

QUARTERLY REPORT
JULY 1 – SEPTEMBER 30, 2023



Hampton Roads Sanitation District

1434 Air Rail Avenue

Virginia Beach, VA 23455

November 28, 2023

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1. Introduction and Purpose

On September 26, 2007, the Hampton Roads Sanitation District (HRSD) entered into a Special Order by Consent (SOC) with the Virginia Department of Environmental Quality (DEQ) and thirteen (13) area Localities for the purpose of resolving certain alleged violations of environmental laws and regulations related to Sanitary Sewer Overflows (SSOs). On February 23, 2010, HRSD entered into an Amended Consent Decree (“Consent Decree”) with the United States of America and the Commonwealth of Virginia for the purpose of fulfilling the objectives of the Clean Water Act and the Virginia State Water Control Law. This Consent Decree has been modified five times by agreement of all parties in 2011, 2013, 2014, 2017, and 2022. In December 2014, the SOC was eliminated by DEQ and HRSD is no longer under state enforcement. On February 8, 2022, the Fifth Amendment to the Consent Decree was entered.

The Fifth Amendment to the Consent Decree requires:

“HRSD will submit quarterly SSO reports to VADEQ and EPA, in which HRSD will identify all SSOs, SSDs, Prohibited Bypasses, or unauthorized discharges from the HRSD SS System or the HRSD STPs. HRSD will identify those SSOs, SSDs, Prohibited Bypasses, or unauthorized discharges for which it asserts a claim of force majeure. If HRSD asserts a force majeure claim, it shall document the basis for such claim in the quarterly SSO reports. It will pay the associated undisputed stipulated penalties for all SSOs, SSDs, Prohibited Bypasses, or unauthorized discharges for which it did not assert a claim of force majeure within 90 days of the close of each calendar quarter. In addition, HRSD will submit all of HRSD’s post-storm synopses reports for rain events during the quarterly reporting period to VADEQ and EPA as part of the quarterly reports for rain events that satisfy HRSD’s current criteria for publishing a post-storm analysis, i.e.: (a.) one or more rain gauge sites meet a two-year or greater rainfall recurrence interval and at least 50% of sites in any treatment plant service area receive one inch of rainfall or greater; (b.) a rain gauge meets a five-year or greater rainfall recurrence interval; or (c.) a weather-related SSO occurs.”

This quarterly report is submitted pursuant to Section XVII.D of the Consent Decree. HRSD has prepared this quarterly report in accordance with the above requirements to apprise the EPA (representing the United States of America) and the DEQ (representing the Commonwealth of Virginia) of steps taken toward meeting the obligations of the Consent Decree. Specifically, this quarterly report summarizes all Sanitary Sewer Overflows (SSOs), Sanitary Sewer Discharges (SSDs), Prohibited Bypasses, or unauthorized discharges from the HRSD Sanitary Sewer System or the HRSD Sewage Treatment Plants from July 1, 2023, through September 30, 2023, the associated post-storm synopses reports, claims of force majeure, and undisputed stipulated penalties.

During the reporting period, there were a total of ten (10) SSOs, SSDs, Prohibited Bypasses, and unauthorized discharges from the HRSD SS System or the HRSD STPs. These are summarized in Tables 1 & 2.

2. Claim of Force Majeure

2.1. Sanitary Sewer Overflow

There were five (5) SSOs from the HRSD SS System during the 3-month reporting period. HRSD asserts a force majeure claim for two (2) of the SSOs.

2.1.1. Basis of Claim

A description of the circumstances supporting a claim of force majeure is included in Table 1.

2.2. Unusual Discharges (Sanitary Sewer Discharge, Prohibited Bypasses, Unauthorized Discharge)

There were five (5) unusual discharges from the HRSD SS System or the HRSD STPs during the 3-month reporting period. HRSD asserts a force majeure claim for three (3) Unusual Discharges that were non potable water or final effluent.

2.2.1. Basis of Claim

A description of the circumstances supporting a claim of force majeure is included in Table 2.

3. Undisputed Stipulated Penalties

3.1. Sanitary Sewer Overflow

There were five (5) SSOs from the HRSD SS System during the 3-month reporting period. HRSD will pay undisputed stipulated penalties in the amount of \$5,550 for three (3) SSOs.

3.1.1. Basis of Undisputed Stipulated Penalties

Calculation of undisputed stipulated penalties is outlined in Section XX “Stipulated Penalties” paragraph 110 of the Consent Decree. The calculated stipulated penalties are shown in Table 1.

<u>Volume of the SSD or Prohibited Bypass</u>	<u>Penalty from the date of entry</u>
Less than 100 gallons	\$ 100
100 to 2,499 gallons	\$ 750
2,500 to 9,999 gallons	\$ 1,250
10,000 to 99,999 gallons	\$ 4,700
100,000 to 999,999 gallons	\$ 10,000
1,000,000 gallons or greater	\$ 15,000

3.2. Unusual Discharges (Sanitary Sewer Discharge, Prohibited Bypasses, Unauthorized Discharge)

There were five (5) unusual discharges from the HRSD SS System or the HRSD STPs during the 3-month reporting period. HRSD will pay undisputed stipulated penalties in the amount of \$1,500 for two (2) Unusual Discharges.

3.2.1. Basis of Undisputed Stipulated Penalties

Calculation of undisputed stipulated penalties is outlined in Section XX “Stipulated Penalties” paragraph 110 of the Consent Decree. The calculated stipulated penalties are shown in Table 2.

<u>Volume of the SSD or Prohibited Bypass</u>	<u>Penalty from the date of entry</u>
Less than 100 gallons	\$ 100
100 to 2,499 gallons	\$ 750
2,500 to 9,999 gallons	\$ 1,250
10,000 to 99,999 gallons	\$ 4,700
100,000 to 999,999 gallons	\$ 10,000
1,000,000 gallons or greater	\$ 15,000

4. Post-Storm Synopses Reports

Post-Storm Synopses Reports are generated when:

- One or more rain gauge sites meets a two year or greater rainfall recurrence interval and 50% of sites receive one inch or greater rainfall
- A rain gauge meets a five-year or greater rainfall recurrence interval or
- A capacity related wet weather SSO occurs

There were six (6) Post-Storm Synopses Reports for the 3-month reporting period.

QUARTERLY REPORT JULY 1 – SEPTEMBER 30, 2023

Table 1. Detailed Listing of HRSD SSOs

(July 1, 2023 to September 30, 2023)

Date and Time of Incident	Location	Sewer System Component	Potential Receiving Waters	Spilled In Jurisdiction	SSO Classification	Description of Incident from SSORS	SSO Duration	Action Taken and Explanation of SSO	Discharge Quantity (gallons)**	Amount Reaching State Waters (gallons)**	DEQ IR	Force Majeure Rationale or Stipulated Penalty
7/8/2023 7:35:00 AM	Robin Hood Road and Birch Street	Robin Hood Road PS	Ground	Norfolk	Maintenance-Other	HRSD responded to a low oil alarm. The pump was turned off for maintenance. Once restored and pump put back in service an aluminum clamp failed and the hose came off the pump.	0 hour(s) 0 minute(s)	Additional standby staff responded. Replaced damaged hose. Cleaned up and spread lime.	50	40	SSORS #2024-T-106297	\$100
8/4/2023 5:44:00 PM	1500 Bainbridge Boulevard	Quick T's Manhole Upstream of Park Avenue PS	Scuffeltown Creek	Chesapeake	Capacity - Weather Related	Heavy rainfall in the area resulted in increased system flows exceeding system capacity. Ferebee Ave PS saw a maximum rainfall of 0.28" in 15 minutes (08/4/23 at 3:30 pm), with a total of 0.50" falling in 1 hour. Total rainfall for the rain event for this rain gauge was 2.44". Overflow was indicated by station alarm at 5:11 pm and occurred at HRSD manhole upstream of the Park Avenue Pump Station. The manhole is located in the parking lot of a local business.	6 hour(s) 36 minute(s)	HRSD staff verified Park Avenue Pump Station was operating properly. At 8am on 8/5/2023, a vaccon was used to remove standing sewage and debris from sidewalk and parking lot. Lime was also applied to affected area.	32,025	31,925	SSORS #2024-T-106306	\$4,700 <i>The rain gauge at Ferebee Avenue PS did not qualify for a specified RRI.</i>
8/5/2023 6:45:00 PM	715 Fairfax Avenue	Colley Avenue PS	Elizabeth River	Norfolk	Infrastructure	Heavy rainfall in the area resulted in increased system flows and high pressures causing the pipe to the Emergency Pump Connection (EPC) behind the station to fail. Sewage was released each time the pumps ran.	0 hour(s) 5 minute(s)	HRSD received a call from the oncall service at 6:11 PM on 8/5/2023 that a spill was reported behind Colley Ave Pump Station. On call staff isolated the station ending the spill, shut valve to the emergency pump connection and turned the station back on. Standby crews pumped sewage from the hole created by the leak and placed lime over the affected area.	200	100	SSORS #2024-T-106307	\$750

QUARTERLY REPORT JULY 1 – SEPTEMBER 30, 2023

Table 1. Detailed Listing of HRSD SSOs
(July 1, 2023 to September 30, 2023)

Date and Time of Incident	Location	Sewer System Component	Potential Receiving Waters	Spilled In Jurisdiction	SSO Classification	Description of Incident from SSORS	SSO Duration	Action Taken and Explanation of SSO	Discharge Quantity (gallons)**	Amount Reaching State Waters (gallons)**	DEQ IR	Force Majeure Rationale or Stipulated Penalty
8/28/2023 3:45:00 PM	5734 Chesapeake Boulevard	Chesapeake Boulevard PS	Lafayette River via Wayne Creek	Norfolk	Capacity - Weather Related	Heavy rainfall in the area resulted in increased system flows. The flows exceeded the capacity of the Chesapeake Boulevard Pump Station causing sewage to overflow from this overflow pipe. Chesapeake Boulevard Pump Station saw a maximum rainfall of 1.62" falling in 1 hour; total rainfall for the rain event for this rain gauge was 3.28".	2 hour(s) 5 minute(s)	HRSD staff verified the Chesapeake Boulevard Pump Station was operating properly. Once the rain subsided the pump station was able to pull the levels within the gravity system down enough to stop the overflow.	200,000	200,000	SSORS #2024-T-106314	Force Majeure The associated rain gauge recorded over 1.6" of rainfall in one hour and 3.25" of rainfall throughout the 7-hour event. This resulted in a 10yr (3hr) RRI.
8/28/2023 3:35:00 PM	3609 Cedar Lane	Western Branch Sewer System	Western Branch of the Elizabeth River	Norfolk	Capacity - Weather Related	Heavy rainfall in the area resulted in increased system flows. The flows exceeded the capacity of the Cedar Lane Pump Station causing sewage to overflow from this manhole. Cedar Lane Pump Station saw a maximum rainfall of 2.98" falling in 1 hour; total rainfall for the rain event for this rain gauge was 6.46".	0 hour(s) 55 minute(s)	HRSD staff verified the Cedar Lane Pump Station was operating properly. Once the rain subsided the pump station was able to pull the levels within the gravity system down enough to stop the overflow.	1,000	1,000	SSORS #2024-T-106316	Force Majeure The associated rain gauge recorded almost 3" of rainfall in one hour and 6.5" of rainfall throughout the 7-hour event. This resulted in a 100yr (2hr) RRI.

QUARTERLY REPORT JULY 1 – SEPTEMBER 30, 2023

Table 2. Detailed Listing of HRSD Treatment Plant Unusual Discharges

(July 1, 2023 to September 30, 2023)

Date	Location	Description/Cause	Duration of Event (minutes)	Corrective Action	Estimated Quantity Discharged (gallons)	Estimated Quantity to State Waters (gallons)	Type of Overflow	Receiving Water	Force Majeure Rationale Or Stipulated Penalty
7/19/2023	Nansemond	Final effluent pumps were not keeping up with effluent flow due to discharge valves being partially closed. These pumps do not have variable frequency drives and the valves are operated locally to prevent the effluent pumps from emptying the channel and shutting the pump off with a 30 minute lock out on the pump. When the operator reached the pumps to manually open the valve further the channel was already overflowing onto the ground.	10	The discharge valves were opened further to bring the level back down. These issues associated with final effluent pump station operation will be fixed with the ongoing plant expansion project.	1500	1500	Final Effluent (FNE)	Ground	FNE
7/31/2023	James River	A large pile of rock was placed over an eight inch non potable water (NPW) line. A large excavator was then driven onto the pile to load the rock for distribution on the construction site. The weight of the rock and excavator cracked a recently repaired NPW line that was buried below. The broken NPW line resulted in approximately 4,800 gallons of NPW being discharged onto the ground and into the nearby storm drain.	17	Plant NPW system was secured until the repair was made.	4800	4800	Non-Potable Water (NPW)	ground/storm drain	NPW
8/19/2023	Nansemond	During a power outage at SWIFT the drain pump station pumps stopped. Once power was restored they failed to turn back on. Once the drain pump station was completely full it started overflowing. Because of the grading, all spilled water went into the grass area on the back of the SWIFT building into a trough.	0	After the SWIFT Operator arrived onsite they observed that both drain pumps were not running. Immediately after, the operator went outside and noticed the drain pump station had over filled and spilled. Water was not actively still flowing out of the pump station because the processes were offline due to the power outage. We then were able to recover 500gal of the water captured in the trough using a godwin pump, pumping the captured water back to the drain pump station.	2500	2000	Ozonated Effluent Water	ground	\$750

QUARTERLY REPORT JULY 1 – SEPTEMBER 30, 2023

Table 2. Detailed Listing of HRSD Treatment Plant Unusual Discharges (July 1, 2023 to September 30, 2023)									
Date	Location	Description/Cause	Duration of Event (minutes)	Corrective Action	Estimated Quantity Discharged (gallons)	Estimated Quantity to State Waters (gallons)	Type of Overflow	Receiving Water	Force Majeure Rationale Or Stipulated Penalty
8/28/2023	Williamsburg	During a high flow rain event the bar-screens were secured while the rag and grit dumpster was being changed. The bar-screens quickly blinded and raw influent overflowed the channel and ran down the steps and down a storm drain into the woods.	4	Bar-screens were restarted and the overflow quickly subsided.	2000	2000	Raw Influent (RWI)	ground, James River	\$750
8/28/2023	Nansemond	Final Effluent Wet Well Overflowed due to Generator failure during high flow event. The Final Effluent Pump program at Nansemond, which runs primarily during high flow events, calls for Effluent Pumps to run on Generator Power due to lack of supplied power from Dominion. During the rain event on Monday the program started as expected however as flow increased the need for two pumps to run to keep up with flow caused an over current to the on line generator. The next available generator came on line and subsequently failed also, leaving the plant unable to pump. During this time the Final Effluent Wet Well underwent a breach of capacity for approximately 13-14 minutes resulting in a loss of ~18,000 gallons of FNE.	14	All flow was diverted to the Pond until both Generators could be reset and Final Effluent pumps returned to service. Nansemond Plant is currently undergoing construction that will include upgrades to our Final Effluent pumping system that will alleviate this problem in the future.	18000	18000	Final Effluent (FNE)	ground	FNE

Note: NPW (non-potable water) is fully treated and chlorinated final effluent.

Appendix A. Post-Storm Synopses Reports

There were six (6) qualifying events this quarter.

Appendix B. Definitions

“Bypass” shall mean the intentional diversion of waste streams from any portion of a treatment facility, as defined by 40 C.F.R. § 122.41(m).

“HRSD SS System” or “HRSD Sanitary Sewer System” shall mean the wastewater collection and transmission systems, including all pipes, Force Mains, Gravity Sewer Lines, lift stations, Pumping Stations, Pressure Reducing Stations, manholes, and any other appurtenances thereto, which are owned or operated by HRSD as of the Effective Date of this Consent Decree, and which serve the Localities. It does not include the portions of the sewer system that serves the Middle Peninsula communities within King William County, King and Queen County, Middlesex County, and Mathews County.

“Non-potable water (NPW)” is fully treated and chlorinated final effluent.

“Prohibited Bypass” shall mean a Bypass within the meaning of 40 C.F.R § 122.41(m)(4).

“Sanitary Sewer Overflow” or “SSO” shall mean an overflow, spill, diversion, or release of wastewater from or caused by the Regional SS System. This term shall include: (i) discharges to waters of the State or United States from the Regional SS System and (ii) any release of wastewater from the Regional SS System to public or private property that does not reach waters of the United States or the State, including Building/Private Property Backups.

“Sanitary Sewer Discharge” or “SSD” shall mean any discharge to waters of the State or the United States from the HRSD SS System through a point source not authorized in any Permit.

Hampton Roads Sanitation District

Post-Storm Report



7/9/2023

DISCLAIMER:

About the information on this HRSD server

This report is intended to provide the HRSD regional community summary information about the HRSD system during select wet weather events/anomalies. The attached report contains a selection of *official* Interceptor and Treatment data, as well as other environmental and meteorological data provided through other services. In an effort to enhance the HRSD system, the attached products have been made accessible on this server and care must be taken when using such products as they are intended for informational and not operational, legal, or other purposes.

This report is located on an HRSD server and is intended to be available 24 hours a day, seven days a week. However, timely availability and/or delivery of data and products from this server through the Internet is subject to numerous potential constraints and is, therefore, not guaranteed. Official HRSD dissemination of information is available only through a written response to a formal written request for data from the user.

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Summary

On July 9th, there was an approximate 8-hour rainfall event that resulted in 4 sites on the North Shore and 10 sites on the South Shore that met a 1 to 5-year rainfall recurrence interval throughout the HRSD rain gauge network. An area of low pressure and a cold front brought rain to the area. North Shore sites averaged around .54 inches of rain while South Shore sites averaged around .99 inches. There was minimal impact on groundwater levels compared to July 2022. See Appendix C for the Historical Shallow Well comparison.

No HRSD interceptor weather-related overflow(s) were reported.

HRSD flow and pressure meters met data reliability requirements per the MOM program. For all pressure meters in the aggregate and all pressure-side flow meters in the aggregate for each treatment plant service area listed below, at least 90% reliable data was achieved, based on the duration of system response to this rainfall event. The data reliability for the gravity flow meters is not included in this synopsis.

- Duration of system response: See Table Below
- Aggregate flow meter validity: 94.00%
- Aggregate pressure meter validity: 98.51%

Currently, rainfall recurrence intervals are only analyzed for a maximum of 96-hours. Rainfall analysis begins after 0.1 inches of rain has occurred. A 72-hour dry period of less than 0.1 inches of rain is typically used to signify two separate events. However, if a site returns to “dry weather” conditions prior to the next rainfall that occurs within 72 hours of the previous event, it is also considered for separate analysis. See Appendix A for the Rainfall Total System Maps.

The current criteria for publishing a post-storm analysis are the following:

- One or more rain gauge sites meet a two-year or greater RRI (rainfall recurrence interval) and at least 50% of sites in any treatment plant service area receive one inch of rainfall or greater,
- A rain gauge site meets a five-year or greater RRI, or
- A weather-related SSO occurs.

Treatment Plant Data: *(Data obtained from Telog Database)*
 See Appendix B for HRSD Treatment Plant Flows

**HRSD Treatment Plant Data
 7/9/2023**

North Shore				
Treatment Plant	Date of Peak Hourly Flow	Peak Hourly Flow (MGD)	Peak Hour	TPSA Total Rainfall Avg (in)
Boat Harbor	7/9/2023	19.81	18:00	0.91
James River	7/9/2023	21.08	20:00	0.58
Williamsburg	7/9/2023	12.70	13:00	0.00
York River	7/9/2023	17.63	20:00	0.71

**HRSD Treatment Plant Data
 7/9/2023**

South Shore				
Treatment Plant	Date of Peak Hourly Flow	Peak Hourly Flow (MGD)	Peak Hour	TPSA Total Rainfall Avg (in)
Army Base	7/9/2023	13.95	15:00	0.76
Atlantic	7/9/2023	119.77	20:00	1.81
Nansemond	7/9/2023	27.63	21:00	0.64
VIP	7/9/2022	49.56	20:00	0.60

July 9th, 2023 – Post-Storm Rain Event Synopsis

North Shore

Weather:

Rainfall (HRSD Rainfall Gauges): *Recurrence intervals based on NOAA Atlas 14*

Rain Gauge Site	Peak Rainfall RI (Duration)	Locality
<i>Boat Harbor Treatment Plant Service Area¹</i>		
Bayshore PS	DNQ	HAMP
Bridge Street Tide Gate	DNQ	HAMP
Boat Harbor	DNQ	NEWP
Copeland Park PS	DNQ	NEWP
Hampton PS 159	DNQ	HAMP
<i>James River Treatment Plant Service Area¹</i>		
Hilton School PS	DNQ	NEWP
James River Main Flow (Influent)	DNQ	NEWP
Lee Hall PRS	DNQ	NEWP
Lucas Creek PS	DNQ	NEWP
Morrison PS	DNQ	NEWP
<i>Williamsburg Treatment Plant Service Area¹</i>		
Ford's Colony	DNQ	JCSA
Fort Eustis PS	DNQ	NEWP
Greensprings PS	DNQ	JCA
Solarex	DNQ	JCSA
Williamsburg Main Flow (Effluent)	DNQ	JCSA
Williamsburg PS	DNQ	WILL
York Skimino Hills PS	DNQ	YORK
<i>York River Treatment Plant Service Area¹</i>		
Big Bethel PRS	DNQ	HAMP
Freeman PS	DNQ	HAMP
Gloucester Court House	DNQ	GLOU
Guinea Rd at Maryus Rd	1-year (1hr)	GLOU
Ordinary PCV	DNQ	GLOU
Poquoson PS 6	1- to 2-year (2hr)	POQ
Wolf Trappe PCV	DNQ	YORK
York Kiln Creek 1 PS	2- to 5-year (1hr)	YORK
York PS 15	2- to 5-year (2hr)	YORK
York River Main Flow (Influent)	Disconnected	YORK
York River Crossing (York River Rectifier)	DNQ	GLOU

Note:

1. Typical treatment plant service area.

Newport News-Williamsburg International (PHF)

- o Wind and Rainfall (daily total):

Date	Gust (max)	Sustained (max)	Sustained (avg)	Direction	Rainfall (in)
7/9/23	22 mph	15 mph	5 mph	VAR	1.04

Tide:

- Yorktown USCG Training Center:
 - Storm Surge: An approximate 1.2-foot storm surge was observed.

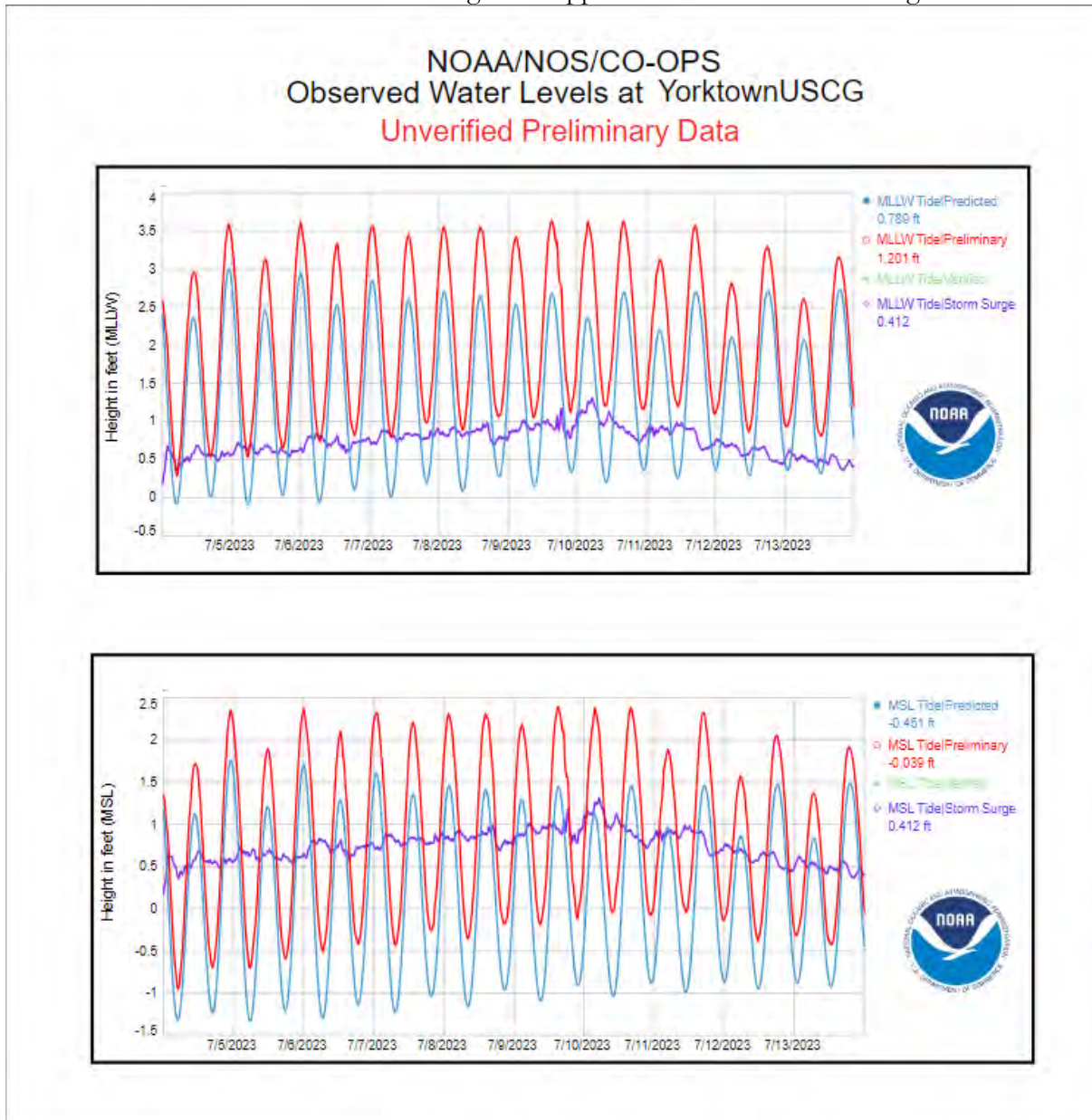


Figure 1. Preliminary data obtained from NOAA and a connection with Open Weather

- Sewells Point Tide Station:
 - Storm Surge: An approximate 1.0 foot storm surge was observed.

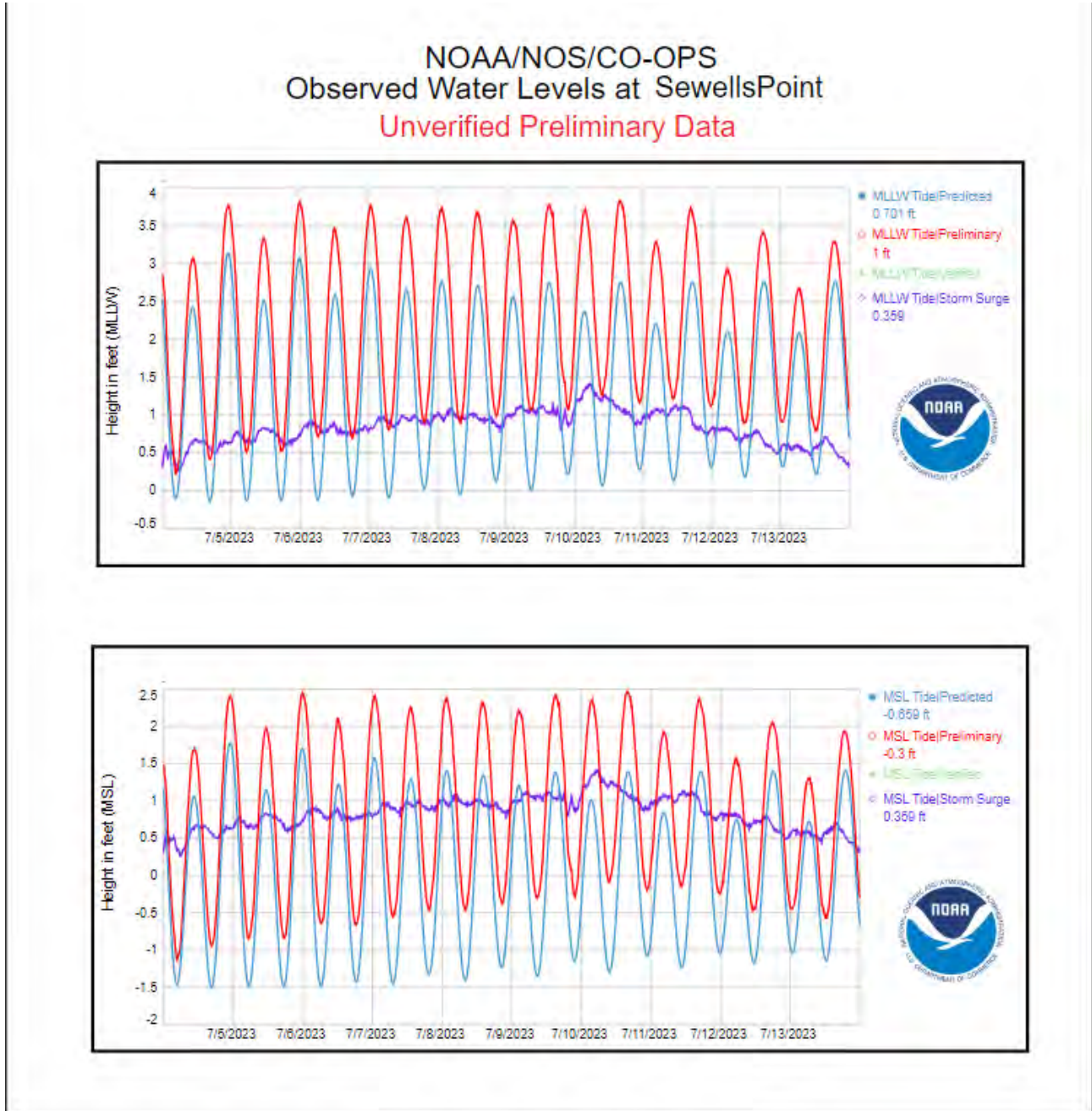


Figure 2. Preliminary data obtained from NOAA and a connection with Open Weather

July 9th, 2023 – Post-Storm Rain Event Synopsis

South Shore

Weather:

Rainfall (HRSD Rainfall Gauges): *Recurrence intervals based on NOAA Atlas 14*

Rain Gauge Site	Peak Rainfall RI (Duration)	Locality
<i>Army Base Treatment Plant Service Area¹</i>		
Bancker Rd (Dovercourt Discharge)	DNQ	NORF
Taussig Blvd PS	DNQ	NORF
<i>Atlantic Treatment Plant Service Area¹</i>		
Callison at GB Locks	1- to 2-year (3hr)	CHES
Chesapeake PS 243	1-year (3hr)	CHES
Chesapeake PS 254	DNQ	CHES
Courthouse PRS	1-year (3hr)	VAB
Elbow Rd	5-year (3hr)	CHES
John B. Dey MLV-AT side	1-year (1hr)	VAB
Kempsville PRS	5-year (3hr)	VAB
Lagomar IFM at Atlantic TP	DNQ	VAB
Laskin Rd PRS	2- to 5-year (2hr)	VAB
Pine Tree PRS	2-year (3hr)	VAB
Shippo Corner PRS	DNQ	VAB
<i>Ches-Liz Treatment Plant Service Area¹</i>		
Dozier's Corner PS	DNQ	CHES
Independence PRS	1-year (2hr)	VAB
Northampton Blvd at Wesleyan Dr	DNQ	NORF
Providence PRS	2-year (3hr)	VAB
Shore Dr @ Jack Frost	DNQ	CHES
<i>Nansemond Treatment Plant Service Area¹</i>		
Bowers Hill PRS	DNQ	CHES
Cedar Lane PS	DNQ	PORT
Chesapeake PS 158	DNQ	CHES
Chesapeake PS 238	DNQ	CHES
Crittenden Rd_Chuckatuck Rectifier	DNQ	SUFF
Deep Creek PRS	DNQ	CHES
Lake Kilby WTP	DNQ	SUFF
Nansemond Main Flow (Effluent)	DNQ	SUFF
Pagan River Rectifier	DNQ	IOW
Pughsville PS	DNQ	SUFF
Route 337 PRS	DNQ	CHES
Smithfield High School	DNQ	IOW
Suffolk PS	DNQ	SUFF
Suffolk PS 81	DNQ	SUFF
Suffolk PS 87	DNQ	SUFF
Windsor Duke St PS	DNQ	IOW

July 9th, 2023 – Post-Storm Rain Event Synopsis

Rain Gauge Site	Peak Rainfall RI (Duration)	Locality
<i>VIP Treatment Plant Service Area¹</i>		
Elizabeth River Crossing_Eastern Branch	DNQ	NORF
Ferebee Avenue PS	DNQ	CHES
Luxembourg Avenue PS	DNQ	NORF
Rodman Ave PS	DNQ	PORT
Va Beach Blvd PS	DNQ	NORF
VIP Main Flow (Effluent)	DNQ	NORF

Note:

1. Typical treatment plant service area.

Norfolk International Airport (ORF)

- o Wind and Rainfall (daily total):

Date	Gust (max)	Sustained (max)	Sustained (avg)	Direction	Rainfall (in)
7/9/2023	26 mph	21 mph	6 mph	S	0.77

Tide:

- Sewells Point Tide Station:
 - Storm Surge: An approximate 1.0 foot storm surge was observed.

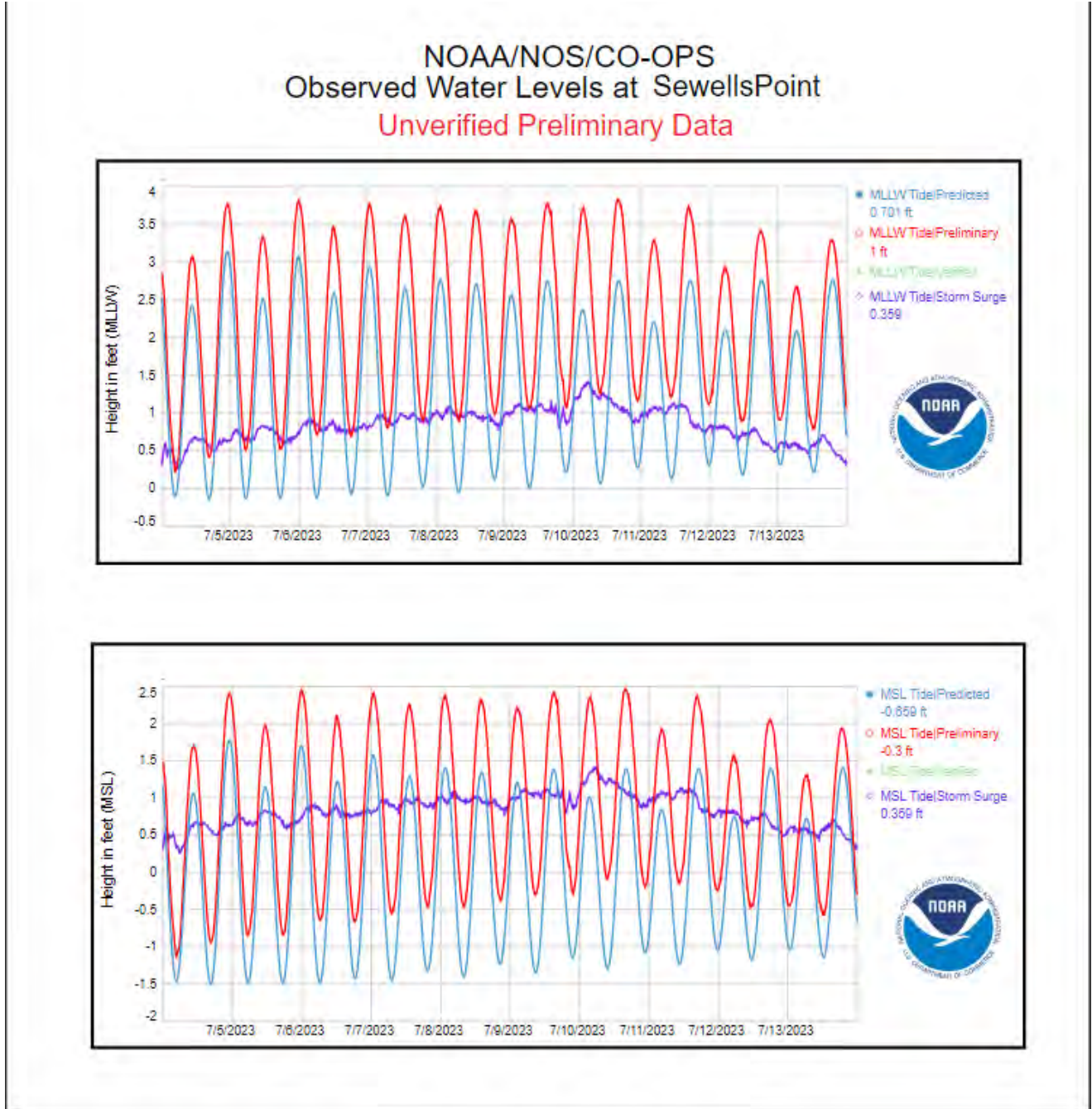


Figure 3. Preliminary data obtained from NOAA and a connection with Open Weather

Shallow Well Analysis:

Shallow wells are located at/or near HRSD Pump Stations to measure groundwater levels. The water column is measured using a pressure transducer located near the bottom of the well. The installed sensor measures gauge pressure in inches of water. The Shallow Well_NAVD88 measurement referenced in Appendix C refers to the elevation (referenced as NAVD 88) of the sensor plus the gauge measurement in feet.

DRAFT

Appendix A

HRSD Rain Gauge Network
Rainfall Totals






North Shore

July 09, 2023

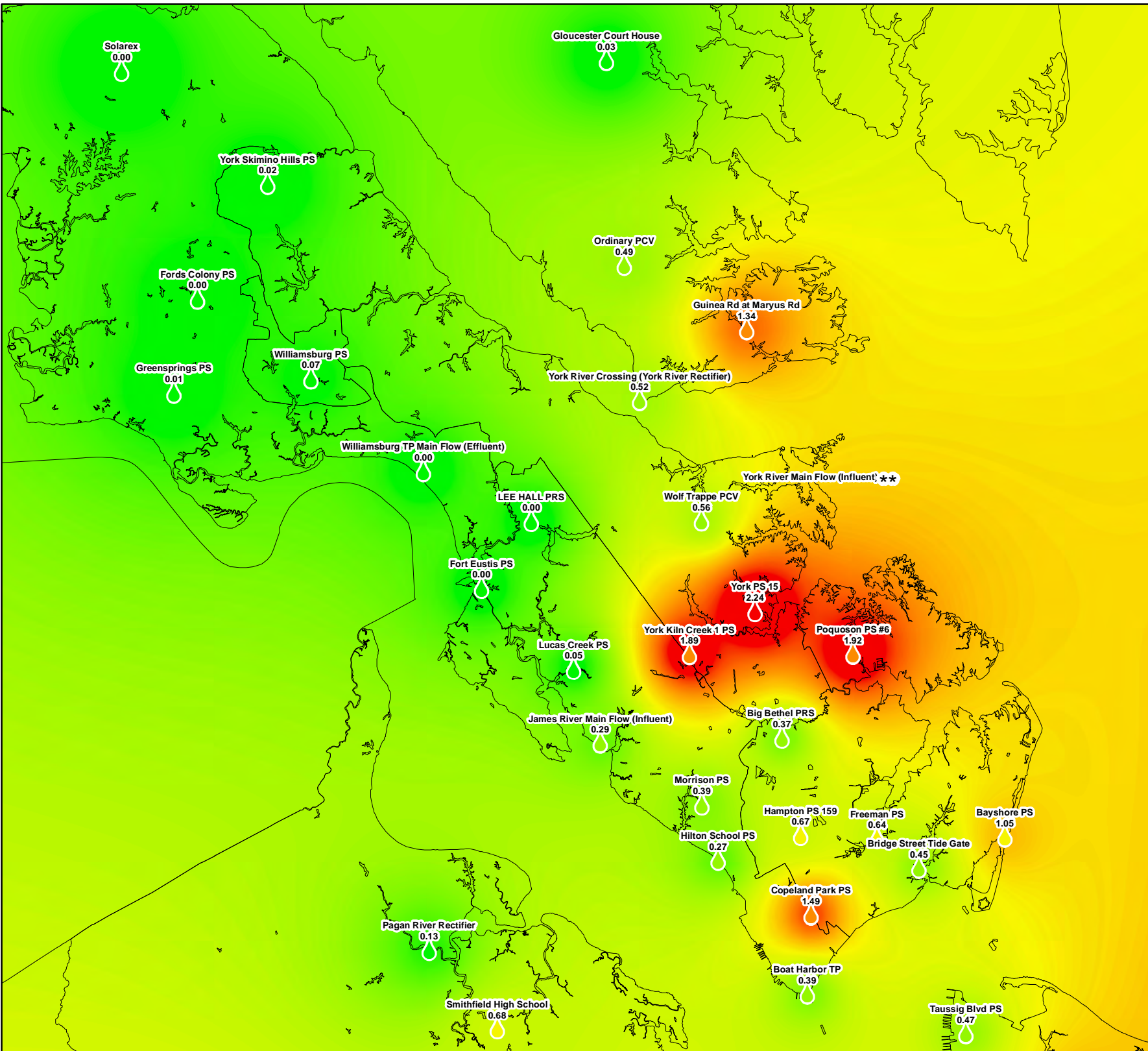
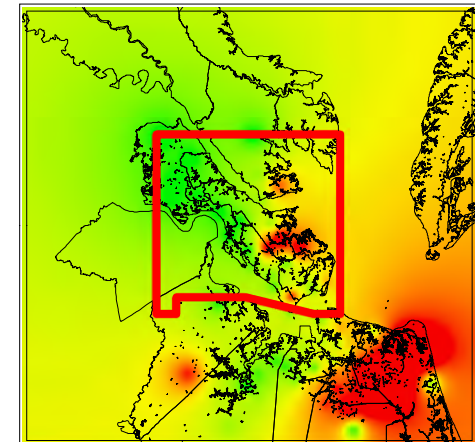
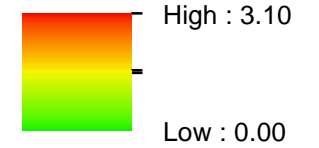
Rainfall Analysis

Total Rainfall

Rain Gauges (in):

-  2.09 - 3.10
-  1.09 - 2.08
-  0.59 - 1.08
-  0.24 - 0.58
-  0.00 - 0.23

Value

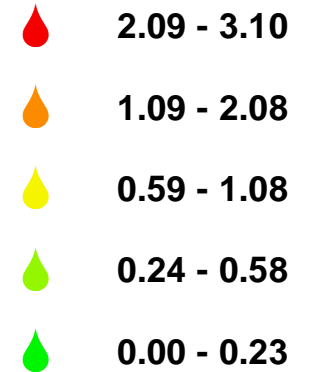


*Note: Rain Gauge was invalid for event and an average of surrounding sites was used. **Rain Gauge disconnected during event

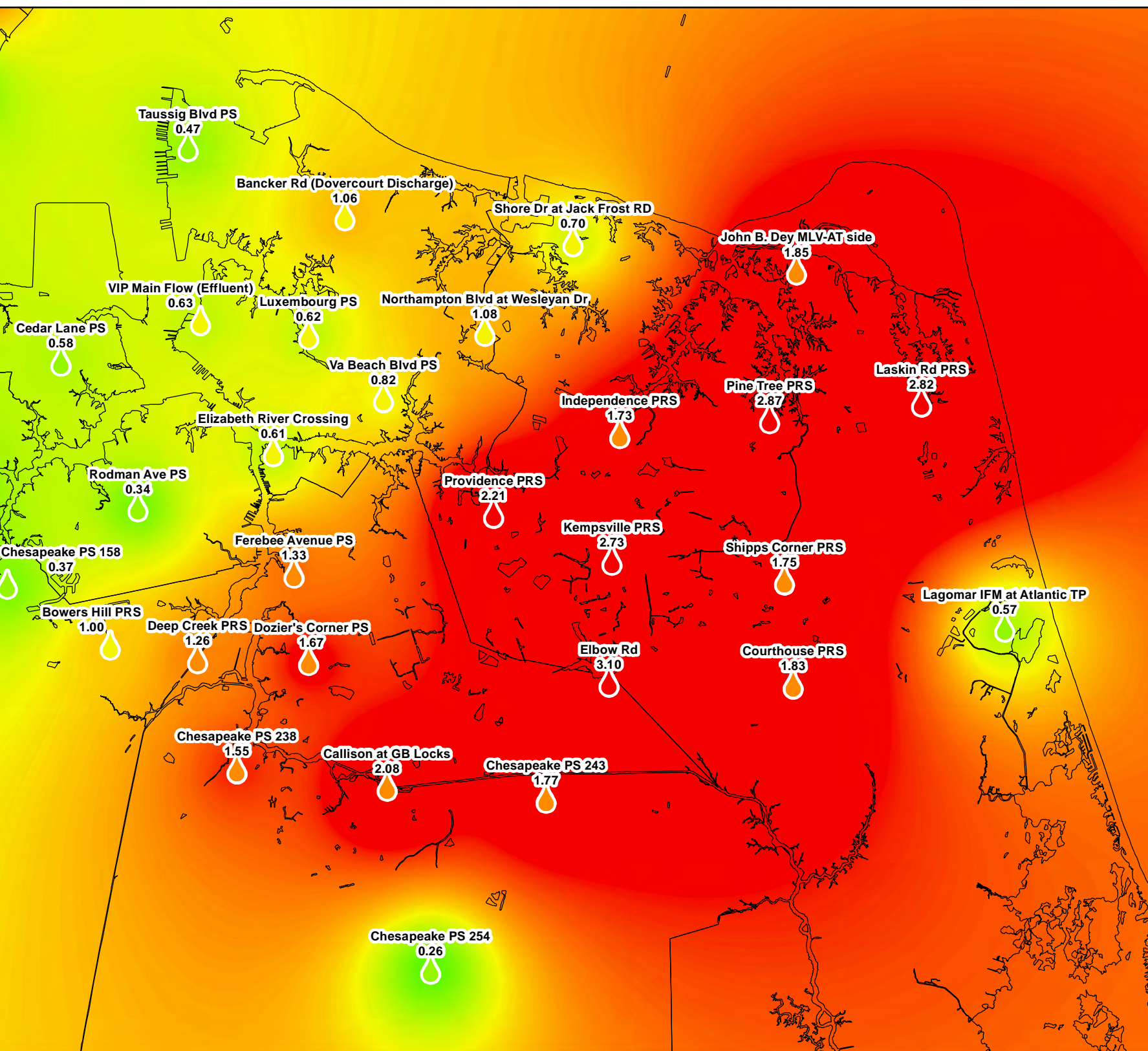
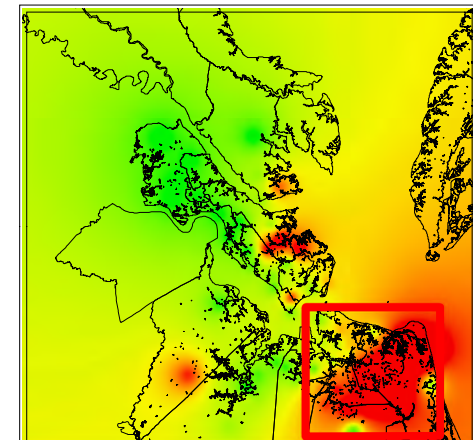
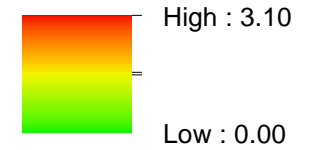
South Shore - East

July 09, 2023 Rainfall Analysis Total Rainfall

Rain Gauges (in):



Value

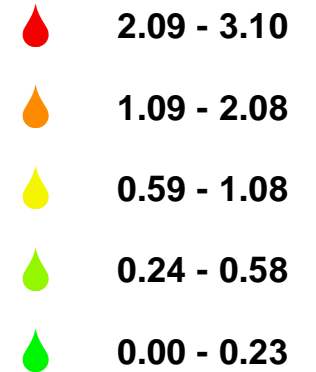


*Note: Rain Gauge was invalid for event and an average of surrounding sites was used. **Rain Gauge disconnected during event

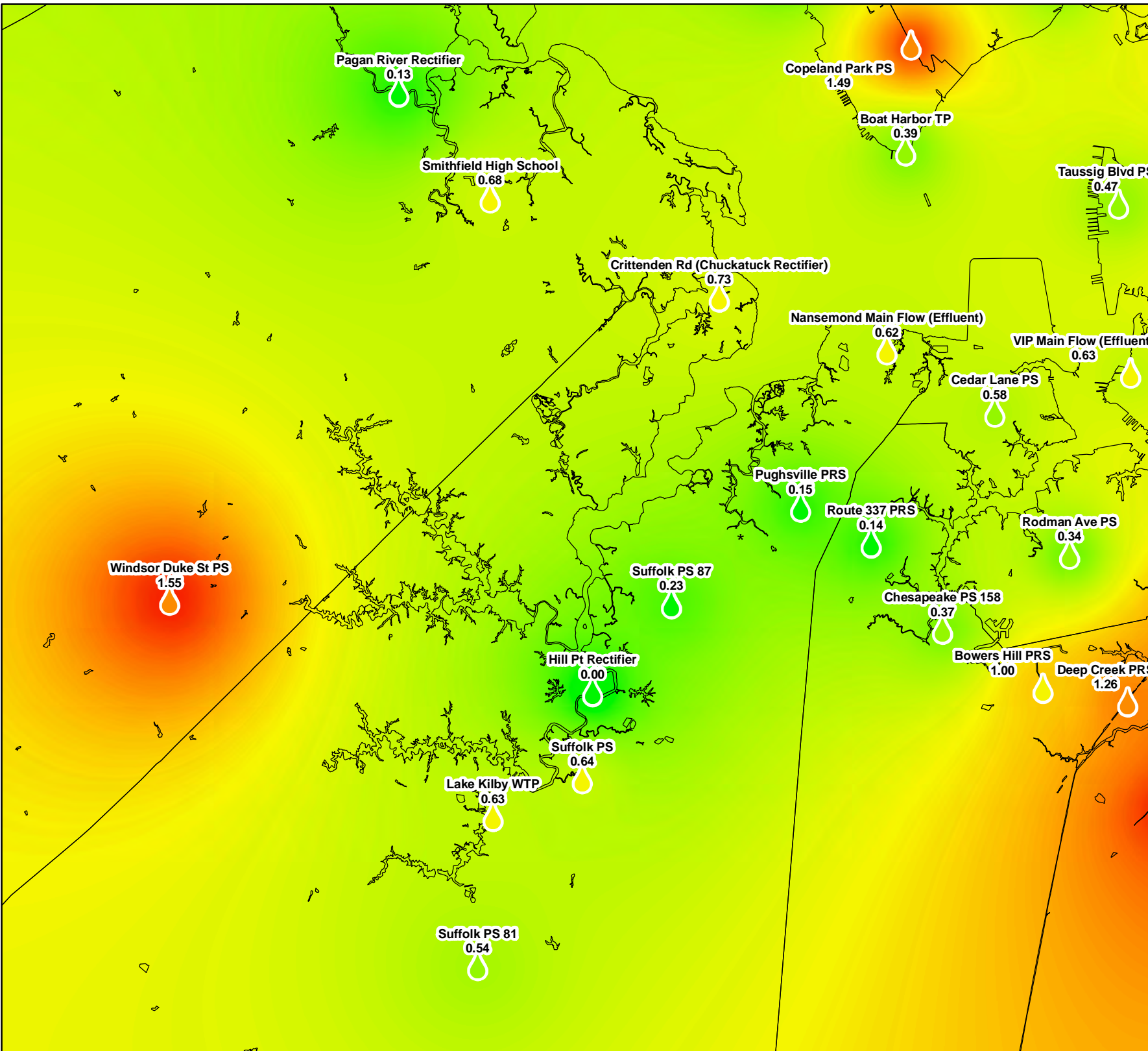
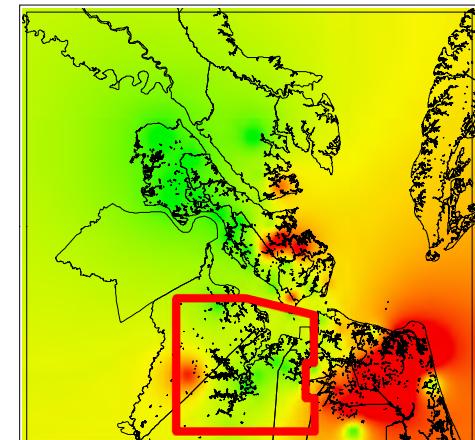
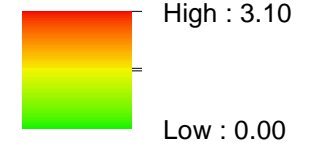
South Shore - West

July 09, 2023 Rainfall Analysis Total Rainfall

Rain Gauges (in):



Value



*Note: Rain Gauge was invalid for event and an average of surrounding sites was used. **Rain Gauge disconnected during event

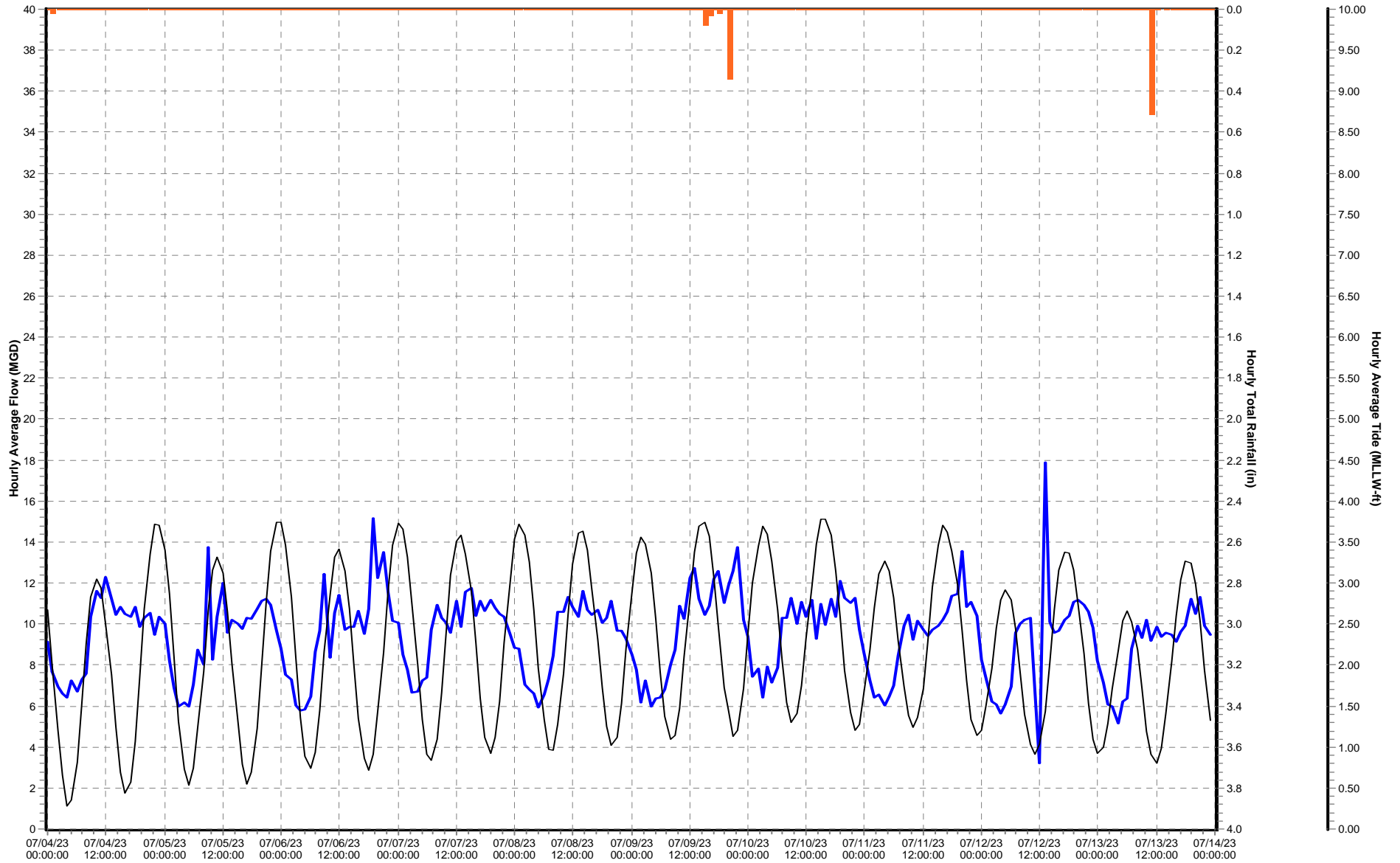
Appendix B

HRSD Treatment Plant Flows

Army Base Treatment Plant

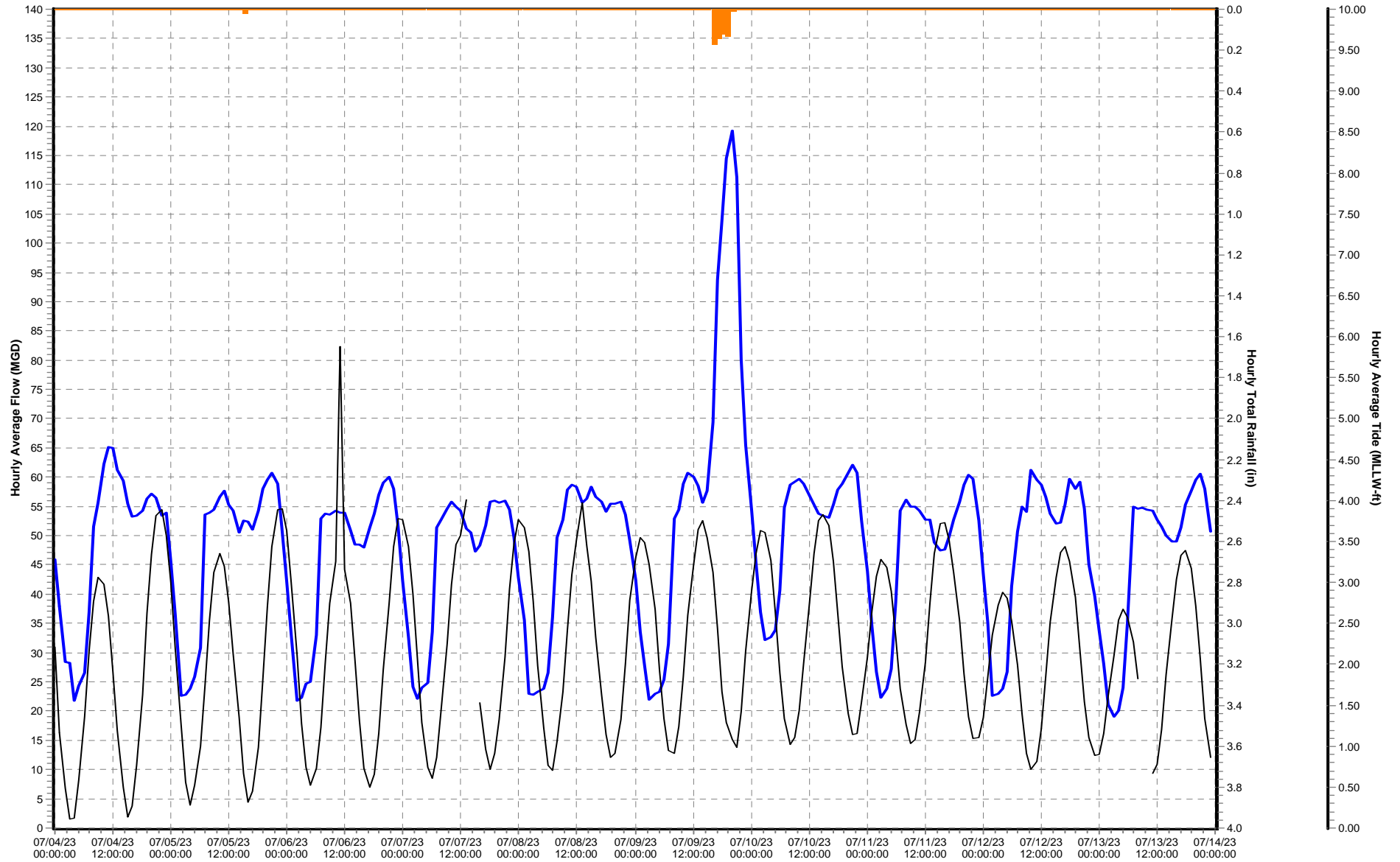
MMPS-035 (07/04/23 to 07/14/23)

