



City of Chattanooga

Mayor Andy Berke

February 28, 2021

VIA CERTIFIED MAIL

Mr. Richard Elliott
Environmental Engineer
Clean Water Enforcement Branch
US EPA-Region 4
61 Forsyth Street, SW
Atlanta, GA 30303

**Re: *United States of America et. al. v. City of Chattanooga, No. 1:12-cv-0024*
Annual Report No. 8 – January 2020 to December 2020**

Dear Mr. Elliott:

On behalf of the City of Chattanooga, Tennessee (“City”), and in accordance with the Consent Decree entered by the United States District Court for the Eastern District of Tennessee (Southern Division), on April 24, 2013, in the case styled the United States of America et. al. v. City of Chattanooga, No. 1:12-cv-0024 (“Consent Decree”), we are submitting to both the Environmental Protection Agency (“EPA”) and the Tennessee Department of Environment and Conservation (“TDEC”) the eighth annual report required pursuant to paragraph 40 of the Consent Decree. This report is also being submitted in accordance with the letter from Denise Diaz, dated September 16, 2013, establishing the dates for reporting under the Consent Decree.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering such information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Mr. Richard Elliott
February 28, 2021
Page Two

Please let me know if you have any questions regarding our submittal.

Sincerely,

A handwritten signature in black ink, appearing to read 'J. Rose', with a stylized flourish at the end.

Jeff A Rose, P.E.
Director, Waste Resources Division

Enclosure

cc: Karl Fingerhood, Esq., US DOJ
Chief, Environmental Enforcement Section, US DOJ
Chief, Clean Water Enforcement Branch, US EPA Region 4
Paul Schwartz, Esq., US EPA
Sohnia Hong, Office of the Attorney General
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Annual Report No. 8

January 1 - December 31, 2020

Prepared for

**Environmental Protection Agency and
Tennessee Department of Environment and
Conservation**

City of Chattanooga
Waste Resources Division
Consent Decree Program
Case No. 1:12-cv-00245

Prepared by

City of Chattanooga
Waste Resources Division

Submitted by

Jacobs

Jacobs Engineering Group Inc.
Consent Decree Program Manager

Chattanooga, Tennessee
February 28, 2021

Table of Contents

1.0	Introduction	1
	1.1 Purpose	1
	1.2 Requirements	1
2.0	CMOM Programs	2
3.0	SSO Trends Analysis	9

Tables

2-1	CMOM Program Summary	3
3-1	SSOs Attributed to Unavoidable Construction	10
3-2	SSOs Attributed to Mechanical Failure	10
3-3	SSOs Attributed to Other Factors	10

Figures

3-1	SSO Events by Year.....	9
3-2	SSO Events by Cause.....	12
3-3	Quarterly SSO Quantities	13
3-4	Quarterly SSO Durations.....	14
3-5	Quarterly SSO Volumes	15

Acronyms and Abbreviations

AOP	Additional Operational Plan
BOD	Biochemical Oxygen Demand
CAP	Capacity Assurance Program
CD	Consent Decree
CMOM	Capacity, Management, Maintenance and Operations
CSOTF	Combined Sewer Overflow Treatment Facility
DO	Dissolved Oxygen
EPA	Environmental Protection Agency
FOG	Fats, Oils, and Grease
FSE	Food Service Establishment
IJA	Inter-Jurisdictional Agreement
ISS	Interceptor Sewer System
KPI	Key Performance Indicator
MBWWTP	Moccasin Bend Wastewater Treatment Plant
MG	Million Gallons
MH	Manhole
N/A	Not Applicable
No.	Number
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
PCCMP	Post Construction Compliance Monitoring Program
PM	Preventive Maintenance
PS	Pump Station
SORP	Sewer Overflow Response Protocol
SSO	Sanitary Sewer Overflow
TDEC	Tennessee Department of Environment and Conservation
TSS	Total Suspended Solids
WQS	Water Quality Standards

1.0 Introduction

1.1 Purpose

On April 24, 2013, the City of Chattanooga (“City”) entered into a Consent Decree with the United States and the State of Tennessee, in the case styled *United States of America et. al. v. City of Chattanooga, No. 1:12-cv-00245* (“CD”). Pursuant to Section IX of the CD, the City is required to submit annual reports on a yearly basis to the Environmental Protection Agency (“EPA”) and Tennessee Department of Environment and Conservation (“TDEC”). Chattanooga has prepared this report to satisfy the reporting requirements found in Paragraph 40 of the CD, which covers the period from January 1, 2020 through December 31, 2020 (“Reporting Period”). This report is also being submitted in accordance with the letter from Denise Diaz, dated September 16, 2013, establishing the dates for the reporting under the CD.

