ONEIDA COUNTY DEPARTMENT OF
WATER QUALITY & WATER POLLUTION CONTROL

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Anthony J. Picente, Jr.
County Executive

Steven P. Devan, P.E.
Commissioner

April 28, 2020

Gregg Townsend, P.E.
Regional Engineer
NYS Department of Environmental Conservation
317 Washington Street
Watertown, NY 13601

FedEx

Carol Lamb-Lafay, P.E.
Director – Bureau of Water Permits
Division of Water
NYS Department of Environmental Conservation
625 Broadway, 4th Floor
Albany, NY 12233

Re: Oneida County Sewer District
Quarterly Progress Report – 1st Quarter 2020

Consent Order No. R6-20060823-67

Dear Mr. Townsend and Ms. Lamb-Lafay:

On behalf of Oneida County, I am providing for your review and comment Oneida County's Quarterly Progress Report for the 1st Quarter – 2020 as required per Section XIII – Reporting Requirements of the Consent Order. This document summarizes the status and progress of work completed between January 1, 2020 and March 31, 2020 in support of Consent Order compliance requirements.

Please feel free to contact me should you have any questions or need additional information.

Sincerely,

THE ONEIDA COUNTY DEPARTMENT OF
WATER QUALITY & WATER POLLUTION CONTROL

Steven P. Devan, P.E.
Commissioner

Enclosure: Quarterly Progress Report – 1st Quarter 2020

ecc: Anthony J. Picente, Jr. – Oneida County Executive
Peter M. Rayhill, Esq. – Oneida County Attorney
Karl E. Schrantz, P.E. – OBG, Part of Ramboll
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John Story, P.E. – GHD Consulting Services, Inc.
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SANITARY SEWER COLLECTION SYSTEM
QUARTERLY PROGRESS REPORT
1ST QUARTER – 2020
ONEIDA COUNTY SEWER DISTRICT

NYSDEC Consent Order R620060823-67

Prepared for

Oneida County Department of Water Quality
& Water Pollution Control
Steven P. Devan, P.E., Commissioner
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April 28, 2020

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Sanitary Sewer Collection System Quarterly Progress Report 1st Quarter - 2020 Oneida County Sewer District NYSDEC Consent Order R620060823-67

Prepared for:

Oneida County Department of Water Quality & Water Pollution Control

Prepared by:

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April 28, 2020

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1.0 INTRODUCTION

1.1 HISTORICAL BACKGROUND

The Oneida County Sewer District (District) was formed in 1965 through an act by the former Oneida County Board of Supervisors. It is administered by Oneida County through the Oneida County Department of Water Quality and Water Pollution Control (WQ&WPC), which is responsible for the operation of the District's facilities and personnel. District facilities include 45-miles of interceptor sewers, the Sauquoit Creek Pumping Station (SCPS), the Barnes Avenue Pumping Station, and the Water Pollution Control Plant (WPCP). The District services 15 municipalities, nine of which are within the SCPS Basin. These municipalities own and operate their own collection systems.

1.2 PURPOSE

The New York State Department of Environmental Conservation (NYSDEC) and Oneida County (County) entered a Consent Order (No. R620060823-67) due to sanitary sewer overflows (SSO) at the SCPS. In addition to the required mitigation of those SSOs, the Consent Order, with an effective date of December 12, 2011, requires the submission of Quarterly Progress Reports. The intent of this Quarterly Progress Report is to summarize the work that has been undertaken by the County between January 1, 2020 and March 31, 2020 (1st Quarter of 2020) in support of the Consent Order compliance requirements.

2.0 ENGINEERING INVESTIGATIONS AND EVALUATIONS

During the 1st Quarter of 2020, the County completed the following tasks related to engineering investigations and evaluations.

2.1 COLLECTION SYSTEM

2.1.1 Manhole Inspections

The manhole inspection program was completed in 2012. There were no additional manhole inspections completed during the 1st Quarter of 2020.

2.1.2 Sanitary Sewer Televising

There are approximately 216-miles of sanitary sewer within the SCPS basin (30-miles of District interceptor sewer plus 186-miles of municipal sewer). In 2011, the County contracted with a firm (National Water Main Cleaning Co.) to perform closed circuit televising (CCTV) of these sanitary sewers. Televising data was collected electronically in the field using the nationally standardized Pipe Assessment and Certification Program (PACP) and incorporated into the County's data management software.

The 2011 initial televising contract resulted in approximately 79%, or 171-miles, of the 216-miles of sewers being televised. The remaining 21%, or 47-miles of sewers, were not inspected at that time due to: heavy debris in quantities beyond the scope of the contractual cleaning effort; small diameter pipe inhibiting effective CCTV inspections; lack of easement access to manholes and sewers; and buried manholes. These obstacles are primarily maintenance related and are being addressed through the District-wide Capacity, Management, Operations, and Maintenance (CMOM) program currently in various stages of implementation. Efforts are being made to CCTV and inspect additional sewers as a component of current and future sewer rehabilitation contracts.

During the 1st Quarter 2020, no additional televising was performed. Including the original CCTV contract, and subsequent CMOM and rehabilitation related CCTV, a total of approximately 195-miles of sewer, or 90% of the total sewers in the SCPS basin, have been televised.

2.1.3 Dye Testing

The dye testing program was completed in 2012. There was no additional dye testing performed during 1st Quarter 2020.

2.2 TREATMENT FACILITIES

Investigations, evaluations, and designs have been completed. Upgrades and new construction associated with the WPCP, SCPS, and New Force Main are in various stages of construction. Table 2.1 summarizes how the work has been segregated, and the status of each of the various planned construction contracts. Note: Contract numbers identified for the work at the WPCP and the SCPS/Force Main (C-1 through C-8), do not correlate to the sanitary sewer rehabilitation contracts (Contracts 2-16).

2.2.1 October 31, 2019 Flood Event

As reported last quarter, on October 31, 2019, an intense rainfall event caused widespread flooding in the Mohawk Valley. The rain gauge at the WPCP recorded 3.75 inches of rain, with a peak intensity of over 3 inches per hour. An inflatable plug was installed at the new 42-inch opening to the Influent Building. The open excavation outside the Influent Building filled with stormwater, and the plug gave way. The Influent Building was flooded nearly to the first floor level. Major equipment impacted by the flood included the submersible pumps, manually operated slide gates, an overhead crane motor, magnetic flowmeters, HVAC ductwork, lighting, and electrical conduit. The Motor Control Centers and Variable Frequency Drives are installed at the first floor level and were not impacted by the flood. As the pump station had not been started up or commissioned at the time of the flood, the relevant equipment manufacturers visited the site to recommend corrective actions. The on-site engineering team worked with the contractors, equipment suppliers, and the Owner to ensure all

damage was corrected prior to official start-up and commissioning activities. The electrical contractor replaced lighting, conduits, and wiring. The pumps did not require major rehabilitation as they are designed to operate under submerged conditions. A new sluice gate was installed at the 42-inch diameter opening, thereby eliminating the need for the temporary inflatable plug and providing a more permanent means of preventing flooding into the Influent Building. The identified corrective actions and repairs are now complete. All manufacturers have been onsite to inspect the repairs and have provided written certification that equipment is still under warranty. Startup of the four pumps and two screens is ongoing as of March 2020. Startup of the third screen will commence after the Combined Influent Building bypass is complete.

The flood event was particularly intense within the Sauquoit Creek drainage basin. As a result, there was extensive flooding along Sauquoit Creek including stream bank failures. Sections of the Sauquoit Creek Interceptor Sewer were damaged, which included stream bank failures that resulted in pipe exposures within the creek that caused debris and creek water to enter the sewer. Teams of County personnel walked the interceptor sewer route, documented the damage, and engaged a contractor to begin emergency repairs. Nine interceptor sewer locations were damaged. The three most critical have been repaired (Griffiths Place and Mill Street in the Town of Paris, and Oneida Street in Chadwicks/Town of New Hartford). The remaining six locations are in various stages of design and permitting. Repairs to the interceptor sewers are expected to cost between $750,000 and $1,000,000.

The SCPS was also impacted by the flood event. The flooding of the sewer system due to the damages caused by the storm event carried gravel, rocks, debris, etc., through the Interceptor Sewers to the new Screening Building. Debris either become lodged in the screening/wash-press equipment or settled out in the influent channel creating significant labor effort to clean and repair. The Pumping Station flooded upwards of 12 to 14 feet of water on the drywell side. This impacted the pump instrumentation (temperature switches, vibration switches, etc.) that were mounted at the pumps. Heating and electrical equipment in the lower level was also submerged and damaged. The pumping station has continued to run while parts are either being replaced or being submitted for FEMA Public Assistance reimbursement. On the exterior, the site was covered with debris from the creek (logs, brush, gravel, rocks, personal items swept away from upstream properties). A segment of the access drive was partially undermined, but has since been stabilized. Clean up work progressed from late Q4 2019 into mid Q1 2020. Repairs to the Pumping Station (buildings and site) are estimated to cost between $700,000 and $1,000,000.

Table 2.1

Oneida County Sewer District

Summary of Contracts 1Q 2020

Water Pollution Control Plant and Sauquoit Creek Pumping Station/Force Main

Contract No.	Title of Contract	Components of System Addressed	Status of Design	Status of NYSDEC Review	Status of Other Agency Reviews	Estimated Advertisement	Estimated [(1)] Construction Start	Construction Progress	Estimated Construction Complete
1	Incinerator No. 2 Demolition	Demolition of Incinerator No. 2	Final	Approved	n/a	Bidding occurred during 1Q 2016; however, due to the outcome of bids, the demolition was added to Contract 2 by addendum on May 25, 2016.			
2	WPCP Solids Handling Upgrades	2 new egg-shaped digesters, 1 secondary digester w/gas holding cover, new waste activated sludge pumps, refurbish 4 gravity thickeners, new stand-by lime stabilization system, 2 new belt filter presses.	Final	Approved	n/a	Advertised April 4, 2016	Notice to Proceed September 27, 2016	Construction is substantially complete and all equipment is on-line. The Contractor, Owner, and Engineer are addressing some minor operational/startup issues.	April 2019
3A	Electrical Equipment Pre-Purchase (Digester 15kV)	Pre-purchase of major electrical components such as switch gears, transformers, and supporting power distribution equipment.	Final	n/a	n/a	April 2017	Equipment delivery October 2017	Equipment has been installed and tested. Training has been provided to the Owner.	N/A
4	Sauquoit Creek Force Main Upgrades	New 48-inch force main and rehabilitation of the existing force main, new flow metering and flow control vaults.	Final	Approved	Approved	Advertised December 15, 2017	July 2018	Approximately 18,500 ft of new force main installed (including 9,000 ft +/- on piles) - includes all 36 force main and all 42-inch force main between the WPCP and pig launcher at SCPS (minus micro tunnel); SECA Underground advancing the micro tunneling of the 42-inch force main; CSX jack and bore completed, carrier pipe installed thru casing, electrical/instrumentation conduit installed thru casing, boring pit backfilled; exterior piping connections made at SCPS; pressure testing of the new 36-inch pipe between WPCP and terminus of existing FM at Mohawk River Interceptor completed. Pressure testing of 42-inch pipe between WPCP and Charles Donnelly Drive completed.	June 2022
5	Sauquoit Creek Pumping Station Upgrades	Replacement of existing pump station mechanical screen contained in a new screen building, 2 screenings washer/compactors and conveyor; replacement of existing standby generator capable of operating the station to pump peak flow during a power outage; electrical/HVAC upgrades; flow distribution structure at the WPCP.	Final	Approved	n/a	November 2016	July 2017	Note - Site and buildings impacted by 7/1/2017, 1/24/2019, and 10/31/2019 ice jam/flooding events; New Screenings Building: Facility is generally operational (building access/security pending); new emergency generator fully operational; fiber optic duct bank installed (SCADA/communication with WPCP fully functional); continued de-bugging of the Huber WAP system; paving completed; punch list items pending. Existing Pumping Station Building: Electrical, HVAC, and plumbing renovations complete minus punch list items. interior pipe, wall, and floor painting completed; Pump 2 rotating assembly replaced; continued de-bugging of the pump VFD system ("functional test" of the control system planned for Q2-2020) SCADA is fully functional.	June 2020 (final completion is behind schedule due to damage/delays from flooding events and construction related items)

Table 2.1

Oneida County Sewer District

Summary of Contracts 1Q 2020

Water Pollution Control Plant and Sauquoit Creek Pumping Station/Force Main

Contract No.	Title of Contract	Components of System Addressed	Status of Design	Status of NYSDEC Review	Status of Other Agency Reviews	Estimated Advertisement	Estimated [(1)] Construction Start	Construction Progress	Estimated Construction Complete
5.1	Barnes Avenue Pumping Station Upgrades	Relocation of pumping station to south side of CSX Railroad right-of-way; new, smaller, sustainable pumping station sized to accommodate actual flow rates.	0%	n/a	n/a	January 2021 (Estimated - pending add'l Program funding)	April 2021	Draft "Long Term Right of Entry" permit application has been prepared for site access via service road under NYS Route 8/12 bridge. Under review for Q1 submission. Late Q3 2020 design start anticipated.	December 2021
6	WPCP Headworks Upgrades	New screening facility and pump station dedicated to sanitary flows from North Utica & Starch Factory Creek Interceptors; repurpose existing raw waste building for combined flow from City of Utica; new grit removal facilities; remodeling of the administrative building including new laboratory, control room, offices, training room, etc.	Final	Approved	Approved	March 2017	September 2017	Influent Building: Building is nearly complete. New pumps and 2 bar screens are set in place. Installation of new interior piping, HVAC systems, plumbing, and electrical is nearly complete. Repairs to mitigate flooding damage that occurred on October 31, 2019 are completed. Startup of 4 pumps and 2 screens is ongoing as of March 2020. Startup of 3rd screen will be completed after Combined Influent Building bypass is complete. Combined Influent Building: Refurbishment of building and equipment is in progress. Three new bar screens have been set in place and startup has been completed. As of March 2020, the entire building is being bypassed for refurbishment of the wet well and installation of new isolation gates. All influent flow is being directed to the Influent Building during the bypass operation. Installation of new interior piping, HVAC systems, plumbing, and electrical is ongoing. Grit Removal: Grit buildings No. 2 and 3 are nearly complete. Grit pumps and vortex grit removal trays are set in place and some clean water testing has been conducted. Grit Building No. 3 is receiving wastewater flow from the Influent Building. Interior piping, HVAC, plumbing, and electrical work ongoing. Refurbishment of Grit Building No. 1 is nearly complete. Grit washing equipment is online for grit collected at Grit Building No. 3. Grit Building No. 2 will be placed online (including washing equipment in Grit Building No. 1) once the Combined Influent Building is operational. Administration Building: Significant rehabilitation of the building is complete, and the building has been officially re-occupied. Electrical: New receiving structure/tower for 46kV equipment installed and energized by the utility. New pre-fabricated Switchgear Building and Generator Buildings are installed and functional testing has been completed. Grounding grid complete. New generator fuel system and controls are installed.	September 2020

Table 2.1

Oneida County Sewer District

Summary of Contracts 1Q 2020

Water Pollution Control Plant and Sauquoit Creek Pumping Station/Force Main

Contract No.	Title of Contract	Components of System Addressed	Status of Design	Status of NYSDEC Review	Status of Other Agency Reviews	Estimated Advertisement	Estimated [(1)] Construction Start	Construction Progress	Estimated Construction Complete
7	WPCP Primary Treatment Upgrade/Disinfection	New rectangular primary settling tanks to replace existing circular tanks; new high rate disinfection system for wet weather combined sewer flows; new HRD outfall.	Final	Submitted December 9, 2016	n/a	Advertised November 28, 2017	May 2018	HRD: Excavation, pile driving, and concrete tank and backfill complete for HRD tank. Slide gate, flushing gates, and baffle wall installation complete. Majority of electrical conduit work and lighting complete. Primary Settling Tanks No. 1 and 2: Demolition of existing tanks complete. Excavation and pile driving for new tanks complete. Concrete slab, deck, stairwell, and wall work complete for equipment gallery area and tanks. Electrical conduit work for Electrical and Control Rooms near complete. Process mechanical equipment and gate installation complete for both tanks. HVAC curbs and equipment set and ductwork complete. Plumbing work complete. Preparing for equipment testing and checkout for startup. Disinfection Building: Fire alarm replaced. Building roof replaced. Electrical conduit work ongoing. Yard piping from building to HRD tank complete. Routing of new site electrical ductbank and fiber to building nearing completion. Administration and Operations Building: Demolition of one existing primary sludge degritting unit complete. Installation of new primary sludge and primary scum piping, grit classifier, and scum concentrator ongoing and near complete. Aeration Tank Distribution Structure: Relocation of yard piping complete. Concrete filled steel piles and structure is complete. Installation of slide gates complete. Installation of level instrument ongoing. New piping to Aeration Tank (AT) No. 1 complete and piping to AT No. 2 and 3 ongoing.	December 2021
8	WPCP Secondary Treatment Process Upgrades	Replacement of existing blowers with more efficient units; refurbishment of the existing Blower Building including upgrades to electrical, HVAC, plumbing and structural systems; refurbishment of existing Aeration Tanks including replacement of existing diffusers and structural upgrades, refurbishment of existing Final Settling Tanks including replacement of existing clarifier mechanisms and structural upgrades; new Asset Management Building; upgrades to site wide civil infrastructure including stormwater, fencing and gates; revisions to site electrical system including demolition of existing substation.	Final (Pending Additional Scope)	Submitted February 2019	n/a	Estimated September 2020 (Pending additional program funding)	Estimated January 2021	n/a	March 2023

(1) - Estimated construction start = Notice to Proceed

3.0 MANAGEMENT PROGRAMS

3.1 COMPUTERIZED MANAGEMENT AND MAINTENANCE SYSTEM

The County purchased a Computerized Management and Maintenance System (CMMS) software system (Lucity) in 2009. This software is used to manage the sewer system data (mapping, inspections, etc.) obtained to date by the County. At the same time that the software was acquired, the County invested in computer hardware upgrades to support the CMMS. The County's Geographic Information System (GIS) Coordinator manages the system.

The County continues to utilize the CMMS for tracking and documenting sewer rehabilitation work, and uploading and managing new PACP data provided by the County's CCTV and sewer rehabilitation contractors on a regular basis.

The Consultant Team utilizes the CMMS in support of the sanitary sewer rehabilitation design efforts to identify defects and develop rehabilitation methodologies.

3.1.1 Asset Management

The County continues to maximize the use of its current CMMS software. At the same time, the County, with the assistance of the Consultant Team, continues to assess ways to optimize the CMMS with the long-term expanded asset management needs for the wastewater system. In accordance with Schedule C, Section B.4 of the Consent Order, the Consultant Team developed a proposed asset management program for the Department of Water Quality and Water Pollution Control. Under a previous authorization, the Engineering Team assisted the County with the process of receiving proposals for a new CMMS. Several candidate vendors provided demonstrations of their systems. Based on the proposals and demonstrations received, the "Sprocket" CMMS system by Dematic is the preferred software application for the WPCP. Barton and Loguidice, D.P.C was subcontracted by GHD (Consultant Team) and has started to customize the software for County use.

3.2 FLOW MONITORING PROGRAM AND HYDRAULIC MODEL

The County worked closely with the Dormitory Authority of the State of New York (DASNY) to secure the $950,000 Economic Development Assistance Program (EDAP) funding allocation to support the extensive flow monitoring program proposed by the County and approved by NYSDEC on August 24, 2012.

The EDAP funds were ultimately made available by DASNY to the County in March 2014. Procurement of the flow monitoring equipment was advertised on June 9, 2014 and a contract was awarded on September 10, 2014 to ADS Environmental Services, LLC (ADS). ADS completed installation of 63 flow meters and five rain gauges in 2015. Two of the meters were installed to monitor flow to the County's Barnes Ave Pumping Station, and three are used to monitor flow in the City of Utica's combined sewers to aid in hydraulic model calibration and confirmation. There are 44 meters located in the Sauquoit Creek Pump Station (SCPS) drainage basin, and 14 meters located outside the SCPS basin. The flow meters and rain gauges have been consistently collecting flow data since their installation. Three new flowmeters were installed within the collection system tributary to the Starch Factory Interceptor (outside of the SCPS Basin) in December 2019. The purpose of these meters was to isolate portions of the Starch Factory Interceptor basin so that areas of excess infiltration and inflow (I/I) could be identified. Usable data from these meters are currently limited because of the time of installation. The intent is to collect additional data to evaluate potential extraneous I/I in the Starch Factory Interceptor basin and further evaluation will occur after the spring wet season.

Flow metering data were made available to the County and its Consultant Team by ADS to evaluate the impact sanitary sewer rehabilitation, including manhole rehabilitation completed to date, may have on the amount of I/I entering the sanitary sewer system. Raw flow monitoring data, consisting of 5-minute measurements of depth and velocity, are reviewed by ADS technicians who are able to assess the reliability of the data, and "scrub" out data that is deemed not accurate based on inconsistencies in the expected predictable relationship between depth, velocity, and rate of flow.

After the data has been verified and scrubbed, ADS technicians input the cleaned-up data into Sliicer, which is ADS' proprietary flow analyzing software. Sliicer enables the flow monitoring technician to automate identification of dry and wet weather days, define "typical" rain events for both summer and winter seasons, and analyze the rain event's effect on the flow in the sanitary sewer. This forms the basis of evaluating the quantity of Rain Derived I/I, or RDII in large datasets.

The 2018 1st Quarter progress report presented the evaluation and findings of the hydraulic model calibrations, which were used to compare and evaluate the effectiveness of the I/I removal projects upstream of the SCPS. The 2019 1st Quarter progress report presented an update of the flow monitoring data and RDII analysis for summer 2018 and winter 2019 events. This 2020 1st Quarter progress report presents an update of the flow monitoring data and RDII analysis for summer 2019 and winter 2020 events, as well as comparison to historical flow monitoring data.

A critical piece of information that is needed for the effective use of Sliicer, or any other wet-weather analysis tool, is rainfall. Data collected by the rain gauge installed at the SCPS was used for this evaluation and tabular rainfall data from the SCPS rain gauge for January 2017 through January 2020 are included in Appendix A. For comparison purposes, the annual precipitation totals for 2016 to 2019 are shown in Table 3.1, which indicates that 2019 had the highest rainfall volume over the previous four years, followed by 2017, and then 2018.

Table 3.1 Annual Precipitation Summary

Year	Annual Precipitation, inches
2016	38.60
2017	53.58
2018	45.38
2019	55.71

First, the rainfall and flow data from 2018, 2019, and early 2020 were reviewed to assess the general relationship between rain events and monitored sewer flows, as well as total RDII volume [in million gallons (MG)] using the ADS data and Sliicer output. One flow meter location with a notable observation in 2019 was OKY-1B (Village of Oriskany). As shown on the graphs in Appendix B, flows in the OKY-1B basin showed a notable decrease in late summer 2019 (approximately July/August timeframe). To further quantify this decrease, the total volume of flow during July to December for both 2018 and 2019 was compared, which indicated a decrease of roughly 80 MG from 2018 to 2019. This observed decrease is considerable considering 2019 had a higher rainfall volume compared to 2018. At this time, it is not known what occurred in this basin to cause this change; however, County staff indicated that the New York State Department of Transportation (NYSDOT) performed some bridge work upstream of this flow meter that may have impacted storm water discharges in this area, but the nature of the work is unknown. Subsequently, flows in the OKY-1B basin will continue to be monitored to determine if the decreased flow and RDII volume trend continues, and investigate the work completed by the NYSDOT that may have affected flows.

Another I/I analysis was completed using the ADS flow monitoring data and information from the County's GIS system on the sewer rehabilitation work completed for each of the flow meters in the SCPS basin. The summary table for this analysis is provided in Appendix C, which shows the percent of rehabilitated or new sewers in each basin compared to the average RDII volumes, among other parameters (flow data period evaluated April – July 2019). This evaluation indicates that while there was a significant amount of rehabilitation and/or new sewers (89 percent) in the Village of Yorkville YKV-2 basin, there are still high RDII volumes. Another basin with high RDII volumes was the Village of Oriskany OKY-1B, although only 24 percent of the sewers have been rehabilitated or new in this area. As noted above, there was a notable change in the flows and RDII volumes in

the OKY-1B basin in later 2019; however, the summary table in Appendix C only represents data through July 2019.