MMPS-035.Flow_Effluent (MGD) MMPS-175: Taussig Blvd PS Rain Gauge SewellsPt Tide - MLLW Preliminary (ft)



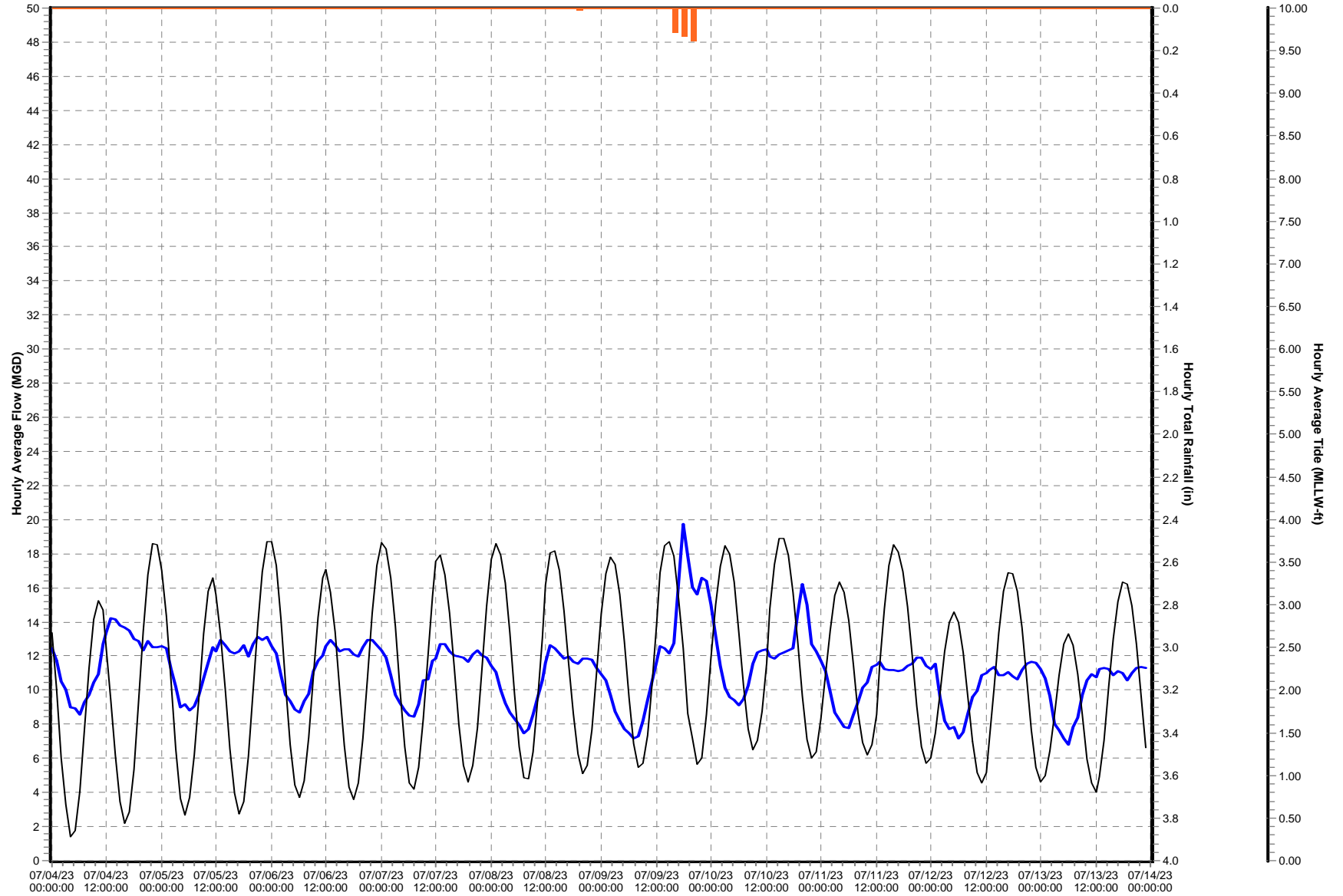
Atlantic Treatment Plant
MMPS-071 (07/04/23 to 07/14/23)

Flow_Effluent (MGD) MMPS-185: Lagomar IFM at Atlantic TP Rain Gauge CBBT Tide - MLLW Preliminary (ft)



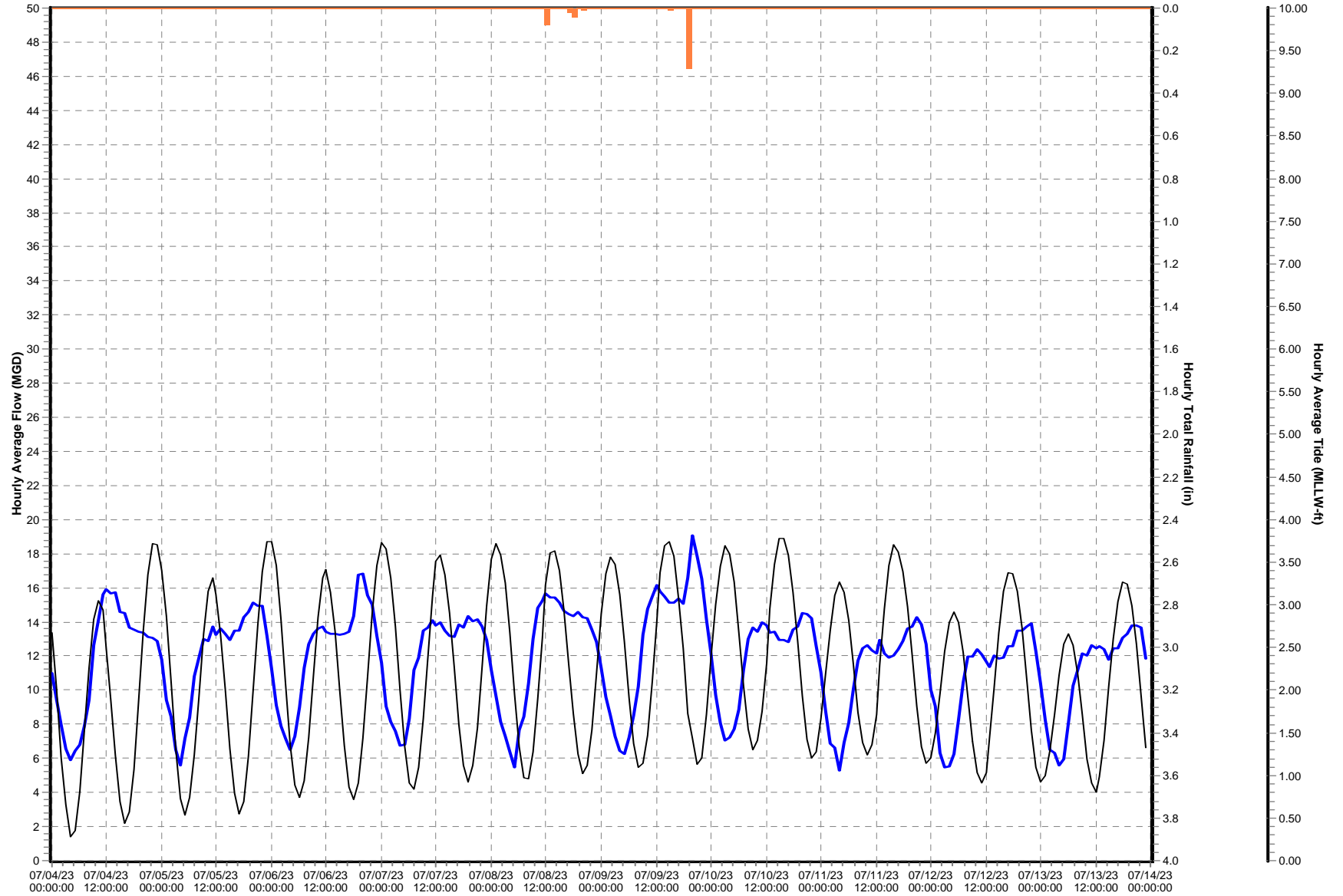
Boat Harbor Treatment Plant

MMPS-075 (07/04/23 to 07/14/23)



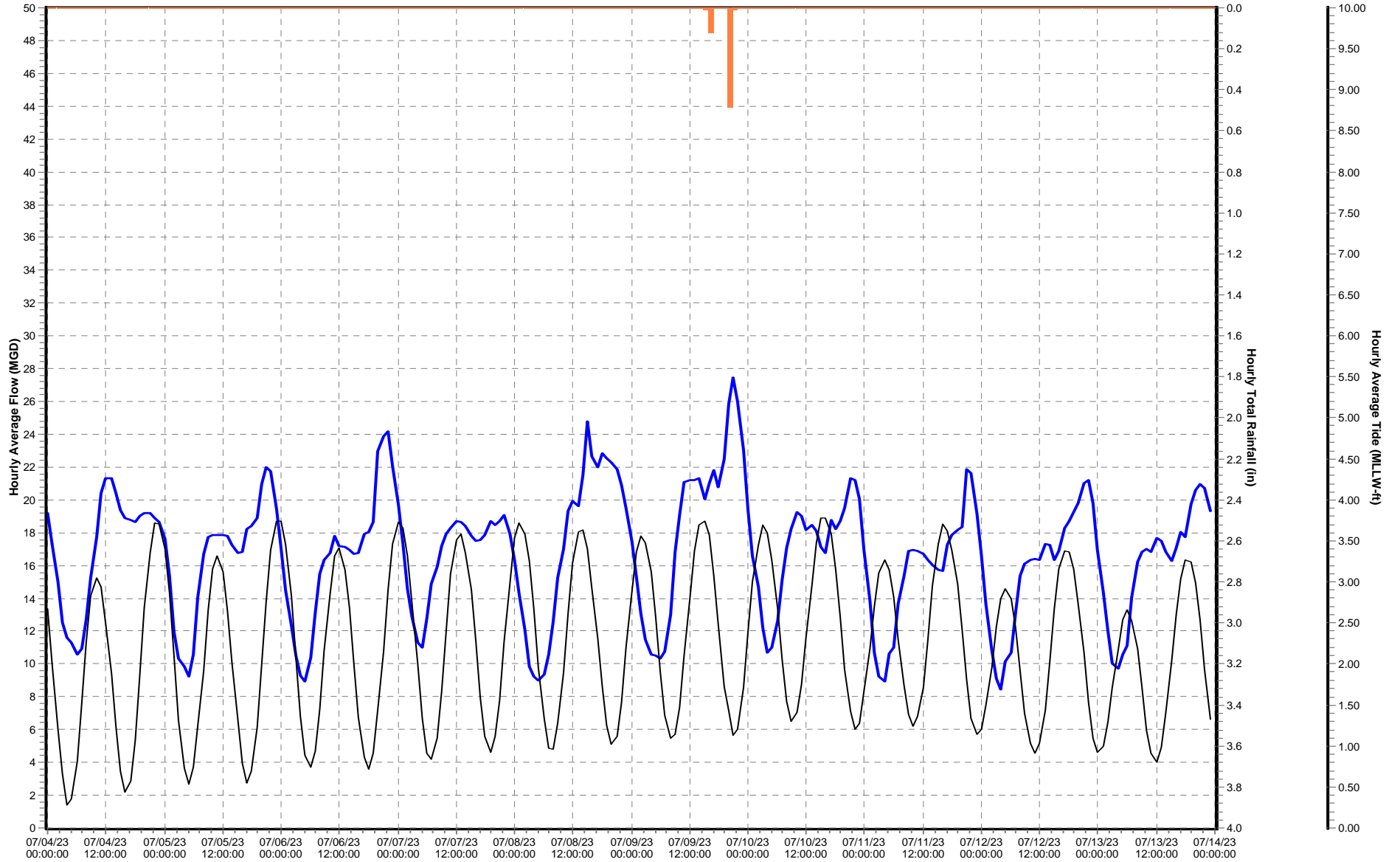
James River Treatment Plant
MMPS-184 (07/04/23 to 07/14/23)

Flow_Influent (MGD) Rainfall @ JRTP SewellsPt Tide - MLLW Preliminary (ft)



Nansemond Treatment Plant

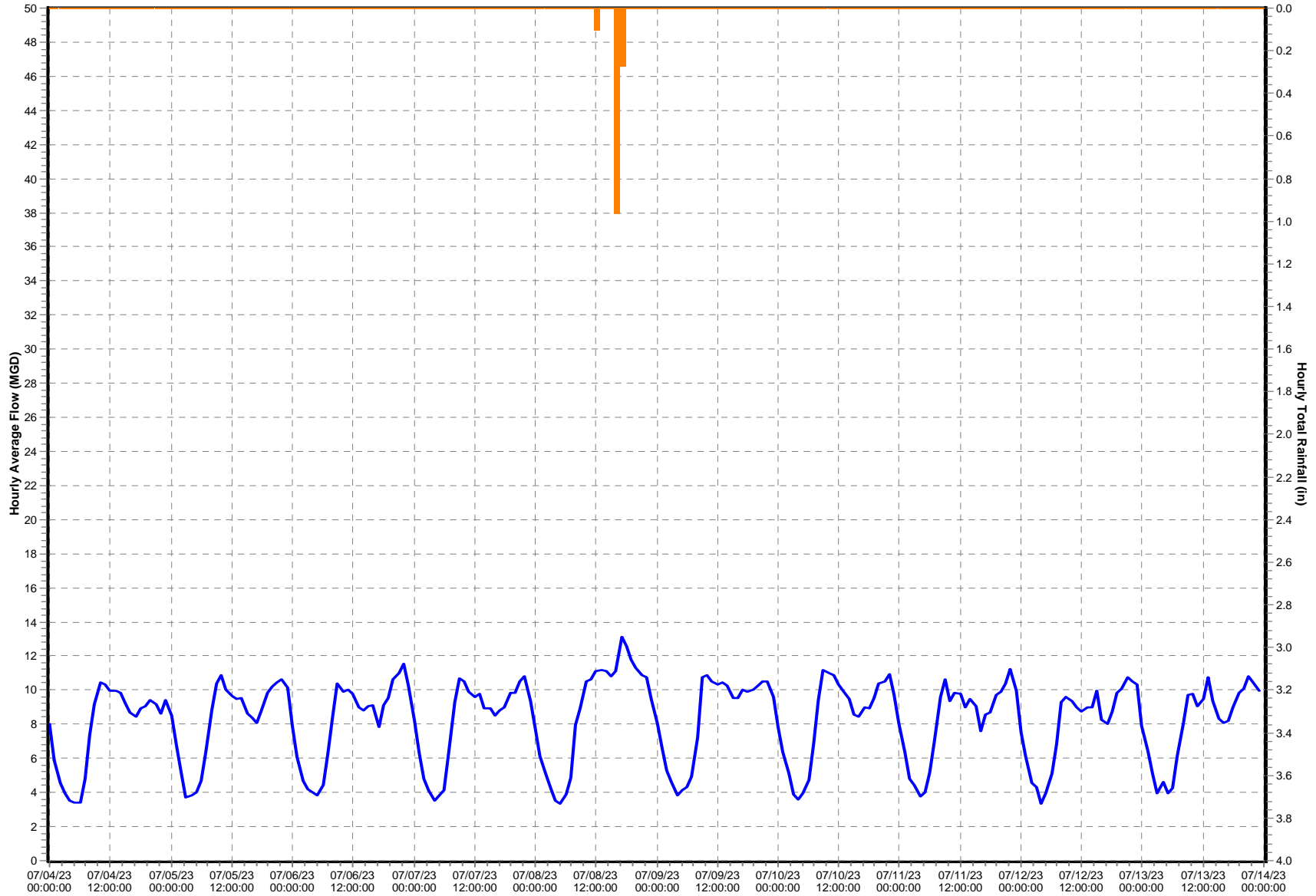
MMPS-202 (07/04/23 to 07/14/23)



Williamsburg Treatment Plant

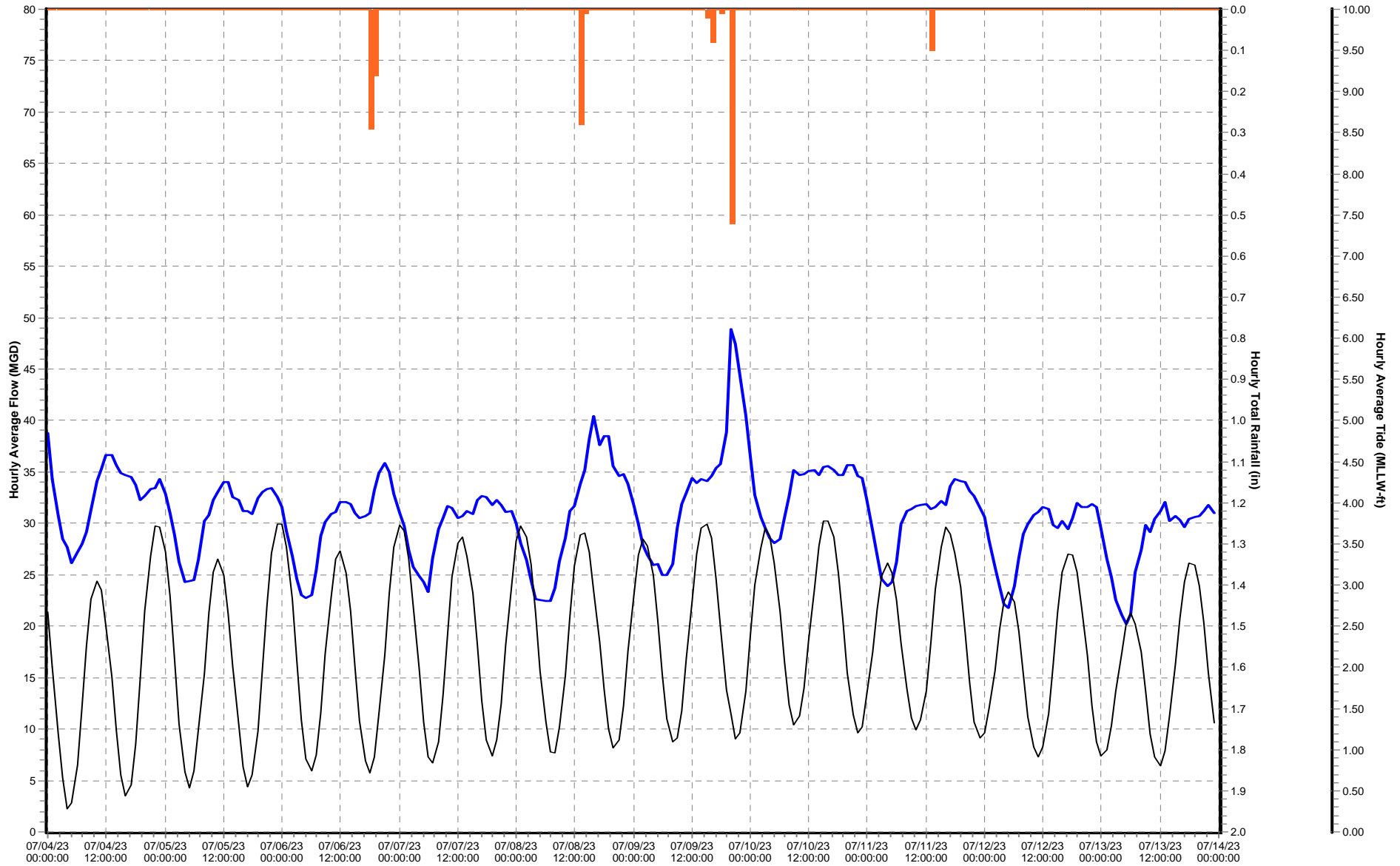
MMPS-222 (07/04/23 to 07/14/23)

Flow_Effluent (MGD) Rainfall @ WBTP



VIP Treatment Plant
MMPS-003 (07/04/23 to 07/14/23)

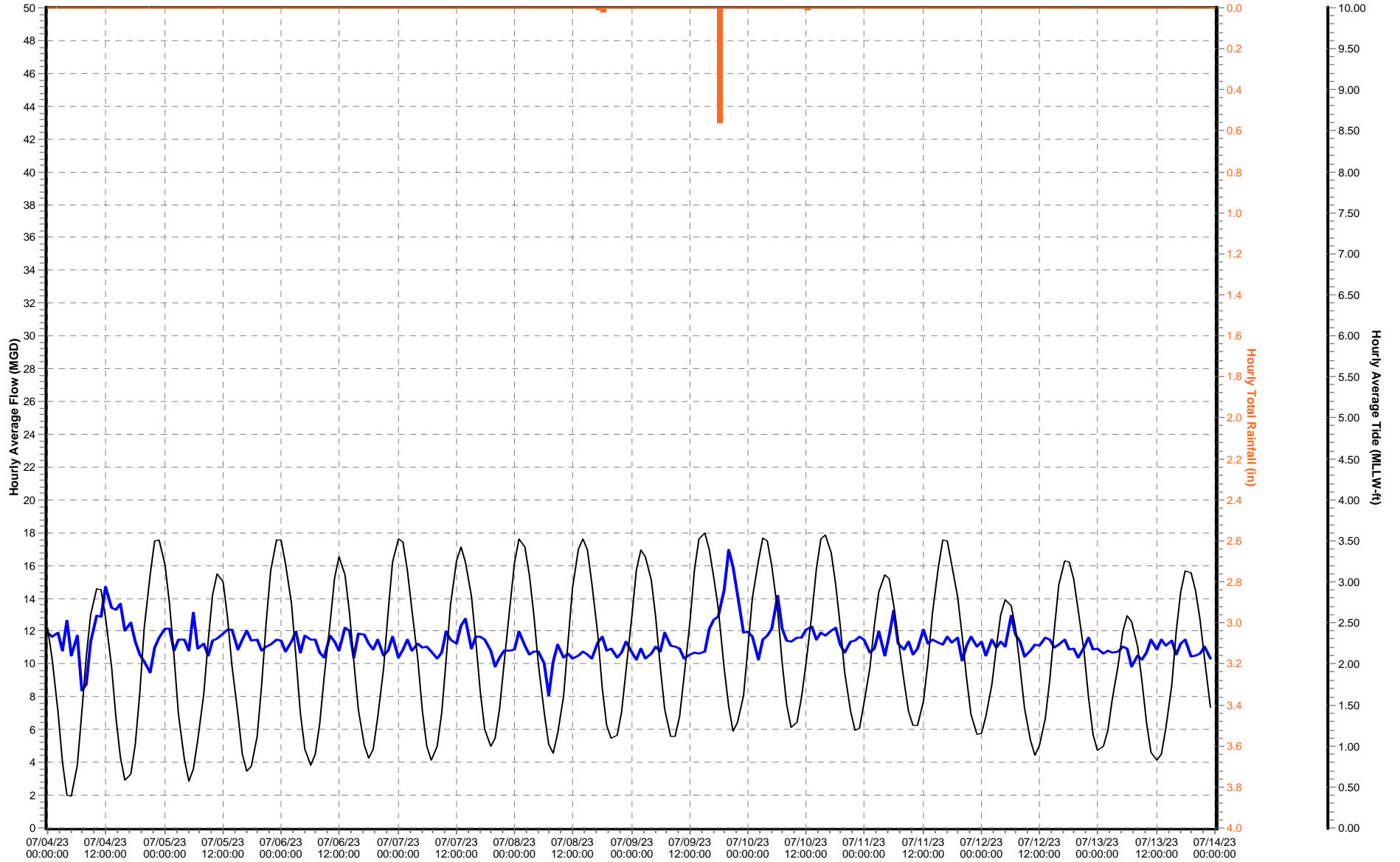
Flow_Effluent (MGD) MMPS-003: VIP Treatment Plant Rain Gauge SewellsPt Tide - MLLW Preliminary



York River Treatment Plant

MMPS-235 (07/04/23 to 07/14/23)

Flow_Influent (MGD) MMPS-234.MMPS-234.Rain Gauge (in) YorktownUSCG Tide - MLLW Preliminary (ft)



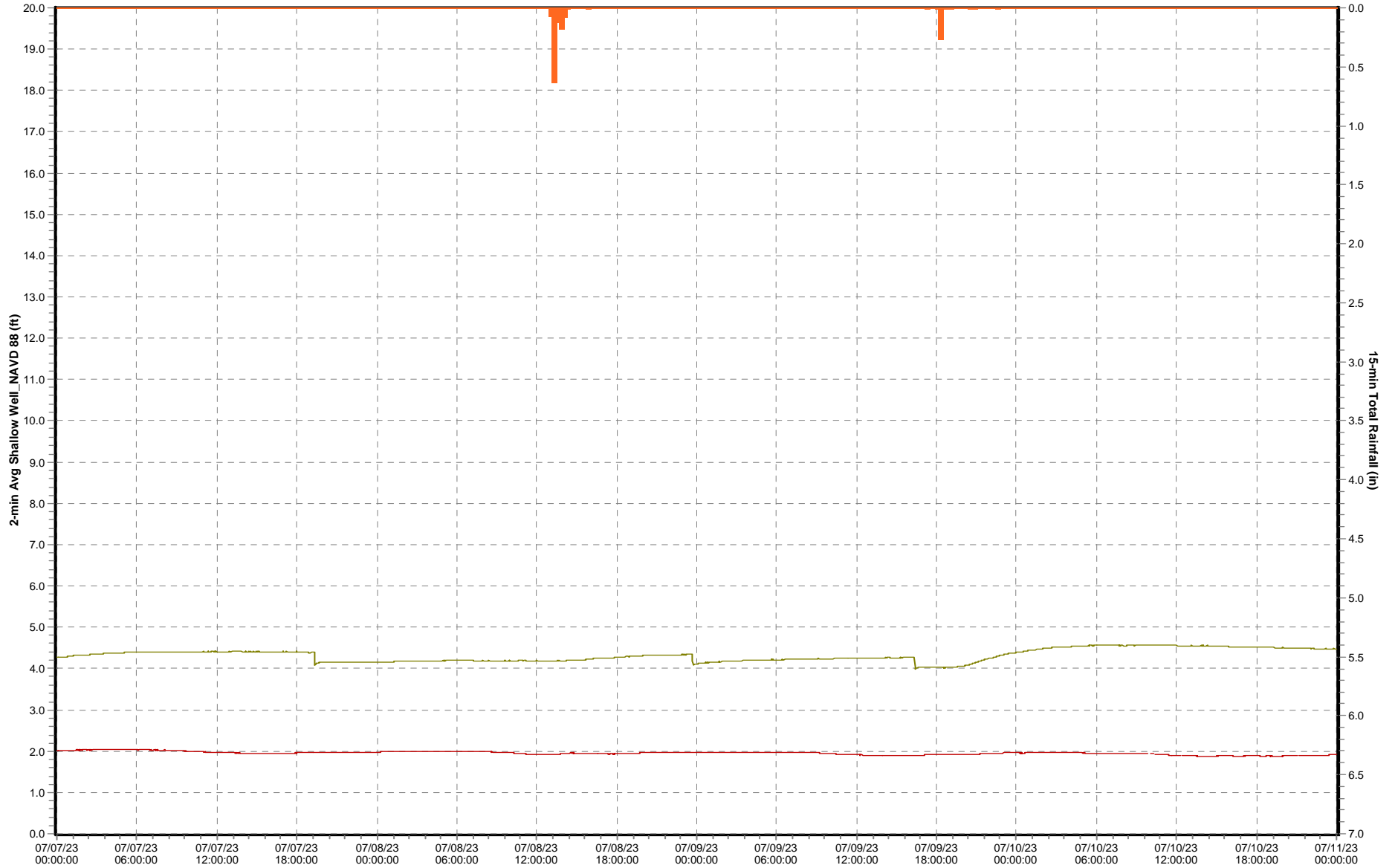
Appendix C

Shallow Well Analysis

5 Day

South Shore Shallow Well Graphs

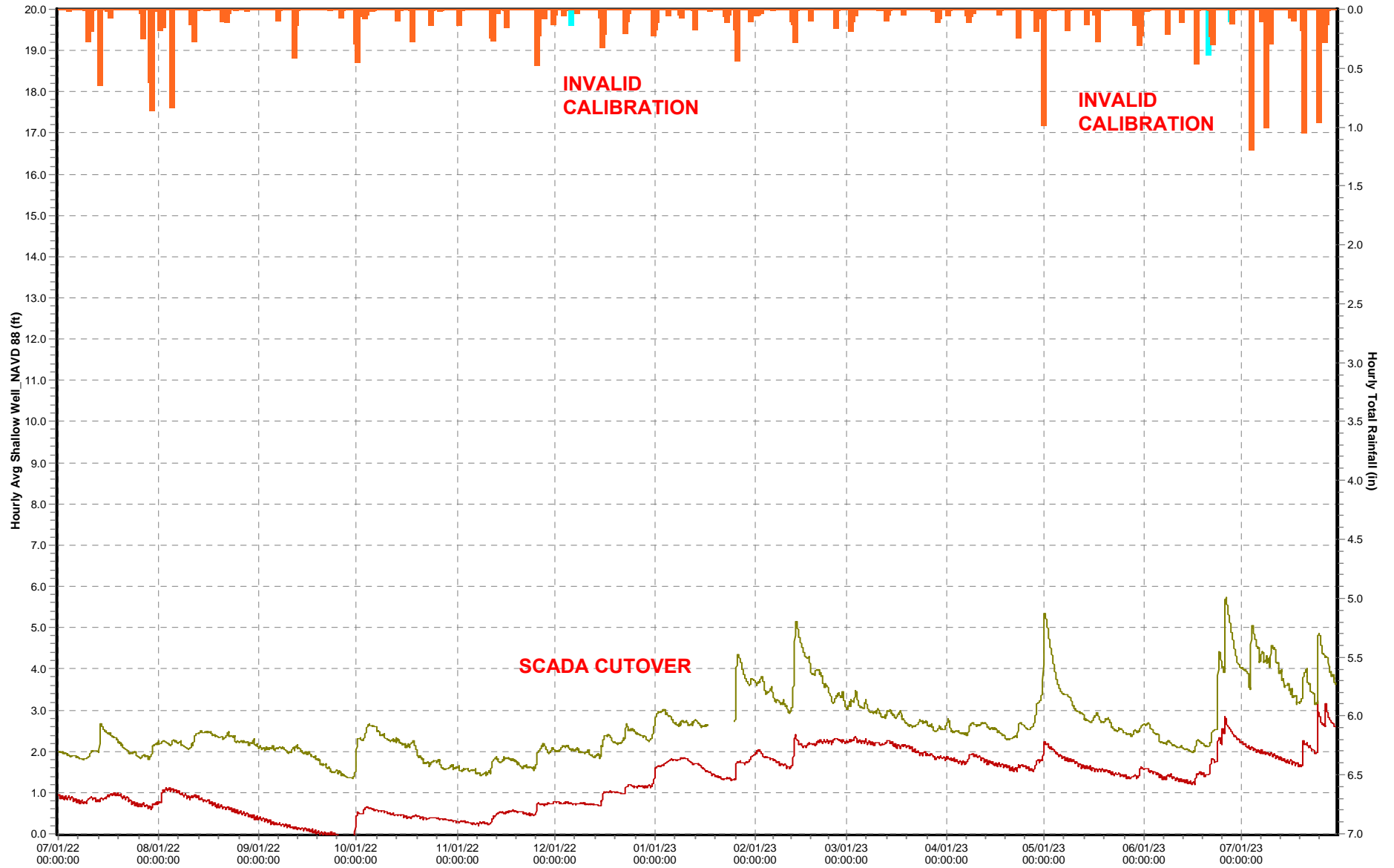
07/07/23 to 07/11/23



1 Year

South Shore Shallow Well Graphs

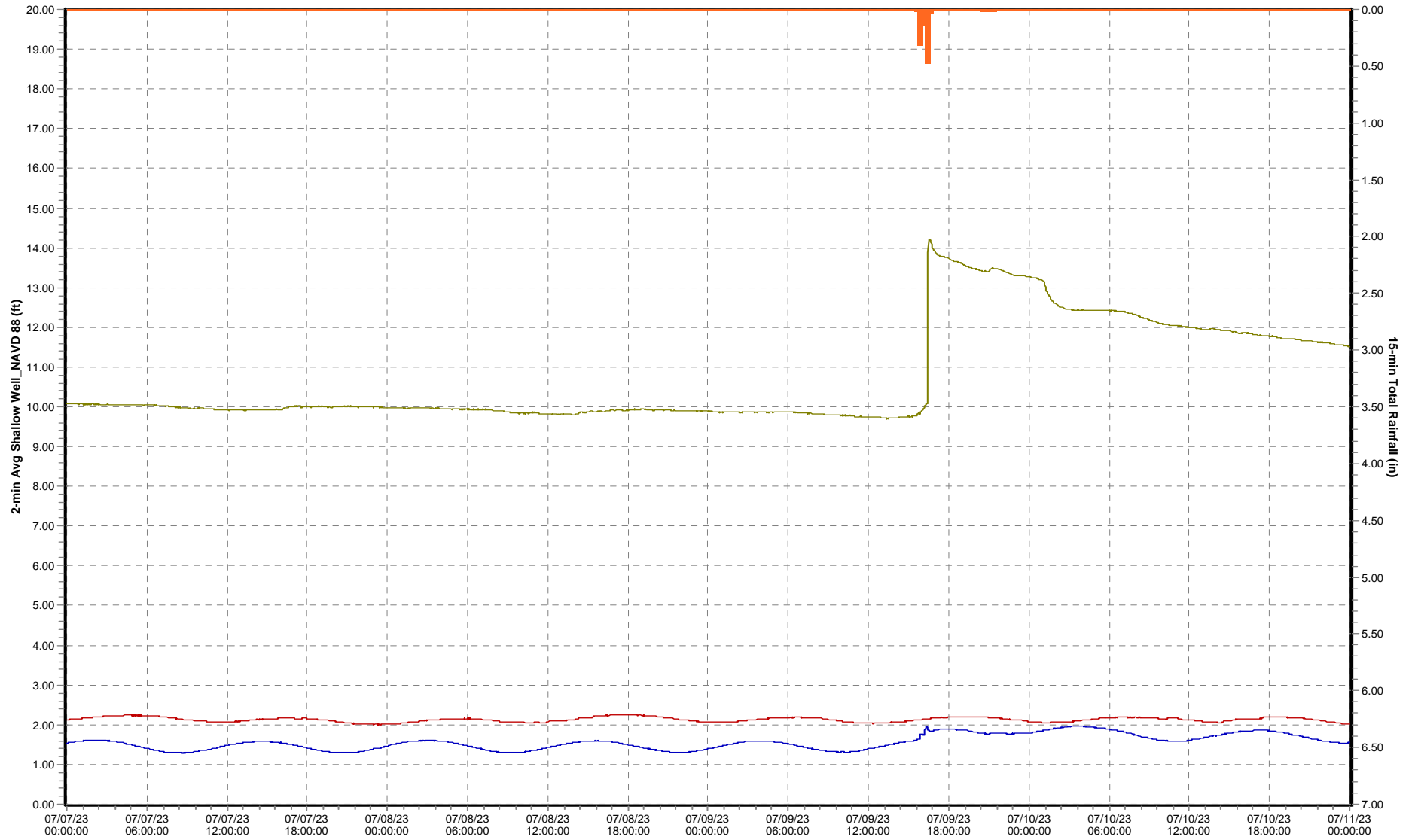
07/01/22 to 07/30/23



5 Day

North Shore Shallow Well Graphs

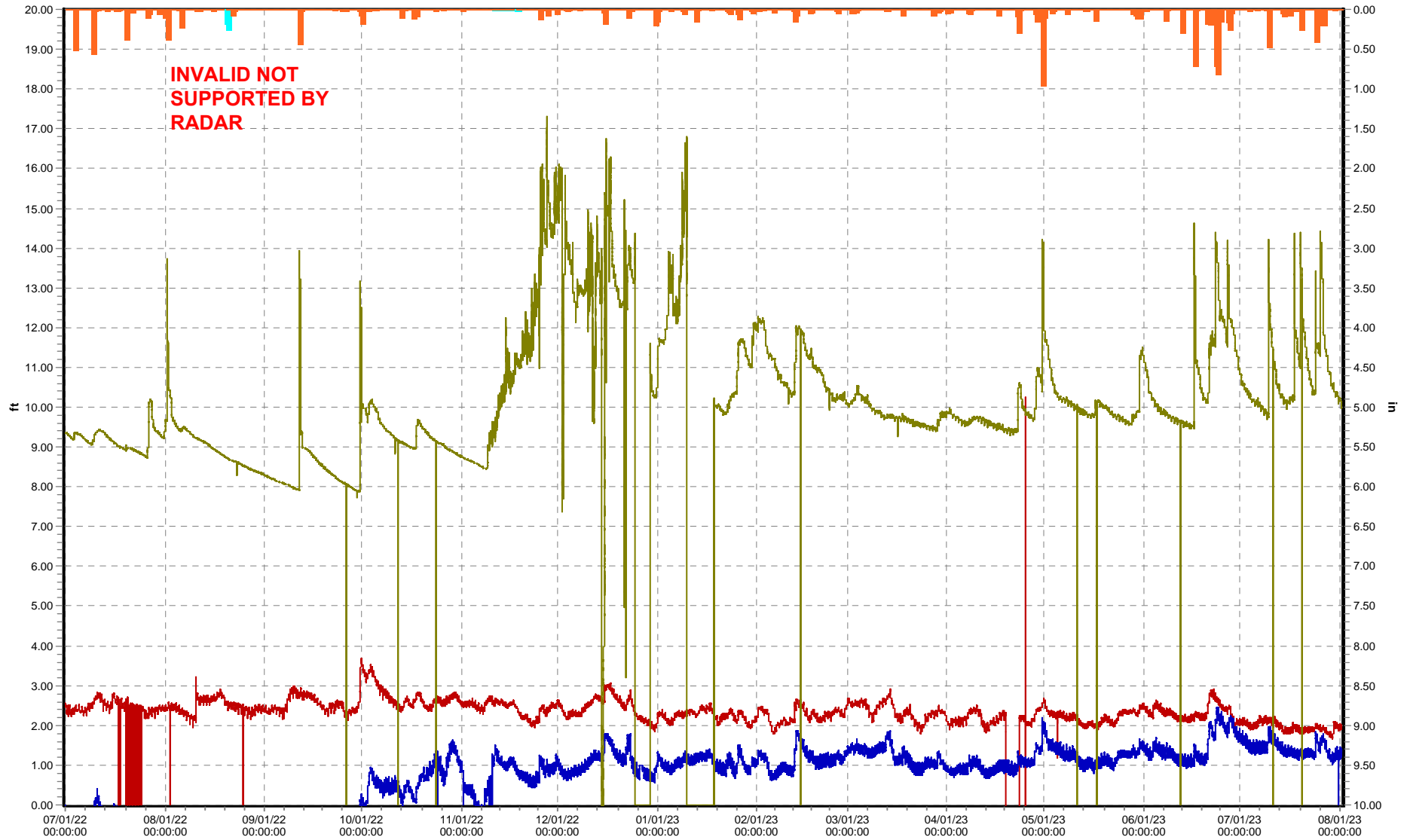
07/07/23 to 07/11/23



1 Year

HRSD NP - Lucas Creek PS

MMPS-148 (07/01/22 to 08/01/23)



Hampton Roads Sanitation District

Post-Storm Report



7/19/2023

DISCLAIMER:

About the information on this HRSD server

This report is intended to provide the HRSD regional community summary information about the HRSD system during select wet weather events/anomalies. The attached report contains a selection of *official* Interceptor and Treatment data, as well as other environmental and meteorological data provided through other services. In an effort to enhance the HRSD system, the attached products have been made accessible on this server and care must be taken when using such products as they are intended for informational and not operational, legal, or other purposes.

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Summary

On July 19th there was an approximate 8-hour rainfall event that resulted in 2 sites on the North Shore and 11 sites on the South Shore that met a 1 to 10-year rainfall recurrence interval throughout the HRSD rain gauge network. Hampton Roads saw high temps and multiple rounds of scattered thunderstorms. In fact, the majority of the area was under a flash flood warning most of the day, with Virginia Beach also seeing a severe thunderstorm warning issued. Hampton Roads also saw tornado watches issued later in the day. North Shore sites averaged around 0.6 inches of rain while South Shore sites averaged around 1.00 inches. There was a slight impact on groundwater levels compared to July 2022. See Appendix C for the Historical Shallow Well comparison.

No HRSD interceptor weather-related overflow(s) were reported.

HRSD flow and pressure meters met data reliability requirements per the MOM program. For all pressure meters in the aggregate and all pressure-side flow meters in the aggregate for each treatment plant service area listed below, at least 90% reliable data was achieved, based on the duration of system response to this rainfall event. The data reliability for the gravity flow meters is not included in this synopsis.

- Duration of system response: See Table Below
- Aggregate flow meter validity: 94.72%
- Aggregate pressure meter validity: 99.85%

Currently, rainfall recurrence intervals are only analyzed for a maximum of 96-hours. Rainfall analysis begins after 0.1 inches of rain has occurred. A 72-hour dry period of less than 0.1 inches of rain is typically used to signify two separate events. However, if a site returns to “dry weather” conditions prior to the next rainfall that occurs within 72 hours of the previous event, it is also considered for separate analysis. See Appendix A for the Rainfall Total System Maps.

The current criteria for publishing a post-storm analysis are the following:

- One or more rain gauge sites meet a two-year or greater RRI (rainfall recurrence interval) and at least 50% of sites in any treatment plant service area receive one inch of rainfall or greater,
- A rain gauge site meets a five-year or greater RRI, or
- A weather-related SSO occurs.

July 19th, 2023 – Post-Storm Rain Event Synopsis

Treatment Plant Data: *(Data obtained from Telog Database)*
 See Appendix B for HRSD Treatment Plant Flows

HRSD Treatment Plant Data 7/19/2023

North Shore				
Treatment Plant	Date of Peak Hourly Flow	Peak Hourly Flow (MGD)	Peak Hour	TPSA Total Rainfall Avg (in)
Boat Harbor	7/19/2023	23.52	17:00	0.70
James River	7/19/2023	20.23	16:00	0.28
Williamsburg	7/19/2023	15.48	16:00	0.52
York River	7/19/2023	15.14	16:00	0.71

HRSD Treatment Plant Data 7/19/2023

South Shore				
Treatment Plant	Date of Peak Hourly Flow	Peak Hourly Flow (MGD)	Peak Hour	TPSA Total Rainfall Avg (in)
Army Base	7/19/2023	25.65	17:00	2.04
Atlantic	7/19/2023	87.21	17:00	0.81
Nansemond	7/19/2023	32.04	16:00	1.15
VIP	7/19/2023	69.69	17:00	1.80

July 19th, 2023 – Post-Storm Rain Event Synopsis

North Shore

Weather:

Rainfall (HRSD Rainfall Gauges): *Recurrence intervals based on NOAA Atlas 14*

Rain Gauge Site	Peak Rainfall RI (Duration)	Locality
<i>Boat Harbor Treatment Plant Service Area¹</i>		
Bayshore PS	DNQ	HAMP
Bridge Street Tide Gate	DNQ	HAMP
Boat Harbor	DNQ	NEWP
Copeland Park PS	DNQ	NEWP
Hampton PS 159	DNQ	HAMP
<i>James River Treatment Plant Service Area¹</i>		
Hilton School PS	DNQ	NEWP
James River Main Flow (Influent)	DNQ	NEWP
Lee Hall PRS	DNQ	NEWP
Lucas Creek PS	DNQ	NEWP
Morrison PS	DNQ	NEWP
<i>Williamsburg Treatment Plant Service Area¹</i>		
Ford's Colony	DNQ	JCSA
Fort Eustis PS	DNQ	NEWP
Greensprings PS	DNQ	JCA
Solarex	DNQ	JCSA
Williamsburg Main Flow (Effluent)	DNQ	JCSA
Williamsburg PS	DNQ	WILL
York Skimino Hills PS	DNQ	YORK
<i>York River Treatment Plant Service Area¹</i>		
Big Bethel PRS	DNQ	HAMP
Freeman PS	DNQ	HAMP
Gloucester Court House	DNQ	GLOU
Guinea Rd at Maryus Rd	10-year (1hr)	GLOU
Ordinary PCV	DNQ	GLOU
Poquoson PS 6	DNQ	POQ
Wolf Trappe PCV	DNQ	YORK
York Kiln Creek 1 PS	DNQ	YORK
York PS 15	DNQ	YORK
York River Main Flow (Influent)	Disconnected	YORK
York River Crossing (York River Rectifier)	2-year (1hr)	GLOU

Note:

1. Typical treatment plant service area.

July 19th, 2023 – Post-Storm Rain Event Synopsis

Newport News-Williamsburg International (PHF)

- Wind and Rainfall (daily total):

Date	Gust (max)	Sustained (max)	Sustained (avg)	Direction	Rainfall (in)
7/19/23	32 mph	12 mph	3 mph	SW	0.03

Tide:

- Yorktown USCG Training Center:
 - Storm Surge: An approximate 0.75-foot storm surge was observed.

NOAA/NOS/CO-OPS Observed Water Levels at YorktownUSCG Unverified Preliminary Data

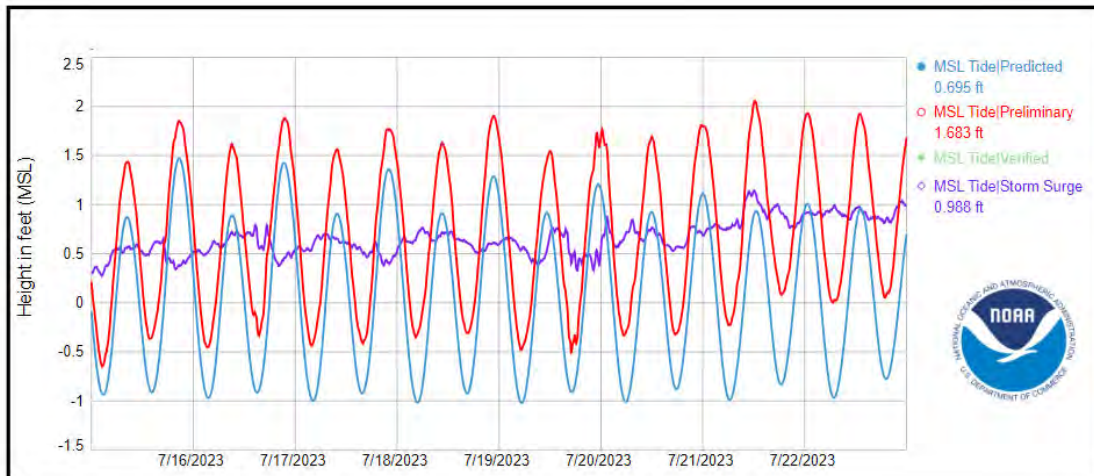
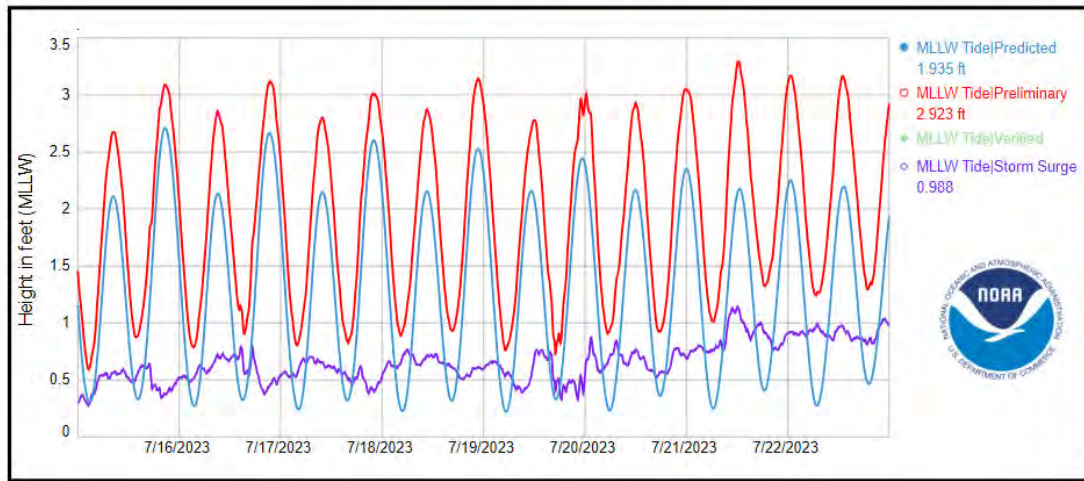


Figure 1. Preliminary data obtained from NOAA and a connection with Open Weather

- Sewells Point Tide Station:
 - Storm Surge: An approximate 0.75 foot storm surge was observed.

NOAA/NOS/CO-OPS Observed Water Levels at SewellsPoint Unverified Preliminary Data

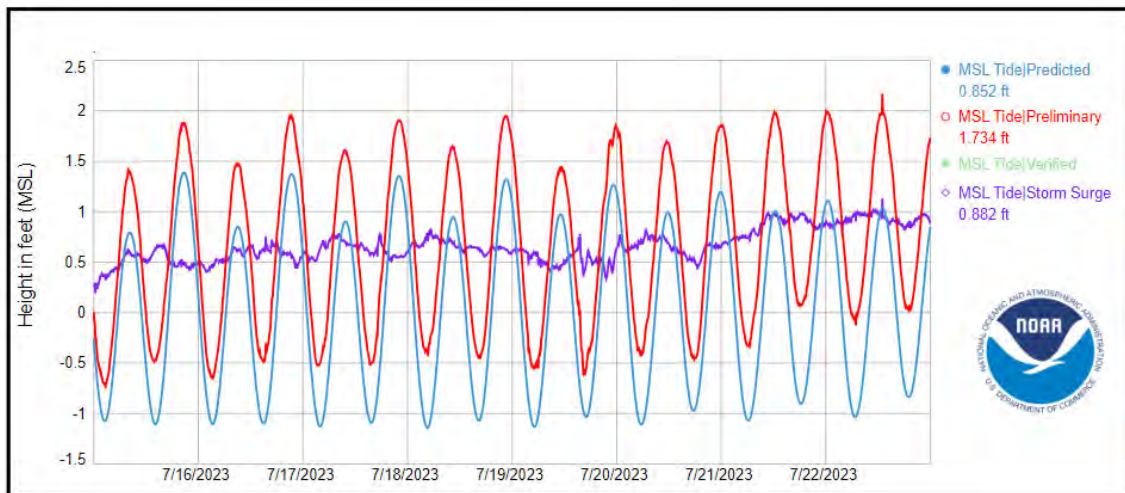
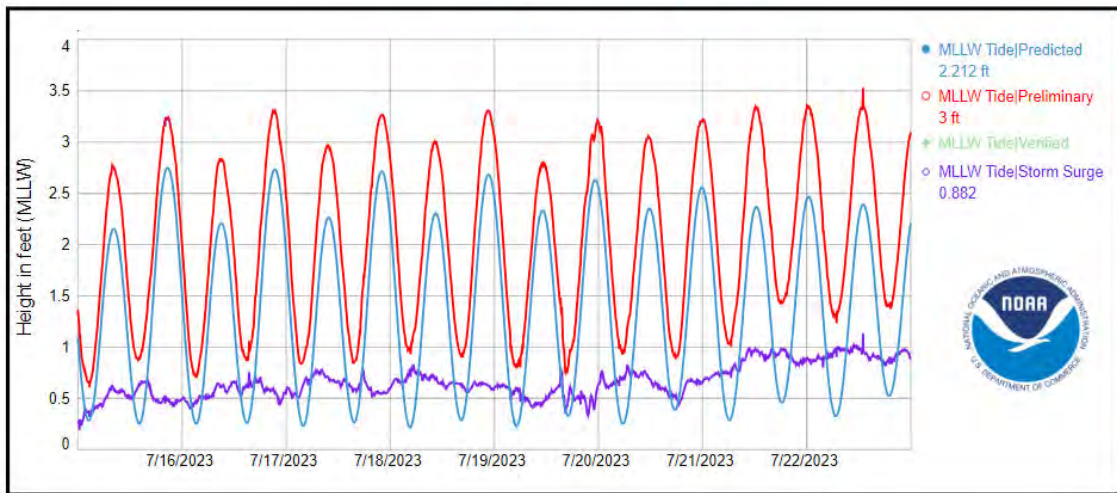


Figure 2. Preliminary data obtained from NOAA and a connection with Open Weather

July 19th, 2023 – Post-Storm Rain Event Synopsis

South Shore

Weather:

Rainfall (HRSD Rainfall Gauges): *Recurrence intervals based on NOAA Atlas 14*

Rain Gauge Site	Peak Rainfall RI (Duration)	Locality
<i>Army Base Treatment Plant Service Area¹</i>		
Bancker Rd (Dovercourt Discharge)	2- to 5-year (2hr)	NORF
Taussig Blvd PS	2-year (1hr)	NORF
<i>Atlantic Treatment Plant Service Area¹</i>		
Callison at GB Locks	DNQ	CHES
Chesapeake PS 243	DNQ	CHES
Chesapeake PS 254	DNQ	CHES
Courthouse PRS	DNQ	VAB
Elbow Rd	DNQ	CHES
John B. Dey MLV-AT side	DNQ	VAB
Kempsville PRS	DNQ	VAB
Lagomar IFM at Atlantic TP	DNQ	VAB
Laskin Rd PRS	DNQ	VAB
Pine Tree PRS	DNQ	VAB
Shipps Corner PRS	DNQ	VAB
<i>Ches-Liz Treatment Plant Service Area¹</i>		
Dozier's Corner PS	DNQ	CHES
Independence PRS	DNQ	VAB
Northampton Blvd at Wesleyan Dr	2-year (1hr)	NORF
Providence PRS	DNQ	VAB
Shore Dr @ Jack Frost	2-year (1hr)	CHES
<i>Nansemond Treatment Plant Service Area¹</i>		
Bowers Hill PRS	DNQ	CHES
Cedar Lane PS	DNQ	PORT
Chesapeake PS 158	DNQ	CHES
Chesapeake PS 238	DNQ	CHES
Crittenden Rd_Chuckatuck Rectifier	DNQ	SUFF
Deep Creek PRS	DNQ	CHES
Lake Kilby WTP	DNQ	SUFF
Nansemond Main Flow (Effluent)	10-year (1hr)	SUFF
Pagan River Rectifier	DNQ	IOW
Pughsville PS	2-year (1hr)	SUFF
Route 337 PRS	DNQ	CHES
Smithfield High School	DNQ	IOW
Suffolk PS	DNQ	SUFF
Suffolk PS 81	DNQ	SUFF
Suffolk PS 87	1- to 2-year (1hr)	SUFF
Windsor Duke St PS	DNQ	IOW

July 19th, 2023 – Post-Storm Rain Event Synopsis

VIP Treatment Plant Service Area¹

Rain Gauge Site	Peak Rainfall RI (Duration)	Locality
Elizabeth River Crossing_Eastern Branch	1-year (1hr)	NORF
Ferebee Avenue PS	DNQ	CHES
Luxembourg Avenue PS	5-year (1hr)	NORF
Rodman Ave PS	DNQ	PORT
Va Beach Blvd PS	2-year (1hr)	NORF
VIP Main Flow (Effluent)	2-year (1hr)	NORF

Note:

1. Typical treatment plant service area.

*Duration represents the minimum amount of time it took to reach the specified RRI.

Norfolk International Airport (ORF)

o Wind and Rainfall (daily total):

Date	Gust (max)	Sustained (max)	Sustained (avg)	Direction	Rainfall (in)
7/19/2023	30 mph	14 mph	5 mph	SW	1.80

Tide:

- Sewells Point Tide Station:
 - Storm Surge: An approximate 0.75 foot storm surge was observed.

NOAA/NOS/CO-OPS Observed Water Levels at SewellsPoint Unverified Preliminary Data

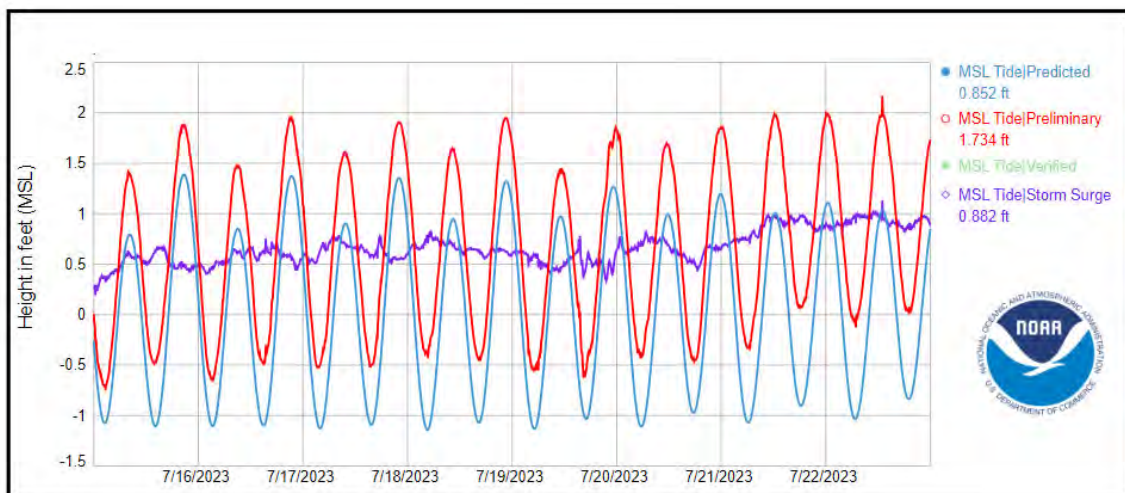
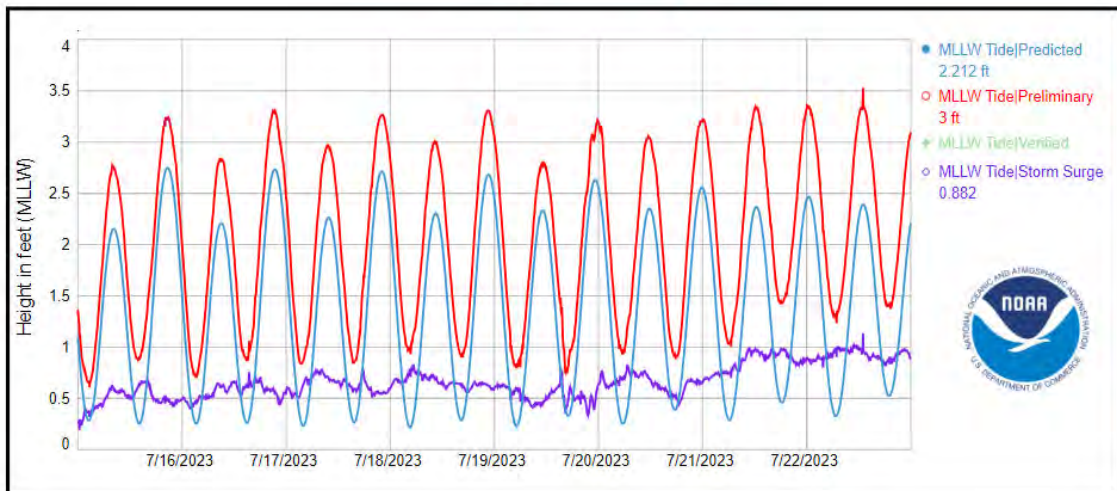


Figure 3. Preliminary data obtained from NOAA and a connection with Open Weather

Shallow Well Analysis:

Shallow wells are located at/or near HRSD Pump Stations to measure groundwater levels. The water column is measured using a pressure transducer located near the bottom of the well. The installed sensor measures gauge pressure in inches of water. The Shallow Well_NAVD88 measurement referenced in Appendix C refers to the elevation (referenced as NAVD 88) of the sensor plus the gauge measurement in feet.

