BUFFALO
SEWER AUTHORITY

SPDES Permit No. NY0028410

Long Term Control Plan Semi-Annual Status Report
Reporting Period: *June through July 2024*

Amended Administrative Order
CWA-02-2014-3033
(Amends CWA-02-2012-3024)

September 2024

Long Term Control Plan Semi-Annual Status Report

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ATTACHMENT:

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 CSOs occurred during this period, so this item does not apply during this reporting period.

This report covers January through June 2024 which serves as Semi-Annual Report No. 21.

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 September 1, 2024, Semi-Annual Report.

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

With this report, while discussions are ongoing regarding the future of the LTCP, projects as outlined in the Draft LTCP Optimization Selected Alternative dated December 22, 2023, are listed as a separate tables within Attachments A and B. Cost data has been requested in the proposed consent decree language provided by the regulatory agencies and United States Department of Justice, to address this request, in Attachment A, columns have been added.

By providing this information now, Buffalo Sewer is demonstrating a good faith effort to ensure that at such time as the Draft LTCP Optimization Selected Alternative replaces the 2014 LTCP as a compliance document, that reporting conforms to formatting agreeable to all parties and that during this transition period the regulatory agencies are kept apprised of our progress.

4. IMPLEMENTATION ISSUES

In demonstration of the ongoing work that Buffalo Sewer has accomplished during this time period Attachment D: Board Items for LTCP Projects has been included in this submission. Preliminary Engineering Reports for several projects are included in Attachment E: Engineering Reports.

4.1 NFA Phase 1

This phase of facility construction work began in earnest during this reporting period with the shutdown of a full secondary system battery. Due to the reduced capacity of the RAS lines and grit issues, the capacity of the secondary system has been reduced to the point of dry weather partial treatment at times. Initial work in the first battery is however currently ahead of schedule and it is anticipated that the capacity of this side will be significantly improved upon restoration of service.

4.2 NFA Phase 2

Phase 2 was bid during this reporting period. The Phase 2A work had several bidders and all paperwork was in order. This contract has therefore been awarded. For Phase 2B, only one bid was received and it had several irregularities. Phase 2B will therefore be rebid.

4.3 CSO 053_11 Canisius/ Jefferson Delavan OLS

During this reporting period, an enhanced public participation plan and plans for an environmental impact statement were developed. It is anticipated that during the next

reporting period, public outreach and environmental investigations will begin in earnest for this project.

4.4 CSO 053_3.2 Bailey & Amherst

This work is included in the ongoing project titled "Scajaquada Creek and Black Rock Canal RTCs." The work specific to Bailey and Amherst is expected to begin during the next reporting period.

4.5 CSO 010_1 Breckenridge Niagara RTC

This work was severed from the "Scajaquada Creek and Black Rock Canal RTCs" project. A revised Preliminary Engineer's Report is included in Attachment E. Design and public outreach are planned to continue in the next reporting period.

4.6 CSO 006_2 Gates Circle RTC

This work is included in the ongoing project titled "Scajaquada Creek and Black Rock Canal RTCs." The work specific to Gates Circle RTC began during this reporting period.

4.7 CSO 053_10 SPP 229A RTC

The contract for SPP 229A was bid during this reporting period. It is anticipated that construction of this project will begin in the next reporting period.

4.8 CSO 053_12.2 Jefferson Ave GI

Various green infrastructure options were reviewed during this reporting period and it was determined that none were feasible due to significant utility conflicts and site constraints. Instead, the goals of this project are anticipated to be achieved through alternative green infrastructure projects in the vicinity, but outside of the actual Jefferson Avenue corridor.

4.9 CSO 053_12.1 Jefferson Ave GI

Various green infrastructure options were reviewed during this reporting period and it was determined that none were feasible due to significant utility conflicts and site constraints. Instead, the goals of this project are anticipated to be achieved through alternative green infrastructure projects in the vicinity, but outside of the actual Jefferson Avenue corridor.

4.10 CSO 053_3.3 Bailey & Minnesota SPP 254 Modification

This work is included in the ongoing project titled "Scajaquada Creek and Black Rock Canal RTCs." The work specific to Gates Circle RTC began during this reporting period.

4.11 CSO 053_2.5 SPP 337 Modification

Preliminary design of this project began during this reporting period. A Preliminary Engineer's Report is included in Attachment E for this project and other SPP Modifications. Design and public outreach are planned to continue in the next reporting period.

4.12 CSO 053_3.1 SPP 338 Modification

Preliminary design of this project began during this reporting period. A Preliminary Engineer's Report is included in Attachment E for this project and other SPP Modifications. Design and public outreach are planned to continue in the next reporting period. Specific to this site it

should be noted that PCBs were found in a boring sample and further investigations are being coordinated with NYS DEC to ensure that remediation of the adjacent brownfield and related superfund site and the SPP modification are properly coordinated.

4.13 CSO 053_8 SPP 341A Modification

Preliminary design of this project began during this reporting period. A Preliminary Engineer's Report is included in Attachment E for this project and other SPP Modifications. Design and public outreach are planned to continue in the next reporting period.

4.14 CSO 053_1.5 SPP 336B

Preliminary design of this project began during this reporting period. A Preliminary Engineer's Report is included in Attachment E for this project and other SPP Modifications. Design and public outreach are planned to continue in the next reporting period.

4.15 CSO 053_1.4 Sidney Street OLS

Preliminary design of this project began during this reporting period. A Preliminary Engineer's Report is included in Attachment E specific to this project. Design and public outreach are planned to continue in the next reporting period.

4.16 CSO 053_14 SPPs 175, 176, & 177 Modifications

Preliminary design of this project began during this reporting period. A Preliminary Engineer's Report is included in Attachment E for this project and other SPP Modifications. Design and public outreach are planned to continue in the next reporting period.

4.17 CSO 053_5.2 Edison & Martha OLS

Preliminary design of this project began during this reporting period. A Preliminary Engineer's Report is included in Attachment E specific to this project. Design and public outreach are planned to continue in the next reporting period.

5. CHANGES IN KEY PERSONNEL

As of September 1, 2024, Roberta Gaiek, Treatment Facility Administrator remains on an extended leave of absence. In March, Greeley and Hansen began to engage in their role as Program Manager. They have begun preliminary investigations and designs for modifications and

6. PUBLIC MEETINGS

On January 9, 2024, a Project Information Flyer and a Project Overview slide deck for the Primary Treatment Renovation were developed for public outreach purposes related to this project. Copies are included in Attachment C.

On January 11, 2024, an Open House was held for the Primary Project, a flyer advertising it, the slide deck that was presented, and an RSVP contact list are included in Attachment C.

On January 16, 2024, Rosaleen Nogle, Principal Sanitary Engineer, presented on behalf of the Buffalo Sewer Authority during an EPA-sponsored webinar on CSO communities adapting to climate change. Copies of the slides presented and an advertising flyer are included in Attachment C.

On February 2, 2024, the New York Water Environment Association (NYWEA) published their Winter 2023 Issue of the Clearwaters magazine. Three articles, one regarding Buffalo Sewer's coordination with NYWEA's INFLOW program, one regarding the secondary system upgrades, and one regarding the Broadway at Oak RTC project and TENORM are included in Attachment C.

On February 7, 2024, Rosaleen Nogle, Principal Sanitary Engineer, presented at the NYWEA's Annual Meeting in New York City on Buffalo Sewer's efforts to Operationalize Equity in the redevelopment of the Long-Term Control Plan. A copy of the presentation is included in Attachment C.

On February 12, 2024, Buffalo Sewer issued Public Notifications of Surveying to neighboring property owners and residents ahead of the CSO 053 projects. A copy of the notifications is included in Attachment C.

On February 20, 2024, a Pre-Bid Meeting was held for the NFA Phase 2 Project. The slide deck for this presentation is included in Attachment C.

On February 22, 2024, Buffalo Sewer presented on the NFA Phase 2 Project to the Rediscover Riverside community group at St. Mark's and All Saints' Episcopal Church. The slides and flyer developed on January 9, 2024, were used in this presentation. Press coverage from the Riverrock Times is included in Attachment C.

On March 3, 2024, Rosaleen Nogle, Principal Sanitary Engineer presented at the Western Chapter of NYWEA's Annual Conference, the "Greater Buffalo Environmental Conference" on the NFA Phase 2 Project and the inclusion of odor management in the design. A copy of the slides is included in Attachment C.

On March 22, 2024, Rosaleen Nogle, Principal Sanitary Engineer and Oluwole McFoy, General Manager presented on the inclusion of Xylem's Smart Sewer technology in the 2014 and the revised Long-Term Control Plans during a webinar. A copy of the slides is included in Attachment C.

On March 26, 2024, at the Western New York Stormwater Coalitions Bi-annual meeting, Rosaleen Nogle, Principal Sanitary Engineer presented on the history of the Buffalo River and the related sewer system and the design challenges this creates for the Long-Term Control Plan. A copy of the slides is included in Attachment C.

On March 29, 2024, a trifold brochure regarding the revised Long-Term Control Plan was created. A copy of the brochure is included in Attachment C.

On April 9, 2024, Rosaleen Nogle, Principal Sanitary Engineer, presented at the Water Environment Federation's Collection System Conference in Hartford, CT on Buffalo Sewer's experience with Smart Sewers to date and plans for the future. A copy of the slides is included in Attachment C.

On April 13, 2024, Regina Harris, Senior Engineer and Rosaleen Nogle, Principal Sanitary Engineer presented at the Masten District Breakfast on various Buffalo Sewer initiatives and on the East Delavan trunk projects.

On April 24, 2024, Rosaleen Nogle, Principal Sanitary Engineer, presented to the Erie-Niagara Chapter of the New York State Society of Professional Engineers on the history of the Buffalo River and related sewer system and the design challenges this has created for the Long-Term Control Plan. A copy of the slides is included in Attachment C.

On April 29, 2024, a flyer was developed for the revised Long-Term Control Plan utilizing the rebranded name of Queen City Clean Waters. A copy of this flyer is included in Attachment C.

On May 6, 2024, Rosaleen Nogle, Principal Sanitary Engineer, Alex Emerson, Treatment Plant Superintendent and Tim Blake, Acting Treatment Plant Administrator presented on the NFA Phase 2 project utilizing the previously mentioned flyers to the Believe in Black Rock Community organization.

On May 22, 2024, Rosaleen Nogle, Principal Sanitary Engineer, presented at the American Society of Civil Engineer's Environmental & Water Resources Institute's 2024 World Environmental & Water Resources Congress in Milwaukee, WI on Buffalo Sewer's efforts to Operationalize Equity in the redevelopment of the Long-Term Control Plan. A copy of the presentation is included in Attachment C.

On June 3, 2024, flyers were distributed to residents and businesses in the Niagara Common Council District regarding boring activities for the design of the Breckenridge project. A copy of this flyer is included in Attachment C.

On June 4, 2024, Rosaleen Nogle, Principal Sanitary Engineer, presented at NYWEA's Spring Meeting on the history of the Buffalo River and related sewer system and the design challenges this has created for the Long-Term Control Plan. A copy of the slides is included in Attachment C.

On June 4, 2024, Rosaleen Nogle also presented on behalf of the Buffalo Sewer Authority to the City of Buffalo's Waterfront Development Committee of the Common Council on past, present, and planned work to reduced combined sewer overflows and abate flooding. A Buffalo News article is included in Attachment C.

On June 10, 2024, flyers were distributed to residents and businesses in the University Common Council District regarding boring activities for the design of the Sidney and Lark OLS project. A copy of this flyer is included in Attachment C.

On June 12, 2024, a revised trifold brochure for the revised Long-Term Control Plan under the rebranded name "Queen City Clean Waters" was created. A copy of this flyer is included in Attachment C.

On June 25, 2024, flyers were distributed to residents and businesses in the Lovejoy Common Council District regarding boring activities for the design of SPP Modifications. A copy of this flyer is included in Attachment C.

On June 26, 2024, flyers were distributed to residents and businesses in the Masten Common Council District regarding boring activities for the design of SPP Modifications. A copy of this flyer is included in Attachment C.

On June 26, 2024, the Believe in Black Rock community group was welcomed to the Bird Island Treatment Facility for a tour follow up to the May 6, 2024 community meeting.

As part of the Program Management Contract, local MBE firm, Hallmark Planning and Development has been contracted to provide public outreach services. Throughout April, May, and June, Hallmark represented the Buffalo Sewer Authority at community events and distributed the previously mentioned LTCP and NFA Phase 2 project flyers.

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.

Throughout the reporting period, negotiations regarding a revised Long-Term Control Plan between the USEPA, NYSDEC, USDOJ, NYS Attorney General's Office, and the Buffalo Sewer Authority have been ongoing. Additionally, during this period, the renewal of Buffalo Sewer's Publicly Owned Treatment Works (POTW) has been under review and subject to multiple submissions and discussions between Buffalo Sewer, USEPA, and NYSDEC.

8. GREEN INFRASTRUCTURE

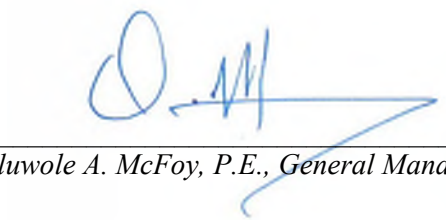
Buffalo Sewer remains committed to meeting the original conditions of the LTCP under the Amended Administrative Order to use Green infrastructure (GI) to the extent originally approved. At this time GI is not being proposed as a replacement for gray infrastructure, but rather in conformance with the approved LTCP.

Award for Niagara Street phase 4B was provided in July 26, 2023, during this reporting period, Notice to Proceed was issued. The private property green infrastructure grant program contract has been executed and is currently receiving applicants.

Projects to be funded through the Environmental Impact Bond 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 Phase 3. These projects will be developed in conformance with the New York State Stormwater Management Design Manual.

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

9/1/2024

Date

Attachment A to the Semi-Annual Status Report: September 2024

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

Project Name and Tag	Costs	Design	Construct	Total	Project Milestone	Proposed Deadline	Actual Completion	Milestone Status
NFA Phase I	Estimated	$ 7,190,000.00	$ 64,710,000.00	$ 71,900,000.00	Design Start	11/25/2019	11/25/2019	Complete
	Last Report	$ -	$ -	$ -	Design Completion	6/23/2022	6/23/2022	Complete
	To Date	$ 785,137.00	$ 22,534,664.94	$ 23,319,801.94	Notice to Proceed	9/27/2022	9/27/2022	Complete
	This Report	$ 785,137.00	$ 22,534,664.94	$ 23,319,801.94	Construction Completion	5/25/2030		
NFA Phase II	Estimated	$ 7,400,000.00	$ 66,600,000.00	$ 74,000,000.00	Design Start	10/28/2020	10/28/2020	Complete
	Last Report	$ -	$ -	$ -	Design Completion	7/10/2025		See Notes
	To Date	$ 2,561,010.98	$ 51,846.77	$ 2,612,857.75	Notice to Proceed	7/23/2026		
	This Report	$ 2,561,010.98	$ 51,846.77	$ 2,612,857.75	Construction Completion	12/26/2031		
Jefferson & Florida (SPP 170B) (2.6 MG) (M) Replaced by CSO053_11 1.5 MG Canisius/Jefferson Delevan OLS	Estimated	$ 3,000,000.00	$ 27,000,000.00	$ 30,000,000.00	Design Start	12/1/2021	9/24/2021	Complete
	Last Report	$ -	$ -	$ -	Design Completion	5/29/2025		
	To Date	$ 1,523,849.85	$ -	$ 1,523,849.85	Notice to Proceed	9/7/2028		
	This Report	$ 1,523,849.85	$ -	$ 1,523,849.85	Construction Completion	4/9/2032		
Amherst Quarry OLS (M) Now CSO053_3.2 Bailey & Amherst, Amherst Quarry PS RTC	Estimated	$ 215,087.20	$ 1,935,784.80	$ 2,150,872.00	Design Start	12/1/2021	4/8/2022	Complete
	Last Report	$ -	$ -	$ -	Design Completion	11/27/2024	7/26/2024	Complete
	To Date	$ 452,940.31	$ 82,897.72	$ 535,838.03	Notice to Proceed	5/28/2025	3/14/2024	Complete
	This Report	$ 452,940.31	$ 82,897.72	$ 535,838.03	Construction Completion	7/6/2028		
Underflow Upsizing (CSO 008/010, 061, 004) (M) Replaced by CSO010_1 Breckenridge Niagara RTC	Estimated	$ 363,661.70	$ 3,272,955.30	$ 3,636,617.00	Design Start	3/1/2022	6/15/2021	Complete
	Last Report	$ -	$ -	$ -	Design Completion	2/25/2025		
	To Date	$ 200,000.00		$ 200,000.00	Notice to Proceed	8/26/2025		
	This Report	$ 200,000.00	$ -	$ 200,000.00	Construction Completion	1/31/2029		
CSO006_2 Gates Circle RTC	Estimated	$ 283,528.70	$ 2,551,758.30	$ 2,835,287.00	Design Start	3/1/2022	4/8/2022	Complete
	Last Report	$ -	$ -	$ -	Design Completion	10/8/2024	6/7/2023	Complete
	To Date	$ 452,940.31	$ 82,897.72	$ 535,838.03	Notice to Proceed	4/8/2025	3/14/2024	Complete
	This Report	$ 452,940.31	$ 82,897.72	$ 535,838.03	Construction Completion	5/17/2028		
CSO053_10 SPP229A RTC	Estimated	$ 300,000.00	$ 2,700,000.00	$ 3,000,000.00	Design Start	3/1/2022	9/24/2021	Complete
	Last Report	$ -	$ -	$ -	Design Completion	4/23/2024	3/25/2024	Complete
	To Date	$ -		$ -	Notice to Proceed	10/22/2024		Anticipated Next Reporting Period
	This Report	$ -	$ -	$ -	Construction Completion	7/19/2026		

Project Name and Tag	Costs	Design	Construct	Total	Project Milestone	Proposed Deadline	Actual Completion	Milestone Status
CSO053_12.2 Jefferson Ave GI	Estimated	$ 152,000.00	$ 1,368,000.00	$ 1,520,000.00	Design Start	3/1/2022	9/14/2020	Complete
	Last Report	$ -	$ -	$ -	Design Completion	11/5/2024		
	To Date	$ 37,950.50		$ 37,950.50	Notice to Proceed	5/6/2025		
	This Report	$ 37,950.50	$ -	$ 37,950.50	Construction Completion	6/14/2028		
CSO053_12.1 Jefferson Ave GI	Estimated	$ 46,000.00	$ 414,000.00	$ 460,000.00	Design Start	3/1/2022	9/14/2020	Complete
	Last Report	$ -	$ -	$ -	Design Completion	11/5/2024		
	To Date	$ 37,950.50		$ 37,950.50	Notice to Proceed	5/6/2025		
	This Report	$ 37,950.50	$ -	$ 37,950.50	Construction Completion	6/14/2028		
CSO053_3.3 Bailey & Minnesota SPP254 Modification	Estimated	$ 23,238.50	$ 209,146.50	$ 232,385.00	Design Start	3/1/2022	4/8/2022	Complete
	Last Report	$ -	$ -	$ -	Design Completion	4/23/2024	6/7/2023	Complete
	To Date	$ 452,940.31	$ 82,897.72	$ 535,838.03	Notice to Proceed	10/22/2024	3/14/2024	Complete
	This Report	$ 452,940.31	$ 82,897.72	$ 535,838.03	Construction Completion	7/19/2026		
Colorado ILS (M) Replaced by CSO053_2.5 SPP337 Modification	Estimated	$ 6,000.00	$ 54,000.00	$ 60,000.00	Design Start	3/2/2024	2/1/2024	Complete
	Last Report	$ -	$ -	$ -	Design Completion	10/24/2025		
	To Date	$ 64,698.11		$ 64,698.11	Notice to Proceed	4/24/2026		
	This Report	$ 64,698.11	$ -	$ 64,698.11	Construction Completion	11/20/2027		
South Bailey ILS (M) Replaced with CSO053_3.1 SPP338 Modification	Estimated	$ 400,000.00	$ 3,600,000.00	$ 4,000,000.00	Design Start	3/2/2024	2/1/2024	Complete
	Last Report	$ -	$ -	$ -	Design Completion	10/23/2026		
	To Date	$ 64,698.11		$ 64,698.11	Notice to Proceed	4/23/2027		
	This Report	$ 64,698.11	$ -	$ 64,698.11	Construction Completion	6/1/2030		
SPP 341A Optimization Genesee & Kearns (M) Replaced by CSO053_8 SPP341A Modification	Estimated	$ 6,000.00	$ 54,000.00	$ 60,000.00	Design Start	3/2/2024	2/1/2024	Complete
	Last Report	$ -	$ -	$ -	Design Completion	10/24/2025		
	To Date	$ 64,698.11		$ 64,698.11	Notice to Proceed	4/24/2026		
	This Report	$ 64,698.11	$ -	$ 64,698.11	Construction Completion	11/20/2027		

Project Name and Tag	Costs	Design	Construct	Total	Project Milestone	Proposed Deadline	Actual Completion	Milestone Status
CSO053_1.5 SPP336B Modification	Estimated	$ 6,000.00	$ 54,000.00	$ 60,000.00	Design Start	3/2/2024	2/1/2024	Complete
	Last Report	$ -	$ -	$ -	Design Completion	10/24/2025		
	To Date	$ 64,698.11		$ 64,698.11	Notice to Proceed	4/24/2026		
	This Report	$ 64,698.11	$ -	$ 64,698.11	Construction Completion	11/20/2027		
SPP 336 A/B (SPP165A, SPP165B, SPP336A, SPP 336B) (4.2 MG) (M) Replaced by CSO053_1.4	Estimated	$ 2,772,000.00	$ 24,948,000.00	$ 27,720,000.00	Design Start	3/2/2024	2/1/2024	Complete
	Last Report	$ -	$ -	$ -	Design Completion	12/18/2026		
	To Date	$ 388,188.65		$ 388,188.65	Notice to Proceed	6/18/2027		
	This Report	$ 388,188.65	$ -	$ 388,188.65	Construction Completion	5/29/2032		
CSO053_13 SPP165B Modification	Estimated	$ 6,000.00	$ 54,000.00	$ 60,000.00	Design Start	3/2/2024	2/1/2024	Complete
	Last Report	$ -	$ -	$ -	Design Completion	10/24/2025		
	To Date	$ 64,698.11		$ 64,698.11	Notice to Proceed	4/24/2026		
	This Report	$ 64,698.11	$ -	$ 64,698.11	Construction Completion	11/20/2027		
CSO053_14 SPP175 Modification	Estimated	$ 6,000.00	$ 54,000.00	$ 60,000.00	Design Start	3/2/2024	2/1/2024	Complete
	Last Report	$ -	$ -	$ -	Design Completion	10/24/2025		
	To Date	$ 64,698.11		$ 64,698.11	Notice to Proceed	4/24/2026		
	This Report	$ 64,698.11	$ -	$ 64,698.11	Construction Completion	11/20/2027		
CSO053_5.2 Edison Martha OLS	Estimated	$ 3,724,000.00	$ 33,516,000.00	$ 37,240,000.00	Design Start	3/2/2024	2/1/2024	Complete
	Last Report	$ -	$ -	$ -	Design Completion	12/18/2026		
	To Date	$ 388,188.65		$ 388,188.65	Notice to Proceed	6/18/2027		
	This Report	$ 388,188.65	$ -	$ 388,188.65	Construction Completion	4/30/2033		
NFA Phase III	Estimated	$ 7,500,000.00	$ 67,500,000.00	$ 75,000,000.00	Design Start	3/2/2024	4/26/2024	Complete
	Last Report	$ -	$ -	$ -	Design Completion	7/15/2027		
	To Date	$ 68,382.54		$ 68,382.54	Notice to Proceed	1/13/2028		
	This Report	$ 68,382.54	$ -	$ 68,382.54	Construction Completion	9/3/2031		

Project Name and Tag	Costs	Design	Construct	Total	Project Milestone	Proposed Deadline	Actual Completion	Milestone Status
Non-NFA Phase III Improvements	Estimated	$ 7,500,000.00	$ 67,500,000.00	$ 75,000,000.00	Design Start	3/2/2024	4/26/2024	Complete
	Last Report	$ -	$ -	$ -	Design Completion	7/15/2027		
	To Date	$ 68,382.54		$ 68,382.54	Notice to Proceed	1/13/2028		
	This Report	$ 68,382.54	$ -	$ 68,382.54	Construction Completion	3/31/2033		
CSO014_1.1 SPP206A&B RTC	Estimated	$ 400,000.00	$ 3,600,000.00	$ 4,000,000.00	Design Start	3/3/2025		
	Last Report	$ -	$ -	$ -	Design Completion	8/27/2027		
	To Date			$ -	Notice to Proceed	2/25/2028		
	This Report	$ -	$ -	$ -	Construction Completion	2/9/2030		
System_2 Schiller Park OLS	Estimated	$ 8,596,000.00	$ 77,364,000.00	$ 85,960,000.00	Design Start	3/3/2025		
	Last Report	$ -	$ -	$ -	Design Completion	12/17/2027		
	To Date			$ -	Notice to Proceed	6/16/2028		
	This Report	$ -	$ -	$ -	Construction Completion	5/28/2033		
System_2_3 SPP339 Modification	Estimated	$ 6,000.00	$ 54,000.00	$ 60,000.00	Design Start	3/3/2025		
	Last Report	$ -	$ -	$ -	Design Completion	10/23/2026		
	To Date			$ -	Notice to Proceed	4/23/2027		
	This Report	$ -	$ -	$ -	Construction Completion	11/18/2028		
System_2_4 Schiller Park OLS SPP340 Modification	Estimated	$ 6,000.00	$ 54,000.00	$ 60,000.00	Design Start	3/3/2025		
	Last Report	$ -	$ -	$ -	Design Completion	10/23/2026		
	To Date			$ -	Notice to Proceed	4/23/2027		
	This Report	$ -	$ -	$ -	Construction Completion	4/7/2029		
CSO-014/015 (0.8 MG) (M) Updated to larger tank: CSO014_1.2 5.55 MG Erie Basin Marina	Estimated	$ 6,244,000.00	$ 56,196,000.00	$ 62,440,000.00	Design Start	3/3/2026		
	Last Report	$ -	$ -	$ -	Design Completion	9/23/2028		
	To Date			$ -	Notice to Proceed	3/24/2029		
	This Report	$ -	$ -	$ -	Construction Completion	3/5/2034		

Project Name and Tag	Costs	Design	Construct	Total	Project Milestone	Proposed Deadline	Actual Completion	Milestone Status
CSO-013 (0.3 MG) (M) Replaced with CSO013_1 SPP304 Modification	Estimated	$ 6,000.00	$ 54,000.00	$ 60,000.00	Design Start	3/3/2026		
	Last Report	$ -	$ -	$ -	Design Completion	10/23/2027		
	To Date			$ -	Notice to Proceed	4/22/2028		
	This Report	$ -	$ -	$ -	Construction Completion	11/18/2029		
CSO017_8 SPP326 Modification	Estimated	$ 6,000.00	$ 54,000.00	$ 60,000.00	Design Start	3/3/2026		
	Last Report	$ -	$ -	$ -	Design Completion	10/23/2027		
	To Date			$ -	Notice to Proceed	4/22/2028		
	This Report	$ -	$ -	$ -	Construction Completion	11/18/2029		
CSO011_1.2 SPP024 Modification	Estimated	$ 6,000.00	$ 54,000.00	$ 60,000.00	Design Start	3/3/2026		
	Last Report	$ -	$ -	$ -	Design Completion	10/23/2027		
	To Date			$ -	Notice to Proceed	4/22/2028		
	This Report	$ -	$ -	$ -	Construction Completion	11/18/2029		
CSO012_1.2 SPP023 Modification	Estimated	$ 6,000.00	$ 54,000.00	$ 60,000.00	Design Start	3/3/2026		
	Last Report	$ -	$ -	$ -	Design Completion	10/23/2027		
	To Date			$ -	Notice to Proceed	4/22/2028		
	This Report	$ -	$ -	$ -	Construction Completion	11/18/2029		
CSO012_2.1 SPP296 Modification	Estimated	$ 6,000.00	$ 54,000.00	$ 60,000.00	Design Start	3/3/2026		
	Last Report	$ -	$ -	$ -	Design Completion	10/23/2027		
	To Date			$ -	Notice to Proceed	4/22/2028		
	This Report	$ -	$ -	$ -	Construction Completion	11/18/2029		
CSO026_1.3 Collins Park OLS	Estimated	$ 3,010,000.00	$ 27,090,000.00	$ 30,100,000.00	Design Start	3/3/2027		
	Last Report	$ -	$ -	$ -	Design Completion	12/18/2029		
	To Date			$ -	Notice to Proceed	6/18/2030		
	This Report	$ -	$ -	$ -	Construction Completion	5/30/2035		

Project Name and Tag	Costs	Design	Construct	Total	Project Milestone	Proposed Deadline	Actual Completion	Milestone Status
CSO027_1 SPP 317 Modification	Estimated	$ 6,000.00	$ 54,000.00	$ 60,000.00	Design Start	3/3/2027		
	Last Report	$ -	$ -	$ -	Design Completion	10/24/2028		
	To Date			$ -	Notice to Proceed	4/24/2029		
	This Report	$ -	$ -	$ -	Construction Completion	11/20/2030		
CSO027_2 Babcock PS Weir Modification	Estimated	$ 6,000.00	$ 54,000.00	$ 60,000.00	Design Start	3/3/2027		
	Last Report	$ -	$ -	$ -	Design Completion	10/24/2028		
	To Date			$ -	Notice to Proceed	4/24/2029		
	This Report	$ -	$ -	$ -	Construction Completion	4/9/2031		
CSO-055 (7.5 MG) (M) Updated to larger tank with new location: CSO055_1.5 11.55 MG Military Rd OLS	Estimated	$ 9,688,000.00	$ 87,192,000.00	$ 96,880,000.00	Design Start	8/27/2027		
	Last Report	$ -	$ -	$ -	Design Completion	6/13/2030		
	To Date			$ -	Notice to Proceed	12/12/2030		
	This Report	$ -	$ -	$ -	Construction Completion	1/2/2037		
Northern Relief Sewer/ North Relief - Interceptor (M) New Configuration, tagged as System_1 Northern Relief Tunnel	Estimated	$ 7,281,074.40	$ 65,529,669.60	$ 72,810,744.00	Design Start	8/27/2027		
	Last Report	$ -	$ -	$ -	Design Completion	12/23/2032		
	To Date			$ -	Notice to Proceed	6/23/2033		
	This Report	$ -	$ -	$ -	Construction Completion	6/1/2040		
CSO017_9 SPP059 Modification	Estimated	$ 6,000.00	$ 54,000.00	$ 60,000.00	Design Start	3/3/2029		
	Last Report	$ -	$ -	$ -	Design Completion	10/25/2030		
	To Date			$ -	Notice to Proceed	4/25/2031		
	This Report	$ -	$ -	$ -	Construction Completion	11/20/2032		

Project Name and Tag	Costs	Design	Construct	Total	Project Milestone	Proposed Deadline	Actual Completion	Milestone Status
CSO027_3 SPP097 modification	Estimated	$ 6,000.00	$ 54,000.00	$ 60,000.00	Design Start	3/3/2029		
	Last Report	$ -	$ -	$ -	Design Completion	10/25/2030		
	To Date			$ -	Notice to Proceed	4/25/2031		
	This Report	$ -	$ -	$ -	Construction Completion	11/20/2032		
CSO033_2 Clinton St OLS	Estimated	$ 16,380,000.00	$ 147,420,000.00	$ 163,800,000.00	Design Start	3/3/2029		
	Last Report	$ -	$ -	$ -	Design Completion	8/29/2031		
	To Date			$ -	Notice to Proceed	2/27/2032		
	This Report	$ -	$ -	$ -	Construction Completion	3/8/2036		
CSO033_3 SPP104 Modification	Estimated	$ 6,000.00	$ 54,000.00	$ 60,000.00	Design Start	3/3/2029		
	Last Report	$ -	$ -	$ -	Design Completion	10/25/2030		
	To Date			$ -	Notice to Proceed	4/25/2031		
	This Report	$ -	$ -	$ -	Construction Completion	11/20/2032		
CSO017_10 SPP051 Modification	Estimated	$ 6,000.00	$ 54,000.00	$ 60,000.00	Design Start	3/3/2029		
	Last Report	$ -	$ -	$ -	Design Completion	10/25/2030		
	To Date			$ -	Notice to Proceed	4/25/2031		
	This Report	$ -	$ -	$ -	Construction Completion	11/20/2032		
CSO-064 (0.1 MG) (M) Replaced with CSO064_1.1 CSO-064 ILS	Estimated	$ 400,000.00	$ 3,600,000.00	$ 4,000,000.00	Design Start	3/3/2030		
	Last Report	$ -	$ -	$ -	Design Completion	9/24/2032		
	To Date			$ -	Notice to Proceed	3/25/2033		
	This Report	$ -	$ -	$ -	Construction Completion	3/10/2035		
CSO006_3 Delavan Drain Weir Raising & RTC	Estimated	$ 400,000.00	$ 3,600,000.00	$ 4,000,000.00	Design Start	3/3/2030		
	Last Report	$ -	$ -	$ -	Design Completion	8/27/2032		
	To Date			$ -	Notice to Proceed	2/25/2033		
	This Report	$ -	$ -	$ -	Construction Completion	4/5/2036		

Project Name and Tag	Costs	Design	Construct	Total	Project Milestone	Proposed Deadline	Actual Completion	Milestone Status
CSO064_1.2 SPP 137 Modification	Estimated	$ 6,000.00	$ 54,000.00	$ 60,000.00	Design Start	3/3/2030		
	Last Report	$ -	$ -	$ -	Design Completion	10/24/2031		
	To Date			$ -	Notice to Proceed	4/23/2032		
	This Report	$ -	$ -	$ -	Construction Completion	11/19/2033		
CSO-028/044/047 (2.3 MG) (M) Updated to smaller tank: CSO028_1 0.95 MG Hopkins & Osage OLS	Estimated	$ 1,764,000.00	$ 15,876,000.00	$ 17,640,000.00	Design Start	3/3/2031		
	Last Report	$ -	$ -	$ -	Design Completion	9/23/2033		
	To Date			$ -	Notice to Proceed	3/24/2034		
	This Report	$ -	$ -	$ -	Construction Completion	3/5/2039		
CSO017_6 Bass Alley OLS	Estimated	$ 3,262,000.00	$ 29,358,000.00	$ 32,620,000.00	Design Start	3/3/2031		
	Last Report	$ -	$ -	$ -	Design Completion	9/23/2033		
	To Date			$ -	Notice to Proceed	3/24/2034		
	This Report	$ -	$ -	$ -	Construction Completion	3/5/2039		
CSO033_1 Bailey & Regent OLS (Moreland Park)	Estimated	$ 5,362,000.00	$ 48,258,000.00	$ 53,620,000.00	Design Start	3/2/2032		
	Last Report	$ -	$ -	$ -	Design Completion	9/23/2034		
	To Date			$ -	Notice to Proceed	3/24/2035		
	This Report	$ -	$ -	$ -	Construction Completion	3/4/2040		
CSO064_2 Perry Street Sanitary Sewer	Estimated	$ 480,000.00	$ 4,320,000.00	$ 4,800,000.00	Design Start	3/3/2033		
	Last Report	$ -	$ -	$ -	Design Completion	9/26/2035		
	To Date			$ -	Notice to Proceed	3/26/2036		
	This Report	$ -	$ -	$ -	Construction Completion	6/3/2038		
CSO017_1.1 SPP054 Sewer Separation	Estimated	$ 70,000.00	$ 630,000.00	$ 700,000.00	Design Start	3/3/2033		
	Last Report	$ -	$ -	$ -	Design Completion	9/26/2035		
	To Date			$ -	Notice to Proceed	3/26/2036		
	This Report	$ -	$ -	$ -	Construction Completion	6/3/2038		
Hertel North East ILS (M) Updated design (CSO055_1.1)	Estimated	$ 400,000.00	$ 3,600,000.00	$ 4,000,000.00	Design Start	3/3/2034		
	Last Report	$ -	$ -	$ -	Design Completion	10/23/2036		
	To Date			$ -	Notice to Proceed	4/23/2037		
	This Report	$ -	$ -	$ -	Construction Completion	6/1/2040		

Project Name and Tag	Costs	Design	Construct	Total	Project Milestone	Proposed Deadline	Actual Completion	Milestone Status
Green Infrastructure Projects								
Waterbody and GI Projects Included	**Costs**	**Design**	**Construct**	**Total**	**Project Milestone**	**Proposed Deadline**	**Actual Compeltion**	**Milestone Status**
CSO053_9 (16.7 acres managed) Scajaquada Creek	Estimated	$ 334,400.00	$ 3,009,600.00	$ 3,344,000.00	Start Date	3/2/2028		
	Last Report	$ -	$ -	$ -	20% Completion	3/1/2029		
	To Date			$ -	40% Completion	3/1/2030		
	This Report	$ -	$ -	$ -	60% Completion	3/1/2031		
					80% Completion	3/1/2033		
					100% Completion	3/1/2034		
CSO006_5 (52.5 acres managed) Black Rock Canal	Estimated	$ 1,050,600.00	$ 9,455,400.00	$ 10,506,000.00	Start Date	3/3/2031		
	Last Report	$ -	$ -	$ -	20% Completion	3/1/2032		
	To Date			$ -	40% Completion	3/1/2033		
	This Report	$ -	$ -	$ -	60% Completion	3/1/2034		
					80% Completion	3/1/2036		
					100% Completion	3/1/2037		
CSO011_1.1 (19.9 acres managed) Niagara River	Estimated	$ 398,200.00	$ 3,583,800.00	$ 3,982,000.00	Start Date	3/2/2032		
	Last Report	$ -	$ -	$ -	20% Completion	3/1/2034		
	To Date			$ -	40% Completion	3/1/2036		
	This Report	$ -	$ -	$ -	60% Completion	3/1/2037		
					80% Completion	3/1/2039		
					100% Completion	3/1/2040		
CSO055_3 (260.2 acres managed) Niagara River	Estimated	$ 5,203,200.00	$ 46,828,800.00	$ 52,032,000.00	Start Date	3/2/2032		
	Last Report	$ -	$ -	$ -	20% Completion	3/1/2034		
	To Date			$ -	40% Completion	3/1/2036		
	This Report	$ -	$ -	$ -	60% Completion	3/1/2037		
					80% Completion	3/1/2039		
					100% Completion	3/1/2040		

Project Name and Tag	Costs	Design	Construct	Total	Project Milestone	Proposed Deadline	Actual Completion	Milestone Status
CSO017_4 (37.5 acres managed) Buffalo River	Estimated	$ 749,000.00	$ 6,741,000.00	$ 7,490,000.00	Start Date	3/2/2032		
	Last Report	$ -	$ -	$ -	20% Completion	3/1/2033		
	To Date			$ -	40% Completion	3/1/2035		
	This Report	$ -	$ -	$ -	60% Completion	3/1/2036		
					80% Completion	3/1/2038		
					100% Completion	3/2/2039		
CSO026_4 (125.5 acres managed) Buffalo River	Estimated	$ 2,510,400.00	$ 22,593,600.00	$ 25,104,000.00	Start Date	3/2/2032		
	Last Report	$ -	$ -	$ -	20% Completion	3/1/2033		
	To Date			$ -	40% Completion	3/1/2035		
	This Report	$ -	$ -	$ -	60% Completion	3/1/2036		
					80% Completion	3/1/2038		
					100% Completion	3/2/2039		

Attachment B to the Semi-Annual Status Report: September 2024

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.
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 6 activations.

Project Name	Project Description	Project Purpose*
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 6 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 6 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 6 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.
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.

Project Name	Project Description	Project Purpose*
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.
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.

Project Name	Project Description	Project Purpose*
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.
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.

Project Name	Project Description	Project Purpose*
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.
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.

Project Name	Project Description	Project Purpose*
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 6 activations.
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 6 activations.
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.
Montgomery CSO (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.

Project Name	Project Description	Project Purpose*
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.
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.

Project Name	Project Description	Project Purpose*
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.
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.

Project Name	Project Description	Project Purpose*
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.
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		

Project Name	Project Description	Project Purpose*
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.
Niagara Street Phase 4b: Hertel Ave to Ontario St		
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.
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.

Project Name	Project Description	Project Purpose*
CSOs 010, 008/010, 061, 004 – Underflow capacity upsizing	This Project is No Longer being Considered and is being superceded by Breckenridge at Niagara Street In-Line Storage	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 1.5 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.
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.

Project Name	Project Description	Project Purpose*
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

Project Name	Project Description	Project Purpose*
Proposed Revised LTCP Projects		
NFA Phase I	The first phase of the Treatment Facility upgrades consists of replacement of the diffusers, removal of grit, and replacement and upgrading of piping and valves for the return activated sludge system.	The NFA Phase 1 project is designed to restore the secondary system's capacity and facilitate work specified in NFA Phase 3 while also increasing the aeration efficiency.
NFA Phase II	The second phase of the Treatment Facility upgrades consists of installation of a new chlorine contact tank, dosing system, and pumping station for the primary system together with odor controls and primary sludge pumping station upgrades.	The NFA Phase 2 project is designed to provide reliable disinfection to flows diverted to the primary treatment system during wet weather events.
Jefferson & Florida (SPP 170B) (2.6 MG) (M) Replaced by CSO053_11 1.5 MG Canisius/Jefferson Delevan OLS	There is a new opportunity to move the tank location north and utilize an existing parking garage area at Jefferson and Delavan proposed to be demolished for the construction of a new surface parking lot. In the updated configuration and location, flow at SPP333 is routed to a 1.5 MG offline storage tank with an RTC at SPP229A.	The proposed Canisius/Jefferson Delevan OLS (CSO053_11) is planned to replace the Jefferson Avenue & Florida Street (CSO-053) Satellite Storage. In this Selected Alternative, it is anticipated that the proposed smaller tank together with other LTCP Projects will reduce activations from 37 to 4 for CSO-053 upon completion of the Selected Alternative.
Amherst Quarry OLS (M) Now CSO053_3.2 Bailey & Amherst, Amherst Quarry PS RTC	This RTC project includes adding RTC at SPP255 (Bailey Avenue and East Amherst Street) as well as improving the efficiency of Amherst Quarry dewatering operations to reduce overflows.	The proposed CSO053_3.2 Bailey & Amherst, Amherst Quarry PS RTC would replace the Amherst Quarry OLS. It is anticipated that the proposed project together with other proposed projects will reduce activations from 37 to 4 for CSO-053 upon completion of the Selected Alternative.
Underflow Upsizing (CSO 008/010, 061, 004) (M) Replaced by CSO010_1 Breckenridge Niagara RTC	The proposed design was similar to the Smith St. and Mill Race RTC projects, with a static weir in the 36” diameter pipe upstream of SPP021 diverting flow to a new controlled connection to the North Interceptor. This project also has the potential to reduce overflows at CSO-011 (SPP024) and CSO-055 (SPP001).	Regarding the Selected Alternative model, the proposed Breckenridge Niagara RTC is planned to replace the Underflow Pipe Upsizing project. In this Selected Alternative, it is anticipated that the new project with other LTCP projects will reduce activations from 5 to 2 for CSO 004, from 33 to no activations for CSO 008, and from 14 to no activations for CSO 010 upon completion of the Selected Alternative. In the new model's baseline and Selected Alternative scenarios, CSO-061 is already in compliance.

Project Name	Project Description	Project Purpose*
CSO006_2 Gates Circle RTC	Real-Time Controlled gate structure at SPP 332. Additional instrumentation will also be installed at the Niagara Metering Station (SPP 330) to inform gate control.	Together with other projects, this project is projected to reduce CSO 006 discharges to Scajaquada Creek from 47 to 1 activation.
CSO053_10 SPP229A RTC	SPP229A would be modified by incorporating an additional 24" diameter underflow pipe downstream of a 24" dynamically controlled gate. The gate would open when there is available capacity in the Scajaquada Tunnel or there is a risk for overflow at SPP229A	Together with other projects, this project is projected to reduce CSO-053 discharges to Scajaquada Creek from 37 to 4 activations
CSO053_12.2 Jefferson Ave GI	Permeable pavement would be installed in the parking lanes along Jefferson Avenue from the intersection with Beverly Road to the intersection with Best Street. The design for this project is not complete, but it is assumed that the depth and pore space would match the Kenmore GI project. This project would manage 7.6 acres of impervious area upstream of SPP229A	Together with other projects, this project is projected to reduce CSO-053 discharges to Scajaquada Creek from 37 to 4 activations.
CSO053_12.1 Jefferson Ave GI	Permeable pavement would be installed in the parking lanes along Jefferson Avenue from the intersection with Main Street to the intersection with Beverly Road. The design for this project is not complete, but it is assumed that the depth and pore space would match the Kenmore GI project. This project would manage 2.3 acres of impervious area upstream of SPP333.	Together with other projects, this project is projected to reduce CSO-053 discharges to Scajaquada Creek from 37 to 4 activations.
CSO053_3.3 Bailey & Minnesota SPP254 Modification	The overflow weir at SPP254 (located at the intersection of Minnesota Avenue and Bailey Avenue) would be replaced. The new weir elevation would be 82.90 ft (City datum), which is slightly lower than the weir elevation in the LTCP model. Lowering the weir results in more flow being routed to the Amherst Quarry PS storage.	Together with other projects, this project is projected to reduce CSO-053 discharges to Scajaquada Creek from 37 to 4 activations.

Project Name	Project Description	Project Purpose*
Colorado ILS (M) Replaced by CSO053_2.5 SPP337 Modification	SPP337 would be modified by incorporating an additional 30" diameter underflow pipe.	The proposed CSO053_2.5 SPP337 Modification is planned to replace the Colorado ILS project. In the Selected Alternative, it is anticipated that the proposed project together with other LTCP Projects will reduce activations from 37 to 4 for CSO-053 upon completion of the Selected Alternative
South Bailey ILS (M) Replaced with CSO053_3.1 SPP338 Modification	For this project, the SPP338 underflow orifice would be enlarged. The overflow weir would be raised to 55.24 ft (City datum), and the length increased to 30'.	The proposed SPP338 Modification (CSO053_3.1) would replace the South Bailey ILS project. It is anticipated that the proposed project together with other proposed projects will reduce activations from 37 to 4 for CSO-053 upon completion of the Selected Alternative.
SPP 341A Optimization Genesee & Kearns (M) Replaced by CSO053_8 SPP341A Modification	For this project, SPP341A would be modified by incorporating an additional 18" diameter underflow pipe and raising the overflow weir to 55.60 ft (City datum), reducing overflows at CSO-053.	The proposed CSO053_8 SPP341A Modification is planned to replace the SPP 341A Optimization Genesee & Kearns project. It is anticipated that the proposed project together with other proposed projects will reduce activations from 37 to 4 for CSO-053 upon completion of the Selected Alternative
CSO053_1.5 SPP336B Modification	SPP336B would be modified by removing the underflow orifice plate, reducing overflows at CSO-053.	Together with other projects, this project is projected to reduce CSO 053 discharges to Scajaquada Creek from 37 to 4 activations.
SPP 336 A/B (SPP165A, SPP165B, SPP336A, SPP 336B) (4.2 MG) (M) Replaced by CSO053_1.4 3.26 MG Sidney OLS	Satellite Storage at Humboldt Parkway will be replaced with a smaller 3.26 MG tank at the corner of Sidney Street and Lark Street. To reduce flows at SPP336B, the Sidney Street OLS will store flow diverted from the sewer along Humboldt Parkway. The storage would dewater via gravity when there is sufficient available capacity in the Scajaquada Tunnel Interceptor.	The proposed Sidney OLS (CSO053_1.4) is planned to replace the SPP 336 A&B (CSO-053) Satellite Storage. In this Selected Alternative, it is anticipated that the proposed smaller tank together with other LTCP Projects will reduce activations from 37 to 4 for CSO-053 upon completion of the Selected Alternative.
CSO053_13 SPP165B Modification	SPP165B underflow orifice would be upsized to 24" and underflow pipe to 36". The overflow weir would also be raised to 54.81 ft (City datum). These modifications would reduce overflows at CSO-053.	Together with other projects, this project is projected to reduce CSO 053 discharges to Scajaquada Creek from 37 to 4 activations.
CSO053_14 SPP175 Modification	SPP175 at Dodge Street and Michigan Ave would be raised to 56.10 ft (City datum). SPP176 at Michigan Avenue and Riley Street and SPP177 at Michigan Avenue and Glenwood Avenue would both be raised to 52.85 ft (City datum).	Together with other projects, this project is projected to reduce CSO-053 discharges to Scajaquada Creek from 37 to 4 activations.

Project Name	Project Description	Project Purpose*
CSO053_5.2 Edison Martha OLS	This project consists of a 2.61 MG tank at the northwest corner of Edison Avenue and Kensington Expressway. The storage would dewater via gravity when there is available capacity in the Edison Avenue trunk sewer.	Together with other projects, this project is projected to reduce CSO-053 discharges to Scajaquada Creek from 37 to 4 activations.
NFA Phase III	The NFA Phase III improvements consist of increasing the penetrations to the existing secondary clarifiers, adding two new secondary clarifiers, and adding an additional chlorine contact tank.	These improvements will be designed to provide 400 MGD of secondary treatment during wet weather events and reduce bypasses of the secondary system.
Non-NFA Phase III Improvements	The non-NFA Phase III Improvements are improvements to the secondary system that were not specified in the 2014 LTCP, but will be incorporated into the contracts for the Phase III NFA Improvements.	These improvements will ensure the long-term reliability of those systems installed and upgrades as part of the NFA Phase III.
CSO014_1.1 SPP206A&B RTC	The proposed RTC project adds a 24” dewatering gate and connection to the South Interceptor. The gate would open to send more flow to the South Interceptor when it has available capacity, and close when it is near full capacity. This would further reduce overflows at SPP206A&B and could provide additional benefit downstream at SPP024 (CSO-011).	Together with other projects, this project is projected to reduce CSO-014 discharges to Erie Basin Marina from 12 to 2 activations.
System_2 Schiller Park OLS	This projects consists of an 8.0 MG offline storage project to divert inflows from Cheektowaga to an 8.00 MG storage facility during wet weather until the BSA collection system has capacity to receive and treat it. This project would help buffer peak flows to the Bird Island Treatment Facility and reduce overflows at SPPs along the North and South Interceptor, including SPP001 and SPP024. The OLS is currently configured as gravity-driven storage with dynamically controlled inlet and outlet gates.	Together with other projects, this project is projected to reduce CSO 012 discharges to Black Rock Canal from 35 to 3 activations., CSO-053 discharges to Scajaquada Creek from 37 to 4 activations, and CSO-055discharges to Niagara River from 38 to 9 activations.
System_2_3 SPP339 Modification	SPP339 would be modified by increasing the diameter of the underflow pipe to 48”, and by raising the elevation of the overflow weir to 52.71 ft (City datum). These modifications would reduce CSO-053 overflows.	Together with other projects, this project is projected to reduce CSO-053 discharges to Scajaquada Creek from 37 to 4 activations.

Project Name	Project Description	Project Purpose*
System_2_4 Schiller Park OLS SPP340 Modification	SPP340 would be modified by increasing the diameter of the underflow orifice to 24”. A flap gate would also be applied to prevent backflow from the Scajaquada Drain. This modification would reduce CSO-053 overflows.	Together with other projects, this project is projected to reduce CSO 053 discharges to Scajaquada Creekfrom 37 to 4 activations.
CSO-014/015 (0.8 MG) (M) Updated to larger tank: CSO014_1.2 5.55 MG Erie Basin Marina OLS	The OLS would consist of a 5.55 MG tank north of the intersection of Trenton Road and Fourth Street. The storage would dewater when there is available capacity in the Swan trunk sewer. The Proposed OLS configuration requires a pump station for dewatering.	The proposed Erie Basin Marina OLS (CSO014_1.2) is planned to replace the CSO-014/015 Satellite Storage. In this Selected Alternative, it is anticipated that the new project together with other LTCP projects will reduce activations from 12 to 2 for CSO-014. In the newmodel's baseline and the Selected Alternative scenarios, there were no activations observed at CSO-015.
CSO-013 (0.3 MG) (M) Replaced with CSO013_1 SPP304 Modification	For this SPP modification project, SPP304 (CSO-013, Virginia St. & Busti Ave.) would be modified by removing the underflow orifice plate. The removal of an existing underflow orifice plate in combination with upstream proposed off-line storage projects are expected to achieve compliance under the revised model.	The proposed SPP304 Modification (CSO013_1) is planned to replace the CSO-013 Satellite Storage. In this Selected Alternative, it is anticipated that the target of 4 CSO activations at CSO-013 in the Black Rock Canal will be sustained from the initial baseline conditions to the implementation of the Selected Alternative.
CSO017_8 SPP326 Modification	This project consists of upsizing SPP 326 underflow pipe to 36” to utilize capacity created by CSO014_1.2 Erie Basin Marina OLS.	Together with other projects, this project is projected to reduce CSO-017 discharges to Buffalo River from 24 to 4 activations.
CSO011_1.2 SPP024 Modification	SPP024 (CSO-011) would be modified by enlarging the underflow opening to 4.8 ft, which would send more flow to South Interceptor and reduce overflows at CSO-011.	Together with other projects, this project is projected to reduce CSO-011 discharges to Niagara River from 39 to 4 activations.

