BUFFALO
SEWER AUTHORITY

March 1, 2022

VIA EMAIL

Mr. Douglas McKenna
Chief, Water Compliance Branch
Division of Enforcement and Compliance Assistance
United States Environmental Protection Agency, Region 2
290 Broadway, 20th Floor
New York, NY 10007-1866
McKenna.Douglas@epa.gov

Mr. Edward Hampston, P.E.
Chief, Compliance Assurance Section
Division of Water
New York State Department of Environmental Conservation
625 Broadway
Albany, NY 12233-3506
Edward.hampston@dec.ny.gov

Ms. Melanie Stein, P.E.
Professional Environmental Engineer 1
New York State Department of Environmental Conservation Region 9
270 Michigan Avenue
Buffalo, NY 14203-2915
melanie.stein@dec.ny.gov

RE: Amended Administrative Order CWA-02-2014-3033
SPDES Permit No. NY 0028410
Semi Annual State Report No. 16 (July 1, 2021- December 31, 2021)

Dear Mr. McKenna, Mr. Hampston, and Ms. Stein:

In accordance with the provisions of the Amended Administrative Order CWA-02-2014-3033, attached please find the Semi-Annual Status Report.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system design 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 the 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 violation.

Sincerely,

Oluwole A. McFoy, P.E.
General Manager

cc via email: Larry Gaugler, USEPA, Gaugler.Larry@epa.gov
Katherine Green, USEPA, Green.Katherine@epa.gov
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BUFFALO
SEWER AUTHORITY

SPDES Permit No. NY0028410

Long Term Control Plan Semi-Annual Status Report
Reporting Period: *July through December 2021*

Amended Administrative Order
CWA-02-2014-3033

(Amends CWA-02-2012-3024)

March 2022

Long Term Control Plan Semi-Annual Status Report

Table of Contents

1. INTRODUCTION

The Buffalo Sewer Authority (Authority) received approval of its Long Term Control Plan (LTCP) from the United States Environmental Protection Agency (USEPA) and New York State Department of Environmental Conservation (NYSDEC) on March 18, 2014. The Authority entered into an Amended Administrative Order on April 16, 2014 (herein after referred to as the AO), with the USEPA. This AO establishes a schedule for implementation of the Authority's LTCP, approved by the USEPA and NYSDEC.

The AO in part requires that the Authority submit written Semi-Annual Status Reports to the USEPA and NYSDEC by September 1st for current year January 1– June 30 reporting period, and March 1st for the previous calendar year July 1 – December 31 reporting period. The AO requires that the following be provided in each Semi-Annual Status Report:

- The project milestones, deadlines and other terms that the Authority is required to meet since the date of the last Semi-Annual Status Report, whether and to what extent the Authority has met those requirements, and the reason for any anticipated delays and/or noncompliance.
- A general description of the work completed during the reporting period and the applicability of the work to meet indicated design criteria, as well as the projection of work to be performed during the next reporting period and any anticipated delays for the upcoming work. Any changes in key personnel must also be noted.
- Enclosure of public meeting (if held) materials including: advertisements, handouts, formal meeting notes, and a summary of the meeting (see Attachment C).
- Copies (to USEPA only) of all monthly monitoring reports or other reports pertaining to combined sewer overflows (CSOs) and bypasses that Authority submitted to the NYSDEC during the reporting period. Please note DMRs are now submitted electronically directly to the USEPA and no dry weather overflows occurred during this period, so this item does not apply during this reporting period.

This report covers July through December 2021 which serves as Semi-Annual Report No. 16.

2. REQUIREMENTS DUE IN REPORTING PERIOD

Attachment A provides the current status of all projects listed in the Administrative Order. Issues with implementing these projects are detailed in Section 4 of this document.

This document serves as the March 1, 2022 semi-annual report.

No Certificates of Acceptance and Occupancy were issued during this reporting period for LTCP related projects.

3. WORK COMPLETED IN CURRENT REPORTING PERIOD AND PROJECTION OF WORK TO BE PERFORMED NEXT REPORTING PERIOD

A general description of the work completed on LTCP projects during the current reporting period and the work projected to be performed during the next reporting period is provided in Attachment A. Items that have been completed have been highlighted orange.

A more detailed description of each project including the location and the goal to be achieved through each project is provided in Attachment B.

4. IMPLEMENTATION ISSUES

The ongoing COVID-19 pandemic has continued to impact Authority operations, as well as those of consultants and contractors working on LTCP projects. The Authority continues to experience decreased revenues due to the pandemic, and the Authority, consultants, and contractors have all experienced significantly reduced staff capacity at times during the reporting period. Nevertheless, the Authority has been, and will continue to, work with internal staff and all necessary outside parties to facilitate the timely completion of LTCP projects.

4.1 Approval of Collection System Model- Model Update Report

Following the October 6, 2021 approval of the Recalibrated Hydraulic Model on October 6, 2021, the Buffalo Sewer Authority has been reevaluating the remaining projects in the Long Term Control Plan for physical and financial feasibility, schedule, environmental justice impacts, and effectiveness in achieving water quality objectives. In reevaluating these projects, potential alternative projects, many of which are proposed to utilize globalized Real Time Control logic whether for in-line storage, off-line storage, or some combination thereof are being considered.

In addition, the Authority is realizing greater reduction in combined sewer overflows due to the installed Real Time Control projects than originally anticipated and is currently exploring globalized control logic to allow for even greater efficiency. In furtherance of this effort, the Authority is deploying sensors to better characterize flow dynamics system-wide. There are currently 58 sensors deployed in the collection system and the Authority is collaborating with the Erie County Division of Sewerage Management to create an expanded rain gauge network. Additionally, the Authority is working toward globally coordinated control to balance flows with underused portions of the system during wet weather events and is working to identify the next Real Time Control Projects to begin design

In reviewing data from these sensors, the issue of backflow especially during seiche events and the impacts of such events upon the Buffalo Sewer Authority's system including reduced capacity have gained prominence. In the case of some outfalls, controlling these

events might provide significant CSO activation reduction and as such this data is being further evaluated and may yield projects that both reduce CSO activations and create greater climate resilience.

4.2 Amherst Quarry Off-line Storage

This project is being re-imagined as a two and possibly three phased project with the first phase being to introduce Real Time Control on Bailey Avenue at Minnesota Avenue and East Amherst Street where flows are diverted from and returned to the Bailey Avenue Trunk Sewer. Engineering Start for this phase is expected in the Next Reporting Period.

The second phase of this project is expected to Start Engineering in late 2022 or early 2023 and consist of the station rehabilitation and logic improvements. A third phase is being contemplated under the system reevaluation referenced in Section 4.1 to divert flows from the SPP 337 sewershed to the Quarry.

4.3 Babcock Pumping Station In-line Storage

On September 21, 2021, the Babcock Pumping Station In-line Storage pumps were put into operation with localized Real-Time Control signifying Substantial Completion. Certificate of Completion is expected to be issued in the Next Reporting Period upon completion of punch list items.

4.4 Smith Street and Eagle Street In-line Storage

On December 31, 2021, the Smith Street and Eagle Street In-line Storage project was put into operation with localized Real-Time Control signifying Substantial Completion. Certificate of Completion is expected to be issued in the Next Reporting Period upon completion of punch list items.

4.5 Broadway at Oak RTC

Engineering of the Broadway at Oak RTC was completed on October 20, 2021. Notice to Proceed is anticipated in the Next Reporting Period. Substantial Completion by March 18, 2024 is anticipated. Please note that this project is in furtherance of the Hamburg Drain Optimizations as well as being an added RTC project.

4.6 Breckenridge at Niagara Street In-Line Storage

This project is proposed to replace the LTCP project "CSOs 010,008/010, 061, 004 Underflow Capacity Upsizing." An Alternatives Analysis of this project is included as Attachment D to this report. CSOs 061 and 008 were determined by the Recalibrated Hydraulic Model to already be in compliance with the goals of the Long-Term Control Plan. Site considerations for the proposed underflow sewer and the future potential for globalized control logic drove the decision making to pivot towards this option over the underflow

sewer. Additional engineering for this project is ongoing with an Engineering Report expected to be available in the Next Reporting Period.

4.7 Gates Circle In-Line Storage

This project is an additional project that was not originally included in the Long-Term Control Plan which is proposed to modify SPP 322 to create a globalized control logic balancing of flows between the Scajaquada Tunnel and Bird Avenue Trunk. An engineering contract for this project is expected to be awarded in the Next Reporting Period.

4.8 Existing RTC Issues

In depth data analysis by Buffalo Sewer and our consultants has demonstrated that some meters currently being used to determine overflow volumes and volumes prevented from overflowing are mis-calibrated. The meter for determining flows from the Smith Street RTC back to the Southern Interceptor was over estimating flows being conveyed. In addition, at both the Hertel at Deer RTC and Smith Street RTC sites, actuator failure was experienced; service was lost at Hertel at Deer on October 13, 2021, and restored on December 15, 2021.

The Smith Street site went into failure mode on July 23, 2021, repairs have been significantly delayed by purchasing and supply chain issues together with the ongoing pandemic, in addition multiple problems at this site have been identified with the latest being failures with the actuators themselves rather than the controllers. It is anticipated that the existing actuator at Smith Street will be repaired within 60 days of this report and potentially replaced with a more reliable system by the end of the next reporting period.

Buffalo Sewer is continuing to explore the root cause of these failures to ensure greater reliability and accuracy in reporting moving forward.

4.9 Hamburg Drain Optimizations

Design of the Mill Race In-Line Storage project was completed on November 22, 2021 when the construction contract associated with this project was awarded. Notice to Proceed is expected in the Next Reporting Period. This project together with the Broadway at Oak In-line Storage Project (See 4.5) substantially meet the goals of the Hamburg Drain Optimizations as outlined in the Long-Term Control Plan. Additional projects which may reduce the size, change the character or location, or eliminate the need for the Foundation 4-Hamburg Drain Storage Project are being considered as outlined in 4.1.

4.10 WWTP Improvement Project Alternative C2

This project is being phased in three parts. The first of these phases is the Secondary System Rehabilitation and Upgrade Project. Five contracts for this project were put out to bid and recommended Contractors were awarded the projects at the June 23rd, 2021, Board Meeting. A consultant Engineering Firm was also selected to move forward for the oversite of construction for the Secondary System Rehabilitation and Upgrade Project. Notice to

Proceed for this project is anticipated to be in the Next Reporting Period. The anticipated substantial completion date is estimated to be October 31, 2025.

In October 2020, Buffalo Sewer awarded a contract with an Engineering firm to provide design services for the second phase of this project, the Primary System NFA project. In addition to the installation of a new primary bypass chlorine contact tank and new pumping station for the new HRD system, this work will also involve retrofitting of the existing primary settling tanks and sludge pumping station. Work on this project began in April 2021 with construction documents expected to be issued for bid in 2022. A copy of the Draft Engineering Report for this project was submitted to the New York State Department of Environmental Conservation on October 7, 2021. The anticipated date for Bid award is scheduled for September 28, 2022. Construction start is mid-April 2023 and substantial completion is at the end of January 2028.

The feasibility and scheduling for the third and final phase, consisting of further upgrades to the Secondary System as outlined in the Long-Term Control Plan are still being reviewed and evaluated.

4.11 North Relief-Interceptor

Preliminary subsurface investigation in conjunction with the North Relief-Interceptor concept has revealed concerns with the location of bedrock and the feasibility of the proposed tunnel location. More cost efficient and physically feasible projects are being considered as part of the effort as outlined in Section 4.1.

As an initial phase of replacement, the Bird Avenue Underflow Sewer Project has been completed. Engineering analysis for additional phases is currently focused on the implementation of real time control technology, short circuit methodologies, upstream storm relief sewers, and other projects to reduce the size, scope, and cost of the North Relief-Interceptor. At this time the Engineering Completion date is not expected to be achieved by March 18, 2022, as outlined in the Long-Term Control Plan.

4.12 Jefferson Avenue & Florida Street (CSO 053) Satellite Storage

The Jefferson Avenue & Florida Street Satellite Storage facility as outlined in the Long-Term Control Plan involves extensive deep rock excavation, the construction of a pumping station, and a new force main. In the Fall of 2021, a more northern site presented itself which will allow for gravity flow and gate controls at a shallower depth. Due to time limitations associated with this site and the recognition that CSO discharges to the Scajaquada Creek District are most impactful from a water quality standpoint, Buffalo Sewer has chosen to move this project forward significantly in scheduling.

5. CHANGES IN KEY PERSONNEL

Lauren Howard was appointed General Counsel on September 29, 2022.

6. PUBLIC MEETINGS

On September 16, 2022, Buffalo Sewer representatives attended the Valley Blockclub monthly meeting to present and discuss the upcoming Mill Race RTC construction that will impact their neighborhood.

7. MODEL MODIFICATIONS

On October 6, 2021, the United States Environmental Protection Agency (EPA) and New York State Department of Environmental Protection (NYSDEC) approved Buffalo Sewer's "Collection System Model- Model Update Report." The Buffalo Sewer Authority has since been utilizing the updated model to review the physical and financial feasibility and efficacy of projects remaining in the Long Term Control Plan while taking the January 7, 2021 Financial Capability Analysis into account.

8. GREEN INFRASTRUCTURE

Construction has continued on Niagara St. Phase 3 with anticipated construction completion in the Next Reporting Period. Notice to proceed has been issued on construction of Niagara St. phase 4A with anticipated completion in 2022. Notice to Proceed for Niagara Street phase 4B is tentatively scheduled for the Second Reporting Period of 2022. Upon completion of Niagara phase 4 A, Buffalo Sewer will have achieved the 677 acres of control required under Phases Green 1 and Green 2.

A private property green infrastructure grant program is being developed with official engineering and program management award expected in the Next Reporting Period.

Projects to be funded through the Environmental Impact Bond and the American Rescue Plan Act including a mix of Bioretention within the right-of-way, permeable pavement, and offline stormwater green infrastructure storage projects within parks and other public spaces are being vetted and developed. In general, these projects are being targeted to provide multiple benefits to the community including increasing climate resiliency, eliminating lead service lines, and replacing aging sewer and water lines while also reducing flow and nutrient loading to the combined sewer system. Through these projects, Buffalo Sewer expects to make significant progress towards Green 3.

9. CERTIFICATION STATEMENT

"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 the 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."

Oluwole A. McFoy, P.E., General Manager

3/1/22
Date

Attachment A to the Semi-Annual Status Report: March 2022

Work Completed in Current Period/ Projection of Work to be Performed in Next Reporting Period

Project Name	Project Milestone	AO Project Deadline	Actual Completion Dates	Project Status
Phase I Projects				
CSO 060 GI Project	---	---	Prior to 1/1/2014	Complete.
Bird/Lang RTC Projects	Construction Start	3/17/2014	2/24/2014	Complete
	Completion Date	9/2/2014	5/9/2016	Complete
	Operations/ Optimization (RTC)	9/3/2014 – 9/3/15	10/1/2016	Complete
Bird RTC Project	Construction Start	3/17/2014	2/24/2014	Complete
	Completion Date	9/2/2014	5/6/2016	Complete
	Operations/ Optimization (RTC)	9/3/2014 – 9/3/15	10/1/2016	Complete
Lang RTC Project	Construction Start	3/17/2014	2/24/2014	Complete
	Completion Date	9/2/2014	5/9/2016	Complete
	Operations/ Optimization (RTC)	9/3/2014 – 9/3/15	10/1/2016	Complete
Foundation Projects				
Foundation 1 - Smith Street Storage	Engineering Start	3/18/2014	Prior to 1/1/2014	Complete
	Engineering Completion	3/18/2015	6/10/2015	Complete
	Notice to Proceed	3/18/2015		Complete
	Substantial Completion	3/18/2017	10/9/2017	Complete
CSO No. 026 Sewer Separation	Engineering Start	3/18/2014	Prior to 1/1/2014	Complete
	Engineering Completion	3/18/2015	4/3/2015	Complete
	Notice to Proceed	3/18/2015	7/8/2015	Complete
	Substantial Completion	3/18/2017	6/22/2016	Complete
CSO No. 026 RTC Structure	Engineering Start	3/18/2014	Prior to 1/1/2014	Complete
	Engineering Completion	3/18/2015	6/10/2015	Complete
	Notice to Proceed	3/18/2015	7/13/2016	Complete
	Substantial Completion	3/18/2017	10/9/2017	Complete

Project Name	Project Milestone	AO Project Deadline	Actual Completion Dates	Project Status
Foundation 2 - SPP Optimization (20 projects)	Engineering Start	3/1/2014	Prior to 1/1/2014	Complete
	Engineering Completion	3/18/2015	4/20/2015	Complete
	Notice to Proceed	3/1/2014	Prior to 1/1/2014	Complete
	Substantial Completion	3/18/2017		
SPP 180 Optimization	Engineering Start	---	Prior to 1/1/2014	Complete
	Engineering Completion	---	4/20/2015	Complete
	Notice to Proceed	---	9/8/2015	Complete
	Substantial Completion	3/18/2017	12/16/2015	Complete
SPP 331 Optimization	Engineering Start	---	Prior to 1/1/2014	Complete
	Engineering Completion	3/18/2015	4/20/2015	Complete
	Notice to Proceed	---	9/8/2015	Complete
	Substantial Completion	3/18/2017	12/16/2015	Complete
SPP 036 Optimization	Engineering Start	---	Prior to 1/1/2014	Complete
	Engineering Completion	---	1/20/2014	Complete
	Notice to Proceed	---	5/30/2014	Complete
	Substantial Completion	3/18/2017	8/4/2014	Complete
SPP 217 Optimization	Engineering Start	---	Prior to 1/1/2014	Complete
	Engineering Completion	---	4/3/2015	Complete
	Notice to Proceed	---	7/8/2015	Complete
	Substantial Completion	3/18/2017	12/21/2015	Complete
SPP 318 Optimization	Engineering Start	---	Prior to 1/1/2014	Complete
	Engineering Completion	---	4/3/2015	Complete
	Notice to Proceed	---	7/8/2015	Complete
	Substantial Completion	3/18/2017	12/21/2015	Complete
SPP 097A Optimization	Engineering Start	---	Prior to 1/1/2014	Complete
	Engineering Completion	---	4/20/2015	Complete
	Notice to Proceed	---	9/8/2015	Complete
	Substantial Completion	3/18/2017	12/16/2015	Complete

