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San Diego, CA 92101

T: 858.514.8822

November 18, 2019

Letter Report

Ms. Darlene Walter
SeaWorld Parks and Entertainment
500 SeaWorld Drive
San Diego, California 92109 154067

Subject:	2019 Sewer Capacity Study Update
Prepared by:	Lindsey Asbury Erik Zalkin, PE
Reviewed by:	Katherine Hayden, PE

Dear Ms. Walter,

At your request, Brown and Caldwell (BC) has performed an update to the 2014 Sewer Capacity Study conducted at the SeaWorld Parks and Entertainment (SeaWorld) theme park in San Diego, California.

The 2014 study evaluated the capacity of the sewer system, which is owned by the City of San Diego (City), that services the SeaWorld property. SeaWorld contracted BC to update the sewer capacity study to gauge the efficacy of changes implemented in response to the 2014 study recommendations. The update was developed to assess the following conditions with regard to the sewer system:

- Compare the current flow and status of the system to the findings from the 2014 sewer study; and
- Analyze flow data from the 2019 monitoring period and compare the performance of the system today associated with operational changes.

Background

In 2014, BC completed a sewer capacity study that included flow monitoring in nine sewer manholes, a manhole invert survey of 16 manholes, observation of manhole and sewer system conditions, flow data analysis, sewer system hydraulic modeling, capacity analysis, and recommendations to increase throughput of the sewer system. The results of the 2014 study identified a bottleneck in the lower portion of the west side sewer with elevated peak flows, causing surcharging into the upstream reaches.

BC understands that based on recommendations from the 2014 study, SeaWorld has implemented the following operational changes:

- The East Flamingo habitat was removed in 2017;
- The waterfowl at West Shipwreck were changed from flamingoes to ducks in 2016; the significant reduction in number of waterfowl and change in type has led to a 50 percent reduction in backwashing;
- At the Main Plant Recovery, the backwash flow rate was adjusted, and the duration of the backwash operation was extended in 2015;

- In 2015, the cleaning process at Cascades Flamingo was changed from straight dump for cleaning to controlling the flow during the draining process; and
- The Dolphin Amphitheater Recovery stopped receiving backwash from the primary filtration from Journey to Atlantis/Wild Arctic in approximately 2017.

Flow Monitoring

BC subcontractor ADS Environmental Services (ADS) installed flow meters in four sewer manholes (JL, JM1, JR, and JS) on October 1, 2019. The selected locations coincide with four locations in the 2014 Sewer Study that exhibited high surcharges. The monitoring period took place over seven days from October 2 through October 8, 2019.

Data measured during the monitoring period included depth, velocity, and flow volume (calculated), recorded at 2-minute intervals. ADS submitted the flow monitoring results to BC as a separate report, included as **Attachment A,** as well as the data in MS Excel spreadsheet format**.**

Data Analysis

For this analysis, the critical factor is depth rather than flow. We are not performing a capacity analysis where flow would be of interest; rather, we are interested in determining the impact of operational changes on the frequency and magnitude of surcharge events at the study manholes. Results of flow monitoring provided by ADS showed surcharge conditions occurred at all four monitoring locations multiple times during the monitoring period. Table 1 below summarizes frequencies and maximum surcharge conditions observed during the study period, among other parameters.

Table-1. Study Surcharge Information

Location[a]	Pipe Diameter (in)	Maximum Depth (in)[b]	Time of Maximum Depth	Maximum Surcharge Depth (in)[c]	Number of Surcharge Events[d]
JL	10.5	19.4	10/4/2019 08:41	8.9	2
JM1	10.25	24.3	10/4/2019 08:37	14.1	6
JR	8.13	20.4	10/8/2019 04:32	12.3	5
JS	6	33.2	10/8/2019 04:32	27.2	17

[a] JS is the furthest downstream location and JL the furthest upstream.

[b] Maximum depth above the pipe invert.

[c] Maximum height above the top of the pipe.

[d] Only events with greater than one inch of surcharge are included.

Using Microsoft Excel, the time-varying depths were compared with the top of pipe to calculate the frequency and the magnitude (height) of surcharging in each manhole throughout the study period. The same exercise was performed on a portion of the 2014 flow monitoring data. We selected the second week of that study, from Wednesday, July 9 through Tuesday July 15, 2014, which corresponds to the same days of the week as the 2019 data. The second week was selected because the previous week's data

included the July 4th weekend, which is a time of peak park attendence and would not be an accurate representation of more typical visitor-induced flows at SeaWorld.

Composite plots depicting the number and magnitude of surcharges are presented below on Figures 1 through 4, along with a discussion of some of the characteristics of each location. Note that the dates from the 2014 study are not shown, for clarity.

Location JL. Location JL is the furthest upstream of the monitoring locations. The 10-inch-diameter mainline enters from the west and exits to the east at roughly the same invert elevation. A third pipe enters at the north from the Shark and Otter area. ADS installed the flow meter in the incoming 10-inch main. Per the 2014 study, surcharging at this location is due to backwatering, not to the capacity of the pipe at this location.

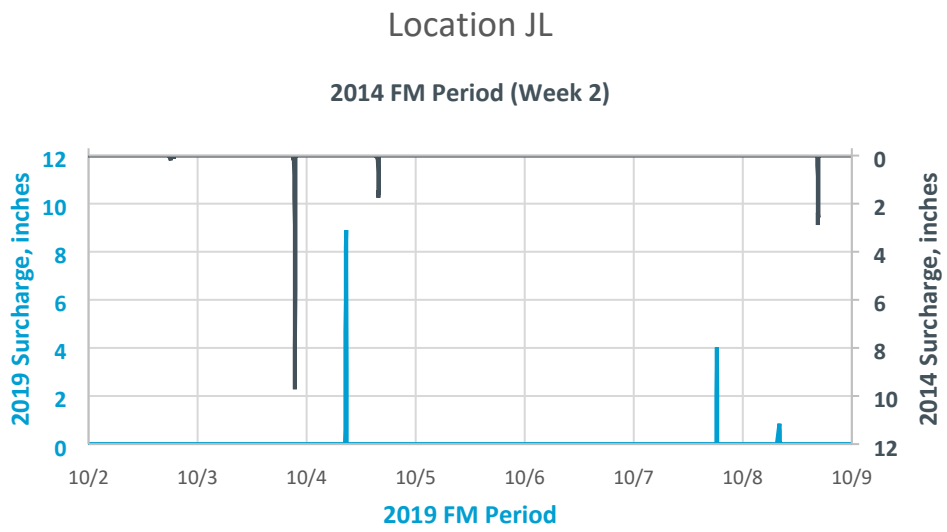


Figure 1. Comparison of Surcharges at Location JL

Location JM1. Location JM1 is the next downstream location from JL. The 10-inch-diameter mainline enters from the west and exits to the south at roughly the same invert elevation. A third pipe enters at the north from the Cascades area. ADS installed the flow meter in the incoming 10-inch main.

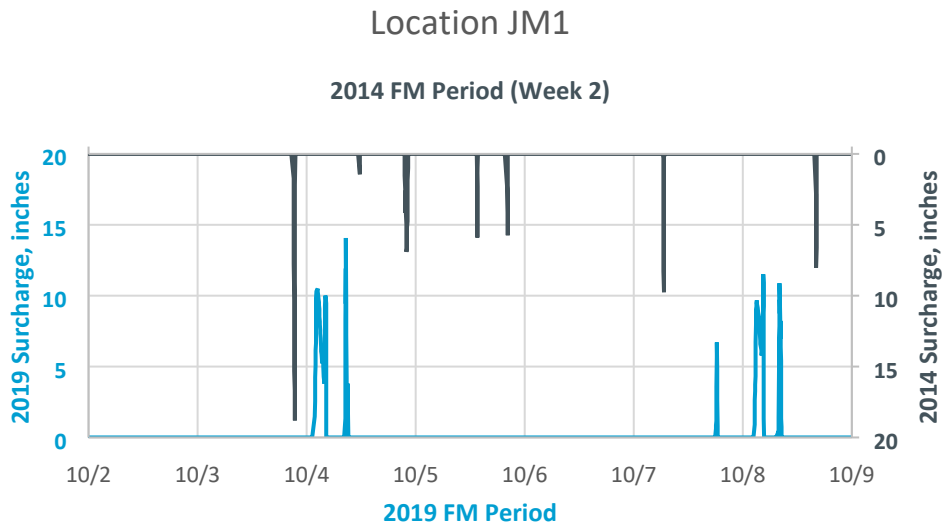


Figure 2 . Comparison of Surcharges at Location JM1

Location JR. Location JR is the next downstream location from JM1. The 10-inch-diameter mainline enters from the north and exits to the south at roughly the same invert elevation. The flow meter was installed in the 8-inch-diameter pipe that enters from the Shipwreck Rapids area to the east. That pipe drops into the manhole approximately 4 to 6 inches above the manhole invert, so the surcharging above the top of the 10-inch-diameter mainline is actually a few inches higher than the value reported for JR.

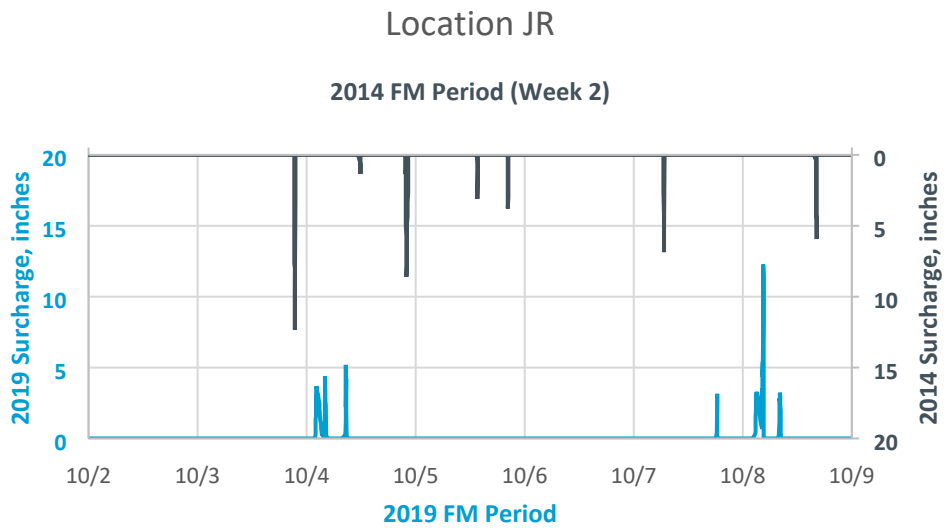


Figure 3. Comparison of Surcharges at Location JR

Location JS. Location JS is the furthest downstream location. The 10-inch-diameter mainline enters from the north and exits to the south at roughly the same invert elevation. The flow meter was installed in the 6-inch-diameter pipe that enters from the Main Plant area to the west. The top of the 6-inch-diamter pipe is roughly equal to the top of the 10-inch-diameter mainline, so surcharging above the top of the 10-inch main is roughly the same as the reported value.

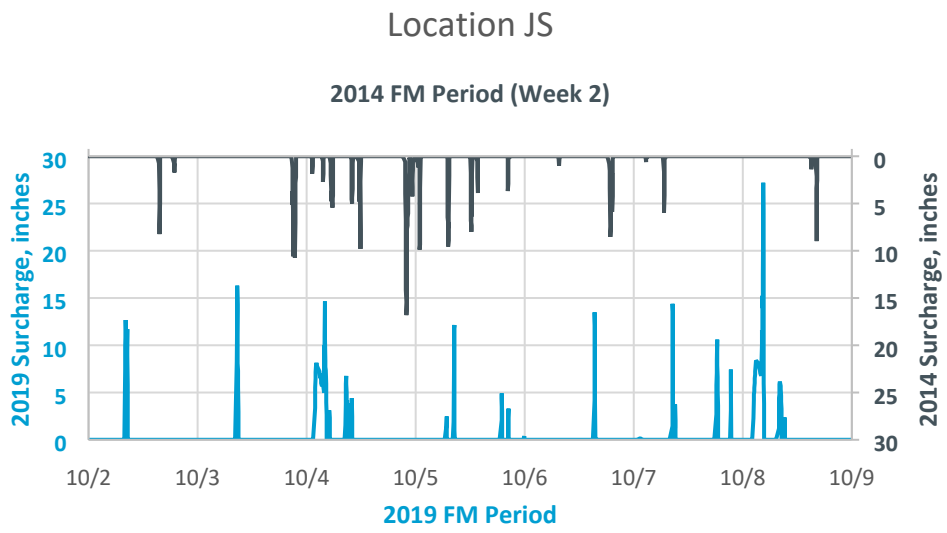


Figure 4. Comparison of Surcharges at Location JS

Findings

All four sewer manholes evaluated exhibited changes in their flow regimen, likely due to operational changes enacted since the 2014 study. We compiled the timing of various operational activities from employee work logs, and compared them with the timing of surcharge events from flow monitoring data to attempt to develop correlations between the two.

- **Location JS**. JS was impacted by the reduction in backwash flow rate and duration in backwash operations at the Main Recovery Plant. Although the frequency of surcharging was reduced in comparison to the 2014 study, the typical height of the surcharge at JS was greater in 2019. Reductions in surcharge frequency at this downstream location likely contributed to lower surcharge frequencies observed at upstream manholes. However, this location experiences peak flows from all of the upstream activities, and the 10-inch-diameter main between JX and JS is still a bottleneck in the system. This capacity restriction continues to cause propagation of surcharge upstream, although the impact appears to be somewhat less than it was in 2014.

- **Location JR**. JR was impacted by changes in waterfowl type at West Shipwreck, resulting in a 50 percent reduction in backwashing. Only five surcharge events occurred during the monitoring period, compared with nine events in 2014. These events can be tied to specific operational activities, specifically backwash events occurring at the Main Plant and at Shipwreck.
- **Location JM1**. JM1 was impacted by the change in cleaning process at Cascades Flamingo changed from a straight dump to a controlled flow during the draining process. Only five surcharge events occurred during the monitoring period, compared with eight events in 2014. These events can be tied to specific operational activities, specifically backwash occurring at the Main Plant and maintenance activities at the Aquarium, Shark and Otter area, Shipwreck, and Cascades. The surcharge event that occurred during the Cascades pool drop was also accompanied by backwash events at the Main Plant and from a facility called ESO#3 in the maintenance logs.
- **Location JL**. JL was impacted by the removal of the East Flamingo habitat and operational changes to the Dolphin Amphitheater Recovery. Only three surcharge events occurred during the monitoring period, compared with six events in 2014. These events can be tied to specific operational activities, specifically backwash events occurring at the Main Plant.
- **Cascade Pool Drops**. The Cascade pool drops caused some of the longest duration surcharging in three of the four study manholes (not JL); however, the level was well below the ground surface and does not pose risk of a sanitary sewer overflow (SSO). Furthermore, these pool drops occur while the park is closed to the public, so any potential odor issues would not be noticed by anyone except SeaWorld staff.

Table-2. Surcharge Summary[a]

Date and Time	Manhole	Maximum Height	Maintenance Activities Occurring
10/2/2019 8:12	JS	12.77	Shark-Otter
10/3/2019 8:44	JS	16.31	Main Plant
10/4/2019 2:24	JM1	10.47	Main Plant/Cascades
10/4/2019 4:02	JS	14.63	Main Plant/West Turtle/Cascades
10/4/2019 4:04	JR	4.37	Main Plant/Cascades
10/4/2019 8:38	JR	5.19	Main Plant
10/4/2019 8:40	JM1	14.07	Main Plant/Aquariums
10/4/2019 8:42	JS	6.76	Main Plant/Aquariums
10/4/2019 8:42	JL	8.9	Main Plant
10/5/2019 8:30	JS	12.14	Main Plant
10/6/2019 15:24	JS	13.49	Main Plant
10/7/2019 8:34	JS	14.39	Main Plant
10/7/2019 18:18	JM1	6.7	Main Plant/Shark-Otter
10/7/2019 18:20	JS	10.6	Main Plant/Shark-Otter

Table-2. Surcharge Summary[a]			
Date and Time	Manhole	Maximum Height	Maintenance Activities Occurring
10/7/2019 21:22	JS	7.43	Main Plant/Shark-Otter
10/8/2019 4:30	JS	27.2	Main Plant/Cascades/Misc (ESO#3)
10/8/2019 4:32	JR	12.27	Main Plant/Cascades/Misc (ESO#3)
10/8/2019 4:32	JM1	11.51	Main Plant/Cascades/Misc.
10/8/2019 8:06	JM1	10.88	Ibis/Shipwreck
10/8/2019 8:12	JS	6.36	Main Plant/Ibis/Shipwreck
10/8/2019 8:12	JR	3.23	Shipwreck

[a] *Except in a few cases, only events with greater than five inches of surcharge are included*

Plots of each surcharge event over 5 inches in height are included as **Attachment B**.

In addition to evaluating the results of the aforementioned operational changes on sewer system flows, BC also evaluated the other recommendations from Section 5 (pp.15-16) of the 2014 report, presented below by header.

- Sewer Condition: The liner in manhole JZ had failed at the time of the 2014 report, and the City has not repaired it to date.
- Sewer Hydraulics: The City has not upsized the pipe between manholes JX and JS.
- Future Sewer Connections: Per information provided, SeaWorld has not built any new features requiring new sewer connections, and no plans have been developed to redirect current flows.
- Other Recommendations: The referenced sewer line that serviced the old restaurant area north of Shark has not been capped.

Recommendations

After review of the data and previous recommendations, BC makes the following operational recommendations to SeaWorld for implementation to mitigate existing capacity and condition issues in the near-term:

- Backwash events have the potential to overlap with one another, as well as on top of peak visitor-induced flows, and appear to cause some of the highest flow spikes. Continued operational improvements geared towards controlling the magnitude and timing of backwash events, particularly in regard to Cascades and the Main Plant, may be effective tools to reduce the frequency, duration and magnitude of capacity surcharging. These operational improvements could include automation sensors or automation controls in the system to allow sequencing of backwash events.
- Perform maintenance activities at the Main Plant ahead of scheduled inclement weather in order to prevent excessive surcharging or SSOs that could be caused by concurrent backwash and large storm events.

- Install a SmartCover at Manhole JS. SmartCovers measure remote site water levels in real-time and can give instant feedback about water levels or provide means for automation control to sequence operations, thereby allowing SeaWorld staff to implement measures to prevent SSOs caused by surcharge from maintenance activities on top of storm-induced flows. Consider installing SmartCovers on other manholes as well.
- Notify the City of required repairs to the liner in manhole JZ and to cap the sewer line north of Shark, as noted in the 2014 report.

Current operational solutions have been effective at reducing surcharge events, and the depth of surcharge is contained well within the depths of the existing manholes. BC also evaluated additional sewer system recommendations related to mitigating surcharging at Manhole JS caused by activities at the Main Plant and other facilities; however, unless there is an urgent need due to unforeseen conditions or future plans, these measures are not recommended at this time, and are provided for informational and planning purposes only. Additional sewer system recommendations include:

- Analyze future exhibits at SeaWorld on a per-project basis regarding flow and operations and maintenance impacts. Because peak-flow capacity issues on the site are driven by exhibits and treatment facilities more than by park visitors, new additions will require identification of mitigation strategies during the planning stages to ensure SeaWorld reduces adverse effects.
- Construct backwash recovery/equalization basins at filter facilities that do not have them, to be evaluated on a case-by-case basis as required.
- If analysis identifies that future exhibits will exceed sewer capacity, SeaWorld, in conjunction with the City as the owner of the sewer utilities, should consider sewer improvements that assure adequate service to existing and new facilities. The following improvements would improve conditions in the west sewer system:
  - Upsize pipe JX to JS from 10-inch-diameter to a minimum of 15 inches.
  - As an alternative to upsizing the main sewer, build a smaller diameter parallel pipe (diameter TBD) that intercepts the Main Plant lateral before its connection to JS and conveys Main Plant flow directly into JX, which is located at the beginning of the 21-inch-diameter sewer segment, with much greater capacity in comparison to the JX-to-JS segment.

Brown and Caldwell continues to be honored by your trust in BC's ability to support SeaWorld in this matter. Should you have any questions, please do not hesitate to call me at 858-571-6767.

Very truly yours,

Brown and Caldwell

Erik Zalkin
Supervising Engineer, PE

Katherine Hayden

Katherine Hayden
Supervising Engineer, PE

Attachments (2)

- Attachment A: ADS Environmental Services Flow Monitoring Report
- Attachment B: Surcharge Graphs

Limitations:

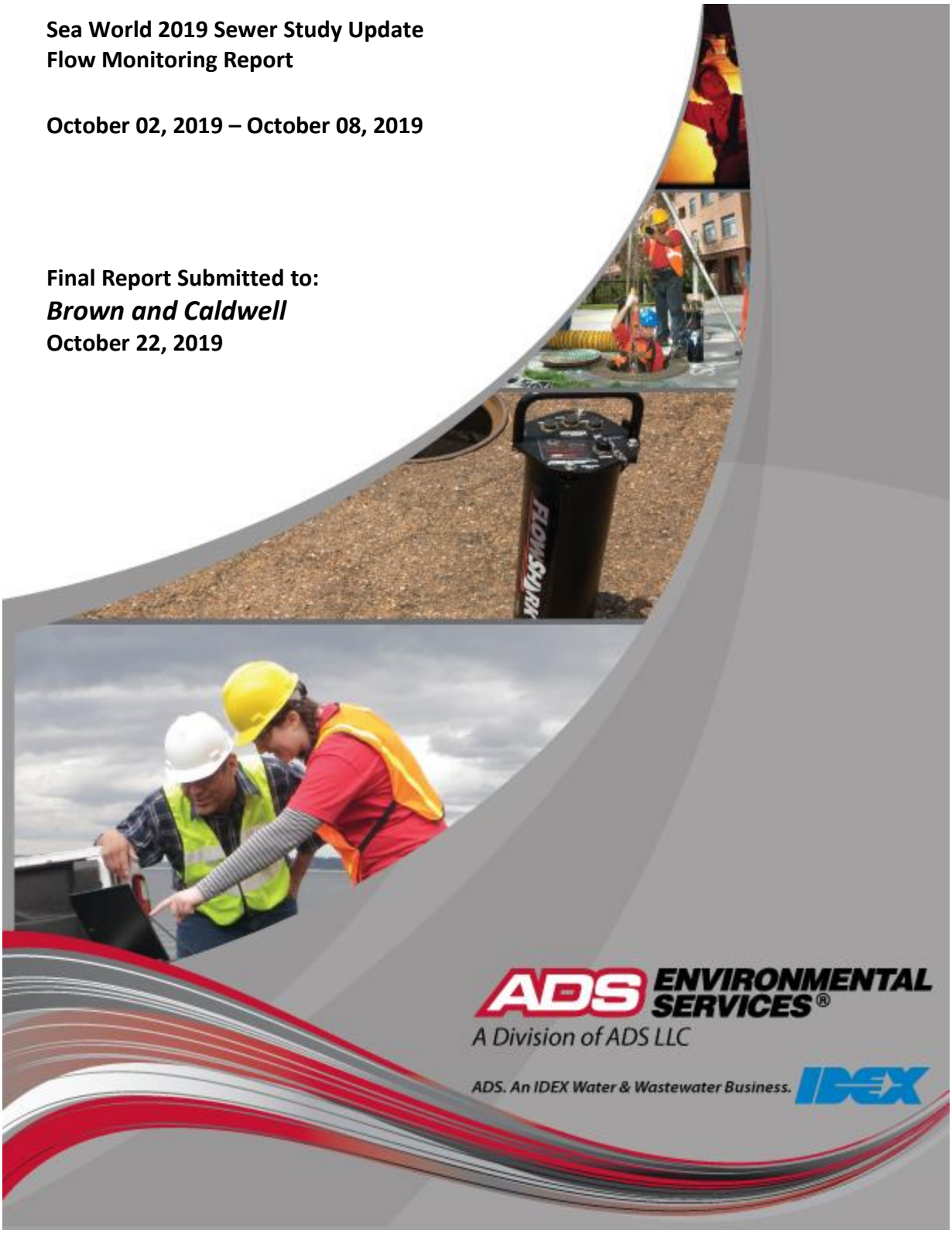
This document was prepared solely for SeaWorld in accordance with professional standards at the time the services were performed and in accordance with the contract between SeaWorld and Brown and Caldwell dated 1/5/2011. This document is governed by the specific scope of work authorized by SeaWorld; it is not intended to be relied upon by any other party except for regulatory authorities contemplated by the scope of work. We have relied on information or instructions provided by SeaWorld and other parties and, unless otherwise expressly indicated, have made no independent investigation as to the validity, completeness, or accuracy of such information.

Attachment A: ADS Environmental Services Flow Monitoring Report

Sea World 2019 Sewer Study Update
Flow Monitoring Report

October 02, 2019 – October 08, 2019

Final Report Submitted to:
Brown and Caldwell
October 22, 2019



Sea World 2019 Sewer Study Update
Brown and Caldwell | San Diego

October 02, 2019 - October 08, 2019

Prepared for:

Eileen Wiegele
Associate Scientist
Brown and Caldwell | San Diego, CA
T: 858.571.6767
C: 858.243.4819

Prepared by:

ADS, LLC
4820 Mercury Street, Suite C
San Diego, CA 92111

ADS LLC

October 22, 2019

Eileen Wiegele
Associate Scientist
Brown and Caldwell
San Diego, CA

SUBJECT: Sea World 2019 Sewer Study Update

Dear Ms. Wiegele,

ADS is pleased to submit the Final Report for the Sea World 2019 Sewer Study Update. The metering was conducted for seven (7) days at four (4) locations. The study period is October 02, 2019 - October 08, 2019. The report contains 2-minute averaged depth, velocity, and quantity hydrographs as well as daily long tables for the metering period in pdf format. An Excel file containing depth, quantity, and velocity entities for each monitoring location in 2-minute format is also provided.

In addition, we would be happy to further explain any details about the report that may seem unclear. Should you have any questions or comments, you may contact the Project Manager, Neil Volk at (858) 571-0045.