1.2 Requirements

As detailed in Section IX of the CD, the City is required to report a summary of Capacity, Management, Operations and Management (“CMOM”) Program as implemented or modified pursuant to the CD, including a comparison of actual performance with any performance measures that have been established. Additionally, the 1st five annual reports included a trends analysis of the number, volume, duration, and cause of Chattanooga’s Sanitary Sewer Overflow (“SSO”) events for a 24-month rolling period, updated to reflect the SSO events that occurred during the previous 12-month period. Since the 6th annual report, this trends analysis covers SSO events spanning a 5-year rolling period.

2.0 CMOM Programs

The City has completed the development of its CMOM program pursuant to Paragraph 20 of the CD. As of the end of the last Reporting Period, all nine (9) of the nine CMOM programs have been developed by Chattanooga, submitted to TDEC and EPA, and approved. Table 2-1 on the following page summarizes the status of the CMOM Programs, including updates and key performance indicators (“KPIs”) related to implementation of those that have received EPA approval.

**Table 2-1
CMOM Program Summary**

January 1, 2020 - December 31, 2020						
CMOM Program	CMOM Program Status	CD Reference	CMOM Program KPI	CMOM KPI Purpose	Established Performance Measure	Actual Measured Performance
Sewer Overflow Response Protocol ("SORP")	Approved by EPA and TDEC 5/29/2014	Section VI, Paragraph 20(a)(ii)	Maintain records of all sanitary sewer overflow ("SSO") responses and response times	Reduce response times to respond to SSOs to reduce SSO impacts	Reduce SSO response time to within one hour after notification of event	Average SSO response time for 2020 was ~3 minutes
Sewer Overflow Response Protocol ("SORP")	Approved by EPA and TDEC 5/29/2014	Section VI, Paragraph 20(a)(ii)	Provide notice to TDEC as required by National Pollutant Discharge Elimination ("NPDES") Permit within 24 hours of being made aware of an SSO event	Improve timeliness of SSO reporting to TDEC	Notify TDEC of SSO events within 24 hours after being made aware of event	All 24-hour reports were made to TDEC within the 24-hour time period
Gravity Line Preventive Maintenance Program	Approved by EPA and TDEC 12/3/2014 Updated and reapproved by EPA 9/25/2017	Section VI, Paragraph 20(d)	Annual Chemical Root Control Footage	Reduce the impacts of roots on system performance	Treat 50,000 feet/year	59,048 feet were treated in 2020
Gravity Line Preventive Maintenance Program	Approved by EPA and TDEC 12/3/2014 Revised and reapproved by EPA 9/25/2017	Section VI, Paragraph 20(d)	Footage of Pipeline Hydraulically Cleaned During the Calendar Year	Improve the gravity system performance	1,000,000 feet/year	1,117,949 feet in 2020

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January 1, 2020 - December 31, 2020						
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Gravity Line Preventive Maintenance Program	Approved by EPA and TDEC 12/3/2014 Revised and reapproved by EPA 9/25/2017	Section VI, Paragraph 20(d)	Number of MACP Level 1 Manhole Inspections During the Calendar Year	Complete Level 1 inspections to improve system performance	1,000/year until 2017 and then 2,000/year	1,608 inspections in 2020*
Gravity Line Preventive Maintenance Program	Approved by EPA and TDEC 12/3/2014 Revised and reapproved by EPA 9/25/2017	Section VI, Paragraph 20(d)	Number of MACP Level 2 Manhole Inspections During the Calendar Year	Complete Level 2 inspections to improve system performance	900/year until 2017 and then 500/year	435 inspections in 2020*
Gravity Line Preventive Maintenance Program	Approved by EPA and TDEC 12/3/2014 Revised and reapproved by EPA 9/25/2017	Section VI, Paragraph 20(d)	The Number of SSOs caused by the build-up of debris, sediment, roots, and grease in the collection system	Measure effectiveness of gravity maintenance program	A reduction in maintenance-related SSOs	There were 23 SSOs associated with blockages in 2020 as compared to 51 in 2019; this is a significant reduction in SSOs year over year.

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Gravity Line Preventive Maintenance Program	Approved by EPA and TDEC 12/3/2014 Revised and Revised by EPA 9/25/2017	Section VI, Paragraph 20(d)	Footage of pipelines and frequency that preventive maintenance hydraulic cleaning is performed	Complete gravity line maintenance to improve system performance	Preventive Hydraulic Line Cleaning Frequency Maximum ft. 2 months – 25,000 ft. 4 months – 50,000 ft. 6 months – 50,000 ft. 8 months – 50,000 ft. 12 months- 225,000 ft. 18 months- 250,000 ft. 36 months- 350,000 ft.	Preventive Hydraulic Line Cleaning Frequency Actual ft. 2 months- 0 ft. 4 months- 0 ft. 6 months- 64,777 ft. 8 months- 54,506 ft. 12 months- 1,315,969 ft. 18 months- 1,664,029 ft. 36 months- 2,780,717 ft.
Fats, Oils, and Grease (“FOG”) Management Program	Approved by EPA and TDEC 7/21/2015	Section VI, Paragraph 20(c)	Number of FOG-related SSOs	Measure FOG program effectiveness	Yearly Reduction in FOG-related SSOs	There were 4 SSOs associated with grease blockages; this is a significant reduction in SSOs year over year
Fats, Oils, and Grease (“FOG”) Management Program	Approved by EPA and TDEC 7/21/2015	Section VI, Paragraph 20(c)	Number of annual inspections vs the total number of Food Service Establishments (“FSEs”)	Measure FOG Program Workload	100%	88.9%*