Project Name	Project Milestone	AO Project Deadline	Actual Completion Dates	Project Status
SPP 122 Optimization	Engineering Start	---	Prior to 1/1/2014	Complete
	Engineering Completion	---	Prior to 1/1/2014	Complete
	Notice to Proceed	---	Prior to 1/1/2014	Complete
	Substantial Completion	3/18/2017	Prior to 1/1/2014	Complete
SPP 163 Optimization	Engineering Start	---	3/1/2014	Complete
	Engineering Completion	---	11/25/2014	Complete
	Notice to Proceed	---	3/1/2015	Complete
	Substantial Completion	3/18/2017	8/6/2015	Complete
SPP 165 Optimization	Engineering Start	---	Prior to 1/1/2014	Complete
	Engineering Completion	---	Prior to 1/1/2014	Complete
	Notice to Proceed	---	Prior to 1/1/2014	Complete
	Substantial Completion	3/18/2017	Prior to 1/1/2014	Complete
SPP 165A Optimization	Engineering Start	---	Prior to 1/1/2014	Complete
	Engineering Completion	---	4/4/2014	Complete
	Notice to Proceed	---	7/25/2014	Complete
	Substantial Completion	3/18/2017	11/3/2014	Complete
SPP 178 Optimization	Engineering Start	---	Prior to 1/1/2014	Complete
	Engineering Completion	---	Prior to 1/1/2014	Complete
	Notice to Proceed	---	Prior to 1/1/2014	Complete
	Substantial Completion	3/18/2017	Prior to 1/1/2014	Complete
SPP 335B Optimization	Engineering Start	---	Prior to 1/1/2014	Complete
	Engineering Completion	---	Prior to 1/1/2014	Complete
	Notice to Proceed	---	Prior to 1/1/2014	Complete
	Substantial Completion	3/18/2017	Prior to 1/1/2014	Complete
SPP 336A Optimization	Engineering Start	---	Prior to 1/1/2014	Complete
	Engineering Completion	---	4/20/2015	Complete
	Notice to Proceed	---	9/8/2015	Complete
	Substantial Completion	3/18/2017	12/16/2015	Complete

Project Name	Project Milestone	AO Project Deadline	Actual Completion Dates	Project Status
SPP 341A Optimization	Engineering Start	---	1/1/2014	Complete
	Engineering Completion	---		See 4.1; this project is currently being reevaluated in light of the Approved Recalibrated Hydraulic Model Results.
	Notice to Proceed	---		
	Substantial Completion	3/18/2017		
SPP 342B Optimization	Engineering Start:	---	Prior to 1/1/2014	Complete
	Engineering Completion	---	Prior to 1/1/2014	Complete
	Notice to Proceed	---	Prior to 1/1/2014	Complete
	Substantial Completion	3/18/2017	Prior to 1/1/2014	Complete
SPP 001 Optimization	Engineering Start:	---	Prior to 1/1/2014	Complete
	Engineering Completion	---	3/27/2014	Complete
	Notice to Proceed	---	6/16/2014	Complete
	Substantial Completion	3/18/2017	12/12/2014	Complete
SPP 183 Optimization	Engineering Start	---	Prior to 1/1/2014	Complete
	Engineering Completion	---	Prior to 1/1/2014	Complete
	Notice to Proceed	---	Prior to 1/1/2014	Complete
	Substantial Completion	3/18/2017	Prior to 1/1/2014	Complete
SPP 283 Optimization	Engineering Start	---	Prior to 1/1/2014	Complete
	Engineering Completion	---	Prior to 1/1/2014	Complete
	Notice to Proceed	---	Prior to 1/1/2014	Complete
	Substantial Completion	3/18/2017	Prior to 1/1/2014	Complete
SPP 211 Optimization	Engineering Start	---	Prior to 1/1/2014	Complete
	Engineering Completion	---	Prior to 1/1/2014	Complete
	Notice to Proceed	---	Prior to 1/1/2014	Complete
	Substantial Completion	3/18/2017	Prior to 1/1/2014	Complete

Project Name	Project Milestone	AO Project Deadline	Actual Completion Dates	Project Status
Foundation 3 - Remaining RTC (14 sites)	Engineering Start	3/18/2016	8/9/2016	Ongoing
	Notice to Proceed	3/18/2017		
	Engineering Completion	3/18/2023		
	Substantial Completion	3/18/2024		
Hertel Northwest (Hertel at Deer) In-Line Storage	Engineering Start	---	1/19/2018	Complete
	Engineering Completion	---	12/13/2018	Complete
	Notice to Proceed	---	2/9/2019	Complete
	Substantial Completion	3/18/2024	5/6/2020	Complete
Hertel South (Hertel at Deer) In-Line Storage	Engineering Start	---	1/19/2018	Complete
	Engineering Completion	---	12/13/2018	Complete
	Notice to Proceed	---	2/9/2019	Complete
	Substantial Completion	3/18/2024	5/6/2020	Complete
Hertel Northeast In-Line Storage	Engineering Start	---		See 4.1; this project is currently being reevaluated in light of the Approved Recalibrated Hydraulic Model Results.
	Engineering Completion	---		
	Notice to Proceed	---		
	Substantial Completion	3/18/2024		
Bird East In-Line Storage (Final Bird location between proposed East & West locations)	Engineering Start	---	2/24/2014	Complete
	Engineering Completion	---	5/6/2016	Complete
	Notice to Proceed	---	5/6/2016	Complete
	Substantial Completion	3/18/2024	10/1/2016	Complete
East Ferry In-Line Storage	Engineering Start	---		See 4.1; this project is currently being reevaluated in light of the Approved Recalibrated Hydraulic Model Results.
	Engineering Completion	---		
	Notice to Proceed	---		
	Substantial Completion	3/18/2024		
Colorado In-Line Storage	Engineering Start	---		See 4.1; this project is currently being reevaluated in light of the Approved Recalibrated Hydraulic Model Results.
	Engineering Completion	---		
	Notice to Proceed	---		
	Substantial Completion	3/18/2024		

Project Name	Project Milestone	AO Project Deadline	Actual Completion Dates	Project Status
North Bailey In-Line Storage	Engineering Start	---	12/8/2017	Complete
	Engineering Completion	---	6/5/2018	Complete
	Notice to Proceed	---	10/16/2018	Complete
	Substantial Completion	---	5/27/2020	Complete
South Bailey In-Line Storage	Engineering Start	---		See 4.1; this project is currently being reevaluated in light of the Approved Recalibrated Hydraulic Model Results.
	Engineering Completion	---		
	Notice to Proceed	---		
	Substantial Completion	3/18/2024		
Roslyn In-Line Storage	Engineering Start	---		See 4.1; this project is currently being reevaluated in light of the Approved Recalibrated Hydraulic Model Results.
	Engineering Completion	---		
	Notice to Proceed	---		
	Substantial Completion	3/18/2024		
Hazelwood (Kay) In-Line Storage	Engineering Start	---	8/9/2016	Complete
	Engineering Completion	---	9/22/2017	Complete
	Notice to Proceed	---	2/2/2018	Complete
	Substantial Completion	3/18/2024	6/19/2019	Complete
Amherst Quarry Off-Line Storage	Engineering Start	---		Anticipated in Next Reporting Period; See 4.2.
	Engineering Completion	---		
	Notice to Proceed	---		
	Substantial Completion	3/18/2024		
Fillmore North In-Line Storage	Engineering Start	---		See 4.1; this project is currently being reevaluated in light of the Approved Recalibrated Hydraulic Model Results.
	Engineering Completion	---		
	Notice to Proceed	---		
	Substantial Completion	3/18/2024		
Gibson CSO Line Storage	Engineering Start	---		See 4.1; this project is currently being reevaluated in light of the Approved Recalibrated Hydraulic Model Results.
	Engineering Completion	---		
	Notice to Proceed	---		
	Substantial Completion	3/18/2024		

Project Name	Project Milestone	AO Project Deadline	Actual Completion Dates	Project Status
Montgomery CSO Line Storage	Engineering Start	---		See 4.1; this project is currently being reevaluated in light of the Approved Recalibrated Hydraulic Model Results.
	Engineering Completion	---		
	Notice to Proceed	---		
	Substantial Completion	3/18/2024		
Babcock Pump Station In-Line Storage	Engineering Start	---	6/19/2019	Complete
	Engineering Completion	---	5/15/2020	Complete
	Notice to Proceed	---	7/24/2020	Complete
	Substantial Completion	3/18/2024	9/21/2021	Complete; See 4.3
Smith St. and Eagle St. In-Line Storage	Engineering Start	---	4/4/2019	Complete
	Engineering Completion	---	2/27/2020	Complete
	Notice to Proceed	---	7/13/2020	Complete; See 4.4
	Substantial Completion	3/18/2024	12/31/2021	Complete
Broadway at Oak In-Line Storage	Engineering Start	---	4/4/2019	Complete
	Engineering Completion	---	10/20/2021	Complete; See 4.5
	Notice to Proceed	---		
	Substantial Completion	3/18/2024		
Breckenridge at Niagara Street In-Line Storage	Engineering Start	---	6/15/2021	Complete; See 4.6
	Engineering Completion	---		
	Notice to Proceed	---		
	Substantial Completion	3/19/2024		
Gates Circle In-Line Storage	Engineering Start	---		Anticipated Next Reporting Period; See 4.7
	Engineering Completion	---		
	Notice to Proceed	---		
	Substantial Completion	3/18/2024		

Project Name	Project Milestone	AO Project Deadline	Actual Completion Dates	Project Status
Foundation 4 - Hamburg Drain Optimizations	Engineering Start	3/18/2015	Prior to 1/1/2014	Complete
	Engineering Completion	3/18/2017	2/23/2017	Complete
	Notice to Proceed	3/18/2016	5/16/2017	Complete
	Substantial Completion	3/18/2018		
Mill Race In-Line Storage	Engineering Start	---	4/4/2019	Complete
	Engineering Completion	---	11/22/2021	Complete; See 4.9
	Notice to Proceed	---		
	Substantial Completion	3/18/2032		
Foundation 4 - Hamburg Drain Storage	Engineering Start	3/18/2028		See 4.1; this project is currently being reevaluated in light of the Approved Recalibrated Hydraulic Model Results.
	Engineering Completion	3/18/2030		
	Notice to Proceed	3/18/2030		
	Substantial Completion	3/18/2032		
WWTP				
WWTP Improvement Project Alternative C2	Engineering Start	3/18/2015	4/1/2021	See 4.10. As requested on Nov. 8, 2018, BSA submitted a written Request for Extension that reflects these amended dates. Completion dates are still under review.
	Engineering Completion	3/18/2019		
	Notice to Proceed	3/18/2017		
	Substantial Completion	3/18/2022		
Green Infrastructure Projects				
Green 1 - Pilot Projects – 267-acres of GI control SEE DETAILS FOLLOWING	Engineering Start	3/1/2014	Prior to 1/1/2014	Complete
	Engineering Completion	3/18/2016		Complete
	Substantial Completion	3/18/2018	12/31/2016	Complete.
2001-2016 Residential (traditional) Demolitions	Engineering Start	---	Prior to 1/1/2014	Complete
	Engineering Completion	---	Prior to 1/1/2014	Complete
	Substantial Completion	3/18/2018	12/31/2016	Complete.
2001 - 2016 Commercial and Industrial Demolitions	Engineering Start	---	Prior to 1/1/2014	Complete
	Engineering Completion	---	Prior to 1/1/2014	Complete
	Substantial Completion	3/18/2018	12/31/2016	Complete.

Project Name	Project Milestone	AO Project Deadline	Actual Completion Dates	Project Status
Green 2 – 410 acres of GI Control	Engineering Start:	3/18/2019	Prior to 1/1/2014	Complete
	Engineering Completion:	3/18/2023		See 8.
	Substantial Completion:	3/18/2024		
2017 - 2024 Demolitions	Engineering Start		Prior to 1/1/2014	Complete.
	Engineering Completion:			
	Substantial Completion:	3/18/2018		
Green Demolition Pilot Project	Engineering Start		Prior to 1/1/2014	Complete
	Engineering Completion			Complete
	Substantial Completion		7/31/2017	Complete.
PUSH Blue Projects	Engineering Start	---	Prior to 1/1/2014	Complete
	Engineering Completion	---	Prior to 1/1/2014	Complete
	Substantial Completion	3/18/2018	7/1/2015	Complete.
Carlton Street Porous Asphalt	Engineering Start	---	Prior to 1/1/2014	Complete
	Engineering Completion	---	Prior to 1/1/2014	Complete
	Substantial Completion	3/18/2018	7/25/2014	Complete.
Fillmore Avenue Porous Parking and Green Lots	Engineering Start	---	Prior to 1/1/2014	Complete
	Engineering Completion	---	Prior to 1/1/2014	Complete
	Substantial Completion	3/18/2018	4/23/2015	Complete.
Ohio Street	Engineering Start	---	Prior to 1/1/2014	Complete
	Engineering Completion	---	Prior to 1/1/2014	Complete
	Substantial Completion	3/18/2018	12/1/2014	Complete.
Kenmore Avenue	Engineering Start	---	4/30/2014	Complete
	Engineering Completion		4/20/2015	Complete
	Substantial Completion	3/18/2018	3/1/2017	Complete.
Genesee Street	Engineering Start	---	Prior to 1/1/2014	Complete
	Engineering Completion	---	6/8/2015	Complete
	Substantial Completion	3/18/2018	6/1/2017	Complete.
Allen Street	Engineering Start	---	Prior to 1/1/2014	Green infrastructre will no longer be implemented as part of the Allen Street streetscape project due to site constraints.
	Engineering Completion	---		
	Substantial Completion	3/18/2018		

Project Name	Project Milestone	AO Project Deadline	Actual Completion Dates	Project Status
Willert Park	Engineering Start	---	6/1/2016	Complete
	Engineering Completion	---	2/1/2017	Complete
	Substantial Completion	3/18/2018	4/26/2019	Complete
Northland Ave	Engineering Start	---	7/1/2016	Complete
	Engineering Completion	---	3/1/2017	Complete
	Substantial Completion	3/18/2018	12/17/2019	Complete
612 Northland Ave	Engineering Start	---	1/1/2019	Complete
	Engineering Completion	---	6/1/2019	Complete
	Substantial Completion	---	12/1/2019	Complete
Niagara Street Phase 1: Elmwood Street to Virgina Street	Engineering Start	---	Prior to 1/1/2014	Complete
	Engineering Completion	---	3/19/2014	Complete
	Substantial Completion	3/18/2018	12/1/2016	Complete.
Niagara Street Phase 2: Virgina Street to Porter Avenue	Engineering Start	---	Prior to 1/1/2014	Complete
	Engineering Completion	---	6/3/2015	Complete
	Substantial Completion	3/18/2018	11/16/2017	Complete.
Niagara Street Phase 3: Hampshire Street to Scajaquada Expy	Engineering Start	---	10/28/2015	Complete
	Engineering Completion	---	3/21/2018	Complete
	Substantial Completion	3/18/2024		See 8.
Niagara Street Phase 4a: Scajaquada Expy to Hertel Ave	Engineering Start	---	10/28/2015	Complete
	Engineering Completion	---	6/13/2018	Complete
	Substantial Completion	3/18/2024		See 8.
Niagara Street Phase 4b: Hertel Ave to Ontario St	Engineering Start	---	10/28/2015	Complete
	Engineering Completion	---	6/13/2018	Complete
	Substantial Completion	3/18/2024		See 8.

Project Name	Project Milestone	AO Project Deadline	Actual Completion Dates	Project Status
Niagara Street Phase 5: Porter Avenue to Hampshire Street	Engineering Start	---	10/28/2015	Complete
	Engineering Completion	---		
	Substantial Completion	3/18/2024		
Green 3 – 375 acres of GI Control	Engineering Start:	3/18/2023		See 8.
	Engineering Completion:	3/18/2028		
	Substantial Completion:	3/18/2029		
Green 4 – 263 acres of GI Control	Engineering Start:	3/18/2028		
	Engineering Completion:	3/18/2033		
	Substantial Completion:	3/18/2034		

Project Name	Project Milestone	AO Project Deadline	Actual Completion Dates	Project Status
Gray Projects				
CSOs 014/15 – Erie Basin In-line storage and optimization projects	Engineering Start	---	Prior to 1/1/2014	Complete
	Engineering Completion	---	Prior to 1/1/2014	Complete
	Notice to Proceed	3/18/2014	Prior to 1/1/2014	Complete
	Substantial Completion	3/18/2015	12/29/2014	Complete
SPPs 206A&B	Engineering Start	---	Prior to 1/1/2014	Complete
	Engineering Completion	---	Prior to 1/1/2014	Complete
	Notice to Proceed	---	5/30/2014	Complete
	Substantial Completion	3/18/2015	12/29/2014	Complete
SPP 035	Engineering Start	---	Prior to 1/1/2014	Complete
	Engineering Completion	---	Prior to 1/1/2014	Complete
	Notice to Proceed	---	Prior to 1/1/2014	Complete
	Substantial Completion	3/18/2015	5/31/2014	Complete
SPP 036	Engineering Start	---	Prior to 1/1/2014	Complete
	Engineering Completion	---	Prior to 1/1/2014	Complete
	Notice to Proceed	---	5/30/2014	Complete
	Substantial Completion	3/18/2015	12/5/2014	Complete
CSO 013 – Satellite storage, conveyance, FM & PS	Engineering Start	1/1/2020	3/12/2020	See 4.1; this project is currently being reevaluated in light of the Approved Recalibrated Hydraulic Model Results.
	Engineering Completion	1/1/2021		
	Notice to Proceed	1/1/2021		
	Substantial Completion	1/1/2023		
North Relief – Interceptor	Engineering Start	3/18/2019	5/15/2015	Complete
	Engineering Completion	3/18/2022		See 4.11;
	Notice to Proceed	3/18/2022		
	Substantial Completion	3/18/2026		
CSOs 010, 008/010, 061, 004 – Underflow capacity upsizing	Engineering Start	3/18/2021	6/15/2021	Complete
	Engineering Completion	3/18/2023		This project is transitioning to an RTC project; See 4.6.
	Notice to Proceed	3/18/2023		
	Substantial Completion	3/18/2024		