Project Name	Project Description	Project Purpose*
CSO012_1.2 SPP023 Modification	This project consists of enlarging SPP 023 underflow opening to 5 ft by 5 ft and by raise the overflow weir to 1.55'(City Datum).	Together with other projects, this project is projected to reduce CSO-012 discharges to Black Rock Canal from 35 to 3 activations.
CSO012_2.1 SPP296 Modification	This project consists of enlarging SPP 296 underflow opening to 5 ft by 5 ft and by raise the overflow weir to 1.55' (City Datum).	Together with other projects, this project is projected to reduce CSO-012 discharges to Black Rock Canal from 35 to 3 activations.
CSO026_1.3 Collins Park OLS	This project consists of a 2.56 MG Storage Tank with Gravity Dewatering	Together with other projects, this project is projected to reduce CSO-026 discharges to Buffalo River from 9 to 6 activations.
CSO027_1 SPP 317 Modification	SPP317 overflow weir would be lowered to 7.25 ft (City datum). Lowering the weir would result in increased flows being directed to the Smith Street ILS facility, while lowering the flows in the Swan Trunk. The lowered flows in the Swan Trunk results in a reductionin overflows at CSO 027.	Together with other projects, this project is projected to reduce CSO-027 discharges to Buffalo River from 10 to 4 activations.
CSO027_2 Babcock PS Weir Modification	Babcock Pump Station operates as an RTC facility to store flows in an upstream 11 ft by 11 ft box culvert during wet weather. The CSO027_2 modification project redirects flow from a 48" sewer to the box culvert instead of the sewer downstream of the pump station.This increases the in-line storage utilization and reduces the flow sent to the Swan Trunk in wet weather.	Together with other projects, this project is projected to reduce CSO-027 discharges to Buffalo River from 10 to 4 activations.
CSO-055 (7.5 MG) (M) Updated to larger tank with new location: CSO055_1.5 11.55 MG Military Rd OLS	The proposed Military Road OLS project is a 11.55 MG tank that stores flow diverted from the Hertel Avenue South barrel at the intersection of Hertel Avenue and Military Road.	The proposed Military Rd OLS (CSO055_1.5) is planned to replace the CSO-055 Satellite Storage. In this Selected Alternative, it is anticipated that the proposed larger tank together with other LTCP Projects will reduce activations from 38 to 9 for CSO-055 upon completion of the Selected Alternative.
Northern Relief Sewer/ North Relief - Interceptor (M) New Configuration, tagged as System_1 Northern Relief Tunnel	This tunnel system is anticipated to have three parts, North of Scajaquada Creek, South of Scajaquada Creek, and the Southern Relief Tunnel. The Northern Relief Tunnel is designed to create more conveyance capacity to the WWTP, supplement capacity in the North and South Interceptors, and increase the ability of the system to store wet-weather flows. It is anticipated that the tunnel will have an inside diameter of 12-feet based on the most recent system simulations.	In the Selected Alternative, it is anticipated that the proposed tunnel together with other projects will reduce activations from 35 to 3 for CSO-012.
CSO017_9 SPP059 Modification	This project consists of upsizing the underflow pipe to 24" and raising the overflow weir to 3.25' (City Datum).	Together with other projects, this project is projected to reduce CSO-017 discharges to Buffalo River from 24 to 4 activations.

Project Name	Project Description	Project Purpose*
CSO027_3 SPP097 modification	The SPP097 underflow pipe would be upsized to 48 inches. The overflow weir would be raised to 0.82 ft (City datum) with an associated length increase to 100 ft.	Together with other projects, this project is projected to reduce CSO-027 discharges to Buffalo River from 10 to 4 activations.
CSO033_2 Clinton St OLS	The Clinton St. OLS project includes adding a new 60" diameter sewer that starts on Clinton Street near Kelburn Street and routes wet weather flow through Houghton Park to a 21.72 MG storage tank. An orifice plate and weir would be added at the intersection of Bailey Avenue and Clinton Street to route more flow to the tank via Clinton Street. An automatically controlled gate at the downstream end of the tank would close to store flow when SPP104 (CSO-033) is at risk for overflow and would open to prevent basement backups upstream.	Together with other projects, this project is projected to reduce CSO-033 discharges to Buffalo River from 15 to 2 activations.
CSO033_3 SPP104 Modification	The SPP104 overflow weir would be raised to 6.85 ft (City datum), and the length increased to 40'. These modifications would reduce overflows at CSO-017.	Together with other projects, this project is projected to reduce CSO-033 discharges to Buffalo River from 15 to 2 activations.
CSO017_10 SPP051 Modification	This project consists of removing the orifice plate and raising the overflow weir to -1.35 ft (City Datum).	Together with other projects, this project is projected to reduce CSO-017 discharges to Buffalo River from 24 to 4 activations.
CSO-064 (0.1 MG) (M) Replaced with CSO064_1.1 CSO-064 ILS	The existing 24" sewer upstream of SPP137 between South Street and Republic Street along Louisiana Street would be replaced by two 60" diameter sewers. These sewers would provide in line storage volume to help reduce overflows at SPP137.	The proposed CSO-064 ILS (CSO064_1.1) is planned to replace CSO-064 Satellite Storage. It is anticipated that the proposed project together with other proposed projects will reduce activations from 10 to 4 for CSO-064upon completion of the Selected Alternative.

Project Name	Project Description	Project Purpose*
CSO006_3 Delavan Drain Weir Raising & RTC	This project consists of replacing existing permanently closed sluice gate with dynamically real-time controlled interconnection between the Delavan Drain and North Interceptor and modification (raising of weir)of SPP 170A to divert flows from Scajaquada Creek to the Delavan Drain during only the most extreme storm events for flood prevention purposes.	Together with other projects, this project is projected to reduce CSO 006 discharges to Scajaquada Creek from 47 to 1 activation.
CSO064_1.2 SPP 137 Modification	The SPP137 overflow weir would be raised to 0.50 ft (City datum). In addition, the underflow orifice plate would be removed. These modifications would reduce overflows at CSO-064 and would be implemented in conjunction with the CSO-064 ILS (CSO064_1.1) project.	Together with other projects, this project is projected to reduce CSO-064 discharges to Buffalo River from 10 to 4 activations.
CSO-028/044/047 (2.3 MG) (M) Updated to smaller tank: CSO028_1 0.95 MG Hopkins & Osage OLS	To address CSO-028 overflows, the Hopkins and Osage OLS would store flow from the Hopkins Street sewer in a 0.95 MG tank at the eastern end of Osage Street. The storage would dewater when there is available capacity in the South Park Avenue sewer and no risk of overflow at the downstream SPPs 125 and 126.	The proposed Hopkins & Osage OLS (CSO028_1) is planned to replace the CSOs 028/044/047 Satellite Storage. In this Selected Alternative, it is anticipated that the smaller proposed tank, together with other LTCP Projects, will reduce activations from 33 to 4 for CSO-028. Both CSO-044 and CSO-047 are in compliance in the new model's baseline and the Selected Alternative scenarios.
CSO017_6 Bass Alley OLS	This project will consist of a 3.60 MG Storage Tank with Dewatering Pump Station	Together with other projects, this project is projected to reduce CSO-017 discharges to Buffalo River from 24 to 4 activations.

Project Name	Project Description	Project Purpose*
CSO033_1 Bailey & Regent OLS (Moreland Park)	This project consists of a 4.50 MG tank at Moreland Field between Regent Street and Moreland Street along Bailey Avenue. The storage would dewater when there is available capacity in the downstream sewer and no risk of overflow at the downstream SPP 104. The Proposed OLS configuration requires a pump station for dewatering.	Together with other projects, this project is projected to reduce CSO-033 discharges to Buffalo River from 15 to 2 activations.
CSO064_2 Perry Street Sanitary Sewer	This project would replace an existing sewer partially built into Hamburg Drain. The new sewer would start on Scott St near Illinois St to Louisiana St, then continue along Perry St to the Hamburg St. Pump Station. The total length of new sewer would be 6,417 ft, with the largest pipe diameter being 42”.	Together with other projects, this project is projected to reduce CSO-064 discharges to Buffalo River from 10 to 4 activations.
CSO017_1.1 SPP054 Sewer Separation	This project consists of converting the sewer upstream of SPP054 to a separate storm sewer. This would eliminate SPP054 as an SPP	Together with other projects, this project is projected to reduce CSO-017 discharges to Buffalo River from 24 to 4 activations.
Hertel North East ILS (M) Updated design (CSO055_1.1)	The Hertel North East / Hertel Delaware ILS (CSO055_1.1) is designed to take advantage of additional storage capacity available on Hertel Avenue North barrel upstream of the existing Hertel at Deer RTC structure. Since there is a short travel time between the two locations, the preliminary control strategy would start storage when the depth upstream of the Hertel North East / Hertel Delaware ILS (CSO055_1.1) structure indicates wet weather. This project will work in conjunction with the CSO-055/ Military Road OLS project.	The proposed updated design of the Hertel North East / Hertel Delaware ILS (CSO055_1.1) together with other LTCP Projects will reduce activations from 38 to 9 for CSO-055 upon completion of the Selected Alternative.

Project Name	Project Description	Project Purpose*
Proposed Revised Green Infrastructure Projects		
CSO053_9 (16.7 acres managed)	The CSO-053 basin would have green infrastructure managing 16.7 acres of impervious area. The exact list of projects to be implemented would be determined during the design phase.	Together with other projects, this project is projected to reduce CSO-053 discharges to Scajaquada Creek from 37 to 4 activations.
CSO006_5 (52.5 acres managed)	Green infrastructure projects would be constructed within the basin sufficient to control runoff from 20% of the impervious area within the basin (52.5 acres managed). The exact list of projects to be implemented would be determined during the design phase.	Together with other projects, this project is projected to reduce CSO 006 discharges to Scajaquada Creek from 47 to 1 activations.
CSO011_1.1 (19.9 acres managed)	Green infrastructure projects would be constructed within the basin sufficient to control runoff from 20% of the impervious area within the basin (19.9 acres managed). The exact list of projects to be implemented would be determined during the design phase.	Together with other projects, this project is projected to reduce CSO-011 discharges to Niagara River from 39 to 4 activations.
CSO055_3 (260.2 acres managed)	The CSO-055 basin would have green infrastructure managing 260.2 acres of impervious area. The exact list of projects to be implemented would be determined during the design phase.	Together with other projects, this project is projected to reduce CSO-055 discharges to Niagara River from 38 to 9 activations.
CSO017_4 (37.5 acres managed)	The exact list of projects to be implemented would be determined during the design phase.	Together with other projects, this project is projected to reduce CSO 017 discharges to Buffalo River from 24 to 4 activations.
CSO026_4 (125.5 acres managed)	The CSO-026 basin would have green infrastructure managing 125.5 acres of impervious area.	Together with other projects, this project is projected to reduce CSO-026 discharges to Buffalo River from 9 to 6 activations.

Attachment C to the Semi-Annual Status Report: September 2024

Public Outreach Materials

Can I use the Shoreline Trail during construction?

- The project will require a temporary closure (up to 12 months) of a portion of the Shoreline Trail that runs along the west side of the Bird Island Wastewater Treatment Facility. Extents of the closure are shown below in red.
- A Work Zone Traffic Control Plan has been developed to detour pedestrians and cyclists along Niagara Street between Freedom Park (formerly Broderick Park) and Unity Island Park. Neither park will be impacted by the project.

What else can I expect during construction?

- Construction is scheduled to start in late 2024 / early 2025 and last until 2028.
- Disturbances such as noise and dust are possible while heavy machinery is in operation.
- Sewage odors may also be present during construction. These temporary disturbances will be minimized as much as possible.

Where can I find more information?

If you would like further information, please call or email Timothy Blake, Treatment Plant Capital Improvements Department, at the Buffalo Sewer Authority at (716) 851-4664 or tblake@buffalosewer.org.

Our website has information about the Long Term Control Plan and current construction projects: **www.buffalosewer.org**

Buffalo Sewer Authority

1038 City Hall
65 Niagara Square
Buffalo, NY14202

Phone: 716-851-4664

Primary Treatment Renovation at Bird Island Wastewater Treatment Facility

Project Information

BUFFALO SEWER AUTHORITY

Why is the Buffalo Sewer Authority doing this project?

The Buffalo Sewer Authority is working together with the United States Environmental Protection Agency and the New York State Department of Environmental Conservation on a Long Term Control Plan (LTCP). The LTCP identifies projects that will improve water quality of local water bodies and waterways. This once in a generation project is part of the LTCP to improve the existing primary treatment system.

What are the project goals and community benefits?

- Protect Public Health and the Environment
- Improve Water Quality for the Niagara River
- Modernize the Treatment Facility with necessary upgrades
- Implement an Odor Control system for the Primary Sedimentation Tanks to mitigate odor emissions
- Commitment to Economic Growth with supplier diversity and local workforce

How is this project being funded?

The construction costs of this project are anticipated to be worth $70—$80 million. The project has received State and Federal Funding to ensure affordability to ratepayers.

What is included in the renovations?

1. Primary Sedimentation Tanks Upgrades
2. Sludge Pumping Station Upgrades
3. New Odor Control
4. New High-Rate Disinfection System
5. Bypass Structure Gates Replacement
6. Outfall 001 Repair

Buffalo Sewer Authority

Primary Treatment Renovation
at Bird Island Wastewater Treatment Facility

Project Overview

BUFFALO
SEWER AUTHORITY

GREELEY AND HANSEN

Primary Treatment Renovation Project Goals

- Protect Public Health and Environment
  - Odor control for surrounding communities
  - Water quality for Niagara River
- Compliance with Regulatory Requirements to Achieve Goals of the Long-Term Control Plan
- Improved Wet Weather Treatment Capacity
- Modernize the Treatment Facility and Improve Efficiency
- Affordability to Ratepayers
  - Securing Federal and State Funding
- Community Benefits
  - Odor Control
  - Communication with BSA
  - Meaningful participation of local organizations and local M/WBE design & construction firms

https://buffalosewer.org/construction-projects/wet-weather-capacity-project/

BIRD ISLAND TREATMENT FACILITY WET WEATHER CAPACITY PROJECT

ABOUT THIS PROJECT

The Buffalo Sewer Authority (BSA) Bird Island Wastewater Treatment Facility (WWTF) currently serves residents in the City of Buffalo and surrounding suburbs. As part of a comprehensive plan to preserve the environment and continue its mission to close the health disparities gap, BSA has developed a Combined Sewer Overflow Long-Term Control Plan (CSO LTCP) to increase the capacity of the sewer system and of the Bird Island WWTF over a period of 20 years. The Bird Island Treatment Facility Wet Weather Capacity Project is a three-phase project that is expected to take approximately eight years to complete. It represents the largest investment in clean water infrastructure in Western New York in over forty years.

"This project will ensure greater water quality throughout Buffalo and downstream communities for generations to come."

— Oluwole A. McFoy, P.E., General Manager Buffalo Sewer Authority

Phase I will rehabilitate the WWTF's biological systems to improve treatment of current flows.

Phase II will rehabilitate and upgrade the WWTF's physical treatment system to improve treatment of current flows and provide a new disinfection facility to improve the water quality of discharges into the river during wet weather events.

Phase III will further expand the WWTF's biological system to handle more flow through the WWTF during wet weather.

PRIMARY SYSTEM REHABILITATION AND UPGRADES PROJECT OVERVIEW

1 Primary Sedimentation Tanks

- New sludge and scum collection equipment
- Improved efficiency for sludge settling and removal
- Concrete repair and coating for corrosion protection
- Safety improvements with new handrail and toeboards

2 Sludge Pumping Station

- New pumps, piping, and valves
- New HVAC equipment to meet current ventilation codes and standards
- New electrical and control equipment for improved automation and operations flexibility
- Concrete and masonry repair and improvements while maintaining original building design
- New personnel spaces and lighting

3 Odor Control

- New effluent trough covers for the Primary Sedimentation Tanks
- Odor capture at various chambers
- New FRP piping to convey odorous air to odor control units for treatment prior to being released into the atmosphere

4 High-Rate Disinfection System

- New Chlorine Contact Tank provides 5 minutes of contact time at 160 MGD
- High-Rate Disinfection Building includes chemical storage and feed equipment
- Five new 40 MGD submersible pumps to convey disinfected Primary Effluent through Outfall 001 to the Niagara River

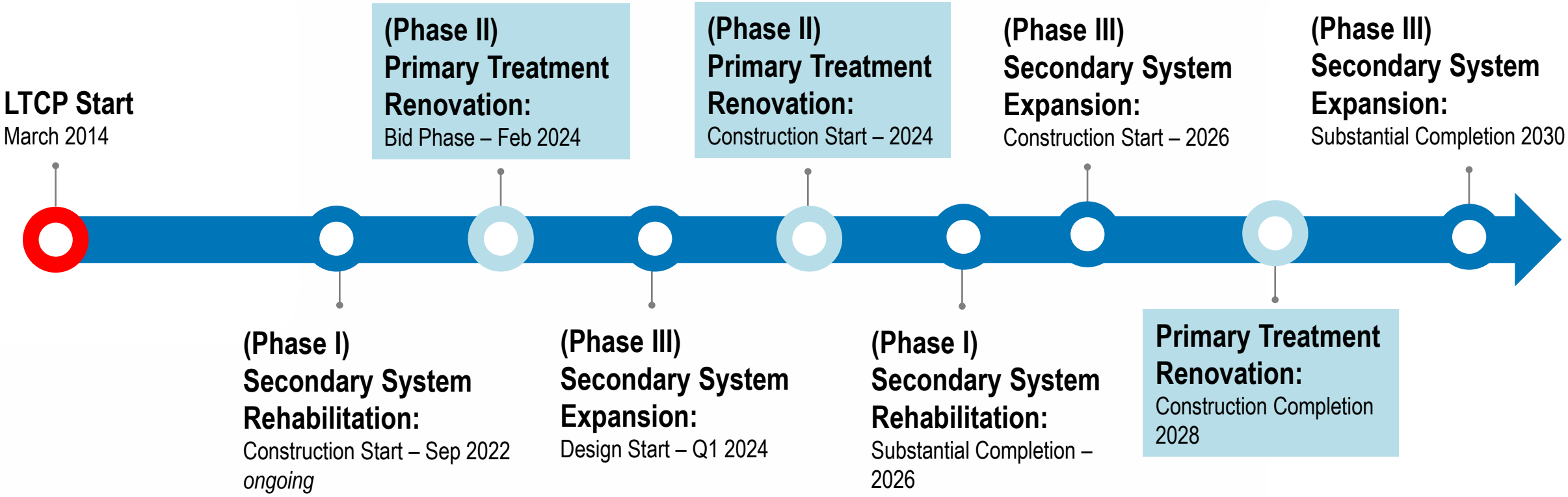
5 Bypass Structure Gates

- Gate 17 installed with new actuator
- New gates and actuators to automate wet weather sequences and provide operational flexibility for Authority staff

6 Outfall 001 Repair

- Restoration of multi-use riverwalk/trail
- Installation of landscaping along public-facing utility bike/pedestrian path along Niagara River
- Repairs to Outfall 001 overflow structure, and connection of HRD pump station pipe to the outfall structure

Bird Island WWTF
NFA Capital Projects Timeline



BUFFALO
SEWER AUTHORITY

Contract No. 82000030

Primary Treatment Renovation Project

Public Participation Plan

December 2023

GREELEY AND HANSEN

INFORMATIONAL SESSION FOR UPCOMING RFP

Construction Services for Primary Treatment Renovation at Bird Island Wastewater Treatment Facility

Thursday, January 11, 2024
1:00 - 2:30 pm EST

via Microsoft Teams

(An invitation with meeting details will be sent after registering)

The Buffalo Sewer Authority will be holding an informational meeting regarding the upcoming bid for the **Primary Treatment Renovation at Bird Island Wastewater Treatment Facility.** The bid advertisement is expected to go live in February 2024 and is anticipated to be worth $70-80M.

Contractors and vendors interested in learning more about this upcoming bid and other future opportunities are encouraged to attend this Informational "Open House" Session (virtual) scheduled for Thursday, January 11, 2024 at 1:00 pm EST.

The agenda of this meeting will provide a detailed overview of the project and an opportunity for all potential bidders to ask questions, to discuss the proposed timelines, build relationships between potential prime/subcontractors and vendors, and to state their interest in the project.

Register to Attend:

Scan the QR code to the right or go to *forms.office.com/r/Bv6xJVN5eD*

buffalosewer.org

Can I use the Shoreline Trail during construction?

- The project will require a temporary closure (up to 12 months) of a portion of the Shoreline Trail that runs along the west side of the Bird Island Wastewater Treatment Facility. Extents of the closure are shown below in red.
- A Work Zone Traffic Control Plan has been developed to detour pedestrians and cyclists along Niagara Street between Freedom Park (formerly Broderick Park) and Unity Island Park. Neither park will be impacted by the project.

What else can I expect during construction?

- Construction is scheduled to start in late 2024 / early 2025 and last until 2028.
- Disturbances such as noise and dust are possible while heavy machinery is in operation.
- Sewage odors may also be present during construction. These temporary disturbances will be minimized as much as possible.

Where can I find more information?

If you would like further information, please call or email Timothy Blake, Treatment Plant Capital Improvements Department, at the Buffalo Sewer Authority at (716) 851-4664 or tblake@buffalosewer.org.

Our website has information about the Long Term Control Plan and current construction projects: **www.buffalosewer.org**

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Primary Treatment Renovation at Bird Island Wastewater Treatment Facility

Project Information

BUFFALO
SEWER AUTHORITY

Why is the Buffalo Sewer Authority doing this project?

The Buffalo Sewer Authority is working together with the United States Environmental Protection Agency and the New York State Department of Environmental Conservation on a Long Term Control Plan (LTCP). The LTCP identifies projects that will improve water quality of local water bodies and waterways. This once in a generation project is part of the LTCP to improve the existing primary treatment system.

What are the project goals and community benefits?

- Protect Public Health and the Environment
- Improve Water Quality for the Niagara River
- Modernize the Treatment Facility with necessary upgrades
- Implement an Odor Control system for the Primary Sedimentation Tanks to mitigate odor emissions
- Commitment to Economic Growth with supplier diversity and local workforce

How is this project being funded?

The construction costs of this project are anticipated to be worth $70—$80 million. The project has received State and Federal Funding to ensure affordability to ratepayers.

What is included in the renovations?

1. Primary Sedimentation Tanks Upgrades
2. Sludge Pumping Station Upgrades
3. New Odor Control
4. New High-Rate Disinfection System
5. Bypass Structure Gates Replacement
6. Outfall 001 Repair

Current Bid & Procurement Schedule

- Bid Advertisement: February 2024
- Recommendation of Bid Award: May 2024
- Notice to Proceed: Summer-Fall 2024
- Construction Completion: December 2028

Buffalo Sewer Authority Design Project Team

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Design Deputy Project Manager
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BUFFALO SEWER AUTHORITY

INFORMATIONAL SESSION FOR UPCOMING RFP

Construction Services for Primary Treatment Renovation at Bird Island Wastewater Treatment Facility

Thursday, January 11, 2024
1:00 - 2:30 pm EST

via Microsoft Teams

(An invitation with meeting details will be sent after registering)

The Buffalo Sewer Authority will be holding an informational meeting regarding the upcoming bid for the **Primary Treatment Renovation at Bird Island Wastewater Treatment Facility**. The bid advertisement is expected to go live in February 2024 and is anticipated to be worth $70-80M.

Contractors and vendors interested in learning more about this upcoming bid and other future opportunities are encouraged to attend this Informational "Open House" Session (virtual) scheduled for Thursday, January 11, 2024 at 1:00 pm EST.

The agenda of this meeting will provide a detailed overview of the project and an opportunity for all potential bidders to ask questions, to discuss the proposed timelines, build relationships between potential prime/ subcontractors and vendors, and to state their interest in the project.

Register to Attend:

Scan the QR code to the right or go to *forms.office.com/r/Bv6xJVN5eD*

Primary Treatment Renovation
at Bird Island Wastewater Treatment Facility

Informational Session for Upcoming Request for Construction Bids

BUFFALO SEWER AUTHORITY

GREELEY AND HANSEN
A TYLin Company

January 11, 2024

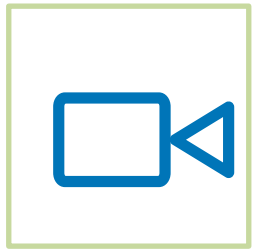
Housekeeping

Online Meeting

You are Muted

Chat Box

Live Q&A



Meeting Recorded

This presentation and attendee list will be shared with all attendees.

Safety Minute - Ladders

Portable ladders are one of the leading causes of occupational fatalities and injuries

Step, straight, combination, and extension | OSHA 1926.1053

Do's

- ✓ Avoid electrical hazards
- ✓ Inspect ladder for damage
- ✓ Maintain a 3-point contact
- ✓ Extend ladder at least 3 feet above the point of support
- ✓ Place base of ladder ¼ of the working length of the ladder from the wall or vertical surface
- ✓ Engage all locks on the ladder

Don'ts

- × Do not use the top step
- × Do not stand on the top 3 steps
- × Do not exceed the ladders maximum load

Safety First!

Safety is a high priority for us and we practice it daily throughout our organization. We have found that high safety standards translate into high efficiency results in the field. Buffalo Sewer Authority puts SAFETY FIRST, assuring a safe environment for our employees and customers.

It is our mission to maintain a working environment where every employee, new and seasoned, takes responsibility to implement, enforce and model all safety guidelines in everything they do. Each new employee must attend an extensive orientation and safety training program.

Objectives of this Meeting

- Provide information on Buffalo Sewer Authority's upcoming Construction Services RFP: Primary Treatment Renovation at Bird Island WWTF
- Review expectations of contract requirements, including meaningful D/M/WBE engagement
- Provide networking opportunities and encourage teaming prior to bid advertisement. Center Disadvantaged Business Enterprise (DBE) firms.
- Provide brief overview of upcoming Buffalo Sewer Authority construction contracts
- Question & Answer

Agenda

- Introductions & Welcome
- Contracting Equity
- About Buffalo Sewer Authority
- LTCP/NFA at Bird Island WWTF
- Project Background, Summary of Work, & Constraints
- Contract Administration & Requirements
- Project Schedule: Procurement & Construction
- Future Buffalo Sewer contracts to be advertised in 2024-2028
- Feedback and Q&A Session

Presenters

BUFFALO SEWER AUTHORITY (OWNER)

- **Tim Blake**
  WWTF Capital Projects Manager
- **Rosaleen Nogle, PE, BCEE**
  Principal Sanitary Engineer

GREELEY AND HANSEN
A TYLin Company (DESIGN CONSULTANT)

- **Walt Walker, PE, ENV SP**
  Project Manager
- **Ryan Christopher, PE, ENV SP**
  Deputy Project Manager

Networking and Follow-Up Site Visit

Presentation and attendee list will be share with attendees after this meeting.

Networking for teaming partners is encouraged!

An optional site visit to Bird Island WWTF can be scheduled the Week of January 22-26 at 9:00am each day. Advance notice required, email: walt.walker@greeley-hansen.com

Register to receive the presentation (if you haven't already):
forms.office.com/r/Bv6xJVN5eD

- Name
- Company
- Email
- Prime/Subcontractor/Vendor/Undecided
- DBE (Y/N)
- Trade / Specialty

Contracting Equity & Supplier Diversity: DBE/MBE/WBE inclusion at BSA

- Create economic opportunity for DBE/MBE/WBE firms, including firms who are new to working with BSA and/or the City of Buffalo
- Promote meaningful teaming arrangements, mentorship, and partnership between established, experienced firms and new and/or smaller firms
- For the Primary Treatment Renovation Construction Services contract:
  - **DBE utilization goal of 20%** of total value of the contract
  - DBE must be certified in New York State as a DBE
  - Utilization of Erie County certified M/WBE firms is encouraged

Contracting Equity: DBE Inclusion Plans and Resources

- A DBE Utilization Plan **must** be submitted with your Bid Proposal Package:

  https://efc.ny.gov/system/files/documents/2023/02/dbe-utilization-plan.docx

- Prime contractor must utilize DBE suppliers/subcontractors that are certified on behalf of the New York State Unified Certification Program:

  https://nysucp.newnycontracts.com/

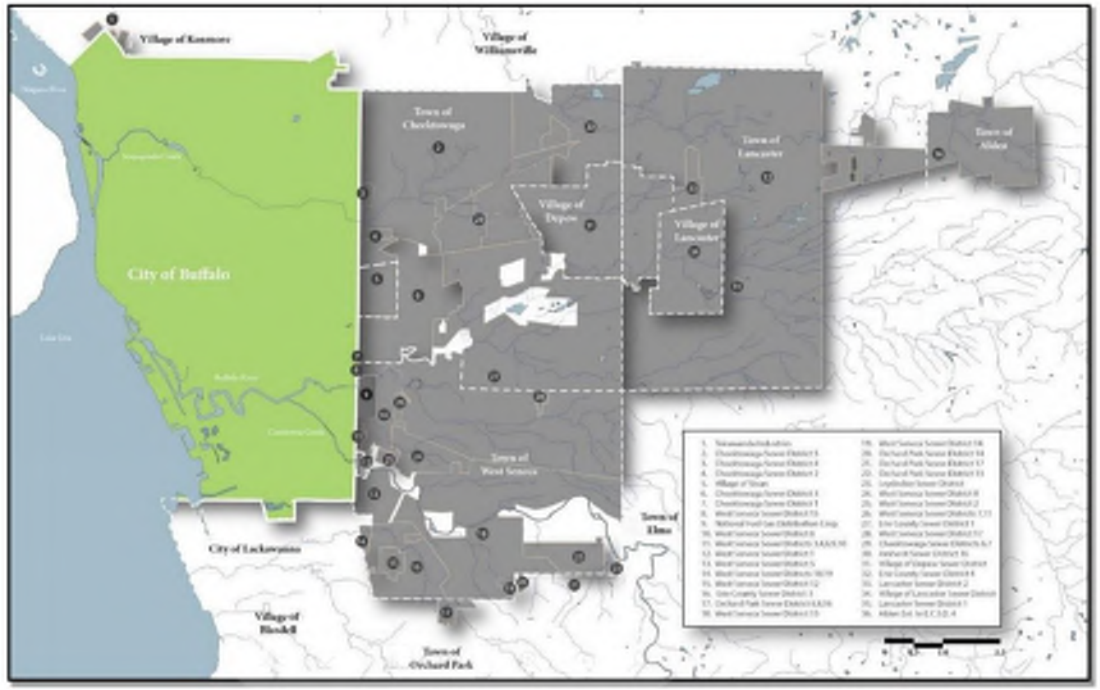
- We are looking for Plans that are:
  - Reflecting a good-faith effort
  - Realistic and meaningful

About Buffalo Sewer Authority and the Project

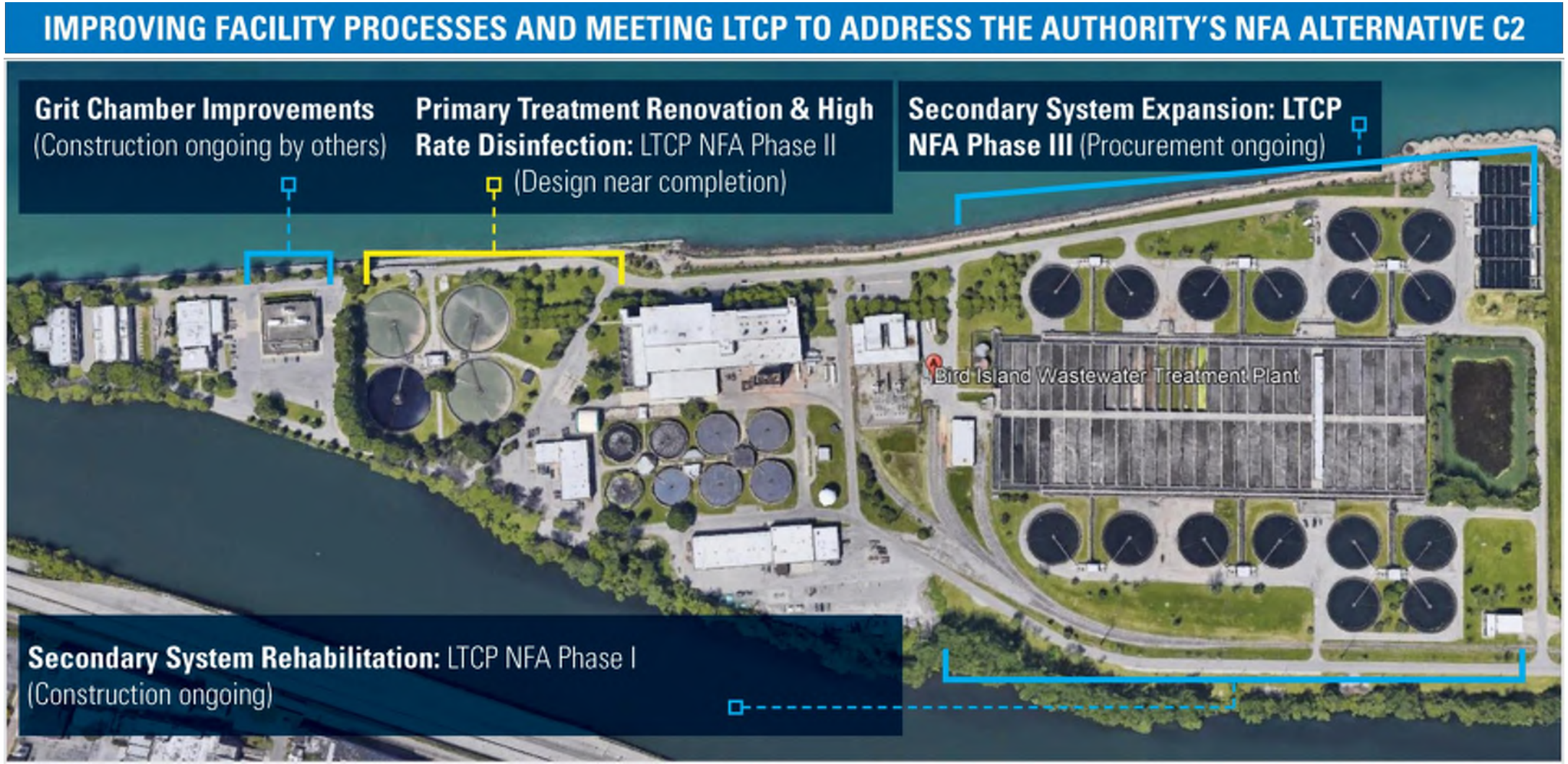
- The Buffalo Sewer Authority (BSA) provides wastewater service to approximately 550,000 people. The Authority owns and operates the Bird Island WWTF

- As part of the approved 2014 LTCP **No Feasible Alternative (NFA)**, the Authority committed to:
  - **Renovate the primary treatment system at 160 MGD, with capacity for increased disinfection of flows as needed**
  - Restore the full secondary treatment capacity up to 360 MGD, and in the future designing for peak capacity up to 400 MGD

- **Once-in-a generation upgrade and rehabilitation of the Bird Island WWTF primary treatment system**



Buffalo Sewer Authority – Bird Island WWTF



Buffalo Sewer Authority LTCP NFA Goals

- Advancement of NFA Schedule and Expediting Completion w/ Funding In Place

  Secondary System Rehabilitation (Phase I) – replacement of aeration system and restoration of capacity from 320 MGD to 360 MGD. Construction Start in September 2022. Ongoing.

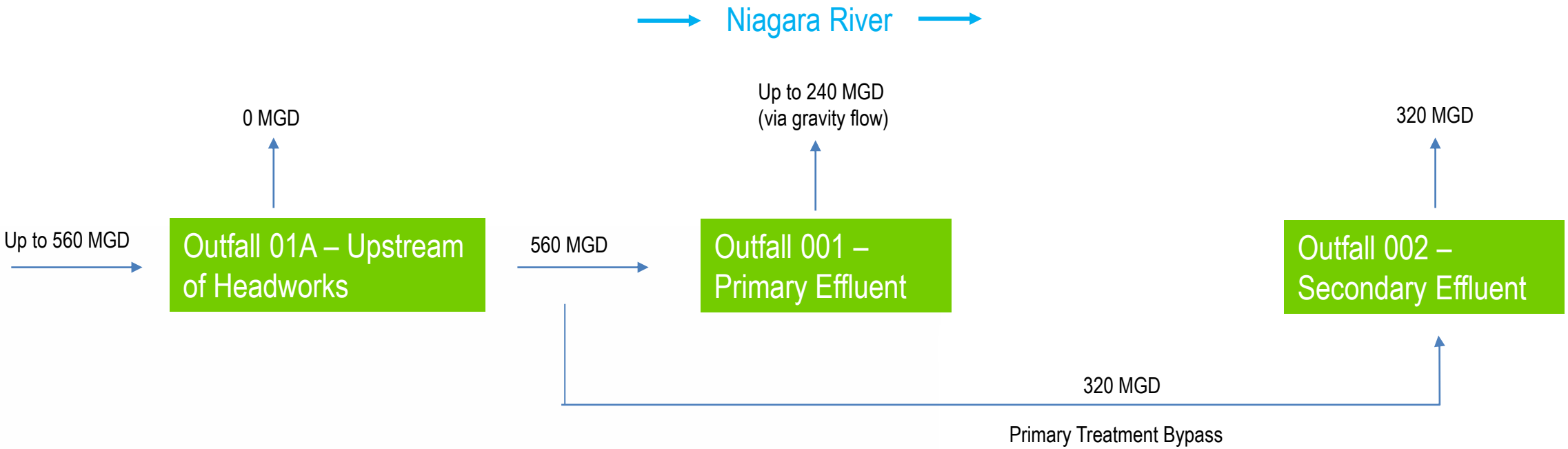
  Primary Treatment Renovation (Phase II) – Engineering design ongoing. Construction Start scheduled for Summer/Fall 2024.

  Secondary System Expansion (Phase III) – increase of secondary system treatment capacity from 360 MGD to 400 MGD. Engineering Design Start in Q1 2024. Construction Start in Q4 2026.

- Protect Public Health, Water Quality, and Environment
- Compliance with Regulatory Requirements to Achieve LTCP/NFA Goals
- Affordability to Ratepayers and the Authority – State and Federal Funding
- Modernize the Treatment Facility and Improve Efficiency
- Community Benefits
  - Improved Water Quality for Niagara River
  - Odor Control
  - Increased Community Engagement + Public Understanding of Water Infrastructure
  - Commitment to Economic Growth, Supplier Diversity, and Local Workforce

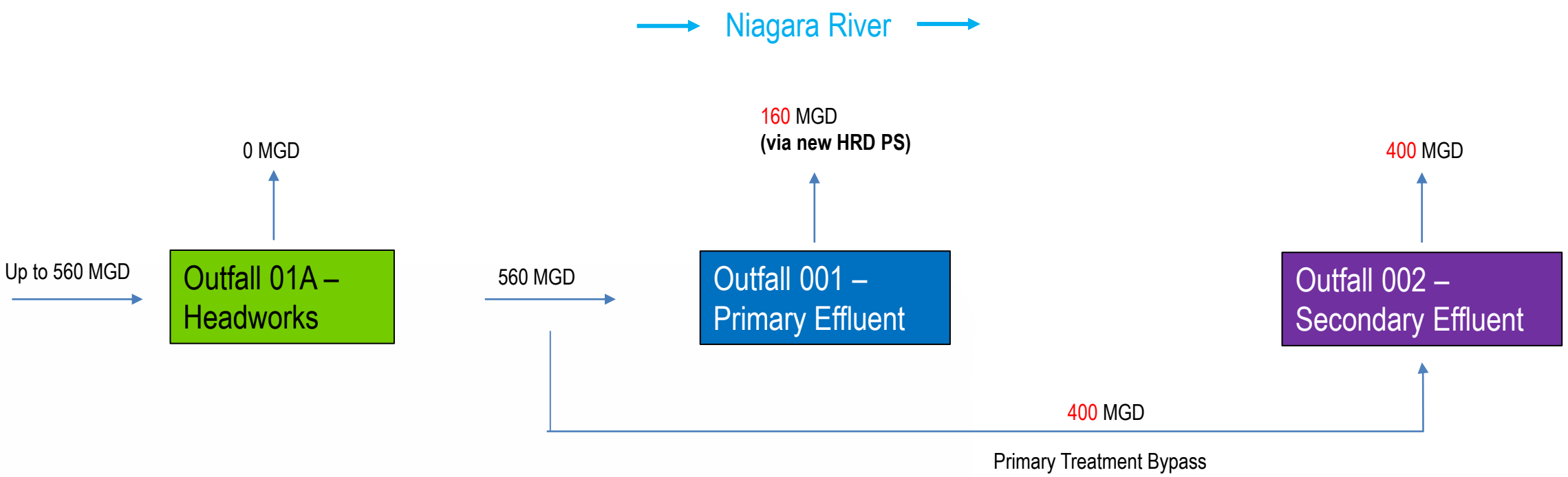
Existing Conditions during Peak Wet Weather
(Present)

- During normal operating conditions, Primary Treatment throughput is 160 MGD
- Secondary Treatment capacity currently limited to ~320 MGD
- During peak wet weather conditions (partial treatment mode), excess flows are discharged through partial treatment primary Outfall 001

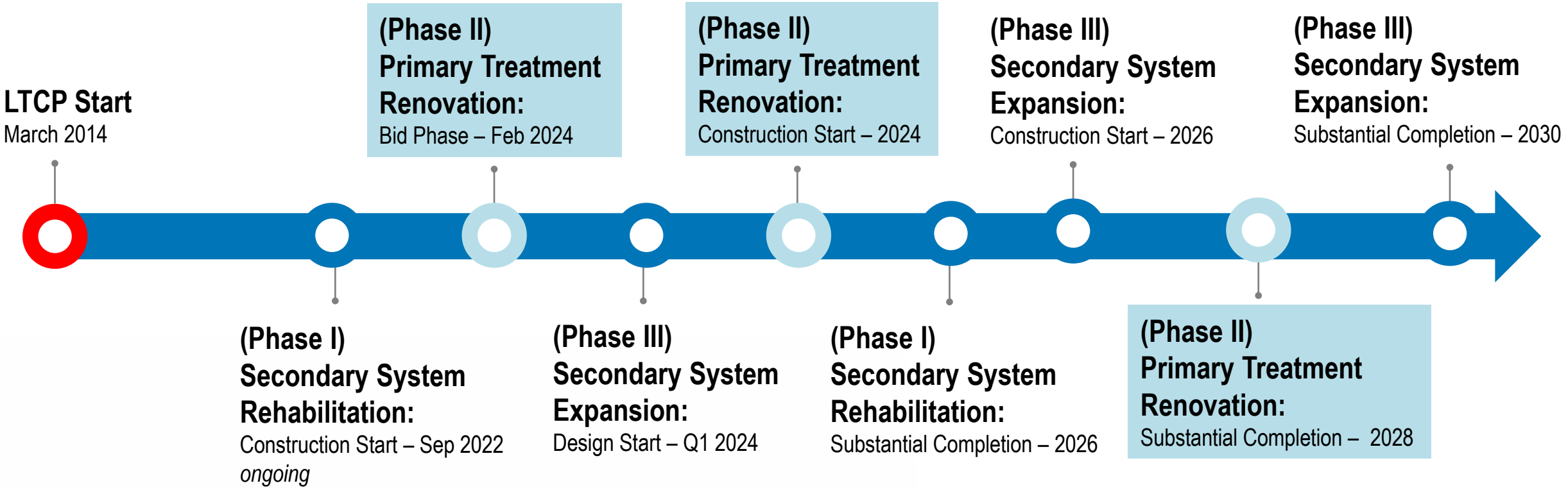


Ultimate System Buildout – Peak Wet Weather Conditions (2029)

- Primary Treatment Renovation, and Secondary System Rehabilitation and Upgrades completed
- Primary Treatment Capacity maximum throughput of 160 MGD; Secondary Treatment Capacity increased to 400 MGD



Bird Island WWTF
NFA Capital Projects Timeline



PRIMARY SYSTEM REHABILITATION AND UPGRADES PROJECT OVERVIEW

1 Primary Sedimentation Tanks

- New sludge and scum collection equipment
- Improved efficiency for sludge settling and removal
- Concrete repair and coating for corrosion protection
- Safety improvements with new handrail and toeboards

2 Sludge Pumping Station

- New pumps, piping, and valves
- New HVAC equipment to meet current ventilation codes and standards
- New electrical and control equipment for improved automation and operations flexibility
- Concrete and masonry repair and improvements while maintaining original building design
- New personnel spaces and lighting

3 Odor Control

- New effluent trough covers for the Primary Sedimentation Tanks
- Odor capture at various chambers
- New FRP piping to convey odorous air to odor control units for treatment prior to being released into the atmosphere

4 High-Rate Disinfection System

- New Chlorine Contact Tank provides 5 minutes of contact time at 160 MGD
- High-Rate Disinfection Building includes chemical storage and feed equipment
- Five new 40 MGD submersible pumps to convey disinfected Primary Effluent through Outfall 001 to the Niagara River

5 Bypass Structure Gates

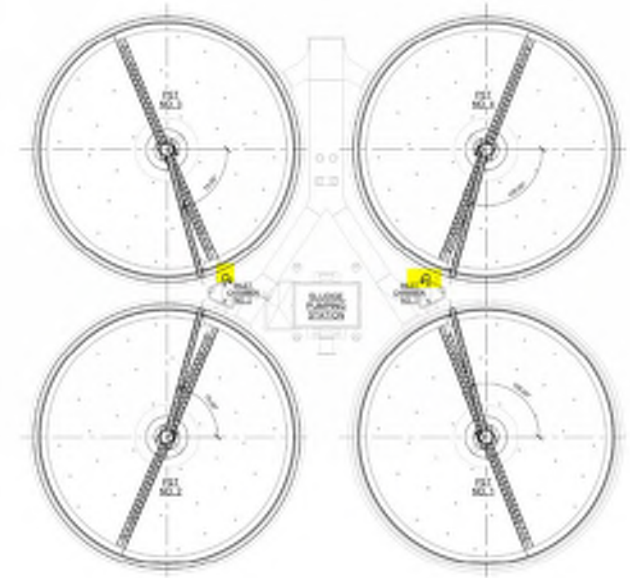
- Gate 17 installed with new actuator
- New gates and actuators to automate wet weather sequences and provide operational flexibility for Authority staff

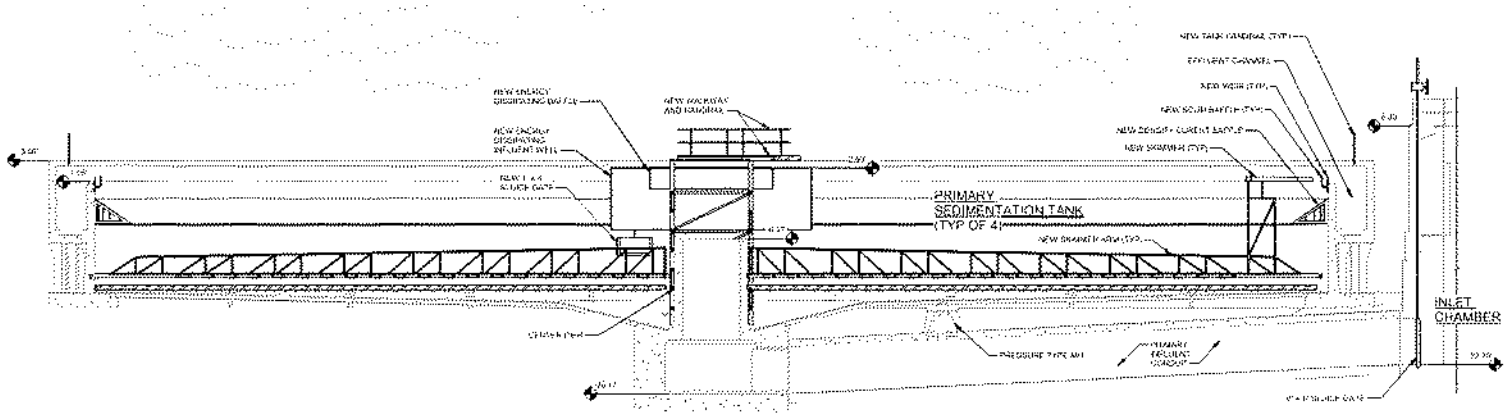
6 Outfall 001 Repair

- Restoration of multi-use riverwalk/trail
- Installation of landscaping along public-facing utility bike/pedestrian path along Niagara River
- Repairs to Outfall 001 overflow structure, and connection of HRD pump station pipe to the outfall structure

Primary Sedimentation Tanks Upgrades

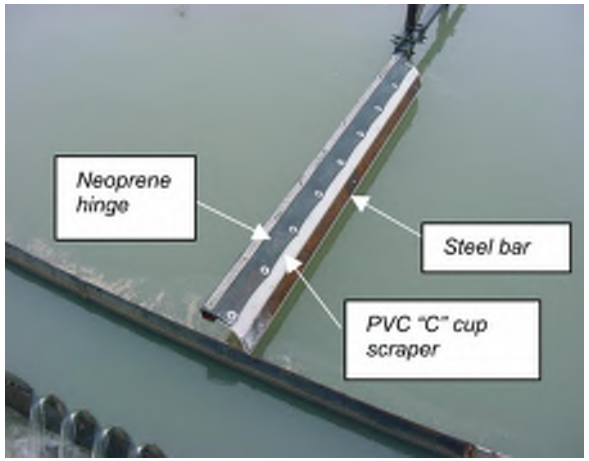
- New Clarifying Equipment
  - New Sludge and Scum Collection Equipment
  - Density Current Baffles
  - Energy Dissipating Inlets
  - Replace GW relief valves
  - New Scum Trough, Beach
  - Effluent Weir Covers – Odor Control
- Structural Repairs
  - GW Relief Valve Replacement
  - Concrete Crack / Spall repairs
  - Concrete Coating Inlet Chamber Repairs
  - Inlet Chamber & Scum Well Repairs
- Electrical
  - New Area Lighting
    - SwivelPole Type at PSTs and PST Walkway
- New Handrails around PSTs
- Davit Mounts
- Inlet Chamber / Scum Well Handrails Left in Place

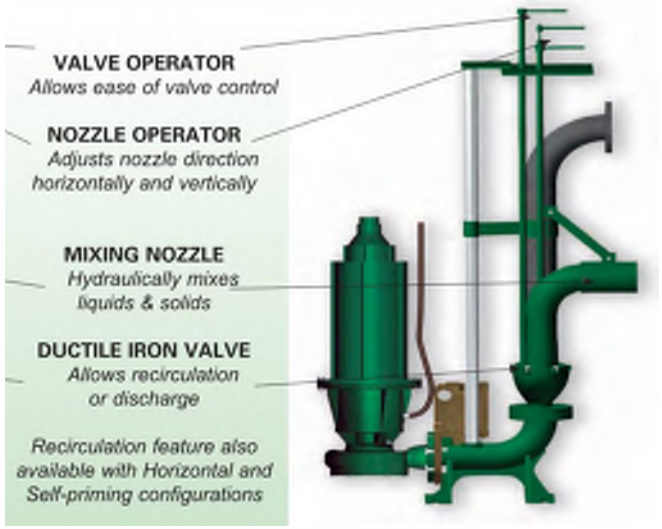


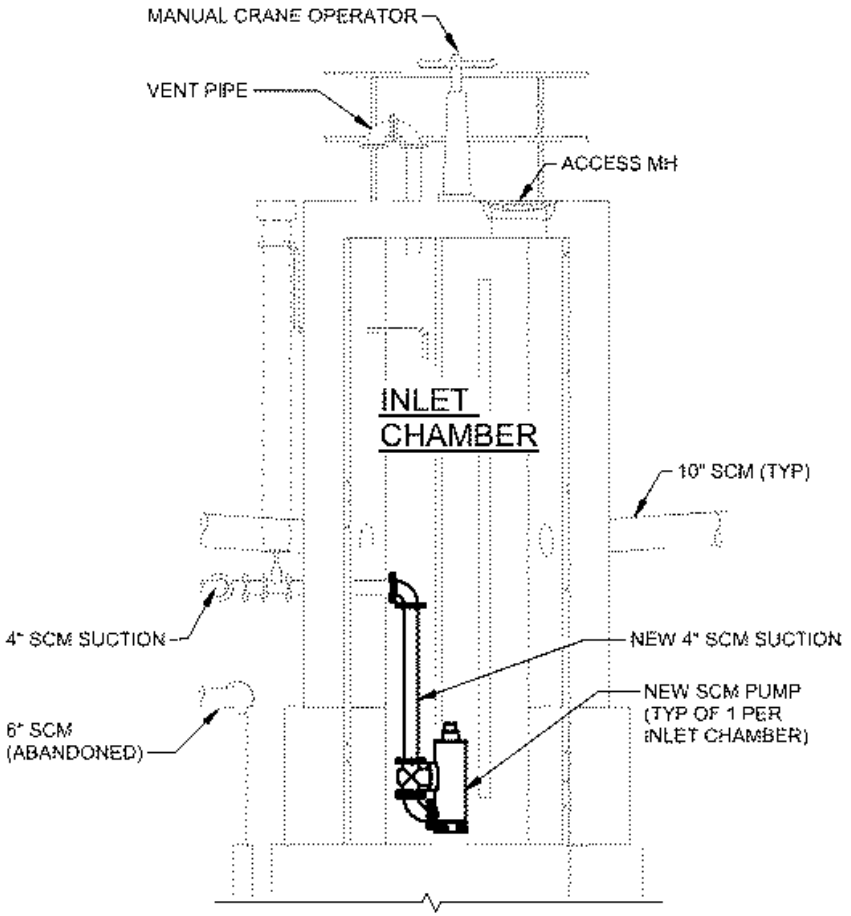


Scum Collection

- Operation
  - Automatic Based on Level
- Submersible Recirculation Pumps
- Scum Collection Equipment
  - Increase Scum Beach and Trough Length
- Scum Collection Equipment
  - Scum Beach to be Mostly Submerged
  - Hinged Scum Skimmer Arm





