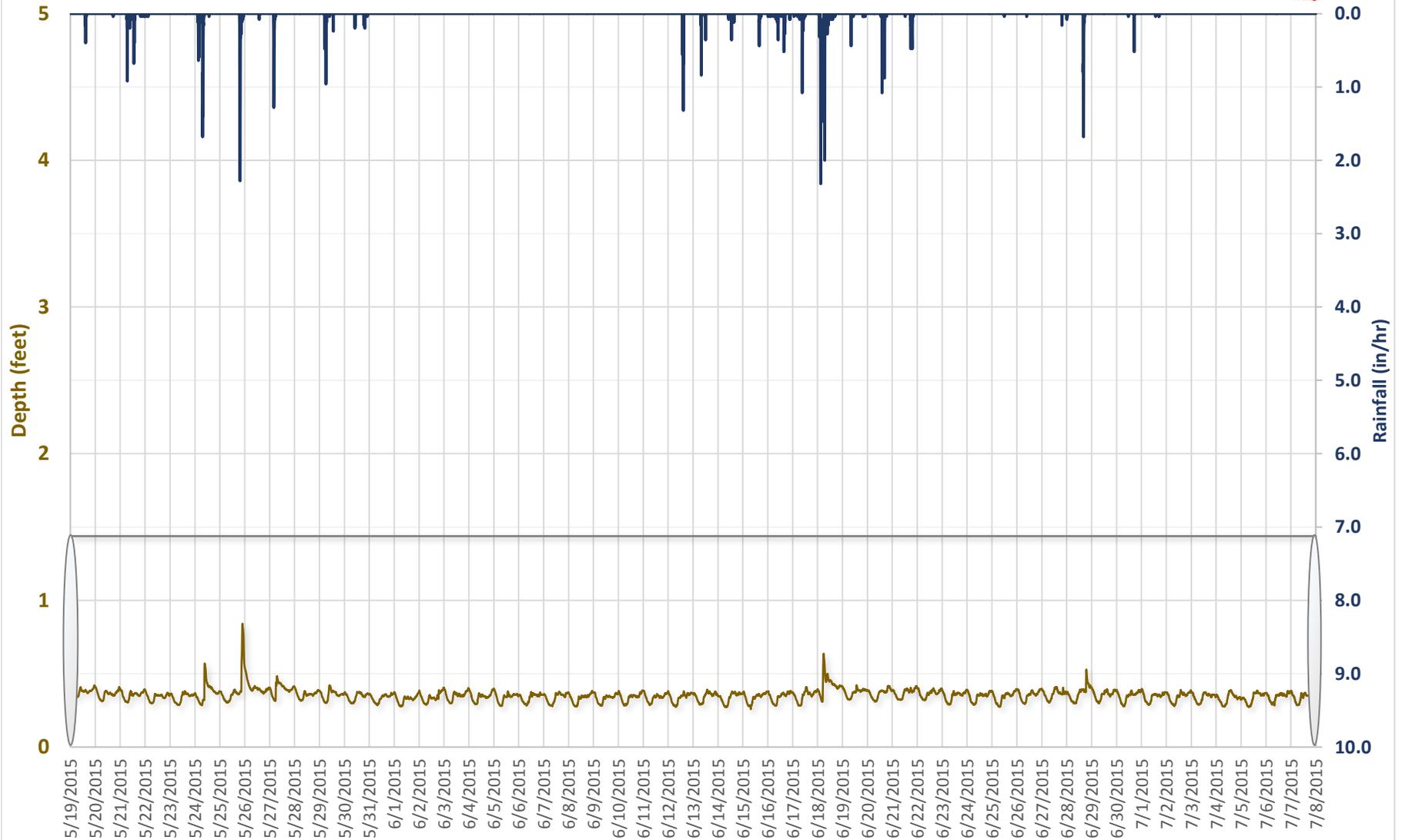




City of Huntsville  
Wastewater System Field Testing  
Flow Monitor Data  
Flow monitor ID: RC-02



Recorded Depth of Flow

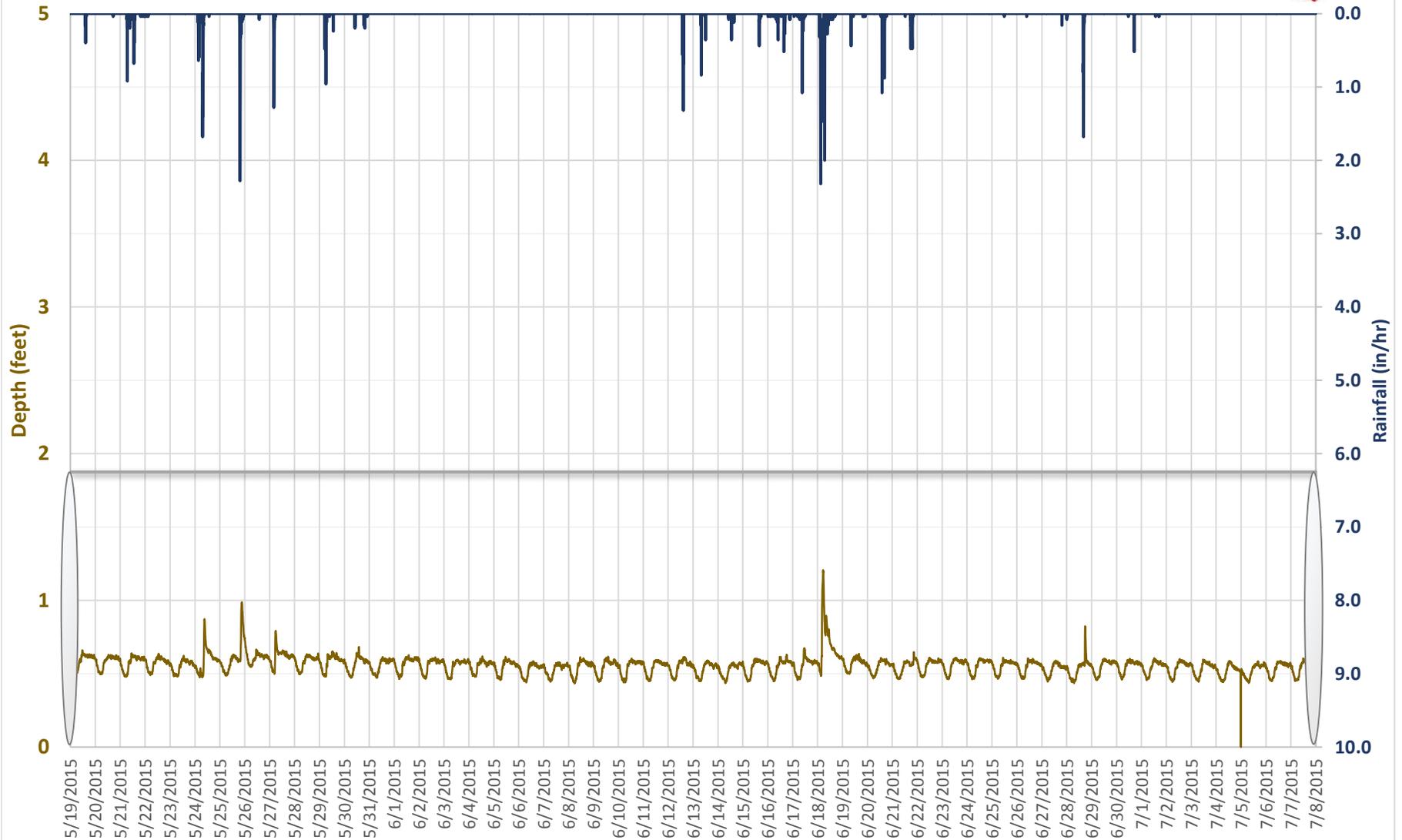




City of Huntsville  
Wastewater System Field Testing  
Flow Monitor Data  
Flow monitor ID: RC-03



Recorded Depth of Flow

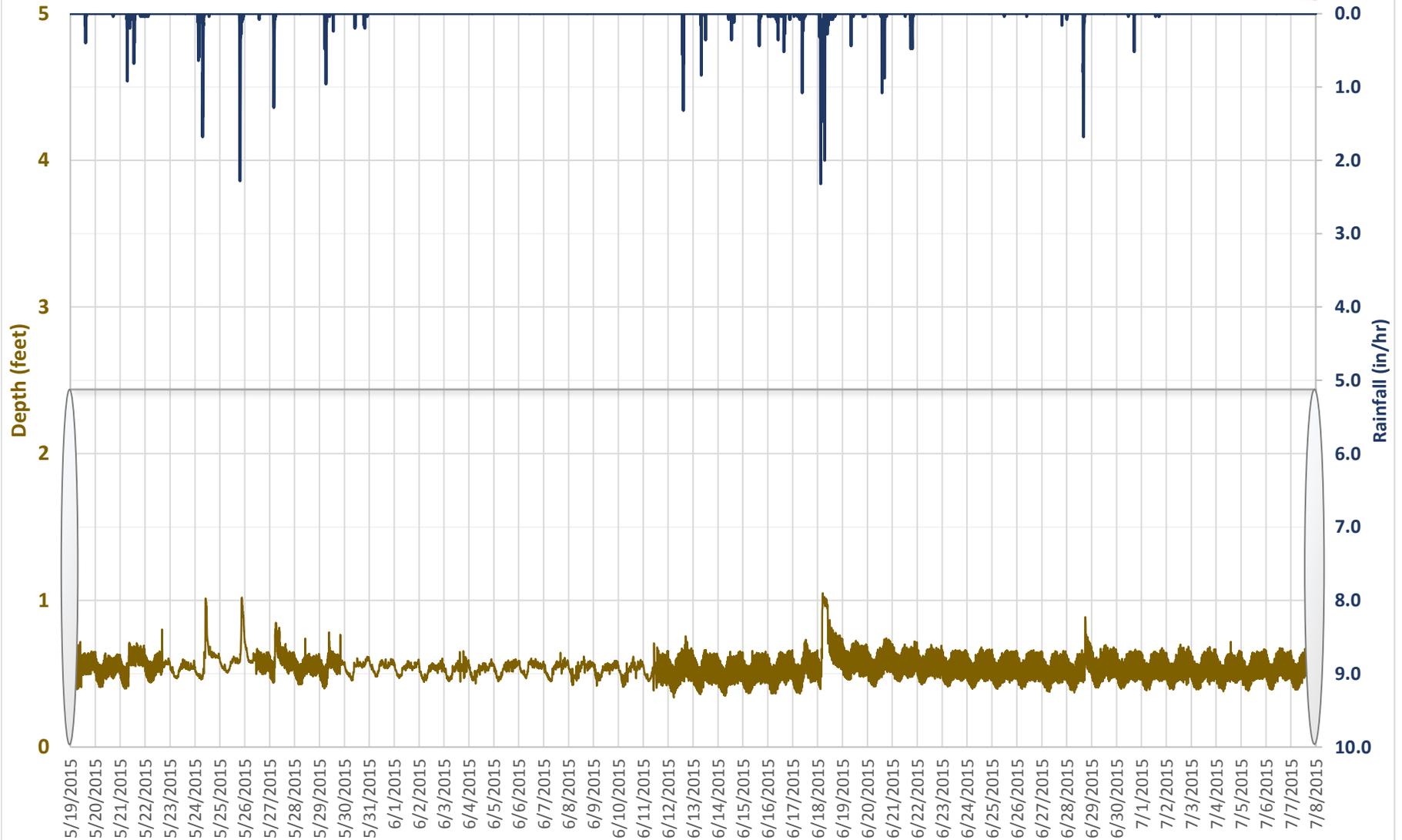




City of Huntsville  
Wastewater System Field Testing  
Flow Monitor Data  
Flow monitor ID: RC-04



Recorded Depth of Flow

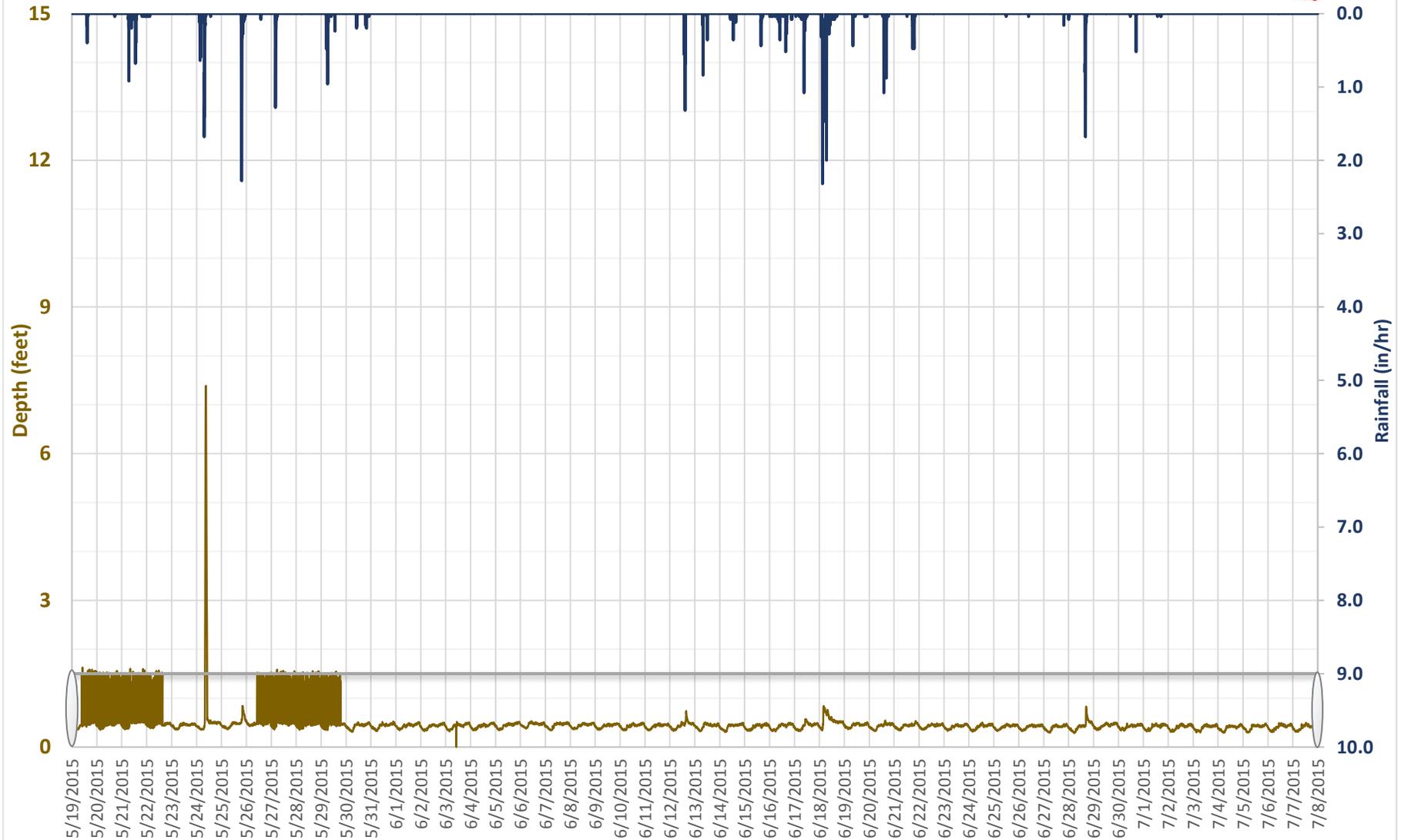




City of Huntsville  
Wastewater System Field Testing  
Flow Monitor Data  
Flow monitor ID: RC-05



Recorded Depth of Flow

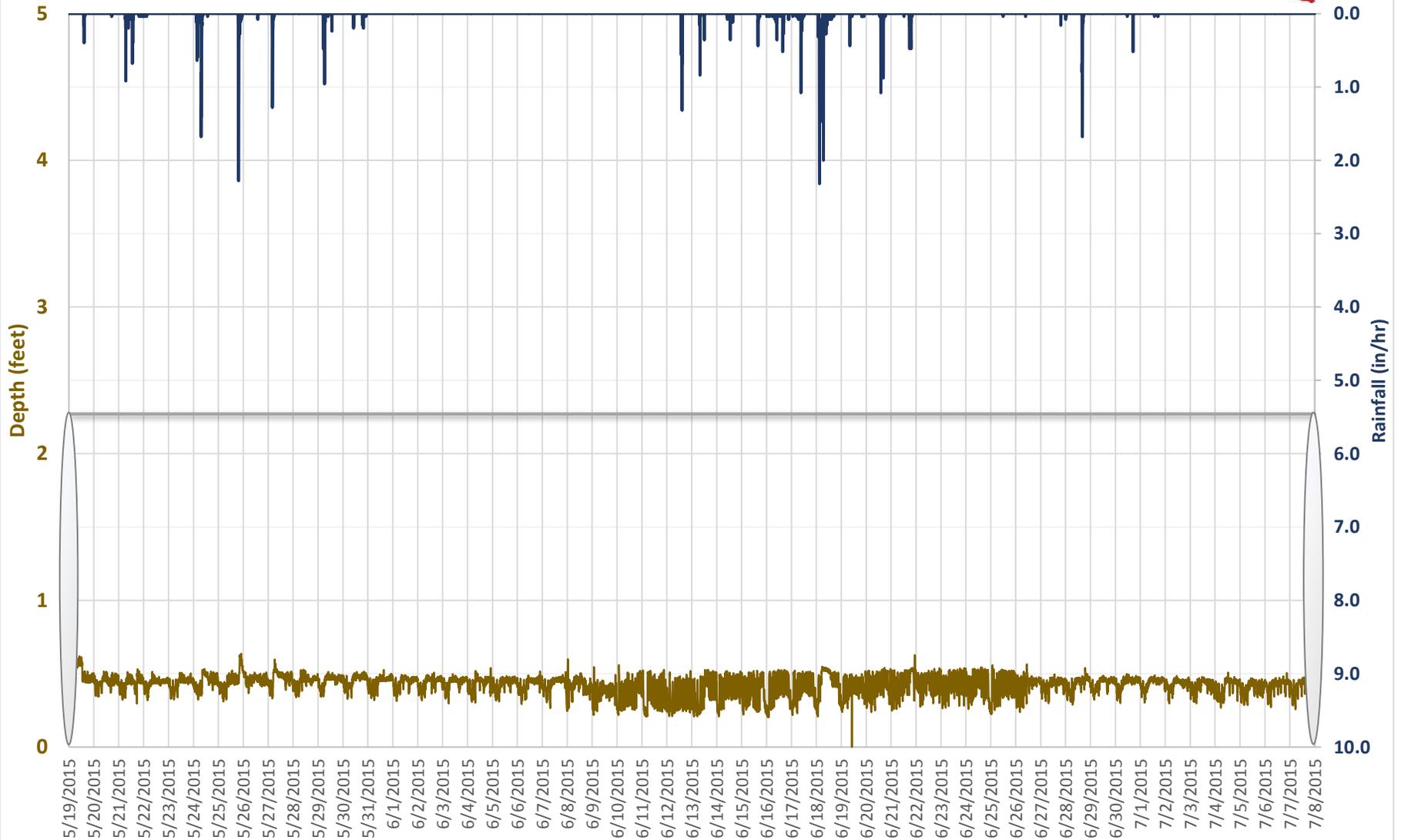




City of Huntsville  
Wastewater System Field Testing  
Flow Monitor Data  
Flow monitor ID: NB-06

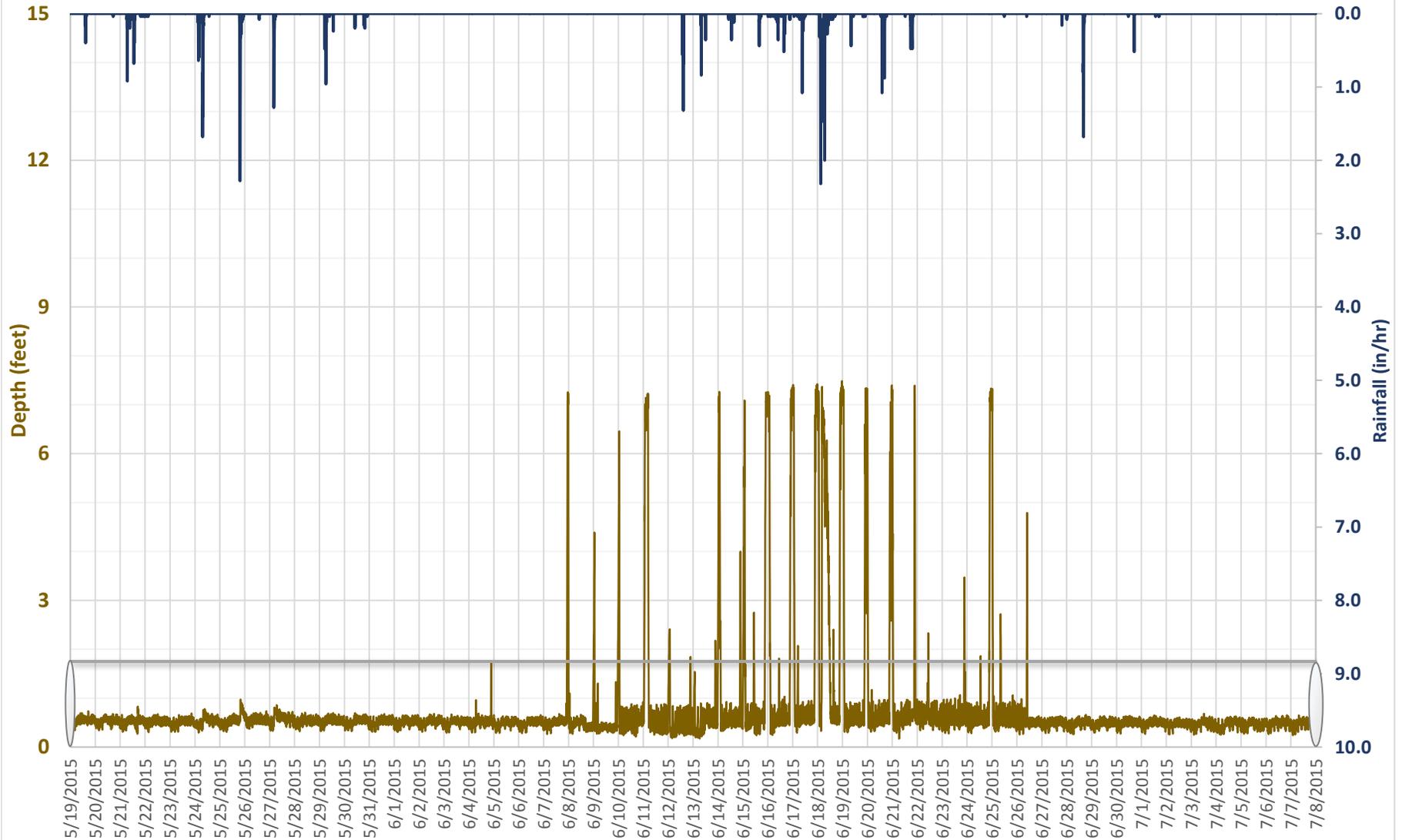


Recorded Depth of Flow





**Recorded Depth of Flow**

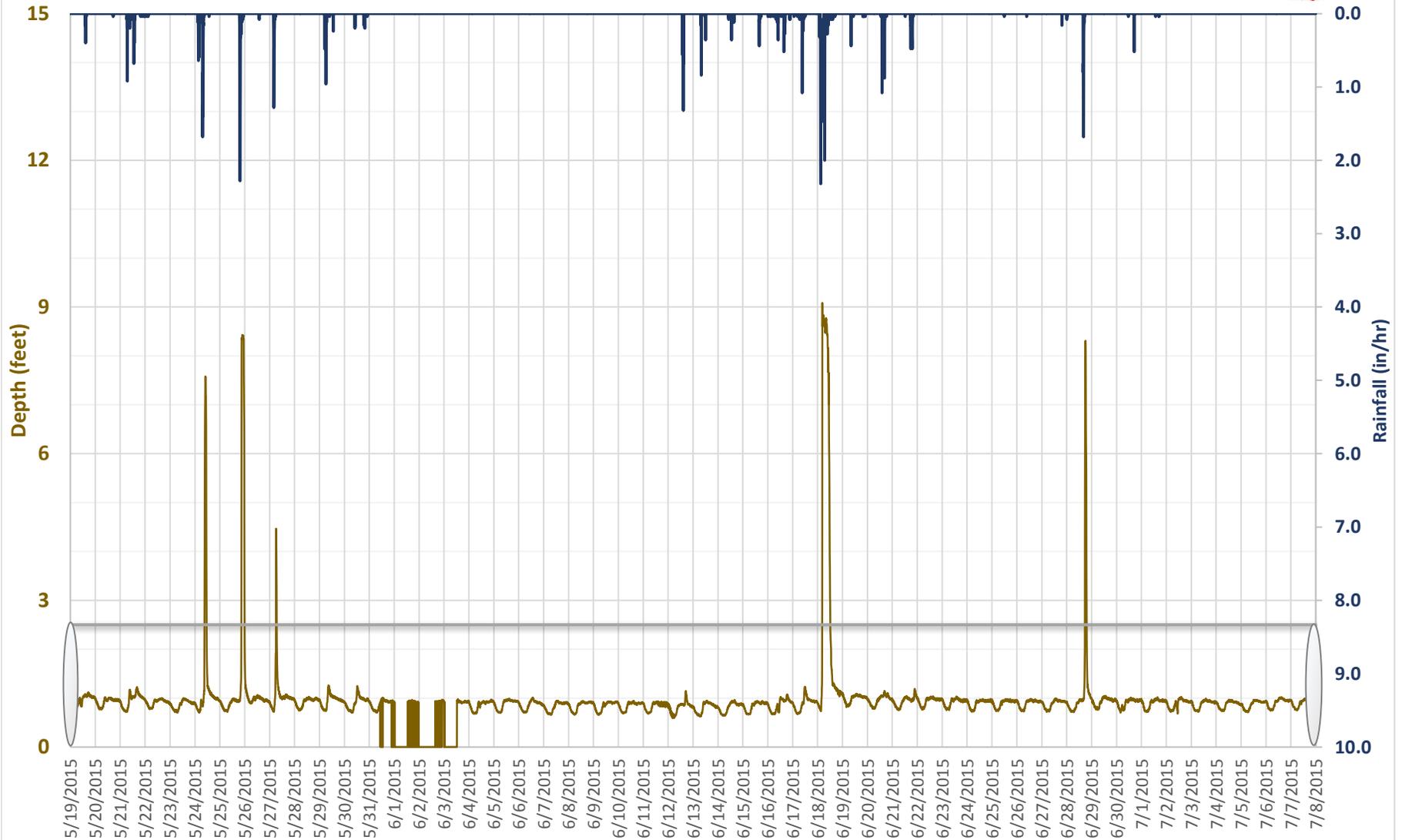




City of Huntsville  
Wastewater System Field Testing  
Flow Monitor Data  
Flow monitor ID: **AJ-08**



**Recorded Depth of Flow**

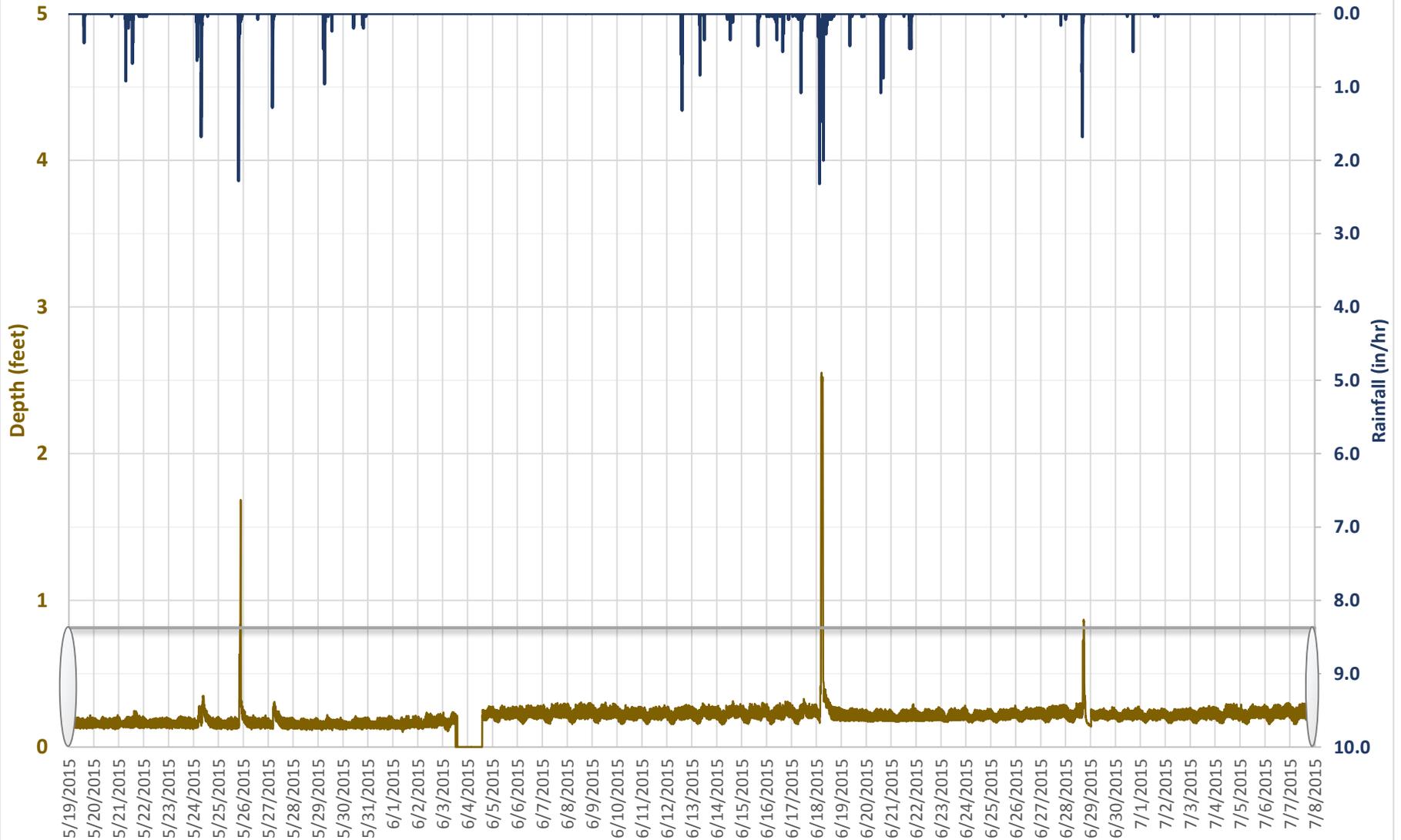




City of Huntsville  
Wastewater System Field Testing  
Flow Monitor Data  
Flow monitor ID: **AJ-09**



**Recorded Depth of Flow**

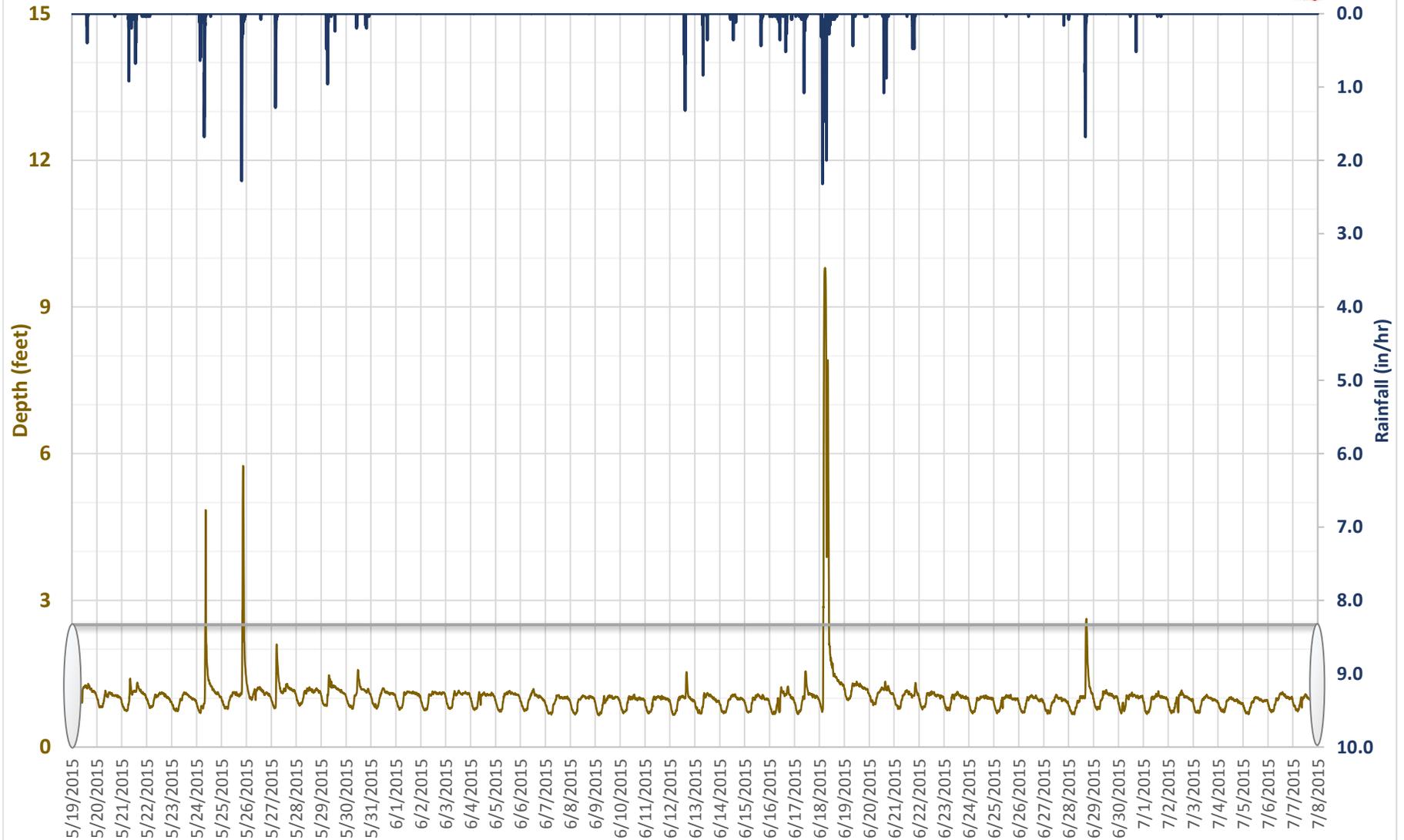




City of Huntsville  
Wastewater System Field Testing  
Flow Monitor Data  
Flow monitor ID: **AJ-10**



**Recorded Depth of Flow**

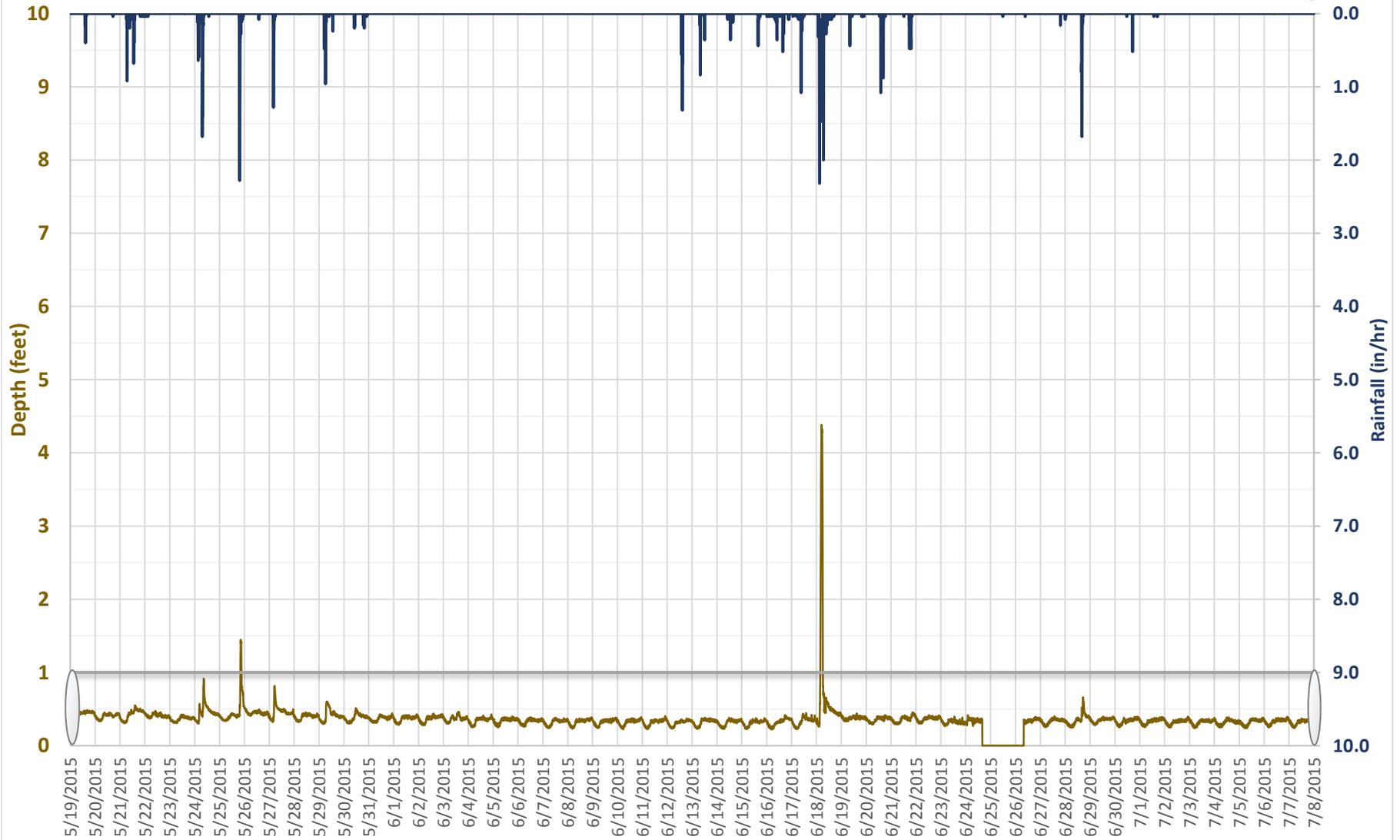




City of Huntsville  
Wastewater System Field Testing  
Flow Monitor Data  
Flow monitor ID: **AJ-11**



**Recorded Depth of Flow**

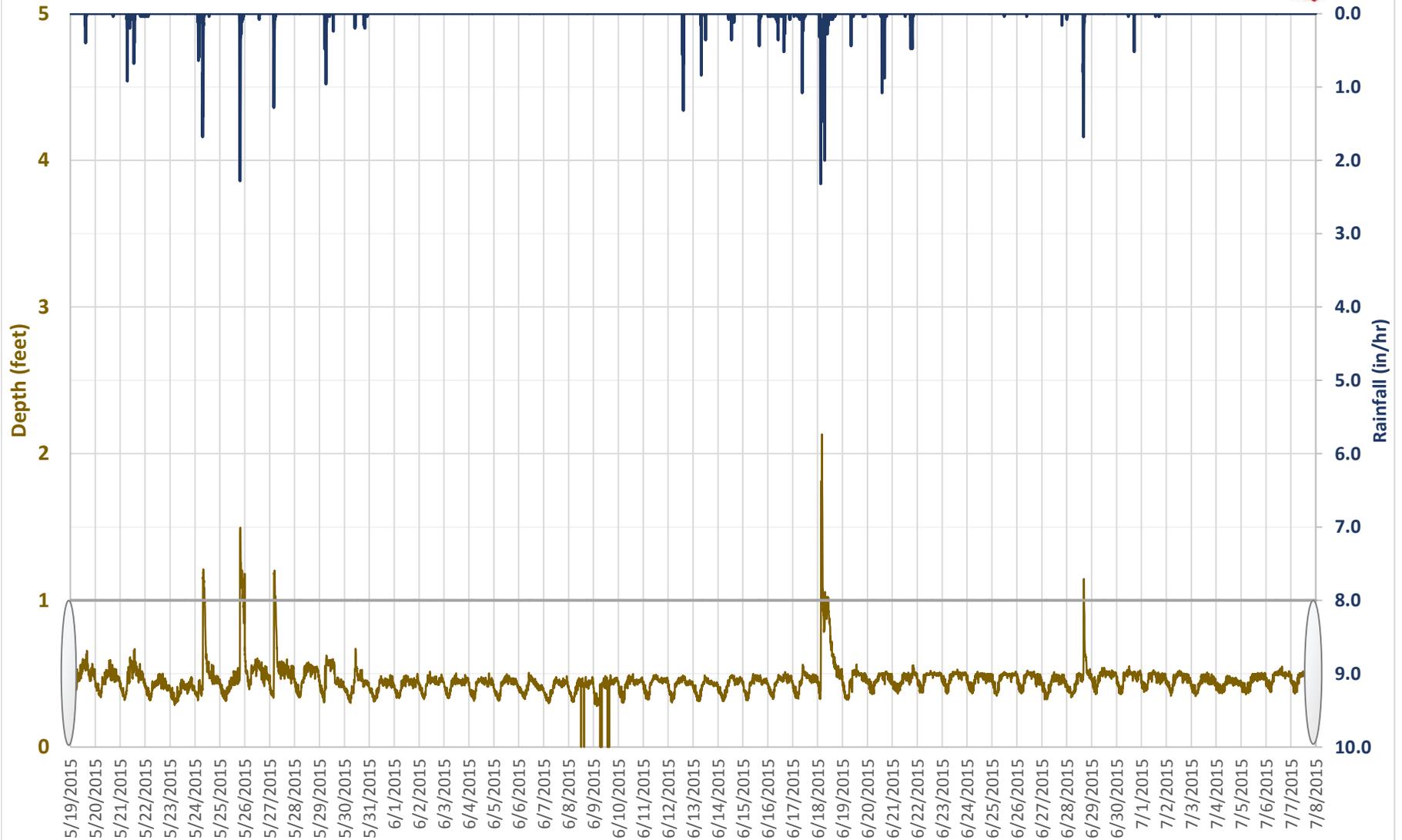




City of Huntsville  
Wastewater System Field Testing  
Flow Monitor Data  
Flow monitor ID: **AJ-12**



**Recorded Depth of Flow**

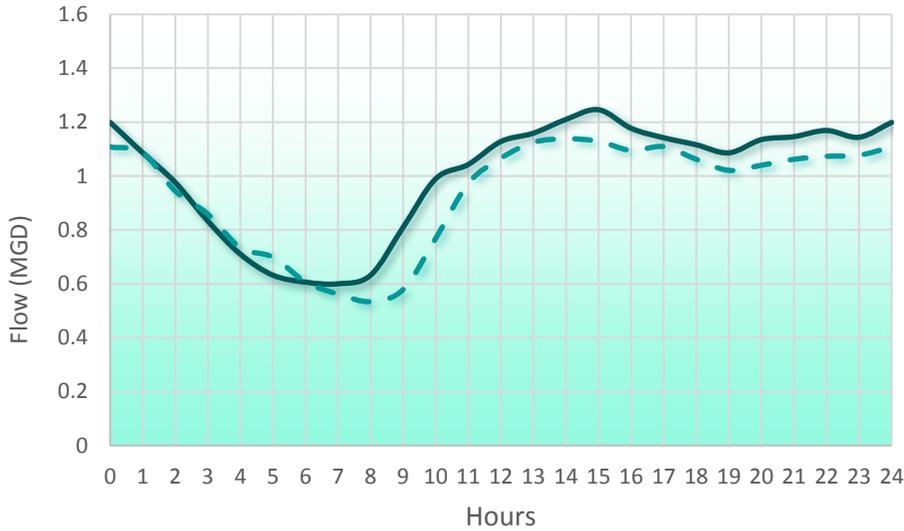




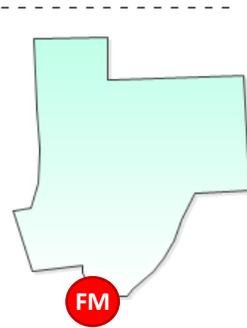
## **APPENDIX J**

### **Wastewater Diurnal Patterns**

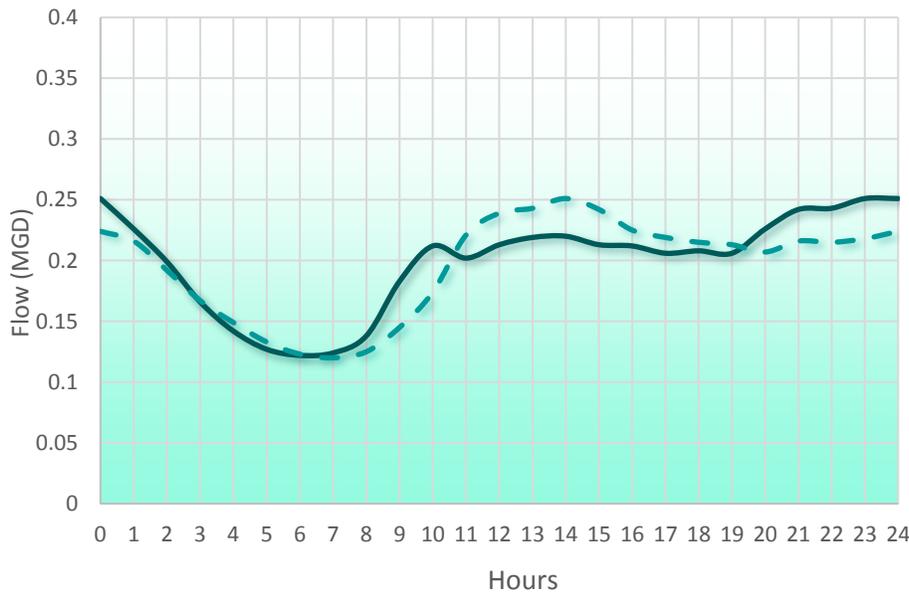
**Flow Monitor: RC-01**



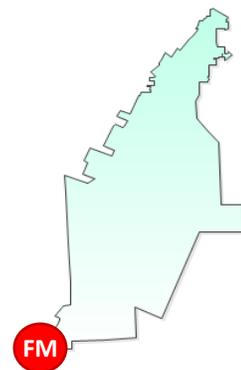
Average Dry Flow  
1.00 MGD



**Flow Monitor: RC-02**



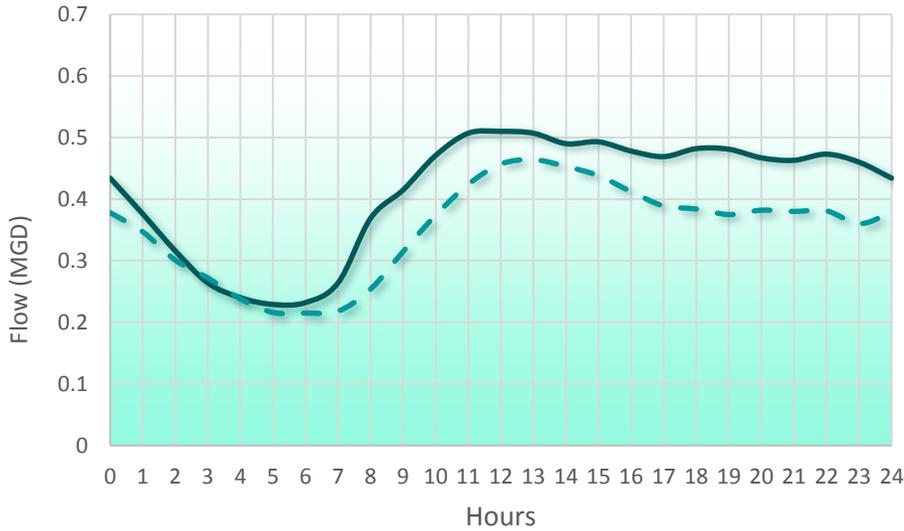
Average Dry Flow  
0.20 MGD



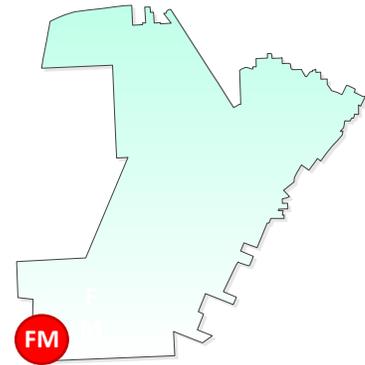
City of Huntsville  
Wastewater System Field Testing  
Diurnal Patterns



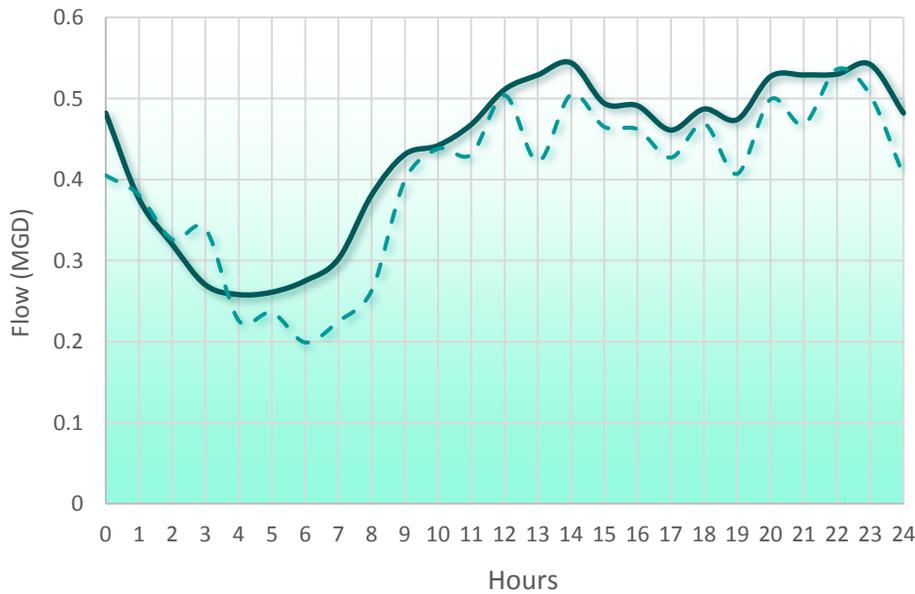
**Flow Monitor: RC-03**



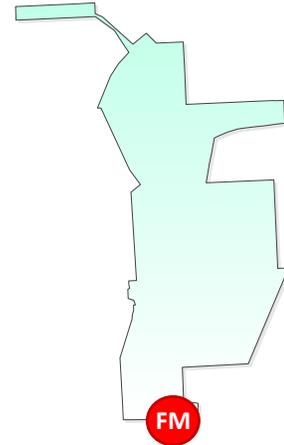
Average Dry Flow  
0.41 MGD



**Flow Monitor: RC-04**

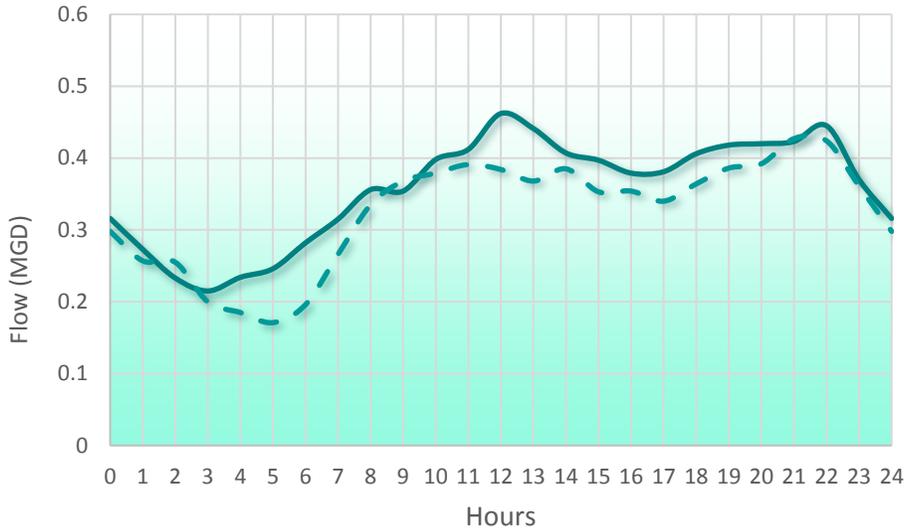


Average Dry Flow  
0.43 MGD



— Weekday Diurnal    - - - Weekend Diurnal    **FM** Flow Monitor Location

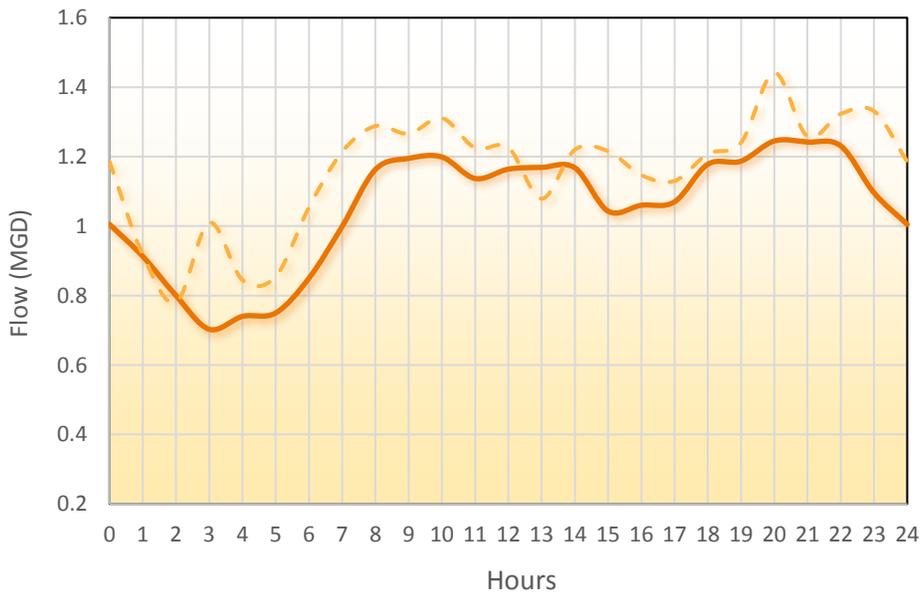
**Flow Monitor: RC-05**



Average Dry Flow  
0.36 MGD



**Flow Monitor: NB-06**



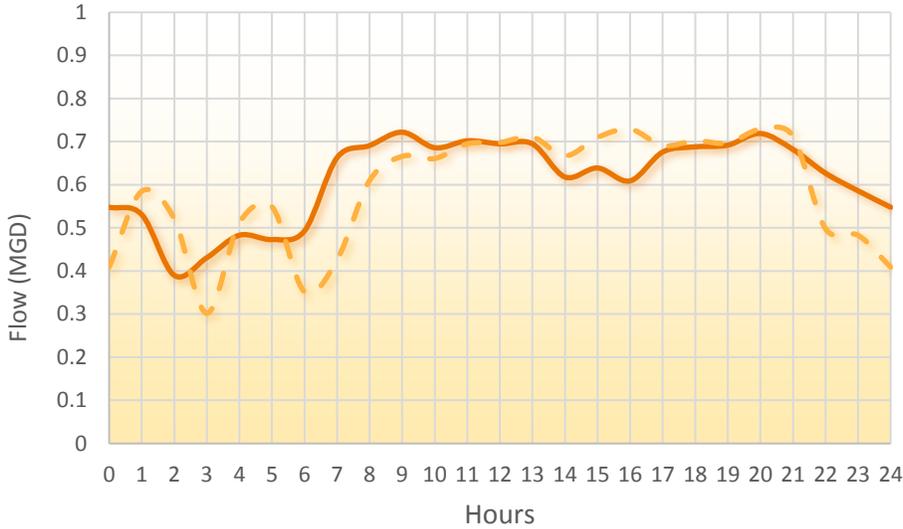
Average Dry Flow  
1.05 MGD



City of Huntsville  
Wastewater System Field Testing  
Diurnal Patterns



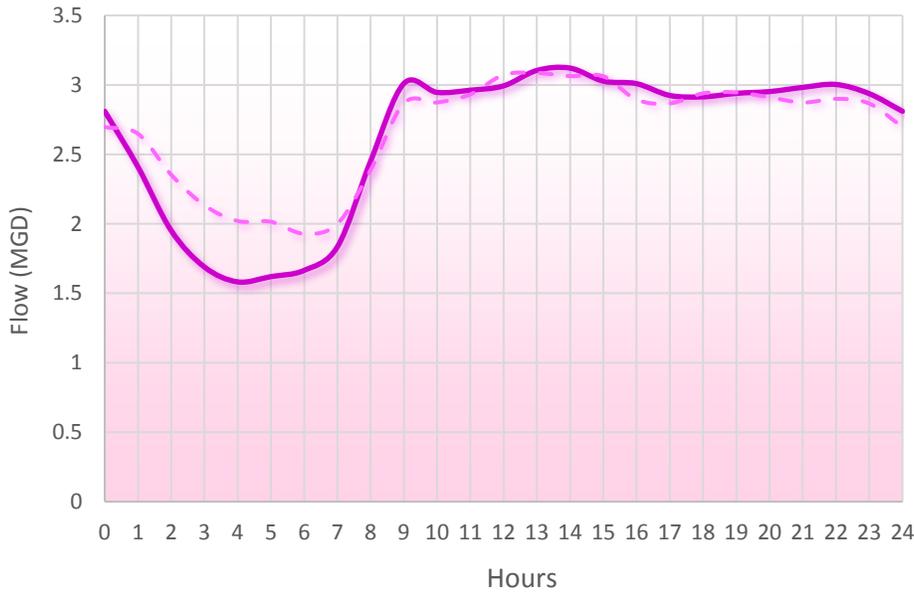
**Flow Monitor: NB-07**



Average Dry Flow  
0.61 MGD



**Flow Monitor: AJ-08**



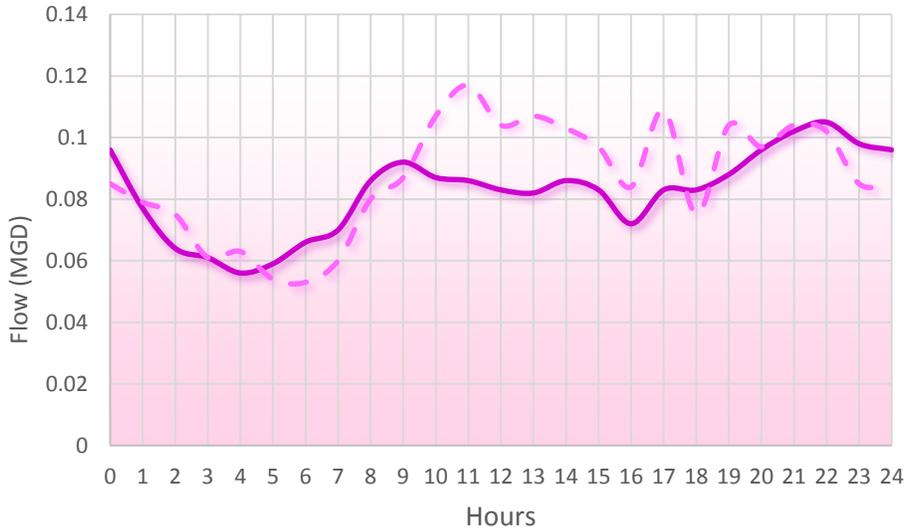
Average Dry Flow  
2.62 MGD



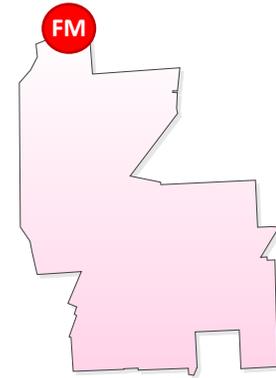
City of Huntsville  
Wastewater System Field Testing  
Diurnal Patterns



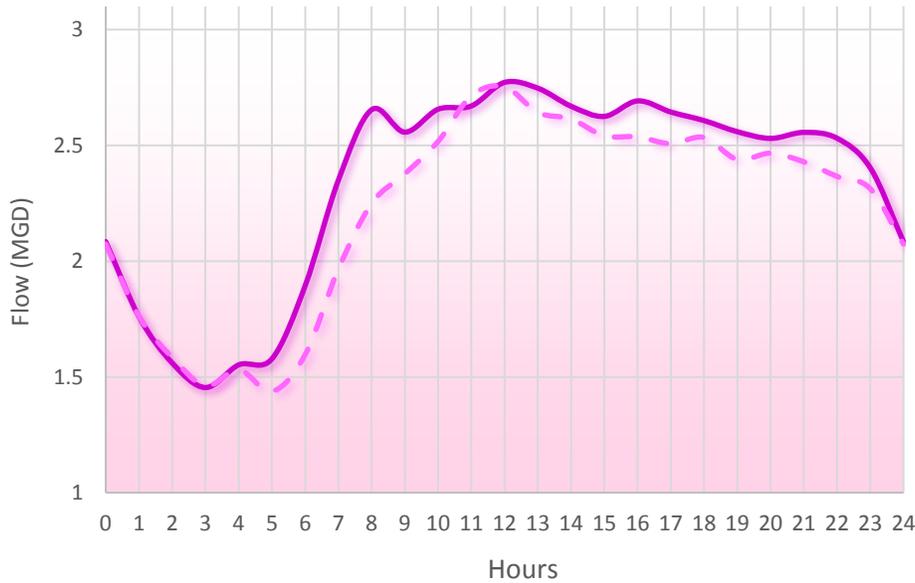
**Flow Monitor: AJ-09**



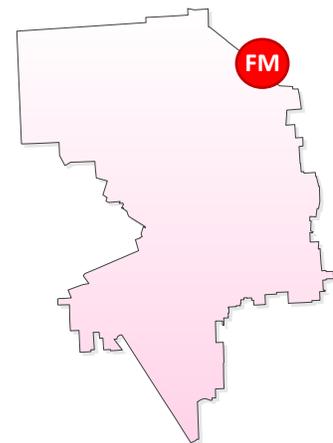
Average Dry Flow  
0.08 MGD



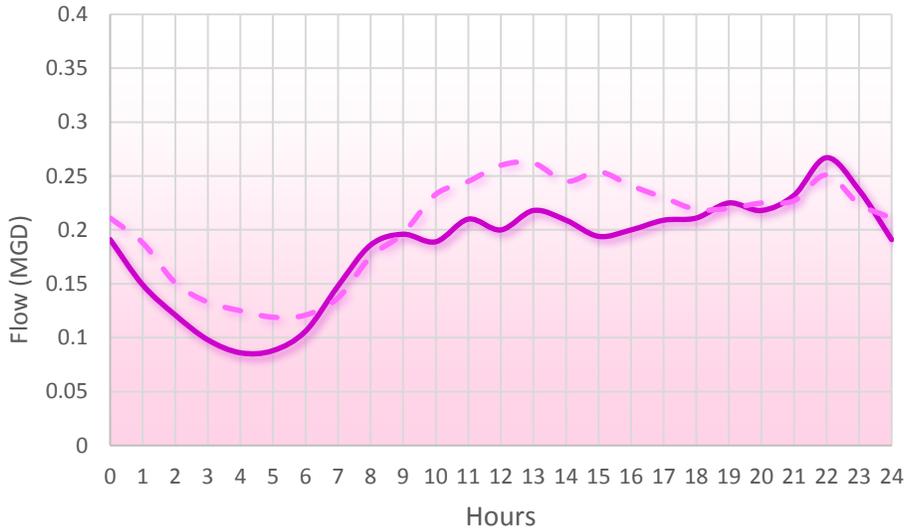
**Flow Monitor: AJ-10**



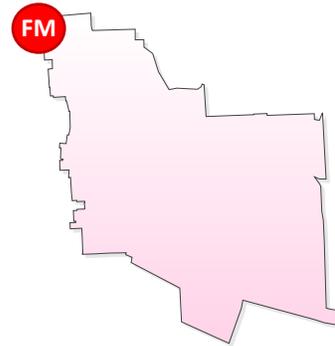
Average Dry Flow  
2.34 MGD



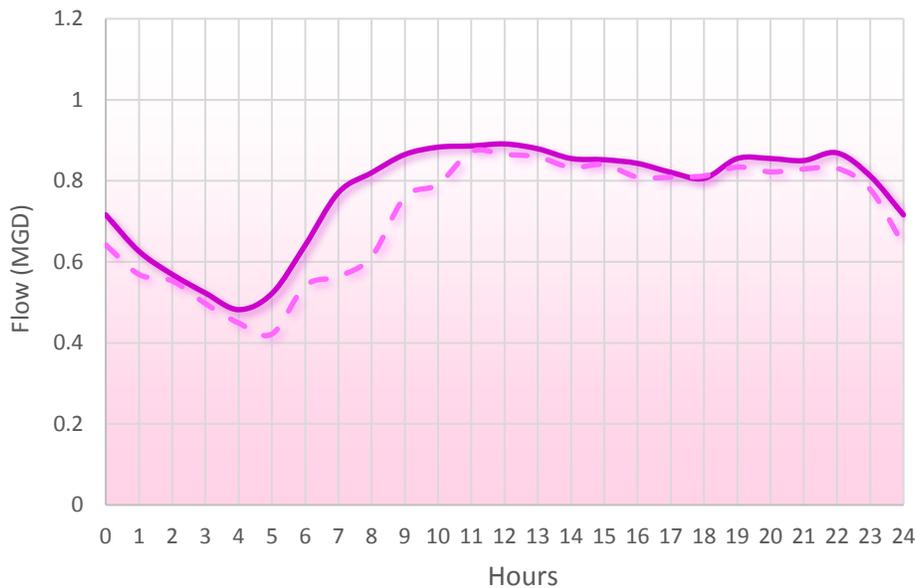
**Flow Monitor: AJ-11**



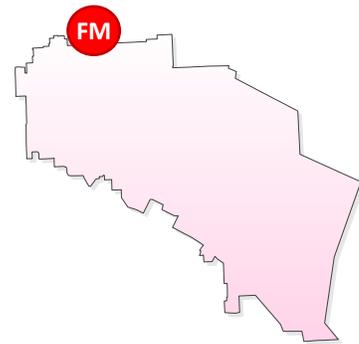
Average Dry Flow  
0.18 MGD



**Flow Monitor: AJ-12**



Average Dry Flow  
0.77 MGD





**APPENDIX K**  
**RC-01 Basin Manhole Inspection Sheets**

PROJECT NUMBER 25146.11

# Sewer System Evaluation Survey

Manhole Inspections – Robinson Creek Basin

**Draft**

PREPARED FOR

City of Huntsville

448 State Highway 75 North  
Huntsville, TX 7732

SUBMITTED

December 21, 2015





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## *Introduction*

This report presents the results of manhole inspection activities conducted by ADS Environmental Services (ADS) within selected portions of the Robinson Creek Basin of the City of Huntsville sanitary sewer system. Manhole inspection activities were performed at the request of Freese & Nichols, Inc. (Engineer).