Project Name	Project Milestone	AO Project Deadline	Actual Completion Dates	Project Status
SPP 337 (CSO 053) – Satellite storage, conveyance, FM & PS	Engineering Start	3/18/2023		See 4.1; this project is currently being reevaluated in light of the Approved Recalibrated Hydraulic Model Results.
	Engineering Completion	3/18/2025		
	Notice to Proceed	3/18/2025		
	Substantial Completion	3/18/2027		
SPP 336A&B (CSO 053) – Satellite storage, conveyance, FM & PS	Engineering Start	3/18/2024		See 4.1; this project is currently being reevaluated in light of the Approved Recalibrated Hydraulic Model Results.
	Engineering Completion	3/18/2026		
	Notice to Proceed	3/18/2026		
	Substantial Completion	3/18/2029		
Jefferson Avenue & Florida Street (CSO 053) – Satellite storage, conveyance and FM	Engineering Start	3/18/2025	9/24/2021	Complete; See 4.12
	Engineering Completion	3/18/2027		
	Notice to Proceed	3/18/2027		
	Substantial Completion	3/18/2030		
CSO 055 – Satellite storage, conveyance, FM & PS	Engineering Start:	3/18/2027		See 4.1; this project is currently being reevaluated in light of the Approved Recalibrated Hydraulic Model Results.
	Engineering Completion:	3/18/2030		
	Notice to Proceed:	3/18/2030		
	Substantial Completion:	3/18/2034		
CSOs 028/044/047 - Satellite storage, conveyance, FM & PS	Engineering Start:	3/18/2028		See 4.1; this project is currently being reevaluated in light of the Approved Recalibrated Hydraulic Model Results.
	Engineering Completion:	3/18/2031		
	Notice to Proceed:	3/18/2031		
	Substantial Completion:	3/18/2034		
CSO 052 – Satellite storage, conveyance, FM & PS	Engineering Start:	3/18/2030		See 4.1; this project is currently being reevaluated in light of the Approved Recalibrated Hydraulic Model Results.
	Engineering Completion:	3/18/2032		
	Notice to Proceed:	3/18/2032		
	Substantial Completion:	3/18/2034		
CSO 064 – Satellite storage, conveyance, FM & PS	Engineering Start:	3/18/2030		See 4.1; this project is currently being reevaluated in light of the Approved Recalibrated Hydraulic Model Results.
	Engineering Completion:	3/18/2032		
	Notice to Proceed:	3/18/2032		
	Substantial Completion:	3/18/2034		

Attachment B to the Semi-Annual Status Report: March 2022

Detailed Project Descriptions

Project Name	Project Description	Project Purpose*
Phase I Projects		
CSO 060 GI Project	This project consisted of the construction of 4768 CF of rain garden on Windsor, Parkdale and Elmwood Avenues between Bird and Forest Avenues and 39,600 SF of permeable pavement on Clarendon and Claremont Avenues between Bird and Forest Avenues, installation of a Stormceptor unit at Bird Avenue and Granger Place and a total of 6,125 LF of 12-30 inch sewer designed to carry street flow to the existing storm overflow sewer on Forest Avenue from the above mentioned street segments. Additionally, weirs were raised in SPPs 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, and 240.	This project was designed to treat 13,600 cf of stormwater runoff from the 0.9 inch water quality storm event and remove 49.5 cfs of peak flow from the combined sewer system. Thereby reducing overflows through SPPs 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, and 241 to CSO 060. Together with other LTCP projects, this project is projected reduce CSO 060 discharges to Scajaquada Creek based on the 1993 Modified Typical Year (TY) to negligible activations and flow.
Bird/Lang RTC Projects	These RTC projects utilize available capacity of large sewers to provide flow control measures during wet weather events through the use of gates which allow continuous dry weather underflow.	
Bird RTC Project	The Bird RTC Project is located on Bird Avenue between Parkdale Avenue and Hoyt Street.	The Bird RTC project is designed to provide 1.01 MG of storage volume, thereby reducing discharges through SPP 013 to CSO 004. Together with other LTCP projects, this project is projected reduce CSO 004 discharges to the Black Rock Canal based on the TY to 3 activations.
Lang RTC Project	The Lang RTC Project is located on Lang Avenue between Courtland Avenue and Hagen Street.	The Lang RTC project is designed to have a storage volume of 0.84 MG, thereby reducing discharges through SPP 340 to CSO 053. Together with other LTCP projects, this project is projected to reduce CSO 053 discharges to Scajaquada Creek based on the 1993 Modified Typical Year (TY) to 4 activations.

Project Name	Project Description	Project Purpose*
Foundation Projects		
Foundation 1 - Smith Street Storage	Originally envisioned as a single project, these two projects have been separated to realize cost advantages due to the different levels of skill required for the projects and to expedite the sewer separation component.	
CSO No. 026 Sewer Separation	This project consisted of the installation of collection sewers for street receiver flows on Leddy Street, South Park Avenue, Owahn Place, Prenatt Street, Bolton Place, St. Stephen's Place, and Buffalo River Place, tributary to to SPP 88 and 90, in order to discharge these storm flows downstream of regulators, in conjuction with the optimization projects for SPP 217 and SPP 318.	Together with the Smith Street in-line storage project, the Smith Street partial sewer separation project is designed to divert storm flows directly to the Smith Street Drain thereby reducing CSO 026 discharges. Together with other LTCP projects, this project is projected to reduce CSO 026 discharges to the Buffalo River based on the TY to 6 activations or less.
CSO No. 026 RTC Structure	The second contract consists of an in-line storage project which is designed to detain wet weather flows along the western side of Smith Street using a weir structure between the I-190 and the I-190 off ramp within the Smith Street Drain for discharge to the South Interceptor thereby diverting combined sewer flows from CSO 026.	Together with the Smith Street partial sewer separation project, the Smith Street in-line storage project is designed to divert and detain the equivalent of a storage volume of 1.94 MG, thereby reducing CSO 026 discharges. Together with other LTCP projects, this project is projected to reduce CSO 026 discharges to the Buffalo River based on the TY to 6 activations or less.

Project Name	Project Description	Project Purpose*
Foundation 2 - SPP Optimization (20 projects)	Project consists of multiple smaller projects that will overlap in engineering and construction. SEE DETAILS FOLLOWING FOR SPECIFIC PROJECTS	In general, these projects will reduce discharges to the CSOs by detaining flows within the BSA's system through the modification of existing control structures.
SPP 180 Optimization	This project consisted of raising of the weir associated with SPP 180 by 2.0' along its entire length. SPP 180 is located on Delaware Avenue at the intersection with West Delavan. As part of the revised SPP 331 Optimization, this weir will be raised an additional 1.75' along its entire length.	The SPP 180 Optimization project was designed to increase the capacity of the CSS at SPP 180 thereby decreasing CSO 006 discharges. Together with other LTCP projects, this project is projected to reduce CSO 006 discharges to the Black Rock Canal based on the TY to 4 activations.
SPP 331 Optimization	SPP331 is located at the intersection of Elmwood Avenue and West Delavan Avenue. Preliminary plans were for the diversion of flows from this point through a new sewer to Bird Avenue along the centerline of Elmwood Avenue. This would have required major disruption of a very high traffic commercial area and was deemed impractical. Plans have been developed to instead divert the same flow that was to have been diverted through this project through a system of localized weir modifications rather than extensive pipe installation. These modifications include raising the weir at SPP 180 by 1.75' and the bench located in SPP 332 on the northeast quadrant of Gates Circle which currently directs dry weather flows into the interceptor will be removed and replaced with a 6.2' weir and restored sewer trough which will direct dry weather flows into the Bird Avenue trunk sewer.	The SPP 331 Optimization project is designed to increase the underflow capacity at SPP 331 thereby decreasing CSO 006 discharges. Together with other LTCP projects, this project is projected to reduce CSO 006 discharges to the Black Rock Canal based on the TY to 4 activations.
SPP 036 Optimization	This project consisted of the reconstruction of 35' of 30" sewer associated with SPP 036 to reverse the slope. It was located on Church Street between the off and on ramps of the Skyway (State Route 5).	The SPP 036 Optimization project was designed to increase the underflow capacity at SPP 036 thereby decreasing CSO 015 discharges. Together with other LTCP projects, this project is projected based on the TY to reduce discharges to the Erie Basin through CSO 015 to 0 activations.

Project Name	Project Description	Project Purpose*
SPP 217 Optimization	In association with the Smith Street partial sewer separation project, this project consisted of the removal of two bottom orifice plates totaling 1.42' in height, increasing the orifice size and conveyance capacity of the Emslie Street Sewer. SPP 217 is located on Emslie Street at its intersection with Eagle Street.	The SPP 217 Optimization project is designed to increase the underflow capacity at SPP 217 thereby decreasing CSO 026 discharges. Together with other LTCP projects, this project is projected to reduce CSO 026 discharges to the Buffalo River based on the TY to 3 activations.
SPP 318 Optimization	In association with the Smith Street partial sewer separation project, this project consisted of the removal of an orifice plate, increasing the orifice size and conveyance capacity of the Clinton Avenue Sewer. SPP 318 is located east of the intersection of Fillmore Avenue and Clinton Street.	The SPP 318 Optimization project is designed to increase the underflow capacity at SPP 318 thereby decreasing CSO 026 discharges. Together with other LTCP projects, this project is projected to reduce CSO 026 discharges to the Buffalo River based on the TY to 3 activations.
SPP 097A Optimization	This project consisted of abandoning an inactive combined sewer, converting another to a storm sewer and abandoning the underflow connection. SPP 097A is located at the intersection of the extension of Prenatt and Orlando Streets.	The SPP 097A Optimization project is designed to eliminate SPP 097A thereby decreasing CSO 026 discharges. Together with other LTCP projects, this project is projected to reduce CSO 026 discharges to the Buffalo River based on the TY to 3 activations.
SPP 122 Optimization	This project consisted of raising of the weir associated with SPP 122 by 0.5' along its entire length. SPP 122 is located on South Legion Drive just north of the intersection with Meriden Street.	The SPP 122 Optimization project was designed to increase the flow volume conveyed by the CSS at SPP 122 thereby decreasing CSO 037 discharges. Together with other LTCP projects, this project is projected to reduce CSO 037 discharges to the Buffalo River based on the TY to 3 activations.
SPP 163 Optimization	The SPP 163 Weir Optimization project consisted of replacing the existing weir with a new weir 0.75' higher. It is located to the East of the intersection of Fillmore Avenue and Northland on Northland Avenue.	The SPP 163 Optimization project is designed to increase the flow volume conveyed by the CSS at SPP 163 thereby decreasing CSO 053 discharges. Together with other LTCP projects, this project is projected to reduce CSO 053 discharges to Scajaquada Creek based on the TY to 4 activations.
SPP 165 Optimization	This project consisted of raising of the weir associated with SPP 165 by 0.5' along its entire length. SPP 165 is located on Fillmore Avenue just north of the intersection with East Delavan Street.	The SPP 165 Optimization project was designed to increase the capacity of the CSS at SPP 165 thereby decreasing CSO 053 discharges. Together with other LTCP projects, this project is projected to reduce CSO 053 discharges to Scajaquada Creek based on the TY to 4 activations.

Project Name	Project Description	Project Purpose*
SPP 165A Optimization	The weir associated with SPP 165A located at the intersections of Fillmore and Kensington Avenues.	The SPP 165A Optimization project was designed to increase the capacity of the CSS at SPP 165A by raising the weir by 0.75' and upsizing 675' of 15" pipe to 18" pipe to reduce CSOs in association with CSO 053. Together with other LTCP projects, this project is projected to reduce CSO 053 discharges to Scajaquada Creek based on the TY to 4 activations.
SPP 178 Optimization	This project consisted of raising of the weir associated with SPP 178 by 0.5' along its entire length. SPP 178 is located on Masten Avenue just north of the intersection with Northland Avenue.	The SPP 178 Optimization project was designed to increase the flow volume conveyed by the CSS at SPP 178 thereby decreasing CSO 053 discharges. Together with other LTCP projects, this project is projected to reduce CSO 053 discharges to Scajaquada Creek based on the TY to 4 activations.
SPP 335B Optimization	This project consisted of raising of the weir associated with SPP 335B by 1.0' along its entire length. SPP 335B is located on Hager Street just south of the intersection with Florida Street.	The SPP 335B Optimization project was designed to increase the flow volume conveyed by CSS at SPP 335B thereby decreasing CSO 053 discharges. Together with other LTCP projects, this project is projected to reduce CSO 053 discharges to Scajaquada Creek based on the TY to 4 activations.
SPP 336A Optimization	This project has been constructed in association with the SPP 331 optimization. The project consist sof removing a sluice gate and orifice plate and modifying the existing structure by changing the existing side channel opening from 24" to 30". SPP 336A is located on Humboldt Parkway North of the Scajaquada Drain.	The SPP 336A Optimization project is designed to increase the underflow capacity of the CSS at SPP 336A thereby decreasing CSO 053 discharges. Together with other LTCP projects, this project is projected to reduce CSO 053 discharges to Scajaquada Creek based on the TY to 4 activations.
SPP 341A Optimization	SPP 341A is located on Genesee Street east of Kerns Avenue. This project is on hold pending the results of post-construction monitoring of Lang and Hazelwood RTCs.	The SPP 341A Optimization project would increase the flow volume conveyed by the CSS at SPP 341A thereby decreasing CSO 053 discharges. Together with other LTCP projects, this project is projected to reduce CSO 053 discharges to Scajaquada Creek based on the TY to 4 activations. Field conditions may require modification to this planned optimization.

Project Name	Project Description	Project Purpose*
SPP 342B Optimization	This project consisted of raising of the weir associated with SPP 342B by 1.0' along its entire length. SPP 342B is located on Sprenger Avenue adjacent to Schiller Park.	The SPP 342B Optimization project was designed to increase the flow volume conveyed by the CSS at SPP 342B thereby decreasing CSO 053 discharges. Together with other LTCP projects, this project is projected to reduce CSO 053 discharges to Scajaquada Creek based on the TY to 4 activations.
SPP 001 Optimization	The weir associated with SPP 001 located at the discharge of Cornelius Creek into the Niagara River and tributary to CSO 055 has been raised 1.0' to reduce CSOs.	The SPP 001 Optimization project was designed to increase the flow volume conveyed by the CSS at SPP 001 thereby decreasing CSO 055 discharges. Together with other LTCP projects, this project is projected to reduce CSO 055 discharges to the Niagara River based on the TY to 9 activations.
SPP 183 Optimization	This project consisted of raising of the weir associated with SPP 183 by 2.0' along its entire length. SPP 183 is located at the intersection of Bradley Avenue and Dewitt Street.	The SPP 183 Optimization project was designed to increase the flow volume conveyed by the CSS at SPP 183 thereby decreasing CSO 059 discharges. Together with other LTCP projects, this project is projected to reduce CSO 059 discharges to Scajaquada Creek based on the TY to 0 activations.
SPP 283 Optimization	SPP 283 is located in the median between the I-190 South ramp to Porter Avenue and a service road near the West Side Rowing Club. This project consisted of removing an orifice plate which restricted flows from entering the Swan Trunk and the installation of a new 1.0' tall weir to restrict flows from discharging through CSO 063.	The SPP 283 Optimization project was designed to increase the underflow capacity of the CSS at SPP 283 thereby decreasing CSO 063 discharges. Together with other LTCP projects, this project is projected to reduce CSO 063 discharges to the Niagara River based on the TY to 4 activations.
SPP 211 Optimization	This project consisted of constructing a weir to an elevation above the overflow raised pipe invert at SPP 211. SPP 211 is located at the South East corner of the intersection of Clinton and South Ogden Streets.	The SPP 211 Optimization project was designed to increase the flow volume conveyed by the CSS at SPP 211 thereby decreasing CSO 066 discharges. Together with other LTCP projects, this project is projected to reduce CSO 066 discharges to the Buffalo River based on the TY to 4 activations.

Project Name	Project Description	Project Purpose*
Foundation 3 - Remaining RTC (14 sites)	These RTC projects propose to utilize available capacity in the CSS to provide flow control measures during wet weather events through the use of active controls.	In general, these projects are designed to reduce discharges to the CSOs through the detention of flows within the BSA's CSS system.
Hertel Northwest (Hertel at Deer) In-Line Storage	This RTC project is proposed to utilize available capacity of a large sewer to provide flow control measures during wet weather events while allowing continuous dry weather underflow. The proposed project location is within the northern portion of the two large combined sewers which are located under Hertel Avenue.	This RTC project is proposed to utilize available capacity within the collection system to detain flows until downstream capacity becomes available. Together with other LTCP projects, this project is projected to reduce CSO 055 discharges to the Niagara River based on the TY to 9 activations.
Hertel South (Hertel at Deer) In-Line Storage	This RTC project is proposed to utilize available capacity of a large sewer to provide flow control measures during wet weather events while allowing continuous dry weather underflow. The proposed project location is within the southern portion of the two large combined sewers which are located under Hertel Avenue.	This RTC project is proposed to utilize available capacity within the collection system to detain flows until downstream capacity becomes available. Together with other LTCP projects, this project is projected to reduce CSO 055 discharges to the Niagara River based on the TY to 9 activations.
Hertel Northeast In-Line Storage	This RTC project is proposed to utilize available capacity of a large sewer to provide flow control measures during wet weather events while allowing continuous dry weather underflow. This project will be located within the northern portion of the two large combined sewers which are located under Hertel Avenue.	This RTC project is proposed to utilize available capacity within the collection system to detain flows until downstream capacity becomes available. Together with other LTCP projects, this project is projected to reduce CSO 055 discharges to the Niagara River based on the TY to 9 activations.
Bird East In-Line Storage	This RTC project is proposed to utilize available capacity of a large sewer to provide flow control measures during wet weather events while allowing continuous dry weather underflow. This project will be located to the east of the above mentioned Bird RTC project along the same Bird Avenue sewer.	This RTC project is proposed to utilize available capacity within the collection system to detain flows until downstream capacity becomes available. Together with other LTCP projects, this project is projected to reduce CSO 004 discharges to the Black Rock Canal based on the TY to 3 activations.