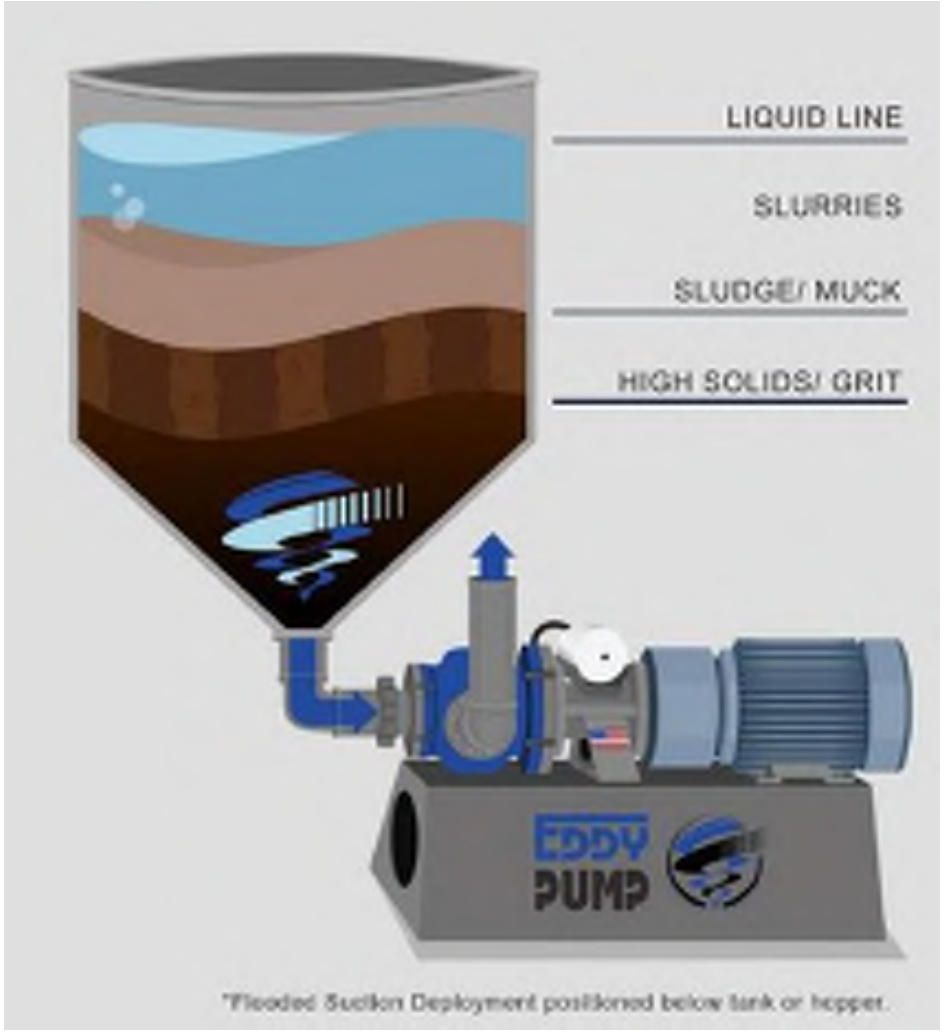


Sludge Pumping Station

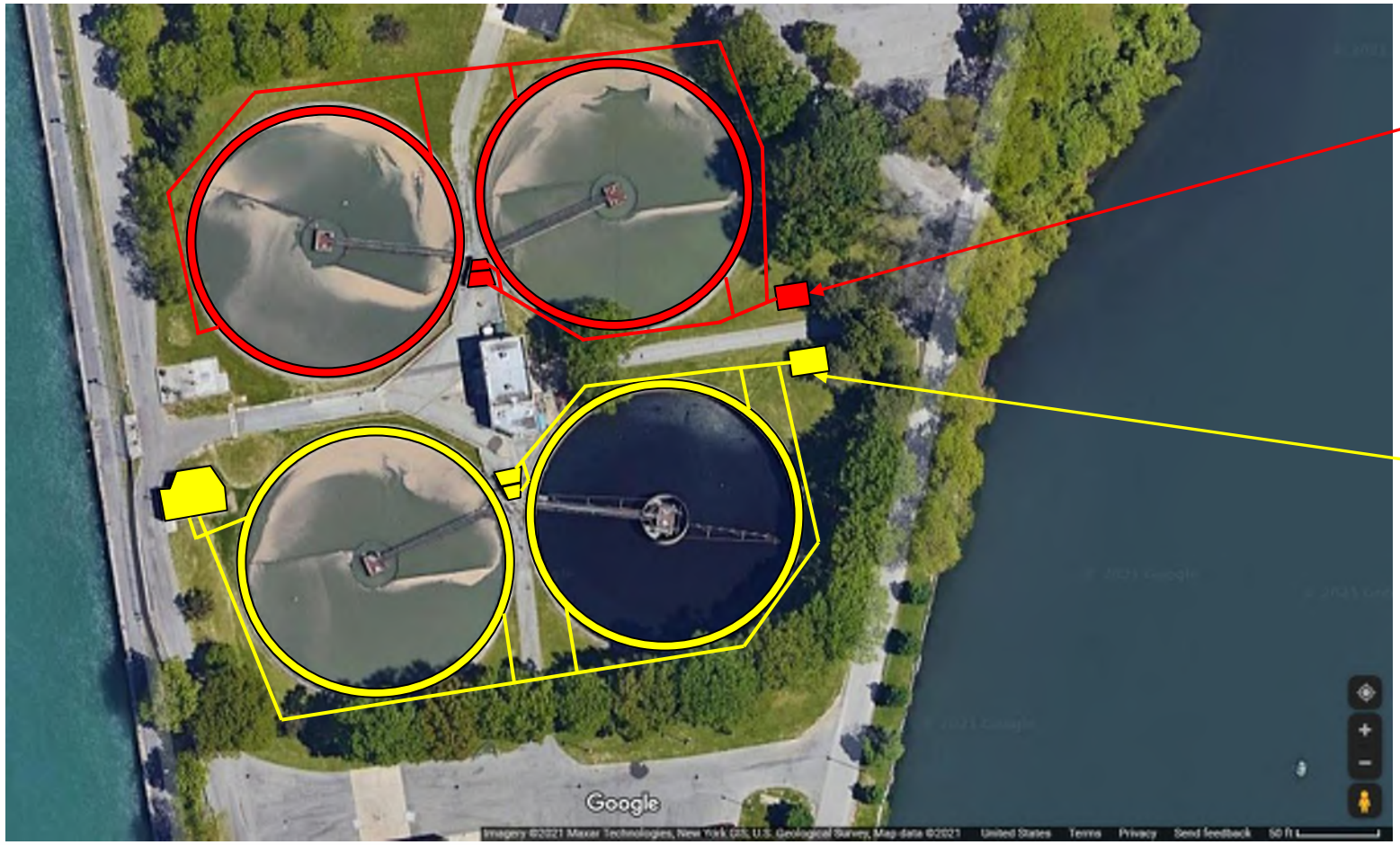
- Full Building Renovation – Masonry and Building Repairs
- New Sludge Pumps w/ Grinders
- New Drainage Pumps
- New Piping and Valves
- New Plumbing and HVAC
- New Bridge Crane
- Location of New MCC
- Renovated Electrical Control Room

Sludge Pumping Station

- Operation
  - Pumps to Operate Automatically Based on Timer and Sludge Density Meters
  - Manual Valve Actuation
- Primary Sludge Pumps
  - Eddy Pumps
- Sludge Monitoring
  - Sludge Density Meters
- Drainage Pumps
  - Dry Pit Submersible with Control Panel on Upper Level
  - Operated Based on Level



Odor Control System Layout



Odor Control System to Treat North Inlet Chamber and Effluent Channels of Primary Sedimentation Tanks 1 and 4

Odor Control System to Treat Bypass and Control Chamber, South Inlet Chamber, and Effluent Channels of Primary Sedimentation Tanks 2 and 3

Odor Control Approach

- **Hybrid system (carbon column + biotrickling filter).** Benefits:
  - Reduced frequency of carbon media replacement
  - Reduced carbon media replacement costs
  - More effective for treating large range of H_2S concentrations that BSA experiences
- Pulling air from Bypass and Control Chamber, PSTs, and Inlet Chambers
- At Bypass and Control Chamber
  - Two draw-offs on south side of chamber
- At PSTs
  - Launders covered along the perimeters
  - Two draw-off points per PST approximately 180° apart from each other
- At Inlet Chambers
  - Draw-offs from scum well and influent chamber

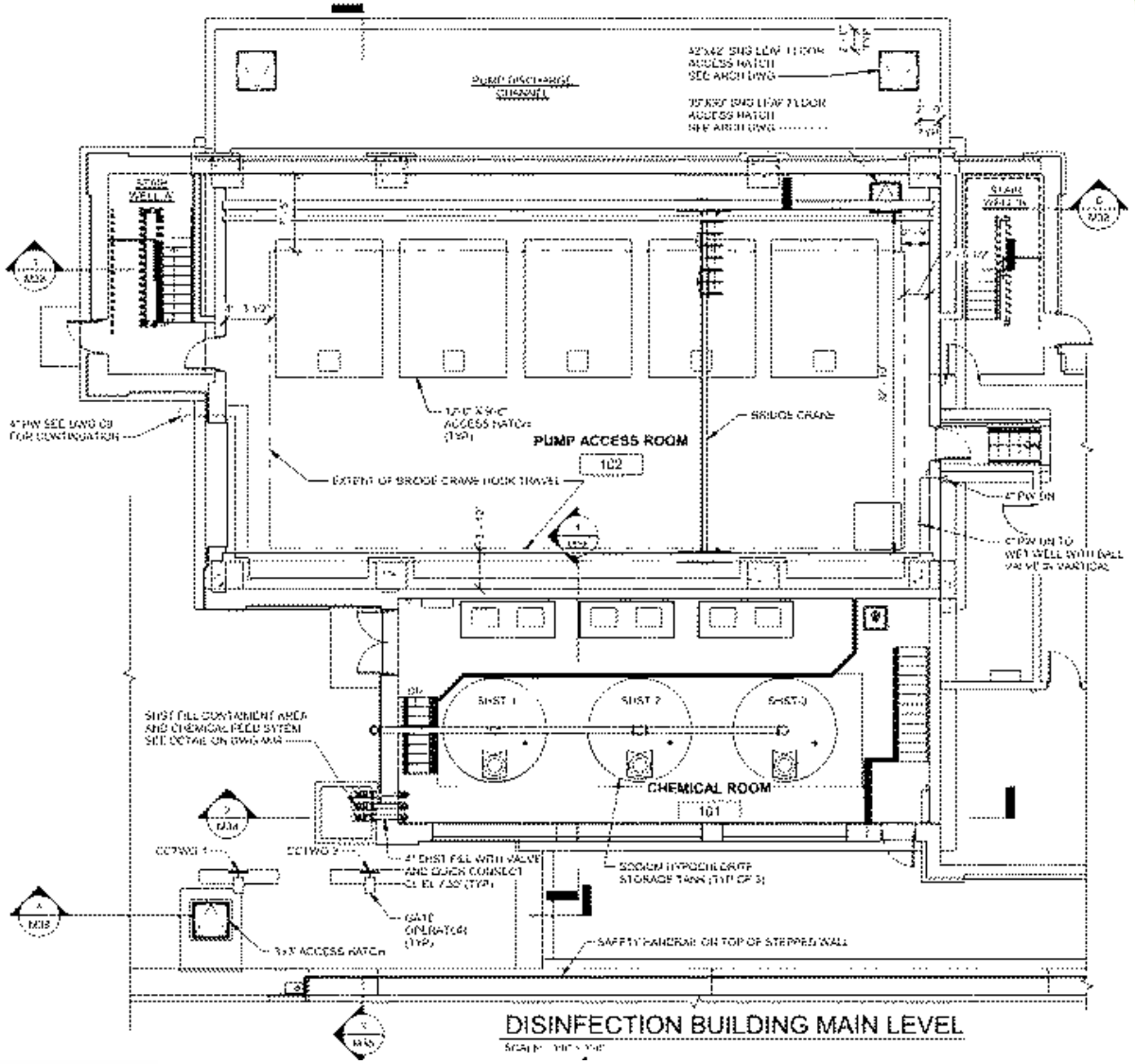
High-Rate Disinfection (HRD) Pump Station and Chlorine Contact Tank

- 160 MGD max throughput
- To be operational only during Partial Treatment mode
- Once connected to Outfall 001, the existing Sodium Hypo Building would be decommissioned

Future Rendering of New HRD Facility

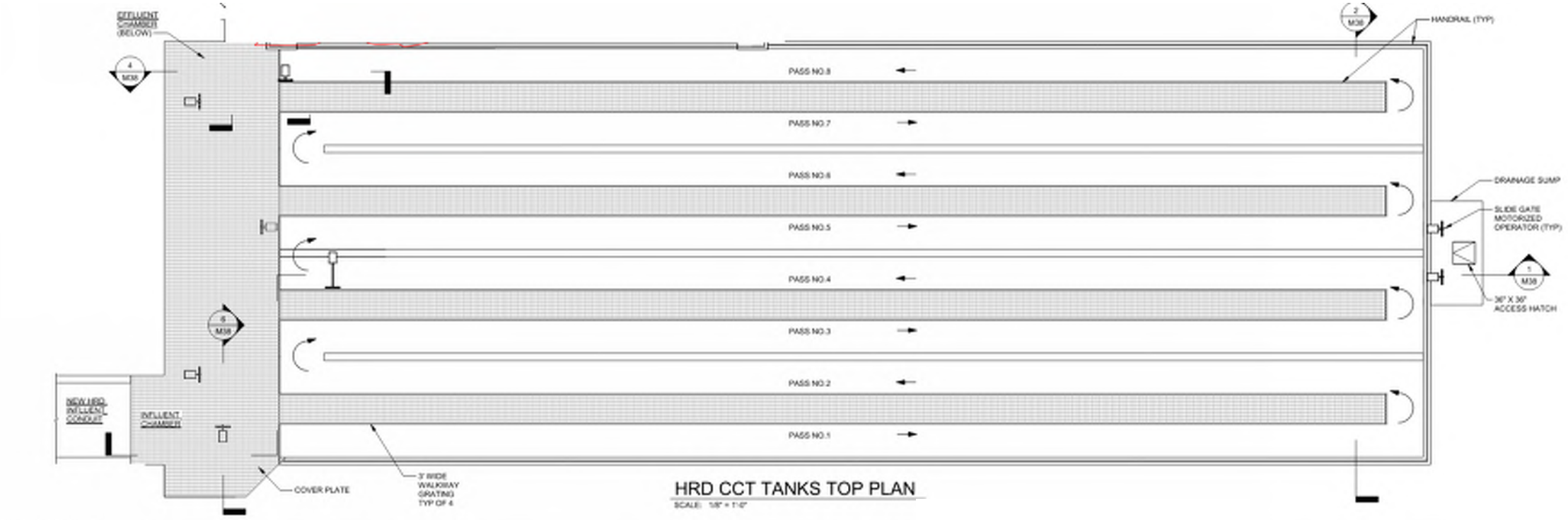
HRD Pump Station

- Pumping Station
  - 160 MGD firm capacity
  - Five 40 MGD Submersible Pumps
  - 3 Pumps on VFD, 2 constant speed
- Chemical Feed and Storage
  - Three 11,200 gallon storage tanks
  - Chemical feed pumps

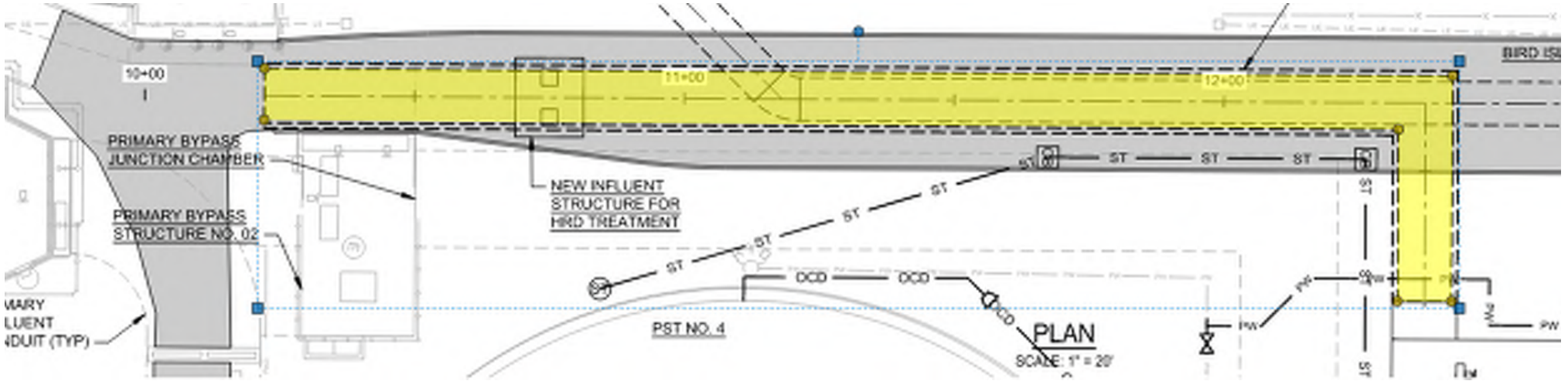


HRD Chlorine Contact Tank

- 5-minute contact time:
  - Channel Width: 6 ft
  - Channels Length: 120 ft
  - Water Depth: ~13 ft



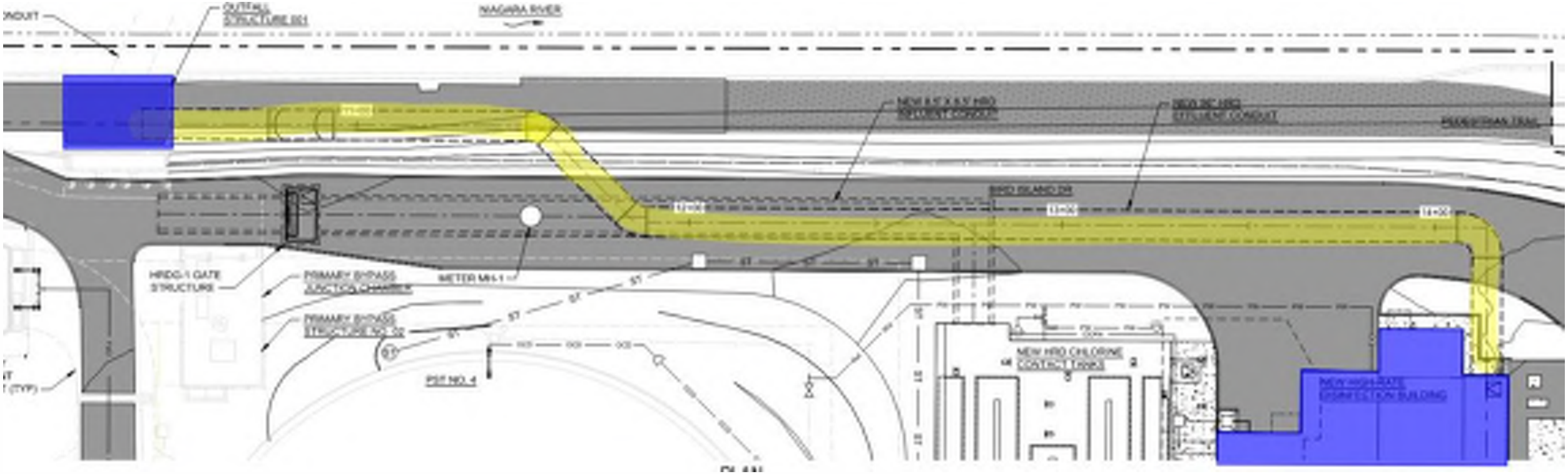
Influent to HRD Conduit



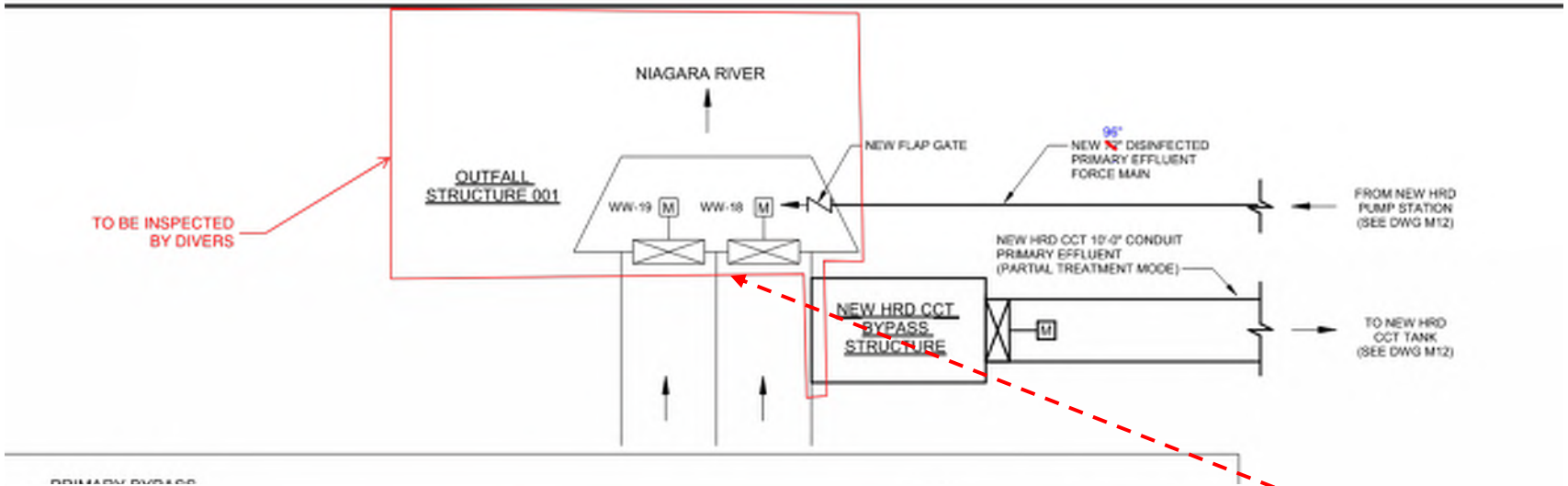
- Flow
  - Gravity
  - Average Flow: 74 MGD
  - Max Flow: 160 MGD
- Size
  - 8.5’x8.5’
- Structural
  - Material: Cast in Place Concrete
  - Steel piles

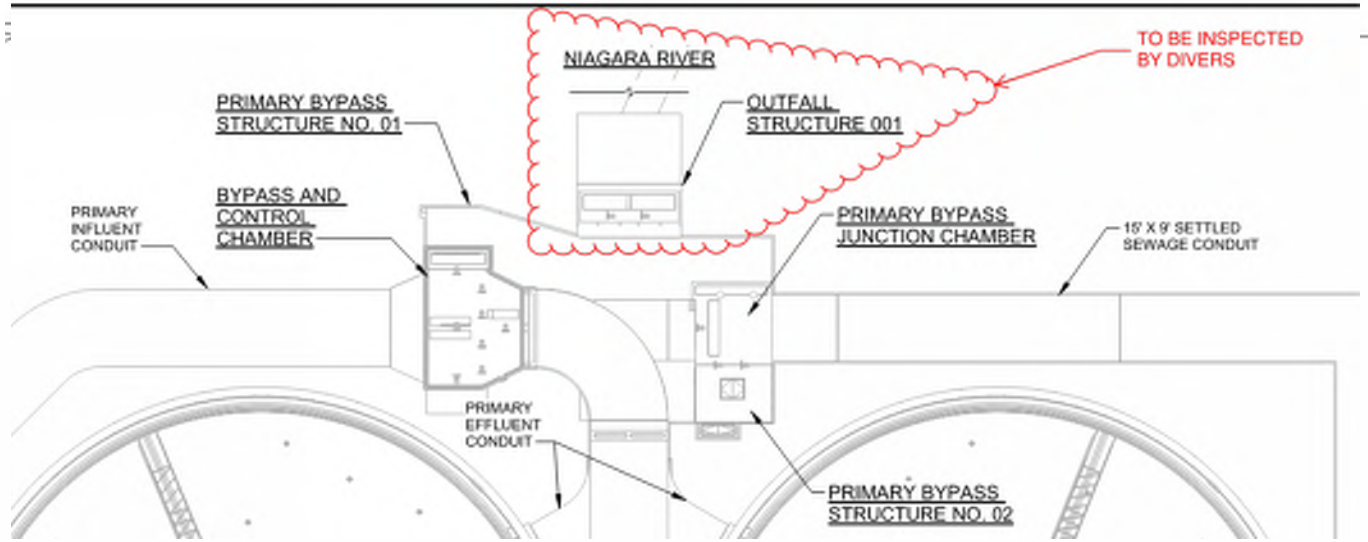
Outfall 001 Repair and Connection to HRD

- The HRD Pumping Station force main will tie into the existing Outfall 001 structure.
- The existing Outfall 001 overflow structure and conduit was inspected to verify they are structurally competent to facilitate the proposed renovation.



Outfall 001 Access





What to Expect:
Project Constraints and Site Coordination

BUFFALO
SEWER AUTHORITY

GREELEY AND HANSEN
A TYLin Company

Maintenance of Plant Operations

- Limitations in shutdown of the 4 Primary Tanks – typically one at a time
- Understanding Duration of Plant and Tank Shutdowns
- Flexibility of Wet Weather Capacity in either Primary or Secondary Treatment
- Contract B: Replacement of Gate WW-17 must occur first
- Limit Any Potential Discharge Permit Violations/Conflicts
- Riverwalk/Shoreline trail shutdown due to Outfall 001 repair: communication & coordination with City DPW and community
- Large deliveries shall occur at North Gate Entrance (via International Railroad Bridge)
- Coordination with other ongoing Contracts: Secondary Systems Rehab (Phase I), Secondary System Expansion (Phase III), and others

Staging Coordination with Other NFA Contracts

Major Work and Coordination items

- HRD PS and CCT
  - Deep Excavation and Dewatering for Dewatering
  - Electrical power supply from MegaStructure/Substation
  - The new facility itself – Pump station, CCT, and influent and effluent conduit
  - Connection to Outfall 001
- Replacement of Gate WW-17
- Instrumentation & Controls Coordination w/ Ovation
- Primary Tank Structural Repair and Mechanical Replacement
- Gut renovation of the Sludge Pump Station – new pumps, relocated process lines and MCC
- Long lead items: Sludge and HRD pumps, MCCs, clarifier mechanisms, odor control equipment, WW gates

Contract Administration & Requirements

Funding, Contract Packaging, and Contractor Requirements

BUFFALO
SEWER AUTHORITY

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A TYLin Company

Contract Packaging

The work is divided into two Contracts, A and B. Bidder may propose on either Contract A or Contract B.

- **Contract A** – Primary Settling Tanks and Sludge Pumping Station
  - Primary Sedimentation Tanks and Sludge Pumping Station Renovation; Installation of New Odor Control System; Demolition of equipment in the existing Bypass SH Facility.
- **Contract B** – New Chlorine Contact Tanks and High-Rate Disinfection (HRD) System
  - New High-Rate Disinfection Chlorine Contact Tank, High-Rate Disinfection Building, a new connection and renovations to the existing Outfall Structure 001, HRD Influent and Effluent Conduits, modifications to the existing Bypass and Control Chamber and Primary Bypass Junction Chamber, replacement of gates at the Bypass and Control Chamber, Primary Bypass Structure No. 1 and 2.
  - Replacement of gates WW-15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, and 26
- **The Bidder may propose the bid alternate identified as Contract C (Combined Bid for Contracts A+B).** If a Bidder proposes on Contract C, they must also provide proposals for Contract A and B.

- The Bidder understands that after a Contract is awarded, the Authority may select the bid alternate. The proposed prices for the bid alternate may or may not be considered in determination of the lowest bid.

Scope of Work – Measurement and Payment

- Lump Sum Items (Contract A)
  - Renovations to the Primary Sedimentation Tanks, Sludge Pumping Station, Odor Control system, demolition of equipment in the Bypass SH Facility, and associated equipment, material, and labor.
  - Negotiated Price: Emerson equipment and integration for the equipment associated with the Primary Sedimentation Tanks, Sludge Pumping Station, and Odor Control System.

Scope of Work – Measurement and Payment

- Lump Sum Items (Contract B)
  - Construction of a new Chlorine Contact Tank and High-Rate Disinfection Building,
  - a new connection and renovations to the existing Outfall Structure 001, HRD Influent and Effluent Conduits,
  - modifications to the existing Bypass and Control Chamber and Primary Bypass Junction Chamber,
  - replacement of WW gates at the Bypass and Control Chamber and Primary Bypass Structure No. 1 and 2
  - Negotiated Price: Emerson equipment and integration for the equipment associated with the High-Rate Disinfection System.

Scope of Work – Measurement and Payment

- Unit Price Items
  - Additional earth excavation (Per CY)
  - Additional select fill (Per CY)
  - Additional Class B Concrete (Per CY)
  - Additional Steel Reinforcing (Per LB)
  - Additional Pile Length (Per LF)
  - Additional re-pointing of existing masonry (Per SF)
  - Removal of damaged brick and installation of matching brick (Per SF)
  - Removal of damaged floor tile and installation of matching floor tile (Per SF)

- Allowance
  - Allowance for the handling, removal, and legal disposal of unanticipated hazardous and non-hazardous (regulated) waste.
  - Allowance for the handling, removal, and legal disposal of unanticipated impacted soil and groundwater.
  - Allowance for the repair of existing pipelines.

Funding for Primary Treatment Renovation Project

- Overall Projected Construction Cost: $70-80 Million
  - Contract A: $20-25M
  - Contract B: $50-55M
- Project funding secured from State and Federal dollars, interest-free state and federally-backed loans, low interest state-backed loans, and grants (CWSRF, BIL, WIIA, WQIP, NYSERDA)
- Administered through NYSDEC and NYSEFC
- NYSEFC Terms & Conditions will govern – **get familiar with EFC requirements**
- **Compliance for the entirety of the construction contact is critical**
- 20% Disadvantaged Business Enterprise (DBE) Utilization Goal

NEW YORK STATE | Environmental Facilities Corporation

State Revolving Loan Fund DBE Requirements

- **Contractor agrees to make documented Good Faith Efforts to utilize at least 20% of total value of the contract to NYS-certified DBEs.**
- Prime contractor must utilize DBE suppliers/subcontractors that are certified on behalf of the New York State Unified Certification Program. NYSUCP (newnycontracts.com)
- Prime contractors certified as DBE as per the above can use their self-performance towards fulfilling the DBE participation goal.
- Awarded contractor will be required to submit Quarterly DBE reports and proof of payments to DBEs throughout the term of the contract.
- Contractor should also continue **Good Faith Efforts** to seek opportunities for DBE participation during the life of the contract even if proposed fair share objectives have been achieved.
- **DBE utilization plan must be submitted with Bid Package to be considered**
  https://efc.ny.gov/mwbe-forms / dbe-utilization-plan.docx (live.com)

NYS Environmental Facilities Corporation
Disadvantaged Business Enterprise (DBE) Utilization Plan

SECTION 1: MUNICIPAL INFORMATION		
Recipient/Municipality:	**County:**	
Project No.:	**Contract ID:**	**Registration No. (NYC only):**
Minority Business Officer:	**Email:**	**Phone #:**
Address of MBO:		
Electronic Signature of MBO: ☐ I certify that the information submitted herein is true, accurate and complete to the best of my knowledge and belief.		**Date:**

SECTION 2: PRIME CONTRACTOR / SERVICE PROVIDER INFORMATION				
Firm Name:			**Contract Type:** ☐ Construction ☐ Other Services	
Is the Prime Firm certified as a DBE? ☐ Yes ☐ No If yes, please include Prime information in Section 3.				
Address:		**Phone #:**	**Fed. Employer ID #:**	
Description of Work:		**Email:**		
Award Date:	**Start Date:**	**Completion Date:**	**DBE Fair Share Objective**	**PROPOSED DBE Participation**
Total Contract Amount: $ **DBE Eligible Contract Amount: $** (DBE Fair Share Objectives are applied to this amount and includes all change orders, amendments, & specialty waivers)			**Total: 20%** $	**Total:** % $
If fair share objectives are not met, documentation must be attached: ☐ No Participation ☐ Short of the DBE Fair Share Objective				
☐ **Specialty Equipment/Services:** must be of SIGNIFICANT cost – attach list of cost and type of equipment and good faith effort documentation				

SECTION 3: DBE SUBCONTRACTOR INFORMATION			
This Submittal is: ☐ The First/Original Utilization Plan ☐ Revised Utilization Plan #:			
DBE Subcontractor Information		**Contract Amount**	**For EFC Use:**
Business Name:	**Fed. Employer ID#:**		
Address:	**Phone #:**		
Scope of Work:	**Email:**		
Certifying Entity: ☐ DOT in State of _____; or ☐ SBA ☐ Other (indicate entity):	**Start Date:** **Completion Date:**		
Full Contract Amount $			

Contract Administration

- BSA will follow up with attendees at this meeting when the bid advertisement goes live
- Bid Advertisement will also be posted on BSA's RFP/Procurement Opportunities page: https://buffalosewer.org/category/vendor-opportunities/vendor-opportunities-vendor-opportunities/
- Become a plan holder on Avalon Planroom
- **Notable documents with Bid Package**
  - Entire spec book required for the bid submission
  - DBE Utilization Plan and documented Good Faith Efforts
  - Requirements of funding terms & conditions
  - Owner's Protective Liability policy of insurance
  - Check the math! Make sure the total bid amount adds up correctly

Contract Administration (Cont'd)

- Prevailing Wage Requirements
  - This contract is subject to prevailing wage requirements under Article 8 of the NYS Labor Law.
  - The prevailing wage and supplement rates that are in effect (for each trade) at the time the work is performed must be paid.
- Build America, Buy America (BABA) Act waived for this contract
- Must comply with American Iron & Steel (AIS)

Communications

- Document Management Software
  - *Procore* will be used for submission of submittals, RFIs/RFCs.
  - Contractor will be provided Procore training and specific instructions for submittal procedures after the bid is awarded.
- Bi-Weekly Progress Meetings
- Daily Communications with Buffalo Sewer staff and Consultant Construction Manager prior to start of the day's work
- Coordination with BSA Security (North Gate) for delivery of construction equipment and products

Project Schedule:
Procurement and Construction

BUFFALO
SEWER AUTHORITY

GREELEY AND HANSEN
A TYLin Company

Current Bid & Procurement Schedule

- Bid Advertisement: February 12, 2024
- Three (3) Mandatory Pre-Bid Meetings
  - **Meeting #1** – Virtual Informational Meeting: February 20, 2024 @ 11:00am ET
  - **Meeting #2** – Virtual NYSEFC Funding Compliance Meeting: February 21, 2024 @ 2:00pm ET
  - **Meeting #3** – Site walkthrough of the project site: February 22-23, 2024
- Bid Packages Due: March 28, 2024 at 11:00am EST
- Recommendation of Bid Award: May 2024
- Notice to Proceed: Summer-Fall 2024
- Substantial Completion: December 2028

Future Buffalo Sewer construction contracts to be advertised

BUFFALO
SEWER AUTHORITY

GREELEY AND HANSEN
A TYLin Company

Future BSA Construction Contracts

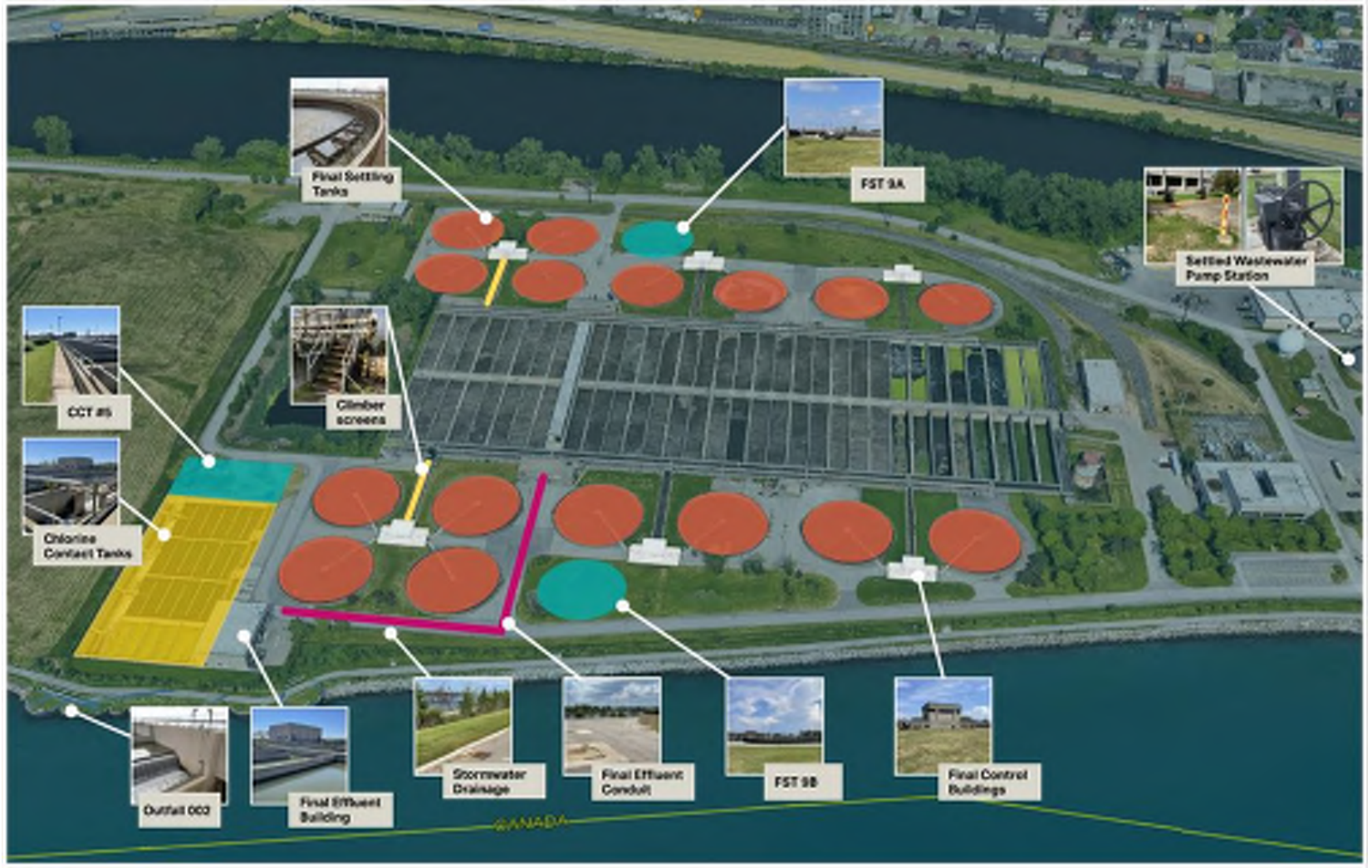
Treatment Facility Projects	Construction Start Date	Opinion of Probable Construciton Cost
WWTF Upgrades Phase III (Secondary System Expansion)	November 2026	$ 80M – $ 100M
Collection System Projects	**Construction Start Date**	**Opinion of Probable Construciton Cost**
CSO 010 - Breckenridge St CSO Sewer Project	March 2025	$ 20,000,000
CSO 053 - Jefferson Ave Green Infrastructure	June 2025	$ 2,178,000
CSO 053 - SPP & OLS Various Modifications	July 2025	$ 330,000
CSO 053 - Canisius (Jefferson Delavan) OLS	June 2026	$ 33,000,000
CSO 053 - SPP338 Modification	July 2026	$ 4,400,000
System - Schiller Park OLS SPP339-340 Modifications	July 2026	$ 132,000
CSO 014 - SPP206 A&B Real-Time Control Smart Sewers	May 2027	$ 4,400,000
CSO 053 - SPP336B OLS (Sidney OLS)	July 2027	$ 30,492,000
CSO 053 - Edison Martha OLS	June 2028	$ 40,964,000
System - Schiller Park OLS	July 2028	$ 94,556,000

$500M+ Capital Plan through 2028

CSO: Combined Sewer Overflow
OLS: Off-Line Storage
SPP: Sewer Patrol Point

WWTF Upgrades Phase III: Secondary System Upgrades and Expansion

- Rehabilitation of secondary system and increase of secondary treatment capacity from 360 MGD to 400 MGD.
- Engineering Design Start: Q1 2024
- Construction Start: Q4 2026
- Opinion of Probable Construction Cost: $80M-$100M



Feedback and Questions

BUFFALO SEWER AUTHORITY

GREELEY AND HANSEN
A TYLin Company

Buffalo Sewer Authority Design Project Team

Walt Walker, PE, ENV SP
Design Project Manager
walt.walker@greeley-hansen.com
Project Point of Contact

Ryan Christopher, PE, ENV SP
Design Deputy Project Manager

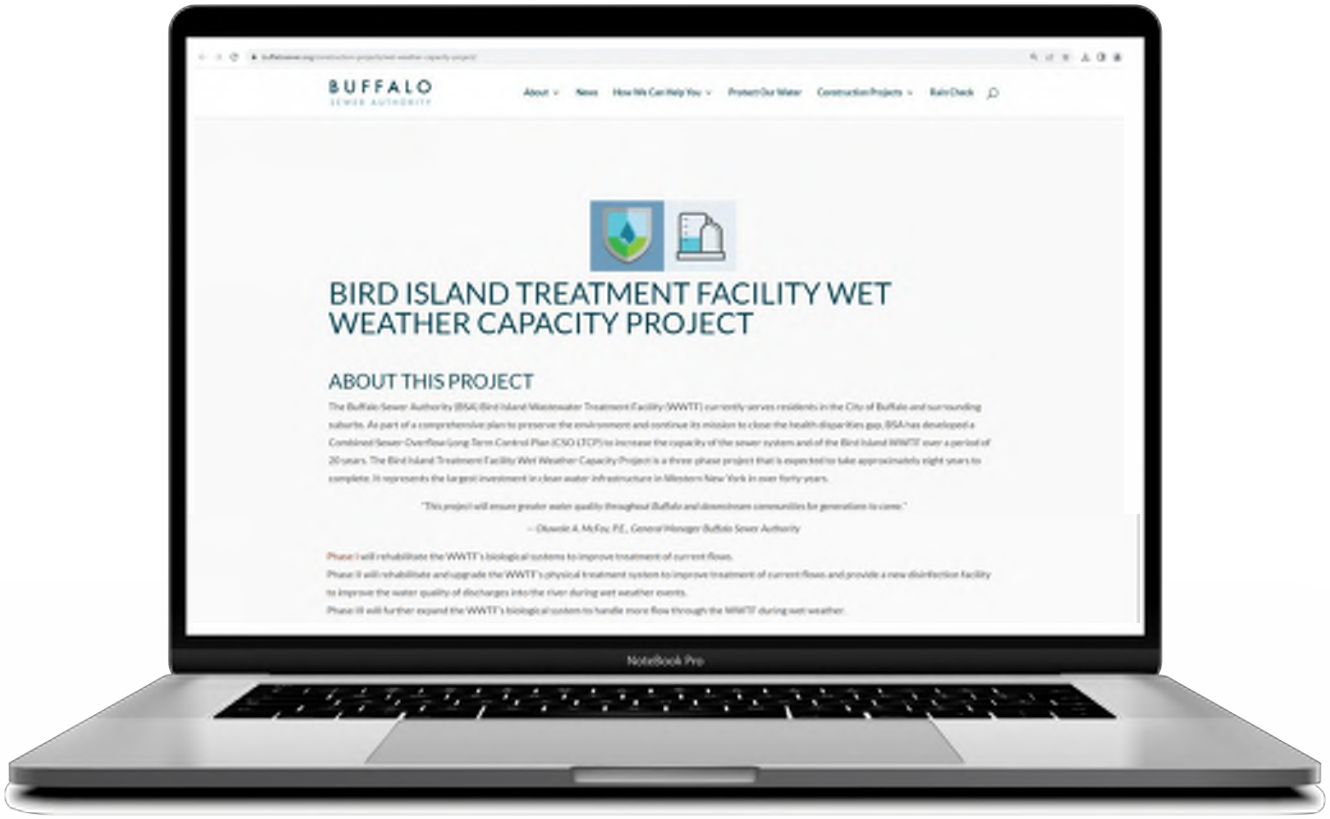
Tim Blake
WWTF Capital Projects Manager

Rosaleen Nogle, PE
Principal Sanitary Engineer

Alex Emmerson
Plant Superintendent

Paul Harris, PMP
Superintendent of Mechanical Maintenance

Buffalo Sewer Authority Website



buffalosewer.org

Your BEST source of information!

- Consultant, Contractor, and Supplier Opportunities
- Construction Updates
- FAQs
- Board Meeting Minutes
- Public Participation Plans

Thank You!

GET IN TOUCH:

buffalosewer.org

@BuffaloSewer

@BuffaloSewer

BuffaloSewerAuthority

01/11/2024 Informational Session for BSA Upcoming Request for Construction Bids:

Primary Treatment Renovation at Bird Island WWTF

RSVP/Attendee List

First & Last Name	Company	Email2	Prime/Sub/Vendor/Undecided?	Trade / Specialty	Is your company a certified DBE in New York State?
Jamie Johnson	AECOM	Jamie.l.johnson@aecom.com	Consultant ;	Engineering	No
George Kansas	HDR	George.Kansas@hdrinc.com	Consultant;	Engineering	No
Anthony Sciandra	Frey Electric Construction Co., Inc.	anthonysciandra@frey-electric.com	Prime;	Electrical Contractor	No
Buzz Karas	Cold Spring Construction Company	bkaras@coldspringconstruction.com	Prime;	GC	No
Daniel Shults	Jett Industries, Inc.	dan.shults@jettindustries.com	Prime;	General Contractor	No
Don Schiedel	Hohl Industrial	Dschiedel@hohlind.com	Prime;	General Contractor / Waste Water Facilities	No
Erik Gundel	Jett Industries, Inc.	Erik.Gundel@kiewit.com	Prime;	General & Heavy Construction	No
Gina Bosco	Jos. A. Sanders & Sons, Inc.	projsupport@jasroofing.com	Prime;	roofing & related architectural sheet metal	Yes
James Larcara	Mark Cerrone, Inc.	jlarcara@markcerrone.com	Prime;	Site	No
James Lyke	Mark Cerrone, Inc.	jlyke@markcerrone.com	Prime;	Site	No
Jeffrey Salvatore	Mark Cerrone, Inc.	jsalvatore@markcerrone.com	Prime;	Site	No
John Moynier	Parsons	john.moynier@parsons.com	Prime;	Engineering Design/ Program & Construction Management	No
Jordan Astyk	John W Danforth	jastyk@jwdanforth.com	Prime;	Mechanical / Plumbing	No
Parker Sanders	Jos. A. Sanders & Sons, Inc.	pssanders@jasroofing.com	Prime;	roofing & related architectural sheet metal	Yes
Stephen Kiebzak	Jos. A. Sanders & Sons, Inc.	sskiebzak@jasroofing.com	Prime;	roofing & related architectural sheet metal	Yes
Steve Gillett	Jett Industries, Inc.	steve.gillett@jettindustries.com	Prime;	General Construction	No
Wendy Sanders	Jos. A. Sanders & Sons, Inc	wendylsanders@jasroofing.com	Prime;	roofing & related architectural sheet metal	Yes
Zachary Hein	American Contracting and Environmental Services, Inc.	Zack.hein@aceservinc.com	Prime;	GC	No
Andrew Fassl	O'CONNELL	andrew.fassl@oconnellelectric.com	Prime;	Electrical	Yes
Camila Buresch	Lazarus Industries	camila.buresch@lazarusindustries.com	Prime;Subcontractor;	Steel and concrete	Yes
Eric Miller	Frey Electric Construction Co., Inc.	emiller@frey-electric.com	Prime;Subcontractor;	Electrical Contractor	No
Mike Schifano	John W. Danforth Company	mschifano@jwdanforth.com	Prime;Subcontractor;	Process Mechanical, HVAC, Plumbing	No
James Johnson	Beautiful Brains	James@beautifulbrains.com	Prime;Subcontractor;Vendor/Manufacturer/Supplier;	MWBE consulting , paint and coating supplier	Yes
Adrian Quackenbush	Quackenbush Co., Inc.	aquackenbush@qcoinc.com	Subcontractor;	Mechanical Contractor	No
Brad Keatley	O'Connell Electric Co.	brad.keatley@oconnellelectric.com	Subcontractor;	Electrical	No
Chris Wall	O'Connell Electric	Chris.wall@oconnellelectric.com	Subcontractor;	Electrical	No
Christopher Wan	Dyno Group, Inc.	chris.wan@dynogrp.com	Subcontractor;	Electrical/Carpentry	No
Dan George	Manning Squires Hennig	dgeorge@mshco.com	Subcontractor;	Concrete/Masonry	No
Herbert Darling III	Herbert F. Darling, Inc.	bdarling@hfdarling.com	Subcontractor;	Piledriving, Drilling, Shoring, marine work	No
Jonathon Jonas	Surianello General Concrete Corp	Jonathon@surianello.com	Subcontractor;	Concrete Contractor and Concrete Sawcutting Contractor	No
Matthew Kane	Black Rock Controls	matthew.kane@blackrockcontrols.com	Subcontractor;	System Integration SCADA	No
Steven Vinci	Brierley Associates	svinci@brierleyassociates.com	Subcontractor;	Geostructural, Trenchless and Tunnel Engineers	No
Tim Okeefe	Empire building Diagnostics	timothyo@ebdinc.com	Subcontractor;	Demo, abatement, concrete cutting/coring/grinding, vacuum trucks	No
Wendel Armstrong	Keller North America, Inc.	wcarmstrong@keller-na.com	Subcontractor;	Specialty Geotechnical Construction	No
Stefanie Taplin	Atlantic Testing Laboratory	staplin@atlantictesting.com	Subcontractor;Geotechnical Engineering & Material Testing;	Geotechnical Engineering & Material Testing	No
Christian Johnson	Beautiful Brains	Christian@beautifulbrains.com	Subcontractor;Prime;Vendor/Manufacturer/Supplier;	MWBE consulting, paint and coating supplier	Yes
Rusty Hesselschwardt	Advanced Rehabilitation Technology	rusty@artcoatingtech.com	Subcontractor;Vendor/Manufacturer/Supplier;	Severe Coatings specialists	No
Aaron Tandy	Walter S. Johnson Building Company, Inc.	aaron.tandy@wsjbuilding.com	Undecided;	GC with focus on concrete and carpentry	No

01/11/2024 Informational Session for BSA Upcoming Request for Construction Bids:

Primary Treatment Renovation at Bird Island WWTF

RSVP/Attendee List

Jason Rice	STC Construction, Inc.	Jason@STC.build	Undecided;	GC, Concrete, Process Piping	No
Matthew McGuire	John W Danforth	mmcguire@jwdanforth.com	Undecided;	Mechanical and Plumbing Contractor	No
William J. McCarthy III	M.G. McLaren Engineering and Land Surveying, P.C.	wmccarthy@mgmclaren.com	Undecided;	Multi-Disciplined Engineering Services	No
William Vasquez	VasCo	Vascovasco716@gmail.com	Undecided;	Construction management	Yes
Amiyah Young	C&V	Amiyah@candvconsulting.com	Undecided;	Water	No
Andrew Cowan	Ferguson Waterworks	andrew.cowan@ferguson.com	Vendor/Manufacturer/Supplier;	Mechanical and Utility Piping	No
Caleb Shen	Thompson Pipe Group	Caleb.shen@thompsonpipegroup.com	Vendor/Manufacturer/Supplier;	Pressure Pipe	No
Carley Hill	CAHill	carley@cahillresources.com	Vendor/Manufacturer/Supplier;	Rental, Technology	Yes
Craig Moore	Siewert Equipment	cmoore@siewertequipment.com	Vendor/Manufacturer/Supplier;	Mechanical Equipment	No
Darrell Felker	Upstate Rebar	dfelker@upstaterebar.com	Vendor/Manufacturer/Supplier;	Reinforcement Bar Supplier	Yes
Dean Parker	Biorem Environmental	dparker@biorem.biz	Vendor/Manufacturer/Supplier;	odor control	Yes
Jim Kingsley	Siewert Equipment	Jkingsley@siewertequipment.com	Vendor/Manufacturer/Supplier;	Wastewater	No
Joe Comerate	Martech Controls	joe@martechcontrols.com	Vendor/Manufacturer/Supplier;	Instrumentation / Controls / Gas Detection / Pressure / Temperature / Flow	Yes
Josh Vinciguerra	Empire Crane Company	joshv@empirecrane.com	Vendor/Manufacturer/Supplier;	Crane Sales and Rentals	No
Joshua Moore	E.J. Prescott, Inc.	josh.moore@ejprescott.com	Vendor/Manufacturer/Supplier;	Pipe Distributor	No
Marc Gerbsch	Pioneer Pump Systems, Inc	marc@pioneerpumpsystems.com	Vendor/Manufacturer/Supplier;	Pumps and valves	No
Marie Patton	Active Workforce, Inc	marie@activewf.com	Vendor/Manufacturer/Supplier;	Placement for all skill levels of building tradespeople.	Yes
Mark Candido	GA Fleet	mcandido@gafleet.com	Vendor/Manufacturer/Supplier;	Pumping, Treatment Equipment	No
Mark Koester	Koester Associates, Inc.	mkoester@koesterassociates.com	Vendor/Manufacturer/Supplier;	Water/Wastewater	No
Michael Baron	Empire Crane Company	mike@empirecrane.com	Vendor/Manufacturer/Supplier;	Crane Sales and Rentals	No
Michael Deyulio	J. Andrew Lange	miked@jalangeinc.com	Vendor/Manufacturer/Supplier;	Mfg Rep. Equipment.	Yes
Mike Lannon	Siewert Equipment	mlannon@siewertequipment.com	Vendor/Manufacturer/Supplier;	Water and Wastewater Equipment Manufacturer Representative	No
Mike Mulcahy	Drydon Equipment	mmulcahy@drydon.com	Vendor/Manufacturer/Supplier;	Sales Engineering	No
Nick Thomashefski	Rain For Rent	Nthomashefski@rainforrent.com	Vendor/Manufacturer/Supplier;	Bypass Pumping, wastewater storage	No
Noelle Markle	Koester Associates	nmarkle@koesterassociates.com	Vendor/Manufacturer/Supplier;	Water/Wastewater	No
Rudy Melisz	R.M. Headlee	rudy@rmheadlee.com	Vendor/Manufacturer/Supplier;	Valves, Gates, Actuators	No
Tim Toole	Lawley	ttoole@lawleyinsurane.com	Vendor/Manufacturer/Supplier;	Surety Bonds	No
Robert Emmerson	Sherwin Williams Protective and Marine Coatings	robert.emmerson@sherwin.com	Vendor/Manufacturer/Supplier;Specification Design Assistance ;	Protective Coatings and Linings	No
Michael Kistner	Kistner Concrete Products Inc.	Michael.kistner@kistner.com	Vendor/Manufacturer;	Precast Concrete	No
Mike Hoyt	GA Fleet	Mhoyt@gafleet.com	Vendor/Manufacturer;	Flygt -Pumps	No

Communities with Combined Sewers Adapting to a Changing Climate

U.S. EPA is hosting a webcast series on communities with combined sewers adapting to a changing climate. The impacts of climate change, such as changes in annual precipitation, storm intensity, storm surge, and/or sea level rise, are anticipated to impact the performance of many combined sewer systems and influence the volume and frequency of combined sewer overflows, sanitary sewer overflows, and basement backups. Several communities will share stories on how they are impacted by and have adapted to climate change during webcasts scheduled for January 16th, January 30th, and February 6th from 1:00 pm to 2:30 pm EST.