## *Background*

ADS was previously retained by the Engineer to gather and evaluate flow monitor and rainfall data within selected portions of the existing sanitary sewer system located in Huntsville, Texas. The scope of this original study was to characterize dry weather and wet weather flow conditions at key locations within the sewer system, evaluate key performance indicators, and rank the relative severity of observed rain-dependent inflow and infiltration (RDII) to assist the Engineer to direct subsequent planning, condition assessment, and rehabilitation activities. This work was completed during Summer 2015, and the results indicated that Sub-Basin RC-01 of the Robinson Creek Basin had the highest levels of RDII.

## *Methodology*

Manhole inspection is a common inspection method used to locate and identify potential sources of infiltration and inflow within a sanitary sewer system. During manhole inspections, the condition of each manhole is inspected from cover to invert. Structural defects, operation and maintenance (O&M) concerns, roots, and infiltration sources are noted. Conditions within attached sewer lines and service laterals are also noted. Manhole inspection observations are used along with smoke testing results to guide further inspection and rehabilitation recommendations. Manhole inspection is one of many tools available to evaluate sewer conditions and complements other inspection and testing methods.

Manhole inspection is performed by two methods: confined space entry and remote inspection. Using the confined space entry method, a trained inspector physically enters the manhole using proper safety equipment and methods. The inspector then documents observed conditions. Using the remote inspection method, a trained operator uses a pole-mounted camera to observe and document observed conditions, and confined-space entry is not required. The remote inspection method was used in these evaluations. Results from each inspection are incorporated into a database for further evaluation and/or corrective action.



## Results

A total of 43 manhole inspections were assigned, and 42 manhole inspections were completed in the Robinson Creek Basin. Manhole 0003 was not accessible for inspection due to the poor condition of the manhole. This manhole needs a frame and cover replacement, the frame is in danger of falling into the manhole if disturbed.

Manhole inspections were performed from 10/15/2015 through 10/19/2015. All of the manholes inspected in Robinson Creek Basin are located in unpaved (grass) areas. The rim-to-invert depths ranged from 6.20 ft to 13.40 ft. Defects were found at 39 manholes that warrant subsequent rehabilitation activities. The most common defects identified during manhole inspections were varying degrees of concrete corrosion due to hydrogen sulfide (H<sub>2</sub>S). Some active sources of infiltration were identified, and the widespread use of inflow dishes suggests that surface water inflow has previously been identified as a problem within this area.

## Recommendations

The recommendations in this study are based on data gathered while performing manhole inspections on 43 manholes within the City of Huntsville.

**TABLE 1: Manhole Rehabilitation Recommendations**

Manhole	Recommendation	Units	Estimated Unit Cost	Estimated Cost
0002	Apply H <sub>2</sub> S resistant liner to manhole	7.00 VF	\$200	\$1,400
0003	Repair concrete around frame	1 EA	\$250	\$250
0003	Replace frame and cover	1 EA	\$750	\$750
0004	Apply H <sub>2</sub> S resistant liner to manhole	6.20 VF	\$200	\$1,240
0005	Apply H <sub>2</sub> S resistant liner to manhole	6.80 VF	\$200	\$1,360
0006	Repair concrete around frame	1 EA	\$250	\$250
0006	Apply H <sub>2</sub> S resistant liner to manhole	8.00 VF	\$200	\$1,600
0013	Apply H <sub>2</sub> S resistant liner to manhole	8.50 VF	\$200	\$1,700
0016	Apply H <sub>2</sub> S resistant liner to manhole	08.60 VF	\$200	\$1,720
0018	Apply H <sub>2</sub> S resistant liner to manhole	10.00 VF	\$200	\$2,000
0022	Apply H <sub>2</sub> S resistant liner to manhole	10.10 VF	\$200	\$2,020
0024	Apply H <sub>2</sub> S resistant liner to manhole	10.40 VF	\$200	\$2,080
0027	Apply H <sub>2</sub> S resistant liner to manhole	10.30 VF	\$200	\$2,060
0034	Apply H <sub>2</sub> S resistant liner to manhole	12.00 VF	\$200	\$2,400
0037	Apply H <sub>2</sub> S resistant liner to manhole	10.20 VF	\$200	\$2,040
0041	Apply H <sub>2</sub> S resistant liner to manhole	7.90 VF	\$200	\$1,580
0048	Apply H <sub>2</sub> S resistant liner to manhole	8.00 VF	\$200	\$1,600



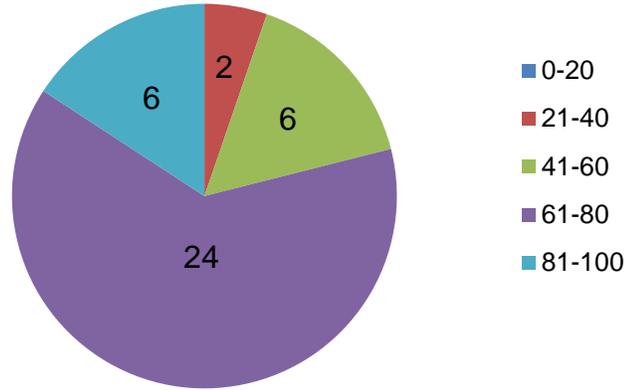
0052	Apply H <sub>2</sub> S resistant liner to manhole	10.00 VF	\$200	\$2,000
0064	Apply H <sub>2</sub> S resistant liner to manhole	7.50 VF	\$200	\$1,500
0070	Apply H <sub>2</sub> S resistant liner to manhole	8.30 VF	\$200	\$1,660
0073	Apply H <sub>2</sub> S resistant liner to manhole	8.30 VF	\$200	\$1,660
0077	Apply H <sub>2</sub> S resistant liner to manhole	7.80 VF	\$200	\$1,560
0083	Apply H <sub>2</sub> S resistant liner to manhole	8.00 VF	\$200	\$1,600
0087	Apply H <sub>2</sub> S resistant liner to manhole	13.40 VF	\$200	\$2,680
0093	Apply H <sub>2</sub> S resistant liner to manhole	7.40 VF	\$200	\$1,480
0104	Apply H <sub>2</sub> S resistant liner to manhole	6.80 VF	\$200	\$1,360
0116	Apply H <sub>2</sub> S resistant liner to manhole	7.40 VF	\$200	\$1,480
0124	Apply H <sub>2</sub> S resistant liner to manhole	7.00 VF	\$200	\$1,400
0133	Apply H <sub>2</sub> S resistant liner to manhole	7.40 VF	\$200	\$1,480
0147	Apply H <sub>2</sub> S resistant liner to manhole	8.00 VF	\$200	\$1,600
0185	Apply H <sub>2</sub> S resistant liner to manhole	8.50 VF	\$200	\$1,700
0201	Apply H <sub>2</sub> S resistant liner to manhole	10.00 VF	\$200	\$2,000
0215	Apply H <sub>2</sub> S resistant liner to manhole	9.10 VF	\$200	\$1,820
0230	Apply H <sub>2</sub> S resistant liner to manhole	9.00 VF	\$200	\$1,800
0251	Apply H <sub>2</sub> S resistant liner to manhole	9.70 VF	\$200	\$1,940
0270	Apply H <sub>2</sub> S resistant liner to manhole	11.50 VF	\$200	\$2,300
0302	Apply H <sub>2</sub> S resistant liner to manhole	12.50 VF	\$200	\$2,500
0341	Repair offset frame	1 EA	\$500	\$500
0341	Apply H <sub>2</sub> S resistant liner to manhole	11.20 VF	\$200	\$2,240
0364	Apply H <sub>2</sub> S resistant liner to manhole	8.40 VF	\$200	\$1,680
0366	Apply H <sub>2</sub> S resistant liner to manhole	8.40 VF	\$200	\$1,680
0369	Apply H <sub>2</sub> S resistant liner to manhole	7.70 VF	\$200	\$1,540
0375	Apply H <sub>2</sub> S resistant liner to manhole	11.00 VF	\$200	\$2,200
5469	Apply H <sub>2</sub> S resistant liner to manhole	11.10 VF	\$200	\$2,220
5470	Apply H <sub>2</sub> S resistant liner to manhole	9.10 VF	\$200	\$1,820
5471	Apply H <sub>2</sub> S resistant liner to manhole	8.50 VF	\$200	\$1,700

The total preliminary estimate for manhole rehabilitation activities is \$77,150. Since rehabilitation strategies and approaches can vary, ADS recommends that the Engineer validate the overall rehabilitation approach recommended as well as unit cost estimate assumptions.

The individual scores and defects for each manhole are provided in the attached appendix. The highest priority manholes are Manholes 0087, 0364, 0366, 0104, and 0369. Manholes are scored on a 0 (best) to 100 (worst) system. Figure 1 displays the number of manholes within each score range.

Figure 1

### Manhole Inspection Scores





## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin Robinson Creek	Manhole GIS ID 0002	Inspection Date 10/16/2015	Time 8:09:00 AM	Crew Leader CH
-------------------------------------	------------------------	-------------------------------	--------------------	-------------------

Location Description  Easement on Robinson Creek Road	Manhole Grade Above Grade
	Grade Difference (ft) 1.50
	Cover to Invert Depth (ft) 7.00

GPS Verified? N/A	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Field	Surface Material Grass
----------------------	-------------------	--------------------	----------------------	------------------------	---------------------------

<p>Images</p>  	<p>Defects</p> <p>Chimney corrosion minor</p> <p>Frame corrosion moderate</p> <p>Grade ring crack moderate</p> <p>Cone corrosion moderate</p> <p>Bench corrosion moderate</p> <p>Channel corrosion moderate</p> <p>Wall corrosion minor</p> <p style="text-align: right;"><i>Overall Score</i></p> <p style="text-align: right;">Total <b>68</b></p>
--	---

Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	Concrete
09:00	Incoming	PVC	36	Flat Slab	None
12:00	Outgoing	PVC	36	Chimney	Concrete
				Cone	Concrete
				Wall	Concrete
				Bench	Concrete
				Channel	Concrete
				Steps	None

Comments  
Concrete around the frame of the manhole has minor cracks



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin Robinson Creek	Manhole GIS ID 0003	Inspection Date 10/16/2015	Time 9:22:00 AM	Crew Leader CH
-------------------------------------	------------------------	-------------------------------	--------------------	-------------------

Location Description  Robinson Creek Wastewater Treatment Plant - FM 1374	Manhole Grade
	Grade Difference (ft)
	Cover to Invert Depth (ft)

GPS Verified? N/A	MH On Map? Yes	MH Located? Yes	MH Inspected? No, CNA	Surface Cover	Surface Material
----------------------	-------------------	--------------------	--------------------------	---------------	------------------

Images



Defects

Pipe Configuration	Construction Materials <i>Grade Ring</i> <i>Flat Slab</i> <i>Chimney</i> <i>Cone</i> <i>Wall</i> <i>Bench</i> <i>Channel</i> <i>Steps</i>
--------------------	---

Comments



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin Robinson Creek	Manhole GIS ID 0004	Inspection Date 10/16/2015	Time 7:56:00 AM	Crew Leader CH
-------------------------------------	------------------------	-------------------------------	--------------------	-------------------

Location Description  Robinson Creek Road Easment	Manhole Grade Above Grade
	Grade Difference (ft) 0.50
	Cover to Invert Depth (ft) 6.20

GPS Verified? N/A	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Field	Surface Material Grass
----------------------	-------------------	--------------------	----------------------	------------------------	---------------------------

<p>Images</p>  	<p>Defects</p> <p>Grade ring crack minor</p> <p>Cone corrosion minor</p> <p>Bench corrosion minor</p> <p>Channel corrosion minor</p> <p>Pipe seal I/I evidence major</p> <p>Wall corrosion minor</p> <p style="text-align: right;"><i>Overall Score</i></p> <p style="text-align: right;">Total        <b>76</b></p>
--	---

Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	Concrete
06:00	Incoming	PVC	36	Flat Slab	None
12:00	Outgoing	PVC	36	Chimney	Concrete
				Cone	Concrete
				Wall	Concrete
				Bench	Concrete
				Channel	Concrete
				Steps	None

Comments

Flow monitor RCO1 from the 2015 Temporary Inflow and Infiltration study. This location contains an inflow dish. oncrete around the frame of the manhole has minor cracks



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin Robinson Creek	Manhole GIS ID 0005	Inspection Date 10/15/2015	Time 12:31:00 PM	Crew Leader CH
-------------------------------------	------------------------	-------------------------------	---------------------	-------------------

Location Description  Robinson Creek Road Easement	Manhole Grade Above Grade
	Grade Difference (ft) 1.00
	Cover to Invert Depth (ft) 6.80

GPS Verified? N/A	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Field	Surface Material Grass
----------------------	-------------------	--------------------	----------------------	------------------------	---------------------------

<p>Images</p> 	<p>Defects</p> <p>Chimney corrosion moderate</p> <p>Frame corrosion moderate</p> <p>Cone corrosion moderate</p> <p>Bench corrosion moderate</p> <p>Channel corrosion moderate</p> <p>Wall corrosion moderate</p>
--	--

*Overall Score*  
Total **67**

Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	Concrete
06:00	Incoming	PVC	36	Flat Slab	None
12:00	Outgoing	PVC	36	Chimney	Concrete
				Cone	Concrete
				Wall	Concrete
				Bench	Concrete
				Channel	Concrete
				Steps	None

Comments  
This location contains an inflow dish.



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin Robinson Creek	Manhole GIS ID 0006	Inspection Date 10/15/2015	Time 12:24:00 PM	Crew Leader CH
-------------------------------------	------------------------	-------------------------------	---------------------	-------------------

Location Description  Robinson Creek Road Easement	Manhole Grade Above Grade
	Grade Difference (ft) 0.50
	Cover to Invert Depth (ft) 8.00

GPS Verified? N/A	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Field	Surface Material Grass
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<p>Images</p>  	<p>Defects</p> <table style="width: 100%;"> <tr> <td style="width: 70%;">Chimney corrosion minor</td> <td style="width: 30%; text-align: right;"><i>Overall Score</i></td> </tr> <tr> <td>Frame base seal crack moderate</td> <td style="text-align: right;">Total <b>46</b></td> </tr> <tr> <td>Frame base seal corrosion minor</td> <td></td> </tr> <tr> <td>Frame corrosion moderate</td> <td></td> </tr> <tr> <td>Grade ring crack major</td> <td></td> </tr> <tr> <td>Cone corrosion minor</td> <td></td> </tr> <tr> <td>Riser ring offset minor</td> <td></td> </tr> <tr> <td>Bench corrosion minor</td> <td></td> </tr> <tr> <td>Channel corrosion minor</td> <td></td> </tr> <tr> <td>Wall corrosion minor</td> <td></td> </tr> </table>	Chimney corrosion minor	<i>Overall Score</i>	Frame base seal crack moderate	Total <b>46</b>	Frame base seal corrosion minor		Frame corrosion moderate		Grade ring crack major		Cone corrosion minor		Riser ring offset minor		Bench corrosion minor		Channel corrosion minor		Wall corrosion minor	
Chimney corrosion minor	<i>Overall Score</i>																				
Frame base seal crack moderate	Total <b>46</b>																				
Frame base seal corrosion minor																					
Frame corrosion moderate																					
Grade ring crack major																					
Cone corrosion minor																					
Riser ring offset minor																					
Bench corrosion minor																					
Channel corrosion minor																					
Wall corrosion minor																					

Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	Concrete
06:00	Incoming	PVC	36	Flat Slab	None
12:00	Outgoing	PVC	36	Chimney	Concrete
				Cone	Concrete
				Wall	Concrete
				Bench	Concrete
				Channel	Concrete
				Steps	None

Comments

The concrete around the frame has broken away from the frame and is offset slightly. This location contains an inflow dish.



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin Robinson Creek	Manhole GIS ID 0013	Inspection Date 10/15/2015	Time 12:10:00 PM	Crew Leader CH
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Location Description  Robinson Creek Road Easement	Manhole Grade Above Grade
	Grade Difference (ft) 0.50
	Cover to Invert Depth (ft) 8.50

GPS Verified? N/A	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Field	Surface Material Grass
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<p>Images</p>  	<p>Defects</p> <p>Chimney corrosion moderate</p> <p>Riser ring corrosion moderate</p> <p>Cone corrosion moderate</p> <p>Bench corrosion moderate</p> <p>Channel corrosion moderate</p> <p>Wall corrosion moderate</p> <p style="text-align: right;"><i>Overall Score</i></p> <p style="text-align: right;">Total        <b>66</b></p>
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Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	Concrete
07:00	Incoming	PVC	36	Flat Slab	None
12:00	Outgoing	PVC	36	Chimney	Concrete
				Cone	Concrete
				Wall	Concrete
				Bench	Concrete
				Channel	Concrete
				Steps	None

Comments  
This location contains an inflow dish.



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin Robinson Creek	Manhole GIS ID 0016	Inspection Date 10/15/2015	Time 1:00:00 PM	Crew Leader CH
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Location Description  Robinson Creek Road Easement	Manhole Grade Above Grade
	Grade Difference (ft) 0.50
	Cover to Invert Depth (ft) 8.60

GPS Verified? N/A	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Field	Surface Material Grass
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<p>Images</p>  	<p>Defects</p> <p>Chimney corrosion minor</p> <p>Cone corrosion minor</p> <p>Bench corrosion minor</p> <p>Channel corrosion minor</p> <p>Wall corrosion minor</p> <p style="text-align: right;"><i>Overall Score</i></p> <p style="text-align: right;">Total <b>46</b></p>
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Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	Concrete
06:00	Incoming	PVC	36	Flat Slab	None
12:00	Outgoing	PVC	36	Chimney	Concrete
				Cone	Concrete
				Wall	Concrete
				Bench	Concrete
				Channel	Concrete
				Steps	None

Comments  
This location contains an inflow dish.



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin Robinson Creek	Manhole GIS ID 0018	Inspection Date 10/15/2015	Time 11:46:00 AM	Crew Leader CH
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Location Description  Robinson Creek Road Easement	Manhole Grade Above Grade
	Grade Difference (ft) 1.00
	Cover to Invert Depth (ft) 10.00

GPS Verified? N/A	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Field	Surface Material Grass
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<p>Images</p>  	<p>Defects</p> <p>Chimney corrosion minor</p> <p>Frame base seal corrosion minor</p> <p>Cone corrosion minor</p> <p>Bench corrosion minor</p> <p>Channel corrosion minor</p> <p>Wall corrosion minor</p> <table style="width: 100%;"> <tr> <td style="text-align: right;"><i>Overall Score</i></td> <td></td> </tr> <tr> <td style="text-align: right;">Total</td> <td style="text-align: right;"><b>46</b></td> </tr> </table>	<i>Overall Score</i>		Total	<b>46</b>
<i>Overall Score</i>					
Total	<b>46</b>				

Pipe Configuration				Construction Materials	
<i>Pipe Location</i>	<i>Pipe Service</i>	<i>Pipe Material</i>	<i>Pipe Diameter (in)</i>	<i>Grade Ring</i>	<i>Concrete</i>
06:00	Incoming	PVC	36	<i>Flat Slab</i>	None
12:00	Outgoing	PVC	36	<i>Chimney</i>	Concrete
				<i>Cone</i>	Concrete
				<i>Wall</i>	Concrete
				<i>Bench</i>	Concrete
				<i>Channel</i>	Concrete
				<i>Steps</i>	None

Comments  
This location contains an inflow dish.



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin Robinson Creek	Manhole GIS ID 0022	Inspection Date 10/15/2015	Time 11:33:00 AM	Crew Leader CH
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Location Description  Robinson Creek Road Easement	Manhole Grade Above Grade
	Grade Difference (ft) 1.00
	Cover to Invert Depth (ft) 10.10

GPS Verified? N/A	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Field	Surface Material Grass
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<p>Images</p>  	<p>Defects</p> <table style="width: 100%;"> <tr> <td>Chimney corrosion moderate</td> <td style="text-align: right;"><i>Overall Score</i></td> </tr> <tr> <td>Frame base seal corrosion minor</td> <td style="text-align: right;">Total <b>69</b></td> </tr> <tr> <td>Frame corrosion minor</td> <td></td> </tr> <tr> <td>Cone corrosion moderate</td> <td></td> </tr> <tr> <td>Bench corrosion minor</td> <td></td> </tr> <tr> <td>Channel corrosion minor</td> <td></td> </tr> <tr> <td>Wall corrosion minor</td> <td></td> </tr> </table>	Chimney corrosion moderate	<i>Overall Score</i>	Frame base seal corrosion minor	Total <b>69</b>	Frame corrosion minor		Cone corrosion moderate		Bench corrosion minor		Channel corrosion minor		Wall corrosion minor	
Chimney corrosion moderate	<i>Overall Score</i>														
Frame base seal corrosion minor	Total <b>69</b>														
Frame corrosion minor															
Cone corrosion moderate															
Bench corrosion minor															
Channel corrosion minor															
Wall corrosion minor															

Pipe Configuration				Construction Materials	
<i>Pipe Location</i>	<i>Pipe Service</i>	<i>Pipe Material</i>	<i>Pipe Diameter (in)</i>	<i>Grade Ring</i>	<i>Concrete</i>
06:00	Incoming	PVC	36	<i>Flat Slab</i>	None
12:00	Outgoing	PVC	36	<i>Chimney</i>	Concrete
				<i>Cone</i>	Concrete
				<i>Wall</i>	Concrete
				<i>Bench</i>	Concrete
				<i>Channel</i>	Concrete
				<i>Steps</i>	None

Comments  
This location contains an inflow dish.



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin Robinson Creek	Manhole GIS ID 0024	Inspection Date 10/15/2015	Time 11:21:00 AM	Crew Leader CH
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Location Description  Robinson Creek Road Easement	Manhole Grade Above Grade
	Grade Difference (ft) 1.00
	Cover to Invert Depth (ft) 10.40

GPS Verified? N/A	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Field	Surface Material Grass
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<p>Images</p>  	<p>Defects</p> <p>Chimney corrosion minor</p> <p>Frame corrosion minor</p> <p>Cone corrosion minor</p> <p>Bench corrosion moderate</p> <p>Channel corrosion moderate</p> <p>Wall corrosion moderate</p> <div style="text-align: right; margin-top: 20px;"> <p><i>Overall Score</i></p> <p>Total <b>65</b></p> </div>
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Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	Concrete
03:00	Incoming	PVC	36	Flat Slab	None
12:00	Outgoing	PVC	36	Chimney	Concrete
				Cone	Concrete
				Wall	Concrete
				Bench	Concrete
				Channel	Concrete
				Steps	None

Comments  
This location contains a inflow dish.



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin Robinson Creek	Manhole GIS ID 0027	Inspection Date 10/15/2015	Time 11:08:00 AM	Crew Leader CH
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Location Description  Robinson Creek Road Easement	Manhole Grade Above Grade
	Grade Difference (ft) 1.30
	Cover to Invert Depth (ft) 10.30

GPS Verified? N/A	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Field	Surface Material Grass
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<p>Images</p>  	<p>Defects</p> <p>Chimney corrosion moderate</p> <p>Frame base seal crack moderate</p> <p>Cone corrosion moderate</p> <p>Bench corrosion moderate</p> <p>Channel corrosion moderate</p> <p>Wall corrosion moderate</p> <p style="text-align: right;"><i>Overall Score</i></p> <p style="text-align: right;">Total <b>67</b></p>
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Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	Concrete
07:00	Incoming	PVC	36	Flat Slab	None
12:00	Outgoing	PVC	36	Chimney	Concrete
				Cone	Concrete
				Wall	Concrete
				Bench	Concrete
				Channel	Concrete
				Steps	None

Comments

The concrete around the frame has a few minor cracks. This location contains an inflow dish.



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin Robinson Creek	Manhole GIS ID 0034	Inspection Date 10/15/2015	Time 10:53:00 AM	Crew Leader CH
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Location Description Robinson Creek Road Easement	Manhole Grade Above Grade
	Grade Difference (ft) 0.50
	Cover to Invert Depth (ft) 12.00

GPS Verified? N/A	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Field	Surface Material Grass
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<p>Images</p>  	<p>Defects</p> <p>Chimney corrosion moderate</p> <p>Cone corrosion moderate</p> <p>Bench corrosion moderate</p> <p>Channel corrosion moderate</p> <p>Channel Hydraulic major</p> <p>Wall corrosion moderate</p> <p style="text-align: right;"><i>Overall Score</i></p> <p style="text-align: right;">Total <b>75</b></p>
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Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	Concrete
06:00	Incoming	PVC	36	Flat Slab	None
12:00	Outgoing	PVC	36	Chimney	Concrete
				Cone	Concrete
				Wall	Concrete
				Bench	Concrete
				Channel	Concrete
				Steps	None

Comments  
This location contains an inflow dish. Incoming pipe in 6 o clock position has an offset joint.



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin Robinson Creek	Manhole GIS ID 0037	Inspection Date 10/15/2015	Time 10:40:00 AM	Crew Leader CH
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Location Description  Robinson Creek Road Easement	Manhole Grade Above Grade
	Grade Difference (ft) 0.50
	Cover to Invert Depth (ft) 10.20

GPS Verified? N/A	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Field	Surface Material Grass
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<p>Images</p>  	<p>Defects</p> <p>Chimney corrosion moderate</p> <p>Frame base seal corrosion moderate</p> <p>Cone crack moderate</p> <p>Bench corrosion moderate</p> <p>Channel corrosion moderate</p> <p>Wall corrosion moderate</p> <p style="text-align: right;"><i>Overall Score</i></p> <p style="text-align: right;">Total <b>68</b></p>
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Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	Concrete
07:00	Incoming	PVC	36	Flat Slab	None
12:00	Outgoing	PVC	36	Chimney	Concrete
				Cone	Concrete
				Wall	Concrete
				Bench	Concrete
				Channel	Concrete
				Steps	None

Comments  
This location contains a inflow dish.



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin Robinson Creek	Manhole GIS ID 0041	Inspection Date 10/15/2015	Time 10:23:00 AM	Crew Leader CH
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Location Description  Robinson Creek Road Easement	Manhole Grade Above Grade
	Grade Difference (ft) 0.50
	Cover to Invert Depth (ft) 7.90

GPS Verified? N/A	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Field	Surface Material Grass
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<p>Images</p>  	<p>Defects</p> <p>Chimney corrosion moderate</p> <p>Frame base seal corrosion moderate</p> <p>Frame corrosion moderate</p> <p>Cone corrosion moderate</p> <p>Bench corrosion moderate</p> <p>Channel corrosion moderate</p> <p>Wall corrosion moderate</p> <p style="text-align: right;"><i>Overall Score</i></p> <p style="text-align: right;">Total <b>67</b></p>
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Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	Concrete
06:00	Incoming	PVC	36	Flat Slab	None
12:00	Outgoing	PVC	36	Chimney	Concrete
				Cone	Concrete
				Wall	Concrete
				Bench	Concrete
				Channel	Concrete
				Steps	None

Comments  
This location contains an inflow dish.



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin Robinson Creek	Manhole GIS ID 0048	Inspection Date 10/15/2015	Time 10:06:00 AM	Crew Leader CH
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Location Description  Robinson Creek Road Easement	Manhole Grade Above Grade
	Grade Difference (ft) 0.50
	Cover to Invert Depth (ft) 8.00

GPS Verified? N/A	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Field	Surface Material Grass
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<p>Images</p>  	<p>Defects</p> <p>Chimney corrosion moderate</p> <p>Frame base seal corrosion moderate</p> <p>Cone corrosion moderate</p> <p>Bench corrosion moderate</p> <p>Channel corrosion moderate</p> <p>Wall corrosion moderate</p> <p style="text-align: right;"><i>Overall Score</i></p> <p style="text-align: right;">Total <b>77</b></p>
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Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	Concrete
06:00	Incoming	PVC	36	Flat Slab	None
12:00	Outgoing	PVC	36	Chimney	Concrete
				Cone	Concrete
				Wall	Concrete
				Bench	Concrete
				Channel	Concrete
				Steps	None

Comments



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin Robinson Creek	Manhole GIS ID 0052	Inspection Date 10/15/2015	Time 9:51:00 AM	Crew Leader CH
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Location Description  Robinson Creek Road Easement	Manhole Grade Above Grade
	Grade Difference (ft) 0.50
	Cover to Invert Depth (ft) 10.00

GPS Verified? N/A	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Field	Surface Material Grass
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<p>Images</p>  	<p>Defects</p> <p>Chimney corrosion moderate</p> <p>Cone corrosion moderate</p> <p>Bench corrosion moderate</p> <p>Channel corrosion moderate</p> <p>Wall corrosion moderate</p> <p style="text-align: right;"><i>Overall Score</i></p> <p style="text-align: right;">Total        <b>65</b></p>
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Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	Concrete
06:00	Incoming	PVC	36	Flat Slab	None
12:00	Outgoing	PVC	36	Chimney	Concrete
				Cone	Concrete
				Wall	Concrete
				Bench	Concrete
				Channel	Concrete
				Steps	None

Comments  
This location contains an inflow dish.



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin Robinson Creek	Manhole GIS ID 0064	Inspection Date 10/15/2015	Time 9:15:00 AM	Crew Leader CH
Location Description  Robinson Creek Road Easement				Manhole Grade Above Grade
				Grade Difference (ft) 0.50
				Cover to Invert Depth (ft) 7.50
GPS Verified? N/A	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Field
				Surface Material Grass
Images		Defects		
  		Chimney corrosion moderate		<i>Overall Score</i>
		Cone corrosion moderate		Total <b>66</b>
		Bench corrosion moderate		
		Channel corrosion moderate		
		Wall corrosion moderate		
Pipe Configuration				Construction Materials
<i>Pipe Location</i>	<i>Pipe Service</i>	<i>Pipe Material</i>	<i>Pipe Diameter (in)</i>	<i>Grade Ring</i> Concrete
06:00	Incoming	PVC	36	<i>Flat Slab</i> None
12:00	Outgoing	PVC	36	<i>Chimney</i> Concrete
				<i>Cone</i> Concrete
				<i>Wall</i> Concrete
				<i>Bench</i> Concrete
				<i>Channel</i> Concrete
				<i>Steps</i> None
Comments				



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin Robinson Creek	Manhole GIS ID 0070	Inspection Date 10/16/2015	Time 8:43:00 AM	Crew Leader CH
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Location Description Robinson Creek Road Easement	Manhole Grade Above Grade
	Grade Difference (ft) 0.50
	Cover to Invert Depth (ft) 8.30

GPS Verified? N/A	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Field	Surface Material Grass
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<p>Images</p>  	<p>Defects</p> <p>Chimney corrosion moderate</p> <p>Cone corrosion moderate</p> <p>Bench corrosion moderate</p> <p>Channel corrosion moderate</p> <p>Wall corrosion moderate</p> <p style="text-align: right;"><i>Overall Score</i></p> <p style="text-align: right;">Total <b>66</b></p>
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Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	Concrete
06:00	Incoming	PVC	36	Flat Slab	None
12:00	Outgoing	PVC	36	Chimney	Concrete
				Cone	Concrete
				Wall	Concrete
				Bench	Concrete
				Channel	Concrete
				Steps	None

Comments  
Concrete is breaking away from the frame. This location contains an inflow dish.



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin Robinson Creek	Manhole GIS ID 0073	Inspection Date 10/16/2015	Time 10:34:00 AM	Crew Leader CH
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Location Description  Robinson Creek Road Easement	Manhole Grade Above Grade
	Grade Difference (ft) 0.50
	Cover to Invert Depth (ft) 8.30

GPS Verified? N/A	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Field	Surface Material Grass
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<p>Images</p>  	<p>Defects</p> <p>Chimney corrosion moderate</p> <p>Frame base seal corrosion moderate</p> <p>Frame corrosion moderate</p> <p>Cone corrosion moderate</p> <p>Bench corrosion moderate</p> <p>Channel crack moderate</p> <p>Wall corrosion moderate</p> <p style="text-align: right;"><i>Overall Score</i></p> <table style="width: 100%;"> <tr> <td style="text-align: right;">Total</td> <td style="text-align: right;"><b>66</b></td> </tr> </table>	Total	<b>66</b>
Total	<b>66</b>		

Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	Concrete
06:00	Incoming	PVC	36	Flat Slab	None
12:00	Outgoing	PVC	36	Chimney	Concrete
				Cone	Concrete
				Wall	Concrete
				Bench	Concrete
				Channel	Concrete
				Steps	None

Comments  
Concrete is breaking away from the frame. This location contains an inflow dish.



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin Robinson Creek	Manhole GIS ID 0077	Inspection Date 10/16/2015	Time 10:43:00 AM	Crew Leader CH
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Location Description  Robinson Creek Road Easement	Manhole Grade Above Grade
	Grade Difference (ft) 0.50
	Cover to Invert Depth (ft) 7.80

GPS Verified? N/A	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Field	Surface Material Grass
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<p>Images</p>  	<p>Defects</p> <table style="width: 100%;"> <tr> <td style="width: 70%;">Chimney corrosion moderate</td> <td style="width: 30%; text-align: right;"><i>Overall Score</i></td> </tr> <tr> <td>Frame base seal crack moderate</td> <td style="text-align: right;">Total <b>58</b></td> </tr> <tr> <td>Cone corrosion minor</td> <td></td> </tr> <tr> <td>Bench corrosion moderate</td> <td></td> </tr> <tr> <td>Channel corrosion moderate</td> <td></td> </tr> <tr> <td>Wall corrosion minor</td> <td></td> </tr> </table>	Chimney corrosion moderate	<i>Overall Score</i>	Frame base seal crack moderate	Total <b>58</b>	Cone corrosion minor		Bench corrosion moderate		Channel corrosion moderate		Wall corrosion minor	
Chimney corrosion moderate	<i>Overall Score</i>												
Frame base seal crack moderate	Total <b>58</b>												
Cone corrosion minor													
Bench corrosion moderate													
Channel corrosion moderate													
Wall corrosion minor													

Pipe Configuration				Construction Materials	
<i>Pipe Location</i>	<i>Pipe Service</i>	<i>Pipe Material</i>	<i>Pipe Diameter (in)</i>	<i>Grade Ring</i>	<i>Concrete</i>
06:00	Incoming	PVC	36	<i>Flat Slab</i>	None
12:00	Outgoing	PVC	36	<i>Chimney</i>	Concrete
				<i>Cone</i>	Concrete
				<i>Wall</i>	Concrete
				<i>Bench</i>	Concrete
				<i>Channel</i>	Concrete
				<i>Steps</i>	None

Comments  
This location contains an inflow dish.



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin	Manhole GIS ID	Inspection Date	Time	Crew Leader
Robinson Creek	0083	10/16/2015	10:55:00 AM	CH

Location Description	Manhole Grade
Robinson Creek Road Easement	Above Grade
	Grade Difference (ft)
	0.25
	Cover to Invert Depth (ft)
	8.00

GPS Verified?	MH On Map?	MH Located?	MH Inspected?	Surface Cover	Surface Material
N/A	Yes	Yes	Yes	Field	Grass

<p>Images</p>  	<p>Defects</p> <p>Chimney crack minor</p> <p>Frame base seal corrosion minor</p> <p>Frame corrosion moderate</p> <p>Cone corrosion moderate</p> <p>Bench crack minor</p> <p>Channel corrosion minor</p> <p>Wall corrosion minor</p> <p style="text-align: right;"><i>Overall Score</i></p> <p style="text-align: right;">Total <b>66</b></p>
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Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	Concrete
06:00	Incoming	PVC	36	Flat Slab	None
12:00	Outgoing	PVC	36	Chimney	Concrete
				Cone	Concrete
				Wall	Concrete
				Bench	Concrete
				Channel	Concrete
				Steps	None

Comments

The concrete is cracked around the frame. This location contains an inflow dish.



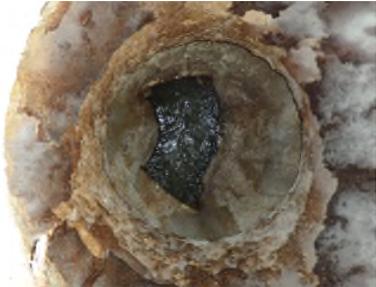
## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin Robinson Creek	Manhole GIS ID 0087	Inspection Date 10/16/2015	Time 11:04:00 AM	Crew Leader CH
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Location Description Robinson Creek Road Easement	Manhole Grade Above Grade
	Grade Difference (ft) 0.50
	Cover to Invert Depth (ft) 13.40

GPS Verified? N/A	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Field	Surface Material Grass
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<p>Images</p>  	<p>Defects</p> <p>Chimney crack major</p> <p>Chimney roots moderate</p> <p>Cone crack major</p> <p>Bench corrosion major</p> <p>Channel corrosion major</p> <p>Wall corrosion major</p>
--	---

*Overall Score*  
Total **96**

Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	Concrete
07:00	Incoming	PVC	36	Flat Slab	None
12:00	Outgoing	PVC	36	Chimney	Concrete
				Cone	Concrete
				Wall	Concrete
				Bench	Concrete
				Channel	Concrete
				Steps	None

Comments  
This location contains an inflow dish.



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin Robinson Creek	Manhole GIS ID 0093	Inspection Date 10/16/2015	Time 11:16:00 AM	Crew Leader CH
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Location Description  Robinson Creek Road Easement	Manhole Grade Above Grade
	Grade Difference (ft) 0.50
	Cover to Invert Depth (ft) 7.40

GPS Verified? N/A	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Field	Surface Material Grass
----------------------	-------------------	--------------------	----------------------	------------------------	---------------------------

<p>Images</p>  	<p>Defects</p> <p>Chimney corrosion moderate</p> <p>Frame offset moderate</p> <p>Cone corrosion moderate</p> <p>Chimney I/I evidence major</p> <p>Bench corrosion moderate</p> <p>Channel corrosion moderate</p> <p>Wall corrosion moderate</p> <p style="text-align: right;"><i>Overall Score</i></p> <p style="text-align: right;">Total <b>66</b></p>
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Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	Concrete
04:00	Incoming	PVC	36	Flat Slab	None
12:00	Outgoing	PVC	36	Chimney	Concrete
				Cone	Concrete
				Wall	Concrete
				Bench	Concrete
				Channel	Concrete
				Steps	None

Comments  
concrete is breaking away from the frame. This location contains an inflow dish.



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin Robinson Creek	Manhole GIS ID 0104	Inspection Date 10/16/2015	Time 11:27:00 AM	Crew Leader CH
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Location Description  Robinson Creek Road Easement	Manhole Grade At Grade
	Grade Difference (ft) 0.00
	Cover to Invert Depth (ft) 6.80

GPS Verified? N/A	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Field	Surface Material Grass
----------------------	-------------------	--------------------	----------------------	------------------------	---------------------------

<p>Images</p>  	<p>Defects</p> <p>Chimney corrosion minor</p> <p>Frame base seal corrosion moderate</p> <p>Frame corrosion moderate</p> <p>Grade ring crack major</p> <p>Cone corrosion major</p> <p>Bench corrosion moderate</p> <p>Channel corrosion moderate</p> <p>Wall corrosion major</p> <p style="text-align: right;"><i>Overall Score</i></p> <p style="text-align: right;">Total           <b>95</b></p>
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Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	Concrete
07:00	Incoming	PVC	27	Flat Slab	None
12:00	Outgoing	PVC	27	Chimney	Concrete
				Cone	Concrete
				Wall	Concrete
				Bench	Concrete
				Channel	Concrete
				Steps	None

Comments  
This location contains an inflow dish.



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin Robinson Creek	Manhole GIS ID 0116	Inspection Date 10/16/2015	Time 11:45:00 AM	Crew Leader CH
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Location Description  Robinson Creek Road Easement	Manhole Grade Above Grade
	Grade Difference (ft) 2.00
	Cover to Invert Depth (ft) 7.40

GPS Verified? N/A	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Field	Surface Material Grass
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<p>Images</p>  	<p>Defects</p> <p>Chimney corrosion minor</p> <p>Frame base seal corrosion moderate</p> <p>Cone corrosion minor</p> <p>Frame corrosion major</p> <p>Bench corrosion moderate</p> <p>Channel corrosion minor</p> <p>Wall corrosion minor</p> <p style="text-align: right;"><i>Overall Score</i></p> <p style="text-align: right;">Total           <b>80</b></p>
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Pipe Configuration	<p>Construction Materials</p> <p><i>Grade Ring</i>    Concrete</p> <p><i>Flat Slab</i>     None</p> <p><i>Chimney</i>      Concrete</p> <p><i>Cone</i>          Concrete</p> <p><i>Wall</i>           Concrete</p> <p><i>Bench</i>         Concrete</p> <p><i>Channel</i>       Concrete</p> <p><i>Steps</i>          None</p>
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Comments

The concrete is breaking away from the frame. This location contains an inflow dish.



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin Robinson Creek	Manhole GIS ID 0124	Inspection Date 10/16/2015	Time 12:00:00 PM	Crew Leader CH
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Location Description  Robinson Creek Easement	Manhole Grade At Grade
	Grade Difference (ft) 0.00
	Cover to Invert Depth (ft) 7.00

GPS Verified? N/A	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Field	Surface Material Grass
----------------------	-------------------	--------------------	----------------------	------------------------	---------------------------

<p>Images</p>  	<p>Defects</p> <table style="width: 100%;"> <tr> <td>Frame base seal corrosion moderate</td> <td style="text-align: right;"><i>Overall Score</i></td> </tr> <tr> <td>Frame crack moderate</td> <td style="text-align: right;">Total <b>65</b></td> </tr> <tr> <td>Cone corrosion moderate</td> <td></td> </tr> <tr> <td>Bench corrosion moderate</td> <td></td> </tr> <tr> <td>Channel corrosion moderate</td> <td></td> </tr> <tr> <td>Wall corrosion moderate</td> <td></td> </tr> </table>	Frame base seal corrosion moderate	<i>Overall Score</i>	Frame crack moderate	Total <b>65</b>	Cone corrosion moderate		Bench corrosion moderate		Channel corrosion moderate		Wall corrosion moderate	
Frame base seal corrosion moderate	<i>Overall Score</i>												
Frame crack moderate	Total <b>65</b>												
Cone corrosion moderate													
Bench corrosion moderate													
Channel corrosion moderate													
Wall corrosion moderate													

Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	Concrete
07:00	Incoming	PVC	27	Flat Slab	None
12:00	Outgoing	PVC	27	Chimney	Concrete
				Cone	Concrete
				Wall	Concrete
				Bench	Concrete
				Channel	Concrete
				Steps	None

Comments  
This location contains an inflow dish.



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin Robinson Creek	Manhole GIS ID 0133	Inspection Date 10/16/2015	Time 12:20:00 PM	Crew Leader CH
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Location Description  Robinson Creek Easement	Manhole Grade Above Grade
	Grade Difference (ft) 1.00
	Cover to Invert Depth (ft) 7.40

GPS Verified? N/A	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Field	Surface Material Grass
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<p>Images</p>  	<p>Defects</p> <p>Chimney corrosion moderate</p> <p>Frame base seal corrosion moderate</p> <p>Frame corrosion moderate</p> <p>Cone crack moderate</p> <p>Bench corrosion moderate</p> <p>Channel corrosion moderate</p> <p>Wall corrosion moderate</p> <p style="text-align: right;"><i>Overall Score</i></p> <p style="text-align: right;">Total <b>69</b></p>
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Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	Concrete
06:00	Incoming	PVC	27	Flat Slab	None
12:00	Outgoing	PVC	27	Chimney	Concrete
				Cone	Concrete
				Wall	Concrete
				Bench	Concrete
				Channel	Concrete
				Steps	None

Comments  
This location contains an inflow dish.



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin Robinson Creek	Manhole GIS ID 0147	Inspection Date 10/16/2015	Time 12:38:00 PM	Crew Leader CH
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Location Description  Robinson Creek Easement	Manhole Grade Above Grade
	Grade Difference (ft) 1.00
	Cover to Invert Depth (ft) 8.00

GPS Verified? N/A	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Field	Surface Material Grass
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<p>Images</p>  	<p>Defects</p> <p>Cone corrosion minor</p> <p>Bench corrosion minor</p> <p>Channel corrosion minor</p> <p>Wall corrosion minor</p> <p style="text-align: right;"><i>Overall Score</i></p> <p style="text-align: right;">Total <b>46</b></p>
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Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	Concrete
06:00	Incoming	PVC	27	Flat Slab	None
12:00	Outgoing	PVC	27	Chimney	Concrete
				Cone	Concrete
				Wall	Concrete
				Bench	Concrete
				Channel	Concrete
				Steps	None

Comments  
This location contains an inflow dish.



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin Robinson Creek	Manhole GIS ID 0185	Inspection Date 10/16/2015	Time 12:57:00 PM	Crew Leader CH
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Location Description  Robinson Creek Easement	Manhole Grade Above Grade
	Grade Difference (ft) 1.00
	Cover to Invert Depth (ft) 8.50

GPS Verified? N/A	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Field	Surface Material Grass
----------------------	-------------------	--------------------	----------------------	------------------------	---------------------------

<p>Images</p>  	<p>Defects</p> <p>Cone corrosion moderate</p> <p>Bench corrosion moderate</p> <p>Channel corrosion moderate</p> <p>Wall corrosion moderate</p> <p style="text-align: right;"><i>Overall Score</i></p> <p style="text-align: right;">Total <b>61</b></p>
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Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	Concrete
05:00	Incoming	PVC	27	Flat Slab	None
12:00	Outgoing	PVC	27	Chimney	Concrete
				Cone	Concrete
				Wall	Concrete
				Bench	Concrete
				Channel	Concrete
				Steps	None

Comments  
This location contains an inflow dish.



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin Robinson Creek	Manhole GIS ID 0201	Inspection Date 10/16/2015	Time 1:11:00 PM	Crew Leader CH
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Location Description  Robinson Creek Easement	Manhole Grade Above Grade
	Grade Difference (ft) 0.50
	Cover to Invert Depth (ft) 10.00

GPS Verified? N/A	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Field	Surface Material Grass
----------------------	-------------------	--------------------	----------------------	------------------------	---------------------------

<p>Images</p>  	<p>Defects</p> <p>Chimney corrosion moderate</p> <p>Cone corrosion moderate</p> <p>Bench corrosion moderate</p> <p>Channel corrosion moderate</p> <p>Wall corrosion moderate</p> <p style="text-align: right;"><i>Overall Score</i></p> <p style="text-align: right;">Total        <b>66</b></p>
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Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	Concrete
09:00	Incoming	PVC	27	Flat Slab	None
12:00	Outgoing	PVC	27	Chimney	Concrete
				Cone	Concrete
				Wall	Concrete
				Bench	Concrete
				Channel	Concrete
				Steps	None

Comments

The concrete is breaking away from the frame. This location contains an inflow dish.



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin Robinson Creek	Manhole GIS ID 0215	Inspection Date 10/16/2015	Time 1:26:00 PM	Crew Leader CH
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Location Description  Robinson Creek Easement	Manhole Grade Above Grade
	Grade Difference (ft) 0.50
	Cover to Invert Depth (ft) 9.10

GPS Verified? N/A	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Field	Surface Material Grass
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<p>Images</p>  	<p>Defects</p> <p>Chimney corrosion minor</p> <p>Cone corrosion minor</p> <p>Bench corrosion minor</p> <p>Channel corrosion minor</p> <p>Wall corrosion minor</p> <p style="text-align: right;"><i>Overall Score</i></p> <p style="text-align: right;">Total <b>46</b></p>
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Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	Concrete
07:00	Incoming	PVC	27	Flat Slab	None
12:00	Outgoing	PVC	27	Chimney	Concrete
				Cone	Concrete
				Wall	Concrete
				Bench	Concrete
				Channel	Concrete
				Steps	None

Comments  
The concrete is breaking away from the frame. This location contains an inflow dish.



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin Robinson Creek	Manhole GIS ID 0230	Inspection Date 10/16/2015	Time 1:40:00 PM	Crew Leader CH
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Location Description  Robinson Creek Easement	Manhole Grade Above Grade
	Grade Difference (ft) 0.50
	Cover to Invert Depth (ft) 9.00

GPS Verified? N/A	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Field	Surface Material Grass
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<p>Images</p>  	<p>Defects</p> <p>Chimney corrosion moderate</p> <p>Cone corrosion moderate</p> <p>Bench corrosion moderate</p> <p>Wall corrosion moderate</p> <p style="text-align: right;"><i>Overall Score</i></p> <p style="text-align: right;">Total       <b>63</b></p>
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Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	Concrete
07:00	Incoming	PVC	27	Flat Slab	None
12:00	Outgoing	PVC	27	Chimney	Concrete
				Cone	Concrete
				Wall	Concrete
				Bench	Concrete
				Channel	Concrete
				Steps	None

Comments  
This location contains an inflow dish.



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin Robinson Creek	Manhole GIS ID 0251	Inspection Date 10/19/2015	Time 8:34:00 AM	Crew Leader CH
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Location Description Robinson Creek Easement	Manhole Grade Above Grade
	Grade Difference (ft) 1.00
	Cover to Invert Depth (ft) 9.70

GPS Verified? N/A	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Field	Surface Material Grass
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<p>Images</p>  	<p>Defects</p> <p style="text-align: right;"><i>Overall Score</i></p> <p style="text-align: right;">Total           <b>10</b></p>
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Pipe Configuration				Construction Materials	
<i>Pipe Location</i>	<i>Pipe Service</i>	<i>Pipe Material</i>	<i>Pipe Diameter (in)</i>	<i>Grade Ring</i>	<i>Concrete</i>
06:00	Incoming	PVC	27	<i>Flat Slab</i>	None
12:00	Outgoing	PVC	27	<i>Chimney</i>	Concrete
				<i>Cone</i>	Concrete
				<i>Wall</i>	Concrete
				<i>Bench</i>	Concrete
				<i>Channel</i>	Concrete
				<i>Steps</i>	None

Comments  
This location contains an inflow dish. No visible problems.



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin Robinson Creek	Manhole GIS ID 0270	Inspection Date 10/19/2015	Time 9:10:00 AM	Crew Leader CH
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Location Description  Robinson Creek Easement	Manhole Grade Above Grade
	Grade Difference (ft) 1.00
	Cover to Invert Depth (ft) 11.50

GPS Verified? N/A	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Field	Surface Material Grass
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<p>Images</p>  	<p>Defects</p> <p style="text-align: right;"><i>Overall Score</i></p> <p style="text-align: right;">Total           <b>39</b></p>
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Pipe Configuration				Construction Materials	
<i>Pipe Location</i>	<i>Pipe Service</i>	<i>Pipe Material</i>	<i>Pipe Diameter (in)</i>	<i>Grade Ring</i>	<i>Concrete</i>
06:00	Incoming	PVC	27	<i>Flat Slab</i>	None
12:00	Outgoing	PVC	27	<i>Chimney</i>	Concrete
				<i>Cone</i>	Concrete
				<i>Wall</i>	Concrete
				<i>Bench</i>	Concrete
				<i>Channel</i>	Concrete
				<i>Steps</i>	None

Comments  
The concrete is cracked around the the frame. This location is an inflow dish.