Project Name	Project Description	Project Purpose*
East Ferry In-Line Storage	This RTC project is proposed to utilize available capacity of a large sewer to provide flow control measures during wet weather events while allowing continuous dry weather underflow. The proposed project location is along the Ferry Street sewer upstream of its leaping weir overflow to the Scajaquada Drain north of Florida Street.	This RTC project is proposed to utilize available capacity within the collection system to detain flows until downstream capacity becomes available. Together with other LTCP projects, this project is projected to reduce CSO 053 discharges to Scajaquada Creek based on the TY to 4 activations.
Colorado In-Line Storage	This RTC project is proposed to utilize available capacity of a large sewer to provide flow control measures during wet weather events while allowing continuous dry weather underflow. The proposed project location is along the Colorado Avenue sewer which runs underneath the manufacturing facility located at 1001 East Delavan Avenue.	This RTC project is proposed to utilize available capacity within the collection system to detain flows until downstream capacity becomes available. Together with other LTCP projects, this project is projected to reduce CSO 053 discharges to Scajaquada Creek based on the TY to 4 activations.
North Bailey In-Line Storage	This RTC project is proposed to utilize available capacity of a large sewer to provide flow control measures during wet weather events while allowing continuous dry weather underflow. The proposed project location is along Bailey Avenue north of Scajaquada Street.	This RTC project is proposed to utilize available capacity within the collection system to detain flows until downstream capacity becomes available. Together with other LTCP projects, this project is projected to reduce CSO 053 discharges to Scajaquada Creek based on the TY to 4 activations.
South Bailey In-Line Storage	This RTC project is proposed to utilize available capacity of a large sewer to provide flow control measures during wet weather events while allowing continuous dry weather underflow. The proposed project location is along Bailey Avenue north of Scajaquada Street and south of the afore mentioned North Bailey In-Line Storage project.	This RTC project is proposed to utilize available capacity within the collection system to detain flows until downstream capacity becomes available. Together with other LTCP projects, this project is projected to reduce CSO 053 discharges to Scajaquada Creek based on the TY to 4 activations.
Roslyn In-Line Storage	This RTC project is proposed to utilize available capacity of a large sewer to provide flow control measures during wet weather events while allowing continuous dry weather underflow. The proposed project location is near Roslyn Street on Lang Avenue.	This RTC project is proposed to utilize available capacity within the collection system to detain flows until downstream capacity becomes available. Together with other LTCP projects, this project is projected to reduce CSO 053 discharges to Scajaquada Creek based on the TY to 4 activations.

Project Name	Project Description	Project Purpose*
Hazelwood (Kay) In-Line Storage	This RTC project, now known as Hazelwood, is proposed to utilize available capacity in the CSS capacity of a large sewer to provide flow control measures during wet weather events while allowing continuous dry weather underflow. The proposed project location is on Hazelwood Avenue between East Delavan and Easton Avenues.	This RTC project is proposed to utilize available capacity within the collection system to detain flows until downstream capacity becomes available. Together with other LTCP projects, this project is projected to reduce CSO 053 discharges to Scajaquada Creek based on the TY to 4 activations.
Amherst Quarry Off-Line Storage	This RTC project proposes to utilize available capacity within the active Amherst Quarry to provide flow control measures during wet weather events, once downstream capacity is available, flows will then be pumped back into the system. The Amherst Quarry is located in an area bounded by Parkridge Avenue, East Amherst Street, and Hewitt Avenue.	This RTC project is proposed to utilize available capacity of the quarry to detain flows until downstream capacity becomes available. Together with other LTCP projects, this project is projected to reduce CSO 053 discharges to Scajaquada Creek based on the TY to 4 activations.
Fillmore North In-Line Storage	This RTC project is proposed to utilize available capacity of a large sewer to provide flow control measures during wet weather events while allowing continuous dry weather underflow. This project is proposed to be located on Fillmore Avenue, however pending the results of post-construction monitoring, it may be eliminated depending on the efficancy of the Smith Street Storage project.	This RTC project is proposed to utilize available capacity within the collection system to detain flows until downstream capacity becomes available. Together with other LTCP projects, this project is projected to reduce CSO 026 discharges to the Buffalo River based on the TY to 3 activations.

Project Name	Project Description	Project Purpose*
Gibson CSO Line Storage	This project is proposed to utilize the available capacity of the CSO pipe downstream of the SPP, but before the discharge point or outfall. It would be designed to convey water to prevent surface flooding and overflows through upstream SPPs. Once the storm event has subsided, it would be designed to dewater back into the combined system. The dewatering rate would be controlled so that it would not cause overflows downstream from the control structure. The proposed project location is on Gibson Street, however pending the results of post-construction monitoring, it may be eliminated depending on the efficancy of the Smith Street Storage project.	This RTC project is proposed to utilize available capacity within the collection system to detain flows until downstream capacity becomes available. Together with other LTCP projects, this project is projected to reduce CSO 026 discharges to the Buffalo River based on the TY to 3 activations.
Montgomery CSO Line Storage	This project is proposed to utilize the available capacity of the CSO pipe downstream of the SPP, but before the discharge point or outfall. It would be designed to convey water to prevent surface flooding and overflows through upstream SPPs. Once the storm event has subsided, it would be designed to dewater back into the combined system. The dewatering rate would be controlled so that it would not cause overflows downstream from the control structure. The proposed project location is along the railroad right-of-way near Montgomery Street, however pending the results of post-construction monitoring, it may be eliminated depending on the efficancy of the Smith Street Storage project.	This RTC project is proposed to utilize available capacity within the collection system to detain flows until downstream capacity becomes available. Together with other LTCP projects, this project is projected to reduce CSO 026 discharges to the Buffalo River based on the TY to 3 activations.

Project Name	Project Description	Project Purpose*
Babcock Pump Station In-Line Storage	This RTC project is proposed to modify the function of an existing pump station to utilize available capacity of a large sewer to provide flow control measures during wet weather events. The proposed project location is at the existing pump staion on New Babcock Street at Howard Street.	This RTC project is proposed to utilize available capacity within the collection system to reduce the peak flow into the Swan Trunk. Together with other LTCP projects, this project is projected to reduce CSO 027 discharges to the Buffalo River based on the TY to 6 activations.
Smith at Eagle In-Line Storage	This RTC project is proposed to utilize available capacity in the Smith St Drain to provide flow control measures during wet weather events while allowing continuous dry weather underflow. The proposed project location is upstream of the existing CSO 026 RTC project on Smith St. and Eagle St.	This RTC project is proposed to utilize available capacity within the collection system to detain flows until downstream capacity becomes available. Together with other LTCP projects, this project is projected to reduce CSO 026 discharges to the Buffalo River based on the TY to 6 activations.
Broadway at Oak In-Line Storage	This RTC project is proposed to utilize available capacity in the collection system to provide flow control measures during wet weather events while allowing continuous dry weather underflow. The proposed project location is on Broadway St. at Oak St.	This RTC project is proposed to utilize available capacity within the collection system to detain flows until downstream capacity becomes available. Together with other LTCP projects, this project is projected to reduce CSO 017 discharges to the Buffalo River based on the TY to 6 activations.
Breckenridge at Niagara Street In-line Storage	This RTC project is proposed to replace the CSOs 010, 008/010, 061-Underflow capacity upsizing project and will be designed to store flows in the Breckenridge Street Sewer and release these flows back into the Northern Interceptor as capacity is available. It will be located at Niagara and Breckenridge Streets.	This RTC project is proposed to utilize available capacity within the existing Breckenridge combined sewer to store flows and then release them when there is available capacity to the Northern Interceptor Sewer rather than directly connecting into the syphon gates connection. It is anticipated to reduce CSO 010 discharges to the Black Rock Canal based in the TY to 4 activations.
Gates Circle In-line Storage	This project is proposed to be located at the North East corner of Gates Circle and will provideThis project is an additional project that was not originally included in the Long-Term Control Plan which is proposed to modify SPP 322 to create a globalized control logic balancing of flows between the Scajaquada Tunnel and Bird Avenue Trunk. An engineering contract for this project is expected to be	This RTC project is proposed to balance flows between the Bird Avenue Trunk and Scajaquada Tunnel to work together with other projects to reduce discharges to the Black Rock Canal through CSO 061 and CSO 004 in the TY to 4 activations.

Project Name	Project Description	Project Purpose*
Foundation 4 - Hamburg Drain Optimizations	This project will entail several in-system optimizations, e.g. rerouting of flows, installation of weirs, partial sewer separations etc. and/or green infrastructure to reduce the overflow events at a number of upstream SPPs in order to control flows through CSOs 017, 022, and 064. These optimizations would be located within the Hamburg Basin.	These optimization projects are proposed to increase the flow volume conveyed by the CSS upstream of the SPPs and diverting stormwater flows out of the CSS thereby decreasing CSO 017, 022, and 064 discharges. Together with other LTCP projects, this project is projected based on the TY to reduce discharges to the Buffalo River through CSO 017 to 4 activations, CSO 022 to 5 activations, and CSO 064 to 3 activations.
Foundation 4 - Hamburg Drain Storage	Together with the Hamburg Drain Optimizations, this project would be designed to provide the equivalent of 5 MG of offline storage. This facility would be located within the Hamburg Basin and may involve the installation of RTCs.	This storage project is proposed to provide off-line storage thereby decreasing CSO 017, 022, and 064 discharges. Together with other LTCP projects, this project is projected based on the TY to reduce discharges to the Buffalo River through CSO 017 to 4 activations, CSO 022 to 5 activations, and CSO 064 to 3 activations.
Mill Race In-Line Storage	This RTC project is proposed to utilize available capacity of a large sewer to provide flow control measures during wet weather events while allowing continuous dry weather underflow. The proposed project location is on Larkin Street near Roseville Street.	This RTC project is proposed to utilize available capacity within the collection system to detain flows until downstream capacity becomes available. Together with other LTCP projects, this project is projected to reduce CSO 017 discharges to the Buffalo River based on the TY to 6 activations.
WWTP		
WWTP Improvement Project Alternative C2	The proposed project is expected to rehabilitate the existing primary clarifiers by adding high rate disinfection and provide additional secondary clarifiers at the Bird Island WWTP.	This project would be designed to provide treatment of wet weather flows and increased secondary treatment capacity.

Project Name	Project Description	Project Purpose*
Green Infrastructure Projects		
Green 1 - Pilot Projects – 267-acres of GI control	Projects consist of multiple green infrastructure projects that will overlap in engineering and construction.	In general, this phase is designed to control stormwater flow from 267 acres of impervious area in the various sewer sheds within the targeted areas.
2001-2016 Residential Demolitions	This project consists of the demolition of vacant houses thereby replacing impervious with pervious surfaces.	This project is designed to remove 256 total acres of impervious area and manage stormwater on site.
2001-2016 Commercial and Industrial Demolitions	This project consists of the demolition of commercial and industrial structures thereby replacing impervious with pervious surfaces.	This project is designed to control stormwater flow from 78 total acres of impervious area.

Project Name	Project Description	Project Purpose*
Green 2 – 410 acres of GI Control	These projects will consist of multiple green infrastructure projects that will overlap in engineering and construction. Details will be provided in future reports.	In general, these projects would be designed to retain stormwater flow from 410 acres of impervious area in the various sewer sheds in the targeted areas.
2017 -2024 Demolitions	This project consists of the demolition of vacant and dilapidated structures thereby replacing impervious surface with pervious surface	This project is designed to control stormwater flow for each post demolition vacant lot. Total acreate TBD on a rolling basis depending upon demolitions completed.
Green Demolition Pilot Project	A three year pilot study where the City of Buffalo's demolition specifications were altered to allow for the use of shallow bioretention to increase onsite infiltration	Over the course of the pilot project the revised demolition specifications/bioretention approach was applied to 221 sites impacting a total of 19.03 acres.
PUSH Blue Projects	PUSH-Buffalo will install rain gardens, porous pavement and a green roof and distribute rain barrels within the CSO 012 sewershed.	This project is designed to control stormwater flow from 1 acre of impervious area.
Carlton Street Porous Asphalt	This project consisted of the installation of pervious pavement to retain stormwater from the area tributary to the Right-of-Way on Carlton Street between Michigan and Jefferson Avenues in the City of Buffalo as part of the City's streetscape project.	This project is designed to control stormwater flow from a 5.9 acre sewershed.
Fillmore Avenue Porous Parking Lots and Green Lots	This project consisted of the installation of porous pavement parking lots and modified rain gardens to retain stormwater from the area tributary to the Right-of-Way of Fillmore Avenue in the City of Buffalo as part of the City's streetscape project.	This project is designed to control stormwater flow from 0.4 total acres of impervious area.
Ohio Street	This project consisted of the installation of green infrastructure to retain stormwater from the area tributary to the Right-of-Way on Ohio Street in the City of Buffalo as part of the City's streetscape project.	This project is designed to control stormwater flow from 6.1 total acres of impervious area.
Kenmore Avenue	This project consists of the installation of green infrastructure to retain stormwater from the area tributary to the Right-of-Way on Kenmore Avenue in the City of Buffalo as part of the City's streetscape project.	This project is designed to control stormwater flow from 5.17 total acres of impervious area.

Project Name	Project Description	Project Purpose*
Genesee Gateway Project	This project consists of the installation of green infrastructure to retain stormwater from the area tributary to the Right-of-Way on Genesee Street in the City of Buffalo as part of the City's streetscape project.	This project is designed to control stormwater flow from 2.8 total acres of impervious area.
Allen Street	This project will consist of the installation of green infrastructure to retain stormwater from the area tributary to the Right-of-Way for the portion of Allen Street between Main Street and Elmwood Avenue in the City of Buffalo as part of the City's streetscape project.	This project is designed to control stormwater flow from 2.5 total acres of impervious area.
Willert Park	This project will consist of the installation of green infrastructure to retain stormwater from the area tributary to the Right-of-Way for the portion of William Street between Michigan and Jefferson in the City of Buffalo.	This project is designed to control stormwater flow from 13.9 total acres of impervious area.
Northland Ave	This project will consist of the installation of green infrastructure to retain stormwater from the area tributary to the Right-of-Way for the portion of Northland Avenue between Fillmore and Grider in the City of Buffalo.	This project is designed to control stormwater flow from 6.1 total acres of impervious area.
612 Northland Ave	The project consists of a rain garden, permeable gravel pavement, and conversion of impervious pavement to lawn/shrubs.	The project is designed to control stormwater flow from 0.26 acres of impervious area.
Niagara Street Phase 1: Elmwood Street to Virgina Street	This project consists of the installation of green infrastructure to retain stormwater from the area tributary to the Right-of-Way for the length of Niagara Street in the City of Buffalo as part of the City's streetscape project.	This project is designed to control stormwater flow from 2 total acres of impervious area.
Niagara Street Phase 2: Virgina Street to Porter Avenue	This project consists of the installation of green infrastructure to retain stormwater from the area tributary to the Right-of-Way for the length of Niagara Street in the City of Buffalo as part of the City's streetscape project.	This project is designed to control stormwater flow from 7.3 total acres of impervious area.

Project Name	Project Description	Project Purpose*
Niagara Street Phase 3: Hampshire Street to Scajaquada Expressway	This project consists of the installation of green infrastructure to retain stormwater from the area tributary to the Right-of-Way for the length of Niagara Street in the City of Buffalo as part of the City's streetscape project.	This project is designed to control stormwater flow from 15 total acres of impervious area in MS4 drainage areas and 25.5 in CSO drainage areas.
Niagara Street Phase 4a: Scajaquada Expy to Hertel Ave		
Niagara Street Phase 4b: Hertel Ave to Ontario St		
Niagara Street Phase 5: Porter Avenue to Hampshire Street		
Green 3 – 375 acres of GI Control	These projects will consist of multiple green infrastructure projects that will overlap in engineering and construction. Details will be provided in the Phase 2 Green Infrastructure Master Plan.	In general, these projects would be designed to retain stormwater flow from 375 acres of impervious area in the various sewer sheds in the targeted areas.
Green 4 – 263 acres of GI Control	These projects will consist of multiple green infrastructure projects that will overlap in engineering and construction. Details will be provided in the Phase 2 Green Infrastructure Master Plan.	In general, these projects would be designed to retain stormwater flow from 263 acres of impervious area in the various sewer sheds in the targeted areas.

Project Name	Project Description	Project Purpose*
Gray Projects		
CSOs 014/15 – Erie Basin In-line storage and optimization	**SEE DETAILS FOLLOWING FOR SPECIFIC PROJECTS**	
SPPs 206A&B	A new 113,000 gallon in-line storage facility was constructed in association with SPPs 206A&B to reduce CSOs at CSO 014. This site is located at Trenton Road/ Village Court north east of Fourth Street.	This project was designed to provide in-line storage thereby decreasing CSO 014 discharges through SPPs 206A&B. Together with other LTCP projects, this project is projected based on the TY to reduce discharges to the Erie Basin through CSO 014 to 2 activations.
SPP 035	A new 50,000 gallon in-line storage facility was constructed between the Genesee Trunk and Swan Trunk sewers to create additional storage capacity in association with SPP 035 (CSO 015). This project is located to the north west of the intersection of South Elmwood Avenue and West Genesee Street.	This project was designed to provide in-line storage thereby decreasing CSO 015 discharges through SPP 35. Together with other LTCP projects, this project is projected based on the TY to reduce discharges to the Erie Basin through CSO 015 to 0 activations.
SPP 036	This project consisted of the reconstruction of 35' of 30" sewer associated with SPP 036 to reverse the slope. This site is located on Church Street between the off and on ramps of the Skyway bridge (State Route 5).	This sewer reconstruction project was designed to increase the underflow capacity of the CSS thereby decreasing CSO 015 discharges. Together with other LTCP projects, this project is projected based on the TY to reduce discharges to the Erie Basin through CSO 015 to 0 activations.
CSO 013 – Satellite storage, conveyance, FM & PS	CSO 013 is located at the extension of Virginia Street, in LaSalle Park, into the Black Rock Canal, the structure is tentatively planned to be built between the last SPP structure and the Canal. The proposed satellite storage facility would consist of a covered, concrete, underground tank. This project is currently on hold pending the Model Recalibration.	This storage project would provide off-line storage thereby decreasing CSO 013 discharges. Preliminary design is for a 0.3 MG offline storage facility. Together with other LTCP projects, this project is projected based on the TY to reduce discharges to the Black Rock Canal through CSO 013 to 4 activations.