Thank you for choosing ADS products and services to meet your flow monitoring needs.

Sincerely,
ADS ENVIRONMENTAL SERVICES

Mackenzie Michaud
Data Analyst

Scope and Methodology

Introduction

Brown and Caldwell entered into an agreement with ADS Environmental Services to conduct flow monitoring at (4) four metering locations at Sea World, CA Sanitary Sewer Collection System. The study was conducted over a 7-day period. The objective of this study was to measure peak depth, velocity, and quantify flows. Data obtained will be used for validating a sewer study conducted in 2014.

Project Scope

The scope of this study involved using a flow monitor to quantify wastewater flows at the designated location for the 7-day time period. Specifically, the study included the following key components.

- Investigate each proposed flow-monitoring site for adequate hydraulic conditions.
- Flow monitor installation.
- Flow monitor confirmations and data collections.
- Flow data analysis.

Equipment installation was accomplished on October 1, 2019. The monitoring period began on October 02, 2019 and was completed on October 08, 2019.

Flow Monitoring Equipment

The ***ADS FlowShark Triton*** monitor was selected for this project. This flow monitor is an area velocity flow monitor that uses both the Continuity and Manning's equations to measure flow.

The ADS FlowShark Triton monitor consists of data acquisition sensors and a battery-powered microcomputer. The microcomputer includes a processor unit, data storage, and an on-board clock to control and synchronize the sensor recordings. The monitor was programmed to acquire and store depth of flow and velocity readings at 5-minute intervals.

The FS Triton monitor features cross-checking using multiple technologies in each sensor for continuous running of comparisons and tolerances. The FS Triton monitor can support two (2) sets of sensors. The sensor option used for this project was:
The Peak Combo Sensor installed at the bottom of the pipe includes three types of data acquisition technologies.

The ***up looking ultrasonic depth*** uses sound waves from two independent transceivers to measure the distance from the sensor upward toward the flow surface; applying the speed of sound in the water and the temperature measured by sensor to calculate depth.

The ***pressure depth*** is calculated by using a piezo-resistive crystal to determine the difference between hydrostatic and atmospheric pressure. The pressure sensor is temperature compensated and vented to the atmosphere through a desiccant filled breather tube.

To obtain ***peak velocity*****,** the sensor sends an ultrasonic signal at an angle upward through the widest cross-section of the oncoming flow. The signal is reflected by suspended particles, air bubbles, or organic matter with a frequency shift proportional to the velocity of the reflecting objects. The reflected signal is received by the sensor and processed using digital spectrum analysis to determine the peak flow velocity.

Installation

Installation of flow monitoring equipment typically proceeds in four steps. First, the site is investigated for safety and to determine physical and hydraulic suitability for the flow monitoring equipment. Second, the equipment is physically installed at the selected location. Third, the monitor is tested to assure proper operation of the velocity and depth of flow sensors and verify that the monitor clock is operational and synchronized to the master computer clock. Fourth, the depth and velocity sensors are confirmed and line confirmations are performed.

In pipes up to 56 inches in diameter, the sensors were mounted on expandable stainless steel rings, inserted at least a foot upstream into influent pipes and tightened against the inside walls of the pipes. Influent pipe installations reduce the influences of turbulence and backwater often caused by changes in channel geometry in manholes.

Data Collection, Confirmation, and Quality Assurance

Data collects were done remotely via wireless connect on a weekly basis via ADS Field Representatives. Weekly, during the monitoring period, field crews visit each monitoring location to verify proper monitor operation and document field conditions. The following quality assurance steps are taken to assure the integrity of the collected data:

Measure power supplies: monitors were powered by dry cell battery packs. Voltages were recorded and battery packs replaced, as necessary. Separate batteries provided back-up power to memory allowing primary batteries to be replaced without loss of data.

Clock synchronization: Field crews synchronized monitor clocks to master clocks.

Confirm depth and velocity readings: Field crews descended into meter manholes to manually measure depths and velocities and compare them meter readings to confirm that they agreed. They also measured silt levels, if any, in the inverts of the pipes. Silt areas were subtracted from flow areas to compute true areas of flow.

Confirm average velocities through cross-sectional velocity profiles: Since ADS velocity sensors measure peak velocity, field crews collected cross-sectional velocity profiles in order to develop a relationship between peak and average velocity in lines that meet the hydraulic criteria.

Upload and Review Data: Data collected from the monitors were uploaded and reviewed by a Data Analyst for completeness, outliers and deviations in the flow patterns, which indicate system anomalies or equipment failure.

Flow Quantification Methods

There are two main equations used to measure open channel flow: the ***Continuity Equation*** and the ***Manning Equation.*** The Continuity Equation, which is considered the most accurate, can be used if both depth of flow and velocity are available. In cases where velocity measurements are not available or not practical to obtain, the Manning Equation can be used to estimate velocity from the depth data based on certain physical characteristics of the pipe (i.e. the slope and roughness of the pipe being measured). However, the Manning equation assumes uniform, steady flow hydraulic conditions with non-varying roughness, which are typically invalid assumptions in most sanitary sewers. The Continuity Equation was used exclusively for this study.

Continuity Equation

The Continuity Equation states that the flow quantity (Q) is equal to the wetted area (A) multiplied by the average velocity (V) of the flow.

$$Q = A * V$$

This equation is applicable in a variety of conditions including backwater, surcharge, and reverse flow.

Data Analysis and Presentation

Data Analysis

A flow monitor is typically programmed to collect data at either 15-minute or 5-minute intervals throughout the monitoring period. The monitor stores raw data consisting of (1) the ultrasonic depth, (2) the peak velocity and (3) the pressure depth. The data is imported into ADS's proprietary software and is examined by a data analyst to verify its integrity. The data analyst also reviews the daily field reports and site visit records to identify conditions that would affect the collected data.

Velocity profiles and the line confirmation data developed by the field personnel are reviewed by the data analyst to identify inconsistencies and verify data integrity. Velocity profiles are reviewed and an average to peak velocity ratio is

calculated for the site. This ratio is used in converting the peak velocity measured by the sensor to the average velocity used in the Continuity equation. The data analyst selects which depth sensor entity will be used to calculate the final depth information. Silt levels present at each site visit are reviewed and representative silt levels established.

Occasionally the velocity sensor's performance may be compromised resulting in invalid readings sporadically during the monitoring period. This is generally caused by excessive debris (silt) blocking the sensor's crystals, shallow flows (~< 2") that may drop below the top of the sensor or very clear flows lacking the particles needed to measure rate. In order to use the Continuity equation to quantify the flow during these periods, a Data Analyst and/or Engineer will use the site's historical pipe curve (depth vs. velocity) data along with valid field confirmations to reconstitute and replace the false velocity recordings with expected velocity readings for a given historical depth along the curve.

Selections for the above parameters can be constant or can change during the monitoring period. While the data analysis process is described in a linear manner, it often requires an iterative approach to accurately complete.

Data Presentation

This type of flow monitoring project generates a large volume of data. To facilitate review of the data, results have been provided in graphical and tabular formats. The flow data is presented graphically in the form of scattergraphs and hydrographs. Hydrographs are based on hourly averaging. Tables are provided in daily average format. These tables show the flow rate for each day, along with the daily minimum and maximums, the times they were observed, the total daily flow, and total flow for the month (or monitoring period). The following explanation of terms may aid in interpretation of the tables and hydrographs.

DEPTH - Final calculated depth measurement (in inches)

QUANTITY - Final calculated flow rate (in MGD)

VELOCITY - Final calculated flow velocity (in feet per second)

REPORT TOTAL - Total volume of flow recorded for the indicated time period (in MG)

Site Commentary

Site Information

JL	
Pipe Dimensions	10.5 "
Silt Level	0.00"

Overview

Site JL functioned under normal conditions during the period Wednesday, October 2, 2019 to Tuesday, October 8, 2019. Surcharge conditions were experienced at this location. Review of the Scattergraph shows that both free flow and backwater conditions were recorded during the study period.

Flow depth and velocity measurements recorded by the flow monitor are consistent with field confirmations conducted and support the relative accuracy of the flow monitor at this location.

This location was installed upstream of site JM1. (See JM1 Site Commentary for More Details)

Observations

Average flow depth, velocity, and quantity data observed during Wednesday, October 2, 2019 to Tuesday, October 8, 2019, along with observed minimum and maximum data, are provided in the following table. The values presented herein are based on 2-minute data. In regards to depth, this site flows at approximately 188% full at its recorded 2 minute peak of 19.70 inches and approximately 29% full during the typical average depth of 3.08 inches.

Observed Flow Conditions			
Item	Depth (in)	Velocity (ft/s)	Quantity (MGD)
Average	3.08	1.50	0.150
Minimum	1.89	0.57	0.043
Maximum	19.70	2.58	0.606
Time of Minimum	10/6/2019 04:21	10/5/2019 00:52	10/4/2019 00:44
Time of Maximum	10/4/2019 08:41	10/7/2019 08:24	10/4/2019 08:33

Data Quality

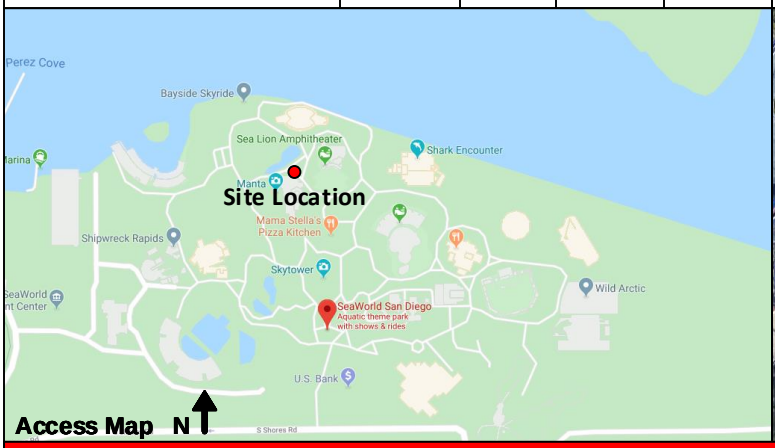
Data uptime observed during the Wednesday, October 2, 2019 to the Tuesday, October 8, 2019 monitoring period is provided in the table below. Based upon the quality and consistency of the observed flow depth and velocity data, the Continuity equation was used to calculate flow rate and quantities during the monitoring period.

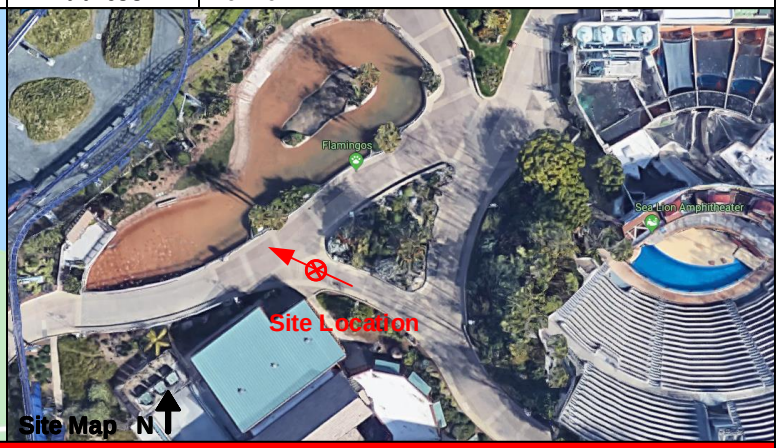
Percent Uptime	
Depth (in)	100
Velocity (ft/s)	100
Quantity (MGD)	100

ADS Site Report

Quality Form

Project Name: Sea World TFM19	**City / State:** San Diego, CA			**Date Installed:** 10/01/2019	**FM Initials:** JG
Site Name: JL	**Monitor Series:** Triton+			**Monitor S/N:**	40501
Address / Location: 500 Sea World Way (by Flamingos)				**Manhole #:**	N/A
				Map Page #:	N/A
Access: Drive, Sea World Park	**Type of System:**	**Sanitary** [x]	**Storm** [ ]	**Combined** [ ]	**Pipe Height:** 10.50"
					Pipe Width: 10.50"
					IP Address: 10.4.6.4





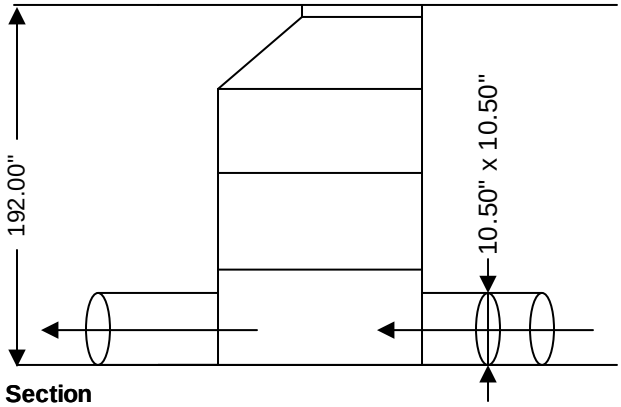
Investigation Information:

Date/Time of Investigation:	10/01/2019 @ 1900
Site Hydraulics:	Low flow with slow moving velocity through manhole
Upstream Input: (L/S,P/S)	N/A
Upstream Manhole:	N/A
Downstream Manhole:	N/A
Depth of Flow (DOF)	2.88 +/- 0.25
Range (Air space)	+/- 0.25
Peak Velocity:	0.88 **Fps**
Silt:	0.00 **Inches**

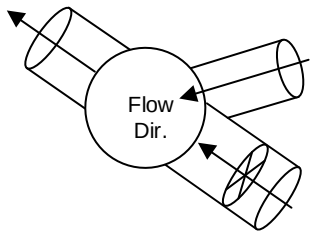
Manhole Information:

Manhole Depth:	192.00				**Inches**
Manhole Material / Condition:	Concrete / Good				
Pipe Material / Condition:	Clay / N/A				
Mini System Character:	**Residential** [ ]	**Commercial** [ ]	**Industrial** [x]	**Other** [ ]	
Telephone Information:	N/A				
Access Pole #:	N/A				
Distance From Manhole:	N/A				**Feet**
Road Cut Length:	N/A				**Feet**
Trench Length:	N/A				**Feet**

Other Information:



Cross Section



Sensor Location

Planar N

Installation Information		Backup	Yes	No	?	Distance
Installation Type:	Standard Ring Installation	**Trunk**	[x]	[ ]		
Sensors/ Devices:	CS4 (Ultrasonic Depth/ Velocity/ Pressure)	**Lift/ Pump Station**	[ ]	[ ]		
Surcharge Height:	Evidence of Surcharge **Feet**	**WWTP**	[ ]	[ ]		
Rain Gauge Zone:	N/A	**Other**	[ ]	[ ]		

Additional Site Information / Comments:

SCATTERGRAPH REPORT

Flow Monitor

JL

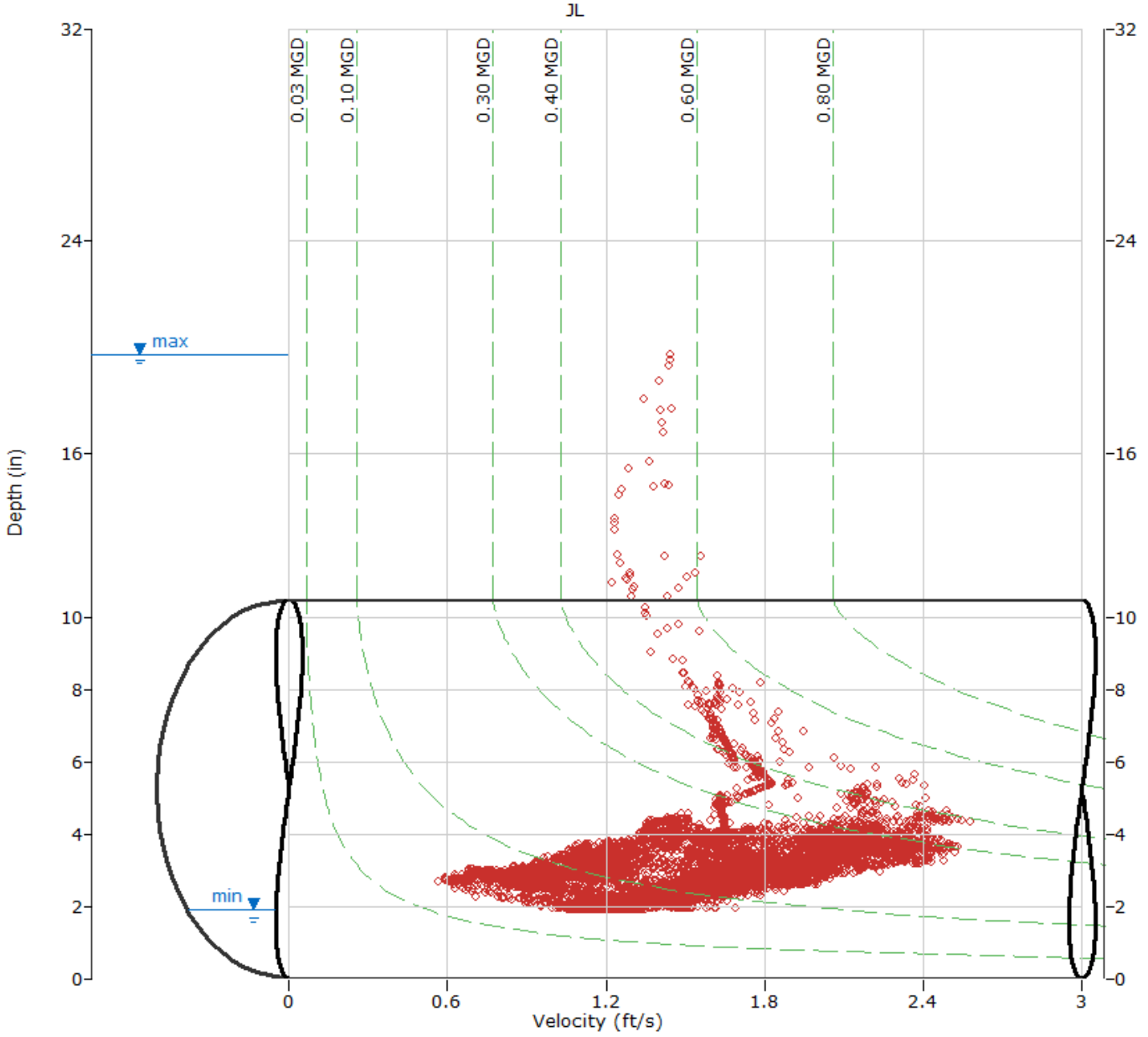
Pipe Height
10.50 in

Report Period

10/2/2019
To
10/8/2019

Legend

- Depth - Velocity
- Iso-Q™
- Silt
- Min-Max Depth



ADS ENVIRONMENTAL SERVICES

HYDROGRAPH REPORT

JL

Flow Monitor

JL

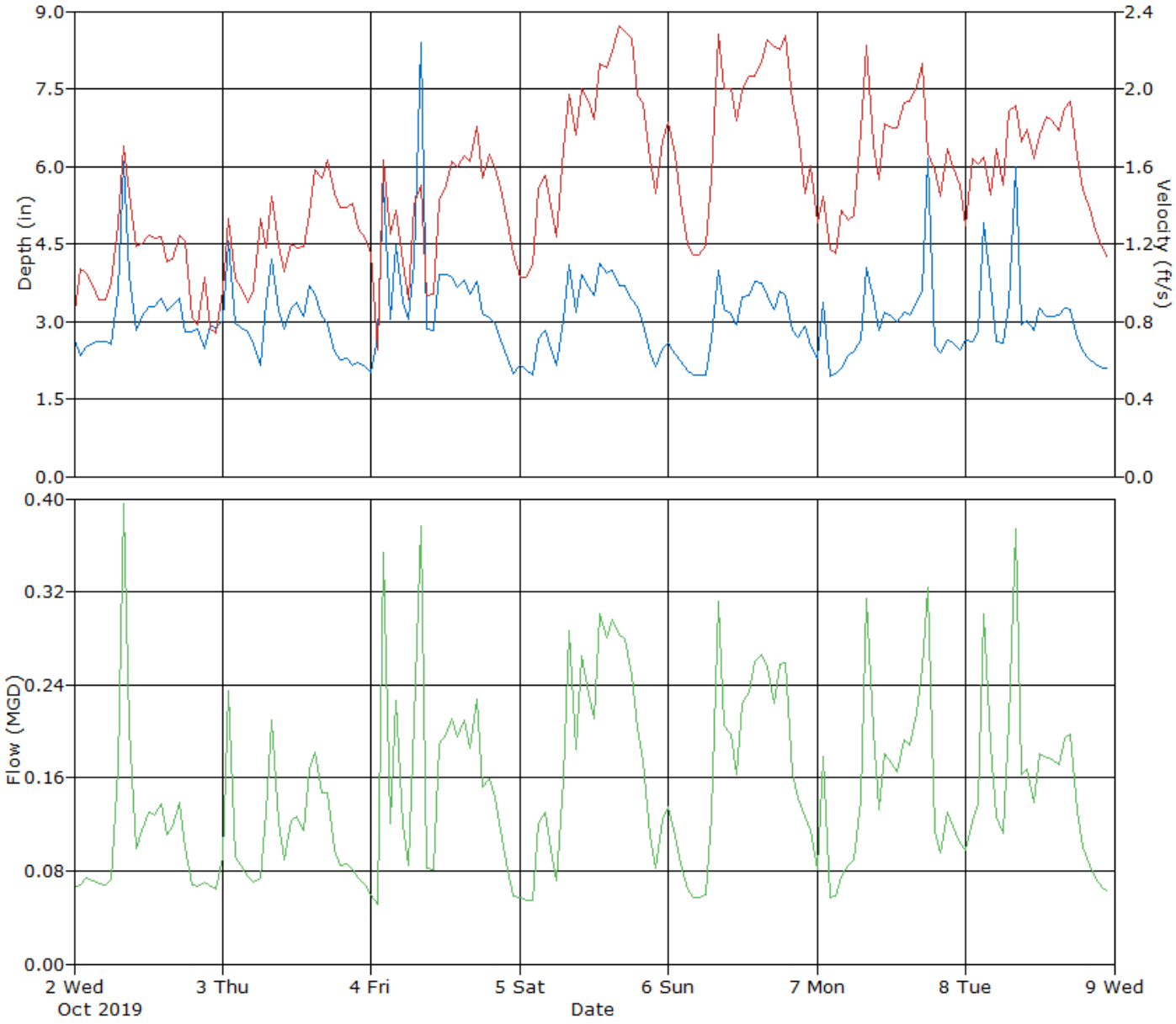
Pipe Height
10.50 in

Report Period

10/2/2019
To
10/8/2019

Legend

- Depth
- Velocity
- Quantity



ADS ENVIRONMENTAL SERVICES

Daily Tabular Report For The Period 10/02/2019 00:00 - 10/08/2019 23:59

JL, Pipe Height: 10.50 in, Silt: 0.00 in

Daily Tabular Report

Date	Depth (in)					Velocity (ft/s)					Quantity (MGD - Total ft3)						Rain (in)
	Time	Min	Time	Max	Avg	Time	Min	Time	Max	Avg	Time	Min	Time	Max	Avg	Total	Total
10/02/2019	21:52	2.00	08:01	8.16	3.08	23:20	0.68	07:54	1.86	1.09	00:16	0.058	07:59	0.534	0.111	14859	
10/03/2019	06:37	1.93	01:14	7.59	2.96	00:28	0.63	01:10	1.82	1.26	23:23	0.053	01:14	0.478	0.115	15439	
10/04/2019	00:43	1.91	08:41	19.70	3.54	01:46	0.59	17:20	1.95	1.37	00:44	0.043	08:33	0.606	0.162	21657	
10/05/2019	23:06	1.92	08:35	5.37	3.07	00:52	0.57	16:39	2.53	1.75	00:52	0.044	08:34	0.444	0.179	23988	
10/06/2019	04:21	1.89	08:11	4.49	2.93	07:09	0.67	16:37	2.52	1.80	05:32	0.050	08:16	0.386	0.171	22840	
10/07/2019	02:40	1.89	18:17	15.40	2.94	00:57	0.76	08:24	2.58	1.64	03:30	0.048	18:01	0.523	0.153	20404	
10/08/2019	23:52	2.05	08:12	11.45	3.03	04:19	0.86	08:48	2.44	1.62	23:56	0.052	08:15	0.577	0.157	20910	

Report Summary For The Period 10/02/2019 00:00 - 10/08/2019 23:59

	Depth (in)	Velocity (ft/s)	Quantity (MGD - Total ft3)
Total			140097
Avg	3.08	1.50	0.150

Site Commentary

Site Information

JM1	
Pipe Dimensions	10.25 "
Silt Level	0.00"

Overview

Site JM1 functioned under normal conditions during the period Wednesday, October 2, 2019 to Tuesday, October 8, 2019. Surcharge conditions were experienced at this location. Review of the Scattergraph shows that both free flow and backwater conditions were recorded during the study period.

Flow depth and velocity measurements recorded by the flow monitor are consistent with field confirmations conducted and support the relative accuracy of the flow monitor at this location.

This location was installed downstream of site JL. A review of balancing with JL shows a net flow of 0.176 MGD between the sites.

Observations

Average flow depth, velocity, and quantity data observed during Wednesday, October 2, 2019 to Tuesday, October 8, 2019, along with observed minimum and maximum data, are provided in the following table. The values presented herein are based on 2-minute data. In regards to depth, this site flows at approximately 241% full at its recorded 2 minute peak of 24.75 inches and approximately 38% full during the typical average depth of 3.86 inches.