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin Robinson Creek	Manhole GIS ID 0302	Inspection Date 10/19/2015	Time 10:05:00 AM	Crew Leader CH
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Location Description  Robinson Creek Easement	Manhole Grade Above Grade
	Grade Difference (ft) 0.50
	Cover to Invert Depth (ft) 12.50

GPS Verified? N/A	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Field	Surface Material Grass
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<p>Images</p>  	<p>Defects</p> <p>Frame offset moderate</p> <p>Cone corrosion minor</p> <p>Wall corrosion minor</p> <p style="text-align: right;"><i>Overall Score</i></p> <p style="text-align: right;">Total <b>77</b></p>
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Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	Concrete
06:00	Incoming	PVC	27	Flat Slab	None
12:00	Outgoing	PVC	27	Chimney	Concrete
				Cone	Concrete
				Wall	Concrete
				Bench	Concrete
				Channel	Concrete
				Steps	None

Comments

Manhole cover is stuck to the manhole frame, the entire frame and cover come off the manhole. This location contains an inflow dish.



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin Robinson Creek	Manhole GIS ID 0341	Inspection Date 10/19/2015	Time 10:41:00 AM	Crew Leader CH
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Location Description  Robinson Creek Easement	Manhole Grade Above Grade
	Grade Difference (ft) 0.50
	Cover to Invert Depth (ft) 11.20

GPS Verified? N/A	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Field	Surface Material Grass
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<p>Images</p>  	<p>Defects</p> <p>Chimney corrosion moderate</p> <p>Frame offset completely displaced</p> <p>Cone corrosion moderate</p> <p>Bench corrosion moderate</p> <p>Channel corrosion moderate</p> <p>Wall corrosion moderate</p> <p style="text-align: right;"><i>Overall Score</i></p> <p style="text-align: right;">Total <b>82</b></p>
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Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	Concrete
06:00	Incoming	PVC	27	Flat Slab	None
12:00	Outgoing	PVC	27	Chimney	Concrete
				Cone	Concrete
				Wall	Concrete
				Bench	Concrete
				Channel	Concrete
				Steps	None

Comments  
Manhole cover is stuck to the manhole frame, the entire frame and cover come off the manhole.



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin Robinson Creek	Manhole GIS ID 0364	Inspection Date 10/19/2015	Time 11:22:00 AM	Crew Leader CH
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Location Description  Robinson Creek Easement	Manhole Grade Above Grade
	Grade Difference (ft) 1.50
	Cover to Invert Depth (ft) 8.40

GPS Verified? N/A	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Field	Surface Material Grass
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<p>Images</p>  	<p>Defects</p> <p>Chimney corrosion moderate</p> <p>Cone corrosion moderate</p> <p>Bench corrosion moderate</p> <p>Channel corrosion moderate</p> <p>Channel hydraulic major</p> <p>Wall corrosion moderate</p> <p>Pipe connection offset moderate</p> <table style="width: 100%; margin-top: 20px;"> <tr> <td style="text-align: right;"><i>Overall Score</i></td> <td></td> </tr> <tr> <td style="text-align: right;">Total</td> <td style="text-align: right;"><b>96</b></td> </tr> </table>	<i>Overall Score</i>		Total	<b>96</b>
<i>Overall Score</i>					
Total	<b>96</b>				

Pipe Configuration				Construction Materials	
<i>Pipe Location</i>	<i>Pipe Service</i>	<i>Pipe Material</i>	<i>Pipe Diameter (in)</i>	<i>Grade Ring</i>	<i>Concrete</i>
06:00	Incoming	PVC	24	<i>Flat Slab</i>	None
12:00	Outgoing	PVC	24	<i>Chimney</i>	Concrete
				<i>Cone</i>	Concrete
				<i>Wall</i>	Concrete
				<i>Bench</i>	Concrete
				<i>Channel</i>	Concrete
				<i>Steps</i>	None

Comments  
Turbulent flow in this manhole. This location contains an inflow dish.



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin Robinson Creek	Manhole GIS ID 0366	Inspection Date 10/19/2015	Time 11:47:00 AM	Crew Leader CH
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Location Description  Robinson Creek Easement	Manhole Grade Above Grade
	Grade Difference (ft) 1.50
	Cover to Invert Depth (ft) 8.40

GPS Verified? N/A	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Field	Surface Material Grass
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<p>Images</p>  	<p>Defects</p> <p>Chimney corrosion moderate</p> <p>Cone corrosion major</p> <p>Bench corrosion major</p> <p>Channel corrosion major</p> <p>Wall corrosion major</p> <p style="text-align: right;"><i>Overall Score</i></p> <p style="text-align: right;">Total <b>96</b></p>
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Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	Concrete
05:00	Incoming	PVC	24	Flat Slab	None
12:00	Outgoing	PVC	24	Chimney	Concrete
				Cone	Concrete
				Wall	Concrete
				Bench	Concrete
				Channel	Concrete
				Steps	None

Comments  
This location contains an inflow dish.



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin Robinson Creek	Manhole GIS ID 0369	Inspection Date 10/19/2015	Time 11:08:00 AM	Crew Leader CH
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Location Description  Robinson Creek Easement	Manhole Grade Above Grade
	Grade Difference (ft) 1.50
	Cover to Invert Depth (ft) 7.70

GPS Verified? N/A	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Field	Surface Material Grass
----------------------	-------------------	--------------------	----------------------	------------------------	---------------------------

<p>Images</p>  	<p>Defects</p> <table style="width: 100%;"> <tr> <td>Chimney corrosion major</td> <td style="text-align: right;"><i>Overall Score</i></td> </tr> <tr> <td>Frame base seal corrosion minor</td> <td style="text-align: right;">Total <b>95</b></td> </tr> <tr> <td>Frame corrosion minor</td> <td></td> </tr> <tr> <td>Cone corrosion major</td> <td></td> </tr> <tr> <td>Bench corrosion major</td> <td></td> </tr> <tr> <td>Channel corrosion major</td> <td></td> </tr> <tr> <td>Wall corrosion major</td> <td></td> </tr> </table>	Chimney corrosion major	<i>Overall Score</i>	Frame base seal corrosion minor	Total <b>95</b>	Frame corrosion minor		Cone corrosion major		Bench corrosion major		Channel corrosion major		Wall corrosion major	
Chimney corrosion major	<i>Overall Score</i>														
Frame base seal corrosion minor	Total <b>95</b>														
Frame corrosion minor															
Cone corrosion major															
Bench corrosion major															
Channel corrosion major															
Wall corrosion major															

Pipe Configuration				Construction Materials	
<i>Pipe Location</i>	<i>Pipe Service</i>	<i>Pipe Material</i>	<i>Pipe Diameter (in)</i>	<i>Grade Ring</i>	<i>Concrete</i>
06:00	Incoming	PVC	24	<i>Flat Slab</i>	None
12:00	Outgoing	PVC	24	<i>Chimney</i>	Concrete
				<i>Cone</i>	Concrete
				<i>Wall</i>	Concrete
				<i>Bench</i>	Concrete
				<i>Channel</i>	Concrete
				<i>Steps</i>	None

Comments  
This location contains an inflow dish.



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin Robinson Creek	Manhole GIS ID 0375	Inspection Date 10/19/2015	Time 10:56:00 AM	Crew Leader CH
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Location Description  Robinson Creek Easement	Manhole Grade Above Grade
	Grade Difference (ft) 1.00
	Cover to Invert Depth (ft) 11.00

GPS Verified? N/A	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Field	Surface Material Grass
----------------------	-------------------	--------------------	----------------------	------------------------	---------------------------

<p>Images</p>  	<p>Defects</p> <p>Chimney corrosion moderate</p> <p>Cone corrosion moderate</p> <p>Bench corrosion moderate</p> <p>Channel corrosion moderate</p> <p>Wall corrosion moderate</p> <p style="text-align: right;"><i>Overall Score</i></p> <p style="text-align: right;">Total <b>65</b></p>
--	--

Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	Concrete
05:00	Incoming	PVC	27	Flat Slab	None
08:00	Incoming	PVC	24	Chimney	Concrete
12:00	Outgoing	PVC	27	Cone	Concrete
				Wall	Concrete
				Bench	Concrete
				Channel	Concrete
				Steps	None

Comments  
This location contains an inflow dish.



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin Robinson Creek	Manhole GIS ID 5469	Inspection Date 10/19/2015	Time 12:00:00 PM	Crew Leader CH
-------------------------------------	------------------------	-------------------------------	---------------------	-------------------

Location Description  Robinson Creek Easement	Manhole Grade Above Grade
	Grade Difference (ft) 0.50
	Cover to Invert Depth (ft) 11.10

GPS Verified? N/A	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Field	Surface Material Grass
----------------------	-------------------	--------------------	----------------------	------------------------	---------------------------

<p>Images</p>  	<p>Defects</p> <p style="text-align: right;"><i>Overall Score</i></p> <p style="text-align: right;">Total           <b>0</b></p>
--	--

Pipe Configuration				Construction Materials	
<i>Pipe Location</i>	<i>Pipe Service</i>	<i>Pipe Material</i>	<i>Pipe Diameter (in)</i>	<i>Grade Ring</i>	<i>Concrete</i>
06:00	Incoming	PVC	30	<i>Flat Slab</i>	None
12:00	Outgoing	PVC	30	<i>Chimney</i>	Concrete
				<i>Cone</i>	Concrete
				<i>Wall</i>	Concrete
				<i>Bench</i>	Concrete
				<i>Channel</i>	Concrete
				<i>Steps</i>	None

Comments  
This location contains an inflow dish. No visible problems.



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin Robinson Creek	Manhole GIS ID 5470	Inspection Date 10/19/2015	Time 12:18:00 PM	Crew Leader CH
-------------------------------------	------------------------	-------------------------------	---------------------	-------------------

Location Description  Robinson Creek Easement	Manhole Grade At Grade
	Grade Difference (ft) 0.00
	Cover to Invert Depth (ft) 9.10

GPS Verified? N/A	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Field	Surface Material Grass
----------------------	-------------------	--------------------	----------------------	------------------------	---------------------------

<p>Images</p>  	<p>Defects</p> <p>Bench corrosion minor</p> <p>Channel corrosion minor</p> <table style="width: 100%; margin-top: 20px;"> <tr> <td style="text-align: right;"><i>Overall Score</i></td> <td></td> </tr> <tr> <td style="text-align: right;">Total</td> <td style="text-align: right;"><b>32</b></td> </tr> </table>	<i>Overall Score</i>		Total	<b>32</b>
<i>Overall Score</i>					
Total	<b>32</b>				

Pipe Configuration				Construction Materials	
<i>Pipe Location</i>	<i>Pipe Service</i>	<i>Pipe Material</i>	<i>Pipe Diameter (in)</i>	<i>Grade Ring</i>	<i>Concrete</i>
08:00	Incoming	PVC	30	<i>Flat Slab</i>	None
12:00	Outgoing	PVC	30	<i>Chimney</i>	Concrete
				<i>Cone</i>	Concrete
				<i>Wall</i>	Concrete
				<i>Bench</i>	Concrete
				<i>Channel</i>	Concrete
				<i>Steps</i>	None

Comments  
This location contains an inflow dish.



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin Robinson Creek	Manhole GIS ID 5471	Inspection Date 10/19/2015	Time 12:40:00 PM	Crew Leader CH
-------------------------------------	------------------------	-------------------------------	---------------------	-------------------

Location Description  Robinson Creek Easement	Manhole Grade Above Grade
	Grade Difference (ft) 1.00
	Cover to Invert Depth (ft) 8.50

GPS Verified? N/A	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Field	Surface Material Grass
----------------------	-------------------	--------------------	----------------------	------------------------	---------------------------

<p>Images</p>  	<p>Defects</p> <p>Channel corrosion minor</p> <p style="text-align: right;"><i>Overall Score</i></p> <p style="text-align: right;">Total           <b>22</b></p>
--	--

Pipe Configuration				Construction Materials	
<i>Pipe Location</i>	<i>Pipe Service</i>	<i>Pipe Material</i>	<i>Pipe Diameter (in)</i>	<i>Grade Ring</i>	<i>Concrete</i>
05:00	Incoming	PVC	30	<i>Flat Slab</i>	None
12:00	Outgoing	PVC	30	<i>Chimney</i>	Concrete
				<i>Cone</i>	Concrete
				<i>Wall</i>	Concrete
				<i>Bench</i>	Concrete
				<i>Channel</i>	Concrete
				<i>Steps</i>	None

Comments  
This location contains an inflow dish.



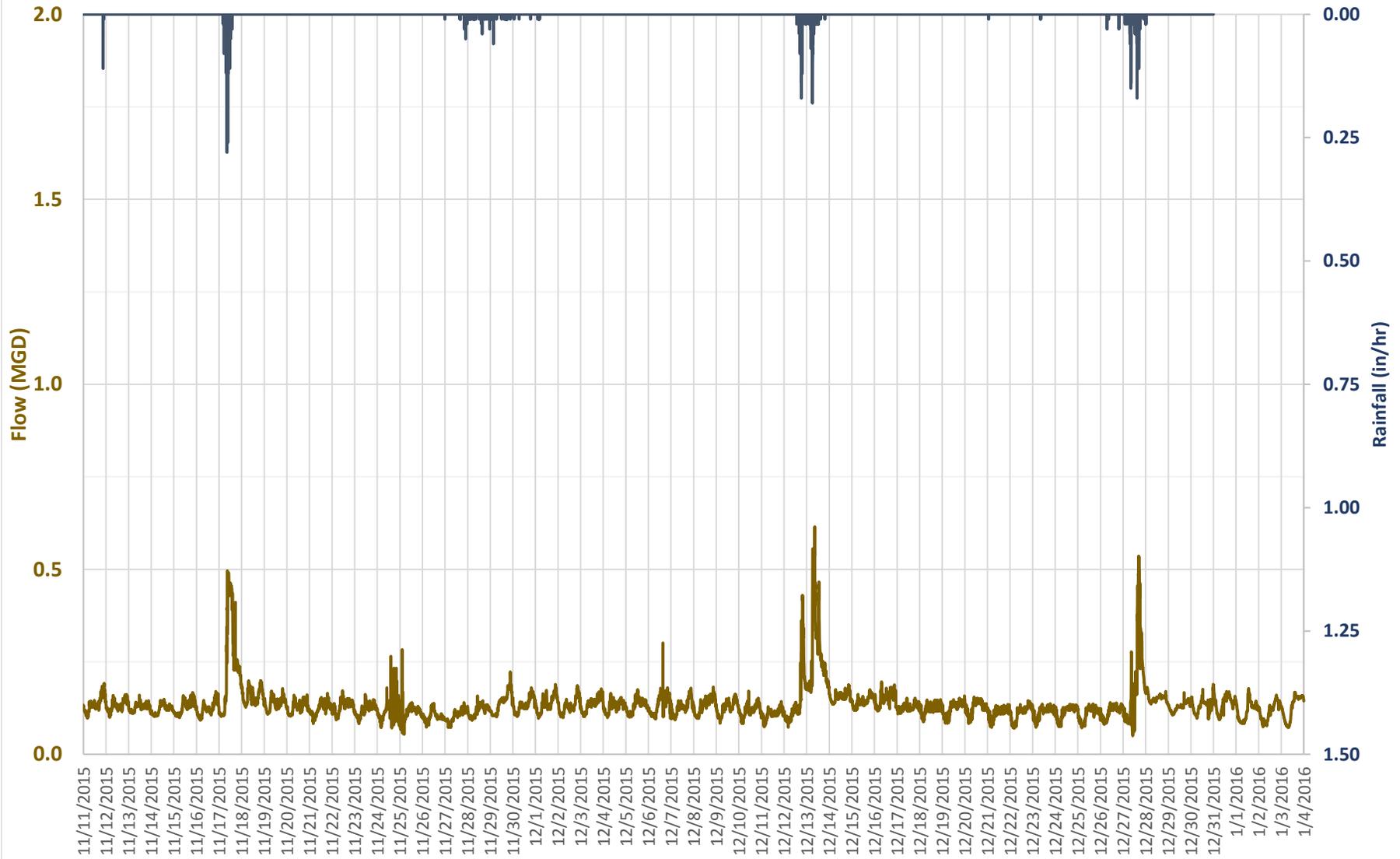
**APPENDIX L**  
**AJ-12 Sub Basin E SSES Flow Monitor Hydrographs and Flow Depth Plots**



City of Huntsville  
Wastewater System Field Testing  
SSES Flow Monitor Data  
Flow monitor ID: **FM A**



Recorded Flow Rate

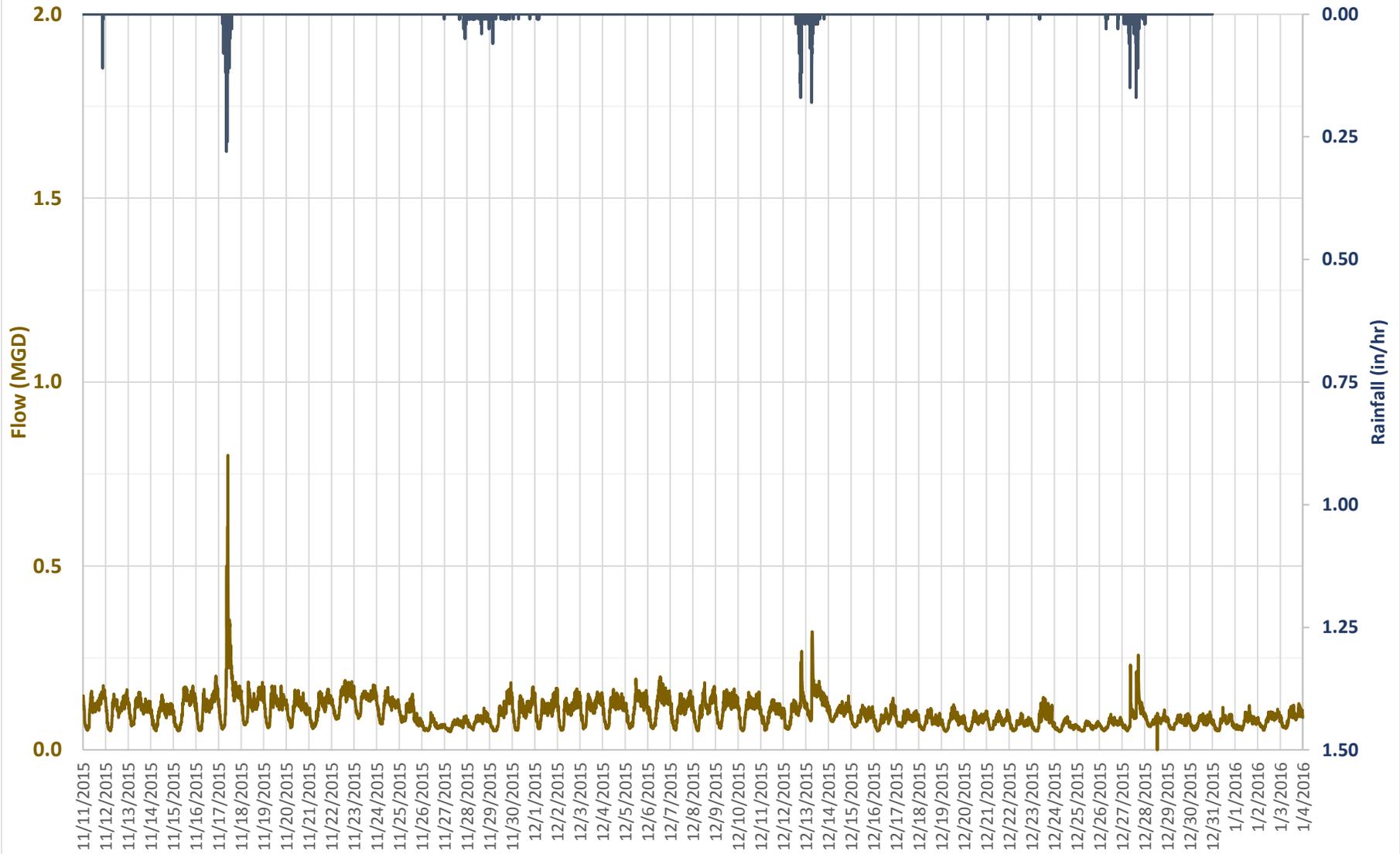




City of Huntsville  
Wastewater System Field Testing  
SSES Flow Monitor Data  
Flow monitor ID: **FM B**



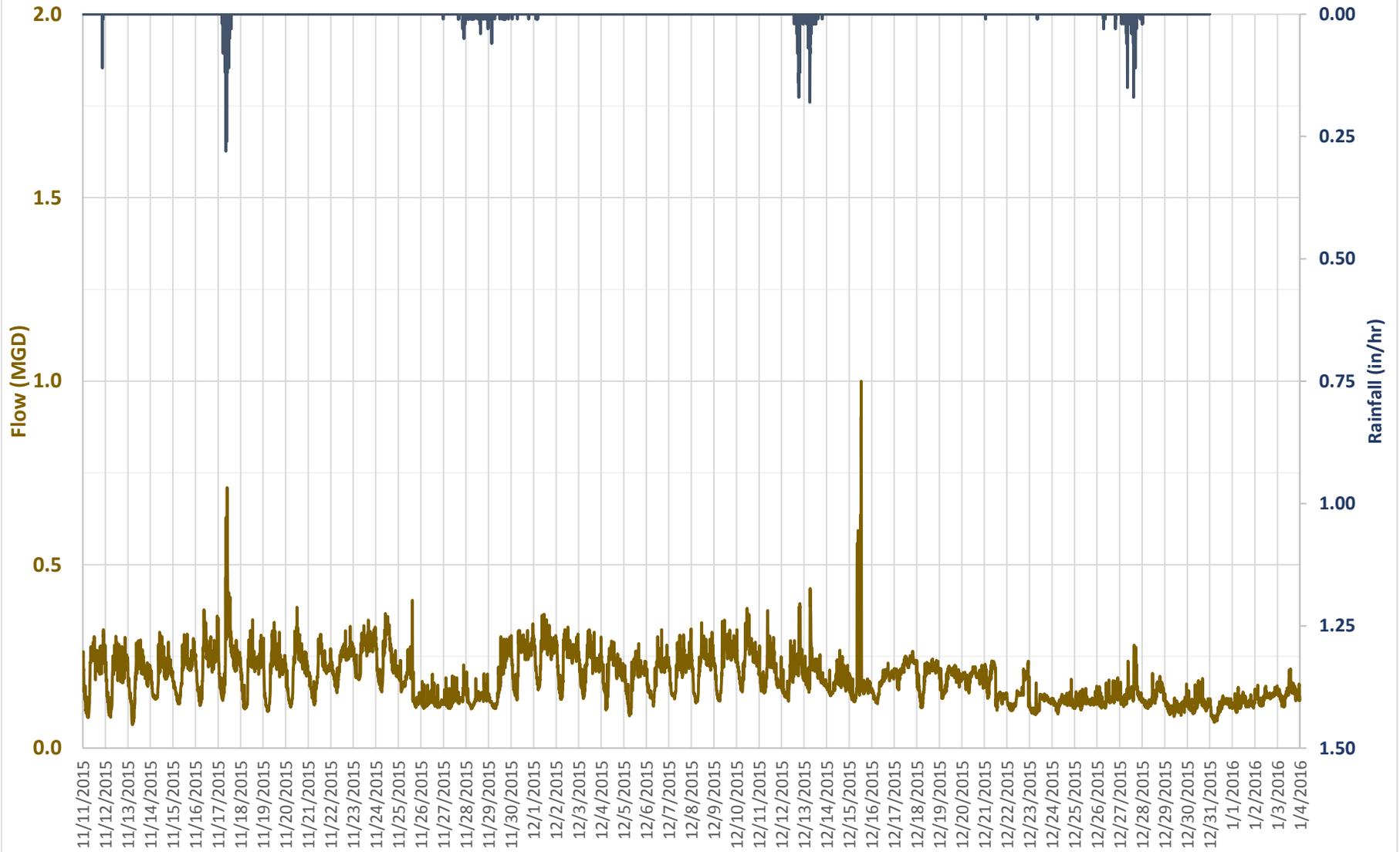
Recorded Flow Rate



City of Huntsville  
Wastewater System Field Testing  
SSES Flow Monitor Data  
Flow monitor ID: **FM C**

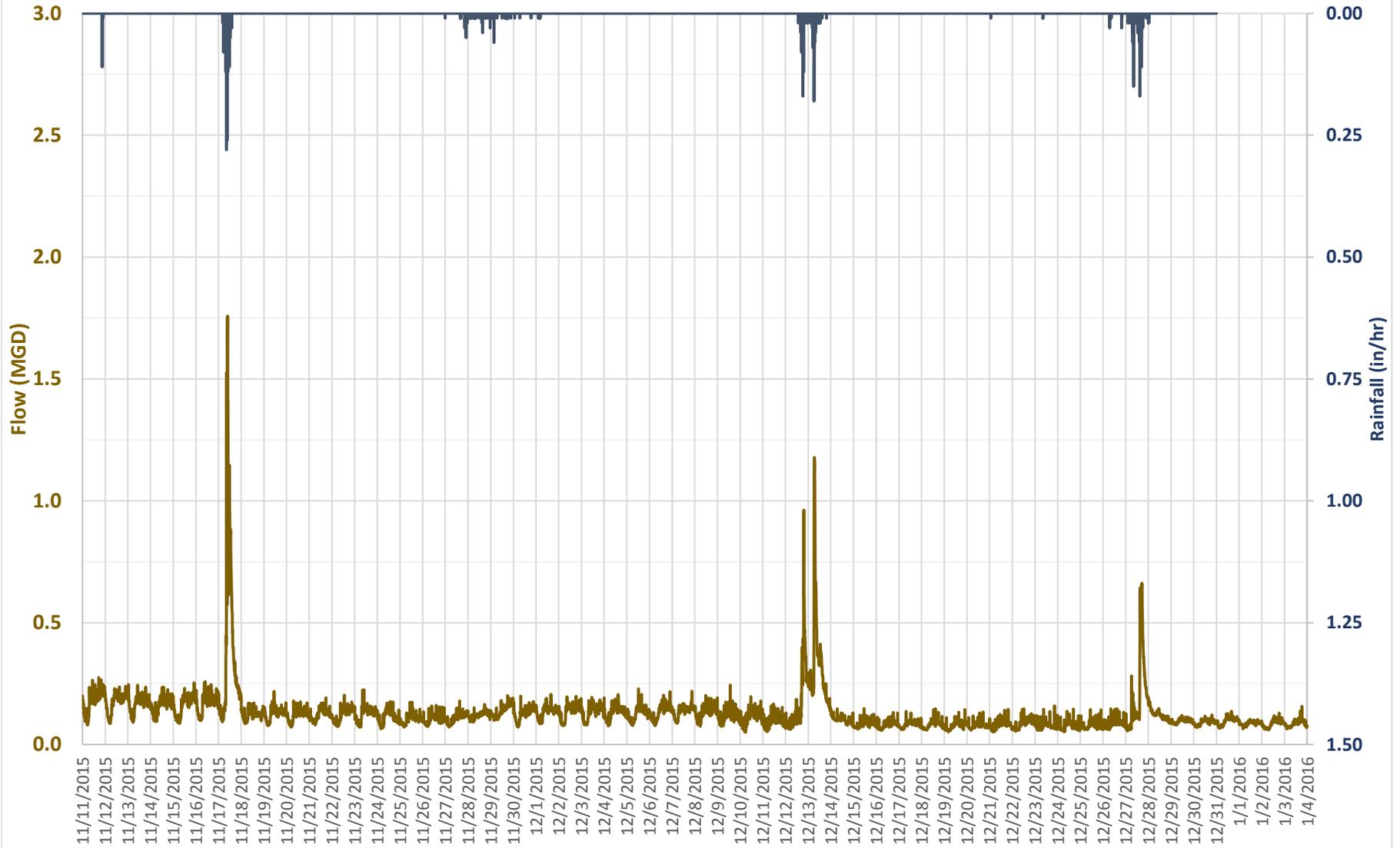


**Recorded Flow Rate**





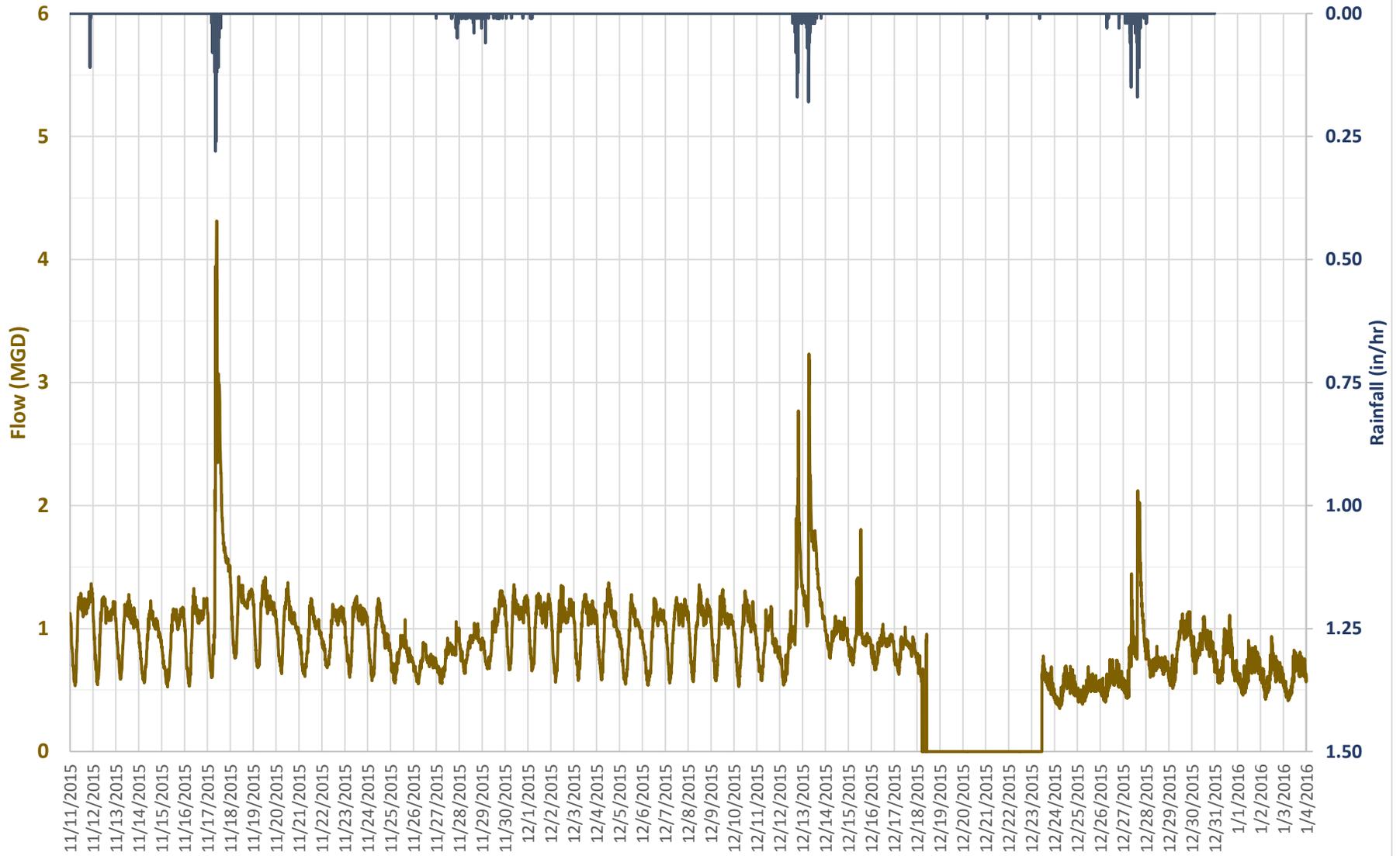
**Recorded Flow Rate**



City of Huntsville  
Wastewater System Field Testing  
SSES Flow Monitor Data  
Flow monitor ID: **FM E**



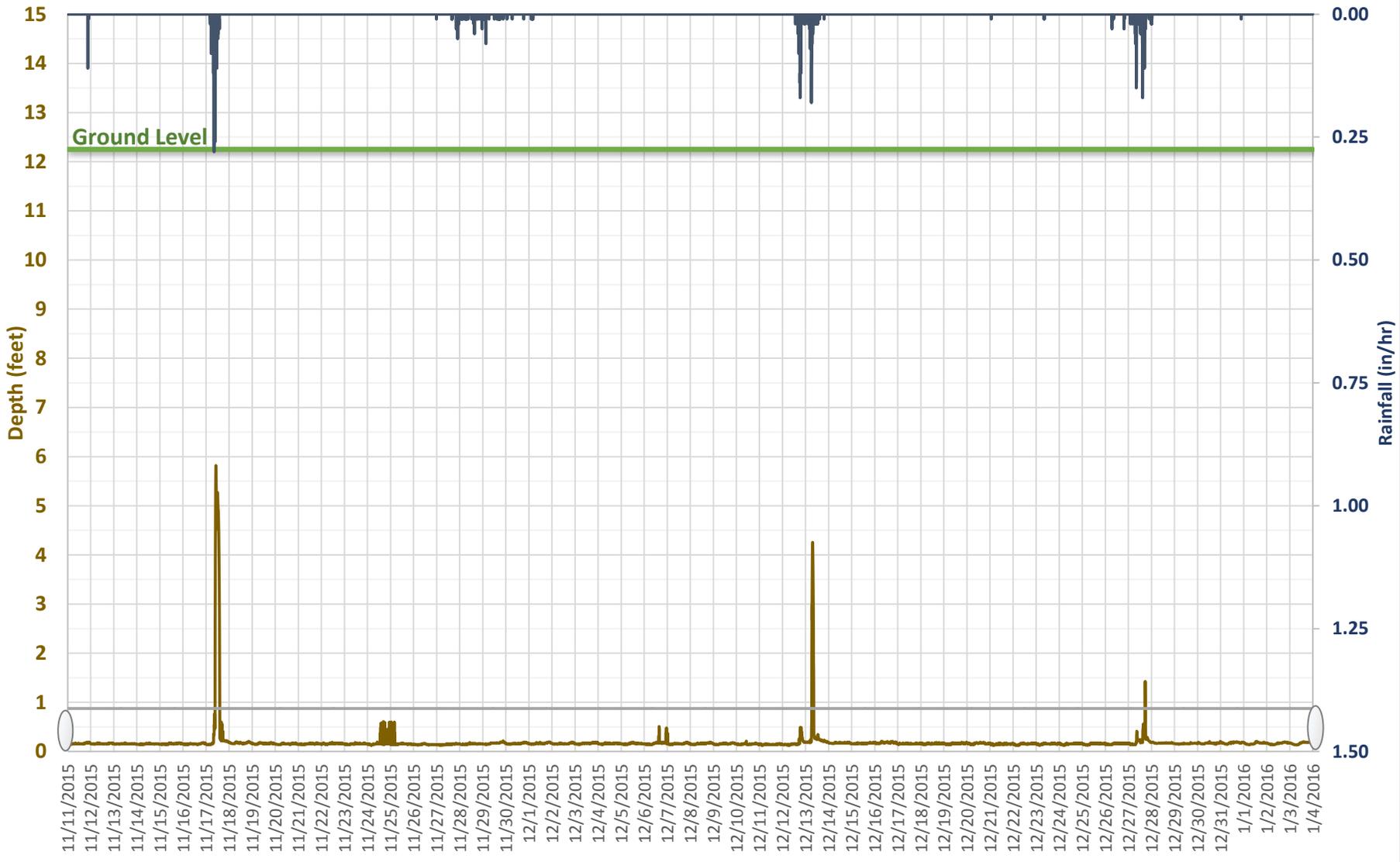
**Recorded Flow Rate**



City of Huntsville  
Wastewater System Field Testing  
SSES Flow Monitor Data  
Flow monitor ID: **FM A**



**Recorded Depth of Flow**

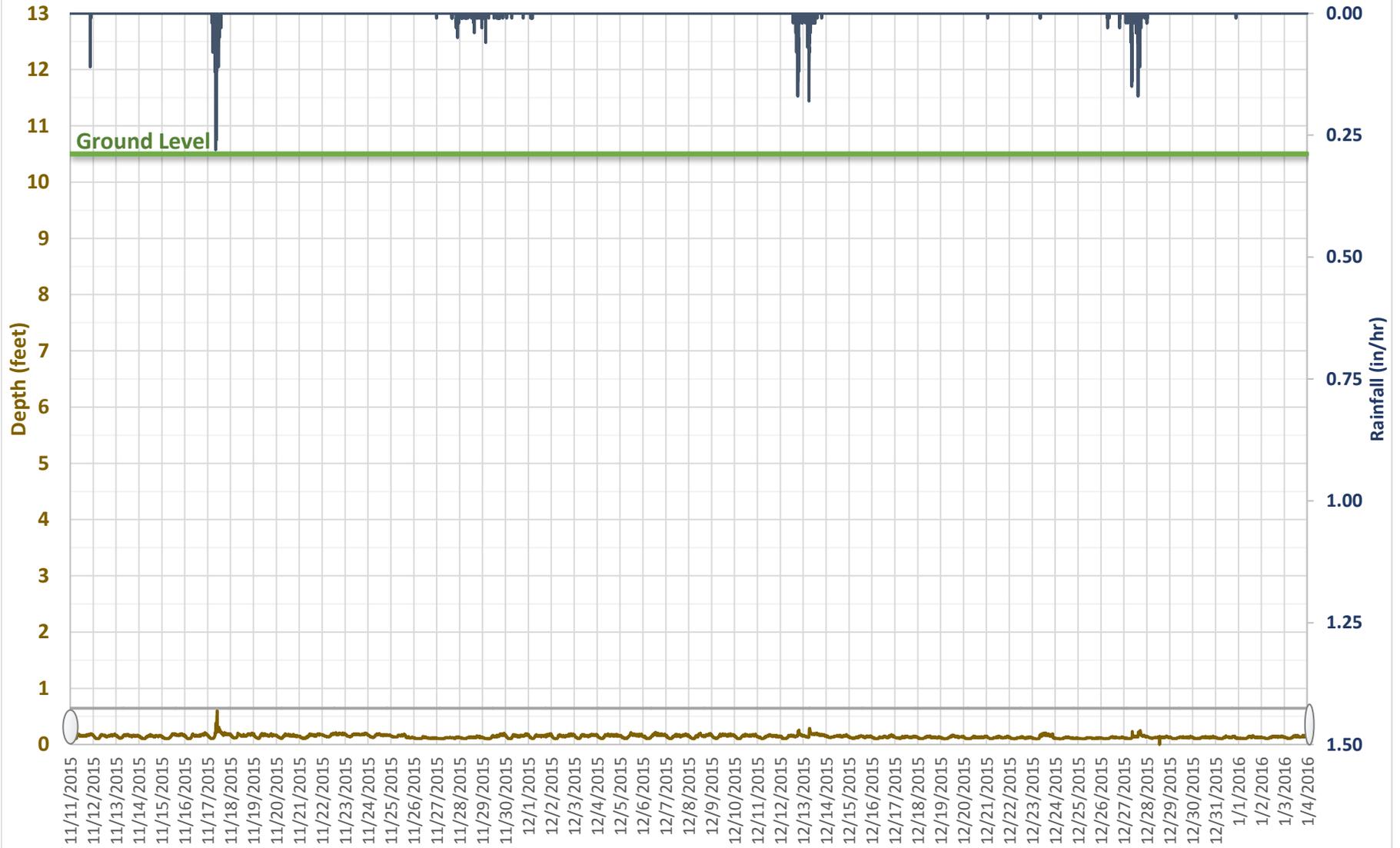




City of Huntsville  
Wastewater System Field Testing  
SSES Flow Monitor Data  
Flow monitor ID: **FM B**



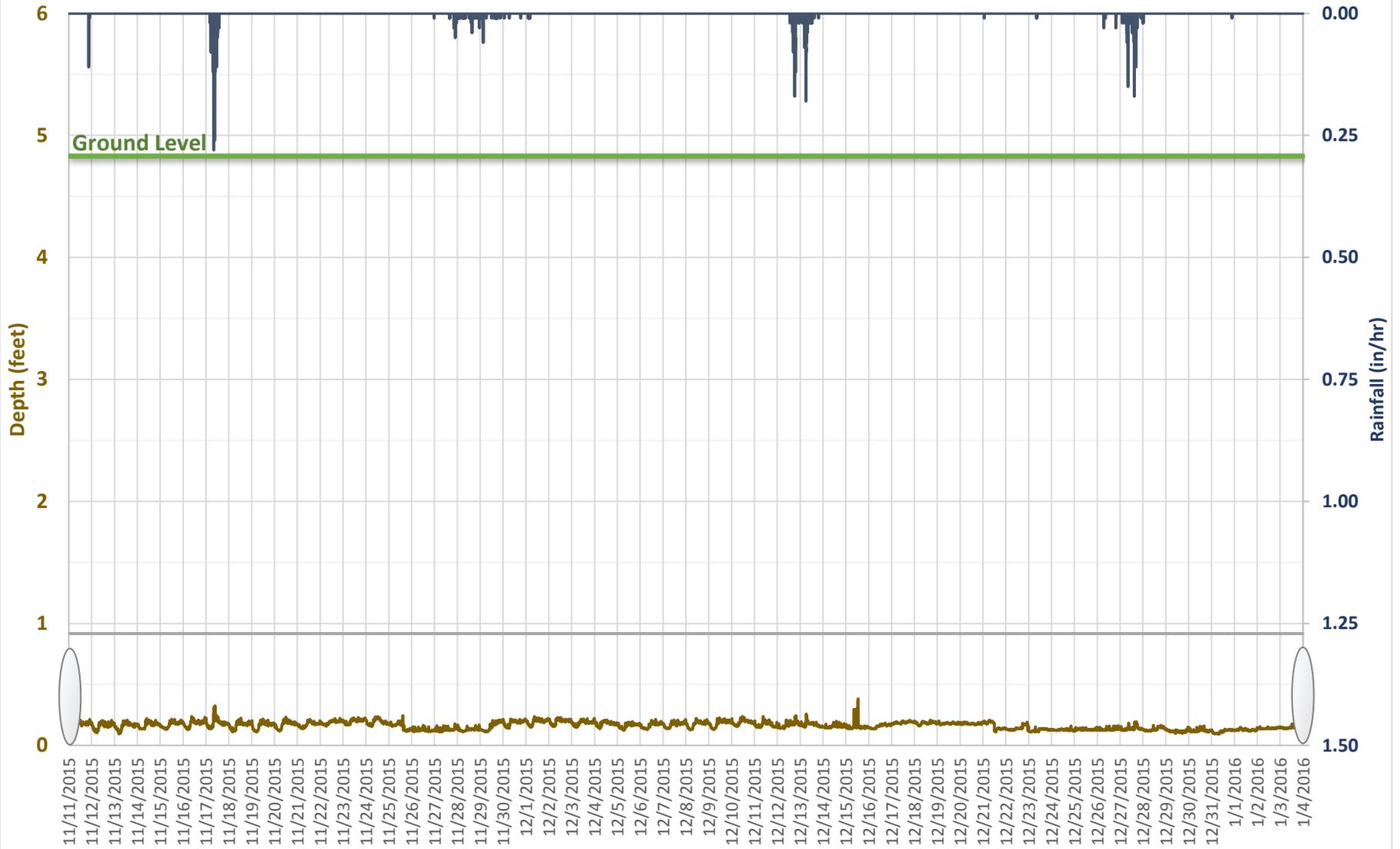
Recorded Depth of Flow



City of Huntsville  
Wastewater System Field Testing  
SSES Flow Monitor Data  
Flow monitor ID: **FM C**



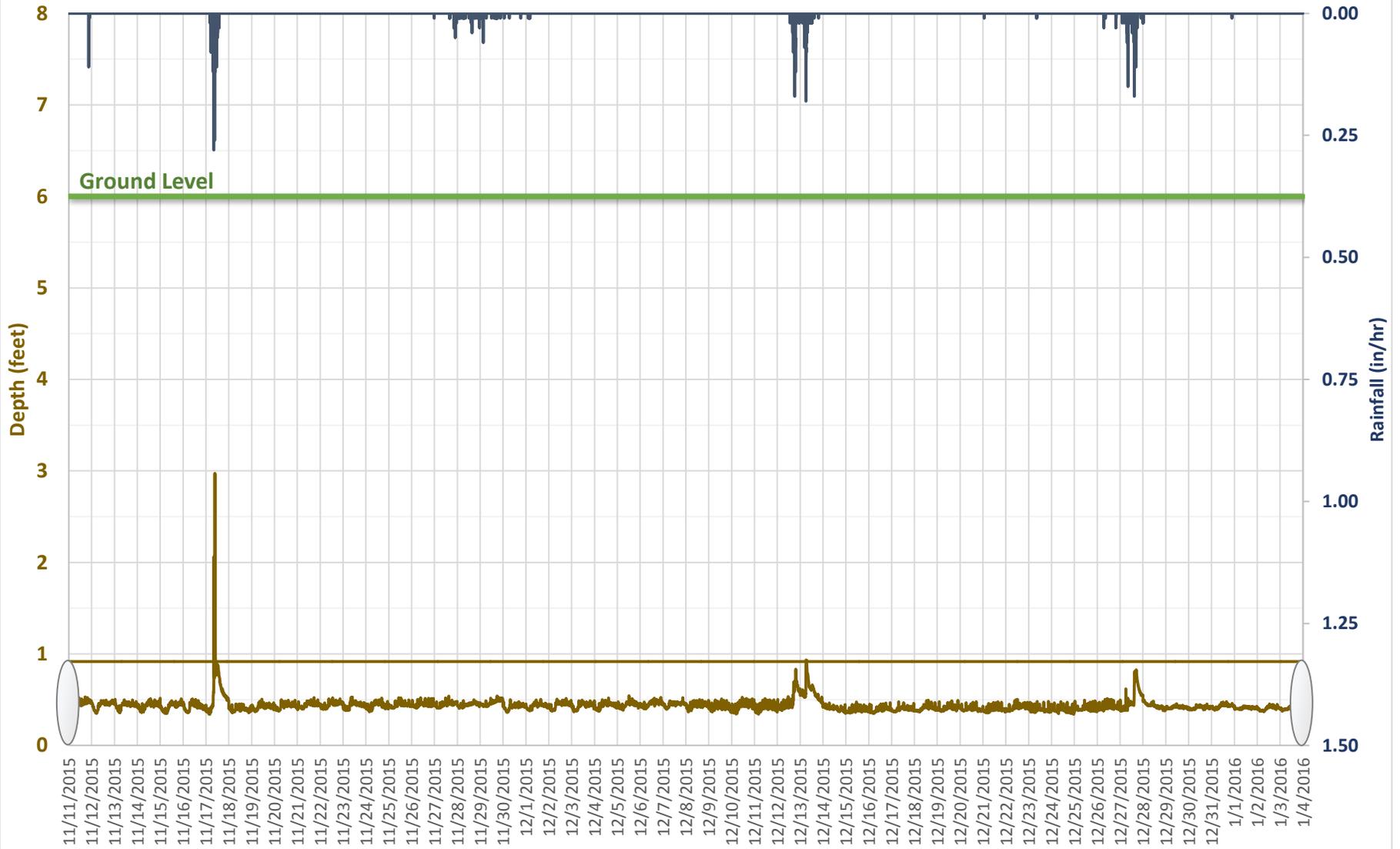
**Recorded Depth of Flow**



City of Huntsville  
 Wastewater System Field Testing  
 SSES Flow Monitor Data  
 Flow monitor ID: **FM D**

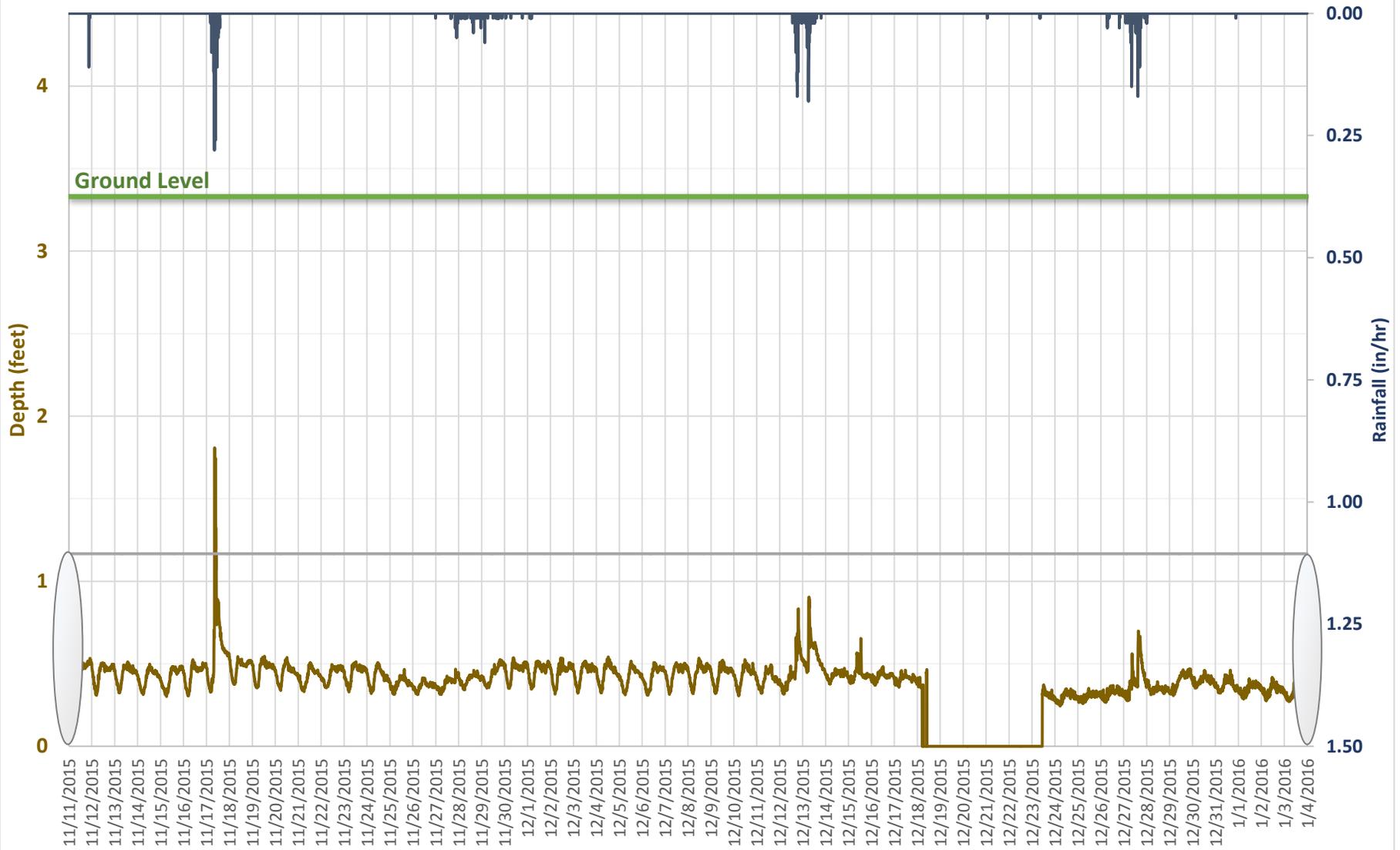


**Recorded Depth of Flow**





**Recorded Depth of Flow**





**APPENDIX M**  
**AJ-12 Sub Basin E SSES Manhole Inspection Report**

PROJECT NUMBER 25174.11

# Sewer System Evaluation Survey

Manhole Inspections – A.J. Brown Basin

**Draft**

PREPARED FOR

City of Huntsville

448 State Highway 75 North  
Huntsville, TX 7732

SUBMITTED

June 14, 2016





## ***Table of Contents***

Introduction.....	1
Methodology .....	1
Results.....	2
Recommendations.....	2

## *Introduction*

This report presents the results of manhole inspection activities conducted by ADS Environmental Services (ADS) within selected portions of the A.J. Brown Basin of the City of Huntsville sanitary sewer system. Manhole inspection activities were performed at the request of Freese & Nichols, Inc. (Engineer).

## *Background*

ADS was previously retained by the Engineer to gather and evaluate flow monitor and rainfall data within selected portions of the existing sanitary sewer system located in Huntsville, Texas. The scope of this original study was to characterize dry weather and wet weather flow conditions at key locations within the sewer system, evaluate key performance indicators, and rank the relative severity of observed rain-dependent inflow and infiltration (RDII) to assist the Engineer to direct subsequent planning, condition assessment, and rehabilitation activities. This work was completed during Summer 2015, and the results indicated that Sub-Basin RC-01 of the Robinson Creek Basin had the highest levels of RDII followed by the A. J. Brown Basin. A previous round of manhole inspections was completed in the Robinson Creek Basin in October of 2015.

## *Methodology*

Manhole inspection is a common inspection method used to locate and identify potential sources of infiltration and inflow within a sanitary sewer system. During manhole inspections, the condition of each manhole is inspected from cover to invert. Structural defects, operation and maintenance (O&M) concerns, roots, and infiltration sources are noted. Conditions within attached sewer lines and service laterals are also noted. Manhole inspection observations are used to guide further inspection and rehabilitation recommendations. Manhole inspection is one of many tools available to evaluate sewer conditions and complements other inspection and testing methods.

Manhole inspection is performed by two methods: confined space entry and remote inspection. Using the confined space entry method, a trained inspector physically enters the manhole using proper safety equipment and methods. The inspector then documents observed conditions. Using the remote inspection method, a trained operator uses a pole-mounted camera to observe and document observed conditions, and confined-space entry is not required. The remote inspection method was used in these evaluations. Results from each inspection are incorporated into a database for further evaluation and/or corrective action.



## Results

A total of 90 manhole inspections were assigned, and all 90 manholes were inspected in the A.J. Brown Basin. However, Manholes 2110, 2164, and 2152 were surcharged during the time of the inspection. Therefore, complete inspections could not be completed at these locations.

Manhole inspections were performed from 03/07/2016 through 03/23/2016. The manholes inspected in the A.J. Brown Basin are located in unpaved (grass) areas and asphalt areas. The rim-to-invert depths ranged from 3.25 ft to 15.00 ft. Defects were found at 27 manholes that warrant subsequent rehabilitation activities. The most common defects identified during manhole inspections were varying degrees of concrete corrosion due to hydrogen sulfide (H<sub>2</sub>S). ADS also observed moderate to significant amounts of debris in the channel. Therefore, ADS recommends cleaning the manholes and sewer lines within the affected areas.

## Recommendations

The recommendations in this study are based on data gathered while performing manhole inspections on 90 manholes within the City of Huntsville.

**TABLE 1: Manhole Rehabilitation Recommendations**

Manhole	Recommendation	Units	Estimated Unit Cost	Estimated Cost
1953	Apply H <sub>2</sub> S resistant liner to manhole	7.12 VF	\$200	\$1,424
1961	Repair concrete in the bench	1 EA	\$250	\$250
1980	Apply H <sub>2</sub> S resistant liner to manhole	9.17 VF	\$200	\$1,834
1986	Repair missing mortar	1 EA	\$250	\$250
1986	Apply H <sub>2</sub> S resistant liner to manhole	14.00 VF	\$200	\$2,800
2001	Apply H <sub>2</sub> S resistant liner to manhole	8.75 VF	\$200	\$1,750
2023	Apply H <sub>2</sub> S resistant liner to manhole	6.58 VF	\$200	\$1,316
2026	Install inflow dish	1 EA	\$200	\$200
2152	Reseal frame to manhole	1 EA	\$200	\$200
2164	Reseal frame to manhole	1 EA	\$200	\$200
2170	Apply H <sub>2</sub> S resistant liner to manhole	3.25 VF	\$200	\$650
2183	Repair pipe connection cracks	1 EA	\$200	\$200
2207	Apply H <sub>2</sub> S resistant liner to manhole	13.00 VF	\$200	\$2,600
2224	Repair chimney mortar and bricks	1 EA	\$250	\$250
2232	Apply H <sub>2</sub> S resistant liner to manhole	3.00 VF	\$200	\$600
2239	Repair pipe connection cracks	1 EA	\$200	\$200
2271	Repair missing bricks in chimney	1 EA	\$250	\$250
2271	Apply H <sub>2</sub> S resistant liner to manhole	3.00 VF	\$200	\$600

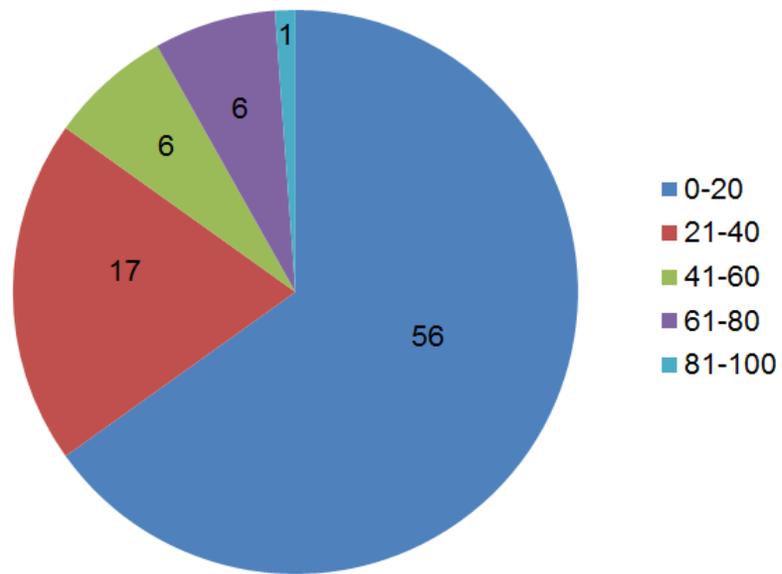


Manhole	Recommendation	Units	Estimated Unit Cost	Estimated Cost
2293	Repair pipe connection cracks	1 EA	\$200	\$200
2314	Rebuild chimney	1 EA	\$750	\$750
2320	Replace frame and cover	1 EA	\$750	\$750
2320	Apply H <sub>2</sub> S resistant liner to manhole	9.42 VF	\$200	\$1,884
2322	Apply H <sub>2</sub> S resistant liner to manhole	5.92 VF	\$200	\$750
2323	Apply H <sub>2</sub> S resistant liner to manhole	4.00 VF	\$200	\$800
2324	Apply H <sub>2</sub> S resistant liner to manhole	6.50 VF	\$200	\$1,300
2356	Replace cover	1 EA	\$200	\$200
2356	Apply H <sub>2</sub> S resistant liner to manhole	8.33 VF	\$200	\$1,600
2369	Replace cover and frame	1 EA	\$750	\$750
2369	Install inflow dish	1 EA	\$200	\$200
2369	Apply H <sub>2</sub> S resistant liner to manhole	4.25 VF	\$200	\$850
2379	Repair mortar in the channel	1 EA	\$250	\$250
4588	Repair pipe connection crack	1 EA	\$200	\$200
FN-02	Repair bench	1 EA	\$250	\$250
FN-02	Apply H <sub>2</sub> S resistant liner to manhole	6.25 VF	\$200	\$1,250

The total preliminary estimate for manhole rehabilitation activities is approximately \$17,200. Since rehabilitation strategies and approaches can vary, ADS recommends that the Engineer validate the overall rehabilitation approach recommended as well as unit cost estimate assumptions.

