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DEPARTMENT OF ENVIRONMENTAL CONSERVATION
WATERSHED MANAGEMENT DIVISION

City of Rutland
2021 Combined Sewer Overflow Control Project Report

Introduction

The City of Rutland's Wastewater Treatment Facility (WWTF) is a secondary conventional activated sludge treatment plant with phosphorus removal that serves the City's sanitary and combined sewer system. This collection system includes a total of four combined sewer overflow (CSO) outfalls that discharge into the Otter and East Creeks during significant wet weather events. Over the course of 2021 the City of Rutland experienced 25 separate rain events that resulted in a CSO.

This report outlines those events and compares the data to recent years. In addition, it will address the City's compliance with the Minimum Controls, the condition of the combined sewer system, the status of the Long-Term Control Plan (LTCP), and the City's current projects that contribute to the reduction of CSOs.

Required Content

(i) Compliance with Minimum Controls

(1) Proper operation and regular maintenance programs for collection systems and CSO outfalls:

The Wastewater Treatment and Wastewater Collection divisions operate and maintain the City's collection system, which includes all CSO outfalls, pump stations and sewer mains. One hundred percent of the system's catch basins, swirl separators, and sedimentation basins were inspected and cleaned. Problematic areas that are prone to the collection of grease were inspected and cleaned as needed. In addition, routine maintenance occurred with respect to the City's siphons.

(2) Maximum use of the collection system for storage without endangering public health or property, or causing solids deposition problems:

The City currently monitors four combined sewer overflow outfalls that incorporate weirs and/or flap gates. These outfall structures activate to relieve the combined sewer system during wet weather events. The weirs were designed and reconstructed over the years to improve storage capacity while preventing wastewater from backing up into streets and/or residential and commercial buildings.

The City contracted West & Sampson Consulting Engineers to prepare a Hydraulic and Hydrologic (H&H) Model of the City's combined sewer system and a Long-Term Control Plan (LTCP). The LTCP is currently being finalized and incorporates multiple projects that will improve upon the system's storage capacity and ultimately decrease the frequency and volume of CSO events.

The City hired a private contractor to inspect the Moon Brook Trunk Sewer and Mussey Brook Trunk Sewer in 2021. The goals of this inspection were to evaluate the integrity of the conduits and to determine the amount of grit that exists in this portion of the system and if needed, how to remove it and improve capacity. During the 2022 construction season, the City will be cleaning the priority areas that were identified during the inspection. This cleaning will improve upon the performance and increase storage capacity within the combined sewer system.

(3) *Review and modification of pretreatment requirements to assure that CSO impacts are minimized*:

The City monitors the wastewater of industrial/large commercial customers. A High Strength Surcharge is invoiced quarterly to these customers, based upon Total Suspended Solids (TSS) and Ultimate Oxygen Demand (UOD) standards.

There are numerous customers within the City of Rutland and Rutland Town that have pretreatment facilities on site. General Electric submits a Toxic Organic Management Plan to the City on a monthly basis. This report is an analysis of their industrial wastewater treatment facilities at both their Windcrest Road and Columbian Avenue locations.

(4) *Maximization of flow to the treatment plant for treatment consistent with an evaluation of alternative treatment options*:

The City of Rutland has a long-standing history of implementing projects that increase the flow of combined sewage to the wastewater treatment plant in conjunction with combined sewer separation projects. Currently, the wastewater treatment plant has the capacity to treat 29 million gallons per day (MGD). However, the River Street Pump Station, which conveys one hundred percent of the City's sewerage to the plant, has a capacity of 22 MGD.

The Long-Term Control Plan identifies projects that will increase the flow of wastewater to the treatment plant, as well as the plant's treatment capacity.

(5) *Prohibition of CSOs during dry weather:*

There were no dry weather combined sewer overflow events in 2021.

(6) *Control of solid and floatable materials in CSOs:*

The City limits solid and floatable materials within CSO's through the maintenance of the collection system and streets. In 2021, every catch basin in both the combined and sanitary systems was cleaned at least once. The City's downtown had its streets swept weekly. The remaining City streets were swept at least 3 times from May to October.

(7) *Establishment of pollution prevention programs to minimize contaminants in CSOs*:

The City has routinely inserted stormwater education materials in utility bills since 2017. In addition, the City maintains a stormwater web page (www.rutlandcity.org/stormwater) that educates residents on the adverse impacts of stormwater pollution and what they can do to mitigate it.