Learn more about combined sewer overflows and where they are located here:
https://www.epa.gov/npdes/combined-sewer-overflows-csos

Presentations from six municipalities and opening remarks by Kathryn Kazior (U.S. EPA).
Register today:

Session 1
January 16, 2024 1:00 PM

- Buffalo Sewer Authority
- Milwaukee Metropolitan Sewer District

Session 2
January 30, 2024 1:00 PM

- Camden County Municipal Utilities Authority
- City of Spokane

Session 3
February 6, 2024 1:00 PM

- Detroit Water and Sewerage Department
- Pittsburgh Water and Sewer Authority

For additional information, questions, or reasonable accommodation requests, please contact Kathryn Kazior (Kazior.kathryn@epa.gov) and EPA's contractor Carlisle Rowlands (Carlisle.rowlands@ erg.com).

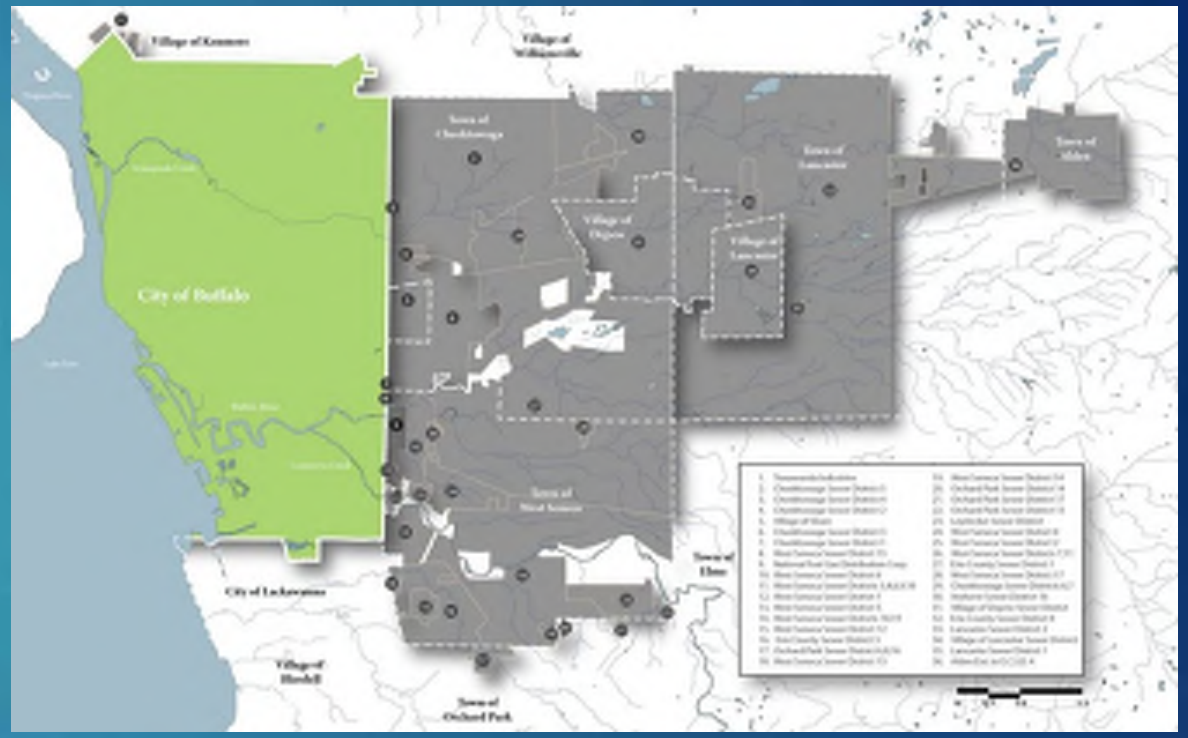
Why the combination of Seiche, Climate Change, and CSOs keep me awake at night

ROSALEEN B. NOGLE, PE, BCEE, BC. WRE, CFM
PRINCIPAL SANITARY ENGINEER
JANUARY 16, 2024

BUFFALO
SEWER AUTHORITY

Buffalo Sewer Authority

- Founded on April 8, 1935
- Created to "provide an effectual means for relieving the Niagara River, Buffalo River and Lake Erie from pollution by sewage and waste"
- Approximately 200 employees
- Serves Buffalo and 11 Outlying Communities



Combined Sewer Systems

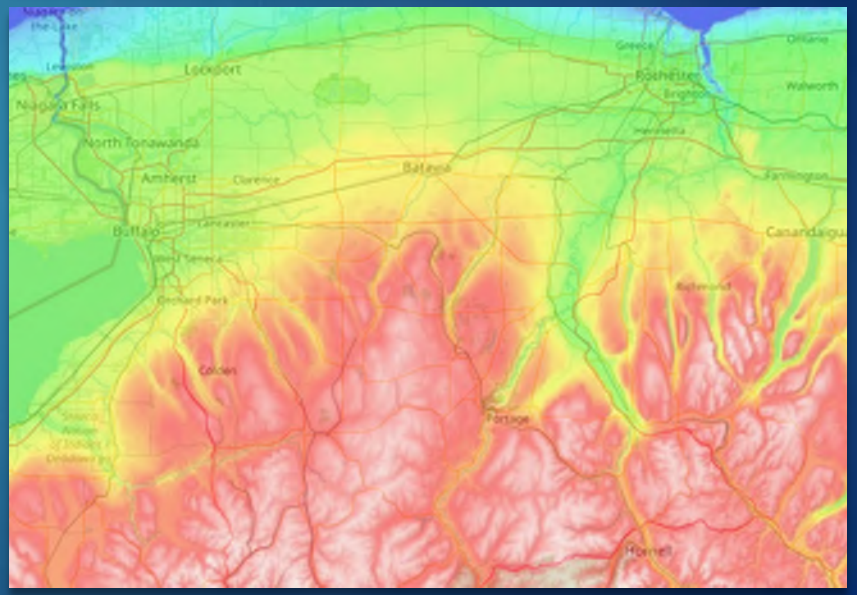
- Stormwater and wastewater in one pipe
- Typical of older cities
- During dry weather all flows go to treatment facility
- During wet weather, first flush generally gets to treatment facility, but as storm progresses, more flows overflow to receiving waters
- Over 90% of City of Buffalo's landmass

Separate Storm Sewer Systems

- Typical of systems constructed after World War II
- Parallel pipes for wastewater and stormwater
- Designed to carry wastewater to treatment facility
- Stormwater directly discharges to surface waters
- New construction since 2003 may have some treatment of stormwater
- Inflow and infiltration can lead to sanitary sewer overflows

Topography

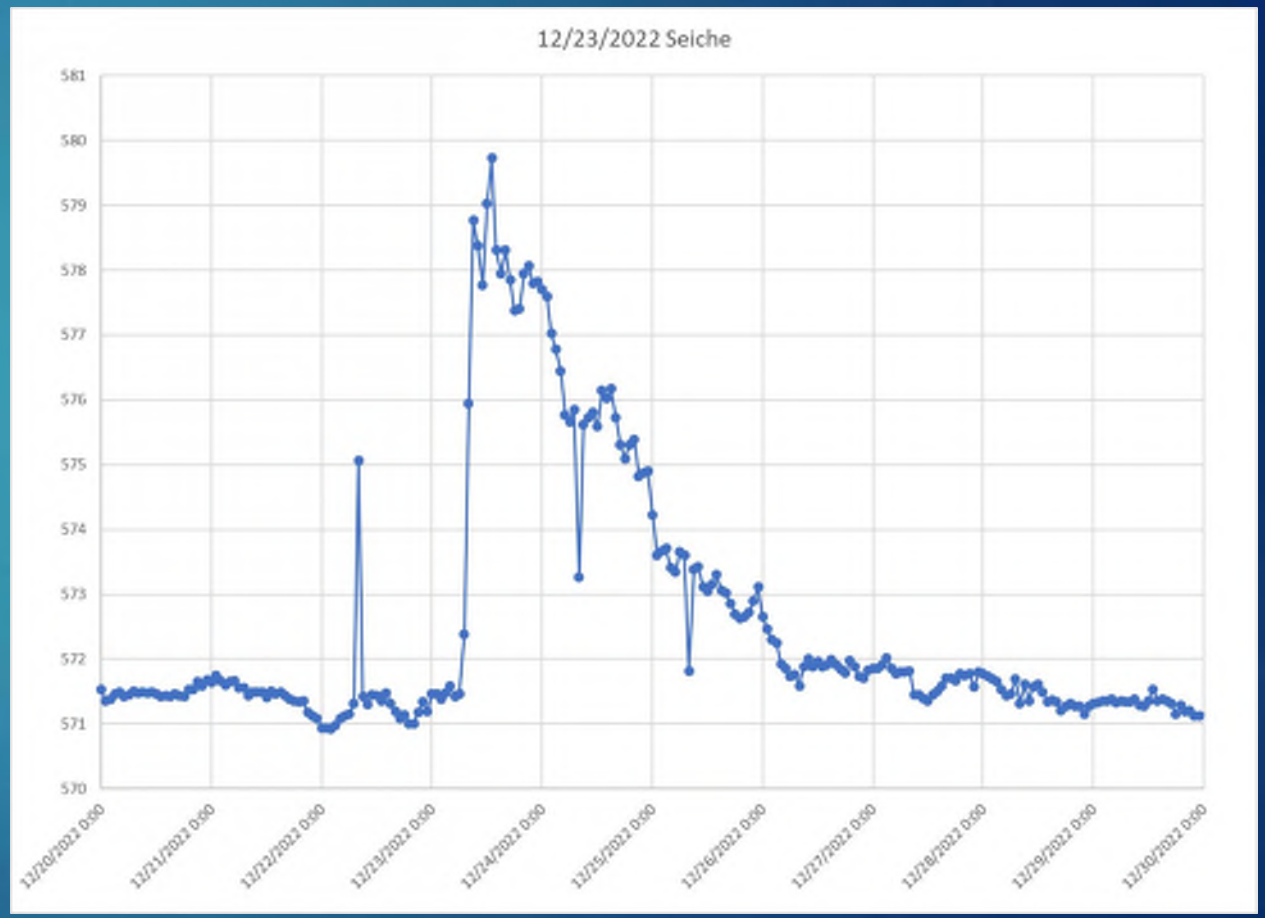
- **Seiche/ Sāsh:** A name given in Switzerland and especially on the Lake of Geneva to certain irregular waves or fluctuations of the level of the water which may be raised or lowered several feet. Origin of waves considered to be sudden local variations in barometric pressure attended with the development of local cyclonic winds. *(Greeley and Hansen, 1936)*
- **A seiche (pronounced "saysh")** is a prolonged, standing wave oscillating through a body of water such as a lake or bay. Rapid changes in atmospheric pressure or high sustained winds from one direction, push up the water level at the one end of the lake, while dropping by a corresponding amount on the opposite end. *(Roy Widrig, New York Sea Grant and Kendra Vorenkamp, University at Buffalo, 2021)*



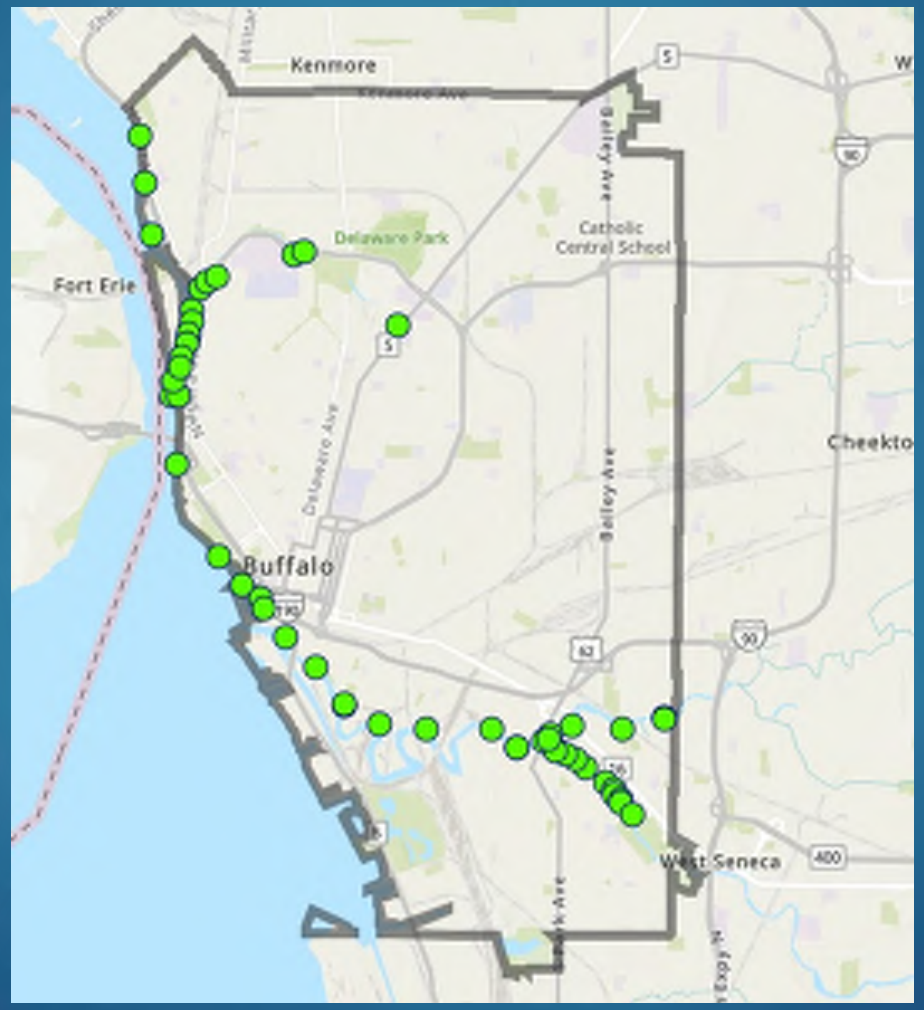
Seiche Events

Historic Crests
(Station Established 4/1/1860)

1. 12.08 ft 12/2/1985
2. 11.12 ft 11/15/2020
3. 11.06 ft 1/30/2008
4. 10.67 ft 12/23/2022
5. 10.65 ft 11/1/2019
6. 10.65 ft 4/6/1979
7. 10.57 ft 12/11/2021
8. 10.36 ft 12/20/2020

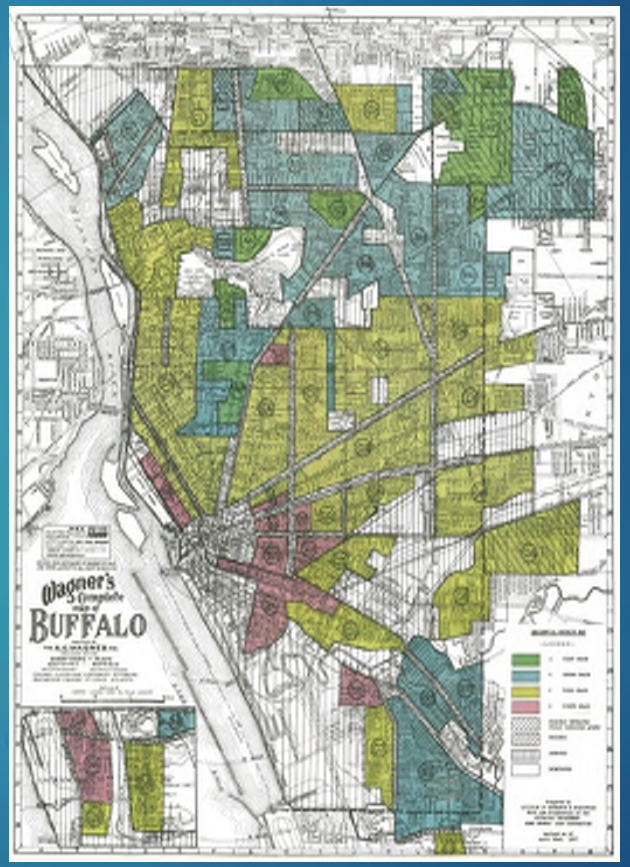


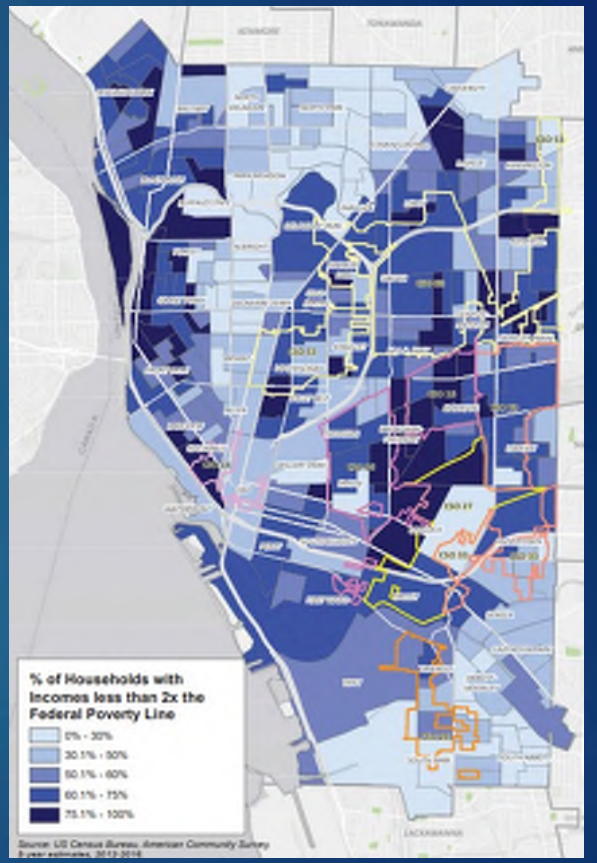
Combined System Vulnerabilities



Equity Issues

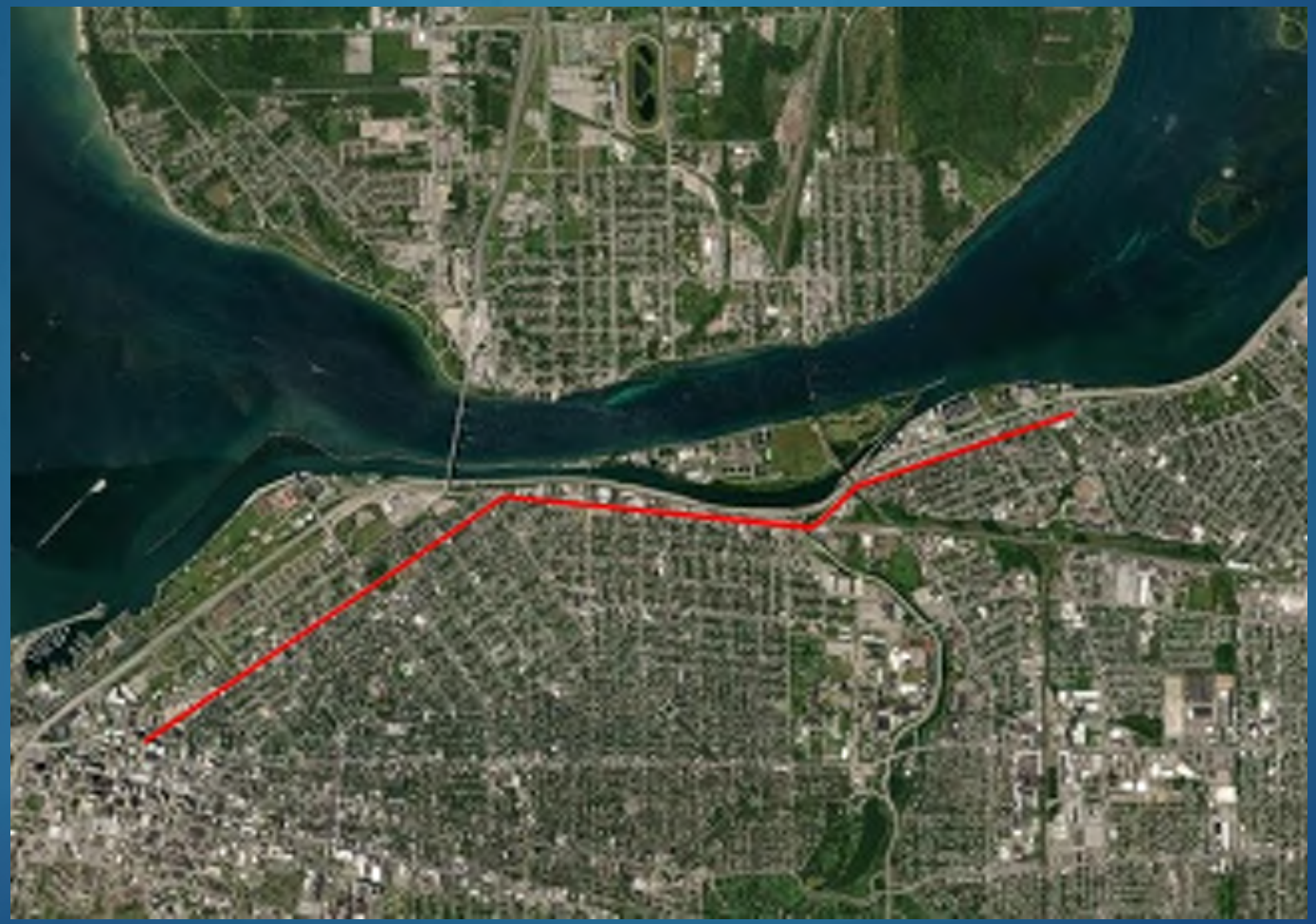
- History of Environmental Justice Issues
- One of the Most Segregated Metropolitan Areas in the United States





Instructions to HOLC Agents: Any threat of infiltration of foreign-born, negro or lower grade population? If so, indicate these by nationality and rate of infiltration like this: "Negro-rapid."

Location: Niagara Street, Buffalo



Scajaquada Creek

Niagara Street Corridor Work

Niagara Street Corridor Work

Niagara Street Corridor Work

Niagara Street Corridor Work

Surface Site Limitations

- Bicycle track
- Three driving lanes
- Two parking lanes
- Sidewalks

Subsurface Site Limitations

- Major watermains
- Fiberoptic lines
- Underground electrical
- Gas mains
- Old combined sewers
- Deep interceptors

Designs

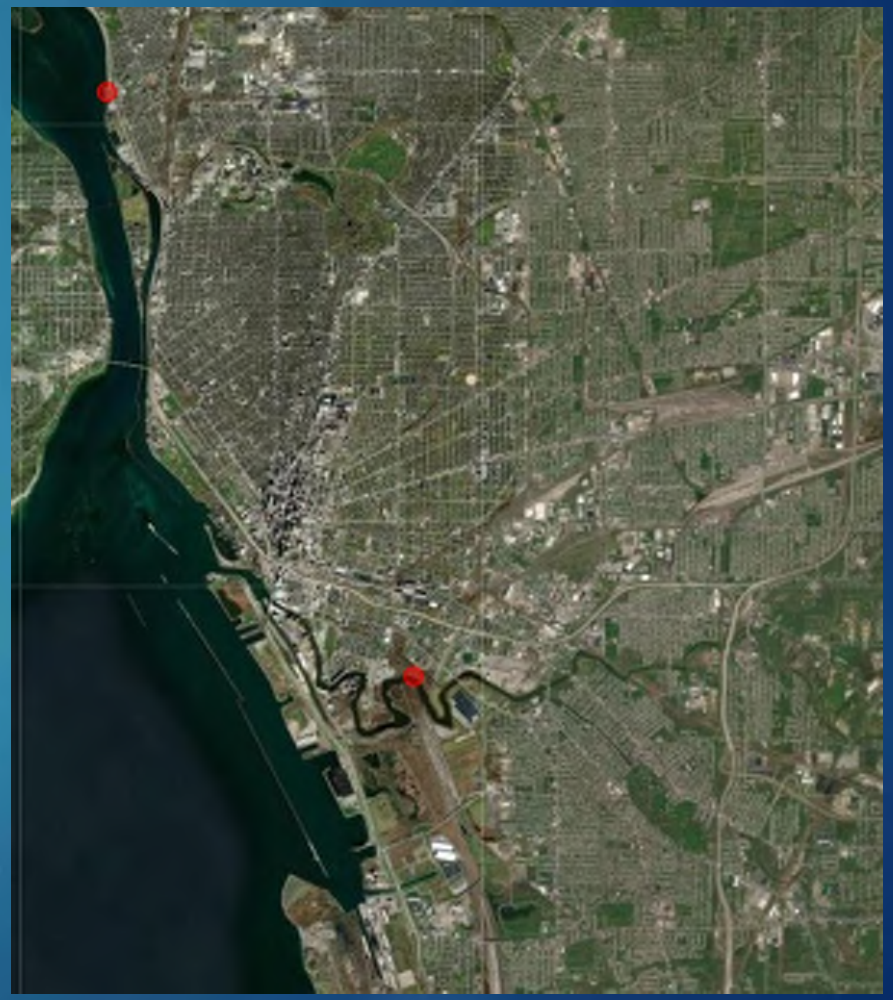
- Geomatrix
- Underdrain piping
- Underground filtration and storage
- Vegetation primarily aesthetic

Outcomes

- Benefits
  - Air quality and heat island impacts
  - Water treatment
  - Surcharge relief for Creek and Street
- Cautions
  - Green Infrastructure is not Gray Infrastructure
  - Differences of opinion in aesthetics
  - Functionality and form
  - Safety considerations

Cornelius Creek and Smith Street

- Two of the Largest Combined Sewer Overflow Basins and Outfalls in Buffalo
- History of Seiche-driven Flooding
  - Exacerbated by Climate Change
  - High Poverty Neighborhoods Most Impacted
- Near-term fix possible for Smith
- Larger Project Necessary for Cornelius Creek
- FEMA Hazard Mitigation Grant Funding



Q & A

Spotlight on the Inaugural Class of NYWEA's InFLOW STEMPath Scholars

By Jamie L. Johnson and Madison M. Quinn

GBEC scholars and mentors. From left to right: Rebecca Carmine-Shaw (mentor, Hazen & Sawyer), Kristina Macro (mentor, Xylem), Emily Navarette (scholar, UB), Ashley Brito (scholar, UB), Kaitlin Weglarz (scholar, UB), Juliana Denney (scholar, UB), Noelle Sawicki (mentor, Town of Tonawanda), Regina Harris (mentor, Buffalo Sewer Authority). *Jamie Johnson*

The Western Chapter of NYWEA became the first chapter to incorporate a local InFLOW (Introducing Future Leaders to Opportunities in Water) program with their regional conference at the 41st annual Greater Buffalo Environmental Conference (GBEC) held March 14, 2023. The 42nd annual GBEC will be held March 5, 2024, at the Hyatt Hotel in Buffalo, New York, and will be host to the second annual GBEC InFLOW class.

About GBEC

The Greater Buffalo Environmental Conference (GBEC) is a one-day technical conference providing learning and networking opportunities for the water workforce throughout western New York and beyond. There are three sessions to choose from throughout the day with topics including treatment plant improvement, collection systems, ethics, regulatory updates, emerging contaminants, plant operations, asset management and beyond.

About InFLOW

NYWEA's Diversity Equity & Inclusion (DE&I) Committee began the state-level InFLOW Program in 2021, modeled after the very successful Water Environment Federation (WEF) InFLOW Program, which began in 2018. These programs aim to enhance diversity and inclusion in the water workforce.

There are two tracks for InFLOW: CareerTech and STEMpath. CareerTech partners with community-based organizations to expose scholars in job-readiness programs to the variety of rewarding career possibilities in water quality. STEMpath identifies scholars from historically underrepresented groups enrolled in undergraduate or graduate degree programs in environmental science, engineering, math, chemistry, biology, physics and other STEM fields of study.

The NYWEA DE&I Committee launched the CareerTech InFLOW at the virtual 2021 Spring Meeting and began the STEMpath program at the virtual 94th Annual Meeting in 2022. The CareerTech and STEMpath InFLOW programs were held in person for the first time at the 2022 Spring Meeting and the 2023 95th Annual Meeting, respectively. For the 2023 GBEC InFLOW class, members of the DE&I Committee in the Western Chapter recruited four STEM scholars from the University at Buffalo (UB): Ashley Brito, Juliana Denney, Emily Navarrete and Kaitlin Weglarz.

Meet the 2023 GBEC InFLOW Scholars:

Ashley Brito

Ashley Brito is a junior at UB, majoring in environmental engineering (class of 2025). She is from the Dominican Republic, by way of the Bronx, New York, and was a transfer student from the State University of New York. Ashley was originally an environmental science major but changed her major to environmental engineering. She is interested in water quality issues and designing sustainable engineering systems for low-resourced communities. She is currently serving as the president of the Student Chapter of NYWEA at UB.

Juliana Denney

Juliana Denney is a junior at UB, majoring in environmental engineering (class of 2025). After participating in a water quality project for a community in Kenya, her passion shifted to environmental engineering. She wants to help disadvantaged communities that have water quality and water access issues. Juliana wants to have her own business someday, possibly an engineering firm. She is currently serving as the vice president of the Student Chapter of NYWEA at UB.

Emily Navarrete

Emily Navarrete is a sophomore at UB, majoring in environmental engineering (class of 2026). She hails from Chicago, Illinois. As a first-year UB student in 2023, Emily used the InFLOW experience to "test the waters" regarding potential careers in the water and environment sector.

Kaitlin Weglarz

Kaitlin Weglarz is a junior at UB, majoring in environmental engineering (class of 2025). She is originally from outside of New York City. Kaitlin transferred to UB from McGill University in Canada. Among many things, she is interested in hydroelectric facilities following a recent plant tour. She is currently serving as the secretary of the Student Chapter of NYWEA at UB.

continued on page 19

continued from page 17

GBEC InFLOW Program Highlights

As part of the program, InFLOW scholars receive a variety of benefits. Registration for the conference is included in the InFLOW scholarship, as well as one year of student membership in NYWEA and WEF and a small stipend. The students were assigned one-for-one mentors from the Western Chapter to help guide them during the conference and beyond.

Pre-conference activities included a virtual meeting that allowed the students and mentors an opportunity to introduce themselves and ask any questions. The Buffalo Sewer Authority also hosted a tour of the Bird Island Wastewater Treatment Facility before the conference. For some of the students, it was their first time at a treatment plant!

During the day of the conference, the students were able to fully immerse themselves in the experience, attending presentations, networking with water professionals throughout the region, and ultimately building connections to the local water workforce.

Post-conference activities included a short survey to capture their thoughts on the experience overall. They also received their stipend for participating.

Since participating in the GBEC InFLOW program, three of the four scholars spearheaded the revitalization of the UB Student Chapter of NYWEA. With the help and support of the Western Chapter Young Professionals Committee and board of directors, these scholars are serving in leadership roles and helping to drive and shape the future of the organization.

The Future of InFLOW

The NYWEA DE&I Committee aims to expand the InFLOW Program to include the CareerTech track at every spring conference and to foster a STEMpath program with students from across New York state. The committee will provide support and guidance to the regional chapters that wish to host InFLOW programs at their regional conferences, following the model of the Western Chapter's GBEC InFLOW 2023 pilot program.

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GBEC InFLOW scholars tour the Buffalo Sewer Authority's Bird Island Wastewater Treatment Facility. From left to right: Sean Morrison (Buffalo Sewer Authority), Kristina Macro, Emily Navarette, Kaitlin Weglarz, Ashley Brito, Juliana Denney, Rebecca Carmine-Shaw, Dan O'Sullivan (Buffalo Sewer Authority). *Jamie Johnson*

Bird Island Treatment Facility Wet Weather Capacity Project

By Dan Casper, Jamie L. Johnson, Walter A. Walker, Rosaleen B. Nogle and Tim Blake

The Buffalo Sewer Authority (Buffalo Sewer) operates treatment facilities and collection systems for the City of Buffalo. To improve the ability of the combined sewer system and the Bird Island treatment facility to adequately handle and treat wet weather flows, Buffalo Sewer has enacted a 10-year Wet Weather Capacity Project. This article provides a background of Buffalo Sewer and its facilities and collection systems, the processes and decisions leading to the Wet Weather Capacity Project, and a summary of the three phases of the project.

History of the Buffalo Sewer Authority

Buffalo Sewer, a public benefit corporation, was created by an Act of the Legislature in the spring of 1935 and delegated the responsibility for providing an effectual means of relieving the Niagara River and other tributary streams from pollution by sewage and waste. Buffalo Sewer accepted and fulfilled its responsibility in full conformity with the intent and spirit of the mandate. It provided a system of intercepting sewers to bring the sewage of the city to a then modern (1938) and efficient primary sewage treatment plant where solid matter was removed and incinerated, and all liquid matter chlorinated (***Figure 1***). This facility today is known as the Bird Island Wastewater Treatment Facility (WWTF).

Figure 1. Bird Island WWTF circa 1950s. *Buffalo Sewer Authority*

With respect to the collection system, the City of Buffalo constructed a then state of the art combined sewer system that collected and transmitted sanitary and stormwater within a single pipe system. By design, the combined system was constructed with several overflow points, referred to as combined sewer overflows or CSOs, which relieved the system during rainfall events when the large amounts of water (stormwater primarily) could have damaged the treatment plant and private property. For decades following its construction, the system served the city and surrounding suburbs well and continues to do so today.

However, with the increasing national awareness of the need to protect our water resources more fully, in 1966 New York state directed further improvement of the Bird Island WWTF by providing secondary treatment. With the help of federal and state grants, secondary treatment facilities were constructed and placed in service in 1981 (***Figure 2, Figure 3***). Throughout these improvements, the collection system continued to operate adequately with few modifications.

Figure 2. Construction photo of settled wastewater effluent pipes circa 1970s. *Conser, Townsend, & Associates via Buffalo Sewer Authority*

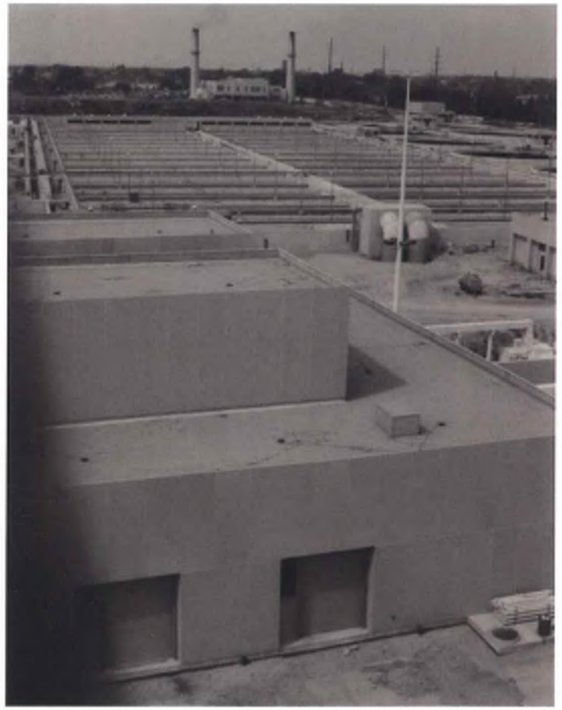

Figure 3. Construction photo of secondary treatment system circa 1970s. *Conser, Townsend, & Associates via Buffalo Sewer Authority*

The CSO LTCP

In the early 1990s the regulatory focus shifted from the treatment facilities to the collection systems. Not only in Buffalo but across the United States, emphasis was being placed on the impacts of sewer overflows and on their reduction. With a keen sense of self-awareness, Buffalo Sewer recognized the general inadequacy of their own combined sewer system and treatment facility in terms of their ability to adequately handle and treat wet weather flows.

As part of a comprehensive plan to preserve the environment and continue its mission to close the health disparities gap, Buffalo Sewer developed a Combined Sewer Overflow Long-Term Control Plan (CSO LTCP) to increase the capacity of the sewer system and of the Bird Island WWTF over a period of 20 years. Since that time, Buffalo Sewer has been actively working toward compliance with the LTCP. Areas of formerly prevalent basement and surface flooding have been eliminated throughout the City of Buffalo, along with the removal of several of the originally designed CSOs. While the CSO LTCP focused primarily on the collection system, the Bird Island WWTF is an integral part of the overall success of the plan. Overall, the goal of the CSO LTCP is to have over 97% of all sanitary and stormwater flow captured and cleaned at the Bird Island WWTF.

The No Feasible Alternatives Analysis – Wet Weather Capacity Project

The current rating of the Bird Island WWTF primary system is 160 million gallons per day (mgd) whereas the current rating of the secondary system is 320 mgd. As designed, influent flows up to the secondary system capacity receive full physical and biological treatment and disinfection prior to ultimate discharge (Normal Mode). Flows greater than the secondary system capacity are treated through the original primary facilities and chlorinated before ultimate discharge without biological treatment (Wet Weather Mode).

Treated plant flows are discharged to the Niagara River via two permitted outfalls: Primary Effluent Outfall 001 in Wet Weather Mode and Final Effluent Outfall 002 in Normal Mode (***Figure 4***). A third emergency outfall (01A) exists upstream of the raw wastewater pump station at the Bird Island WWTF but is only used to protect the WWTF in the event of extreme weather or equipment malfunction.

As part of the CSO LTCP efforts — and recognizing the problematic multiple modes of operation — a No Feasible Alternatives analysis was developed. This analysis would confirm the WWTF wet weather capacity and evaluate feasible alternatives, if any, to reduce the volume of (or provide additional treatment for) the wet weather flows currently bypassing the secondary treatment and discharging directly to the Niagara River following primary treatment and disinfection in the primary clarifiers.

Three alternatives were evaluated to provide a total treatment capacity of 560 mgd through the Bird Island WWTF.

- Alternative A: Maintain the secondary capacity at 320 mgd and increase the primary system capacity to 240 mgd.
- Alternative B: Increase the secondary capacity to 360 mgd and increase the primary system capacity to 200 mgd.
- Alternative C: Increase the secondary capacity to 400 mgd and maintain the primary system capacity at 160 mgd.

Ultimately, the decision was made to move forward with Alternative C, now dubbed the Bird Island Treatment Facility Wet Weather Capacity Project. The Wet Weather Capacity Project will be undertaken in three phases and is expected to take approximately 10 years to complete.

Phase I will rehabilitate the WWTF's biological systems to improve treatment of current flows and upgrade outdated equipment.

Phase II will rehabilitate and upgrade the WWTF's physical treatment system to improve treatment of current flows and provide a new disinfection facility to improve the water quality of discharges into the river during wet weather events.

Phase III will further expand the WWTF's biological system to handle more flow through the WWTF during wet weather.

The project will be designed and implemented to protect public health and the environment, as well as comply with regulatory requirements to achieve LTCP goals. In addition, the project will maximize community benefits by improving odor control, strengthening public participation

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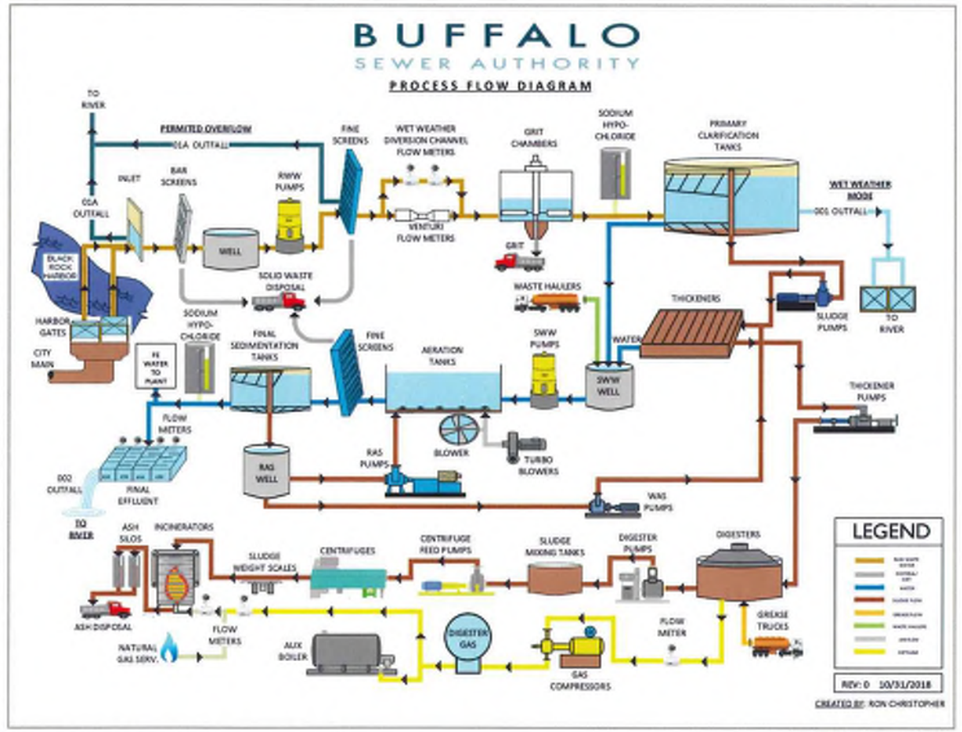

Figure 4. Bird Island WWTF process flow diagram. *Buffalo Sewer Authority*

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and understanding of water infrastructure, and committing to meaningful participation of disadvantaged/minority/women business enterprises (D/M/WBE).

The Bird Island Treatment Facility Wet Weather Capacity project represents the largest investment in clean water infrastructure in western New York in over 40 years.

Phase I – Secondary System Rehabilitation and Upgrades Project

The first phase of Buffalo Sewer's Wet Weather Capacity Project is the Secondary System Rehabilitation and Upgrades Project (***Figure 5***). This first phase serves to rehabilitate the Bird Island WWTF's biological systems to improve treatment of current flows (320 mgd). Some processes and equipment included in the Phase I project are nearing 50 years old, well beyond their useful life. Ultimately, it is expected that this project will yield a fully refurbished secondary treatment system to meet modern codes and comply with the No Feasible Alternative of the CSO LTCP.

Figure 5. Phase I Secondary System Rehabilitation and Upgrades Project groundbreaking event, October 2022. *AECOM*

The target outcomes for this project are to improve treatment efficiency, restore hydraulic capacity and provide improved operational flexibility.

Affordability to Buffalo Sewer and the City of Buffalo residents is also an important goal. An ideal funding package has been secured for this $60 million to $70 million project. Phase I will be funded through a combination of federal and state loan and grant programs including the New York State Clean Water State Revolving Fund Program (CWSRF), Bipartisan Infrastructure Law (BIL) funds, the Water Quality Improvement Project (WQIP) grants, and a Water Infrastructure Improvement Act (WIIA) grant, all administered by the New York State Environmental Facilities Corporation.

Secondary System Rehabilitation and Upgrades Overview

Engineering design services were awarded to AECOM in November 2019, with an original schedule for the construction contract to advertise for bid in August 2020. The project was initiated with AECOM performing an inspection of the secondary system's existing facilities including piping, channels, valves, and ancillary system (***Figure 6, Figure 7***).

Upon inspection, it became evident to both the engineer and owner that the extent of rehabilitation required for Phase I to restore capacity to 320 mgd exceeded what had previously been communicated to the regulatory agencies. Further, the capital dollars allocated would be insufficient to fund the full extent of the project. As such, in parallel to performing preliminary engineering investigative efforts, AECOM and Buffalo Sewer engaged in negotiations with the regulatory agencies to expand the scope of Phase I, increase the funding allocated, and adjust the compliance schedule accordingly.

As part of the preliminary engineering efforts, AECOM reviewed five years of plant operational data and record documents to create both a hydraulic model and a biological process model of the secondary system to compre-

Figure 6. Bird Island WWTF aeration tank influent channel with accumulated grit and debris. *AECOM*

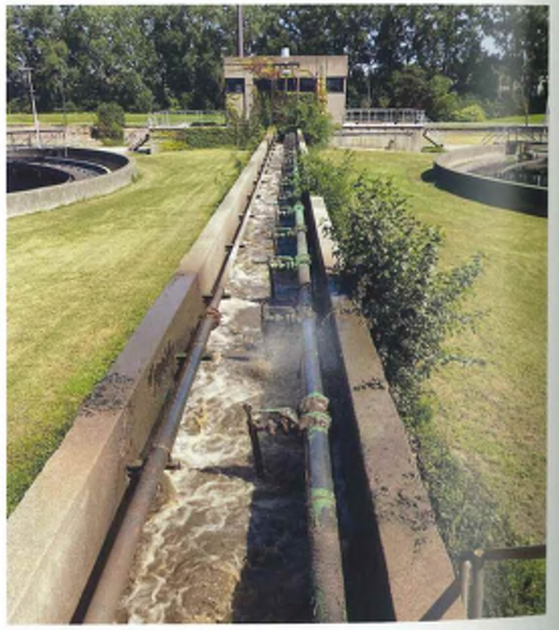

Figure 7. Bird Island WWTF final settling tank influent channel with damaged air header. *AECOM*

hensively represent the characteristics of the plant's hydraulic and treatment capacities. Through the hydraulic and process modeling exercises, AECOM substantiated what they already knew to be true: the secondary treatment system was in poor condition, warranting a nearly full rehabilitation of the system, in addition to upgrades necessary for proper isolation.

Secondary System Rehabilitation and Upgrades Design

Upon receipt of necessary approvals from the regulatory agencies, the Phase I project was released for bidding in August 2020 as one large General Construction contract. However, due to several extenuating circumstances only one bid was received. Based on conversations with the local contracting community at that time, the perception of Phase I was that the bonding capacity required was too expensive and risky for the smaller, local contracting companies, while at the same time the project was too small to attract the larger, outside contracting companies. As such, Buffalo Sewer elected to reject the bid received in favor of providing more opportunity for the local contracting community to work on this groundbreaking project. Ultimately, the Phase I project was re-released for bidding in April 2021 as five separate construction contracts (***Table 1***).

Table 1. Phase I Construction Contracts.

Contract	Description
Contract A - Piping	• Upgrade the return activated sludge (RAS) system with new ductile iron pipe, butterfly valves and actuators, gate valves and flow meters. • Replace the influent wastewater butterfly valves, actuators and flow meters. • Upgrade the waste activated sludge (WAS) system with new butterfly valves and actuators.
Contract B - Cleaning	• Remove and dispose of accumulated grit and debris in the aeration tanks. • Clean the influent and effluent wastewater pipes of grit and debris. • Clean the settled wastewater wet well and drainage wet wells of grit and debris.
Contract C - Gates	• Install 90 new sluice gates at the influent and effluent pipes in each aeration tank. • Rehabilitate the existing aeration tank and final tank influent channel stop log gates. • Replace the existing chlorine contact tank sluice gates and actuators.
Contract D - Diffusers	Upgrade the entire aeration system by: • Installing new fine bubble diffusers in the 16 aeration tanks. • Replacing and installing new coarse bubble diffusers in the aeration tank influent and effluent channels, and in the final tank influent channel.
Contract E - Electrical	Consists of all the electrical, instrumentation, and controls work to accommodate the upgrades associated with the other four contracts.

Secondary System Rehabilitation and Upgrades Construction

In June 2021, Notices of Award were issued to the five responsible low bidders. An unfortunate side effect of having five separate construction contracts is the amount of paperwork and coordination required to execute the contracts. Each contractor has D/M/WBE goals to meet and paperwork to submit, with ultimate approvals coming from the state agencies. And in the case of the Phase I project, adjustments to the funding package were being made well after Notices of Award were issued, causing further delay and some confusion.

On top of that, think back to what the world was like in fall 2021. As a community we were still reeling from a pandemic, we were experiencing an unprecedented strain on the raw materials market, there was unforeseeable volatility in the construction industry, and a war in Ukraine. However, Buffalo Sewer persevered and Notices to Proceed for construction were issued in September 2022.

As of the time of this writing, the construction work for Phase I is ongoing. The first major phase of work, which will require half of Buffalo Sewer's secondary treatment system to be taken offline for 26 weeks, is scheduled to commence in June 2024. The work now focuses on prepping for that major shutdown including procurement and delivery of materials, construction and contractor staging, and equipment relocations and removals (***Figures 8 through 11***). Ultimately, it is anticipated that final completion for this project will be issued in March 2027.

Phase II – Primary Treatment Renovation and Upgrades Project

The second phase of Buffalo Sewer's Wet Weather Capacity Project is the Primary Treatment Renovation and Upgrades Project. Phase II will rehabilitate and upgrade the WWTF's 160 mgd primary treatment system to improve treatment of current flows and provide a new disinfection facility to improve the water quality of discharges into the Niagara River during wet weather events.

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Figure 8. Bird Island WWTF chlorine contact tank sluice gates prior to removal. *AECOM*

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Figure 9. Bird Island WWTF chlorine contact tank sluice gates during removal. *AECOM*

Figure 10. Bird Island WWTF large diameter ductile iron pipe delivery. *AECOM*

Figure 11. Bird Island WWTF large diameter ductile iron pipe fittings staged for installation. *AECOM*

Currently, the Bird Island WWTF primary treatment system includes four primary settling tanks, a sludge pumping station and ancillary equipment. As part of this Phase II project, the primary tanks will be fitted with a new odor control system — which also addresses a local community environmental justice issue — and a new high-rate disinfection pumping station and chlorine contact tanks will be constructed. Ultimately, it is expected that this project will yield a fully refurbished primary treatment system to meet modern codes and comply with the No Feasible Alternative of the CSO LTCP.

The target outcomes for this project are to modernize the treatment facility, originally constructed in the 1930s, and improve process efficiency and general facility operations.

As with Phase I, affordability is another goal of Phase II. Favorable funding terms for this $70 million to $80 million project have been pursued to ensure an equitable cost burden for Buffalo Sewer and the people of the City of Buffalo. This phase will be funded entirely through grants and low-interest loans, including the CWSRF program and BIL funds, WQIP grants and WIIA financing.

Primary Treatment Renovation Overview

Engineering design services proceeded with Greeley and Hansen in April 2021, with a current schedule of construction bid advertisement for the first quarter of 2024. The project initiated with numerous site visits and fieldwork to assess the existing conditions of the project area. Plant operations and designers worked together to:

- Plan/sequence the inspection of the four primary settling tanks.
- Plan and safely execute the dive inspection of the outfall structure and conduit.