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Fats, Oils, and Grease ("FOG") Management Program	Approved by EPA and TDEC 7/21/2015	Section VI, Paragraph 20(c)	Number of annual Noncompliance Notifications vs the total inspections	Evaluate the FOG Program effectiveness	Below 15%	0.96% of total inspections yielded a non-compliance notification
Fats, Oils, and Grease ("FOG") Management Program	Approved by EPA and TDEC 7/21/2015	Section VI, Paragraph 20(c)	FOG Hot Spots	Reduce the number of FOG hot spot areas	Reduce linear footage by 10%	0% reduction
Fats, Oils, and Grease ("FOG") Management Program	Approved by EPA and TDEC 7/21/2015	Section VI, Paragraph 20(c)	Number of FSEs Added Annually	Measure FOG program effectiveness	Have every existing FSE included in Program so only new ones are added	29 FSEs were added during the reporting period
Fats, Oils, and Grease ("FOG") Management Program	Approved by EPA and TDEC 7/21/2015	Section VI, Paragraph 20(c)	Annual FOG Management Program Update Completed on Time	Improve FOG program effectiveness	Complete Annually	100%
Fats, Oils, and Grease ("FOG") Management Program	Approved by EPA and TDEC 7/21/2015	Section VI, Paragraph 20(c)	Number of Pretreatment Program Employees Trained on FOG Management Program	Improve employee program knowledge through training	100%	100%

**Table 2-1
CMOM Program Summary**

January 1, 2020 - December 31, 2020						
CMOM Program	CMOM Program Status	CD Reference	CMOM Program KPI	CMOM KPI Purpose	Established Performance Measure	Actual Measured Performance
Pump Station Operations Program	Approved by EPA and TDEC 10/22/2015 Revised and reapproved by EPA 9/25/2017	Section VI, Paragraph 20(e)	Pump Station ("PS") Operational Checks	Improve pump station performance	95% adherence to PS/CSOTF visit schedule	99% completed on time
Pump Station Preventive Maintenance Program	Approved by EPA and TDEC 3/17/2015 Revised and reapproved by EPA 9/25/2017	Section VI, Paragraph 20(f)	Preventive Maintenance ("PM") Completion Schedule	Measure PM program effectiveness	95% adherence to PM schedule	81.8% completed on time*
Pump Station Preventive Maintenance Program	Approved by EPA and TDEC 3/17/2015 Revised and reapproved by EPA 9/25/2017	Section VI, Paragraph 20(f)	Number of Preventable Work Orders	Measure work order program effectiveness	Less than 5 preventable work orders per month	Total of 20 and average of 1.67 preventable work orders per month, as compared to 1.75 per month in 2020
Pump Station Preventive Maintenance Program	Approved by EPA and TDEC 3/17/2015 Revised and reapproved by EPA 9/25/2017	Section VI, Paragraph 20(f)	Track Work Orders Found Via PM Activities	Evaluate effectiveness of the PM program	Track the number of CMs generated as a result of a PM	13.7% for 2020 overall (168 CMs and 1226 PMs)
Pump Station Preventive Maintenance Program	Approved by EPA and TDEC 3/17/2015 Revised and reapproved by EPA 9/25/2017	Section VI, Paragraph 20(f)	Track the Age of Work Orders	Improve work order process	No work orders older than 6 months	Average of 42.6 work orders older than 6 months in 2020 (3% of total work orders)