(8) *Public notification*:

In 2021, the City notified the public of CSOs by way of social media and through the Department of Environmental Conservation's "Combined Sewer Overflows and Untreated Discharges" reporting web page.

(9) *Monitoring*

(A)(i) *Precipitation monitoring system*:

The City operates two tipping bucket rain gauges, one at the WWTF and another at the Streets Department located on Spruce Street. The first records data for later download and the second transmits data for near real-time monitoring through a web-based platform. Both devices comply with the specification in the CSO Rule and the 1272 Order.

(A)(ii) *Flow monitoring system*:

The City has installed ultrasonic level sensors with telemetry devices at all CSO overflow structures. With this equipment the City is able to estimate the duration and magnitude of the overflow. In 2021, the telemetry devices were upgraded.

In addition, the City purchased an additional eight area-velocity meters, fully equipped with telemetry equipment. Most recently, these devices were used to further calibrate the H&H Model. During the 2022 construction season, these units will be relocated to specific areas of concerns, in order to identify unknown point sources of stormwater within the combined sewer system.

(ii) *The condition and operation of the CSS*:

The City is continuously inspecting the condition of the combined sewer system to ensure that it's functioning efficiently and effectively.

The mapping of the system is continuously being evaluated, particularly when preparing for the construction season. Projects typically include the rehabilitation of existing manholes and the installation of new structures that allow personal to better inspect and maintain combined sewer mains. The City has a robotic sewer camera that is capable of inspecting the majority of these mains. Private contractors are hired on an annual basis to inspect the larger truck lines. From these inspections, new construction and rehabilitation projects are developed and executed.

As a result of recent inspection, portions of two of the City's major truck sewers are scheduled for cleaning.

(iii) The frequency, duration and magnitude of precipitation events leading to CSOs:

In 2021 the City experienced 25 rain events that resulted in CSOs from one or more of the four outfall locations. Table 1 summarizes the duration, overall magnitude, and maximum rain fall rates associated with these events. This information was derived from rain data that is collected on five-minute intervals.

On March 26, 2021, the City experienced the first CSO of 2021, a large portion of which was due to a rupture in one of the two East Creek Force Mains. Due to the location of the failure, the pipe was deemed unrepairable. For the next several weeks the City remained vulnerable to CSO events, until the forcemain replacement project was completed in July of 2021.

Five of the seven CSO events that occurred during this time period were associated with storms that had maximum rainfall rates of less than 0.30 inches per hour. By comparison, once the second forcemain was back in operation, only one of the remaining 19 CSO events had a maximum rainfall rate of less than 0.30 inches per hour. By further examining the data, it's not unreasonable to believe that the unanticipated delays associated with the East Creek Forcemain Replacement project resulted in five CSO events that otherwise may not have occurred.

CSO EVENT RAINFALL DATA			
Event #	**Date**	**Total Rainfall (Inches)**	**Rainfall Rate (in/hr)**
1	26-Mar	0.22	1.45
2	29-Apr	0.49	0.23
3	30-Apr	0.79	0.15
4	6-May	0.49	0.19
5	3-Jun	0.11	0.28
6	14-Jun	0.46	0.14
7	21-Jun	1.34	3.92
8	14-Jul	0.15	0.84
9	18-Jul	0.40	0.77
10	19-Jul	0.31	0.51
11	20-Jul	0.83	2.76
12	27-Jul	0.35	1.50
13	29-Jul	0.64	0.42
14	1-Aug	0.36	0.75
15	7-Aug	0.48	3.00
16	19-Aug	0.64	0.28
17	29-Aug	0.33	0.66
18	30-Aug	0.43	0.51
19	8-Sep	0.78	1.87
20	15-Sep	0.64	0.56
21	24-Sep	1.02	1.12
22	31-Oct	1.26	0.41
23	12-Nov	0.62	1.92
24	13-Nov	0.60	0.29
25	11-Dec	0.78	1.12

TABLE 1 – CSO Event Rainfall Data

(iv) *The frequency, duration and magnitude of all CSOs from the system in the past year and comparison to prior years*:

Table 2 outlines the total CSO duration, magnitude, and rainfall associated with each storm event. Table 3 is a summary of this data for the entire year. Table 4 compares the frequency and magnitude of CSOs from 2021 to previous years.

