EASTERN WASHINGTON STORMWATER EFFECTIVENESS STUDIES

TECHNICAL EVALUATION REPORT (TER)
SAND FILTER SIDEWALK VAULT BMP

Study Classification: Structural BMP

Study Objective(s): ☑ Evaluate Effectiveness ☑ Develop New BMP

February 3, 2021

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QAPP and TER Publication Information

The project Quality Assurance Project Plan (QAPP) and Technical Evaluation Report will be stored and accessible to the public on the Spokane County's website: https://www.spokanecounty.org/918/Stormwater-Utility. For questions regarding the project, please contact Matt Zarecor by email MZarecor@spokanecounty.org or phone (509) 477-7255.

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DOCUMENT HISTORY

This study was conducted following the QAPP which can be accessed at the link on the previous page. The study started in October 2018 and the last data was collected in December 2020. The draft Technical Evaluation Report (TER) was presented and submitted to the Technical Advisory Group (TAG) in January 2021 for review and comment. Appendix Q of the TER contains a summary of the TAG's comments along with a summary of response to the comments including how they were addressed in this document. The final TER was submitted to Ecology in January 2021.

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2.0 EXECUTIVE SUMMARY

The focus of this study is to evaluate the stormwater treatment performance of a new potential best management practice (BMP) referred to as the sand filter sidewalk vault. This BMP fits in a 4-foot by 5-foot vault installed below the sidewalk that receives runoff through a curb cut located in the street gutter. The sand filter media consists of 18-inches of coarse sand overlaid by a coconut coir mat. This BMP is being evaluated to provide jurisdictions with more options for retrofit or redevelopment projects located in built urban areas where available space (right of way) for new BMPs is limited. The proposed BMP is a variation of the basic sand filter vault BMP as defined by the Ecology stormwater manuals for Washington State. The primary differences between the sand filter sidewalk vault and the basic sand filter BMPs include: the proposed BMP can be installed underneath the sidewalk (usually within the existing right of way) and is designed to accept runoff from a larger contributing basin area.

The goal for this study is to evaluate the effectiveness of the proposed BMP. Effectiveness will be based upon:

- The ability of the BMP to infiltrate stormwater during the 6-month 24-hour storm event without overflowing into the bypass system within the maintenance cycle.
- The efficacy of the BMP to reduce the concentrations of total suspended solids (TSS), dissolved copper (Cu) and zinc (Zn), and oils, which will be evaluated to determine whether the BMP can achieve the respective Ecology treatment goals.

The goals for this study were achieved by conducting flow-through column testing and field testing of the BMP. The flow-through column testing was conducted to develop the BMP design and maintenance guidance prior to installation in the field. This work is described in the study QAPP Section 3.3. The field testing was conducted at a test site in Spokane County. Automated equipment installed at the test site was used to collect composite influent and effluent water quality samples, flow rate, temperature, and precipitation depth. The water quality parameters tested included the required and screening parameters defined in Technology Assessment Protocol Ecology (TAPE) for basic, dissolved metals, and oil treatment. The physiochemical properties of the sand filter media and sediment accumulated on top of the media were also analyzed. The media infiltration rate was measured continuously using the data collected from the automated equipment and twice using a modified falling head test.

The test site was constructed in 2016 and field testing was conducted from October 2018 to December 2020. In January of 2019 (three months after testing started), the BMP failed due to the large quantity of solids deposited on top of the sand filter media which inhibited infiltration. The sand filter sidewalk vault design was re-evaluated, and the test site was modified to provide a pre-settling basin to reduce the quantity of solids entering the vault. The contributing basin area was also reduced. In June of 2019, a new sand filter media was installed in the sidewalk vault. Sample collection re-started in the summer of 2019 and continued through November 2020. Maintenance was performed in February 2020 to improve infiltration.

Samples were collected from a total of 24 storm events. For each of these events, a storm report was created, and the data was evaluated to determine whether the storm met the TAPE qualifying

storm criteria and sample collection criteria. These criteria define the minimum storm depth and duration, storm antecedent and post storm dry period, minimum number of aliquots, sample event coverage, and minimum number of samples. The evaluation results determined that 11 storm events met the TAPE criteria for qualifying conditions and 8 met all the qualifying conditions except for one or two of the criteria. The remaining storm events did not meet the criteria for three or more qualifying conditions.

The collected data was analyzed to determine the effectiveness of the proposed BMP. The specific objectives completed to meet the study goal are summarized below along with the results.

Objective 1: Define the BMP design and maintenance guidance for the test site.

Prior to the start of the field study, the BMP design and maintenance guidance were developed for the proposed BMP. The guidance was based on column testing results (QAPP Section 3.3) and modified design guidance outlined in the Eastern Washington Stormwater Management Manual for the basic sand filter BMP (Ecology, 2019). A specification was developed for a sand filter media (and followed to construct the test site) with a design infiltration rate of 50 inches/hour and a hydraulic loading of 1.6 gallons per minute. The target contributing basin area for each sand filter sidewalk vault was 3,500 sq.ft. for a site with a mean annual precipitation (MAP) of 18-inches. *Reference Section 6.1 for a complete description of the guidance.*

Objective 2: Determine the pollutant removal efficiency of the BMP by measuring and comparing the pollutant concentrations in the influent and effluent.

The average pollutant removal efficiencies were calculated for TSS, TPH (oils), and dissolved copper and zinc. The average pollutant removal efficiency was 53.4% (TSS); -17.8% and 28.0% (dissolved copper and zinc respectively), and 16.6% (TPH). The results of the statistical analysis indicated a statistically significant difference between influent and effluent concentrations for TSS and dissolved zinc. However, the influent and effluent concentrations difference is statistically insignificant for dissolved copper and TPH.

Objective 3: Determine whether the treatment performance goals were achieved by comparing study results to TAPE goals and requirements.

The sand filter sidewalk vault BMP did not meet the TAPE treatment performance goals for Basic, Dissolved Metals, or Oils Treatment.

Objective 4: Establish a design hydraulic loading rate in gallons per minute per square foot of the sand filter surface area.

The design hydraulic loading rate of 1.6 gpm/sq.ft. was developed through column testing prior to the start of this study. This hydraulic loading rate was assessed in comparison to the measured loading rate, TSS treatment performance, and bypass flows to determine if the rate was appropriate for the site. Based on this evaluation, the proposed 1.6 gpm/sq.ft. hydraulic loading rate was recommended for the design of sand filter sidewalk vault.

Objective 5: Determine the maintenance cycle frequency using the results from infiltration testing.

The maintenance frequency was determined using infiltration and precipitation data collected continuously during storm events by the monitoring equipment. Results indicated maintenance should be performed twice a year at the test site, which has a 18,000 sq.ft. basin area, and every 2.5 years for a 3,500 sq.ft. basin area which is the target size for locating the proposed BMP. These results assume the MAP is 18 inches. For larger sites with less MAP, the maintenance frequency is expected to be longer.

In addition to assessing the effectiveness of the BMP, results from this study were intended to be used to justify the development of a new BMP that is approved for '*general use*' on future projects if the targeted performance was achieved for infiltration and the TAPE treatment goals were achieved for basic (TSS), dissolved metals (enhanced), and oils. Because the BMP did not meet TAPE treatment goals for TSS, dissolved metals, or oils, the intent of this study is limited to meeting the 2014-2019 National Pollutant Discharge Elimination System Municipal Stormwater (NPDES MS4) permit requirements, Section 8 (S8), Monitoring and Assessment, for evaluating the effectiveness of permit required Stormwater Management Programs.

Recommendations for future research are also included and focus on:

- Amendment of the media with a sorptive material, such as high carbon ash, to increase dissolved metals removal.
- Modification of the test site to include a catch basin with a sump to serve as a pre-settling basin that reduces sediment accumulation rates on the media surface, and by extension, the required maintenance frequency.
- Use of a media with finer pore size distribution that will not reduce the infiltration rate or hydraulic loading rate. The media with a finer pore size distribution is expected to filter smaller diameter particles than the media selected for this study.

3.0 INTRODUCTION

3.1 INTRODUCTION TO THE STRUCTURAL BMP

The focus of this study was to evaluate the stormwater treatment performance of a new sand filter BMP (referred to herein as the sand filter sidewalk vault). This BMP is installed below grade in a sidewalk vault (Figure 3.1). Runoff from the street enters the vault through a curb cut (concrete throat) located in the gutter. The primary components of this BMP are a concrete vault, a sand filtration layer, an underdrain pipe, and a bypass pipe. The vault is 5-feet long and the same width as the sidewalk (4-feet). The sand filtration layer consists of an 18-inch layer of coarse sand overlaid by a coconut coir mat (organic material) and underlaid by a 3-inch choke stone layer (3/8-inch Pea Gravel) that separates the sand from the underdrain pipe. Stormwater runoff is treated as it infiltrates through the sand filtration layer. Treated runoff is collected and conveyed by an underdrain to a drywell or to a storm drain network.

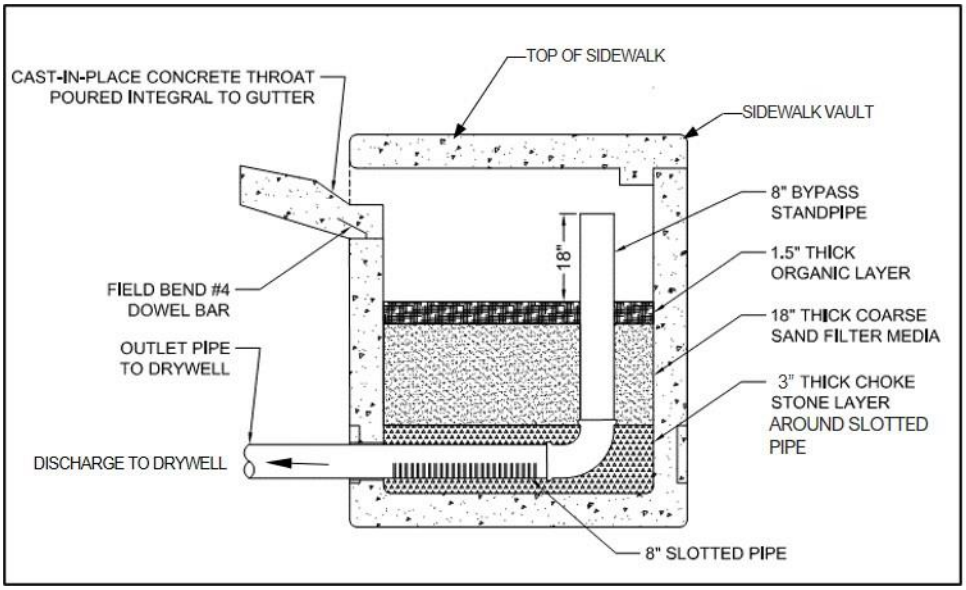


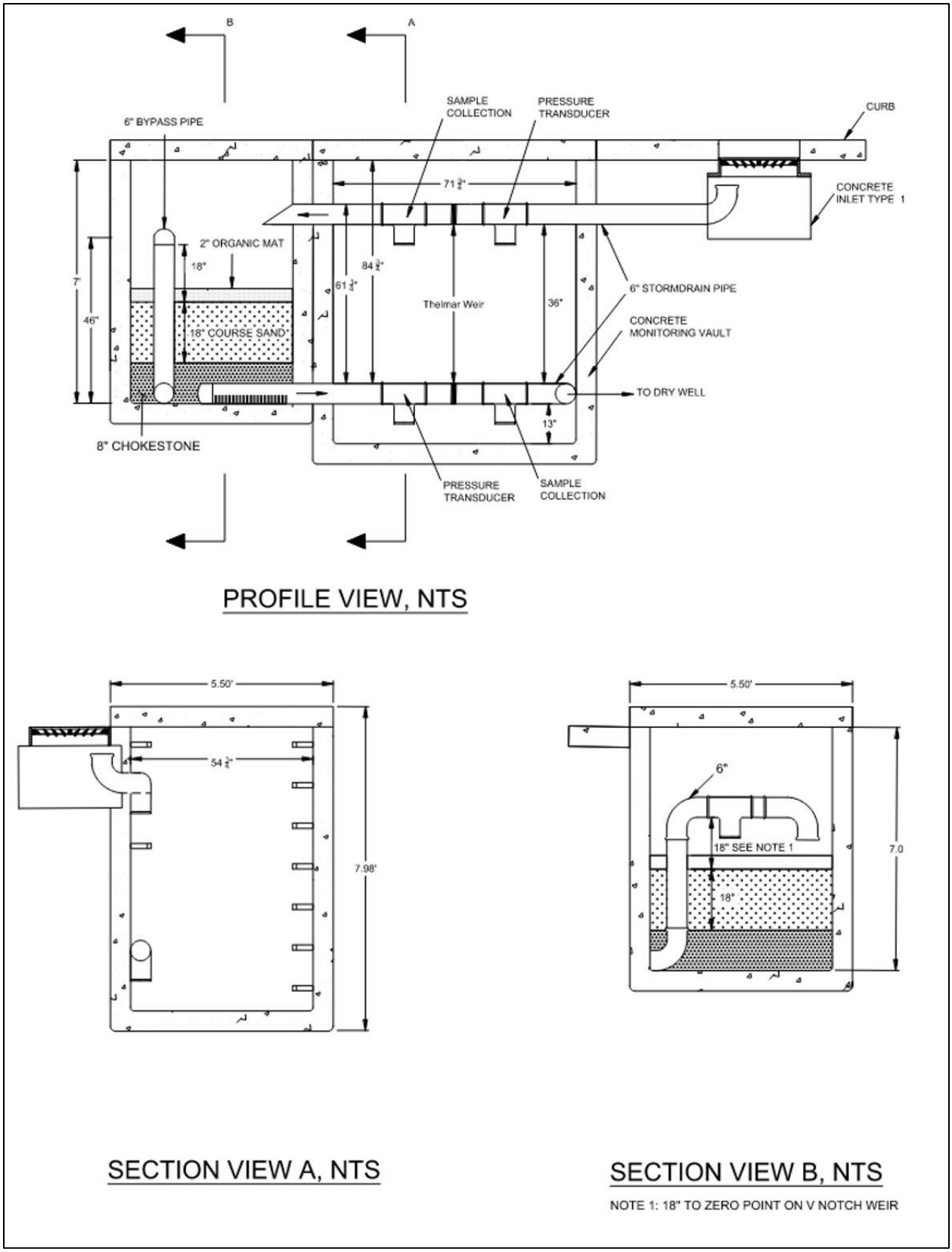
Figure 3.1 Cross Section of Sand Filter in Sidewalk Vault Design

The proposed sand filter sidewalk vault BMP design criteria are similar to the existing basic sand filter vault BMP defined in the Ecology Stormwater Manual (Ecology, 2019). Both BMPs are designed to treat runoff from the same water quality event (6-month 24-hour storm) while flows from larger events are designed to bypass the BMP. The primary differences between the BMPs pertain to the composition of the sand filtration layer and the inclusion of the organic layer. The proposed BMP sand filtration layer is composed primarily of coarse sand compared to the basic sand filter which is composed of medium sand. The larger grain sand was selected because it results in a higher infiltration rate which allows the proposed BMP to treat runoff from a larger contributing basin area. In addition, the proposed BMP includes a layer of organic material (coconut coir mat) that has a high cation exchange capacity (CEC) for reducing concentrations of dissolved metals and also acts as an energy dissipator when stormwater runoff enters the sidewalk vault.

The test site was constructed in 2016 (Figure 3.2) and the design was modified from Figure 3.1 to accommodate the monitoring equipment. At the test site, runoff enters the system through a non-sumped catch basin, which is representative of runoff entering the vault through a curb cut. Runoff is then conveyed in a pipe running through a vault containing monitoring and sampling equipment. Downstream of the monitoring vault, the pipe discharges into the sand filter sidewalk vault. Treated runoff is routed back through the monitoring vault and then discharges into a drywell. The second vault also contains the monitoring equipment and is where samples are collected. Section 4.2 of this report provides a more detailed description of the monitoring equipment and sample collection process.

Sample collection initially started in the fall of 2018, however, the BMP failed after three months due to the quantity of solids deposited on the surface of the sand filter media inhibiting infiltration. The sand filter sidewalk vault design was re-evaluated, and it was determined that a catch basin with a sump upstream of the sand filter vault could serve as a pre-settling basin for sediment and a downturn elbow on the inlet pipe could reduce the quantity of settleable solids and floatables entering the vault. With fewer solids and sediment entering the sand filter sidewalk vault, the maintenance frequency of the proposed BMP is expected to be lower compared to the initial BMP configuration. The recommended revision to the sand filter sidewalk vault BMP configuration is shown in Figure 3.3.

Since it was not possible to reconstruct the test site to the recommended configuration, the test site was adapted to create conditions similar to Figure 3.3. Specifically, instead of replacing the non-sumped catch basin (inlet type 1) with a sumped catch basin such as a catch basin type 1 structure, an upturned elbow was added to the inlet pipe in the existing catch basin. This configuration was expected to perform similar to a catch basin with a sump in that heavier solids could settle in the bottom of the catch basin compared to the original configuration which routed all solids to the sand filter. Construction safety fencing was placed over the opening of the upturned elbow to limit floatables (i.e., leaves, trash, etc.) from entering the sand filter vault. In addition to the BMP configuration changes, the contributing basin area to the test site was also reduced from 0.75 acres to 0.41 acres. For more information regarding revisions to the BMP configuration and study design, refer to Section 7.1 and Appendix E of the QAPP.


B
A
6" BYPASS PIPE
SAMPLE COLLECTION
PRESSURE TRANSDUCER
CURB
CONCRETE INLET TYPE 1
71 3/4"
2" ORGANIC MAT
18"
84 3/4"
61 1/4"
Thelmar Weir
36"
6" STORMDRAIN PIPE
CONCRETE MONITORING VAULT
7'
46"
18" COURSE SAND
TO DRY WELL
13"
8" CHOKESTONE
PRESSURE TRANSDUCER
SAMPLE COLLECTION
PROFILE VIEW, NTS
5.50'
54 3/4"
7.98'
SECTION VIEW A, NTS
5.50'
6"
18" SEE NOTE 1
18"
7.0
SECTION VIEW B, NTS
NOTE 1: 18" TO ZERO POINT ON V NOTCH WEIR

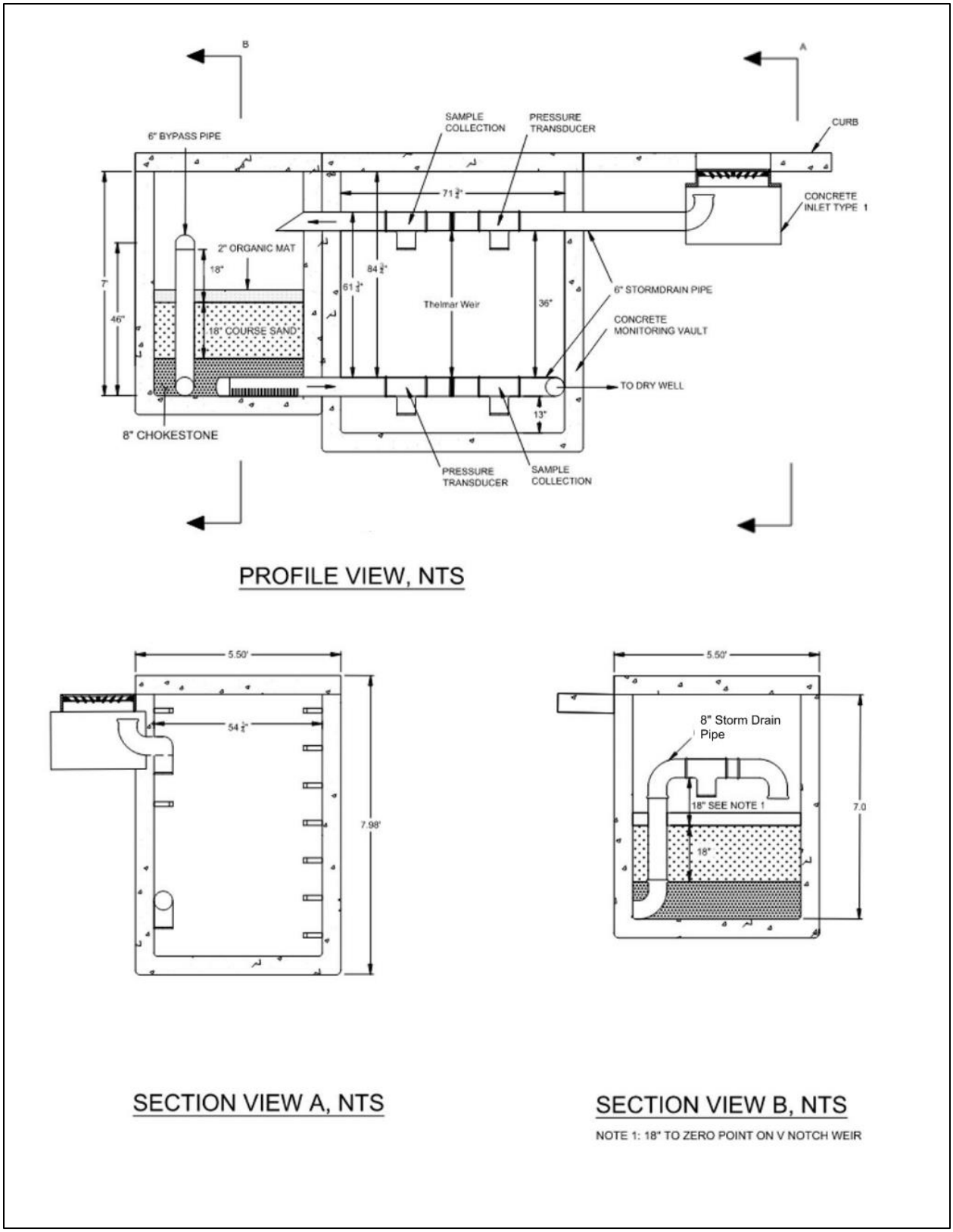


Figure 3.2 Constructed Test Site Setup

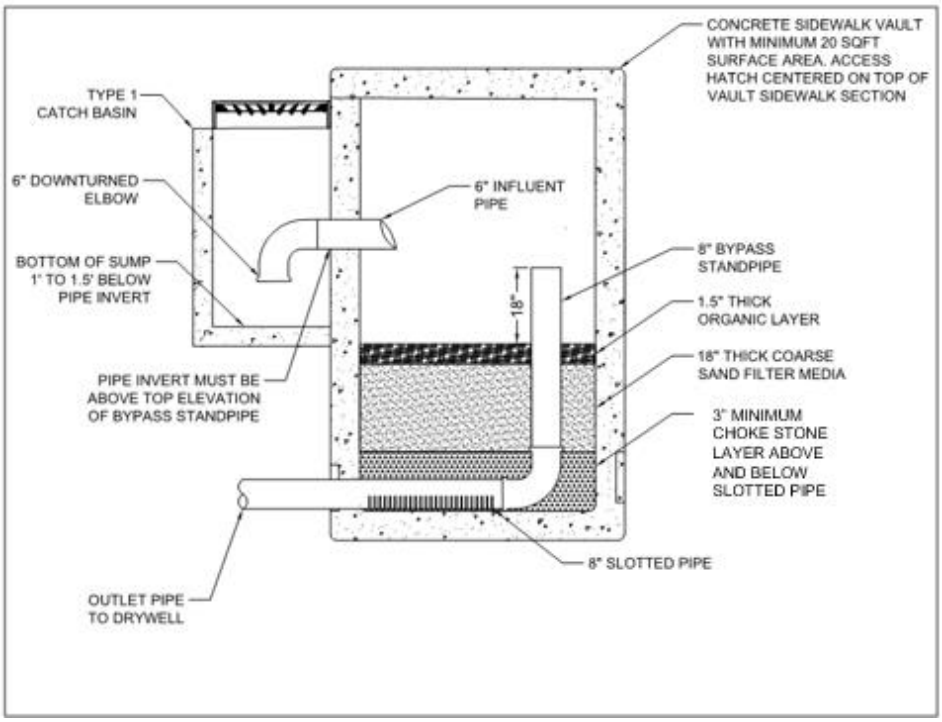


Figure 3.3 Cross Section of Revised Sand Filter in Sidewalk Vault Design

3.2 PROBLEM DESCRIPTION

Constructing BMPs at sites with space constraints creates a challenge for jurisdictions, particularly for retrofit or redevelopment projects located in built urban areas where the right-of-way abuts property lines or where there is limited space between sidewalk and roadway. A viable solution is to develop BMPs that can fit into these built areas, such as the proposed sand filter sidewalk vault which can be installed underneath the sidewalk and connected to existing (or new) storm drain networks. This BMP could eliminate (or reduce) the need for constructing a treatment BMP downstream and subsequently reduce the overall cost of stormwater management for future projects.

3.3 PROJECT GOALS AND OBJECTIVES

The goal of this study was to evaluate the effectiveness of the revised sand filter BMP that can be installed within a sidewalk vault. The effectiveness evaluation was based upon:

- The infiltration performance, specifically infiltrating the water quality volume (6-month 24-hour event) without overflowing into the bypass pipe (set 18-inches above the sand media) within the maintenance cycle (based on design infiltration rate).
- The treatment performance of the BMP was evaluated for reducing the following stormwater runoff target pollutants: total suspended solids (TSS), dissolved copper and zinc, and oils.

Results from this study were intended to be used to justify the development of a new BMP that is approved for '*general use*' on future projects if the targeted performance was achieved for infiltration and the TAPE treatment goals were achieved for basic (TSS), dissolved metals

(enhanced), and oils. The work conducted during this study was also completed to meet the 2014-2019 NPDES MS4 permit requirements, Section 8 (S8), Monitoring and Assessment, for evaluating the effectiveness of permit required Stormwater Management Programs. Specifically, "*each city and county permittee listed in the permit shall collaborate with other permittees to select, propose, develop, and conduct Ecology-approved studies to assess, on a regional or sub-regional basis, effectiveness of permit-required stormwater management program activities and best management practices"* (Washington State Department of Ecology, 2014). The permit requirement that the study addresses is defined in S5.B.5, Post-Construction Stormwater Management for New Development and Redevelopment: "*all permittees shall implement and enforce a program to address post-construction stormwater runoff to the MS4 from new development and redevelopment projects that disturb one acre or more, and from projects of less than one acre that are part of a larger common plan of development or sale"* (Washington State Department of Ecology, 2014).

The goals for this study were achieved by meeting the following objectives:

1. Define the BMP design and maintenance guidance for the test site.
2. Determine the pollutant removal efficiency of the BMP by measuring and comparing the pollutant concentrations in the influent and effluent.
3. Determine whether the treatment performance goals were achieved by comparing study results to TAPE goals and requirements.
4. Establish a design flow in gallons per minute per square foot of the sand filter surface area.
5. Determine the maintenance cycle frequency using the results from infiltration testing.

3.4 PROJECT OVERVIEW

The focus of this report is the field testing. In the summer of 2019, a new sand filter media, choke stone layer, and coconut coir mat were installed in the sidewalk vault. Sample collection restarted following the installation of new media at the test site in June of 2019 and continued through December 2020. In February 2020, maintenance was performed (as described in Section 6.1) because the infiltration rate had declined to below the design rate (50 in/hr) causing ponding in the sand filter vault and flows to access the bypass pipe.

Flow-weighted composite samples were collected from rainfall events that were predicted to be qualifying per the TAPE guidelines (Ecology, 2011). Samples were collected from a total of 24 storm events of which 11 events met the TAPE criteria for qualifying events and sampling and 8 met all the qualifying conditions except for one or two criteria. Samples were tested for the required and screening parameters as defined in TAPE for basic, dissolved metals, and oil treatment (Table 4.2). The infiltration performance of the sand filter media was evaluated using data collected from falling head tests and the effluent flow rate measured by autosamplers. The data were evaluated to determine whether pollutant reduction met Ecology's treatment performance criteria as defined in TAPE (Section 6.3).

The BMP design guidance and maintenance cycle frequency were confirmed using data from the field testing portion of the study. Triggers for maintenance included bypass flows that occur when

the infiltration rate drops below the 50 in/hr design rate or the hydraulic loading rate was less than or equal to 1.6 gpm/sq.ft. for the water quality event. Sediment accumulated on top of the sand filter media was also collected to determine the sediment accumulation rate. The hydraulic loading rate and infiltration rate were primarily measured using data collected from the automated monitoring equipment. The infiltration rate was also measured twice using a falling head test. Reference Section 6.5 of this report for results and a detailed discussion regarding the evaluation of the maintenance cycle using field data.

This study included submitting a TAPE application for entrance of the sand filter sidewalk vault BMP into the evaluation program. The intent was to use the results from this study to demonstrate that the proposed BMP meets the TAPE treatment criteria and to confirm maintenance practices. However, results from this study indicated that the sand filter sidewalk vault did not meet the TAPE treatment performance criteria for any of the parameters. Instead, Section 7.0 Future Action Recommendations provides recommendations for modifying the BMP design and retesting as part of a future study.

3.5 STUDY LOCATION

This study was conducted near the intersection of Hawthorne Road and U.S. 2 in Spokane, Washington (Figure 3.4). At this location, the land use is a mix of residential and commercial. The contributing basin area (Basin 19 in Figure 3.5) is approximately 18,000 sq.ft. of which 14,000 sq.ft. are impervious surfaces (roadway and sidewalks) and 4,000 sq.ft. are pervious surfaces (lawns). The contributing roadway is primarily an urban arterial with some runoff from a residential road. Per the Web Soil Survey, the pervious area is defined as urban land-marble, disturbed complex with 0 to 3 percent slopes. No Hydrologic Soil Group (HSG) is provided for the contributing basin area; however, soils adjacent to the area are listed as class A HSG (Soil Survey Staff, 2018). Details regarding the test site selection process are in the QAPP Section 7.2.

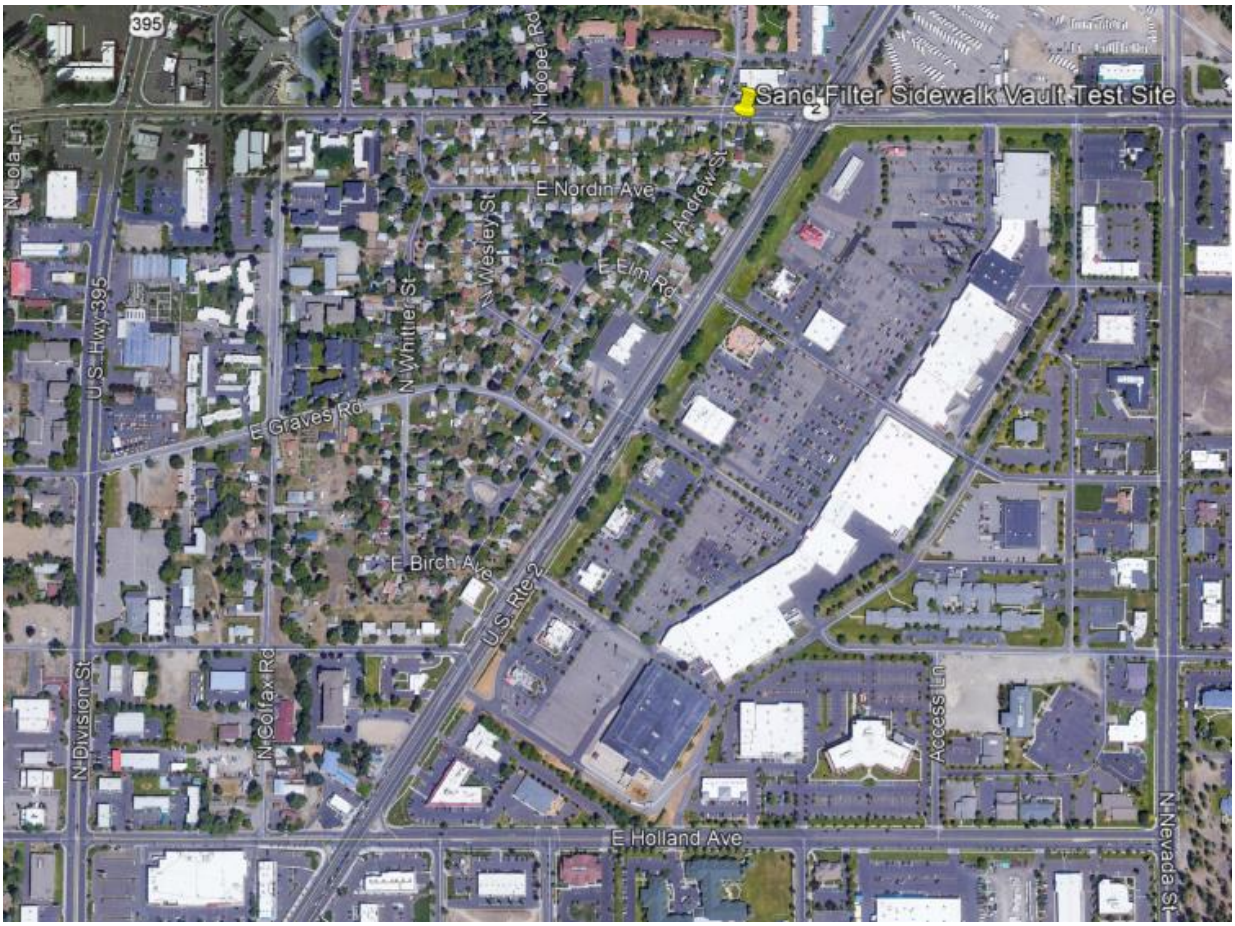


Figure 3.4 Test Site Area Map

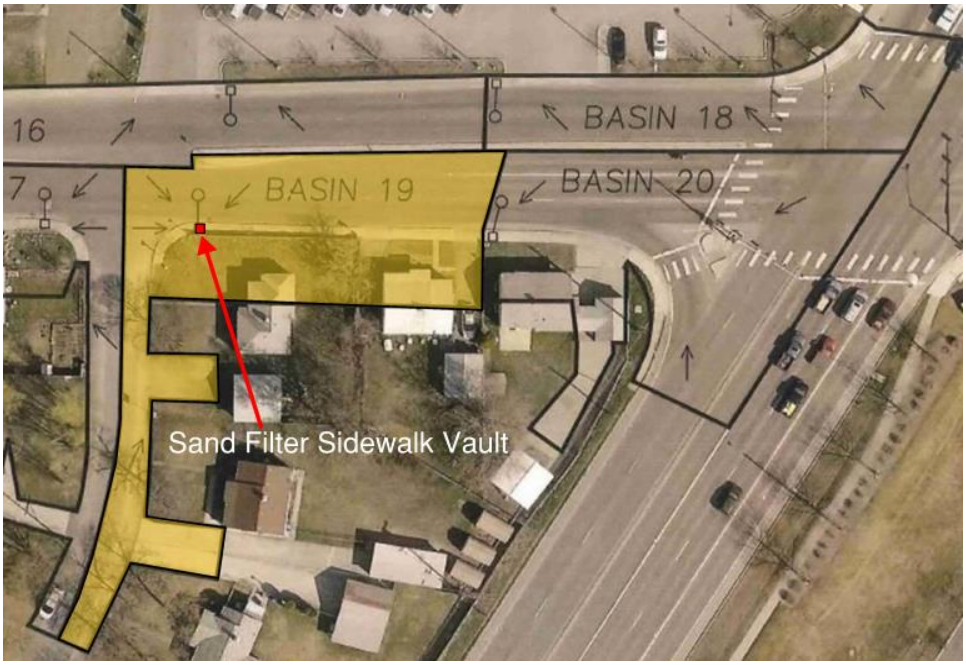


Figure 3.5 Test Site Location and Contributing Basin Area

4.0 SAMPLING PROCEDURES

This section provides an overview of the data collected and sampling procedures followed during the study. More specific details can be found in QAPP Sections 7-9.

4.1 TYPES OF DATA COLLECTED

Sampling of the sand filter sidewalk vault began in early 2019, following revisions to the test site as described in Section 3.1. Sampling was terminated in December 2020 because data analysis indicated that the proposed BMP did not meet the TAPE treatment performance standards (comparison of results to TAPE standards provided in Section 6.3). Table 4.1 provides a summary of the types of data collected including the equipment used, collection frequency, and total number of samples. Table 4.2 provides a timeline of sample collection. Appendices A and B of this report contain raw data collected during the study.

Table 4.1 Summary of the Types of Data Collected

Data Type	How Data Was Collected	Frequency	Total # of Samples
Sand filter media physiochemical properties	Samples of sand filter media	Prior to installation of sand filter media	2[2]
Precipitation	Rain gauge connected to data logger at the test site	Measured continuously[1]	NA
Flow Depth, Temperature (influent, effluent, bypass)	Pressure transducer upstream of weir in pipes (influent, effluent, bypass). Converted depth to flow w/ weir equation	Measured continuously[1]	NA
Composite Water Quality Samples	Autosamplers collected composite samples & were triggered by the data logger during rainfall conditions	See Table 4.2	24, Table 4.2
pH Measurement; Oil Sheen Observations	Measured composite sample pH; observed oil sheen: effluent, top of media, composite sample	Min. 3 storm events; Each storm event monitored	7, Table 4.2
Sediment PSD	Collected from composite flow-weighted samples	Min. 3 storm events	4 Table 4.2
Sediment Grain Size, Mass Accumulated on BMP	Collected sample (media surface); dry weight analysis & estimated mass accumulated.	Once following BMP failure	1
Infiltration Rate	Modified falling head test; effluent flow rates	Immediately after media installation; continuously measured[1]	NA

[1] Recorded every 15 minutes or 5 minutes if 0.04 in. or greater precipitation fell in the previous 6 hours.
[2] Samples of sand filter media were taken prior to field testing. Results from media samples can be found in Appendix L and M of the study QAPP.

Table 4.2 Summary of Water Quality Samples Collected

Type	Parameter	Sample Event																												
Event Number		M	M	I	1	2	3	4	5	6	7	S	I	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Date of Event		9/17/2017	5/19/2019	8/1/2019	9/18/2019	10/18/2019	10/21/2019	11/19/2019	12/7/2019	1/6/2020	1/28/2020	2/3/2020	2/18/2020	3/31/2020	5/2/2020	5/17/2020	5/20/2020	5/31/2020	6/14/2020	6/16/2020	7/1/2020	9/23/2020	9/25/2020	10/10/2020	10/13/2020	11/5/2020	11/13/2020	11/14/2020	11/16/2020	11/25/2020
Qualifying Event (Y/M/N)[1]		N/A	N/A	N/A	N	N	M	Y	M	M	Y	N/A	N/A	N	Y	Y	Y	M	M	M	M	Y	M	Y	Y	Y	Y	N	Y	N
Water Quality Stormwater	Ortho-phosphate (OP)				X			X	X							X	X	X				X		X,f		X,d			X	X
	Total Phosphorus (TP)				X			X	X							X	X	X				X		X	X	X,d	X,d			
	Particle Size Distribution (PSD)													X	X	X						X								
	Total Suspended Solids (TSS)				X	X	X	X	X	X	X			X	X	X,d	X	X	X	X	X	X	X	X	X	X	X	X			
	pH				X	X	X								X,f	X			X											X
	Dissolved Copper (Cu)				X	X	X	X	X	X	X				X	X	X	X	X	X	X	X	X	X		X,d	X			
	Dissolved Zinc (Zn)				X	X	X	X	X	X	X				X	X	X,f	X	X	X	X	X	X	X		X,d	X			
	Total Copper (Cu)				X	X	X	X	X	X	X				X	X	X	X	X	X	X	X	X	X	X		X,d	X,d			
	Total Zinc (Zn)				X	X	X	X	X	X	X				X	X	X	X	X	X	X	X	X	X	X		X,d	X,d			
	Hardness as CaCO3				X	X	X	X,f	X		X				X	X	X	X	X	X	X	X	X	X	X	X,d	X			
	NWTPH-Dx				X	X	X	X	X						X	X	X	X			X	X	X	X			X		X	X
Sediment	Sediment PSD	X										X																		
	NWTPH-Dx											X																		
	Calcium		X																											
	Copper		X																											
	Magnesium		X																											
	Zinc		X																											
	Inorganic Solids											X																		

1. For qualifying events: Y indicates the storm was a “qualifying” event, M indicates the storm was a “potentially qualifying” event, N indicates the storm was a “non-qualifying” event. The types of events are defined in Section 5.2.1.
f = Data was flagged by analytical laboratory; following discussion with laboratory data was considered acceptable to include in dataset.
d = Indicates field duplicate samples were collected and analyzed.
M = Sample of sand filter media for physiochemical analysis
S = Sample of sediment accumulated on sand filter sidewalk vault BMP
I = Falling head infiltration testing

4.2 SAMPLE COLLECTION PROCESS

Data for the study were collected following the standard operating procedures (SOPs) defined in the study QAPP. The procedures are summarized in this section along with information about the audit and monitoring equipment. More detailed information regarding each SOP can be found in the Section 8.0 of the study QAPP.

4.2.1 SOP Overview

- Storm Selection and Tracking – Procedures outline how to decide whether to monitor and collect samples during a storm event. This SOP was conducted daily.
- Storm Monitoring Equipment Maintenance - Procedures describe how to perform maintenance on the monitoring equipment and test site. This SOP was conducted monthly.
- Preparing Stormwater Monitoring Equipment for Storm Sampling - Procedures detail how to prepare monitoring equipment and the test site for a storm to collect data that meet QA/QC requirements. This SOP was conducted before each storm selected for monitoring.
- Stormwater Grab Sampling - Procedures describe how to collect grab samples at the site. *Not used for this study, reference Appendix C5.*
- Stormwater Sample Collection and Processing - Procedures detail how to collect and process samples for transportation to the analytical laboratory following a storm event. This SOP was conducted following each storm in which samples were collected.
- Monitoring Equipment Data Download - Procedures detail how to download data following a storm event. This SOP was typically done at the same time as collection of samples following the event (covered under Stormwater Sample Collection and Processing SOP).
- Sediment Accumulation Rate - Procedures describe how to measure sediment accumulation on the sand filter media by using depth measurements. Sediment was collected from representative 3-inch by 3-inch squares instead and submitted to the lab for dry weight analysis. *Not used for this study, reference Appendix C5.*
- Falling Head Test - Procedures describe how to perform a falling head test at the test site to estimate infiltration rates through the sand filter media. This SOP was performed following installation of new media and approximately six months later.
- Inlet Box Sediment Depth - Procedures describe how to measure sediment accumulation in the inlet box at the test site. *Not used for this study, reference Appendix C5.*

4.2.2 Audit Overview

An audit was conducted by a participating entity as part of the data quality assessment to verify whether staff followed the SOPs during the study. Any deviations in the SOPs from those in the study QAPP are summarized in the audit findings (Appendix C.4) and detailed in the summary of deviations from the QAPP (Appendix C.5). Deviations primarily included SOPs that were not used because an alternative method was more appropriate.

4.2.3 Monitoring Equipment Overview

Figure 4.1 includes photos of the test site monitoring equipment. The monitoring vault (#3 in Figure 4.1) is located upstream of the sand filter sidewalk vault BMP, with the exception of the rain gauge for the site, which was located immediately above the monitoring vault. Flow entered the site through a non-sumped inlet box with a grate inlet and upturned elbow (see #1 in Figure 4.1) and flowed through the influent pipe (#2 in Figure 4.1) in the monitoring vault to the sand filter sidewalk vault. In the influent pipe, flow and temperature were measured through the use of a pressure transducer located upstream of a v-notch control weir. The appropriate weir equation was used to convert the depth recorded by the pressure transducer into flow. Influent water quality samples were also collected downstream of the weir by automated samplers.

In the sand filter sidewalk vault (#4 in Figure 4.1), bypass flows and temperature were monitored through the same pressure transducer and control weir configuration. Flows which infiltrated through the sand filter media were collected in an underdrain and passed through the effluent pipe in the monitoring vault (#6 in Figure 4.1). The same pressure transducer and control weir configuration was used to monitor flow and temperature in the effluent pipe. Effluent water quality samples were also collected by automated samplers (#7 in Figure 4.1) downstream of the control weir. Effluent flow then was discharged to a drywell located adjacent to the site. The data collected by the monitoring system were saved in the data logger (#8 in Figure 4.1) located in a cabinet in the monitoring vault. A process diagram of the monitoring equipment and connections is shown in Figure 7.3 and Table 7.1 of the QAPP.

1. Concrete Type 1 non-sumped inlet box with an upturned elbow and a grate inlet.
2. Six-inch PVC inlet pipe in monitoring vault (upper right) and in sand filter sidewalk vault (lower right).
3. Concrete monitoring vault.
4. Sand filter sidewalk vault.
5. Eight- inch PVC bypass pipe in sand filter sidewalk vault, a) without monitoring equipment and b) with monitoring equipment.
6. Six-inch PVC effluent pipe in monitoring vault.
7. Two Automated Samplers.
8. Data logger located in a cabinet in the monitoring vault. The cabinet also contained two batteries and a trickle charger which powered the automated samplers.

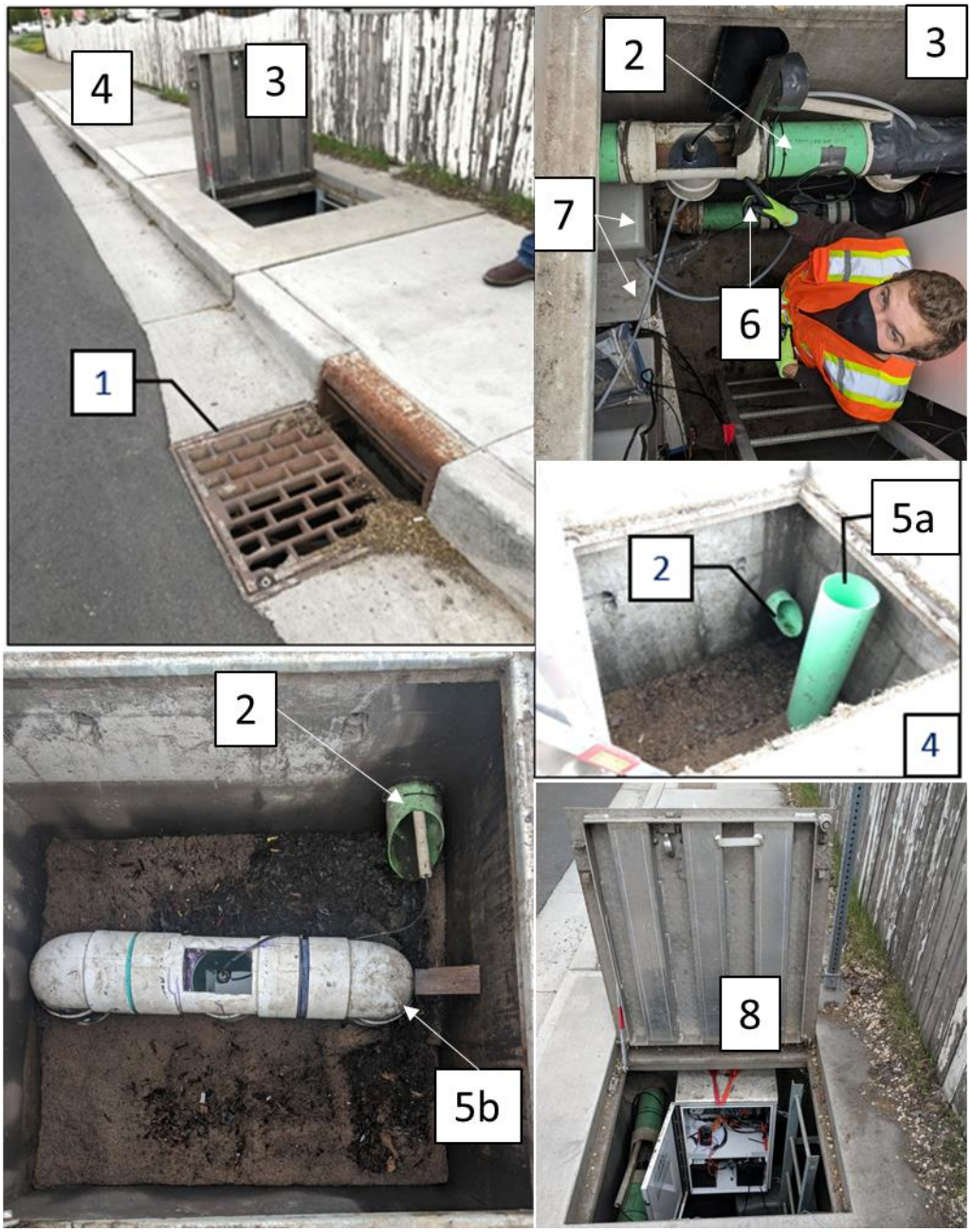


Figure 4.1 Monitoring system and sand filter BMP located at the Test Site

5.0 DATA QUALITY ASSESSMENT

A data quality assessment was performed to determine whether data collected during the study met Data Quality Indicators (DQIs) and Measurement Performance Criteria (MPCs) that were defined in the study QAPP (Osborn Consulting, Inc., 2018). DQIs are qualitative and quantitative measures that characterize the aspects of quality data. MPCs are the acceptance criteria for DQIs which specify the standard for data that meets the project's data quality objectives. The assessment of whether MPCs were met for each DQI is summarized in Appendix C.1. As part of the data quality assessment, a data verification and data usability assessment were performed. The data verification is summarized in Section 5.1 and supporting materials are included in Appendix C.2. The data usability assessment is summarized in Section 5.2 and supporting materials are included in Appendix C.1-C.6.

5.1 DATA VERIFICATION

Data verification involves a review of data provided by the analytical laboratory. The review of data is performed for events where samples were collected and is summarized in the Quality Assurance (QA) Worksheets in Appendix C.2. The worksheets were completed for each storm event which was sampled and contain calculations (reference QAPP Section 6.0 for detailed description) to determine whether laboratory and field water quality data are acceptable. The information summarized in the QA worksheets includes:

- Parameter
- Method
- Chain of Custody Issues
- Holding Times
- Temperature of Samples Received at Lab
- Laboratory Method Blank Results
- Laboratory Control Sample Recovery Percent
- Laboratory Matrix Spike Recovery Percent
- Laboratory Duplicates Relative Percent Difference
- Field Duplicates Relative Percent Difference
- Laboratory QA/QC Flags and Associated Action (if needed)

Based on the information included in the QA worksheets, water quality data were rejected if samples arrived beyond holding times, if multiple laboratory QC tests did not meet laboratory limits, or if field duplicates exceeded the relative percent difference limit. Water quality data were potentially accepted if one laboratory QC test did not meet laboratory limits and the sample met other quality tests. Water quality data were also accepted if temperatures were above 6 degrees Celsius, as there did not appear to be a relationship between analytical results and temperature (see Appendix C.6 for discussion). From the data verification process, a total of two samples were rejected, as shown in Table 5.1.

Table 5.1. Data Rejected Following Data Verification

Date of Sample	Parameter	Location of Sample	Reason for Rejection
10/10/2020	Ortho-phosphate	Influent and Effluent	Sample past holding time for analysis
11/13/2020	Total Phosphorus	Effluent	Field duplicate exceeded relative percent difference limit of 20%.

5.2 DATA USABILITY ASSESSMENT

The data usability assessment consists of a review of QA/QC materials by the QA Officer for the study to determine whether each MPC for the study is met. The materials are reviewed in terms of precision, bias, representativeness, completeness, and comparability. The usability assessment also includes a discussion of limitations on use of measurement data, whether the quality assurance objectives were met, and the resulting impact on decision-making. The materials reviewed include:

- Results of field and lab data verification (Section 5.1 and Appendix C.2)
- Copies of field forms used to document SOPs being followed (Appendix C.3)
- Results of technical system audits (Appendix C.4)
- Changes and deviations from QAPP (Appendix C.5)
- Identification of significant quality assurance problems and recommended solutions (Appendix C.6)

As discussed in Section 5.1, following review of the field and lab data verification two samples were rejected due to QA issues summarized in Table 5.1. The review of field forms and technical system audits suggested the SOPs were followed for the duration of the study; where modifications were made, they were noted in the audit form (Appendix C.4) and summary of deviations from the QAPP (Appendix C.5). Reasons for modifications included: addition of procedures that provided a data quality benefit (i.e. tightening of weir wheels to limit any leaking of flow around the weir seal); revision of steps following installation of equipment or guidance provided by manufacturers, analytical laboratories, or others (i.e. addition of sample blank for dissolved metals); removal of items that were not necessary to ensure data quality (i.e. disconnect power supply to battery in order to test voltage of battery); and removal of items which were not measurable (i.e. Inlet Box Sediment Depth SOP – see Appendix C.5). In Appendix C.6, quality assurance problems identified during the study along with corrective action taken and justification for not rejecting sample results are provided.

Following review of the data, an assessment was performed to determine whether each quality objective for the study was met. The materials discussed in the previous paragraph were used to support whether the MPCs were fulfilled for each DQI associated with precision, bias, representativeness, completeness, comparability, and sensitivity. The assessment showed that quality objectives were met for the study; a detailed assessment for each DQI is included in Appendix C.1.

From the review of the data and data quality objectives, the main limitation of the data is related to the data intended use. The study data are expected to be sufficient for the purposes of this effectiveness study. However, once data analysis showed that the TAPE treatment performance goals were not going to be met, data collection was halted. As a result, some of the data requirements needed to submit the sand filter sidewalk vault BMP to TAPE for certification are not included in this study (i.e., quantities of field duplicates needed according to the TAPE Guidance manual were not met). This report as a result is solely being submitted to fulfill the effectiveness study requirements.

5.2.1 TAPE Qualifying Event and Pollutant Concentration Criteria

The TAPE Technical Guidance Manual (Washington State Department of Ecology, 2011) specifies storm event guidelines and sample collection requirements for automated, flow-proportional composite sampling. The storm event guidelines help determine whether a storm event is acceptable for sampling and the sample collection requirements help ensure composite samples are representative of the storm event mean concentration. Table 5.2 and Table 5.3 display the storm event guidelines and sample collection requirements.

Table 5.2 Ecology Storm Event Guidelines

Parameter	Definition	Guideline
Minimum Storm Depth	Total rainfall amount during an event	0.15 inches
Storm Antecedent Dry Period	Defines the storm event's beginning as designated by minimum time interval without significant rainfall	6 hours minimum with less than 0.04 inches of rain
Post-Storm Dry Period	Defines the storm event's end as designated by minimum time interval without significant rainfall	6 hours minimum with less than 0.04 inches of rain
Minimum Storm Duration	Shortest acceptable rainfall duration	1 hour
Average Storm Intensity	Total rainfall amount divided by total rainfall duration	Range of rainfall intensities

5.3 Ecology Sample Collection Requirements

Parameter	Definition	Requirement
Minimum Aliquot Number	Number of equal-volume samples collected during a storm event that are combined to create a composite sample	10 aliquots[1]
Storm Event Coverage	The percentage of the total storm volume that the collected aliquots represent	Samples shall be collected for at least 75% of the storm event hydrograph (by volume).
Maximum sampling duration	Time in hours between the collection of the first and last aliquots	36 hours
Minimum number of sample pairs	Number of storm events with successfully collected flow-proportional composite samples that meet influent concentration ranges and the storm event guidelines	12 samples

[1] As few as 7 aliquots may be accepted by Ecology (Washington State Department of Ecology, 2011).

The water quality data included in this report was obtained from 24 storm events of which 11 events met all of the TAPE storm event guidelines and sample collection requirements (qualifying criteria). The events which met all the qualifying criteria were referred to herein as "qualifying events." Another eight events met all the qualifying criteria except for one to two of the criteria. These storms were referred to as "potentially or maybe qualifying" events. Two common criteria that were not met were minimum precipitation depth and minimum number of aliquots. During the study, the target minimum precipitation depth guideline was lowered to 0.08-0.10 inches to expand the storm conditions monitored and increase the likelihood of obtaining samples. The minimum number of aliquots (10) were also not collected from several storms. In these cases, the storm event coverage was met, but the forecasted precipitation was greater than the actual precipitation and flows entering the BMP. Three of the potentially qualifying events reflected these conditions. Because the storm coverage was met, the samples were included to cover a wide range of precipitation conditions at the BMP.

Water quality data were also included as a "potentially or maybe qualifying" event if the influent storm event coverage was not equal to 75%, but minimum precipitation depth was met. These events occurred when high intensity rainfall caused ponding in the influent pipe. For this condition, the monitoring system cannot distinguish between flow and ponding and an artificially high influent volume was recorded by the data logger. It is anticipated that those events actually did achieve 75% of event coverage of the influent volume. Five of the eight potentially qualifying events reflected these conditions.

Of the 24 storm events monitored, five were determined to be "non-qualifying" events. These events did not meet three or more of the qualifying criteria in TAPE. The most common criteria not met were number of aliquots, minimum precipitation depth, storm event coverage, and storm event duration. A summary of all of the events monitored and the qualifying criteria met for those storm events can be found in Appendix B as well as Appendix D.2.

The TAPE Guidance Manual also defines the influent concentration ranges for each pollutant as shown in Table 6.5 (Section 6. 3). TAPE specifies that all data below the limit is either rejected or included, however, values cannot be "cherry picked." The upper limit defines the maximum value that can be used to calculate the removal efficiency. If values measured are larger than the upper limit, the upper limit must be used in the analysis. For this study, all values below the lower limit were included in the analysis. The site was selected to be representative of a typical location where a sand filter sidewalk vault would be installed. Some parameters' concentrations, consistently below the lower range, were included in the data analysis to show realistic pollutant removal rates for the BMP. The parameters that were below the lower range are noted below along with the frequency of which this occurred:

- TSS concentrations were below the lower influent limit 1 of 24 times.
- Dissolved zinc influent concentrations were below the lower influent limit 2/17 times.
- Dissolved copper influent concentrations were below the lower influent limit 7/17 times.
- Oils influent concentrations were below the lower influent limit 17/17 times.

6.0 RESULTS AND DISCUSSION

The goals for this study were achieved by completing the objectives outlined in Section 3.3. Each objective is noted in the subsequent section along with a summary of how the objective was achieved, the results, and discussion about the results. The QAPP Table 9.1 defines the Standard Testing Methods for parameters tested and a detailed summary of the analysis can be found in Section 14.0.

6.1 BMP DESIGN AND MAINTENANCE GUIDANCE

Objective 1: Define the BMP design and maintenance guidance for the test site.

Prior to the start of the field study, BMP design and maintenance guidance was developed for the proposed BMP. The guidance was developed based on the results from column testing (QAPP Section 3.3) and by modifying design guidance defined in the Eastern Washington Stormwater Management Manual for the basic sand filter BMP (Ecology, 2019). The following outlines the BMP design guidance and media specification followed to construct the test site. The guidance includes performance objectives, applications, limitations, siting, design criteria, sand filter media criteria, construction criteria, and maintenance criteria. Results from the field portion of this study were used to verify the design guidance and maintenance frequency which are described in Section 6.5 of this document.

6.1.1 Recommended Design Guidance and Sand Media Specification

The new BMP is sized to provide runoff treatment for the water quality event (6-month 24-hour event) with larger flows managed through the bypass pipe which is located 18-inches above the sand filter media. The methods and assumptions for sizing the BMP include:

- The BMP will be sized using the Bowstring Method as defined in the *Spokane Regional Stormwater Manual* (Spokane County, City of Spokane, and Spokane Valley, 2008) or other approved hydrology method defined in the *Ecology Stormwater Manual for Eastern Washington*.
- A catch basin Type 1 is located upstream of the sand filter sidewalk vault location.
- The sand filter sidewalk vault footprint is 20 sq.ft. (internal base area of the vault)
- The sand filter media design infiltration rate is 50 in/hr (Ksat = 100 in/hr)
- The maximum ponding depth in the sand filter is 18 inches (rise of bypass standpipe above media) during the water quality event.

Performance Objectives

The sand filter sidewalk vault is designed to meet the following performance objectives:

- Basic Treatment Goal: Effluent TSS concentration less than 20 mg/L (at influent mean concentrations of 20-100 mg/L); 80% reduction of TSS (at influent event mean concentrations of 100-200 mg/L)

- Dissolved Metals Treatment Goals: Greater than 30% reduction of dissolved copper; greater than 60% reduction of dissolved zinc
- Oil Performance Treatment Goal: Oil and grease in effluent is below 10 mg/L daily average and below 15 mg/L at any time; no visible sheen in discharge

Applications and Limitations

The applications of the sand filter sidewalk vault include the conditions listed below where basic, dissolved metals, and/or oils treatment are required:

- Residential and commercial roadways
- Locations with available space constraints
- Retrofit or re-development projects

The limitations of the sand filter sidewalk vault include:

- Design infiltration rate = 50 in/hr
- Hydraulic Loading Rate = 1.6 gallon per minute (gpm) per square foot (sq.ft.) of sand filter media area
- Sized to treat only the 6-month, 24-hour storm event (72% of the intensity calculated using the 2-year 24-hour Rational Method)
- Not designed to handle pollutant loads higher than those expected from residential or commercial roadways

Site Suitability Criteria

The characteristics to consider when assessing a potential sand filter sidewalk vault site include:

- Space availability (5-feet long, 4-feet wide) in sidewalk
- Access to a catch basin or space available for pre-settling of gross solids
- Access to a drywell or storm drain network for effluent discharge
- Adequate access for operation and maintenance of the sand filter sidewalk vault
- Contributing basin is residential or commercial roadway

Design Criteria

The sand filter sidewalk vault is sized according to the design criteria defined in the Ecology Stormwater Manuals. A summary of the criteria is listed in the bulleted list below.

- Size to infiltrate the water quality event - for Eastern Washington this is the 6-month 24-hour storm (72% of the intensity calculated using the 2-year 24-hour Rational Method)
- Bypass standpipe set at 18 inches above media. When the ponding depth exceeds the height of the standpipe, runoff will overflow into the standpipe (bypassing treatment) and discharge to the drywell or storm drain network.

- Design infiltration rate is 50 in/hr
- Hydraulic Loading Rate is 1.6 gallons per minute (gpm) per square foot (sq.ft.) sand filter media surface area
- Western Washington: for treatment installed upstream of detention or retention, the water quality design flow rate is the peak 15-minute flow rate as calculated using the latest version of the Western Washington Hydrology Model or other Ecology-approved continuous runoff models.
- Eastern Washington: For treatment installed upstream of detention or retention, the water quality design flow rate is the peak 15-minute flow rate as calculated using one of the three methods described in the *Stormwater Management Manual for Eastern Washington* (SWMMEW) or local manual.

Pre-settling Device

A catch basin type 1 structure should be located upstream and immediately adjacent to the sand filter sidewalk vault. A summary of the criteria is listed below:

- The type 1 catch basin and metal inlet grate will meet the Spokane County Standards for Road and Sewer Construction (Spokane County, 2018).
- The catch basin will contain a downturned 90° elbow on the pipe leaving the catch basin.
- The invert elevation of the pipe leaving the catch basin (vault influent pipe) will be set above the bypass top elevation in the sand filter sidewalk vault.

Please note: the influent pipe will enter the sand filter vault on the opposite side of the vault from the bypass pipe.

Sand Filter Media Criteria

The sand filter media placed within the sand filter sidewalk vault will be 18 inches minimum in depth and must consist of a coarse sand meeting the size gradation provided in Table 6.1.

Table 6.1 Sand Filter Media (C2100 Coarse Sand) Gradation

U.S. Sieve Number	Particle Diameter (mm)	Percent Passing Range (%)
3/8	9.50	100
4	4.75	98-100
8	2.36	50-68
16	1.19	14-30
30	0.60	4-14
50	0.30	1-6
100	0.15	0-3
200	0.07	0-2

The sand filter media is placed on top of a 3-inch-thick layer of choke stone which overlays a slotted underdrain pipe and another 6-inch layer of choke stone is used as the pipe bedding layer.

Pea Gravel is used for both the choke stone and pipe bedding. The gradation of Pea Gravel is summarized in Table 6.2.

Table 6.2 Choke Stone and Pipe Bedding (Washed Pea Gravel) Gradation

U.S. Sieve Number	Particle Diameter (mm)	Percent Passing Range (%)
1/2	12.7	100
3/8	9.50	90-100
4	4.75	20-55
8	2.36	0-30
16	1.19	0-10
50	0.30	0-5
200	0.07	0-1

Within the pea gravel layer is an underdrain which collects flow and conveys the effluent to a collector pipe and then to a drywell or storm drain network. The underdrain pipe should meet the specifications listed below.

- 3-inches of the choke stone should be placed above the underdrain and underneath the sand filter media
- Size to handle the two-year return frequency flow, assuming at least one foot of hydraulic head above the invert of the collector pipe leaving the sand filter sidewalk vault
- Use an underdrain pipe with an internal diameter of 6-inches, with two rows of ½-inch holes spaced six inches apart longitudinally, and holes 120° apart (pipe laid with holes downward)
- The underdrain slot side of the pipe should be placed on top of the bottom of the vault

Coconut coir is laid on top of the sand filter media in the sand filter sidewalk vault to dissipate energy of influent stormwater, assist with distributing runoff over the sand filter media surface, and provide some treatment through the CEC of the material. The coconut coir to be used is approximately 1.5 inches thick. A specification sheet for the coconut coir used in the study is included in Appendix L of the study QAPP.

Construction Criteria

No runoff should enter the catch basin or sand filter sidewalk vault prior to completion of construction and approval of site stabilization by the responsible inspector. Level placement of sand filter media during installation is important to avoid formation of voids within the sand that could lead to short-circuiting. Sand filter media will be placed into the vault in 6-inch lifts above the choke stone layer. After each 6-inch lift, water will be used to compact and settle the sand filter media. Once all of the 6-inch lifts have been settled, the coconut coir mat can be placed on top of the sand filter media and secured in place with landscape staples.

Maintenance Criteria

Maintenance requirements focus on two elements of the BMP: the upstream catch basin and the sand filter media.

- Catch Basin - inspection and maintenance of the catch basin acting as a pre-settling basin for the sand filter sidewalk vault will occur in accordance with the Eastern Washington Phase II Municipal Stormwater Permit: catch basins are inspected every two years and cleaned if operation and maintenance standards set by the County determine maintenance is required (Washington State Department of Ecology, 2019). According to County maintenance standards, catch basins will be inspected and cleaned as needed semi-annually.
- Sand Filter Sidewalk Vault - maintenance frequency of the sand filter sidewalk vault will be assessed during the study. Triggers for maintenance include measured bypass flows that occur when the hydraulic loading rate is less than or equal to 1.6 gpm/sq.ft. In addition, sediment accumulation will be measured (on top of the sand filter media) and compared to the change in infiltration rate. Prior to measured rate dropping below the design infiltration rate, accumulated sediment will be measured and collected for analysis. If necessary, the coconut coir mat will be removed, and the top 6 inches of sand filter media will be removed by a vactor truck. A new 6-inch lift will be placed and settled using the procedures outlined in the previous section (Construction Criteria). The coconut coir mat will also be cleaned by either sweeping or rinsing accumulated debris from the top of the mat in an appropriate location, such as a decant facility, to limit any sediment transport to the storm drain system. The mat will also be shaken to remove remaining debris in an appropriate location and replaced on the sand filter media.

6.2 WATER QUALITY DATA ANALYSIS

Objective 2: Determine the pollutant removal efficiency of the BMP by measuring and comparing the pollutant concentrations in the influent and effluent.

The following sections describe the analysis conducted to summarize the storm reports, compare the influent and effluent pollutant concentrations, and calculate the pollutant removal efficiency. Raw data and calculations for this section can be found in Appendix A, Appendix B, and Appendix D.

6.2.1 Storm Reports

For each storm event where samples were collected, a storm report was created to determine whether the storm met qualifying storm criteria (described in Section 5.0), define flow characteristics through the sand filter media for a variety of influent conditions, and estimate pollutant removal. Storm reports were developed using data downloaded from the data logger at the test site, which included precipitation, flow, temperature, sample quantity, and equipment information for each time step (every 15 minutes or every 5 minutes if greater than or equal to 0.04 inches of precipitation had fallen in the previous 6 hours). An analysis of the data was performed to summarize the information in Table 6.1 for each storm.

Table 6.1 Storm Report Data Summary

Data	Definition
Storm date	The date when the storm began; used to identify the individual storm event.
Total storm precipitation depth	The cumulative precipitation following the initial antecedent dry period (6 hours with 0.04 inches or more of precipitation).
Storm duration	The length of time between storm start (6 hours minimum with greater than or equal to 0.04 inches of precipitation) and end (6 hours with less than 0.04 inches of precipitation).
Storm average precipitation intensity	Equal to the total rainfall amount divided by the total rainfall duration.
Storm peak precipitation intensity	Obtained from the time interval with the maximum precipitation depth per time.
Total influent, effluent, and bypass flow volume	The total volume of influent, effluent, and bypass from storm start to end.
Influent, effluent, and bypass peak flow rates	The peak influent, effluent, and bypass flow rate for a time interval during the storm event.
Influent, effluent, and bypass average flow rates	The average influent, effluent, and bypass flow rate during the storm event.
Number of influent and effluent aliquots	The total number of aliquots (individual samples which create a composite sample) collected during the storm event.
Influent and effluent sample duration	Equal to the time in hours between the collection of the first and last aliquots for the influent and effluent autosamplers.
Percentage of influent and effluent storm volume sampled	Equal to the product of total number of aliquots and the threshold volume, divided by the total storm volume. The threshold is an estimated volume of stormwater that must pass through the influent or effluent before an aliquot is collected.
Water quality parameters monitored	Summarizes analytical results for parameters which were sampled during the storm event
Pollutant removal efficiency	Equal to the difference between the influent and effluent parameter concentrations, divided by the influent parameter concentration.
Analytical laboratory detection limits and flags	The limits at which parameters can be detected by the analytical method and any quality control or quality assurance flags that the laboratory includes in the analytical report.

Copies of the storm reports for each storm event in which samples were collected can be found in Appendix B. Results for TSS, dissolved copper, dissolved zinc, oils (TPH), and the screening parameters for the study are summarized in each storm report. The TSS, TPH, dissolved copper, and dissolved zinc water quality data included in the storm reports were used to perform the analyses described in the following sections of the report. Specifically, the analytical results for the parameters and associated pollutant removal efficiencies were used to conduct the statistical comparison of influent and effluent concentrations, calculate removal efficiencies, and compare results to TAPE treatment performance goals.

6.2.2 Statistical Analysis

A statistical analysis was performed using water quality data obtained during the study to assess whether there was a statistically significant difference in the analytical results of influent and effluent pollutant concentrations for TSS, TPH, dissolved copper, and dissolved zinc. Screening parameters were not included in the statistical analysis as the number of data points for each parameter was not sufficient to run an analysis.

The statistical analysis consisted of first determining whether the data was normally distributed. The data was then compared to determine whether influent and effluent pollutant concentrations for a certain parameter were significantly different. The following paragraphs include a more detailed description of the analysis as well as the results of the analysis.

Influent and effluent concentrations for TSS, dissolved copper, dissolved zinc, and TPH were evaluated using the Ryan-Joiner test to determine whether each dataset was normally distributed. Normality was assumed if the test produced a p-value greater than 0.05. From the Ryan-Joiner test it was found that dissolved zinc influent and effluent concentrations were normally distributed, as were dissolved copper influent concentrations. The remaining datasets were non-normally distributed. The normality of each dataset determined which statistical analysis method to use to determine whether influent concentrations were significantly different from effluent concentrations.

The two-sample t-test was used for normal data while the Mann-Whitney test was used for non-normal data. These tests were used to determine whether influent and effluent datasets were statistically significantly different. Both tests use a 95% confidence interval to decide whether the null hypothesis is void, or that there is a statistically significant difference between the two datasets (influent and effluent concentrations). The specific null hypothesis (H_o) and alternative hypothesis (H_a) evaluated were:

- H_o: Effluent pollutant concentrations are equal to the influent concentrations
- H_a: Effluent concentrations are less or greater than influent concentrations

The two-sample t-test was used to test the difference between dissolved zinc influent and effluent concentrations. The Mann-Whitney test was used for the TSS, dissolved copper, dissolved zinc, and TPH influent and effluent concentrations. Although the dissolved copper and TPH influent concentration datasets were normally distributed, the dissolved copper and TPH effluent concentration datasets were not; it was assumed that the Mann-Whitney test would be a more appropriate test to use for the analysis. Results from the statistical analysis indicate a statistically

significant difference existed between influent and effluent concentrations for TSS and dissolved zinc. However, the influent and effluent concentrations are statistically insignificant for dissolved copper and TPH. The results of the statistical analysis are summarized in Table 6.2. Calculations and output from the statistical analysis can be found in Appendix D.1.

Table 6.2 Summary of Influent and Effluent Concentrations Statistical Comparison

Pollutant	Normally Distributed?	Statistically Significant Difference?	P Value (>0.05 No Difference)
TSS	No	Yes	0.000
Oils (TPH)	No	No	0.371
Dissolved Copper	No	No	0.679
Dissolved Zinc	Yes	Yes	0.039

6.2.3 Pollutant Removal Efficiency

The sand filter sidewalk vault BMP pollutant removal efficiency was calculated for TSS, TPH, dissolved copper, and dissolved zinc for each storm event in which the parameter was tested using Equation 1. The concentrations of parameters tested represent a flow-weighted average concentration from the composite samples collected during the storm event (see Table 4.1). If any non-detect results were reported from analytical testing of the effluent concentration, the reporting limit for the respective pollutant was used. The pollutant removal efficiencies calculated are summarized in the storm report for each storm sampled (Appendix B) as well as in Appendix D.2 for comparison to TAPE treatment performance goals. Table 6.3 provides the average pollutant removal efficiencies for each storm event. *Additional discussion of the results for TSS, TPH, dissolved copper, and dissolved zinc is included Section 6.3.*

$$\text{Average Removal Efficiency} = 100 \times \frac{C_{in} - C_{eff}}{C_{in}} \qquad \text{Equation 1}$$

Where:

C_{in} = flow-weighted average influent concentration (mg/L)
C_{eff} = flow-weighted average effluent concentration (mg/L)

The removal efficiencies for screening parameters (Total Phosphorus, Orthophosphate, Hardness, pH, and Particle Size Distribution (PSD)) were also analyzed using Equation 1. TAPE requires analytical testing of these parameters (minimum of three samples) to further assess the BMP treatment performance. These parameters were included to determine whether restrictions may be required for locating the BMP (e.g., if phosphorus is being exported, the BMP could not discharge to a nutrient sensitive water body) and to understand the stormwater chemistry (e.g., parameter behavior changes with pH and hardness can influence the toxicity of dissolved metals). PSD is included to determine whether the influent to the treatment system is representative of Pacific Northwest stormwater and to determine the particle size that is reduced in the effluent (Washington State Department of Ecology, 2011). Table 6.4 includes a summary of average screening parameter removal efficiencies and average influent and effluent concentrations. Results for each storm can be found in Appendices A and B.

Table 6.4 provides a summary of the average influent, effluent, and removal efficiency for the screening parameters. Reductions were observed for total phosphorus (27.84%) and orthophosphate (1.22%). There was a slight increase in pH (mostly increasing towards pH = 7.0);

however, the difference between the influent and effluent are statistically insignificant, and the increase in hardness concentrations (-12.79%) suggests the media leaches calcium and/or magnesium. For PSD, reductions were observed for larger particle sizes (>250mm, 250-62.5mm) while smaller sizes (<62.5mm) were exported through the media. This suggests that the sand filter media is more effective at trapping larger particle sizes than sizes below the 62.5mm limit. Per the TAPE guidance the PSD performance is acceptable for pre-treatment BMPs; however, it is not acceptable for basic treatment BMPs. Based on these results, a smaller grain media is needed to retain particle sizes less than 62.5 mm.

Table 6.3 Pollutant Removal Summary by Storm Event

Storm Event	TSS Reduction	Oils (TPH) Reduction	Dissolved Copper Reduction	Dissolved Zinc Reduction
10/21/2019	78.9%	78.0%	44.6%	65.4%
11/19/2019	47.8%	50.7%	4.8%	32.8%
1/28/2020	90.8%	ND	16.9%	11.3%
5/2/2020	-3.4%	NT	-59.4%	29.1%
5/17/2020	63.4%	ND	31.0%	62.3%
5/20/2020	75.7%	NT	-58.5%	-25.0%
12/7/2019	43.8%	ND	33.9%	49.0%
1/6/2020	77.9%	8.8%	-14.8%	28.2%
5/31/2020	68.0%	17.3%	-49.0%	6.8%
6/14/2020	72.4%	-9.6%	-8.3%	2.5%
6/16/2020	36.8%	NT	-67.1%	22.9%
7/1/2020	20.5%	NT	-44.3%	19.3%
9/25/2020	73.1%	-15.1%	4.8%	64.0%
9/23/2020	16.1%	ND	-18.8%	55.4%
10/10/2020	61.2%	ND	-31.9%	33.4%
10/13/2020	64.6%	ND	No data for this storm event.	
11/5/2020	79.1%	ND	-15.3%	46.6%
11/13/2020	55.8%	NT	-71.0%	-28.0%
Average:	53.4%	16.6%	-17.79%	28.0%

Table 6.4 Summary of Screening Parameter Pollutant Removal Results

Screening Parameters	Average Removal Efficiency	Average Influent Concentration (mg/L)	Average Effluent Concentration (mg/L)
PSD, >250 mm	55.29%	10.29	2.89
PSD, 250 - 62.5 mm	48.30%	23.64	9.87
PSD, <62.5 mm	-11.19%	75.22	92.10
Total Phosphorus	27.84%	0.488	0.308
Orthophosphate	1.22%	0.0464	0.0458
Hardness	-12.79%	33.08	34.02
pH	-0.98%	6.63	6.69

6.3 COMPARISON OF RESULTS TO TAPE TREATMENT PERFORMANCE GOALS

Objective 3: Determine whether the treatment performance goals were achieved by comparing study results to TAPE goals and requirements.

The Ecology treatment performance goals for Basic, Dissolved Metals, and Oils Treatment were compared to the removal efficiencies for TSS, dissolved copper and zinc, and oils. TSS effluent concentrations were also compared to these goals because the influent concentration for 16 of the TSS samples was below 100 mg/L. The treatment goal for samples below this influent concentration is TSS effluent concentration less than 20 mg/L. The treatment goals are evaluated using the bootstrap method to determine the one-tailed upper 95% confidence interval for mean effluent concentrations and the one-tailed lower 95% confidence interval around the mean pollutant removal efficiency. Results of the bootstrap method compared to TAPE treatment performance goals are displayed in Table 6.5.

Table 6.5 Ecology Treatment Performance Goals

Performance Goal	Pollutant	Influent Concentration Range	Treatment Performance Criteria	Study Water Quality Data Results	Treatment Performance Goal Achieved
Basic Treatment	Total Suspended Solids (TSS)	20-100 mg/L	Effluent <20 mg/L	31.9 mg/L	No
		100-200 mg/L	80% Reduction	38%[1]	No
Dissolved Metals Treatment	Dissolved Copper (Cu)	5.0-20.0 µg/L	30% Reduction	-32.2%	No
	Dissolved Zinc (Zn)	20-300 µg/L	60% Reduction	16.7%	No
Oil Treatment	NWTPH-Dx, visible sheen	Total petroleum hydrocarbons (TPH) > 10 mg/L	1) No ongoing or recurring visible sheen in effluent 2) Daily average effluent conc. < 10 mg/L 3) Max. effluent conc. of 15mg/L for a discrete sample	1.37 mg/L	No

[1] This value represents only two data points. Additionally, TAPE requires TSS influent concentrations above the influent concentration range be artificially set to 200mg/L; if influent concentrations are not artificially set to 200mg/L, the value becomes 78%.

Based on the results from the bootstrapping method, the sand filter sidewalk vault BMP did not meet treatment performance goals for Basic, Oils, or Dissolved Metals Treatment. One reason the removal efficiencies are low is because almost all the influent concentrations used to calculate

these values are on the low end or below the TAPE influent concentration range for all parameters (Figures 6.1-6.4). It is well documented that removal efficiencies are higher when the influent concentration is higher and, conversely, removal efficiencies are lower when the influent concentration is lower. In addition, the media grades appear to be too large based on the results from the PSD testing.

Dissolved metals removal was anticipated based on the high cation exchange capacity (CEC) of the coconut coir mat. While some of the highest reductions were observed during the storm events right after the media was installed, the removal efficiency for storm events (Table 6.3) only achieved the Ecology treatment goals (30% for dissolved copper and 60% for dissolved zinc) three times for each parameter during testing and leaching was observed for both parameters, especially copper. One reason is because the sediment accumulation increased with each storm and eventually clogged the textile pores of the coir mat limiting the achieved contact time.

For oils, seven of the 14 influent samples were non-detects and the other seven were significantly lower than the TAPE influent range (>10mg/L). Based on the influent concentration and number of samples, more testing is needed to determine if the BMP could achieve the TAPE performance criteria for oils.

Additional graphs of the parameters were created to evaluate the treatment performance including box plots which show the spread and distribution of the data for both the influent and effluent (Figures 6.5-6.8). The effluent concentration divided by the influent concentration was also graphed to evaluate how the treatment performance changed over time (Figures 6.9-6.12). Except for copper, no pattern was observed in the data that indicated the treatment performance changed over time. For copper, there appears to be a decline in the treatment performance over time (Ce/Ci appears to be increasing).

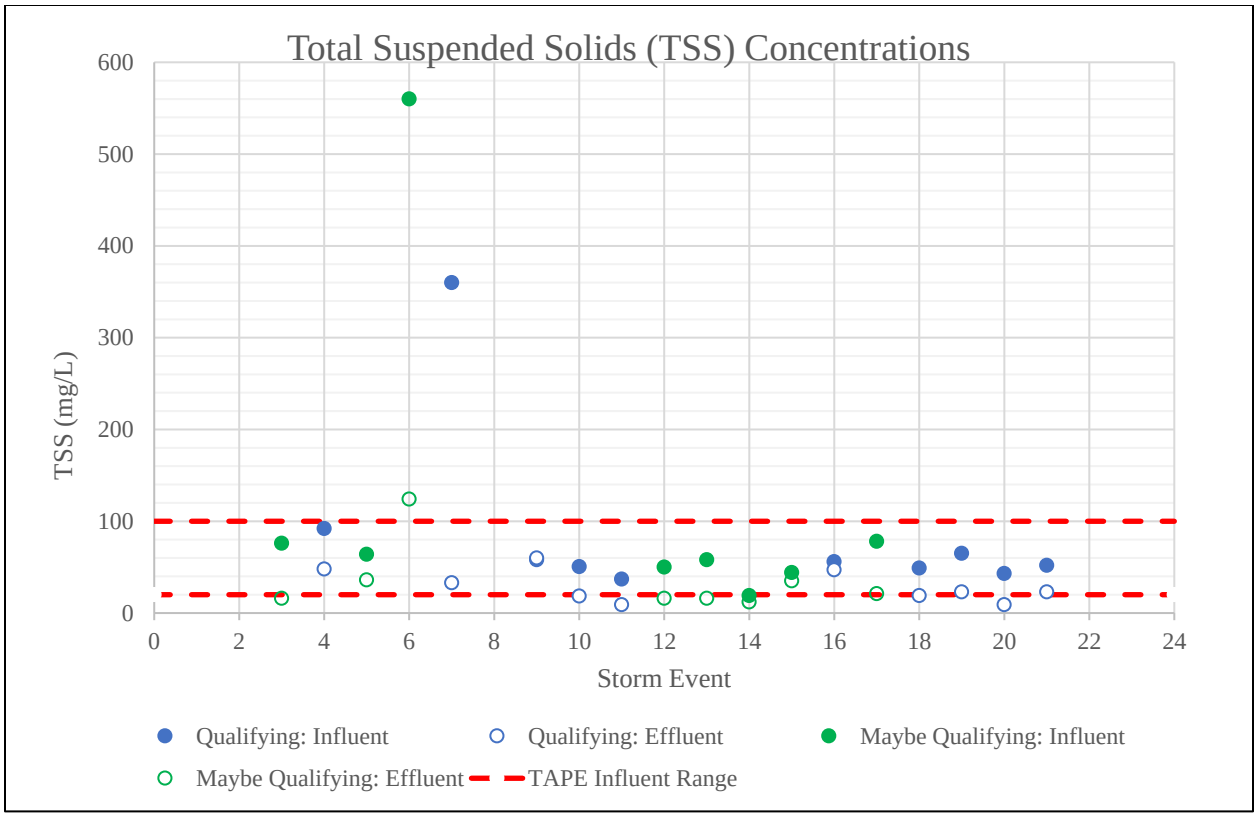


Figure 6.1 TSS Influent & Effluent Concentrations and TAPE Influent Range

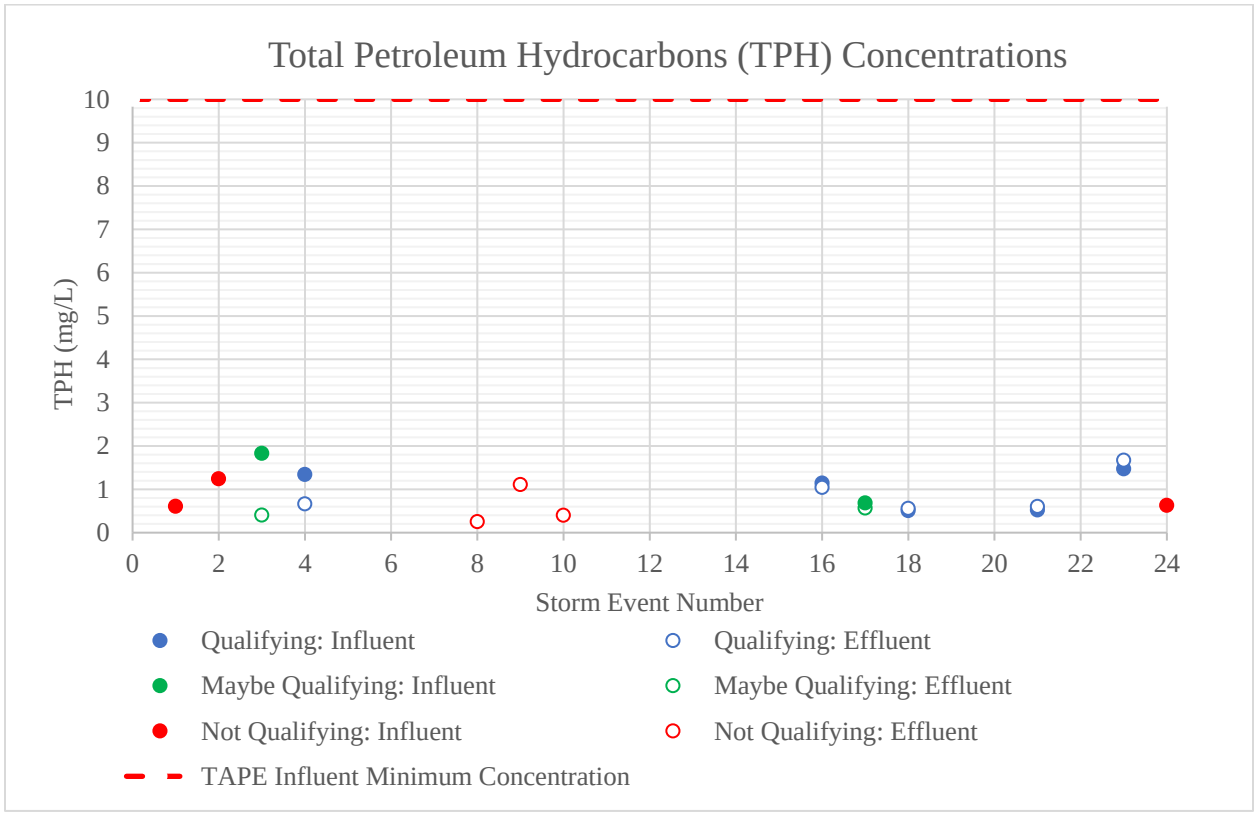


Figure 6.2 TPH Influent & Effluent Concentrations and TAPE Influent Range

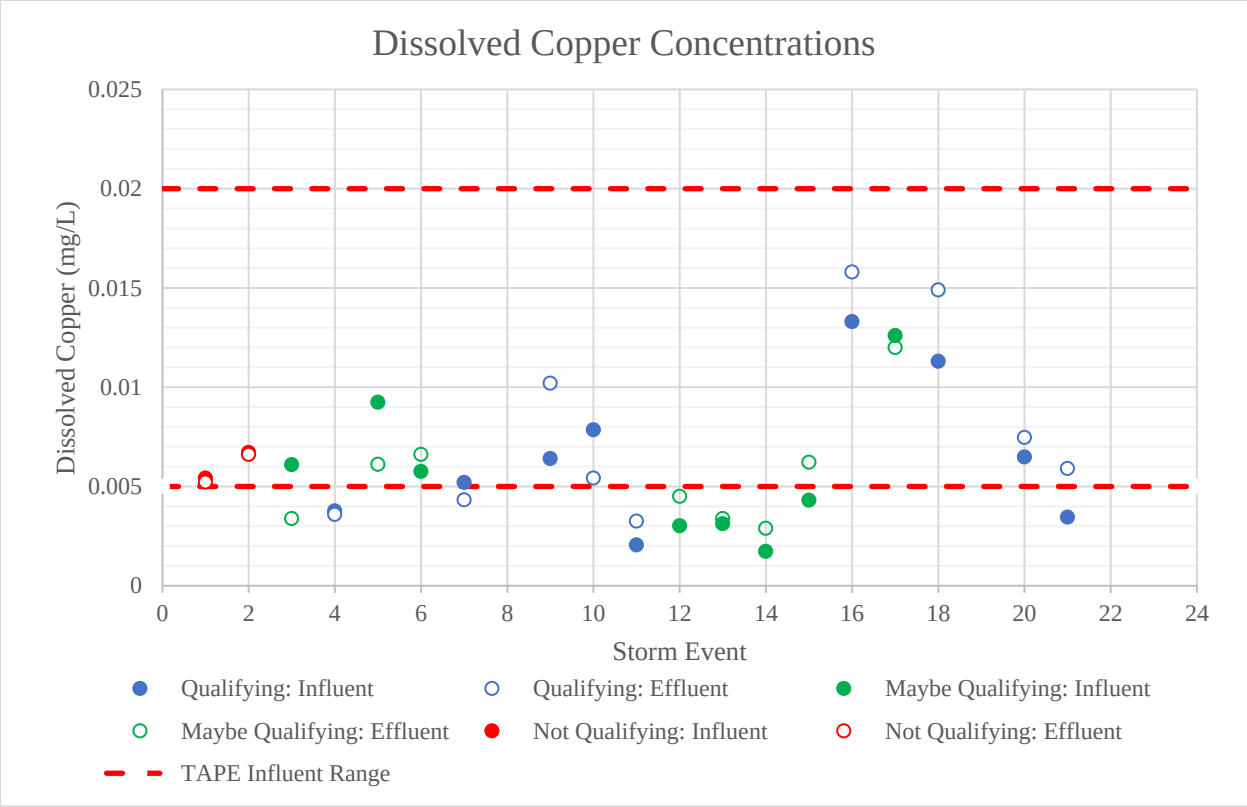


Figure 6.3 Dissolved Copper Influent & Effluent Concentrations and TAPE Influent Range

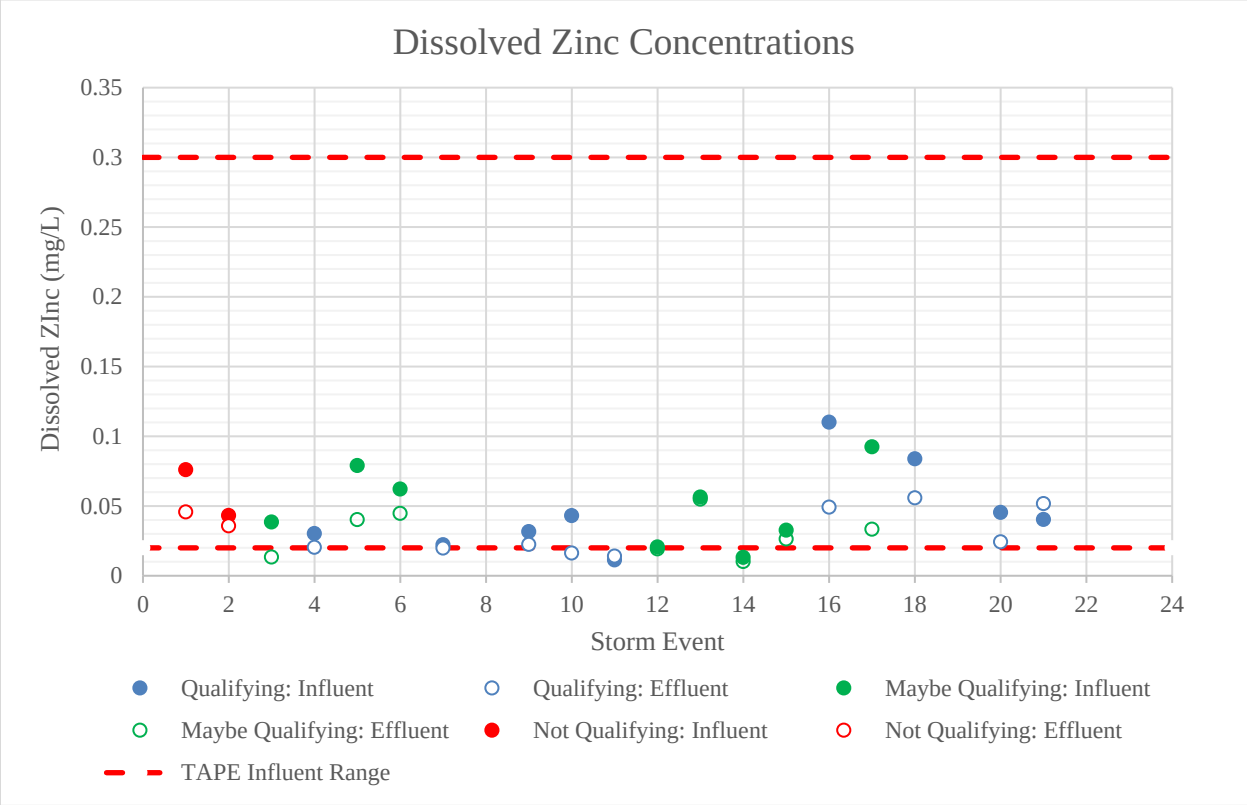


Figure 6.4 Dissolved Zinc Influent & Effluent Concentrations and TAPE Influent Range

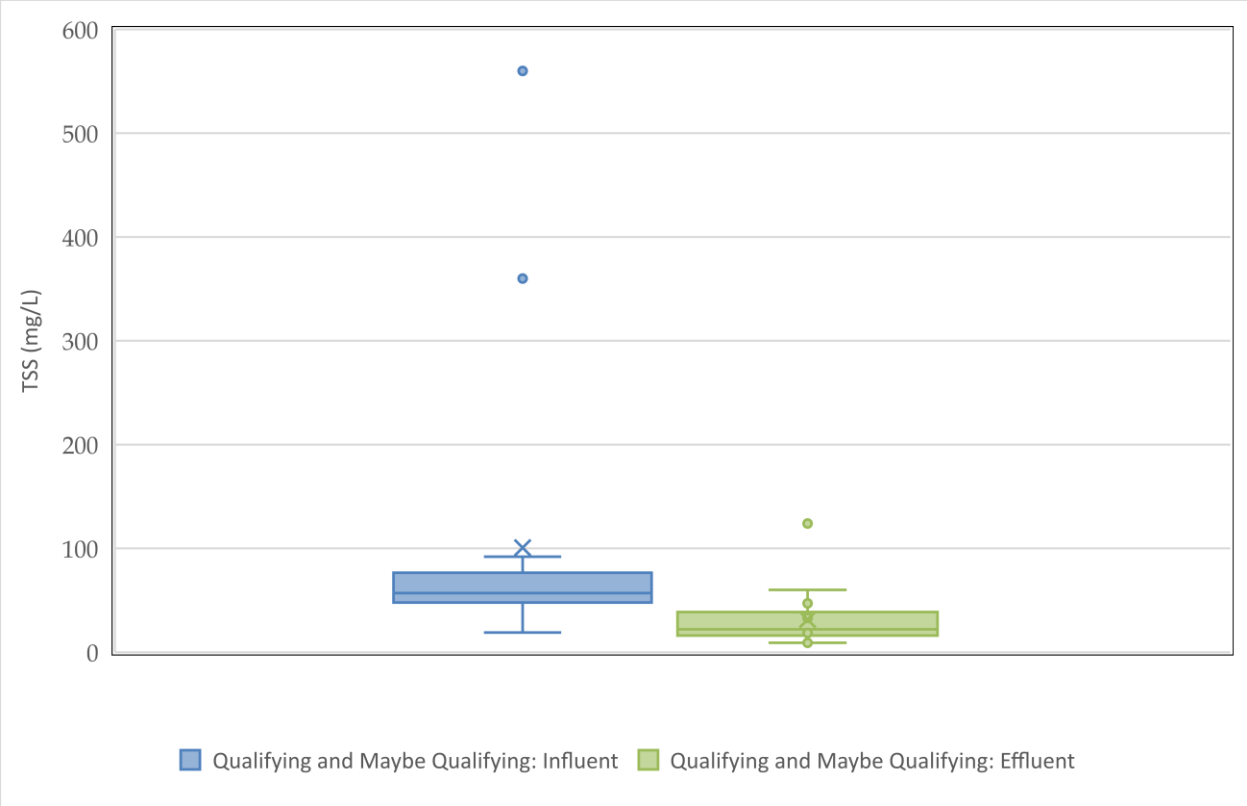


Figure 6.5 TSS Box Plots for all Qualifying and Potentially Qualifying Sample Events

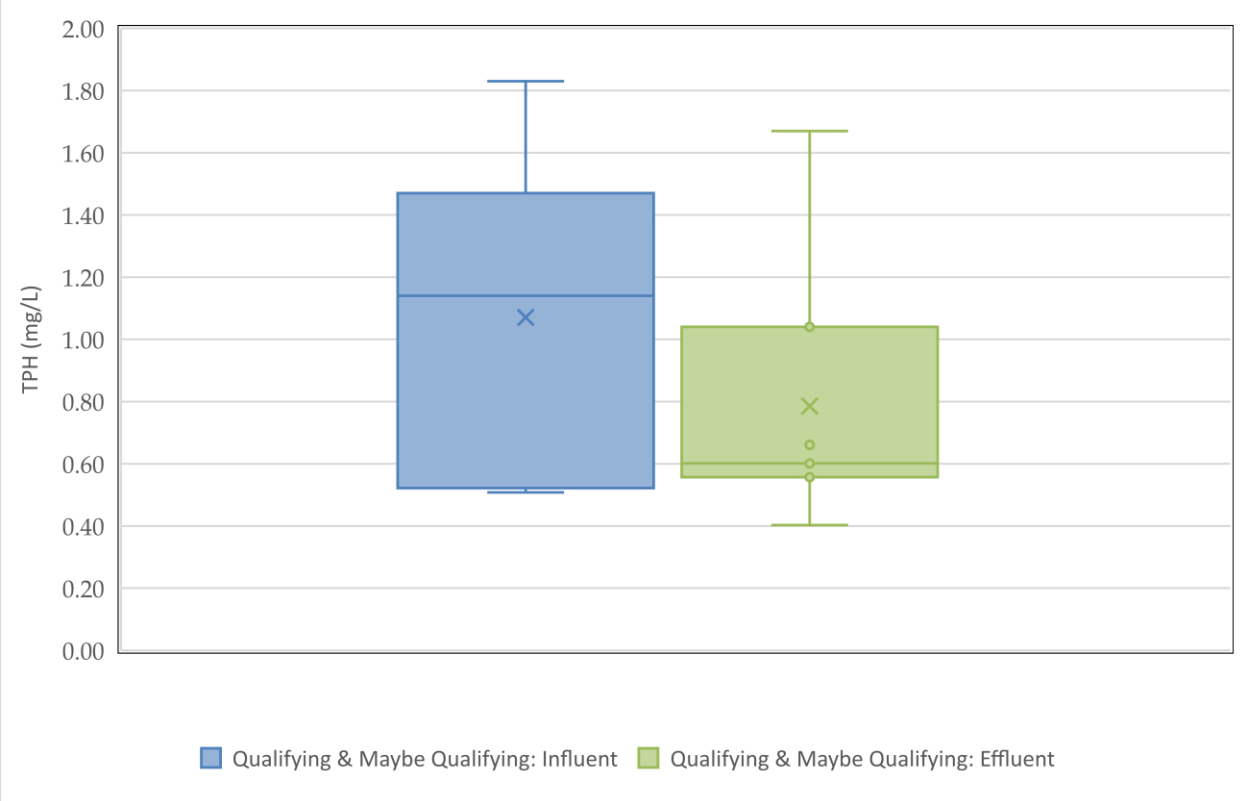


Figure 6.6 TPH Box Plots for all Qualifying and Potentially Qualifying Sample Events

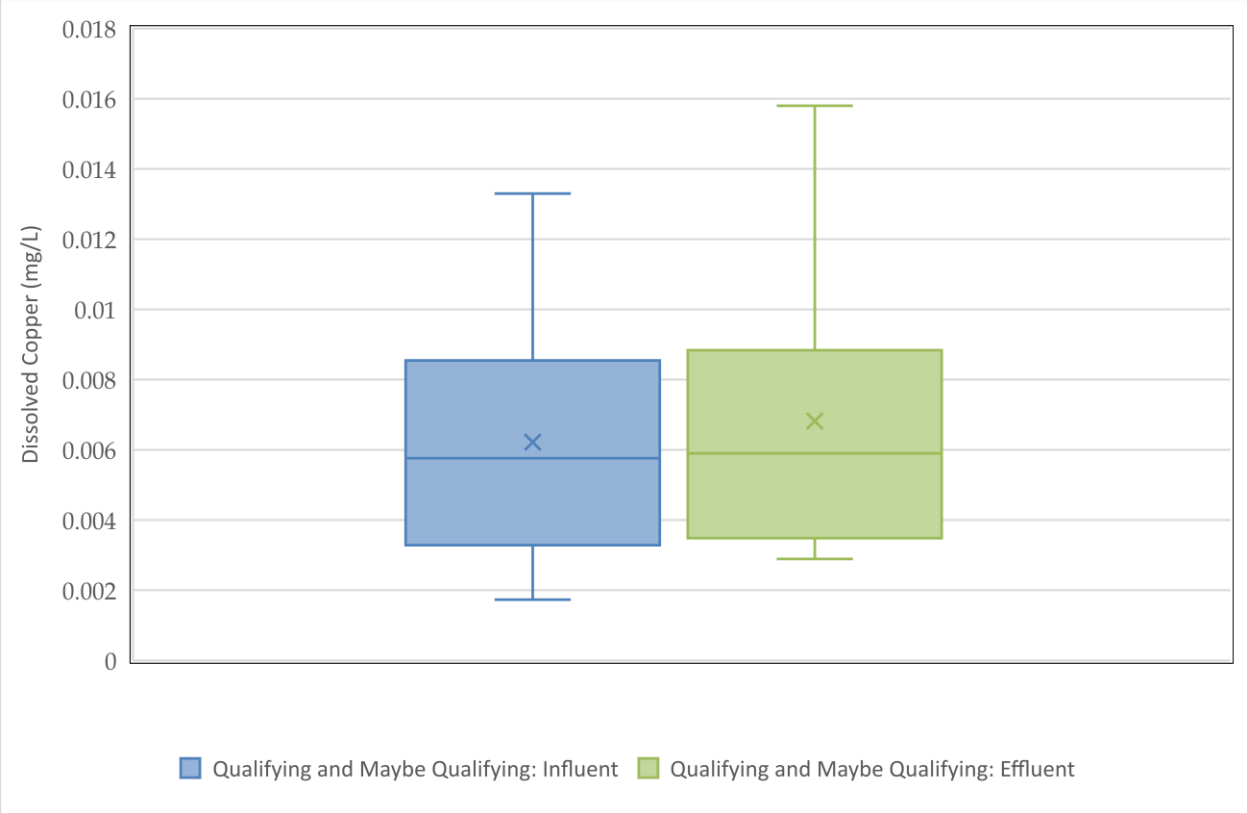


Figure 6.7 Dissolved Copper Box Plots for all Qualifying and Potentially Qualifying Sample Events

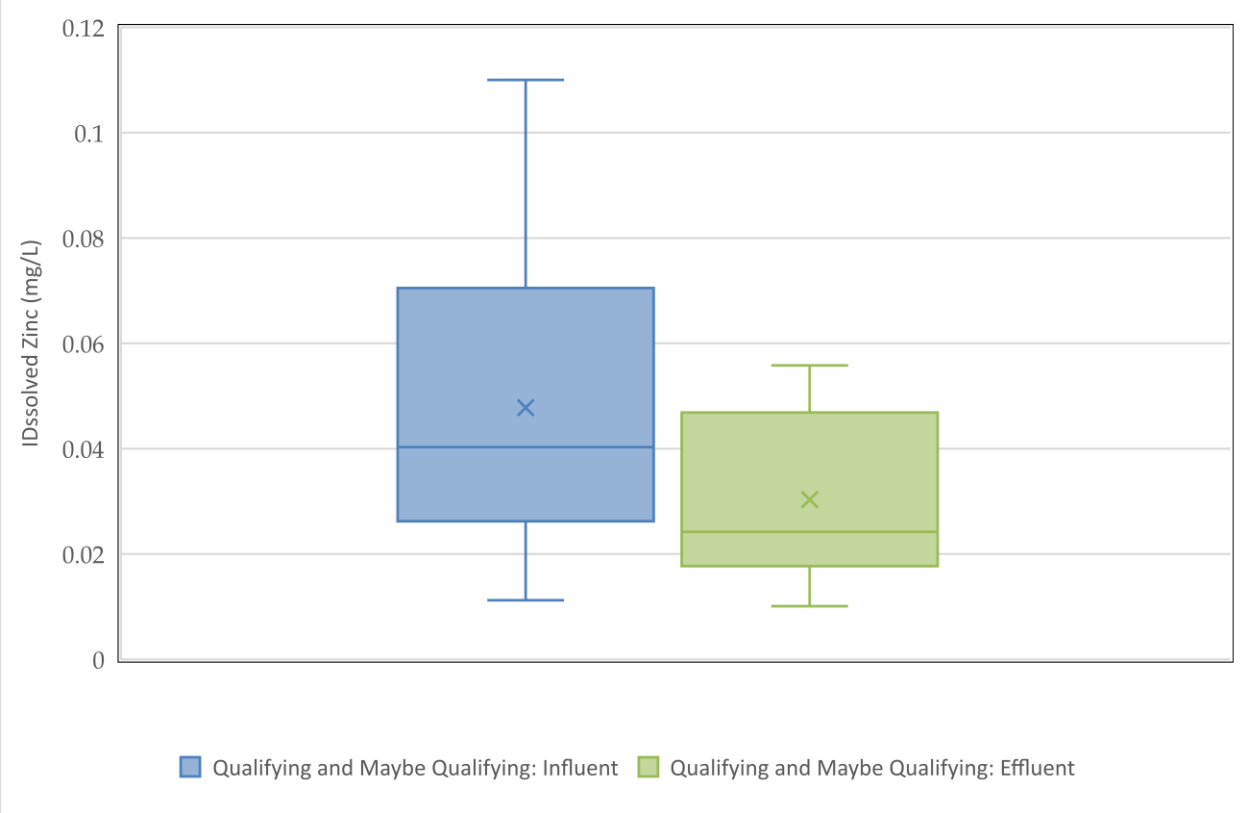
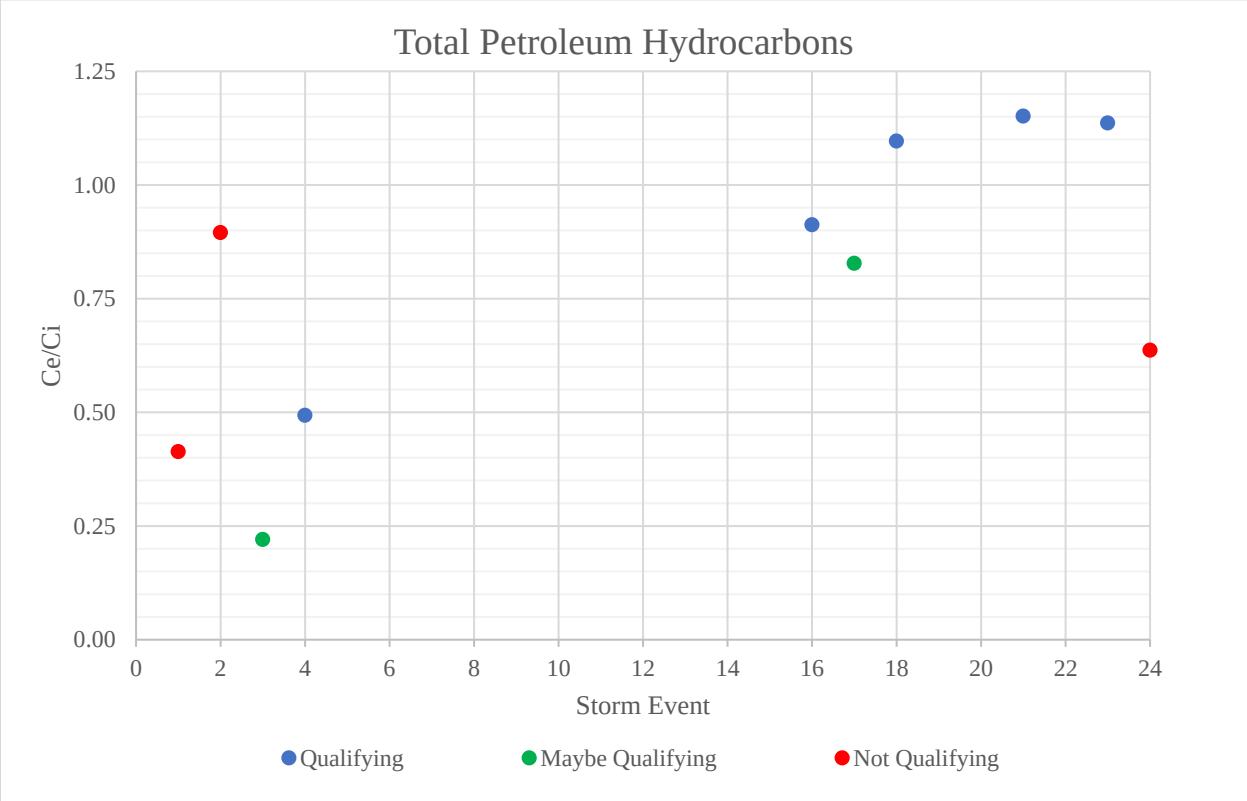
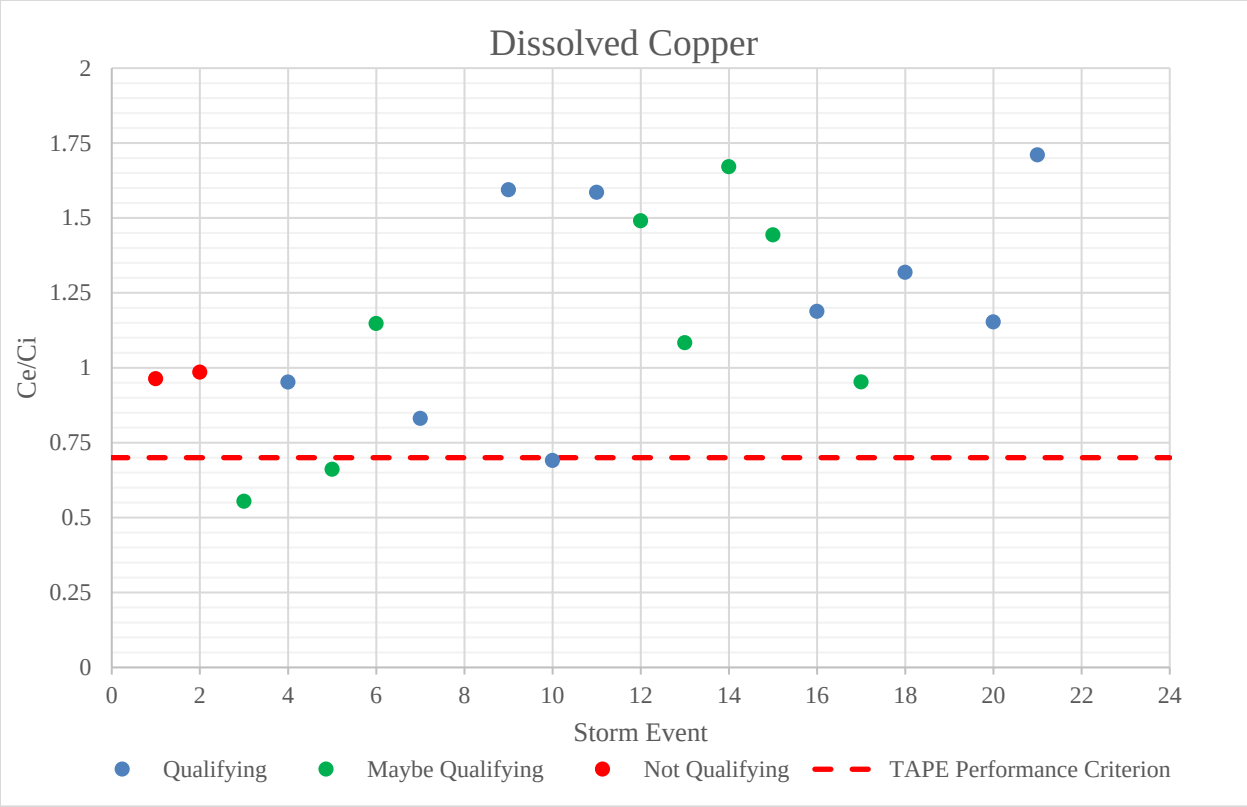


Figure 6.8 Dissolved Zinc Box Plots for all Qualifying and Potentially Qualifying Sample Events

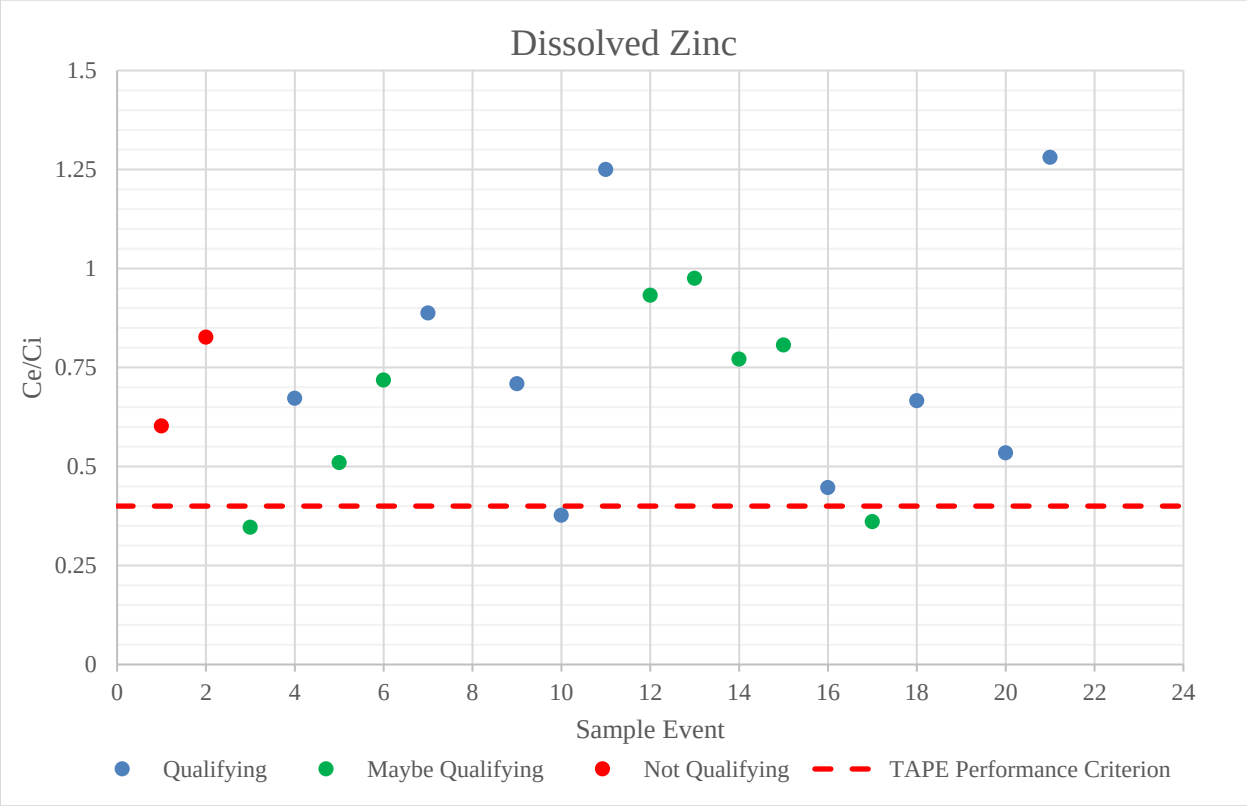
6.9 TSS Effluent/Influent Concentrations for Qualifying & Potentially Qualifying Sample Events



6.10 TPH Effluent/Influent Conc. for Qualifying & Potentially Qualifying Sample Events



6.11 Dissolved Cu Effluent/Influent Conc. for Qualifying & Potentially Qualifying Sample Events



6.12 Dissolved Zn Effluent/Influent Conc. for Qualifying & Potentially Qualifying Sample Events

6.4 BMP DESIGN FLOW

Objective 4: Establish a design flow in gallons per minute per square foot of the sand filter surface area.

The peak and average hydraulic loading rate was calculated for each sample event and compared to the 1.6 gpm/sq.ft. proposed hydraulic loading rate to assess whether this rate is appropriate for the proposed BMP. The approach for this assessment and the results were as follows:

- Measured Hydraulic Loading Rate Range – the measured hydraulic loading was calculated for each storm event to verify that samples were collect from events that were both higher and lower than the proposed design rate. A comparison of the hydraulic loading rates is shown in Figure 6.13 which indicates that the treatment performance was evaluated over a range of hydraulic loading rates: average peak of 1.94 gpm/sq.ft. (ranged from 0.04 to 13.6) and 0.48 gpm/sq.ft. (ranged from 0.01 to 3.76).
- TSS Treatment Performance vs Hydraulic Loading Rate – the TSS removal efficiency for each storm was compared to the hydraulic loading rate to assess whether there was a relationship (Figure 6.14). Trendlines were used to assess the relationship along the line equation and R value. As noted on the graph, the trendline has a slight decline as the removal efficiency increases and the hydraulic loading rate declines; however, the R value is zero for both the average and peak average rate which suggests there is no relationship between the TSS treatment performance and hydraulic loading.
- Bypass flow – the bypass hydraulic loading rate was compared to the measured peak and average hydraulic loading rate, precipitation depth, and design hydraulic loading rate (Figure 6.15). As previously noted, this BMP is designed to treat the water quality event without overflowing into the bypass pipe. The water quality event (6-month 24-hour event) has a precipitation depth of 1 inch at the test site. Considering the test site is approximately five times larger (18,000 sq.ft.) compared to the target basin size (3,500 sq.ft.) in which the sand filter sidewalk vault would be located, the equivalent precipitation depth for the target site is 0.20 inches. The equivalent precipitation depth is shown as an orange line on Figure 6.15. None of the bypass flows occurred at this depth, suggesting the proposed design hydraulic loading rate is acceptable for the target test site.

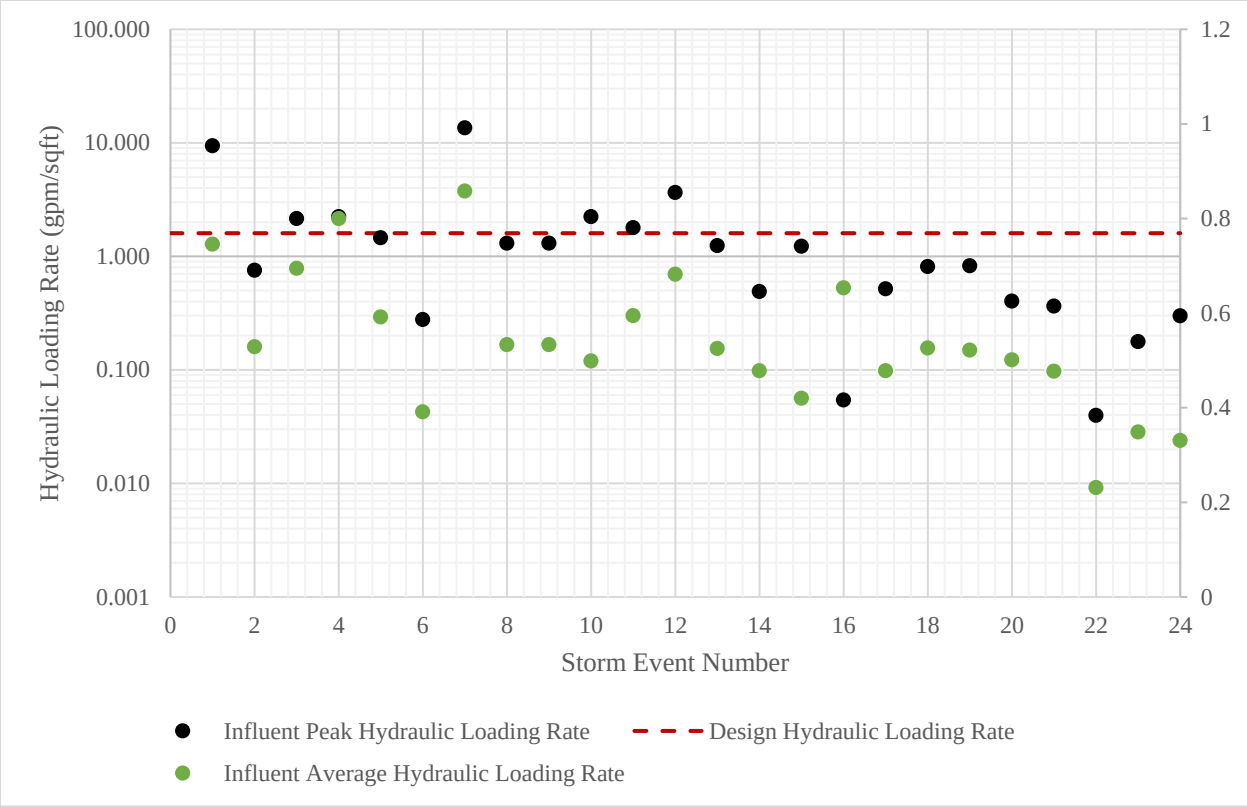


Figure 6.13 Hydraulic Loading Rate Ranges Measured During the Study: Design, Peak, Average

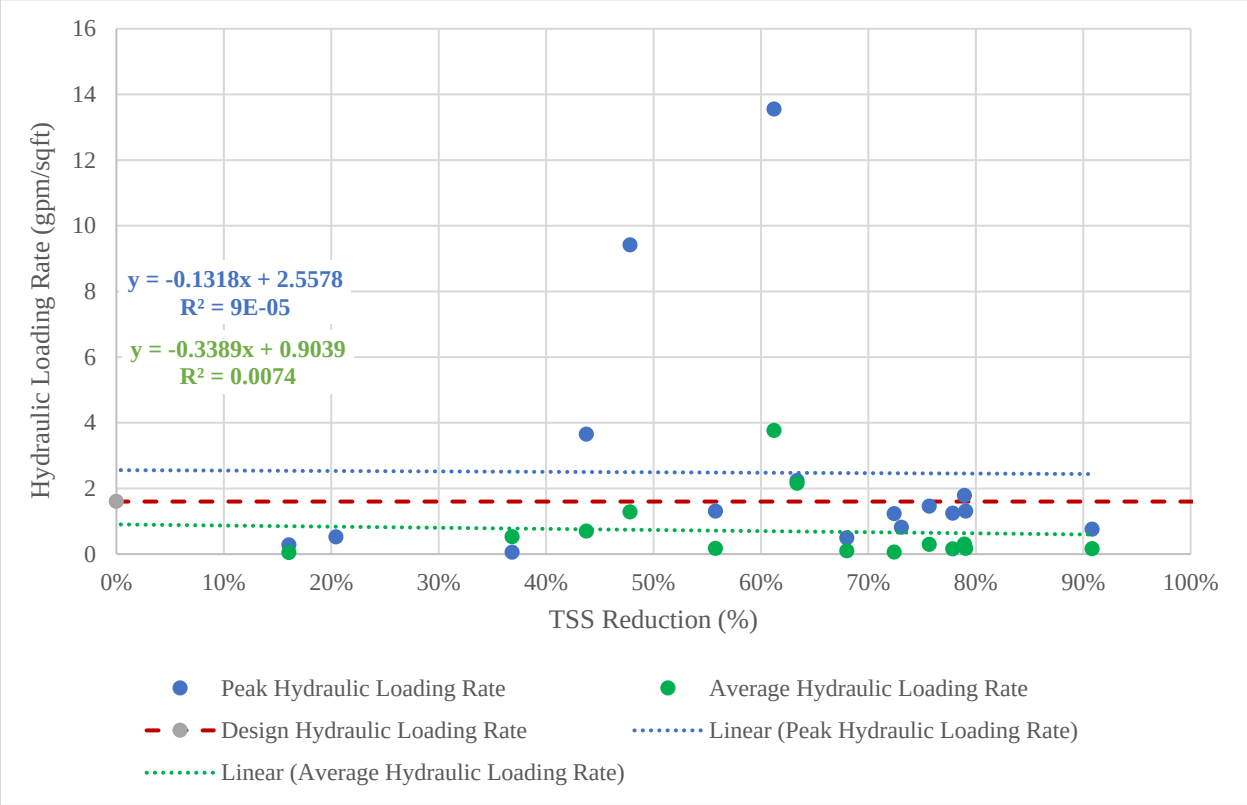


Figure 6.14 Design Hydraulic Loading Rates Observed vs. TSS Reduction for Duration of Study

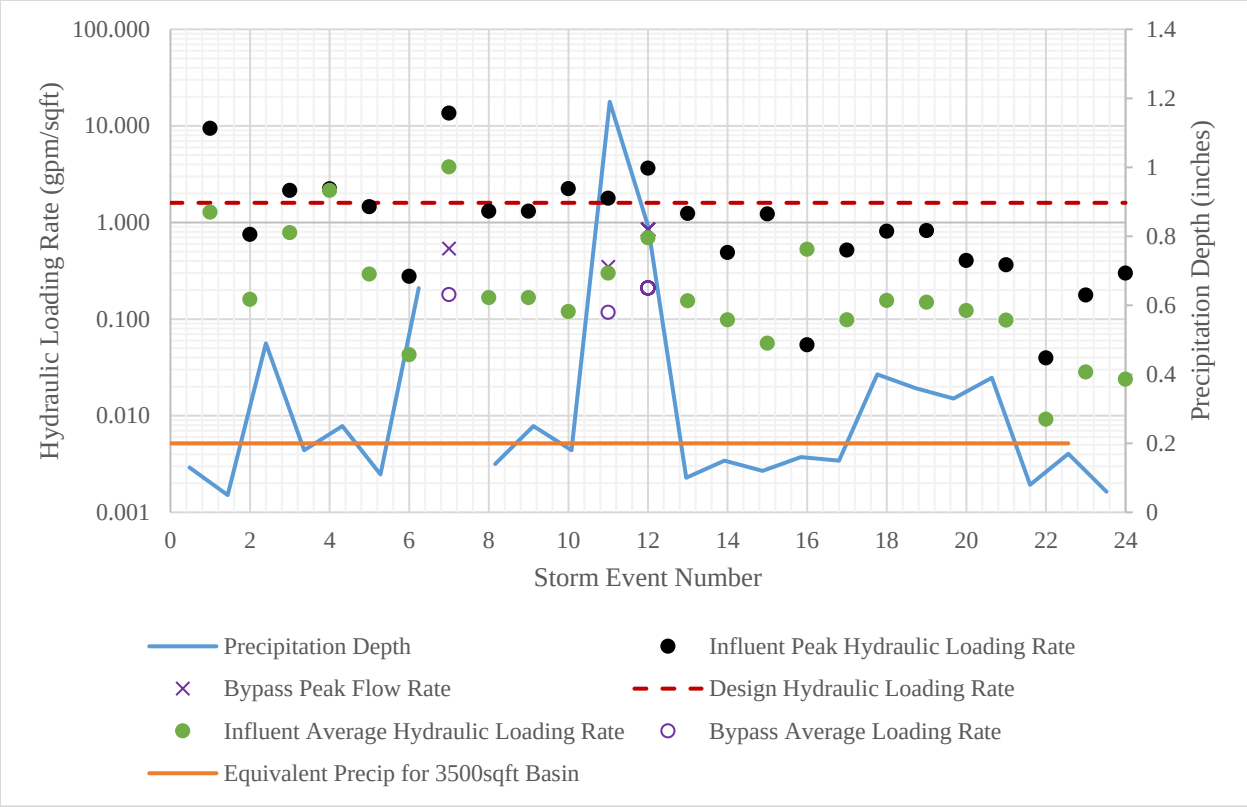


Figure 6.15 Comparison of Hydraulic Loading Rates & Precipitation Depth at Test Site as well as Equivalent Precipitation Depth for Target Basin Area

6.5 OPERATION AND MAINTENANCE (O&M) CYCLE

Objective 5: Determine the maintenance cycle frequency using the results from infiltration testing.

The following sections summarize the O&M data for the study and include data analysis specific to evaluating the infiltration performance of the sand filter sidewalk vault BMP. The infiltration and sediment accumulation data provide an estimate of operation and maintenance frequency for the BMP. Calculations, output, and other supporting materials for data analysis can be found in Appendix D.

6.5.1 BMP Infiltration Rate

The sand filter sidewalk vault BMP initial infiltration rate was evaluated using results from two falling head tests. These tests were conducted following installation of media and immediately after maintenance to get an estimate of initial infiltration rates for the media. Falling head tests consisted of saturating the sand media using a fire hose, allowing water to pond to a measured depth above the media, and then timing the rate of head decrease to estimate a saturated infiltration rate. Results from the falling head testing indicate the initial infiltration rate for the sand filter media was 1000 in/hr.

Changes in infiltration over the entire testing period were also calculated using the effluent flow rates measured continuously with the monitoring equipment for each storm event. The rate was

evaluated for two periods: 1) immediately after the media installed in June 2019 to January 2020 and, 2) from February 2020 after maintenance was conducted to December 2020 when testing ended. The average peak infiltration rate was calculated for each storm for the two time periods and graphed vs. the cumulative precipitation depth (11.5 and 12.35 inches for period 1 and 2 respectively) in Figure 6.16. Based on the trendlines, the measured infiltration rate fell below the design rate (50 inches/hour) after 7 inches (June to January) and 11 inches of cumulative rainfall (average of 9 inches). These results suggest that for a 18,000 sq.ft. basin area with a mean annual precipitation depth of 18 inches, maintenance would be required twice per year.

Results from the two testing periods were averaged to develop one trendline for the 18,000 sq.ft. basin area is shown in Figure 6.17. The trendline equation was used to estimate changes in the infiltration rate for different size basin areas (15,000 sq.ft., 11,000 sq.ft., 7,000 sq.ft., and 3,500 sq.ft.) compared to the cumulative infiltration rate. Based on these results, it is estimated that the maintenance frequency for the target 3,500 sq.ft. basin area would be approximately every 2.5 years. That said, it is recommended that inspection prior to the 2.5-year-mark be performed to check whether early failure has occurred in case higher-than-normal loading or precipitation occurs during the maintenance cycle.

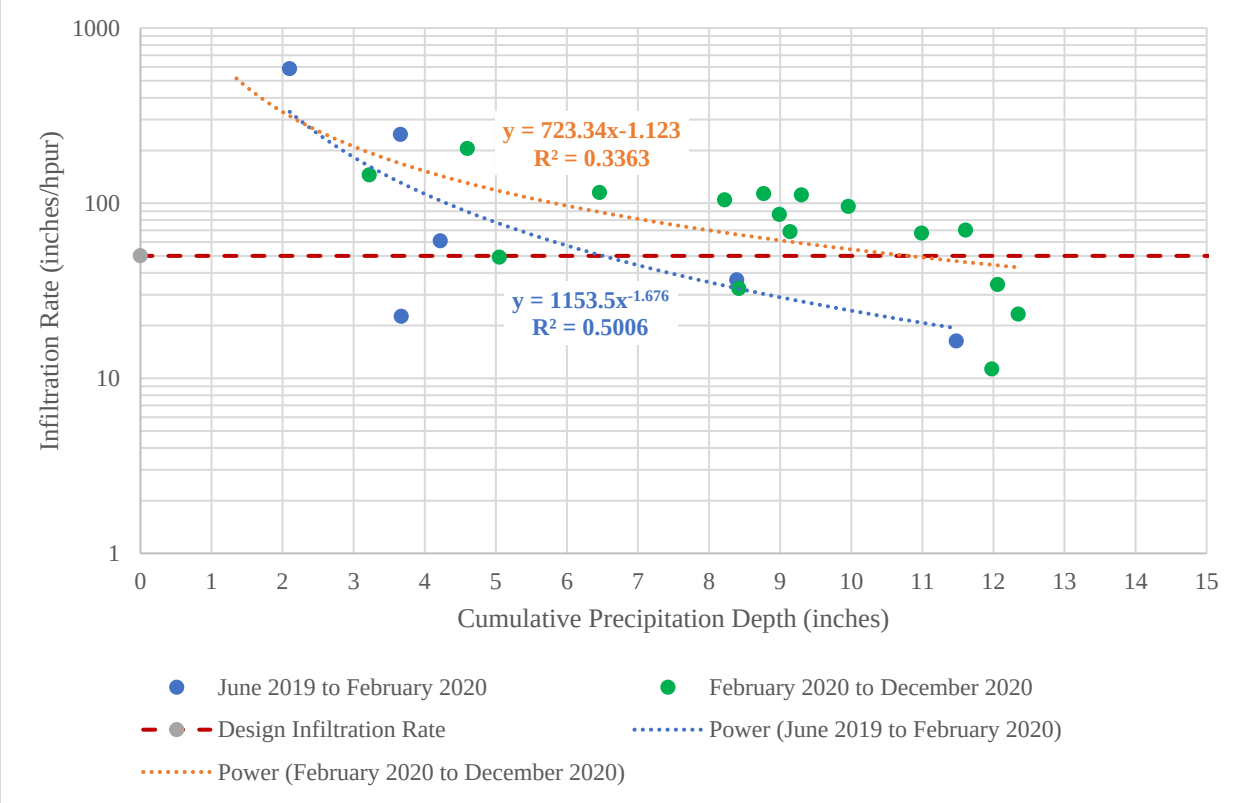


Figure 6.16 Cumulative Precipitation vs Changes in Infiltration Rate Over the Study Duration

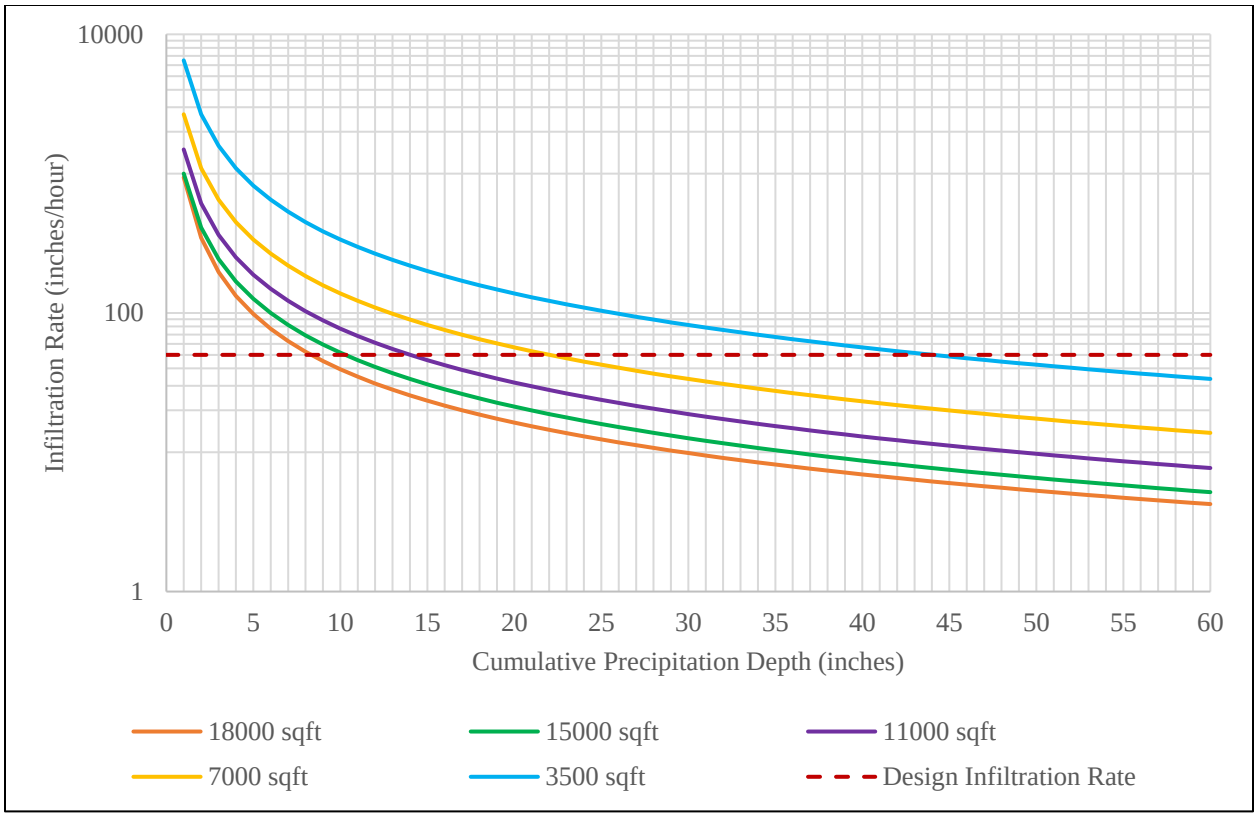


Figure 6.17 Infiltration Rates vs. Cumulative Precipitation – Comparative Graph for Various Basin Areas

6.5.2 Sediment Accumulation Rate

The sediment accumulation rate was measured from June 2019 to January 2020 to understand the loading rate contributing to the test site. Prior to maintenance, a 3in. by 3in. transect of accumulated material on top of the sand filter media was collected for analysis. A dry weight was obtained for the material, and sediment accumulation was estimated using the Equation 2. Table 6.6 summarizes results of the sample, an estimate of the mass of material accumulated on top of the sand filter, and sediment accumulation rate. Additional calculations regarding sediment accumulation can be found in Appendix D.6.

$$S_{AR-Mass} = \frac{sediment\ mass\ (pounds)}{total\ depth\ of\ precipitation\ since\ start\ of\ study\ (inches)}$$ Equation 2

Table 6.6 Summary of Sediment Accumulation Results

Sample Dry Weight (g)	Area of Sand Filter Sidewalk Vault BMP (sq.ft.)	Sediment Accumulated on BMP (lb)	Total Precipitation Depth Since Media Installation (in.)	Sediment Accumulation Rate (lb/in. precipitation)
16.4	**20**	**11.6**	**7**	**1.66**

7.0 FUTURE ACTION RECOMMENDATIONS

Based upon the results, the BMP will need to be modified and field testing repeated to meet TAPE treatment goals. If the study is repeated, the following modifications are recommended:

- The test site should be modified to include a catch basin with a sump upstream of the sand filter sidewalk vault as shown in Figure 3.1. This will reduce the sediment accumulation rate for the sand filter which in turn will reduce the maintenance cycle frequency. Other benefits include that it allows maintenance staff to use a vactor truck to clean the catch basin (a practice they are familiar with) and the reduction of sediment removal frequency for the top of the sand filter media. The test site should also be modified to monitor influent flow rates and parameter concentrations upstream of the catch basin with the sump. This will allow future studies to understand the impact of the catch basin with a sump on pollutant removal.
- Based on the PSD results, particles smaller than 62.5 mm are not retained by the current media. This could be improved through the use of a finer sand which will reduce the media pore size distribution enough to capture the smaller TSS particles but is still large enough to maintain a 50 inch/hour infiltration rate. For example, a mix of medium grain and coarse grain sand (e.g., 20%:80%) could be mixed to reduce the pore size distribution.
- Based on the dissolved metals testing, more contact time is needed between stormwater and an organic material that has a high CEC and/or surface area with adsorptive properties. This could be achieved by adding a high carbon fly ash mix to the sand. High carbon fly ash is also known for having a high infiltration rate while also reducing the porosity.
- Rename the BMP “the poor man’s Filterra”.

8.0 CONCLUSIONS

The purpose of this study was to evaluate the stormwater treatment performance of a new sand filter sidewalk BMP. The effectiveness evaluation was based upon, 1) the infiltration performance, particularly the ability of the BMP to infiltrate stormwater during 6-month 24-hour storm events without overflowing into the bypass system within the maintenance cycle and, 2) the treatment performance, specifically reducing stormwater target pollutants: total suspended solids (TSS), dissolved copper and zinc, and oils. The intent is to use the study's results to develop a new BMP that could be located within the existing right-of-way for redevelopment or retrofit projects. The study followed the TAPE protocol for developing a new BMP, however, after two years of field testing, none of the treatment performance goals were achieved to the level required by TAPE. Recommendations are provided for modifying the test site which include: amending the media with an organic material (improves dissolved metals removal), reducing the porosity of the media (to retain TSS particles smaller than 62.5 mm), and installing a catch basin upstream of the sand filter to reduce sediment transport to the sand filter which will reduce the maintenance frequency.

9.0 REFERENCES

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10.0 APPENDICES

APPENDIX A. LABORATORY ANALYTICAL REPORTS

soiltest
farm consultants, inc.
2925 Driggs Dr., Moses Lake, Wa 98837 - www.soiltestlab.com
Office: (509)765-1622 - Fax:(509)765-0314 - (800)764-1622

Client: **SPOKANE COUNTY**
JAKE SAXON
1026 W BROADWAY AVE
SPOKANE, WA 99260

Sample I.D. INSTALLED SF MEDIA
Date Received: 05/02/19

Date Reported: 5/9/2019
Laboratory # S19-6553
Reveiwed by Brent Thyssen, CPSSc
AMOUNT:

	Method	Dry Wt.	Units				MDL		
Calcium	3050B DIGEST/6010D	**8553**	mg/Kg				9.00		
Copper	3050B DIGEST/6010D	**13.4**	mg/Kg				0.20		
Magnesium	3050B DIGEST/6010D	**6813**	mg/Kg				1.00		
Zinc	3050B DIGEST/6010D	**36.2**	mg/Kg				0.30		

soiltest farm consultants, inc.
2925 Driggs Dr., Moses Lake, Wa 98837 - www.soiltestlab.com
Office: (509)765-1622 - Fax:(509)765-0314 - (800)764-1622

PAP-Accredited NAPT 2019

Soil & Plant Program 2019 NAPT Participating Laboratory

SOILTEST FARM CONSULTANTS - 1
2925 DRIGGS DR

Moses Lake , WA 98837
Laboratory #: S19-06553

Date Received: 5/2/2019
Grower: SPOKANE COUNTY
Sampled By:
Field: INSTALLED SF MEDIA
Customer Account #:
Customer Sample ID:

Soil Test Results

Cation Exchange	CEC	meq/100g	2.3

pH 1:1 7.9
E.C. 1:1 m.mhos/cm
Est Sat Paste E.C. m.mhos/cm
Effervescence

Lbs/Acre

Ammonium - N mg/kg
Organic Matter W.B. % ENR:

Other Tests:

Total-N (%) = 0.024 Total-C (%) = 0.36 C:N = 14.8

%MOISTURE = 3.1%

We make every effort to provide an accurate analysis of your sample. For reasonable cause we will repeat tests, but because of factors beyond our control in sampling procedures and the inherent variability of soil, our liability is limited to the price of the tests. Recommendations are to be used as general guides and should be modified for specific field conditions and situations. Note: "u" indicates that the element was analyzed for but not detected

This is your Invoice #: S19-06553 Account # 100100 Reviewed by: B.Thyssen, CP List Cost: $125.00

soiltest
farm consultants, inc.
2925 Driggs Dr., Moses Lake, Wa 98837 - www.soiltestlab.com
Office: (509)765-1622 - Fax:(509)765-0314 - (800)764-1622

Laboratory Chain of Custody

Client: Please fill out:	**Copy of report sent to:**
Company: Spokane County	Company: Osborn Consulting, Inc.
Contact: Jake Saxon	Contact: Aimee Navickis-Brasch
Address: 1026 W. Broadway Avenue	Address: P.O. Box 48026
City, ST, Zip.: Spokane, WA 99260-0170	City, ST, Zip.: Spokane, WA 99208
Telephone: 509-477-7245	Telephone: (509)995-0557
Fax:	Fax:
e mail: JSAXON@spokanecounty.org	e mail: aimeen@osbornconsulting.com

Date: 3/6/19

Page 1 of 1

Job #/ Name:

Payment Method: Credit Card____ Est. Acct.___

Write sample information in horizontal rows. Write test name(s) or code(s) in verticle boxes at left. Mark an "X" at the intersection(s) where appropriate.

Analyses Requested

Sample Identification	Date Sampled	No. of Containers	Sample Matrix	**Cation Exchange Capacity** S-10.10	**Moisture Content** ASTM D2216	**Total Elements Zn, Cu, Ca, Mg** EPA 3050A/ 6010B	**pH** S-2.20	**Total Organic Carbon** EPA 415.3	**Lab Use Only** Sample Condition	**Lab Use Only** LAB ID
Installed SF Media	**05/01/19**	**1**	**soil**	X	X	X	X	X		

Releasing	Date/Time	**Receiving**	Date	Time
Releasing signature 1		Receiving Signature 1		
Releasing signature 2		Receiving Signature 2		
Releasing signature 3		Receiving Signature 3		

Submission of samples to Laboratory with a Chain of Custody constitutes a contract for services requested. Provide payment detail with each COC. If no payment information is provided, you will be contacted by the laboratory. We will make every effort to provide an accurate analysis of this sample. For reasonable cause, we will repeat the tests, but because of factors beyond our control, in sampling procedures and inherent sample variability in compost, soils, plants and water our liability is limited to the price of the tests.

soiltest
farm consultants, inc.
2925 Driggs Dr., Moses Lake, Wa 98837 - www.soiltestlab.com
Office: (509)765-1622 - Fax:(509)765-0314 - (800)764-1622

Laboratory Chain of Custody

Client: Please fill out:	**Copy of report sent to:**
Company: Spokane County	Company: Osborn Consulting, Inc.
Contact: Jake Saxon	Contact: Aimee Navickis-Brasch
Address: 1026 W. Broadway Avenue	Address: P.O. Box 48026
City, ST, Zip.: Spokane, WA 99260-0170	City, ST, Zip.: Spokane, WA 99208
Telephone: 509-477-7245	Telephone: (509)995-0557
Fax:	Fax:
e mail: JSAXON@spokanecounty.org	e mail: aimeen@osbornconsulting.com

Date: **3/6/19**

Page **1** of **1**

Job #/ Name:

Payment Method: Credit Card____ Est. Acct.___

Write sample information in horizontal rows. Write test name(s) or code(s) in verticle boxes at left. Mark an "X" at the intersection(s) where appropriate.

Analyses Requested

Sample Identification	Date Sampled	No. of Containers	Sample Matrix	**Carbon to Nitrogen Ratio** EPA 415.3/351.2					**Lab Use Only** Sample Condition	**Lab Use Only** LAB ID
Installed SF Media	**05/01/19**	**1**	**soil**	**X**						

Releasing	Date/Time	**Receiving**	Date	Time
Releasing signature 1		Receiving Signature 1		
Releasing signature 2		Receiving Signature 2		
Releasing signature 3		Receiving Signature 3		

Submission of samples to Laboratory with a Chain of Custody constitutes a contract for services requested. Provide payment detail with each COC. If no payment information is provided, you will be contacted by the laboratory. We will make every effort to provide an accurate analysis of this sample. For reasonable cause, we will repeat the tests, but because of factors beyond our control, in sampling procedures and inherent sample variability in compost, soils, plants and water our liability is limited to the price of the tests.

Anatek Labs, Inc.

1282 Alturas Drive • Moscow, ID 83843 • (208) 883-2839 • Fax (208) 882-9246 • email moscow@anateklabs.com
504 E Sprague Ste. D • Spokane WA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@anateklabs.com

Client: OSBORN CONSULTING
Address: P.O. BOX 48026
SPOKANE, WA 99208
Attn: AIMEE NOVICKIS-BRASCH

Batch #: 190919037
Project Name: SAND FILTER

Analytical Results Report

Sample Number	190919037-001	**Sampling Date**	9/18/2019	**Date/Time Received**	9/19/2019	11:00 AM
Client Sample ID	INF09182019	**Sampling Time**	8:20 PM	**Extraction Date**		
Matrix	Water	**Sample Location**				
Comments						

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Copper	0.0170	mg/L	0.001	9/25/2019 2:11:00 PM	BAG	EPA 200.8	
Dissolved Copper	0.00542	mg/L	0.001	9/25/2019 2:17:00 PM	BAG	EPA 200.8	
Dissolved Iron	0.196	mg/L	0.01	9/25/2019 2:17:00 PM	BAG	EPA 200.8	
Dissolved Zinc	0.0759	mg/L	0.001	9/25/2019 2:17:00 PM	BAG	EPA 200.8	
Hardness	17.5	mg CaCO3/L	1	9/20/2019 9:30:00 AM	NDE	EPA 130.2	
Iron	3.01	mg/L	0.01	9/25/2019 2:11:00 PM	BAG	EPA 200.8	
PO4/P	0.0465	mg/L	0.01	9/20/2019 9:21:00 AM	TLM	SM4500PF	
TSS	216	mg/L	2	9/24/2019 4:00:00 PM	BAS	SM 2540D	
Total P	0.345	mg/L	0.1	9/30/2019 3:14:00 PM	TLM	SM4500PF	
Diesel	ND	mg/L	0.1	9/27/2019 1:59:00 AM	LMC	NWTPHDX	
Lube Oil	0.605	mg/L	0.5	9/27/2019 1:59:00 AM	LMC	NWTPHDX	
Zinc	0.0979	mg/L	0.001	9/25/2019 2:11:00 PM	BAG	EPA 200.8	

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504 E Sprague Ste. D • Spokane WA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@anateklabs.com

Client: OSBORN CONSULTING
Address: P.O. BOX 48026
SPOKANE, WA 99208
Attn: AIMEE NOVICKIS-BRASCH

Batch #: 190919037
Project Name: SAND FILTER

Analytical Results Report

Sample Number 190919037-002
Client Sample ID EFF09182019
Matrix Water
Comments

Sampling Date 9/18/2019
Sampling Time 8:20 PM
Sample Location

Date/Time Received 9/19/2019 11:00 AM
Extraction Date

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Copper	0.00730	mg/L	0.001	9/25/2019 2:14:00 PM	BAG	EPA 200.8	
Dissolved Copper	0.00522	mg/L	0.001	9/25/2019 2:20:00 PM	BAG	EPA 200.8	
Dissolved Iron	0.0545	mg/L	0.01	9/25/2019 2:20:00 PM	BAG	EPA 200.8	
Dissolved Zinc	0.0457	mg/L	0.001	9/25/2019 2:20:00 PM	BAG	EPA 200.8	
Hardness	21.0	mg CaCO3/L	1	9/20/2019 9:30:00 AM	NDE	EPA 130.2	
Iron	0.694	mg/L	0.01	9/25/2019 2:14:00 PM	BAG	EPA 200.8	
PO4/P	0.0300	mg/L	0.01	9/20/2019 9:22:00 AM	TLM	SM4500PF	
TSS	29	mg/L	1	9/24/2019 4:00:00 PM	BAS	SM 2540D	
Total P	0.104	mg/L	0.01	9/30/2019 2:59:00 PM	TLM	SM4500PF	
Diesel	ND	mg/L	0.1	9/27/2019 2:54:00 AM	LMC	NWTPHDX	
Lube Oil	ND	mg/L	0.5	9/27/2019 2:54:00 AM	LMC	NWTPHDX	
Zinc	0.0234	mg/L	0.001	9/25/2019 2:14:00 PM	BAG	EPA 200.8	

Authorized Signature

Kathleen A. Sattler, Lab Manager

MCL EPA's Maximum Contaminant Level
ND Not Detected
PQL Practical Quantitation Limit

The results reported relate only to the samples indicated.
Soil/solid results are reported on a dry-weight basis unless otherwise noted.

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; FL(NELAP):E87893; ID:ID00013; MT:CERT0028; NM: ID00013;NV:ID00013; OR:ID200001-002; WA:C595
Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C585; MT:Cert0095; FL(NELAP): E871099

Anatek Labs, Inc.