**Table 2-1
CMOM Program Summary**

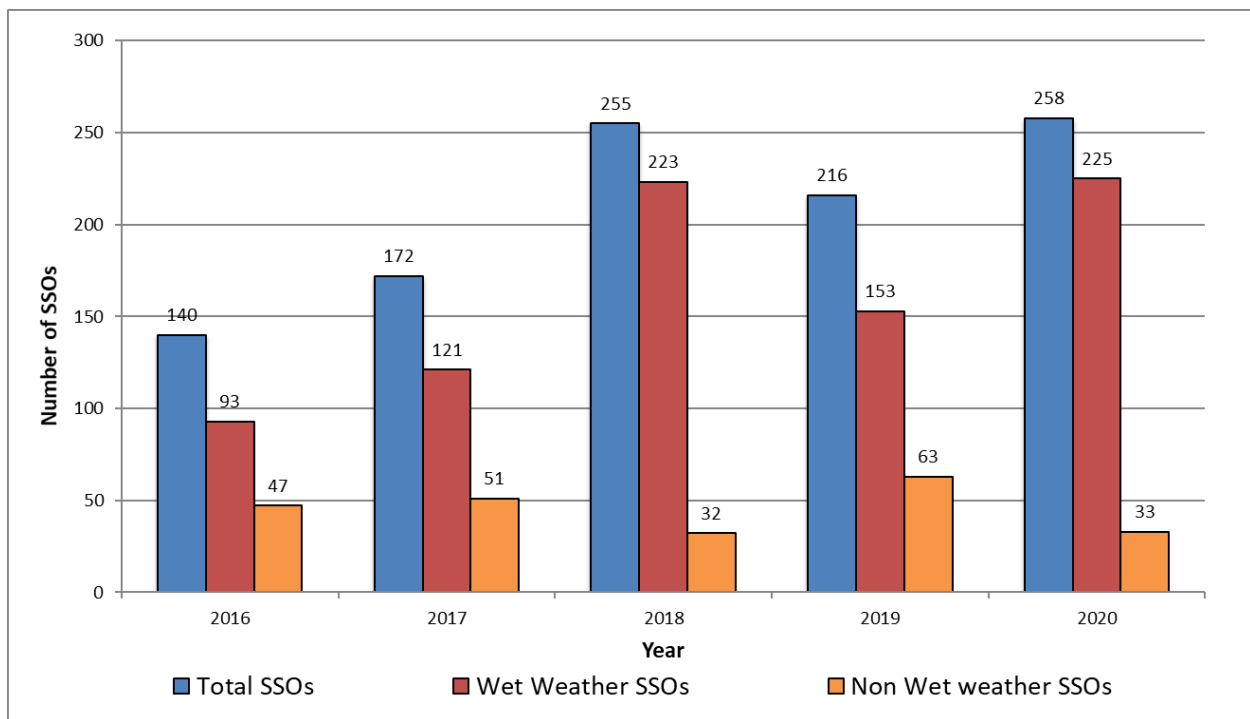
January 1, 2020 - December 31, 2020						
CMOM Program	CMOM Program Status	CD Reference	CMOM Program KPI	CMOM KPI Purpose	Established Performance Measure	Actual Measured Performance
Pump Station Preventive Maintenance Program	Approved by EPA and TDEC 3/17/2015 Revised and reapproved by EPA 9/25/2017	Section VI, Paragraph 20(f)	Percentage of Emergency Work Orders	Track the reliability of the City assets	Less than 10% of the work orders are emergencies	Emergency work orders were 0% of total work orders written
Pump Station Preventive Maintenance Program	Approved by EPA and TDEC 3/17/2015 Revised and reapproved by EPA 9/25/2017	Section VI, Paragraph 20(f)	Work Orders Awaiting Parts	Improve work order program	No Work Orders Older than 30 days Awaiting Parts	10 total requests with an average delivery time of 14 days
Pump Station Preventive Maintenance Program	Approved by EPA and TDEC 3/17/2015 Revised and reapproved by EPA 9/25/2017	Section VI, Paragraph 20(f)	Work Backlog	Measure work order program effectiveness	Not more than 6 weeks of work	81% of work orders written were closed
Pump Station Preventive Maintenance Program	Approved by EPA and TDEC 3/17/2015 Revised and reapproved by EPA 9/25/2017	Section VI, Paragraph 20(f)	Overtime as a Percent of Total Hours Worked	Improve pump station program by measuring overall overtime usage	Less than 5%	12.5% OT
Capacity Assurance Program ("CAP")	Approved by EPA and TDEC 10/13/2016	Section VI, Paragraph 20(h)	Applicable CD components to be identified during program implementation	N/A	N/A	N/A

*Measured performance was not met due to the impact of COVID-19 pandemic.

3.0 SSO Trends Analysis

The City conducted a trends analysis of the cause, duration, and volume of SSO events for the 60-month period spanning January 1, 2016 through December 31, 2020. Rainfall data collected during the same time period was included in the analysis to illustrate the effects of heavy, sustained rainfall on the occurrence, duration, and volume of the recorded SSO events. Figure 3-1 below provides a summary of SSO events by year for the reporting period:

Figure 3-1
SSO Events by Year



As illustrated in Figure 3-1, there was an upward trend in SSO events (+74%), including wet weather (+114%), and a downward trend (-13%) of non-wet weather SSOs, over the five year period. However, there was also a corresponding significant upward trend in rainfall (+66%), as described further in this section below. The majority of SSO events during the reporting period were wet weather related (78%). This downward trend of non-wet weather SSOs is attributed to the continued implementation of the CMOM program.