To further evaluate flow monitoring data, Sliicer was used to calculate the a normalized RDII in units of gallons per linear foot of sewer multiplied by inches of rainfall [gal/(LF*in)] for each major wet weather event utilizing rainfall and flow data from 2008 (before sewer rehabilitation work), 2015, and 2019. Using the units of (gal/LF*in) allows the analysis to be normalized by precipitation and minimize the variability of the result due to rainfall intensity and duration, as compared to utilizing Q vs I plots. This analysis is then used to compare the slopes of a linear trend line for each year's RDII data against the same data for a control basin where little to no rehabilitation work has been identified. Simply put, the steeper the slope, the more I/I that is entering the system. The normalized RDII data were plotted for the following flowmeters as reported on in the 2019 1st Quarter report and can be found in Appendix D: HHI1, NHD6, NHD9, NHD18, NHD20, NHD23, WHN2, PRS4, PRS5, SCI1, and YKV1A. For this analysis, flowmeter NYM1 was used as a control basin since minimal rehabilitation work has been completed in this basin.

A number of the flowmeters analyzed showed increased RDII in both 2015 and 2019 compared to 2008, including flowmeters NHD6, NHD9, NHD18, NHD20, NHD23, PRS4, PRS5, SCI1, and YKV1A. Flowmeter HHI1 showed lower RDII in both 2015 and 2019 suggesting that the sewer rehabilitation work in this area has reduced I/I, while flowmeter WHN2 showed lower RDII in 2015, but higher in 2019. In addition to the previous areas analyzed, data for two additional flowmeters (YKV1B and YKV2) were examined as County personnel indicated that this part of the system has demonstrated operational issues during wet weather. These two flowmeters were not part of the original flow monitoring effort in 2008, but an increase was observed when comparing 2015 to 2019 data.

ADS also provided an Annual Report on RDII Analysis for all County flow meter data from summer 2018 through March 2020, which is included in Appendix E. This report provided information on the October 31, 2019 storm event compared to other storms, the additional flow monitoring in the Starch Factory Interceptor basin, trends in average dry day flows (ADDF) and base infiltration, and trends in RDII volume and peak flows system-wide for the larger storm events in 2019.

Overall the results of these evaluations indicate that although a significant amount of sewer investigation and subsequent rehabilitation work has been completed, there still appears to be I/I entering the sewer system in certain areas of the system. These results in part may be attributed to high precipitation in 2019 that included a flood event in October 2019. Rehabilitation work to date has consisted of cured-in-place-pipe (CIPP) lining, lateral joint grouting, pipe joint grouting, and manhole rehabilitation. These methods have the potential to eliminate infiltration and repair the structural integrity of the sewer main, but are limited to addressing mostly public side I/I sources. Further investigation is warranted to identify and address other sources of I/I, such as cross connections between storm and sanitary sewers and private side I/I (see Section 3.3).

3.3 PRIVATE PROPERTY INFLOW AND INFILTRATION REDUCTION PROGRAM

The document titled "Preliminary Planning Document – Private Property Inflow and Infiltration Reduction Program" was submitted to the NYSDEC on June 29, 2012 as required by Schedule A - Section B.2 of the Consent Order. The County, working through the Steering Committee, created a working group of appropriate private property inflow and infiltration (PPII)-oriented community representatives to map out a phased implementation plan.

An engineering Work Order for continuation of the PPII program was approved by the County in the 1st Quarter of 2020. Planning among the Consultant Team regarding the 2020 program elements is ongoing, and includes identifying potential modifications to the County's Sewer Use Rules and Regulations and drafting policy documents relative to private property I/I.

3.4 CAPACITY, MANAGEMENT, OPERATIONS AND MAINTENANCE PROGRAM

The document titled "Preliminary Planning Document – Proposed CMOM Framework – Sauquoit Creek Pumping Station Basin Communities" was submitted to the NYSDEC on June 29, 2012 as required by Schedule A – Section B.3 of the Consent Order. The County, working through the Steering Committee, created a working group of appropriate CMOM-oriented community representatives to map out a phased implementation plan.

Fats, Oils, and Grease (FOG) Program: The OCSD and Oneida County Department of Health (OCDOH) are collaborating on the implementation of the Fats, Oils, and Grease (FOG) program. In the 1Q 2020, no inspections of Food Service Establishments (FSEs) were performed as the lead person at the OCDOH working on the FOG program left the County in January 2020 (more details provided in Section 9.1). To date, a total of 225 FSEs have been visited. Initial visits are primarily for educational purposes, informing owners of the FOG program and best management practices (BMP). Inspectors also verify that proper plumbing fixtures are in place, and that FSEs follow the local and County sewer use ordinance in not releasing fat-laden wash water or cooking oils to the sanitary sewer system. Inspectors look for evidence that FSEs are utilizing BMPs, tracking grease trap maintenance, and keeping grease hauling records. Inspectors have found varying levels of FOG compliance, but most have been reportedly receptive to learning about the program and willing to allow inspection of existing facilities. In some cases, follow-up visits are made to ensure action on non-compliance. Facility characteristics, inspection details, and compliance status on each FSE is collected and tracked. In the future, the data will be entered in the County CMMS (Lucity), so that it can be linked with the growing collection system database.

4.0 SCHEDULE/MILESTONE DATES

4.1 APPROVED SCHEDULE

The following table represents the approved schedule as defined by the Consent Order (note that there were no changes to this schedule during the 1st Quarter of 2020):

Description	Consent Order, Schedule "A" Date	Status
Engineering Investigations and Evaluations		
Dye Testing and Storm Sewer Report	June 30, 2012	Complete, Submitted June 29, 2012
Manhole Evaluation Report – Phase II	June 30, 2012	Complete, Submitted June 29, 2012
SCPS Evaluation Report	August 31, 2012	Complete, Approved November 28, 2012
WPCP Evaluation Report	August 31, 2012	Complete, Approved November 28, 2012
Treatment System Supplement (Report)	60 days after approval of WPCP Evaluation Report	Complete, Submitted January 25, 2013
Sewer CCTV Inspection Report – Phase II	April 30, 2013	Complete, Submitted April 25, 2013
Sewer CCTV Inspection Report – Phase III	April 30, 2014	Complete, Submitted April 29, 2014
Collection System Supplement (Report)	May 31, 2014 (extension granted to July 1, 2014)	Complete, Submitted June 30, 2014 Approved December 18, 2014
Management Programs		
Flow Monitoring Program	March 31, 2012	Complete, Approved August 24, 2012
Private Property I/I Reduction Program	June 30, 2012	Complete, Submitted June 29, 2012
CMOM Program	June 30, 2012	Complete, Submitted June 29, 2012
PPII Reduction Program Implementation	May 31, 2013	Began implementation in 4th Quarter 2012
CMOM Implementation	May 31, 2013	Began implementation in 4th Quarter 2012
Asset Management Plan	December 31, 2021	In development
Remedial Measures		
Semi-Permanent Alternative-Construction	~~December 31, 2016~~	Modified Consent Order effective 6/28/18 removed the requirement for construction of the semi-permanent alternative.
SSO Mitigation-Consent Order Compliance	December 31, 2021	In progress
Reporting		
Annual Work Plan	January 31, Annually	Submitted annually
Quarterly Progress Report	Quarterly	Submitted quarterly

Note: I/I – Inflow and Infiltration

4.2 MILESTONES

During the 1st Quarter of 2020, the following milestone dates were met:

- Continuing to make progress toward compliance milestones.

4.3 MODIFIED ORDER – JUNE 28, 2018

Description	Consent Order, Schedule "A" Date	Status
Remedial Measures		
Contract 10 – Sanitary Sewer Mainline Rehabilitation Phase V – Whitesboro (V), Whitestown (T) – Completion	August 31, 2018	Certificate of Compliance submitted to NYSDEC August 30, 2018.
Contract 12 – Sanitary Sewer Mainline Rehabilitation Phase VII – Yorkville (V) – Completion	July 31, 2019	Certificate of Compliance submitted to NYSDEC June 28, 2019.
Contract 13 – Sanitary Sewer Mainline Rehabilitation Phase VIII – New Hartford (T) – Completion	August 31, 2018	Certificate of Compliance submitted to NYSDEC August 30, 2018.
Contract 14 – Sanitary Sewer Mainline Rehabilitation Phase IX – New Hartford (T) – Completion	December 31, 2018	Certificate of Compliance submitted to NYSDEC December 21, 2018.
Contract 16 – Sanitary Sewer Mainline Rehabilitation Phase X –Whitestown (T) – Completion	July 31, 2019	Certificate of Compliance submitted to NYSDEC June 28, 2019.

5.0 SEWER REHABILITATION

Sewer rehabilitation work financed under CWSRF Project No. C6-6070-08-00, C6-6070-08-10, and C6-6071-02-00 continued to progress. Projects are being tracked by contract number. The rehabilitation contracts are being undertaken in order to reduce the amount of inflow and infiltration entering the system due to defects in interceptor sewers, mainline sewers, lateral connections and manhole structures. Work under these sewer rehabilitation contracts typically includes: a mix of cured-in-place-pipe (CIPP) lining; pipe joint and lateral grouting; open cut repairs; spot repairs; manhole repairs/replacement; and supplemental CCTV inspections. The status and details of the rehabilitation contracts to date are presented in Table 5.1. Required work per the Consent Order is essentially complete, and any remaining open contracts are going through the administrative closeout process. The Engineering Team continues to review available data and looks for additional sewer rehabilitation opportunities.

Table 5.1

Oneida County Sewer District

Summary of Contracts 1Q 2020

Sewer Rehabilitation Contracts

Contract No.*	Title of Contract	Project Location/Description	CWSRF Project No.	Status of Design	Status of DEC/EFC/COUNTY Review	Miles of Rehabilitation[2]	Estimated I/I Reduction (gal/day)	Current Contract Amount [1]	Contractor	Contract Status
2	Sanitary Sewer Manhole Rehabilitation - Phase 2	District-wide: Rehabilitation of approximately 1,278 sanitary sewer manholes.	C6-6070-08-00	Final	Approved	47	5,411,910	$ 1,529,131.73	Green Mountain Pipeline Services	Project Complete; Closed Out
3	Sanitary Sewer Mainline Rehabilitation - Phase 1	Villages of New York Mills, Oriskany, New Hartford, Whitesboro, and Yorkville; Towns of New Hartford and Whitestown	C6-6070-08-00	Final	Approved	13	1,503,360	$ 1,916,428.54	Insituform	Project Complete; Closed Out
4	Sewer Separation - Clinton/Henderson Street, NY Mills	NY Mills: Storm/Sanitary sewer separation.	C6-6070-08-00	Final	Approved	2	264,000	$ 155,007.51	JJ Lane Construction	Project Complete; Closed Out
5	Sewer Repairs and Rehabilitation	Villages of Whitesboro, New Hartford, Yorkville, New York Mills: Storm/Sanitary sewer repairs and rehabilitation; manhole replacement and UV-CIPP lining.	C6-6070-08-00	Final	Approved	1	120,000	$ 411,841.66	Central Paving	Project Complete; Closed Out
6	Sanitary Sewer Mainline Rehabilitation - Phase 2	Villages of New Hartford and Clayville; Towns of New Hartford and Paris; City of Utica	C6-6070-08-00	Final	Approved	15	1,130,000	$ 2,086,525.00	Green Mountain Pipeline Services	Project Complete; Closed out
7	Sanitary Sewer Mainline Rehabilitation - Phase 3	Towns of New Hartford and Whitestown: Glenhaven area (HHI-1 and WHN-31), the area west of the Whitesboro Parkway School and south of Clinton Street area (WHN-33), and Kellogg Road area (NHD-18)	C6-6070-08-00	Final	Approved	13	630,000	$ 2,060,644.00	Green Mountain Pipeline Services	Project Complete; Closed out
8	Sanitary Sewer Mainline Rehabilitation - Phase 4	Town of New Hartford: Paris Road area (NHD-23)	C6-6070-08-00	Final	Approved	14	249,000	$ 1,143,410.78	National Water Main Cleaning Co.	Project Complete: Closed Out
10	Sanitary Sewer Mainline Rehabilitation - Phase 5	Town of Whitestown and Village of Whitesboro: Area west of Henderson St., north of Mud Creek, south of Clinton St. and east of Clinton Rd; and areas of V. of Whitesboro that have not been previously rehabbed.	C6-6070-08-10	Final	Approved	17	1,120,000	$ 3,429,370.00	Green Mountain Pipeline Services	Project Complete; Closed Out

Table 5.1

Oneida County Sewer District

Summary of Contracts 1Q 2020

Sewer Rehabilitation Contracts

Contract No.*	Title of Contract	Project Location/Description	CWSRF Project No.	Status of Design	Status of DEC/EFC/COUNTY Review	Miles of Rehabilitation[2]	Estimated I/I Reduction (gal/day)	Current Contract Amount [1]	Contractor	Contract Status
11	Sanitary Sewer Mainline Rehabilitation - Phase 6	Town of New Hartford/Hamlet of Washington Mills: Chapman Rd, Higby Rd., and Mohawk St. as well as side streets in Town of New Hartford (NHD-20).	C6-6070-08-10	Final	Approved	7	260,640	$ 632,029.26	National Water Main Cleaning Co.	Project Complete; Closed Out
12[3]	Sewer Rehabilitation Project	Village of Yorkville: Areas of the Village not previously rehabbed (YKV-1).	C6-6071-02-00	Final	Approved	11	824,832	$ 3,420,966.19	National Water Main Cleaning Co.	Base Project complete; Closed Out Unexpended balance of financing being used for supplemental I/I investigation and mitigation.
13	Sanitary Sewer Mainline Rehabilitation - Phase 8	Town of New Hartford: Residential subdivisions along Routes 12B and Merritt Place, situated south of Route 5B and Seneca Turnpike, and north of Sherrill Brook Park (NHD-6).	C6-6070-08-10	Final	Approved	5	280,000	$ 802,838.50	National Water Main Cleaning Co.	Project Complete; Closed Out
14	Sanitary Sewer Mainline Rehabilitation - Phase 9	Town of New Hartford: Commercial district along Seneca Turnpike surrounding Sangertown Square Shopping Mall, south to a residential area situated between Seneca Turnpike and Clinton Rd., and a small residential area south of Clinton Rd. along Merritt Place (NHD-9).	C6-6070-08-10	Final	Approved	7	360,000	$ 907,050.79	National Water Main Cleaning Co.	Project Complete; Closed Out
16	Sanitary Sewer Mainline Rehabilitation - Phase 10	Town of Whitestown: Residential area along Westmoreland Rd. and West St., south of the NYS Thruway, and north of Clinton Rd. (WHN-34, WHN-35, WHN-12 & WHN-36).	C6-6070-08-10	Final	Approved	3	270,000	$ 386,042.00	National Water Main Cleaning Co.	Construction complete. Closeout documentation pending.

* - Contract 9 - Flow Monitoring Contract

(1) - Values are subject to change upon submission of final contractor close-out documentation. Some entries are contract bid amounts and will be updated when project closes out.

(2)- In order to estimate the manhole repairs in equivalent miles, the following calculation was used:
In the April 2012, Engineering Report, Sauquoit Creek Pumping Station Basin – Phase I-Mainline Pipe Rehabilitation – Contract No. 3, the length of line to be rehabilitated was 13-miles, and the corresponding flow to be removed is 1,503,360 gal/day, which calculates to 116,000 gpd/mile. Using the same 116,000 gpd/mile figure for Contract No. 2, an estimated 5,411,910 gal/day divided by 116,000 gpd/mile, is equivalent to 47-miles of rehabilitated sewers.

(3) - Formerly Contract 12 - Sanitary Sewer Mainline Rehabilitation - Phase 7. Financed by the Village of Yorkville.

BOLD - Value represents the Engineers estimate

6.0 ASSESSMENT OF REHABILITATION EFFECTIVENESS

See Section 3.2 above for a discussion of the status of flow monitoring and hydraulic model update. Based on the completed work, and using estimated values of inflow and infiltration (I/I) removals provided in the Offset Plan and/or the approved Basis of Design engineering reports for the respective projects, the estimated reductions in I/I for each rehabilitation contract are shown in Table 5.1.

7.0 COMPLETED CAPITAL PROJECTS/FACILITY UPGRADES

Status of all capital projects and facility upgrades is provided in Table 2.1 and Table 5.1.

8.0 I/I OFFSET PROJECTS/NEW FLOWS

During the 1st Quarter of 2020, new additions and subtractions to the I/I Offset Credit Bank were recorded by the County. All amounts are reported in gallons per day (gpd) after the application of the 5:1 offset ratio.

Community	Starting Balance	Credits Added	Location	Credits Used	Ending Balance
Town of New Hartford	1,841,427	0	219 Florence Ct 349.020-2-26	330	1,840,217
			216 Jack's Way, Applewood (328.000-2-1) Lot 6	320	
			314 Gracie Place, Applewood (328.000-2-1) Lot 2	320	
			313 Gracie Place, Applewood (328.000-2-1) Lot 35	240	
Town of Paris	253,064	0		0	253,064
Town of Whitestown	1,054,274	0	548 Bretts Way (304.016-2-25)	320	1,053,954
Village of Clayville	59,069	0		0	59,069
Village of New Hartford	277,147	0		0	277,147
Village of New York Mills	166,523	0		0	166,523
Village of Oriskany	103,466	0		0	103,466
Village of Whitesboro	1,083,599	0		0	1,083,599
Village of Yorkville	159,082	0		0	159,082
Oneida County Business Park	43,027	0		0	43,027
Oneida County Sewer District	24,710	0		0	24,710
Totals	**5,065,388**	**0**		**1,530**	**5,063,858**

9.0 KEY PERSONNEL CHANGES

Key personnel changes, as they relate to the SSO Mitigation/Consent Order compliance project, are interpreted to be those staff members whose addition to or deletion from the project would be viewed by the County to either add resources or be a detriment to progress. Project staff includes County, satellite community, and Consultant Team personnel. The following is a summary of changes.

9.1 COUNTY STAFF

During the 1st Quarter of 2020, the primary person working on the FOG program, Tanya Giedratis at the Oneida County Health Department left her position in January 2020. The Health Department is searching for a suitable replacement to fill the position, but has not been able to find a suitable candidate to date.

9.2 SATELLITE COMMUNITY STAFF

During the 1st Quarter of 2020, there were no changes of key personnel to report.

9.3 CONSULTANT TEAM STAFF

During the 1st Quarter of 2020, there were no changes of key personnel to report.

9.4 COVID-19 IMPACT

In March 2020, the COVID-19 crisis began affecting daily work routines for the County, Consultant Team and contractors. OCSD staff are operating at reduced staff level in accordance with New York State Executive Orders (Order 202 and its amendments) for Essential Workers, in order to minimize potential operation disruptions should an employee contract COVID-19.

The Consultant Team continues to work on the project as necessary and in accordance to the County and their own company guidance and modified procedures to maintain social distancing and safe work conditions. On-site staff is generally limited to key Construction Management, Construction Inspection, and Start-up/Commissioning personnel. Engineering/design personnel work remotely per the Governor's Executive Order 202.

As construction work also is considered essential to infrastructure, contractors continue to make progress on the various construction contracts, and have implemented practices to maintain social distancing and safe work conditions. Some vendors, subcontractors, and their employees have expressed concern about working at the site during the COVID-19 pandemic, which has the potential for schedule impacts.

10.0 ADMINISTRATIVE ITEMS

10.1 WORK AUTHORIZATIONS

The following work authorizations were issued during the 1st Quarter of 2020.

- Work Order 27-7: CMOM Phase 8
- Work Order 28-7: Community Outreach
- Work Order 29-7: Private Property I/I Phase 8
- Work Order 30-7: Program Administration
- Work Order 35-2: Flow Monitoring
- Work Order 38-1: Operations Support

10.2 PROJECT FINANCING

The following listing is from the CWSRF 2020 DRAFT Intended Use Plan (IUP), issued in July 2019, and includes financings for the County:

CWSRF PROJECT #	PROJECT NAME	TOTAL IUP AMOUNT
C6-6070-08-00 (Long-term financed)	I/I CORR [9 CONTRIBUTING COMMUNITIES] Phase 1 and 2a	(1)$10,078,438 (includes $4M Principal Forgiveness)
C6-6070-08-10 (Balance of unexpended funds from Original C6-6070-08-00 financing)	I/I CORR [9 CONTRIBUTING COMMUNITIES] Phase 1 and 2a	(1)$11,721,562
C6-6070-08-01 (Multi-year)	I/I CORR [SSO - 9 Contributing Communities] Phase 2b, 3, 4, 5, & 6	$15,000,000
C6-6070-08-02 (Long-term financed)	FM, PS REHAB [DESIGN AND PERMITTING PHASE] Phase 5a	(1)$2,524,071
C6-6070-08-03 (Multi-year)	I/I CORR [SSO Phase 4]	$7,663,000
C6-6070-08-04 (Annual List - Short-term financed)	FM Rehab, PS Rehab [CONSTRUCTION PHASE] Phases 5b	(1)$97,000,000
	FM Rehab, PS Rehab [CONSTRUCTION PHASE] Phase 5b	(1)$15,000,000
	Water Infrastructure Grant	(1)$5,000,000
C6-6070-08-05 (Annual List)	STP UP (Phases 6A)	$80,000,000
C6-6070-08-15	STP UP (Phase 6B)	$120,000,000
C6-6070-08-06 (Long-term financed)	STP UP [SOLIDS HANDLING SYSTEMS DESIGN AND CONSTRUCTION]	(1)$35,000,000

(1) - CWSRF Project Financing has closed, is no longer listed in IUP, but reflect the amount Oneida County is now repaying.

10.2.1 STP Upgrades [Phase 6B] C6-6070-08-15 - $120 Million

This includes $80 Million scheduled for a closing on Short Term Financing in the 3rd quarter of 2020.

10.2.1.1 Additional Bond Authorization

The balance of the C6-6070-08-15 financing ($40 Million) requires an amendment to the County's current bond authorization. The County is reviewing the engineering report prepared in support of the additional bonding. Action is anticipated in the 3rd Quarter 2020.