Project Name	Project Description	Project Purpose*
North Relief – Interceptor	The original conception of this project was of a deep tunnel relief sewer to run in the vicinity of Niagara Street between Bird Avenue and Albany Street with an additional line connecting the tunnel to the WWTP influent siphon. Preliminary design is for 5,310' of 96"pipe and 571' of 120" pipe. Due to site constraints this project may be redesigned.	The purpose of this project is to reduce discharges through CSOs 004, 011, and 012, by creating a new relief sewer thereby creating offline storage capacity capacity in the CSS. Together with other LTCP projects, this project is projected based on the TY to reduce discharges to the Black Rock Canal through CSO 004 to 3 activations, CSO 011 to 4 activation, and CSO 012 to 2 activations.
CSOs 010, 008/010, 061, 004 – Underflow capacity upsizing	This project will consist of upsizing of underflow piping to maximize flow to the interceptors. This project is tentatively proposed for between Breckenridge Street and Brace Street along the I-190 with an extension along Brace Street across Niagara Street.	This underflow capacity upsizing project would increase the capacity of the CSS thereby decreasing CSO 010, 008, 061 and 004 discharges. Together with other LTCP projects, this project is projected based on the 1993 Modified Typical Year to reduce discharges to the Black Rock Canal through CSO 004 to 3 activations, CSO 010 to 1 activations, CSO 008 to 0 activations, and CSO 061 to 4 activations.
SPP 337 (CSO 053) – Satellite storage, conveyance, FM & PS	SPP 337 is located at Colorado Street North of Scajaquada Street. The proposed satellite storage facility would consist of a covered, concrete, underground tank.	The purpose of this project is to reduce discharges through CSO 53 to the Scajaquada Creek. Preliminary design is for a 0.7 MG off-line storage facility. Together with other LTCP projects, this project is projected reduce CSO discharges to Scajaquada Creek based on the TY to 4 activations.
SPP 336A&B (CSO 053) – Satellite storage, conveyance, FM & PS	SPP 336A&B are located on Humboldt Parkway on each side of the Scajaquada Drain. The proposed satellite storage facility would consist of a covered, concrete, underground tank.	The purpose of this project is to reduce discharges through CSO 53 to the Scajaquada Creek. Preliminary design is for a 4.2 MG off-line storage facility. Together with other LTCP projects, this project is projected reduce CSO discharges to Scajaquada Creek based on the TY to 4 activations.
Jefferson Avenue & Florida Street (CSO 053) – Satellite storage, conveyance and FM	The proposed location for this facility is in the vicinity of the intersection of Jefferson Avenue and Florida Street. The proposed satellite storage facility would consist of a covered, concrete, underground tank.	The purpose of this project is to reduce discharges through CSO 53 to the Scajaquada Creek. Preliminary design is for a 2.6 MG off-line storage facility. Together with other LTCP projects, this project is projected reduce CSO discharges to Scajaquada Creek based on the TY to 4 activations.

Project Name	Project Description	Project Purpose*
CSO 055 – Satellite storage, conveyance, FM & PS	For CSO 055, the proposed storage facility would be located upstream of the regulator, near Military Road. At this location, an offline facility would be constructed and flows above 26 MGD (instantaneous peak) would be diverted from the South Hertel Trunk sewer into the storage facility. The proposed satellite storage facility would consist of a covered, concrete, underground tank.	The purpose of this project is to reduce discharges through CSO 55 to the Niagara River. Preliminary design is for a 7.5 MG off-line storage facility. Together with other LTCP projects, this project is projected reduce CSO discharges to the Niagara River through CSO 55 based on the TY to 9 activations.
CSOs 028/044/047 - Satellite storage, conveyance, FM & PS	The proposed location for this facility is underneath the Tops parking lot between South Park Avenue and the Buffalo River. The proposed satellite storage facility would consist of a covered, concrete, underground tank.	The purpose of this project is to reduce discharges through CSO 28 to the Buffalo River and through CSOs 047 and 044 to Cazenovia Creek. Preliminary design is for a 2.3 MG off-line storage facility. Together with other LTCP projects, this project is projected reduce CSO discharges based on the TY to 6 activations through CSO 028, 2 activations through CSO 044 and 3 activations through CSO 047.
CSO 052 – Satellite storage, conveyance, FM & PS	The proposed location for this facility is in the vicinity of South Ogden Street between Mineral Springs Road and Cazenovia Creek. The proposed satellite storage facility would consist of a covered, concrete, underground tank.	The purpose of this project is to reduce discharges through CSO 52 to the Buffalo River. Preliminary design is for a 0.6 MG offline storage facility. Together with other LTCP projects, this project is projected reduce CSO discharges to the Buffalo River through CSO 052 based on the TY to 3 activations.
CSO 064 – Satellite storage, conveyance, FM & PS	The proposed location for this facility is in the vicinity of the confluence of Ohio, Louisiana and Saint Claire Streets. The proposed satellite storage facility would consist of a covered, concrete, underground tank.	The purpose of this project is to reduce discharges through CSO 064 to the Buffalo River. Preliminary design is for a 0.1 MG off-line storage facility. Together with other LTCP projects, this project is projected reduce CSO discharges to the Buffalo River through CSO 064 based on the TY to 3 activations.

***Note:** Black Rock Canal Performance Criterion is 4 Activations in the Typical Year
Buffalo River Performance Criterion is 6 Activations in the Typical Year
Cazenovia Creek - B Performance Criterion is 4 Activations in the Typical Year
Cazenovia Creek - C Performance Criterion is 6 Activations in the Typical Year
Erie Basin Performance Criterion is 2 Activations in the Typical Year
Niagara River Performance Criterion is 9 Activations in the Typical Year
Scajaquada Creek - Performance Criterion is 4 Activations in the Typical Year

Attachment C to the Semi-Annual Status Report: March 2022

Public Meeting Materials

Will there be any odors once the project is completed?

No odors will be present upon completion of the project. BSA will employ a continuous flushing and cleaning program to diminish the number of leftover solids that may create odors.

Is there a higher risk that my basement will backup?

No. The system is designed to ensure the prevention of basement back-ups and damage to the Treatment Plant by providing flow relief in the combined sewer systems.

Are the sewers structurally capable of handling this material, despite their age?

Yes. The sewer systems are in excellent condition despite their age. They have been inspected,

Mill Race Real Time Control Structure Project: Fact Sheet

BUFFALO
SEWER AUTHORITY

Buffalo Sewer Authority

1038 City Hall
65 Niagara Square
Buffalo, NY
14202

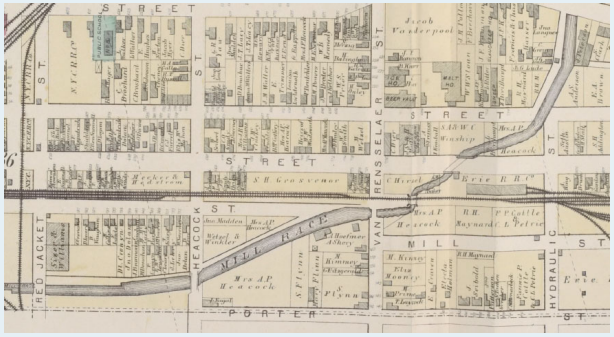
Phone: 716-851-4664

What is this project?

The Buffalo Sewer Authority (BSA) is working together with the Environmental Protection Agency and the New York State Department of Environmental Conservation (NYSDEC) on a 20-year Long Term Control Plan. This plan is focused on significantly improving water quality of the local water bodies and waterways.

What does this project involve?

This project will install a weir inside the existing sewer system and series of chambers to control the flow to the treatment plant. The implementation of this project is estimated to cost $4,000,000 with 75% of costs covered provided through a NYSDEC grant.



Project Location Map

How was this project designed?

This project was designed by Licensed Professional Engineers who are highly proficient in water and wastewater conveyance and treatment.

Where can I find design details?

Plans and Specifications can be found at the BSA's office.

When and what can I expect during construction?

Construction is expected to start in early 2022, and conclude at the end of 2022. During construction, the street and a portion of 236 Larkin will be dug up to install the Real Time Control weir and chambers. There will be noise and dust while heavy machinery is operated for the excavation. One can also expect traffic disturbances and odors from the sewer system. These disturbances will be minimized as much as possible during construction. After the project is completed, these disturbances will be eliminated. The BSA will have a full-time representative onsite during construction to answer any questions or complaints. If you would like further information, please call or email Rosaleen Nogle, Principal Sanitary Engineer, at the BSA at (716) 851-4664 or rnogle@buffalosewer.org.

Attachment D to the Semi-Annual Status Report: March 2022

CSO 010 Alternatives Analysis Report

Buffalo Sewer Authority

Combined Sewer Overflow (CSO) No. 008, 010, and 061

Alternatives Evaluation – Final Report

Prepared for:

Buffalo Sewer Authority
City Hall - Room 1038
65 Niagara Square
Buffalo, NY 14202

Prepared By:

AECOM
1 John James Audubon, Suite 210
Buffalo, New York 14228

December 2021

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References

1. Buffalo Sewer Authority Geographical Information System
2. Greeley and Hansen Engineers, Buffalo Sewer Authority Intercepting Sewer Division X Drawings, March 1937
3. GHD, Figure 1 – BSA Wet Weather Flow Optimization, Niagara at Breckenridge Leaping Weir, October 2019
4. Malcolm Pirnie Arcadis, Buffalo Sewer Authority – Long Term Control Plan Final, January 2014
5. Arcadis, BSA Collection System Model Update, CSOs Activation Condition – Existing and Post LTCP Projects, April 16, 2020

1. Introduction

Buffalo Sewer Authority (BSA) retained AECOM to evaluate CSOs 008, 010, and 061 and provide recommended alternatives to reduce the volume and number of annual activations for these CSOs. The alternatives include green infrastructure, sewer separation, dry weather flow sewer upgrade, and upstream flow diversion.

The three (3) CSOs were previously evaluated as part of the BSA's Long Term Control Plan (LTCP) – Final, dated January 2014. The purpose of this report is to review the LTCP and confirm a recommended alternative for each CSO. Per the LTCP, the recommended alternative for all three (3) CSOs is underflow capacity upsizing. This alternative would increase the size of the existing sewers that convey wastewater to the interceptor and ultimately to the Bird Island Wastewater Treatment Plant (WWTP) to prevent the wastewater from overflowing into the Black Rock Canal via the CSOs. The LTCP provides an estimated project cost of $500,000 (2014 dollars) to perform this work; however, recent modifications/improvements to the sewer systems associated with these CSOs and changes to this sewershed have presented the potential for considering other alternatives relative to the LTCP recommendation of sewer upsizing.

1.1. Background

The three (3) CSOs are located in the Scajaquada District and discharge to the Black Rock Canal. Figure 1 shows the Scajaquada District and the multiple CSOs predominately at the Black Rock Canal. The main interceptor trunk line in the Scajaquada District is the Scajaquada Tunnel Interceptor which carries flow from the sewershed and from Cheektowaga towards the Black Rock Canal. Eleven of the BSA's CSOs are located within the District and the receiving water bodies are Scajaquada Creek and the Black Rock Canal. Figure 2 shows the CSOs along the Black Rock Canal and highlights (green outline) the CSOs (i.e., 008, 010, and 061) that are reviewed as part of this alternative evaluation. In addition, Figure 2 shows the originally proposed pipe upsizing location (shown in red) that would convey combined sewer wastewater to the Bird Island WWTP and minimize the activation of these CSOs. This sewer pipe upsizing presents some constructability and logistical challenges given its location to the Interstate 190 (I-190) and proximity to the Black Rock Canal wall. Thus, additional alternatives were considered as part of this evaluation including green infrastructure, sewer separation, and upstream flow diversion.

Figure 1
Scajaquada District

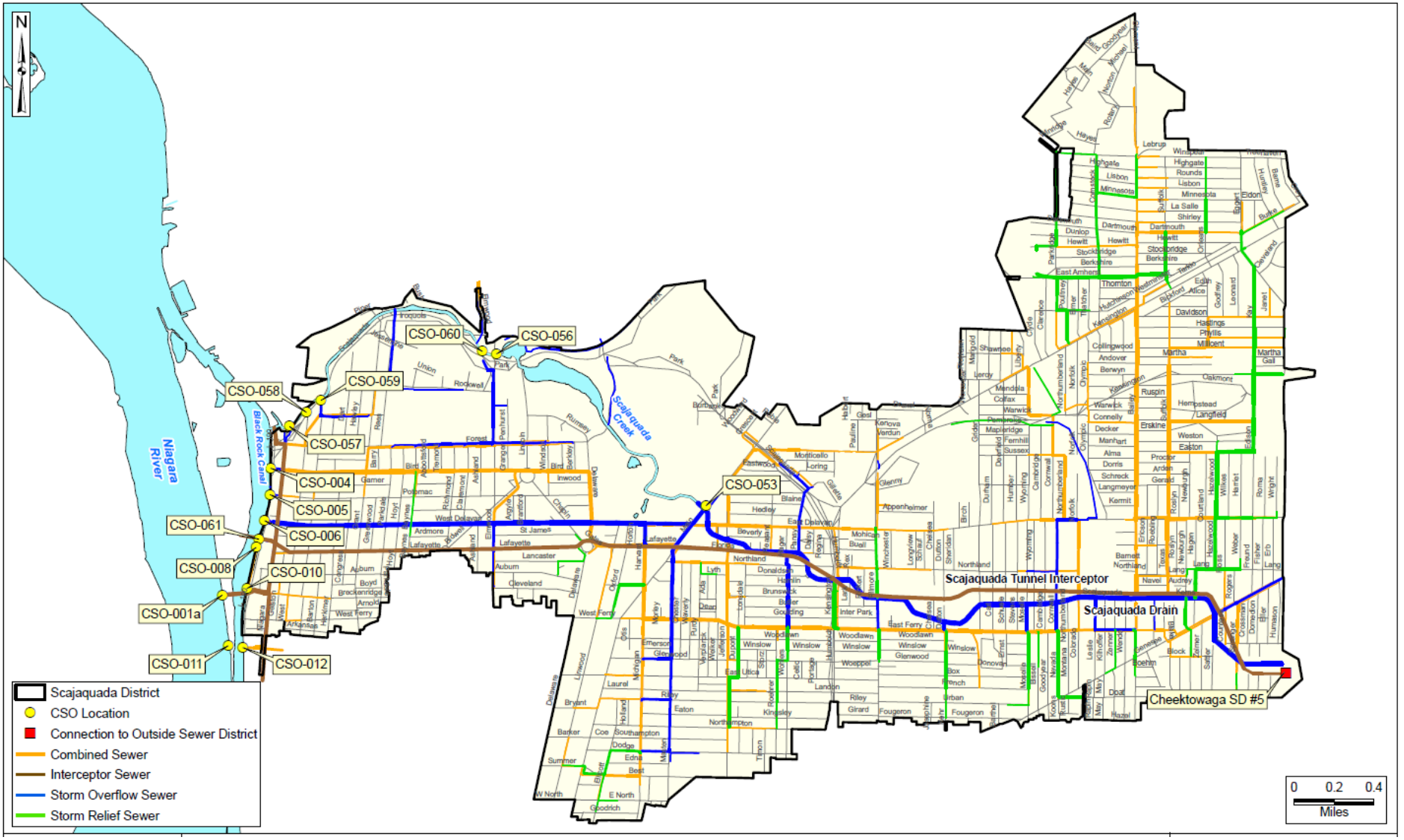
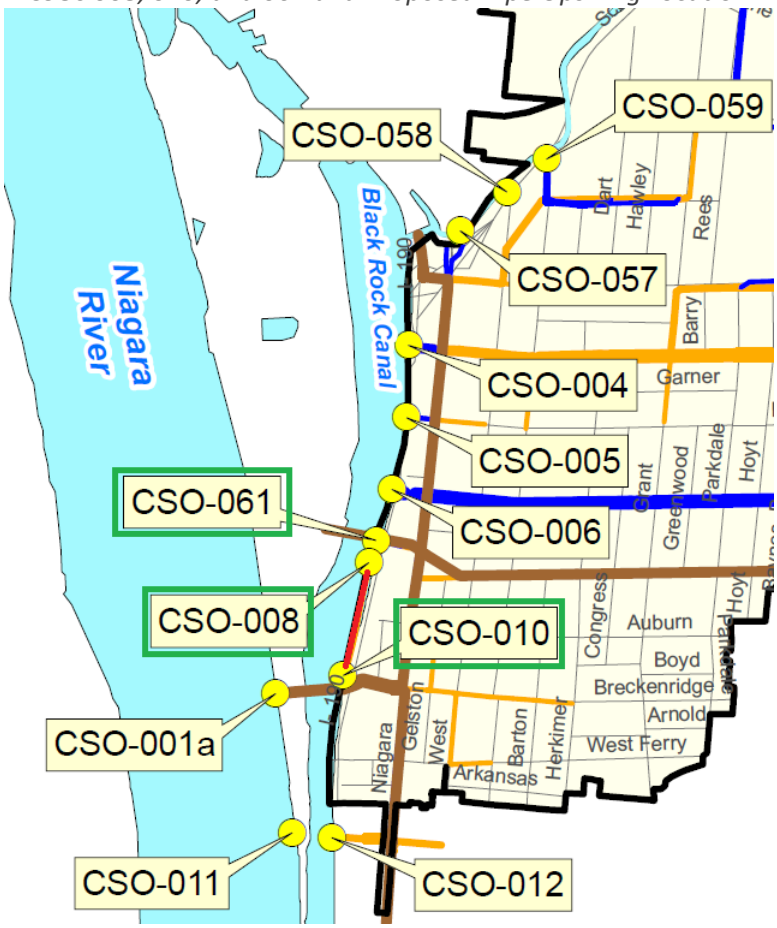


Figure 2
CSOs 008, 010, and 061 and Proposed Pipe Upsizing Location



1.1.1. CSO 008

CSO 008 is located at Brace Street on the west side of the I-190 Thruway. The CSO is downstream of Sewer Patrol Point (SPP) 019. CSO 008 location and sewershed are shown in Figures 3 and 4, respectively. The sewer shed area is 51.65 acres and the receiving waterbody is the Black Rock Canal.