Observed Flow Conditions			
Item	Depth (in)	Velocity (ft/s)	Quantity (MGD)
Average	3.86	2.79	0.326
Minimum	1.70	1.22	0.051
Maximum	24.75	4.20	1.556
Time of Minimum	10/4/2019 00:30	10/3/2019 23:25	10/3/2019 23:25
Time of Maximum	10/4/2019 08:37	10/4/2019 08:37	10/4/2019 08:37

Data Quality

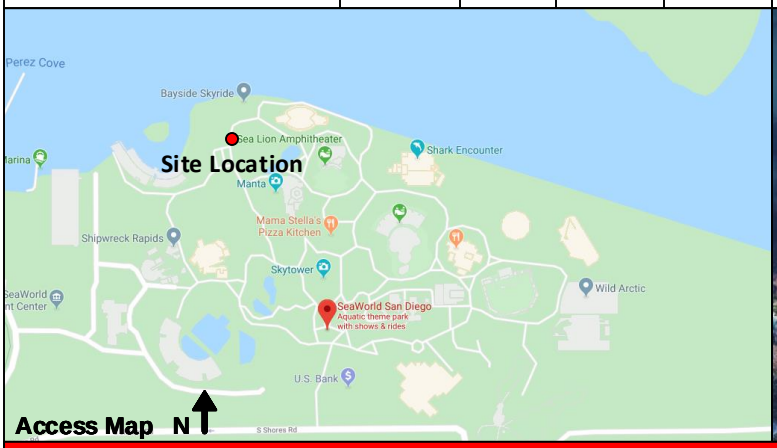
Data uptime observed during the Wednesday, October 2, 2019 to the Tuesday, October 8, 2019 monitoring period is provided in the table below. Based upon the quality and consistency of the observed flow depth and velocity data, the Continuity equation was used to calculate flow rate and quantities during the monitoring period.

Percent Uptime	
Depth (in)	100
Velocity (ft/s)	100
Quantity (MGD)	100

ADS Site Report

Quality Form

Project Name: Sea World TFM19	**City / State:** San Diego, CA			**Date Installed:** 10/01/2019	**FM Initials:** JG
Site Name: JM1	**Monitor Series:** Triton+			**Monitor S/N:**	40514
Address / Location: 500 Sea World Way (left of Mantas)				**Manhole #:**	N/A
				Map Page #:	N/A
Access: Drive, Sea World Park	**Type of System:**	Sanitary [x]	Storm [ ]	Combined [ ]	**Pipe Height:** 10.25"
					Pipe Width: 10.25"
					IP Address: 10.4.0.93



Access Map

Site Map

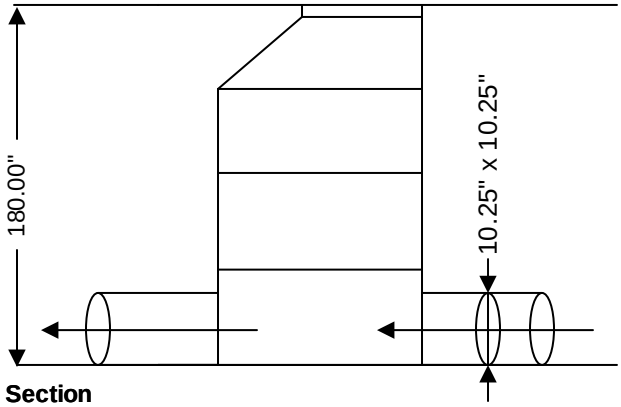
Investigation Information:

Date/Time of Investigation:	10/01/2019 @ 1800		
Site Hydraulics:	Low flow with scouring velocity through manhole		
Upstream Input: (L/S,P/S)	N/A		
Upstream Manhole:	N/A		
Downstream Manhole:	N/A		
Depth of Flow (DOF)	3.00	+/-	0.25
Range (Air space)		+/-	0.25
Peak Velocity:	2.42	**Fps**	
Silt:	0.00	**Inches**	

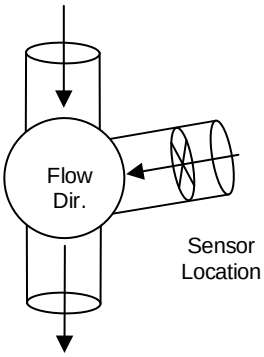
Manhole Information:

Manhole Depth:	180.00	**Inches**			
Manhole Material / Condition:	Concrete / Good				
Pipe Material / Condition:	Clay / OK				
Mini System Character:	Residential [ ]	Commercial [ ]	Industrial [x]	Other [ ]	
Telephone Information:	N/A				
Access Pole #:	N/A				
Distance From Manhole:	N/A	**Feet**			
Road Cut Length:	N/A	**Feet**			
Trench Length:	N/A	**Feet**			

Other Information:



Cross Section



Planar

Installation Information		Backup	Yes	No	?	Distance
Installation Type:	Standard Ring Installation	**Trunk**	[x]	[ ]		
Sensors/ Devices:	CS4 (Ultrasonic Depth/ Velocity/ Pressure)	**Lift/ Pump Station**	[ ]	[ ]		
Surcharge Height:	Evidence of Surcharge **Feet**	**WWTP**	[ ]	[ ]		
Rain Gauge Zone:	N/A	**Other**	[ ]	[ ]		

Additional Site Information / Comments:

SCATTERGRAPH REPORT

Flow Monitor

JM1

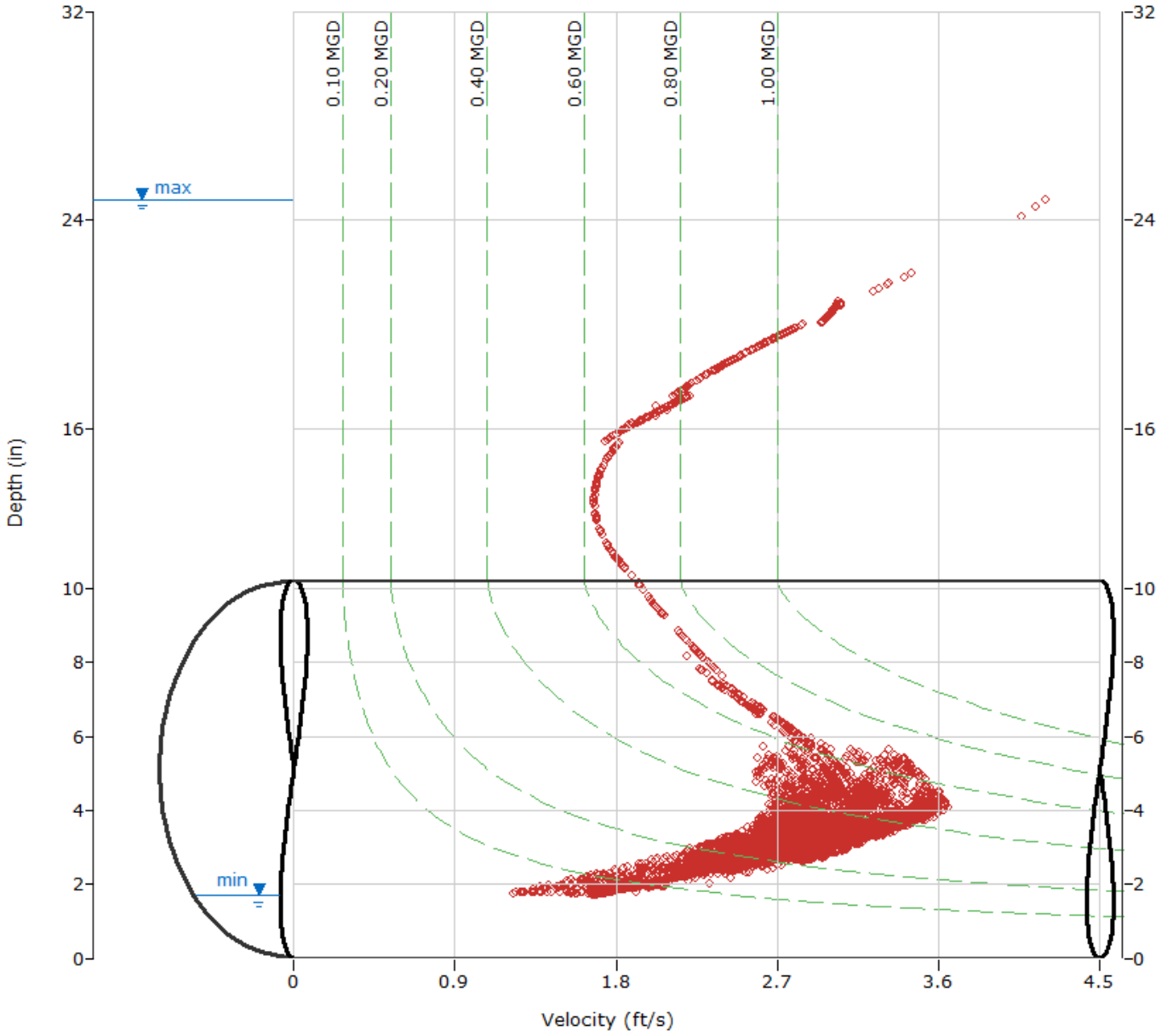
Pipe Height
10.25 in

Report Period

10/2/2019
To
10/8/2019

Legend

- Depth - Velocity
- Iso-Q™
- Silt
- Min-Max Depth



ADS ENVIRONMENTAL SERVICES

HYDROGRAPH REPORT

JM1

Flow Monitor

JM1

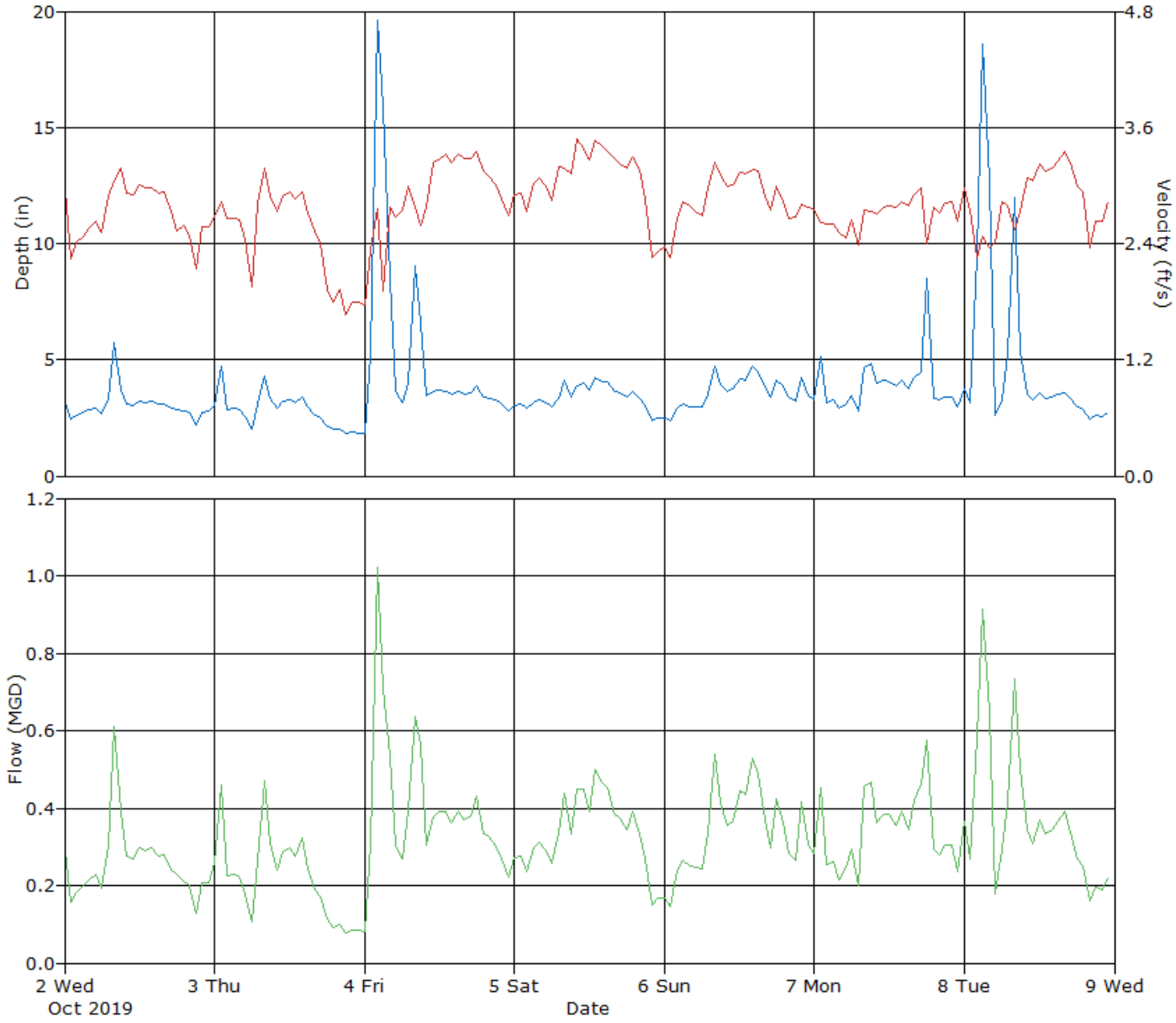
Pipe Height
10.25 in

Report Period

10/2/2019
To
10/8/2019

Legend

- Depth
- Velocity
- Quantity



ADS ENVIRONMENTAL SERVICES

Daily Tabular Report For The Period 10/02/2019 00:00 - 10/08/2019 23:59

JM1, Pipe Height: 10.25 in, Silt: 0.00 in

Daily Tabular Report

Date	Depth (in)					Velocity (ft/s)					Quantity (MGD - Total ft3)						Rain (in)
	Time	Min	Time	Max	Avg	Time	Min	Time	Max	Avg	Time	Min	Time	Max	Avg	Total	Total
10/02/2019	21:55	1.82	08:04	8.43	3.04	01:24	1.52	07:55	3.65	2.72	21:55	0.079	08:04	0.726	0.257	34410	
10/03/2019	23:14	1.72	01:19	7.42	2.81	23:25	1.22	01:12	3.28	2.49	23:25	0.051	01:19	0.688	0.221	29483	
10/04/2019	00:30	1.70	08:37	24.75	5.24	00:30	1.67	08:37	4.20	2.88	00:30	0.067	08:37	1.556	0.403	53830	
10/05/2019	23:07	1.89	08:39	5.18	3.41	23:16	1.38	10:46	3.66	3.08	23:16	0.066	13:45	0.560	0.341	45546	
10/06/2019	01:49	2.24	14:44	5.96	3.60	02:01	1.69	14:08	3.53	2.86	01:51	0.102	14:41	0.679	0.341	45580	
10/07/2019	05:27	2.16	18:20	17.32	3.92	18:14	1.68	17:59	3.32	2.70	05:27	0.120	18:19	0.790	0.343	45797	
10/08/2019	20:42	2.07	04:33	21.96	4.99	08:26	1.68	15:57	3.60	2.83	20:42	0.109	04:33	1.278	0.374	50008	

Report Summary For The Period 10/02/2019 00:00 - 10/08/2019 23:59

	Depth (in)	Velocity (ft/s)	Quantity (MGD - Total ft3)
Total			304654
Avg	3.86	2.79	0.326

Site Commentary

Site Information

JR	
Pipe Dimensions	8.13 "
Silt Level	0.00"

Overview

Site JR functioned under normal conditions during the period Wednesday, October 2, 2019 to Tuesday, October 8, 2019. Surcharge conditions were experienced at this location. Review of the Scattergraph shows that both free flow and backwater conditions were recorded during the study period.

Flow depth and velocity measurements recorded by the flow monitor are consistent with field confirmations conducted and support the relative accuracy of the flow monitor at this location. Data confidence is lower at this site due to operating near or below detection levels during much of the day.

Observations

Average flow depth, velocity, and quantity data observed during Wednesday, October 2, 2019 to Tuesday, October 8, 2019, along with observed minimum and maximum data, are provided in the following table. The values presented herein are based on 2-minute data. In regards to depth, this site flows at approximately 251% full at its recorded 2 minute peak of 20.40 inches and approximately 8% full during the typical average depth of 0.64 inches.

Observed Flow Conditions			
Item	Depth (in)	Velocity (ft/s)	Quantity (MGD)
Average	0.64	0.36	0.004
Minimum	0.00	0.00	0.000
Maximum	20.40	0.76	0.097
Time of Minimum	10/2/2019 00:24	10/2/2019 00:24	10/2/2019 00:24
Time of Maximum	10/8/2019 04:32	10/7/2019 09:00	10/4/2019 08:36

Data Quality

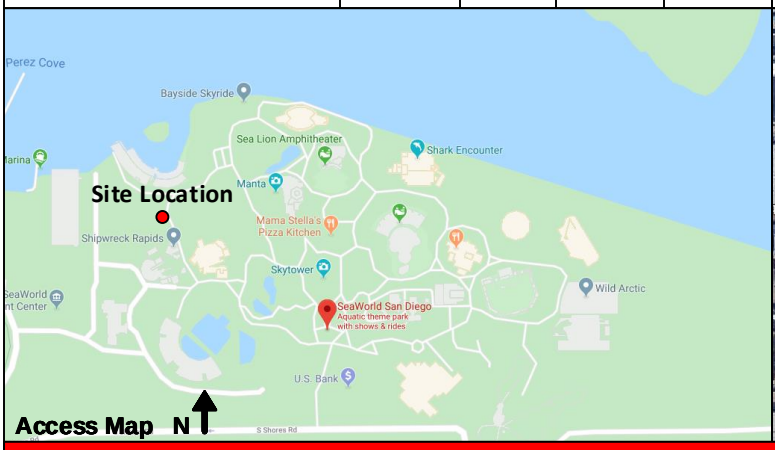
Data uptime observed during the Wednesday, October 2, 2019 to the Tuesday, October 8, 2019 monitoring period is provided in the table below. Based upon the quality and consistency of the observed flow depth and velocity data, the Continuity equation was used to calculate flow rate and quantities during the monitoring period.

Percent Uptime	
Depth (in)	100
Velocity (ft/s)	100
Quantity (MGD)	100

ADS Site Report

Quality Form

Project Name: Sea World TFM19	**City / State:** San Diego, CA			**Date Installed:** 10/01/2019	**FM Initials:** JG
Site Name: JR	**Monitor Series:** Triton+			**Monitor S/N:**	40530
Address / Location: 500 Sea World Way (left of Mantas)				**Manhole #:**	N/A
				Map Page #:	N/A
Access: Drive, Sea World Park	**Type of System:**	**Sanitary** [x]	**Storm** [ ]	**Combined** [ ]	**Pipe Height:** 8.13"
					Pipe Width: 8.00"
					IP Address: 10.4.10.84



Access Map

Site Map

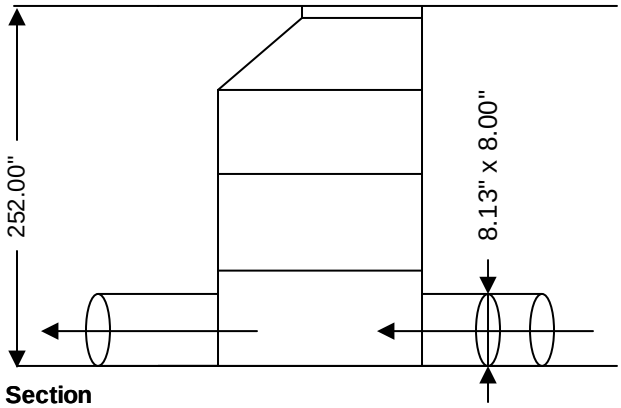
Investigation Information:

Date/Time of Investigation:	10/01/2019 @ 1800		
Site Hydraulics:	Low stagnant flow through manhole		
Upstream Input: (L/S,P/S)	N/A		
Upstream Manhole:	N/A		
Downstream Manhole:	N/A		
Depth of Flow (DOF)	0.25	**+/-**	0.25
Range (Air space)		**+/-**	0.25
Peak Velocity:	0.00	**Fps**	
Silt:	0.00	**Inches**	

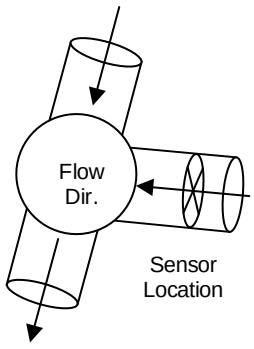
Manhole Information:

Manhole Depth:	252.00	**Inches**			
Manhole Material / Condition:	Concrete / Good				
Pipe Material / Condition:	Clay / OK				
Mini System Character:	**Residential** [ ]	**Commercial** [x]	**Industrial** [x]	**Other** [ ]	
Telephone Information:	N/A				
Access Pole #:	N/A				
Distance From Manhole:	N/A	**Feet**			
Road Cut Length:	N/A	**Feet**			
Trench Length:	N/A	**Feet**			

Other Information:



Cross Section



Planar

Installation Information		Backup	Yes	No	?	Distance
Installation Type:	Standard Ring Installation	**Trunk**	[x]	[ ]		
Sensors/ Devices:	CS4 (Ultrasonic Depth/ Velocity/ Pressure)	**Lift/ Pump Station**	[ ]	[ ]		
Surcharge Height:	Evidence of Surcharge **Feet**	**WWTP**	[ ]	[ ]		
Rain Gauge Zone:	N/A	**Other**	[ ]	[ ]		

Additional Site Information / Comments:

SCATTERGRAPH REPORT

Flow Monitor

JR

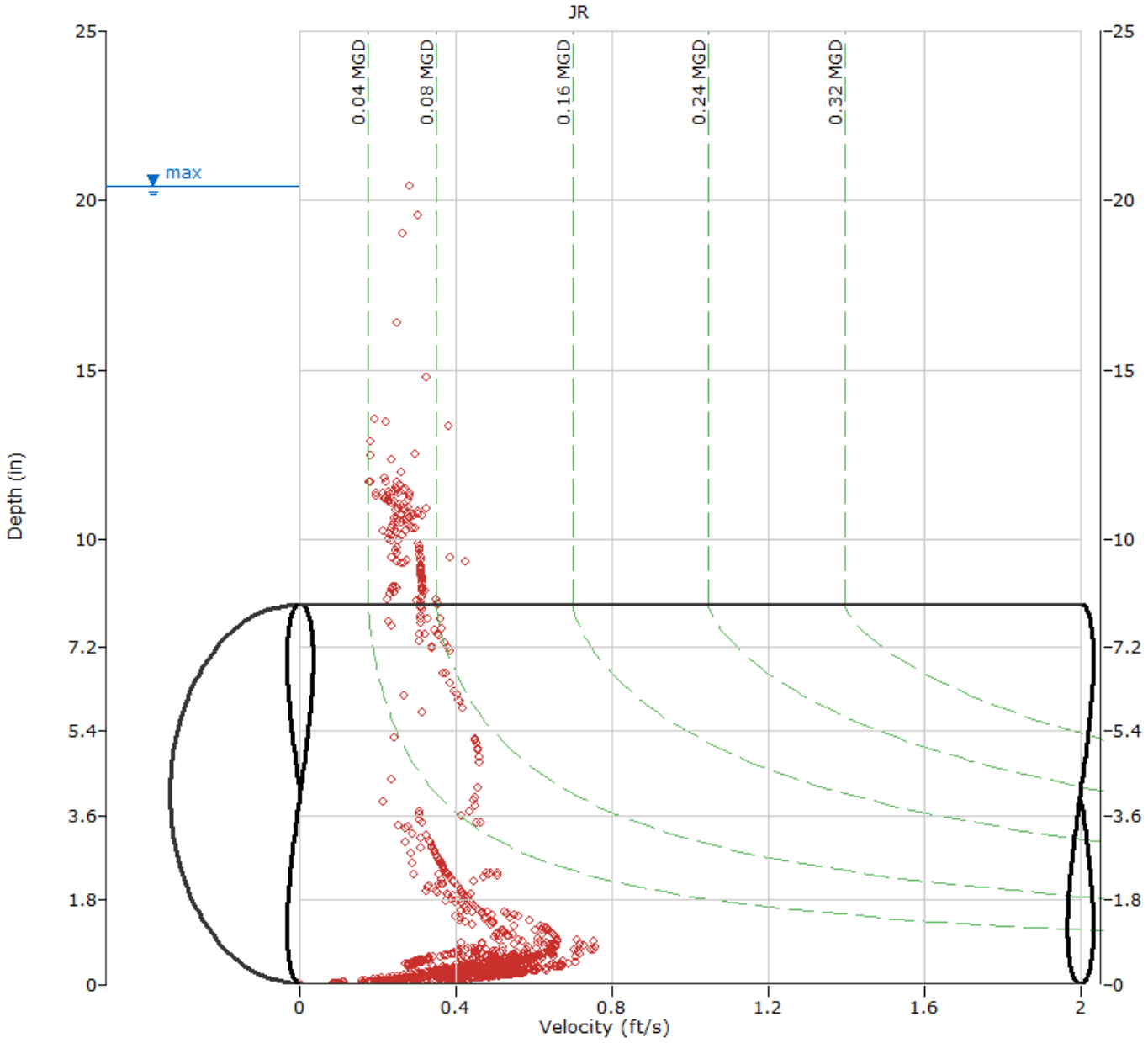
Pipe Height
8.13 in

Report Period

10/2/2019
To
10/8/2019

Legend

- Depth - Velocity
- Iso-Q™
- Silt
- Min-Max Depth



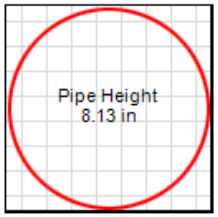
ADS ENVIRONMENTAL SERVICES

HYDROGRAPH REPORT

JR

Flow Monitor

JR

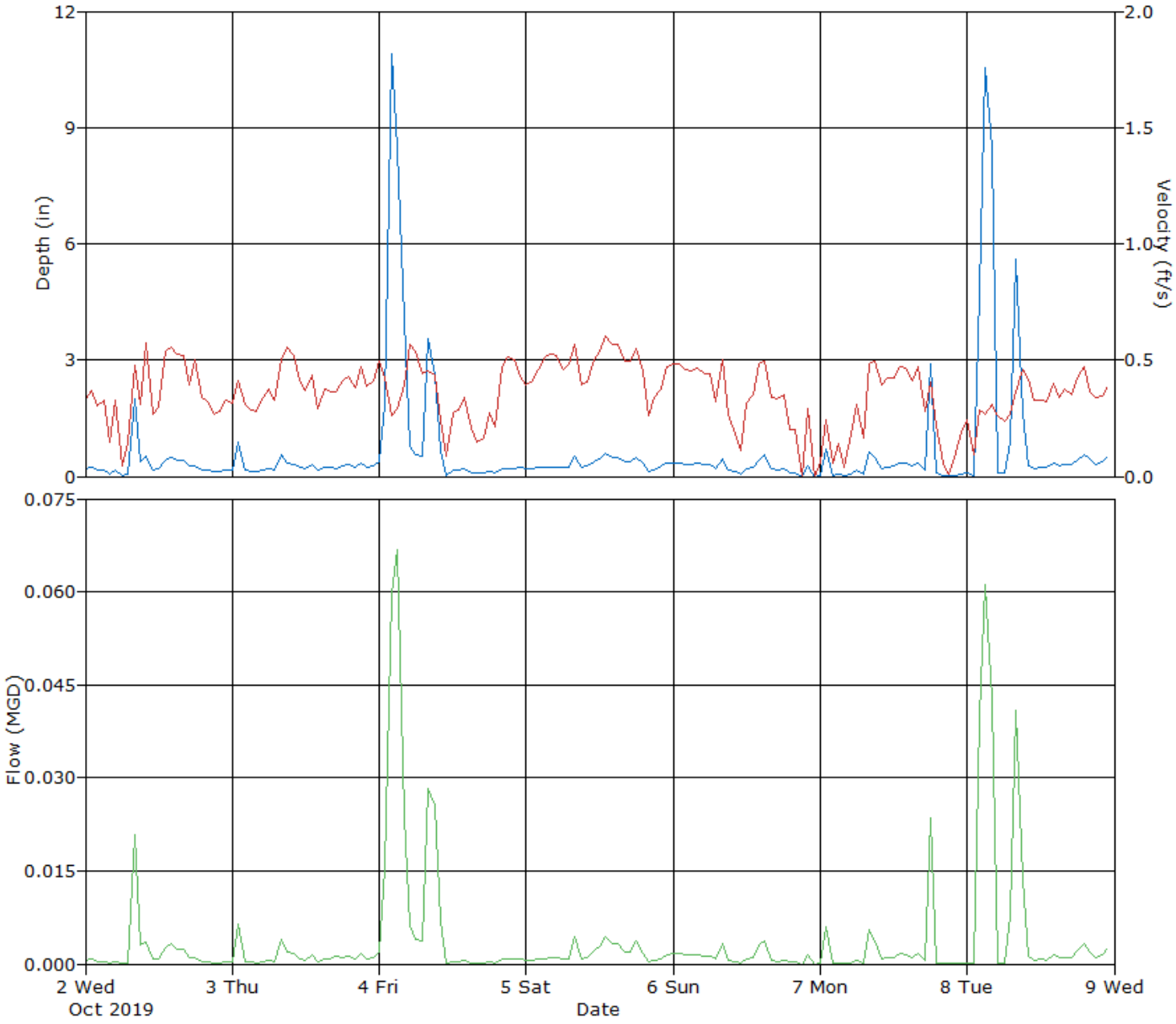


Report Period

10/2/2019
To
10/8/2019

Legend

- Depth
- Velocity
- Quantity



ADS ENVIRONMENTAL SERVICES

Daily Tabular Report

Date	Depth (in)					Velocity (ft/s)					Quantity (MGD - Total ft3)						Rain (in)
	Time	Min	Time	Max	Avg	Time	Min	Time	Max	Avg	Time	Min	Time	Max	Avg	Total	Total
10/02/2019	00:24	0.00	08:12	6.41	0.30	00:24	0.00	11:04	0.71	0.35	00:24	0.000	08:12	0.075	0.002	255	
10/03/2019	14:06	0.00	01:22	2.14	0.27	14:06	0.00	17:34	0.67	0.39	14:06	0.000	01:22	0.018	0.001	160	
10/04/2019	04:52	0.00	08:38	13.32	1.51	04:52	0.00	09:18	0.66	0.35	04:52	0.000	08:36	0.097	0.010	1379	
10/05/2019	20:34	0.00	08:32	1.91	0.32	20:34	0.00	08:40	0.75	0.47	20:34	0.000	08:32	0.018	0.002	227	
10/06/2019	07:32	0.00	15:26	2.57	0.24	07:32	0.00	14:44	0.66	0.33	07:32	0.000	15:26	0.023	0.001	150	
10/07/2019	00:00	0.00	18:20	11.28	0.31	00:00	0.00	09:00	0.76	0.27	00:00	0.000	18:26	0.075	0.002	273	
10/08/2019	00:18	0.00	04:32	20.40	1.54	00:18	0.00	19:16	0.66	0.33	00:18	0.000	02:38	0.081	0.009	1263	

Report Summary For The Period 10/02/2019 00:00 - 10/08/2019 23:59

	Depth (in)	Velocity (ft/s)	Quantity (MGD - Total ft3)
Total			3708
Avg	0.64	0.36	0.004

Site Commentary

Site Information

JS	
Pipe Dimensions	6 "
Silt Level	0.00"

Overview

Site JS functioned under normal conditions during the period Wednesday, October 2, 2019 to Tuesday, October 8, 2019. Surcharge conditions were experienced at this location. Review of the Scattergraph shows that both free flow and backwater conditions were recorded during the study period.

Flow depth and velocity measurements recorded by the flow monitor are consistent with field confirmations conducted and support the relative accuracy of the flow monitor at this location. Data confidence is lower at this site due to operating near or below detection levels during much of the day.

Observations

Average flow depth, velocity, and quantity data observed during Wednesday, October 2, 2019 to Tuesday, October 8, 2019, along with observed minimum and maximum data, are provided in the following table. The values presented herein are based on 2-minute data. In regards to depth, this site flows at approximately 562% full at its recorded 2 minute peak of 33.70 inches and approximately 36% full during the typical average depth of 2.13 inches.

Observed Flow Conditions			
Item	Depth (in)	Velocity (ft/s)	Quantity (MGD)
Average	2.13	0.62	0.018
Minimum	1.26	0.31	0.011
Maximum	33.70	0.92	0.117
Time of Minimum	10/4/2019 12:57	10/8/2019 08:03	10/3/2019 11:30
Time of Maximum	10/8/2019 04:31	10/8/2019 04:34	10/8/2019 04:34

Data Quality

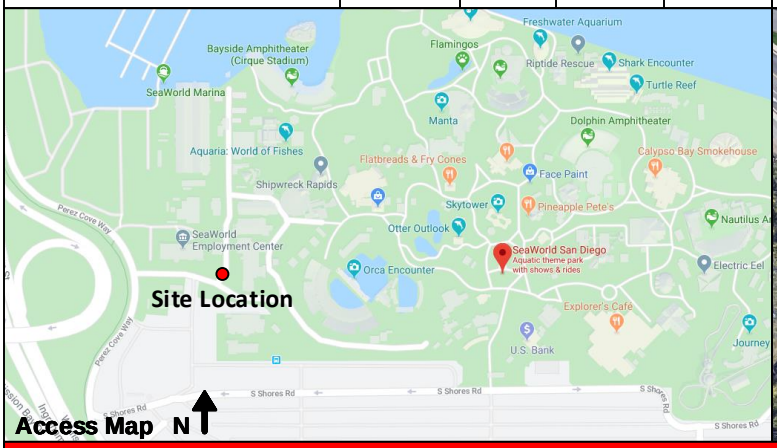
Data uptime observed during the Wednesday, October 2, 2019 to the Tuesday, October 8, 2019 monitoring period is provided in the table below. Based upon the quality and consistency of the observed flow depth and velocity data, the Continuity equation was used to calculate flow rate and quantities during the monitoring period.

Percent Uptime	
Depth (in)	100
Velocity (ft/s)	100
Quantity (MGD)	100

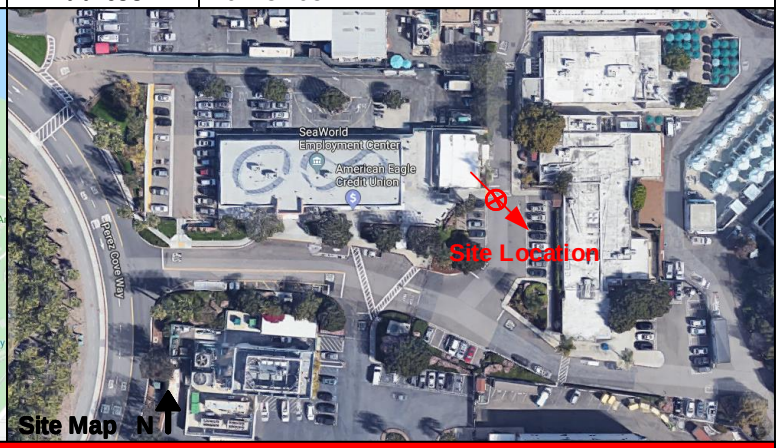
ADS Site Report

Quality Form

Project Name: Sea World TFM19	**City / State:** San Diego, CA			**Date Installed:** 10/01/2019	**FM Initials:** JG
Site Name: JS	**Monitor Series:** Triton+			**Monitor S/N:**	40523
Address / Location: 500 Sea World Way (Security Sign In Office)				**Manhole #:**	N/A
				Map Page #:	N/A
Access: Drive, Sea World Park	**Type of System:**	**Sanitary** [x]	**Storm** [ ]	**Combined** [ ]	**Pipe Height:** 6.00"
					Pipe Width: 6.00"
					IP Address: 10.4.3.205



Access Map N



Site Map N

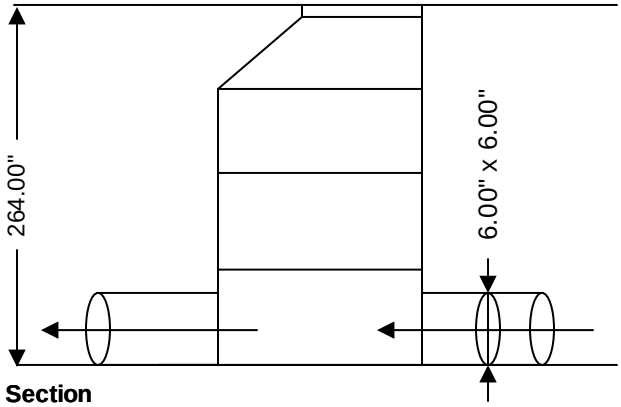
Investigation Information:

Date/Time of Investigation:	10/01/2019 @ 1700		
Site Hydraulics:	Low slow moving flow through manhole		
Upstream Input: (L/S,P/S)	N/A		
Upstream Manhole:	N/A		
Downstream Manhole:	N/A		
Depth of Flow (DOF)	1.38	**+/-**	0.25
Range (Air space)		**+/-**	0.25
Peak Velocity:	0.59	**Fps**	
Silt:	0.00	**Inches**	

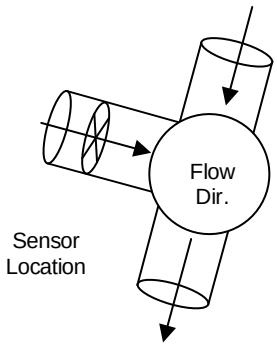
Manhole Information:

Manhole Depth:	264.00	**Inches**			
Manhole Material / Condition:	Concrete / Good				
Pipe Material / Condition:	Clay / OK				
Mini System Character:	**Residential** [ ]	**Commercial** [x]	**Industrial** [x]	**Other** [ ]	
Telephone Information:	N/A				
Access Pole #:	N/A				
Distance From Manhole:	N/A	**Feet**			
Road Cut Length:	N/A	**Feet**			
Trench Length:	N/A	**Feet**			

Other Information:



Cross Section



Planar N

Installation Information		Backup	Yes	No	?	Distance
Installation Type:	Standard Ring Installation	**Trunk**	[x]	[ ]		
Sensors/ Devices:	CS4 (Ultrasonic Depth/ Velocity/ Pressure)	**Lift/ Pump Station**	[ ]	[ ]		
Surcharge Height:	Evidence of Surcharge **Feet**	**WWTP**	[ ]	[ ]		
Rain Gauge Zone:	N/A	**Other**	[ ]	[ ]		

Additional Site Information / Comments:

SCATTERGRAPH REPORT

JS

Flow Monitor

JS

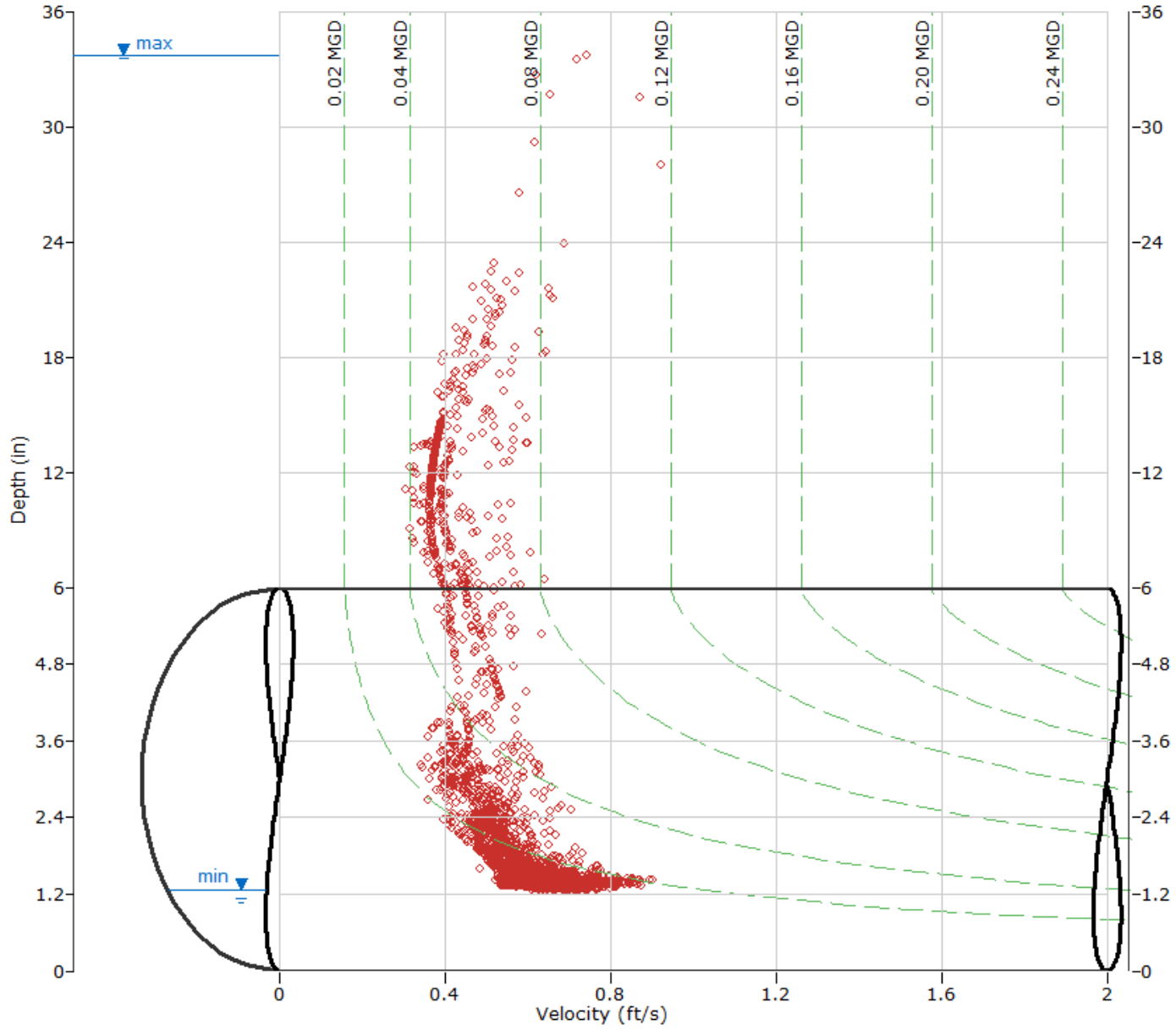
Pipe Height
6.00 in

Report Period

10/2/2019
To
10/8/2019

Legend

- Depth - Velocity
- Iso-Q™
- Silt
- Min-Max Depth



ADS ENVIRONMENTAL SERVICES

HYDROGRAPH REPORT

JS

Flow Monitor

JS

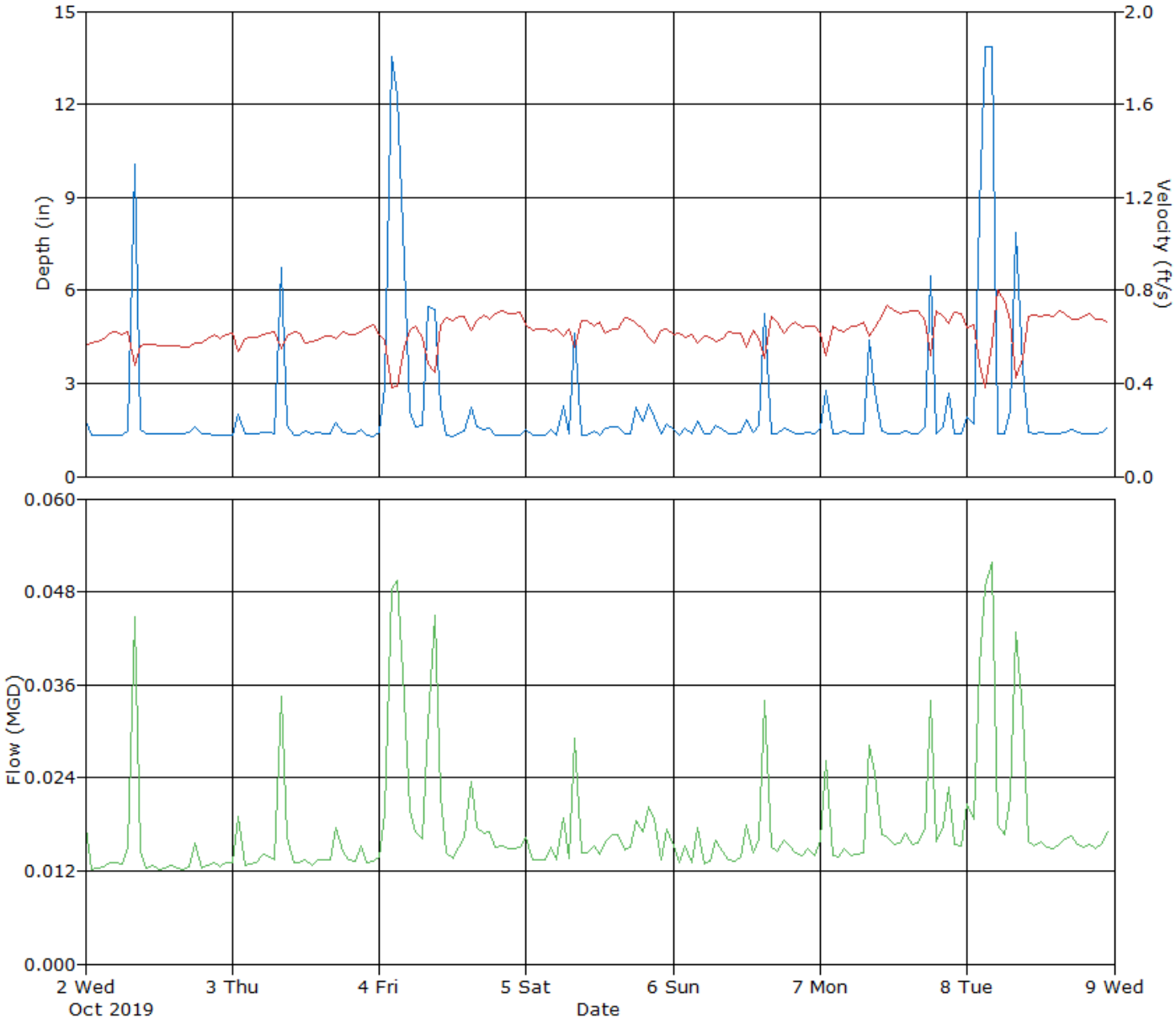
Pipe Height
6.00 in

Report Period

10/2/2019
To
10/8/2019

Legend

- Depth
- Velocity
- Quantity



ADS ENVIRONMENTAL SERVICES

Daily Tabular Report For The Period 10/02/2019 00:00 - 10/08/2019 23:59

JS, Pipe Height: 6.00 in, Silt: 0.00 in

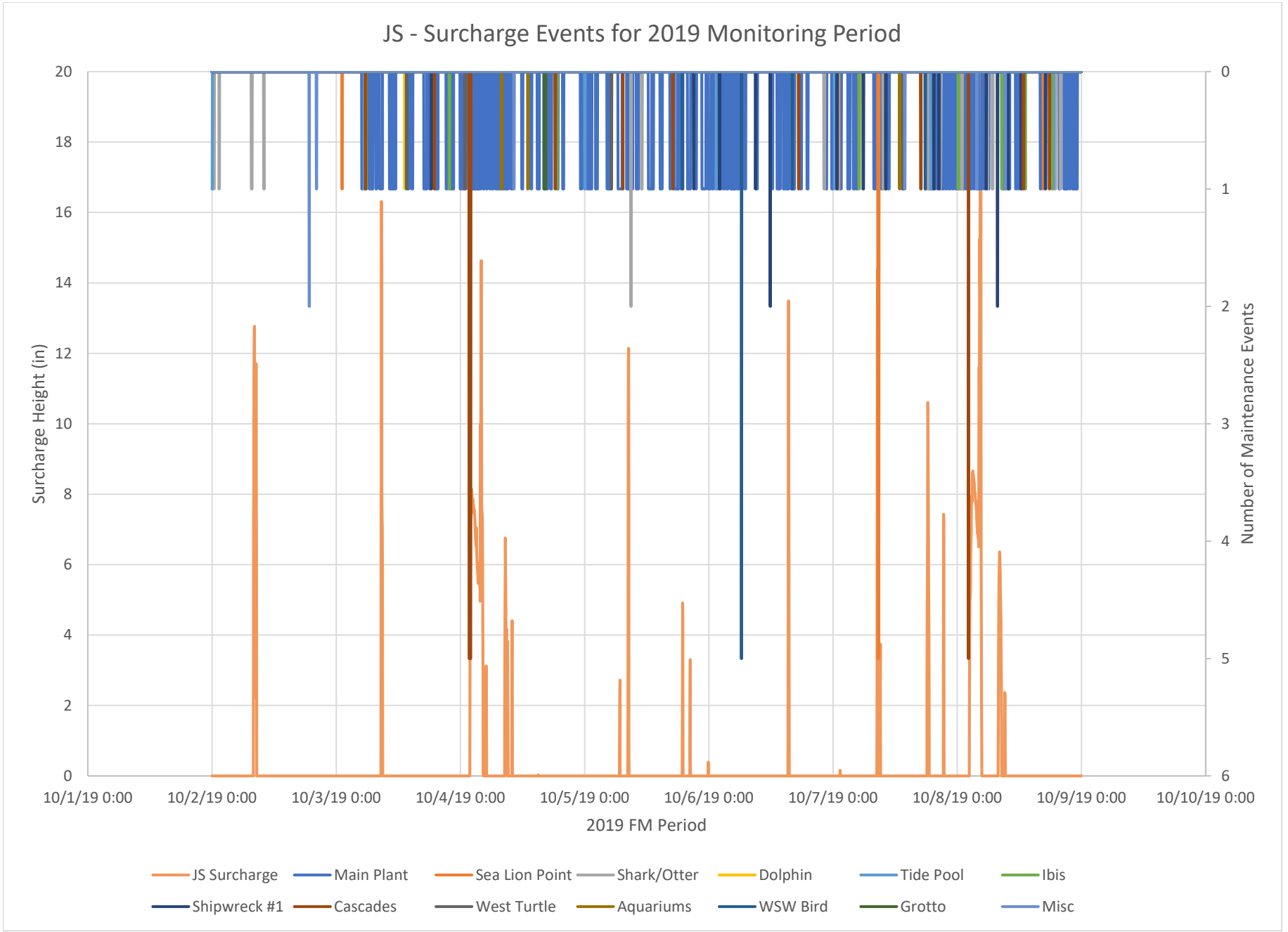
Daily Tabular Report

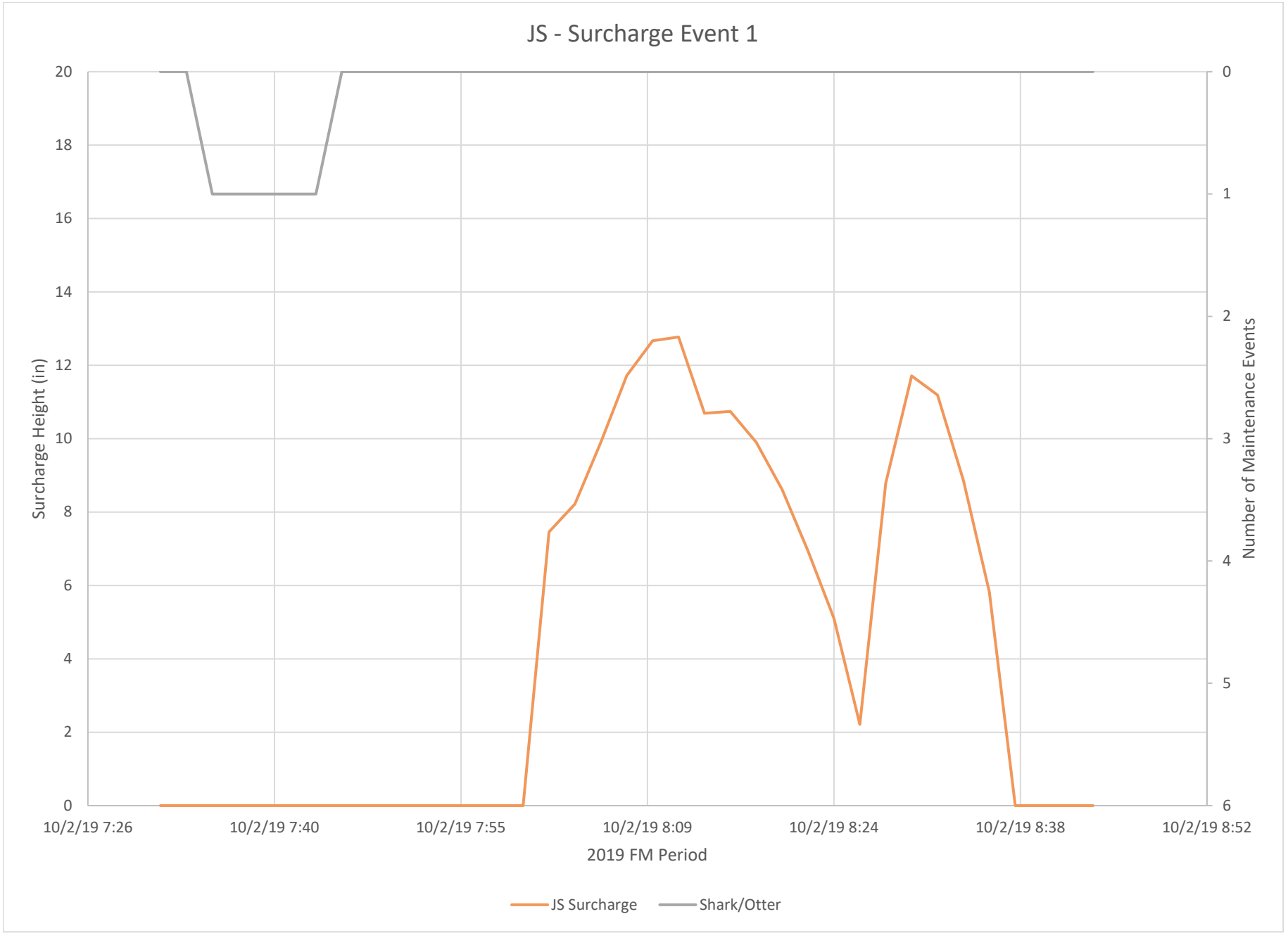
Date	Depth (in)					Velocity (ft/s)					Quantity (MGD - Total ft3)						Rain (in)
	Time	Min	Time	Max	Avg	Time	Min	Time	Max	Avg	Time	Min	Time	Max	Avg	Total	Total
10/02/2019	06:34	1.32	08:12	18.99	1.76	08:24	0.39	05:53	0.73	0.58	00:11	0.011	08:34	0.074	0.014	1928	
10/03/2019	22:52	1.27	08:45	22.88	1.65	08:59	0.35	21:27	0.80	0.60	11:30	0.011	08:49	0.082	0.015	1983	
10/04/2019	12:57	1.26	04:02	20.94	3.10	08:57	0.32	13:37	0.87	0.62	12:57	0.012	04:59	0.077	0.022	2925	
10/05/2019	23:52	1.32	08:30	19.14	1.70	18:56	0.32	23:53	0.83	0.63	22:43	0.012	23:57	0.075	0.016	2166	
10/06/2019	04:43	1.30	15:25	19.60	1.62	15:30	0.37	00:00	0.82	0.61	05:04	0.012	15:16	0.068	0.015	2070	
10/07/2019	15:31	1.34	08:35	21.53	1.92	09:07	0.32	20:52	0.86	0.66	05:55	0.012	08:36	0.084	0.018	2394	
10/08/2019	01:58	1.35	04:31	33.70	3.17	08:03	0.31	04:34	0.92	0.65	23:17	0.012	04:34	0.117	0.022	2939	