Appendix A

Sauquoit Creek Pumping Station Rain Gauge Data

Sauquoit Pump Station Rain Gauge Data (inches)

Data Provided by ADS Environmental Services

Monthly Summary	
Date	**Rainfall**
January 2017	3.69
February 2017	2.77
March 2017	3.74
April 2017	4.75
May 2017	6.17
June 2017	6.51
July 2017	8.2
August 2017	3.4
September 2017	1.99
October 2017	6.09
November 2017	4.37
December 2017	1.9
January 2018	2.04
February 2018	3.05
March 2018	3.71
April 2018	3.28
May 2018	3.08
June 2018	2.82
July 2018	2.73
August 2018	4.02
September 2087	5.04
October 2018	5.39
November 2018	6.41
December 2018	3.81
January 2019	2.37
February 2019	2.38
March 2019	1.64
April 2019	5.67
May 2019	6.65
June 2019	5.72
July 2019	4.71
August 2019	5.38
September 2019	3.23
October 2019	10.67
November 2019	3.12
December 2019	4.17

Yearly Summary	
Date	**Rainfall**
2017	53.58
2018	45.38
2019	55.71

Daily Data	
Date	Rainfall
1/1/2017	0.31
1/2/2017	0
1/3/2017	0.62
1/4/2017	0.11
1/5/2017	0
1/6/2017	0.05
1/7/2017	0.03
1/8/2017	0
1/9/2017	0
1/10/2017	0
1/11/2017	0.02
1/12/2017	0.38
1/13/2017	0.02
1/14/2017	0
1/15/2017	0
1/16/2017	0
1/17/2017	0.12
1/18/2017	0.33
1/19/2017	0.08
1/20/2017	0
1/21/2017	0
1/22/2017	0
1/23/2017	0.14
1/24/2017	1.18
1/25/2017	0.07
1/26/2017	0.14
1/27/2017	0.09
1/28/2017	0
1/29/2017	0
1/30/2017	0
1/31/2017	0
2/1/2017	0.14
2/2/2017	0.07
2/3/2017	0.01
2/4/2017	0.05
2/5/2017	0.01
2/6/2017	0.01
2/7/2017	1.03
2/8/2017	0.11
2/9/2017	0.01
2/10/2017	0.03
2/11/2017	0.01
2/12/2017	0
2/13/2017	0
2/14/2017	0.01
2/15/2017	0.29
2/16/2017	0
2/17/2017	0.02
2/18/2017	0
2/19/2017	0
2/20/2017	0
2/21/2017	0
2/22/2017	0
2/23/2017	0
2/24/2017	0.02
2/25/2017	0.95
2/26/2017	0
2/27/2017	0
2/28/2017	0
3/1/2017	0.15
3/2/2017	0
3/3/2017	0
3/4/2017	0
3/5/2017	0
3/6/2017	0
3/7/2017	0.55
3/8/2017	0.34
3/9/2017	0.01
3/10/2017	0
3/11/2017	0
3/12/2017	0
3/13/2017	0
3/14/2017	0
3/15/2017	0
3/16/2017	0.01
3/17/2017	0.26
3/18/2017	0
3/19/2017	0
3/20/2017	0
3/21/2017	0
3/22/2017	0
3/23/2017	0
3/24/2017	0.09
3/25/2017	0.42
3/26/2017	0.01
3/27/2017	0.33
3/28/2017	0.01
3/29/2017	0
3/30/2017	0.08
3/31/2017	1.48
4/1/2017	0.1
4/2/2017	0
4/3/2017	0
4/4/2017	1.47
4/5/2017	0.03
4/6/2017	0.86
4/7/2017	0.38
4/8/2017	0.01
4/9/2017	0
4/10/2017	0
4/11/2017	0.1
4/12/2017	0
4/13/2017	0
4/14/2017	0
4/15/2017	0
4/16/2017	0
4/17/2017	0
4/18/2017	0
4/19/2017	0.76
4/20/2017	0.2
4/21/2017	0.69
4/22/2017	0
4/23/2017	0
4/24/2017	0
4/25/2017	0.15
4/26/2017	0
4/27/2017	0
4/28/2017	0
4/29/2017	0
4/30/2017	0
5/1/2017	0.74

5/2/2017	0.04
5/3/2017	0.11
5/4/2017	0.07
5/5/2017	0.98
5/6/2017	0.33
5/7/2017	0.29
5/8/2017	0.02
5/9/2017	0.02
5/10/2017	0
5/11/2017	0
5/12/2017	0
5/13/2017	0.57
5/14/2017	0.04
5/15/2017	0
5/16/2017	0
5/17/2017	0
5/18/2017	0.06
5/19/2017	0.05
5/20/2017	0
5/21/2017	0.09
5/22/2017	0.44
5/23/2017	0
5/24/2017	0
5/25/2017	0.19
5/26/2017	0.03
5/27/2017	0
5/28/2017	0
5/29/2017	1.53
5/30/2017	0.51
5/31/2017	0.06
6/1/2017	0
6/2/2017	0
6/3/2017	0
6/4/2017	0.16
6/5/2017	1.22
6/6/2017	0.98
6/7/2017	0
6/8/2017	0
6/9/2017	0.2
6/10/2017	0
6/11/2017	0

6/12/2017	0
6/13/2017	0.07
6/14/2017	0.01
6/15/2017	0.1
6/16/2017	0.7
6/17/2017	0
6/18/2017	0.35
6/19/2017	0.36
6/20/2017	0.15
6/21/2017	0.02
6/22/2017	0
6/23/2017	0.23
6/24/2017	0.54
6/25/2017	0.11
6/26/2017	0.05
6/27/2017	0.31
6/28/2017	0.01
6/29/2017	0.12
6/30/2017	0.82
7/1/2017	3.08
7/2/2017	0
7/3/2017	0
7/4/2017	0
7/5/2017	0
7/6/2017	0.72
7/7/2017	0.02
7/8/2017	1.01
7/9/2017	0.01
7/10/2017	0
7/11/2017	0.25
7/12/2017	0.01
7/13/2017	0.41
7/14/2017	1.27
7/15/2017	0.01
7/16/2017	0
7/17/2017	0.8
7/18/2017	0
7/19/2017	0
7/20/2017	0
7/21/2017	0
7/22/2017	0

7/23/2017	0
7/24/2017	0.25
7/25/2017	0.13
7/26/2017	0
7/27/2017	0.23
7/28/2017	0
7/29/2017	0
7/30/2017	0
7/31/2017	0
8/1/2017	0
8/2/2017	0
8/3/2017	0
8/4/2017	0.45
8/5/2017	0.29
8/6/2017	0
8/7/2017	0
8/8/2017	0
8/9/2017	0
8/10/2017	0
8/11/2017	0.01
8/12/2017	0.42
8/13/2017	0
8/14/2017	0.01
8/15/2017	0.16
8/16/2017	0.01
8/17/2017	0
8/18/2017	0.78
8/19/2017	0.07
8/20/2017	0.01
8/21/2017	0.01
8/22/2017	1.17
8/23/2017	0
8/24/2017	0
8/25/2017	0
8/26/2017	0
8/27/2017	0
8/28/2017	0.01
8/29/2017	0
8/30/2017	0
8/31/2017	0
9/1/2017	0

9/2/2017	0.01
9/3/2017	0.74
9/4/2017	0
9/5/2017	0.72
9/6/2017	0.16
9/7/2017	0.02
9/8/2017	0.08
9/9/2017	0
9/10/2017	0
9/11/2017	0.01
9/12/2017	0
9/13/2017	0.01
9/14/2017	0
9/15/2017	0
9/16/2017	0
9/17/2017	0
9/18/2017	0.01
9/19/2017	0
9/20/2017	0
9/21/2017	0
9/22/2017	0.01
9/23/2017	0
9/24/2017	0
9/25/2017	0.01
9/26/2017	0
9/27/2017	0
9/28/2017	0
9/29/2017	0.03
9/30/2017	0.18
10/1/2017	0
10/2/2017	0.01
10/3/2017	0.01
10/4/2017	0.17
10/5/2017	0.05
10/6/2017	0.06
10/7/2017	0.08
10/8/2017	0.3
10/9/2017	0.54
10/10/2017	0
10/11/2017	0.26
10/12/2017	0.03

10/13/2017	0
10/14/2017	0
10/15/2017	0.54
10/16/2017	0.06
10/17/2017	0
10/18/2017	0
10/19/2017	0.01
10/20/2017	0
10/21/2017	0
10/22/2017	0.01
10/23/2017	0
10/24/2017	0.19
10/25/2017	0
10/26/2017	0
10/27/2017	0
10/28/2017	0
10/29/2017	1.85
10/30/2017	1.9
10/31/2017	0.02
11/1/2017	0.6
11/2/2017	0.76
11/3/2017	0.24
11/4/2017	0.01
11/5/2017	0.61
11/6/2017	0.26
11/7/2017	0
11/8/2017	0
11/9/2017	0.15
11/10/2017	0.03
11/11/2017	0
11/12/2017	0
11/13/2017	0.08
11/14/2017	0
11/15/2017	0
11/16/2017	0.04
11/17/2017	0
11/18/2017	0.45
11/19/2017	0.31
11/20/2017	0.16
11/21/2017	0
11/22/2017	0.14

11/23/2017	0.01
11/24/2017	0
11/25/2017	0.05
11/26/2017	0.25
11/27/2017	0.03
11/28/2017	0
11/29/2017	0
11/30/2017	0.19
12/1/2017	0.03
12/2/2017	0
12/3/2017	0
12/4/2017	0
12/5/2017	0.38
12/6/2017	0
12/7/2017	0
12/8/2017	0
12/9/2017	0
12/10/2017	0.04
12/11/2017	0.03
12/12/2017	0.06
12/13/2017	0
12/14/2017	0
12/15/2017	0.05
12/16/2017	0
12/17/2017	0.07
12/18/2017	0
12/19/2017	0.26
12/20/2017	0.14
12/21/2017	0.06
12/22/2017	0
12/23/2017	0.71
12/24/2017	0.06
12/25/2017	0.01
12/26/2017	0
12/27/2017	0
12/28/2017	0
12/29/2017	0
12/30/2017	0
12/31/2017	0
1/1/2018	0
1/2/2018	0

1/3/2018	0.01
1/4/2018	0
1/5/2018	0
1/6/2018	0
1/7/2018	0
1/8/2018	0.03
1/9/2018	0
1/10/2018	0.06
1/11/2018	0.05
1/12/2018	0.7
1/13/2018	0
1/14/2018	0.01
1/15/2018	0
1/16/2018	0
1/17/2018	0
1/18/2018	0
1/19/2018	0.03
1/20/2018	0.59
1/21/2018	0.01
1/22/2018	0.06
1/23/2018	0.32
1/24/2018	0.01
1/25/2018	0
1/26/2018	0
1/27/2018	0.14
1/28/2018	0
1/29/2018	0
1/30/2018	0
1/31/2018	0.02
2/1/2018	0.03
2/2/2018	0
2/3/2018	0.01
2/4/2018	0.01
2/5/2018	0
2/6/2018	0
2/7/2018	0
2/8/2018	0
2/9/2018	0
2/10/2018	0.02
2/11/2018	0
2/12/2018	0

2/13/2018	0.01
2/14/2018	0
2/15/2018	0.09
2/16/2018	0.17
2/17/2018	0
2/18/2018	0.16
2/19/2018	0.94
2/20/2018	0.37
2/21/2018	0.01
2/22/2018	0.23
2/23/2018	0.33
2/24/2018	0.03
2/25/2018	0.54
2/26/2018	0
2/27/2018	0
2/28/2018	0.1
3/1/2018	0.02
3/2/2018	0.1
3/3/2018	0.44
3/4/2018	0.27
3/5/2018	0
3/6/2018	0.01
3/7/2018	0.21
3/8/2018	0.08
3/9/2018	0.13
3/10/2018	0.02
3/11/2018	0
3/12/2018	0
3/13/2018	0.42
3/14/2018	0.23
3/15/2018	0.11
3/16/2018	0
3/17/2018	0
3/18/2018	0
3/19/2018	0
3/20/2018	0
3/21/2018	0
3/22/2018	0
3/23/2018	0
3/24/2018	0
3/25/2018	0

3/26/2018	0
3/27/2018	0.23
3/28/2018	0.06
3/29/2018	1.06
3/30/2018	0.32
3/31/2018	0
4/1/2018	0.13
4/2/2018	0
4/3/2018	0.11
4/4/2018	0.6
4/5/2018	0
4/6/2018	0.07
4/7/2018	0.08
4/8/2018	0
4/9/2018	0
4/10/2018	0
4/11/2018	0.03
4/12/2018	0.44
4/13/2018	0
4/14/2018	0
4/15/2018	0.02
4/16/2018	0.76
4/17/2018	0.02
4/18/2018	0.04
4/19/2018	0.09
4/20/2018	0
4/21/2018	0
4/22/2018	0
4/23/2018	0
4/24/2018	0
4/25/2018	0.66
4/26/2018	0.05
4/27/2018	0.01
4/28/2018	0.06
4/29/2018	0.03
4/30/2018	0.08
5/1/2018	0.2
5/2/2018	0.01
5/3/2018	0.01
5/4/2018	0.41
5/5/2018	0

5/6/2018	0.07
5/7/2018	0
5/8/2018	0
5/9/2018	0
5/10/2018	0.01
5/11/2018	0
5/12/2018	0.01
5/13/2018	0
5/14/2018	0
5/15/2018	0.55
5/16/2018	0
5/17/2018	0
5/18/2018	0
5/19/2018	0.72
5/20/2018	0.24
5/21/2018	0
5/22/2018	0.55
5/23/2018	0
5/24/2018	0.01
5/25/2018	0
5/26/2018	0
5/27/2018	0.29
5/28/2018	0
5/29/2018	0
5/30/2018	0
5/31/2018	0
6/1/2018	0
6/2/2018	0
6/3/2018	0.09
6/4/2018	0.61
6/5/2018	0.01
6/6/2018	0
6/7/2018	0.01
6/8/2018	0
6/9/2018	0
6/10/2018	0
6/11/2018	0
6/12/2018	0
6/13/2018	0.48
6/14/2018	0
6/15/2018	0.02

6/16/2018	0
6/17/2018	0
6/18/2018	0.13
6/19/2018	0
6/20/2018	0
6/21/2018	0
6/22/2018	0
6/23/2018	0.16
6/24/2018	0.2
6/25/2018	0
6/26/2018	0
6/27/2018	0.98
6/28/2018	0.12
6/29/2018	0.01
6/30/2018	0
7/1/2018	0
7/2/2018	0.52
7/3/2018	0
7/4/2018	0
7/5/2018	0
7/6/2018	0.04
7/7/2018	0
7/8/2018	0
7/9/2018	0
7/10/2018	0
7/11/2018	0
7/12/2018	0
7/13/2018	0
7/14/2018	0
7/15/2018	0
7/16/2018	0.72
7/17/2018	0.41
7/18/2018	0
7/19/2018	0
7/20/2018	0
7/21/2018	0
7/22/2018	0.11
7/23/2018	0.14
7/24/2018	0.35
7/25/2018	0.41
7/26/2018	0.03

7/27/2018	0
7/28/2018	0
7/29/2018	0
7/30/2018	0
7/31/2018	0
8/1/2018	0.01
8/2/2018	0.35
8/3/2018	0.11
8/4/2018	0.01
8/5/2018	0
8/6/2018	0
8/7/2018	0
8/8/2018	0.17
8/9/2018	0.08
8/10/2018	0
8/11/2018	0.09
8/12/2018	0
8/13/2018	0.25
8/14/2018	0.79
8/15/2018	0
8/16/2018	0
8/17/2018	0.98
8/18/2018	0.06
8/19/2018	0
8/20/2018	0
8/21/2018	0.2
8/22/2018	0.14
8/23/2018	0.01
8/24/2018	0
8/25/2018	0
8/26/2018	0.02
8/27/2018	0
8/28/2018	0
8/29/2018	0.58
8/30/2018	0.08
8/31/2018	0.09
9/1/2018	0
9/2/2018	0.12
9/3/2018	0.13
9/4/2018	0
9/5/2018	0.02

9/6/2018	0.02
9/7/2018	0
9/8/2018	0
9/9/2018	0
9/10/2018	1.55
9/11/2018	0.66
9/12/2018	0
9/13/2018	0
9/14/2018	0
9/15/2018	0
9/16/2018	0
9/17/2018	0.11
9/18/2018	0.47
9/19/2018	0
9/20/2018	0
9/21/2018	0.25
9/22/2018	0.13
9/23/2018	0
9/24/2018	0
9/25/2018	0.82
9/26/2018	0.39
9/27/2018	0.02
9/28/2018	0.34
9/29/2018	0
9/30/2018	0.01
10/1/2018	0.01
10/2/2018	0.7
10/3/2018	0.01
10/4/2018	0.05
10/5/2018	0.01
10/6/2018	0.02
10/7/2018	0.04
10/8/2018	0
10/9/2018	0
10/10/2018	0
10/11/2018	1.36
10/12/2018	0.01
10/13/2018	0.23
10/14/2018	0
10/15/2018	0.28
10/16/2018	0

10/17/2018	0.21
10/18/2018	0
10/19/2018	0
10/20/2018	0
10/21/2018	0
10/22/2018	0.07
10/23/2018	0.25
10/24/2018	0.14
10/25/2018	0
10/26/2018	0
10/27/2018	1.17
10/28/2018	0.45
10/29/2018	0.28
10/30/2018	0
10/31/2018	0.1
11/1/2018	0.25
11/2/2018	0.32
11/3/2018	0.51
11/4/2018	0.02
11/5/2018	0.22
11/6/2018	0.57
11/7/2018	0
11/8/2018	0
11/9/2018	0.75
11/10/2018	0.09
11/11/2018	0.07
11/12/2018	0
11/13/2018	0.34
11/14/2018	0.06
11/15/2018	0
11/16/2018	0.82
11/17/2018	0.02
11/18/2018	0
11/19/2018	0.03
11/20/2018	0.01
11/21/2018	0.07
11/22/2018	0
11/23/2018	0
11/24/2018	0.23
11/25/2018	0.09
11/26/2018	0.54

11/27/2018	0.98
11/28/2018	0.37
11/29/2018	0.01
11/30/2018	0.04
12/1/2018	0.4
12/2/2018	0.46
12/3/2018	0.12
12/4/2018	0
12/5/2018	0
12/6/2018	0
12/7/2018	0.06
12/8/2018	0
12/9/2018	0
12/10/2018	0
12/11/2018	0
12/12/2018	0.03
12/13/2018	0
12/14/2018	0
12/15/2018	0
12/16/2018	0.19
12/17/2018	0.13
12/18/2018	0
12/19/2018	0
12/20/2018	0.14
12/21/2018	0.36
12/22/2018	0.03
12/23/2018	0
12/24/2018	0.17
12/25/2018	0.1
12/26/2018	0.01
12/27/2018	0.02
12/28/2018	0.9
12/29/2018	0.02
12/30/2018	0.03
12/31/2018	0.64
1/1/2019	0.05
1/2/2019	
1/3/2019	0.13
1/4/2019	0.03
1/5/2019	
1/6/2019	0.1

1/7/2019	
1/8/2019	0.32
1/9/2019	0.71
1/10/2019	
1/11/2019	
1/12/2019	
1/13/2019	
1/14/2019	
1/15/2019	
1/16/2019	
1/17/2019	
1/18/2019	0.03
1/19/2019	
1/20/2019	
1/21/2019	
1/22/2019	0.02
1/23/2019	0.01
1/24/2019	0.79
1/25/2019	0.13
1/26/2019	
1/27/2019	0.05
1/28/2019	
1/29/2019	
1/30/2019	
1/31/2019	
2/1/2019	0.08
2/2/2019	0.01
2/3/2019	0.02
2/4/2019	0.01
2/5/2019	0.21
2/6/2019	0.37
2/7/2019	0.29
2/8/2019	0.27
2/9/2019	0.04
2/10/2019	0.01
2/11/2019	0.01
2/12/2019	
2/13/2019	0.09
2/14/2019	0.14
2/15/2019	0.26
2/16/2019	

2/17/2019	
2/18/2019	0.03
2/19/2019	
2/20/2019	
2/21/2019	0.02
2/22/2019	
2/23/2019	
2/24/2019	0.34
2/25/2019	
2/26/2019	
2/27/2019	
2/28/2019	0.18
3/1/2019	
3/2/2019	
3/3/2019	0.02
3/4/2019	0.12
3/5/2019	
3/6/2019	0.05
3/7/2019	0.06
3/8/2019	
3/9/2019	
3/10/2019	0.23
3/11/2019	
3/12/2019	
3/13/2019	0.04
3/14/2019	
3/15/2019	0.12
3/16/2019	0.02
3/17/2019	0.02
3/18/2019	0.01
3/19/2019	
3/20/2019	
3/21/2019	0.16
3/22/2019	0.56
3/23/2019	0.02
3/24/2019	
3/25/2019	
3/26/2019	
3/27/2019	
3/28/2019	0.02
3/29/2019	0.04

3/30/2019	
3/31/2019	0.15
4/1/2019	0.03
4/2/2019	
4/3/2019	
4/4/2019	
4/5/2019	0.34
4/6/2019	0.22
4/7/2019	
4/8/2019	0.47
4/9/2019	0.24
4/10/2019	
4/11/2019	
4/12/2019	0.19
4/13/2019	
4/14/2019	0.27
4/15/2019	0.9
4/16/2019	
4/17/2019	
4/18/2019	0.14
4/19/2019	0.77
4/20/2019	0.14
4/21/2019	
4/22/2019	
4/23/2019	0.38
4/24/2019	0.01
4/25/2019	
4/26/2019	1.25
4/27/2019	0.22
4/28/2019	0.04
4/29/2019	0.01
4/30/2019	0.05
5/1/2019	0.39
5/2/2019	0.1
5/3/2019	0.28
5/4/2019	
5/5/2019	0.11
5/6/2019	0.27
5/7/2019	0.31
5/8/2019	0.01
5/9/2019	0.03

5/10/2019	1.92
5/11/2019	
5/12/2019	0.47
5/13/2019	0.6
5/14/2019	0.41
5/15/2019	0.08
5/16/2019	0.03
5/17/2019	0.12
5/18/2019	
5/19/2019	0.31
5/20/2019	0.3
5/21/2019	
5/22/2019	
5/23/2019	0.21
5/24/2019	
5/25/2019	0.26
5/26/2019	0.05
5/27/2019	
5/28/2019	0.38
5/29/2019	0.01
5/30/2019	
5/31/2019	
6/1/2019	0.21
6/2/2019	0.19
6/3/2019	
6/4/2019	0.14
6/5/2019	0.79
6/6/2019	0.02
6/7/2019	
6/8/2019	
6/9/2019	
6/10/2019	0.3
6/11/2019	0.14
6/12/2019	
6/13/2019	0.45
6/14/2019	0.06
6/15/2019	0.15
6/16/2019	0.54
6/17/2019	
6/18/2019	
6/19/2019	

6/20/2019	1.71
6/21/2019	0.17
6/22/2019	
6/23/2019	
6/24/2019	
6/25/2019	0.09
6/26/2019	0.04
6/27/2019	
6/28/2019	
6/29/2019	0.06
6/30/2019	0.66
7/1/2019	
7/2/2019	0.1
7/3/2019	
7/4/2019	
7/5/2019	
7/6/2019	
7/7/2019	
7/8/2019	
7/9/2019	
7/10/2019	
7/11/2019	0.17
7/12/2019	1.41
7/13/2019	
7/14/2019	
7/15/2019	
7/16/2019	0.04
7/17/2019	1.77
7/18/2019	
7/19/2019	
7/20/2019	0.31
7/21/2019	
7/22/2019	0.8
7/23/2019	0.01
7/24/2019	
7/25/2019	0.01
7/26/2019	
7/27/2019	
7/28/2019	0.04
7/29/2019	0.02
7/30/2019	0.03

7/31/2019	
8/1/2019	
8/2/2019	0.01
8/3/2019	0.39
8/4/2019	
8/5/2019	
8/6/2019	0.18
8/7/2019	0.74
8/8/2019	0.34
8/9/2019	0.01
8/10/2019	0.12
8/11/2019	
8/12/2019	0.11
8/13/2019	
8/14/2019	
8/15/2019	0.1
8/16/2019	0.61
8/17/2019	1.04
8/18/2019	0.02
8/19/2019	0.2
8/20/2019	
8/21/2019	0.43
8/22/2019	
8/23/2019	
8/24/2019	
8/25/2019	
8/26/2019	
8/27/2019	
8/28/2019	1.07
8/29/2019	0.01
8/30/2019	
8/31/2019	
9/1/2019	0.01
9/2/2019	1.02
9/3/2019	
9/4/2019	0.2
9/5/2019	
9/6/2019	0.01
9/7/2019	0.52
9/8/2019	0.01
9/9/2019	