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504 E Sprague Ste. D • Spokane WA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@anateklabs.com

Login Report

Customer Name: OSBORN CONSULTING
P.O. BOX 48026
SPOKANE WA 99208

Order ID: 190919037
Order Date: 9/19/2019

Contact Name: AIMEE NOVICKIS-BRASCH
Project Name: SAND FILTER

Comment: PSD SUB TO BUDI

Sample #: 190919037-001 **Customer Sample #:** INF09182019

Recv'd: ☑ **Matrix:** Water **Collector:** **Date Collected:** 9/18/2019
Quantity: 6 **Date Received:** 9/19/2019 11:00:00 AM **Time Collected:** 8:20 PM
Comment:

Test	Lab	Method	Due Date	Priority
COPPER SPO	S	EPA 200.8	10/1/2019	***Normal (~10 Days)***
DISSOLVED COPPER SPO	S	EPA 200.8	10/1/2019	***Normal (~10 Days)***
DISSOLVED IRON SPO	S	EPA 200.8	10/1/2019	***Normal (~10 Days)***
DISSOLVED ZINC SPO	S	EPA 200.8	10/1/2019	***Normal (~10 Days)***
HARDNESS EPA 130.2	S	EPA 130.2	10/1/2019	***Normal (~10 Days)***
IRON SPO	S	EPA 200.8	10/1/2019	***Normal (~10 Days)***
PHOSPHATE/P FIA	S	SM4500PF	10/1/2019	***Normal (~10 Days)***
SOLIDS - TSS	S	SM 2540D	10/1/2019	***Normal (~10 Days)***
TOTAL P FIA	S	SM4500PF	10/1/2019	***Normal (~10 Days)***
TPHDX-NW	S	NWTPHDX	10/1/2019	***Normal (~10 Days)***
ZINC SPO	S	EPA 200.8	10/1/2019	***Normal (~10 Days)***

Sample #: 190919037-002 **Customer Sample #:** EFF09182019

Recv'd: ☑ **Matrix:** Water **Collector:** **Date Collected:** 9/18/2019
Quantity: 5 **Date Received:** 9/19/2019 11:00:00 AM **Time Collected:** 8:20 PM
Comment:

Test	Lab	Method	Due Date	Priority
COPPER SPO	S	EPA 200.8	10/1/2019	***Normal (~10 Days)***
DISSOLVED COPPER SPO	S	EPA 200.8	10/1/2019	***Normal (~10 Days)***
DISSOLVED IRON SPO	S	EPA 200.8	10/1/2019	***Normal (~10 Days)***
DISSOLVED ZINC SPO	S	EPA 200.8	10/1/2019	***Normal (~10 Days)***
HARDNESS EPA 130.2	S	EPA 130.2	10/1/2019	***Normal (~10 Days)***

Customer Name: OSBORN CONSULTING
P.O. BOX 48026
SPOKANE WA 99208

Order ID: 190919037
Order Date: 9/19/2019

Contact Name: AIMEE NOVICKIS-BRASCH

Project Name: SAND FILTER

Comment: PSD SUB TO BUDI

IRON SPO	S	EPA 200.8	10/1/2019	***Normal (~10 Days)***
PHOSPHATE/P FIA	S	SM4500PF	10/1/2019	***Normal (~10 Days)***
SOLIDS - TSS	S	SM 2540D	10/1/2019	***Normal (~10 Days)***
TOTAL P FIA	S	SM4500PF	10/1/2019	***Normal (~10 Days)***
TPHDX-NW	S	NWTPHDX	10/1/2019	***Normal (~10 Days)***
ZINC SPO	S	EPA 200.8	10/1/2019	***Normal (~10 Days)***

SAMPLE CONDITION RECORD

Samples received in a cooler?	Yes
Samples received intact?	Yes
What is the temperature of the sample(s)? (°C)	3.2
Samples received with a COC?	Yes
Samples received within holding time?	Yes
Are all sample bottles properly preserved?	Yes
Labels and chain agree?	Yes
Total number of containers?	11

90919 037 **OCON** Last Due 10/1/2019
1st SAMP 9/18/2019 1st RCVD 9/19/2019
SAND FILTER

Anatek Labs, Inc.

Chain of Custody Record

1282 Alturas Drive, Moscow ID 83843 (208) 883-2839 FAX 882-9246
504 E Sprague Ste D, Spokane WA 99202 (509) 838-3999 FAX 838-4433

Company Name:	Osborn Consulting	Project Manager:	Aimee Navickis-Brasch
Address:	429 W. 1st Ave	Project Name & #:	Sand Filter
City: Spokane	State: WA Zip: 99201	Email Address:	aimeen@osbornconsulting.com
Phone:	(509) 867-3654	Purchase Order #:	
Fax:		Sampler Name & phone:	(509)995-0557

Turn Around Time & Reporting

Please refer to our normal turn around times at: http://www.anateklabs.com/services/guidelines/reporting.a

__Normal
__Next Day*
__2nd Day*
__Other*______

*All rush order requests must be prior approved.

__Phone
__Mail
__Fax
x Email

Provide Sample Description

synthetic stormwater influent and effluent

List Analyses Requested

Lab ID	Sample Identification	Sampling Date/Time	Matrix	# of Containers	Sample Volume	TSS SM 2540D	Cu Zn Fe Total EPA 200.8 ICP/MS	Cu Zn Fe Dissolved EPA 200.8 ICP/MS	Hardness, SM 2340B (ICP)	Total Phosphorus, SM4500-PF	NWTPH, Ecology NWTPH Dx	Ortho Phosphate SM 4500-PG	PSD ASTM D3977-97			Note Special Instructions/Comments
	INF09182019	2020 9/18	water	6		x	x	x	x	x	x	x	x			SWBS BUDI - PSD
	EFF09182019	2020 ↓	water	5		x	x	x	x	x	x	x				
		date per bottles														

Preservative:

	Printed Name	Signature	Company	Date	Time
Relinquished by	Taylor Hoffman-Ballard	Taylor Hoffman-Ballard	Osborn	9/19	11:00am
Received by					
Relinquished by					
Received by	KSutt	KSutt	anatek	9/19/19	1100
Relinquished by					
Received by					

Inspection Checklist

Received Intact? (Y) N
Labels & Chains Agree? (Y) N
Containers Sealed? (Y) N
VOC Head Space? ~~Y N~~
hd / Cooler/ice
Temperature (°C): 3.2° dig or
Preservative: H_2SO_4 R386-3 <2
HCl R385-3 <2 pH P18285-300
Date & Time: 9-19-19 1445
Inspected By: MG

Form COC01.00 - Eff 1 Mar 2015

Samples submitted to Anatek Labs may be subcontracted to other accredited labs if necessary. This message serves as notice of this possibility. Sub-contracted analyses will be clearly noted on the analytical report.

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504 E Sprague Ste. D • Spokane WA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@anateklabs.com

Client: SPOKANE COUNTY
Address: 1026 W BROADWAY
SPOKANE, WA 99260-0430
Attn: JAKE SAXON

Batch #: 191021015
Project Name: SAND FILTER

Analytical Results Report

Sample Number 191021015-001
Client Sample ID INF10192019
Matrix Water
Comments

Sampling Date 10/19/2019
Sampling Time 9:30 PM
Sample Location

Date/Time Received 10/21/2019 9:15 AM
Extraction Date

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Copper	0.0395	mg/L	0.001	10/25/2019 2:56:00 PM	BAG	EPA 200.8	
Dissolved Copper	0.00671	mg/L	0.001	10/25/2019 2:52:00 PM	BAG	EPA 200.8	
Dissolved Iron	0.0743	mg/L	0.01	10/25/2019 2:52:00 PM	BAG	EPA 200.8	
Dissolved Zinc	0.0432	mg/L	0.001	10/25/2019 2:52:00 PM	BAG	EPA 200.8	
Hardness	29.5	mg CaCO3/L	1	10/29/2019 11:30:00 AM	NDE	EPA 130.2	
Iron	1.42	mg/L	0.01	10/25/2019 2:56:00 PM	BAG	EPA 200.8	
TSS	100	mg/L	2	10/24/2019 9:15:00 AM	BAS	SM 2540D	
Diesel	0.476	mg/L	0.1	11/1/2019 1:05:00 PM	LMC	NWTPHDX	
Lube Oil	1.24	mg/L	0.4	11/1/2019 1:05:00 PM	LMC	NWTPHDX	
Zinc	0.0776	mg/L	0.001	10/25/2019 2:56:00 PM	BAG	EPA 200.8	

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; FL(NELAP):E87893; ID:ID00013; MT:CERT0028; NM: ID00013;NV:ID00013; OR:ID200001-002; WA:C595
Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C585; MT:Cert0095; FL(NELAP): E871099

Anatek Labs, Inc.

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504 E Sprague Ste. D • Spokane WA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@anateklabs.com

Client: SPOKANE COUNTY
Address: 1026 W BROADWAY
SPOKANE, WA 99260-0430
Attn: JAKE SAXON

Batch #: 191021015
Project Name: SAND FILTER

Analytical Results Report

Sample Number 191021015-002 | **Sampling Date** 10/19/2019 | **Date/Time Received** 10/21/2019 9:15 AM
Client Sample ID EFF10192019 | **Sampling Time** 9:30 PM | **Extraction Date**
Matrix Water | **Sample Location**
Comments

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Copper	0.0132	mg/L	0.001	10/25/2019 3:02:00 PM	BAG	EPA 200.8	
Dissolved Copper	0.00661	mg/L	0.001	10/25/2019 2:59:00 PM	BAG	EPA 200.8	
Dissolved Iron	0.0550	mg/L	0.01	10/25/2019 2:59:00 PM	BAG	EPA 200.8	
Dissolved Zinc	0.0357	mg/L	0.001	10/25/2019 2:59:00 PM	BAG	EPA 200.8	
Hardness	28.0	mg CaCO3/L	2	10/29/2019 11:30:00 AM	NDE	EPA 130.2	
Iron	1.19	mg/L	0.01	10/25/2019 3:02:00 PM	BAG	EPA 200.8	
TSS	39	mg/L	1	10/24/2019 9:15:00 AM	BAS	SM 2540D	
Diesel	0.331	mg/L	0.1	11/1/2019 2:00:00 PM	LMC	NWTPHDX	
Lube Oil	1.11	mg/L	0.4	11/1/2019 2:00:00 PM	LMC	NWTPHDX	
Zinc	0.0412	mg/L	0.001	10/25/2019 3:02:00 PM	BAG	EPA 200.8	

Sample Number 191021015-003 | **Sampling Date** 10/19/2019 | **Date/Time Received** 10/21/2019 9:15 AM
Client Sample ID IN DI WATER | **Sampling Time** 9:30 PM | **Extraction Date**
Matrix Water | **Sample Location**
Comments

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Dissolved Copper	ND	mg/L	0.001	10/25/2019 3:06:00 PM	BAG	EPA 200.8	
Dissolved Iron	ND	mg/L	0.01	10/25/2019 3:06:00 PM	BAG	EPA 200.8	
Dissolved Zinc	0.0146	mg/L	0.001	10/25/2019 3:06:00 PM	BAG	EPA 200.8	

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; FL(NELAP):E87893; ID:ID00013; MT:CERT0028; NM: ID00013;NV:ID00013; OR:ID200001-002; WA:C595
Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C585; MT:Cert0095; FL(NELAP): E871099

Anatek Labs, Inc.

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504 E Sprague Ste. D • Spokane WA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@anateklabs.com

Client: SPOKANE COUNTY
Address: 1026 W BROADWAY
SPOKANE, WA 99260-0430
Attn: JAKE SAXON

Batch #: 191021015
Project Name: SAND FILTER

Analytical Results Report

Sample Number	191021015-004	**Sampling Date**	10/19/2019	**Date/Time Received**	10/21/2019 9:15 AM
Client Sample ID	EFF DI WATER	**Sampling Time**	9:30 PM	**Extraction Date**	
Matrix	Water	**Sample Location**			
Comments					

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Dissolved Copper	ND	mg/L	0.001	10/25/2019 3:09:00 PM	BAG	EPA 200.8	
Dissolved Iron	ND	mg/L	0.01	10/25/2019 3:09:00 PM	BAG	EPA 200.8	
Dissolved Zinc	0.0166	mg/L	0.001	10/25/2019 3:09:00 PM	BAG	EPA 200.8	

Authorized Signature

Kathleen A. Sattler, Lab Manager

MCL EPA's Maximum Contaminant Level
ND Not Detected
PQL Practical Quantitation Limit

The results reported relate only to the samples indicated.
Soil/solid results are reported on a dry-weight basis unless otherwise noted.

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; FL(NELAP):E87893; ID:ID00013; MT:CERT0028; NM: ID00013;NV:ID00013; OR:ID200001-002; WA:C595
Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C585; MT:Cert0095; FL(NELAP): E871099

Anatek Labs, Inc.

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504 E Sprague Ste. D • Spokane WA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@anateklabs.com

Client: SPOKANE COUNTY
Address: 1026 W BROADWAY
SPOKANE, WA 99260-0430
Attn: JAKE SAXON

Batch #: 191021015
Project Name: SAND FILTER

Analytical Results Report

Quality Control Data

Lab Control Sample

Parameter	LCS Result	Units	LCS Spike	%Rec	AR %Rec	Prep Date	Analysis Date
Zinc	0.0521	mg/L	0.05	104.2	85-115	10/24/2019	10/25/2019
TSS	94	mg/L	100	94.0	90-110	10/24/2019	10/24/2019
Iron	0.107	mg/L	0.1	107.0	85-115	10/24/2019	10/25/2019
Hardness	99.5	mg CaCO3/L	100	99.5	90-110	10/29/2019	10/29/2019
Dissolved Zinc	0.0521	mg/L	0.05	104.2	85-115	10/24/2019	10/25/2019
Dissolved Iron	0.107	mg/L	0.1	107.0	85-115	10/24/2019	10/25/2019
Dissolved Copper	0.0570	mg/L	0.05	114.0	85-115	10/24/2019	10/25/2019
Diesel	0.760	mg/L	1	76.0	50-150	10/31/2019	10/31/2019
Copper	0.0570	mg/L	0.05	114.0	85-115	10/24/2019	10/25/2019

Lab Control Sample Duplicate

Parameter	LCSD Result	Units	LCSD Spike	%Rec	%RPD	AR %RPD	Prep Date	Analysis Date
Hardness	100	mg CaCO3/L	100	100.0	0.5	0-25	10/29/2019	10/29/2019

Matrix Spike

Sample Number	Parameter	Sample Result	MS Result	Units	MS Spike	%Rec	AR %Rec	Prep Date	Analysis Date
191021027-005A	Zinc	0.00122	0.0526	mg/L	0.05	102.8	70-130	10/24/2019	10/25/2019
191022021-001	TSS	<1	98	mg/L	100	98.0	80-120	10/24/2019	10/24/2019
191021027-005A	Iron	ND	0.111	mg/L	0.1	111.0	70-130	10/24/2019	10/25/2019
191029011-001A	Hardness	39.5	138	mg CaCO3/L	100	98.5	80-120	10/29/2019	10/29/2019
191021027-005A	Dissolved Zinc	0.00122	0.0526	mg/L	0.05	102.8	70-130	10/24/2019	10/25/2019
191021027-005A	Dissolved Iron	ND	0.111	mg/L	0.1	111.0	70-130	10/24/2019	10/25/2019
191021027-005A	Dissolved Copper	ND	0.0520	mg/L	0.05	104.0	70-130	10/24/2019	10/25/2019
191021027-005A	Copper	ND	0.0520	mg/L	0.05	104.0	70-130	10/24/2019	10/25/2019

Matrix Spike Duplicate

Parameter	MSD Result	Units	MSD Spike	%Rec	%RPD	AR %RPD	Prep Date	Analysis Date
Zinc	0.0524	mg/L	0.05	102.4	0.4	0-20	10/24/2019	10/25/2019
TSS	98	mg/L	100	98.0	0.0	0-20	10/24/2019	10/24/2019
Iron	0.115	mg/L	0.1	115.0	3.5	0-20	10/24/2019	10/25/2019
Hardness	138	mg CaCO3/L	100	98.5	0.0	0-20	10/29/2019	10/29/2019
Dissolved Zinc	0.0524	mg/L	0.05	102.4	0.4	0-20	10/24/2019	10/25/2019

Comments:

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; FL(NELAP):E87893; ID:ID00013; MT:CERT0028; NM: ID00013;NV:ID00013; OR:ID200001-002; WA:C595
Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C585; MT:Cert0095; FL(NELAP): E871099

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Client: SPOKANE COUNTY
Address: 1026 W BROADWAY
SPOKANE, WA 99260-0430
Attn: JAKE SAXON

Batch #: 191021015
Project Name: SAND FILTER

Analytical Results Report

Quality Control Data

Matrix Spike Duplicate

Parameter	MSD Result	Units	MSD Spike	%Rec	%RPD	AR %RPD	Prep Date	Analysis Date
Dissolved Iron	0.115	mg/L	0.1	115.0	3.5	0-20	10/24/2019	10/25/2019
Dissolved Copper	0.0545	mg/L	0.05	109.0	4.7	0-20	10/24/2019	10/25/2019
Copper	0.0545	mg/L	0.05	109.0	4.7	0-20	10/24/2019	10/25/2019

Method Blank

Parameter	Result	Units	PQL	Prep Date	Analysis Date
Copper	ND	mg/L	0.001	10/24/2019	10/25/2019
Diesel	ND	mg/L	0.1	10/31/2019	10/31/2019
Dissolved Copper	ND	mg/L	0.001	10/24/2019	10/25/2019
Dissolved Iron	ND	mg/L	0.001	10/24/2019	10/25/2019
Dissolved Zinc	ND	mg/L	0.001	10/24/2019	10/25/2019
Hardness	<5	mg CaCO3/L	1	10/29/2019	10/29/2019
Iron	ND	mg/L	0.01	10/24/2019	10/25/2019
Lube Oil	ND	mg/L	0.4	10/31/2019	10/31/2019
TSS	<1	mg/L	1	10/24/2019	10/24/2019
Zinc	ND	mg/L	0.001	10/24/2019	10/25/2019

Duplicate

Sample Number	Parameter	Sample Result	Duplicate Result	Units	%RPD	AR %RPD	Prep Date	Analysis Date
191022006-002	TSS	4	5	mg/L	22.2	0-20	10/24/2019	10/24/2019
191022006-002	TSS	4	5	mg/L	22.2	0-20	10/24/2019	10/24/2019
191021015-001	Hardness	29.5	29.0	mg CaCO3/L	1.7	0-25	10/29/2019	10/29/2019

AR	Acceptable Range
ND	Not Detected
PQL	Practical Quantitation Limit
RPD	Relative Percentage Difference

Comments:

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; FL(NELAP):E87893; ID:ID00013; MT:CERT0028; NM: ID00013;NV:ID00013; OR:ID200001-002; WA:C595
Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C585; MT:Cert0095; FL(NELAP): E871099

Anatek Labs, Inc.

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Login Report

Customer Name: SPOKANE COUNTY
1026 W BROADWAY
SPOKANE WA 99260-0430

Order ID: 191021015
Order Date: 10/21/2019

Contact Name: JAKE SAXON

Project Name: SAND FILTER

Comment:

Sample #: 191021015-001 **Customer Sample #:** INF10192019

Recv'd: ☑ **Matrix:** Water **Collector:** **Date Collected:** 10/19/2019
Quantity: 4 **Date Received:** 10/21/2019 9:15:00 AM **Time Collected:** 9:30 PM
Comment:

Test	Lab	Method	Due Date	Priority
COPPER SPO	S	EPA 200.8	10/31/2019	***Normal (~10 Days)***
DISSOLVED COPPER SPO	S	EPA 200.8	10/31/2019	***Normal (~10 Days)***
DISSOLVED IRON SPO	S	EPA 200.8	10/31/2019	***Normal (~10 Days)***
DISSOLVED ZINC SPO	S	EPA 200.8	10/31/2019	***Normal (~10 Days)***
HARDNESS EPA 130.2	S	EPA 130.2	10/31/2019	***Normal (~10 Days)***
IRON SPO	S	EPA 200.8	10/31/2019	***Normal (~10 Days)***
SOLIDS - TSS	S	SM 2540D	10/31/2019	***Normal (~10 Days)***
TPHDX-NW	S	NWTPHDX	10/31/2019	***Normal (~10 Days)***
ZINC SPO	S	EPA 200.8	10/31/2019	***Normal (~10 Days)***

Sample #: 191021015-002 **Customer Sample #:** EFF10192019

Recv'd: ☑ **Matrix:** Water **Collector:** **Date Collected:** 10/19/2019
Quantity: 4 **Date Received:** 10/21/2019 9:15:00 AM **Time Collected:** 9:30 PM
Comment:

Test	Lab	Method	Due Date	Priority
COPPER SPO	S	EPA 200.8	10/31/2019	***Normal (~10 Days)***
DISSOLVED COPPER SPO	S	EPA 200.8	10/31/2019	***Normal (~10 Days)***
DISSOLVED IRON SPO	S	EPA 200.8	10/31/2019	***Normal (~10 Days)***
DISSOLVED ZINC SPO	S	EPA 200.8	10/31/2019	***Normal (~10 Days)***
HARDNESS EPA 130.2	S	EPA 130.2	10/31/2019	***Normal (~10 Days)***
IRON SPO	S	EPA 200.8	10/31/2019	***Normal (~10 Days)***
SOLIDS - TSS	S	SM 2540D	10/31/2019	***Normal (~10 Days)***

Customer Name: SPOKANE COUNTY
1026 W BROADWAY
SPOKANE WA 99260-0430

Order ID: 191021015
Order Date: 10/21/2019

Contact Name: JAKE SAXON
Project Name: SAND FILTER

Comment:

TPHDX-NW	S	NWTPHDX	10/31/2019	***Normal (~10 Days)***
ZINC SPO	S	EPA 200.8	10/31/2019	***Normal (~10 Days)***

Sample #: 191021015-003 **Customer Sample #:** IN DI WATER

Recv'd: ☑ **Matrix:** Water **Collector:** **Date Collected:** 10/19/2019
Quantity: 1 **Date Received:** 10/21/2019 9:15:00 AM **Time Collected:** 9:30 PM
Comment:

Test	Lab	Method	Due Date	Priority
DISSOLVED COPPER SPO	S	EPA 200.8	10/31/2019	***Normal (~10 Days)***
DISSOLVED IRON SPO	S	EPA 200.8	10/31/2019	***Normal (~10 Days)***
DISSOLVED ZINC SPO	S	EPA 200.8	10/31/2019	***Normal (~10 Days)***

Sample #: 191021015-004 **Customer Sample #:** EFF DI WATER

Recv'd: ☑ **Matrix:** Water **Collector:** **Date Collected:** 10/19/2019
Quantity: 1 **Date Received:** 10/21/2019 9:15:00 AM **Time Collected:** 9:30 PM
Comment:

Test	Lab	Method	Due Date	Priority
DISSOLVED COPPER SPO	S	EPA 200.8	10/31/2019	***Normal (~10 Days)***
DISSOLVED IRON SPO	S	EPA 200.8	10/31/2019	***Normal (~10 Days)***
DISSOLVED ZINC SPO	S	EPA 200.8	10/31/2019	***Normal (~10 Days)***

SAMPLE CONDITION RECORD

Samples received in a cooler?	Yes
Samples received intact?	Yes
What is the temperature of the sample(s)? (°C)	2.3
Samples received with a COC?	Yes
Samples received within holding time?	Yes
Are all sample bottles properly preserved?	Yes
Labels and chain agree?	Yes
Total number of containers?	10

'91021 015 SPKC Last Due 10/31/2019
1st SAMP 10/19/201 1st RCVD 10/21/2019
SAND FILTER

Anatek Labs, Inc.

Chain of Custody Record

1282 Alturas Drive, Moscow ID 83843 (208) 883-2839 FAX 882-9246
504 E Sprague Ste D, Spokane WA 99202 (509) 838-3999 FAX 838-4433

Company Name: **Spokane County**	Project Manager: **Jake Saxon**
Address: **1026 W. Broadway Avenue**	Project Name & # : **Sand Filter**
City: **Spokane** State: **WA** Zip: **99260**	Email Address : **JSAXON@spokanecounty.org**
Phone: **(509) 477-7245**	Purchase Order #:
Fax:	Sampler Name & phone: **(509)995-0557**

Turn Around Time & Reporting

Please refer to our normal turn around times at:
http://www.anateklabs.com/services/guidelines/reporting.asp

__Normal __Next Day* __2nd Day* __Other*_____
*All rush order requests must be prior approved.
__Phone __Mail __Fax x Email

Provide Sample Description

stormwater influent and effluent

List Analyses Requested

Lab ID	Sample Identification	Sampling Date/Time	Matrix	# of Containers	Sample Volume	TSS SM 2540D	Cu Zn Fe Total EPA 200.8 ICP/MS	Cu Zn Fe Dissolved EPA 200.8 ICP/MS	NWTPH, Ecology NWTPH-Dx	Hardness as CaCO3 SM 2340B ICP
	INF10192019	10/19/2019 9:30pm	water	4		x	x	x	x	x
	EFF10192019	10/19/2019 9:30pm	water	4		x	x	x	x	x
	IN DI Water	10/19/2019 9:30pm	water	1				x		
	EFF DI Water	10/19/2019 9:30pm	water	1				x		

Note Special Instructions/Comments

Please send results to Jake Saxon JSAXON@spokanecounty.org and Aimee Navickis-Brasch aimeen@osborneconsulting.com

50mL DI water was filtered through the 0.45um filters prior to filtering the dissolved metals samples. The DI water is contained within the unlabeled bottles in each bag (influent DI water is in the bag with the influent samples; effluent DI water is in the bag with the effluent samples).

SWBS

	Printed Name	Signature	Company	Date	Time
Relinquished by	Taylor Hoffman-Ballard	Taylor Hoffman-Ballard	Osborn	10/21/19	7:30a
Received by	Kaela Mansfield	Kaela Mansfield	OSBORN	10/21/19	7:30A
Relinquished by	KAELA MANSFIELD	Kaela Mansfield	OSBORN	10/21/19	9:15A
Received by	KScott	KScott	Anatek	10/21/19	0915
Relinquished by					
Received by					

Inspection Checklist

Received Intact? (Y) N
Labels & Chains Agree? (Y) N
Containers Sealed? (Y) N
VOC Head Space? Y N

Ice/Coolant

Temperature (°C): 2.3° digital
Preservative: HCl R385-3 <2
HNO3 P18009-7B<2 pH P16285-30C
Date & Time: 10-21-19 1245
Inspected By: WG

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Client: SPOKANE COUNTY
Address: 1026 W BROADWAY
SPOKANE, WA 99260-0430
Attn: JAKE SAXON

Batch #: 191022018
Project Name: SAND FILTER

Analytical Results Report

Sample Number 191022018-001
Client Sample ID INF10212019
Matrix Water
Comments

Sampling Date 10/22/2019
Sampling Time 10:30 AM
Sample Location

Date/Time Received 10/22/2019 12:15 PM
Extraction Date

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Copper	0.0182	mg/L	0.001	10/25/2019 3:15:00 PM	BAG	EPA 200.8	
Dissolved Copper	0.00610	mg/L	0.001	10/25/2019 3:12:00 PM	BAG	EPA 200.8	
Dissolved Iron	0.0653	mg/L	0.01	10/25/2019 3:12:00 PM	BAG	EPA 200.8	
Dissolved Zinc	0.0384	mg/L	0.001	10/25/2019 3:12:00 PM	BAG	EPA 200.8	
Hardness	21.5	mg CaCO3/L	1	10/29/2019 11:30:00 AM	NDE	EPA 130.2	
Iron	2.42	mg/L	0.01	10/25/2019 3:15:00 PM	BAG	EPA 200.8	
TSS	76	mg/L	4	10/24/2019 9:15:00 AM	BAS	SM 2540D	
Diesel	ND	mg/L	0.1	11/1/2019 2:56:00 PM	LMC	NWTPHDX	
Lube Oil	1.83	mg/L	0.4	11/1/2019 2:56:00 PM	LMC	NWTPHDX	
Zinc	0.105	mg/L	0.001	10/25/2019 3:15:00 PM	BAG	EPA 200.8	

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; FL(NELAP):E87893; ID:ID00013; MT:CERT0028; NM: ID00013;NV:ID00013; OR:ID200001-002; WA:C595
Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C585; MT:Cert0095; FL(NELAP): E871099

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504 E Sprague Ste. D • Spokane WA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@anateklabs.com

Client: SPOKANE COUNTY
Address: 1026 W BROADWAY
SPOKANE, WA 99260-0430
Attn: JAKE SAXON

Batch #: 191022018
Project Name: SAND FILTER

Analytical Results Report

Sample Number 191022018-002
Client Sample ID EFF10212019
Matrix Water
Comments

Sampling Date 10/22/2019
Sampling Time 10:30 AM
Sample Location

Date/Time Received 10/22/2019 12:15 PM
Extraction Date

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Copper	0.00639	mg/L	0.001	10/25/2019 3:22:00 PM	BAG	EPA 200.8	
Dissolved Copper	0.00338	mg/L	0.001	10/25/2019 3:19:00 PM	BAG	EPA 200.8	
Dissolved Iron	0.0345	mg/L	0.01	10/25/2019 3:19:00 PM	BAG	EPA 200.8	
Dissolved Zinc	0.0133	mg/L	0.001	10/25/2019 3:19:00 PM	BAG	EPA 200.8	
Hardness	20.5	mg CaCO3/L	1	10/29/2019 11:30:00 AM	NDE	EPA 130.2	
Iron	0.547	mg/L	0.01	10/25/2019 3:22:00 PM	BAG	EPA 200.8	
TSS	16	mg/L	2	10/24/2019 9:15:00 AM	BAS	SM 2540D	
Diesel	ND	mg/L	0.1	11/1/2019 8:26:00 PM	LMC	NWTPHDX	
Lube Oil	0.403	mg/L	0.4	11/1/2019 8:26:00 PM	LMC	NWTPHDX	
Zinc	0.0234	mg/L	0.001	10/25/2019 3:22:00 PM	BAG	EPA 200.8	

Authorized Signature

Kathleen A. Sattler, Lab Manager

MCL EPA's Maximum Contaminant Level
ND Not Detected
PQL Practical Quantitation Limit

This report shall not be reproduced except in full, without the written approval of the laboratory.
The results reported relate only to the samples indicated.
Soil/solid results are reported on a dry-weight basis unless otherwise noted.

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Client: SPOKANE COUNTY
Address: 1026 W BROADWAY
SPOKANE, WA 99260-0430
Attn: JAKE SAXON

Batch #: 191022018
Project Name: SAND FILTER

Analytical Results Report

Quality Control Data

Lab Control Sample

Parameter	LCS Result	Units	LCS Spike	%Rec	AR %Rec	Prep Date	Analysis Date
Zinc	0.0521	mg/L	0.05	104.2	85-115	10/24/2019	10/25/2019
TSS	94	mg/L	100	94.0	90-110	10/24/2019	10/24/2019
Iron	0.107	mg/L	0.1	107.0	85-115	10/24/2019	10/25/2019
Hardness	99.5	mg CaCO3/L	100	99.5	90-110	10/29/2019	10/29/2019
Dissolved Zinc	0.0521	mg/L	0.05	104.2	85-115	10/24/2019	10/25/2019
Dissolved Iron	0.107	mg/L	0.1	107.0	85-115	10/24/2019	10/25/2019
Dissolved Copper	0.0570	mg/L	0.05	114.0	85-115	10/24/2019	10/25/2019
Diesel	0.760	mg/L	1	76.0	50-150	10/31/2019	10/31/2019
Copper	0.0570	mg/L	0.05	114.0	85-115	10/24/2019	10/25/2019

Lab Control Sample Duplicate

Parameter	LCSD Result	Units	LCSD Spike	%Rec	%RPD	AR %RPD	Prep Date	Analysis Date
Hardness	100	mg CaCO3/L	100	100.0	0.5	0-25	10/29/2019	10/29/2019

Matrix Spike

Sample Number	Parameter	Sample Result	MS Result	Units	MS Spike	%Rec	AR %Rec	Prep Date	Analysis Date
191021027-005A	Zinc	0.00122	0.0526	mg/L	0.05	102.8	70-130	10/24/2019	10/25/2019
191022021-001	TSS	<1	98	mg/L	100	98.0	80-120	10/24/2019	10/24/2019
191021027-005A	Iron	ND	0.111	mg/L	0.1	111.0	70-130	10/24/2019	10/25/2019
191029011-001A	Hardness	39.5	138	mg CaCO3/L	100	98.5	80-120	10/29/2019	10/29/2019
191021027-005A	Dissolved Zinc	0.00122	0.0526	mg/L	0.05	102.8	70-130	10/24/2019	10/25/2019
191021027-005A	Dissolved Iron	ND	0.111	mg/L	0.1	111.0	70-130	10/24/2019	10/25/2019
191021027-005A	Dissolved Copper	ND	0.0520	mg/L	0.05	104.0	70-130	10/24/2019	10/25/2019
191021027-005A	Copper	ND	0.0520	mg/L	0.05	104.0	70-130	10/24/2019	10/25/2019

Matrix Spike Duplicate

Parameter	MSD Result	Units	MSD Spike	%Rec	%RPD	AR %RPD	Prep Date	Analysis Date
Zinc	0.0524	mg/L	0.05	102.4	0.4	0-20	10/24/2019	10/25/2019
TSS	98	mg/L	100	98.0	0.0	0-20	10/24/2019	10/24/2019
Iron	0.115	mg/L	0.1	115.0	3.5	0-20	10/24/2019	10/25/2019
Hardness	138	mg CaCO3/L	100	98.5	0.0	0-20	10/29/2019	10/29/2019
Dissolved Zinc	0.0524	mg/L	0.05	102.4	0.4	0-20	10/24/2019	10/25/2019

Comments:

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; FL(NELAP):E87893; ID:ID00013; MT:CERT0028; NM: ID00013;NV:ID00013; OR:ID200001-002; WA:C595
Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C585; MT:Cert0095; FL(NELAP): E871099

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Client: SPOKANE COUNTY
Address: 1026 W BROADWAY
SPOKANE, WA 99260-0430
Attn: JAKE SAXON

Batch #: 191022018
Project Name: SAND FILTER

Analytical Results Report

Quality Control Data

Matrix Spike Duplicate

Parameter	MSD Result	Units	MSD Spike	%Rec	%RPD	AR %RPD	Prep Date	Analysis Date
Dissolved Iron	0.115	mg/L	0.1	115.0	3.5	0-20	10/24/2019	10/25/2019
Dissolved Copper	0.0545	mg/L	0.05	109.0	4.7	0-20	10/24/2019	10/25/2019
Copper	0.0545	mg/L	0.05	109.0	4.7	0-20	10/24/2019	10/25/2019

Method Blank

Parameter	Result	Units	PQL	Prep Date	Analysis Date
Copper	ND	mg/L	0.001	10/24/2019	10/25/2019
Diesel	ND	mg/L	0.1	10/31/2019	10/31/2019
Dissolved Copper	ND	mg/L	0.001	10/24/2019	10/25/2019
Dissolved Iron	ND	mg/L	0.001	10/24/2019	10/25/2019
Dissolved Zinc	ND	mg/L	0.001	10/24/2019	10/25/2019
Hardness	<5	mg CaCO3/L	1	10/29/2019	10/29/2019
Iron	ND	mg/L	0.01	10/24/2019	10/25/2019
Lube Oil	ND	mg/L	0.4	10/31/2019	10/31/2019
TSS	<1	mg/L	1	10/24/2019	10/24/2019
Zinc	ND	mg/L	0.001	10/24/2019	10/25/2019

Duplicate

Sample Number	Parameter	Sample Result	Duplicate Result	Units	%RPD	AR %RPD	Prep Date	Analysis Date
191022006-002	TSS	4	5	mg/L	22.2	0-20	10/24/2019	10/24/2019
191022006-002	TSS	4	5	mg/L	22.2	0-20	10/24/2019	10/24/2019
191021015-001	Hardness	29.5	29.0	mg CaCO3/L	1.7	0-25	10/29/2019	10/29/2019

AR	Acceptable Range
ND	Not Detected
PQL	Practical Quantitation Limit
RPD	Relative Percentage Difference

Comments:

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; FL(NELAP):E87893; ID:ID00013; MT:CERT0028; NM: ID00013;NV:ID00013; OR:ID200001-002; WA:C595
Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C585; MT:Cert0095; FL(NELAP): E871099

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Login Report

Customer Name: SPOKANE COUNTY
1026 W BROADWAY
SPOKANE WA 99260-0430

Order ID: 191022018
Order Date: 10/22/2019

Contact Name: JAKE SAXON

Project Name: SAND FILTER

Comment:

Sample #: 191022018-001 **Customer Sample #:** INF10212019

Recv'd: ☑ **Matrix:** Water **Collector:** **Date Collected:** 10/22/2019
Quantity: 4 **Date Received:** 10/22/2019 12:15:00 PM **Time Collected:** 10:30 AM
Comment:

Test	Lab	Method	Due Date	Priority
COPPER SPO	S	EPA 200.8	11/1/2019	***Normal (~10 Days)***
DISSOLVED COPPER SPO	S	EPA 200.8	11/1/2019	***Normal (~10 Days)***
DISSOLVED IRON SPO	S	EPA 200.8	11/1/2019	***Normal (~10 Days)***
DISSOLVED ZINC SPO	S	EPA 200.8	11/1/2019	***Normal (~10 Days)***
HARDNESS EPA 130.2	S	EPA 130.2	11/1/2019	***Normal (~10 Days)***
IRON SPO	S	EPA 200.8	11/1/2019	***Normal (~10 Days)***
SOLIDS - TSS	S	SM 2540D	11/1/2019	***Normal (~10 Days)***
TPHDX-NW	S	NWTPHDX	11/1/2019	***Normal (~10 Days)***
ZINC SPO	S	EPA 200.8	11/1/2019	***Normal (~10 Days)***

Sample #: 191022018-002 **Customer Sample #:** EFF10212019

Recv'd: ☑ **Matrix:** Water **Collector:** **Date Collected:** 10/22/2019
Quantity: 4 **Date Received:** 10/22/2019 12:15:00 PM **Time Collected:** 10:30 AM
Comment:

Test	Lab	Method	Due Date	Priority
COPPER SPO	S	EPA 200.8	11/1/2019	***Normal (~10 Days)***
DISSOLVED COPPER SPO	S	EPA 200.8	11/1/2019	***Normal (~10 Days)***
DISSOLVED IRON SPO	S	EPA 200.8	11/1/2019	***Normal (~10 Days)***
DISSOLVED ZINC SPO	S	EPA 200.8	11/1/2019	***Normal (~10 Days)***
HARDNESS EPA 130.2	S	EPA 130.2	11/1/2019	***Normal (~10 Days)***
IRON SPO	S	EPA 200.8	11/1/2019	***Normal (~10 Days)***
SOLIDS - TSS	S	SM 2540D	11/1/2019	***Normal (~10 Days)***

Customer Name: SPOKANE COUNTY
1026 W BROADWAY
SPOKANE WA 99260-0430

Order ID: 191022018
Order Date: 10/22/2019

Contact Name: JAKE SAXON

Project Name: SAND FILTER

Comment:

TPHDX-NW	S	NWTPHDX	11/1/2019	***Normal (~10 Days)***
ZINC SPO	S	EPA 200.8	11/1/2019	***Normal (~10 Days)***

SAMPLE CONDITION RECORD

Samples received in a cooler?	Yes
Samples received intact?	Yes
What is the temperature of the sample(s)? (°C)	5.7
Samples received with a COC?	Yes
Samples received within holding time?	Yes
Are all sample bottles properly preserved?	Yes
Labels and chain agree?	Yes
Total number of containers?	8

Anatek Labs, Inc.

Chain of Custody Record

1282 Alturas Drive, Moscow ID 83843 (208) 883-2839 FAX 882-9246
504 E Sprague Ste D, Spokane WA 99202 (509) 838-3999 FAX 838-4433

91022 018 SPKC Last Due 11/1/2019
1st SAMP 10/22/201 1st RCVD 10/22/2019
SAND FILTER

Company Name: SPOKANE COUNTY	Project Manager: JAKE SAXON
Address: 1026 W BROADWAY AVE	Project Name & # : SAND FILTER
City: SPOKANE State: WA Zip: 99260	Email Address : JSAXON@SPOKANECOUNTY.ORG
Phone: (509) 477-7245	Purchase Order #:
Fax:	Sampler Name & phone: 5099950557

http://www.anateklabs.com/services/guidelines/reporting.asp

__Normal __Next Day* __2nd Day* __Other*_____ *All rush order requests must be prior approved. __Phone __Mail __Fax x Email

Provide Sample Description

STORMWATER INFLUENT AND EFFLUENT

List Analyses Requested

Lab ID	Sample Identification	Sampling Date/Time	Matrix	Preservative: # of Containers	Sample Volume	TSS SM 2540D	Cu Zn Fe Total EPA 200.8 ICCP/MS	Cu Zn Fe Dissolved EPA 200.8 ICP/MS	NWTPH, Ecology NWTPH-Dx	Hardness as CaCO3 SM 2340B ICP
	INF10212019	10/22/2019 10:30AM	WATER	4		x	x	x	x	x
	EFF10212019	10/22/2019 10:30AM	WATER	4		x	x	x	x	x

Note Special Instructions/Comments

PLEASE SEND RESULTS TO JAKE SAXON
JSAXON@SPOKANECOUNTY.ORG AND
AIMEE NAVICKIS-BRASCH
AIMEEN@OSBORNCONSULTING.COM

SWBS

Inspection Checklist

Received Intact?	(Y)	N
Labels & Chains Agree?	(Y)	N
Containers Sealed?	(Y)	N
VOC Head Space?	Y	N

N/I/C

Temperature (°C): 5.7° digital
Preservative: HCl R385-342
HNO3 P18009-7B 42 pH P18285-30 42
Date & Time: 10-22-19 1420
Inspected By: MW

	Printed Name	Signature	Company	Date	Time
Relinquished by	KAELA MANSFIELD	Kaela Mansfield	OSBORN	10/22/19	12:15pm
Received by	Aurora Younger		Anatek	10/22/19	12:15
Relinquished by					
Received by					
Relinquished by					
Received by					

Anatek Labs, Inc.

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504 E Sprague Ste. D • Spokane WA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@anateklabs.com

Client: SPOKANE COUNTY
Address: 1026 W BROADWAY
SPOKANE, WA 99260-0430
Attn: JAKE SAXON

Batch #: 191120023
Project Name: SAND FILTER

Analytical Results Report

Sample Number 191120023-001 **Sampling Date** 11/19/2019 **Date/Time Received** 11/20/2019 10:30 AM
Client Sample ID INF11192019 **Sampling Time** 4:15 PM **Extraction Date**
Matrix Water **Sample Location**
Comments

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Copper	0.0203	mg/L	0.001	11/27/2019 3:51:00 PM	BAG	EPA 200.8	
Dissolved Copper	0.00377	mg/L	0.001	11/27/2019 3:48:00 PM	BAG	EPA 200.8	
Dissolved Iron	0.0464	mg/L	0.01	11/27/2019 3:48:00 PM	BAG	EPA 200.8	
Dissolved Zinc	0.0302	mg/L	0.001	11/27/2019 3:48:00 PM	BAG	EPA 200.8	
Hardness	22.5	mg CaCO3/L	5	11/26/2019 2:30:00 PM	NDE	EPA 130.2	J
Iron	4.42	mg/L	0.5	11/27/2019 4:10:00 PM	BAG	EPA 200.8	
PO4/P	0.0463	mg/L	0.01	11/21/2019 2:38:00 PM	TLM	SM4500PF	
TSS	92	mg/L	4	11/26/2019 1:15:00 PM	BAS	SM 2540D	
Total P	0.308	mg/L	0.05	12/4/2019 2:57:00 PM	TLM	SM4500PF	
Diesel	0.271	mg/L	0.1	11/28/2019 2:09:00 AM	TAZ	NWTPHDX	
Lube Oil	1.34	mg/L	0.4	11/28/2019 2:09:00 AM	TAZ	NWTPHDX	
Zinc	0.134	mg/L	0.001	11/27/2019 3:51:00 PM	BAG	EPA 200.8	

Sample Number 191120023-002 **Sampling Date** 11/19/2019 **Date/Time Received** 11/20/2019 10:30 AM
Client Sample ID EFF11192019 **Sampling Time** 4:15 PM **Extraction Date**
Matrix Water **Sample Location**
Comments

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Copper	0.0119	mg/L	0.001	11/27/2019 4:26:00 PM	BAG	EPA 200.8	
Dissolved Copper	0.00359	mg/L	0.001	11/27/2019 4:23:00 PM	BAG	EPA 200.8	
Dissolved Iron	0.0366	mg/L	0.01	11/27/2019 4:23:00 PM	BAG	EPA 200.8	
Dissolved Zinc	0.0203	mg/L	0.001	11/27/2019 4:23:00 PM	BAG	EPA 200.8	
Hardness	26.0	mg CaCO3/L	2	11/26/2019 2:30:00 PM	NDE	EPA 130.2	
Iron	2.48	mg/L	0.01	11/27/2019 4:26:00 PM	BAG	EPA 200.8	
PO4/P	0.0616	mg/L	0.01	11/21/2019 2:39:00 PM	TLM	SM4500PF	
TSS	48	mg/L	1	11/26/2019 1:15:00 PM	BAS	SM 2540D	
Total P	0.190	mg/L	0.05	12/4/2019 2:59:00 PM	TLM	SM4500PF	
Diesel	0.236	mg/L	0.1	11/28/2019 2:44:00 AM	TAZ	NWTPHDX	
Lube Oil	0.661	mg/L	0.4	11/28/2019 2:44:00 AM	TAZ	NWTPHDX	
Zinc	0.0603	mg/L	0.001	11/27/2019 4:26:00 PM	BAG	EPA 200.8	

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; FL(NELAP):E87893; ID:ID00013; MT:CERT0028; NM: ID00013;NV:ID00013; OR:ID200001-002; WA:C595
Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C585; MT:Cert0095; FL(NELAP): E871099

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504 E Sprague Ste. D • Spokane WA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@anateklabs.com

Client: SPOKANE COUNTY
Address: 1026 W BROADWAY
SPOKANE, WA 99260-0430
Attn: JAKE SAXON

Batch #: 191120023
Project Name: SAND FILTER

Analytical Results Report

Sample Number 191120023-003 **Sampling Date** 11/19/2019 **Date/Time Received** 11/20/2019 10:30 AM
Client Sample ID DI BLANK FOR DISS METALS- **Sampling Time** 4:15 PM **Extraction Date**
Matrix Water **Sample Location**
Comments Influent

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Dissolved Copper	ND	mg/L	0.001	11/27/2019 3:57:00 PM	BAG	EPA 200.8	
Dissolved Iron	ND	mg/L	0.01	11/27/2019 3:57:00 PM	BAG	EPA 200.8	
Dissolved Zinc	0.0156	mg/L	0.001	11/27/2019 3:57:00 PM	BAG	EPA 200.8	

Sample Number 191120023-004 **Sampling Date** 11/19/2019 **Date/Time Received** 11/20/2019 10:30 AM
Client Sample ID DI BLANK FOR DISS METALS- **Sampling Time** 4:15 PM **Extraction Date**
Matrix Water **Sample Location**
Comments Effluent

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Dissolved Copper	ND	mg/L	0.001	11/27/2019 4:29:00 PM	BAG	EPA 200.8	
Dissolved Iron	ND	mg/L	0.01	11/27/2019 4:29:00 PM	BAG	EPA 200.8	
Dissolved Zinc	0.00838	mg/L	0.001	11/27/2019 4:29:00 PM	BAG	EPA 200.8	

Sample Number 191120023-005 **Sampling Date** 11/19/2019 **Date/Time Received** 11/20/2019 10:30 AM
Client Sample ID DI BLANK FOR ORTHO-P INF **Sampling Time** 4:15 PM **Extraction Date**
Matrix Water **Sample Location**
Comments

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
PO4/P	ND	mg/L	0.01	11/21/2019 2:39:00 PM	TLM	SM4500PF	

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Client: SPOKANE COUNTY
Address: 1026 W BROADWAY
SPOKANE, WA 99260-0430
Attn: JAKE SAXON

Batch #: 191120023
Project Name: SAND FILTER

Analytical Results Report

Sample Number	191120023-006	**Sampling Date**	11/19/2019	**Date/Time Received**	11/20/2019 10:30 AM
Client Sample ID	DI BLANK FOR ORTHO-P EFF	**Sampling Time**	4:15 PM	**Extraction Date**	
Matrix	Water	**Sample Location**			
Comments					

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
PO4/P	ND	mg/L	0.01	11/21/2019 2:40:00 PM	TLM	SM4500PF	

Authorized Signature

Kathleen A. Sattler, Lab Manager

J	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
MCL	EPA's Maximum Contaminant Level
ND	Not Detected
PQL	Practical Quantitation Limit

The results reported relate only to the samples indicated.
Soil/solid results are reported on a dry-weight basis unless otherwise noted.

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; FL(NELAP):E87893; ID:ID00013; MT:CERT0028; NM: ID00013;NV:ID00013; OR:ID200001-002; WA:C595
Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C585; MT:Cert0095; FL(NELAP): E871099

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Client: SPOKANE COUNTY
Address: 1026 W BROADWAY
SPOKANE, WA 99260-0430
Attn: JAKE SAXON

Batch #: 191120023
Project Name: SAND FILTER

Analytical Results Report

Quality Control Data

Lab Control Sample

Parameter	LCS Result	Units	LCS Spike	%Rec	AR %Rec	Prep Date	Analysis Date
Zinc	0.0508	mg/L	0.05	101.6	85-115	11/22/2019	11/27/2019
TSS	97	mg/L	100	97.0	90-110	11/26/2019	11/26/2019
Total P	0.102	mg/L	0.1	102.0	80-120	12/4/2019	12/4/2019
PO4/P	0.0833	mg/L	0.1	83.3	80-120	11/21/2019	11/21/2019
Iron	0.105	mg/L	0.1	105.0	85-115	11/22/2019	11/27/2019
Hardness	102	mg CaCO3/L	100	102.0	90-110	11/26/2019	11/26/2019
Dissolved Zinc	0.0508	mg/L	0.05	101.6	85-115	11/22/2019	11/27/2019
Dissolved Iron	0.105	mg/L	0.1	105.0	85-115	11/22/2019	11/27/2019
Dissolved Copper	0.0517	mg/L	0.05	103.4	85-115	11/22/2019	11/27/2019
Diesel	0.411	mg/L	0.5	82.2	50-150	11/25/2019	11/27/2019
Copper	0.0517	mg/L	0.05	103.4	85-115	11/22/2019	11/27/2019

Lab Control Sample Duplicate

Parameter	LCSD Result	Units	LCSD Spike	%Rec	%RPD	AR %RPD	Prep Date	Analysis Date
Hardness	100	mg CaCO3/L	100	100.0	2.0	0-25	11/26/2019	11/26/2019
Diesel	0.372	mg/L	0.5	74.4	10.0	0-50	11/25/2019	11/27/2019

Matrix Spike

Sample Number	Parameter	Sample Result	MS Result	Units	MS Spike	%Rec	AR %Rec	Prep Date	Analysis Date
191120023-003A	Zinc	0.00311	0.0536	mg/L	0.05	101.0	70-130	11/22/2019	11/27/2019
191126011-002A	Total P	0.0774	0.191	mg/L	0.1	113.6	70-130	12/4/2019	12/4/2019
191121028-002	TSS	3	92	mg/L	100	89.0	80-120	11/26/2019	11/26/2019
191120020-002	PO4/P	0.0392	0.136	mg/L	0.1	96.8	80-120	11/21/2019	11/21/2019
191120023-003A	Iron	ND	0.107	mg/L	0.1	107.0	70-130	11/22/2019	11/27/2019
191121016-001A	Hardness	126	228	mg CaCO3/L	100	102.0	80-120	11/26/2019	11/26/2019
191120023-003A	Dissolved Zinc	0.00311	0.0536	mg/L	0.05	101.0	70-130	11/22/2019	11/27/2019
191120023-003A	Dissolved Iron	ND	0.108	mg/L	0.1	108.0	70-130	11/22/2019	11/27/2019
191120023-003A	Dissolved Copper	ND	0.0524	mg/L	0.05	104.8	70-130	11/22/2019	11/27/2019
191120023-003A	Copper	ND	0.0524	mg/L	0.05	104.8	70-130	11/22/2019	11/27/2019

Matrix Spike Duplicate

Parameter	MSD Result	Units	MSD Spike	%Rec	%RPD	AR %RPD	Prep Date	Analysis Date

Comments:

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; FL(NELAP):E87893; ID:ID00013; MT:CERT0028; NM: ID00013;NV:ID00013; OR:ID200001-002; WA:C595
Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C585; MT:Cert0095; FL(NELAP): E871099

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Client: SPOKANE COUNTY
Address: 1026 W BROADWAY
SPOKANE, WA 99260-0430
Attn: JAKE SAXON

Batch #: 191120023
Project Name: SAND FILTER

Analytical Results Report

Quality Control Data

Matrix Spike Duplicate

Parameter	MSD Result	Units	MSD Spike	%Rec	%RPD	AR %RPD	Prep Date	Analysis Date
Zinc		mg/L	0.05			0-20	11/22/2019	11/27/2019
Total P	0.189	mg/L	0.1	111.6	1.1	0-20	12/4/2019	12/4/2019
TSS	100	mg/L	100	97.0	8.3	0-20	11/26/2019	11/26/2019
PO4/P	0.142	mg/L	0.1	102.8	4.3	0-20	11/21/2019	11/21/2019
Iron		mg/L	0.1			0-20	11/22/2019	11/27/2019
Hardness	226	mg CaCO3/L	100	100.0	0.9	0-20	11/26/2019	11/26/2019
Dissolved Zinc		mg/L	0.05			0-20	11/22/2019	11/27/2019
Dissolved Iron		mg/L	0.1			0-20	11/22/2019	11/27/2019
Dissolved Copper		mg/L	0.05			0-20	11/22/2019	11/27/2019
Copper		mg/L	0.05			0-20	11/22/2019	11/27/2019

Method Blank

Parameter	Result	Units	PQL	Prep Date	Analysis Date
Copper	ND	mg/L	0.001	11/22/2019	11/27/2019
Diesel	ND	mg/L	0.1	11/25/2019	11/27/2019
Dissolved Copper	ND	mg/L	0.001	11/22/2019	11/27/2019
Dissolved Iron	ND	mg/L	0.001	11/22/2019	11/27/2019
Dissolved Zinc	ND	mg/L	0.001	11/22/2019	11/27/2019
Hardness	<5	mg CaCO3/L	1	11/26/2019	11/26/2019
Iron	ND	mg/L	0.01	11/22/2019	11/27/2019
Lube Oil	ND	mg/L	0.4	11/25/2019	11/27/2019
PO4/P	ND	mg/L	0.01	11/21/2019	11/21/2019
Total P	ND	mg/L	0.01	12/4/2019	12/4/2019
TSS	<1	mg/L	1	11/26/2019	11/26/2019
Zinc	ND	mg/L	0.001	11/22/2019	11/27/2019

Duplicate

Sample Number	Parameter	Sample Result	Duplicate Result	Units	%RPD	AR %RPD	Prep Date	Analysis Date
191121029-002	TSS	12	13	mg/L	8.0	0-20	11/26/2019	11/26/2019
191121029-002	TSS	12	13	mg/L	8.0	0-20	11/26/2019	11/26/2019
191121008-001A	Hardness	127	128	mg CaCO3/L	0.8	0-25	11/26/2019	11/26/2019

Comments:

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; FL(NELAP):E87893; ID:ID00013; MT:CERT0028; NM: ID00013;NV:ID00013; OR:ID200001-002; WA:C595
Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C585; MT:Cert0095; FL(NELAP): E871099

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Client: SPOKANE COUNTY
Address: 1026 W BROADWAY
SPOKANE, WA 99260-0430
Attn: JAKE SAXON

Batch #: 191120023
Project Name: SAND FILTER

Analytical Results Report

Quality Control Data

AR	Acceptable Range
ND	Not Detected
PQL	Practical Quantitation Limit
RPD	Relative Percentage Difference

Comments:

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; FL(NELAP):E87893; ID:ID00013; MT:CERT0028; NM: ID00013;NV:ID00013; OR:ID200001-002; WA:C595
Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C585; MT:Cert0095; FL(NELAP): E871099

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504 E Sprague Ste. D • Spokane WA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@anateklabs.com

Login Report

Customer Name: SPOKANE COUNTY
1026 W BROADWAY
SPOKANE WA 99260-0430

Order ID: 191120023
Order Date: 11/20/2019

Contact Name: JAKE SAXON
Project Name: SAND FILTER

Comment:

Sample #: 191120023-001 **Customer Sample #:** INF11192019

Recv'd: ☑ **Matrix:** Water **Collector:** **Date Collected:** 11/19/2019
Quantity: 4 **Date Received:** 11/20/2019 10:30:00 AM **Time Collected:** 4:15 PM
Comment:

Test	Lab	Method	Due Date	Priority
COPPER SPO	S	EPA 200.8	12/4/2019	***Normal (~10 Days)***
DISSOLVED COPPER SPO	S	EPA 200.8	12/4/2019	***Normal (~10 Days)***
DISSOLVED IRON SPO	S	EPA 200.8	12/4/2019	***Normal (~10 Days)***
DISSOLVED ZINC SPO	S	EPA 200.8	12/4/2019	***Normal (~10 Days)***
HARDNESS EPA 130.2	S	EPA 130.2	12/4/2019	***Normal (~10 Days)***
IRON SPO	S	EPA 200.8	12/4/2019	***Normal (~10 Days)***
PHOSPHATE/P FIA	S	SM4500PF	12/4/2019	***Normal (~10 Days)***
SOLIDS - TSS	S	SM 2540D	12/4/2019	***Normal (~10 Days)***
TOTAL P FIA	S	SM4500PF	12/4/2019	***Normal (~10 Days)***
TPHDX-NW	S	NWTPHDX	12/4/2019	***Normal (~10 Days)***
ZINC SPO	S	EPA 200.8	12/4/2019	***Normal (~10 Days)***

Sample #: 191120023-002 **Customer Sample #:** EFF11192019

Recv'd: ☑ **Matrix:** Water **Collector:** **Date Collected:** 11/19/2019
Quantity: 4 **Date Received:** 11/20/2019 10:30:00 AM **Time Collected:** 4:15 PM
Comment:

Test	Lab	Method	Due Date	Priority
COPPER SPO	S	EPA 200.8	12/4/2019	***Normal (~10 Days)***
DISSOLVED COPPER SPO	S	EPA 200.8	12/4/2019	***Normal (~10 Days)***
DISSOLVED IRON SPO	S	EPA 200.8	12/4/2019	***Normal (~10 Days)***
DISSOLVED ZINC SPO	S	EPA 200.8	12/4/2019	***Normal (~10 Days)***
HARDNESS EPA 130.2	S	EPA 130.2	12/4/2019	***Normal (~10 Days)***
IRON SPO	S	EPA 200.8	12/4/2019	***Normal (~10 Days)***
PHOSPHATE/P FIA	S	SM4500PF	12/4/2019	***Normal (~10 Days)***
SOLIDS - TSS	S	SM 2540D	12/4/2019	***Normal (~10 Days)***
TOTAL P FIA	S	SM4500PF	12/4/2019	***Normal (~10 Days)***
TPHDX-NW	S	NWTPHDX	12/4/2019	***Normal (~10 Days)***
ZINC SPO	S	EPA 200.8	12/4/2019	***Normal (~10 Days)***

Customer Name: SPOKANE COUNTY
1026 W BROADWAY
SPOKANE WA 99260-0430

Order ID: 191120023
Order Date: 11/20/2019

Contact Name: JAKE SAXON
Project Name: SAND FILTER

Comment:

Sample #: 191120023-003 **Customer Sample #:** DI BLANK FOR DISS METALS--INF

Recv'd: ☑ **Matrix:** Water **Collector:** **Date Collected:** 11/19/2019
Quantity: 4 **Date Received:** 11/20/2019 10:30:00 AM **Time Collected:** 4:15 PM
Comment:

Test	Lab	Method	Due Date	Priority
DISSOLVED COPPER SPO	S	EPA 200.8	12/4/2019	***Normal (~10 Days)***
DISSOLVED IRON SPO	S	EPA 200.8	12/4/2019	***Normal (~10 Days)***
DISSOLVED ZINC SPO	S	EPA 200.8	12/4/2019	***Normal (~10 Days)***

Sample #: 191120023-004 **Customer Sample #:** DI BLANK FOR DISS METALS--EFF

Recv'd: ☑ **Matrix:** Water **Collector:** **Date Collected:** 11/19/2019
Quantity: 4 **Date Received:** 11/20/2019 10:30:00 AM **Time Collected:** 4:15 PM
Comment:

Test	Lab	Method	Due Date	Priority
DISSOLVED COPPER SPO	S	EPA 200.8	12/4/2019	***Normal (~10 Days)***
DISSOLVED IRON SPO	S	EPA 200.8	12/4/2019	***Normal (~10 Days)***
DISSOLVED ZINC SPO	S	EPA 200.8	12/4/2019	***Normal (~10 Days)***

Sample #: 191120023-005 **Customer Sample #:** DI BLANK FOR ORTHO-P INF

Recv'd: ☑ **Matrix:** Water **Collector:** **Date Collected:** 11/19/2019
Quantity: 4 **Date Received:** 11/20/2019 10:30:00 AM **Time Collected:** 4:15 PM
Comment:

Test	Lab	Method	Due Date	Priority
PHOSPHATE/P FIA	S	SM4500PF	12/4/2019	***Normal (~10 Days)***

Sample #: 191120023-006 **Customer Sample #:** DI BLANK FOR ORTHO-P EFF

Recv'd: ☑ **Matrix:** Water **Collector:** **Date Collected:** 11/19/2019
Quantity: 4 **Date Received:** 11/20/2019 10:30:00 AM **Time Collected:** 4:15 PM
Comment:

Test	Lab	Method	Due Date	Priority
PHOSPHATE/P FIA	S	SM4500PF	12/4/2019	***Normal (~10 Days)***

Customer Name:	SPOKANE COUNTY			**Order ID:**	191120023
	1026 W BROADWAY			**Order Date:**	11/20/2019
	SPOKANE	WA	99260-0430		
Contact Name:	JAKE SAXON			**Project Name:**	SAND FILTER
Comment:					

SAMPLE CONDITION RECORD

Samples received in a cooler?	Yes
Samples received intact?	Yes
What is the temperature of the sample(s)? (°C)	1.7
Samples received with a COC?	Yes
Samples received within holding time?	Yes
Are all sample bottles properly preserved?	Yes
Labels and chain agree?	Yes
Total number of containers?	14

91120 023 SPKC Last Due 12/4/2019
1st SAMP 11/19/201 1st RCVD 11/20/2019
SAND FILTER

Anatek Labs, Inc.

Chain of Custody Record

1282 Alturas Drive, Moscow ID 83843 (208) 883-2839 FAX 882-9246
504 E Sprague Ste D, Spokane WA 99202 (509) 838-3999 FAX 838-4433

Company Name: Spokane County	Project Manager: Jake Saxon
Address: 1026 W. Broadway Avenue	Project Name & #: Sand Filter
City: Spokane State: WA Zip: 99260	Email Address: JSAXON@spokanecounty.org
Phone: (509) 477-7245	Purchase Order #:
Fax:	Sampler Name & phone: (509)995-0557

Turn Around Time & Reporting

Please refer to our normal turn around times at:
http://www.anateklabs.com/services/guidelines/reporting.asp

__Normal __Next Day* __2nd Day* __Other*_____
*All rush order requests must be prior approved.
__Phone __Mail __Fax x Email

Provide Sample Description

stormwater influent and effluent

List Analyses Requested

Lab ID	Sample Identification	Sampling Date/Time	Matrix	# of Containers	Sample Volume	Preservative: TSS SM 2540D	Cu Zn Fe Total EPA 200.8 ICP/MS	Cu Zn Fe Dissolved EPA 200.8 ICP/MS	NWTPH, Ecology NWTPH-Dx	Hardness as CaCO3 SM 2340B ICP	Ortho-phosphate SM 4500-P G	Total Phosphorus SM 4500-P F			
01	INF11192019	11/19/2019 4:15pm	water	5		x	x	x	x	x	x	x			
02	EFF11192019	11/19/2019 4:15pm	water	5		x	x	x	x	x	x	x			
03	DI Blank for Diss Metals-INF	11/19/2019 4:15pm	water	1				x							
04	DI Blank for Diss Metals-EFF	11/19/2019 4:15pm	water	1				x							
05	DI Blank for Ortho-P INF	11/19/2019 4:15pm	water	1							x				
06	DI Blank for Ortho-P EFF	11/19/2019 4:15pm	water	1							x				

Note Special Instructions/Comments

Please send results to Jake Saxon JSAXON@spokanecounty.org and Aimee Navickis-Brasch aimeen@osbornconsulting.com

50mL DI water was filtered through the 0.45um filters prior to filtering the dissolved metals and ortho-phoshpate samples. The DI water is contained within labeled bottles in each bag (influent DI water is in the bag with the influent samples; effluent DI water is in the bag with the effluent samples).

Inspection Checklist

Received Intact?	(Y)	N
Labels & Chains Agree?	Y	N
Containers Sealed?	Y	N
VOC Head Space?	Y	N

Ice/Coolants

Temperature (°C): -1.7 deg-C

Preservative: H_2SO_4 R386-3 HNO_3 ~~HNO_3~~ P18009-7B
HCl R385-3

Date & Time:

Inspected By:

	Printed Name	Signature	Company	Date	Time
Relinquished by	Taylor Hoffman		Osborn	11/20	10:20a
Received by			Anatek	11/20	1030
Relinquished by					
Received by					
Relinquished by					
Received by					

Anatek Labs, Inc.

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504 E Sprague Ste. D • Spokane WA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@anateklabs.com

Client: SPOKANE COUNTY
Address: 1026 W BROADWAY
SPOKANE, WA 99260-0430
Attn: JAKE SAXON

Batch #: 191209033
Project Name: SAND FILTER

Analytical Results Report

Sample Number 191209033-001 **Sampling Date** 12/7/2019 **Date/Time Received** 12/9/2019 11:00 AM
Client Sample ID INF12072019 **Sampling Time** 9:00 PM **Extraction Date**
Matrix Water **Sample Location**
Comments TSS samples for influent & effluent were switched.

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Copper	0.0995	mg/L	0.001	12/16/2019 12:24:00 PM	TRC	EPA 200.8	
Dissolved Copper	0.00924	mg/L	0.001	12/16/2019 12:08:00 PM	TRC	EPA 200.8	
Dissolved Iron	1.27	mg/L	0.01	12/16/2019 12:08:00 PM	TRC	EPA 200.8	
Dissolved Zinc	0.0789	mg/L	0.001	12/16/2019 12:08:00 PM	TRC	EPA 200.8	
Hardness	40.0	mg CaCO3/L	2	12/10/2019 11:30:00 AM	NDE	EPA 130.2	
Iron	2.07	mg/L	0.01	12/16/2019 12:24:00 PM	TRC	EPA 200.8	
PO4/P	0.178	mg/L	0.01	12/9/2019 2:02:00 PM	KAS	SM4500PF	
TSS	36	mg/L	2	12/12/2019 10:15:00 AM	BAS	SM 2540D	
Diesel	ND	mg/L	0.1	12/16/2019 12:15:00 AM	LMC	NWTPHDX	
Lube Oil	ND	mg/L	0.4	12/16/2019 12:15:00 AM	LMC	NWTPHDX	
Zinc	0.0851	mg/L	0.001	12/16/2019 12:24:00 PM	TRC	EPA 200.8	

Sample Number 191209033-002 **Sampling Date** 12/7/2019 **Date/Time Received** 12/9/2019 11:00 AM
Client Sample ID EFF12072019 **Sampling Time** 9:00 PM **Extraction Date**
Matrix Water **Sample Location**
Comments

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Copper	0.00671	mg/L	0.001	12/16/2019 12:26:00 PM	TRC	EPA 200.8	
Dissolved Copper	0.00611	mg/L	0.001	12/16/2019 12:11:00 PM	TRC	EPA 200.8	
Dissolved Iron	0.864	mg/L	0.01	12/16/2019 12:11:00 PM	TRC	EPA 200.8	
Dissolved Zinc	0.0402	mg/L	0.001	12/16/2019 12:11:00 PM	TRC	EPA 200.8	
Hardness	42.0	mg CaCO3/L	2	12/10/2019 11:30:00 AM	NDE	EPA 130.2	
Iron	1.64	mg/L	0.01	12/16/2019 12:26:00 PM	TRC	EPA 200.8	
PO4/P	0.141	mg/L	0.01	12/9/2019 2:05:00 PM	KAS	SM4500PF	
TSS	64	mg/L	2	12/12/2019 10:15:00 AM	BAS	SM 2540D	
Total P	0.142	mg/L	0.01	12/12/2019 3:03:00 PM	KAS	SM4500PF	
Diesel	ND	mg/L	0.1	12/17/2019 1:09:00 AM	LMC	NWTPHDX	
Lube Oil	ND	mg/L	0.4	12/17/2019 1:09:00 AM	LMC	NWTPHDX	
Zinc	0.0470	mg/L	0.001	12/16/2019 12:26:00 PM	TRC	EPA 200.8	

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; FL(NELAP):E87893; ID:ID00013; MT:CERT0028; NM: ID00013;NV:ID00013; OR:ID200001-002; WA:C595
Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C585; MT:Cert0095; FL(NELAP): E871099

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Client: SPOKANE COUNTY
Address: 1026 W BROADWAY
SPOKANE, WA 99260-0430
Attn: JAKE SAXON

Batch #: 191209033
Project Name: SAND FILTER

Analytical Results Report

Sample Number 191209033-003 **Sampling Date** 12/7/2019 **Date/Time Received** 12/9/2019 11:00 AM
Client Sample ID INF12072019D **Sampling Time** 9:00 PM **Extraction Date**
Matrix Water **Sample Location**
Comments

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Dissolved Copper	ND	mg/L	0.001	12/16/2019 12:18:00 PM	TRC	EPA 200.8	
Dissolved Iron	0.0193	mg/L	0.01	12/16/2019 12:18:00 PM	TRC	EPA 200.8	
Dissolved Zinc	0.00849	mg/L	0.001	12/16/2019 12:18:00 PM	TRC	EPA 200.8	
PO4/P	0.349	mg/L	0.01	12/9/2019 2:08:00 PM	KAS	SM4500PF	

Sample Number 191209033-004 **Sampling Date** 12/7/2019 **Date/Time Received** 12/9/2019 11:00 AM
Client Sample ID EFF12072019D **Sampling Time** 9:00 PM **Extraction Date**
Matrix Water **Sample Location**
Comments

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Dissolved Copper	ND	mg/L	0.001	12/16/2019 12:21:00 PM	TRC	EPA 200.8	
Dissolved Iron	0.0116	mg/L	0.01	12/16/2019 12:21:00 PM	TRC	EPA 200.8	
Dissolved Zinc	0.00855	mg/L	0.001	12/16/2019 12:21:00 PM	TRC	EPA 200.8	
PO4/P	0.352	mg/L	0.01	12/9/2019 2:09:00 PM	KAS	SM4500PF	

Authorized Signature Kathleen A. Sattler

Kathleen A. Sattler, Lab Manager

MCL EPA's Maximum Contaminant Level
ND Not Detected
PQL Practical Quantitation Limit

This report shall not be reproduced except in full, without the written approval of the laboratory.
The results reported relate only to the samples indicated.
Soil/solid results are reported on a dry-weight basis unless otherwise noted.

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; FL(NELAP):E87893; ID:ID00013; MT:CERT0028; NM: ID00013;NV:ID00013; OR:ID200001-002; WA:C595
Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C585; MT:Cert0095; FL(NELAP): E871099

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Login Report

Customer Name: SPOKANE COUNTY
1026 W BROADWAY
SPOKANE WA 99260-0430

Order ID: 191209033
Order Date: 12/9/2019

Contact Name: JAKE SAXON
Project Name: SAND FILTER

Comment:

Sample #: 191209033-001 **Customer Sample #:** INF12072019

Recv'd: ☑ **Matrix:** Water **Collector:** **Date Collected:** 12/7/2019
Quantity: 6 **Date Received:** 12/9/2019 11:00:00 AM **Time Collected:** 9:00 PM
Comment:

Test	Lab	Method	Due Date	Priority
COPPER SPO	S	EPA 200.8	12/19/2019	***Normal (~10 Days)***
DISSOLVED COPPER SPO	S	EPA 200.8	12/19/2019	***Normal (~10 Days)***
DISSOLVED IRON SPO	S	EPA 200.8	12/19/2019	***Normal (~10 Days)***
DISSOLVED ZINC SPO	S	EPA 200.8	12/19/2019	***Normal (~10 Days)***
HARDNESS EPA 130.2	S	EPA 130.2	12/19/2019	***Normal (~10 Days)***
IRON SPO	S	EPA 200.8	12/19/2019	***Normal (~10 Days)***
PHOSPHATE/P FIA	S	SM4500PF	12/19/2019	***Normal (~10 Days)***
SOLIDS - TSS	S	SM 2540D	12/19/2019	***Normal (~10 Days)***
TOTAL P FIA	S	SM4500PF	12/19/2019	***Normal (~10 Days)***
TPHDX-NW	S	NWTPHDX	12/19/2019	***Normal (~10 Days)***
ZINC SPO	S	EPA 200.8	12/19/2019	***Normal (~10 Days)***

Sample #: 191209033-002 **Customer Sample #:** EFF12072019

Recv'd: ☑ **Matrix:** Water **Collector:** **Date Collected:** 12/7/2019
Quantity: 6 **Date Received:** 12/9/2019 11:00:00 AM **Time Collected:** 9:00 PM
Comment:

Test	Lab	Method	Due Date	Priority
COPPER SPO	S	EPA 200.8	12/19/2019	***Normal (~10 Days)***
DISSOLVED COPPER SPO	S	EPA 200.8	12/19/2019	***Normal (~10 Days)***
DISSOLVED IRON SPO	S	EPA 200.8	12/19/2019	***Normal (~10 Days)***
DISSOLVED ZINC SPO	S	EPA 200.8	12/19/2019	***Normal (~10 Days)***
HARDNESS EPA 130.2	S	EPA 130.2	12/19/2019	***Normal (~10 Days)***
IRON SPO	S	EPA 200.8	12/19/2019	***Normal (~10 Days)***
PHOSPHATE/P FIA	S	SM4500PF	12/19/2019	***Normal (~10 Days)***
SOLIDS - TSS	S	SM 2540D	12/19/2019	***Normal (~10 Days)***
TOTAL P FIA	S	SM4500PF	12/19/2019	***Normal (~10 Days)***
TPHDX-NW	S	NWTPHDX	12/19/2019	***Normal (~10 Days)***
ZINC SPO	S	EPA 200.8	12/19/2019	***Normal (~10 Days)***

Customer Name: SPOKANE COUNTY
1026 W BROADWAY
SPOKANE WA 99260-0430

Order ID: 191209033
Order Date: 12/9/2019

Contact Name: JAKE SAXON

Project Name: SAND FILTER

Comment:

Sample #: 191209033-003 **Customer Sample #:** INF12072019D

Recv'd: ☑ **Matrix:** Water **Collector:** **Date Collected:** 12/7/2019
Quantity: 1 **Date Received:** 12/9/2019 11:00:00 AM **Time Collected:** 9:00 PM
Comment:

Test	Lab	Method	Due Date	Priority
DISSOLVED COPPER SPO	S	EPA 200.8	12/19/2019	***Normal (~10 Days)***
DISSOLVED IRON SPO	S	EPA 200.8	12/19/2019	***Normal (~10 Days)***
DISSOLVED ZINC SPO	S	EPA 200.8	12/19/2019	***Normal (~10 Days)***
PHOSPHATE/P FIA	S	SM4500PF	12/19/2019	***Normal (~10 Days)***

Sample #: 191209033-004 **Customer Sample #:** EFF12072019D

Recv'd: ☑ **Matrix:** Water **Collector:** **Date Collected:** 12/7/2019
Quantity: 1 **Date Received:** 12/9/2019 11:00:00 AM **Time Collected:** 9:00 PM
Comment:

Test	Lab	Method	Due Date	Priority
DISSOLVED COPPER SPO	S	EPA 200.8	12/19/2019	***Normal (~10 Days)***
DISSOLVED IRON SPO	S	EPA 200.8	12/19/2019	***Normal (~10 Days)***
DISSOLVED ZINC SPO	S	EPA 200.8	12/19/2019	***Normal (~10 Days)***
PHOSPHATE/P FIA	S	SM4500PF	12/19/2019	***Normal (~10 Days)***

SAMPLE CONDITION RECORD

Samples received in a cooler?	Yes
Samples received intact?	Yes
What is the temperature of the sample(s)? (°C)	2.2
Samples received with a COC?	Yes
Samples received within holding time?	Yes
Are all sample bottles properly preserved?	Yes
Labels and chain agree?	Yes
Total number of containers?	14

Anatek Labs, Inc.

Chain of Custody Record

1282 Alturas Drive, Moscow ID 83843 (208) 883-2839 FAX 882-9246
504 E Sprague Ste D, Spokane WA 99202 (509) 838-3999 FAX 838-4433

'91209 033 **SPKC** Last Due **12/19/2019**
1st SAMP 12/7/2019 1st RCVD 12/9/2019
SAND FILTER

Company Name: **Spokane County**	Project Manager: **Jake Saxon**
Address: **1026 W. Broadway Avenue**	Project Name & # : **Sand Filter**
City: **Spokane** State: **WA** Zip: **99260**	Email Address : **JSAXON@spokanecounty.org**
Phone: **(509) 477-7245**	Purchase Order #:
Fax:	Sampler Name & phone: **(509)995-0557**

Turn Around Time & Reporting

Please refer to our normal turn around times at:
http://www.anateklabs.com/services/guidelines/reporting.asp

__Normal
__Next Day*
__2nd Day*
__Other*_____

*All rush order requests must be prior approved.

__Phone
__Mail
__Fax
x Email

Provide Sample Description

stormwater influent and effluent

List Analyses Requested

Lab ID	Sample Identification	Sampling Date/Time	Matrix	# of Containers	Sample Volume	TSS SM 2540D	Cu Zn Fe Total EPA 200.8 ICP/MS	Cu Zn Fe Dissolved EPA 200.8 ICP/MS	NWTPH, Ecology NWTPH-Dx	Hardness as CaCO3 SM 2340B ICP	Ortho-phosphate SM 4500-P G	Total Phosphorus SM 4500-P F
				Preservative:								
	INF12072019	12/07/2019 9:00pm	water	6		x	x	x	x	x	x	x
	EFF12072019	12/07/2019 9:00pm	water	6		x	x	x	x	x	x	x
	IN12072019D	12/07/2019 9:00pm	water	1				x			x	
	EF12072019D	12/07/2019 9:00pm	water	1				x			x	

Note Special Instructions/Comments

Please send results to Jake Saxon JSAXON@spokanecounty.org and Aimee Navickis-Brasch aimeen@osbornconsulting.com

SWBS

Inspection Checklist

Received Intact?	(Y)	N
Labels & Chains Agree?	(Y)	N
Containers Sealed?	(Y)	N
VOC Head Space?	Y	N

hIIC

Temperature (°C): 2.2° dig-04
Preservative: H_2SO_4 R386-3<2
HCl R385-3<2 HNO3 P18009-7B
Date & Time: 12-9-19
Inspected By: MWC
pH P18285-3V

	Printed Name	Signature	Company	Date	Time
Relinquished by	ASNBrasch	ASNBrasch	OCI	12/9/19	10:30am
Received by	Taylor Holtzman Bellas	Taylor Holtzman Bellas	OCI	12/9/19	10:30a
Relinquished by	Taylor Holtzman Bellas	Taylor Holtzman Bellas	OCI	12/9/19	
Received by	Aurora Youngren		anatek	12/9/19	11:00
Relinquished by					
Received by					

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Client: SPOKANE COUNTY
Address: 1026 W BROADWAY
SPOKANE, WA 99260-0430
Attn: JAKE SAXON

Batch #: 200107031
Project Name: SAND FILTER

Analytical Results Report

Sample Number 200107031-001 | **Sampling Date** 1/7/2020 | **Date/Time Received** 1/7/2020 9:50 AM
Client Sample ID INF01062020 | **Sampling Time** 8:15 AM | **Digested Date**
Matrix Wastewater | **Sample Location**
Comments

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Copper	0.0509	mg/L	0.001	1/9/2020 4:57:00 PM	TRC	EPA 200.8	
Dissolved Copper	0.00576	mg/L	0.001	1/9/2020 4:52:00 PM	TRC	EPA 200.8	
Dissolved Iron	0.0616	mg/L	0.01	1/9/2020 4:52:00 PM	TRC	EPA 200.8	
Dissolved Zinc	0.0621	mg/L	0.001	1/9/2020 4:52:00 PM	TRC	EPA 200.8	
Iron	19.6	mg/L	0.1	1/13/2020 1:57:00 PM	TRC	EPA 200.8	
TSS	560	mg/L	10	1/8/2020 9:00:00 AM	BAS	SM 2540D	
Zinc	0.400	mg/L	0.001	1/9/2020 4:57:00 PM	TRC	EPA 200.8	

Sample Number 200107031-002 | **Sampling Date** 1/7/2020 | **Date/Time Received** 1/7/2020 9:50 AM
Client Sample ID EFF01062020 | **Sampling Time** 8:15 AM | **Digested Date**
Matrix Wastewater | **Sample Location**
Comments

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Copper	0.0202	mg/L	0.001	1/9/2020 4:59:00 PM	TRC	EPA 200.8	
Dissolved Copper	0.00661	mg/L	0.001	1/9/2020 4:55:00 PM	TRC	EPA 200.8	
Dissolved Iron	0.176	mg/L	0.01	1/9/2020 4:55:00 PM	TRC	EPA 200.8	
Dissolved Zinc	0.0446	mg/L	0.001	1/9/2020 4:55:00 PM	TRC	EPA 200.8	
Iron	7.08	mg/L	0.1	1/13/2020 2:00:00 PM	TRC	EPA 200.8	
TSS	124	mg/L	4	1/8/2020 9:00:00 AM	BAS	SM 2540D	
Zinc	0.138	mg/L	0.001	1/9/2020 4:59:00 PM	TRC	EPA 200.8	

Authorized Signature Kathleen A. Sattler

Kathleen A. Sattler, Lab Manager

MCL	EPA's Maximum Contaminant Level
ND	Not Detected
PQL	Practical Quantitation Limit

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; FL(NELAP):E87893; ID:ID00013; MT:CERT0028; NM: ID00013;NV:ID00013; OR:ID200001-002; WA:C595
Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C585; MT:Cert0095; FL(NELAP): E871099

Anatek Labs, Inc.

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Client: SPOKANE COUNTY
Address: 1026 W BROADWAY
SPOKANE, WA 99260-0430
Attn: JAKE SAXON

Batch #: 200107031
Project Name: SAND FILTER

Analytical Results Report

Quality Control Data

Lab Control Sample

Parameter	LCS Result	Units	LCS Spike	%Rec	AR %Rec	Prep Date	Analysis Date
Iron	0.106	mg/L	0.1	106.0	85-115	1/9/2020	1/13/2020
Zinc	0.0494	mg/L	0.05	98.8	85-115	1/9/2020	1/9/2020
Dissolved Zinc	0.0494	mg/L	0.05	98.8	85-115	1/9/2020	1/9/2020
Dissolved Iron	0.103	mg/L	0.1	103.0	85-115	1/9/2020	1/9/2020
Dissolved Copper	0.0500	mg/L	0.05	100.0	85-115	1/9/2020	1/9/2020
Copper	0.0500	mg/L	0.05	100.0	85-115	1/9/2020	1/9/2020
TSS	100	mg/L	100	100.0	90-110	1/8/2020	1/8/2020

Matrix Spike

Sample Number	Parameter	Sample Result	MS Result	Units	MS Spike	%Rec	AR %Rec	Prep Date	Analysis Date
200107025-001A	Zinc	0.0402	0.0862	mg/L	0.05	92.0	70-130	1/9/2020	1/9/2020
200102031-001	TSS	<1	98	mg/L	100	98.0	80-120	1/8/2020	1/8/2020
200108032-009A	Iron	0.0117	0.118	mg/L	0.1	106.3	70-130	1/9/2020	1/13/2020
200107025-001A	Dissolved Zinc	0.0402	0.0862	mg/L	0.05	92.0	70-130	1/9/2020	1/9/2020
200107025-001A	Dissolved Iron	0.212	0.307	mg/L	0.1	95.0	70-130	1/9/2020	1/9/2020
200107025-001A	Dissolved Copper	0.00134	0.0476	mg/L	0.05	92.5	70-130	1/9/2020	1/9/2020
200107025-001A	Copper	0.00134	0.0476	mg/L	0.05	92.5	70-130	1/9/2020	1/9/2020

Matrix Spike Duplicate

Parameter	MSD Result	Units	MSD Spike	%Rec	%RPD	AR %RPD	Prep Date	Analysis Date
Zinc	0.0860	mg/L	0.05	91.6	0.2	0-20	1/9/2020	1/9/2020
TSS	92	mg/L	100	92.0	6.3	0-20	1/8/2020	1/8/2020
Iron	0.115	mg/L	0.1	103.3	2.6	0-20	1/9/2020	1/13/2020
Dissolved Zinc	0.0860	mg/L	0.05	91.6	0.2	0-20	1/9/2020	1/9/2020
Dissolved Iron	0.307	mg/L	0.1	95.0	0.0	0-20	1/9/2020	1/9/2020
Dissolved Copper	0.0471	mg/L	0.05	91.5	1.1	0-20	1/9/2020	1/9/2020
Copper	0.0471	mg/L	0.05	91.5	1.1	0-20	1/9/2020	1/9/2020

Method Blank

Parameter	Result	Units	PQL	Prep Date	Analysis Date
Copper	ND	mg/L	0.001	1/9/2020	1/9/2020

Comments:

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; FL(NELAP):E87893; ID:ID00013; MT:CERT0028; NM: ID00013;NV:ID00013; OR:ID200001-002; WA:C595
Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C585; MT:Cert0095; FL(NELAP): E871099

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Client: SPOKANE COUNTY
Address: 1026 W BROADWAY
SPOKANE, WA 99260-0430
Attn: JAKE SAXON

Batch #: 200107031
Project Name: SAND FILTER

Analytical Results Report

Quality Control Data

Method Blank

Parameter	Result	Units	PQL	Prep Date	Analysis Date
Dissolved Copper	ND	mg/L	0.001	1/9/2020	1/9/2020
Dissolved Iron	ND	mg/L	0.001	1/9/2020	1/9/2020
Dissolved Zinc	ND	mg/L	0.001	1/9/2020	1/9/2020
Iron	ND	mg/L	0.01	1/9/2020	1/13/2020
TSS	<1	mg/L	1	1/8/2020	1/8/2020
Zinc	ND	mg/L	0.001	1/9/2020	1/9/2020

Duplicate

Sample Number	Parameter	Sample Result	Duplicate Result	Units	%RPD	AR %RPD	Prep Date	Analysis Date
200107024-001	TSS	224	224	mg/L	0.0	0-20	1/8/2020	1/8/2020
200107024-001	TSS	224	224	mg/L	0.0	0-20	1/8/2020	1/8/2020

AR	Acceptable Range
ND	Not Detected
PQL	Practical Quantitation Limit
RPD	Relative Percentage Difference

Comments:

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; FL(NELAP):E87893; ID:ID00013; MT:CERT0028; NM: ID00013;NV:ID00013; OR:ID200001-002; WA:C595
Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C585; MT:Cert0095; FL(NELAP): E871099

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Login Report

Customer Name: SPOKANE COUNTY
1026 W BROADWAY
SPOKANE WA 99260-0430

Order ID: 200107031
Order Date: 1/7/2020

Contact Name: JAKE SAXON
Project Name: SAND FILTER

Comment:

Sample #: 200107031-001 **Customer Sample #:** INF01062020

Recv'd: ☑ **Matrix:** Water **Collector:** **Date Collected:** 1/7/2020
Quantity: 3 **Date Received:** 1/7/2020 9:50:00 AM **Time Collected:** 8:15 AM
Comment:

Test	Lab	Method	Due Date	Priority
COPPER SPO	S	EPA 200.8	1/17/2020	***Normal (~10 Days)***
DISSOLVED COPPER SPO	S	EPA 200.8	1/17/2020	***Normal (~10 Days)***
DISSOLVED IRON SPO	S	EPA 200.8	1/17/2020	***Normal (~10 Days)***
DISSOLVED ZINC SPO	S	EPA 200.8	1/17/2020	***Normal (~10 Days)***
IRON SPO	S	EPA 200.8	1/17/2020	***Normal (~10 Days)***
SOLIDS - TSS	S	SM 2540D	1/17/2020	***Normal (~10 Days)***
ZINC SPO	S	EPA 200.8	1/17/2020	***Normal (~10 Days)***

Sample #: 200107031-002 **Customer Sample #:** EFF01062020

Recv'd: ☑ **Matrix:** Water **Collector:** **Date Collected:** 1/7/2020
Quantity: 3 **Date Received:** 1/7/2020 9:50:00 AM **Time Collected:** 8:15 AM
Comment:

Test	Lab	Method	Due Date	Priority
COPPER SPO	S	EPA 200.8	1/17/2020	***Normal (~10 Days)***
DISSOLVED COPPER SPO	S	EPA 200.8	1/17/2020	***Normal (~10 Days)***
DISSOLVED IRON SPO	S	EPA 200.8	1/17/2020	***Normal (~10 Days)***
DISSOLVED ZINC SPO	S	EPA 200.8	1/17/2020	***Normal (~10 Days)***
IRON SPO	S	EPA 200.8	1/17/2020	***Normal (~10 Days)***
SOLIDS - TSS	S	SM 2540D	1/17/2020	***Normal (~10 Days)***
ZINC SPO	S	EPA 200.8	1/17/2020	***Normal (~10 Days)***

Customer Name:	SPOKANE COUNTY			**Order ID:**	200107031
	1026 W BROADWAY			**Order Date:**	1/7/2020
	SPOKANE	WA	99260-0430		
Contact Name:	JAKE SAXON			**Project Name:**	SAND FILTER
Comment:					

SAMPLE CONDITION RECORD

Samples received in a cooler?	Yes
Samples received intact?	Yes
What is the temperature of the sample(s)? (°C)	7.4
Samples received with a COC?	Yes
Samples received within holding time?	Yes
Are all sample bottles properly preserved?	Yes
Labels and chain agree?	Yes
Total number of containers?	6

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Chain of Custody Record

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200107 031 **SPKC** Last Due 1/17/2020
1st SAMP 1/7/2020 1st RCVD 1/7/2020
SAND FILTER

Company Name:	Spokane County
Address:	1026 W. Broadway Avenue
City:	Spokane State: WA Zip: 99260
Phone:	(509) 477-7245
Fax:	
Project Manager:	Jake Saxon
Project Name & # :	Sand Filter
Email Address :	JSAXON@spokanecounty.org
Purchase Order #:	
Sampler Name & phone:	(509)995-0557

Please refer to our normal turn around times at:
http://www.anateklabs.com/services/guidelines/reporting.asp

__Normal __Next Day* __2nd Day* __Other*_____ *All rush order requests must be prior approved. __Phone __Mail __Fax x Email

Provide Sample Description

stormwater influent and effluent

List Analyses Requested

Lab ID	Sample Identification	Sampling Date/Time	Matrix	# of Containers	Sample Volume	TSS SM 2540D	Cu Zn Fe Total EPA 200.8 ICP/MS	Cu Zn Fe Dissolved EPA 200.8 ICP/MS	NWTPH, Ecology NWTPH-Dx	Hardness as CaCO3 SM 2340B ICP	Ortho-phosphate SM 4500-P G	Total Phosphorus SM 4500-P F			
Preservative:															
	INF01062020	01/07/2020 8:15am	water	3		x	x	x							
	EFF01062020	01/07/2020 8:15am	water	3		x	x	x							

Note Special Instructions/Comments

Please send results to Jake Saxon JSAXON@spokanecounty.org and Aimee Navickis-Brasch aimeen@osbornconsulting.com

SW35

diss metals not filtered

	Printed Name	Signature	Company	Date	Time
Relinquished by	Taylor Hoffman-Bellars	Taylor Hoffman-Bellars	OLI	1/7/2020	9:50a
Received by	K Scott	K Scott	Anatek	1/7/2020	0950
Relinquished by					
Received by					
Relinquished by					
Received by					

Inspection Checklist

Received Intact?	(Y)	N
Labels & Chains Agree?	(Y)	N
Containers Sealed?	(Y)	N
VOC Head Space?	Y	N

hal/Coolers/ice

Temperature (°C): 7.4° dig-04

Preservative: HNO3 (lab filt. & pres-D) <2
HNO3 (lab pres) P18089-23 <2 pH P18285-3

Date & Time: 1-7-20 1400

Inspected By: MG

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Client:	Spokane County	Work Order:	WAA0192
Address:	1026 W. Broadway Ave.	Project:	Sand Filter
	Spokane, WA 99260-0430	Reported:	2/17/2020 11:28
Attn:	Jake Saxon		

Analytical Results Report

Sample Location:	INF01282020		
Lab/Sample Number:	WAA0192-01	Collect Date:	01/28/20 16:45
Date Received:	01/29/20 09:42	Collected By:	

Analyte	Result	Units	PQL	Analyzed	Analyst	Method	Qualifier
Inorganics							
Hardness	34.5	mg CaCO3/L	1.00	02/03/2020	NDE	SM 2340 C	
TSS	360	mg/L	10.0	01/31/2020	BAS	SM 2540 D	
Metals by ICP-MS							
Copper	0.0225	mg/L	0.00100	02/03/2020	Metals	EPA 200.8	
Dissolved Copper	0.00520	mg/L	0.00100	02/03/2020	Metals	EPA 200.8	
Iron	1.99	mg/L	0.0100	02/03/2020	Metals	EPA 200.8	
Dissolved Iron	0.0403	mg/L	0.0100	02/03/2020	Metals	EPA 200.8	
Zinc	0.142	mg/L	0.00100	02/03/2020	Metals	EPA 200.8	
Dissolved Zinc	0.0222	mg/L	0.00100	02/03/2020	Metals	EPA 200.8	
Semivolatiles							
Lube Oil	ND	mg/L	0.500	02/11/2020	LMC	EPA 8015D	
Mineral Oil	ND	mg/L	0.100	02/11/2020	LMC	EPA 8015D	
Diesel	ND	mg/L	0.100	02/11/2020	LMC	EPA 8015D	
Surrogate: n-Hexacosane	*106%*		*50-150*	*02/11/2020*	*LMC*	*EPA 8015D*	

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Sample Location: EFF01282020
Lab/Sample Number: WAA0192-02 Collect Date: 01/28/20 16:45
Date Received: 01/29/20 09:42 Collected By:

Analyte	Result	Units	PQL	Analyzed	Analyst	Method	Qualifier
Inorganics							
Hardness	25.5	mg CaCO3/L	1.00	02/03/2020	NDE	SM 2340 C	
TSS	33.0	mg/L	1.00	01/31/2020	BAS	SM 2540 D	
Metals by ICP-MS							
Copper	0.0119	mg/L	0.00100	02/03/2020	Metals	EPA 200.8	
Dissolved Copper	0.00432	mg/L	0.00100	02/03/2020	Metals	EPA 200.8	
Iron	0.970	mg/L	0.0100	02/03/2020	Metals	EPA 200.8	
Dissolved Iron	0.0404	mg/L	0.0100	02/03/2020	Metals	EPA 200.8	
Zinc	0.0625	mg/L	0.00100	02/03/2020	Metals	EPA 200.8	
Dissolved Zinc	0.0197	mg/L	0.00100	02/03/2020	Metals	EPA 200.8	
Semivolatiles							
Lube Oil	ND	mg/L	0.500	02/11/2020	LMC	EPA 8015D	
Mineral Oil	ND	mg/L	0.100	02/11/2020	LMC	EPA 8015D	
Diesel	ND	mg/L	0.100	02/11/2020	LMC	EPA 8015D	
Surrogate: n-Hexacosane	*92.3%*		*50-150*	*02/11/2020*	*LMC*	*EPA 8015D*	

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Sample Location: INF01282020-DI

Lab/Sample Number: WAA0192-03 Collect Date: 01/28/20 16:45

Date Received: 01/29/20 09:42 Collected By:

Analyte	Result	Units	PQL	Analyzed	Analyst	Method	Qualifier
Metals by ICP-MS							
Dissolved Copper	0.00228	mg/L	0.00100	02/03/2020	Metals	EPA 200.8	
Dissolved Iron	ND	mg/L	0.0100	02/03/2020	Metals	EPA 200.8	
Dissolved Zinc	0.0216	mg/L	0.00100	02/03/2020	Metals	EPA 200.8	

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Sample Location: EFF01282020-DI
Lab/Sample Number: WAA0192-04 Collect Date: 01/28/20 16:45
Date Received: 01/29/20 09:42 Collected By:

Analyte	Result	Units	PQL	Analyzed	Analyst	Method	Qualifier
Metals by ICP-MS							
Dissolved Copper	0.00206	mg/L	0.00100	02/03/2020	Metals	EPA 200.8	
Dissolved Iron	ND	mg/L	0.0100	02/03/2020	Metals	EPA 200.8	
Dissolved Zinc	0.0178	mg/L	0.00100	02/03/2020	Metals	EPA 200.8	

Authorized Signature,

Brock Gerger For Kathleen Sattler, Laboratory Manager

PQL	Practical Quantitation Limit
ND	Not Detected
MCL	EPA's Maximum Contaminant Level
Dry	Sample results reported on a dry weight basis

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Certifications

Code	Description	Facility	Number
W WA DOE	Washington Department of Ecology	Anatek-Spokane, WA	C585

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Quality Control Data

Inorganics

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAB0003 - W Wet Chem										
Blank (BAB0003-BLK1)					Prepared & Analyzed: 2/3/2020					
Hardness	ND		1.00	mg CaCO3/L						
Blank (BAB0003-BLK2)					Prepared & Analyzed: 2/3/2020					
Hardness	ND		1.00	mg CaCO3/L						
LCS (BAB0003-BS1)					Prepared & Analyzed: 2/3/2020					
Hardness	101			mg CaCO3/L	100		101	0-200		
LCS Dup (BAB0003-BSD1)					Prepared & Analyzed: 2/3/2020					
Hardness	100			mg CaCO3/L	100		100	0-200	0.995	200
Duplicate (BAB0003-DUP1)		**Source: WAA0246-01**			Prepared & Analyzed: 2/3/2020					
Hardness	336		2.00	mg CaCO3/L		334			0.597	200
Matrix Spike (BAB0003-MS1)		**Source: WAA0224-01**			Prepared & Analyzed: 2/3/2020					
Hardness	228			mg CaCO3/L	100	15.0	213	0-200		
Matrix Spike Dup (BAB0003-MSD1)		**Source: WAA0224-01**			Prepared & Analyzed: 2/3/2020					
Hardness	230			mg CaCO3/L	100	15.0	215	0-200	0.873	200
Batch: BAB0006 - W Inorganics										
Blank (BAB0006-BLK1)					Prepared & Analyzed: 1/31/2020					
TSS	ND		1.00	mg/L						
LCS (BAB0006-BS1)					Prepared & Analyzed: 1/31/2020					
TSS	91.0			mg/L	100		91.0	90-110		

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Quality Control Data
(Continued)

Inorganics (Continued)

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAB0006 - W Inorganics (Continued)										
Duplicate (BAB0006-DUP1)		**Source: WAA0162-02**			Prepared & Analyzed: 1/31/2020					
TSS	7.00		1.00	mg/L		7.00			0.00	20
Matrix Spike (BAB0006-MS1)		**Source: WAA0187-02**			Prepared & Analyzed: 1/31/2020					
TSS	96.0		1.00	mg/L	100	8.00	88.0	80-120		
Matrix Spike Dup (BAB0006-MSD1)		**Source: WAA0187-02**			Prepared & Analyzed: 1/31/2020					
TSS	94.0		1.00	mg/L	100	8.00	86.0	80-120	2.11	20

Quality Control Data
(Continued)

Metals by ICP-MS

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAB0034 - W 3010 Digest										
Blank (BAB0034-BLK1)					Prepared: 1/31/2020 Analyzed: 2/3/2020					
Copper	ND		0.00100	mg/L						
Iron	ND		0.0100	mg/L						
Zinc	ND		0.00100	mg/L						
LCS (BAB0034-BS1)					Prepared: 1/31/2020 Analyzed: 2/3/2020					
Zinc	0.0516		0.00100	mg/L	0.0500		103	85-115		
Copper	0.0537		0.00100	mg/L	0.0500		107	85-115		
Iron	0.110		0.0100	mg/L	0.100		110	85-115		
Matrix Spike (BAB0034-MS1)		**Source: WAA0226-02**			Prepared: 1/31/2020 Analyzed: 2/3/2020					
Iron	0.162		0.0100	mg/L	0.100	0.0547	107	70-130		
Copper	0.0535		0.00100	mg/L	0.0500	0.00792	91.2	70-130		
Zinc	0.0769		0.00100	mg/L	0.0500	0.0264	101	70-130		
Matrix Spike Dup (BAB0034-MSD1)		**Source: WAA0226-02**			Prepared: 1/31/2020 Analyzed: 2/3/2020					
Zinc	0.0758		0.00100	mg/L	0.0500	0.0264	98.8	70-130	1.40	20
Iron	0.162		0.0100	mg/L	0.100	0.0547	107	70-130	0.201	20
Copper	0.0527		0.00100	mg/L	0.0500	0.00792	89.6	70-130	1.45	20
Batch: BAB0058 - W ICP-MS										
Blank (BAB0058-BLK1)					Prepared & Analyzed: 2/3/2020					
Dissolved Iron	ND		0.0100	mg/L						
Dissolved Zinc	ND		0.00100	mg/L						
Dissolved Copper	ND		0.00100	mg/L						
LCS (BAB0058-BS1)					Prepared & Analyzed: 2/3/2020					
Dissolved Zinc	0.0504		0.00100	mg/L	0.0500		101	85-115		
Dissolved Copper	0.0523		0.00100	mg/L	0.0500		105	85-115		
Dissolved Iron	0.105		0.0100	mg/L	0.100		105	85-115		

Quality Control Data
(Continued)

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Semivolatiles

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAB0158 - W TPH-Dx										
Blank (BAB0158-BLK1)					Prepared & Analyzed: 2/11/2020					
Diesel	ND		0.100	mg/L						
Lube Oil	ND		0.500	mg/L						
Mineral Oil	ND		0.100	mg/L						
Surrogate: n-Hexacosane			*49.0*	*ppm*	*50.0*		*98.1*	*50-150*		
LCS (BAB0158-BS1)					Prepared & Analyzed: 2/11/2020					
Diesel	0.936		0.100	mg/L	1.00		93.6	50-150		
Lube Oil	ND		0.500	mg/L				50-150		
Surrogate: n-Hexacosane			*49.4*	*ppm*	*50.0*		*98.8*	*50-150*		
Matrix Spike (BAB0158-MS1)		**Source: WAA0224-03**			Prepared: 2/11/2020 Analyzed: 2/12/2020					
Diesel	0.773		0.100	mg/L	1.00	ND	77.3	50-150		
Lube Oil	ND		0.500	mg/L		ND		50-150		
Surrogate: n-Hexacosane			*44.4*	*ppm*	*50.0*		*88.8*	*50-150*		
Matrix Spike Dup (BAB0158-MSD1)		**Source: WAA0224-03**			Prepared: 2/11/2020 Analyzed: 2/12/2020					
Diesel	0.893		0.100	mg/L	1.00	ND	89.3	50-150	14.3	20
Lube Oil	ND		0.500	mg/L		ND		50-150		20
Surrogate: n-Hexacosane			*52.9*	*ppm*	*50.0*		*106*	*50-150*		

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Chain of Custody Record

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Anatek Log-In # WAA0192

Company Name: Spokane County	Project Manager: Jake Saxon
Address: 1026 W. Broadway Avenue	Project Name & # : Sand Filter
City: Spokane State: WA Zip: 99260	Email Address : JSAXON@spokanecounty.org
Phone: (509) 477-7245	Purchase Order #:
Fax:	Sampler Name & phone: (509)995-0557

Turn Around Time & Reporting

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http://www.anateklabs.com/services/guidelines/reporting.asp

__Normal
__Next Day*
__2nd Day*
__Other*_____

*All rush order requests must be prior approved.

__Phone
__Mail
__Fax
_x_Email

Provide Sample Description

stormwater influent and effluent

List Analyses Requested

Lab ID	Sample Identification	Sampling Date/Time	Matrix	Preservative: # of Containers	Sample Volume	TSS SM 2540D	Cu Zn Fe Total EPA 200.8 ICP/MS	Cu Zn Fe Dissolved EPA 200.8 ICP/MS	NWTPH, Ecology NWTPH-Dx	Hardness as CaCO3 SM 2340B ICP	Ortho-phosphate SM 4500-P G	Total Phosphorus SM 4500-P F			
	INF01282020	01/28/2020 4:45pm	water	4		x	x	x	x	x					
	EFF01282020	01/28/2020 4:45pm	water	4		x	x	x	x	x					
	INF01282020-DI	01/28/2020 4:45pm	water	1				x							
	EFF01282020-DI	01/28/2020 4:45pm	water	1				x							

Note Special Instructions/Comments

Please send results to Jake Saxon JSAXON@spokanecounty.org and Aimee Navickis-Brasch aimeen@osbornconsulting.com

SWPS

Inspection Checklist

Received Intact? (Y) N
Labels & Chains Agree? (Y) N
Containers Sealed? (Y) N
VOC Head Space? Y N

hci

Temperature (°C): 4.0 Dig-04
Preservative: HNO3 P18009-7B <2
HCl R385-3 <2 pH P18285-3Y
Date & Time: 1-30-20 1430
Inspected By: WZ

	Printed Name	Signature	Company	Date	Time
Relinquished by	Taylor Hoffmann-Ballard	Taylor Hoffmann-Ballard	OCI	1/28/2020	9:30a
Received by	Brock Gregor	Brock Gregor	Anatek	1-29-20	0942
Relinquished by					
Received by					
Relinquished by					
Received by					

Form COC01.00 - Eff 1 Mar 2015

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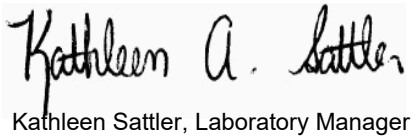
Client:	Spokane County	Work Order:	WAB0162
Address:	1026 W. Broadway Ave.	Project:	Sand Filter
	Spokane, WA 99260-0430	Reported:	3/10/2020 20:17
Attn:	Jon Morrow		

Analytical Results Report

Sample Location:	SF02032020-sediment		
Lab/Sample Number:	WAB0162-01	Collect Date:	02/03/20 09:45
Date Received:	02/07/20 13:45	Collected By:	Taylor H-B
Matrix:	Solid		

Analyte	Result	Units	PQL	Analyzed	Analyst	Method	Qualifier
Inorganics							
% Solids	31.9	%	0.100	2/13/20 9:59	LMC	% solids	
Semivolatiles							
Lube Oil	1640	mg/kg dry	311	2/13/20 22:10	LMC	EPA 8015D	
Mineral Oil	ND	mg/kg dry	77.7	2/13/20 22:10	LMC	EPA 8015D	
Diesel	ND	mg/kg dry	77.7	2/13/20 22:10	LMC	EPA 8015D	
Surrogate: n-Hexacosane	*101%*		*50-150*	*2/13/20 22:10*	*LMC*	*EPA 8015D*	

Authorized Signature,



Kathleen Sattler, Laboratory Manager

PQL	Practical Quantitation Limit
ND	Not Detected
MCL	EPA's Maximum Contaminant Level
Dry	Sample results reported on a dry weight basis
*	Not a certified analyte

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Certifications

Code	Description	Facility	Number
W WA DOE	Washington Department of Ecology	Anatek-Spokane, WA	C585

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Quality Control Data

Semivolatiles

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAB0242 - W TPH-Dx										
Blank (BAB0242-BLK1)					Prepared & Analyzed: 2/13/2020					
Diesel	ND		22.8	mg/kg wet						
Lube Oil	ND		91.1	mg/kg wet						
Mineral Oil	ND		22.8	mg/kg wet						
Surrogate: n-Hexacosane			*51.8*	*mg/kg*	*50.0*		*104*	*50-150*		
LCS (BAB0242-BS1)					Prepared & Analyzed: 2/13/2020					
Diesel	89.5		23.7	mg/kg wet	94.9		94.3	50-150		
Lube Oil	ND		94.9	mg/kg wet				50-150		
Surrogate: n-Hexacosane			*49.4*	*mg/kg*	*50.0*		*98.8*	*50-150*		
Matrix Spike (BAB0242-MS1)		**Source: WAB0175-07**			Prepared: 2/13/2020 Analyzed: 2/14/2020					
Diesel	84.0		22.5	mg/kg dry	89.9	ND	93.4	50-150		
Lube Oil	ND		89.9	mg/kg dry		ND		50-150		
Surrogate: n-Hexacosane			*54.1*	*mg/kg*	*50.0*		*108*	*50-150*		
Matrix Spike Dup (BAB0242-MSD1)		**Source: WAB0175-07**			Prepared: 2/13/2020 Analyzed: 2/14/2020					
Diesel	83.7		23.4	mg/kg dry	93.5	ND	89.5	50-150	0.314	20
Lube Oil	ND		93.5	mg/kg dry		ND		50-150		20
Surrogate: n-Hexacosane			*53.3*	*mg/kg*	*50.0*		*107*	*50-150*		

WAB0162

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Chain of Custody Record

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Anatek Log-In #

Company Name: Spokane County	Project Manager: Jon Morrow
Address: 1026 W. Broadway Avenue	Project Name & # : Sand Filter
City: Spokane State: WA Zip: 99260	Email Address : JSAXON@spokanecounty.org
Phone: (509) 477-7245	Purchase Order #:
Fax:	Sampler Name & phone: Taylor H-B (952)-836-7863

Turn Around Time & Reporting

Please refer to our normal turn around times at: http://www.anateklabs.com/services/guidelines/reporting.asp

__Normal __Next Day* __2nd Day* __Other*_____

*All rush order requests must be prior approved.

__Phone __Mail __Fax __Email

Provide Sample Description

catch basin and street sediment

List Analyses Requested

Lab ID	Sample Identification	Sampling Date/Time	Matrix	Preservative:	# of Containers	Sample Volume	Moisture Content	PSD ASTM D422	NWTPH, Ecology NWTPH-Dx
	SF02032020-sediment	02/03/2020	solid		1		X	X	X

Note Special Instructions/Comments

Please send a copy of the results to Jon at email above and Aimee at aimeen@osbornconsulting.com

SWBS Budi - PSD

For ASTM D422 testing, use the following sieve sizes:
1", 3/4", 1/2", 3/8", 1/4", #10, #16, #30, #40, #100, #200, 0.05mm, 0.01mm, 0.005mm, and 0.001mm.

With the moisture content, please provide a dry weight of the sample.

Inspection Checklist

Received Intact?	(Y)	N
Labels & Chains Agree?	(Y)	N
Containers Sealed?	(Y)	N
VOC Head Space?	Y	N

wd / c / ni

Temperature (°C): 19.5 Dig-07

Preservative:

Date & Time: 2-7-20 1600

Inspected By: WG

	Printed Name	Signature	Company	Date	Time
Relinquished by	Taylor Hoffman Bullard	Taylor Hoffman Bullard	OCI	2/7/2020	1:45p
Received by	Brock Granger	Brock Granger	Anatek	2-7-20	1345
Relinquished by					
Received by					
Relinquished by					
Received by					

Budinger & Associates

Geotechnical Engineering
Environmental Engineering
Construction Materials Testing
Subsurface Exploration
Special Inspection

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Kathy Sattler
Anatek Labs, Inc
504 E Sprague Ave Ste D
Spokane, WA 99202

March 10, 2020

Project Number L20180

PROJECT: Anatek Materials Testing

SUBJECT: Results of Laboratory Testing
Report #1

At your request, we provided laboratory testing services for the subject project. Services were limited to the performance of testing of laboratory tests, selected at your discretion.

For this period, our involvement was limited to laboratory testing of one sample delivered to our laboratory on February 25, 2020. Laboratory tests were conducted in general accordance with methods listed on the attached *Laboratory Summary* sheet.

If you have questions regarding this report, please call.

Respectfully Submitted,
Budinger & Associates, Inc.

Terri Ballard
Laboratory Manager

TJB/kah/Addressee –
Kathy Sattler - kathys@anateklabs.com

Attachments:
Soils Laboratory Summary - (1 page)

SOILS
LABORATORY SUMMARY

LABORATORY NUMBER				20-0040
SAMPLED BY				Client
SAMPLE TYPE				Bulk
DATE RECEIVED				2/25/20
SAMPLE IDENTIFICATION				WAB0162-01
		UNITS	Test Method	
SIEVE ANALYSIS			ASTM D422*	
	#4	%		100
S	#10			98
I	#16	P		96
E	#30	A		93
V	#40	S		84
E	#100	S		84
	#200	I		81
S	.05mm	N		79
I	.01mm	G		48
Z	.005mm			26
E	.001mm			18

*ASTM D422 states to set up approximately 50 grams of soil for test. This sample was only 16.39 grams after moisture removed.

Materials Testing & Consulting, Inc.

Geotechnical Engineering • Special Inspection • Materials Testing • Environmental Consulting

Project:	Sand Filter	**Date Received:**	April 2, 2020
Project #:	20S091	**Sampled By:**	Others
Client :	Spokane County	**Date Tested:**	April 7, 2020
Source:	Multiple	**Tested By:**	B. Goble
MTC Sample#:	Multiple		

CASE NARRATIVE

1. Two samples were submitted for particle size distribution by laser diffraction according to TAPE 2011 Methods. These methods include running sediment concentration according to modified ASTM D3977, Method C.
2. Two samples were submitted for Total Suspended Solids according to SM 2540D.
3. There were no other noted anomalies during this testing.

Reviewed by: E Gabriel Goble

Materials Testing & Consulting, Inc.

Geotechnical Engineering • Special Inspection • Materials Testing • Environmental Consulting

Project: Sand Filter
Project #: 20S091
Date Received: April 2, 2020
Date Tested: April 7, 2020

Client: Spokane County
Sampled by: Others
Tested by: B. Goble

Sediment Concentration per Size Fraction

TAPE 2011 / ASTM D3977 Method C

Sample Identification	Concentration of Coarse Fractions (mg/L)		Concentration of <62.5µm Fraction (mg/L)	Total Sample Concentration (mg/L)	Date Sampled	Analysis Date
	>250 µm	250 - 62.5 µm				
INF03312020	8.99	39.97	226.67	275.63	3/31/2020	4/7/2020
EFF03312020	1.94	8.69	286.84	297.47	3/31/2020	4/7/2020

Reviewed by: E Gabe Goble

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Regional Offices: Olympia ~ 360.534.9777 Bellingham ~ 360.647.6111 Silverdale ~ 360.698.6787 Tukwila ~ 206.241.1974
Visit our website: www.mtc-inc.net

Materials Testing & Consulting, Inc.

Geotechnical Engineering • Special Inspection • Materials Testing • Environmental Consulting

Project: Sand Filter
Project #: 20S091
Date Received: April 2, 2020
Date Tested: April 7, 2020

Client: Spokane County
Sampled by: Others
Tested by: B. Goble

Total Suspended Solids - SM 2540 D

MTC Sample ID	Client Sample ID	Total Suspended Solids (mg/L)
S20-0211	INF03312020	265.1
S20-0212	EFF03312020	287.3

Reviewed by: EGabriel Goble

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Client:	Spokane County	Work Order:	WAD0178
Address:	1026 W. Broadway Ave.	Project:	Sand Filter
	Spokane, WA 99260-0430	Reported:	4/21/2020 15:37
Attn:	Jake Saxon		

Analytical Results Report

Sample Location:	RNDINF04072020		
Lab/Sample Number:	WAD0178-01	Collect Date:	04/07/20 14:00
Date Received:	04/07/20 15:41	Collected By:	Taylor H-B
Matrix:	Stormwater		

Analyte	Result	Units	PQL	Analyzed	Analyst	Method	Qualifier
Inorganics							
Hardness	ND	mg CaCO3/L	3.00	4/16/20 10:30	NDE	SM 2340 C	
TSS	3.00	mg/L	1.00	4/10/20 12:45	BAS	SM 2540 D	
Metals by ICP-MS							
Copper	0.00377	mg/L	0.00100	4/14/20 13:54	TRC	EPA 200.8	
Dissolved Copper	0.00176	mg/L	0.00100	4/14/20 13:26	TRC	EPA 200.8	
Iron	0.0665	mg/L	0.0100	4/14/20 13:54	TRC	EPA 200.8	
Dissolved Iron	0.0242	mg/L	0.0100	4/14/20 13:26	TRC	EPA 200.8	
Zinc	0.0190	mg/L	0.00100	4/14/20 13:54	TRC	EPA 200.8	
Dissolved Zinc	0.0210	mg/L	0.00100	4/14/20 13:26	TRC	EPA 200.8	

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Sample Location:	RNDEFF04072020		
Lab/Sample Number:	WAD0178-02	Collect Date:	04/07/20 14:00
Date Received:	04/07/20 15:41	Collected By:	Taylor H-B
Matrix:	Stormwater		

Analyte	Result	Units	PQL	Analyzed	Analyst	Method	Qualifier
Inorganics							
Hardness	3.46	mg CaCO3/L	3.00	4/16/20 10:30	NDE	SM 2340 C	
TSS	3.00	mg/L	1.00	4/10/20 12:45	BAS	SM 2540 D	
Metals by ICP-MS							
Copper	0.00104	mg/L	0.00100	4/14/20 13:58	TRC	EPA 200.8	
Dissolved Copper	ND	mg/L	0.00100	4/14/20 13:35	TRC	EPA 200.8	
Iron	0.0408	mg/L	0.0100	4/14/20 13:58	TRC	EPA 200.8	
Dissolved Iron	0.0145	mg/L	0.0100	4/14/20 13:35	TRC	EPA 200.8	
Zinc	0.00920	mg/L	0.00100	4/14/20 13:58	TRC	EPA 200.8	
Dissolved Zinc	0.0130	mg/L	0.00100	4/14/20 13:35	TRC	EPA 200.8	

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Sample Location: RNCINF04072020
Lab/Sample Number: WAD0178-03 Collect Date: 04/07/20 15:00
Date Received: 04/07/20 15:41 Collected By: Taylor H-B
Matrix: Stormwater

Analyte	Result	Units	PQL	Analyzed	Analyst	Method	Qualifier
Inorganics							
Hardness	ND	mg CaCO3/L	3.00	4/16/20 10:30	NDE	SM 2340 C	
TSS	1.00	mg/L	1.00	4/10/20 12:45	BAS	SM 2540 D	
Metals by ICP-MS							
Copper	0.00391	mg/L	0.00100	4/14/20 14:01	TRC	EPA 200.8	
Dissolved Copper	ND	mg/L	0.00100	4/14/20 13:39	TRC	EPA 200.8	
Iron	0.0295	mg/L	0.0100	4/14/20 14:01	TRC	EPA 200.8	
Dissolved Iron	0.0106	mg/L	0.0100	4/14/20 13:39	TRC	EPA 200.8	
Zinc	0.00861	mg/L	0.00100	4/14/20 14:01	TRC	EPA 200.8	
Dissolved Zinc	0.00685	mg/L	0.00100	4/14/20 13:39	TRC	EPA 200.8	

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Sample Location:	RNCEFF04072020		
Lab/Sample Number:	WAD0178-04	Collect Date:	04/07/20 14:00 - 04/07/20 15:00
Date Received:	04/07/20 15:41	Collected By:	Taylor H-B
Matrix:	Stormwater		

Analyte	Result	Units	PQL	Analyzed	Analyst	Method	Qualifier
Inorganics							
Hardness	ND	mg CaCO3/L	3.00	4/16/20 10:30	NDE	SM 2340 C	
TSS	<1	mg/L	1.00	4/10/20 12:45	BAS	SM 2540 D	
Metals by ICP-MS							
Copper	0.00240	mg/L	0.00100	4/14/20 14:04	TRC	EPA 200.8	
Dissolved Copper	0.00160	mg/L	0.00100	4/14/20 13:42	TRC	EPA 200.8	
Iron	0.0519	mg/L	0.0100	4/14/20 14:04	TRC	EPA 200.8	
Dissolved Iron	0.0128	mg/L	0.0100	4/14/20 13:42	TRC	EPA 200.8	
Zinc	0.00535	mg/L	0.00100	4/14/20 14:04	TRC	EPA 200.8	
Dissolved Zinc	0.0135	mg/L	0.00100	4/14/20 13:42	TRC	EPA 200.8	

Authorized Signature,

Karice Scott For Kathleen Sattler, Laboratory Manager

PQL	Practical Quantitation Limit
ND	Not Detected
MCL	EPA's Maximum Contaminant Level
Dry	Sample results reported on a dry weight basis
*	Not a certified analyte

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Certifications

Code	Description	Facility	Number
W WA DOE	Washington Department of Ecology	Anatek-Spokane, WA	C585

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Quality Control Data

Inorganics

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAD0318 - W Filtration										
Blank (BAD0318-BLK1)					Prepared & Analyzed: 4/10/2020					
TSS	ND		1.00	mg/L						
Blank (BAD0318-BLK2)					Prepared & Analyzed: 4/10/2020					
TSS	ND		1.00	mg/L						
Blank (BAD0318-BLK3)					Prepared & Analyzed: 4/10/2020					
TSS	ND		1.00	mg/L						
Blank (BAD0318-BLK4)					Prepared & Analyzed: 4/10/2020					
TSS	ND		1.00	mg/L						
Blank (BAD0318-BLK5)					Prepared & Analyzed: 4/10/2020					
TSS	ND		1.00	mg/L						
Blank (BAD0318-BLK6)					Prepared & Analyzed: 4/10/2020					
TSS	ND		1.00	mg/L						
LCS (BAD0318-BS1)					Prepared & Analyzed: 4/10/2020					
TSS	92.0			mg/L	100		92.0	90-110		
LCS (BAD0318-BS2)					Prepared & Analyzed: 4/10/2020					
TSS	94.0			mg/L	100		94.0	90-110		
LCS (BAD0318-BS3)					Prepared & Analyzed: 4/10/2020					
TSS	96.0			mg/L	100		96.0	90-110		
LCS Dup (BAD0318-BSD1)					Prepared & Analyzed: 4/10/2020					
TSS	94.0			mg/L	100		94.0	90-110	2.15	10

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Quality Control Data
(Continued)

Inorganics (Continued)

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAD0318 - W Filtration (Continued)										
LCS Dup (BAD0318-BSD2)					Prepared & Analyzed: 4/10/2020					
TSS	94.0			mg/L	100		94.0	90-110	0.00	10
LCS Dup (BAD0318-BSD3)					Prepared & Analyzed: 4/10/2020					
TSS	97.0			mg/L	100		97.0	90-110	1.04	10
Duplicate (BAD0318-DUP1)		**Source: MAD0153-02**			Prepared & Analyzed: 4/10/2020					
TSS	86.0		1.00	mg/L		85.0			1.17	20
Duplicate (BAD0318-DUP2)		**Source: WAD0194-01**			Prepared & Analyzed: 4/10/2020					
TSS	8.00		1.00	mg/L		8.00			0.00	20
Duplicate (BAD0318-DUP3)		**Source: WAD0242-02**			Prepared & Analyzed: 4/10/2020					
TSS	6.00		1.00	mg/L		6.00			0.00	20
Matrix Spike (BAD0318-MS1)		**Source: MAD0132-01**			Prepared & Analyzed: 4/10/2020					
TSS	90.0			mg/L	100	0.00	90.0	80-120		
Matrix Spike (BAD0318-MS2)		**Source: WAD0178-01**			Prepared & Analyzed: 4/10/2020					
TSS	106			mg/L	100	1.50	104	80-120		
Matrix Spike (BAD0318-MS3)		**Source: WAD0250-01**			Prepared & Analyzed: 4/10/2020					
TSS	90.0			mg/L	100	0.500	89.5	80-120		
Matrix Spike Dup (BAD0318-MSD1)		**Source: MAD0132-01**			Prepared & Analyzed: 4/10/2020					
TSS	92.0			mg/L	100	0.00	92.0	80-120	2.20	20
Matrix Spike Dup (BAD0318-MSD2)		**Source: WAD0178-01**			Prepared & Analyzed: 4/10/2020					
TSS	104			mg/L	100	1.50	102	80-120	1.90	20

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Quality Control Data
(Continued)

Inorganics (Continued)

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAD0318 - W Filtration (Continued)										
Matrix Spike Dup (BAD0318-MSD3)		**Source: WAD0250-01**			Prepared & Analyzed: 4/10/2020					
TSS	102			mg/L	100	0.500	102	80-120	12.5	20
Batch: BAD0353 - W Wet Chem										
Blank (BAD0353-BLK1)					Prepared: 4/14/2020 Analyzed: 4/16/2020					
Hardness	ND		3.00	mg CaCO3/L						
LCS (BAD0353-BS1)					Prepared: 4/14/2020 Analyzed: 4/16/2020					
Hardness	100			mg CaCO3/L	100		100	90-110		
LCS Dup (BAD0353-BSD1)					Prepared: 4/14/2020 Analyzed: 4/16/2020					
Hardness	100			mg CaCO3/L	100		100	90-110	0.00	20
Duplicate (BAD0353-DUP1)		**Source: WAD0183-06**			Prepared: 4/14/2020 Analyzed: 4/16/2020					
Hardness	191		3.00	mg CaCO3/L		191			0.00	20
Matrix Spike (BAD0353-MS1)		**Source: WAD0237-01**			Prepared: 4/14/2020 Analyzed: 4/16/2020					
Hardness	190		6.00	mg CaCO3/L	100	90.6	99.5	80-120		
Matrix Spike Dup (BAD0353-MSD1)		**Source: WAD0237-01**			Prepared: 4/14/2020 Analyzed: 4/16/2020					
Hardness	191		6.00	mg CaCO3/L	100	90.6	100	80-120	0.519	20

Quality Control Data
(Continued)

Metals by ICP-MS

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAD0297 - W 3010 Digest										
Blank (BAD0297-BLK1)					Prepared: 4/13/2020 Analyzed: 4/14/2020					
Copper	ND		0.00100	mg/L						
Zinc	ND		0.00100	mg/L						
Iron	ND		0.0100	mg/L						
LCS (BAD0297-BS1)					Prepared: 4/13/2020 Analyzed: 4/14/2020					
Iron	0.105		0.0100	mg/L	0.100		105	85-115		
Copper	0.0495		0.00100	mg/L	0.0500		98.9	85-115		
Zinc	0.0495		0.00100	mg/L	0.0500		99.0	85-115		
Matrix Spike (BAD0297-MS1)		**Source: WAD0221-03**			Prepared: 4/13/2020 Analyzed: 4/14/2020					
Iron	0.158		0.0100	mg/L	0.100	0.0376	120	70-130		
Copper	0.0504		0.00100	mg/L	0.0500	0.00152	97.7	70-130		
Zinc	0.0666		0.00100	mg/L	0.0500	0.0157	102	70-130		
Matrix Spike (BAD0297-MS2)		**Source: WAD0230-02**			Prepared: 4/13/2020 Analyzed: 4/14/2020					
Zinc	0.0746		0.00100	mg/L	0.0500	0.0262	96.8	70-130		
Iron	0.166		0.0100	mg/L	0.100	0.0654	101	70-130		
Copper	0.0486		0.00100	mg/L	0.0500	0.00181	93.6	70-130		
Matrix Spike Dup (BAD0297-MSD1)		**Source: WAD0221-03**			Prepared: 4/13/2020 Analyzed: 4/14/2020					
Iron	0.154		0.0100	mg/L	0.100	0.0376	117	70-130	2.52	20

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Quality Control Data
(Continued)

Metals by ICP-MS (Continued)

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAD0297 - W 3010 Digest (Continued)										
Matrix Spike Dup (BAD0297-MSD1)		**Source: WAD0221-03**			Prepared: 4/13/2020 Analyzed: 4/14/2020					
Zinc	0.0690		0.00100	mg/L	0.0500	0.0157	107	70-130	3.49	20
Copper	0.0508		0.00100	mg/L	0.0500	0.00152	98.6	70-130	0.803	20
Matrix Spike Dup (BAD0297-MSD2)		**Source: WAD0230-02**			Prepared: 4/13/2020 Analyzed: 4/14/2020					
Iron	0.172		0.0100	mg/L	0.100	0.0654	106	70-130	2.98	20
Zinc	0.0764		0.00100	mg/L	0.0500	0.0262	100	70-130	2.31	20
Copper	0.0496		0.00100	mg/L	0.0500	0.00181	95.6	70-130	2.07	20
Batch: BAD0298 - W 3010 Digest										
Blank (BAD0298-BLK1)					Prepared: 4/13/2020 Analyzed: 4/14/2020					
Dissolved Iron	ND		0.0100	mg/L						
Dissolved Zinc	ND		0.00100	mg/L						
Dissolved Copper	ND		0.00100	mg/L						
LCS (BAD0298-BS1)					Prepared: 4/13/2020 Analyzed: 4/14/2020					
Dissolved Copper	0.0487		0.00100	mg/L	0.0500		97.4	85-115		
Dissolved Iron	0.104		0.0100	mg/L	0.100		104	85-115		
Dissolved Zinc	0.0491		0.00100	mg/L	0.0500		98.2	85-115		
Matrix Spike (BAD0298-MS1)		**Source: WAD0178-01**			Prepared: 4/13/2020 Analyzed: 4/14/2020					
Dissolved Copper	0.247		0.00500	mg/L	0.250	0.00176	98.0	70-130		
Dissolved Zinc	0.267		0.00500	mg/L	0.250	0.0210	98.5	70-130		
Dissolved Iron	0.548		0.0500	mg/L	0.500	0.0242	105	70-130		
Matrix Spike Dup (BAD0298-MSD1)		**Source: WAD0178-01**			Prepared: 4/13/2020 Analyzed: 4/14/2020					
Dissolved Copper	0.251		0.00500	mg/L	0.250	0.00176	99.8	70-130	1.83	20
Dissolved Iron	0.538		0.0500	mg/L	0.500	0.0242	103	70-130	1.76	20
Dissolved Zinc	0.267		0.00500	mg/L	0.250	0.0210	98.5	70-130	0.0430	20

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Chain of Custody Record

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Anatek Log-In #

WAD0178

Due: 04/22/20

Company Name: Spokane County	Project Manager: Jake Saxon
Address: 1026 W. Broadway Avenue	Project Name & # : Sand Filter
City: Spokane State: WA Zip: 99260	Email Address : JSAXON@spokanecounty.org
Phone: (509) 477-7245	Purchase Order #:
Fax:	Sampler Name & phone: (509)995-0557

Please rerer to our normal turn around times at:
http://www.anateklabs.com/services/guidelines/reporting.asp

__Normal
__Next Day*
__2nd Day*
__Other*_____

*All rush order requests must be prior approved.

__Phone
__Mail
__Fax
x Email

Provide Sample Description

stormwater influent and effluent

List Analyses Requested

Preservative:

Lab ID	Sample Identification	Sampling Date/Time	Matrix	# of Containers	Sample Volume	TSS SM 2540D	Cu Zn Fe Total EPA 200.8 ICP/MS	Cu Zn Fe Dissolved EPA 200.8 ICP/MS	NWTPH, Ecology NWTPH-Dx	Hardness as CaCO3 SM 2340B ICP	Ortho-phosphate SM 4500-P G	Total Phosphorus SM 4500-P F			
	RNDINF04072020	04/07/2020 2:00pm	water	3		x	x	x		x					
	RNDEFF04072020	04/07/2020 2:00pm	water	3		x	x	x		x					
	RNCINF04072020	04/07/2020 3:00pm	water	3		x	x	x		x					
	RNCEFF04072020	04/07/2020 3:00pm	water	3		x	x	x		x					

Note Special Instructions/Comments

Please send results to Jake Saxon
JSAXON@spokanecounty.org and
Aimee Navickis-Brasch
aimeen@osbornconsulting.com

	Printed Name	Signature	Company	Date	Time
Relinquished by	Taylor Hoffman-Ballard		Osborn	4/7/2020	3:40
Received by	Brock Berger		Anatek	4-7-20	1541
Relinquished by					
Received by					
Relinquished by					
Received by					

Inspection Checklist

Received Intact?	(Y)	N
Labels & Chains Agree?	(Y)	N
Containers Sealed?	(Y)	N
~~VOC Head Space?~~	~~Y~~	~~N~~

4 Ci

Temperature (°C): 15.7° Dig-07
Preservative: HNO_3 P18009-7B
pH < 2 2001015
Date & Time: 4-7-2020/1620
Inspected By: KAS

Form COC01.00 - Eff 1 Mar 2015

Samples submitted to Anatek Labs may be subcontracted to other accredited labs if necessary. This message serves as notice of this possibility. Sub-contracted analyses will be clearly noted on the analytical report.

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Client:	Spokane County	Work Order:	WAD0724
Address:	1026 W. Broadway Ave.	Project:	Sand Filter
	Spokane, WA 99260-0430	Reported:	5/7/2020 14:10
Attn:	Jake Saxon		

Analytical Results Report

Sample Location:	RNCINF04282020		
Lab/Sample Number:	WAD0724-01	Collect Date:	04/28/20 13:15
Date Received:	04/28/20 14:42	Collected By:	
Matrix:	Water		

Analyte	Result	Units	PQL	Analyzed	Analyst	Method	Qualifier
Inorganics							
Hardness	ND	mg CaCO3/L	3.00	4/30/20 10:45	NDE	SM 2340 C	
TSS	<1	mg/L	1.00	5/1/20 10:00	BAS	SM 2540 D	
Metals by ICP-MS							
Copper	0.00215	mg/L	0.00100	4/30/20 11:34	TRC	EPA 200.8	
Dissolved Copper	ND	mg/L	0.00100	4/30/20 11:49	TRC	EPA 200.8	
Iron	0.0289	mg/L	0.0100	4/30/20 11:34	TRC	EPA 200.8	
Dissolved Iron	<0.004	mg/L	0.0100	4/30/20 11:49	TRC	EPA 200.8	
Zinc	0.0130	mg/L	0.00100	4/30/20 11:34	TRC	EPA 200.8	
Dissolved Zinc	0.00712	mg/L	0.00100	4/30/20 11:49	TRC	EPA 200.8	

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Sample Location: RNCEFF04282020
Lab/Sample Number: WAD0724-02 Collect Date: 04/28/20 13:30
Date Received: 04/28/20 14:42 Collected By:
Matrix: Water

Analyte	Result	Units	PQL	Analyzed	Analyst	Method	Qualifier
Inorganics							
Hardness	ND	mg CaCO3/L	3.00	4/30/20 10:45	NDE	SM 2340 C	
TSS	1.00	mg/L	1.00	5/1/20 10:00	BAS	SM 2540 D	
Metals by ICP-MS							
Copper	<0.00042	mg/L	0.00100	4/30/20 11:37	TRC	EPA 200.8	
Dissolved Copper	ND	mg/L	0.00100	4/30/20 11:51	TRC	EPA 200.8	
Iron	0.0169	mg/L	0.0100	4/30/20 11:37	TRC	EPA 200.8	
Dissolved Iron	ND	mg/L	0.0100	4/30/20 11:51	TRC	EPA 200.8	
Zinc	0.00864	mg/L	0.00100	4/30/20 11:37	TRC	EPA 200.8	
Dissolved Zinc	0.0116	mg/L	0.00100	4/30/20 11:51	TRC	EPA 200.8	

Authorized Signature,

Karice Scott For Kathleen Sattler, Laboratory Manager

PQL	Practical Quantitation Limit
ND	Not Detected
MCL	EPA's Maximum Contaminant Level
Dry	Sample results reported on a dry weight basis
*	Not a certified analyte

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Certifications

Code	Description	Facility	Number
W WA DOE	Washington Department of Ecology	Anatek-Spokane, WA	C585

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Quality Control Data

Inorganics

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAD0773 - W Wet Chem										
Blank (BAD0773-BLK1)					Prepared & Analyzed: 4/30/2020					
Hardness	ND		3.00	mg CaCO3/L						
LCS (BAD0773-BS1)					Prepared & Analyzed: 4/30/2020					
Hardness	100			mg CaCO3/L	100		100	90-110		
LCS Dup (BAD0773-BSD1)					Prepared & Analyzed: 4/30/2020					
Hardness	100			mg CaCO3/L	100		100	90-110	0.00	20
Duplicate (BAD0773-DUP1)		**Source: WAD0724-02**			Prepared & Analyzed: 4/30/2020					
Hardness	ND		3.00	mg CaCO3/L		ND				20
Batch: BAE0104 - W Filtration										
Blank (BAE0104-BLK1)					Prepared & Analyzed: 5/1/2020					
TSS	ND		1.00	mg/L						
Blank (BAE0104-BLK2)					Prepared & Analyzed: 5/1/2020					
TSS	ND		1.00	mg/L						
LCS (BAE0104-BS1)					Prepared & Analyzed: 5/1/2020					
TSS	99.0			mg/L	100		99.0	90-110		
LCS Dup (BAE0104-BSD1)					Prepared & Analyzed: 5/1/2020					
TSS	97.0			mg/L	100		97.0	90-110	2.04	10
Duplicate (BAE0104-DUP1)		**Source: WAD0712-02**			Prepared & Analyzed: 5/1/2020					
TSS	5.00		1.00	mg/L		6.00			18.2	20

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Quality Control Data
(Continued)

Inorganics (Continued)

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAE0104 - W Filtration (Continued)										
Matrix Spike (BAE0104-MS1)		**Source: WAD0724-02**			Prepared & Analyzed: 5/1/2020					
TSS	48.0		1.00	mg/L	50.0	1.00	94.0	80-120		
Matrix Spike Dup (BAE0104-MSD1)		**Source: WAD0724-02**			Prepared & Analyzed: 5/1/2020					
TSS	46.0		1.00	mg/L	50.0	1.00	90.0	80-120	4.26	20

Quality Control Data
(Continued)

Metals by ICP-MS

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAD0768 - W 3010 Digest										
Blank (BAD0768-BLK1)					Prepared: 4/29/2020 Analyzed: 4/30/2020					
Dissolved Copper	ND		0.00100	mg/L						
Dissolved Zinc	ND		0.00100	mg/L						
Dissolved Iron	ND		0.0100	mg/L						
LCS (BAD0768-BS1)					Prepared: 4/29/2020 Analyzed: 4/30/2020					
Dissolved Iron	0.0951		0.0100	mg/L	0.100		95.1	85-115		
Dissolved Zinc	0.0467		0.00100	mg/L	0.0500		93.5	85-115		
Dissolved Copper	0.0469		0.00100	mg/L	0.0500		93.7	85-115		
Batch: BAD0769 - W 3010 Digest										
Blank (BAD0769-BLK1)					Prepared: 4/29/2020 Analyzed: 4/30/2020					
Iron	ND		0.0100	mg/L						
Zinc	ND		0.00100	mg/L						
Copper	ND		0.00100	mg/L						
LCS (BAD0769-BS1)					Prepared: 4/29/2020 Analyzed: 4/30/2020					
Iron	0.0916		0.0100	mg/L	0.100		91.6	85-115		
Copper	0.0447		0.00100	mg/L	0.0500		89.3	85-115		
Zinc	0.0446		0.00100	mg/L	0.0500		89.1	85-115		
Matrix Spike (BAD0769-MS1)		**Source: WAD0715-02**			Prepared: 4/29/2020 Analyzed: 4/30/2020					
Copper	0.210		0.00500	mg/L	0.250	0.00217	83.1	70-130		
Iron	0.473		0.0500	mg/L	0.500	0.0570	83.1	70-130		
Zinc	0.226		0.00500	mg/L	0.250	0.0267	79.8	70-130		
Matrix Spike Dup (BAD0769-MSD1)		**Source: WAD0715-02**			Prepared: 4/29/2020 Analyzed: 4/30/2020					
Copper	0.213		0.00500	mg/L	0.250	0.00217	84.5	70-130	1.71	20
Zinc	0.250		0.00500	mg/L	0.250	0.0267	89.1	70-130	9.87	20
Iron	0.552		0.0500	mg/L	0.500	0.0570	99.1	70-130	15.6	20

WAD0724

Due: 05/13/20

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Chain of Custody Record

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Anatek Log-In #

Company Name: Spokane County	Project Manager: Jake Saxon
Address: 1026 W. Broadway Avenue	Project Name & #: Sand Filter
City: Spokane State: WA Zip: 99260	Email Address: JSAXON@spokanecounty.org
Phone: (509) 477-7245	Purchase Order #:
Fax:	Sampler Name & phone: (509)995-0557

Turn Around

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__Normal
__Next Day*
__2nd Day*
__Other*______

*All rush order requests must be prior approved.

__Phone
__Mail
__Fax
x Email

Provide Sample Description

stormwater influent and effluent

List Analyses Requested

Lab ID	Sample Identification	Sampling Date/Time	Matrix	# of Containers	Sample Volume	TSS SM 2540D	Cu Zn Fe Total EPA 200.8 ICP/MS	Cu Zn Fe Dissolved EPA 200.8 ICP/MS	NWTPH, Ecology NWTPH-Dx	Hardness as CaCO3 SM 2340B ICP	Ortho-phosphate SM 4500-P G	Total Phosphorus SM 4500-P F			
	RNCINF04282020	04/28/2020 1:15p	water	3		X	X	X		X					
	RNCEFF04282020	04/28/2020 1:30p	water	3		X	X	X		X					

Preservative:

Note Special Instructions/Comments

Please send results to Jake Saxon JSAXON@spokanecounty.org and Aimee Navickis-Brasch aimeen@osbornconsulting.com

SWBS

	Printed Name	Signature	Company	Date	Time
Relinquished by	Taylor Hoffman-Ballard	Taylor Hoffman Ballard	OCI	04/28/2020	2:45p
Received by	Brock Greger	[signature]	Anatek	4-28-20	1442
Relinquished by					
Received by					
Relinquished by					
Received by					

Inspection Checklist

Received Intact? (Y) N
Labels & Chains Agree? (Y) N
Containers Sealed? (Y) N
VOC Head Space? ~~Y N~~

hci

Temperature (°C): 10.8 IRg-07
Preservative: HNO3 2000994 <2
pH 2001015
Date & Time: 4-28-20 1500
Inspected By: [initials]

Form COC01.00 - Eff 1 Mar 2015

Page 1 of 1

Samples submitted to Anatek Labs may be subcontracted to other accredited labs if necessary. This message serves as notice of this possibility. Sub-contracted analyses will be clearly noted on the analytical report.

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Client:	Spokane County	Work Order:	WAE0037
Address:	1026 W. Broadway Ave.	Project:	Sand Filter
	Spokane, WA 99260-0430	Reported:	5/18/2020 20:22
Attn:	Jake Saxon		

Analytical Results Report

Sample Location:	INF05022020		
Lab/Sample Number:	WAE0037-01	Collect Date:	05/03/20 13:30
Date Received:	05/04/20 08:25	Collected By:	
Matrix:	Stormwater		

Analyte	Result	Units	PQL	Analyzed	Analyst	Method	Qualifier
Inorganics							
Hardness	28.1	mg CaCO3/L	3.00	5/12/20 10:15	NDE	SM 2340 C	
pH	6.02	pH Units	1.00	5/7/20 11:10	SST	SM 4500-H-B	H1
TSS	58.0	mg/L	1.00	5/8/20 11:00	BAS	SM 2540 D	
Metals by ICP-MS							
Copper	0.0110	mg/L	0.00100	5/6/20 14:21	TRC	EPA 200.8	
Dissolved Copper	0.00640	mg/L	0.00100	5/6/20 13:41	TRC	EPA 200.8	
Iron	1.30	mg/L	0.0100	5/6/20 14:21	TRC	EPA 200.8	
Dissolved Iron	0.106	mg/L	0.0100	5/6/20 13:41	TRC	EPA 200.8	
Zinc	0.0671	mg/L	0.00100	5/6/20 14:21	TRC	EPA 200.8	
Dissolved Zinc	0.0316	mg/L	0.00100	5/6/20 13:41	TRC	EPA 200.8	
Hydrocarbons							
Lube Oil	ND	mg/L	0.400	5/15/20 23:57	ARC	NWTPH-Dx	
Mineral Oil	ND	mg/L	0.160	5/15/20 23:57	ARC	NWTPH-Dx	
Diesel	ND	mg/L	0.160	5/15/20 23:57	ARC	NWTPH-Dx	
Surrogate: n-Hexacosane	*79.9%*		*50-150*	*5/15/20 23:57*	*ARC*	*NWTPH-Dx*	

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Analytical Results Report

(Continued)

Sample Location: EFF05022020
Lab/Sample Number: WAE0037-02 Collect Date: 05/03/20 13:30
Date Received: 05/04/20 08:25 Collected By:
Matrix: Stormwater

Analyte	Result	Units	PQL	Analyzed	Analyst	Method	Qualifier
Inorganics							
Hardness	33.2	mg CaCO3/L	3.00	5/12/20 10:15	NDE	SM 2340 C	
pH	6.35	pH Units	1.00	5/7/20 11:10	SST	SM 4500-H-B	H1
TSS	60.0	mg/L	1.00	5/8/20 11:00	BAS	SM 2540 D	
Metals by ICP-MS							
Copper	0.0147	mg/L	0.00100	5/6/20 14:25	TRC	EPA 200.8	
Dissolved Copper	0.0102	mg/L	0.00100	5/6/20 13:51	TRC	EPA 200.8	
Iron	1.94	mg/L	0.0100	5/6/20 14:25	TRC	EPA 200.8	
Dissolved Iron	0.158	mg/L	0.0100	5/6/20 13:51	TRC	EPA 200.8	
Zinc	0.0499	mg/L	0.00100	5/6/20 14:25	TRC	EPA 200.8	
Dissolved Zinc	0.0224	mg/L	0.00100	5/6/20 13:51	TRC	EPA 200.8	
Hydrocarbons							
Lube Oil	ND	mg/L	0.400	5/16/20 0:51	ARC	NWTPH-Dx	
Mineral Oil	ND	mg/L	0.160	5/16/20 0:51	ARC	NWTPH-Dx	
Diesel	ND	mg/L	0.160	5/16/20 0:51	ARC	NWTPH-Dx	
Surrogate: n-Hexacosane	*88.4%*		*50-150*	*5/16/20 0:51*	*ARC*	*NWTPH-Dx*	

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Analytical Results Report

(Continued)

Sample Location:	INFDI05022020		
Lab/Sample Number:	WAE0037-03	Collect Date:	05/03/20 13:30
Date Received:	05/04/20 08:25	Collected By:	
Matrix:	Water		

Analyte	Result	Units	PQL	Analyzed	Analyst	Method	Qualifier
Metals by ICP-MS							
Dissolved Copper	<0.00007	mg/L	0.00100	5/6/20 13:55	TRC	EPA 200.8	
Dissolved Iron	0.0107	mg/L	0.0100	5/6/20 13:55	TRC	EPA 200.8	
Dissolved Zinc	0.0176	mg/L	0.00100	5/6/20 13:55	TRC	EPA 200.8	

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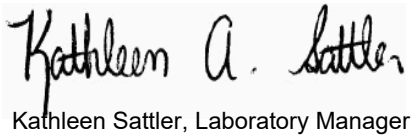
Analytical Results Report

(Continued)

Sample Location:	EFFDI05022020		
Lab/Sample Number:	WAE0037-04	Collect Date:	05/03/20 13:30
Date Received:	05/04/20 08:25	Collected By:	
Matrix:	Water		

Analyte	Result	Units	PQL	Analyzed	Analyst	Method	Qualifier
Metals by ICP-MS							
Dissolved Copper	<0.00007	mg/L	0.00100	5/6/20 13:58	TRC	EPA 200.8	
Dissolved Iron	0.0205	mg/L	0.0100	5/6/20 13:58	TRC	EPA 200.8	
Dissolved Zinc	0.0127	mg/L	0.00100	5/6/20 13:58	TRC	EPA 200.8	

Authorized Signature,



Kathleen Sattler, Laboratory Manager

H1	Sample analysis performed past holding time.
PQL	Practical Quantitation Limit
ND	Not Detected
MCL	EPA's Maximum Contaminant Level
Dry	Sample results reported on a dry weight basis
*	Not a certified analyte
RPD	Relative Percent Difference
%REC	Percent Recovery
Source	Sample that was spiked or duplicated.

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Certifications

Code	Description	Facility	Number
W WA DOE	Washington Department of Ecology	Anatek-Spokane, WA	C585

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Quality Control Data

Inorganics

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAE0267 - W Filtration										
Blank (BAE0267-BLK1)					Prepared & Analyzed: 5/8/2020					
TSS	ND		1.00	mg/L						
Blank (BAE0267-BLK2)					Prepared & Analyzed: 5/8/2020					
TSS	ND		1.00	mg/L						
Blank (BAE0267-BLK3)					Prepared & Analyzed: 5/8/2020					
TSS	ND		1.00	mg/L						
Blank (BAE0267-BLK4)					Prepared & Analyzed: 5/8/2020					
TSS	ND		1.00	mg/L						
LCS (BAE0267-BS1)					Prepared & Analyzed: 5/8/2020					
TSS	103			mg/L	100		103	90-110		
LCS (BAE0267-BS2)					Prepared & Analyzed: 5/8/2020					
TSS	106			mg/L	100		106	90-110		
LCS Dup (BAE0267-BSD1)					Prepared & Analyzed: 5/8/2020					
TSS	102			mg/L	100		102	90-110	0.976	10
LCS Dup (BAE0267-BSD2)					Prepared & Analyzed: 5/8/2020					
TSS	101			mg/L	100		101	90-110	4.83	10
Duplicate (BAE0267-DUP1)		**Source: MAE0087-01**			Prepared & Analyzed: 5/8/2020					
TSS	1.00		1.00	mg/L		1.00			0.00	20
Duplicate (BAE0267-DUP2)		**Source: WAE0127-02**			Prepared & Analyzed: 5/8/2020					
TSS	3.00		1.00	mg/L		3.00			0.00	20

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Quality Control Data
(Continued)

Inorganics (Continued)

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAE0267 - W Filtration (Continued)										
Matrix Spike (BAE0267-MS1)		**Source: MAE0100-01**			Prepared & Analyzed: 5/8/2020					
TSS	100		2.00	mg/L	100	4.00	96.0	80-120		
Matrix Spike (BAE0267-MS2)		**Source: WAE0150-01**			Prepared & Analyzed: 5/8/2020					
TSS	104		2.00	mg/L	100	9.00	95.0	80-120		
Matrix Spike Dup (BAE0267-MSD1)		**Source: MAE0100-01**			Prepared & Analyzed: 5/8/2020					
TSS	102		2.00	mg/L	100	4.00	98.0	80-120	1.98	20
Matrix Spike Dup (BAE0267-MSD2)		**Source: WAE0150-01**			Prepared & Analyzed: 5/8/2020					
TSS	104		2.00	mg/L	100	9.00	95.0	80-120	0.00	20
Batch: BAE0278 - W Wet Chem										
Blank (BAE0278-BLK1)					Prepared & Analyzed: 5/12/2020					
Hardness	ND		3.00	mg CaCO3/L						
Blank (BAE0278-BLK2)					Prepared & Analyzed: 5/12/2020					
Hardness	ND		3.00	mg CaCO3/L						
LCS (BAE0278-BS1)					Prepared & Analyzed: 5/12/2020					
Hardness	101			mg CaCO3/L	100		101	90-110		
LCS Dup (BAE0278-BSD1)					Prepared & Analyzed: 5/12/2020					
Hardness	100			mg CaCO3/L	100		100	90-110	0.499	20
Duplicate (BAE0278-DUP1)		**Source: WAE0230-01**			Prepared & Analyzed: 5/12/2020					
Hardness	20.1		3.00	mg CaCO3/L		19.6			2.53	20

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Quality Control Data
(Continued)

Inorganics (Continued)

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAE0278 - W Wet Chem (Continued)										
Matrix Spike (BAE0278-MS1)		**Source: WAE0172-01**			Prepared & Analyzed: 5/12/2020					
Hardness	111		6.00	mg CaCO3/L	100	9.55	101	80-120		
Matrix Spike Dup (BAE0278-MSD1)		**Source: WAE0172-01**			Prepared & Analyzed: 5/12/2020					
Hardness	110		6.00	mg CaCO3/L	100	9.55	100	80-120	0.913	20

Quality Control Data
(Continued)

Metals by ICP-MS

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAE0105 - W 3010 Digest										
Blank (BAE0105-BLK1)					Prepared & Analyzed: 5/5/2020					
Iron	ND		0.0100	mg/L						
Zinc	ND		0.00100	mg/L						
Copper	ND		0.00100	mg/L						
LCS (BAE0105-BS1)					Prepared & Analyzed: 5/5/2020					
Zinc	0.0503		0.00100	mg/L	0.0500		101	85-115		
Iron	0.113		0.0100	mg/L	0.100		113	85-115		
Copper	0.0506		0.00100	mg/L	0.0500		101	85-115		
Matrix Spike (BAE0105-MS1)		**Source: WAE0019-02**			Prepared & Analyzed: 5/5/2020					
Copper	0.254		0.00500	mg/L	0.250	0.00234	101	70-130		
Zinc	0.291		0.00500	mg/L	0.250	0.0340	103	70-130		
Iron	0.672		0.0500	mg/L	0.500	0.0767	119	70-130		
Matrix Spike (BAE0105-MS2)		**Source: WAE0042-02**			Prepared & Analyzed: 5/5/2020					
Copper	0.250		0.00500	mg/L	0.250	0.00363	98.6	70-130		
Iron	0.634		0.0500	mg/L	0.500	0.0709	113	70-130		
Zinc	0.293		0.00500	mg/L	0.250	0.0346	103	70-130		
Matrix Spike Dup (BAE0105-MSD1)		**Source: WAE0019-02**			Prepared & Analyzed: 5/5/2020					
Copper	0.251		0.00500	mg/L	0.250	0.00234	99.3	70-130	1.42	20
Iron	0.626		0.0500	mg/L	0.500	0.0767	110	70-130	7.18	20
Zinc	0.287		0.00500	mg/L	0.250	0.0340	101	70-130	1.38	20
Matrix Spike Dup (BAE0105-MSD2)		**Source: WAE0042-02**			Prepared & Analyzed: 5/5/2020					
Iron	0.722		0.0500	mg/L	0.500	0.0709	130	70-130	12.9	20
Zinc	0.288		0.00500	mg/L	0.250	0.0346	102	70-130	1.56	20
Copper	0.254		0.00500	mg/L	0.250	0.00363	100	70-130	1.71	20

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Quality Control Data
(Continued)

Metals by ICP-MS (Continued)

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAE0106 - W 3010 Digest										
Blank (BAE0106-BLK1)					Prepared: 5/5/2020 Analyzed: 5/6/2020					
Dissolved Zinc	ND		0.00100	mg/L						
Dissolved Copper	ND		0.00100	mg/L						
Dissolved Iron	ND		0.0100	mg/L						
LCS (BAE0106-BS1)					Prepared: 5/5/2020 Analyzed: 5/6/2020					
Dissolved Zinc	0.0500		0.00100	mg/L	0.0500		99.9	85-115		
Dissolved Iron	0.0984		0.0100	mg/L	0.100		98.4	85-115		
Dissolved Copper	0.0496		0.00100	mg/L	0.0500		99.1	85-115		
Matrix Spike (BAE0106-MS1)		**Source: WAE0037-01**			Prepared: 5/5/2020 Analyzed: 5/6/2020					
Dissolved Iron	0.578		0.0500	mg/L	0.500	0.106	94.5	70-130		
Dissolved Zinc	0.275		0.00500	mg/L	0.250	0.0316	97.2	70-130		
Dissolved Copper	0.245		0.00500	mg/L	0.250	0.00640	95.4	70-130		
Matrix Spike Dup (BAE0106-MSD1)		**Source: WAE0037-01**			Prepared: 5/5/2020 Analyzed: 5/6/2020					
Dissolved Iron	0.602		0.0500	mg/L	0.500	0.106	99.1	70-130	3.95	20
Dissolved Zinc	0.286		0.00500	mg/L	0.250	0.0316	102	70-130	4.13	20
Dissolved Copper	0.257		0.00500	mg/L	0.250	0.00640	100	70-130	4.83	20

Quality Control Data
(Continued)

Hydrocarbons

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAE0062 - W TPH-Dx										
Blank (BAE0062-BLK1)					Prepared: 5/14/2020 Analyzed: 5/15/2020					
Diesel	ND		0.160	mg/L						
Lube Oil	ND		0.400	mg/L						
Mineral Oil	ND		0.160	mg/L						
Surrogate: n-Hexacosane			*47.2*	*ppm*	*50.0*		*94.3*	*50-150*		
LCS (BAE0062-BS1)					Prepared: 5/14/2020 Analyzed: 5/15/2020					
Diesel	0.781		0.160	mg/L	1.00		78.1	70-130		
Lube Oil	ND		0.400	mg/L				70-130		
Surrogate: n-Hexacosane			*45.0*	*ppm*	*50.0*		*89.9*	*50-150*		
Duplicate (BAE0062-DUP1)		**Source: WAE0230-01**			Prepared: 5/14/2020 Analyzed: 5/16/2020					
Diesel	ND		0.160	mg/L		ND				20
Lube Oil	ND		0.400	mg/L		ND				20
Mineral Oil	ND		0.160	mg/L		ND				20
Surrogate: n-Hexacosane			*45.9*	*ppm*	*50.0*		*91.9*	*50-150*		

WAE0037

Due: 05/18/20

Anatek Labs, Inc.