1 Primary Sedimentation Tanks
- New sludge and scum collection equipment
- Improved efficiency for sludge settling and removal
- Concrete repair and coating for corrosion protection
- Safety improvements with new handrail and toeboards

2 Sludge Pumping Station
- New pumps, piping, and valves
- New HVAC equipment to meet current ventilation codes and standards
- New electrical and control equipment for improved automation and operations flexibility
- Concrete and masonry repair and improvements while maintaining original building design
- New personnel spaces and lighting

3 Odor Control
- New effluent trough covers for the Primary Sedimentation Tanks
- Odor capture at various chambers
- New FRP piping to convey odorous air to odor control units for treatment prior to being released into the atmosphere

4 High-Rate Disinfection System
- New Chlorine Contact Tank provides 5 minutes of contact time at 160 MGD
- High-Rate Disinfection Building includes chemical storage and feed equipment
- Five new 40 MGD submersible pumps to convey disinfected Primary Effluent through Outfall 001 to the Niagara River

5 Bypass Structure Gates
- Gate 17 installed with new actuator
- New gates and actuators to automate wet weather sequences and provide operational flexibility for Authority staff

6 Outfall 001 Repair
- Restoration of multi-use riverwalk/trail
- Installation of landscaping along public-facing utility bike/pedestrian path along Niagara River
- Repairs to Outfall 001 overflow structure, and connection of HRD pump station pipe to the outfall structure

Figure 12. Overview of Primary System Rehabilitation and Project Upgrades. *Greeley and Hansen*

- Share lessons learned such as reliance of operations internal knowledge of processes.
- Outline an overview of the maintenance of facility operations plan for the construction phase.

The project team also coordinated with the Phase I Secondary System Rehabilitation and Upgrades Project design team to understand overall plant flow limitations during construction and to transfer knowledge of best practices to incorporate in the contract documents. An overview of the renovation project is presented in ***Figure 12***.

Key Elements of the Phase II Primary Treatment Renovation Design

The key elements for Phase II are:

- Primary settling tanks and sludge pump station inspection.
- Outfall 001 inspection.
- Odor sampling in primary settling tanks.
- Developing and advancing a Public Participation Plan.
- Securing project funding.
- Coordinating with regulatory stakeholders.

Figure 13. Primary tank inspection. *Greeley and Hansen*

Primary Settling Tanks and Sludge Pump Station Inspection

The design team conducted structural and mechanical tank inspections from June through August 2021, and developed a Health and Safety Plan. Only one tank shutdown could occur at a time, so it was imperative for the team to plan and adapt around wet weather events. The design team worked side-by-side with Buffalo Sewer's Maintenance and Operations staff for tank shutdown, dewatering, cleaning, and safe entry for design team inspections (***Figure 13***).

Outfall 001 Inspection

The high-rate disinfection pumping station force main will tie into the existing Outfall 001 structure. The existing Outfall 001 overflow structure and conduit were inspected by a third-party partner consultant to verify they are structurally competent to facilitate the proposed renovation (***Figure 14***).

Odor sampling was conducted in the primary settling tanks to determine the odor control design. The design will consist of a hybrid system

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Figure 14. Outfall 001 inspection. *Greeley and Hansen*

of carbon column and biotrickling filter (***Figure 15***), which will reduce the frequency of carbon media replacement and save on carbon media replacement costs. It is also more effective for treating the large range of hydrogen sulfide concentrations that Buffalo Sewer experiences. The system will pull air from the bypass and control chamber, primary settling tanks and inlet chambers. The renovated primary settling tanks will have launders covered along the perimeter weirs.

Developing and Advancing a Public Participation Plan

The Public Participation Plan laid out an approach to providing education on the value of water and being a good neighbor, centered around water equity and environmental justice. The plan also discusses minimizing construction disturbances and getting community buy-in and feedback for the project (***Figure 16***).

Securing Project Funding

Project funding has been secured as grants and low-interest loans through the CWSRF and BIL funds, WQIP grants and WIIA financing.

Coordination with Regulatory Stakeholders

The project team coordinated with the New York State Department of Environmental Conservation and the U.S. Environmental Protection Agency to gather their feedback and acceptance of the basis of design and implementation schedule. The project team has also coordinated with city agencies for work and detours in public areas, such as the Niagara Riverwalk.

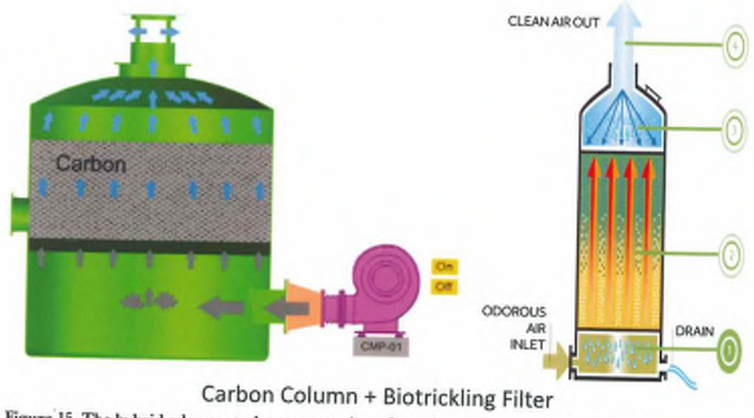
Phase II Schedule

The final design for the Primary Treatment Renovation Project will be complete by the end of 2023, followed by construction bid advertisement in the first quarter of 2024. Recommendation of the bid award to contractor(s) is planned for the second quarter of 2024. Construction is projected to be completed by December 2028.

Phase III – Secondary System Expansion Project

The final step in Buffalo Sewer's CSO LTCP Wet Weather Capacity Project is to expand the secondary biological treatment system to handle more flow through the treatment facility during wet weather events. By processing more flow through the Bird Island WWTF, Buffalo Sewer accomplishes the goal set out by the LTCP, which is to treat sustained peak flows up to 400 mgd through the secondary system while maintaining primary treatment capacity at 160 mgd. In addition, there are miscellaneous other upgrades to critical processes and infrastructure planned throughout the plant, further enhancing the efficiency and reliability of the Bird Island WWTF for generations to come. Phase III is anticipated to reach substantial completion in October 2029 with final completion in May 2031.

Together, the three phases of the Wet Weather Capacity Project represent an investment in local waterways by Buffalo Sewer to reduce CSOs in the City of Buffalo and surrounding communities, providing greater water quality throughout Buffalo for generations to come.



Carbon Column + Biotrickling Filter

Figure 15. The hybrid odor control system consists of a carbon column and biotrickling filter. *BioAir Solutions*

Figure 16. Future rendering of the new high-rate disinfection system from the public riverwalk view. *Greeley and Hansen*

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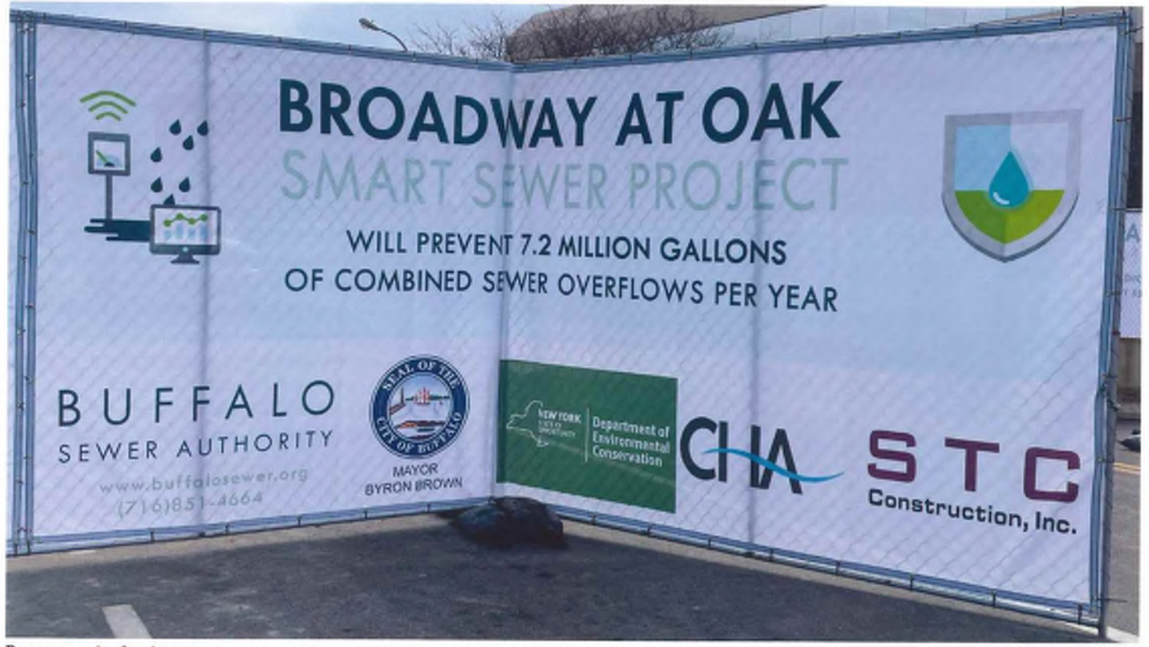
TENORM or How to Double Your Construction Costs and Schedule Overnight

By Rosaleen B. Nogle



Banner on site fencing. *Casterland Fanfan*

Project Background

As part of Buffalo Sewer's 2014 Approved Long-Term Control Plan, the Hamburg Drain Optimizations were included as projects to be completed by the end of Year 4 or March 18, 2018. These optimizations, to be located within the Combined Sewer Overflow 17 sewershed, were to manage overflows to the Hamburg Drain.

The Hamburg Drain is a sewer that was laid in the footprint of the former Main and Hamburg canal after it was abandoned. The Main and Hamburg canal in turn was laid in the Little Buffalo Creek's former bed. As a former creek bed, the Hamburg Drain is subject to intense infiltration and is directly hydraulically linked to the Buffalo River, which is itself a deep shipping canal laid in the ephemeral Big Buffalo Creek's former bed.

The goal of Hamburg Drain Optimizations was to decrease the required size — and potentially eliminate — the 5-million-gallon Hamburg Drain Storage facility, which was to be constructed in later years. Exactly what these optimizations were to consist of was unclear. Typically, the term "optimizations" was used to reference a weir raising or orifice adjustment, neither of which was a practical option in this case.

To make matters more difficult, as design was set to start on these optimization projects in 2015, the level of the Buffalo River was inordinately high; the Hamburg Drain was downstream of weirs and hydraulically linked to the river, not to the Bird Island Wastewater Treatment Facility.

After significant delays throughout the design process, it was determined that two Real-Time Control Projects — the Broadway at Oak Smart Sewer Project and the Mill Race Smart Sewer Project — would be constructed to meet the intent of the "Hamburg Drain Optimizations" projects. These two Smart Sewer projects would be located along two different sewers upstream of the Hamburg Drain. The Mill Race Smart Sewer would be constructed along a further upstream extent of the former Little Buffalo Creek from the Hamburg Drain, while the Broadway at Oak Smart Sewer would be constructed within an oversized combined sewer that was built in the 1960s to divert flows from and around the New York State Route 33 Kensington Expressway.

Broadway at Oak Smart Sewer Project

The New York State Route 33 Kensington Expressway, colloquially known as "The 33," is an expressway constructed to allow suburban and airport traffic to reach downtown Buffalo in a faster and more efficient way. A significant portion of this highway was installed below the ground surface through the Frederick Law Olmsted-designed Humboldt Parkway. Not only did this sunken expressway cut in half the thriving neighborhood that was once united by this tree-lined parkway, it also required redirecting existing sewer flows around the highway.

One of the new sewers that was installed for this purpose was the 9-foot-diameter reinforced concrete pipe sewer that extends from The 33 south along Michigan Avenue to Broadway and then continues for two blocks in the westbound lanes of Broadway before continuing south along Oak Street to then convey dry weather flows to the Southern Interceptor sewer and to overflow to the Hamburg Drain. It is within this structure that the Broadway at Oak Smart Sewer would be constructed.

In 2019, design work on a gate structure in the block east of Oak Street began with a preliminary cost estimate of $3.1 million. Before bidding could begin, permitting was required from the New York State Department of Transportation (DOT). This permitting was delayed significantly, first by the COVID pandemic and then the resignation of the Principal Sanitary Engineer in June 2020. As this position remained vacant for over a year afterward, communication between Buffalo Sewer and DOT was delayed and the permit process took over a year to complete.

By late spring of 2021, the final design had been completed with an engineer's estimate of $2.25 million. DOT permitting was not finalized until the end of the summer of 2021. When bids opened Sept. 28, 2021, as post-COVID lockdown hyperinflation was taking hold, the low bid was for $3.4 million.

After extensive contract document processing and shop drawing review, the project was $300,000.00 over the original budget and 50% over the engineer's estimate. But April 4, 2022, four years after the Hamburg Drain Optimizations project was originally scheduled to have been completed, construction on the 7.2-million-gallon-per-year Broadway at Oak Smart Sewer storage project finally began.

Barricades were erected, the road was cut, and ground was broken April 8, 2022. Teal and bright green lines were found in what was thought to be a concrete road base. A stop-work order was immediately issued and the DOT design drawings for the sewer and The 33 were more closely scrutinized. The drawings were found to contain an option that if the contractor were to substitute slag for concrete, the state was to have received a credit on the cost savings.

Teal and bright green lines found in what was thought to be a concrete road base that turned out to be slag TENORM. *Casterland Fanfan*

What Are Slag and TENORM?

To understand why work was stopped and why the drawings were searched for references to "slag," it is helpful to understand what slag is and the issues that can result in using it as a construction material.

When ore is smelted to produce iron or another metal, there are impurities that are present in the ore that need to be separated from the selected material. While the choice material is used in the finished metal, the impurities are collected together and disposed of as slag. These impurities in the ore can include radioactive isotopes, which when part of the host ore composed primarily of the choice material are at very low levels. When they are consolidated into slag, however, the radioactivity may rise to regulated levels.

Slag with these qualities is referred to as "Technologically Enhanced Naturally Occurring Radioactive Material" or TENORM. Generally, the levels of radiation present in TENORM are non-hazardous, as long as they remain buried and no one comes into direct contact with them. But once it is disturbed, it becomes radioactive hazardous waste and requires special handling and disposal in conformance with Part 380 of New York state's Environmental Laws.

The issue of TENORM first rose to prominence in Western New York in Niagara Falls. Local manufacturers had offered slag for free to contractors from the 1940s through the 1960s in what was seen as a waste- and cost-saving measure. The contractors in turn had used the material on both public and private projects throughout Niagara Falls. It seemed like a good idea at the time, but in the decades to come roads, driveways, and even building foundations started setting off Geiger counters, and were identified as emitting radiation at regulated levels through aerial surveys.

Until the Broadway at Oak Smart Sewer project, the issue of TENORM and slag was generally considered by the local engineering and contracting community to be a problem concentrated in and largely restricted to Niagara Falls. With the discovery of the bright green and teal lines in the road base on Broadway, however, concerns regarding a more widespread issue were raised and a crew was dispatched to the site with a Geiger counter, which immediately started chirping.

So Now What?

Given that radioactivity was now confirmed at above background levels, though still at relatively low levels, a specialty consultant and testing firm was called in to advise on the storage, determination of constituents and disposition of the material. Samples were collected and sent for laboratory analysis that would take over a month to complete. In the interim, the road base, including the TENORM, could be collected on-site in a covered location and stored until a final disposal location could be found. While radioactive, the level of radiation observed was not an immediate threat to the health or safety of the public or workers, but direct contact was nonetheless to be avoided.

The process of segregating and storing the material resulted in a one-month construction delay on an already aggressive schedule that was to have been completed before Thanksgiving of 2022. With the local asphalt manufacturers closing down for the winter immediately after Thanksgiving each year, and a winter shutdown through the Christmas Blizzard, this delay ultimately entailed pushing back paving until spring, resulting in significant additional handling and storage costs totaling $180,000.00.

Once the material was analyzed, the costs skyrocketed even further as the nearest disposal site that could accept the material was in Ohio; specialty contractors had to be used to carry the TENORM-containing slag the daylong trip to get there. This resulted in an additional $620,000.00 change order and further delays in work.

Project Completion

Finally, Sept. 28, 2023, almost a year behind schedule and at a final cost of $4,224,349.96, the Broadway at Oak Smart Sewer project contract was completed. Happily, the site has already begun to store flows and work to prevent overflows. In the second half of 2023, even as the site is still being calibrated, the project has already stored over 7.2 million gallons, the designed capacity for an entire year.

While significantly over budget and behind schedule, due in large part to TENORM, this project remains a success story as well as a lesson learned in site investigations moving forward.

Rosaleen B. Nogle, PE, BCEE, BCWRE, is a principal sanitary engineer with the Buffalo Sewer Authority and may be reached at rnogle@buffalosewer.org.

BUFFALO SEWER AUTHORITY

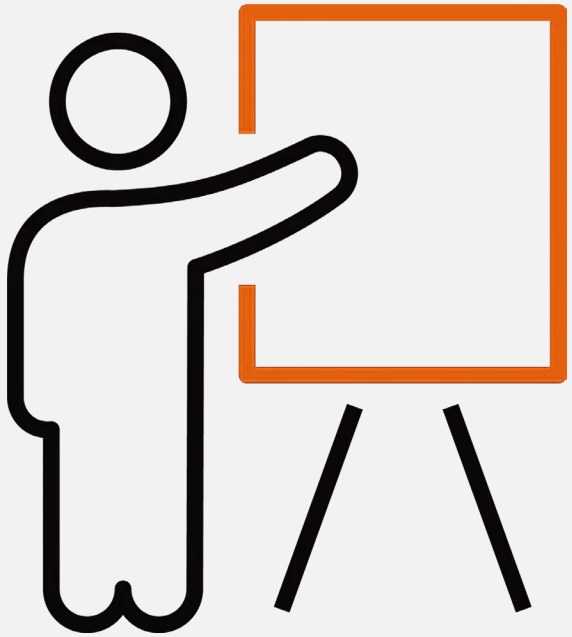
ARCADIS

Operationalizing Equity

Case Study: Buffalo Sewer Authority Long Term Control Plan

February 07, 2024

Agenda



1. LTCP Background and Goals
2. Definition of Key Terms and Importance of Equity
3. Equity and EJ Considerations – Data Points
4. Disadvantage Rankings Evaluation
5. Best Practices for Integrating Equity and EJ

Buffalo Sewer Authority Background and Overview

1935 – The Authority established – Protect the City's waterways from sewage pollution

1938 – The WWTP began operations

1980s – The Secondary treatment facilities are constructed in response to the Clean Water Act

1990 – Regulatory policies shifted from treatment facilities to collection system

2004 – The Authority submitted its LTCP for CSO abatement to the NYSDEC

2012 – USEPA issued to the Authority an Administrative Order

2014 – LTCP Final Submitted to NYSDEC and USEPA

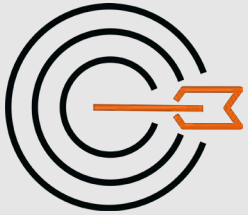
2021 – Revised Collection System Model is approved

2022 – LTCP Optimization begins

2023 – LTCP Optimization Selected Alternative(51 proposed projects) submitted to NYSDEC

2024 – BSA engages Program Management for LTCP Projects Implementation

Defining BSA Project Goals and Ranking Factors for LTCP Projects



GOAL

Address water quality concerns and maximize project benefits to communities that have been historically ignored and/or disadvantaged by previous projects.

Ranking Criteria

- SPP Overflow Volume Rank
- Water Body Ranking
- SPP Project Rank
- Construction Priority
- CSO Cost Effectiveness
- Environmental Justice

Definition of Key Terms

Water Equity

All communities have **access** to safe, clean, affordable wastewater services; are **resilient** in the face of floods, drought, and other climate risks; have a role in **decision-making** processes related to water management in their communities; and share in the economic, social, and environmental **benefits** of water systems.

- US Water Alliance, "Towards An Equitable Future"

Environmental Justice (EJ)

The fair **treatment** and **meaningful involvement of *all* people** regardless of race, color, national origin or income, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.

- Exposed community did not generate problem
- Exposed community receives marginal benefits
- Exposed community bears environmental burden

- US Environmental Protection Agency

Vulnerable Communities

Historic or contemporary **barriers** to *economic* and *social* opportunities and a healthy environment: Income/Unemployment, Education , Race or ethnicity, Age , Language , Geographic location , Other demographics

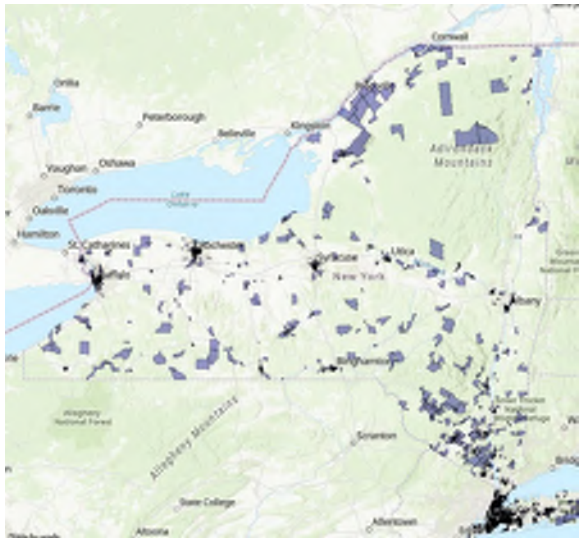
- US Water Alliance, "Towards An Equitable Future"

Disadvantaged Communities (DAC)

DAC are state defined. States use 17 different indicators to establish **affordability** criteria for their DAC definitions. These indicators can be grouped into six broad categories: *socioeconomic, demographic, financial, public health, environmental justice (EJ), and other*

- US Environmental Protection Agency

The Importance of Equity and EJ in Asset Management and Capital Improvement Projects



Source: NYS ArcGIS Webmap of the Potential EJ Area

Source: https://phys.org/news/2023-02-flint-crisis-social-networks.html

Fetid water stands outside a mobile home in Hayneville, Ala.
The Washington Post

Ensuring fairness and equity benefits all communities.
.

Allocating resources to high-vulnerability and EJ zones.
.

Community Engagement: Promoting trust and community betterment.
.

Equity and EJ Considerations – Data Points

Designated Disadvantaged Community

Source: DAC Are state defined. State Law (State Drinking Water Act)

Examples: Intended Use Plan; Regulations

Socio-Economic Data

Source: Census Tract Data

Examples: Median Household Income; Density; Education; Age; Affordability

Economic Growth Focus Areas

Source: Federal, State, and Local designated communities

Examples: Opportunity Zones; Empowerment Zones

Environmental Justice Analysis

Source: Climate and Economic Justice Screening Tool (CEJST), EPA Environmental Justice Screening Tool (EJScreen)

Examples: Historically underserved and overburdened communities

Customer and Operational Data

Source: Utility

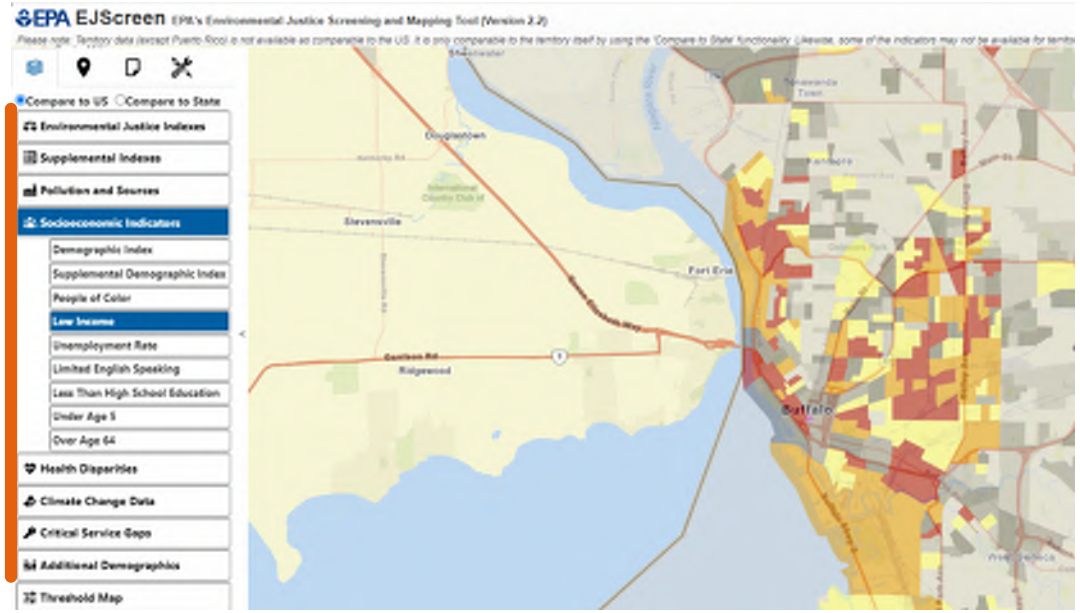
Examples: CSOs; SSOs; Consent Decrees; Customer assistance; delinquent accounts; Affordability

Additional Environmental Concerns/Citations

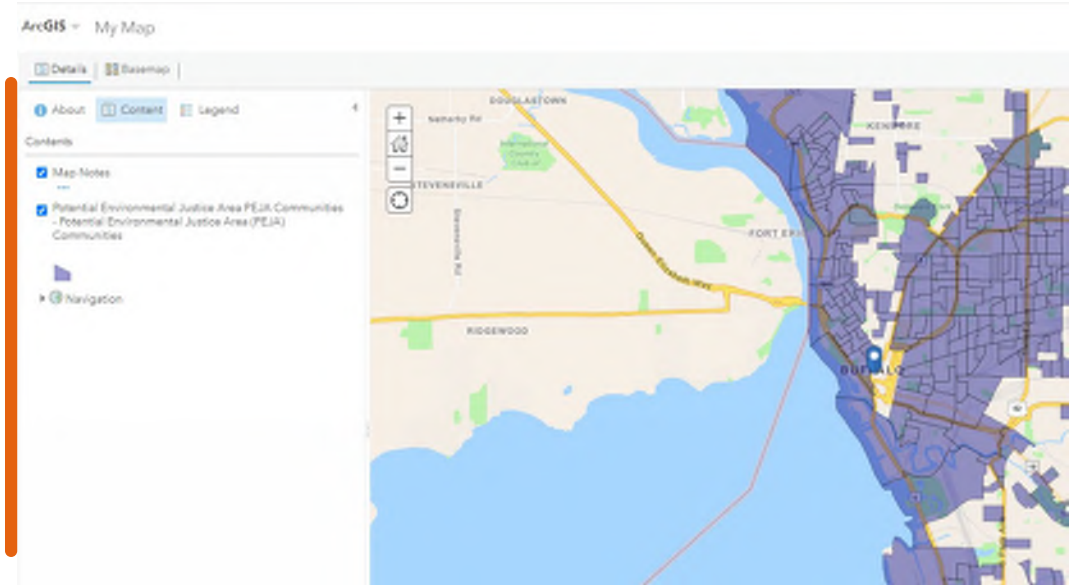
Source: Varies

Examples: Floods; tree canopies/energy burden; etc.

LTCP Environmental Justice Data Point Selection



EPA EJScreen: Environmental Justice Screening and Mapping Tool

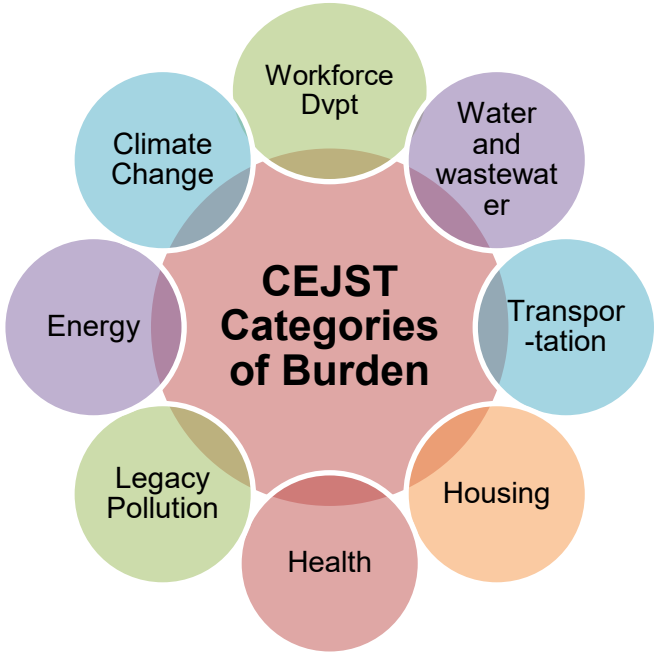


NYS Potential Environmental Justice Areas (PEJAs)

Data Source	Description
EPA EJ Screen	• Considers multiple environmental and socioeconomic factors • Options of having metrics on a state or national level
NYS DEC Potential EJ Areas	• Combines only two factors race and household income metrics. • Specific to NYS • Less granular

LTCP Environmental Justice Data Point Selection

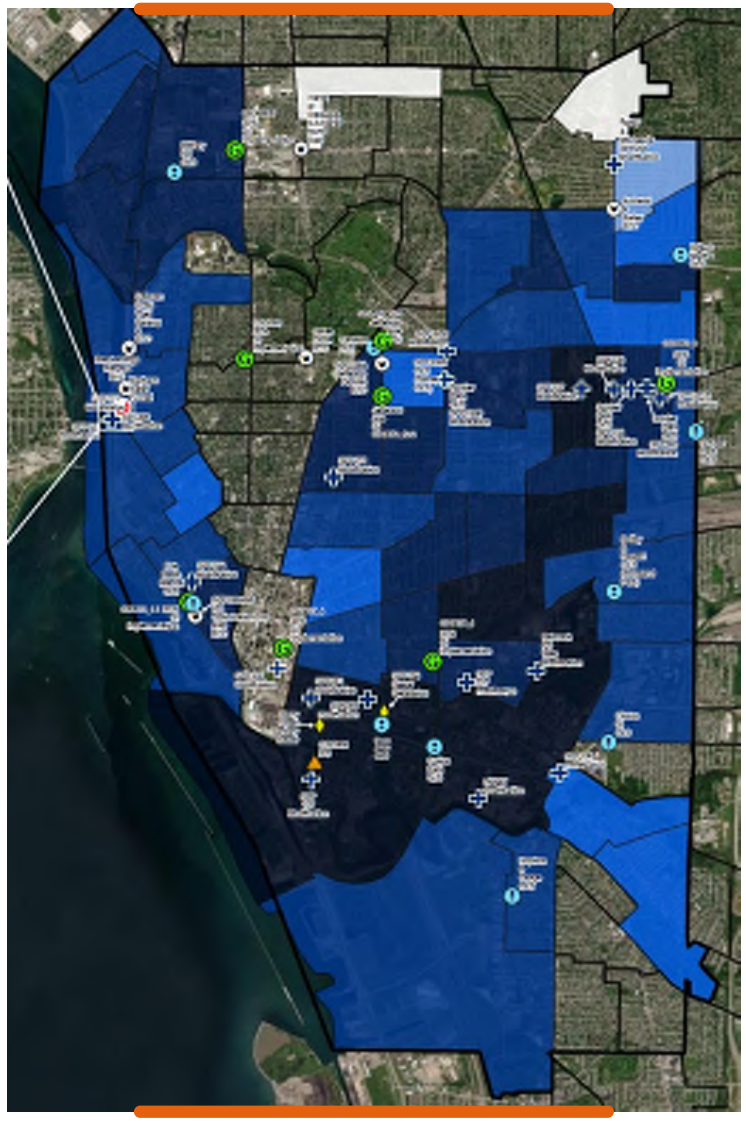
Buffalo Sewer Authority, "Rain Check 2.0 Opportunity Report"



Council on Environmental Quality – Climate and Economic Justice Screening Tool

Data Source	Description
Buffalo Sewer Authority Rain Check 2.0	• Provide local relevance • Aggregate socioeconomic and environmental factors; however, some of the factors were not as relevant to the current work
Climate and Economic Justice Screening Tool	• Addresses the intersection of climate and economic justice, which is increasingly important. • Disadvantaged communities meet thresholds in at least one burden category and have low income (65th percentile). • Justice 40 initiative directs 40% of federal benefits to these communities.

Environmental Justice Disadvantage Rankings Map



Legend

Disadvantage Rating

- 0
- 1
- 2
- 3
- 4
- 5
- 6

* Disadvantage Ratings of 7 & 8 were not observed in the City of Buffalo.

Project Type

- Green Infrastructure
- In-Line Storage
- Off-Line Storage
- Real Time Control
- SPP Modification
- Sewer Separation
- Tunnel
- City of Buffalo Boundary

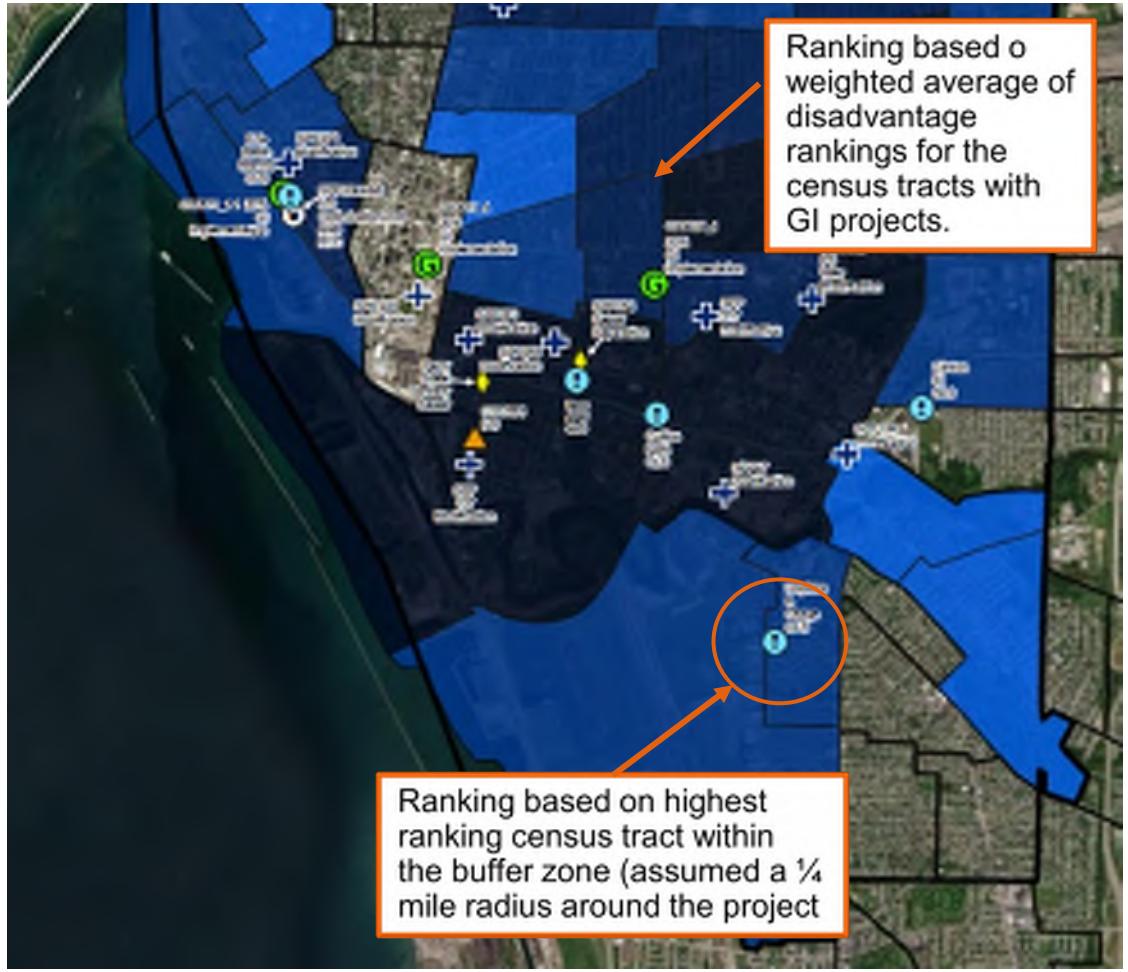
Disadvantage Rankings Calculations

Assessing Disadvantage Ranking:

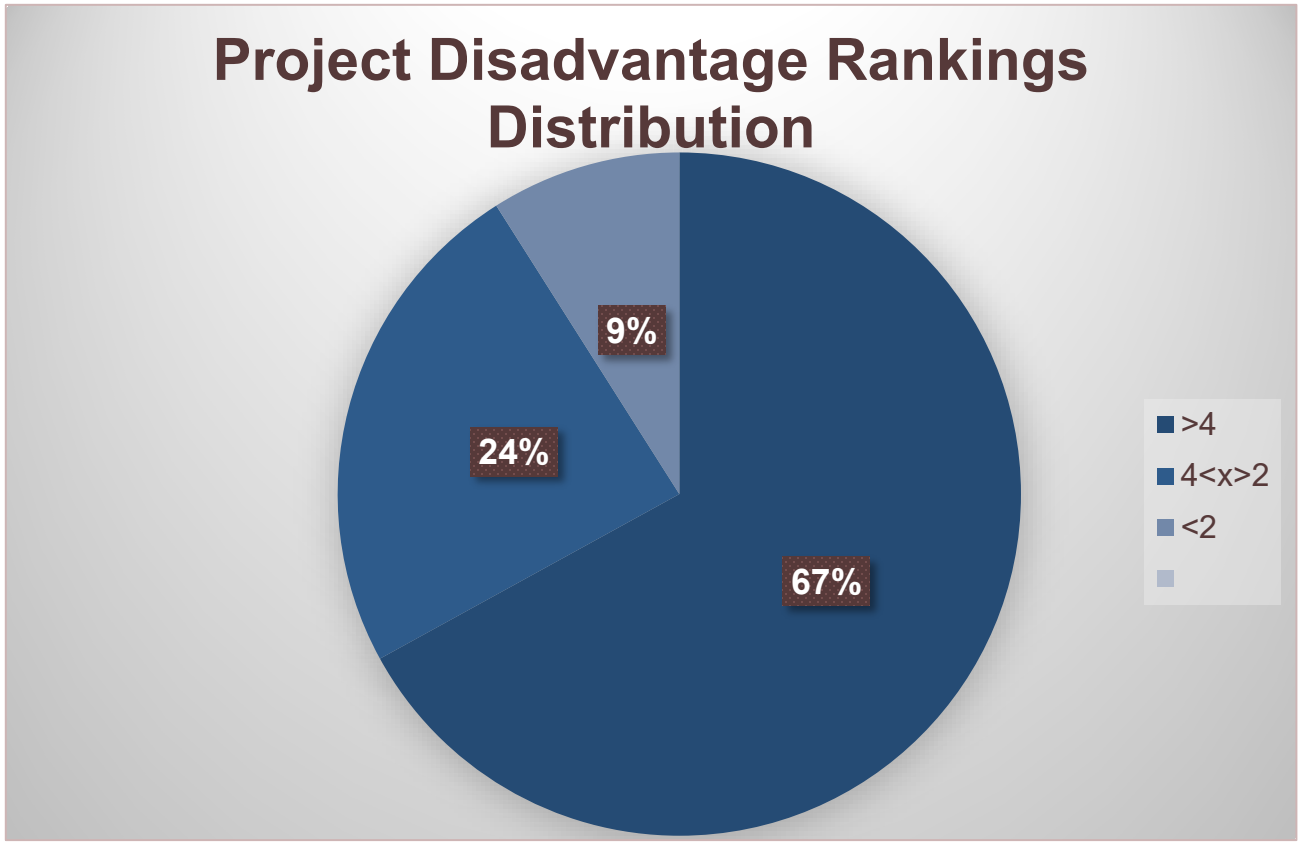
- Observed disadvantage rankings range from 0 to 6
- Projects' locations plotted on the disadvantaged community map to calculate their respective rankings.

Approaches for Ranking Calculation:

- Green Infrastructure (GI) Projects:
- Other Projects (OLS, RTC, ILS, SPP Modifications):



Results and Next Step



Conclusion:

- The evaluation of disadvantage rankings offers insights into project impact on vulnerable communities, guiding targeted community engagement and fostering equitable project implementation

Stakeholder Engagement - DEC Enhanced Public Participation Plan

NYSDEC Commissioner Policy 29

- Enacted 3/19/2003
- Applicants for certain major ECL permits with environmental impact in or near a Potential Environmental Justice Area (PEJA)
- Geared towards discrete project site and short time-line
- Requires identification of stakeholders and deliberate outreach to them "Enhanced Public Participation Plan"

9/27/2023 Draft CLCPA Policy issued

- Climate Leadership and Community Protection Act (CLCPA),
- Preventing disadvantaged communities from being disproportionately affected by greenhouse gas (GHG) or co-pollutant emissions;
- All applicants under policy will need to prepare Enhanced Public Participation Plan

Equitable outcomes

- Public outreach targeted towards neighborhoods most impacted during construction
- DEC Enhanced Public Participation Plan as starting point, not as end point
- Workforce development and Green Infrastructure limited to neighborhoods with highest burdens
- Community benefit projects as requirement moving forward
- Prioritizing impacts to waterways in neighborhoods with greatest environmental justice concerns earlier
- Credits for low and fixed income residents

Key Takeaways

Equity and Environmental Justice considerations are important in asset management and CIP

Disadvantage rankings can be used to prioritize projects in vulnerable communities. *Remember: Equity looks different for different communities*

Stakeholder engagement is important for achieving equitable outcomes, and it is now a policy to comply with in New York.

Inclusive planning includes articulating project goals, identifying equity gaps, and engaging all members of the community.

Thank You!

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Q&A

BUFFALO
SEWER AUTHORITY

UPCOMING WORK
IN THE
LOVEJOY COMMON COUNCIL DISTRICT

Buffalo Sewer through its Long-Term Control Plan **is tackling stormwater challenges in Buffalo.**

This month, our team will be **mapping** sites in your neighborhood for projects that are part of this Plan.

Our crews will wear yellow vests and hardhats as they work at:

1. **Genesee St. between Countess Ave. and Kerns Ave.**
2. **Hagen St. near intersection with Kerns Ave.**

For more information please contact:
Rosaleen Nogle, Principal Sanitary Engineer
Buffalo Sewer Authority
rnogle@buffalosewer.org.

BUFFALO
SEWER AUTHORITY

UPCOMING WORK
IN THE
MASTEN COMMON COUNCIL DISTRICT

Buffalo Sewer through its Long-Term Control Plan **is tackling stormwater challenges in Buffalo.**

This month, our team will be **mapping** sites in your neighborhood for projects that are part of this Plan.

Our crews will wear yellow vests and hardhats as they work at:

1. **Colorado Ave. near Scajaquada St.**
2. **E. Delavan Ave. near Humboldt Pkwy.**
3. **Humboldt Pkwy. from E. Delavan Ave. to Sidney St.**
4. **Sidney St. from Humboldt Pkwy. to Lark St.**
5. **Lark St.**

For more information please contact:
Rosaleen Nogle, Principal Sanitary Engineer
Buffalo Sewer Authority
rnogle@buffalosewer.org.

BUFFALO
SEWER AUTHORITY

UPCOMING WORK
IN THE
ELLICOTT COMMON COUNCIL DISTRICT

Buffalo Sewer through its Long-Term Control Plan **is tackling stormwater challenges in Buffalo.**

This month, our team will be **mapping** sites in your neighborhood for projects that are part of this Plan.

Our crews will wear yellow vests and hardhats as they work at:

Michigan Ave. from Glenwood Ave. to Dodge St.

For more information please contact:
Rosaleen Nogle, Principal Sanitary Engineer
Buffalo Sewer Authority
rnogle@buffalosewer.org.

BUFFALO
SEWER AUTHORITY

UPCOMING WORK
IN THE
FILLMORE COMMON COUNCIL DISTRICT

Buffalo Sewer through its Long-Term Control Plan **is tackling stormwater challenges in Buffalo.**

This month, our team will be **mapping** sites in your neighborhood for projects that are part of this Plan.

Our crews will wear yellow vests and hardhats as they work at:

1. **Babcock St., South of intersection with Elm St.**
2. **Perry Blvd. between Erie St. and Pearl St.**

For more information please contact:
Rosaleen Nogle, Principal Sanitary Engineer
Buffalo Sewer Authority
rnogle@buffalosewer.org.

Primary Treatment Renovation
at Bird Island Wastewater Treatment Facility

Pre-Bid Meeting #1: General Information

BUFFALO SEWER AUTHORITY

GREELEY AND HANSEN
A TYLin Company

February 20, 2024

Agenda

- Opening Remarks
- Overview of Work
- Construction Documents
- Project Components
- Project Constraints and Site Coordination
- General Discussion / Contractor Questions
- Roll Call / Closing Remarks

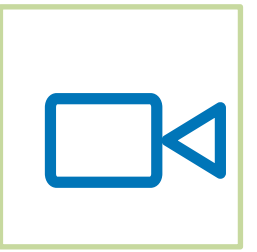
Opening Remarks

Online Meeting

You are Muted

Chat Box

Live Q&A



Meeting Recorded

- ***Attendance Record – one representative from each firm to check in via the chat***
  - ***Name of attendee and firm***
  - ***Roll call at the end***
- ***The presentation and attendee list will be shared with all attendees by addendum.***
- ***All questions to be provided in writing.***

Presenters

BUFFALO SEWER AUTHORITY (OWNER)

- **Tim Blake**
  WWTF Capital Projects Manager
- **Rosaleen Nogle, PE, BCEE**
  Principal Sanitary Engineer

GREELEY AND HANSEN
A TYLin Company (DESIGN CONSULTANT)

- **Walt Walker, PE, ENV SP**
  Project Manager
- **Ryan Christopher, PE, ENV SP**
  Deputy Project Manager

Bid and Procurement Schedule

- Bid Advertisement: February 12, 2024
- Three (3) Mandatory Pre-Bid Meetings
  - **Meeting #1** – Virtual Informational Meeting: February 20, 2024 @ 11:00am ET
  - **Meeting #2** – Virtual NYSEFC Funding Compliance Meeting: February 21, 2024 @ 2:00pm ET
  - **Meeting #3** – Site walkthrough of the project site: February 22 or 23, 2024
    - Email walt.walker@greeley-hansen.com by 02/21/2024 @ 1:00 pm ET to register
    - PPE required
- Contract Documents are available through Avalon Planroom
  - www.avalonbuff-planroom.com in the “Public Jobs” section.
  - All addenda will posted there

Bid and Procurement Schedule

- Questions
  - Provide all questions in writing by March 18, 2024 to: walt.walker@greeley-hansen.com
  - Questions and Responses will be provided by addenda
    - Final Addendum issued: March 23, 2024

- Bid Packages Due: March 28, 2024 **before** 11:00am EST
  - At the office of *TYLin | Greeley and Hansen*: 77 Broadway, Suite 208, Buffalo, NY 14203
  - Bid Opening via MS Teams **at** 11:00am EST

- Recommendation of Bid Award: May 2024
- Notice to Proceed: Fall 2024
- Substantial Completion: December 2028

Overview of Work

BUFFALO
SEWER AUTHORITY

GREELEY AND HANSEN
A TYLin Company

PRIMARY SYSTEM REHABILITATION AND UPGRADES PROJECT OVERVIEW

1 Primary Sedimentation Tanks

- New sludge and scum collection equipment
- Improved efficiency for sludge settling and removal
- Concrete repair and coating for corrosion protection
- Safety improvements with new handrail and toeboards

2 Sludge Pumping Station

- New pumps, piping, and valves
- New HVAC equipment to meet current ventilation codes and standards
- New electrical and control equipment for improved automation and operations flexibility
- Concrete and masonry repair and improvements while maintaining original building design
- New personnel spaces and lighting

3 Odor Control

- New effluent trough covers for the Primary Sedimentation Tanks
- Odor capture at various chambers
- New FRP piping to convey odorous air to odor control units for treatment prior to being released into the atmosphere

4 High-Rate Disinfection System

- New Chlorine Contact Tank provides 5 minutes of contact time at 160 MGD
- High-Rate Disinfection Building includes chemical storage and feed equipment
- Five new 40 MGD submersible pumps to convey disinfected Primary Effluent through Outfall 001 to the Niagara River

5 Bypass Structure Gates

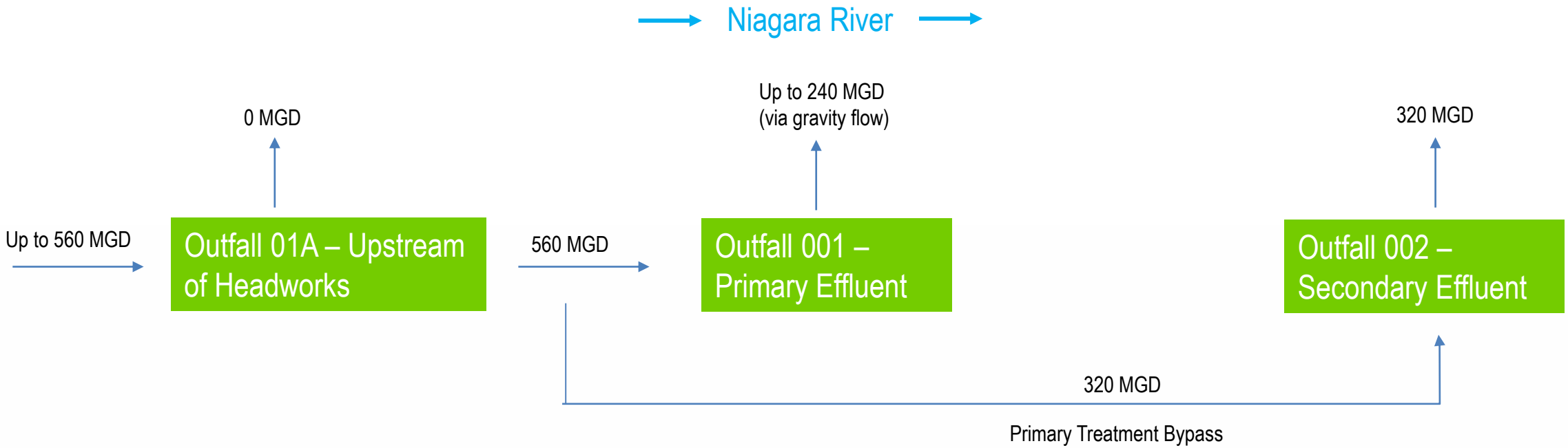
- Gate 17 installed with new actuator
- New gates and actuators to automate wet weather sequences and provide operational flexibility for Authority staff

6 Outfall 001 Repair

- Restoration of multi-use riverwalk/trail
- Installation of landscaping along public-facing utility bike/pedestrian path along Niagara River
- Repairs to Outfall 001 overflow structure, and connection of HRD pump station pipe to the outfall structure

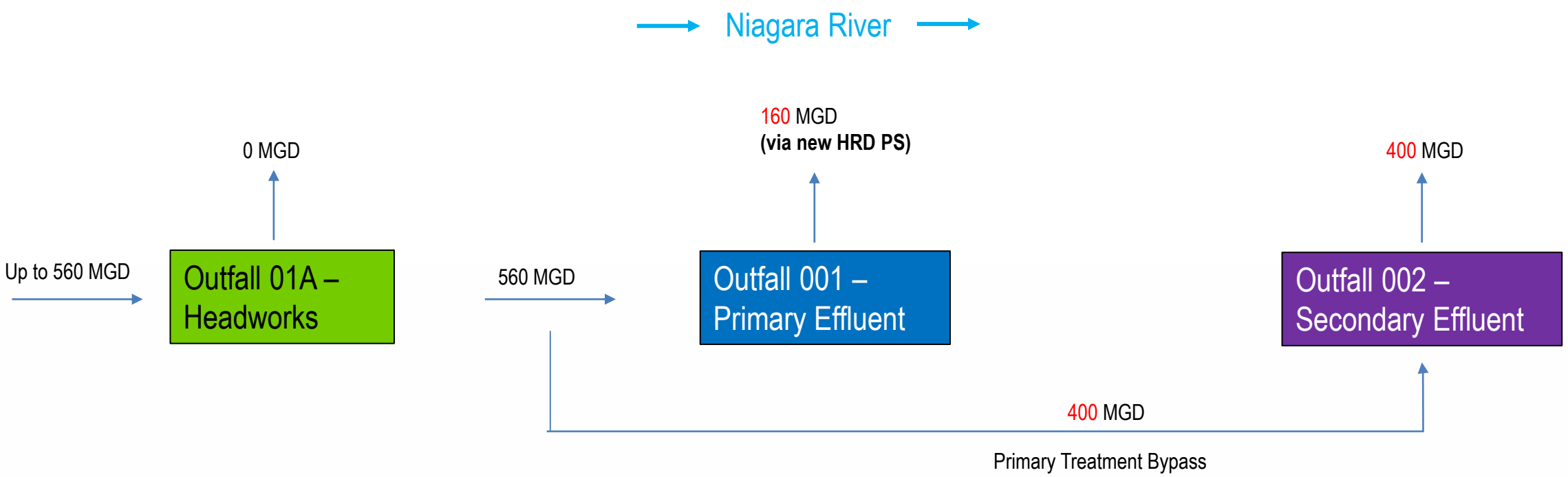
Existing Conditions during Peak Wet Weather
(Present)

- During normal operating conditions, Primary Treatment throughput is 160 MGD
- Secondary Treatment capacity currently limited to ~320 MGD
- During peak wet weather conditions (partial treatment mode), excess flows are discharged through partial treatment primary Outfall 001



Ultimate System Buildout – Peak Wet Weather Conditions (2029)

- Primary Treatment Renovation, and Secondary System Rehabilitation and Upgrades completed
- Primary Treatment Capacity maximum throughput of 160 MGD; Secondary Treatment Capacity increased to 400 MGD



Construction Documents

BUFFALO
SEWER AUTHORITY

GREELEY AND HANSEN
A TYLin Company

Instructions to Bidders

- Bidder's Responsibility
- Preparation of Proposals
- Withdrawal of Bid
- Bid Documents
  - Section 01 29 00 - Measurement and Payment
  - Contract Drawings
- Bid Security
  - Certified Check: 5% of Bid Price
  - Bid Bond: 25% of Bid Price
- Addendum No. 1 includes Addendum Acknowledgement Form

Instructions to Bidders

- Project Funding
  - Federal and state funding administered through NYSEFC and NYSDEC
    - BIL, CWSRF, WIIA, WQIP
- Participation Goals of **Disadvantaged Business Enterprises (DBE)**
  - **20% DBE** Utilization Goal across the entire contract
  - Contractor agrees to make documented Good Faith Efforts to utilize at least 20% of total value of the contract to NYS-certified DBEs
- Contract Packaging
  - Scope organized into Contracts A and B

Contract Packaging

The work is divided into two Contracts, A and B. Bidder may propose on either Contract A or Contract B.