DRAFT

Appendix A

HRSD Rain Gauge Network
Rainfall Totals

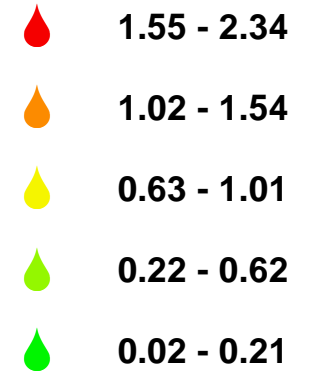
North Shore

July 19, 2023

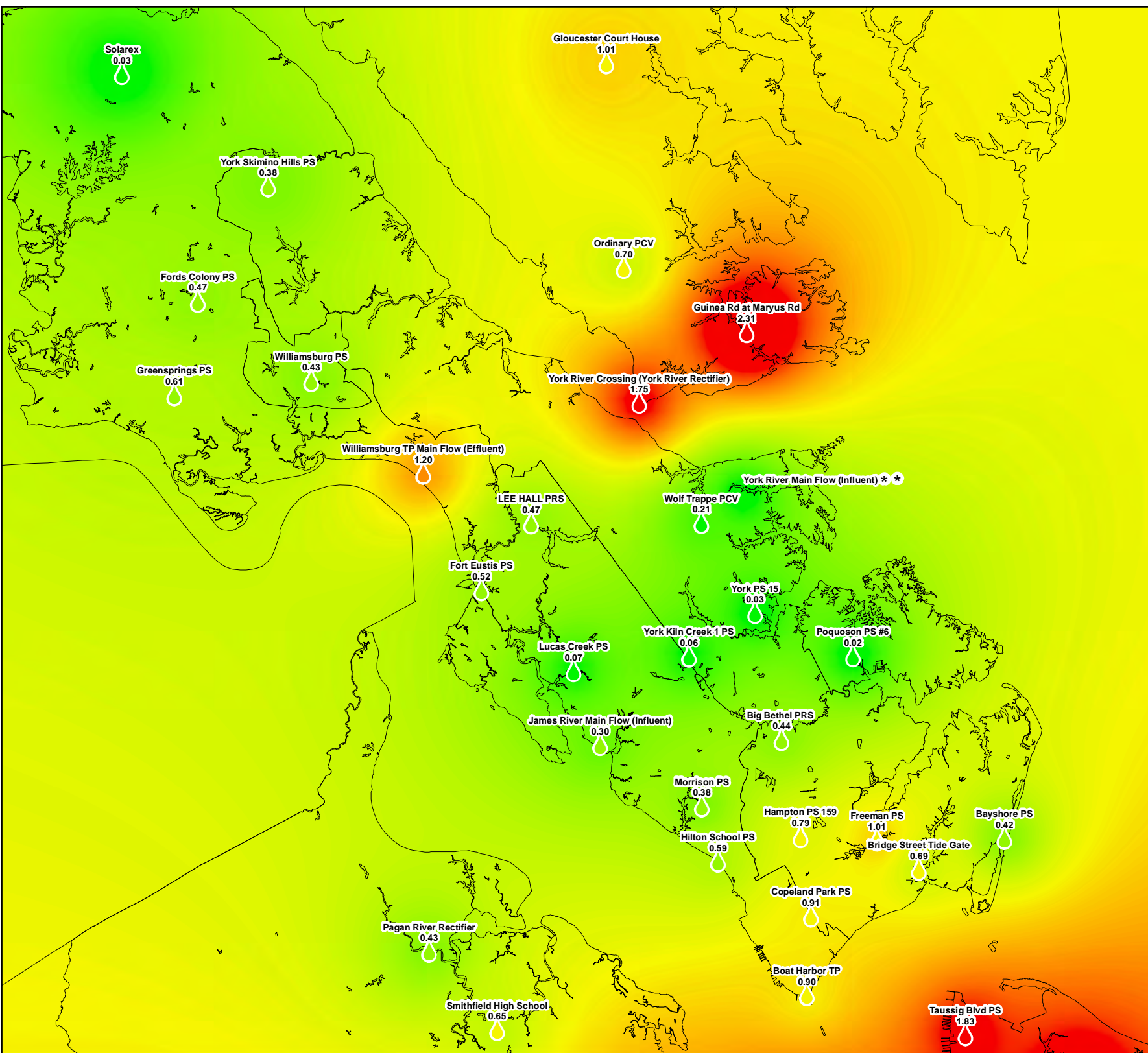
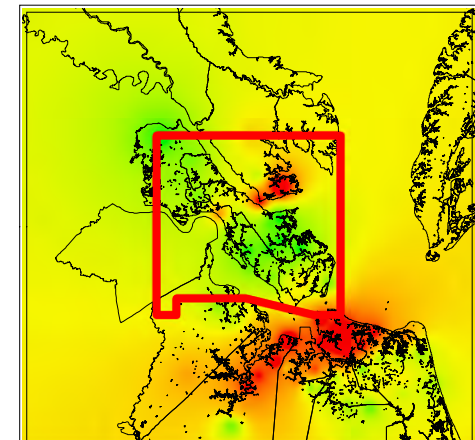
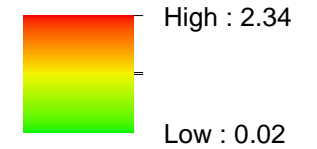
Rainfall Analysis

Total Rainfall

Rain Gauges (in):



Value

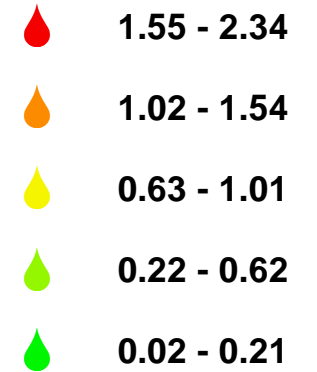


*Note: Rain Gauge was invalid for event and an average of surrounding sites was used. **Rain gauge disconnected during event

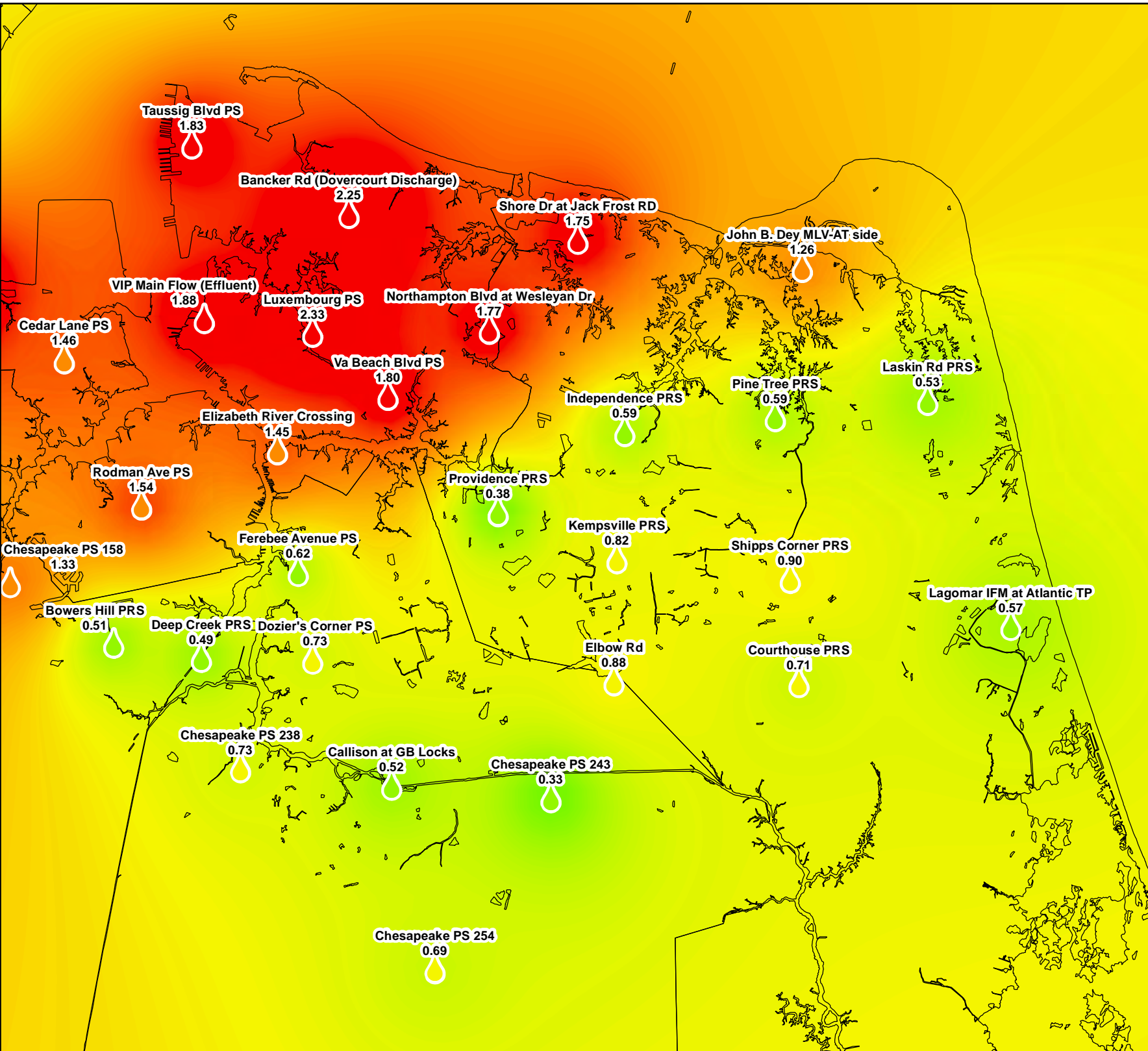
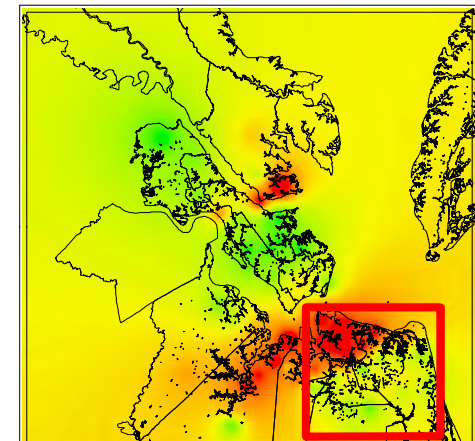
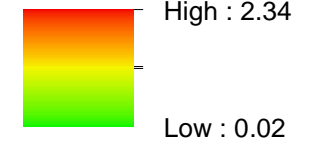
South Shore - East

July 19, 2023 Rainfall Analysis Total Rainfall

Rain Gauges (in):



Value








*Note: Rain Gauge was invalid for event and an average of surrounding sites was used. **Rain gauge disconnected during event

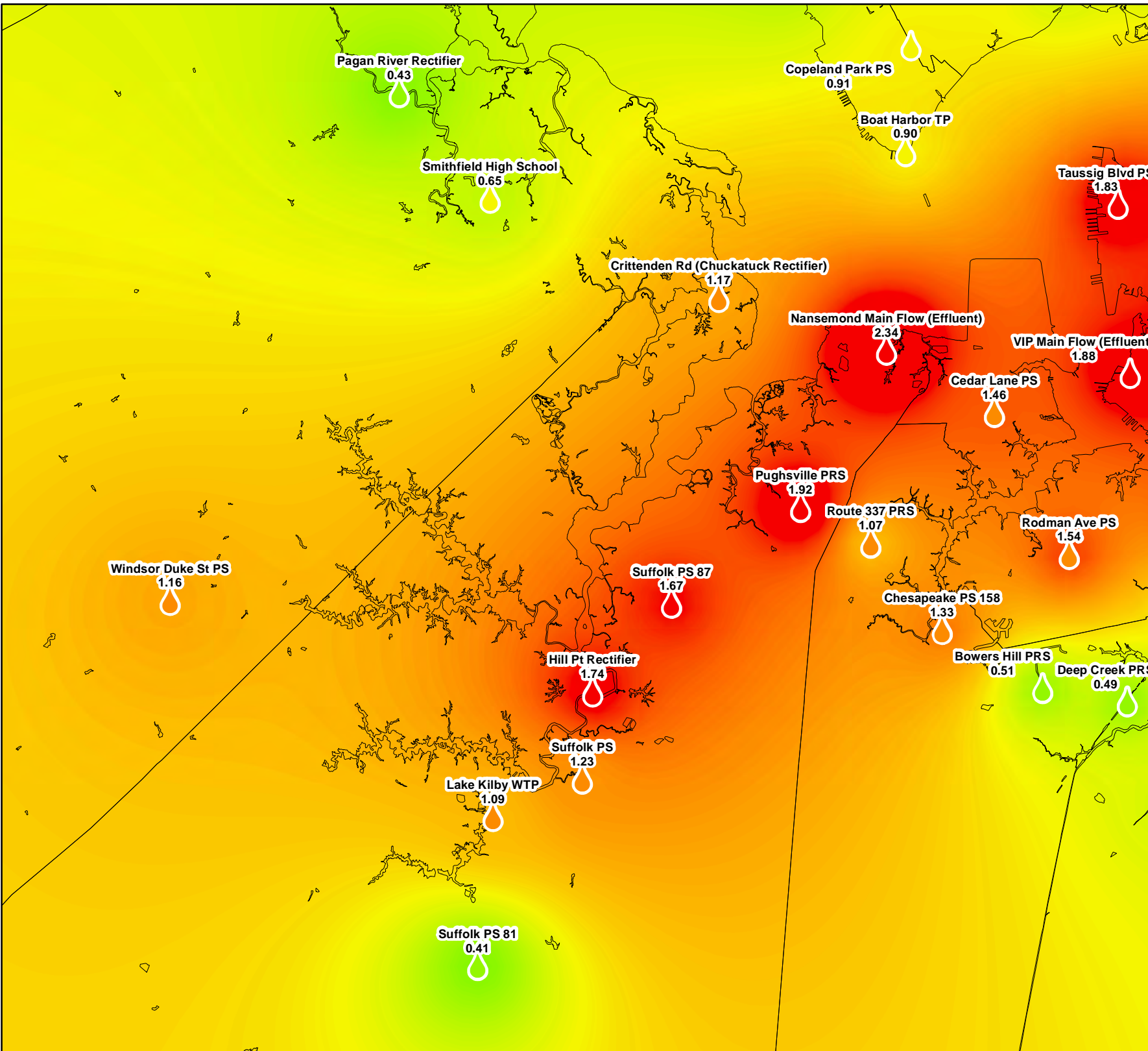
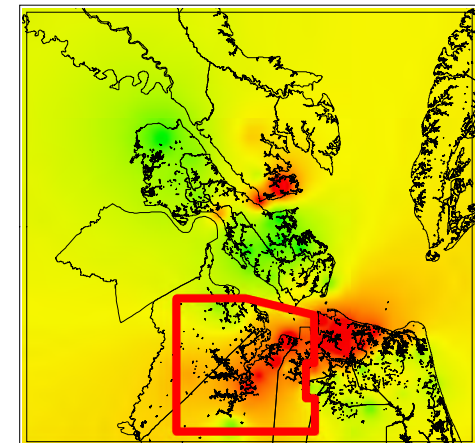
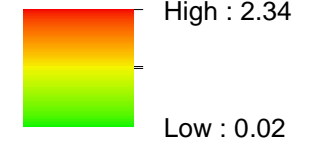
South Shore - West

July 19, 2023 Rainfall Analysis Total Rainfall

Rain Gauges (in):

-  1.55 - 2.34
-  1.02 - 1.54
-  0.63 - 1.01
-  0.22 - 0.62
-  0.02 - 0.21

Value



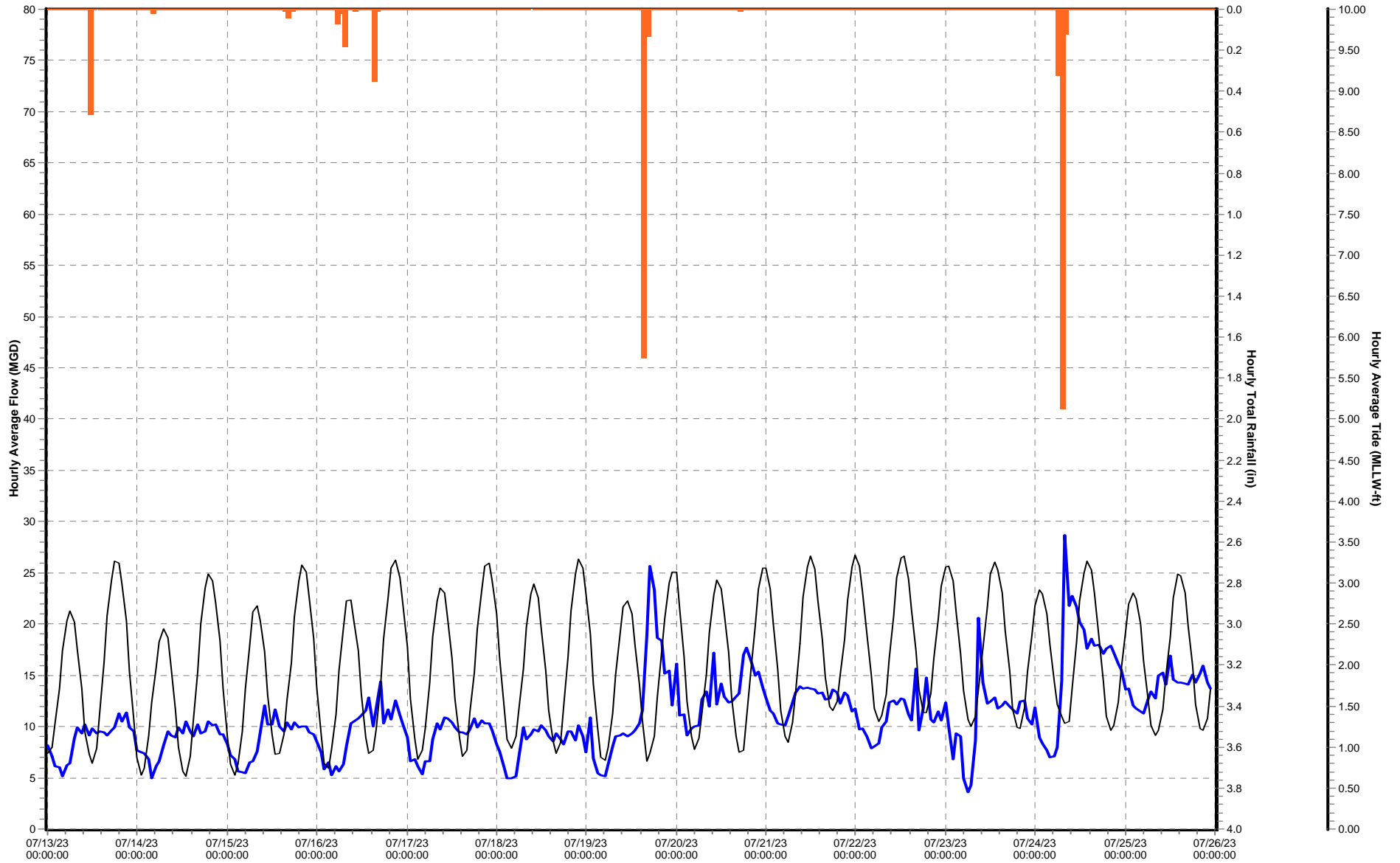
*Note: Rain Gauge was invalid for event and an average of surrounding sites was used. **Rain gauge disconnected during event

Appendix B

HRSD Treatment Plant Flows

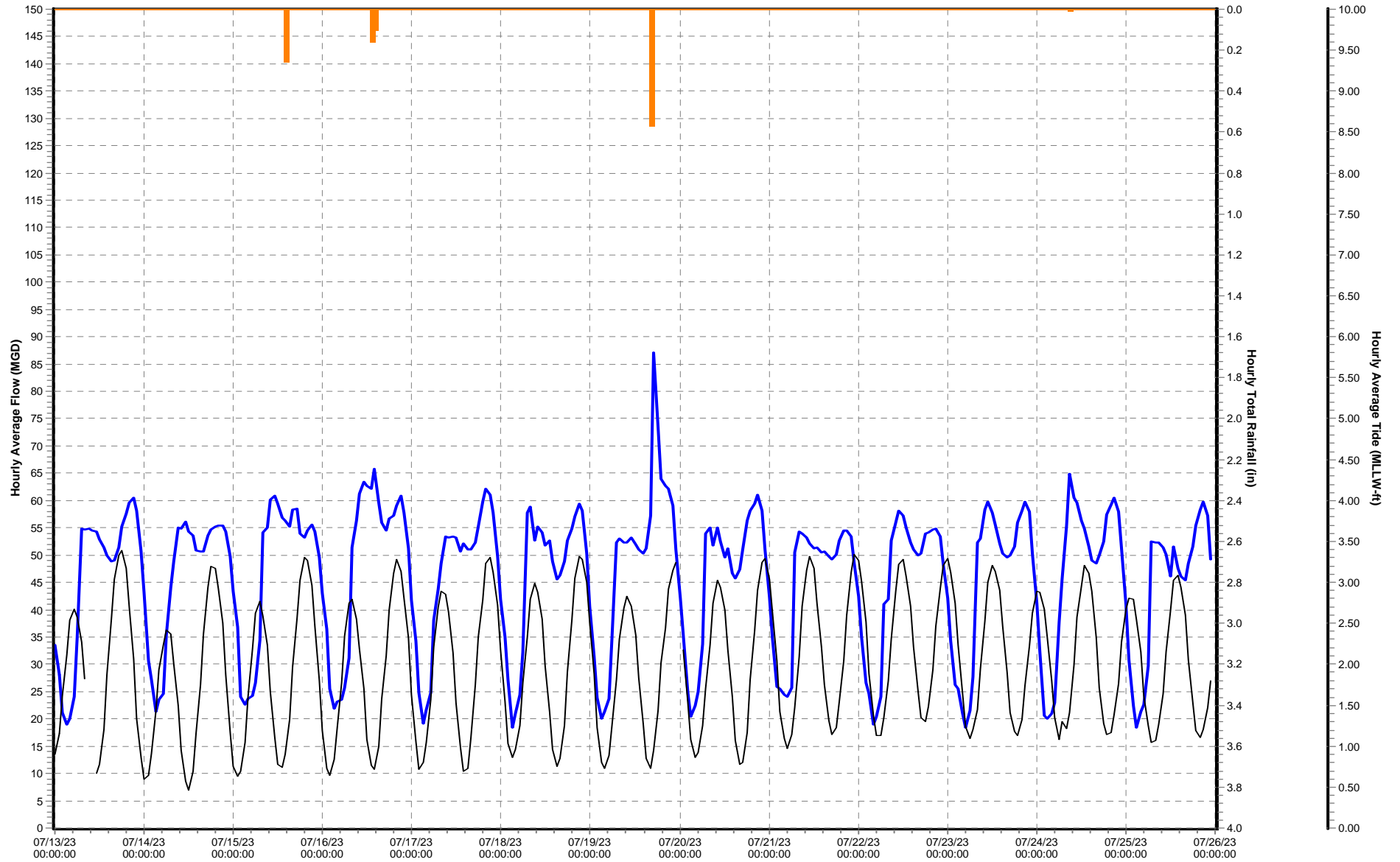
Army Base Treatment Plant

MMPS-035 (07/13/23 to 07/26/23)



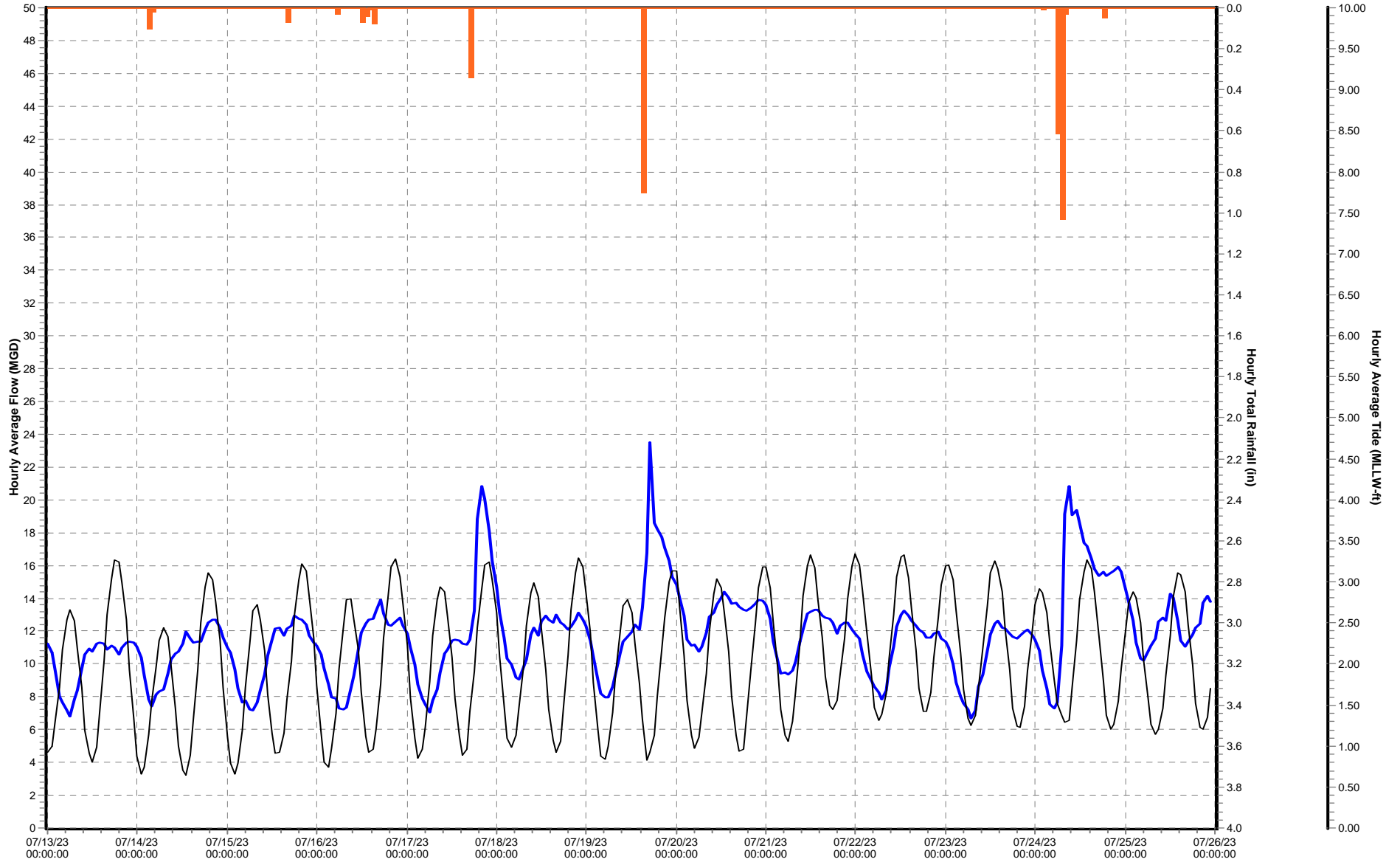
Atlantic Treatment Plant
MMPS-071 (07/13/23 to 07/26/23)

Flow_Effluent (MGD) MMPS-185: Lagomar IFM at Atlantic TP Rain Gauge CBBT Tide - MLLW Preliminary (ft)



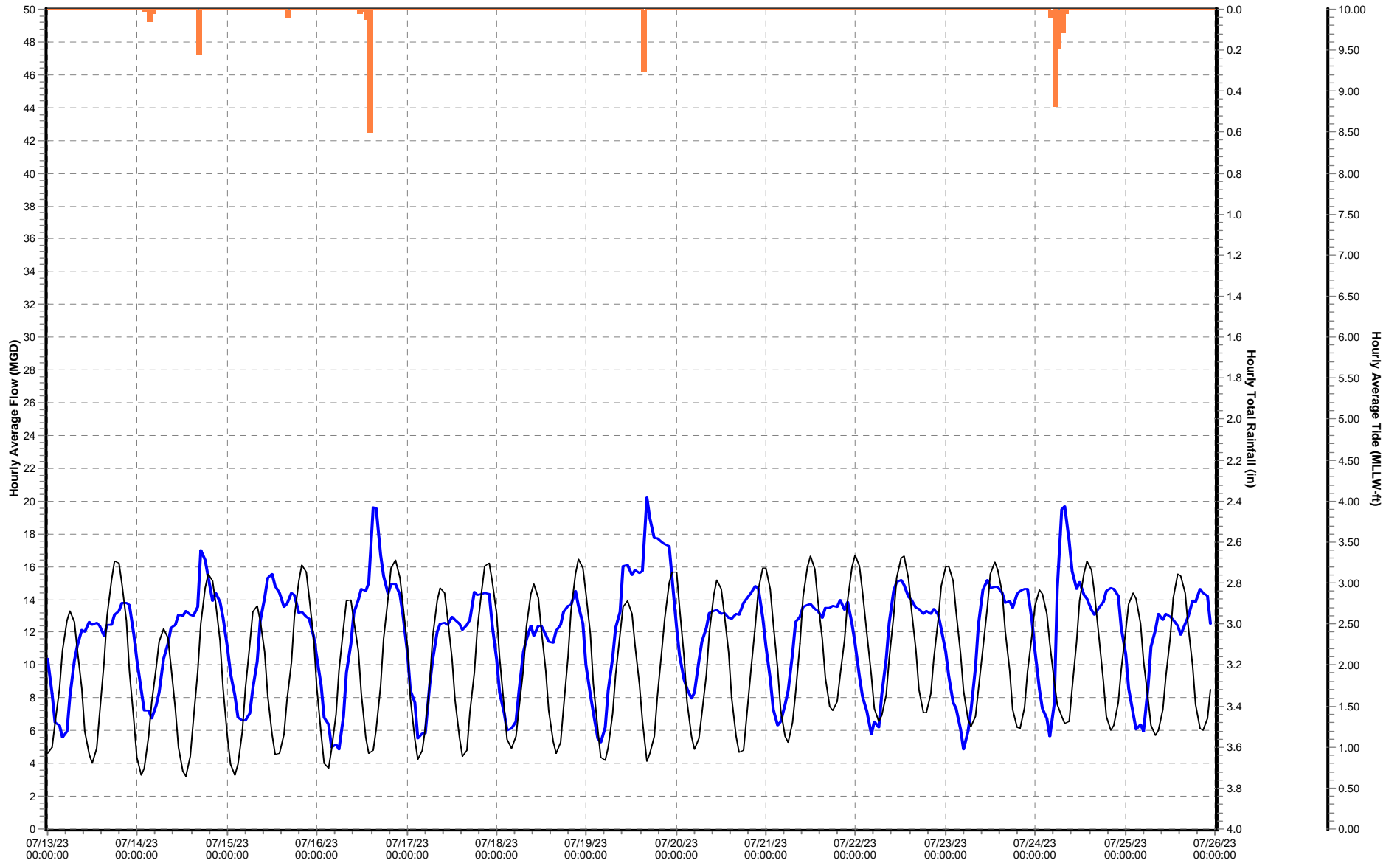
Boat Harbor Treatment Plant

MMPS-075 (07/13/23 to 07/26/23)



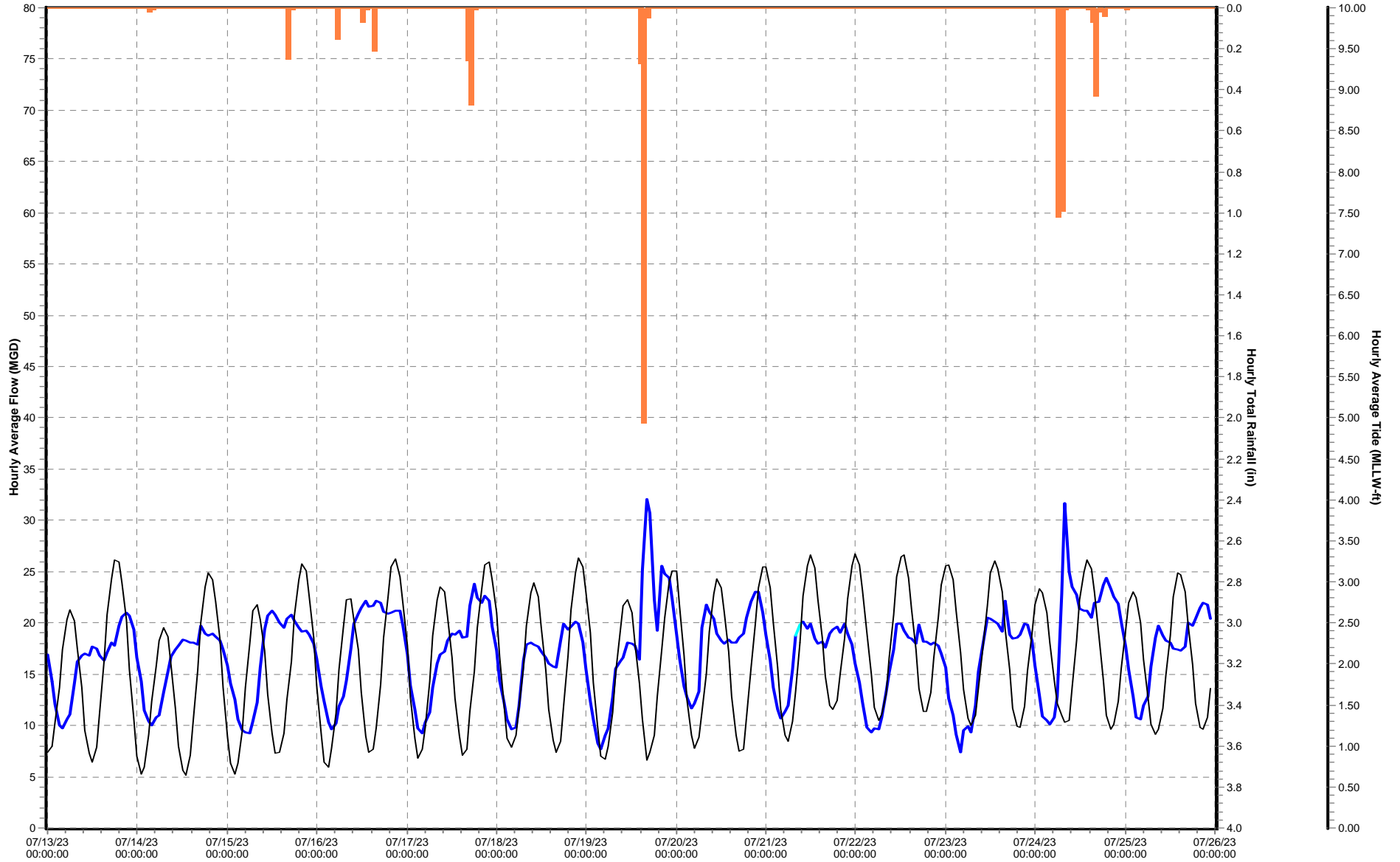
James River Treatment Plant
MMPS-184 (07/13/23 to 07/26/23)

Flow_Influent (MGD) Rainfall @ JRTP SewellsPt Tide - MLLW Preliminary (ft)



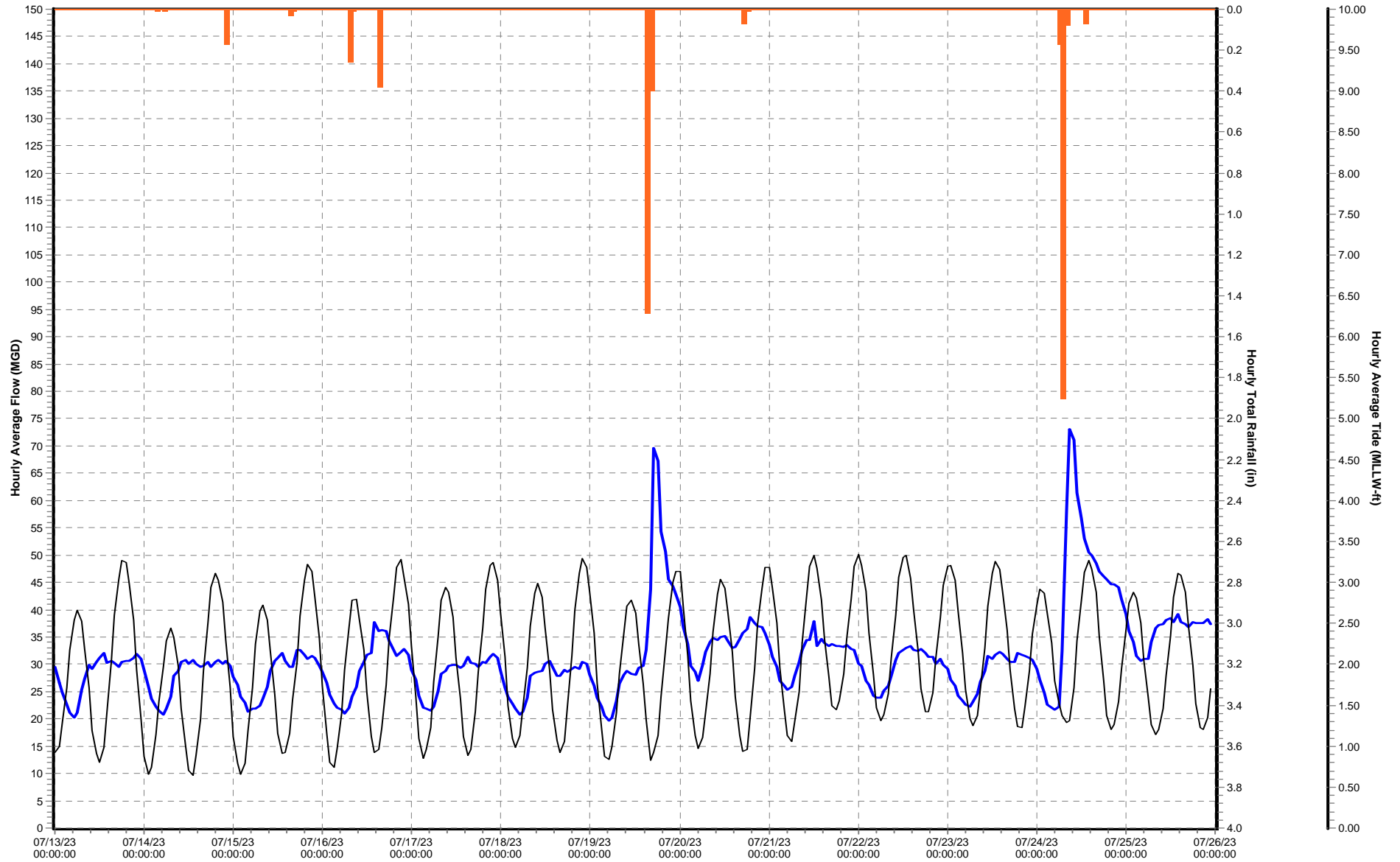
Nansemond Treatment Plant
MMPS-202 (07/13/23 to 07/26/23)

Flow_Effluent (MGD) MMPS-202: Nansemond Main Flow_Effluent Rain Gauge SewellsPt Tide - MLLW Preliminary (ft)



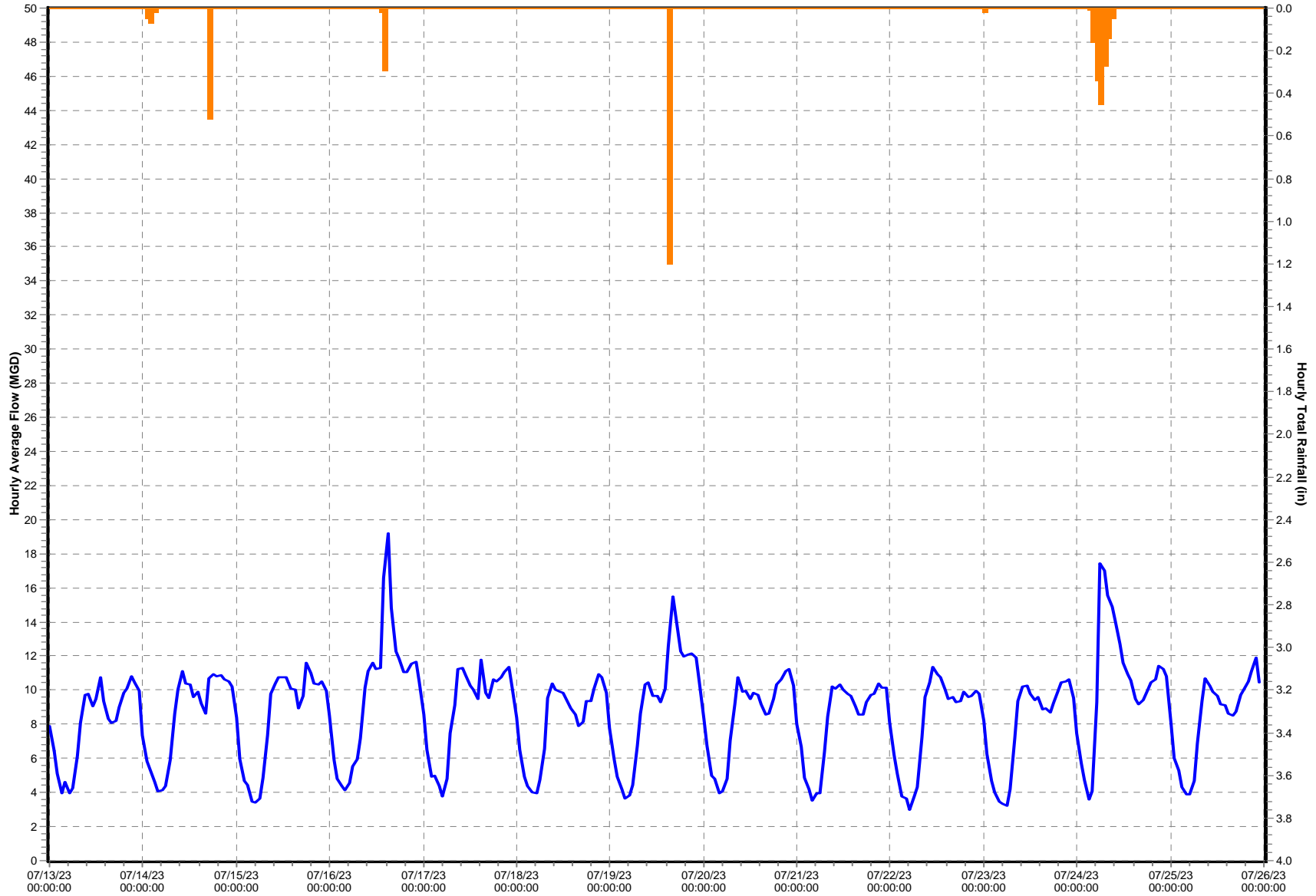
VIP Treatment Plant
MMPS-003 (07/13/23 to 07/26/23)

Flow_Effluent (MGD) MMPS-003: VIP Treatment Plant Rain Gauge SewellsPt Tide - MLLW Preliminary



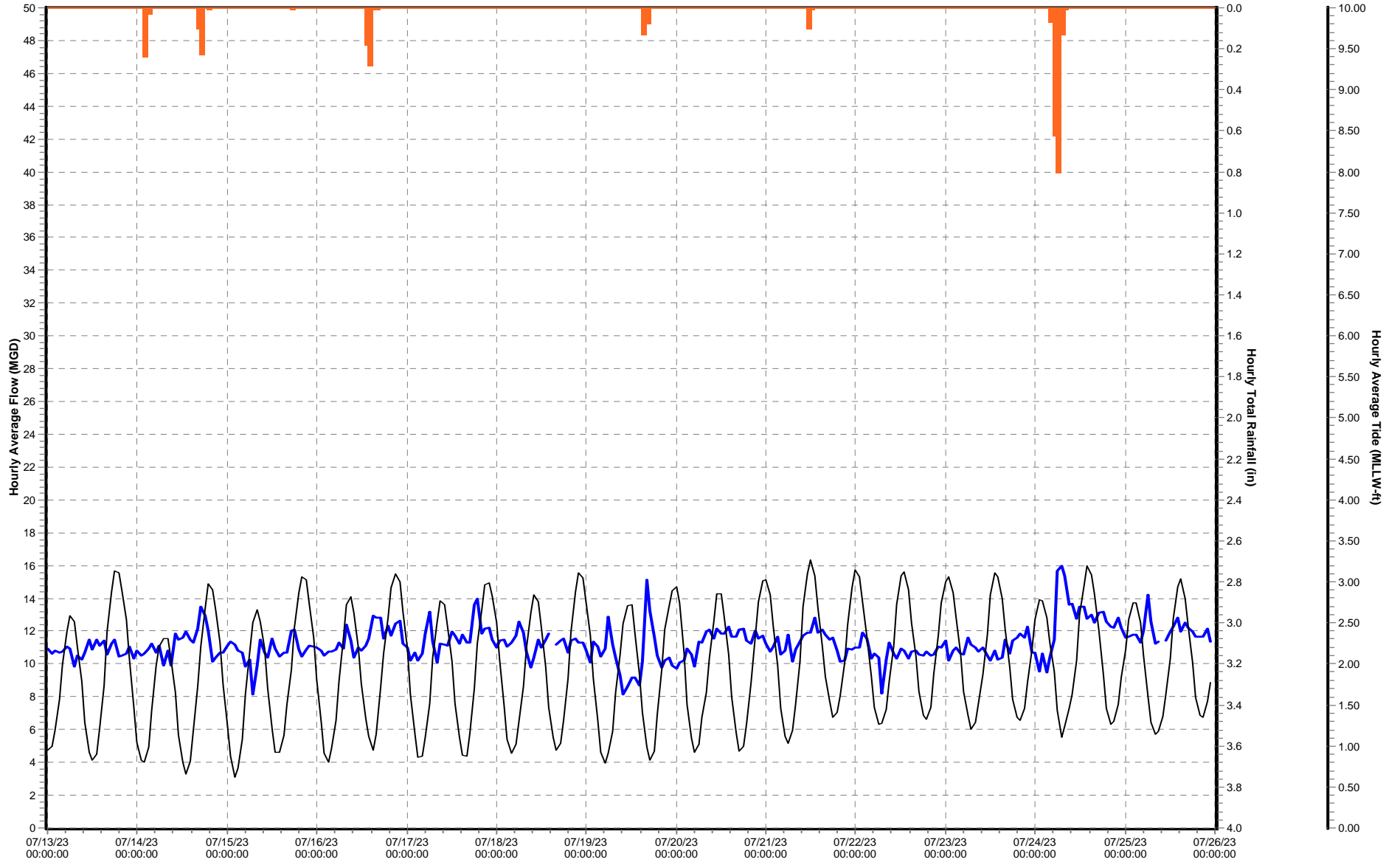
Williamsburg Treatment Plant

MMPS-222 (07/13/23 to 07/26/23)



York River Treatment Plant

MMPS-235 (07/13/23 to 07/26/23)

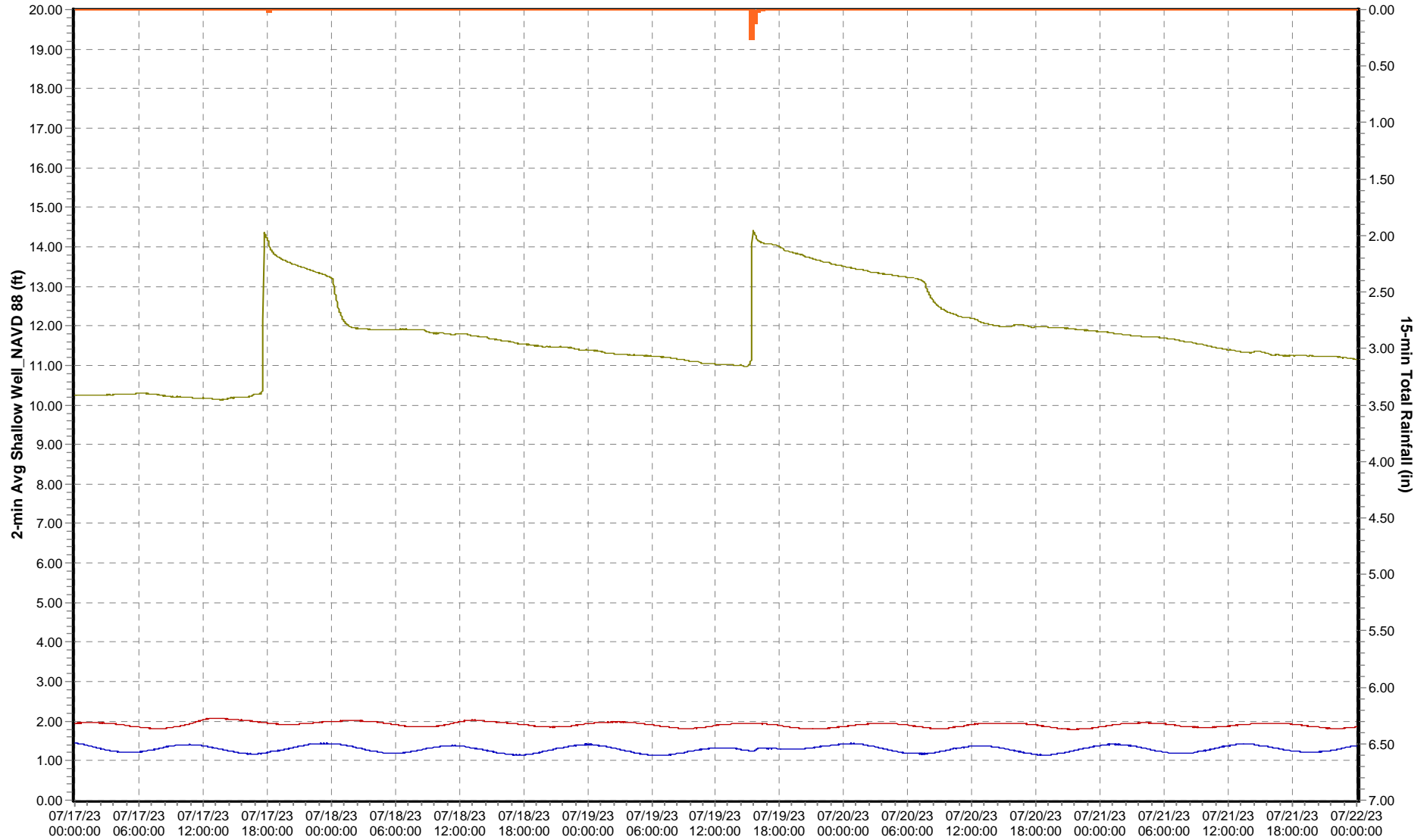


Appendix C

Shallow Well Analysis

5-day
North Shore Shallow Well Graphs
07/17/23 to 07/22/23

MMPS - 148 Lucas Creek PS Shallow Well NAVD88 MMPS - 180 Willard Ave PS Shallow Well NAVD88 MMPS - 011 Copeland Park PS Shallow Well NAVD88
 MMPS - 116 Bayshore PS Rain Guage (in)

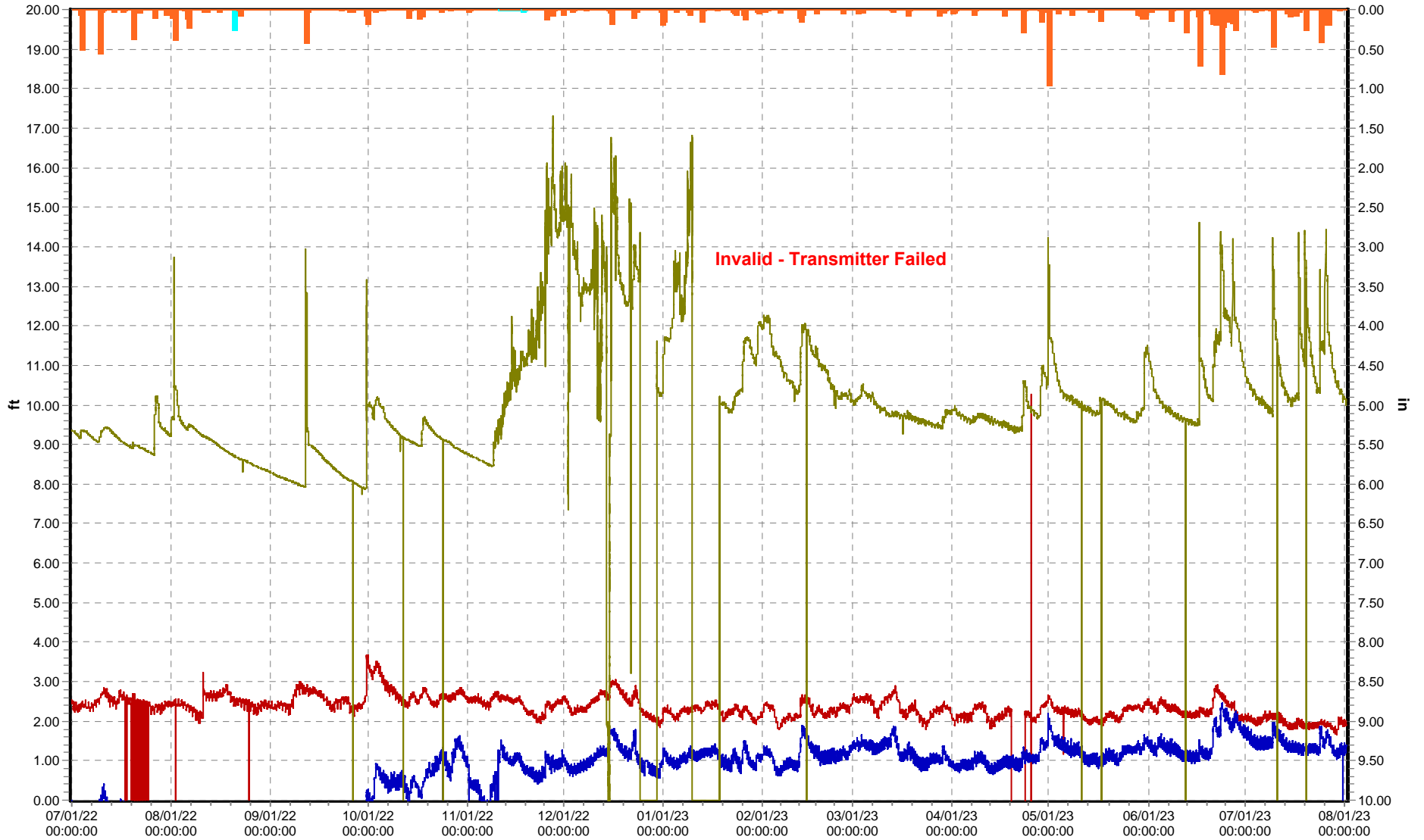


Teal showing invalid RG data

North Shore Shallow Well Graphs

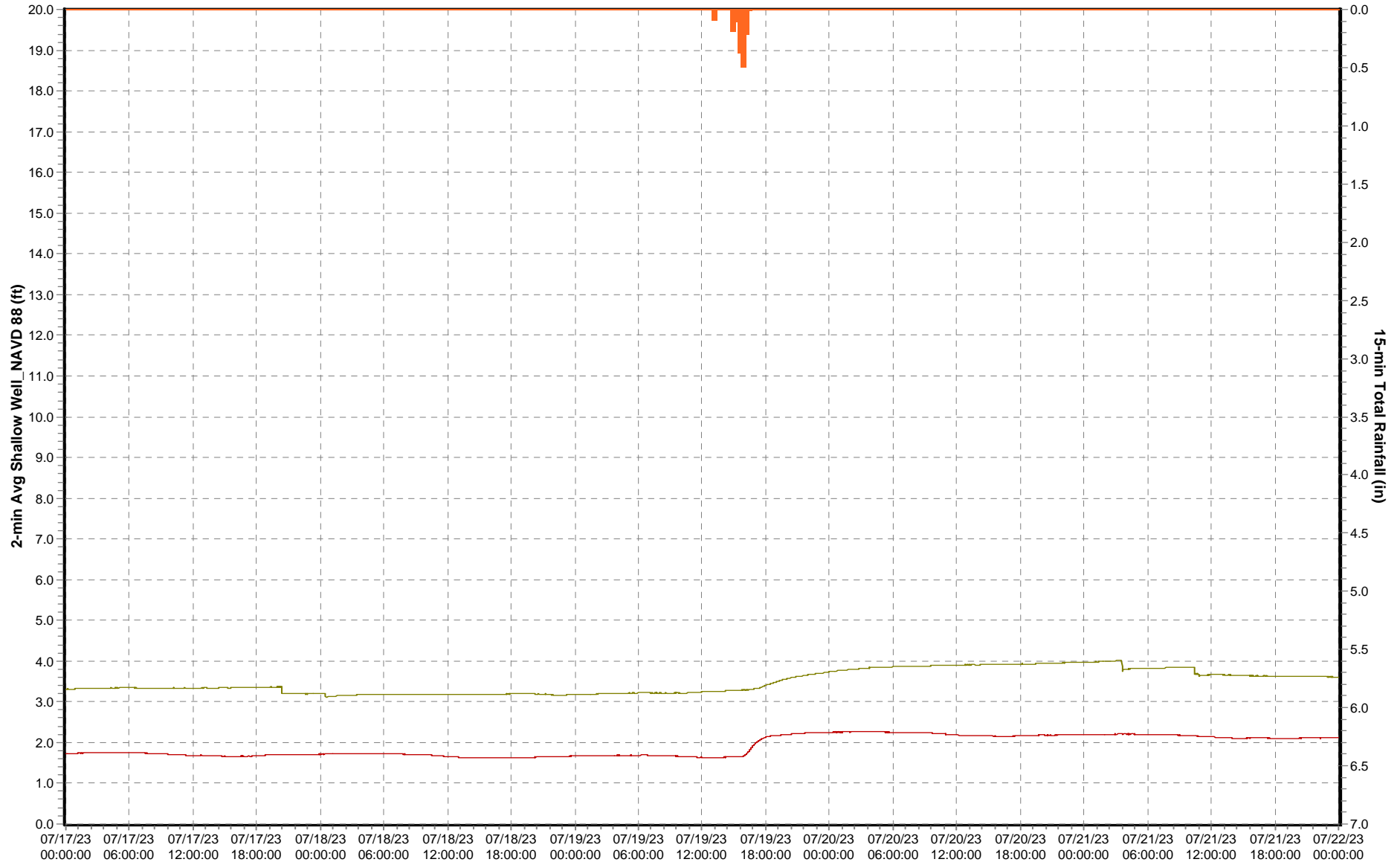
(07/01/22 to 08/01/23)

- MMPS - 148 Lucas Creek PS Shallow Well NAVD88
- MMPS - 180 Willard Ave PS Shallow Well NAVD88
- MMPS - 011 Copeland Park PS Shallow Well NAVD88
- █ MMPS - 116 Bayshore PS Rain Guage (in)



5-day
South Shore Shallow Well Graphs
07/17/23 to 07/22/23

North Shore Rd PS. Shallow Well NAVD88 (ft) Camden Ave PS. Shallow Well_NAVD 88 (ft) Rodman Ave PS. Rain Gauge (in)

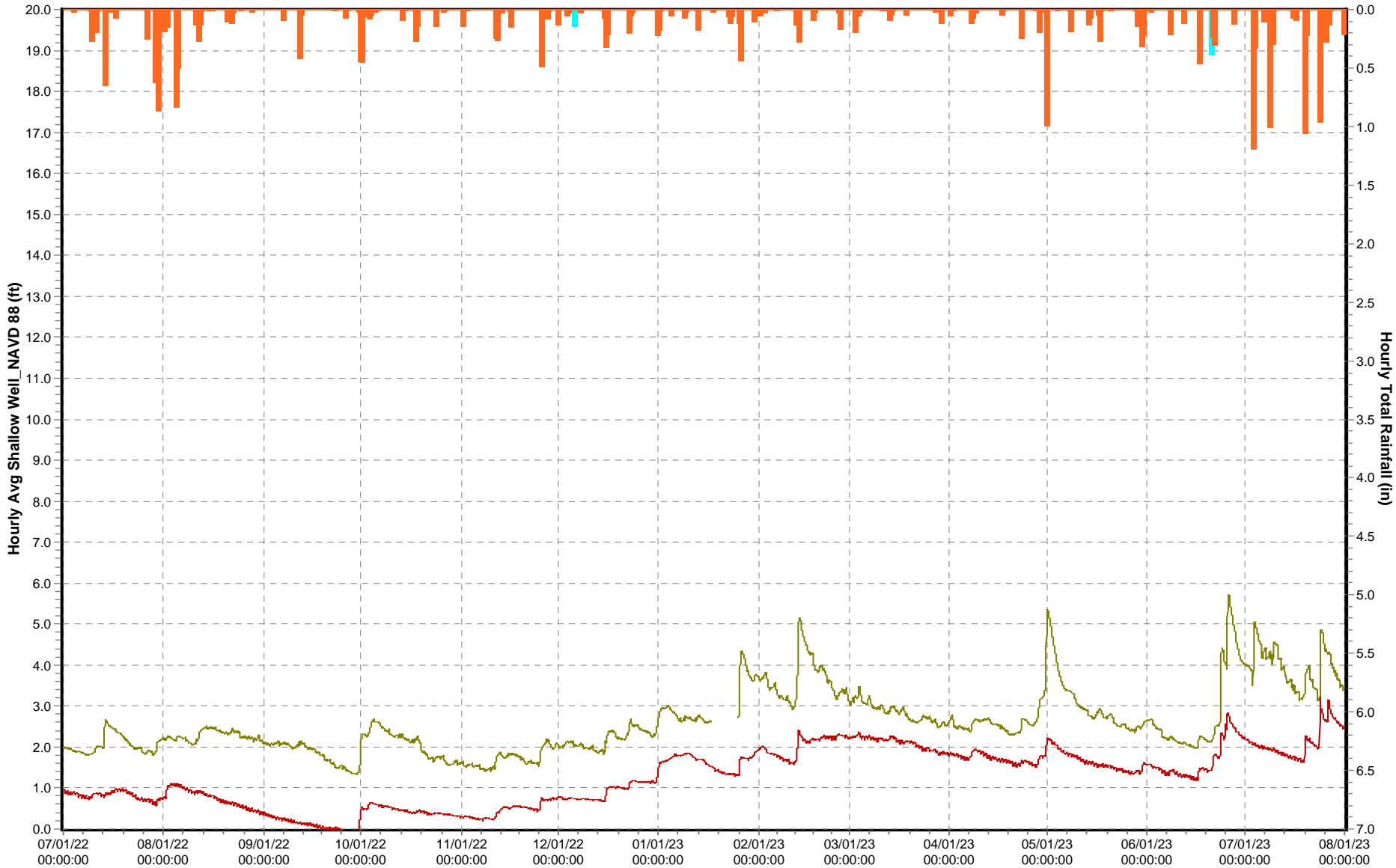


Teal showing invalid RG data

South Shore Shallow Well Graphs

07/01/22 to 08/01/23

North Shore Rd.Shallow Well_NAVD 88 (ft) Camden Ave PS.Shallow Well_NAVD 88 (ft) Rodman Ave PS. Rain Gauge (in)



Hampton Roads Sanitation District

Post-Storm Report



7/24/2023

DISCLAIMER:

About the information on this HRSD server

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These data are part of HRSD's governmental function and HRSD reserves all rights and immunities relating to these data and the terms and manner in which it is made available.