Figure 3
CSO 008 Location

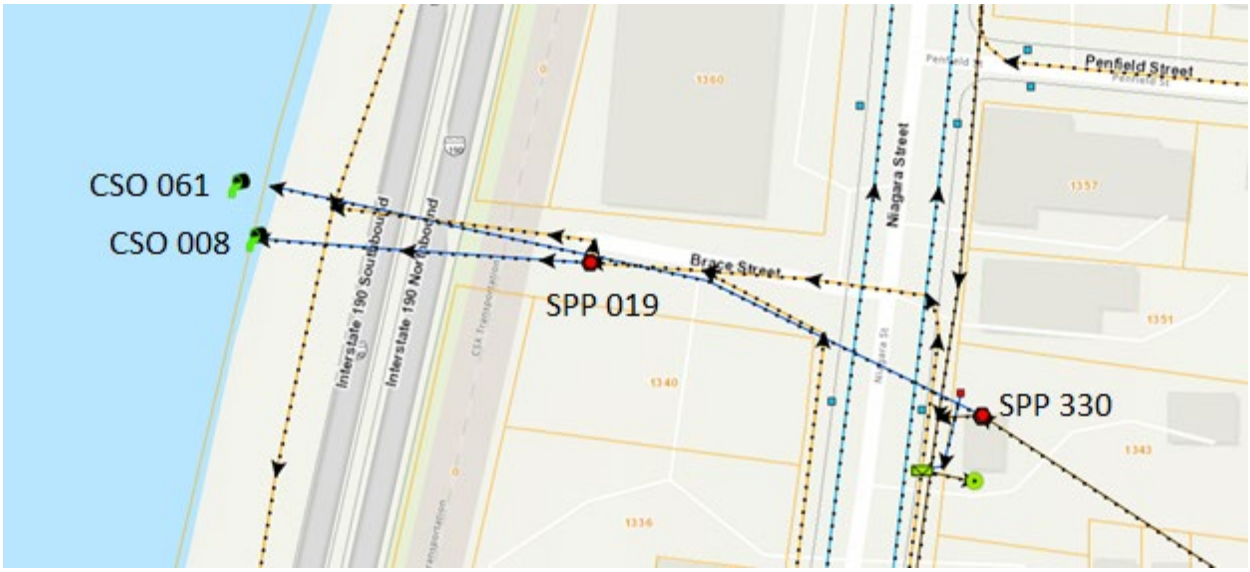
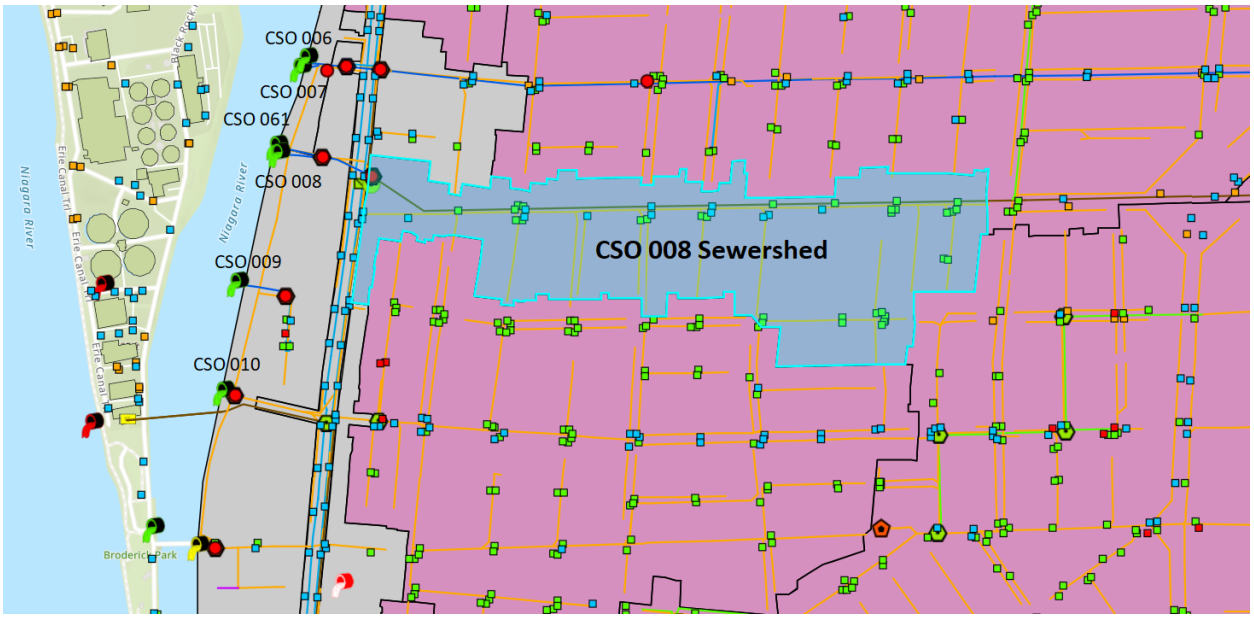


Figure 4
CSO 008 Sewershed



The existing storm overflow sewer from SPP 019 to CSO 008 is a 24-inch diameter brick sewer. The combined sewer that conveys flow from SPP 019 to the interceptor to the Bird Island WTP is vitrified tile and ranges in diameter from 15 inches to 18 inches. The combined sewer is located parallel to the I-190 Thruway in an old toll booth area adjacent to the canal wall. This combined sewer is the existing sewer that is proposed to be upsized in the LTCP. See Figure 5 below for the combined sewer location (shown in red).

Figure 5
CSO 008 Proposed Combined Sewer Upsizing Location

To date, two projects have been completed to reduce the volume and number of annual activations at CSO 008. The CSO 008 Sewer Separation project was completed between 2005 and 2010. This project separated the storm sewers in various streets throughout the sewer shed. Also, an existing overflow control structure (i.e., weir) near Lafayette Avenue and Niagara Street was cleaned out and a blockage was cleared. To prevent future blockage, AECOM recommends periodic preventative maintenance inspections at this location.

Arcadis provided BSA with a Model Update, dated April 16, 2020. Per the Model Update, the target control activations for this CSO is four (4) per year. CSO 008 has zero (0) activations per year with the completion of the sewer separation projects and mitigating the blockage issues. Therefore, CSO 008 is in compliance with the target activation requirement and requires no further action. Therefore, no additional alternatives were considered for this evaluation.

1.1.2. CSO 010

CSO 010 is located at Breckenridge Street on the west side of the I-190 Thruway. This CSO is downstream of SPP 021. The CSO 010 location and sewershed are shown in Figures 6 and 7, respectively. The sewershed area is 104.12 acres and the receiving waterbody is the Black Rock Canal.

Figure 6
CSO 010 Location

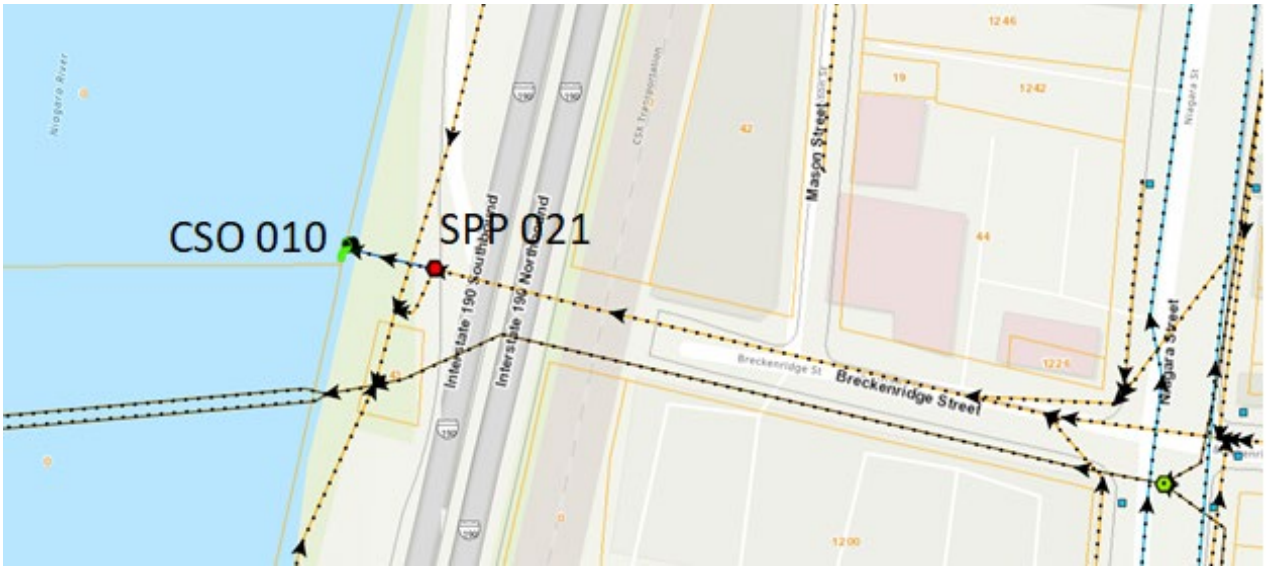
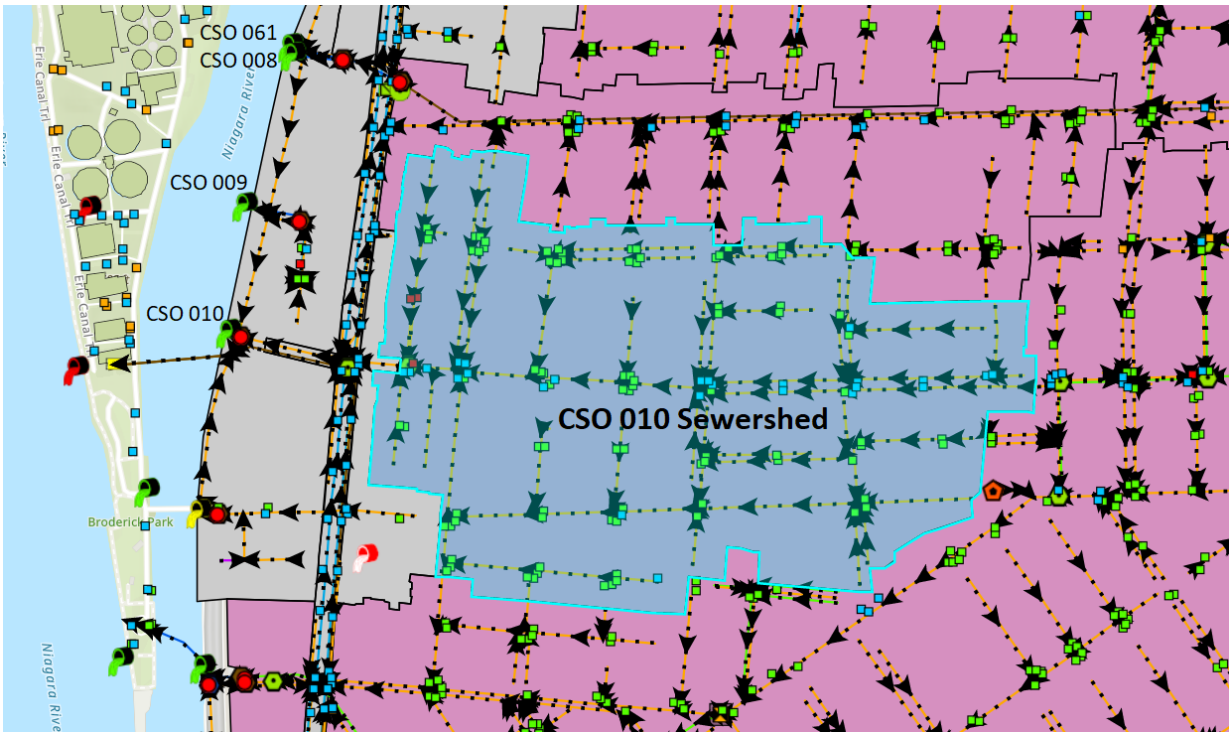


Figure 7
CSO 010 Sewershed



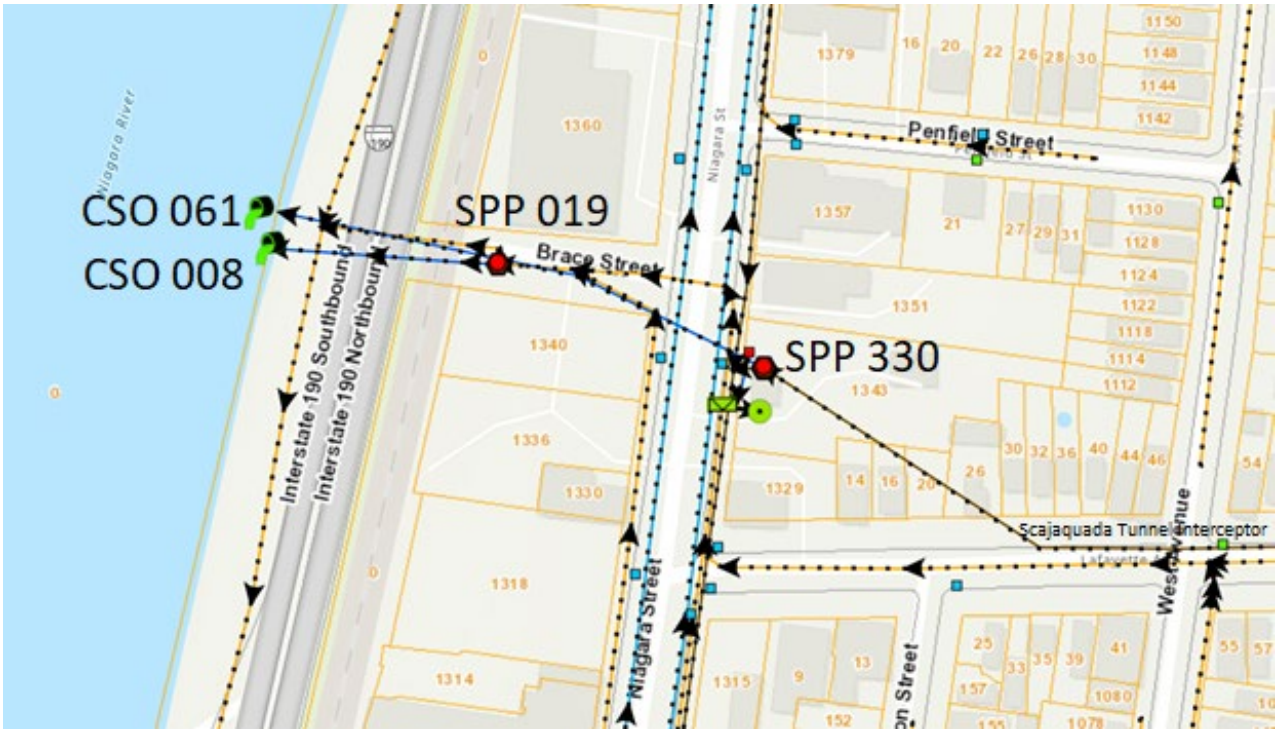
The existing combined sewer that conveys flow to SPP 021 is a 36-inch diameter brick sewer. The storm overflow sewer from SPP 021 to CSO 010 is a 36-inch diameter reinforced concrete pipe. The combined sewer that conveys flow from SPP 021 to the interceptor to the Bird Island WWTP is a 12-inch vitrified tile sewer. This combined sewer was proposed to be upsized in the LTCP.

To date, there have been no projects completed to mitigate CSO 010 activations during storm events. Per the Model Update, dated April 16, 2020, the target control activations for this CSO is four (4) per year. The model identified CSO 010 activated fourteen (14) times per year and overflows totaling approximately 8.16 million gallons per year. Thus, alternatives for CSO 010 were evaluated in this report to reduce the volume and number of annual activations.

1.1.3. CSO 061

CSO 061 is located just north of CSO 008 at Brace Street on the west side of the I-190 Thruway. The CSO is downstream of SPP 330. Figure 8 shows the CSO 061 location.

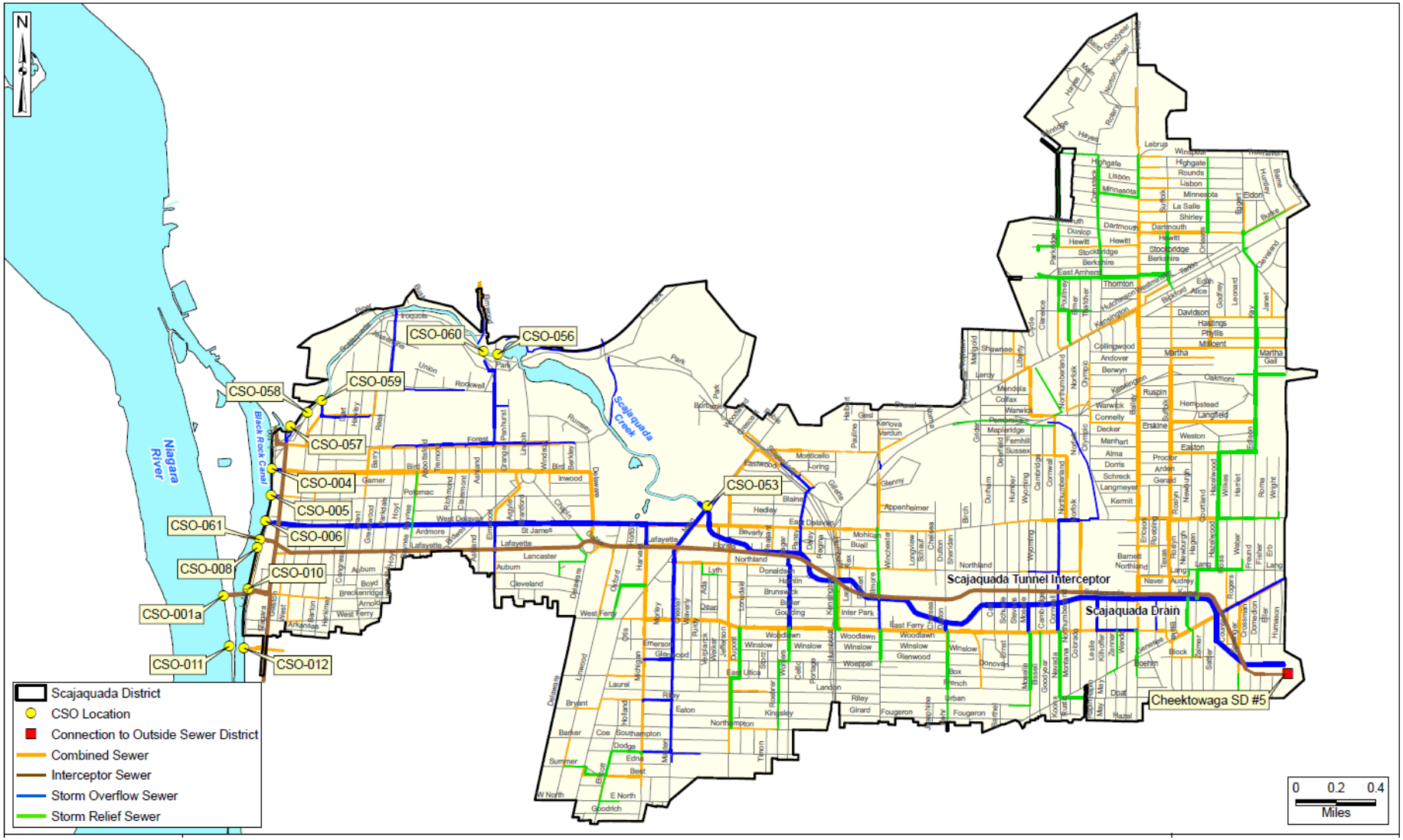
Figure 8
CSO 061 Location



CSO 061 is the outfall for the Scajaquada Tunnel which is a 90-inch reinforced concrete pipe that runs east to west across the City of Buffalo and receives flow from Cheektowaga Sewer District #5. The Scajaquada Tunnel sewershed receiving waterbody is the Black Rock Canal. Figure 9 shows the location of the Scajaquada Tunnel (shown in brown).