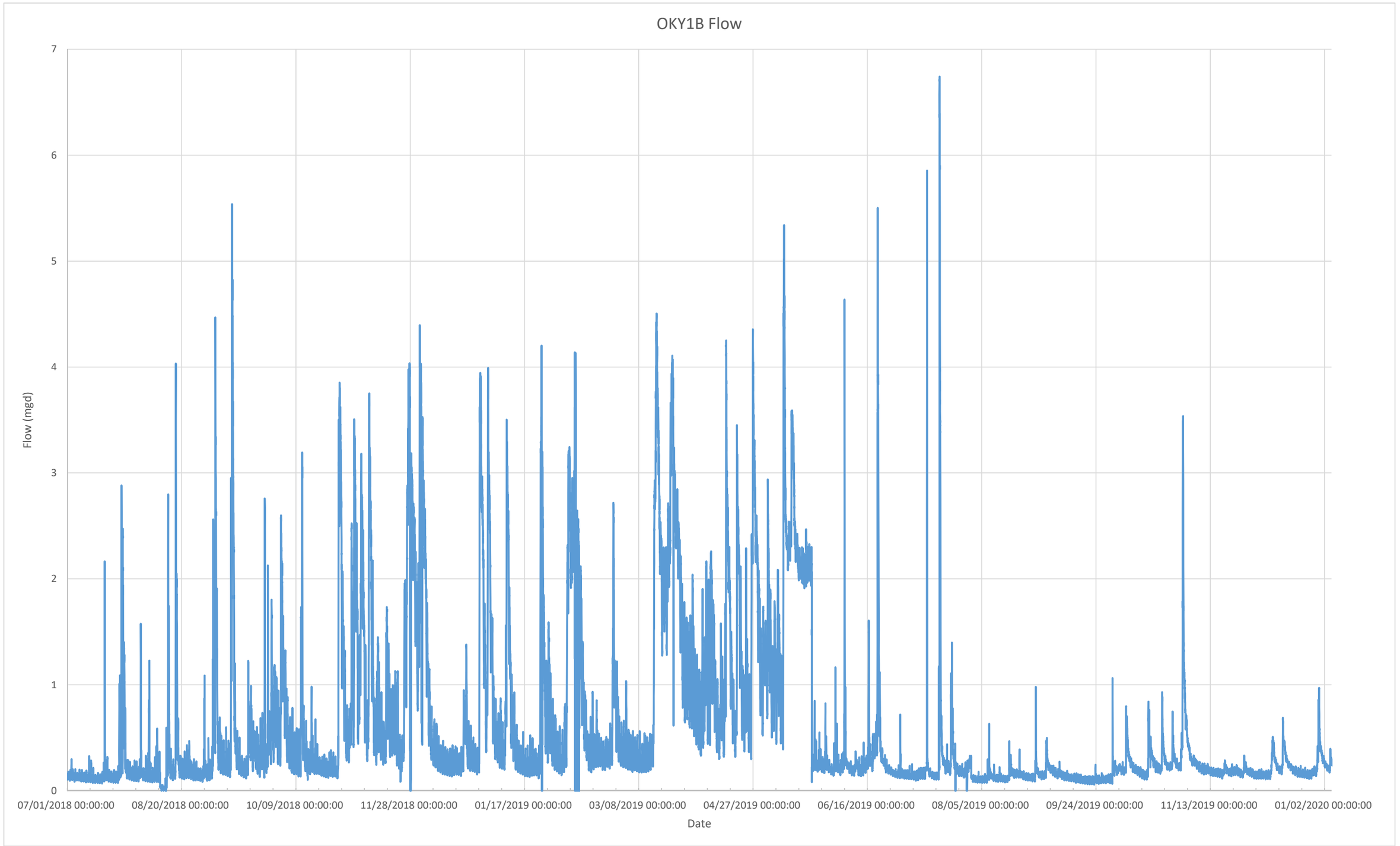
9/10/2019	0.03
9/11/2019	0.07
9/12/2019	0.05
9/13/2019	
9/14/2019	0.08
9/15/2019	0.01
9/16/2019	
9/17/2019	0.01
9/18/2019	
9/19/2019	0.01
9/20/2019	
9/21/2019	0.01
9/22/2019	0.01
9/23/2019	0.5
9/24/2019	0.17
9/25/2019	
9/26/2019	0.29
9/27/2019	0.01
9/28/2019	0.21
9/29/2019	
9/30/2019	
10/1/2019	1.12
10/2/2019	0.52
10/3/2019	0.26
10/4/2019	0.04
10/5/2019	
10/6/2019	0.14
10/7/2019	1.28
10/8/2019	
10/9/2019	
10/10/2019	
10/11/2019	
10/12/2019	0.02
10/13/2019	0.01
10/14/2019	
10/15/2019	
10/16/2019	1.57
10/17/2019	0.96

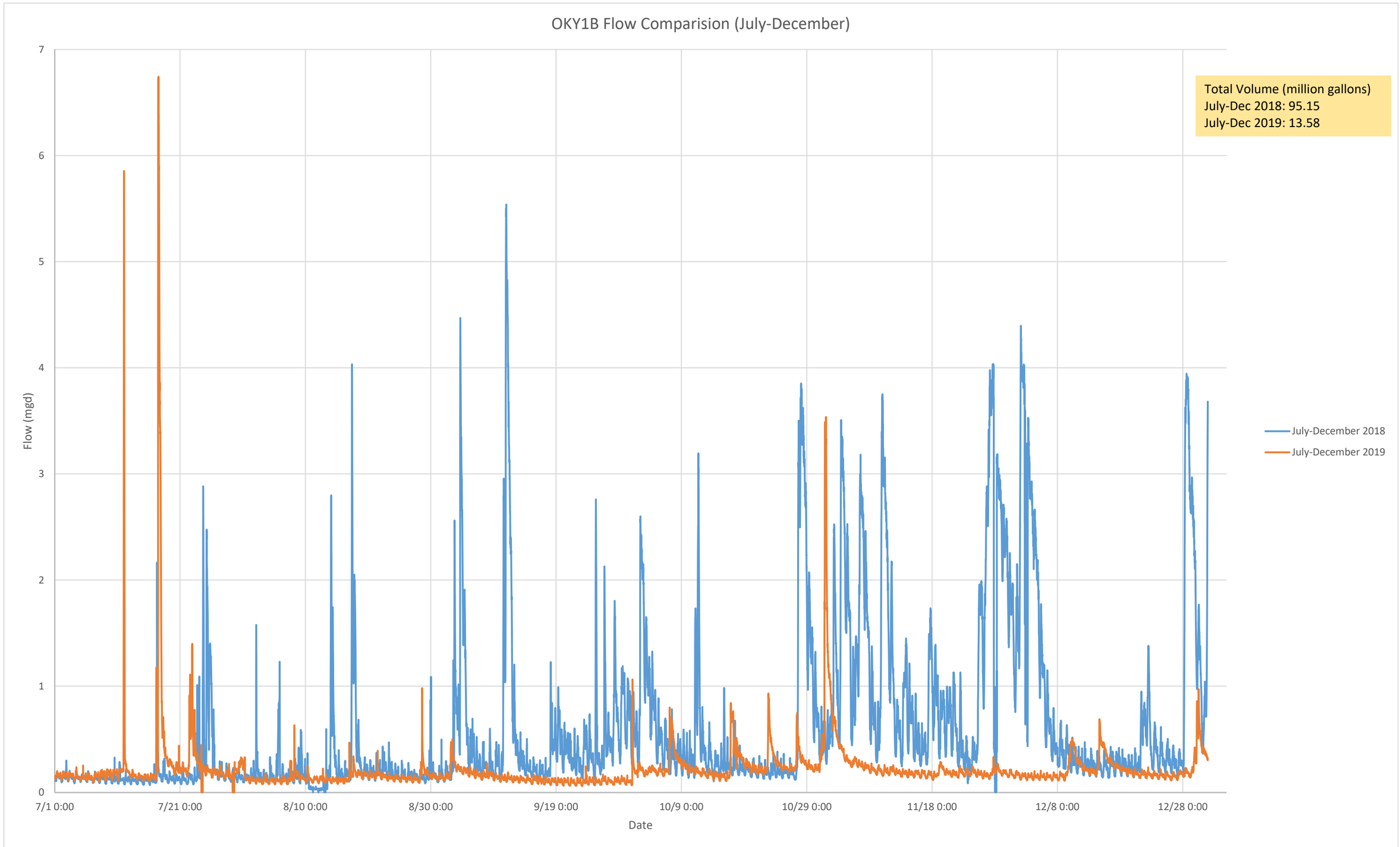
10/18/2019	0.06
10/19/2019	
10/20/2019	0.04
10/21/2019	
10/22/2019	1.08
10/23/2019	0.04
10/24/2019	
10/25/2019	0.06
10/26/2019	0.02
10/27/2019	0.87
10/28/2019	
10/29/2019	
10/30/2019	
10/31/2019	2.58
11/1/2019	0.45
11/2/2019	
11/3/2019	
11/4/2019	
11/5/2019	0.26
11/6/2019	
11/7/2019	0.02
11/8/2019	0.04
11/9/2019	
11/10/2019	0.05
11/11/2019	0.2
11/12/2019	0.02
11/13/2019	0.05
11/14/2019	0.04
11/15/2019	0.07
11/16/2019	
11/17/2019	
11/18/2019	0.16
11/19/2019	0.47
11/20/2019	
11/21/2019	0.1
11/22/2019	0.23
11/23/2019	
11/24/2019	0.36

11/25/2019	
11/26/2019	
11/27/2019	0.48
11/28/2019	0.12
11/29/2019	
11/30/2019	
12/1/2019	
12/2/2019	0.23
12/3/2019	0.1
12/4/2019	0.27
12/5/2019	0.28
12/6/2019	
12/7/2019	0.19
12/8/2019	
12/9/2019	0.07
12/10/2019	0.22
12/11/2019	0.01
12/12/2019	
12/13/2019	0.04
12/14/2019	0.69
12/15/2019	0.1
12/16/2019	
12/17/2019	
12/18/2019	0.25
12/19/2019	
12/20/2019	0.01
12/21/2019	
12/22/2019	
12/23/2019	
12/24/2019	
12/25/2019	
12/26/2019	0.01
12/27/2019	0.11
12/28/2019	0.02
12/29/2019	0.61
12/30/2019	0.87
12/31/2019	0.09

Appendix B

OKY1B Graphs


OKY1B Flow
Flow (mgd)
7
6
5
4
3
2
1
0
07/01/2018 00:00:00
08/20/2018 00:00:00
10/09/2018 00:00:00
11/28/2018 00:00:00
01/17/2019 00:00:00
03/08/2019 00:00:00
04/27/2019 00:00:00
06/16/2019 00:00:00
08/05/2019 00:00:00
09/24/2019 00:00:00
11/13/2019 00:00:00
01/02/2020 00:00:00
Date


OKY1B Flow Comparision (July-December)
Total Volume (million gallons)
July-Dec 2018: 95.15
July-Dec 2019: 13.58
Flow (mgd)
0
1
2
3
4
5
6
7
7/1 0:00
7/21 0:00
8/10 0:00
8/30 0:00
9/19 0:00
10/9 0:00
10/29 0:00
11/18 0:00
12/8 0:00
12/28 0:00
Date
July-December 2018
July-December 2019

Appendix C

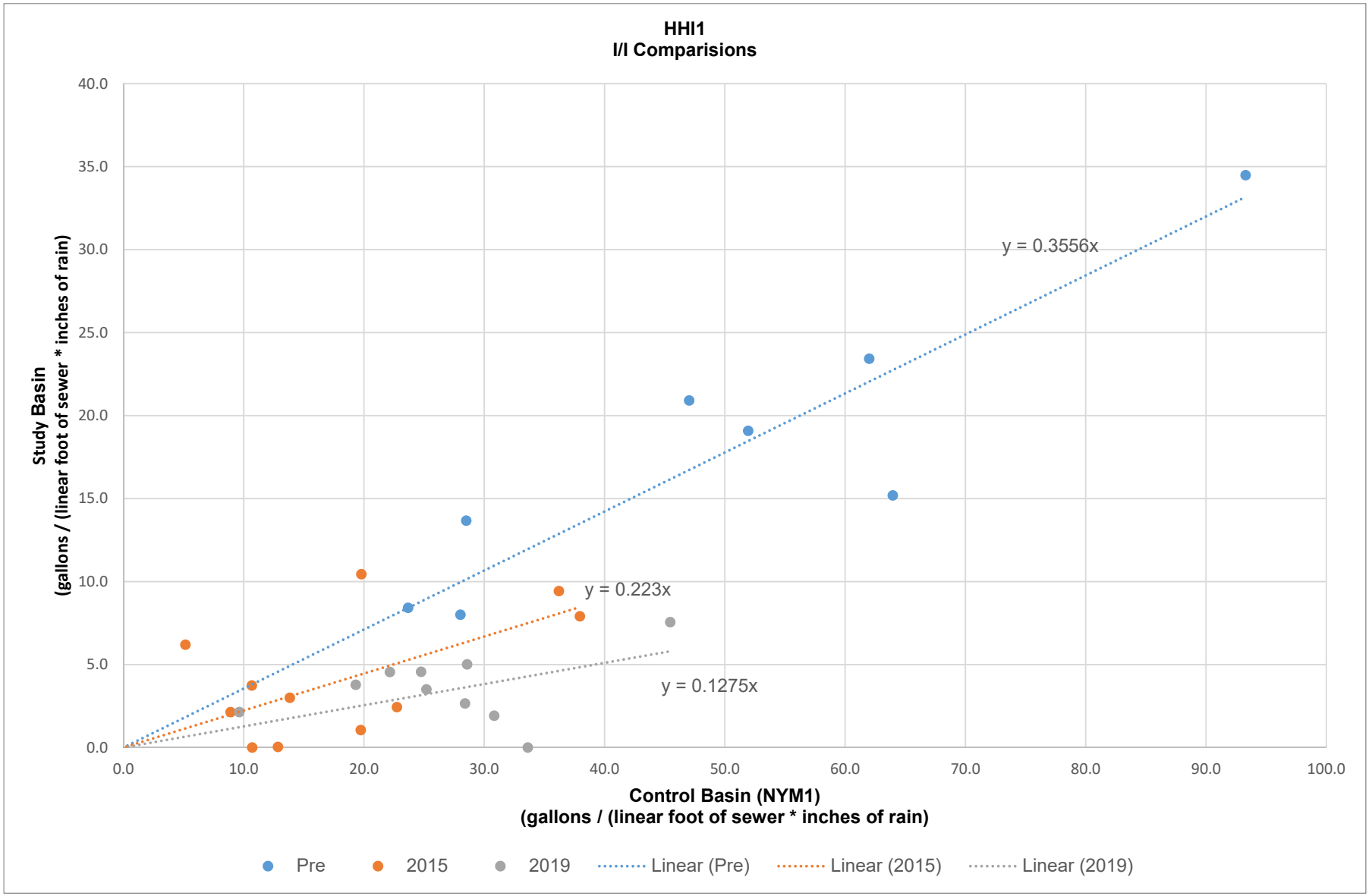
RDII and Sewer Rehabilitation Summary

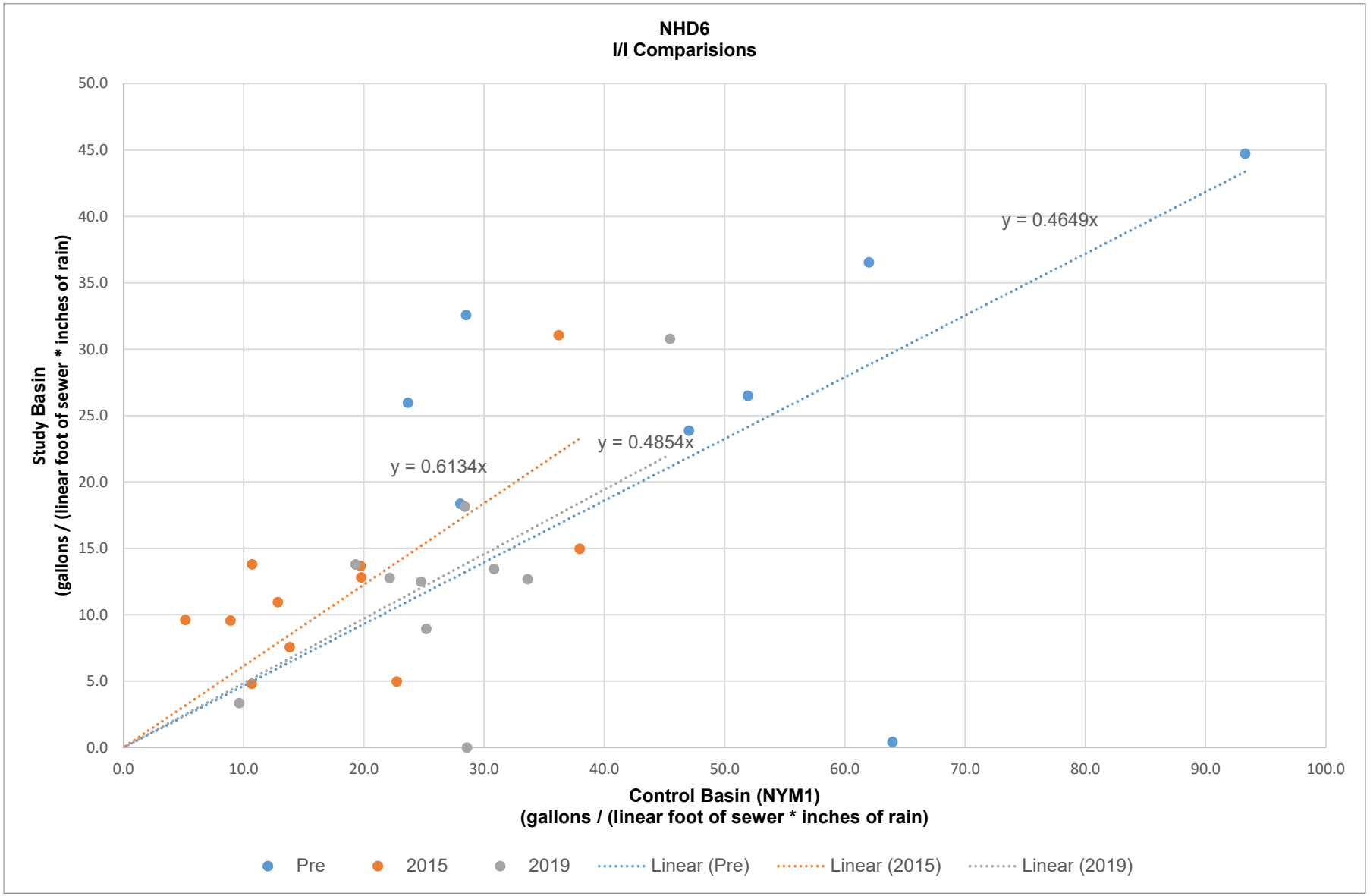
Oneida County Sewer District
Flow Monitoring Analysis
Project No. 8616504
Date: 1/20/2020

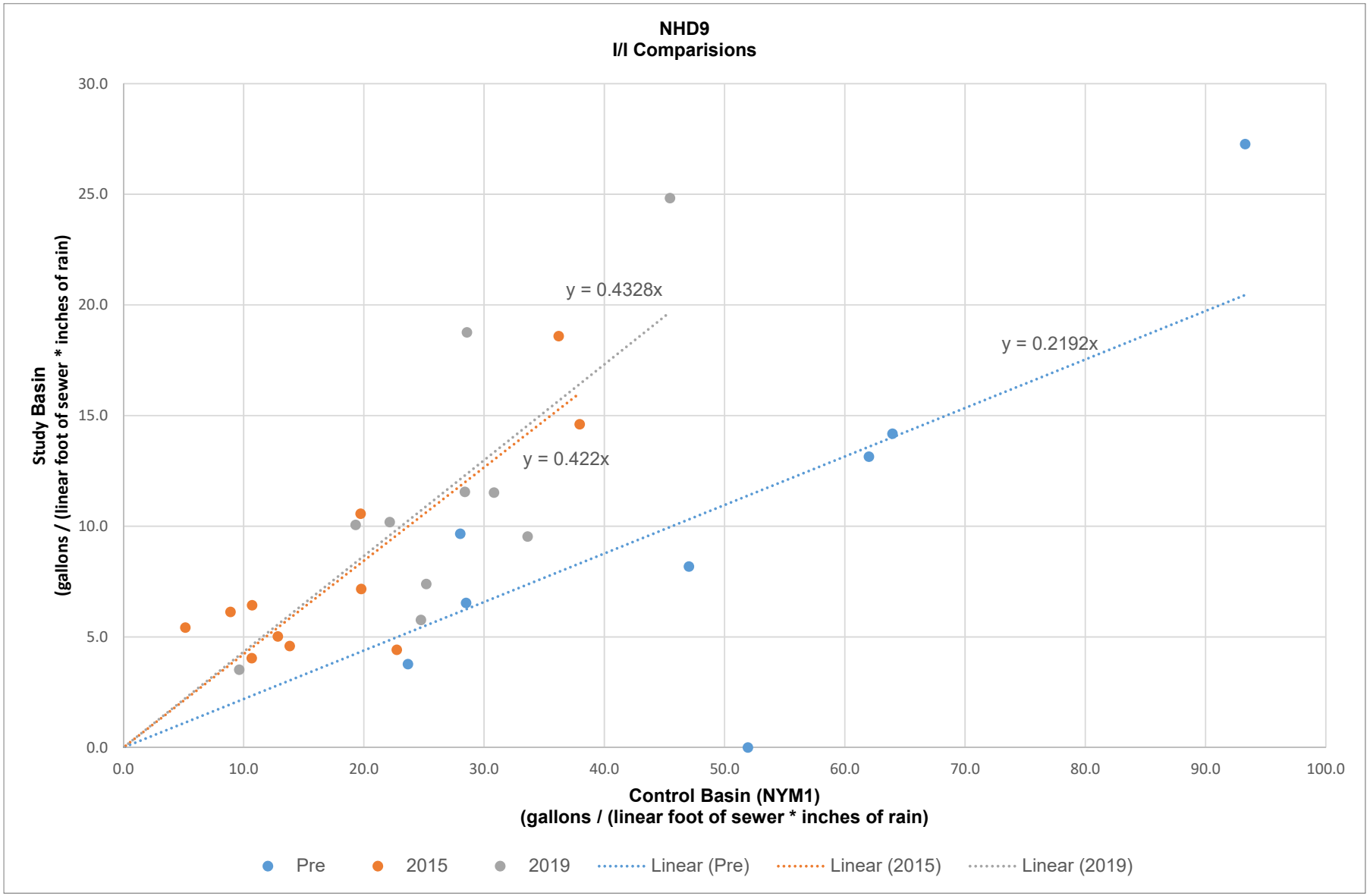
Municipality	Flowmeter	Length of Sewers in Sewershed (isolated, feet)	Length of Sewer CIP Lined (feet)	Percent of Sewer Lined	Length of Sewer grouted (feet)	Percent of Sewer Grouted	Length of Sewer Replaced (feet)	Percent of Sewer Replaced	Length of Sewer Plastic (feet)	Percent of Sewer Plastic	Length of Rehabilitated or New Sewer (feet)	Percent Rehabilitated or New	Average R Value	R-Value Standard Deviation	Average RDII Volume (in)	Average Qp/inch of rain*Area
Town of New Hartford	NHD-23	76,052	787	1%	56,261	74%	229	0%	18,775	25%	76,052	100%	0.0086	0.0064	0.0080	0.0087
Town of Whitestown	WHN-32	37,723	0	0%	689	2%	0	0%	37,034	98%	37,723	100%	0.0060	0.0046	0.0070	0.0057
Town of Whitestown	WHN-8	6,450	0	0%	0	0%	0	0%	6,450	100%	6,450	100%	0.0037	0.0075	0.0079	0.0104
Town of New Hartford	NHD-20	39,213	0	0%	24,551	63%	0	0%	14,662	37%	39,213	100%	0.0104	0.0048	0.0108	0.0085
Village of Yorkville	YKV-1B	1,724	1,082	63%	0	0%	0	0%	642	37%	1,724	100%	0.0142	0.0096	0.0147	0.0249
Town of New Hartford	NHD-1	29,831	0	0%	0	0%	0	0%	29,013	97%	29,013	97%	0.0103	0.0064	0.0102	0.0125
Village of Yorkville	YKV-2	1,913	446	23%	561	29%	0	0%	705	37%	1,712	89%	0.2292	0.1025	0.2630	0.2220
Town of New Hartford	NHD-9	33,658	3,172	9%	24,611	73%	317	1%	500	1%	28,600	85%	0.0097	0.0040	0.0106	0.0107
Town of New Hartford	NHD-6	26,044	1,245	5%	20,241	78%	403	2%	0	0%	21,889	84%	0.0161	0.0101	0.0155	0.0137
Village of Yorkville	YKV-1A	95,892	60,828	63%	6,236	7%	2,435	3%	9,754	10%	79,253	83%	0.0176	0.0107	0.0199	0.0194
Town of Whitestown	WHN-1	15,324	5,352	35%	0	0%	0	0%	6,726	44%	12,078	79%	0.0075	0.0033	0.0102	0.0073
Town of New Hartford	NHD-18	35,900	6,264	17%	12,767	36%	212	1%	6,826	19%	26,069	73%	0.0089	0.0032	0.0103	0.0068
Village of Whitesboro	WBO-1	18,884	8,702	46%	3,370	18%	209	1%	395	2%	12,676	67%	0.0318	0.0200	0.0416	0.0369
Town of Whitestown	WHN-2	15,507	8,992	58%	348	2%	0	0%	878	6%	10,218	66%	0.0118	0.0066	0.0154	0.0088
Town of New Hartford	NHD-2	7,896	2,737	35%	0	0%	404	5%	1,237	16%	4,378	55%	0.0380	0.0232	0.0347	0.0459
Village of New York Mills	NYM-2	11,353	4,184	37%	281	2%	0	0%	1,751	15%	6,216	55%	0.0210	0.0121	0.0297	0.0160
Town of Whitestown	WHN-31	16,328	4,190	26%	2,610	16%	144	1%	892	5%	7,836	48%	0.0093	0.0037	0.0122	0.0104
Village of Whitesboro	WBO-3	5,294	1,395	26%	0	0%	475	9%	60	1%	1,930	36%	0.0096	0.0039	0.0170	0.0252
Village of Oriskany	OKY-1A	12,747	0	0%	0	0%	0	0%	4,366	34%	4,366	34%	0.0121	0.0063	0.0168	0.0127
Town of New Hartford	NHD-11	7,956	0	0%	0	0%	0	0%	2,563	32%	2,563	32%	0.0175	0.0096	0.0173	0.0246
Village of New York Mills	NYM-3A	27,523	7,692	28%	706	3%	0	0%	84	0%	8,482	31%	0.0000	0.0000	0.0000	0.0000
Town of Whitestown	APT-1	21,460	0	0%	0	0%	0	0%	6,407	30%	6,407	30%	0.0254	0.0127	0.0350	0.0366
Village of Oriskany	OKY-1B	21,649	2,970	14%	95	0%	0	0%	2,126	10%	5,191	24%	0.1384	0.1201	0.1529	0.1082
Town of Paris	PRS-5	19,797	479	2%	394	2%	0	0%	3,697	19%	4,570	23%	0.0034	0.0039	0.0028	0.0034
Village of New York Mills	NYM-3B	19,368	3,544	18%	712	4%	0	0%	0	0%	4,256	22%	0.0238	0.0112	0.0310	0.0175
Town of New Hartford	NHD-21	45,250	7,107	16%	867	2%	0	0%	0	0%	7,974	18%	0.0115	0.0075	0.0103	0.0150
Town of New Hartford	NHD-24	28,735	0	0%	0	0%	0	0%	3,483	12%	3,483	12%	0.0157	0.0098	0.0166	0.0131
Town of New Hartford	NHD-22	56,576	5,045	9%	0	0%	100	0%	0	0%	5,145	9%	0.0159	0.0073	0.0164	0.0149
Multiple	SCI-1	26,458	858	3%	1,091	4%	0	0%	0	0%	1,949	7%	0.0018	0.0014	0.0017	0.0036
Town of New Hartford	VNHD-1	48,433	0	0%	1,825	4%	93	0%	0	0%	1,918	4%	0.0189	0.0093	0.0213	0.0197
Town of Paris	PRS-4	23,188	302	1%	299	1%	0	0%	0	0%	601	3%	0.0036	0.0031	0.0032	0.0034
Town of New Hartford	NHD-46	16,705	0	0%	0	0%	0	0%	177	1%	177	1%	0.0204	0.0082	0.0215	0.0250
Town of Paris	PRS-6A	13,269	0	0%	0	0%	0	0%	0	0%	0	0%	0.0098	0.0046	0.0100	0.0104
Village of New York Mills	NYM-1	6,018	0	0%	0	0%	0	0%	0	0%	0	0%	0.0190	0.0081	0.0254	0.0599