Summary

On July 24th, there was an approximate 13-hour rainfall event that resulted in 4 sites on the North Shore and 12 sites on the South Shore that met a 1 to 5-year rainfall recurrence interval throughout the HRSD rain gauge network. A large amount of moisture was pushed into the area from the southeast and a weak area of low pressure was moving east just to the south of the area. This brought heavy downpours and localized flooding in the early hours of the morning. This was followed by more isolated storms in the afternoon. North Shore sites averaged around 1.00 inches of rain while South Shore sites averaged around 1.00 inches. There was minimal impact on groundwater levels compared to July 2022. See Appendix C for the Historical Shallow Well comparison.

No HRSD interceptor weather-related overflow(s) were reported.

HRSD flow and pressure meters met data reliability requirements per the MOM program. For all pressure meters in the aggregate and all pressure-side flow meters in the aggregate for each treatment plant service area listed below, at least 90% reliable data was achieved, based on the duration of system response to this rainfall event. The data reliability for the gravity flow meters is not included in this synopsis.

- Duration of system response: See Table Below
- Aggregate flow meter validity: 94.30%
- Aggregate pressure meter validity: 99.65%

Currently, rainfall recurrence intervals are only analyzed for a maximum of 96-hours. Rainfall analysis begins after 0.1 inches of rain has occurred. A 72-hour dry period of less than 0.1 inches of rain is typically used to signify two separate events. However, if a site returns to “dry weather” conditions prior to the next rainfall that occurs within 72 hours of the previous event, it is also considered for separate analysis. See Appendix A for the Rainfall Total System Maps.

The current criteria for publishing a post-storm analysis are the following:

- One or more rain gauge sites meet a two-year or greater RRI (rainfall recurrence interval) and at least 50% of sites in any treatment plant service area receive one inch of rainfall or greater,
- A rain gauge site meets a five-year or greater RRI, or
- A weather-related SSO occurs.

Treatment Plant Data: *(Data obtained from Telog Database)*
 See Appendix B for HRSD Treatment Plant Flows

**HRSD Treatment Plant Data
 7/24/2023**

North Shore				
Treatment Plant	Date of Peak Hourly Flow	Peak Hourly Flow (MGD)	Peak Hour	TPSA Total Rainfall Avg (in)
Boat Harbor	7/24/2023	20.84	9:00	1.12
James River	7/24/2023	19.66	8:00	0.87
Williamsburg	7/24/2023	17.46	6:00	0.82
York River	7/24/2023	15.99	7:00	0.98

**HRSD Treatment Plant Data
 7/24/2023**

South Shore				
Treatment Plant	Date of Peak Hourly Flow	Peak Hourly Flow (MGD)	Peak Hour	TPSA Total Rainfall Avg (in)
Army Base	7/24/2023	28.66	15:00	2.08
Atlantic	7/24/2023	64.92	9:00	0.33
Nansemond	7/24/2023	31.70	8:00	1.28
VIP	7/24/2023	73.11	9:00	1.77

July 24th, 2023 – Post-Storm Rain Event Synopsis

North Shore

Weather:

Rainfall (HRSD Rainfall Gauges): *Recurrence intervals based on NOAA Atlas 14*

Rain Gauge Site	Peak Rainfall RI (Duration)	Locality
<i>Boat Harbor Treatment Plant Service Area¹</i>		
Bayshore PS	1-year (2hr)	HAMP
Bridge Street Tide Gate	DNQ	HAMP
Boat Harbor	1-year (3hr)	NEWP
Copeland Park PS	DNQ	NEWP
Hampton PS 159	DNQ	HAMP
<i>James River Treatment Plant Service Area¹</i>		
Hilton School PS	DNQ	NEWP
James River Main Flow (Influent)	DNQ	NEWP
Lee Hall PRS	DNQ	NEWP
Lucas Creek PS	DNQ	NEWP
Morrison PS	DNQ	NEWP
<i>Williamsburg Treatment Plant Service Area¹</i>		
Ford's Colony	DNQ	JCSA
Fort Eustis PS	DNQ	NEWP
Greensprings PS	DNQ	JCA
Solarex	DNQ	JCSA
Williamsburg Main Flow (Effluent)	DNQ	JCSA
Williamsburg PS	DNQ	WILL
York Skimino Hills PS	DNQ	YORK
<i>York River Treatment Plant Service Area¹</i>		
Big Bethel PRS	DNQ	HAMP
Freeman PS	DNQ	HAMP
Gloucester Court House	DNQ	GLOU
Guinea Rd at Maryus Rd	DNQ	GLOU
Ordinary PCV	DNQ	GLOU
Poquoson PS 6	DNQ	POQ
Wolf Trappe PCV	1-year (1hr)	YORK
York Kiln Creek 1 PS	DNQ	YORK
York PS 15	DNQ	YORK
York River Main Flow (Influent)	Disconnected	YORK
York River Crossing (York River Rectifier)	1-year (1hr)	GLOU

Note:

1. Typical treatment plant service area.

July 24th, 2023 – Post-Storm Rain Event Synopsis

Newport News-Williamsburg International (PHF)

○ Wind and Rainfall (daily total):

Date	Gust (max)	Sustained (max)	Sustained (avg)	Direction	Rainfall (in)
7/24/2023	29 mph	22 mph	6 mph	E	0.90

Tide:

- Yorktown USCG Training Center:
 - Storm Surge: An approximate 1.01-foot storm surge was observed.

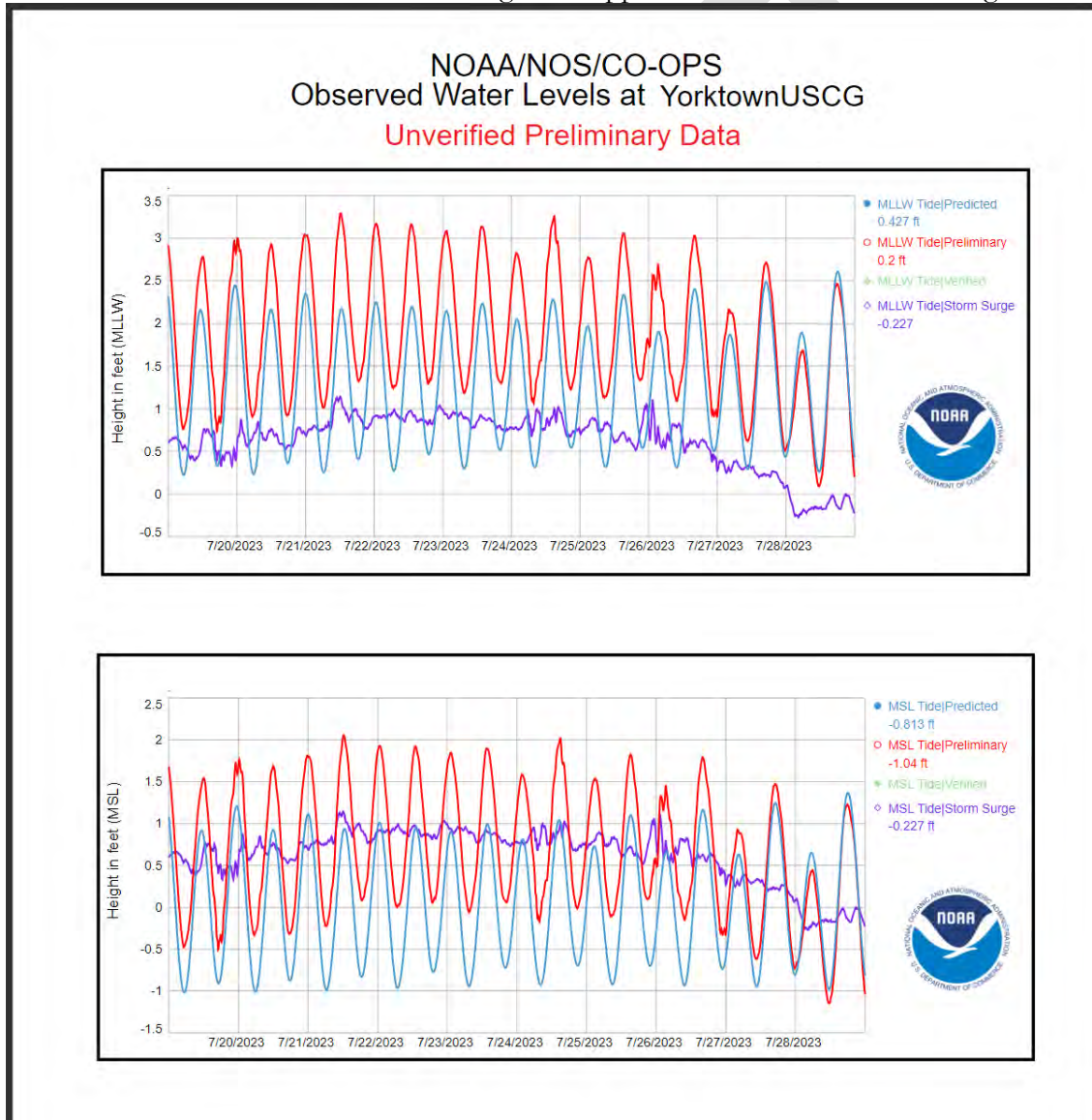


Figure 1. Preliminary data obtained from NOAA and a connection with Open Weather

- Sewells Point Tide Station:
 - Storm Surge: An approximate 1.02 foot storm surge was observed.

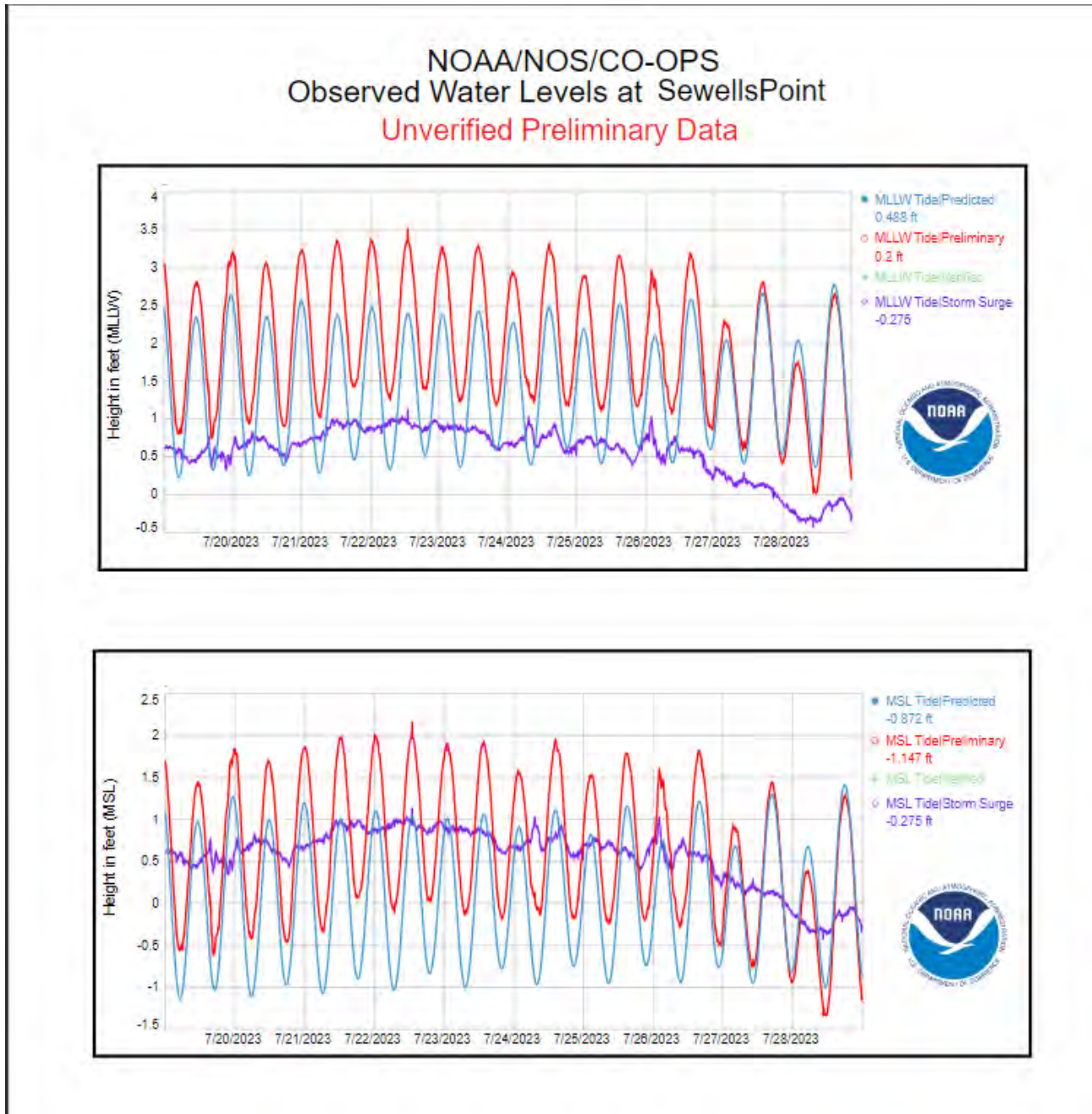


Figure 2. Preliminary data obtained from NOAA and a connection with Open Weather

July 24th, 2023 – Post-Storm Rain Event Synopsis

South Shore

Weather:

Rainfall (HRSD Rainfall Gauges): *Recurrence intervals based on NOAA Atlas 14*

Rain Gauge Site	Peak Rainfall RI (Duration)	Locality
<i>Army Base Treatment Plant Service Area¹</i>		
Bancker Rd (Dovercourt Discharge)	1- to 2-year (1hr)	NORF
Taussig Blvd PS	5-year (1hr)	NORF
<i>Atlantic Treatment Plant Service Area¹</i>		
Callison at GB Locks	DNQ	CHES
Chesapeake PS 243	DNQ	CHES
Chesapeake PS 254	DNQ	CHES
Courthouse PRS	DNQ	VAB
Elbow Rd	DNQ	CHES
John B. Dey MLV-AT side	DNQ	VAB
Kempsville PRS	DNQ	VAB
Lagomar IFM at Atlantic TP	DNQ	VAB
Laskin Rd PRS	DNQ	VAB
Pine Tree PRS	DNQ	VAB
Shipps Corner PRS	DNQ	VAB
<i>Ches-Liz Treatment Plant Service Area¹</i>		
Dozier's Corner PS	DNQ	CHES
Independence PRS	DNQ	VAB
Northampton Blvd at Wesleyan Dr	2-year (1hr)	NORF
Providence PRS	DNQ	VAB
Shore Dr @ Jack Frost	DNQ	CHES
<i>Nansemond Treatment Plant Service Area¹</i>		
Bowers Hill PRS	DNQ	CHES
Cedar Lane PS	2-year (1hr)	PORT
Chesapeake PS 158	DNQ	CHES
Chesapeake PS 238	DNQ	CHES
Crittenden Rd_Chuckatuck Rectifier	2-year (1hr)	SUFF
Deep Creek PRS	DNQ	CHES
Lake Kilby WTP	DNQ	SUFF
Nansemond Main Flow (Effluent)	2- to 5-year (1hr)	SUFF
Pagan River Rectifier	DNQ	IOW
Pughsville PS	1- to 2-year (1hr)	SUFF
Route 337 PRS	DNQ	CHES
Smithfield High School	DNQ	IOW
Suffolk PS	DNQ	SUFF
Suffolk PS 81	DNQ	SUFF
Suffolk PS 87	DNQ	SUFF
Windsor Duke St PS	1-year (1hr)	IOW

July 24th, 2023 – Post-Storm Rain Event Synopsis

Rain Gauge Site	Peak Rainfall RI (Duration)	Locality
<i>VIP Treatment Plant Service Area¹</i>		
Elizabeth River Crossing_Eastern Branch	2- to 5-year (1hr)	NORF
Ferebee Avenue PS	DNQ	CHES
Luxembourg Avenue PS	5-year (1hr)	NORF
Rodman Ave PS	DNQ	PORT
Va Beach Blvd PS	1- to 2-year (1hr)	NORF
VIP Main Flow (Effluent)	5-year (1hr)	NORF

Note:

1. Typical treatment plant service area.

*Duration represents the minimum amount of time it took to reach the specified RRI.

Norfolk International Airport (ORF)

o Wind and Rainfall (daily total):

Date	Gust (max)	Sustained (max)	Sustained (avg)	Direction	Rainfall (in)
7/24/2023	20 mph	17 mph	6 mph	E	1.65

Tide:

- Sewells Point Tide Station:
 - Storm Surge: An approximate 1.02 foot storm surge was observed.

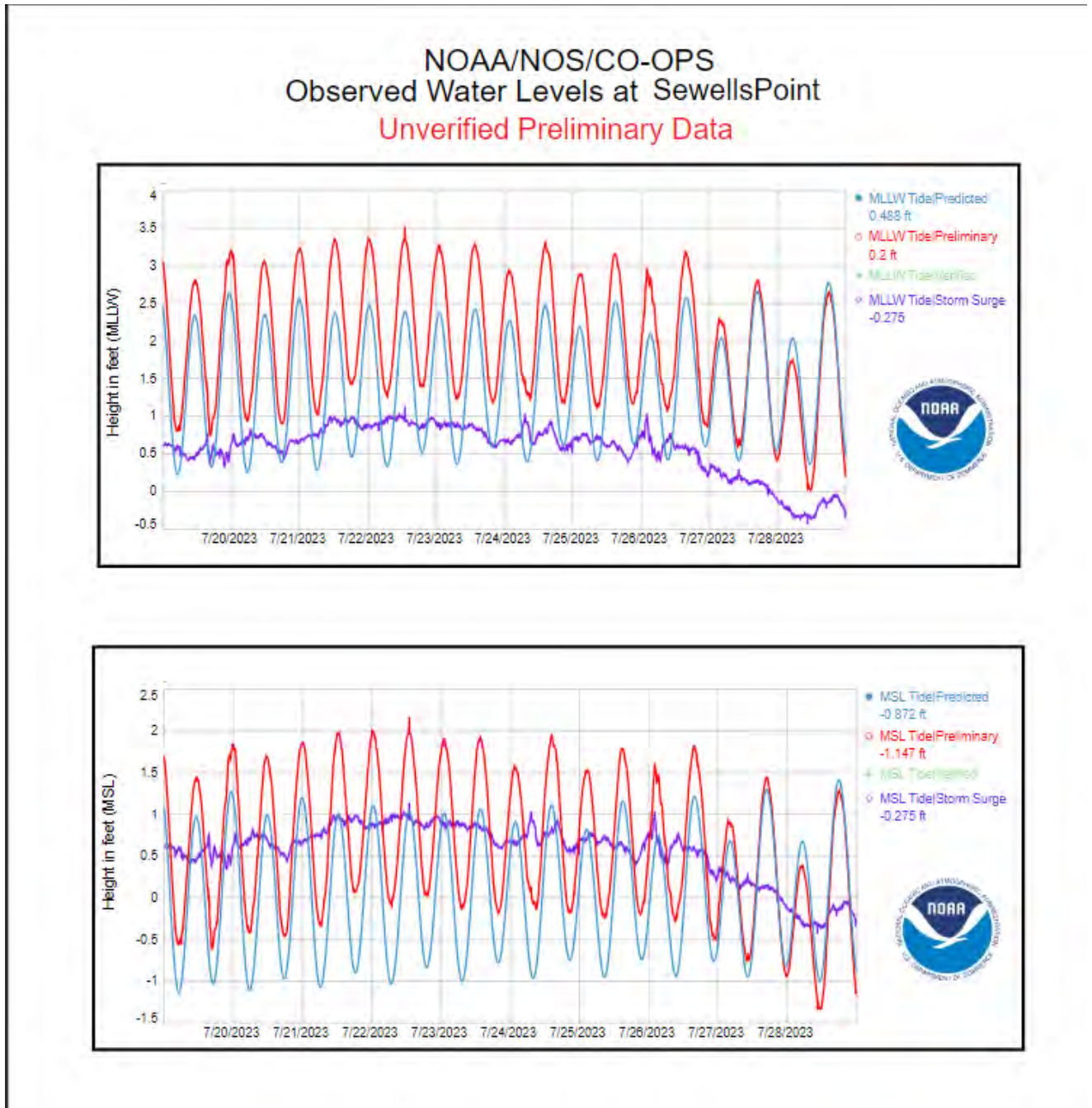


Figure 3. Preliminary data obtained from NOAA and a connection with Open Weather

Shallow Well Analysis:

Shallow wells are located at/or near HRSD Pump Stations to measure groundwater levels. The water column is measured using a pressure transducer located near the bottom of the well. The installed sensor measures gauge pressure in inches of water. The Shallow Well_NAVD88 measurement referenced in Appendix C refers to the elevation (referenced as NAVD 88) of the sensor plus the gauge measurement in feet.

DRAFT

Appendix A

HRSD Rain Gauge Network
Rainfall Totals






North Shore

July 24, 2023

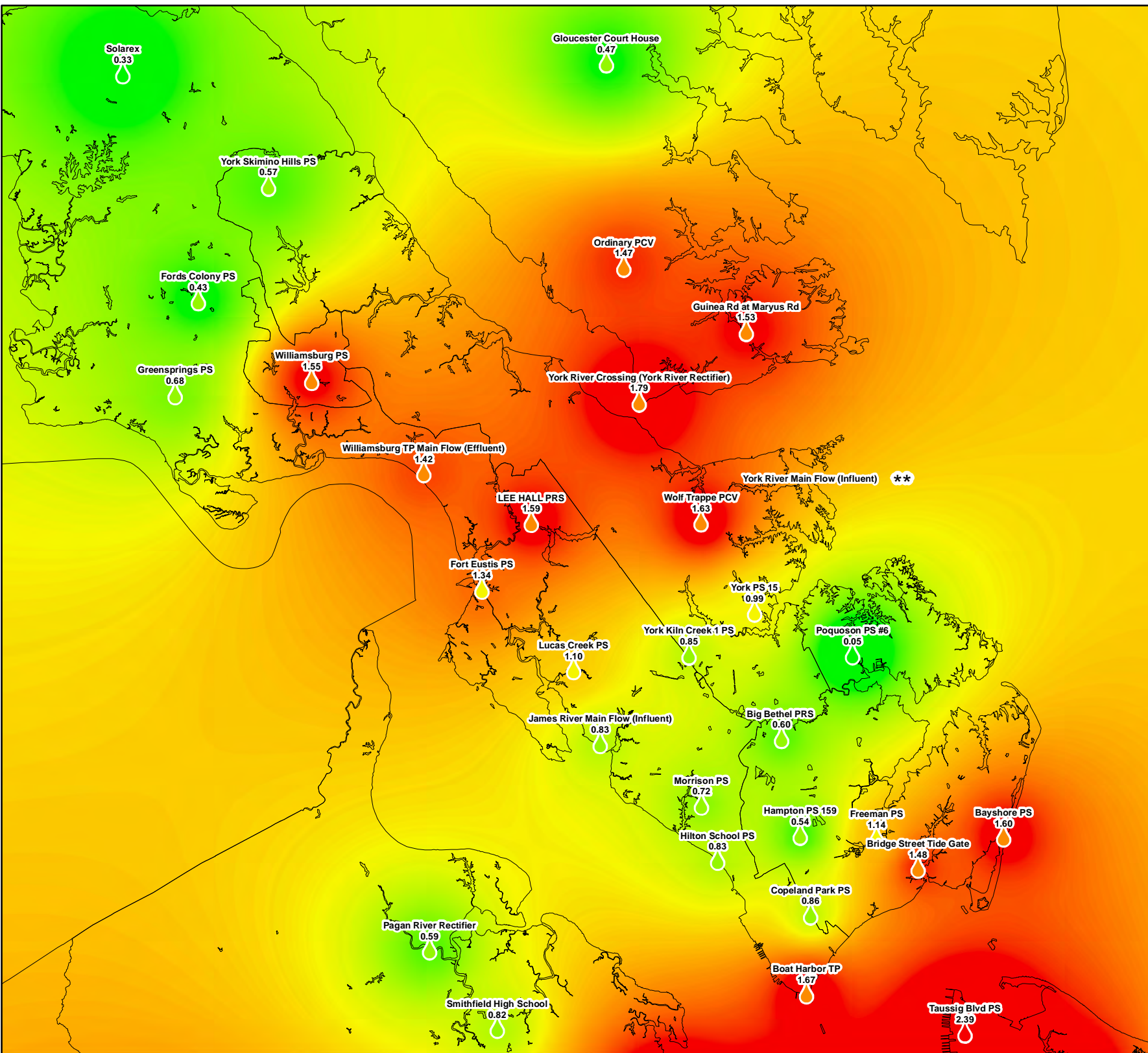
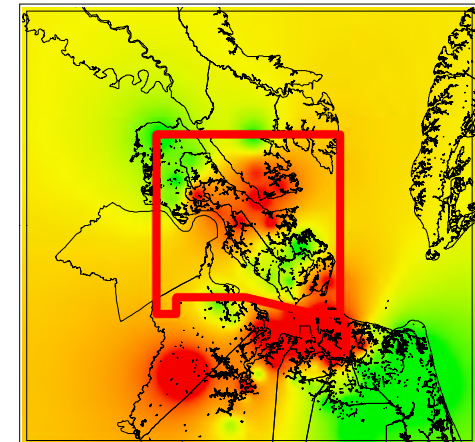
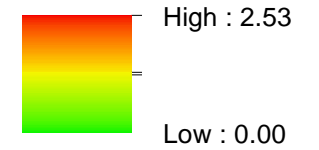
Rainfall Analysis

Total Rainfall

Rain Gauges (in):

-  1.80 - 2.53
-  1.37 - 1.79
-  0.91 - 1.36
-  0.38 - 0.90
-  0.00 - 0.37

Value








*Note: Rain Gauge was invalid for event and an average of surrounding sites was used. **Rain Gauge disconnected during event

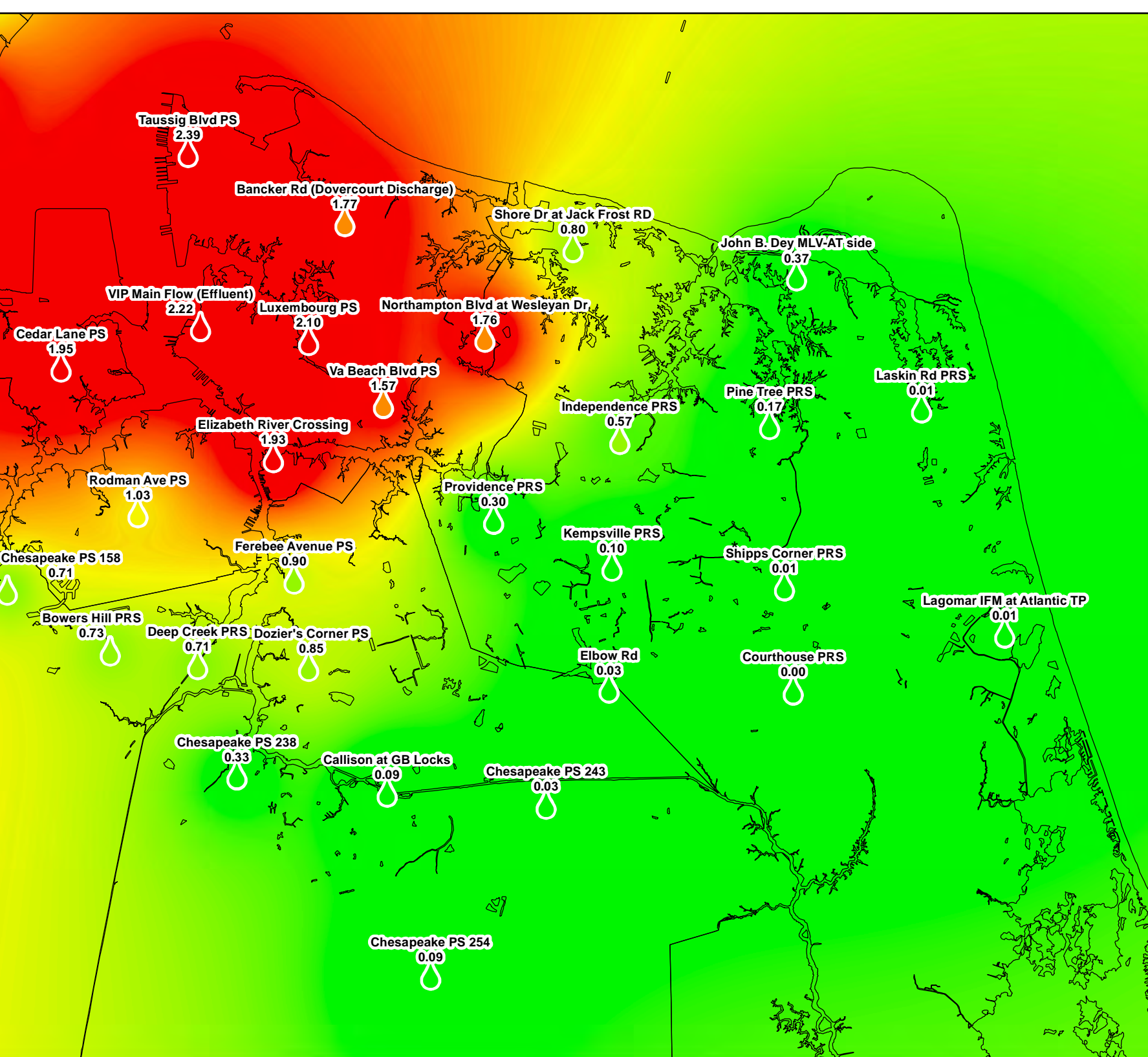
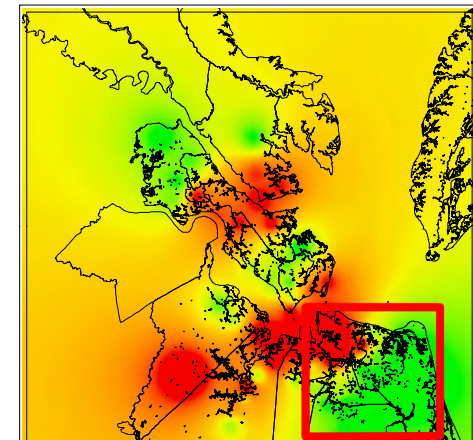
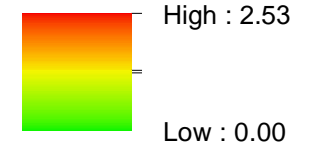
South Shore - East

July 24, 2023 Rainfall Analysis Total Rainfall

Rain Gauges (in):

-  1.80 - 2.53
-  1.37 - 1.79
-  0.91 - 1.36
-  0.38 - 0.90
-  0.00 - 0.37

Value

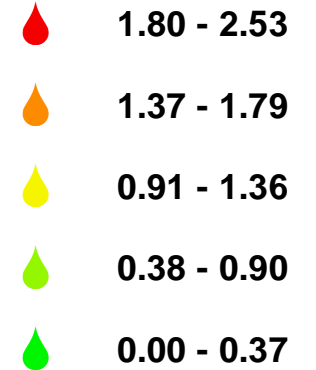


*Note: Rain Gauge was invalid for event and an average of surrounding sites was used. **Rain Gauge disconnected during event

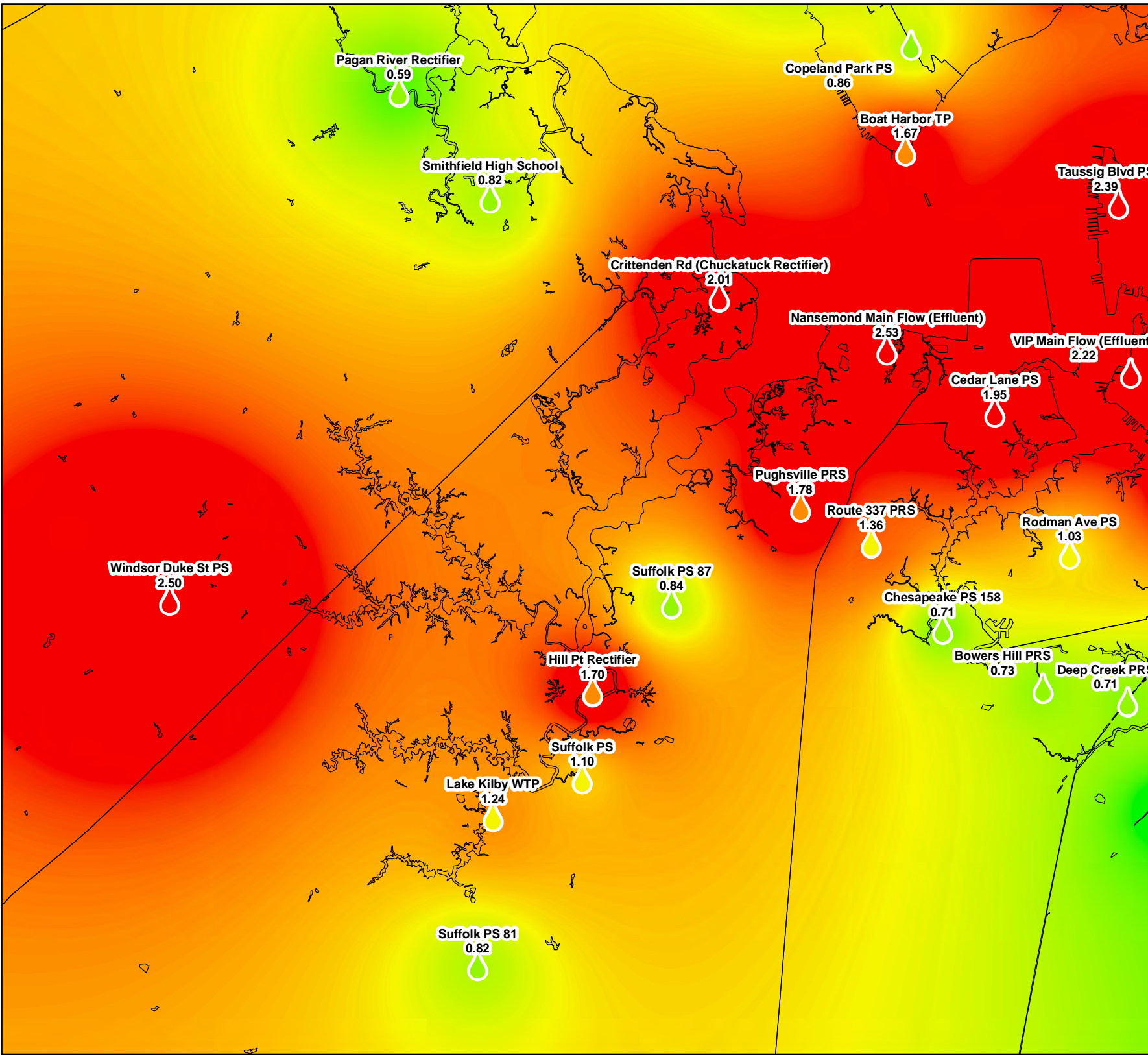
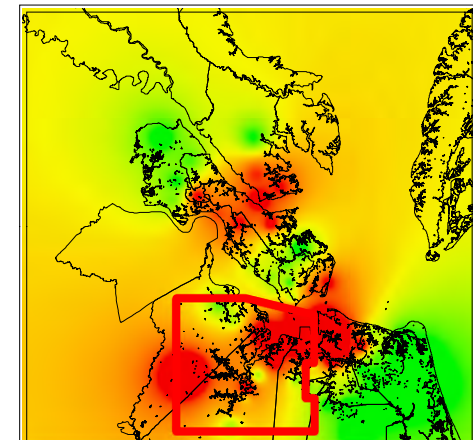
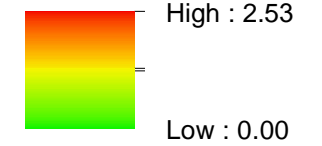
South Shore - West

July 24, 2023 Rainfall Analysis Total Rainfall

Rain Gauges (in):



Value



*Note: Rain Gauge was invalid for event and an average of surrounding sites was used. **Rain Gauge disconnected during event

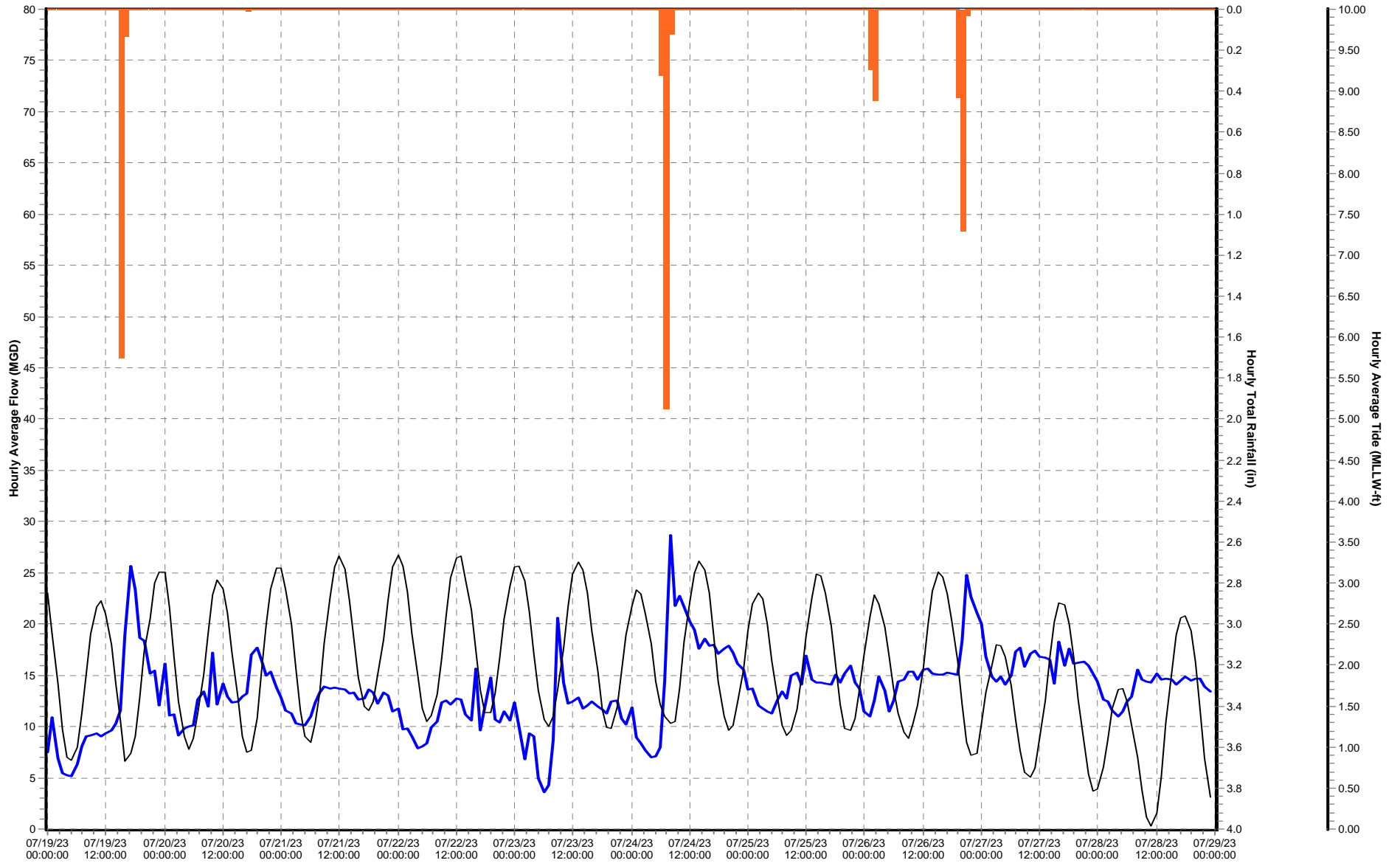
Appendix B

HRSD Treatment Plant Flows

Army Base Treatment Plant

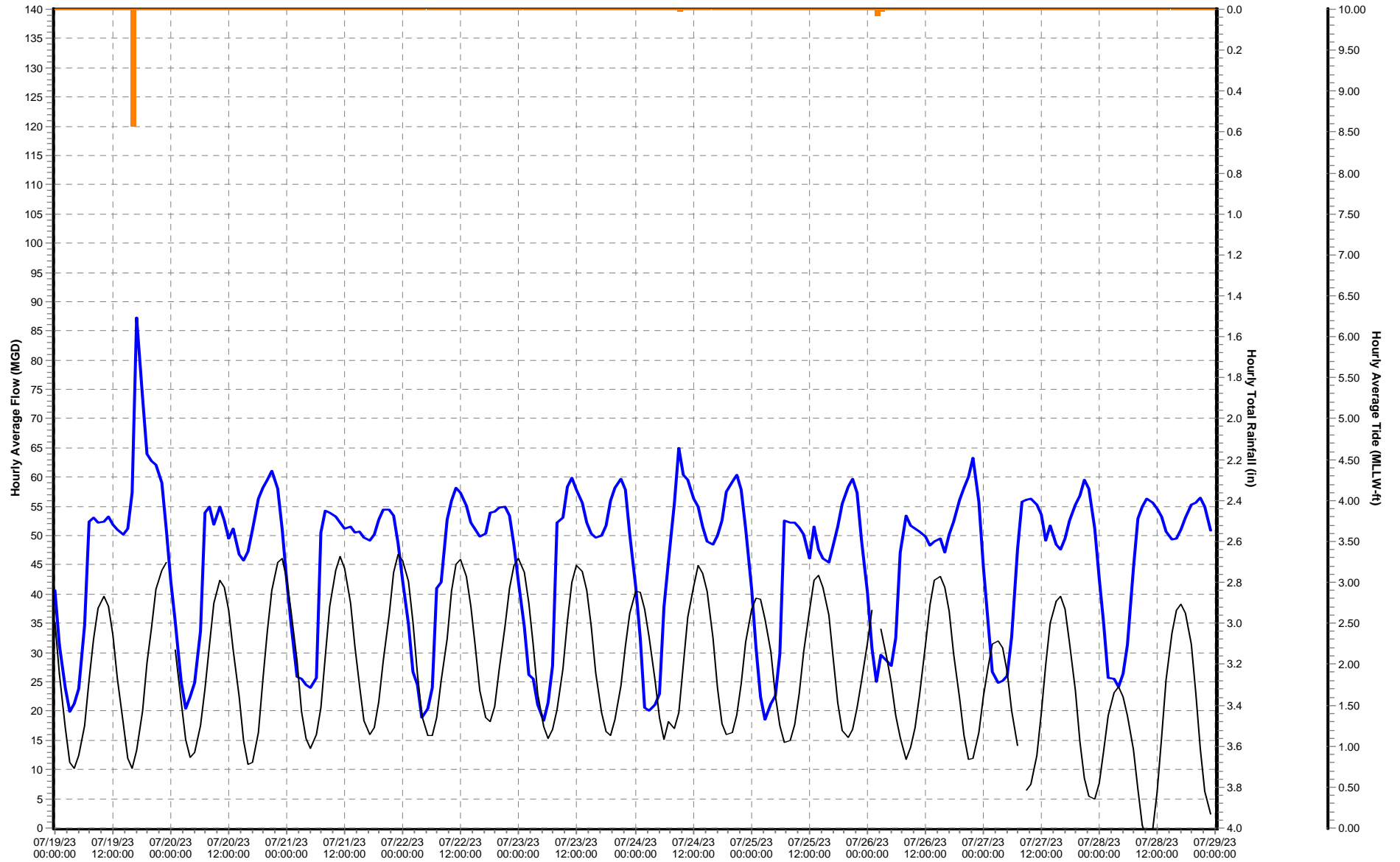
MMPS-035 (07/19/23 to 07/29/23)

MMPS-035.Flow_Effluent (MGD) MMPS-175: Taussig Blvd PS Rain Gauge SewellsPt Tide - MLLW Preliminary (ft)



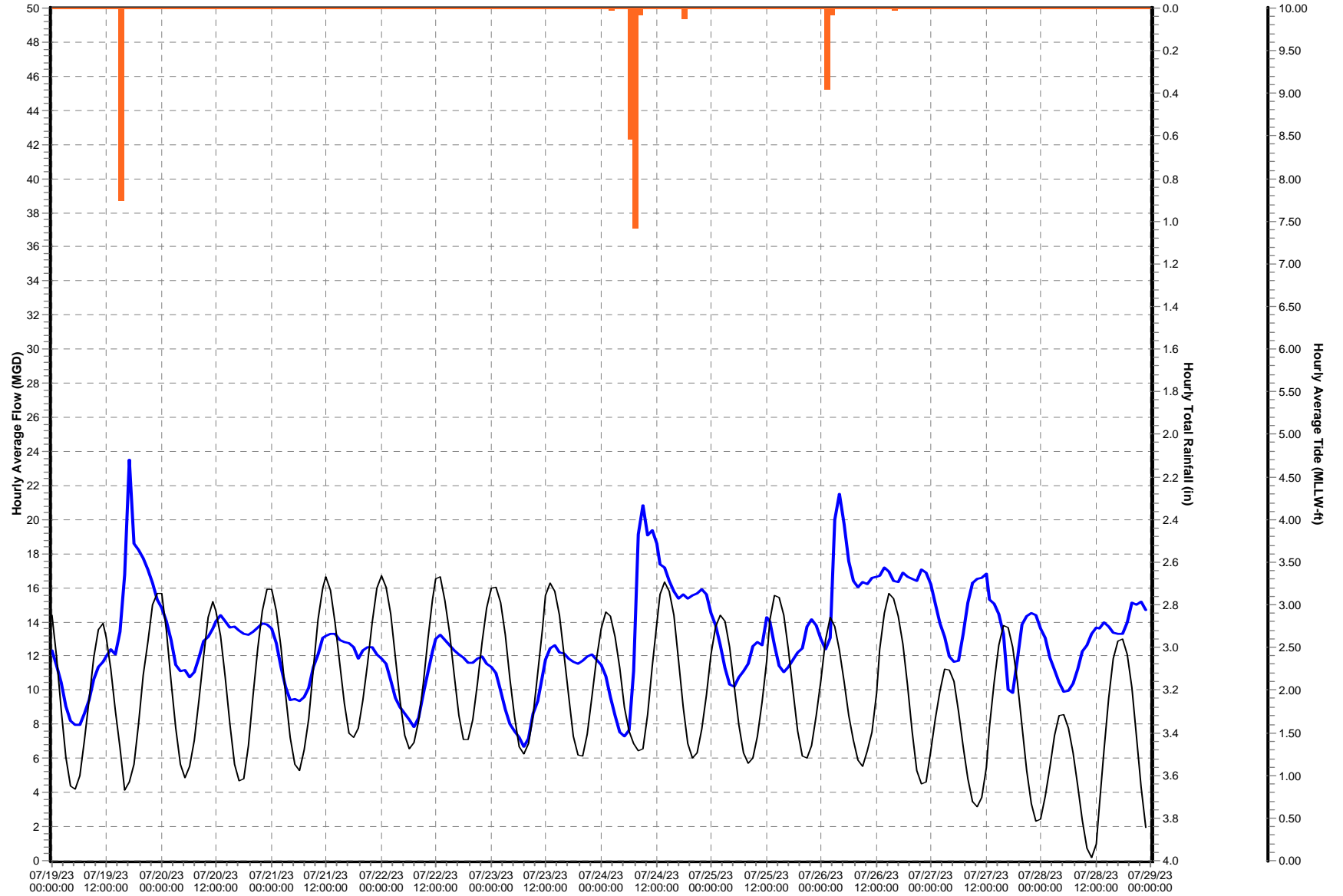
Atlantic Treatment Plant
MMPS-071 (07/19/23 to 07/29/23)

Flow_Effluent (MGD) MMPS-185: Lagomar IFM at Atlantic TP Rain Gauge CBBT Tide - MLLW Preliminary (ft)



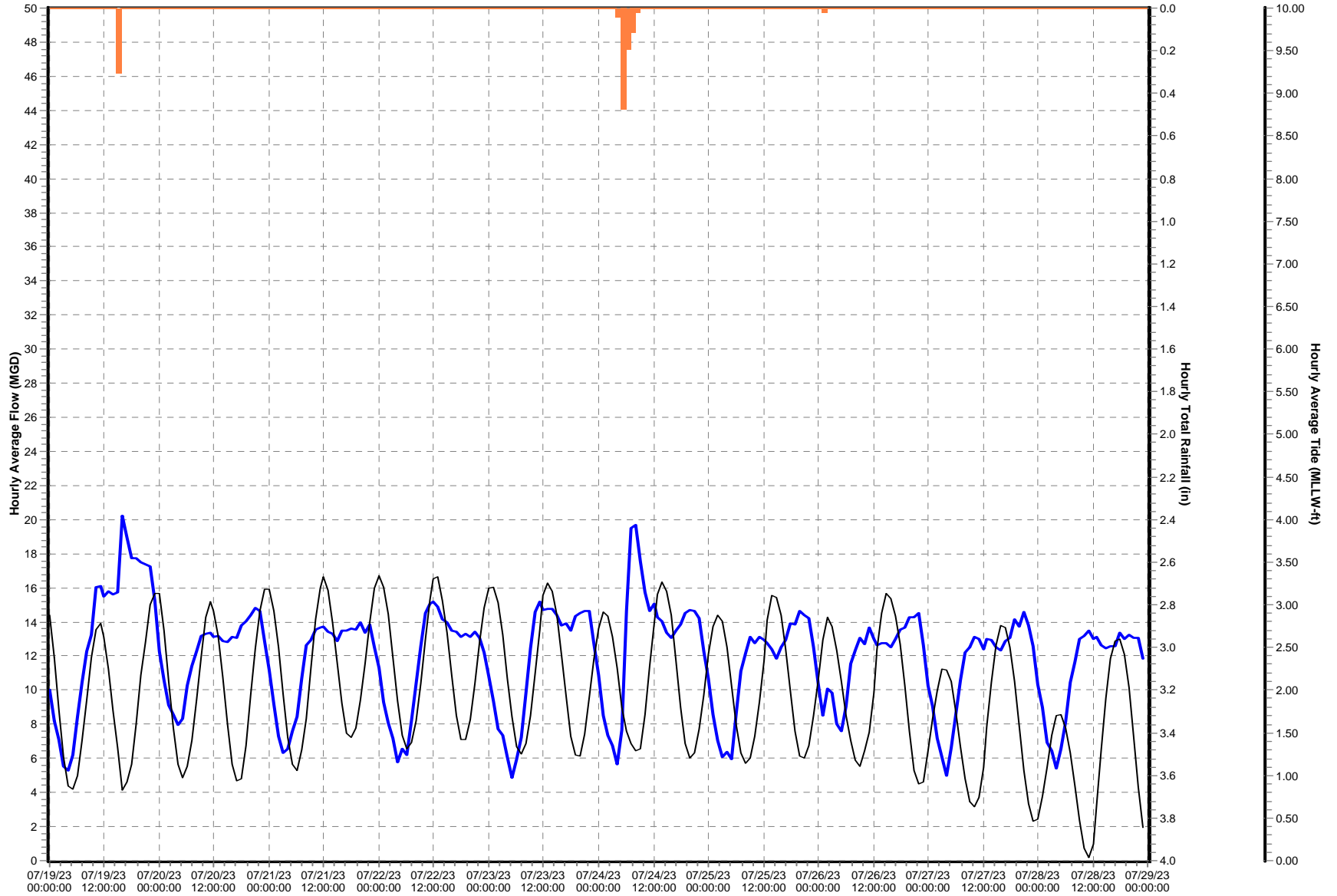
Boat Harbor Treatment Plant

MMPS-075 (07/19/23 to 07/29/23)



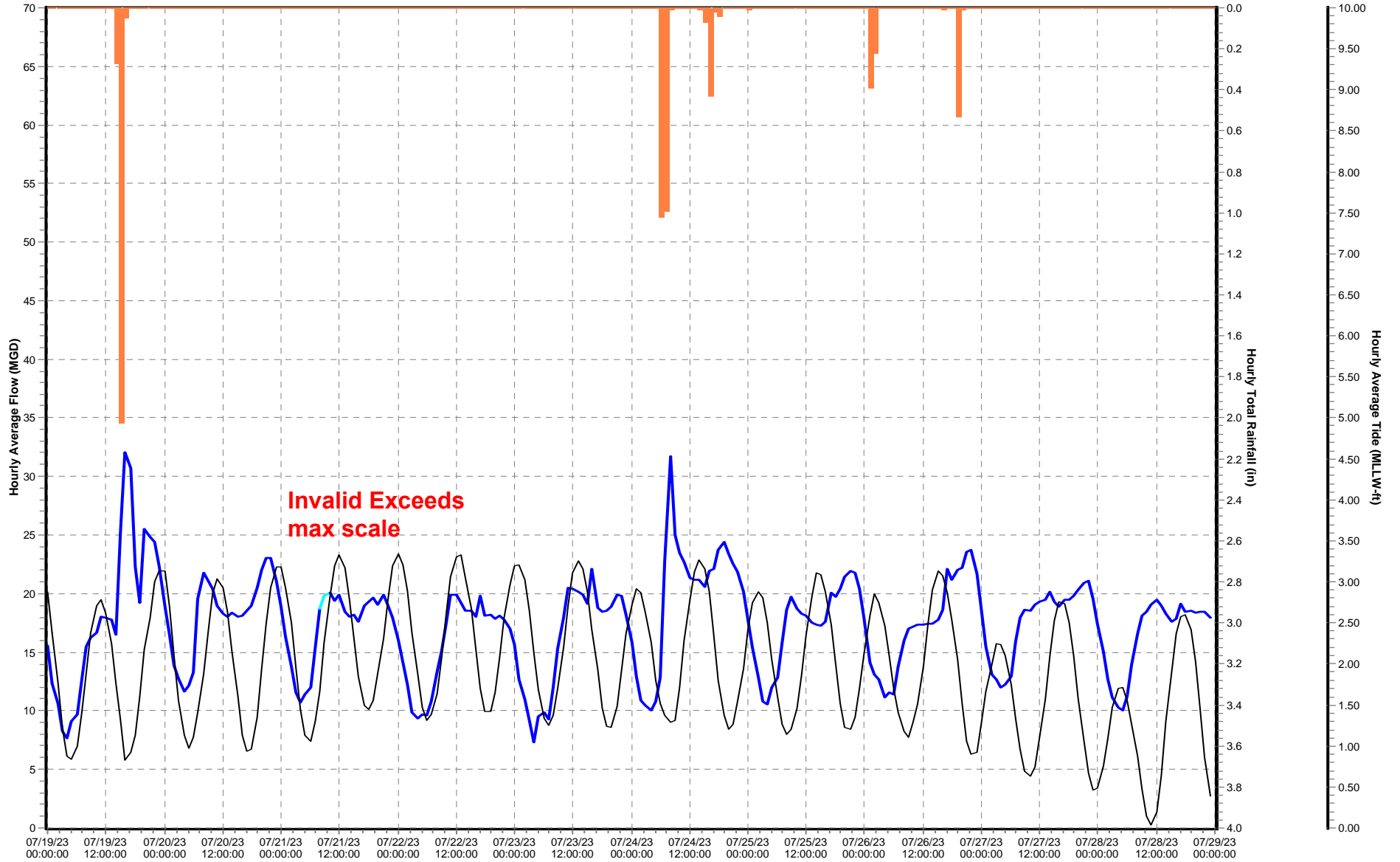
James River Treatment Plant
MMPS-184 (07/19/23 to 07/29/23)