Based on averaged data from the 13 rain gauges installed throughout Chattanooga, the observed rainfall in 2020 was 37% higher than normal and 2020 was officially reported as the wettest year ever recorded in the Tennessee Valley. The first quarter of 2020 itself was the wettest on record. These extreme wet weather conditions produced two back-to-back storm events in 2020 that each had total rainfall significantly larger than the 2-year 24-hour design storm event rainfall depth of

3.67 inches as defined in the CD. The first event began on February 4, latest until February 7, 2020 and had a rainfall total of 4.81 inches. The second event occurred only 3 days later on February 10, latest until February 13, 2020 and had a rainfall total of 4.16 inches. Combined, these two rainfall events account for 12% of the overall 2020 rainfall total. There were 95 SSOs associated with these two back-to-back events. There were also 33 SSOs associated with two other events that occurred on April 12 and September 23, 2020, both of which exceeded the 2-year 24-hour design storm event in rainfall depth. This results in a total of 128 wet weather SSOs caused by extreme wet weather events, or 57% of the total wet weather SSOs in 2020, as shown in Table 3-1. This is significant because Chattanooga is developing its wastewater infrastructure to account for the 2-year 24-hour design storm event, in accordance with the CD, and each of these events exceed that standard.

Table 3-1

2020 Storm Events Exceeding the Design Storm Event Depth and Associated SSOs

Rainfall Event Start Date	Rainfall Event End Date	Rainfall Event Duration (hrs)	Rainfall Depth (in)	No. of SSO	Total Estimated SSO Volume (gal)
4-Feb-20	7-Feb-20	87	4.81	54	36,699,384
10-Feb-20	13-Feb-20	89	4.16	41	4,675,739
12-Apr-20	13-Apr-20	24	3.81	30	13,198,732
23-Sep-20	26-Sep-20	67	3.76	3	153,261
Total				128	54,727,116

Table 3-2 illustrates how the Eastbank/Westbank SSO events in 2020 were mostly caused by wet-weather conditions exceeding the 2-year 24-hour design storm event standard.

Table 3-2

2020 Eastbank/Westbank Wet-Weather SSO Events

Location	SSO Event Date	Estimated SSO Duration (hrs)	Estimated SSO Volume (gal)	24-hr Rainfall Depth (in) Avg (Min-Max)	Comments
West Bank	2-4-Jan-20	52	24,065,434	2.61 (2.03-3.74)	SSO caused by rainfall locally exceeding the design storm event
West Bank	6-14-Feb-20	209	9,497,513	4.02 (3.29-4.48)	SSO caused by rainfall exceeding the design storm event and a total of 10.5 inches between Feb 6 and 20
East Bank	6-17-Feb-20	278	11,878,506		
East Bank	18-20-Feb-20	39	4,981,027		
East Bank	18-Feb-20	51	4,981,027	1.95 (1.55-2.33)	SSO caused a total of 4.82 inches between Mar 20 and 25
West Bank	23-Mar-20	110	11,119,940		
East Bank	24-26-Mar-20	43	4,966,864	3.81 (3.25-4.91)	SSO caused by rainfall exceeding the design storm event
West Bank	13-Apr-20	51	9,729,330		

West Bank	25-Sep-20	0.75	114,861	3.55 (3.15-4.27)	SSO caused by rainfall locally exceeding the design storm event
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In addition to higher than normal rainfall, the Influent Pump Station (“IPS”) and Influent Relief Pump Station (“IRPS”) at the Moccasin Bend Wastewater Treatment Plant (“MBWWTP”) shut down due to power failure for 3 hours on March 12, 2020, during an ongoing wet weather event. Modeling shows that this SSO would not have occurred in the absence of the power failure. This SSO is shown in Table 3-3 along with 3 other overflows which occurred due to power failure.

Table 3-3

SSOs Attributed to Power Failure

Start Date	Start Time	Location	Source	Estimated Duration (hrs)	Estimated Volume (gal)	SSO Destination	Cause
12-Mar-20	9:45 AM	122 Rowland Gap Rd (West Bank)	West Bank	3.83	2,409,611	Tennessee River	IPS/IRPS Power Failure
28-Apr-20	9:30 AM	929 Riverside Dr (Citico PS)	Manhole	0.08	250	Tennessee River	Power Failure from Power Source
1-May-20	2:45 PM	929 Riverside Dr (Citico PS)	Manhole	0.5	15,000	Tennessee River	Power Failure from Power Source
5-May-20	7:45 AM	4327 Woodland Dr (Summit #1 PS)	Manhole	7.75	69,750	Storm Drain	Power Failure from Power Source

There was also an electrical failure at the East Brainerd PS, causing an SSO. This SSO is shown in Table 3-4.

Table 3-4

SSO Attributed to Electrical Failure

Start Date	Start Time	Location	Source	Estimated Duration (hrs)	Estimated Volume (gal)	SSO Destination	Cause
08-Nov-20	3:45 PM	Frawley Rd	Manhole	0.17	2,000	South Chickamauga Creek	East Brainerd Pump Station - Electrical Failure

Figure 3-2 depicts SSO events by cause per quarter for the reporting period. Wet weather was the leading cause of SSOs, followed by blockages.