The individual defects and overall scores and defects for each manhole are provided in the attached appendix. The highest priority manholes are Manholes FN-02, 2271, 1986, 2323, 2369 and 2324. Manholes are scored on a 0 (best) to 100 (worst) system. Figure 1 displays the number of manholes within each score range.

Figure 1: Total Manhole Inspection Scores





## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin AJ-12	Manhole GIS ID 1908	Inspection Date 2/7/2016	Time 9:36:00 AM	Crew Leader CH
----------------------------	------------------------	-----------------------------	--------------------	-------------------

Location Description  1900 Old Sycamore	Manhole Grade At Grade
	Grade Difference (ft) 0.00
	Cover to Invert Depth (ft) 6.33

GPS Verified? Visually Corr	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Street	Surface Material Asphalt
--------------------------------	-------------------	--------------------	----------------------	-------------------------	-----------------------------

<p>Images</p>  	<p>Defects</p> <table style="width: 100%;"> <tr> <td>Cover Fit Tight</td> <td style="text-align: right;"><i>Overall Score</i></td> </tr> <tr> <td>Chimney I/I minor</td> <td style="text-align: right;">Total <b>19</b></td> </tr> <tr> <td>Cover seal missing</td> <td></td> </tr> <tr> <td>Grade ring corrosion minor</td> <td></td> </tr> </table>	Cover Fit Tight	<i>Overall Score</i>	Chimney I/I minor	Total <b>19</b>	Cover seal missing		Grade ring corrosion minor	
Cover Fit Tight	<i>Overall Score</i>								
Chimney I/I minor	Total <b>19</b>								
Cover seal missing									
Grade ring corrosion minor									

Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	Brick
06:00	Incoming	Clay	6	Flat Slab	None
07:00	Appurtenance	PVC	3	Chimney	Concrete
12:00	Outgoing	Clay	6	Cone	None
				Wall	Other
				Bench	Concrete
				Channel	Other
				Steps	None

Comments  
Frame seal has deteriorated. Evidence of infiltration present.



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin AJ-12	Manhole GIS ID 1919	Inspection Date 3/20/2016	Time 10:20:00 AM	Crew Leader MB
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Location Description  1751 Ron Randleman Boulevard	Manhole Grade At Grade
	Grade Difference (ft) 0.00
	Cover to Invert Depth (ft) 3.83

GPS Verified? Visually Corr	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Street	Surface Material Asphalt
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<p>Images</p> 	<p>Defects</p> <table style="width: 100%;"> <tr> <td>Cover Fit Tight</td> <td style="text-align: right;"><i>Overall Score</i></td> </tr> <tr> <td>Cover seal missing</td> <td style="text-align: right;">Total <b>8</b></td> </tr> </table>	Cover Fit Tight	<i>Overall Score</i>	Cover seal missing	Total <b>8</b>
Cover Fit Tight	<i>Overall Score</i>				
Cover seal missing	Total <b>8</b>				

Pipe Configuration				Construction Materials	
<i>Pipe Location</i>	<i>Pipe Service</i>	<i>Pipe Material</i>	<i>Pipe Diameter (in)</i>	<i>Grade Ring</i>	<i>None</i>
05:00	Incoming	PVC	6	<i>Flat Slab</i>	None
06:00	Incoming	PVC	6	<i>Chimney</i>	None
12:00	Outgoing	PVC	6	<i>Cone</i>	Concrete
				<i>Wall</i>	Concrete
				<i>Bench</i>	Concrete
				<i>Channel</i>	Other
				<i>Steps</i>	None

Comments



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin AJ-12	Manhole GIS ID 1943	Inspection Date 3/20/2016	Time 10:03:00 AM	Crew Leader MB
----------------------------	------------------------	------------------------------	---------------------	-------------------

Location Description 1751 Ron Randleman Boulevard	Manhole Grade At Grade
	Grade Difference (ft) 0.00
	Cover to Invert Depth (ft) 4.50

GPS Verified? Visually Corr	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Street	Surface Material Asphalt
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<p>Images</p>  	<p>Defects</p> <table style="width: 100%;"> <tr> <td>Cover fit loose</td> <td style="text-align: right;"><i>Overall Score</i></td> </tr> <tr> <td>Cover seal missing</td> <td style="text-align: right;">Total <b>15</b></td> </tr> </table>	Cover fit loose	<i>Overall Score</i>	Cover seal missing	Total <b>15</b>
Cover fit loose	<i>Overall Score</i>				
Cover seal missing	Total <b>15</b>				

Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	None
03:00	Incoming	PVC	6	Flat Slab	None
12:00	Outgoing	PVC	6	Chimney	None
05:00	Appurtenance	PVC	6	Cone	Concrete
				Wall	Concrete
				Bench	Concrete
				Channel	Other
				Steps	None

Comments



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin AJ-12	Manhole GIS ID 1953	Inspection Date 3/21/2016	Time 10:57:00 AM	Crew Leader EC
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Location Description 1830 Avenue H	Manhole Grade At Grade
	Grade Difference (ft) 0.00
	Cover to Invert Depth (ft) 7.12

GPS Verified? Visually Corr	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Street	Surface Material Asphalt
--------------------------------	-------------------	--------------------	----------------------	-------------------------	-----------------------------

<p>Images</p> 	<p>Defects</p> <table style="width: 100%;"> <tr> <td>Cover Fit Tight</td> <td style="text-align: right;"><i>Overall Score</i></td> </tr> <tr> <td>Cover seal missing</td> <td style="text-align: right;">Total <b>23</b></td> </tr> <tr> <td>Channel debris moderate</td> <td></td> </tr> </table>	Cover Fit Tight	<i>Overall Score</i>	Cover seal missing	Total <b>23</b>	Channel debris moderate	
Cover Fit Tight	<i>Overall Score</i>						
Cover seal missing	Total <b>23</b>						
Channel debris moderate							

Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	None
06:00	Incoming	Clay	8	Flat Slab	None
12:00	Outgoing	Clay	8	Chimney	Concrete
				Cone	None
				Wall	Brick
				Bench	Concrete
				Channel	Other
				Steps	None

Comments



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin AJ-12	Manhole GIS ID 1956	Inspection Date 3/21/2016	Time 10:36:00 AM	Crew Leader EC
----------------------------	------------------------	------------------------------	---------------------	-------------------

Location Description  1800 Avenue H	Manhole Grade At Grade
	Grade Difference (ft) 0.00
	Cover to Invert Depth (ft) 8.33

GPS Verified? Visually Corr	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Street	Surface Material Asphalt
--------------------------------	-------------------	--------------------	----------------------	-------------------------	-----------------------------

<p>Images</p>  	<p>Defects</p> <table style="width: 100%;"> <tr> <td>Cover Fit Tight</td> <td style="text-align: right;"><i>Overall Score</i></td> </tr> <tr> <td>Cover seal missing</td> <td style="text-align: right;">Total <b>13</b></td> </tr> <tr> <td>Frame base seal corrosion minor</td> <td></td> </tr> </table>	Cover Fit Tight	<i>Overall Score</i>	Cover seal missing	Total <b>13</b>	Frame base seal corrosion minor	
Cover Fit Tight	<i>Overall Score</i>						
Cover seal missing	Total <b>13</b>						
Frame base seal corrosion minor							

Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	None
06:00	Incoming	Clay	8	Flat Slab	None
09:00	Incoming	Clay	8	Chimney	Other
12:00	Outgoing	Clay	8	Cone	None
				Wall	Concrete
				Bench	Concrete
				Channel	Concrete
				Steps	None

Comments



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin AJ-12	Manhole GIS ID 1961	Inspection Date 3/7/2016	Time 1:44:00 PM	Crew Leader CH
----------------------------	------------------------	-----------------------------	--------------------	-------------------

Location Description  316 Bearkat Boulevard	Manhole Grade Above Grade
	Grade Difference (ft) 36.5
	Cover to Invert Depth (ft) 11.42

GPS Verified? Visually Corr	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Other	Surface Material Concrete
--------------------------------	-------------------	--------------------	----------------------	------------------------	------------------------------

<p>Images</p>  	<p>Defects</p> <p>Bench crack minor</p> <p>Sewer connection crack moderate</p> <table style="width: 100%; border: none;"> <tr> <td style="text-align: right;"><i>Overall Score</i></td> <td></td> </tr> <tr> <td style="text-align: right;">Total</td> <td style="text-align: right;"><b>13</b></td> </tr> </table>	<i>Overall Score</i>		Total	<b>13</b>
<i>Overall Score</i>					
Total	<b>13</b>				

Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	None
06:00	Incoming	PVC	8	Flat Slab	None
12:00	Outgoing	PVC	8	Chimney	Concrete
				Cone	Other
				Wall	Other
				Bench	Concrete
				Channel	Concrete
				Steps	None

Comments



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin AJ-12	Manhole GIS ID 1963	Inspection Date 3/20/2016	Time 9:50:00 AM	Crew Leader MB
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Location Description  1751 Ron Randleman Boulevard	Manhole Grade At Grade
	Grade Difference (ft) 0.00
	Cover to Invert Depth (ft) 4.17

GPS Verified? Visually Corr	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Street	Surface Material Asphalt
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<p>Images</p>  	<p>Defects</p> <p>Cover Fit Tight</p> <table style="width: 100%; border: none;"> <tr> <td style="text-align: right;"><i>Overall Score</i></td> <td></td> </tr> <tr> <td style="text-align: right;">Total</td> <td style="text-align: right;"><b>3</b></td> </tr> </table>	<i>Overall Score</i>		Total	<b>3</b>
<i>Overall Score</i>					
Total	<b>3</b>				

Pipe Configuration				Construction Materials	
<i>Pipe Location</i>	<i>Pipe Service</i>	<i>Pipe Material</i>	<i>Pipe Diameter (in)</i>	<i>Grade Ring</i>	<i>None</i>
06:00	Incoming	PVC	6	<i>Flat Slab</i>	None
12:00	Outgoing	PVC	6	<i>Chimney</i>	None
03:00	Appurtenance	PVC	4	<i>Cone</i>	Other
				<i>Wall</i>	
				<i>Bench</i>	Concrete
				<i>Channel</i>	Other
				<i>Steps</i>	None

Comments



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin AJ-12	Manhole GIS ID 1970	Inspection Date 3/7/2016	Time 12:55:00 PM	Crew Leader CH
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Location Description  322 Beakat Boulevard	Manhole Grade Above Grade
	Grade Difference (ft) 0.33
	Cover to Invert Depth (ft) 14.33

GPS Verified? Visually Corr	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Field	Surface Material Grass
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<p>Images</p>  	<p>Defects</p> <table style="width: 100%;"> <tr> <td>Cover Fit Tight</td> <td style="text-align: right;"><i>Overall Score</i></td> </tr> <tr> <td>Cover seal missing</td> <td style="text-align: right;">Total <b>8</b></td> </tr> </table>	Cover Fit Tight	<i>Overall Score</i>	Cover seal missing	Total <b>8</b>
Cover Fit Tight	<i>Overall Score</i>				
Cover seal missing	Total <b>8</b>				

Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	Concrete
02:00	Incoming	PVC	8	Flat Slab	None
07:00	Incoming	PVC	6	Chimney	Concrete
10:00	Outgoing	PVC	8	Cone	None
				Wall	Other
				Bench	Concrete
				Channel	Concrete
				Steps	None

Comments



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin AJ-12	Manhole GIS ID 1980	Inspection Date 3/22/2016	Time 10:50:00 AM	Crew Leader EC
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Location Description  1800 Old Sycamore Avenue	Manhole Grade At Grade
	Grade Difference (ft) 0.00
	Cover to Invert Depth (ft) 9.17

GPS Verified? Visually Corr	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Street	Surface Material Asphalt
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<p>Images</p>  	<p>Defects</p> <table style="width: 100%;"> <tr> <td>Cover Fit Tight</td> <td style="text-align: right;"><i>Overall Score</i></td> </tr> <tr> <td>Chimney corrosion minor</td> <td style="text-align: right;">Total <b>13</b></td> </tr> <tr> <td>Cover seal missing</td> <td></td> </tr> </table>	Cover Fit Tight	<i>Overall Score</i>	Chimney corrosion minor	Total <b>13</b>	Cover seal missing	
Cover Fit Tight	<i>Overall Score</i>						
Chimney corrosion minor	Total <b>13</b>						
Cover seal missing							

Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	None
07:00	Incoming	Clay	6	Flat Slab	None
08:00	Incoming	PVC	10	Chimney	Concrete
12:00	Outgoing	PVC	10	Cone	None
				Wall	Other
				Bench	Concrete
				Channel	Concrete
				Steps	None

Comments



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin AJ-12	Manhole GIS ID 1986	Inspection Date 3/7/2016	Time 11:25:00 AM	Crew Leader CH
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Location Description  1616 Sycamore Avenue	Manhole Grade Above Grade
	Grade Difference (ft) 0.50
	Cover to Invert Depth (ft) 14

GPS Verified? Visually Corr	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Field	Surface Material Grass
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<p>Images</p>  	<p>Defects</p> <table style="width: 100%;"> <tr> <td>Cover Fit Tight</td> <td style="text-align: right;"><i>Overall Score</i></td> </tr> <tr> <td>Chimney mortar missing moderate</td> <td style="text-align: right;">Total <b>77</b></td> </tr> <tr> <td>Cover seal missing</td> <td></td> </tr> <tr> <td>Frame base seal I/I minor</td> <td></td> </tr> <tr> <td>Frame base seal roots minor</td> <td></td> </tr> <tr> <td>Channel hydraulic restriction moderate</td> <td></td> </tr> <tr> <td>Chamber corrosion minor</td> <td></td> </tr> <tr> <td>Chamber joint offset moderate</td> <td></td> </tr> </table>	Cover Fit Tight	<i>Overall Score</i>	Chimney mortar missing moderate	Total <b>77</b>	Cover seal missing		Frame base seal I/I minor		Frame base seal roots minor		Channel hydraulic restriction moderate		Chamber corrosion minor		Chamber joint offset moderate	
Cover Fit Tight	<i>Overall Score</i>																
Chimney mortar missing moderate	Total <b>77</b>																
Cover seal missing																	
Frame base seal I/I minor																	
Frame base seal roots minor																	
Channel hydraulic restriction moderate																	
Chamber corrosion minor																	
Chamber joint offset moderate																	

Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	None
03:00	Incoming	PVC	6	Flat Slab	None
06:00	Incoming	PVC	6	Chimney	Concrete
09:00	Appurtenance	PVC	3	Cone	Concrete
12:00	Outgoing	PVC	8	Wall	Concrete
				Bench	Concrete
				Channel	Concrete
				Steps	None

Comments



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin AJ-12	Manhole GIS ID 1999	Inspection Date 3/8/2016	Time 3/8/2016	Crew Leader CH
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Location Description  311 Bearkat Boulevard	Manhole Grade Above Grade
	Grade Difference (ft) 0.50
	Cover to Invert Depth (ft) 7.75

GPS Verified? Visually Corr	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Side Yard	Surface Material Grass
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<p>Images</p>  	<p>Defects</p> <p>Cover seal missing</p> <p style="text-align: right;"><i>Overall Score</i></p> <p style="text-align: right;">Total <b>5</b></p>
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Pipe Configuration				Construction Materials	
<i>Pipe Location</i>	<i>Pipe Service</i>	<i>Pipe Material</i>	<i>Pipe Diameter (in)</i>	<i>Grade Ring</i>	<i>None</i>
06:00	Incoming	PVC	10	<i>Flat Slab</i>	<i>None</i>
12:00	Outgoing	PVC	10	<i>Chimney</i>	<i>Concrete</i>
				<i>Cone</i>	<i>None</i>
				<i>Wall</i>	<i>Other</i>
				<i>Bench</i>	<i>Concrete</i>
				<i>Channel</i>	<i>Concrete</i>
				<i>Steps</i>	<i>None</i>

Comments  
No visible problems.



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin AJ-12	Manhole GIS ID 2001	Inspection Date 3/22/2016	Time 11:05:00 AM	Crew Leader EC
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Location Description 1799 Old Sycamore Avenue	Manhole Grade Above Grade
	Grade Difference (ft) 1.25
	Cover to Invert Depth (ft) 8.75

GPS Verified? Visually Corr	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Field	Surface Material Grass
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<p>Images</p>  	<p>Defects</p> <table style="width: 100%;"> <tr> <td>Cover Fit Tight</td> <td style="text-align: right;"><i>Overall Score</i></td> </tr> <tr> <td>Chimney corrosion moderate</td> <td style="text-align: right;">Total <b>33</b></td> </tr> <tr> <td>Frame base seal corrosion moderate</td> <td></td> </tr> <tr> <td>Frame corrosion moderate</td> <td></td> </tr> </table>	Cover Fit Tight	<i>Overall Score</i>	Chimney corrosion moderate	Total <b>33</b>	Frame base seal corrosion moderate		Frame corrosion moderate	
Cover Fit Tight	<i>Overall Score</i>								
Chimney corrosion moderate	Total <b>33</b>								
Frame base seal corrosion moderate									
Frame corrosion moderate									

Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	None
06:00	Incoming	PVC	8	Flat Slab	None
07:00	Incoming	PVC	8	Chimney	Concrete
12:00	Outgoing	PVC	8	Cone	Other
				Wall	Other
				Bench	Concrete
				Channel	Concrete
				Steps	None

Comments



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin AJ-12	Manhole GIS ID 2011	Inspection Date 3/20/2016	Time 9:40:00 AM	Crew Leader MB
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Location Description  17th Street and Avenue I	Manhole Grade At Grade
	Grade Difference (ft) 0.00
	Cover to Invert Depth (ft) 3.25

GPS Verified? Visually Corr	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Street	Surface Material Asphalt
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<p>Images</p>  	<p>Defects</p> <p>Cover Fit Tight</p> <table style="width: 100%; border: none;"> <tr> <td style="text-align: right;"><i>Overall Score</i></td> <td></td> </tr> <tr> <td style="text-align: right;">Total</td> <td style="text-align: right;"><b>3</b></td> </tr> </table>	<i>Overall Score</i>		Total	<b>3</b>
<i>Overall Score</i>					
Total	<b>3</b>				

Pipe Configuration				Construction Materials	
<i>Pipe Location</i>	<i>Pipe Service</i>	<i>Pipe Material</i>	<i>Pipe Diameter (in)</i>	<i>Grade Ring</i>	<i>None</i>
06:00	Incoming	Clay	8	<i>Flat Slab</i>	None
12:00	Outgoing	PVC	8	<i>Chimney</i>	Concrete
01:00	Appurtenance	PVC	4	<i>Cone</i>	None
				<i>Wall</i>	Concrete
				<i>Bench</i>	Concrete
				<i>Channel</i>	Other
				<i>Steps</i>	None

Comments



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin AJ-12	Manhole GIS ID 2020	Inspection Date 3/21/2016	Time 10:12:00 AM	Crew Leader EC
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Location Description  1600 Avenue H	Manhole Grade At Grade
	Grade Difference (ft) 0.00
	Cover to Invert Depth (ft) 4.92

GPS Verified? Visually Corr	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Street	Surface Material Asphalt
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<p>Images</p>  	<p>Defects</p> <table style="width: 100%;"> <tr> <td>Cover Fit Tight</td> <td style="text-align: right;"><i>Overall Score</i></td> </tr> <tr> <td>Cover seal missing</td> <td style="text-align: right;">Total <b>23</b></td> </tr> <tr> <td>Channel debris moderate</td> <td></td> </tr> </table>	Cover Fit Tight	<i>Overall Score</i>	Cover seal missing	Total <b>23</b>	Channel debris moderate	
Cover Fit Tight	<i>Overall Score</i>						
Cover seal missing	Total <b>23</b>						
Channel debris moderate							

Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	None
06:00	Incoming	Clay	8	Flat Slab	None
09:00	Incoming	Clay	8	Chimney	Concrete
12:00	Outgoing	Clay	8	Cone	None
07:00	Appurtenance	PVC	4	Wall	Brick
				Bench	Concrete
				Channel	Brick
				Steps	None

Comments



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin AJ-12	Manhole GIS ID 2023	Inspection Date 3/22/2016	Time 9:47:00 AM	Crew Leader EC
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Location Description  1616 Sycamore Avenue	Manhole Grade Above Grade
	Grade Difference (ft) 2.67
	Cover to Invert Depth (ft) 6.58

GPS Verified? Visually Corr	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Field	Surface Material Grass
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<p>Images</p>  	<p>Defects</p> <table style="width: 100%;"> <tr> <td>Cover Fit Tight</td> <td style="text-align: right;"><i>Overall Score</i></td> </tr> <tr> <td>Cover seal missing</td> <td style="text-align: right;">Total <b>50</b></td> </tr> <tr> <td>Frame base seal corrosion moderate</td> <td></td> </tr> <tr> <td>Frame corrosion moderate</td> <td></td> </tr> </table>	Cover Fit Tight	<i>Overall Score</i>	Cover seal missing	Total <b>50</b>	Frame base seal corrosion moderate		Frame corrosion moderate	
Cover Fit Tight	<i>Overall Score</i>								
Cover seal missing	Total <b>50</b>								
Frame base seal corrosion moderate									
Frame corrosion moderate									

Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	None
07:00	Incoming	Clay	8	Flat Slab	None
12:00	Outgoing	Clay	8	Chimney	Other
				Cone	Other
				Wall	Other
				Bench	Concrete
				Channel	Concrete
				Steps	None

Comments



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin AJ-12	Manhole GIS ID 2026	Inspection Date 3/18/2016	Time 10:42:00 AM	Crew Leader CH
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Location Description  1616 Sycamore Avenue	Manhole Grade At Grade
	Grade Difference (ft) 0.00
	Cover to Invert Depth (ft) 4.92

GPS Verified? Visually Corr	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Field	Surface Material Grass
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<p>Images</p>  	<p>Defects</p> <ul style="list-style-type: none"> <li>Cover corrosion minor</li> <li>Cover Fit Tight</li> <li>Chimney crack minor</li> <li>Chimney corrosion minor</li> <li>Chimney mortar missing moderate</li> <li>Cover I/I moderate</li> <li>Cover seal missing</li> <li>Cover surface wear minor</li> <li>Sewer connection crack minor</li> </ul> <div style="text-align: right; margin-top: 20px;"> <p><i>Overall Score</i></p> <p>Total <b>54</b></p> </div>
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Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	None
07:00	Incoming	PVC	6	Flat Slab	None
12:00	Outgoing	Clay	6	Chimney	Brick
				Cone	None
				Wall	Other
				Bench	Concrete
				Channel	Concrete
				Steps	None

Comments  
Liner has detached on the chimney.



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin AJ-12	Manhole GIS ID 2027	Inspection Date 3/8/2016	Time 8:55:00 AM	Crew Leader CH
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Location Description  300 Bearkat Boulevard	Manhole Grade At Grade
	Grade Difference (ft) 0.00
	Cover to Invert Depth (ft) 8.91

GPS Verified? Visually Corr	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Field	Surface Material Grass
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<p>Images</p>  	<p>Defects</p> <table style="width: 100%;"> <tr> <td>Cover Fit Tight</td> <td style="text-align: right;"><i>Overall Score</i></td> </tr> <tr> <td>Bench corrosion minor</td> <td style="text-align: right;">Total <b>36</b></td> </tr> <tr> <td>Channel corrosion minor</td> <td></td> </tr> <tr> <td>Channel hydraulic restriction moderate</td> <td></td> </tr> <tr> <td>Sewer connection crack minor</td> <td></td> </tr> </table>	Cover Fit Tight	<i>Overall Score</i>	Bench corrosion minor	Total <b>36</b>	Channel corrosion minor		Channel hydraulic restriction moderate		Sewer connection crack minor	
Cover Fit Tight	<i>Overall Score</i>										
Bench corrosion minor	Total <b>36</b>										
Channel corrosion minor											
Channel hydraulic restriction moderate											
Sewer connection crack minor											

Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	None
06:00	Incoming	PVC	10	Flat Slab	None
12:00	Outgoing	PVC	10	Chimney	Concrete
				Cone	None
				Wall	Other
				Bench	Concrete
				Channel	Concrete
				Steps	None

Comments



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin AJ-12	Manhole GIS ID 2032	Inspection Date 3/20/2016	Time 9:24:00 AM	Crew Leader CH
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Location Description 1500 Avenue I	Manhole Grade At Grade
	Grade Difference (ft) 0.00
	Cover to Invert Depth (ft) 6.75

GPS Verified? Visually Corr	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Street	Surface Material Asphalt
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<p>Images</p>  	<p>Defects</p> <table style="width: 100%;"> <tr> <td>Cover Fit Tight</td> <td style="text-align: right;"><i>Overall Score</i></td> </tr> <tr> <td>Cover seal missing</td> <td style="text-align: right;">Total <b>8</b></td> </tr> </table>	Cover Fit Tight	<i>Overall Score</i>	Cover seal missing	Total <b>8</b>
Cover Fit Tight	<i>Overall Score</i>				
Cover seal missing	Total <b>8</b>				

Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	None
06:00	Incoming	Clay	8	Flat Slab	None
12:00	Outgoing	Clay	8	Chimney	Concrete
09:00	Appurtenance	PVC	4	Cone	Concrete
				Wall	Concrete
				Bench	Concrete
				Channel	Other
				Steps	None

Comments



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin AJ-12	Manhole GIS ID 2107	Inspection Date 3/14/2016	Time 9:45:00 AM	Crew Leader CH
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Location Description  1108 16th Street	Manhole Grade At Grade
	Grade Difference (ft) 0.00
	Cover to Invert Depth (ft) 4.17

GPS Verified? Visually Corr	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Street	Surface Material Asphalt
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<p>Images</p>  	<p>Defects</p> <p>Sewer connection crack moderate</p> <p style="text-align: right;"><i>Overall Score</i></p> <p style="text-align: right;">Total            <b>6</b></p>
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Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	None
03:00	Incoming	Clay	6	Flat Slab	None
06:00	Incoming	PVC	8	Chimney	Brick
09:00	Incoming	Clay	6	Cone	Brick
12:00	Outgoing	PVC	8	Wall	Brick
				Bench	Concrete
				Channel	Brick
				Steps	None

Comments  
3' O' Clock and 9 O' Clock pipes are cracked.



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin AJ-12	Manhole GIS ID 2110	Inspection Date 3/23/2016	Time 8:19:00 AM	Crew Leader MB	
Location Description  100 Bearkat Boulevard				Manhole Grade At Grade	
				Grade Difference (ft) 0.00	
				Cover to Invert Depth (ft) 8.00	
GPS Verified? Visually Corr	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Field	Surface Material Grass
Images    			Defects		
Comments This location was surcharged during inspection, therefore certain data was unable to be collected.					



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin AJ-12	Manhole GIS ID 2111	Inspection Date 3/20/2016	Time 11:48:00 AM	Crew Leader MB
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Location Description  1600 Bobby R. Marks Drive	Manhole Grade At Grade
	Grade Difference (ft) 0.00
	Cover to Invert Depth (ft) 6.67

GPS Verified? Visually Corr	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Street	Surface Material Asphalt
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<p>Images</p>  	<p>Defects</p> <p>Cover Fit Tight</p> <table style="width: 100%;"> <tr> <td colspan="2" style="text-align: right;"><i>Overall Score</i></td> </tr> <tr> <td style="text-align: right;">Total</td> <td style="text-align: right;"><b>8</b></td> </tr> </table>	<i>Overall Score</i>		Total	<b>8</b>
<i>Overall Score</i>					
Total	<b>8</b>				

Pipe Configuration				Construction Materials	
<i>Pipe Location</i>	<i>Pipe Service</i>	<i>Pipe Material</i>	<i>Pipe Diameter (in)</i>	<i>Grade Ring</i>	<i>None</i>
06:00	Incoming	Clay	8	<i>Flat Slab</i>	None
09:00	Incoming	Clay	8	<i>Chimney</i>	Brick
12:00	Outgoing	PVC	8	<i>Cone</i>	Brick
				<i>Wall</i>	Brick
				<i>Bench</i>	Concrete
				<i>Channel</i>	Other
				<i>Steps</i>	None

Comments



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin AJ-12	Manhole GIS ID 2112	Inspection Date 3/20/2016	Time 8:58:00 AM	Crew Leader CH
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Location Description  1500 Avenue I	Manhole Grade At Grade
	Grade Difference (ft) 0.00
	Cover to Invert Depth (ft) 4.00

GPS Verified? Visually Corr	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Street	Surface Material Asphalt
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<p>Images</p>  	<p>Defects</p> <table style="width: 100%;"> <tr> <td>Cover Fit Tight</td> <td style="text-align: right;"><i>Overall Score</i></td> </tr> <tr> <td>Cover seal missing</td> <td style="text-align: right;">Total <b>8</b></td> </tr> </table>	Cover Fit Tight	<i>Overall Score</i>	Cover seal missing	Total <b>8</b>
Cover Fit Tight	<i>Overall Score</i>				
Cover seal missing	Total <b>8</b>				

Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	None
06:00	Incoming	Clay	8	Flat Slab	None
12:00	Outgoing	Clay	8	Chimney	Concrete
				Cone	None
				Wall	Concrete
				Bench	Concrete
				Channel	Other
				Steps	None

Comments



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin AJ-12	Manhole GIS ID 2120	Inspection Date 3/20/2016	Time 10:39:00 AM	Crew Leader MB
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Location Description  815 16th Street	Manhole Grade At Grade
	Grade Difference (ft) 0.00
	Cover to Invert Depth (ft) 3.83

GPS Verified? Visually Corr	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Street	Surface Material Asphalt
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Images




Defects		<i>Overall Score</i>
Cover Fit Tight		Total
Cover seal missing		<b>8</b>

Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	None
03:00	Incoming	Clay	6	Flat Slab	None
09:00	Incoming	Clay	6	Chimney	None
12:00	Outgoing	Clay	6	Cone	Concrete
				Wall	Concrete
				Bench	Concrete
				Channel	Concrete
				Steps	None

Comments



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin AJ-12	Manhole GIS ID 2121	Inspection Date 3/20/2016	Time 10:59:00 AM	Crew Leader MB
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Location Description  815 16th Street	Manhole Grade At Grade
	Grade Difference (ft) 0.00
	Cover to Invert Depth (ft) 6.17

GPS Verified? Visually Corr	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Street	Surface Material Asphalt
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<p>Images</p>  	<p>Defects</p> <p>Cover Fit Tight</p> <table style="width: 100%;"> <tr> <td colspan="2" style="text-align: right;"><i>Overall Score</i></td> </tr> <tr> <td style="text-align: right;">Total</td> <td style="text-align: right;"><b>3</b></td> </tr> </table>	<i>Overall Score</i>		Total	<b>3</b>
<i>Overall Score</i>					
Total	<b>3</b>				

Pipe Configuration				Construction Materials	
<i>Pipe Location</i>	<i>Pipe Service</i>	<i>Pipe Material</i>	<i>Pipe Diameter (in)</i>	<i>Grade Ring</i>	<i>None</i>
06:00	Incoming	Clay	6	<i>Flat Slab</i>	None
12:00	Outgoing	Clay	6	<i>Chimney</i>	Other
03:00	Appurtenance	PVC	4	<i>Cone</i>	None
				<i>Wall</i>	Other
				<i>Bench</i>	Concrete
				<i>Channel</i>	Other
				<i>Steps</i>	None

Comments



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin AJ-12	Manhole GIS ID 2123	Inspection Date 3/20/2016	Time 10:49:00 AM	Crew Leader MB
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Location Description  815 16th Street	Manhole Grade At Grade
	Grade Difference (ft) 0.00
	Cover to Invert Depth (ft) 6.33

GPS Verified? Visually Corr	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Street	Surface Material Asphalt
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<p>Images</p>  	<p>Defects</p> <p>Cover Fit Tight</p> <table style="width: 100%;"> <tr> <td colspan="2" style="text-align: right;"><i>Overall Score</i></td> </tr> <tr> <td style="text-align: right;">Total</td> <td style="text-align: right;"><b>3</b></td> </tr> </table>	<i>Overall Score</i>		Total	<b>3</b>
<i>Overall Score</i>					
Total	<b>3</b>				

Pipe Configuration				Construction Materials	
<i>Pipe Location</i>	<i>Pipe Service</i>	<i>Pipe Material</i>	<i>Pipe Diameter (in)</i>	<i>Grade Ring</i>	<i>None</i>
06:00	Incoming	Clay	6	<i>Flat Slab</i>	None
12:00	Outgoing	Clay	6	<i>Chimney</i>	Concrete
03:00	Appurtenance	Clay	4	<i>Cone</i>	Concrete
				<i>Wall</i>	Concrete
				<i>Bench</i>	Concrete
				<i>Channel</i>	Other
				<i>Steps</i>	None

Comments



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin AJ-12	Manhole GIS ID 2126	Inspection Date 3/20/2016	Time 11:40:00 AM	Crew Leader MB
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Location Description  1600 Bobby R. Marks Drive	Manhole Grade At Grade
	Grade Difference (ft) 0.00
	Cover to Invert Depth (ft) 6.58

GPS Verified? Visually Corr	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Street	Surface Material Asphalt
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<p>Images</p>  	<p>Defects</p> <p>Cover Fit Tight</p> <table style="width: 100%;"> <tr> <td colspan="2" style="text-align: right;"><i>Overall Score</i></td> </tr> <tr> <td style="text-align: right;">Total</td> <td style="text-align: right;"><b>3</b></td> </tr> </table>	<i>Overall Score</i>		Total	<b>3</b>
<i>Overall Score</i>					
Total	<b>3</b>				

Pipe Configuration				Construction Materials	
<i>Pipe Location</i>	<i>Pipe Service</i>	<i>Pipe Material</i>	<i>Pipe Diameter (in)</i>	<i>Grade Ring</i>	<i>None</i>
06:00	Incoming	PVC	8	<i>Flat Slab</i>	None
09:00	Incoming	Clay	6	<i>Chimney</i>	Brick
12:00	Outgoing	Clay	8	<i>Cone</i>	Brick
				<i>Wall</i>	Brick
				<i>Bench</i>	Brick
				<i>Channel</i>	Brick
				<i>Steps</i>	None

Comments



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin AJ-12	Manhole GIS ID 2140	Inspection Date 3/23/2016	Time 8:38:00 AM	Crew Leader MB
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Location Description  100 Bearkat Boulevard	Manhole Grade At Grade
	Grade Difference (ft) 0.00
	Cover to Invert Depth (ft) 5.83

GPS Verified? Visually Corr	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Parking Lot	Surface Material Grass
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<p>Images</p>  	<p>Defects</p> <table style="width: 100%;"> <tr> <td>Cover Fit Tight</td> <td style="text-align: right;"><i>Overall Score</i></td> </tr> <tr> <td>Cover seal missing</td> <td style="text-align: right;">Total <b>3</b></td> </tr> </table>	Cover Fit Tight	<i>Overall Score</i>	Cover seal missing	Total <b>3</b>
Cover Fit Tight	<i>Overall Score</i>				
Cover seal missing	Total <b>3</b>				

Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	None
06:00	Incoming	Clay	12	Flat Slab	None
12:00	Outgoing	Clay	12	Chimney	Brick
				Cone	None
				Wall	Brick
				Bench	Concrete
				Channel	Concrete
				Steps	None

Comments



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin AJ-12	Manhole GIS ID 2152	Inspection Date 3/23/2016	Time 8:51:00 AM	Crew Leader MB
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Location Description  100 Bearkat Boulevard	Manhole Grade Above Grade
	Grade Difference (ft) 0.25
	Cover to Invert Depth (ft) 8.25

GPS Verified? Visually Corr	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Field	Surface Material Dirt
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<p>Images</p>  	<p>Defects</p> <table style="width: 100%;"> <tr> <td>Cover Fit Tight</td> <td style="text-align: right;"><i>Overall Score</i></td> </tr> <tr> <td>Frame corrosion major</td> <td style="text-align: right;">Total <b>18</b></td> </tr> </table>	Cover Fit Tight	<i>Overall Score</i>	Frame corrosion major	Total <b>18</b>
Cover Fit Tight	<i>Overall Score</i>				
Frame corrosion major	Total <b>18</b>				

Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	None
03:00	Incoming	Clay	0	Flat Slab	None
12:00	Outgoing	Clay	0	Chimney	Brick
				Cone	Concrete
				Wall	Concrete
				Bench	Concrete
				Channel	Concrete
				Steps	None

Comments  
Line was surcharged during manhole inspection reducing visibility of the manhole.



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin AJ-12	Manhole GIS ID 2164	Inspection Date 3/8/2016	Time 10:57:00 AM	Crew Leader CH
Location Description 311 Bearkat Boulevard				Manhole Grade Above Grade
				Grade Difference (ft) 0.50
				Cover to Invert Depth (ft) 8.17
GPS Verified? Visually Corr	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Field
Surface Material Dirt				
Images		Defects		
 		Cover Fit Tight	<i>Overall Score</i>	
		Frame offset completely displaced	Total	<b>23</b>
Pipe Configuration				Construction Materials
				<i>Grade Ring</i> None
				<i>Flat Slab</i> None
				<i>Chimney</i> Brick
				<i>Cone</i> None
				<i>Wall</i> Brick
				<i>Bench</i> N/A
				<i>Channel</i> N/A
				<i>Steps</i> None
Comments Frame detaches from the manhole. This location was surcharged during inspection. Incoming lines, outgoing lines, the bench and channel could not be inspected.				



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin AJ-12	Manhole GIS ID 2167	Inspection Date 3/21/2016	Time 11:50:00 AM	Crew Leader EC
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Location Description  6 Avenue H	Manhole Grade At Grade
	Grade Difference (ft) 0.00
	Cover to Invert Depth (ft) 5.67

GPS Verified? Visually Corr	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Street	Surface Material Asphalt
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<p>Images</p>  	<p>Defects</p> <table style="width: 100%;"> <tr> <td>Cover Fit Tight</td> <td style="text-align: right;"><i>Overall Score</i></td> </tr> <tr> <td>Cover seal missing</td> <td style="text-align: right;">Total <b>8</b></td> </tr> </table>	Cover Fit Tight	<i>Overall Score</i>	Cover seal missing	Total <b>8</b>
Cover Fit Tight	<i>Overall Score</i>				
Cover seal missing	Total <b>8</b>				

Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	None
07:00	Incoming	Clay	8	Flat Slab	None
12:00	Outgoing	Clay	8	Chimney	Brick
				Cone	Brick
				Wall	Brick
				Bench	Brick
				Channel	Concrete
				Steps	None

Comments



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin AJ-12	Manhole GIS ID 2170	Inspection Date 3/23/2016	Time 9:15:00 AM	Crew Leader MB
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Location Description 100 Bearkat Boulevard	Manhole Grade Above Grade
	Grade Difference (ft) 1.00
	Cover to Invert Depth (ft) 3.25

GPS Verified? Visually Corr	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Field	Surface Material Dirt
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<p>Images</p>  	<p>Defects</p> <table style="width: 100%;"> <tr> <td>Cover Fit Tight</td> <td style="text-align: right;"><i>Overall Score</i></td> </tr> <tr> <td>Cover seal missing</td> <td style="text-align: right;">Total <b>18</b></td> </tr> <tr> <td>Frame corrosion moderate</td> <td></td> </tr> </table>	Cover Fit Tight	<i>Overall Score</i>	Cover seal missing	Total <b>18</b>	Frame corrosion moderate	
Cover Fit Tight	<i>Overall Score</i>						
Cover seal missing	Total <b>18</b>						
Frame corrosion moderate							

Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	None
09:00	Incoming	Clay	6	Flat Slab	None
12:00	Outgoing	Clay	6	Chimney	Brick
05:00	Appurtenance	PVC	4	Cone	None
				Wall	Concrete
				Bench	Concrete
				Channel	Concrete
				Steps	None

Comments



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin AJ-12	Manhole GIS ID 2179	Inspection Date 3/19/2016	Time 9:11:00 AM	Crew Leader CH
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Location Description  1751 Avenue I.	Manhole Grade At Grade
	Grade Difference (ft) 0.00
	Cover to Invert Depth (ft) 5.25

GPS Verified? Visually Corr	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Street	Surface Material Asphalt
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<p>Images</p> <div style="text-align: center; margin-top: 20px;">  </div>	<p>Defects</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 70%;">Cover Fit Tight</td> <td style="text-align: right;"><i>Overall Score</i></td> </tr> <tr> <td>Cover seal missing</td> <td style="text-align: right;">Total <b>14</b></td> </tr> <tr> <td>Connection crack moderate</td> <td></td> </tr> </table>	Cover Fit Tight	<i>Overall Score</i>	Cover seal missing	Total <b>14</b>	Connection crack moderate	
Cover Fit Tight	<i>Overall Score</i>						
Cover seal missing	Total <b>14</b>						
Connection crack moderate							

Pipe Configuration				Construction Materials	
<i>Pipe Location</i>	<i>Pipe Service</i>	<i>Pipe Material</i>	<i>Pipe Diameter (in)</i>	<i>Grade Ring</i>	<i>None</i>
06:00	Incoming	Clay	8	<i>Flat Slab</i>	None
07:00	Incoming	Clay	8	<i>Chimney</i>	Brick
12:00	Outgoing	Clay	8	<i>Cone</i>	Brick
				<i>Wall</i>	Brick
				<i>Bench</i>	Concrete
				<i>Channel</i>	Other
				<i>Steps</i>	None

Comments



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin AJ-12	Manhole GIS ID 2183	Inspection Date 3/21/2016	Time 11:29:00 AM	Crew Leader EC
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Location Description  6 Avenue H	Manhole Grade At Grade
	Grade Difference (ft) 0.00
	Cover to Invert Depth (ft) 6.12

GPS Verified? Visually Corr	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Street	Surface Material Asphalt
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<p>Images</p>  	<p>Defects</p> <p>Cover corrosion minor</p> <p>Cover Fit Tight</p> <p>Cover seal missing</p> <p>Lateral corrosion moderate</p> <p style="text-align: right;"><i>Overall Score</i></p> <p style="text-align: right;">Total        <b>23</b></p>
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Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	None
06:00	Incoming	Clay	12	Flat Slab	None
12:00	Outgoing	Clay	12	Chimney	Brick
				Cone	None
				Wall	Brick
				Bench	Concrete
				Channel	Concrete
				Steps	Iron

Comments



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin AJ-12	Manhole GIS ID 2207	Inspection Date 3/23/2016	Time 10:37:00 AM	Crew Leader MB
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Location Description  1501 Sam Houston Avenue	Manhole Grade At Grade
	Grade Difference (ft) 0.00
	Cover to Invert Depth (ft) 13.00

GPS Verified? Visually Corr	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Street	Surface Material Asphalt
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<p>Images</p>  	<p>Defects</p> <table style="width: 100%;"> <tr> <td>Cover Fit Tight</td> <td style="text-align: right;"><i>Overall Score</i></td> </tr> <tr> <td>Lateral corrosion moderate</td> <td style="text-align: right;">Total <b>13</b></td> </tr> </table>	Cover Fit Tight	<i>Overall Score</i>	Lateral corrosion moderate	Total <b>13</b>
Cover Fit Tight	<i>Overall Score</i>				
Lateral corrosion moderate	Total <b>13</b>				

Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	None
06:00	Incoming	Clay	6	Flat Slab	None
12:00	Outgoing	Clay	6	Chimney	Brick
03:00	Appurtenance	PVC	4	Cone	Brick
				Wall	Concrete
				Bench	Concrete
				Channel	Concrete
				Steps	Iron

Comments



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin AJ-12	Manhole GIS ID 2211	Inspection Date 3/18/2016	Time 1:39:00 PM	Crew Leader CH
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Location Description  1400 Universtiy Avenue	Manhole Grade At Grade
	Grade Difference (ft) 0.00
	Cover to Invert Depth (ft) 7.42

GPS Verified? Visually Corr	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Street	Surface Material Asphalt
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Images




Defects

Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	None
06:00	Incoming	Clay	12	Flat Slab	None
12:00	Outgoing	Clay	12	Chimney	Brick
10:00	Appurtenance	PVC	4	Cone	None
				Wall	Brick
				Bench	Concrete
				Channel	Concrete
				Steps	None

Comments





## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin AJ-12	Manhole GIS ID 2224	Inspection Date 3/15/2016	Time 11:17:00 AM	Crew Leader CH
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Location Description 1000 15th Street	Manhole Grade At Grade
	Grade Difference (ft) 0.00
	Cover to Invert Depth (ft) 6.83

GPS Verified? Visually Corr	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Street	Surface Material Asphalt
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<p>Images</p>  	<p>Defects</p> <table style="width: 100%;"> <tr> <td>Cover Fit Tight</td> <td style="text-align: right;"><i>Overall Score</i></td> </tr> <tr> <td>Cover seal missing</td> <td style="text-align: right;">Total <b>23</b></td> </tr> <tr> <td>Lateral corrosion major</td> <td></td> </tr> </table>	Cover Fit Tight	<i>Overall Score</i>	Cover seal missing	Total <b>23</b>	Lateral corrosion major	
Cover Fit Tight	<i>Overall Score</i>						
Cover seal missing	Total <b>23</b>						
Lateral corrosion major							

Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	None
06:00	Incoming	Clay	8	Flat Slab	None
09:00	Incoming	PVC	8	Chimney	Brick
12:00	Outgoing	Clay	8	Cone	Brick
				Wall	Brick
				Bench	Concrete
				Channel	Other
				Steps	Iron

Comments



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin AJ-12	Manhole GIS ID 2225	Inspection Date 3/19/2016	Time 8:28:00 AM	Crew Leader CH
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Location Description  916 15th Street	Manhole Grade At Grade
	Grade Difference (ft) 0.00
	Cover to Invert Depth (ft) 5.42

GPS Verified? Visually Corr	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Street	Surface Material Asphalt
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<p>Images</p>  	<p>Defects</p> <table style="width: 100%;"> <tr> <td>Cover Fit Tight</td> <td style="text-align: right;"><i>Overall Score</i></td> </tr> <tr> <td>Cover seal missing</td> <td style="text-align: right;">Total <b>8</b></td> </tr> </table>	Cover Fit Tight	<i>Overall Score</i>	Cover seal missing	Total <b>8</b>
Cover Fit Tight	<i>Overall Score</i>				
Cover seal missing	Total <b>8</b>				

Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	None
06:00	Incoming	Clay	10	Flat Slab	None
12:00	Outgoing	PVC	10	Chimney	Concrete
				Cone	None
				Wall	Concrete
				Bench	Concrete
				Channel	Other
				Steps	None

Comments



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin AJ-12	Manhole GIS ID 2226	Inspection Date 3/19/2016	Time 8:59:00 AM	Crew Leader CH
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Location Description  916 15th Street	Manhole Grade At Grade
	Grade Difference (ft) 0.00
	Cover to Invert Depth (ft) 3.83

GPS Verified? Visually Corr	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Street	Surface Material Asphalt
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<p>Images</p>  	<p>Defects</p> <p>Cover seal missing</p> <table style="width: 100%; margin-top: 20px;"> <tr> <td colspan="2" style="text-align: right;"><i>Overall Score</i></td> </tr> <tr> <td style="text-align: right;">Total</td> <td style="text-align: right; font-weight: bold;">5</td> </tr> </table>	<i>Overall Score</i>		Total	5
<i>Overall Score</i>					
Total	5				

Pipe Configuration				Construction Materials	
<i>Pipe Location</i>	<i>Pipe Service</i>	<i>Pipe Material</i>	<i>Pipe Diameter (in)</i>	<i>Grade Ring</i>	None
12:00	Outgoing	Clay	6	<i>Flat Slab</i>	Concrete
				<i>Chimney</i>	Concrete
				<i>Cone</i>	Brick
				<i>Wall</i>	Concrete
				<i>Bench</i>	Concrete
				<i>Channel</i>	Concrete
				<i>Steps</i>	None

Comments  
This manhole is located at the end of the line



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin AJ-12	Manhole GIS ID 2228	Inspection Date 3/19/2016	Time 8:36:00 AM	Crew Leader CH
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Location Description 916 15th Street	Manhole Grade Below Grade
	Grade Difference (ft) 0.12
	Cover to Invert Depth (ft) 6.00

GPS Verified? Visually Corr	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Street	Surface Material Asphalt
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<p>Images</p>  	<p>Defects</p> <table style="width: 100%;"> <tr> <td>Cover Fit Tight</td> <td style="text-align: right;"><i>Overall Score</i></td> </tr> <tr> <td>Cover seal missing</td> <td style="text-align: right;">Total <b>11</b></td> </tr> <tr> <td>Sewer connection crack minor</td> <td></td> </tr> </table>	Cover Fit Tight	<i>Overall Score</i>	Cover seal missing	Total <b>11</b>	Sewer connection crack minor	
Cover Fit Tight	<i>Overall Score</i>						
Cover seal missing	Total <b>11</b>						
Sewer connection crack minor							

Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	None
03:00	Incoming	PVC	10	Flat Slab	None
06:00	Incoming	Clay	10	Chimney	Other
12:00	Outgoing	Clay	10	Cone	Concrete
				Wall	Brick
				Bench	Brick
				Channel	Concrete
				Steps	None

Comments



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin AJ-12	Manhole GIS ID 2230	Inspection Date 3/19/2016	Time 8:15:00 AM	Crew Leader CH
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Location Description  815 15th Street	Manhole Grade At Grade
	Grade Difference (ft) 0.00
	Cover to Invert Depth (ft) 8.67

GPS Verified? Visually Corr	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Street	Surface Material Asphalt
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<p>Images</p>  	<p>Defects</p> <table style="width: 100%;"> <tr> <td>Cover Fit Tight</td> <td style="text-align: right;"><i>Overall Score</i></td> </tr> <tr> <td>Cover seal missing</td> <td style="text-align: right;">Total <b>23</b></td> </tr> <tr> <td>Channel debris moderate</td> <td></td> </tr> </table>	Cover Fit Tight	<i>Overall Score</i>	Cover seal missing	Total <b>23</b>	Channel debris moderate	
Cover Fit Tight	<i>Overall Score</i>						
Cover seal missing	Total <b>23</b>						
Channel debris moderate							

Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	None
04:00	Incoming	Clay	10	Flat Slab	None
09:00	Incoming	Clay	10	Chimney	Brick
12:00	Outgoing	Concrete	10	Cone	Brick
				Wall	Brick
				Bench	Brick
				Channel	Brick
				Steps	None

Comments



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin AJ-12	Manhole GIS ID 2232	Inspection Date 3/19/2016	Time 8:47:00 AM	Crew Leader CH
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Location Description  916 15th Street	Manhole Grade At Grade
	Grade Difference (ft) 0.00
	Cover to Invert Depth (ft) 3.00

GPS Verified? Visually Corr	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Street	Surface Material Asphalt
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<p>Images</p>  	<p>Defects</p> <table style="width: 100%;"> <tr> <td>Cover Fit Tight</td> <td style="text-align: right;"><i>Overall Score</i></td> </tr> <tr> <td>Cover seal missing</td> <td style="text-align: right;">Total <b>26</b></td> </tr> <tr> <td>Cover surface wear minor</td> <td></td> </tr> <tr> <td>Frame corrosion minor</td> <td></td> </tr> <tr> <td>Bench corrosion moderate</td> <td></td> </tr> </table>	Cover Fit Tight	<i>Overall Score</i>	Cover seal missing	Total <b>26</b>	Cover surface wear minor		Frame corrosion minor		Bench corrosion moderate	
Cover Fit Tight	<i>Overall Score</i>										
Cover seal missing	Total <b>26</b>										
Cover surface wear minor											
Frame corrosion minor											
Bench corrosion moderate											

Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	None
03:00	Incoming	PVC	12	Flat Slab	None
12:00	Outgoing	PVC	12	Chimney	Concrete
				Cone	None
				Wall	Concrete
				Bench	Brick
				Channel	Concrete
				Steps	None

Comments



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin AJ-12	Manhole GIS ID 2236	Inspection Date 3/21/2016	Time 12:30:00 PM	Crew Leader EC
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Location Description  819 15th Street	Manhole Grade At Grade
	Grade Difference (ft) 0.00
	Cover to Invert Depth (ft) 4.67

GPS Verified? Visually Corr	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Street	Surface Material Asphalt
--------------------------------	-------------------	--------------------	----------------------	-------------------------	-----------------------------

<p>Images</p>  	<p>Defects</p> <table style="width: 100%;"> <tr> <td>Cover Fit Tight</td> <td style="text-align: right;"><i>Overall Score</i></td> </tr> <tr> <td>Cover seal missing</td> <td style="text-align: right;">Total <b>8</b></td> </tr> </table>	Cover Fit Tight	<i>Overall Score</i>	Cover seal missing	Total <b>8</b>
Cover Fit Tight	<i>Overall Score</i>				
Cover seal missing	Total <b>8</b>				

Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	None
08:00	Incoming	Clay	8	Flat Slab	None
12:00	Outgoing	Clay	8	Chimney	Brick
10:00	Appurtenance	PVC	4	Cone	Brick
				Wall	Brick
				Bench	Brick
				Channel	Concrete
				Steps	None

Comments



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin AJ-12	Manhole GIS ID 2239	Inspection Date 3/21/2016	Time 12:17:00 PM	Crew Leader EC
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Location Description 819 15th Street	Manhole Grade Above Grade
	Grade Difference (ft) 0.50
	Cover to Invert Depth (ft) 6.33

GPS Verified? Visually Corr	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Field	Surface Material Grass
--------------------------------	-------------------	--------------------	----------------------	------------------------	---------------------------

<p>Images</p>  	<p>Defects</p> <table style="width: 100%;"> <tr> <td style="width: 60%;">Sewer connection crack moderate</td> <td style="width: 40%; text-align: right;"><i>Overall Score</i></td> </tr> <tr> <td>Lateral corrosion major</td> <td style="text-align: right;">Total <b>21</b></td> </tr> </table>	Sewer connection crack moderate	<i>Overall Score</i>	Lateral corrosion major	Total <b>21</b>
Sewer connection crack moderate	<i>Overall Score</i>				
Lateral corrosion major	Total <b>21</b>				

Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	None
08:00	Incoming	Clay	12	Flat Slab	None
12:00	Outgoing	Clay	12	Chimney	Brick
				Cone	Brick
				Wall	Brick
				Bench	Concrete
				Channel	Concrete
				Steps	Iron

Comments



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin AJ-12	Manhole GIS ID 2254	Inspection Date 3/23/2016	Time 12:03:00 PM	Crew Leader MB
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Location Description  1417 Avenue M	Manhole Grade At Grade
	Grade Difference (ft) 0.00
	Cover to Invert Depth (ft) 4.25

GPS Verified? Visually Corr	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Street	Surface Material Asphalt
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<p>Images</p>  	<p>Defects</p> <table style="width: 100%;"> <tr> <td>Cover Fit Tight</td> <td style="text-align: right;"><i>Overall Score</i></td> </tr> <tr> <td>Channel debris moderate</td> <td style="text-align: right;">Total <b>18</b></td> </tr> </table>	Cover Fit Tight	<i>Overall Score</i>	Channel debris moderate	Total <b>18</b>
Cover Fit Tight	<i>Overall Score</i>				
Channel debris moderate	Total <b>18</b>				

Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	None
03:00	Incoming	Clay	6	Flat Slab	None
12:00	Outgoing	PVC	8	Chimney	Concrete
				Cone	None
				Wall	Concrete
				Bench	Concrete
				Channel	Concrete
				Steps	None

Comments



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin AJ-12	Manhole GIS ID 2258	Inspection Date 3/23/2016	Time 12:24:00 PM	Crew Leader MB
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Location Description  1417 Avenue M	Manhole Grade At Grade
	Grade Difference (ft) 0.00
	Cover to Invert Depth (ft) 6.00

GPS Verified? Visually Corr	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Other	Surface Material Grass
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<p>Images</p>  	<p>Defects</p> <table style="width: 100%;"> <tr> <td>Cover Fit Tight</td> <td style="text-align: right;"><i>Overall Score</i></td> </tr> <tr> <td>Lateral corrosion minor</td> <td style="text-align: right;">Total <b>8</b></td> </tr> </table>	Cover Fit Tight	<i>Overall Score</i>	Lateral corrosion minor	Total <b>8</b>
Cover Fit Tight	<i>Overall Score</i>				
Lateral corrosion minor	Total <b>8</b>				

Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	None
06:00	Incoming	PVC	12	Flat Slab	None
12:00	Outgoing	PVC	12	Chimney	Concrete
08:00	Appurtenance	PVC	4	Cone	Brick
				Wall	Brick
				Bench	Concrete
				Channel	Concrete
				Steps	Iron

Comments



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin AJ-12	Manhole GIS ID 2260	Inspection Date 3/19/2016	Time 8:10:00 AM	Crew Leader CH
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Location Description  1429 Avenue I	Manhole Grade At Grade
	Grade Difference (ft) 0.00
	Cover to Invert Depth (ft) 6.42

GPS Verified? Visually Corr	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Street	Surface Material Asphalt
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<p>Images</p>  	<p>Defects</p> <table style="width: 100%;"> <tr> <td>Cover Fit Tight</td> <td style="text-align: right;"><i>Overall Score</i></td> </tr> <tr> <td>Cover seal missing</td> <td style="text-align: right;">Total <b>8</b></td> </tr> </table>	Cover Fit Tight	<i>Overall Score</i>	Cover seal missing	Total <b>8</b>
Cover Fit Tight	<i>Overall Score</i>				
Cover seal missing	Total <b>8</b>				

Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	None
05:00	Incoming	Concrete	10	Flat Slab	None
12:00	Outgoing	PVC	10	Chimney	Concrete
				Cone	None
				Wall	Concrete
				Bench	Concrete
				Channel	Concrete
				Steps	None

Comments



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin AJ-12	Manhole GIS ID 2271	Inspection Date 3/18/2016	Time 11:42:00 AM	Crew Leader CH
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Location Description  1412 Sam Houston Avenue	Manhole Grade At Grade
	Grade Difference (ft) 0.00
	Cover to Invert Depth (ft) 3.00