Chain of Custody Record

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Anatek Log-In #

Company Name: Spokane County
Address: 1026 W Broadway Ave
City: Spokane State: WA Zip: 99260
Phone: (509) 447-7245
Fax:

Project Manager: Jake Saxon
Project Name & #: Sand Filter
Email Address: JSAXON@spokanecounty.org
Purchase Order #:
Sampler Name & phone: (509) 995-0557

Turn Around Time & Reporting

Please refer to our normal turn around times at:
http://www.anateklabs.com/services/guidelines/reporting.asp

__Normal __Next Day* __2nd Day* __Other*_____
*All rush order requests must be prior approved.
__Phone __Mail __Fax __Email

Provide Sample Description

Stormwater influent + effluent

List Analyses Requested

Lab ID	Sample Identification	Sampling Date/Time	Matrix	Preservative: # of Containers	Sample Volume	TSS SM2540D	Cu Zn Fe Total EPA 200.8 ICP/MS	NWTPH-Dx Ecology	Cu Zn Fe Dissolved EPA 200.8 ICP/MS	Hardness as $CaCO_3$
	INF05022020	5/3/2020 1:30p	water	4		X	X	X	X	X
	EFF05022020		water	4		X	X	X	X	X
	INFDI05022020			1					X	
	EFFDI05022020			1					X	

Please send results to Jake Saxon at JSAXON@spokanecounty.org and Aimee Navickis-Brasch at aimeen@osbornconsulting.com

SWBS

Inspection Checklist

Received Intact? (Y) N
Labels & Chains Agree? (Y) N
Containers Sealed? (Y) N
VOC Head Space? Y N
HCl

Temperature (°C): 4.6°D.g-07
Preservative: HNO_3 2000994 <2
HCl 2001180 <2 pH 2001015
Date & Time: 5-4-20 0930
Inspected By: MG

	Printed Name	Signature	Company	Date	Time
Relinquished by	Taylor Hoffman-Ballard	Taylor Hoffman Ballard	Osborn Consulting	05/04/2020	8:25a
Received by	Brock Gregor		Anatek	5.4.20	0825
Relinquished by					
Received by					
Relinquished by					
Received by					

Materials Testing & Consulting, Inc.

Geotechnical Engineering • Special Inspection • Materials Testing • Environmental Consulting

Project:	Sand Filter	**Date Received:**	May 7, 2020
Project #:	20S091	**Sampled By:**	Others
Client :	Spokane County	**Date Tested:**	May 8, 2020
Source:	Multiple	**Tested By:**	B. Goble
MTC Sample#:	Multiple		

CASE NARRATIVE

1. Two samples were submitted for particle size distribution by laser diffraction according to TAPE 2011 Methods. These methods include running sediment concentration according to modified ASTM D3977, Method C.
2. Particle size distribution is reported as "Concentration per Size Fraction" in mg/L.
3. There were no noted anomalies in this project.

Reviewed by: E Gabriel Goble

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Materials Testing & Consulting, Inc.

Geotechnical Engineering • Special Inspection • Materials Testing • Environmental Consulting

Project: Sand Filter
Project #: 20S091
Date Received: May 7, 2020
Date Tested: May 8, 2020

Client: Spokane County
Sampled by: Others
Tested by: B. Goble

Sediment Concentration per Size Fraction

TAPE 2011 / ASTM D3977 Method C

Sample Identification	Concentration of Coarse Fractions (mg/L)		Concentration of <62.5µm Fraction (mg/L)	Total Sample Concentration (mg/L)	Date Sampled	Analysis Date
	>250 µm	250 - 62.5 µm				
INF05022020	5.86	15.62	27.77	49.24	5/3/2020	5/8/2020
EFF05022020	4.40	16.65	39.64	60.70	5/3/2020	5/8/2020

Reviewed by: Elizabeth Goble

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Client:	Spokane County	Work Order:	WAE0525
Address:	1026 W. Broadway Ave.	Project:	Sand Filter
	Spokane, WA 99260-0430	Reported:	6/5/2020 16:22
Attn:	Jake Saxon		

Analytical Results Report

Sample Location:	INF05172020		
Lab/Sample Number:	WAE0525-01	Collect Date:	05/17/20 19:30
Date Received:	05/18/20 13:15	Collected By:	
Matrix:	Water		

Analyte	Result	Units	PQL	Analyzed	Analyst	Method	Qualifier
Inorganics							
Hardness	30.2	mg CaCO3/L	3.00	5/22/20 12:00	NDE	SM 2340 C	
Phosphate/P	0.0935	mg/L	0.0180	5/19/20 14:46	TLM	SM 4500-P G	
Total P	0.628	mg/L	0.100	6/4/20 15:33	TLM	SM 4500-P H	
TSS	36.0	mg/L	1.00	5/22/20 10:00	BAS	SM 2540 D	
Metals by ICP-MS							
Copper	0.0126	mg/L	0.00100	5/28/20 14:37	TRC	EPA 200.8	
Dissolved Copper	0.00785	mg/L	0.00100	5/27/20 15:18	TRC	EPA 200.8	
Iron	1.05	mg/L	0.0100	5/28/20 14:37	TRC	EPA 200.8	
Dissolved Iron	0.151	mg/L	0.0100	5/27/20 15:18	TRC	EPA 200.8	
Zinc	0.0641	mg/L	0.00100	5/28/20 14:37	TRC	EPA 200.8	
Dissolved Zinc	0.0430	mg/L	0.00100	5/27/20 15:18	TRC	EPA 200.8	
Hydrocarbons							
Lube Oil	ND	mg/L	0.400	5/29/20 21:47	ARC	NWTPH-Dx	
Mineral Oil	ND	mg/L	0.160	5/29/20 21:47	ARC	NWTPH-Dx	
Diesel	ND	mg/L	0.160	5/29/20 21:47	ARC	NWTPH-Dx	
Surrogate: n-Hexacosane	*97.6%*		*50-150*	*5/29/20 21:47*	*ARC*	*NWTPH-Dx*	

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Analytical Results Report

(Continued)

Sample Location: EFF05172020

Lab/Sample Number: WAE0525-02 Collect Date: 05/17/20 19:30

Date Received: 05/18/20 13:15 Collected By:

Matrix: Water

Analyte	Result	Units	PQL	Analyzed	Analyst	Method	Qualifier
Inorganics							
Hardness	30.7	mg CaCO3/L	3.00	5/22/20 12:00	NDE	SM 2340 C	
Phosphate/P	0.0560	mg/L	0.0180	5/19/20 14:50	TLM	SM 4500-P G	
Total P	0.250	mg/L	0.100	6/4/20 15:34	TLM	SM 4500-P H	
TSS	22.0	mg/L	1.00	5/22/20 10:00	BAS	SM 2540 D	
Metals by ICP-MS							
Copper	0.00814	mg/L	0.00100	5/28/20 14:40	TRC	EPA 200.8	
Dissolved Copper	0.00542	mg/L	0.00100	5/27/20 15:22	TRC	EPA 200.8	
Iron	0.828	mg/L	0.0100	5/28/20 14:40	TRC	EPA 200.8	
Dissolved Iron	0.0993	mg/L	0.0100	5/27/20 15:22	TRC	EPA 200.8	
Zinc	0.0240	mg/L	0.00100	5/28/20 14:40	TRC	EPA 200.8	
Dissolved Zinc	0.0162	mg/L	0.00100	5/27/20 15:22	TRC	EPA 200.8	
Hydrocarbons							
Lube Oil	ND	mg/L	0.400	5/29/20 22:44	ARC	NWTPH-Dx	
Mineral Oil	ND	mg/L	0.160	5/29/20 22:44	ARC	NWTPH-Dx	
Diesel	ND	mg/L	0.160	5/29/20 22:44	ARC	NWTPH-Dx	
Surrogate: n-Hexacosane	*83.1%*		*50-150*	*5/29/20 22:44*	*ARC*	*NWTPH-Dx*	

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Analytical Results Report

(Continued)

Sample Location:	INF05172020-DUP		
Lab/Sample Number:	WAE0525-03	Collect Date:	05/17/20 19:30
Date Received:	05/18/20 13:15	Collected By:	
Matrix:	Water		

Analyte	Result	Units	PQL	Analyzed	Analyst	Method	Qualifier
Inorganics							
TSS	65.0	mg/L	1.00	5/22/20 10:00	BAS	SM 2540 D	

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Analytical Results Report

(Continued)

Sample Location:	EFF05172020-DUP		
Lab/Sample Number:	WAE0525-04	Collect Date:	05/17/20 19:30
Date Received:	05/18/20 13:15	Collected By:	
Matrix:	Water		

Analyte	Result	Units	PQL	Analyzed	Analyst	Method	Qualifier
Inorganics							
TSS	15.0	mg/L	1.00	5/22/20 10:00	BAS	SM 2540 D	

Authorized Signature,

Karice Scott For Kathleen Sattler, Laboratory Manager

M1	Matrix spike recovery was high; the associated blank spike recovery was acceptable. Potential matrix effect
PQL	Practical Quantitation Limit
ND	Not Detected
MCL	EPA's Maximum Contaminant Level
Dry	Sample results reported on a dry weight basis
*	Not a certified analyte
RPD	Relative Percent Difference
%REC	Percent Recovery
Source	Sample that was spiked or duplicated.

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Certifications

Code	Description	Facility	Number
W WA DOE	Washington Department of Ecology	Anatek-Spokane, WA	C585

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Quality Control Data

Inorganics

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAE0475 - W Wet Chem										
Blank (BAE0475-BLK1)					Prepared & Analyzed: 5/22/2020					
Hardness	ND		3.00	mg CaCO3/L						
Blank (BAE0475-BLK2)					Prepared & Analyzed: 5/22/2020					
Hardness	ND		3.00	mg CaCO3/L						
LCS (BAE0475-BS1)					Prepared & Analyzed: 5/22/2020					
Hardness	102			mg CaCO3/L	100		102	90-110		
LCS Dup (BAE0475-BSD1)					Prepared & Analyzed: 5/22/2020					
Hardness	102			mg CaCO3/L	100		102	90-110	0.494	20
Duplicate (BAE0475-DUP1)		**Source: WAE0700-01**			Prepared & Analyzed: 5/22/2020					
Hardness	13.1		3.00	mg CaCO3/L		13.1			0.00	20
Matrix Spike (BAE0475-MS1)		**Source: WAE0702-01**			Prepared & Analyzed: 5/22/2020					
Hardness	115		6.00	mg CaCO3/L	100	13.6	101	80-120		
Matrix Spike Dup (BAE0475-MSD1)		**Source: WAE0702-01**			Prepared & Analyzed: 5/22/2020					
Hardness	115		6.00	mg CaCO3/L	100	13.6	101	80-120	0.00	20
Batch: BAE0722 - W Filtration										
Blank (BAE0722-BLK1)					Prepared & Analyzed: 5/22/2020					
TSS	ND		1.00	mg/L						
Blank (BAE0722-BLK2)					Prepared & Analyzed: 5/22/2020					
TSS	ND		1.00	mg/L						

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Quality Control Data
(Continued)

Inorganics (Continued)

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAE0722 - W Filtration (Continued)										
Blank (BAE0722-BLK3)					Prepared & Analyzed: 5/22/2020					
TSS	ND		1.00	mg/L						
Blank (BAE0722-BLK4)					Prepared & Analyzed: 5/22/2020					
TSS	ND		1.00	mg/L						
LCS (BAE0722-BS1)					Prepared & Analyzed: 5/22/2020					
TSS	100			mg/L	100		100	90-110		
LCS (BAE0722-BS2)					Prepared & Analyzed: 5/22/2020					
TSS	98.0			mg/L	100		98.0	90-110		
LCS Dup (BAE0722-BSD1)					Prepared & Analyzed: 5/22/2020					
TSS	97.0			mg/L	100		97.0	90-110	3.05	10
LCS Dup (BAE0722-BSD2)					Prepared & Analyzed: 5/22/2020					
TSS	96.0			mg/L	100		96.0	90-110	2.06	10
Duplicate (BAE0722-DUP1)		**Source: MAE0548-01**			Prepared & Analyzed: 5/22/2020					
TSS	<1		1.00	mg/L		ND				20
Duplicate (BAE0722-DUP2)		**Source: WAE0582-02**			Prepared & Analyzed: 5/22/2020					
TSS	6.00		1.00	mg/L		6.00			0.00	20
Matrix Spike (BAE0722-MS1)		**Source: MAE0516-01**			Prepared & Analyzed: 5/22/2020					
TSS	128		2.00	mg/L	100	35.0	93.0	80-120		
Matrix Spike (BAE0722-MS2)		**Source: WAE0658-01**			Prepared & Analyzed: 5/22/2020					
TSS	96.0		2.00	mg/L	100	2.00	94.0	80-120		

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Quality Control Data
(Continued)

Inorganics (Continued)

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAE0722 - W Filtration (Continued)										
Matrix Spike Dup (BAE0722-MSD1)		**Source: MAE0516-01**			Prepared & Analyzed: 5/22/2020					
TSS	132		2.00	mg/L	100	35.0	97.0	80-120	3.08	20
Matrix Spike Dup (BAE0722-MSD2)		**Source: WAE0658-01**			Prepared & Analyzed: 5/22/2020					
TSS	98.0		2.00	mg/L	100	2.00	96.0	80-120	2.06	20
Batch: BAE0750 - W FIA										
Blank (BAE0750-BLK1)					Prepared & Analyzed: 5/19/2020					
Phosphate/P	ND		0.0180	mg/L						
LCS (BAE0750-BS1)					Prepared & Analyzed: 5/19/2020					
Phosphate/P	0.0968		0.0180	mg/L	0.100		96.8	85-115		
Matrix Spike (BAE0750-MS1)		**Source: WAE0525-02**			Prepared & Analyzed: 5/19/2020					
Phosphate/P	0.153		0.0180	mg/L	0.100	0.0560	97.1	80-120		
Matrix Spike Dup (BAE0750-MSD1)		**Source: WAE0525-02**			Prepared & Analyzed: 5/19/2020					
Phosphate/P	0.148		0.0180	mg/L	0.100	0.0560	92.4	80-120	3.12	20
Batch: BAF0169 - W FIA										
Blank (BAF0169-BLK1)					Prepared & Analyzed: 6/4/2020					
Total P	ND		0.00500	mg/L						
Blank (BAF0169-BLK2)					Prepared & Analyzed: 6/4/2020					
Total P	ND		0.00500	mg/L						

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Quality Control Data
(Continued)

Inorganics (Continued)

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAF0169 - W FIA (Continued)										
Blank (BAF0169-BLK3)					Prepared & Analyzed: 6/4/2020					
Total P	ND		0.00500	mg/L						
LCS (BAF0169-BS1)					Prepared & Analyzed: 6/4/2020					
Total P	0.109		0.00500	mg/L	0.100		109	90-110		
LCS (BAF0169-BS2)					Prepared & Analyzed: 6/4/2020					
Total P	0.105		0.00500	mg/L	0.100		105	90-110		
Matrix Spike (BAF0169-MS1)		**Source: WAF0050-02**			Prepared & Analyzed: 6/4/2020					
Total P	0.175		0.00500	mg/L	0.100	0.0685	106	80-120		
Matrix Spike (BAF0169-MS2)		**Source: WAF0126-02**			Prepared & Analyzed: 6/4/2020					
Total P	0.193		0.00500	mg/L	0.100	0.0846	108	80-120		
Matrix Spike Dup (BAF0169-MSD1)		**Source: WAF0050-02**			Prepared & Analyzed: 6/4/2020					
Total P	0.182		0.00500	mg/L	0.100	0.0685	114	80-120	4.26	20
Matrix Spike Dup (BAF0169-MSD2)		**Source: WAF0126-02**			Prepared & Analyzed: 6/4/2020					
Total P	0.205		0.00500	mg/L	0.100	0.0846	120	80-120	5.94	20

Quality Control Data
(Continued)

Metals by ICP-MS

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAE0473 - W 3010 Digest										
Blank (BAE0473-BLK1)					Prepared: 5/19/2020 Analyzed: 5/20/2020					
Dissolved Zinc	ND		0.00100	mg/L						
Dissolved Iron	ND		0.0100	mg/L						
Dissolved Copper	ND		0.00100	mg/L						
LCS (BAE0473-BS1)					Prepared: 5/19/2020 Analyzed: 5/20/2020					
Dissolved Zinc	0.0479		0.00100	mg/L	0.0500		95.8	85-115		
Dissolved Copper	0.0481		0.00100	mg/L	0.0500		96.2	85-115		
Dissolved Iron	0.100		0.0100	mg/L	0.100		100	85-115		
Matrix Spike (BAE0473-MS1)		**Source: WAE0478-01**			Prepared: 5/19/2020 Analyzed: 5/20/2020					
Dissolved Zinc	0.268		0.00500	mg/L	0.250	0.0139	101	70-130		
Dissolved Copper	0.249		0.00500	mg/L	0.250	ND	99.6	70-130		
Dissolved Iron	0.647		0.0500	mg/L	0.500	0.114	107	70-130		
Matrix Spike (BAE0473-MS2)		**Source: WAE0478-10**			Prepared: 5/19/2020 Analyzed: 5/20/2020					
Dissolved Zinc	0.275		0.00500	mg/L	0.250	0.0255	99.8	70-130		
Dissolved Iron	0.682		0.0500	mg/L	0.500	0.190	98.5	70-130		
Dissolved Copper	0.259		0.00500	mg/L	0.250	0.0159	97.3	70-130		
Matrix Spike Dup (BAE0473-MSD1)		**Source: WAE0478-01**			Prepared: 5/19/2020 Analyzed: 5/20/2020					
Dissolved Zinc	0.261		0.00500	mg/L	0.250	0.0139	99.0	70-130	2.28	20
Dissolved Copper	0.247		0.00500	mg/L	0.250	ND	98.7	70-130	0.914	20
Dissolved Iron	0.611		0.0500	mg/L	0.500	0.114	99.5	70-130	5.70	20

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Quality Control Data
(Continued)

Metals by ICP-MS (Continued)

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAE0473 - W 3010 Digest (Continued)										
Matrix Spike Dup (BAE0473-MSD2)		**Source: WAE0478-10**			Prepared: 5/19/2020 Analyzed: 5/20/2020					
Dissolved Iron	0.695		0.0500	mg/L	0.500	0.190	101	70-130	1.83	20
Dissolved Zinc	0.272		0.00500	mg/L	0.250	0.0255	98.6	70-130	1.04	20
Dissolved Copper	0.256		0.00500	mg/L	0.250	0.0159	96.2	70-130	1.08	20
Batch: BAE0474 - W 3010 Digest										
Blank (BAE0474-BLK1)					Prepared: 5/19/2020 Analyzed: 5/28/2020					
Copper	ND		0.00100	mg/L						
Iron	ND		0.0100	mg/L						
Zinc	ND		0.00100	mg/L						
LCS (BAE0474-BS1)					Prepared: 5/19/2020 Analyzed: 5/28/2020					
Iron	0.0984		0.0100	mg/L	0.100		98.4	85-115		
Copper	0.0474		0.00100	mg/L	0.0500		94.9	85-115		
Zinc	0.0486		0.00100	mg/L	0.0500		97.2	85-115		
Matrix Spike (BAE0474-MS1)		**Source: WAE0451-01**			Prepared: 5/19/2020 Analyzed: 5/28/2020					
Copper	0.237		0.00500	mg/L	0.250	ND	94.7	70-130		
Iron	0.912	M1	0.0500	mg/L	0.500	0.0715	168	70-130		
Zinc	0.253		0.00500	mg/L	0.250	0.00746	98.1	70-130		
Matrix Spike (BAE0474-MS2)		**Source: WAE0451-07**			Prepared: 5/19/2020 Analyzed: 5/28/2020					
Copper	0.246		0.00500	mg/L	0.250	ND	98.6	70-130		
Zinc	0.248		0.00500	mg/L	0.250	0.00258	98.3	70-130		
Iron	0.504		0.0500	mg/L	0.500	ND	101	70-130		

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Quality Control Data
(Continued)

Metals by ICP-MS (Continued)

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAE0474 - W 3010 Digest (Continued)										
Matrix Spike Dup (BAE0474-MSD1)		**Source: WAE0451-01**			Prepared: 5/19/2020 Analyzed: 5/28/2020					
Iron	0.764	M1	0.0500	mg/L	0.500	0.0715	139	70-130	17.6	20
Zinc	0.260		0.00500	mg/L	0.250	0.00746	101	70-130	2.88	20
Copper	0.246		0.00500	mg/L	0.250	ND	98.6	70-130	3.98	20
Matrix Spike Dup (BAE0474-MSD2)		**Source: WAE0451-07**			Prepared: 5/19/2020 Analyzed: 5/28/2020					
Copper	0.247		0.00500	mg/L	0.250	ND	98.6	70-130	0.0548	20
Iron	0.499		0.0500	mg/L	0.500	ND	99.8	70-130	0.946	20
Zinc	0.249		0.00500	mg/L	0.250	0.00258	98.5	70-130	0.141	20

Quality Control Data
(Continued)

Hydrocarbons

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAE0650 - W TPH-Dx										
Blank (BAE0650-BLK1)					Prepared: 5/22/2020 Analyzed: 5/29/2020					
Diesel	ND		0.160	mg/L						
Lube Oil	ND		0.400	mg/L						
Mineral Oil	ND		0.160	mg/L						
Surrogate: n-Hexacosane			*46.9*	*ppm*	*50.0*		*93.9*	*50-150*		
LCS (BAE0650-BS1)					Prepared: 5/22/2020 Analyzed: 5/29/2020					
Diesel	0.861		0.160	mg/L	1.00		86.1	70-130		
Lube Oil	ND		0.400	mg/L				70-130		
Surrogate: n-Hexacosane			*47.2*	*ppm*	*50.0*		*94.5*	*50-150*		
Duplicate (BAE0650-DUP1)		**Source: WAE0525-02**			Prepared: 5/22/2020 Analyzed: 5/29/2020					
Diesel	ND		0.160	mg/L		ND				20
Lube Oil	ND		0.400	mg/L		ND				20
Mineral Oil	ND		0.160	mg/L		ND				20
Surrogate: n-Hexacosane			*47.9*	*ppm*	*50.0*		*95.7*	*50-150*		

Anatek Labs, Inc.

Chain of Custody Record

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Anatek Log-In #

WAE0525

Due: 06/02/20

Company Name: Spokane County	Project Manager: Jake Saxon
Address: 1026 W. Broadway Avenue	Project Name & # : Sand Filter
City: Spokane State: WA Zip: 99260	Email Address : JSAXON@spokanecounty.org
Phone: (509) 477-7245	Purchase Order #:
Fax:	Sampler Name & phone: (509)995-0557

Turn Around

Please refer to our normal turn around times at:
http://www.anateklabs.com/services/guidelines/reporting.asp

__Normal
__Next Day*
__2nd Day*
__Other*_____

*All rush order requests must be prior approved.

__Phone
__Mail
__Fax
x Email

Provide Sample Description

stormwater influent and effluent

List Analyses Requested

Note Special Instructions/Comments

Please send results to Jake Saxon
JSAXON@spokanecounty.org and
Aimee Navickis-Brasch
aimeen@osbornconsulting.com

SWBS

Lab ID	Sample Identification	Sampling Date/Time	Matrix	Preservative: # of Containers	Sample Volume	TSS SM 2540D	Cu Zn Fe Total EPA 200.8 ICP/MS	Cu Zn Fe Dissolved EPA 200.8 ICP/MS	NWTPH, Ecology NWTPH-Dx	Hardness as CaCO3 SM 2340B ICP	Ortho-phosphate SM 4500-P G	Total Phosphorus SM 4500-P F			
	INF05172020	05/17/2020 7:30pm	water	6		x	x	x	x	x	x	x			
	EFF05172020	05/17/2020 7:30pm	water	6		x	x	x	x	x	x	x			
	INF05172020-DUP	05/17/2020 7:30pm	water	1		x									
	EFF05172020-DUP	05/17/2020 7:30pm	water	1		x									

	Printed Name	Signature	Company	Date	Time
Relinquished by	Taylor Hoffman-Ballard	Taylor Hoffman-Ballard	OCI	5/18/2020	1:15p
Received by	Wendy Oz	Wendy Oz	Anatek	5/18/20	1315
Relinquished by					
Received by					
Relinquished by					
Received by					

Inspection Checklist

Received Intact?	Y	N
Labels & Chains Agree?	Y	N
Containers Sealed?	Y	N
VOC Head Space?	Y	N

w/ cli

Temperature (°C): 10.1 dig07

Preservative: H_2SO_4 2001181 <2 HNO3 2000994 <2 HCl R385-3<2

Date & Time: 5-18-20 1345

Inspected By: W/cq

Form COC01.00 - Eff 1 Mar 2015

Page 1 of 1

Samples submitted to Anatek Labs may be subcontracted to other accredited labs if necessary. This message serves as notice of this possibility. Sub-contracted analyses will be clearly noted on the analytical report.

Materials Testing & Consulting, Inc.

Geotechnical Engineering • Special Inspection • Materials Testing • Environmental Consulting

Project:	Sand Filter	**Date Received:**	May 21, 2020
Project #:	20S091	**Sampled By:**	Others
Client :	Spokane County	**Date Tested:**	May 22, 2020
Source:	Multiple	**Tested By:**	B. Goble
MTC Sample#:	Multiple		

CASE NARRATIVE

1. Two samples were submitted for particle size distribution by laser diffraction according to TAPE 2011 Methods. These methods include running sediment concentration according to modified ASTM D3977, Method C.
2. Particle size distribution is reported as "Concentration per Size Fraction" in mg/L.
3. There were no other noted anomalies in this project.

Reviewed by: E Gabriel Goble

Materials Testing & Consulting, Inc.

Geotechnical Engineering • Special Inspection • Materials Testing • Environmental Consulting

Project: Sand Filter
Project #: 20S091
Date Received: May 21, 2020
Date Tested: May 22, 2020

Client: Spokane County
Sampled by: Others
Tested by: B. Goble

Sediment Concentration per Size Fraction

TAPE 2011 / ASTM D3977 Method C

Sample Identification	Concentration of Coarse Fractions (mg/L)		Concentration of <62.5µm Fraction (mg/L)	Total Sample Concentration (mg/L)	Date Sampled	Analysis Date
	>250 µm	250 - 62.5 µm				
INF05172020	4.83	28.45	17.61	50.89	5/18/2020	5/22/2020
EFF05172020	3.61	9.34	13.59	26.54	5/18/2020	5/22/2020

Reviewed by: E Gabriel Goble

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Client:	Spokane County	Work Order:	WAE0702
Address:	1026 W. Broadway Ave.	Project:	Sand Filter
	Spokane, WA 99260-0430	Reported:	6/12/2020 15:17
Attn:	Jake Saxon		

Analytical Results Report

Sample Location:	INF05202020		
Lab/Sample Number:	WAE0702-01	Collect Date:	05/21/20 08:30
Date Received:	05/21/20 12:45	Collected By:	
Matrix:	Water		

Analyte	Result	Units	PQL	Analyzed	Analyst	Method	Qualifier
Inorganics							
Hardness	13.6	mg CaCO3/L	3.00	5/22/20 12:00	NDE	SM 2340 C	
Phosphate/P	0.0248	mg/L	0.0180	5/21/20 16:34	TLM	SM 4500-P G	
Total P	0.100	mg/L	0.00500	6/10/20 10:59	TLM	SM 4500-P H	
TSS	37.0	mg/L	1.00	5/26/20 14:00	BAS	SM 2540 D	
Metals by ICP-MS							
Copper	0.00673	mg/L	0.00100	5/29/20 15:45	TRC	EPA 200.8	
Dissolved Copper	0.00205	mg/L	0.00100	5/28/20 16:25	TRC	EPA 200.8	
Iron	1.39	mg/L	0.0100	5/29/20 15:45	TRC	EPA 200.8	
Dissolved Iron	0.0934	mg/L	0.0100	5/28/20 16:25	TRC	EPA 200.8	
Zinc	0.0389	mg/L	0.00100	5/29/20 15:45	TRC	EPA 200.8	
Dissolved Zinc	0.0112	mg/L	0.00100	5/28/20 16:25	TRC	EPA 200.8	
Hydrocarbons							
Lube Oil	ND	mg/L	0.400	5/30/20 0:36	ARC	NWTPH-Dx	
Mineral Oil	ND	mg/L	0.160	5/30/20 0:36	ARC	NWTPH-Dx	
Diesel	ND	mg/L	0.160	5/30/20 0:36	ARC	NWTPH-Dx	
Surrogate: n-Hexacosane	*95.4%*		*50-150*	*5/30/20 0:36*	*ARC*	*NWTPH-Dx*	

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Analytical Results Report

(Continued)

Sample Location: EFF05202020
Lab/Sample Number: WAE0702-02 Collect Date: 05/21/20 08:30
Date Received: 05/21/20 12:45 Collected By:
Matrix: Water

Analyte	Result	Units	PQL	Analyzed	Analyst	Method	Qualifier
Inorganics							
Hardness	15.6	mg CaCO3/L	3.00	5/22/20 12:00	NDE	SM 2340 C	
Phosphate/P	0.0319	mg/L	0.0180	5/21/20 16:35	TLM	SM 4500-P G	
Total P	0.0630	mg/L	0.00500	6/10/20 11:00	TLM	SM 4500-P H	
TSS	9.00	mg/L	1.00	5/26/20 14:00	BAS	SM 2540 D	
Metals by ICP-MS							
Copper	0.00410	mg/L	0.00100	5/29/20 15:48	TRC	EPA 200.8	
Dissolved Copper	0.00325	mg/L	0.00100	5/28/20 16:28	TRC	EPA 200.8	
Iron	0.518	mg/L	0.0100	5/29/20 15:48	TRC	EPA 200.8	M1
Dissolved Iron	0.0808	mg/L	0.0100	5/28/20 16:28	TRC	EPA 200.8	
Zinc	0.0181	mg/L	0.00100	5/29/20 15:48	TRC	EPA 200.8	M2
Dissolved Zinc	0.0140	mg/L	0.00100	5/28/20 16:28	TRC	EPA 200.8	
Hydrocarbons							
Lube Oil	ND	mg/L	0.400	5/30/20 1:32	ARC	NWTPH-Dx	
Mineral Oil	ND	mg/L	0.160	5/30/20 1:32	ARC	NWTPH-Dx	
Diesel	ND	mg/L	0.160	5/30/20 1:32	ARC	NWTPH-Dx	
Surrogate: n-Hexacosane	*97.3%*		*50-150*	*5/30/20 1:32*	*ARC*	*NWTPH-Dx*	

Authorized Signature,

Karice Scott For Kathleen Sattler, Laboratory Manager

M1	Matrix spike recovery was high; the associated blank spike recovery was acceptable. Potential matrix effect
M2	Matrix spike recovery was low; the associated blank spike recovery was acceptable. Potential matrix effect.
PQL	Practical Quantitation Limit
ND	Not Detected
MCL	EPA's Maximum Contaminant Level
Dry	Sample results reported on a dry weight basis
*	Not a certified analyte
RPD	Relative Percent Difference
%REC	Percent Recovery
Source	Sample that was spiked or duplicated.

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Certifications

Code	Description	Facility	Number
W WA DOE	Washington Department of Ecology	Anatek-Spokane, WA	C585

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Quality Control Data

Inorganics

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAE0475 - W Wet Chem										
Blank (BAE0475-BLK1)					Prepared & Analyzed: 5/22/2020					
Hardness	ND		3.00	mg CaCO3/L						
Blank (BAE0475-BLK2)					Prepared & Analyzed: 5/22/2020					
Hardness	ND		3.00	mg CaCO3/L						
LCS (BAE0475-BS1)					Prepared & Analyzed: 5/22/2020					
Hardness	102			mg CaCO3/L	100		102	90-110		
LCS Dup (BAE0475-BSD1)					Prepared & Analyzed: 5/22/2020					
Hardness	102			mg CaCO3/L	100		102	90-110	0.494	20
Duplicate (BAE0475-DUP1)		**Source: WAE0700-01**			Prepared & Analyzed: 5/22/2020					
Hardness	13.1		3.00	mg CaCO3/L		13.1			0.00	20
Matrix Spike (BAE0475-MS1)		**Source: WAE0702-01**			Prepared & Analyzed: 5/22/2020					
Hardness	115		6.00	mg CaCO3/L	100	13.6	101	80-120		
Matrix Spike Dup (BAE0475-MSD1)		**Source: WAE0702-01**			Prepared & Analyzed: 5/22/2020					
Hardness	115		6.00	mg CaCO3/L	100	13.6	101	80-120	0.00	20
Batch: BAE0751 - W FIA										
Blank (BAE0751-BLK1)					Prepared & Analyzed: 5/21/2020					
Phosphate/P	ND		0.0180	mg/L						
LCS (BAE0751-BS1)					Prepared & Analyzed: 5/21/2020					
Phosphate/P	0.0948		0.0180	mg/L	0.100		94.8	85-115		

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Quality Control Data
(Continued)

Inorganics (Continued)

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAE0751 - W FIA (Continued)										
Matrix Spike (BAE0751-MS1)		**Source: WAE0638-02**			Prepared & Analyzed: 5/21/2020					
Phosphate/P	0.129		0.0180	mg/L	0.100	0.0204	109	80-120		
Matrix Spike Dup (BAE0751-MSD1)		**Source: WAE0638-02**			Prepared & Analyzed: 5/21/2020					
Phosphate/P	0.126		0.0180	mg/L	0.100	0.0204	106	80-120	2.11	20
Batch: BAE0840 - W Filtration										
Blank (BAE0840-BLK1)					Prepared & Analyzed: 5/26/2020					
TSS	ND		1.00	mg/L						
Blank (BAE0840-BLK2)					Prepared & Analyzed: 5/26/2020					
TSS	ND		1.00	mg/L						
LCS (BAE0840-BS1)					Prepared & Analyzed: 5/26/2020					
TSS	98.0			mg/L	100		98.0	90-110		
LCS Dup (BAE0840-BSD1)					Prepared & Analyzed: 5/26/2020					
TSS	98.0			mg/L	100		98.0	90-110	0.00	10
Duplicate (BAE0840-DUP1)		**Source: WAE0700-01**			Prepared & Analyzed: 5/26/2020					
TSS	33.0		1.00	mg/L		36.0			8.70	20
Matrix Spike (BAE0840-MS1)		**Source: WAE0702-02**			Prepared & Analyzed: 5/26/2020					
TSS	108		2.00	mg/L	100	9.00	99.0	80-120		
Matrix Spike Dup (BAE0840-MSD1)		**Source: WAE0702-02**			Prepared & Analyzed: 5/26/2020					
TSS	104		2.00	mg/L	100	9.00	95.0	80-120	3.77	20

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Quality Control Data
(Continued)

Inorganics (Continued)

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAF0332 - W FIA										
Blank (BAF0332-BLK1)					Prepared & Analyzed: 6/10/2020					
Total P	ND		0.00500	mg/L						
Blank (BAF0332-BLK2)					Prepared & Analyzed: 6/10/2020					
Total P	ND		0.00500	mg/L						
Blank (BAF0332-BLK3)					Prepared & Analyzed: 6/10/2020					
Total P	ND		0.00500	mg/L						
LCS (BAF0332-BS1)					Prepared & Analyzed: 6/10/2020					
Total P	0.0982		0.00500	mg/L	0.100		98.2	90-110		
LCS (BAF0332-BS2)					Prepared & Analyzed: 6/10/2020					
Total P	0.0984		0.00500	mg/L	0.100		98.4	90-110		
Matrix Spike (BAF0332-MS1)		**Source: WAF0197-02**			Prepared & Analyzed: 6/10/2020					
Total P	0.165		0.00500	mg/L	0.100	0.0622	103	80-120		
Matrix Spike (BAF0332-MS2)		**Source: WAF0262-02**			Prepared & Analyzed: 6/10/2020					
Total P	0.160		0.00500	mg/L	0.100	0.0574	103	80-120		
Matrix Spike Dup (BAF0332-MSD1)		**Source: WAF0197-02**			Prepared & Analyzed: 6/10/2020					
Total P	0.165		0.00500	mg/L	0.100	0.0622	103	80-120	0.00	20
Matrix Spike Dup (BAF0332-MSD2)		**Source: WAF0262-02**			Prepared & Analyzed: 6/10/2020					
Total P	0.162		0.00500	mg/L	0.100	0.0574	104	80-120	1.06	20

Quality Control Data
(Continued)

Metals by ICP-MS

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAE0677 - W 3010 Digest										
Blank (BAE0677-BLK1)					Prepared: 5/26/2020 Analyzed: 5/28/2020					
Dissolved Copper	ND		0.00100	mg/L						
Dissolved Iron	ND		0.0100	mg/L						
Dissolved Zinc	ND		0.00100	mg/L						
LCS (BAE0677-BS1)					Prepared: 5/26/2020 Analyzed: 5/28/2020					
Dissolved Copper	0.0482		0.00100	mg/L	0.0500		96.3	85-115		
Dissolved Iron	0.104		0.0100	mg/L	0.100		104	85-115		
Dissolved Zinc	0.0485		0.00100	mg/L	0.0500		97.0	85-115		
Matrix Spike (BAE0677-MS1)		**Source: WAE0600-01**			Prepared: 5/26/2020 Analyzed: 5/28/2020					
Dissolved Zinc	0.250		0.00500	mg/L	0.250	0.00766	96.9	70-130		
Dissolved Copper	0.239		0.00500	mg/L	0.250	0.000528	95.5	70-130		
Dissolved Iron	0.519		0.0500	mg/L	0.500	ND	104	70-130		
Matrix Spike (BAE0677-MS2)		**Source: WAE0600-03**			Prepared: 5/26/2020 Analyzed: 5/28/2020					
Dissolved Copper	0.211		0.00500	mg/L	0.250	0.000947	84.1	70-130		
Dissolved Iron	0.525		0.0500	mg/L	0.500	ND	105	70-130		

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Quality Control Data
(Continued)

Metals by ICP-MS (Continued)

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAE0677 - W 3010 Digest (Continued)										
Matrix Spike (BAE0677-MS2)		**Source: WAE0600-03**			Prepared: 5/26/2020 Analyzed: 5/28/2020					
Dissolved Zinc	0.224		0.00500	mg/L	0.250	0.0101	85.7	70-130		
Matrix Spike Dup (BAE0677-MSD1)		**Source: WAE0600-01**			Prepared: 5/26/2020 Analyzed: 5/28/2020					
Dissolved Iron	0.901	M1	0.0500	mg/L	0.500	ND	180	70-130	53.7	20
Dissolved Zinc	0.276		0.00500	mg/L	0.250	0.00766	107	70-130	9.81	20
Dissolved Copper	0.246		0.00500	mg/L	0.250	0.000528	98.0	70-130	2.57	20
Matrix Spike Dup (BAE0677-MSD2)		**Source: WAE0600-03**			Prepared: 5/26/2020 Analyzed: 5/28/2020					
Dissolved Copper	0.219		0.00500	mg/L	0.250	0.000947	87.2	70-130	3.56	20
Dissolved Zinc	0.242		0.00500	mg/L	0.250	0.0101	92.6	70-130	7.37	20
Dissolved Iron	0.483		0.0500	mg/L	0.500	ND	96.6	70-130	8.25	20
Batch: BAE0678 - W 3010 Digest										
Blank (BAE0678-BLK1)					Prepared: 5/26/2020 Analyzed: 5/29/2020					
Copper	ND		0.00100	mg/L						
Zinc	ND		0.00100	mg/L						
Iron	ND		0.0100	mg/L						
LCS (BAE0678-BS1)					Prepared: 5/26/2020 Analyzed: 5/29/2020					
Iron	0.0955		0.0100	mg/L	0.100		95.5	85-115		
Zinc	0.0494		0.00100	mg/L	0.0500		98.9	85-115		
Copper	0.0496		0.00100	mg/L	0.0500		99.3	85-115		
Matrix Spike (BAE0678-MS1)		**Source: WAE0700-06**			Prepared: 5/26/2020 Analyzed: 5/29/2020					
Iron	0.226	M1	0.0100	mg/L	0.100	0.553	NR	70-130		
Copper	0.0510		0.00100	mg/L	0.0500	0.00548	91.1	70-130		
Zinc	0.0499		0.00100	mg/L	0.0500	0.00713	85.5	70-130		

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Quality Control Data
(Continued)

Metals by ICP-MS (Continued)

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAE0678 - W 3010 Digest (Continued)										
Matrix Spike (BAE0678-MS2)		**Source: WAE0702-02**			Prepared: 5/26/2020 Analyzed: 5/29/2020					
Zinc	0.0514	M2	0.00100	mg/L	0.0500	0.0181	66.6	70-130		
Copper	0.0503		0.00100	mg/L	0.0500	0.00410	92.4	70-130		
Iron	0.202	M1	0.0100	mg/L	0.100	0.518	NR	70-130		
Matrix Spike Dup (BAE0678-MSD1)		**Source: WAE0700-06**			Prepared: 5/26/2020 Analyzed: 5/29/2020					
Iron	0.228	M1	0.0100	mg/L	0.100	0.553	NR	70-130	0.776	20
Copper	0.0518		0.00100	mg/L	0.0500	0.00548	92.7	70-130	1.51	20
Zinc	0.0512		0.00100	mg/L	0.0500	0.00713	88.2	70-130	2.67	20
Matrix Spike Dup (BAE0678-MSD2)		**Source: WAE0702-02**			Prepared: 5/26/2020 Analyzed: 5/29/2020					
Zinc	0.0524	M2	0.00100	mg/L	0.0500	0.0181	68.4	70-130	1.79	20
Iron	0.192	M1	0.0100	mg/L	0.100	0.518	NR	70-130	5.07	20
Copper	0.0515		0.00100	mg/L	0.0500	0.00410	94.8	70-130	2.34	20

Quality Control Data
(Continued)

Hydrocarbons

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAE0650 - W TPH-Dx										
Blank (BAE0650-BLK1)					Prepared: 5/22/2020 Analyzed: 5/29/2020					
Diesel	ND		0.160	mg/L						
Lube Oil	ND		0.400	mg/L						
Mineral Oil	ND		0.160	mg/L						
Surrogate: n-Hexacosane			*46.9*	*ppm*	*50.0*		*93.9*	*50-150*		
LCS (BAE0650-BS1)					Prepared: 5/22/2020 Analyzed: 5/29/2020					
Diesel	0.861		0.160	mg/L	1.00		86.1	70-130		
Lube Oil	ND		0.400	mg/L				70-130		
Surrogate: n-Hexacosane			*47.2*	*ppm*	*50.0*		*94.5*	*50-150*		
Duplicate (BAE0650-DUP1)		**Source: WAE0525-02**			Prepared: 5/22/2020 Analyzed: 5/29/2020					
Diesel	ND		0.160	mg/L		ND				20
Lube Oil	ND		0.400	mg/L		ND				20
Mineral Oil	ND		0.160	mg/L		ND				20
Surrogate: n-Hexacosane			*47.9*	*ppm*	*50.0*		*95.7*	*50-150*		

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Chain of Custody Record

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Anatek Log-In #

WAE0702

Due: 06/05/20

Company Name: Spokane County	Project Manager: Jake Saxon
Address: 1026 W. Broadway Avenue	Project Name & # : Sand Filter
City: Spokane State: WA Zip: 99260	Email Address : JSAXON@spokanecounty.org
Phone: (509) 477-7245	Purchase Order #:
Fax:	Sampler Name & phone: (509)995-0557

Turn Arou

Please refer to ou
http://www.anateklabs.com/services/guidelines/reporting.asp

__Normal
__Next Day*
__2nd Day*
__Other*_____

*All rush order requests must be prior approved.

__Phone
__Mail
__Fax
x Email

Provide Sample Description

stormwater influent and effluent

List Analyses Requested

Lab ID	Sample Identification	Sampling Date/Time	Matrix	# of Containers	Sample Volume	TSS SM 2540D	Cu Zn Fe Total EPA 200.8 ICP/MS	Cu Zn Fe Dissolved EPA 200.8 ICP/MS	NWTPH, Ecology NWTPH-Dx	Hardness as CaCO3 SM 2340B ICP	Ortho-phosphate SM 4500-P G	Total Phosphorus SM 4500-P F
				Preservative:								
	INF05202020	05/21/2020 8:30am	water			x	x	x	x	x	x	x
	EFF05202020	05/21/2020 8:30am	water			x	x	x	x	x	x	x

Note Special Instructions/Comments

Please send results to Jake Saxon
JSAXON@spokanecounty.org and
Aimee Navickis-Brasch
aimeen@osbornconsulting.com

SWBS

Inspection Checklist

Received Intact? Y N
Labels & Chains Agree? Y N
Containers Sealed? Y N
VOC Head Space? Y N

h/c li

Temperature (°C): 7.6 D167
Preservative: HCl 2001180 <2
H_2SO_4 2001181 <2 HNO3 2000944 <2
Date & Time: 5-21-20 1445
Inspected By: kk/cg
pH 2001015

	Printed Name	Signature	Company	Date	Time
Relinquished by	Taylor Hoffman-Ballard	Taylor Hoffman-Ballard	OCI	5/21/20	12:45p
Received by	Tracy Martinez	Tracy Martinez	Anatek Labs	5/21/20	1245
Relinquished by					
Received by					
Relinquished by					
Received by					

Form COC01.00 - Eff 1 Mar 2015

Page 1 of 1

Samples submitted to Anatek Labs may be subcontracted to other accredited labs if necessary. This message serves as notice of this possibility. Sub-contracted analyses will be clearly noted on the analytical report.

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Client:	Spokane County	Work Order:	WAF0003
Address:	1026 W. Broadway Ave.	Project:	Sand Filter
	Spokane, WA 99260-0430	Reported:	6/25/2020 15:55
Attn:	Jake Saxon		

Analytical Results Report

Sample Location:	INF05302020		
Lab/Sample Number:	WAF0003-01	Collect Date:	05/31/20 15:15
Date Received:	06/01/20 09:00	Collected By:	
Matrix:	Water		

Analyte	Result	Units	PQL	Analyzed	Analyst	Method	Qualifier
Inorganics							
Hardness	11.8	mg CaCO3/L	6.00	6/11/20 9:45	NDE	SM 2340 C	
Phosphate/P	0.0692	mg/L	0.0180	6/2/20 11:48	TLM	SM 4500-P G	
Total P	0.642	mg/L	0.300	6/10/20 11:20	TLM	SM 4500-P H	
TSS	50.0	mg/L	1.00	6/5/20 11:00	BAS	SM 2540 D	
Metals by ICP-MS							
Copper	0.00497	mg/L	0.00100	6/19/20 14:49	TRC	EPA 200.8	
Dissolved Copper	0.00302	mg/L	0.00100	6/24/20 13:59	TRC	EPA 200.8	
Iron	0.704	mg/L	0.0100	6/22/20 12:33	TRC	EPA 200.8	
Dissolved Iron	0.0894	mg/L	0.0100	6/24/20 13:59	TRC	EPA 200.8	
Zinc	0.0363	mg/L	0.00100	6/19/20 14:49	TRC	EPA 200.8	
Dissolved Zinc	0.0206	mg/L	0.00100	6/24/20 13:59	TRC	EPA 200.8	
Hydrocarbons							
Lube Oil	ND	mg/L	0.400	6/12/20 17:44	ARC	NWTPH-Dx	
Mineral Oil	ND	mg/L	0.160	6/12/20 17:44	ARC	NWTPH-Dx	
Diesel	ND	mg/L	0.160	6/12/20 17:44	ARC	NWTPH-Dx	
Surrogate: n-Hexacosane	*82.7%*		*50-150*	*6/12/20 17:44*	*ARC*	*NWTPH-Dx*	

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Analytical Results Report

(Continued)

Sample Location: EFF05302020
Lab/Sample Number: WAF0003-02 Collect Date: 05/31/20 15:15
Date Received: 06/01/20 09:00 Collected By:
Matrix: Water

Analyte	Result	Units	PQL	Analyzed	Analyst	Method	Qualifier
Inorganics							
Hardness	22.5	mg CaCO3/L	6.00	6/11/20 9:45	NDE	SM 2340 C	
Phosphate/P	0.128	mg/L	0.0180	6/2/20 11:50	TLM	SM 4500-P G	
Total P	0.450	mg/L	0.300	6/10/20 11:22	TLM	SM 4500-P H	
TSS	16.0	mg/L	1.00	6/5/20 11:00	BAS	SM 2540 D	
Metals by ICP-MS							
Copper	0.00578	mg/L	0.00100	6/19/20 14:51	TRC	EPA 200.8	
Dissolved Copper	0.00450	mg/L	0.00100	6/24/20 14:01	TRC	EPA 200.8	
Iron	0.499	mg/L	0.0100	6/22/20 12:36	TRC	EPA 200.8	
Dissolved Iron	0.0965	mg/L	0.0100	6/24/20 14:01	TRC	EPA 200.8	
Zinc	0.0253	mg/L	0.00100	6/19/20 14:51	TRC	EPA 200.8	
Dissolved Zinc	0.0192	mg/L	0.00100	6/24/20 14:01	TRC	EPA 200.8	
Hydrocarbons							
Lube Oil	ND	mg/L	0.400	6/12/20 20:33	ARC	NWTPH-Dx	
Mineral Oil	ND	mg/L	0.160	6/12/20 20:33	ARC	NWTPH-Dx	
Diesel	ND	mg/L	0.160	6/12/20 20:33	ARC	NWTPH-Dx	
Surrogate: n-Hexacosane	*89.6%*		*50-150*	*6/12/20 20:33*	*ARC*	*NWTPH-Dx*	

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Analytical Results Report

(Continued)

Sample Location:	INF05302020-DI		
Lab/Sample Number:	WAF0003-03	Collect Date:	05/31/20 15:15
Date Received:	06/01/20 09:00	Collected By:	
Matrix:	Water		

Analyte	Result	Units	PQL	Analyzed	Analyst	Method	Qualifier
Metals by ICP-MS							
Dissolved Copper	<0.00007	mg/L	0.00100	6/24/20 14:03	TRC	EPA 200.8	
Dissolved Iron	<0.00397	mg/L	0.0100	6/24/20 14:03	TRC	EPA 200.8	
Dissolved Zinc	0.0189	mg/L	0.00100	6/24/20 14:03	TRC	EPA 200.8	

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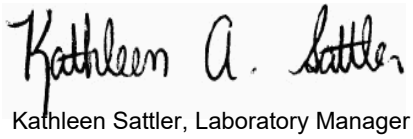
Analytical Results Report

(Continued)

Sample Location:	EFF05302020-DI		
Lab/Sample Number:	WAF0003-04	Collect Date:	05/31/20 15:15
Date Received:	06/01/20 09:00	Collected By:	
Matrix:	Water		

Analyte	Result	Units	PQL	Analyzed	Analyst	Method	Qualifier
Metals by ICP-MS							
Dissolved Copper	<0.00007	mg/L	0.00100	6/24/20 14:06	TRC	EPA 200.8	
Dissolved Iron	<0.00397	mg/L	0.0100	6/24/20 14:06	TRC	EPA 200.8	
Dissolved Zinc	0.0157	mg/L	0.00100	6/24/20 14:06	TRC	EPA 200.8	

Authorized Signature,



Kathleen Sattler, Laboratory Manager

M1	Matrix spike recovery was high; the associated blank spike recovery was acceptable. Potential matrix effect
M2	Matrix spike recovery was low; the associated blank spike recovery was acceptable. Potential matrix effect.
PQL	Practical Quantitation Limit
ND	Not Detected
MCL	EPA's Maximum Contaminant Level
Dry	Sample results reported on a dry weight basis
*	Not a certified analyte
RPD	Relative Percent Difference
%REC	Percent Recovery
Source	Sample that was spiked or duplicated.

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Certifications

Code	Description	Facility	Number
W WA DOE	Washington Department of Ecology	Anatek-Spokane, WA	C585

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Quality Control Data

Inorganics

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAF0152 - W FIA										
Blank (BAF0152-BLK1)					Prepared & Analyzed: 6/2/2020					
Phosphate/P	ND		0.0180	mg/L						
LCS (BAF0152-BS1)					Prepared & Analyzed: 6/2/2020					
Phosphate/P	0.100		0.0180	mg/L	0.100		100	85-115		
LCS Dup (BAF0152-BSD1)					Prepared & Analyzed: 6/2/2020					
Phosphate/P	0.103		0.0180	mg/L	0.100		103	85-115	2.76	20
Batch: BAF0246 - W Filtration										
Blank (BAF0246-BLK1)					Prepared & Analyzed: 6/5/2020					
TSS	ND		1.00	mg/L						
Blank (BAF0246-BLK2)					Prepared & Analyzed: 6/5/2020					
TSS	ND		1.00	mg/L						
Blank (BAF0246-BLK3)					Prepared & Analyzed: 6/5/2020					
TSS	ND		1.00	mg/L						
Blank (BAF0246-BLK4)					Prepared & Analyzed: 6/5/2020					
TSS	ND		1.00	mg/L						
LCS (BAF0246-BS1)					Prepared & Analyzed: 6/5/2020					
TSS	99.0			mg/L	100		99.0	90-110		
LCS (BAF0246-BS2)					Prepared & Analyzed: 6/5/2020					
TSS	98.0			mg/L	100		98.0	90-110		

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Quality Control Data
(Continued)

Inorganics (Continued)

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAF0246 - W Filtration (Continued)										
LCS Dup (BAF0246-BSD1)					Prepared & Analyzed: 6/5/2020					
TSS	100			mg/L	100		100	90-110	1.01	10
LCS Dup (BAF0246-BSD2)					Prepared & Analyzed: 6/5/2020					
TSS	102			mg/L	100		102	90-110	4.00	10
Duplicate (BAF0246-DUP1)		**Source: MAF0054-02**			Prepared & Analyzed: 6/5/2020					
TSS	6.00		1.00	mg/L		7.00			15.4	20
Duplicate (BAF0246-DUP2)		**Source: WAF0152-01**			Prepared & Analyzed: 6/5/2020					
TSS	7.00		1.00	mg/L		4.00			54.5	20
Matrix Spike (BAF0246-MS1)		**Source: MAF0052-01**			Prepared & Analyzed: 6/5/2020					
TSS	100		2.00	mg/L	100	ND	100	80-120		
Matrix Spike (BAF0246-MS2)		**Source: WAF0131-01**			Prepared & Analyzed: 6/5/2020					
TSS	100		2.00	mg/L	100	7.00	93.0	80-120		
Matrix Spike Dup (BAF0246-MSD1)		**Source: MAF0052-01**			Prepared & Analyzed: 6/5/2020					
TSS	102		2.00	mg/L	100	ND	102	80-120	1.98	20
Matrix Spike Dup (BAF0246-MSD2)		**Source: WAF0131-01**			Prepared & Analyzed: 6/5/2020					
TSS	104		2.00	mg/L	100	7.00	97.0	80-120	3.92	20
Batch: BAF0332 - W FIA										
Blank (BAF0332-BLK1)					Prepared & Analyzed: 6/10/2020					
Total P	ND		0.00500	mg/L						

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Quality Control Data
(Continued)

Inorganics (Continued)

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAF0332 - W FIA (Continued)										
Blank (BAF0332-BLK2)					Prepared & Analyzed: 6/10/2020					
Total P	ND		0.00500	mg/L						
Blank (BAF0332-BLK3)					Prepared & Analyzed: 6/10/2020					
Total P	ND		0.00500	mg/L						
LCS (BAF0332-BS1)					Prepared & Analyzed: 6/10/2020					
Total P	0.0982		0.00500	mg/L	0.100		98.2	90-110		
LCS (BAF0332-BS2)					Prepared & Analyzed: 6/10/2020					
Total P	0.0984		0.00500	mg/L	0.100		98.4	90-110		
Matrix Spike (BAF0332-MS1)		**Source: WAF0197-02**			Prepared & Analyzed: 6/10/2020					
Total P	0.165		0.00500	mg/L	0.100	0.0622	103	80-120		
Matrix Spike (BAF0332-MS2)		**Source: WAF0262-02**			Prepared & Analyzed: 6/10/2020					
Total P	0.160		0.00500	mg/L	0.100	0.0574	103	80-120		
Matrix Spike Dup (BAF0332-MSD1)		**Source: WAF0197-02**			Prepared & Analyzed: 6/10/2020					
Total P	0.165		0.00500	mg/L	0.100	0.0622	103	80-120	0.00	20
Matrix Spike Dup (BAF0332-MSD2)		**Source: WAF0262-02**			Prepared & Analyzed: 6/10/2020					
Total P	0.162		0.00500	mg/L	0.100	0.0574	104	80-120	1.06	20
Batch: BAF0364 - W Wet Chem										
Blank (BAF0364-BLK1)					Prepared & Analyzed: 6/11/2020					
Hardness	ND		3.00	mg CaCO3/L						

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Quality Control Data
(Continued)

Inorganics (Continued)

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAF0364 - W Wet Chem (Continued)										
LCS (BAF0364-BS1)					Prepared & Analyzed: 6/11/2020					
Hardness	99.0			mg CaCO3/L	100		99.0	90-110		
LCS Dup (BAF0364-BSD1)					Prepared & Analyzed: 6/11/2020					
Hardness	98.5			mg CaCO3/L	100		98.5	90-110	0.496	20
Duplicate (BAF0364-DUP1)		**Source: WAF0108-01**			Prepared & Analyzed: 6/11/2020					
Hardness	253		6.00	mg CaCO3/L		252			0.388	20
Matrix Spike (BAF0364-MS1)		**Source: WAE0894-01**			Prepared & Analyzed: 6/11/2020					
Hardness	284		12.0	mg CaCO3/L	100	182	102	80-120		
Matrix Spike Dup (BAF0364-MSD1)		**Source: WAE0894-01**			Prepared & Analyzed: 6/11/2020					
Hardness	282		12.0	mg CaCO3/L	100	182	100	80-120	0.692	20

Quality Control Data
(Continued)

Metals by ICP-MS

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAF0090 - W 3010 Digest										
Blank (BAF0090-BLK1)					Prepared: 6/3/2020 Analyzed: 6/24/2020					
Dissolved Copper	ND		0.00100	mg/L						
Dissolved Iron	ND		0.0100	mg/L						
Dissolved Zinc	ND		0.00100	mg/L						
LCS (BAF0090-BS1)					Prepared: 6/3/2020 Analyzed: 6/24/2020					
Dissolved Zinc	0.0489		0.00100	mg/L	0.0500		97.8	85-115		
Dissolved Iron	0.106		0.0100	mg/L	0.100		106	85-115		
Dissolved Copper	0.0480		0.00100	mg/L	0.0500		96.0	85-115		
Matrix Spike (BAF0090-MS1)		**Source: WAF0004-02**			Prepared: 6/3/2020 Analyzed: 6/24/2020					
Dissolved Zinc	0.250		0.00500	mg/L	0.250	0.00412	98.2	70-130		
Dissolved Iron	0.613		0.0500	mg/L	0.500	0.0984	103	70-130		
Dissolved Copper	0.246		0.00500	mg/L	0.250	0.00432	96.7	70-130		
Matrix Spike Dup (BAF0090-MSD1)		**Source: WAF0004-02**			Prepared: 6/3/2020 Analyzed: 6/24/2020					
Dissolved Zinc	0.246		0.00500	mg/L	0.250	0.00412	96.8	70-130	1.40	20
Dissolved Iron	0.729		0.0500	mg/L	0.500	0.0984	126	70-130	17.3	20
Dissolved Copper	0.242		0.00500	mg/L	0.250	0.00432	95.2	70-130	1.49	20
Batch: BAF0120 - W 3010 Digest										
Blank (BAF0120-BLK1)					Prepared: 6/3/2020 Analyzed: 6/22/2020					
Iron	ND		0.0100	mg/L						
Zinc	ND		0.00100	mg/L						
Copper	ND		0.00100	mg/L						
LCS (BAF0120-BS1)					Prepared: 6/3/2020 Analyzed: 6/22/2020					
Iron	0.101		0.0100	mg/L	0.100		101	85-115		
Zinc	0.0493		0.00100	mg/L	0.0500		98.6	85-115		

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Quality Control Data
(Continued)

Metals by ICP-MS (Continued)

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAF0120 - W 3010 Digest (Continued)										
LCS (BAF0120-BS1)					Prepared: 6/3/2020 Analyzed: 6/19/2020					
Copper	0.0481		0.00100	mg/L	0.0500		96.2	85-115		
Matrix Spike (BAF0120-MS1)		**Source: WAE0919-03**			Prepared: 6/3/2020 Analyzed: 6/22/2020					
Iron	4.52	M1	0.0100	mg/L	0.100	4.05	463	70-130		
Zinc	0.0560		0.00100	mg/L	0.0500	0.0133	85.4	70-130		
Copper	0.0470		0.00100	mg/L	0.0500	0.00631	81.3	70-130		
Matrix Spike (BAF0120-MS2)		**Source: WAE0919-14**			Prepared: 6/3/2020 Analyzed: 6/19/2020					
Zinc	0.0466	M2	0.00100	mg/L	0.0500	0.0136	66.0	70-130		
Iron	1.10	M2	0.0100	mg/L	0.100	5.94	NR	70-130		
Copper	0.0441		0.00100	mg/L	0.0500	0.00620	75.7	70-130		
Matrix Spike Dup (BAF0120-MSD1)		**Source: WAE0919-03**			Prepared: 6/3/2020 Analyzed: 6/19/2020					
Copper	0.0500		0.00100	mg/L	0.0500	0.00631	87.4	70-130	6.31	20
Iron	4.96	M1	0.0100	mg/L	0.100	4.05	910	70-130	9.43	20
Zinc	0.0600		0.00100	mg/L	0.0500	0.0133	93.4	70-130	6.90	20
Matrix Spike Dup (BAF0120-MSD2)		**Source: WAE0919-14**			Prepared: 6/3/2020 Analyzed: 6/19/2020					
Copper	0.0449		0.00100	mg/L	0.0500	0.00620	77.4	70-130	1.90	20
Zinc	0.0473	M2	0.00100	mg/L	0.0500	0.0136	67.5	70-130	1.55	20
Iron	1.16	M2	0.0100	mg/L	0.100	5.94	NR	70-130	5.23	20

Quality Control Data
(Continued)

Hydrocarbons

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAF0399 - W TPH-Dx										
Blank (BAF0399-BLK1)					Prepared: 6/11/2020 Analyzed: 6/12/2020					
Diesel	ND		0.160	mg/L						
Lube Oil	ND		0.400	mg/L						
Mineral Oil	ND		0.160	mg/L						
Surrogate: n-Hexacosane			*44.6*	*ppm*	*50.0*		*89.2*	*50-150*		
LCS (BAF0399-BS1)					Prepared: 6/11/2020 Analyzed: 6/12/2020					
Diesel	1.03		0.160	mg/L	1.00		103	70-130		
Lube Oil	ND		0.400	mg/L				70-130		
Surrogate: n-Hexacosane			*46.5*	*ppm*	*50.0*		*93.1*	*50-150*		
Duplicate (BAF0399-DUP1)		**Source: WAF0168-01**			Prepared: 6/11/2020 Analyzed: 6/13/2020					
Diesel	ND		0.160	mg/L		ND				20
Lube Oil	ND		0.400	mg/L		ND				20
Mineral Oil	ND		0.160	mg/L		ND				20
Surrogate: n-Hexacosane			*47.6*	*ppm*	*50.0*		*95.2*	*50-150*		
Matrix Spike (BAF0399-MS1)		**Source: WAF0003-01**			Prepared: 6/11/2020 Analyzed: 6/12/2020					
Diesel	0.901		0.160	mg/L	1.00	ND	90.1	70-130		
Lube Oil	ND		0.400	mg/L		ND		70-130		

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Quality Control Data
(Continued)

Hydrocarbons (Continued)

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAF0399 - W TPH-Dx (Continued)										
Matrix Spike (BAF0399-MS1)		**Source: WAF0003-01**			Prepared: 6/11/2020 Analyzed: 6/12/2020					
Surrogate: n-Hexacosane			*44.7*	*ppm*	*50.0*		*89.4*	*50-150*		
Matrix Spike Dup (BAF0399-MSD1)		**Source: WAF0003-01**			Prepared: 6/11/2020 Analyzed: 6/12/2020					
Diesel	0.759		0.160	mg/L	1.00	ND	75.9	70-130	17.2	20
Lube Oil	ND		0.400	mg/L		ND		70-130		20
Surrogate: n-Hexacosane			*42.3*	*ppm*	*50.0*		*84.6*	*50-150*		

Anatek Labs, Inc.

Chain of Custody Record

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Anatek Log-In #

WAF0003

Due: 06/15/20

Company Name:	Spokane County	Project Manager:	Jake Saxon
Address:	1026 W. Broadway Avenue	Project Name & # :	Sand Filter
City: Spokane State: WA Zip: 99260		Email Address :	JSAXON@spokanecounty.org
Phone:	(509) 477-7245	Purchase Order #:	
Fax:		Sampler Name & phone:	(509)995-0557

Turn Around

Please refer to our normal turn around times at:
http://www.anateklabs.com/services/guidelines/reporting.asp

__Normal
__Next Day*
__2nd Day*
__Other*_____

*All rush order requests must be prior approved.

__Phone
__Mail
__Fax
x Email

Provide Sample Description

stormwater influent and effluent

List Analyses Requested

Lab ID	Sample Identification	Sampling Date/Time	Matrix	# of Containers	Sample Volume	TSS SM 2540D	Cu Zn Fe Total EPA 200.8 ICP/MS	Cu Zn Fe Dissolved EPA 200.8 ICP/MS	NWTPH, Ecology NWTPH-Dx	Hardness as CaCO3 SM 2340B ICP	Ortho-phosphate SM 4500-P G	Total Phosphorus SM 4500-P F
				Preservative:								
	INF05302020	05/31/2020 15:15	water			x	x	x	x	x	x	x
	EFF05302020	05/31/2020 15:15	water			x	x	x	x	x	x	x
	INF05302020-DI	05/31/2020 15:15	water					x				
	EFF05302020-DI	05/31/2020 15:15	water					x				

Note Special Instructions/Comments

Please send results to Jake Saxon
JSAXON@spokanecounty.org and
Aimee Navickis-Brasch
aimeen@osbornconsulting.com

Inspection Checklist

Received Intact?	(Y)	N
Labels & Chains Agree?	(Y)	N
Containers Sealed?	(Y)	N
VOC Head Space?	Y	N

N/I/C

Temperature (°C): 5.7 dig-07
Preservative: HNO_3 2000994 <2
H_2SO_4 (lab pres) 2001181 <2
Date & Time: 6-1-20 1230
Inspected By: MW
pH 2001015

	Printed Name	Signature	Company	Date	Time
Relinquished by	Taylor Hoffman-Ballard	Taylor Hoffman Ballard	OCI	6/1/2020	9:00a
Received by	Aimee Younger		anatek	6/1/20	9:00am
Relinquished by					
Received by					
Relinquished by					
Received by					

Form COC01.00 - Eff 1 Mar 2015

Page 1 of 1

Samples submitted to Anatek Labs may be subcontracted to other accredited labs if necessary. This message serves as notice of this possibility. Sub-contracted analyses will be clearly noted on the analytical report.

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Client:	Spokane County	Work Order:	WAF0586
Address:	1026 W. Broadway Ave.	Project:	Sand Filter
	Spokane, WA 99260-0430	Reported:	7/1/2020 14:15
Attn:	Jake Saxon		

Analytical Results Report

Sample Location:	INF06142020		
Lab/Sample Number:	WAF0586-01	Collect Date:	06/15/20 07:00
Date Received:	06/15/20 13:30	Collected By:	
Matrix:	Water		

Analyte	Result	Units	PQL	Analyzed	Analyst	Method	Qualifier
Inorganics							
Hardness	16.7	mg CaCO3/L	3.00	6/23/20 10:00	NDE	SM 2340 C	
TSS	58.0	mg/L	2.00	6/19/20 8:45	BAS	SM 2540 D	
Metals by ICP-MS							
Copper	0.00786	mg/L	0.00100	6/26/20 16:30	TRC	EPA 200.8	
Dissolved Copper	0.00312	mg/L	0.00100	6/30/20 14:08	TRC	EPA 200.8	
Iron	1.45	mg/L	0.0100	6/26/20 16:30	TRC	EPA 200.8	M1
Dissolved Iron	0.0580	mg/L	0.0100	6/30/20 14:08	TRC	EPA 200.8	
Zinc	0.0494	mg/L	0.00100	6/26/20 16:30	TRC	EPA 200.8	
Dissolved Zinc	0.0563	mg/L	0.00100	6/30/20 14:08	TRC	EPA 200.8	

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Analytical Results Report

(Continued)

Sample Location: EFF06142020
Lab/Sample Number: WAF0586-02 Collect Date: 06/15/20 07:00
Date Received: 06/15/20 13:30 Collected By:
Matrix: Water

Analyte	Result	Units	PQL	Analyzed	Analyst	Method	Qualifier
Inorganics							
Hardness	23.5	mg CaCO3/L	3.00	6/23/20 10:00	NDE	SM 2340 C	
TSS	16.0	mg/L	1.00	6/19/20 8:45	BAS	SM 2540 D	
Metals by ICP-MS							
Copper	0.00492	mg/L	0.00100	6/26/20 16:32	TRC	EPA 200.8	
Dissolved Copper	0.00338	mg/L	0.00100	6/30/20 14:11	TRC	EPA 200.8	
Iron	0.634	mg/L	0.0100	6/26/20 16:32	TRC	EPA 200.8	M1
Dissolved Iron	0.0404	mg/L	0.0100	6/30/20 14:11	TRC	EPA 200.8	
Zinc	0.0165	mg/L	0.00100	6/26/20 16:32	TRC	EPA 200.8	
Dissolved Zinc	0.0549	mg/L	0.00100	6/30/20 14:11	TRC	EPA 200.8	

Authorized Signature,

Karice Scott For Kathleen Sattler, Laboratory Manager

M1	Matrix spike recovery was high; the associated blank spike recovery was acceptable. Potential matrix effect
PQL	Practical Quantitation Limit
ND	Not Detected
MCL	EPA's Maximum Contaminant Level
Dry	Sample results reported on a dry weight basis
*	Not a certified analyte
RPD	Relative Percent Difference
%REC	Percent Recovery
Source	Sample that was spiked or duplicated.

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Certifications

Code	Description	Facility	Number
W WA DOE	Washington Department of Ecology	Anatek-Spokane, WA	C585

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Quality Control Data

Inorganics

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAF0623 - W Wet Chem										
Blank (BAF0623-BLK1)					Prepared: 6/18/2020 Analyzed: 6/23/2020					
Hardness	ND		3.00	mg CaCO3/L						
Blank (BAF0623-BLK2)					Prepared: 6/18/2020 Analyzed: 6/23/2020					
Hardness	ND		3.00	mg CaCO3/L						
LCS (BAF0623-BS1)					Prepared: 6/18/2020 Analyzed: 6/23/2020					
Hardness	99.5			mg CaCO3/L	100		99.5	90-110		
LCS Dup (BAF0623-BSD1)					Prepared: 6/18/2020 Analyzed: 6/23/2020					
Hardness	98.5			mg CaCO3/L	100		98.5	90-110	0.990	20
Duplicate (BAF0623-DUP1)		**Source: WAF0653-01**			Prepared: 6/18/2020 Analyzed: 6/23/2020					
Hardness	13.7		3.00	mg CaCO3/L		14.2			3.51	20
Matrix Spike (BAF0623-MS1)		**Source: WAF0441-01**			Prepared: 6/18/2020 Analyzed: 6/23/2020					
Hardness	110		6.00	mg CaCO3/L	100	10.3	99.5	80-120		
Matrix Spike Dup (BAF0623-MSD1)		**Source: WAF0441-01**			Prepared: 6/18/2020 Analyzed: 6/23/2020					
Hardness	108		6.00	mg CaCO3/L	100	10.3	97.5	80-120	1.80	20
Batch: BAF0768 - W Filtration										
Blank (BAF0768-BLK1)					Prepared & Analyzed: 6/19/2020					
TSS	ND		1.00	mg/L						
Blank (BAF0768-BLK2)					Prepared & Analyzed: 6/19/2020					
TSS	ND		1.00	mg/L						

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Quality Control Data
(Continued)

Inorganics (Continued)

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAF0768 - W Filtration (Continued)										
Blank (BAF0768-BLK3)					Prepared & Analyzed: 6/19/2020					
TSS	ND		1.00	mg/L						
Blank (BAF0768-BLK4)					Prepared & Analyzed: 6/19/2020					
TSS	ND		1.00	mg/L						
LCS (BAF0768-BS1)					Prepared & Analyzed: 6/19/2020					
TSS	96.0			mg/L	100		96.0	90-110		
LCS (BAF0768-BS2)					Prepared & Analyzed: 6/19/2020					
TSS	98.0			mg/L	100		98.0	90-110		
LCS Dup (BAF0768-BSD1)					Prepared & Analyzed: 6/19/2020					
TSS	97.0			mg/L	100		97.0	90-110	1.04	10
LCS Dup (BAF0768-BSD2)					Prepared & Analyzed: 6/19/2020					
TSS	97.0			mg/L	100		97.0	90-110	1.03	10
Duplicate (BAF0768-DUP1)		**Source: MAF0582-04**			Prepared & Analyzed: 6/19/2020					
TSS	8.00		1.00	mg/L		8.00			0.00	20
Duplicate (BAF0768-DUP2)		**Source: WAF0611-02**			Prepared & Analyzed: 6/19/2020					
TSS	5.00		1.00	mg/L		5.00			0.00	20
Matrix Spike (BAF0768-MS1)		**Source: MAF0578-01**			Prepared & Analyzed: 6/19/2020					
TSS	104		2.00	mg/L	100	2.00	102	80-120		
Matrix Spike (BAF0768-MS2)		**Source: WAF0685-02**			Prepared & Analyzed: 6/19/2020					
TSS	108		2.00	mg/L	100	6.00	102	80-120		

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Quality Control Data
(Continued)

Inorganics (Continued)

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAF0768 - W Filtration (Continued)										
Matrix Spike Dup (BAF0768-MSD1)		**Source: MAF0578-01**			Prepared & Analyzed: 6/19/2020					
TSS	98.0		2.00	mg/L	100	2.00	96.0	80-120	5.94	20
Matrix Spike Dup (BAF0768-MSD2)		**Source: WAF0685-02**			Prepared & Analyzed: 6/19/2020					
TSS	94.0		2.00	mg/L	100	6.00	88.0	80-120	13.9	20

Quality Control Data
(Continued)

Metals by ICP-MS

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAF0544 - W 3010 Digest										
Blank (BAF0544-BLK1)					Prepared: 6/16/2020 Analyzed: 6/26/2020					
Copper	ND		0.00100	mg/L						
Zinc	ND		0.00100	mg/L						
Iron	0.0134	M1	0.0100	mg/L						
LCS (BAF0544-BS1)					Prepared: 6/16/2020 Analyzed: 6/26/2020					
Iron	0.115	M1	0.0100	mg/L	0.100		115	85-115		
Zinc	0.0468		0.00100	mg/L	0.0500		93.6	85-115		
Copper	0.0429		0.00100	mg/L	0.0500		85.8	85-115		
Matrix Spike (BAF0544-MS1)		**Source: WAF0407-08**			Prepared: 6/16/2020 Analyzed: 6/26/2020					
Copper	0.231		0.00500	mg/L	0.250	ND	92.6	70-130		
Iron	0.684	M1	0.0500	mg/L	0.500	ND	137	70-130		
Zinc	0.255		0.00500	mg/L	0.250	0.00901	98.4	70-130		
Matrix Spike Dup (BAF0544-MSD1)		**Source: WAF0407-08**			Prepared: 6/16/2020 Analyzed: 6/26/2020					
Copper	0.228		0.00500	mg/L	0.250	ND	91.1	70-130	1.57	20
Iron	0.549	M1	0.0500	mg/L	0.500	ND	110	70-130	21.9	20
Zinc	0.250		0.00500	mg/L	0.250	0.00901	96.2	70-130	2.10	20
Batch: BAF0587 - W 3010 Digest										
Blank (BAF0587-BLK1)					Prepared: 6/17/2020 Analyzed: 6/30/2020					
Dissolved Zinc	0.00156		0.00100	mg/L						
Dissolved Iron	ND		0.0100	mg/L						
Dissolved Copper	ND		0.00100	mg/L						
LCS (BAF0587-BS1)					Prepared: 6/17/2020 Analyzed: 6/30/2020					
Dissolved Copper	0.0454		0.00100	mg/L	0.0500		90.7	85-115		
Dissolved Iron	0.0959		0.0100	mg/L	0.100		95.9	85-115		
Dissolved Zinc	0.0463		0.00100	mg/L	0.0500		92.6	85-115		

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Quality Control Data
(Continued)

Metals by ICP-MS (Continued)

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAF0587 - W 3010 Digest (Continued)										
Matrix Spike (BAF0587-MS1)		**Source: WAF0640-06**			Prepared: 6/17/2020 Analyzed: 6/30/2020					
Dissolved Copper	0.243		0.00500	mg/L	0.250	0.00548	94.9	70-130		
Dissolved Iron	0.632		0.0500	mg/L	0.500	0.171	92.2	70-130		
Dissolved Zinc	0.312		0.00500	mg/L	0.250	0.0756	94.5	70-130		
Matrix Spike (BAF0587-MS2)		**Source: WAF0640-31**			Prepared: 6/17/2020 Analyzed: 6/30/2020					
Dissolved Copper	0.228		0.00500	mg/L	0.250	0.00234	90.4	70-130		
Dissolved Iron	0.491		0.0500	mg/L	0.500	0.0306	92.1	70-130		
Dissolved Zinc	0.252		0.00500	mg/L	0.250	0.0277	89.6	70-130		
Matrix Spike Dup (BAF0587-MSD1)		**Source: WAF0640-06**			Prepared: 6/17/2020 Analyzed: 6/30/2020					
Dissolved Copper	0.238		0.00500	mg/L	0.250	0.00548	93.0	70-130	2.02	20
Dissolved Iron	0.601		0.0500	mg/L	0.500	0.171	86.0	70-130	5.07	20
Dissolved Zinc	0.311		0.00500	mg/L	0.250	0.0756	94.2	70-130	0.194	20
Matrix Spike Dup (BAF0587-MSD2)		**Source: WAF0640-31**			Prepared: 6/17/2020 Analyzed: 6/30/2020					
Dissolved Copper	0.236		0.00500	mg/L	0.250	0.00234	93.3	70-130	3.20	20
Dissolved Iron	0.578		0.0500	mg/L	0.500	0.0306	109	70-130	16.3	20
Dissolved Zinc	0.261		0.00500	mg/L	0.250	0.0277	93.1	70-130	3.49	20

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Chain of Custody Record

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Anatek Log-In #

WAF0586

Due: 06/29/20

Company Name: Spokane County	Project Manager: Jake Saxon
Address: 1026 W. Broadway Avenue	Project Name & # : Sand Filter
City: Spokane State: WA Zip: 99260	Email Address : JSAXON@spokanecounty.org
Phone: (509) 477-7245	Purchase Order #:
Fax:	Sampler Name & phone: (509)995-0557

Turn Arou

Please refer to o
http://www.anateklabs.com/services/guidelines/reporting.asp

__Normal
__Next Day*
__2nd Day*
__Other*_____

*All rush order requests must be prior approved.

__Phone
__Mail
__Fax
x Email

Provide Sample Description

stormwater influent and effluent

List Analyses Requested

Lab ID	Sample Identification	Sampling Date/Time	Matrix	# of Containers	Sample Volume	TSS SM 2540D	Cu Zn Fe Total EPA 200.8 ICP/MS	Cu Zn Fe Dissolved EPA 200.8 ICP/MS	NWTPH-Ecology NWTPH-Dx	Hardness as CaCO3 SM 2340B ICP	Ortho-phosphate SM 4500-P G	Total Phosphorus SM 4500-P F			
Preservative:															
	INF06142020	06/15/2020 7:00	water	3		x	x	x	x	x					
	EFF06142020	06/15/2020 7:00	water	3		x	x	x	x	x					

Note Special Instructions/Comments

Please send results to Jake Saxon
JSAXON@spokanecounty.org and
Aimee Navickis-Brasch
aimeen@osbornconsulting.com

SW35

Inspection Checklist

Received Intact?	Y	N
Labels & Chains Agree?	Y	N
Containers Sealed?	Y	N
VOC Head Space?	Y	N

n/I/c

Temperature (°C): -0.2° dig-07
Preservative: HNO3 2000994 <2
pH 2001015
Date & Time: 6-15-20 1400
Inspected By: MG

	Printed Name	Signature	Company	Date	Time
Relinquished by	ASNBrasch	ASNBrasch	OCI	6/15/20	1:30p
Received by	Aunna Younger		anatek	6/15/20	13:30
Relinquished by					
Received by					
Relinquished by					
Received by					

Form COC01.00 - Eff 1 Mar 2015

Samples submitted to Anatek Labs may be subcontracted to other accredited labs if necessary. This message serves as notice of this possibility. Sub-contracted analyses will be clearly noted on the analytical report.

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Client:	Spokane County	Work Order:	WAF0653
Address:	1026 W. Broadway Ave.	Project:	Sand Filter
	Spokane, WA 99260-0430	Reported:	7/1/2020 14:16
Attn:	Jake Saxon		

Analytical Results Report

Sample Location:	INF06152020		
Lab/Sample Number:	WAF0653-01	Collect Date:	06/16/20 13:00
Date Received:	06/16/20 15:25	Collected By:	
Matrix:	Water		

Analyte	Result	Units	PQL	Analyzed	Analyst	Method	Qualifier
Inorganics							
Hardness	14.2	mg CaCO3/L	3.00	6/23/20 10:00	NDE	SM 2340 C	
TSS	19.0	mg/L	1.00	6/19/20 8:45	BAS	SM 2540 D	
Metals by ICP-MS							
Copper	0.00312	mg/L	0.00100	6/18/20 12:32	TRC	EPA 200.8	
Dissolved Copper	0.00173	mg/L	0.00100	6/30/20 14:30	TRC	EPA 200.8	
Zinc	0.0186	mg/L	0.00100	6/18/20 12:32	TRC	EPA 200.8	
Dissolved Zinc	0.0131	mg/L	0.00100	6/30/20 14:30	TRC	EPA 200.8	

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Analytical Results Report

(Continued)

Sample Location: EFF06152020
Lab/Sample Number: WAF0653-02 Collect Date: 06/16/20 13:00
Date Received: 06/16/20 15:25 Collected By:
Matrix: Water

Analyte	Result	Units	PQL	Analyzed	Analyst	Method	Qualifier
Inorganics							
Hardness	21.1	mg CaCO3/L	3.00	6/23/20 10:00	NDE	SM 2340 C	
TSS	12.0	mg/L	1.00	6/19/20 8:45	BAS	SM 2540 D	
Metals by ICP-MS							
Copper	0.00367	mg/L	0.00100	6/18/20 11:20	TRC	EPA 200.8	
Dissolved Copper	0.00289	mg/L	0.00100	6/30/20 14:32	TRC	EPA 200.8	
Zinc	0.0101	mg/L	0.00100	6/18/20 11:20	TRC	EPA 200.8	
Dissolved Zinc	0.0101	mg/L	0.00100	6/30/20 14:32	TRC	EPA 200.8	

Authorized Signature,

Karice Scott For Kathleen Sattler, Laboratory Manager

PQL	Practical Quantitation Limit
ND	Not Detected
MCL	EPA's Maximum Contaminant Level
Dry	Sample results reported on a dry weight basis
*	Not a certified analyte

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Certifications

Code	Description	Facility	Number
W WA DOE	Washington Department of Ecology	Anatek-Spokane, WA	C585

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Quality Control Data

Inorganics

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAF0623 - W Wet Chem										
Blank (BAF0623-BLK1)					Prepared: 6/18/2020 Analyzed: 6/23/2020					
Hardness	ND		3.00	mg CaCO3/L						
Blank (BAF0623-BLK2)					Prepared: 6/18/2020 Analyzed: 6/23/2020					
Hardness	ND		3.00	mg CaCO3/L						
LCS (BAF0623-BS1)					Prepared: 6/18/2020 Analyzed: 6/23/2020					
Hardness	99.5			mg CaCO3/L	100		99.5	90-110		
LCS Dup (BAF0623-BSD1)					Prepared: 6/18/2020 Analyzed: 6/23/2020					
Hardness	98.5			mg CaCO3/L	100		98.5	90-110	0.990	20
Duplicate (BAF0623-DUP1)		**Source: WAF0653-01**			Prepared: 6/18/2020 Analyzed: 6/23/2020					
Hardness	13.7		3.00	mg CaCO3/L		14.2			3.51	20
Matrix Spike (BAF0623-MS1)		**Source: WAF0441-01**			Prepared: 6/18/2020 Analyzed: 6/23/2020					
Hardness	110		6.00	mg CaCO3/L	100	10.3	99.5	80-120		
Matrix Spike Dup (BAF0623-MSD1)		**Source: WAF0441-01**			Prepared: 6/18/2020 Analyzed: 6/23/2020					
Hardness	108		6.00	mg CaCO3/L	100	10.3	97.5	80-120	1.80	20
Batch: BAF0768 - W Filtration										
Blank (BAF0768-BLK1)					Prepared & Analyzed: 6/19/2020					
TSS	ND		1.00	mg/L						
Blank (BAF0768-BLK2)					Prepared & Analyzed: 6/19/2020					
TSS	ND		1.00	mg/L						

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Quality Control Data
(Continued)

Inorganics (Continued)

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAF0768 - W Filtration (Continued)										
Blank (BAF0768-BLK3)					Prepared & Analyzed: 6/19/2020					
TSS	ND		1.00	mg/L						
Blank (BAF0768-BLK4)					Prepared & Analyzed: 6/19/2020					
TSS	ND		1.00	mg/L						
LCS (BAF0768-BS1)					Prepared & Analyzed: 6/19/2020					
TSS	96.0			mg/L	100		96.0	90-110		
LCS (BAF0768-BS2)					Prepared & Analyzed: 6/19/2020					
TSS	98.0			mg/L	100		98.0	90-110		
LCS Dup (BAF0768-BSD1)					Prepared & Analyzed: 6/19/2020					
TSS	97.0			mg/L	100		97.0	90-110	1.04	10
LCS Dup (BAF0768-BSD2)					Prepared & Analyzed: 6/19/2020					
TSS	97.0			mg/L	100		97.0	90-110	1.03	10
Duplicate (BAF0768-DUP1)		**Source: MAF0582-04**			Prepared & Analyzed: 6/19/2020					
TSS	8.00		1.00	mg/L		8.00			0.00	20
Duplicate (BAF0768-DUP2)		**Source: WAF0611-02**			Prepared & Analyzed: 6/19/2020					
TSS	5.00		1.00	mg/L		5.00			0.00	20
Matrix Spike (BAF0768-MS1)		**Source: MAF0578-01**			Prepared & Analyzed: 6/19/2020					
TSS	104		2.00	mg/L	100	2.00	102	80-120		
Matrix Spike (BAF0768-MS2)		**Source: WAF0685-02**			Prepared & Analyzed: 6/19/2020					
TSS	108		2.00	mg/L	100	6.00	102	80-120		

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Quality Control Data
(Continued)

Inorganics (Continued)

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAF0768 - W Filtration (Continued)										
Matrix Spike Dup (BAF0768-MSD1)		**Source: MAF0578-01**			Prepared & Analyzed: 6/19/2020					
TSS	98.0		2.00	mg/L	100	2.00	96.0	80-120	5.94	20
Matrix Spike Dup (BAF0768-MSD2)		**Source: WAF0685-02**			Prepared & Analyzed: 6/19/2020					
TSS	94.0		2.00	mg/L	100	6.00	88.0	80-120	13.9	20

Quality Control Data
(Continued)

Metals by ICP-MS

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAF0586 - W 3010 Digest										
Blank (BAF0586-BLK1)					Prepared: 6/17/2020 Analyzed: 6/18/2020					
Copper	ND		0.00100	mg/L						
Zinc	ND		0.00100	mg/L						
LCS (BAF0586-BS1)					Prepared: 6/17/2020 Analyzed: 6/18/2020					
Zinc	0.0493		0.00100	mg/L	0.0500		98.6	85-115		
Copper	0.0455		0.00100	mg/L	0.0500		91.0	85-115		
Matrix Spike (BAF0586-MS1)		**Source: WAF0653-02**			Prepared: 6/17/2020 Analyzed: 6/18/2020					
Zinc	0.242		0.00500	mg/L	0.250	0.0101	92.8	70-130		
Copper	0.231		0.00500	mg/L	0.250	0.00367	90.9	70-130		
Matrix Spike Dup (BAF0586-MSD1)		**Source: WAF0653-02**			Prepared: 6/17/2020 Analyzed: 6/18/2020					
Zinc	0.235		0.00500	mg/L	0.250	0.0101	89.8	70-130	3.18	20
Copper	0.222		0.00500	mg/L	0.250	0.00367	87.4	70-130	3.88	20
Batch: BAF0587 - W 3010 Digest										
Blank (BAF0587-BLK1)					Prepared: 6/17/2020 Analyzed: 6/30/2020					
Dissolved Zinc	0.00156		0.00100	mg/L						
Dissolved Copper	ND		0.00100	mg/L						
LCS (BAF0587-BS1)					Prepared: 6/17/2020 Analyzed: 6/30/2020					
Dissolved Zinc	0.0463		0.00100	mg/L	0.0500		92.6	85-115		
Dissolved Copper	0.0454		0.00100	mg/L	0.0500		90.7	85-115		
Matrix Spike (BAF0587-MS1)		**Source: WAF0640-06**			Prepared: 6/17/2020 Analyzed: 6/30/2020					
Dissolved Zinc	0.312		0.00500	mg/L	0.250	0.0756	94.5	70-130		
Dissolved Copper	0.243		0.00500	mg/L	0.250	0.00548	94.9	70-130		

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Quality Control Data
(Continued)

Metals by ICP-MS (Continued)

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAF0587 - W 3010 Digest (Continued)										
Matrix Spike (BAF0587-MS2)		**Source: WAF0640-31**			Prepared: 6/17/2020 Analyzed: 6/30/2020					
Dissolved Copper	0.228		0.00500	mg/L	0.250	0.00234	90.4	70-130		
Dissolved Zinc	0.252		0.00500	mg/L	0.250	0.0277	89.6	70-130		
Matrix Spike Dup (BAF0587-MSD1)		**Source: WAF0640-06**			Prepared: 6/17/2020 Analyzed: 6/30/2020					
Dissolved Copper	0.238		0.00500	mg/L	0.250	0.00548	93.0	70-130	2.02	20
Dissolved Zinc	0.311		0.00500	mg/L	0.250	0.0756	94.2	70-130	0.194	20
Matrix Spike Dup (BAF0587-MSD2)		**Source: WAF0640-31**			Prepared: 6/17/2020 Analyzed: 6/30/2020					
Dissolved Copper	0.236		0.00500	mg/L	0.250	0.00234	93.3	70-130	3.20	20
Dissolved Zinc	0.261		0.00500	mg/L	0.250	0.0277	93.1	70-130	3.49	20

WAF0653

Due: 07/01/20

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Chain of Custody Record

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Anatek Log-In #

Company Name: Spokane County	Project Manager: Jake Saxon
Address: 1026 W Broadway Avenue	Project Name & #: Sand Filter
City: Spokane State: WA Zip: 99260	Email Address: JSAXON@spokanecounty.org
Phone: (509)477-7245	Purchase Order #:
Fax:	Sampler Name & phone: (509)995-0557

Turn Around Time & Reporting

Please refer to our normal turn around times at:
http://www.anateklabs.com/services/guidelines/reporting.asp

__Normal
__Next Day*
__2nd Day*
__Other*_____

*All rush order requests must be prior approved.

__Phone
__Mail
__Fax
X Email

Provide Sample Description / **List Analyses Requested**

Lab ID	Sample Identification	Sampling Date/Time	Matrix	# of Containers	Sample Volume	Preservative:	TSS	Hardness	Dissolved Metals Cu, Zn	Total Metals Cu, Zn						
	INF061520	6/16/20 13:00	water	3			X	X	X	X						
	EFF061520	6/16/20 13:00	water	3			X	X	X	X						

Note Special Instructions/Comments

Please send results to Jake Saxon (JSAXON@spokanecounty.org) + Aimee Navickis-Brasch (aimeen@[redacted]osbornconsulting.com)

SUBS

Inspection Checklist

Received Intact?	(Y)	N
Labels & Chains Agree?	(Y)	N
Containers Sealed?	(Y)	N
VOC Head Space?	Y	N

Temperature (°C): 4.2° dig-07
Preservative: HNO3 2000994 K2
pH 2001015
Date & Time: 6-16-20 1630
Inspected By: MG

	Printed Name	Signature	Company	Date	Time
Relinquished by	Taylor Hoffman-Ballard	Taylor Hoffman Ballard	OCI	6/16/20	3:00
Received by	Aimee N. Brasch	ANBrasch	OCI	6/16/20	3:25
Relinquished by					
Received by	RSwift	RSwift	Anatek	6/16/20	1525
Relinquished by					
Received by					

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Client:	Spokane County	Work Order:	WAG0077
Address:	1026 W. Broadway Ave.	Project:	Sand Filter
	Spokane, WA 99260-0430	Reported:	7/16/2020 16:24
Attn:	Jake Saxon		

Analytical Results Report

Sample Location:	INF07012020		
Lab/Sample Number:	WAG0077-01	Collect Date:	07/01/20 14:00
Date Received:	07/02/20 11:25	Collected By:	
Matrix:	Water		

Analyte	Result	Units	PQL	Analyzed	Analyst	Method	Qualifier
Inorganics							
Hardness	16.9	mg CaCO3/L	3.00	7/13/20 11:15	NDE	SM 2340 C	
TSS	44.0	mg/L	1.00	7/4/20 10:00	BAS	SM 2540 D	
Metals by ICP-MS							
Copper	0.00880	mg/L	0.00100	7/13/20 17:06	TRC	EPA 200.8	
Dissolved Copper	0.00431	mg/L	0.00100	7/15/20 14:09	TRC	EPA 200.8	
Zinc	0.0601	mg/L	0.00100	7/13/20 17:06	TRC	EPA 200.8	
Dissolved Zinc	0.0326	mg/L	0.00100	7/15/20 14:09	TRC	EPA 200.8	
Hydrocarbons							
Lube Oil	ND	mg/L	0.400	7/15/20 18:10	ARC	NWTPH-Dx	
Mineral Oil	ND	mg/L	0.160	7/15/20 18:10	ARC	NWTPH-Dx	
Diesel	ND	mg/L	0.160	7/15/20 18:10	ARC	NWTPH-Dx	
Surrogate: n-Hexacosane	*73.8%*		*50-150*	*7/15/20 18:10*	*ARC*	*NWTPH-Dx*	

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Analytical Results Report

(Continued)

Sample Location: EFF07012020
Lab/Sample Number: WAG0077-02 Collect Date: 07/01/20 14:00
Date Received: 07/02/20 11:25 Collected By:
Matrix: Water

Analyte	Result	Units	PQL	Analyzed	Analyst	Method	Qualifier
Inorganics							
Hardness	29.4	mg CaCO3/L	3.00	7/13/20 11:15	NDE	SM 2340 C	
TSS	35.0	mg/L	1.00	7/4/20 10:00	BAS	SM 2540 D	
Metals by ICP-MS							
Copper	0.00682	mg/L	0.00100	7/13/20 17:08	TRC	EPA 200.8	
Dissolved Copper	0.00622	mg/L	0.00100	7/15/20 14:11	TRC	EPA 200.8	
Zinc	0.0219	mg/L	0.00100	7/13/20 17:08	TRC	EPA 200.8	
Dissolved Zinc	0.0263	mg/L	0.00100	7/15/20 14:11	TRC	EPA 200.8	
Hydrocarbons							
Lube Oil	ND	mg/L	0.400	7/15/20 19:05	ARC	NWTPH-Dx	
Mineral Oil	ND	mg/L	0.160	7/15/20 19:05	ARC	NWTPH-Dx	
Diesel	ND	mg/L	0.160	7/15/20 19:05	ARC	NWTPH-Dx	
Surrogate: n-Hexacosane	*72.3%*		*50-150*	*7/15/20 19:05*	*ARC*	*NWTPH-Dx*	

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Analytical Results Report

(Continued)

Sample Location:	INF07012020 -DI		
Lab/Sample Number:	WAG0077-03	Collect Date:	07/01/20 14:00
Date Received:	07/02/20 11:25	Collected By:	
Matrix:	Water		

Analyte	Result	Units	PQL	Analyzed	Analyst	Method	Qualifier
Metals by ICP-MS							
Dissolved Copper	0.00676	mg/L	0.00100	7/15/20 14:13	TRC	EPA 200.8	
Dissolved Zinc	0.0689	mg/L	0.00100	7/15/20 14:13	TRC	EPA 200.8	

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Analytical Results Report

(Continued)

Sample Location:	EFF07012020 -DI		
Lab/Sample Number:	WAG0077-04	Collect Date:	07/01/20 14:00
Date Received:	07/02/20 11:25	Collected By:	
Matrix:	Water		

Analyte	Result	Units	PQL	Analyzed	Analyst	Method	Qualifier
Metals by ICP-MS							
Dissolved Copper	0.00703	mg/L	0.00100	7/15/20 14:16	TRC	EPA 200.8	
Dissolved Zinc	0.0750	mg/L	0.00100	7/15/20 14:16	TRC	EPA 200.8	

Authorized Signature,

Karice Scott For Kathleen Sattler, Laboratory Manager

PQL	Practical Quantitation Limit
ND	Not Detected
MCL	EPA's Maximum Contaminant Level
Dry	Sample results reported on a dry weight basis
*	Not a certified analyte

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Certifications

Code	Description	Facility	Number
W WA DOE	Washington Department of Ecology	Anatek-Spokane, WA	C585

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Quality Control Data

Inorganics

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAG0168 - W Filtration										
Blank (BAG0168-BLK1)					Prepared & Analyzed: 7/4/2020					
TSS	ND		1.00	mg/L						
Blank (BAG0168-BLK2)					Prepared & Analyzed: 7/4/2020					
TSS	ND		1.00	mg/L						
Blank (BAG0168-BLK3)					Prepared & Analyzed: 7/4/2020					
TSS	ND		1.00	mg/L						
Blank (BAG0168-BLK4)					Prepared & Analyzed: 7/4/2020					
TSS	ND		1.00	mg/L						
LCS (BAG0168-BS1)					Prepared & Analyzed: 7/4/2020					
TSS	97.0			mg/L	100		97.0	90-110		
LCS (BAG0168-BS2)					Prepared & Analyzed: 7/4/2020					
TSS	98.0			mg/L	100		98.0	90-110		
LCS Dup (BAG0168-BSD1)					Prepared & Analyzed: 7/4/2020					
TSS	98.0			mg/L	100		98.0	90-110	1.03	10
LCS Dup (BAG0168-BSD2)					Prepared & Analyzed: 7/4/2020					
TSS	98.0			mg/L	100		98.0	90-110	0.00	10
Duplicate (BAG0168-DUP1)		**Source: WAG0005-01**			Prepared & Analyzed: 7/4/2020					
TSS	5.00		1.00	mg/L		5.00			0.00	20
Duplicate (BAG0168-DUP2)		**Source: WAG0015-01**			Prepared & Analyzed: 7/4/2020					
TSS	4.00		1.00	mg/L		4.00			0.00	20

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Quality Control Data
(Continued)

Inorganics (Continued)

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAG0168 - W Filtration (Continued)										
Matrix Spike (BAG0168-MS1)		**Source: MAF0924-02**			Prepared & Analyzed: 7/4/2020					
TSS	140		2.00	mg/L	100	57.0	83.0	80-120		
Matrix Spike (BAG0168-MS2)		**Source: WAG0064-02**			Prepared & Analyzed: 7/4/2020					
TSS	104		2.00	mg/L	100	4.00	100	80-120		
Matrix Spike Dup (BAG0168-MSD1)		**Source: MAF0924-02**			Prepared & Analyzed: 7/4/2020					
TSS	142		2.00	mg/L	100	57.0	85.0	80-120	1.42	20
Matrix Spike Dup (BAG0168-MSD2)		**Source: WAG0064-02**			Prepared & Analyzed: 7/4/2020					
TSS	102		2.00	mg/L	100	4.00	98.0	80-120	1.94	20
Batch: BAG0361 - W Wet Chem										
Blank (BAG0361-BLK1)					Prepared & Analyzed: 7/13/2020					
Hardness	ND		3.00	mg CaCO3/L						
Blank (BAG0361-BLK2)					Prepared & Analyzed: 7/13/2020					
Hardness	ND		3.00	mg CaCO3/L						
LCS (BAG0361-BS1)					Prepared & Analyzed: 7/13/2020					
Hardness	100			mg CaCO3/L	100		100	90-110		
LCS Dup (BAG0361-BSD1)					Prepared & Analyzed: 7/13/2020					
Hardness	100			mg CaCO3/L	100		100	90-110	0.00	20
Duplicate (BAG0361-DUP1)		**Source: WAG0280-01**			Prepared & Analyzed: 7/13/2020					
Hardness	1860		60.0	mg CaCO3/L		1860			0.00	20

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Quality Control Data
(Continued)

Inorganics (Continued)

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAG0361 - W Wet Chem (Continued)										
Matrix Spike (BAG0361-MS1)		**Source: WAG0350-01**			Prepared & Analyzed: 7/13/2020					
Hardness	207		12.0	mg CaCO3/L	100	105	101	80-120		
Matrix Spike Dup (BAG0361-MSD1)		**Source: WAG0350-01**			Prepared & Analyzed: 7/13/2020					
Hardness	203		12.0	mg CaCO3/L	100	105	97.5	80-120	1.94	20

Quality Control Data
(Continued)

Metals by ICP-MS

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAG0237 - W 3010 Digest										
Blank (BAG0237-BLK1)					Prepared: 7/9/2020 Analyzed: 7/13/2020					
Zinc	ND		0.00100	mg/L						
Copper	ND		0.00100	mg/L						
LCS (BAG0237-BS1)					Prepared: 7/9/2020 Analyzed: 7/13/2020					
Copper	0.0496		0.00100	mg/L	0.0500		99.3	85-115		
Zinc	0.0491		0.00100	mg/L	0.0500		98.1	85-115		
Matrix Spike (BAG0237-MS1)		**Source: WAG0079-01**			Prepared: 7/9/2020 Analyzed: 7/13/2020					
Zinc	0.0643		0.00100	mg/L	0.0500	0.0180	92.5	70-130		
Copper	0.0501		0.00100	mg/L	0.0500	0.00394	92.3	70-130		
Matrix Spike Dup (BAG0237-MSD1)		**Source: WAG0079-01**			Prepared: 7/9/2020 Analyzed: 7/13/2020					
Copper	0.0490		0.00100	mg/L	0.0500	0.00394	90.2	70-130	2.12	20
Zinc	0.0632		0.00100	mg/L	0.0500	0.0180	90.5	70-130	1.60	20
Batch: BAG0277 - W 3010 Digest										
Blank (BAG0277-BLK1)					Prepared: 7/10/2020 Analyzed: 7/15/2020					
Dissolved Copper	ND		0.00100	mg/L						
Dissolved Zinc	ND		0.00100	mg/L						
LCS (BAG0277-BS1)					Prepared: 7/10/2020 Analyzed: 7/15/2020					
Dissolved Copper	0.0516		0.00100	mg/L	0.0500		103	85-115		
Dissolved Zinc	0.0498		0.00100	mg/L	0.0500		99.7	85-115		
Matrix Spike (BAG0277-MS1)		**Source: WAG0077-02**			Prepared: 7/10/2020 Analyzed: 7/15/2020					
Dissolved Zinc	0.288		0.00500	mg/L	0.250	0.0263	105	70-130		
Dissolved Copper	0.250		0.00500	mg/L	0.250	0.00622	97.7	70-130		

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Quality Control Data
(Continued)

Metals by ICP-MS (Continued)

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAG0277 - W 3010 Digest (Continued)										
Matrix Spike (BAG0277-MS2)		**Source: WAG0205-01**			Prepared: 7/10/2020 Analyzed: 7/15/2020					
Dissolved Zinc	0.296		0.00500	mg/L	0.250	0.0443	101	70-130		
Dissolved Copper	0.260		0.00500	mg/L	0.250	0.00130	104	70-130		
Matrix Spike Dup (BAG0277-MSD1)		**Source: WAG0077-02**			Prepared: 7/10/2020 Analyzed: 7/15/2020					
Dissolved Zinc	0.282		0.00500	mg/L	0.250	0.0263	102	70-130	2.09	20
Dissolved Copper	0.246		0.00500	mg/L	0.250	0.00622	95.9	70-130	1.77	20
Matrix Spike Dup (BAG0277-MSD2)		**Source: WAG0205-01**			Prepared: 7/10/2020 Analyzed: 7/15/2020					
Dissolved Copper	0.257		0.00500	mg/L	0.250	0.00130	102	70-130	1.14	20
Dissolved Zinc	0.294		0.00500	mg/L	0.250	0.0443	100	70-130	0.699	20

Quality Control Data
(Continued)

Hydrocarbons

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAG0439 - W TPH-Dx										
Blank (BAG0439-BLK1)					Prepared: 7/14/2020 Analyzed: 7/15/2020					
Diesel	ND		0.160	mg/L						
Lube Oil	ND		0.400	mg/L						
Mineral Oil	ND		0.160	mg/L						
Surrogate: n-Hexacosane			*45.8*	*ppm*	*50.0*		*91.6*	*50-150*		
LCS (BAG0439-BS1)					Prepared: 7/14/2020 Analyzed: 7/15/2020					
Diesel	0.972		0.160	mg/L	1.00		97.2	70-130		
Lube Oil	ND		0.400	mg/L				70-130		
Surrogate: n-Hexacosane			*46.3*	*ppm*	*50.0*		*92.7*	*50-150*		

WAG0077

Due: 07/16/20

Anatek Labs, Inc.

Chain of Custody Record

1282 Alturas Drive, Moscow ID 83843 (208) 883-2839 FAX 882-9246
504 E Sprague Ste D, Spokane WA 99202 (509) 838-3999 FAX 838-4433

Anatek Log-In #

Company Name: Spokane County	Project Manager: Jake Saxon
Address: 1026 W. Broadway Avenue	Project Name & #: Sand Filter
City: Spokane State: WA Zip: 99260	Email Address: JSAXON@spokanecounty.org
Phone: (509) 477-7245	Purchase Order #:
Fax:	Sampler Name & phone: (509) 995-0557

Turn Around Time & Reporting

Please refer to our normal turn around times at:
http://www.anateklabs.com/services/guidelines/reporting.asp

__Normal
__Next Day*
__2nd Day*
__Other*_____

*All rush order requests must be prior approved.

__Phone
__Mail
__Fax
X Email

Provide Sample Description / **List Analyses Requested**

Lab ID	Sample Identification	Sampling Date/Time	Matrix	# of Containers	Sample Volume	Preservative:	TSS SM2540D	Cu Zn Total Metals	Cu Zn Diss Metals	Nutrients-Dx Ecology	Hardness as $CaCO_3$
	INF07012020	7/1/2020 2:00p	water	4			X	X	X	X	X
	EFF07012020	↓	↓	4			X	X	X	X	X
	INF07012020-DI			1					X		
	EFF07012020-DI			1					X		

Note Special Instructions/Comments

Please send results to Jake Saxon JSAXON@spokanecounty.org and Aimee Navickis-Brasch aimees@osbornconsulting.com

SWBS

	Printed Name	Signature	Company	Date	Time
Relinquished by	Taylor Hoffman-Ballard	Taylor Hoffman-Ballard	OCI	7/2/2020	11:25a
Received by			Anatek	7/2/20	1125
Relinquished by					
Received by					
Relinquished by					
Received by					

Inspection Checklist

Received Intact?	Y	N
Labels & Chains Agree?	Y	N
Containers Sealed?	Y	N
VOC Head Space?	Y	N

hd/Coolwice

Temperature (°C): 1.2° drg IR#1

Preservative: HNO3 200994 <2

pH 200105 HCl 200139 <2

Date & Time: 7-2-20 1340

Inspected By: MG

Materials Testing & Consulting, Inc.

Geotechnical Engineering • Special Inspection • Materials Testing • Environmental Consulting

Project:	Sand Filter	**Date Received:**	September 28, 2020
Project #:	20S091	**Sampled By:**	Others
Client :	Spokane County	**Date Tested:**	September 30, 2020
Source:	Multiple	**Tested By:**	B. Goble
MTC Sample#:	Multiple		

CASE NARRATIVE

1. Two samples were submitted for particle size distribution by laser diffraction according to TAPE 2011 Methods. These methods include running sediment concentration according to modified ASTM D3977, Method C.
2. There were no noted anomalies during this testing.

Reviewed by: E Gabriel Goble

Materials Testing & Consulting, Inc.

Geotechnical Engineering • Special Inspection • Materials Testing • Environmental Consulting

Project: Sand Filter
Project #: 20S091
Date Received: September 28, 2020
Date Tested: September 30, 2020

Client: Spokane County
Sampled by: Others
Tested by: B. Goble

Sediment Concentration per Size Fraction

TAPE 2011 / ASTM D3977 Method C

Sample Identification	Concentration of Coarse Fractions (mg/L)		Concentration of <62.5µm Fraction (mg/L)	Total Sample Concentration (mg/L)
	>250 µm	250 - 62.5 µm		
INF09232020	21.47	10.50	28.82	60.78
EFF09232020	1.60	4.79	28.33	34.71

Reviewed by: E Gabriel Goble

Corporate ~ 777 Chrysler Drive • Burlington, WA 98233 • Phone (360) 755-1990 • Fax (360) 755-1980
Regional Offices: Olympia ~ 360.534.9777 Bellingham ~ 360.647.6111 Silverdale ~ 360.698.6787 Tukwila ~ 206.241.1974
Visit our website: www.mtc-inc.net

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Client:	Spokane County	Work Order:	WAI0963
Address:	1026 W. Broadway Ave.	Project:	Sand Filter
	Spokane, WA 99260-0430	Reported:	10/13/2020 11:09
Attn:	Jake Saxon		

Analytical Results Report

Sample Location:	INF09232020		
Lab/Sample Number:	WAI0963-01	Collect Date:	09/24/20 11:00
Date Received:	09/24/20 15:45	Collected By:	
Matrix:	Water		

Analyte	Result	Units	PQL	Analyzed	Analyst	Method	Qualifier
Inorganics							
Hardness	61.4	mg CaCO3/L	12.0	10/6/20 7:30	ary	SM 2340 C	
Phosphate/P	0.349	mg/L	0.0180	9/25/20 9:11	TLM	SM 4500-P G	
Total P	0.654	mg/L	0.0500	9/30/20 16:10	TLM	SM 4500-P H	
TSS	56.0	mg/L	1.00	9/28/20 8:20	BAS	SM 2540 D	
Metals by ICP-MS							
Copper	0.0168	mg/L	0.00100	9/30/20 13:43	TRC	EPA 200.8	
Dissolved Copper	0.0133	mg/L	0.00100	9/30/20 13:28	TRC	EPA 200.8	
Iron	0.986	mg/L	0.0100	9/30/20 13:43	TRC	EPA 200.8	
Dissolved Iron	0.119	mg/L	0.0100	9/30/20 13:28	TRC	EPA 200.8	
Zinc	0.137	mg/L	0.00100	9/30/20 13:43	TRC	EPA 200.8	
Dissolved Zinc	0.110	mg/L	0.00100	9/30/20 13:28	TRC	EPA 200.8	
Hydrocarbons							
Lube Oil	1.14	mg/L	0.400	10/8/20 22:10	ARC	NWTPH-Dx	
Mineral Oil	ND	mg/L	0.160	10/8/20 22:10	ARC	NWTPH-Dx	
Diesel	1.22	mg/L	0.160	10/8/20 22:10	ARC	NWTPH-Dx	
Surrogate: n-Hexacosane	*85.5%*		*50-150*	*10/8/20 22:10*	*ARC*	*NWTPH-Dx*	

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Analytical Results Report

(Continued)

Sample Location: EFF09232020
Lab/Sample Number: WAI0963-02 Collect Date: 09/24/20 11:00
Date Received: 09/24/20 15:45 Collected By:
Matrix: Water

Analyte	Result	Units	PQL	Analyzed	Analyst	Method	Qualifier
Inorganics							
Hardness	40.3	mg CaCO3/L	3.00	10/6/20 7:30	ary	SM 2340 C	
Phosphate/P	0.430	mg/L	0.0180	9/25/20 9:12	TLM	SM 4500-P G	
Total P	0.619	mg/L	0.0500	9/30/20 16:13	TLM	SM 4500-P H	
TSS	47.0	mg/L	1.00	9/28/20 8:20	BAS	SM 2540 D	
Metals by ICP-MS							
Copper	0.0177	mg/L	0.00100	9/30/20 13:46	TRC	EPA 200.8	
Dissolved Copper	0.0158	mg/L	0.00100	9/30/20 13:31	TRC	EPA 200.8	
Iron	0.797	mg/L	0.0100	9/30/20 13:46	TRC	EPA 200.8	
Dissolved Iron	0.190	mg/L	0.0100	9/30/20 13:31	TRC	EPA 200.8	
Zinc	0.0592	mg/L	0.00100	9/30/20 13:46	TRC	EPA 200.8	
Dissolved Zinc	0.0491	mg/L	0.00100	9/30/20 13:31	TRC	EPA 200.8	
Hydrocarbons							
Lube Oil	1.04	mg/L	0.400	10/8/20 23:06	ARC	NWTPH-Dx	
Mineral Oil	ND	mg/L	0.160	10/8/20 23:06	ARC	NWTPH-Dx	
Diesel	1.30	mg/L	0.160	10/8/20 23:06	ARC	NWTPH-Dx	
Surrogate: n-Hexacosane	*92.8%*		*50-150*	*10/8/20 23:06*	*ARC*	*NWTPH-Dx*	

Authorized Signature,

Karice Scott For Kathleen Sattler, Laboratory Manager

PQL	Practical Quantitation Limit
ND	Not Detected
MCL	EPA's Maximum Contaminant Level
Dry	Sample results reported on a dry weight basis
*	Not a certified analyte

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Certifications

Code	Description	Facility	Number
W WA DOE	Washington Department of Ecology	Anatek-Spokane, WA	C585

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Quality Control Data

Inorganics

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAI0851 - W FIA										
Blank (BAI0851-BLK1)					Prepared & Analyzed: 9/25/2020					
Phosphate/P	ND		0.0180	mg/L						
LCS (BAI0851-BS1)					Prepared & Analyzed: 9/25/2020					
Phosphate/P	0.0954		0.0180	mg/L	0.100		95.4	85-115		
Matrix Spike (BAI0851-MS1)		**Source: WAI0862-02**			Prepared & Analyzed: 9/25/2020					
Phosphate/P	0.106		0.0180	mg/L	0.100	0.0197	86.0	80-120		
Matrix Spike Dup (BAI0851-MSD1)		**Source: WAI0862-02**			Prepared & Analyzed: 9/25/2020					
Phosphate/P	0.107		0.0180	mg/L	0.100	0.0197	87.2	80-120	1.13	20
Batch: BAI0910 - W Filtration										
Blank (BAI0910-BLK1)					Prepared & Analyzed: 9/28/2020					
TSS	ND		1.00	mg/L						
Blank (BAI0910-BLK2)					Prepared & Analyzed: 9/28/2020					
TSS	ND		1.00	mg/L						
Blank (BAI0910-BLK3)					Prepared & Analyzed: 9/28/2020					
TSS	ND		1.00	mg/L						
Blank (BAI0910-BLK4)					Prepared & Analyzed: 9/28/2020					
TSS	ND		1.00	mg/L						
LCS (BAI0910-BS1)					Prepared & Analyzed: 9/28/2020					
TSS	97.0			mg/L	100		97.0	90-110		

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Quality Control Data
(Continued)

Inorganics (Continued)

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAI0910 - W Filtration (Continued)										
LCS (BAI0910-BS2)					Prepared & Analyzed: 9/28/2020					
TSS	97.0			mg/L	100		97.0	90-110		
LCS Dup (BAI0910-BSD1)					Prepared & Analyzed: 9/28/2020					
TSS	98.0			mg/L	100		98.0	90-110	1.03	10
LCS Dup (BAI0910-BSD2)					Prepared & Analyzed: 9/28/2020					
TSS	92.0			mg/L	100		92.0	90-110	5.29	10
Duplicate (BAI0910-DUP1)		**Source: WAI0830-09**			Prepared & Analyzed: 9/28/2020					
TSS	<1		1.00	mg/L		ND				20
Duplicate (BAI0910-DUP2)		**Source: WAI0830-12**			Prepared & Analyzed: 9/28/2020					
TSS	<1		1.00	mg/L		ND				20
Matrix Spike (BAI0910-MS1)		**Source: WAI0784-01**			Prepared & Analyzed: 9/28/2020					
TSS	112		2.00	mg/L	100	6.00	106	80-120		
Matrix Spike (BAI0910-MS2)		**Source: WAI0903-02**			Prepared & Analyzed: 9/28/2020					
TSS	98.0		2.00	mg/L	100	2.00	96.0	80-120		
Matrix Spike Dup (BAI0910-MSD1)		**Source: WAI0784-01**			Prepared & Analyzed: 9/28/2020					
TSS	110		2.00	mg/L	100	6.00	104	80-120	1.80	20
Matrix Spike Dup (BAI0910-MSD2)		**Source: WAI0903-02**			Prepared & Analyzed: 9/28/2020					
TSS	98.0		2.00	mg/L	100	2.00	96.0	80-120	0.00	20
Batch: BAI0922 - W FIA										
Blank (BAI0922-BLK1)					Prepared & Analyzed: 9/30/2020					
Total P	ND		0.00500	mg/L						

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Quality Control Data
(Continued)

Inorganics (Continued)

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAI0922 - W FIA (Continued)										
Blank (BAI0922-BLK2)					Prepared & Analyzed: 9/30/2020					
Total P	ND		0.00500	mg/L						
Blank (BAI0922-BLK3)					Prepared & Analyzed: 9/30/2020					
Total P	ND		0.00500	mg/L						
LCS (BAI0922-BS1)					Prepared & Analyzed: 9/30/2020					
Total P	0.100		0.00500	mg/L	0.100		100	90-110		
LCS (BAI0922-BS2)					Prepared & Analyzed: 9/30/2020					
Total P	0.105		0.00500	mg/L	0.100		105	90-110		
Matrix Spike (BAI0922-MS1)		**Source: WAI0984-02**			Prepared & Analyzed: 9/30/2020					
Total P	0.143		0.00500	mg/L	0.100	0.0325	110	80-120		
Matrix Spike (BAI0922-MS2)		**Source: WAI0985-02**			Prepared & Analyzed: 9/30/2020					
Total P	0.136		0.00500	mg/L	0.100	0.0312	105	80-120		
Matrix Spike Dup (BAI0922-MSD1)		**Source: WAI0984-02**			Prepared & Analyzed: 9/30/2020					
Total P	0.138		0.00500	mg/L	0.100	0.0325	106	80-120	3.41	20
Matrix Spike Dup (BAI0922-MSD2)		**Source: WAI0985-02**			Prepared & Analyzed: 9/30/2020					
Total P	0.136		0.00500	mg/L	0.100	0.0312	105	80-120	0.147	20
Batch: BAJ0124 - W Wet Chem										
Blank (BAJ0124-BLK1)					Prepared: 10/5/2020 Analyzed: 10/6/2020					
Hardness	ND		3.00	mg CaCO3/L						

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Quality Control Data
(Continued)

Inorganics (Continued)

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAJ0124 - W Wet Chem (Continued)										
Blank (BAJ0124-BLK2)					Prepared: 10/5/2020 Analyzed: 10/6/2020					
Hardness	ND		3.00	mg CaCO3/L						
LCS (BAJ0124-BS1)					Prepared: 10/5/2020 Analyzed: 10/6/2020					
Hardness	101		3.00	mg CaCO3/L	100		101	90-110		
LCS Dup (BAJ0124-BSD1)					Prepared: 10/5/2020 Analyzed: 10/6/2020					
Hardness	98.9		3.00	mg CaCO3/L	100		98.9	90-110	1.92	20
Duplicate (BAJ0124-DUP1)		**Source: WAJ0094-01**			Prepared: 10/5/2020 Analyzed: 10/6/2020					
Hardness	159		6.00	mg CaCO3/L		163			2.38	20
Matrix Spike (BAJ0124-MS1)		**Source: WAI1016-02**			Prepared: 10/5/2020 Analyzed: 10/6/2020					
Hardness	140		6.00	mg CaCO3/L	100	45.1	95.0	80-120		
Matrix Spike Dup (BAJ0124-MSD1)		**Source: WAI1016-02**			Prepared: 10/5/2020 Analyzed: 10/6/2020					
Hardness	140		6.00	mg CaCO3/L	100	45.1	95.0	80-120	0.00	20

Quality Control Data
(Continued)

Metals by ICP-MS

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAI0792 - W 3010 Digest										
Blank (BAI0792-BLK1)					Prepared: 9/28/2020 Analyzed: 9/30/2020					
Zinc	ND		0.00100	mg/L						
Iron	ND		0.0100	mg/L						
Copper	ND		0.00100	mg/L						
LCS (BAI0792-BS1)					Prepared: 9/28/2020 Analyzed: 9/30/2020					
Copper	0.0473		0.00100	mg/L	0.0500		94.5	85-115		
Iron	0.113		0.0100	mg/L	0.100		113	85-115		
Zinc	0.0490		0.00100	mg/L	0.0500		97.9	85-115		
Matrix Spike (BAI0792-MS1)		**Source: WAI0722-01**			Prepared: 9/28/2020 Analyzed: 9/30/2020					
Copper	0.134		0.00100	mg/L	0.0500	0.0921	83.7	70-130		
Zinc	0.0903		0.00100	mg/L	0.0500	0.0441	92.4	70-130		
Iron	0.409		0.0100	mg/L	0.100	0.331	78.0	70-130		
Matrix Spike Dup (BAI0792-MSD1)		**Source: WAI0722-01**			Prepared: 9/28/2020 Analyzed: 9/30/2020					
Zinc	0.0914		0.00100	mg/L	0.0500	0.0441	94.5	70-130	1.16	20
Copper	0.136		0.00100	mg/L	0.0500	0.0921	87.3	70-130	1.33	20
Iron	0.412		0.0100	mg/L	0.100	0.331	81.8	70-130	0.918	20
Batch: BAI0794 - W 3010 Digest										
Blank (BAI0794-BLK1)					Prepared: 9/28/2020 Analyzed: 9/30/2020					
Dissolved Copper	ND		0.00100	mg/L						
Dissolved Zinc	ND		0.00100	mg/L						
Dissolved Iron	ND		0.0100	mg/L						

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Quality Control Data
(Continued)

Metals by ICP-MS (Continued)

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAI0794 - W 3010 Digest (Continued)										
LCS (BAI0794-BS1)					Prepared: 9/28/2020 Analyzed: 9/30/2020					
Dissolved Copper	0.0456		0.00100	mg/L	0.0500		91.2	85-115		
Dissolved Zinc	0.0465		0.00100	mg/L	0.0500		93.1	85-115		
Dissolved Iron	0.110		0.0100	mg/L	0.100		110	85-115		

Quality Control Data
(Continued)

Hydrocarbons

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAJ0057 - W TPH-Dx										
Blank (BAJ0057-BLK1)					Prepared: 10/7/2020 Analyzed: 10/8/2020					
Diesel	ND		0.160	mg/L						
Lube Oil	ND		0.400	mg/L						
Mineral Oil	ND		0.160	mg/L						
Surrogate: n-Hexacosane			*48.0*	*ppm*	*50.1*		*95.9*	*50-150*		
LCS (BAJ0057-BS1)					Prepared: 10/7/2020 Analyzed: 10/8/2020					
Diesel	0.931		0.160	mg/L	1.01		92.2	70-130		
Lube Oil	ND		0.400	mg/L				70-130		
Surrogate: n-Hexacosane			*45.0*	*ppm*	*50.1*		*89.7*	*50-150*		
Duplicate (BAJ0057-DUP1)		**Source: WAJ0055-02**			Prepared: 10/7/2020 Analyzed: 10/8/2020					
Diesel	ND		0.160	mg/L		ND				20
Lube Oil	ND		0.400	mg/L		ND				20
Mineral Oil	ND		0.160	mg/L		ND				20
Surrogate: n-Hexacosane			*47.5*	*ppm*	*50.1*		*94.9*	*50-150*		
Matrix Spike (BAJ0057-MS1)		**Source: WAJ0055-01**			Prepared: 10/7/2020 Analyzed: 10/8/2020					
Diesel	1.14		0.160	mg/L	1.01	ND	113	70-130		
Lube Oil	ND		0.400	mg/L		ND		70-130		
Surrogate: n-Hexacosane			*45.8*	*ppm*	*50.1*		*91.5*	*50-150*		
Matrix Spike Dup (BAJ0057-MSD1)		**Source: WAJ0055-01**			Prepared: 10/7/2020 Analyzed: 10/8/2020					
Diesel	1.14		0.160	mg/L	1.01	ND	113	70-130	0.124	20
Lube Oil	ND		0.400	mg/L		ND		70-130		20
Surrogate: n-Hexacosane			*46.0*	*ppm*	*50.1*		*91.9*	*50-150*		

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Anatek Log-In #

WAI0963

Due: 10/09/20

Company Name: Spokane County	Project Manager: Jake Saxon
Address: 1026 W. Broadway Avenue	Project Name & # : Sand Filter
City: Spokane State: WA Zip: 99260	Email Address : JSAXON@spokanecounty.org
Phone: (509) 477-7245	Purchase Order #:
Fax:	Sampler Name & phone: (509)995-0557

Turn Arou

Please refer to o
http://www.anateklabs.com/services/guidelines/reporting.asp

__Normal
__Next Day*
__2nd Day*
__Other*_____

*All rush order requests must be prior approved.

__Phone
__Mail
__Fax
x Email

Provide Sample Description

stormwater influent and effluent

List Analyses Requested

Lab ID	Sample Identification	Sampling Date/Time	Matrix	# of Containers	Sample Volume	TSS SM 2540D	Cu Zn Fe Total EPA 200.8 ICP/MS	Cu Zn Fe Dissolved EPA 200.8 ICP/MS	NWTPH, Ecology NWTPH-Dx	Hardness as CaCO3 SM 2340B ICP	Ortho-phosphate SM 4500-P G	Total Phosphorus SM 4500-P F
				Preservative:								
	INF09232020	9/24/2020 11:00am	water	6		x	x	x	x	x	x	x
	EFF09232020	9/24/2020 11:00am	water	6		x	x	x	x	x	x	x

Note Special Instructions/Comments

Please send results to Jake Saxon JSAXON@spokanecounty.org and Aimee Navickis-Brasch aimeen@osbornconsulting.com

SWPS

Inspection Checklist

Received Intact?	(Y)	N
Labels & Chains Agree?	(Y)	N
Containers Sealed?	(Y)	N
VOC Head Space?	~~Y~~	~~N~~

hd/c/1

Temperature (°C): 9.2 IR#1

Preservative: HCl 2001139<2 pH 2001045
H_2SO_4 2001181<2 HNO3-2000994<2

Date & Time: 9-25-20 1250

Inspected By: MG

	Printed Name	Signature	Company	Date	Time
Relinquished by	Megan Ehlebracht	Megan Ehlebracht	OCI	09/24/20	3:45
Received by	KScott	KScott	Anatek	9/24/20	1545
Relinquished by					
Received by					
Relinquished by					
Received by					

Form COC01.00 - Eff 1 Mar 2015

Page 1 of 1

Samples submitted to Anatek Labs may be subcontracted to other accredited labs if necessary. This message serves as notice of this possibility. Sub-contracted analyses will be clearly noted on the analytical report.

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504 E Sprague Ste. D - Spokane, WA 99202 - (509) 838-3999 - fax (509) 838-4433 - email spokane@anateklabs.com

Client:	Spokane County	Work Order:	WAI1016
Address:	1026 W. Broadway Ave.	Project:	Sand Filter
	Spokane, WA 99260-0430	Reported:	10/13/2020 11:09
Attn:	Jake Saxon		

Analytical Results Report

Sample Location:	INF092520		
Lab/Sample Number:	WAI1016-01	Collect Date:	09/26/20 08:30
Date Received:	09/28/20 14:37	Collected By:	
Matrix:	Water		

Analyte	Result	Units	PQL	Analyzed	Analyst	Method	Qualifier
Inorganics							
Hardness	48.0	mg CaCO3/L	6.00	10/6/20 7:30	ary	SM 2340 C	
TSS	78.0	mg/L	2.00	10/2/20 14:25	BAS	SM 2540 D	
Metals by ICP-MS							
Copper	0.0244	mg/L	0.00100	10/8/20 12:18	TRC	EPA 200.8	
Dissolved Copper	0.0126	mg/L	0.00100	10/8/20 11:25	TRC	EPA 200.8	
Iron	2.49	mg/L	0.0100	10/8/20 12:18	TRC	EPA 200.8	
Dissolved Iron	0.169	mg/L	0.0100	10/8/20 11:25	TRC	EPA 200.8	
Zinc	0.137	mg/L	0.00100	10/8/20 12:18	TRC	EPA 200.8	
Dissolved Zinc	0.0924	mg/L	0.00100	10/8/20 11:25	TRC	EPA 200.8	
Hydrocarbons							
Lube Oil	0.684	mg/L	0.400	10/9/20 0:02	ARC	NWTPH-Dx	
Mineral Oil	ND	mg/L	0.160	10/9/20 0:02	ARC	NWTPH-Dx	
Diesel	0.852	mg/L	0.160	10/9/20 0:02	ARC	NWTPH-Dx	
Surrogate: n-Hexacosane	*84.3%*		*50-150*	*10/9/20 0:02*	*ARC*	*NWTPH-Dx*	

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Analytical Results Report

(Continued)

Sample Location: EFF092520

Lab/Sample Number: WAI1016-02 Collect Date: 09/26/20 08:30

Date Received: 09/28/20 14:37 Collected By:

Matrix: Water

Analyte	Result	Units	PQL	Analyzed	Analyst	Method	Qualifier
Inorganics							
Hardness	45.1	mg CaCO3/L	3.00	10/6/20 7:30	ary	SM 2340 C	
TSS	21.0	mg/L	1.00	10/2/20 14:25	BAS	SM 2540 D	
Metals by ICP-MS							
Copper	0.0169	mg/L	0.00100	10/8/20 12:21	TRC	EPA 200.8	
Dissolved Copper	0.0120	mg/L	0.00100	10/8/20 11:27	TRC	EPA 200.8	
Iron	1.41	mg/L	0.0100	10/8/20 12:21	TRC	EPA 200.8	
Dissolved Iron	0.169	mg/L	0.0100	10/8/20 11:27	TRC	EPA 200.8	
Zinc	0.0425	mg/L	0.00100	10/8/20 12:21	TRC	EPA 200.8	
Dissolved Zinc	0.0333	mg/L	0.00100	10/8/20 11:27	TRC	EPA 200.8	
Hydrocarbons							
Lube Oil	0.566	mg/L	0.400	10/9/20 0:58	ARC	NWTPH-Dx	
Mineral Oil	ND	mg/L	0.160	10/9/20 0:58	ARC	NWTPH-Dx	
Diesel	0.579	mg/L	0.160	10/9/20 0:58	ARC	NWTPH-Dx	
Surrogate: n-Hexacosane	*82.2%*		*50-150*	*10/9/20 0:58*	*ARC*	*NWTPH-Dx*	

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Analytical Results Report

(Continued)

Sample Location:	INF092520-DI		
Lab/Sample Number:	WAI1016-03	Collect Date:	09/26/20 08:30
Date Received:	09/28/20 14:37	Collected By:	
Matrix:	Water		

Analyte	Result	Units	PQL	Analyzed	Analyst	Method	Qualifier
Metals by ICP-MS							
Dissolved Copper	0.00833	mg/L	0.00100	10/8/20 11:29	TRC	EPA 200.8	
Dissolved Iron	ND	mg/L	0.0100	10/8/20 11:29	TRC	EPA 200.8	
Dissolved Zinc	0.0734	mg/L	0.00100	10/8/20 11:29	TRC	EPA 200.8	

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Analytical Results Report

(Continued)

Sample Location:	EFF092520-DI		
Lab/Sample Number:	WAI1016-04	Collect Date:	09/26/20 08:30
Date Received:	09/28/20 14:37	Collected By:	
Matrix:	Water		

Analyte	Result	Units	PQL	Analyzed	Analyst	Method	Qualifier
Metals by ICP-MS							
Dissolved Copper	0.00599	mg/L	0.00100	10/8/20 11:32	TRC	EPA 200.8	
Dissolved Iron	ND	mg/L	0.0100	10/8/20 11:32	TRC	EPA 200.8	
Dissolved Zinc	0.0798	mg/L	0.00100	10/8/20 11:32	TRC	EPA 200.8	

Authorized Signature,

Karice Scott For Kathleen Sattler, Laboratory Manager

PQL	Practical Quantitation Limit
ND	Not Detected
MCL	EPA's Maximum Contaminant Level
Dry	Sample results reported on a dry weight basis
*	Not a certified analyte

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Certifications

Code	Description	Facility	Number
W WA DOE	Washington Department of Ecology	Anatek-Spokane, WA	C585

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Quality Control Data

Inorganics

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAJ0124 - W Wet Chem										
Blank (BAJ0124-BLK1)					Prepared: 10/5/2020 Analyzed: 10/6/2020					
Hardness	ND		3.00	mg CaCO3/L						
Blank (BAJ0124-BLK2)					Prepared: 10/5/2020 Analyzed: 10/6/2020					
Hardness	ND		3.00	mg CaCO3/L						
LCS (BAJ0124-BS1)					Prepared: 10/5/2020 Analyzed: 10/6/2020					
Hardness	101		3.00	mg CaCO3/L	100		101	90-110		
LCS Dup (BAJ0124-BSD1)					Prepared: 10/5/2020 Analyzed: 10/6/2020					
Hardness	98.9		3.00	mg CaCO3/L	100		98.9	90-110	1.92	20
Duplicate (BAJ0124-DUP1)		**Source: WAJ0094-01**			Prepared: 10/5/2020 Analyzed: 10/6/2020					
Hardness	159		6.00	mg CaCO3/L		163			2.38	20
Matrix Spike (BAJ0124-MS1)		**Source: WAI1016-02**			Prepared: 10/5/2020 Analyzed: 10/6/2020					
Hardness	140		6.00	mg CaCO3/L	100	45.1	95.0	80-120		
Matrix Spike Dup (BAJ0124-MSD1)		**Source: WAI1016-02**			Prepared: 10/5/2020 Analyzed: 10/6/2020					
Hardness	140		6.00	mg CaCO3/L	100	45.1	95.0	80-120	0.00	20
Batch: BAJ0151 - W Filtration										
Blank (BAJ0151-BLK1)					Prepared & Analyzed: 10/2/2020					
TSS	ND		1.00	mg/L						
Blank (BAJ0151-BLK2)					Prepared & Analyzed: 10/2/2020					
TSS	ND		1.00	mg/L						

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Quality Control Data
(Continued)

Inorganics (Continued)

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAJ0151 - W Filtration (Continued)										
Blank (BAJ0151-BLK3)					Prepared & Analyzed: 10/2/2020					
TSS	ND		1.00	mg/L						
Blank (BAJ0151-BLK4)					Prepared & Analyzed: 10/2/2020					
TSS	ND		1.00	mg/L						
LCS (BAJ0151-BS1)					Prepared & Analyzed: 10/2/2020					
TSS	102			mg/L	100		102	90-110		
LCS (BAJ0151-BS2)					Prepared & Analyzed: 10/2/2020					
TSS	98.0			mg/L	100		98.0	90-110		
LCS Dup (BAJ0151-BSD1)					Prepared & Analyzed: 10/2/2020					
TSS	96.0			mg/L	100		96.0	90-110	6.06	10
LCS Dup (BAJ0151-BSD2)					Prepared & Analyzed: 10/2/2020					
TSS	94.0			mg/L	100		94.0	90-110	4.17	10
Duplicate (BAJ0151-DUP1)		**Source: WAI1113-01**			Prepared & Analyzed: 10/2/2020					
TSS	1.00		1.00	mg/L		1.00			0.00	20
Duplicate (BAJ0151-DUP2)		**Source: WAJ0005-02**			Prepared & Analyzed: 10/2/2020					
TSS	1.00		1.00	mg/L		1.00			0.00	20
Matrix Spike (BAJ0151-MS1)		**Source: WAI1018-02**			Prepared & Analyzed: 10/2/2020					
TSS	124		2.00	mg/L	100	25.0	99.0	80-120		
Matrix Spike (BAJ0151-MS2)		**Source: WAJ0007-02**			Prepared & Analyzed: 10/2/2020					
TSS	100		2.00	mg/L	100	3.00	97.0	80-120		

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Quality Control Data
(Continued)

Inorganics (Continued)

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAJ0151 - W Filtration (Continued)										
Matrix Spike Dup (BAJ0151-MSD1)		**Source: WAI1018-02**			Prepared & Analyzed: 10/2/2020					
TSS	118		2.00	mg/L	100	25.0	93.0	80-120	4.96	20
Matrix Spike Dup (BAJ0151-MSD2)		**Source: WAJ0007-02**			Prepared & Analyzed: 10/2/2020					
TSS	98.0		2.00	mg/L	100	3.00	95.0	80-120	2.02	20

Quality Control Data
(Continued)

Metals by ICP-MS

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAJ0003 - W 3010 Digest										
Blank (BAJ0003-BLK1)					Prepared: 10/1/2020 Analyzed: 10/8/2020					
Dissolved Zinc	ND		0.00100	mg/L						
Dissolved Iron	ND		0.0100	mg/L						
Dissolved Copper	ND		0.00100	mg/L						
LCS (BAJ0003-BS1)					Prepared: 10/1/2020 Analyzed: 10/8/2020					
Dissolved Zinc	0.0450		0.00100	mg/L	0.0500		89.9	85-115		
Dissolved Copper	0.0484		0.00100	mg/L	0.0500		96.8	85-115		
Dissolved Iron	0.110		0.0100	mg/L	0.100		110	85-115		
Matrix Spike (BAJ0003-MS1)		**Source: WAI1018-03**			Prepared: 10/1/2020 Analyzed: 10/8/2020					
Dissolved Copper	0.0490		0.00100	mg/L	0.0500	0.00297	92.1	70-130		
Dissolved Zinc	0.0468		0.00100	mg/L	0.0500	0.00828	77.1	70-130		
Dissolved Iron	0.131		0.0100	mg/L	0.100	0.0426	88.1	70-130		
Matrix Spike Dup (BAJ0003-MSD1)		**Source: WAI1018-03**			Prepared: 10/1/2020 Analyzed: 10/8/2020					
Dissolved Zinc	0.0471		0.00100	mg/L	0.0500	0.00828	77.6	70-130	0.554	20
Dissolved Iron	0.130		0.0100	mg/L	0.100	0.0426	87.6	70-130	0.348	20
Dissolved Copper	0.0498		0.00100	mg/L	0.0500	0.00297	93.7	70-130	1.56	20
Batch: BAJ0004 - W 3010 Digest										
Blank (BAJ0004-BLK1)					Prepared: 10/1/2020 Analyzed: 10/8/2020					
Copper	ND		0.00100	mg/L						
Zinc	ND		0.00100	mg/L						
Iron	ND		0.0100	mg/L						
LCS (BAJ0004-BS1)					Prepared: 10/1/2020 Analyzed: 10/8/2020					
Copper	0.0474		0.00100	mg/L	0.0500		94.8	85-115		
Iron	0.0983		0.0100	mg/L	0.100		98.3	85-115		
Zinc	0.0440		0.00100	mg/L	0.0500		88.0	85-115		

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Quality Control Data
(Continued)

Metals by ICP-MS (Continued)

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAJ0004 - W 3010 Digest (Continued)										
Matrix Spike (BAJ0004-MS1)		**Source: WAI1018-03**			Prepared: 10/1/2020 Analyzed: 10/8/2020					
Iron	0.526		0.0100	mg/L	0.100	0.435	90.6	70-130		
Copper	0.0516		0.00100	mg/L	0.0500	0.00560	92.1	70-130		
Zinc	0.0488		0.00100	mg/L	0.0500	0.00587	85.8	70-130		
Matrix Spike Dup (BAJ0004-MSD1)		**Source: WAI1018-03**			Prepared: 10/1/2020 Analyzed: 10/8/2020					
Copper	0.0520		0.00100	mg/L	0.0500	0.00560	92.8	70-130	0.747	20
Iron	0.516		0.0100	mg/L	0.100	0.435	81.2	70-130	1.81	20
Zinc	0.0496		0.00100	mg/L	0.0500	0.00587	87.5	70-130	1.75	20

Quality Control Data
(Continued)

Hydrocarbons

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAJ0057 - W TPH-Dx										
Blank (BAJ0057-BLK1)					Prepared: 10/7/2020 Analyzed: 10/8/2020					
Diesel	ND		0.160	mg/L						
Lube Oil	ND		0.400	mg/L						
Mineral Oil	ND		0.160	mg/L						
Surrogate: n-Hexacosane			*48.0*	*ppm*	*50.1*		*95.9*	*50-150*		
LCS (BAJ0057-BS1)					Prepared: 10/7/2020 Analyzed: 10/8/2020					
Diesel	0.931		0.160	mg/L	1.01		92.2	70-130		
Lube Oil	ND		0.400	mg/L				70-130		
Surrogate: n-Hexacosane			*45.0*	*ppm*	*50.1*		*89.7*	*50-150*		
Duplicate (BAJ0057-DUP1)		**Source: WAJ0055-02**			Prepared: 10/7/2020 Analyzed: 10/8/2020					
Diesel	ND		0.160	mg/L		ND				20
Lube Oil	ND		0.400	mg/L		ND				20
Mineral Oil	ND		0.160	mg/L		ND				20
Surrogate: n-Hexacosane			*47.5*	*ppm*	*50.1*		*94.9*	*50-150*		
Matrix Spike (BAJ0057-MS1)		**Source: WAJ0055-01**			Prepared: 10/7/2020 Analyzed: 10/8/2020					
Diesel	1.14		0.160	mg/L	1.01	ND	113	70-130		
Lube Oil	ND		0.400	mg/L		ND		70-130		
Surrogate: n-Hexacosane			*45.8*	*ppm*	*50.1*		*91.5*	*50-150*		
Matrix Spike Dup (BAJ0057-MSD1)		**Source: WAJ0055-01**			Prepared: 10/7/2020 Analyzed: 10/8/2020					
Diesel	1.14		0.160	mg/L	1.01	ND	113	70-130	0.124	20
Lube Oil	ND		0.400	mg/L		ND		70-130		20
Surrogate: n-Hexacosane			*46.0*	*ppm*	*50.1*		*91.9*	*50-150*		

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Chain of Custody Record

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Anatek Log-In #

WAI1016

Due: 10/13/20

Company Name: Spokane County	Project Manager: Jake Saxon
Address: 1026 W. Broadway Avenue	Project Name & # : Sand Filter
City: Spokane State: WA Zip: 99260	Email Address : JSAXON@spokanecounty.org
Phone: (509) 477-7245	Purchase Order #:
Fax:	Sampler Name & phone: (509)995-0557

Turn Aro

Please refer to c
http://www.anateklabs.com/services/guidelines/reporting.asp

__Normal
__Next Day*
__2nd Day*
__Other*_____

*All rush order requests must be prior approved.

__Phone
__Mail
__Fax
x Email

Provide Sample Description

stormwater influent and effluent

List Analyses Requested

Lab ID	Sample Identification	Sampling Date/Time	Matrix	Preservative:	# of Containers	Sample Volume	TSS SM 2540D	Cu Zn Fe Total EPA 200.8 ICP/MS	Cu Zn Fe Dissolved EPA 200.8 ICP/MS	NWTPH, Ecology NWTPH-Dx	Hardness as CaCO3 SM 2340B ICP	Ortho-phosphate SM 4500-P G	Total Phosphorus SM 4500-P F			
	INF092520	09/26/2020 8:30 AM	water				x	x	x	x	x					
	EFF092520	09/26/2020 8:30 AM	water				x	x	x	x	x					
	INF092520-DI	09/26/2020 8:30 AM	water						x							
	EFF092520-DI	09/26/2020 8:30 AM	water						x							

Note Special Instructions/Comments

Please send results to Jake Saxon JSAXON@spokanecounty.org and Aimee Navickis-Brasch aimeen@osbornconsulting.com

SWBS

Inspection Checklist

Received Intact?	(Y)	N
Labels & Chains Agree?	(Y)	N
Containers Sealed?	(Y)	N
VOC Head Space?	~~Y~~	~~N~~

hei

Temperature (°C): -0.4°the1 hd

Preservative: HNO3 - 2000994 <2

HCl - 2002747 (INF) <2 pH 2001015

2001139 (EFF) <2 9-28-20 1645

Date & Time:

Inspected By: NW

	Printed Name	Signature	Company	Date	Time
Relinquished by	Kevin Flanagan	Kevin Flanagan	Osborn Consulting	9/28/20	
Received by	Brett Geiger		Anatek	9-28-20	1437
Relinquished by					
Received by					
Relinquished by					
Received by					

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Client:	Spokane County	Work Order:	WAJ0379
Address:	1026 W. Broadway Ave.	Project:	Sand Filter
	Spokane, WA 99260-0430	Reported:	10/26/2020 09:25
Attn:	Jake Saxon		

Analytical Results Report

Sample Location:	INF1010020		
Lab/Sample Number:	WAJ0379-01	Collect Date:	10/10/20 17:30
Date Received:	10/12/20 16:35	Collected By:	
Matrix:	Water		

Analyte	Result	Units	PQL	Analyzed	Analyst	Method	Qualifier
Inorganics							
Hardness	36.5	mg CaCO3/L	6.00	10/15/20 13:00	ARY	SM 2340 C	
Phosphate/P	0.311	mg/L	0.0180	10/12/20 17:48	TLM	SM 4500-P G	H3
Total P	0.512	mg/L	0.0500	10/16/20 15:10	TLM	SM 4500-P H	
TSS	49.0	mg/L	1.00	10/16/20 13:28	BAS	SM 2540 D	
Metals by ICP-MS							
Copper	0.0249	mg/L	0.00100	10/22/20 16:16	TRC	EPA 200.8	
Dissolved Copper	0.0113	mg/L	0.00100	10/21/20 15:32	TRC	EPA 200.8	
Iron	2.70	mg/L	0.0100	10/22/20 16:16	TRC	EPA 200.8	
Dissolved Iron	0.286	mg/L	0.0100	10/22/20 15:17	TRC	EPA 200.8	
Zinc	0.154	mg/L	0.00100	10/22/20 16:16	TRC	EPA 200.8	
Dissolved Zinc	0.0838	mg/L	0.00100	10/22/20 15:17	TRC	EPA 200.8	
Hydrocarbons							
Diesel	ND	mg/L	0.160	10/21/20 22:52	ARC	NWTPH-Dx	
Lube Oil	0.508	mg/L	0.400	10/21/20 22:52	ARC	NWTPH-Dx	
Mineral Oil	ND	mg/L	0.160	10/21/20 22:52	ARC	NWTPH-Dx	
Surrogate: n-Hexacosane	*85.0%*		*50-150*	*10/21/20 22:52*	*ARC*	*NWTPH-Dx*	

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Analytical Results Report

(Continued)

Sample Location: EFF1010020
Lab/Sample Number: WAJ0379-02 Collect Date: 10/10/20 17:30
Date Received: 10/12/20 16:35 Collected By:
Matrix: Water

Analyte	Result	Units	PQL	Analyzed	Analyst	Method	Qualifier
Inorganics							
Hardness	40.3	mg CaCO3/L	6.00	10/15/20 13:00	ARY	SM 2340 C	
Phosphate/P	0.303	mg/L	0.0180	10/12/20 17:49	TLM	SM 4500-P G	H3
Total P	0.477	mg/L	0.0500	10/16/20 15:13	TLM	SM 4500-P H	
TSS	19.0	mg/L	1.00	10/16/20 13:28	BAS	SM 2540 D	
Metals by ICP-MS							
Copper	0.0200	mg/L	0.00100	10/22/20 16:19	TRC	EPA 200.8	
Dissolved Copper	0.0149	mg/L	0.00100	10/21/20 15:35	TRC	EPA 200.8	
Iron	1.65	mg/L	0.0100	10/22/20 16:19	TRC	EPA 200.8	
Dissolved Iron	0.208	mg/L	0.0100	10/22/20 15:19	TRC	EPA 200.8	
Zinc	0.0618	mg/L	0.00100	10/22/20 16:19	TRC	EPA 200.8	
Dissolved Zinc	0.0558	mg/L	0.00100	10/22/20 15:19	TRC	EPA 200.8	
Hydrocarbons							
Diesel	ND	mg/L	0.160	10/21/20 23:46	ARC	NWTPH-Dx	
Lube Oil	0.557	mg/L	0.400	10/21/20 23:46	ARC	NWTPH-Dx	
Mineral Oil	ND	mg/L	0.160	10/21/20 23:46	ARC	NWTPH-Dx	
Surrogate: n-Hexacosane	*85.8%*		*50-150*	*10/21/20 23:46*	*ARC*	*NWTPH-Dx*	

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Analytical Results Report

(Continued)

Sample Location:	INF101020-DI		
Lab/Sample Number:	WAJ0379-03	Collect Date:	10/10/20 17:30
Date Received:	10/12/20 16:35	Collected By:	
Matrix:	Water		

Analyte	Result	Units	PQL	Analyzed	Analyst	Method	Qualifier
Metals by ICP-MS							
Dissolved Copper	ND	mg/L	0.00100	10/21/20 15:44	TRC	EPA 200.8	
Dissolved Iron	0.0237	mg/L	0.0100	10/22/20 15:26	TRC	EPA 200.8	
Dissolved Zinc	0.0138	mg/L	0.00100	10/22/20 15:26	TRC	EPA 200.8	

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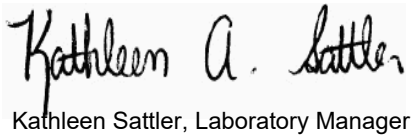
Analytical Results Report

(Continued)

Sample Location:	EFF101020-DI		
Lab/Sample Number:	WAJ0379-04	Collect Date:	10/10/20 17:30
Date Received:	10/12/20 16:35	Collected By:	
Matrix:	Water		

Analyte	Result	Units	PQL	Analyzed	Analyst	Method	Qualifier
Metals by ICP-MS							
Dissolved Copper	ND	mg/L	0.00100	10/21/20 15:48	TRC	EPA 200.8	
Dissolved Zinc	0.0156	mg/L	0.00100	10/22/20 15:29	TRC	EPA 200.8	

Authorized Signature,



Kathleen Sattler, Laboratory Manager

H3	Sample was received past holding time.
PQL	Practical Quantitation Limit
ND	Not Detected
MCL	EPA's Maximum Contaminant Level
Dry	Sample results reported on a dry weight basis
*	Not a certified analyte
RPD	Relative Percent Difference
%REC	Percent Recovery
Source	Sample that was spiked or duplicated.