- **Contract A** – Primary Settling Tanks and Sludge Pumping Station
  - Primary Sedimentation Tanks and Sludge Pumping Station Renovation; Installation of New Odor Control System; Demolition of equipment in the existing Bypass SH Facility.
- **Contract B** – New Chlorine Contact Tanks and High-Rate Disinfection (HRD) System
  - New High-Rate Disinfection Chlorine Contact Tank, High-Rate Disinfection Building, a new connection and renovations to the existing Outfall Structure 001, HRD Influent and Effluent Conduits, modifications to the existing Bypass and Control Chamber and Primary Bypass Junction Chamber, replacement of gates at the Bypass and Control Chamber, Primary Bypass Structure No. 1 and 2.
  - Replacement of gates WW-15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, and 26

- **The Bidder may propose the bid alternate identified as Contract C (Combined Bid for Contracts A+B).** If a Bidder proposes on Contract C, they must also provide proposals for Contract A and B.

- The Bidder understands that after a Contract is awarded, the Authority may select the bid alternate. The proposed prices for the bid alternate may or may not be considered in determination of the lowest bid.

DBE Inclusion Plans and Resources

- A DBE Utilization Plan **must** be submitted with your Bid Proposal Package:

  https://efc.ny.gov/system/files/documents/2023/02/dbe-utilization-plan.docx

- Prime contractor must utilize DBE suppliers/subcontractors that are certified on behalf of the New York State Unified Certification Program:

  https://nysucp.newnycontracts.com/

- We are looking for Plans that are:
  - Reflecting a good-faith effort
  - Realistic and meaningful

DBE Inclusion (Cont.)

- Create economic opportunity for DBE/MBE/WBE firms, including firms who are new to working with BSA and/or the City of Buffalo
- Promote meaningful teaming arrangements, mentorship, and partnership between established, experienced firms and new and/or smaller firms
- For the Primary Treatment Renovation Construction Services contract:
  - **DBE utilization goal of 20%** of total value of the contract
  - DBE must be certified in New York State as a DBE
  - Utilization of Erie County certified M/WBE and SDVOB firms is encouraged

Contract Documents

- General
  - Equal Employment Opportunity
  - Tax Exemption
  - Non-Collusive Bidding Certification
  - Insurance
- Bonds
  - Performance Bond – 100%
  - Maintenance Bond – 10%
- Liquidated Damages
  - $500 per day after time specified for Substantial Completion
  - $1,000 per day beginning 60 days after time specified for Substantial Completion

Contract Administration

- Prevailing Wage Requirements
  - This contract is subject to prevailing wage requirements under Article 8 of the NYS Labor Law.
  - The prevailing wage and supplement rates that are in effect (for each trade) at the time the work is performed must be paid.
- Build America, Buy America (BABA) Act waived for this contract
- Must comply with American Iron & Steel (AIS)

Contract Administration

- Coordination with Emerson for Ovation DCS
- Document Management Software
  - *Procore* will be used for submission of submittals, RFIs/RFCs.
  - Contractor will be provided Procore training and specific instructions for submittal procedures after the bid is awarded.
- Engineer's Field Trailer
  - Part of Contract B

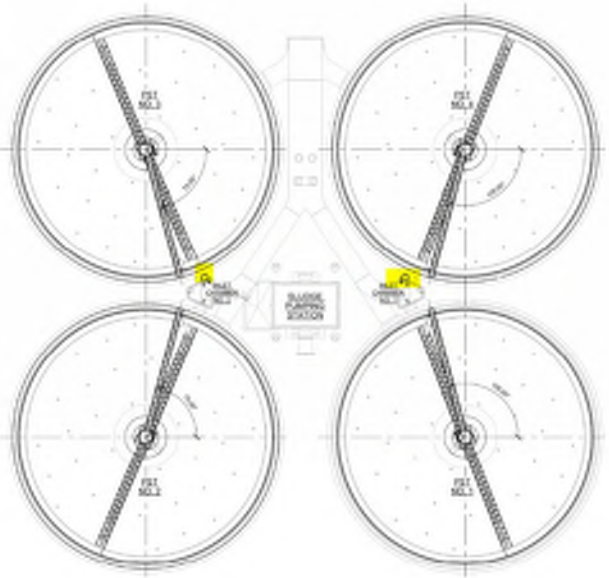
Project Components: Contract A

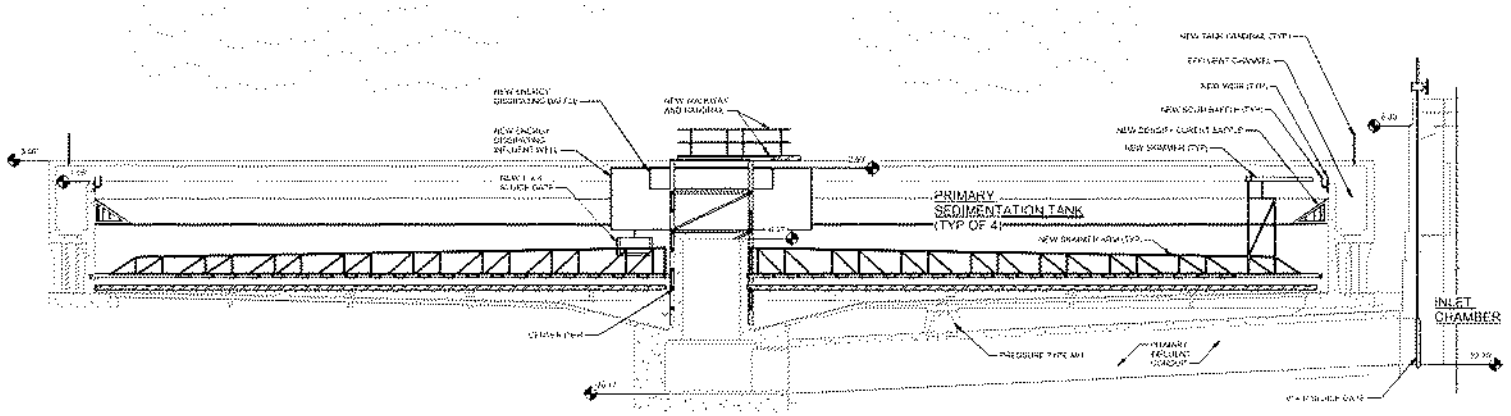
BUFFALO
SEWER AUTHORITY

GREELEY AND HANSEN
A TYLin Company

Primary Sedimentation Tanks Upgrades

- New Clarifying Equipment
  - New Sludge and Scum Collection Equipment
  - Density Current Baffles
  - Energy Dissipating Inlets
  - Replace GW relief valves
  - New Scum Trough, Beach
  - Effluent Weir Covers – Odor Control
- Structural Repairs
  - GW Relief Valve Replacement
  - Concrete Crack / Spall repairs
  - Concrete Coating Inlet Chamber Repairs
  - Inlet Chamber & Scum Well Repairs
- Electrical
  - New Area Lighting
    - SwivelPole Type at PSTs and PST Walkway
- New Handrails around PSTs
- Davit Mounts
- Inlet Chamber / Scum Well Handrails Left in Place

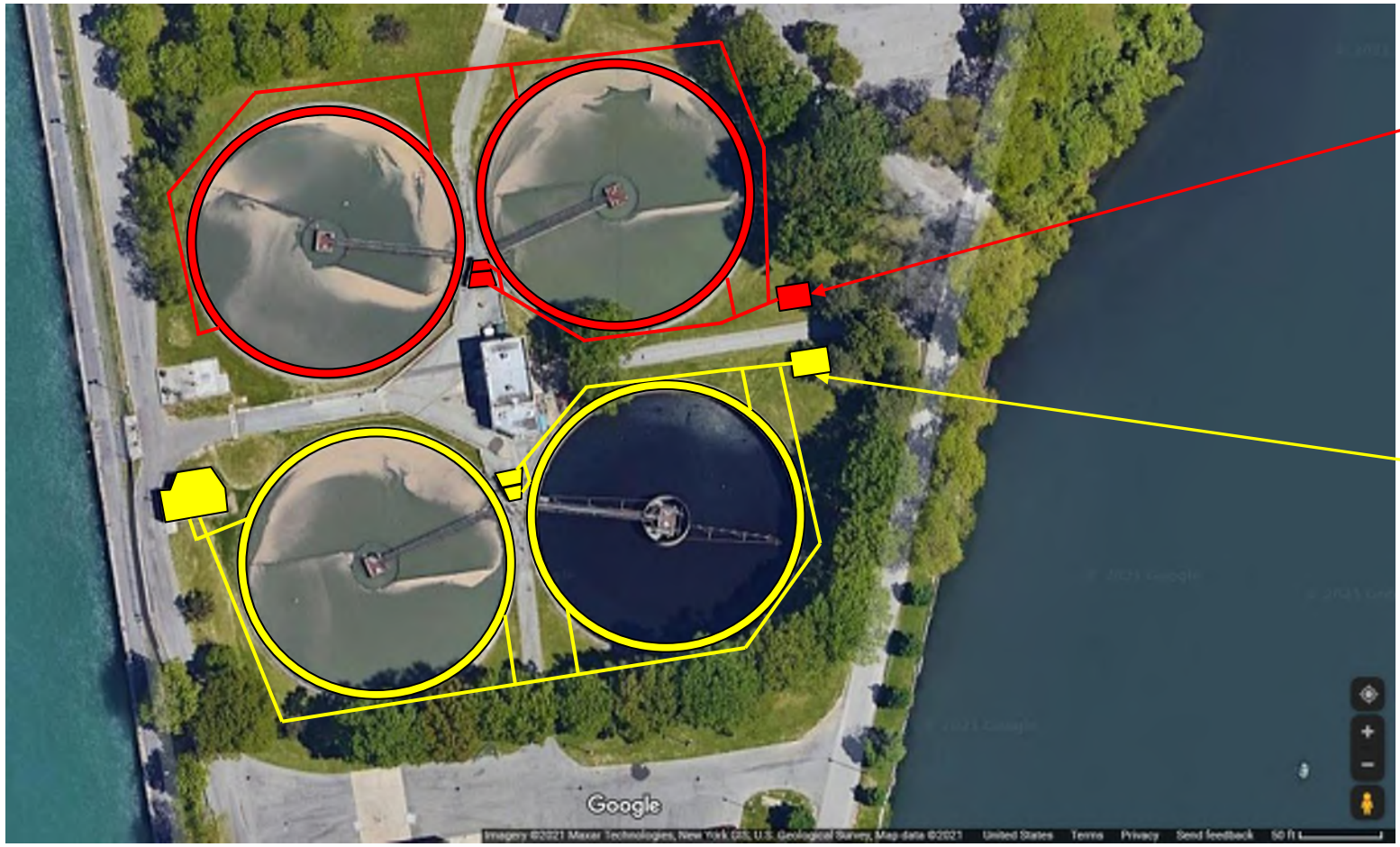




Sludge Pumping Station

- Full Building Renovation – Masonry and Building Repairs
- New Sludge Pumps w/ Grinders
- New Drainage Pumps
- New Piping and Valves
- New Plumbing and HVAC
- New Bridge Crane
- Location of New MCC
- Renovated Electrical Control Room

Odor Control System Layout



Odor Control System to Treat North Inlet Chamber and Effluent Channels of Primary Sedimentation Tanks 1 and 4

Odor Control System to Treat Bypass and Control Chamber, South Inlet Chamber, and Effluent Channels of Primary Sedimentation Tanks 2 and 3

Scope of Work – Schedule of Quantities

NO.	ITEM	QUANTITY	UNIT
1A	Renovations to the Primary Settling Tanks, Sludge Pump Station, Odor Control system, and associated equipment, material, and labor.	1	Lump Sum
2A	Emerson DCS equipment and integration for the equipment associated with the Primary Settling Tanks.	1	Lump Sum
3A	Allowance for the handling, removal, and legal disposal of hazardous and non-hazardous waste.	1	Lump Sum
4A	Allowance for the handling, removal, and legal disposal of unanticipated impacted soil and groundwater.	1	Lump Sum
5A	Allowance for the repair of existing pipes and utilities discovered to be in poor condition or damaged through no fault of the Contractor.	1	Lump Sum
6A	Additional earth excavation	500	Cubic Yards
7A	Additional select fill	500	Cubic Yards
8A	Additional Class B Concrete	250	Cubic Yards
9A	Additional Steel Reinforcing	500	Pounds
10A	Additional Pile Length	300	Linear Feet
11A	Additional re-pointing of existing masonry	50	Square Feet
12A	Removal of damaged brick and installation of matching brick	30	Square Feet
13A	Removal of damaged floor tile and installation of matching floor tile.	40	Square Feet
14A	Removal of damaged limestone coping and installation of matching limestone coping.	7	Each

Project Components: Contract B

BUFFALO
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A TYLin Company

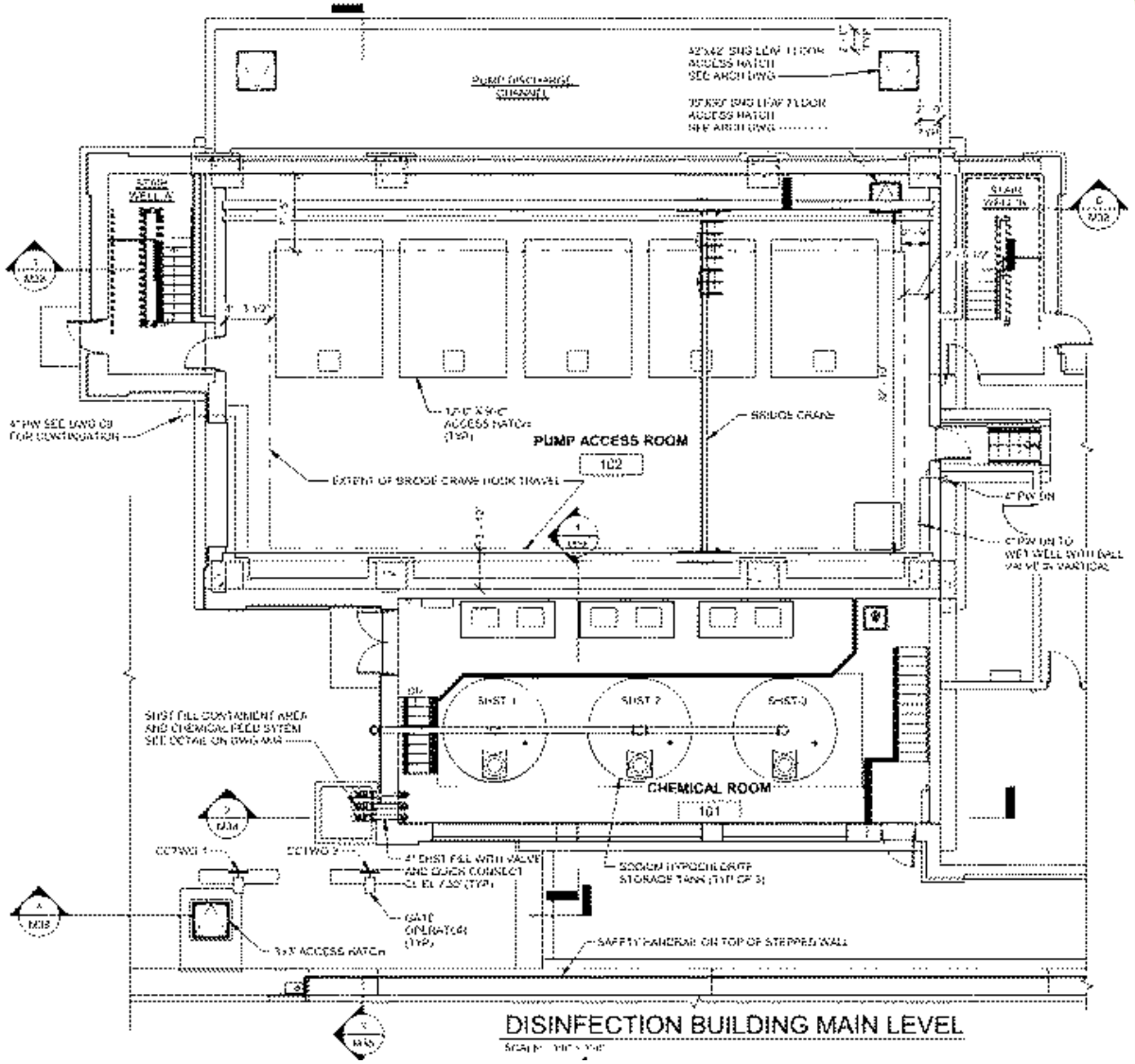
High-Rate Disinfection (HRD) Pump Station and Chlorine Contact Tank

- 160 MGD max throughput
- To be operational only during Partial Treatment mode
- Once connected to Outfall 001, the existing Sodium Hypo Building would be decommissioned

Future Rendering of New HRD Facility

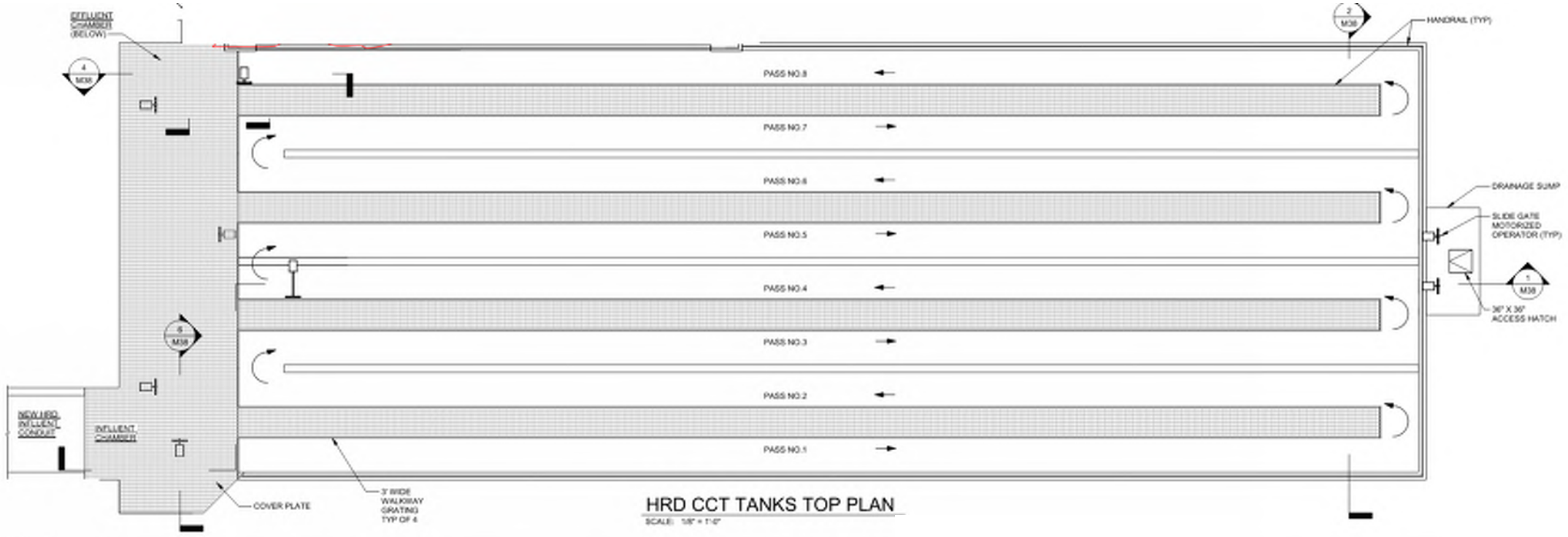
HRD Pump Station

- Pumping Station
  - 160 MGD firm capacity
  - Five 40 MGD Submersible Pumps
  - 3 Pumps on VFD, 2 constant speed
- Chemical Feed and Storage
  - Three 11,200 gallon storage tanks
  - Chemical feed pumps

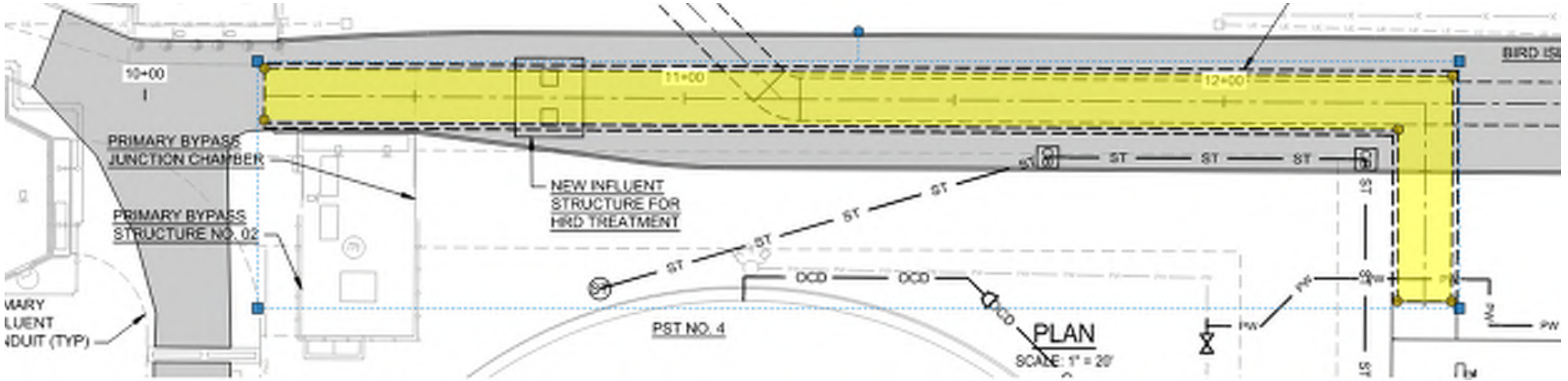


HRD Chlorine Contact Tank

- 5-minute contact time:
  - Channel Width: 6 ft
  - Channels Length: 120 ft
  - Water Depth: ~13 ft



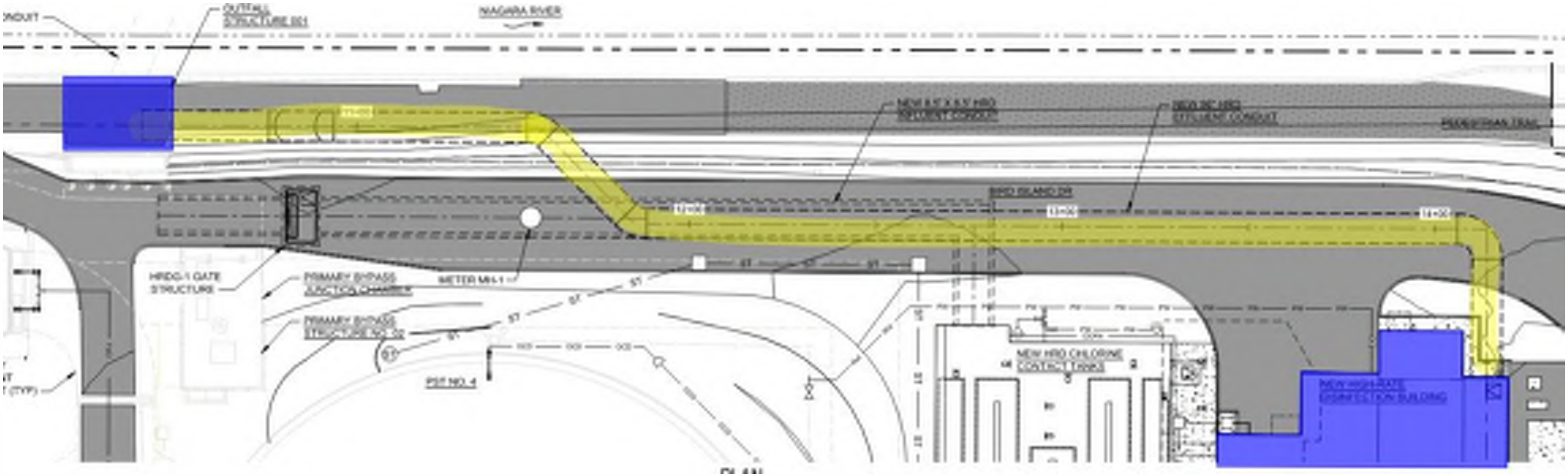
Influent to HRD Conduit



- Flow
  - Gravity
  - Average Flow: 74 MGD
  - Max Flow: 160 MGD
- Size
  - 8.5’x8.5’
- Structural
  - Material: Cast in Place Concrete
  - Steel piles

Outfall 001 Repair and Connection to HRD

- The HRD Pumping Station force main will tie into the existing Outfall 001 structure.
- The existing Outfall 001 overflow structure and conduit was inspected to verify they are structurally competent to facilitate the proposed renovation.



Scope of Work – Schedule of Quantities

NO.	ITEM	QUANTITY	UNIT
1B	Renovations to the Primary Settling Tanks, Sludge Pump Station, Odor Control system, and associated equipment, material, and labor.	1	Lump Sum
2B	Emerson DCS equipment and integration for the equipment associated with the Primary Settling Tanks.	1	Lump Sum
3B	Allowance for the handling, removal, and legal disposal of hazardous and non-hazardous waste.	1	Lump Sum
4B	Allowance for the handling, removal, and legal disposal of unanticipated impacted soil and groundwater.	1	Lump Sum
5B	Allowance for the repair of existing pipes and utilities discovered to be in poor condition or damaged through no fault of the Contractor.	1	Lump Sum
6B	Additional earth excavation	1,000	Cubic Yards
7B	Additional select fill	1,000	Cubic Yards
8B	Additional Class B Concrete	1,000	Cubic Yards
9B	Additional Steel Reinforcing	5,000	Pounds
10B	Additional Pile Length	2,000	Linear Feet

Summary: Major Work and Coordination items

- HRD PS and CCT
  - Deep Excavation and Dewatering for Dewatering
  - Electrical power supply from MegaStructure/Substation
  - The new facility itself – Pump station, CCT, and influent and effluent conduit
  - Connection to Outfall 001
- Replacement of Gate WW-17
- Instrumentation & Controls Coordination with Emerson for the Ovation Control System
- Primary Tank Structural Repair and Mechanical Replacement
- Gut renovation of the Sludge Pump Station – new pumps, relocated process lines and MCC
- Long lead items: Sludge and HRD pumps, MCCs, clarifier mechanisms, odor control equipment, WW gates

Project Constraints and Site Coordination

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Maintenance of Plant Operations

- Limitations in shutdown of the 4 Primary Tanks – typically one at a time
- Understanding Duration of Plant and Tank Shutdowns
- Flexibility of Wet Weather Capacity in either Primary or Secondary Treatment
- Contract B: Replacement of Gate WW-17 must occur first
- Limit Any Potential Discharge Permit Violations/Conflicts
- Riverwalk/Shoreline trail shutdown due to Outfall 001 repair: communication and coordination with City DPW and community
- Large deliveries shall occur at North Gate Entrance (via International Railroad Bridge)
- Coordination with other ongoing Contracts: Secondary Systems Rehab (Phase I), Secondary System Expansion (Phase III), and others

Staging Coordination with Other NFA Contracts

General Discussion / Contractor Questions

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Roll Call / Closing Remarks

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Closing Remarks

- Meeting notes, slides, and attendance list from Pre-Bid General Info Meeting #1 and EFC/Funding Meeting #2 will be provided via addendum
- Roll Call

Project Reminders / Key Dates

- Three (3) Mandatory Pre-Bid Meetings
  - **Meeting #1** – Virtual Informational Meeting: February 20, 2024 @ 11:00am ET
  - **Meeting #2** – Virtual Funding Compliance Meeting, hosted by NYSEFC: February 21, 2024 @ 2:00pm ET
  - **Meeting #3** – Site walkthrough of the project site: February 22 or 23, 2024
    - Email walt.walker@greeley-hansen.com by 02/21/2024 @ 1:00 pm ET to register
    - Proper PPE required
- Questions
  - All questions to be provided in writing to walt.walker@greeley-hansen.com
    - Deadline for questions: March 18, 2024
  - Questions and Responses will be provided in addenda
    - Final Addendum issued: March 23, 2024
- Bid Packages Due: March 28, 2024 before 11:00am EST
- Submit DBE Utilization Plan with Bid Package
- Access of Contract Documents
  - All documents and addenda available via Avalon Planroom: www.avalonbuff-planroom.com in the “Public Jobs” section

Buffalo Sewer Authority Design Project Team

Walt Walker, PE, ENV SP
Design Project Manager
walt.walker@greeley-hansen.com
Project Point of Contact

Ryan Christopher, PE, ENV SP
Design Deputy Project Manager

Tim Blake
WWTF Capital Projects Manager

Rosaleen Nogle, PE
Principal Sanitary Engineer

Alex Emmerson
Plant Superintendent

Paul Harris, PMP
Superintendent of Mechanical Maintenance

Thank You!

BUFFALO
SEWER AUTHORITY

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RIVERROCK TIMES

Vol. 4 No. 1 | Thursday, February 29, 2024 | Covering the Northwest Corner of Buffalo

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BSA set to begin four-year renovation project

Buffalo Sewer Authority rendering shows areas to be addressed. *buffalosewer.org*

by Roxie Harbison

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The BSA will also be installing an odor control system from the tanks. This new technology reportedly filters out the odors. The current tanks and outflow pipes are still in pretty good condition.

The goals of the renovation, according to the speakers, are to protect public health, improve water quality, modernize the water treatment facility, and implement odor control. They will be keeping the original yellow brick on the outside of the facility while upgrading the inside.

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• Buffalo Sewer Authority is also working to reduce flooding and back flows into households. It was recommended that if residents have a basement flood to call 311 first. Let the BSA check the problem.

• Storm water receivers are the sewer drains that seem to fill up with trash. There is a 2 foot difference between the bottom of the receiver and the water pipe. Debris collects in the bottom and it requires a 4-man crew to clean it up…twice a year.

• Right now the work at Hertel & Niagara streets is just sewer line replacement work.

• Tours are available of Bird Island.

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• The BSA has two other large projects and a number of smaller projects in the works.

SCHEDULE A

DESCRIPTION OF PROPERTY SUBJECT TO THE BUFFALO SEWER AUTHORITY LIEN

All that tract or parcel of land situate in the City of Buffalo, County of Erie and State of New York, being part of Lot No. 49, Township 10 and Range 8 of the Buffalo Creek Reservation and more particularly described as follows: Beginning at a point in the northwesterly line of Folger Street at the distance of seven hundred thirty-two (732) feet from the point of intersection of the northwesterly line of Folger Street with the westerly line of Triangle Street running thence southwesterly along the said northwesterly line of Folger Street thirty-three (33) feet; running thence northerly and parallel with Triangle Street one hundred sixty-eight (168) feet running thence northeasterly and parallel with Folger Street thirty-three (33) feet; running thence southerly and parallel with Triangle Street one hundred sixty-eight (168) feet to the place of beginning.

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WATER QUALITY MANAGEMENT

WNYWEA GBEC2024

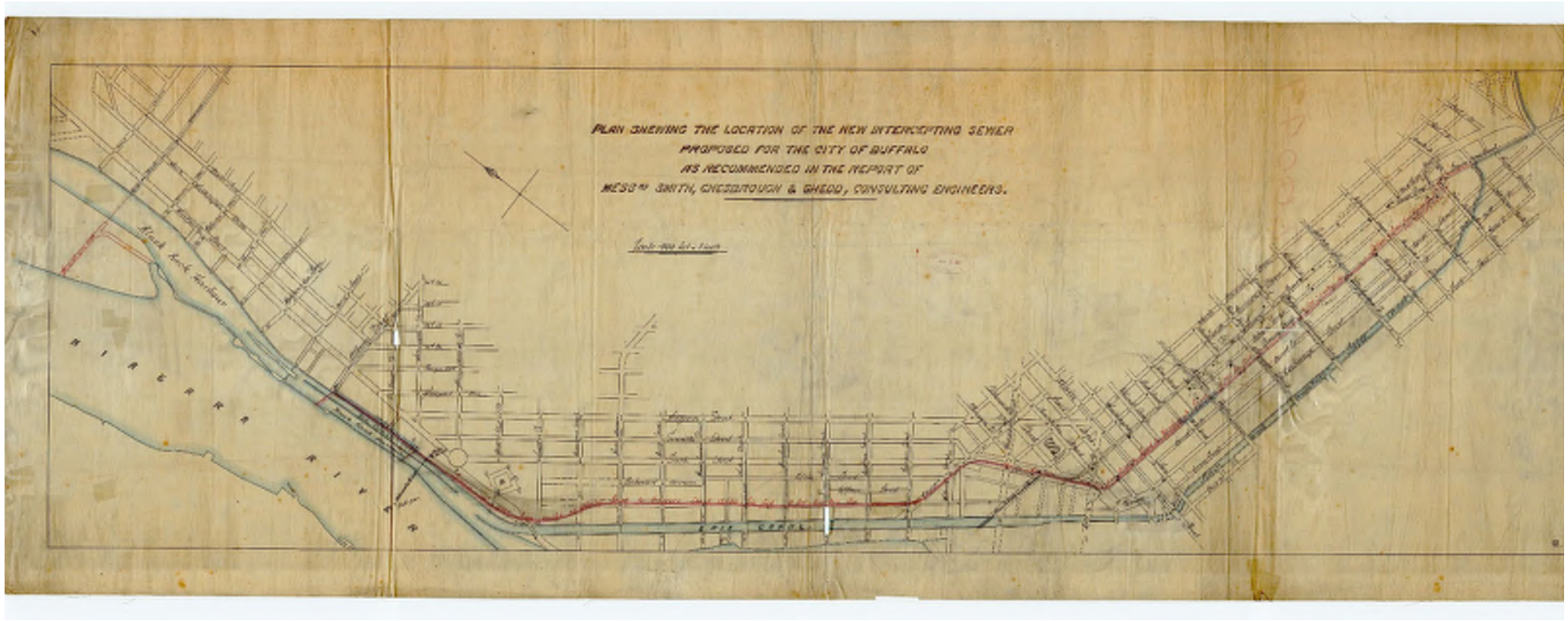
Not a Perfume Factory, but We Can be a Better Neighbor: **BSA Bird Island WWTF Phase 2 Primary System Upgrades**

Rosaleen Nogle, PE, BCEE, BC WRE | Principal Sanitary Engineer, Buffalo Sewer Authority
Walt Walker, PE, ENV SP | Vice President / Project Director, Greeley and Hansen

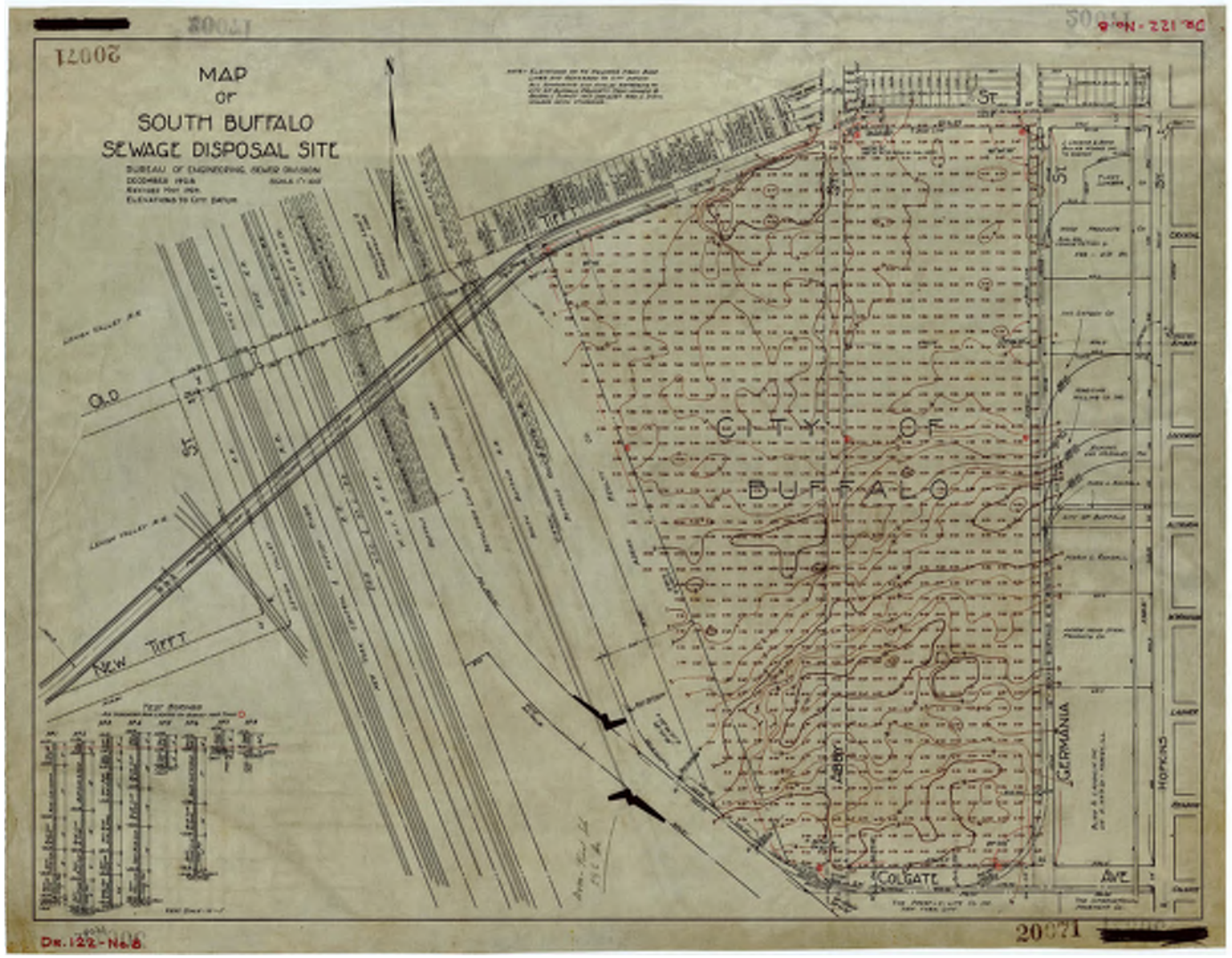
TYLin | Greeley and Hansen Water Solutions

BUFFALO SEWER AUTHORITY

The Swan Trunk



Alternative to Bird Island



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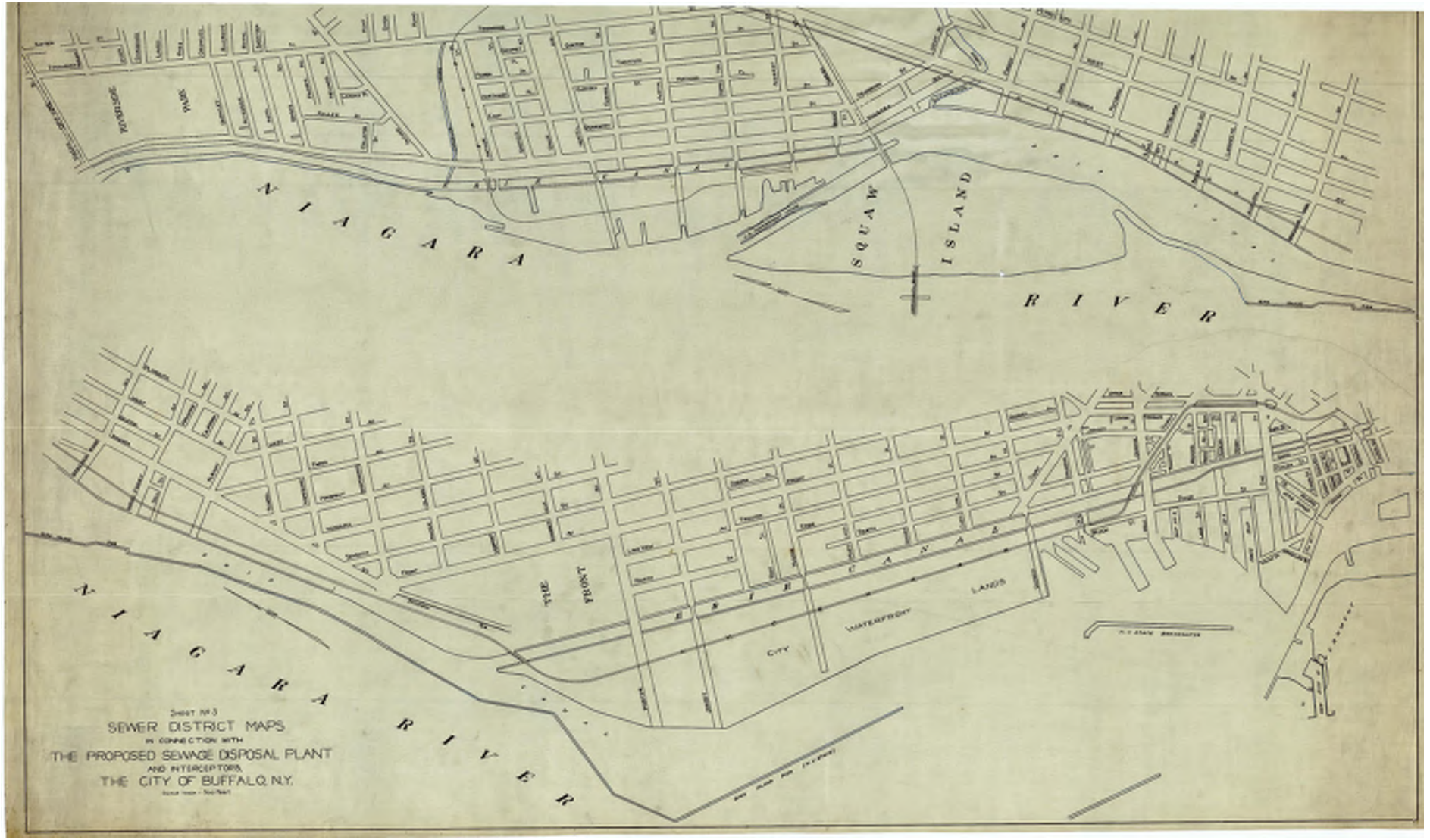
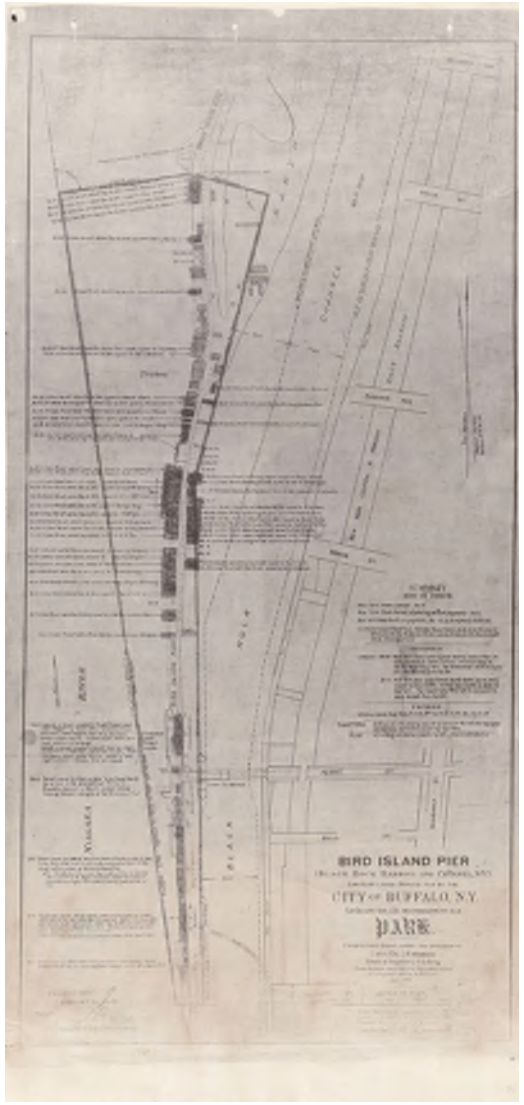


Bird Island in 1935



Eww!!! What is that Smell?

104 The International Engineer October, 1939

Dedicate Buffalo Sewage Treatment Plant

On September 12, 1939, the Buffalo Sewer Authority Dedicated to the Public Service the Bird Island Sewage Treatment Works—This Event Marks Completion of a Sanitation Project to End Pollution of the Niagara River

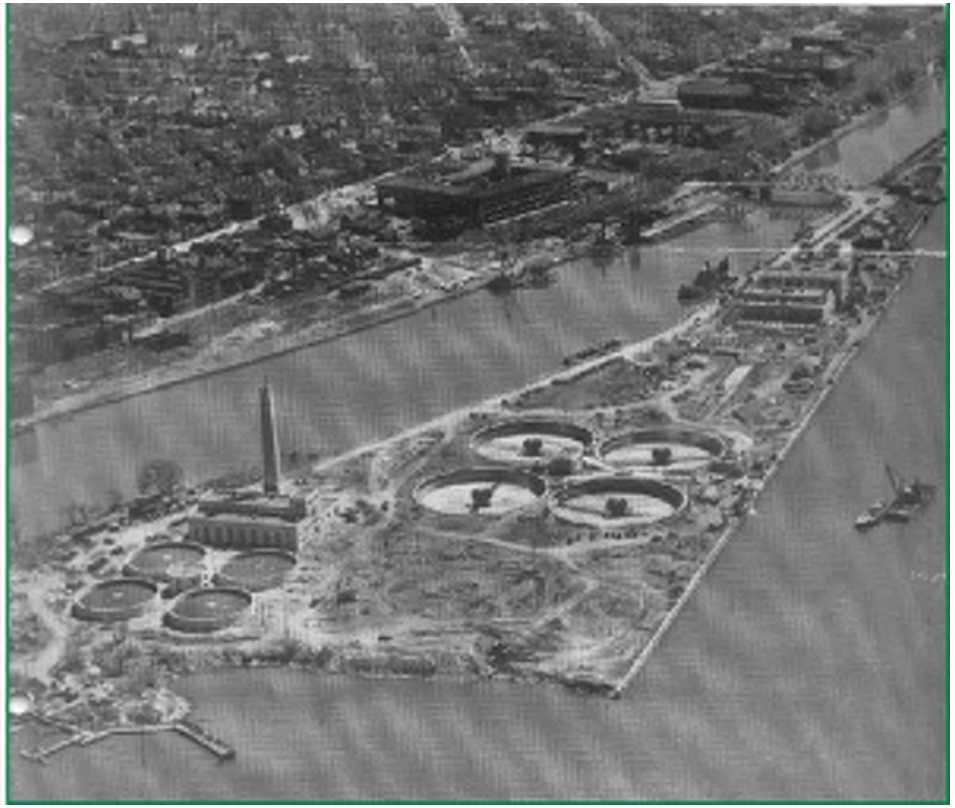
CONTRIBUTED

Formal dedication to the Public Service of the Bird Island sewage treatment plant marks the fulfillment of a specific task, delegated four years ago to the Buffalo Sewer Authority by the citizens of Buffalo and the sovereign people of the state of New York. This task, reduced to its essential terms, was: *Put an end, once and for all, to the pollution of the Niagara River, which has been for many years, increasingly, a menace to public health, an offense to civic pride, and a constant irritant, marring the fraternal fellowship of two great and friendly nations.*" How the Buffalo Sewer Authority has complied with this explicit command is briefly outlined below.

Completion of the Bird Island sewage treatment works, formally dedicated to the service of the people of Buffalo and its environs on September 12, 1939, is historically significant in various ways. It

Fig. 1.—View of the pumping station which can deliver 620,000,000 gallons of sewage through the sewage treatment works in 24 hours.