2021 CSO Duration and Magnitude					
Event #	**Date**	**Start**	**Stop**	**CSO Duration**	**CSO Volume**
1	26-Mar	3:24 PM	4:28 PM	1:04	905,871
2	29-Apr	9:20 PM	10:17 PM	0:57	47,433
3	30-Apr	1:54 PM	6:52 PM	4:58	593,614
4	6-May	8:49 PM	4:06 AM	7:17	686,651
5	3-Jun	10:41 PM	11:52 PM	1:11	92,306
6	14-Jun	5:08 AM	7:25 AM	2:17	470,334
7	21-Jun	6:08 PM	9:04 PM	2:56	910,924
8	14-Jul	2:34 PM	2:55 PM	0:21	7,181
9	18-Jul	1:09 AM	2:53 AM	1:44	150,404
10	19-Jul	6:24 AM	8:11 AM	1:47	267,468
11	20-Jul	8:44 PM	10:41 PM	1:57	882,045
12	27-Jul	3:59 PM	5:31 PM	1:32	154,588
13	29-Jul	6:47 PM	8:09 PM	1:22	152,022
14	1-Aug	5:29 PM	9:06 PM	3:37	39,265
15	7-Aug	3:44 PM	5:02 PM	1:18	136,997
16	19-Aug	10:08 AM	11:13 AM	1:05	15,945
17	29-Aug	9:09 AM	9:40 AM	0:31	18,233
18	30-Aug	3:58 PM	4:34 PM	0:36	8,198
19	8-Sep	7:45 PM	10:22 PM	2:37	375,161
20	15-Sep	2:00 PM	6:43 PM	4:43	30,908
21	24-Sep	4:00 AM	9:12 AM	5:12	624,276
22	31-Oct	7:08 AM	6:13 PM	11:05	1,625,381
23	12-Nov	12:35 PM	1:49 PM	1:14	262,706
24	13-Nov	4:48 PM	7:03 PM	2:15	290,333
25	11-Dec	9:09 AM	2:41 PM	5:32	368,889

T***ABLE 2 – 2021 Storm Event CSO Summary***

2021 CSO Summary				
	CSO Duration	**CSO Volume**	**Rainfall Total**	**Rainfall Rate**
TOTAL	21:08	9,117,133	14.52	
AVG	2:45	364,685.32	0.58	1.026
MAX	11:05	1,625,381	1.34	3.920
MIN	0:21	7,181	0.11	0.140

TABLE 3 – 2021 CSO Summary

YEAR	Number of Storms Leading To a CSO	VOLUME (Gallons)	Total Duration (H:M)	Average Volume Per Storm (Gallons)
2018	35	30,519,740	78:23	871,993
2019	34	37,729,781	132:44	1,109,699
2020	22	5,928,241	52:36	269,466
2021	25	9,117,133	69:08	364,385
*2021	20	6,341,420	51:13	317,061

**2021 = estimated values for 2021, if delays did not occur during the East Creek Forcemain Replacement Project*

TABLE 4 – 2021 CSO Comparison to Previous Years

(v) The overall status of the Long-Term Control Plan (LTCP)

The City contracted Weston & Sampson to develop the CSO Long Term Control Plan. The updated 90% submittal of the LTCP was submitted on February 28th, 2021.

(vi) Key CSO control accomplishments, highlighting those that reduced the frequency and magnitude of CSOs; projects under design; and construction that occurred in the previous year.

The Northwest Neighborhood Sewer Separation Project Phase 1A was substantially completed in the fall of 2020, and reached final completion during the spring of 2021. This project was a continuation of a previous sewer separation project that was completed in 2015. This phase included the installation of 5,100 feet of storm sewer pipe, effectively removing stormwater from the combined system located between Grove Street and Lincoln Avenue (east to west) and Seabury Street/Kingsley Avenue and Library/Kendall Avenue (north to south). Excess capacity was incorporated into the design to enable the City to continue separating adjacent neighborhoods in the future.

In 2021, the East Creek Forcemain Replacement project was completed, which comprised of installed approximately 1,500 linear feet of ductile iron forcemain. This force main is one of two conduits that conveys the City's combined sewage from the River Street Pump Station to the Wastewater Treatment Facility.