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Certifications

Code	Description	Facility	Number
W WA DOE	Washington Department of Ecology	Anatek-Spokane, WA	C585

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Quality Control Data

Inorganics

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAJ0421 - W Wet Chem										
Blank (BAJ0421-BLK1)					Prepared & Analyzed: 10/15/2020					
Hardness	ND		3.00	mg CaCO3/L						
Blank (BAJ0421-BLK2)					Prepared & Analyzed: 10/15/2020					
Hardness	ND		3.00	mg CaCO3/L						
LCS (BAJ0421-BS1)					Prepared & Analyzed: 10/15/2020					
Hardness	101			mg CaCO3/L	100		101	90-110		
LCS Dup (BAJ0421-BSD1)					Prepared & Analyzed: 10/15/2020					
Hardness	99.8			mg CaCO3/L	100		99.8	90-110	0.957	20
Duplicate (BAJ0421-DUP1)		**Source: WAJ0129-01**			Prepared & Analyzed: 10/15/2020					
Hardness	194		6.00	mg CaCO3/L		194			0.00	20
Matrix Spike (BAJ0421-MS1)		**Source: WAJ0535-01**			Prepared & Analyzed: 10/15/2020					
Hardness	129		6.00	mg CaCO3/L	100	38.4	90.2	80-120		
Matrix Spike Dup (BAJ0421-MSD1)		**Source: WAJ0535-01**			Prepared & Analyzed: 10/15/2020					
Hardness	136		6.00	mg CaCO3/L	100	38.4	97.9	80-120	5.80	20
Batch: BAJ0479 - W FIA										
Blank (BAJ0479-BLK1)					Prepared & Analyzed: 10/16/2020					
Total P	ND		0.00500	mg/L						
Blank (BAJ0479-BLK2)					Prepared & Analyzed: 10/16/2020					
Total P	ND		0.00500	mg/L						

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Quality Control Data
(Continued)

Inorganics (Continued)

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAJ0479 - W FIA (Continued)										
Blank (BAJ0479-BLK3)					Prepared & Analyzed: 10/16/2020					
Total P	ND		0.00500	mg/L						
LCS (BAJ0479-BS1)					Prepared & Analyzed: 10/16/2020					
Total P	0.0944		0.00500	mg/L	0.100		94.4	90-110		
LCS (BAJ0479-BS2)					Prepared & Analyzed: 10/16/2020					
Total P	0.0976		0.00500	mg/L	0.100		97.6	90-110		
Matrix Spike (BAJ0479-MS1)		**Source: WAJ0354-02**			Prepared & Analyzed: 10/16/2020					
Total P	0.151		0.00500	mg/L	0.100	0.0375	114	80-120		
Matrix Spike (BAJ0479-MS2)		**Source: WAJ0358-02**			Prepared & Analyzed: 10/16/2020					
Total P	0.145		0.00500	mg/L	0.100	0.0358	110	80-120		
Matrix Spike Dup (BAJ0479-MSD1)		**Source: WAJ0354-02**			Prepared & Analyzed: 10/16/2020					
Total P	0.149		0.00500	mg/L	0.100	0.0375	112	80-120	1.33	20
Matrix Spike Dup (BAJ0479-MSD2)		**Source: WAJ0358-02**			Prepared & Analyzed: 10/16/2020					
Total P	0.154		0.00500	mg/L	0.100	0.0358	118	80-120	5.62	20
Batch: BAJ0516 - W FIA										
Blank (BAJ0516-BLK1)					Prepared & Analyzed: 10/12/2020					
Phosphate/P	ND		0.0180	mg/L						
LCS (BAJ0516-BS1)					Prepared & Analyzed: 10/12/2020					
Phosphate/P	0.0868		0.0180	mg/L	0.100		86.8	85-115		

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Quality Control Data
(Continued)

Inorganics (Continued)

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAJ0516 - W FIA (Continued)										
Matrix Spike (BAJ0516-MS1)		**Source: WAJ0379-02**			Prepared & Analyzed: 10/12/2020					
Phosphate/P	0.392		0.0180	mg/L	0.100	0.303	89.0	80-120		
Matrix Spike Dup (BAJ0516-MSD1)		**Source: WAJ0379-02**			Prepared & Analyzed: 10/12/2020					
Phosphate/P	0.398		0.0180	mg/L	0.100	0.303	95.2	80-120	1.57	20
Batch: BAJ0601 - W Filtration										
Blank (BAJ0601-BLK1)					Prepared & Analyzed: 10/16/2020					
TSS	ND		1.00	mg/L						
Blank (BAJ0601-BLK2)					Prepared & Analyzed: 10/16/2020					
TSS	ND		1.00	mg/L						
LCS (BAJ0601-BS1)					Prepared & Analyzed: 10/16/2020					
TSS	97.0			mg/L	100		97.0	90-110		
LCS Dup (BAJ0601-BSD1)					Prepared & Analyzed: 10/16/2020					
TSS	94.0			mg/L	100		94.0	90-110	3.14	10
Duplicate (BAJ0601-DUP1)		**Source: WAJ0379-01**			Prepared & Analyzed: 10/16/2020					
TSS	48.0		1.00	mg/L		49.0			2.06	20
Matrix Spike (BAJ0601-MS1)		**Source: MAJ0312-01**			Prepared & Analyzed: 10/16/2020					
TSS	260		2.00	mg/L	100	178	82.0	80-120		
Matrix Spike Dup (BAJ0601-MSD1)		**Source: MAJ0312-01**			Prepared & Analyzed: 10/16/2020					
TSS	270		2.00	mg/L	100	178	92.0	80-120	3.77	20

Quality Control Data
(Continued)

Metals by ICP-MS

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAJ0368 - W 3010 Digest										
Blank (BAJ0368-BLK1)					Prepared: 10/14/2020 Analyzed: 10/21/2020					
Dissolved Copper	ND		0.00100	mg/L						
Dissolved Iron	ND		0.0100	mg/L						
Dissolved Zinc	ND		0.00100	mg/L						
LCS (BAJ0368-BS1)					Prepared: 10/14/2020 Analyzed: 10/21/2020					
Dissolved Zinc	0.0481		0.00100	mg/L	0.0500		96.2	85-115		
Dissolved Iron	0.112		0.0100	mg/L	0.100		112	85-115		
Dissolved Copper	0.0489		0.00100	mg/L	0.0500		97.8	85-115		
Matrix Spike (BAJ0368-MS1)		**Source: WAJ0379-02**			Prepared: 10/14/2020 Analyzed: 10/22/2020					
Dissolved Iron	1.42		0.100	mg/L	1.00	0.208	121	70-130		
Dissolved Copper	0.515		0.0100	mg/L	0.500	0.0149	100	70-130		
Dissolved Zinc	0.535		0.0100	mg/L	0.500	0.0558	95.8	70-130		
Matrix Spike Dup (BAJ0368-MSD1)		**Source: WAJ0379-02**			Prepared: 10/14/2020 Analyzed: 10/22/2020					

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Quality Control Data
(Continued)

Metals by ICP-MS (Continued)

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAJ0368 - W 3010 Digest (Continued)										
Matrix Spike Dup (BAJ0368-MSD1)		**Source: WAJ0379-02**			Prepared: 10/14/2020 Analyzed: 10/22/2020					
Dissolved Iron	1.28		0.100	mg/L	1.00	0.208	107	70-130	10.4	20
Dissolved Zinc	0.540		0.0100	mg/L	0.500	0.0558	96.8	70-130	0.962	20
Dissolved Copper	0.520		0.0100	mg/L	0.500	0.0149	101	70-130	0.977	20
Batch: BAJ0369 - W 3010 Digest										
Blank (BAJ0369-BLK1)					Prepared: 10/14/2020 Analyzed: 10/22/2020					
Zinc	ND		0.00100	mg/L						
Copper	ND		0.00100	mg/L						
Iron	ND		0.0100	mg/L						
LCS (BAJ0369-BS1)					Prepared: 10/14/2020 Analyzed: 10/22/2020					
Zinc	0.0487		0.00100	mg/L	0.0500		97.4	85-115		
Copper	0.0501		0.00100	mg/L	0.0500		100	85-115		
Iron	0.113		0.0100	mg/L	0.100		113	85-115		
Matrix Spike (BAJ0369-MS1)		**Source: WAJ0389-01**			Prepared: 10/14/2020 Analyzed: 10/22/2020					
Zinc	0.0665		0.00100	mg/L	0.0500	0.0169	99.2	70-130		
Iron	0.329		0.0100	mg/L	0.100	0.240	89.2	70-130		
Copper	0.0541		0.00100	mg/L	0.0500	0.00191	104	70-130		
Matrix Spike Dup (BAJ0369-MSD1)		**Source: WAJ0389-01**			Prepared: 10/14/2020 Analyzed: 10/22/2020					
Zinc	0.0647		0.00100	mg/L	0.0500	0.0169	95.7	70-130	2.68	20
Copper	0.0523		0.00100	mg/L	0.0500	0.00191	101	70-130	3.37	20
Iron	0.325		0.0100	mg/L	0.100	0.240	85.7	70-130	1.09	20

Quality Control Data
(Continued)

Hydrocarbons

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAJ0511 - W TPH-Dx										
Blank (BAJ0511-BLK1)					Prepared & Analyzed: 10/21/2020					
Diesel	ND		0.160	mg/L						
Lube Oil	ND		0.400	mg/L						
Mineral Oil	ND		0.160	mg/L						
Surrogate: n-Hexacosane			*45.9*	*ppm*	*50.1*		*91.6*	*50-150*		
LCS (BAJ0511-BS1)					Prepared & Analyzed: 10/21/2020					
Diesel	0.986		0.160	mg/L	1.01		97.7	70-130		
Lube Oil	ND		0.400	mg/L				70-130		
Surrogate: n-Hexacosane			*45.0*	*ppm*	*50.1*		*89.9*	*50-150*		
Duplicate (BAJ0511-DUP1)		**Source: WAJ0488-02**			Prepared: 10/21/2020 Analyzed: 10/22/2020					
Diesel	ND		0.160	mg/L		ND				20
Lube Oil	0.193		0.400	mg/L		0.202			4.58	20
Mineral Oil	ND		0.160	mg/L		ND				20
Surrogate: n-Hexacosane			*45.6*	*ppm*	*50.1*		*91.1*	*50-150*		

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Quality Control Data
(Continued)

Hydrocarbons (Continued)

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAJ0511 - W TPH-Dx (Continued)										
Matrix Spike (BAJ0511-MS1)		**Source: WAJ0380-03**			Prepared: 10/21/2020 Analyzed: 10/22/2020					
Diesel	0.832		0.160	mg/L	1.01	ND	82.4	70-130		
Lube Oil	0.173		0.400	mg/L		0.174		70-130		
Surrogate: n-Hexacosane			*42.1*	*ppm*	*50.1*		*84.0*	*50-150*		
Matrix Spike Dup (BAJ0511-MSD1)		**Source: WAJ0380-03**			Prepared: 10/21/2020 Analyzed: 10/22/2020					
Diesel	0.862		0.160	mg/L	1.01	ND	85.4	70-130	3.54	20
Lube Oil	0.192		0.400	mg/L		0.174		70-130	10.2	20
Surrogate: n-Hexacosane			*44.4*	*ppm*	*50.1*		*88.5*	*50-150*		

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Chain of Custody Record

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Anatek Log-In #

WAJ0379

Due: 10/27/20

Company Name:	Spokane County	Project Manager:	Jake Saxon
Address:	1026 W. Broadway Avenue	Project Name & # :	Sand Filter
City: Spokane	State: WA Zip: 99260	Email Address :	JSAXON@spokanecounty.org
Phone:	(509) 477-7245	Purchase Order #:	
Fax:		Sampler Name & phone:	(509)995-0557

Turn Arc

Please refer to our normal turn around times at
http://www.anateklabs.com/services/guidelines/reporting.asp

__Normal __Next Day* __2nd Day* __Other*_____

*All rush order requests must be prior approved.

__Phone __Mail __Fax x Email

Provide Sample Description

stormwater influent and effluent

List Analyses Requested

Note Special Instructions/Comments

Please send results to Jake Saxon JSAXON@spokanecounty.org and Aimee Navickis-Brasch aimeen@osbornconsulting.com

SWBS

*ortho p bottle recd broken

Lab ID	Sample Identification	Sampling Date/Time	Matrix	# of Containers	Sample Volume	Preservative:	TSS SM 2540D	Cu Zn Fe Total EPA 200.8 ICP/MS	Cu Zn Fe Dissolved EPA 200.8 ICP/MS	NWTPH, Ecology NWTPH-Dx	Hardness as CaCO3 SM 2340B ICP	Ortho-phosphate SM 4500-P G	Total Phosphorus SM 4500-P F			
	INF101020	10/10/2020 5:30 PM	water				x	x	x	x	x	x	x			
	EFF101020	10/10/2020 5:30 PM	water				x	x	x	x	x	x	x			
	INF101020-DI	10/10/2020 5:30 PM	water						x							
	EFF101020-DI	10/10/2020 5:30 PM	water						x							

Inspection Checklist

Received Intact?	(Y)	N x
Labels & Chains Agree?	(Y)	N
Containers Sealed?	(Y)	N
VOC Head Space?	Y	N

hei

Temperature (°C): 6.7°/6.2°DLG

Preservative: HCl 200274<2 H2SO4 200288<2 HNO3 200228<2

Date & Time: 10-12-20 1705

Inspected By: MG

pH 200105

	Printed Name	Signature	Company	Date	Time
Relinquished by	Kevin Flanagan	Kevin Flanagan	Osborn Consulting	10/12/20	4:15
Received by	Brooke Gregg	Brooke Gregg	Anatek	10-12-20	1635
Relinquished by					
Received by					
Relinquished by					
Received by					

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Client:	Spokane County	Work Order:	WAJ0535
Address:	1026 W. Broadway Ave.	Project:	Sand Filter
	Spokane, WA 99260-0430	Reported:	10/30/2020 15:13
Attn:	Jake Saxon		

Analytical Results Report

Sample Location:	INF101320		
Lab/Sample Number:	WAJ0535-01	Collect Date:	10/13/20 16:00
Date Received:	10/14/20 10:50	Collected By:	
Matrix:	Water		

Analyte	Result	Units	PQL	Analyzed	Analyst	Method	Qualifier
Inorganics							
Hardness	38.4	mg CaCO3/L	6.00	10/15/20 13:00	ARY	SM 2340 C	
Total P	0.142	mg/L	0.0500	10/21/20 16:37	TLM	SM 4500-P H	
TSS	65.0	mg/L	1.00	10/19/20 8:30	BAS	SM 2540 D	
Metals by ICP-MS							
Copper	0.0111	mg/L	0.00100	10/29/20 13:58	TRC	EPA 200.8	
Iron	1.84	mg/L	0.0100	10/29/20 13:58	TRC	EPA 200.8	M2
Zinc	0.0745	mg/L	0.00100	10/29/20 13:58	TRC	EPA 200.8	

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Analytical Results Report

(Continued)

Sample Location: EFF101320
Lab/Sample Number: WAJ0535-02 Collect Date: 10/13/20 16:00
Date Received: 10/14/20 10:50 Collected By:
Matrix: Water

Analyte	Result	Units	PQL	Analyzed	Analyst	Method	Qualifier
Inorganics							
Hardness	23.0	mg CaCO3/L	6.00	10/15/20 13:00	ARY	SM 2340 C	
Total P	0.150	mg/L	0.00500	10/21/20 16:38	TLM	SM 4500-P H	
TSS	23.0	mg/L	1.00	10/19/20 8:30	BAS	SM 2540 D	
Metals by ICP-MS							
Copper	0.00775	mg/L	0.00100	10/29/20 14:02	TRC	EPA 200.8	
Iron	1.04	mg/L	0.0100	10/29/20 14:02	TRC	EPA 200.8	M2
Zinc	0.0285	mg/L	0.00100	10/29/20 14:02	TRC	EPA 200.8	

Authorized Signature,

Karice Scott For Kathleen Sattler, Laboratory Manager

M2	Matrix spike recovery was low; the associated blank spike recovery was acceptable. Potential matrix effect.
PQL	Practical Quantitation Limit
ND	Not Detected
MCL	EPA's Maximum Contaminant Level
Dry	Sample results reported on a dry weight basis
*	Not a certified analyte
RPD	Relative Percent Difference
%REC	Percent Recovery
Source	Sample that was spiked or duplicated.

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Certifications

Code	Description	Facility	Number
W WA DOE	Washington Department of Ecology	Anatek-Spokane, WA	C585

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Quality Control Data

Inorganics

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAJ0421 - W Wet Chem										
Blank (BAJ0421-BLK1)					Prepared & Analyzed: 10/15/2020					
Hardness	ND		3.00	mg CaCO3/L						
Blank (BAJ0421-BLK2)					Prepared & Analyzed: 10/15/2020					
Hardness	ND		3.00	mg CaCO3/L						
LCS (BAJ0421-BS1)					Prepared & Analyzed: 10/15/2020					
Hardness	101			mg CaCO3/L	100		101	90-110		
LCS Dup (BAJ0421-BSD1)					Prepared & Analyzed: 10/15/2020					
Hardness	99.8			mg CaCO3/L	100		99.8	90-110	0.957	20
Duplicate (BAJ0421-DUP1)		**Source: WAJ0129-01**			Prepared & Analyzed: 10/15/2020					
Hardness	194		6.00	mg CaCO3/L		194			0.00	20
Matrix Spike (BAJ0421-MS1)		**Source: WAJ0535-01**			Prepared & Analyzed: 10/15/2020					
Hardness	129		6.00	mg CaCO3/L	100	38.4	90.2	80-120		
Matrix Spike Dup (BAJ0421-MSD1)		**Source: WAJ0535-01**			Prepared & Analyzed: 10/15/2020					
Hardness	136		6.00	mg CaCO3/L	100	38.4	97.9	80-120	5.80	20
Batch: BAJ0634 - W FIA										
Blank (BAJ0634-BLK1)					Prepared & Analyzed: 10/21/2020					
Total P	ND		0.00500	mg/L						
Blank (BAJ0634-BLK2)					Prepared & Analyzed: 10/21/2020					
Total P	ND		0.00500	mg/L						

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Quality Control Data
(Continued)

Inorganics (Continued)

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAJ0634 - W FIA (Continued)										
Blank (BAJ0634-BLK3)					Prepared & Analyzed: 10/21/2020					
Total P	ND		0.00500	mg/L						
LCS (BAJ0634-BS1)					Prepared & Analyzed: 10/21/2020					
Total P	0.104		0.00500	mg/L	0.100		104	90-110		
LCS (BAJ0634-BS2)					Prepared & Analyzed: 10/21/2020					
Total P	0.104		0.00500	mg/L	0.100		104	90-110		
Matrix Spike (BAJ0634-MS1)		**Source: WAJ0620-02**			Prepared & Analyzed: 10/21/2020					
Total P	0.158		0.00500	mg/L	0.100	0.0514	107	80-120		
Matrix Spike (BAJ0634-MS2)		**Source: WAJ0626-02**			Prepared & Analyzed: 10/21/2020					
Total P	0.174		0.00500	mg/L	0.100	0.0614	113	80-120		
Matrix Spike Dup (BAJ0634-MSD1)		**Source: WAJ0620-02**			Prepared & Analyzed: 10/21/2020					
Total P	0.162		0.00500	mg/L	0.100	0.0514	110	80-120	2.31	20
Matrix Spike Dup (BAJ0634-MSD2)		**Source: WAJ0626-02**			Prepared & Analyzed: 10/21/2020					
Total P	0.166		0.00500	mg/L	0.100	0.0614	104	80-120	4.94	20
Batch: BAJ0671 - W Filtration										
Blank (BAJ0671-BLK1)					Prepared & Analyzed: 10/19/2020					
TSS	ND		1.00	mg/L						
Blank (BAJ0671-BLK2)					Prepared & Analyzed: 10/19/2020					
TSS	ND		1.00	mg/L						

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Quality Control Data
(Continued)

Inorganics (Continued)

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAJ0671 - W Filtration (Continued)										
LCS (BAJ0671-BS1)					Prepared & Analyzed: 10/19/2020					
TSS	96.0			mg/L	100		96.0	90-110		
LCS Dup (BAJ0671-BSD1)					Prepared & Analyzed: 10/19/2020					
TSS	96.0			mg/L	100		96.0	90-110	0.00	10
Duplicate (BAJ0671-DUP1)		**Source: WAJ0535-01**			Prepared & Analyzed: 10/19/2020					
TSS	54.0		1.00	mg/L		65.0			18.5	20
Matrix Spike (BAJ0671-MS1)		**Source: WAJ0570-01**			Prepared & Analyzed: 10/19/2020					
TSS	136		2.00	mg/L	100	33.0	103	80-120		
Matrix Spike Dup (BAJ0671-MSD1)		**Source: WAJ0570-01**			Prepared & Analyzed: 10/19/2020					
TSS	140		2.00	mg/L	100	33.0	107	80-120	2.90	20

Quality Control Data
(Continued)

Metals by ICP-MS

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAJ0641 - W 3010 Digest										
Blank (BAJ0641-BLK1)					Prepared: 10/23/2020 Analyzed: 10/29/2020					
Iron	ND		0.0100	mg/L						
Zinc	ND		0.00100	mg/L						
Copper	ND		0.00100	mg/L						
LCS (BAJ0641-BS1)					Prepared: 10/23/2020 Analyzed: 10/29/2020					
Copper	0.0507		0.00100	mg/L	0.0500		101	85-115		
Iron	0.108		0.0100	mg/L	0.100		108	85-115		
Zinc	0.0520		0.00100	mg/L	0.0500		104	85-115		
Matrix Spike (BAJ0641-MS1)		**Source: WAJ0488-02**			Prepared: 10/23/2020 Analyzed: 10/29/2020					
Copper	0.0554		0.00100	mg/L	0.0500	0.00931	92.1	70-130		
Zinc	0.0570		0.00100	mg/L	0.0500	0.00841	97.2	70-130		
Iron	0.782		0.0100	mg/L	0.100	0.676	106	70-130		
Matrix Spike (BAJ0641-MS2)		**Source: WAJ0539-03**			Prepared: 10/23/2020 Analyzed: 10/29/2020					
Copper	0.0505		0.00100	mg/L	0.0500	0.00476	91.6	70-130		
Iron	2.79	M2	0.0100	mg/L	0.100	2.77	16.0	70-130		
Zinc	0.0540		0.00100	mg/L	0.0500	0.00625	95.5	70-130		
Matrix Spike Dup (BAJ0641-MSD1)		**Source: WAJ0488-02**			Prepared: 10/23/2020 Analyzed: 10/29/2020					
Iron	0.798		0.0100	mg/L	0.100	0.676	122	70-130	1.97	20
Zinc	0.0581		0.00100	mg/L	0.0500	0.00841	99.4	70-130	1.95	20
Copper	0.0569		0.00100	mg/L	0.0500	0.00931	95.1	70-130	2.68	20
Matrix Spike Dup (BAJ0641-MSD2)		**Source: WAJ0539-03**			Prepared: 10/23/2020 Analyzed: 10/29/2020					
Copper	0.0504		0.00100	mg/L	0.0500	0.00476	91.2	70-130	0.349	20
Iron	2.62	M2	0.0100	mg/L	0.100	2.77	NR	70-130	6.30	20
Zinc	0.0534		0.00100	mg/L	0.0500	0.00625	94.3	70-130	1.13	20

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Chain of Custody Record

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Anatek Log-In #

WAJ0535

Due: 10/28/20

Company Name: Spokane County	Project Manager: Jake Saxon
Address: 1026 W. Broadway Avenue	Project Name & # : Sand Filter
City: Spokane State: WA Zip: 99260	Email Address : JSAXON@spokanecounty.org
Phone: (509) 477-7245	Purchase Order #:
Fax:	Sampler Name & phone: (509)995-0557

Turn Arou

Please refer to ou
http://www.anateklabs.com/services/guidelines/reporting.asp

__Normal
__Next Day*
__2nd Day*
__Other*_____

*All rush order requests must be prior approved.

__Phone
__Mail
__Fax
_x_Email

Provide Sample Description

stormwater influent and effluent

List Analyses Requested

Preservative:

Lab ID	Sample Identification	Sampling Date/Time	Matrix	# of Containers	Sample Volume	TSS SM 2540D	Cu Zn Fe Total EPA 200.8 ICP/MS	Cu Zn Fe Dissolved EPA 200.8 ICP/MS	NWTPH, Ecology NWTPH-Dx	Hardness as CaCO3 SM 2340B ICP	Ortho-phosphate SM 4500-P G	Total Phosphorus SM 4500-P F			
	INF101320	10/13/2020 4:00 PM	water			x	x			x		x			
	EFF101320	10/13/2020 4:00 PM	water			x	x			x		x			

Note Special Instructions/Comments

Please send results to Jake Saxon JSAXON@spokanecounty.org and Aimee Navickis-Brasch aimeen@osbornconsulting.com

SWBS

Inspection Checklist

Received Intact?	(Y)	N
Labels & Chains Agree?	(Y)	N
Containers Sealed?	(Y)	N
VOC Head Space?	~~Y~~	~~N~~

hei

Temperature (°C): 6.6°/6.1° IR1 hd
Preservative: H_2SO_4 2002883 <2
HNO3-2002280<2 pH 200105
Date & Time: 10-14-20 1100
Inspected By: MW

	Printed Name	Signature	Company	Date	Time
Relinquished by	Kevin Flanagan		Osborn Consulting	10/14/20	10 35AM
Received by	Brock Graber		Anatek	10-14-20	1050
Relinquished by					
Received by					
Relinquished by					
Received by					

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Client:	Spokane County	Work Order:	WAK0229
Address:	1026 W. Broadway Ave.	Project:	Sand Filter
	Spokane, WA 99260-0430	Reported:	11/25/2020 16:49
Attn:	Jake Saxon		

Analytical Results Report

Sample Location:	INF11052020-1		
Lab/Sample Number:	WAK0229-01	Collect Date:	11/06/20 09:30
Date Received:	11/06/20 12:46	Collected By:	
Matrix:	Water		

Analyte	Result	Units	PQL	Analyzed	Analyst	Method	Qualifier
Inorganics							
Hardness	40.6	mg CaCO3/L	3.00	11/11/20 14:00	ARY	SM 2340 C	
Phosphate/P	0.368	mg/L	0.0180	11/6/20 15:12	SAG	SM 4500-P G	
Total P	1.08	mg/L	0.200	11/19/20 15:28	SAG	SM 4500-P H	
TSS	43.0	mg/L	1.00	11/9/20 10:00	BAS	SM 2540 D	
Metals by ICP-MS							
Dissolved Copper	0.00648	mg/L	0.00100	11/11/20 15:13	TRC	EPA 200.8	
Dissolved Iron	0.118	mg/L	0.0100	11/11/20 15:13	TRC	EPA 200.8	
Dissolved Zinc	0.0453	mg/L	0.00100	11/11/20 15:13	TRC	EPA 200.8	

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Analytical Results Report

(Continued)

Sample Location:	INF11052020-2		
Lab/Sample Number:	WAK0229-02	Collect Date:	11/06/20 09:30
Date Received:	11/06/20 12:46	Collected By:	
Matrix:	Water		

Analyte	Result	Units	PQL	Analyzed	Analyst	Method	Qualifier
Inorganics							
Hardness	35.6	mg CaCO3/L	6.00	11/11/20 14:00	ARY	SM 2340 C	
Phosphate/P	0.345	mg/L	0.0180	11/6/20 15:13	SAG	SM 4500-P G	
Total P	1.03	mg/L	0.200	11/19/20 15:30	SAG	SM 4500-P H	
Metals by ICP-MS							
Dissolved Copper	0.00628	mg/L	0.00100	11/11/20 15:16	TRC	EPA 200.8	
Dissolved Iron	0.112	mg/L	0.0100	11/11/20 15:16	TRC	EPA 200.8	
Dissolved Zinc	0.0466	mg/L	0.00100	11/11/20 15:16	TRC	EPA 200.8	

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Analytical Results Report

(Continued)

Sample Location:	EFF11052020-1		
Lab/Sample Number:	WAK0229-03	Collect Date:	11/06/20 09:30
Date Received:	11/06/20 12:46	Collected By:	
Matrix:	Water		

Analyte	Result	Units	PQL	Analyzed	Analyst	Method	Qualifier
Inorganics							
Hardness	34.6	mg CaCO3/L	3.00	11/11/20 14:00	ARY	SM 2340 C	
Phosphate/P	0.309	mg/L	0.0180	11/6/20 15:13	SAG	SM 4500-P G	
Total P	0.864	mg/L	0.200	11/19/20 15:33	SAG	SM 4500-P H	
TSS	9.00	mg/L	1.00	11/9/20 10:00	BAS	SM 2540 D	
Metals by ICP-MS							
Dissolved Copper	0.00747	mg/L	0.00100	11/11/20 15:18	TRC	EPA 200.8	
Dissolved Iron	0.158	mg/L	0.0100	11/11/20 15:18	TRC	EPA 200.8	
Dissolved Zinc	0.0242	mg/L	0.00100	11/11/20 15:18	TRC	EPA 200.8	

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Analytical Results Report

(Continued)

Sample Location:	EFF11052020-2		
Lab/Sample Number:	WAK0229-04	Collect Date:	11/06/20 09:30
Date Received:	11/06/20 12:46	Collected By:	
Matrix:	Water		

Analyte	Result	Units	PQL	Analyzed	Analyst	Method	Qualifier
Inorganics							
Hardness	29.7	mg CaCO3/L	6.00	11/11/20 14:00	ARY	SM 2340 C	
Phosphate/P	0.309	mg/L	0.0180	11/6/20 15:14	SAG	SM 4500-P G	
Total P	0.712	mg/L	0.200	11/24/20 15:19	SAG	SM 4500-P H	M1
Metals by ICP-MS							
Dissolved Copper	0.00781	mg/L	0.00100	11/11/20 15:20	TRC	EPA 200.8	
Dissolved Iron	0.136	mg/L	0.0100	11/11/20 15:20	TRC	EPA 200.8	
Dissolved Zinc	0.0279	mg/L	0.00100	11/11/20 15:20	TRC	EPA 200.8	

Authorized Signature,

Brock Gerger For Kathleen Sattler, Laboratory Manager

M1	Matrix spike recovery was high; the associated blank spike recovery was acceptable. Potential matrix effect
PQL	Practical Quantitation Limit
ND	Not Detected
MCL	EPA's Maximum Contaminant Level
Dry	Sample results reported on a dry weight basis
*	Not a certified analyte
RPD	Relative Percent Difference
%REC	Percent Recovery
Source	Sample that was spiked or duplicated.

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Certifications

Code	Description	Facility	Number
W WA DOE	Washington Department of Ecology	Anatek-Spokane, WA	C585

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Quality Control Data

Inorganics

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAK0200 - W FIA										
Blank (BAK0200-BLK1)					Prepared & Analyzed: 11/6/2020					
Phosphate/P	ND		0.0180	mg/L						
LCS (BAK0200-BS1)					Prepared & Analyzed: 11/6/2020					
Phosphate/P	0.103		0.0180	mg/L	0.100		103	85-115		
Matrix Spike (BAK0200-MS1)		**Source: WAK0231-03**			Prepared & Analyzed: 11/6/2020					
Phosphate/P	0.563		0.0180	mg/L	0.100	0.454	109	80-120		
Matrix Spike Dup (BAK0200-MSD1)		**Source: WAK0231-03**			Prepared & Analyzed: 11/6/2020					
Phosphate/P	0.565		0.0180	mg/L	0.100	0.454	112	80-120	0.390	20
Batch: BAK0269 - W Filtration										
Blank (BAK0269-BLK1)					Prepared & Analyzed: 11/9/2020					
TSS	ND		1.00	mg/L						
Blank (BAK0269-BLK2)					Prepared & Analyzed: 11/9/2020					
TSS	ND		1.00	mg/L						
Blank (BAK0269-BLK3)					Prepared & Analyzed: 11/9/2020					
TSS	ND		1.00	mg/L						
Blank (BAK0269-BLK4)					Prepared & Analyzed: 11/9/2020					
TSS	ND		1.00	mg/L						
Blank (BAK0269-BLK5)					Prepared & Analyzed: 11/9/2020					
TSS	ND		1.00	mg/L						

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Quality Control Data
(Continued)

Inorganics (Continued)

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAK0269 - W Filtration (Continued)										
LCS (BAK0269-BS1)					Prepared & Analyzed: 11/9/2020					
TSS	94.0			mg/L	100		94.0	90-110		
LCS (BAK0269-BS2)					Prepared & Analyzed: 11/9/2020					
TSS	96.0			mg/L	100		96.0	90-110		
LCS (BAK0269-BS3)					Prepared & Analyzed: 11/9/2020					
TSS	93.0			mg/L	100		93.0	90-110		
LCS Dup (BAK0269-BSD1)					Prepared & Analyzed: 11/9/2020					
TSS	96.0			mg/L	100		96.0	90-110	2.11	10
LCS Dup (BAK0269-BSD2)					Prepared & Analyzed: 11/9/2020					
TSS	98.0			mg/L	100		98.0	90-110	2.06	10
LCS Dup (BAK0269-BSD3)					Prepared & Analyzed: 11/9/2020					
TSS	101			mg/L	100		101	90-110	8.25	10
Duplicate (BAK0269-DUP1)		**Source: WAK0063-02**			Prepared & Analyzed: 11/9/2020					
TSS	14.0		1.00	mg/L		15.0			6.90	20
Duplicate (BAK0269-DUP2)		**Source: WAK0167-02**			Prepared & Analyzed: 11/9/2020					
TSS	19.0		1.00	mg/L		19.0			0.00	20
Duplicate (BAK0269-DUP3)		**Source: WAK0229-01**			Prepared & Analyzed: 11/9/2020					
TSS	45.0		1.00	mg/L		43.0			4.55	20
Matrix Spike (BAK0269-MS1)		**Source: WAK0114-01**			Prepared & Analyzed: 11/9/2020					
TSS	106		2.00	mg/L	100	3.00	103	80-120		

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Quality Control Data
(Continued)

Inorganics (Continued)

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAK0269 - W Filtration (Continued)										
Matrix Spike (BAK0269-MS2)		**Source: WAK0171-01**			Prepared & Analyzed: 11/9/2020					
TSS	124		2.00	mg/L	100	26.0	98.0	80-120		
Matrix Spike (BAK0269-MS3)		**Source: WAK0111-01**			Prepared & Analyzed: 11/9/2020					
TSS	214		2.00	mg/L	100	118	96.0	80-120		
Matrix Spike Dup (BAK0269-MSD1)		**Source: WAK0114-01**			Prepared & Analyzed: 11/9/2020					
TSS	106		2.00	mg/L	100	3.00	103	80-120	0.00	20
Matrix Spike Dup (BAK0269-MSD2)		**Source: WAK0171-01**			Prepared & Analyzed: 11/9/2020					
TSS	118		2.00	mg/L	100	26.0	92.0	80-120	4.96	20
Matrix Spike Dup (BAK0269-MSD3)		**Source: WAK0111-01**			Prepared & Analyzed: 11/9/2020					
TSS	214		2.00	mg/L	100	118	96.0	80-120	0.00	20
Batch: BAK0289 - W Wet Chem										
Blank (BAK0289-BLK1)					Prepared: 11/10/2020 Analyzed: 11/11/2020					
Hardness	ND		3.00	mg CaCO3/L						
LCS (BAK0289-BS1)					Prepared: 11/10/2020 Analyzed: 11/11/2020					
Hardness	102			mg CaCO3/L	100		102	90-110		
LCS Dup (BAK0289-BSD1)					Prepared: 11/10/2020 Analyzed: 11/11/2020					
Hardness	100			mg CaCO3/L	100		100	90-110	1.96	20
Duplicate (BAK0289-DUP1)		**Source: WAK0231-01**			Prepared: 11/10/2020 Analyzed: 11/11/2020					
Hardness	19.8		3.00	mg CaCO3/L		18.8			5.13	20

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Quality Control Data
(Continued)

Inorganics (Continued)

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAK0289 - W Wet Chem (Continued)										
Matrix Spike (BAK0289-MS1)		**Source: WAK0229-01**			Prepared: 11/10/2020 Analyzed: 11/11/2020					
Hardness	139		6.00	mg CaCO3/L	100	40.6	98.0	80-120		
Matrix Spike Dup (BAK0289-MSD1)		**Source: WAK0229-01**			Prepared: 11/10/2020 Analyzed: 11/11/2020					
Hardness	143		6.00	mg CaCO3/L	100	40.6	102	80-120	2.82	20
Batch: BAK0591 - W FIA										
Blank (BAK0591-BLK1)					Prepared & Analyzed: 11/19/2020					
Total P	ND		0.00500	mg/L						
Blank (BAK0591-BLK2)					Prepared & Analyzed: 11/19/2020					
Total P	ND		0.00500	mg/L						
Blank (BAK0591-BLK3)					Prepared & Analyzed: 11/19/2020					
Total P	ND		0.00500	mg/L						
LCS (BAK0591-BS1)					Prepared & Analyzed: 11/19/2020					
Total P	0.0996		0.00500	mg/L	0.100		99.6	90-110		
LCS (BAK0591-BS2)					Prepared & Analyzed: 11/19/2020					
Total P	0.0994		0.00500	mg/L	0.100		99.4	90-110		
Matrix Spike (BAK0591-MS1)		**Source: WAK0166-02**			Prepared & Analyzed: 11/19/2020					
Total P	0.154		0.00500	mg/L	0.100	0.0392	114	80-120		
Matrix Spike (BAK0591-MS2)		**Source: WAK0223-02**			Prepared & Analyzed: 11/19/2020					
Total P	0.161		0.00500	mg/L	0.100	0.0456	116	80-120		

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Quality Control Data
(Continued)

Inorganics (Continued)

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAK0591 - W FIA (Continued)										
Matrix Spike Dup (BAK0591-MSD1)		**Source: WAK0166-02**			Prepared & Analyzed: 11/19/2020					
Total P	0.152		0.00500	mg/L	0.100	0.0392	113	80-120	0.785	20
Matrix Spike Dup (BAK0591-MSD2)		**Source: WAK0223-02**			Prepared & Analyzed: 11/19/2020					
Total P	0.162		0.00500	mg/L	0.100	0.0456	117	80-120	0.803	20
Batch: BAK0782 - W FIA										
Blank (BAK0782-BLK1)					Prepared & Analyzed: 11/24/2020					
Total P	ND		0.00500	mg/L						
Blank (BAK0782-BLK2)					Prepared & Analyzed: 11/24/2020					
Total P	ND		0.00500	mg/L						
LCS (BAK0782-BS1)					Prepared & Analyzed: 11/24/2020					
Total P	0.108	M1	0.00500	mg/L	0.100		108	90-110		
Matrix Spike (BAK0782-MS1)		**Source: WAK0257-02**			Prepared & Analyzed: 11/24/2020					
Total P	0.206	M1	0.00500	mg/L	0.100	0.0703	136	80-120		
Matrix Spike Dup (BAK0782-MSD1)		**Source: WAK0257-02**			Prepared & Analyzed: 11/24/2020					
Total P	0.210	M1	0.00500	mg/L	0.100	0.0703	139	80-120	1.59	20

Quality Control Data
(Continued)

Metals by ICP-MS

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAK0257 - W 3010 Digest										
Blank (BAK0257-BLK1)					Prepared: 11/10/2020 Analyzed: 11/11/2020					
Dissolved Iron	ND		0.0100	mg/L						
Dissolved Copper	ND		0.00100	mg/L						
Dissolved Zinc	ND		0.00100	mg/L						
LCS (BAK0257-BS1)					Prepared: 11/10/2020 Analyzed: 11/11/2020					
Dissolved Copper	0.0432		0.00100	mg/L	0.0500		86.3	85-115		
Dissolved Iron	0.106		0.0100	mg/L	0.100		106	85-115		
Dissolved Zinc	0.0435		0.00100	mg/L	0.0500		87.0	85-115		
Matrix Spike (BAK0257-MS1)		**Source: WAK0150-01**			Prepared: 11/10/2020 Analyzed: 11/11/2020					
Dissolved Copper	0.232		0.00500	mg/L	0.250	0.000562	92.5	70-130		
Dissolved Zinc	0.235		0.00500	mg/L	0.250	0.00285	93.0	70-130		
Dissolved Iron	0.481		0.0500	mg/L	0.500	ND	96.2	70-130		
Matrix Spike (BAK0257-MS2)		**Source: WAK0150-10**			Prepared: 11/10/2020 Analyzed: 11/11/2020					
Dissolved Iron	0.500		0.0500	mg/L	0.500	ND	100	70-130		
Dissolved Copper	0.227		0.00500	mg/L	0.250	0.000585	90.4	70-130		
Dissolved Zinc	0.228		0.00500	mg/L	0.250	0.00341	89.8	70-130		
Matrix Spike Dup (BAK0257-MSD1)		**Source: WAK0150-01**			Prepared: 11/10/2020 Analyzed: 11/11/2020					
Dissolved Iron	0.496		0.0500	mg/L	0.500	ND	99.2	70-130	3.05	20

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Quality Control Data
(Continued)

Metals by ICP-MS (Continued)

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAK0257 - W 3010 Digest (Continued)										
Matrix Spike Dup (BAK0257-MSD1)		**Source: WAK0150-01**		Prepared: 11/10/2020 Analyzed: 11/11/2020						
Dissolved Copper	0.225		0.00500	mg/L	0.250	0.000562	89.9	70-130	2.82	20
Dissolved Zinc	0.224		0.00500	mg/L	0.250	0.00285	88.5	70-130	4.90	20
Matrix Spike Dup (BAK0257-MSD2)		**Source: WAK0150-10**		Prepared: 11/10/2020 Analyzed: 11/11/2020						
Dissolved Copper	0.229		0.00500	mg/L	0.250	0.000585	91.4	70-130	1.11	20
Dissolved Iron	0.491		0.0500	mg/L	0.500	ND	98.2	70-130	1.81	20
Dissolved Zinc	0.232		0.00500	mg/L	0.250	0.00341	91.3	70-130	1.54	20

WAK0229

Due: 11/20/20

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Chain of Custody Record

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Anatek Log-In #

Company Name:	Spokane County	Project Manager:	Jake Saxon
Address:	1026 W. Broadway Avenue	Project Name & # :	Sand Filter
City: Spokane	State: WA Zip: 99260	Email Address :	JSAXON@spokanecounty.org
Phone:	(509) 477-7245	Purchase Order #:	
Fax:		Sampler Name & phone:	(509)995-0557

Turn Around

Please refer to our normal turn around times at:
http://www.anateklabs.com/services/guidelines/reporting.asp

__Normal __Next Day* __2nd Day* __Other*_____

*All rush order requests must be prior approved.

__Phone __Mail __Fax x Email

Provide Sample Description

stormwater influent and effluent

List Analyses Requested

Lab ID	Sample Identification	Sampling Date/Time	Matrix	Preservative:	# of Containers	Sample Volume	TSS SM 2540D	Cu Zn Fe Total EPA 200.8 ICP/MS	Cu Zn Fe Dissolved EPA 200.8 ICP/MS	NWTPH, Ecology NWTPH-Dx	Hardness as CaCO3 SM 2340B ICP	Ortho-phosphate SM 4500-P G	Total Phosphorus SM 4500-P F			
	INF11052020-1	11/6/2020 9:30am	water		4		x		x		x	x	x			
	INF11052020-2	11/6/2020 9:30am	water		3				x		x	x	x			
	EFF11052020-1	11/6/2020 9:30am	water		4		x		x		x	x	x			
	EFF11052020-2	11/6/2020 9:30am	water		3				x		x	x	x			

Note Special Instructions/Comments

Please send results to Jake Saxon JSAXON@spokanecounty.org and Aimee Navickis-Brasch aimeen@osbornconsulting.com

SW125

Inspection Checklist

Received Intact?	Y	N
Labels & Chains Agree?	Y	N
Containers Sealed?	Y	N
VOC Head Space?	Y	N

Inc:

Temperature (°C): 6.5°/6.3° ER7

Preservative: H2SO4 2002883 42

pH 260105

Date & Time: 11-6-20 1400

Inspected By: MWG

	Printed Name	Signature	Company	Date	Time
Relinquished by	Kevin Flanagan		Osborn Consulting	11/6/2020	1231
Received by	Brock Gonya		Anatek	11-6-20	1246
Relinquished by					
Received by					
Relinquished by					
Received by					

Form COC01.00 - Eff 1 Mar 2015

Page 1 of 1

Samples submitted to Anatek Labs may be subcontracted to other accredited labs if necessary. This message serves as notice of this possibility. Sub-contracted analyses will be clearly noted on the analytical report.

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Client:	Spokane County	Work Order:	WAK0519
Address:	1026 W. Broadway Ave.	Project:	Sand Filter
	Spokane, WA 99260-0430	Reported:	11/30/2020 14:42
Attn:	Jake Saxon		

Analytical Results Report

Sample Location:	INF11132020-1		
Lab/Sample Number:	WAK0519-01	Collect Date:	11/13/20 16:30
Date Received:	11/16/20 16:02	Collected By:	
Matrix:	Water		

Analyte	Result	Units	PQL	Analyzed	Analyst	Method	Qualifier
Inorganics							
Hardness	103	mg CaCO3/L	6.00	11/23/20 10:00	ARY	SM 2340 C	
Total P	1.15	mg/L	0.200	11/25/20 10:39	SAG	SM 4500-P H	
TSS	52.0	mg/L	2.00	11/20/20 14:00	BAS	SM 2540 D	
Metals by ICP-MS							
Copper	0.0103	mg/L	0.00100	11/24/20 14:00	TRC	EPA 200.8	
Dissolved Copper	0.00345	mg/L	0.00100	11/30/20 11:22	TRC	EPA 200.8	
Zinc	0.0739	mg/L	0.00100	11/24/20 14:00	TRC	EPA 200.8	
Dissolved Zinc	0.0403	mg/L	0.00100	11/30/20 11:22	TRC	EPA 200.8	
Hydrocarbons							
Diesel	ND	mg/L	0.160	11/19/20 8:42	ARC	NWTPH-Dx	
Lube Oil	0.522	mg/L	0.400	11/19/20 8:42	ARC	NWTPH-Dx	
Mineral Oil	ND	mg/L	0.160	11/19/20 8:42	ARC	NWTPH-Dx	
Surrogate: n-Hexacosane	*67.8%*		*50-150*	*11/19/20 8:42*	*ARC*	*NWTPH-Dx*	

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Analytical Results Report

(Continued)

Sample Location:	INF11132020-2		
Lab/Sample Number:	WAK0519-02	Collect Date:	11/13/20 16:30
Date Received:	11/16/20 16:02	Collected By:	
Matrix:	Water		

Analyte	Result	Units	PQL	Analyzed	Analyst	Method	Qualifier
Inorganics							
Total P	1.13	mg/L	0.200	11/25/20 11:00	SAG	SM 4500-P H	
Metals by ICP-MS							
Copper	0.0103	mg/L	0.00100	11/24/20 14:07	TRC	EPA 200.8	
Zinc	0.0734	mg/L	0.00100	11/24/20 14:07	TRC	EPA 200.8	

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Analytical Results Report

(Continued)

Sample Location:	EFF11132020-1		
Lab/Sample Number:	WAK0519-03	Collect Date:	11/13/20 16:30
Date Received:	11/16/20 16:02	Collected By:	
Matrix:	Water		

Analyte	Result	Units	PQL	Analyzed	Analyst	Method	Qualifier
Inorganics							
Hardness	152	mg CaCO3/L	6.00	11/23/20 10:00	ARY	SM 2340 C	
Total P	0.236	mg/L	0.200	11/25/20 10:45	SAG	SM 4500-P H	
TSS	23.0	mg/L	1.00	11/20/20 14:00	BAS	SM 2540 D	
Metals by ICP-MS							
Copper	0.0108	mg/L	0.00100	11/24/20 14:09	TRC	EPA 200.8	
Dissolved Copper	0.00590	mg/L	0.00100	11/30/20 11:24	TRC	EPA 200.8	
Zinc	0.0576	mg/L	0.00100	11/24/20 14:09	TRC	EPA 200.8	
Dissolved Zinc	0.0516	mg/L	0.00100	11/30/20 11:24	TRC	EPA 200.8	
Hydrocarbons							
Diesel	ND	mg/L	0.160	11/19/20 9:38	ARC	NWTPH-Dx	
Lube Oil	0.601	mg/L	0.400	11/19/20 9:38	ARC	NWTPH-Dx	
Mineral Oil	ND	mg/L	0.160	11/19/20 9:38	ARC	NWTPH-Dx	
Surrogate: n-Hexacosane	*80.0%*		*50-150*	*11/19/20 9:38*	*ARC*	*NWTPH-Dx*	

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Analytical Results Report

(Continued)

Sample Location: EFF11132020-2
Lab/Sample Number: WAK0519-04 Collect Date: 11/13/20 16:30
Date Received: 11/16/20 16:02 Collected By:
Matrix: Water

Analyte	Result	Units	PQL	Analyzed	Analyst	Method	Qualifier
Inorganics							
Total P	0.668	mg/L	0.200	11/25/20 10:48	SAG	SM 4500-P H	
Metals by ICP-MS							
Copper	0.0108	mg/L	0.00100	11/24/20 14:25	TRC	EPA 200.8	
Zinc	0.0575	mg/L	0.00100	11/24/20 14:25	TRC	EPA 200.8	

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Analytical Results Report

(Continued)

Sample Location:	INF-DI		
Lab/Sample Number:	WAK0519-05	Collect Date:	11/13/20 16:30
Date Received:	11/16/20 16:02	Collected By:	
Matrix:	Water		

Analyte	Result	Units	PQL	Analyzed	Analyst	Method	Qualifier
Metals by ICP-MS							
Dissolved Copper	<0.00003	mg/L	0.00100	11/30/20 11:26	TRC	EPA 200.8	
Dissolved Zinc	0.0110	mg/L	0.00100	11/30/20 11:26	TRC	EPA 200.8	

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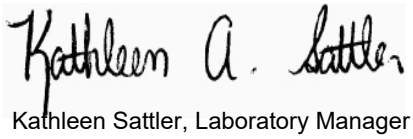
Analytical Results Report

(Continued)

Sample Location:	EFF-DI		
Lab/Sample Number:	WAK0519-06	Collect Date:	11/13/20 16:30
Date Received:	11/16/20 16:02	Collected By:	
Matrix:	Water		

Analyte	Result	Units	PQL	Analyzed	Analyst	Method	Qualifier
Metals by ICP-MS							
Dissolved Copper	<0.00003	mg/L	0.00100	11/30/20 11:29	TRC	EPA 200.8	
Dissolved Zinc	0.00992	mg/L	0.00100	11/30/20 11:29	TRC	EPA 200.8	

Authorized Signature,



Kathleen Sattler, Laboratory Manager

PQL	Practical Quantitation Limit
ND	Not Detected
MCL	EPA's Maximum Contaminant Level
Dry	Sample results reported on a dry weight basis
*	Not a certified analyte

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Certifications

Code	Description	Facility	Number
W WA DOE	Washington Department of Ecology	Anatek-Spokane, WA	C585

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Quality Control Data

Inorganics

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAK0655 - W Wet Chem										
Blank (BAK0655-BLK1)					Prepared & Analyzed: 11/23/2020					
Hardness	ND		3.00	mg CaCO3/L						
Blank (BAK0655-BLK2)					Prepared & Analyzed: 11/23/2020					
Hardness	ND		3.00	mg CaCO3/L						
LCS (BAK0655-BS1)					Prepared & Analyzed: 11/23/2020					
Hardness	101			mg CaCO3/L	100		101	90-110		
LCS Dup (BAK0655-BSD1)					Prepared & Analyzed: 11/23/2020					
Hardness	102			mg CaCO3/L	100		102	90-110	1.01	20
Duplicate (BAK0655-DUP1)		**Source: WAK0519-03**			Prepared & Analyzed: 11/23/2020					
Hardness	158		6.00	mg CaCO3/L		152			3.82	20
Matrix Spike (BAK0655-MS1)		**Source: WAK0521-09**			Prepared & Analyzed: 11/23/2020					
Hardness	297		6.00	mg CaCO3/L	100	204	93.1	80-120		
Matrix Spike Dup (BAK0655-MSD1)		**Source: WAK0521-09**			Prepared & Analyzed: 11/23/2020					
Hardness	295		6.00	mg CaCO3/L	100	204	91.1	80-120	0.676	20
Batch: BAK0734 - W Filtration										
Blank (BAK0734-BLK1)					Prepared & Analyzed: 11/20/2020					
TSS	ND		1.00	mg/L						
Blank (BAK0734-BLK2)					Prepared & Analyzed: 11/20/2020					
TSS	ND		1.00	mg/L						

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Quality Control Data
(Continued)

Inorganics (Continued)

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAK0734 - W Filtration (Continued)										
Blank (BAK0734-BLK3)					Prepared & Analyzed: 11/20/2020					
TSS	ND		1.00	mg/L						
Blank (BAK0734-BLK4)					Prepared & Analyzed: 11/20/2020					
TSS	ND		1.00	mg/L						
Blank (BAK0734-BLK5)					Prepared & Analyzed: 11/20/2020					
TSS	ND		1.00	mg/L						
Blank (BAK0734-BLK6)					Prepared & Analyzed: 11/20/2020					
TSS	ND		1.00	mg/L						
Blank (BAK0734-BLK7)					Prepared & Analyzed: 11/20/2020					
TSS	ND		1.00	mg/L						
LCS (BAK0734-BS1)					Prepared & Analyzed: 11/20/2020					
TSS	97.0			mg/L	100		97.0	90-110		
LCS (BAK0734-BS2)					Prepared & Analyzed: 11/20/2020					
TSS	96.0			mg/L	100		96.0	90-110		
LCS (BAK0734-BS3)					Prepared & Analyzed: 11/20/2020					
TSS	96.0			mg/L	100		96.0	90-110		
LCS (BAK0734-BS4)					Prepared & Analyzed: 11/20/2020					
TSS	98.0			mg/L	100		98.0	90-110		
LCS Dup (BAK0734-BSD1)					Prepared & Analyzed: 11/20/2020					
TSS	106			mg/L	100		106	90-110	8.87	10

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Quality Control Data
(Continued)

Inorganics (Continued)

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAK0734 - W Filtration (Continued)										
LCS Dup (BAK0734-BSD2)					Prepared & Analyzed: 11/20/2020					
TSS	101			mg/L	100		101	90-110	5.08	10
LCS Dup (BAK0734-BSD3)					Prepared & Analyzed: 11/20/2020					
TSS	103			mg/L	100		103	90-110	7.04	10
LCS Dup (BAK0734-BSD4)					Prepared & Analyzed: 11/20/2020					
TSS	97.0			mg/L	100		97.0	90-110	1.03	10
Duplicate (BAK0734-DUP1)		**Source: WAK0519-03**			Prepared & Analyzed: 11/20/2020					
TSS	22.0		1.00	mg/L		23.0			4.44	20
Duplicate (BAK0734-DUP2)		**Source: WAK0545-02**			Prepared & Analyzed: 11/20/2020					
TSS	24.0		1.00	mg/L		25.0			4.08	20
Duplicate (BAK0734-DUP3)		**Source: WAK0677-01**			Prepared & Analyzed: 11/20/2020					
TSS	1.00		1.00	mg/L		1.00			0.00	20
Duplicate (BAK0734-DUP4)		**Source: WAK0682-02**			Prepared & Analyzed: 11/20/2020					
TSS	9.00		1.00	mg/L		9.00			0.00	20
Matrix Spike (BAK0734-MS1)		**Source: MAK0523-01**			Prepared & Analyzed: 11/20/2020					
TSS	158		2.00	mg/L	100	66.0	92.0	80-120		
Matrix Spike (BAK0734-MS2)		**Source: WAK0567-01**			Prepared & Analyzed: 11/20/2020					
TSS	112		2.00	mg/L	100	17.0	95.0	80-120		
Matrix Spike (BAK0734-MS3)		**Source: WAK0649-01**			Prepared & Analyzed: 11/20/2020					
TSS	114		2.00	mg/L	100	15.0	99.0	80-120		

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Quality Control Data
(Continued)

Inorganics (Continued)

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAK0734 - W Filtration (Continued)										
Matrix Spike (BAK0734-MS4)		**Source: WAK0681-01**			Prepared & Analyzed: 11/20/2020					
TSS	108		2.00	mg/L	100	9.00	99.0	80-120		
Matrix Spike Dup (BAK0734-MSD1)		**Source: MAK0523-01**			Prepared & Analyzed: 11/20/2020					
TSS	148		2.00	mg/L	100	66.0	82.0	80-120	6.54	20
Matrix Spike Dup (BAK0734-MSD2)		**Source: WAK0567-01**			Prepared & Analyzed: 11/20/2020					
TSS	110		2.00	mg/L	100	17.0	93.0	80-120	1.80	20
Matrix Spike Dup (BAK0734-MSD3)		**Source: WAK0649-01**			Prepared & Analyzed: 11/20/2020					
TSS	126		2.00	mg/L	100	15.0	111	80-120	10.0	20
Matrix Spike Dup (BAK0734-MSD4)		**Source: WAK0681-01**			Prepared & Analyzed: 11/20/2020					
TSS	112		2.00	mg/L	100	9.00	103	80-120	3.64	20
Batch: BAK0798 - W FIA										
Blank (BAK0798-BLK1)					Prepared & Analyzed: 11/25/2020					
Total P	ND		0.00500	mg/L						
Blank (BAK0798-BLK2)					Prepared & Analyzed: 11/25/2020					
Total P	ND		0.00500	mg/L						
Blank (BAK0798-BLK3)					Prepared & Analyzed: 11/25/2020					
Total P	ND		0.00500	mg/L						
Blank (BAK0798-BLK4)					Prepared & Analyzed: 11/25/2020					
Total P	ND		0.00500	mg/L						

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Quality Control Data
(Continued)

Inorganics (Continued)

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAK0798 - W FIA (Continued)										
LCS (BAK0798-BS1)					Prepared & Analyzed: 11/25/2020					
Total P	0.0967		0.00500	mg/L	0.100		96.7	90-110		
LCS (BAK0798-BS2)					Prepared & Analyzed: 11/25/2020					
Total P	0.0931		0.00500	mg/L	0.100		93.1	90-110		
Matrix Spike (BAK0798-MS1)		**Source: WAK0489-02**			Prepared & Analyzed: 11/25/2020					
Total P	0.185		0.00500	mg/L	0.100	0.0731	112	80-120		
Matrix Spike (BAK0798-MS2)		**Source: WAK0495-02**			Prepared & Analyzed: 11/25/2020					
Total P	0.184		0.00500	mg/L	0.100	0.0681	116	80-120		
Matrix Spike Dup (BAK0798-MSD1)		**Source: WAK0489-02**			Prepared & Analyzed: 11/25/2020					
Total P	0.187		0.00500	mg/L	0.100	0.0731	114	80-120	1.34	20
Matrix Spike Dup (BAK0798-MSD2)		**Source: WAK0495-02**			Prepared & Analyzed: 11/25/2020					
Total P	0.188		0.00500	mg/L	0.100	0.0681	120	80-120	2.16	20

Quality Control Data
(Continued)

Metals by ICP-MS

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAK0657 - W 3010 Digest										
Blank (BAK0657-BLK1)					Prepared: 11/23/2020 Analyzed: 11/24/2020					
Copper	ND		0.00100	mg/L						
Zinc	ND		0.00100	mg/L						
LCS (BAK0657-BS1)					Prepared: 11/23/2020 Analyzed: 11/24/2020					
Zinc	0.0490		0.00100	mg/L	0.0500		97.9	85-115		
Copper	0.0498		0.00100	mg/L	0.0500		99.7	85-115		
Matrix Spike (BAK0657-MS1)		**Source: WAK0519-01**			Prepared: 11/23/2020 Analyzed: 11/24/2020					
Copper	0.0584		0.00100	mg/L	0.0500	0.0103	96.3	70-130		
Zinc	0.123		0.00100	mg/L	0.0500	0.0739	98.0	70-130		
Matrix Spike (BAK0657-MS2)		**Source: WAK0588-01**			Prepared: 11/23/2020 Analyzed: 11/24/2020					
Copper	0.0583		0.00100	mg/L	0.0500	0.0132	90.3	70-130		
Zinc	0.0597		0.00100	mg/L	0.0500	0.0144	90.6	70-130		
Matrix Spike Dup (BAK0657-MSD1)		**Source: WAK0519-01**			Prepared: 11/23/2020 Analyzed: 11/24/2020					
Zinc	0.123		0.00100	mg/L	0.0500	0.0739	98.4	70-130	0.154	20
Copper	0.0586		0.00100	mg/L	0.0500	0.0103	96.5	70-130	0.176	20
Matrix Spike Dup (BAK0657-MSD2)		**Source: WAK0588-01**			Prepared: 11/23/2020 Analyzed: 11/24/2020					
Copper	0.0605		0.00100	mg/L	0.0500	0.0132	94.6	70-130	3.57	20
Zinc	0.0617		0.00100	mg/L	0.0500	0.0144	94.5	70-130	3.16	20
Batch: BAK0775 - W 3010 Digest										
Blank (BAK0775-BLK1)					Prepared: 11/25/2020 Analyzed: 11/30/2020					

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Quality Control Data
(Continued)

Metals by ICP-MS (Continued)

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAK0775 - W 3010 Digest (Continued)										
Blank (BAK0775-BLK1)					Prepared: 11/25/2020 Analyzed: 11/30/2020					
Dissolved Copper	ND		0.00100	mg/L						
Dissolved Zinc	ND		0.00100	mg/L						
LCS (BAK0775-BS1)					Prepared: 11/25/2020 Analyzed: 11/30/2020					
Dissolved Zinc	0.0508		0.00100	mg/L	0.0500		102	85-115		
Dissolved Copper	0.0517		0.00100	mg/L	0.0500		103	85-115		
Matrix Spike (BAK0775-MS1)		**Source: WAK0567-02**			Prepared: 11/25/2020 Analyzed: 11/30/2020					
Dissolved Zinc	0.0539		0.00100	mg/L	0.0500	0.00684	94.1	70-130		
Dissolved Copper	0.0526		0.00100	mg/L	0.0500	0.00313	99.0	70-130		
Matrix Spike Dup (BAK0775-MSD1)		**Source: WAK0567-02**			Prepared: 11/25/2020 Analyzed: 11/30/2020					
Dissolved Copper	0.0522		0.00100	mg/L	0.0500	0.00313	98.1	70-130	0.843	20
Dissolved Zinc	0.0540		0.00100	mg/L	0.0500	0.00684	94.3	70-130	0.213	20

Quality Control Data
(Continued)

Hydrocarbons

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAK0508 - W TPH-Dx										
Blank (BAK0508-BLK1)					Prepared & Analyzed: 11/18/2020					
Diesel	ND		0.160	mg/L						
Lube Oil	ND		0.400	mg/L						
Mineral Oil	ND		0.160	mg/L						
Surrogate: n-Hexacosane			*42.2*	*ppm*	*50.1*		*84.2*	*50-150*		
LCS (BAK0508-BS1)					Prepared & Analyzed: 11/18/2020					
Diesel	0.971		0.160	mg/L	1.01		96.1	70-130		
Lube Oil	ND		0.400	mg/L				70-130		
Surrogate: n-Hexacosane			*47.0*	*ppm*	*50.1*		*93.9*	*50-150*		
Duplicate (BAK0508-DUP1)		**Source: WAK0416-02**			Prepared: 11/18/2020 Analyzed: 11/19/2020					
Diesel	ND		0.160	mg/L		ND				20
Lube Oil	ND		0.400	mg/L		ND				20
Mineral Oil	ND		0.160	mg/L		ND				20
Surrogate: n-Hexacosane			*46.6*	*ppm*	*50.1*		*92.9*	*50-150*		
Matrix Spike (BAK0508-MS1)		**Source: WAK0416-01**			Prepared: 11/18/2020 Analyzed: 11/19/2020					
Diesel	0.876		0.160	mg/L	1.01	ND	86.7	70-130		
Lube Oil	ND		0.400	mg/L		ND		70-130		
Surrogate: n-Hexacosane			*46.0*	*ppm*	*50.1*		*91.8*	*50-150*		
Matrix Spike Dup (BAK0508-MSD1)		**Source: WAK0416-01**			Prepared: 11/18/2020 Analyzed: 11/19/2020					
Diesel	0.854		0.160	mg/L	1.01	ND	84.6	70-130	2.48	20
Lube Oil	ND		0.400	mg/L		ND		70-130		20
Surrogate: n-Hexacosane			*44.2*	*ppm*	*50.1*		*88.2*	*50-150*		

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Chain of Custody Record

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Anatek Log-In #

WAK0519

Due: 12/03/20

Company Name: Spokane County	Project Manager: Jake Saxon
Address: 1026 W. Broadway Avenue	Project Name & # : Sand Filter
City: Spokane State: WA Zip: 99260	Email Address : JSAXON@spokanecounty.org
Phone: (509) 477-7245	Purchase Order #:
Fax:	Sampler Name & phone: (509)995-0557

Turn Aro

Please refer to our normal turn...
http://www.anateklabs.com/services/guidelines/reporting.asp

__Normal __Next Day* __2nd Day* __Other*_____

*All rush order requests must be prior approved.

__Phone __Mail __Fax x Email

Provide Sample Description

stormwater influent and effluent

List Analyses Requested

Lab ID	Sample Identification	Sampling Date/Time	Matrix	# of Containers	Sample Volume	TSS SM 2540D	Cu Zn Total EPA 200.8 ICP/MS	Cu Zn Dissolved EPA 200.8 ICP/MS	NWTPH, Ecology NWTPH-Dx	Hardness as CaCO3 SM 2340B ICP	Ortho-phosphate SM 4500-P G	Total Phosphorus SM 4500-P F
			Preservative:									
	INF11132020-1	11/13/2020 4:30pm	water	5		x	x	x	x	x		x
	INF11132020-2	11/13/2020 4:30pm	water	2			x					x
	EFF11132020-1	11/13/2020 4:30pm	water	5		x	x	x	x	x		x
	EFF11132020-2	11/13/2020 4:30pm	water	2			x					x
	INF-DI	11/13/2020 4:30pm	water	1				x				
	EFF-DI	11/13/2020 4:30pm	water	1				x				

Note Special Instructions/Comments

Please send results to Jake Saxon JSAXON@spokanecounty.org and Aimee Navickis-Brasch aimeen@osbornconsulting.com

SWBS

Inspection Checklist

Received Intact?	(Y)	N
Labels & Chains Agree?	Y	(N)
Containers Sealed?	(Y)	N
VOC Head Space?	Y	N

Temperature (°C): 2.0 | 1.5° IR-1

Preservative: HCl 200747 <2 H_2SO_4 200118 <2 HNO3 200994 <2, 200280 <2 pH 2004 15

Date & Time: 11-16-20 1710

Inspected By:

	Printed Name	Signature	Company	Date	Time
Relinquished by	Megan Enebrauntt		OCI	11/16/20	4:00
Received by	Brock Greger		Anatek	11-16-20	1602
Relinquished by					
Received by					
Relinquished by					
Received by					

Form COC01.00 - Eff 1 Mar 2015

Samples submitted to Anatek Labs may be subcontracted to other accredited labs if necessary. This message serves as notice of this possibility. Sub-contracted analyses will be clearly noted on the analytical report.

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Client:	Spokane County	Work Order:	WAK0512
Address:	1026 W. Broadway Ave.	Project:	Sand Filter
	Spokane, WA 99260-0430	Reported:	11/24/2020 16:26
Attn:	Jake Saxon		

Analytical Results Report

Sample Location:	INF11152020-1		
Lab/Sample Number:	WAK0512-01	Collect Date:	11/15/20 12:00
Date Received:	11/16/20 16:02	Collected By:	
Matrix:	Water		

Analyte	Result	Units	PQL	Analyzed	Analyst	Method	Qualifier
Metals by ICP-MS							
Copper	0.0152	mg/L	0.00100	11/24/20 13:50	TRC	EPA 200.8	
Zinc	0.0770	mg/L	0.00100	11/24/20 13:50	TRC	EPA 200.8	

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Analytical Results Report

(Continued)

Sample Location:	INF11152020-2		
Lab/Sample Number:	WAK0512-02	Collect Date:	11/15/20 12:00
Date Received:	11/16/20 16:02	Collected By:	
Matrix:	Water		

Analyte	Result	Units	PQL	Analyzed	Analyst	Method	Qualifier
Metals by ICP-MS							
Copper	0.0152	mg/L	0.00100	11/24/20 13:53	TRC	EPA 200.8	
Zinc	0.0762	mg/L	0.00100	11/24/20 13:53	TRC	EPA 200.8	

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Analytical Results Report

(Continued)

Sample Location:	EFF11152020-1		
Lab/Sample Number:	WAK0512-03	Collect Date:	11/15/20 12:00
Date Received:	11/16/20 16:02	Collected By:	
Matrix:	Water		

Analyte	Result	Units	PQL	Analyzed	Analyst	Method	Qualifier
Metals by ICP-MS							
Copper	0.0192	mg/L	0.00100	11/24/20 13:55	TRC	EPA 200.8	
Zinc	0.0703	mg/L	0.00100	11/24/20 13:55	TRC	EPA 200.8	

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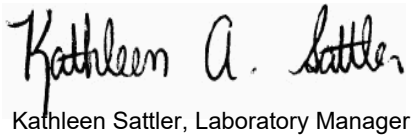
Analytical Results Report

(Continued)

Sample Location:	EFF11152020-2		
Lab/Sample Number:	WAK0512-04	Collect Date:	11/15/20 12:00
Date Received:	11/16/20 16:02	Collected By:	
Matrix:	Water		

Analyte	Result	Units	PQL	Analyzed	Analyst	Method	Qualifier
Metals by ICP-MS							
Copper	0.0188	mg/L	0.00100	11/24/20 13:57	TRC	EPA 200.8	
Zinc	0.0692	mg/L	0.00100	11/24/20 13:57	TRC	EPA 200.8	

Authorized Signature,



Kathleen Sattler, Laboratory Manager

PQL	Practical Quantitation Limit
ND	Not Detected
MCL	EPA's Maximum Contaminant Level
Dry	Sample results reported on a dry weight basis
*	Not a certified analyte

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Certifications

Code	Description	Facility	Number
W WA DOE	Washington Department of Ecology	Anatek-Spokane, WA	C585

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Quality Control Data

Metals by ICP-MS

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAK0657 - W 3010 Digest										
Blank (BAK0657-BLK1)					Prepared: 11/23/2020 Analyzed: 11/24/2020					
Zinc	ND		0.00100	mg/L						
Copper	ND		0.00100	mg/L						
LCS (BAK0657-BS1)					Prepared: 11/23/2020 Analyzed: 11/24/2020					
Zinc	0.0490		0.00100	mg/L	0.0500		97.9	85-115		
Copper	0.0498		0.00100	mg/L	0.0500		99.7	85-115		
Matrix Spike (BAK0657-MS1)		**Source: WAK0519-01**			Prepared: 11/23/2020 Analyzed: 11/24/2020					
Zinc	0.123		0.00100	mg/L	0.0500	0.0739	98.0	70-130		
Copper	0.0584		0.00100	mg/L	0.0500	0.0103	96.3	70-130		
Matrix Spike (BAK0657-MS2)		**Source: WAK0588-01**			Prepared: 11/23/2020 Analyzed: 11/24/2020					
Zinc	0.0597		0.00100	mg/L	0.0500	0.0144	90.6	70-130		
Copper	0.0583		0.00100	mg/L	0.0500	0.0132	90.3	70-130		
Matrix Spike Dup (BAK0657-MSD1)		**Source: WAK0519-01**			Prepared: 11/23/2020 Analyzed: 11/24/2020					
Zinc	0.123		0.00100	mg/L	0.0500	0.0739	98.4	70-130	0.154	20
Copper	0.0586		0.00100	mg/L	0.0500	0.0103	96.5	70-130	0.176	20
Matrix Spike Dup (BAK0657-MSD2)		**Source: WAK0588-01**			Prepared: 11/23/2020 Analyzed: 11/24/2020					
Zinc	0.0617		0.00100	mg/L	0.0500	0.0144	94.5	70-130	3.16	20
Copper	0.0605		0.00100	mg/L	0.0500	0.0132	94.6	70-130	3.57	20

Anatek Labs, Inc.

Chain of Custody Record

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Anatek Log-In #

WAK0512

Due: 12/03/20

Company Name: Spokane County	Project Manager: Jake Saxon
Address: 1026 W. Broadway Avenue	Project Name & # : Sand Filter
City: Spokane State: WA Zip: 99260	Email Address : JSAXON@spokanecounty.org
Phone: (509) 477-7245	Purchase Order #:
Fax:	Sampler Name & phone: (509)995-0557

Turn Aro

Please refer to
http://www.anateklabs.com/services/guidelines/reporting.asp

__Normal
__Next Day*
__2nd Day*
__Other*_____

*All rush order requests must be prior approved.

__Phone
__Mail
__Fax
x Email

Provide Sample Description

stormwater influent and effluent

List Analyses Requested

Preservative:

Lab ID	Sample Identification	Sampling Date/Time	Matrix	# of Containers	Sample Volume	TSS SM 2540D	Cu Zn Total EPA 200.8 ICP/MS	Cu Zn Dissolved EPA 200.8 ICP/MS	NWTPH, Ecology NWTPH-Dx	Hardness as CaCO3 SM 2340B ICP	Ortho-phosphate SM 4500-P G	Total Phosphorus SM 4500-P F			
	INF11152020-1	11/15/2020 12:00pm	water	1			x								
	INF11152020-2	11/15/2020 12:00pm	water	1			x								
	EFF11152020-1	11/15/2020 12:00pm	water	1			x								
	EFF11152020-2	11/15/2020 12:00pm	water	1			x								

Note Special Instructions/Comments

Please send results to Jake Saxon JSAXON@spokanecounty.org and Aimee Navickis-Brasch aimeen@osbornconsulting.com

* no cooler 1.8°/1.6°C IR2
* cooler 2 5.5°/5.6° IR1
* -- Called 11-16-20 about missing INF 11152020

	Printed Name	Signature	Company	Date	Time
Relinquished by	megan ehrebracht		OCI	11/16/20	4:00
Received by	Brock Granger		Anatek	11-16-20	1602
Relinquished by					
Received by					
Relinquished by					
Received by					

Inspection Checklist

Received Intact?	(Y)	N
Labels & Chains Agree?	(Y)	N
Containers Sealed?	(Y)	N
VOC Head Space?	Y	N

hei

Temperature (°C): 2.0°/1.8° IR1
Preservative: HNO3 2002280 <2
pH 2001015
Date & Time: 11-16-20 1715
Inspected By:

Page 1 of 1

Form COC01.00 - Eff 1 Mar 2015

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Client:	Spokane County	Work Order:	WAK0564
Address:	1026 W. Broadway Ave.	Project:	Sand Filter
	Spokane, WA 99260-0430	Reported:	11/30/2020 12:08
Attn:	Jake Saxon		

Analytical Results Report

Sample Location:	INF11172020		
Lab/Sample Number:	WAK0564-01	Collect Date:	11/17/20 09:00
Date Received:	11/17/20 15:56	Collected By:	
Matrix:	Water		

Analyte	Result	Units	PQL	Analyzed	Analyst	Method	Qualifier
Inorganics							
Phosphate/P	0.120	mg/L	0.0180	11/19/20 9:00	SAG	SM 4500-P F	H2
Hydrocarbons							
Diesel	ND	mg/L	0.160	11/26/20 1:35	ARC	NWTPH-Dx	
Lube Oil	1.47	mg/L	0.400	11/26/20 1:35	ARC	NWTPH-Dx	
Mineral Oil	ND	mg/L	0.160	11/26/20 1:35	ARC	NWTPH-Dx	
Surrogate: n-Hexacosane	*80.2%*		*50-150*	*11/26/20 1:35*	*ARC*	*NWTPH-Dx*	

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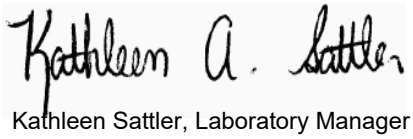
Analytical Results Report

(Continued)

Sample Location: EFF11172020
Lab/Sample Number: WAK0564-02 Collect Date: 11/17/20 09:00
Date Received: 11/17/20 15:56 Collected By:
Matrix: Water

Analyte	Result	Units	PQL	Analyzed	Analyst	Method	Qualifier
Inorganics							
Phosphate/P	0.153	mg/L	0.0180	11/19/20 9:01	SAG	SM 4500-P F	H2
Hydrocarbons							
Diesel	ND	mg/L	0.160	11/26/20 2:30	ARC	NWTPH-Dx	
Lube Oil	1.67	mg/L	0.400	11/26/20 2:30	ARC	NWTPH-Dx	
Mineral Oil	ND	mg/L	0.160	11/26/20 2:30	ARC	NWTPH-Dx	
Surrogate: n-Hexacosane	*87.3%*		*50-150*	*11/26/20 2:30*	*ARC*	*NWTPH-Dx*	

Authorized Signature,



Kathleen Sattler, Laboratory Manager

H2	Initial analysis within holding time, Reanalysis for the required dilution was past holding time.
PQL	Practical Quantitation Limit
ND	Not Detected
MCL	EPA's Maximum Contaminant Level
Dry	Sample results reported on a dry weight basis
*	Not a certified analyte
RPD	Relative Percent Difference
%REC	Percent Recovery
Source	Sample that was spiked or duplicated.

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Certifications

Code	Description	Facility	Number
W WA DOE	Washington Department of Ecology	Anatek-Spokane, WA	C585

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Quality Control Data

Inorganics

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAK0549 - W FIA										
Blank (BAK0549-BLK1)					Prepared & Analyzed: 11/19/2020					
Phosphate/P	ND		0.0180	mg/L						
LCS (BAK0549-BS1)					Prepared & Analyzed: 11/19/2020					
Phosphate/P	0.108		0.0180	mg/L	0.100		108	90-110		
Matrix Spike (BAK0549-MS1)		**Source: WAK0564-02**			Prepared & Analyzed: 11/19/2020					
Phosphate/P	0.270		0.0180	mg/L	0.100	0.153	117	80-120		
Matrix Spike Dup (BAK0549-MSD1)		**Source: WAK0564-02**			Prepared & Analyzed: 11/19/2020					
Phosphate/P	0.262		0.0180	mg/L	0.100	0.153	108	80-120	3.12	20

Quality Control Data

Hydrocarbons

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAK0676 - W TPH-Dx										
Blank (BAK0676-BLK1)					Prepared & Analyzed: 11/25/2020					
Diesel	ND		0.160	mg/L						
Lube Oil	ND		0.400	mg/L						
Mineral Oil	ND		0.160	mg/L						
Surrogate: n-Hexacosane			*48.0*	*ppm*	*50.1*		*95.7*	*50-150*		
LCS (BAK0676-BS1)					Prepared & Analyzed: 11/25/2020					
Diesel	0.988		0.160	mg/L	1.01		97.8	70-130		
Lube Oil	ND		0.400	mg/L				70-130		
Surrogate: n-Hexacosane			*46.5*	*ppm*	*50.1*		*92.9*	*50-150*		
Duplicate (BAK0676-DUP1)		**Source: WAK0521-03**			Prepared: 11/25/2020 Analyzed: 11/26/2020					
Diesel	ND		0.160	mg/L		ND				20
Lube Oil	ND		0.400	mg/L		ND				20
Mineral Oil	ND		0.160	mg/L		ND				20
Surrogate: n-Hexacosane			*46.6*	*ppm*	*50.1*		*93.1*	*50-150*		
Matrix Spike (BAK0676-MS1)		**Source: WAK0567-01**			Prepared: 11/25/2020 Analyzed: 11/26/2020					
Diesel	0.992		0.160	mg/L	1.01	ND	98.3	70-130		
Lube Oil	ND		0.400	mg/L		ND		70-130		
Surrogate: n-Hexacosane			*37.8*	*ppm*	*50.1*		*75.5*	*50-150*		
Matrix Spike Dup (BAK0676-MSD1)		**Source: WAK0567-01**			Prepared: 11/25/2020 Analyzed: 11/26/2020					
Diesel	1.00		0.160	mg/L	1.01	ND	99.3	70-130	1.04	20
Lube Oil	ND		0.400	mg/L		ND		70-130		20
Surrogate: n-Hexacosane			*36.6*	*ppm*	*50.1*		*73.1*	*50-150*		

Anatek Labs, Inc.

Chain of Custody Record

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Anatek Log-In #

WAK0564

Due: 12/04/20

Company Name:	Spokane County	Project Manager:	Jake Saxon
Address:	1026 W. Broadway Avenue	Project Name & # :	Sand Filter
City: Spokane	State: WA Zip: 99260	Email Address :	JSAXON@spokanecounty.org
Phone:	(509) 477-7245	Purchase Order #:	
Fax:		Sampler Name & phone:	(509)995-0557

Turn Arour

Please refer to our ...
http://www.anateklabs.com/services/guidelines/reporting.asp

__Normal
__Next Day*
__2nd Day*
__Other*_____

*All rush order requests must be prior approved.

__Phone
__Mail
__Fax
x Email

Provide Sample Description

stormwater influent and effluent

List Analyses Requested

Preservative:

Lab ID	Sample Identification	Sampling Date/Time	Matrix	# of Containers	Sample Volume	TSS SM 2540D	Cu Zn Total EPA 200.8 ICP/MS	Cu Zn Dissolved EPA 200.8 ICP/MS	NWTPH, Ecology NWTPH-Dx	Hardness as CaCO3 SM 2340B ICP	Ortho-phosphate SM 4500-P G	Total Phosphorus SM 4500-P F			
	INF11172020	11/17/2020 9:00 am	water						x		x				
	EFF11172020	11/17/2020 9:00 am	water						x		x				

Note Special Instructions/Comments

Please send results to Jake Saxon JSAXON@spokanecounty.org and Aimee Navickis-Brasch aimeen@osbornconsulting.com

Inspection Checklist

Received Intact?	Y	N
Labels & Chains Agree?	Y	N
Containers Sealed?	Y	N
VOC Head Space?	Y	N

hd / Cl

Temperature (°C): 4.4 / 4.2 IR#1

Preservative: HCl 2002447<2

Date & Time: 16:42 11/17/20

Inspected By:

	Printed Name	Signature	Company	Date	Time
Relinquished by	Kevin Flanagan		Osborn Consulting	11/17/20	4:00PM
Received by	KScott		Anatek	11/17/2020	1656
Relinquished by					
Received by					
Relinquished by					
Received by					

Form COC01.00 - Eff 1 Mar 2015

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Client:	Spokane County	Work Order:	WAK0862
Address:	1026 W. Broadway Ave.	Project:	Sand Filter
	Spokane, WA 99260-0430	Reported:	12/10/2020 08:11
Attn:	Jake Saxon		

Analytical Results Report

Sample Location:	INF11252020		
Lab/Sample Number:	WAK0862-01	Collect Date:	11/25/20 09:30
Date Received:	11/25/20 13:50	Collected By:	
Matrix:	Wastewater		

Analyte	Result	Units	PQL	Analyzed	Analyst	Method	Qualifier
Inorganics							
Phosphate/P	0.0661	mg/L	0.0180	11/25/20 14:57	SAG	SM 4500-P G	
Hydrocarbons							
Diesel	0.618	mg/L	0.160	12/8/20 20:21	ARC	NWTPH-Dx	T10
Lube Oil	0.630	mg/L	0.400	12/8/20 20:21	ARC	NWTPH-Dx	
Mineral Oil	ND	mg/L	0.160	12/8/20 20:21	ARC	NWTPH-Dx	
Surrogate: n-Hexacosane	*96.9%*		*50-150*	*12/8/20 20:21*	*ARC*	*NWTPH-Dx*	

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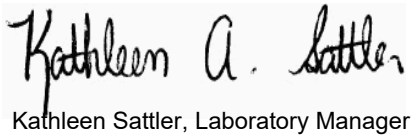
Analytical Results Report

(Continued)

Sample Location:	EFF11252020		
Lab/Sample Number:	WAK0862-02	Collect Date:	11/25/20 09:30
Date Received:	11/25/20 13:50	Collected By:	
Matrix:	Wastewater		

Analyte	Result	Units	PQL	Analyzed	Analyst	Method	Qualifier
Inorganics							
Phosphate/P	<0.018	mg/L	0.0180	11/25/20 14:57	SAG	SM 4500-P G	
Hydrocarbons							
Diesel	0.523	mg/L	0.160	12/8/20 21:17	ARC	NWTPH-Dx	T10
Lube Oil	0.401	mg/L	0.400	12/8/20 21:17	ARC	NWTPH-Dx	
Mineral Oil	ND	mg/L	0.160	12/8/20 21:17	ARC	NWTPH-Dx	
Surrogate: n-Hexacosane	*88.4%*		*50-150*	*12/8/20 21:17*	*ARC*	*NWTPH-Dx*	

Authorized Signature,



Kathleen Sattler, Laboratory Manager

T10	Non-target analyte in diesel and lube oil range, tentatively identified as heavy fuel oil.
PQL	Practical Quantitation Limit
ND	Not Detected
MCL	EPA's Maximum Contaminant Level
Dry	Sample results reported on a dry weight basis
*	Not a certified analyte
RPD	Relative Percent Difference
%REC	Percent Recovery
Source	Sample that was spiked or duplicated.

Anatek Labs, Inc.

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Certifications

Code	Description	Facility	Number
W WA DOE	Washington Department of Ecology	Anatek-Spokane, WA	C585

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Quality Control Data

Inorganics

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAK0810 - W FIA										
Blank (BAK0810-BLK1)					Prepared & Analyzed: 11/25/2020					
Phosphate/P	ND		0.0180	mg/L						
LCS (BAK0810-BS1)					Prepared & Analyzed: 11/25/2020					
Phosphate/P	0.0965		0.0180	mg/L	0.100		96.5	85-115		
Matrix Spike (BAK0810-MS1)		**Source: WAK0862-02**			Prepared & Analyzed: 11/25/2020					
Phosphate/P	0.108		0.0180	mg/L	0.100	<0.018	108	80-120		
Matrix Spike Dup (BAK0810-MSD1)		**Source: WAK0862-02**			Prepared & Analyzed: 11/25/2020					
Phosphate/P	0.115		0.0180	mg/L	0.100	<0.018	115	80-120	5.65	20

Quality Control Data

Hydrocarbons

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BAL0192 - W TPH-Dx										
Blank (BAL0192-BLK1)					Prepared & Analyzed: 12/8/2020					
Diesel	ND		0.160	mg/L						
Lube Oil	ND		0.400	mg/L						
Mineral Oil	ND		0.160	mg/L						
Surrogate: n-Hexacosane			*46.2*	*ppm*	*50.1*		*92.3*	*50-150*		
LCS (BAL0192-BS1)					Prepared & Analyzed: 12/8/2020					
Diesel	1.06		0.160	mg/L	1.01		105	70-130		
Lube Oil	ND		0.400	mg/L				70-130		
Surrogate: n-Hexacosane			*49.9*	*ppm*	*50.1*		*99.5*	*50-150*		
Duplicate (BAL0192-DUP1)		**Source: WAL0086-01**			Prepared & Analyzed: 12/8/2020					
Diesel	2.62		0.160	mg/L		2.63			0.564	20
Lube Oil	ND		0.400	mg/L		ND				20
Mineral Oil	ND		0.160	mg/L		ND				20
Surrogate: n-Hexacosane			*51.3*	*ppm*	*50.1*		*102*	*50-150*		

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Chain of Custody Record

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Anatek Log-In #

WAK0862

Due: 12/11/20

Company Name: Spokane County	Project Manager: Jake Saxon
Address: 1026 W. Broadway Avenue	Project Name & # : Sand Filter
City: Spokane State: WA Zip: 99260	Email Address : JSAXON@spokanecounty.org
Phone: (509) 477-7245	Purchase Order #:
Fax:	Sampler Name & phone: (509)995-0557

Turn Ar

Please refer to our normal turn around times at:
http://www.anateklabs.com/services/guidelines/reporting.asp

__Normal __Next Day* __2nd Day* __Other*_____

*All rush order requests must be prior approved.

__Phone __Mail __Fax x Email

Provide Sample Description

stormwater influent and effluent

List Analyses Requested

Note Special Instructions/Comments

Please send results to Jake Saxon
JSAXON@spokanecounty.org and
Aimee Navickis-Brasch
aimeen@osbornconsulting.com

SWBS

Lab ID	Sample Identification	Sampling Date/Time	Matrix	# of Containers	Sample Volume	TSS SM 2540D	Cu Zn Total EPA 200.8 ICP/MS	Cu Zn Dissolved EPA 200.8 ICP/MS	NWTPH, Ecology NWTPH-Dx	Hardness as CaCO3 SM 2340B ICP	Ortho-phosphate SM 4500-P G	Total Phosphorus SM 4500-P F
				Preservative:								
	INF11252020	11/25/2020 9:30 am	water						x		x	
	EFF11252020	11/25/2020 9:30 am	water						x		x	

Inspection Checklist

Received Intact?	(Y)	N
Labels & Chains Agree?	(Y)	N
Containers Sealed?	(Y)	N
VOC Head Space?	Y	N

h/c/i

Temperature (°C): 4.8/4.6 IR1

Preservative: HCl 2002747<2
pH 2001015

Date & Time: 13:55 11/25/20

Inspected By:

	Printed Name	Signature	Company	Date	Time
Relinquished by	Megan Ehlebracht		OCI	11/25/20	1:50
Received by	Wendy Oz	Wendy Oz	Anatek	11/25/20	1350
Relinquished by					
Received by					
Relinquished by					
Received by					

Form COC01.00 - Eff 1 Mar 2015

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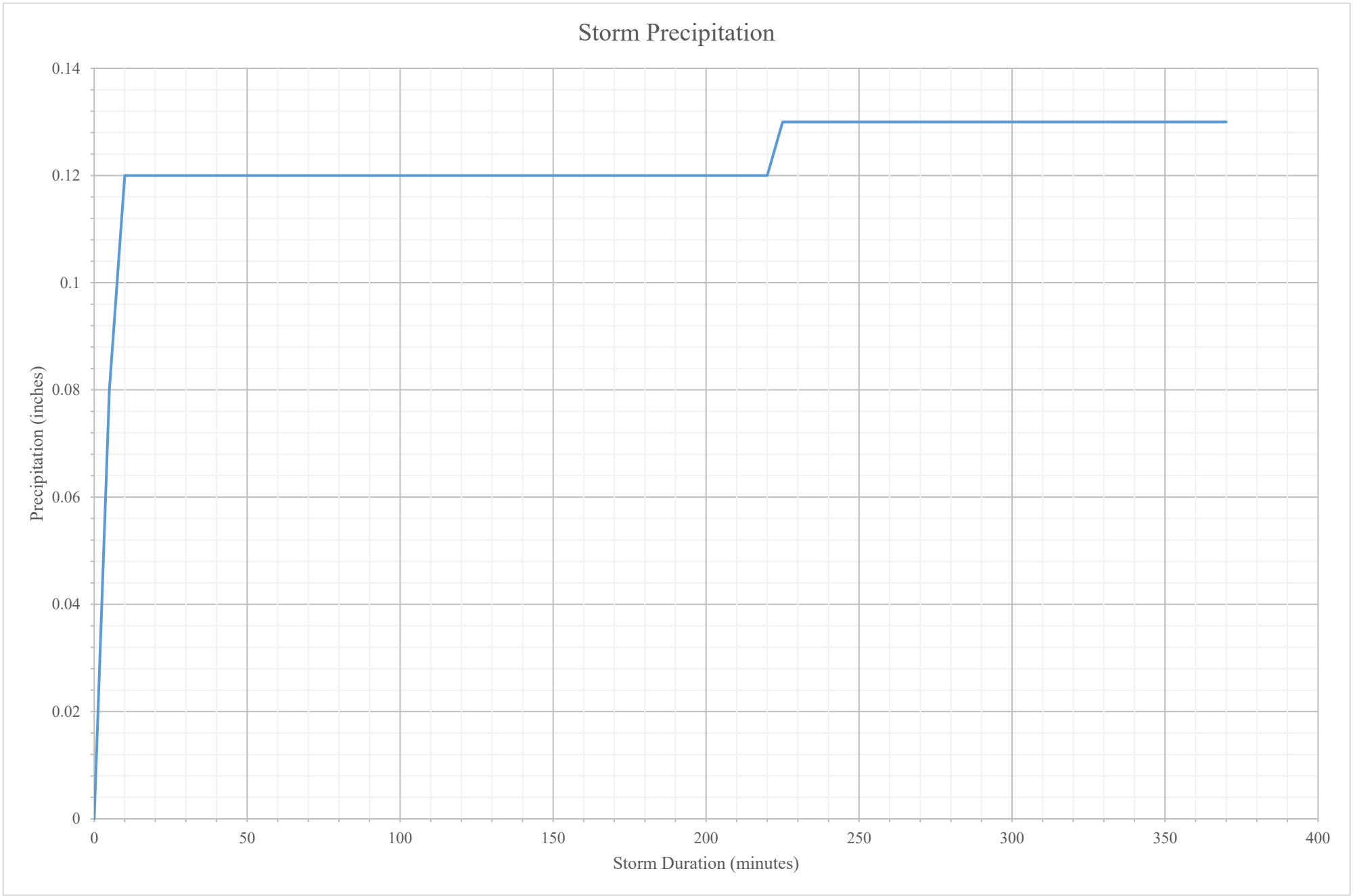
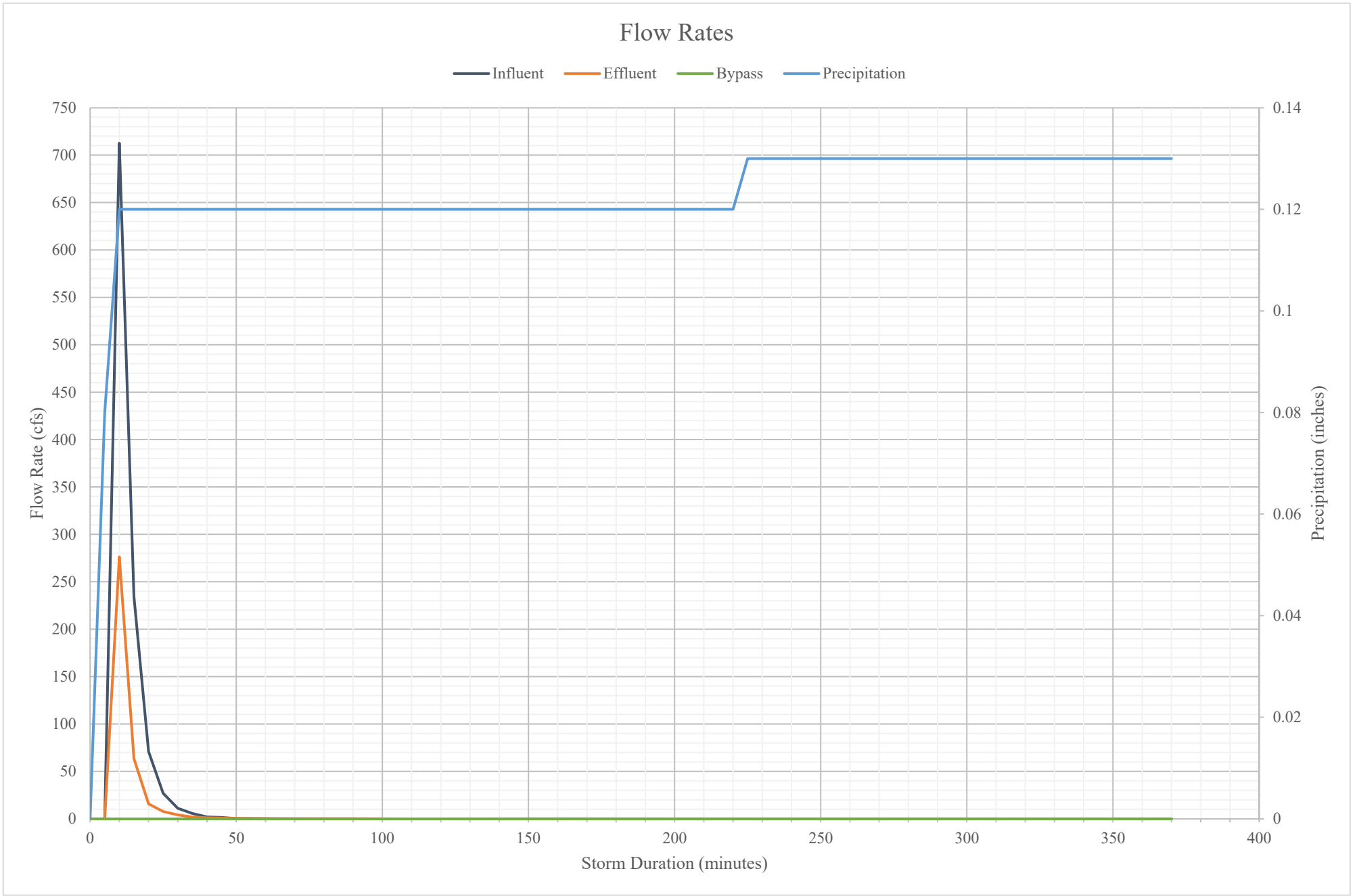
APPENDIX B. STORM REPORTS

	Paramter	Value	Units	Definition	Notes
Storm Data	Storm ID	9/18/2019	-	Identification number for monitored qualifying (?) storm event	
	Storm Start Date and Time	9/18/19 1:25 PM	-	Defines storm event start: 6 hours minimim with ≥ than 0.04" of rain	
	Storm End Date and Time	9/18/19 7:30 PM	-	Defines storm event end: 6 hours minimim with less than 0.04" of rain	
	Total Precipitation Depth	0.13	inches	Cumulative rainfall from the start of the qualifying storm event and the end of the qualifying storm event	
	Storm Duration	6.08	Hours	Duration of qualifying storm event	
	Storm Average Intensity	0.52	in/hr	Total rainfall amount divided by total rainfall duration (e.g., inches per hour)	
	Storm Peak Intensity	0.96	in/hr	Maximum precipitation depth per time interval (5 minutes) converted to in/hr	
	Storm Antecedent Dry Period	201.92	hours	From end of the last rainfall event to start of current rainfall event	
Total Volume	Influent	188.21	ft^3	Total volume of influent from start of event to end of event	
	Effluent	65.58	ft^3	Total volume of effluent from start of event to end of event	
	Bypass	0.00	ft^3	Total volume of bypass from start of event to end of event	
Average Flow Rate	Influent	25.585	gpm	Average influent flow rate during storm event	
	Effluent	5.162	gpm	Average effluent flow rate during storm event	
	Bypass	0.000	gpm	Average bypass flow rate during storm evnt	
Peak Flow Rate	Influent	188.284	gpm	Peak influent flow rate during storm event	
	Effluent	72.979	gpm	Peak effluent flow rate during storm event	
	Peak Bypass	0.000	gpm	Peak bypass flow rate during storm event	
Aliquots	Number of Influent	12	-	Total number of aliquots obtained during qualifying storm event	The maximum of aliquots that can be collected is 45
	Number of Effluent	18	-		
Sample Duration	Influent	1.08	hours	Time in hours between the collection of the first and last aliquots	The duration reflects the time between the first and last aliquots, or the first and 45th aliquot if the number of aliquots reported exceeds 45
	Effluent	1.42	hours		
Threshold	Influent	100.00	L	Volume of stormwater that pass through the influent before a aliquot is collected	
	Effluent	100.00	L	Volume of stormwater that pass through the effluent before a aliquot is collected	
Storm Volume Sampled	% of Influent	22.5%	%	Number of aliquots times the threshold volume, divided by the total storm volume	
	% of Effluent	97.0%	%		

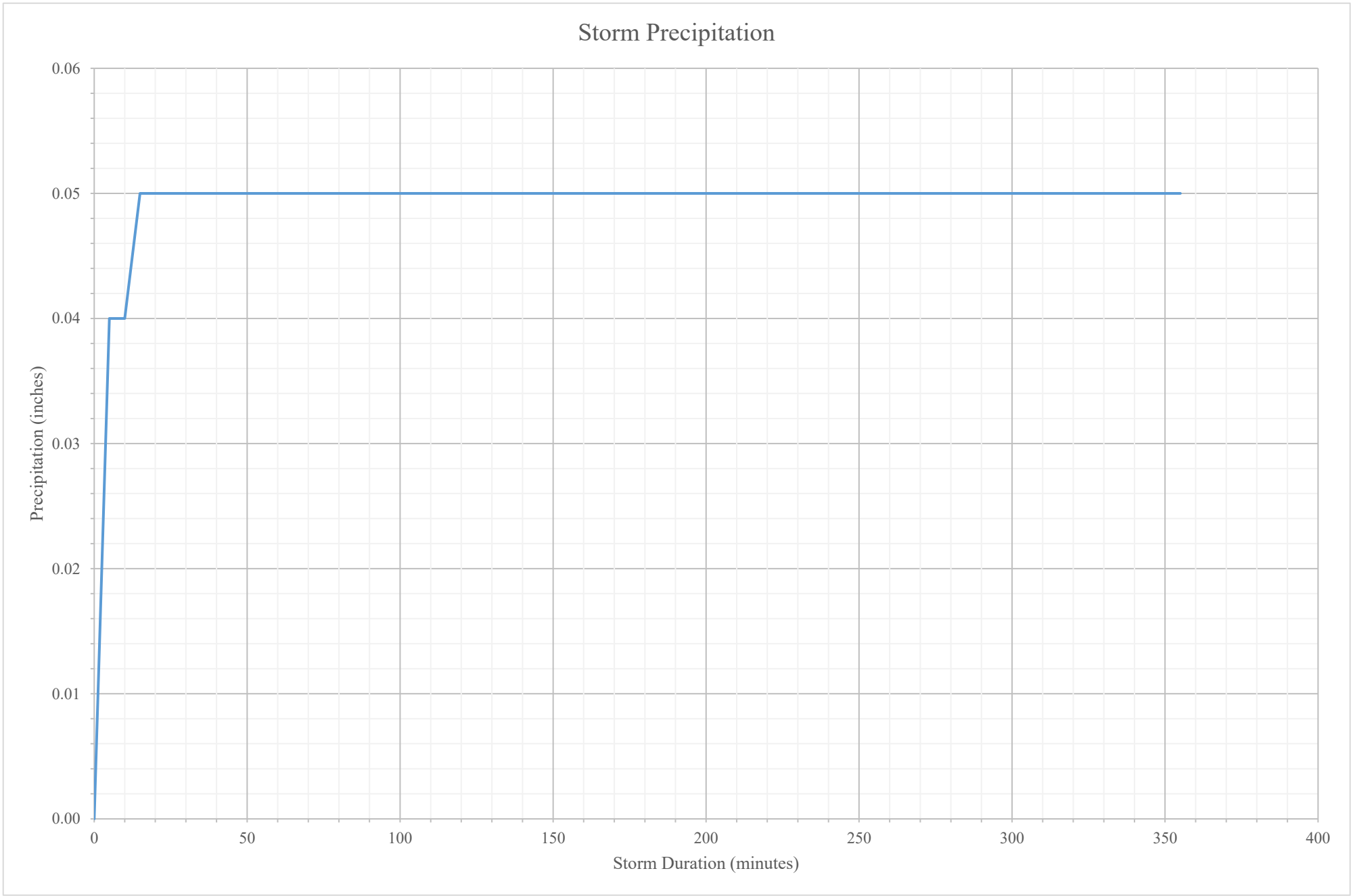

Storm Precipitation
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
Precipitation (inches)
0
50
100
150
200
250
300
350
400
Storm Duration (minutes)

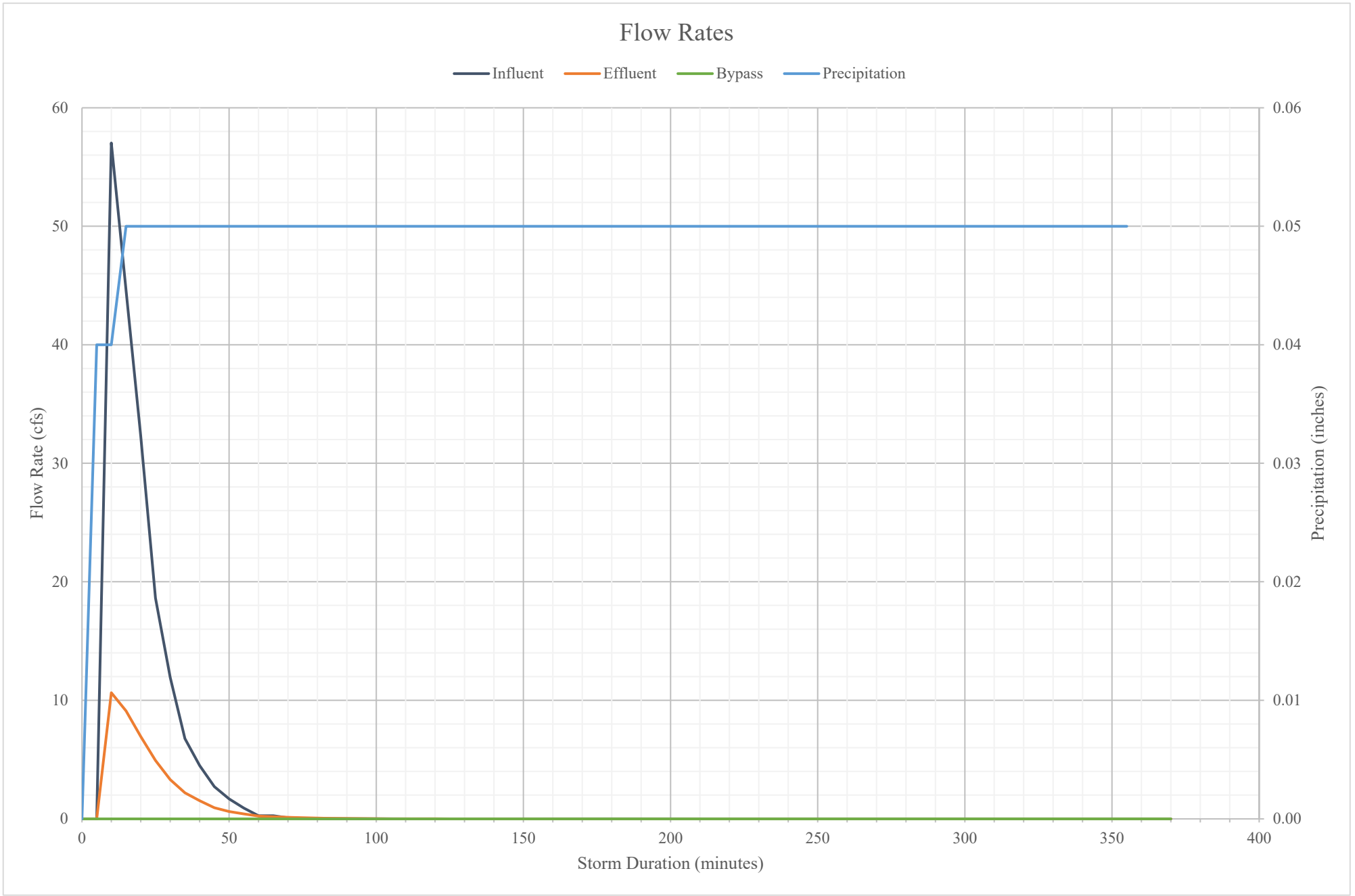

Flow Rates
Influent
Effluent
Bypass
Precipitation
Flow Rate (cfs)
Precipitation (inches)
Storm Duration (minutes)
750
700
650
600
550
500
450
400
350
300
250
200
150
100
50
0
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
0
50
100
150
200
250
300
350
400

Storm Date: 9/18/2019

	Parameter	Units	Influent EMC Measured	Influent Conc. Minimum Limit	Influent Conc. Maximum Limit	Effluent	Removal Efficiency	Detection Limit (DL)	Flags	Notes
Required Parameters	TSS	mg/L	216	20	100	29	86.57%	1		
	Total Copper	mg/L	0.017	N/A	N/A	0.0073	57.06%	0.00007		
	Dissolved Copper	mg/L	0.00542	0.005	0.02	0.00522	3.69%	0.00007		
	Total Zinc	mg/L	0.0979	N/A	N/A	0.0234	76.10%	0.00025		
	Dissolved Zinc	mg/L	0.0759	0.02	0.3	0.0457	39.79%	0.00025		
	Total Phosphorus	mg/L	0.345	0.1	0.5	0.104	69.86%	0.00505		
	Iron	mg/L	3.01	N/A	N/A	0.694	76.94%	0.01		
	Dissolved Iron	mg/L	0.196	N/A	N/A	0.0545	72.19%	0.01		
	NWTPH-Dx									
	Lube Oil	mg/kg	0.605	N/A	N/A	ND	-	0.25		
	Mineral Oil	mg/kg	N/A	N/A	N/A	N/A	-	N/A		
	Diesel	mg/kg	ND	N/A	N/A	ND	-	0.05		
Screening Parameters	PSD									
	>250	µm	N/A	N/A	N/A	N/A	-	N/A		
	250 - 62.5	µm	N/A	N/A	N/A	N/A	-	N/A		
	<62.5	µm	N/A	N/A	N/A	N/A	-	N/A		
	pH	std. units	6.73	N/A	N/A	6.95	-3.27%	N/A		Increased pH in eff
	Orthophosphate	mg/L	0.0465	N/A	N/A	0.03	35.48%	N/A		
	Hardness	mg CaCO3/L	17.5	N/A	N/A	21	-20.00%	0.865		Increased hardness in eff

	Paramter	Value	Units	Definition	Notes
Storm Data	Storm ID	10/18/2019	-	Identification number for monitored qualifying (?) storm event	
	Storm Start Date and Time	10/18/19 12:40 AM	-	Defines storm event start: 6 hours minimim with ≥ than 0.04" of rain	
	Storm End Date and Time	10/18/19 6:30 AM	-	Defines storm event end: 6 hours minimim with less than 0.04" of rain	
	Total Precipitation Depth	0.05	inches	Cumulative rainfall from the start of the qualifying storm event and the end of the qualifying storm event	
	Storm Duration	5.83	Hours	Duration of qualifying storm event	
	Storm Average Intensity	0.18	in/hr	Total rainfall amount divided by total rainfall duration (e.g., inches per hour)	
	Storm Peak Intensity	0.24	in/hr	Maximum precipitation depth per time interval (5 minutes) converted to in/hr	
	Storm Antecedent Dry Period	63.17	hours	From end of the last rainfall event to start of current rainfall event	
Total Volume	Influent	32.09	ft^3	Total volume of influent from start of event to end of event	
	Effluent	7.30	ft^3	Total volume of effluent from start of event to end of event	
	Bypass	0.00	ft^3	Total volume of bypass from start of event to end of event	
Average Flow Rate	Influent	3.199	gpm	Average influent flow rate during storm event	
	Effluent	0.496	gpm	Average effluent flow rate during storm event	
	Bypass	0.000	gpm	Average bypass flow rate during storm evnt	
Peak Flow Rate	Influent	15.067	gpm	Peak influent flow rate during storm event	
	Effluent	2.811	gpm	Peak effluent flow rate during storm event	
	Peak Bypass	0.000	gpm	Peak bypass flow rate during storm event	
Aliquots	Number of Influent	5	-	Total number of aliquots obtained during qualifying storm event	The maximum of aliquots that can be collected is 45
	Number of Effluent	1	-		
Sample Duration	Influent	0.33	hours	Time in hours between the collection of the first and last aliquots	The duration reflects the time between the first and last aliquots, or the first and 45th aliquot if the number of aliquots reported exceeds 45
	Effluent	0.00	hours		
Threshold	Influent	155.00	L	Volume of stormwater that pass through the influent before a aliquot is collected	
	Effluent	155.00	L	Volume of stormwater that pass through the effluent before a aliquot is collected	
Storm Volume Sampled	% of Influent	85.3%	%	Number of aliquots times the threshold volume, divided by the total storm volume	
	% of Effluent	75.0%	%		

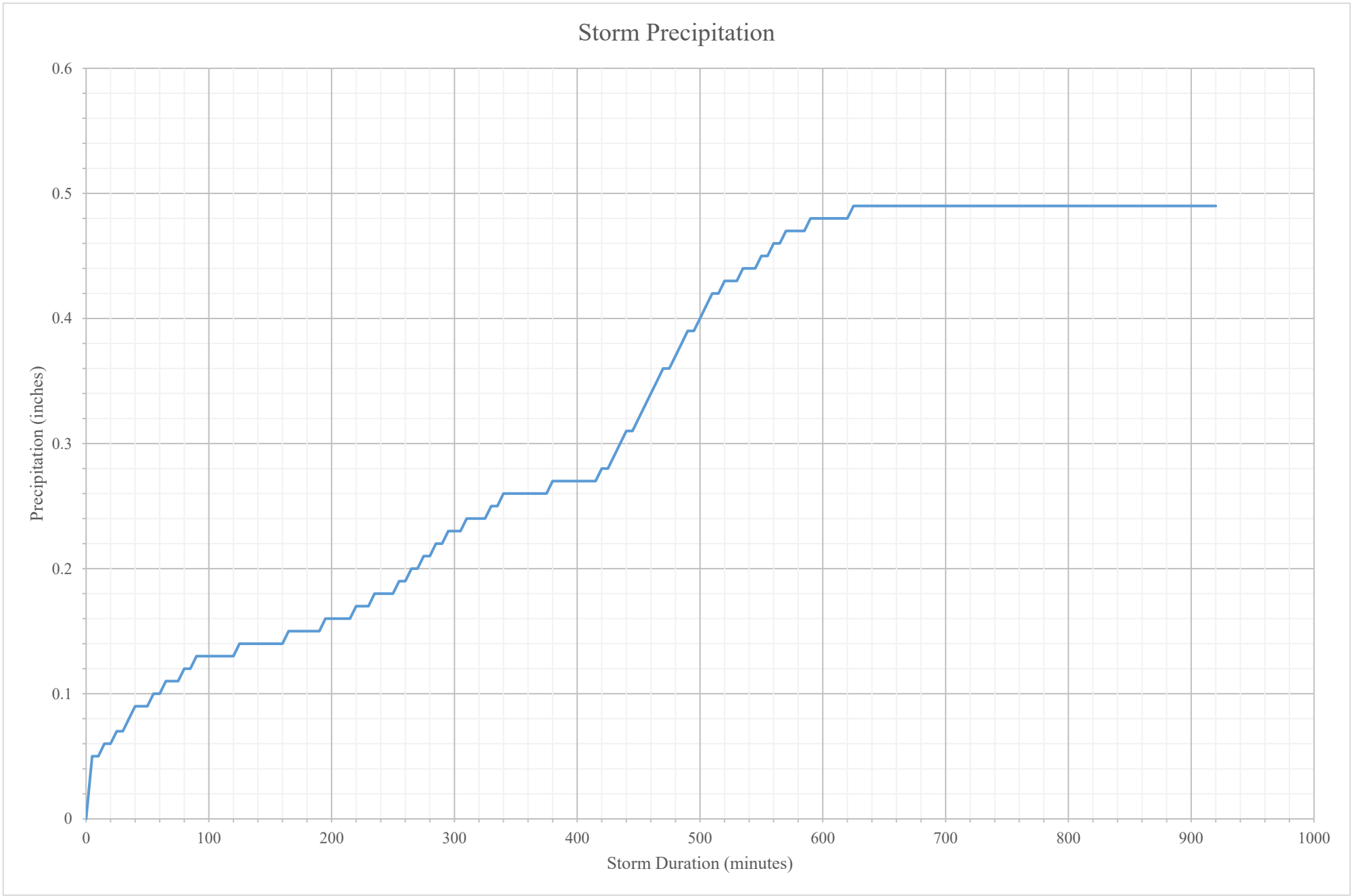

Storm Precipitation
Precipitation (inches)
0.06
0.05
0.04
0.03
0.02
0.01
0.00
0
50
100
150
200
250
300
350
400
Storm Duration (minutes)

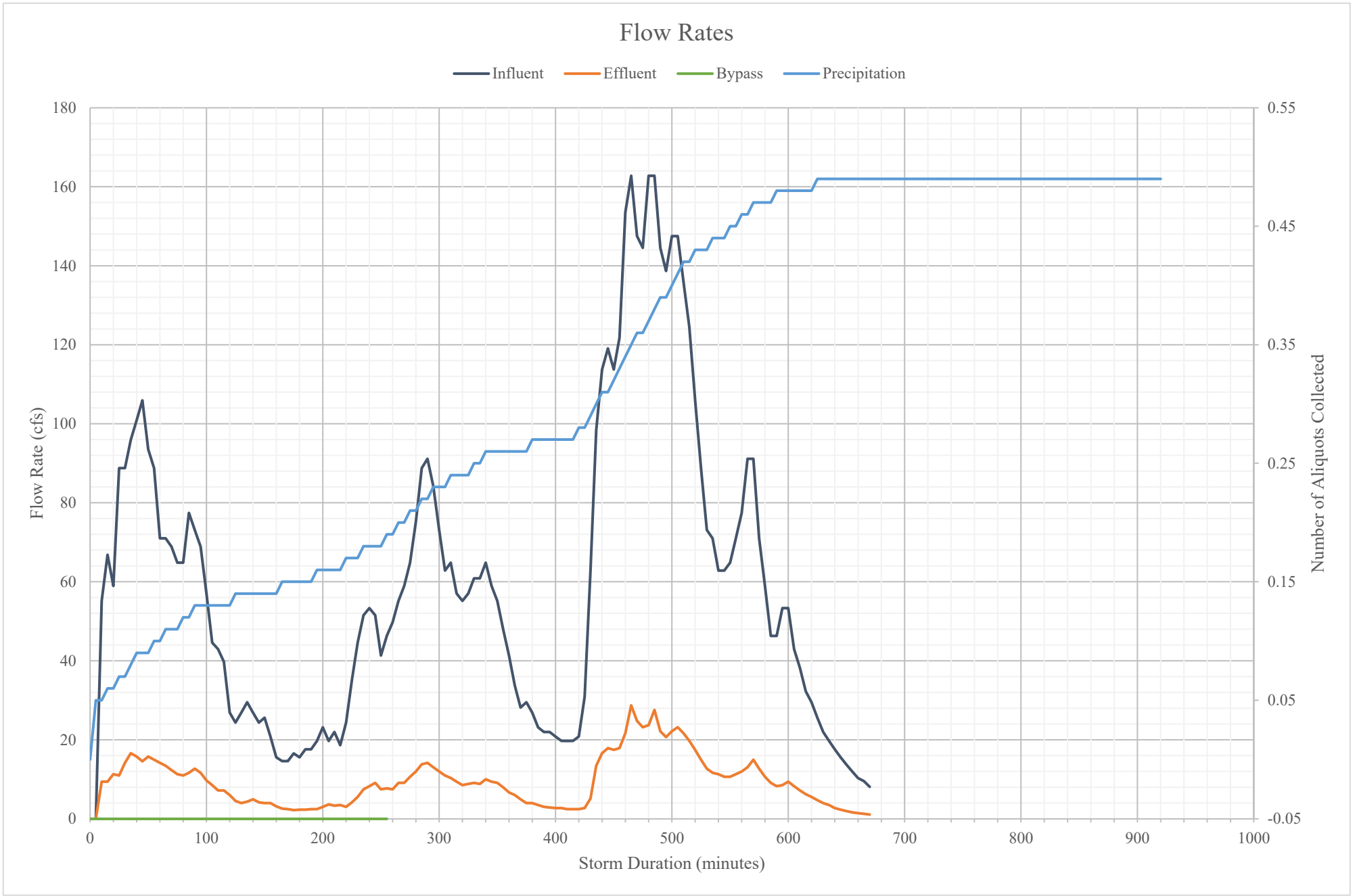

Flow Rates
Influent
Effluent
Bypass
Precipitation
Flow Rate (cfs)
Precipitation (inches)
Storm Duration (minutes)
0
10
20
30
40
50
60
0.00
0.01
0.02
0.03
0.04
0.05
0.06
0
50
100
150
200
250
300
350
400

Storm Date: 10/18/2019

	Parameter	Units	Influent EMC Measured	Influent Conc. Minimum Limit	Influent Conc. Maximum Limit	Effluent	Removal Efficiency	Detection Limit (DL)	Flags	Notes
Required Parameters	TSS	mg/L	100	20	100	39	61.00%	1		
	Total Copper	mg/L	0.0395	N/A	N/A	0.0132	66.58%	0.00007		
	Dissolved Copper	mg/L	0.00671	0.005	0.02	0.00661	1.49%	0.00007		
	Total Zinc	mg/L	0.0776	N/A	N/A	0.0412	46.91%	0.00025		
	Dissolved Zinc	mg/L	0.0432	0.02	0.3	0.0357	17.36%	0.00025		
	Total Phosphorus	mg/L	N/A	0.1	0.5	N/A	-	0.00505		
	Iron	mg/L	1.42	N/A	N/A	1.19	16.20%	0.01		
	Dissolved Iron	mg/L	0.0743	N/A	N/A	0.055	25.98%	0.01		
	NWTPH-Dx									
	Lube Oil	mg/kg	1.24	N/A	N/A	1.11	10.48%	0.25		
	Mineral Oil	mg/kg	N/A	N/A	N/A	N/A	-	N/A		
	Diesel	mg/kg	0.476	N/A	N/A	0.331	30.46%	0.05		
Screening Parameters	PSD									
	>250	µm	N/A	N/A	N/A	N/A	-	N/A		
	250 - 62.5	µm	N/A	N/A	N/A	N/A	-	N/A		
	<62.5	µm	N/A	N/A	N/A	N/A	-	N/A		
	pH	std. units	6.63	N/A	N/A	6.3	4.98%	N/A		
	Orthophosphate	mg/L	N/A	N/A	N/A	N/A	-	N/A		
	Hardness	mg CaCO3/L	29.5	N/A	N/A	28	5.08%	0.865		

	Paramter	Value	Units	Definition	Notes
Storm Data	Storm ID	10/21/2019	-	Identification number for monitored qualifying (?) storm event	
	Storm Start Date and Time	10/21/19 3:45 PM	-	Defines storm event start: 6 hours minimim with ≥ than 0.04" of rain	
	Storm End Date and Time	10/22/19 7:00 AM	-	Defines storm event end: 6 hours minimim with less than 0.04" of rain	
	Total Precipitation Depth	0.49	inches	Cumulative rainfall from the start of the qualifying storm event and the end of the qualifying storm event	
	Storm Duration	15.25	Hours	Duration of qualifying storm event	
	Storm Average Intensity	0.12	in/hr	Total rainfall amount divided by total rainfall duration (e.g., inches per hour)	
	Storm Peak Intensity	0.12	in/hr	Maximum precipitation depth per time interval (5 minutes) converted to in/hr	
	Storm Antecedent Dry Period	14.17	hours	From end of the last rainfall event to start of current rainfall event	
Total Volume	Influent	1393.78	ft^3	Total volume of influent from start of event to end of event	
	Effluent	222.18	ft^3	Total volume of effluent from start of event to end of event	
	Bypass	0.00	ft^3	Total volume of bypass from start of event to end of event	
Average Flow Rate	Influent	15.671	gpm	Average influent flow rate during storm event	
	Effluent	2.498	gpm	Average effluent flow rate during storm event	
	Bypass	0.000	gpm	Average bypass flow rate during storm evnt	
Peak Flow Rate	Influent	43.008	gpm	Peak influent flow rate during storm event	
	Effluent	7.589	gpm	Peak effluent flow rate during storm event	
	Peak Bypass	0.000	gpm	Peak bypass flow rate during storm event	
Aliquots	Number of Influent	>45	-	Total number of aliquots obtained during qualifying storm event	The maximum of aliquots that can be collected is 45
	Number of Effluent	25	-		
Sample Duration	Influent	13.33	hours	Time in hours between the collection of the first and last aliquots	The duration reflects the time between the first and last aliquots, or the first and 45th aliquot i the number of aliquots reported exceeds 45
	Effluent	10.25	hours		
Threshold	Influent	250.00	L	Volume of stormwater that pass through the influent before a aliquot is collected	
	Effluent	250.00	L	Volume of stormwater that pass through the effluent before a aliquot is collected	
Storm Volume Sampled	% of Influent	28.5%	%	Number of aliquots times the threshold volume, divided by the total storm volume	
	% of Effluent	99.4%	%		

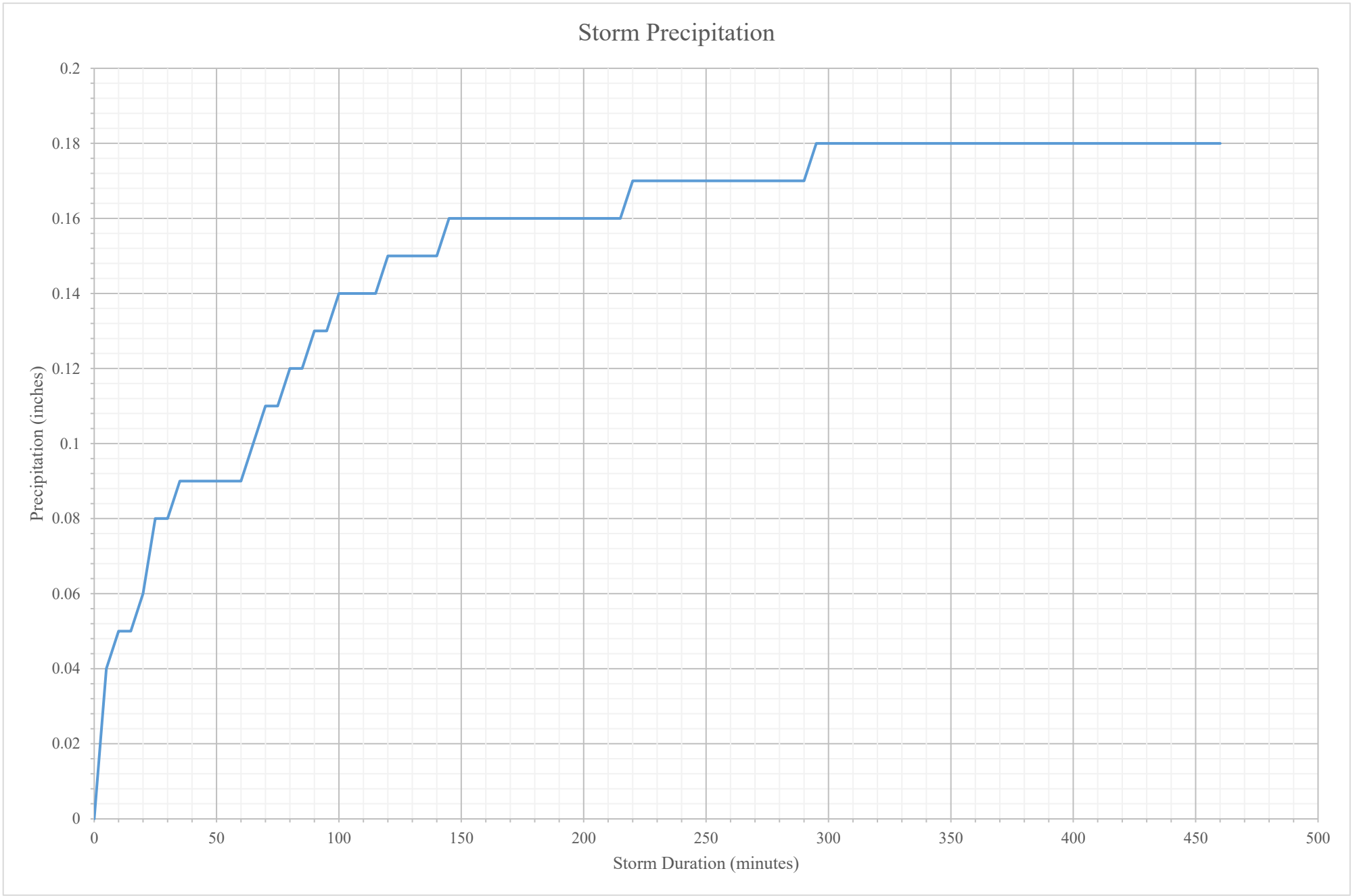

Storm Precipitation
Precipitation (inches)
0.6
0.5
0.4
0.3
0.2
0.1
0
0
100
200
300
400
500
600
700
800
900
1000
Storm Duration (minutes)

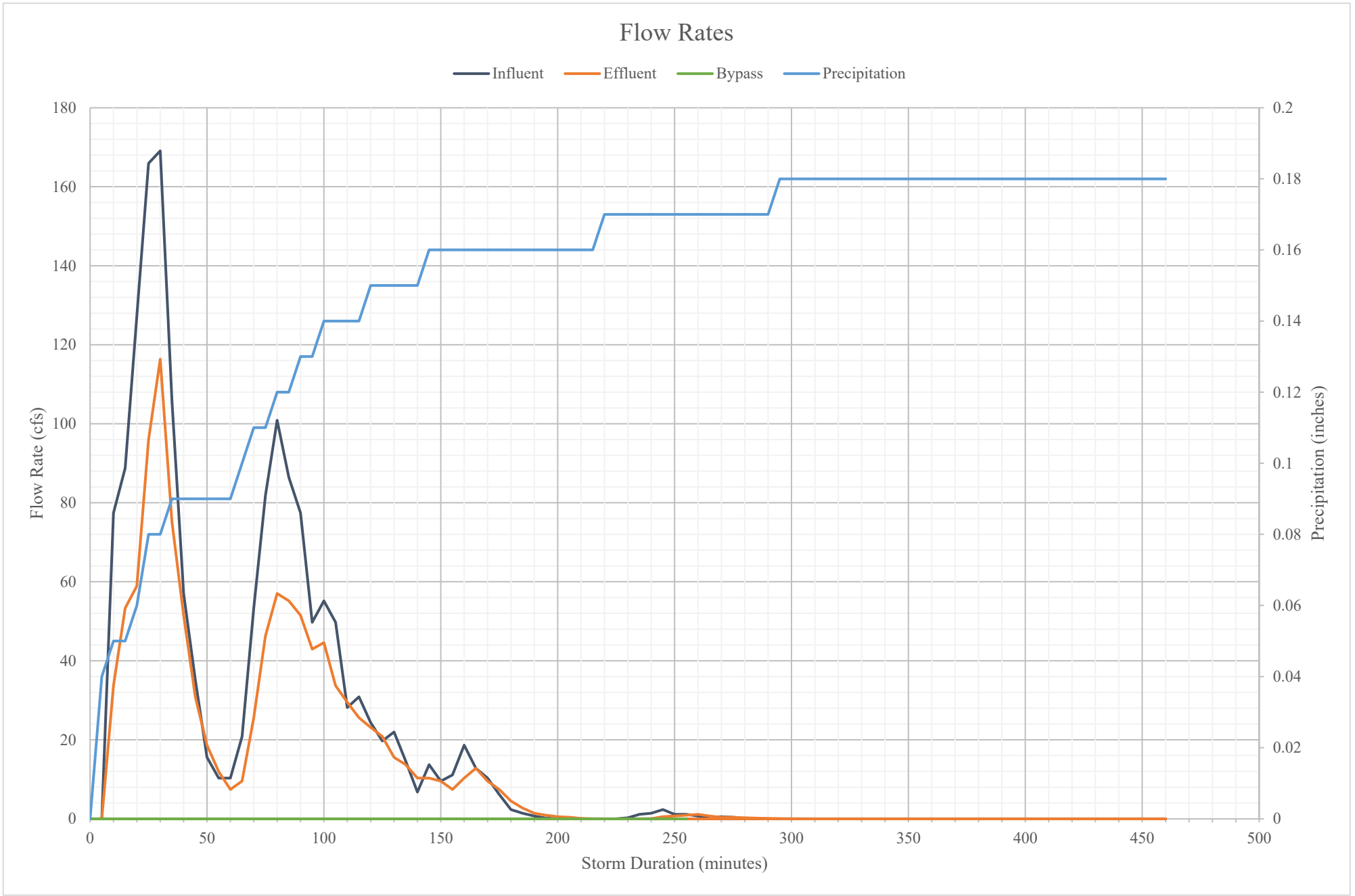

Flow Rates
Influent
Effluent
Bypass
Precipitation
Flow Rate (cfs)
Number of Aliquots Collected
Storm Duration (minutes)
180
160
140
120
100
80
60
40
20
0
0.55
0.45
0.35
0.25
0.15
0.05
-0.05
0
100
200
300
400
500
600
700
800
900
1000

Storm Date: 10/21/2019

	Parameter	Units	Influent EMC Measured	Influent Conc. Minimum Limit	Influent Conc. Maximum Limit	Effluent	Removal Efficiency	Detection Limit (DL)	Flags	Notes
Required Parameters	TSS	mg/L	76	20	100	16	78.95%	1		
	Total Copper	mg/L	0.0182	N/A	N/A	0.00639	64.89%	0.00007		
	Dissolved Copper	mg/L	0.0061	0.005	0.02	0.00338	44.59%	0.00007		
	Total Zinc	mg/L	0.105	N/A	N/A	0.0234	77.71%	0.00025		
	Dissolved Zinc	mg/L	0.0384	0.02	0.3	0.0133	65.36%	0.00025		
	Total Phosphorus	mg/L	N/A	0.1	0.5	N/A	-	0.00505		
	Iron	mg/L	2.42	N/A	N/A	0.547	77.40%	0.01		
	Dissolved Iron	mg/L	0.0653	N/A	N/A	0.0345	47.17%	0.01		
	NWTPH-Dx									
	Lube Oil	mg/kg	1.83	N/A	N/A	0.403	77.98%	0.25		
	Mineral Oil	mg/kg	N/A	N/A	N/A	N/A	-	N/A		
	Diesel	mg/kg	ND	N/A	N/A	ND	-	0.05		
Screening Parameters	PSD									
	>250	µm	N/A	N/A	N/A	N/A	-	N/A		
	250 - 62.5	µm	N/A	N/A	N/A	N/A	-	N/A		
	<62.5	µm	N/A	N/A	N/A	N/A	-	N/A		
	pH	std. units	7	N/A	N/A	7.11	-1.57%	N/A		Increased in pH in eff
	Orthophosphate	mg/L	N/A	N/A	N/A	N/A	-	N/A		
	Hardness	mg CaCO3/L	21.5	N/A	N/A	20.5	4.65%	0.865		

	Paramter	Value	Units	Definition	Notes
Storm Data	Storm ID	11/19/2019	-	Identification number for monitored qualifying (?) storm event	
	Storm Start Date and Time	11/19/19 9:50 AM	-	Defines storm event start: 6 hours minimim with ≥ than 0.04" of rain	
	Storm End Date and Time	11/19/19 5:25 PM	-	Defines storm event end: 6 hours minimim with less than 0.04" of rain	
	Total Precipitation Depth	0.18	inches	Cumulative rainfall from the start of the qualifying storm event and the end of the qualifying storm event	
	Storm Duration	7.58	Hours	Duration of qualifying storm event	
	Storm Average Intensity	0.13	in/hr	Total rainfall amount divided by total rainfall duration (e.g., inches per hour)	
	Storm Peak Intensity	0.24	in/hr	Maximum precipitation depth per time interval (5 minutes) converted to in/hr	
	Storm Antecedent Dry Period	42.75	hours	From end of the last rainfall event to start of current rainfall event	
Total Volume	Influent	296.97	ft^3	Total volume of influent from start of event to end of event	
	Effluent	201.75	ft^3	Total volume of effluent from start of event to end of event	
	Bypass	0.00	ft^3	Total volume of bypass from start of event to end of event	
Average Flow Rate	Influent	8.540	gpm	Average influent flow rate during storm event	
	Effluent	5.485	gpm	Average effluent flow rate during storm event	
	Bypass	0.000	gpm	Average bypass flow rate during storm evnt	
Peak Flow Rate	Influent	44.675	gpm	Peak influent flow rate during storm event	
	Effluent	30.744	gpm	Peak effluent flow rate during storm event	
	Peak Bypass	0.000	gpm	Peak bypass flow rate during storm event	
Aliquots	Number of Influent	40	-	Total number of aliquots obtained during qualifying storm event	The maximum of aliquots that can be collected is 45
	Number of Effluent	27	-		
Sample Duration	Influent	3.25	hours	Time in hours between the collection of the first and last aliquots	The duration reflects the time between the first and last aliquots, or the first and 45th aliquot i the number of aliquots reported exceeds 45
	Effluent	2.58	hours		
Threshold	Influent	207.00	L	Volume of stormwater that pass through the influent before a aliquot is collected	
	Effluent	207.00	L	Volume of stormwater that pass through the effluent before a aliquot is collected	
Storm Volume Sampled	% of Influent	98.5%	%	Number of aliquots times the threshold volume, divided by the total storm volume	
	% of Effluent	97.9%	%		

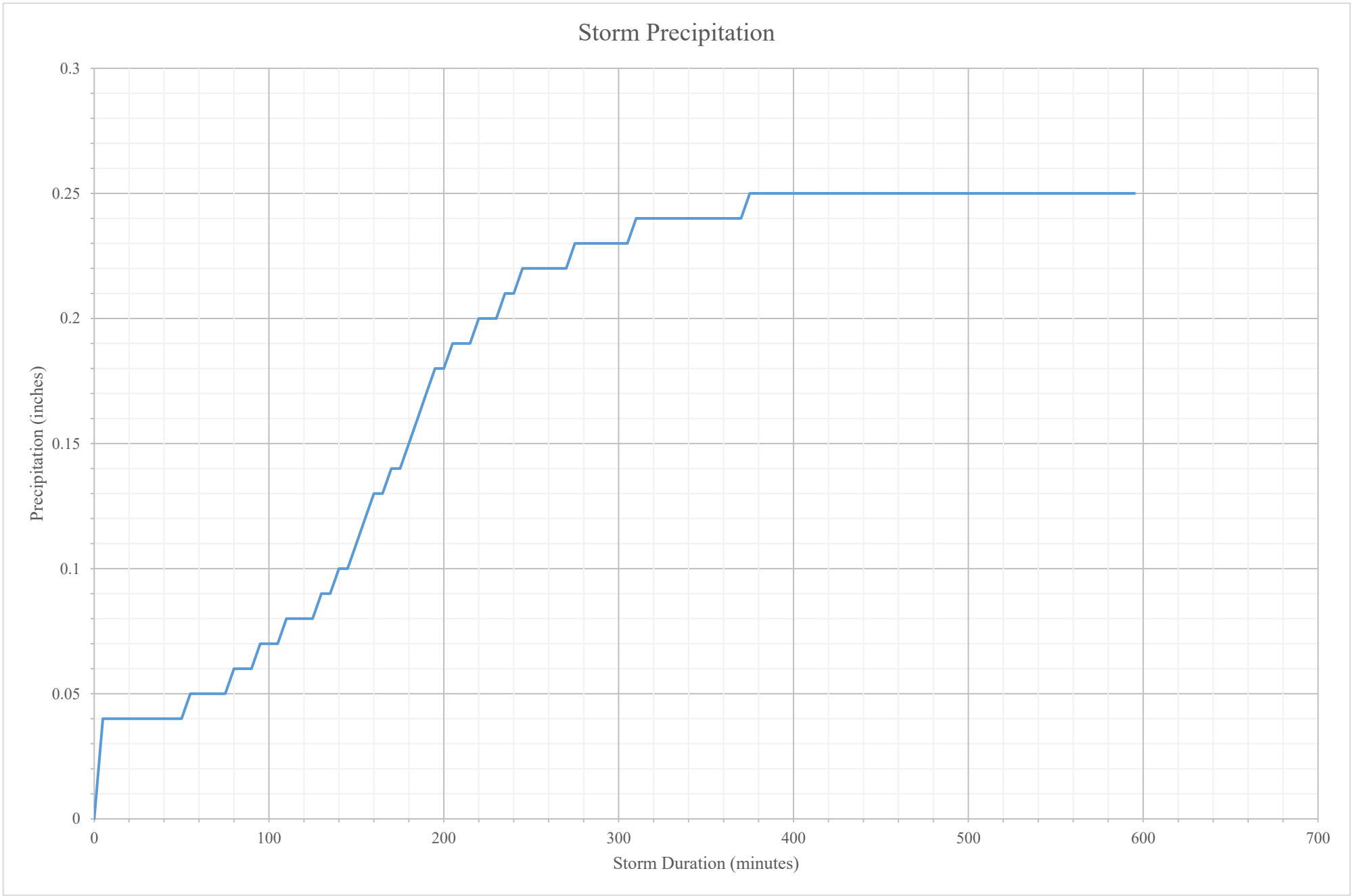

Storm Precipitation
Precipitation (inches)
0.2
0.18
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
0
50
100
150
200
250
300
350
400
450
500
Storm Duration (minutes)

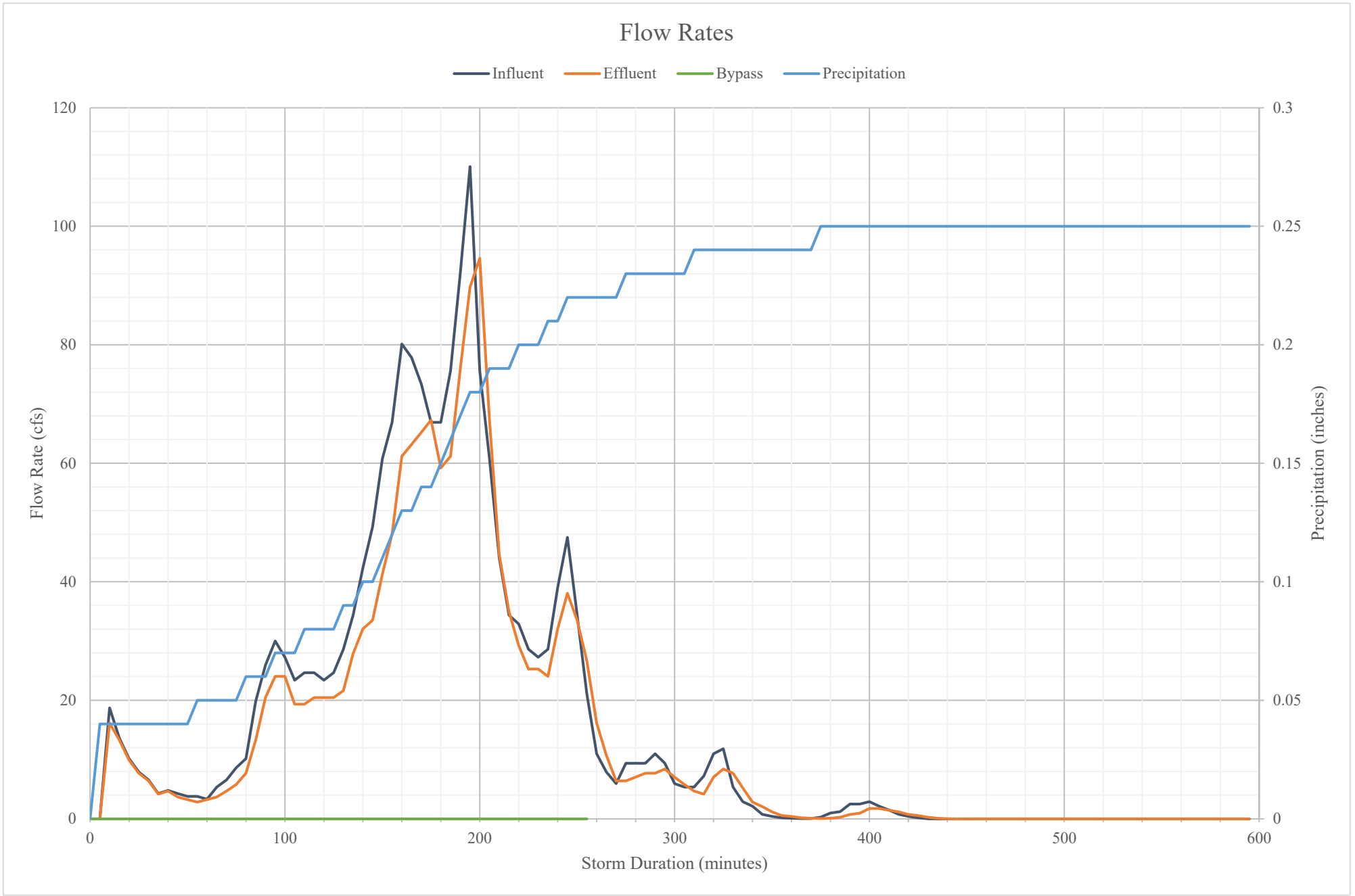

Flow Rates
Influent
Effluent
Bypass
Precipitation
Flow Rate (cfs)
Precipitation (inches)
Storm Duration (minutes)
0
20
40
60
80
100
120
140
160
180
0
0.02
0.04
0.06
0.08
0.1
0.12
0.14
0.16
0.18
0.2
0
50
100
150
200
250
300
350
400
450
500

Storm Date: 11/19/2019

	Parameter	Units	Influent EMC Measured	Influent Conc. Minimum Limit	Influent Conc. Maximum Limit	Effluent	Removal Efficiency	Detection Limit (DL)	Flags	Notes
Required Parameters	TSS	mg/L	92	20	100	48	47.83%	1		
	Total Copper	mg/L	0.0203	N/A	N/A	0.0119	41.38%	0.00007		
	Dissolved Copper	mg/L	0.00377	0.005	0.02	0.00359	4.77%	0.00007		
	Total Zinc	mg/L	0.134	N/A	N/A	0.0603	55.00%	0.00025		
	Dissolved Zinc	mg/L	0.0302	0.02	0.3	0.0203	32.78%	0.00025		
	Total Phosphorus	mg/L	0.308	0.1	0.5	0.19	38.31%	0.00505		
	Iron	mg/L	4.42	N/A	N/A	2.48	43.89%	0.01		
	Dissolved Iron	mg/L	0.0464	N/A	N/A	0.0366	21.12%	0.01		
	NWTPH-Dx									
	Lube Oil	mg/kg	1.34	N/A	N/A	0.661	50.67%	0.25		
	Mineral Oil	mg/kg	N/A	N/A	N/A	N/A	-	N/A		
	Diesel	mg/kg	0.271	N/A	N/A	N/A	-	0.05		
Screening Parameters	PSD									
	>250	µm	N/A	N/A	N/A	N/A	-	N/A		
	250 - 62.5	µm	N/A	N/A	N/A	N/A	-	N/A		
	<62.5	µm	N/A	N/A	N/A	N/A	-	N/A		
	pH	std. units	N/A	N/A	N/A	N/A	-	N/A		
	Orthophosphate	mg/L	0.0463	N/A	N/A	0.0616	-33.05%	N/A		Increased in orthophosphate in eff
	Hardness	mg CaCO3/L	22.5	N/A	N/A	26	-15.56%	0.865		Increased in hardness in eff

	Paramter	Value	Units	Definition	Notes
Storm Data	Storm ID	12/7/2019	-	Identification number for monitored qualifying (?) storm event	
	Storm Start Date and Time	12/7/19 3:30 AM	-	Defines storm event start: 6 hours minimim with ≥ than 0.04" of rain	
	Storm End Date and Time	12/7/19 1:20 PM	-	Defines storm event end: 6 hours minimim with less than 0.04" of rain	
	Total Precipitation Depth	0.25	inches	Cumulative rainfall from the start of the qualifying storm event and the end of the qualifying storm event	
	Storm Duration	9.83	Hours	Duration of qualifying storm event	
	Storm Average Intensity	0.12	in/hr	Total rainfall amount divided by total rainfall duration (e.g., inches per hour)	
	Storm Peak Intensity	0.12	in/hr	Maximum precipitation depth per time interval (5 minutes) converted to in/hr	
	Storm Antecedent Dry Period	138.00	hours	From end of the last rainfall event to start of current rainfall event	
Total Volume	Influent	332.40	ft^3	Total volume of influent from start of event to end of event	
	Effluent	289.55	ft^3	Total volume of effluent from start of event to end of event	
	Bypass	0.00	ft^3	Total volume of bypass from start of event to end of event	
Average Flow Rate	Influent	5.848	gpm	Average influent flow rate during storm event	
	Effluent	4.977	gpm	Average effluent flow rate during storm event	
	Bypass	0.000	gpm	Average bypass flow rate during storm evnt	
Peak Flow Rate	Influent	29.084	gpm	Peak influent flow rate during storm event	
	Effluent	24.992	gpm	Peak effluent flow rate during storm event	
	Peak Bypass	0.000	gpm	Peak bypass flow rate during storm event	
Aliquots	Number of Influent	>45	-	Total number of aliquots obtained during qualifying storm event	The maximum of aliquots that can be collected is 45
	Number of Effluent	>45	-		
Sample Duration	Influent	6.25	hours	Time in hours between the collection of the first and last aliquots	The duration reflects the time between the first and last aliquots, or the first and 45th aliquot if the number of aliquots reported exceeds 45
	Effluent	5.75	hours		
Threshold	Influent	145.00	L	Volume of stormwater that pass through the influent before a aliquot is collected	
	Effluent	145.00	L	Volume of stormwater that pass through the effluent before a aliquot is collected	
Storm Volume Sampled	% of Influent	69.4%	%	Number of aliquots times the threshold volume, divided by the total storm volume	
	% of Effluent	79.6%	%		

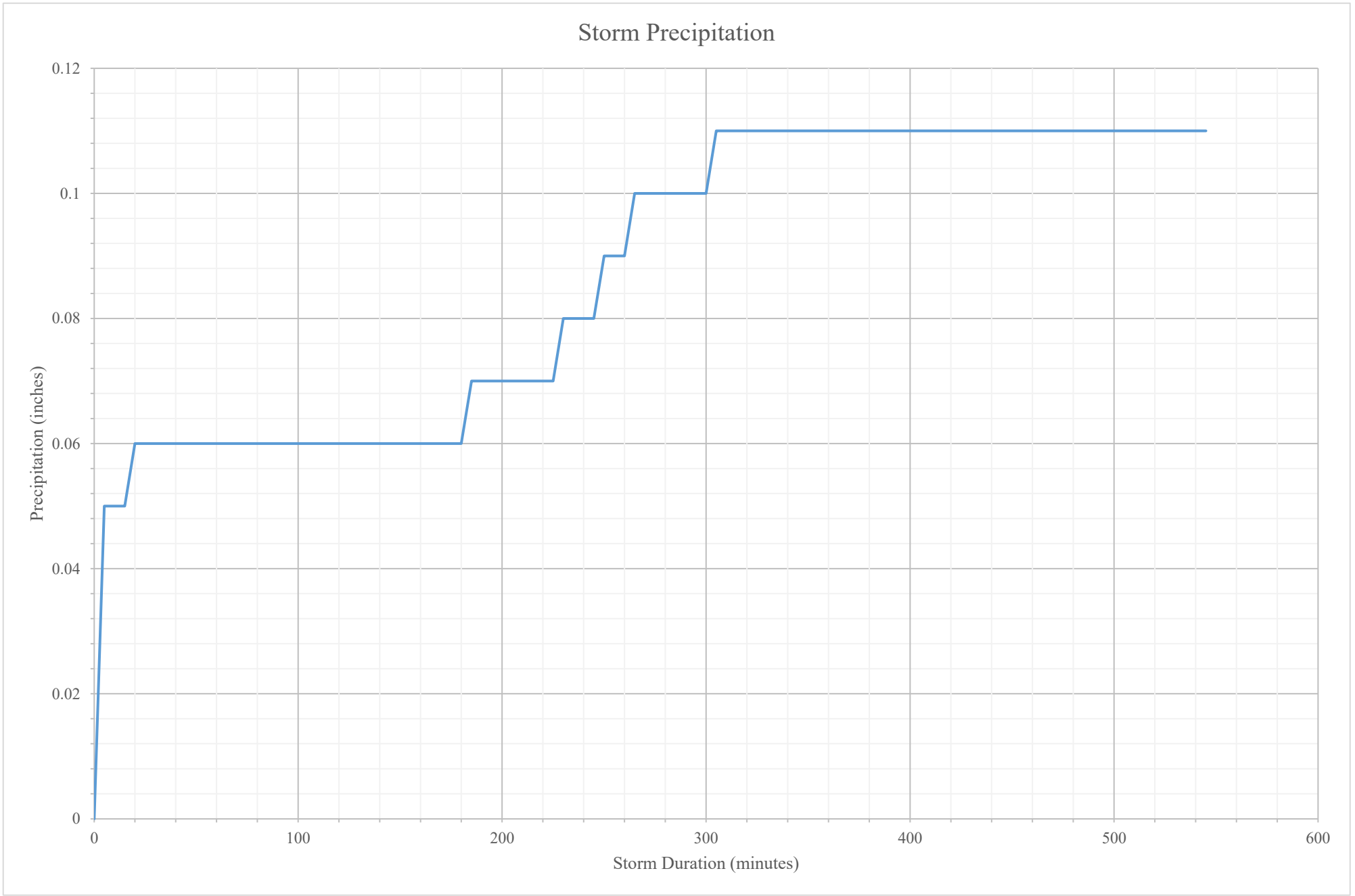

Storm Precipitation
Precipitation (inches)
0.3
0.25
0.2
0.15
0.1
0.05
0
0
100
200
300
400
500
600
700
Storm Duration (minutes)

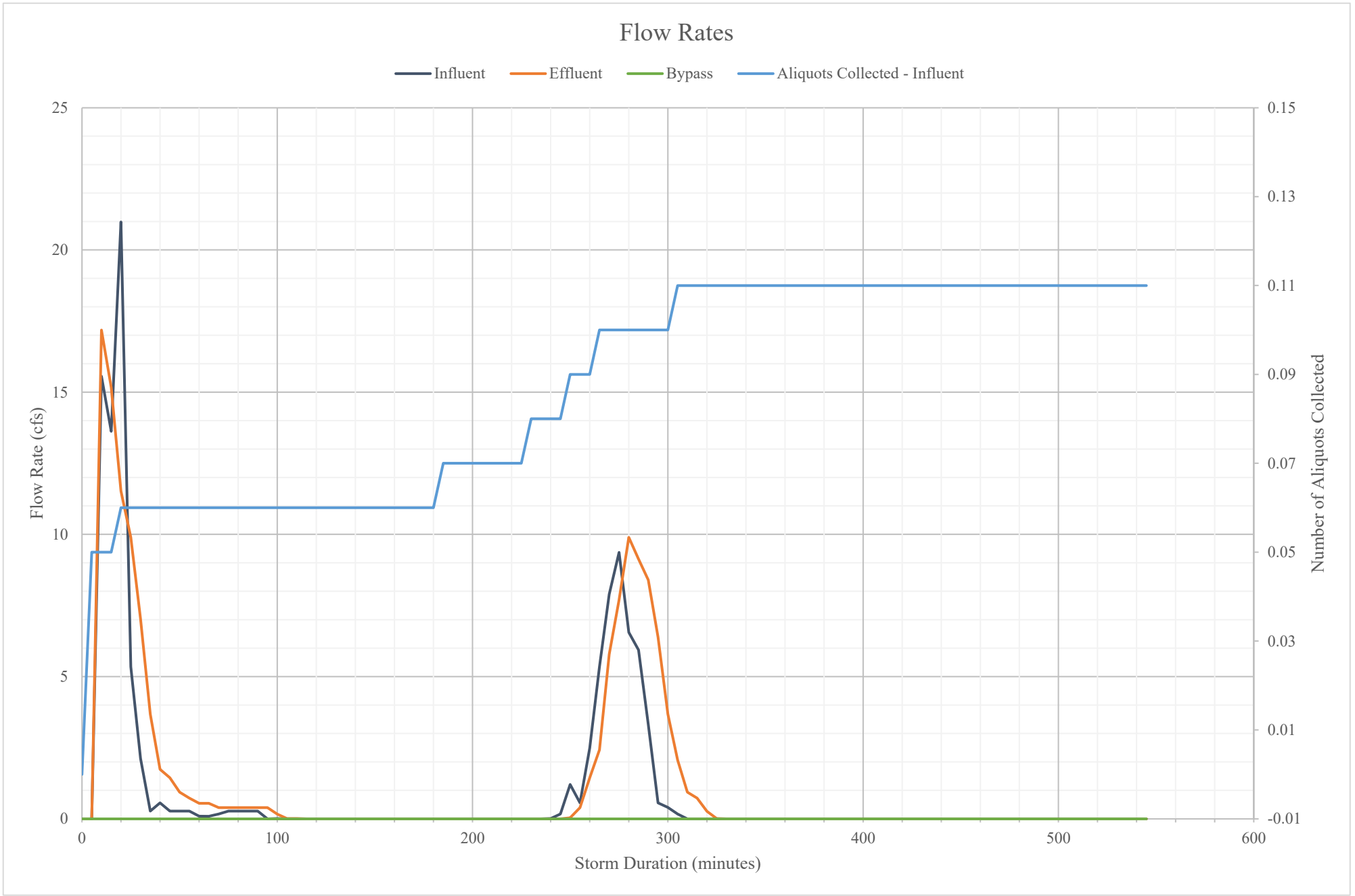

Flow Rates
Influent
Effluent
Bypass
Precipitation
120
100
80
60
40
20
0
0.3
0.25
0.2
0.15
0.1
0.05
0
Flow Rate (cfs)
Precipitation (inches)
0
100
200
300
400
500
600
Storm Duration (minutes)