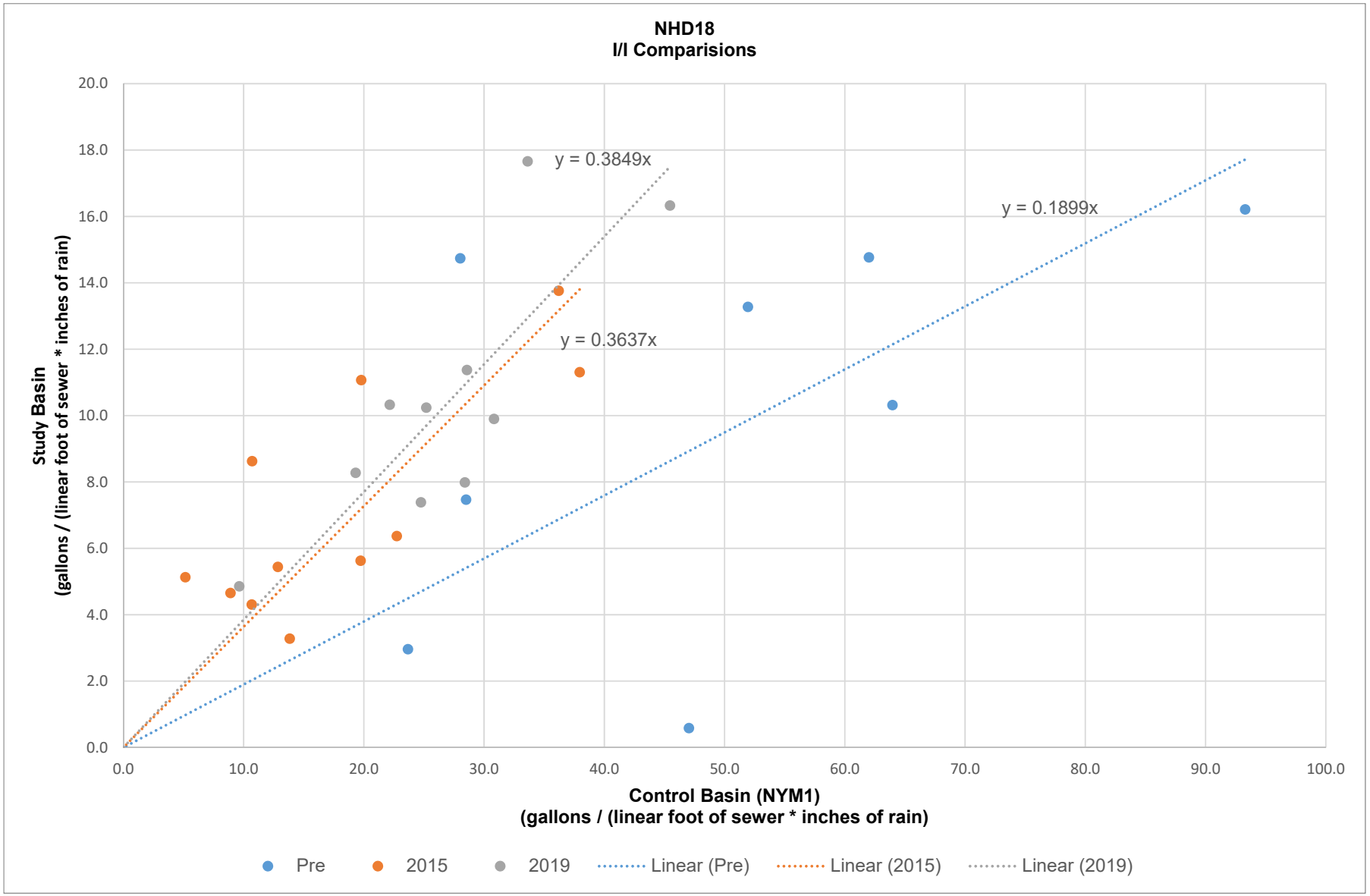
Appendix D

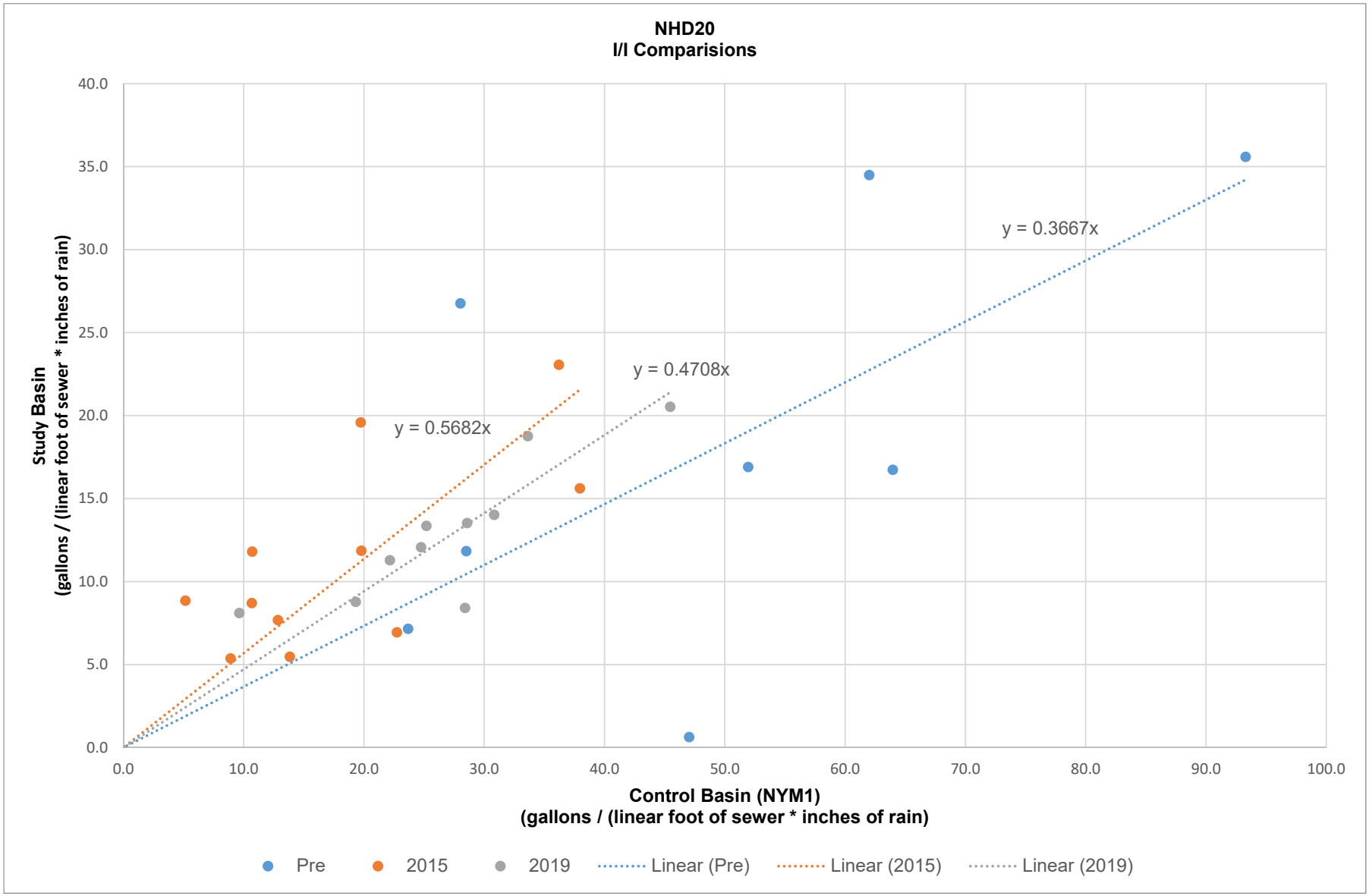
RDII Comparison

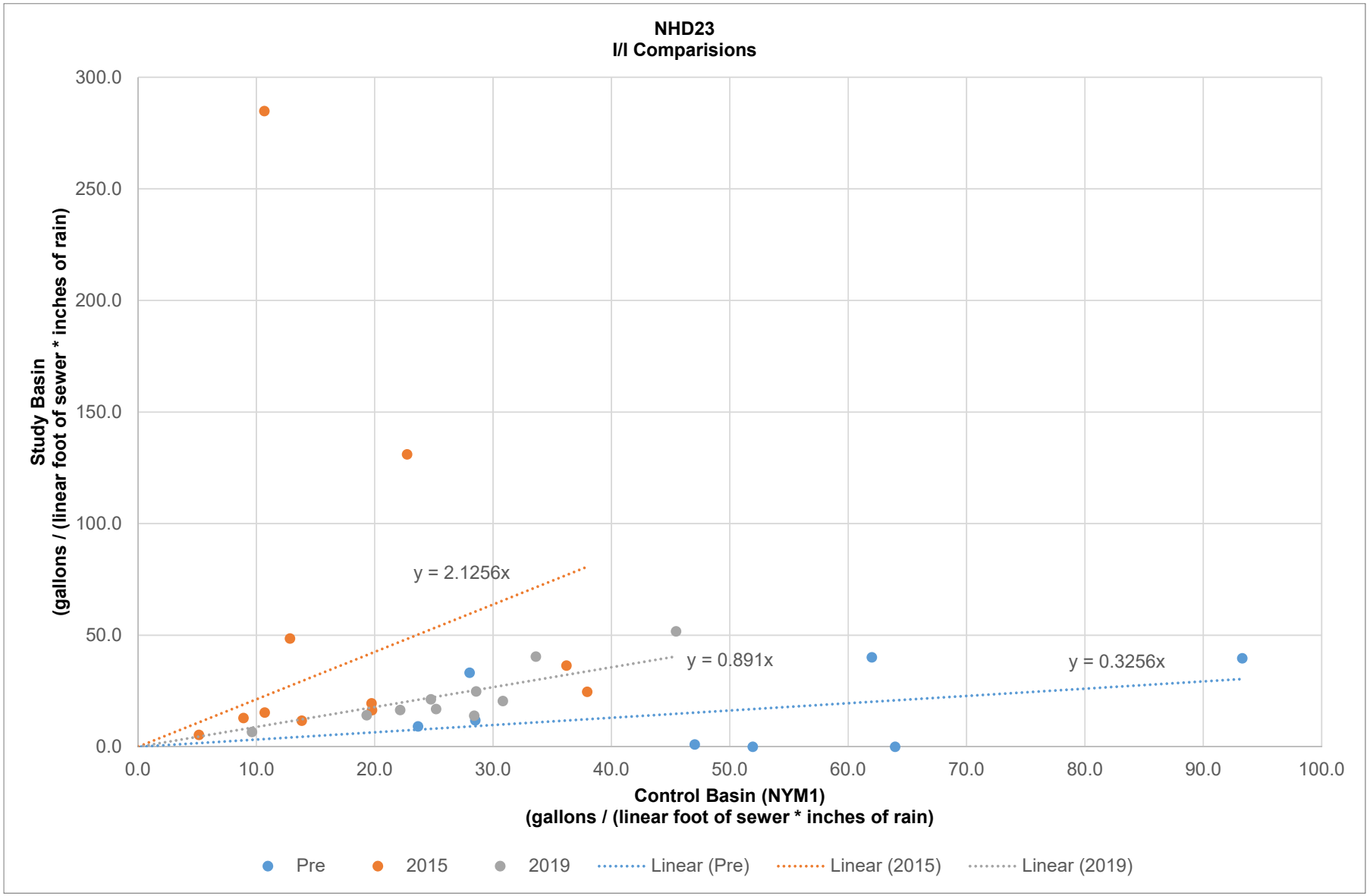

HHI1
I/I Comparisions
Study Basin
(gallons / (linear foot of sewer * inches of rain)
Control Basin (NYM1)
(gallons / (linear foot of sewer * inches of rain)
y = 0.3556x
y = 0.223x
y = 0.1275x
0.0
5.0
10.0
15.0
20.0
25.0
30.0
35.0
40.0
0.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
100.0
Pre
2015
2019
Linear (Pre)
Linear (2015)
Linear (2019)

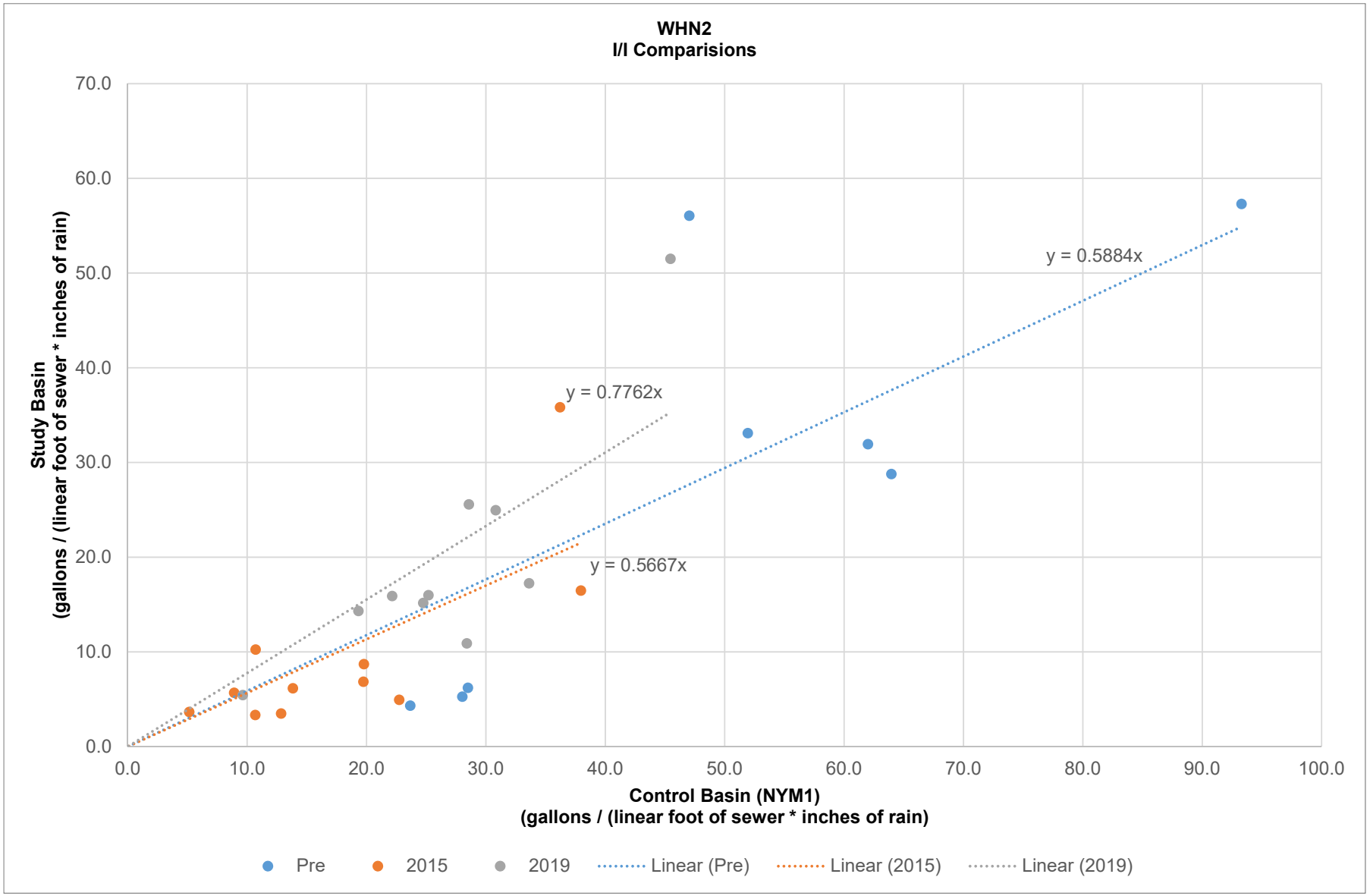

NHD6
I/I Comparisions
Study Basin
(gallons / (linear foot of sewer * inches of rain)
Control Basin (NYM1)
(gallons / (linear foot of sewer * inches of rain)
y = 0.4649x
y = 0.4854x
y = 0.6134x
0.0
5.0
10.0
15.0
20.0
25.0
30.0
35.0
40.0
45.0
50.0
0.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
100.0
Pre
2015
2019
Linear (Pre)
Linear (2015)
Linear (2019)

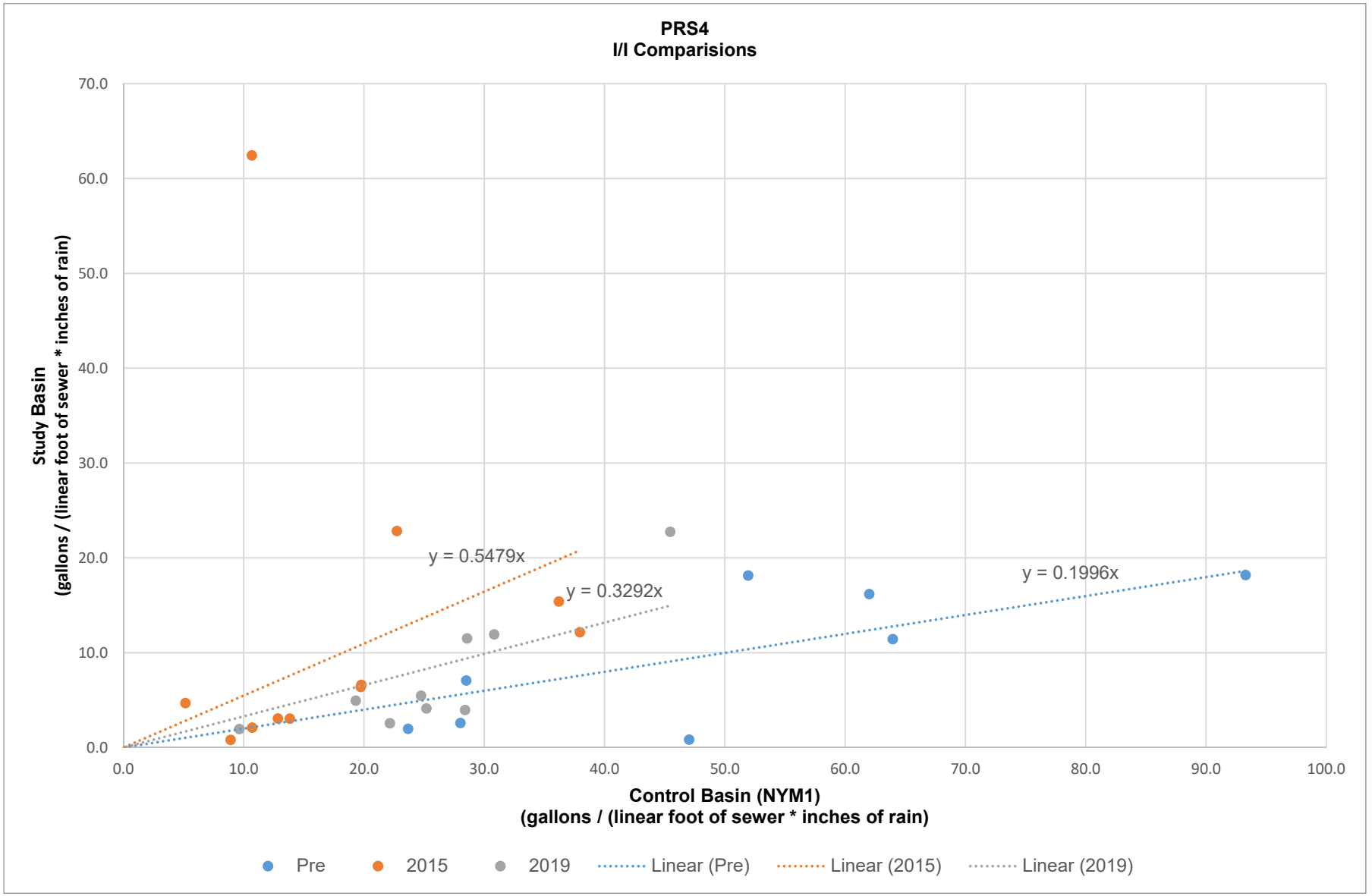

NHD9
I/I Comparisions
Study Basin
(gallons / (linear foot of sewer * inches of rain)
Control Basin (NYM1)
(gallons / (linear foot of sewer * inches of rain)
y = 0.4328x
y = 0.2192x
y = 0.422x
0.0
5.0
10.0
15.0
20.0
25.0
30.0
0.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
100.0
Pre
2015
2019
Linear (Pre)
Linear (2015)
Linear (2019)