GPS Verified? Visually Corr	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Street	Surface Material Asphalt
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<p>Images</p>  	<p>Defects</p> <table style="width: 100%;"> <tr> <td>Cover Fit Tight</td> <td style="text-align: right;"><i>Overall Score</i></td> </tr> <tr> <td>Chimney bricks missing minor</td> <td style="text-align: right;">Total <b>78</b></td> </tr> <tr> <td>Chimney corrosion moderate</td> <td></td> </tr> <tr> <td>Chimney I/I moderate</td> <td></td> </tr> <tr> <td>Chimney mortar missing moderate</td> <td></td> </tr> <tr> <td>Chamber corrosion moderate</td> <td></td> </tr> <tr> <td>Chamber I/I major</td> <td></td> </tr> <tr> <td>Chimney bricks missing moderate</td> <td></td> </tr> </table>	Cover Fit Tight	<i>Overall Score</i>	Chimney bricks missing minor	Total <b>78</b>	Chimney corrosion moderate		Chimney I/I moderate		Chimney mortar missing moderate		Chamber corrosion moderate		Chamber I/I major		Chimney bricks missing moderate	
Cover Fit Tight	<i>Overall Score</i>																
Chimney bricks missing minor	Total <b>78</b>																
Chimney corrosion moderate																	
Chimney I/I moderate																	
Chimney mortar missing moderate																	
Chamber corrosion moderate																	
Chamber I/I major																	
Chimney bricks missing moderate																	

Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	None
06:00	Incoming	Clay	6	Flat Slab	None
12:00	Outgoing	Clay	6	Chimney	Brick
				Cone	None
				Wall	Brick
				Bench	None
				Channel	Other
				Steps	None

Comments



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin AJ-12	Manhole GIS ID 2273	Inspection Date 3/23/2016	Time 9:46:00 AM	Crew Leader MB
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Location Description  701 14th Street	Manhole Grade Above Grade
	Grade Difference (ft) 2.50
	Cover to Invert Depth (ft) 15.00

GPS Verified? Visually Corr	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Field	Surface Material Grass
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<p>Images</p>  	<p>Defects</p> <p>Cover Fit Tight</p> <table style="width: 100%;"> <tr> <td colspan="2" style="text-align: right;"><i>Overall Score</i></td> </tr> <tr> <td style="text-align: right;">Total</td> <td style="text-align: right;"><b>3</b></td> </tr> </table>	<i>Overall Score</i>		Total	<b>3</b>
<i>Overall Score</i>					
Total	<b>3</b>				

Pipe Configuration				Construction Materials	
<i>Pipe Location</i>	<i>Pipe Service</i>	<i>Pipe Material</i>	<i>Pipe Diameter (in)</i>	<i>Grade Ring</i>	<i>None</i>
07:00	Incoming		10	<i>Flat Slab</i>	None
12:00	Outgoing		10	<i>Chimney</i>	Brick
02:00	Appurtenance	Clay	4	<i>Cone</i>	Concrete
05:00	Appurtenance	Clay	4	<i>Wall</i>	Concrete
				<i>Bench</i>	Concrete
				<i>Channel</i>	Concrete
				<i>Steps</i>	None

Comments



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin AJ-12	Manhole GIS ID 2278	Inspection Date 3/19/2016	Time 7:55:00 AM	Crew Leader CH
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Location Description  1429 Avenue I	Manhole Grade At Grade
	Grade Difference (ft) 0.00
	Cover to Invert Depth (ft) 6.25

GPS Verified? Visually Corr	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Street	Surface Material Asphalt
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<p>Images</p>  	<p>Defects</p> <table style="width: 100%;"> <tr> <td>Cover Fit Tight</td> <td style="text-align: right;"><i>Overall Score</i></td> </tr> <tr> <td>Cover seal missing</td> <td style="text-align: right;">Total <b>8</b></td> </tr> </table>	Cover Fit Tight	<i>Overall Score</i>	Cover seal missing	Total <b>8</b>
Cover Fit Tight	<i>Overall Score</i>				
Cover seal missing	Total <b>8</b>				

Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	None
06:00	Incoming	PVC	10	Flat Slab	None
12:00	Outgoing	Clay	10	Chimney	Concrete
				Cone	None
				Wall	Brick
				Bench	Concrete
				Channel	Concrete
				Steps	None

Comments



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin AJ-12	Manhole GIS ID 2293	Inspection Date 3/24/2016	Time 2:37:00 PM	Crew Leader MB
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Location Description  1318 14th Street	Manhole Grade At Grade
	Grade Difference (ft) 0.00
	Cover to Invert Depth (ft) 4.67

GPS Verified? Visually Corr	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Street	Surface Material Asphalt
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Images




Defects	
Cover Fit Tight	<i>Overall Score</i>
Lateral connection crack moderate	Total <b>24</b>
Sewer connection crack moderate	

Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	None
06:00	Incoming	Clay	8	Flat Slab	None
12:00	Outgoing	Clay	8	Chimney	Brick
03:00	Appurtenance	PVC	4	Cone	Brick
				Wall	Brick
				Bench	Concrete
				Channel	Concrete
				Steps	None

Comments



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin AJ-12	Manhole GIS ID 2296	Inspection Date 3/16/2016	Time 12:36:00 PM	Crew Leader CH
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Location Description  1471 Avenue I	Manhole Grade Below Grade
	Grade Difference (ft) 0.17
	Cover to Invert Depth (ft) 7.50

GPS Verified? Visually Corr	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Field	Surface Material Grass
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<p>Images</p>  	<p>Defects</p> <p>Cover Fit Tight</p> <p>Cover seal missing</p> <p>Lateral corrosion minor</p> <p style="text-align: right;"><i>Overall Score</i></p> <p style="text-align: right;">Total        <b>13</b></p>
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Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	None
06:00	Incoming	Clay	8	Flat Slab	None
12:00	Outgoing	Clay	8	Chimney	Brick
				Cone	Brick
				Wall	Brick
				Bench	Concrete
				Channel	Concrete
				Steps	Iron

Comments



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin AJ-12	Manhole GIS ID 2306	Inspection Date 3/23/2016	Time 12:53:00 PM	Crew Leader MC
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Location Description  1400 Avenue M	Manhole Grade At Grade
	Grade Difference (ft) 0.00
	Cover to Invert Depth (ft) 4.33

GPS Verified? Visually Corr	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Street	Surface Material Asphalt
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<p>Images</p>  	<p>Defects</p> <p>Cover Fit Tight</p> <table style="width: 100%; border: none;"> <tr> <td style="text-align: right;"><i>Overall Score</i></td> <td></td> </tr> <tr> <td style="text-align: right;">Total</td> <td style="text-align: right;"><b>3</b></td> </tr> </table>	<i>Overall Score</i>		Total	<b>3</b>
<i>Overall Score</i>					
Total	<b>3</b>				

Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	None
06:00	Incoming	PVC	12	Flat Slab	None
09:00	Incoming	PVC	8	Chimney	Concrete
12:00	Outgoing	PVC	12	Cone	None
				Wall	Concrete
				Bench	Concrete
				Channel	Concrete
				Steps	None

Comments



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin AJ-12	Manhole GIS ID 2307	Inspection Date 3/23/2016	Time 1:01:00 PM	Crew Leader MB
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Location Description 1401 Avenue M	Manhole Grade At Grade
	Grade Difference (ft) 0.00
	Cover to Invert Depth (ft) 5.00

GPS Verified? Visually Corr	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Street	Surface Material Asphalt
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<p>Images</p>  	<p>Defects</p> <p>Cover Fit Tight</p> <table style="width: 100%; border: none;"> <tr> <td style="text-align: right;"><i>Overall Score</i></td> <td></td> </tr> <tr> <td style="text-align: right;">Total</td> <td style="text-align: right;"><b>3</b></td> </tr> </table>	<i>Overall Score</i>		Total	<b>3</b>
<i>Overall Score</i>					
Total	<b>3</b>				

Pipe Configuration				Construction Materials	
<i>Pipe Location</i>	<i>Pipe Service</i>	<i>Pipe Material</i>	<i>Pipe Diameter (in)</i>	<i>Grade Ring</i>	
03:00	Incoming	PVC	10	<i>Flat Slab</i>	None
07:00	Incoming	PVC	8	<i>Chimney</i>	Concrete
12:00	Outgoing	PVC	16	<i>Cone</i>	Concrete
				<i>Wall</i>	Concrete
				<i>Bench</i>	Concrete
				<i>Channel</i>	Concrete
				<i>Steps</i>	None

Comments



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin AJ-12	Manhole GIS ID 2313	Inspection Date 3/23/2016	Time 1:35:00 PM	Crew Leader MB
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Location Description  1401 Avenue M	Manhole Grade At Grade
	Grade Difference (ft) 0.00
	Cover to Invert Depth (ft) 6.58

GPS Verified? Visually Corr	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Street	Surface Material Asphalt
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<p>Images</p>  	<p>Defects</p> <p>Cover Fit Tight</p> <p style="text-align: right;"><i>Overall Score</i></p> <p style="text-align: right;">Total <b>3</b></p>
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Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	None
03:00	Incoming	PVC	12	Flat Slab	None
06:00	Incoming	Clay	16	Chimney	Concrete
09:00	Incoming	PVC	8	Cone	Concrete
12:00	Outgoing	PVC	14	Wall	Concrete
				Bench	Concrete
				Channel	Concrete
				Steps	None

Comments



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin AJ-12	Manhole GIS ID 2314	Inspection Date 3/23/2016	Time 1:25:00 PM	Crew Leader MB
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Location Description  1401 Avenue M	Manhole Grade At Grade
	Grade Difference (ft) 0.00
	Cover to Invert Depth (ft) 6.12

GPS Verified? Visually Corr	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Street	Surface Material Asphalt
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<p>Images</p>  	<p>Defects</p> <p>Cover Fit Tight</p> <table style="width: 100%;"> <tr> <td colspan="2" style="text-align: right;"><i>Overall Score</i></td> </tr> <tr> <td style="text-align: right;">Total</td> <td style="text-align: right;"><b>3</b></td> </tr> </table>	<i>Overall Score</i>		Total	<b>3</b>
<i>Overall Score</i>					
Total	<b>3</b>				

Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	None
06:00	Incoming		6	Flat Slab	None
12:00	Outgoing		10	Chimney	Brick
				Cone	None
				Wall	Brick
				Bench	Other
				Channel	Concrete
				Steps	None

Comments



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin AJ-12	Manhole GIS ID 2317	Inspection Date 3/19/2016	Time 7:39:00 AM	Crew Leader CH
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Location Description  1421 Sam Houston Avenue	Manhole Grade At Grade
	Grade Difference (ft) 0.00
	Cover to Invert Depth (ft) 7.92

GPS Verified? Visually Corr	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Street	Surface Material Asphalt
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<p>Images</p>  	<p>Defects</p> <table style="width: 100%;"> <tr> <td>Cover Fit Tight</td> <td style="text-align: right;"><i>Overall Score</i></td> </tr> <tr> <td>Cover seal missing</td> <td style="text-align: right;">Total <b>8</b></td> </tr> </table>	Cover Fit Tight	<i>Overall Score</i>	Cover seal missing	Total <b>8</b>
Cover Fit Tight	<i>Overall Score</i>				
Cover seal missing	Total <b>8</b>				

Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	None
06:00	Incoming	PVC	15	Flat Slab	None
12:00	Outgoing	PVC	15	Chimney	Concrete
				Cone	Concrete
				Wall	Concrete
				Bench	Concrete
				Channel	Concrete
				Steps	None

Comments



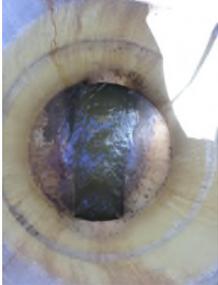
## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin AJ-12	Manhole GIS ID 2319	Inspection Date 3/14/2016	Time 12:30:00 PM	Crew Leader CH
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Location Description  1329 14th Street	Manhole Grade At Grade
	Grade Difference (ft) 0.00
	Cover to Invert Depth (ft) 6.33

GPS Verified? Visually Corr	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Street	Surface Material Asphalt
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<p>Images</p>  	<p>Defects</p> <table style="width: 100%;"> <tr> <td>Cover Fit Tight</td> <td style="text-align: right;"><i>Overall Score</i></td> </tr> <tr> <td>Cover I/I minor</td> <td style="text-align: right;">Total <b>49</b></td> </tr> <tr> <td>Cover seal missing</td> <td></td> </tr> <tr> <td>Cover surface wear moderate</td> <td></td> </tr> <tr> <td>Frame base seal corrosion major</td> <td></td> </tr> <tr> <td>Frame base seal I/I moderate</td> <td></td> </tr> </table>	Cover Fit Tight	<i>Overall Score</i>	Cover I/I minor	Total <b>49</b>	Cover seal missing		Cover surface wear moderate		Frame base seal corrosion major		Frame base seal I/I moderate	
Cover Fit Tight	<i>Overall Score</i>												
Cover I/I minor	Total <b>49</b>												
Cover seal missing													
Cover surface wear moderate													
Frame base seal corrosion major													
Frame base seal I/I moderate													

Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	None
06:00	Incoming	Concrete	12	Flat Slab	None
12:00	Outgoing	Concrete	12	Chimney	Concrete
				Cone	Concrete
				Wall	Concrete
				Bench	Concrete
				Channel	Concrete
				Steps	None

Comments



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin AJ-12	Manhole GIS ID 2320	Inspection Date 3/18/2016	Time 11:14:00 AM	Crew Leader CH
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Location Description  1200 14th Street	Manhole Grade At Grade
	Grade Difference (ft) 0.00
	Cover to Invert Depth (ft) 9.42

GPS Verified? Visually Corr	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Street	Surface Material Asphalt
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<p>Images</p>  	<p>Defects</p> <table style="width: 100%;"> <tr> <td>Cover Fit Tight</td> <td style="text-align: right;"><i>Overall Score</i></td> </tr> <tr> <td>Frame corrosion moderate</td> <td style="text-align: right;">Total <b>30</b></td> </tr> <tr> <td>Steps broken major</td> <td></td> </tr> <tr> <td>Lateral corrosion minor</td> <td></td> </tr> </table>	Cover Fit Tight	<i>Overall Score</i>	Frame corrosion moderate	Total <b>30</b>	Steps broken major		Lateral corrosion minor	
Cover Fit Tight	<i>Overall Score</i>								
Frame corrosion moderate	Total <b>30</b>								
Steps broken major									
Lateral corrosion minor									

Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	None
06:00	Incoming	Clay	8	Flat Slab	None
09:00	Incoming		6	Chimney	Brick
12:00	Outgoing		8	Cone	None
				Wall	Brick
				Bench	Concrete
				Channel	Concrete
				Steps	Iron

Comments



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin AJ-12	Manhole GIS ID 2321	Inspection Date 3/14/2016	Time 11:37:00 AM	Crew Leader CH
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Location Description University Avenue	Manhole Grade At Grade
	Grade Difference (ft) 0.00
	Cover to Invert Depth (ft) 6.67

GPS Verified? Visually Corr	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Street	Surface Material Asphalt
--------------------------------	-------------------	--------------------	----------------------	-------------------------	-----------------------------

<p>Images</p>  	<p>Defects</p> <table style="width: 100%;"> <tr> <td>Cover Fit Tight</td> <td style="text-align: right;"><i>Overall Score</i></td> </tr> <tr> <td>Chimney corrosion moderate</td> <td style="text-align: right;">Total <b>54</b></td> </tr> <tr> <td>Cover seal missing</td> <td></td> </tr> <tr> <td>Cone corroded minor</td> <td></td> </tr> <tr> <td>Bench corrosion moderate</td> <td></td> </tr> <tr> <td>Channel corrosion moderate</td> <td></td> </tr> <tr> <td>Chamber corrosion minor</td> <td></td> </tr> <tr> <td>Sewer connection crack moderate</td> <td></td> </tr> </table>	Cover Fit Tight	<i>Overall Score</i>	Chimney corrosion moderate	Total <b>54</b>	Cover seal missing		Cone corroded minor		Bench corrosion moderate		Channel corrosion moderate		Chamber corrosion minor		Sewer connection crack moderate	
Cover Fit Tight	<i>Overall Score</i>																
Chimney corrosion moderate	Total <b>54</b>																
Cover seal missing																	
Cone corroded minor																	
Bench corrosion moderate																	
Channel corrosion moderate																	
Chamber corrosion minor																	
Sewer connection crack moderate																	

Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	None
06:00	Incoming	Clay	10	Flat Slab	None
12:00	Outgoing	PVC	10	Chimney	Brick
				Cone	Brick
				Wall	Brick
				Bench	Brick
				Channel	Brick
				Steps	None

Comments  
6 O' Clock Line is stagnant.



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin AJ-12	Manhole GIS ID 2322	Inspection Date 3/14/2016	Time 11:49:00 AM	Crew Leader CH
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Location Description  1400 University Avenue	Manhole Grade At Grade
	Grade Difference (ft) 0.00
	Cover to Invert Depth (ft) 5.92

GPS Verified? Visually Corr	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Street	Surface Material Asphalt
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<p>Images</p>  	<p>Defects</p> <p>Cover crack minor</p> <p>Cover Fit Tight</p> <p>Cover seal missing</p> <p>Frame base seal corrosion moderate</p> <p>Channel hydraulic restriction moderate</p> <p>Sewer connection crack moderate</p> <p style="text-align: right;"><i>Overall Score</i></p> <p style="text-align: right;">Total        <b>44</b></p>
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Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	None
03:00	Incoming	Clay	8	Flat Slab	None
12:00	Outgoing	Clay	8	Chimney	Brick
				Cone	Brick
				Wall	Brick
				Bench	Concrete
				Channel	Concrete
				Steps	None

Comments  
9 O' Clock line is blocked.



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin AJ-12	Manhole GIS ID 2323	Inspection Date 3/14/2016	Time 10:18:00 AM	Crew Leader CH
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Location Description 1400 University Avenue	Manhole Grade At Grade
	Grade Difference (ft) 0.00
	Cover to Invert Depth (ft) 4.00

GPS Verified? Visually Corr	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Street	Surface Material Asphalt
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<p>Images</p>  	<p>Defects</p> <ul style="list-style-type: none"> <li>Cover Fit Tight</li> <li>Cover seal missing</li> <li>Cover surface wear minor</li> <li>Bench corrosion moderate</li> <li>Channel corrosion moderate</li> <li>Chamber corrosion moderate</li> <li>Sewer connection crack moderate</li> <li>Steps broken major</li> <li>Lateral corrosion major</li> </ul> <p style="text-align: right;"><i>Overall Score</i></p> <p style="text-align: right;">Total <b>74</b></p>
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Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	None
03:00	Incoming	PVC	6	Flat Slab	None
06:00	Incoming	Clay	8	Chimney	Brick
12:00	Incoming	Clay	6	Cone	Brick
09:00	Outgoing	Clay	8	Wall	Brick
				Bench	Concrete
				Channel	Concrete
				Steps	None

Comments



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin AJ-12	Manhole GIS ID 2324	Inspection Date 3/14/2016	Time 11:25:00 AM	Crew Leader CH
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Location Description 1400 University Avenue	Manhole Grade Below Grade
	Grade Difference (ft) 0.17
	Cover to Invert Depth (ft) 6.50

GPS Verified? Visually Corr	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Street	Surface Material Asphalt
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<p>Images</p>  	<p>Defects</p> <table style="width: 100%;"> <tr> <td>Cover Fit Tight</td> <td style="text-align: right;"><i>Overall Score</i></td> </tr> <tr> <td>Cover seal missing</td> <td style="text-align: right;">Total <b>71</b></td> </tr> <tr> <td>Bench corrosion moderate</td> <td></td> </tr> <tr> <td>Channel corrosion moderate</td> <td></td> </tr> <tr> <td>Chamber corrosion moderate</td> <td></td> </tr> <tr> <td>Sewer connection crack moderate</td> <td></td> </tr> <tr> <td>Steps broken major</td> <td></td> </tr> <tr> <td>Lateral corrosion major</td> <td></td> </tr> </table>	Cover Fit Tight	<i>Overall Score</i>	Cover seal missing	Total <b>71</b>	Bench corrosion moderate		Channel corrosion moderate		Chamber corrosion moderate		Sewer connection crack moderate		Steps broken major		Lateral corrosion major	
Cover Fit Tight	<i>Overall Score</i>																
Cover seal missing	Total <b>71</b>																
Bench corrosion moderate																	
Channel corrosion moderate																	
Chamber corrosion moderate																	
Sewer connection crack moderate																	
Steps broken major																	
Lateral corrosion major																	

Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	None
03:00	Incoming	PVC	6	Flat Slab	None
06:00	Incoming	Clay	8	Chimney	Brick
09:00	Outgoing	Clay	8	Cone	Brick
12:00	Outgoing	Clay	8	Wall	Brick
				Bench	Concrete
				Channel	Concrete
				Steps	Iron

Comments



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin AJ-12	Manhole GIS ID 2331	Inspection Date 3/15/2016	Time 9:50:00 AM	Crew Leader CH
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Location Description  1000 14th Street	Manhole Grade At Grade
	Grade Difference (ft) 0.00
	Cover to Invert Depth (ft) 4.08

GPS Verified? Visually Corr	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Street	Surface Material Asphalt
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<p>Images</p>  	<p>Defects</p> <table style="width: 100%;"> <tr> <td>Cover Fit Tight</td> <td style="text-align: right;"><i>Overall Score</i></td> </tr> <tr> <td>Cover seal missing</td> <td style="text-align: right;">Total <b>8</b></td> </tr> </table>	Cover Fit Tight	<i>Overall Score</i>	Cover seal missing	Total <b>8</b>
Cover Fit Tight	<i>Overall Score</i>				
Cover seal missing	Total <b>8</b>				

Pipe Configuration				Construction Materials	
<i>Pipe Location</i>	<i>Pipe Service</i>	<i>Pipe Material</i>	<i>Pipe Diameter (in)</i>	<i>Grade Ring</i>	<i>None</i>
03:00	Incoming	PVC	4	<i>Flat Slab</i>	None
06:00	Incoming	Clay	10	<i>Chimney</i>	Concrete
12:00	Outgoing	Clay	10	<i>Cone</i>	None
				<i>Wall</i>	Other
				<i>Bench</i>	Concrete
				<i>Channel</i>	Concrete
				<i>Steps</i>	None

Comments



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin AJ-12	Manhole GIS ID 2333	Inspection Date 3/15/2016	Time 10:13:00 AM	Crew Leader CH
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Location Description  1000 14th Street	Manhole Grade Below Grade
	Grade Difference (ft) 0.25
	Cover to Invert Depth (ft) 4.42

GPS Verified? Visually Corr	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Street	Surface Material Concrete
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<p>Images</p>  	<p>Defects</p> <table style="width: 100%;"> <tr> <td>Cover Fit Tight</td> <td style="text-align: right;"><i>Overall Score</i></td> </tr> <tr> <td>Cover seal missing</td> <td style="text-align: right;">Total <b>8</b></td> </tr> </table>	Cover Fit Tight	<i>Overall Score</i>	Cover seal missing	Total <b>8</b>
Cover Fit Tight	<i>Overall Score</i>				
Cover seal missing	Total <b>8</b>				

Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	None
03:00	Incoming	Clay	10	Flat Slab	None
06:00	Incoming	PVC	8	Chimney	Brick
12:00	Outgoing	PVC	8	Cone	Brick
				Wall	Brick
				Bench	Concrete
				Channel	Concrete
				Steps	None

Comments



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin AJ-12	Manhole GIS ID 2335	Inspection Date 3/15/2016	Time 10:23:00 AM	Crew Leader CH
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Location Description  1000 14th Street	Manhole Grade Above Grade
	Grade Difference (ft) 0.17
	Cover to Invert Depth (ft) 4.50

GPS Verified? Visually Corr	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Field	Surface Material Grass
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<p>Images</p>  	<p>Defects</p> <table style="width: 100%;"> <tr> <td>Cover Fit Tight</td> <td style="text-align: right;"><i>Overall Score</i></td> </tr> <tr> <td>Chimney seal defect major</td> <td style="text-align: right;">Total <b>33</b></td> </tr> </table>	Cover Fit Tight	<i>Overall Score</i>	Chimney seal defect major	Total <b>33</b>
Cover Fit Tight	<i>Overall Score</i>				
Chimney seal defect major	Total <b>33</b>				

Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	None
01:00	Appurtenance	PVC	8	Flat Slab	None
06:00	Incoming	PVC	10	Chimney	Concrete
12:00	Outgoing	PVC	10	Cone	None
				Wall	Concrete
				Bench	Concrete
				Channel	Concrete
				Steps	None

Comments  
1 O' Clock line was empty during inspection.



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin AJ-12	Manhole GIS ID 2349	Inspection Date 3/16/2016	Time 10:20:00 AM	Crew Leader CH
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Location Description  2571 14th Street	Manhole Grade At Grade
	Grade Difference (ft) 0.00
	Cover to Invert Depth (ft) 5.67

GPS Verified? Needs Updat	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Street	Surface Material Concrete
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<p>Images</p>  	<p>Defects</p> <table style="width: 100%;"> <tr> <td>Cover Fit Tight</td> <td style="text-align: right;"><i>Overall Score</i></td> </tr> <tr> <td>Cover seal missing</td> <td style="text-align: right;">Total <b>8</b></td> </tr> </table>	Cover Fit Tight	<i>Overall Score</i>	Cover seal missing	Total <b>8</b>
Cover Fit Tight	<i>Overall Score</i>				
Cover seal missing	Total <b>8</b>				

Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	None
06:00	Incoming	Clay	6	Flat Slab	None
12:00	Outgoing	Clay	6	Chimney	Brick
07:00	Appurtenance		4	Cone	Brick
08:00	Appurtenance		4	Wall	Brick
				Bench	Concrete
				Channel	Other
				Steps	None

Comments



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin AJ-12	Manhole GIS ID 2349	Inspection Date 3/16/2016	Time 10:20:00 AM	Crew Leader CH
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Location Description 2571 14th Street	Manhole Grade At Grade
	Grade Difference (ft) 0.00
	Cover to Invert Depth (ft) 5.67

GPS Verified? Visually Corr	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Street	Surface Material Concrete
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<p>Images</p>  	<p>Defects</p> <table style="width: 100%;"> <tr> <td>Cover Fit Tight</td> <td style="text-align: right;"><i>Overall Score</i></td> </tr> <tr> <td>Cover seal missing</td> <td style="text-align: right;">Total <b>8</b></td> </tr> </table>	Cover Fit Tight	<i>Overall Score</i>	Cover seal missing	Total <b>8</b>
Cover Fit Tight	<i>Overall Score</i>				
Cover seal missing	Total <b>8</b>				

Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	None
06:00	Incoming	Clay	6	Flat Slab	None
12:00	Outgoing	Clay	6	Chimney	Brick
07:00	Appurtenance		4	Cone	Brick
08:00	Appurtenance		4	Wall	Brick
				Bench	Concrete
				Channel	Other
				Steps	None

Comments



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin AJ-12	Manhole GIS ID 2353	Inspection Date 3/22/2016	Time 12:49:00 PM	Crew Leader EX
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Location Description  1400 Avenue J.	Manhole Grade At Grade
	Grade Difference (ft) 0.00
	Cover to Invert Depth (ft) 3.67

GPS Verified? Visually Corr	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Street	Surface Material Asphalt
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Images




Defects

Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	None
09:00	Incoming	PVC	8	Flat Slab	None
12:00	Outgoing	PVC	8	Chimney	Concrete
				Cone	None
				Wall	Concrete
				Bench	Concrete
				Channel	Concrete
				Steps	None

Comments



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin AJ-12	Manhole GIS ID 2354	Inspection Date 3/22/2016	Time 12:30:00 PM	Crew Leader EC
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Location Description  1400 Avenue J	Manhole Grade At Grade
	Grade Difference (ft) 0.00
	Cover to Invert Depth (ft) 4.00

GPS Verified? Visually Corr	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Field	Surface Material Grass
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<p>Images</p>  	<p>Defects</p> <p>Cover crack minor</p> <p>Cover Fit Tight</p> <p>Cover seal missing</p> <p style="text-align: right;"><i>Overall Score</i></p> <p style="text-align: right;">Total        <b>13</b></p>
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Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	None
03:00	Incoming	PVC	8	Flat Slab	None
06:00	Incoming	PVC	6	Chimney	Brick
12:00	Outgoing	PVC	8	Cone	Brick
				Wall	Brick
				Bench	Concrete
				Channel	Concrete
				Steps	None

Comments



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin AJ-12	Manhole GIS ID 2356	Inspection Date 3/16/2016	Time 11:10:00 AM	Crew Leader CH
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Location Description 1000 14th Street	Manhole Grade Below Grade
	Grade Difference (ft) 0.50
	Cover to Invert Depth (ft) 8.33

GPS Verified? Visually Corr	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Other	Surface Material Grass
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<p>Images</p>  	<p>Defects</p> <ul style="list-style-type: none"> <li>Cover crack minor</li> <li>Cover corrosion moderate</li> <li>Cover fit loose</li> <li>Cover I/I moderate</li> <li>Cover surface wear major</li> </ul> <table style="width: 100%; margin-top: 20px;"> <tr> <td style="text-align: right;"><i>Overall Score</i></td> <td></td> </tr> <tr> <td style="text-align: right;">Total</td> <td style="text-align: right;"><b>52</b></td> </tr> </table>	<i>Overall Score</i>		Total	<b>52</b>
<i>Overall Score</i>					
Total	<b>52</b>				

Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	None
09:00	Incoming	Clay	10	Flat Slab	None
12:00	Outgoing	Clay	6	Chimney	Brick
				Cone	Brick
				Wall	Brick
				Bench	Concrete
				Channel	Concrete
				Steps	None

Comments  
12 O' Clock line is abandoned.



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin AJ-12	Manhole GIS ID 2357	Inspection Date 3/23/2016	Time 10:13:00 AM	Crew Leader MB
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Location Description 701 14th Street	Manhole Grade At Grade
	Grade Difference (ft) 0.00
	Cover to Invert Depth (ft) 3.42

GPS Verified? Visually Corr	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Street	Surface Material Asphalt
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Images




Defects

Cover Fit Tight	<i>Overall Score</i>
Cover seal missing	Total <b>23</b>
Channel debris moderate	

Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	None
03:00	Incoming	Clay	6	Flat Slab	None
12:00	Outgoing	Clay	6	Chimney	Brick
05:00	Appurtenance	PVC	4	Cone	Brick
				Wall	Brick
				Bench	Brick
				Channel	Brick
				Steps	None

Comments



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin AJ-12	Manhole GIS ID 2358	Inspection Date 3/16/2016	Time 10:31:00 AM	Crew Leader CH
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Location Description 2571 14th Street	Manhole Grade At Grade
	Grade Difference (ft) 0.00
	Cover to Invert Depth (ft) 6.50

GPS Verified? Visually Corr	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Other	Surface Material Grass
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<p>Images</p>  	<p>Defects</p> <table style="width: 100%;"> <tr> <td>Cover Fit Tight</td> <td style="text-align: right;"><i>Overall Score</i></td> </tr> <tr> <td>Cover seal missing</td> <td style="text-align: right;">Total <b>8</b></td> </tr> </table>	Cover Fit Tight	<i>Overall Score</i>	Cover seal missing	Total <b>8</b>
Cover Fit Tight	<i>Overall Score</i>				
Cover seal missing	Total <b>8</b>				

Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	None
03:00	Incoming	Clay	10	Flat Slab	None
06:00	Incoming	Concrete	10	Chimney	Concrete
12:00	Outgoing	Concrete	10	Cone	None
				Wall	Concrete
				Bench	Concrete
				Channel	Concrete
				Steps	None

Comments  
12 O' Clock line was full of debris during inspection and was restricting the flow.



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin AJ-12	Manhole GIS ID 2359	Inspection Date 3/18/2016	Time 12:49:00 PM	Crew Leader CH
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Location Description 701 14th Street	Manhole Grade At Grade
	Grade Difference (ft) 0.00
	Cover to Invert Depth (ft) 4.75

GPS Verified? Visually Corr	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Street	Surface Material Asphalt
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<p>Images</p>  	<p>Defects</p> <table style="width: 100%;"> <tr> <td>Cover Fit Tight</td> <td style="text-align: right;"><i>Overall Score</i></td> </tr> <tr> <td>Cover seal missing</td> <td style="text-align: right;">Total <b>13</b></td> </tr> <tr> <td>Bench debris moderate</td> <td></td> </tr> </table>	Cover Fit Tight	<i>Overall Score</i>	Cover seal missing	Total <b>13</b>	Bench debris moderate	
Cover Fit Tight	<i>Overall Score</i>						
Cover seal missing	Total <b>13</b>						
Bench debris moderate							

Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	None
03:00	Incoming	Clay	6	Flat Slab	None
12:00	Outgoing	Clay	6	Chimney	Brick
				Cone	None
				Wall	Brick
				Bench	Concrete
				Channel	Concrete
				Steps	None

Comments



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin AJ-12	Manhole GIS ID 2364	Inspection Date 3/18/2016	Time 12:31:00 PM	Crew Leader CH
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Location Description 701 14th Street	Manhole Grade Below Grade
	Grade Difference (ft) 0.12
	Cover to Invert Depth (ft) 5.25

GPS Verified? Visually Corr	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Street	Surface Material Concrete
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<p>Images</p>  	<p>Defects</p> <table style="width: 100%;"> <tr> <td>Cover Fit Tight</td> <td style="text-align: right;"><i>Overall Score</i></td> </tr> <tr> <td>Sewer connection crack moderate</td> <td style="text-align: right;">Total <b>19</b></td> </tr> <tr> <td>Lateral corrosion moderate</td> <td></td> </tr> </table>	Cover Fit Tight	<i>Overall Score</i>	Sewer connection crack moderate	Total <b>19</b>	Lateral corrosion moderate	
Cover Fit Tight	<i>Overall Score</i>						
Sewer connection crack moderate	Total <b>19</b>						
Lateral corrosion moderate							

Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	None
06:00	Incoming		6	Flat Slab	None
12:00	Outgoing		6	Chimney	Brick
				Cone	Brick
				Wall	Brick
				Bench	Concrete
				Channel	Other
				Steps	Plastic

Comments



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin AJ-12	Manhole GIS ID 2365	Inspection Date 3/18/2016	Time 1:00:00 PM	Crew Leader CH
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Location Description  701 14th Street	Manhole Grade At Grade
	Grade Difference (ft) 0.00
	Cover to Invert Depth (ft) 10.25

GPS Verified? Visually Corr	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Field	Surface Material Grass
--------------------------------	-------------------	--------------------	----------------------	------------------------	---------------------------

<p>Images</p>  	<p>Defects</p> <p>Cover seal missing</p> <p style="text-align: right;"><i>Overall Score</i></p> <p style="text-align: right;">Total <b>5</b></p>
--	--

Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	None
06:00	Incoming	Clay	6	Flat Slab	None
12:00	Outgoing	Clay	6	Chimney	Brick
08:00	Appurtenance	PVC	4	Cone	None
				Wall	Brick
				Bench	Concrete
				Channel	Other
				Steps	None

Comments



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin AJ-12	Manhole GIS ID 2366	Inspection Date 3/18/2016	Time 12:18:00 PM	Crew Leader CH
----------------------------	------------------------	------------------------------	---------------------	-------------------

Location Description 811 14th Street	Manhole Grade Below Grade
	Grade Difference (ft) 0.00
	Cover to Invert Depth (ft) 4.12

GPS Verified? Visually Corr	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Field	Surface Material Grass
--------------------------------	-------------------	--------------------	----------------------	------------------------	---------------------------

<p>Images</p>  	<p>Defects</p> <table style="width: 100%;"> <tr> <td>Cover Fit Tight</td> <td style="text-align: right;"><i>Overall Score</i></td> </tr> <tr> <td>Cover seal missing</td> <td style="text-align: right;">Total <b>8</b></td> </tr> </table>	Cover Fit Tight	<i>Overall Score</i>	Cover seal missing	Total <b>8</b>
Cover Fit Tight	<i>Overall Score</i>				
Cover seal missing	Total <b>8</b>				

Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	None
03:00	Incoming	Clay	6	Flat Slab	None
09:00	Incoming	Clay	6	Chimney	Brick
12:00	Outgoing	Clay	8	Cone	Brick
				Wall	Brick
				Bench	Concrete
				Channel	Other
				Steps	None

Comments



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin AJ-12	Manhole GIS ID 2369	Inspection Date 3/18/2016	Time 12:06:00 PM	Crew Leader CH
----------------------------	------------------------	------------------------------	---------------------	-------------------

Location Description 811 14th Street	Manhole Grade Below Grade
	Grade Difference (ft) 0.17
	Cover to Invert Depth (ft) 4.25

GPS Verified? Visually Corr	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Driveway	Surface Material Gravel
--------------------------------	-------------------	--------------------	----------------------	---------------------------	----------------------------

<p>Images</p>  	<p>Defects</p> <p>Cover fit rocking</p> <p>Cover I/I major</p> <p>Channel debris moderate</p> <p>Channel hydraulic restriction moderate</p> <p>Sewer connection crack moderate</p> <p style="text-align: right;"><i>Overall Score</i></p> <p style="text-align: right;">Total <b>74</b></p>
--	--

Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	None
06:00	Incoming	Clay	6	Flat Slab	None
12:00	Outgoing	Clay	6	Chimney	Concrete
08:00	Appurtenance	PVC	4	Cone	Brick
10:00	Appurtenance	PVC	4	Wall	Brick
				Bench	Concrete
				Channel	Concrete
				Steps	None

Comments



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin AJ-12	Manhole GIS ID 2373	Inspection Date 3/14/2016	Time 1:00:00 PM	Crew Leader CH
----------------------------	------------------------	------------------------------	--------------------	-------------------

Location Description  701 14th Street	Manhole Grade At Grade
	Grade Difference (ft) 0.00
	Cover to Invert Depth (ft) 5.25

GPS Verified? Visually Corr	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Street	Surface Material Asphalt
--------------------------------	-------------------	--------------------	----------------------	-------------------------	-----------------------------

<p>Images</p>  	<p>Defects</p> <table style="width: 100%;"> <tr> <td>Cover Fit Tight</td> <td style="text-align: right;"><i>Overall Score</i></td> </tr> <tr> <td>Cover seal missing</td> <td style="text-align: right;">Total <b>21</b></td> </tr> <tr> <td>Cover surface wear minor</td> <td></td> </tr> <tr> <td>Frame base seal corrosion moderate</td> <td></td> </tr> </table>	Cover Fit Tight	<i>Overall Score</i>	Cover seal missing	Total <b>21</b>	Cover surface wear minor		Frame base seal corrosion moderate	
Cover Fit Tight	<i>Overall Score</i>								
Cover seal missing	Total <b>21</b>								
Cover surface wear minor									
Frame base seal corrosion moderate									

Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	None
06:00	Incoming	Clay	6	Flat Slab	None
12:00	Outgoing	Clay	6	Chimney	Brick
02:00	Appurtenance	Clay	4	Cone	Brick
04:00	Appurtenance	Clay	4	Wall	Brick
				Bench	Concrete
				Channel	Other
				Steps	None

Comments



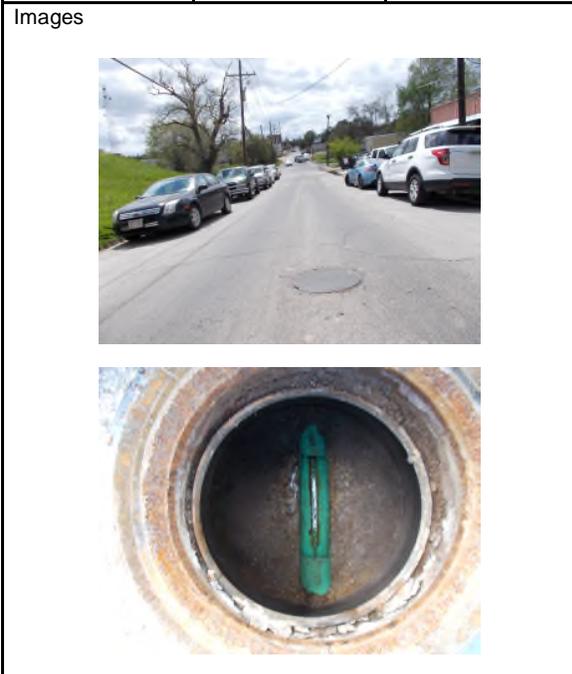
## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin AJ-12	Manhole GIS ID 2379	Inspection Date 3/22/2016	Time 12:58:00 PM	Crew Leader EC
----------------------------	------------------------	------------------------------	---------------------	-------------------

Location Description  1300 Avenue J	Manhole Grade At Grade
	Grade Difference (ft) 0.00
	Cover to Invert Depth (ft) 5.50

GPS Verified? Visually Corr	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Street	Surface Material Asphalt
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Defects		<i>Overall Score</i>
Cover Fit Tight		Total
Cover seal missing		<b>18</b>
Channel mortar missing moderate		

Pipe Configuration				Construction Materials	
<i>Pipe Location</i>	<i>Pipe Service</i>	<i>Pipe Material</i>	<i>Pipe Diameter (in)</i>	<i>Grade Ring</i>	
06:00	Incoming	PVC	8	<i>Flat Slab</i>	None
12:00	Outgoing	PVC	8	<i>Chimney</i>	Concrete
				<i>Cone</i>	None
				<i>Wall</i>	Concrete
				<i>Bench</i>	Concrete
				<i>Channel</i>	Other
				<i>Steps</i>	

Comments



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin AJ-12	Manhole GIS ID 2380	Inspection Date 3/22/2016	Time 1:09:00 PM	Crew Leader EC
----------------------------	------------------------	------------------------------	--------------------	-------------------

Location Description 1300 Avenue J	Manhole Grade Above Grade
	Grade Difference (ft) 0.67
	Cover to Invert Depth (ft) 6.00

GPS Verified? Visually Corr	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Field	Surface Material Grass
--------------------------------	-------------------	--------------------	----------------------	------------------------	---------------------------

Images

Defects

Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	None
06:00	Incoming	PVC	6	Flat Slab	None
12:00	Outgoing	PVC	6	Chimney	Concrete
				Cone	Other
				Wall	Other
				Bench	Concrete
				Channel	Concrete
				Steps	None

Comments



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin AJ-12	Manhole GIS ID 2441	Inspection Date 3/22/2016	Time 1:21:00 PM	Crew Leader EC
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Location Description 1000 13th Street	Manhole Grade At Grade
	Grade Difference (ft) 0.00
	Cover to Invert Depth (ft) 4.92

GPS Verified? Visually Corr	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Street	Surface Material Asphalt
--------------------------------	-------------------	--------------------	----------------------	-------------------------	-----------------------------

<p>Images</p>  	<p>Defects</p> <table style="width: 100%;"> <tr> <td>Cover Fit Tight</td> <td style="text-align: right;"><i>Overall Score</i></td> </tr> <tr> <td>Cover seal missing</td> <td style="text-align: right;">Total <b>8</b></td> </tr> </table>	Cover Fit Tight	<i>Overall Score</i>	Cover seal missing	Total <b>8</b>
Cover Fit Tight	<i>Overall Score</i>				
Cover seal missing	Total <b>8</b>				

Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	None
03:00	Incoming	Clay	6	Flat Slab	None
06:00	Incoming	PVC	8	Chimney	Other
09:00	Incoming	Clay	6	Cone	Other
12:00	Outgoing	PVC	8	Wall	Other
				Bench	Concrete
				Channel	Concrete
				Steps	None

Comments



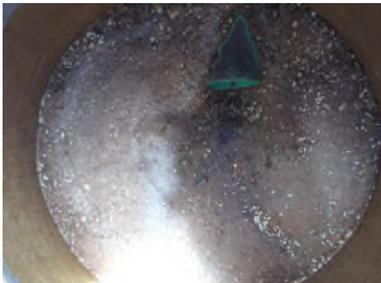
## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin AJ-12	Manhole GIS ID 2458	Inspection Date 3/22/2016	Time 1:40:00 PM	Crew Leader EC
----------------------------	------------------------	------------------------------	--------------------	-------------------

Location Description  1000 13th Street	Manhole Grade At Grade
	Grade Difference (ft) 0.00
	Cover to Invert Depth (ft) 5.50

GPS Verified? Visually Corr	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Sidewalk	Surface Material Concrete
--------------------------------	-------------------	--------------------	----------------------	---------------------------	------------------------------

<p>Images</p>  	<p>Defects</p> <p>Cover Fit Tight</p> <table style="width: 100%;"> <tr> <td colspan="2" style="text-align: right;"><i>Overall Score</i></td> </tr> <tr> <td style="text-align: right;">Total</td> <td style="text-align: right;"><b>3</b></td> </tr> </table>	<i>Overall Score</i>		Total	<b>3</b>
<i>Overall Score</i>					
Total	<b>3</b>				

Pipe Configuration				Construction Materials	
<i>Pipe Location</i>	<i>Pipe Service</i>	<i>Pipe Material</i>	<i>Pipe Diameter (in)</i>	<i>Grade Ring</i>	<i>None</i>
12:00	Outgoing	PVC	8	<i>Flat Slab</i>	None
04:00	Appurtenance	PVC	4	<i>Chimney</i>	Concrete
				<i>Cone</i>	Other
				<i>Wall</i>	Other
				<i>Bench</i>	Concrete
				<i>Channel</i>	Concrete
				<i>Steps</i>	None

Comments



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin AJ-12	Manhole GIS ID 4572	Inspection Date 3/16/2016	Time 12:41:00 PM	Crew Leader CH
----------------------------	------------------------	------------------------------	---------------------	-------------------

Location Description  1000 14th Street	Manhole Grade Above Grade
	Grade Difference (ft) 0.33
	Cover to Invert Depth (ft) 10.50

GPS Verified? Visually Corr	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Field	Surface Material Grass
--------------------------------	-------------------	--------------------	----------------------	------------------------	---------------------------

<p>Images</p>  	<p>Defects</p> <p>Cover seal missing</p> <p style="text-align: right;"><i>Overall Score</i></p> <p style="text-align: right;">Total <b>5</b></p>
--	--

Pipe Configuration				Construction Materials	
<i>Pipe Location</i>	<i>Pipe Service</i>	<i>Pipe Material</i>	<i>Pipe Diameter (in)</i>	<i>Grade Ring</i>	<i>None</i>
06:00	Incoming	PVC	12	<i>Flat Slab</i>	None
09:00	Incoming	Brick	12	<i>Chimney</i>	Concrete
12:00	Outgoing	PVC	12	<i>Cone</i>	None
10:00	Appurtenance	PVC	6	<i>Wall</i>	Concrete
				<i>Bench</i>	Concrete
				<i>Channel</i>	Concrete
				<i>Steps</i>	None

Comments



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin AJ-12	Manhole GIS ID 4585	Inspection Date 3/16/2016	Time 11:34:00 AM	Crew Leader CH
----------------------------	------------------------	------------------------------	---------------------	-------------------

Location Description  1000 14th Street	Manhole Grade At Grade
	Grade Difference (ft) 0.00
	Cover to Invert Depth (ft) 10.33

GPS Verified? Visually Corr	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Street	Surface Material Asphalt
--------------------------------	-------------------	--------------------	----------------------	-------------------------	-----------------------------

<p>Images</p>  	<p>Defects</p> <table style="width: 100%;"> <tr> <td>Cover Fit Tight</td> <td style="text-align: right;"><i>Overall Score</i></td> </tr> <tr> <td>Cover seal missing</td> <td style="text-align: right;">Total <b>8</b></td> </tr> </table>	Cover Fit Tight	<i>Overall Score</i>	Cover seal missing	Total <b>8</b>
Cover Fit Tight	<i>Overall Score</i>				
Cover seal missing	Total <b>8</b>				

Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	None
05:00	Incoming	Clay	6	Flat Slab	None
06:00	Incoming	Clay	10	Chimney	Brick
12:00	Outgoing	Clay	10	Cone	Brick
09:00	Appurtenance	PVC	4	Wall	Brick
				Bench	Concrete
				Channel	Concrete
				Steps	None

Comments



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin AJ-12	Manhole GIS ID 4586	Inspection Date 3/18/2016	Time 1:18:00 PM	Crew Leader CH
----------------------------	------------------------	------------------------------	--------------------	-------------------

Location Description  1000 14th Street	Manhole Grade At Grade
	Grade Difference (ft) 0.00
	Cover to Invert Depth (ft) 10.00

GPS Verified? Visually Corr	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Field	Surface Material Grass
--------------------------------	-------------------	--------------------	----------------------	------------------------	---------------------------

<p>Images</p>  	<p>Defects</p> <p>Cover corrosion moderate</p> <p>Cover I/I minor</p> <p>Cover seal missing</p> <p>Cover surface wear major</p> <p>Channel hydraulic restriction moderate</p> <p>Lateral corrosion moderate</p> <div style="text-align: right; margin-top: 20px;"> <p><i>Overall Score</i></p> <p>Total <b>66</b></p> </div>
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Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	None
09:00	Incoming	Clay	12	Flat Slab	None
12:00	Outgoing	Clay	12	Chimney	Brick
				Cone	Brick
				Wall	Brick
				Bench	Concrete
				Channel	Concrete
				Steps	Iron

Comments



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin AJ-12	Manhole GIS ID 4587	Inspection Date 3/16/2016	Time 12:19:00 PM	Crew Leader CH
----------------------------	------------------------	------------------------------	---------------------	-------------------

Location Description  1471 Avenue I	Manhole Grade At Grade
	Grade Difference (ft) 0.00
	Cover to Invert Depth (ft) 7.58

GPS Verified? Visually Corr	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Sidewalk	Surface Material Concrete
--------------------------------	-------------------	--------------------	----------------------	---------------------------	------------------------------



Defects

Cover Fit Tight	<i>Overall Score</i>
Cover seal missing	Total <b>8</b>

Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	None
03:00	Incoming	PVC	8	Flat Slab	None
06:00	Incoming	PVC	10	Chimney	Concrete
12:00	Outgoing	Concrete	12	Cone	Concrete
				Wall	Concrete
				Bench	Concrete
				Channel	Concrete
				Steps	None

Comments



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin AJ-12	Manhole GIS ID 4588	Inspection Date 3/16/2016	Time 11:50:00 AM	Crew Leader CH
----------------------------	------------------------	------------------------------	---------------------	-------------------

Location Description  1471 Avenue I	Manhole Grade At Grade
	Grade Difference (ft) 0.00
	Cover to Invert Depth (ft) 7.92

GPS Verified? Visually Corr	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Street	Surface Material Asphalt
--------------------------------	-------------------	--------------------	----------------------	-------------------------	-----------------------------

<p>Images</p>  	<p>Defects</p> <table style="width: 100%;"> <tr> <td>Cover Fit Tight</td> <td style="text-align: right;"><i>Overall Score</i></td> </tr> <tr> <td>Sewer connection crack moderate</td> <td style="text-align: right;">Total <b>15</b></td> </tr> </table>	Cover Fit Tight	<i>Overall Score</i>	Sewer connection crack moderate	Total <b>15</b>
Cover Fit Tight	<i>Overall Score</i>				
Sewer connection crack moderate	Total <b>15</b>				

Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	None
03:00	Incoming	Clay	12	Flat Slab	None
06:00	Incoming	Concrete	10	Chimney	Concrete
09:00	Incoming	Clay	12	Cone	None
12:00	Outgoing	Clay	6	Wall	Other
				Bench	Concrete
				Channel	Concrete
				Steps	None

Comments



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin AJ-12	Manhole GIS ID FN-02	Inspection Date 3/15/2016	Time 11:40:00 AM	Crew Leader CH
----------------------------	-------------------------	------------------------------	---------------------	-------------------

Location Description 1528 Avenue J	Manhole Grade At Grade
	Grade Difference (ft) 0.00
	Cover to Invert Depth (ft) 6.25

GPS Verified? Visually Corr	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Street	Surface Material Asphalt
--------------------------------	-------------------	--------------------	----------------------	-------------------------	-----------------------------

<p>Images</p>  	<p>Defects</p> <table style="width: 100%;"> <tr> <td>Cover Fit Tight</td> <td style="text-align: right;"><i>Overall Score</i></td> </tr> <tr> <td>Cover seal missing</td> <td style="text-align: right;">Total <b>87</b></td> </tr> <tr> <td>Bench broken moderate</td> <td></td> </tr> <tr> <td>Bench corrosion major</td> <td></td> </tr> <tr> <td>Bench I/I moderate</td> <td></td> </tr> <tr> <td>Bench mortar missing major</td> <td></td> </tr> <tr> <td>Channel I/I moderate</td> <td></td> </tr> <tr> <td>Sewer connection crack moderate</td> <td></td> </tr> <tr> <td>Steps broken major</td> <td></td> </tr> </table>	Cover Fit Tight	<i>Overall Score</i>	Cover seal missing	Total <b>87</b>	Bench broken moderate		Bench corrosion major		Bench I/I moderate		Bench mortar missing major		Channel I/I moderate		Sewer connection crack moderate		Steps broken major	
Cover Fit Tight	<i>Overall Score</i>																		
Cover seal missing	Total <b>87</b>																		
Bench broken moderate																			
Bench corrosion major																			
Bench I/I moderate																			
Bench mortar missing major																			
Channel I/I moderate																			
Sewer connection crack moderate																			
Steps broken major																			

Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	None
06:00	Incoming	Clay	8	Flat Slab	None
09:00	Incoming	Clay	8	Chimney	Brick
12:00	Outgoing	Clay	8	Cone	Brick
05:00	Appurtenance	Clay	4	Wall	Brick
				Bench	Brick
				Channel	Other
				Steps	Iron

Comments  
There is a blocked line inoming to this manhole.



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin AJ-12	Manhole GIS ID FN-05	Inspection Date 3/22/2016	Time 10:13:00 AM	Crew Leader EC
----------------------------	-------------------------	------------------------------	---------------------	-------------------

Location Description  1615 Old Sycamore Avenue	Manhole Grade Above Grade
	Grade Difference (ft) 0.12
	Cover to Invert Depth (ft) 5.00

GPS Verified? Visually Corr	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Front Yard	Surface Material Grass
--------------------------------	-------------------	--------------------	----------------------	-----------------------------	---------------------------

<p>Images</p>  	<p>Defects</p> <p>Channel debris moderate</p> <p style="text-align: right;"><i>Overall Score</i></p> <p style="text-align: right;">Total           <b>15</b></p>
--	--

Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	None
06:00	Incoming	PVC	6	Flat Slab	None
12:00	Outgoing	PVC	6	Chimney	Concrete
				Cone	Concrete
				Wall	Concrete
				Bench	Concrete
				Channel	Concrete
				Steps	None

Comments



## MANHOLE INSPECTION REPORT

Huntsville, Texas

Basin / Sub-Basin AJ-12	Manhole GIS ID FN-06	Inspection Date 3/16/2016	Time 10:57:00 AM	Crew Leader CH
----------------------------	-------------------------	------------------------------	---------------------	-------------------

Location Description  2571 14th Street	Manhole Grade Above Grade
	Grade Difference (ft) 0.33
	Cover to Invert Depth (ft) 5.67

GPS Verified? Visually Corr	MH On Map? Yes	MH Located? Yes	MH Inspected? Yes	Surface Cover Other	Surface Material Grass
--------------------------------	-------------------	--------------------	----------------------	------------------------	---------------------------

<p>Images</p>  	<p>Defects</p> <table style="width: 100%;"> <tr> <td>Cover Fit Tight</td> <td style="text-align: right;"><i>Overall Score</i></td> </tr> <tr> <td>Cover seal missing</td> <td style="text-align: right;">Total <b>28</b></td> </tr> <tr> <td>Channel hydraulic restriction moderate</td> <td></td> </tr> </table>	Cover Fit Tight	<i>Overall Score</i>	Cover seal missing	Total <b>28</b>	Channel hydraulic restriction moderate	
Cover Fit Tight	<i>Overall Score</i>						
Cover seal missing	Total <b>28</b>						
Channel hydraulic restriction moderate							

Pipe Configuration				Construction Materials	
Pipe Location	Pipe Service	Pipe Material	Pipe Diameter (in)	Grade Ring	None
07:00	Appurtenance	PVC	8	Flat Slab	None
06:00	Incoming	Clay	6	Chimney	Brick
12:00	Outgoing	Clay	8	Cone	Brick
				Wall	Brick
				Bench	Concrete
				Channel	Concrete
				Steps	None

Comments  
All flow is blocked



**APPENDIX N**  
**AJ-12 Sub Basin E SSES Smoke Testing Report**

PROJECT NUMBER 25146.11

# Sewer System Evaluation Survey

Smoke Testing – Huntsville, TX

PREPARED FOR

Freese and Nichols, Inc.  
11200 Broadway Street, Suite 2332  
Pearland, TX 77584

SUBMITTED

August 9, 2016

**ADS ENVIRONMENTAL SERVICES®**





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## ***Introduction***

This report presents the results of smoke testing activities conducted by ADS Environmental Services (ADS) within selected portions of the sanitary sewer system maintained by the City of Huntsville. Smoke testing activities were performed at the request of Freese & Nichols, Inc. (Engineer) and were completed between July 17, 2016 and July 18, 2016.

## ***Project Description***

The City of Huntsville and Freese & Nichols, Inc. have identified inflow and infiltration into its sanitary sewer system as a concern and seeks to locate and eliminate inflow and infiltration sources where possible. Therefore, the purpose of this project is to perform smoke testing within sanitary sewers located in the project area designated by the Engineer. The project area includes much of the AJ-12 Basin within the existing sanitary sewer system.

## ***Methodology***

Smoke testing is a common diagnostic method used to locate and identify potential sources of infiltration and inflow within a sanitary sewer system. During smoke testing, a special non-toxic, non-staining smoke is blown into a selected portion of the system. Potential infiltration and inflow sources are evidenced by visible smoke. Smoke testing is one of many tools available to evaluate sewer conditions and complements other inspection and testing methods.

## ***Equipment and Materials***

A smoke blower and smoke generating items are the primary equipment and materials used to conduct smoke testing activities. Portable smoke blowers with a minimum rated air flow capacity of 3,500 CFM are used and are commercially available through several equipment providers.

Smoke generating items are available in two common varieties: smoke candles or smoke fluid. Both varieties are designed to produce a white to gray smoke and leave no visible residue or stains. Most smoke blowers are designed to operate with either smoke candles or smoke fluid, but some models are available that accommodate both. Smoke fluid was used for this particular project.

## Procedure

Smoke testing is performed by removing a manhole cover, placing a smoke blower on top of a manhole, starting the blower, and introducing smoke into the sewer. Each placement of the smoke blower is defined as a *set-up*, and may include one or more manhole-to-manhole segments. For best results, the smoke blower is often placed on an upstream manhole of the set-up area, and a typical set-up includes approximately 1,000 LF of sewer.

Once smoke is introduced, one person is required to operate the smoke blower, and at least one person is required to scout the set-up area for visible smoke. Smoke will be observed from the vent pipes of nearby homes and buildings and is a positive indication of their connection to the sewer system. Smoke will also be observed from public and private defects in the sewer system including manholes, sewer mains, service laterals, clean-outs, downspouts, and others. These defects are documented and photographed, and the results are incorporated into a database and report for further evaluation and/or corrective action by the Board.