Storm Date: 12/7/2019

	Parameter	Units	Influent EMC Measured	Influent Conc. Minimum Limit	Influent Conc. Maximum Limit	Effluent	Removal Efficiency	Detection Limit (DL)	Flags	Notes
Required Parameters	TSS	mg/L	64	20	100	36	43.75%	1		
	Total Copper	mg/L	0.995	N/A	N/A	0.00671	99.33%	0.00007		
	Dissolved Copper	mg/L	0.00924	0.005	0.02	0.00611	33.87%	0.00007		
	Total Zinc	mg/L	0.0851	N/A	N/A	0.047	44.77%	0.00025		
	Dissolved Zinc	mg/L	0.0789	0.02	0.3	0.0402	49.05%	0.00025		
	Total Phosphorus	mg/L	0.178	0.1	0.5	0.142	20.22%	0.00505		
	Iron	mg/L	2.07	N/A	N/A	1.64	20.77%	0.01		
	Dissolved Iron	mg/L	1.27	N/A	N/A	0.864	31.97%	0.01		
	NWTPH-Dx									
	Lube Oil	mg/kg	ND	N/A	N/A	ND	-	0.25		
	Mineral Oil	mg/kg	N/A	N/A	N/A	N/A	-	N/A		
	Diesel	mg/kg	ND	N/A	N/A	ND	-	0.05		
Screening Parameters	PSD									
	>250	µm	N/A	N/A	N/A	N/A	-	N/A		
	250 - 62.5	µm	N/A	N/A	N/A	N/A	-	N/A		
	<62.5	µm	N/A	N/A	N/A	N/A	-	N/A		
	pH	std. units	N/A	N/A	N/A	N/A	-	N/A		
	Orthophosphate	mg/L	N/A	N/A	N/A	N/A	-	N/A		
	Hardness	mg CaCO3/L	40	N/A	N/A	42	-5.00%	0.865		Increased hardness in eff

	Paramter	Value	Units	Definition	Notes
Storm Data	Storm ID	1/6/2020	-	Identification number for monitored qualifying (?) storm event	
	Storm Start Date and Time	1/6/20 8:55 AM	-	Defines storm event start: 6 hours minimim with ≥ than 0.04" of rain	
	Storm End Date and Time	1/6/20 5:55 PM	-	Defines storm event end: 6 hours minimim with less than 0.04" of rain	
	Total Precipitation Depth	0.11	inches	Cumulative rainfall from the start of the qualifying storm event and the end of the qualifying storm event	
	Storm Duration	9.00	Hours	Duration of qualifying storm event	
	Storm Average Intensity	0.12	in/hr	Total rainfall amount divided by total rainfall duration (e.g., inches per hour)	
	Storm Peak Intensity	0.12	in/hr	Maximum precipitation depth per time interval (5 minutes) converted to in/hr	
	Storm Antecedent Dry Period	73.42	hours	From end of the last rainfall event to start of current rainfall event	
Total Volume	Influent	18.49	ft^3	Total volume of influent from start of event to end of event	
	Effluent	23.35	ft^3	Total volume of effluent from start of event to end of event	
	Bypass	0.00	ft^3	Total volume of bypass from start of event to end of event	
Average Flow Rate	Influent	0.864	gpm	Average influent flow rate during storm event	
	Effluent	0.944	gpm	Average effluent flow rate during storm event	
	Bypass	0.000	gpm	Average bypass flow rate during storm evnt	
Peak Flow Rate	Influent	5.545	gpm	Peak influent flow rate during storm event	
	Effluent	4.540	gpm	Peak effluent flow rate during storm event	
	Peak Bypass	0.000	gpm	Peak bypass flow rate during storm event	
Aliquots	Number of Influent	5	-	Total number of aliquots obtained during qualifying storm event	The maximum of aliquots that can be collected is 45
	Number of Effluent	6	-		
Sample Duration	Influent	0.83	hours	Time in hours between the collection of the first and last aliquots	The duration reflects the time between the first and last aliquots, or the first and 45th aliquot i the number of aliquots reported exceeds 45
	Effluent	0.42	hours		
Threshold	Influent	97.00	L	Volume of stormwater that pass through the influent before a aliquot is collected	
	Effluent	97.00	L	Volume of stormwater that pass through the effluent before a aliquot is collected	
Storm Volume Sampled	% of Influent	92.7%	%	Number of aliquots times the threshold volume, divided by the total storm volume	
	% of Effluent	88.1%	%		

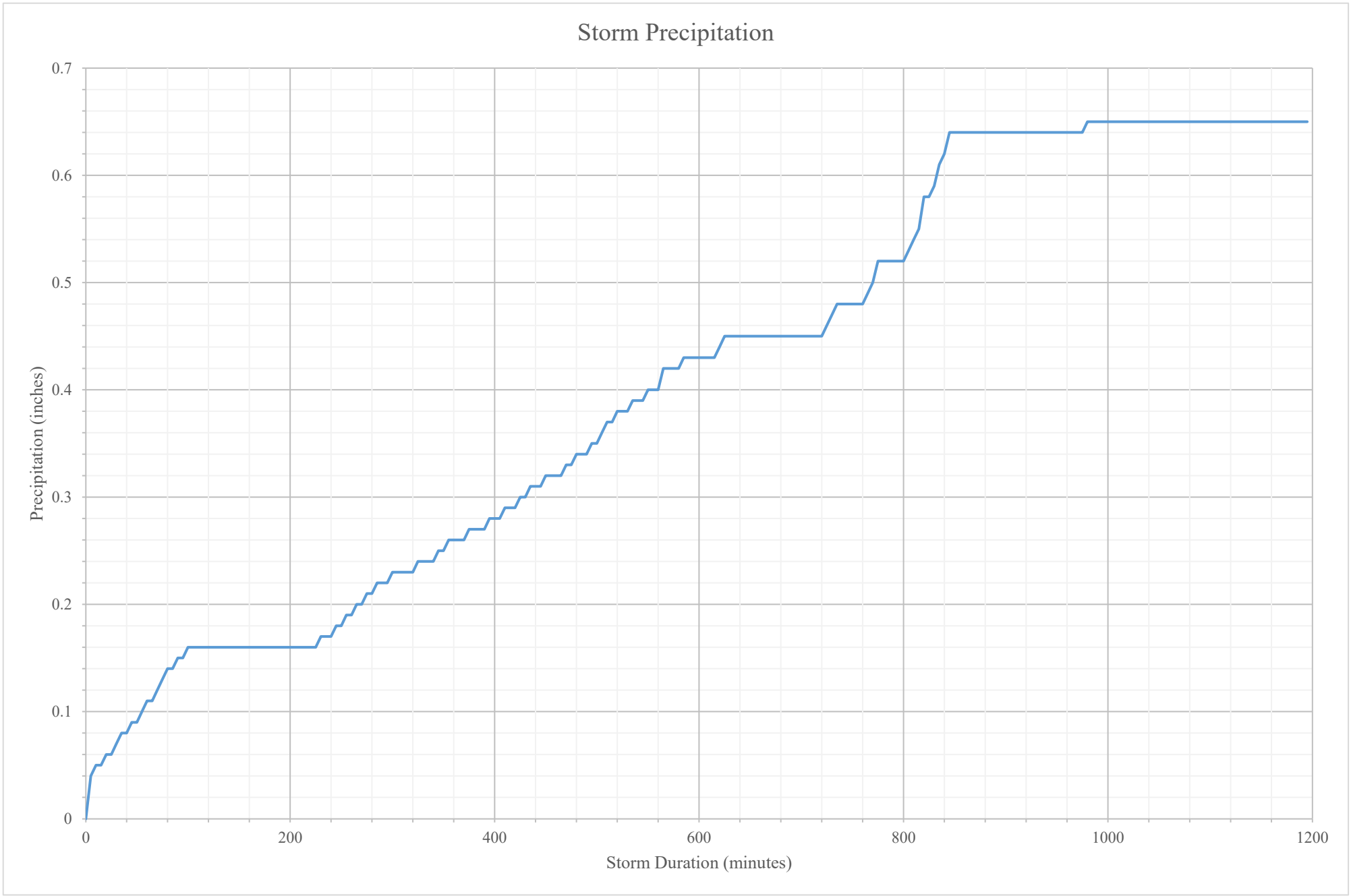

Storm Precipitation
0.12
0.1
0.08
0.06
0.04
0.02
0
Precipitation (inches)
0
100
200
300
400
500
600
Storm Duration (minutes)

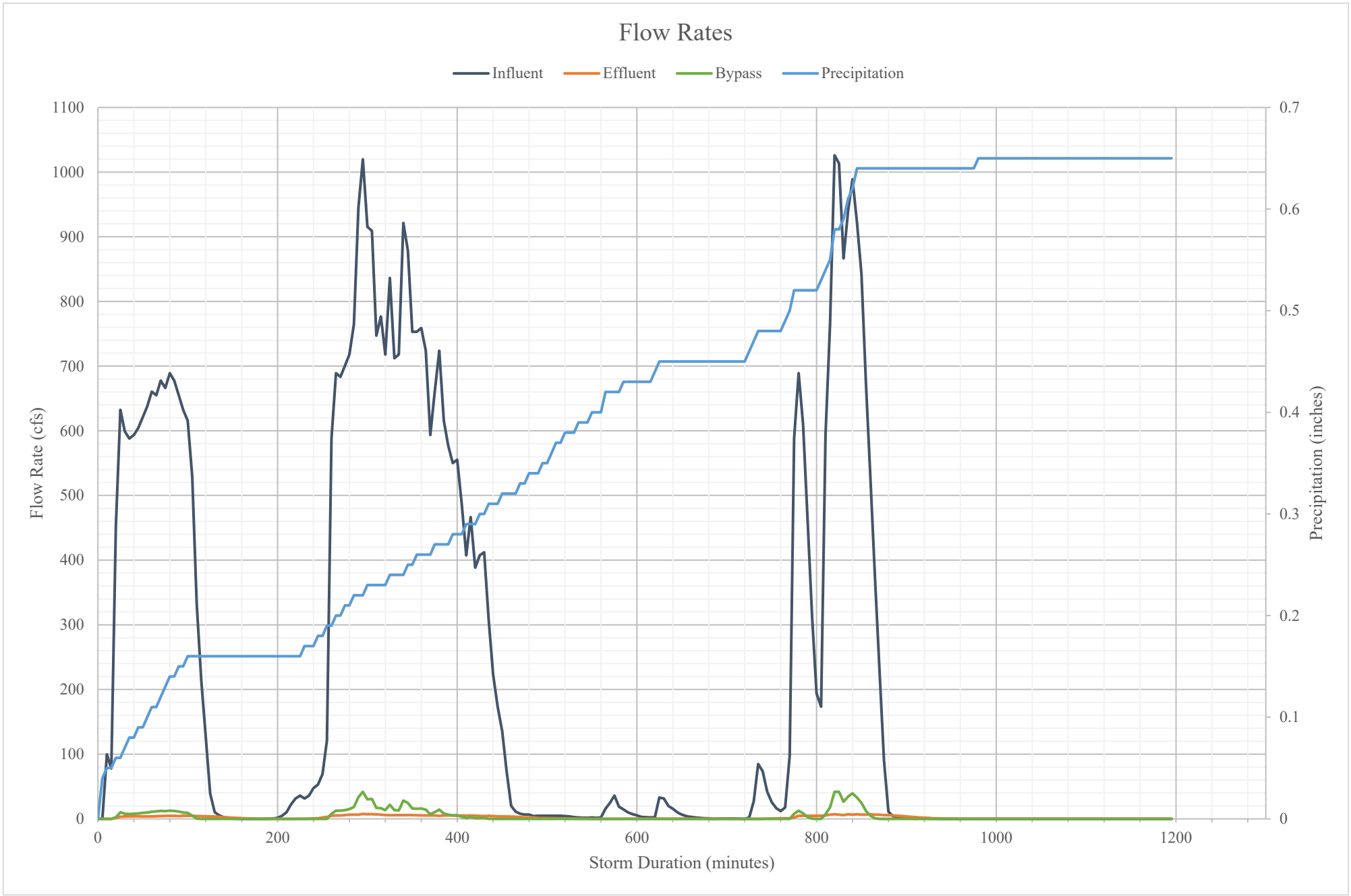

Flow Rates
Influent
Effluent
Bypass
Aliquots Collected - Influent
Flow Rate (cfs)
Number of Aliquots Collected
Storm Duration (minutes)
0
5
10
15
20
25
-0.01
0.01
0.03
0.05
0.07
0.09
0.11
0.13
0.15
0
100
200
300
400
500
600

Storm Date: 1/6/2019

	Parameter	Units	Influent EMC Measured	Influent Conc. Minimum Limit	Influent Conc. Maximum Limit	Effluent	Removal Efficiency	Detection Limit (DL)	Flags	Notes
Required Parameters	TSS	mg/L	560	20	100	124	77.86%	1		
	Total Copper	mg/L	0.0509	N/A	N/A	0.0202	60.31%	0.00007		
	Dissolved Copper	mg/L	0.00576	0.005	0.02	0.00661	-14.76%	0.00007		Increased dissolved copper in eff
	Total Zinc	mg/L	0.4	N/A	N/A	0.138	65.50%	0.00025		
	Dissolved Zinc	mg/L	0.0621	0.02	0.3	0.0446	28.18%	0.00025		
	Total Phosphorus	mg/L	N/A	0.1	0.5	N/A	-	0.00505		
	Iron	mg/L	19.6	N/A	N/A	7.08	63.88%	0.01		
	Dissolved Iron	mg/L	0.0616	N/A	N/A	0.176	-185.71%	0.01		Increased dissolved iron in eff
	NWTPH-Dx									
	Lube Oil	mg/kg	N/A	N/A	N/A	N/A	-	0.25		
	Mineral Oil	mg/kg	N/A	N/A	N/A	N/A	-	N/A		
	Diesel	mg/kg	N/A	N/A	N/A	N/A	-	0.05		
Screening Parameters	PSD									
	>250	µm	N/A	N/A	N/A	N/A	-	N/A		
	250 - 62.5	µm	N/A	N/A	N/A	N/A	-	N/A		
	<62.5	µm	N/A	N/A	N/A	N/A	-	N/A		
	pH	std. units	N/A	N/A	N/A	N/A	-	N/A		
	Orthophosphate	mg/L	N/A	N/A	N/A	N/A	-	N/A		
	Hardness	mg CaCO3/L	N/A	N/A	N/A	N/A	-	0.865		

	Paramter	Value	Units	Definition	Notes
Storm Data	Storm ID	1/28/2020	-	Identification number for monitored qualifying (?) storm event	
	Storm Start Date and Time	1/28/20 12:40 AM	-	Defines storm event start: 6 hours minimim with ≥ than 0.04" of rain	
	Storm End Date and Time	1/28/20 8:30 PM	-	Defines storm event end: 6 hours minimim with less than 0.04" of rain	
	Total Precipitation Depth	0.65	inches	Cumulative rainfall from the start of the qualifying storm event and the end of the qualifying storm event	
	Storm Duration	19.83	Hours	Duration of qualifying storm event	
	Storm Average Intensity	0.13	in/hr	Total rainfall amount divided by total rainfall duration (e.g., inches per hour)	
	Storm Peak Intensity	0.24	in/hr	Maximum precipitation depth per time interval (5 minutes) converted to in/hr	
	Storm Antecedent Dry Period	14.58	hours	From end of the last rainfall event to start of current rainfall event	
Total Volume	Influent	265.00	ft^3	Total volume of influent from start of event to end of event	
	Effluent	90.26	ft^3	Total volume of effluent from start of event to end of event	
	Bypass	172.27	ft^3	Total volume of bypass from start of event to end of event	
Average Flow Rate	Influent	75.184	gpm	Average influent flow rate during storm event	
	Effluent	0.808	gpm	Average effluent flow rate during storm event	
	Bypass	3.584	gpm	Average bypass flow rate during storm evnt	
Peak Flow Rate	Influent	271.044	gpm	Peak influent flow rate during storm event	
	Effluent	2.033	gpm	Peak effluent flow rate during storm event	
	Peak Bypass	10.775	gpm	Peak bypass flow rate during storm event	
Aliquots	Number of Influent	>45	-	Total number of aliquots obtained during qualifying storm event	The maximum of aliquots that can be collected is 45
	Number of Effluent	10	-		
Sample Duration	Influent	5.00	hours	Time in hours between the collection of the first and last aliquots	The duration reflects the time between the first and last aliquots, or the first and 45th aliquot i the number of aliquots reported exceeds 45
	Effluent	1.67	hours		
Threshold	Influent	250.00	L	Volume of stormwater that pass through the influent before a aliquot is collected	
	Effluent	250.00	L	Volume of stormwater that pass through the effluent before a aliquot is collected	
Storm Volume Sampled	% of Influent	100.0%	%	Number of aliquots times the threshold volume, divided by the total storm volume	
	% of Effluent	97.9%	%		

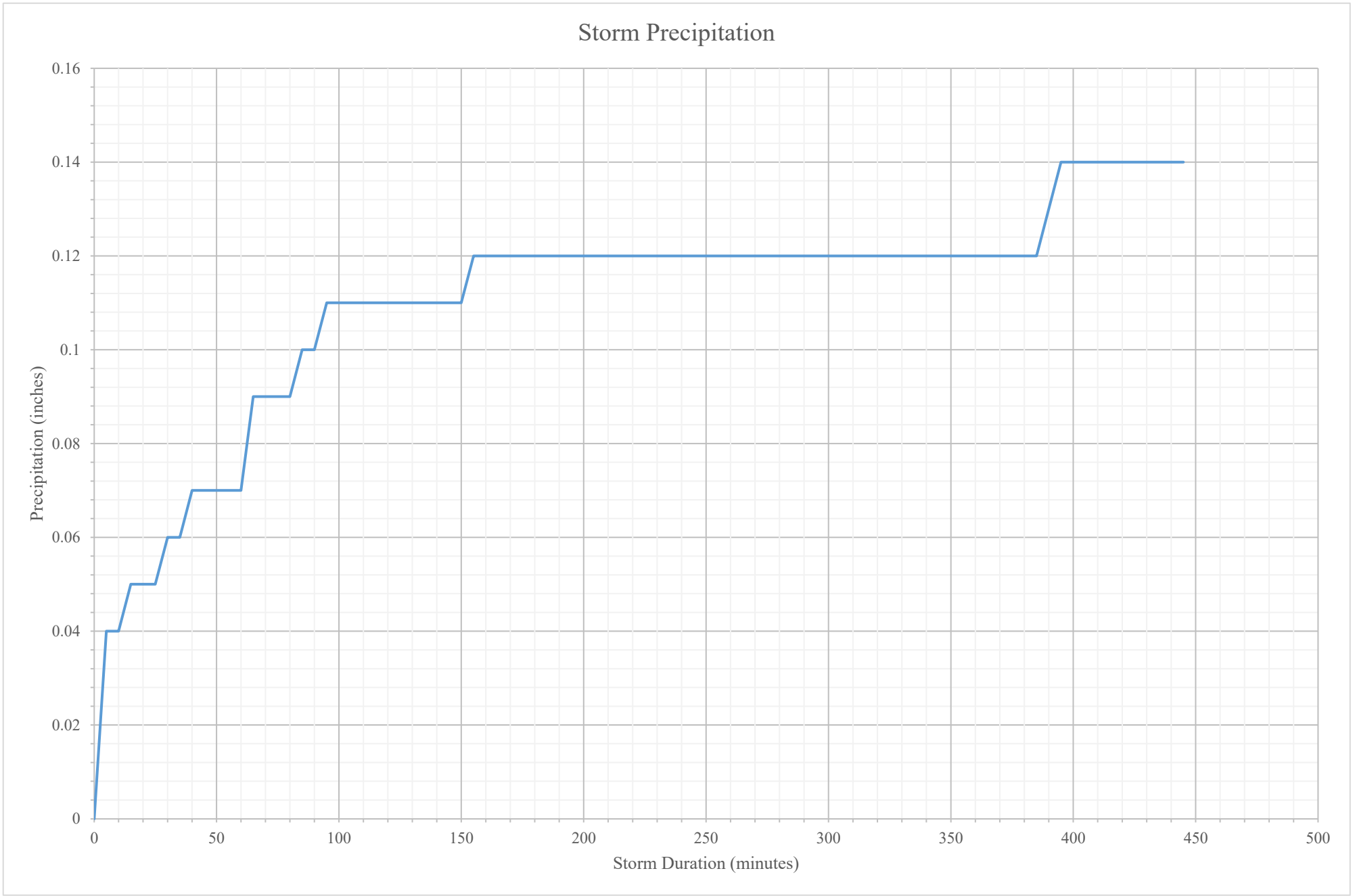

Storm Precipitation
Precipitation (inches)
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
0
200
400
600
800
1000
1200
Storm Duration (minutes)

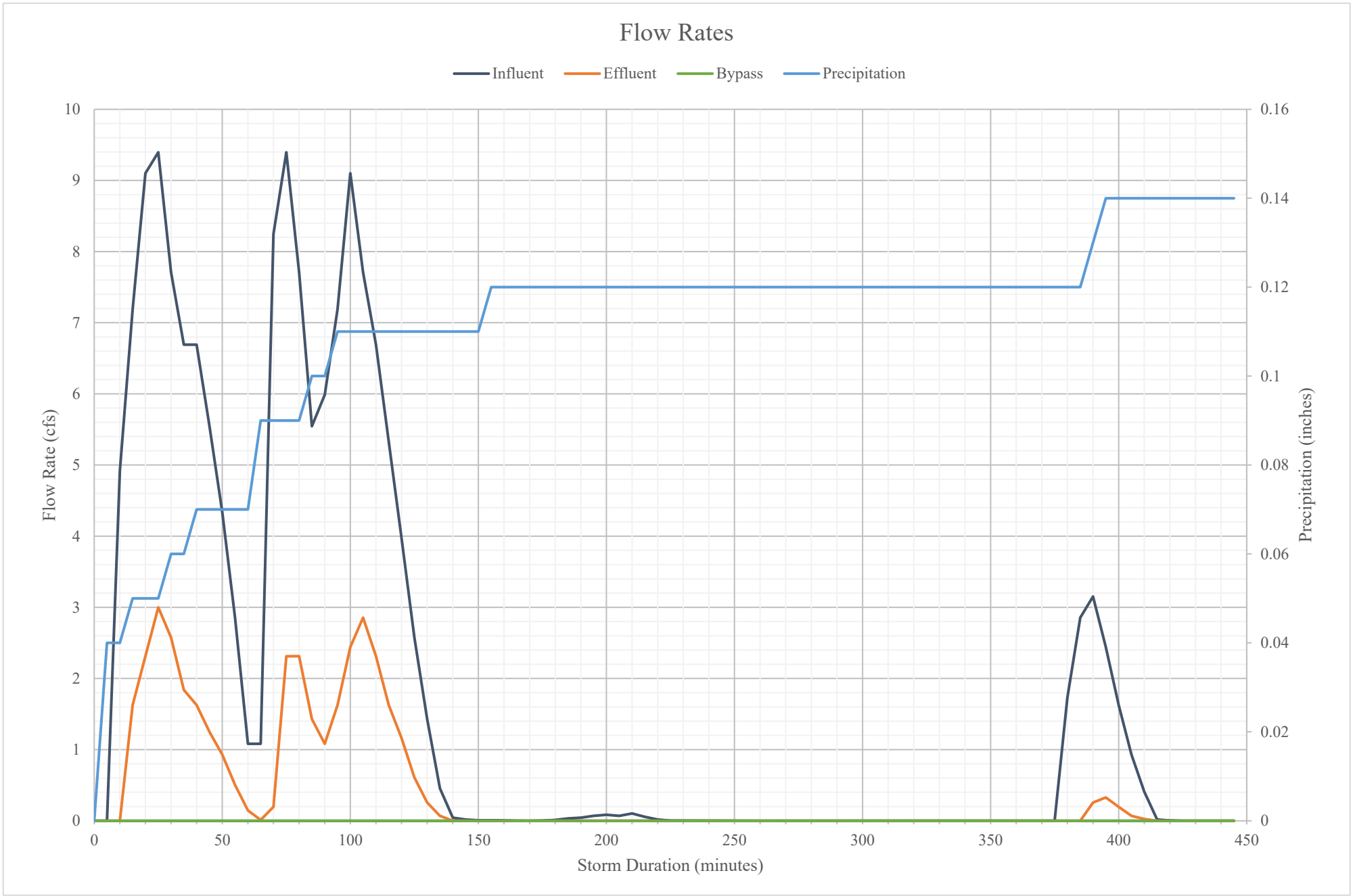

Flow Rates
Influent
Effluent
Bypass
Precipitation
Flow Rate (cfs)
Precipitation (inches)
Storm Duration (minutes)
0
100
200
300
400
500
600
700
800
900
1000
1100
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0
200
400
600
800
1000
1200

Storm Date: 1/28/2020

	Parameter	Units	Influent EMC Measured	Influent Conc. Minimum Limit	Influent Conc. Maximum Limit	Effluent	Removal Efficiency	Detection Limit (DL)	Flags	Notes
Required Parameters	TSS	mg/L	360	20	100	33	90.83%	1		
	Total Copper	mg/L	0.0225	N/A	N/A	0.0119	47.11%	0.00007		
	Dissolved Copper	mg/L	0.0052	0.005	0.02	0.00432	16.92%	0.00007		
	Total Zinc	mg/L	0.142	N/A	N/A	0.0625	55.99%	0.00025		
	Dissolved Zinc	mg/L	0.0222	0.02	0.3	0.0197	11.26%	0.00025		
	Total Phosphorus	mg/L	N/A	0.1	0.5	N/A	-	0.00505		
	Iron	mg/L	1.99	N/A	N/A	0.97	51.26%	0.01		
	Dissolved Iron	mg/L	0.0403	N/A	N/A	0.0404	-0.25%	0.01		Increased in dissolved iron in eff
	NWTPH-Dx									
	Lube Oil	mg/kg	ND	N/A	N/A	ND	-	0.25		
	Mineral Oil	mg/kg	ND	N/A	N/A	ND	-	N/A		
	Diesel	mg/kg	ND	N/A	N/A	ND	-	0.05		
Screening Parameters	PSD									
	>250	µm	N/A	N/A	N/A	N/A	-	N/A		
	250 - 62.5	µm	N/A	N/A	N/A	N/A	-	N/A		
	<62.5	µm	N/A	N/A	N/A	N/A	-	N/A		
	pH	std. units	N/A	N/A	N/A	N/A	-	N/A		
	Orthophosphate	mg/L	N/A	N/A	N/A	N/A	-	N/A		
	Hardness	mg CaCO3/L	34.5	N/A	N/A	25.5	26.09%	0.865		

	Paramter	Value	Units	Definition	Notes
Storm Data	Storm ID	3/31/2020	-	Identification number for monitored qualifying (?) storm event	
	Storm Start Date and Time	3/31/20 7:35 AM	-	Defines storm event start: 6 hours minimim with ≥ than 0.04" of rain	
	Storm End Date and Time	3/31/20 2:55 PM	-	Defines storm event end: 6 hours minimim with less than 0.04" of rain	
	Total Precipitation Depth	0.14	inches	Cumulative rainfall from the start of the qualifying storm event and the end of the qualifying storm event	
	Storm Duration	7.33	Hours	Duration of qualifying storm event	
	Storm Average Intensity	0.13	in/hr	Total rainfall amount divided by total rainfall duration (e.g., inches per hour)	
	Storm Peak Intensity	0.24	in/hr	Maximum precipitation depth per time interval (5 minutes) converted to in/hr	
	Storm Antecedent Dry Period	14.83	hours	From end of the last rainfall event to start of current rainfall event	
Total Volume	Influent	28.56	ft^3	Total volume of influent from start of event to end of event	
	Effluent	6.53	ft^3	Total volume of effluent from start of event to end of event	
	Bypass	0.00	ft^3	Total volume of bypass from start of event to end of event	
Average Flow Rate	Influent	0.821	gpm	Average influent flow rate during storm event	
	Effluent	0.315	gpm	Average effluent flow rate during storm event	
	Bypass	0.000	gpm	Average bypass flow rate during storm evnt	
Peak Flow Rate	Influent	2.483	gpm	Peak influent flow rate during storm event	
	Effluent	0.793	gpm	Peak effluent flow rate during storm event	
	Peak Bypass	0.000	gpm	Peak bypass flow rate during storm event	
Aliquots	Number of Influent	0	-	Total number of aliquots obtained during qualifying storm event	The maximum of aliquots that can be collected is 45
	Number of Effluent	0	-		
Sample Duration	Influent	0.00	hours	Time in hours between the collection of the first and last aliquots	The duration reflects the time between the first and last aliquots, or the first and 45th aliquot i the number of aliquots reported exceeds 45
	Effluent	0.00	hours		
Threshold	Influent	120.00	L	Volume of stormwater that pass through the influent before a aliquot is collected	
	Effluent	120.00	L	Volume of stormwater that pass through the effluent before a aliquot is collected	
Storm Volume Sampled	% of Influent	0.0%	%	Number of aliquots times the threshold volume, divided by the total storm volume	
	% of Effluent	0.0%	%		

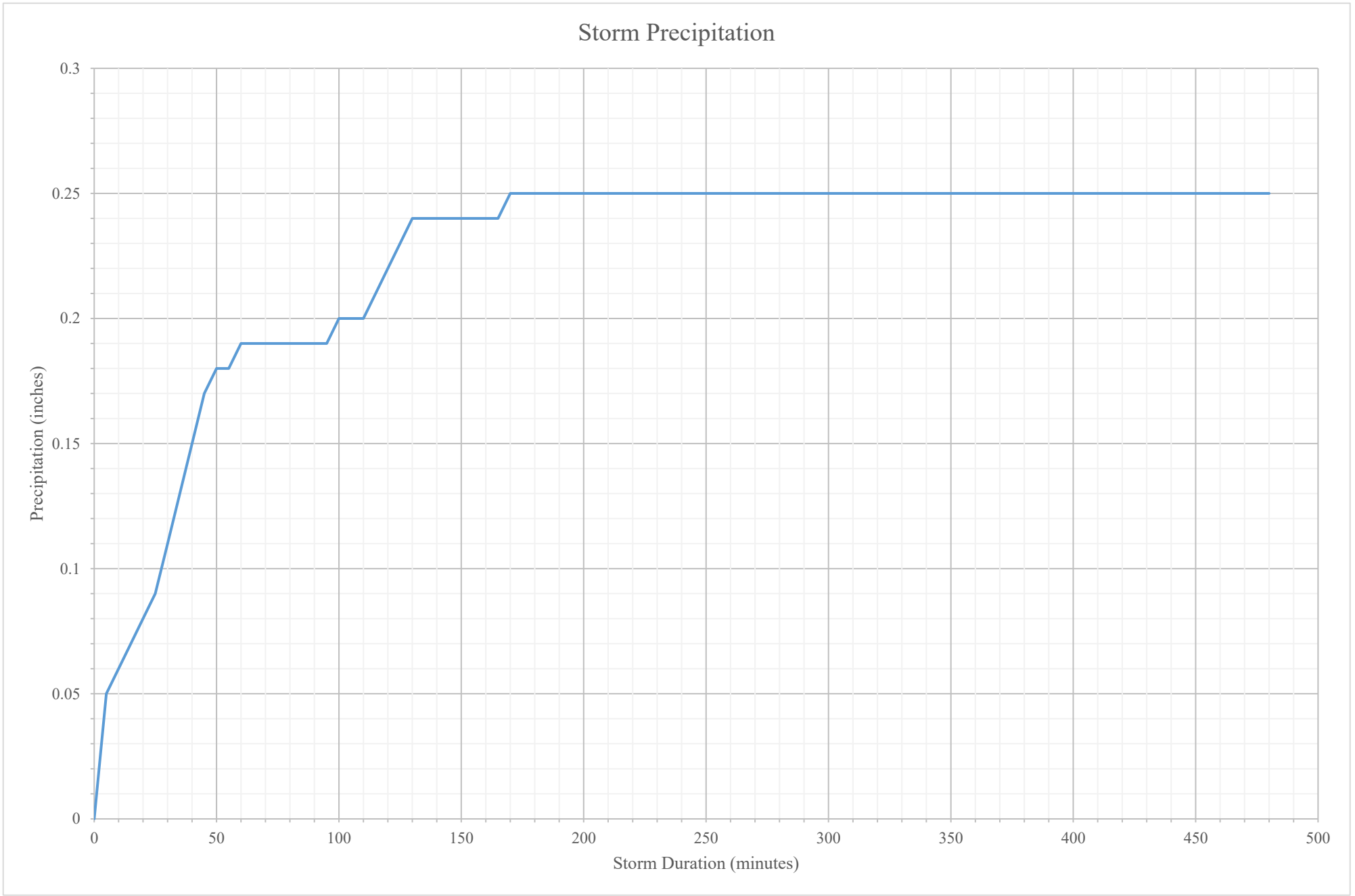

Storm Precipitation
Precipitation (inches)
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
0
50
100
150
200
250
300
350
400
450
500
Storm Duration (minutes)

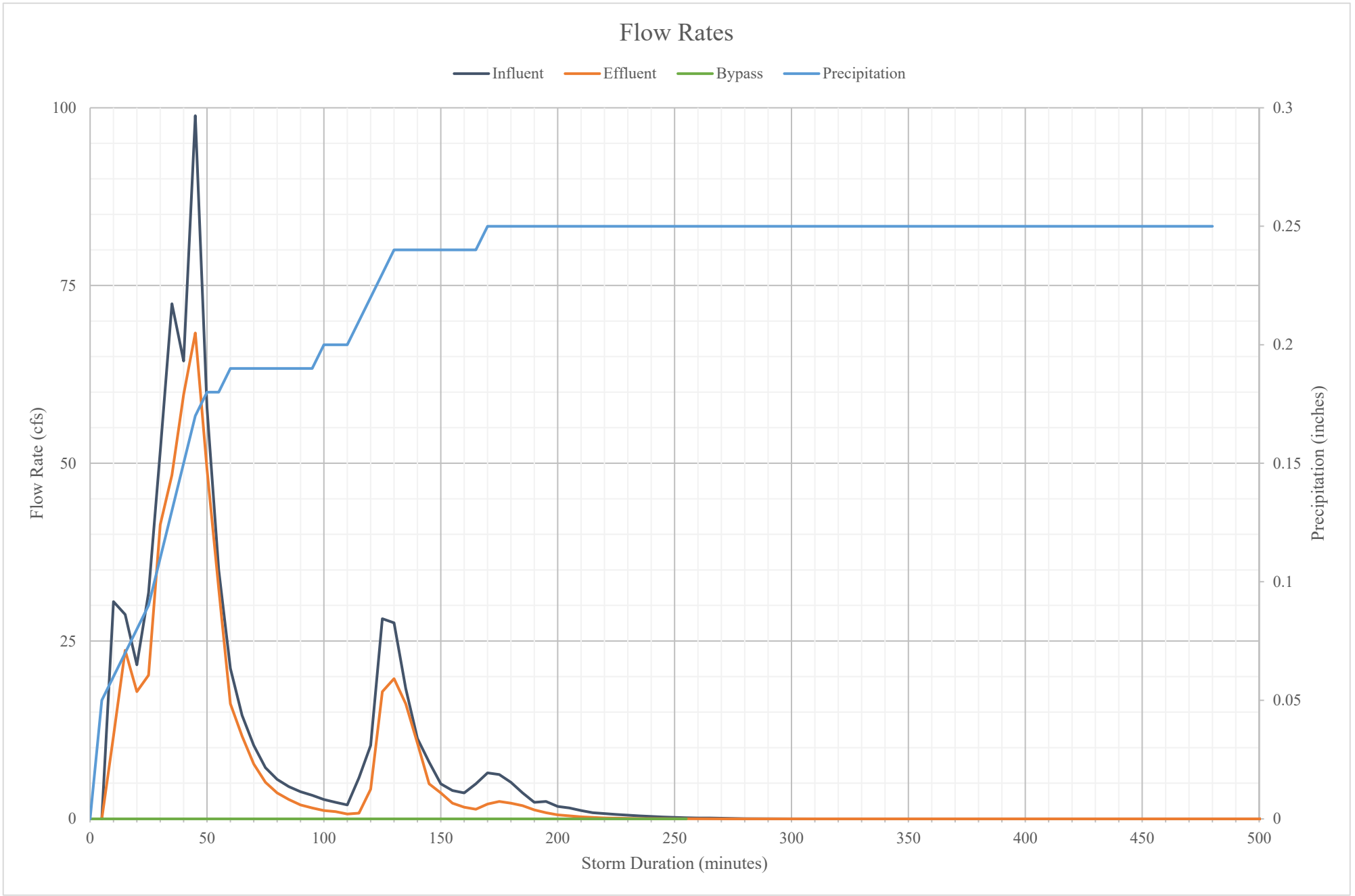

Flow Rates
Influent
Effluent
Bypass
Precipitation
Flow Rate (cfs)
Precipitation (inches)
Storm Duration (minutes)
0
1
2
3
4
5
6
7
8
9
10
0
0.02
0.04
0.06
0.08
0.1
0.12
0.14
0.16
0
50
100
150
200
250
300
350
400
450

Storm Date: 3/31/2020

	Parameter	Units	Influent EMC Measured	Influent Conc. Minimum Limit	Influent Conc. Maximum Limit	Effluent	Removal Efficiency	Detection Limit (DL)	Flags	Notes
Required Parameters	TSS	mg/L	265.1	20	100	287.3	-8.37%	1		Data from PSD sample from MTC Increased TSS in eff
	Total Copper	mg/L	N/A	N/A	N/A	N/A	-	0.00007		
	Dissolved Copper	mg/L	N/A	0.005	0.02	N/A	-	0.00007		
	Total Zinc	mg/L	N/A	N/A	N/A	N/A	-	0.00025		
	Dissolved Zinc	mg/L	N/A	0.02	0.3	N/A	-	0.00025		
	Total Phosphorus	mg/L	N/A	0.1	0.5	N/A	-	0.00505		
	Iron	mg/L	N/A	N/A	N/A	N/A	-	0.01		
	Dissolved Iron	mg/L	N/A	N/A	N/A	N/A	-	0.01		
	NWTPH-Dx									
	Lube Oil	mg/kg	N/A	N/A	N/A	N/A	-	0.25		
	Mineral Oil	mg/kg	N/A	N/A	N/A	N/A	-	N/A		
	Diesel	mg/kg	N/A	N/A	N/A	N/A	-	0.05		
Screening Parameters	PSD									
	>250	µm	8.99	N/A	N/A	1.94	78.42%	N/A		
	250 - 62.5	µm	39.97	N/A	N/A	8.69	78.26%	N/A		
	<62.5	µm	226.67	N/A	N/A	286.84	-26.55%	N/A		Increased PSD <62.5 in eff
	pH	std. units	N/A	N/A	N/A	N/A	-	N/A		
	Orthophosphate	mg/L	N/A	N/A	N/A	N/A	-	N/A		
	Hardness	mg CaCO3/L	N/A	N/A	N/A	N/A	-	0.865		

	Paramter	Value	Units	Definition	Notes
Storm Data	Storm ID	5/2/2020	-	Identification number for monitored qualifying (?) storm event	
	Storm Start Date and Time	5/2/20 10:05 PM	-	Defines storm event start: 6 hours minimim with ≥ than 0.04" of rain	
	Storm End Date and Time	5/3/20 6:00 AM	-	Defines storm event end: 6 hours minimim with less than 0.04" of rain	
	Total Precipitation Depth	0.25	inches	Cumulative rainfall from the start of the qualifying storm event and the end of the qualifying storm event	
	Storm Duration	7.92	Hours	Duration of qualifying storm event	
	Storm Average Intensity	0.15	in/hr	Total rainfall amount divided by total rainfall duration (e.g., inches per hour)	
	Storm Peak Intensity	0.24	in/hr	Maximum precipitation depth per time interval (5 minutes) converted to in/hr	
	Storm Antecedent Dry Period	238.42	hours	From end of the last rainfall event to start of current rainfall event	
Total Volume	Influent	129.34	ft^3	Total volume of influent from start of event to end of event	
	Effluent	92.12	ft^3	Total volume of effluent from start of event to end of event	
	Bypass	0.00	ft^3	Total volume of bypass from start of event to end of event	
Average Flow Rate	Influent	3.335	gpm	Average influent flow rate during storm event	
	Effluent	2.701	gpm	Average effluent flow rate during storm event	
	Bypass	0.000	gpm	Average bypass flow rate during storm evnt	
Peak Flow Rate	Influent	26.125	gpm	Peak influent flow rate during storm event	
	Effluent	18.054	gpm	Peak effluent flow rate during storm event	
	Peak Bypass	0.000	gpm	Peak bypass flow rate during storm event	
Aliquots	Number of Influent	22	-	Total number of aliquots obtained during qualifying storm event	The maximum of aliquots that can be collected is 45
	Number of Effluent	16	-		
Sample Duration	Influent	2.67	hours	Time in hours between the collection of the first and last aliquots	The duration reflects the time between the first and last aliquots, or the first and 45th aliquot i the number of aliquots reported exceeds 45
	Effluent	2.67	hours		
Threshold	Influent	160.00	L	Volume of stormwater that pass through the influent before a aliquot is collected	
	Effluent	160.00	L	Volume of stormwater that pass through the effluent before a aliquot is collected	
Storm Volume Sampled	% of Influent	96.2%	%	Number of aliquots times the threshold volume, divided by the total storm volume	
	% of Effluent	98.2%	%		

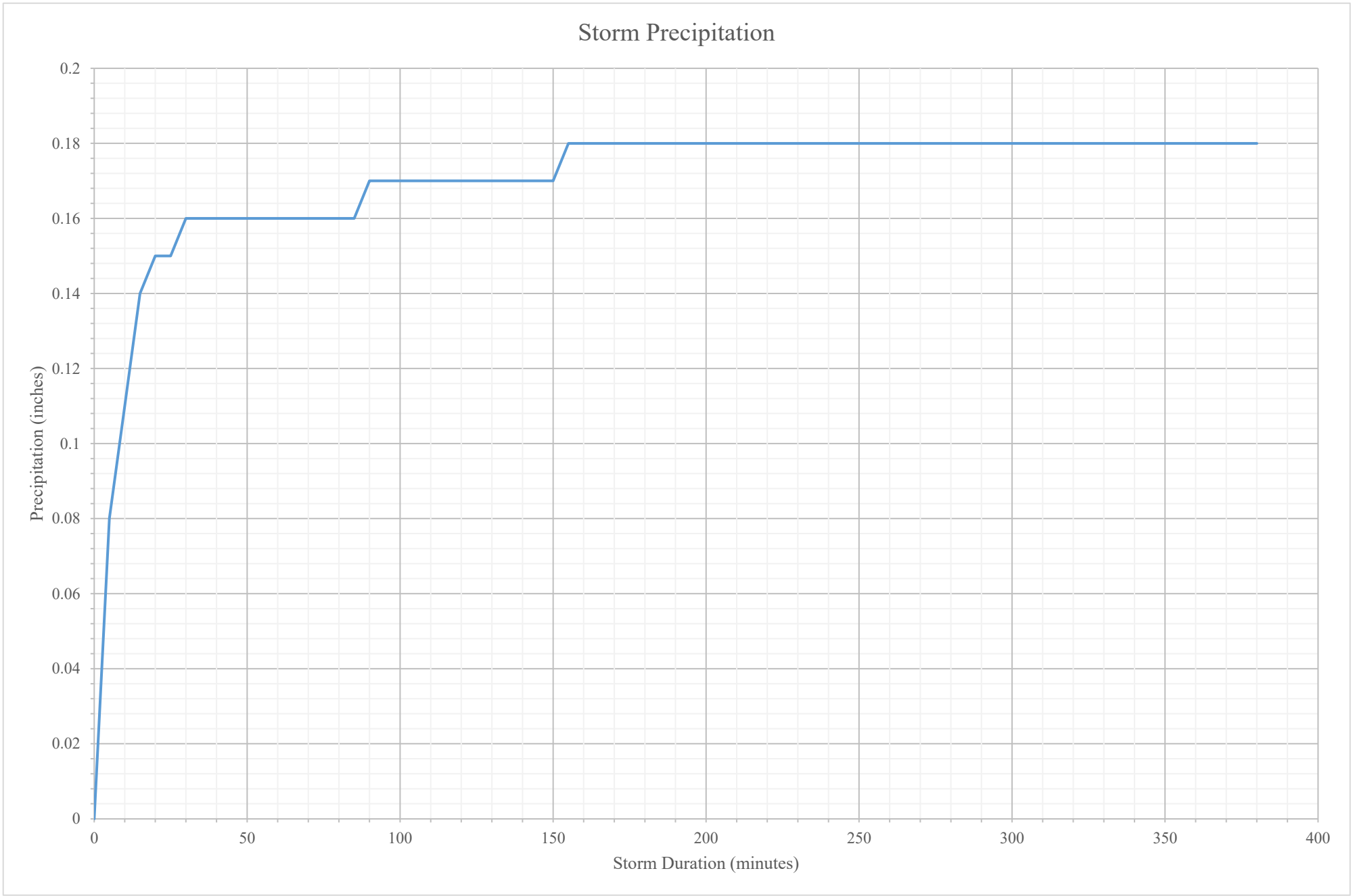

Storm Precipitation
Precipitation (inches)
0.3
0.25
0.2
0.15
0.1
0.05
0
0
50
100
150
200
250
300
350
400
450
500
Storm Duration (minutes)

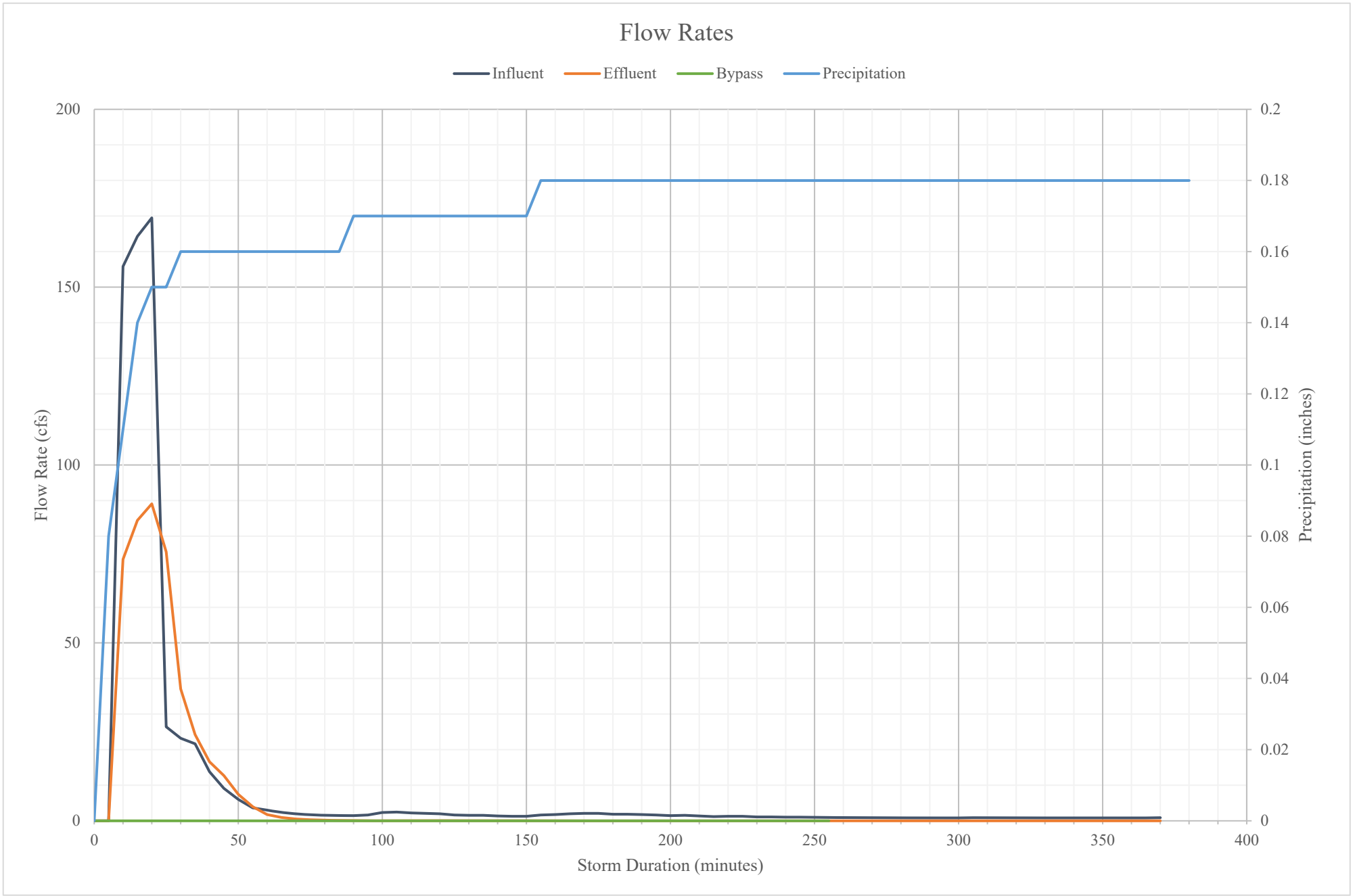

Flow Rates
Influent
Effluent
Bypass
Precipitation
Flow Rate (cfs)
Precipitation (inches)
Storm Duration (minutes)
0
25
50
75
100
0
0.05
0.1
0.15
0.2
0.25
0.3
0
50
100
150
200
250
300
350
400
450
500

Storm Date: 5/2/2020

	Parameter	Units	Influent EMC Measured	Influent Conc. Minimum Limit	Influent Conc. Maximum Limit	Effluent	Removal Efficiency	Detection Limit (DL)	Flags	Notes
Required Parameters	TSS	mg/L	58	20	100	60	-3.45%	1		Increased Eff for TSS
	Total Copper	mg/L	0.011	N/A	N/A	0.0147	-33.64%	0.00007		Increased Eff for total copper
	Dissolved Copper	mg/L	0.0064	0.005	0.02	0.0102	-59.38%	0.00007		Increased dissolved copper in Eff
	Total Zinc	mg/L	0.0671	N/A	N/A	0.0499	25.63%	0.00025		
	Dissolved Zinc	mg/L	0.0316	0.02	0.3	0.0224	29.11%	0.00025		
	Total Phosphorus	mg/L	N/A	0.1	0.5	N/A	-	0.00505		
	Iron	mg/L	1.3	N/A	N/A	1.94	-49.23%	0.01		Increased eff in iron
	Dissolved Iron	mg/L	0.106	N/A	N/A	0.158	-49.06%	0.01		Increased eff in dissolved iron
	NWTPH-Dx									
	Lube Oil	mg/kg	ND	N/A	N/A	ND	-	0.25		
	Mineral Oil	mg/kg	ND	N/A	N/A	ND	-	N/A		
	Diesel	mg/kg	ND	N/A	N/A	ND	-	0.05		
Screening Parameters	PSD									
	>250	µm	5.86	N/A	N/A	4.4	24.91%	N/A		
	250 - 62.5	µm	15.62	N/A	N/A	16.65	-6.59%	N/A		Increased 250-62.5 PSD in Eff
	<62.5	µm	27.77	N/A	N/A	39.64	-42.74%	N/A		Increased 62.5 PSD Eff
	pH	std. units	6.02	N/A	N/A	6.35	-5.48%	N/A		Increased pH for eff
	Orthophosphate	mg/L	N/A	N/A	N/A	N/A	-	N/A		
	Hardness	mg CaCO3/L	28.1	N/A	N/A	33.2	-18.15%	0.865		Increased EFF in hardness

	Paramter	Value	Units	Definition	Notes
Storm Data	Storm ID	5/17/2020	-	Identification number for monitored qualifying (?) storm event	
	Storm Start Date and Time	5/17/20 3:25 PM	-	Defines storm event start: 6 hours minimim with ≥ than 0.04" of rain	
	Storm End Date and Time	5/17/20 9:40 PM	-	Defines storm event end: 6 hours minimim with less than 0.04" of rain	
	Total Precipitation Depth	0.18	inches	Cumulative rainfall from the start of the qualifying storm event and the end of the qualifying storm event	
	Storm Duration	6.25	Hours	Duration of qualifying storm event	
	Storm Average Intensity	0.31	in/hr	Total rainfall amount divided by total rainfall duration (e.g., inches per hour)	
	Storm Peak Intensity	0.96	in/hr	Maximum precipitation depth per time interval (5 minutes) converted to in/hr	
	Storm Antecedent Dry Period	53.58	hours	From end of the last rainfall event to start of current rainfall event	
Total Volume	Influent	119.94	ft^3	Total volume of influent from start of event to end of event	
	Effluent	75.69	ft^3	Total volume of effluent from start of event to end of event	
	Bypass	0.00	ft^3	Total volume of bypass from start of event to end of event	
Average Flow Rate	Influent	2.391	gpm	Average influent flow rate during storm event	
	Effluent	4.042	gpm	Average effluent flow rate during storm event	
	Bypass	0.000	gpm	Average bypass flow rate during storm evnt	
Peak Flow Rate	Influent	44.777	gpm	Peak influent flow rate during storm event	
	Effluent	23.543	gpm	Peak effluent flow rate during storm event	
	Peak Bypass	0.000	gpm	Peak bypass flow rate during storm event	
Aliquots	Number of Influent	28	-	Total number of aliquots obtained during qualifying storm event	The maximum of aliquots that can be collected is 45
	Number of Effluent	17	-		
Sample Duration	Influent	6.08	hours	Time in hours between the collection of the first and last aliquots	The duration reflects the time between the first and last aliquots, or the first and 45th aliquot i the number of aliquots reported exceeds 45
	Effluent	1.33	hours		
Threshold	Influent	121.00	L	Volume of stormwater that pass through the influent before a aliquot is collected	
	Effluent	121.00	L	Volume of stormwater that pass through the effluent before a aliquot is collected	
Storm Volume Sampled	% of Influent	99.8%	%	Number of aliquots times the threshold volume, divided by the total storm volume	
	% of Effluent	96.0%	%		


Storm Precipitation
Precipitation (inches)
0.2
0.18
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
0
50
100
150
200
250
300
350
400
Storm Duration (minutes)

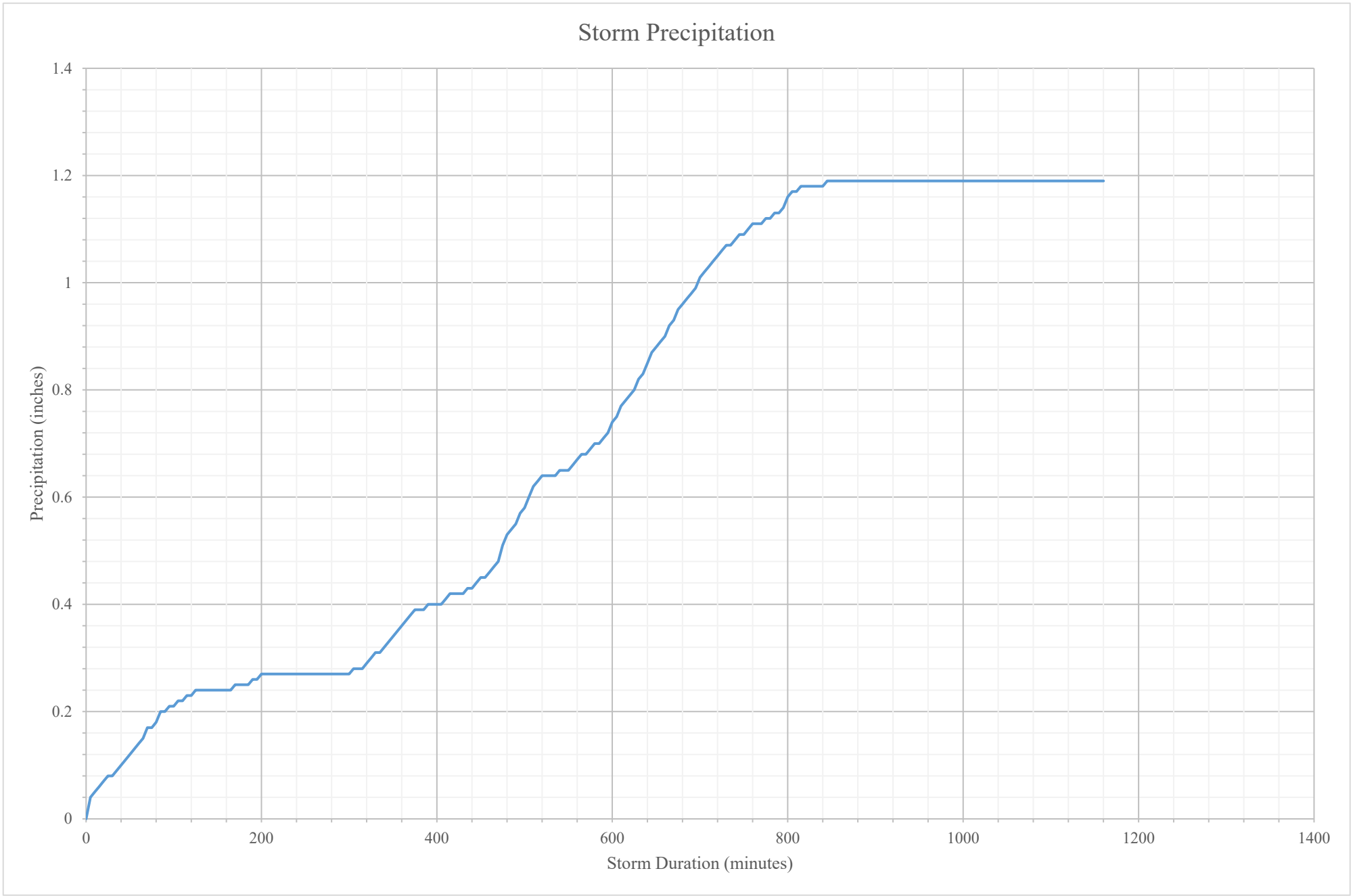

Flow Rates
Influent
Effluent
Bypass
Precipitation
Flow Rate (cfs)
Precipitation (inches)
Storm Duration (minutes)
0
50
100
150
200
250
300
350
400
0
0.02
0.04
0.06
0.08
0.1
0.12
0.14
0.16
0.18
0.2

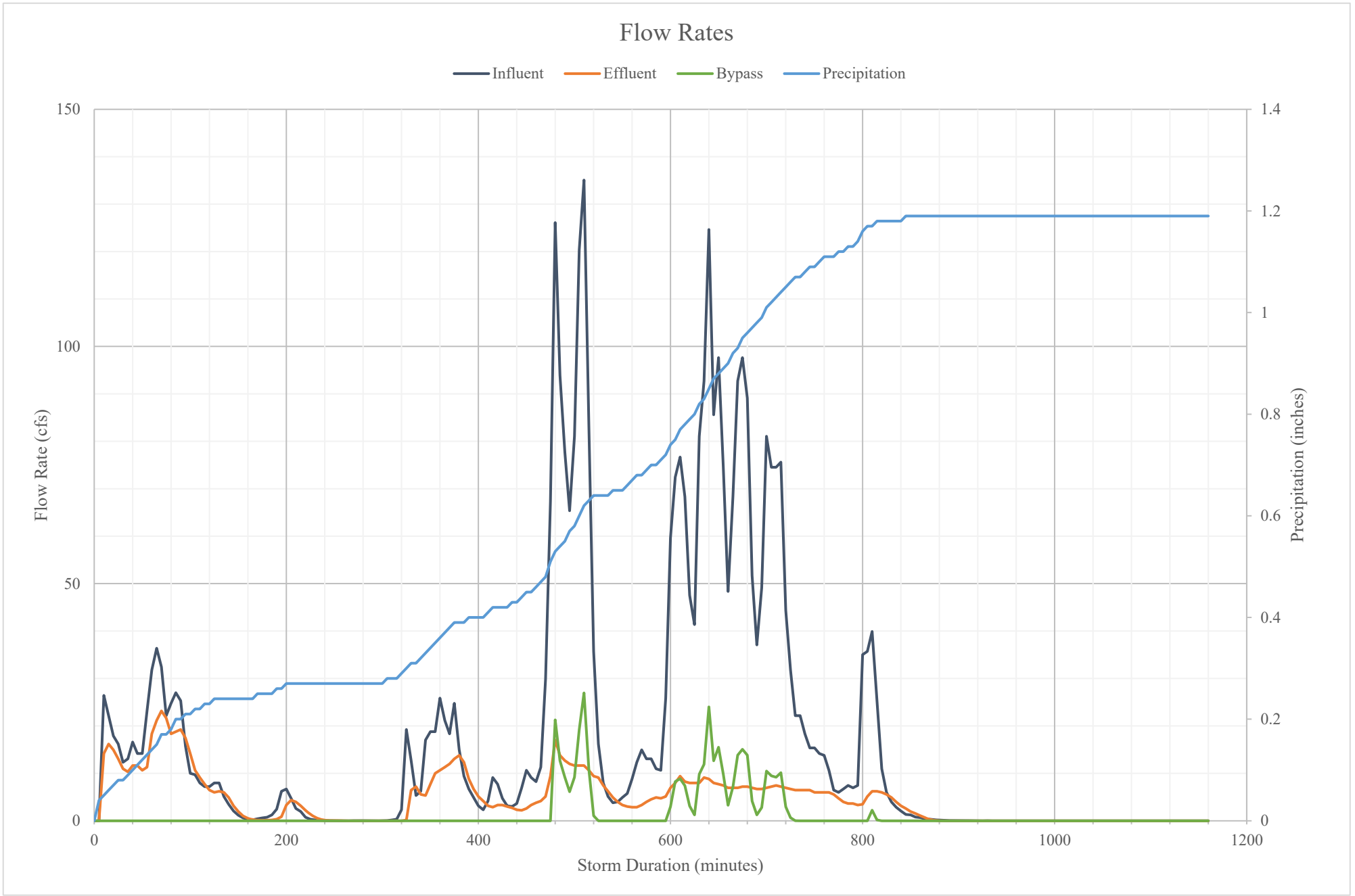
Storm Date: 5/17/2020

	Parameter	Units	Influent EMC Measured	Influent Conc. Minimum Limit	Influent Conc. Maximum Limit	Effluent	Removal Efficiency	Detection Limit (DL)	Flags	Notes
Required Parameters	TSS	mg/L	50.5	20	100	18.5	63.37%	1		
	Total Copper	mg/L	0.0126	N/A	N/A	0.00814	35.40%	0.00007		
	Dissolved Copper	mg/L	0.00785	0.005	0.02	0.00542	30.96%	0.00007		
	Total Zinc	mg/L	0.0641	N/A	N/A	0.024	62.56%	0.00025		
	Dissolved Zinc	mg/L	0.043	0.02	0.3	0.0162	62.33%	0.00025		
	Total Phosphorus	mg/L	0.628	0.1	0.5	0.25	60.19%	0.00505		
	Iron	mg/L	1.05	N/A	N/A	0.828	21.14%	0.01		
	Dissolved Iron	mg/L	0.151	N/A	N/A	0.0993	34.24%	0.01		
	NWTPH-Dx									
	Lube Oil	mg/kg	ND	N/A	N/A	ND	-	0.25		
	Mineral Oil	mg/kg	ND	N/A	N/A	ND	-	N/A		
	Diesel	mg/kg	ND	N/A	N/A	ND	-	0.05		
Screening Parameters	PSD			N/A	N/A		-	N/A		
	>250	µm	4.83	N/A	N/A	3.61	25.26%	N/A		
	250 - 62.5	µm	28.45	N/A	N/A	9.34	67.17%	N/A		
	<62.5	µm	17.61	N/A	N/A	13.59	22.83%	N/A		
	pH	std. units	6.91	N/A	N/A	7	-1.30%	N/A		Increased pH in eff
	Orthophosphate	mg/L	0.0935	N/A	N/A	0.056	40.11%	N/A		
	Hardness	mg CaCO3/L	30.2	N/A	N/A	30.7	-1.66%	0.865		Increased hardness in eff

	Influent EMC Measured - Test 1	Influent EMC Measured - Test 2	Influent EMC Measured - Average	Effluent - Test 1	Effluent - Test 2	Effluent - Average
TSS (mg/L)	36	65	50.5	22	15	18.5

	Paramter	Value	Units	Definition	Notes
Storm Data	Storm ID	5/20/2020	-	Identification number for monitored qualifying (?) storm event	
	Storm Start Date and Time	5/20/20 9:55 AM	-	Defines storm event start: 6 hours minimim with ≥ than 0.04" of rain	
	Storm End Date and Time	5/21/20 5:10 AM	-	Defines storm event end: 6 hours minimim with less than 0.04" of rain	
	Total Precipitation Depth	1.19	inches	Cumulative rainfall from the start of the qualifying storm event and the end of the qualifying storm event	
	Storm Duration	19.25	Hours	Duration of qualifying storm event	
	Storm Average Intensity	0.14	in/hr	Total rainfall amount divided by total rainfall duration (e.g., inches per hour)	
	Storm Peak Intensity	0.36	in/hr	Maximum precipitation depth per time interval (5 minutes) converted to in/hr	
	Storm Antecedent Dry Period	5.00	hours	From end of the last rainfall event to start of current rainfall event	
Total Volume	Influent	716.79	ft^3	Total volume of influent from start of event to end of event	
	Effluent	190.32	ft^3	Total volume of effluent from start of event to end of event	
	Bypass	59.67	ft^3	Total volume of bypass from start of event to end of event	
Average Flow Rate	Influent	5.988	gpm	Average influent flow rate during storm event	
	Effluent	1.746	gpm	Average effluent flow rate during storm event	
	Bypass	2.352	gpm	Average bypass flow rate during storm evnt	
Peak Flow Rate	Influent	35.686	gpm	Peak influent flow rate during storm event	
	Effluent	6.123	gpm	Peak effluent flow rate during storm event	
	Peak Bypass	6.954	gpm	Peak bypass flow rate during storm event	
Aliquots	Number of Influent	42	-	Total number of aliquots obtained during qualifying storm event	The maximum of aliquots that can be collected is 45
	Number of Effluent	11	-		
Sample Duration	Influent	13.08	hours	Time in hours between the collection of the first and last aliquots	The duration reflects the time between the first and last aliquots, or the first and 45th aliquot i the number of aliquots reported exceeds 45
	Effluent	13.00	hours		
Threshold	Influent	480.00	L	Volume of stormwater that pass through the influent before a aliquot is collected	
	Effluent	480.00	L	Volume of stormwater that pass through the effluent before a aliquot is collected	
Storm Volume Sampled	% of Influent	99.4%	%	Number of aliquots times the threshold volume, divided by the total storm volume	
	% of Effluent	98.0%	%		

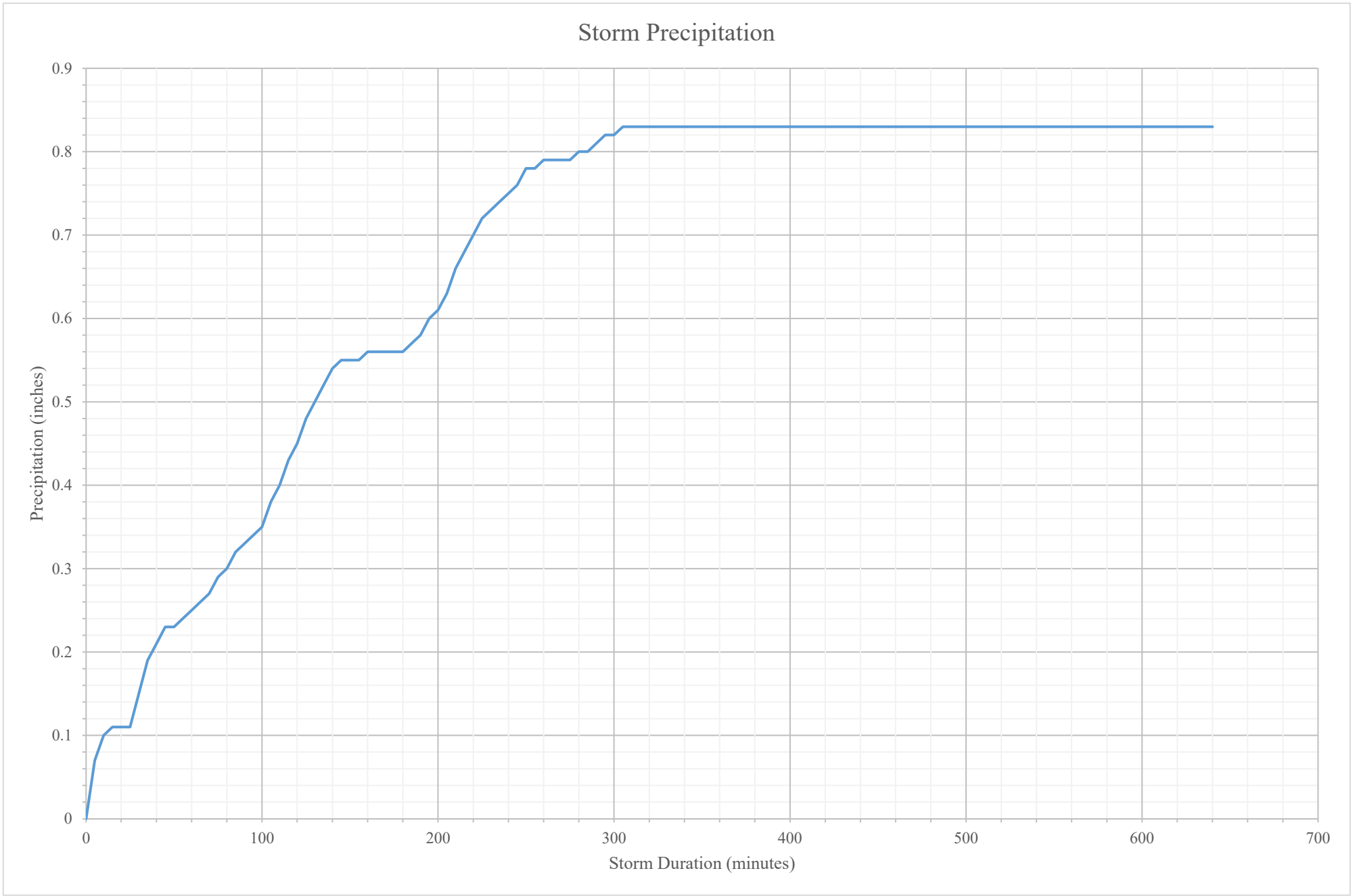

Storm Precipitation
Precipitation (inches)
1.4
1.2
1
0.8
0.6
0.4
0.2
0
0
200
400
600
800
1000
1200
1400
Storm Duration (minutes)

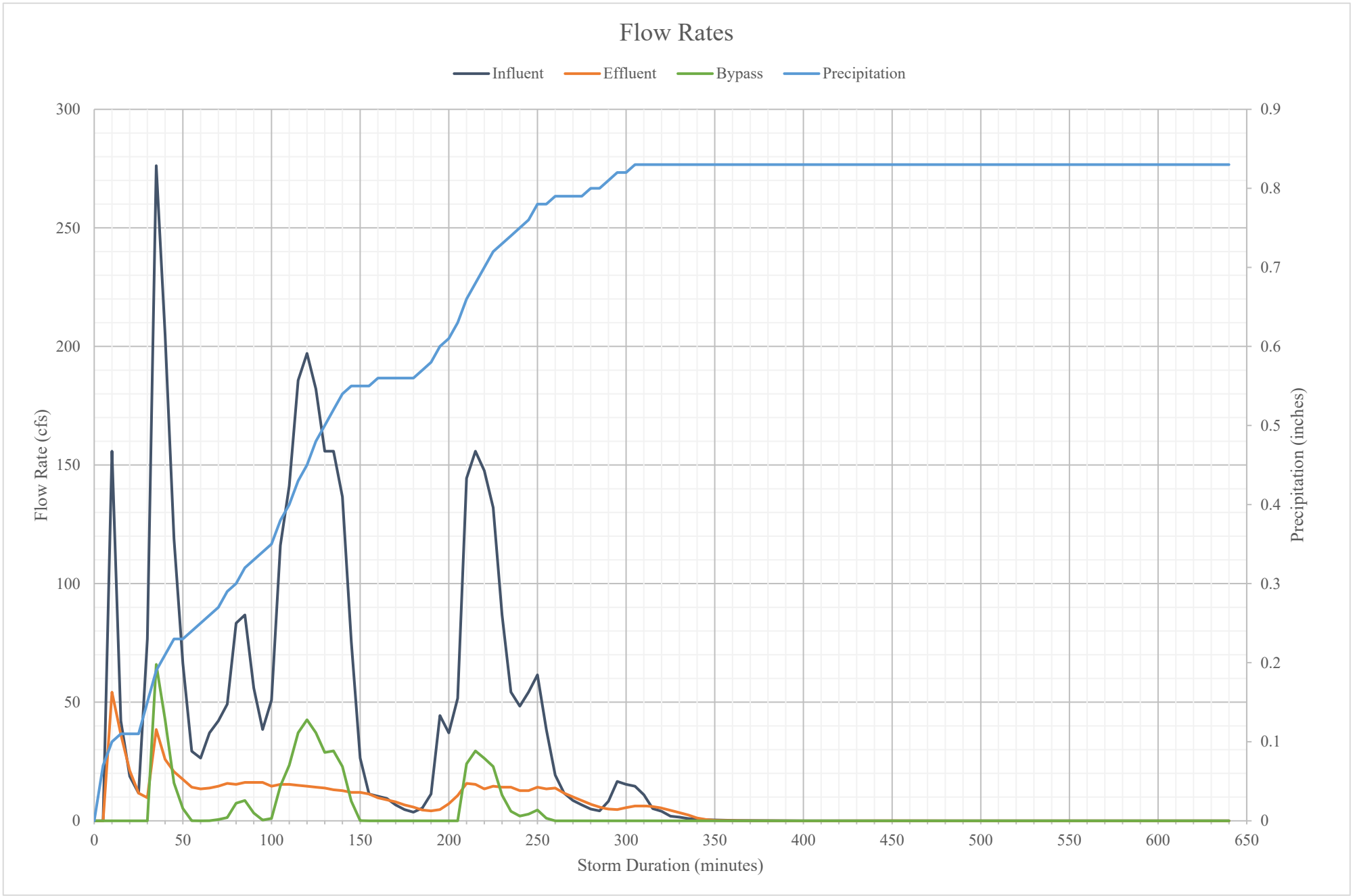

Flow Rates
Influent
Effluent
Bypass
Precipitation
150
100
50
0
Flow Rate (cfs)
1.4
1.2
1
0.8
0.6
0.4
0.2
0
Precipitation (inches)
0
200
400
600
800
1000
1200
Storm Duration (minutes)

Storm Date: 5/20/2020

	Parameter	Units	Influent EMC Measured	Influent Conc. Minimum Limit	Influent Conc. Maximum Limit	Effluent	Removal Efficiency	Detection Limit (DL)	Flags	Notes
Required Parameters	TSS	mg/L	37	20	100	9	75.68%	1		
	Total Copper	mg/L	0.00673	N/A	N/A	0.0041	39.08%	0.00007		
	Dissolved Copper	mg/L	0.00205	0.005	0.02	0.00325	-58.54%	0.00007		Increased Dissolved copper in eff
	Total Zinc	mg/L	0.0389	N/A	N/A	0.0181	53.47%	0.00025		
	Dissolved Zinc	mg/L	0.0112	0.02	0.3	0.014	-25.00%	0.00025		Increased dissolved zinc in eff
	Total Phosphorus	mg/L	0.1	0.1	0.5	0.063	37.00%	0.00505		
	Iron	mg/L	1.39	N/A	N/A	0.518	62.73%	0.01		
	Dissolved Iron	mg/L	0.0934	N/A	N/A	0.0808	13.49%	0.01		
	NWTPH-Dx									
	Lube Oil	mg/kg	ND	N/A	N/A	ND	-	0.25		
	Mineral Oil	mg/kg	ND	N/A	N/A	ND	-	N/A		
	Diesel	mg/kg	ND	N/A	N/A	ND	-	0.05		
Screening Parameters	PSD									
	>250	µm	N/A	N/A	N/A	N/A	-	N/A		
	250 - 62.5	µm	N/A	N/A	N/A	N/A	-	N/A		
	<62.5	µm	N/A	N/A	N/A	N/A	-	N/A		
	pH	std. units	N/A	N/A	N/A	N/A	-	N/A		
	Orthophosphate	mg/L	0.0248	N/A	N/A	0.0319	-28.63%	N/A		Increased in Orthophosphate in eff
	Hardness	mg CaCO3/L	13.6	N/A	N/A	15.6	-14.71%	0.865		Increased harness in eff

	Paramter	Value	Units	Definition	Notes
Storm Data	Storm ID	5/31/2020	-	Identification number for monitored qualifying (?) storm event	
	Storm Start Date and Time	5/31/20 2:30 AM	-	Defines storm event start: 6 hours minimim with ≥ than 0.04" of rain	
	Storm End Date and Time	5/31/20 1:05 PM	-	Defines storm event end: 6 hours minimim with less than 0.04" of rain	
	Total Precipitation Depth	0.83	inches	Cumulative rainfall from the start of the qualifying storm event and the end of the qualifying storm event	
	Storm Duration	10.58	Hours	Duration of qualifying storm event	
	Storm Average Intensity	0.22	in/hr	Total rainfall amount divided by total rainfall duration (e.g., inches per hour)	
	Storm Peak Intensity	0.84	in/hr	Maximum precipitation depth per time interval (5 minutes) converted to in/hr	
	Storm Antecedent Dry Period	125.33	hours	From end of the last rainfall event to start of current rainfall event	
Total Volume	Influent	724.17	ft^3	Total volume of influent from start of event to end of event	
	Effluent	150.70	ft^3	Total volume of effluent from start of event to end of event	
	Bypass	92.45	ft^3	Total volume of bypass from start of event to end of event	
Average Flow Rate	Influent	13.884	gpm	Average influent flow rate during storm event	
	Effluent	3.130	gpm	Average effluent flow rate during storm event	
	Bypass	4.197	gpm	Average bypass flow rate during storm evnt	
Peak Flow Rate	Influent	72.979	gpm	Peak influent flow rate during storm event	
	Effluent	14.333	gpm	Peak effluent flow rate during storm event	
	Peak Bypass	17.022	gpm	Peak bypass flow rate during storm event	
Aliquots	Number of Influent	>45	-	Total number of aliquots obtained during qualifying storm event	The maximum of aliquots that can be collected is 45
	Number of Effluent	13	-		
Sample Duration	Influent	5.08	hours	Time in hours between the collection of the first and last aliquots	The duration reflects the time between the first and last aliquots, or the first and 45th aliquot i the number of aliquots reported exceeds 45
	Effluent	5.00	hours		
Threshold	Influent	320.00	L	Volume of stormwater that pass through the influent before a aliquot is collected	
	Effluent	320.00	L	Volume of stormwater that pass through the effluent before a aliquot is collected	
Storm Volume Sampled	% of Influent	70.3%	%	Number of aliquots times the threshold volume, divided by the total storm volume	
	% of Effluent	97.5%	%		

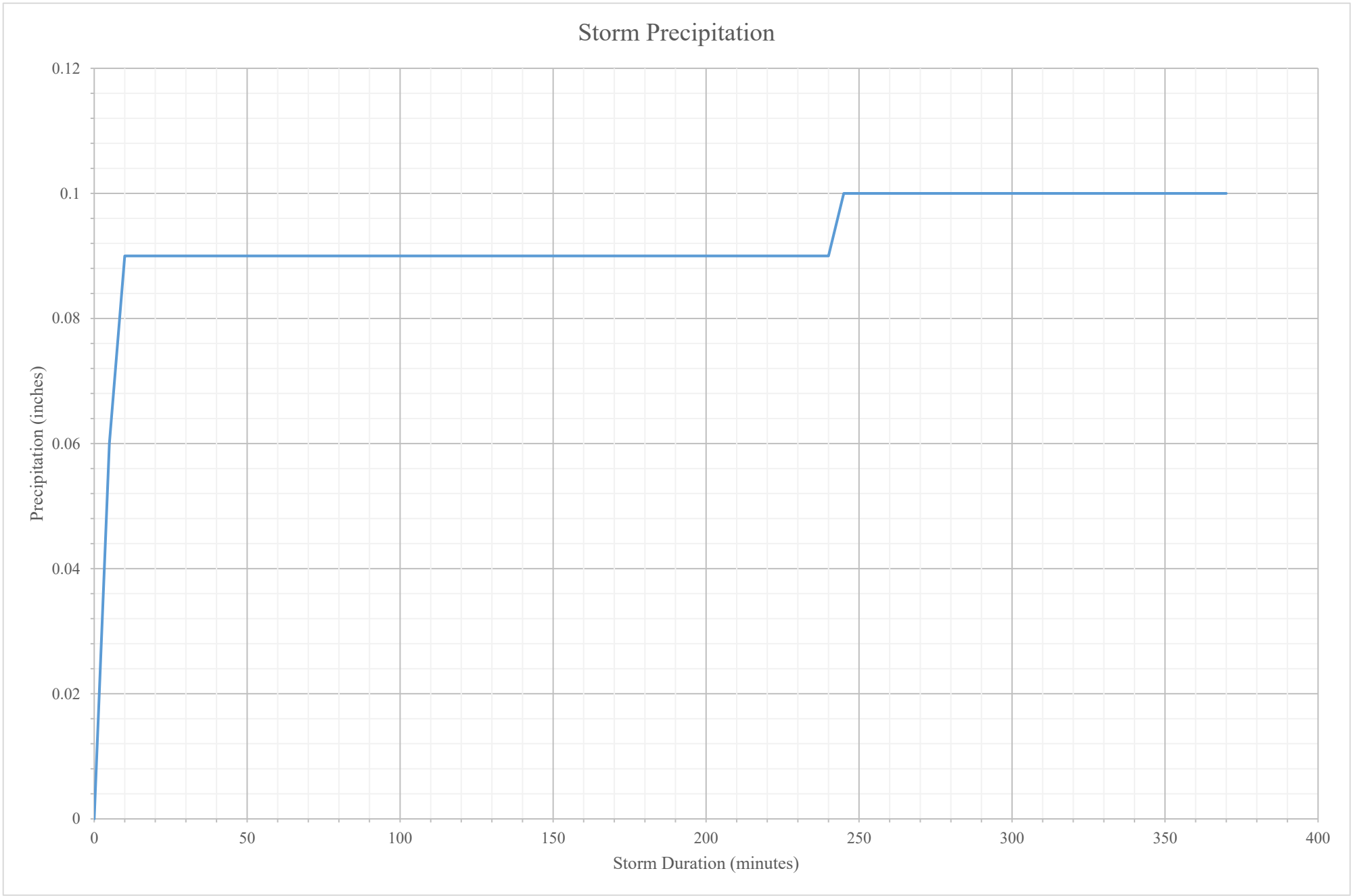

Storm Precipitation
Precipitation (inches)
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
0
100
200
300
400
500
600
700
Storm Duration (minutes)

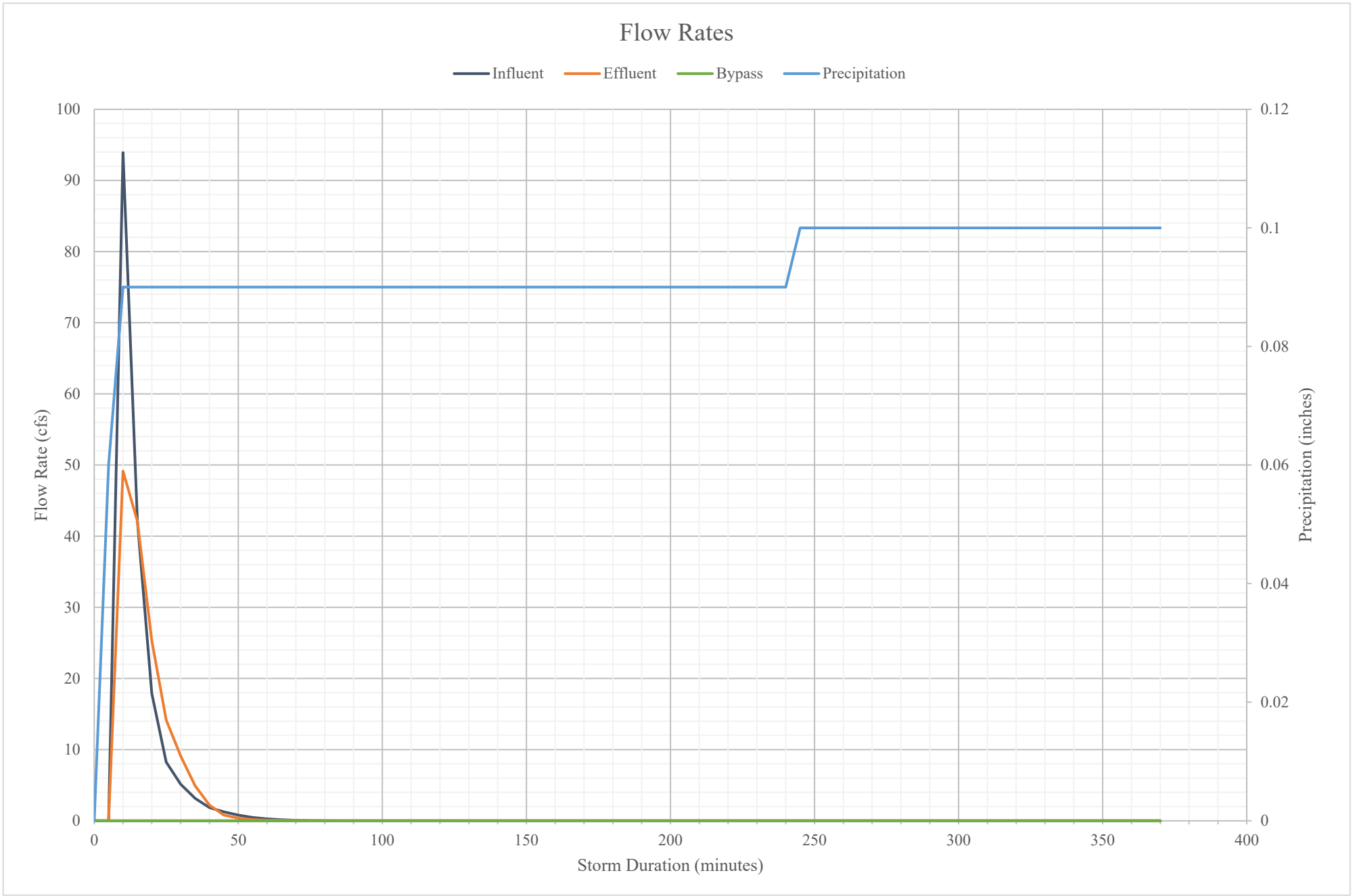

Flow Rates
Influent
Effluent
Bypass
Precipitation
Flow Rate (cfs)
Precipitation (inches)
Storm Duration (minutes)
0
50
100
150
200
250
300
350
400
450
500
550
600
650
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9

Storm Date: 5/31/2020

	Parameter	Units	Influent EMC Measured	Influent Conc. Minimum Limit	Influent Conc. Maximum Limit	Effluent	Removal Efficiency	Detection Limit (DL)	Flags	Notes
Required Parameters	TSS	mg/L	50	20	100	16	68.00%	1		
	Total Copper	mg/L	0.00497	N/A	N/A	0.00578	-16.30%	0.00007		Increased Copper in Eff
	Dissolved Copper	mg/L	0.00302	0.005	0.02	0.0045	-49.01%	0.00007		Increased dissolved copper in Eff
	Total Zinc	mg/L	0.0363	N/A	N/A	0.0253	30.30%	0.00025		
	Dissolved Zinc	mg/L	0.0206	0.02	0.3	0.0192	6.80%	0.00025		
	Total Phosphorus	mg/L	0.642	0.1	0.5	0.45	29.91%	0.00505		
	Iron	mg/L	0.704	N/A	N/A	0.499	29.12%	0.01		
	Dissolved Iron	mg/L	0.0897	N/A	N/A	0.0965	-7.58%	0.01		Increased dissolved iron in eff
	NWTPH-Dx									
	Lube Oil	mg/kg	ND	N/A	N/A	ND	-	0.25		
	Mineral Oil	mg/kg	ND	N/A	N/A	ND	-	N/A		
	Diesel	mg/kg	ND	N/A	N/A	ND	-	0.05		
Screening Parameters	PSD									
	>250	µm	N/A	N/A	N/A	N/A	-	N/A		
	250 - 62.5	µm	N/A	N/A	N/A	N/A	-	N/A		
	<62.5	µm	N/A	N/A	N/A	N/A	-	N/A		
	pH	std. units	N/A	N/A	N/A	N/A	-	N/A		
	Orthophosphate	mg/L	0.0692	N/A	N/A	0.128	-84.97%	N/A		Increased orthophosphate in eff
	Hardness	mg CaCO3/L	11.8	N/A	N/A	22.5	-90.68%	0.865		Increased hardness in eff

	Paramter	Value	Units	Definition	Notes
Storm Data	Storm ID	6/14/2020	-	Identification number for monitored qualifying (?) storm event	
	Storm Start Date and Time	6/14/20 3:00 PM	-	Defines storm event start: 6 hours minimim with ≥ than 0.04" of rain	
	Storm End Date and Time	6/14/20 9:05 PM	-	Defines storm event end: 6 hours minimim with less than 0.04" of rain	
	Total Precipitation Depth	0.10	inches	Cumulative rainfall from the start of the qualifying storm event and the end of the qualifying storm event	
	Storm Duration	6.08	Hours	Duration of qualifying storm event	
	Storm Average Intensity	0.40	in/hr	Total rainfall amount divided by total rainfall duration (e.g., inches per hour)	
	Storm Peak Intensity	0.72	in/hr	Maximum precipitation depth per time interval (5 minutes) converted to in/hr	
	Storm Antecedent Dry Period	12.33	hours	From end of the last rainfall event to start of current rainfall event	
Total Volume	Influent	30.97	ft^3	Total volume of influent from start of event to end of event	
	Effluent	26.22	ft^3	Total volume of effluent from start of event to end of event	
	Bypass	0.00	ft^3	Total volume of bypass from start of event to end of event	
Average Flow Rate	Influent	3.087	gpm	Average influent flow rate during storm event	
	Effluent	2.801	gpm	Average effluent flow rate during storm event	
	Bypass	0.000	gpm	Average bypass flow rate during storm evnt	
Peak Flow Rate	Influent	24.814	gpm	Peak influent flow rate during storm event	
	Effluent	12.989	gpm	Peak effluent flow rate during storm event	
	Peak Bypass	0.000	gpm	Peak bypass flow rate during storm event	
Aliquots	Number of Influent	8	-	Total number of aliquots obtained during qualifying storm event	The maximum of aliquots that can be collected is 45
	Number of Effluent	7	-		
Sample Duration	Influent	0.58	hours	Time in hours between the collection of the first and last aliquots	The duration reflects the time between the first and last aliquots, or the first and 45th aliquot i the number of aliquots reported exceeds 45
	Effluent	0.50	hours		
Threshold	Influent	100.00	L	Volume of stormwater that pass through the influent before a aliquot is collected	
	Effluent	100.00	L	Volume of stormwater that pass through the effluent before a aliquot is collected	
Storm Volume Sampled	% of Influent	91.3%	%	Number of aliquots times the threshold volume, divided by the total storm volume	
	% of Effluent	94.3%	%		

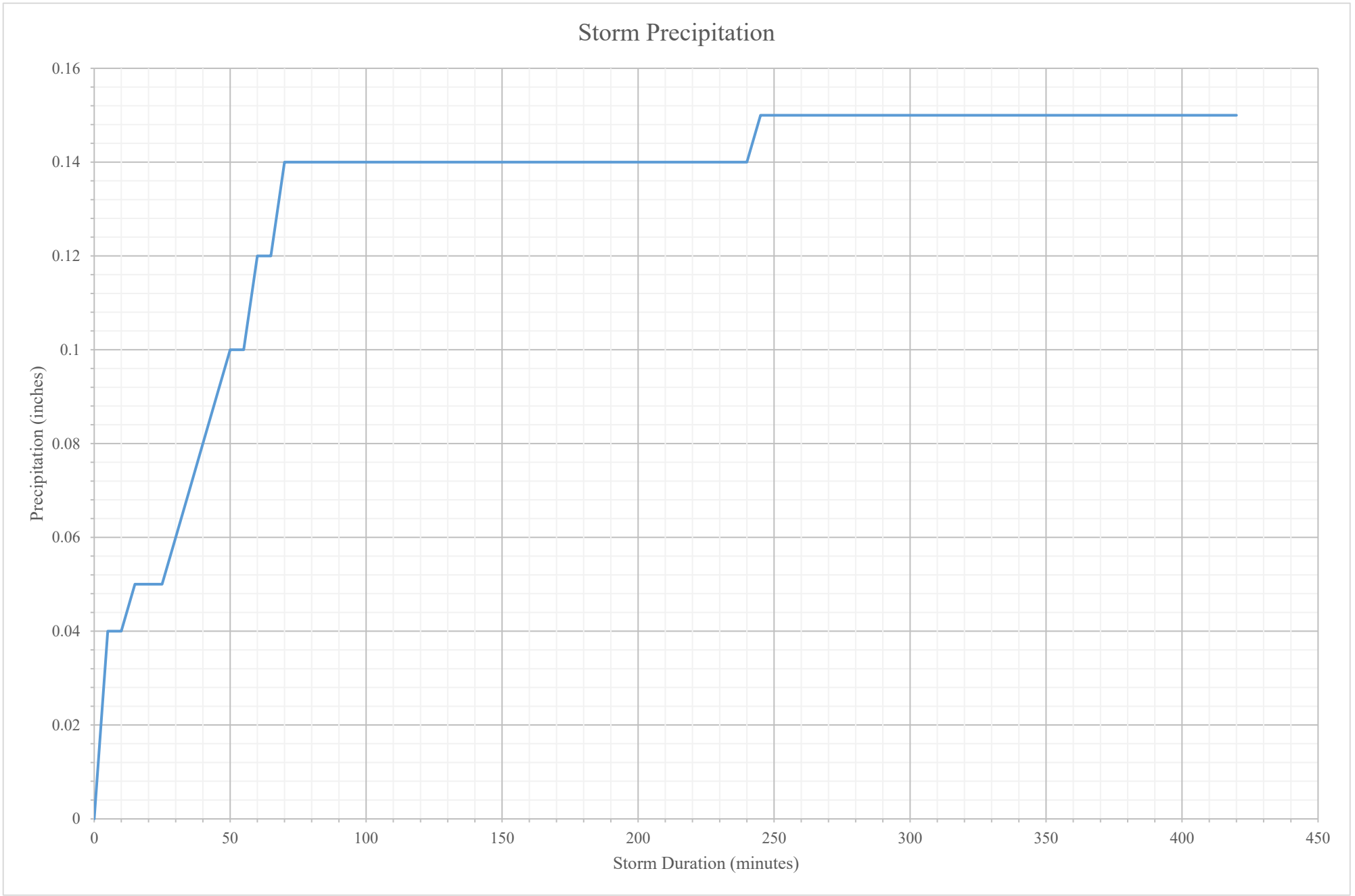

Storm Precipitation
0.12
0.1
0.08
0.06
0.04
0.02
0
Precipitation (inches)
0
50
100
150
200
250
300
350
400
Storm Duration (minutes)

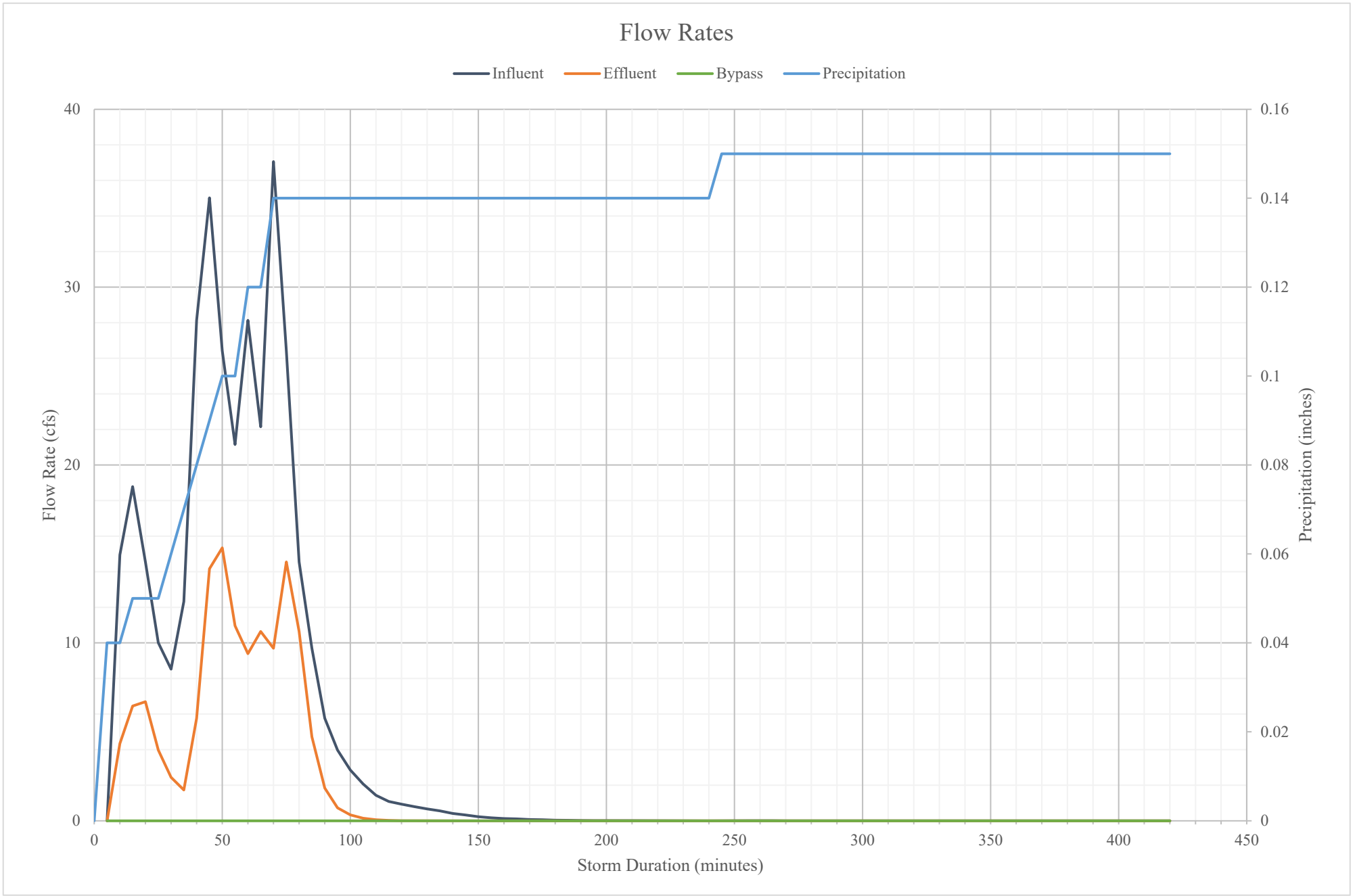

Flow Rates
Influent
Effluent
Bypass
Precipitation
Flow Rate (cfs)
Precipitation (inches)
Storm Duration (minutes)
0
10
20
30
40
50
60
70
80
90
100
0
0.02
0.04
0.06
0.08
0.1
0.12
0
50
100
150
200
250
300
350
400

Storm Date: 6/14/2020

	Parameter	Units	Influent EMC Measured	Influent Conc. Minimum Limit	Influent Conc. Maximum Limit	Effluent	Removal Efficiency	Detection Limit (DL)	Flags	Notes
Required Parameters	TSS	mg/L	58	20	100	16	72.41%	1		
	Total Copper	mg/L	0.00786	N/A	N/A	0.00492	37.40%	0.00007		
	Dissolved Copper	mg/L	0.00312	0.005	0.02	0.00338	-8.33%	0.00007		Increased Dissolved copper in eff
	Total Zinc	mg/L	0.0494	N/A	N/A	0.0165	66.60%	0.00025		
	Dissolved Zinc	mg/L	0.0563	0.02	0.3	0.0549	2.49%	0.00025		
	Total Phosphorus	mg/L	N/A	0.1	0.5	N/A	-	0.00505		
	Iron	mg/L	1.45	N/A	N/A	0.634	56.28%	0.01		
	Dissolved Iron	mg/L	0.058	N/A	N/A	0.0404	30.34%	0.01		
	NWTPH-Dx		N/A							
	Lube Oil	mg/kg	N/A	N/A	N/A	N/A	-	0.25		
	Mineral Oil	mg/kg	N/A	N/A	N/A	N/A	-	N/A		
	Diesel	mg/kg	N/A	N/A	N/A	N/A	-	0.05		
Screening Parameters	PSD		N/A							
	>250	µm	N/A	N/A	N/A	N/A	-	N/A		
	250 - 62.5	µm	N/A	N/A	N/A	N/A	-	N/A		
	<62.5	µm	N/A	N/A	N/A	N/A	-	N/A		
	pH	std. units	N/A	N/A	N/A	N/A	-	N/A		
	Orthophosphate	mg/L	N/A	N/A	N/A	N/A	-	N/A		
	Hardness	mg CaCO3/L	16.7	N/A	N/A	23.5	-40.72%	0.865		Increased harness in eff

	Paramter	Value	Units	Definition	Notes
Storm Data	Storm ID	6/16/2020	-	Identification number for monitored qualifying (?) storm event	
	Storm Start Date and Time	6/16/20 1:15 AM	-	Defines storm event start: 6 hours minimim with ≥ than 0.04" of rain	
	Storm End Date and Time	6/16/20 8:10 AM	-	Defines storm event end: 6 hours minimim with less than 0.04" of rain	
	Total Precipitation Depth	0.15	inches	Cumulative rainfall from the start of the qualifying storm event and the end of the qualifying storm event	
	Storm Duration	6.92	Hours	Duration of qualifying storm event	
	Storm Average Intensity	0.16	in/hr	Total rainfall amount divided by total rainfall duration (e.g., inches per hour)	
	Storm Peak Intensity	0.24	in/hr	Maximum precipitation depth per time interval (5 minutes) converted to in/hr	
	Storm Antecedent Dry Period	28.17	hours	From end of the last rainfall event to start of current rainfall event	
Total Volume	Influent	61.77	ft^3	Total volume of influent from start of event to end of event	
	Effluent	23.79	ft^3	Total volume of effluent from start of event to end of event	
	Bypass	0.00	ft^3	Total volume of bypass from start of event to end of event	
Average Flow Rate	Influent	1.965	gpm	Average influent flow rate during storm event	
	Effluent	1.547	gpm	Average effluent flow rate during storm event	
	Bypass	0.000	gpm	Average bypass flow rate during storm evnt	
Peak Flow Rate	Influent	9.792	gpm	Peak influent flow rate during storm event	
	Effluent	4.055	gpm	Peak effluent flow rate during storm event	
	Peak Bypass	0.000	gpm	Peak bypass flow rate during storm event	
Aliquots	Number of Influent	17	-	Total number of aliquots obtained during qualifying storm event	The maximum of aliquots that can be collected is 45
	Number of Effluent	6	-		
Sample Duration	Influent	1.50	hours	Time in hours between the collection of the first and last aliquots	The duration reflects the time between the first and last aliquots, or the first and 45th aliquot i the number of aliquots reported exceeds 45
	Effluent	0.92	hours		
Threshold	Influent	100.00	L	Volume of stormwater that pass through the influent before a aliquot is collected	
	Effluent	100.00	L	Volume of stormwater that pass through the effluent before a aliquot is collected	
Storm Volume Sampled	% of Influent	97.3%	%	Number of aliquots times the threshold volume, divided by the total storm volume	
	% of Effluent	89.1%	%		

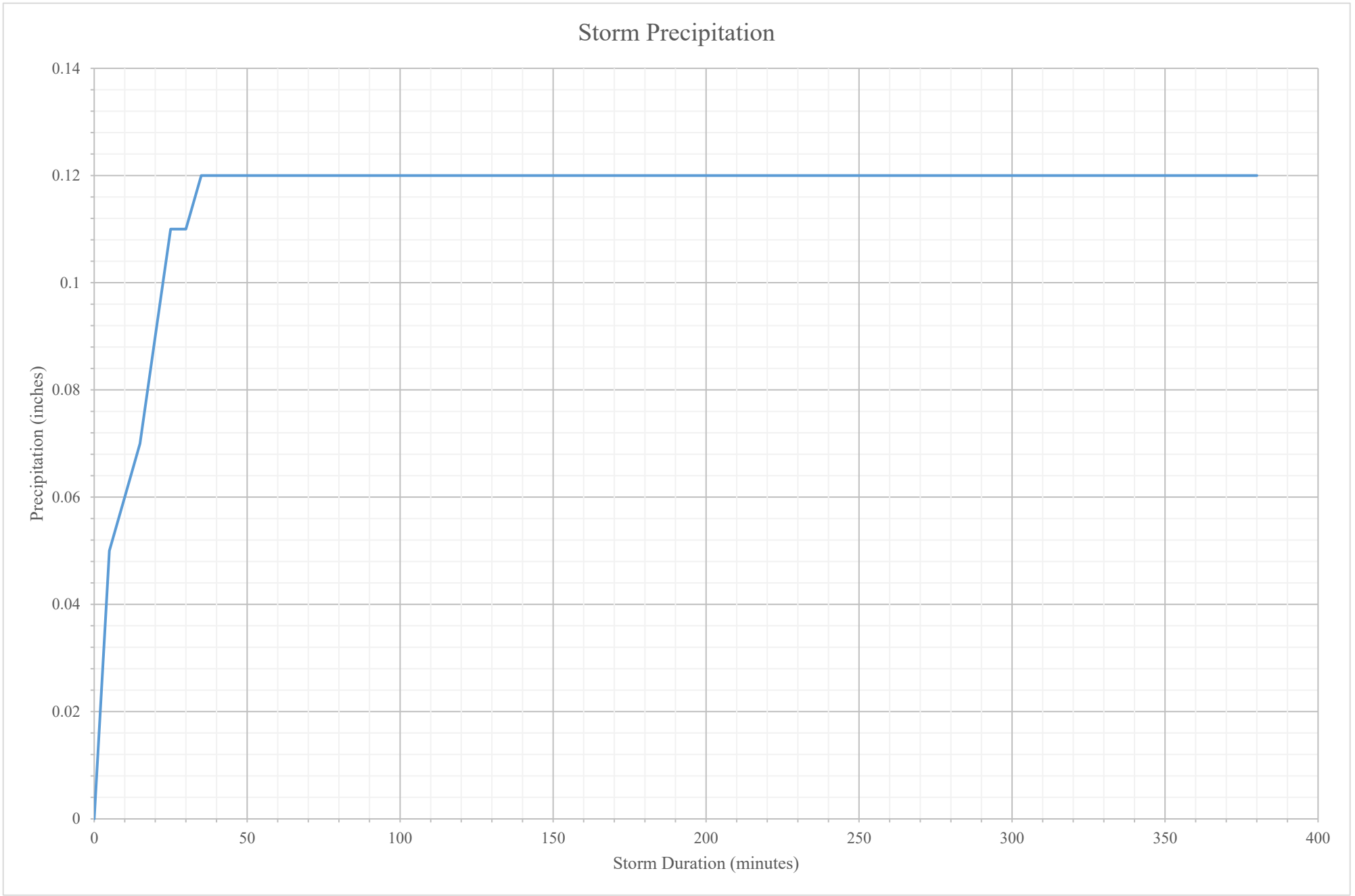

Storm Precipitation
Precipitation (inches)
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
0
50
100
150
200
250
300
350
400
450
Storm Duration (minutes)

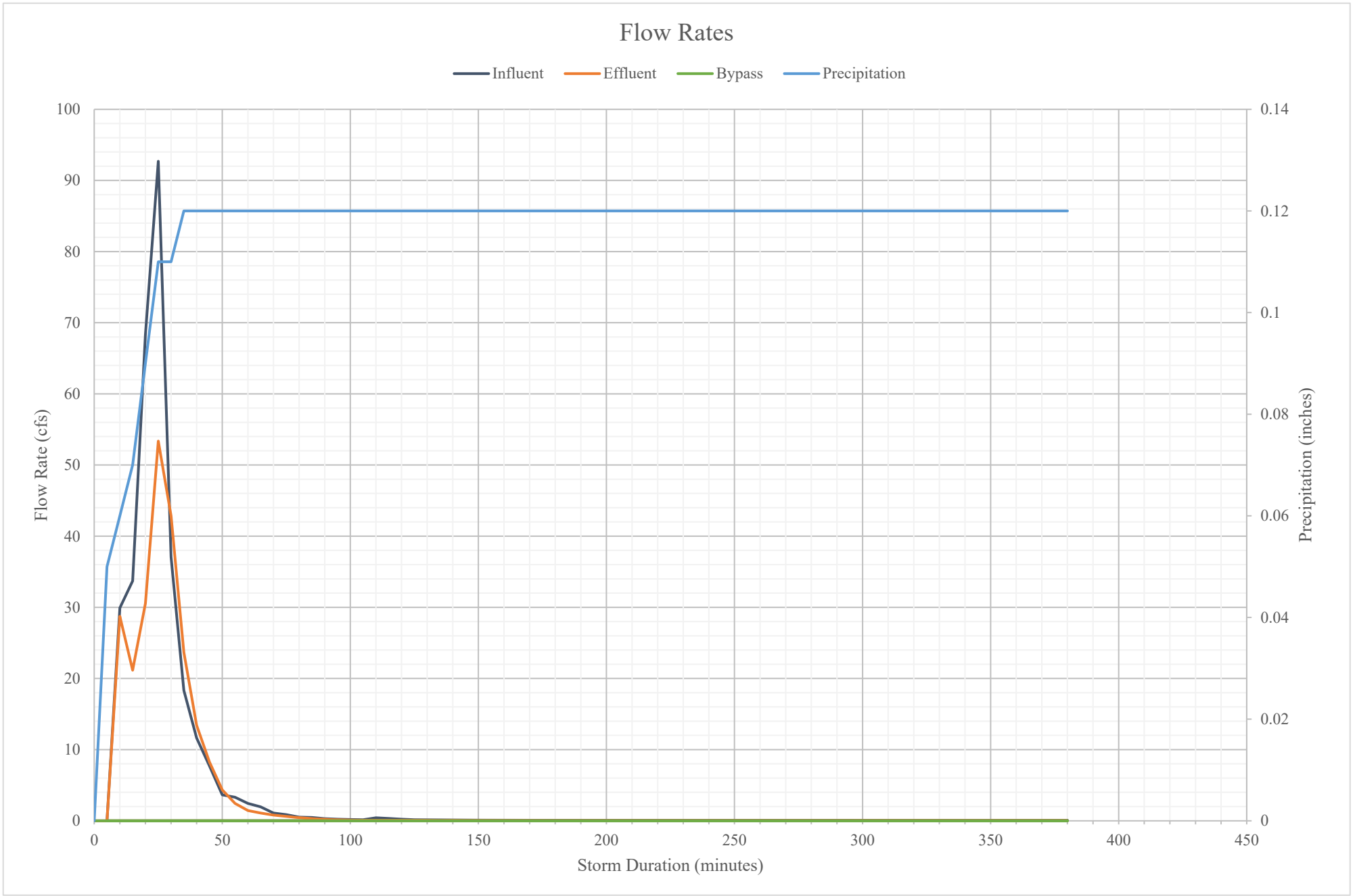

Flow Rates
Influent
Effluent
Bypass
Precipitation
Flow Rate (cfs)
Precipitation (inches)
Storm Duration (minutes)
0
10
20
30
40
0
0.02
0.04
0.06
0.08
0.1
0.12
0.14
0.16
0
50
100
150
200
250
300
350
400
450

Storm Date: 6/16/2020

	Parameter	Units	Influent EMC Measured	Influent Conc. Minimum Limit	Influent Conc. Maximum Limit	Effluent	Removal Efficiency	Detection Limit (DL)	Flags	Notes
Required Parameters	TSS	mg/L	19	20	100	12	36.84%	1		
	Total Copper	mg/L	0.00312	N/A	N/A	0.00367	-17.63%	0.00007		Increased copper in eff
	Dissolved Copper	mg/L	0.00173	0.005	0.02	0.00289	-67.05%	0.00007		Increased Dissolved copper in eff
	Total Zinc	mg/L	0.0186	N/A	N/A	0.0101	45.70%	0.00025		
	Dissolved Zinc	mg/L	0.0131	0.02	0.3	0.0101	22.90%	0.00025		
	Total Phosphorus	mg/L	N/A	0.1	0.5	N/A	-	0.00505		
	Iron	mg/L	N/A	N/A	N/A	N/A	-	0.01		
	Dissolved Iron	mg/L	N/A	N/A	N/A	N/A	-	0.01		
	NWTPH-Dx									
	Lube Oil	mg/kg	N/A	N/A	N/A	N/A	-	0.25		
	Mineral Oil	mg/kg	N/A	N/A	N/A	N/A	-	N/A		
	Diesel	mg/kg	N/A	N/A	N/A	N/A	-	0.05		
Screening Parameters	PSD									
	>250	µm	N/A	N/A	N/A	N/A	-	N/A		
	250 - 62.5	µm	N/A	N/A	N/A	N/A	-	N/A		
	<62.5	µm	N/A	N/A	N/A	N/A	-	N/A		
	pH	std. units	N/A	N/A	N/A	N/A	-	N/A		
	Orthophosphate	mg/L	N/A	N/A	N/A	N/A	-	N/A		
	Hardness	mg CaCO3/L	14.2	N/A	N/A	21.1	-48.59%	0.865		Increased harness in eff

	Paramter	Value	Units	Definition	Notes
Storm Data	Storm ID	7/1/2020	-	Identification number for monitored qualifying (?) storm event	
	Storm Start Date and Time	7/1/20 5:45 AM	-	Defines storm event start: 6 hours minimim with ≥ than 0.04" of rain	
	Storm End Date and Time	7/1/20 12:00 PM	-	Defines storm event end: 6 hours minimim with less than 0.04" of rain	
	Total Precipitation Depth	0.12	inches	Cumulative rainfall from the start of the qualifying storm event and the end of the qualifying storm event	
	Storm Duration	6.25	Hours	Duration of qualifying storm event	
	Storm Average Intensity	0.22	in/hr	Total rainfall amount divided by total rainfall duration (e.g., inches per hour)	
	Storm Peak Intensity	0.48	in/hr	Maximum precipitation depth per time interval (5 minutes) converted to in/hr	
	Storm Antecedent Dry Period	25.83	hours	From end of the last rainfall event to start of current rainfall event	
Total Volume	Influent	56.30	ft^3	Total volume of influent from start of event to end of event	
	Effluent	41.43	ft^3	Total volume of effluent from start of event to end of event	
	Bypass	0.00	ft^3	Total volume of bypass from start of event to end of event	
Average Flow Rate	Influent	1.123	gpm	Average influent flow rate during storm event	
	Effluent	0.826	gpm	Average effluent flow rate during storm event	
	Bypass	0.000	gpm	Average bypass flow rate during storm evnt	
Peak Flow Rate	Influent	24.492	gpm	Peak influent flow rate during storm event	
	Effluent	14.103	gpm	Peak effluent flow rate during storm event	
	Peak Bypass	0.000	gpm	Peak bypass flow rate during storm event	
Aliquots	Number of Influent	15	-	Total number of aliquots obtained during qualifying storm event	The maximum of aliquots that can be collected is 45
	Number of Effluent	11	-		
Sample Duration	Influent	1.17	hours	Time in hours between the collection of the first and last aliquots	The duration reflects the time between the first and last aliquots, or the first and 45th aliquot i the number of aliquots reported exceeds 45
	Effluent	0.83	hours		
Threshold	Influent	100.00	L	Volume of stormwater that pass through the influent before a aliquot is collected	
	Effluent	100.00	L	Volume of stormwater that pass through the effluent before a aliquot is collected	
Storm Volume Sampled	% of Influent	94.1%	%	Number of aliquots times the threshold volume, divided by the total storm volume	
	% of Effluent	93.8%	%		

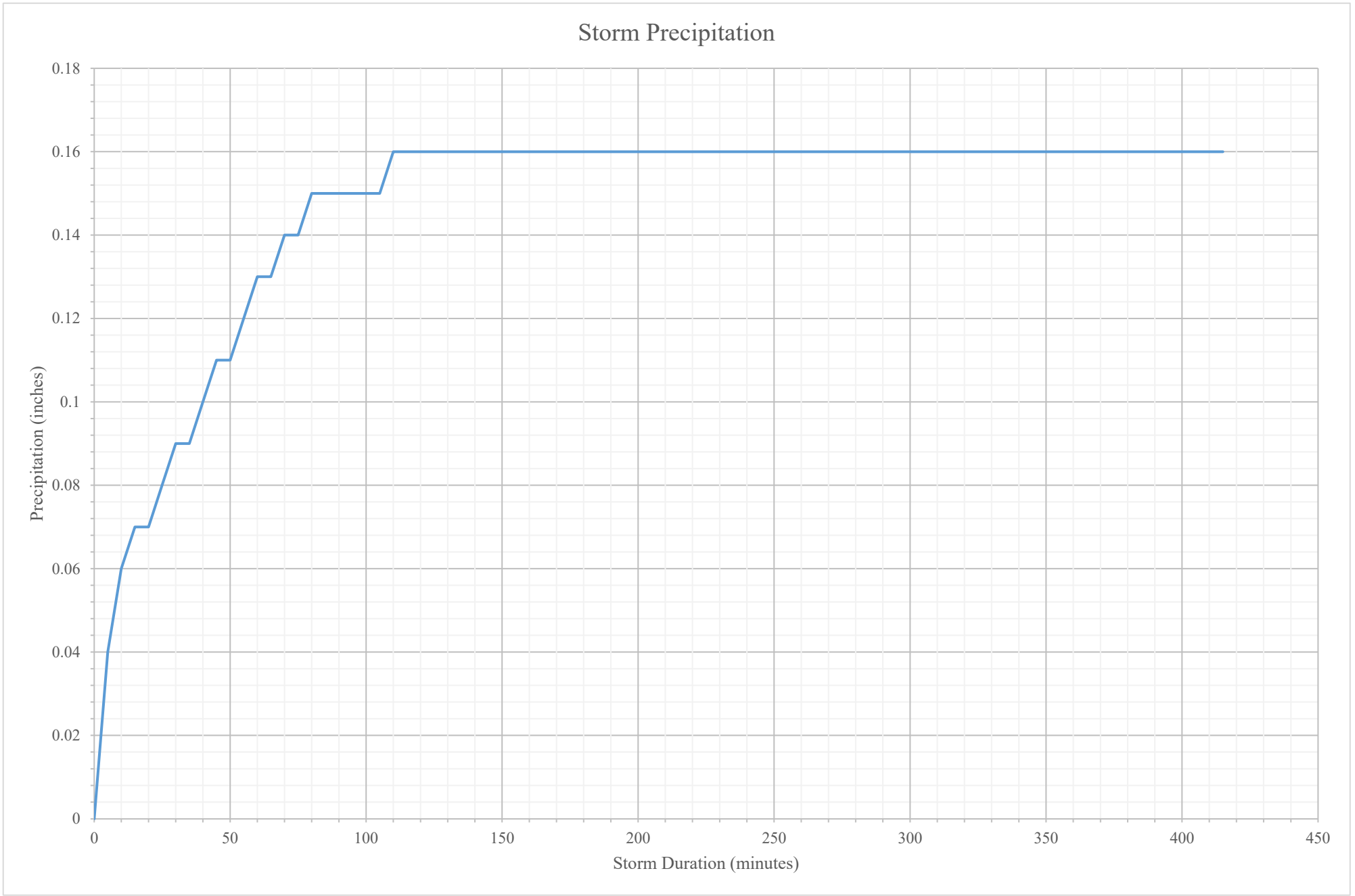

Storm Precipitation
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
Precipitation (inches)
0
50
100
150
200
250
300
350
400
Storm Duration (minutes)

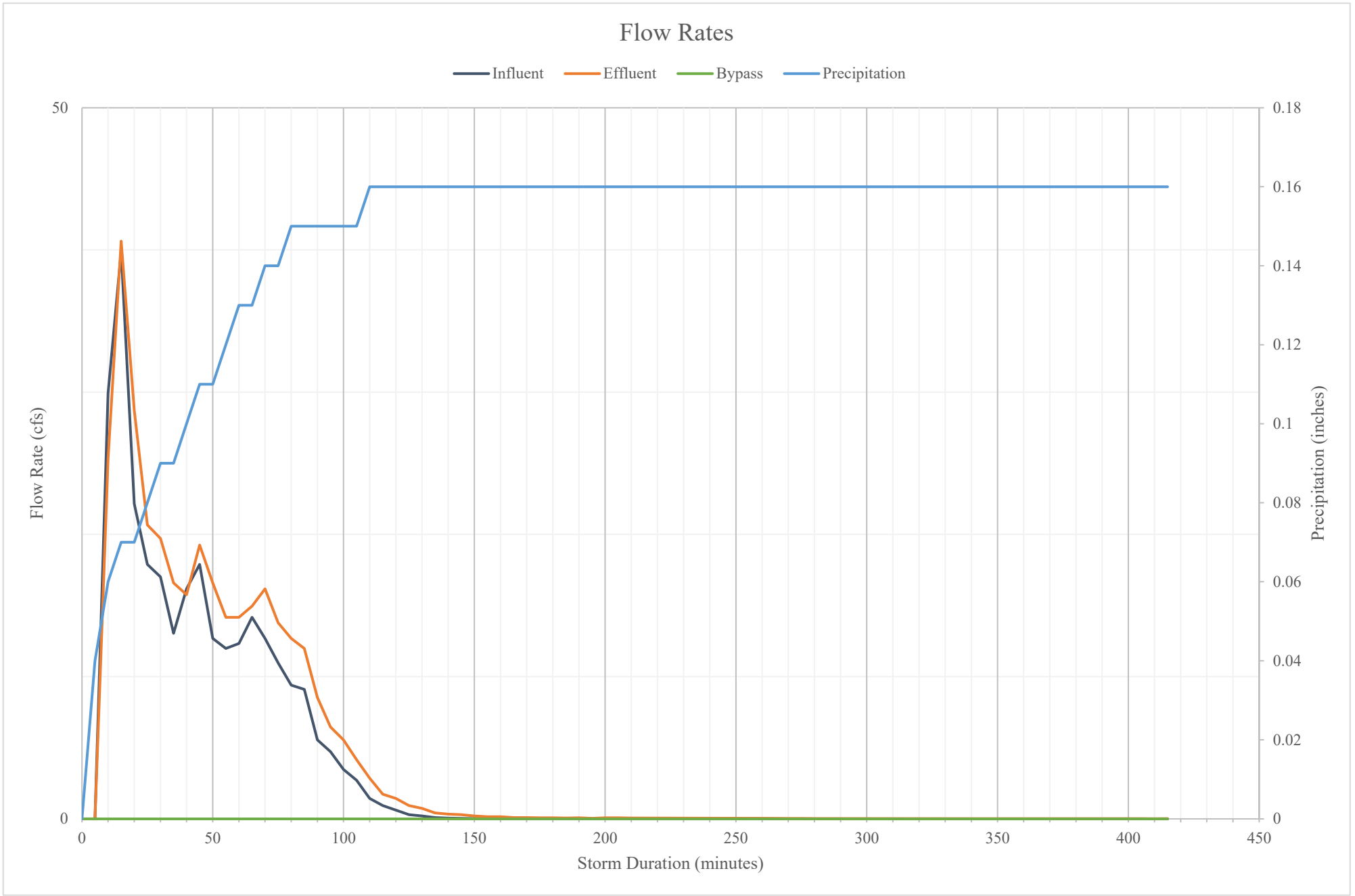

Flow Rates
Influent
Effluent
Bypass
Precipitation
Flow Rate (cfs)
Precipitation (inches)
Storm Duration (minutes)
0
10
20
30
40
50
60
70
80
90
100
0
0.02
0.04
0.06
0.08
0.1
0.12
0.14
0
50
100
150
200
250
300
350
400
450

Storm Date: 7/1/2020

	Parameter	Units	Influent EMC Measured	Influent Conc. Minimum Limit	Influent Conc. Maximum Limit	Effluent	Removal Efficiency	Detection Limit (DL)	Flags	Notes
Required Parameters	TSS	mg/L	44	20	100	35	20.45%	1		
	Total Copper	mg/L	0.0088	N/A	N/A	0.00682	22.50%	0.00007		
	Dissolved Copper	mg/L	0.00431	0.005	0.02	0.00622	-44.32%	0.00007		
	Total Zinc	mg/L	0.0601	N/A	N/A	0.0219	63.56%	0.00025		
	Dissolved Zinc	mg/L	0.0326	0.02	0.3	0.0263	19.33%	0.00025		
	Total Phosphorus	mg/L	N/A	0.1	0.5	N/A	-	0.00505		
	Iron	mg/L	N/A	N/A	N/A	N/A	-	0.01		
	Dissolved Iron	mg/L	N/A	N/A	N/A	N/A	-	0.01		
	NWTPH-Dx									
	Lube Oil	mg/kg	ND	N/A	N/A	ND	-	0.25		
	Mineral Oil	mg/kg	ND	N/A	N/A	ND	-	N/A		
	Diesel	mg/kg	ND	N/A	N/A	ND	-	0.05		
Screening Parameters	PSD									
	>250	µm	N/A	N/A	N/A	N/A	-	N/A		
	250 - 62.5	µm	N/A	N/A	N/A	N/A	-	N/A		
	<62.5	µm	N/A	N/A	N/A	N/A	-	N/A		
	pH	std. units	N/A	N/A	N/A	N/A	-	N/A		
	Orthophosphate	mg/L	N/A	N/A	N/A	N/A	-	N/A		
	Hardness	mg CaCO3/L	16.9	N/A	N/A	29.4	-73.96%	0.865		

	Paramter	Value	Units	Definition	Notes
Storm Data	Storm ID	9/23/2020	-	Identification number for monitored qualifying (?) storm event	
	Storm Start Date and Time	9/23/20 10:40 PM	-	Defines storm event start: 6 hours minimim with ≥ than 0.04" of rain	
	Storm End Date and Time	9/24/20 5:30 AM	-	Defines storm event end: 6 hours minimim with less than 0.04" of rain	
	Total Precipitation Depth	0.16	inches	Cumulative rainfall from the start of the qualifying storm event and the end of the qualifying storm event	
	Storm Duration	6.83	Hours	Duration of qualifying storm event	
	Storm Average Intensity	0.14	in/hr	Total rainfall amount divided by total rainfall duration (e.g., inches per hour)	
	Storm Peak Intensity	0.24	in/hr	Maximum precipitation depth per time interval (5 minutes) converted to in/hr	
	Storm Antecedent Dry Period	1158.00	hours	From end of the last rainfall event to start of current rainfall event	
Total Volume	Influent	50.772	ft^3	Total volume of influent from start of event to end of event	
	Effluent	59.429	ft^3	Total volume of effluent from start of event to end of event	
	Bypass	0.000	ft^3	Total volume of bypass from start of event to end of event	
Average Flow Rate	Influent	1.582	gpm	Average influent flow rate during storm event	
	Effluent	1.084	gpm	Average effluent flow rate during storm event	
	Bypass	0.000	gpm	Average bypass flow rate during storm evnt	
Peak Flow Rate	Influent	10.540	gpm	Peak influent flow rate during storm event	
	Effluent	10.732	gpm	Peak effluent flow rate during storm event	
	Peak Bypass	0.000	gpm	Peak bypass flow rate during storm event	
Aliquots	Number of Influent	17	-	Total number of aliquots obtained during qualifying storm event	The maximum of aliquots that can be collected is 45
	Number of Effluent	21	-		
Sample Duration	Influent	1.33	hours	Time in hours between the collection of the first and last aliquots	The duration reflects the time between the first and last aliquots, or the first and 45th aliquot if the number of aliquots reported exceeds 45
	Effluent	4.17	hours		
Threshold	Influent	80.00	L	Volume of stormwater that pass through the influent before a aliquot is collected	
	Effluent	80.00	L	Volume of stormwater that pass through the effluent before a aliquot is collected	
Storm Volume Sampled	% of Influent	94.7%	%	Number of aliquots times the threshold volume, divided by the total storm volume	
	% of Effluent	99.9%	%		

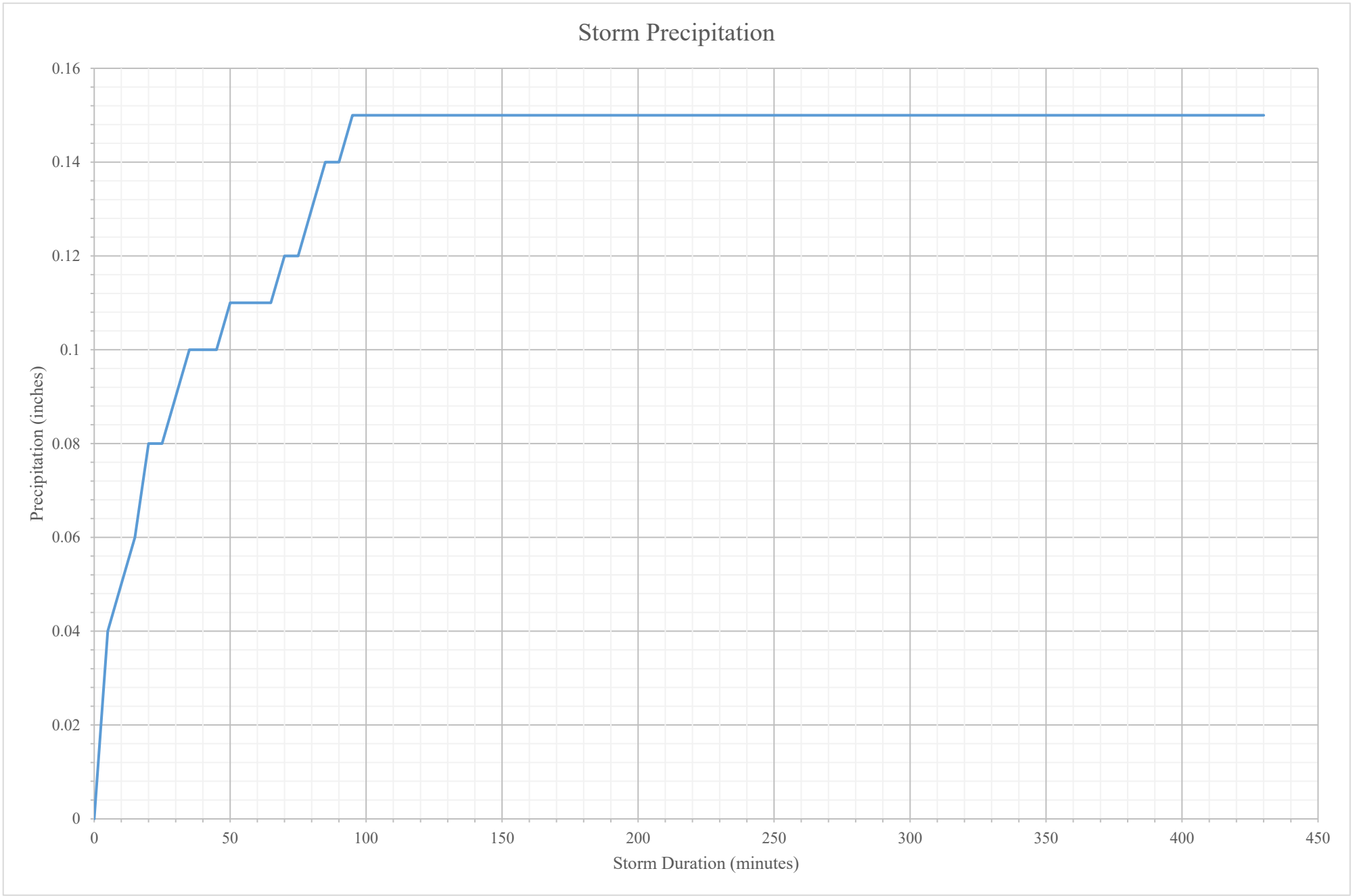

Storm Precipitation
Precipitation (inches)
0.18
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
0
50
100
150
200
250
300
350
400
450
Storm Duration (minutes)

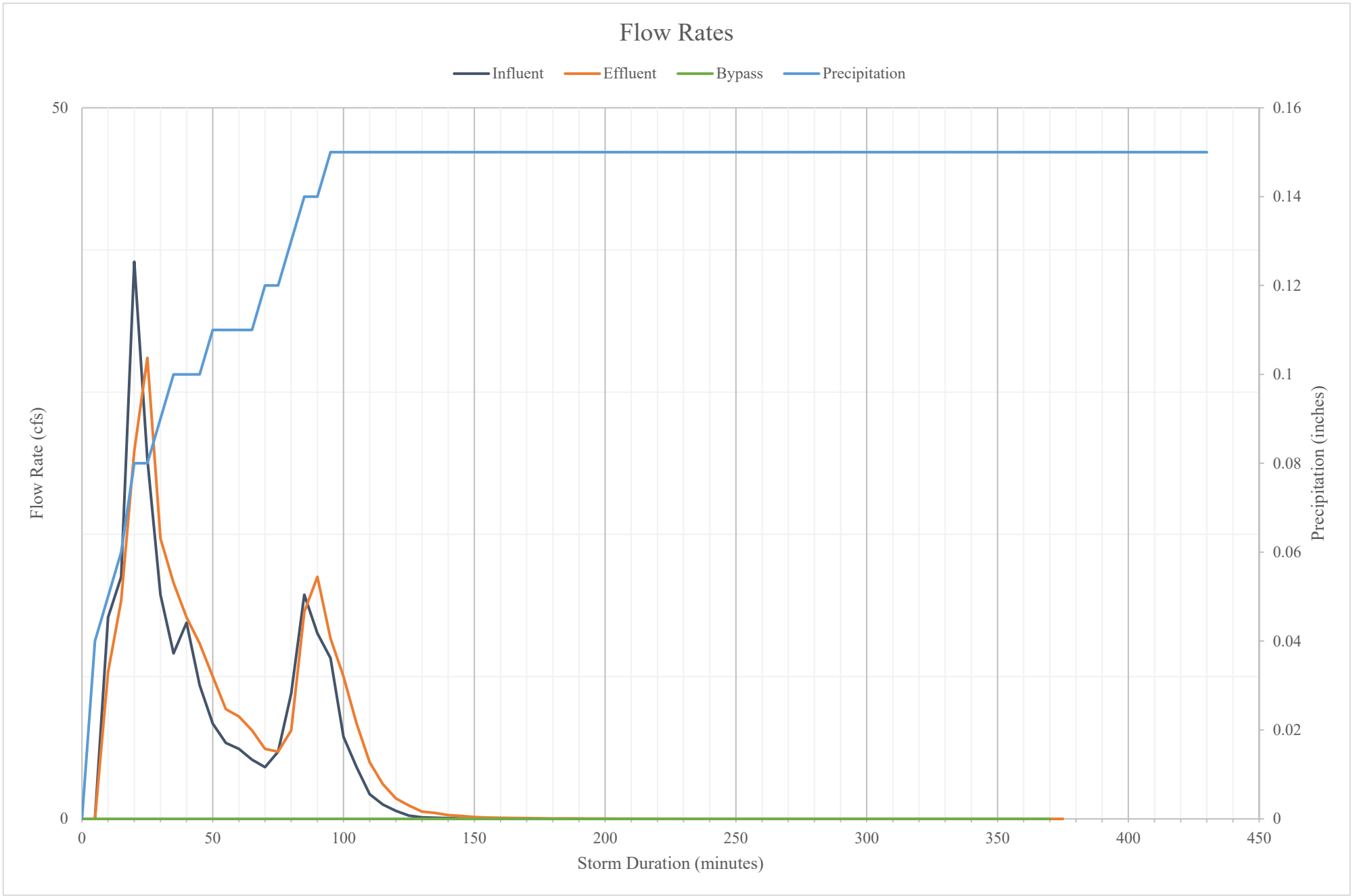

Flow Rates
Influent
Effluent
Bypass
Precipitation
Flow Rate (cfs)
Precipitation (inches)
Storm Duration (minutes)
50
0
0.18
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
0
50
100
150
200
250
300
350
400
450

Storm Date: 9/23/2020

	Parameter	Units	Influent EMC Measured	Influent Conc. Minimum Limit	Influent Conc. Maximum Limit	Effluent	Removal Efficiency	Detection Limit (DL)	Flags	Notes
Required Parameters	TSS	mg/L	56	20	100	47	16.07%	1		
	Total Copper	mg/L	0.0168	N/A	N/A	0.0177	-5.36%	0.00007		Increased total copper in eff
	Dissolved Copper	mg/L	0.0133	0.005	0.02	0.0158	-18.80%	0.00007		Increased dissolved copper in eff
	Total Zinc	mg/L	0.137	N/A	N/A	0.0592	56.79%	0.00025		
	Dissolved Zinc	mg/L	0.11	0.02	0.3	0.0491	55.36%	0.00025		
	Total Phosphorus	mg/L	0.654	0.1	0.5	0.619	5.35%	0.00505		
	Iron	mg/L	0.986	N/A	N/A	0.797	19.17%	0.01		
	Dissolved Iron	mg/L	0.119	N/A	N/A	0.19	-59.66%	0.01		Increased dissolved iron in eff
	NWTPH-Dx									
	Lube Oil	mg/kg	1.14	N/A	N/A	1.04	8.77%	0.25		
	Mineral Oil	mg/kg	ND	N/A	N/A	ND	-	N/A		
	Diesel	mg/kg	1.22	N/A	N/A	1.3	-6.56%	0.05		Increased diesel in eff
Screening Parameters	PSD									
	>250	µm	21.47	N/A	N/A	1.6	92.55%	N/A		
	250 - 62.5	µm	10.5	N/A	N/A	4.79	54.38%	N/A		
	<62.5	µm	28.82	N/A	N/A	28.33	1.70%	N/A		
	pH	std. units	N/A	N/A	N/A	N/A	-	N/A		
	Orthophosphate	mg/L	0.349	N/A	N/A	0.43	-23.21%	N/A		Increased PO4/P in eff
	Hardness	mg CaCO3/L	61.4	N/A	N/A	40.3	34.36%	0.865		

	Paramter	Value	Units	Definition	Notes
Storm Data	Storm ID	9/25/2020	-	Identification number for monitored qualifying (?) storm event	
	Storm Start Date and Time	9/25/20 9:20 AM	-	Defines storm event start: 6 hours minimim with ≥ than 0.04" of rain	
	Storm End Date and Time	9/25/20 4:25 PM	-	Defines storm event end: 6 hours minimim with less than 0.04" of rain	
	Total Precipitation Depth	0.15	inches	Cumulative rainfall from the start of the qualifying storm event and the end of the qualifying storm event	
	Storm Duration	7.08	Hours	Duration of qualifying storm event	
	Storm Average Intensity	0.13	in/hr	Total rainfall amount divided by total rainfall duration (e.g., inches per hour)	
	Storm Peak Intensity	0.24	in/hr	Maximum precipitation depth per time interval (5 minutes) converted to in/hr	
	Storm Antecedent Dry Period	27.83	hours	From end of the last rainfall event to start of current rainfall event	
Total Volume	Influent	42.00	ft^3	Total volume of influent from start of event to end of event	
	Effluent	46.87	ft^3	Total volume of effluent from start of event to end of event	
	Bypass	0.00	ft^3	Total volume of bypass from start of event to end of event	
Average Flow Rate	Influent	1.963	gpm	Average influent flow rate during storm event	
	Effluent	1.630	gpm	Average effluent flow rate during storm event	
	Bypass	0.000	gpm	Average bypass flow rate during storm evnt	
Peak Flow Rate	Influent	10.350	gpm	Peak influent flow rate during storm event	
	Effluent	8.563	gpm	Peak effluent flow rate during storm event	
	Peak Bypass	0.000	gpm	Peak bypass flow rate during storm event	
Aliquots	Number of Influent	9	-	Total number of aliquots obtained during qualifying storm event	The maximum of aliquots that can be collected is 45
	Number of Effluent	10	-		
Sample Duration	Influent	1.58	hours	Time in hours between the collection of the first and last aliquots	The duration reflects the time between the first and last aliquots, or the first and 45th aliquot if the number of aliquots reported exceeds 45
	Effluent	1.58	hours		
Threshold	Influent	130.00	L	Volume of stormwater that pass through the influent before a aliquot is collected	
	Effluent	130.00	L	Volume of stormwater that pass through the effluent before a aliquot is collected	
Storm Volume Sampled	% of Influent	98.4%	%	Number of aliquots times the threshold volume, divided by the total storm volume	
	% of Effluent	98.0%	%		

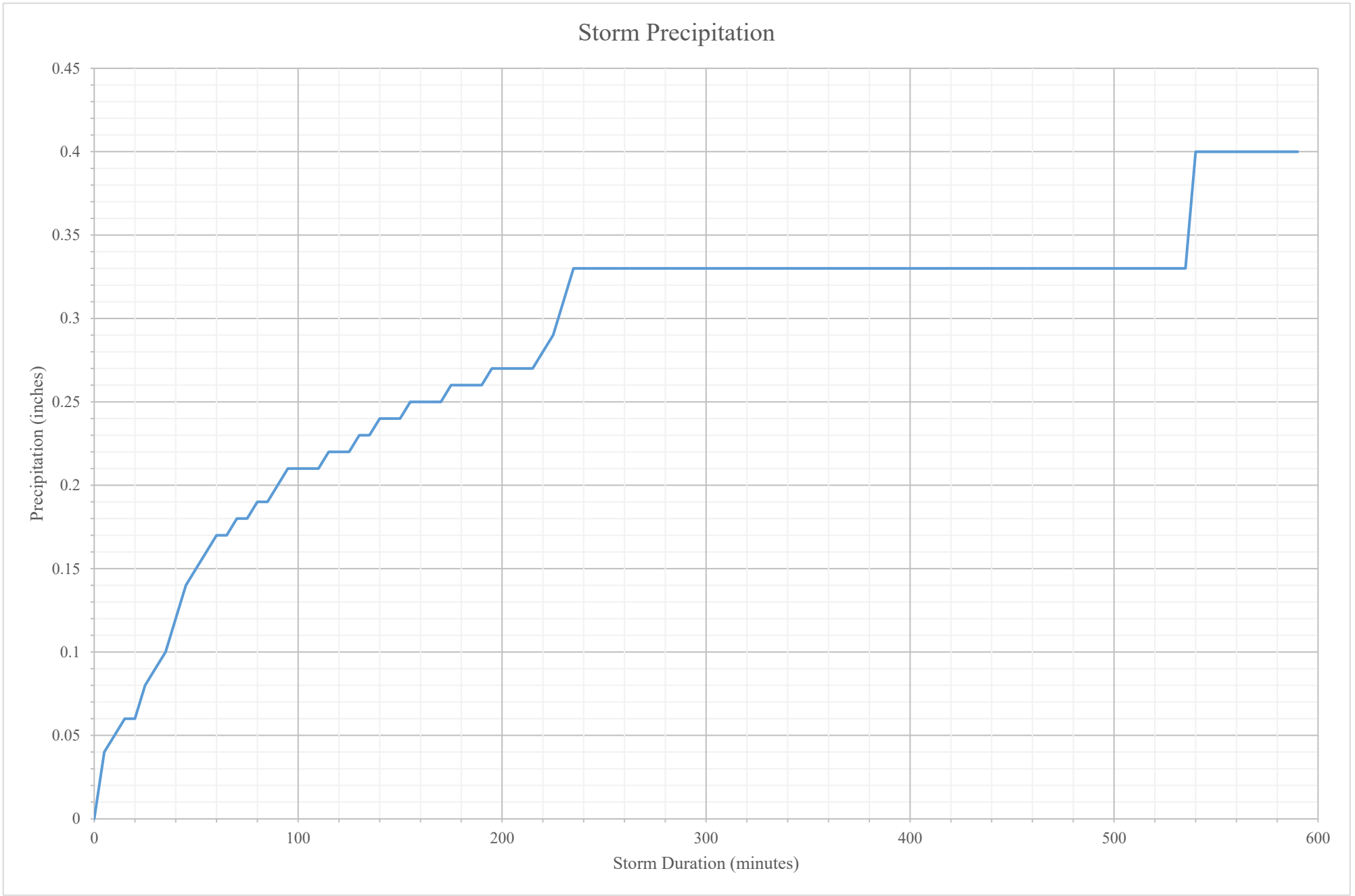

Storm Precipitation
Precipitation (inches)
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
0
50
100
150
200
250
300
350
400
450
Storm Duration (minutes)

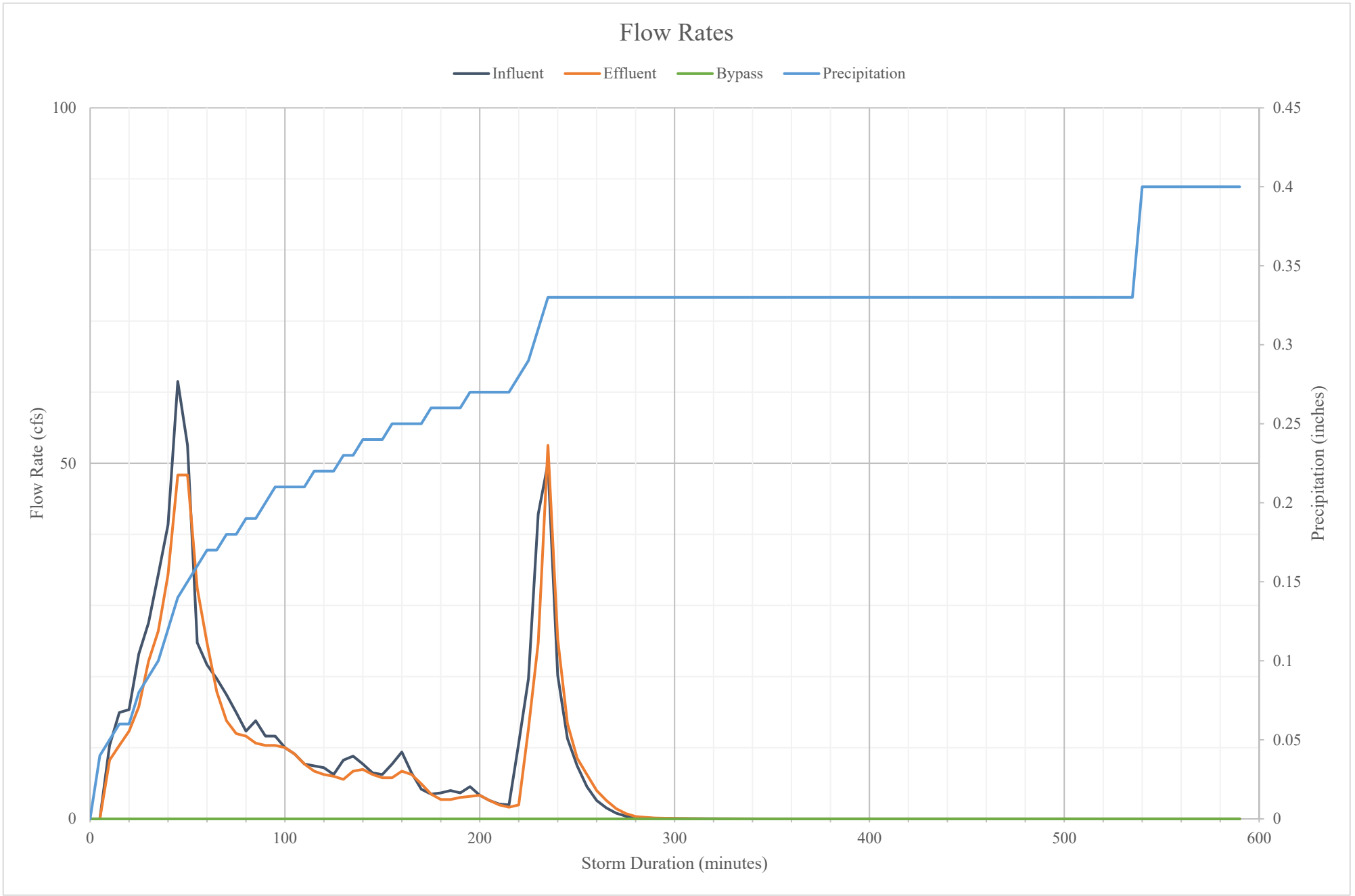

Flow Rates
Influent
Effluent
Bypass
Precipitation
Flow Rate (cfs)
Precipitation (inches)
Storm Duration (minutes)
50
0
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
0
50
100
150
200
250
300
350
400
450

Storm Date: 9/25/2020

	Parameter	Units	Influent EMC Measured	Influent Conc. Minimum Limit	Influent Conc. Maximum Limit	Effluent	Removal Efficiency	Detection Limit (DL)	Flags	Notes
Required Parameters	TSS	mg/L	78	20	100	21	73.08%	1		
	Total Copper	mg/L	0.0244	N/A	N/A	0.0169	30.74%	0.00007		
	Dissolved Copper	mg/L	0.0126	0.005	0.02	0.012	4.76%	0.00007		
	Total Zinc	mg/L	0.137	N/A	N/A	0.0425	68.98%	0.00025		
	Dissolved Zinc	mg/L	0.0924	0.02	0.3	0.0333	63.96%	0.00025		
	Total Phosphorus	mg/L	N/A	0.1	0.5	N/A	-	0.00505		
	Iron	mg/L	2.49	N/A	N/A	1.41	43.37%	0.01		
	Dissolved Iron	mg/L	0.169	N/A	N/A	0.169	0.00%	0.01		
	NWTPH-Dx									
	Lube Oil	mg/kg	0.684	N/A	N/A	0.566	17.25%	0.25		
	Mineral Oil	mg/kg	ND	N/A	N/A	ND	-	N/A		
	Diesel	mg/kg	0.852	N/A	N/A	0.579	32.04%	0.05		
Screening Parameters	PSD									
	>250	µm	N/A	N/A	N/A	N/A	-	N/A		
	250 - 62.5	µm	N/A	N/A	N/A	N/A	-	N/A		
	<62.5	µm	N/A	N/A	N/A	N/A	-	N/A		
	pH	std. units	N/A	N/A	N/A	N/A	-	N/A		
	Orthophosphate	mg/L	N/A	N/A	N/A	N/A	-	N/A		
	Hardness	mg CaCO3/L	48	N/A	N/A	45.1	6.04%	0.865		

	Paramter	Value	Units	Definition	Notes
Storm Data	Storm ID	10/10/2020	-	Identification number for monitored qualifying (?) storm event	
	Storm Start Date and Time	10/10/20 7:40 AM	-	Defines storm event start: 6 hours minimim with ≥ than 0.04" of rain	
	Storm End Date and Time	10/10/20 5:25 PM	-	Defines storm event end: 6 hours minimim with less than 0.04" of rain	
	Total Precipitation Depth	0.40	inches	Cumulative rainfall from the start of the qualifying storm event and the end of the qualifying storm event	
	Storm Duration	9.75	Hours	Duration of qualifying storm event	
	Storm Average Intensity	0.14	in/hr	Total rainfall amount divided by total rainfall duration (e.g., inches per hour)	
	Storm Peak Intensity	0.24	in/hr	Maximum precipitation depth per time interval (5 minutes) converted to in/hr	
	Storm Antecedent Dry Period	386.17	hours	From end of the last rainfall event to start of current rainfall event	
Total Volume	Influent	131.32	ft^3	Total volume of influent from start of event to end of event	
	Effluent	114.81	ft^3	Total volume of effluent from start of event to end of event	
	Bypass	0.00	ft^3	Total volume of bypass from start of event to end of event	
Average Flow Rate	Influent	3.117	gpm	Average influent flow rate during storm event	
	Effluent	2.641	gpm	Average effluent flow rate during storm event	
	Bypass	0.000	gpm	Average bypass flow rate during storm evnt	
Peak Flow Rate	Influent	16.252	gpm	Peak influent flow rate during storm event	
	Effluent	13.876	gpm	Peak effluent flow rate during storm event	
	Peak Bypass	0.000	gpm	Peak bypass flow rate during storm event	
Aliquots	Number of Influent	13	-	Total number of aliquots obtained during qualifying storm event	The maximum of aliquots that can be collected is 45
	Number of Effluent	12	-		
Sample Duration	Influent	3.50	hours	Time in hours between the collection of the first and last aliquots	The duration reflects the time between the first and last aliquots, or the first and 45th aliquot if the number of aliquots reported exceeds 45
	Effluent	3.75	hours		
Threshold	Influent	266.00	L	Volume of stormwater that pass through the influent before a aliquot is collected	
	Effluent	266.00	L	Volume of stormwater that pass through the effluent before a aliquot is collected	
Storm Volume Sampled	% of Influent	93.0%	%	Number of aliquots times the threshold volume, divided by the total storm volume	
	% of Effluent	98.2%	%		