Figure 9

Scajaquada Tunnel Interceptor



Modifications to the SPP 332 weir in 2016 have mitigated the CSO 061 activations during storm events. SPP 332 is located upstream of CSO 061 in the Scajaquada Tunnel at Lafayette Avenue and Delaware Avenue. This project included removal of an existing bench and installation of a new concrete weir.

Per the Model Update, dated April 16, 2020, the target control activations for this CSO is four (4) per year. Following the completion of the SPP weir modifications, CSO 061 has zero (0) activations per year. Therefore, CSO 061 is in compliance, requires no further action, and thus no additional alternatives were considered for this evaluation.

2. Alternatives Evaluation – CSO 010

AECOM evaluated four (4) alternatives to address the annual overflow volume and activations at CSO 010. These alternatives included green infrastructure, sewer separation, dry weather flow sewer upgrade and upstream flow diversion. Model runs needed to evaluate these alternatives were developed by AECOM and were performed by Arcadis. The summary of the model run output was provided to AECOM.

2.1. Green Infrastructure

The LTCP calls for green infrastructure (GI) implementation of either 10 or 20 percent for each CSO sewershed. The goal for CSO 010 is 20 percent GI. BSA is passively implementing GI by accounting for reduction in impervious area as redevelopment occurs. In particular, as abandoned buildings are demolished and lots are cleared, the reduction in impervious area is accounted for as potential GI within the sewershed. Annually, the model is updated with new impervious and pervious areas for each sub-sewershed based on the properties addressed.

A model run was performed that implemented 20 percent green infrastructure in the CSO 010 sewershed. The model assumed that runoff from 20 percent of the sewershed area was routed over permeable pavement. Implementing these conditions to the BSA collection system model determined that there would be 6.5 million gallons (MG) of overflow volume and thirteen (13) annual activations. It is AECOM's assumption that 20 percent of the sewershed will need to be permeable pavement, independent from the abandoned buildings that are being demolished annually. The rate of reduction of impervious area due to demolition of abandoned buildings is less then 1% GI reduction per year, therefore this assumption is reasonable.

This alternative will only decrease the annual CSO 010 activation by one (1) and the overflow volume decreases by 1.66 MG. This alternative does not meet the target activations. This alternative would require significant construction to implement permeable pavement and would still not meet the target CSO activations. Thus, this is not a feasible alternative.

2.2. Sewer Separation

This alternative includes the installation of new sanitary sewer to convey the sewage from the CSO 010 sewershed to the south interceptor on Niagara Street. New sanitary sewers would be installed, and the existing laterals will be connected. The existing combined sewers will be converted to storm sewers and the existing catch basins and roof drains from homes will remain connected to the storm drainage system. The storm drainage system will thus remain in the location of the existing combined sewers and will be disconnected from the combined flow to the Bird Island WWTP and will outfall at CSO 010.

Two model runs were performed to analyze the potential for the sewer separation alternative. The first model run assumed 100 percent sewer separation (i.e., all sewers in the sewershed will be separated). This model run determined there would be 0.64 MG overflow volume and 3 annual activations. The second model run assumed 50 percent sewer separation (half of the sewers would be separated) in the sewershed. This model run determined there would be 3.59 MG overflow volume and 8 annual activations.

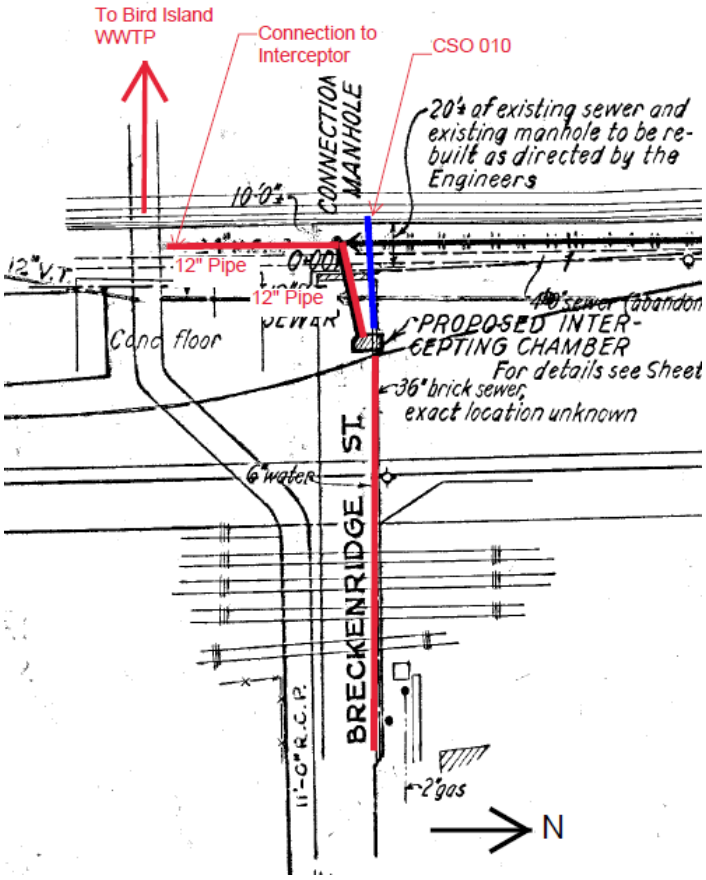
Based on the results of the BSA collection system model runs, 50 percent sewer separation does not comply with the annual target activations requirement (i.e., 4 activations). The 100 percent sewer separation approach does comply with the annual target activations with three (3) annual activations and 0.64 MG overflow volume. Therefore 100 percent sewer separation is the only feasible option for sewer separation.

To perform sewer separation of the entire sewershed, each street of the 104.12 acre sewershed will require construction work to implement the new collection and conveyance piping. This amount of construction and disturbance to the neighborhood would present challenges.

2.3. Dry Weather Flow Sewer Upgrade

This alternative includes upsizing the existing 12-inch diameter sewer from SPP 021 to the interceptor that carries flow to the Bird Island WWTP. The sewer that would need upsizing is approximately 120-feet in length; however, it is located along an existing canal wall that presents conditions unfavorable for potential disturbance during construction when modifying this sewer. Figure 10 shows the location and flow path for the existing sewer in this location.

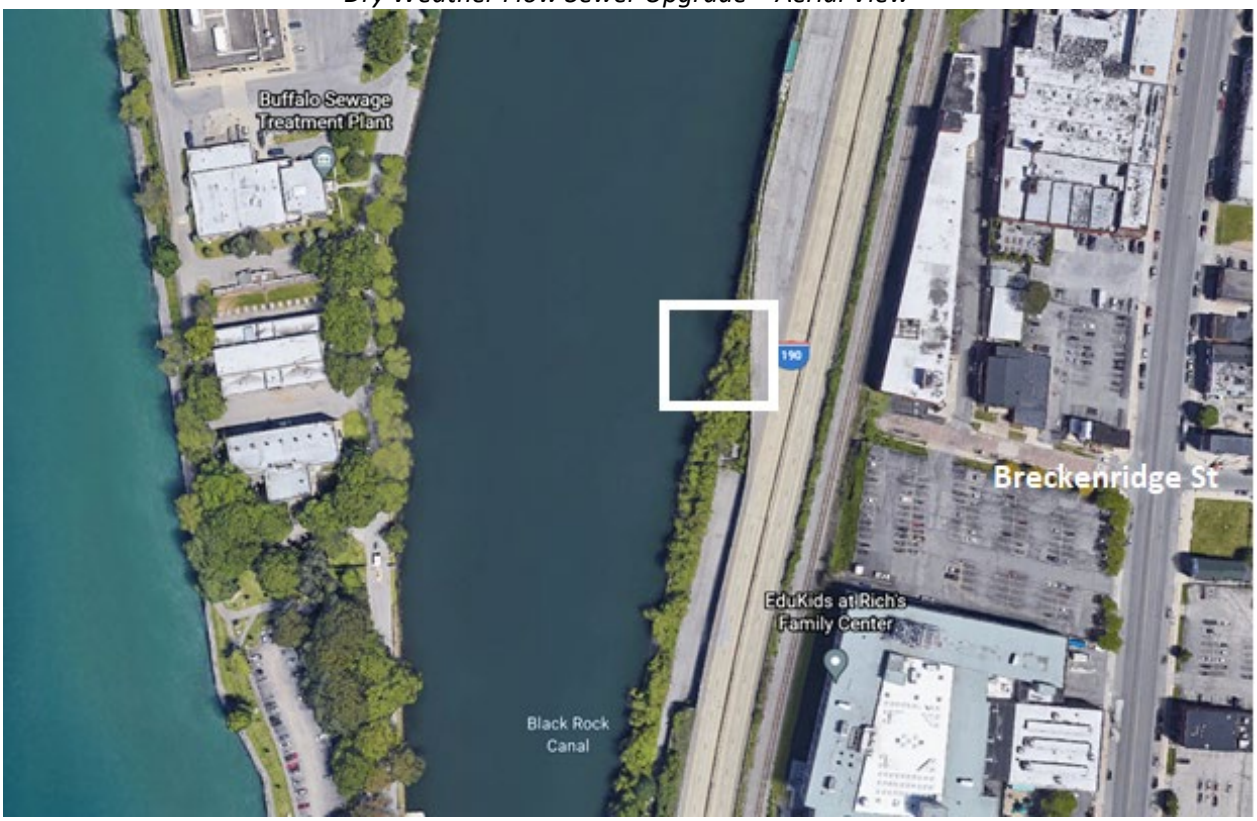
Figure 10
Existing Sewer Plan



The red lines shown in Figure 10 indicate normal dry weather flow while the blue line indicates the storm overflow sewer that carries flow to CSO 010. The "Proposed Intercepting Chamber" shown in the figure is the location of SPP 021. The existing 12-inch pipe from SPP 021 to the 11-foot reinforced concrete pipe (RCP) interceptor to the Bird Island WWTP is proposed to be upsized.

This alternative will require construction along the existing deteriorating canal wall and adjacent to the active NY-190 Thruway. Figure 11 shows the proposed project area outlined in white.

Figure 11
Dry Weather Flow Sewer Upgrade – Aerial View



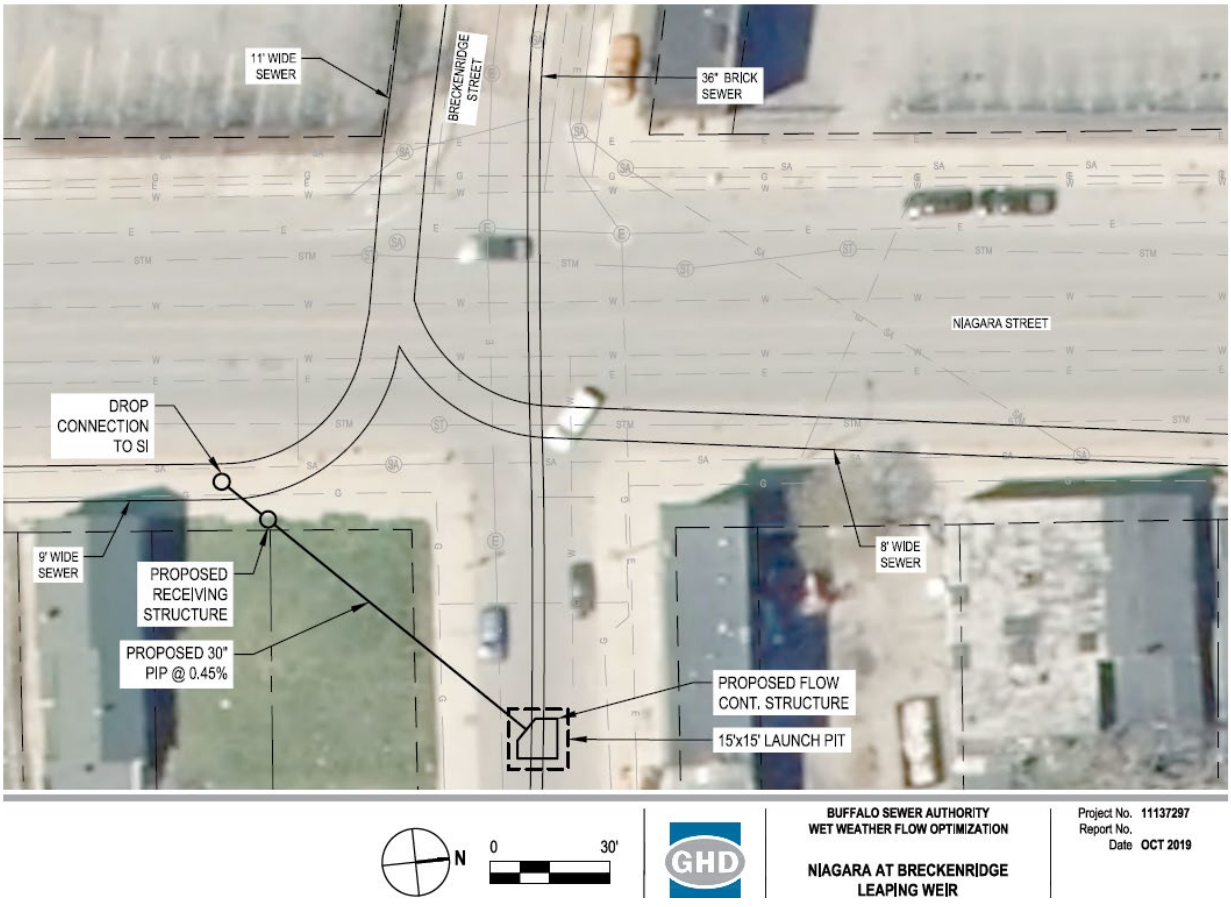
Two (2) model runs were performed to evaluate this alternative. The first model run assumed the existing 12-inch sewer is upsized to an 18-inch sewer. This scenario would result in approximately 1.58 MG of annual overflow volume and 4 annual activations. The second scenario evaluated upsizing the existing sewer to a 24-inch sewer and the model determined there would be approximately 0.56 MG of annual overflow volume and 3 annual activations. Both model scenarios assumed the same slope and alignment for the new sewer as the existing sewer.

The 18-inch sewer upsizing scenario did result in a fifth annual activation as part of the modeling exercise that is just below the 0.1 MG volume cutoff. Therefore, this alternative considers the 24-inch pipe upsizing option as the approach to mitigate potential exceedance above the 4 activation target.

2.4. Upstream Flow Diversion

As part of the upstream flow diversion evaluation, the BSA CSO team including Arcadis, GHD, and EmNet, proposed the use of a new control structure in the existing CSO combined sewer. The proposed plan is to intercept flow before it reaches SPP 021 and send the bulk of the flow to the south interceptor that connects to the Bird Island WWTP. A new control structure is proposed to be installed on Breckenridge Street with a drop connection to the south interceptor. GHD originally proposed a 30-inch sewer sloped at 4.5 percent to connect from the new intercepting manhole to the south interceptor. If capacity is not available in the south interceptor during a high flow event, flow would overtop a weir in the new control structure and continue to SPP 021. This concept assumes one sluice gate and one flow meter will be installed in the proposed flow control structure. The control devices in the proposed structure will be further evaluated if this alternative is selected. Figure 12 shows the proposed upstream flow diversion concept.

Figure 12
Proposed Diversion Structure



This alternative would need to minimize damage/disturbance to the newly renovated Niagara Street. The sewer is proposed to be installed crossing vacant lots with the intention of minimizing disturbance to Niagara Street. The BSA will need to obtain easements for installation of this sewer in the vacant lots.

Two potential sewer pipe size scenarios connecting the proposed diversion structure to the south interceptor were evaluated using the BSA collection system model. The first scenario evaluated a 15-inch connecting sewer at a 1 percent slope. This scenario produced estimated model results of 1.27 MG of annual overflow volume and 4 annual activations. The second scenario evaluated using an 18-inch connecting sewer at a 1 percent slope. The second scenario produced estimated model results of 0.4 MG of annual overflow volume and 2 annual activations.

Due to the small increase of pipe size from the first scenario (i.e., 15-inch connecting sewer) to the second scenario (i.e., 18-inch connecting sewer) and the lower volume of overflow and annual activations, the 18-inch connecting sewer was evaluated for this alternative.

3. Cost Estimates

Association for the Advancement of Cost Engineering (AACE) International Class 5 standards, for which the estimated accuracy range is from -50% to +100%, total installed capital cost estimates for each alternative were developed. Details of the cost estimates are included in Appendix A.

The estimates include equipment cost, freight, labor, contractor overhead and markup, and engineering. The costs are based on quotations from vendors, published unit costs for labor and commodities, and AECOM's prior experience with similar facilities. Additionally, costs for startup, commissioning, and engineering services during construction are included in the total installed cost estimate.