## Notification

Sewer systems are generally perceived as "out-of-sight, out-of-mind" by the public, and the same is true for most sewer inspection and testing activities. Smoke testing, however, is a bit more visible. Smoke from testing activities is sometimes confused as a fire by residents, pedestrians, or motorists and can result in false alarms to the Fire Department. Also, smoke will, on occasion, enter a residence or business through defective plumbing or dry drain traps, resulting in frightened or disgruntled residents, as well as calls to the Fire Department. Therefore, public relations and public notification are an important component of a smoke testing project and involve education and notification for both the public and other local government officials and agencies that may be affected.

During public education and notification efforts, it is important to identify any domestic, commercial, institutional, or industrial establishment with occupants whose incidental exposure to smoke during smoke testing activities may result in excessive panic or aggravation of existing health conditions. These establishments include, but are not limited to, hospitals, nursing homes, schools, and child care facilities. Other establishments may also be identified that warrant similar consideration. Such facilities require extra communication and notification efforts prior to smoke testing. Individual meetings and tight schedule control are required to minimize disruptions. Avoiding these facilities all together may be the best option in some cases.



The level of public education depends on the size and extent of a given smoke testing project. However, the purpose is always the same – to provide information about the general nature and extent of smoke testing activities. During smoke testing for this project, notification was provided via door hangers distributed within affected areas prior to smoke testing. Notification was also provided to other governmental agencies – including the Board and the Fire Department – on each day that smoke testing was performed.

## ***Results***

A total of 17 set-ups were used to smoke test 22,937 LF of sanitary sewer, approximately 1,349 LF per set-up. Individual smoke testing defect identification reports are provided in the attached appendices. A total of 20 defects were identified, equivalent to about 1.18 defects per set-up. The observed defects include eight manholes (40%), 4 sewer lines (20%), and 8 service laterals (40%). Based on the distribution of defects, 10% of the observed defects are classified as public defects, and 90% of the observed defects are classified as private defects. Smoke was not reported entering any homes during smoke testing activities.

## ***Recommendations***

The defects identified during smoke testing activities require further action by the City to mitigate their inflow and infiltration potential into the sanitary sewer system. Recommendations for the mitigation or further evaluation of observed public and private defects are provided in the following sections.



**TABLE 1: Defects for Inspection and Repair**

<b>Owner</b>	<b>Set-up/Defect</b>	<b>Smoke From</b>	<b>US-DS Manhole</b>
Private	DM001-01	Service Lateral	FN07-1908
Private	DM002-02	Manhole # 1970	1970-1986
Private	DM002-02	Service Lateral	1986-1970
Private	DM005-01	Sewer Line	2232-4587
Public	DM008-01	Sewer Line	2375-2373
Public	DM008-02	Sewer Line	2373-2369
Private	DM010-01	Service Lateral	2458-2441
Private	DM010-02	Service Lateral	2458-2441
Private	DM010-03	Manhole # 2241	2441-2379
Private	DM010-04	Manhole # 2380	2380-2354
Private	DM010-05	Manhole # 2335	2335-2331
Private	DM011-01	Service Lateral	2219-2224
Private	DM011-02	Service Lateral	2219-2224
Private	DM011-03	Service Lateral	2219-2224
Private	DM012-01	Manhole # 1990	1990-2103
Private	DM012-02	Sewer Line	N/A-1990
Private	DM012-03	Manhole # N/A	N/A-1990
Private	DM012-04	Manhole # N/A	N/A-1990
Private	DM014-01	Service Lateral	2320-2314
Private	DM016-01	Manhole # 2306	2290-2306





## SMOKE TEST DEFECT REPORT

City of Huntsville, Texas

Basin / Sub-Basin AJ-12	Set-Up DM001	Defect No 1	Date 7/16/2016	Time 10:00:00 AM	Crew Leader DM
----------------------------	-----------------	----------------	-------------------	---------------------	-------------------

Address  
517 Bearkat Blvd

USMH FN07
DSMH 1908

Reference Point 1  
Fence Corner

Distance to Defect  
87 ft  in

Reference Point 2  
Fence Corner

Distance to Defect  
189 ft  in

Defect Type Private	Surface Cover Side Yard	Surface Cover Material Grass	Smoke From Lateral	Intensity Medium
------------------------	----------------------------	---------------------------------	-----------------------	---------------------

Comments  
N: 30.7141 W: -95.5382





## SMOKE TEST DEFECT REPORT

City of Huntsville, Texas

Basin / Sub-Basin AJ-12	Set-Up DM002	Defect No 1	Date 7/16/2016	Time 11:05:00 AM	Crew Leader DM
----------------------------	-----------------	----------------	-------------------	---------------------	-------------------

Address  
566 Bearkat Blvd

USMH 1970
DSMH 1986

Reference Point 1  
Manhole 1970

Distance to Defect  
 ft  in

Reference Point 2

Distance to Defect  
 ft  in

Defect Type Private	Surface Cover Front Yard	Surface Cover Material Grass	Smoke From Manhole	Intensity Medium
------------------------	-----------------------------	---------------------------------	-----------------------	---------------------

Comments  
N: 30.7157; W: -95.5404





## SMOKE TEST DEFECT REPORT

City of Huntsville, Texas

Basin / Sub-Basin AJ-12	Set-Up DM002	Defect No 2	Date 7/16/2016	Time 11:05:00 AM	Crew Leader DM
----------------------------	-----------------	----------------	-------------------	---------------------	-------------------

Address  
566 Bearkat Blvd

USMH 1986
DSMH 1970

Reference Point 1  
MH 1970

Distance to Defect  
6 ft  in

Reference Point 2

Distance to Defect  
 ft  in

Defect Type Public	Surface Cover Side Yard	Surface Cover Material Grass	Smoke From Lateral	Intensity Medium
-----------------------	----------------------------	---------------------------------	-----------------------	---------------------

Comments  
N: 30.7157; W: -95.5404 Utility pole intrusion





## SMOKE TEST DEFECT REPORT

City of Huntsville, Texas

Basin / Sub-Basin AJ-12	Set-Up DM005	Defect No 1	Date 7/16/2016	Time 12:20:00 PM	Crew Leader DM
----------------------------	-----------------	----------------	-------------------	---------------------	-------------------

Address  
916 15th Street

USMH 2232
DSMH 4587

Reference Point 1  
MH 2232

Distance to Defect  
116 ft  in

Reference Point 2

Distance to Defect  
 ft  in

Defect Type Public	Surface Cover Driveway	Surface Cover Material Concrete	Smoke From Sewer Line	Intensity Medium
-----------------------	---------------------------	------------------------------------	--------------------------	---------------------

Comments  
N: 30.7194; W: -95.5476





# SMOKE TEST DEFECT REPORT

City of Huntsville, Texas

Basin / Sub-Basin AJ-12	Set-Up DM008	Defect No 1	Date 7/16/2016	Time 1:48:00 PM	Crew Leader DM
----------------------------	-----------------	----------------	-------------------	--------------------	-------------------

Address  
608 14th Street

USMH  
2375  
DSMH  
2373

Reference Point 1  
MH 2373

Distance to Defect  
55 ft  in

Reference Point 2

Distance to Defect  
 ft  in

Defect Type Public	Surface Cover Driveway	Surface Cover Material Gravel	Smoke From Sewer Line	Intensity Heavy
-----------------------	---------------------------	----------------------------------	--------------------------	--------------------

Comments  
N: 30.7205, W: -95.5436





## SMOKE TEST DEFECT REPORT

City of Huntsville, Texas

Basin / Sub-Basin AJ-12	Set-Up DM008	Defect No 2	Date 7/16/2016	Time 1:48:00 PM	Crew Leader DM
----------------------------	-----------------	----------------	-------------------	--------------------	-------------------

Address  
600 14th Street

USMH 2373
DSMH 2369

Reference Point 1  
MH2373

Distance to Defect  
 ft  in

Reference Point 2

Distance to Defect  
 ft  in

Defect Type Public	Surface Cover Other	Surface Cover Material Grass	Smoke From Sewer Line	Intensity Medium
-----------------------	------------------------	---------------------------------	--------------------------	---------------------

Comments  
N: 30.7205, W: -95.5439





## SMOKE TEST DEFECT REPORT

City of Huntsville, Texas

Basin / Sub-Basin AJ-12	Set-Up DM010	Defect No 1	Date 7/16/2016	Time 3:30:00 PM	Crew Leader DM
----------------------------	-----------------	----------------	-------------------	--------------------	-------------------

Address  
1000 13th Street

USMH 2458
DSMH 2441

Reference Point 1  
Meter Box

Distance to Defect  
10 ft  in

Reference Point 2  
Open Space

Distance to Defect  
 ft  in

Defect Type Private	Surface Cover Front Yard	Surface Cover Material Grass	Smoke From Lateral	Intensity Medium
------------------------	-----------------------------	---------------------------------	-----------------------	---------------------

Comments  
N: 30.7218, W: -95.5494





## SMOKE TEST DEFECT REPORT

City of Huntsville, Texas

Basin / Sub-Basin AJ-12	Set-Up DM010	Defect No 2	Date 7/16/2016	Time 3:30:00 PM	Crew Leader DM
----------------------------	-----------------	----------------	-------------------	--------------------	-------------------

Address  
1000 13th Street

USMH 2458
DSMH 2441

Reference Point 1  
MH2458

Distance to Defect  
83 ft  in

Reference Point 2  
Tree

Distance to Defect  
24 ft  in

Defect Type Private	Surface Cover Front Yard	Surface Cover Material Grass	Smoke From Lateral	Intensity Medium
------------------------	-----------------------------	---------------------------------	-----------------------	---------------------

Comments  
N: 30.7218, W: -95.5491





## SMOKE TEST DEFECT REPORT

City of Huntsville, Texas

Basin / Sub-Basin AJ-12	Set-Up DM010	Defect No 3	Date 7/16/2016	Time 3:30:00 PM	Crew Leader DM
----------------------------	-----------------	----------------	-------------------	--------------------	-------------------

Address 1000 13th Street
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USMH 2441
DSMH 2379

Reference Point 1 MH 2441
------------------------------

Distance to Defect  
 ft  in

Reference Point 2
-------------------

Distance to Defect  
 ft  in

Defect Type Private	Surface Cover Street	Surface Cover Material Concrete	Smoke From Manhole	Intensity Medium
------------------------	-------------------------	------------------------------------	-----------------------	---------------------

Comments  
Smoke seeping out from pavement





## SMOKE TEST DEFECT REPORT

City of Huntsville, Texas

Basin / Sub-Basin AJ-12	Set-Up DM010	Defect No 4	Date 7/16/2016	Time 3:30:00 PM	Crew Leader DM
----------------------------	-----------------	----------------	-------------------	--------------------	-------------------

Address  
1310 Avenue J

USMH 2380
DSMH 2354

Reference Point 1

Distance to Defect  
 ft  in

Reference Point 2

Distance to Defect  
 ft  in

Defect Type Private	Surface Cover Side Yard	Surface Cover Material Grass	Smoke From Manhole	Intensity Light
------------------------	----------------------------	---------------------------------	-----------------------	--------------------

Comments  
Leak at wall-smoke blowing out of manhole cone seal at grade





## SMOKE TEST DEFECT REPORT

City of Huntsville, Texas

Basin / Sub-Basin AJ-12	Set-Up DM010	Defect No 5	Date 7/16/2016	Time 3:00:00 PM	Crew Leader DM
----------------------------	-----------------	----------------	-------------------	--------------------	-------------------

Address  
1000 14th Street

USMH 2335
DSMH 2331

Reference Point 1  
MH2335

Distance to Defect  
 ft  in

Reference Point 2

Distance to Defect  
 ft  in

Defect Type Private	Surface Cover Street	Surface Cover Material Concrete	Smoke From Manhole	Intensity Heavy
------------------------	-------------------------	------------------------------------	-----------------------	--------------------

Comments  
Subject to inflow and location does not have an inflow dish.





## SMOKE TEST DEFECT REPORT

City of Huntsville, Texas

Basin / Sub-Basin AJ-12	Set-Up DM011	Defect No 1	Date 7/17/2016	Time 8:45:00 AM	Crew Leader DM
----------------------------	-----------------	----------------	-------------------	--------------------	-------------------

Address  
1010 15th Street

USMH 2219
DSMH 2224

Reference Point 1  
MH 2219

Distance to Defect  
345 ft  in

Reference Point 2

Distance to Defect  
 ft  in

Defect Type Private	Surface Cover Side Yard	Surface Cover Material Grass	Smoke From Lateral	Intensity Medium
------------------------	----------------------------	---------------------------------	-----------------------	---------------------

Comments  
N: 30.7189 ; W: -95.5499





## SMOKE TEST DEFECT REPORT

City of Huntsville, Texas

Basin / Sub-Basin AJ-12	Set-Up DM011	Defect No 2	Date 7/17/2016	Time 8:45:00 AM	Crew Leader DM
----------------------------	-----------------	----------------	-------------------	--------------------	-------------------

Address  
1010 15th Street

USMH  
2219  
DSMH  
2224

Reference Point 1  
MH Main line

Distance to Defect  
45 ft  in

Reference Point 2  
Main Lane Defect

Distance to Defect  
21 ft  in

Defect Type Private	Surface Cover Side Yard	Surface Cover Material Grass	Smoke From Lateral	Intensity Medium
------------------------	----------------------------	---------------------------------	-----------------------	---------------------

Comments  
N: 30.7189; W: -95.5498





## SMOKE TEST DEFECT REPORT

City of Huntsville, Texas

Basin / Sub-Basin AJ-12	Set-Up DM011	Defect No 3	Date 7/17/2016	Time 8:45:00 AM	Crew Leader DM
----------------------------	-----------------	----------------	-------------------	--------------------	-------------------

Address  
1010 15th Street

USMH  
2219  
DSMH  
2224

Reference Point 1  
Main line Defect

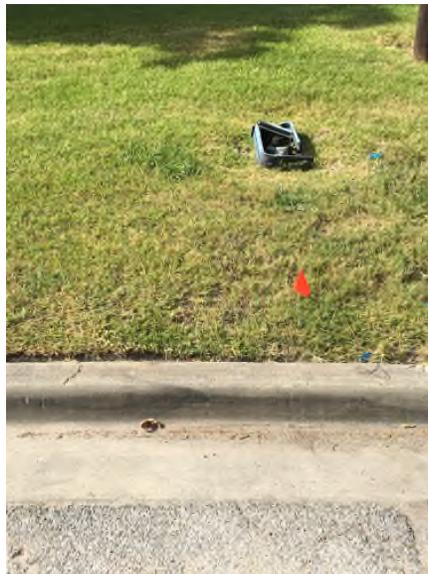
Distance to Defect  
15 ft  in

Reference Point 2  
Manhole- Main line

Distance to Defect  
144 ft  in

Defect Type Public	Surface Cover Side Yard	Surface Cover Material Grass	Smoke From Lateral	Intensity Medium
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Comments  
Service lateral collapsed at edge of road. Potential inflow.





## SMOKE TEST DEFECT REPORT

City of Huntsville, Texas

Basin / Sub-Basin AJ-12	Set-Up DM012	Defect No 1	Date 7/17/2016	Time 11:00:00 AM	Crew Leader DM
----------------------------	-----------------	----------------	-------------------	---------------------	-------------------

Address  
1741 University Ave

USMH  
1990  
DSMH  
2103

Reference Point 1  
MH 1990

Distance to Defect  
 ft  in

Reference Point 2

Distance to Defect  
 ft  in

Defect Type Private	Surface Cover Side Yard	Surface Cover Material Grass	Smoke From Manhole	Intensity Medium
------------------------	----------------------------	---------------------------------	-----------------------	---------------------

Comments  
Manhole wall leak





## SMOKE TEST DEFECT REPORT

City of Huntsville, Texas

Basin / Sub-Basin AJ-12	Set-Up DM012	Defect No 2	Date 7/17/2016	Time 11:00:00 AM	Crew Leader DM
----------------------------	-----------------	----------------	-------------------	---------------------	-------------------

Address  
1741 University Ave

USMH UNK
DSMH 1990

Reference Point 1  
MH 1990

Distance to Defect  
10 ft 10 in

Reference Point 2

Distance to Defect  
ft in

Defect Type Private	Surface Cover Side Yard	Surface Cover Material Grass	Smoke From Sewer Line	Intensity Medium
------------------------	----------------------------	---------------------------------	--------------------------	---------------------

Comments  
Mainline leak between manholes. N: 30.7164; W: -95.5505





## SMOKE TEST DEFECT REPORT

City of Huntsville, Texas

Basin / Sub-Basin AJ-12	Set-Up DM012	Defect No 3	Date 7/17/2016	Time 11:00:00 AM	Crew Leader DM
----------------------------	-----------------	----------------	-------------------	---------------------	-------------------

Address  
1741 University Ave

USMH UNK
DSMH 1990

Reference Point 1  
UNK Manhole

Distance to Defect  
210 ft  in

Reference Point 2

Distance to Defect  
 ft  in

Defect Type Private	Surface Cover Side Yard	Surface Cover Material Grass	Smoke From Manhole	Intensity Medium
------------------------	----------------------------	---------------------------------	-----------------------	---------------------

Comments





## SMOKE TEST DEFECT REPORT

City of Huntsville, Texas

Basin / Sub-Basin AJ-12	Set-Up DM012	Defect No 4	Date 7/17/2016	Time 11:00:00 AM	Crew Leader DM
----------------------------	-----------------	----------------	-------------------	---------------------	-------------------

Address  
1741 University Ave

USMH UNK
DSMH 1990

Reference Point 1  
UNK Manhole

Distance to Defect  
256 ft  in

Reference Point 2

Distance to Defect  
 ft  in

Defect Type Private	Surface Cover Field	Surface Cover Material Grass	Smoke From Manhole	Intensity Medium
------------------------	------------------------	---------------------------------	-----------------------	---------------------

Comments  
Subject to inflow with no inflow dish





## SMOKE TEST DEFECT REPORT

City of Huntsville, Texas

Basin / Sub-Basin AJ-12	Set-Up DM014	Defect No 1	Date 7/17/2016	Time 12:00:00 PM	Crew Leader DM
----------------------------	-----------------	----------------	-------------------	---------------------	-------------------

Address  
1328 Sam Houston Ave

USMH  
2320  
DSMH  
2314

Reference Point 1  
Smoothie King

Distance to Defect  
45 ft  in

Reference Point 2  
Utility Pole

Distance to Defect  
17 ft  in

Defect Type Private	Surface Cover Driveway	Surface Cover Material Concrete	Smoke From Lateral	Intensity Heavy
------------------------	---------------------------	------------------------------------	-----------------------	--------------------

Comments  
N: 30.7204, W: -95.5517





## SMOKE TEST DEFECT REPORT

City of Huntsville, Texas

Basin / Sub-Basin AJ-12	Set-Up DM016	Defect No 1	Date 7/17/2016	Time 2:15:00 PM	Crew Leader DM
----------------------------	-----------------	----------------	-------------------	--------------------	-------------------

Address  
1401 Ave M

USMH  
DSMH

Reference Point 1  
2306

Distance to Defect  
 ft  in

Reference Point 2

Distance to Defect  
 ft  in

Defect Type Private	Surface Cover Street	Surface Cover Material Asphalt	Smoke From Manhole	Intensity Heavy
------------------------	-------------------------	-----------------------------------	-----------------------	--------------------

Comments  
Subject to inflow





**APPENDIX O**  
**Lift Station Risk Based Assessment Detail Sheets**

# City of Huntsville

## Water and Wastewater Condition and Capacity Assessment Studies

### Lift Station Risk Based Assessment



Airport

Robinson Creek WWTP Service Area



Inspection Date: 6/9/2015

Facility Information	
Address:	186 Kevin Williams Rd
Year in Service:	
Type of Facility:	End Suction (Self Priming)
Number of Pumps:	2
Firm Capacity:	0.09 MGD
Horsepower:	15 hp
Monitoring:	SCADA
Generator:	35 kW



#### CONDITION ASSESSMENT

Component Group	Component Condition Rating	Weight Factor	Weighted Component Rating	Comments
Electrical – MCC, Back-up Power, Cables	3	20%	0.60	Age
Pumps and Motors	3	20%	0.60	Age
Instrumentation - SCADA, alarms	2	15%	0.30	Rack needs rehab.
Structure - Hatches, Corrosion, Cracks, Leaking, Ventilation, Odor Control	3	20%	0.60	Heavy root intrusion. 24" manhole access. No wet well coating.
Piping and Valves	3	15%	0.45	Check valve 2 not closing. Heavy corrosion in wet well.
Site - Drainage, Access Drive, Security, Fencing	2	10%	0.20	Driveway needs gravel touch up. No site lighting.
Total Inspection Score	-	100%	2.75	
Impact of Work Order Data	-	-	0.00	Below average number of work orders
<b>Condition Rating</b>	-	-	<b>2.75</b>	

#### CRITICALITY ASSESSMENT

Component Group	Component Criticality Rating	Weight Factor	Weighted Component Rating	Comments
Environmentally Sensitive Areas	0	50%	0.00	
Population Served	1	25%	0.25	
High Impact Areas	0	25%	0.00	
<b>Criticality Rating</b>	-	100%	<b>0.25</b>	

#### RISK BASED ASSESSMENT

	Condition Rating	Criticality Rating	Overall Risk Rating	Risk Category
<b>Lift Station Risk Rating</b>	<b>2.75</b>	<b>0.25</b>	<b>3.00</b>	<b>Low Risk</b>

# City of Huntsville

## Water and Wastewater Condition and Capacity Assessment Studies

### Lift Station Risk Based Assessment



Hitchin' Post

Robinson Creek WWTP Service Area



Inspection Date: 6/9/2015

Facility Information	
Address:	536 IH 45 N
Year in Service:	
Type of Facility:	End Suction (Self Priming)
Number of Pumps:	2
Firm Capacity:	0.15 MGD @ 63' TDH
Horsepower:	7.5 hp
Monitoring:	SCADA
Generator:	35 kW



#### CONDITION ASSESSMENT

Component Group	Component Condition Rating	Weight Factor	Weighted Component Rating	Comments
Electrical – MCC, Back-up Power, Cables	3	20%	0.60	Broken conduits.
Pumps and Motors	3	20%	0.60	Pump 1 not priming. Age.
Instrumentation - SCADA, alarms	2	15%	0.30	
Structure - Hatches, Corrosion, Cracks, Leaking, Ventilation, Odor Control	5	20%	1.00	Complete wall deterioration with rebar showing. Heavy root intrusion. 24" manhole access. Undermining of structural slab.
Piping and Valves	3	15%	0.45	Heavy Corrosion in wet well.
Site - Drainage, Access Drive, Security, Fencing	3	10%	0.30	Needs grading. Fence needs repair.
Total Inspection Score	-	100%	3.25	
Impact of Work Order Data	-	-	0.25	Above average number of work orders
<b>Condition Rating</b>	-	-	<b>3.50</b>	

#### CRITICALITY ASSESSMENT

Component Group	Component Criticality Rating	Weight Factor	Weighted Component Rating	Comments
Environmentally Sensitive Areas	0	50%	0.00	
Population Served	1	25%	0.25	
High Impact Areas	3	25%	0.75	
<b>Criticality Rating</b>	-	100%	<b>1.00</b>	

#### RISK BASED ASSESSMENT

	Condition Rating	Criticality Rating	Overall Risk Rating	Risk Category
<b>Lift Station Risk Rating</b>	<b>3.50</b>	<b>1.00</b>	<b>4.50</b>	<b>Moderate Risk</b>

**City of Huntsville**  
**Water and Wastewater Condition and Capacity Assessment Studies**  
**Lift Station Risk Based Assessment**



McGary Creek

Robinson Creek WWTP Service Area



Inspection Date: 6/9/2015

Facility Information	
Address:	1009 SH 75 N
Year in Service:	Rehab. 2015
Type of Facility:	Submersible
Number of Pumps:	2
Firm Capacity:	2.95 MGD
Horsepower:	160 hp
Monitoring:	SCADA
Generator:	400 kW



**CONDITION ASSESSMENT**

Component Group	Component Condition Rating	Weight Factor	Weighted Component Rating	Comments
Electrical – MCC, Back-up Power, Cables	3	20%	0.60	Bad condition overall.
Pumps and Motors	3	20%	0.60	Only 1 pump in operation currently. VFD # 2 is being repaired.
Instrumentation - SCADA, alarms	2	15%	0.30	
Structure - Hatches, Corrosion, Cracks, Leaking, Ventilation, Odor Control	3	20%	0.60	Wet well liner needs repair. Valve Vault holding water. Crane needs repair.
Piping and Valves	3	15%	0.45	Moderate corrosion in wet well Check valve No. 1 leaking in valve vault.
Site - Drainage, Access Drive, Security, Fencing	2	10%	0.20	Access drive touchups needed. Needs some grading.
Total Inspection Score	-	100%	2.75	
Impact of Work Order Data	-	-	0.25	Above average number of work orders
<b>Condition Rating</b>	-	-	<b>3.00</b>	

**CRITICALITY ASSESSMENT**

Component Group	Component Criticality Rating	Weight Factor	Weighted Component Rating	Comments
Environmentally Sensitive Areas	3	50%	1.50	
Population Served	5	25%	1.25	
High Impact Areas	2	25%	0.50	
<b>Criticality Rating</b>	-	100%	<b>3.25</b>	

**RISK BASED ASSESSMENT**

	Condition Rating	Criticality Rating	Overall Risk Rating	Risk Category
<b>Lift Station Risk Rating</b>	<b>3.00</b>	<b>3.25</b>	<b>6.25</b>	<b>High Risk</b>

# City of Huntsville

## Water and Wastewater Condition and Capacity Assessment Studies

### Lift Station Risk Based Assessment



TDCJ BOT

Robinson Creek WWTP Service Area



Inspection Date: 6/9/2015

Facility Information	
Address:	861C IH 45 N
Year in Service:	
Type of Facility:	End Suction (Self Priming)
Number of Pumps:	2
Firm Capacity:	
Horsepower:	10 hp
Monitoring:	SCADA
Generator:	35 kW



#### CONDITION ASSESSMENT

Component Group	Component Condition Rating	Weight Factor	Weighted Component Rating	Comments
Electrical – MCC, Back-up Power, Cables	4	20%	0.80	Age
Pumps and Motors	4	20%	0.80	No drawdown observed on either pump.
Instrumentation - SCADA, alarms	3	15%	0.45	
Structure - Hatches, Corrosion, Cracks, Leaking, Ventilation, Odor Control	5	20%	1.00	Complete deterioration of wet well. 24" manhole access.
Piping and Valves	3	15%	0.45	Piping submerged in wet well.
Site - Drainage, Access Drive, Security, Fencing	2	10%	0.20	Some low areas. (Poor drainage)
Total Inspection Score	-	100%	3.70	
Impact of Work Order Data	-	-	0.00	Below average number of work orders
<b>Condition Rating</b>	-	-	<b>3.70</b>	

#### CRITICALITY ASSESSMENT

Component Group	Component Criticality Rating	Weight Factor	Weighted Component Rating	Comments
Environmentally Sensitive Areas	0	50%	0.00	
Population Served	1	25%	0.25	
High Impact Areas	2	25%	0.50	
<b>Criticality Rating</b>	-	100%	<b>0.75</b>	

#### RISK BASED ASSESSMENT

	Condition Rating	Criticality Rating	Overall Risk Rating	Risk Category
<b>Lift Station Risk Rating</b>	<b>3.70</b>	<b>0.75</b>	<b>4.45</b>	<b>Moderate Risk</b>

# City of Huntsville

## Water and Wastewater Condition and Capacity Assessment Studies

### Lift Station Risk Based Assessment



McDonald Creek

Robinson Creek WWTP Service Area



Inspection Date: 6/9/2015

Facility Information	
Address:	259 Sunset Lake Dr
Year in Service:	
Type of Facility:	Submersible
Number of Pumps:	2
Firm Capacity:	1.44 MGD @ 65' TDH
Horsepower:	40 hp
Monitoring:	SCADA
Generator:	135 kW



#### CONDITION ASSESSMENT

Component Group	Component Condition Rating	Weight Factor	Weighted Component Rating	Comments
Electrical – MCC, Back-up Power, Cables	2	20%	0.40	
Pumps and Motors	2	20%	0.40	Age
Instrumentation - SCADA, alarms	2	15%	0.30	
Structure - Hatches, Corrosion, Cracks, Leaking, Ventilation, Odor Control	3	20%	0.60	Odor control system not working. Hoist chain problematic. No safety grate. Broken pump rail.
Piping and Valves	2	15%	0.30	Light corrosion in wet well.
Site - Drainage, Access Drive, Security, Fencing	2	10%	0.20	Touch up gravel drive.
Total Inspection Score	-	100%	2.20	
Impact of Work Order Data	-	-	0.00	Below average number of work orders
<b>Condition Rating</b>	-	-	<b>2.20</b>	

#### CRITICALITY ASSESSMENT

Component Group	Component Criticality Rating	Weight Factor	Weighted Component Rating	Comments
Environmentally Sensitive Areas	4	50%	2.00	
Population Served	3	25%	0.75	
High Impact Areas	2	25%	0.50	
<b>Criticality Rating</b>	-	100%	<b>3.25</b>	

#### RISK BASED ASSESSMENT

	Condition Rating	Criticality Rating	Overall Risk Rating	Risk Category
<b>Lift Station Risk Rating</b>	<b>2.20</b>	<b>3.25</b>	<b>5.45</b>	<b>Moderate Risk</b>

# City of Huntsville

## Water and Wastewater Condition and Capacity Assessment Studies

### Lift Station Risk Based Assessment



Transfer Station

Robinson Creek WWTP Service Area



Inspection Date: 6/9/2015

Facility Information	
Address:	590B IH 45 N
Year in Service:	
Type of Facility:	Submersible
Number of Pumps:	2
Firm Capacity:	
Horsepower:	
Monitoring:	No SCADA
Generator:	175 kW



#### CONDITION ASSESSMENT

Component Group	Component Condition Rating	Weight Factor	Weighted Component Rating	Comments
Electrical – MCC, Back-up Power, Cables	3	20%	0.60	
Pumps and Motors	3	20%	0.60	Age
Instrumentation - SCADA, alarms	2	15%	0.30	No SCADA. Floats.
Structure - Hatches, Corrosion, Cracks, Leaking, Ventilation, Odor Control	3	20%	0.60	I/I at upstream manhole. Wet well hatch needs lock. Pump rail supports heavily corroded.
Piping and Valves	2	15%	0.30	PVC pipe in wet well.
Site - Drainage, Access Drive, Security, Fencing	2	10%	0.20	
Total Inspection Score	-	100%	2.60	
Impact of Work Order Data	-	-	0.00	Below average number of work orders
<b>Condition Rating</b>	-	-	<b>2.60</b>	

#### CRITICALITY ASSESSMENT

Component Group	Component Criticality Rating	Weight Factor	Weighted Component Rating	Comments
Environmentally Sensitive Areas	0	50%	0.00	
Population Served	1	25%	0.25	
High Impact Areas	0	25%	0.00	
<b>Criticality Rating</b>	-	100%	<b>0.25</b>	

#### RISK BASED ASSESSMENT

	Condition Rating	Criticality Rating	Overall Risk Rating	Risk Category
<b>Lift Station Risk Rating</b>	<b>2.60</b>	<b>0.25</b>	<b>2.85</b>	<b>Low Risk</b>

**City of Huntsville**  
**Water and Wastewater Condition and Capacity Assessment Studies**  
**Lift Station Risk Based Assessment**



TXDOT #1 (Rest Area 45)

Robinson Creek WWTP Service Area



Inspection Date: 6/9/2015

Facility Information	
Address:	1576 IH 45 N
Year in Service:	
Type of Facility:	Submersible
Number of Pumps:	2
Firm Capacity:	
Horsepower:	9.4 hp
Monitoring:	No SCADA
Generator:	No Generator



**CONDITION ASSESSMENT**

Component Group	Component Condition Rating	Weight Factor	Weighted Component Rating	Comments
Electrical – MCC, Back-up Power, Cables	2	20%	0.40	
Pumps and Motors	2	20%	0.40	Age
Instrumentation - SCADA, alarms	2	15%	0.30	
Structure - Hatches, Corrosion, Cracks, Leaking, Ventilation, Odor Control	2	20%	0.40	Valve vault holding water.
Piping and Valves	2	15%	0.30	Light corrosion in wet well. Could use a coating.
Site - Drainage, Access Drive, Security, Fencing	1	10%	0.10	
Total Inspection Score	-	100%	1.90	
Impact of Work Order Data	-	-	0.00	Below average number of work orders
<b>Condition Rating</b>	-	-	<b>1.90</b>	

**CRITICALITY ASSESSMENT**

Component Group	Component Criticality Rating	Weight Factor	Weighted Component Rating	Comments
Environmentally Sensitive Areas	0	50%	0.00	
Population Served	1	25%	0.25	
High Impact Areas	0	25%	0.00	
<b>Criticality Rating</b>	-	100%	<b>0.25</b>	

**RISK BASED ASSESSMENT**

	Condition Rating	Criticality Rating	Overall Risk Rating	Risk Category
<b>Lift Station Risk Rating</b>	<b>1.90</b>	<b>0.25</b>	<b>2.15</b>	<b>Low Risk</b>

**City of Huntsville**  
**Water and Wastewater Condition and Capacity Assessment Studies**  
**Lift Station Risk Based Assessment**



TXDOT #2 (Rest Area 1696)

Robinson Creek WWTP Service Area



Inspection Date: 6/9/2015

<u>Facility Information</u>	
Address:	1270 IH 45 N
Year in Service:	
Type of Facility:	Submersible
Number of Pumps:	2
Firm Capacity:	
Horsepower:	16.7 hp
Monitoring:	No SCADA
Generator:	No Generator



**CONDITION ASSESSMENT**

Component Group	Component Condition Rating	Weight Factor	Weighted Component Rating	Comments
Electrical – MCC, Back-up Power, Cables	4	20%	0.80	Water infiltration of panel
Pumps and Motors	3	20%	0.60	Pump 1 replaced approximately 5 months ago and about 30% more efficient than pump 2
Instrumentation - SCADA, alarms	2	15%	0.30	No SCADA. Floats.
Structure - Hatches, Corrosion, Cracks, Leaking, Ventilation, Odor Control	5	20%	1.00	Complete deterioration of wet well. No safety grate. No lock on hatch.
Piping and Valves	4	15%	0.60	Severe corrosion in well and vault.
Site - Drainage, Access Drive, Security, Fencing	3	10%	0.30	Erosion of gravel drive
Total Inspection Score	-	100%	3.60	
Impact of Work Order Data	-	-	0.00	Below average number of work orders
<b>Condition Rating</b>	-	-	<b>3.60</b>	

**CRITICALITY ASSESSMENT**

Component Group	Component Criticality Rating	Weight Factor	Weighted Component Rating	Comments
Environmentally Sensitive Areas	4	50%	2.00	
Population Served	1	25%	0.25	
High Impact Areas	2	25%	0.50	
<b>Criticality Rating</b>	-	100%	<b>2.75</b>	

**RISK BASED ASSESSMENT**

	Condition Rating	Criticality Rating	Overall Risk Rating	Risk Category
<b>Lift Station Risk Rating</b>	<b>3.60</b>	<b>2.75</b>	<b>6.35</b>	<b>High Risk</b>

# City of Huntsville

## Water and Wastewater Condition and Capacity Assessment Studies

### Lift Station Risk Based Assessment



Bayes

N.B. Davidson WWTP Service Area



Inspection Date: 6/9/2015

Facility Information	
Address:	260 Rush Rd
Year in Service:	
Type of Facility:	Submersible
Number of Pumps:	2
Firm Capacity:	0.89 MGD @ 103' TDH
Horsepower:	
Monitoring:	SCADA
Generator:	130 kW



#### CONDITION ASSESSMENT

Component Group	Component Condition Rating	Weight Factor	Weighted Component Rating	Comments
Electrical – MCC, Back-up Power, Cables	4	20%	0.80	Severe corrosion.
Pumps and Motors	2	20%	0.40	Age
Instrumentation - SCADA, alarms	2	15%	0.30	
Structure - Hatches, Corrosion, Cracks, Leaking, Ventilation, Odor Control	2	20%	0.40	Crane very difficult to operate. No safety grate.
Piping and Valves	2	15%	0.30	Moderate corrosion in wet well.
Site - Drainage, Access Drive, Security, Fencing	2	10%	0.20	Fence needs repair. Needs all weather drive.
Total Inspection Score	-	100%	2.40	
Impact of Work Order Data	-	-	0.00	Below average number of work orders
<b>Condition Rating</b>	-	-	<b>2.40</b>	

#### CRITICALITY ASSESSMENT

Component Group	Component Criticality Rating	Weight Factor	Weighted Component Rating	Comments
Environmentally Sensitive Areas	5	50%	2.50	
Population Served	1	25%	0.25	
High Impact Areas	5	25%	1.25	
<b>Criticality Rating</b>	-	100%	<b>4.00</b>	

#### RISK BASED ASSESSMENT

	Condition Rating	Criticality Rating	Overall Risk Rating	Risk Category
<b>Lift Station Risk Rating</b>	<b>2.40</b>	<b>4.00</b>	<b>6.40</b>	<b>High Risk</b>

**City of Huntsville**  
**Water and Wastewater Condition and Capacity Assessment Studies**  
**Lift Station Risk Based Assessment**



Brook Hollow

N.B. Davidson WWTP Service Area



Inspection Date: 6/9/2015

Facility Information	
Address:	214 Brook Hollow Dr
Year in Service:	
Type of Facility:	End Suction (Self Priming)
Number of Pumps:	2
Firm Capacity:	1.08 MGD @ 48' TDH
Horsepower:	50 hp
Monitoring:	SCADA
Generator:	275 kW (Portable)



**CONDITION ASSESSMENT**

Component Group	Component Condition Rating	Weight Factor	Weighted Component Rating	Comments
Electrical – MCC, Back-up Power, Cables	3	20%	0.60	Rusting enclosures.
Pumps and Motors	3	20%	0.60	No drawdown observed on pump 1.
Instrumentation - SCADA, alarms	2	15%	0.30	
Structure - Hatches, Corrosion, Cracks, Leaking, Ventilation, Odor Control	3	20%	0.60	24" manhole access. Non-sealing wet well. Visible aggregate.
Piping and Valves	3	15%	0.45	Moderate corrosion in wet well.
Site - Drainage, Access Drive, Security, Fencing	3	10%	0.30	Submerged in wet water. Fencing needs repair.
Total Inspection Score	-	100%	2.85	
Impact of Work Order Data	-	-	0.25	Above average number of work orders
<b>Condition Rating</b>	-	-	<b>3.10</b>	

**CRITICALITY ASSESSMENT**

Component Group	Component Criticality Rating	Weight Factor	Weighted Component Rating	Comments
Environmentally Sensitive Areas	4	50%	2.00	
Population Served	3	25%	0.75	
High Impact Areas	4	25%	1.00	
<b>Criticality Rating</b>	-	100%	<b>3.75</b>	

**RISK BASED ASSESSMENT**

	Condition Rating	Criticality Rating	Overall Risk Rating	Risk Category
<b>Lift Station Risk Rating</b>	<b>3.10</b>	<b>3.75</b>	<b>6.85</b>	<b>High Risk</b>

**City of Huntsville**  
**Water and Wastewater Condition and Capacity Assessment Studies**  
**Lift Station Risk Based Assessment**



Elkins Lake Dam

N.B. Davidson WWTP Service Area



Inspection Date: 6/9/2015

Facility Information	
Address:	1861 Camelia Dr
Year in Service:	1970's
Type of Facility:	End Suction (Self Priming)
Number of Pumps:	2
Firm Capacity:	1.43 MGD
Below average number of work	Above average number of work
Monitoring:	75 hp
Generator:	SCADA
	205 kW



**CONDITION ASSESSMENT**

Component Group	Component Condition Rating	Weight Factor	Weighted Component Rating	Comments
Electrical – MCC, Back-up Power, Cables	4	20%	0.80	Motor starters and NTC need to be replaced.
Pumps and Motors	4	20%	0.80	One motor just re-worked. Single pump in operation.
Instrumentation - SCADA, alarms	2	15%	0.30	Concern over classification of inside building.
Structure - Hatches, Corrosion, Cracks, Leaking, Ventilation, Odor Control	3	20%	0.60	Needs ventilation. Some brick deterioration. Rusted hoist support beam. Wet well 24" manhole access with no functioning ladder. No coating on wet well.
Piping and Valves	4	15%	0.60	Age. Check valve 1 not working. Isolation valves not working. Moderate corrosion of piping in wet well.
Site - Drainage, Access Drive, Security, Fencing	2	10%	0.20	
Total Inspection Score	-	100%	3.30	
Impact of Work Order Data	-	-	0.25	Above average number of work orders
<b>Condition Rating</b>	-	-	<b>3.55</b>	

**CRITICALITY ASSESSMENT**

Component Group	Component Criticality Rating	Weight Factor	Weighted Component Rating	Comments
Environmentally Sensitive Areas	5	50%	2.50	
Population Served	4	25%	1.00	
High Impact Areas	2	25%	0.50	
<b>Criticality Rating</b>	-	100%	<b>4.00</b>	

**RISK BASED ASSESSMENT**

	Condition Rating	Criticality Rating	Overall Risk Rating	Risk Category
<b>Lift Station Risk Rating</b>	<b>3.55</b>	<b>4.00</b>	<b>7.55</b>	<b>Extreme Risk</b>

# City of Huntsville

## Water and Wastewater Condition and Capacity Assessment Studies

### Lift Station Risk Based Assessment



Elkins Lake #1

N.B. Davidson WWTP Service Area



Inspection Date: 6/9/2015

Facility Information	
Address:	806A Overbrook Dr
Year in Service:	
Type of Facility:	Submersible
Number of Pumps:	2
Firm Capacity:	
Horsepower:	
Monitoring:	SCADA
Generator:	40 kW



#### CONDITION ASSESSMENT

Component Group	Component Condition Rating	Weight Factor	Weighted Component Rating	Comments
Electrical – MCC, Back-up Power, Cables	4	20%	0.80	Control panel and phase shift needs to be replaced.
Pumps and Motors	3	20%	0.60	Age. Pump rail deterioration. No pump chains.
Instrumentation - SCADA, alarms	2	15%	0.30	No SCADA. Floats.
Structure - Hatches, Corrosion, Cracks, Leaking, Ventilation, Odor Control	4	20%	0.80	Severe rusting and corrosion of hatches; needs replacement. Valve vault holding water. Wet well needs rehab.
Piping and Valves	4	15%	0.60	Heavy corrosion in wet well. Isolation valves not working.
Site - Drainage, Access Drive, Security, Fencing	4	10%	0.40	Site submerged in large May rain event. Needs driveway improvements and lighting. May need wood fence due to future homes expected on nearby lots.
Total Inspection Score	-	100%	3.50	
Impact of Work Order Data	-	-	0.00	Below average number of work orders
<b>Condition Rating</b>	-	-	<b>3.50</b>	

#### CRITICALITY ASSESSMENT

Component Group	Component Criticality Rating	Weight Factor	Weighted Component Rating	Comments
Environmentally Sensitive Areas	4	50%	2.00	
Population Served	1	25%	0.25	
High Impact Areas	4	25%	1.00	
<b>Criticality Rating</b>	-	100%	<b>3.25</b>	

#### RISK BASED ASSESSMENT

	Condition Rating	Criticality Rating	Overall Risk Rating	Risk Category
<b>Lift Station Risk Rating</b>	<b>3.50</b>	<b>3.25</b>	<b>6.75</b>	<b>High Risk</b>

**City of Huntsville**  
**Water and Wastewater Condition and Capacity Assessment Studies**  
**Lift Station Risk Based Assessment**



Elkins Lake #2

N.B. Davidson WWTP Service Area



Inspection Date: 6/9/2015

Facility Information	
Address:	833A Overbrook Dr
Year in Service:	
Type of Facility:	Submersible
Number of Pumps:	2
Firm Capacity:	
Horsepower:	15 hp
Monitoring:	SCADA
Generator:	100 kW



**CONDITION ASSESSMENT**

Component Group	Component Condition Rating	Weight Factor	Weighted Component Rating	Comments
Electrical – MCC, Back-up Power, Cables	3	20%	0.60	
Pumps and Motors	3	20%	0.60	Age
Instrumentation - SCADA, alarms	2	15%	0.30	
Structure - Hatches, Corrosion, Cracks, Leaking, Ventilation, Odor Control	4	20%	0.80	Circumferential crack in wet well; evidence of I/I. Heavy corrosion of wet well cover.
Piping and Valves	4	15%	0.60	Moderate corrosion in wet well. Age. Check valves and plug valves need to be replaced.
Site - Drainage, Access Drive, Security, Fencing	2	10%	0.20	Needs gravel drive. No lighting.
Total Inspection Score	-	100%	3.10	
Impact of Work Order Data	-	-	0.25	Above average number of work orders
<b>Condition Rating</b>	-	-	<b>3.35</b>	

**CRITICALITY ASSESSMENT**

Component Group	Component Criticality Rating	Weight Factor	Weighted Component Rating	Comments
Environmentally Sensitive Areas	4	50%	2.00	
Population Served	1	25%	0.25	
High Impact Areas	2	25%	0.50	
<b>Criticality Rating</b>	-	100%	<b>2.75</b>	

**RISK BASED ASSESSMENT**

	Condition Rating	Criticality Rating	Overall Risk Rating	Risk Category
<b>Lift Station Risk Rating</b>	<b>3.35</b>	<b>2.75</b>	<b>6.10</b>	<b>High Risk</b>

**City of Huntsville**  
**Water and Wastewater Condition and Capacity Assessment Studies**  
**Lift Station Risk Based Assessment**



Elkins Lake Post Office

N.B. Davidson WWTP Service Area



Inspection Date: 6/9/2015

Facility Information	
Address:	638 Cherry Hills Dr
Year in Service:	
Type of Facility:	Submersible
Number of Pumps:	2
Firm Capacity:	1.22 MGD
Horsepower:	
Monitoring:	SCADA
Generator:	100 kW



**CONDITION ASSESSMENT**

Component Group	Component Condition Rating	Weight Factor	Weighted Component Rating	Comments
Electrical – MCC, Back-up Power, Cables	3	20%	0.60	40 Volt panel is old.
Pumps and Motors	1	20%	0.20	New.
Instrumentation - SCADA, alarms	2	15%	0.30	
Structure - Hatches, Corrosion, Cracks, Leaking, Ventilation, Odor Control	1	20%	0.20	
Piping and Valves	1	15%	0.15	
Site - Drainage, Access Drive, Security, Fencing	1	10%	0.10	Site needs lighting.
Total Inspection Score	-	100%	1.55	
Impact of Work Order Data	-	-	0.00	Below average number of work orders
<b>Condition Rating</b>	-	-	<b>1.55</b>	

**CRITICALITY ASSESSMENT**

Component Group	Component Criticality Rating	Weight Factor	Weighted Component Rating	Comments
Environmentally Sensitive Areas	5	50%	2.50	
Population Served	2	25%	0.50	
High Impact Areas	3	25%	0.75	
<b>Criticality Rating</b>	-	100%	<b>3.75</b>	

**RISK BASED ASSESSMENT**

	Condition Rating	Criticality Rating	Overall Risk Rating	Risk Category
<b>Lift Station Risk Rating</b>	1.55	3.75	5.30	Moderate Risk

**City of Huntsville**  
**Water and Wastewater Condition and Capacity Assessment Studies**  
**Lift Station Risk Based Assessment**



Elkins Lake #3

N.B. Davidson WWTP Service Area



Inspection Date: 6/9/2015

Facility Information	
Address:	1440 River Oaks Dr
Year in Service:	
Type of Facility:	Submersible
Number of Pumps:	2
Firm Capacity:	0.86 MGD @ 60' TDH
Horsepower:	
Monitoring:	SCADA
Generator:	135 kW



**CONDITION ASSESSMENT**

Component Group	Component Condition Rating	Weight Factor	Weighted Component Rating	Comments
Electrical – MCC, Back-up Power, Cables	4	20%	0.80	Control panel needs to be replaced.
Pumps and Motors	2	20%	0.40	Age
Instrumentation - SCADA, alarms	2	15%	0.30	
Structure - Hatches, Corrosion, Cracks, Leaking, Ventilation, Odor Control	3	20%	0.60	Hatches need to be replaced. Needs new liner in wet well.
Piping and Valves	3	15%	0.45	Heavy corrosion in wet well. Age.
Site - Drainage, Access Drive, Security, Fencing	1	10%	0.10	Needs security lighting.
Total Inspection Score	-	100%	2.65	
Impact of Work Order Data	-	-	0.00	Below average number of work orders
<b>Condition Rating</b>	-	-	<b>2.65</b>	

**CRITICALITY ASSESSMENT**

Component Group	Component Criticality Rating	Weight Factor	Weighted Component Rating	Comments
Environmentally Sensitive Areas	5	50%	2.50	
Population Served	1	25%	0.25	
High Impact Areas	4	25%	1.00	
<b>Criticality Rating</b>	-	100%	<b>3.75</b>	

**RISK BASED ASSESSMENT**

	Condition Rating	Criticality Rating	Overall Risk Rating	Risk Category
<b>Lift Station Risk Rating</b>	<b>2.65</b>	<b>3.75</b>	<b>6.40</b>	<b>High Risk</b>

# City of Huntsville

## Water and Wastewater Condition and Capacity Assessment Studies

### Lift Station Risk Based Assessment



Elkins Lake Equestrian Center

N.B. Davidson WWTP Service Area



Inspection Date: 6/9/2015

<u>Facility Information</u>	
Address:	1933 Greentree Dr
Year in Service:	
Type of Facility:	Submersible
Number of Pumps:	2
Firm Capacity:	0.22 MGD @ 40' TDH
Horsepower:	5 hp?
Monitoring:	No SCADA
Generator:	Installation Pending



#### CONDITION ASSESSMENT

Component Group	Component Condition Rating	Weight Factor	Weighted Component Rating	Comments
Electrical – MCC, Back-up Power, Cables	4	20%	0.80	Water has infiltrated holes in cabinet; rusting.
Pumps and Motors	4	20%	0.80	No rails. Must pull pumps with discharge pipe. One pump not working well.
Instrumentation - SCADA, alarms	3	15%	0.45	Floats. No SCADA.
Structure - Hatches, Corrosion, Cracks, Leaking, Ventilation, Odor Control	3	20%	0.60	No coating on wet well. Unsafe access hatch.
Piping and Valves	2	15%	0.30	Age.
Site - Drainage, Access Drive, Security, Fencing	4	10%	0.40	Site submerged in large May 2015 rain event. Driveway in poor condition. Fence violates TCEQ requirements. Needs lighting.
Total Inspection Score	-	100%	3.35	
Impact of Work Order Data	-	-	0.00	Below average number of work orders
<b>Condition Rating</b>	-	-	<b>3.35</b>	

#### CRITICALITY ASSESSMENT

Component Group	Component Criticality Rating	Weight Factor	Weighted Component Rating	Comments
Environmentally Sensitive Areas	5	50%	2.50	
Population Served	1	25%	0.25	
High Impact Areas	3	25%	0.75	
<b>Criticality Rating</b>	-	100%	<b>3.50</b>	

#### RISK BASED ASSESSMENT

	Condition Rating	Criticality Rating	Overall Risk Rating	Risk Category
<b>Lift Station Risk Rating</b>	<b>3.35</b>	<b>3.50</b>	<b>6.85</b>	<b>High Risk</b>

# City of Huntsville

## Water and Wastewater Condition and Capacity Assessment Studies

### Lift Station Risk Based Assessment



McCoy's

N.B. Davidson WWTP Service Area



Inspection Date: 6/9/2015

Facility Information	
Address:	202A Graham Rd
Year in Service:	
Type of Facility:	Submersible
Number of Pumps:	2
Firm Capacity:	
Horsepower:	
Monitoring:	No SCADA
Generator:	10 kW



#### CONDITION ASSESSMENT

Component Group	Component Condition Rating	Weight Factor	Weighted Component Rating	Comments
Electrical – MCC, Back-up Power, Cables	3	20%	0.60	Age
Pumps and Motors	2	20%	0.40	Age
Instrumentation - SCADA, alarms	3	15%	0.45	Age. Bubbler.
Structure - Hatches, Corrosion, Cracks, Leaking, Ventilation, Odor Control	3	20%	0.60	Wet well wall needs coating. Pump rails deteriorating.
Piping and Valves	3	15%	0.45	Heavy corrosion in wet well.
Site - Drainage, Access Drive, Security, Fencing	2	10%	0.20	Drive needs gravel touch up.
Total Inspection Score	-	100%	2.70	
Impact of Work Order Data	-	-	0.00	Below average number of work orders
<b>Condition Rating</b>	-	-	<b>2.70</b>	

#### CRITICALITY ASSESSMENT

Component Group	Component Criticality Rating	Weight Factor	Weighted Component Rating	Comments
Environmentally Sensitive Areas	3	50%	1.50	
Population Served	1	25%	0.25	
High Impact Areas	3	25%	0.75	
<b>Criticality Rating</b>	-	100%	<b>2.50</b>	

#### RISK BASED ASSESSMENT

	Condition Rating	Criticality Rating	Overall Risk Rating	Risk Category
<b>Lift Station Risk Rating</b>	<b>2.70</b>	<b>2.50</b>	<b>5.20</b>	<b>Moderate Risk</b>

# City of Huntsville

## Water and Wastewater Condition and Capacity Assessment Studies

### Lift Station Risk Based Assessment



Southwood Drive

N.B. Davidson WWTP Service Area



Inspection Date: 6/9/2015

Facility Information	
Address:	1149 Southwood Dr
Year in Service:	
Type of Facility:	End Suction (Self Priming)
Number of Pumps:	2
Firm Capacity:	0.36 MGD @ 60' TDH
Horsepower:	10 hp
Monitoring:	SCADA
Generator:	40 kW



#### CONDITION ASSESSMENT

Component Group	Component Condition Rating	Weight Factor	Weighted Component Rating	Comments
Electrical – MCC, Back-up Power, Cables	2	20%	0.40	
Pumps and Motors	2	20%	0.40	*Were not able to run pumps due to downstream construction.
Instrumentation - SCADA, alarms	2	15%	0.30	
Structure - Hatches, Corrosion, Cracks, Leaking, Ventilation, Odor Control	3	20%	0.60	24" manhole access. Tree root intrusion near invert due to poor seal. Wet well has fiberglass liner.
Piping and Valves	2	15%	0.30	Moderate corrosion on force main in wet well.
Site - Drainage, Access Drive, Security, Fencing	1	10%	0.10	
Total Inspection Score	-	100%	2.10	
Impact of Work Order Data	-	-	0.00	Below average number of work orders
<b>Condition Rating</b>	-	-	<b>2.10</b>	

#### CRITICALITY ASSESSMENT

Component Group	Component Criticality Rating	Weight Factor	Weighted Component Rating	Comments
Environmentally Sensitive Areas	0	50%	0.00	
Population Served	1	25%	0.25	
High Impact Areas	2	25%	0.50	
<b>Criticality Rating</b>	-	100%	<b>0.75</b>	

#### RISK BASED ASSESSMENT

	Condition Rating	Criticality Rating	Overall Risk Rating	Risk Category
<b>Lift Station Risk Rating</b>	<b>2.10</b>	<b>0.75</b>	<b>2.85</b>	<b>Low Risk</b>

# City of Huntsville

## Water and Wastewater Condition and Capacity Assessment Studies

### Lift Station Risk Based Assessment



Waters Edge

N.B. Davidson WWTP Service Area



Inspection Date: 6/9/2015

Facility Information	
Address:	294 Brook Hollow Dr
Year in Service:	
Type of Facility:	Submersible
Number of Pumps:	2
Firm Capacity:	1.21 MGD @ 85' TDH
Horsepower:	36 hp
Monitoring:	SCADA
Generator:	130 kW



#### CONDITION ASSESSMENT

Component Group	Component Condition Rating	Weight Factor	Weighted Component Rating	Comments
Electrical – MCC, Back-up Power, Cables	1	20%	0.20	
Pumps and Motors	2	20%	0.40	No issues. Age.
Instrumentation - SCADA, alarms	1	15%	0.15	
Structure - Hatches, Corrosion, Cracks, Leaking, Ventilation, Odor Control	3	20%	0.60	Hoist needs improvements. Wet well needs coating. Ladder safety issues (needs hand rail).
Piping and Valves	3	15%	0.45	Moderate corrosion in wet well.
Site - Drainage, Access Drive, Security, Fencing	1	10%	0.10	Site needs lighting.
Total Inspection Score	-	100%	1.90	
Impact of Work Order Data	-	-	0.00	Below average number of work orders
<b>Condition Rating</b>	-	-	<b>1.90</b>	

#### CRITICALITY ASSESSMENT

Component Group	Component Criticality Rating	Weight Factor	Weighted Component Rating	Comments
Environmentally Sensitive Areas	5	50%	2.50	
Population Served	2	25%	0.50	
High Impact Areas	4	25%	1.00	
<b>Criticality Rating</b>	-	100%	<b>4.00</b>	

#### RISK BASED ASSESSMENT

	Condition Rating	Criticality Rating	Overall Risk Rating	Risk Category
<b>Lift Station Risk Rating</b>	<b>1.90</b>	<b>4.00</b>	<b>5.90</b>	<b>High Risk</b>

**City of Huntsville**  
**Water and Wastewater Condition and Capacity Assessment Studies**  
**Lift Station Risk Based Assessment**



Park Road 40

N.B. Davidson WWTP Service Area



Inspection Date: 6/9/2015

Facility Information	
Address:	7757 SH 75 S
Year in Service:	
Type of Facility:	Submersible
Number of Pumps:	2
Firm Capacity:	
Horsepower:	36 hp
Monitoring:	SCADA
Generator:	130 kW



**CONDITION ASSESSMENT**

Component Group	Component Condition Rating	Weight Factor	Weighted Component Rating	Comments
Electrical – MCC, Back-up Power, Cables	2	20%	0.40	
Pumps and Motors	2	20%	0.40	Age
Instrumentation - SCADA, alarms	2	15%	0.30	
Structure - Hatches, Corrosion, Cracks, Leaking, Ventilation, Odor Control	2	20%	0.40	No safety grate.
Piping and Valves	3	15%	0.45	Moderate corrosion in wet well.
Site - Drainage, Access Drive, Security, Fencing	3	10%	0.30	Grate proximity to road.
Total Inspection Score	-	100%	2.25	
Impact of Work Order Data	-	-	0.00	Below average number of work orders
<b>Condition Rating</b>	-	-	<b>2.25</b>	