Flow_Influent (MGD) Rainfall @ JRTP SewellsPt Tide - MLLW Preliminary (ft)



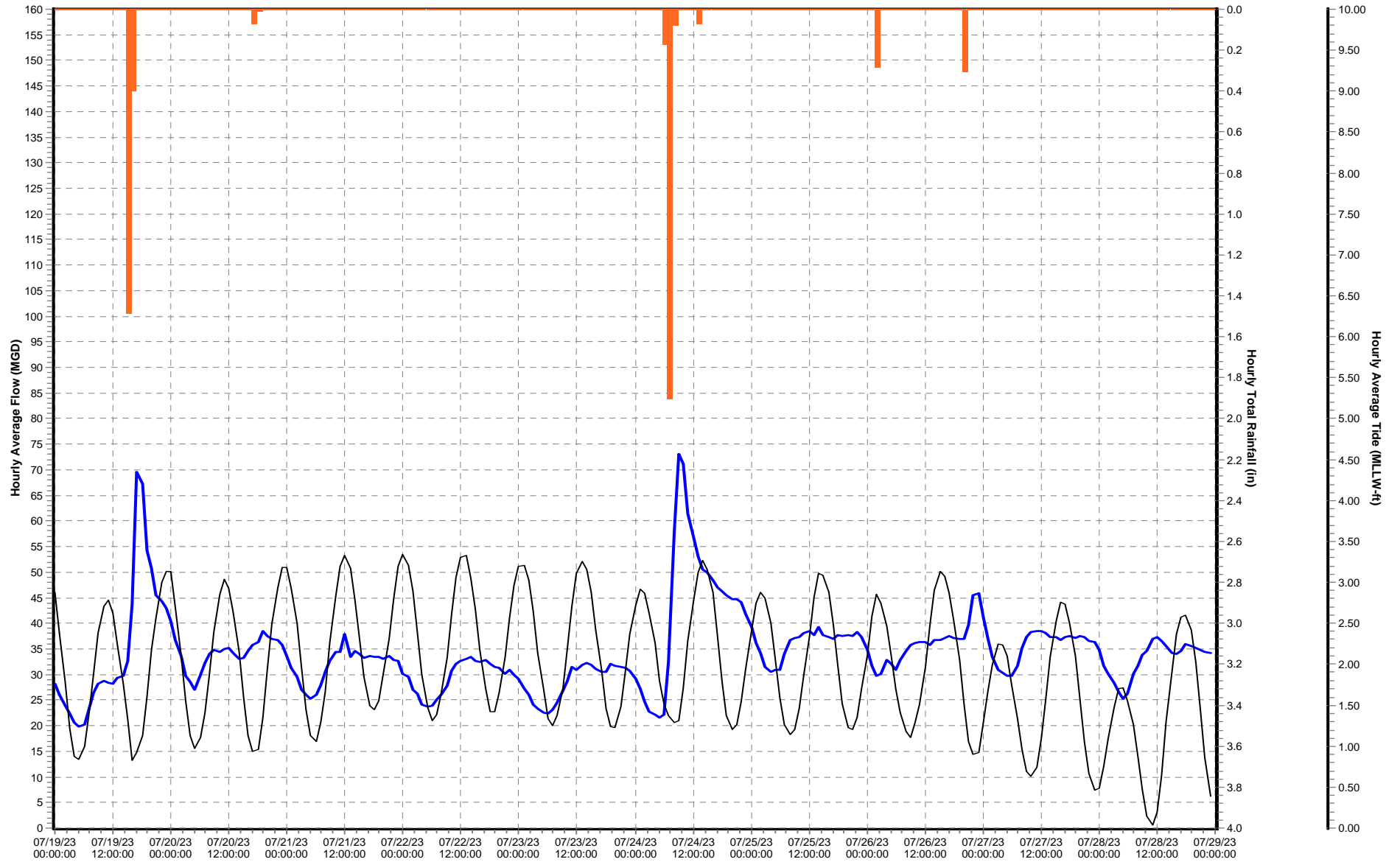
Nansemond Treatment Plant
MMPS-202 (07/19/23 to 07/29/23)

Flow_Effluent (MGD) MMPS-202: Nansemond Main Flow_Effluent Rain Gauge SewellsPt Tide - MLLW Preliminary (ft)



VIP Treatment Plant
MMPS-003 (07/19/23 to 07/29/23)

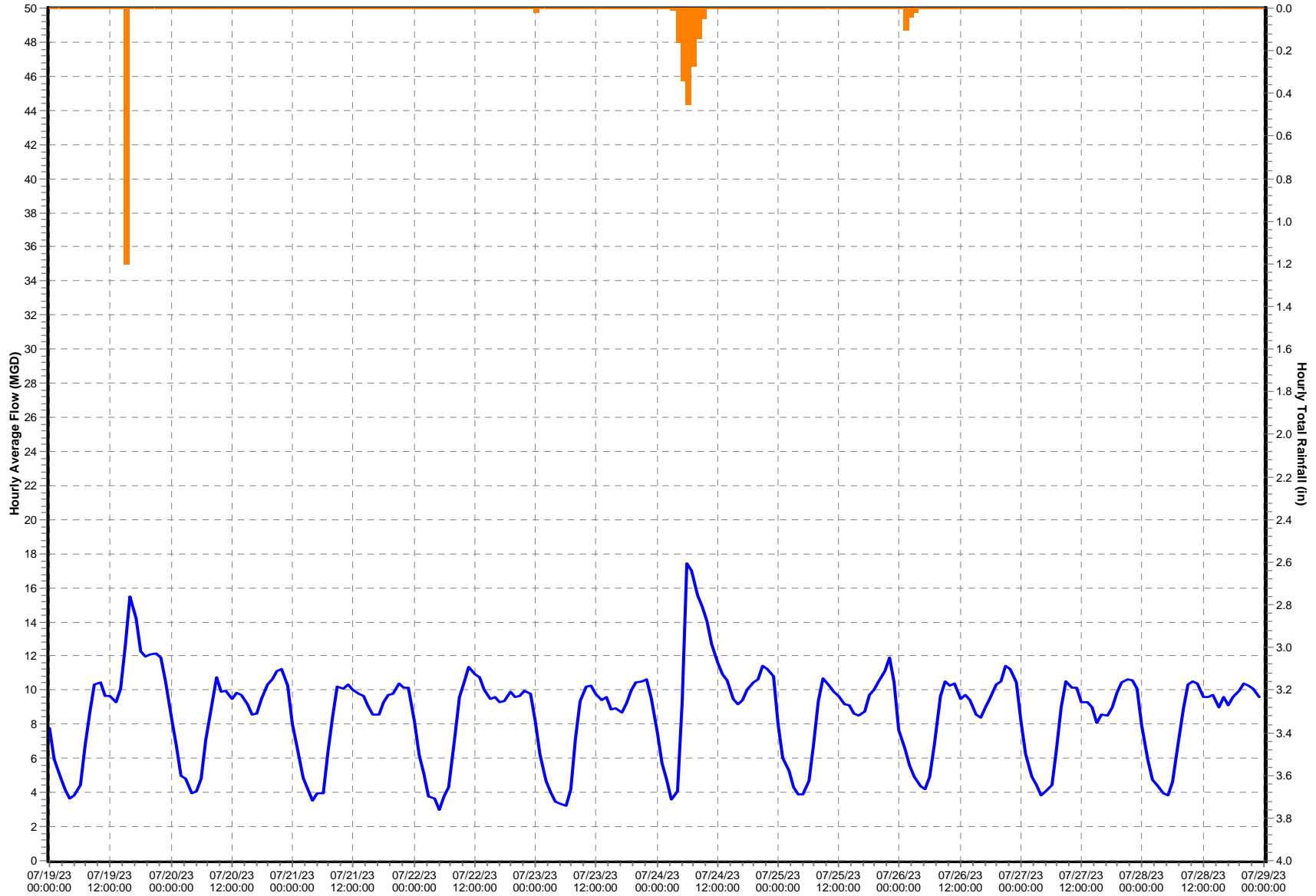
Flow_Effluent (MGD) MMPS-003: VIP Treatment Plant Rain Gauge SewellsPt Tide - MLLW Preliminary



Williamsburg Treatment Plant

MMPS-222 (07/19/23 to 07/29/23)

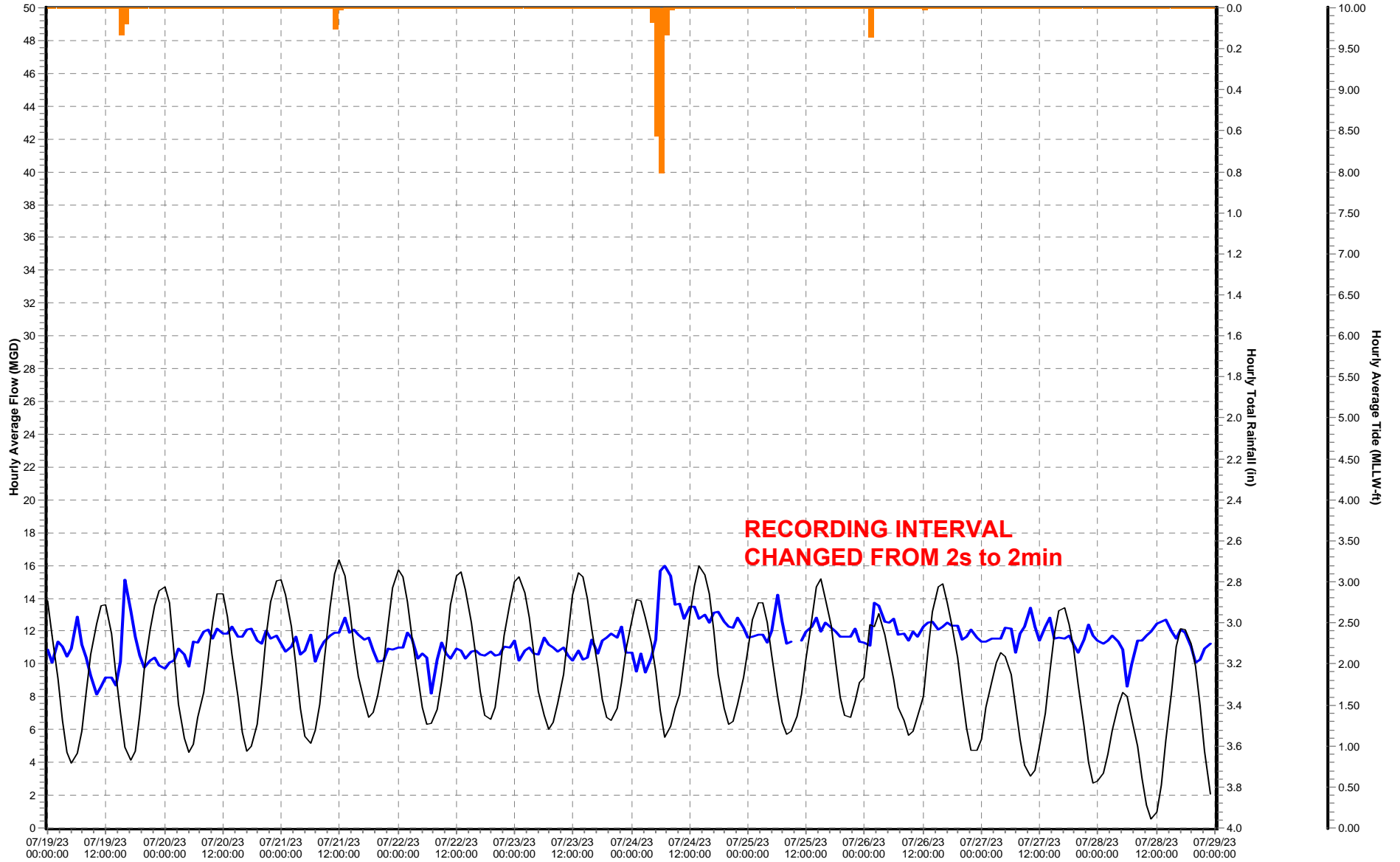
Flow_Effluent (MGD) Rainfall @ WBTP



York River Treatment Plant

MMPS-235 (07/19/23 to 07/29/23)

Flow_Influent (MGD) MMPS-234.MMPS-234.Rain Gauge (in) YorktownUSCG Tide - MLLW Preliminary (ft)



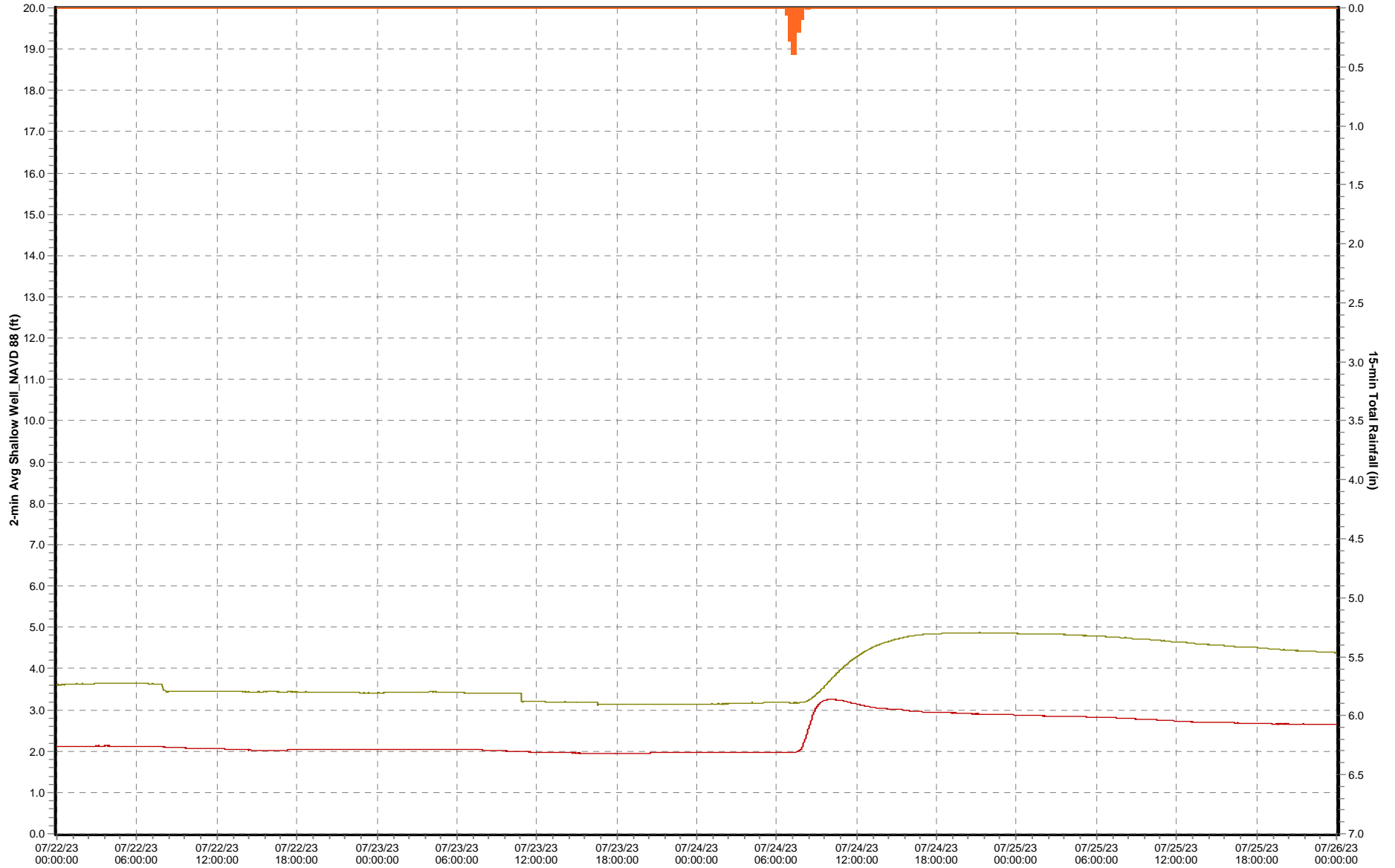
Appendix C

Shallow Well Analysis

5 Day

South Shore Shallow Well Graphs

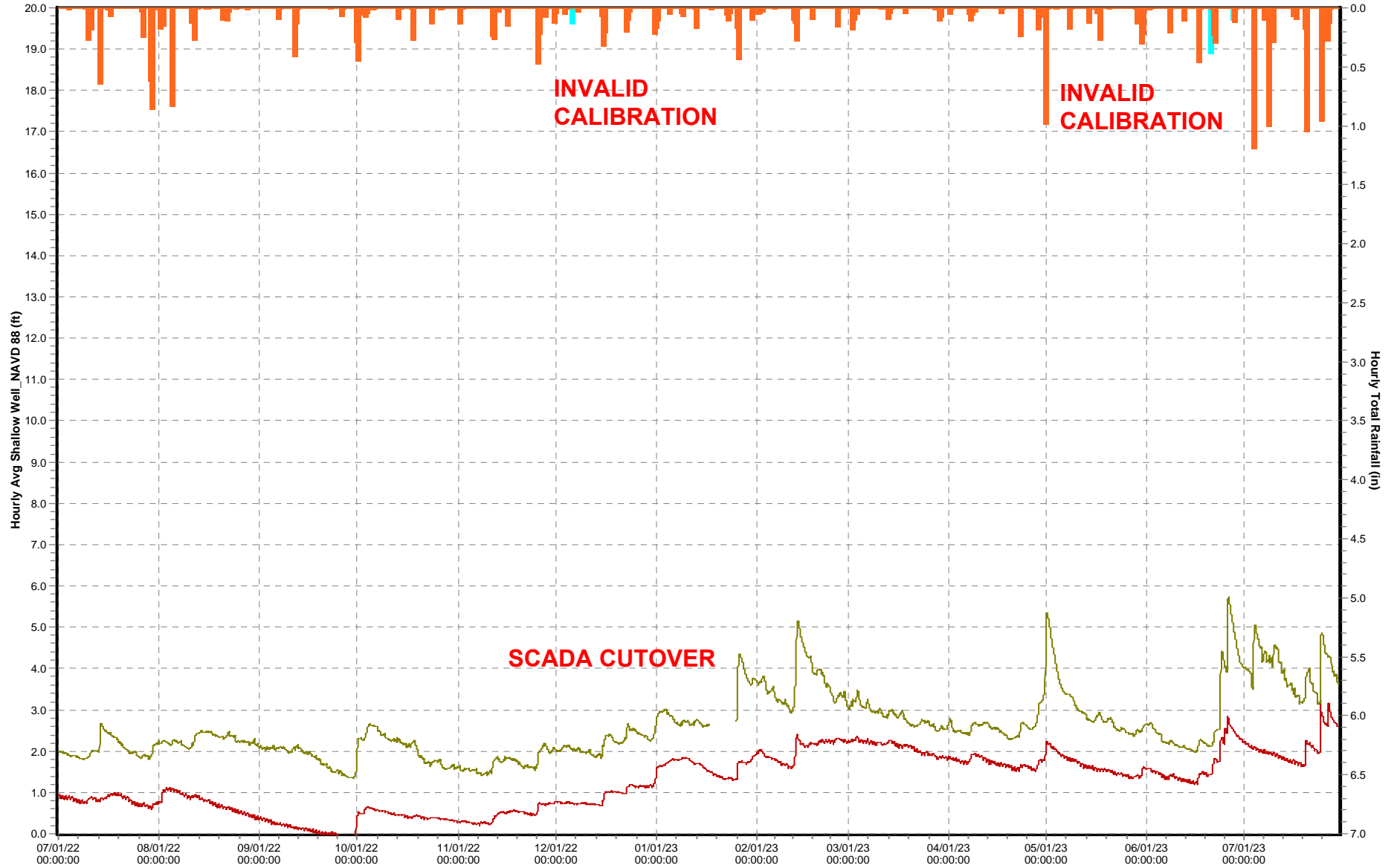
07/22/23 to 07/26/23



1 Year

South Shore Shallow Well Graphs

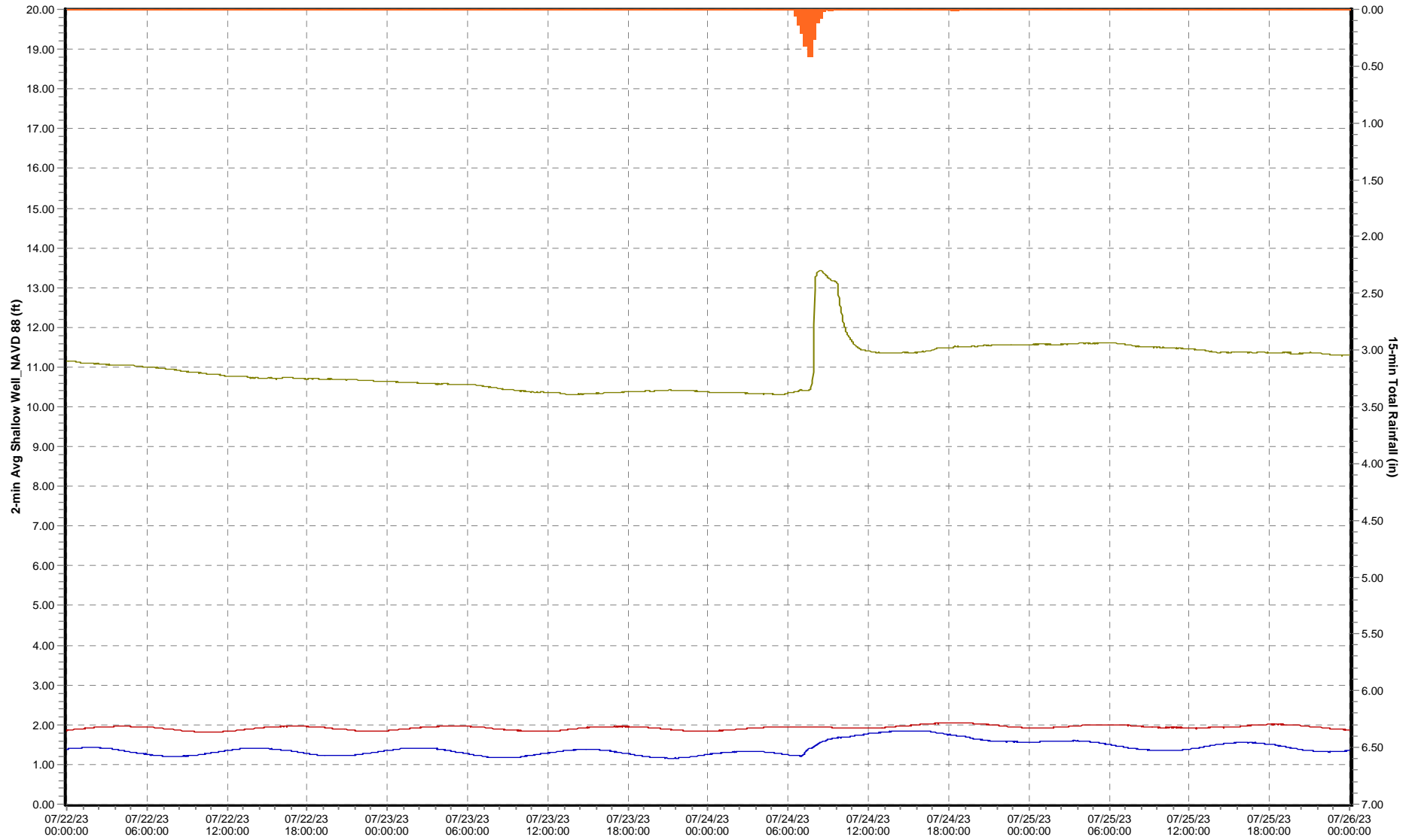
07/01/22 to 07/30/23



5 Day

North Shore Shallow Well Graphs

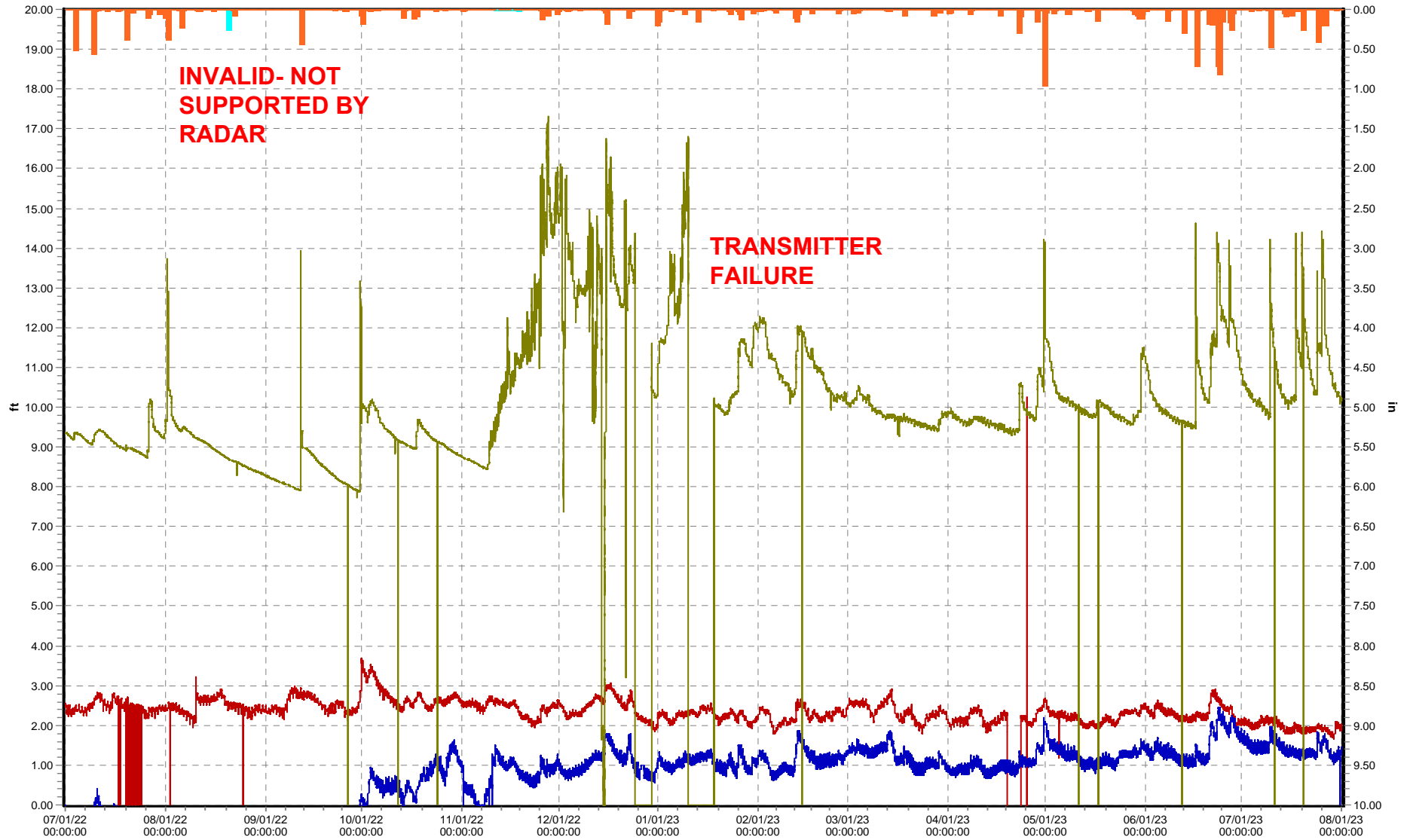
07/22/23 to 07/26/23



1 Year

HRSD NP - Lucas Creek PS

MMPS-148 (07/01/22 to 08/01/23)



Hampton Roads Sanitation District

Post-Storm Report



8/3/2023 – 8/4/2023

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Summary

From August 3rd through August 4th, there was an approximate 33-hour rainfall event that resulted in 1 site on the North Shore and 2 sites on the South Shore that met a 1 to 2-year rainfall recurrence interval throughout the HRSD rain gauge network. A weak area of low pressure brought a large area of rainfall to Hampton Roads. We saw a large amount of rainfall early in the morning that turned into more scattered showers for the afternoon. North Shore sites averaged around 1.75 inches of rain while South Shore sites averaged around 1.62 inches. There was minimal impact on groundwater levels compared to August 2022. See Appendix C for the Historical Shallow Well comparison. This report will be for South Shore only.

One HRSD interceptor weather-related overflow(s) were reported.

HRSD flow and pressure meters met data reliability requirements per the MOM program. For all pressure meters in the aggregate and all pressure-side flow meters in the aggregate for each treatment plant service area listed below, at least 90% reliable data was achieved, based on the duration of system response to this rainfall event. The data reliability for the gravity flow meters is not included in this synopsis.

- Duration of system response: See Table Below
- Aggregate flow meter validity: 91.63%
- Aggregate pressure meter validity: 99.66%

Currently, rainfall recurrence intervals are only analyzed for a maximum of 96-hours. Rainfall analysis begins after 0.1 inches of rain has occurred. A 72-hour dry period of less than 0.1 inches of rain is typically used to signify two separate events. However, if a site returns to “dry weather” conditions prior to the next rainfall that occurs within 72 hours of the previous event, it is also considered for separate analysis. See Appendix A for the Rainfall Total System Maps.

The current criteria for publishing a post-storm analysis are the following:

- One or more rain gauge sites meet a two-year or greater RRI (rainfall recurrence interval) and at least 50% of sites in any treatment plant service area receive one inch of rainfall or greater,
- A rain gauge site meets a five-year or greater RRI, or
- A weather-related SSO occurs.

Sanitary Sewer Overflows:

HRSD		
Location	Jurisdiction	Start Date
1500 Bainbridge Boulevard	Chesapeake	8/4/2023

Treatment Plant Data: *(Data obtained from Telog Database)*
 See Appendix B for HRSD Treatment Plant Flows

**HRSD Treatment Plant Data
 8/3/2023 – 8/4/2023**

South Shore				
Treatment Plant	Date of Peak Hourly Flow	Peak Hourly Flow (MGD)	Peak Hour	TPSA Total Rainfall Avg (in)
Army Base	8/3/2023	12.71	20:00	0.05
	8/4/2023	21.09	18:00	1.80
Atlantic	8/3/2023	56.76	21:00	0.02
	8/4/2023	75.34	20:00	1.43
Nansemond	8/3/2023	19.60	21:00	0.03
	8/4/2023	26.96	17:00	1.96
VIP	8/3/2023	34.24	12:00	0.02
	8/4/2023	71.01	19:00	2.29

DRAFT

Aug 3rd – Aug 4th, 2023 – Post-Storm Rain Event Synopsis

South Shore

Weather:

Rainfall (HRSD Rainfall Gauges): *Recurrence intervals based on NOAA Atlas 14*

Rain Gauge Site	Peak Rainfall RI (Duration)	Locality
<i>Army Base Treatment Plant Service Area¹</i>		
Bancker Rd (Dovercourt Discharge)	DNQ	NORF
Taussig Blvd PS	DNQ	NORF
<i>Atlantic Treatment Plant Service Area¹</i>		
Callison at GB Locks	DNQ	CHES
Chesapeake PS 243	DNQ	CHES
Chesapeake PS 254	DNQ	CHES
Courthouse PRS	DNQ	VAB
Elbow Rd	DNQ	CHES
John B. Dey MLV-AT side	DNQ	VAB
Kempsville PRS	DNQ	VAB
Lagomar IFM at Atlantic TP	DNQ	VAB
Laskin Rd PRS	DNQ	VAB
Pine Tree PRS	DNQ	VAB
Shippo Corner PRS	DNQ	VAB
<i>Ches-Liz Treatment Plant Service Area¹</i>		
Dozier's Corner PS	DNQ	CHES
Independence PRS	DNQ	VAB
Northampton Blvd at Wesleyan Dr	DNQ	NORF
Providence PRS	DNQ	VAB
Shore Dr @ Jack Frost	DNQ	CHES
<i>Nansemond Treatment Plant Service Area¹</i>		
Bowers Hill PRS	DNQ	CHES
Cedar Lane PS	DNQ	PORT
Chesapeake PS 158	1-year (12hr)	CHES
Chesapeake PS 238	DNQ	CHES
Crittenden Rd_Chuckatuck Rectifier	DNQ	SUFF
Deep Creek PRS	DNQ	CHES
Lake Kilby WTP	DNQ	SUFF
Nansemond Main Flow (Effluent)	DNQ	SUFF
Pagan River Rectifier	DNQ	IOW
Pughsville PS	DNQ	SUFF
Route 337 PRS	DNQ	CHES
Smithfield High School	DNQ	IOW
Suffolk PS	DNQ	SUFF
Suffolk PS 81	DNQ	SUFF
Suffolk PS 87	DNQ	SUFF
Windsor Duke St PS	DNQ	IOW

Aug 3rd – Aug 4th, 2023 – Post-Storm Rain Event Synopsis

Rain Gauge Site	Peak Rainfall RI (Duration)	Locality
<i>VIP Treatment Plant Service Area¹</i>		
Elizabeth River Crossing_Eastern Branch	1-year (1hr)	NORF
Ferebee Avenue PS	DNQ	CHES
Luxembourg Avenue PS	DNQ	NORF
Rodman Ave PS	DNQ	PORT
Va Beach Blvd PS	DNQ	NORF
VIP Main Flow (Effluent)	DNQ	NORF

Note:

1. Typical treatment plant service area.

*Duration represents the minimum amount of time it took to reach the specified RRI.

Norfolk International Airport (ORF)

○ Wind and Rainfall (daily total):

Date	Gust (max)	Sustained (max)	Sustained (avg)	Direction	Rainfall (in)
8/3/2023	18 mph	8 mph	3 mph	S	0.00
8/4/2023	25 mph	8 mph	3 mph	SE	2.18

Tide:

- Sewells Point Tide Station:
 - Storm Surge: An approximate 0.75 foot storm surge was observed.

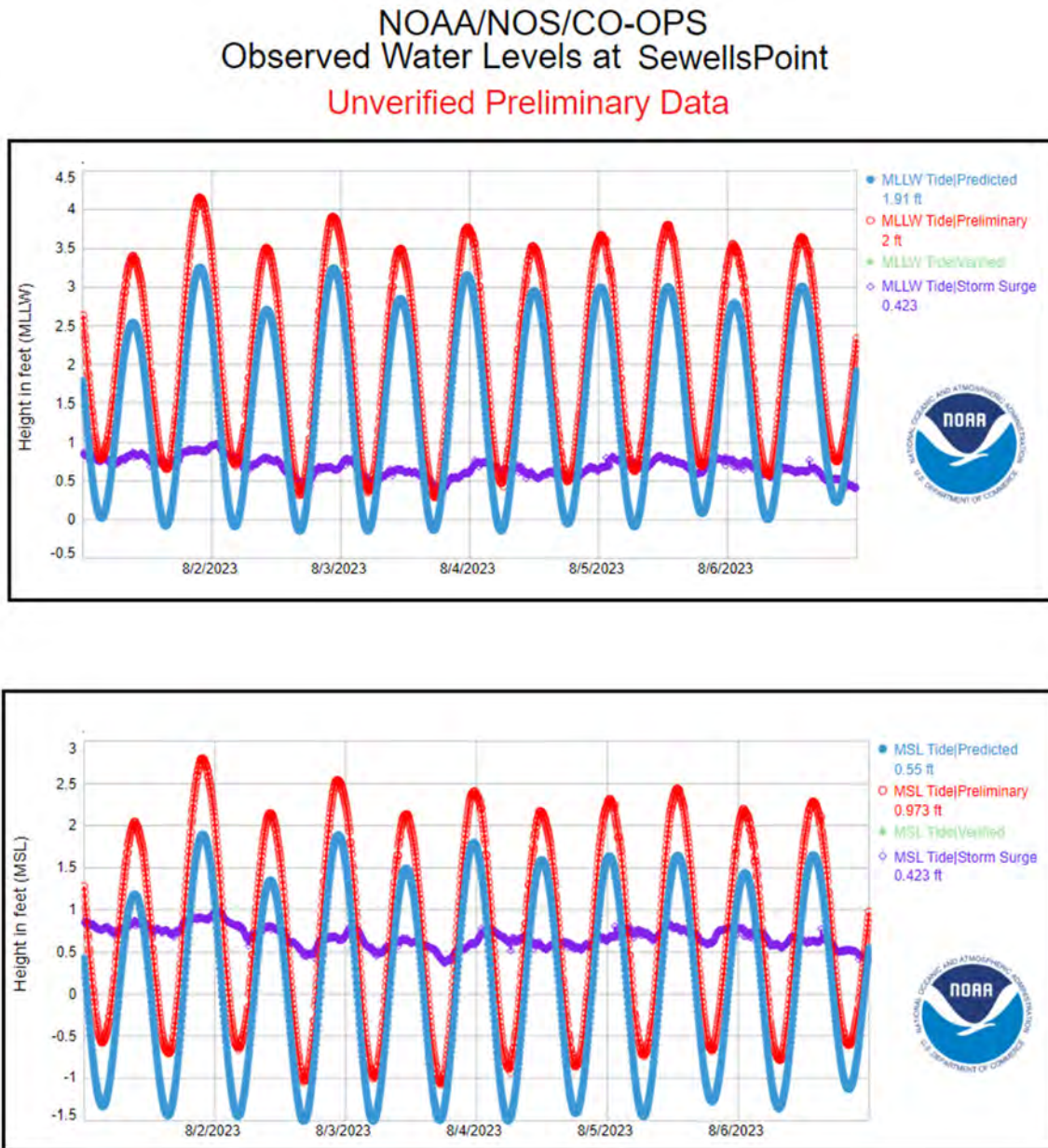


Figure 3. Preliminary data obtained from NOAA and a connection with Open Weather

Shallow Well Analysis:

Shallow wells are located at/or near HRSD Pump Stations to measure groundwater levels. The water column is measured using a pressure transducer located near the bottom of the well. The installed sensor measures gauge pressure in inches of water. The Shallow Well_NAVD88 measurement referenced in Appendix C refers to the elevation (referenced as NAVD 88) of the sensor plus the gauge measurement in feet.






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Appendix A

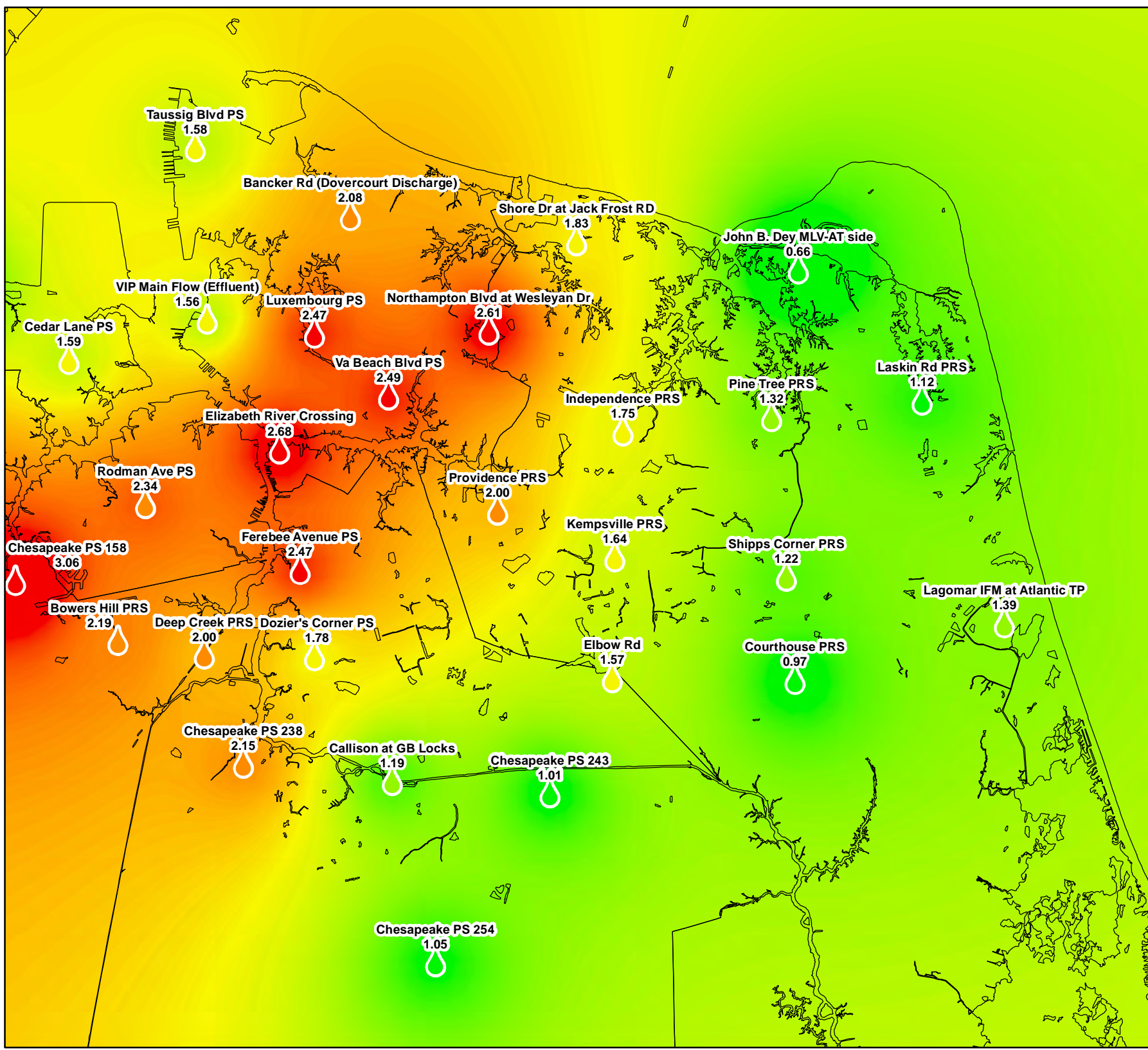
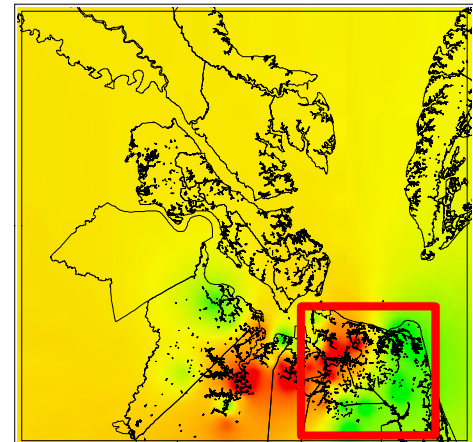
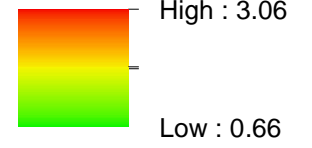
HRSD Rain Gauge Network
Rainfall Totals

South Shore - East August 3-4, 2023 Rainfall Analysis Total Rainfall

Rain Gauges (in):

-  2.37 - 3.06
-  1.84 - 2.36
-  1.48 - 1.83
-  1.13 - 1.47
-  0.66 - 1.12

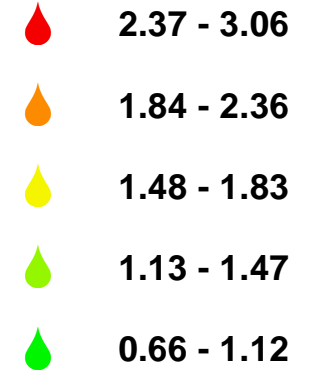
Value



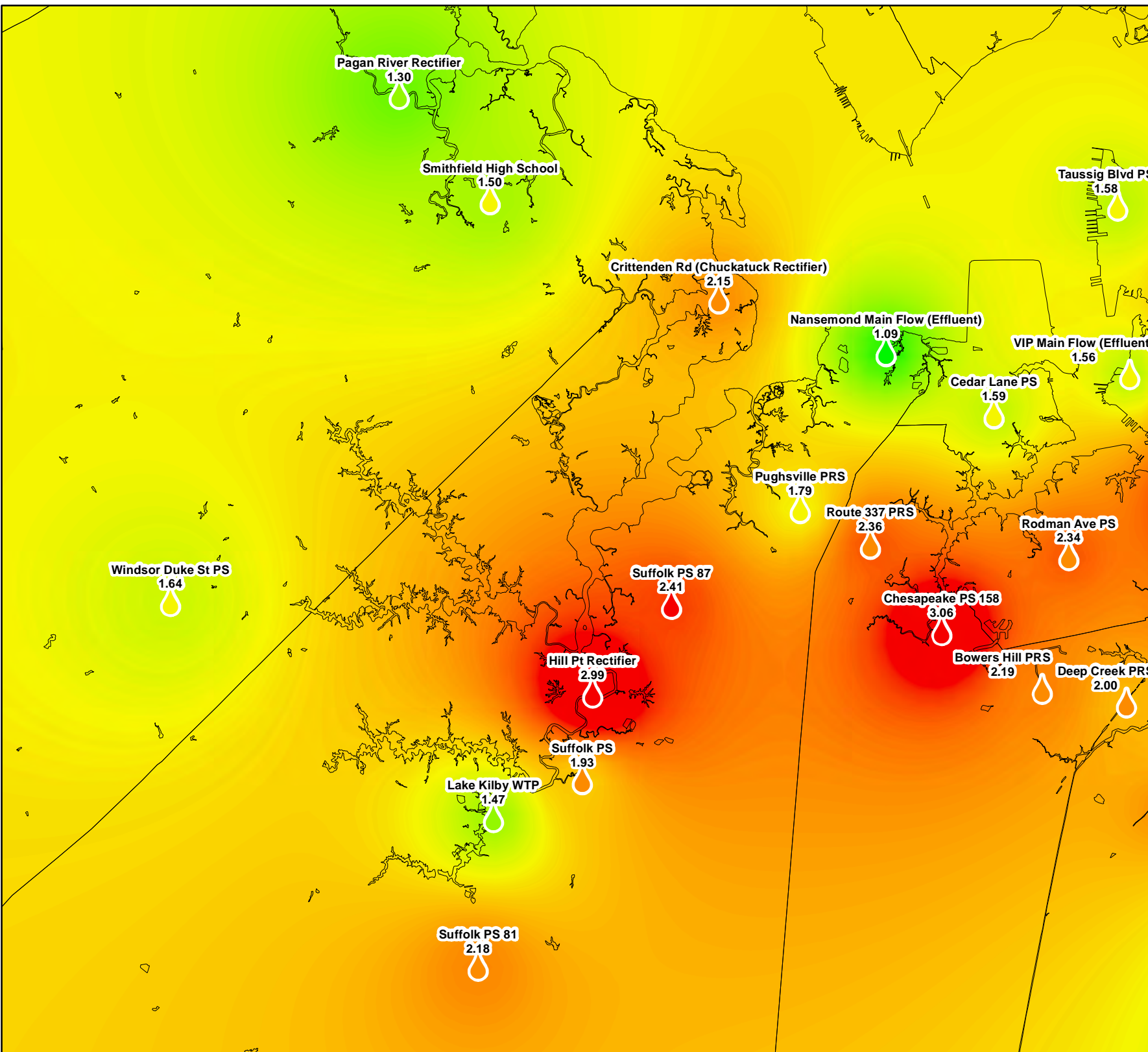
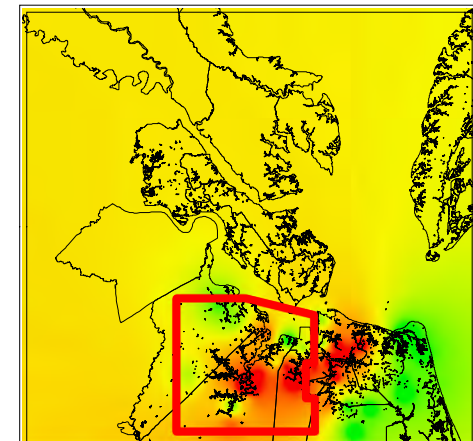
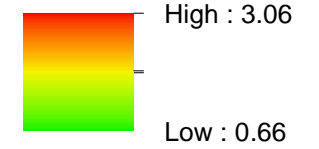
*Note: Rain Gauge was invalid for event and an average of surrounding sites was used.

South Shore - West August 3-4, 2023 Rainfall Analysis Total Rainfall

Rain Gauges (in):



Value



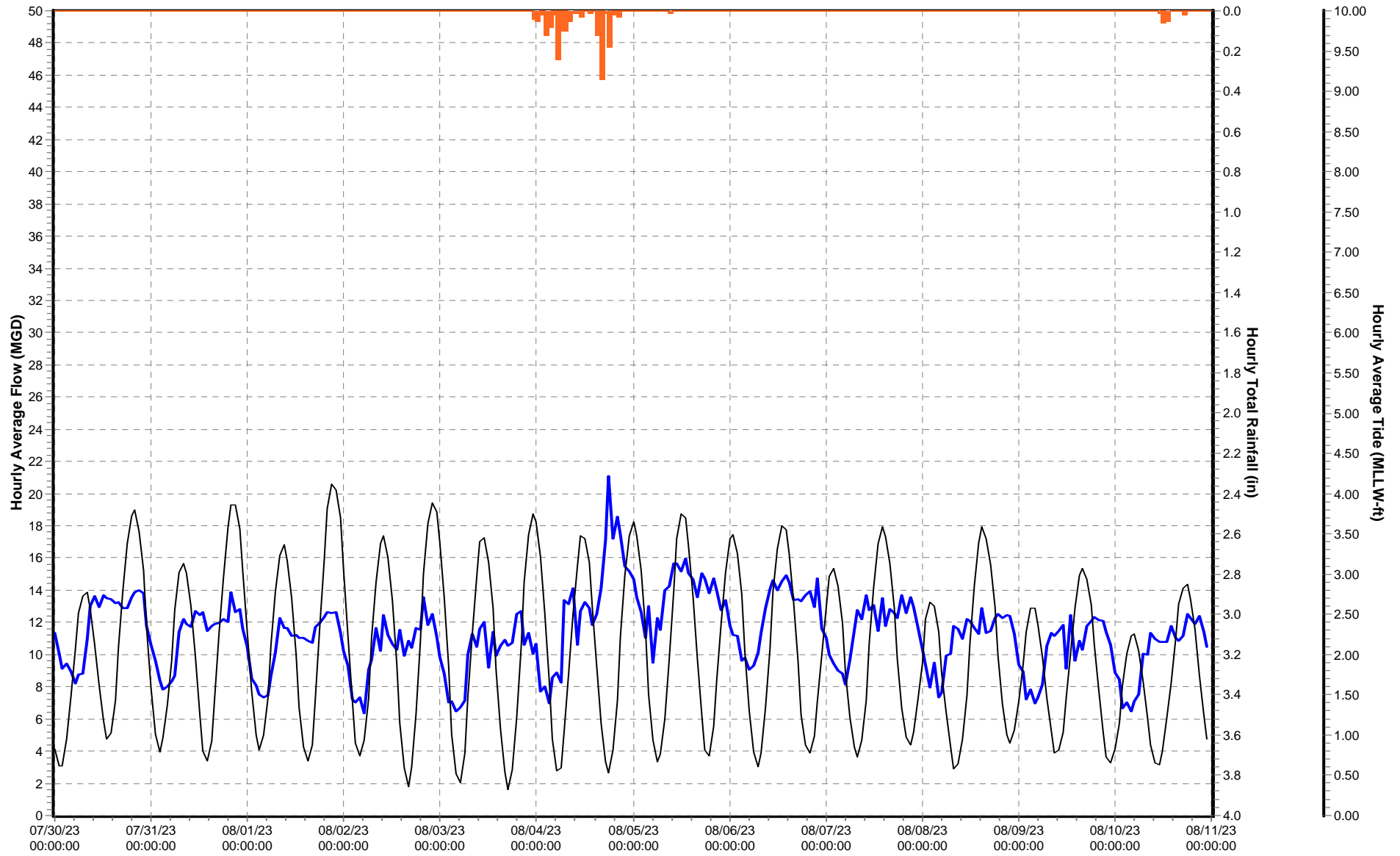
*Note: Rain Gauge was invalid for event and an average of surrounding sites was used.