Figure 3-3 depicts total SSO events and rainfall accumulation per quarter. Looking at the overall, five-year, and quarterly trends, there has been a 42% increase in the number of SSOs since 2016. This is largely due to wet weather SSOs caused by exceptional rainfall. At the same time, there

has indeed been a 66% increase in rainfall since 2016, which generates the rain derived inflow and infiltration (“I/I”) causing these SSOs. The significant number of SSOs for the first quarter of 2020 (172) was caused by heavy rainfall. This quarter recorded the highest quarterly amount of rainfall on record. These two events in February 2020 that each exceeded the CD design storm and occurred back to back had a combined rainfall equal to 12% of the overall 2020 rainfall and were responsible for 42% of the total wet weather SSOs in 2020. In the City’s assessment, these kinds of events are outliers and not indicative of true system performance.

Figure 3-4 depicts cumulative SSO duration and rainfall accumulation per quarter or the sum of the durations of each SSO event that was recorded per quarter for the reporting period. There is an increasing trend in cumulative SSO duration in the 5-year span (+182%); however, this trend is significantly inflated by the 2 extreme storm events that occurred in February 2020, as well as another event which occurred in February 2019. In addition, SSO duration has been impacted by the implementation of the SORP under the CD. The response team has shortened their response time. Therefore, longer SSO durations were due to the rain events discussed above.

Figure 3-5 depicts cumulative SSO volume and rainfall accumulation per quarter or the sum of the volumes of each SSO event that was recorded per quarter for the reporting period. Looking at the overall, five-year, and quarterly trends, there has been an increase in rainfall by 66% and a corresponding increase in total SSO volume of 102%; however, this trend is significantly inflated by the 2 extreme storm events that occurred in February 2020, as well as another event which occurred in February 2019. Despite this upward quarterly trend, the efforts taken under the CD, including Early Action Capital Improvement Projects and the implementation of the CMOM programs, are having a positive impact on system performance. Although the month of February 2020 had the same amount of rainfall as February 2019, the overflow volume was significantly less in February 2020 (46 million gallons) compared to February 2019 (181 million gallons). This downward trend in SSO volume is generalized throughout the year 2020 with 127 million gallons of overflow observed in 2020 versus 220 million gallons in 2019. The decrease in volume is mostly due to the reduction in Eastbank/Westbank overflow volume. On average since 2013, Eastbank/Westbank is responsible for approximately 85% of the annual overflow volume. A constant downward trend has been observed since 2018 with the combined Eastbank/Westbank overflow volume dropping from 244 million gallons in 2018 to 175 million gallons in 2019, and 79 million gallons in 2020. The completion of the Wet Weather Storage Phases 1-3 at Hamm Rd at the end of 2021 should significantly reduce, if not eliminate, the Eastbank/Westbank overflow for wet weather events up to the 2-year 24-hour design storm.