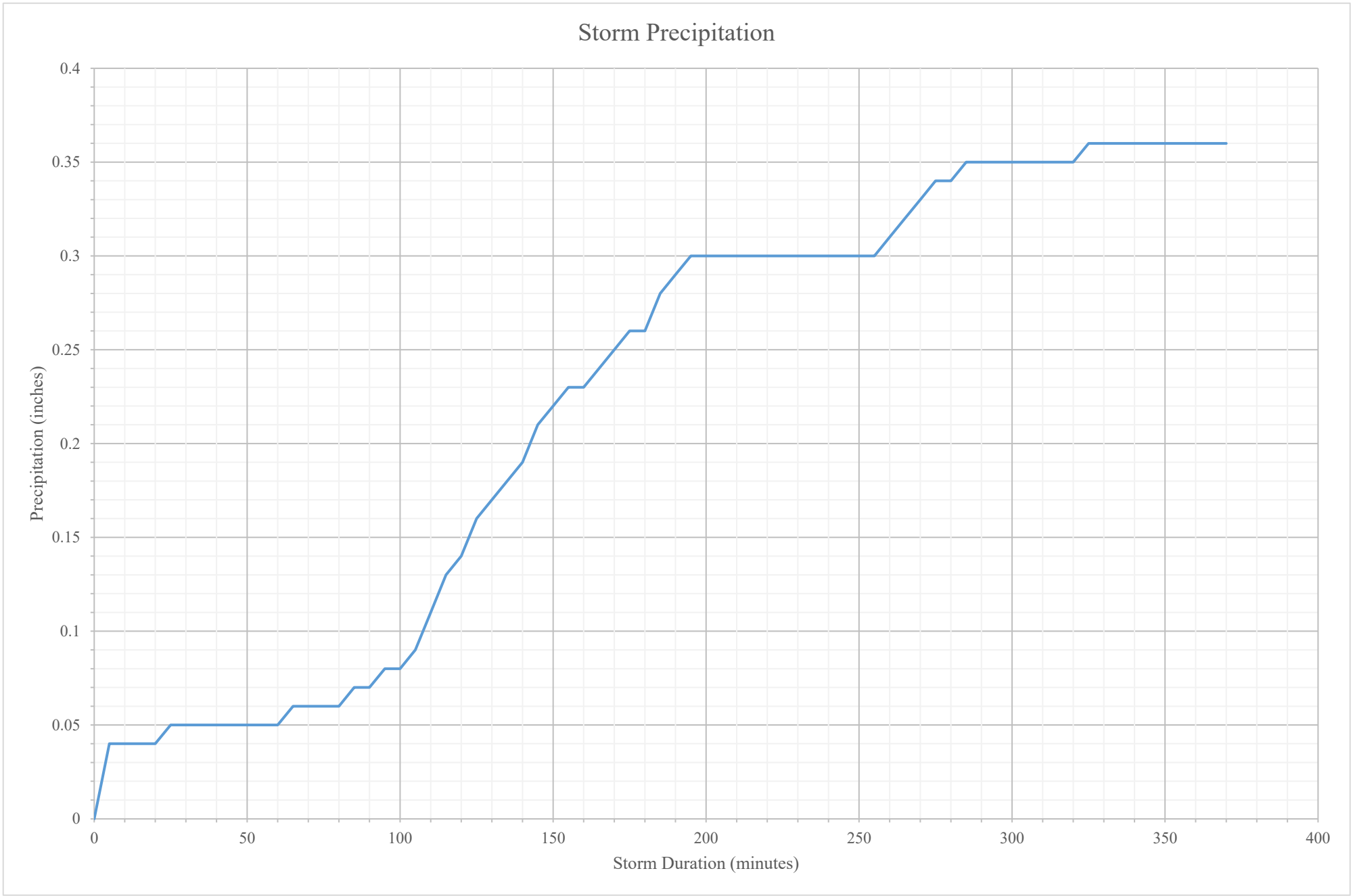

Storm Precipitation
Precipitation (inches)
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
0
100
200
300
400
500
600
Storm Duration (minutes)

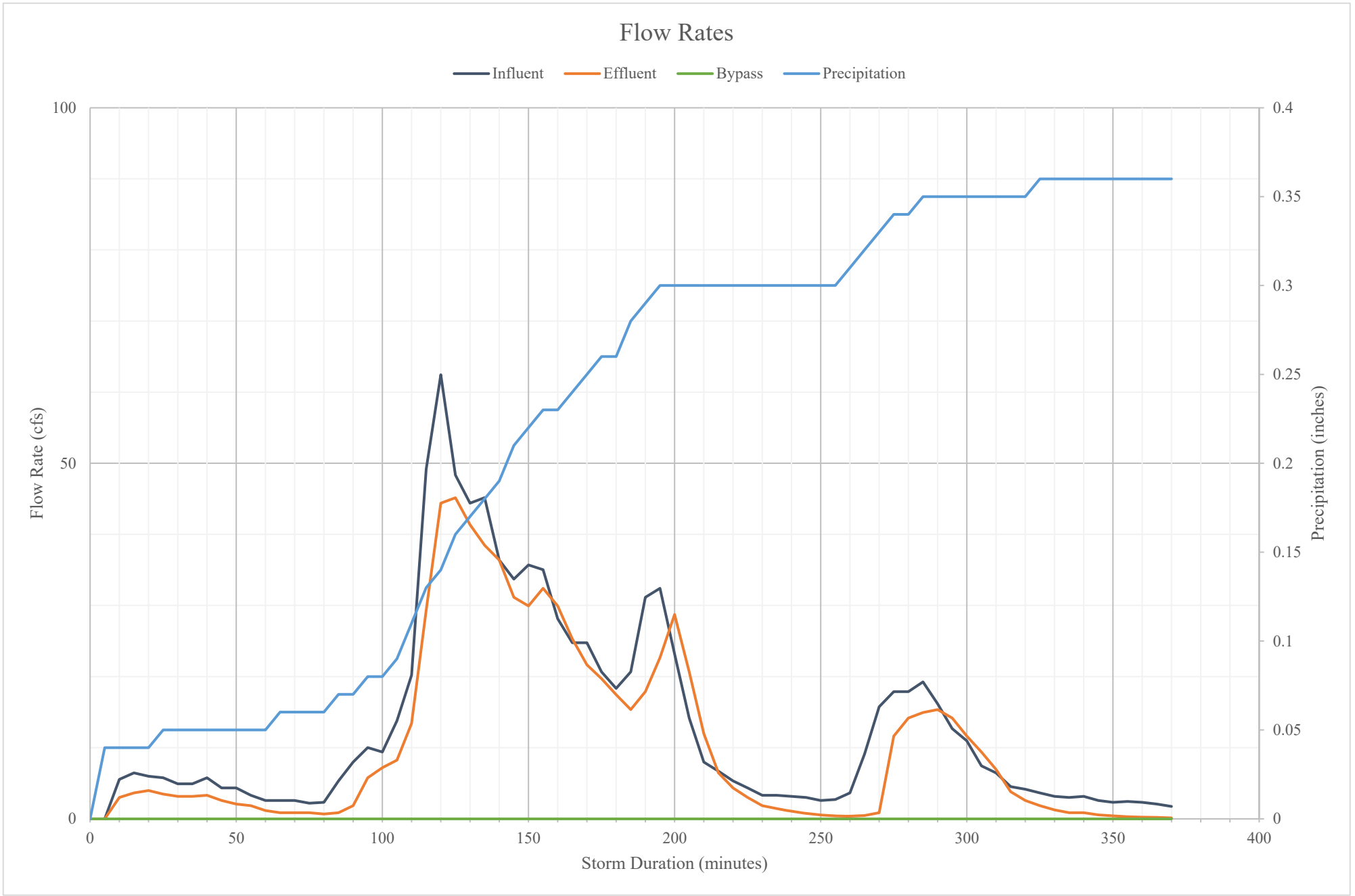

Flow Rates
Influent
Effluent
Bypass
Precipitation
Flow Rate (cfs)
Precipitation (inches)
Storm Duration (minutes)
100
50
0
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
0
100
200
300
400
500
600

Storm Date: 10/10/2020

	Parameter	Units	Influent EMC Measured	Influent Conc. Minimum Limit	Influent Conc. Maximum Limit	Effluent	Removal Efficiency	Detection Limit (DL)	Flags	Notes
Required Parameters	TSS	mg/L	49	20	100	19	61.22%	1		
	Total Copper	mg/L	0.0249	N/A	N/A	0.02	19.68%	0.00007		
	Dissolved Copper	mg/L	0.0113	0.005	0.02	0.0149	-31.86%	0.00007		Increased dissolved copper in eff
	Total Zinc	mg/L	0.154	N/A	N/A	0.0618	59.87%	0.00025		
	Dissolved Zinc	mg/L	0.0838	0.02	0.3	0.0558	33.41%	0.00025		
	Total Phosphorus	mg/L	0.512	0.1	0.5	0.477	6.84%	0.00505		
	Iron	mg/L	2.7	N/A	N/A	1.65	38.89%	0.01		
	Dissolved Iron	mg/L	0.286	N/A	N/A	0.208	27.27%	0.01		
	NWTPH-Dx									
	Lube Oil	mg/kg	0.508	N/A	N/A	0.557	-9.65%	0.25		Increased lube oil in eff
	Mineral Oil	mg/kg	ND	N/A	N/A	ND	-	N/A		
	Diesel	mg/kg	ND	N/A	N/A	ND	-	0.05		
Screening Parameters	PSD									
	>250	µm	N/A	N/A	N/A	N/A	-	N/A		
	250 - 62.5	µm	N/A	N/A	N/A	N/A	-	N/A		
	<62.5	µm	N/A	N/A	N/A	N/A	-	N/A		
	pH	std. units	N/A	N/A	N/A	N/A	-	N/A		
	Orthophosphate	mg/L	0.311	N/A	N/A	0.303	2.57%	N/A		
	Hardness	mg CaCO3/L	36.5	N/A	N/A	40.3	-10.41%	0.865		Increased hardness in eff

	Paramter	Value	Units	Definition	Notes
Storm Data	Storm ID	10/13/2020	-	Identification number for monitored qualifying (?) storm event	
	Storm Start Date and Time	10/13/20 5:25 AM	-	Defines storm event start: 6 hours minimim with ≥ than 0.04" of rain	
	Storm End Date and Time	10/13/20 3:20 PM	-	Defines storm event end: 6 hours minimim with less than 0.04" of rain	
	Total Precipitation Depth	0.36	inches	Cumulative rainfall from the start of the qualifying storm event and the end of the qualifying storm event	
	Storm Duration	9.92	Hours	Duration of qualifying storm event	
	Storm Average Intensity	0.14	in/hr	Total rainfall amount divided by total rainfall duration (e.g., inches per hour)	
	Storm Peak Intensity	0.24	in/hr	Maximum precipitation depth per time interval (5 minutes) converted to in/hr	
	Storm Antecedent Dry Period	26.42	hours	From end of the last rainfall event to start of current rainfall event	
Total Volume	Influent	173.42	ft^3	Total volume of influent from start of event to end of event	
	Effluent	135.12	ft^3	Total volume of effluent from start of event to end of event	
	Bypass	0.00	ft^3	Total volume of bypass from start of event to end of event	
Average Flow Rate	Influent	2.981	gpm	Average influent flow rate during storm event	
	Effluent	2.322	gpm	Average effluent flow rate during storm event	
	Bypass	0.000	gpm	Average bypass flow rate during storm evnt	
Peak Flow Rate	Influent	16.502	gpm	Peak influent flow rate during storm event	
	Effluent	11.931	gpm	Peak effluent flow rate during storm event	
	Peak Bypass	0.000	gpm	Peak bypass flow rate during storm event	
Aliquots	Number of Influent	16	-	Total number of aliquots obtained during qualifying storm event	The maximum of aliquots that can be collected is 45
	Number of Effluent	12	-		
Sample Duration	Influent	5.33	hours	Time in hours between the collection of the first and last aliquots	The duration reflects the time between the first and last aliquots, or the first and 45th aliquot if the number of aliquots reported exceeds 45
	Effluent	3.17	hours		
Threshold	Influent	306.00	L	Volume of stormwater that pass through the influent before a aliquot is collected	
	Effluent	306.00	L	Volume of stormwater that pass through the effluent before a aliquot is collected	
Storm Volume Sampled	% of Influent	99.8%	%	Number of aliquots times the threshold volume, divided by the total storm volume	
	% of Effluent	96.0%	%		

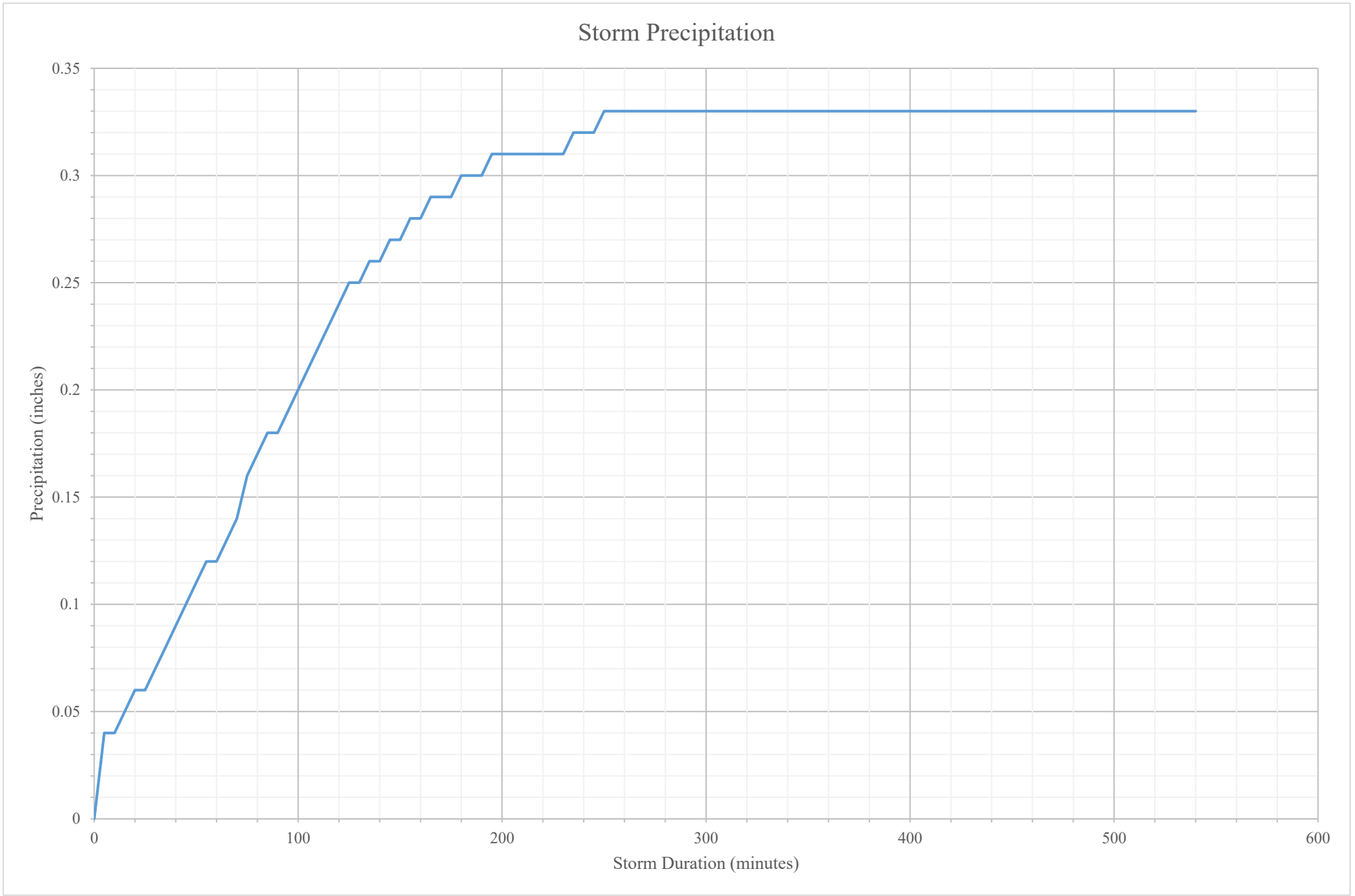

Storm Precipitation
Precipitation (inches)
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
0
50
100
150
200
250
300
350
400
Storm Duration (minutes)

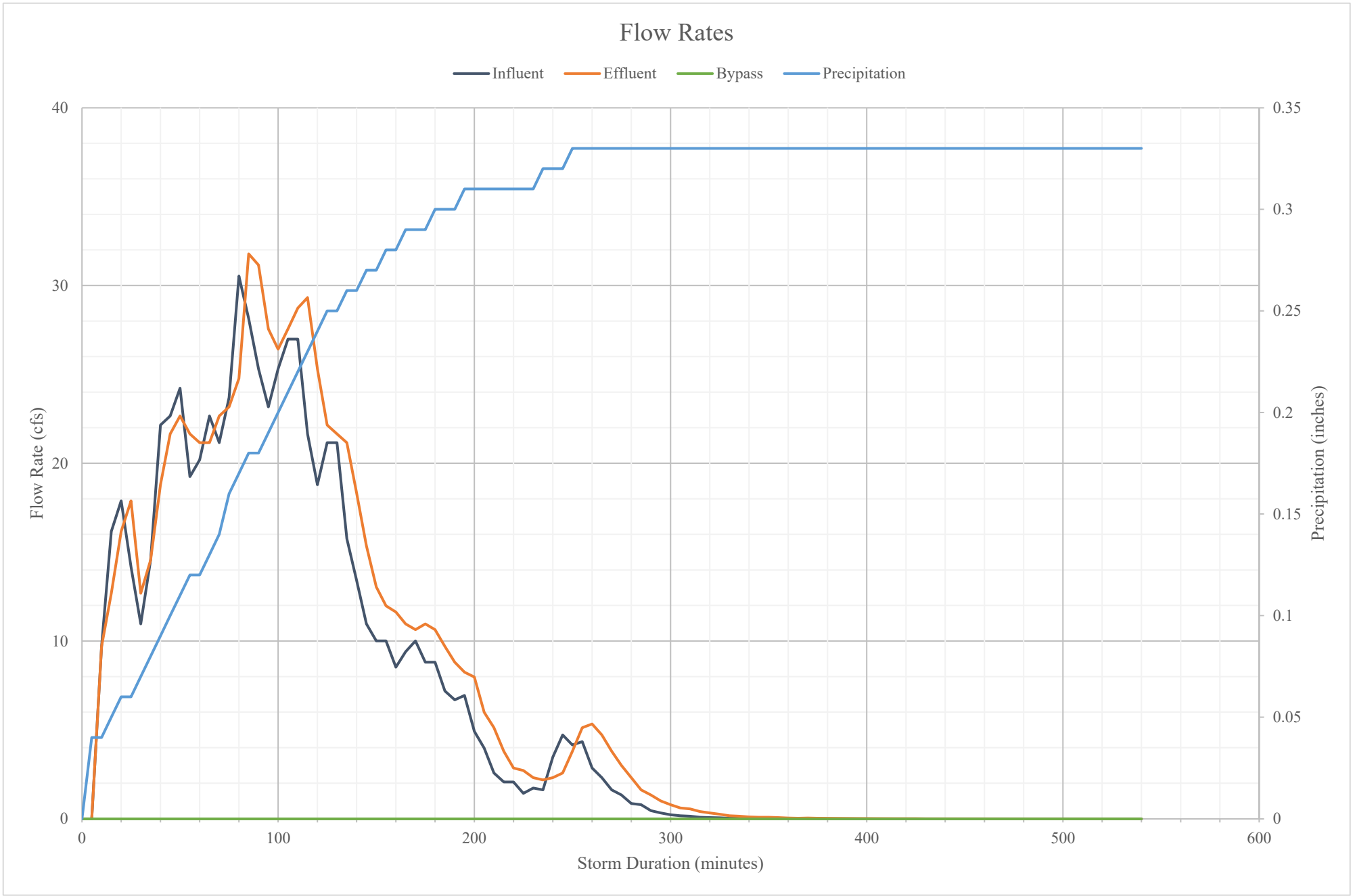

Flow Rates
Influent
Effluent
Bypass
Precipitation
Flow Rate (cfs)
Precipitation (inches)
Storm Duration (minutes)
100
50
0
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
0
50
100
150
200
250
300
350
400

Storm Date: 10/13/2020

	Parameter	Units	Influent EMC Measured	Influent Conc. Minimum Limit	Influent Conc. Maximum Limit	Effluent	Removal Efficiency	Detection Limit (DL)	Flags	Notes
Required Parameters	TSS	mg/L	65	20	100	23	64.62%	1		
	Total Copper	mg/L	0.0111	N/A	N/A	0.00775	30.18%	0.00007		
	Dissolved Copper	mg/L	N/A	0.005	0.02	N/A	-	0.00007		
	Total Zinc	mg/L	0.0745	N/A	N/A	0.0285	61.74%	0.00025		
	Dissolved Zinc	mg/L	N/A	0.02	0.3	N/A	-	0.00025		
	Total Phosphorus	mg/L	0.142	0.1	0.5	0.15	-5.63%	0.00505		Increased total phosphorus in eff
	Iron	mg/L	1.84	N/A	N/A	1.04	43.48%	0.01		
	Dissolved Iron	mg/L	N/A	N/A	N/A	N/A	-	0.01		
	NWTPH-Dx									
	Lube Oil	mg/kg	N/A	N/A	N/A	N/A	-	0.25		
	Mineral Oil	mg/kg	N/A	N/A	N/A	N/A	-	N/A		
	Diesel	mg/kg	N/A	N/A	N/A	N/A	-	0.05		
Screening Parameters	PSD									
	>250	µm	N/A	N/A	N/A	N/A	-	N/A		
	250 - 62.5	µm	N/A	N/A	N/A	N/A	-	N/A		
	<62.5	µm	N/A	N/A	N/A	N/A	-	N/A		
	pH	std. units	N/A	N/A	N/A	N/A	-	N/A		
	Orthophosphate	mg/L	N/A	N/A	N/A	N/A	-	N/A		
	Hardness	mg CaCO3/L	38.4	N/A	N/A	23	40.10%	0.865		

	Paramter	Value	Units	Definition	Notes
Storm Data	Storm ID	11/5/2020	-	Identification number for monitored qualifying (?) storm event	
	Storm Start Date and Time	11/5/20 3:40 PM	-	Defines storm event start: 6 hours minimim with ≥ than 0.04" of rain	
	Storm End Date and Time	11/6/20 12:35 AM	-	Defines storm event end: 6 hours minimim with less than 0.04" of rain	
	Total Precipitation Depth	0.33	inches	Cumulative rainfall from the start of the qualifying storm event and the end of the qualifying storm event	
	Storm Duration	8.92	Hours	Duration of qualifying storm event	
	Storm Average Intensity	0.13	in/hr	Total rainfall amount divided by total rainfall duration (e.g., inches per hour)	
	Storm Peak Intensity	0.24	in/hr	Maximum precipitation depth per time interval (5 minutes) converted to in/hr	
	Storm Antecedent Dry Period	41.50	hours	From end of the last rainfall event to start of current rainfall event	
Total Volume	Influent	124.31	ft^3	Total volume of influent from start of event to end of event	
	Effluent	139.25	ft^3	Total volume of effluent from start of event to end of event	
	Bypass	0.00	ft^3	Total volume of bypass from start of event to end of event	
Average Flow Rate	Influent	2.446	gpm	Average influent flow rate during storm event	
	Effluent	2.239	gpm	Average effluent flow rate during storm event	
	Bypass	0.000	gpm	Average bypass flow rate during storm evnt	
Peak Flow Rate	Influent	8.067	gpm	Peak influent flow rate during storm event	
	Effluent	8.396	gpm	Peak effluent flow rate during storm event	
	Peak Bypass	0.000	gpm	Peak bypass flow rate during storm event	
Aliquots	Number of Influent	16	-	Total number of aliquots obtained during qualifying storm event	The maximum of aliquots that can be collected is 45
	Number of Effluent	18	-		
Sample Duration	Influent	3.42	hours	Time in hours between the collection of the first and last aliquots	The duration reflects the time between the first and last aliquots, or the first and 45th aliquot if the number of aliquots reported exceeds 45
	Effluent	3.75	hours		
Threshold	Influent	210.00	L	Volume of stormwater that pass through the influent before a aliquot is collected	
	Effluent	210.00	L	Volume of stormwater that pass through the effluent before a aliquot is collected	
Storm Volume Sampled	% of Influent	95.5%	%	Number of aliquots times the threshold volume, divided by the total storm volume	
	% of Effluent	95.9%	%		

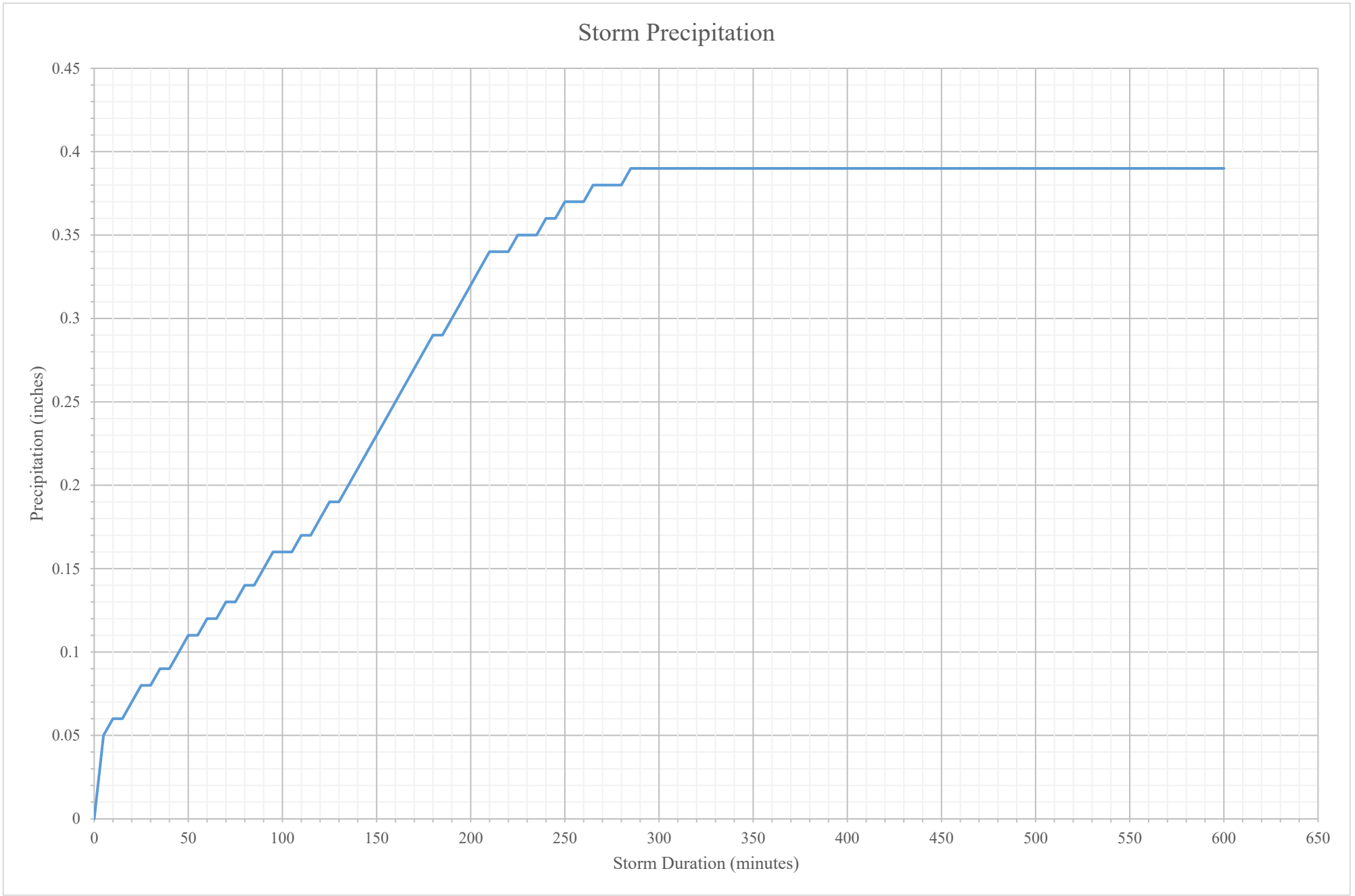

Storm Precipitation
Precipitation (inches)
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
0
100
200
300
400
500
600
Storm Duration (minutes)

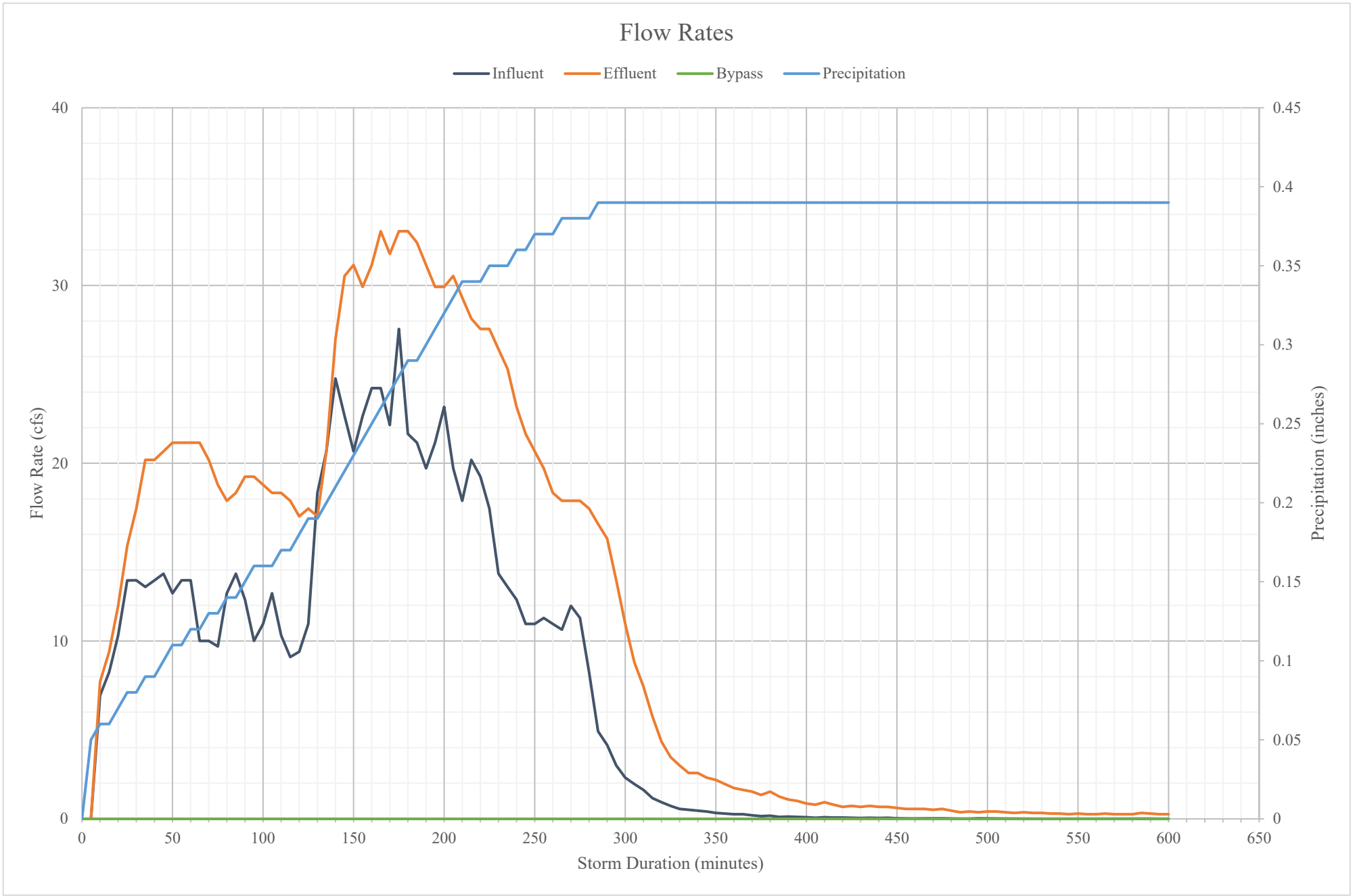

Flow Rates
Influent
Effluent
Bypass
Precipitation
Flow Rate (cfs)
Precipitation (inches)
Storm Duration (minutes)
0
10
20
30
40
0
0.05
0.1
0.15
0.2
0.25
0.3
0.35
0
100
200
300
400
500
600

Storm Date: 11/5/2020

	Parameter	Units	Influent EMC Measured	Influent Conc. Minimum Limit	Influent Conc. Maximum Limit	Effluent	Removal Efficiency	Detection Limit (DL)	Flags	Notes
Required Parameters	TSS	mg/L	43	20	100	9	79.07%	1		
	Total Copper	mg/L	N/A	N/A	N/A	N/A	-	0.00007		
	Dissolved Copper	mg/L	0.00648	0.005	0.02	0.00747	-15.28%	0.00007		Increased dissolved copper in eff
	Total Zinc	mg/L	N/A	N/A	N/A	N/A	-	0.00025		
	Dissolved Zinc	mg/L	0.0453	0.02	0.3	0.0242	46.58%	0.00025		
	Total Phosphorus	mg/L	1.08	0.1	0.5	0.864	20.00%	0.00505		
	Iron	mg/L	N/A	N/A	N/A	N/A	-	0.01		
	Dissolved Iron	mg/L	0.118	N/A	N/A	0.158	-33.90%	0.01		Increased dissolved iron in eff
	NWTPH-Dx									
	Lube Oil	mg/kg	N/A	N/A	N/A	N/A	-	0.25		
	Mineral Oil	mg/kg	N/A	N/A	N/A	N/A	-	N/A		
	Diesel	mg/kg	N/A	N/A	N/A	N/A	-	0.05		
Screening Parameters	PSD									
	>250	µm	N/A	N/A	N/A	N/A	-	N/A		
	250 - 62.5	µm	N/A	N/A	N/A	N/A	-	N/A		
	<62.5	µm	N/A	N/A	N/A	N/A	-	N/A		
	pH	std. units	N/A	N/A	N/A	N/A	-	N/A		
	Orthophosphate	mg/L	0.368	N/A	N/A	0.309	16.03%	N/A		
	Hardness	mg CaCO3/L	40.6	N/A	N/A	34.6	14.78%	0.865		

	Paramter	Value	Units	Definition	Notes
Storm Data	Storm ID	11/13/2020	-	Identification number for monitored qualifying (?) storm event	
	Storm Start Date and Time	11/13/20 6:30 AM	-	Defines storm event start: 6 hours minimim with ≥ than 0.04" of rain	
	Storm End Date and Time	11/13/20 4:25 PM	-	Defines storm event end: 6 hours minimim with less than 0.04" of rain	
	Total Precipitation Depth	0.39	inches	Cumulative rainfall from the start of the qualifying storm event and the end of the qualifying storm event	
	Storm Duration	9.92	Hours	Duration of qualifying storm event	
	Storm Average Intensity	0.12	in/hr	Total rainfall amount divided by total rainfall duration (e.g., inches per hour)	
	Storm Peak Intensity	0.12	in/hr	Maximum precipitation depth per time interval (5 minutes) converted to in/hr	
	Storm Antecedent Dry Period	58.42	hours	From end of the last rainfall event to start of current rainfall event	
Total Volume	Influent	150.93	ft^3	Total volume of influent from start of event to end of event	
	Effluent	242.28	ft^3	Total volume of effluent from start of event to end of event	
	Bypass	0.00	ft^3	Total volume of bypass from start of event to end of event	
Average Flow Rate	Influent	1.946	gpm	Average influent flow rate during storm event	
	Effluent	3.045	gpm	Average effluent flow rate during storm event	
	Bypass	0.000	gpm	Average bypass flow rate during storm evnt	
Peak Flow Rate	Influent	7.281	gpm	Peak influent flow rate during storm event	
	Effluent	8.733	gpm	Peak effluent flow rate during storm event	
	Peak Bypass	0.000	gpm	Peak bypass flow rate during storm event	
Aliquots	Number of Influent	17	-	Total number of aliquots obtained during qualifying storm event	The maximum of aliquots that can be collected is 45
	Number of Effluent	28	-		
Sample Duration	Influent	1.33	hours	Time in hours between the collection of the first and last aliquots	The duration reflects the time between the first and last aliquots, or the first and 45th aliquot if the number of aliquots reported exceeds 45
	Effluent	6.50	hours		
Threshold	Influent	242.00	L	Volume of stormwater that pass through the influent before a aliquot is collected	
	Effluent	242.00	L	Volume of stormwater that pass through the effluent before a aliquot is collected	
Storm Volume Sampled	% of Influent	96.3%	%	Number of aliquots times the threshold volume, divided by the total storm volume	
	% of Effluent	98.8%	%		

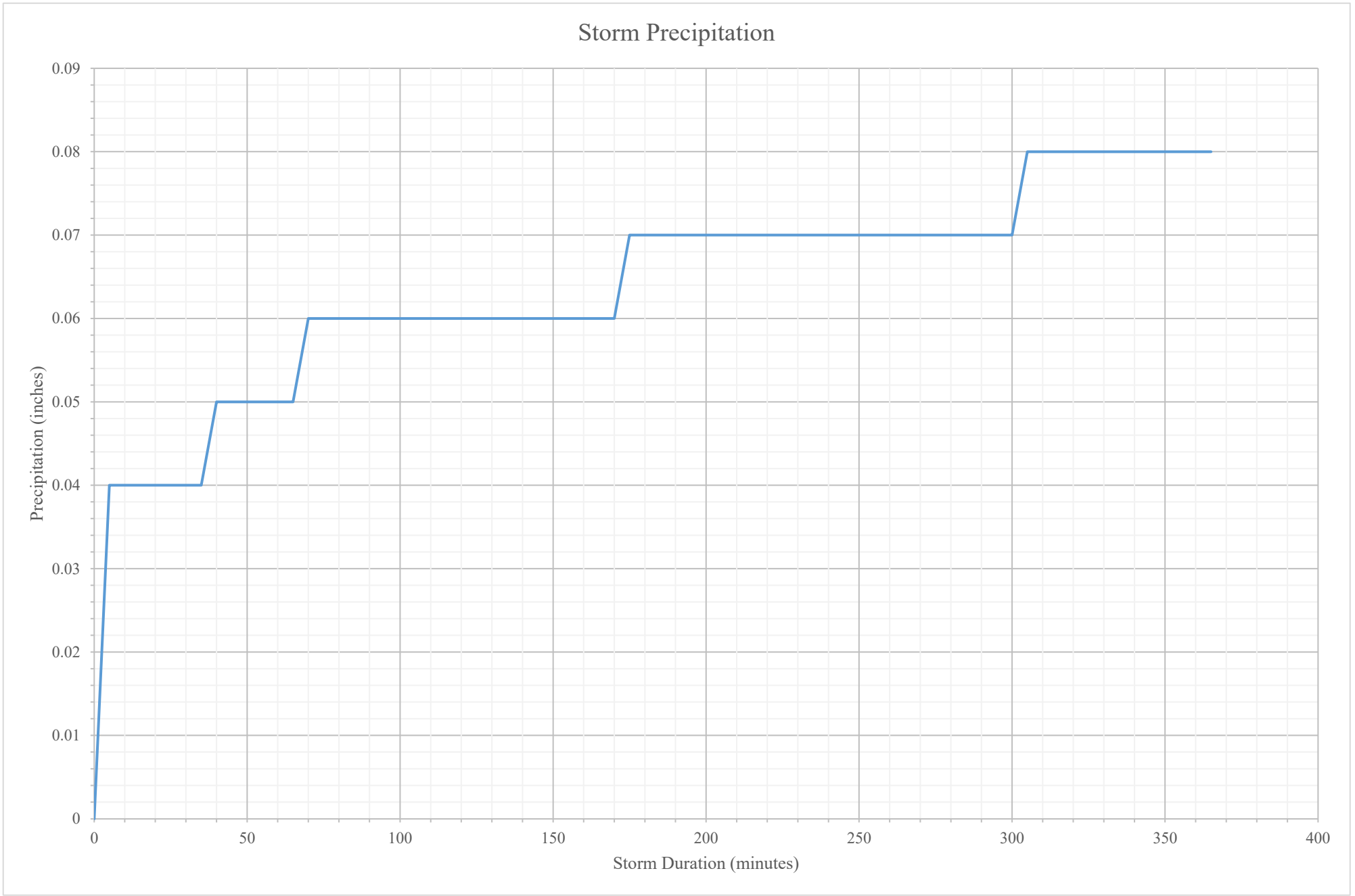

Storm Precipitation
Precipitation (inches)
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
0
50
100
150
200
250
300
350
400
450
500
550
600
650
Storm Duration (minutes)

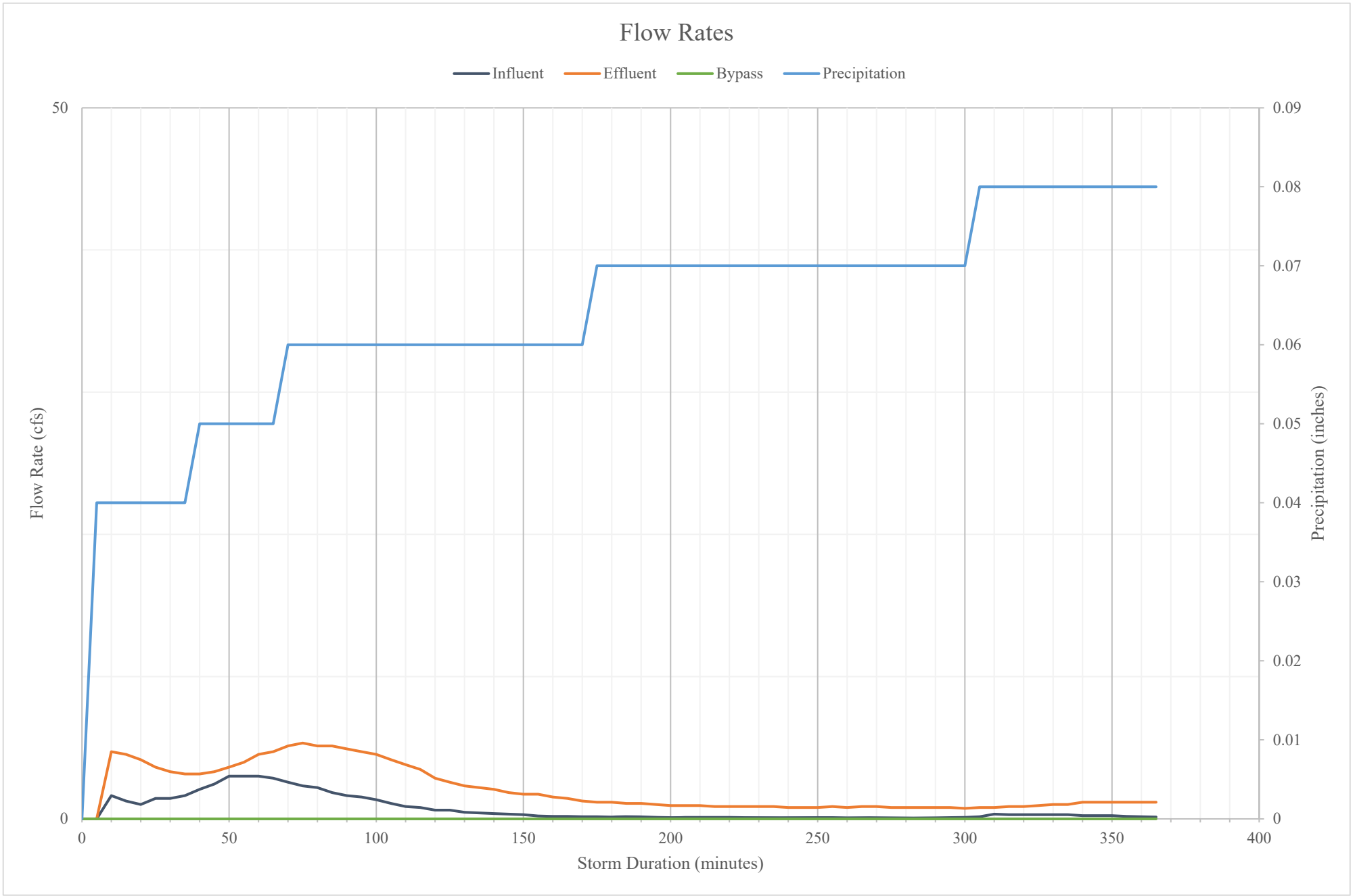

Flow Rates
Influent
Effluent
Bypass
Precipitation
Flow Rate (cfs)
Precipitation (inches)
Storm Duration (minutes)
0
10
20
30
40
0
0.05
0.1
0.15
0.2
0.25
0.3
0.35
0.4
0.45
0
50
100
150
200
250
300
350
400
450
500
550
600
650

Storm Date: 11/13/2020

	Parameter	Units	Influent EMC Measured	Influent Conc. Minimum Limit	Influent Conc. Maximum Limit	Effluent	Removal Efficiency	Detection Limit (DL)	Flags	Notes
Required Parameters	TSS	mg/L	52	20	100	23	55.77%	1		
	Total Copper	mg/L	0.0103	N/A	N/A	0.0108	-4.85%	0.00007		Increased total copper in 18" eff
	Dissolved Copper	mg/L	0.00345	0.005	0.02	0.0059	-71.01%	0.00007		Increased dissolved copper in 18" eff
	Total Zinc	mg/L	0.0739	N/A	N/A	0.0576	22.06%	0.00025		
	Dissolved Zinc	mg/L	0.0403	0.02	0.3	0.0516	-28.04%	0.00025		Increased dissolved zinc in 18"
	Total Phosphorus	mg/L	1.15	0.1	0.5	0.236	79.48%	0.00505		
	Iron	mg/L	N/A	N/A	N/A	N/A	-	0.01		
	Dissolved Iron	mg/L	N/A	N/A	N/A	N/A	-	0.01		
	NWTPH-Dx									
	Lube Oil	mg/kg	0.522	N/A	N/A	0.601	-15.13%	0.25		Increased lube oil in eff
	Mineral Oil	mg/kg	ND	N/A	N/A	ND	-	N/A		
	Diesel	mg/kg	ND	N/A	N/A	ND	-	0.05		
Screening Parameters	PSD									
	>250	µm	N/A	N/A	N/A	N/A	-	N/A		
	250 - 62.5	µm	N/A	N/A	N/A	N/A	-	N/A		
	<62.5	µm	N/A	N/A	N/A	N/A	-	N/A		
	pH	std. units	N/A	N/A	N/A	N/A	-	N/A		
	Orthophosphate	mg/L	N/A	N/A	N/A	N/A	-	N/A		
	Hardness	mg CaCO3/L	103	N/A	N/A	152	-47.57%	0.865		Increased hardness in eff

	Paramter	Value	Units	Definition	Notes
Storm Data	Storm ID	11/14/2020	-	Identification number for monitored qualifying (?) storm event	
	Storm Start Date and Time	11/14/20 10:25 PM	-	Defines storm event start: 6 hours minimim with ≥ than 0.04" of rain	
	Storm End Date and Time	11/15/20 4:25 AM	-	Defines storm event end: 6 hours minimim with less than 0.04" of rain	
	Total Precipitation Depth	0.08	inches	Cumulative rainfall from the start of the qualifying storm event and the end of the qualifying storm event	
	Storm Duration	6.00	Hours	Duration of qualifying storm event	
	Storm Average Intensity	0.12	in/hr	Total rainfall amount divided by total rainfall duration (e.g., inches per hour)	
	Storm Peak Intensity	0.12	in/hr	Maximum precipitation depth per time interval (5 minutes) converted to in/hr	
	Storm Antecedent Dry Period	30.00	hours	From end of the last rainfall event to start of current rainfall event	
Total Volume	Influent	8.84	ft^3	Total volume of influent from start of event to end of event	
	Effluent	26.65	ft^3	Total volume of effluent from start of event to end of event	
	Bypass	0.00	ft^3	Total volume of bypass from start of event to end of event	
Average Flow Rate	Influent	0.184	gpm	Average influent flow rate during storm event	
	Effluent	0.553	gpm	Average effluent flow rate during storm event	
	Bypass	0.000	gpm	Average bypass flow rate during storm event	
Peak Flow Rate	Influent	0.793	gpm	Peak influent flow rate during storm event	
	Effluent	1.408	gpm	Peak effluent flow rate during storm event	
	Peak Bypass	0.000	gpm	Peak bypass flow rate during storm event	
Aliquots	Number of Influent	3	-	Total number of aliquots obtained during qualifying storm event	The maximum of aliquots that can be collected is 45
	Number of Effluent	9	-		
Sample Duration	Influent	3.50	hours	Time in hours between the collection of the first and last aliquots	The duration reflects the time between the first and last aliquots, or the first and 45th aliquot if the number of aliquots reported exceeds 45
	Effluent	5.25	hours		
Threshold	Influent	80.00	L	Volume of stormwater that pass through the influent before a aliquot is collected	
	Effluent	80.00	L	Volume of stormwater that pass through the effluent before a aliquot is collected	
Storm Volume Sampled	% of Influent	95.9%	%	Number of aliquots times the threshold volume, divided by the total storm volume	
	% of Effluent	95.5%	%		

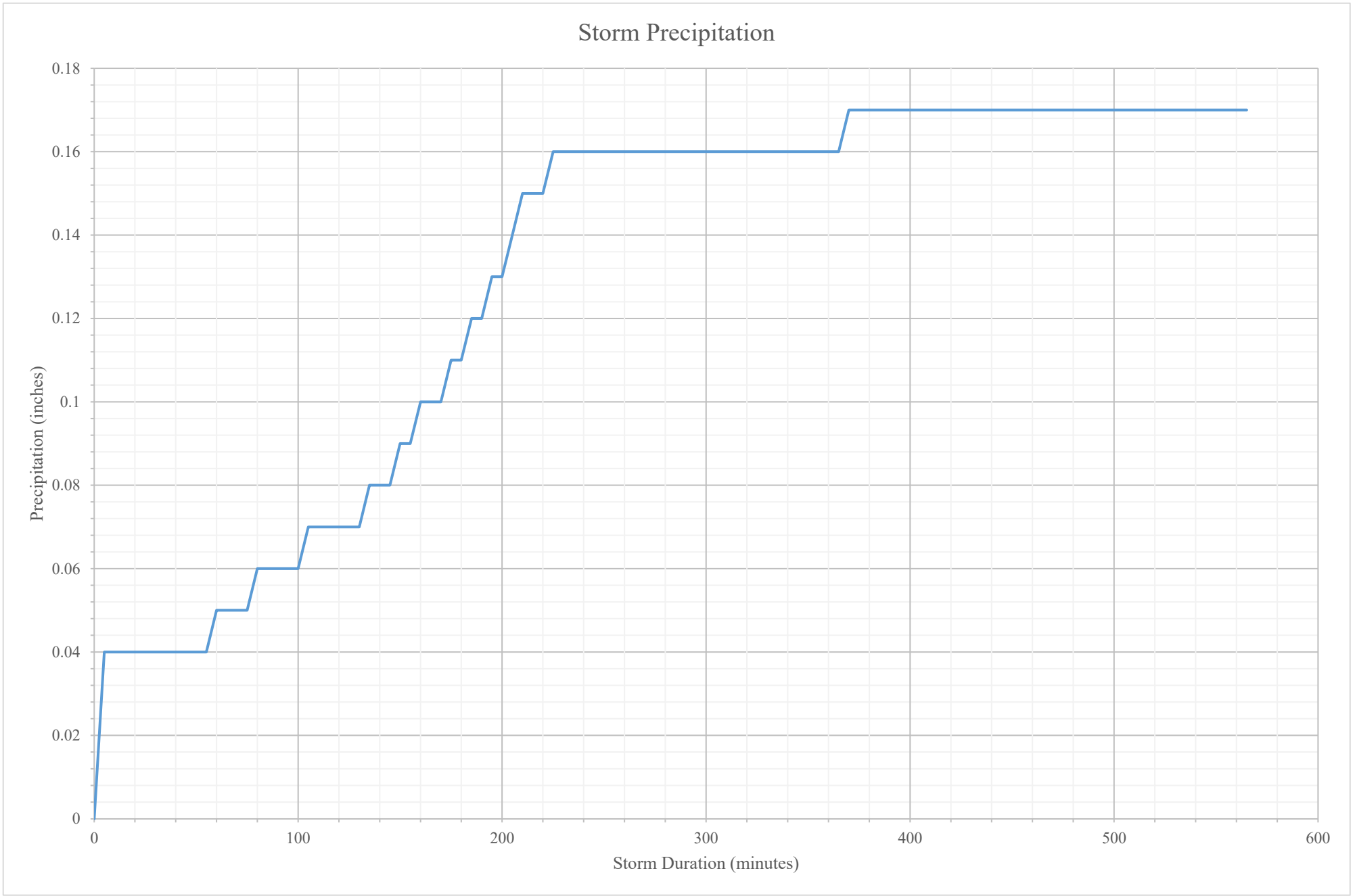

Storm Precipitation
Precipitation (inches)
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
0
50
100
150
200
250
300
350
400
Storm Duration (minutes)

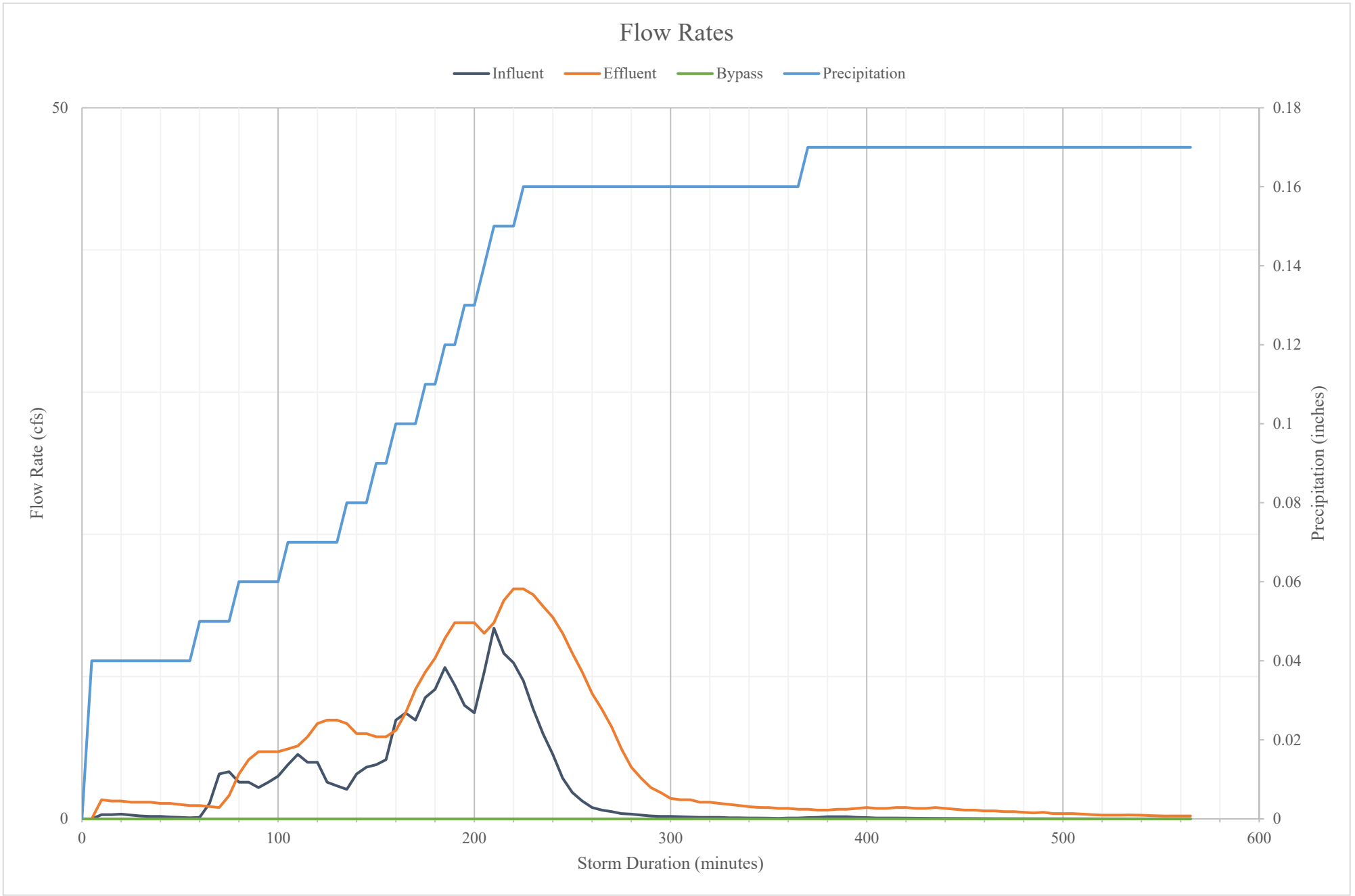

Flow Rates
Influent
Effluent
Bypass
Precipitation
Flow Rate (cfs)
Precipitation (inches)
Storm Duration (minutes)
50
0
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
0
50
100
150
200
250
300
350
400

Storm Date: 11/14/2020

	Parameter	Units	Influent EMC Measured	Influent Conc. Minimum Limit	Influent Conc. Maximum Limit	Effluent	Removal Efficiency	Detection Limit (DL)	Flags	Notes
Required Parameters	TSS	mg/L	N/A	20	100	N/A	-	1		
	Total Copper	mg/L	0.0152	N/A	N/A	0.0192	-26.32%	0.00007		Increase in copper in effluent field duplicate
	Dissolved Copper	mg/L	N/A	0.005	0.02	N/A	-	0.00007		
	Total Zinc	mg/L	0.077	N/A	N/A	0.0703	8.70%	0.00025		Field duplicate
	Dissolved Zinc	mg/L	N/A	0.02	0.3	N/A	-	0.00025		
	Total Phosphorus	mg/L	N/A	0.1	0.5	N/A	-	0.00505		
	Iron	mg/L	N/A	N/A	N/A	N/A	-	0.01		
	Dissolved Iron	mg/L	N/A	N/A	N/A	N/A	-	0.01		
	NWTPH-Dx									
	Lube Oil	mg/kg	N/A	N/A	N/A	N/A	-	0.25		
	Mineral Oil	mg/kg	N/A	N/A	N/A	N/A	-	N/A		
	Diesel	mg/kg	N/A	N/A	N/A	N/A	-	0.05		
Screening Parameters	PSD									
	>250	µm	N/A	N/A	N/A	N/A	-	N/A		
	250 - 62.5	µm	N/A	N/A	N/A	N/A	-	N/A		
	<62.5	µm	N/A	N/A	N/A	N/A	-	N/A		
	pH	std. units	N/A	N/A	N/A	N/A	-	N/A		
	Orthophosphate	mg/L	N/A	N/A	N/A	N/A	-	N/A		
	Hardness	mg CaCO3/L	N/A	N/A	N/A	N/A	-	0.865		

	Paramter	Value	Units	Definition	Notes
Storm Data	Storm ID	11/16/2020	-	Identification number for monitored qualifying (?) storm event	
	Storm Start Date and Time	11/16/20 12:25 PM	-	Defines storm event start: 6 hours minimim with ≥ than 0.04" of rain	
	Storm End Date and Time	11/16/20 9:45 PM	-	Defines storm event end: 6 hours minimim with less than 0.04" of rain	
	Total Precipitation Depth	0.17	inches	Cumulative rainfall from the start of the qualifying storm event and the end of the qualifying storm event	
	Storm Duration	9.33	Hours	Duration of qualifying storm event	
	Storm Average Intensity	0.12	in/hr	Total rainfall amount divided by total rainfall duration (e.g., inches per hour)	
	Storm Peak Intensity	0.12	in/hr	Maximum precipitation depth per time interval (5 minutes) converted to in/hr	
	Storm Antecedent Dry Period	32.00	hours	From end of the last rainfall event to start of current rainfall event	
Total Volume	Influent	39.01	ft^3	Total volume of influent from start of event to end of event	
	Effluent	75.79	ft^3	Total volume of effluent from start of event to end of event	
	Bypass	0.00	ft^3	Total volume of bypass from start of event to end of event	
Average Flow Rate	Influent	0.566	gpm	Average influent flow rate during storm event	
	Effluent	1.012	gpm	Average effluent flow rate during storm event	
	Bypass	0.000	gpm	Average bypass flow rate during storm evnt	
Peak Flow Rate	Influent	3.543	gpm	Peak influent flow rate during storm event	
	Effluent	4.272	gpm	Peak effluent flow rate during storm event	
	Peak Bypass	0.000	gpm	Peak bypass flow rate during storm event	
Aliquots	Number of Influent	13	-	Total number of aliquots obtained during qualifying storm event	The maximum of aliquots that can be collected is 45
	Number of Effluent	26	-		
Sample Duration	Influent	2.50	hours	Time in hours between the collection of the first and last aliquots	The duration reflects the time between the first and last aliquots, or the first and 45th aliquot if the number of aliquots reported exceeds 45
	Effluent	5.67	hours		
Threshold	Influent	80.00	L	Volume of stormwater that pass through the influent before a aliquot is collected	
	Effluent	80.00	L	Volume of stormwater that pass through the effluent before a aliquot is collected	
Storm Volume Sampled	% of Influent	94.2%	%	Number of aliquots times the threshold volume, divided by the total storm volume	
	% of Effluent	97.0%	%		

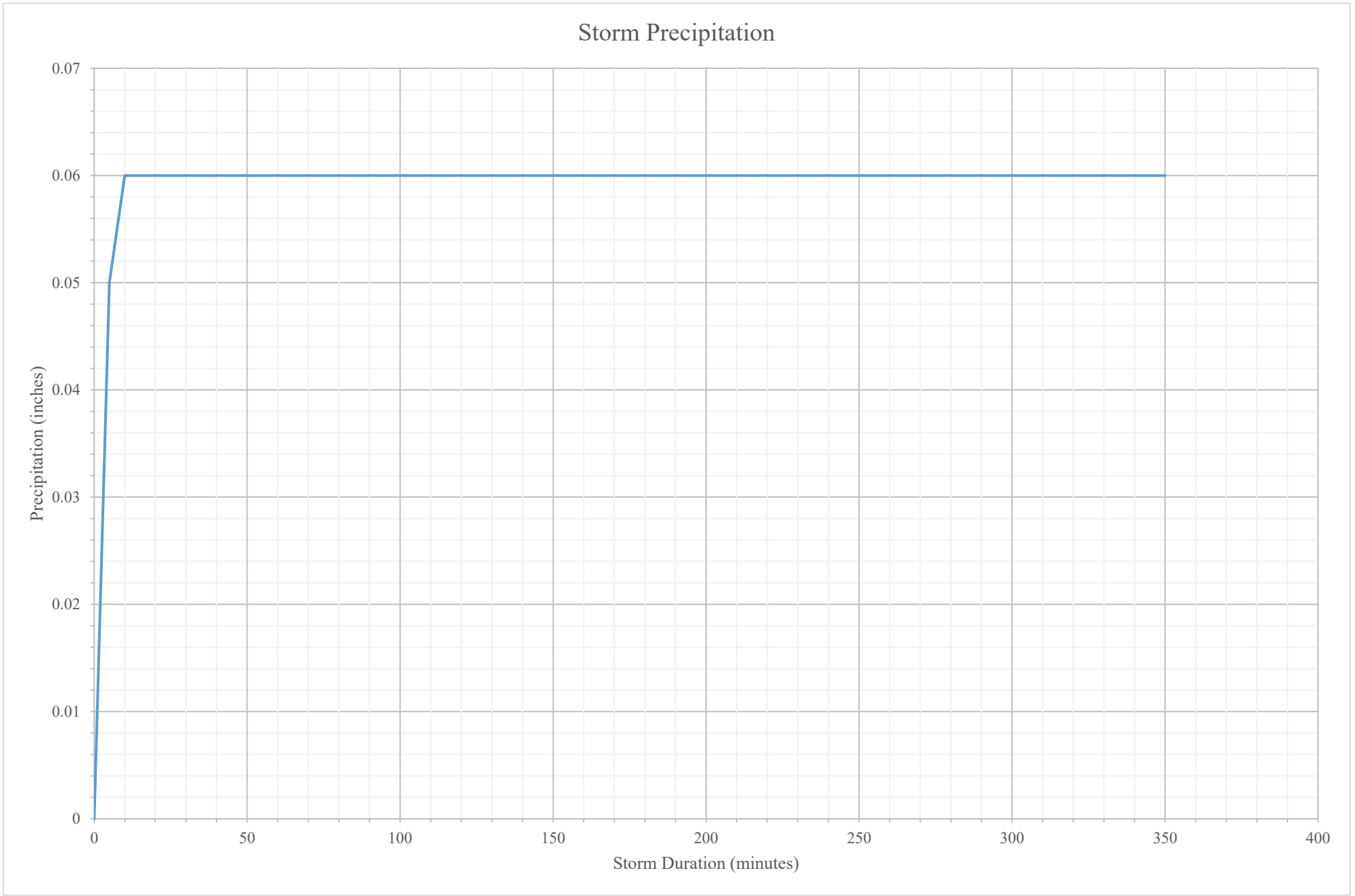

Storm Precipitation
Precipitation (inches)
0.18
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
0
100
200
300
400
500
600
Storm Duration (minutes)

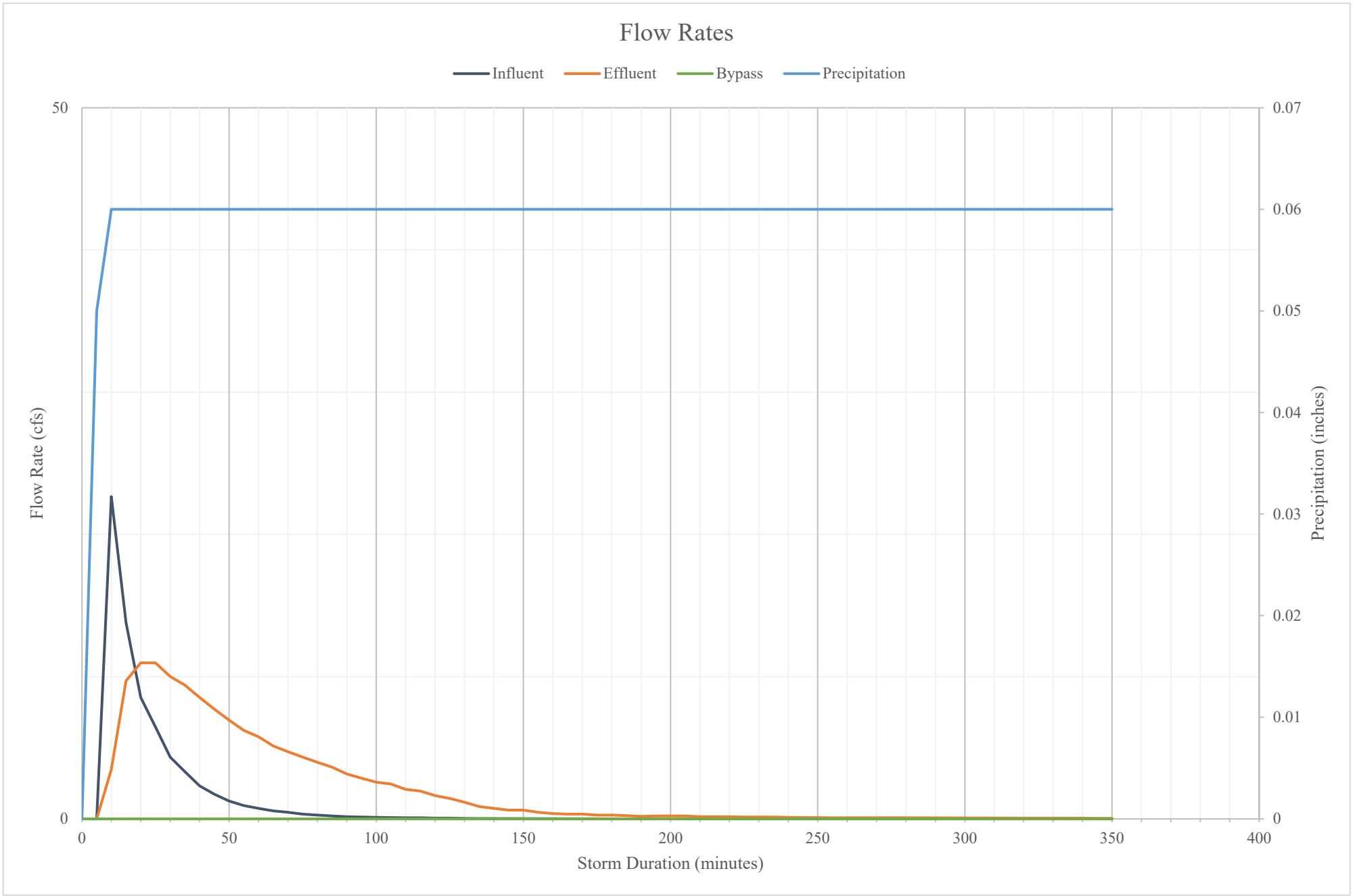

Flow Rates
Influent
Effluent
Bypass
Precipitation
50
0
Flow Rate (cfs)
0.18
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
Precipitation (inches)
0
100
200
300
400
500
600
Storm Duration (minutes)

Storm Date: 11/16/2020

	Parameter	Units	Influent EMC Measured	Influent Conc. Minimum Limit	Influent Conc. Maximum Limit	Effluent	Removal Efficiency	Detection Limit (DL)	Flags	Notes
Required Parameters	TSS	mg/L	N/A	20	100	N/A	-	1		
	Total Copper	mg/L	N/A	N/A	N/A	N/A	-	0.00007		
	Dissolved Copper	mg/L	N/A	0.005	0.02	N/A	-	0.00007		
	Total Zinc	mg/L	N/A	N/A	N/A	N/A	-	0.00025		
	Dissolved Zinc	mg/L	N/A	0.02	0.3	N/A	-	0.00025		
	Total Phosphorus	mg/L	0.12	0.1	0.5	0.153	-27.50%	0.00505		Increased total Phosphorus in eff
	Iron	mg/L	N/A	N/A	N/A	N/A	-	0.01		
	Dissolved Iron	mg/L	N/A	N/A	N/A	N/A	-	0.01		
	NWTPH-Dx									
	Lube Oil	mg/kg	1.47	N/A	N/A	1.67	-13.61%	0.25		Increased lube oil in 18" eff
	Mineral Oil	mg/kg	ND	N/A	N/A	ND	-	N/A		
	Diesel	mg/kg	ND	N/A	N/A	ND	-	0.05		
Screening Parameters	PSD									
	>250	µm	N/A	N/A	N/A	N/A	-	N/A		
	250 - 62.5	µm	N/A	N/A	N/A	N/A	-	N/A		
	<62.5	µm	N/A	N/A	N/A	N/A	-	N/A		
	pH	std. units	N/A	N/A	N/A	N/A	-	N/A		
	Orthophosphate	mg/L	N/A	N/A	N/A	N/A	-	N/A		
	Hardness	mg CaCO3/L	N/A	N/A	N/A	N/A	-	0.865		

	Paramter	Value	Units	Definition	Notes
Storm Data	Storm ID	11/25/2020	-	Identification number for monitored qualifying (?) storm event	
	Storm Start Date and Time	11/25/20 1:35 AM	-	Defines storm event start: 6 hours minimim with ≥ than 0.04" of rain	
	Storm End Date and Time	11/25/20 7:20 AM	-	Defines storm event end: 6 hours minimim with less than 0.04" of rain	
	Total Precipitation Depth	0.06	inches	Cumulative rainfall from the start of the qualifying storm event and the end of the qualifying storm event	
	Storm Duration	5.75	Hours	Duration of qualifying storm event	
	Storm Average Intensity	0.18	in/hr	Total rainfall amount divided by total rainfall duration (e.g., inches per hour)	
	Storm Peak Intensity	0.24	in/hr	Maximum precipitation depth per time interval (5 minutes) converted to in/hr	
	Storm Antecedent Dry Period	31.42	hours	From end of the last rainfall event to start of current rainfall event	
Total Volume	Influent	12.12	ft^3	Total volume of influent from start of event to end of event	
	Effluent	24.50	ft^3	Total volume of effluent from start of event to end of event	
	Bypass	0.00	ft^3	Total volume of bypass from start of event to end of event	
Average Flow Rate	Influent	0.477	gpm	Average influent flow rate during storm event	
	Effluent	0.531	gpm	Average effluent flow rate during storm event	
	Bypass	0.000	gpm	Average bypass flow rate during storm evnt	
Peak Flow Rate	Influent	5.986	gpm	Peak influent flow rate during storm event	
	Effluent	2.897	gpm	Peak effluent flow rate during storm event	
	Peak Bypass	0.000	gpm	Peak bypass flow rate during storm event	
Aliquots	Number of Influent	6	-	Total number of aliquots obtained during qualifying storm event	The maximum of aliquots that can be collected is 45
	Number of Effluent	12	-		
Sample Duration	Influent	1.08	hours	Time in hours between the collection of the first and last aliquots	The duration reflects the time between the first and last aliquots, or the first and 45th aliquot if the number of aliquots reported exceeds 45
	Effluent	2.50	hours		
Threshold	Influent	56.00	L	Volume of stormwater that pass through the influent before a aliquot is collected	
	Effluent	56.00	L	Volume of stormwater that pass through the effluent before a aliquot is collected	
Storm Volume Sampled	% of Influent	98.0%	%	Number of aliquots times the threshold volume, divided by the total storm volume	
	% of Effluent	96.9%	%		


Storm Precipitation
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
Precipitation (inches)
0
50
100
150
200
250
300
350
400
Storm Duration (minutes)


Flow Rates
Influent
Effluent
Bypass
Precipitation
50
0
Flow Rate (cfs)
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
Precipitation (inches)
0
50
100
150
200
250
300
350
400
Storm Duration (minutes)

Storm Date: 11/25/2020

	Parameter	Units	Influent EMC Measured	Influent Conc. Minimum Limit	Influent Conc. Maximum Limit	Effluent	Removal Efficiency	Detection Limit (DL)	Flags	Notes
Required Parameters	TSS	mg/L	N/A	20	100	N/A	-	1		
	Total Copper	mg/L	N/A	N/A	N/A	N/A	-	0.00007		
	Dissolved Copper	mg/L	N/A	0.005	0.02	N/A	-	0.00007		
	Total Zinc	mg/L	N/A	N/A	N/A	N/A	-	0.00025		
	Dissolved Zinc	mg/L	N/A	0.02	0.3	N/A	-	0.00025		
	Total Phosphorus	mg/L	N/A	0.1	0.5	N/A	-	0.00505		
	Iron	mg/L	N/A	N/A	N/A	N/A	-	0.01		
	Dissolved Iron	mg/L	N/A	N/A	N/A	N/A	-	0.01		
	NWTPH-Dx									
	Lube Oil	mg/kg	0.63	N/A	N/A	0.401	36.35%	0.25		
	Mineral Oil	mg/kg	ND	N/A	N/A	ND	-	N/A		
	Diesel	mg/kg	0.618	N/A	N/A	0.523	15.37%	0.05		
Screening Parameters	PSD									
	>250	µm	N/A	N/A	N/A	N/A	-	N/A		
	250 - 62.5	µm	N/A	N/A	N/A	N/A	-	N/A		
	<62.5	µm	N/A	N/A	N/A	N/A	-	N/A		
	pH	std. units	6.49	N/A	N/A	6.44	0.77%	N/A		
	Orthophosphate	mg/L	0.0661	N/A	N/A	0.018	72.77%	N/A		Lab reported effluent value <0.018, PQL limit = 0.018
	Hardness	mg CaCO3/L	N/A	N/A	N/A	N/A	-	0.865		

APPENDIX C. DATA QUALITY ASSESSMENT

Appendix C.1 Quality Objectives

This section describes the assessment performed to review the quality of the data collected during the study. The purpose of the assessment was to determine whether measurement performance criteria (MPCs) identified in the study QAPP were met for each of the data quality indicators (DQIs). The DQIs for the project included precision, bias, representativeness, completeness, comparability, and sensitivity. Detailed definitions of each DQI and descriptions for each MPC are included in the study QAPP. This section describes the evaluation of each DQI with respect to the MPCs for the data collected during the study.

Precision

DQI #1: Developing and consistently following SOPs for collecting samples and measuring data will reduce the potential of collecting imprecise data.

MPC #1: An audit will be conducted to verify that sampling staff are following the SOPs. Data will be considered acceptable if the sampling staff are consistently following the SOPs.

Assessment: An audit was performed to verify that sampling staff are following the SOPs. A copy of the audit results is included in Appendix C.4. SOPs were followed unless improvements were made to procedures which included: addition of steps that provided a data quality benefit (i.e. tightening of weir wheels to limit any leaking of flow around the weir seal); revision of steps following installation of equipment or guidance provided by manufacturers, analytical laboratories, or others (i.e. addition of sample blank for dissolved metals); removal of items that were not necessary to ensure data quality (i.e. disconnect power supply to battery in order to test voltage of battery); and removal of items which were not measurable (i.e. Inlet Box Sediment Depth SOP – see Appendix C.5). The data are, as a result, considered acceptable.

DQI #2: Duplicate analytical testing will be performed for the water quality parameters shown in Table 6.2.

MPC #2: If the results of the duplicate sampling meet the respective relative percent difference (RPD) for the parameters listed in Table 6.2 of the study QAPP, the results of the analytical testing will be considered acceptable.

Assessment: Laboratory and field duplicates were obtained during the study. Data which met the RPD was considered acceptable. Lab duplicates which exceeded the RPD but were not flagged and were associated with sample QA/QC which met limits were also accepted (TSS samples on 10/18/2019 and 10/21/2019). Field duplicates which exceeded the RPD were rejected along with the sample result, with the exception of a TSS field duplicate sample on 5/17/2020, which was collected improperly. Corrective action was taken following the sample to properly collect field duplicates for future events.

DQI #3: Rain gauge and flow measurements will also be assessed.

MPC #3: If the flow measurements and rain gauge data meet the RPD defined in section 6.1, that data will be considered acceptable.

Assessment: Flow measurements and rain gauge RPD procedures were revised as described in Appendix C.5. Data is considered acceptable.

Bias

DQI #1: Calibration of instruments, including the pH meter, pressure transducers and ISCO, will occur according to manufacturer's specifications. Buffer solutions will be used to calibrate the pH meter to reduce the potential for bias.

MPC #1: To reduce the potential for biased measurements, the instruments requiring calibration will be calibrated according to the procedures and frequency outlined in Section 8.0 of the study QAPP, per manufacturer's specifications. An audit will be conducted to verify that sampling staff are following the calibration procedures.

Assessment: Instruments were maintained and calibrated during the study according to the SOPs in Section 8.1 of the study QAPP, per manufacturer specifications. An audit was performed to verify the SOPs were followed and can be found in Appendix C.4.

DQI #2: Lack of maintenance at the site can be a source of bias in sample values or measurements. For example, if ISCO tubing is not cleaned regularly, sediment, oils, etc. can accumulate in the tubing and affect sample results. For that reason, manufacturer's recommendations for maintenance frequency and procedures will be followed to reduce the potential for bias.

MPC #2: An audit (Section 12.0) will be conducted to verify that sampling staff are following the SOPs outlined in Section 8.0 (written to match manufacturer's specifications).

Assessment: An audit was performed to verify that sampling staff are following the SOPs. See Precision DQI #1 for further discussion on the audit and SOPs.

DQI #3: SOPs defined in Section 8.0 will be followed when collecting samples and measuring data to limit bias.

MPC #3: An audit (Section 12.0) will be conducted to verify that sampling staff are following the SOPs outlined in Section 8.0.

Assessment: An audit was performed to verify that sampling staff are following the SOPs. See Precision DQI #1 for further discussion on the audit and SOPs.

DQI #4: Method blanks, matrix spikes, and field duplicates will be analyzed to check for bias.

MPC #4: Sample results will be accepted if results of the method blanks, matrix spikes, and/or field duplicates are below the limits.

Assessment: Samples were accepted if results of the method blanks, matrix spikes, and field duplicates were below the limits. Two dissolved zinc results were also accepted on 6/14/2020 and 6/15/2020 despite method blank results exceeding reporting limits because other laboratory QA/QC and TAPE storm and sampling criteria were met, and the result was not flagged by the laboratory.

Representativeness

DQI #1: The location selected for this study is on an urban arterial, within commercial and residential zones. The space constraints at the site would preclude the use of a basic sand filter BMP.

MPC #1: These conditions reflect the characteristics of a location where a sand filter sidewalk vault would be installed: a developed, urban area with space constraints and the presence of a sidewalk.

Assessment: The sand filter sidewalk vault BMP was installed and monitored on an urban arterial, within commercial and residential zone. The right-of-way in this location abuts private property on either side of the arterial. As such, the site is expected to accurately represent a typical site where a sand filter sidewalk vault BMP would be installed.

DQI #2: Hydrologic conditions at the site should be representative of a range of weather patterns and conditions seen throughout the wet season.

MPC #2: Local stormwater hydrologic conditions are represented by conducting the study over two wet seasons and collecting data from a minimum of 12 qualifying storm events (described in Section 7.5).

Assessment: The study was conducted over two wet seasons (2019 and 2020) as well as during the dry seasons when rainfall occurred. Data was collected from a total 18 storm events. As a result, the data collected is expected to represent local stormwater hydrologic conditions.

DQI #3: Rainfall data, flow data, and water quality samples should be representative of the site.

MPC #3: Equipment will be set up to achieve representative rainfall, flow, and water quality data as follows:

- The rain gauge will be installed within the drainage basin of the sand filter sidewalk vault and in a location where no buildings, trees, or other objects obstruct or divert rainfall from entering the rain gage

- Pressure transducers will be installed upstream of weirs in influent, effluent, and bypass pipes, which will mimic typical sand filter sidewalk vault construction

- Water quality samples will be collected as composite samples. pH measurements will also be taken from the composite samples. The composite samples will capture at least 10 aliquots and 75% of the qualifying rainfall event hydrograph to be representative of water quality during the storm.

Assessment: The rain gauge was located immediately above the monitoring vault at the test site. The pressure transducers were installed upstream of weirs in influent, effluent, and bypass pipes. The influent, effluent, and bypass pipes mimicked typical sand filter sidewalk construction. Water quality samples were collected as composite samples which captured at least 75% of the storm event hydrograph. Per TAPE (Washington State Department of Ecology, 2018), aliquots as low as

7 for a storm event were accepted if other storm event guidelines, sampling requirements, and QA/QC criteria were met.

DQI #4: Equipment at the site will be installed per manufacturer specifications.

MPC #4: No MPC was listed for this DQI.

Assessment: Equipment at the site was installed per manufacturer specifications.

Completeness

DQI #1: A minimum of 12 qualifying rainfall events (Section 7.5) are required to be sampled for the duration of the study, per TAPE. Additionally, at least 10 aliquots and 75% of the hydrograph must be sampled during the qualifying rainfall event.

MPC #1: The number of rainfall events sampled will be compared to the minimum amount at the end of the project, and additional rainfall events will be sampled as needed. Samples which represent less than 75% of the hydrograph will not be accepted. If samples only consist of 7-9 aliquots, the samples may be accepted if rationale is provided in the TER as to why the sample was used (per TAPE).

Assessment: Water quality samples were collected for 18 events which captured an estimated 75% of the storm event hydrograph at minimum. Per TAPE (Washington State Department of Ecology, 2018), aliquots as low as seven for a storm event were accepted if other storm event guidelines, sampling requirements, and QA/QC criteria were met.

DQI #2: A minimum of 95% of the samples analyzed by the lab must be considered valid prior to the end of the study.

MPC #2: 95% of the samples must be accompanied by method blanks, matrix spikes, lab control spikes, and field duplicate results which are valid. Additionally, the samples must be received and analyzed within the appropriate temperatures and holding times. Temperature will be verified from the results reported by the lab.

Assessment: Over 95% of samples were accompanied by method blanks, matrix spikes, lab control spikes, and field duplicate results which were valid. Samples were received within the appropriate holding times or rejected. An exception was made for samples above 6 degrees Celsius as further analysis indicated that there was not a relationship between the sample results obtained and temperature (see Appendix C.6). Samples above the 6 degrees Celsius were determined to be acceptable.

DQI #3: Define procedures for handling missing data, use appropriate coding for missing data, and report missing data with the results.

MPC #3: Procedures for handling missing data and coding missing data are defined in section 11.0. The Final Technical Report for this study will include consideration for how missing data could limit the comparability of the data set.

Assessment: Missing data was not encountered during the study.

DQI #4: Conduct routine maintenance for equipment at the site, in accordance with SOPs outlined in Section 8.0, to limit the possibility of missing or invalid data.

MPC #4: An audit (Section 12.0) will be conducted to verify that sampling staff are following the SOPs outlined in Section 8.0 (written to match manufacturer's specifications).

Assessment: An audit was performed to verify that sampling staff are following the SOPs. See Precision DQI #1 for further discussion on the audit and SOPs.

DQI #5: An equipment checklist and Chain of Custody forms will be used to prevent loss of data resulting from missing containers, inoperable delivery and collection apparatus or sample delivery.

MPC #5: No MPC was listed for this DQI.

Assessment: Chain of custody forms were used to prevent the loss of data resulting from missing containers, inoperable delivery and collection apparatus, or sample delivery.

Comparability

DQI #1: The test site is located on an arterial in a developed urban area with commercial and residential land use surrounding the site.

MPC #1: The process for selecting the study area is defined in section 7.2. The process focused on having a test site that is representative of locations where the sand filter sidewalk vault will be installed.

Assessment: The sand filter sidewalk vault BMP was installed and monitored on an urban arterial, within commercial and residential zone. The right-of-way in this location abuts private property on either side of the arterial. As such, the site is expected to accurately represent a typical site where a sand filter sidewalk vault BMP would be installed.

DQI #2: Define and consistently follow SOPs for sample collection and field measurements.

MPC #2: SOPs were developed and will be consistently followed during this study.

Assessment: An audit was performed to verify that sampling staff are following the SOPs. See Precision DQI #1 for further discussion on the audit and SOPs.

DQI #3: All data and sample collection will be conducted in accordance with the SOPs outlined in Section 8.0.

MPC #3: An audit (Section 12.0) will be conducted to verify that sampling staff are following the SOPs outlined in Section 8.0.

Assessment: An audit was performed to verify that sampling staff are following the SOPs. See Precision DQI #1 for further discussion on the audit and SOPs.

DQI #4: Standard testing methods will be used to analyze samples submitted to the lab.

MPC #4: Anatek, the laboratory proposed for water quality testing in this study, is certified by Ecology and will follow standard methods approved by the US Environmental Protection Agency (EPA) (APHA et al. 1992, 1998; US EPA 1983, 1984). The methods to be used are listed in Table 9.1. Deviations from methods will be noted on analytical reports.

Assessment: Methods used by Anatek were recorded for each sampling event monitored. The methods were recorded in the QA worksheets, which are located in Appendix C.2. Methods used were standard methods approved by the EPA, and matched or were equivalent methods to those proposed in the study QAPP.

Sensitivity

DQI #1: Analytical results for water quality samples will be reported if they are above the reporting limit.

MPC #1: Reporting limits for water quality parameters are listed in Table 6.2 of the study QAPP. Data reported as below the detection limit will be calculated using the reporting limit shown in Table 9.1 of the study QAPP.

Assessment: Data reported below the detection limit was calculated using the reporting limit shown in the laboratory report. As methods used by the laboratory were standard methods and matched, or were equivalent tests to those proposed in the QAPP, detection limits used in the laboratory reports were assumed to be sufficient.

DQI #2: All water quality testing methods selected have detection limits below the expected range of results.

MPC #2: The expected range of results and respective reporting limit were compared in Table 9.1 of the study QAPP.

Assessment: Per the study QAPP (Osborn Consulting, Inc., 2018), the reporting/detection limits for each method were below the expected range of results.

DQI #3: Instruments capable of accurately measuring variables at the site will be used during the study.

MPC #3: The sensitivity of instruments at the site is included with the monitoring equipment specifications in Appendix G of the study QAPP.

Assessment: Per the study QAPP (Osborn Consulting, Inc., 2018), the instruments used during the study were selected to be capable of accurately measuring variables at the site.

Appendix C.2 Data Verification

Data Quality Assurance Spreadsheet																													
Project Name	Sand Filter		Sample ID:	INF09182019, EFF09182019 (no QC included in Lab Report)																									
Sample Date:	9/18/2019		Lab Report #:	190919037-001, 190919037-002																									
Matrix	Parameter	Method	Chain-of-Custody Issues?	Completeness/ Methodology	Holding Times (days)				Cooler Temperature	Blanks (mg/L)		Matrix Spikes/ Surrogate Recovery (%)		Lab Control Samples Recovery (%)		Lab Duplicates RPD (%)		Influent Field Duplicates RPD (%)		Effluent Field Duplicates RPD (%)		Flagged	ACTION
					Date Collected	Date Analyzed	Reported	Goal		Result	Reporting Limit	Reported	Goal	Reported	Goal	RPD	RPD Limit	Reported	Goal	Reported	Goal		
Stormwater	Total Suspended Solids (TSS)	SM 2540D	NO	SM 2540D	9/18/19 20:20	9/24/19 16:00	5.82	7	3.2		1		80-120		90-110				≤ 25%		≤ 25%	NO	No flag for %RPD exceeding RPD goal
	Dissolved Copper (Cu)	EPA 200.8 (ICP/MS)	NO	EPA 200.8	9/18/19 20:20	9/25/19 14:17	6.75	180	3.2		0.001		70-130		85-115				≤ 20%		≤ 20%		
	Dissolved Zinc (Zn)	EPA 200.8 (ICP/MS)	NO	EPA 200.8	9/18/19 20:20	9/25/19 14:17	6.75	180	3.2		0.001		70-130		85-115				≤ 20%		≤ 20%		
	Total Zinc (Zn)	EPA 200.8 (ICP/MS)	NO	EPA 200.8	9/18/19 20:20	9/25/19 14:11	6.74	180	3.2		0.001		70-130		85-115				≤ 20%		≤ 20%		
	Total Copper (Cu)	EPA 200.8 (ICP/MS)	NO	EPA 200.8	9/18/19 20:20	9/25/19 14:11	6.74	180	3.2		0.001		70-130		85-115				≤ 20%		≤ 20%		
	Hardness as CaCO3	SM 2340B (ICP)	NO	EPA 130.2	9/18/19 20:20	9/20/19 9:30	1.55	180	3.2		3		80-120		90-110				≤ 20%		≤ 20%		
	Ortho-phosphate (OP)	SM 4500-P G	NO	SM 4500PF	9/18/19 20:20	9/20/19 9:21	1.54	2	3.2		0.018		80-120		85-115				≤ 20%		≤ 20%		
	Total Phosphorus (TP)	SM 4500-P F	NO	SM 4500PF	9/18/19 20:20	9/30/19 15:14	11.79	28	3.2		0.005		80-120		90-100				≤ 20%		≤ 20%		
	NWTPH-Dx , Diesel	Ecology NWTPH Dx	NO	NWTPH-Dx	9/18/19 20:20	9/27/19 13:59	8.74	14	3.2		0.16		70-130		70-130				≤ 40%		≤ 40%		
	NWTPH-Dx , Lube Oil	Ecology NWTPH Dx	NO	NWTPH-Dx	9/18/19 20:20	9/27/19 13:59	8.74	14	3.2		0.4		70-130		70-130				≤ 40%		≤ 40%		
	NWTPH-Dx , Mineral Oil	Ecology NWTPH Dx	NO	NWTPH-Dx	9/18/19 20:20	9/27/19 13:59	8.74	14	3.2		0.16		70-130		70-130				≤ 40%		≤ 40%		
Sediment	Sediment Dry Weight	EPA 1684																					
	Sediment PSD	ASTM D422																	≤ 25%		≤ 25%		
Sand Filter Media	pH	S-2.20																					
	Cation Exchange Capacity	S-10.10																					
	Maximum Dry Density	ASTM D1557																					
	Saturated Hydraulic Conductivity	ASTM D2434																					
	Particle Size Distribution	ASTM D422																					
	Total Elements (Zn, Cu, Pb, Fe, Al, P, Mg, Ca)	EPA 3050A/6010B																					
	Total Organic Carbon	EPA 415.3																					
	C:N Ratio	EPA 415.3/351.2																					

Data Quality Assurance Spreadsheet
Sample ID
Lab Report #

Data Quality Assurance Spreadsheet																											
Project Name	Sand Filter		Sample ID:	INF10192019, EFF10192019											Data Quality Assurance Spreadsheet											
Sample Date:	10/18/2019		Lab Report #:	191021015-001, 191021015-002											Sample ID											
															Lab Report #											
Matrix	Parameter	Method	Chain-of-Custody Issues?	Completeness/ Methodology	Holding Times (days)				Cooler Temperature	Blanks (mg/L)		Matrix Spikes/ Surrogate Recovery (%)		Lab Control Samples Recovery (%)		Lab Duplicates RPD (%)		Influent Field Duplicates RPD (%)		Effluent Field Duplicates RPD (%)		Flagged	ACTION
					Date Collected	Date Analyzed	Reported	Goal		Result	Reporting Limit	Reported	Goal	Reported	Goal	RPD	RPD Limit	Reported	Goal	Reported	Goal		
Stormwater	Total Suspended Solids (TSS)	SM 2540D	NO	SM 2540D	10/19/19 21:15	10/24/19 9:15	4.50	7	2.3	<1	1	99	80-120	94	90-110	22.2	20		≤ 25%		≤ 25%	NO	No flag for %RPD exceeding RPD goal
	Dissolved Copper (Cu)	EPA 200.8 (ICP/MS)	NO	EPA 200.8	10/19/19 21:15	10/25/19 14:52	5.73	180	2.3	ND	0.001	106.5	70-130	114	85-115				≤ 20%		≤ 20%		
	Dissolved Zinc (Zn)	EPA 200.8 (ICP/MS)	NO	EPA 200.8	10/19/19 21:15	10/25/19 14:52	5.73	180	2.3	ND	0.001	102.6	70-130	104.2	85-115				≤ 20%		≤ 20%		
	Total Zinc (Zn)	EPA 200.8 (ICP/MS)	NO	EPA 200.8	10/19/19 21:15	10/25/19 14:56	5.74	180	2.3	ND	0.001	102.6	70-130	104.2	85-115				≤ 20%		≤ 20%		
	Total Copper (Cu)	EPA 200.8 (ICP/MS)	NO	EPA 200.8	10/19/19 21:15	10/25/19 14:56	5.74	180	2.3	ND	0.001	106.5	70-130	114	85-115				≤ 20%		≤ 20%		
	Hardness as CaCO3	SM 2340B (ICP)	NO	EPA 130.2	10/19/19 21:15	10/29/19 11:30	9.59	180	2.3	<5	3	98.5	80-120	99.5	90-110	1.7	25		≤ 20%		≤ 20%		
	Ortho-phosphate (OP)	SM 4500-P G					0.00	2			0.018		80-120		85-115				≤ 20%		≤ 20%		
	Total Phosphorus (TP)	SM 4500-P F					0.00	28			0.005		80-120		90-100				≤ 20%		≤ 20%		
	NWTPH-Dx , Diesel	Ecology NWTPH Dx	NO	NWTPH-Dx	10/19/19 21:15	11/1/19 13:05	12.66	14	2.3	ND	0.16		70-130	76	70-130				≤ 40%		≤ 40%		
	NWTPH-Dx , Lube Oil	Ecology NWTPH Dx	NO	NWTPH-Dx	10/19/19 21:15	11/1/19 13:05	12.66	14	2.3	ND	0.4		70-130		70-130				≤ 40%		≤ 40%		
	NWTPH-Dx , Mineral Oil	Ecology NWTPH Dx	NO	NWTPH-Dx	10/19/19 21:15	11/1/19 13:05	12.66	14	2.3	ND	0.16		70-130		70-130				≤ 40%		≤ 40%		
Sediment	Sediment Dry Weight	EPA 1684																					
	Sediment PSD	ASTM D422																	≤ 25%		≤ 25%		
Sand Filter Media	pH	S-2.20																					
	Cation Exchange Capacity	S-10.10																					
	Maximum Dry Density	ASTM D1557																					
	Saturated Hydraulic Conductivity	ASTM D2434																					
	Particle Size Distribution	ASTM D422																					
	Total Elements (Zn, Cu, Pb, Fe, Al, P, Mg, Ca)	EPA 3050A/6010B																					
	Total Organic Carbon	EPA 415.3																					
	C:N Ratio	EPA 415.3/351.2																					

Data Quality Assurance Spreadsheet																										
Project Name	Sand Filter		Sample ID:	INF10212019, EFF10212019										Data Quality Assurance Spreadsheet												
Sample Date:	10/21/2019		Lab Report #:	191209033-001, 191209033-002										Sample ID												
														Lab Report #												
Matrix	Parameter	Method	Chain-of-Custody Issues?	Completeness/ Methodology	Holding Times (days)				Cooler Temperature	Blanks (mg/L)		Matrix Spikes/ Surrogate Recovery (%)		Lab Control Samples Recovery (%)		Lab Duplicates RPD (%)		Influent Field Duplicates RPD (%)		Effluent Field Duplicates RPD (%)		Flagged	ACTION
					Date Collected	Date Analyzed	Reported	Goal		Result	Reporting Limit	Reported	Goal	Reported	Goal	RPD	RPD Limit	Reported	Goal	Reported	Goal	OK	
Stormwater	Total Suspended Solids (TSS)	SM 2540D	NO	SM 2540D	10/22/19 10:30	10/24/19 9:15	1.95	7	5.7	<1	1	98	80-120	94	90-110	22.2	20		≤ 25%		≤ 25%	NO	Not flagged for Lab Duplicate exceeding RPD Limit
	Dissolved Copper (Cu)	EPA 200.8 (ICP/MS)	NO	EPA 200.8	10/22/19 10:30	10/25/19 15:12	3.20	180	5.7	ND	0.001	104	70-130	114	85-115				≤ 20%		≤ 20%		
	Dissolved Zinc (Zn)	EPA 200.8 (ICP/MS)	NO	EPA 200.8	10/22/19 10:30	10/25/19 15:12	3.20	180	5.7	ND	0.001	102.8	70-130	104.2	85-115				≤ 20%		≤ 20%		
	Total Zinc (Zn)	EPA 200.8 (ICP/MS)	NO	EPA 200.8	10/22/19 10:30	10/25/19 15:15	3.20	180	5.7	ND	0.001	102.6	70-130	104.2	85-115				≤ 20%		≤ 20%		
	Total Copper (Cu)	EPA 200.8 (ICP/MS)	NO	EPA 200.8	10/22/19 10:30	10/25/19 15:15	3.20	180	5.7	ND	0.001	104	70-130	114	85-115				≤ 20%		≤ 20%		
	Hardness as CaCO3	SM 2340B (ICP)	NO	EPA 130.2	10/22/19 10:30	10/29/19 11:30	7.04	180	5.7	<5	3	98.5	80-120	99.75	90-110				≤ 20%		≤ 20%		
	Ortho-phosphate (OP)	SM 4500-P G					0.00	2			0.018		80-120		85-115				≤ 20%		≤ 20%		
	Total Phosphorus (TP)	SM 4500-P F					0.00	28			0.005		80-120		90-100				≤ 20%		≤ 20%		
	NWTPH-Dx , Diesel	Ecology NWTPH Dx	NO	NWTPH-Dx	10/22/19 10:30	11/1/19 14:56	10.18	14	5.7	ND	0.16		70-130	76	70-130				≤ 40%		≤ 40%		
	NWTPH-Dx , Lube Oil	Ecology NWTPH Dx	NO	NWTPH-Dx	10/22/19 10:30	11/1/19 14:56	10.18	14	5.7	ND	0.4		70-130		70-130				≤ 40%		≤ 40%		
	NWTPH-Dx , Mineral Oil	Ecology NWTPH Dx	NO	NWTPH-Dx	10/22/19 10:30	11/1/19 14:56	10.18	14	5.7	ND	0.16		70-130		70-130				≤ 40%		≤ 40%		
Sediment	Sediment Dry Weight	EPA 1684																					
	Sediment PSD	ASTM D422																	≤ 25%		≤ 25%		
Sand Filter Media	pH	S-2.20																					
	Cation Exchange Capacity	S-10.10																					
	Maximum Dry Density	ASTM D1557																					
	Saturated Hydraulic Conductivity	ASTM D2434																					
	Particle Size Distribution	ASTM D422																					
	Total Elements (Zn, Cu, Pb, Fe, Al, P, Mg, Ca)	EPA 3050A/6010B																					
	Total Organic Carbon	EPA 415.3																					
	C:N Ratio	EPA 415.3/351.2																					

Data Quality Assurance Spreadsheet																											
Project Name	Sand Filter		Sample ID:	INF11192019, EFF11192019										Data Quality Assurance Spreadsheet													
Sample Date:	11/19/2019		Lab Report #:	191120023-001, 191120023-002										Sample ID													
														Lab Report #													
Matrix	Parameter	Method	Chain-of-Custody Issues?	Completeness/ Methodology	Holding Times (days)				Cooler Temperature	Blanks (mg/L)		Matrix Spikes/ Surrogate Recovery (%)		Lab Control Samples Recovery (%)		Lab Duplicates RPD (%)		Influent Field Duplicates RPD (%)		Effluent Field Duplicates RPD (%)		Flagged	ACTION
					Date Collected	Date Analyzed	Reported	Goal		Result	Reporting Limit	Reported	Goal	Reported	Goal	RPD	RPD Limit	Reported	Goal	Reported	Goal	OK	
Stormwater	Total Suspended Solids (TSS)	SM 2540D	NO	SM 2540D	11/19/19 16:15	11/26/19 13:15	6.88	7	-1.7	<1	1	93	80-120	97	90-110	8	20		≤ 25%		≤ 25%		
	Dissolved Copper (Cu)	EPA 200.8 (ICP/MS)	NO	EPA 200.8	11/19/19 16:15	11/27/19 15:48	7.98	180	-1.7	ND	0.001	104.8	70-130	103.4	85-115				≤ 20%		≤ 20%		
	Dissolved Zinc (Zn)	EPA 200.8 (ICP/MS)	NO	EPA 200.8	11/19/19 16:15	11/27/19 15:48	7.98	180	-1.7	ND	0.001	101	70-130	101.6	85-115				≤ 20%		≤ 20%		
	Total Zinc (Zn)	EPA 200.8 (ICP/MS)	NO	EPA 200.8	11/19/19 16:15	11/27/19 15:48	7.98	180	-1.7	ND	0.001	101	70-130	101.6	85-115				≤ 20%		≤ 20%		
	Total Copper (Cu)	EPA 200.8 (ICP/MS)	NO	EPA 200.8	11/19/19 16:15	11/27/19 15:48	7.98	180	-1.7	ND	0.001	104.8	70-130	101.7	85-115				≤ 20%		≤ 20%		
	Hardness as CaCO3	SM 2340B (ICP)	NO	EPA 130.2	11/19/19 16:15	11/26/19 16:30	7.01	180	-1.7	<5	3	101	80-120	102	90-110	0.8	25		≤ 20%		≤ 20%	YES	"The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit"
	Ortho-phosphate (OP)	SM 4500-P G	NO	SM 4500-P F	11/19/19 16:15	11/21/19 16:38	2.02	2	-1.7	ND	0.018	99.8	80-120	83.3	85-115				≤ 20%		≤ 20%	NO	No flag was provided for being analyzed outside of holding time. Assumed that analysis began within holding time.
	Total Phosphorus (TP)	SM 4500-P F	NO	SM 4500-P F	11/19/19 16:15	11/21/19 16:38	2.02	28	-1.7	ND	0.005	112.6	80-120	102	90-100				≤ 20%		≤ 20%		
	NWTPH-Dx , Diesel	Ecology NWTPH Dx	NO	NWTPH-DX	11/19/19 16:15	11/28/19 16:09	9.00	14	-1.7	ND	0.16		70-130	78.3	70-130				≤ 40%		≤ 40%		
	NWTPH-Dx , Lube Oil	Ecology NWTPH Dx	NO	NWTPH-DX	11/19/19 16:15	11/28/19 16:09	9.00	14	-1.7	ND	0.4		70-130		70-130				≤ 40%		≤ 40%		
	NWTPH-Dx , Mineral Oil	Ecology NWTPH Dx	NO	NWTPH-DX	11/19/19 16:15	11/28/19 16:09	9.00	14	-1.7	ND	0.16		70-130		70-130				≤ 40%		≤ 40%		
Sediment	Sediment Dry Weight	EPA 1684																					
	Sediment PSD	ASTM D422																	≤ 25%		≤ 25%		
Sand Filter Media	pH	S-2.20																					
	Cation Exchange Capacity	S-10.10																					
	Maximum Dry Density	ASTM D1557																					
	Saturated Hydraulic Conductivity	ASTM D2434																					
	Particle Size Distribution	ASTM D422																					
	Total Elements (Zn, Cu, Pb, Fe, Al, P, Mg, Ca)	EPA 3050A/6010B																					
	Total Organic Carbon	EPA 415.3																					
	C:N Ratio	EPA 415.3/351.2																					

Data Quality Assurance Spreadsheet					Data Quality Assurance Spreadsheet																		
Project Name	Sand Filter		Sample ID:	INF12072019,EFF12072019 (no QC in Lab Report)										Sample ID									
Sample Date:	12/7/2019		Lab Report #:	191209033-001, 191209033-002										Lab Report #									
Matrix	Parameter	Method	Chain-of-Custody Issues?	Completeness/ Methodology	Holding Times (days)				Cooler Temperature	Blanks (mg/L)		Matrix Spikes/ Surrogate Recovery (%)		Lab Control Samples Recovery (%)		Lab Duplicates RPD (%)		Influent Field Duplicates RPD (%)		Effluent Field Duplicates RPD (%)		Flagged	ACTION
					Date Collected	Date Analyzed	Reported	Goal		Result	Reporting Limit	Reported	Goal	Reported	Goal	RPD	RPD Limit	Reported	Goal	Reported	Goal	OK	
Stormwater	Total Suspended Solids (TSS)	SM 2540D	NO	SM 2540D	12/7/19 21:00	12/12/19 10:15	4.55	7	2.2		1		80-120		90-110				≤ 25%		≤ 25%		
	Dissolved Copper (Cu)	EPA 200.8 (ICP/MS)	NO	EPA 200.8	12/7/19 21:00	12/16/19 12:11	8.63	180	2.2		0.001		70-130		85-115				≤ 20%		≤ 20%		
	Dissolved Zinc (Zn)	EPA 200.8 (ICP/MS)	NO	EPA 200.8	12/7/19 21:00	12/16/19 12:11	8.63	180	2.2		0.001		70-130		85-115				≤ 20%		≤ 20%		
	Total Zinc (Zn)	EPA 200.8 (ICP/MS)	NO	EPA 200.8	12/7/19 21:00	12/16/19 12:26	8.64	180	2.2		0.001		70-130		85-115				≤ 20%		≤ 20%		
	Total Copper (Cu)	EPA 200.8 (ICP/MS)	NO	EPA 200.8	12/7/19 21:00	12/16/19 12:26	8.64	180	2.2		0.001		70-130		85-115				≤ 20%		≤ 20%		
	Hardness as CaCO3	SM 2340B (ICP)	NO	EPA 130.2	12/7/19 21:00	12/10/19 11:30	2.60	180	2.2		3		80-120		90-110				≤ 20%		≤ 20%		
	Ortho-phosphate (OP)	SM 4500-P G	NO	SM 4500-P F	12/7/19 21:00	12/9/19 14:05	1.71	2	2.2		0.018		80-120		85-115				≤ 20%		≤ 20%		
	Total Phosphorus (TP)	SM 4500-P F	NO		12/7/19 21:00	12/9/19 14:05	1.71	28	2.2		0.005		80-120		90-100				≤ 20%		≤ 20%		
	NWTPH-Dx , Diesel	Ecology NWTPH Dx	NO	NWTPH-Dx	12/7/19 21:00	12/17/19 1:09	9.17	14	2.2		0.16		70-130		70-130				≤ 40%		≤ 40%		
	NWTPH-Dx , Lube Oil	Ecology NWTPH Dx	NO	NWTPH-Dx	12/7/19 21:00	12/17/19 1:09	9.17	14	2.2		0.4		70-130		70-130				≤ 40%		≤ 40%		
	NWTPH-Dx , Mineral Oil	Ecology NWTPH Dx	NO	NWTPH-Dx	12/7/19 21:00	12/17/19 1:09	9.17	14	2.2		0.16		70-130		70-130				≤ 40%		≤ 40%		
Sediment	Sediment Dry Weight	EPA 1684																					
	Sediment PSD	ASTM D422																	≤ 25%		≤ 25%		
Sand Filter Media	pH	S-2.20																					
	Cation Exchange Capacity	S-10.10																					
	Maximum Dry Density	ASTM D1557																					
	Saturated Hydraulic Conductivity	ASTM D2434																					
	Particle Size Distribution	ASTM D422																					
	Total Elements (Zn, Cu, Pb, Fe, Al, P, Mg, Ca)	EPA 3050A/6010B																					
	Total Organic Carbon	EPA 415.3																					
	C:N Ratio	EPA 415.3/351.2																					

Data Quality Assurance Spreadsheet																									
Project Name	Sand Filter		Sample ID:	INF01062020, EFF01062020										Data Quality Assurance Spreadsheet											
Sample Date:	1/6/2020		Lab Report #:	200107031-001, 200107031-002										Sample ID											
														Lab Report #											
Matrix	Parameter	Method	Chain-of-Custody Issues?	Completeness/ Methodology	Holding Times (days)				Cooler Temperature	Blanks (mg/L)		Matrix Spikes/ Surrogate Recovery (%)		Lab Control Samples Recovery (%)		Lab Duplicates RPD (%)		Influent Field Duplicates RPD (%)		Effluent Field Duplicates RPD (%)		Flagged	ACTION
					Date Collected	Date Analyzed	Reported	Goal		Result	Reporting Limit	Reported	Goal	Reported	Goal	RPD	RPD Limit	Reported	Goal	Reported	Goal	OK	
Stormwater	Total Suspended Solids (TSS)	SM 2540D	NO	SM 2540D	1/7/20 8:15	1/8/20 9:00	1.03	7	7.4	<1	1	95	80-120	100	90-110	0	20		≤ 25%		≤ 25%		
	Dissolved Copper (Cu)	EPA 200.8 (ICP/MS)	NO	EPA 200.8	1/7/20 8:15	1/9/20 16:55	2.36	180	7.4	ND	0.001	92	70-130	100	85-115				≤ 20%		≤ 20%		
	Dissolved Zinc (Zn)	EPA 200.8 (ICP/MS)	NO	EPA 200.9	1/7/20 8:15	1/9/20 16:55	2.36	180	7.4	ND	0.001	91.8	70-130	98.8	85-115				≤ 20%		≤ 20%		
	Total Zinc (Zn)	EPA 200.8 (ICP/MS)	NO	EPA 200.11	1/7/20 8:15	1/9/20 16:59	2.36	180	7.4	ND	0.001	91.8	70-130	98.8	85-115				≤ 20%		≤ 20%		
	Total Copper (Cu)	EPA 200.8 (ICP/MS)	NO	EPA 200.12	1/7/20 8:15	1/9/20 16:59	2.36	180	7.4	ND	0.001	92	70-130	100	85-115				≤ 20%		≤ 20%		
	Hardness as CaCO3	SM 2340B (ICP)						180			3		80-120		90-110				≤ 20%		≤ 20%		
	Ortho-phosphate (OP)	SM 4500-P G						2			0.018		80-120		85-115				≤ 20%		≤ 20%		
	Total Phosphorus (TP)	SM 4500-P F						28			0.005		80-120		90-100				≤ 20%		≤ 20%		
	NWTPH-Dx , Diesel	Ecology NWTPH Dx						14			0.16		70-130		70-130				≤ 40%		≤ 40%		
	NWTPH-Dx , Lube Oil	Ecology NWTPH Dx						14			0.4		70-130		70-130				≤ 40%		≤ 40%		
	NWTPH-Dx , Mineral Oil	Ecology NWTPH Dx						14			0.16		70-130		70-130				≤ 40%		≤ 40%		
Sediment	Sediment Dry Weight	EPA 1684																					
	Sediment PSD	ASTM D422																	≤ 25%		≤ 25%		
Sand Filter Media	pH	S-2.20																					
	Cation Exchange Capacity	S-10.10																					
	Maximum Dry Density	ASTM D1557																					
	Saturated Hydraulic Conductivity	ASTM D2434																					
	Particle Size Distribution	ASTM D422																					
	Total Elements (Zn, Cu, Pb, Fe, Al, P, Mg, Ca)	EPA 3050A/6010B																					
	Total Organic Carbon	EPA 415.3																					
	C:N Ratio	EPA 415.3/351.2																					

Data Quality Assurance Spreadsheet																										
Project Nan	Sand Filter		Sample ID:	INF01282020, EFF01282020																						
Sample Dat	1/28/2020		Lab Report #:	WAA0192-01, WAA0192-02																						
Matrix	Parameter	Method	Chain-of-Custody Issues?	Completeness/ Methodology	Holding Times (days)				Cooler Temperature	Blanks (mg/L)		Matrix Spikes/ Surrogate Recovery (%)		Lab Control Samples Recovery (%)		Lab Duplicates RPD (%)		Influent Field Duplicates RPD (%)		Effluent Field Duplicates RPD (%)		Flagged	ACTION
					Date Collected	Date Analyzed	Reported	Goal		Result	Reporting Limit	Reported	Goal	Reported	Goal	RPD	RPD Limit	Reported	Goal	Reported	Goal	OK	
Stormwater	Total Suspended Solids (TSS)	SM 2540D	NO	SM 2540 D	1/28/20 16:45	1/31/20 0:00	2.30	7	4	ND	1	87	80-120	91	90-110	0	20		≤ 25%		≤ 25%		
	Dissolved Copper (Cu)	EPA 200.8 (ICP/MS)	NO	EPA 200.8	1/28/20 16:45	2/3/20 0:00	5.30	180	4	ND	0.001		70-130	105	85-115				≤ 20%		≤ 20%		
	Dissolved Zinc (Zn)	EPA 200.8 (ICP/MS)	NO	EPA 200.8	1/28/20 16:45	2/3/20 0:00	5.30	180	4	ND	0.001		70-130	101	85-115				≤ 20%		≤ 20%		
	Total Zinc (Zn)	EPA 200.8 (ICP/MS)	NO	EPA 200.8	1/28/20 16:45	2/3/20 0:00	5.30	180	4	ND	0.001	99.9	70-130	103	85-115				≤ 20%		≤ 20%		
	Total Copper (Cu)	EPA 200.8 (ICP/MS)	NO	EPA 200.8	1/28/20 16:45	2/3/20 0:00	5.30	180	4	ND	0.001	90.4	70-130	107	85-115				≤ 20%		≤ 20%		
	Hardness as CaCO3	SM 2340B (ICP)	NO	SM 2340 C	1/28/20 16:45	2/3/20 0:00	5.30	180	4	ND	3	214	0-200	100.5	90-110	0.597	200		≤ 20%		≤ 20%		
	Ortho-phosphate (OP)	SM 4500-P G					0.00	2			0.018		80-120		85-115				≤ 20%		≤ 20%		
	Total Phosphorus (TP)	SM 4500-P F					0.00	28			0.005		80-120		90-100				≤ 20%		≤ 20%		
	NWTPH-Dx , Diesel	Ecology NWTPH Dx	NO	EPA 8015D	1/28/20 16:45	2/11/20 0:00	13.30	14	4	ND	0.16	83.3	70-130	93.6	70-130				≤ 40%		≤ 40%		
	NWTPH-Dx , Lube Oil	Ecology NWTPH Dx	NO	EPA 8015D	1/28/20 16:45	2/11/20 0:00	13.30	14	4	ND	0.4		70-130		70-130				≤ 40%		≤ 40%		
	NWTPH-Dx , Mineral Oil	Ecology NWTPH Dx	NO	EPA 8015D	1/28/20 16:45	2/11/20 0:00	13.30	14	4	ND	0.16		70-130		70-130				≤ 40%		≤ 40%		
Sediment	Sediment Dry Weight	EPA 1684																					
	Sediment PSD	ASTM D422																	≤ 25%		≤ 25%		
Sand Filter Media	pH	S-2.20																					
	Cation Exchange Capacity	S-10.10																					
	Maximum Dry Density	ASTM D1557																					
	Saturated Hydraulic Conductivity	ASTM D2434																					
	Particle Size Distribution	ASTM D422																					
	Total Elements (Zn, Cu, Pb, Fe, Al, P, Mg, Ca)	EPA 3050A/6010B																					
	Total Organic Carbon	EPA 415.3																					
	C:N Ratio	EPA 415.3/351.2																					

Data Quality Assurance Spreadsheet
Sample ID
Lab Report #

Data Quality Assurance Spreadsheet																										
Project Nar	Sand Filter		Sample ID:	SF02032020-sediment														Data Quality Assurance Spreadsheet								
Sample Dat	2/3/2020		Lab Report #:	WAB0162-01														Sample ID								
																		Lab Report #								
Matrix	Parameter	Method	Chain-of-Custody Issues?	Completeness / Methodology	Holding Times (days)				Cooler Temperature	Blanks (mg/L)		Matrix Spikes/ Surrogate Recovery (%)		Lab Control Samples Recovery (%)		Lab Duplicates RPD (%)		Influent Field Duplicates RPD (%)		Effluent Field Duplicates RPD (%)		Flagged	ACTION
					Date Collected	Date Analyzed	Reported	Goal		Result	Reporting Limit	Reported	Goal	Reported	Goal	RPD	RPD Limit	Reported	Goal	Reported	Goal	OK	
Stormwater	Total Suspended Solids (TSS)	SM 2540D						7			1		80-120		90-110				≤ 25%		≤ 25%		
	Dissolved Copper (Cu)	EPA 200.8 (ICP/MS)						180			0.001		70-130		85-115				≤ 20%		≤ 20%		
	Dissolved Zinc (Zn)	EPA 200.8 (ICP/MS)						180			0.001		70-130		85-115				≤ 20%		≤ 20%		
	Total Zinc (Zn)	EPA 200.8 (ICP/MS)						180			0.001		70-130		85-115				≤ 20%		≤ 20%		
	Total Copper (Cu)	EPA 200.8 (ICP/MS)						180			0.001		70-130		85-115				≤ 20%		≤ 20%		
	Hardness as CaCO3	SM 2340B (ICP)						180			3		80-120		90-110				≤ 20%		≤ 20%		
	Ortho-phosphate (OP)	SM 4500-P G						2			0.018		80-120		85-115				≤ 20%		≤ 20%		
	Total Phosphorus (TP)	SM 4500-P F						28			0.005		80-120		90-100				≤ 20%		≤ 20%		
	NWTPH-Dx , Diesel	Ecology NWTPH Dx						14			0.16		70-130		70-130				≤ 40%		≤ 40%		
	NWTPH-Dx , Lube Oil	Ecology NWTPH Dx						14			0.4		70-130		70-130				≤ 40%		≤ 40%		
	NWTPH-Dx , Mineral Oil	Ecology NWTPH Dx						14			0.16		70-130		70-130				≤ 40%		≤ 40%		
Sediment	Sediment Dry Weight	EPA 1684	NO	% solids																			
	Sediment PSD	ASTM D422	NO	ASTM D422															≤ 25%		≤ 25%	YES	"*ASTM D422 states to set up approximately 50 grams of soil fo test. This sample was only 16.39 grams after moisture removed."
	NWTPH-Dx , Diesel	Ecology NWTPH Dx	NO	EPA 8015D						ND	22.8	91.45	50-150	94.3	50-150								
	NWTPH-Dx , Lube Oil	Ecology NWTPH Dx	NO	EPA 8015D						ND	91.1												
	NWTPH-Dx , Mineral Oil	Ecology NWTPH Dx	NO	EPA 8015D						ND	22.8												
Sand Filter Media	pH	S-2.20																					
	Cation Exchange Capacity	S-10.10																					
	Maximum Dry Density	ASTM D1557																					
	Saturated Hydraulic Conductivity	ASTM D2434																					
	Particle Size Distribution	ASTM D422																					
	Total Elements (Zn, Cu, Pb, Fe, Al, P, Mg, Ca)	EPA 3050A/6010B																					
	Total Organic Carbon	EPA 415.3																					
	C:N Ratio	EPA 415.3/351.2																					

Data Quality Assurance Spreadsheet																										
Project Name	Sand Filter		Sample ID:		INF03312020, EFF03312020																					
Sample Date:	3/31/2020		Lab Report #:		NA																					
Matrix	Parameter	Method	Chain-of-Custody Issues?	Completeness/ Methodology	Holding Times (days)				Cooler Temperature	Blanks (mg/L)		Matrix Spikes/ Surrogate Recovery (%)		Lab Control Samples Recovery (%)		Lab Duplicates RPD (%)		Influent Field Duplicates RPD (%)		Effluent Field Duplicates RPD (%)		Flagged	ACTION
					Date Collected	Date Analyzed	Reported	Goal		Result	Reporting Limit	Reported	Goal	Reported	Goal	RPD	RPD Limit	Reported	Goal	Reported	Goal	OK	
Stormwater	Total Suspended Solids (TSS)	SM 2540D						7			1		80-120		90-110				≤ 25%		≤ 25%		
	Dissolved Copper (Cu)	EPA 200.8 (ICP/MS)						180			0.001		70-130		85-115				≤ 20%		≤ 20%		
	Dissolved Zinc (Zn)	EPA 200.8 (ICP/MS)						180			0.001		70-130		85-115				≤ 20%		≤ 20%		
	Total Zinc (Zn)	EPA 200.8 (ICP/MS)						180			0.001		70-130		85-115				≤ 20%		≤ 20%		
	Total Copper (Cu)	EPA 200.8 (ICP/MS)						180			0.001		70-130		85-115				≤ 20%		≤ 20%		
	Hardness as CaCO3	SM 2340B (ICP)						180			3		80-120		90-110				≤ 20%		≤ 20%		
	Ortho-phosphate (OP)	SM 4500-P G						2			0.018		80-120		85-115				≤ 20%		≤ 20%		
	Total Phosphorus (TP)	SM 4500-P F						28			0.005		80-120		90-100				≤ 20%		≤ 20%		
	NWTPH-Dx , Diesel	Ecology NWTPH Dx						14			0.16		70-130		70-130				≤ 40%		≤ 40%		
	NWTPH-Dx , Lube Oil	Ecology NWTPH Dx						14			0.4		70-130		70-130				≤ 40%		≤ 40%		
	NWTPH-Dx , Mineral Oil	Ecology NWTPH Dx						14			0.16		70-130		70-130				≤ 40%		≤ 40%		
	PSD	Modified SSC	TAPE 2011 / ASTM D3977 Modified Method C																				"There were no other noted anomalies during this testing"
Sediment	Sediment Dry Weight	EPA 1684																					
	Sediment PSD	ASTM D422																	≤ 25%		≤ 25%		
Sand Filter Media	pH	S-2.20																					
	Cation Exchange Capacity	S-10.10																					
	Maximum Dry Density	ASTM D1557																					
	Saturated Hydraulic Conductivity	ASTM D2434																					
	Particle Size Distribution	ASTM D422																					
	Total Elements (Zn, Cu, Pb, Fe, Al, P, Mg, Ca)	EPA 3050A/6010B																					
	Total Organic Carbon	EPA 415.3																					
	C:N Ratio	EPA 415.3/351.2																					

Data Quality Assurance Spreadsheet

Data Quality Assurance Spreadsheet

Project Name	Sand Filter	**Sample ID:**	INF05022020, EFF05022020
Sample Date:	5/2/2020	**Lab Report #:**	WAE0037-01, WAE0037-02

Sample ID

Lab Report #

Matrix	Parameter	Method	Chain-of-Custody Issues?	Completeness/ Methodology	Holding Times (days)				Cooler Temperature	Blanks (mg/L)		Matrix Spikes/ Surrogate Recovery (%)		Lab Control Samples Recovery (%)		Lab Duplicates RPD (%)		Influent Field Duplicates RPD (%)		Effluent Field Duplicates RPD (%)		Flagged	ACTION
					Date Collected	Date Analyzed	Reported	Goal		Result	Reporting Limit	Reported	Goal	Reported	Goal	RPD	RPD Limit	Reported	Goal	Reported	Goal	OK	
Stormwater	Total Suspended Solids (TSS)	SM 2540D	NO	SM 2540 D	5/3/20 13:30	5/8/20 11:00	4.90	7	4.6	ND	1	96	80-120	103	90-110	0	20		≤ 25%		≤ 25%		
	Dissolved Copper (Cu)	EPA 200.8 (ICP/MS)	NO	EPA 200.8	5/3/20 13:30	5/6/20 13:41	3.01	180	4.6	ND	0.001	97.7	70-130	99.1	85-115				≤ 20%		≤ 20%		
	Dissolved Zinc (Zn)	EPA 200.8 (ICP/MS)	NO	EPA 200.8	5/3/20 13:30	5/6/20 13:41	3.01	180	4.6	ND	0.001	99.6	70-130	99.9	85-115				≤ 20%		≤ 20%		
	Total Zinc (Zn)	EPA 200.8 (ICP/MS)	NO	EPA 200.8	5/3/20 13:30	5/6/20 14:21	3.04	180	4.6	ND	0.001	102.25	70-130	101	85-115				≤ 20%		≤ 20%		
	Total Copper (Cu)	EPA 200.8 (ICP/MS)	NO	EPA 200.8	5/3/20 13:30	5/6/20 14:21	3.04	180	4.6	ND	0.001	99.725	70-130	101	85-115				≤ 20%		≤ 20%		
	Hardness as CaCO3	SM 2340B (ICP)	NO	SM 2340 C	5/3/20 13:30	5/12/20 10:15	8.86	180	4.6	ND	3	100.5	80-120	100.5	90-110	2.53	20		≤ 20%		≤ 20%		
	Ortho-phosphate (OP)	SM 4500-P G					0.00	2			0.018		80-120		85-115				≤ 20%		≤ 20%		
	Total Phosphorus (TP)	SM 4500-P F					0.00	28			0.005		80-120		90-100				≤ 20%		≤ 20%		
	NWTPH-Dx , Diesel	Ecology NWTPH Dx	NO	NWTPH-Dx	5/3/20 13:30	5/16/20 0:51	12.47	14	4.6	ND	0.16		70-130	78.1	70-130	ND	20		≤ 40%		≤ 40%		
	NWTPH-Dx , Lube Oil	Ecology NWTPH Dx	NO	NWTPH-Dx	5/3/20 13:30	5/16/20 0:51	12.47	14	4.6	ND	0.4		70-130		70-130	ND	20		≤ 40%		≤ 40%		
	NWTPH-Dx , Mineral Oil	Ecology NWTPH Dx	NO	NWTPH-Dx	5/3/20 13:30	5/16/20 0:51	12.47	14	4.6	ND	0.16		70-130		70-130	ND	20		≤ 40%		≤ 40%		
	PSD	Modified SSC		TAPE 2011/ ASTM D3977 Method C																			"There were no noted anomalies in this project"
Sediment	Sediment Dry Weight	EPA 1684																					
	Sediment PSD	ASTM D422																	≤ 25%		≤ 25%		
Sand Filter Media	pH	S-2.20																					
	Cation Exchange Capacity	S-10.10																					
	Maximum Dry Density	ASTM D1557																					
	Saturated Hydraulic Conductivity	ASTM D2434																					
	Particle Size Distribution	ASTM D422																					
	Total Elements (Zn, Cu, Pb, Fe, Al, P, Mg, Ca)	EPA 3050A/6010B																					
	Total Organic Carbon	EPA 415.3																					
	C:N Ratio	EPA 415.3/351.2																					

Data Quality Assurance Spreadsheet																									
Project Name	Sand Filter		Sample ID:	INF05172020, EFF05172020, INF05172020-DUP, EFF05172020-DUP																				
Sample Date:	5/17/2020		Lab Report #:	WAE0525-01, WAE0525-02, WAE0525-03, WAE0525-04																				
Matrix	Parameter	Method	Chain-of-Custody Issues?	Completeness/ Methodology	Holding Times (days)				Cooler Temperature	Blanks (mg/L)		Matrix Spikes/ Surrogate Recovery (%)		Lab Control Samples Recovery (%)		Lab Duplicates RPD (%)		Influent Field Duplicates RPD (%)		Effluent Field Duplicates RPD (%)		Flagged	ACTION
					Date Collected	Date Analyzed	Reported	Goal		Result	Reporting Limit	Reported	Goal	Reported	Goal	RPD	RPD Limit	Reported	Goal	Reported	Goal	OK	
Stormwater	Total Suspended Solids (TSS)	SM 2540D	NO	SM 2540 D	5/17/20 19:30	5/22/20 10:00	4.60	7	10.1	ND	1	95	80-120	97.75	90-110	0	20	59%	≤ 25%	38%	≤ 25%	YES	Field duplicate RPD exceeded. Received additional instruction regarding proper procedures for field duplicate collection from lab following sampling event.
	Dissolved Copper (Cu)	EPA 200.8 (ICP/MS)	NO	EPA 200.8	5/17/20 19:30	5/27/20 15:18	9.82	180	10.1	ND	0.001	97.95	70-130	96.2	85-115				≤ 20%		≤ 20%		
	Dissolved Zinc (Zn)	EPA 200.8 (ICP/MS)	NO	EPA 200.8	5/17/20 19:30	5/27/20 15:18	9.82	180	10.1	ND	0.001	99.6	70-130	95.8	85-115				≤ 20%		≤ 20%		
	Total Zinc (Zn)	EPA 200.8 (ICP/MS)	NO	EPA 200.8	5/17/20 19:30	5/28/20 14:37	10.80	180	10.1	ND	0.001	98.975	70-130	97.2	85-115				≤ 20%		≤ 20%		
	Total Copper (Cu)	EPA 200.8 (ICP/MS)	NO	EPA 200.8	5/17/20 19:30	5/28/20 14:37	10.80	180	10.1	ND	0.001	97.625	70-130	94.9	85-115				≤ 20%		≤ 20%		
	Hardness as CaCO3	SM 2340B (ICP)	NO	SM 2340 C	5/17/20 19:30	5/22/20 12:00	4.69	180	10.1	ND	3	101	80-120	102	90-110	0	20		≤ 20%		≤ 20%		
	Ortho-phosphate (OP)	SM 4500-P G	NO	SM 4500-P G	5/17/20 19:30	5/19/20 14:50	1.81	2	10.1		0.018		80-120		85-115				≤ 20%		≤ 20%		
	Total Phosphorus (TP)	SM 4500-P F	NO	SM 4500-P H	5/17/20 19:30	6/4/20 15:33	17.84	28	10.1	ND	0.005	112	80-120	107	90-100				≤ 20%		≤ 20%		
	NWTPH-Dx , Diesel	Ecology NWTPH Dx	NO	NWTPH-Dx	5/17/20 19:30	5/29/20 22:44	12.13	14	10.1	ND	0.16		70-130	86.1	70-130	ND	20		≤ 40%		≤ 40%		
	NWTPH-Dx , Lube Oil	Ecology NWTPH Dx	NO	NWTPH-Dx	5/17/20 19:30	5/29/20 22:44	12.13	14	10.1	ND	0.4		70-130		70-130	ND	20		≤ 40%		≤ 40%		
	NWTPH-Dx , Mineral Oil	Ecology NWTPH Dx	NO	NWTPH-Dx	5/17/20 19:30	5/29/20 22:44	12.13	14	10.1	ND	0.16		70-130		70-130	ND	20		≤ 40%		≤ 40%		
	PSD	Modified SSC	NO																				"No noted anomalies in this project."
Sediment	Sediment Dry Weight	EPA 1684																					
	Sediment PSD	ASTM D422																	≤ 25%		≤ 25%		
Sand Filter Media	pH	S-2.20																					
	Cation Exchange Capacity	S-10.10																					
	Maximum Dry Density	ASTM D1557																					
	Saturated Hydraulic Conductivity	ASTM D2434																					
	Particle Size Distribution	ASTM D422																					
	Total Elements (Zn, Cu, Pb, Fe, Al, P, Mg, Ca)	EPA 3050A/6010B																					
	Total Organic Carbon	EPA 415.3																					
	C:N Ratio	EPA 415.3/351.2																					

Data Quality Assurance Spreadsheet																									
Project Name	Sand Filter		Sample ID:	INF05202020,EFF05202020										Data Quality Assurance Spreadsheet											
Sample Date:	5/20/2020		Lab Report #:	WAE0702-01,WAE0702-02										Sample ID											
														Lab Report #											
Matrix	Parameter	Method	Chain-of-Custody Issues?	Completeness/ Methodology	Holding Times (days)				Cooler Temperature	Blanks (mg/L)		Matrix Spikes/ Surrogate Recovery (%)		Lab Control Samples Recovery (%)		Lab Duplicates RPD (%)		Influent Field Duplicates RPD (%)		Effluent Field Duplicates RPD (%)		Flagged	ACTION
					Date Collected	Date Analyzed	Reported	Goal		Result	Reporting Limit	Reported	Goal	Reported	Goal	RPD	RPD Limit	Reported	Goal	Reported	Goal	OK	
Stormwater	Total Suspended Solids (TSS)	SM 2540D	NO	SM 2540 D	5/21/20 8:30	5/26/20 14:00	5.23	7	7.6	ND	1	97	80-120	98	90-110	8.7	20		≤ 25%		≤ 25%		
	Dissolved Copper (Cu)	EPA 200.8 (ICP/MS)	NO	EPA 200.8	5/21/20 8:30	5/28/20 16:25	7.33	180	7.6	ND	0.001	91.2	70-130	96.3	85-115				≤ 20%		≤ 20%		
	Dissolved Zinc (Zn)	EPA 200.8 (ICP/MS)	NO	EPA 200.8	5/21/20 8:30	5/28/20 16:25	7.33	180	7.6	ND	0.001	95.55	70-130	97	85-115				≤ 20%		≤ 20%		
	Total Zinc (Zn)	EPA 200.8 (ICP/MS)	NO	EPA 200.8	5/21/20 8:30	5/29/20 15:45	8.30	180	7.6	ND	0.001	77.175	70-130	98.9	85-115				≤ 20%		≤ 20%	YES	Matrix spike recovery was low; the associated blank spike recovery was acceptable. Potential matrix effect.
	Total Copper (Cu)	EPA 200.8 (ICP/MS)	NO	EPA 200.8	5/21/20 8:30	5/29/20 15:45	8.30	180	7.6	ND	0.001	92.75	70-130	99.3	85-115				≤ 20%		≤ 20%		
	Hardness as CaCO3	SM 2340B (ICP)	NO	SM 2340 C	5/21/20 8:30	5/22/20 12:00	1.15	180	7.6	ND	3	101	80-120	102	90-110	0	20		≤ 20%		≤ 20%		
	Ortho-phosphate (OP)	SM 4500-P G	NO	SM 4500-P G	5/21/20 8:30	5/21/20 16:34	0.34	2	7.6	ND	0.018	107.5	80-120	94.8	85-115				≤ 20%		≤ 20%		
	Total Phosphorus (TP)	SM 4500-P F	NO	SM 4500-P H	5/21/20 8:30	6/10/20 10:59	20.10	28	7.6	ND	0.005	103.25	80-120	98.3	90-100				≤ 20%		≤ 20%		
	NWTPH-Dx , Diesel	Ecology NWTPH Dx	NO	NWTPH-Dx	5/21/20 8:30	5/30/20 0:36	8.67	14	7.6	ND	0.16		70-130	86.1	70-130	ND	20		≤ 40%		≤ 40%		
	NWTPH-Dx , Lube Oil	Ecology NWTPH Dx	NO	NWTPH-Dx	5/21/20 8:30	5/30/20 0:36	8.67	14	7.6	ND	0.4		70-130		70-130	ND	20		≤ 40%		≤ 40%		
	NWTPH-Dx , Mineral Oil	Ecology NWTPH Dx	NO	NWTPH-Dx	5/21/20 8:30	5/30/20 0:36	8.67	14	7.6	ND	0.16		70-130		70-130	ND	20		≤ 40%		≤ 40%		
Sediment	Sediment Dry Weight	EPA 1684																					
	Sediment PSD	ASTM D422																	≤ 25%		≤ 25%		
Sand Filter Media	pH	S-2.20																					
	Cation Exchange Capacity	S-10.10																					
	Maximum Dry Density	ASTM D1557																					
	Saturated Hydraulic Conductivity	ASTM D2434																					
	Particle Size Distribution	ASTM D422																					
	Total Elements (Zn, Cu, Pb, Fe, Al, P, Mg, Ca)	EPA 3050A/6010B																					
	Total Organic Carbon	EPA 415.3																					
	C:N Ratio	EPA 415.3/351.2																					

Data Quality Assurance Spreadsheet																											
Project Name	Sand Filter		Sample ID:	INF05302020, EFF05302020													Data Quality Assurance Spreadsheet									
Sample Date:	5/31/2020		Lab Report #:	WAF0003-01, WAF0003-02													Sample ID									
																	Lab Report #									
Matrix	Parameter	Method	Chain-of-Custody Issues?	Completeness/ Methodology	Holding Times (days)				Cooler Temperature	Blanks (mg/L)		Matrix Spikes/ Surrogate Recovery (%)		Lab Control Samples Recovery (%)		Lab Duplicates RPD (%)		Influent Field Duplicates RPD (%)		Effluent Field Duplicates RPD (%)		Flagged	ACTION
					Date Collected	Date Analyzed	Reported	Goal		Result	Reporting Limit	Reported	Goal	Reported	Goal	RPD	RPD Limit	Reported	Goal	Reported	Goal	OK	
Stormwater	Total Suspended Solids (TSS)	SM 2540D	NO	SM 2540D	5/31/20 15:15	6/5/20 11:00	4.82	7	5.7	ND	1	98	80-120	99.75	90-110	9.7	20		≤ 25%		≤ 25%		
	Dissolved Copper (Cu)	EPA 200.8 (ICP/MS)	NO	EPA 200.8	5/31/20 15:15	6/24/20 13:59	23.95	180	5.7	ND	0.001	95.95	70-130	96	85-115				≤ 20%		≤ 20%		
	Dissolved Zinc (Zn)	EPA 200.8 (ICP/MS)	NO	EPA 200.8	5/31/20 15:15	6/24/20 13:59	23.95	180	5.7	ND	0.001	97.5	70-130	97.8	85-115				≤ 20%		≤ 20%		
	Total Zinc (Zn)	EPA 200.8 (ICP/MS)	NO	EPA 200.8	5/31/20 15:15	6/19/20 14:49	18.98	180	5.7	ND	0.001	78.075	70-130	98.6	85-115				≤ 20%		≤ 20%		
	Total Copper (Cu)	EPA 200.8 (ICP/MS)	NO	EPA 200.8	5/31/20 15:15	6/19/20 14:49	18.98	180	5.7	ND	0.001	80.45	70-130	96.2	85-115				≤ 20%		≤ 20%		
	Hardness as CaCO3	SM 2340B (ICP)	NO	SM 2340 C	5/31/20 15:15	6/11/20 9:45	10.77	180	5.7	ND	3	101	80-120	98.75	90-110	0.388	20		≤ 20%		≤ 20%		
	Ortho-phosphate (OP)	SM 4500-P G	NO	SM 4500-P G	5/31/20 15:15	6/2/20 11:48	1.86	2	5.7	ND	0.018		80-120	101.5	85-115				≤ 20%		≤ 20%		
	Total Phosphorus (TP)	SM 4500-P F	NO	SM 4500-P H	5/31/20 15:15	6/10/20 11:20	9.84	28	5.7	ND	0.005	103.25	80-120	98.3	90-100				≤ 20%		≤ 20%		
	NWTPH-Dx , Diesel	Ecology NWTPH Dx	NO	NWTPH-Dx	5/31/20 15:15	6/12/20 20:33	12.22	14	5.7	ND	0.16	83	70-130	103	70-130	ND	20		≤ 40%		≤ 40%		
	NWTPH-Dx , Lube Oil	Ecology NWTPH Dx	NO	NWTPH-Dx	5/31/20 15:15	6/12/20 20:33	12.22	14	5.7	ND	0.4		70-130		70-130				≤ 40%		≤ 40%		
	NWTPH-Dx , Mineral Oil	Ecology NWTPH Dx	NO	NWTPH-Dx	5/31/20 15:15	6/12/20 20:33	12.22	14	5.7	ND	0.16		70-130		70-130				≤ 40%		≤ 40%		
Sediment	Sediment Dry Weight	EPA 1684																					
	Sediment PSD	ASTM D422																	≤ 25%		≤ 25%		
Sand Filter Media	pH	S-2.20																					
	Cation Exchange Capacity	S-10.10																					
	Maximum Dry Density	ASTM D1557																					
	Saturated Hydraulic Conductivity	ASTM D2434																					
	Particle Size Distribution	ASTM D422																					
	Total Elements (Zn, Cu, Pb, Fe, Al, P, Mg, Ca)	EPA 3050A/6010B																					
	Total Organic Carbon	EPA 415.3																					
	C:N Ratio	EPA 415.3/351.2																					

Data Quality Assurance Spreadsheet																								
Project Name	**Sand Filter**		**Sample ID:**	**INF06142020, EFF06142020**																				
Sample Date:	**6/14/2020**		**Lab Report #:**	**WAF0586-01, WAF0586-02**																				
Matrix	**Parameter**	**Method**	**Chain-of-Custody Issues?**	**Completeness/ Methodology**	**Holding Times (days)**				**Cooler Temperature**	**Blanks (mg/L)**		**Matrix Spikes/ Surrogate Recovery (%)**		**Lab Control Samples Recovery (%)**		**Lab Duplicates RPD (%)**		**Influent Field Duplicates RPD (%)**		**Effluent Field Duplicates RPD (%)**		**Flagged**	**ACTION**
					Date Collected	**Date Analyzed**	**Reported**	**Goal**		**Result**	**Reporting Limit**	**Reported**	**Goal**	**Reported**	**Goal**	**RPD**	**RPD Limit**	**Reported**	**Goal**	**Reported**	**Goal**	**OK**	
Stormwater	Total Suspended Solids (TSS)	SM 2540D	NO	SM 2540 D	6/15/20 7:00	6/19/20 8:45	4.07	7	-0.2	ND	1	97	80-120	97	90-110	0	20		≤ 25%		≤ 25%		
	Dissolved Copper (Cu)	EPA 200.8 (ICP/MS)	NO	EPA 200.8	6/15/20 7:00	6/30/20 14:08	15.30	180	-0.2	ND	0.001	92.9	70-130	90.7	85-115				≤ 20%		≤ 20%		
	Dissolved Zinc (Zn)	EPA 200.8 (ICP/MS)	NO	EPA 200.8	6/15/20 7:00	6/30/20 14:08	15.30	180	-0.2	0.00156	0.001	92.85	70-130	92.6	85-115				≤ 20%		≤ 20%		No flag associated with detected amount on blank
	Total Zinc (Zn)	EPA 200.8 (ICP/MS)	NO	EPA 200.8	6/15/20 7:00	6/26/20 16:30	11.40	180	-0.2	ND	0.001	97.3	70-130	93.6	85-115				≤ 20%		≤ 20%		
	Total Copper (Cu)	EPA 200.8 (ICP/MS)	NO	EPA 200.8	6/15/20 7:00	6/26/20 16:30	11.40	180	-0.2	ND	0.001	91.85	70-130	85.8	85-115				≤ 20%		≤ 20%		
	Hardness as CaCO3	SM 2340B (ICP)	NO	SM 2340 C	6/15/20 7:00	6/23/20 10:00	8.13	180	-0.2	ND	3	98.5	80-120	99	90-110	3.51	20		≤ 20%		≤ 20%		
	Ortho-phosphate (OP)	SM 4500-P G																	≤ 20%		≤ 20%		
	Total Phosphorus (TP)	SM 4500-P F																	≤ 20%		≤ 20%		
	NWTPH-Dx , Diesel	Ecology NWTPH Dx																	≤ 40%		≤ 40%		
	NWTPH-Dx , Lube Oil	Ecology NWTPH Dx																	≤ 40%		≤ 40%		
	NWTPH-Dx , Mineral Oil	Ecology NWTPH Dx																	≤ 40%		≤ 40%		
Sediment	Sediment Dry Weight	EPA 1684																					
	Sediment PSD	ASTM D422																	≤ 25%		≤ 25%		
Sand Filter Media	pH	S-2.20																					
	Cation Exchange Capacity	S-10.10																					
	Maximum Dry Density	ASTM D1557																					
	Saturated Hydraulic Conductivity	ASTM D2434																					
	Particle Size Distribution	ASTM D422																					
	Total Elements (Zn, Cu, Pb, Fe, Al, P, Mg, Ca)	EPA 3050A/6010B																					
	Total Organic Carbon	EPA 415.3																					
	C:N Ratio	EPA 415.3/351.2																					

Data Quality Assurance Spreadsheet																								
Project Nan	Sand Filter		Sample ID:	INF06152020, EFF06152020																				
Sample Dat	6/15/2020		Lab Report #:	WAF0653-01, WAF0653-02																				
Matrix	Parameter	Method	Chain-of-Custody Issues?	Completeness/ Methodology	Holding Times (days)				Cooler Temperature	Blanks (mg/L)		Matrix Spikes/ Surrogate Recovery (%)		Lab Control Samples Recovery (%)		Lab Duplicates RPD (%)		Influent Field Duplicates RPD (%)		Effluent Field Duplicates RPD (%)		Flagged	ACTION
					Date Collected	Date Analyzed	Reported	Goal		Result	Reporting Limit	Reported	Goal	Reported	Goal	RPD	RPD Limit	Reported	Goal	Reported	Goal	OK	
Stormwater	Total Suspended Solids (TSS)	SM 2540D	NO	SM 2540 D	6/16/20 13:00	6/19/20 8:45	2.82	7	4.2	ND	1	97	80-120	97	90-110	0	20		≤ 25%		≤ 25%		
	Dissolved Copper (Cu)	EPA 200.8 (ICP/MS)	NO	EPA 200.8	6/16/20 13:00	6/30/20 14:30	14.06	180	4.2	ND	0.001	92.9	70-130	90.7	85-115				≤ 20%		≤ 20%		
	Dissolved Zinc (Zn)	EPA 200.8 (ICP/MS)	NO	EPA 200.8	6/16/20 13:00	6/30/20 14:30	14.06	180	4.2	0.00156	0.001	92.85	70-130	92.6	85-115				≤ 20%		≤ 20%		No flag assigned to detected amount in blank
	Total Zinc (Zn)	EPA 200.8 (ICP/MS)	NO	EPA 200.8	6/16/20 13:00	6/18/20 12:32	1.98	180	4.2	ND	0.001	91.3	70-130	98.6	85-115				≤ 20%		≤ 20%		
	Total Copper (Cu)	EPA 200.8 (ICP/MS)	NO	EPA 200.8	6/16/20 13:00	6/18/20 12:32	1.98	180	4.2	ND	0.001	89.15	70-130		85-115				≤ 20%		≤ 20%		
	Hardness as CaCO3	SM 2340B (ICP)	NO	SM 2340 C	6/16/20 13:00	6/23/20 10:00	6.88	180	4.2	ND	3	98.5	80-120	99	90-110	3.51	20		≤ 20%		≤ 20%		
	Ortho-phosphate (OP)	SM 4500-P G																	≤ 20%		≤ 20%		
	Total Phosphorus (TP)	SM 4500-P F																	≤ 20%		≤ 20%		
	NWTPH-Dx , Diesel	Ecology NWTPH Dx																	≤ 40%		≤ 40%		
	NWTPH-Dx , Lube Oil	Ecology NWTPH Dx																	≤ 40%		≤ 40%		
	NWTPH-Dx , Mineral Oil	Ecology NWTPH Dx																	≤ 40%		≤ 40%		
Sedimen	Sediment Dry Weight	EPA 1684																					
	Sediment PSD	ASTM D422																	≤ 25%		≤ 25%		
Sand Filter Media	pH	S-2.20																					
	Cation Exchange Capacity	S-10.10																					
	Maximum Dry Density	ASTM D1557																					
	Saturated Hydraulic Conductivity	ASTM D2434																					
	Particle Size Distribution	ASTM D422																					
	Total Elements (Zn, Cu, Pb, Fe, Al, P, Mg, Ca)	EPA 3050A/6010B																					
	Total Organic Carbon	EPA 415.3																					
	C:N Ratio	EPA 415.3/351.2																					

Data Quality Assurance Spreadsheet

Project Name	**Sand Filter**	**Sample ID:**	**INF09232020,EFF09232020**
Sample Date:	**9/23/2020**	**Lab Report #:**	**WAI0963-01,WAI0963-02**

Matrix	Parameter	Method	Chain-of-Custody Issues?	Completeness/ Methodology	Holding Times (days)				Cooler Temperature	Blanks (mg/L)		Matrix Spikes/ Surrogate Recovery (%)		Lab Control Samples Recovery (%)		Lab Duplicates RPD (%)		Influent Field Duplicates RPD (%)		Effluent Field Duplicates RPD (%)		Flagged	ACTION
					Date Collected	Date Analyzed	Reported	Goal		Result	Reporting Limit	Reported	Goal	Reported	Goal	RPD	RPD Limit	Reported	Goal	Reported	Goal	OK	
Stormwater	Total Suspended Solids (TSS)	SM 2540D	NO	SM 2540 D	9/24/20 11:00	9/28/20 8:20	3.89	7	9.2	ND	1	100.5	80-120	96	90-110	ND	20		≤ 25%		≤ 25%		
	Dissolved Copper (Cu)	EPA 200.8 (ICP/MS)	NO	EPA 200.8	9/24/20 11:00	9/30/20 13:28	6.10	180	9.2	ND	0.001		70-130	91.2	85-115				≤ 20%		≤ 20%		
	Dissolved Zinc (Zn)	EPA 200.8 (ICP/MS)	NO	EPA 200.8	9/24/20 11:00	9/30/20 13:28	6.10	180	9.2	ND	0.001		70-130	93.1	85-115				≤ 20%		≤ 20%		
	Total Zinc (Zn)	EPA 200.8 (ICP/MS)	NO	EPA 200.8	9/24/20 11:00	9/30/20 13:43	6.11	180	9.2	ND	0.001	93.45	70-130	97.9	85-115				≤ 20%		≤ 20%		
	Total Copper (Cu)	EPA 200.8 (ICP/MS)	NO	EPA 200.8	9/24/20 11:00	9/30/20 13:43	6.11	180	9.2	ND	0.001	85.5	70-130	94.5	85-115				≤ 20%		≤ 20%		
	Hardness as CaCO3	SM 2340B (ICP)	NO	SM 2340 C	9/24/20 11:00	10/6/20 7:30	11.85	180	9.2	ND	3	95	80-120	99.95	90-110	2.38	20		≤ 20%		≤ 20%		
	Ortho-phosphate (OP)	SM 4500-P G	NO	SM 4500-P G	9/24/20 11:00	9/25/20 9:11	0.92	2	9.2	ND	0.018	86.6	80-120	95.4	85-115				≤ 20%		≤ 20%		
	Total Phosphorus (TP)	SM 4500-P F	NO	SM 4500-P H	9/24/20 11:00	9/30/20 16:10	6.22	28	9.2	ND	0.005	106.5	80-120	102.5	90-100				≤ 20%		≤ 20%		
	NWTPH-Dx , Diesel	Ecology NWTPH Dx	NO	NWTPH-Dx	9/24/20 11:00	10/8/20 22:10	14.47	14	9.2	ND	0.16	113	70-130	92.2	70-130	ND	20		≤ 40%		≤ 40%		No flag for exceeding holding time; assume analysis started before end of holding time
	NWTPH-Dx , Lube Oil	Ecology NWTPH Dx	NO	NWTPH-Dx	9/24/20 11:00	10/8/20 22:10	14.47	14	9.2	ND	0.4		70-130		70-130				≤ 40%		≤ 40%		No flag for exceeding holding time; assume analysis started before end of holding time
	NWTPH-Dx , Mineral Oil	Ecology NWTPH Dx	NO	NWTPH-Dx	9/24/20 11:00	10/8/20 22:10	14.47	14	9.2	ND	0.16		70-130		70-130				≤ 40%		≤ 40%		No flag for exceeding holding time; assume analysis started before end of holding time
	PSD	Modified SSC	NO	TAPE 2011/modified ASTM D3977 Method C	9/24/20 11:00	9/30/20 12:00	6.04	7															No noted anomalies during the testing.
Sediment	Sediment Dry Weight	EPA 1684																					
	Sediment PSD	ASTM D422																	≤ 25%		≤ 25%		
Sand Filter Media	pH	S-2.20																					
	Cation Exchange Capacity	S-10.10																					
	Maximum Dry Density	ASTM D1557																					
	Saturated Hydraulic Conductivity	ASTM D2434																					
	Particle Size Distribution	ASTM D422																					
	Total Elements (Zn, Cu, Pb, Fe, Al, P, Mg, Ca)	EPA 3050A/6010B																					
	Total Organic Carbon	EPA 415.3																					
	C:N Ratio	EPA 415.3/351.2																					

Data Quality Assurance Spreadsheet																								
Project Name	**Sand Filter**		**Sample ID:**	**INF092520, EFF092520**																				
Sample Date:	**9/25/2020**		**Lab Report #:**	**WAI1016-01, WAI1016-02**																				
Matrix	**Parameter**	**Method**	**Chain-of-Custody Issues?**	**Completeness/ Methodology**	**Holding Times (days)**				**Cooler Temperature**	**Blanks (mg/L)**		**Matrix Spikes/ Surrogate Recovery (%)**		**Lab Control Samples Recovery (%)**		**Lab Duplicates RPD (%)**		**Influent Field Duplicates RPD (%)**		**Effluent Field Duplicates RPD (%)**		**Flagged**	**ACTION**
					Date Collected	**Date Analyzed**	**Reported**	**Goal**		**Result**	**Reporting Limit**	**Reported**	**Goal**	**Reported**	**Goal**	**RPD**	**RPD Limit**	**Reported**	**Goal**	**Reported**	**Goal**	**OK**	
Stormwater	Total Suspended Solids (TSS)	SM 2540D	NO	SM 2540 D	9/26/20 8:30	10/2/20 14:25	6.25	7	-0.4	ND	1	96	80-120	97.5	90-110	0	20		≤ 25%		≤ 25%		
	Dissolved Copper (Cu)	EPA 200.8 (ICP/MS)	NO	EPA 200.8	9/26/20 8:30	10/8/20 11:25	12.12	180	-0.4	ND	0.001	92.9	70-130	96.8	85-115				≤ 20%		≤ 20%		
	Dissolved Zinc (Zn)	EPA 200.8 (ICP/MS)	NO	EPA 200.8	9/26/20 8:30	1/8/20 11:25	-261.88	180	-0.4	ND	0.001	77.35	70-130	89.9	85-115				≤ 20%		≤ 20%		
	Total Zinc (Zn)	EPA 200.8 (ICP/MS)	NO	EPA 200.8	9/26/20 8:30	10/8/20 12:18	12.16	180	-0.4	ND	0.001	86.65	70-130	88	85-115				≤ 20%		≤ 20%		
	Total Copper (Cu)	EPA 200.8 (ICP/MS)	NO	EPA 200.8	9/26/20 8:30	10/8/20 12:18	12.16	180	-0.4	ND	0.001	92.45	70-130	94.8	85-115				≤ 20%		≤ 20%		
	Hardness as CaCO3	SM 2340B (ICP)	NO	SM 2340 C	9/26/20 8:30	10/6/20 7:30	9.96	180	-0.4	ND	3	95	80-120	99.95	90-110	2.38	20		≤ 20%		≤ 20%		
	Ortho-phosphate (OP)	SM 4500-P G	NO					2	-0.4		0.018		80-120		85-115				≤ 20%		≤ 20%		
	Total Phosphorus (TP)	SM 4500-P F	NO					28	-0.4		0.005		80-120		90-100				≤ 20%		≤ 20%		
	NWTPH-Dx , Diesel	Ecology NWTPH Dx	NO	NWTPH-Dx	9/26/20 8:30	10/9/20 0:02	12.65	14	-0.4	ND	0.16	113	70-130	92.2	70-130	ND	20		≤ 40%		≤ 40%		
	NWTPH-Dx , Lube Oil	Ecology NWTPH Dx	NO	NWTPH-Dx	9/26/20 8:30	10/9/20 0:02	12.65	14	-0.4	ND	0.4		70-130		70-130				≤ 40%		≤ 40%		
	NWTPH-Dx , Mineral Oil	Ecology NWTPH Dx	NO	NWTPH-Dx	9/26/20 8:30	10/9/20 0:02	12.65	14	-0.4	ND	0.16		70-130		70-130				≤ 40%		≤ 40%		
Sediment	Sediment Dry Weight	EPA 1684																					
	Sediment PSD	ASTM D422																	≤ 25%		≤ 25%		
Sand Filter Media	pH	S-2.20																					
	Cation Exchange Capacity	S-10.10																					
	Maximum Dry Density	ASTM D1557																					
	Saturated Hydraulic Conductivity	ASTM D2434																					
	Particle Size Distribution	ASTM D422																					
	Total Elements (Zn, Cu, Pb, Fe, Al, P, Mg, Ca)	EPA 3050A/6010B																					
	Total Organic Carbon	EPA 415.3																					
	C:N Ratio	EPA 415.3/351.2																					