Appendix B

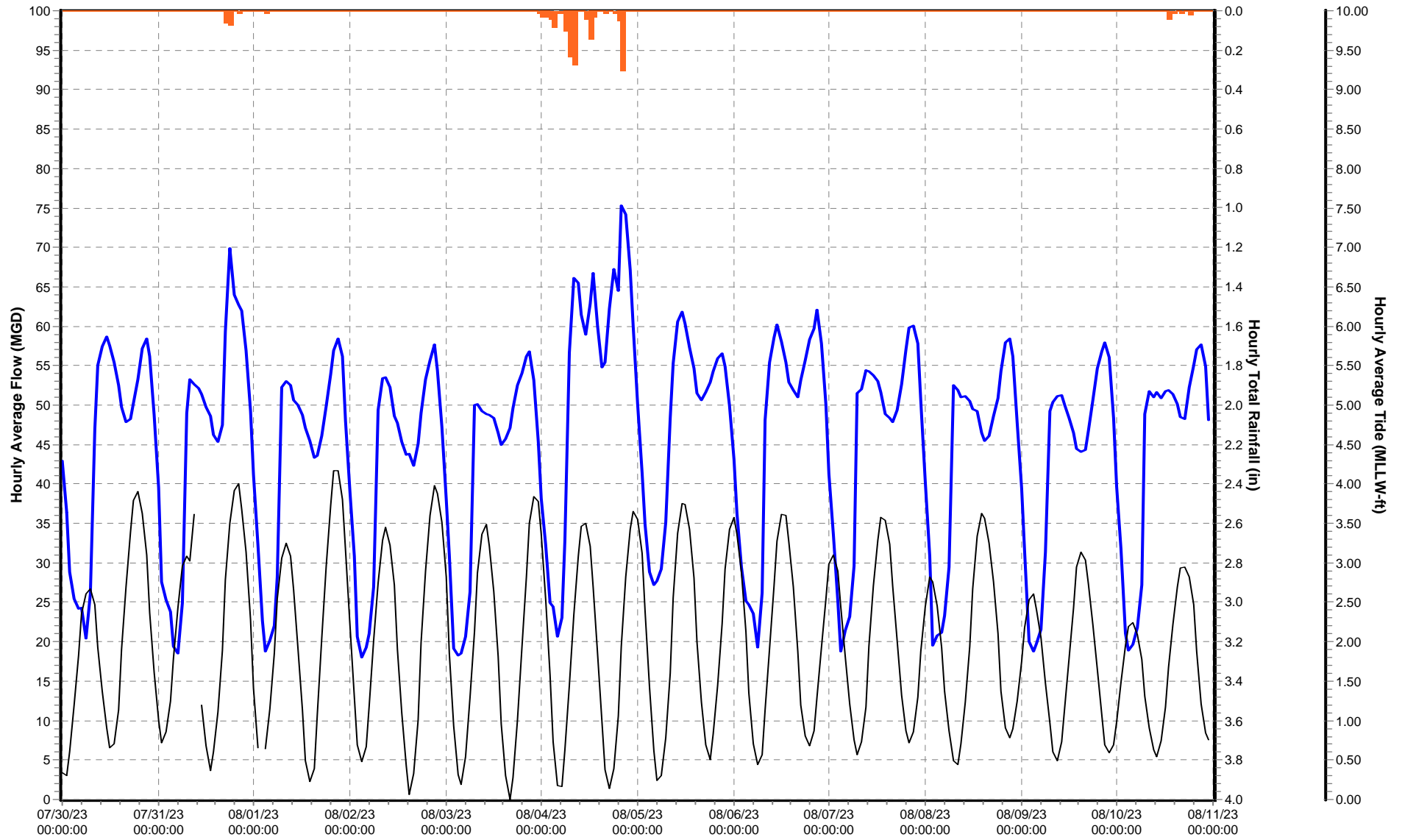
HRSD Treatment Plant Flows

Army Base Treatment Plant MMPS-035 (07/30/23 to 08/11/23)

MMPS-035.Flow_Effluent (MGD) MMPS-175: Taussig Blvd PS Rain Gauge SewellsPt Tide - MLLW Preliminary (ft)

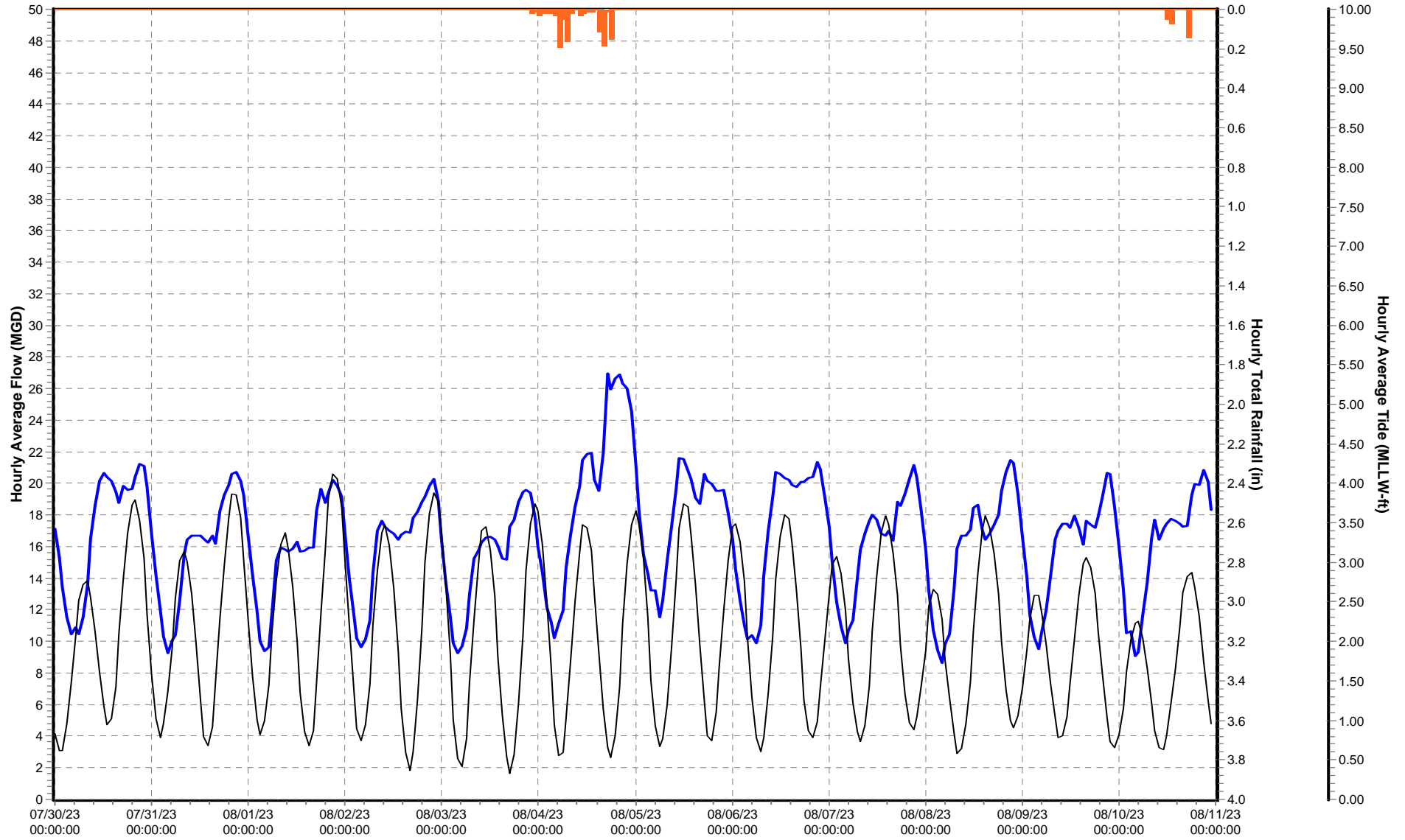


Atlantic Treatment Plant MMPS-071 (07/30/23 to 08/11/23)



Nansemond Treatment Plant

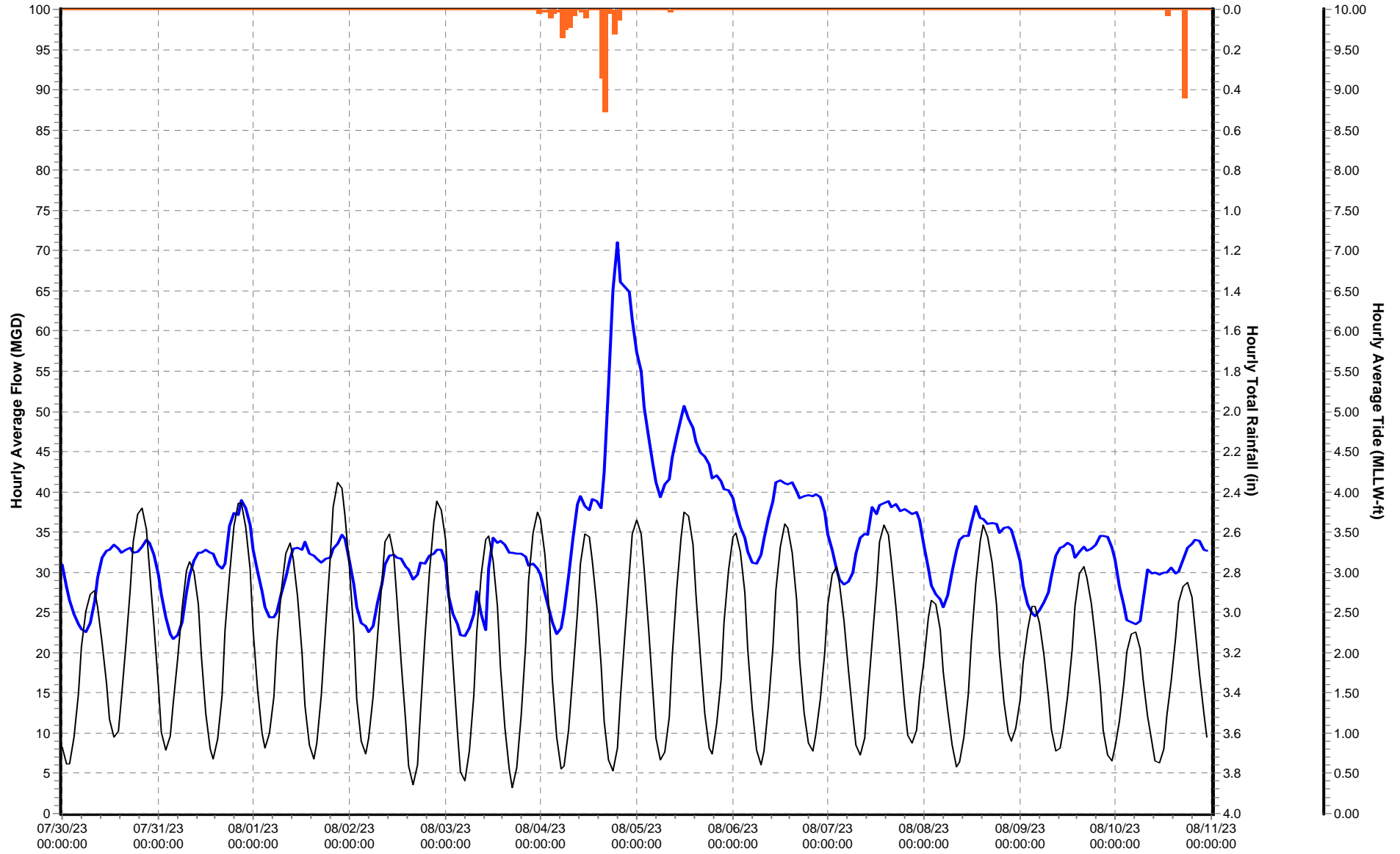
MMPS-202 (07/30/23 to 08/11/23)



VIP Treatment Plant

MMPS-003 (07/30/23 to 08/11/23)

Flow_Effluent (MGD) MMPS-003: VIP Treatment Plant Rain Gauge SewellsPt Tide - MLLW Preliminary

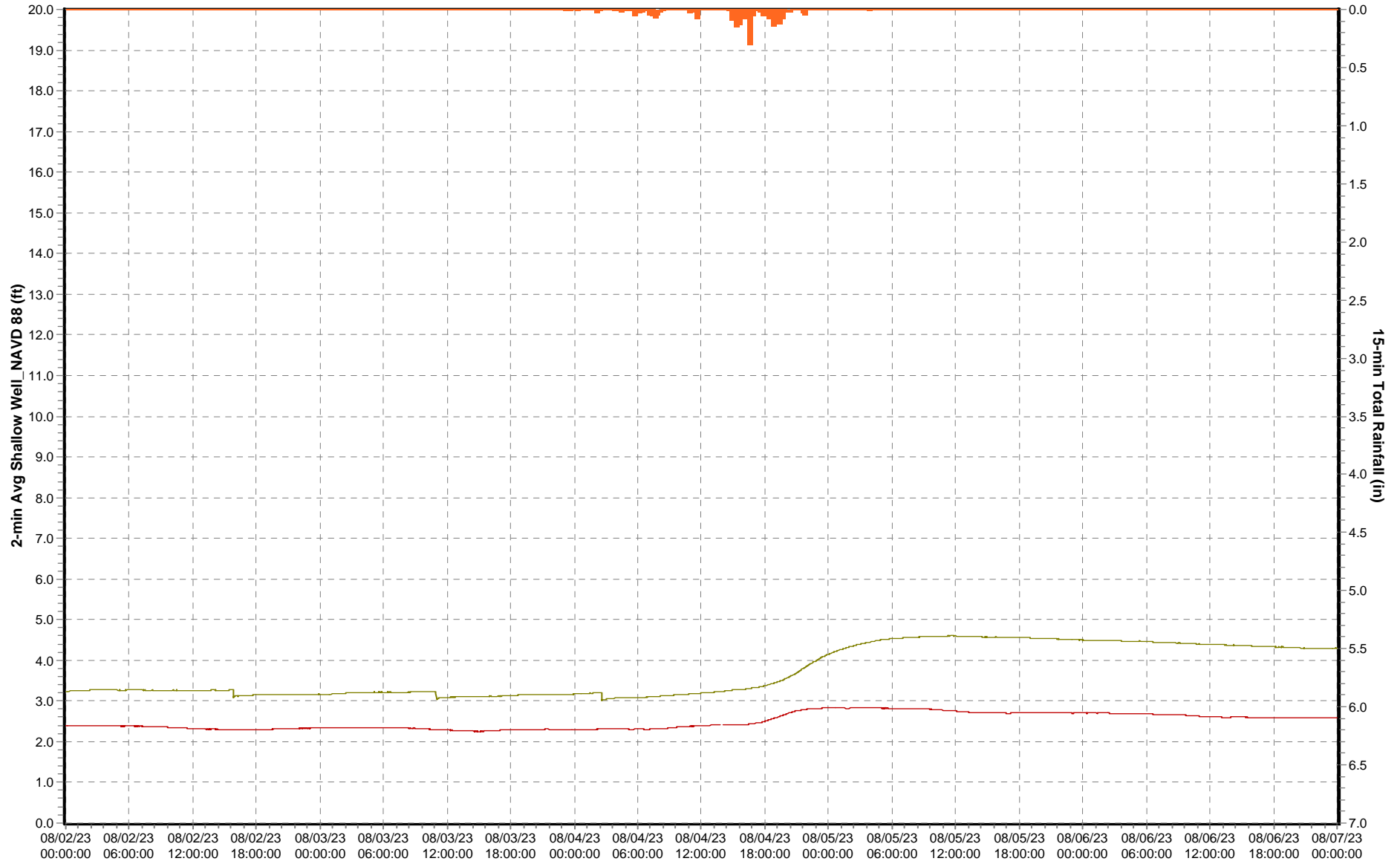


Appendix C

Shallow Well Analysis

5-day
South Shore Shallow Well Graphs
08/02/23 to 08/07/23

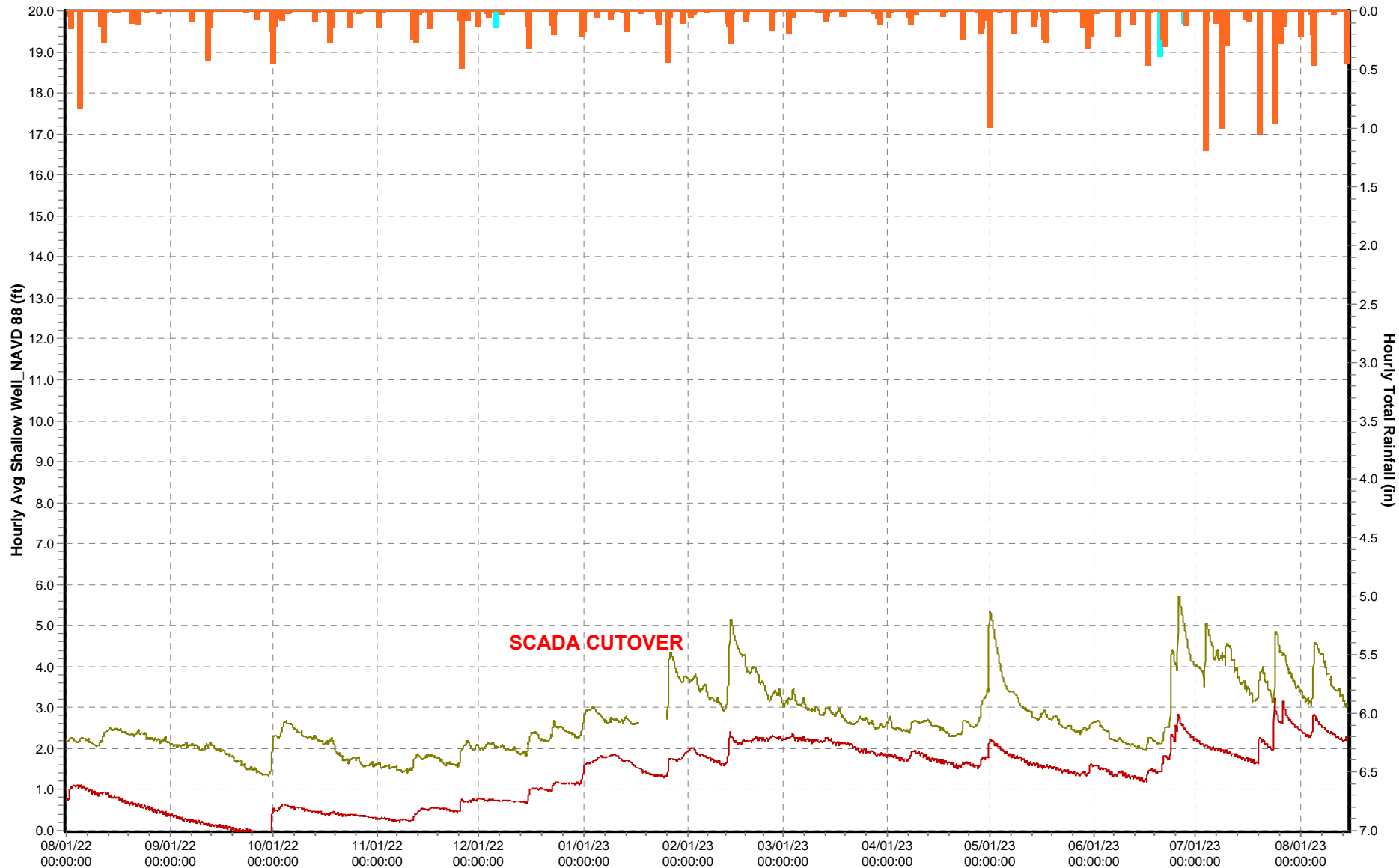
North Shore Rd PS. Shallow Well_NAVD88 (ft) Camden Ave PS. Shallow Well_NAVD 88 (ft) Rodman Ave PS. Rain Gauge (in)



1-year

South Shore Shallow Well Graphs

08/01/22 to 08/15/23



Hampton Roads Sanitation District

Post-Storm Report



8/28/2023

DISCLAIMER:

About the information on this HRSD server

This report is intended to provide the HRSD regional community summary information about the HRSD system during select wet weather events/anomalies. The attached report contains a selection of *official* Interceptor and Treatment data, as well as other environmental and meteorological data provided through other services. In an effort to enhance the HRSD system, the attached products have been made accessible on this server and care must be taken when using such products as they are intended for informational and not operational, legal, or other purposes.

This report is located on an HRSD server and is intended to be available 24 hours a day, seven days a week. However, timely availability and/or delivery of data and products from this server through the Internet is subject to numerous potential constraints and is, therefore, not guaranteed. Official HRSD dissemination of information is available only through a written response to a formal written request for data from the user.

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These data are part of HRSD's governmental function and HRSD reserves all rights and immunities relating to these data and the terms and manner in which it is made available.

Summary

On August 28th, there was an approximate 7-hour rainfall event that resulted in 6 sites on the North Shore and 23 sites on the South Shore that met a 1 to 100-year rainfall recurrence interval throughout the HRSD rain gauge network. A stationary front combined with a layer of rich moisture brought thunderstorms and heavy downpours to the area which caused flooding in some areas. North Shore sites averaged around 1.62 inches of rain while South Shore sites averaged around 1.92 inches. There was high impact on groundwater levels compared to August 2022. See Appendix C for the Historical Shallow Well comparison.

2 HRSD interceptor weather-related overflow(s) were reported.

7 Locality interceptor weather-related overflow(s) were reported.

HRSD flow and pressure meters met data reliability requirements per the MOM program. For all pressure meters in the aggregate and all pressure-side flow meters in the aggregate for each treatment plant service area listed below, at least 90% reliable data was achieved, based on the duration of system response to this rainfall event. The data reliability for the gravity flow meters is not included in this synopsis.

- Duration of system response: See Table Below
- Aggregate flow meter validity: 95.32%
- Aggregate pressure meter validity: 99.86%

Currently, rainfall recurrence intervals are only analyzed for a maximum of 96-hours. Rainfall analysis begins after 0.1 inches of rain has occurred. A 72-hour dry period of less than 0.1 inches of rain is typically used to signify two separate events. However, if a site returns to “dry weather” conditions prior to the next rainfall that occurs within 72 hours of the previous event, it is also considered for separate analysis. See Appendix A for the Rainfall Total System Maps.

The current criteria for publishing a post-storm analysis are the following:

- One or more rain gauge sites meet a two-year or greater RRI (rainfall recurrence interval) and at least 50% of sites in any treatment plant service area receive one inch of rainfall or greater,
- A rain gauge site meets a five-year or greater RRI, or
- A weather-related SSO occurs.

August 28th, 2023 – Post-Storm Rain Event Synopsis

Sanitary Sewer Overflows:

HRSD - South Shore

Location	Locality	Start Date
5734 Chesapeake Blvd	Norfolk	8/28/2023
3609 Cedar Ln	Norfolk	8/28/2023

Localities

Location	Locality	Start Date
76-Z Carlton Ct	Williamsburg	8/28/2023
99 Patrick Henry Dr	Williamsburg	8/28/2023
152-A Red Oak Landing	James City	8/28/2023
5349 Rockingham Dr	James City	8/28/2023
173 Forest Heights Rd	James City	8/28/2023
123 Depot	James City	8/28/2023
8798 Six Mt Zion Rd	James City	8/28/2023

Treatment Plant Data: *(Data obtained from Telog Database)*
See Appendix B for HRSD Treatment Plant Flows

HRSD Treatment Plant Data 8/28/2023

North Shore				
Treatment Plant	Date of Peak Hourly Flow	Peak Hourly Flow (MGD)	Peak Hour	TPSA Total Rainfall Avg (in)
Boat Harbor	8/28/2023	38.72	16:00	1.58
James River	8/28/2023	24.15	15:00	1.41
Williamsburg	8/28/2023	36.40	15:00	1.66
York River	8/28/2023	17.99	15:00	1.17

**HRSD Treatment Plant Data
8/28/2023**

South Shore				
Treatment Plant	Date of Peak Hourly Flow	Peak Hourly Flow (MGD)	Peak Hour	TPSA Total Rainfall Avg (in)
Army Base	8/28/2023	34.83	15:00	3.12
Atlantic	8/28/2023	106.1	16:00	1.96
Nansemond	8/28/2023	40.31	18:00	1.93
VIP	8/28/2023	77.72	15:00	3.09

North Shore

Weather:

Rainfall (HRSD Rainfall Gauges): *Recurrence intervals based on NOAA Atlas 14*

Rain Gauge Site	Peak Rainfall RI (Duration)	Locality
<i>Boat Harbor Treatment Plant Service Area¹</i>		
Bayshore PS	DNQ	HAMP
Bridge Street Tide Gate	Invalid	HAMP
Boat Harbor	25-year (3hr)	NEWP
Copeland Park PS	5- to 10-year (3hr)	NEWP
Hampton PS 159	DNQ	HAMP
<i>James River Treatment Plant Service Area¹</i>		
Hilton School PS	DNQ	NEWP
James River Main Flow (Influent)	DNQ	NEWP
Lee Hall PRS	DNQ	NEWP
Lucas Creek PS	DNQ	NEWP
Morrison PS	DNQ	NEWP
<i>Williamsburg Treatment Plant Service Area¹</i>		
Ford's Colony	10-year (3hr)	JCSA
Fort Eustis PS	DNQ	NEWP
Greensprings PS	25-year (3hr)	JCA
Solarex	1-year (6hr)	JCSA
Williamsburg Main Flow (Effluent)	DNQ	JCSA
Williamsburg PS	10-year (3hr)	WILL
York Skimino Hills PS	Invalid	YORK

August 28th, 2023 – Post-Storm Rain Event Synopsis

Rain Gauge Site	Peak Rainfall RI (Duration)	Locality
<i>York River Treatment Plant Service Area¹</i>		
Big Bethel PRS	DNQ	HAMP
Freeman PS	DNQ	HAMP
Gloucester Court House	DNQ	GLOU
Guinea Rd at Maryus Rd	DNQ	GLOU
Ordinary PCV	DNQ	GLOU
Poquoson PS 6	Invalid	POQ
Wolf Trappe PCV	DNQ	YORK
York Kiln Creek 1 PS	DNQ	YORK
York PS 15	DNQ	YORK
York River Main Flow (Influent)	Disconnected	YORK
York River Crossing (York River Rectifier)	DNQ	GLOU

Note:

1. Typical treatment plant service area.

Newport News-Williamsburg International (PHF)

- o Wind and Rainfall (daily total):

Date	Gust (max)	Sustained (max)	Sustained (avg)	Direction	Rainfall (in)
8/28/23	22 mph	16 mph	8 mph	E	1.31

Tide:

- Yorktown USCG Training Center:
 - Storm Surge: An approximate 1.25-foot storm surge was observed.

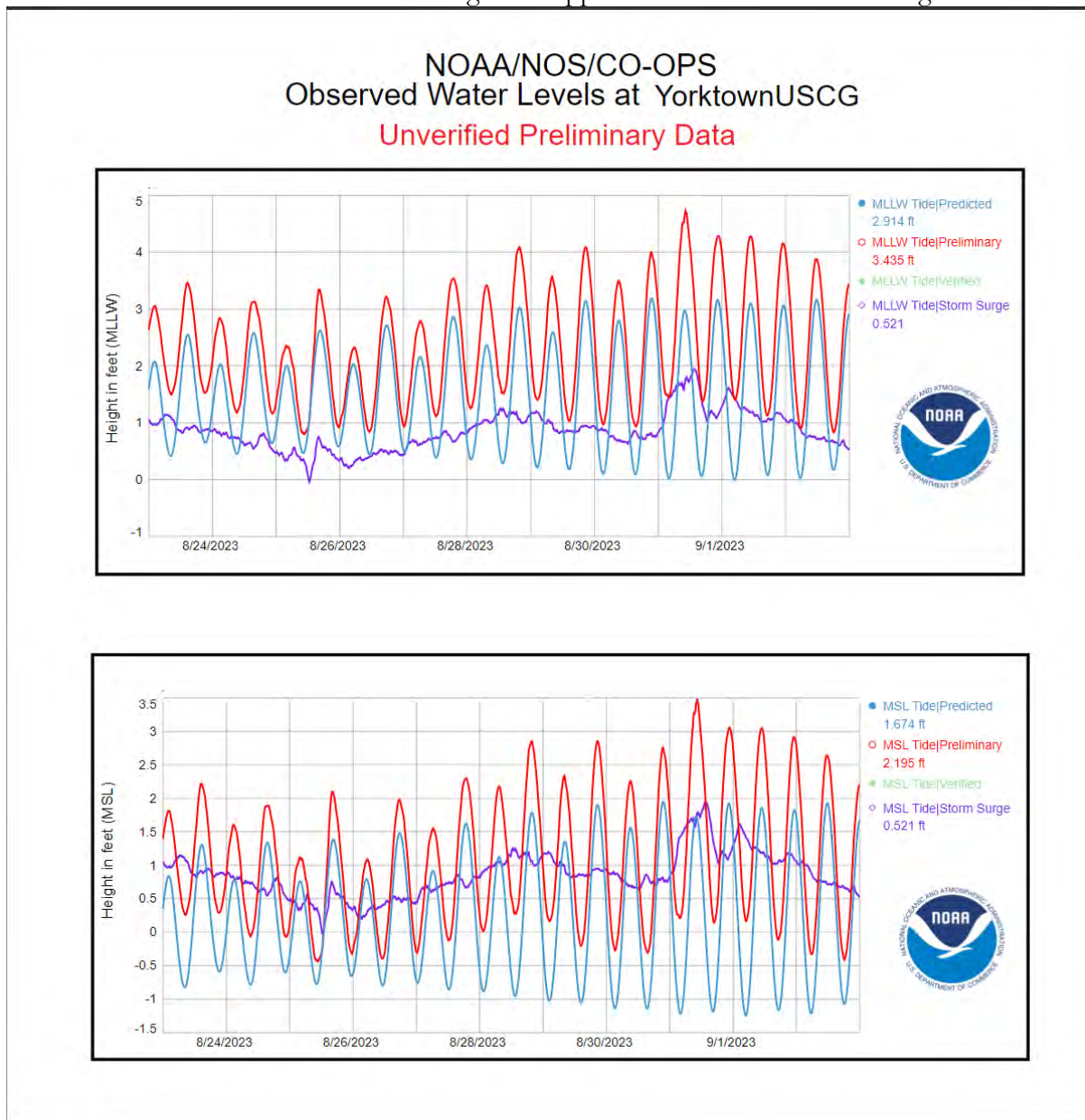


Figure 1. Preliminary data obtained from NOAA and a connection with Open Weather

- Sewells Point Tide Station:
 - Storm Surge: An approximate 1.08 foot storm surge was observed.

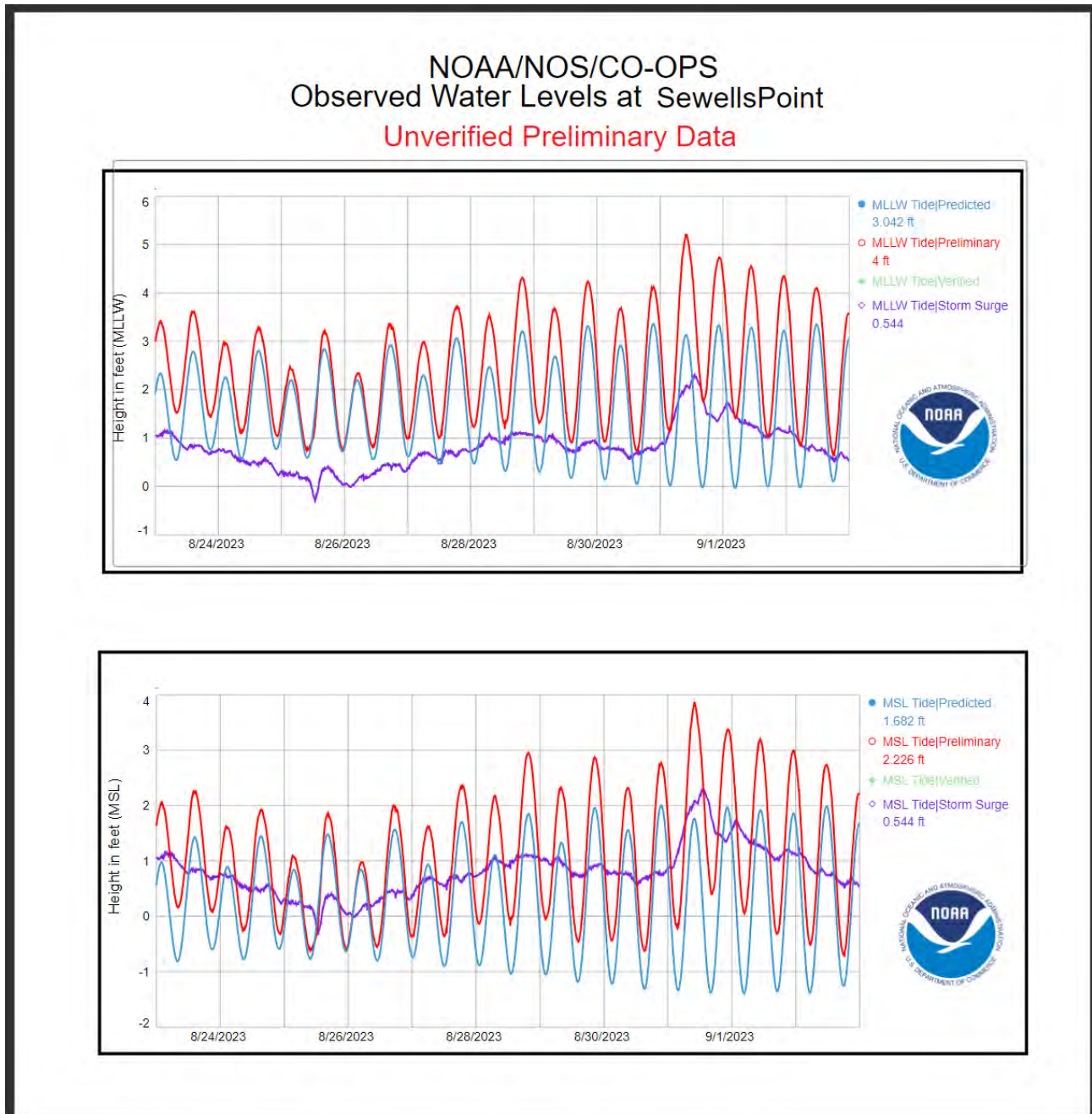


Figure 2. Preliminary data obtained from NOAA and a connection with Open Weather

August 28th, 2023 – Post-Storm Rain Event Synopsis

South Shore

Weather:

Rainfall (HRSD Rainfall Gauges): *Recurrence intervals based on NOAA Atlas 14*

*Duration represents the minimum amount of time it took to reach the specified RRI.

Rain Gauge Site	Peak Rainfall RI (Duration)	Locality
<i>Army Base Treatment Plant Service Area¹</i>		
Bancker Rd (Dovercourt Discharge)	2- to 5-year (3hr)	NORF
Taussig Blvd PS	10- to 25-year (2hr)	NORF
<i>Atlantic Treatment Plant Service Area¹</i>		
Callison at GB Locks	DNQ	CHES
Chesapeake PS 243	DNQ	CHES
Chesapeake PS 254	DNQ	CHES
Courthouse PRS	DNQ	VAB
Elbow Rd	DNQ	CHES
John B. Dey MLV-AT side	DNQ	VAB
Kempsville PRS	10- to 25-year (1hr)	VAB
Lagomar IFM at Atlantic TP	2- to 5-year (1hr)	VAB
Laskin Rd PRS	10- to 25-year (1hr)	VAB
Pine Tree PRS	10-year (1hr)	VAB
Shipp's Corner PRS	DNQ	VAB
<i>Ches-Liz Treatment Plant Service Area¹</i>		
Dozier's Corner PS	2- to 5-year (3hr)	CHES
Independence PRS	25- to 50-year (1hr)	VAB
Northampton Blvd at Wesleyan Dr	2- to 5-year (2hr)	NORF
Providence PRS	10-year (1hr)	VAB
Shore Dr @ Jack Frost	1-year (1hr)	CHES
<i>Nansemond Treatment Plant Service Area¹</i>		
Bowers Hill PRS	2-year (1hr)	CHES
Cedar Lane PS	100-year (2hr)	PORT
Chesapeake PS 158	DNQ	CHES
Chesapeake PS 238	DNQ	CHES
Crittenden Rd_Chuckatuck Rectifier	25- to 50-year (3hr)	SUFF
Deep Creek PRS	1- to 2-year (3hr)	CHES
Lake Kilby WTP	DNQ	SUFF
Nansemond Main Flow (Effluent)	10-year (3hr)	SUFF
Pagan River Rectifier	DNQ	IOW
Pughsville PS	1- to 2-year (3hr)	SUFF
Route 337 PRS	DNQ	CHES
Smithfield High School	DNQ	IOW
Suffolk PS	DNQ	SUFF
Suffolk PS 81	DNQ	SUFF
Suffolk PS 87	DNQ	SUFF
Windsor Duke St PS	Invalid	IOW

August 28th, 2023 – Post-Storm Rain Event Synopsis

Rain Gauge Site	Peak Rainfall RI (Duration)	Locality
<i>VIP Treatment Plant Service Area¹</i>		
Elizabeth River Crossing_Eastern Branch	25-year (2hr)	NORF
Ferebee Avenue PS	2- to 5-year (2hr)	CHES
Luxembourg Avenue PS	10-year (3hr)	NORF
Rodman Ave PS	2-year (2hr)	PORT
Va Beach Blvd PS	5- to 10-year (2hr)	NORF
VIP Main Flow (Effluent)	10-year (3hr)	NORF

Note:

1. Typical treatment plant service area.

Norfolk International Airport (ORF)

- o Wind and Rainfall (daily total):

Date	Gust (max)	Sustained (max)	Sustained (avg)	Direction	Rainfall (in)
8/28/23	23 mph	16 mph	8 mph	E	2.18

Tide:

- Sewells Point Tide Station:
 - Storm Surge: An approximate 1.08 foot storm surge was observed.

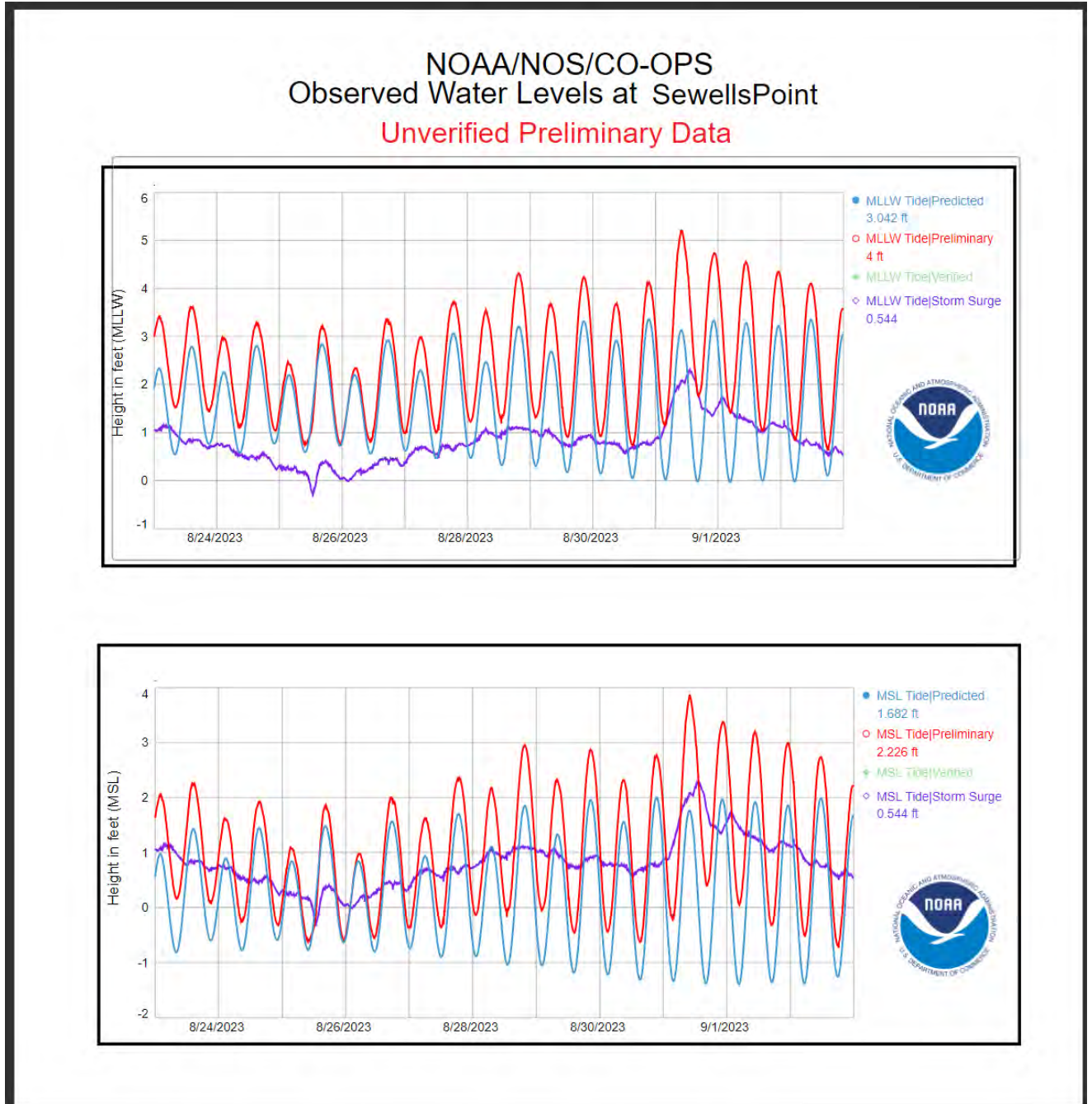


Figure 3. Preliminary data obtained from NOAA and a connection with Open Weather

Shallow Well Analysis:

Shallow wells are located at/or near HRSD Pump Stations to measure groundwater levels. The water column is measured using a pressure transducer located near the bottom of the well. The installed sensor measures gauge pressure in inches of water. The Shallow Well_NAVD88 measurement referenced in Appendix C refers to the elevation (referenced as NAVD 88) of the sensor plus the gauge measurement in feet.

DRAFT






Appendix A

HRSD Rain Gauge Network
Rainfall Totals

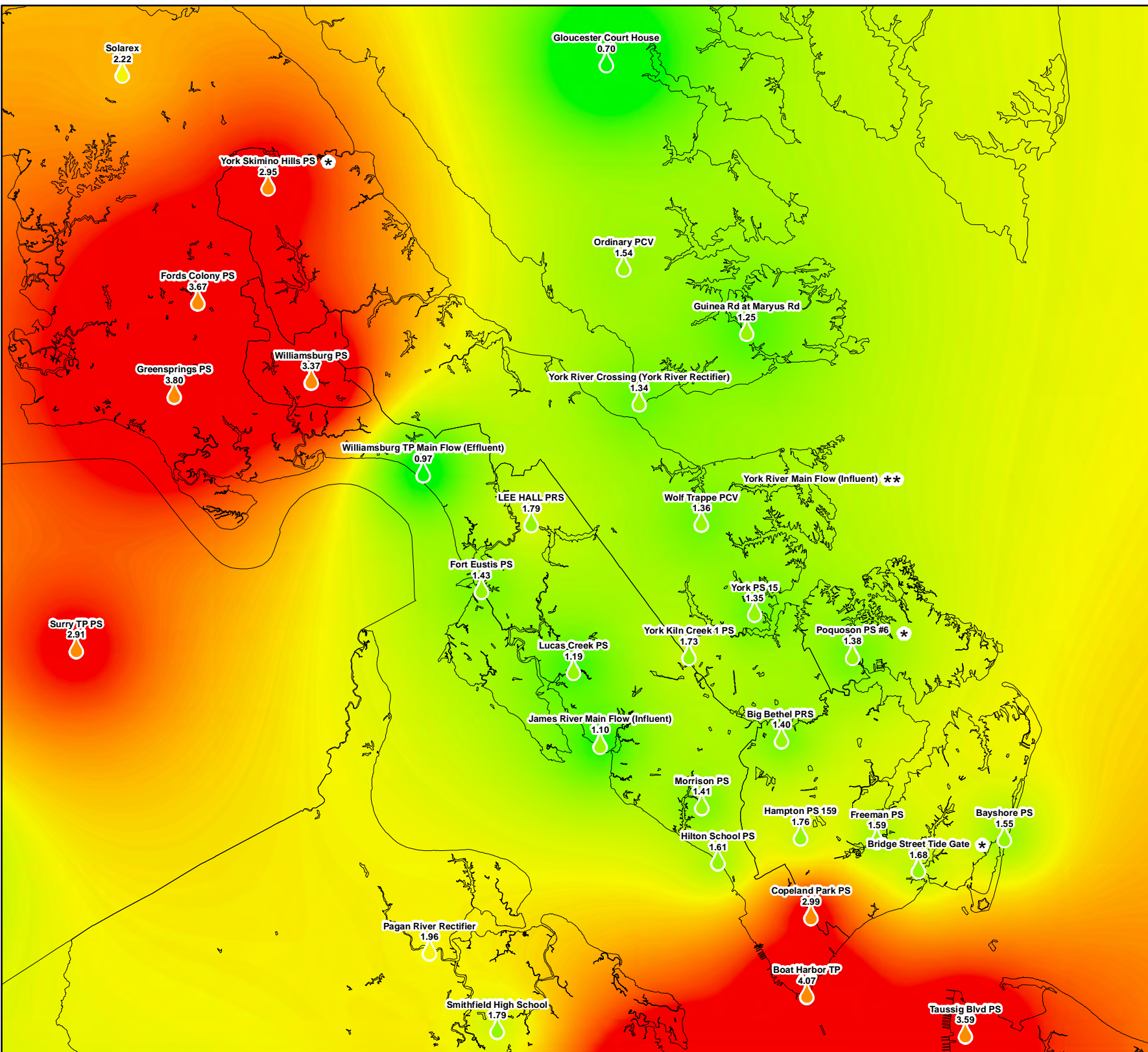
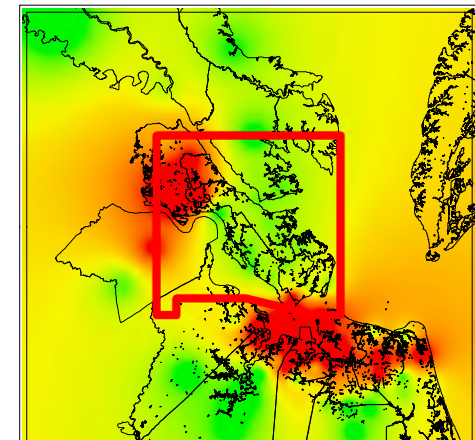
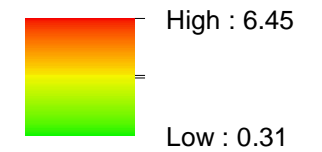
North Shore

August 28, 2023 Rainfall Analysis Total Rainfall

Rain Gauges (in):

-  4.08 - 6.45
-  2.67 - 4.07
-  1.80 - 2.66
-  0.98 - 1.79
-  0.31 - 0.97

Value

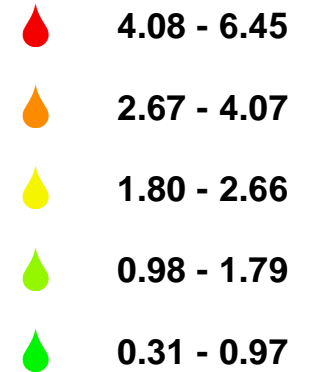


*Note: Rain Gauge was invalid for event and an average of surrounding sites was used. **Rain Gauge disconnected during event

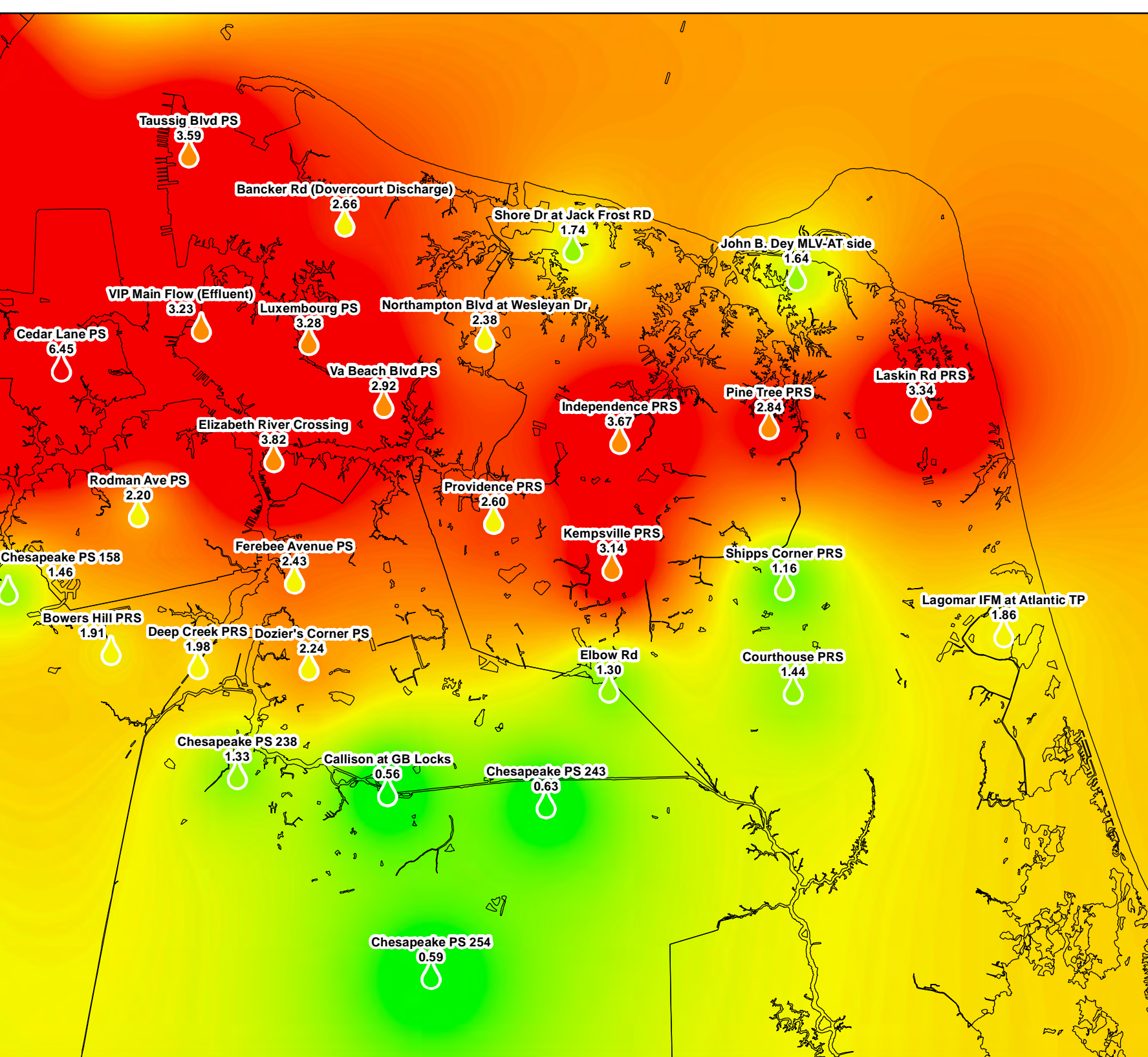
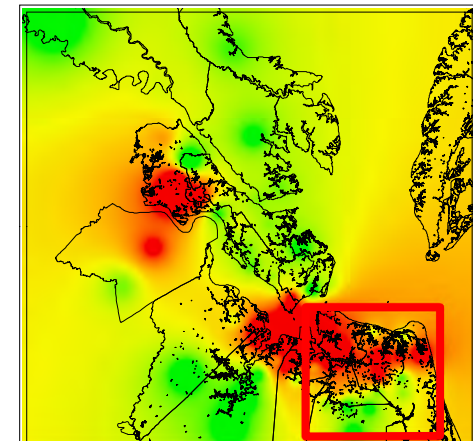
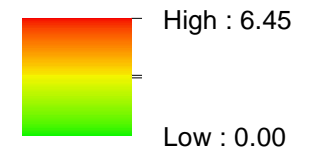
South Shore - East

August 28, 2023 Rainfall Analysis Total Rainfall

Rain Gauges (in):



Value

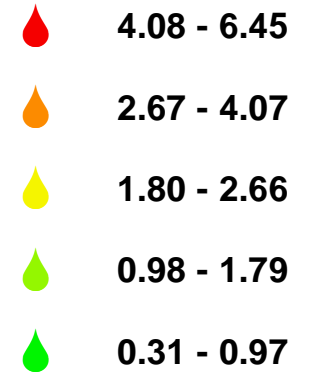


*Note: Rain Gauge was invalid for event and an average of surrounding sites was used. **Rain Gauge disconnected during event

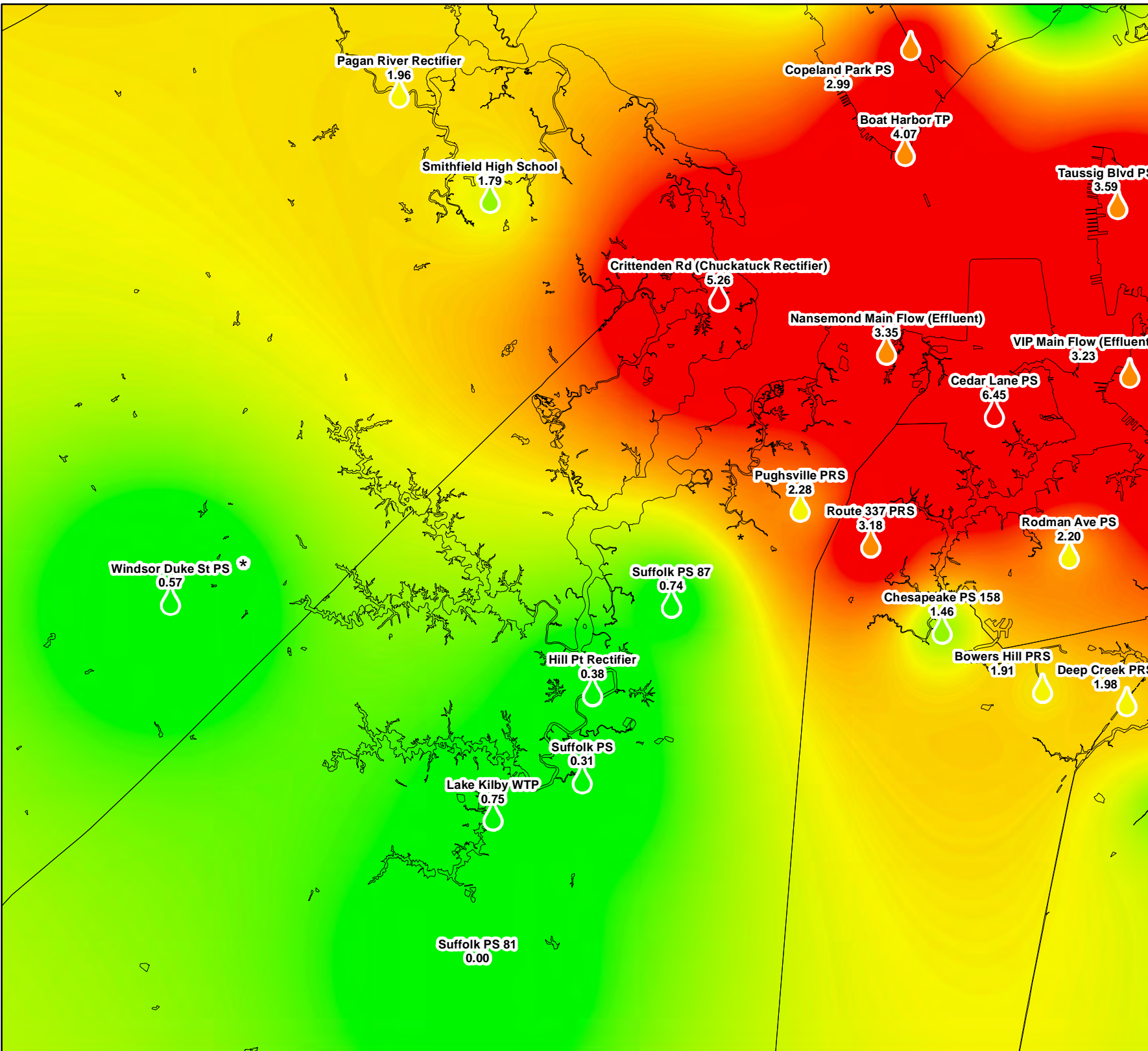
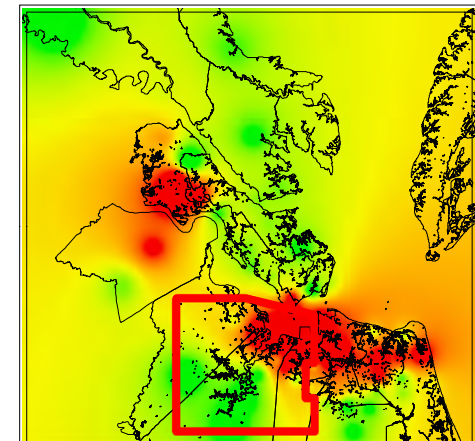
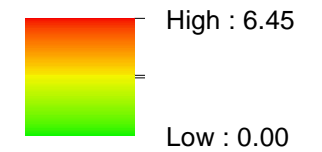
South Shore - West

August 28, 2023 Rainfall Analysis Total Rainfall

Rain Gauges (in):



Value



*Note: Rain Gauge was invalid for event and an average of surrounding sites was used. **Rain Gauge disconnected during event

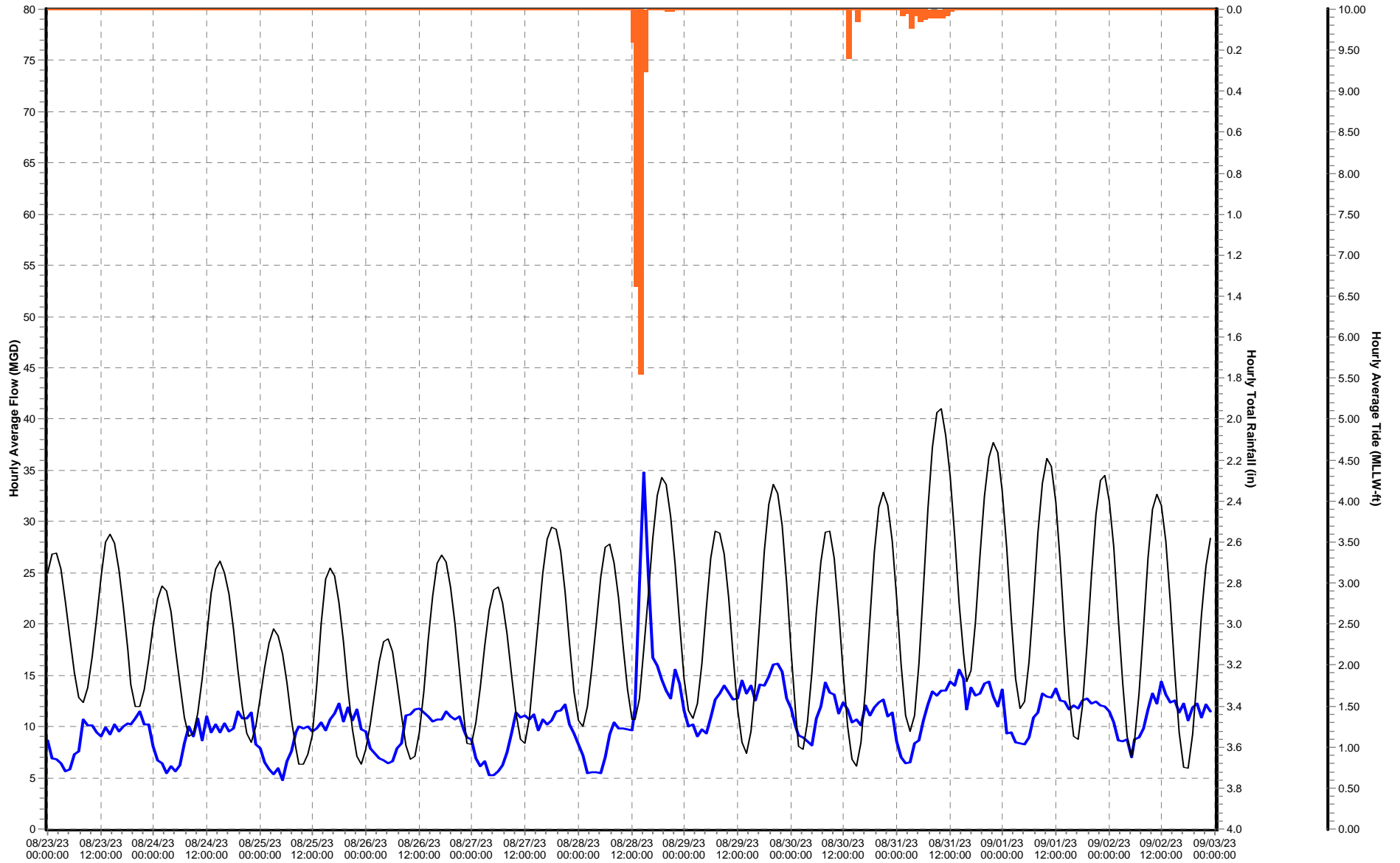
Appendix B

HRSD Treatment Plant Flows

Army Base Treatment Plant

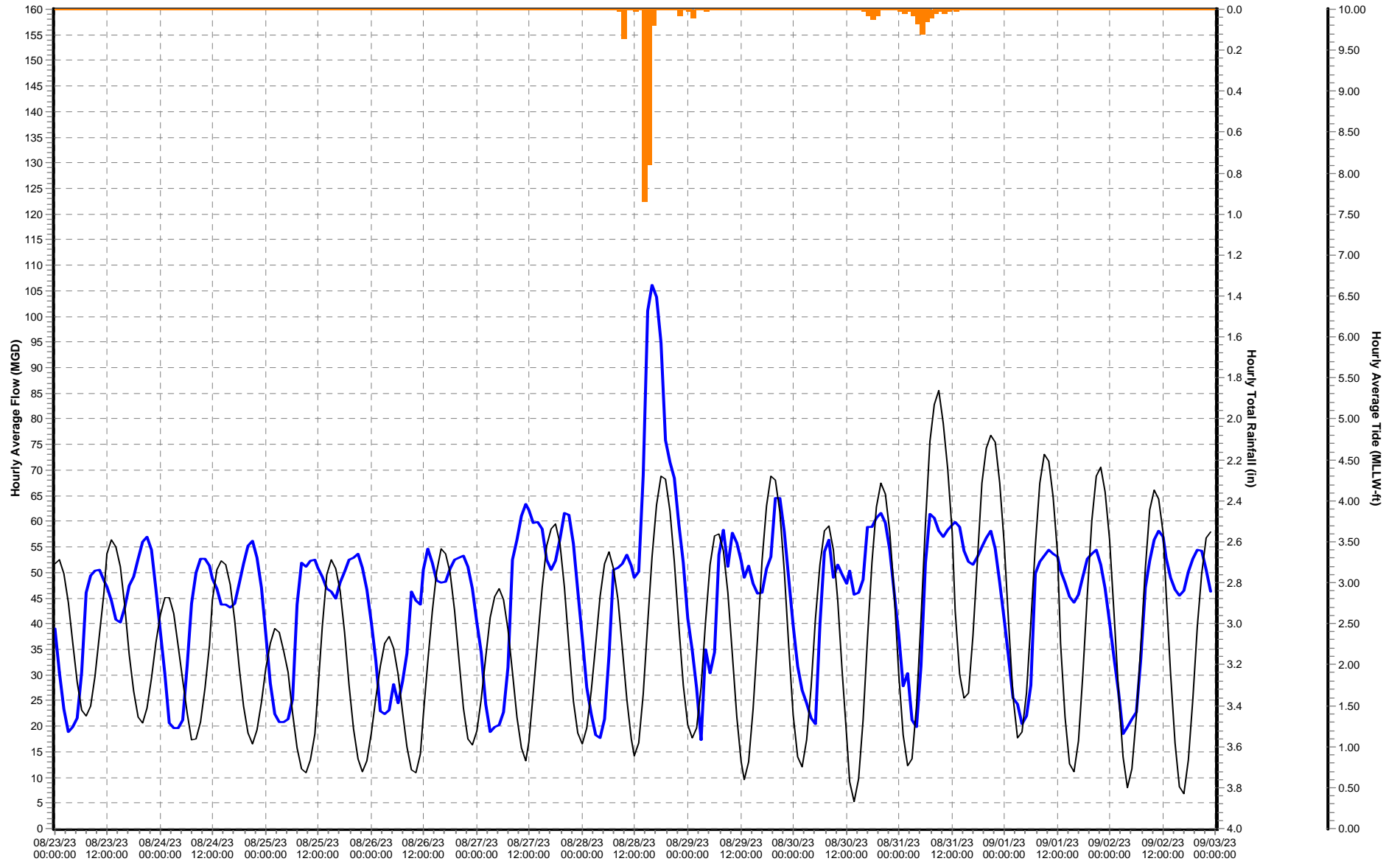
MMPS-035 (08/23/23 to 09/03/23)

MMPS-035.Flow_Effluent (MGD) MMPS-175: Taussig Blvd PS Rain Gauge SewellsPt Tide - MLLW Preliminary (ft)