Not even a ripple of the river marked the hour,



Time Marches On

A SMELLY NUISANCE AS PROBLEMS PERSIST AT THE WASTEWATER TREATMENT PLANT ON SQUAW ISLAND, DOWNWIND IS A BAD PLACE TO BE

By DAN HERBECK AND MICHAEL BEEBE, CHARLES ANZALONE AND MICHAEL BEEBE, GENE WARNER AND MICHAEL BEEBE, CAROLYN RAEKE AND MICHAEL BEEBE, DAN HERBECK, JOANN SCELSA AND MICHAEL BEEBE, DAN HERBECK, JANE KWIATKOWSKI AND MICHAEL BEEBE, CHARLES ANZALONE, SUSAN SCHULMAN AND MICHAEL BEEBE, BARBARA J. O'BRIEN AND MICHAEL BEEBE, DAN HERBECK, HENRY L. DAVIS AND MICHAEL BEEBE, DICK CHRISTIAN AND MICHAEL BEEBE

Jun 15, 2004 0

Niagara Now

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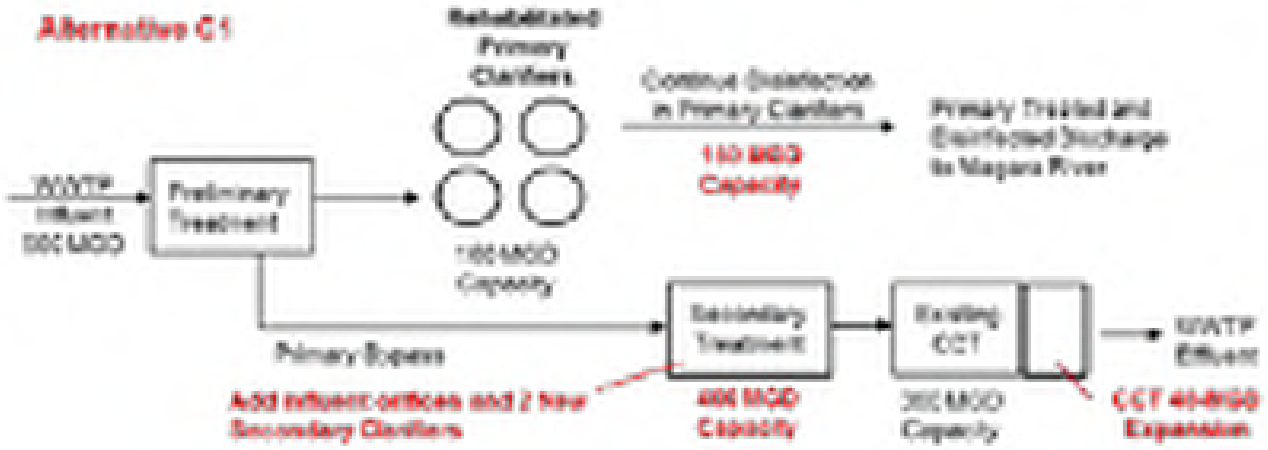
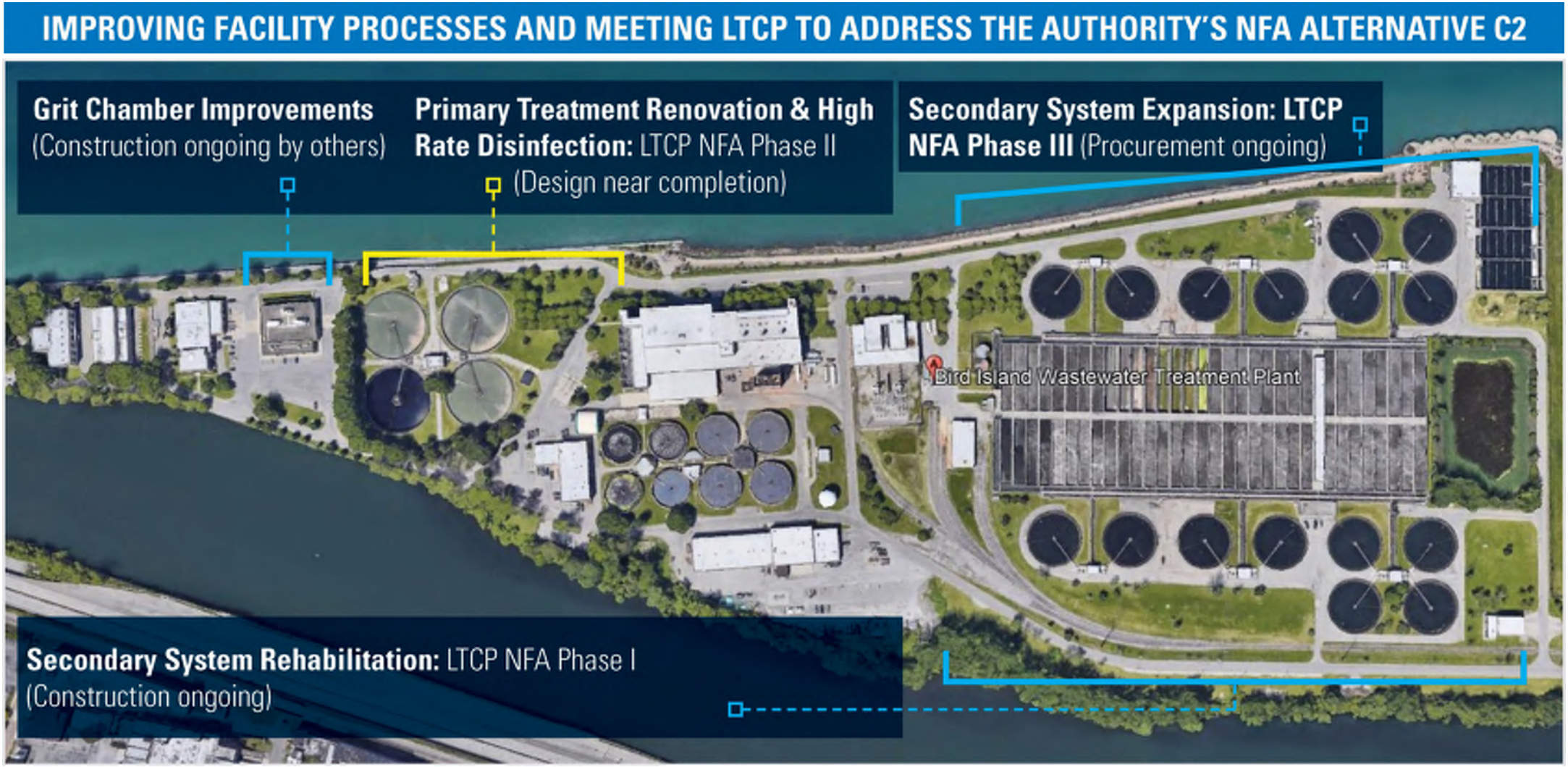
NFA: As Proposed



NFA: Issues with Implementation

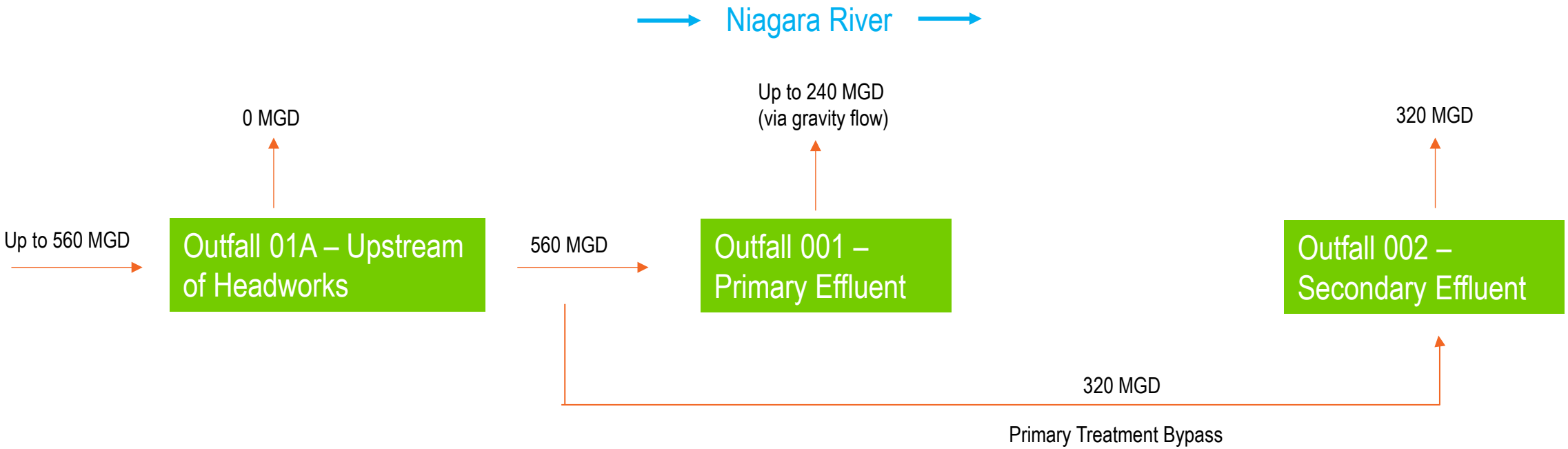
- Return Activated Sludge Lines
- Failing Aerators
- Isolation
- Grit

Buffalo Sewer Authority – Bird Island WWTF



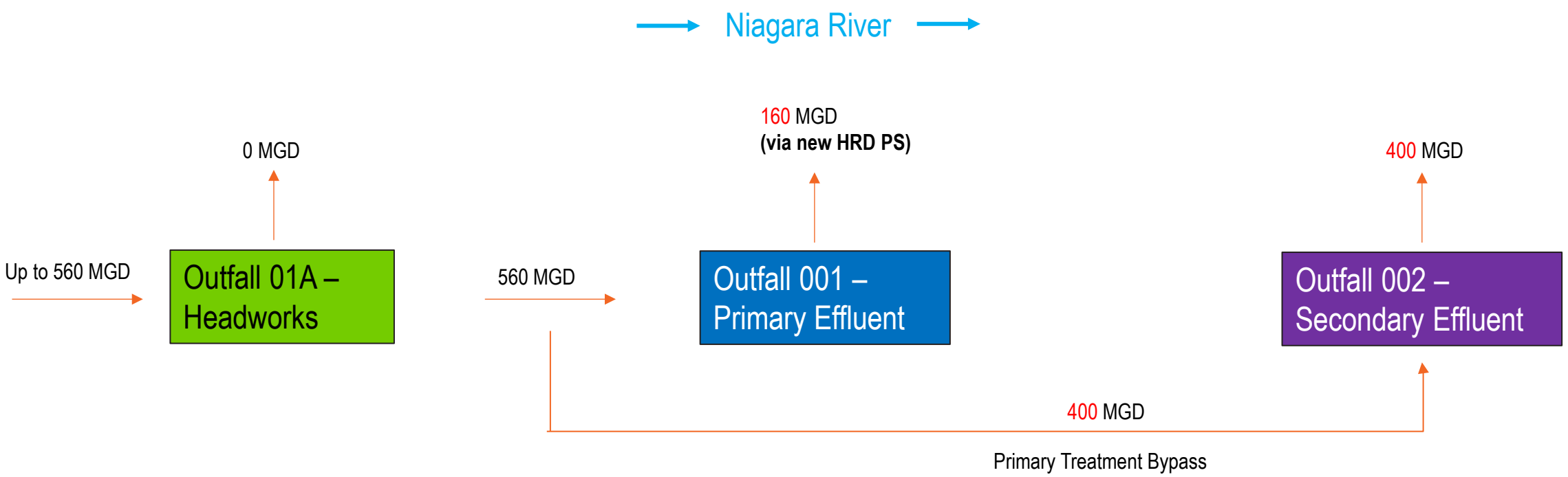
Existing Conditions during Peak Wet Weather (Present)

- During normal operating conditions, Primary Treatment throughput is 160 MGD
- Secondary Treatment capacity currently limited to ~320 MGD
- During peak wet weather conditions (partial treatment mode), excess flows are discharged through partial treatment primary Outfall 001

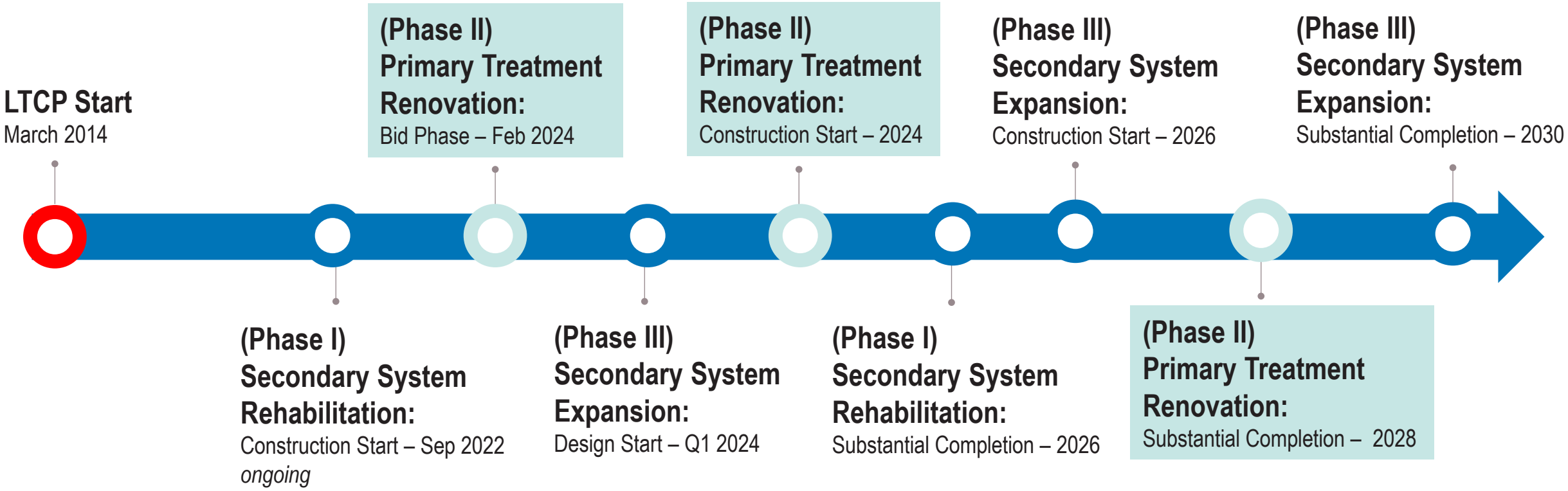


Ultimate System Buildout – Peak Wet Weather Conditions (2029)

- Primary Treatment Renovation, and Secondary System Rehabilitation and Upgrades completed
- Primary Treatment Capacity maximum throughput of 160 MGD; Secondary Treatment Capacity increased to 400 MGD



Bird Island WWTF
NFA Capital Projects Timeline



PRIMARY SYSTEM REHABILITATION AND UPGRADES PROJECT OVERVIEW

1 Primary Sedimentation Tanks

- New sludge and scum collection equipment
- Improved efficiency for sludge settling and removal
- Concrete repair and coating for corrosion protection
- Safety improvements with new handrail and toeboards

2 Sludge Pumping Station

- New pumps, piping, and valves
- New HVAC equipment to meet current ventilation codes and standards
- New electrical and control equipment for improved automation and operations flexibility
- Concrete and masonry repair and improvements while maintaining original building design
- New personnel spaces and lighting

3 Odor Control

- New effluent trough covers for the Primary Sedimentation Tanks
- Odor capture at various chambers
- New FRP piping to convey odorous air to odor control units for treatment prior to being released into the atmosphere

4 High-Rate Disinfection System

- New Chlorine Contact Tank provides 5 minutes of contact time at 160 MGD
- High-Rate Disinfection Building includes chemical storage and feed equipment
- Five new 40 MGD submersible pumps to convey disinfected Primary Effluent through Outfall 001 to the Niagara River

5 Bypass Structure Gates

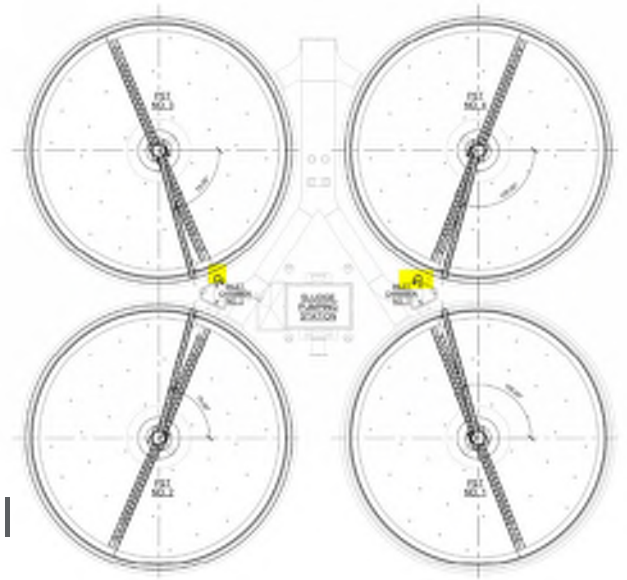
- Gate 17 installed with new actuator
- New gates and actuators to automate wet weather sequences and provide operational flexibility for Authority staff

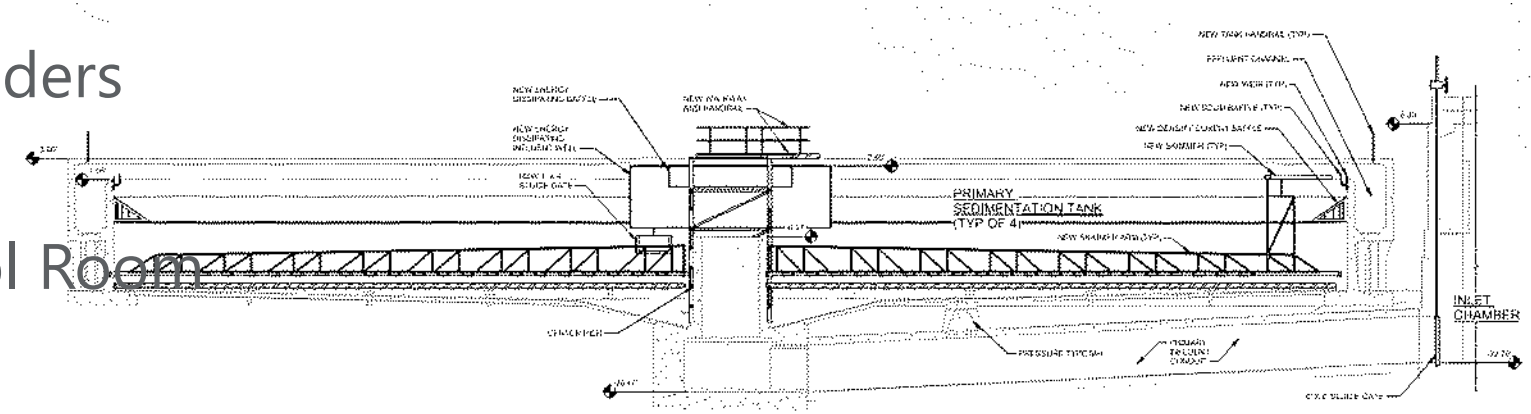
6 Outfall 001 Repair

- Restoration of multi-use riverwalk/trail
- Installation of landscaping along public-facing utility bike/pedestrian path along Niagara River
- Repairs to Outfall 001 overflow structure, and connection of HRD pump station pipe to the outfall structure

Upgrades to Primary Sedimentation Tanks and Sludge Pumping Station

- New Clarifying Equipment
  - New Sludge and Scum Collection Equipment
  - Density Current Baffles
  - Energy Dissipating Inlets
  - Replace GW relief valves
  - New Scum Trough, Beach
  - Effluent Weir Covers – Odor Control
- Structural Repairs
- New Sludge Pumps w/ Grinders
- Location of New MCC
- Renovated Electrical Control Room

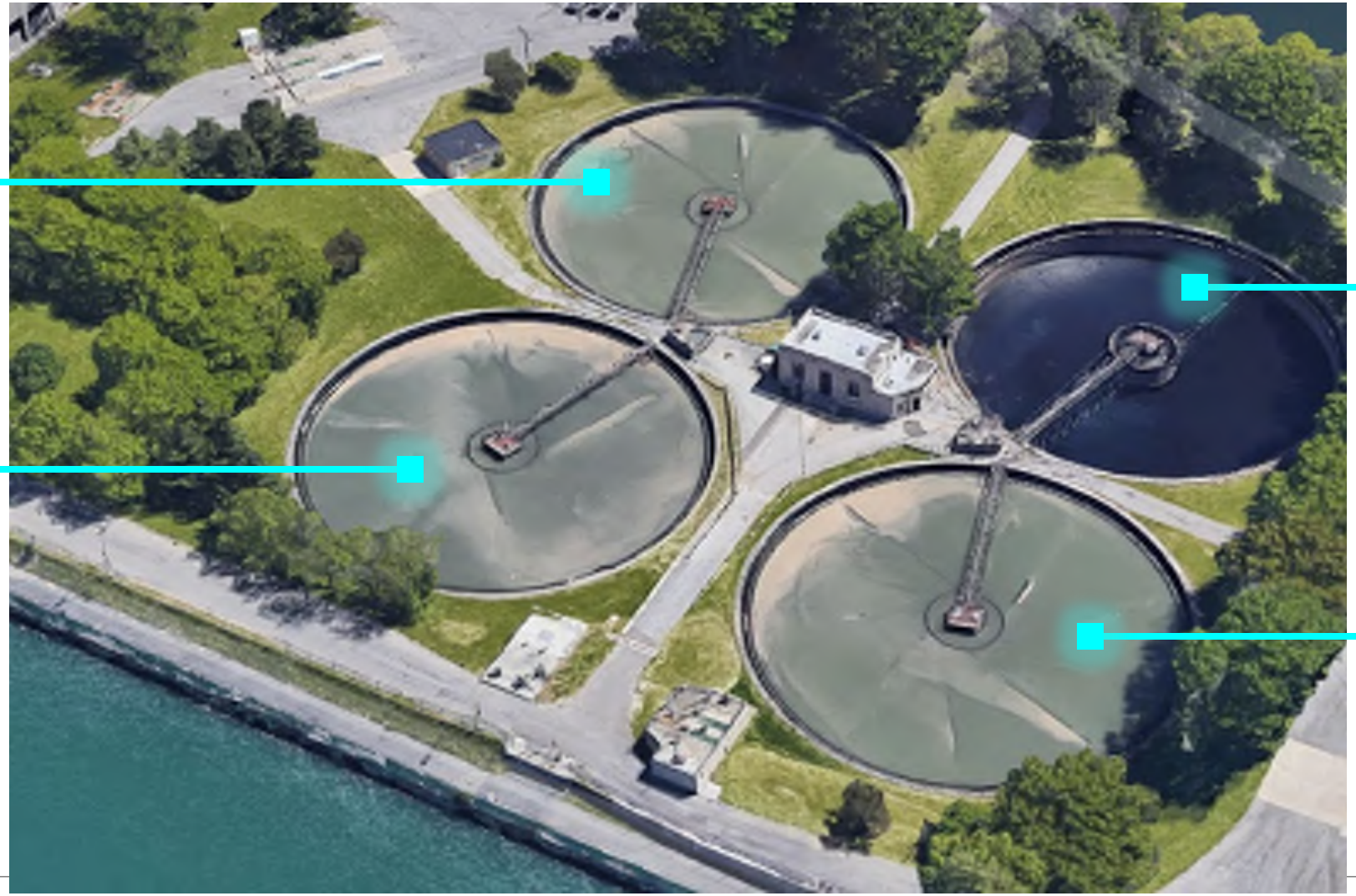




Coordination of Tank Inspections

- Occurred June – August 2021
  - Structural and Mechanical Inspection by Design Team
  - Health and Safety Plan
- Only One Tank Shutdown at a Time
  - Plan Around Wet Weather Events
  - Groundwater and Tank Cracking
  - Bypass Pumping to Maintain Dry Tanks
- Coordination with BSA Capital Projects, Maintenance, and Operations Teams for Tank Shutdown, Dewatering, Cleaning, and Safe Entry for Design Team Inspections

Renovation of Primary Sedimentation Tanks



Tank No.1 Dewatering & Inspection: July 2021

Tank No. 4 Dewatering & Inspection: August 2021

Tank No. 2 Dewatering & Inspection: June 2021

Tank No. 3 Dewatering & Inspection: June 2021

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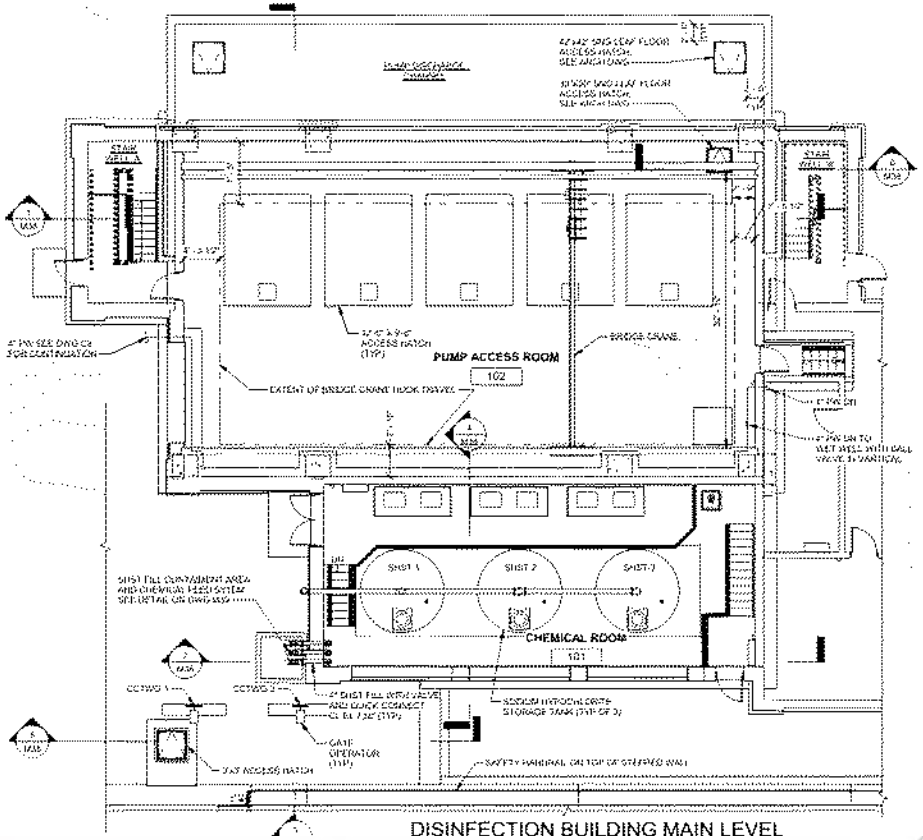

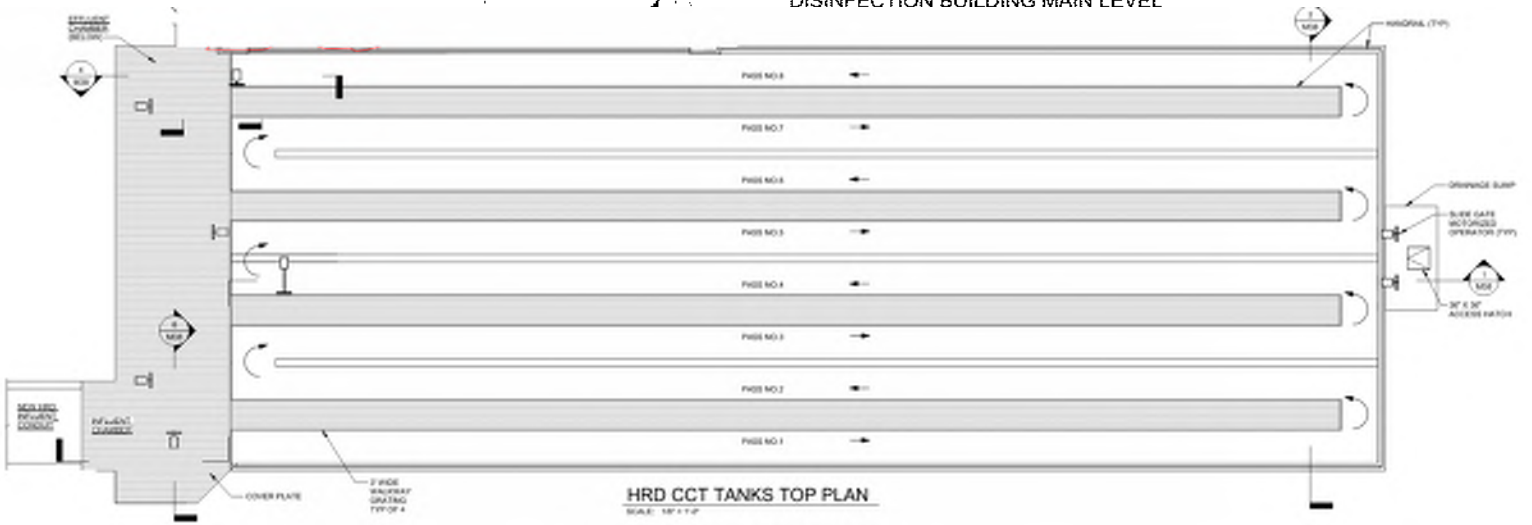

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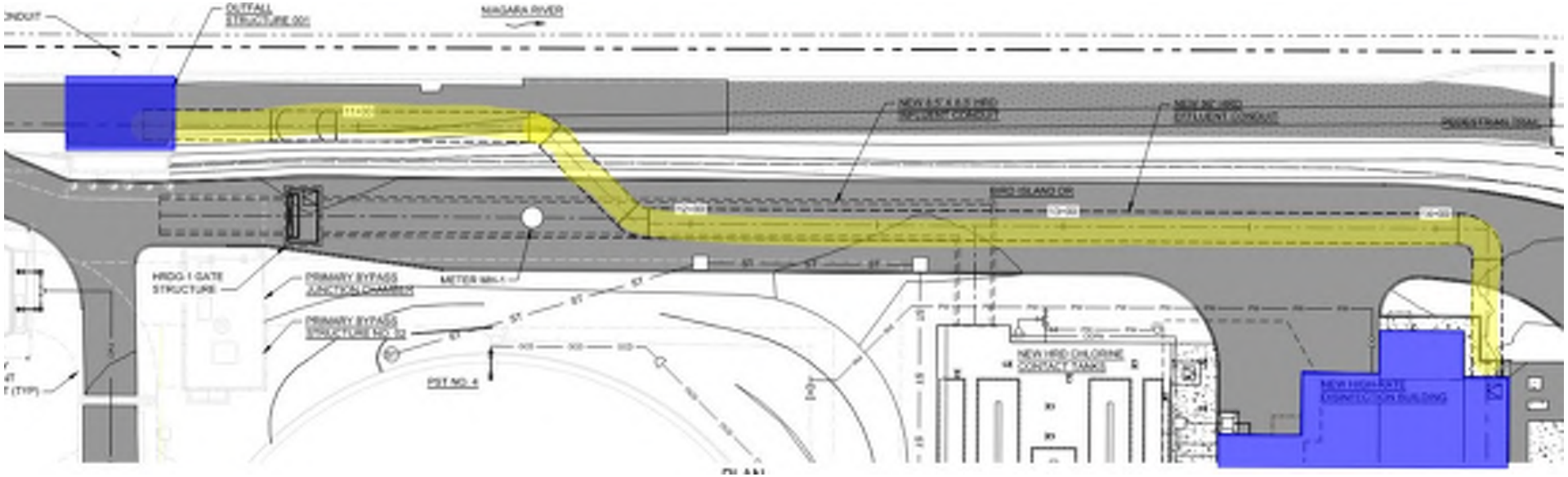
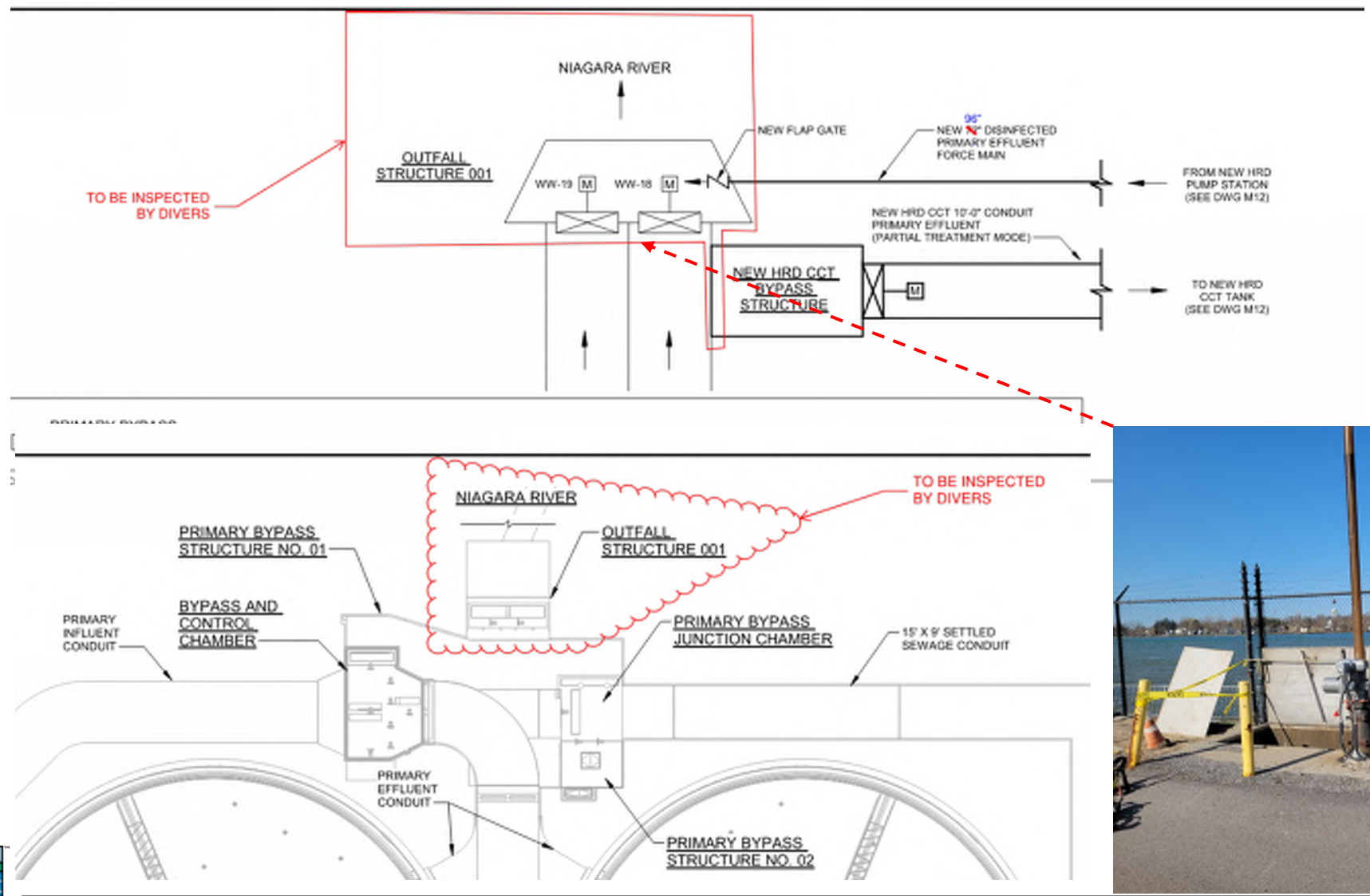


Outfall 001 Access



Outfall Inspection Timeline

November 2021: Draft Inspection Work Plan developed, and preliminary site visit held with Engineer, diving supervisor, BSA Capital/Ops/Site Safety teams

December 2021: Based on discussions and feedback with BSA staff, additional safety coordination details provided (LOTO, plant shutdown)

Jan-Apr 2022: NYSDEC informed by of upcoming temporary plant shutdown

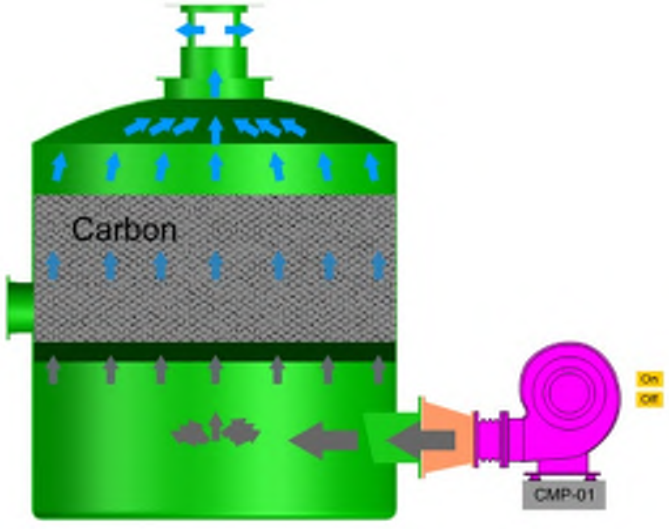
April 28, 2022: diving inspection occurs over a 4-hour period. BSA updates DEC on the completed inspection.

Odor Control Sampling: Bypass and Control Chamber, PST Effluent Channel, and Inlet Chambers

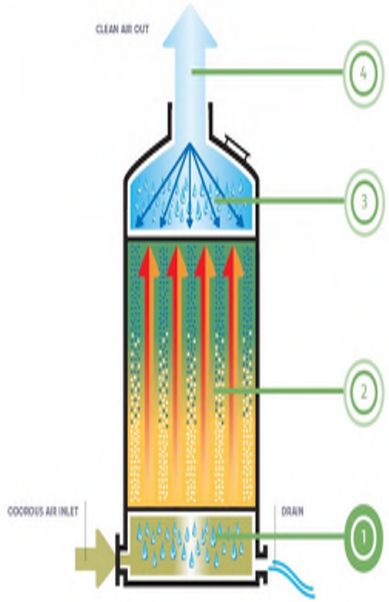
H2S Concentrations Based on AcruLog Results (July-August 2021)

	Average (ppm)	Maximum (ppm)
Bypass and Control Chamber	4.8	51
South Primary Inlet Chamber	5.7	116
Primary Sedimentation Tank No. 3	14	76

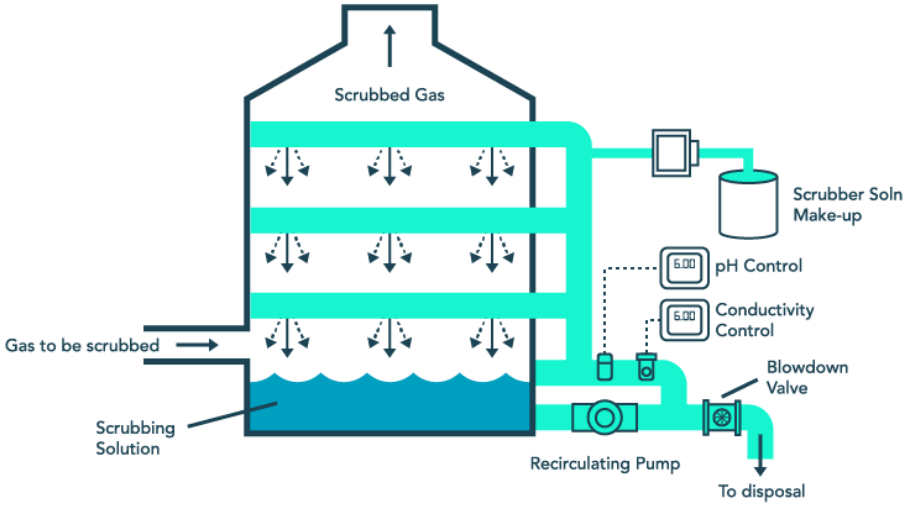
Odor Control Technologies Considered



Carbon Column



Biotrickling Filter



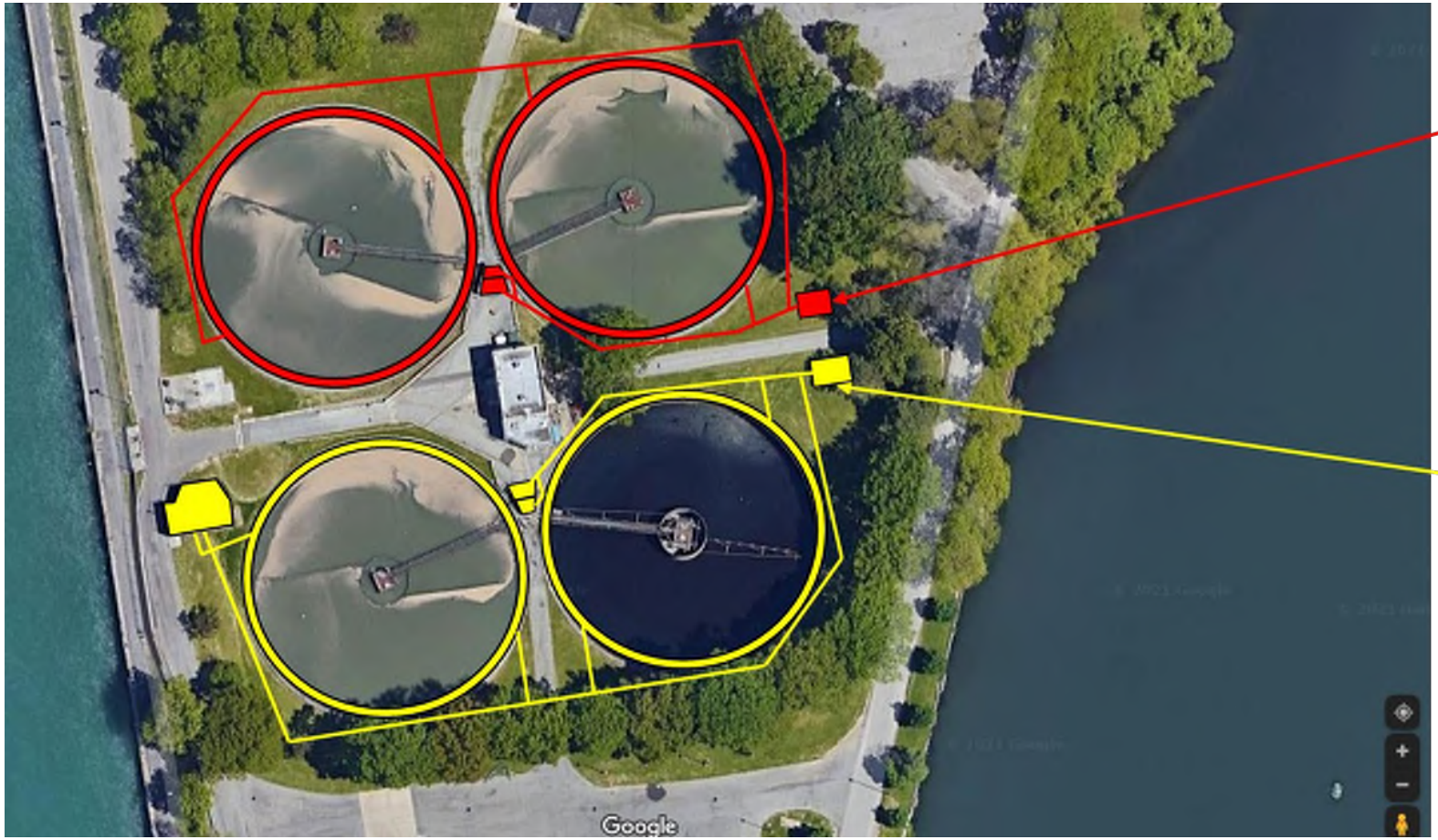
Chemical Scrubber

http://amerair-intl.com/carbon-adsorption/
https://www.bioairsolutions.com/ecofilter-biotrickling-filter/
https://sensorex.com/wet-scrubbers/

Odor Control Approach

- Hybrid system (carbon column + biotrickling filter). Benefits:
  - Reduced frequency of carbon media replacement
  - Reduced carbon media replacement costs
  - More effective for treating large range of H2S concentrations that BSA experiences
- Pulling air from Bypass and Control Chamber, PSTs, and Inlet Chambers
- At Bypass and Control Chamber:
  - Two draw-offs on south side of chamber
- At PSTs
  - Launders covered along the perimeters
  - Two draw-off points per PST approximately 180° apart from each other
- At Inlet Chambers
  - Draw-offs from scum well and influent chamber

Odor Control System Layout



Odor Control System to Treat North Inlet Chamber and Effluent Channels of Primary Sedimentation Tanks 1 and 4

Odor Control System to Treat Bypass and Control Chamber, South Inlet Chamber, and Effluent Channels of Primary Sedimentation Tanks 2 and 3

Community Outreach

INVITATION TO BID – FEBRUARY 12, 2024

The work is organized as two contracts, Contract A and Contract B. There is one set of bid documents for both contracts.

The Bidder may bid on:

(1) Contract A,
(2) Contract B, and/or
(3) Contract C (Combined Bid for Contracts A+B).

The Bidder understands that the Buffalo Sewer Authority can select the Combined Bid, with the expectation that the combined bid cost is less than that Bidder's individual bids for Contract A plus Contract B.

BUFFALO SEWER AUTHORITY

INVITATION TO BID – FEBRUARY 12, 2024

Copies of the Contract Documents may be viewed and ordered through *avalonbuff-planroom.com* in the "Public Jobs" section.

Visit *buffalosewer.org/category/vendor-opportunities/vendor-opportunities-vendor-opportunities* to view the full bid advertisement.

BUFFALO SEWER AUTHORITY

INVITATION TO BID – FEBRUARY 12, 2024

Sealed bids for the **Primary Renovation Project at Bird Island WWTF** will be received and publicly opened and read aloud by the Buffalo Sewer Authority:

Thursday, March 28, 2024 (11:00 am ET)
TYLin | Greeley and Hansen Water Solutions
77 Broadway, Suite 208
Buffalo, NY 14203

BUFFALO SEWER AUTHORITY

INVITATION TO BID – FEBRUARY 12, 2024

PRE-BID MEETING DATES:

The following three mandatory Pre-Bid meetings will occur:

- Meeting #1
  Virtual Informational Meeting:
  February 20, 2024 @ 11:00 am ET
- Meeting #2
  Virtual NYSEFC Funding Compliance Meeting: *February 21, 2024 @ 2:00 pm ET*
- Meeting #3
  Site walk-through of the project site:
  February 22-23, 2024 (by appointment)

BUFFALO SEWER AUTHORITY

NYWEA
LEADING THE WAY IN WATER QUALITY MANAGEMENT

Community Outreach

Can I use the Shoreline Trail during construction?

- The project will require a temporary closure (up to 12 months) of a portion of the Shoreline Trail that runs along the west side of the Bird Island Wastewater Treatment Facility. Extents of the closure are shown below in red.
- A Work Zone Traffic Control Plan has been developed to detour pedestrians and cyclists along Niagara Street between Freedom Park (formerly Broderick Park) and Unity Island Park. Neither park will be impacted by the project.

What else can I expect during construction?

- Construction is scheduled to start in late 2024 / early 2025 and last until 2028.
- Disturbances such as noise and dust are possible while heavy machinery is in operation.
- Sewage odors may also be present during construction. These temporary disturbances will be minimized as much as possible.

Where can I find more information?

If you would like further information, please call or email Timothy Blake, Treatment Plant Capital Improvements Department, at the Buffalo Sewer Authority at (716) 851-4664 or tblake@buffalosewer.org.

Our website has information about the Long Term Control Plan and current construction projects: **www.buffalosewer.org**

Buffalo Sewer Authority

1038 City Hall
65 Niagara Square
Buffalo, NY14202

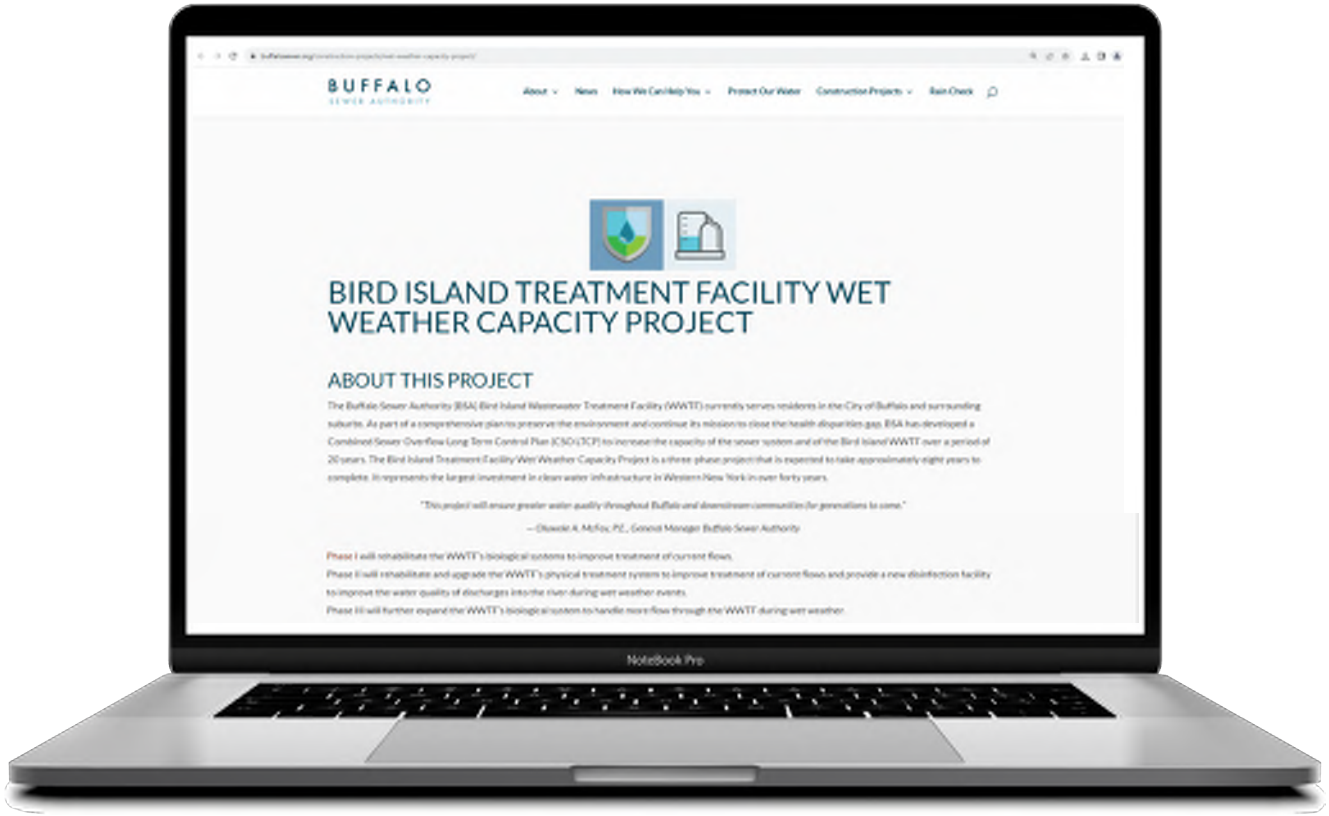
Phone: 716-851-4664

Primary Treatment Renovation at Bird Island Wastewater Treatment Facility

Project Information

BUFFALO
SEWER AUTHORITY

Buffalo Sewer Authority Website



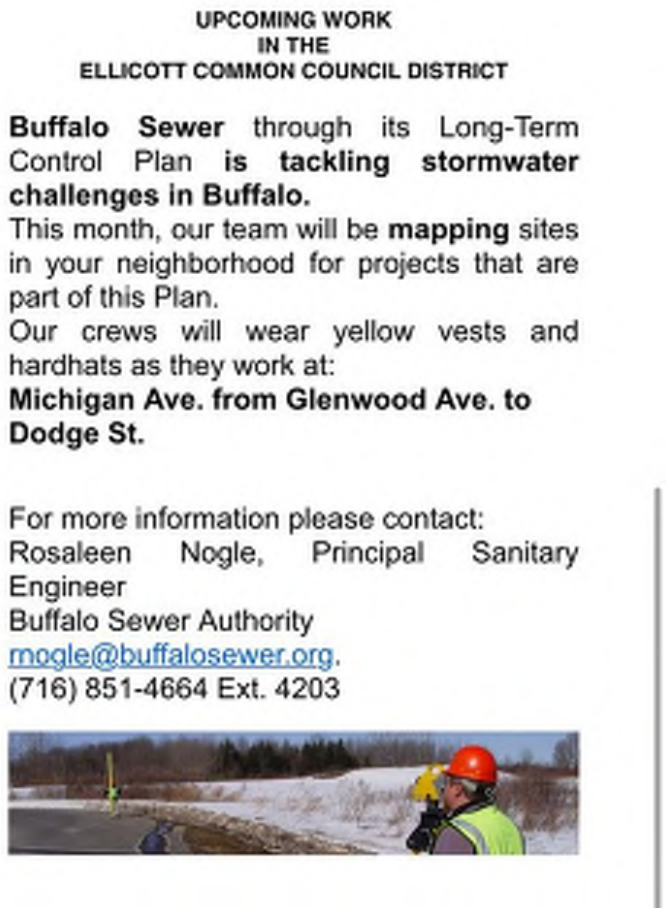
buffalosewer.org

Your BEST source of information!

- Consultant, Contractor, and Supplier Opportunities
- Construction Updates
- FAQs
- Board Meeting Minutes
- Public Participation Plans
- Videos

Community Outreach

- Minimal project or program specific public meetings
- Focus on meeting people where they are at:
  - Minimize demands on community's time
  - Present at existing community meetings
  - Table and flier at community meetings
  - Flier ahead of any visible activities
- Website usage
- Social Media
  - LinkedIn
  - Facebook
  - YouTube



UPCOMING WORK
IN THE
ELLICOTT COMMON COUNCIL DISTRICT

Buffalo Sewer through its Long-Term Control Plan **is tackling stormwater challenges in Buffalo.**
This month, our team will be **mapping** sites in your neighborhood for projects that are part of this Plan.
Our crews will wear yellow vests and hardhats as they work at:
Michigan Ave. from Glenwood Ave. to Dodge St.

For more information please contact:
Rosaleen Nogle, Principal Sanitary Engineer
Buffalo Sewer Authority
mogle@buffalosewer.org.
(716) 851-4664 Ext. 4203

Areas for Improvement

Follow up on concerns

Comprehensive planning of initiatives

Professionally designed outreach materials

Webpage design

TYLin | Greeley and Hansen Water Solutions

BUFFALO SEWER AUTHORITY

THANK YOU

Questions?