Data Quality Assurance Spreadsheet

Project Name	**Sand Filter**	**Sample ID:**	**INF1010020, EFF1010020**
Sample Date:	**10/10/2020**	**Lab Report #:**	**WAJ0379-01, WAJ0379-02**

Matrix	Parameter	Method	Chain-of-Custody Issues?	Completeness/ Methodology	Holding Times (days)				Cooler Temperature	Blanks (mg/L)		Matrix Spikes/ Surrogate Recovery (%)		Lab Control Samples Recovery (%)		Lab Duplicates RPD (%)		Influent Field Duplicates RPD (%)		Effluent Field Duplicates RPD (%)		Flagged	ACTION
					Date Collected	Date Analyzed	Reported	Goal		Result	Reporting Limit	Reported	Goal	Reported	Goal	RPD	RPD Limit	Reported	Goal	Reported	Goal	OK	
Stormwater	Total Suspended Solids (TSS)	SM 2540D	NO	SM 2540 D	10/10/20 17:30	10/16/20 13:28	5.83	7	6.7 / 6.2	ND	1	87	80-120	95.5	90-110	2.06	20		≤ 25%		≤ 25%		
	Dissolved Copper (Cu)	EPA 200.8 (ICP/MS)	NO	EPA 200.8	10/10/20 17:30	10/21/20 15:32	10.92	180	6.7 / 6.2	ND	0.001	100.5	70-130	97.8	85-115				≤ 20%		≤ 20%		
	Dissolved Zinc (Zn)	EPA 200.8 (ICP/MS)	NO	EPA 200.8	10/10/20 17:30	10/22/20 15:17	11.91	180	6.7 / 6.2	ND	0.001	96.3	70-130	96.2	85-115				≤ 20%		≤ 20%		
	Total Zinc (Zn)	EPA 200.8 (ICP/MS)	NO	EPA 200.8	10/10/20 17:30	10/22/20 16:16	11.95	180	6.7 / 6.2	ND	0.001	97.45	70-130	113	85-115				≤ 20%		≤ 20%		
	Total Copper (Cu)	EPA 200.8 (ICP/MS)	NO	EPA 200.8	10/10/20 17:30	10/22/20 16:16	11.95	180	6.7 / 6.2	ND	0.001	102.5	70-130	100	85-115				≤ 20%		≤ 20%		
	Hardness as CaCO3	SM 2340B (ICP)	NO	SM 2340 C	10/10/20 17:30	10/15/20 13:00	4.81	180	6.7 / 6.2	ND	3	94.05	80-120	100.4	90-110	0	20		≤ 20%		≤ 20%		
	Ortho-phosphate (OP)	SM 4500-P G	NO	SM 4500-P G	10/10/20 17:30	10/12/20 17:48	2.01	2	6.7 / 6.2	ND	0.018	92.1	80-120	86.8	85-115				≤ 20%		≤ 20%	YES	Sample received past holding time. Reject orthophosphate results.
	Total Phosphorus (TP)	SM 4500-P F	NO	SM 4500-P H	10/10/20 17:30	10/16/20 15:10	5.90	28	6.7 / 6.2	ND	0.005	113.5	80-120	96	90-100				≤ 20%		≤ 20%		
	NWTPH-Dx , Diesel	Ecology NWTPH Dx	NO	NWTPH-Dx	10/10/20 17:30	10/21/20 22:52	11.22	14	6.7 / 6.2	ND	0.16	83.9	70-130	97.7	70-130				≤ 40%		≤ 40%		
	NWTPH-Dx , Lube Oil	Ecology NWTPH Dx	NO	NWTPH-Dx	10/10/20 17:30	10/21/20 22:52	11.22	14	6.7 / 6.2	ND	0.4		70-130		70-130	4.58	20		≤ 40%		≤ 40%		
	NWTPH-Dx , Mineral Oil	Ecology NWTPH Dx	NO	NWTPH-Dx	10/10/20 17:30	10/21/20 22:52	11.22	14	6.7 / 6.2	ND	0.16		70-130		70-130				≤ 40%		≤ 40%		
Sediment	Sediment Dry Weight	EPA 1684																					
	Sediment PSD	ASTM D422																					
Sand Filter Media	pH	S-2.20																					
	Cation Exchange Capacity	S-10.10																					
	Maximum Dry Density	ASTM D1557																					
	Saturated Hydraulic Conductivity	ASTM D2434																					
	Particle Size Distribution	ASTM D422																					
	Total Elements (Zn, Cu, Pb, Fe, Al, P, Mg, Ca)	EPA 3050A/6010B																					
	Total Organic Carbon	EPA 415.3																					
	C:N Ratio	EPA 415.3/351.2																					

Data Quality Assurance Spreadsheet																								
Project Name	**Sand Filter**		**Sample ID:**	**INF101320 & EFF101320**																				
Sample Date:	**10/13/2020**		**Lab Report #:**	**WAJ0535**																				
Matrix	**Parameter**	**Method**	**Chain-of-Custody Issues?**	**Completeness/ Methodology**	**Holding Times (days)**				**Cooler Temperature**	**Blanks (mg/L)**		**Matrix Spikes/ Surrogate Recovery (%)**		**Lab Control Samples Recovery (%)**		**Lab Duplicates RPD (%)**		**Influent Field Duplicates RPD (%)**		**Effluent Field Duplicates RPD (%)**		**Flagged**	**ACTION**
					Date Collected	**Date Analyzed**	**Reported**	**Goal**		**Result**	**Reporting Limit**	**Reported**	**Goal**	**Reported**	**Goal**	**RPD**	**RPD Limit**	**Reported**	**Goal**	**Reported**	**Goal**	**OK**	
Stormwater	Total Suspended Solids (TSS)	SM 2540D	NO	SM 2540 D	10/13/20 16:00	10/29/20 8:30	15.6875	7	6.6 / 6.1	ND	1	105	80-120	96	90-110	2.9	20		≤ 25%		≤ 25%		
	Dissolved Copper (Cu)	EPA 200.8 (ICP/MS)						180			0.001		70-130		85-115				≤ 20%		≤ 20%		
	Dissolved Zinc (Zn)	EPA 200.8 (ICP/MS)						180			0.001		70-130		85-115				≤ 20%		≤ 20%		
	Dissolved Iron (Fe)	EPA 200.8 (ICP/MS)						180			0.01		70-130		85-115				≤ 20%		≤ 20%		
	Total Zinc (Zn)	EPA 200.8 (ICP/MS)	NO	EPA 200.8	10/13/20 16:00	10/29/20 14:02	15.91805556	180	6.6 / 6.1	ND	0.001	96.6	70-130	104	85-115				≤ 20%		≤ 20%		
	Total Copper (Cu)	EPA 200.8 (ICP/MS)	NO	EPA 200.8	10/13/20 16:00	10/29/20 14:02	15.91805556	180	6.6 / 6.1	ND	0.001	92.5	70-130	101	85-115				≤ 20%		≤ 20%		
	Hardness as CaCO3	SM 2340B (ICP)	NO	SM 2340 C	10/13/20 16:00	10/15/20 13:00	1.875	180	6.6 / 6.1	ND	3	94.05	80-120	100.4	90-110	0	20		≤ 20%		≤ 20%		
	Ortho-phosphate (OP)	SM 4500-P G						2			0.018		80-120		85-115				≤ 20%		≤ 20%		
	Total Phosphorus (TP)	SM 4500-P F	NO	SM 4500-P H	10/13/20 16:00	10/21/20 16:38	8.026388889	28	6.6 / 6.1	ND	0.005	108.5	80-120	104	90-100				≤ 20%		≤ 20%		
	NWTPH-Dx , Diesel	Ecology NWTPH Dx																	≤ 40%		≤ 40%		
	NWTPH-Dx , Lube Oil	Ecology NWTPH Dx																	≤ 40%		≤ 40%		
	NWTPH-Dx , Mineral Oil	Ecology NWTPH Dx																	≤ 40%		≤ 40%		
Sediment	Sediment Dry Weight	EPA 1684																					
	Sediment PSD	ASTM D422																	≤ 25%		≤ 25%		
Sand Filter Media	pH	S-2.20																					
	Cation Exchange Capacity	S-10.10																					
	Maximum Dry Density	ASTM D1557																					
	Saturated Hydraulic Conductivity	ASTM D2434																					
	Particle Size Distribution	ASTM D422																					
	Total Elements (Zn, Cu, Pb, Fe, Al, P, Mg, Ca)	EPA 3050A/6010B																					
	Total Organic Carbon	EPA 415.3																					
	C:N Ratio	EPA 415.3/351.2																					

Data Quality Assurance Spreadsheet																									
Project Nam	Sand Filter		Sample ID:	INF11052020-01, INF11052020-02, EFF11052020-01 & EFF11052020-02																				
Sample Dat	11/5/2020		Lab Report #:	WAK0229																				
Matrix	Parameter	Method	Chain-of-Custody Issues?	Completeness/ Methodology	Holding Times (days)				Cooler Temperature	Blanks (mg/L)		Matrix Spikes/ Surrogate Recovery (%)		Lab Control Samples Recovery (%)		Lab Duplicates RPD (%)		Influent Field Duplicates RPD (%)		Effluent Field Duplicates RPD (%)		Flagged	ACTION
					Date Collected	Date Analyzed	Reported	Goal		Result	Reporting Limit	Reported	Goal	Reported	Goal	RPD	RPD Limit	Reported	Goal	Reported	Goal	OK	
Stormwater	Total Suspended Solids (TSS)	SM 2540D	No	SM 2540 D	11/6/20 9:30	11/9/20 10:00	3.02083333	7	6.5 / 6.3	ND	1	98	80-120	96.3333333	90-110	3.8167	20						
	Dissolved Copper (Cu)	EPA 200.8 (ICP/MS)	No	EPA 200.8	11/6/20 9:30	11/11/20 15:18	5.24166667	180	6.5 / 6.3	ND	0.001	91.05	70-130	86.5	85-115			3.1%	≤ 20%	4.5%	≤ 20%		
	Dissolved Zinc (Zn)	EPA 200.8 (ICP/MS)	No	EPA 200.8	11/6/20 9:30	11/11/20 15:18	5.24166667	180	6.5 / 6.3	ND	0.001	90.65	70-130	87	85-115			2.8%	≤ 20%	14.2%	≤ 20%		
	Dissolved Iron	EPA 200.8 (ICP/MS)	No	EPA 200.8	11/6/20 9:30	11/11/20 15:18	5.24166667	180	6.5 / 6.3	ND	0.01	98.4	70-130	106	85-115			5.2%	≤ 20%	15.0%	≤ 20%		
	Total Metals , Zinc (Zn)	EPA 200.8 (ICP/MS)																					
	Total Metals , Copper (Cu)	EPA 200.8 (ICP/MS)																					
	Hardness as CaCO3	SM 2340B (ICP)	No	SM 2340 C	11/6/20 9:30	11/11/20 14:00	5.1875	180	6.5 / 6.3	ND	3	100	80-120	101	90-110	5.13	20	13.1%	≤ 20%	15.2%	≤ 20%		
	Ortho-phosphate (OP)	SM 4500-P G	No	SM 4500-P G	11/6/20 9:30	11/6/20 15:13	0.23819444	2	6.5 / 6.3	ND	0.018	110.5	80-120	103	85-115			6.5%	≤ 20%	0.0%	≤ 20%		
	Total Phosphorus (TP)	SM 4500-P F	No	SM 4500-P H	11/6/20 9:30	11/19/20 15:33	13.2520833	28	6.5 / 6.3	ND	0.005	122.5	80-120	102.333333	90-100			4.7%	≤ 20%	19.3%	≤ 20%	M1	"Matrix spike recovery was high; the associated blank spike recovery was acceptable. Potential matrix effect". From discussion with lab, data is acceptable.
	NWTPH-Dx , Diesel	Ecology NWTPH Dx																					
	NWTPH-Dx , Lube Oil	Ecology NWTPH Dx																					
	NWTPH-Dx , Mineral Oil	Ecology NWTPH Dx																					
Sediment	Sediment Dry Weight	EPA 1684																					
	Sediment PSD	ASTM D422																					
Sand Filter Media	pH	S-2.20																					
	Cation Exchange Capacity	S-10.10																					
	Maximum Dry Density	ASTM D1557																					
	Saturated Hydraulic Conductivity	ASTM D2434																					
	Particle Size Distribution	ASTM D422																					
	Total Elements (Zn, Cu, Pb, Fe, Al, P, Mg, Ca)	EPA 3050A/6010B																					
	Total Organic Carbon	EPA 415.3																					
	C:N Ratio	EPA 415.3/351.2																					

Data Quality Assurance Spreadsheet																									
Project Name	**Sand Filter**		**Sample ID:**	**INF11132020-01, INF11132020-02, EFF11132020-01 & EFF11132020-02**																				
Sample Date:	**11/13/2020**		**Lab Report #:**	**WAK0519**																				
Matrix	**Parameter**	**Method**	**Chain-of-Custody Issues?**	**Completeness/ Methodology**	**Holding Times (days)**				**Cooler Temperature**	**Blanks (mg/L)**		**Matrix Spikes/ Surrogate Recovery (%)**		**Lab Control Samples Recovery (%)**		**Lab Duplicates RPD (%)**		**Influent Field Duplicates RPD (%)**		**Effluent Field Duplicates RPD (%)**		**Flagged**	**ACTION**
					Date Collected	**Date Analyzed**	**Reported**	**Goal**		**Result**	**Reporting Limit**	**Reported**	**Goal**	**Reported**	**Goal**	**RPD**	**RPD Limit**	**Reported**	**Goal**	**Reported**	**Goal**	**OK**	
Stormwater	Total Suspended Solids (TSS)	SM 2540D	No	SM 2540 D	11/13/20 16:30	11/20/20 14:00	6.895833333	7	2.0 / 1.8	ND	1	96.75	80-120	99.25	90-110	2.13	20		≤ 25%		≤ 25%		
	Dissolved Copper (Cu)	EPA 200.8 (ICP/MS)	No	EPA 200.8	11/13/20 16:30	11/30/20 11:22	16.78611111	180	2.0 / 1.8	ND	0.001	98.55	70-130	103	85-115				≤ 20%		≤ 20%		
	Total Copper (Cu)	EPA 200.8 (ICP/MS)	No	EPA 200.8	11/13/20 16:30	11/24/20 14:09	10.90208333	180	2.0 / 1.8	ND	0.001	94.425	70-130	99.7	85-115			0%	≤ 20%	0%	≤ 20%		
	Hardness as CaCO3	SM 2340B (ICP)	No	SM 2340 C	11/13/20 16:30	11/23/20 10:00	9.729166667	180	2.0 / 1.8	ND	3	92.1	80-120	101.5	90-110	3.82	20		≤ 20%		≤ 20%		
	Ortho-phosphate (OP)	SM 4500-P G						2											≤ 20%		≤ 20%		
	Total Phosphorus (TP)	SM 4500-P F	No	SM 4500-P H	11/13/20 16:30	11/25/20 10:45	11.76041667	28	2.0 / 1.8	ND	0.005	115.5	80-120	94.9	90-110			1.8%	≤ 20%	96%	≤ 20%	YES	RPD exceeded for effluent field duplicate. Reject field duplicate and effluent TP result.
	NWTPH-Dx , Diesel	Ecology NWTPH Dx	No	NWTPH-Dx	11/13/20 16:30	11/19/20 9:38	5.713888889	14	2.0 / 1.8	ND	0.16	85.65	70-130	96.1	70-130		20		≤ 40%		≤ 40%		
	NWTPH-Dx , Lube Oil	Ecology NWTPH Dx	No	NWTPH-Dx	11/13/20 16:30	11/19/20 9:38	5.713888889	14	2.0 / 1.8	ND	0.4		70-130		70-130		20		≤ 40%		≤ 40%		
	NWTPH-Dx , Mineral Oil	Ecology NWTPH Dx	No	NWTPH-Dx	11/13/20 16:30	11/19/20 9:38	5.713888889	14	2.0 / 1.8	ND	0.16						20		≤ 40%		≤ 40%		
Sediment	Sediment Dry Weight	EPA 1684					0																
	Sediment PSD	ASTM D422					0												≤ 25%		≤ 25%		
Sand Filter Media	pH	S-2.20					0																
	Cation Exchange Capacity	S-10.10					0																
	Maximum Dry Density	ASTM D1557					0																
	Saturated Hydraulic Conductivity	ASTM D2434					0																
	Particle Size Distribution	ASTM D422					0																
	Total Elements (Zn, Cu, Pb, Fe, Al, P, Mg, Ca)	EPA 3050A/6010B					0																
	Total Organic Carbon	EPA 415.3					0																
	C:N Ratio	EPA 415.3/351.2					0																

Data Quality Assurance Spreadsheet																								
Project Name	**Sand Filter**		**Sample ID:**	**INF11152020-01, INF11152020-02, EFF11152020-01 & EFF11152020-02**																				
Sample Date:	**11/14/2020**		**Lab Report #:**	**WAK0512-01, WAK0512-02**																				
Matrix	**Parameter**	**Method**	**Chain-of-Custody Issues?**	**Completeness/ Methodology**	**Holding Times (days)**				**Cooler Temperature**	**Blanks (mg/L)**		**Matrix Spikes/ Surrogate Recovery (%)**		**Lab Control Samples Recovery (%)**		**Lab Duplicates RPD (%)**		**Influent Field Duplicates RPD (%)**		**Effluent Field Duplicates RPD (%)**		**Flagged**	**ACTION**
					Date Collected	**Date Analyzed**	**Reported**	**Goal**		**Result**	**Reporting Limit**	**Reported**	**Goal**	**Reported**	**Goal**	**RPD**	**RPD Limit**	**Reported**	**Goal**	**Reported**	**Goal**	**OK**	
Stormwater	Total Suspended Solids (TSS)	SM 2540D																						
	Dissolved Copper (Cu) and Zinc (Zn)	EPA 200.8 (ICP/MS)																						
	Total Metals , Zinc (Zn)	EPA 200.8 (ICP/MS)	Yes (see Action Column)	EPA 200.8	11/15/20 12:00	11/24/20 13:57	9.08	180	2.0 / 1.8	ND	0.001	95.375	70-130	97.9	85-115			1.0%	≤ 20%	1.6%	≤ 20%		COC issues involved missing INF11152020 - issue was resolved, assume sample results are acceptable based on QA results on this page.
	Total Metals , Copper (Cu)	EPA 200.8 (ICP/MS)	Yes (see Action Column)	EPA 200.8	11/15/20 12:00	11/24/20 13:57	9.08	180	2.0 / 1.8	ND	0.001	94.425	70-130	99.7	85-115			0%	≤ 20%	2.1%	≤ 20%		COC issues involved missing INF11152020 - issue was resolved, assume sample results are acceptable based on QA results on this page.
	Hardness as CaCO3	SM 2340B (ICP)																					
	Ortho-phosphate (OP)	SM 4500-P G																					
	Total Phosphorus (TP)	SM 4500-P F																					
	NWTPH-Dx , Diesel	Ecology NWTPH Dx																					
	NWTPH-Dx , Lube Oil	Ecology NWTPH Dx																					
	NWTPH-Dx , Mineral Oil	Ecology NWTPH Dx																					
Sediment	Sediment Dry Weight	EPA 1684																					
	Sediment PSD	ASTM D422																					
Sand Filter Media	pH	S-2.20																					
	Cation Exchange Capacity	S-10.10																					
	Maximum Dry Density	ASTM D1557																					
	Saturated Hydraulic Conductivity	ASTM D2434																					
	Particle Size Distribution	ASTM D422																					
	Total Elements (Zn, Cu, Pb, Fe, Al, P, Mg, Ca)	EPA 3050A/6010B																					
	Total Organic Carbon	EPA 415.3																					
	C:N Ratio	EPA 415.3/351.2																					

Data Quality Assurance Spreadsheet

Project Name	**Sand Filter**	**Sample ID:**	**INF11162020 & EFF11162020**
Sample Date:	**11/16/2020**	**Lab Report #:**	**WAK0564-01 & WAK0564-02**

Matrix	Parameter	Method	Chain-of-Custody Issues?	Completeness/ Methodology	Holding Times (days)				Cooler Temperature	Blanks (mg/L)		Matrix Spikes/ Surrogate Recovery (%)		Lab Control Samples Recovery (%)		Lab Duplicates RPD (%)		Field Duplicates RPD (%)		Flagged	ACTION
					Date Collected	Date Analyzed	Reported	Goal		Result	Reporting Limit	Reported	Goal	Reported	Goal	RPD	RPD Limit	Reported	Goal	OK	
Stormwater	Total Suspended Solids (TSS)	SM 2540D																			
	Dissolved Copper (Cu) and Zinc (Zn)	EPA 200.8 (ICP/MS)																			
	Total Copper (Cu) and Zinc (Zn)	EPA 200.8 (ICP/MS)																			
	Hardness as CaCO3	SM 2340B (ICP)																			
	Ortho-phosphate (OP)	SM 4500-P G	No	SM 4500-P F	11/17/20 9:00	11/19/20 9:00	2	2	4.4 / 4.2	ND		112.5	80-120							YES	"Initial analysis within holding time; reanalysis for the required dilution was past holding time." Assume result is acceptable.
	Total Phosphorus (TP)	SM 4500-P F																			
	NWTPH-Dx , Diesel	Ecology NWTPH Dx	No	NWTPH-Dx	11/17/20 9:00	11/26/20 14:30	9.2291667	14	4.4 / 4.2	ND	0.16	98.8	70-130	97.8	70-130		20				
	NWTPH-Dx , Lube Oil	Ecology NWTPH Dx	No	NWTPH-Dx	11/17/20 9:00	11/26/20 14:30	9.2291667	14	4.4 / 4.2	ND	0.4		70-130		70-130		20				
	NWTPH-Dx , Mineral Oil	Ecology NWTPH Dx	No	NWTPH-Dx	11/17/20 9:00	11/26/20 14:30	9.2291667	14	4.4 / 4.2	ND	0.16						20				
Sediment	Sediment Dry Weight	EPA 1684																			
	Sediment PSD	ASTM D422																			
Sand Filter Media	pH	S-2.20																			
	Cation Exchange Capacity	S-10.10																			
	Maximum Dry Density	ASTM D1557																			
	Saturated Hydraulic Conductivity	ASTM D2434																			
	Particle Size Distribution	ASTM D422																			
	Total Elements (Zn, Cu, Pb, Fe, Al, P, Mg, Ca)	EPA 3050A/6010B																			
	Total Organic Carbon	EPA 415.3																			
	C:N Ratio	EPA 415.3/351.2																			

Data Quality Assurance Spreadsheet

Project Name	**Sand Filter**	**Sample ID:**	**INF11252020 & EFF11252020**
Sample Date:	**11/25/2020**	**Lab Report #:**	**WAK0862-01 & WAK0862-02**

Matrix	Parameter	Method	Chain-of-Custody Issues?	Completeness/ Methodology	Holding Times (days)				Cooler Temperature	Blanks (mg/L)		Matrix Spikes/ Surrogate Recovery (%)		Lab Control Samples Recovery (%)		Lab Duplicates RPD (%)		Field Duplicates RPD (%)		Flagged	ACTION
					Date Collected	Date Analyzed	Reported	Goal		Result	Reporting Limit	Reported	Goal	Reported	Goal	RPD	RPD Limit	Reported	Goal	OK	
Stormwater	Total Suspended Solids (TSS)	SM 2540D																			
	Dissolved Copper (Cu) and Zinc (Zn)	EPA 200.8 (ICP/MS)																			
	Total Copper (Cu) and Zinc (Zn)	EPA 200.8 (ICP/MS)																			
	Hardness as CaCO3	SM 2340B (ICP)																			
	Ortho-phosphate (OP)	SM 4500-P G	No	SM 4500-P G	11/25/20 9:30	11/25/2020 14:57	0.227083333	2	4.8 / 4.6	ND	0.018	111.5	80-120	96.5	85-115						
	Total Phosphorus (TP)	SM 4500-P F																			
	NWTPH-Dx , Diesel	Ecology NWTPH Dx	No	NWTPH-Dx	11/25/20 9:30	12/8/2020 21:17	13.49097222	14	4.8 / 4.6	ND	0.16			105	70-130	0.564	20			T10	Non-target analyte in diesel and lube oil range, tentatively identified as heavy fuel oil. Assume value still valid
	NWTPH-Dx , Lube Oil	Ecology NWTPH Dx	No	NWTPH-Dx	11/25/20 9:30	12/8/2020 21:17	13.49097222	14	4.8 / 4.6	ND	0.4			ND	70-130	ND	20				
	NWTPH-Dx , Mineral Oil	Ecology NWTPH Dx	No	NWTPH-Dx	11/25/20 9:30	12/8/2020 21:17	13.49097222	14	4.8 / 4.6	ND	0.16			ND	70-131	ND	20				
Sediment	Sediment Dry Weight	EPA 1684																			
	Sediment PSD	ASTM D422																			
Sand Filter Media	pH	S-2.20																			
	Cation Exchange Capacity	S-10.10																			
	Maximum Dry Density	ASTM D1557																			
	Saturated Hydraulic Conductivity	ASTM D2434																			
	Particle Size Distribution	ASTM D422																			
	Total Elements (Zn, Cu, Pb, Fe, Al, P, Mg, Ca)	EPA 3050A/6010B																			
	Total Organic Carbon	EPA 415.3																			
	C:N Ratio	EPA 415.3/351.2																			

Appendix C.3 Field Forms

Field staff names: Taylor Hoffman-Ballard + Kaela Mansfield	Date: 10/3/19
	Time: 10am

Any indication of damage/tampering during site inspection (surrounding area, pipes, cables, wiring, cords, tubing, monitoring equipment):
None

Maintenance Activities	**Activity Complete?**	**Notes (circle text as appropriate):**		
Debris/Obstruction Removal from piping	✓	Debris removed? (Y) N		
Check voltage of battery	✓	Measured voltage: 13.1		
Rain gage internal part cleanliness and level (quarterly)		Debris removed? Y (N)	Reset level of gage? Y (N)	
ISCO head tubing check		Tubing replaced? Y (N)		
ISCO pump tubing check		Tubing replaced? Y (N)		
ISCO suction tubing check	✓	Tubing replaced? Y (N)		
ISCO Internal Humidity Indicator check		Indicator Color and Percent:		Desiccant replaced? Y (N)
PT #1 Humidity Indicator Check	✓	Indicator Color: white		Desiccant replaced? Y (N)
PT #2 Humidity Indicator Check	✓	Indicator Color: white		Desiccant replaced? Y (N)
PT #3 Humidity Indicator Check	✓	Indicator Color: white		Desiccant replaced? Y (N)
Deflate ISCO controller pad (as needed)				
ISCO pump capabilities				
ISCO volumetric verification (performed quarterly)		Service needed? Y N		

Periodic Maintenance Checklist Field Form

Field staff names: TAYLOR H-B, KAELA M.	Date: 11/8/19
	Time: 3:00

Any indication of damage/tampering during site inspection (surrounding area, pipes, cables, wiring, cords, tubing, monitoring equipment):

NO

Maintenance Activities	**Activity Complete?**	**Notes (circle text as appropriate):**	
Debris/Obstruction Removal from piping	N	Debris removed? Y (N)	SOME DEBRIS REMOVED FROM CB
Check voltage of battery	Y	Measured voltage: 13.1	Voltage should be above 10.3V. If not, replace battery.
Rain gage internal part cleanliness and level (quarterly)	N	Debris removed? Y (N)	Reset level of gage? Y (N)
ISCO head tubing check	N	Tubing replaced? Y (N)	TUBING IS RELATIVELY NEW
ISCO pump tubing check	N	Tubing replaced? Y (N)	
ISCO suction tubing check	N	Tubing replaced? Y (N)	
ISCO Internal Humidity Indicator check	Y	Indicator Color and Percent:	Desiccant replaced? Y (N)
PT #1 Humidity Indicator Check	Y	Indicator Color: light orange	Desiccant replaced? Y (N)
PT #2 Humidity Indicator Check	Y	Indicator Color: light orange	Desiccant replaced? Y (N)
PT #3 Humidity Indicator Check	Y	Indicator Color: light orange	Desiccant replaced? Y (N)
Deflate ISCO controller pad (as needed)	N		
ISCO pump capabilities	N		
ISCO volumetric verification (performed quarterly)	N	Service needed? Y N	

Periodic Maintenance Checklist Field Form

Field staff names: TAYLOR H-B, KAELA M	Date: 11/8/19 Time: 2:00

Any indication of damage/tampering during site inspection (surrounding area, pipes, cables, wiring, cords, tubing, monitoring equipment):

NO

Maintenance Activities	**Activity Complete?**	**Notes (circle text as appropriate):**		
Debris/Obstruction Removal from piping	N*	Debris removed? Y N	*DEBRIS REMOVED FROM UPSTREAM CB	
Check voltage of battery	Y	Measured voltage: 13.17	Voltage should be above 10.3V. If not, replace battery.	
Rain gage internal part cleanliness and level (quarterly)	N	Debris removed? Y N	Reset level of gage? Y N	
ISCO head tubing check	Y	Tubing replaced? Y (N)		
ISCO pump tubing check	Y	Tubing replaced? Y (N)		
ISCO suction tubing check	Y*	Tubing replaced? Y (N)	*SUCTION TUBING FOR EFFLUENT NEEDS TO GET REPLACED	
ISCO Internal Humidity Indicator check	N	Indicator Color and Percent:		Desiccant replaced? Y (N)
PT #1 Humidity Indicator Check	Y	Indicator Color: WHITE*	NEEDS TO BE REPLACED	Desiccant replaced? Y (N)
PT #2 Humidity Indicator Check	Y	Indicator Color: WHITE		Desiccant replaced? Y (N)
PT #3 Humidity Indicator Check	Y	Indicator Color: WHITE		Desiccant replaced? Y (N)
Deflate ISCO controller pad (as needed)	N			
ISCO pump capabilities	Y			
ISCO volumetric verification (performed quarterly)	Y	Service needed? (Y) N	*REPLACE EFFLUENT TUBING	

Periodic Maintenance Checklist Field Form

Field staff names: Kaela M., Taylor A-B	Date: 1/8/2020 Time: 9:30a

Any indication of damage/tampering during site inspection (surrounding area, pipes, cables, wiring, cords, tubing, monitoring equipment):
None

Maintenance Activities	**Activity Complete?**	**Notes (circle text as appropriate):**		
Debris/Obstruction Removal from piping	Y	Debris removed? Y N		
Check voltage of battery	Y	Measured voltage: 12.91V	Voltage should be above 10.3V. If not, replace battery.	
Rain gage internal part cleanliness and level (quarterly)	N	Debris removed? Y N	Reset level of gage? Y N	
ISCO head tubing check	Y	Tubing replaced? Y (N)		
ISCO pump tubing check	N	Tubing replaced? Y (N)		
ISCO suction tubing check	Y	Tubing replaced? Y (N)		
ISCO Internal Humidity Indicator check	Y	Indicator Color and Percent: blue/white on 40	Desiccant replaced? Y (N) → Specific visit needed	
PT #1 Humidity Indicator Check	Y	Indicator Color: orange/white	Desiccant replaced? Y N	
PT #2 Humidity Indicator Check	Y	Indicator Color: " "	Desiccant replaced? Y N	
PT #3 Humidity Indicator Check	Y	Indicator Color: " "	Desiccant replaced? Y N	
Deflate ISCO controller pad (as needed)	N/A			
ISCO pump capabilities	Y			
ISCO volumetric verification (performed quarterly)	Y	Service needed? Y (N)		

Note: Also calibrated influent, effluent 12 in., + effluent 18 in.

Field staff names: Megan E., Taylor H., Kevin F.	Date: 8/17/2020 Time: 8:00 AM

Any indication of damage/tampering during site inspection (surrounding area, pipes, cables, wiring, cords, tubing, monitoring equipment):

No

Maintenance Activities	Activity Performed?	Notes (circle text as appropriate):		
Debris/Obstruction Removal from piping	Yes	Debris removed? (Y) N		
Adjust weir fit in pipe (as needed)		[illegible]		[illegible]
Pressure Transducer (PT) Calibration	Influent	Initial inf raw reading:	Initial inf offset: -0.295	Initial inf reading:
		New inf raw reading:	New inf offset: -0.326	New inf reading:
	Effluent	Intial eff raw reading:	Intial eff offset: -0.287	Initial eff reading:
		New eff raw reading:	New eff offset: -0.199	New eff reading:
Pressure transducers (PT) and mounts cleaning (quarterly)		PTs cleaned? Y N	Mounts cleaned? Y N	
Check voltage of battery	✓	Measured voltage: 13.1		
Rain gage internal part cleanliness and level (quarterly)		Debris removed? Y N	Reset level of gage? Y N	
ISCO head tubing check	✓	Tubing replaced? Y N		
ISCO pump tubing check	✓	Tubing replaced? Y N		
ISCO suction tubing check	✓	Tubing replaced? Y N		
Check tubing, bulkhead caps, and cable attachments	✓			
ISCO Internal Humidity Indicator check	✓	Indicator Color and Percent:		Desiccant replaced? Y N
PT #1 Humidity Indicator Check	need to be replaced	Indicator Color:		Desiccant replaced? Y N
PT #2 Humidity Indicator Check	need to be replaced	Indicator Color:		Desiccant replaced? Y N
PT #3 Humidity Indicator Check	need to be replaced	Indicator Color:		Desiccant replaced? Y N
Deflate ISCO controller pad (as needed)				
ISCO pump capabilities				
ISCO volumetric verification (performed quarterly)	✓	Service needed? Y N		
Clean catch basin and HVF on up-turned elbow (as needed)	✓			

Field staff names: Taylor Hoffman-Ballard, Kevin Flanagan	Date: 9/23/2020 Time: 10:30
Any indication of damage/tampering during site inspection (surrounding area, pipes, cables, wiring, cords, tubing, monitoring equipment): No, vault bottom very dry	

Maintenance Activities	Activity Performed?	Notes (circle text as appropriate):		
Debris/Obstruction Removal from piping	✓	Debris removed? (Y) N	Little debris in pipe	
Pressure Transducer (PT) Calibration	✓	Initial inf raw reading: 0.33	Initial inf offset: -0.326	Initial inf reading: 0.003
		New inf raw reading: 0.329	New inf offset: -0.329	New inf reading: 0.000
	✓	Intial eff raw reading: 0.198	Intial eff offset: -0.199	Initial eff reading: -0.001
		New eff raw reading: 0.199	New eff offset: -0.199	New eff reading: 0.000
	NA	Intial eff raw reading:	Intial eff offset:	Initial eff reading:
		New eff raw reading:	New eff offset:	New eff reading:
Pressure transducers (PT) and mounts cleaning (quarterly)	NA	PTs cleaned? Y N	Mounts cleaned? Y N	
Check voltage of battery	✓	Measured voltage: 13.1		
Rain gage internal part cleanliness and level (quarterly)	NA	Debris removed? Y N	Reset level of gage? Y N	
ISCO head tubing check	✓	Tubing replaced? Y (N)		
ISCO pump tubing check	✓	Tubing replaced? Y (N)		
ISCO suction tubing check	✓	Tubing replaced? Y (N)	kink in elt, appears fine (no leak)	
Check tubing, bulkhead caps, and cable attachments				
ISCO Internal Humidity Indicator check		Indicator Color and Percent:		Desiccant replaced? Y N
		Indicator Color and Percent:		Desiccant replaced? Y N
		Indicator Color and Percent:		Desiccant replaced? Y N
PT #1 Humidity Indicator Check		Indicator Color:		Desiccant replaced? Y N
PT #2 Humidity Indicator Check		Indicator Color:		Desiccant replaced? Y N
PT #3 Humidity Indicator Check		Indicator Color:		Desiccant replaced? Y N
Deflate ISCO controller pad (as needed)		Unscrew Flow Meter Cable or connector cap on back of the controller		
ISCO pump capabilities	✓			
ISCO volumetric verification (performed quarterly)	NA ✓	Service needed? Y N		
Adjust weir fit in pipe (as needed)				
Clean catch basin inlet grate and grates on the end of the flow split pipes				

Battery voltage must be above 13.0

* Need to change names of items within Datalogger to match
* Start visit Report ☑ End visit Report ☑

Field staff names: Megan + Kevin					Date: 10/30/2020 Time: 1:45 pm
Any indication of damage/tampering during site inspection (surrounding area, pipes, cables, wiring, cords, tubing, monitoring equipment): No					
Maintenance Activities	**Activity Performed?**	**Notes (circle text as appropriate):**			
Debris/Obstruction Removal from piping	✓	Debris removed? (Y) N			
Visit Report	✓	Start Visit Report ☑	End Visit Report ☐		
Pressure Transducer (PT) Calibration	Influent	Initial inf raw reading: 0.327	Initial inf offset: -0.329	Initial inf reading: -0.002	-0.005
		New inf raw reading: 0.323	New inf offset: -0.323	New inf reading: 0.000	
	Effluent	Intial eff raw reading: 0.215	Intial eff offset: -0.199	Initial eff reading: 0.016	
		New eff raw reading: .208	New eff offset: -0.208	New eff reading: 0.000	
Pressure transducers (PT) and mounts cleaning (quarterly)		PTs cleaned? (Y) N	Mounts cleaned? (Y) N		
Check voltage of battery	✓	Measured voltage: 13.1V			
Rain gage internal part cleanliness and level (quarterly)		Debris removed? Y N	Reset level of gage? Y N		
ISCO head tubing check	✓	Tubing replaced? Y (N)			
ISCO pump tubing check	✓	Tubing replaced? Y (N)			
ISCO suction tubing check	Kink in tube	Tubing replaced? Y (N)			
Check tubing, bulkhead caps, and cable attachments	✓				
ISCO Internal Humidity Indicator check	✓	Indicator Color and Percent: 40 blue		Desiccant replaced? Y N	
PT #1 Humidity Indicator Check	✓	Indicator Color: White/light orange		Desiccant replaced? Y N	
PT #2 Humidity Indicator Check	✓	Indicator Color: White/light orange		Desiccant replaced? Y N	
PT #3 Humidity Indicator Check	✓	Indicator Color: White/light orange		Desiccant replaced? Y N	
Deflate ISCO controller pad (as needed)	X				
ISCO pump capabilities					
ISCO volumetric verification (performed quarterly)		Service needed? Y N			
Adjust weir fit in pipe (as needed)					
Clean catch basin and HVF on up-turned elbow (as needed)					

Field staff names: Megan + Kaela	Date: 11/12/2020
	Time: 8:15 am

Any indication of damage/tampering during site inspection (surrounding area, pipes, cables, wiring, cords, tubing, monitoring equipment): No

Maintenance Activities	Activity Performed?	Notes (circle text as appropriate):		
Debris/Obstruction Removal from piping	✓	Debris removed? (Y) N		
Visit Report	✓	Start Visit Report ☑	End Visit Report ☑	
Pressure Transducer (PT) Calibration	INF	Initial inf raw reading: 0.334	Initial inf offset: -0.333	Initial inf reading: 0.011
		New inf raw reading: 0.335	New inf offset: -0.335	New inf reading: 0.000
	Eff	Intial eff raw reading: 0.206	Intial eff offset: -0.209	Initial eff reading: -0.003
		New eff raw reading: 0.210	New eff offset: -0.202	New eff reading: 0.00
Pressure transducers (PT) and mounts cleaning (quarterly)	✓	PTs cleaned? Y N	Mounts cleaned? Y N	
Check voltage of battery	✓	Measured voltage: 13.1 V		
Rain gage internal part cleanliness and level (quarterly)		Debris removed? Y N	Reset level of gage? Y N	
ISCO head tubing check	✓	Tubing replaced? Y (N)		
ISCO pump tubing check (eff.)	✓	Tubing replaced? Y (N)	Kink	
ISCO suction tubing check	✓	Tubing replaced? Y (N)		
Check tubing, bulkhead caps, and cable attachments	✓			
ISCO Internal Humidity Indicator check	✓	Indicator Color and Percent: blue 30		Desiccant replaced? Y (N)
PT #1 Humidity Indicator Check	✓	Indicator Color: yellowish white		Desiccant replaced? Y (N)
PT #2 Humidity Indicator Check	✓	Indicator Color: yellowish white		Desiccant replaced? Y (N)
PT #3 Humidity Indicator Check	✓	Indicator Color: yellowish white		Desiccant replaced? Y (N)
Deflate ISCO controller pad (as needed)		Not needed		
ISCO pump capabilities	✓			
ISCO volumetric verification (performed quarterly)		Service needed? Y N		
Adjust weir fit in pipe (as needed)				
Clean catch basin and HVF on up-turned elbow (as needed)		frozen		

Field staff names: Megan + Taylor					Date: 12/14/2020 Time: 8:45am
Any indication of damage/tampering during site inspection (surrounding area, pipes, cables, wiring, cords, tubing, monitoring equipment): None					
Maintenance Activities	**Activity Performed?**	**Notes (circle text as appropriate):**			
Debris/Obstruction Removal from piping	✓	Debris removed? (Y) N			
Visit Report	✓	Start Visit Report ☑	End Visit Report ☑		
Pressure Transducer (PT) Calibration	✓ INF	Initial inf raw reading: 0.317	Initial inf offset: -0.325		Initial inf reading: -0.008
		New inf raw reading: 0.318	New inf offset: -0.319		New inf reading: 0.000
	✓ Eff	Intial eff raw reading: 0.210	Intial eff offset: -0.202		Initial eff reading: 0.008
		New eff raw reading: 0.194	New eff offset: -0.194		New eff reading: 0.000
Pressure transducers (PT) and mounts cleaning (quarterly)		PTs cleaned? Y N	Mounts cleaned? Y N		
Check voltage of battery	✓	Measured voltage: [illegible]	13.1 V		
Rain gage internal part cleanliness and level (quarterly)		Debris removed? Y N	Reset level of gage? Y N		
ISCO head tubing check	✓	Tubing replaced? Y (N)			
ISCO pump tubing check	✓	Tubing replaced? Y (N)			
ISCO suction tubing check	✓	Tubing replaced? Y (N)			
Check tubing, bulkhead caps, and cable attachments	✓				
ISCO Internal Humidity Indicator check	✓	Indicator Color and Percent: Inf: 40 Eff: 30			Desiccant replaced? Y (N)
PT #1 Humidity Indicator Check	✓	Indicator Color: White			Desiccant replaced? (Y) N
PT #2 Humidity Indicator Check	✓	Indicator Color: White			Desiccant replaced? (Y) N
PT #3 Humidity Indicator Check	✓	Indicator Color: White			Desiccant replaced? (Y) N
Deflate ISCO controller pad (as needed)	NA				
ISCO pump capabilities					
ISCO volumetric verification (performed quarterly)		Service needed? Y N			
Adjust weir fit in pipe (as needed)	✓				
Clean catch basin and HVF on up-turned elbow (as needed)		Will perform after ice / snow has melted			

Pre-Storm Event Maintenance Checklist Field Form

Field staff names: Kaela M., Taylor H-B	Date:
	Time:
Any indication of damage/tampering during site inspection (surrounding area, pipes, cables, wiring, cords, tubing, monitoring equipment):	

Maintenance Activities	**Activity Complete?**	**Notes (circle text as appropriate):**		
Check datalogger water surface elevation (WSE) against measured WSE		Reference elevation: Electronic water level indicator reading:	Uncertainty value (±) and reason: Measured WSE:	Datalogger WSE:
Debris/Obstruction Removal from piping		Debris removed? Y N		
ISCO head tubing check		Tubing replaced? Y (N)	Tubing cleaned? Y (N)	
ISCO pump tubing check		Tubing replaced? Y (N)	Tubing cleaned? Y (N)	
ISCO suction tubing check		Tubing replaced? Y (N)	Tubing cleaned? Y (N)	
Check level of weirs, pipe tees				
Pressure transducers (PT) and mounts cleaning		PTs cleaned? Y N	Mounts cleaned? Y N	
Pressure transducers (PT) reading check		PT reading zero flow? Y N	If no, PT reading:	Any drift observed? Y N Value:
Check tubing, bulkhead caps, and cable attachments				
Data logger and ISCO set to sample		DL set? Y N	ISCO set? Y N	
Threshold values set		Threshold value:		
pH meter inspection and cleaning		Service needed? Y N		
pH meter calibration		1st Calibration Point:	2nd Calibration Point:	

Pre-Storm Event Maintenance Checklist Field Form

Field staff names: TAYLOR HUFFMAN-BALLARD KAELA MANSFIELD	Date: 10/15/19 Time: 11:00

Any indication of damage/tampering during site inspection (surrounding area, pipes, cables, wiring, cords, tubing, monitoring equipment):

NO

Maintenance Activities	**Activity Complete?**	**Notes (circle text as appropriate):**		
Check datalogger water surface elevation (WSE) against measured WSE		Reference elevation: Electronic water level indicator reading:	Uncertainty value (±) and reason: Measured WSE:	Datalogger WSE:
Debris/Obstruction Removal from piping	X	Debris removed? (Y) N	MUCH LEAFY DEBRIS	
ISCO head tubing check		Tubing replaced? Y N	Tubing cleaned? Y N	
ISCO pump tubing check		Tubing replaced? Y N	Tubing cleaned? Y N	
ISCO suction tubing check		Tubing replaced? Y N	Tubing cleaned? Y N	
* Check level of weirs, pipe tees				
Pressure transducers (PT) and mounts cleaning		PTs cleaned? Y N	Mounts cleaned? Y N	
Pressure transducers (PT) reading check		PT reading zero flow? Y N	If no, PT reading:	Any drift observed? Y N Value:
Check tubing, bulkhead caps, and cable attachments				
Data logger and ISCO set to sample	X	DL set? (Y) N	ISCO set? (Y) N	
Threshold values set	X	Threshold value: 155		
pH meter inspection and cleaning		Service needed? Y N		
pH meter calibration		1st Calibration Point:	2nd Calibration Point:	

Pre-Storm Event Maintenance Checklist

Field staff names: Kaela Mansfield, Taylor Hoffman-Ballard	Date: 12/5/2019
	Time: 10:30

Any indication of damage/tampering during site inspection (surrounding area, pipes, cables, wiring, cords, tubing, monitoring equipment):
No, but water in CB appeared to draw down significantly since visit to site on Tuesday

Maintenance Activities	**Activity Complete?**	**Notes (circle text as appropriate):**		
Check datalogger water surface elevation (WSE) against measured WSE		Reference elevation:	Uncertainty value (±) and reason:	
		Electronic water level indicator reading:	Measured WSE:	Datalogger WSE:
Debris/Obstruction Removal from piping		Debris removed? Y N		
ISCO head tubing check		Tubing replaced? Y N	Tubing cleaned? Y N	
ISCO pump tubing check		Tubing replaced? Y N	Tubing cleaned? Y N	
ISCO suction tubing check		Tubing replaced? Y N	Tubing cleaned? Y N	
Check level of weirs, pipe tees				
Pressure transducers (PT) and mounts cleaning		PTs cleaned? Y N	Mounts cleaned? Y N	
Pressure transducers (PT) reading check		PT reading zero flow? Y N	If no, PT reading:	Any drift observed? Y N Value:
Check tubing, bulkhead caps, and cable attachments				
Data logger and ISCO set to sample		DL set? Y N	ISCO set? Y N	
Threshold values set		Threshold value:		
pH meter inspection and cleaning		Service needed? Y N		
pH meter calibration		1st Calibration Point:	2nd Calibration Point:	

Pre-Storm Maintenance Form

Field staff names: Kevin Flanagan, Taylor H-B	Date: 9/23/2020
	Time: 1am

Any indication of damage/tampering during site inspection (surrounding area, pipes, cables, wiring, cords, tubing, monitoring equipment):
No, vault was very dry

Maintenance Activities	Activity Performed?	Notes (circle text as appropriate):		
Debris/Obstruction Removal from piping (as needed)	✓	Debris removed? (Y) N		
Sample tubing placement checked	✓			
Grab sample taken to verify pump function	✓			
Sample jars placed in ISCOs, with ice packs as needed	✓			
Data logger and ISCO set to sample	✓	DL set? Y N	ISCO set? Y N	
Threshold values set		Threshold value:		
Weir wheels tightened	✓			
Clean catch basin and HVF on up-turned elbow (as needed)				

Pre-Storm Maintenance Form

Field staff names: Megan + Kevin

Date: 10/09/2020

Time: 10:00 AM

Any indication of damage/tampering during site inspection (surrounding area, pipes, cables, wiring, cords, tubing, monitoring equipment):

No

Maintenance Activities	Activity Performed?	Notes (circle text as appropriate):
Debris/Obstruction Removal from piping (as needed)		Debris removed? Y N
Sample tubing placement checked	✓	ISCO says replace tubing / * Kink in effluent
Grab sample taken to verify pump function		
Sample jars placed in ISCOs, with ice packs as needed	✓	
Data logger and ISCO set to sample		DL set? (Y) N ISCO set? (Y) N
Threshold values set	✓	Threshold value: 266
Weir wheels tightened		
Clean catch basin and HVF on up-turned elbow (as needed)	✓	Remove debris by early next week

SF

Pre-Storm Maintenance Form

Field staff names: Kevin F, Megan E	Date: 10/10/2020
	Time: 5:10 pm

Any indication of damage/tampering during site inspection (surrounding area, pipes, cables, wiring, cords, tubing, monitoring equipment):

No

Maintenance Activities	Activity Performed?	Notes (circle text as appropriate):
Debris/Obstruction Removal from piping (as needed)	✓	Debris removed? (Y) N
Sample tubing placement checked	✓	
Grab sample taken to verify pump function	✓	
Sample jars placed in ISCOs, with ice packs as needed	✓	
Data logger and ISCO set to sample	✓	DL set? (Y) N ISCO set? (Y) N
Threshold values set	✓	Threshold value: 306
Weir wheels tightened		
Clean catch basin and HVF on up-turned elbow (as needed)		Not needed

* datalogger at 2-status

Pre-Storm Maintenance Form

Field staff names: KEVIN FLANAGAN & KAELA MANSFIELD	Date: 10/12/2020
	Time: 13:00

Any indication of damage/tampering during site inspection (surrounding area, pipes, cables, wiring, cords, tubing, monitoring equipment):

NO

Maintenance Activities	Activity Performed?	Notes (circle text as appropriate):		
Debris/Obstruction Removal from piping (as needed)	X	Debris removed? (Y) N	VACUUMED OUT PIPES/PTS	
Sample tubing placement checked	X			
Grab sample taken to verify pump function	X			
Sample jars placed in ISCOs, with ice packs as needed	X			
Data logger and ISCO set to sample	X	DL set? (Y) N	ISCO set? (Y) N	
Threshold values set	X	Threshold value: 306		
Weir wheels tightened	—			
Clean catch basin and HVF on up-turned elbow (as needed)				

Pre-Storm Maintenance Form sand

Field staff names: Megan + Kevin		Date: 10/23/2020 Time: 8:30 am	
Any indication of damage/tampering during site inspection (surrounding area, pipes, cables, wiring, cords, tubing, monitoring equipment): No			
Maintenance Activities	**Activity Performed?**	**Notes (circle text as appropriate):**	
Debris/Obstruction Removal from piping (as needed)	✓	Debris removed? Y (N)	Not needed
Sample tubing placement checked	✓		
Grab sample taken to verify pump function	✓	Influent @ 125 mL	
Sample jars placed in ISCOs, with ice packs as needed	✓		
Data logger and ISCO set to sample	✓	DL set? (Y) N	ISCO set? (Y) N
Threshold values set	✓	Threshold value: 241	
Weir wheels tightened			
Clean catch basin and HVF on up-turned elbow (as needed)	✓	Not needed	

Pre-Storm Maintenance Form - Sand Filter

Field staff names: Kevin, Taylor	Date: 11/4/2020
	Time: 2:00 pm

Any indication of damage/tampering during site inspection (surrounding area, pipes, cables, wiring, cords, tubing, monitoring equipment):
None

Maintenance Activities	**Activity Performed?**	**Notes (circle text as appropriate):**		
Debris/Obstruction Removal from piping (as needed)	✓	Debris removed? Y N	no debris	
Sample tubing placement checked	✓			
Grab sample taken to verify pump function				
Sample jars placed in ISCOs, with ice packs as needed	✓			
Data logger and ISCO set to sample	✓	DL set? (Y) N	ISCO set? (Y) N	
Threshold values set	✓	Threshold value: 210L		
Weir wheels tightened	✓			
Clean catch basin and HVF on up-turned elbow (as needed)				

Pre-Storm Maintenance Form - Sand Filter

Field staff names: Megan + Kaela	Date: 11/7/2020 Time: 9:30
Any indication of damage/tampering during site inspection (surrounding area, pipes, cables, wiring, cords, tubing, monitoring equipment):	

Maintenance Activities	**Activity Performed?**	**Notes (circle text as appropriate):**
Debris/Obstruction Removal from piping (as needed)	✓	Debris removed? (Y) N
Sample tubing placement checked	✓	
Grab sample taken to verify pump function	✓	
Sample jars placed in ISCOs, with ice packs as needed	✓	
Data logger and ISCO set to sample	✓	DL set? (Y) N ISCO set? (Y) N
Threshold values set	✓	Threshold value: 342
Weir wheels tightened		
Clean catch basin and HVF on up-turned elbow (as needed)		frozen

Pre-Storm Maintenance Form - Sand Filter

Field staff names: Kaela + megan	Date: 11/13/2020 Time: 3:45 pm

Any indication of damage/tampering during site inspection (surrounding area, pipes, cables, wiring, cords, tubing, monitoring equipment): None

Maintenance Activities	**Activity Performed?**	**Notes (circle text as appropriate):**
Debris/Obstruction Removal from piping (as needed)		Debris removed? Y (N)
Sample tubing placement checked	✓	
Grab sample taken to verify pump function		
Sample jars placed in ISCOs, with ice packs as needed	✓	
Data logger and ISCO set to sample	✓	DL set? (Y) N ISCO set? (Y) N
Threshold values set	✓	Threshold value: 242
Weir wheels tightened		
Clean catch basin and HVF on up-turned elbow (as needed)		

Pre-Storm Maintenance Form - Sand Filter

Field staff names: megan + Taylor		Date: 11/15/2020 Time: 11:45 am
Any indication of damage/tampering during site inspection (surrounding area, pipes, cables, wiring, cords, tubing, monitoring equipment): None		
Maintenance Activities	**Activity Performed?**	**Notes (circle text as appropriate):**
Debris/Obstruction Removal from piping (as needed)	✓	Debris removed? Y (N)
Sample tubing placement checked	✓	
Grab sample taken to verify pump function		
Sample jars placed in ISCOs, with ice packs as needed	✓	
Data logger and ISCO set to sample	✓	DL set? (Y) N ISCO set? (Y) N
Threshold values set	✓	Threshold value: 80
Weir wheels tightened		
Clean catch basin and HVF on up-turned elbow (as needed)		

Pre-Storm Maintenance Form - Sand Filter

Field staff names: Kevin + Megan	Date: 11/17/2020
	Time: 8:30 am

Any indication of damage/tampering during site inspection (surrounding area, pipes, cables, wiring, cords, tubing, monitoring equipment): None

Maintenance Activities	**Activity Performed?**	**Notes (circle text as appropriate):**		
Debris/Obstruction Removal from piping (as needed)	✓	Debris removed? Y (N)		
Sample tubing placement checked	✓			
Grab sample taken to verify pump function	✓			
Sample jars placed in ISCOs, with ice packs as needed	✓			
Data logger and ISCO set to sample	✓	DL set? (Y) N	ISCO set? (Y) N	
Threshold values set	✓	Threshold value: 97		
Weir wheels tightened				
Clean catch basin and HVF on up-turned elbow (as needed)	✓			

Pre-Storm Maintenance Form - Sand Filter

Field staff names: Taylor + megan	Date: 11/25/2020 Time: 8:30 am
Any indication of damage/tampering during site inspection (surrounding area, pipes, cables, wiring, cords, tubing, monitoring equipment): None	

Maintenance Activities	Activity Performed?	Notes (circle text as appropriate):
Debris/Obstruction Removal from piping (as needed)	✓	Debris removed? Y (N)
Sample tubing placement checked	✓	
Grab sample taken to verify pump function	✓	
Sample jars placed in ISCOs, with ice packs as needed	✓	
Data logger and ISCO set to sample	✓	DL set? (Y) N ISCO set? (Y) N
Threshold values set	✓	Threshold value: 56
Weir wheels tightened		
Clean catch basin and HVF on up-turned elbow (as needed)		

Pre-Storm Maintenance Form - Sand Filter

Field staff names: Megan + Kenn	Date: 12/16/2020 Time: 10:00 am

Any indication of damage/tampering during site inspection (surrounding area, pipes, cables, wiring, cords, tubing, monitoring equipment): No

Maintenance Activities	**Activity Performed?**	**Notes (circle text as appropriate):**
Debris/Obstruction Removal from piping (as needed)	✓	Debris removed? Y (N)
Sample tubing placement checked	✓	
Grab sample taken to verify pump function	✓	
Sample jars placed in ISCOs, with ice packs as needed	✓	
Data logger and ISCO set to sample	✓	DL set? (Y) N ISCO set? (Y) N
Threshold values set	✓	Threshold value: 72
Weir wheels tightened	✓	
Clean catch basin and HVF on up-turned elbow (as needed)	✓	

Pre-Storm Maintenance Form - Sand Filter

Field staff names: Megan + Kevin	Date: 12/17/2020
	Time: 11:05 am

Any indication of damage/tampering during site inspection (surrounding area, pipes, cables, wiring, cords, tubing, monitoring equipment): None

Maintenance Activities	**Activity Performed?**	**Notes (circle text as appropriate):**
Debris/Obstruction Removal from piping (as needed)	✓	Debris removed? Y (N)
Sample tubing placement checked	✓	Potential pump tubing error in effluent
Grab sample taken to verify pump function	✓	
Sample jars placed in ISCOs, with ice packs as needed	✓	
Data logger and ISCO set to sample	✓	DL set? (Y) N ISCO set? (Y) N
Threshold values set	✓	Threshold value: 64
Weir wheels tightened		
Clean catch basin and HVF on up-turned elbow (as needed)		

Appendix C.4 Field Audit

Sand Filter Sidewalk Vault Effectiveness Study Audit

Name of Auditor: Shilo Sprouse, TAG Member, City of Pullman

Date Performed: 12/30/2020

Storm Selection and Tracking		Notes Overall for SOP:	
Step #	**Standard Operating Procedures (SOP)**	**Yes/No/Modified**	**If No or Modified, explain:**
1	Using the local weather forecast, identify the likelihood of storm meeting TAPE guidelines and using the qualitative classification system of "Unlikely", "Marginal", or "Likely".	Modified	Taking probabillity into account sampled when predicted storm was .1 or greater
2	If deemed "Unlikely", the storm was not sampled. If deemed "Marginal" or "Likely", project manager used best judgement whether to prepare for the storm.	Modified	See above, D5
3	If the storm was selected for monitoring, a bottle request was submitted to the lab.	Yes	
4	If the storm was selected for monitoring, the actual rain gauges at the test site were monitored remotely to understand when it is time to collect samples.	Modified	Monitored NWS Airport rain gauge.
Storm Monitoring Equipment Maintenance (every month unless otherwise noted)		**Notes Overall for SOP:**	
Step #	**Standard Operating Procedures (SOP)**	**Yes/No/Modified**	**If No or Modified, explain:**
1	Place traffic cones and visually inspect site for damage or tampering.	Yes	
2	Inspect catchbasin and pipes for debris and measure depth of material on inlet box.	Modified	Inspected CB and pipes for debris however material on inlet box was visually monitored.
3	Disconnect and test power supply for greater than 10.3 volts.	Modified	Didn't need to disconnect to test power supply.
4	Insert USB drive and begin visit report.	Yes	
5	Inspect rain gauge every three months.	Modified	Used data logger info onsite.
6	Inspect ISCO suction tubing, head tubing, and pump tubing for wear and tear.	Yes	
7	Check humidity indicators for ISCO and PTs and replace dessicant as needed.	Yes	
8	Check pump capabilities of ISCOs and calibrate volumed pumped as nescessary or every 3 months.	Yes	
9	End visit report, secure Sand Filter and monitoring vaults, and collect traffic cones as neeed.	Yes	
Preparing Stormwater Monitoring Equipment for Storm Sampling (before every storm unless otherwise noted)		**Notes Overall for SOP: #5, #8 & #10 moved to monthly maintenance based on experience.**	
Step #	**Standard Operating Procedures (SOP)**	**Yes/No/Modified**	**If No or Modified, explain:**
1	Place traffic cones and visually inspect site for damage or tampering.	Yes	
2	Start a visit report on the data logger.	Yes	
3	Inspect catch basin, elbows, pipes, tees, and weirs for debris and measure depth of material on inlet box.	Modified	Inspected CB, elbows, pipes, tees and weirs for debris however material on inlet box was visually monitored.
4	Collect a water surface elevation measurement from the reference point on the control tee. Subtract the measurement from the reference elevation. Compare this value to the to measurement collected by data logger to identify any instrument drift.	Modified	Used the data logger measurement and visually monitored for difference.
5	Remove debris and liquids using a vaccum from pipe tees, weirs, elbows and connections.	Yes	moved to monthly maintenance based on experience
6	Inspect ISCO pump tubing for kinks or bellies and replace as needed. Clean ISCO tubing that was not replaced using a triple rinse of 10% HNO3 acid solution, liquinox soap solution, then lastly a triple rinse of DI water.	Modified	Inspected and replaced each time as needed.
7	Access influent autosampler; place clean suction tubing in carboy of DI water and place clean pump tubing over one bottle provided by the lab for rinsate blank. Set ISCO to "Pump Forward" and fill bottle so that no airspace is remaining when cap is replaced. Once both rinsate bottles are filled, place bottles in a cooler and fill out Chain of Custody for rinsate samples.	Modified	Rinsate samples conducted 3 times. Conducted pre-monitoring , during monitoring and post-monitoring rinsate samples.
8	Adjust weirs and pipe tees to a level position and note in form if weirs or tees were not level.	Yes	Weirs were tightened. Moved to monthly maintenance based on experience.
9	Inspect PTs for cleanliness; if PTs and/or mounts are dirty, remove PT and remove material gently.	Modified	Didn't need to remove PT. Rinsed with ample water.
10	Fill control tee with clean water and use data logger to get a current PT reading and set to zero if no change in water surface elevation occurs.	Yes	moved to monthly maintenance based on experience

Step #	Standard Operating Procedures (SOP)	Yes/No/Modified	If No or Modified, explain:
11	Place sample jars in ISCO, and set ISCOs to sample. Set the data logger value Sampl_enabl to 0 and set threshold values on the data logger.	Yes	
12	End visit report, secure vaults and remove traffic cones.	Yes	
13	Obtain pH probe at office and inspect cable and electrode for damage or buildup. Clean as necessary.	Yes	
Stormwater Sample Collection and Processing (following each storm event)		**Notes Overall for SOP:**	
Step #	**Standard Operating Procedures (SOP)**	**Yes/No/Modified**	**If No or Modified, explain:**
1	Place sample bottles in refridgerator before leaving for the site to keep cool.	Yes	
2	Place traffic cones and visually inspect site for damage or tampering.	Yes	
3	Start visit report and measure water surface elevation using electronic water level indicator.	Modified	Used data logger info.
4	Check ISCO to see if sampling is complete and pour small sample into a beaker for pH test.	Yes	pH tested at Lab.
5	Move composite samples to cooler and repeat for other samples.	Yes	
6	End visit report, secure vaults and remove traffic cones.	Yes	
7	At the office, transfer composite samples to laboratory-specified bottles and filter samples for dissolved metals and ortho-phosphate.	Yes	Filtered as needed.
8	If filtering sample, obtain a syringe and place a 0.45 micron filter on the end of the syringe. Fill the syringe with 50mL of sample and use the syringe to filter sample into the designated bottle. Repeat to fill the bottle.	Modified	Grabbed dissolved metals blank prior to each sample per Lab.
9	Place filled bottles into a cooler and fill out the chain of custody.	Yes	
10	Deliever samples to Anatek under 6 deg C.	Yes	
Monitoring Equipment Data Download (following each storm event)		**Notes Overall for SOP: Conducted when samples were retrieved**	
Step #	**Standard Operating Procedures (SOP)**	**Yes/No/Modified**	**If No or Modified, explain:**
1	Place traffic cones and visually inspect site for damage or tampering.	Yes	
2	Insert USB and download data.	Yes	
3	Close vault and collect traffic cones.	Yes	
Falling Head Test		**Notes Overall for SOP:**	
Step #	**Standard Operating Procedure (SOP)**	**Yes/No/Modified**	**If No or Modified, explain:**
1	Access monitoring vault and sand filter vault.	Yes	
2	Turn valve on effluent pipe to closed.	Modified	Used fire hydrant onsite and saturated media & filled the vault then conducted the falling head test.
3	Measure height from top of sediment to the top of the bypass pipe in 5 different locations. Calculate the average height.		
4	Fill sand filter vault with water until even with overflow pipe. Wait an hour until the media is saturated. Add water until the water surface elevation is even again with the overflow pipe.		
5	Open valve on effluent pipe and start timer. Stop timer when all water has infiltrated into the media. Record the time on the Falling Head Test Form.		
6	Close and secure vaults.	Yes	

Appendix C.5 Deviations from QAPP

Revision #	Section and Page	Original Instructions	Suggested Revision	Reason for Deviation
1	Section 6.1; page 29	Precision for laboratory duplicates will be ± 40 percent relative percent difference (RPD) for oils (NWTPH-Dx), ± 25 percent for TSS, and 20 percent for all other water quality parameters (Table 6.1).	Precision for laboratory duplicates will be 20 percent for all water quality parameters (Table 6.1).	Text was revised to be consistent with analytical laboratory's (Anatek) RPD limits.
2	Section 6.1; page 29	Rain gauge and flow measurement precision will be assessed at the beginning and end of the study. The rain gage precision will be assessed by pouring a known quantity of water into the tipping bucket two times. Precision for the rain gage measurements will be ± 20 percent RPD. Precision for flow will be assessed by comparing repeated pressure measurements with a known depth of water over each of the respective pressure transducers. Precision for pressure transducer measurements will be ± 20 percent RPD.	Rain gauge and flow measurement precision will be assessed as needed throughout the study. The rain gauge precision will be checked against nearby rain gauges. Precision for the rain gage measurements will be ± 20 percent RPD. Precision for flow will be assessed by comparing repeated pressure measurements with a known depth of water over each of the respective pressure transducers. Precision for pressure transducer measurements will be ± 20 percent RPD.	Nearby rain gauges and weather stations provide a check to determine whether the rain gauge is operating properly and whether maintenance is needed for the rain gauge. Precision for flow is assessed each time the pressure transducers are calibrated; depth measurements are accepted for calibration only if differences between measurements are equal to or less than ±0.001.
3	Section 6.2; page 29	Rinsate blank values will not exceed two times the reporting limit.	Rinsate blank values will not exceed 1/10th of composite sample concentrations to be considered unacceptably affected.	Per 2018 TAPE Guidance Manual, composite sample concentrations greater than 10 times the result of rinsate blanks are considered unacceptably affected.
4	Section 8.1.1, page 50	Whether to monitor an upcoming storm event is based upon the qualitative classification system of "Unlikely", "Marginal", or "Likely". The minimum rainfall amount to monitor is 0.15 inches.	Lowed the minimum rainfall amount to 0.08-0.10 inches. If the sum product of probability and rainfall amounts over the duration of the storm is greater than or equal to 0.08 inches, set up the site to monitor the storm event.	Multiplying the probability of rainfall by the predicted rainfall amount forecasted on the NWS Spokane Station website provided more accurate estimates of whether a storm could be successfully monitored. In this case, successfully monitored means the storm depth was predicted to gather at least 10 aliquots for influent and effluent and capture 75% of the hydrograph.
5	Section 8.1.2, 8.1.3, 8.1.9	Measure depth of material in inlet box according to procedures in Section 8.1.9. Note depth on Inlet Box Sediment Depth field form. Note and describe any debris on the field form.	Remove Inlet Box Sediment Depth SOP and step in Storm Monitoriong and Equipment Maintenance SOP.	Sediment in inlet box was not reliably measurable. Inlet box was never dry, and sediment/material was too soft to get a reliable measurement.
6	Section 8.1.2, page 52	Disconnect power to battery to check the voltage of the battery.	Delete "Disconnect power to battery"	Power did not need to be disconnected to check the voltage of the batteries.
7	Section 8.1.2, page 53	Once every three months, unplug the rain gage from the data logger. Remove cover from rain gage and check instrument for levelness and cleanliness of internal parts. Clear any debris carefully. Note any discrepancies and reset level of rain gage platform if needed. Replace cover on rain gage and plug rain gage back in to the data logger.	If nearby rain gauges indicate there is a discrepancy in the rain gauge readings, unplug the rain gage from the data logger. Remove cover from rain gage and check instrument for levelness and cleanliness of internal parts. Clear any debris carefully. Note any discrepancies and reset level of rain gage platform if needed. Replace cover on rain gage and plug rain gage back in to the data logger.	During the study, nearby rain gauges were used to check the readings of the rain gauge at the site. If consistent differences begin to arise, maintenance would then be performed.
8	Section 8.1.3, page 56	Before starting to clean, collect a water surface elevation measurement from the reference point on the control tee. Record the measurement and reference elevation on the Pre-Storm Event Maintenance Checklist in the assigned space. Assign a + or – value to your reading if there is any uncertainty due to debris, blockage, etc. Subtract the measurement from the reference elevation to determine water surface elevation and record the value on the form. Compare this value to the measurement collected by the data logger to identify any prior instrument drift.	Delete this step from SOP.	The water depth recorded by the pressure transducer was occasionally checked with a tape measure or similar device during calibration. No difference was ever observed.
9	Section 8.1.3, page 56	Inspect the pump, suction, and head tubing for the ISCO. If kinks or bellies are observed in the tubing, replace the tubing. Clean any ISCO tubing that was not replaced.	Inspect the pump, suction, and head tubing for the ISCO. If kinks or bellies are observed in the tubing, replace the tubing.	Replacement of tubing appears to be the best way to reduce contamination and is safer than lowering a solution of nitric acid above someone's head into a vault.
10	Section 8.1.3, Steps 7-11	Steps 7-11 cover collection of rinsate blanks.	Remove steps from Section 8.1.3, place in separate SOP.	Rinsate blank samples are taken three times during the project as opposed to before every storm event.
11	Section 8.1.3, page 56	Use a level to check position of weirs and pipe tees. Adjust to a level position as needed, and note if weirs or tees were not level on the Pre-Storm Event Maintenance Checklist.	Move step to Section 8.1.2, and change to "tighten weirs".	Weirs do not move once they are installed, but the gasket can become loose enough to allow water to leak underneath the gasket. Tightening the weirs once per month appeared to solve that issue.

Revision #	Section and Page	Original Instructions	Suggested Revision	Reason for Deviation
12	Section 8.1.3, Steps 14-15	Steps 14-15 cover calibration of the pressure transducer zero-depth reading.	Move step to Section 8.1.2.	After the study had begun, and following some analysis of the data, it appeared that calibrating the pressure transducers once per month was sufficient. These steps could be moved to Section 8.1.2.
13	Section 8.1.3, Steps 21-34	Steps 21-34 cover maintenace of the pH meter.	Move step to Section 8.1.5.	It is preferable to maintain and calibrate the pH meter immediately before taking pH measurements.
14	Section 8.1.4	Section covers Stormwater Grab Sampling.	SOP was not used for this study.	Due to the location of the site, it was not possible to anticipate the rising limb of the hydrograph and obtain a grab sample. Additionally, NWTPH-Dx analyses at the site rarely showed anything other than a non-detect value. No oil sheen was ever observed in the inlet box or influent or effluent pipes.
15	Section 8.1.5, Steps 7-10	Steps cover pH reading performed in the field.	Revise to indicate pH measurement is done at the office.	It was significantly easier and safer to take pH measurements in the office immediately after sample collection and a 30 minute driving to the office rather than in the field because the test site is located at a busy intersection.
16	Section 8.1.5, page 61	None	Add a step covering collection of a metals blank for use at the lab if dissolved metals sample is filtered at OCI.	Per instructions from the lab, a blank is needed prior to collecting any sample through one of the 0.45 micron filters.
17	Section 8.1.5, page 61	None	Add a step which describes how to fill the cooler with ice when samples are ready for transport to Anatek.	During the study, the analytical laboratory (Anatek) recommended we place a layer of ice into the cooler, place the samples above that layer, and then fill the rest of the cooler to the brim with ice. This ensures samples arrive at approximately 2 degrees Celsius at the lab.
18	Section 8.1.6	Section covers data download from monitoring site.	Add the steps from this SOP to Section 8.1.5.	Data was downloaded at the same time as samples were collected. A separate trip to the site was not made to download the data.
19	Section 8.1.7	Section covers estimation of sediment accumulation rate in the sand filter sidewalk vault.	Remove steps regarding measurement of sediment depth. Revise SOP to use 3-inch by 3-inch transects of accumulated media to estimate accumulation.	Sediment on top of the sand filter was not measurable because sediment tended to filter through the coir mat and settle onto the top of and migrate into the sand filter media. Collection of transects would enable measurement of sediment accumulation on top of the media.
20	8.1.8	Section covers how to perform a falling head test at the site.	Remove reference to valve; revise SOP to describe use of water from nearby hydrant to saturate the media, then conduct a falling head test once a static flow rate had been achieved.	A valve was not able to be installed in the sand filter effluent pipe. Instead, the nearby hydrant was used to saturate the sand filter media and perform a falling head test.

Appendix C.6 Identification of Quality Assurance Issues & Recommended Solutions

A common quality assurance issue identified during the study was related to the temperature of the samples once they arrived at the laboratory. The samples could be surrounded in ice packs and stored in the freezer for up to the past 24 hours, but still be recorded above the maximum temperature of 6 degrees Celsius. Upon discussion with the lab, corrective action was taken. The corrective action adjusted how samples were transported to the laboratory. Instead of ice packs, ice was used in the cooler. First, a shallow layer of ice was placed in the bottom of the cooler before samples were put into the cooler. The samples were then placed on top of the layer of ice. Once the samples were in the cooler it was filled to the rim with ice. This resulted in samples being measured at a consistent temperature of 2 degrees Celsius at the lab.

Results of samples were plotted against temperature to observe whether temperature influenced the sample concentrations. A consistent relationship was not identified for TSS, dissolved copper, or dissolved zinc. The plots for TSS, dissolved copper, and dissolved zinc are shown in Figures C6.1, C.6.2, and C.6.3.

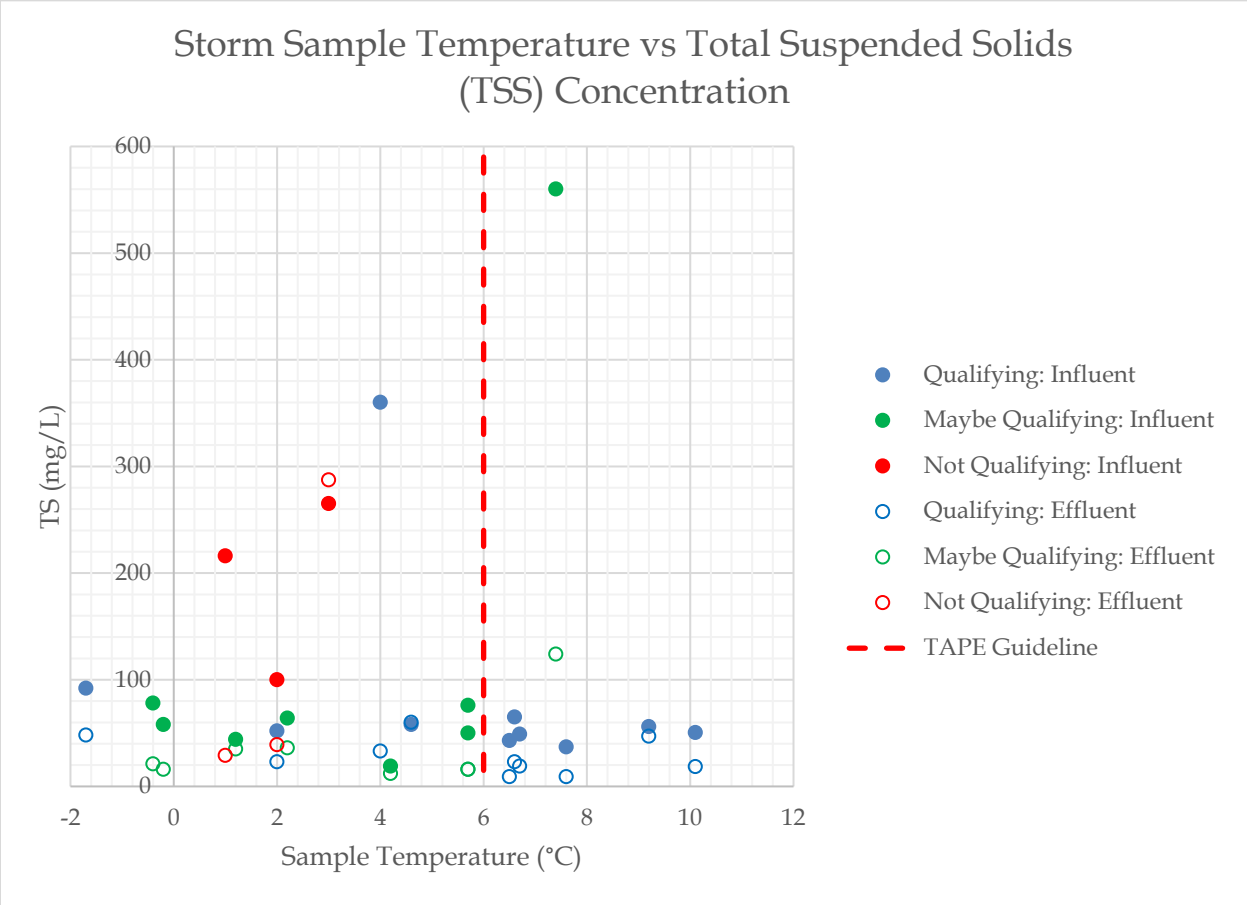


Figure C.6.1 Storm Sample Temperature vs. TSS Concentration

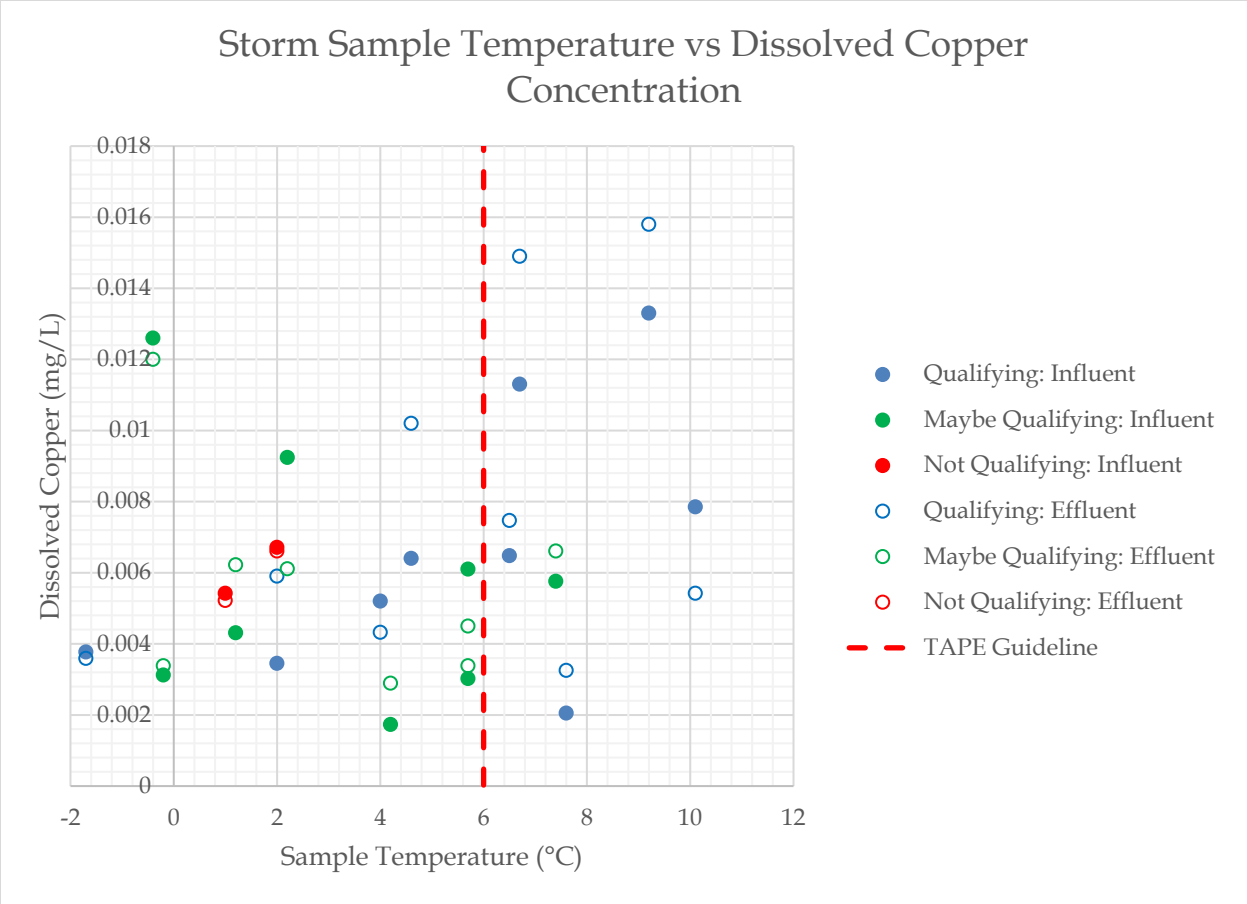


Figure C.6.2 Storm Sample Temperature vs. Dissolved Copper Concentration

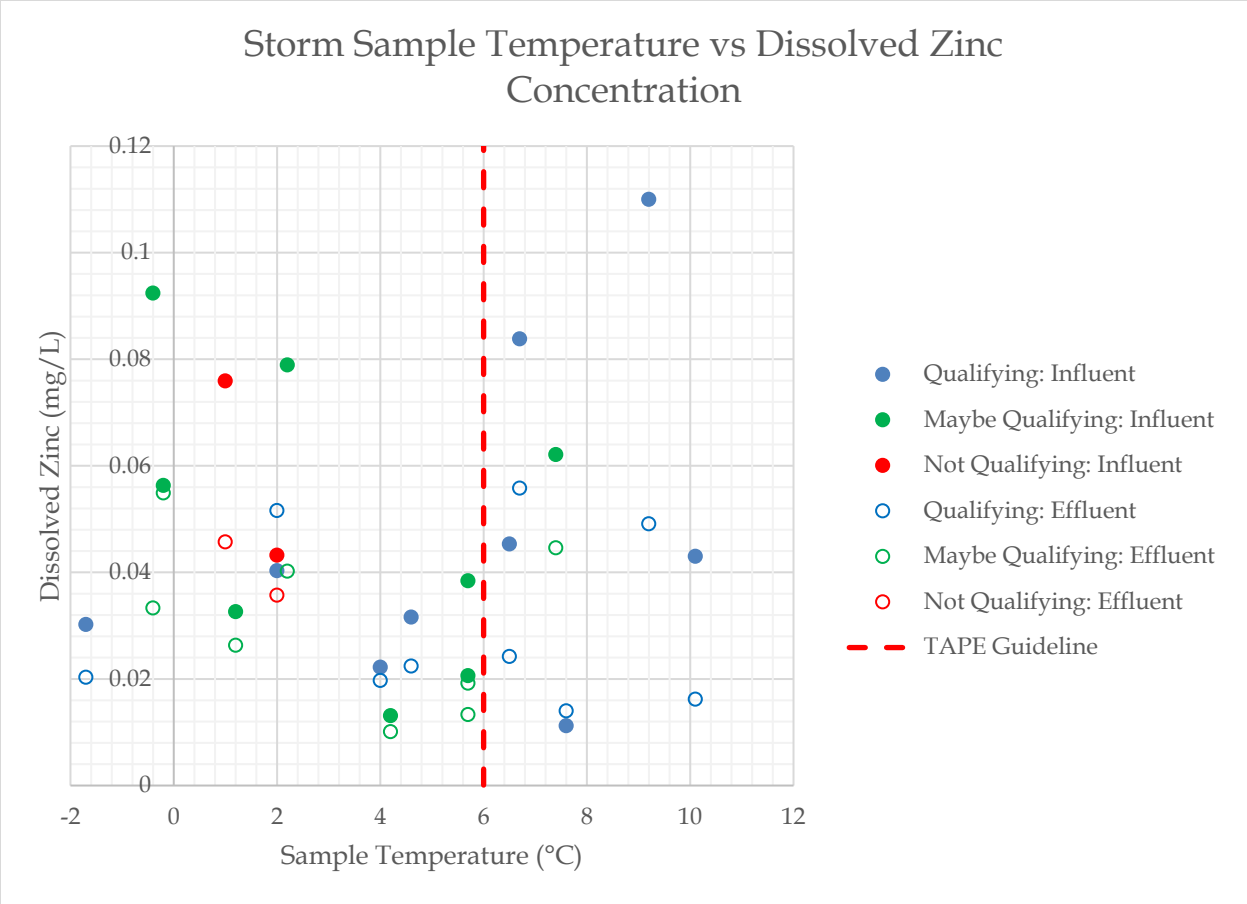


Figure C.6.2 Storm Sample Temperature vs. Dissolved Zinc Concentration

No other quality assurance issues were identified during the study.

APPENDIX D. STATISTICAL AND DATA ANALYSIS

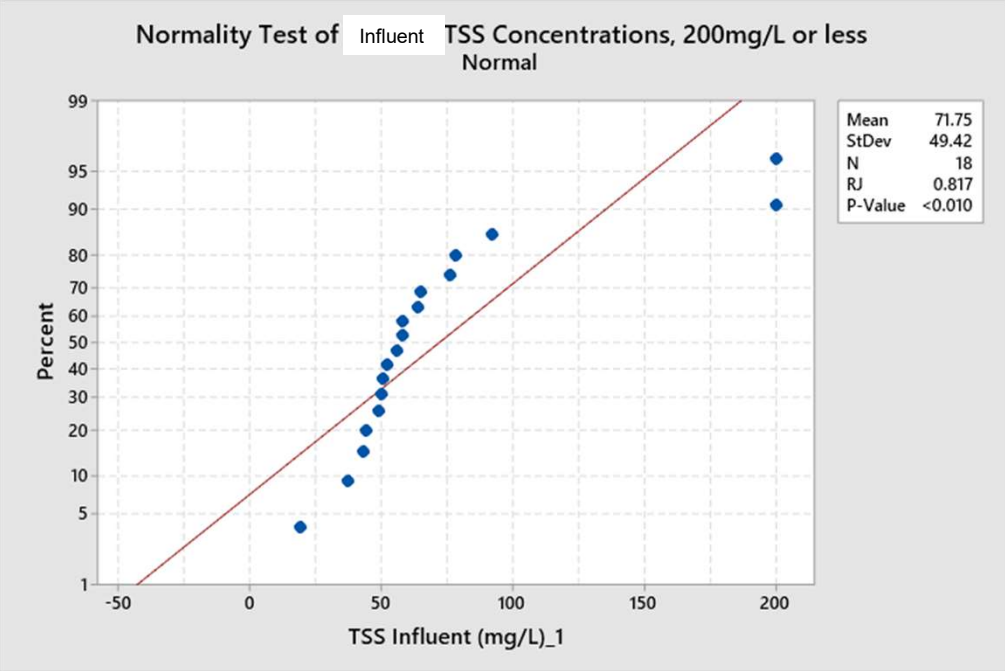
Appendix D.1 Statistical Comparison of Influent and Effluent

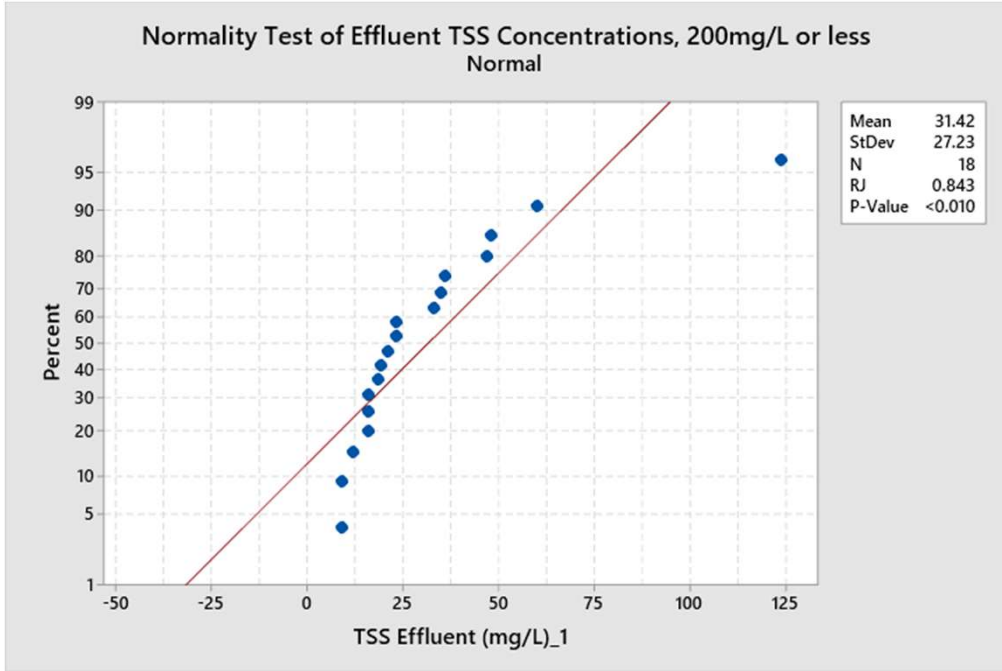
TSS Influent and Effluent Data

- Without adjusting influent concentrations:
  - Not normally distributed
  - Significant difference between influent and effluent
- Adjust influent concentrations to a maximum of 200mg/L (per TAPE)
  - Not normally distributed
  - Significant difference between influent and effluent
- Adjust influent concentrations to a maximum of 200mg/L (per TAPE), remove outliers
  - Not normally distributed
  - Significant difference between influent and effluent

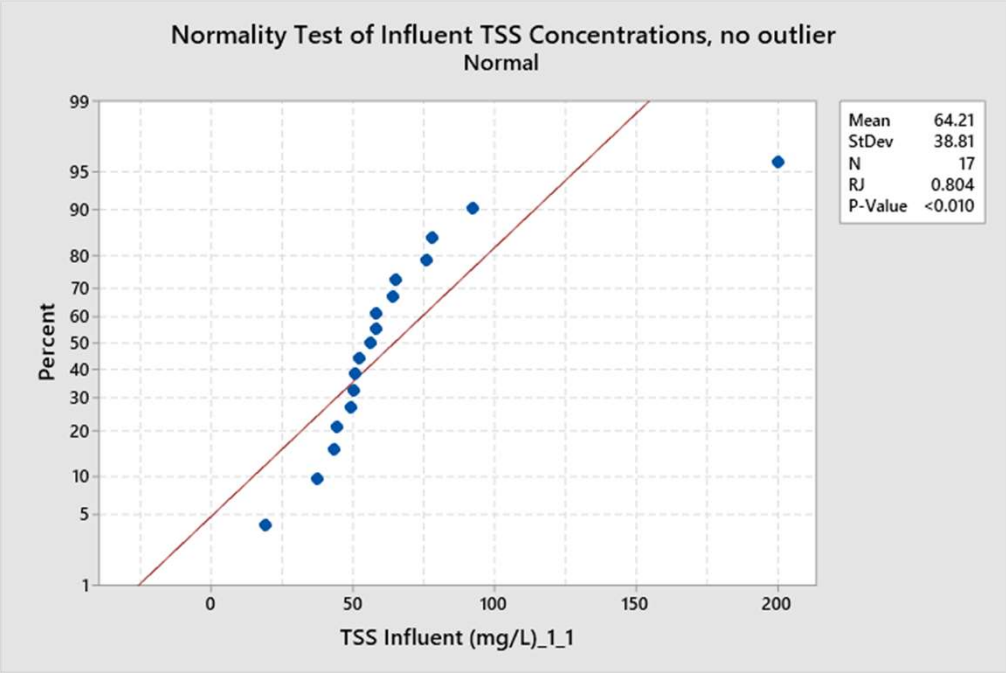
Following TAPE guidelines, influent concentrations above 200mg/L should be adjusted to 200mg/L

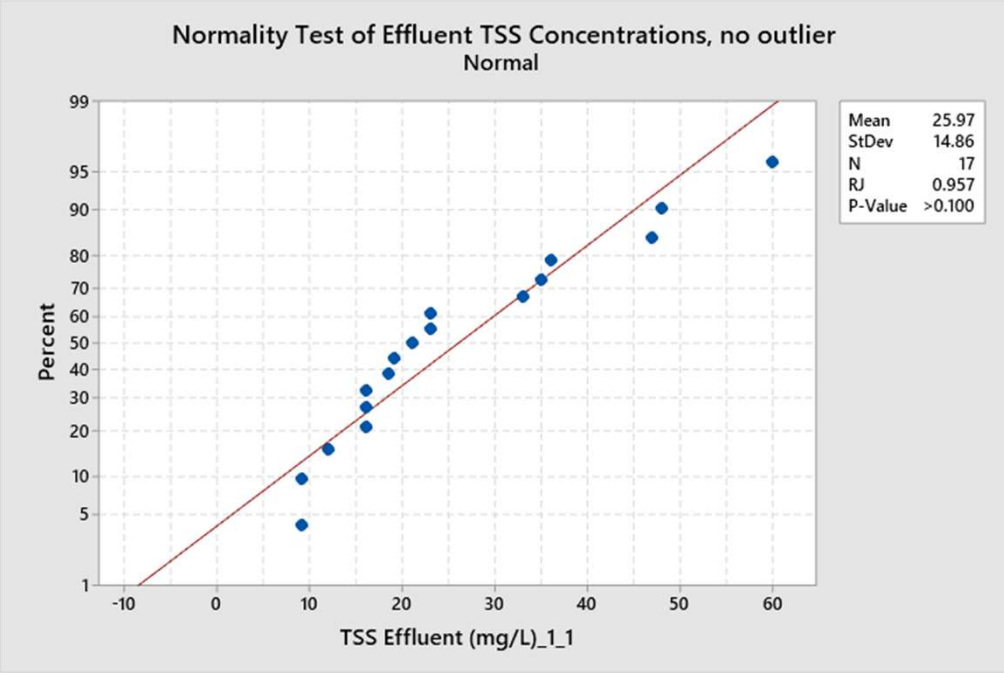
Normality Test of TSS Concentration Data





Normality Test of TSS Concentration Data – no outliers





TSS Influent and Effluent

- Mann-Whitney test (similar to Wilcoxon signed-rank test)
  - Per TAPE Guidance, for non-normally distributed data
- **<u>Influent and effluent determined to be significantly different</u>**
  - Null Hypothesis: Effluent pollutant concentration = Influent pollutant concentration
  - Alternate Hypothesis: Effluent pollutant concentration ≠ Influent pollutant concentration

Method

η_1: median of TSS Influent (mg/L)_1
η_2: median of TSS Effluent (mg/L)_1
Difference: η_1 - η_2

Descriptive Statistics

Sample	N	Median
TSS Influent (mg/L)_1	18	57
TSS Effluent (mg/L)_1	18	22

Estimation for Difference

Difference	CI for Difference	Achieved Confidence
33	(20, 44)	95.20%

Test

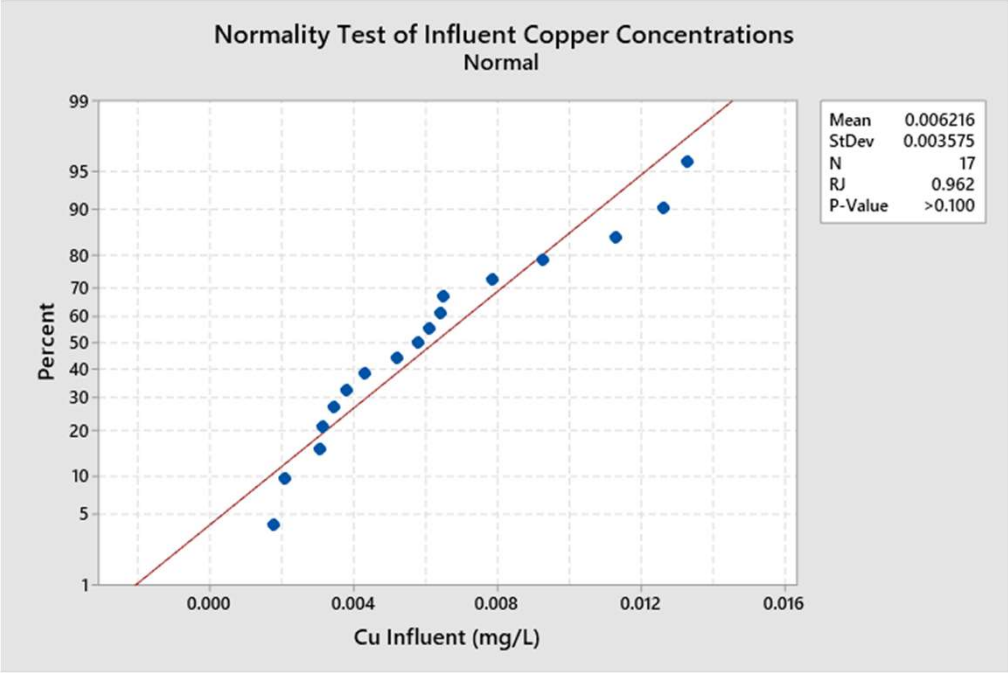
Null hypothesis H_0: η_1 - η_2 = 0
Alternative hypothesis H_1: η_1 - η_2 ≠ 0

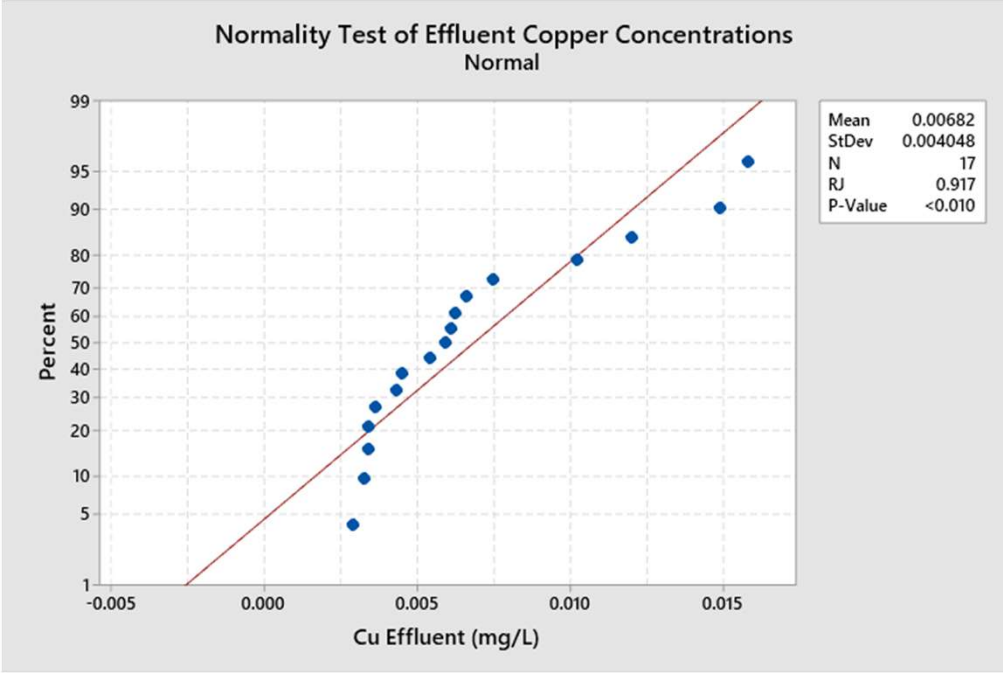
Method	W-Value	P-Value
Not adjusted for ties	453.50	0.000
Adjusted for ties	453.50	0.000

Zinc and Copper Influent and Effluent Data

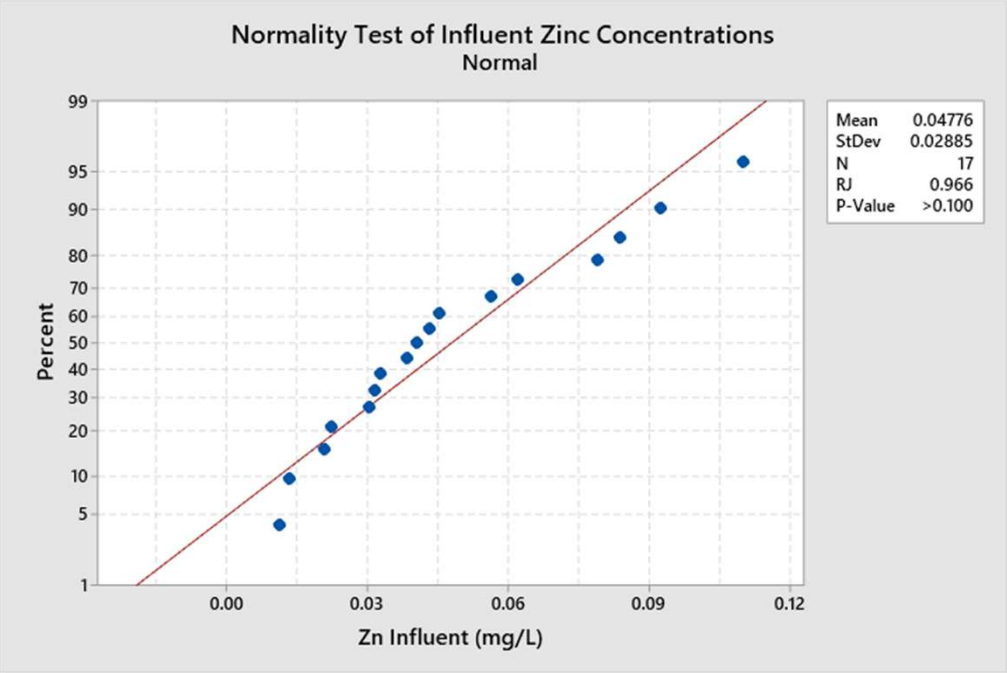
- Zinc data normally distributed
  - Use of 2 Sample t-Test to determine statistical significance
    - More powerful for normally distributed data
- Copper data mix of normally (influent) and non-normally (effluent) distributed
  - Use of Mann-Whitney Test to determine statistical significance

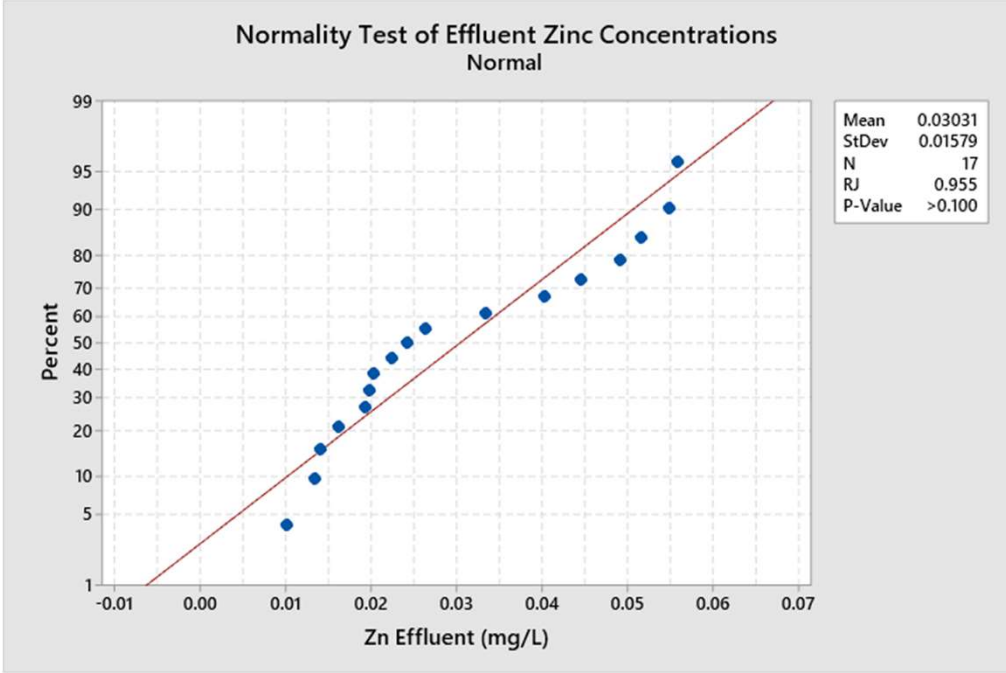
Copper Normality





Zinc Normality





Zinc and Copper Influent and Effluent Data

- Mann-Whitney Test for Copper:
  - **Influent and effluent NOT determined to be significantly different**
  - Null hypothesis confirmed
  - P = 0.679, P > 0.05
- 2 Sample T-Test for Zinc:
  - **Influent and effluent determined to be significantly different**
  - Alternative hypothesis confirmed
  - P = 0.039, P ≤ 0.05

Test

Null hypothesis	$H_0: \eta_1 - \eta_2 = 0$
Alternative hypothesis	$H_1: \eta_1 - \eta_2 \neq 0$

Method	W-Value	P-Value
Not adjusted for ties	285.00	0.679
Adjusted for ties	285.00	0.679

Test

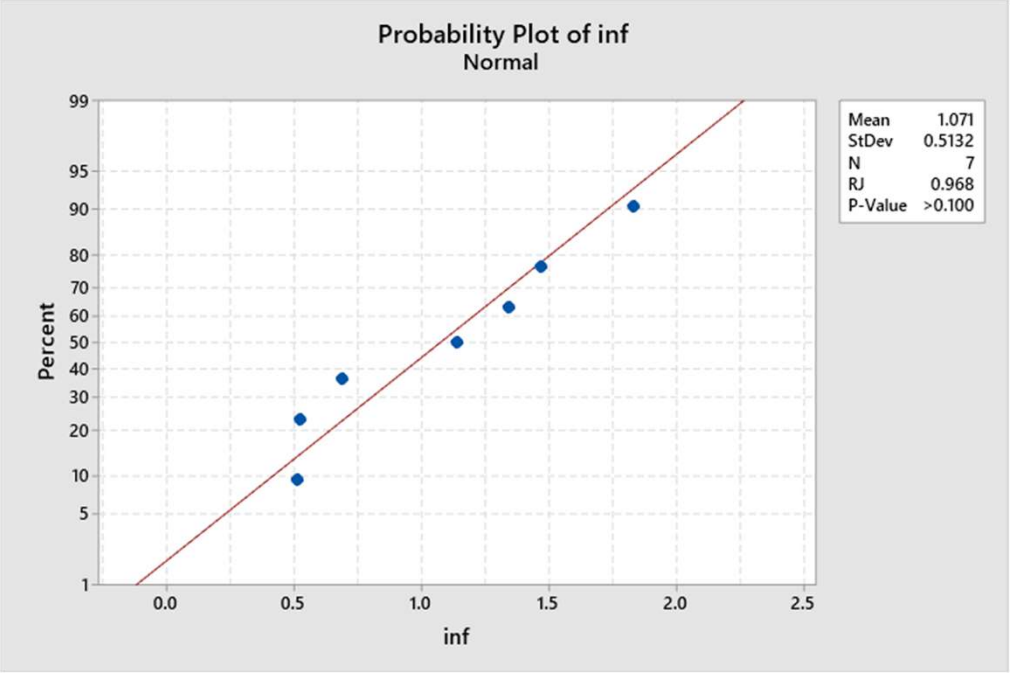
Null hypothesis	$H_0: \mu_1 - \mu_2 = 0$
Alternative hypothesis	$H_1: \mu_1 - \mu_2 \neq 0$

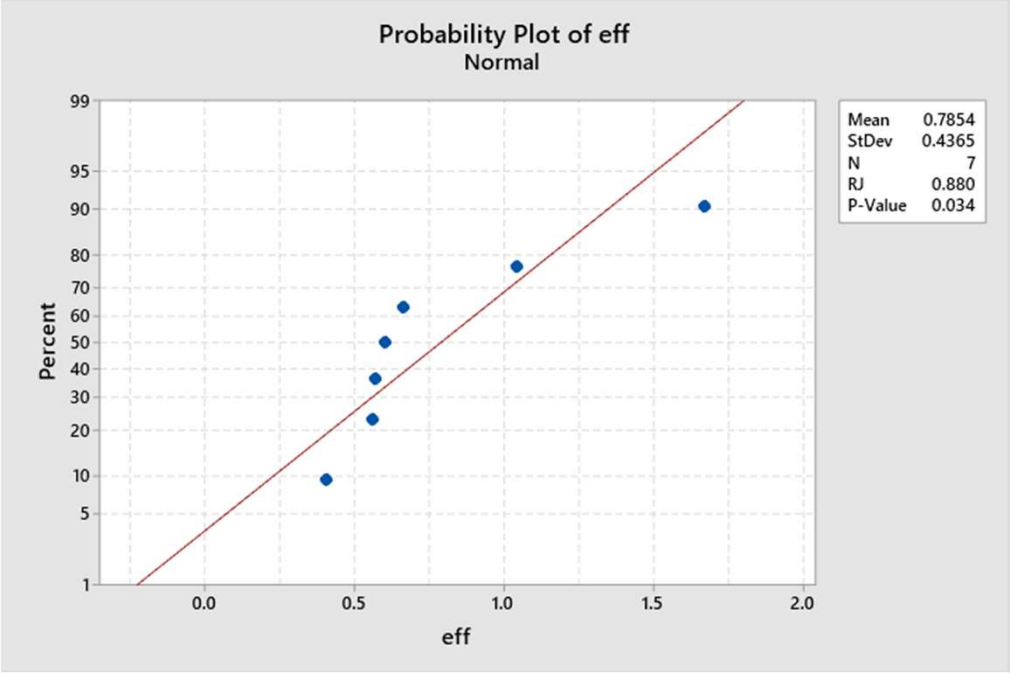
T-Value	DF	P-Value
2.19	24	0.039

Oils Influent and Effluent Data

- Oils data mix of normally (influent) and non-normally (effluent) distributed
  - Use of Mann-Whitney Test to determine statistical significance

Oils Normality





Oils Influent and Effluent Data

- Mann-Whitney Test for Oils:
  - **<u>Influent and effluent NOT determined to be significantly different</u>**
  - Null hypothesis confirmed
  - P = 0.371, P > 0.05

Test

Null hypothesis	$H_0: \eta_1 - \eta_2 = 0$
Alternative hypothesis	$H_1: \eta_1 - \eta_2 \neq 0$

W-Value	P-Value
60.00	0.371

Appendix D.2 Pollutant Effluent Concentrations and Removal Efficiencies

	TAPE Qualifying Parameters		TAPE Guideline																						
	Storm ID			9/18/2019	10/18/2019	10/21/2019	11/19/2019	12/7/2019	1/6/2020	1/28/2020	3/31/2020	5/2/2020	5/17/2020	5/20/2020	5/31/2020	6/14/2020	6/16/2020	7/1/2020	9/23/2020	9/25/2020	10/10/2020	10/13/2020	11/5/2020	11/13/2020	11/14/2020	11/16/2020	11/25/2020
	Qualifying?		Qualified?	N	N	M	Y	M	M	Y	N	Y	Y	Y	M	M	M	M	Y	M	Y	Y	Y	Y	N	Y	N
Storm Data	Minimum Storm Depth (inches)	inches	0.15"	0.13	0.05	0.49	0.18	0.25	0.11	0.65	0.14	0.25	0.18	1.19	0.83	0.1	0.15	0.12	0.16	0.15	0.4	0.36	0.33	0.39	0.08	0.17	0.06
	Minimum Storm Duration (hr)	hours	1 hour	6.08	5.83	15.25	7.58	9.83	9.00	19.83	7.33	7.92	6.25	19.25	10.58	6.08	6.92	6.25	6.83	7.08	9.75	9.92	8.92	9.92	6.00	9.33	5.75
	Storm Average Intensity (in/hr)	in/hr	Range of rainfall intensities	0.52	0.18	0.12	0.13	0.12	0.12	0.13	0.13	0.15	0.31	0.14	0.22	0.40	0.16	0.22	0.14	0.13	0.14	0.14	0.13	0.12	0.12	0.12	0.18
	Storm Peak Intensity (in/hr)	in/hr		0.96	0.24	0.12	0.24	0.12	0.12	0.24	0.24	0.24	0.96	0.36	0.84	0.72	0.24	0.48	0.24	0.24	0.24	0.24	0.24	0.12	0.12	0.12	0.24
	Storm Antecedent Dry Period (hr)	hours	6 hrs w/ <0.04" rainfall before the storm start	201.92	63.17	14.17	42.75	138.00	73.42	14.58	14.83	238.42	53.58	5.00	125.33	12.33	28.17	25.83	1158.00	27.83	386.17	26.42	41.50	58.42	30.00	32.00	31.42
	Post Storm Dry Period > 6hr?	hours	6 hours minimum with less than 0.04 inches of rain	N/A	N/A	Y	Y	Y	N/A	Y	Y	Y	Y	Y	Y	Y	Y	N/A	Y	Y	Y	Y	Y	Y	Y	Y	Y
Total Volume	Influent	ft^3		188.206	32.092	1393.778	296.974	332.400	18.491	265.000	28.563	129.341	119.943	716.789	724.175	30.965	61.767	56.304	50.772	42.002	131.324	173.422	124.312	150.931	8.841	39.006	12.116
	Effluent	ft^3		65.585	7.299	222.181	201.748	289.549	23.353	90.257	6.534	92.121	75.693	190.318	150.701	26.219	23.787	41.431	59.429	46.869	114.810	135.116	139.253	242.279	26.649	75.789	24.502
	Bypass	ft^3		0.000	0.000	0.000	0.000	0.000	0.000	172.269	0.000	0.000	0.000	59.672	92.454	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Average Flow Rate	Influent (gpm)	gpm	Range	25.585	3.199	15.671	8.540	5.848	0.864	75.184	0.821	3.335	2.391	5.988	13.884	3.087	1.965	1.123	1.582	1.963	3.117	2.981	2.446	1.946	0.184	0.566	0.477
	Effluent (gpm)	gpm		5.162	0.496	2.498	5.485	4.977	0.944	0.808	0.315	2.701	4.042	1.746	3.130	2.801	1.547	0.826	1.084	1.630	2.641	2.322	2.239	3.045	0.553	1.012	0.531
	Bypass (gpm)	gpm		0.000	0.000	0.000	0.000	0.000	0.000	3.584	0.000	0.000	0.000	2.352	4.197	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Peak Flow Rate	Influent (gpm)	gpm	Range	188.284	15.067	43.008	44.675	29.084	5.545	271.044	2.483	26.125	44.777	35.686	72.979	24.814	9.792	24.492	10.540	10.350	16.252	16.502	8.067	7.281	0.793	3.543	5.986
	Effluent (gpm)	gpm		72.979	2.811	7.589	30.744	24.992	4.540	2.033	0.793	18.054	23.543	6.123	14.333	12.989	4.055	14.103	10.732	8.563	13.876	11.931	8.396	8.733	1.408	4.272	2.897
	Bypass (gpm)	gpm		0.000	0.000	0.000	0.000	0.000	0.000	10.775	0.000	0.000	0.000	6.954	17.022	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Aliquots	Influent	-	10 aliquots minimum	12	5	>45	40	>45	5	>45	0	22	28	42	>45	8	17	15	17	9	13	16	16	17	3	13	6
	Effluent	-		18	1	25	27	>45	6	10	0	16	17	11	13	7	6	11	21	10	12	12	18	28	9	26	12
Maximum Sample Duration	Influent (hr)	hours	36 hours maximum	1.08	0.33	13.33	3.25	6.25	0.83	5.00	0.00	2.67	6.08	13.08	5.08	0.58	1.50	1.17	1.33	1.58	3.50	5.33	3.42	1.33	3.50	2.50	1.08
	Effluent (hr)	hours		1.42	0.00	10.25	2.58	5.75	0.42	1.67	0.00	2.67	1.33	13.00	5.00	0.50	0.92	0.83	4.17	1.58	3.75	3.17	3.75	6.50	5.25	5.67	2.50
Storm Event Coverage	% of Influent	-	75% of storm for the first 24 hours	22.53%	85.33%	28.52%	98.52%	69.36%	92.68%	100.00%	0.00%	96.17%	99.81%	99.38%	70.26%	91.29%	97.25%	94.14%	94.65%	98.43%	93.05%	99.76%	95.51%	96.32%	95.92%	94.21%	97.99%
	% of Effluent	-		96.98%	75.03%	0.99	0.98	0.80	0.88	0.98	0.00	0.98	0.96	0.98	0.98	0.94	0.89	0.94	1.00	0.98	0.98	0.96	0.96	0.99	0.95	0.97	0.97
90th Percentile Flow Rate	Influent	gpm		61.927	10.480	31.171	23.392	17.675	2.435	193.687	2.036	8.653	2.075	20.343	41.165	8.564	6.979	1.605	4.564	4.163	7.133	8.700	6.192	5.460	0.575	2.022	1.314
Influent Concentration	TSS	mg/L	≥20 mg/L	216	100	76	92	64	560	360	265.1	58	50.5	37	50	58	19	44	56	78	49	65	43	52	N/A	N/A	N/A
	Dissolved Cu	mg/L	0.005-0.02 mg/L	0.00542	0.00671	0.0061	0.00377	0.00924	0.00576	0.0052	N/A	0.0064	0.00785	0.00205	0.00302	0.00312	0.00173	0.00431	0.0133	0.0126	0.0113	N/A	0.00648	0.00345	N/A	N/A	N/A
	Dissolved Zn	mg/L	0.02-0.03 mg/L	0.0759	0.0432	0.0384	0.0302	0.0789	0.0621	0.0222	N/A	0.0316	0.043	0.0112	0.0206	0.0563	0.0131	0.0326	0.11	0.0924	0.0838	N/A	0.0453	0.0403	N/A	N/A	N/A
	Total Phosphorus	mg/L	0.1-0.5 mg/L	0.345	N/A	N/A	0.308	0.178	N/A	N/A	N/A	N/A	0.628	0.1	0.642	N/A	N/A	N/A	0.654	N/A	0.512	0.142	1.08	1.15	N/A	0.12	N/A
Effluent Concentration	TSS	mg/L	≥20 mg/L	29	39	16	48	36	124	33	287.3	60	18.5	9	16	16	12	35	47	21	19	23	9	23	N/A	N/A	N/A
	Dissolved Cu	mg/L	0.005-0.02 mg/L	0.00522	0.00661	0.00338	0.00359	0.00611	0.00661	0.00432	N/A	0.0102	0.00542	0.00325	0.0045	0.00338	0.00289	0.00622	0.0158	0.012	0.0149	N/A	0.00747	0.0059	N/A	N/A	N/A
	Dissolved Zn	mg/L	0.02-0.03 mg/L	0.0457	0.0357	0.0133	0.0203	0.0402	0.0446	0.0197	N/A	0.0224	0.0162	0.014	0.0192	0.0549	0.0101	0.0263	0.0491	0.0333	0.0558	N/A	0.0242	0.0516	N/A	N/A	N/A
	Total Phosphorus	mg/L	0.1-0.5 mg/L	0.104	N/A	N/A	0.19	0.142	N/A	N/A	N/A	N/A	0.25	0.063	0.45	N/A	N/A	N/A	0.619	N/A	0.477	0.15	0.864	0.236	N/A	0.153	N/A
Sample Data	Temperature < 6°C	Celsius	Sample Temperature cannot exceed 6°C	3.2	2.3	5.7	-1.7	2.2	7.4	4	N/A	4.6	10.1	7.6	5.7	-0.2	4.2	1.2	9.2	-0.4	6.7	6.6	6.5	2	2	4.4	4.8

TSS Removal Efficiency

TSS					
Qualifying?	Storm Event	Influent (mg/L)	Effluent (mg/L)	Percent Reduction	90% Percentile Influent Flow Rate
Y	11/19/2019	92	48	47.83%	23.392
Y	1/28/2020	360	33	90.83%	193.687
Y	5/2/2020	58	60	-3.45%	8.653
Y	5/17/2020	50.5	18.5	63.37%	2.075
Y	5/20/2020	37	9	75.68%	20.343
Y	9/23/2020	56	47	16.07%	4.564
Y	10/10/2020	49	19	61.22%	7.133
Y	10/13/2020	65	23	64.62%	8.700
Y	11/5/2020	43	9	79.07%	6.192
Y	11/13/2020	52	23	55.77%	5.460
Y	11/16/2020	0	0		2.022
M	10/21/2019	76	16	78.95%	31.171
M	12/7/2019	64	36	43.75%	17.675
M	1/6/2020	560	124	77.86%	2.435
M	5/31/2020	50	16	68.00%	41.165
M	6/14/2020	58	16	72.41%	8.564
M	6/16/2020	19	12	36.84%	6.979
M	7/1/2020	44	35	20.45%	1.605
M	9/25/2020	78	21	73.08%	4.163
N	9/18/2019	216	29	86.57%	61.927
N	10/18/2019	100	39	61.00%	10.480
N	3/31/2020	265.1	287.3	-8.37%	2.036
N	11/14/2020	0	0		0.575
N	11/25/2020	0	0		1.314

TSS Averages			
	Influent	Effluent	Percent Reduction
Qualifying Average	55.83	28.50	51.13%
Maybe Qualifying Average	55.57	21.71	56.21%
Qualifying and Maybe Qualifying Average	55.72	25.53	53.35%

Notes:

Cells highlighted in blue have calculations.

Cells highlighted in yellow are not included in the average

Dissolved Copper Removal Efficiency

Dissolved Copper					
Qualifying?	Storm Event	Influent (mg/L)	Effluent (mg/L)	Percent Reduction	90% Percentile Influent Flow Rate
Y	11/19/2019	0.00377	0.00359	4.77%	23.39
Y	1/28/2020	0.0052	0.00432	16.92%	193.69
Y	5/2/2020	0.0064	0.0102	-59.38%	8.65
Y	5/17/2020	0.00785	0.00542	30.96%	2.08
Y	5/20/2020	0.00205	0.00325	-58.54%	20.34
Y	9/23/2020	0.0133	0.0158	-18.80%	4.56
Y	10/10/2020	0.0113	0.0149	-31.86%	7.13
Y	10/13/2020	0	0		8.70
Y	11/5/2020	0.00648	0.00747	-15.28%	6.19
Y	11/13/2020	0.00345	0.0059	-71.01%	5.46
Y	11/16/2020	0	0		2.02
M	10/21/2019	0.0061	0.00338	44.59%	31.17
M	12/7/2019	0.00924	0.00611	33.87%	17.68
M	1/6/2020	0.00576	0.00661	-14.76%	2.44
M	5/31/2020	0.00302	0.0045	-49.01%	41.16
M	6/14/2020	0.00312	0.00338	-8.33%	8.56
M	6/16/2020	0.00173	0.00289	-67.05%	6.98
M	7/1/2020	0.00431	0.00622	-44.32%	1.61
M	9/25/2020	0.0126	0.012	4.76%	4.16
N	9/18/2019	0.00542	0.00522	3.69%	61.93
N	10/18/2019	0.00671	0.00661	1.49%	10.48
N	3/31/2020	0	0		2.04
N	11/14/2020	0	0		0.57
N	11/25/2020	0	0		1.31

Dissolved Copper Averages			
	Influent	Effluent	Percent Reduction
Qualifying Average	0.0066	0.0079	-22.47%
Maybe Qualifying Average	0.0057	0.0056	-12.53%
Qualifying and Maybe Qualifying Average	0.0062	0.0068	-17.79%

Dissolved Copper Averages - Opts Influent Concentrations less than 0.005 mg/L			
	Influent	Effluent	Percent Reduction
Qualifying Average	0.0084	0.0097	-12.90%
Maybe Qualifying Average	0.0084	0.0070	17.12%
Qualifying and Maybe Qualifying Average	0.0084	0.0086	-0.90%

Notes:

Cells highlighted in blue have calculations.

Cells highlighted in yellow are not included in the average

Cells highlighted in orange have an influent concentration of less than 0.005 mg/L

Dissolved ZInc Removal Efficiency

Dissolved Zinc					
Qualifying?	Storm Event	Influent (mg/L)	Effluent (mg/L)	Percent Reduction	90% Percentile Influent Flow Rate
Y	11/19/2019	0.0302	0.0203	32.78%	23.39
Y	1/28/2020	0.0222	0.0197	11.26%	193.69
Y	5/2/2020	0.0316	0.0224	29.11%	8.65
Y	5/17/2020	0.043	0.0162	62.33%	2.08
Y	5/20/2020	0.0112	0.014	-25.00%	20.34
Y	9/23/2020	0.11	0.0491	55.36%	4.56
Y	10/10/2020	0.0838	0.0558	33.41%	7.13
Y	10/13/2020	0	0		8.70
Y	11/5/2020	0.0453	0.0242	46.58%	6.19
Y	11/13/2020	0.0403	0.0516	-28.04%	5.46
Y	11/16/2020	0	0		2.02
M	10/21/2019	0.0384	0.0133	65.36%	31.17
M	12/7/2019	0.0789	0.0402	49.05%	17.68
M	1/6/2020	0.0621	0.0446	28.18%	2.44
M	5/31/2020	0.0206	0.0192	6.80%	41.16
M	6/14/2020	0.0563	0.0549	2.49%	8.56
M	6/16/2020	0.0131	0.0101	22.90%	6.98
M	7/1/2020	0.0326	0.0263	19.33%	1.61
M	9/25/2020	0.0924	0.0333	63.96%	4.16
N	9/18/2019	0.0759	0.0457	39.79%	61.93
N	10/18/2019	0.0432	0.0357	17.36%	10.48
N	3/31/2020	0	0		2.04
N	11/14/2020	0	0		0.57
N	11/25/2020	0	0		1.31

Dissolved Zinc			
	Influent	Effluent	Percent Reduction
Qualifying Average	0.0464	0.0304	24.20%
Maybe Qualifying Average	0.0493	0.0302	32.26%
Qualifying and Maybe Qualifying Average	0.0478	0.0303	27.99%

Dissolved Zinc - Opts Influent Concentrations less than 0.02 mg/L			
	Influent	Effluent	Percent Reduction
Qualifying Average	0.0508	0.0324	30.35%
Maybe Qualifying Average	0.0545	0.0331	33.59%
Qualifying and Maybe Qualifying Average	0.0525	0.0327	31.86%

Notes:

Cells highlighted in blue have calculations.

Cells highlighted in yellow are not included in the average

Cells highlighted in orange have an influent concentration of less than 0.02 mg/L

Total Phosphorus (TP) Removal Efficiency

TP					
Qualifying?	Storm Event	Influent (mg/L)	Effluent (mg/L)	Percent Reduction	90% Percentile Influent Flow Rate
Y	11/19/2019	0.308	0.19	38.31%	23.39
Y	1/28/2020	0	0		193.69
Y	5/2/2020	0	0		8.65
Y	5/17/2020	0.628	0.25	60.19%	2.08
Y	5/20/2020	0.1	0.063	37.00%	20.34
Y	9/23/2020	0.654	0.619	5.35%	4.56
Y	10/10/2020	0.512	0.477	6.84%	7.13
Y	10/13/2020	0.142	0.15	-5.63%	8.70
Y	11/5/2020	1.08	0.864	20.00%	6.19
Y	11/13/2020	1.15	0.236	79.48%	5.46
Y	11/16/2020	0.12	0.153	-27.50%	2.02
M	10/21/2019	0	0		31.17
M	12/7/2019	0.178	0.142	20.22%	17.68
M	1/6/2020	0	0		2.44
M	5/31/2020	0.642	0.45	29.91%	41.16
M	6/14/2020	0	0		8.56
M	6/16/2020	0	0		6.98
M	7/1/2020	0	0		1.61
M	9/25/2020	0	0		4.16
N	9/18/2019	0.345	0.104	69.86%	61.93
N	10/18/2019	0	0		10.48
N	3/31/2020	0	0		2.04
N	11/14/2020	0	0		0.57
N	11/25/2020	0	0		1.31

TP Averages			
	Influent	Effluent	Percent Reduction
Qualifying Average	0.522	0.334	23.78%
Maybe Qualifying Average	0.410	0.296	25.07%
Qualifying and Maybe Qualifying Average	0.501	0.327	24.02%

Notes:

Cells highlighted in blue have calculations.

Cells highlighted in yellow are not included in the average

No influent concentrations below 0.1 mg/L

Per TAPE 2018 only report results for motor oil. Per NWTPH-Dx motor oil is reported as lube oil.

ND

NT

Detection Limit = 0.250

Storm Event Number	Date	Influent	Effluent	% Reduction	Ce/Ci
4	11/19/2019	1.340	0.661	50.7%	0.49
7	1/28/2020				
9	5/2/2020				
10	5/17/2020				
11	5/20/2020				
16	9/23/2020	1.140	1.040	8.8%	0.91
18	10/10/2020	0.508	0.557	-9.6%	1.10
19	10/13/2020				
20	11/5/2020				
21	11/13/2020	0.522	0.601	-15.1%	1.15
23	11/16/2020	1.470	1.670	-13.6%	1.14
3	10/21/2019	1.830	0.403	78.0%	0.22
5	12/7/2019				
6	1/6/2020				
12	5/31/2020				
13	6/14/2020				
14	6/16/2020				
15	7/1/2020				
17	9/25/2020	0.684	0.566	17.3%	0.83
1	9/18/2019	0.605	0.250	58.7%	0.41
2	10/18/2019	1.240	1.110	10.5%	0.90
8	3/31/2020				
22	11/14/2020				
24	11/25/2020	0.630	0.401	36.3%	0.64

Appendix D.3 Ecology Bootstrapping Method

TSS Effluent Concentration Bootstrap Calculation

Macro Description

The macro uses a "bootstrapping" procedure to calculate either the one-tailed upper 95% confidence interval around the mean effluent concentration, or the one-tailed lower 95% confidence interval around the mean pollutant removal efficiency. To perform these calculations, the macro randomly resamples the original data to create 5000 datasets with the same number of values as the original data. The mean of each resampled dataset is then calculated. The 5000 means are then sorted in ascending order. The one-tailed upper 95% confidence interval around the mean effluent concentration is the mean with the rank of 4750 out of 5000. The one-tailed lower 95% confidence interval around the mean pollutant removal efficiency is the mean with the rank of 250 out of 5000. THIS MACRO SHOULD ONLY BE USED WHEN THERE ARE 10 OR MORE DATA POINTS FOR EFFLUENT CONCENTRATION OR POLLUTANT REMOVAL EFFICIENCY. See references in accompanying worksheet for more detailed information on bootstrapped confidence intervals.

1. Clear any previous effluent and remove data by clicking on the **Clear Data** button

2. Enter effluent concentration and remove efficiency data in columns K and L

3. Select which confidence limit to calculate

- (•) Upper 95% confidence limit for effluent concentration
- ( ) Lower 95% confidence limit for removal efficiency

4. Click on the calculate button **Calculate**

Upper 95% for effluent concentration **31.875**

Effluent Concentration	Removal Efficiency (%)
48	84.00
60	38.00
18.5	
9	
47	
19	
23	
9	
23	
16	
36	
16	
16.000	
12	
35	
21	

TSS Removal Efficiency Bootstrap Calculation

Macro Description

The macro uses a "bootstrapping" procedure to calculate either the one-tailed upper 95% confidence interval around the mean effluent concentration, or the one-tailed lower 95% confidence interval around the mean pollutant removal efficiency. To perform these calculations, the macro randomly resamples the original data to create 5000 datasets with the same number of values as the original data. The mean of each resampled dataset is then calculated. The 5000 means are then sorted in ascending order. The one-tailed upper 95% confidence interval around the mean effluent concentration is the mean with the rank of 4750 out of 5000. The one-tailed lower 95% confidence interval around the mean pollutant removal efficiency is the mean with the rank of 250 out of 5000. THIS MACRO SHOULD ONLY BE USED WHEN THERE ARE 10 OR MORE DATA POINTS FOR EFFLUENT CONCENTRATION OR POLLUTANT REMOVAL EFFICIENCY. See references in accompanying worksheet for more detailed information on bootstrapped confidence intervals.

1. Clear any previous effluent and remove data by clicking on the **Clear Data** button

2. Enter effluent concentration and remove efficiency data in columns K and L

3. Select which confidence limit to calculate

   ○ Upper 95% confidence limit for effluent concentration

   ◉ Lower 95% confidence limit for removal efficiency

4. Click on the calculate button **Calculate**

Lower 95% for removal efficiency (%) **38.000**

Effluent Concentration	Removal Efficiency (%)
48	84.00
60	38.00
18.5	
9	
47	
19	
23	
9	
23	
16	
36	
16	
16.000	
12	
35	
21	

Dissolved Copper Removal Efficiency Bootstrap Calculation

Macro Description

The macro uses a "bootstrapping" procedure to calculate either the one-tailed upper 95% confidence interval around the mean effluent concentration, or the one-tailed lower 95% confidence interval around the mean pollutant removal efficiency. To perform these calculations, the macro randomly resamples the original data to create 5000 datasets with the same number of values as the original data. The mean of each resampled dataset is then calculated. The 5000 means are then sorted in ascending order. The one-tailed upper 95% confidence interval around the mean effluent concentration is the mean with the rank of 4750 out of 5000. The one-tailed lower 95% confidence interval around the mean pollutant removal efficiency is the mean with the rank of 250 out of 5000. THIS MACRO SHOULD ONLY BE USED WHEN THERE ARE 10 OR MORE DATA POINTS FOR EFFLUENT CONCENTRATION OR POLLUTANT REMOVAL EFFICIENCY. See references in accompanying worksheet for more detailed information on bootstrapped confidence intervals.

1. Clear any previous effluent and remove data by clicking on the **Clear Data** button

2. Enter effluent concentration and remove efficiency data in columns K and L

3. Select which confidence limit to calculate

- ○ Upper 95% confidence limit for effluent concentration
- ◉ Lower 95% confidence limit for removal efficiency

4. Click on the calculate button **Calculate**

Lower 95% for removal efficiency (%) **-32.194**

Effluent Concentration	Removal Efficiency (%)
	4.77
	16.92
	-59.38
	30.96
	-58.54
	-18.80
	-31.86
	-15.28
	-71.01
	44.59
	33.87
	-14.76
	-49.01
	-8.33
	-67.05
	-44.32
	4.76

Dissolved Zinc Removal Efficiency Bootstrap Calculation

Macro Description

The macro uses a "bootstrapping" procedure to calculate either the one-tailed upper 95% confidence interval around the mean effluent concentration, or the one-tailed lower 95% confidence interval around the mean pollutant removal efficiency. To perform these calculations, the macro randomly resamples the original data to create 5000 datasets with the same number of values as the original data. The mean of each resampled dataset is then calculated. The 5000 means are then sorted in ascending order. The one-tailed upper 95% confidence interval around the mean effluent concentration is the mean with the rank of 4750 out of 5000. The one-tailed lower 95% confidence interval around the mean pollutant removal efficiency is the mean with the rank of 250 out of 5000. THIS MACRO SHOULD ONLY BE USED WHEN THERE ARE 10 OR MORE DATA POINTS FOR EFFLUENT CONCENTRATION OR POLLUTANT REMOVAL EFFICIENCY. See references in accompanying worksheet for more detailed information on bootstrapped confidence intervals.

1. Clear any previous effluent and remove data by clicking on the **Clear Data** button

2. Enter effluent concentration and remove efficiency data in columns K and L

3. Select which confidence limit to calculate

- ○ Upper 95% confidence limit for effluent concentration
- ◉ Lower 95% confidence limit for removal efficiency

4. Click on the calculate button **Calculate**

Lower 95% for removal efficiency (%) **16.672**

Effluent Concentration	Removal Efficiency (%)
	32.78
	11.26
	29.11
	62.33
	-25.00
	55.36
	33.41
	46.58
	-28.04
	65.36
	49.05
	28.18
	6.80
	2.49
	22.90
	19.33
	63.96

Oils Effluent Concentration Bootstrap Calculation

Macro Description

The macro uses a "bootstrapping" procedure to calculate either the one-tailed upper 95% confidence interval around the mean effluent concentration, or the one-tailed lower 95% confidence interval around the mean pollutant removal efficiency. To perform these calculations, the macro randomly resamples the original data to create 5000 datasets with the same number of values as the original data. The mean of each resampled dataset is then calculated. The 5000 means are then sorted in ascending order. The one-tailed upper 95% confidence interval around the mean effluent concentration is the mean with the rank of 4750 out of 5000. The one-tailed lower 95% confidence interval around the mean pollutant removal efficiency is the mean with the rank of 250 out of 5000. THIS MACRO SHOULD ONLY BE USED WHEN THERE ARE 10 OR MORE DATA POINTS FOR EFFLUENT CONCENTRATION OR POLLUTANT REMOVAL EFFICIENCY. See references in accompanying worksheet for more detailed information on bootstrapped confidence intervals.