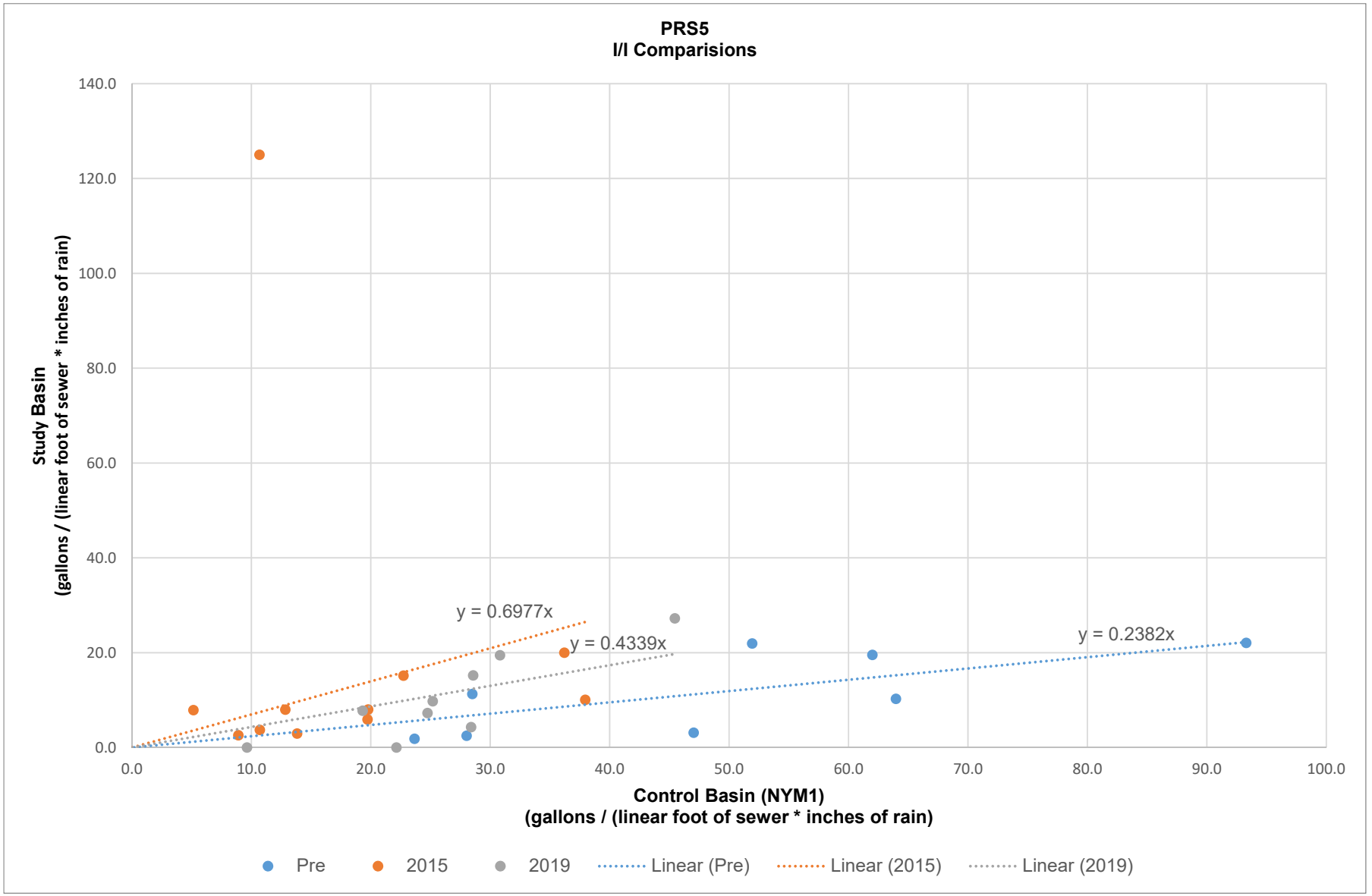

NHD18
I/I Comparisions
Study Basin
(gallons / (linear foot of sewer * inches of rain)
Control Basin (NYM1)
(gallons / (linear foot of sewer * inches of rain)
y = 0.3849x
y = 0.3637x
y = 0.1899x
0.0
2.0
4.0
6.0
8.0
10.0
12.0
14.0
16.0
18.0
20.0
0.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
100.0
Pre
2015
2019
Linear (Pre)
Linear (2015)
Linear (2019)

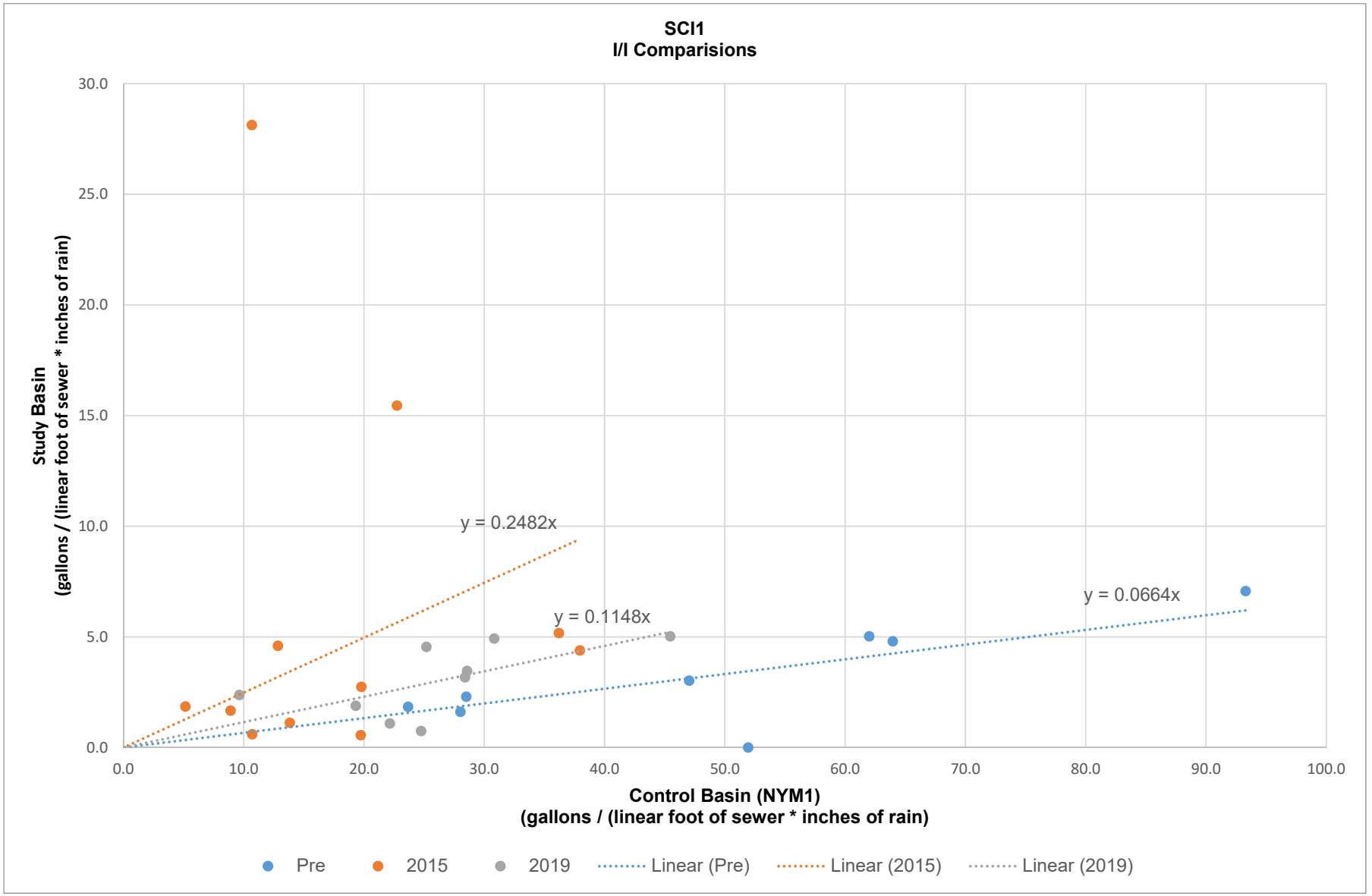

NHD20
I/I Comparisions
Study Basin
(gallons / (linear foot of sewer * inches of rain)
Control Basin (NYM1)
(gallons / (linear foot of sewer * inches of rain)
y = 0.3667x
y = 0.4708x
y = 0.5682x
0.0
5.0
10.0
15.0
20.0
25.0
30.0
35.0
40.0
0.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
100.0
Pre
2015
2019
Linear (Pre)
Linear (2015)
Linear (2019)

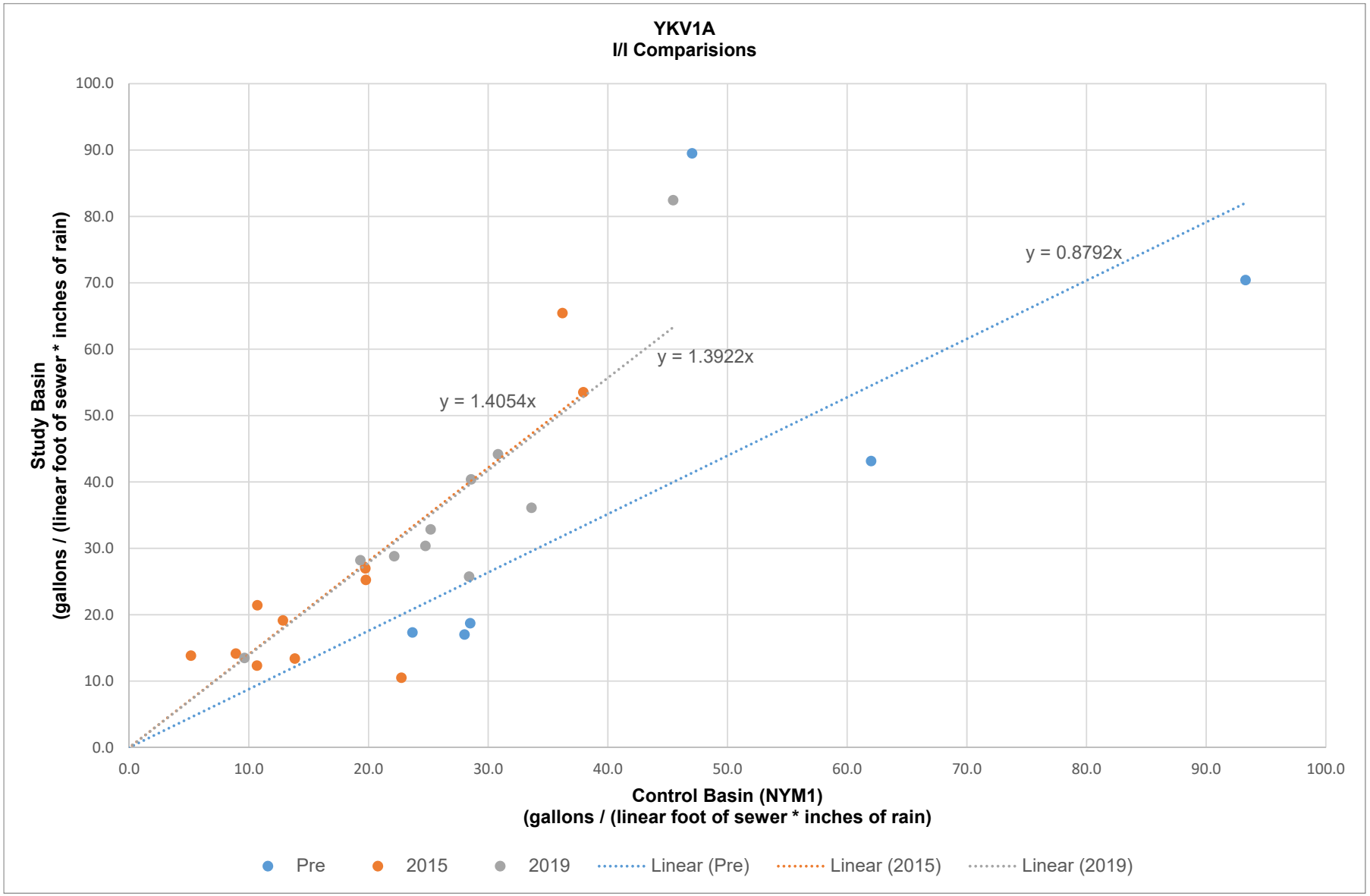

NHD23
I/I Comparisions
Study Basin
(gallons / (linear foot of sewer * inches of rain)
300.0
250.0
200.0
150.0
100.0
50.0
0.0
0.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
100.0
Control Basin (NYM1)
(gallons / (linear foot of sewer * inches of rain)
y = 2.1256x
y = 0.891x
y = 0.3256x
Pre
2015
2019
Linear (Pre)
Linear (2015)
Linear (2019)

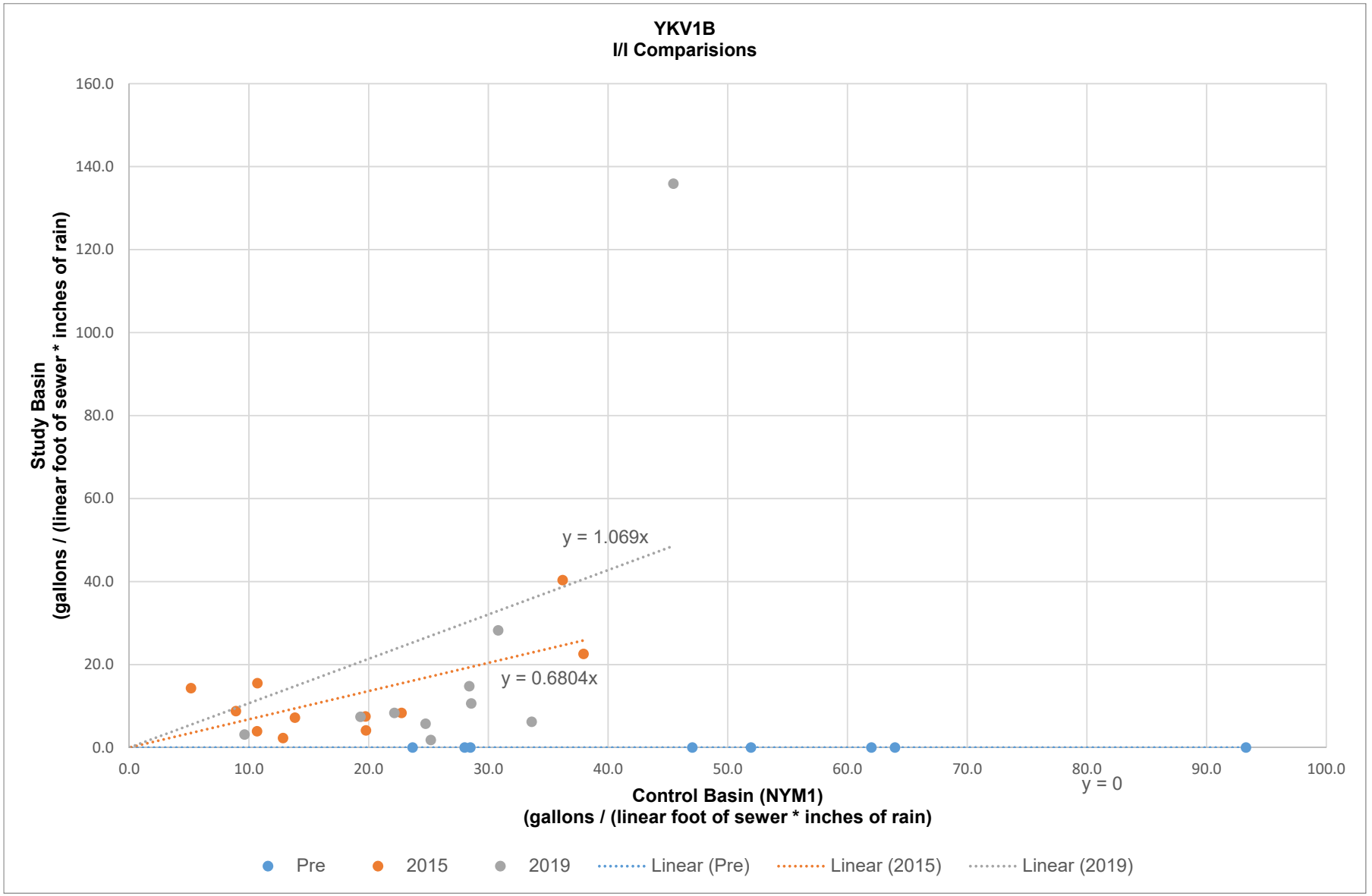

WHN2
I/I Comparisions
Study Basin
(gallons / (linear foot of sewer * inches of rain)
Control Basin (NYM1)
(gallons / (linear foot of sewer * inches of rain)
y = 0.5884x
y = 0.7762x
y = 0.5667x
0.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
100.0
Pre
2015
2019
Linear (Pre)
Linear (2015)
Linear (2019)

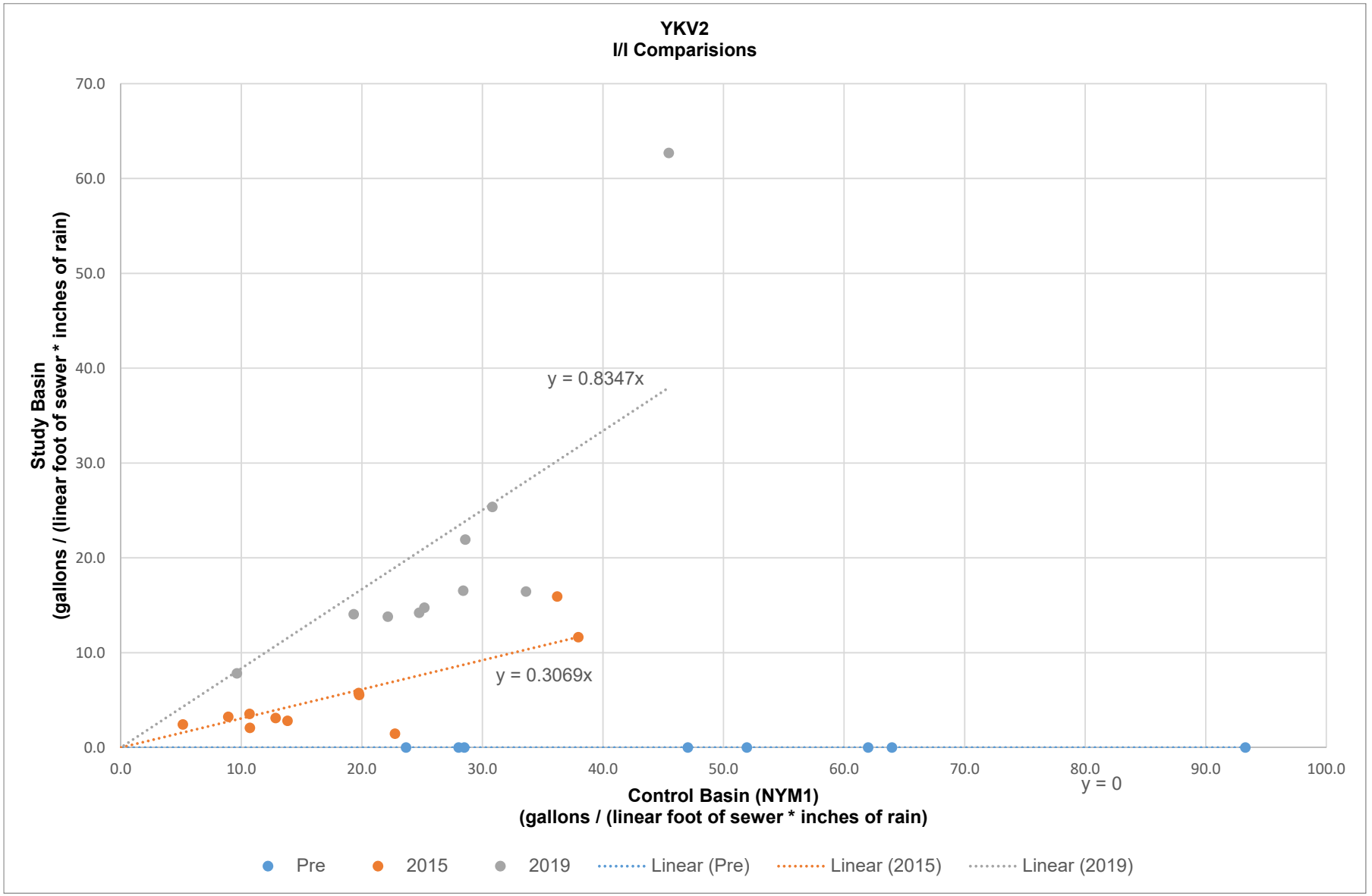

PRS4
I/I Comparisions
Study Basin
(gallons / (linear foot of sewer * inches of rain)
Control Basin (NYM1)
(gallons / (linear foot of sewer * inches of rain)
y = 0.5479x
y = 0.3292x
y = 0.1996x
Pre
2015
2019
Linear (Pre)
Linear (2015)
Linear (2019)


PRS5
I/I Comparisions
Study Basin
(gallons / (linear foot of sewer * inches of rain)
140.0
120.0
100.0
80.0
60.0
40.0
20.0
0.0
0.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
100.0
Control Basin (NYM1)
(gallons / (linear foot of sewer * inches of rain)
y = 0.6977x
y = 0.4339x
y = 0.2382x
Pre
2015
2019
Linear (Pre)
Linear (2015)
Linear (2019)


SCI1
I/I Comparisions
Study Basin
(gallons / (linear foot of sewer * inches of rain)
Control Basin (NYM1)
(gallons / (linear foot of sewer * inches of rain)
y = 0.2482x
y = 0.1148x
y = 0.0664x
0.0
5.0
10.0
15.0
20.0
25.0
30.0
0.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
100.0
Pre
2015
2019
Linear (Pre)
Linear (2015)
Linear (2019)


YKV1A
I/I Comparisions
Study Basin
(gallons / (linear foot of sewer * inches of rain)
Control Basin (NYM1)
(gallons / (linear foot of sewer * inches of rain)
y = 0.8792x
y = 1.3922x
y = 1.4054x
0.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
100.0
Pre
2015
2019
Linear (Pre)
Linear (2015)
Linear (2019)


YKV1B
I/I Comparisions
Study Basin
(gallons / (linear foot of sewer * inches of rain)
160.0
140.0
120.0
100.0
80.0
60.0
40.0
20.0
0.0
0.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
100.0
y = 1.069x
y = 0.6804x
y = 0
Control Basin (NYM1)
(gallons / (linear foot of sewer * inches of rain)
Pre
2015
2019
Linear (Pre)
Linear (2015)
Linear (2019)


YKV2
I/I Comparisions
Study Basin
(gallons / (linear foot of sewer * inches of rain)
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
y = 0.8347x
y = 0.3069x
y = 0
0.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
100.0
Control Basin (NYM1)
(gallons / (linear foot of sewer * inches of rain)
Pre
2015
2019
Linear (Pre)
Linear (2015)
Linear (2019)