**CRITICALITY ASSESSMENT**

Component Group	Component Criticality Rating	Weight Factor	Weighted Component Rating	Comments
Environmentally Sensitive Areas	5	50%	2.50	
Population Served	1	25%	0.25	
High Impact Areas	2	25%	0.50	
<b>Criticality Rating</b>	-	100%	<b>3.25</b>	

**RISK BASED ASSESSMENT**

	Condition Rating	Criticality Rating	Overall Risk Rating	Risk Category
<b>Lift Station Risk Rating</b>	<b>2.25</b>	<b>3.25</b>	<b>5.50</b>	<b>Moderate Risk</b>

**City of Huntsville**  
**Water and Wastewater Condition and Capacity Assessment Studies**  
**Lift Station Risk Based Assessment**



Sterlingbrook

N.B. Davidson WWTP Service Area



Inspection Date: 6/9/2015

Facility Information	
Address:	5060 Sam Houston Ave
Year in Service:	
Type of Facility:	End Suction (Self Priming)
Number of Pumps:	2
Firm Capacity:	0.34 MGD @ 55' TDH
Horsepower:	3 hp
Monitoring:	SCADA
Generator:	40 kW



**CONDITION ASSESSMENT**

Component Group	Component Condition Rating	Weight Factor	Weighted Component Rating	Comments
Electrical – MCC, Back-up Power, Cables	1	20%	0.20	
Pumps and Motors	2	20%	0.40	High return volume into wet well.
Instrumentation - SCADA, alarms	1	15%	0.15	
Structure - Hatches, Corrosion, Cracks, Leaking, Ventilation, Odor Control	2	20%	0.40	Some possible slab undermining.
Piping and Valves	2	15%	0.30	Age. Light corrosion.
Site - Drainage, Access Drive, Security, Fencing	3	10%	0.30	Fence does not meet current TCEQ standards. Enclosure locks do not work.
Total Inspection Score	-	100%	1.75	
Impact of Work Order Data	-	-	0.00	Below average number of work orders
<b>Condition Rating</b>	-	-	<b>1.75</b>	

**CRITICALITY ASSESSMENT**

Component Group	Component Criticality Rating	Weight Factor	Weighted Component Rating	Comments
Environmentally Sensitive Areas	4	50%	2.00	
Population Served	3	25%	0.75	
High Impact Areas	3	25%	0.75	
<b>Criticality Rating</b>	-	100%	<b>3.50</b>	

**RISK BASED ASSESSMENT**

	Condition Rating	Criticality Rating	Overall Risk Rating	Risk Category
<b>Lift Station Risk Rating</b>	1.75	3.50	5.25	<b>Moderate Risk</b>

# City of Huntsville

## Water and Wastewater Condition and Capacity Assessment Studies

### Lift Station Risk Based Assessment



Huntsville State Park

N.B. Davidson WWTP Service Area



Inspection Date: 6/9/2015

Facility Information	
Address:	142 State Park Maint. Rd
Year in Service:	
Type of Facility:	Submersible
Number of Pumps:	2
Firm Capacity:	
Horsepower:	
Monitoring:	No SCADA
Generator:	150 kW



#### CONDITION ASSESSMENT

Component Group	Component Condition Rating	Weight Factor	Weighted Component Rating	Comments
Electrical – MCC, Back-up Power, Cables	2	20%	0.40	
Pumps and Motors	2	20%	0.40	Age
Instrumentation - SCADA, alarms	2	15%	0.30	
Structure - Hatches, Corrosion, Cracks, Leaking, Ventilation, Odor Control	3	20%	0.60	Wet well coating needs repair.
Piping and Valves	3	15%	0.45	Wet well piping has heavy corrosion.
Site - Drainage, Access Drive, Security, Fencing	1	10%	0.10	Site needs lighting.
Total Inspection Score	-	100%	2.25	
Impact of Work Order Data	-	-	0.00	Below average number of work orders
<b>Condition Rating</b>	-	-	<b>2.25</b>	

#### CRITICALITY ASSESSMENT

Component Group	Component Criticality Rating	Weight Factor	Weighted Component Rating	Comments
Environmentally Sensitive Areas	5	50%	2.50	
Population Served	1	25%	0.25	
High Impact Areas	2	25%	0.50	
<b>Criticality Rating</b>	-	100%	<b>3.25</b>	

#### RISK BASED ASSESSMENT

	Condition Rating	Criticality Rating	Overall Risk Rating	Risk Category
<b>Lift Station Risk Rating</b>	<b>2.25</b>	<b>3.25</b>	<b>5.50</b>	<b>Moderate Risk</b>

# City of Huntsville

## Water and Wastewater Condition and Capacity Assessment Studies

### Lift Station Risk Based Assessment



Bearkat Blvd

A.J. Brown WWTP Service Area



Inspection Date: 6/9/2015

Facility Information	
Address:	219 Bearkat Blvd
Year in Service:	
Type of Facility:	End Suction (Self Priming)
Number of Pumps:	2
Firm Capacity:	0.63 MGD @ 85' TDH
Horsepower:	25 hp
Monitoring:	SCADA
Generator:	100 kW



#### CONDITION ASSESSMENT

Component Group	Component Condition Rating	Weight Factor	Weight Factor	Comments
Electrical – MCC, Back-up Power, Cables	3	20%	0.60	Corrosion (transfer switches)
Pumps and Motors	2	20%	0.40	Rags. Pump 1 serviced one year ago. Pump 2 not meeting current demands.
Instrumentation - SCADA, alarms	2	15%	0.30	
Structure - Hatches, Corrosion, Cracks, Leaking, Ventilation, Odor Control	2	20%	0.40	24" manhole access
Piping and Valves	4	15%	0.60	Check valve on Pump 1 leaking. Heavy corrosion on wet well piping. Cross brace holding up force main in wet well, collecting rags and debris.
Site - Drainage, Access Drive, Security, Fencing	2	10%	0.20	Gravel drive.
Total Inspection Score	-	100%	2.50	
Impact of Work Order Data	-	-	0.25	Above average number of work orders
<b>Condition Rating</b>	-	-	<b>2.75</b>	

#### CRITICALITY ASSESSMENT

Component Group	Component Criticality Rating	Weight Factor	Weight Factor	Comments
Environmentally Sensitive Areas	5	50%	2.50	
Population Served	4	25%	1.00	
High Impact Areas	3	25%	0.75	
<b>Criticality Rating</b>	-	100%	<b>4.25</b>	

#### RISK BASED ASSESSMENT

	Condition Rating	Criticality Rating	Overall Risk Rating	Risk Category
<b>Lift Station Risk Rating</b>	<b>2.75</b>	<b>4.25</b>	<b>7.00</b>	<b>High Risk</b>

**City of Huntsville**  
**Water and Wastewater Condition and Capacity Assessment Studies**  
**Lift Station Risk Based Assessment**



Highway 190

A.J. Brown WWTP Service Area



Inspection Date: 6/9/2015

<u>Facility Information</u>	
Address:	631 SH 190
Year in Service:	
Type of Facility:	End Suction (Self Priming)
Number of Pumps:	2
Firm Capacity:	0.29 MGD @ 32' TDH
Horsepower:	7.5 hp
Monitoring:	No SCADA
Generator:	30 kW



**CONDITION ASSESSMENT**

Component Group	Component Condition Rating	Weight Factor	Weighted Component Rating	Comments
Electrical – MCC, Back-up Power, Cables	3	20%	0.60	Panel aging.
Pumps and Motors	3	20%	0.60	Some rags. Motors less than two years old. Age. Pump No. 2 not priming (waiting on a part).
Instrumentation - SCADA, alarms	1	15%	0.15	Floats. No SCADA.
Structure - Hatches, Corrosion, Cracks, Leaking, Ventilation, Odor Control	2	20%	0.40	Non-locking steel cover.
Piping and Valves	3	15%	0.45	Some leaking of pipe. Moderate corrosion in wet well.
Site - Drainage, Access Drive, Security, Fencing	2	10%	0.20	Fence damage. Slight grade to wet well.
Total Inspection Score	-	100%	2.40	
Impact of Work Order Data	-	-	0.25	Above average number of work orders
<b>Condition Rating</b>	-	-	<b>2.65</b>	

**CRITICALITY ASSESSMENT**

Component Group	Component Criticality Rating	Weight Factor	Weighted Component Rating	Comments
Environmentally Sensitive Areas	5	50%	2.50	
Population Served	1	25%	0.25	
High Impact Areas	5	25%	1.25	
<b>Criticality Rating</b>	-	100%	<b>4.00</b>	

**RISK BASED ASSESSMENT**

	Condition Rating	Criticality Rating	Overall Risk Rating	Risk Category
<b>Lift Station Risk Rating</b>	<b>2.65</b>	<b>4.00</b>	<b>6.65</b>	<b>High Risk</b>

**City of Huntsville**  
**Water and Wastewater Condition and Capacity Assessment Studies**  
**Lift Station Risk Based Assessment**



Mallery Lake

A.J. Brown WWTP Service Area



Inspection Date: 6/9/2015

Facility Information	
Address:	414 SH 19
Year in Service:	
Type of Facility:	End Suction (Self Priming)
Number of Pumps:	2
Firm Capacity:	0.35 MGD @ 50' TDH
Horsepower:	5 hp
Monitoring:	SCADA
Generator:	40 kW



**CONDITION ASSESSMENT**

Component Group	Component Condition Rating	Weight Factor	Weighted Component Rating	Comments
Electrical – MCC, Back-up Power, Cables	3	20%	0.60	Enclosure rack leaning. Rust on ATS door.
Pumps and Motors	2	20%	0.40	Pump 1 not draining wet well at all. Flapper on order.
Instrumentation - SCADA, alarms	1	15%	0.15	
Structure - Hatches, Corrosion, Cracks, Leaking, Ventilation, Odor Control	2	20%	0.40	24" access manhole. No coating on wet well.
Piping and Valves	3	15%	0.45	Moderate Corrosion in wet well. Piping delaminating in wet well.
Site - Drainage, Access Drive, Security, Fencing	1	10%	0.10	
Total Inspection Score	-	100%	2.10	
Impact of Work Order Data	-	-	0.25	Above average number of work orders
<b>Condition Rating</b>	-	-	<b>2.35</b>	

**CRITICALITY ASSESSMENT**

Component Group	Component Criticality Rating	Weight Factor	Weighted Component Rating	Comments
Environmentally Sensitive Areas	5	50%	2.50	
Population Served	3	25%	0.75	
High Impact Areas	3	25%	0.75	
<b>Criticality Rating</b>	-	100%	<b>4.00</b>	

**RISK BASED ASSESSMENT**

	Condition Rating	Criticality Rating	Overall Risk Rating	Risk Category
<b>Lift Station Risk Rating</b>	<b>2.35</b>	<b>4.00</b>	<b>6.35</b>	<b>High Risk</b>

**City of Huntsville**  
**Water and Wastewater Condition and Capacity Assessment Studies**  
**Lift Station Risk Based Assessment**



Old Colony

A.J. Brown WWTP Service Area



Inspection Date: 6/9/2015

Facility Information	
Address:	919 Old Colony Rd
Year in Service:	25+
Type of Facility:	End Suction (Self Priming)
Number of Pumps:	2
Firm Capacity:	0.22 MGD @ 28.4' TDH
Horsepower:	5 hp
Monitoring:	SCADA
Generator:	30 kW



**CONDITION ASSESSMENT**

Component Group	Component Condition Rating	Weight Factor	Weighted Component Rating	Comments
Electrical – MCC, Back-up Power, Cables	4	20%	0.80	Pump control panel in poor condition due to age.
Pumps and Motors	3	20%	0.60	Two and three year old motors. Age/wear on pumps.
Instrumentation - SCADA, alarms	2	15%	0.30	
Structure - Hatches, Corrosion, Cracks, Leaking, Ventilation, Odor Control	4	20%	0.80	24" manhole access. Heavy corrosion on wet well. Wall deterioration. Fiberglass enclosure does not fully open.
Piping and Valves	4	15%	0.60	Heavy corrosion. Check valve 1 not operational. No vent pipe.
Site - Drainage, Access Drive, Security, Fencing	4	10%	0.40	complete submersion during recent heavy rain event. Low lying area close proximity to drainage ditch.
Total Inspection Score	-	100%	3.50	
Impact of Work Order Data	-	-	0.25	Above average number of work orders
<b>Condition Rating</b>	-	-	<b>3.75</b>	

**CRITICALITY ASSESSMENT**

Component Group	Component Criticality Rating	Weight Factor	Weighted Component Rating	Comments
Environmentally Sensitive Areas	5	50%	2.50	
Population Served	1	25%	0.25	
High Impact Areas	5	25%	1.25	
<b>Criticality Rating</b>	-	100%	<b>4.00</b>	

**RISK BASED ASSESSMENT**

	Condition Rating	Criticality Rating	Overall Risk Rating	Risk Category
<b>Lift Station Risk Rating</b>	<b>3.75</b>	<b>4.00</b>	<b>7.75</b>	<b>Extreme Risk</b>

# City of Huntsville

## Water and Wastewater Condition and Capacity Assessment Studies

### Lift Station Risk Based Assessment



Simmons Street

A.J. Brown WWTP Service Area



Inspection Date: 6/9/2015

Facility Information	
Address:	3021 Simmons St
Year in Service:	
Type of Facility:	Submersible
Number of Pumps:	
Firm Capacity:	
Horsepower:	15 hp
Monitoring:	SCADA
Generator:	50 kW



#### CONDITION ASSESSMENT

Component Group	Component Condition Rating	Weight Factor	Weighted Component Rating	Comments
Electrical – MCC, Back-up Power, Cables	3	20%	0.60	Power line in trees.
Pumps and Motors	2	20%	0.40	Age. Not new but no issues.
Instrumentation - SCADA, alarms	2	15%	0.30	
Structure - Hatches, Corrosion, Cracks, Leaking, Ventilation, Odor Control	2	20%	0.40	Wet well coating needs touch up.
Piping and Valves	3	15%	0.45	Moderate corrosion in wet well and valve vault.
Site - Drainage, Access Drive, Security, Fencing	2	10%	0.20	Overgrowth on fence.
Total Inspection Score	-	100%	2.35	
Impact of Work Order Data	-	-	0.00	Below average number of work orders
<b>Condition Rating</b>	-	-	<b>2.35</b>	

#### CRITICALITY ASSESSMENT

Component Group	Component Criticality Rating	Weight Factor	Weighted Component Rating	Comments
Environmentally Sensitive Areas	5	50%	2.50	
Population Served	1	25%	0.25	
High Impact Areas	3	25%	0.75	
<b>Criticality Rating</b>	-	100%	<b>3.50</b>	

#### RISK BASED ASSESSMENT

	Condition Rating	Criticality Rating	Overall Risk Rating	Risk Category
<b>Lift Station Risk Rating</b>	<b>2.35</b>	<b>3.50</b>	<b>5.85</b>	<b>High Risk</b>

# City of Huntsville

## Water and Wastewater Condition and Capacity Assessment Studies

### Lift Station Risk Based Assessment



Tanyard Creek

A.J. Brown WWTP Service Area



Inspection Date: 6/9/2015

Facility Information	
Address:	1489 Fish Hatchery Rd
Year in Service:	
Type of Facility:	Submersible
Number of Pumps:	2
Firm Capacity:	2.59 MGD @ 90' TDH
Horsepower:	65 hp
Monitoring:	
Generator:	175 kW



#### CONDITION ASSESSMENT

Component Group	Component Condition Rating	Weight Factor	Weighted Component Rating	Comments
Electrical – MCC, Back-up Power, Cables	2	20%	0.40	
Pumps and Motors	2	20%	0.40	Pump 2 observed 20% deficiency compared to Pump 1. One pump is new and the other is re-built.
Instrumentation - SCADA, alarms	2	15%	0.30	
Structure - Hatches, Corrosion, Cracks, Leaking, Ventilation, Odor Control	2	20%	0.40	Structure in good condition overall.
Piping and Valves	2	15%	0.30	Moderate corrosion in wet well.
Site - Drainage, Access Drive, Security, Fencing	2	10%	0.20	Driveway needs touch up. No turn around.
Total Inspection Score	-	100%	2.00	
Impact of Work Order Data	-	-	0.25	Above average number of work orders
<b>Condition Rating</b>	-	-	<b>2.25</b>	

#### CRITICALITY ASSESSMENT

Component Group	Component Criticality Rating	Weight Factor	Weighted Component Rating	Comments
Environmentally Sensitive Areas	5	50%	2.50	
Population Served	2	25%	0.50	
High Impact Areas	2	25%	0.50	
<b>Criticality Rating</b>	-	100%	<b>3.50</b>	

#### RISK BASED ASSESSMENT

	Condition Rating	Criticality Rating	Overall Risk Rating	Risk Category
<b>Lift Station Risk Rating</b>	<b>2.25</b>	<b>3.50</b>	<b>5.75</b>	<b>Moderate Risk</b>

**City of Huntsville**  
**Water and Wastewater Condition and Capacity Assessment Studies**  
**Lift Station Risk Based Assessment**



Sims

A.J. Brown WWTP Service Area



Inspection Date: 6/9/2015

Facility Information	
Address:	110 Sims Ln
Year in Service:	
Type of Facility:	Submersible
Number of Pumps:	2
Firm Capacity:	
Horsepower:	15 hp
Monitoring:	
Generator:	50 kW



**CONDITION ASSESSMENT**

Component Group	Component Condition Rating	Weight Factor	Weighted Component Rating	Comments
Electrical – MCC, Back-up Power, Cables	4	20%	0.80	ATS needs work. Phase maker unavailable.
Pumps and Motors	2	20%	0.40	Age
Instrumentation - SCADA, alarms	2	15%	0.30	
Structure - Hatches, Corrosion, Cracks, Leaking, Ventilation, Odor Control	2	20%	0.40	No coating on wet well. Non-sealing hatch.
Piping and Valves	2	15%	0.30	Light corrosion in wet well.
Site - Drainage, Access Drive, Security, Fencing	4	10%	0.40	Graded across wet well. One inch rain causes site to submerge.
Total Inspection Score	-	100%	2.60	
Impact of Work Order Data	-	-	0.25	Above average number of work orders
<b>Condition Rating</b>	-	-	<b>2.85</b>	

**CRITICALITY ASSESSMENT**

Component Group	Component Criticality Rating	Weight Factor	Weighted Component Rating	Comments
Environmentally Sensitive Areas	5	50%	2.50	
Population Served	1	25%	0.25	
High Impact Areas	2	25%	0.50	
<b>Criticality Rating</b>	-	100%	<b>3.25</b>	

**RISK BASED ASSESSMENT**

	Condition Rating	Criticality Rating	Overall Risk Rating	Risk Category
<b>Lift Station Risk Rating</b>	<b>2.85</b>	<b>3.25</b>	<b>6.10</b>	<b>High Risk</b>

**City of Huntsville**  
**Water and Wastewater Condition and Capacity Assessment Studies**  
**Lift Station Risk Based Assessment**



Badger Lane

A.J. Brown WWTP Service Area



Inspection Date: 6/9/2015

Facility Information	
Address:	2319 Badger Ln
Year in Service:	Approx. 5
Type of Facility:	Submersible
Number of Pumps:	2
Firm Capacity:	
Horsepower:	7.5 hp
Monitoring:	No SCADA
Generator:	No Generator



**CONDITION ASSESSMENT**

Component Group	Component Condition Rating	Weight Factor	Weighted Component Rating	Comments
Electrical – MCC, Back-up Power, Cables	1	20%	0.20	
Pumps and Motors	1	20%	0.20	New pumps within last 5 years.
Instrumentation - SCADA, alarms	1	15%	0.15	
Structure - Hatches, Corrosion, Cracks, Leaking, Ventilation, Odor Control	2	20%	0.40	Non-sealing valve vault and wet well hatches.
Piping and Valves	2	15%	0.30	Light corrosion in wet well.
Site - Drainage, Access Drive, Security, Fencing	3	10%	0.30	Some grade across wet well. No fence and hatches unlocked.
Total Inspection Score	-	100%	1.55	
Impact of Work Order Data	-	-	0.00	Below average number of work orders
<b>Condition Rating</b>	-	-	<b>1.55</b>	

**CRITICALITY ASSESSMENT**

Component Group	Component Criticality Rating	Weight Factor	Weighted Component Rating	Comments
Environmentally Sensitive Areas	5	50%	2.50	
Population Served	1	25%	0.25	
High Impact Areas	3	25%	0.75	
<b>Criticality Rating</b>	-	100%	<b>3.50</b>	

**RISK BASED ASSESSMENT**

	Condition Rating	Criticality Rating	Overall Risk Rating	Risk Category
<b>Lift Station Risk Rating</b>	1.55	3.50	5.05	Moderate Risk

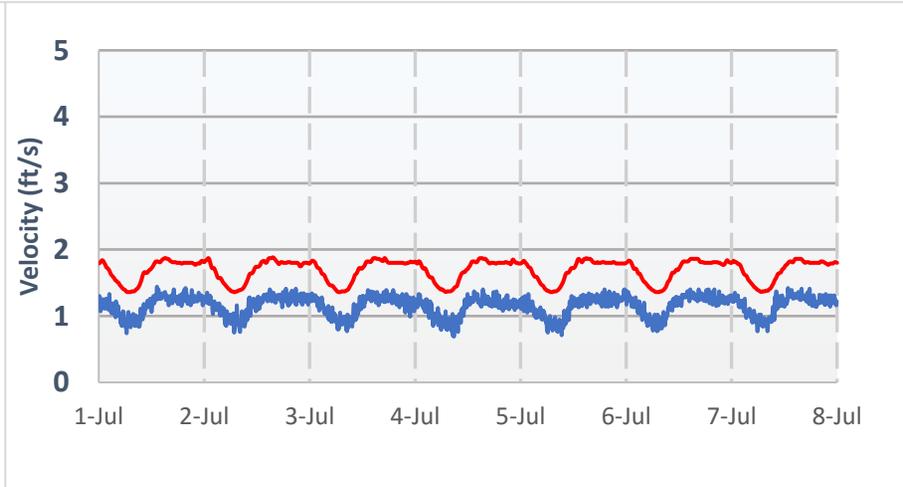
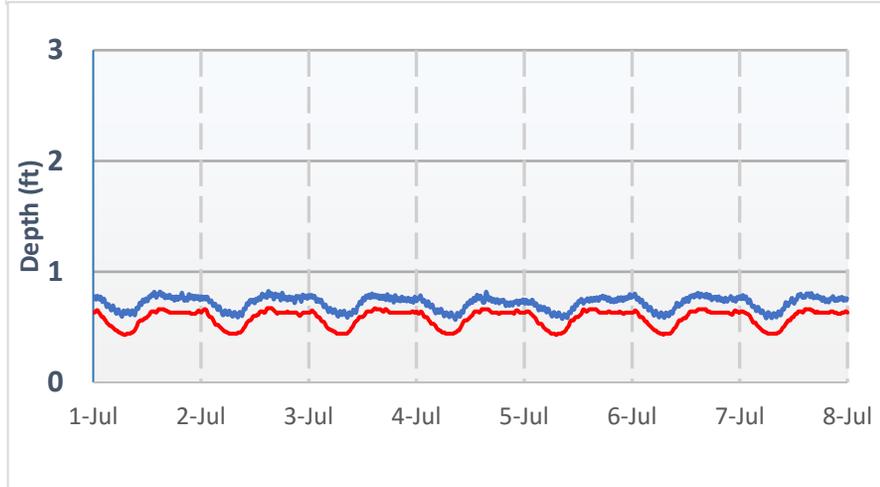
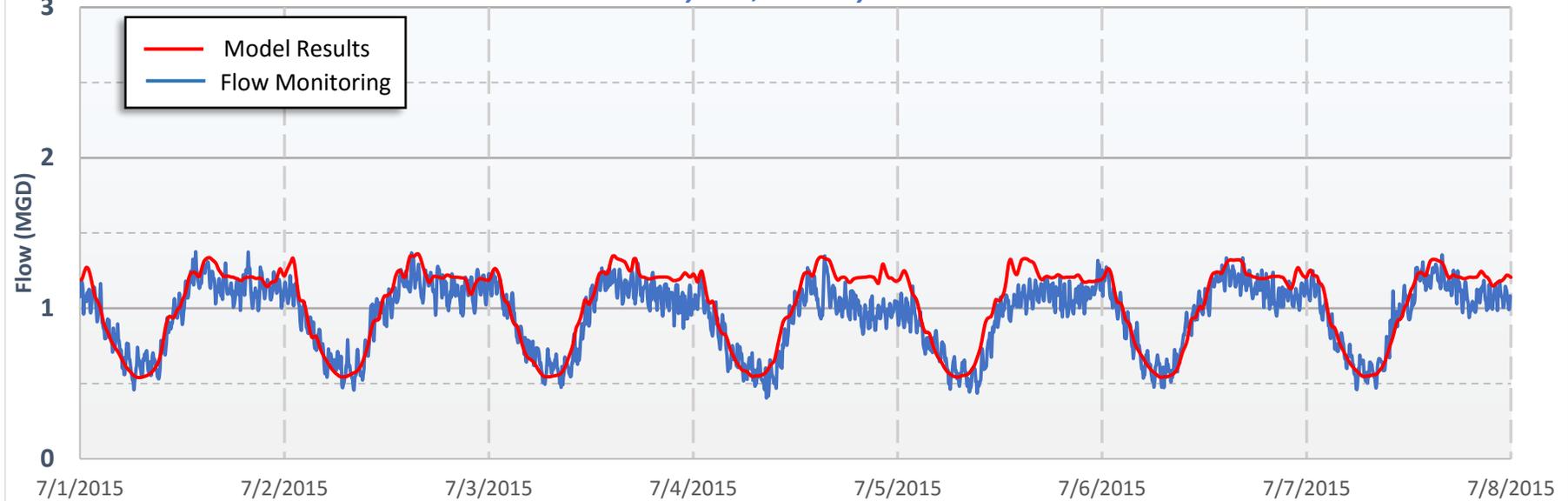


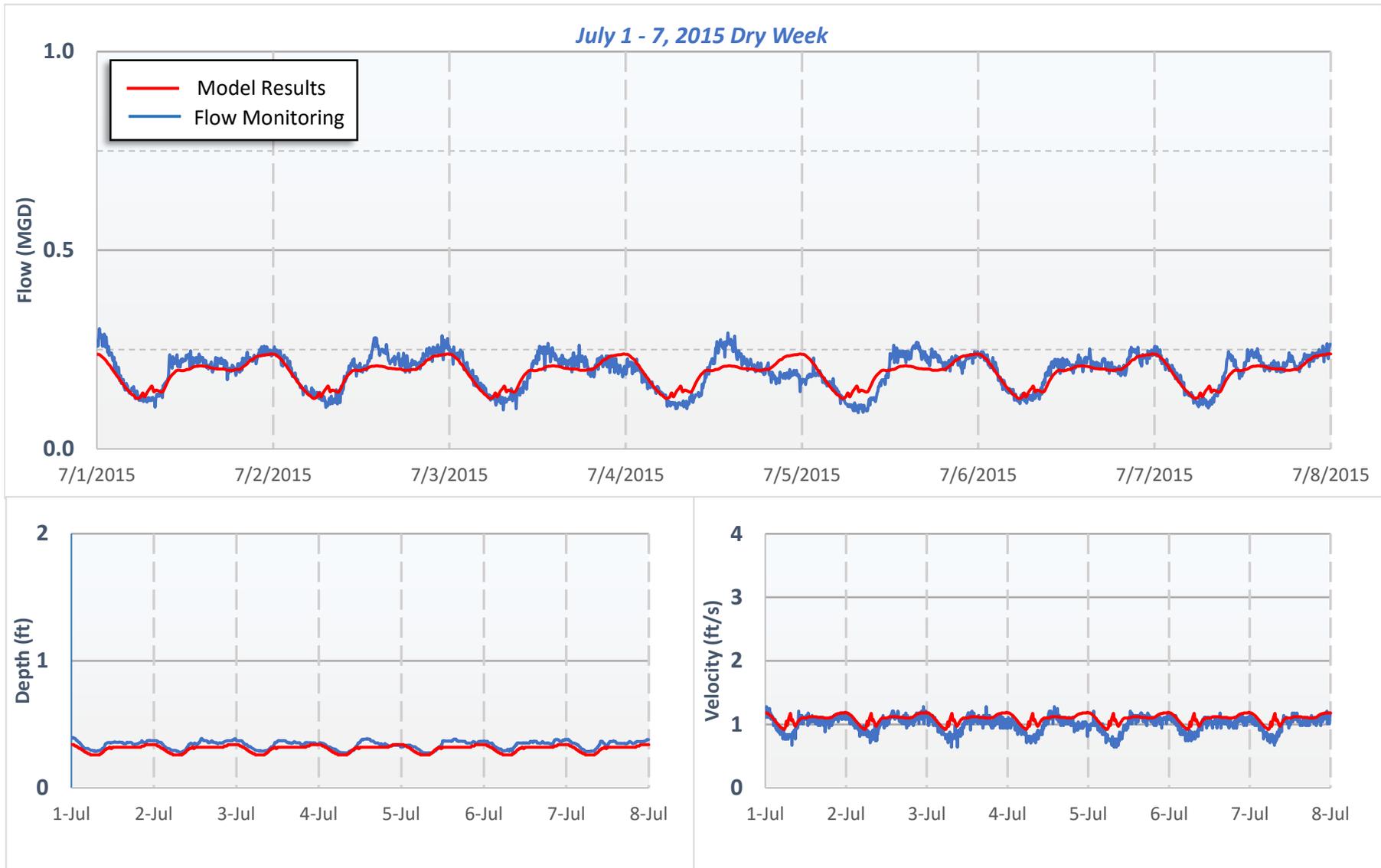
## **APPENDIX P**

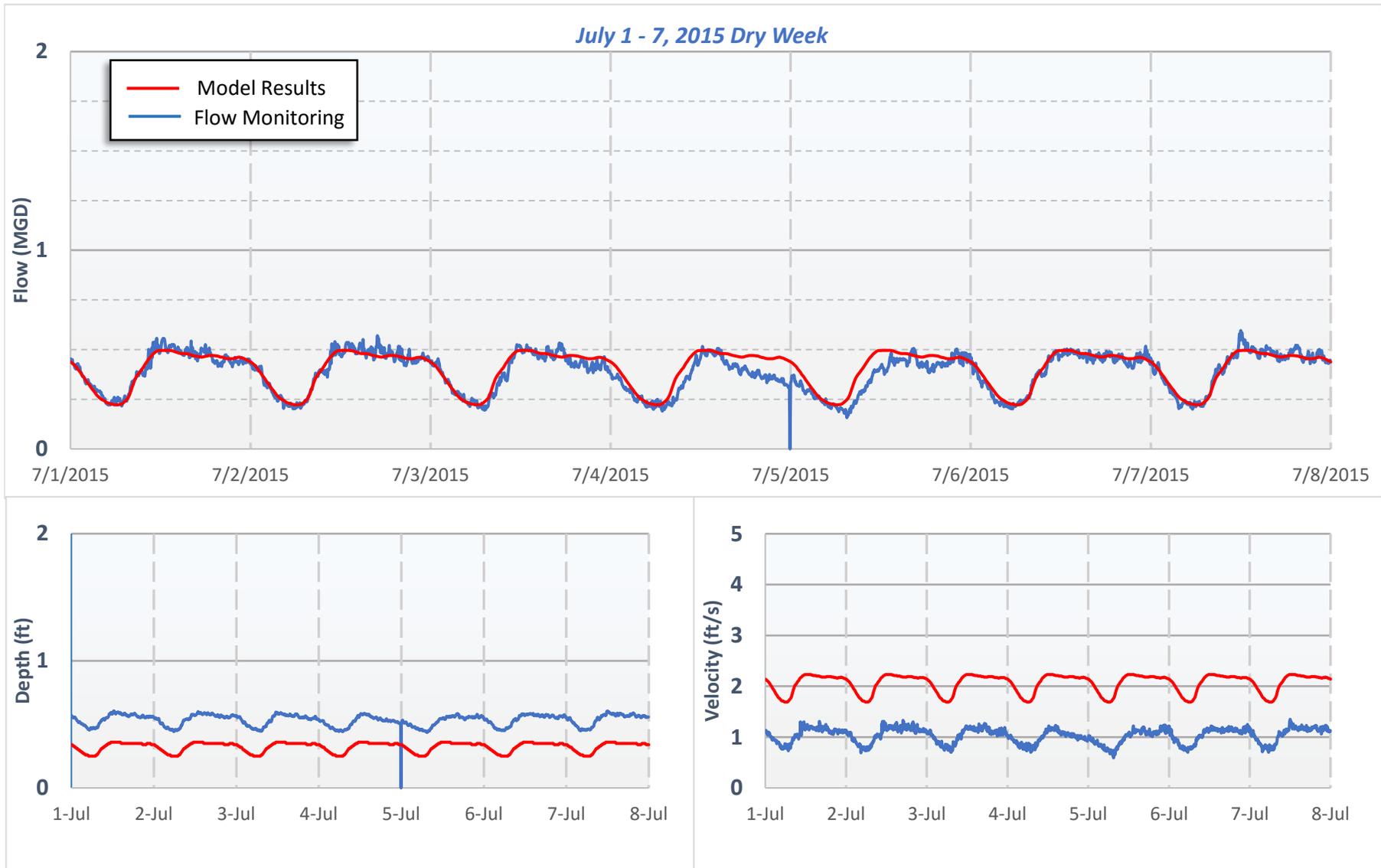
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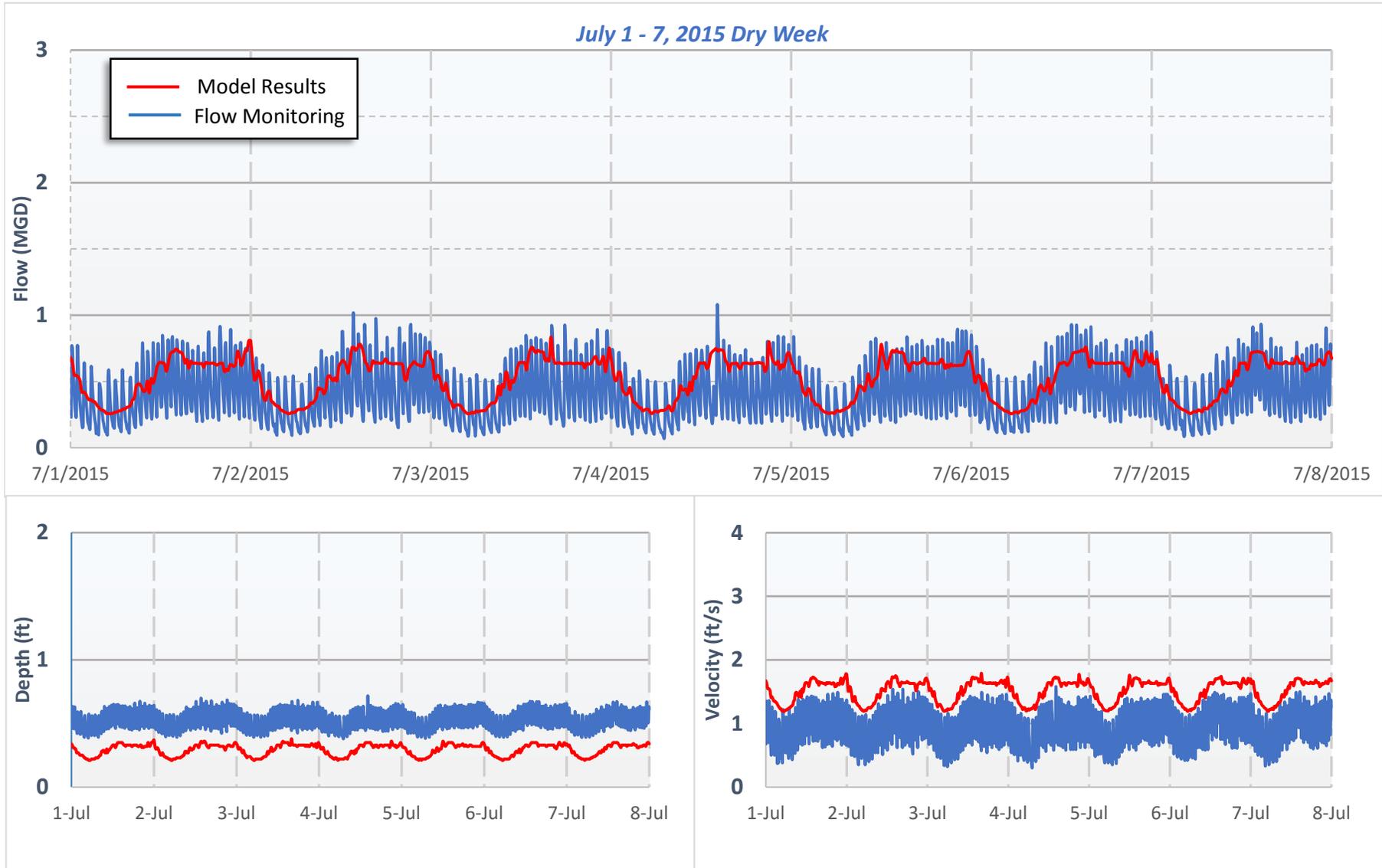


*July 1 - 7, 2015 Dry Week*



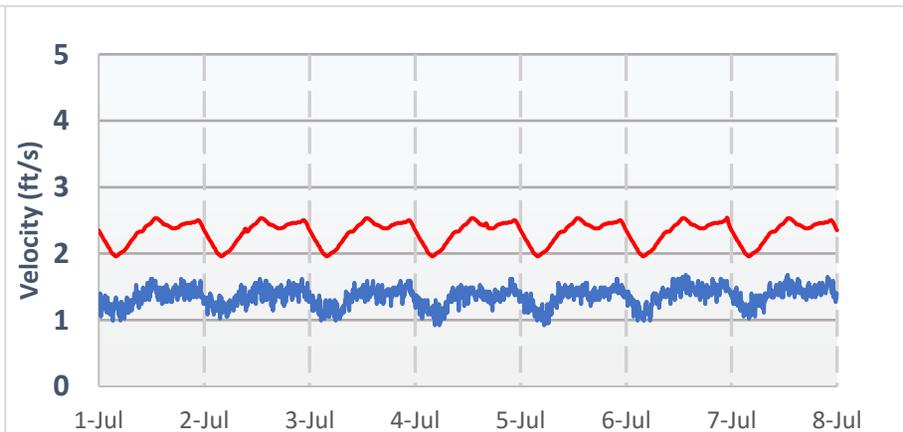
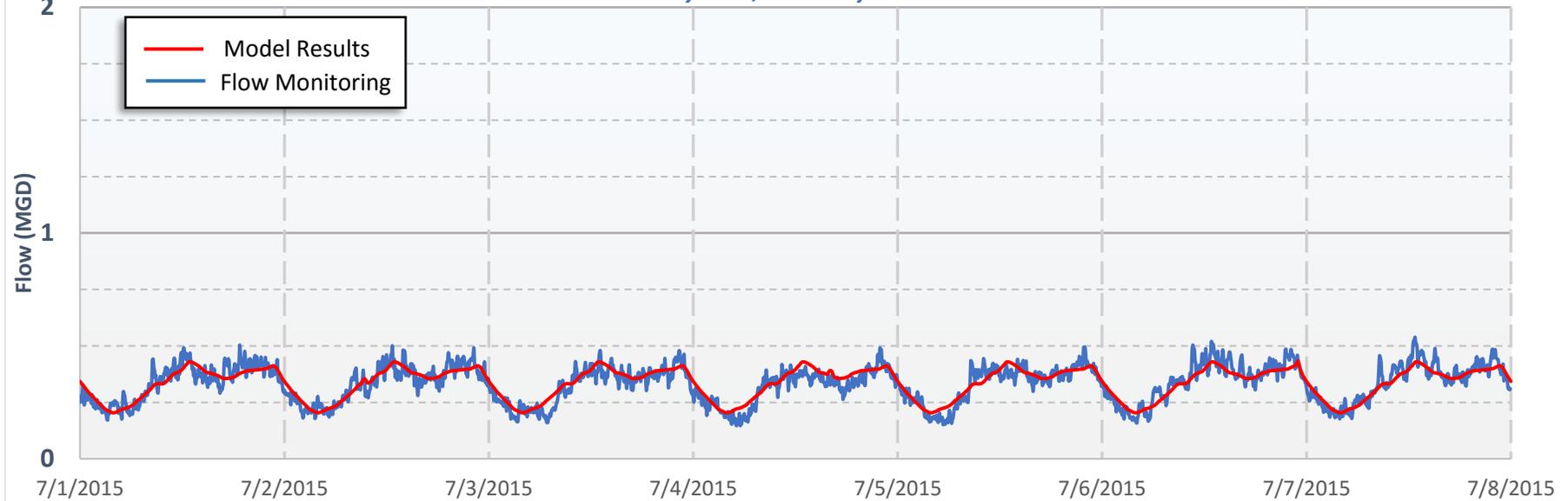


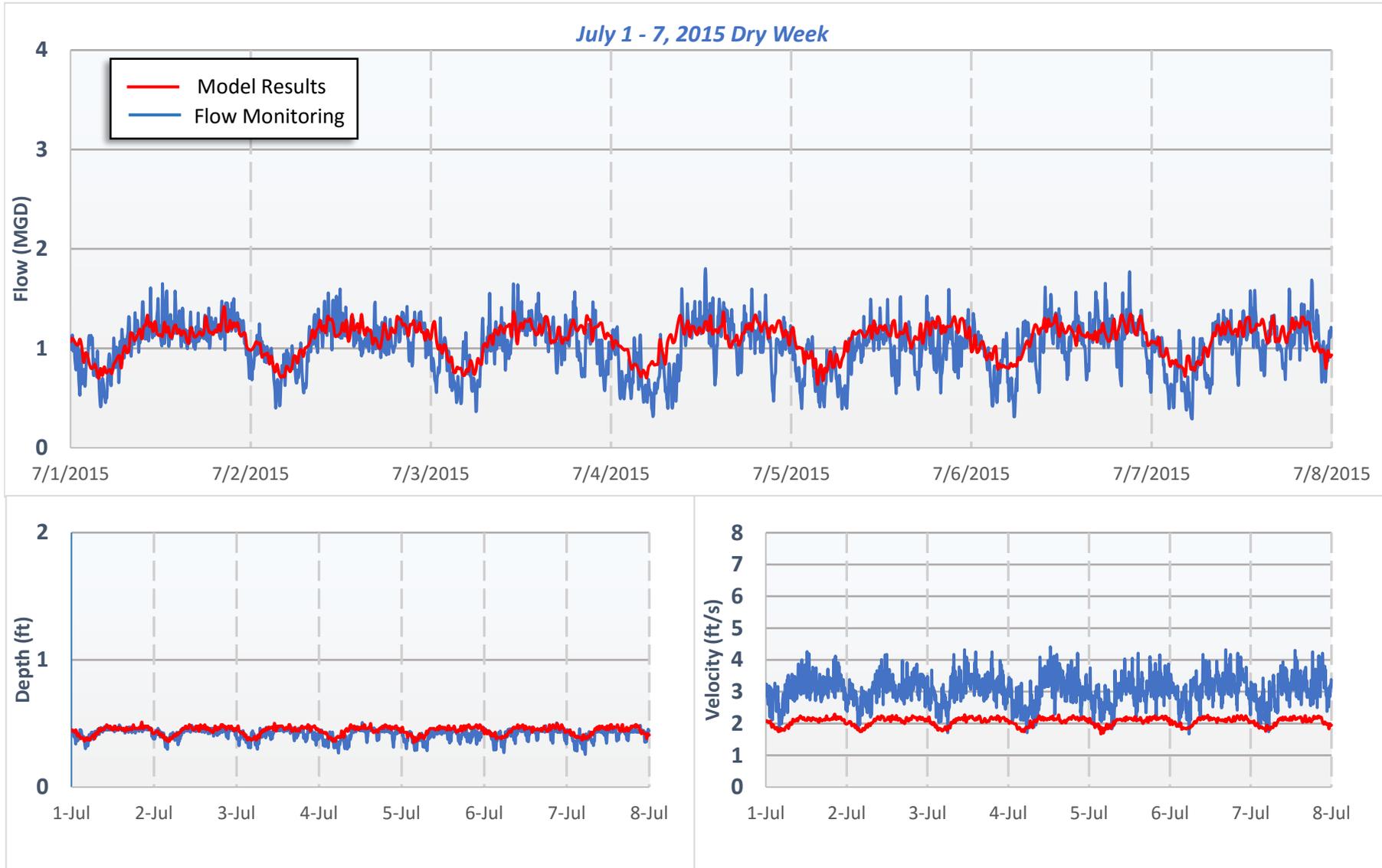


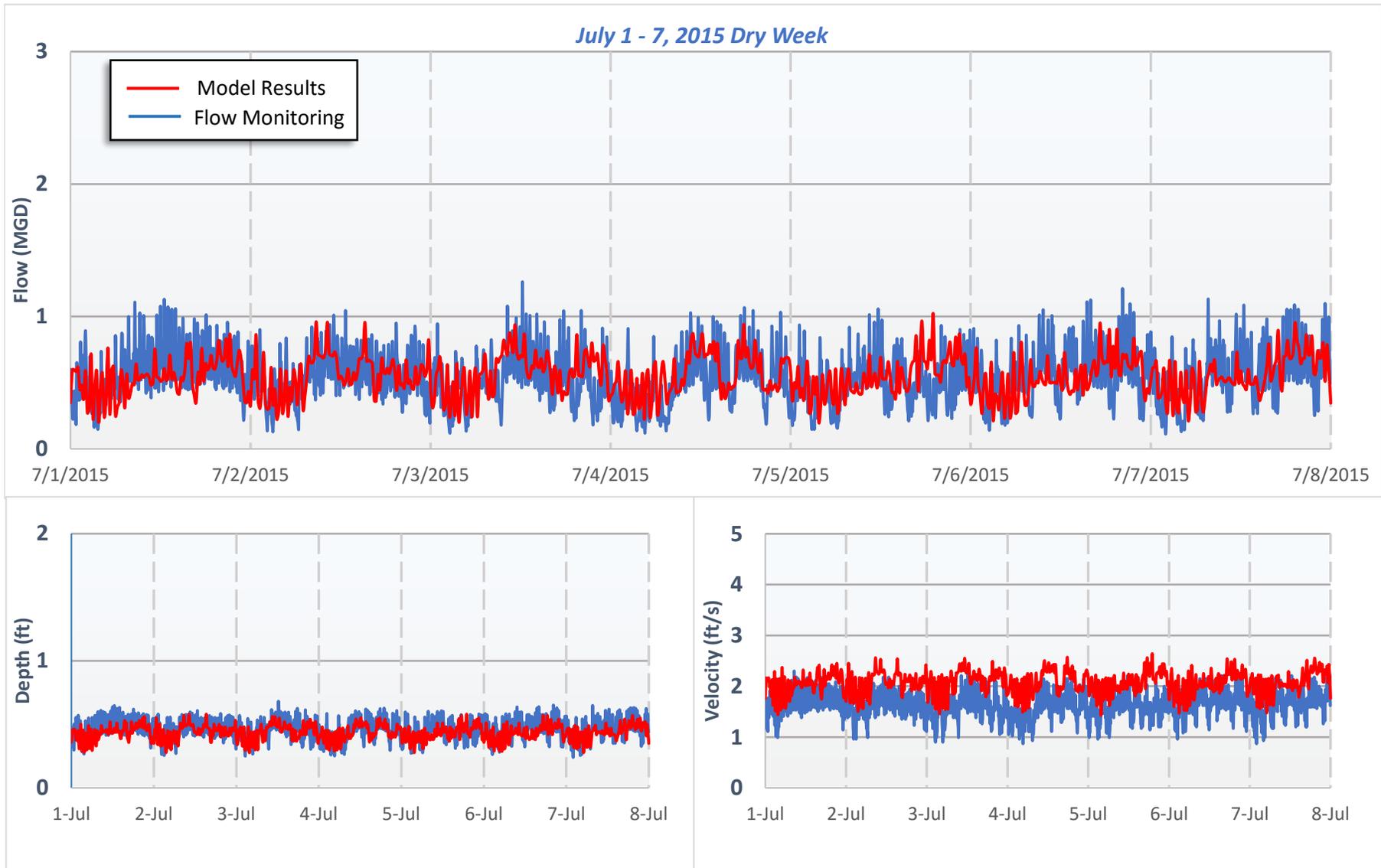




*July 1 - 7, 2015 Dry Week*





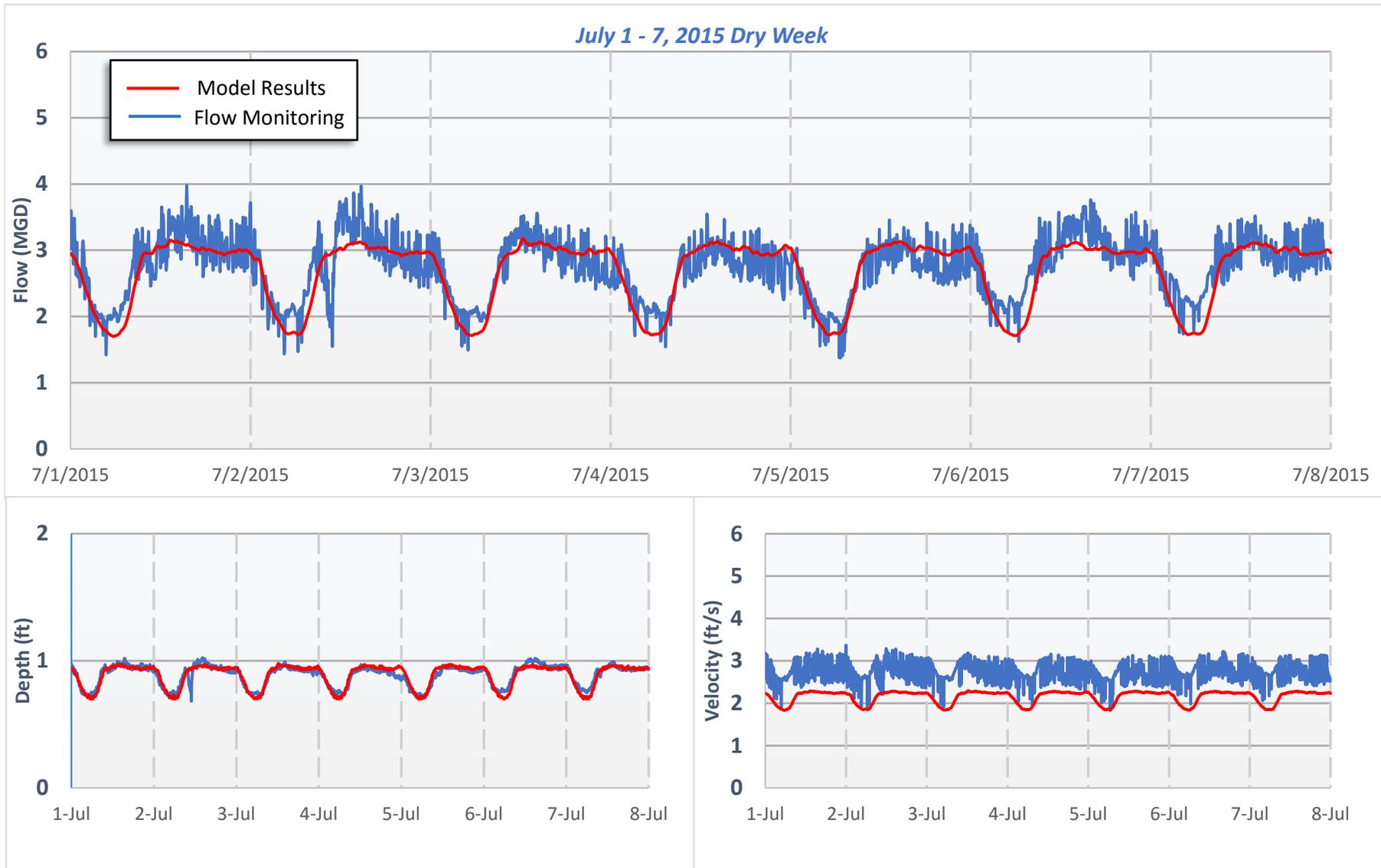


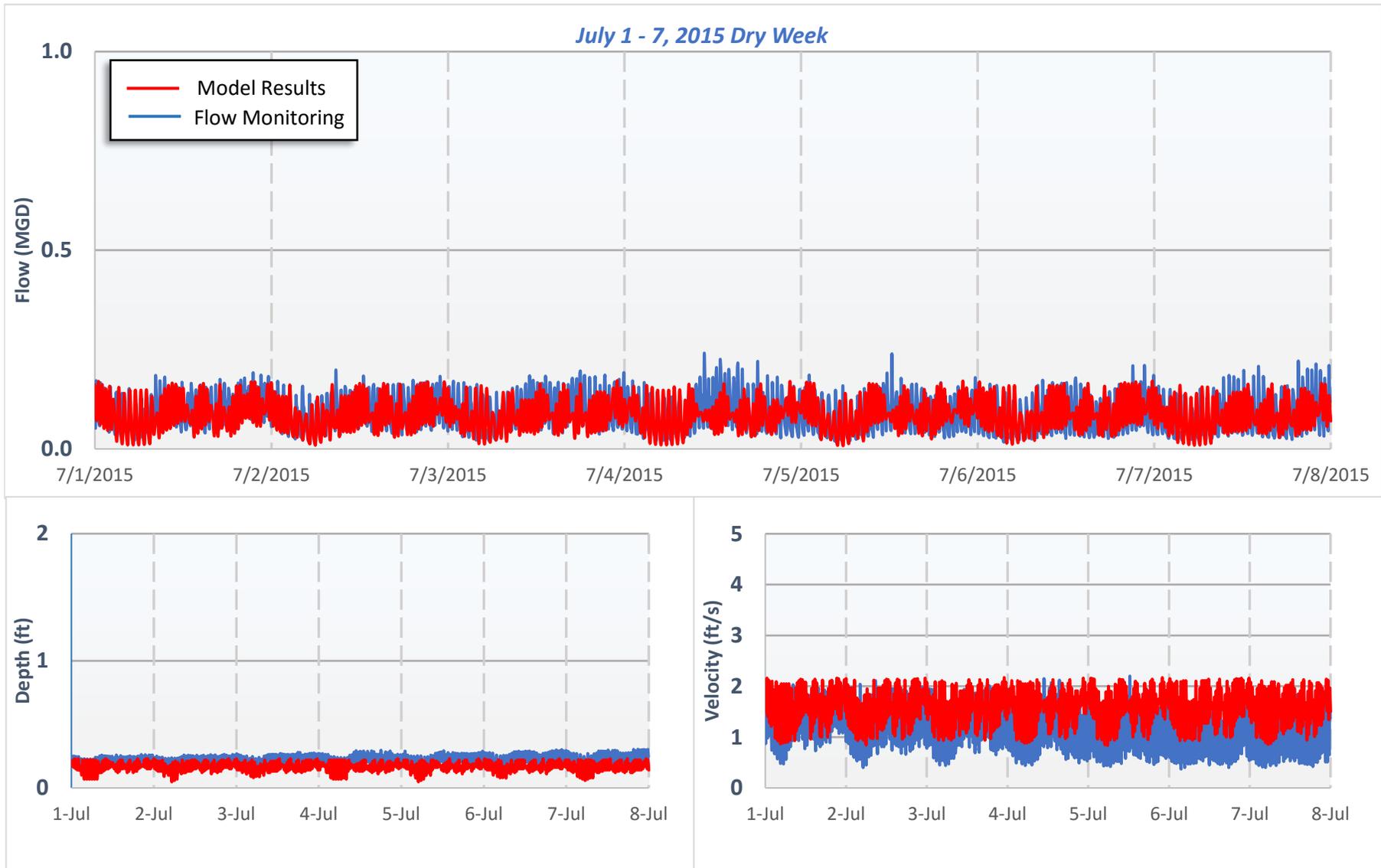
# City of Huntsville

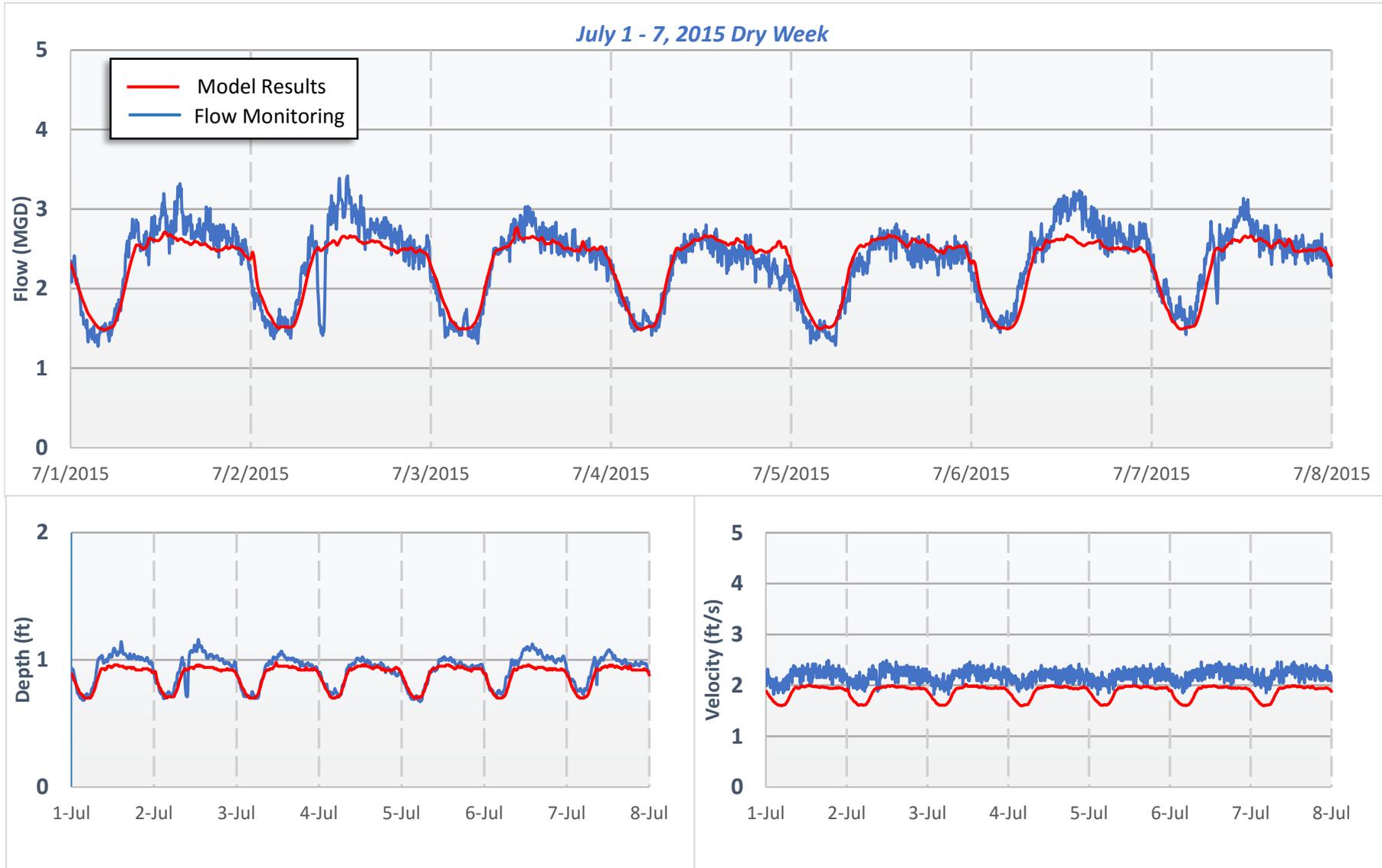
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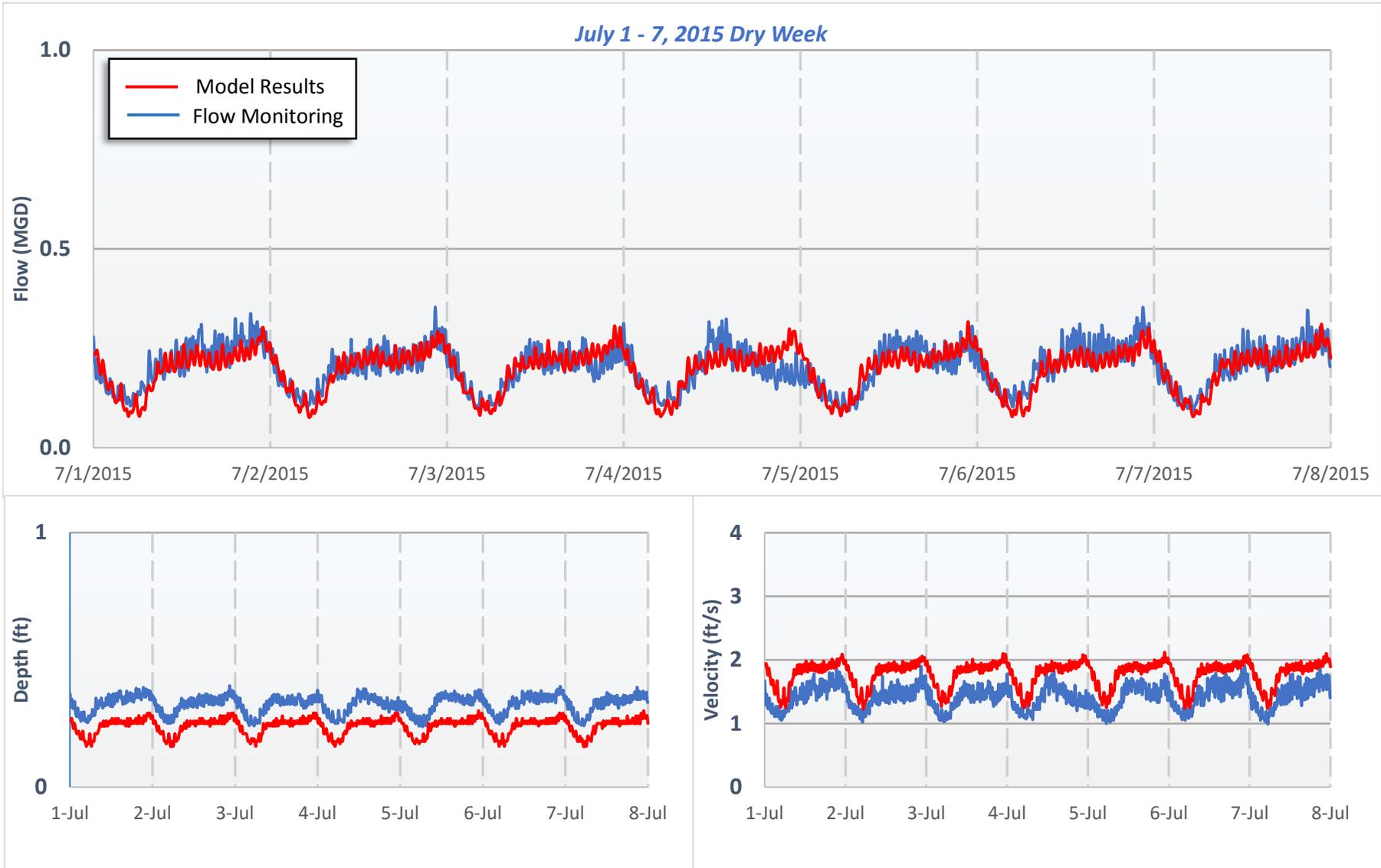