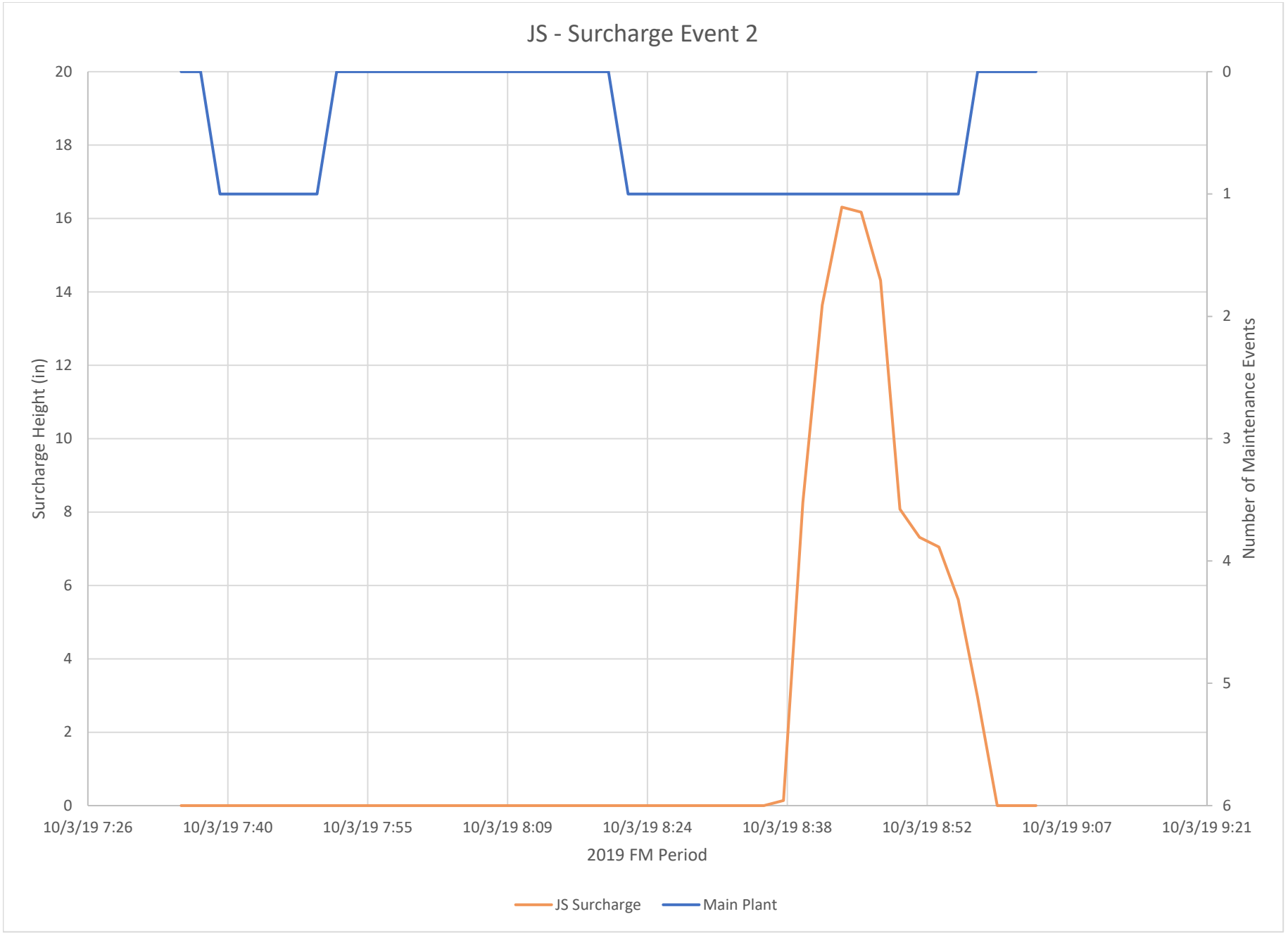
Report Summary For The Period 10/02/2019 00:00 - 10/08/2019 23:59

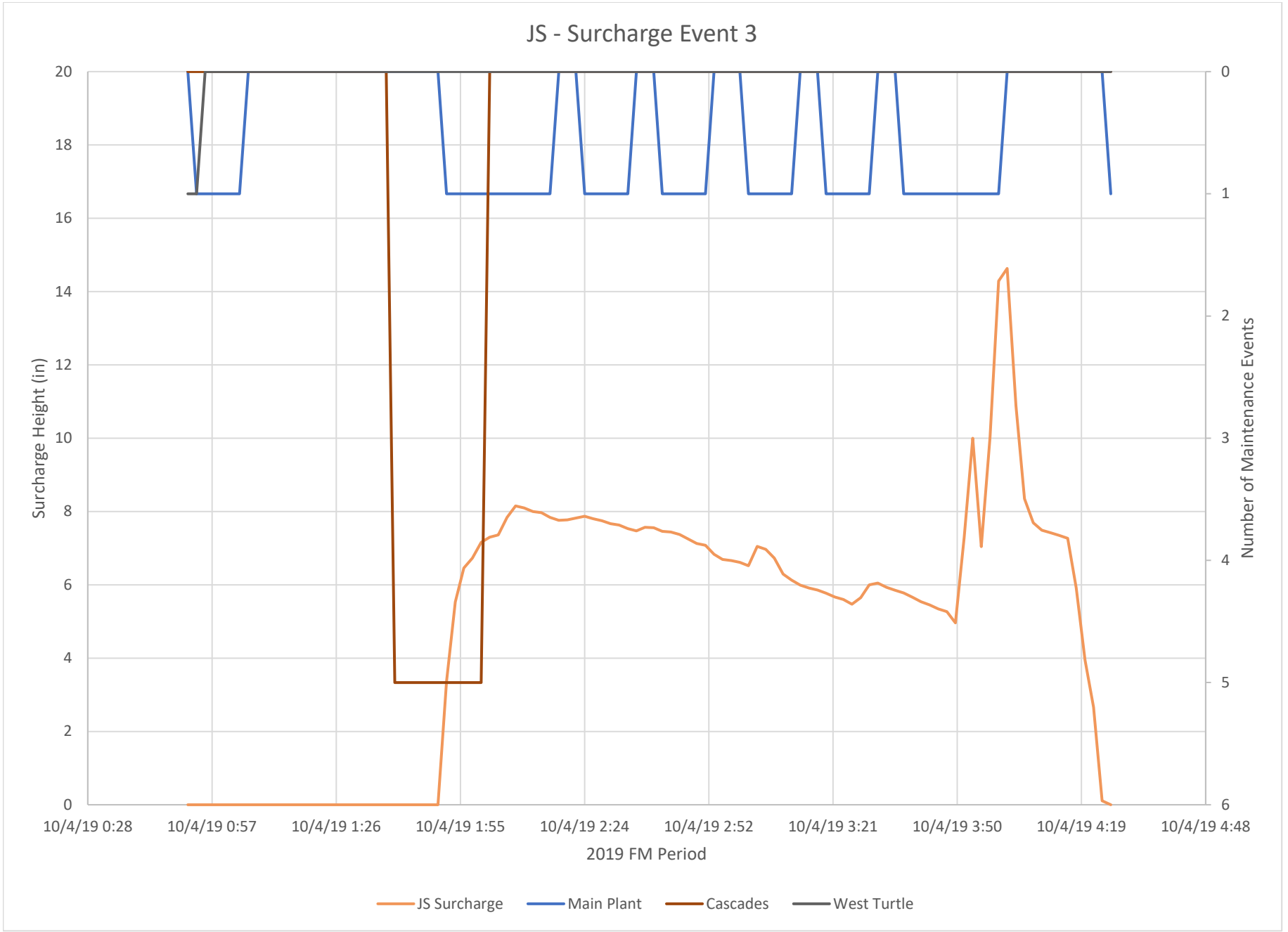
	Depth (in)	Velocity (ft/s)	Quantity (MGD - Total ft3)
Total			16405
Avg	2.13	0.62	0.018

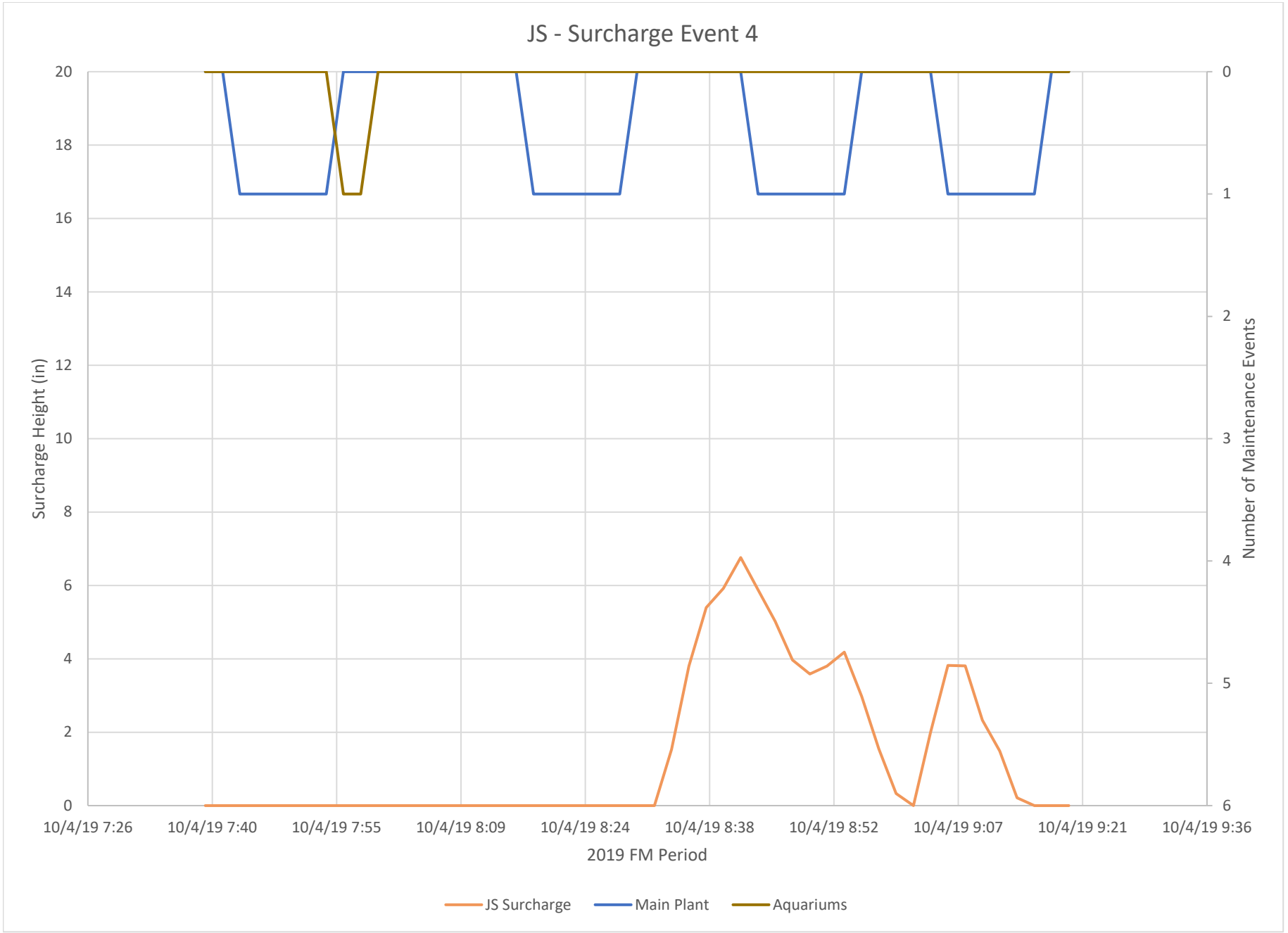
Attachment B: Surcharge Graphs

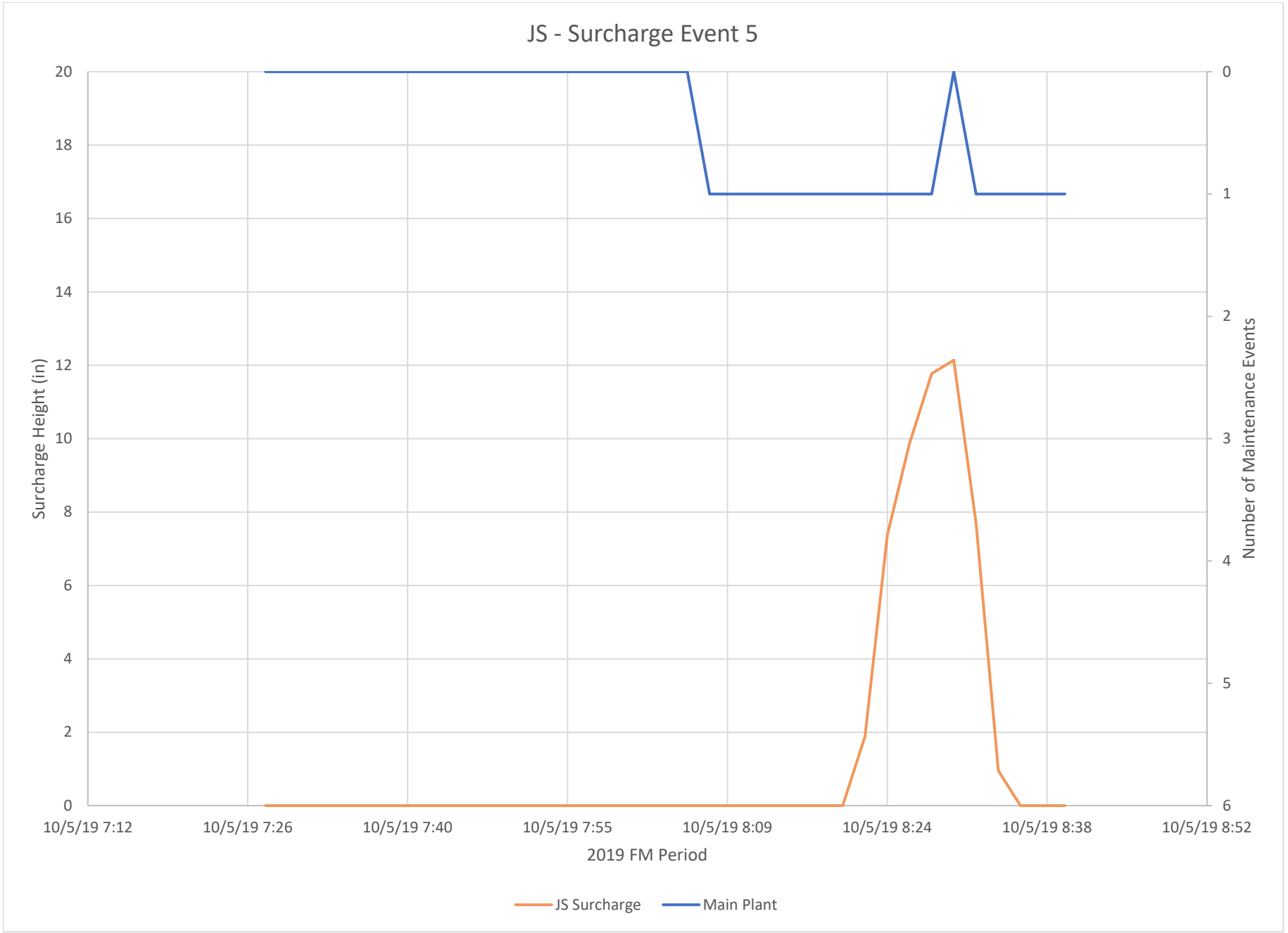

JS - Surcharge Events for 2019 Monitoring Period
Surcharge Height (in)
Number of Maintenance Events
2019 FM Period
20
18
16
14
12
10
8
6
4
2
0
0
1
2
3
4
5
6
10/1/19 0:00
10/2/19 0:00
10/3/19 0:00
10/4/19 0:00
10/5/19 0:00
10/6/19 0:00
10/7/19 0:00
10/8/19 0:00
10/9/19 0:00
10/10/19 0:00
JS Surcharge
Main Plant
Sea Lion Point
Shark/Otter
Dolphin
Tide Pool
Ibis
Shipwreck #1
Cascades
West Turtle
Aquariums
WSW Bird
Grotto
Misc

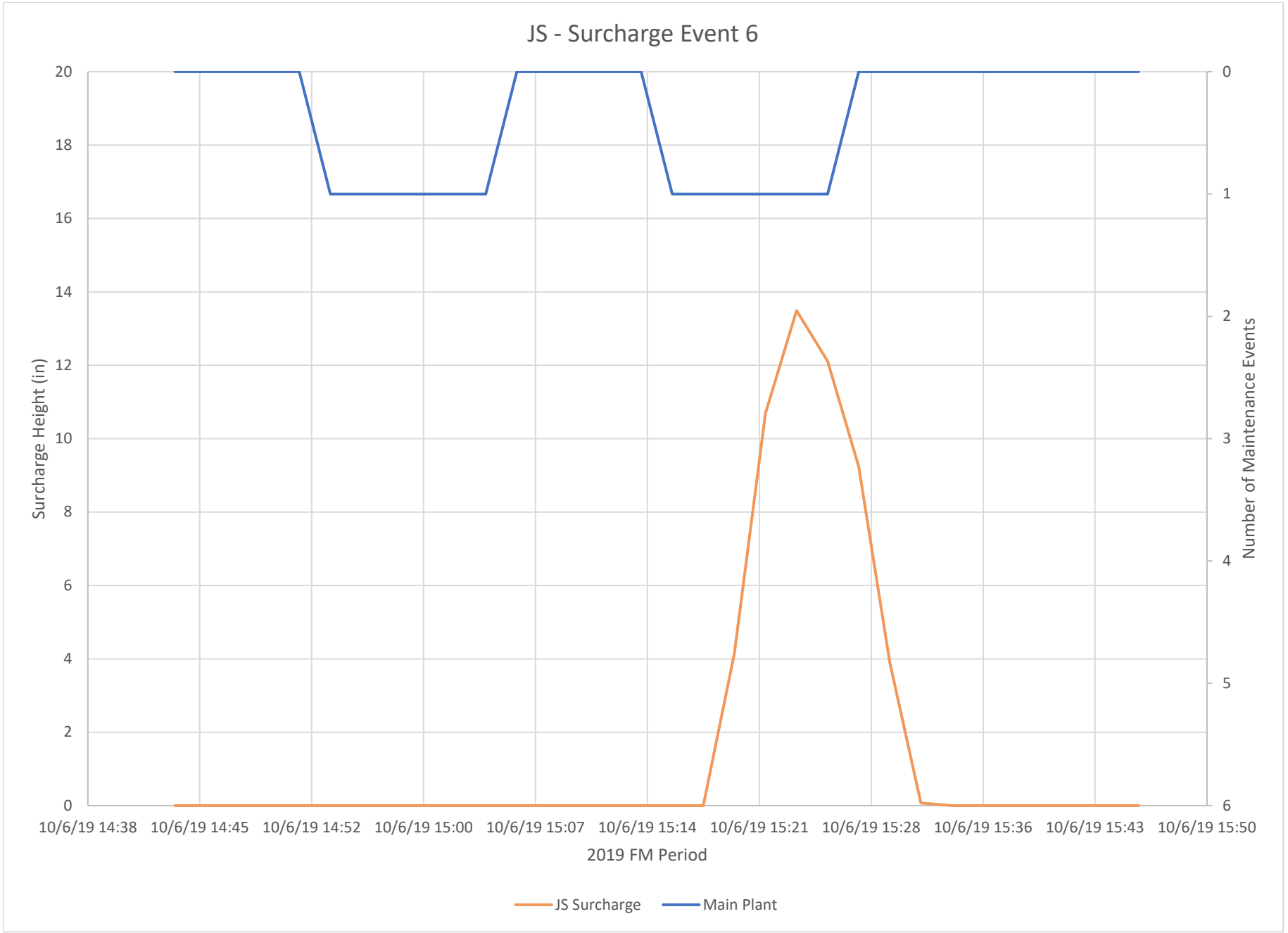

JS - Surcharge Event 1
Surcharge Height (in)
Number of Maintenance Events
20
18
16
14
12
10
8
6
4
2
0
0
1
2
3
4
5
6
10/2/19 7:26
10/2/19 7:40
10/2/19 7:55
10/2/19 8:09
10/2/19 8:24
10/2/19 8:38
10/2/19 8:52
2019 FM Period
JS Surcharge
Shark/Otter