Appendix E

ADS Oneida County Annual Report, RDII Analysis

Oneida County Annual Report
RDII Analysis
20 April 2020

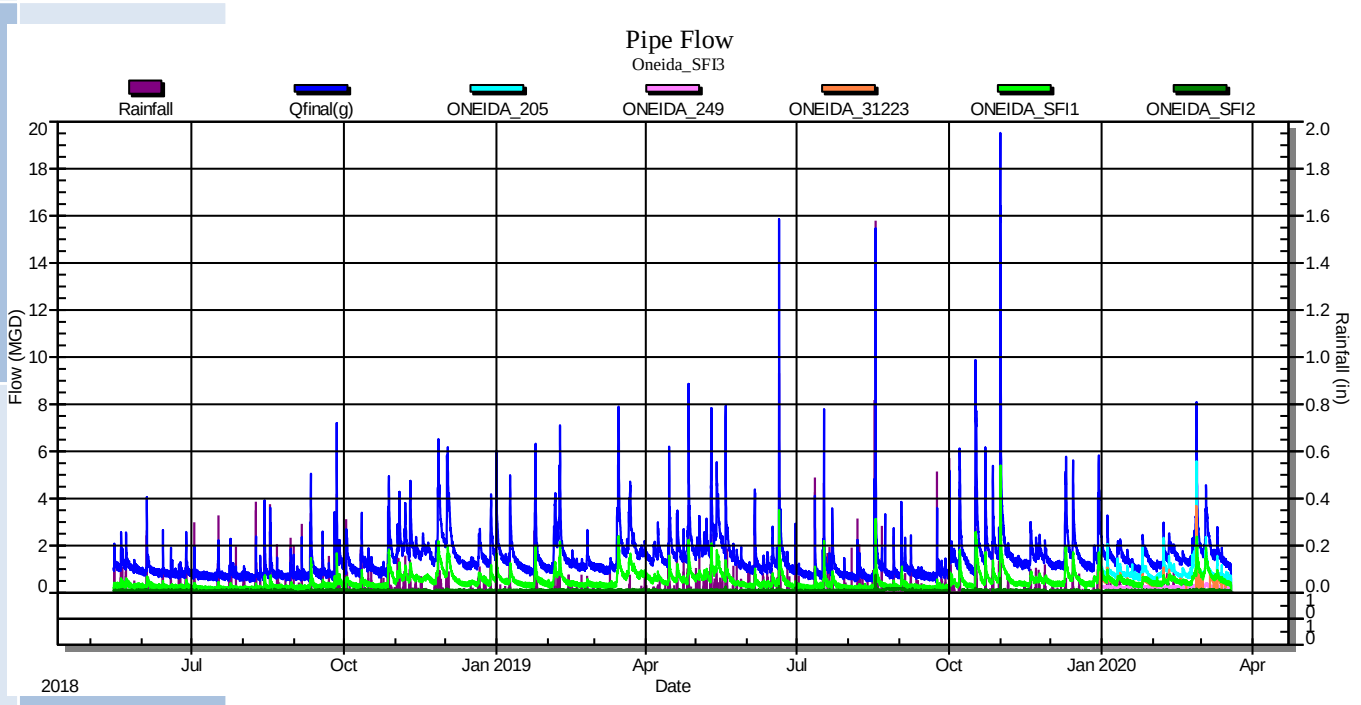


Table of Contents

1.0 – Overview

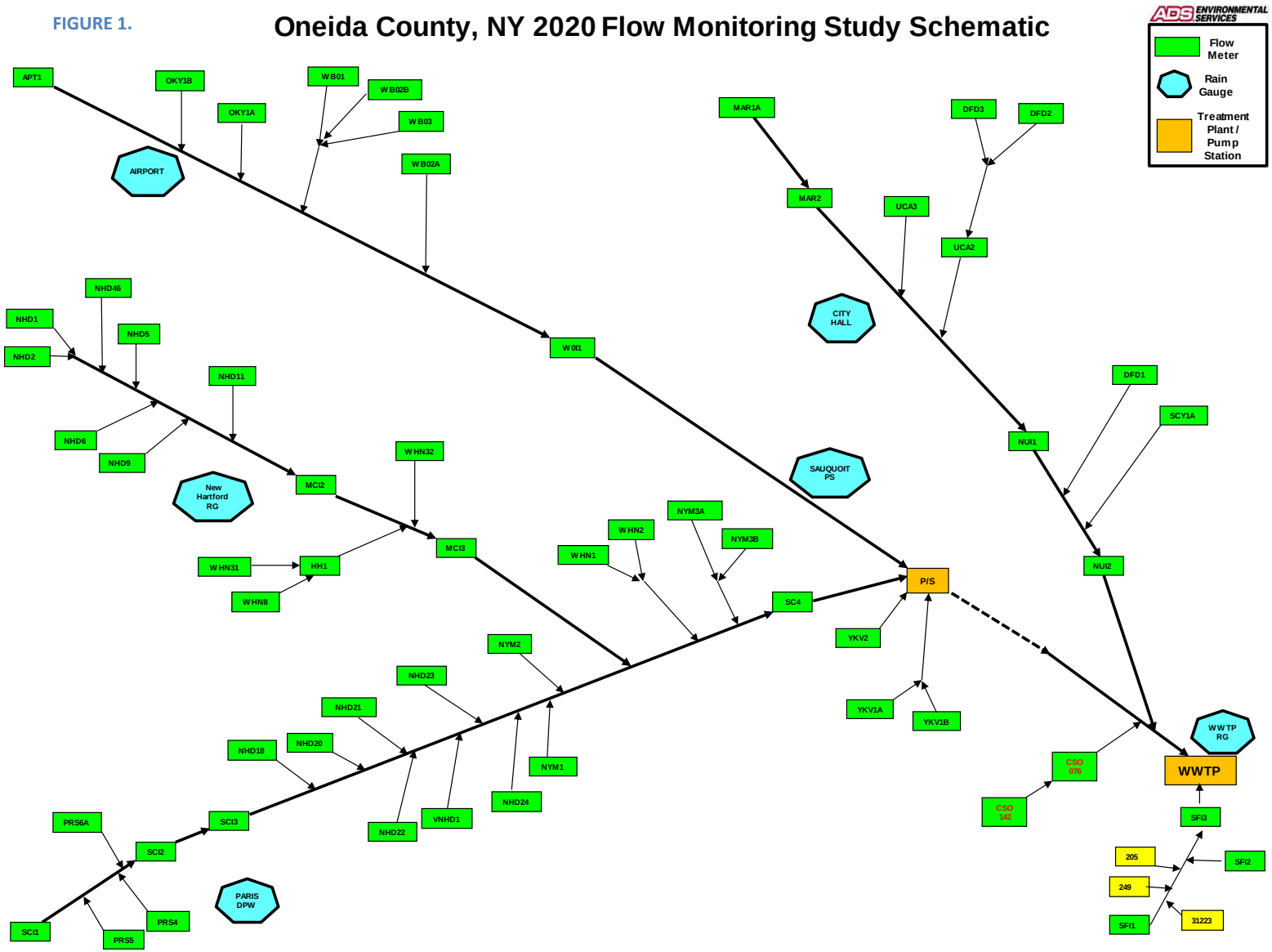
The objectives of this report are to review the historical flow data from the County's metering and rain gauge networks from the summer of 2018 through March of 2020. In specific the report will look at:

1. The Halloween 2019 storm relative to other storms in this period.
2. The additional metering in the Starch Factory Interceptor in 2020
3. Trends in Average Dry Day Flow (ADDF) and Base Infiltration (BI)
4. Trends in Gross RDII Volume and Peak Flows
5. Severity of RDII in individual meter basins.

Figure 1 on the next page is a schematic layout of the metering network including the three temporary meters installed on the Starch Factory Interceptor in January 2020.

FIGURE 1.

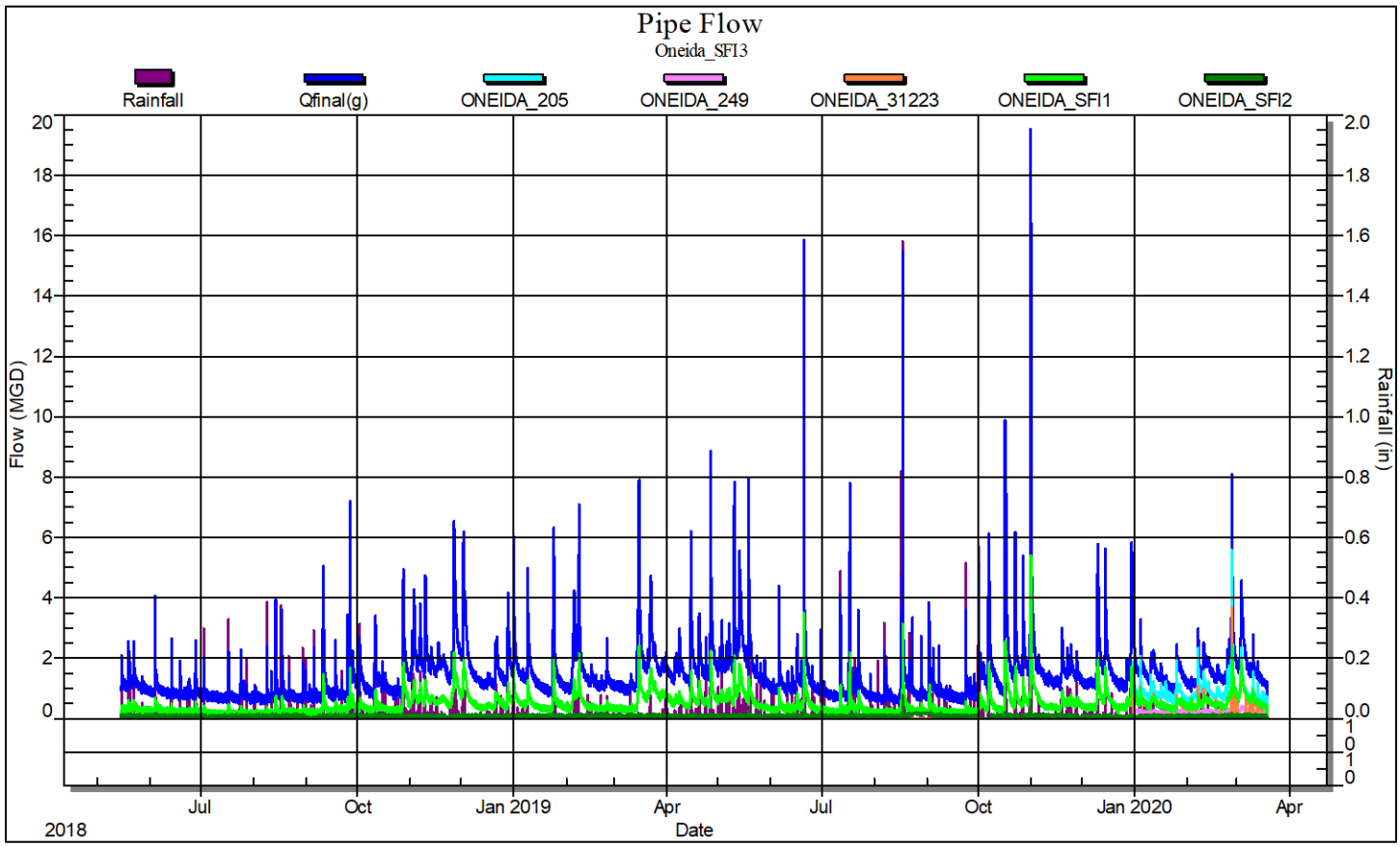
Oneida County, NY 2020 Flow Monitoring Study Schematic



2.0 – Halloween Storm Response System Wide

The Halloween 2019 storm resulted in the greatest peak flows for almost all the meter sites in the network. Figure 2 is the hydrograph of the Starch Factory meters along with the three temporary meters installed to help isolate the source of the large Halloween flow response. The peak hourly flow rate is nearly 20 mgd at Oneida_SFI3. Hydrographs for this period for all sites are included in Appendix

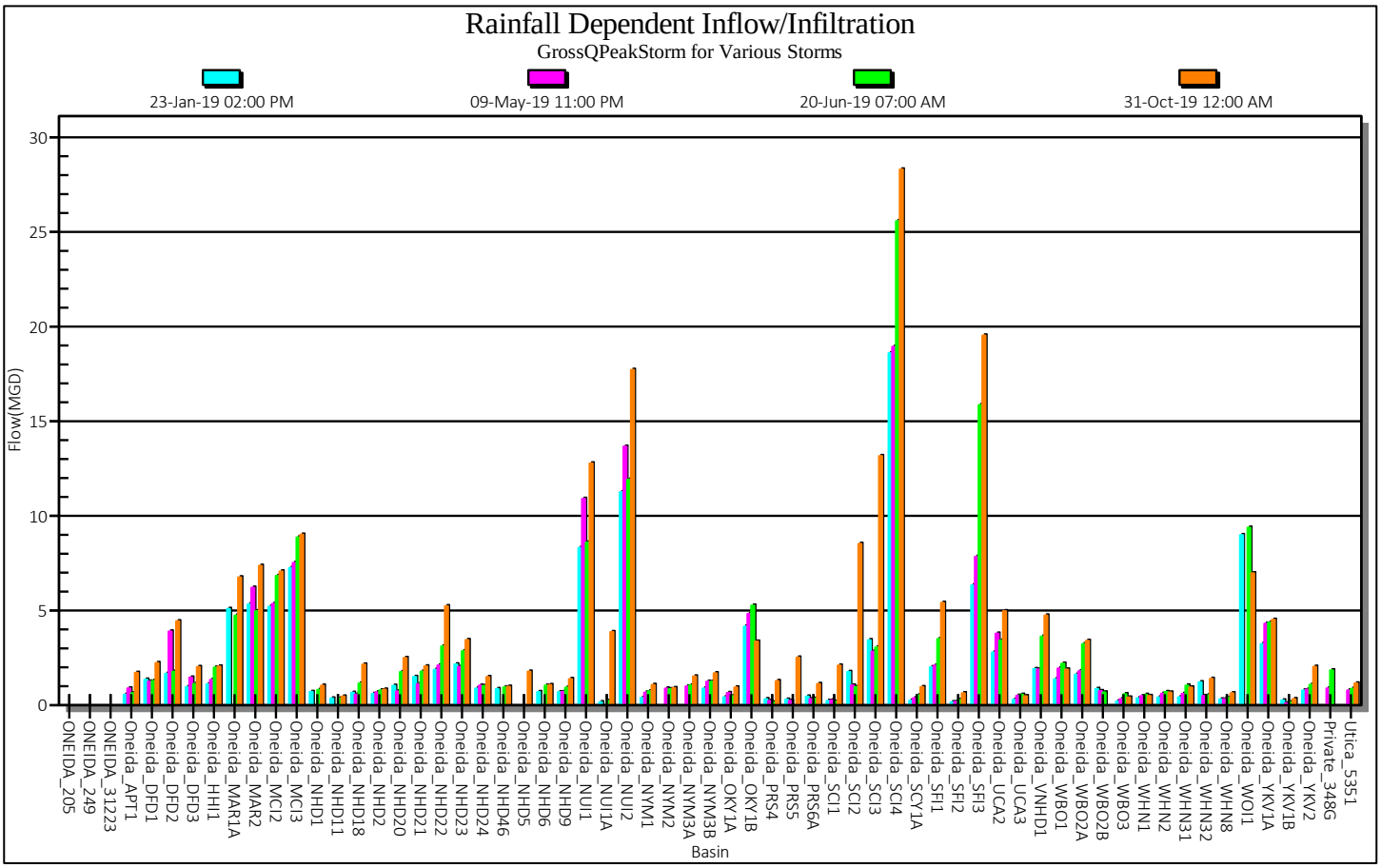
Figure 2 Hydrographs from the Starch Factory meters for the study period.



A.

The other greatest peak flows around the network varied, but in general the greatest peak flows resulted from the storms of 23 June, 9 May, 20 June and 31 October 2019. Figure 3 shows the Peak flows recorded at each meter for these four storms and the Halloween storm appears to have resulted in the greatest flow at most of the sites.

Figure 3 Peak flows recorded at all meters for the 4 largest storms.



Although the total rainfall in 2018 and 2019 was similar, many of the storms in 2019 were more intense. Table 1 shows the maximum return frequency for the 37 storms in this study period. Storms that exceed a one-year return frequency are shaded in yellow. There were many more one-year storms in 2019 and one gauge recorded a 24-year return frequency during the Halloween storm.

Table 1 Maximum Return Frequency for the 37 storms in this study period. Storm exceeding a 1-year return are shaded in yellow.

Storm	RG_Airport	RG_Cityhall	RG_ParisDPW	RG_SauquoitPS	RG_Sherillpark	RG_WWTP
5/19/2018		1.2-mo;24-hr;0.7-in	1.4-mo;6-hr;0.6-in	1.5-mo;6-hr;0.6-in	0.0-mo;15-min;0.0-in	1.0-mo;24-hr;0.6-in
5/22/2018	1.0-mo;6-hr;0.4-in	1.0-mo;6-hr;0.4-in	1.1-mo;6-hr;0.5-in	1.2-mo;6-hr;0.5-in	1.2-mo;6-hr;0.5-in	1.0-mo;6-hr;0.4-in
9/10/2018	1.0-yr;24-hr;2.4-in	4.1-mo;24-hr;1.6-in	5.3-mo;24-hr;1.7-in	10.2-mo;24-hr;2.2-in	7.0-mo;24-hr;1.9-in	4.9-mo;24-hr;1.7-in
9/25/2018	1.9-mo;72-hr;1.5-in	1.8-mo;72-hr;1.5-in	1.1-yr;1-hr;0.8-in	1.8-mo;72-hr;1.5-in	1.9-mo;72-hr;1.5-in	2.0-mo;72-hr;1.7-in
10/11/2018	1.8-mo;24-hr;1.1-in	1.7-mo;24-hr;1.0-in	1.3-mo;1-hr;0.3-in	2.7-mo;2-hr;0.7-in	1.6-mo;1-hr;0.4-in	1.5-mo;24-hr;1.0-in
10/27/2018	3.2-mo;24-hr;1.5-in	3.5-mo;24-hr;1.5-in	3.4-mo;24-hr;1.5-in	4.1-mo;24-hr;1.6-in	3.6-mo;24-hr;1.5-in	2.9-mo;48-hr;1.6-in
11/9/2018	1.6-mo;12-hr;0.9-in	1.4-mo;12-hr;0.7-in	1.4-mo;12-hr;0.8-in	1.5-mo;12-hr;0.8-in	1.5-mo;12-hr;0.8-in	1.5-mo;12-hr;0.8-in
11/26/2018	1.4-mo;48-hr;1.0-in	2.8-mo;48-hr;1.5-in	1.7-mo;48-hr;1.2-in	3.8-mo;48-hr;1.8-in	1.5-mo;48-hr;1.1-in	3.2-mo;48-hr;1.6-in
12/1/2018	1.5-mo;6-hr;0.6-in	1.2-mo;6-hr;0.5-in	1.5-mo;48-hr;1.0-in	1.7-mo;6-hr;0.7-in	1.9-mo;48-hr;1.4-in	1.3-mo;6-hr;0.5-in
12/20/2018	0.7-mo;48-hr;0.5-in	0.6-mo;48-hr;0.4-in	0.8-mo;24-hr;0.5-in	0.7-mo;48-hr;0.5-in	0.7-mo;48-hr;0.5-in	0.7-mo;48-hr;0.5-in
12/28/2018	3.0-mo;15-min;0.4-in	5.4-mo;15-min;0.4-in	0.5-mo;24-hr;0.3-in	5.4-mo;15-min;0.4-in	0.4-mo;24-hr;0.3-in	0.3-mo;12-hr;0.2-in
12/31/2018	1.6-mo;6-hr;0.7-in	1.4-mo;6-hr;0.6-in	1.0-mo;6-hr;0.4-in	1.5-mo;6-hr;0.6-in	1.4-mo;6-hr;0.6-in	1.6-mo;6-hr;0.7-in
1/8/2019	1.5-mo;24-hr;0.9-in	1.4-mo;6-hr;0.6-in	1.9-mo;6-hr;0.8-in	1.6-mo;24-hr;1.0-in	1.7-mo;6-hr;0.7-in	1.4-mo;6-hr;0.6-in
1/23/2019	1.9-mo;24-hr;1.2-in	2.9-mo;48-hr;1.6-in	1.3-mo;24-hr;0.8-in	1.4-mo;12-hr;0.8-in	4.3-mo;24-hr;1.6-in	5.7-mo;24-hr;1.8-in
2/4/2019	1.3-mo;48-hr;0.9-in	1.0-mo;48-hr;0.7-in	1.1-mo;48-hr;0.8-in	1.3-mo;48-hr;0.9-in	1.1-mo;48-hr;0.8-in	1.1-mo;48-hr;0.8-in
3/21/2019	1.2-mo;24-hr;0.8-in	1.1-mo;24-hr;0.7-in	0.0-mo;15-min;0.0-in	1.0-mo;48-hr;0.7-in	1.1-mo;72-hr;0.9-in	0.0-mo;15-min;0.0-in
4/14/2019	1.8-mo;2-hr;0.6-in	1.9-mo;2-hr;0.6-in	1.7-mo;2-hr;0.5-in	2.5-mo;2-hr;0.7-in	1.3-mo;1-hr;0.3-in	2.7-mo;2-hr;0.7-in
4/19/2019	2.3-mo;1-hr;0.5-in	1.9-mo;1-hr;0.4-in	1.3-mo;1-hr;0.3-in	3.5-mo;1-hr;0.5-in	0.0-mo;15-min;0.0-in	1.5-mo;1-hr;0.3-in
4/26/2019	2.2-mo;24-hr;1.3-in	1.9-mo;1-hr;0.4-in	1.8-mo;1-hr;0.4-in	2.5-mo;1-hr;0.5-in	0.1-mo;15-min;0.0-in	2.0-mo;1-hr;0.4-in
5/9/2019	1.5-yr;240-hr;4.4-in	4.5-mo;240-hr;2.8-in	3.4-mo;240-hr;2.4-in	9.6-mo;12-hr;1.9-in	0.4-mo;72-hr;0.3-in	4.9-mo;240-hr;2.9-in
6/5/2019	4.6-mo;1-hr;0.6-in	1.7-mo;6-hr;0.7-in	4.0-mo;1-hr;0.6-in	1.7-mo;1-hr;0.4-in	1.7-mo;6-hr;0.7-in	2.0-mo;6-hr;0.8-in
6/20/2019	4.9-mo;6-hr;1.2-in	1.5-yr;1-hr;0.9-in	2.9-mo;6-hr;1.0-in	1.6-yr;1-hr;0.9-in	3.5-yr;1-hr;1.2-in	5.0-yr;1-hr;1.4-in
7/11/2019	44.2-yr;2-hr;2.7-in	11.5-mo;2-hr;1.2-in	6.0-mo;3-hr;1.1-in	1.9-yr;2-hr;1.4-in	4.2-yr;1-hr;1.3-in	7.4-mo;2-hr;1.0-in
8/16/2019	1.5-mo;1-hr;0.3-in	0.0-mo;15-min;0.0-in	0.0-mo;15-min;0.0-in	4.5-mo;2-hr;0.8-in	2.4-yr;1-hr;1.0-in	15.0-yr;30-min;1.4-in
8/28/2019	4.6-mo;6-hr;1.1-in	1.4-mo;1-hr;0.3-in	1.2-mo;30-min;0.2-in	2.6-mo;6-hr;1.0-in	1.9-mo;6-hr;0.8-in	1.2-mo;6-hr;0.5-in
9/1/2019	2.1-mo;12-hr;1.1-in	1.7-mo;6-hr;0.7-in	2.8-mo;6-hr;1.0-in	2.0-mo;6-hr;0.9-in	2.1-mo;12-hr;1.1-in	2.6-mo;6-hr;1.0-in
10/6/2019	3.3-mo;12-hr;1.3-in	2.8-mo;24-hr;1.4-in	4.4-mo;24-hr;1.6-in	2.8-mo;24-hr;1.4-in	2.8-mo;24-hr;1.4-in	3.6-mo;24-hr;1.5-in
10/16/2019	11.5-mo;24-hr;2.3-in	1.3-yr;24-hr;2.5-in	2.3-yr;24-hr;2.9-in	1.1-yr;24-hr;2.4-in	1.2-yr;24-hr;2.5-in	2.0-yr;24-hr;2.8-in
10/22/2019	0.0-mo;15-min;0.0-in	2.5-mo;6-hr;0.9-in	2.9-mo;6-hr;1.0-in	3.3-mo;6-hr;1.0-in	0.0-mo;15-min;0.0-in	2.4-mo;6-hr;0.9-in
10/26/2019	0.0-mo;15-min;0.0-in	1.1-mo;12-hr;0.6-in	1.4-mo;24-hr;0.8-in	1.5-mo;12-hr;0.8-in	1.4-mo;24-hr;0.9-in	1.4-mo;12-hr;0.7-in
10/31/2019	0.0-mo;15-min;0.0-in	4.1-yr;6-hr;2.3-in	24.2-yr;6-hr;3.5-in	2.7-yr;6-hr;2.1-in	3.5-yr;6-hr;2.2-in	9.8-yr;6-hr;2.9-in
11/18/2019	0.9-mo;12-hr;0.5-in	1.1-mo;12-hr;0.6-in	1.0-mo;12-hr;0.6-in	1.1-mo;12-hr;0.6-in	0.9-mo;12-hr;0.5-in	1.2-mo;6-hr;0.5-in
12/8/2019	0.8-mo;24-hr;0.5-in	0.5-mo;24-hr;0.3-in	0.5-mo;24-hr;0.3-in	0.5-mo;24-hr;0.3-in	0.7-mo;48-hr;0.5-in	0.8-mo;48-hr;0.6-in
12/14/2019	1.3-mo;6-hr;0.6-in	1.1-mo;3-hr;0.4-in	1.2-mo;6-hr;0.5-in	1.3-mo;12-hr;0.7-in	1.3-mo;6-hr;0.5-in	1.2-mo;6-hr;0.5-in
12/29/2019	3.7-mo;24-hr;1.5-in	1.5-mo;24-hr;1.0-in	1.6-mo;24-hr;1.0-in	2.9-mo;24-hr;1.4-in	1.7-mo;24-hr;1.0-in	1.8-mo;24-hr;1.1-in
2/6/2020	0.8-mo;6-hr;0.3-in	1.0-mo;12-hr;0.5-in	1.1-mo;24-hr;0.7-in	1.2-mo;24-hr;0.8-in	0.9-mo;6-hr;0.4-in	0.8-mo;24-hr;0.5-in
2/27/2020	1.3-mo;3-hr;0.5-in	2.3-mo;1-hr;0.5-in	1.6-mo;3-hr;0.6-in	1.4-mo;6-hr;0.6-in	1.5-mo;12-hr;0.8-in	1.7-mo;6-hr;0.7-in

3.0 - Starch Factory Interceptor

The very large 19.5 mgd peak hourly flow at SFI3 during the Halloween storm prompted the County to add three temporary meters in the Starch Factory sewershed in January 2020. The three meters are on side branches as shown in Figure 4. The actual GIS sewer lines are missing for Oneida_249 and Oneida_31223 meters.