1. Clear any previous effluent and remove data by clicking on the **Clear Data** button

2. Enter effluent concentration and remove efficiency data in columns K and L

3. Select which confidence limit to calculate

- (•) Upper 95% confidence limit for effluent concentration
- ( ) Lower 95% confidence limit for removal efficiency

4. Click on the calculate button **Calculate**

Upper 95% for effluent concentration **1.37**

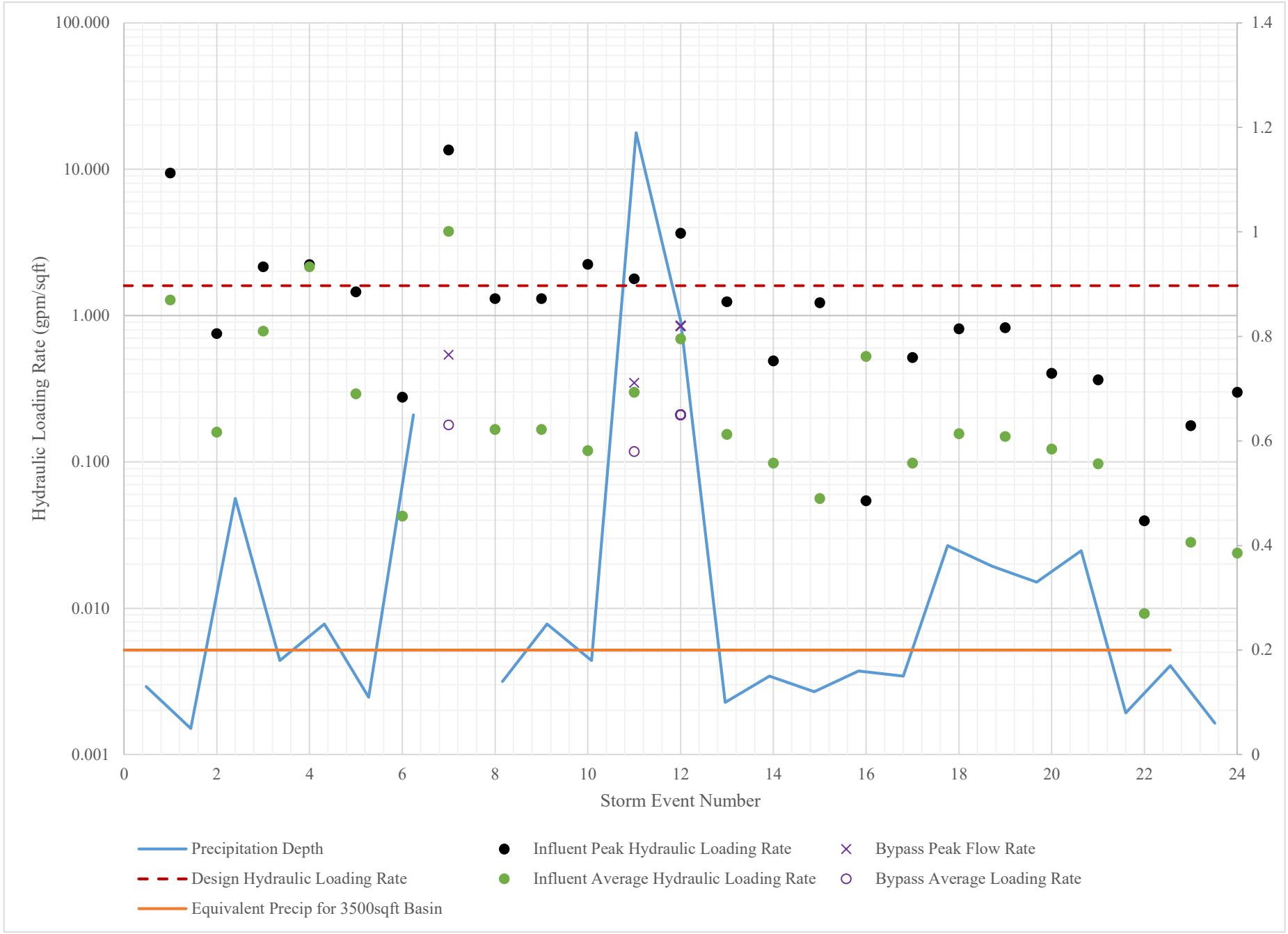
Effluent Concentration	Removal Efficiency (%)
1.340	50.7%
1.140	8.8%
0.508	-9.6%
0.522	-15.1%
1.470	-13.6%
1.830	78.0%
0.684	17.3%

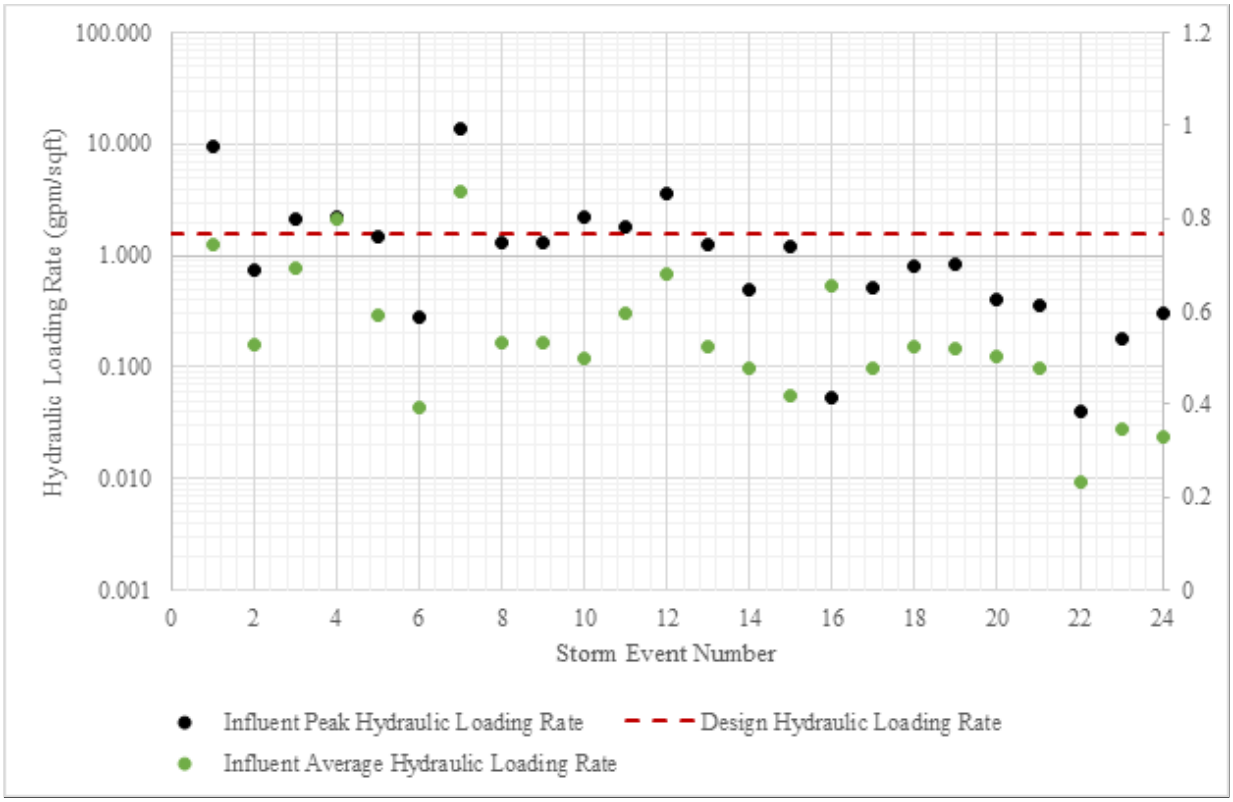
Appendix D.4 BMP Design Flow Calculations

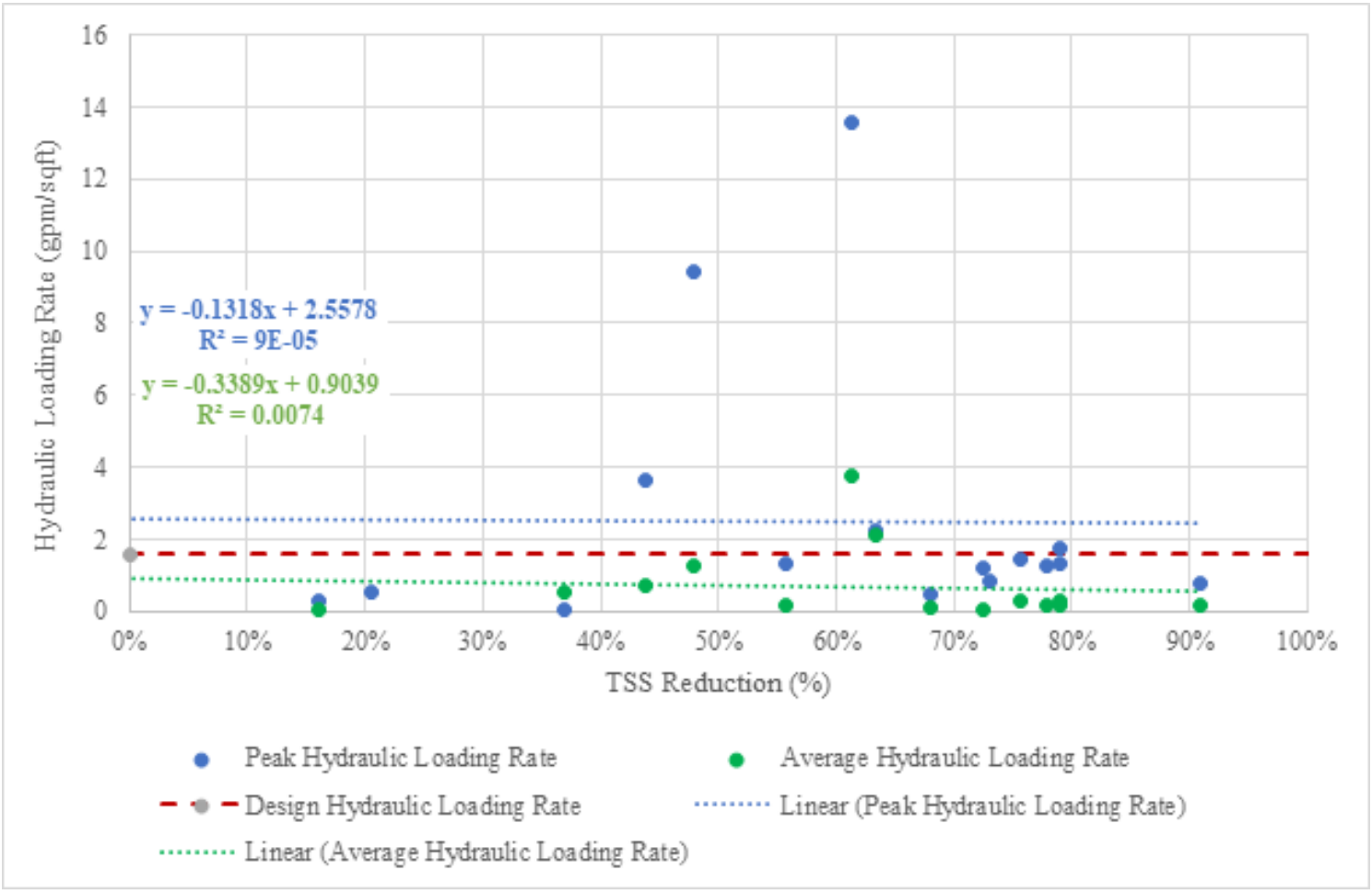
Storm Event Number	Qualifying?	Storm Event Number	Date
1	N	1	9/18/2019
2	N	2	10/18/2019
3	M	3	10/21/2019
4	Y	4	11/19/2019
5	M	5	12/7/2019
6	M	6	1/6/2020
7	Y	7	1/28/2020
8	N	8	3/31/2020
9	Y	9	5/2/2020
10	Y	10	5/17/2020
11	Y	11	5/20/2020
12	M	12	5/31/2020
13	M	13	6/14/2020
14	M	14	6/16/2020
15	M	15	7/1/2020
16	Y	16	9/23/2020
17	M	17	9/25/2020
18	Y	18	10/10/2020
19	Y	19	10/13/2020
20	Y	20	11/5/2020
21	Y	21	11/13/2020
22	N	22	11/14/2020
23	Y	23	11/16/2020
24	N	24	11/25/2020

Date	Precipitation Depth (inches)		Cummulative Precipitation (inches)	Storm Duration (hours)	Storm Average Intensity (in/hr)	Storm Peak Intensity (in/hr)	Influent Average Flow Rate (gpm)	Influent Peak Flow Rate (gpm)	Effluent Average Flow Rate (gpm)	Effluent Peak Flow Rate (gpm)
7/23/2019		13.28								
9/18/2019	0.13	15.38	2.1	6.08	0.52	0.96	25.59	188.28	5.16	72.98
10/18/2019	0.05	16.95	3.67	5.83	0.18	0.24	3.20	15.07	0.50	2.81
10/21/2019	0.49	17.5	4.22	15.25	0.12	0.12	15.67	43.01	2.50	7.59
11/19/2019	0.18	16.94	3.66	7.58	0.13	0.24	8.54	44.68	5.49	30.74
12/7/2019	0.25	18.92	5.64	9.83	0.12	0.12	5.85	29.08	4.98	24.99
1/6/2020	0.11	21.67	8.39	9.00	0.12	0.12	0.85	5.55	0.94	4.54
1/28/2020	0.65	24.76	11.48	19.83	0.13	0.24	75.18	271.04	0.81	2.03
2/6/2020		26.11	1.35							
3/31/2020	0.14	27.36	2.6	7.33	0.13	0.24	0.82	2.48	0.32	0.79
5/2/2020	0.25	27.98	3.22	7.92	0.13	0.24	3.34	26.13	2.70	18.05
5/17/2020	0.18	29.36	4.6	6.25	0.15	0.24	2.39	44.78	4.04	25.54
5/20/2020	1.19	29.81	5.05	19.25	0.31	0.96	5.99	35.69	1.75	6.12
5/31/2020	0.83	31.22	6.46	10.58	0.14	0.36	13.88	72.98	3.13	14.33
6/14/2020	0.1	32.98	8.22	6.08	0.22	0.84	3.09	24.81	2.80	12.99
6/16/2020	0.15	33.18	8.42	6.92	0.40	0.72	1.97	9.79	1.55	4.06
7/1/2020	0.12	33.53	8.77	6.25	0.16	0.24	1.12	24.49	0.83	14.10
9/23/2020	0.16	33.75	8.99	1.58	0.22	0.48	1.58	10.54	1.08	10.73
9/25/2020	0.15	33.9	9.14	7.08	0.14	0.24	1.96	10.35	1.63	8.56
10/10/2020	0.4	34.06	9.3	9.75	0.13	0.24	3.12	16.25	2.64	13.88
10/13/2020	0.36	34.72	9.96	9.92	0.14	0.24	2.98	16.50	2.32	11.93
11/5/2020	0.33	35.75	10.99	8.92	0.14	0.24	2.45	8.07	2.24	8.40
11/13/2020	0.39	36.37	11.61	9.92	0.13	0.24	1.95	7.28	3.05	8.73
11/14/2020	0.08	36.74	11.98	6.00	0.12	0.12	0.18	0.79	0.55	1.41
11/16/2020	0.17	36.82	12.06	9.33	0.12	0.12	0.57	3.54	1.01	4.27
11/25/2020	0.06	37.11	12.35	5.75	0.12	0.12	0.48	5.99	0.53	2.90

Date	Bypass Average Flow Rate (gpm)	Bypass Peak Flow Rate (gpm)	Influent Average Flow Rate (gpm/sqft)	Influent Peak Flow Rate (gpm/sqft)	Effluent Average Flow Rate (gpm/sqft)	Effluent Peak Flow Rate (gpm/sqft)	Bypass Average Flow Rate (gpm/sqft)	Bypass Peak Flow Rate (gpm/sqft)	Infiltration Rate Average (inches/hour)	Infiltration Rate peak (inches/hour)
7/23/2019										
9/18/2019	0.00	0.00	1.28	9.41	0.26	3.65	0.00	0.00	41.40	585.29
10/18/2019	0.00	0.00	0.16	0.75	0.02	0.14	0.00	0.00	3.98	22.54
10/21/2019	0.00	0.00	0.78	2.15	0.12	0.38	0.00	0.00	20.03	60.86
11/19/2019	0.00	0.00	2.15	2.23	0.27	1.54	0.00	0.00	43.99	246.57
12/7/2019	0.00	0.00	0.29	1.45	0.25	1.25	0.00	0.00	39.92	200.44
1/6/2020	0.00	0.00	0.04	0.28	0.05	0.23	0.00	0.00	7.57	36.41
1/28/2020	3.58	10.78	3.76	13.55	0.04	0.10	0.18	0.54	6.48	16.30
2/6/2020										
3/31/2020	0.00	0.00	0.17	1.31	0.02	0.04	0.00	0.00	2.53	
5/2/2020	0.00	0.00	0.17	1.31	0.14	0.90	0.00	0.00	21.66	144.79
5/17/2020	0.00	0.00	0.12	2.24	0.20	1.28	0.00	0.00	32.42	204.85
5/20/2020	2.35	6.95	0.30	1.78	0.09	0.31	0.12	0.35	14.00	49.11
5/31/2020	4.20	17.02	0.69	3.65	0.16	0.72	0.21	0.85	25.10	114.95
6/14/2020	0.00	0.00	0.15	1.24	0.14	0.65	0.00	0.00	22.46	104.17
6/16/2020	0.00	0.00	0.10	0.49	0.08	0.20	0.00	0.00	12.41	32.52
7/1/2020	0.00	0.00	0.06	1.22	0.04	0.71	0.00	0.00	6.62	113.11
9/23/2020	0.00	0.00	0.53	0.05	0.54	0.54	0.00	0.00	86.07	86.07
9/25/2020	0.00	0.00	0.10	0.52	0.08	0.43	0.00	0.00	13.07	68.68
10/10/2020	0.00	0.00	0.16	0.81	0.13	0.69	0.00	0.00	21.18	111.29
10/13/2020	0.00	0.00	0.15	0.83	0.12	0.60	0.00	0.00	18.62	95.69
11/5/2020	0.00	0.00	0.12	0.40	0.11	0.42	0.00	0.00	17.96	67.34
11/13/2020	0.00	0.00	0.10	0.36	0.15	0.44	0.00	0.00	24.42	70.04
11/14/2020	0.00	0.00	0.01	0.04	0.03	0.07	0.00	0.00	4.44	11.29
11/16/2020	0.00	0.00	0.03	0.18	0.05	0.21	0.00	0.00	8.12	34.26
11/25/2020	0.00	0.00	0.02	0.30	0.03	0.14	0.00	0.00	4.26	23.23


100.000
10.000
1.000
0.100
0.010
0.001
Hydraulic Loading Rate (gpm/sqft)
1.4
1.2
1
0.8
0.6
0.4
0.2
0
0
2
4
6
8
10
12
14
16
18
20
22
24
Storm Event Number
Precipitation Depth
Design Hydraulic Loading Rate
Equivalent Precip for 3500sqft Basin
Influent Peak Hydraulic Loading Rate
Influent Average Hydraulic Loading Rate
Bypass Peak Flow Rate
Bypass Average Loading Rate


100.000
10.000
1.000
0.100
0.010
0.001
Hydraulic Loading Rate (gpm/sqft)
1.2
1
0.8
0.6
0.4
0.2
0
0 2 4 6 8 10 12 14 16 18 20 22 24
Storm Event Number
Influent Peak Hydraulic Loading Rate
Design Hydraulic Loading Rate
Influent Average Hydraulic Loading Rate

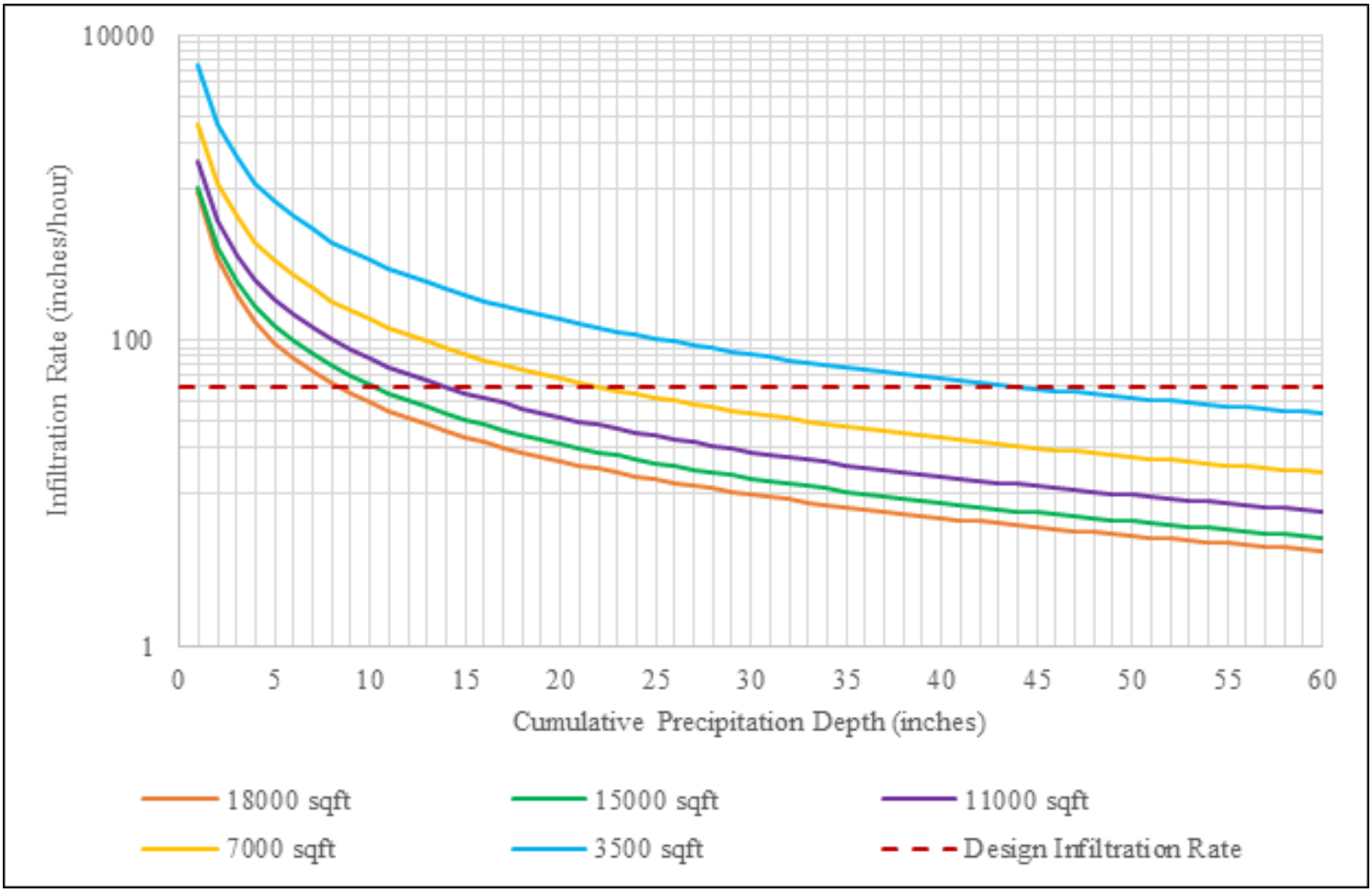

16
14
12
10
8
6
4
2
0
Hydraulic Loading Rate (gpm/sqft)
y = -0.1318x + 2.5578
R² = 9E-05
y = -0.3389x + 0.9039
R² = 0.0074
0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
TSS Reduction (%)
Peak Hydraulic Loading Rate
Average Hydraulic Loading Rate
Design Hydraulic Loading Rate
Linear (Peak Hydraulic Loading Rate)
Linear (Average Hydraulic Loading Rate)

	$y = 1153.5x^{-1.676}$	$y = 723.34x^{-1.123}$	$y = 791.42x^{-1.286}$	18000	15000	11000	7000	3500	18000	15000.00	11000.00	7000.00	3500.00
X Precip Depth	y infil rate 1	y infil rate 2	y infil rate average	Runoff Volume (cft)	Runoff Volume (cft)	Runoff Volume (cft)	Runoff Volume (cft)	Runoff Volume (cft)	Precip Depth (inches)	Precip Depth (inches)	Precip Depth (inches)	Precip Depth (inches)	Precip Depth (inches)
1	1153.50	723.34	938.42	1350	1125	825	525	263	1	0.83	0.61	0.39	0.19
2	360.99	332.11	346.55	2700	2250	1650	1050	525	2	1.67	1.22	0.78	0.39
3	182.96	210.64	196.80	4050	3375	2475	1575	788	3	2.50	1.83	1.17	0.58
4	112.97	152.49	132.73	5400	4500	3300	2100	1050	4	3.33	2.44	1.56	0.78
5	77.72	118.69	98.20	6750	5625	4125	2625	1313	5	4.17	3.06	1.94	0.97
6	57.26	96.71	76.98	8100	6750	4950	3150	1575	6	5.00	3.67	2.33	1.17
7	44.22	81.34	62.78	9450	7875	5775	3675	1838	7	5.83	4.28	2.72	1.36
8	35.35	70.01	52.68	10800	9000	6600	4200	2100	8	6.67	4.89	3.11	1.56
9	29.02	61.34	45.18	12150	10125	7425	4725	2363	9	7.50	5.50	3.50	1.75
10	24.32	54.49	39.41	13500	11250	8250	5250	2625	10	8.33	6.11	3.89	1.94
11	20.73	48.96	34.85	14850	12375	9075	5775	2888	11	9.17	6.72	4.28	2.14
12	17.92	44.40	31.16	16200	13500	9900	6300	3150	12	10.00	7.33	4.67	2.33
13	15.67	40.59	28.13	17550	14625	10725	6825	3413	13	10.83	7.94	5.06	2.53
14	13.84	37.35	25.59	18900	15750	11550	7350	3675	14	11.67	8.56	5.44	2.72
15	12.33	34.56	23.44	20250	16875	12375	7875	3938	15	12.50	9.17	5.83	2.92
16	11.06	32.15	21.60	21600	18000	13200	8400	4200	16	13.33	9.78	6.22	3.11
17	10.00	30.03	20.01	22950	19125	14025	8925	4463	17	14.17	10.39	6.61	3.31
18	9.08	28.16	18.62	24300	20250	14850	9450	4725	18	15.00	11.00	7.00	3.50
19	8.30	26.50	17.40	25650	21375	15675	9975	4988	19	15.83	11.61	7.39	3.69
20	7.61	25.02	16.32	27000	22500	16500	10500	5250	20	16.67	12.22	7.78	3.89
21	7.01	23.69	15.35	28350	23625	17325	11025	5513	21	17.50	12.83	8.17	4.08
22	6.49	22.48	14.48	29700	24750	18150	11550	5775	22	18.33	13.44	8.56	4.28
23	6.02	21.39	13.70	31050	25875	18975	12075	6038	23	19.17	14.06	8.94	4.47
24	5.61	20.39	13.00	32400	27000	19800	12600	6300	24	20.00	14.67	9.33	4.67
25	5.24	19.47	12.36	33750	28125	20625	13125	6563	25	20.83	15.28	9.72	4.86
26	4.90	18.63	11.77	35100	29250	21450	13650	6825	26	21.67	15.89	10.11	5.06
27	4.60	17.86	11.23	36450	30375	22275	14175	7088	27	22.50	16.50	10.50	5.25
28	4.33	17.15	10.74	37800	31500	23100	14700	7350	28	23.33	17.11	10.89	5.44
29	4.08	16.48	10.28	39150	32625	23925	15225	7613	29	24.17	17.72	11.28	5.64
30	3.86	15.87	9.86	40500	33750	24750	15750	7875	30	25.00	18.33	11.67	5.83
31	3.65	15.29	9.47	41850	34875	25575	16275	8138	31	25.83	18.94	12.06	6.03
32	3.46	14.76	9.11	43200	36000	26400	16800	8400	32	26.67	19.56	12.44	6.22
33	3.29	14.26	8.77	44550	37125	27225	17325	8663	33	27.50	20.17	12.83	6.42
34	3.13	13.79	8.46	45900	38250	28050	17850	8925	34	28.33	20.78	13.22	6.61
35	2.98	13.35	8.16	47250	39375	28875	18375	9188	35	29.17	21.39	13.61	6.81

	$y = 1153.5x^{-1.676}$	$y = 723.34x^{-1.123}$	$y = 791.42x^{-1.286}$	18000	15000	11000	7000	3500	18000	15000.00	11000.00	7000.00	3500.00
X Precip Depth	y infil rate 1	y infil rate 2	y infil rate average	Runoff Volume (cft)	Runoff Volume (cft)	Runoff Volume (cft)	Runoff Volume (cft)	Runoff Volume (cft)	Precip Depth (inches)	Precip Depth (inches)	Precip Depth (inches)	Precip Depth (inches)	Precip Depth (inches)
36	2.84	12.93	7.89	48600	40500	29700	18900	9450	36	30.00	22.00	14.00	7.00
37	2.71	12.54	7.63	49950	41625	30525	19425	9713	37	30.83	22.61	14.39	7.19
38	2.60	12.17	7.38	51300	42750	31350	19950	9975	38	31.67	23.22	14.78	7.39
39	2.49	11.82	7.15	52650	43875	32175	20475	10238	39	32.50	23.83	15.17	7.58
40	2.38	11.49	6.93	54000	45000	33000	21000	10500	40	33.33	24.44	15.56	7.78
41	2.29	11.17	6.73	55350	46125	33825	21525	10763	41	34.17	25.06	15.94	7.97
42	2.20	10.88	6.54	56700	47250	34650	22050	11025	42	35.00	25.67	16.33	8.17
43	2.11	10.59	6.35	58050	48375	35475	22575	11288	43	35.83	26.28	16.72	8.36
44	2.03	10.32	6.18	59400	49500	36300	23100	11550	44	36.67	26.89	17.11	8.56
45	1.96	10.06	6.01	60750	50625	37125	23625	11813	45	37.50	27.50	17.50	8.75
46	1.88	9.82	5.85	62100	51750	37950	24150	12075	46	38.33	28.11	17.89	8.94
47	1.82	9.58	5.70	63450	52875	38775	24675	12338	47	39.17	28.72	18.28	9.14
48	1.75	9.36	5.56	64800	54000	39600	25200	12600	48	40.00	29.33	18.67	9.33
49	1.70	9.15	5.42	66150	55125	40425	25725	12863	49	40.83	29.94	19.06	9.53
50	1.64	8.94	5.29	67500	56250	41250	26250	13125	50	41.67	30.56	19.44	9.72
51	1.59	8.74	5.16	68850	57375	42075	26775	13388	51	42.50	31.17	19.83	9.92
52	1.53	8.56	5.05	70200	58500	42900	27300	13650	52	43.33	31.78	20.22	10.11
53	1.49	8.37	4.93	71550	59625	43725	27825	13913	53	44.17	32.39	20.61	10.31
54	1.44	8.20	4.82	72900	60750	44550	28350	14175	54	45.00	33.00	21.00	10.50
55	1.40	8.03	4.72	74250	61875	45375	28875	14438	55	45.83	33.61	21.39	10.69
56	1.36	7.87	4.61	75600	63000	46200	29400	14700	56	46.67	34.22	21.78	10.89
57	1.32	7.72	4.52	76950	64125	47025	29925	14963	57	47.50	34.83	22.17	11.08
58	1.28	7.57	4.42	78300	65250	47850	30450	15225	58	48.33	35.44	22.56	11.28
59	1.24	7.42	4.33	79650	66375	48675	30975	15488	59	49.17	36.06	22.94	11.47
60	1.21	7.29	4.25	81000	67500	49500	31500	15750	60	50.00	36.67	23.33	11.67

	$y = 1153.5x^{-1.676}$	$y = 723.34x^{-1.123}$	$y = 791.42x^{-1.286}$	18000 sqft	15000 sqft	11000 sqft	7000 sqft	3500 sqft
X Precip Depth	y infil rate 1	y infil rate 2	y infil rate average	Infiltration rate (in/hr)	Infiltration rate (in/hr)	Infiltration rate (in/hr)	Infiltration rate (in/hr)	Infiltration rate (in/hr)
1	1153.50	723.34	938.42	938.42	1000.54	1490.93	2666.19	6501.54
2	360.99	332.11	346.55	346.55	410.31	611.41	1093.37	2666.19
3	182.96	210.64	196.80	196.80	243.59	362.98	649.10	1582.84
4	112.97	152.49	132.73	132.73	168.26	250.73	448.38	1093.37
5	77.72	118.69	98.20	98.20	126.29	188.18	336.52	820.62
6	57.26	96.71	76.98	76.98	99.89	148.85	266.19	649.10
7	44.22	81.34	62.78	62.78	81.93	122.08	218.32	532.38
8	35.35	70.01	52.68	52.68	69.00	102.82	183.87	448.38
9	29.02	61.34	45.18	45.18	59.30	88.37	158.03	385.35
10	24.32	54.49	39.41	39.41	51.79	77.17	138.00	336.52
11	20.73	48.96	34.85	34.85	45.81	68.27	122.08	297.70
12	17.92	44.40	31.16	31.16	40.96	61.04	109.16	266.19
13	15.67	40.59	28.13	28.13	36.96	55.07	98.48	240.15
14	13.84	37.35	25.59	25.59	33.60	50.07	89.53	218.32
15	12.33	34.56	23.44	23.44	30.75	45.81	81.93	199.78
16	11.06	32.15	21.60	21.60	28.30	42.17	75.40	183.87
17	10.00	30.03	20.01	20.01	26.17	39.00	69.75	170.08
18	9.08	28.16	18.62	18.62	24.32	36.24	64.81	158.03
19	8.30	26.50	17.40	17.40	22.69	33.80	60.45	147.41
20	7.61	25.02	16.32	16.32	21.24	31.65	56.59	138.00
21	7.01	23.69	15.35	15.35	19.95	29.72	53.15	129.61
22	6.49	22.48	14.48	14.48	18.79	28.00	50.07	122.08
23	6.02	21.39	13.70	13.70	17.74	26.44	47.28	115.30
24	5.61	20.39	13.00	13.00	16.80	25.03	44.77	109.16
25	5.24	19.47	12.36	12.36	15.94	23.75	42.48	103.58
26	4.90	18.63	11.77	11.77	15.16	22.58	40.39	98.48
27	4.60	17.86	11.23	11.23	14.44	21.51	38.47	93.82
28	4.33	17.15	10.74	10.74	13.78	20.53	36.72	89.53
29	4.08	16.48	10.28	10.28	13.17	19.63	35.10	85.58
30	3.86	15.87	9.86	9.86	12.61	18.79	33.60	81.93
31	3.65	15.29	9.47	9.47	12.09	18.01	32.21	78.55
32	3.46	14.76	9.11	9.11	11.60	17.29	30.92	75.40
33	3.29	14.26	8.77	8.77	11.15	16.62	29.72	72.48
34	3.13	13.79	8.46	8.46	10.73	15.99	28.60	69.75
35	2.98	13.35	8.16	8.16	10.34	15.41	27.56	67.20
36	2.84	12.93	7.89	7.89	9.97	14.86	26.58	64.81
37	2.71	12.54	7.63	7.63	9.63	14.35	25.66	62.56
38	2.60	12.17	7.38	7.38	9.30	13.86	24.79	60.45
39	2.49	11.82	7.15	7.15	9.00	13.41	23.98	58.47
40	2.38	11.49	6.93	6.93	8.71	12.98	23.21	56.59
41	2.29	11.17	6.73	6.73	8.44	12.57	22.48	54.82
42	2.20	10.88	6.54	6.54	8.18	12.19	21.80	53.15
43	2.11	10.59	6.35	6.35	7.94	11.83	21.15	51.57
44	2.03	10.32	6.18	6.18	7.70	11.48	20.53	50.07
45	1.96	10.06	6.01	6.01	7.49	11.15	19.95	48.64
46	1.88	9.82	5.85	5.85	7.28	10.84	19.39	47.28
47	1.82	9.58	5.70	5.70	7.08	10.55	18.86	45.99
48	1.75	9.36	5.56	5.56	6.89	10.27	18.36	44.77
49	1.70	9.15	5.42	5.42	6.71	10.00	17.88	43.59

	$y = 1153.5x^{-1.676}$	$y = 723.34x^{-1.123}$	$y = 791.42x^{-1.286}$	18000 sqft	15000 sqft	11000 sqft	7000 sqft	3500 sqft
X Precip Depth	y infil rate 1	y infil rate 2	y infil rate average	Infiltration rate (in/hr)	Infiltration rate (in/hr)	Infiltration rate (in/hr)	Infiltration rate (in/hr)	Infiltration rate (in/hr)
50	1.64	8.94	5.29	5.29	6.54	9.74	17.42	42.48
51	1.59	8.74	5.16	5.16	6.37	9.50	16.98	41.41
52	1.53	8.56	5.05	5.05	6.22	9.26	16.56	40.39
53	1.49	8.37	4.93	4.93	6.06	9.04	16.16	39.41
54	1.44	8.20	4.82	4.82	5.92	8.82	15.78	38.47
55	1.40	8.03	4.72	4.72	5.78	8.62	15.41	37.58
56	1.36	7.87	4.61	4.61	5.65	8.42	15.06	36.72
57	1.32	7.72	4.52	4.52	5.52	8.23	14.72	35.89
58	1.28	7.57	4.42	4.42	5.40	8.05	14.39	35.10
59	1.24	7.42	4.33	4.33	5.28	7.87	14.08	34.33
60	1.21	7.29	4.25	4.25	5.17	7.70	13.78	33.60


10000
100
1
Infiltration Rate (inches/hour)
0
5
10
15
20
25
30
35
40
45
50
55
60
Cumulative Precipitation Depth (inches)
18000 sqft
15000 sqft
11000 sqft
7000 sqft
3500 sqft
Design Infiltration Rate

Appendix D.5 Infiltration Rate Calculations

Media Installation Number	Time to Bypass for Events Below WQ Event (days)	Length of Time Media Installed (days)	Length of Time to Consistent Infiltration Rate of 50in/hr (days)	Rainfall During Media Installation (inches)
Media 1	60.6	263.0	100.7	4.9
Media 2	233.1	261.0	258.3	21.3
Media 3	303.6	314.0	305.2	16.8
Avg (2&3)	268.4	287.5	281.8	19.0

Media 1 (Pre-TAPE/Pretreatment)			
Date and Time	Day #	Infiltration	Bypass
11/22/2018 8:05	52.00	576.3856966	0
11/22/2018 8:15	52.00	750.4862763	0
11/22/2018 11:10	52.00	0.064113074	0
11/22/2018 19:15	52.00	300.9223459	0
11/22/2018 19:20	52.00	308.1488059	0
11/22/2018 19:30	52.00	330.4693148	0
11/22/2018 19:40	52.00	330.4693141	0
11/22/2018 19:45	52.00	338.1201417	0
11/22/2018 19:55	52.00	353.7515198	0
11/22/2018 20:05	52.00	378.0106859	0
11/22/2018 20:10	52.00	386.3148547	0
11/22/2018 21:25	52.00	253.2191663	0
11/22/2018 21:30	52.00	266.3348689	0
11/22/2018 21:35	52.00	279.8596752	0
11/22/2018 21:45	52.00	266.3348695	0
11/22/2018 22:00	52.00	210.4526928	0
11/22/2018 22:05	52.00	216.2656111	0
11/22/2018 23:45	52.00	4.997766779	0
11/23/2018 0:45	53.00	0.65639576	0
11/23/2018 1:20	53.00	0.177074205	0
11/23/2018 1:35	53.00	0.112961131	0
11/23/2018 18:30	53.00	642.6664021	0
11/23/2018 18:40	53.00	642.6633491	0
11/23/2018 19:35	53.00	555.2680712	0
11/23/2018 19:40	53.00	565.7673492	0
11/23/2018 20:05	53.00	1415.115987	0
11/23/2018 20:10	53.00	1490.311461	0
11/23/2018 20:15	53.00	1607.598701	0
11/23/2018 20:20	53.00	1668.295464	0
11/23/2018 20:25	53.00	1815.309793	0
11/23/2018 20:50	53.00	524.4876895	0
11/23/2018 22:30	53.00	1.557031804	0
11/23/2018 23:50	53.00	597.9918027	0
11/23/2018 23:55	53.00	620.0650169	0
11/24/2018 2:10	54.00	81.39307411	0
11/24/2018 4:35	54.00	6.25865725	0
11/24/2018 5:05	54.00	2.564522971	0
11/24/2018 5:45	54.00	0.5190106	0
11/24/2018 7:10	54.00	0.030530035	0
11/24/2018 7:20	54.00	0.030530035	0
11/24/2018 10:20	54.00	2.982784455	0
11/24/2018 10:30	54.00	2.979731452	0
11/24/2018 10:45	54.00	2.979731452	0
11/24/2018 11:20	54.00	2.20121555	0
11/24/2018 11:40	54.00	1.560084807	0
11/24/2018 11:55	54.00	1.050233214	0

Media 1 (Pre-TAPE/Pretreatment)			
Date and Time	Day #	Infiltration	Bypass
11/24/2018 12:05	54.00	0.839575973	0
11/24/2018 12:15	54.00	0.50069258	0
11/24/2018 12:25	54.00	0.369413428	0
11/24/2018 12:45	54.00	0.109908127	0
11/24/2018 13:20	54.00	0.030530035	0
11/24/2018 14:20	54.00	0.003053004	0
11/26/2018 19:10	56.00	240.5064596	0
11/26/2018 19:15	56.00	253.2161128	0
11/26/2018 19:30	56.00	330.4693148	0
11/26/2018 20:50	56.00	33.39985869	0
11/26/2018 21:15	56.00	121.726304	0
11/26/2018 21:20	56.00	130.1495405	0
11/26/2018 21:25	56.00	143.4362121	0
11/26/2018 21:30	56.00	157.5227701	0
11/26/2018 21:35	56.00	167.3626009	0
11/26/2018 21:40	56.00	177.5718443	0
11/26/2018 21:45	56.00	193.5848482	0
11/26/2018 21:50	56.00	204.7344172	0
11/26/2018 22:55	56.00	60.68149829	0
11/26/2018 23:25	56.00	157.5197171	0
11/26/2018 23:30	56.00	167.3626009	0
11/26/2018 23:45	56.00	157.5227701	0
11/26/2018 23:50	56.00	172.4214277	0
11/27/2018 0:15	57.00	386.3179085	0
11/27/2018 0:20	57.00	394.7319854	0
11/27/2018 0:25	57.00	394.7350392	0
11/27/2018 0:30	57.00	403.2620773	0
11/27/2018 0:35	57.00	429.5179085	0
11/27/2018 0:50	57.00	665.7440572	0
11/27/2018 1:35	57.00	386.3148555	0
11/27/2018 1:40	57.00	420.6550384	0
11/27/2018 1:55	57.00	750.4862763	0
11/27/2018 2:10	57.00	725.640932	0
11/27/2018 2:15	57.00	725.6409335	0
11/27/2018 3:30	57.00	420.6550384	0
11/27/2018 3:50	57.00	763.0982339	0
11/27/2018 3:55	57.00	788.7129319	0
11/27/2018 4:00	57.00	841.5298948	0
11/27/2018 4:45	57.00	524.5060076	0
11/27/2018 4:50	57.00	565.7520841	0
11/27/2018 4:55	57.00	587.1231101	0
11/27/2018 5:00	57.00	620.095547	0
11/27/2018 5:05	57.00	654.1365377	0
11/27/2018 5:10	57.00	701.3054409	0
11/27/2018 6:45	57.00	345.8747706	0
11/27/2018 7:10	57.00	286.7991522	0

Media 1 (Pre-TAPE/Pretreatment)			
Date and Time	Day #	Infiltration	Bypass
11/27/2018 7:15	57.00	308.1396463	0
11/27/2018 7:20	57.00	308.1396469	0
11/27/2018 8:15	57.00	143.4301061	0
11/27/2018 8:20	57.00	143.4606362	0
11/27/2018 8:50	57.00	113.6327916	0
11/27/2018 9:00	57.00	130.1495408	0
11/27/2018 9:20	57.00	216.2747701	0
11/27/2018 9:45	57.00	204.7344172	0
11/27/2018 9:50	57.00	216.2747705	0
11/27/2018 10:20	57.00	188.1566079	0
11/27/2018 10:25	57.00	204.7344167	0
11/27/2018 12:50	57.00	1.312791521	0
11/27/2018 13:00	57.00	0.85484099	0
11/27/2018 13:10	57.00	0.85484099	0
11/27/2018 13:50	57.00	84.65978789	0
11/28/2018 22:35	58.00	524.4907425	0
11/29/2018 0:00	59.00	81.37780926	0
11/29/2018 0:05	59.00	84.64147004	0
11/29/2018 0:40	59.00	240.5034061	0
11/29/2018 0:45	59.00	259.7281699	0
11/29/2018 0:50	59.00	279.8596752	0
11/29/2018 0:55	59.00	300.9192929	0
11/29/2018 1:00	59.00	322.9222901	0
11/29/2018 1:10	59.00	369.8133714	0
11/29/2018 3:00	59.00	78.19352657	0
11/29/2018 3:05	59.00	81.37780926	0
11/29/2018 3:30	59.00	157.5227701	0
11/29/2018 4:45	59.00	9.299448772	0
11/29/2018 5:50	59.00	1.291420496	0
11/29/2018 6:20	59.00	0.500692579	0
11/29/2018 6:50	59.00	0.177074205	0
11/29/2018 7:00	59.00	0.109908127	0
11/30/2018 13:50	60.00	689.325455	6.514431088
11/30/2018 14:05	60.00	654.1426437	1.12978092
11/30/2018 14:25	60.00	642.6633491	0.402657243
11/30/2018 14:30	60.00	654.1426437	11.37973146
11/30/2018 17:15	60.00	1.291420496	0
11/30/2018 18:00	60.00	0.262558304	0
11/30/2018 18:25	60.00	0.112961131	0
11/30/2018 18:40	60.00	0.064113074	0
12/1/2018 5:40	61.00	322.9253431	0
12/1/2018 5:45	61.00	345.8808759	0
12/1/2018 5:50	61.00	353.7515198	0
12/1/2018 6:15	61.00	322.9222901	0
12/1/2018 6:25	61.00	386.3179085	7.253088346
12/1/2018 6:35	61.00	386.3179085	0

Media 1 (Pre-TAPE/Pretreatment)			
Date and Time	Day #	Infiltration	Bypass
12/1/2018 7:45	61.00	199.1107846	0
12/1/2018 7:55	61.00	234.2966504	0
12/1/2018 11:05	61.00	0.65639576	0
12/1/2018 11:15	61.00	0.369413428	0
12/1/2018 12:15	61.00	0.030530035	0
12/10/2018 12:50	70.00	157.5197175	0
12/10/2018 15:15	70.00	20.42154066	0
12/10/2018 15:20	70.00	21.83202824	0
12/10/2018 16:20	70.00	2.982784455	0
12/10/2018 17:20	70.00	0.369413428	0
12/10/2018 17:30	70.00	0.262558304	0
12/11/2018 10:45	71.00	193.5848482	0
12/11/2018 11:05	71.00	177.5718447	0
12/11/2018 11:15	71.00	182.8169048	0
12/11/2018 11:25	71.00	188.1535546	0
12/11/2018 11:30	71.00	193.5848482	0
12/11/2018 11:35	71.00	199.1138372	0
12/11/2018 11:40	71.00	204.7344172	0
12/11/2018 11:45	71.00	210.4496393	0
12/11/2018 11:50	71.00	228.1906433	0
12/11/2018 11:55	71.00	240.5034061	0
12/11/2018 12:05	71.00	293.7966363	0
12/11/2018 12:10	71.00	315.4821198	0.104989399
12/11/2018 12:15	71.00	322.9222901	2.628805656
12/11/2018 12:20	71.00	338.123194	0.195561837
12/11/2018 13:10	71.00	222.1792794	0
12/11/2018 13:25	71.00	210.4526923	0
12/11/2018 13:35	71.00	216.2656115	0
12/11/2018 13:40	71.00	216.2686641	0
12/11/2018 13:45	71.00	228.1875903	0
12/11/2018 13:50	71.00	240.5034061	0
12/11/2018 13:55	71.00	253.2191663	0
12/11/2018 14:00	71.00	266.3348689	0.014077738
12/11/2018 14:05	71.00	286.7747282	0.595166078
12/11/2018 14:30	71.00	246.8109119	0
12/11/2018 14:45	71.00	222.1792789	0
12/11/2018 15:05	71.00	216.2656115	0
12/11/2018 15:30	71.00	182.8169044	0
12/11/2018 15:45	71.00	167.3626009	0
12/11/2018 15:50	71.00	177.5718447	0
12/11/2018 15:55	71.00	182.8169044	0
12/11/2018 16:00	71.00	188.1535549	0
12/11/2018 16:05	71.00	193.5848478	0
12/11/2018 16:10	71.00	199.1107846	0
12/11/2018 16:15	71.00	204.7344167	0
12/11/2018 16:20	71.00	216.2656115	0

Media 1 (Pre-TAPE/Pretreatment)			
Date and Time	Day #	Infiltration	Bypass
12/11/2018 16:30	71.00	216.2686645	0
12/11/2018 16:35	71.00	228.1875903	0
12/11/2018 17:00	71.00	210.4526923	0
12/11/2018 17:05	71.00	210.4526928	0
12/11/2018 17:10	71.00	216.2656111	0
12/11/2018 17:15	71.00	216.2656115	0
12/11/2018 17:20	71.00	216.2686645	0
12/11/2018 17:25	71.00	222.1792789	0
12/11/2018 17:35	71.00	210.4526923	0
12/11/2018 17:50	71.00	199.1138376	0
12/11/2018 17:55	71.00	204.7313637	0
12/11/2018 18:05	71.00	193.5848482	0
12/11/2018 18:10	71.00	193.5879008	0
12/11/2018 18:15	71.00	199.1107846	0
12/11/2018 18:25	71.00	210.4526928	0
12/11/2018 18:35	71.00	199.1107846	0
12/11/2018 18:45	71.00	228.1875903	0.027307421
12/11/2018 18:50	71.00	240.5064596	1.212042404
12/11/2018 18:55	71.00	246.8109114	1.782445228
12/11/2018 19:00	71.00	259.7251168	3.522657247
12/11/2018 19:05	71.00	259.7281693	3.857300349
12/11/2018 19:15	71.00	259.7251163	10.39768197
12/11/2018 19:20	71.00	259.7251168	8.88152651
12/11/2018 19:25	71.00	259.7281693	6.514261477
12/11/2018 19:30	71.00	266.3348695	4.031830392
12/11/2018 19:45	71.00	259.7281699	0.124325088
12/11/2018 19:55	71.00	259.7281699	1.782445231
12/11/2018 20:00	71.00	273.0453707	2.908833919
12/11/2018 20:05	71.00	279.8596752	1.480197881
12/11/2018 20:15	71.00	266.3379225	0
12/11/2018 20:45	71.00	240.5034061	0
12/11/2018 20:50	71.00	259.7251168	26.09639578
12/11/2018 20:55	71.00	273.0484237	20.35098231
12/11/2018 21:00	71.00	279.8596752	11.71912369
12/11/2018 21:10	71.00	279.8596746	0.01424735
12/11/2018 21:50	71.00	162.4197881	0
12/11/2018 23:25	71.00	8.487349813	0
12/11/2018 23:45	71.00	6.258657237	0
12/11/2018 23:50	71.00	6.25865725	0
12/12/2018 0:30	72.00	6.960848048	0
12/12/2018 1:25	72.00	0.854840988	0
12/13/2018 6:55	73.00	0.064113074	0
12/13/2018 7:35	73.00	188.1535549	34.73232512
12/13/2018 7:50	73.00	188.1535546	15.87409185
12/13/2018 8:15	73.00	182.8169048	4.778120146
12/13/2018 8:20	73.00	182.8169048	1.480197881

Media 1 (Pre-TAPE/Pretreatment)			
Date and Time	Day #	Infiltration	Bypass
12/13/2018 8:30	73.00	177.5718447	0
12/13/2018 8:40	73.00	177.5718447	0
12/13/2018 9:35	73.00	125.8967068	0
12/13/2018 9:45	73.00	121.729357	0
12/13/2018 13:10	73.00	0.030530035	0
12/16/2018 5:20	76.00	162.3953641	1.890996468
12/16/2018 5:35	76.00	188.1535546	11.37973144
12/16/2018 5:40	76.00	188.1535549	10.3978516
12/16/2018 5:45	76.00	193.5848478	9.172918717
12/16/2018 5:50	76.00	193.5848482	8.881356899
12/16/2018 6:00	76.00	199.1138376	11.37973146
12/16/2018 6:15	76.00	193.5848482	5.181116613
12/16/2018 6:30	76.00	193.5848478	2.628805651
12/16/2018 6:40	76.00	193.5848478	0
12/16/2018 7:45	76.00	130.1495408	0
12/16/2018 7:50	76.00	134.4909115	0
12/16/2018 7:55	76.00	138.9208199	0
12/16/2018 8:00	76.00	148.0431942	0
12/16/2018 8:10	76.00	157.5197171	0
12/16/2018 8:15	76.00	157.5227705	0
12/16/2018 8:20	76.00	162.3953641	0
12/16/2018 8:25	76.00	162.3984168	0
12/16/2018 8:30	76.00	172.4183747	0
12/16/2018 8:35	76.00	177.5718443	0
12/16/2018 8:40	76.00	182.8169048	4.58408481
12/16/2018 8:45	76.00	188.1535546	10.08271377
12/16/2018 8:50	76.00	188.1535549	9.773342765
12/16/2018 8:55	76.00	193.5848478	10.39785158
12/16/2018 9:00	76.00	193.5848482	8.881356899
12/16/2018 9:10	76.00	193.5848478	7.77328621
12/16/2018 9:20	76.00	193.5848478	7.510388684
12/16/2018 9:30	76.00	193.5848478	8.315872782
12/16/2018 9:35	76.00	193.5848482	5.82411308
12/16/2018 9:45	76.00	193.5848482	0.771053004
12/16/2018 10:10	76.00	188.1535549	0
12/16/2018 10:20	76.00	193.5848482	1.677795055
12/16/2018 10:30	76.00	193.5848482	5.181286224
12/16/2018 10:40	76.00	199.1107842	3.0555477
12/16/2018 10:45	76.00	199.1107846	1.12978092
12/16/2018 10:50	76.00	199.1138372	0.036127208
12/16/2018 11:00	76.00	193.5848478	0
12/16/2018 11:05	76.00	193.5848482	0
12/16/2018 11:15	76.00	188.1535549	0
12/16/2018 11:40	76.00	172.4214277	0
12/16/2018 11:50	76.00	167.3626009	0
12/16/2018 12:05	76.00	152.7387139	0

Media 1 (Pre-TAPE/Pretreatment)			
Date and Time	Day #	Infiltration	Bypass
12/16/2018 12:15	76.00	148.0401415	0
12/16/2018 12:45	76.00	134.4909118	0
12/16/2018 13:00	76.00	130.1495408	0
12/16/2018 13:10	76.00	134.4909118	0
12/16/2018 13:15	76.00	138.9208196	0
12/16/2018 13:25	76.00	148.0401412	0
12/16/2018 13:30	76.00	148.0431945	0
12/16/2018 13:40	76.00	152.7356606	0
12/16/2018 13:45	76.00	152.7387139	0
12/16/2018 13:50	76.00	157.5197171	0
12/16/2018 13:55	76.00	162.3953641	0
12/16/2018 14:00	76.00	162.3984168	0
12/16/2018 14:05	76.00	172.4214277	0
12/16/2018 14:15	76.00	182.8169048	0
12/16/2018 14:25	76.00	188.1535546	0.287660777
12/16/2018 14:30	76.00	188.1535549	0.072084806
12/16/2018 14:35	76.00	193.5848478	0.020014134
12/16/2018 14:40	76.00	193.5879012	0.087519435
12/16/2018 14:50	76.00	193.5848482	0.000169611
12/16/2018 15:45	76.00	121.729357	0
12/16/2018 15:55	76.00	125.8967066	0
12/16/2018 16:00	76.00	134.4909118	0
12/16/2018 16:05	76.00	143.4362118	0
12/16/2018 16:10	76.00	152.7356609	0
12/16/2018 16:15	76.00	157.5227701	0
12/16/2018 18:05	76.00	17.76542758	0
12/16/2018 18:15	76.00	19.06600708	0
12/16/2018 18:20	76.00	20.41848761	0
12/16/2018 19:10	76.00	177.5718447	15.46380213
12/16/2018 19:15	76.00	182.8169044	15.06012719
12/16/2018 19:25	76.00	193.5848478	20.35098231
12/16/2018 19:35	76.00	193.5848482	19.40014136
12/16/2018 19:45	76.00	188.1535549	13.14012722
12/16/2018 19:55	76.00	188.1535549	9.470077747
12/16/2018 20:00	76.00	193.5848478	6.049017661
12/16/2018 20:15	76.00	188.1535549	0
12/16/2018 22:30	76.00	0.262558304	0
12/16/2018 22:55	76.00	0.064113074	0
12/18/2018 1:35	78.00	143.4362121	11.37956185
12/18/2018 1:40	78.00	152.7356606	10.08271377
12/18/2018 1:45	78.00	157.5197175	9.773342765
12/18/2018 1:50	78.00	157.5227701	10.08271377
12/18/2018 2:00	78.00	157.5227701	12.41707419
12/18/2018 2:05	78.00	162.3953641	13.88862192
12/18/2018 2:15	78.00	167.3626009	16.71468553
12/18/2018 2:25	78.00	167.3626005	14.66306712

Media 1 (Pre-TAPE/Pretreatment)			
Date and Time	Day #	Infiltration	Bypass
12/18/2018 2:30	78.00	167.3626009	12.06496114
12/18/2018 2:35	78.00	172.4214274	12.77546288
12/18/2018 2:50	78.00	167.3626009	13.13995761
12/18/2018 3:00	78.00	167.3626009	12.7752933
12/18/2018 3:05	78.00	172.4214277	13.14012722
12/18/2018 3:15	78.00	177.5718447	14.27262192
12/18/2018 3:35	78.00	177.5748977	18.93540638
12/18/2018 3:50	78.00	177.5718447	15.87392228
12/18/2018 4:00	78.00	182.8138518	13.14012722
12/18/2018 4:10	78.00	177.5718447	12.06496114
12/18/2018 4:20	78.00	177.5718447	16.71451592
12/18/2018 4:25	78.00	182.8169044	24.98561128
12/18/2018 4:30	78.00	182.8169048	29.00573854
12/18/2018 4:40	78.00	182.8169044	21.83067135
12/18/2018 4:55	78.00	182.8138518	19.87216963
12/18/2018 5:00	78.00	182.8169044	21.33014839
12/18/2018 5:05	78.00	188.1535549	18.93540638
12/18/2018 5:15	78.00	177.5718447	21.8306714
12/18/2018 5:20	78.00	182.8169048	31.47205657
12/18/2018 5:30	78.00	182.8169048	17.58224737
12/18/2018 5:40	78.00	177.5718447	6.279010607
12/18/2018 5:45	78.00	182.8169044	8.315872782
12/18/2018 5:55	78.00	182.8138514	21.33014839
12/18/2018 6:00	78.00	188.1535549	17.58224737
12/18/2018 6:20	78.00	182.8169044	18.02645934
12/18/2018 6:25	78.00	182.8169048	21.8306714
12/18/2018 6:30	78.00	188.1535546	20.83708831
12/18/2018 6:35	78.00	188.1535549	13.88862192
12/18/2018 6:45	78.00	193.5848482	12.41707422
12/18/2018 7:00	78.00	193.5848482	22.85291875
12/18/2018 7:15	78.00	193.5848478	11.04627561
12/18/2018 7:35	78.00	182.8169048	18.02645938
12/18/2018 7:45	78.00	177.5718447	11.7192933
12/18/2018 7:55	78.00	188.1535549	9.773342765
12/18/2018 8:05	78.00	182.8169048	27.23737105
12/18/2018 8:20	78.00	182.8169048	32.75245233
12/18/2018 8:30	78.00	182.8169048	15.06012722
12/18/2018 8:45	78.00	182.8169044	4.210939924
12/18/2018 8:55	78.00	182.8169044	0.072084806
12/18/2018 9:45	78.00	130.1495408	0
12/18/2018 10:00	78.00	125.8967068	0
12/18/2018 10:15	78.00	130.1495405	0
12/18/2018 10:30	78.00	130.1495408	0
12/18/2018 10:35	78.00	134.4909118	0
12/18/2018 11:30	78.00	69.09557604	0
12/18/2018 13:25	78.00	0.500692579	0

Media 1 (Pre-TAPE/Pretreatment)			
Date and Time	Day #	Infiltration	Bypass
12/20/2018 15:25	80.00	113.6480566	8.595731457
12/20/2018 15:30	80.00	121.7263037	6.514261477
12/20/2018 15:35	80.00	125.8967068	4.031830392
12/20/2018 15:45	80.00	121.729357	1.211872793
12/20/2018 16:00	80.00	125.8967068	7.253088346
12/20/2018 16:10	80.00	121.729357	11.7192933
12/20/2018 16:15	80.00	125.8936536	11.71912366
12/20/2018 16:20	80.00	130.1495408	9.172918736
12/20/2018 16:35	80.00	125.8967068	1.12978092
12/20/2018 16:40	80.00	130.1495405	1.051250882
12/20/2018 16:55	80.00	125.8967068	6.279010607
12/20/2018 17:00	80.00	130.1495405	3.687689042
12/20/2018 17:05	80.00	130.1495408	2.003618376
12/20/2018 17:15	80.00	125.8967068	0
12/20/2018 17:20	80.00	130.1495408	0
12/20/2018 18:00	80.00	91.40692588	0
12/20/2018 18:25	80.00	72.05393646	0
12/20/2018 18:35	80.00	60.67844529	0
12/20/2018 18:50	80.00	45.80421206	0
12/23/2018 13:45	83.00	98.49294709	0
12/23/2018 14:00	83.00	98.49294688	0
12/23/2018 14:20	83.00	94.90872094	0
12/23/2018 14:40	83.00	91.40692588	0
12/23/2018 14:55	83.00	94.90872074	0.009328622
12/23/2018 15:00	83.00	98.49294709	1.891166079
12/23/2018 15:10	83.00	98.49294688	1.386911659
12/23/2018 15:15	83.00	102.1565513	0.493060071
12/23/2018 15:25	83.00	102.1565513	0.650628976
12/23/2018 15:35	83.00	102.1565513	0.976113075
12/23/2018 15:45	83.00	102.1565513	0.087519435
12/23/2018 15:55	83.00	102.1565511	0.124325088
12/23/2018 16:00	83.00	102.1565513	0.104989399
12/23/2018 16:10	83.00	102.1565513	0.072084806
12/23/2018 16:20	83.00	102.1565513	0.287660778
12/23/2018 16:35	83.00	102.1534983	0.145865725
12/23/2018 16:40	83.00	102.1565511	0.003392226
12/23/2018 16:45	83.00	102.1565513	0.000508834
12/23/2018 16:50	83.00	105.9056395	0
12/23/2018 17:05	83.00	98.49294709	0
12/23/2018 17:30	83.00	84.64147004	0
12/23/2018 17:40	83.00	81.37780926	0
12/23/2018 18:00	83.00	72.05393646	0
12/23/2018 18:45	83.00	50.48141347	0
12/23/2018 19:00	83.00	45.80421206	0
12/23/2018 19:10	83.00	43.56941347	0
12/23/2018 19:35	83.00	33.40291169	0

Media 1 (Pre-TAPE/Pretreatment)			
Date and Time	Day #	Infiltration	Bypass
12/23/2018 21:45	83.00	1.288367492	0
12/23/2018 21:50	83.00	1.291420496	0
12/23/2018 22:00	83.00	1.050233217	0
12/23/2018 22:10	83.00	0.839575973	0
12/23/2018 22:20	83.00	0.65639576	0
12/23/2018 22:30	83.00	0.50069258	0
12/23/2018 22:35	83.00	0.50069258	0
12/23/2018 22:45	83.00	0.50069258	0
12/23/2018 23:05	83.00	0.369413428	0
12/24/2018 0:00	84.00	0.109908127	0
12/24/2018 0:05	84.00	0.109908127	0
12/29/2018 9:10	89.00	33.40291162	0
12/29/2018 9:30	89.00	72.05393631	8.041780909
12/29/2018 9:35	89.00	75.08251597	11.04627563
12/29/2018 9:40	89.00	75.08556882	4.211109536
12/29/2018 9:45	89.00	78.19047357	18.93523677
12/29/2018 10:00	89.00	75.08556897	15.87409189
12/29/2018 10:10	89.00	75.08251597	12.77546291
12/29/2018 10:15	89.00	75.08556882	11.04627561
12/29/2018 10:20	89.00	78.19047357	9.172918736
12/29/2018 10:25	89.00	78.19352641	9.470247339
12/29/2018 10:35	89.00	81.37780926	17.14498942
12/29/2018 10:45	89.00	84.64147004	11.04627563
12/29/2018 10:55	89.00	78.19352657	10.3978516
12/29/2018 11:00	89.00	81.37780909	9.172918717
12/29/2018 11:10	89.00	78.19352641	10.71909539
12/29/2018 11:20	89.00	81.37780926	10.08254418
12/29/2018 11:25	89.00	84.64146987	10.39785158
12/29/2018 11:35	89.00	81.37780909	10.71892578
12/29/2018 11:40	89.00	81.37780926	11.37973146
12/29/2018 12:00	89.00	81.37780926	12.41690461
12/29/2018 12:10	89.00	81.37780909	11.04627561
12/29/2018 12:15	89.00	81.37780926	12.77546291
12/29/2018 12:30	89.00	78.19352641	13.14012719
12/29/2018 12:40	89.00	75.08556882	10.39768197
12/29/2018 12:55	89.00	78.19352641	9.773512356
12/29/2018 13:10	89.00	78.19352657	10.71909542
12/29/2018 13:20	89.00	78.19047357	9.172918736
12/29/2018 13:30	89.00	78.19047357	9.470247359
12/29/2018 13:45	89.00	75.08251597	8.315872799
12/29/2018 13:50	89.00	75.08556882	7.253257942
12/29/2018 14:00	89.00	72.05393631	7.77328621
12/29/2018 14:05	89.00	78.19047357	8.041611315
12/29/2018 14:15	89.00	75.08251597	8.595731457
12/29/2018 14:20	89.00	75.08556897	6.278840995
12/29/2018 14:30	89.00	75.08556897	1.677795055

Media 1 (Pre-TAPE/Pretreatment)			
Date and Time	Day #	Infiltration	Bypass
12/29/2018 14:40	89.00	75.08251597	2.366077741
12/29/2018 14:45	89.00	75.08556882	2.908833919
12/29/2018 14:50	89.00	81.37780926	4.395137813
12/29/2018 15:00	89.00	78.19047357	3.362374561
12/29/2018 15:10	89.00	78.19047341	2.120310952
12/29/2018 15:15	89.00	78.19352657	1.480197881
12/29/2018 15:25	89.00	78.19352657	1.297696114
12/29/2018 15:35	89.00	78.19352657	1.297696114
12/29/2018 15:45	89.00	81.37780926	0.594996467
12/29/2018 16:00	89.00	78.19352657	0.771053004
12/29/2018 16:05	89.00	81.37475609	0.90436749
12/29/2018 16:30	89.00	84.64147004	0.104989399
12/29/2018 16:55	89.00	81.37780926	0
12/29/2018 17:05	89.00	75.08556897	0
12/29/2018 17:15	89.00	75.08556897	0
12/29/2018 17:25	89.00	78.19352641	0
12/29/2018 17:45	89.00	66.21659356	0
12/29/2018 18:05	89.00	58.02233221	0
12/29/2018 18:10	89.00	63.41088332	0
1/3/2019 11:25	94.00	20.41848761	14.27245228
1/3/2019 12:20	94.00	31.5650035	9.470247339
1/3/2019 12:30	94.00	31.5650035	7.510388684
1/3/2019 12:35	94.00	33.39985869	6.279010607
1/3/2019 12:40	94.00	33.40291162	7.77328621
1/3/2019 13:00	94.00	33.39985869	8.315872799
1/3/2019 13:05	94.00	33.40291162	6.048848049
1/3/2019 13:15	94.00	33.40291162	3.206671374
1/3/2019 13:20	94.00	35.30187989	2.366077741
1/3/2019 13:50	94.00	35.30493282	3.52265724
1/3/2019 13:55	94.00	35.3049329	1.480197881
1/3/2019 14:10	94.00	35.30187982	0.014077738
1/3/2019 14:20	94.00	35.30187989	0
1/3/2019 14:25	94.00	35.30493282	0
1/3/2019 14:30	94.00	35.3049329	0
1/3/2019 14:35	94.00	37.27106709	0
1/3/2019 14:45	94.00	33.39985862	0
1/3/2019 14:50	94.00	33.40291169	0
1/3/2019 15:00	94.00	31.56500356	0
1/3/2019 15:15	94.00	28.07542052	0
1/3/2019 15:50	94.00	21.83202829	0
1/3/2019 16:10	94.00	19.06600708	0
1/3/2019 16:30	94.00	16.52285514	0
1/3/2019 16:55	94.00	12.086841	0
1/3/2019 17:10	94.00	11.10987985	0
1/3/2019 17:30	94.00	9.299448772	0
1/8/2019 23:15	99.00	66.2165937	9.172918736

Media 1 (Pre-TAPE/Pretreatment)			
Date and Time	Day #	Infiltration	Bypass
1/8/2019 23:25	99.00	66.21964657	13.14012719
1/8/2019 23:40	99.00	66.2165937	12.77546291
1/8/2019 23:45	99.00	69.09862889	12.06496112
1/9/2019 0:00	100.00	66.2165937	10.3978516
1/9/2019 0:05	100.00	69.09862904	9.172918736
1/9/2019 0:15	100.00	69.09862904	8.041780926
1/9/2019 0:30	100.00	69.09862889	8.88135688
1/9/2019 0:40	100.00	69.09862889	9.470247339
1/9/2019 0:50	100.00	66.2165937	10.08271379
1/9/2019 0:55	100.00	69.09862889	10.39785158
1/9/2019 1:05	100.00	69.09862889	10.71909539
1/9/2019 1:15	100.00	69.09557589	10.39785158
1/9/2019 1:20	100.00	69.09862904	9.773342765
1/9/2019 1:30	100.00	72.05393646	8.041780926
1/9/2019 1:40	100.00	69.09862889	8.041780909
1/9/2019 1:50	100.00	72.05393631	9.172918717
1/9/2019 2:00	100.00	69.09862889	10.39785158
1/9/2019 2:05	100.00	72.05088346	11.37956185
1/9/2019 2:10	100.00	72.05393631	10.71892578
1/9/2019 2:20	100.00	72.05393646	15.06012722
1/9/2019 2:30	100.00	75.08556897	13.51123676
1/9/2019 2:45	100.00	75.08251581	9.470247339
1/9/2019 2:50	100.00	75.08556897	8.041780926
1/9/2019 3:00	100.00	72.05393646	6.278840995
1/9/2019 3:10	100.00	75.08556882	4.778289747
1/9/2019 3:20	100.00	75.08251581	3.52265724
1/9/2019 3:35	100.00	75.08556897	2.495321557
1/9/2019 3:45	100.00	78.19352657	2.908833925
1/9/2019 4:00	100.00	75.08556897	2.003787988
1/9/2019 4:05	100.00	81.37780909	1.577045935
1/9/2019 4:20	100.00	75.08556897	1.782445231
1/9/2019 4:25	100.00	78.19047341	1.051250882
1/9/2019 4:30	100.00	78.19352657	0.493060071
1/9/2019 4:40	100.00	78.19352641	0.05834629
1/9/2019 4:55	100.00	75.08556897	0
1/9/2019 5:05	100.00	78.19352657	0
1/9/2019 5:15	100.00	75.08251597	0
1/9/2019 5:20	100.00	75.08556897	0
1/9/2019 5:40	100.00	72.05393646	0
1/9/2019 6:00	100.00	69.09862904	0
1/9/2019 6:10	100.00	69.09862889	0
1/9/2019 6:20	100.00	75.08251581	0.072084806
1/9/2019 6:25	100.00	78.19352657	2.241074207
1/9/2019 6:30	100.00	81.37780909	2.120480563
1/9/2019 6:40	100.00	81.37780909	0.087519435
1/9/2019 6:55	100.00	81.37780909	0.223717314

Media 1 (Pre-TAPE/Pretreatment)			
Date and Time	Day #	Infiltration	Bypass
1/9/2019 7:05	100.00	81.37475609	2.366077736
1/9/2019 7:10	100.00	81.37780926	1.297696114
1/9/2019 7:30	100.00	78.19047357	4.584254421
1/9/2019 7:40	100.00	78.19352641	0.709144875
1/9/2019 7:50	100.00	78.19352641	0.771053003
1/9/2019 7:55	100.00	81.37475626	2.366247352
1/9/2019 8:15	100.00	75.08556897	0.287660778
1/9/2019 8:20	100.00	78.19047357	0.904367492
1/9/2019 8:25	100.00	78.19352641	0.49306007
1/9/2019 8:35	100.00	78.19352641	0.071915194
1/9/2019 8:45	100.00	75.08556882	0.087519435
1/9/2019 8:55	100.00	75.08556882	0.009498233
1/9/2019 9:05	100.00	78.19352657	1.051250884
1/9/2019 9:30	100.00	78.19352641	1.297696112
1/9/2019 9:40	100.00	78.19352641	2.120310952
1/9/2019 9:50	100.00	78.19352657	2.495321557
1/9/2019 10:05	100.00	78.19047341	0.195561837
1/9/2019 10:20	100.00	75.08251597	2.003618376
1/9/2019 10:25	100.00	75.08556882	1.577045935
1/9/2019 10:30	100.00	78.19047357	0.446586573
1/9/2019 10:40	100.00	78.19047341	3.52265724
1/9/2019 10:55	100.00	75.08251597	2.766699649
1/9/2019 11:00	100.00	75.08556882	3.362374554
1/9/2019 11:10	100.00	78.19352641	4.031830384
1/9/2019 11:20	100.00	75.08556897	5.604636048
1/9/2019 11:30	100.00	75.08251597	11.37956185
1/9/2019 11:35	100.00	75.08556882	11.04627561
1/9/2019 11:40	100.00	78.19047357	10.71909542
1/9/2019 12:00	100.00	75.08251597	4.584254421
1/9/2019 12:05	100.00	78.19352657	5.181116613
1/9/2019 12:15	100.00	75.08556897	4.977243821
1/9/2019 12:25	100.00	69.09862904	4.584254421
1/9/2019 12:30	100.00	72.05088331	15.06012719
1/9/2019 12:35	100.00	72.05393646	24.44115903
1/9/2019 12:45	100.00	72.05393646	32.10843819
1/9/2019 13:00	100.00	66.2196467	13.14012722
1/9/2019 13:10	100.00	66.2165937	10.71892581
1/9/2019 13:20	100.00	66.2165937	16.71468553
1/9/2019 13:25	100.00	66.21964657	21.83050174
1/9/2019 13:30	100.00	69.09557604	24.98561133
1/9/2019 13:35	100.00	69.09862904	19.87200002
1/9/2019 13:45	100.00	66.2165937	12.06496114
1/9/2019 13:55	100.00	66.2196467	6.279010607
1/9/2019 14:05	100.00	66.2165937	3.055378095
1/9/2019 14:15	100.00	66.2165937	1.297696114
1/9/2019 14:20	100.00	66.2196467	0.771053004

Media 1 (Pre-TAPE/Pretreatment)			
Date and Time	Day #	Infiltration	Bypass
1/9/2019 14:25	100.00	69.09557589	0.542586572
1/9/2019 14:35	100.00	66.21964657	0.49306007
1/9/2019 14:40	100.00	69.09557604	0.650628976
1/9/2019 14:45	100.00	69.09862889	0.402657243
1/9/2019 15:00	100.00	69.09557604	0.027307421
1/9/2019 15:05	100.00	72.05393646	0
1/9/2019 15:20	100.00	69.09862889	0
1/9/2019 15:40	100.00	66.21659356	0
1/9/2019 15:55	100.00	60.68149816	0
1/9/2019 16:10	100.00	58.02233221	0
1/9/2019 16:25	100.00	50.48141337	0
1/9/2019 16:35	100.00	48.10922973	0
1/9/2019 16:55	100.00	43.56941347	0
1/9/2019 17:40	100.00	29.7881555	0
1/9/2019 17:55	100.00	26.42679856	0
1/9/2019 22:45	100.00	33.40291169	8.041611315
1/9/2019 22:55	100.00	33.40291169	12.7752933
1/9/2019 23:00	100.00	35.30187982	26.09639573
1/9/2019 23:05	100.00	37.27106717	37.48562548
1/9/2019 23:15	100.00	37.27106717	33.40443819
1/9/2019 23:25	100.00	39.30436745	22.8529187
1/9/2019 23:30	100.00	39.30436753	15.87392228
1/9/2019 23:45	100.00	39.30131444	5.390247344
1/9/2019 23:55	100.00	39.30436745	2.766699643
1/10/2019 0:00	101.00	39.30436753	2.003618376
1/10/2019 0:15	101.00	39.30436753	0.836183746
1/10/2019 0:25	101.00	41.40178096	0.145865725
1/10/2019 0:35	101.00	39.30436753	0.000169611
1/10/2019 0:40	101.00	41.40178087	0
1/10/2019 1:00	101.00	39.30436753	0
1/10/2019 1:10	101.00	37.27106717	0
1/10/2019 1:20	101.00	37.27106717	0
1/10/2019 1:40	101.00	35.30493282	0
1/10/2019 1:50	101.00	33.40291162	0
1/10/2019 2:05	101.00	31.56500356	0
1/10/2019 2:15	101.00	29.7881555	0
1/10/2019 2:30	101.00	28.07542052	0
1/10/2019 2:35	101.00	29.78815544	0
1/10/2019 2:40	101.00	29.7881555	0
1/10/2019 2:45	101.00	31.56195049	0
1/10/2019 2:50	101.00	31.56195056	0
1/10/2019 2:55	101.00	31.5650035	0
1/10/2019 3:05	101.00	31.56195056	0
1/10/2019 3:10	101.00	31.5650035	0
1/10/2019 3:20	101.00	31.5650035	0
1/10/2019 3:35	101.00	31.56500356	0

Media 1 (Pre-TAPE/Pretreatment)			
Date and Time	Day #	Infiltration	Bypass
1/10/2019 4:00	101.00	28.07542052	0
1/10/2019 4:20	101.00	26.42679861	0
1/10/2019 4:30	101.00	24.83313077	0
1/10/2019 4:40	101.00	23.30662895	0
1/10/2019 4:55	101.00	21.83202829	0
1/10/2019 5:05	101.00	21.83508129	0
1/17/2019 8:05	108.00	37.27106717	3.206671381
1/17/2019 8:10	108.00	39.30131444	2.241074202
1/17/2019 8:15	108.00	39.30436753	1.782614843
1/17/2019 8:20	108.00	39.30436753	1.677795055
1/17/2019 8:30	108.00	41.40178096	4.584254421
1/17/2019 8:35	108.00	41.40483387	6.755109533
1/17/2019 8:40	108.00	43.56941347	10.08254418
1/17/2019 8:50	108.00	43.56941347	10.3978516
1/17/2019 9:00	108.00	43.56941347	10.08271379
1/17/2019 9:15	108.00	43.56941347	9.172918736
1/17/2019 9:25	108.00	45.80421206	12.06496114
1/17/2019 9:35	108.00	45.80421206	15.46363252
1/17/2019 9:45	108.00	45.80421206	16.71468553
1/17/2019 9:55	108.00	45.80115896	12.77546288
1/17/2019 10:00	108.00	45.80421206	10.08254418
1/17/2019 10:20	108.00	43.56941347	9.773512377
1/17/2019 10:30	108.00	43.56941347	9.773512377
1/17/2019 10:40	108.00	45.80421196	14.27262189
1/17/2019 10:45	108.00	45.80421206	20.83708836
1/17/2019 10:55	108.00	45.80421206	30.84381628
1/17/2019 11:05	108.00	45.80421206	26.66306716
1/17/2019 11:15	108.00	43.56941347	21.83050179
1/17/2019 11:20	108.00	45.80421206	23.37515197
1/17/2019 11:30	108.00	45.80421206	27.23720144
1/17/2019 11:40	108.00	45.80421206	26.09622617
1/17/2019 12:05	108.00	45.80421206	15.46380213
1/17/2019 12:15	108.00	43.56941347	12.41707422
1/17/2019 12:20	108.00	45.80421196	12.41707419
1/17/2019 12:35	108.00	43.56941347	5.82411308
1/17/2019 12:45	108.00	43.56941347	5.82411308
1/17/2019 13:00	108.00	43.56941347	3.055547706
1/17/2019 13:10	108.00	43.56941347	1.577045938
1/17/2019 13:20	108.00	43.56941347	0.975943464
1/17/2019 13:40	108.00	41.40483387	0.000169611
1/17/2019 13:45	108.00	43.56941347	0
1/17/2019 13:55	108.00	41.40178096	0
1/17/2019 14:00	108.00	41.40483387	0
1/17/2019 14:05	108.00	43.56941347	0
1/17/2019 14:15	108.00	41.40178096	0
1/17/2019 14:20	108.00	41.40483396	0

Media 1 (Pre-TAPE/Pretreatment)			
Date and Time	Day #	Infiltration	Bypass
1/17/2019 14:30	108.00	41.40178096	0
1/17/2019 14:40	108.00	39.30436753	0
1/17/2019 14:50	108.00	39.30436753	0
1/17/2019 15:00	108.00	39.30436753	0
1/17/2019 15:10	108.00	41.40178087	0
1/17/2019 15:15	108.00	41.40178096	4.58408481
1/17/2019 15:20	108.00	41.40483387	5.604636036
1/17/2019 15:25	108.00	43.56941347	6.514431101
1/17/2019 15:35	108.00	43.56941347	3.055547706
1/17/2019 15:40	108.00	45.80421196	2.908833919
1/17/2019 16:00	108.00	43.56941347	0.402657244
1/17/2019 16:10	108.00	41.40483396	0.020014134
1/17/2019 16:20	108.00	43.56941347	0
1/17/2019 16:30	108.00	41.40483396	0
1/17/2019 16:40	108.00	41.40483387	0
1/17/2019 16:55	108.00	41.40483396	0
1/17/2019 17:30	108.00	35.3049329	0
1/17/2019 17:45	108.00	33.40291162	0
1/17/2019 18:00	108.00	29.7881555	0
1/19/2019 1:45	110.00	14.19951945	13.14012722
1/19/2019 2:00	110.00	20.42154061	13.51123673
1/19/2019 2:05	110.00	21.83202829	12.41690461
1/19/2019 2:15	110.00	21.83508129	9.172918736
1/19/2019 2:25	110.00	21.83202824	9.773342745
1/19/2019 2:30	110.00	21.83508129	10.3978516
1/19/2019 2:35	110.00	23.30357594	14.27262189
1/19/2019 2:40	110.00	23.30357599	20.35098235
1/19/2019 2:45	110.00	24.83313071	18.93540634
1/19/2019 2:55	110.00	24.83618372	11.04627561
1/19/2019 3:05	110.00	24.83618377	7.773286226
1/19/2019 3:15	110.00	24.83313077	6.279010607
1/19/2019 3:20	110.00	24.83618372	5.824113067
1/19/2019 3:25	110.00	26.42374561	4.97707421
1/19/2019 3:35	110.00	24.83618377	4.210939933
1/19/2019 3:40	110.00	26.42374555	8.041780909
1/19/2019 3:45	110.00	26.42374561	13.88862192
1/19/2019 4:00	110.00	28.07542052	17.14515903
1/19/2019 4:10	110.00	28.07542052	19.87200002
1/19/2019 4:25	110.00	28.07542046	18.02645934
1/19/2019 4:30	110.00	28.07542052	17.58224737
1/19/2019 4:35	110.00	29.7881555	16.71468553
1/19/2019 4:45	110.00	31.56500356	13.88862192
1/19/2019 4:55	110.00	29.7881555	11.04627563
1/19/2019 5:05	110.00	28.07542052	9.172918736
1/19/2019 5:10	110.00	29.78815544	8.881526491
1/19/2019 5:15	110.00	31.56195056	7.773116615

Media 1 (Pre-TAPE/Pretreatment)			
Date and Time	Day #	Infiltration	Bypass
1/19/2019 5:30	110.00	29.7881555	4.395137813
1/19/2019 5:45	110.00	33.39985862	4.395137804
1/19/2019 6:05	110.00	35.3049329	7.001385166
1/19/2019 6:15	110.00	31.56195056	5.181116613
1/19/2019 6:20	110.00	31.5650035	4.211109536
1/19/2019 6:25	110.00	33.39985869	2.766530038
1/19/2019 6:30	110.00	33.40291162	1.890996464
1/19/2019 6:45	110.00	33.40291169	0.402657244
1/19/2019 6:55	110.00	33.40291162	0.254586572
1/19/2019 7:05	110.00	33.40291162	0.087519435
1/19/2019 7:15	110.00	33.40291162	0.000169611
1/19/2019 7:40	110.00	33.40291162	0
1/19/2019 7:50	110.00	33.40291162	0
1/19/2019 8:20	110.00	31.56500356	0
1/19/2019 8:30	110.00	29.7881555	0
1/19/2019 9:25	110.00	23.30357599	0
1/19/2019 9:35	110.00	23.30357599	0
1/19/2019 9:45	110.00	21.83508129	0
1/19/2019 9:55	110.00	20.42154061	0
1/19/2019 10:00	110.00	21.83202829	0
1/19/2019 10:10	110.00	20.42154066	0
1/19/2019 10:30	110.00	17.76542758	0
1/23/2019 11:50	114.00	28.07542052	13.51106715
1/23/2019 12:15	114.00	28.07542052	16.29099648
1/23/2019 12:25	114.00	28.07542052	8.881356899
1/23/2019 12:35	114.00	28.07542052	16.71468553
1/23/2019 12:45	114.00	28.07542052	16.29099648
1/23/2019 12:55	114.00	28.07542046	10.08271377
1/23/2019 13:10	114.00	29.7881555	12.41707422
1/23/2019 13:20	114.00	29.7881555	9.172918736
1/23/2019 13:30	114.00	28.07542052	7.253257957
1/23/2019 13:35	114.00	28.07542052	9.470247359
1/23/2019 13:45	114.00	28.07542052	10.71909542
1/23/2019 13:55	114.00	29.7881555	11.71912369
1/23/2019 14:05	114.00	28.07542052	7.773286226
1/23/2019 14:15	114.00	28.07542052	5.82411308
1/23/2019 14:30	114.00	28.07542052	4.778120146
1/23/2019 14:35	114.00	29.78815544	7.001385151
1/23/2019 14:40	114.00	29.7881555	7.5103887
1/23/2019 14:50	114.00	28.07542052	4.210939933
1/23/2019 15:00	114.00	28.07542052	6.51426149
1/23/2019 15:05	114.00	29.7881555	8.88152651
1/23/2019 15:25	114.00	29.7881555	5.604636048
1/23/2019 15:35	114.00	29.7881555	2.495321557
1/23/2019 15:45	114.00	29.7881555	1.297696114
1/23/2019 16:00	114.00	28.07542052	0.05834629

Media 1 (Pre-TAPE/Pretreatment)			
Date and Time	Day #	Infiltration	Bypass
1/23/2019 16:10	114.00	28.07542052	0.493060071
1/23/2019 16:20	114.00	28.07542052	0.650628976
1/23/2019 16:30	114.00	28.07542052	0.709144877
1/23/2019 16:35	114.00	28.07542052	0.446416962
1/23/2019 16:45	114.00	28.07542052	0
1/23/2019 17:00	114.00	28.07542046	0
1/23/2019 17:15	114.00	26.42374561	0
1/23/2019 17:25	114.00	24.83618372	0
1/23/2019 17:45	114.00	23.30662895	0
1/23/2019 18:00	114.00	20.42154066	0
1/23/2019 18:10	114.00	20.42154061	0
1/23/2019 18:20	114.00	19.06600704	0
1/23/2019 18:35	114.00	17.76542758	0
1/23/2019 18:45	114.00	17.76542758	0
1/23/2019 19:20	114.00	14.19951945	0
1/23/2019 19:30	114.00	13.11570319	0
1/23/2019 19:35	114.00	13.1187562	0
1/23/2019 19:45	114.00	12.086841	0
1/23/2019 19:55	114.00	11.10987987	0
1/23/2019 20:15	114.00	10.18176679	0
1/23/2019 20:30	114.00	9.299448772	0
1/23/2019 20:40	114.00	8.46903181	0
1/23/2019 20:50	114.00	7.684409901	0
1/23/2019 21:15	114.00	6.252551243	0
1/25/2019 15:05	116.00	0.50069258	0
1/25/2019 15:20	116.00	0.656395759	0
1/25/2019 15:25	116.00	0.65639576	0
1/25/2019 15:40	116.00	0.839575971	0
1/25/2019 15:50	116.00	1.050233217	0
1/25/2019 16:15	116.00	1.291420493	0
1/25/2019 17:35	116.00	1.865385157	0
1/25/2019 17:50	116.00	1.862332157	0
1/25/2019 17:55	116.00	1.865385157	0
2/1/2019 18:00	123.00	20.42154066	4.97707421
2/1/2019 18:10	123.00	20.42154061	3.857300349
2/1/2019 18:20	123.00	20.42154061	6.514431088
2/1/2019 18:30	123.00	20.42154061	7.77328621
2/1/2019 18:35	123.00	21.83202829	8.315872799
2/1/2019 18:45	123.00	21.83508129	8.041780926
2/1/2019 19:00	123.00	21.83202829	5.82411308
2/1/2019 19:05	123.00	21.83508125	6.048848049
2/1/2019 19:20	123.00	21.83508129	5.181286224
2/1/2019 19:30	123.00	21.83202829	7.773286226
2/1/2019 19:40	123.00	21.83508125	8.041780909
2/1/2019 19:55	123.00	21.83508129	9.172918736
2/1/2019 20:05	123.00	21.83202829	7.001385166

Media 1 (Pre-TAPE/Pretreatment)			
Date and Time	Day #	Infiltration	Bypass
2/1/2019 20:15	123.00	21.83508129	5.82411308
2/1/2019 20:25	123.00	21.83202824	6.048848049
2/1/2019 20:30	123.00	21.83508129	5.390247355
2/1/2019 20:40	123.00	21.83202829	4.97707421
2/1/2019 20:50	123.00	21.83508129	3.857469968
2/1/2019 21:00	123.00	21.83202829	2.628805656
2/1/2019 21:05	123.00	21.83508129	1.577045938
2/1/2019 21:20	123.00	20.42154061	0.402826855
2/1/2019 21:30	123.00	20.42154061	0.02730742
2/1/2019 21:35	123.00	21.83202829	0
2/1/2019 21:50	123.00	21.83202829	0
2/1/2019 21:55	123.00	21.83508125	0
2/1/2019 22:10	123.00	21.83508129	0
2/1/2019 22:20	123.00	20.42154066	0
2/1/2019 22:30	123.00	19.06600708	0
2/1/2019 22:45	123.00	17.76542758	0
2/1/2019 22:55	123.00	17.76542758	0
2/1/2019 23:05	123.00	17.76542758	0
2/1/2019 23:15	123.00	16.52285514	0
2/1/2019 23:30	123.00	16.52285514	0
2/1/2019 23:50	123.00	15.33523676	0
2/2/2019 0:00	124.00	14.19951945	0
2/2/2019 0:10	124.00	13.11875617	0
2/2/2019 0:25	124.00	13.1187562	0
2/2/2019 0:35	124.00	12.086841	0
2/2/2019 0:50	124.00	11.10987987	0
2/2/2019 1:00	124.00	11.10682687	0
2/2/2019 1:05	124.00	11.10987985	0
2/3/2019 4:00	125.00	5.605314493	0
2/3/2019 4:10	125.00	5.602261489	0
2/3/2019 4:20	125.00	5.605314493	0
2/13/2019 1:35	135.00	0.109908127	9.17597174
2/13/2019 11:30	135.00	13.11570319	0
2/13/2019 11:35	135.00	14.19951942	0
2/13/2019 11:45	135.00	14.19646641	0
2/13/2019 11:50	135.00	14.19951945	0
2/13/2019 12:05	135.00	15.33523676	0
2/13/2019 12:10	135.00	16.5228551	0
2/13/2019 12:20	135.00	16.5228551	0
2/13/2019 12:25	135.00	17.76542758	0
2/13/2019 12:35	135.00	17.76542758	0.05834629
2/13/2019 12:40	135.00	19.06600704	0.003222615
2/13/2019 12:50	135.00	19.06600708	0
2/13/2019 13:00	135.00	19.06600708	0
2/13/2019 13:10	135.00	19.06600708	0
2/13/2019 13:15	135.00	20.41848761	0.05834629

Media 1 (Pre-TAPE/Pretreatment)			
Date and Time	Day #	Infiltration	Bypass
2/13/2019 13:20	135.00	20.42154066	0.087519435
2/13/2019 13:30	135.00	20.42154066	0.323279152
2/13/2019 13:35	135.00	21.83202829	0.402657244
2/13/2019 13:45	135.00	21.83508129	0.223886926
2/13/2019 13:55	135.00	21.83202829	0.005936396
2/13/2019 14:05	135.00	21.83508129	0.254416961
2/13/2019 14:15	135.00	21.83202829	0.195561838
2/13/2019 14:25	135.00	21.83508125	0
2/13/2019 14:30	135.00	23.30357599	0.000508834
2/13/2019 14:40	135.00	23.30357599	0.000508834
2/13/2019 14:50	135.00	23.30357599	0
2/13/2019 15:05	135.00	23.30357599	0
2/13/2019 15:15	135.00	21.83508129	0
2/13/2019 15:25	135.00	21.83202829	0
2/13/2019 15:30	135.00	21.83508125	0
2/13/2019 15:45	135.00	21.83202829	0
2/13/2019 15:50	135.00	21.83508129	0
2/13/2019 16:00	135.00	21.83202829	0
2/13/2019 16:10	135.00	21.83508129	0
2/13/2019 16:30	135.00	19.06600708	0
2/13/2019 16:40	135.00	19.06600704	0
2/13/2019 16:55	135.00	17.76542758	0
2/13/2019 17:10	135.00	16.5228551	0
2/13/2019 17:45	135.00	13.11875617	0
2/13/2019 18:00	135.00	12.086841	0
2/13/2019 18:15	135.00	11.10987987	0
2/13/2019 18:25	135.00	11.10987987	0
2/13/2019 18:55	135.00	8.469031792	0
2/13/2019 19:30	135.00	6.252551243	0
2/13/2019 20:05	135.00	3.91089753	0
2/14/2019 17:20	136.00	0.030530035	0
2/14/2019 17:30	136.00	0.061060071	0
2/14/2019 18:00	136.00	0.177074205	0
2/14/2019 18:30	136.00	0.262558304	0
2/15/2019 12:05	137.00	11.10987987	0.904537103
2/15/2019 12:15	137.00	11.10682687	1.051250884
2/15/2019 12:20	137.00	11.10987985	2.495321552
2/15/2019 12:30	137.00	11.10987985	0.650628975
2/15/2019 12:45	137.00	11.10987987	0
2/15/2019 12:55	137.00	11.10987985	2.003618372
2/15/2019 13:00	137.00	12.086841	9.470247359
2/15/2019 13:10	137.00	12.086841	20.35098235
2/15/2019 13:20	137.00	12.086841	20.35098235
2/15/2019 13:30	137.00	12.086841	8.041780926
2/15/2019 13:35	137.00	12.086841	26.66289755
2/15/2019 13:40	137.00	13.11570316	35.40873494

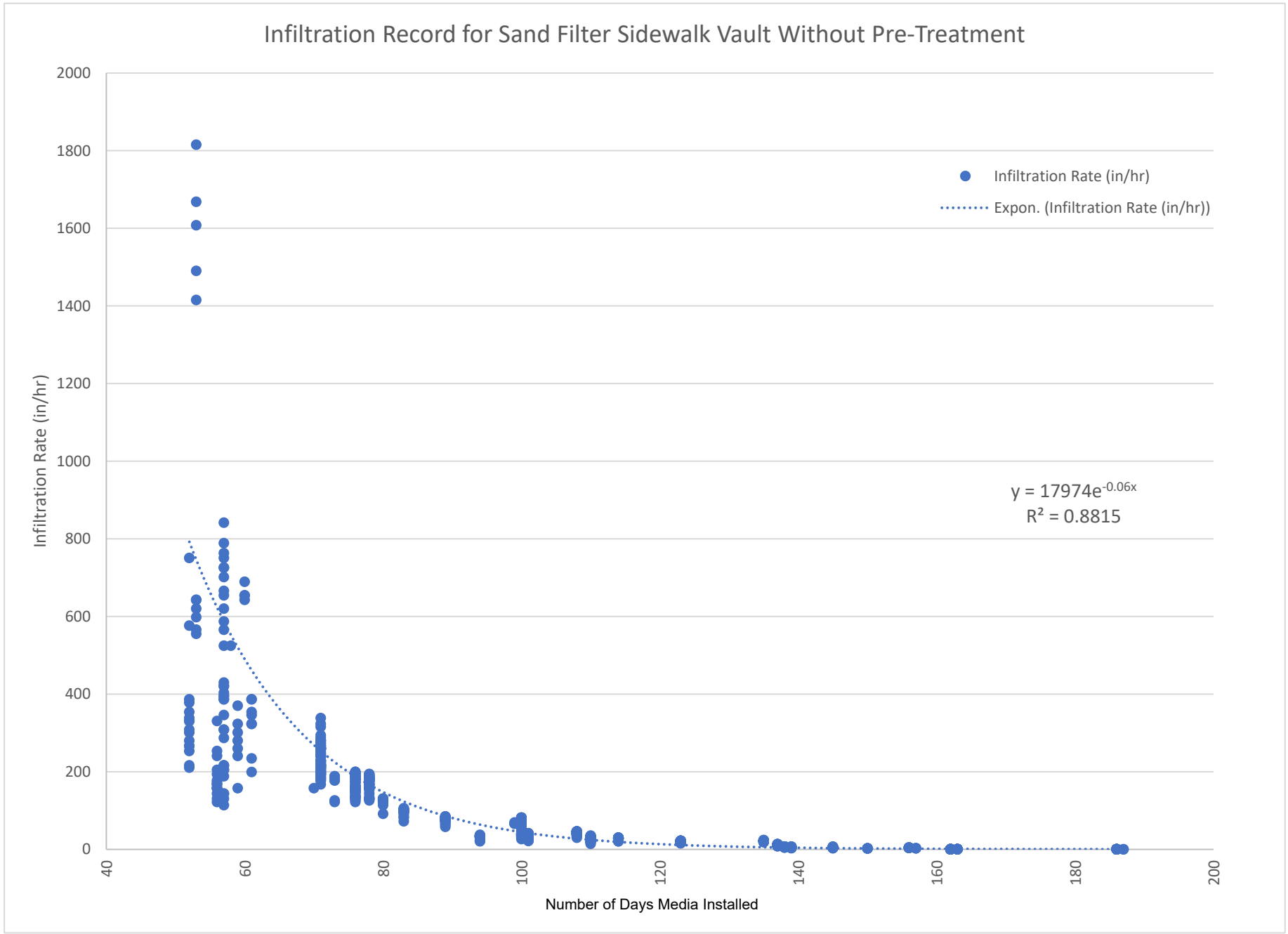
Media 1 (Pre-TAPE/Pretreatment)			
Date and Time	Day #	Infiltration	Bypass
2/15/2019 13:55	137.00	12.086841	16.71468553
2/15/2019 14:05	137.00	12.086841	12.7752933
2/15/2019 14:15	137.00	12.086841	10.71892581
2/15/2019 14:30	137.00	12.086841	6.755109547
2/15/2019 14:40	137.00	12.086841	5.390247355
2/15/2019 14:50	137.00	12.086841	4.031830392
2/15/2019 14:55	137.00	12.08989398	4.778120136
2/15/2019 15:05	137.00	12.086841	4.395307425
2/15/2019 15:15	137.00	12.086841	4.210939933
2/15/2019 15:25	137.00	12.086841	4.395137813
2/15/2019 15:35	137.00	12.086841	3.362374561
2/15/2019 15:45	137.00	13.11570319	5.181286224
2/15/2019 16:00	137.00	12.086841	4.211109545
2/15/2019 16:10	137.00	12.086841	4.210939933
2/15/2019 16:20	137.00	13.1187562	3.055378095
2/15/2019 16:35	137.00	12.086841	2.366077741
2/15/2019 16:45	137.00	12.086841	2.120310956
2/15/2019 16:55	137.00	13.1187562	2.241243818
2/15/2019 17:05	137.00	13.11570319	1.211872793
2/15/2019 17:30	137.00	12.086841	0.650459365
2/15/2019 17:40	137.00	13.1187562	0.169611308
2/15/2019 17:50	137.00	12.086841	0.087519435
2/15/2019 18:00	137.00	12.086841	0.046473498
2/15/2019 18:15	137.00	13.11570319	0
2/15/2019 18:25	137.00	12.086841	0
2/15/2019 18:35	137.00	12.086841	0
2/15/2019 18:45	137.00	12.086841	0
2/15/2019 18:55	137.00	12.08684098	0
2/15/2019 19:05	137.00	12.08684098	0
2/15/2019 19:20	137.00	11.10682687	0
2/15/2019 19:25	137.00	11.10987985	0
2/15/2019 19:40	137.00	11.10987985	0
2/15/2019 19:55	137.00	10.17871379	0
2/15/2019 20:05	137.00	9.299448772	0
2/15/2019 20:10	137.00	9.302501756	0
2/15/2019 20:20	137.00	9.299448772	0
2/15/2019 20:30	137.00	8.46903181	0
2/15/2019 20:40	137.00	8.46903181	0
2/15/2019 20:50	137.00	7.684409901	0
2/16/2019 13:45	138.00	0.50069258	0
2/16/2019 13:55	138.00	0.65639576	0
2/16/2019 14:30	138.00	1.050233217	0
2/16/2019 15:20	138.00	4.997766779	2.366077736
2/16/2019 15:30	138.00	5.605314481	1.677795051
2/16/2019 16:00	138.00	6.252551243	0.009498233
2/16/2019 16:10	138.00	6.252551243	0.036127209

Media 1 (Pre-TAPE/Pretreatment)			
Date and Time	Day #	Infiltration	Bypass
2/16/2019 16:20	138.00	6.945583045	0.003222615
2/16/2019 16:30	138.00	6.945583045	0
2/16/2019 16:35	138.00	6.945583045	0
2/16/2019 16:45	138.00	6.945583045	0
2/16/2019 17:00	138.00	6.945583031	0
2/16/2019 17:05	138.00	6.945583045	0
2/16/2019 17:30	138.00	6.945583045	0
2/16/2019 17:40	138.00	6.945583045	0
2/16/2019 18:00	138.00	6.945583045	0
2/16/2019 18:45	138.00	6.252551243	0
2/16/2019 19:20	138.00	5.605314493	0
2/16/2019 19:30	138.00	5.602261489	0
2/16/2019 19:35	138.00	5.602261489	0
2/16/2019 19:45	138.00	4.997766789	0
2/16/2019 20:00	138.00	4.997766779	0
2/16/2019 20:15	138.00	4.432961135	0
2/17/2019 12:15	139.00	3.425469968	3.206671381
2/17/2019 12:45	139.00	4.432961135	1.577215549
2/17/2019 13:35	139.00	5.605314493	0.361611308
2/17/2019 13:45	139.00	5.602261489	0.323279152
2/17/2019 13:50	139.00	5.605314481	0.223886926
2/17/2019 14:05	139.00	6.252551243	0.1244947
2/17/2019 14:20	139.00	6.252551243	0.1244947
2/17/2019 14:40	139.00	6.252551243	0.001526502
2/17/2019 14:50	139.00	6.252551243	0
2/17/2019 15:00	139.00	6.252551243	0
2/17/2019 15:05	139.00	6.252551243	0
2/17/2019 15:45	139.00	6.252551243	0
2/17/2019 16:00	139.00	6.252551243	0
2/17/2019 16:10	139.00	6.252551243	0
2/17/2019 16:20	139.00	6.252551243	0
2/17/2019 16:30	139.00	5.602261489	0
2/17/2019 16:55	139.00	4.997766789	0
2/17/2019 17:05	139.00	4.997766789	0
2/17/2019 17:15	139.00	4.997766789	0
2/17/2019 17:25	139.00	4.432961126	0
2/17/2019 17:40	139.00	4.432961135	0
2/17/2019 17:55	139.00	3.910897522	0
2/17/2019 18:10	139.00	3.910897522	0
2/17/2019 18:25	139.00	3.425469968	0
2/17/2019 18:45	139.00	2.979731452	0
2/23/2019 12:30	145.00	2.982784449	1.577045935
2/23/2019 12:45	145.00	3.425469968	2.628805656
2/23/2019 12:55	145.00	3.910897522	1.051081271
2/23/2019 13:05	145.00	3.910897522	1.212042401
2/23/2019 13:25	145.00	4.432961126	0.771053003

Media 1 (Pre-TAPE/Pretreatment)			
Date and Time	Day #	Infiltration	Bypass
2/23/2019 13:30	145.00	4.432961135	0.542416962
2/23/2019 13:35	145.00	4.432961135	0.323448764
2/23/2019 13:45	145.00	4.997766789	0.169611308
2/23/2019 13:55	145.00	4.997766789	0.005766784
2/23/2019 14:30	145.00	5.605314493	0
2/23/2019 14:40	145.00	5.602261489	0
2/23/2019 15:10	145.00	6.252551229	0
2/23/2019 15:15	145.00	6.252551243	0
2/23/2019 15:30	145.00	6.252551229	0
2/23/2019 15:35	145.00	6.252551243	0
2/23/2019 16:30	145.00	4.997766789	0
2/23/2019 17:35	145.00	3.910897522	0
2/23/2019 17:45	145.00	3.910897522	0
2/23/2019 18:00	145.00	3.425469968	0
2/23/2019 18:15	145.00	2.979731452	0
2/28/2019 17:00	150.00	2.201215545	0
2/28/2019 17:05	150.00	2.20121555	0
2/28/2019 17:30	150.00	2.20121555	0
2/28/2019 17:40	150.00	2.20121555	0
2/28/2019 18:00	150.00	2.20121555	0
2/28/2019 18:15	150.00	2.20121555	0
3/1/2019 17:05	151.00	0.003053004	0
3/1/2019 17:15	151.00	0.009159011	0
3/1/2019 17:50	151.00	0.009159011	0
3/1/2019 18:15	151.00	0.009159011	0
3/6/2019 18:55	156.00	3.910897522	13.51106712
3/6/2019 19:15	156.00	3.910897522	6.514431088
3/6/2019 19:25	156.00	3.910897522	7.510388684
3/6/2019 19:35	156.00	3.91089753	5.82411308
3/6/2019 19:45	156.00	3.91089753	7.001385166
3/6/2019 19:55	156.00	3.91089753	4.778120146
3/6/2019 20:30	156.00	4.432961135	2.120480567
3/6/2019 20:40	156.00	4.432961135	1.051250884
3/6/2019 20:55	156.00	4.432961126	1.051250882
3/6/2019 21:00	156.00	4.432961135	0.594996467
3/6/2019 21:05	156.00	4.432961135	0.287660778
3/6/2019 21:15	156.00	4.432961135	0.087519435
3/6/2019 21:45	156.00	4.432961135	0
3/6/2019 22:30	156.00	4.432961135	0
3/6/2019 23:10	156.00	3.910897522	0
3/6/2019 23:40	156.00	3.425469968	0
3/6/2019 23:50	156.00	3.425469968	0
3/7/2019 0:00	157.00	2.979731452	0
3/7/2019 0:20	157.00	2.573681976	0
3/7/2019 0:30	157.00	2.573681976	0
3/12/2019 10:45	162.00	0.064113074	15.87392228

Media 1 (Pre-TAPE/Pretreatment)			
Date and Time	Day #	Infiltration	Bypass
3/12/2019 10:55	162.00	0.061060071	17.14515903
3/12/2019 11:05	162.00	0.064113074	8.315872799
3/12/2019 11:15	162.00	0.061060071	11.04627563
3/12/2019 11:50	162.00	0.109908127	7.773286226
3/12/2019 12:00	162.00	0.109908127	10.39768199
3/12/2019 12:05	162.00	0.109908127	4.778120146
3/12/2019 12:25	162.00	0.109908127	4.97707421
3/12/2019 13:20	162.00	0.109908127	1.890996468
3/12/2019 13:30	162.00	0.109908127	1.577045938
3/12/2019 13:50	162.00	0.177074205	0.836183745
3/12/2019 13:55	162.00	0.177074205	0.904367492
3/12/2019 14:05	162.00	0.109908127	0.323279152
3/12/2019 14:15	162.00	0.109908127	0.594996467
3/12/2019 14:45	162.00	0.177074205	1.051081271
3/12/2019 14:55	162.00	0.177074205	2.495321552
3/12/2019 15:00	162.00	0.177074205	2.495321557
3/12/2019 15:10	162.00	0.177074205	1.782445228
3/12/2019 15:15	162.00	0.177074205	3.362374561
3/12/2019 15:35	162.00	0.177074205	1.480197881
3/12/2019 15:55	162.00	0.177074205	0.223886926
3/12/2019 16:20	162.00	0.177074205	0.145865725
3/12/2019 17:05	162.00	0.109908127	0
3/12/2019 17:30	162.00	0.112961131	0
3/12/2019 17:40	162.00	0.109908127	0
3/12/2019 17:50	162.00	0.109908127	0
3/12/2019 18:00	162.00	0.109908127	0
3/12/2019 18:15	162.00	0.109908127	0
3/12/2019 18:25	162.00	0.109908127	0
3/13/2019 11:55	163.00	0.064113074	1.051250882
3/13/2019 12:05	163.00	0.061060071	0.709144877
3/13/2019 12:15	163.00	0.064113074	1.051250884
3/13/2019 12:25	163.00	0.061060071	0.709314488
3/13/2019 12:30	163.00	0.064113074	0.90436749
3/13/2019 13:30	163.00	0.262558304	1.677795055
3/13/2019 13:50	163.00	0.262558304	0.594996466
3/13/2019 13:55	163.00	0.262558304	0.446586573
3/13/2019 14:05	163.00	0.262558304	0.542416962
3/13/2019 14:15	163.00	0.262558304	0.542586573
3/13/2019 14:30	163.00	0.262558304	0.254586573
3/13/2019 14:45	163.00	0.262558304	0.146035336
3/13/2019 14:50	163.00	0.262558304	0.104989399
3/13/2019 15:00	163.00	0.369413428	0.046473498
3/13/2019 15:15	163.00	0.369413428	0.000678445
3/13/2019 15:35	163.00	0.369413428	0
3/13/2019 15:45	163.00	0.369413428	0
3/13/2019 16:10	163.00	0.369413428	0

Media 1 (Pre-TAPE/Pretreatment)			
Date and Time	Day #	Infiltration	Bypass
3/13/2019 16:30	163.00	0.369413428	0
4/5/2019 8:30	186.00	0.109908127	22.33814843
4/5/2019 8:35	186.00	0.112961131	11.71929327
4/5/2019 9:25	186.00	0.109908127	0
4/5/2019 9:35	186.00	0.064113074	0
4/5/2019 9:45	186.00	0.061060071	0
4/5/2019 10:45	186.00	0.177074205	0.145865725
4/5/2019 10:55	186.00	0.177074205	0
4/5/2019 11:25	186.00	0.177074205	0
4/5/2019 11:30	186.00	0.177074205	0
4/5/2019 11:40	186.00	0.109908127	0
4/5/2019 11:50	186.00	0.177074205	0
4/5/2019 12:00	186.00	0.109908127	0
4/5/2019 12:15	186.00	0.109908127	0
4/5/2019 12:25	186.00	0.177074205	0
4/5/2019 12:35	186.00	0.109908127	0
4/5/2019 13:45	186.00	0.030530035	0
4/5/2019 20:00	186.00	0.177074205	14.27262189
4/5/2019 20:05	186.00	0.177074205	8.041611315
4/5/2019 20:15	186.00	0.109908127	8.041611315
4/5/2019 20:25	186.00	0.177074205	5.181116602
4/5/2019 20:30	186.00	0.177074205	3.522657247
4/5/2019 20:45	186.00	0.177074205	0.446416961
4/5/2019 20:50	186.00	0.177074205	0.1244947
4/5/2019 21:00	186.00	0.109908127	0.000508834
4/5/2019 21:20	186.00	0.064113074	0
4/5/2019 21:45	186.00	0.109908127	0
4/5/2019 21:50	186.00	0.109908127	0
4/5/2019 22:30	186.00	0.064113074	0
4/5/2019 22:45	186.00	0.061060071	0
4/5/2019 22:50	186.00	0.064113074	0
4/6/2019 0:15	187.00	0.009159011	0
4/6/2019 1:00	187.00	0.003053004	0


Infiltration Record for Sand Filter Sidewalk Vault Without Pre-Treatment
Infiltration Rate (in/hr)
Expon. (Infiltration Rate (in/hr))
y = 17974e-0.06x
R² = 0.8815
Infiltration Rate (in/hr)
2000
1800
1600
1400
1200
1000
800
600
400
200
0
40
60
80
100
120
140
160
180
200
Number of Days Media Installed

Media 2 (following Pretreatment)			
Date and Time	Day #	Infiltration	Bypass
5/24/2019 11:40	0.00	7895.29612	0
5/24/2019 11:45	0.00	8658.122619	0
8/10/2019 22:55	78.00	102.1565513	0
8/11/2019 9:55	79.00	199.1138372	0
8/11/2019 10:15	79.00	134.4909115	0
8/11/2019 10:20	79.00	143.4362121	0
9/6/2019 9:15	105.00	0.177074205	0
9/6/2019 9:25	105.00	0.109908127	0
9/6/2019 9:45	105.00	0.061060071	0
9/6/2019 9:50	105.00	0.064113074	0
9/6/2019 10:20	105.00	0.030530035	0
9/6/2019 11:30	105.00	0.003053004	0
9/8/2019 10:20	107.00	494.7758591	0
9/8/2019 10:30	107.00	737.9994919	0
9/9/2019 10:25	108.00	157.5227701	0
9/9/2019 10:30	108.00	172.4214277	0
9/9/2019 10:35	108.00	182.8138518	0
9/9/2019 11:30	108.00	240.5034066	0
9/9/2019 20:50	108.00	882.5042552	0
9/10/2019 0:35	109.00	0.009159011	0
9/28/2019 2:50	127.00	188.1535549	0
9/28/2019 3:40	127.00	31.5650035	0
9/28/2019 4:05	127.00	102.1565511	0
9/28/2019 4:10	127.00	102.1565513	0
9/28/2019 4:30	127.00	130.1525938	0
9/28/2019 4:35	127.00	134.4909118	0
9/28/2019 4:45	127.00	148.0401415	0
9/28/2019 4:50	127.00	157.5227701	0
9/28/2019 5:10	127.00	152.7356606	0
9/28/2019 5:20	127.00	193.5848482	0
9/28/2019 5:50	127.00	293.7966363	0
9/28/2019 5:55	127.00	315.4821198	0
9/28/2019 6:15	127.00	353.7515198	0
9/28/2019 6:55	127.00	157.5197171	0
9/28/2019 7:00	127.00	157.5227705	0
9/28/2019 8:20	127.00	125.8967068	0
9/28/2019 10:10	127.00	0.109908127	0
9/28/2019 10:55	127.00	2.20121555	0
9/28/2019 15:55	127.00	8.469031792	0
9/28/2019 16:00	127.00	8.46903181	0
9/28/2019 16:05	127.00	9.299448752	0
9/28/2019 16:40	127.00	2.201215545	0
9/28/2019 17:05	127.00	0.50069258	0
9/28/2019 18:00	127.00	29.7851025	0
9/28/2019 18:40	127.00	24.83313071	0
9/28/2019 19:50	127.00	12.08684098	0

Media 2 (following Pretreatment)			
Date and Time	Day #	Infiltration	Bypass
10/9/2019 1:15	138.00	1.050233214	0
10/19/2019 6:30	148.00	78.19352641	0
10/19/2019 6:35	148.00	84.64147004	0
10/19/2019 6:45	148.00	55.43949122	0
10/19/2019 6:50	148.00	58.02233221	0
10/19/2019 7:05	148.00	94.90872074	0
10/19/2019 7:10	148.00	98.48989408	0
10/19/2019 7:15	148.00	102.1565511	0
10/19/2019 7:20	148.00	109.7341061	0
10/19/2019 7:25	148.00	117.644438	0
10/19/2019 8:10	148.00	177.5718443	0
10/19/2019 8:40	148.00	91.40692588	0
10/19/2019 8:55	148.00	113.6450034	0
10/19/2019 9:55	148.00	31.56195049	0
10/19/2019 10:40	148.00	24.83313071	0
10/19/2019 10:45	148.00	26.42679861	0
10/19/2019 12:15	148.00	148.0401415	0
10/19/2019 12:45	148.00	113.6480566	0
10/19/2019 13:35	148.00	33.40291169	0
10/19/2019 13:45	148.00	28.07542052	0
10/19/2019 14:25	148.00	21.83508125	0
10/19/2019 14:50	148.00	23.30357599	0
10/20/2019 17:40	149.00	2.979731452	0
10/20/2019 18:40	149.00	2.982784449	0
10/20/2019 19:00	149.00	2.979731452	0
10/20/2019 19:10	149.00	3.425469968	0
10/20/2019 19:25	149.00	143.4362118	0
10/20/2019 19:45	149.00	117.6444383	0
10/20/2019 19:50	149.00	125.8967066	0
10/20/2019 19:55	149.00	130.1495408	0
10/21/2019 16:30	150.00	240.5064596	0
10/21/2019 17:05	150.00	177.5718447	0
10/21/2019 17:10	150.00	193.5848478	0
10/21/2019 17:55	150.00	66.21659356	0
10/21/2019 18:15	150.00	60.68149829	0
10/21/2019 18:40	150.00	35.30187982	0
10/21/2019 18:45	150.00	35.3049329	0
10/21/2019 18:50	150.00	37.27106717	0
10/21/2019 19:15	150.00	52.92381619	0
10/21/2019 19:45	150.00	138.9177669	0
10/21/2019 19:55	150.00	117.6444383	0
10/21/2019 20:10	150.00	138.9208196	0
10/21/2019 20:30	150.00	216.2656115	0
10/21/2019 21:05	150.00	134.4909118	0
10/21/2019 21:10	150.00	138.9208196	0
10/21/2019 22:00	150.00	60.68149829	0

Media 2 (following Pretreatment)			
Date and Time	Day #	Infiltration	Bypass
10/21/2019 22:25	150.00	41.40483387	0
10/21/2019 23:05	150.00	273.0484243	0
10/21/2019 23:15	150.00	273.0453713	0
10/21/2019 23:40	150.00	361.729018	0
10/22/2019 0:00	151.00	338.1201417	0
10/22/2019 0:05	151.00	353.7515198	0
10/22/2019 0:55	151.00	172.4214274	0
10/22/2019 1:00	151.00	182.8169048	0
10/22/2019 1:05	151.00	199.1107842	0
10/22/2019 1:35	151.00	130.1495408	0
10/22/2019 1:40	151.00	143.4362118	0
10/22/2019 4:10	151.00	2.20121555	0
10/22/2019 4:55	151.00	1.050233217	0
10/22/2019 6:15	151.00	0.109908127	0
10/22/2019 7:00	151.00	0.030530035	0
11/17/2019 4:25	177.00	1427.584451	0
11/17/2019 5:40	177.00	410.1191241	0
11/17/2019 6:05	177.00	582.8611172	0
11/17/2019 7:30	177.00	1083.575068	0
11/17/2019 7:50	177.00	1776.33515	0
11/17/2019 8:25	177.00	1735.785157	0
11/19/2019 11:25	179.00	680.7831512	0
12/7/2019 5:20	197.00	312.2764667	0
12/7/2019 5:25	197.00	312.2795191	0
12/7/2019 5:35	197.00	329.9319855	0
12/7/2019 5:50	197.00	511.3689333	0
12/7/2019 6:10	197.00	964.3980201	0
12/7/2019 6:15	197.00	995.4959161	0
12/7/2019 6:20	197.00	1027.085342	0
12/7/2019 6:30	197.00	933.7886067	0
12/7/2019 6:45	197.00	1444.012666	0
12/7/2019 7:15	197.00	385.8996462	0
12/7/2019 8:05	197.00	107.2489612	0
12/7/2019 8:10	197.00	117.4612578	0
12/7/2019 8:15	197.00	117.4612581	0
12/7/2019 8:20	197.00	128.1589825	0
12/7/2019 10:10	197.00	26.55807776	0
12/7/2019 19:25	197.00	56.13557591	0
12/7/2019 20:45	197.00	1091.729638	0
12/7/2019 20:50	197.00	1192.350531	0
12/7/2019 21:20	197.00	580.8613986	0
12/11/2019 20:40	201.00	22.02131451	0
12/12/2019 1:35	202.00	557.1975694	0
12/12/2019 2:35	202.00	107.248961	0
12/12/2019 2:45	202.00	117.4612578	0
12/12/2019 3:05	202.00	446.3765941	0

Media 2 (following Pretreatment)			
Date and Time	Day #	Infiltration	Bypass
12/12/2019 5:30	202.00	0.125173145	0
12/12/2019 6:00	202.00	2.482091875	0
12/12/2019 6:25	202.00	1.334162545	0
12/12/2019 6:35	202.00	1.334162545	0
12/12/2019 6:45	202.00	0.555646644	0
12/12/2019 16:55	202.00	489.2010747	0
12/12/2019 17:00	202.00	511.3689323	0
12/12/2019 17:15	202.00	788.1298099	0
12/12/2019 17:30	202.00	1226.85863	0
12/12/2019 17:50	202.00	964.3949691	0
12/12/2019 18:00	202.00	844.9126227	0
12/12/2019 18:15	202.00	733.3283964	0
12/12/2019 20:00	202.00	964.4132851	0
12/12/2019 20:15	202.00	654.8692586	0
12/12/2019 20:35	202.00	534.0313775	0
12/12/2019 20:40	202.00	580.8644528	0
12/12/2019 21:05	202.00	654.8692586	0
12/12/2019 21:15	202.00	760.4726509	0
12/12/2019 21:25	202.00	1027.09145	0
12/19/2019 18:35	209.00	1027.085344	0
12/19/2019 18:40	209.00	1124.784508	0
12/19/2019 19:00	209.00	874.0443824	0
12/19/2019 19:15	209.00	1027.085342	0
12/19/2019 19:20	209.00	1124.78451	0
12/19/2019 19:30	209.00	1297.321952	0
12/19/2019 20:05	209.00	1027.085344	0
12/19/2019 20:40	209.00	385.896594	0
12/19/2019 20:45	209.00	425.7199712	0
12/19/2019 21:45	209.00	151.0320849	0
12/19/2019 22:00	209.00	97.51293295	0
12/19/2019 22:25	209.00	79.53074196	0
12/19/2019 22:50	209.00	151.0320846	0
12/19/2019 22:55	209.00	151.0320849	0
12/19/2019 23:05	209.00	163.183039	0
12/19/2019 23:25	209.00	128.1345582	0
12/19/2019 23:30	209.00	128.1650885	0
12/19/2019 23:55	209.00	231.5092577	0
12/20/2019 0:10	210.00	189.0419786	0
12/20/2019 0:45	210.00	117.4795761	0
12/20/2019 1:20	210.00	88.29286227	0
12/20/2019 1:30	210.00	79.53074212	0
12/20/2019 1:40	210.00	63.47194339	0
12/20/2019 2:30	210.00	88.29286227	0
12/20/2019 3:00	210.00	71.25710254	0
12/20/2019 3:10	210.00	56.14473492	0
12/20/2019 3:25	210.00	37.00240286	0

Media 2 (following Pretreatment)			
Date and Time	Day #	Infiltration	Bypass
12/20/2019 3:35	210.00	26.56113077	0
12/31/2019 15:10	221.00	1192.347476	0
12/31/2019 15:50	221.00	605.0289758	0
12/31/2019 16:00	221.00	489.2071807	0
12/31/2019 16:05	221.00	534.0283245	0
12/31/2019 16:45	221.00	405.5609898	0
12/31/2019 17:00	221.00	312.261201	0
12/31/2019 17:30	221.00	278.4949826	0
12/31/2019 18:05	221.00	202.7194348	0
12/31/2019 18:15	221.00	231.5092582	0
12/31/2019 18:20	221.00	246.6521552	0
12/31/2019 18:35	221.00	107.2520142	0
12/31/2019 18:40	221.00	117.4490458	0
12/31/2019 18:45	221.00	128.1650885	0
12/31/2019 19:10	221.00	312.2917317	0
12/31/2019 19:20	221.00	295.1338519	0
12/31/2019 19:25	221.00	312.261201	0
12/31/2019 19:35	221.00	295.1338519	0
12/31/2019 19:45	221.00	312.2612017	0
12/31/2019 19:55	221.00	295.1033218	0
12/31/2019 20:10	221.00	246.6521552	0
12/31/2019 20:35	221.00	329.9380915	0
12/31/2019 21:00	221.00	278.4644526	0
12/31/2019 21:45	221.00	71.25710254	0
12/31/2019 22:15	221.00	107.252014	0
12/31/2019 22:20	221.00	107.2520142	0
12/31/2019 22:30	221.00	97.51293295	0
12/31/2019 22:45	221.00	79.53074212	0
12/31/2019 23:25	221.00	88.29286209	0
12/31/2019 23:40	221.00	107.2520142	0
12/31/2019 23:55	221.00	97.51293275	0
1/1/2020 0:00	222.00	107.2520142	0
1/1/2020 0:10	222.00	97.54346278	0
1/1/2020 0:20	222.00	107.252014	0
1/1/2020 0:25	222.00	107.2520142	0
1/1/2020 0:50	222.00	71.25710254	0
1/1/2020 1:35	222.00	26.56113077	0
1/2/2020 23:50	223.00	2.482091875	0
1/6/2020 10:10	227.00	5.959462903	0
1/6/2020 10:20	227.00	5.959462903	0
1/6/2020 10:40	227.00	0.125173145	0
1/11/2020 10:05	232.00	995.495914	0
1/11/2020 10:10	232.00	1027.085344	0
1/11/2020 10:15	232.00	1091.729638	0
1/11/2020 10:45	232.00	964.3980221	0
1/11/2020 10:50	232.00	1059.16325	0

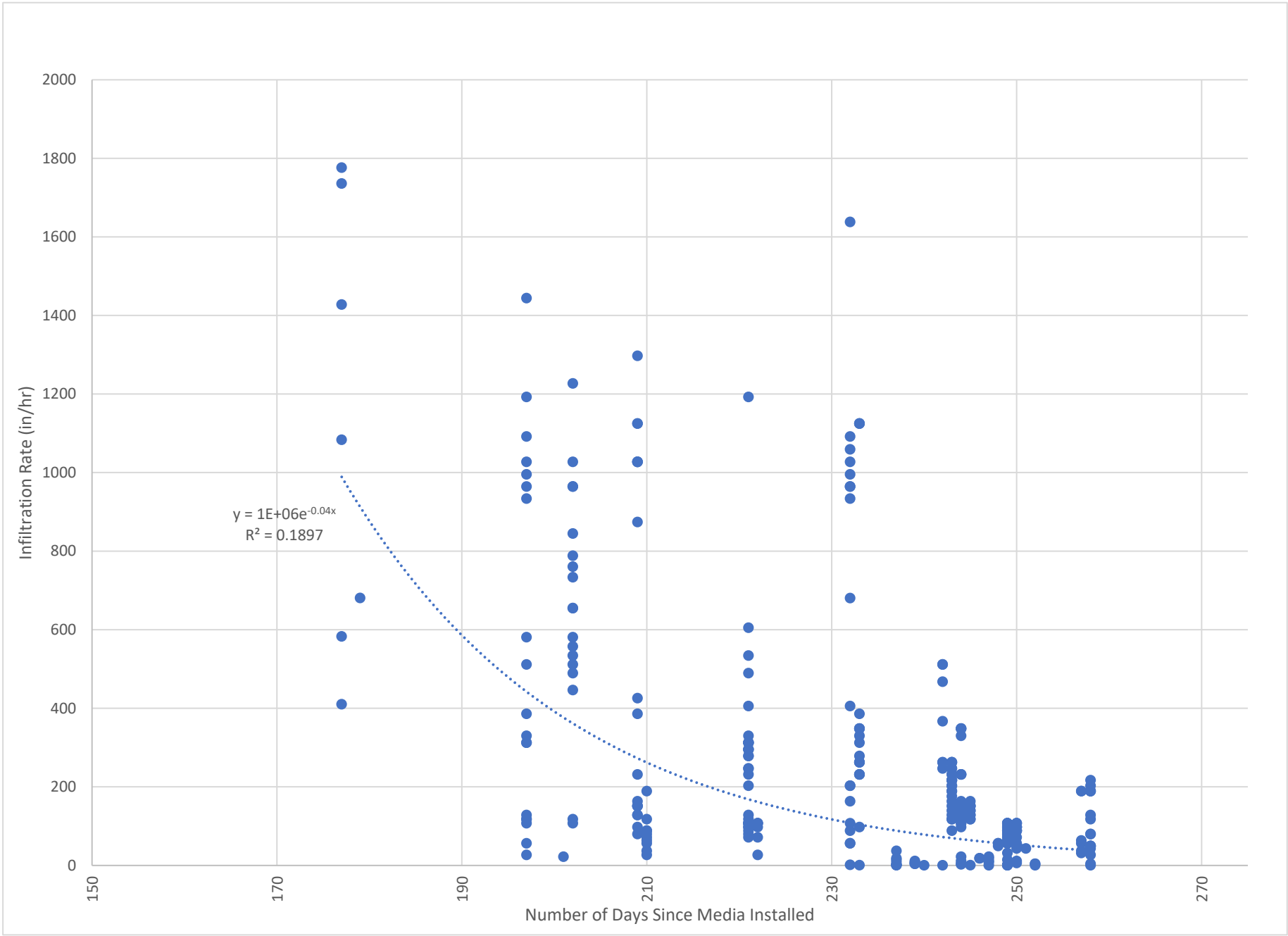
Media 2 (following Pretreatment)			
Date and Time	Day #	Infiltration	Bypass
1/11/2020 11:05	232.00	964.3949691	0
1/11/2020 11:15	232.00	933.7886086	0
1/11/2020 12:15	232.00	1638.076835	0
1/11/2020 13:20	232.00	680.5144883	0
1/11/2020 14:05	232.00	405.5609898	0
1/11/2020 14:50	232.00	202.6889048	0
1/11/2020 14:55	232.00	202.7194344	0
1/11/2020 15:20	232.00	163.2135687	0
1/11/2020 15:35	232.00	107.2520142	0
1/11/2020 15:55	232.00	88.29286209	0
1/11/2020 16:20	232.00	56.14473503	0
1/11/2020 16:30	232.00	56.14473503	0
1/11/2020 17:40	232.00	1.343321556	0
1/12/2020 10:35	233.00	97.52514497	0
1/12/2020 11:00	233.00	262.3201693	0
1/12/2020 11:05	233.00	262.3232229	0
1/12/2020 11:10	233.00	278.470558	0
1/12/2020 11:20	233.00	262.3232229	0
1/12/2020 11:30	233.00	312.2764667	0
1/12/2020 12:40	233.00	0.555646642	0
1/12/2020 14:40	233.00	1124.78451	6.279010607
1/12/2020 14:50	233.00	1124.78451	7.510558311
1/12/2020 15:00	233.00	1124.78451	3.687689049
1/12/2020 16:30	233.00	231.5092582	0
1/12/2020 16:35	233.00	231.5092582	0
1/12/2020 16:40	233.00	231.5397877	0
1/12/2020 17:55	233.00	385.8996462	0
1/12/2020 18:10	233.00	348.1034625	0
1/12/2020 18:25	233.00	329.9380922	0
1/12/2020 18:30	233.00	348.0729325	0
1/12/2020 18:35	233.00	348.1034632	0
1/16/2020 13:15	237.00	36.99629678	0
1/16/2020 13:45	237.00	17.93639578	0
1/16/2020 13:55	237.00	14.29110955	0
1/16/2020 14:15	237.00	8.31332863	0
1/16/2020 14:40	237.00	1.331109542	0
1/16/2020 14:45	237.00	1.334162543	0
1/16/2020 15:20	237.00	0.555646642	0
1/16/2020 16:05	237.00	0.555646642	0
1/18/2020 15:40	239.00	4.020805649	0
1/18/2020 15:50	239.00	4.020805657	0
1/18/2020 16:00	239.00	5.959462903	0
1/18/2020 16:20	239.00	11.08850884	0
1/18/2020 16:30	239.00	8.31332863	0
1/19/2020 11:40	240.00	0.125173145	0
1/21/2020 11:40	242.00	262.3201699	0

Media 2 (following Pretreatment)			
Date and Time	Day #	Infiltration	Bypass
1/21/2020 11:45	242.00	262.3232223	0
1/21/2020 12:00	242.00	246.6674207	0
1/21/2020 12:15	242.00	366.7420498	0
1/21/2020 12:25	242.00	467.5400146	0.254416961
1/21/2020 12:30	242.00	511.3658793	0.104989399
1/21/2020 12:35	242.00	511.3658803	0
1/21/2020 14:05	242.00	0.125173145	0
1/22/2020 17:20	243.00	189.041979	4.977243821
1/22/2020 17:30	243.00	189.041979	2.495321557
1/22/2020 17:40	243.00	202.7011168	2.628805656
1/22/2020 17:50	243.00	216.8578942	4.395137813
1/22/2020 18:00	243.00	216.8609472	1.051250884
1/22/2020 18:15	243.00	216.8578942	0.036127209
1/22/2020 18:25	243.00	202.7011168	0
1/22/2020 19:00	243.00	117.4612581	0
1/22/2020 19:10	243.00	117.4582051	0
1/22/2020 19:15	243.00	128.1620352	0
1/22/2020 19:20	243.00	139.3482404	0
1/22/2020 19:25	243.00	151.0320846	0
1/22/2020 19:30	243.00	163.207463	0
1/22/2020 19:35	243.00	175.8774277	0
1/22/2020 19:45	243.00	216.8609472	2.003618376
1/22/2020 19:50	243.00	231.5123107	3.522826851
1/22/2020 19:55	243.00	231.5153642	3.857300357
1/22/2020 20:00	243.00	246.6674202	4.395137804
1/22/2020 20:10	243.00	246.6704732	3.206671374
1/22/2020 20:20	243.00	262.3201699	3.522657247
1/22/2020 20:30	243.00	262.3201699	1.387081273
1/22/2020 20:45	243.00	262.3232223	0
1/22/2020 21:35	243.00	88.28370326	0
1/23/2020 6:40	244.00	151.0320846	6.755109533
1/23/2020 6:45	244.00	151.0320849	4.211109545
1/23/2020 6:55	244.00	163.2074627	0.005766784
1/23/2020 12:35	244.00	2.482091875	0
1/23/2020 12:45	244.00	4.020805657	0
1/23/2020 13:55	244.00	107.2489612	0
1/23/2020 14:05	244.00	139.3512934	0
1/23/2020 14:10	244.00	151.0320846	0
1/23/2020 14:15	244.00	151.0320849	0
1/23/2020 14:30	244.00	151.0320849	0
1/23/2020 14:40	244.00	151.0320849	0
1/23/2020 14:55	244.00	128.1620352	0
1/23/2020 17:30	244.00	11.08545584	0
1/23/2020 18:00	244.00	22.02131451	0
1/23/2020 19:00	244.00	97.52209196	0
1/23/2020 19:05	244.00	107.248961	0

Media 2 (following Pretreatment)			
Date and Time	Day #	Infiltration	Bypass
1/23/2020 19:10	244.00	117.4582051	0
1/23/2020 19:15	244.00	117.4612578	0
1/23/2020 19:20	244.00	128.1589825	0
1/23/2020 19:25	244.00	139.3482401	0
1/23/2020 19:30	244.00	139.3512934	0
1/23/2020 19:55	244.00	231.5153642	0
1/23/2020 20:05	244.00	231.5153642	0
1/23/2020 20:15	244.00	231.5153642	0
1/23/2020 21:05	244.00	117.4612581	0
1/23/2020 21:15	244.00	117.4582051	0
1/23/2020 21:20	244.00	128.1620352	0
1/23/2020 21:25	244.00	139.3482404	0
1/23/2020 21:50	244.00	329.9319862	6.278840995
1/23/2020 21:55	244.00	348.0851445	3.0555477
1/23/2020 22:00	244.00	348.0851452	0.709314488
1/23/2020 22:10	244.00	348.0851452	0
1/23/2020 23:05	244.00	117.4612581	0
1/24/2020 3:30	245.00	117.4582048	0.104989399
1/24/2020 3:40	245.00	151.0320846	0.402657243
1/24/2020 3:45	245.00	151.0320849	0.446416962
1/24/2020 3:50	245.00	163.207463	0.104989399
1/24/2020 4:10	245.00	151.0320849	0
1/24/2020 4:30	245.00	128.1620355	0
1/24/2020 4:40	245.00	128.1620352	0
1/24/2020 4:50	245.00	117.4612578	0
1/24/2020 5:05	245.00	139.3482404	0
1/24/2020 5:10	245.00	139.3512931	0
1/24/2020 6:15	245.00	0.555646644	0
1/25/2020 11:10	246.00	17.93639574	0
1/25/2020 11:15	246.00	17.93639578	0
1/26/2020 9:25	247.00	11.08850884	0
1/26/2020 9:45	247.00	17.93639578	0
1/26/2020 10:00	247.00	22.02131451	0
1/26/2020 10:30	247.00	8.31332863	0
1/26/2020 12:35	247.00	0.125173145	0
1/27/2020 4:40	248.00	56.13557591	3.857300349
1/27/2020 4:50	248.00	56.13557591	0.709314487
1/27/2020 5:05	248.00	49.28768909	0
1/28/2020 1:30	249.00	56.13557602	8.316042411
1/28/2020 2:15	249.00	71.25404954	7.773286226
1/28/2020 2:30	249.00	63.4566785	0
1/28/2020 2:40	249.00	56.13557602	0
1/28/2020 3:20	249.00	14.29416253	0
1/28/2020 4:25	249.00	0.555646642	0
1/28/2020 5:05	249.00	79.52768912	10.71909542
1/28/2020 5:15	249.00	97.52209196	12.77546291

Media 2 (following Pretreatment)			
Date and Time	Day #	Infiltration	Bypass
1/28/2020 5:20	249.00	97.52514497	15.46380213
1/28/2020 5:40	249.00	107.2489612	26.09622617
1/28/2020 6:00	249.00	88.28370326	18.47745585
1/28/2020 6:05	249.00	88.28370326	11.37973146
1/28/2020 6:15	249.00	88.28370326	23.90450886
1/28/2020 6:25	249.00	88.28370326	13.51106715
1/28/2020 6:50	249.00	79.52768912	8.881356899
1/28/2020 7:10	249.00	79.52768912	4.58408481
1/28/2020 7:40	249.00	71.25404939	0.90436749
1/28/2020 8:10	249.00	56.13557591	0
1/28/2020 8:35	249.00	31.54973848	0
1/28/2020 10:25	249.00	0.555646642	0
1/28/2020 10:45	249.00	1.331109542	0
1/28/2020 11:00	249.00	0.125173145	0
1/28/2020 11:10	249.00	0.555646642	0
1/28/2020 13:45	249.00	71.25099653	2.241243818
1/28/2020 13:55	249.00	71.25404954	0
1/28/2020 14:15	249.00	107.2489612	35.4085654
1/28/2020 14:40	249.00	107.2489612	27.81913784
1/28/2020 14:50	249.00	97.52514497	10.3978516
1/28/2020 14:55	249.00	107.245908	4.031660773
1/28/2020 15:15	249.00	88.28370326	0
1/29/2020 14:20	250.00	49.28768909	6.048848062
1/29/2020 15:00	250.00	71.25099653	9.172918736
1/29/2020 15:25	250.00	88.28370326	9.470247359
1/29/2020 15:35	250.00	88.28370326	6.755109547
1/29/2020 15:45	250.00	88.28370326	6.048848062
1/29/2020 16:00	250.00	88.28370326	2.003618376
1/29/2020 16:05	250.00	97.52514476	1.129780917
1/29/2020 16:15	250.00	97.52209176	2.120310952
1/29/2020 16:20	250.00	107.2489612	2.628805656
1/29/2020 16:30	250.00	107.2489612	4.031830392
1/29/2020 17:10	250.00	107.248961	0
1/29/2020 17:20	250.00	97.52514497	0
1/29/2020 17:50	250.00	56.13557602	0
1/29/2020 18:10	250.00	42.90996461	0
1/29/2020 18:35	250.00	97.52514497	0
1/29/2020 19:55	250.00	11.08850884	0
1/29/2020 20:05	250.00	5.959462903	0
1/30/2020 23:40	251.00	42.9069117	0
1/31/2020 0:35	252.00	4.020805657	0
1/31/2020 0:45	252.00	4.020805657	0
1/31/2020 1:05	252.00	0.125173145	0
2/5/2020 12:45	257.00	189.041979	0
2/5/2020 12:55	257.00	189.0389256	0
2/5/2020 13:55	257.00	56.13557602	0

Media 2 (following Pretreatment)			
Date and Time	Day #	Infiltration	Bypass
2/5/2020 14:30	257.00	31.54668554	0
2/5/2020 15:05	257.00	63.4566785	0
2/5/2020 15:45	257.00	36.99629685	0
2/6/2020 13:55	258.00	26.55807776	0
2/6/2020 14:35	258.00	0.125173145	0
2/6/2020 16:35	258.00	117.4582051	0
2/6/2020 16:40	258.00	128.1620352	0
2/6/2020 16:55	258.00	189.038926	0
2/6/2020 17:00	258.00	189.0419786	0
2/6/2020 17:10	258.00	216.8609467	0
2/6/2020 17:35	258.00	202.7041694	0
2/6/2020 17:45	258.00	189.0419786	0
2/6/2020 18:35	258.00	42.9099647	0
2/6/2020 18:45	258.00	49.28463609	0
2/6/2020 18:50	258.00	49.28768909	0
2/6/2020 19:00	258.00	49.28463609	0
2/6/2020 19:05	258.00	49.28768899	0
2/6/2020 19:45	258.00	79.52768912	0
2/6/2020 19:55	258.00	79.52768912	0
2/6/2020 20:35	258.00	4.020805649	0


2000
1800
1600
1400
1200
1000
800
600
400
200
0
Infiltration Rate (in/hr)
y = 1E+06e-0.04x
R² = 0.1897
150
170
190
210
230
250
270
Number of Days Since Media Installed

Media 3 (following Pretreatment)			
Date and Time	Day #	Infiltration	Bypass
2/15/2020 19:40	0.00	1.334162543	0
2/15/2020 20:00	0.00	4.020805649	0
2/15/2020 21:00	0.00	22.02131451	0
2/23/2020 13:20	8.00	1369.708666	0
2/23/2020 13:30	8.00	1333.274121	0
3/6/2020 22:10	20.00	33.40291169	0
3/6/2020 22:15	20.00	35.30187982	0
3/6/2020 22:35	20.00	45.80421206	0
3/6/2020 22:50	20.00	31.56195049	0
3/7/2020 8:55	21.00	11.10682684	0
3/7/2020 11:30	21.00	4.997766789	0
3/31/2020 8:50	45.00	35.3049329	0
4/22/2020 15:30	67.00	66.21964657	0
4/22/2020 15:45	67.00	72.05088346	0
4/22/2020 15:50	67.00	72.05393646	0
4/22/2020 16:00	67.00	63.41088345	0
4/22/2020 16:30	67.00	39.30436753	0
4/22/2020 17:05	67.00	55.43643821	0
4/22/2020 17:20	67.00	50.48141347	0
4/22/2020 17:30	67.00	63.41088345	0
4/22/2020 17:35	67.00	66.21659356	0
4/22/2020 17:40	67.00	66.2165937	0
4/22/2020 18:00	67.00	117.6444383	0
4/22/2020 18:10	67.00	157.5197171	0
4/22/2020 18:35	67.00	143.4362121	0
4/22/2020 20:50	67.00	0.109908127	0
5/3/2020 0:10	78.00	300.9192929	0
5/6/2020 8:30	81.00	828.1272093	0
5/6/2020 9:10	81.00	300.9192929	0
5/6/2020 9:45	81.00	94.90872094	0
5/6/2020 10:45	81.00	1.560084807	0
5/6/2020 14:50	81.00	2.979731452	0
5/6/2020 15:45	81.00	55.43949122	0
5/13/2020 4:55	88.00	2.979731452	0
5/13/2020 11:05	88.00	665.7440572	0
5/13/2020 11:20	88.00	713.4075484	0
5/13/2020 11:25	88.00	737.9994903	0
5/17/2020 15:40	92.00	1360.274882	0
5/18/2020 19:15	93.00	1137.738402	0
5/18/2020 19:55	93.00	182.8169048	0
5/20/2020 10:45	95.00	172.4214277	0
5/20/2020 11:00	95.00	353.751519	0
5/20/2020 11:15	95.00	286.7777812	0
5/20/2020 11:20	95.00	293.7935833	0
5/20/2020 12:00	95.00	94.90872094	0
5/20/2020 15:50	95.00	162.3953641	0

Media 3 (following Pretreatment)			
Date and Time	Day #	Infiltration	Bypass
5/20/2020 15:55	95.00	172.4214274	0
5/20/2020 16:00	95.00	182.8169048	0
5/20/2020 16:05	95.00	199.1107842	0
5/20/2020 16:10	95.00	210.4526928	0
5/20/2020 16:55	95.00	50.47836047	0
5/20/2020 17:35	95.00	63.41088332	0
5/20/2020 18:15	95.00	177.5718447	16.29099648
5/20/2020 19:35	95.00	75.08556897	0
5/20/2020 19:45	95.00	78.19352657	0
5/20/2020 20:15	95.00	121.729357	1.051250884
5/20/2020 20:55	95.00	105.9056395	6.048848049
5/20/2020 21:05	95.00	109.7341061	12.77546291
5/20/2020 21:25	95.00	102.1565513	2.366077741
5/20/2020 21:30	95.00	105.9056395	8.881526491
5/20/2020 21:35	95.00	109.7341061	8.041780926
5/20/2020 21:40	95.00	113.6450034	7.77328621
5/20/2020 22:05	95.00	98.49294688	0
5/20/2020 22:10	95.00	98.49294709	0
5/20/2020 22:30	95.00	91.40692588	0
5/20/2020 23:10	95.00	52.92076319	0
5/31/2020 3:30	106.00	210.4526923	0.014077738
5/31/2020 3:35	106.00	222.1792794	0.446416962
5/31/2020 3:40	106.00	240.5034061	1.129780917
5/31/2020 3:50	106.00	246.8109119	7.253088346
5/31/2020 4:00	106.00	246.8109119	0.254416961
5/31/2020 4:10	106.00	234.2997034	12.41690461
5/31/2020 4:55	106.00	182.8169048	0.035957597
5/31/2020 6:10	106.00	222.1792789	19.40014132
5/31/2020 6:45	106.00	210.4526928	0
5/31/2020 7:35	106.00	94.90872094	0
6/5/2020 19:00	111.00	105.9056397	0
6/5/2020 20:15	111.00	0.369413428	0
6/5/2020 20:30	111.00	0.50069258	0
6/7/2020 15:30	113.00	113.6480564	0
6/13/2020 12:45	119.00	403.2620781	0
6/13/2020 15:00	119.00	162.3953641	0
6/13/2020 15:05	119.00	167.3626009	0
6/13/2020 15:10	119.00	177.5718443	0
6/13/2020 15:15	119.00	177.5718447	0
6/13/2020 15:25	119.00	167.3626009	0
6/13/2020 15:50	119.00	148.0431945	0
6/13/2020 16:00	119.00	130.1495408	0
6/13/2020 16:05	119.00	134.4909115	0
6/13/2020 16:20	119.00	117.6444383	0
6/16/2020 1:30	122.00	102.1565513	0
6/16/2020 2:00	122.00	234.2966499	0

Media 3 (following Pretreatment)			
Date and Time	Day #	Infiltration	Bypass
6/29/2020 21:50	135.00	447.5886365	0
6/29/2020 23:50	135.00	6.252551243	0
6/30/2020 0:45	136.00	2.979731452	0
6/30/2020 0:55	136.00	2.573681976	0
6/30/2020 1:00	136.00	2.573681981	0
6/30/2020 1:15	136.00	1.865385157	0
6/30/2020 1:55	136.00	1.560084807	0
7/1/2020 7:30	137.00	1.050233217	0
7/1/2020 8:15	137.00	0.369413428	0
7/1/2020 8:30	137.00	0.177074205	0
7/1/2020 8:40	137.00	0.177074205	0
7/1/2020 9:00	137.00	0.109908127	0
7/1/2020 9:25	137.00	0.064113074	0
7/1/2020 9:45	137.00	0.061060071	0
7/1/2020 9:50	137.00	0.064113074	0
7/1/2020 10:20	137.00	0.061060071	0
7/1/2020 10:45	137.00	0.109908127	0
7/1/2020 11:05	137.00	0.061060071	0
7/1/2020 11:15	137.00	0.064113074	0
7/1/2020 11:40	137.00	0.061060071	0
7/1/2020 11:45	137.00	0.064113074	0
9/23/2020 23:35	221.00	216.2686641	0
9/23/2020 23:40	221.00	228.1875903	0
9/23/2020 23:45	221.00	246.8109114	0
9/24/2020 1:35	222.00	1.050233217	0
9/24/2020 2:00	222.00	1.050233214	0
9/24/2020 2:15	222.00	0.65639576	0
9/24/2020 2:20	222.00	0.65639576	0
9/24/2020 2:40	222.00	0.65639576	0
9/24/2020 3:20	222.00	0.262558304	0
9/24/2020 3:25	222.00	0.262558304	0
9/24/2020 3:40	222.00	0.262558304	0
9/24/2020 3:45	222.00	0.262558304	0
9/24/2020 3:55	222.00	0.177074205	0
9/24/2020 4:10	222.00	0.177074205	0
9/24/2020 4:20	222.00	0.109908127	0
9/24/2020 4:30	222.00	0.109908127	0
9/24/2020 4:45	222.00	0.109908127	0
9/24/2020 5:00	222.00	0.064113074	0
9/24/2020 5:15	222.00	0.061060071	0
9/24/2020 5:20	222.00	0.064113074	0
9/25/2020 12:40	223.00	0.064113074	0
10/10/2020 9:55	238.00	105.9025864	0
10/10/2020 10:50	238.00	48.10922963	0
10/10/2020 10:55	238.00	50.47836047	0
10/10/2020 12:50	238.00	0.177074205	0

Media 3 (following Pretreatment)			
Date and Time	Day #	Infiltration	Bypass
10/10/2020 13:00	238.00	0.061060071	0
10/11/2020 17:40	239.00	167.3626009	0
10/11/2020 19:05	239.00	109.7341059	0
10/11/2020 19:40	239.00	286.7777806	0
10/11/2020 22:45	239.00	0.262558304	0
10/12/2020 0:30	240.00	2.201215545	0
10/13/2020 5:40	241.00	60.68149829	0
10/13/2020 6:00	241.00	50.48141347	0
10/13/2020 6:30	241.00	13.11875617	0
10/13/2020 7:25	241.00	689.322402	0
10/13/2020 7:55	241.00	494.7758591	0
10/13/2020 10:05	241.00	228.1875898	0
10/13/2020 10:10	241.00	234.2966504	0
10/13/2020 12:00	241.00	0.50069258	0
10/13/2020 12:25	241.00	0.064113074	0
10/18/2020 4:55	246.00	0.109908127	0
10/24/2020 12:00	252.00	10.17871379	0
10/24/2020 12:05	252.00	10.18176679	0
10/24/2020 12:15	252.00	9.299448772	0
10/24/2020 12:30	252.00	7.684409885	0
10/24/2020 12:45	252.00	6.945583045	0
10/24/2020 13:45	252.00	1.560084807	0
10/24/2020 14:30	252.00	0.369413428	0
10/24/2020 14:45	252.00	0.177074205	0
10/24/2020 15:00	252.00	0.109908127	0
10/24/2020 15:10	252.00	0.064113074	0
10/24/2020 15:35	252.00	0.030530035	0
10/24/2020 16:00	252.00	0.030530035	0
10/24/2020 16:55	252.00	0.003053004	0
11/3/2020 18:20	262.00	0.177074205	0
11/5/2020 16:25	264.00	345.8839289	0
11/5/2020 16:45	264.00	345.8839297	0
11/5/2020 16:50	264.00	353.751519	0
11/5/2020 16:55	264.00	378.0106859	0
11/5/2020 17:20	264.00	420.6519863	0
11/5/2020 17:25	264.00	438.496791	0
11/5/2020 17:30	264.00	447.5886365	0
11/5/2020 18:30	264.00	167.3626005	0
11/5/2020 19:35	264.00	35.30187989	0
11/5/2020 19:55	264.00	81.37475626	0
11/5/2020 21:25	264.00	1.288367492	0
11/5/2020 22:10	264.00	0.262558304	0
11/5/2020 22:30	264.00	0.109908127	0
11/10/2020 12:50	269.00	31.56500356	0
11/10/2020 13:00	269.00	31.56500356	0
11/10/2020 13:10	269.00	33.39985869	0

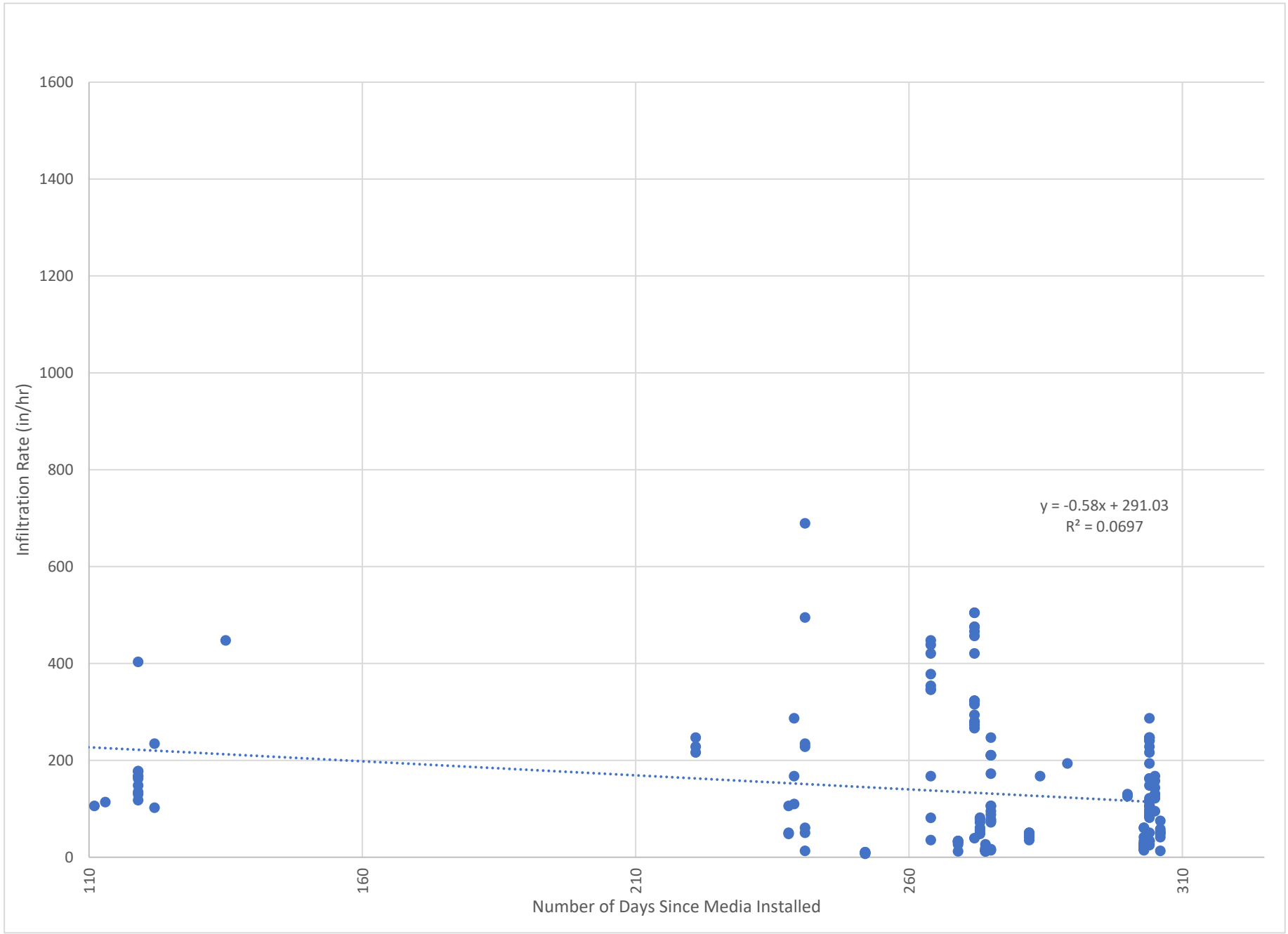
Media 3 (following Pretreatment)			
Date and Time	Day #	Infiltration	Bypass
11/10/2020 13:15	269.00	33.40291162	0
11/10/2020 13:35	269.00	26.42679861	0
11/10/2020 14:20	269.00	12.089894	0
11/10/2020 15:05	269.00	3.91089753	0
11/10/2020 16:10	269.00	0.50069258	0
11/10/2020 16:45	269.00	0.061060071	0
11/10/2020 16:50	269.00	0.064113074	0
11/13/2020 7:10	272.00	315.4821204	0
11/13/2020 7:15	272.00	322.9222894	0
11/13/2020 7:20	272.00	322.9253431	0
11/13/2020 7:30	272.00	322.9222901	0
11/13/2020 7:50	272.00	279.8596746	0
11/13/2020 7:55	272.00	293.7966363	0
11/13/2020 8:15	272.00	279.8596752	0
11/13/2020 8:30	272.00	266.3348695	0
11/13/2020 8:55	272.00	475.5541479	0
11/13/2020 9:05	272.00	475.5541489	0
11/13/2020 9:10	272.00	504.5637874	0
11/13/2020 9:20	272.00	504.5637874	0
11/13/2020 9:45	272.00	456.7964951	0
11/13/2020 9:50	272.00	466.1173149	0
11/13/2020 10:10	272.00	420.6519863	0
11/13/2020 10:55	272.00	273.0453713	0
11/13/2020 12:05	272.00	39.30436753	0
11/13/2020 13:30	272.00	11.10682687	0
11/13/2020 13:40	272.00	11.10682684	0
11/13/2020 14:05	272.00	8.46903181	0
11/13/2020 14:20	272.00	8.46903181	0
11/13/2020 14:50	272.00	6.252551243	0
11/13/2020 15:15	272.00	4.997766789	0
11/13/2020 15:25	272.00	4.432961135	0
11/13/2020 16:00	272.00	3.91089753	0
11/14/2020 23:00	273.00	48.10922963	0
11/14/2020 23:05	273.00	50.47836047	0
11/14/2020 23:10	273.00	55.4364381	0
11/14/2020 23:15	273.00	60.68149829	0
11/14/2020 23:25	273.00	72.05088331	0
11/14/2020 23:30	273.00	78.19047357	0
11/14/2020 23:35	273.00	81.37780909	0
11/15/2020 0:55	274.00	26.42679856	0
11/15/2020 1:20	274.00	17.76542758	0
11/15/2020 1:30	274.00	16.52285514	0
11/15/2020 1:45	274.00	14.19951945	0
11/15/2020 2:05	274.00	13.1187562	0
11/15/2020 2:15	274.00	13.1187562	0
11/15/2020 2:30	274.00	12.086841	0

Media 3 (following Pretreatment)			
Date and Time	Day #	Infiltration	Bypass
11/15/2020 2:35	274.00	13.11570316	0
11/15/2020 2:45	274.00	13.11875617	0
11/15/2020 3:00	274.00	12.086841	0
11/15/2020 3:15	274.00	12.086841	0
11/15/2020 3:25	274.00	12.086841	0
11/15/2020 3:35	274.00	13.11570319	0
11/15/2020 3:45	274.00	14.19951945	0
11/15/2020 3:50	274.00	15.33523676	0
11/15/2020 4:10	274.00	17.76542758	0
11/15/2020 4:20	274.00	17.76542758	0
11/16/2020 13:05	275.00	16.5228551	0
11/16/2020 13:20	275.00	14.19951945	0
11/16/2020 13:55	275.00	72.05393646	0
11/16/2020 14:05	275.00	75.08251597	0
11/16/2020 14:10	275.00	78.19352641	0
11/16/2020 14:25	275.00	105.9025864	0
11/16/2020 14:30	275.00	105.9025867	0
11/16/2020 14:55	275.00	87.98450873	0
11/16/2020 15:00	275.00	94.90872094	0
11/16/2020 15:20	275.00	172.4214274	0
11/16/2020 15:30	275.00	210.4496393	0
11/16/2020 15:35	275.00	210.4526928	0
11/16/2020 15:50	275.00	210.4526928	0
11/16/2020 16:00	275.00	246.8109119	0
11/16/2020 17:30	275.00	20.42154066	0
11/16/2020 17:40	275.00	17.76542758	0
11/16/2020 18:20	275.00	11.10987985	0
11/16/2020 18:45	275.00	10.18176679	0
11/16/2020 18:55	275.00	11.10682684	0
11/16/2020 19:00	275.00	12.086841	0
11/16/2020 19:15	275.00	12.08684098	0
11/16/2020 19:20	275.00	12.086841	0
11/16/2020 19:30	275.00	11.10987987	0
11/16/2020 19:35	275.00	12.086841	0
11/16/2020 19:55	275.00	9.299448772	0
11/16/2020 20:05	275.00	8.46903181	0
11/16/2020 20:15	275.00	7.684409901	0
11/16/2020 20:40	275.00	5.602261489	0
11/16/2020 21:05	275.00	3.91089753	0
11/16/2020 21:15	275.00	3.91089753	0
11/16/2020 21:35	275.00	2.982784455	0
11/16/2020 21:45	275.00	2.979731452	0
11/18/2020 15:30	277.00	26.42679856	0
11/18/2020 17:15	277.00	2.979731452	0
11/18/2020 17:50	277.00	1.865385161	0
11/18/2020 18:25	277.00	1.050233217	0

Media 3 (following Pretreatment)			
Date and Time	Day #	Infiltration	Bypass
11/18/2020 18:35	277.00	1.050233217	0
11/18/2020 19:00	277.00	0.65639576	0
11/18/2020 19:10	277.00	0.50069258	0
11/23/2020 11:50	282.00	41.40178096	0
11/23/2020 11:55	282.00	43.56941338	0
11/23/2020 12:00	282.00	45.80421206	0
11/23/2020 12:05	282.00	50.48141347	0
11/23/2020 12:15	282.00	50.48141347	0
11/23/2020 12:55	282.00	35.30493282	0
11/23/2020 13:55	282.00	6.945583045	0
11/23/2020 14:25	282.00	4.432961126	0
11/23/2020 14:40	282.00	3.91089753	0
11/23/2020 15:15	282.00	3.425469968	0
11/23/2020 15:25	282.00	3.425469968	0
11/23/2020 15:35	282.00	2.979731452	0
11/23/2020 15:50	282.00	2.573681981	0
11/23/2020 16:10	282.00	2.20121555	0
11/23/2020 16:20	282.00	2.20121555	0
11/23/2020 16:35	282.00	1.560084807	0
11/23/2020 17:20	282.00	0.839575973	0
11/23/2020 17:50	282.00	0.65639576	0
11/23/2020 18:00	282.00	0.65639576	0
11/25/2020 1:55	284.00	167.3626009	0
11/25/2020 4:55	284.00	2.979731452	0
11/25/2020 5:05	284.00	2.20121555	0
11/25/2020 5:40	284.00	1.291420496	0
11/25/2020 5:50	284.00	1.050233217	0
11/25/2020 6:10	284.00	1.050233214	0
11/25/2020 6:20	284.00	1.050233214	0
11/25/2020 6:40	284.00	0.839575971	0
11/25/2020 6:55	284.00	0.839575971	0
11/25/2020 7:10	284.00	0.65639576	0
11/25/2020 7:20	284.00	0.50069258	0
11/30/2020 13:45	289.00	193.5848482	0
11/30/2020 15:25	289.00	28.07542052	0
11/30/2020 15:35	289.00	26.42374561	0
11/30/2020 15:50	289.00	23.30357599	0
11/30/2020 16:30	289.00	13.11570319	0
11/30/2020 16:55	289.00	10.18176679	0
11/30/2020 17:15	289.00	6.945583045	0
11/30/2020 17:25	289.00	5.605314481	0
11/30/2020 17:40	289.00	4.997766789	0
11/30/2020 18:00	289.00	3.91089753	0
11/30/2020 18:45	289.00	1.865385161	0
12/9/2020 7:00	298.00	1.050233217	0
12/9/2020 7:25	298.00	0.839575971	0

Media 3 (following Pretreatment)			
Date and Time	Day #	Infiltration	Bypass
12/9/2020 8:20	298.00	0.50069258	0
12/9/2020 9:20	298.00	0.262558304	0
12/9/2020 9:25	298.00	0.262558304	0
12/11/2020 13:55	300.00	125.8967068	0
12/11/2020 14:00	300.00	130.1495405	0
12/11/2020 16:35	300.00	5.602261489	0
12/11/2020 16:55	300.00	4.432961135	0
12/11/2020 17:05	300.00	3.91089753	0
12/11/2020 17:15	300.00	3.425469968	0
12/11/2020 17:30	300.00	2.979731452	0
12/11/2020 18:15	300.00	1.560084807	0
12/11/2020 18:30	300.00	1.050233214	0
12/11/2020 18:40	300.00	1.050233214	0
12/11/2020 18:45	300.00	1.050233217	0
12/11/2020 18:55	300.00	0.839575971	0
12/11/2020 19:05	300.00	0.656395759	0
12/11/2020 19:10	300.00	0.65639576	0
12/11/2020 19:20	300.00	0.50069258	0
12/11/2020 19:30	300.00	0.50069258	0
12/11/2020 19:45	300.00	0.369413428	0
12/11/2020 19:55	300.00	0.369413428	0
12/14/2020 14:55	303.00	60.67844516	0
12/14/2020 15:05	303.00	60.68149829	0
12/14/2020 16:10	303.00	41.40483396	0
12/14/2020 16:40	303.00	33.40291162	0
12/14/2020 17:15	303.00	28.07542052	0
12/14/2020 17:25	303.00	26.42679856	0
12/14/2020 17:35	303.00	26.42374555	0
12/14/2020 17:55	303.00	23.30662895	0
12/14/2020 18:35	303.00	19.06600708	0
12/14/2020 18:40	303.00	20.41848761	0
12/14/2020 19:00	303.00	17.76542758	0
12/14/2020 19:10	303.00	17.76542758	0
12/14/2020 19:25	303.00	16.5228551	0
12/14/2020 19:35	303.00	16.52285514	0
12/14/2020 19:55	303.00	14.19951945	0
12/15/2020 10:25	304.00	286.7777806	7.001385151
12/15/2020 10:55	304.00	246.8109119	0
12/15/2020 11:05	304.00	240.5064596	0
12/15/2020 11:10	304.00	246.8109114	0
12/15/2020 11:15	304.00	246.8109119	0
12/15/2020 11:30	304.00	240.5064596	0
12/15/2020 11:55	304.00	228.1906428	0
12/15/2020 12:15	304.00	216.2686645	0
12/15/2020 12:35	304.00	193.5848482	0
12/15/2020 13:10	304.00	162.3953641	0

Media 3 (following Pretreatment)			
Date and Time	Day #	Infiltration	Bypass
12/15/2020 13:15	304.00	162.3984168	0
12/15/2020 13:40	304.00	148.0431942	0
12/15/2020 14:30	304.00	121.729357	0
12/15/2020 14:40	304.00	117.6444383	0
12/15/2020 14:55	304.00	113.6480564	0
12/15/2020 15:15	304.00	105.9025867	0
12/15/2020 15:25	304.00	105.9056397	0
12/15/2020 15:45	304.00	105.9025867	0
12/15/2020 16:00	304.00	98.49294709	0
12/15/2020 16:10	304.00	94.90872094	0
12/15/2020 16:20	304.00	91.40692588	0
12/15/2020 16:30	304.00	87.98450892	0
12/15/2020 16:45	304.00	84.64147004	0
12/15/2020 16:55	304.00	81.37780926	0
12/15/2020 18:00	304.00	50.48141347	0
12/15/2020 19:10	304.00	33.40291169	0
12/15/2020 19:20	304.00	33.40291169	0
12/15/2020 19:30	304.00	33.39985869	0
12/15/2020 19:35	304.00	33.40291169	0
12/15/2020 20:05	304.00	28.07236752	0
12/15/2020 20:25	304.00	24.83618372	0
12/16/2020 21:50	305.00	121.726304	2.366247352
12/16/2020 21:55	305.00	130.1495405	1.782445228
12/16/2020 22:00	305.00	130.1495408	1.297696114
12/16/2020 22:15	305.00	125.8936536	0.003222615
12/16/2020 22:40	305.00	143.4362118	0
12/16/2020 22:45	305.00	157.5227705	0
12/16/2020 22:50	305.00	167.3626005	0
12/16/2020 23:30	305.00	94.90872094	0
12/17/2020 0:35	306.00	75.08251597	0
12/17/2020 0:50	306.00	52.9238163	0
12/17/2020 1:05	306.00	58.02233209	0
12/17/2020 1:15	306.00	41.40483387	0
12/17/2020 1:45	306.00	48.10617672	0
12/17/2020 1:50	306.00	50.48141337	0
12/17/2020 2:40	306.00	13.11570319	0


1600
1400
1200
1000
800
600
400
200
0
Infiltration Rate (in/hr)
110
160
210
260
310
Number of Days Since Media Installed
y = -0.58x + 291.03
R² = 0.0697

Appendix D.6 Sediment Accumulation Rate Calculations

Lab results for sample taken from 3"x3" square						For TER			
Lab Solids % Result	Sample Moisture Content (%)	Sample Dry Weight (g)	Area of SF (sqft)	Area of Sample (sqft)	Sediment Accumulation (g)	Sediment Accumulation (lb/in)	Sediment Accumulation (g/d)	Sediment Accumulation (g/yr)	Sediment Accumulation (lb/yr)
0.319	0.681	16.39	20	0.0625	5245	0.542	20.10	7335	16.17

Notes:

-Sediment accumulation not measureable in terms of inches due to sifting into the coir and media below. Sediment instead measured by collecting 3"x3" square off of top of media/coir and obtaining dry weight.

-Sediment accumulation in lb/in. is equal to mass accumulated divided by total depth of precipitation since installation of media