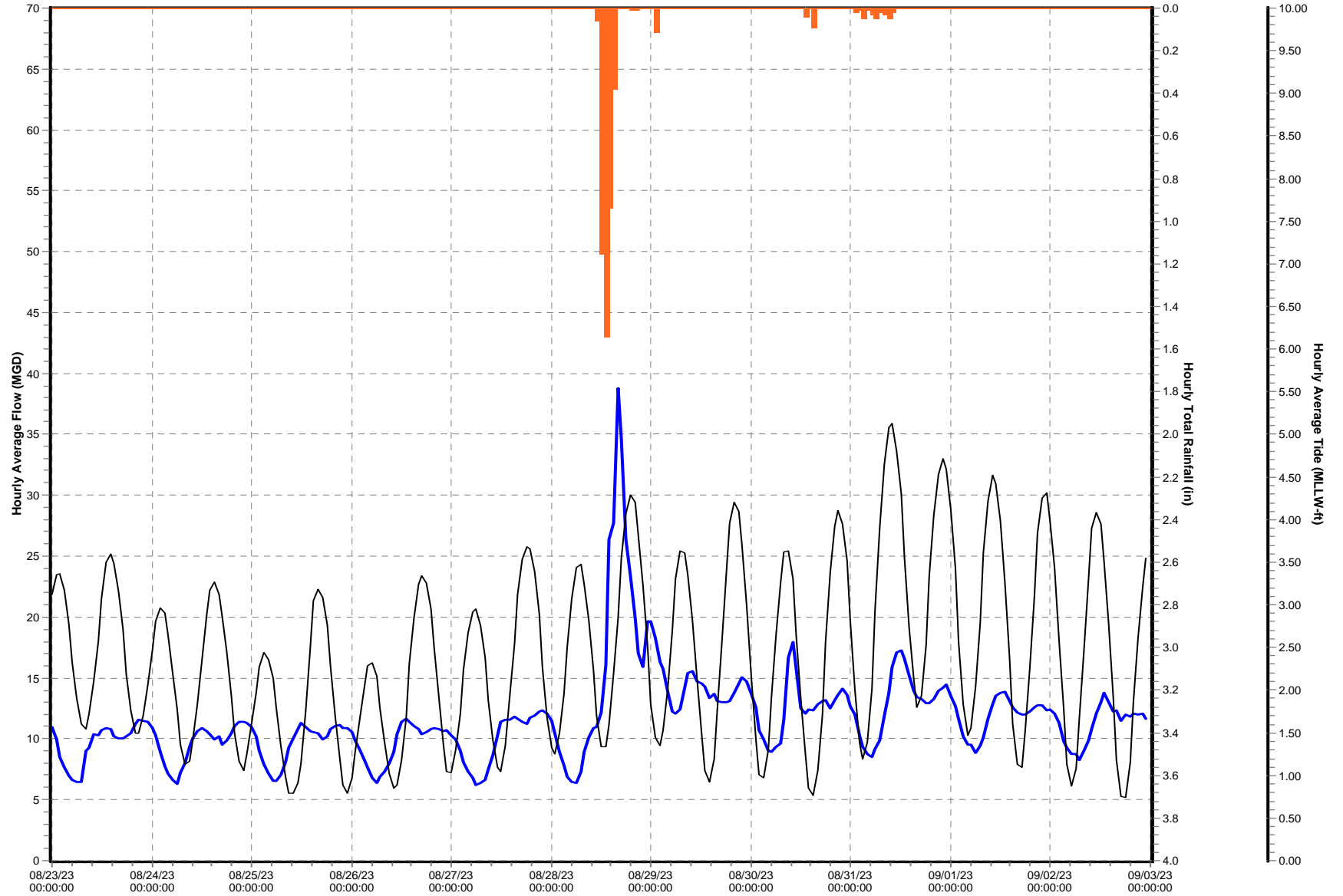
Atlantic Treatment Plant
MMPS-071 (08/23/23 to 09/03/23)

Flow_Effluent (MGD) MMPS-185: Lagomar IFM at Atlantic TP Rain Gauge CBBT Tide - MLLW Preliminary (ft)



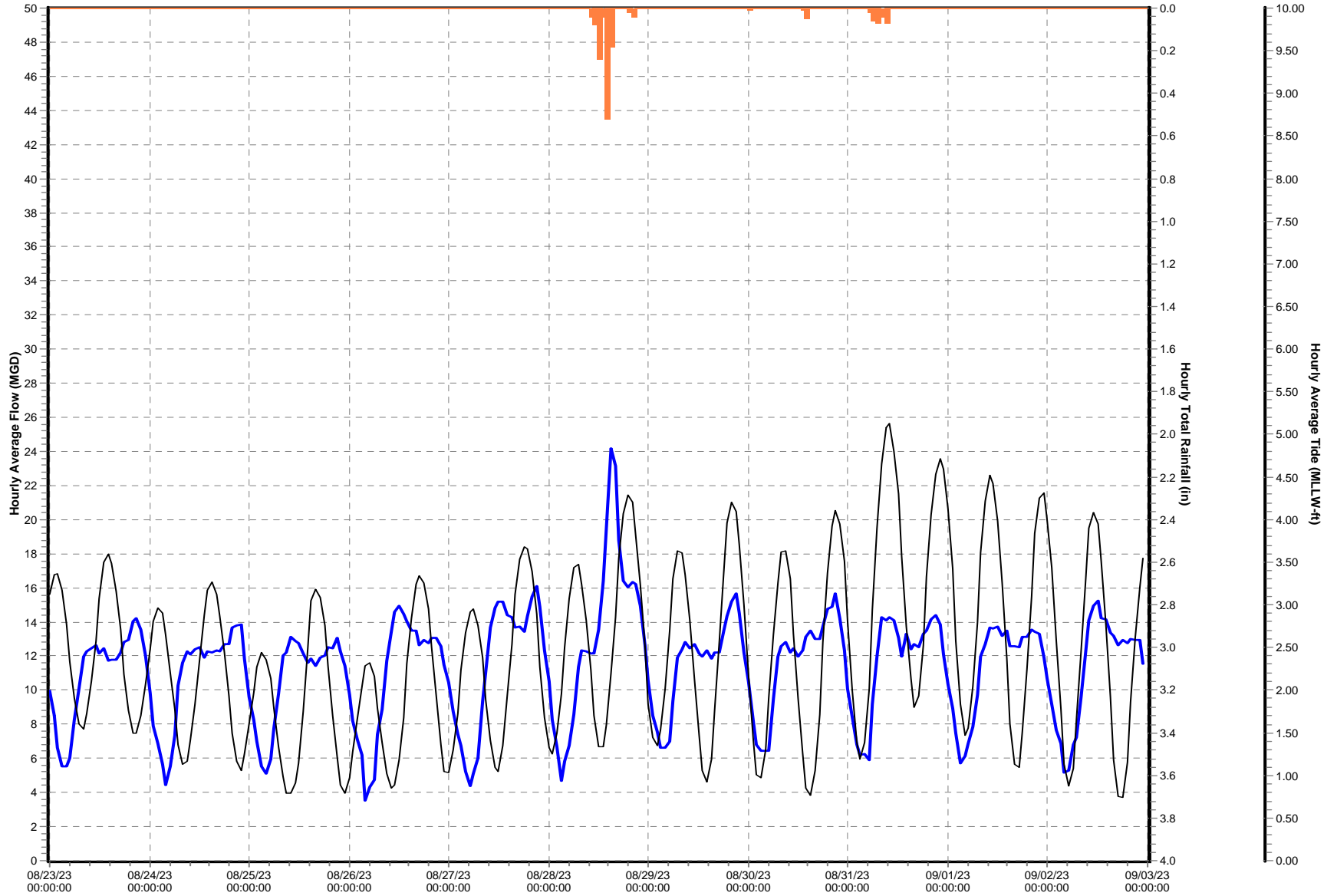
Boat Harbor Treatment Plant

MMPS-075 (08/23/23 to 09/03/23)



James River Treatment Plant
MMPS-184 (08/23/23 to 09/03/23)

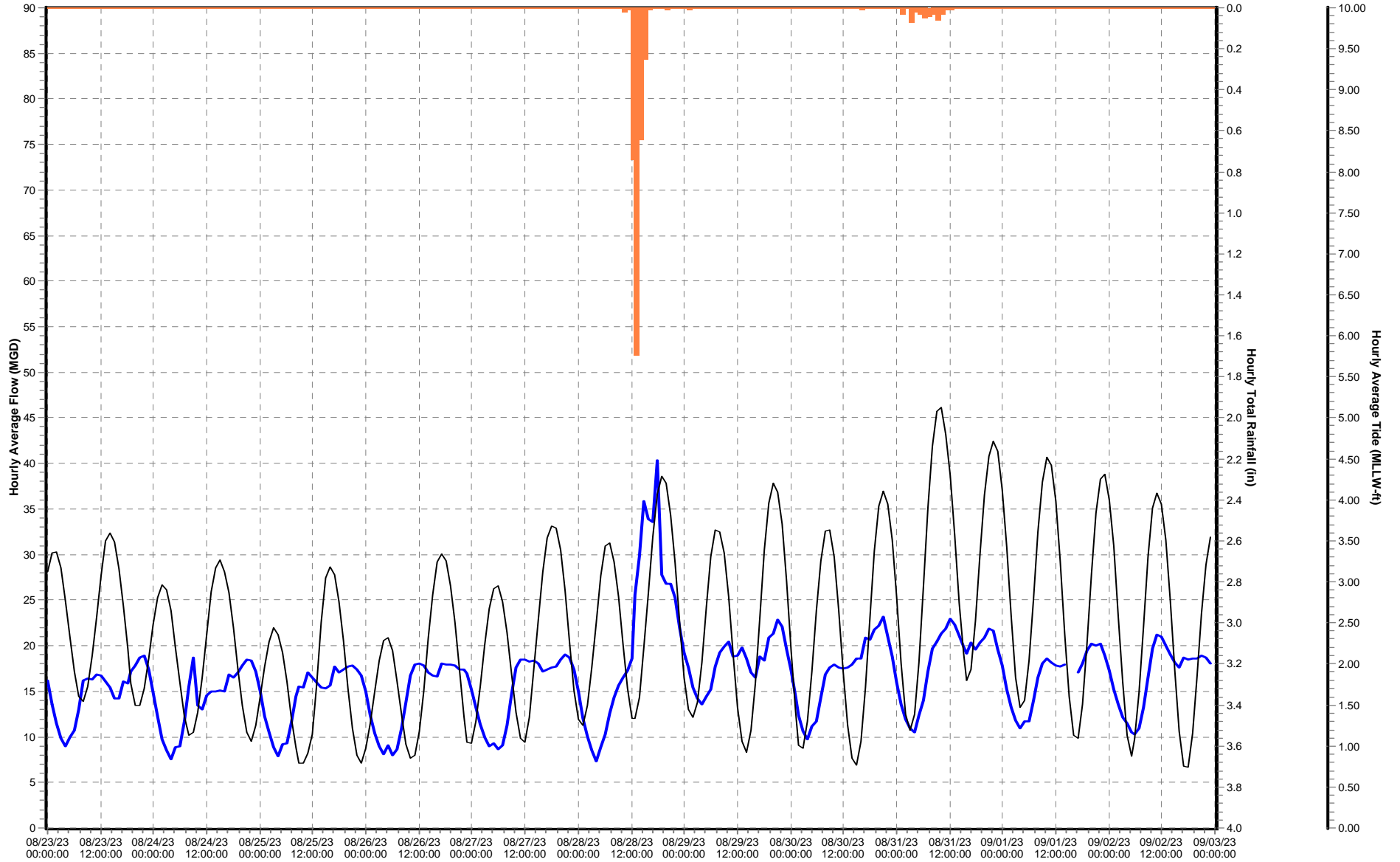
Flow_Influent (MGD) Rainfall @ JRTP SewellsPt Tide - MLLW Preliminary (ft)



Nansemond Treatment Plant

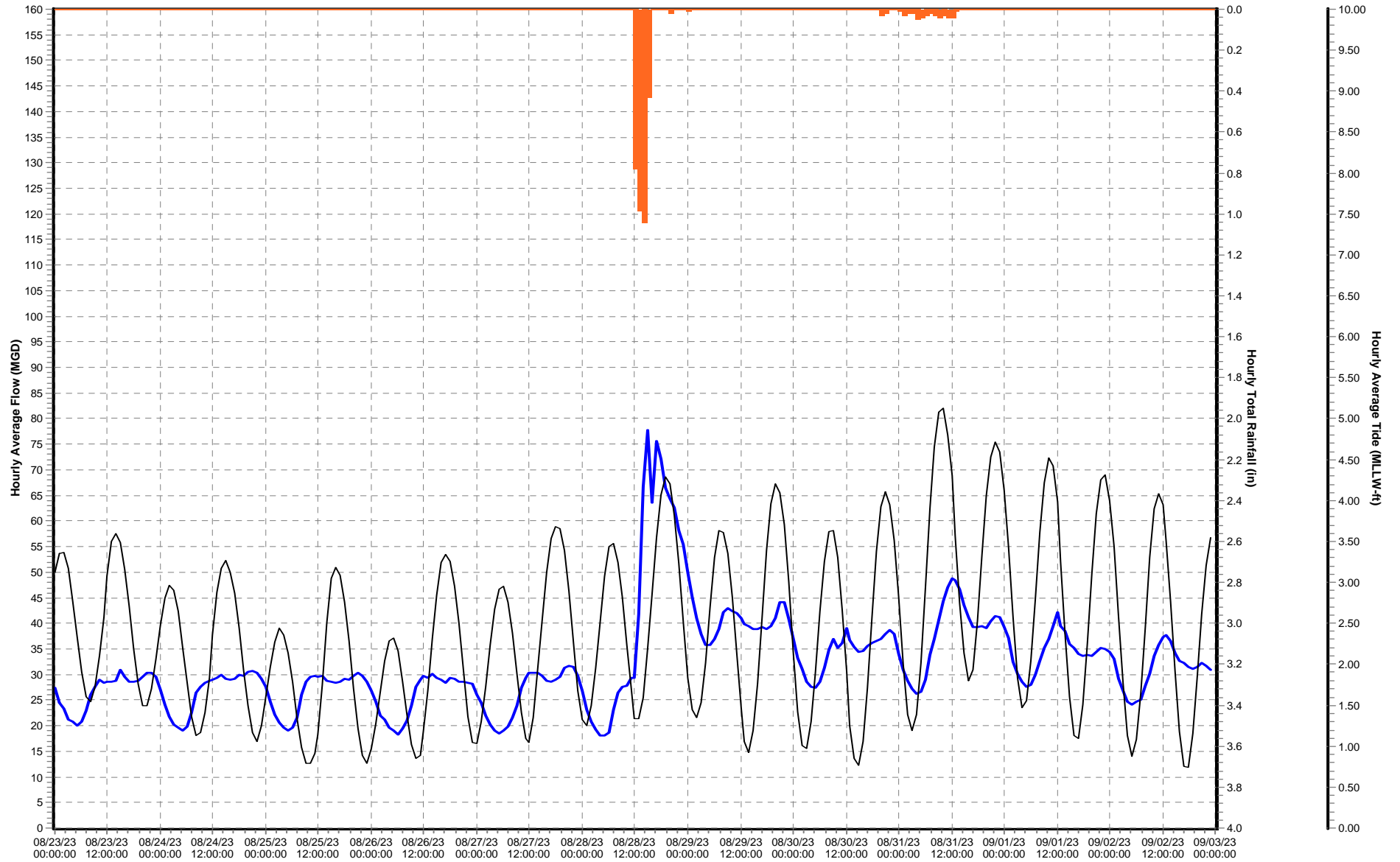
MMPS-202 (08/23/23 to 09/03/23)

Flow_Effluent (MGD) MMPS-202: Nansemond Main Flow_Effluent Rain Gauge SewellsPt Tide - MLLW Preliminary (ft)



VIP Treatment Plant
MMPS-003 (08/23/23 to 09/03/23)

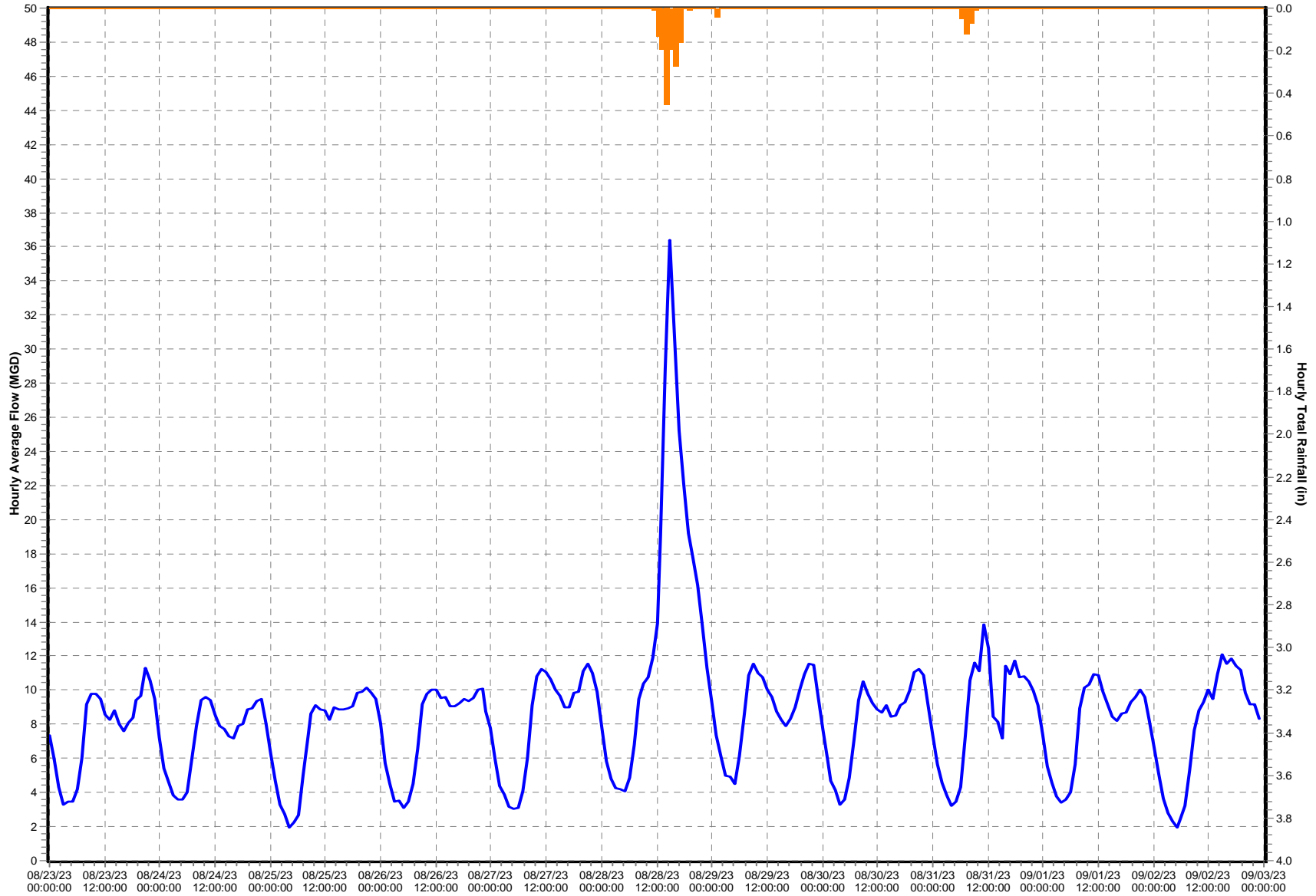
Flow_Effluent (MGD) MMPS-003: VIP Treatment Plant Rain Gauge SewellsPt Tide - MLLW Preliminary



Williamsburg Treatment Plant

MMPS-222 (08/23/23 to 09/03/23)

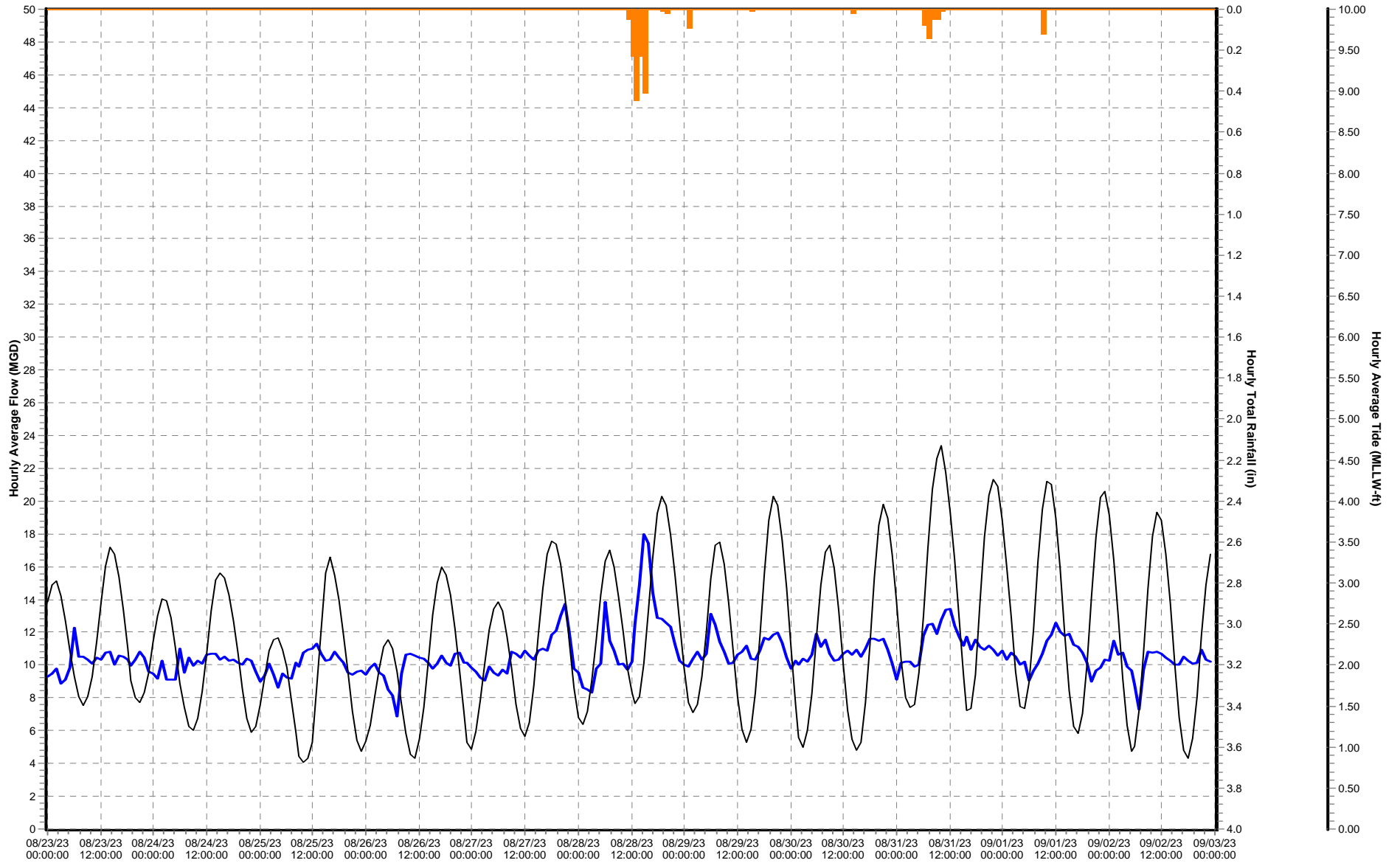
Flow_Effluent (MGD) Rainfall @ WBTP



York River Treatment Plant

MMPS-235 (08/23/23 to 09/03/23)

Flow_Influent (MGD) MMPS-234.MMPS-234.Rain Gauge (in) YorktownUSCG Tide - MLLW Preliminary (ft)



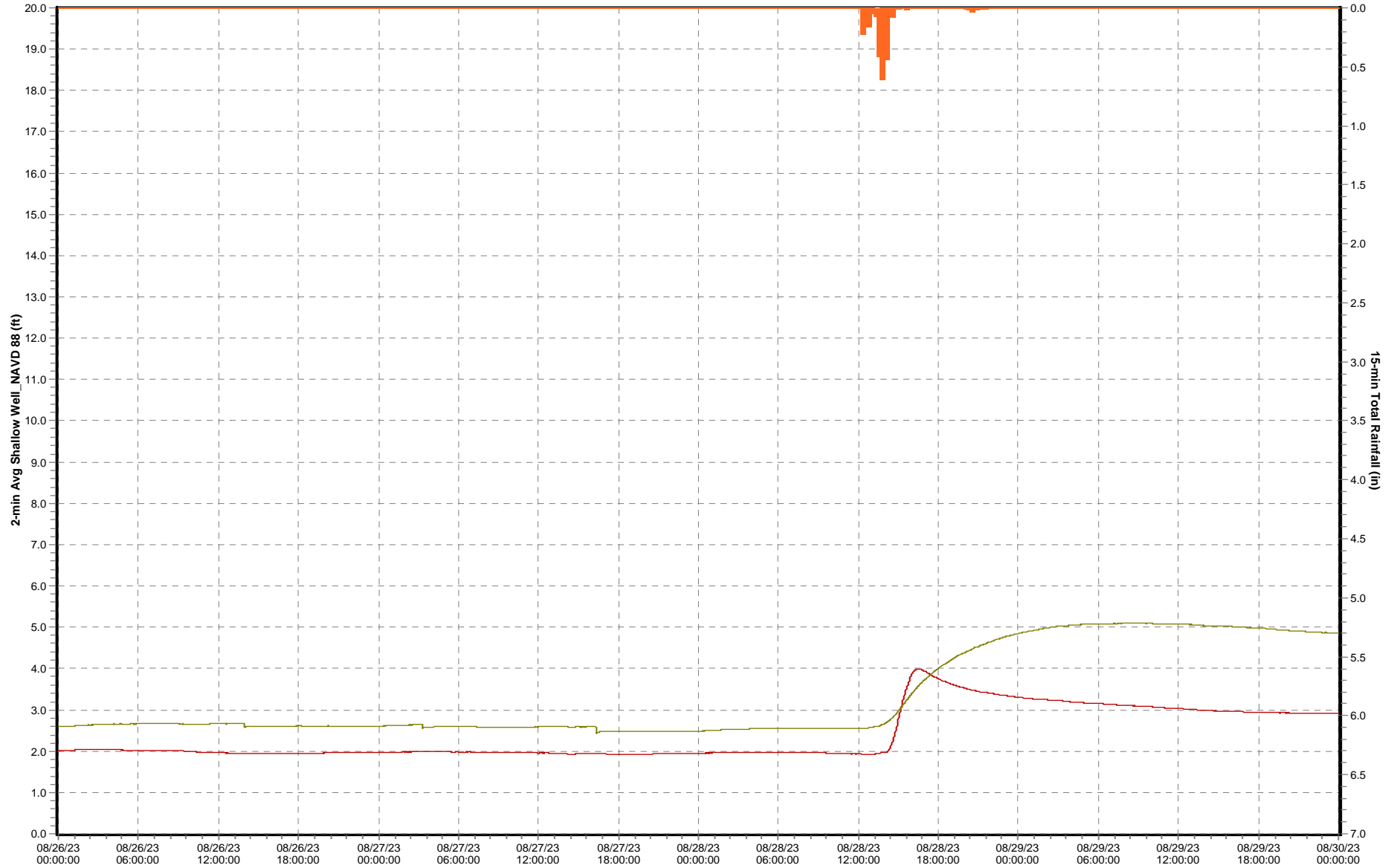
Appendix C

Shallow Well Analysis

5 Day

South Shore Shallow Well Graphs

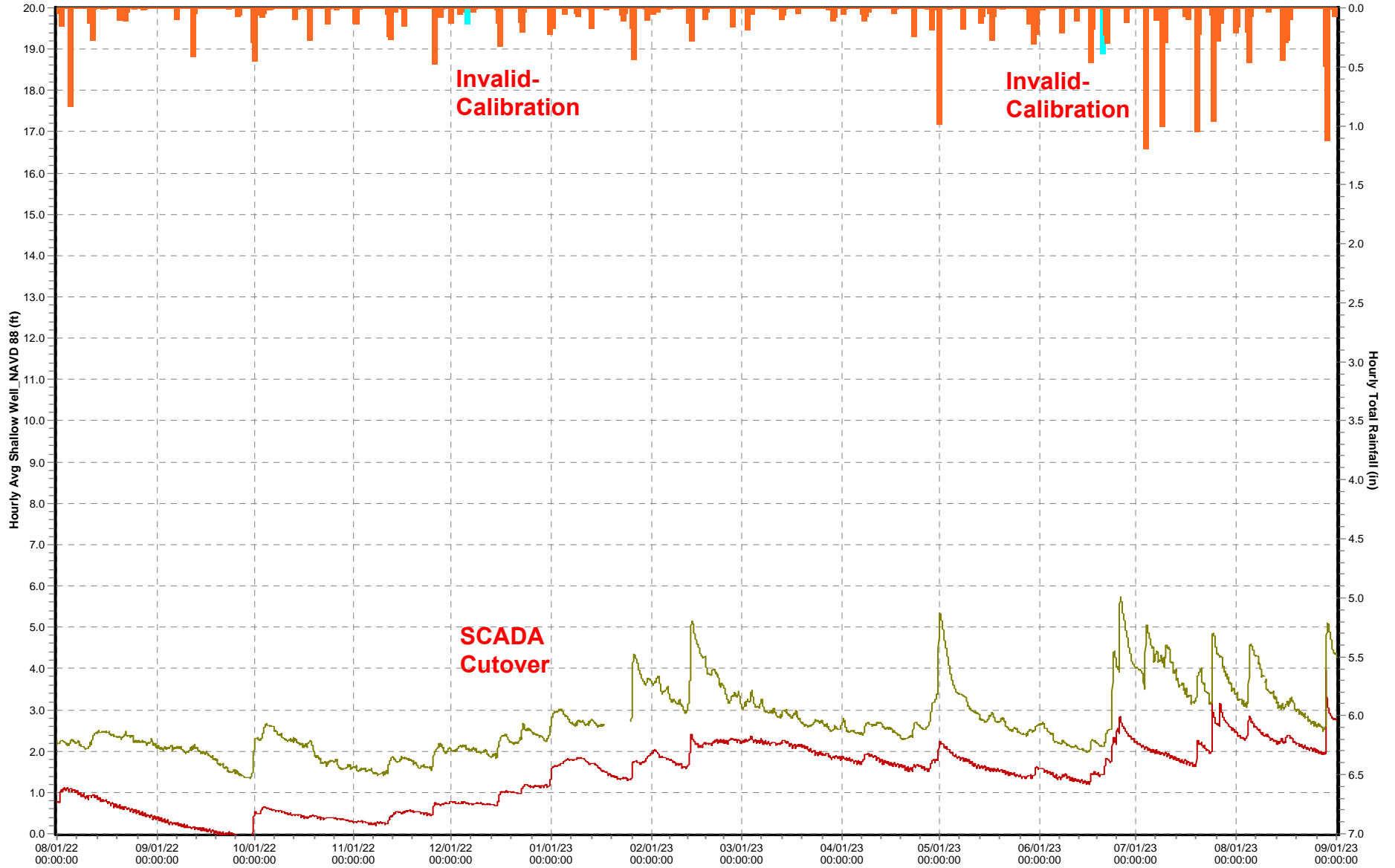
08/26/23 to 08/30/23



1 Year

South Shore Shallow Well Graphs

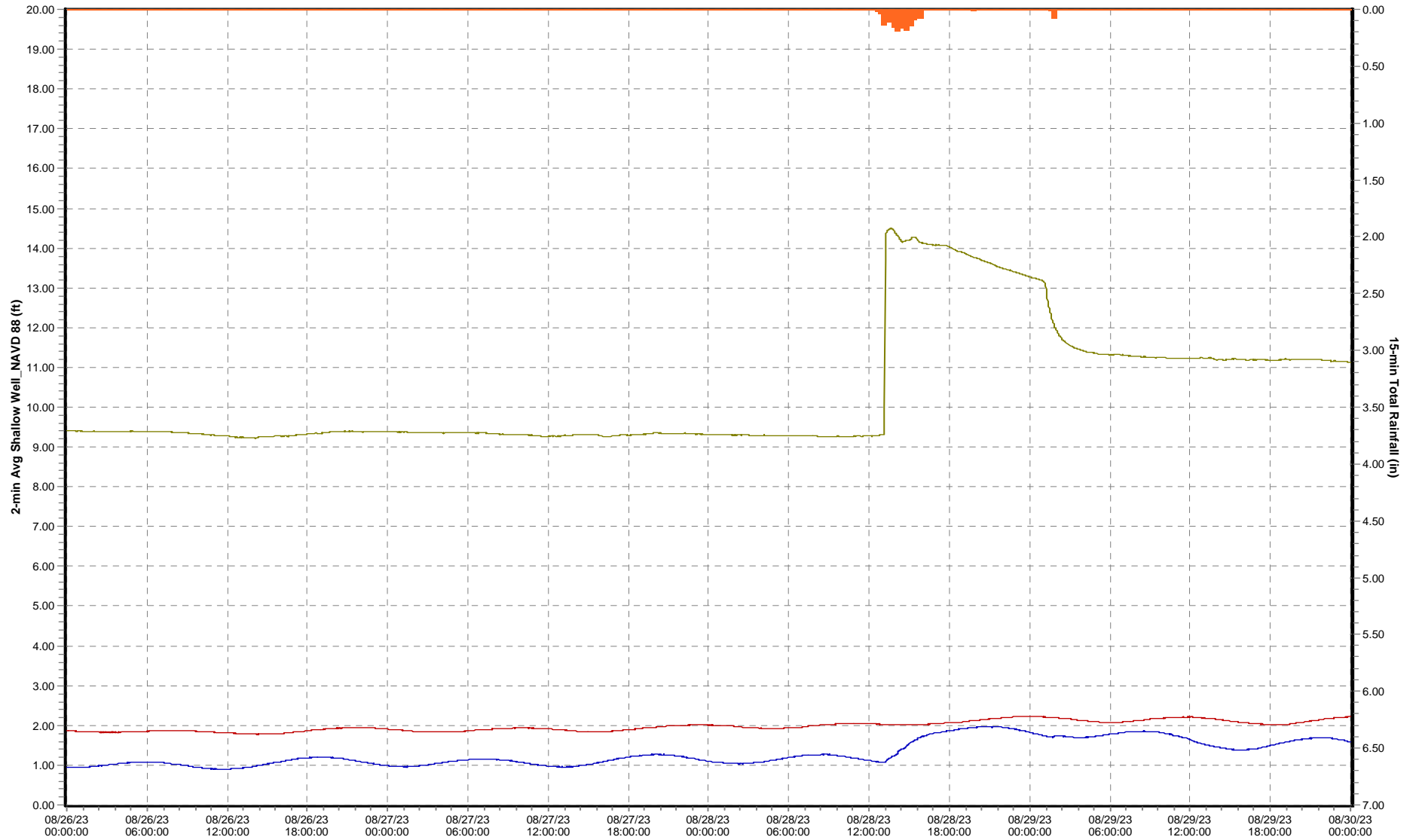
08/01/22 to 09/01/23



5 Day

North Shore Shallow Well Graphs

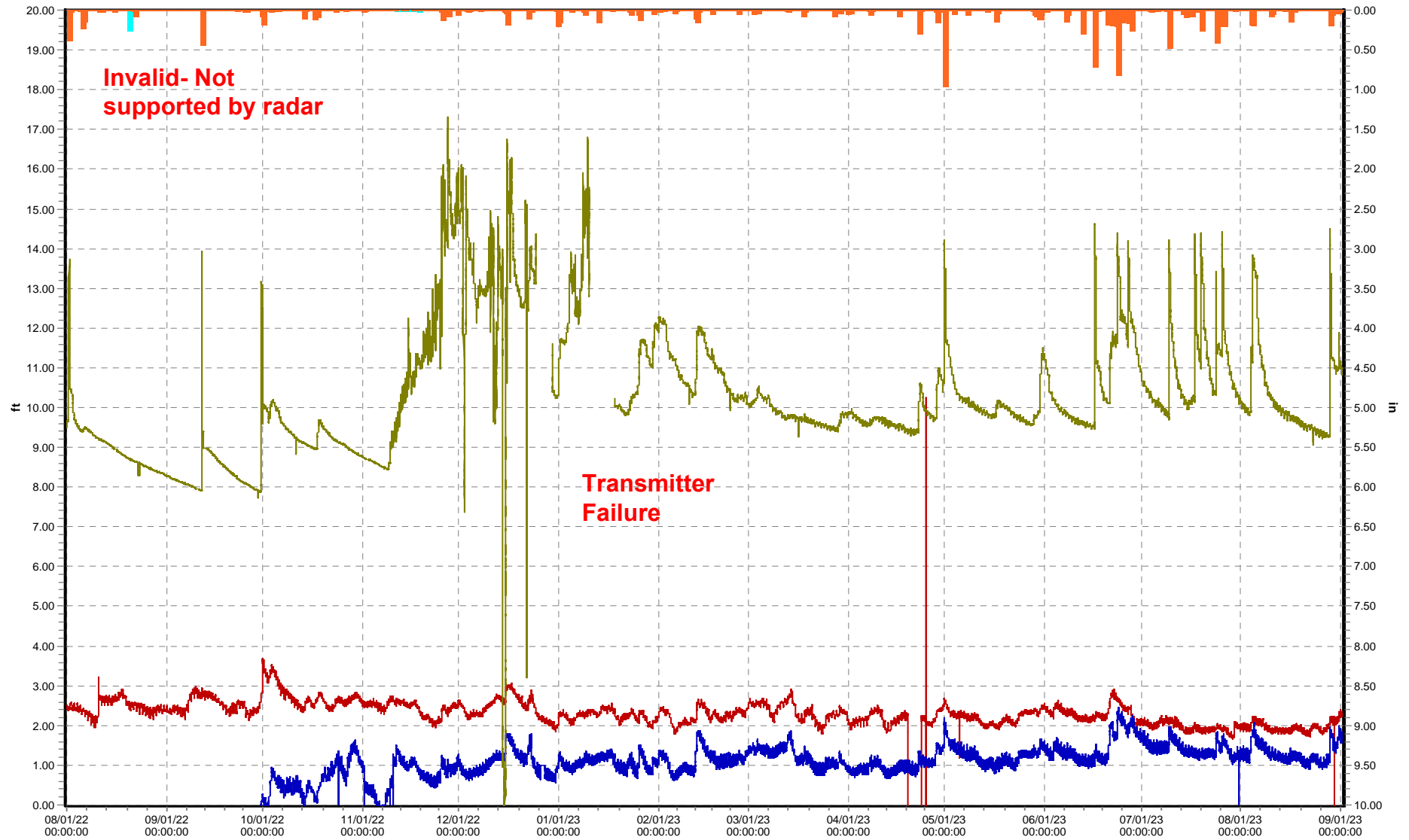
08/26/23 to 08/30/23



1 Year

HRSD NP - Lucas Creek PS

MMPS-148 (08/01/22 to 09/01/23)



Hampton Roads Sanitation District

Post-Storm Report



September 22-23, 2023
Tropical Storm Ophelia

DISCLAIMER:

About the information on this HRSD server

This report is intended to provide the HRSD regional community summary information about the HRSD system during select wet weather events/anomalies. The attached report contains a selection of *official* Interceptor and Treatment data, as well as other environmental and meteorological data provided through other services. In an effort to enhance the HRSD system, the attached products have been made accessible on this server and care must be taken when using such products as they are intended for informational and not operational, legal, or other purposes.

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These data are part of HRSD's governmental function and HRSD reserves all rights and immunities relating to these data and the terms and manner in which it is made available.

Summary

From Sept 22nd through Sept 23rd, Tropical Storm Ophelia came into Hampton Roads bringing an approximate 33-hour rainfall event that resulted in 10 sites on the North Shore and 24 sites on the South Shore that met a 1 to 5-year rainfall recurrence interval throughout the HRSD rain gauge network. Our region saw heavy widespread rain, storm surge and strong wind gusting to 35-45mph, as well as moderate tidal flooding. North Shore sites averaged around 2.53 inches of rain while South Shore sites averaged around 2.67 inches. There was an impact on groundwater levels compared to October 2022. See Appendix C for the Historical Shallow Well comparison.

No HRSD interceptor weather-related overflow(s) were reported.

Two Locality interceptor weather-related overflow(s) were reported.

HRSD flow and pressure meters met data reliability requirements per the MOM program. For all pressure meters in the aggregate and all pressure-side flow meters in the aggregate for each treatment plant service area listed below, at least 90% reliable data was achieved, based on the duration of system response to this rainfall event. The data reliability for the gravity flow meters is not included in this synopsis.

- Duration of system response: See Table Below
- Aggregate flow meter validity: 93.42%
- Aggregate pressure meter validity: 98.99%

Currently, rainfall recurrence intervals are only analyzed for a maximum of 96-hours. Rainfall analysis begins after 0.1 inches of rain has occurred. A 72-hour dry period of less than 0.1 inches of rain is typically used to signify two separate events. However, if a site returns to “dry weather” conditions prior to the next rainfall that occurs within 72 hours of the previous event, it is also considered for separate analysis. See Appendix A for the Rainfall Total System Maps.

The current criteria for publishing a post-storm analysis are the following:

- One or more rain gauge sites meet a two-year or greater RRI (rainfall recurrence interval) and at least 50% of sites in any treatment plant service area receive one inch of rainfall or greater,
- A rain gauge site meets a five-year or greater RRI, or
- A weather-related SSO occurs.

Sanitary Sewer Overflows:

Localities		
Location	Locality	Start Date
115 Depot Stret	James City	9/23/2023
5349 Rockingham Dr	James City	9/23/2023

Treatment Plant Data: *(Data obtained from Telog Database)*
 See Appendix B for HRSD Treatment Plant Flows

**HRSD Treatment Plant Data
 9/22/2023 – 9/23/2023**

North Shore				
Treatment Plant	Date of Peak Hourly Flow	Peak Hourly Flow (MGD)	Peak Hour	TPSA Total Rainfall Avg (in)
Boat Harbor	9/22/2023	13.52	09:00	0.44
	9/23/2023	27.68	03:00	1.94
James River	9/22/2023	13.18	21:00	0.43
	9/23/2023	31.38	11:00	2.27
Williamsburg	9/22/2023	10.33	10:00	0.30
	9/23/2023	33.43	12:00	2.39
York River	9/22/2023	12.35	19:00	0.41
	9/23/2023	22.81	11:00	2.00

**HRSD Treatment Plant Data
 9/22/2023 – 9/23/2023**

South Shore				
Treatment Plant	Date of Peak Hourly Flow	Peak Hourly Flow (MGD)	Peak Hour	TPSA Total Rainfall Avg (in)
Army Base	9/22/2023	12.19	23:00	0.94
	9/23/2023	21.12	02:00	1.61
Atlantic	9/22/2023	86.19	23:00	2.09
	9/23/2023	87.33	00:00	1.10
Nansemond	9/22/2023	21.17	21:00	0.91
	9/23/2023	32.75	11:00	2.04
VIP	9/22/2023	46.69	23:00	1.36
	9/23/2023	66.97	02:00	1.27

Sept 22nd – Sept 23rd, 2023 – Post-Storm Rain Event Synopsis

North Shore

Weather:

Rainfall (HRSD Rainfall Gauges): *Recurrence intervals based on NOAA Atlas 14*

Rain Gauge Site	Peak Rainfall RI (Duration)	Locality
<i>Boat Harbor Treatment Plant Service Area¹</i>		
Bayshore PS	DNQ	HAMP
Bridge Street Tide Gate	DNQ	HAMP
Boat Harbor	DNQ	NEWP
Copeland Park PS	DNQ	NEWP
Hampton PS 159	DNQ	HAMP
<i>James River Treatment Plant Service Area¹</i>		
Hilton School PS	DNQ	NEWP
James River Main Flow (Influent)	DNQ	NEWP
Lee Hall PRS	1-year (12hr)	NEWP
Lucas Creek PS	1-year (12hr)	NEWP
Morrison PS	1-year (12hr)	NEWP
<i>Williamsburg Treatment Plant Service Area¹</i>		
Ford's Colony	1-year (12hr)	JCSA
Fort Eustis PS	1-year (12hr)	NEWP
Greensprings PS	DNQ	JCA
Solarex	DNQ	JCSA
Williamsburg Main Flow (Effluent)	DNQ	JCSA
Williamsburg PS	1-year (12hr)	WILL
York Skimino Hills PS	DNQ	YORK
<i>York River Treatment Plant Service Area¹</i>		
Big Bethel PRS	DNQ	HAMP
Freeman PS	DNQ	HAMP
Gloucester Court House	1-year (12hr)	GLOU
Guinea Rd at Maryus Rd	DNQ	GLOU
Ordinary PCV	1-year (12hr)	GLOU
Poquoson PS 6	DNQ	POQ
Wolf Trappe PCV	DNQ	YORK
York Kiln Creek 1 PS	1-year (12hr)	YORK
York PS 15	DNQ	YORK
York River Main Flow (Influent)	DNQ	YORK
York River Crossing (York River Rectifier)	1-year (12hr)	GLOU

Note:

1. Typical treatment plant service area.

Sept 22nd – Sept 23rd, 2023 – Post-Storm Rain Event Synopsis

Newport News-Williamsburg International (PHF)

○ Wind and Rainfall (daily total):

Date	Gust (max)	Sustained (max)	Sustained (avg)	Direction	Rainfall (in)
9/22/23	39 mph	14 mph	9 mph	NE	0.55
9/23/23	23 mph	15 mph	6 mph	NE	1.99

Tide:

- Yorktown USCG Training Center:
 - Storm Surge: An approximate 3.2-foot storm surge was observed.

NOAA/NOS/CO-OPS Observed Water Levels at YorktownUSCG Unverified Preliminary Data

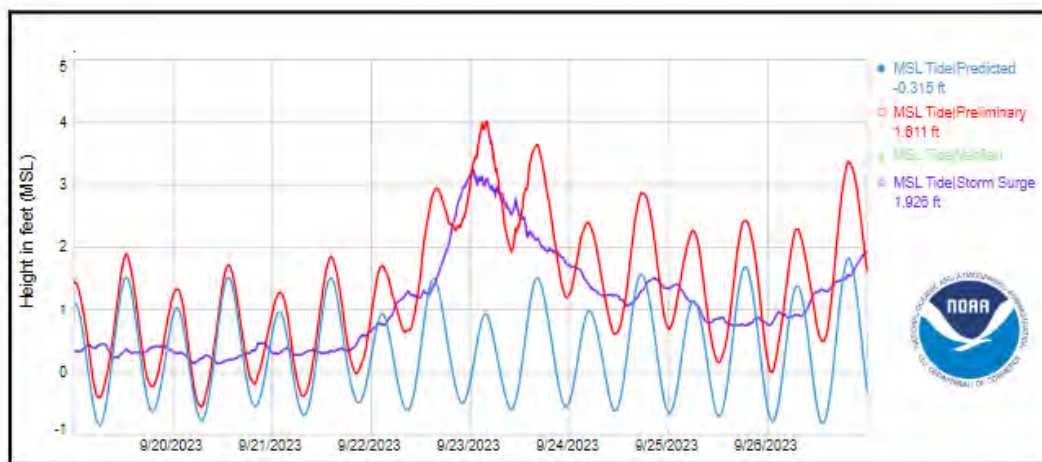
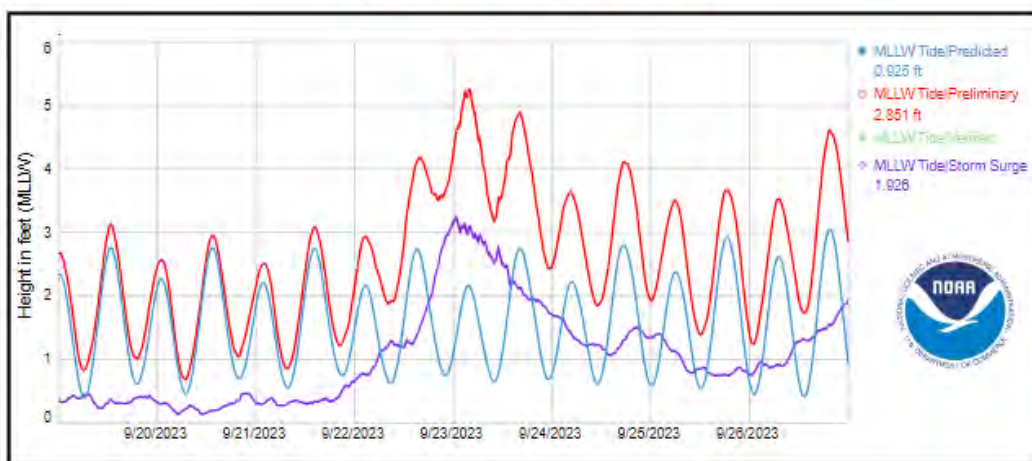


Figure 1. Preliminary data obtained from NOAA and a connection with Open Weather

- Sewells Point Tide Station:
 - Storm Surge: An approximate 3.6 foot storm surge was observed.

NOAA/NOS/CO-OPS Observed Water Levels at SewellsPoint Unverified Preliminary Data

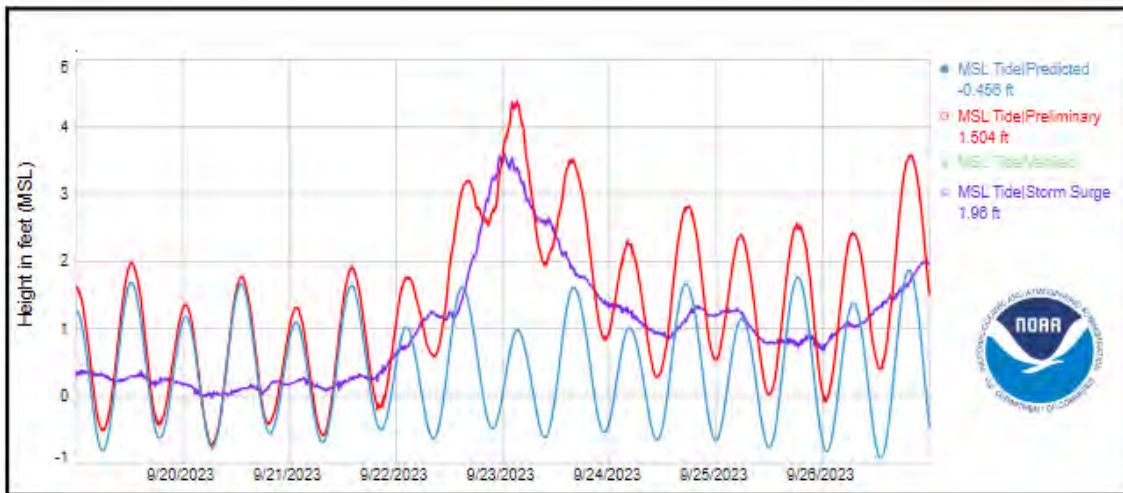
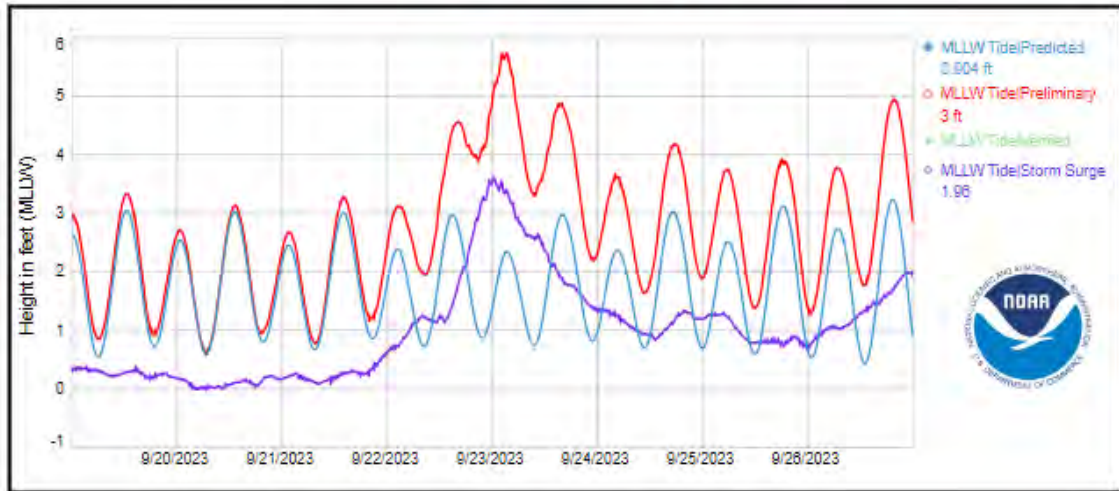


Figure 2. Preliminary data obtained from NOAA and a connection with Open Weather

Sept 22nd – Sept 23rd, 2023 – Post-Storm Rain Event Synopsis

South Shore

Weather:

Rainfall (HRSD Rainfall Gauges): *Recurrence intervals based on NOAA Atlas 14*

Rain Gauge Site	Peak Rainfall RI (Duration)	Locality
<i>Army Base Treatment Plant Service Area¹</i>		
Bancker Rd (Dovercourt Discharge)	DNQ	NORF
Taussig Blvd PS	DNQ	NORF
<i>Atlantic Treatment Plant Service Area¹</i>		
Callison at GB Locks	1- to 2-year (12hr)	CHES
Chesapeake PS 243	2- to 5-year (12hr)	CHES
Chesapeake PS 254	2- to 5-year (12hr)	CHES
Courthouse PRS	2-year (12hr)	VAB
Elbow Rd	2-year (12hr)	CHES
John B. Dey MLV-AT side	DNQ	VAB
Kempsville PRS	2-year (12hr)	VAB
Lagomar IFM at Atlantic TP	DNQ	VAB
Laskin Rd PRS	1-year (6hr)	VAB
Pine Tree PRS	1- to 2-year (12hr)	VAB
Shippo Corner PRS	DNQ	VAB
<i>Ches-Liz Treatment Plant Service Area¹</i>		
Dozier's Corner PS	2-year (24hr)	CHES
Independence PRS	2-year (24hr)	VAB
Northampton Blvd at Wesleyan Dr	2- to 5-year (6hr)	NORF
Providence PRS	1- to 2-year (12hr)	VAB
Shore Dr @ Jack Frost	DNQ	CHES
<i>Nansemond Treatment Plant Service Area¹</i>		
Bowers Hill PRS	1- to 2-year (12hr)	CHES
Cedar Lane PS	DNQ	PORT
Chesapeake PS 158	1-year (12hr)	CHES
Chesapeake PS 238	1- to 2-year (12hr)	CHES
Crittenden Rd_Chuckatuck Rectifier	DNQ	SUFF
Deep Creek PRS	1- to 2-year (12hr)	CHES
Lake Kilby WTP	1-year (24hr)	SUFF
Nansemond Main Flow (Effluent)	DNQ	SUFF
Pagan River Rectifier	DNQ	IOW
Pughsville PS	1- to 2-year (12hr)	SUFF
Route 337 PRS	1- to 2-year (24hr)	CHES
Smithfield High School	DNQ	IOW
Suffolk PS	1-year (12hr)	SUFF
Suffolk PS 81	2-year (3hr)	SUFF
Suffolk PS 87	DNQ	SUFF
Windsor Duke St PS	1- to 2-year (12hr)	IOW

Sept 22nd – Sept 23rd, 2023 – Post-Storm Rain Event Synopsis

VIP Treatment Plant Service Area¹

Rain Gauge Site	Peak Rainfall RI (Duration)	Locality
Elizabeth River Crossing_Eastern Branch	DNQ	NORF
Ferebee Avenue PS	1- to 2-year (24hr)	CHES
Luxembourg Avenue PS	DNQ	NORF
Rodman Ave PS	DNQ	PORT
Va Beach Blvd PS	1-year (6hr)	NORF
VIP Main Flow (Effluent)	DNQ	NORF

Note:

1. Typical treatment plant service area.

*Duration represents the minimum amount of time it took to reach the specified RRI.

Norfolk International Airport (ORF)

○ Wind and Rainfall (daily total):

Date	Gust (max)	Sustained (max)	Sustained (avg)	Direction	Rainfall (in)
9/22/2023	55 mph	30 mph	13 mph	NNE	1.77
9/23/2023	44 mph	16 mph	5 mph	ENE	0.74

Tide:

- Sewells Point Tide Station:
 - Storm Surge: An approximate 3.6 foot storm surge was observed.

NOAA/NOS/CO-OPS
Observed Water Levels at SewellsPoint
Unverified Preliminary Data

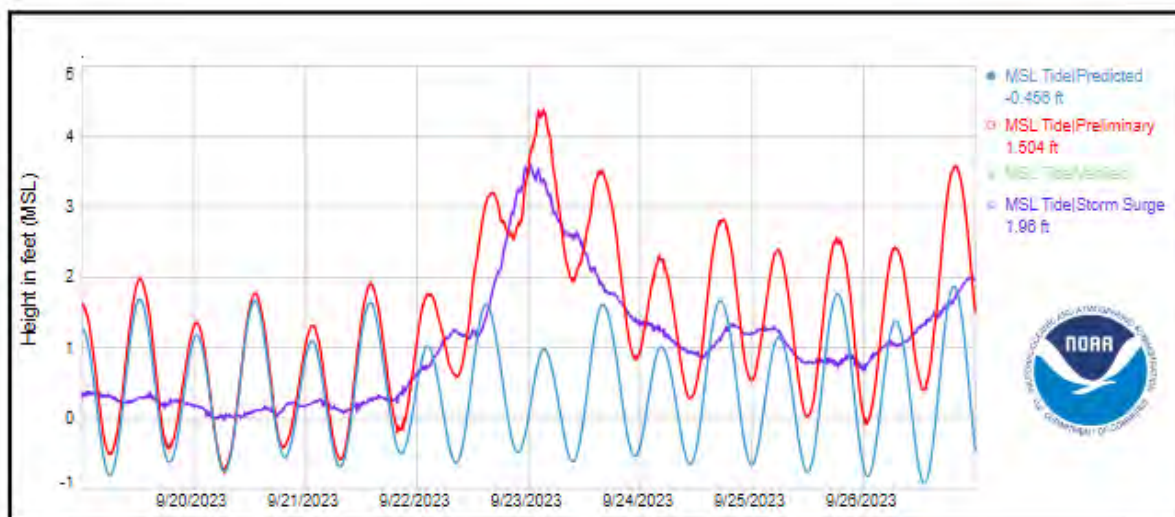
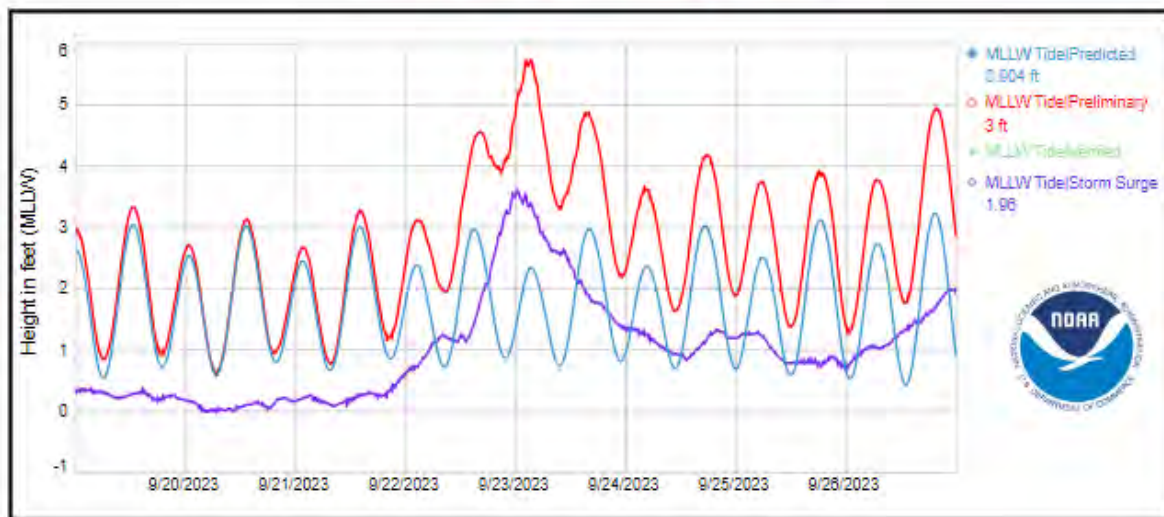


Figure 3. Preliminary data obtained from NOAA and a connection with Open Weather

Shallow Well Analysis:

Shallow wells are located at/or near HRSD Pump Stations to measure groundwater levels. The water column is measured using a pressure transducer located near the bottom of the well. The installed sensor measures gauge pressure in inches of water. The Shallow Well_NAVD88 measurement referenced in Appendix C refers to the elevation (referenced as NAVD 88) of the sensor plus the gauge measurement in feet.