The major capital cost assumptions include the following:

- Escalation is included to midpoint of construction. Construction starts in year 2022.
- Contingency of 30 percent.
- Alternative 1 – GI runoff from 20 percent of the sewershed area was routed over permeable pavement.
- Alternative 2 – the new sanitary sewer installation will be in the same location and configuration as the existing combined sewer. A majority of the new sanitary sewer system will be 8-inch PVC pipe and will transition to 12-inch PVC pipe.
- Alternative 3 – the new 24-inch sewer will be the same slope and alignment as the existing sewer. A barge will be utilized for a period during construction to perform modifications to the existing interceptor.
- Alternative 4 – costs included for a permanent easement for installation of the new dry weather flow sewer connecting the proposed diversion structure to the south interceptor.

Table 1 presents a summary of the alternative's Class 5 capital estimates.

Table 1
Cost Estimate Summary

Alternative #	Description	Capital
1	Green Infrastructure	$8,363,000
2	Sewer Separation	$16,084,000
3	Dry Weather Flow Sewer Upgrade	$850,000
4	Upstream Flow Diversion	$792,000

Alternatives 1 and 2 present the highest capital costs due to the large quantity of construction in the sewershed. These alternatives are also the least feasible due to their annual activations and constructability requirements. Alternatives 3 and 4 are the most feasible and are similar magnitudes in cost. Therefore, alternatives 3 and 4 are the only alternatives considered.

4. Conclusions and Recommendations

CSO's 008, 010, and 061 were previously evaluated as part of the BSA's LTCP that recommended underflow sewer capacity upsizing to mitigate CSO activations. This sewer pipe upsizing presents some constructability and logistical challenges given its location to the I-190 Thruway and proximity to the Black Rock Canal wall. Thus, additional alternatives were considered as part of this evaluation including green infrastructure, sewer separation, and upstream flow diversion. Based on this evaluation, the following conclusions were developed:

- Two projects have been completed to reduce the volume and number of annual activations at CSO 008. CSO 008 is in compliance with the target activation requirement and requires no further action.

- Modifications to the SPP 332 weir in 2016 have mitigated the CSO 061 activations during storm events. CSO 061 is in compliance with the target activation requirements and requires no further action.

- To date, there have been no projects completed to mitigate CSO 010 activations during storm events and this CSO exceeds the target requirements for annual activations. Thus, alternatives for CSO 010 were considered to reduce the volume and number of annual activations. The BSA collection system model was used to evaluate if/how the respective alternative can be implemented to achieve the target CSO activation requirement.

    - Green infrastructure – 20 percent GI was implemented and the model determined that there would be 6.5 MG of overflow volume and thirteen annual activations, therefore this alternative was not considered feasible.
    - Sewer Separation – two model runs were performed (100 percent sewer separation and 50 percent sewer separation) and 100 percent sewer separation was considered the only feasible option due to the compliance with the target activations.
    - Dry Weather Flow Sewer Upgrade – the existing 12-inch diameter sewer would need to be upsized to 24-inch diameter to meet the target activations. This alternative would require construction along the I-190 and Black Rock Canal wall.
    - Upstream Flow Diversion – a new intercepting chamber upstream of SPP 021 with an 18-inch diameter sewer would be required to meet the target activations. This alternative requires connection to the existing south interceptor and a permanent easement in a vacant lot.

- Based on the concepts and costs that were developed for each alternative, the following recommendations should be considered for achieving the CSO 010 annual activation requirement.

    - Given the construction feasibility challenges and proximity to the Black Rock Canal wall, the Alternative 4, Upstream Flow Diversion, concept should be advanced as the approach for minimizing CSO 010 annual activations. This alternative provides a similar magnitude of cost compared to Alternative 3, Dry Weather Flow Sewer Upgrade, and provides much less risk during design and construction due to the unknown condition of the Black Rock Canal wall and working adjacent to the active I-190 Thruway. Alternative 4 complies with

the target activations with 3 annual activations and reduces the volume of overflow by approximately 95 percent.

- The proximity of the proposed flow diversion structure, sewer connection locations, and pipe routes should be further evaluated to minimize impacts to the recently rehabilitated Niagara Street.

Appendix A

Cost Estimate Details

CLIENT: Buffalo Sewer Authority

LOCATION: CSO 010

Class 5 Cost Estimate (+100%/-50%)

DATE: 11/18/21

Rev.0

FACTORED COST ESTIMATE REPORT

MAIN SUMMARY	
ALTERNATIVE 1 - GREEN INFRASTRUCTURE	
TOTAL ESTIMATED COST	**$ 8,363,055**
ALTERNATIVE 2 - SEWER SEPARATION	
TOTAL ESTIMATED COST	**$ 16,083,542**
ALTERNATIVE 3 - DRY WEATHER FLOW SEWER UPGRADE	
TOTAL ESTIMATED COST	**$ 849,914**
ALTERNATIVE 4 - UPSTREAM FLOW DIVERSION	
TOTAL ESTIMATED COST	**$ 792,204**

AECOM

Capital Cost Estimate

CLIENT: Buffalo Sewer Authority

LOCATION: CSO 010

ALTERNATIVE 1 - GREEN INFRASTRUCTURE

Class 5 Cost Estimate (+100%/-50%)

Order of Magnitude Estimate

DATE: 11/18/21

Rev.0

Item	Unit Design Criteria	Quantity		Basis	Unit Cost	Estimated Cost
Total Equipment Cost (TEC)						$ -
Freight		5%		of TEC		$ -
Spare Parts		5%		of TEC		$ -
Purchased Equipment Cost - Delivered (PEC-D)						**$ -**
Equipment Installation		100%		of TEC		$ -
Instrumentation and Controls - SCADA Programming		90%		of TEC		$ -
Electrical - Installation		90%		of TEC		$ -
CONSTRUCTION - DIRECT						
Excavation/Demolition		6,412	CY	RS Means	$ 17.50	$ 112,216
Subbase	12" Depth	4,449	CY	RS Means	$ 45.00	$ 200,223
Permeable Pavement	6" Depth	106,000	SY	RS Means	$ 30.00	$ 3,180,000
8" Underdrain		3,533	LF	RS Means	$ 18.00	$ 63,600
Biaxial Geogrid		106,000	SY	RS Means	$ 1.10	$ 116,600
Total Direct Cost (TDC)						**$ 3,672,639**
Indirects						
Contractor's Field Indirects	Includes Construction equipment, labor, QA/QC	10%		of TDC		$ 368,000
Contractor's OH	Overhead	15%		of TDC		$ 551,000
Bonds, Insurance	Insurance + Bonds of TDC	1%		of TDC		$ 37,000
Mobilization & demobilization	Mob/Demob of TDC	6%		of TDC		$ 221,000
Subtotal (Indirects)						**$ 1,177,000**
Total Direct Cost + Indirect Cost						**$ 4,849,639**
Contractor's Profit		5%		of TDC+TDIC		$ 242,000
Total Direct + Indirect Costs, including Profit	**Total Probable Construction Cost (TPCC)**					**$ 5,091,639**
EPCM Costs						
Engineering		15%		of TPCC		764,000
Construction Management		10%		of TPCC		510,000
Startup Expenses, O&M, Commissioning, Owner Training		0%		of TDC		-
Total Estimated Capital Cost (without contingency)						**$ 6,366,000**
Contingency		30%		of TPCC		1,528,000
Escalation	Estimated Duration	145	man-mos.	6.00	months	469,055
Total Estimated Capital Cost (a)	8.00%	25	per crew	Start 4/12/22		**$ 8,363,055**

(a) This cost estimate has been prepared for guidance in project evaluation and implementation and was based on information available at the time that the estimate was prepared. Final costs for the project, and the project's resulting feasibility will depend on actual labor and material costs, competitive market conditions, actual site conditions, final project scope, implementation schedule, and other variable factors. As a result, the final project cost will vary from the estimate prepared. Because of these factors, project feasibility, benefit/cost ratios, risks, and funding needs must be carefully reviewed before making specific financial decisions or establishing project budgets in order to help ensure proper project evaluation and adequate funding.

AECOM

Capital Cost Estimate

CLIENT: Buffalo Sewer Authority
LOCATION: CSO 010
Class 5 Cost Estimate (+100%/-50%)
DATE: 11/18/21
Rev.0

ALTERNATIVE 2 - SEWER SEPARATION

Order of Magnitude Estimate

Item	Unit Design Criteria	Quantity		Basis	Unit Cost	Estimated Cost
Total Equipment Cost (TEC)						$ -
Freight		5%		of TEC		$ -
Spare Parts		5%		of TEC		$ -
Purchased Equipment Cost - Delivered (PEC-D)						$ -
Equipment Installation		100%		of TEC		$ -
Instrumentation and Controls - SCADA Programming		90%		of TEC		$ -
Electrical - Installation		90%		of TEC		$ -
CONSTRUCTION - DIRECT						
Excavation	6" Bedding below, 12" on each side of pipe	37,000	CY	RS Mean	$ 20.00	$ 740,000
Backfill	6" Bedding below, 12" on each side of pipe	37,000	CY	RS Mean	$ 45.00	$ 1,665,000
8" Sewer Pipe	Assumed average of 10' depth	15,410	LF	RS Mean	$ 13.00	$ 200,324
12" Sewer Pipe	Assumed average of 10' depth	4,421	LF	RS Mean	$ 23.00	$ 101,683
4' DIA Manhole	61 Manholes	610	VLF	Estimate	$ 1,500.00	$ 915,000
Lateral Reconnection	Assumed 1 per Parcel	764	EA		$ 1,800.00	$ 1,375,200
Pavement Restoration	1.5" Top, 2" Type 3 Binder, 7" Asphalt Base Type 2	21,500	SY	RS Mean	$ 55.50	$ 1,193,250
Disconnect Sewer	Disconnect existing piping from Interceptor	1	ALLOW		$ 150,000.00	$ 150,000
After construction Testing	Die testing	764	EA	RS Mean	$ 800.00	$ 611,200
Total Direct Cost (TDC)						**$ 6,951,657**
Indirects						
Contractor's Field Indirects	Includes Construction equipment, labor, QA/QC	10%		of TDC		$ 696,000
Contractor's OH	Overhead	15%		of TDC		$ 1,043,000
Bonds, Insurance	Insurance + Bonds of TDC	1%		of TDC		$ 70,000
Mobilization & demobilization	Mob/Demob of TDC	6%		of TDC		$ 418,000
Subtotal (Indirects)						**$ 2,227,000**
Total Direct Cost + Indirect Cost						**$ 9,178,657**
Contractor's Profit		5%		of TDC+TDIC		$ 459,000
Total Direct + Indirect Costs, including Profit	**Total Probable Construction Cost (TPCC)**					**$ 9,637,657**
EPCM Costs						
Engineering		15%		of TPCC		1,446,000
Construction Management		10%		of TPCC		964,000
Startup Expenses, O&M, Commissioning, Owner Training		0%		of TDC		-
Total Estimated Capital Cost (without contingency)						**$ 12,048,000**
Contingency		30%		of TPCC		2,892,000
Escalation	Estimated Duration	274	man-mos.	11.00	months	1,143,542
Total Estimated Capital Cost (a)	8.00%	25	per crew		Start 4/12/22	**$ 16,083,542**

(a) This cost estimate has been prepared for guidance in project evaluation and implementation and was based on information available at the time that the estimate was prepared. Final costs for the project, and the project's resulting feasibility will depend on actual labor and material costs, competitive market conditions, actual site conditions, final project scope, implementation schedule, and other variable factors. As a result, the final project cost will vary from the estimate prepared. Because of these factors, project feasibility, benefit/cost ratios, risks, and funding needs must be carefully reviewed before making specific financial decisions or establishing project budgets in order to help ensure proper project evaluation and adequate funding.

AECOM

Capital Cost Estimate

CLIENT: Buffalo Sewer Authority
LOCATION: CSO 010
Class 5 Cost Estimate (+100%/-50%)
DATE: 11/18/21
Rev.0

ALTERNATIVE 3 - DRY WEATHER FLOW SEWER UPGRADE

Order of Magnitude Estimate

Item	Unit Design Criteria	Quantity		Basis	Unit Cost	Estimated Cost
Total Equipment Cost (TEC)						$ -
Freight		5%		of TEC		$ -
Spare Parts		5%		of TEC		$ -
Purchased Equipment Cost - Delivered (PEC-D)						$ -
Equipment Installation		100%		of TEC		$ -
Instrumentation and Controls - SCADA Programming		90%		of TEC		$ -
Electrical - Installation		90%		of TEC		$ -
CONSTRUCTION - DIRECT						
Excavation		300	CY	Estimate	$ 18.00	$ 5,400
Backfill		300	CY	Estimate	$ 45.00	$ 13,500
24" Pipe	15' Depth	120	LF	Estimate	$ 200.00	$ 24,000
4' DIA Manhole		34	VLF	Estimate	$ 1,500.00	$ 51,000
Connection into Interceptor		1	ALLOW	Estimate	$ 200,000.00	$ 200,000
Restoration		1	ALLOW	Estimate	$ 20,000.00	$ 20,000
Access/Safety Equipment		1	ALLOW	Estimate	$ 60,000.00	$ 60,000
Total Direct Cost (TDC)						**$ 373,900**
Indirects						
Contractor's Field Indirects	Includes Construction equipment, labor, QA/QC	10%		of TDC		$ 38,000
Contractor's OH	Overhead	15%		of TDC		$ 57,000
Bonds, Insurance	Insurance + Bonds of TDC	1%		of TDC		$ 4,000
Mobilization & demobilization	Mob/Demob of TDC	6%		of TDC		$ 23,000
Subtotal (Indirects)						**$ 122,000**
Total Direct Cost + Indirect Cost						**$ 495,900**
Contractor's Profit		5%		of TDC+TDIC		$ 25,000
Total Direct + Indirect Costs, including Profit	**Total Probable Construction Cost (TPCC)**					**$ 520,900**
EPCM Costs						
Engineering		15%		of TPCC		79,000
Construction Management		10%		of TPCC		53,000
Startup Expenses, O&M, Commissioning, Owner Training		0%		of TDC		-
Total Estimated Capital Cost (without contingency)						**$ 653,000**
Contingency		30%		of TPCC		157,000
Escalation	Estimated Duration	15	man-mos.	3.00	months	39,914
Total Estimated Capital Cost (a)	8.00%	5	per crew		Start 4/12/22	**$ 849,914**

(a) This cost estimate has been prepared for guidance in project evaluation and implementation and was based on information available at the time that the estimate was prepared. Final costs for the project, and the project's resulting feasibility will depend on actual labor and material costs, competitive market conditions, actual site conditions, final project scope, implementation schedule, and other variable factors. As a result, the final project cost will vary from the estimate prepared. Because of these factors, project feasibility, benefit/cost ratios, risks, and funding needs must be carefully reviewed before making specific financial decisions or establishing project budgets in order to help ensure proper project evaluation and adequate funding.

AECOM

Capital Cost Estimate

CLIENT: Buffalo Sewer Authority
LOCATION: CSO 010
Class 5 Cost Estimate (+100%/-50%)
DATE: 11/18/21
Rev.0

ALTERNATIVE 4 - UPSTREAM FLOW DIVERSION

Order of Magnitude Estimate

Item	Unit Design Criteria	Quantity		Basis	Unit Cost	Estimated Cost
Sluice Gate		1	EA	Estimate	$ 15,000.00	$ 15,000
Flow Meter		1	EA	Estimate	$ 3,000.00	$ 3,000
Total Equipment Cost (TEC)						$ 18,000
Freight		5%		of TEC		$ 1,000
Spare Parts		5%		of TEC		$ 1,000
Purchased Equipment Cost - Delivered (PEC-D)						**$ 2,000**
Equipment Installation		100%		of TEC		$ 18,000
Instrumentation and Controls - SCADA Programming		90%		of TEC		$ 16,000
Electrical - Installation		90%		of TEC		$ 16,000
CONSTRUCTION - DIRECT						
Excavation		480	CY	RS Means	$ 18.00	$ 8,640
Backfill		397	CY	RS Means	$ 45.00	$ 17,850
18" Pipe		120	LF	RS Means	$ 50.00	$ 6,000
15'X15' Launch Pit	10' Deep	1	EA	Estimate	$ 70,000.00	$ 70,000
Receiving Structure		1	EA	Estimate	$ 30,000.00	$ 30,000
Drop Connection to SI	50' Deep	1	EA	Estimate	$ 100,000.00	$ 100,000
Pavement Restoration	1.5" Top, 2" Type 3 Binder, 7" Asphalt Base Type 2	100	SY	RS Means	$ 55.50	$ 5,550
Restoration		1	Allow		$ 15,000.00	$ 15,000
Power Connection	New control panel and power source	1	EA		$ 17,000.00	$ 17,000
Total Direct Cost (TDC)						**$ 340,040**
Indirects						
Contractor's Field Indirects	Includes Construction equipment, Rigging, Scaffolding, labor, Power, QA/QC	10%		of TDC		$ 35,000
Contractor's OH	Overhead	15%		of TDC		$ 52,000
Bonds, Insurance	Insurance + Bonds of TDC	1%		of TDC		$ 4,000
Mobilization & demobilization	Mob/Demob of TDC	6%		of TDC		$ 21,000
Subtotal (Indirects)						**$ 112,000**
Total Direct Cost + Indirect Cost						**$ 452,040**
Contractor's Profit		5%		of TDC+TDIC		$ 23,000
Total Direct + Indirect Costs, including Profit	**Total Probable Construction Cost (TPCC)**					**$ 475,040**
EPCM Costs						
Engineering	Permanent Easement, Permit and Survey	15%		of TPCC		72,000
Construction Management		10%		of TPCC		48,000
Startup Expenses, O&M, Commissioning, Owner Training		5%		of TDC		17,100
Total Estimated Capital Cost (without contingency)						**$ 612,000**
Contingency		30%		of TPCC		143,000
Escalation	Estimated Duration	13	man-mos.	3.00	months	37,204
Total Estimated Capital Cost (a)	8.00%	5	per crew		Start 4/12/22	**$ 792,204**

(a) This cost estimate has been prepared for guidance in project evaluation and implementation and was based on information available at the time that the estimate was prepared. Final costs for the project, and the project's resulting feasibility will depend on actual labor and material costs, competitive market conditions, actual site conditions, final project scope, implementation schedule, and other variable factors. As a result, the final project cost will vary from the estimate prepared. Because of these factors, project feasibility, benefit/cost ratios, risks, and funding needs must be carefully reviewed before making specific financial decisions or establishing project budgets in order to help ensure proper project evaluation and adequate funding.