Figure 3-2
SSO Events by Cause

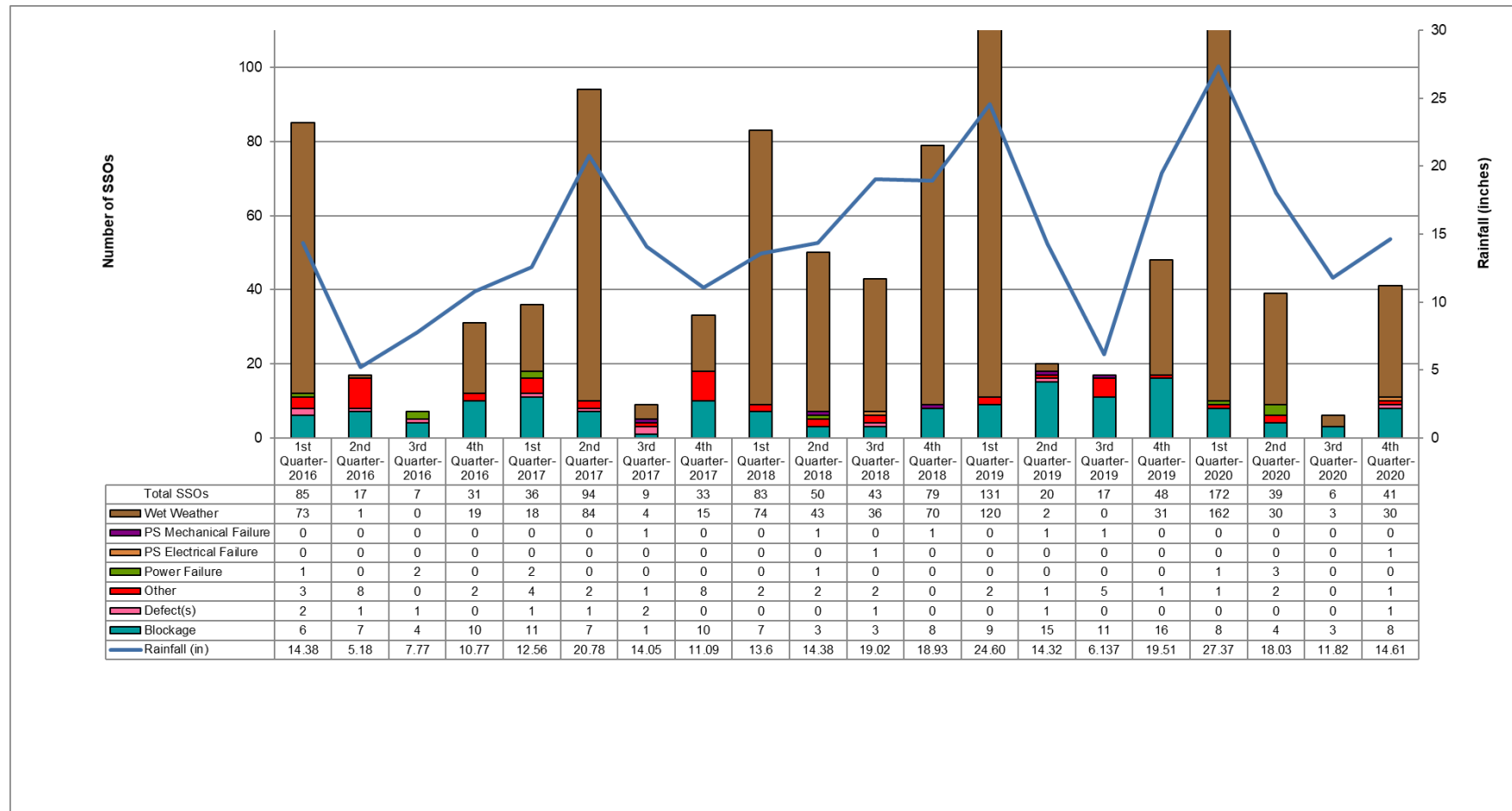


Figure 3-3
Quarterly SSO Quantities

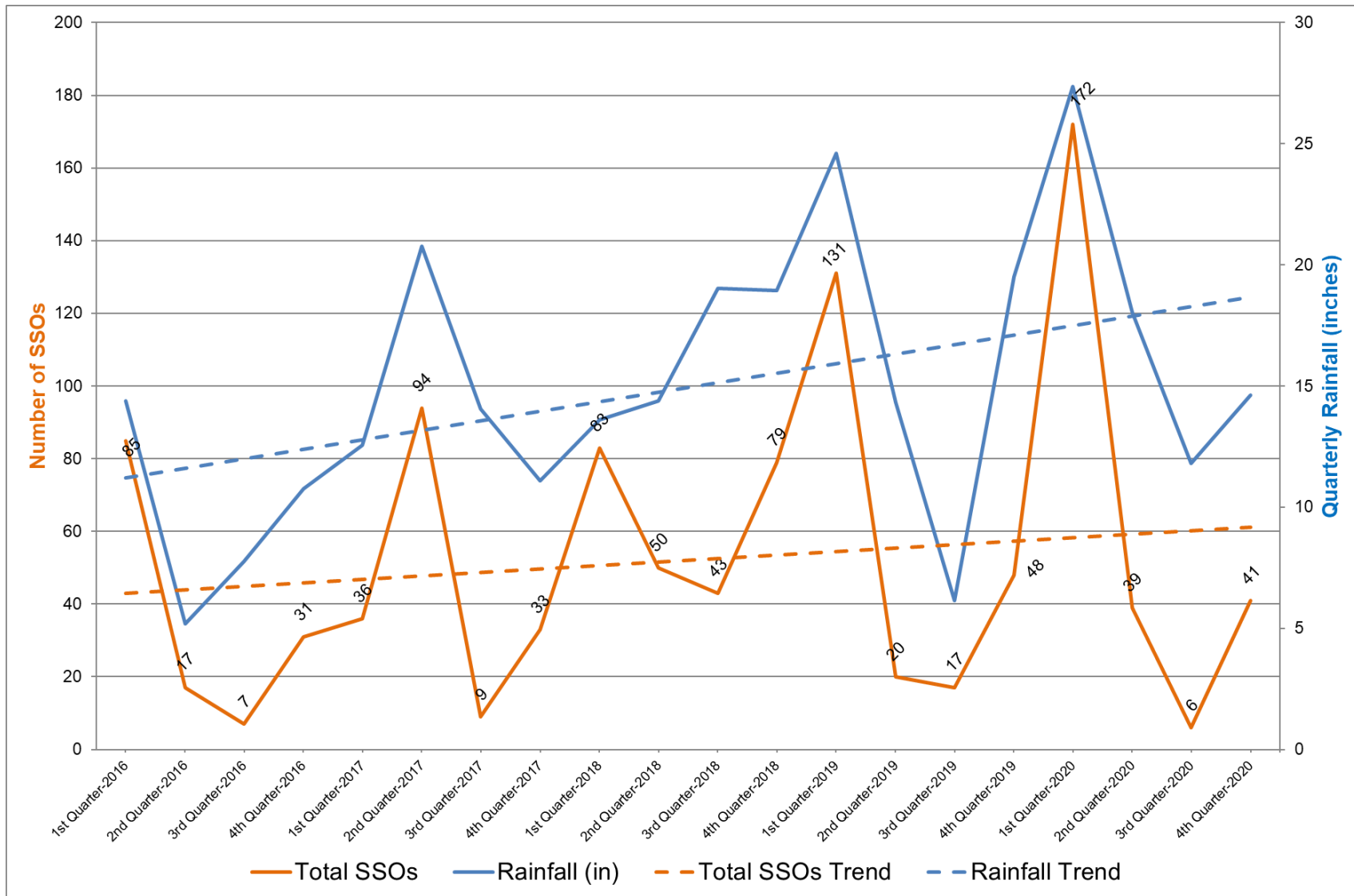