DRAFT

Appendix A

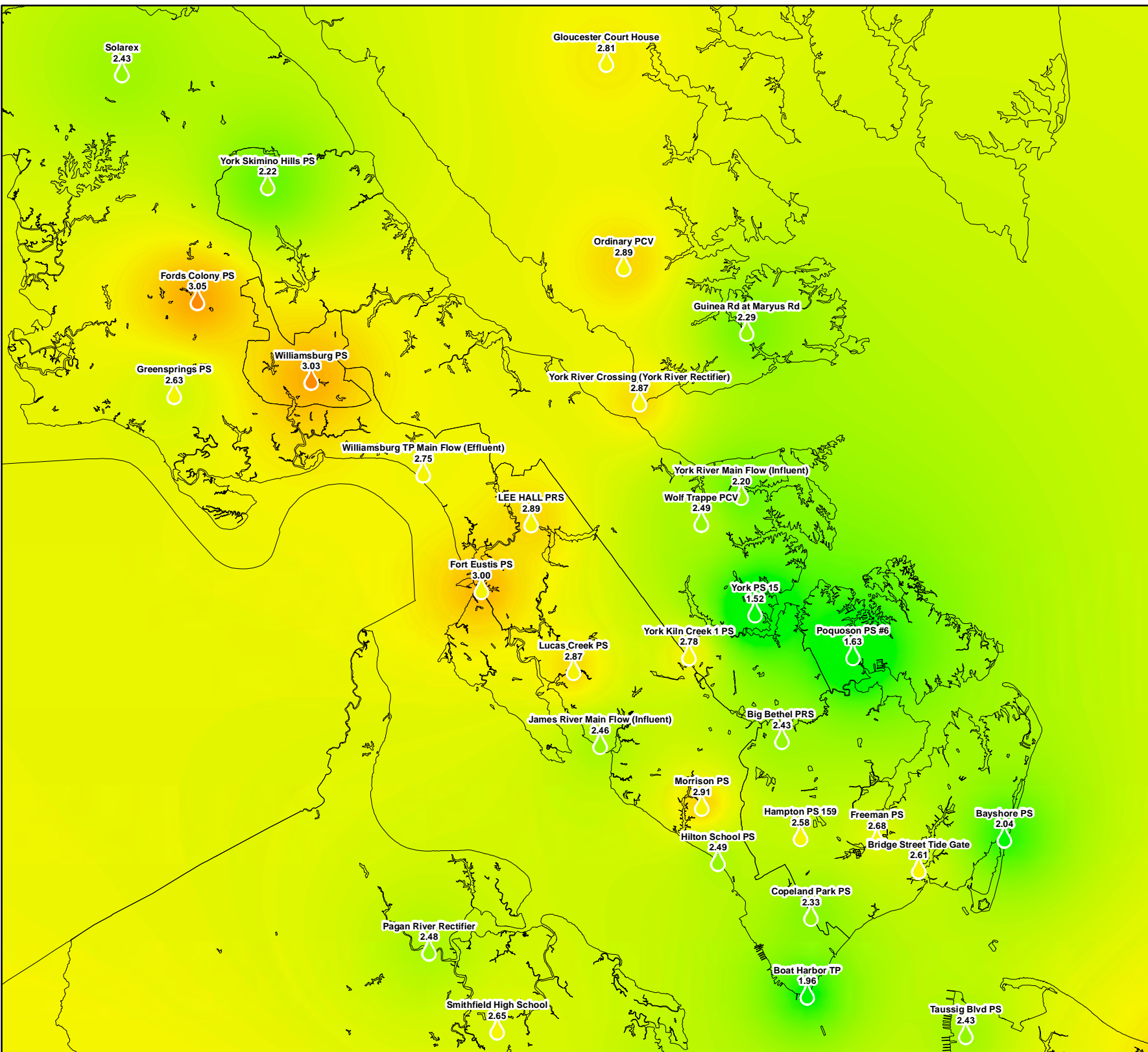
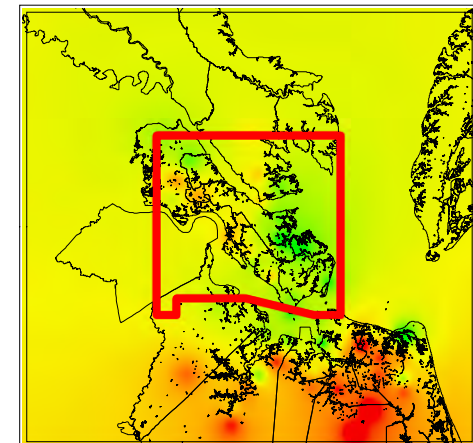
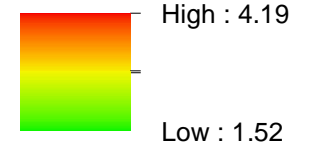
HRSD Rain Gauge Network
Rainfall Totals

North Shore September 22-23, 2023 Rainfall Analysis Total Rainfall

Rain Gauges (in):

-  3.58 - 4.19
-  3.02 - 3.57
-  2.50 - 3.01
-  2.05 - 2.49
-  1.52 - 2.04

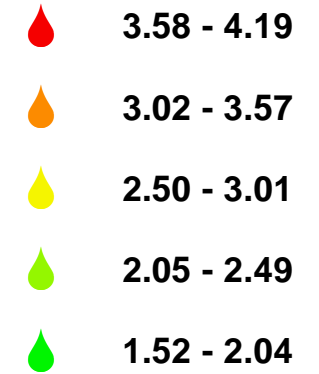
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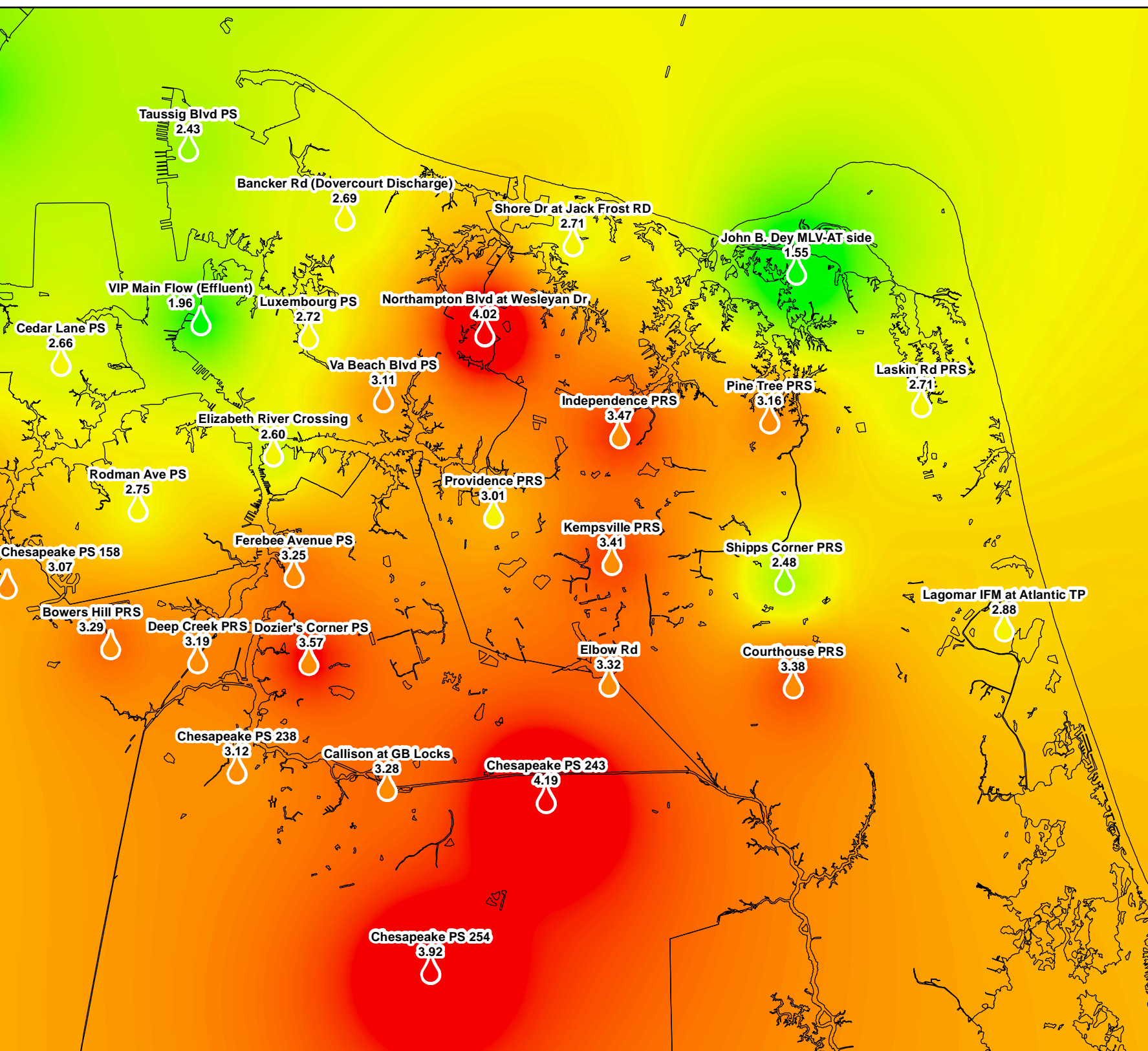
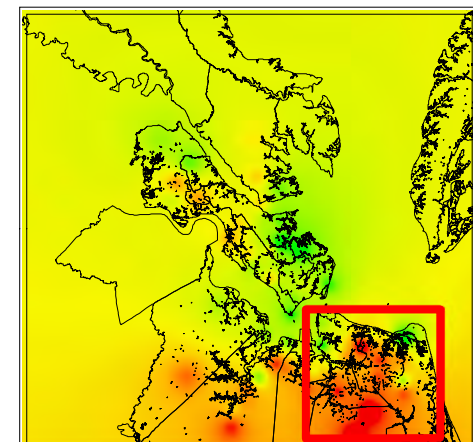
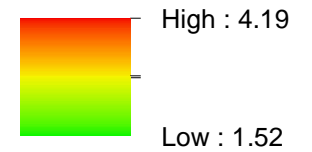
*Note: Rain Gauge was invalid for event and an average of surrounding sites was used.

South Shore - East September 22-23, 2023 Rainfall Analysis Total Rainfall

Rain Gauges (in):








Value



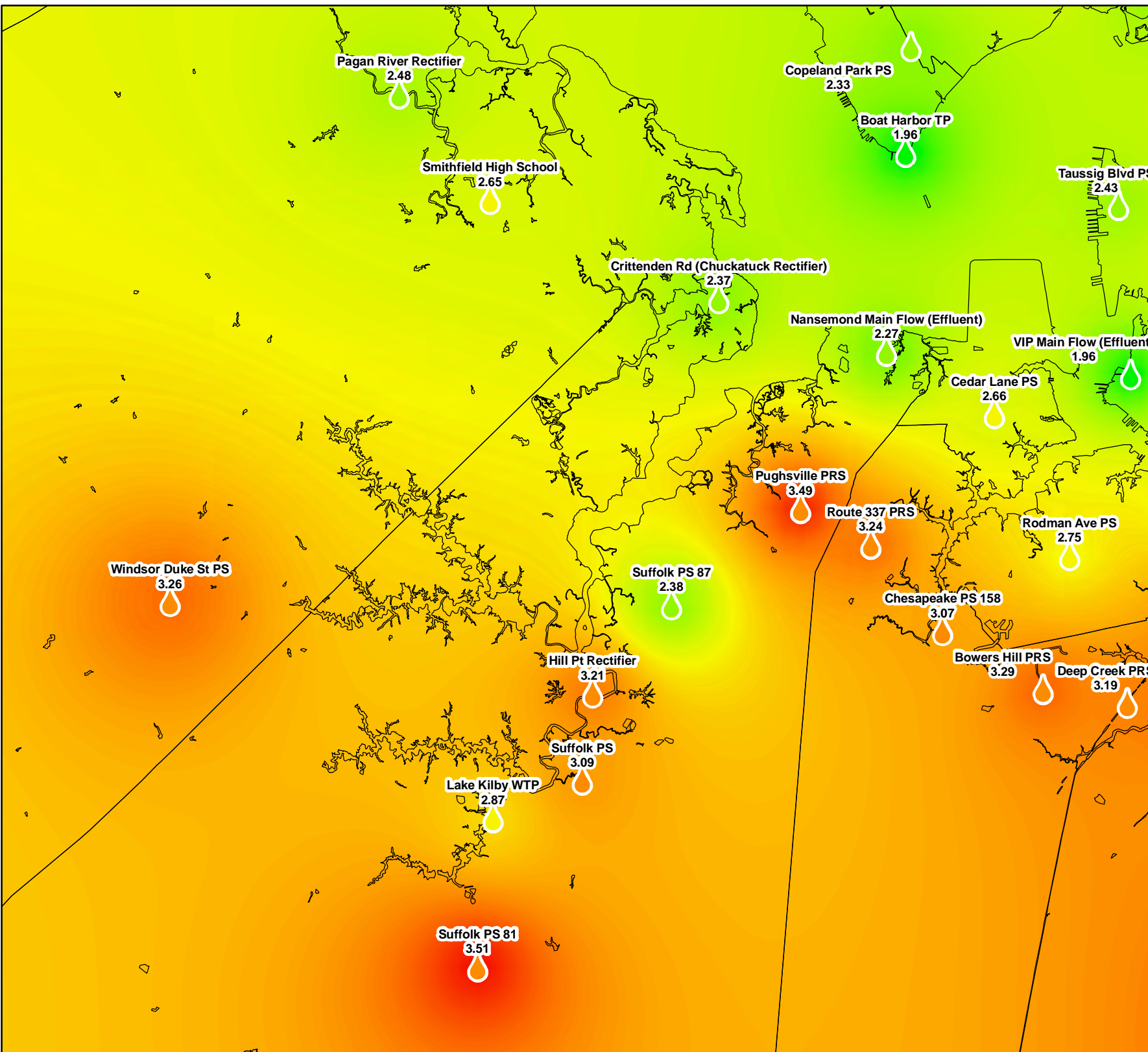
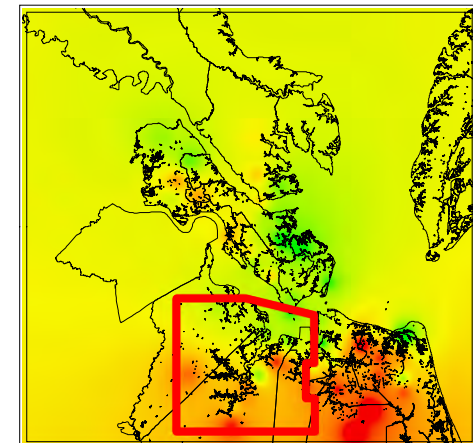
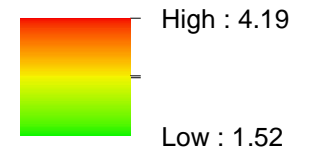
*Note: Rain Gauge was invalid for event and an average of surrounding sites was used.

South Shore - West September 22-23, 2023 Rainfall Analysis Total Rainfall

Rain Gauges (in):

-  3.58 - 4.19
-  3.02 - 3.57
-  2.50 - 3.01
-  2.05 - 2.49
-  1.52 - 2.04

Value



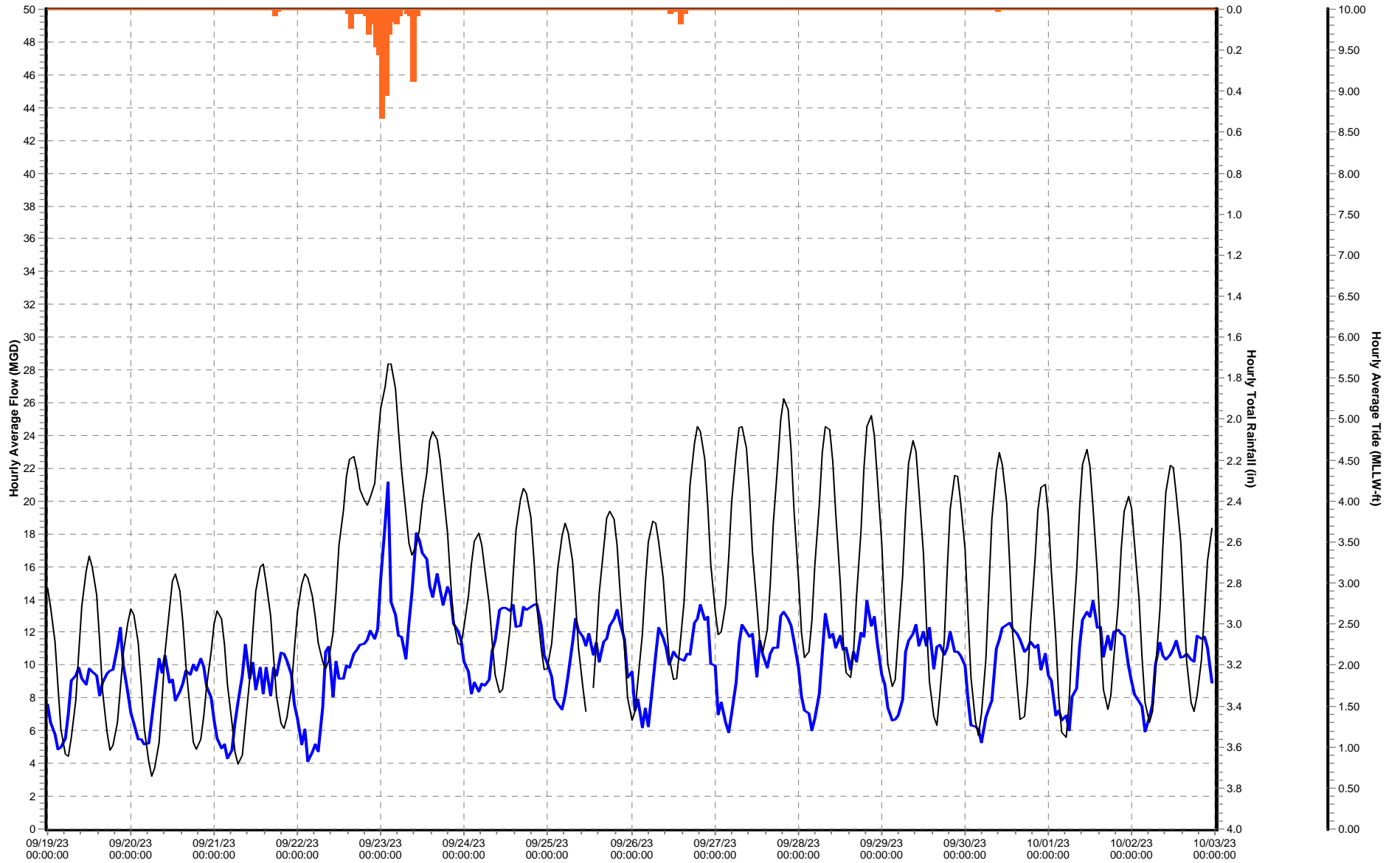
*Note: Rain Gauge was invalid for event and an average of surrounding sites was used.

Appendix B

HRSD Treatment Plant Flows

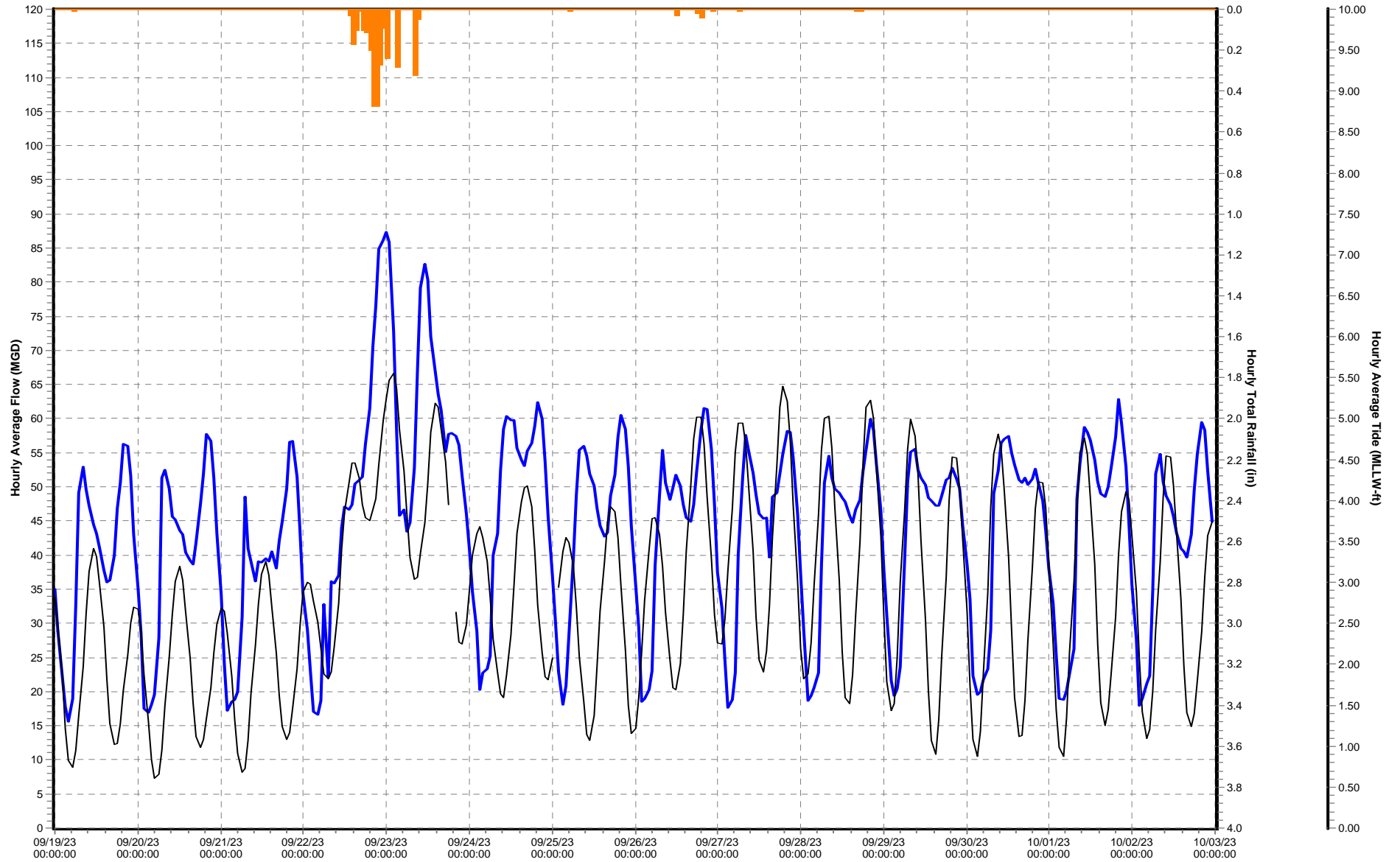
Army Base Treatment Plant

MMPS-035 (09/19/23 to 10/03/23)



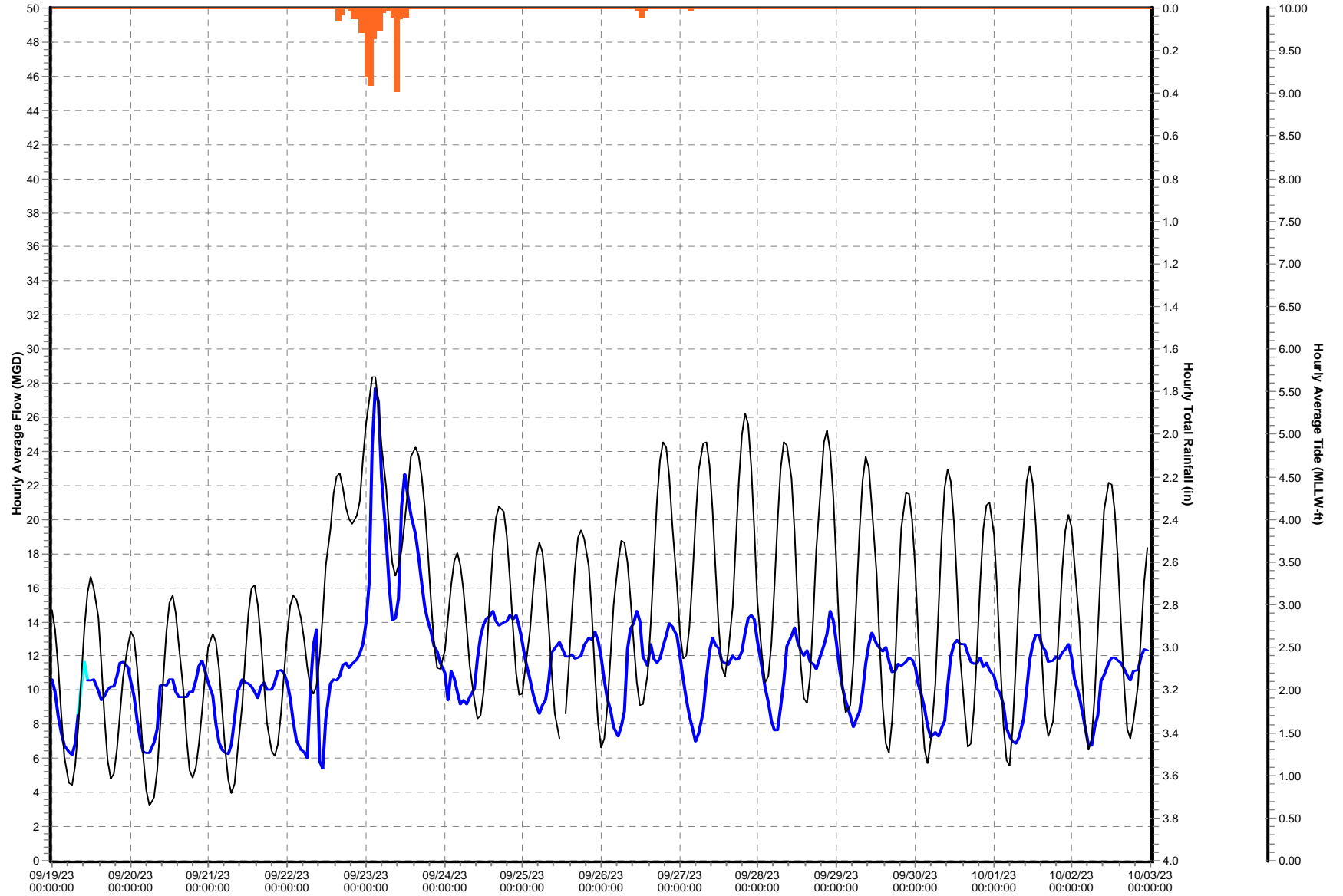
Atlantic Treatment Plant
MMPS-071 (09/19/23 to 10/03/23)

Flow_Effluent (MGD) MMPS-185: Lagomar IFM at Atlantic TP Rain Gauge CBBT Tide - MLLW Preliminary (ft)

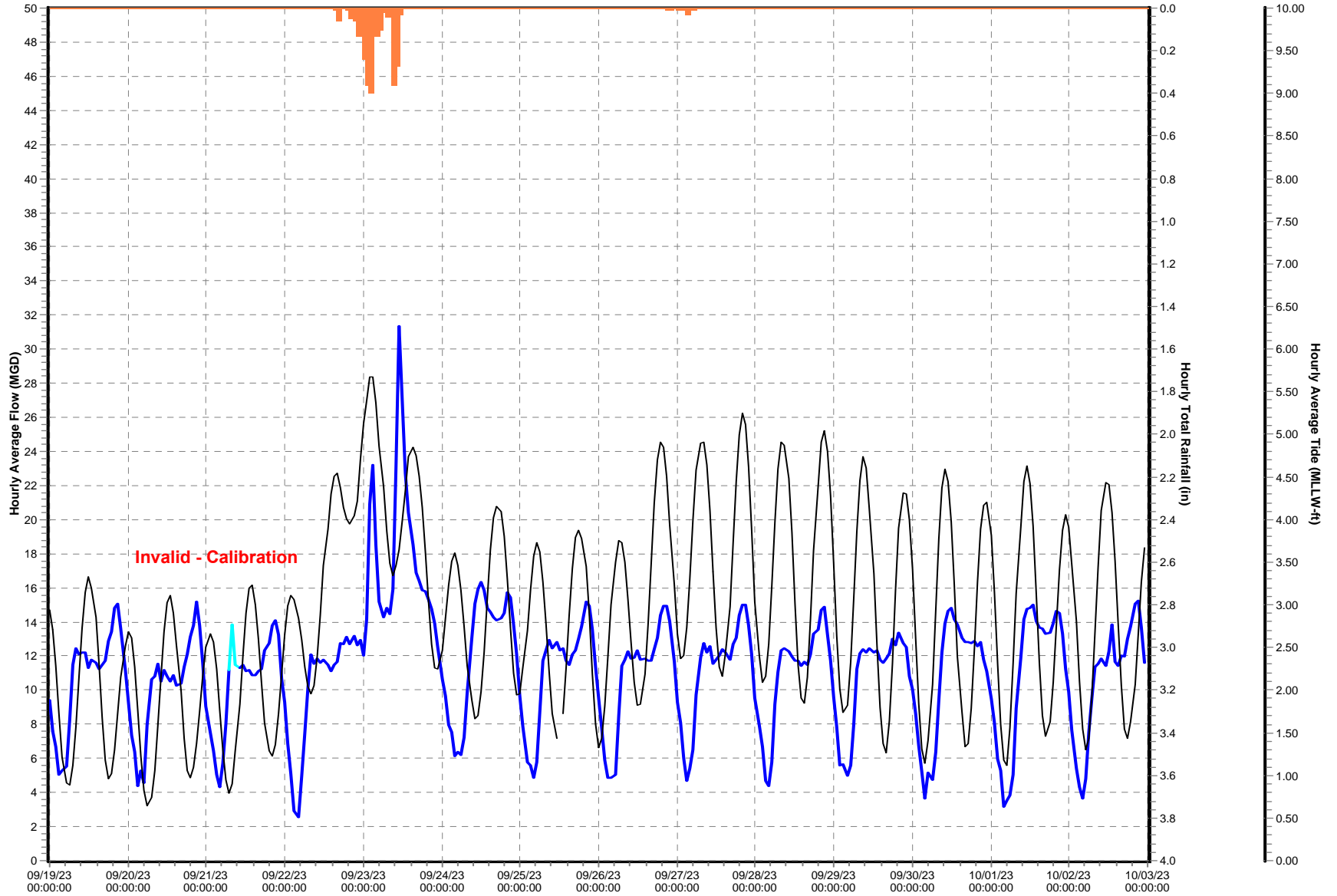


Boat Harbor Treatment Plant
MMPS-075 (09/19/23 to 10/03/23)

Flow_Effluent (MGD) Rain Gauge (in) SewellsPt Tide - MLLW Preliminary (ft)



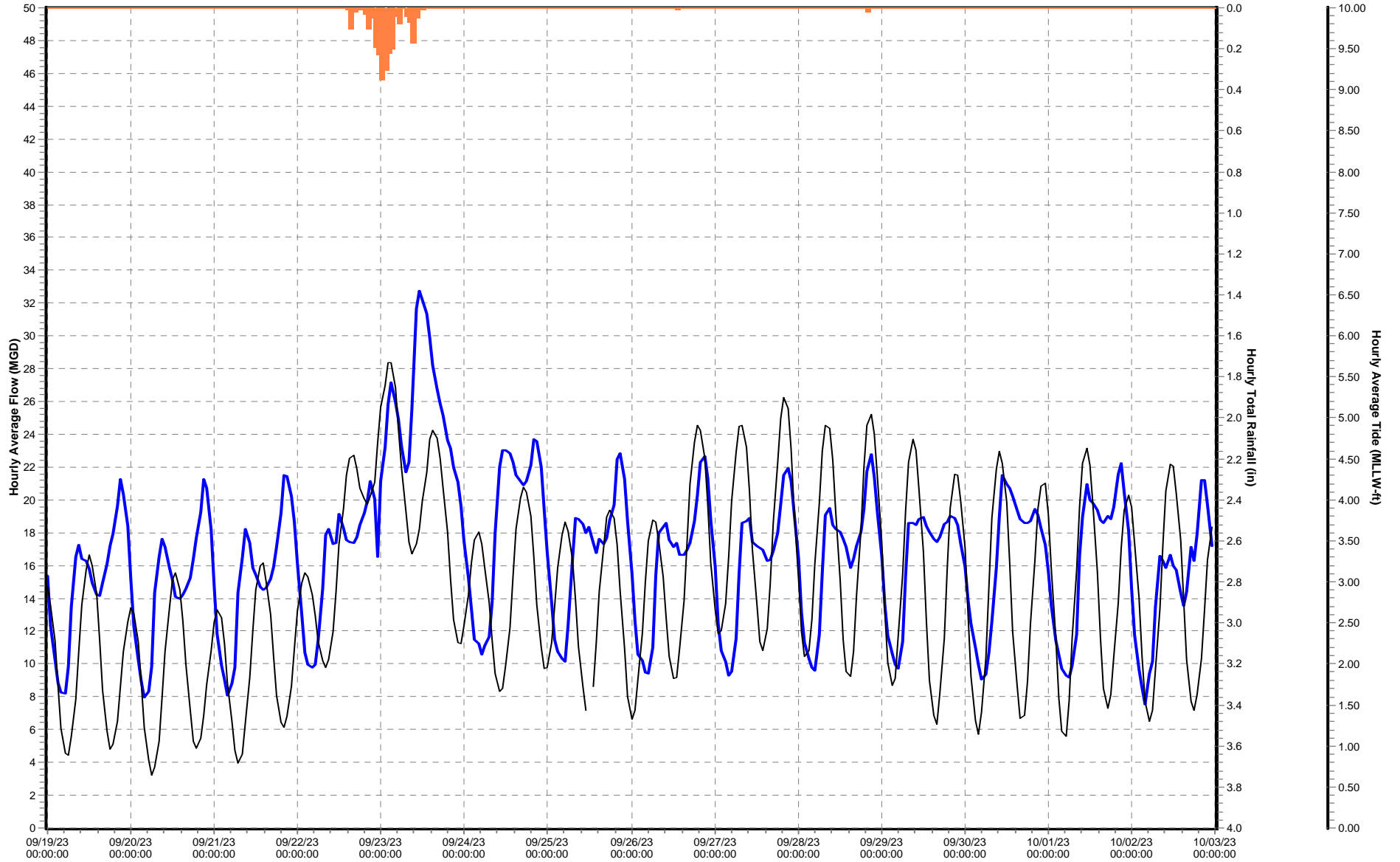
James River Treatment Plant
MMPS-184 (09/19/23 to 10/03/23)



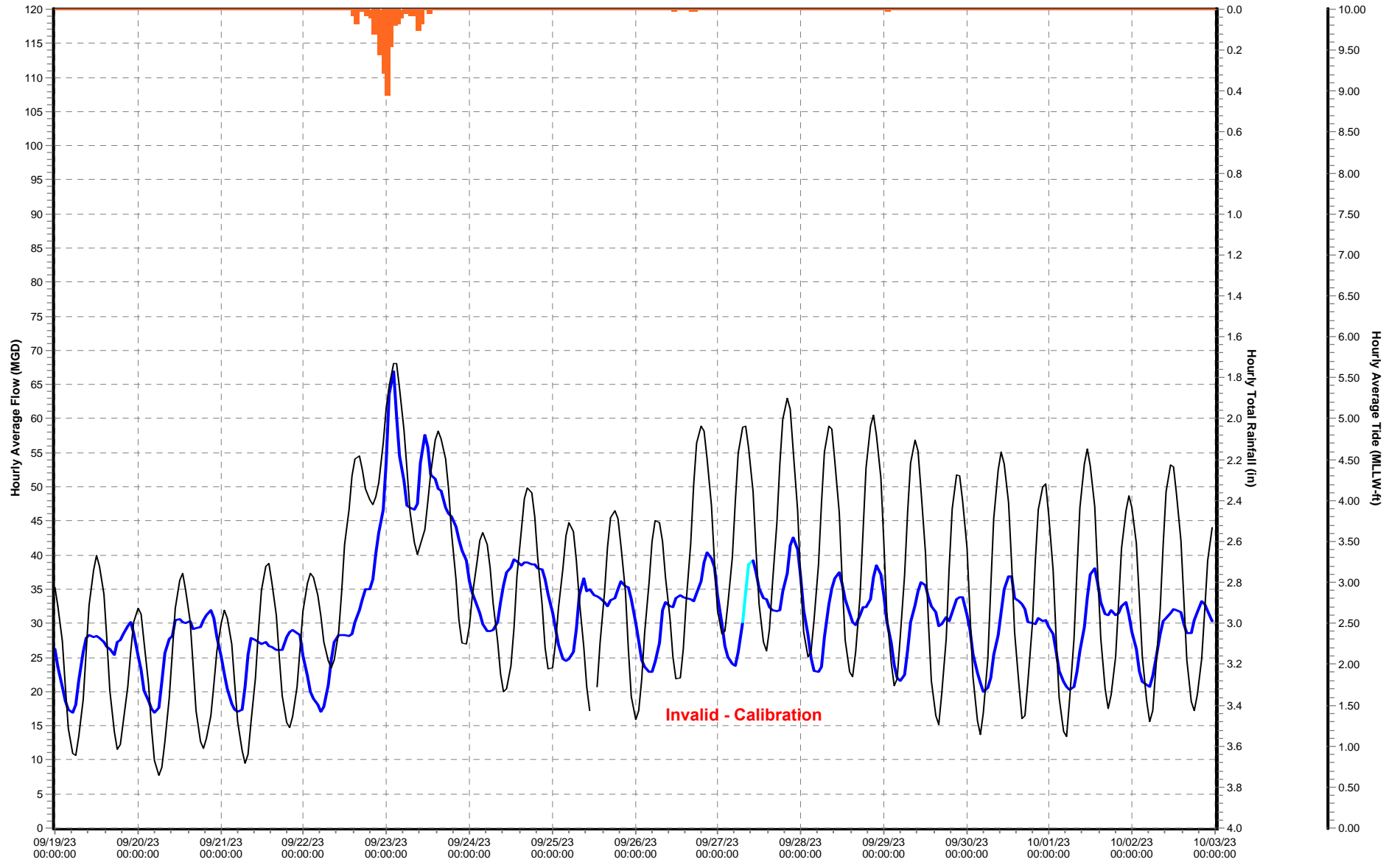
Nansemond Treatment Plant

MMPS-202 (09/19/23 to 10/03/23)

Flow_Effluent (MGD) MMPS-202: Nansemond Main Flow_Effluent Rain Gauge SewellsPt Tide - MLLW Preliminary (ft)



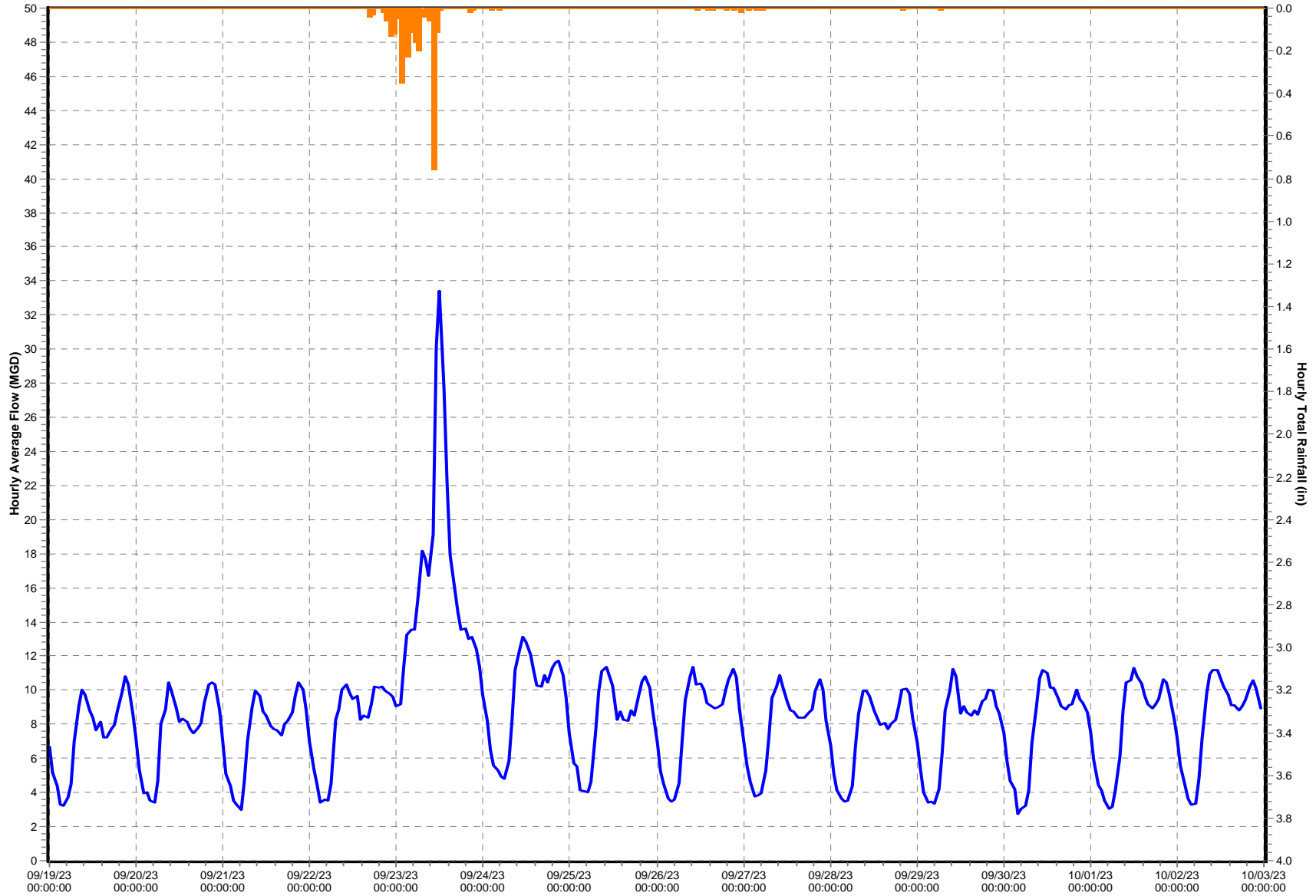
VIP Treatment Plant
MMPS-003 (09/19/23 to 10/03/23)



Williamsburg Treatment Plant

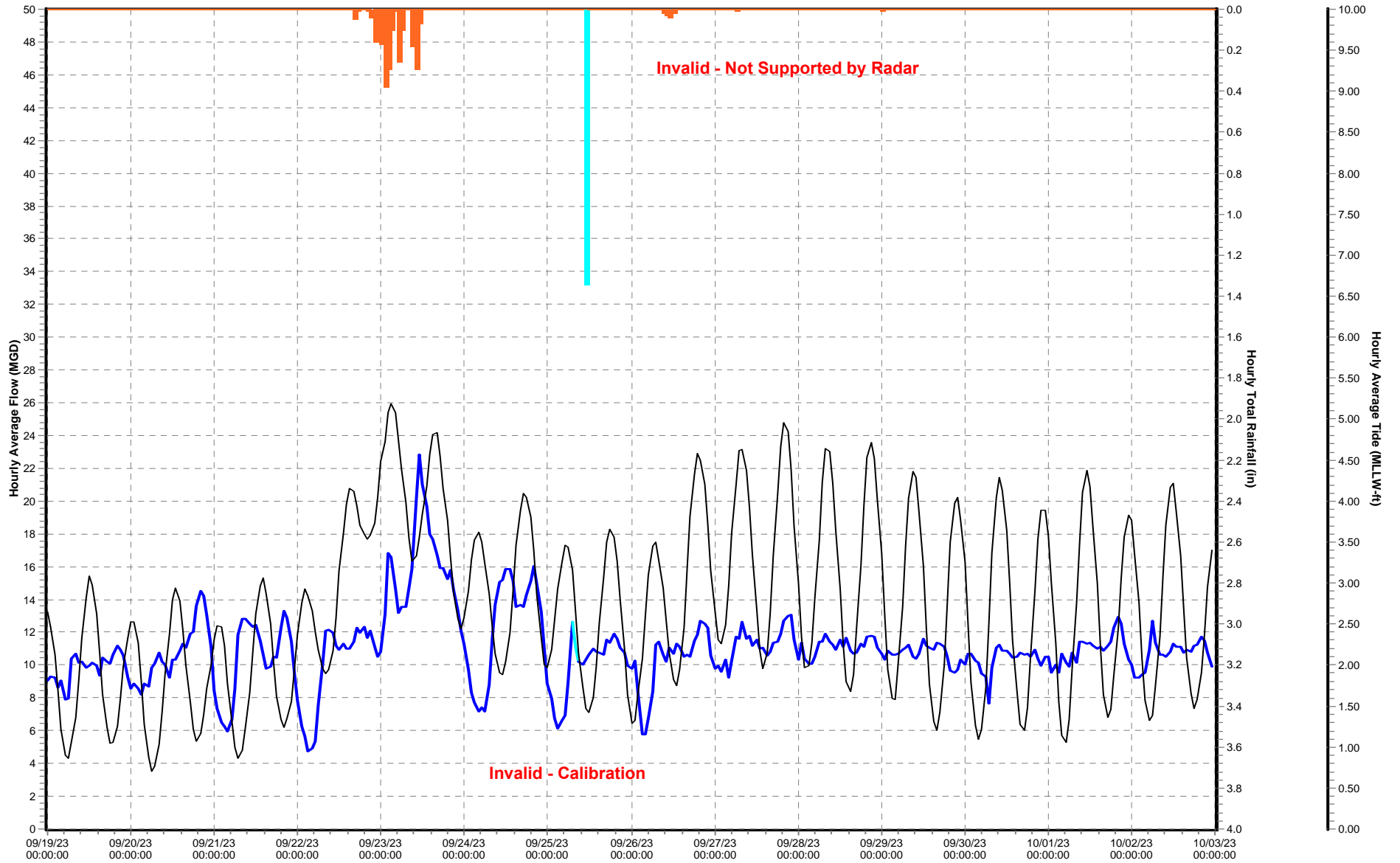
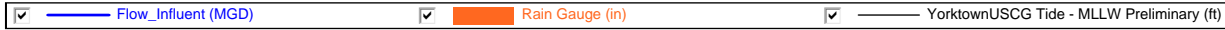
MMPS-222 (09/19/23 to 10/03/23)

Flow_Effluent (MGD) Rainfall @ WBTP



York River Treatment Plant

MMPS-235 (09/19/23 to 10/03/23)



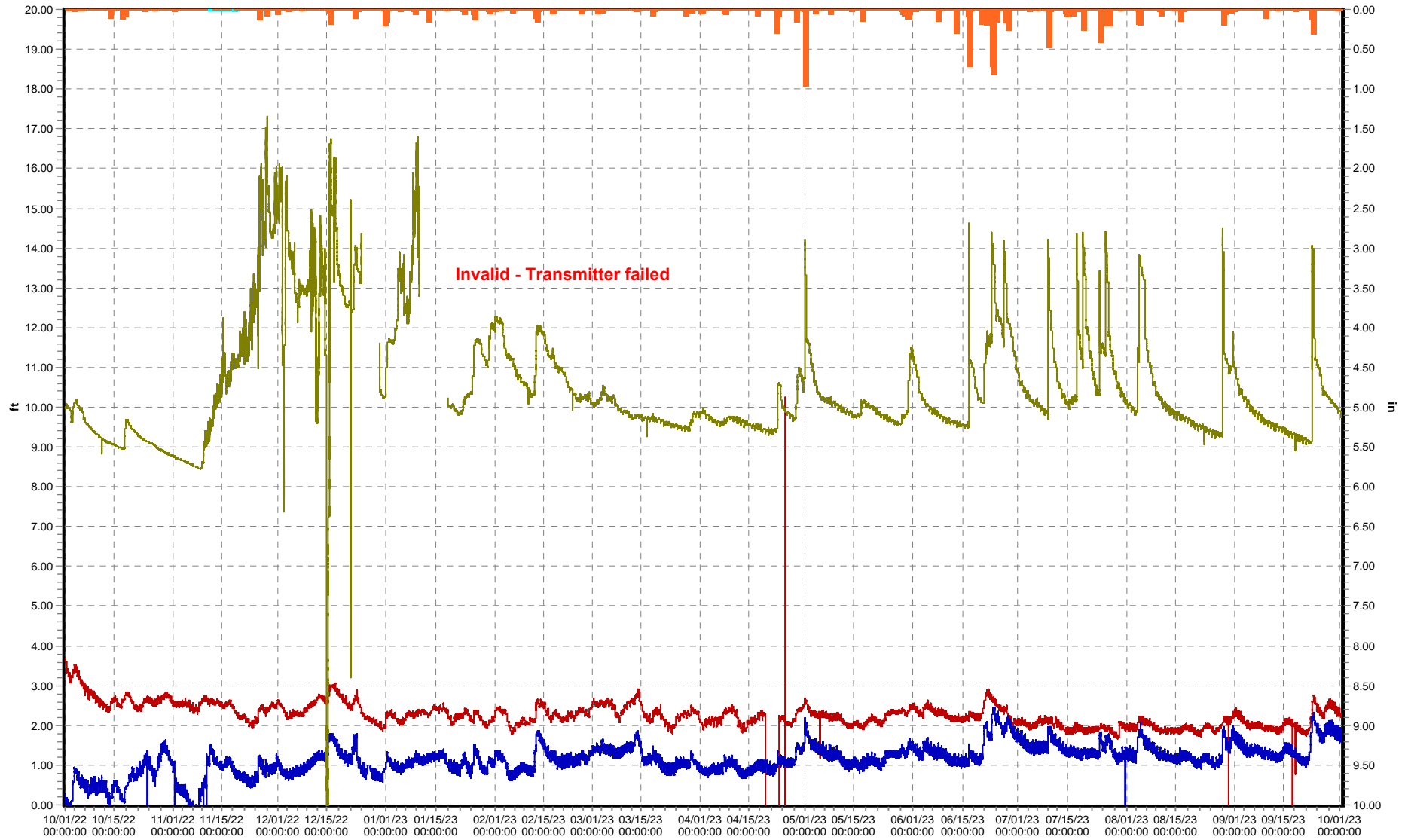
Appendix C

Shallow Well Analysis

1-year

NS Shallow Well Graphs

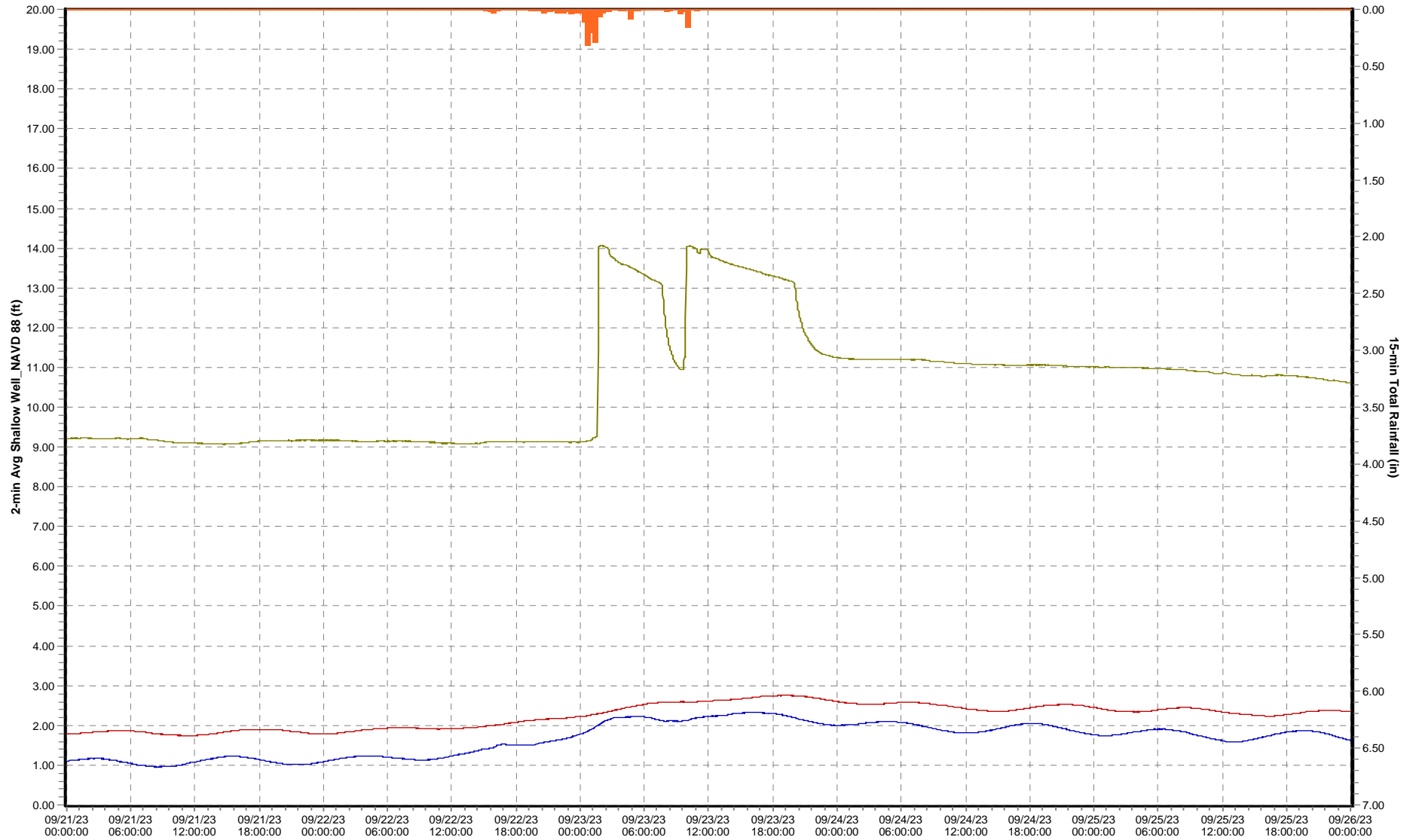
MMPS-148 (10/01/22 to 10/01/23)



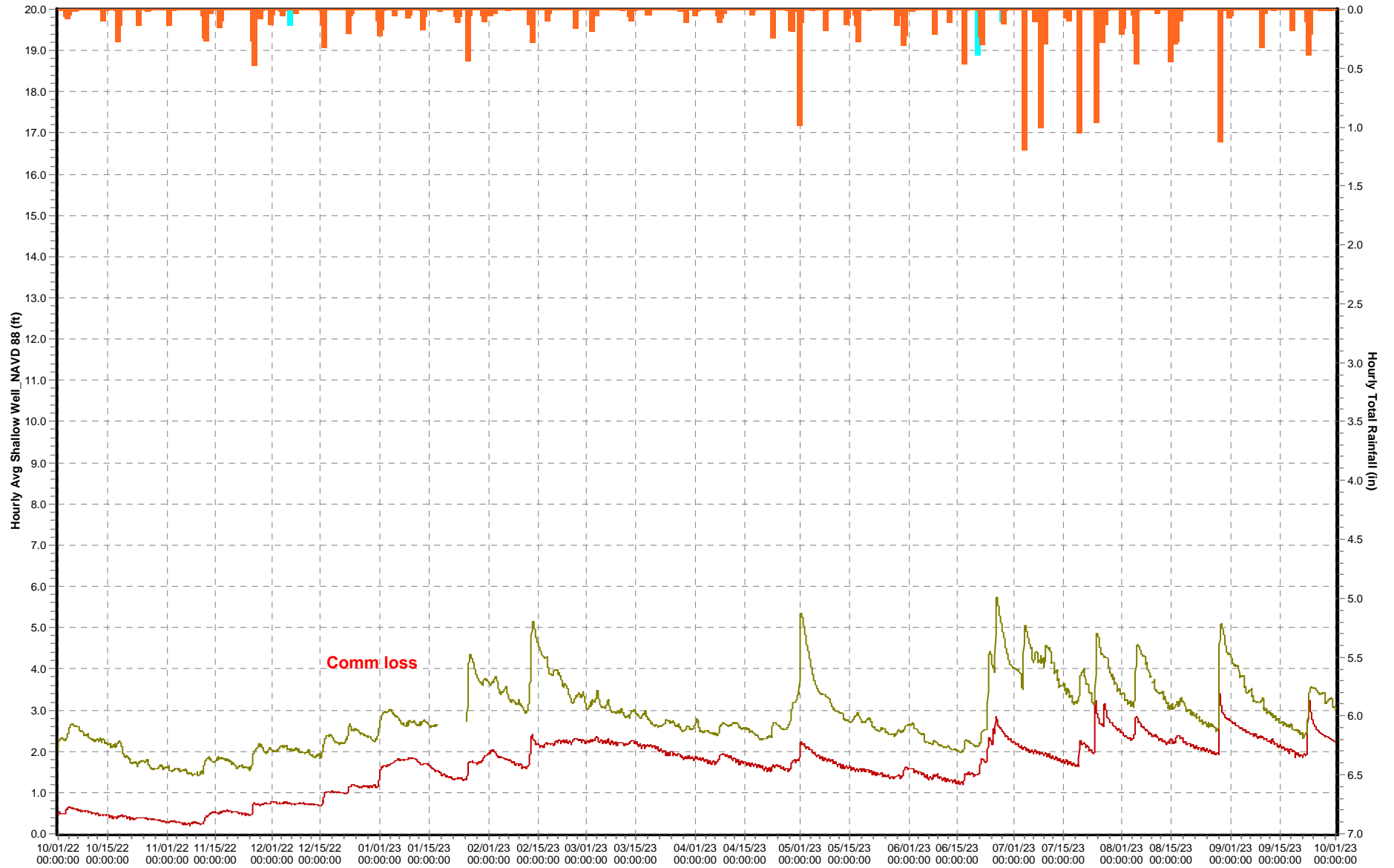
5-day

North Shore Shallow Well Graphs

09/21/23 to 09/26/23



1-year
South Shore Shallow Well Graphs
10/01/22 to 10/01/23



5-day
South Shore Shallow Well Graphs
09/21/23 to 09/26/23

North Shore Rd PS.Shallow Well_NAVD88 (ft) Camden Ave PS.Shallow Well_NAVD 88 (ft) Rodman Ave PS. Rain Gauge (in)