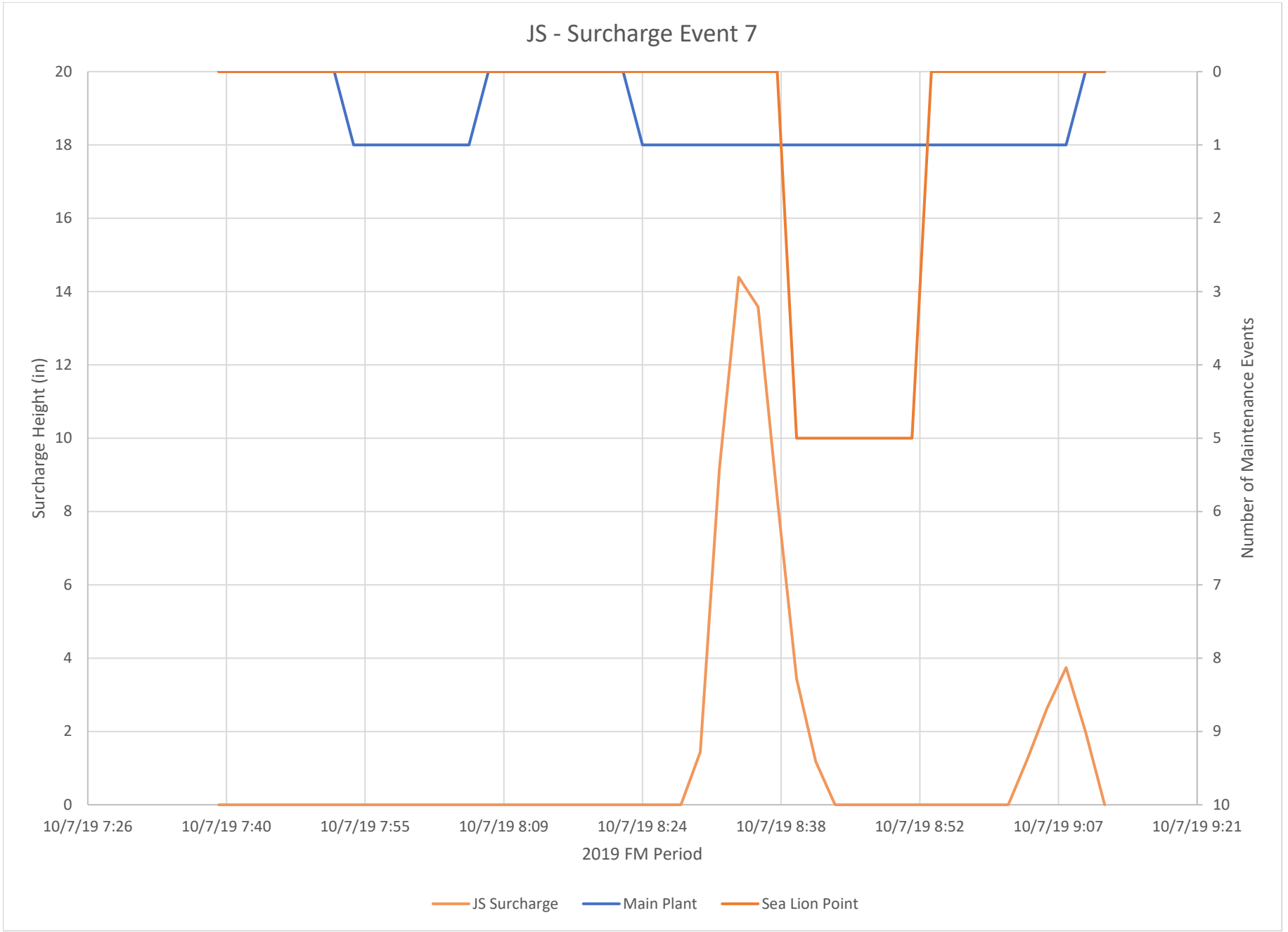

JS - Surcharge Event 2
Surcharge Height (in)
Number of Maintenance Events
20
18
16
14
12
10
8
6
4
2
0
0
1
2
3
4
5
6
10/3/19 7:26
10/3/19 7:40
10/3/19 7:55
10/3/19 8:09
10/3/19 8:24
10/3/19 8:38
10/3/19 8:52
10/3/19 9:07
10/3/19 9:21
2019 FM Period
JS Surcharge
Main Plant

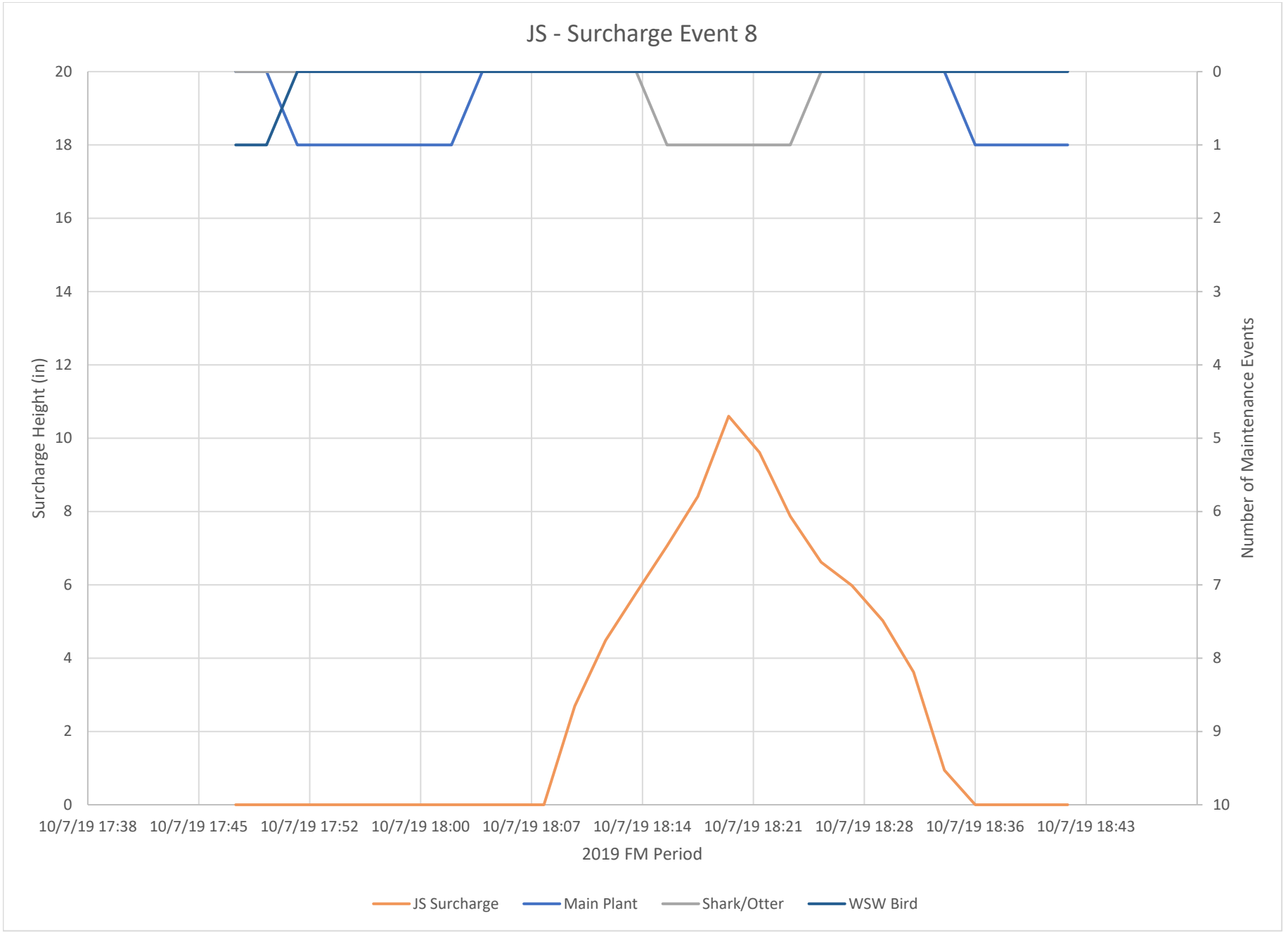

JS - Surcharge Event 3
Surcharge Height (in)
Number of Maintenance Events
20
18
16
14
12
10
8
6
4
2
0
0
1
2
3
4
5
6
10/4/19 0:28
10/4/19 0:57
10/4/19 1:26
10/4/19 1:55
10/4/19 2:24
10/4/19 2:52
10/4/19 3:21
10/4/19 3:50
10/4/19 4:19
10/4/19 4:48
2019 FM Period
JS Surcharge
Main Plant
Cascades
West Turtle

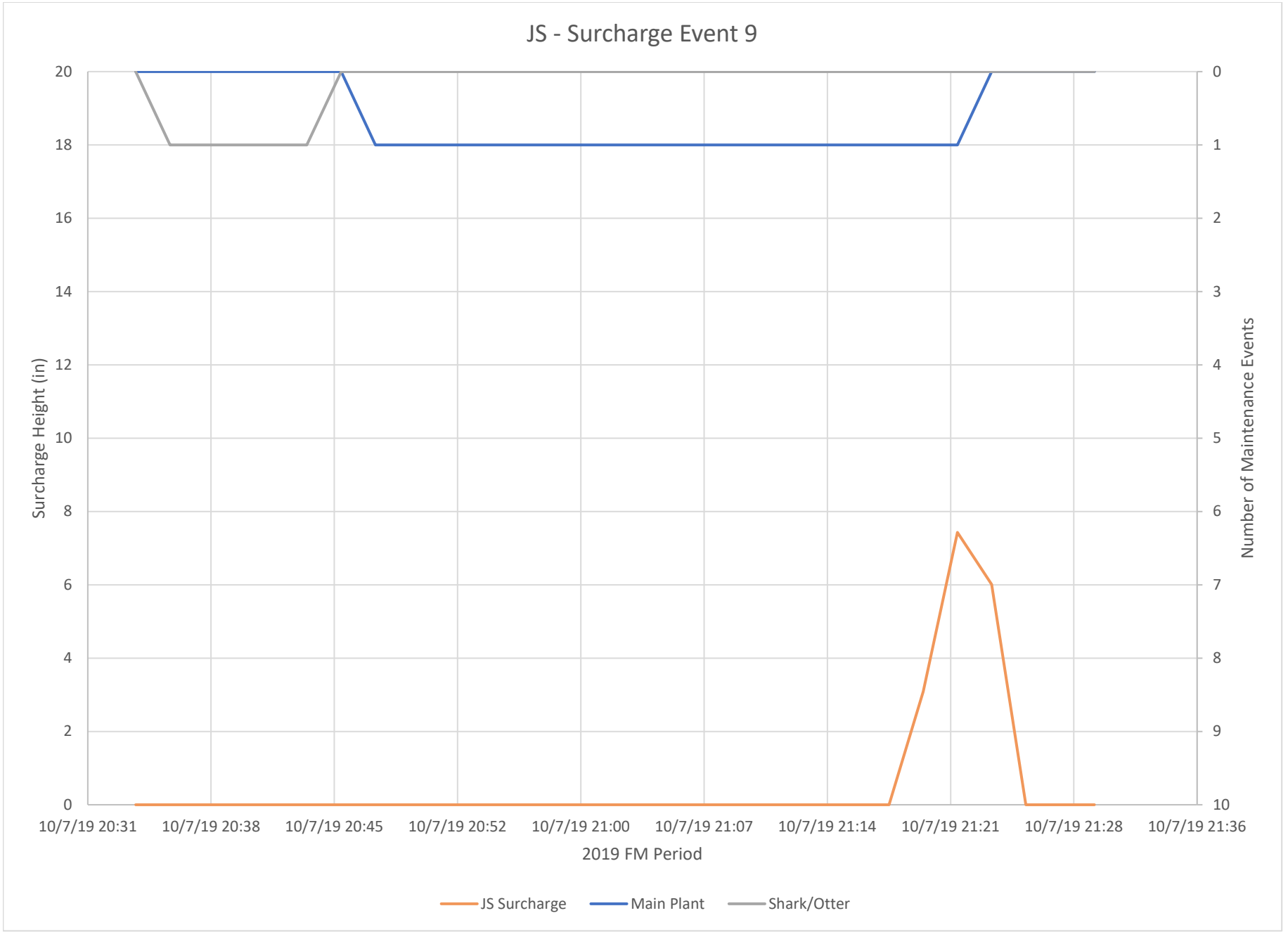

JS - Surcharge Event 4
Surcharge Height (in)
Number of Maintenance Events
20
18
16
14
12
10
8
6
4
2
0
0
1
2
3
4
5
6
10/4/19 7:26
10/4/19 7:40
10/4/19 7:55
10/4/19 8:09
10/4/19 8:24
10/4/19 8:38
10/4/19 8:52
10/4/19 9:07
10/4/19 9:21
10/4/19 9:36
2019 FM Period
JS Surcharge
Main Plant
Aquariums

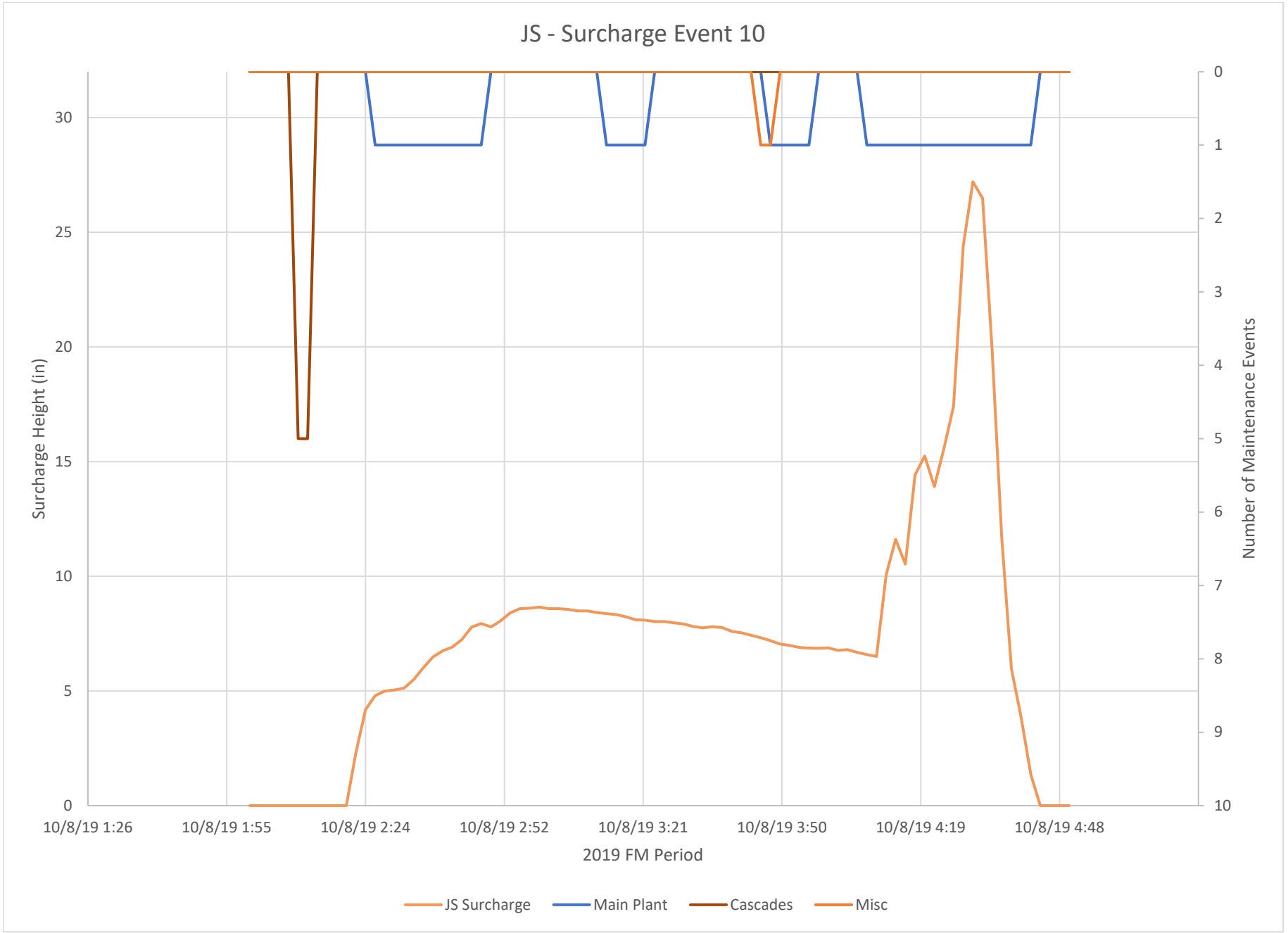

JS - Surcharge Event 5
Surcharge Height (in)
Number of Maintenance Events
20
18
16
14
12
10
8
6
4
2
0
0
1
2
3
4
5
6
10/5/19 7:12
10/5/19 7:26
10/5/19 7:40
10/5/19 7:55
10/5/19 8:09
10/5/19 8:24
10/5/19 8:38
10/5/19 8:52
2019 FM Period
JS Surcharge
Main Plant

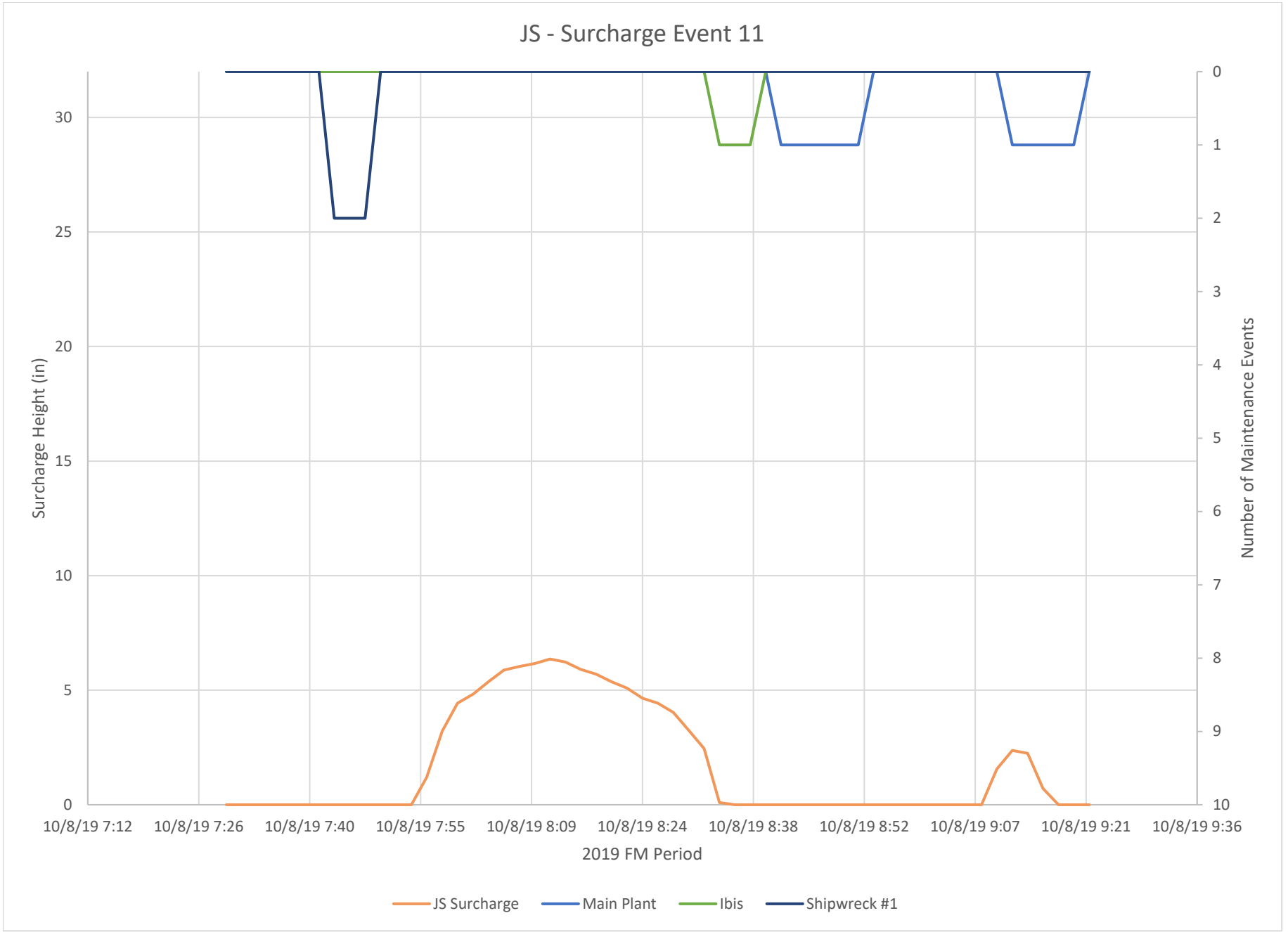

JS - Surcharge Event 6
Surcharge Height (in)
Number of Maintenance Events
20
18
16
14
12
10
8
6
4
2
0
0
1
2
3
4
5
6
10/6/19 14:38
10/6/19 14:45
10/6/19 14:52
10/6/19 15:00
10/6/19 15:07
10/6/19 15:14
10/6/19 15:21
10/6/19 15:28
10/6/19 15:36
10/6/19 15:43
10/6/19 15:50
2019 FM Period
JS Surcharge
Main Plant

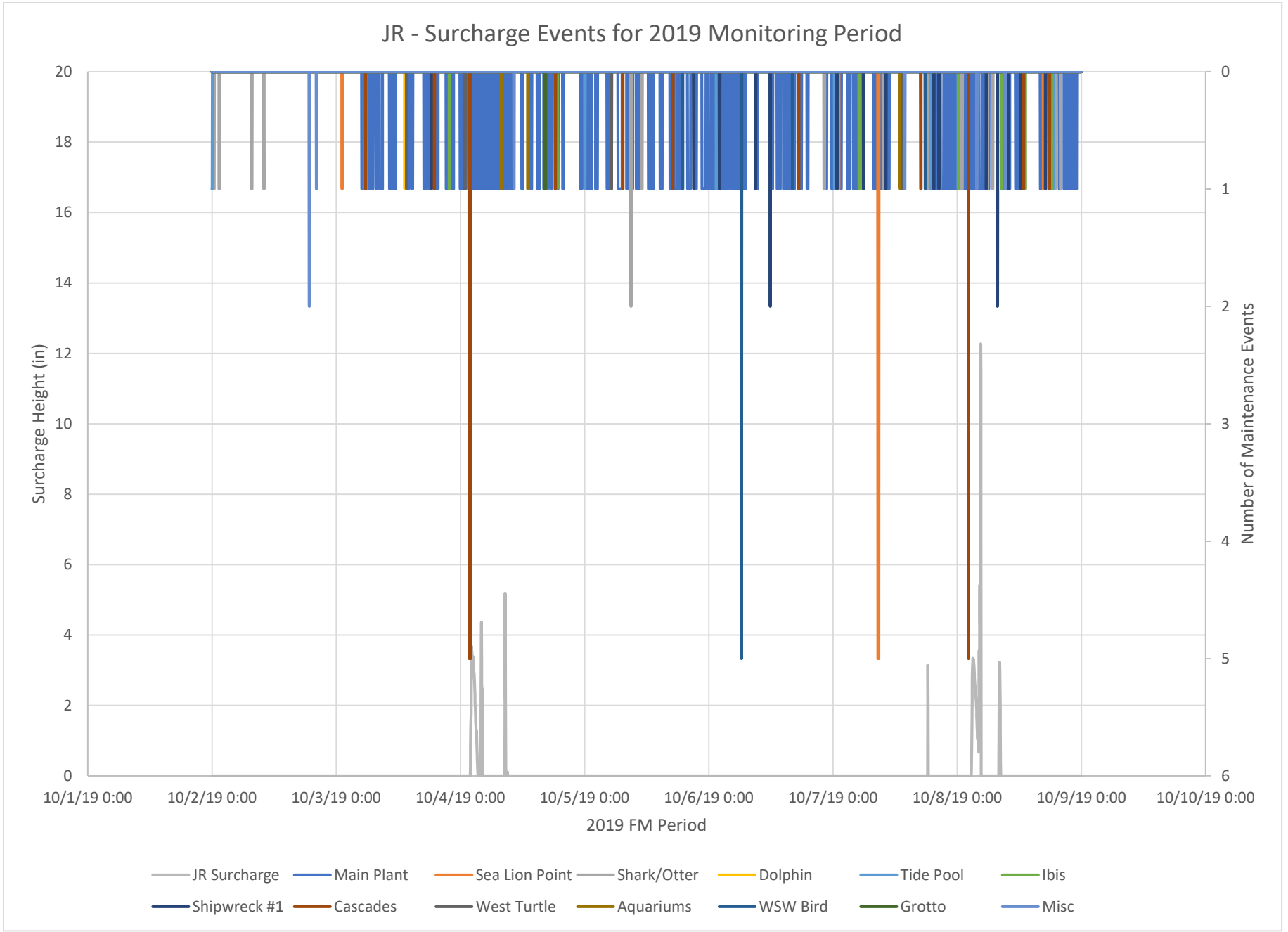

JS - Surcharge Event 7
Surcharge Height (in)
Number of Maintenance Events
20
18
16
14
12
10
8
6
4
2
0
0
1
2
3
4
5
6
7
8
9
10
10/7/19 7:26
10/7/19 7:40
10/7/19 7:55
10/7/19 8:09
10/7/19 8:24
10/7/19 8:38
10/7/19 8:52
10/7/19 9:07
10/7/19 9:21
2019 FM Period
JS Surcharge
Main Plant
Sea Lion Point

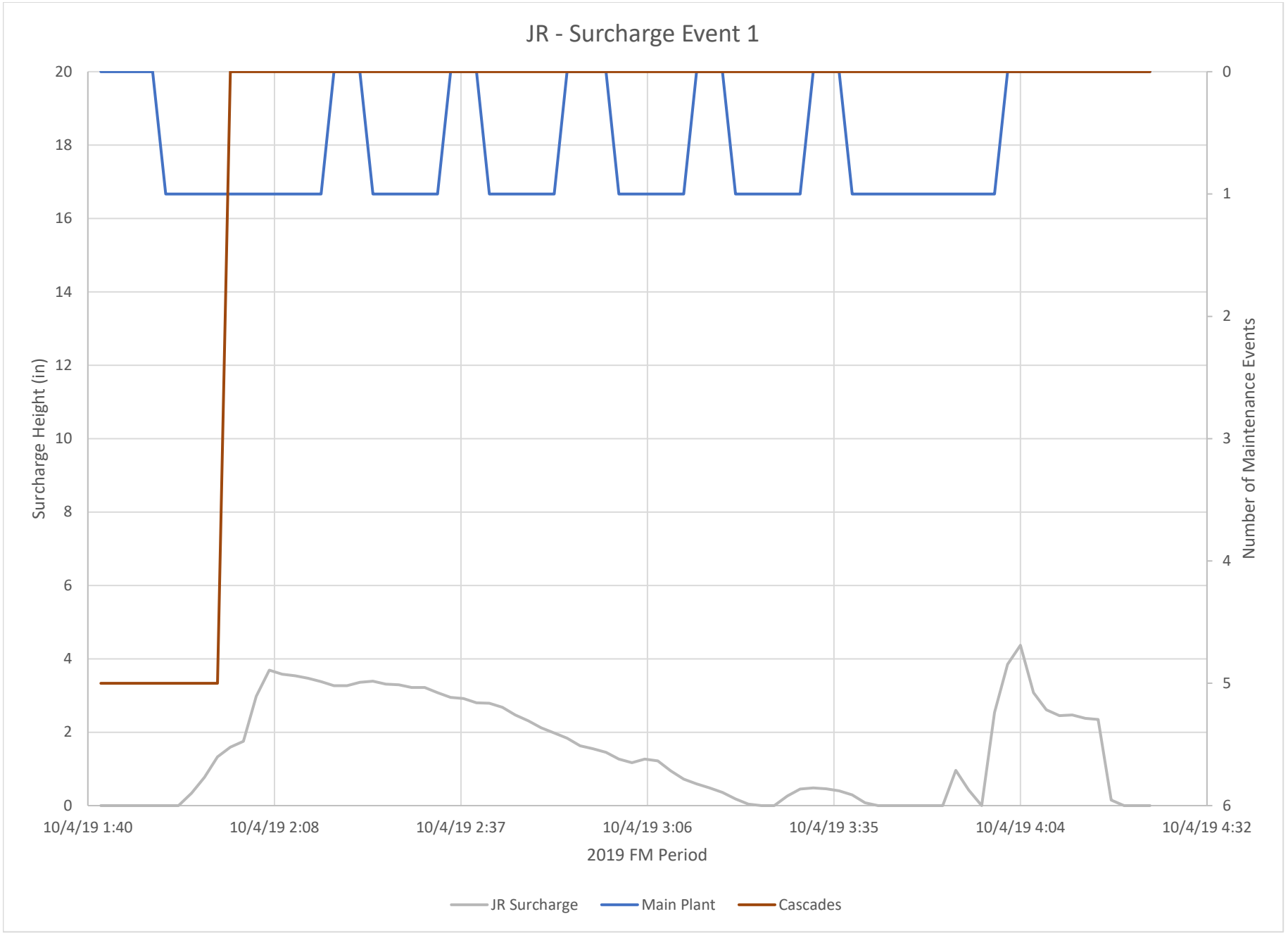

JS - Surcharge Event 8
Surcharge Height (in)
Number of Maintenance Events
20
18
16
14
12
10
8
6
4
2
0
0
1
2
3
4
5
6
7
8
9
10
10/7/19 17:38
10/7/19 17:45
10/7/19 17:52
10/7/19 18:00
10/7/19 18:07
10/7/19 18:14
10/7/19 18:21
10/7/19 18:28
10/7/19 18:36
10/7/19 18:43
2019 FM Period
JS Surcharge
Main Plant
Shark/Otter
WSW Bird