Figure 3-4
Quarterly SSO Durations

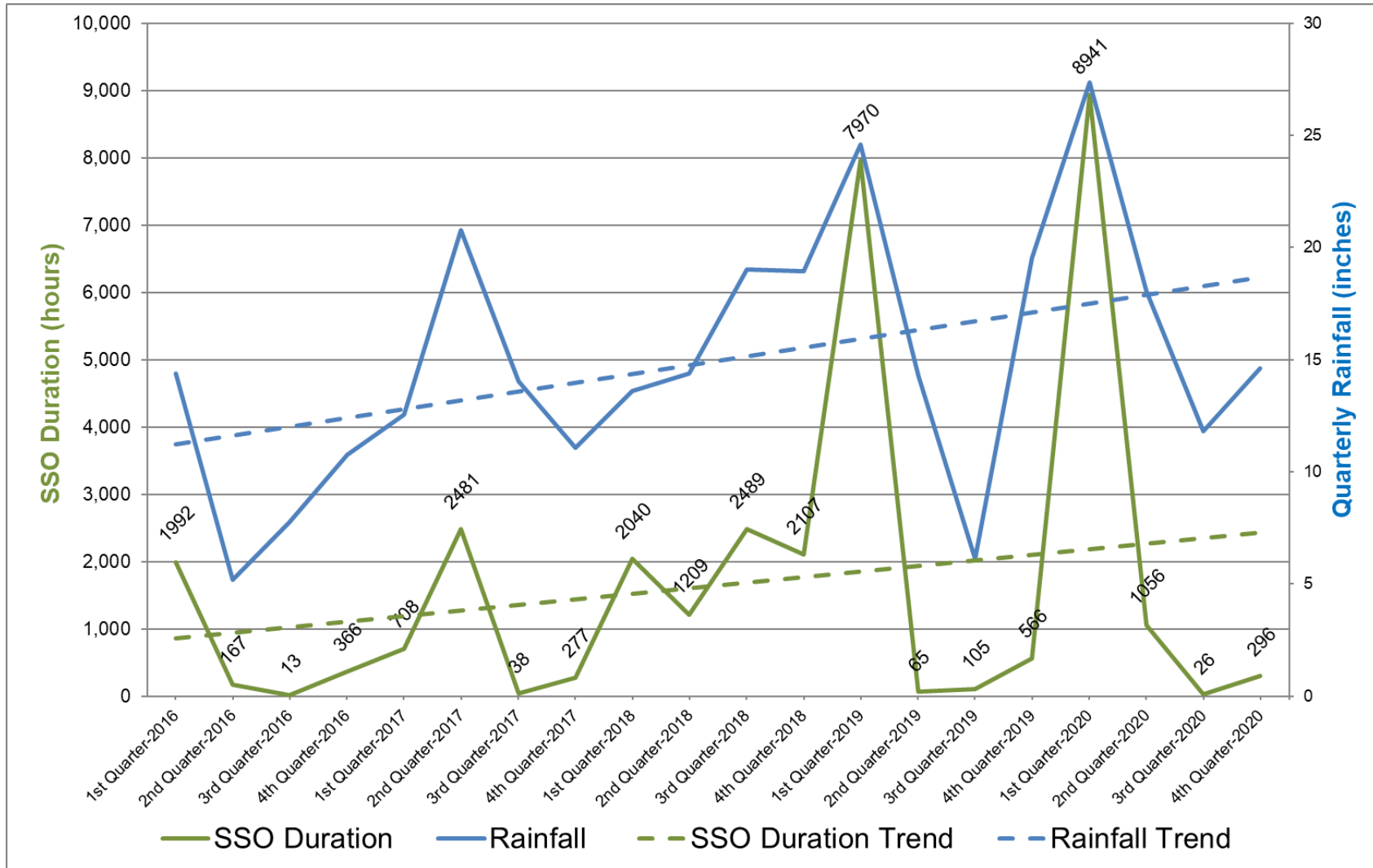


Figure 3-5
Quarterly SSO Volume