*Flow Monitor ID: AJ-08*









# City of Huntsville

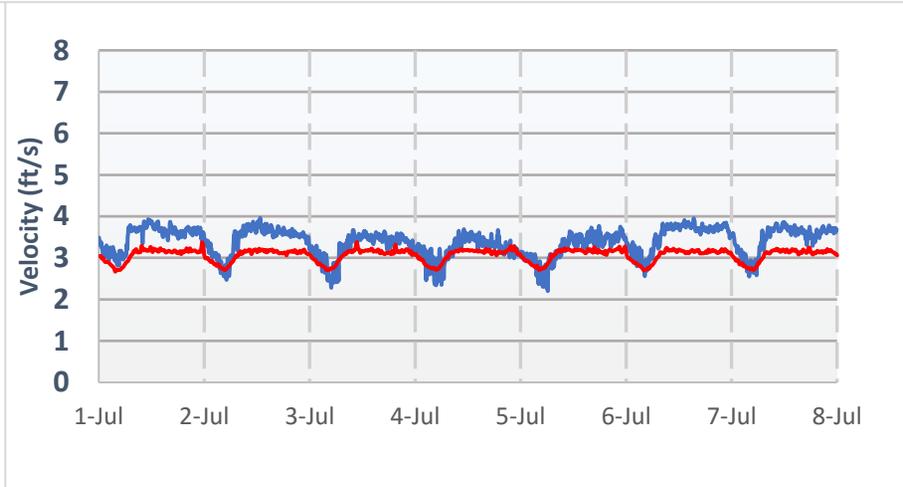
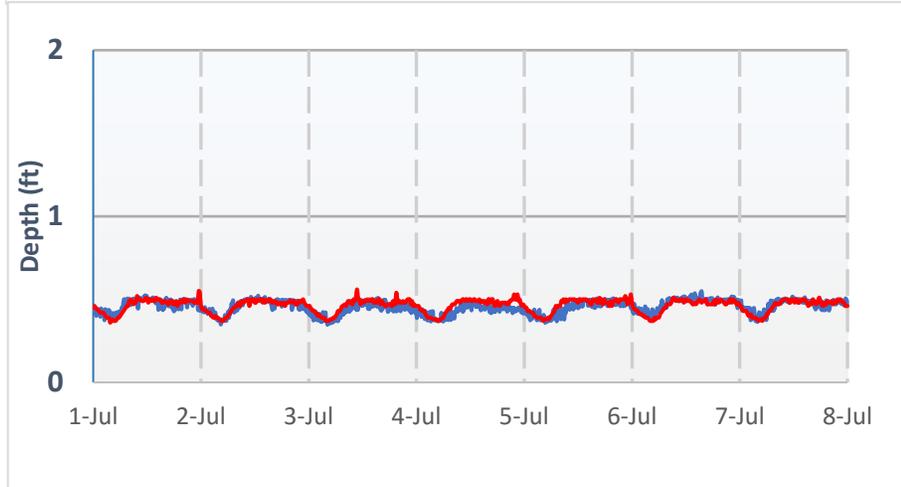
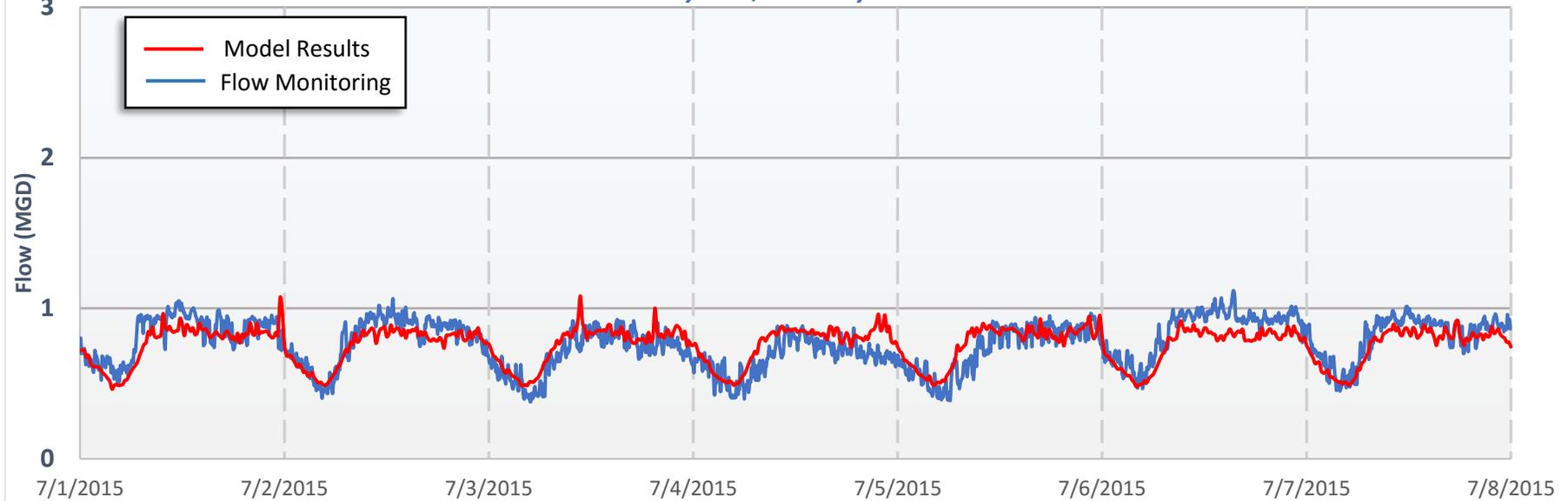
## Wastewater Condition and Capacity Assessment Study

### Dry Weather Calibration

*Flow Monitor ID: AJ-12*

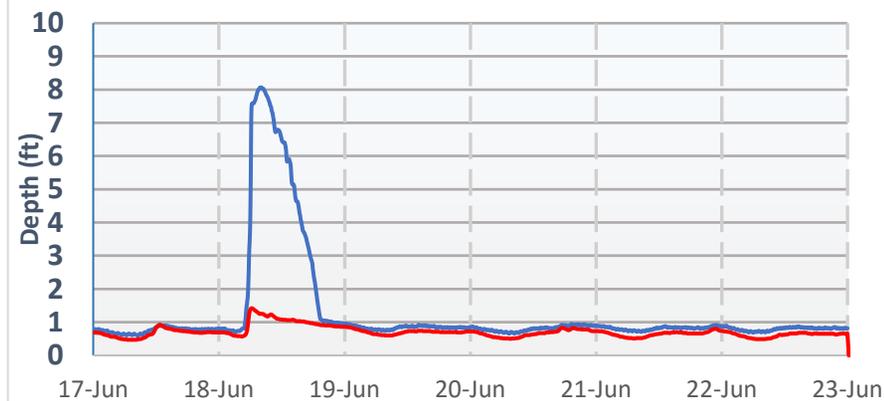
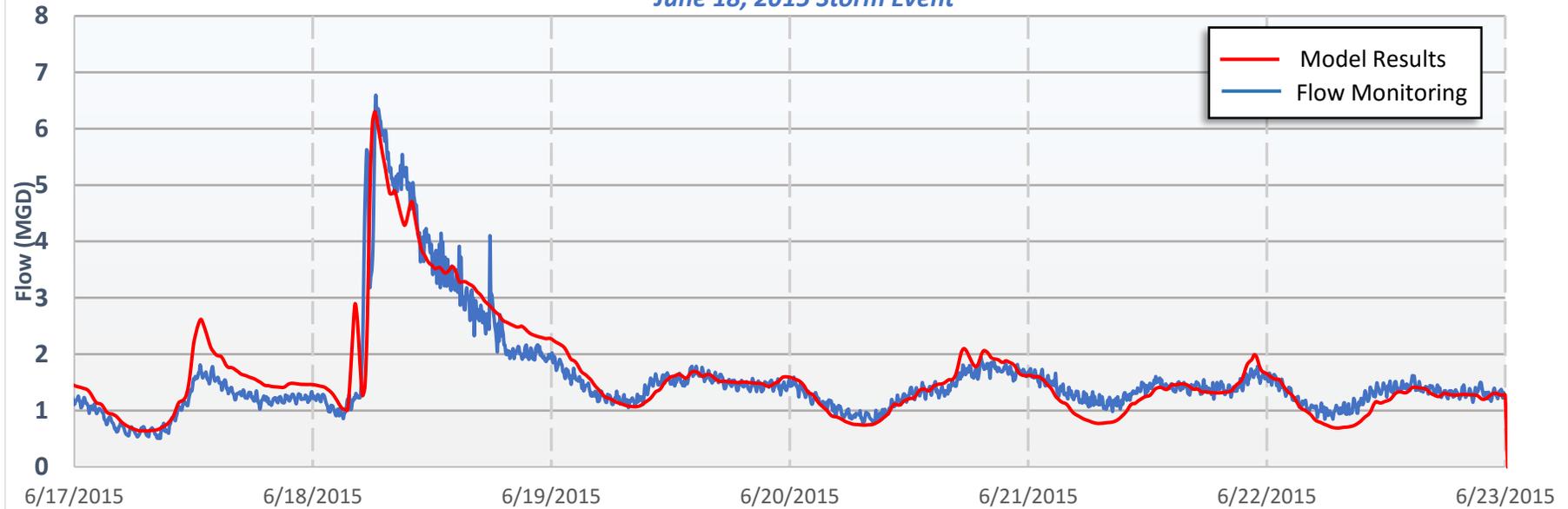


*July 1 - 7, 2015 Dry Week*



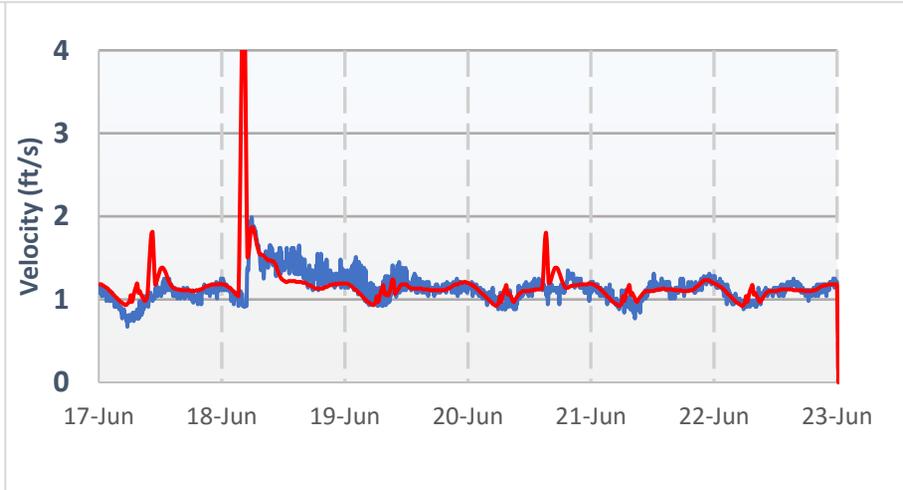
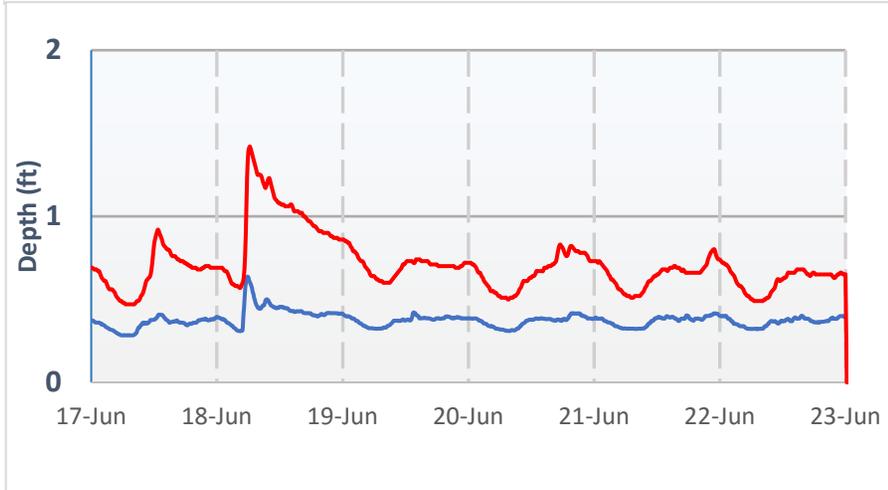
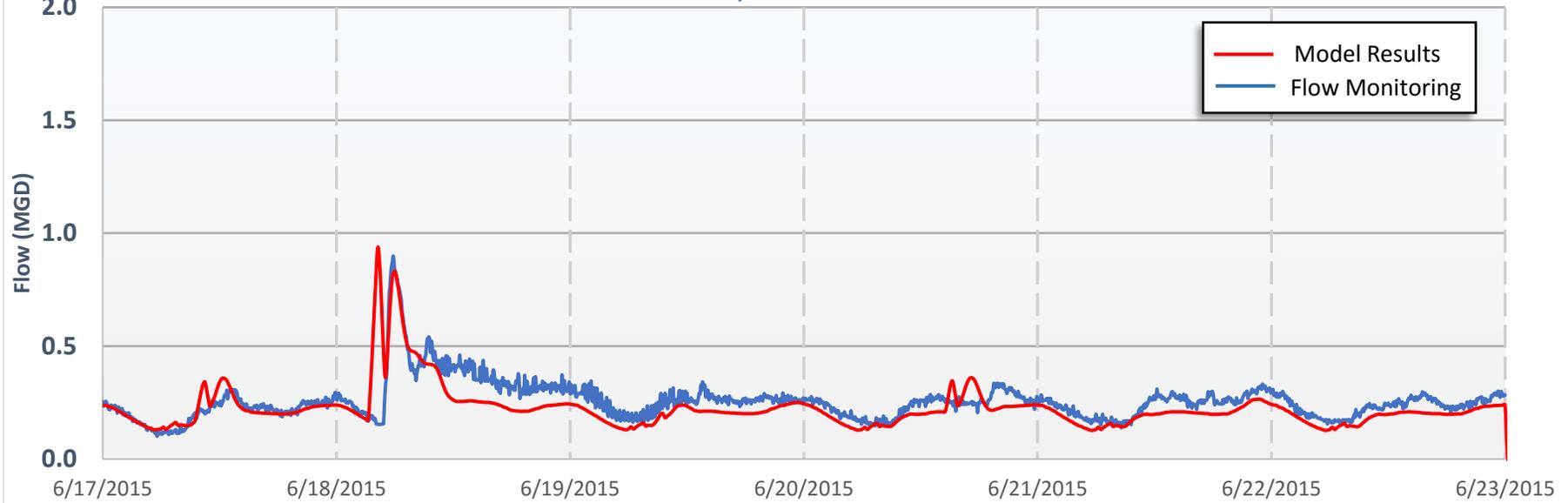
*Flow Monitor ID: RC-01*

*June 18, 2015 Storm Event*





*June 18, 2015 Storm Event*

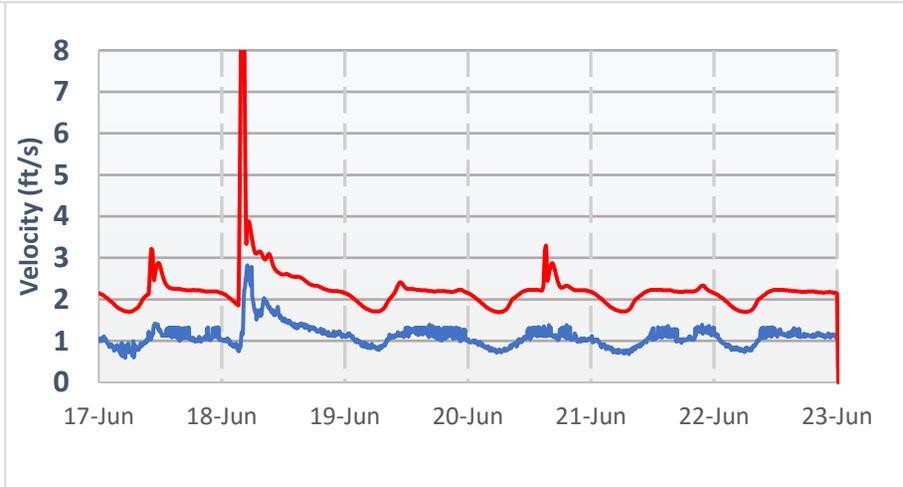
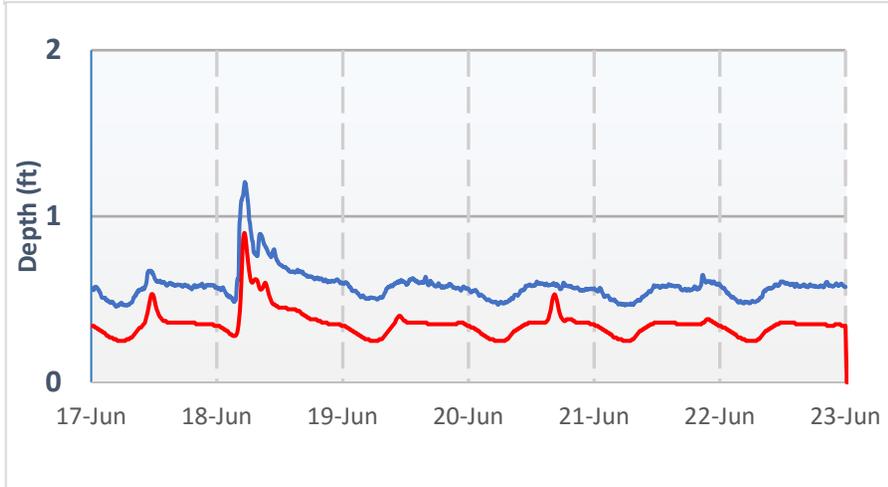
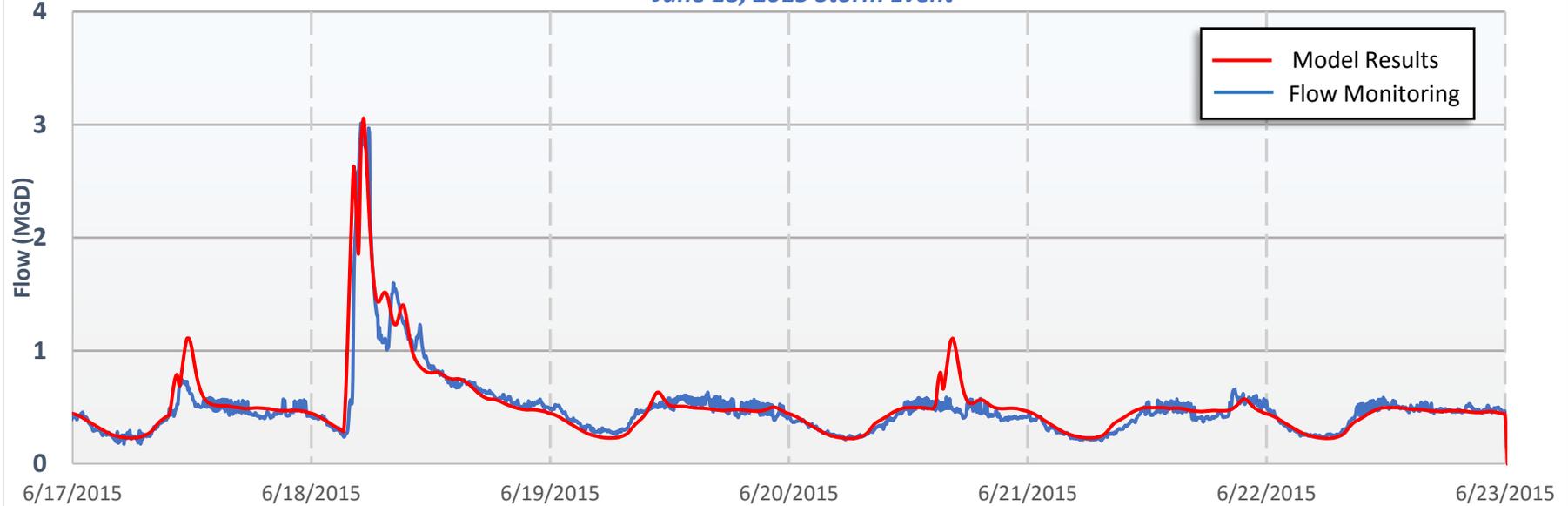


## Wastewater Condition and Capacity Assessment Study Wet Weather Calibration

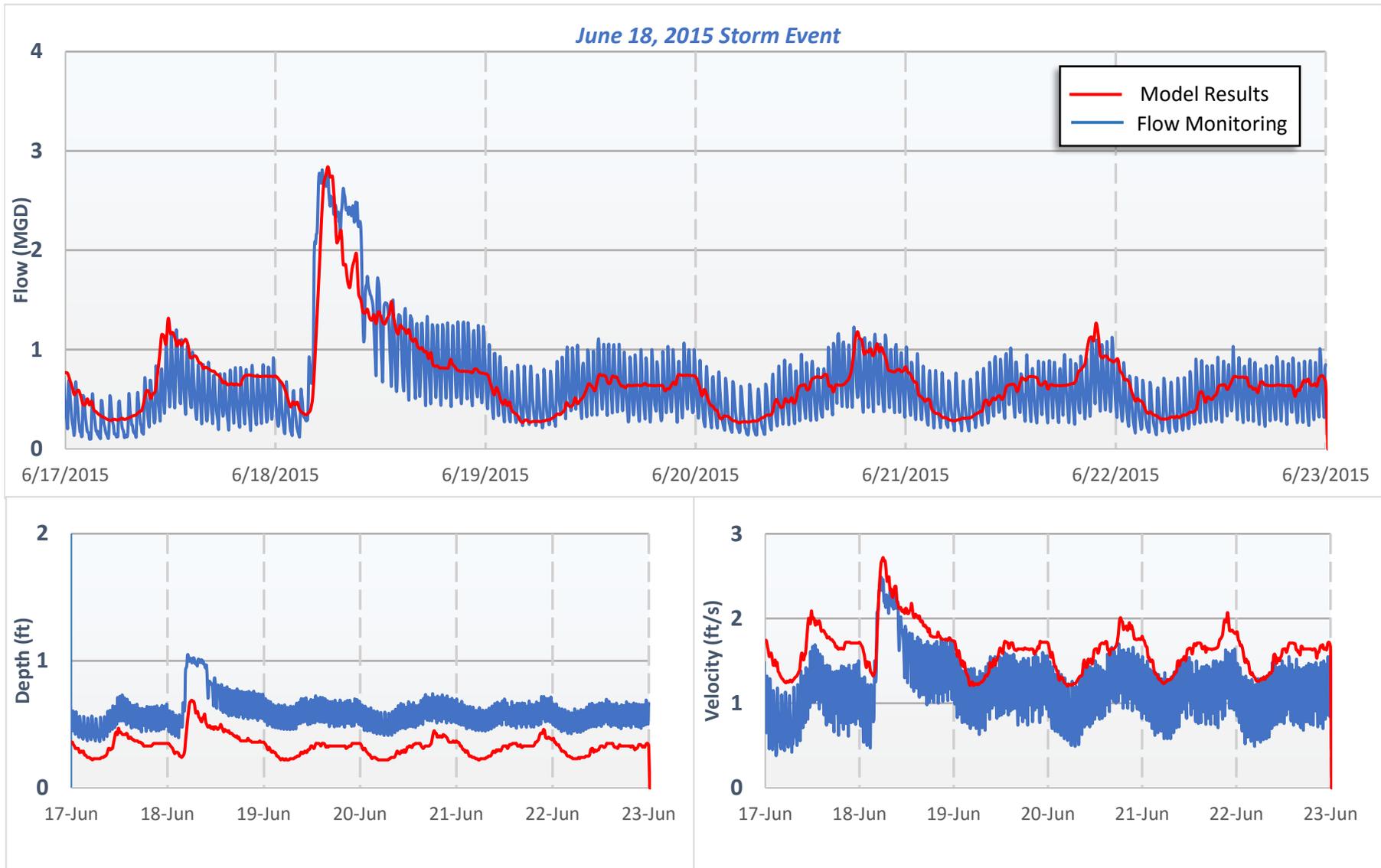
Flow Monitor ID: RC-03



June 18, 2015 Storm Event

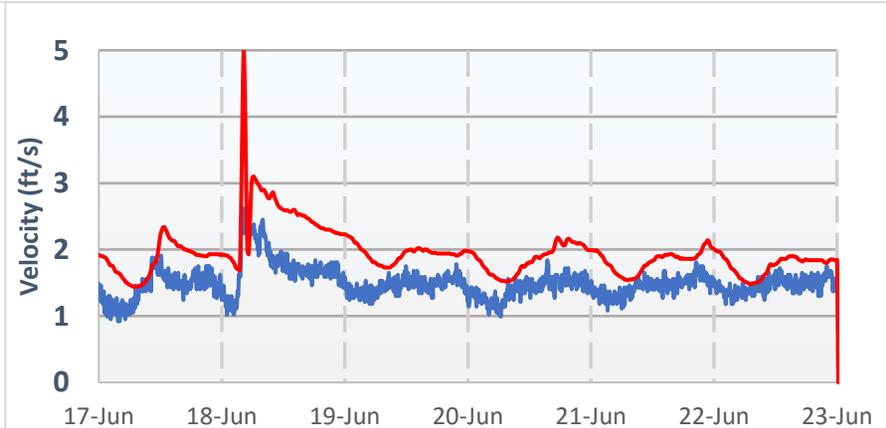
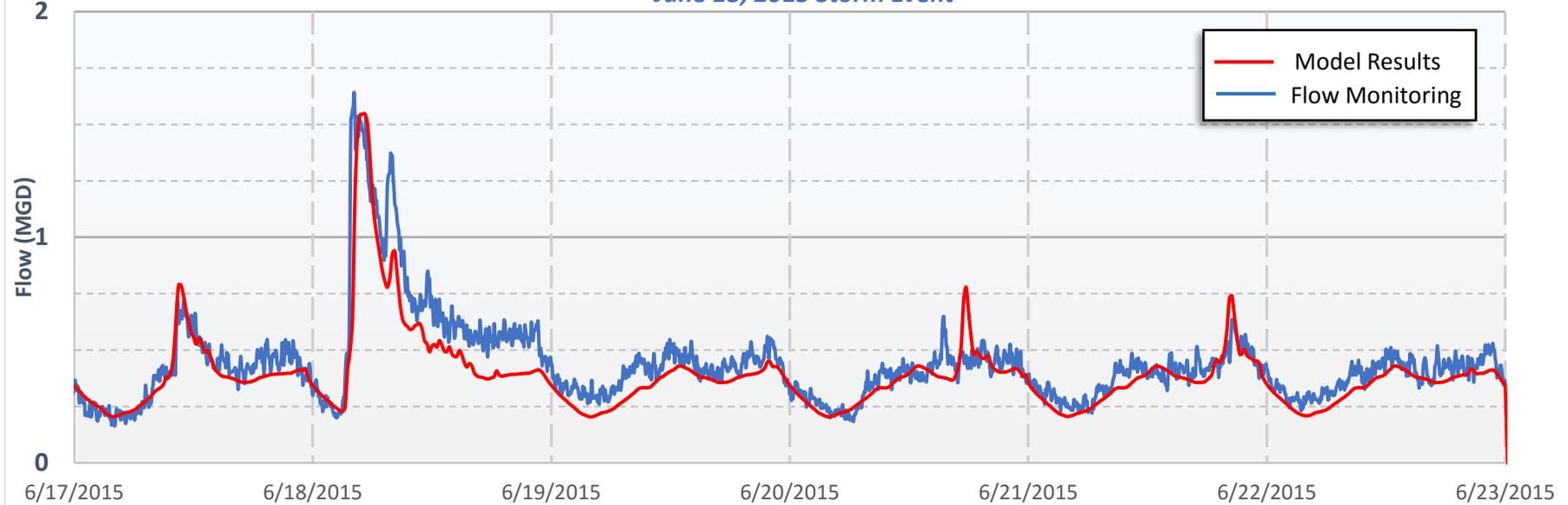


*Flow Monitor ID: RC-04*





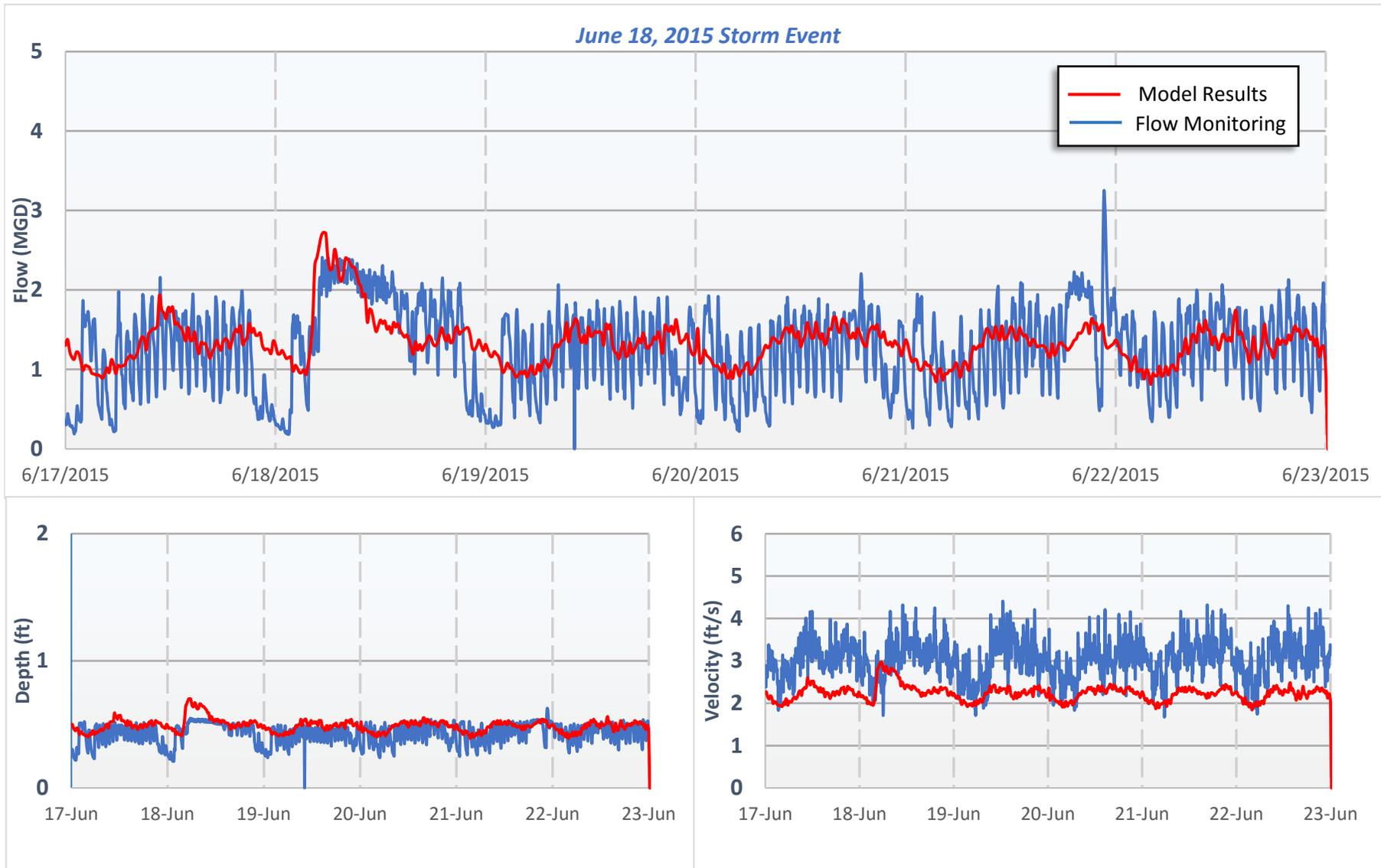
*June 18, 2015 Storm Event*



## Wastewater Condition and Capacity Assessment Study Wet Weather Calibration



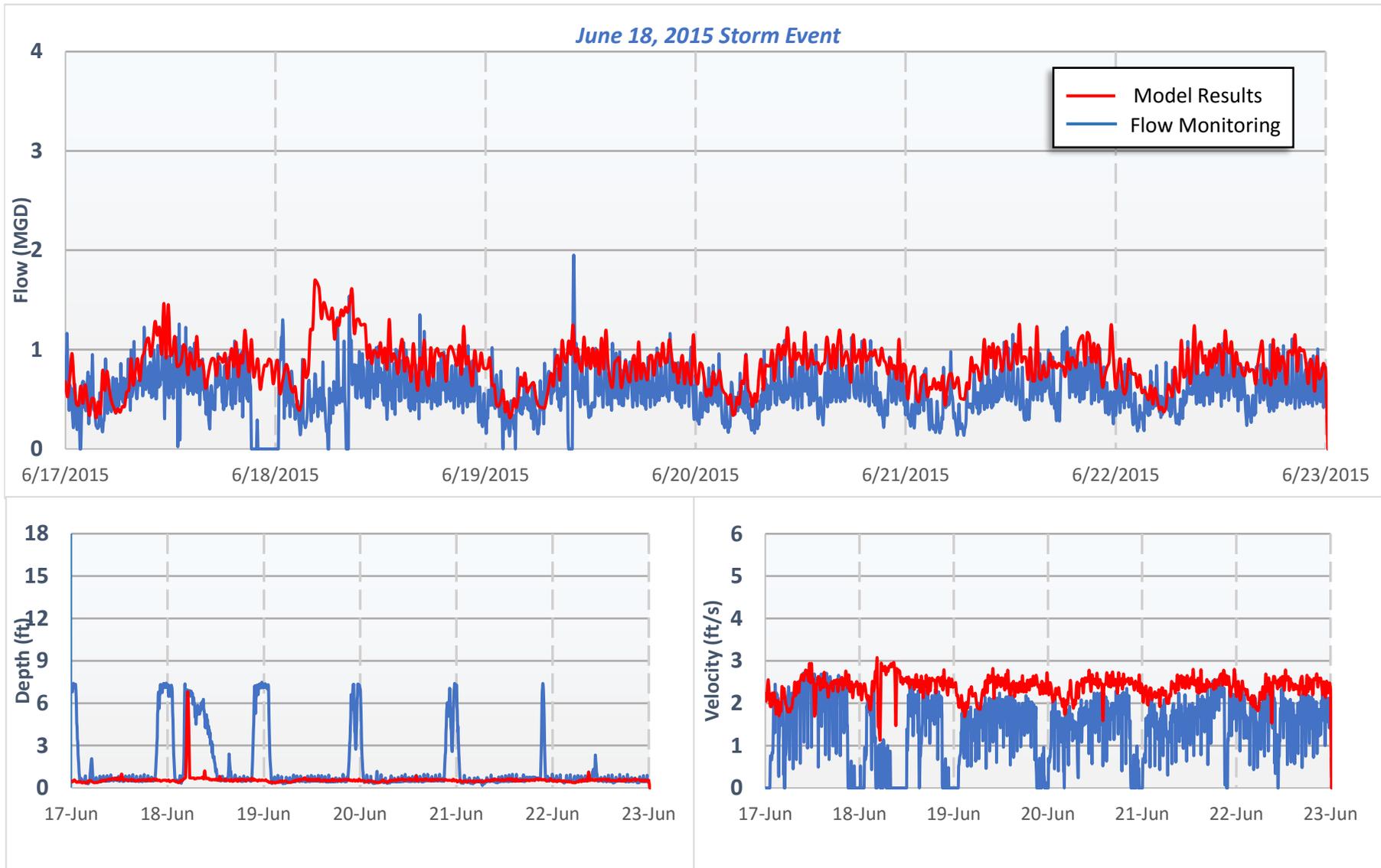
*Flow Monitor ID: NB-06*



## Wastewater Condition and Capacity Assessment Study Wet Weather Calibration



*Flow Monitor ID: NB-07*

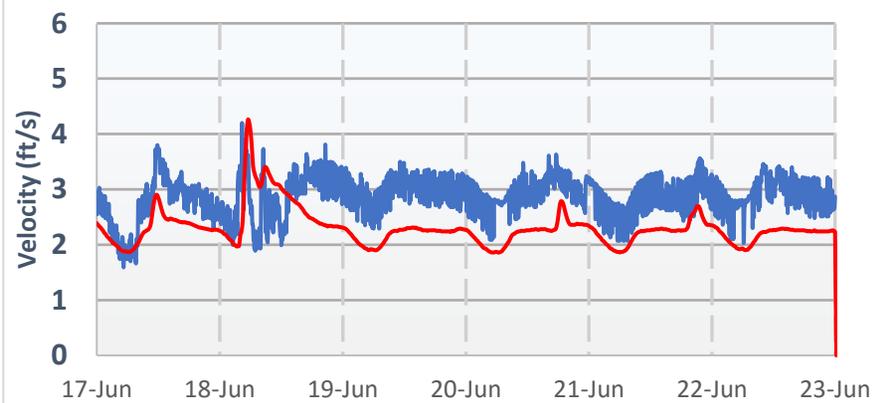
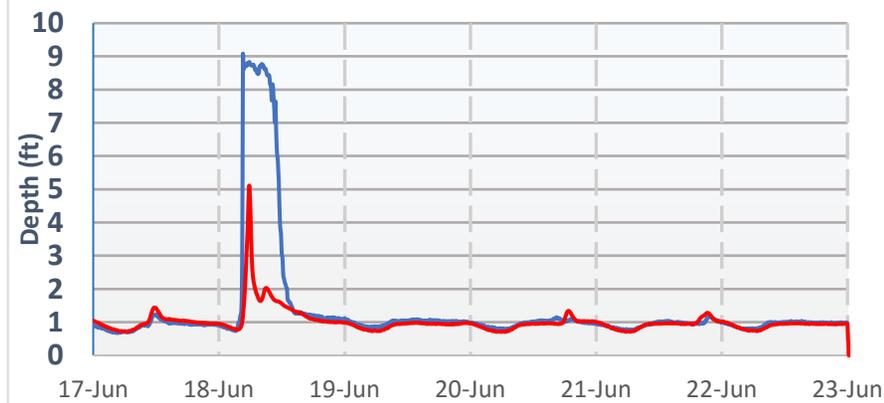
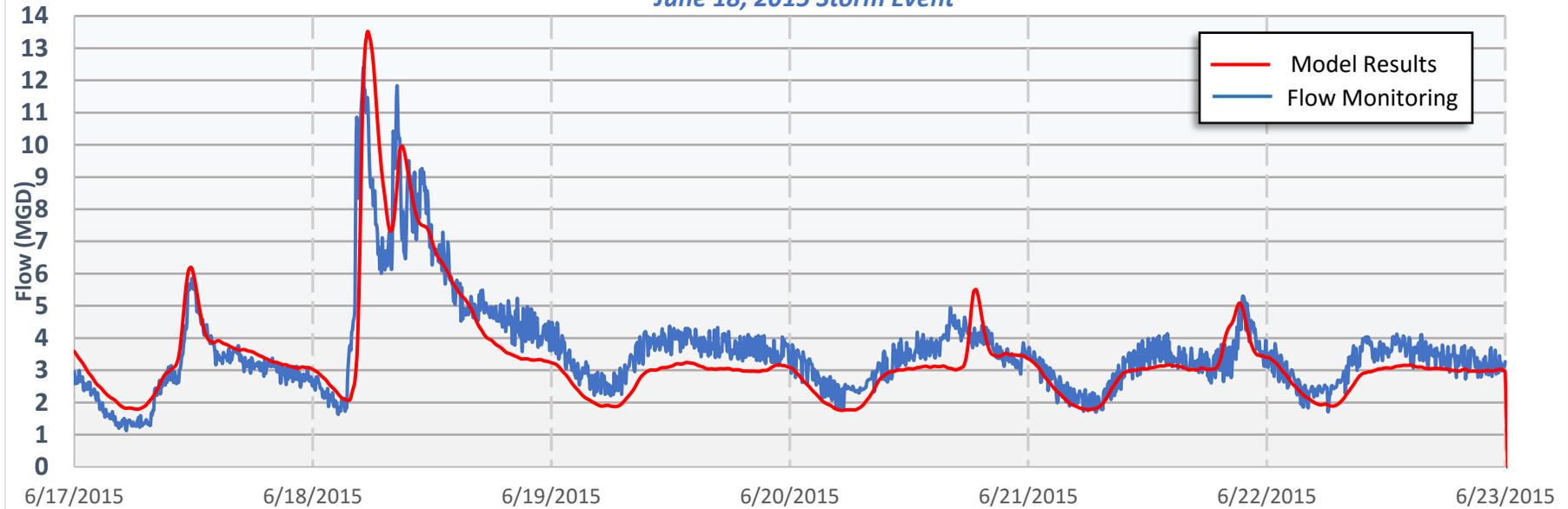


## Wastewater Condition and Capacity Assessment Study Wet Weather Calibration



*Flow Monitor ID: AJ-08*

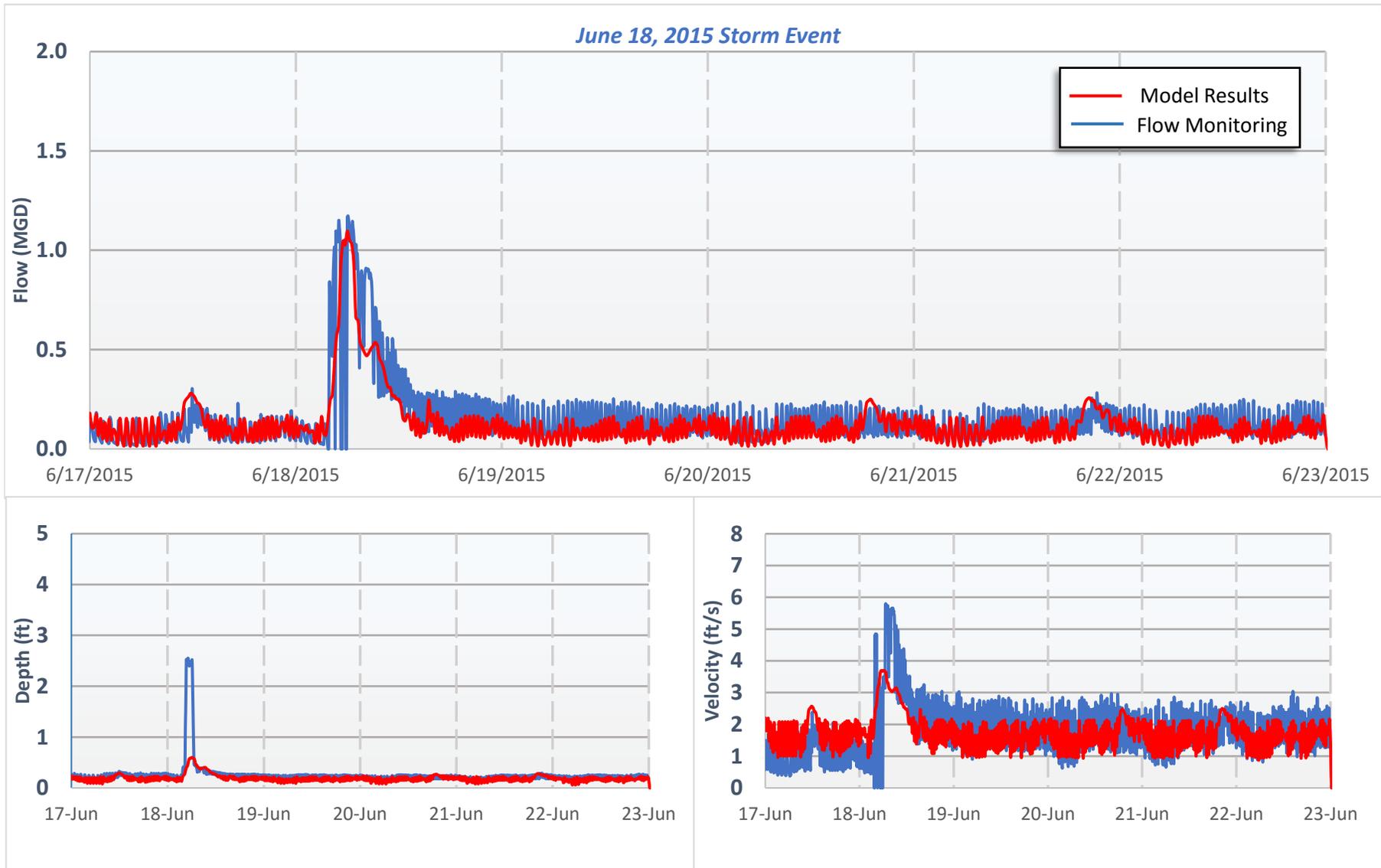
*June 18, 2015 Storm Event*



## Wastewater Condition and Capacity Assessment Study Wet Weather Calibration



*Flow Monitor ID: AJ-09*

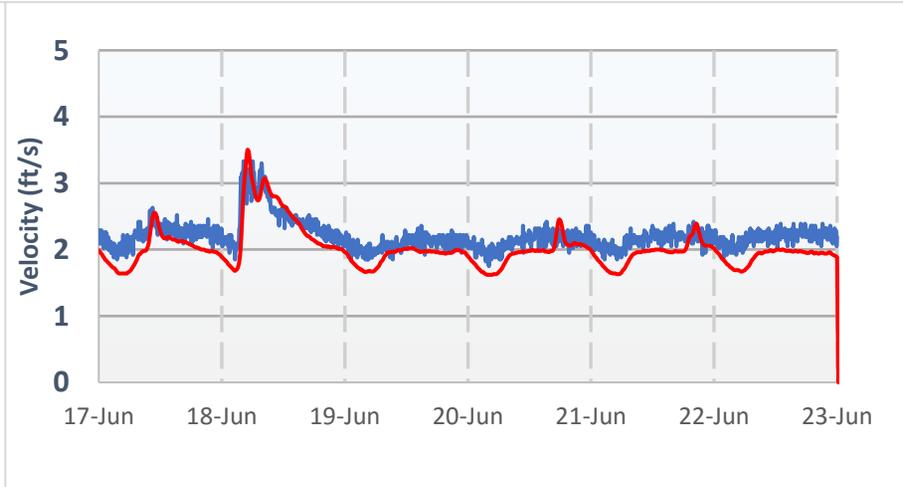
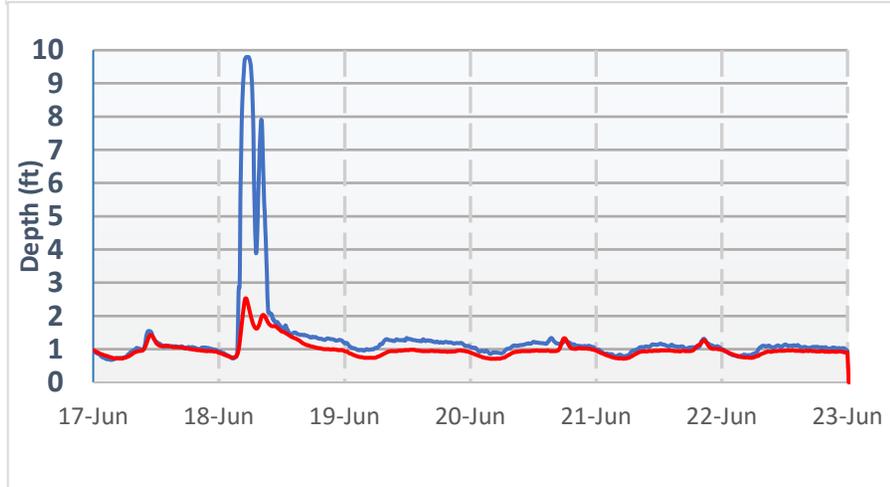
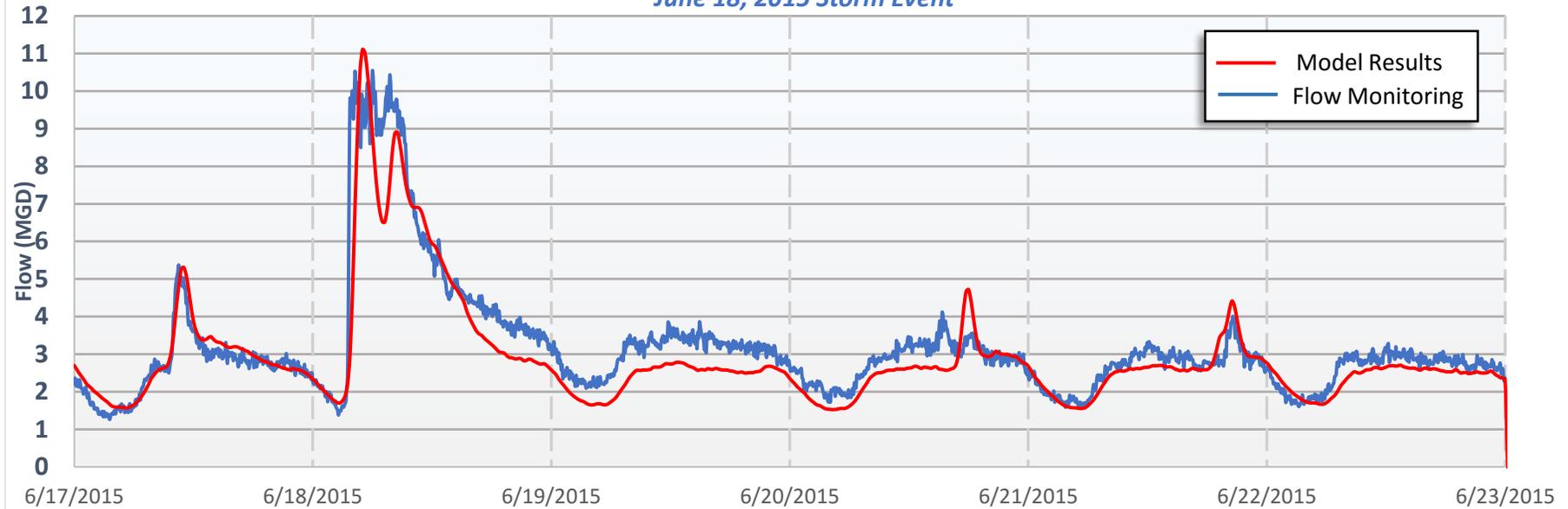


## Wastewater Condition and Capacity Assessment Study Wet Weather Calibration

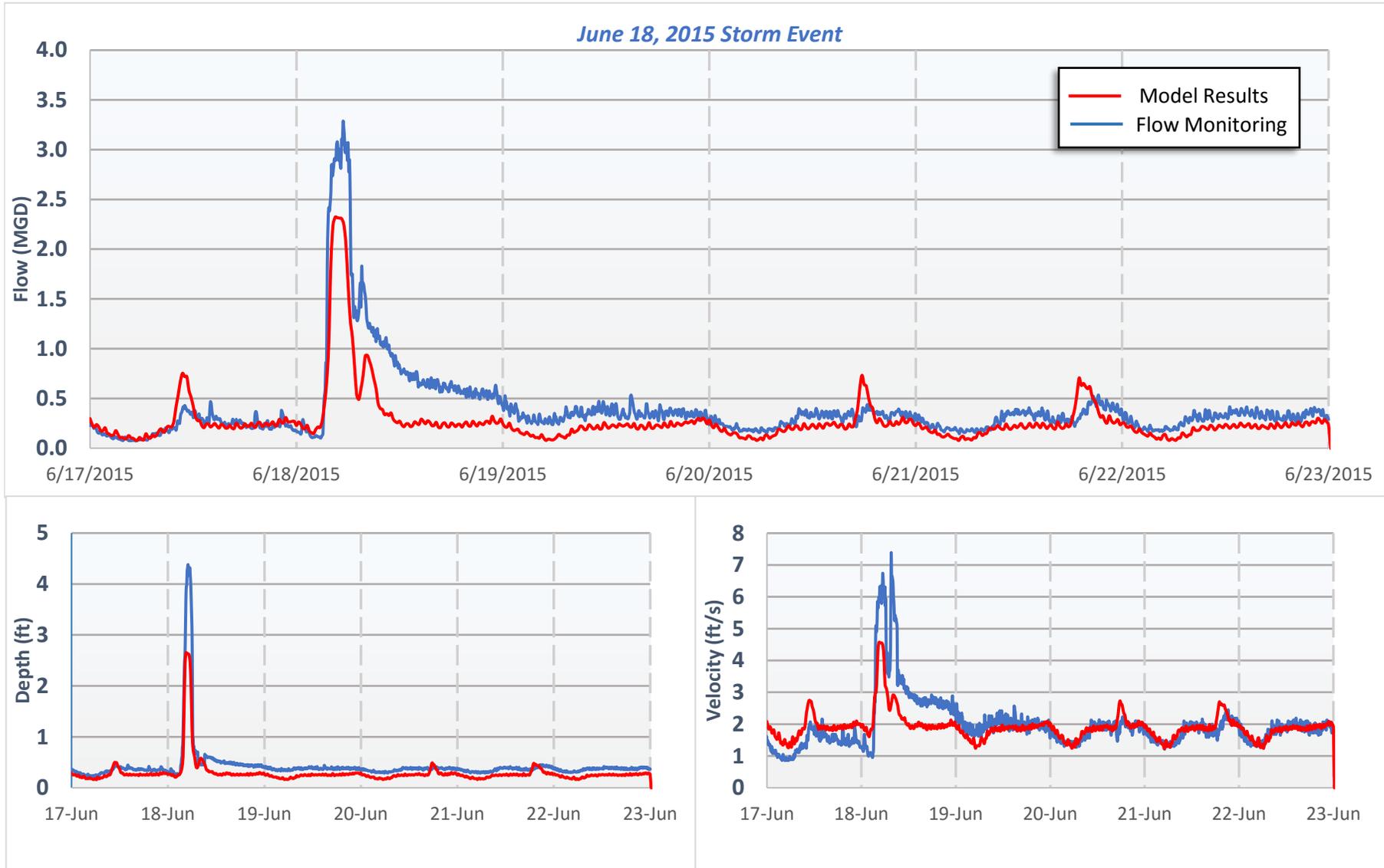


*Flow Monitor ID: AJ-10*

*June 18, 2015 Storm Event*



*Flow Monitor ID: AJ-11*



## Wastewater Condition and Capacity Assessment Study Wet Weather Calibration



*Flow Monitor ID: AJ-12*