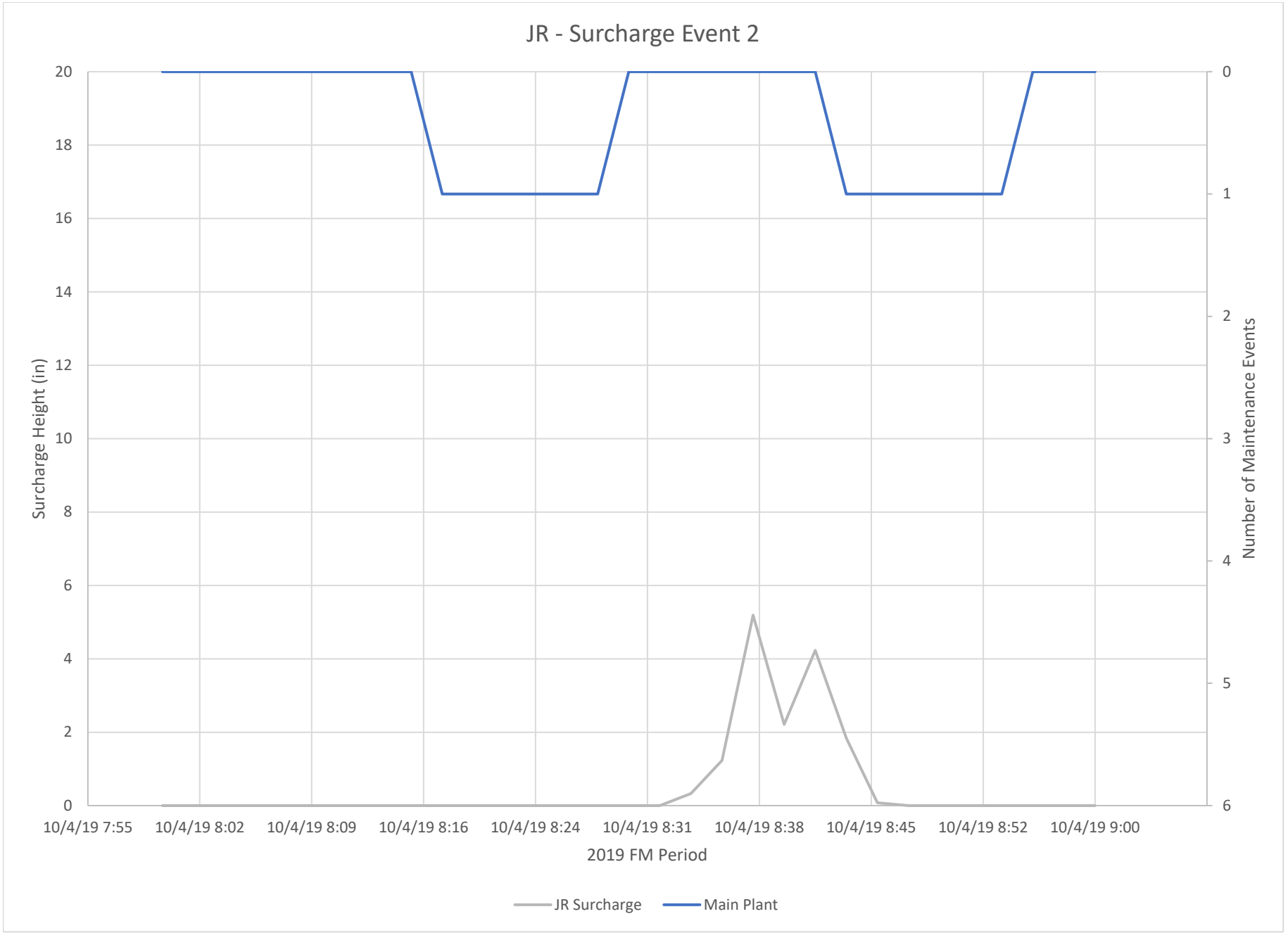

JS - Surcharge Event 9
Surcharge Height (in)
Number of Maintenance Events
20
18
16
14
12
10
8
6
4
2
0
0
1
2
3
4
5
6
7
8
9
10
10/7/19 20:31
10/7/19 20:38
10/7/19 20:45
10/7/19 20:52
10/7/19 21:00
10/7/19 21:07
10/7/19 21:14
10/7/19 21:21
10/7/19 21:28
10/7/19 21:36
2019 FM Period
JS Surcharge
Main Plant
Shark/Otter

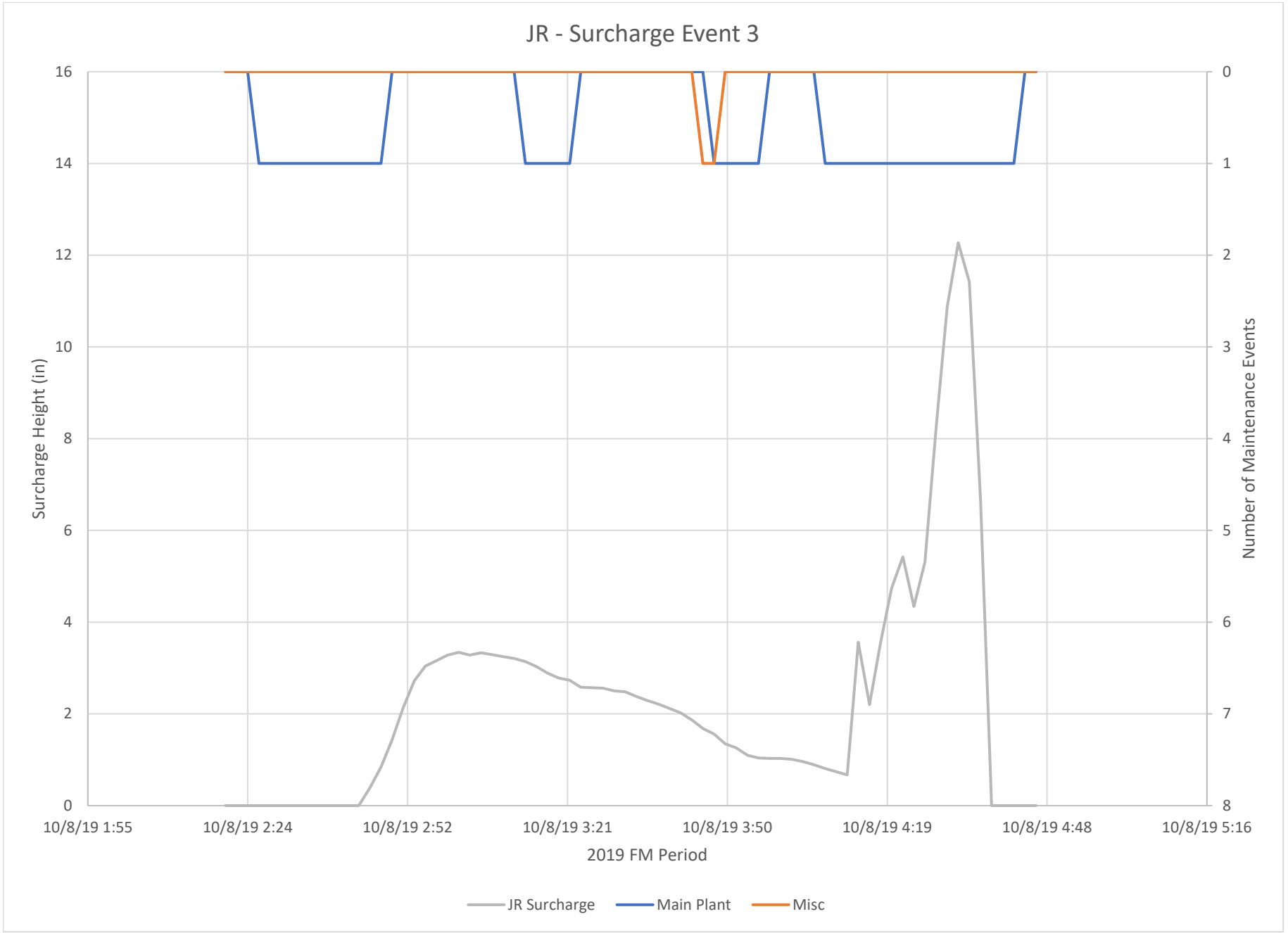

JS - Surcharge Event 10
Surcharge Height (in)
Number of Maintenance Events
0
5
10
15
20
25
30
0
1
2
3
4
5
6
7
8
9
10
10/8/19 1:26
10/8/19 1:55
10/8/19 2:24
10/8/19 2:52
10/8/19 3:21
10/8/19 3:50
10/8/19 4:19
10/8/19 4:48
2019 FM Period
JS Surcharge
Main Plant
Cascades
Misc

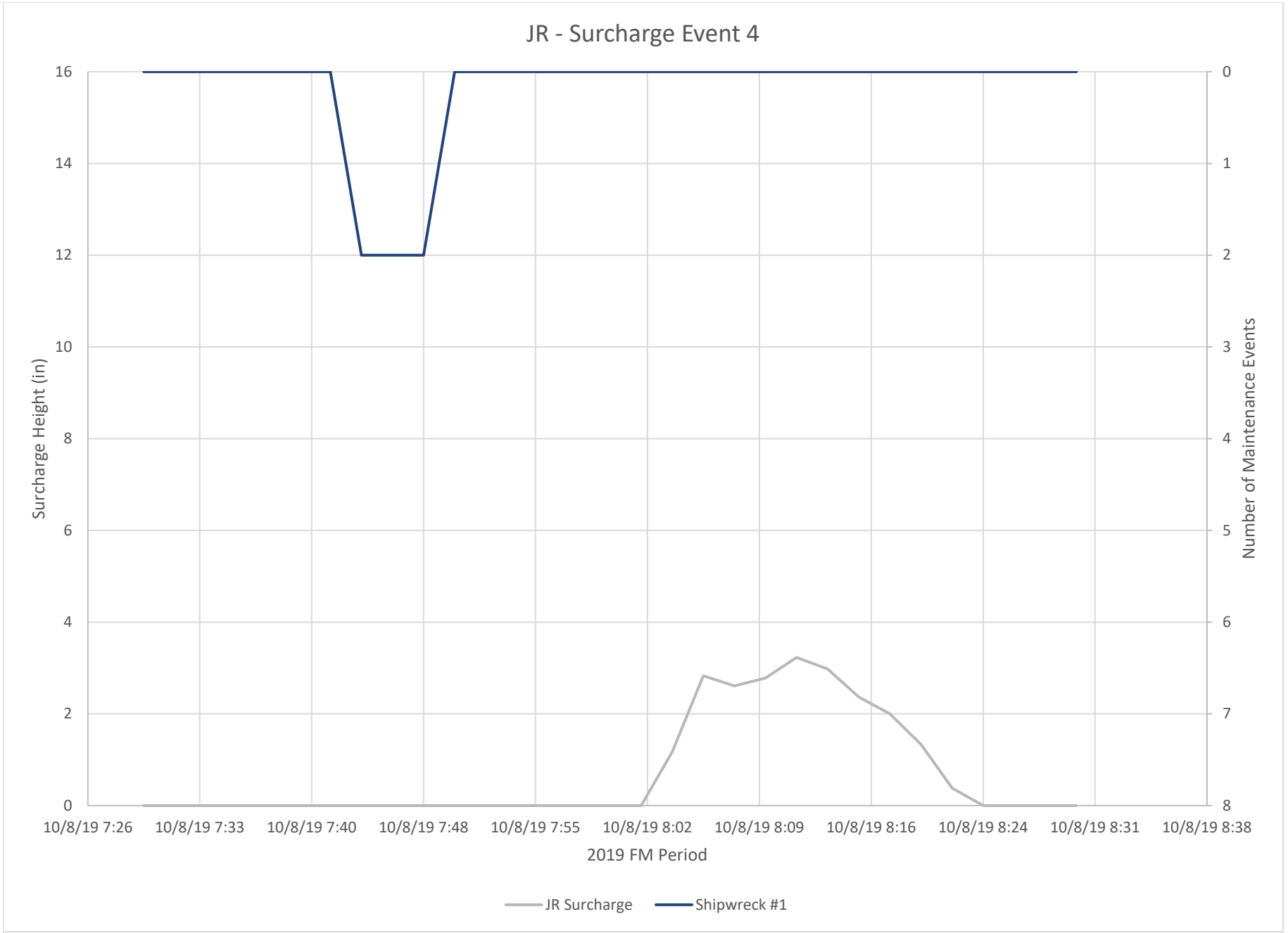

JS - Surcharge Event 11
Surcharge Height (in)
Number of Maintenance Events
0
5
10
15
20
25
30
0
1
2
3
4
5
6
7
8
9
10
10/8/19 7:12
10/8/19 7:26
10/8/19 7:40
10/8/19 7:55
10/8/19 8:09
10/8/19 8:24
10/8/19 8:38
10/8/19 8:52
10/8/19 9:07
10/8/19 9:21
10/8/19 9:36
2019 FM Period
JS Surcharge
Main Plant
Ibis
Shipwreck #1

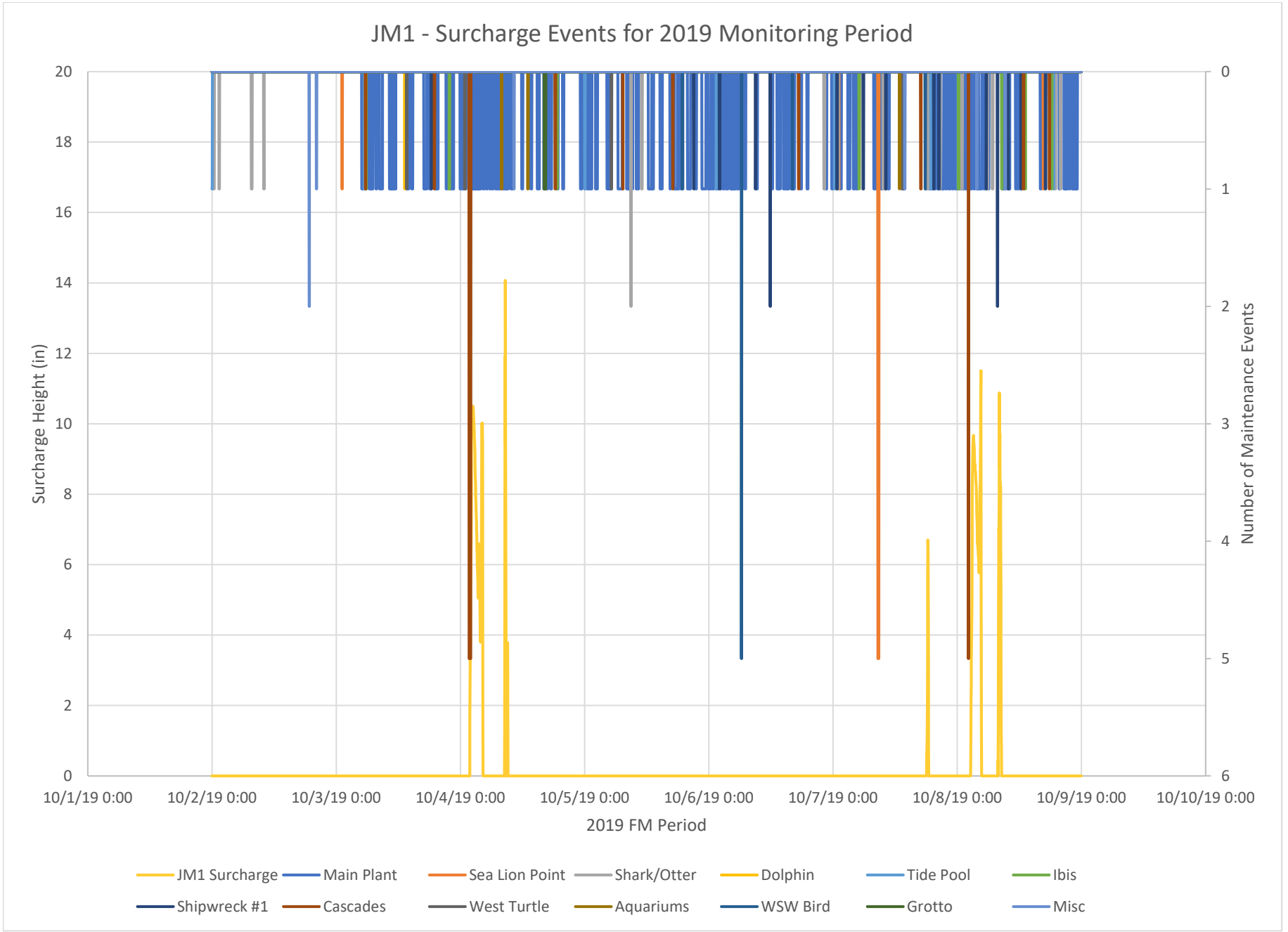

JR - Surcharge Events for 2019 Monitoring Period
Surcharge Height (in)
Number of Maintenance Events
20
18
16
14
12
10
8
6
4
2
0
0
1
2
3
4
5
6
10/1/19 0:00
10/2/19 0:00
10/3/19 0:00
10/4/19 0:00
10/5/19 0:00
10/6/19 0:00
10/7/19 0:00
10/8/19 0:00
10/9/19 0:00
10/10/19 0:00
2019 FM Period
JR Surcharge
Main Plant
Sea Lion Point
Shark/Otter
Dolphin
Tide Pool
Ibis
Shipwreck #1
Cascades
West Turtle
Aquariums
WSW Bird
Grotto
Misc

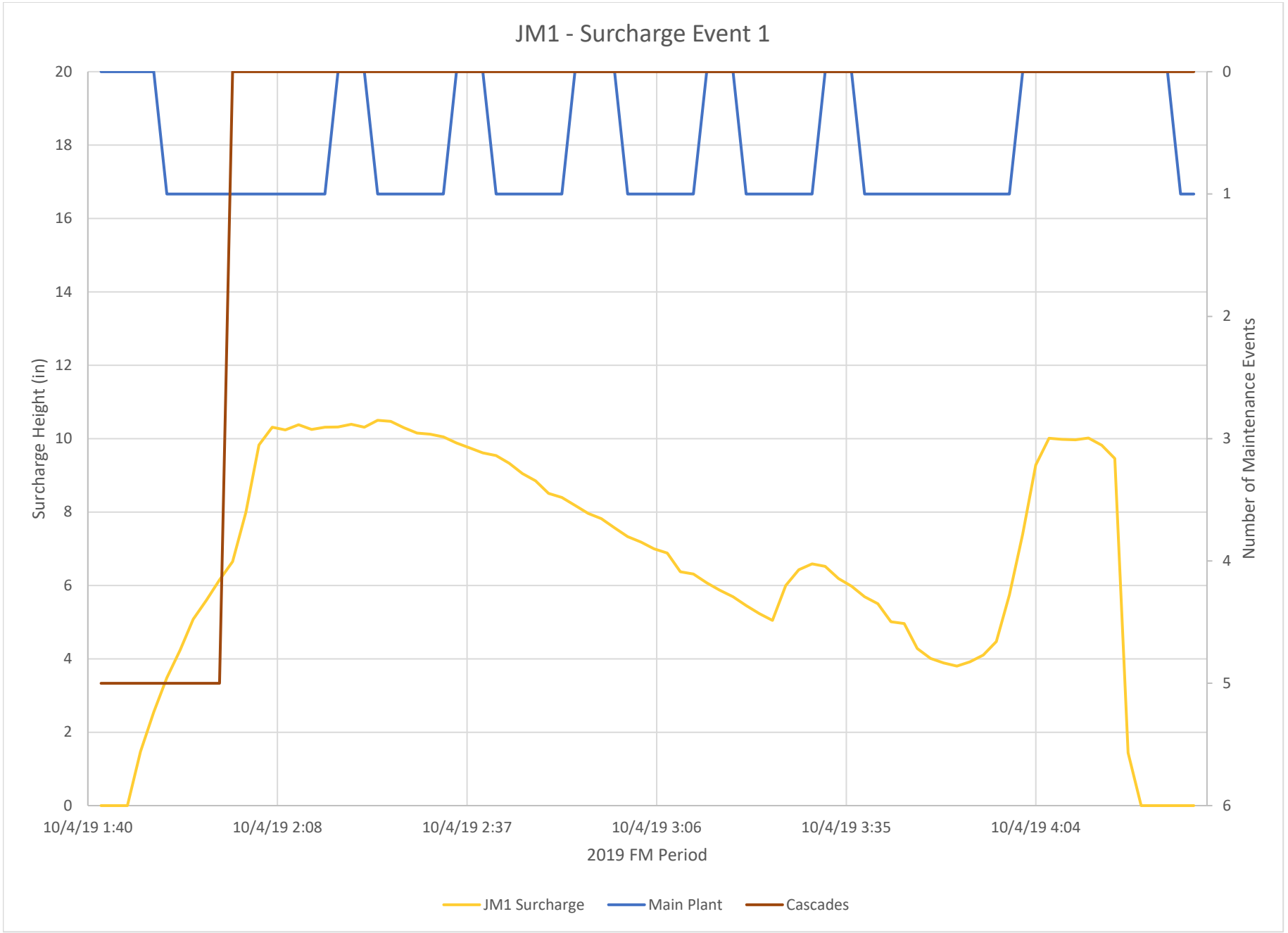

JR - Surcharge Event 1
Surcharge Height (in)
Number of Maintenance Events
20
18
16
14
12
10
8
6
4
2
0
0
1
2
3
4
5
6
10/4/19 1:40
10/4/19 2:08
10/4/19 2:37
10/4/19 3:06
10/4/19 3:35
10/4/19 4:04
10/4/19 4:32
2019 FM Period
JR Surcharge
Main Plant
Cascades

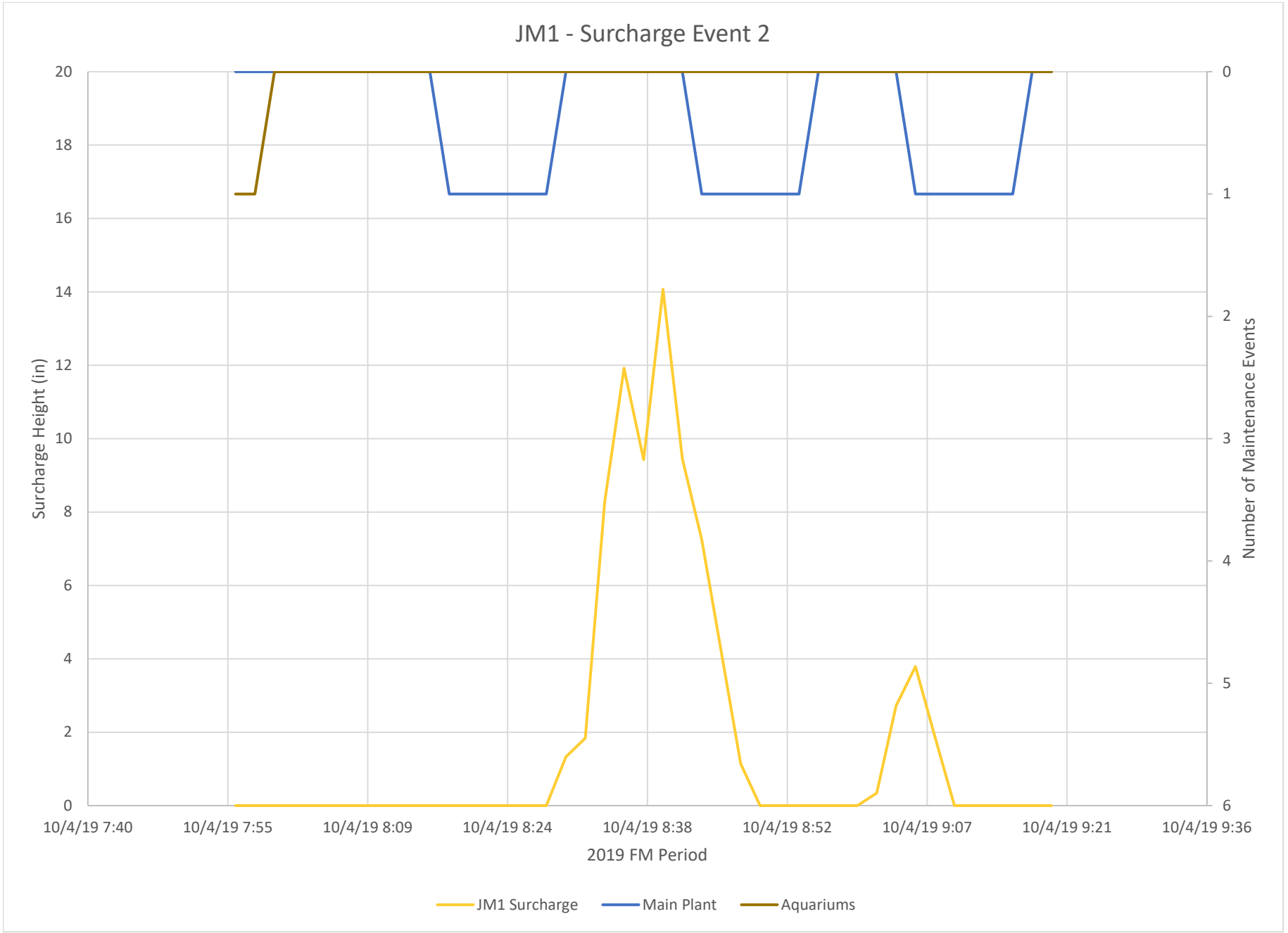

JR - Surcharge Event 2
Surcharge Height (in)
Number of Maintenance Events
20
18
16
14
12
10
8
6
4
2
0
0
1
2
3
4
5
6
10/4/19 7:55
10/4/19 8:02
10/4/19 8:09
10/4/19 8:16
10/4/19 8:24
10/4/19 8:31
10/4/19 8:38
10/4/19 8:45
10/4/19 8:52
10/4/19 9:00
2019 FM Period
JR Surcharge
Main Plant