Figure 4 Map of the six meters in Starch Factory sewershed.

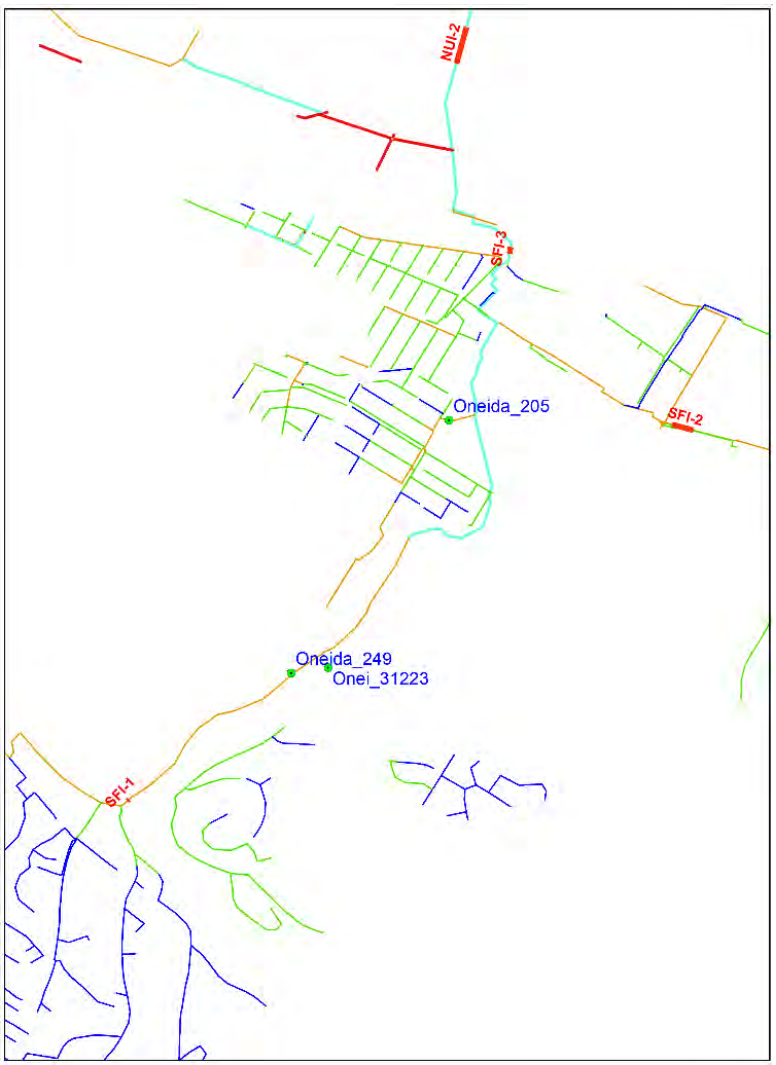


Figure 5 shows the hydrographs from the Starch Factory sewershed starting with the Halloween storm. Basin Oneida_205 appears to be contributing the most RDII.

Figure 5 Hydrographs of the six Starch Factory meters.

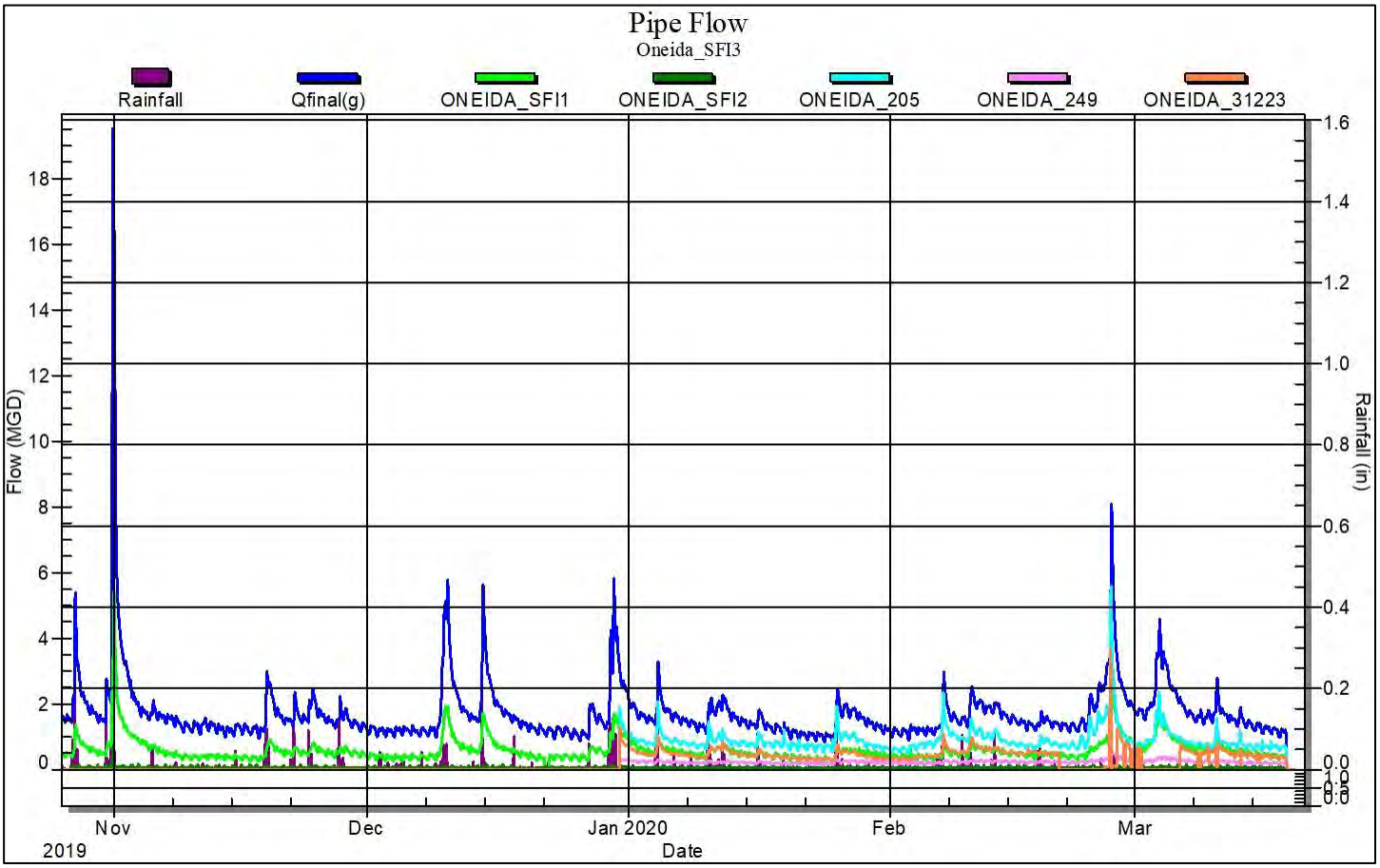


Figure 6 is a view of the six meters in the Starch Factory sewershed since all meters were in place since January 2020.

Figure 6 All six Starch Factory meters since all were in place in January 2020.

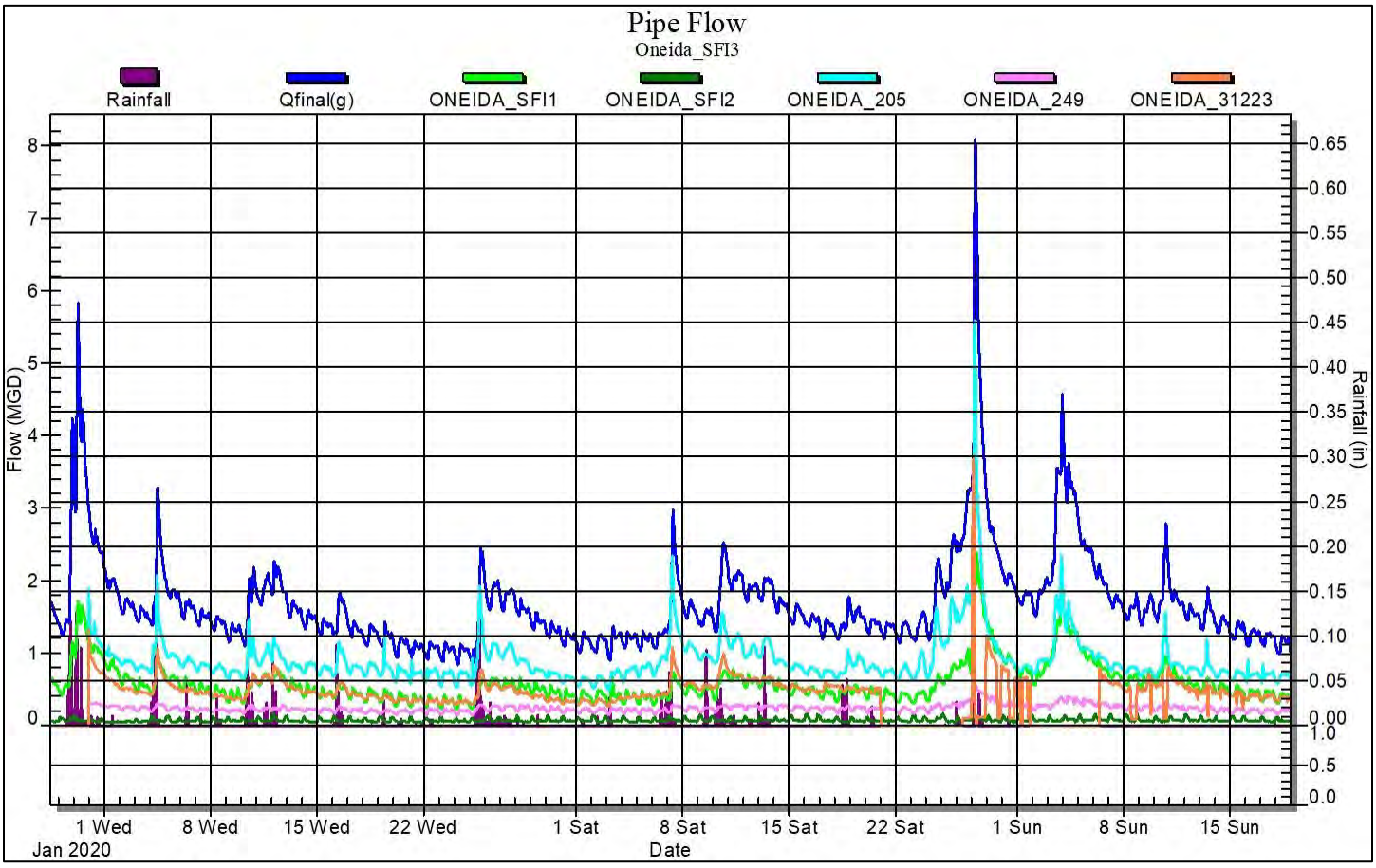
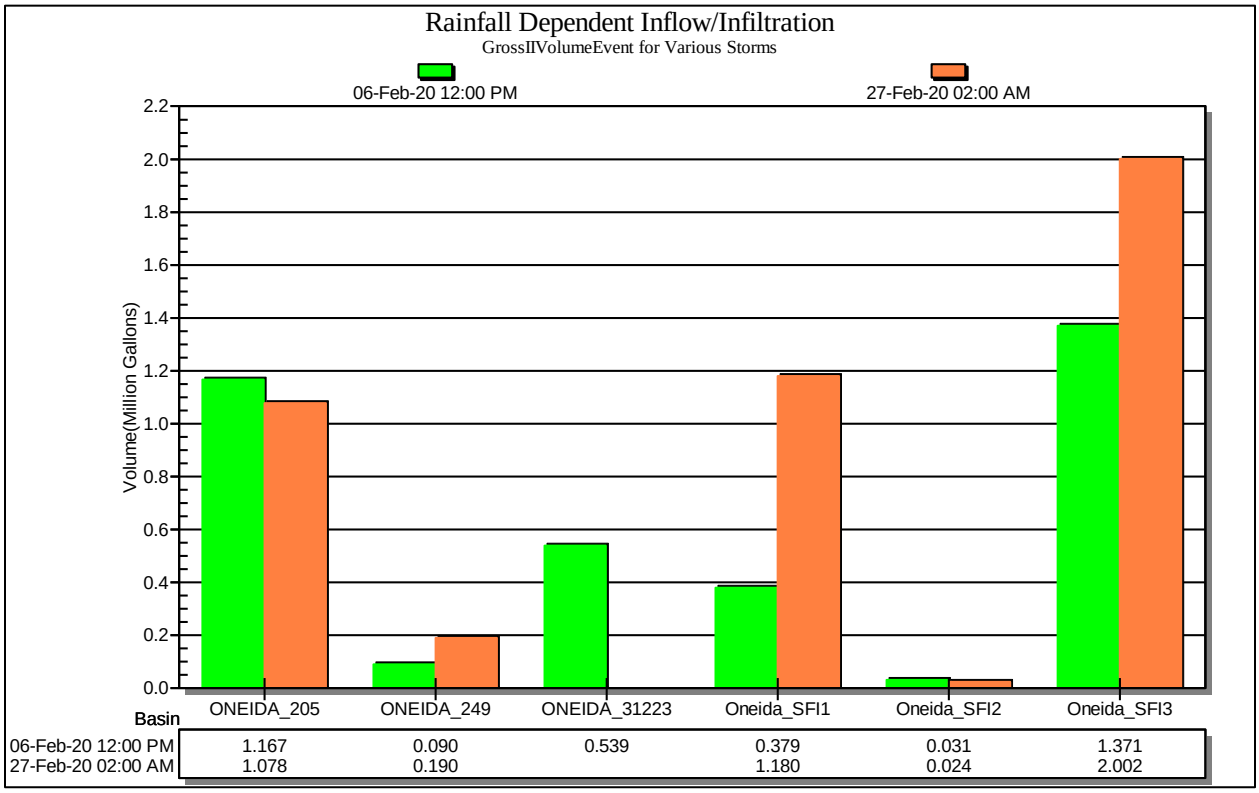


Figure 7 shows the Gross volume of RDII that originated at the six meters. It is recognized that the sum of the 5 upstream meters exceeds the flow at the downstream meter SFI3. At this writing the cause has not been determined but under investigation.

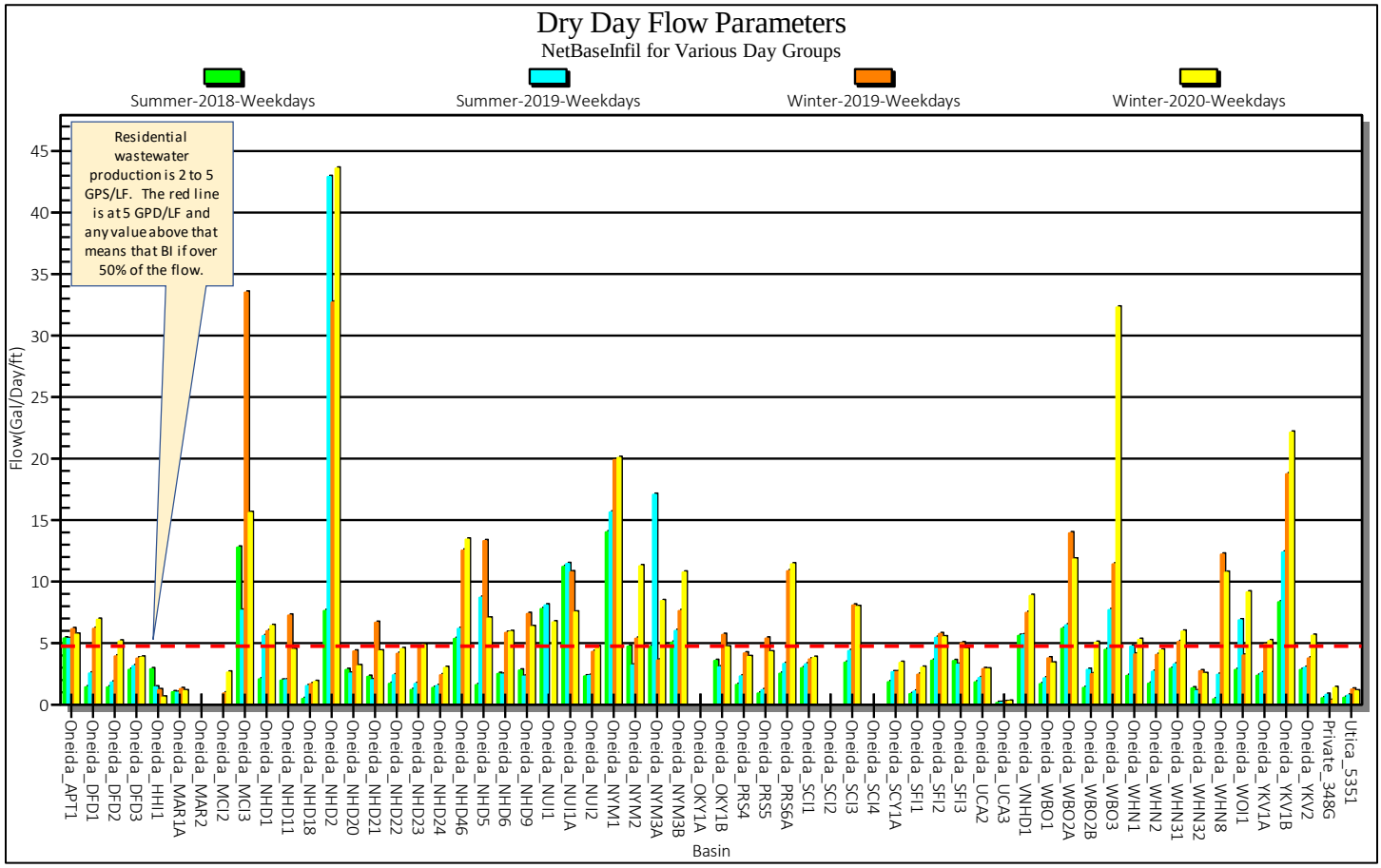
Figure 7 RDII volume for two storms for the 6 Starch Factory meters.



4.0 – ADDF and Base Infiltration System Wide

Figure 8 shows the Base Infiltration (BI) values for the Summers of 2018 and 2019 in green and blue as well as the Winter 2019 and 2020 in orange and yellow. The horizontal red line is at 5 GPD/LF and is the upper limit of wastewater production that we would expect from residential areas. Any BI value above this line indicates that the BI in these meter basins has a BI value of over 50% of the ADDF.

Figure 8 Base Infiltration for Summer and Winter periods. Values above the red line have BI values of greater than 50% of the flow.



5.0 - RDII System Wide

Figure 9 shows the Gross Peak flow rate for the 4 largest storms. This is the peak flow rate recorded by each meter.

Figure 9 Peak flows recorded at each meter for the 4 largest storms during the study period.

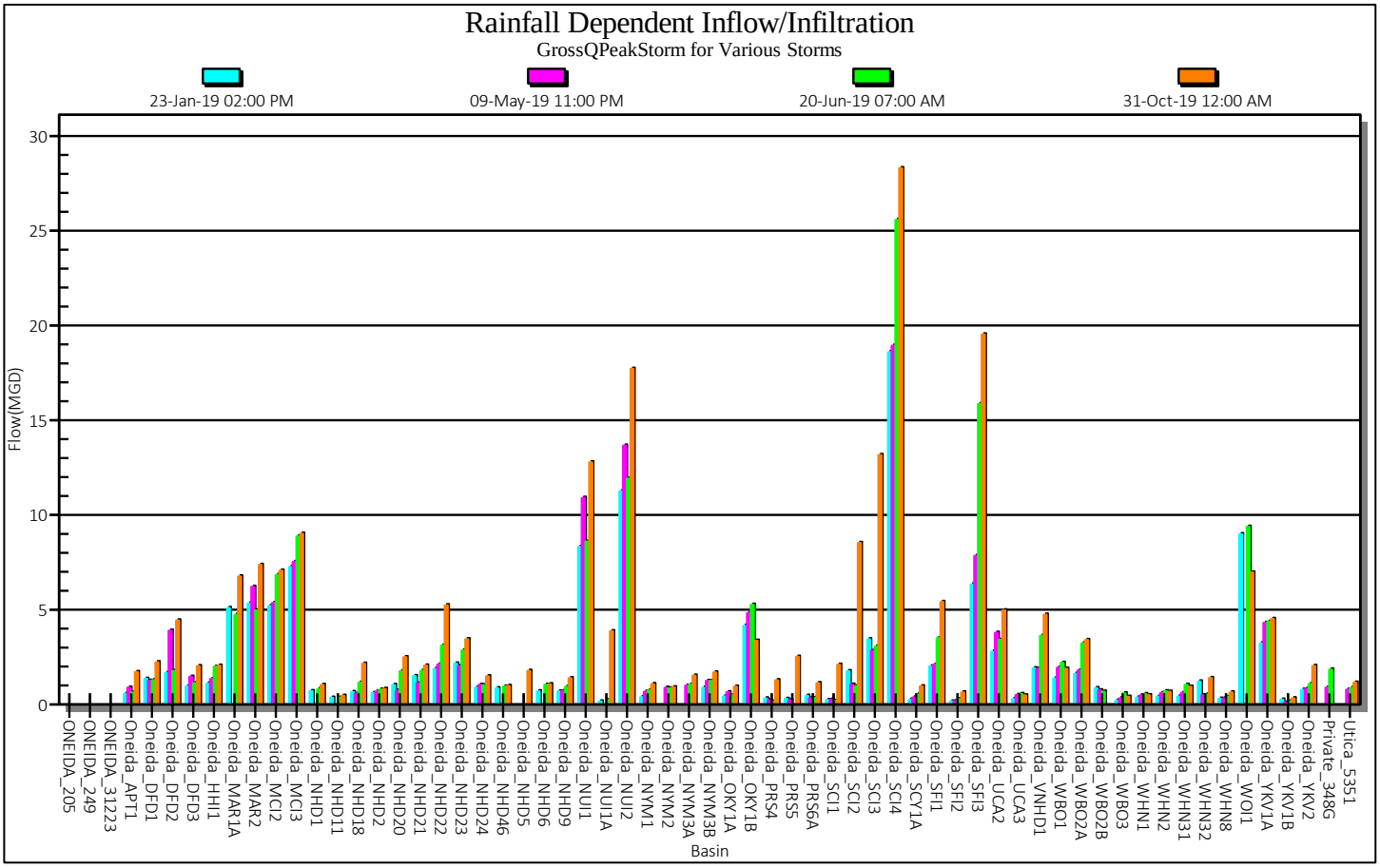


Figure 10 plots the Net RDII generated per linear foot of sewer per inch of rainfall (Gallons/LF/Inch). Although there is not a formal threshold for the definition of 'severe' RDII, a rule of thumb is that the threshold is 15 – 20 gal/LF/inch. Often the lower threshold is applied in the summertime and the upper limit is applied in the wintertime. The horizontal red line is at 15 gal/LF/Inch.

Figure 10 Net RDII expressed in Gallons/LF of sewer/Inch of rainfall. A general rule of thumb is that values greater than 15 are severe.