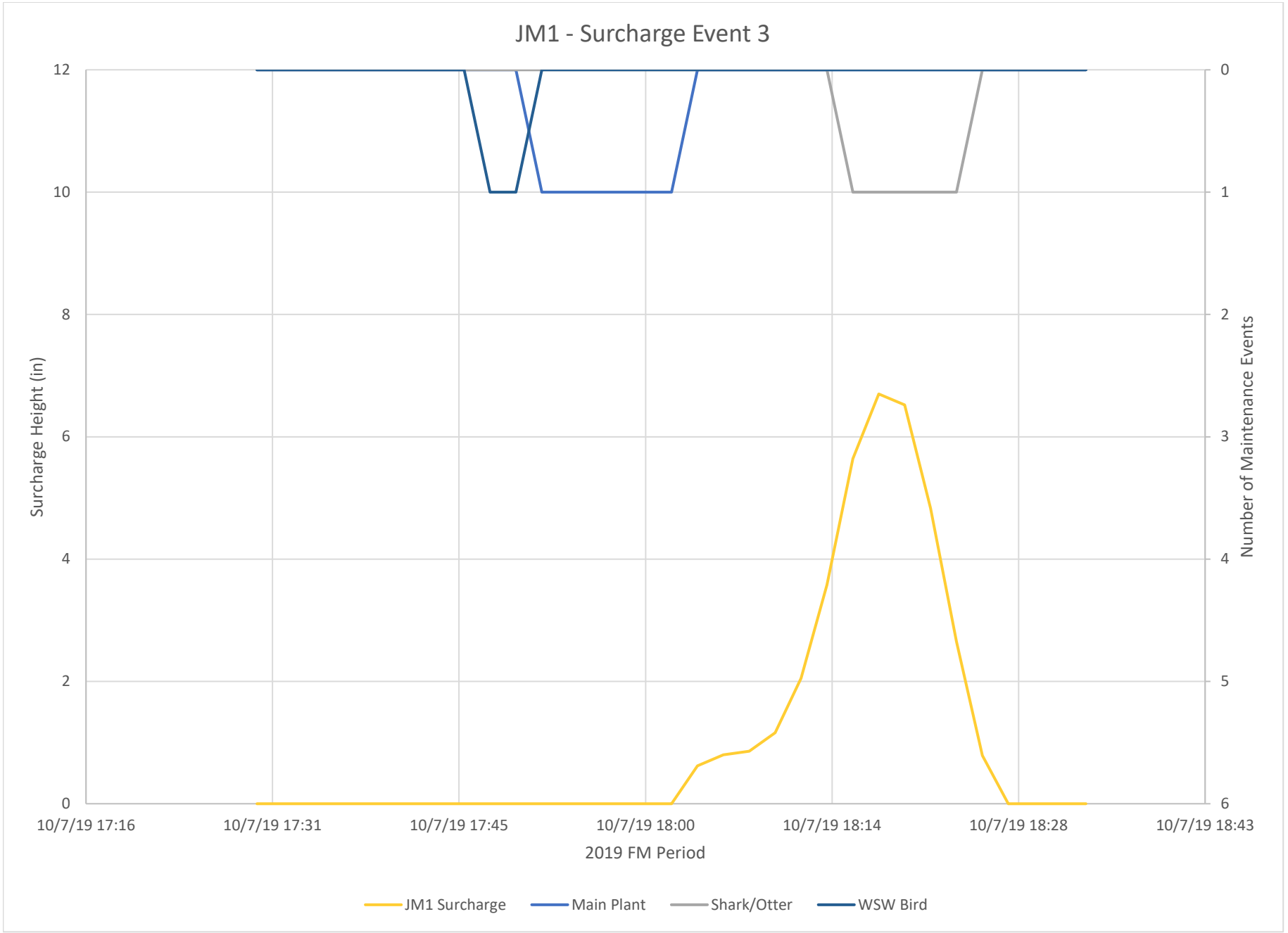

JR - Surcharge Event 3
Surcharge Height (in)
Number of Maintenance Events
16
14
12
10
8
6
4
2
0
0
1
2
3
4
5
6
7
8
10/8/19 1:55
10/8/19 2:24
10/8/19 2:52
10/8/19 3:21
10/8/19 3:50
10/8/19 4:19
10/8/19 4:48
10/8/19 5:16
2019 FM Period
JR Surcharge
Main Plant
Misc

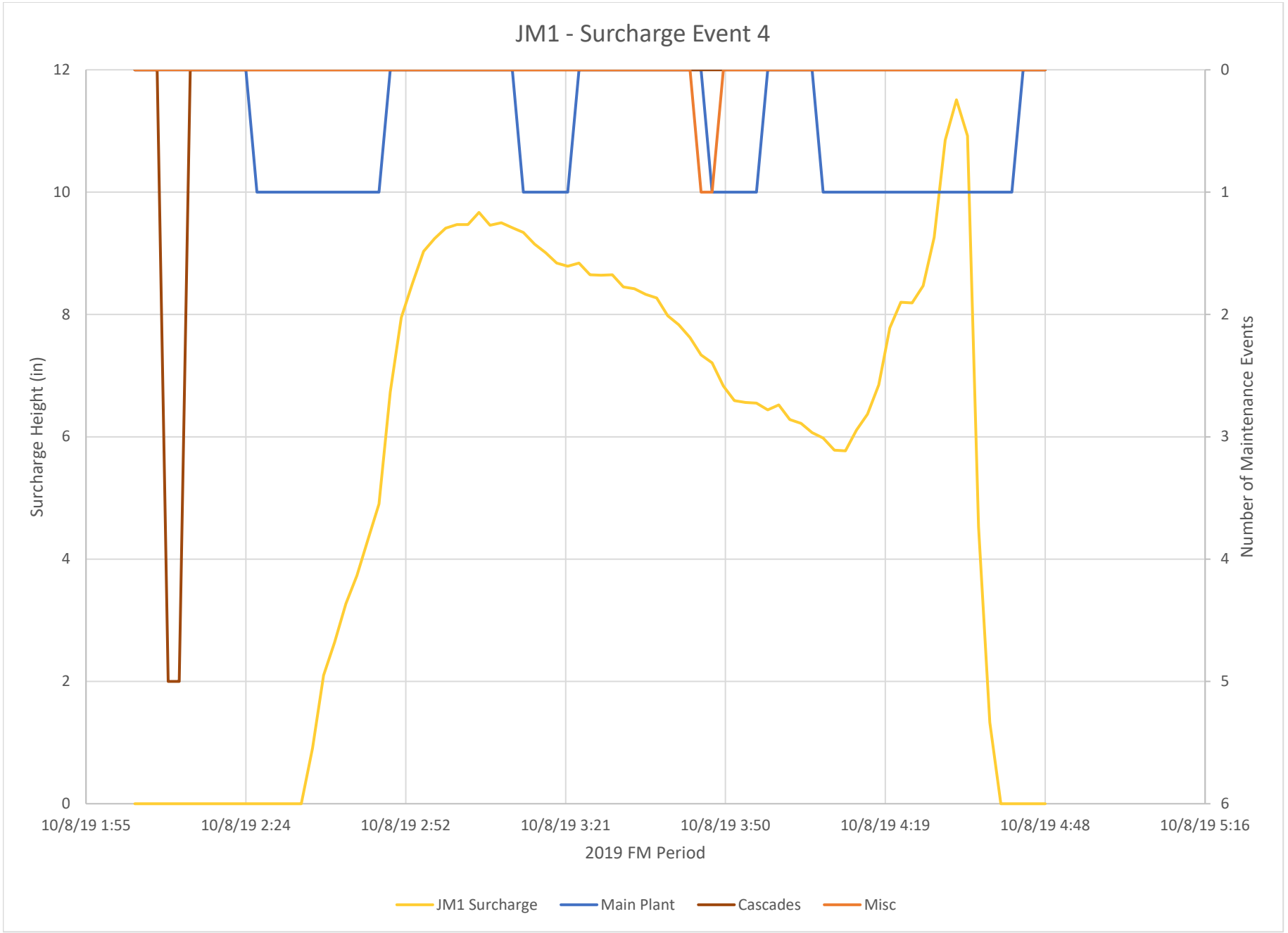

JR - Surcharge Event 4
Surcharge Height (in)
Number of Maintenance Events
16
14
12
10
8
6
4
2
0
0
1
2
3
4
5
6
7
8
10/8/19 7:26
10/8/19 7:33
10/8/19 7:40
10/8/19 7:48
10/8/19 7:55
10/8/19 8:02
10/8/19 8:09
10/8/19 8:16
10/8/19 8:24
10/8/19 8:31
10/8/19 8:38
2019 FM Period
JR Surcharge
Shipwreck #1

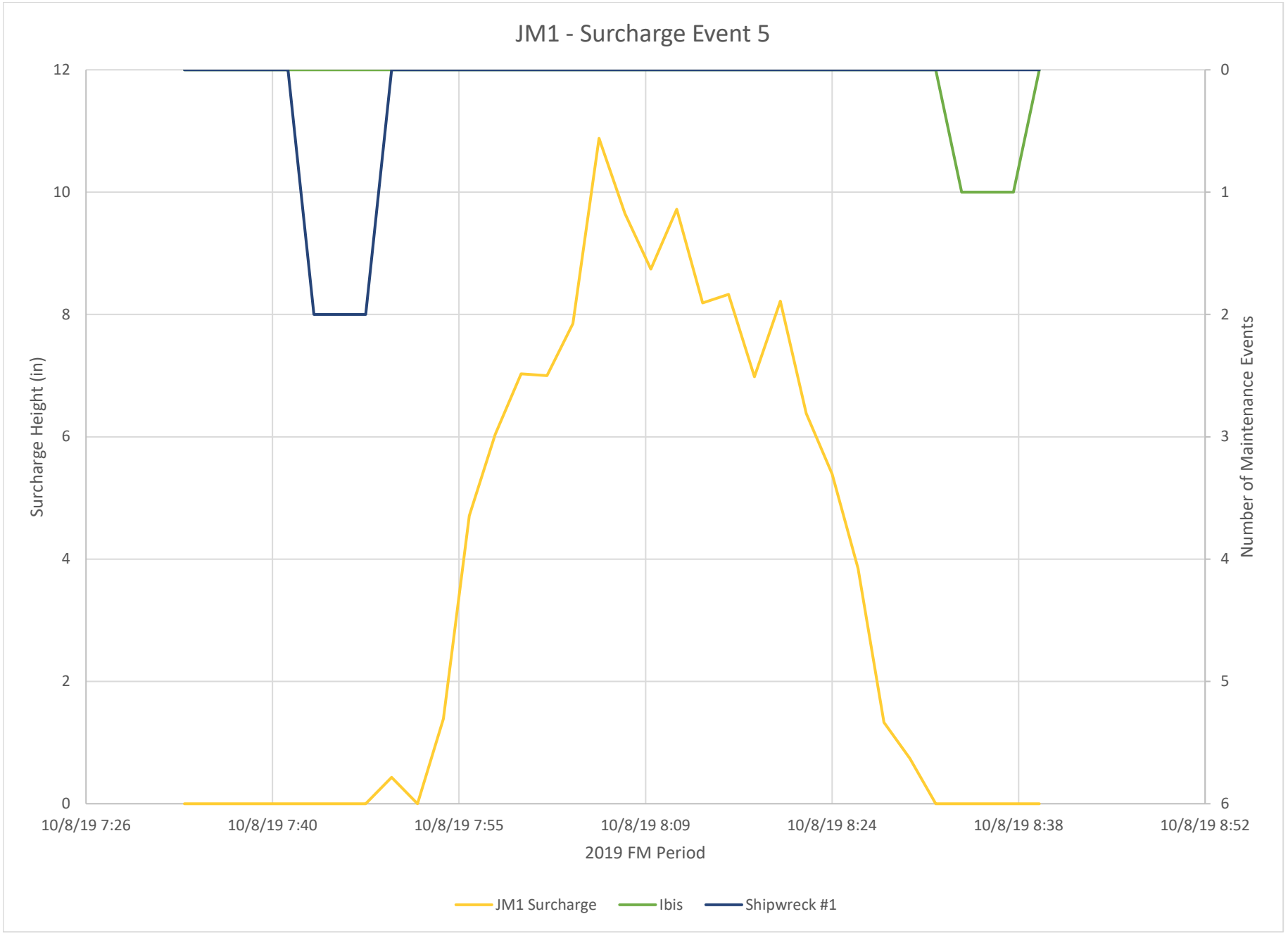

JM1 - Surcharge Events for 2019 Monitoring Period
Surcharge Height (in)
Number of Maintenance Events
2019 FM Period
20
18
16
14
12
10
8
6
4
2
0
0
1
2
3
4
5
6
10/1/19 0:00
10/2/19 0:00
10/3/19 0:00
10/4/19 0:00
10/5/19 0:00
10/6/19 0:00
10/7/19 0:00
10/8/19 0:00
10/9/19 0:00
10/10/19 0:00
JM1 Surcharge
Main Plant
Sea Lion Point
Shark/Otter
Dolphin
Tide Pool
Ibis
Shipwreck #1
Cascades
West Turtle
Aquariums
WSW Bird
Grotto
Misc

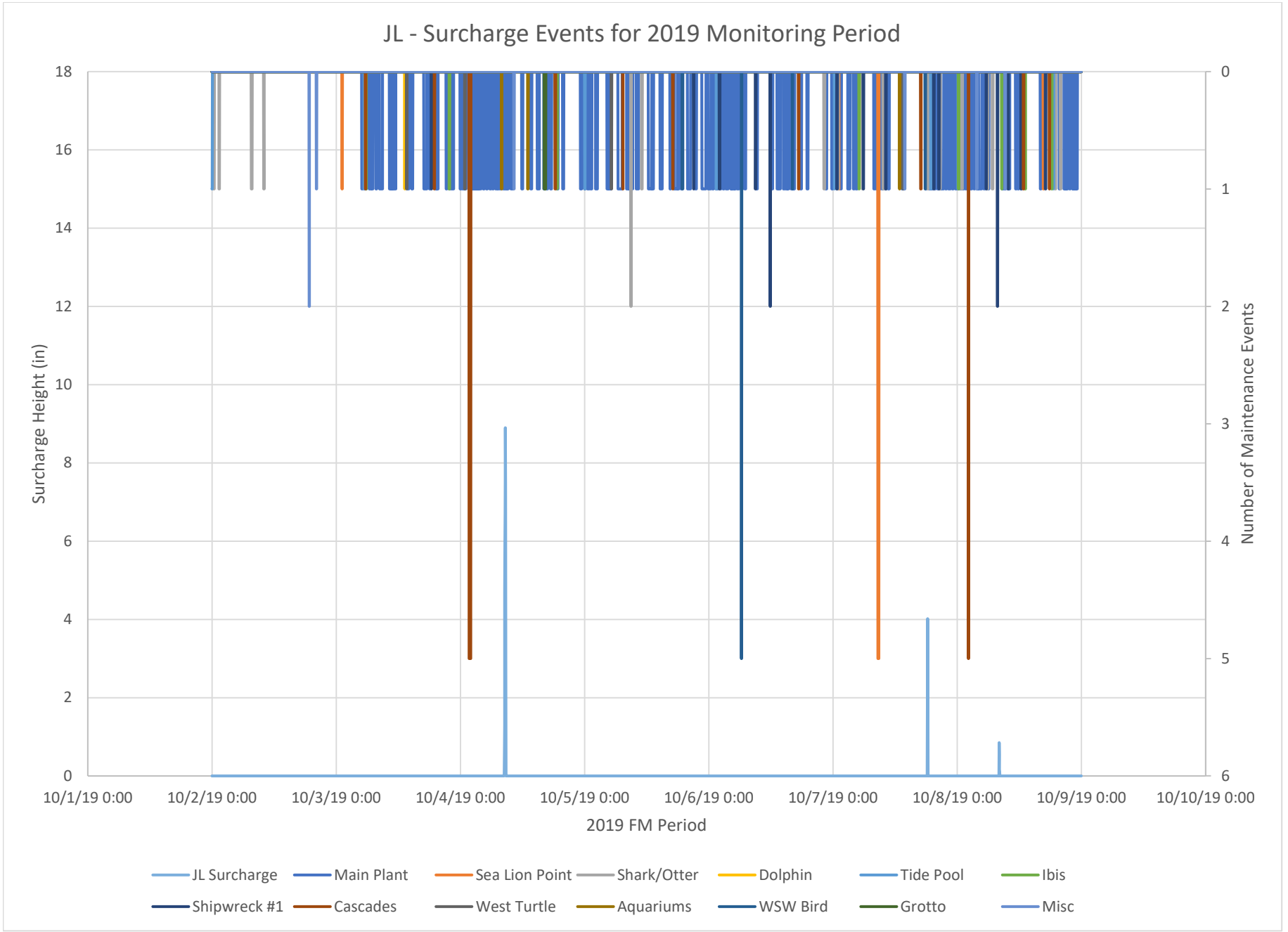

JM1 - Surcharge Event 1
Surcharge Height (in)
Number of Maintenance Events
20
18
16
14
12
10
8
6
4
2
0
0
1
2
3
4
5
6
10/4/19 1:40
10/4/19 2:08
10/4/19 2:37
10/4/19 3:06
10/4/19 3:35
10/4/19 4:04
2019 FM Period
JM1 Surcharge
Main Plant
Cascades

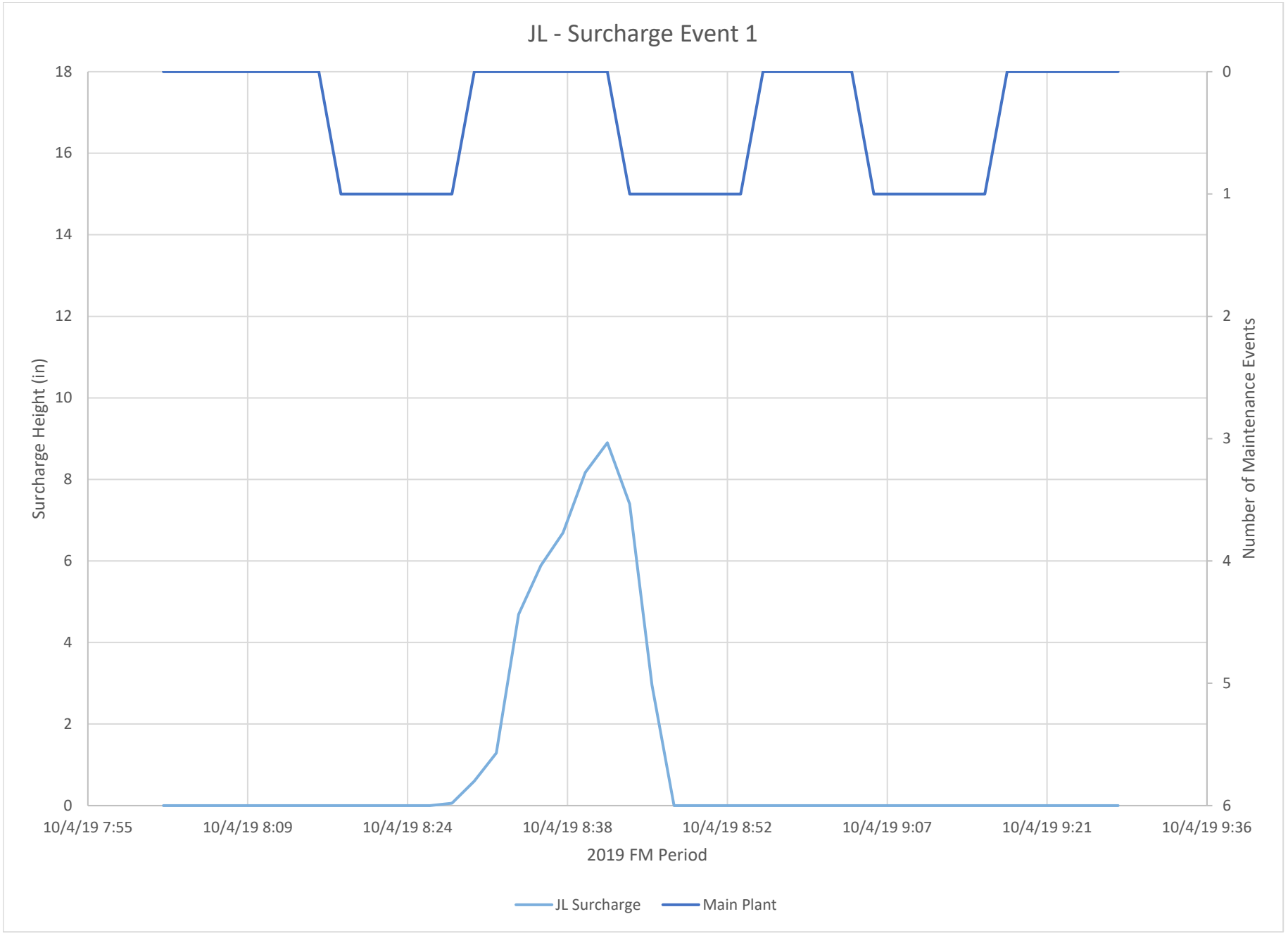

JM1 - Surcharge Event 2
Surcharge Height (in)
Number of Maintenance Events
20
18
16
14
12
10
8
6
4
2
0
0
1
2
3
4
5
6
10/4/19 7:40
10/4/19 7:55
10/4/19 8:09
10/4/19 8:24
10/4/19 8:38
10/4/19 8:52
10/4/19 9:07
10/4/19 9:21
10/4/19 9:36
2019 FM Period
JM1 Surcharge
Main Plant
Aquariums


JM1 - Surcharge Event 3
Surcharge Height (in)
Number of Maintenance Events
12
10
8
6
4
2
0
0
1
2
3
4
5
6
10/7/19 17:16
10/7/19 17:31
10/7/19 17:45
10/7/19 18:00
10/7/19 18:14
10/7/19 18:28
10/7/19 18:43
2019 FM Period
JM1 Surcharge
Main Plant
Shark/Otter
WSW Bird


JM1 - Surcharge Event 4
Surcharge Height (in)
Number of Maintenance Events
12
10
8
6
4
2
0
0
1
2
3
4
5
6
10/8/19 1:55
10/8/19 2:24
10/8/19 2:52
10/8/19 3:21
10/8/19 3:50
10/8/19 4:19
10/8/19 4:48
10/8/19 5:16
2019 FM Period
JM1 Surcharge
Main Plant
Cascades
Misc


JM1 - Surcharge Event 5
Surcharge Height (in)
Number of Maintenance Events
12
10
8
6
4
2
0
0
1
2
3
4
5
6
10/8/19 7:26
10/8/19 7:40
10/8/19 7:55
10/8/19 8:09
10/8/19 8:24
10/8/19 8:38
10/8/19 8:52
2019 FM Period
JM1 Surcharge
Ibis
Shipwreck #1


JL - Surcharge Events for 2019 Monitoring Period
Surcharge Height (in)
Number of Maintenance Events
18
16
14
12
10
8
6
4
2
0
0
1
2
3
4
5
6
10/1/19 0:00
10/2/19 0:00
10/3/19 0:00
10/4/19 0:00
10/5/19 0:00
10/6/19 0:00
10/7/19 0:00
10/8/19 0:00
10/9/19 0:00
10/10/19 0:00
2019 FM Period
JL Surcharge
Main Plant
Sea Lion Point
Shark/Otter
Dolphin
Tide Pool
Ibis
Shipwreck #1
Cascades
West Turtle
Aquariums
WSW Bird
Grotto
Misc


JL - Surcharge Event 1
Surcharge Height (in)
Number of Maintenance Events
18
16
14
12
10
8
6
4
2
0
0
1
2
3
4
5
6
10/4/19 7:55
10/4/19 8:09
10/4/19 8:24
10/4/19 8:38
10/4/19 8:52
10/4/19 9:07
10/4/19 9:21
10/4/19 9:36
2019 FM Period
JL Surcharge
Main Plant