Rosaleen Nogle, PE, BCEE
Principal Sanitary Engineer
rnogle@buffalosewer.org

Walt Walker, PE, ENV SP
VP, Equity Practice Leader
Primary Treatment Design Project Manager
walt.walker@greeley-hansen.com

NYWEA™
LEADING THE WAY IN WATER QUALITY MANAGEMENT

Buffalo Sewer Authority

Transforming Buffalo's Aging Infrastructure Into A Smart Sewer System

March 22, 2024

Agenda

1. Speaker Introductions
2. Opening Comments
3. Buffalo Sewer Authority Background & RTC Program to Date
4. Advent of Xylem Vue powered by GoAigua
5. Next Steps for Buffalo Sewer Authority
6. Q&A

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Let's Solve Water

1

Speaker Introductions

Richard Loeffler, Xylem

Speaker Introductions

OJ McFoy, P.E.
General Manager
Buffalo Sewer Authority

Rosaleen Nogle, P.E.
Principal Sanitary Engineer
Buffalo Sewer Authority

Richard Loeffler
Client Solutions Manager
Xylem

Kristina Macro, P.E.
Project Manager
Xylem

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2

Opening Comments

OJ McFoy, Buffalo Sewer Authority

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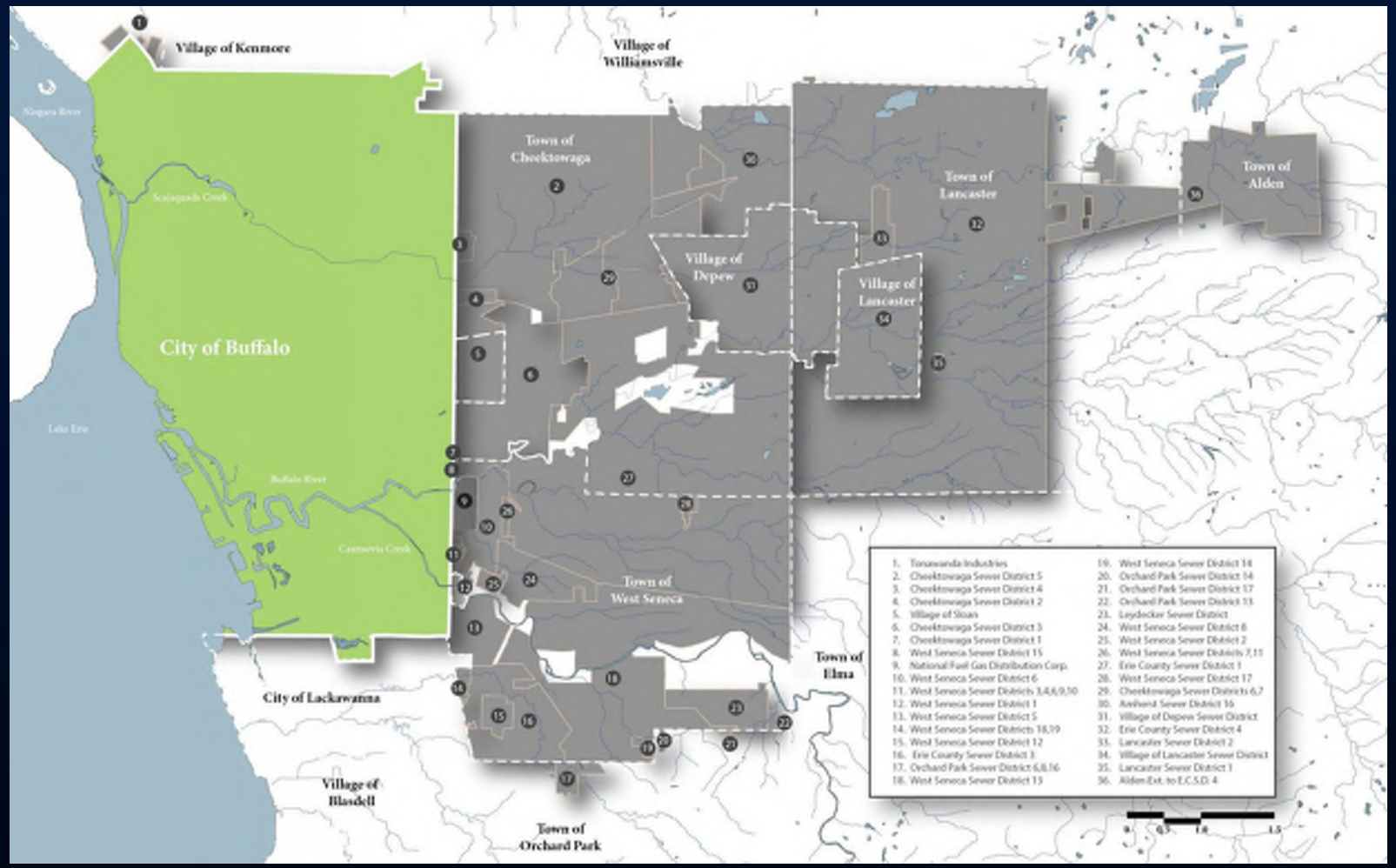
3

Buffalo Sewer Authority Background & RTC Program To Date

Rosaleen Nogle, Buffalo Sewer Authority

Buffalo Sewer Authority Overview



- Established in 1938
- Services City of Buffalo and 11 surrounding municipalities (> 550,000 people)
- 110 sq. mi of coverage, 850 mi of sewer pipe
- Annual operating budget of $54.9 million
- Undertakes over $20 million in capital projects annually
- Long Term Control Plan (LTCP) approved in 2014 to be completed in 20 years, 97% of wet weather flows to be captured upon completion

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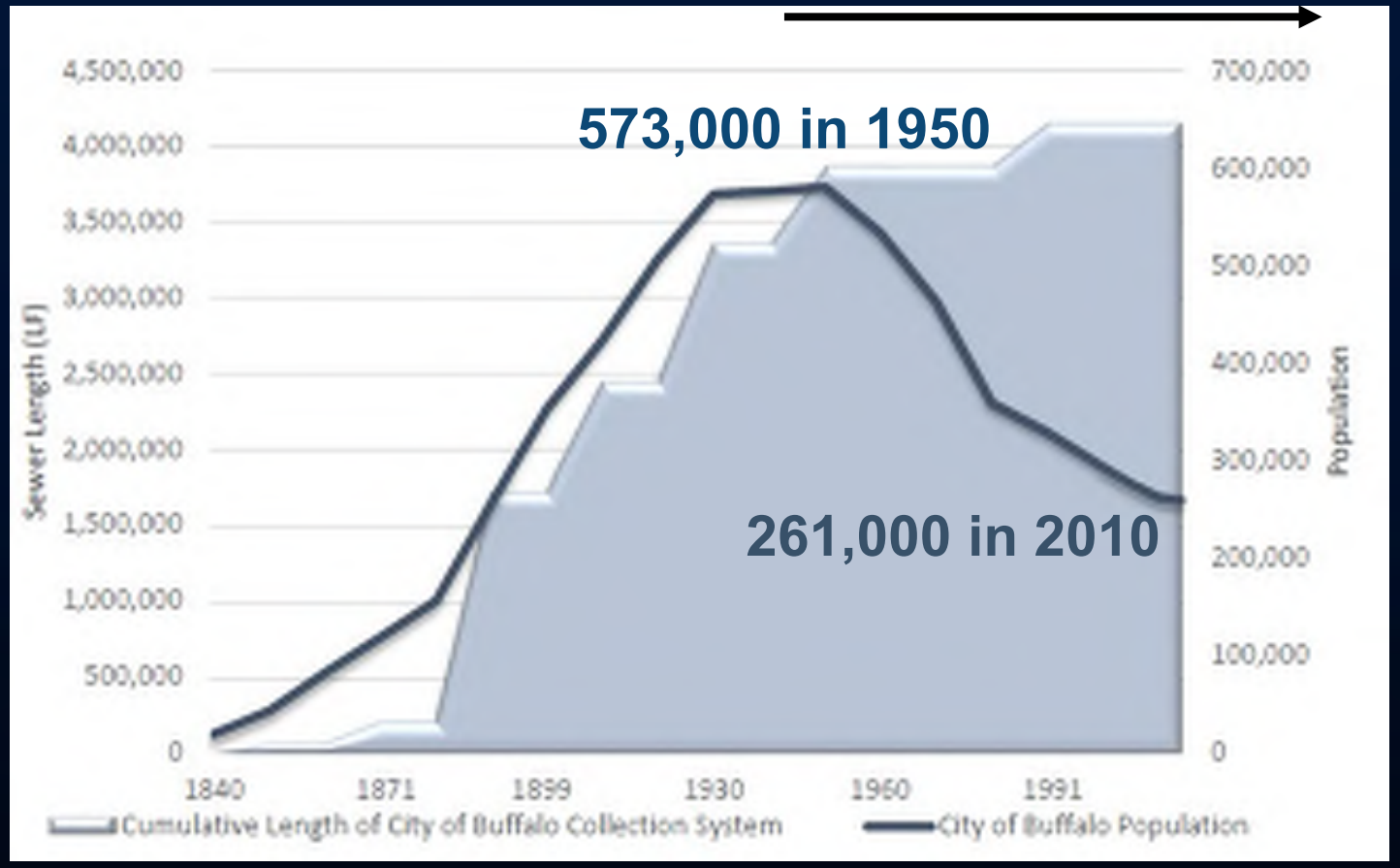
Why Real Time Control (RTC)/In-line Storage (ILS)?

55% Population decrease
Industry decrease



8 major trunklines were more than half empty during the peaks of the largest expected storm events in a typical year

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Buffalo Sewer Authority's Wet Weather Operational Optimization Program Objectives

1. To enable BSA to control every ounce of collection system storage
2. Identify new real-time control (RTC) opportunities
3. Continuous system improvement

Buffalo Sewer Authority's Wet Weather Operational Optimization Program

2010

Up to 16 RTC projects were recommended as part of BSA's LTCP.

2014

With promising model results for RTC and green infrastructure improvements, BSA was able to negotiate $145 million out of their LTCP.

2016

Lang Ave. & Bird Ave. in-line storage structures become the first operational RTC sites in BSA's system.

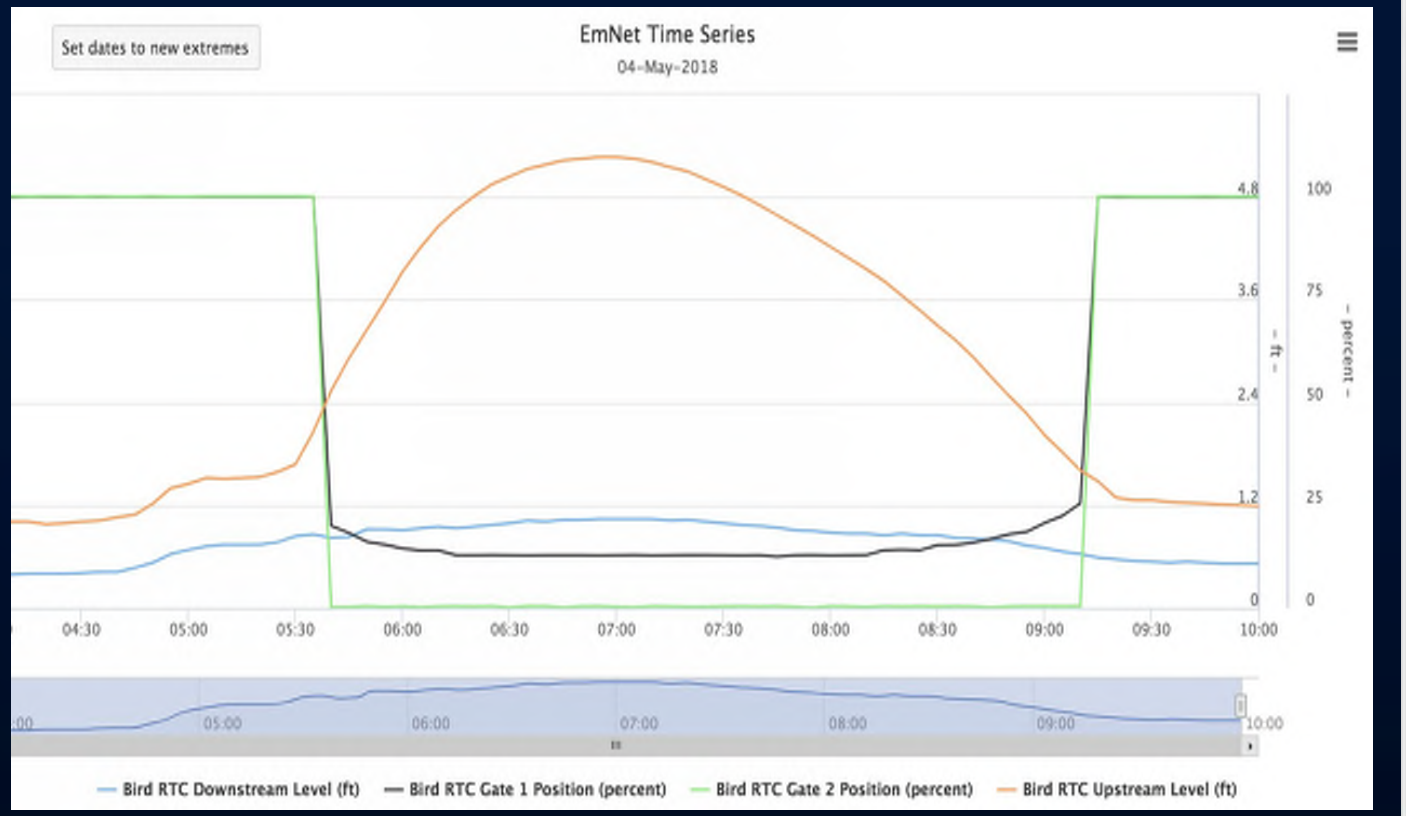
2020

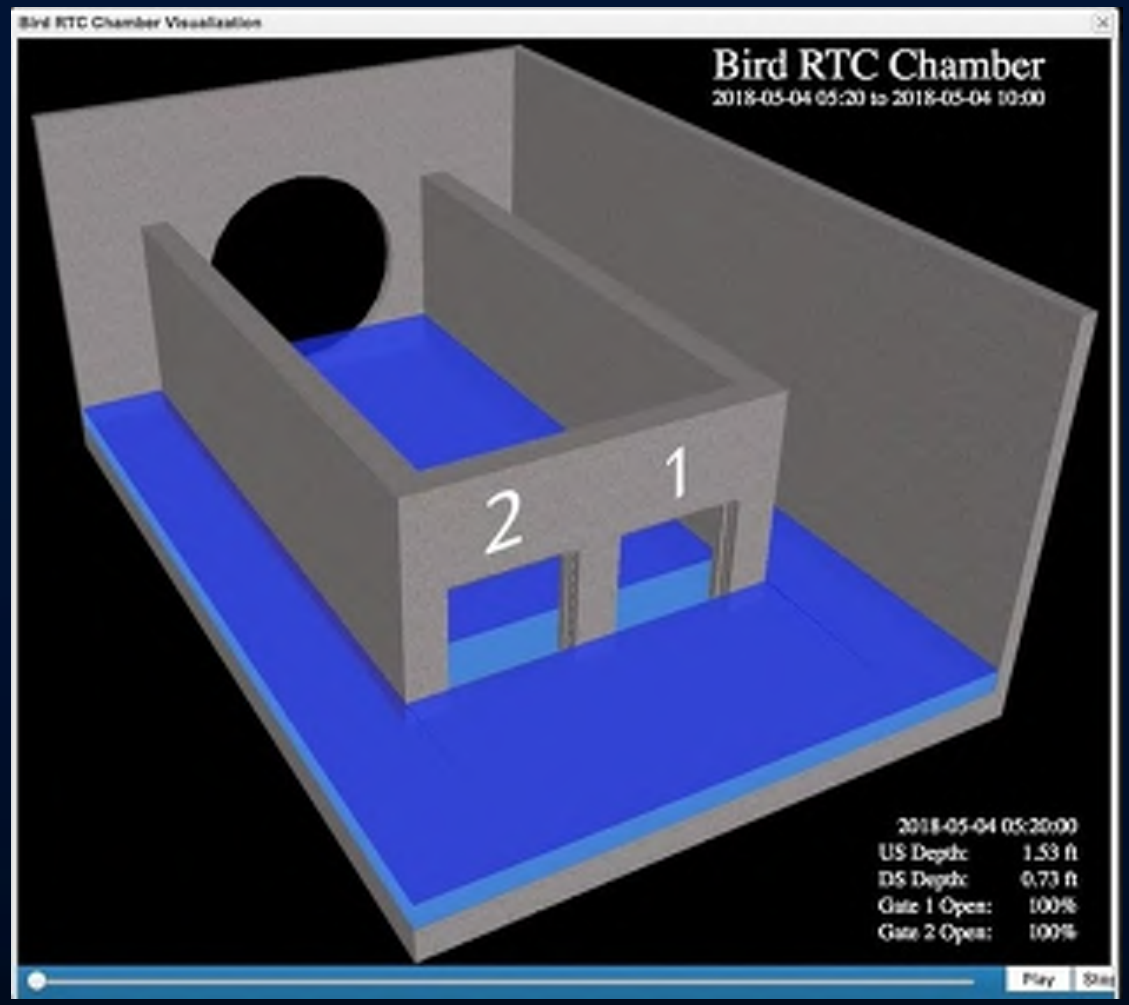
With 6 operational RTC sites, BSA prevented 108 Sewer Patrol Point (SPP) activations in 2020.

2024

BSA has built & commissioned nine RTC sites as of 2024 using an adaptive management approach.

Bird Avenue RTC





During wet weather, downstream sensors indicate when it is time to begin storing
Nearly every gallon stored would have contributed to a CSO activation
The gates take turns with each event – one closes entirely while the other modulates

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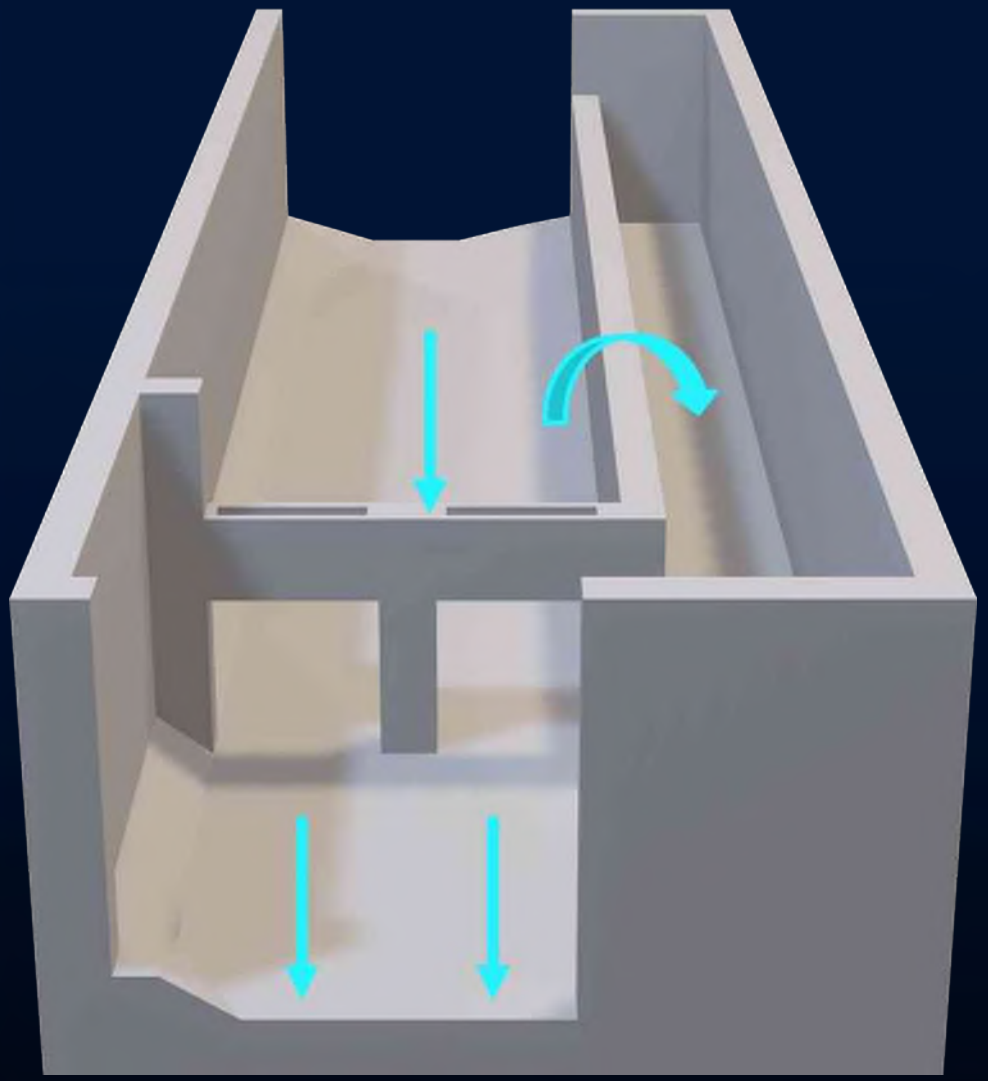
Minimizing Equipment Failure Risk



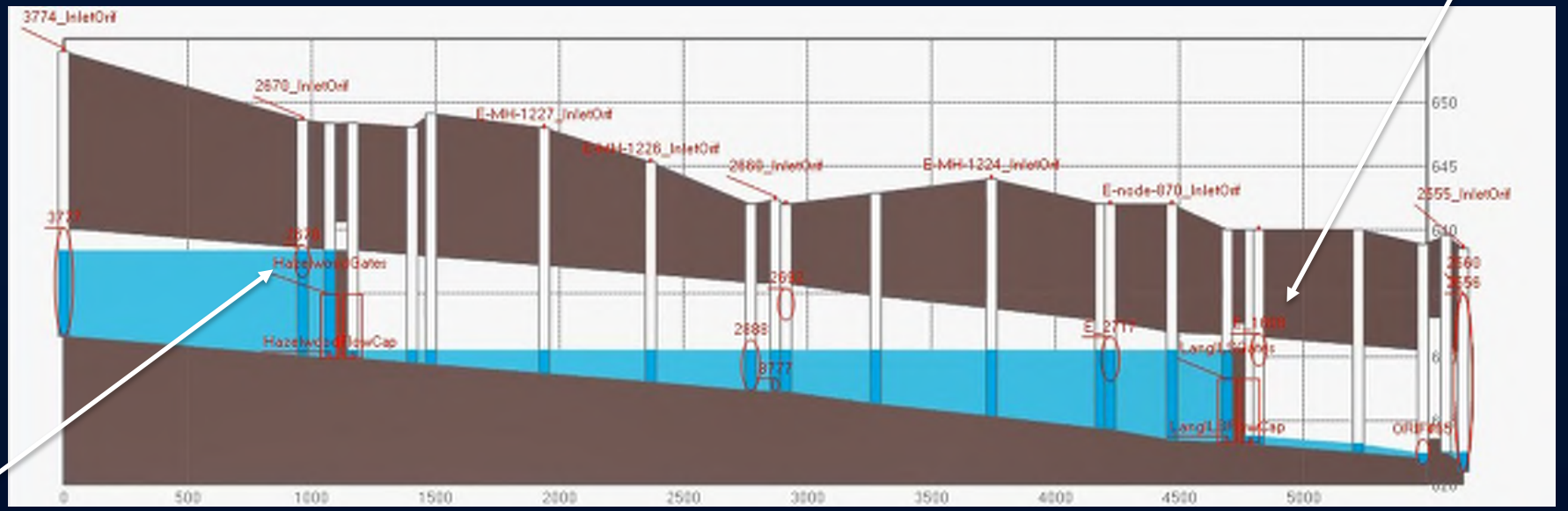
Looking upstream from downstream end of North Bailey in-line storage chamber

RTC sites are designed with redundancies and fail safes to minimize the risks associated with equipment failures

If gates fail closed	1. Emergency relief weir maintains level below surcharging risk level 2. "Gate fail to move" alert is sent
If gates fail open	1. Flow continues on the same path it would have prior to RTC implementation 2. "Gate fail to move" alert is sent
If sensor data is out of range or if there is communication loss	1. RTC PLC logic uses redundant sensor data if available 2. Automatically returns to Auto-Local mode if currently in Auto-Remote mode

Coordinated Real Time Control

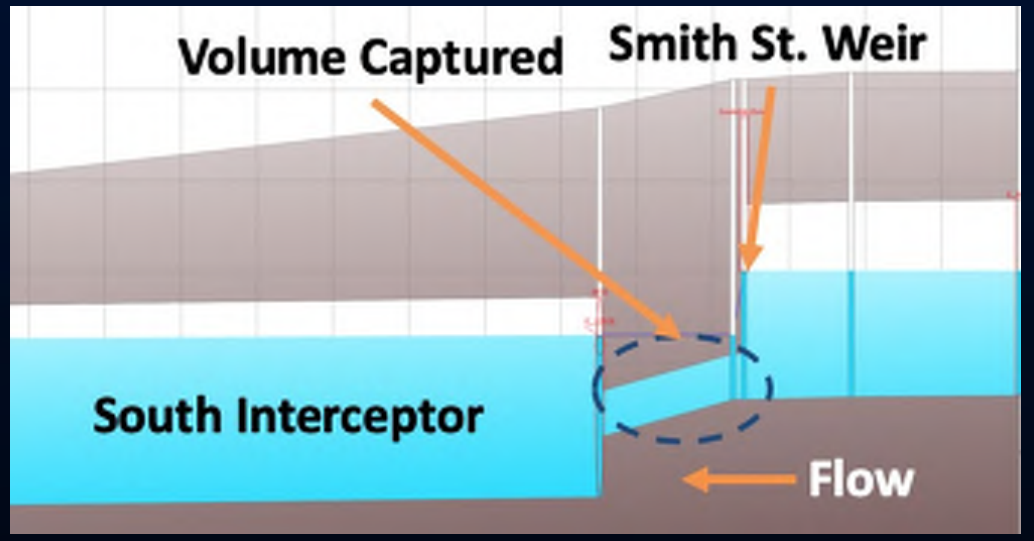
Lang Ave



Hazelwood

Real Time Control Strategies:

- Coordinated inline storage
- Pump station optimization/storage
- Recapturing overflow volume
- Dynamic underflow



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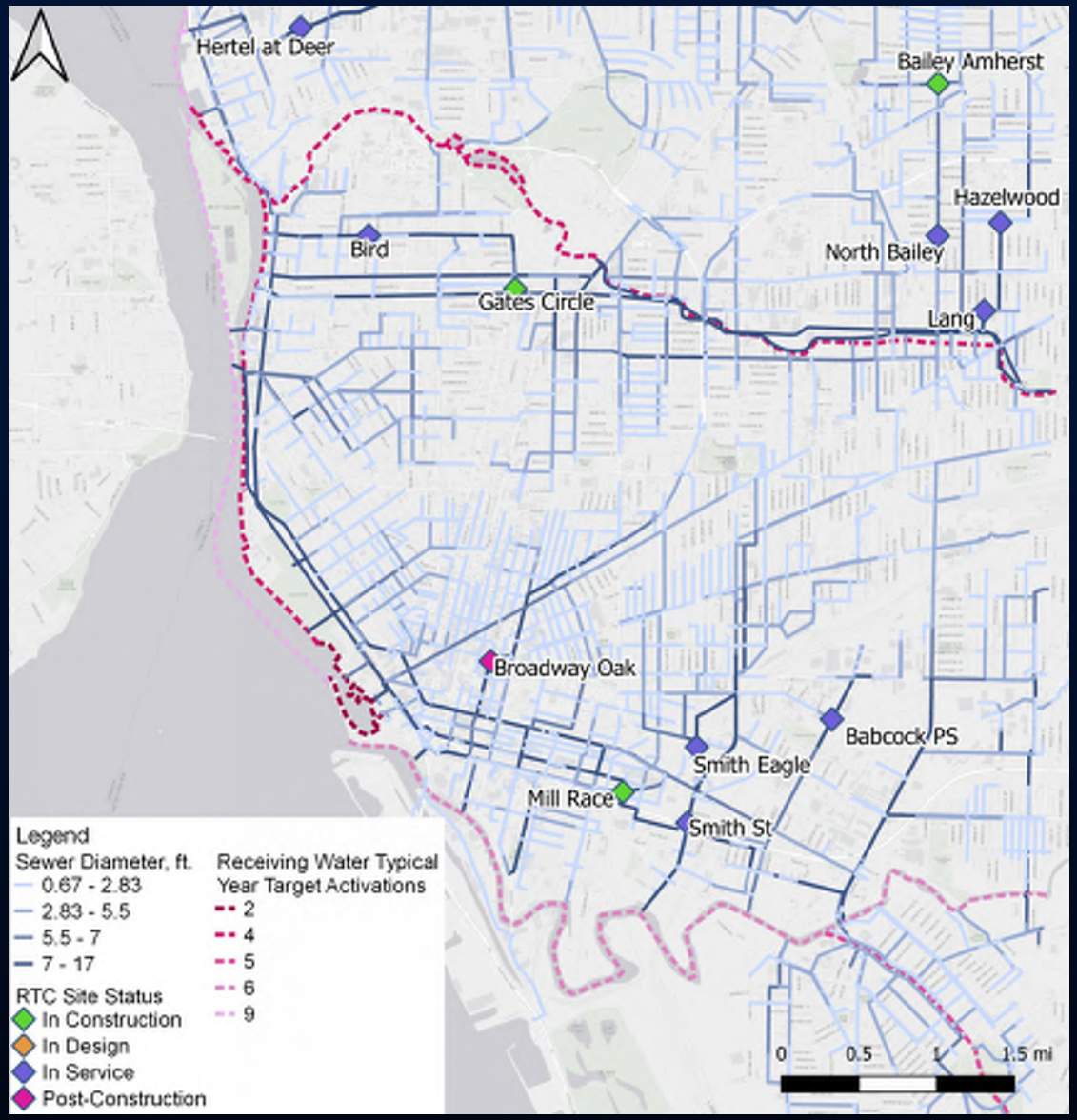
Hertel at Deer Construction

Hertel at Deer RTC Construction Fall 2019

Commissioned January 2020

Real Time Control Site Status



Fully Commissioned:

Smith St, Lang, Hazelwood, Bird, North Bailey, Hertel at Deer, Smith Eagle and Babcock Pump Station

Completed, undergoing tuning:

Broadway Oak

In Construction:

Mill Race, Bailey Amherst, Gates Circle

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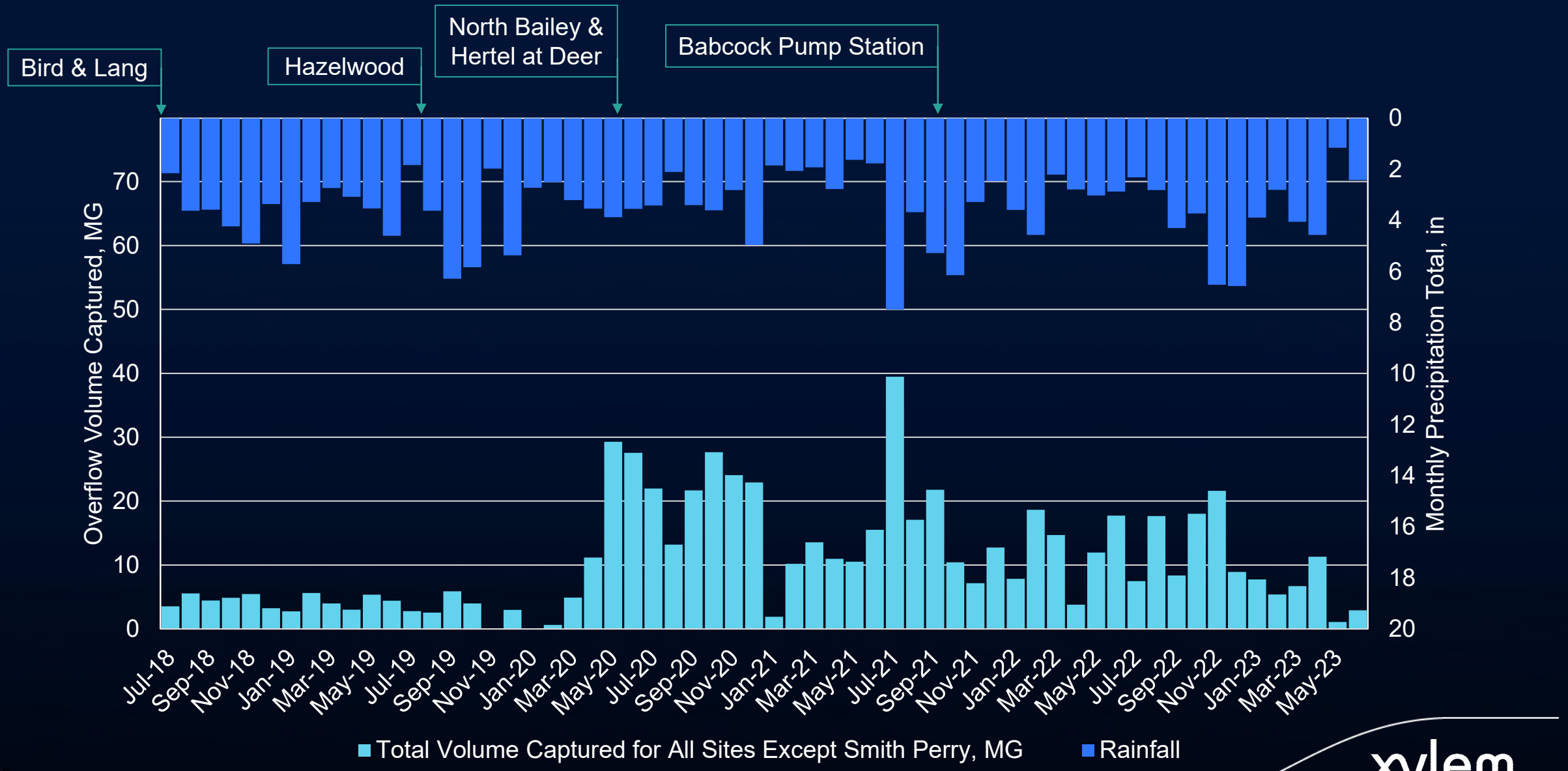
RTC Performance: Bird, Lang, Hazelwood, North Bailey, Hertel at Deer, Babcock Pump Station



16

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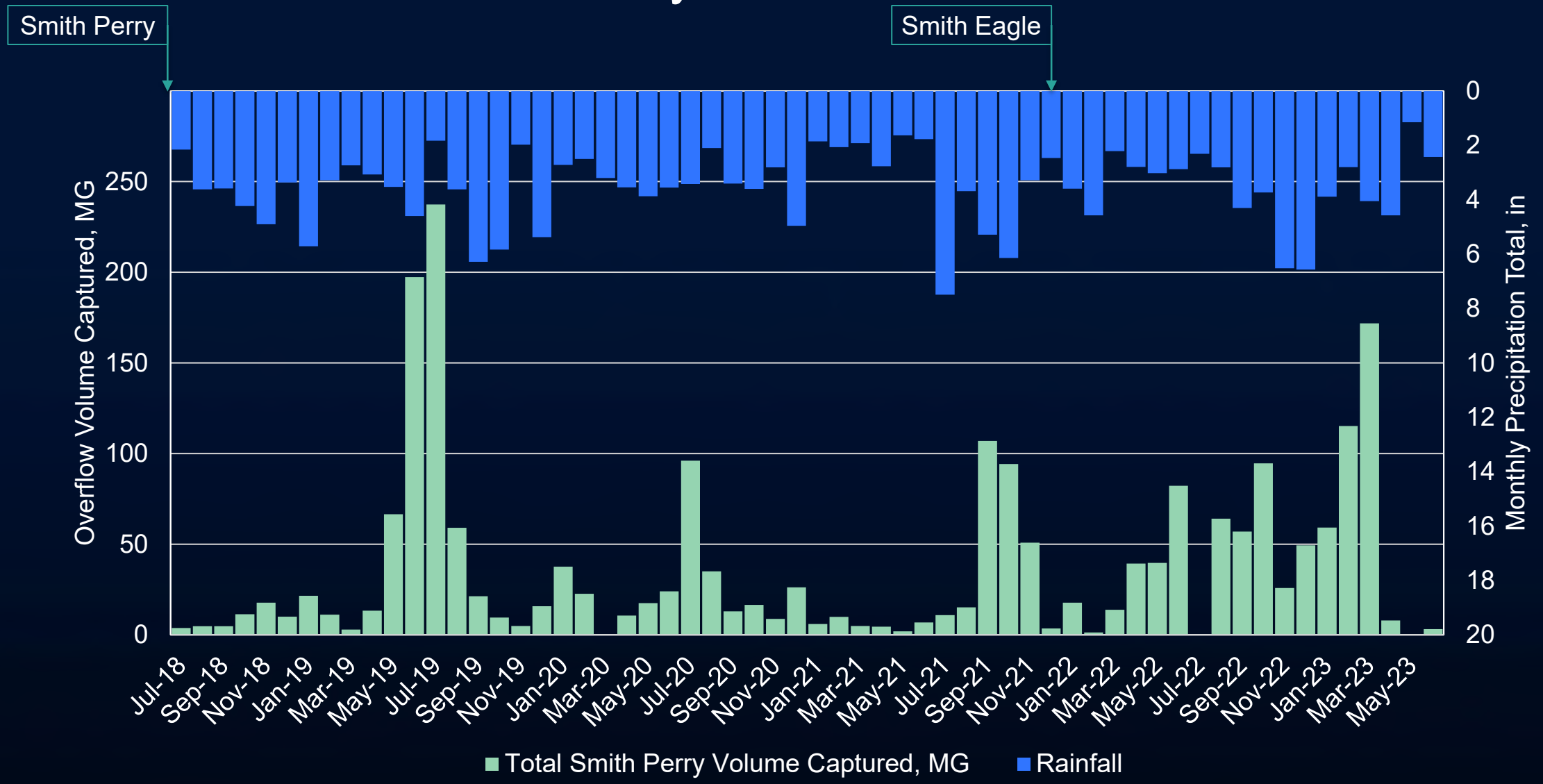
RTC Performance: Smith Perry



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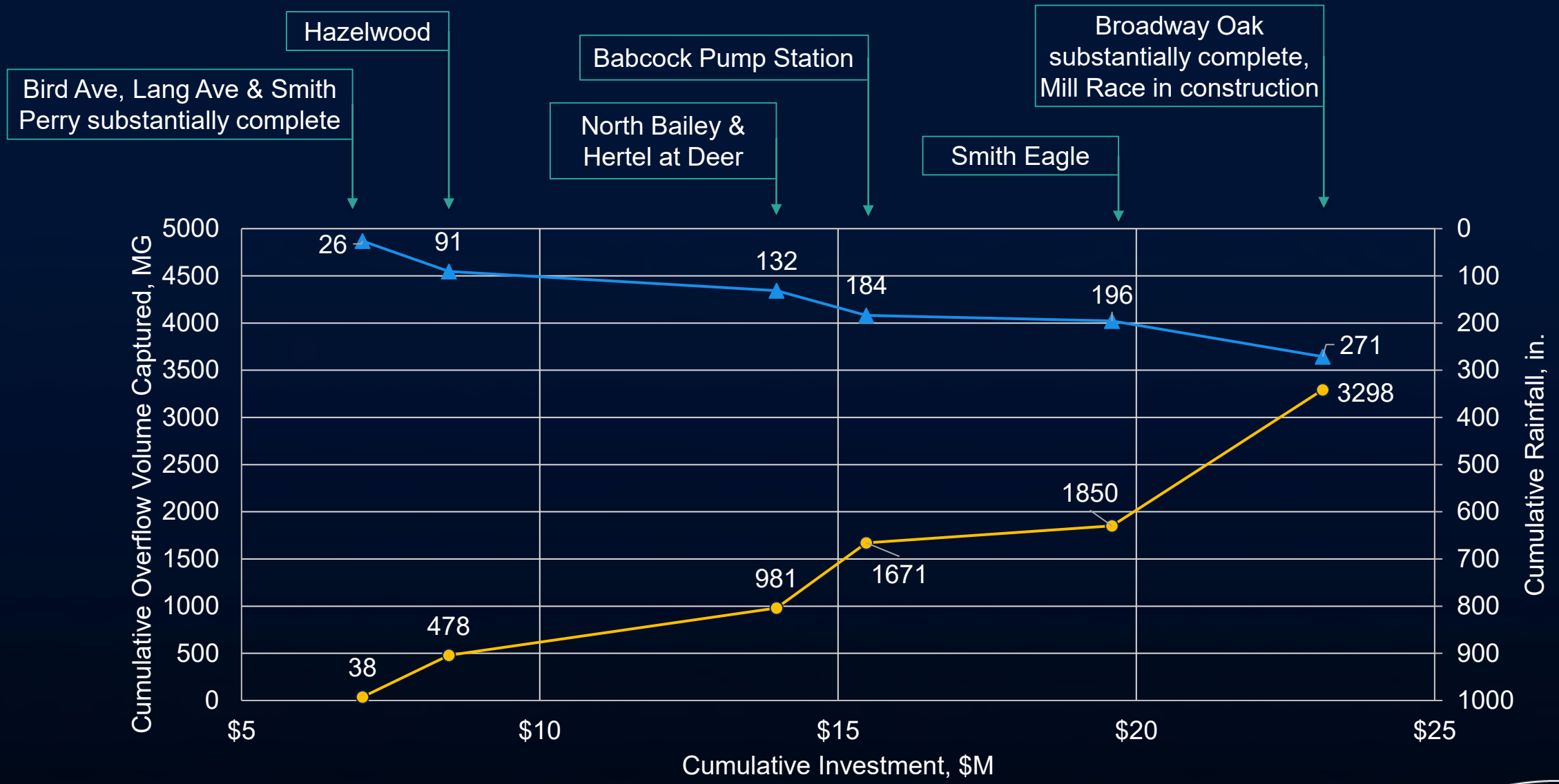
Cumulative RTC Performance



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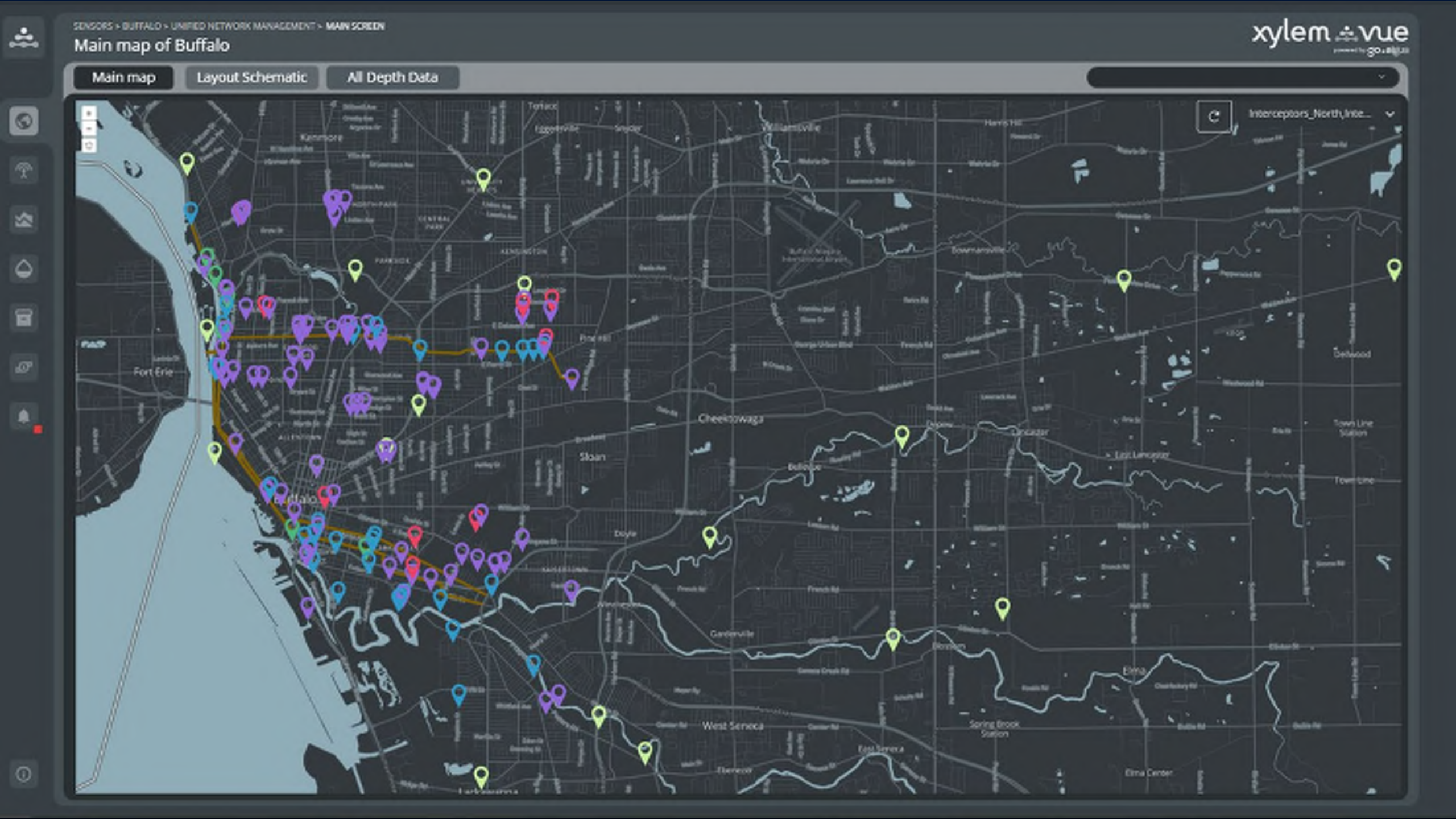
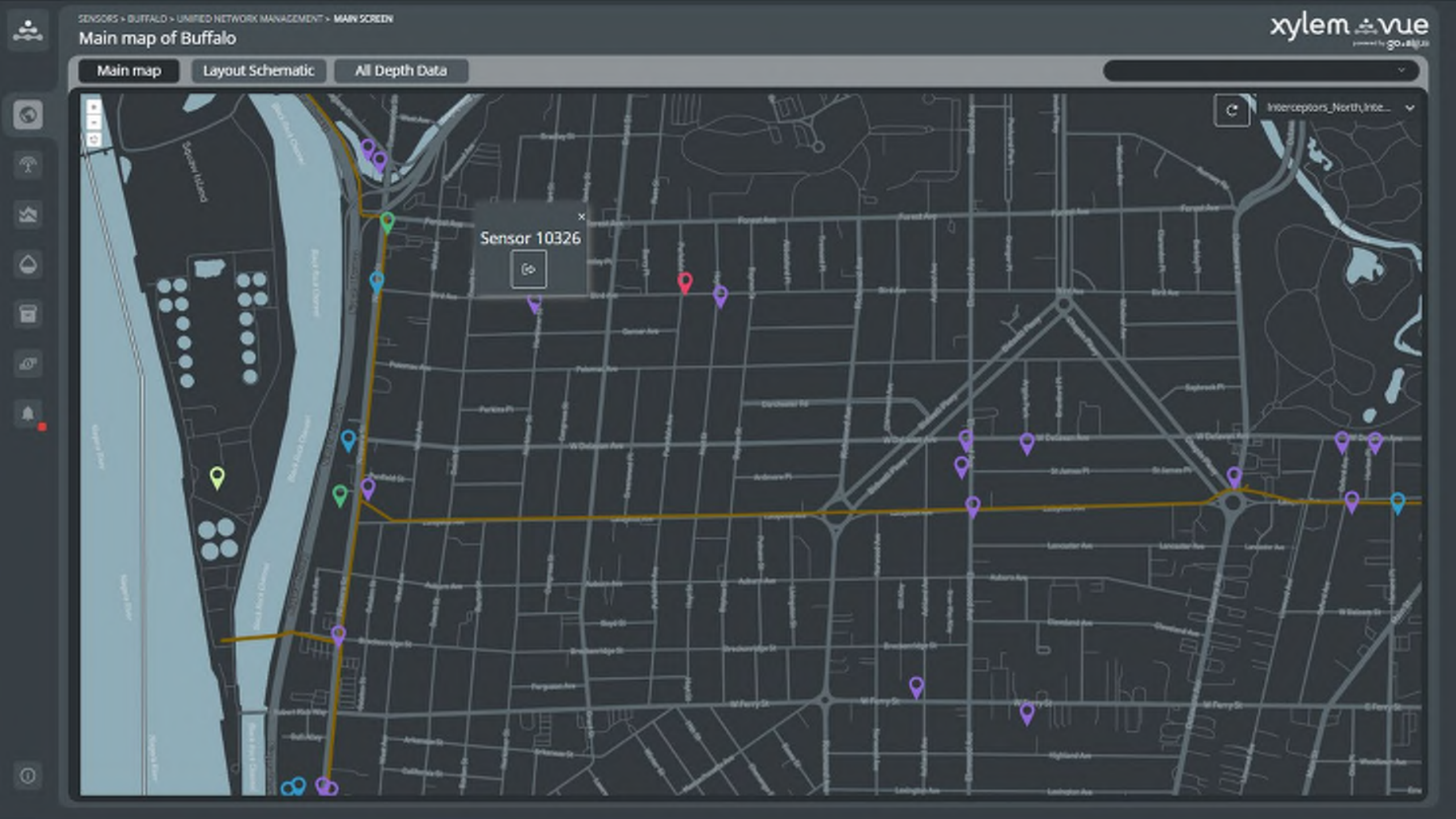
Let's Solve Water

Advent of Xylem Vue powered by GoAigua for BSA's Smart Sewer Program

4

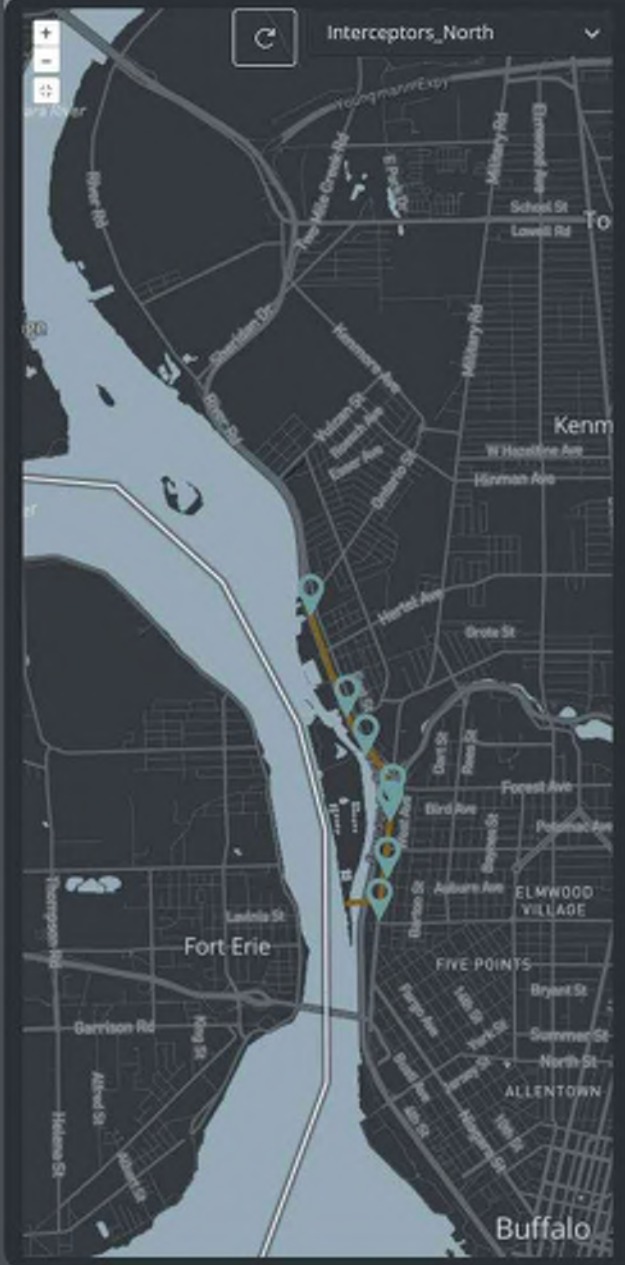
Kristina Macro, Xylem

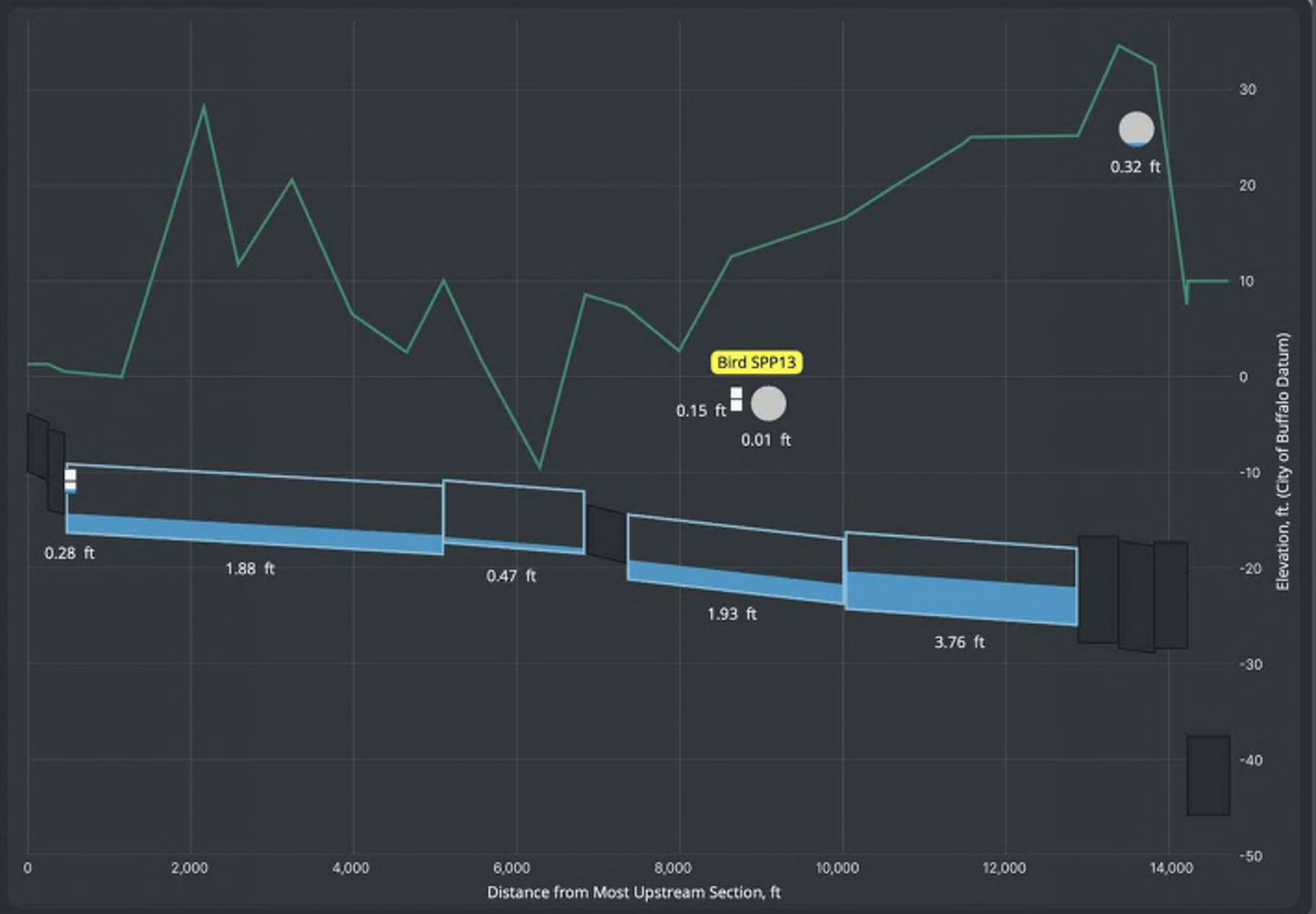

SENSORS > BUFFALO > UNIFIED NETWORK MANAGEMENT > MAIN SCREEN
Main map of Buffalo
xylem vue
Main map
Layout Schematic
All Depth Data
Interceptors_North,Inte...
Kenmore
Tonawanda
Eggertsville
Snyder
Williamsville
Amherst
Fort Erie
Buffalo
Cheektowaga
Sloan
Depew
Lancaster
East Lancaster
Bellevue
Gardenville
West Seneca
Elma
Spring Brook Station
Elma Center
Town Line Station
Town Line


SENSORS > BUFFALO > UNIFIED NETWORK MANAGEMENT > MAIN SCREEN
Main map of Buffalo
xylem vue
Main map
Layout Schematic
All Depth Data
Interceptors_North,Inte...
Sensor 10326

Interceptor profiler

NORTH INTERCEPTOR | SOUTH INTERCEPTOR | SWAN TRUNK

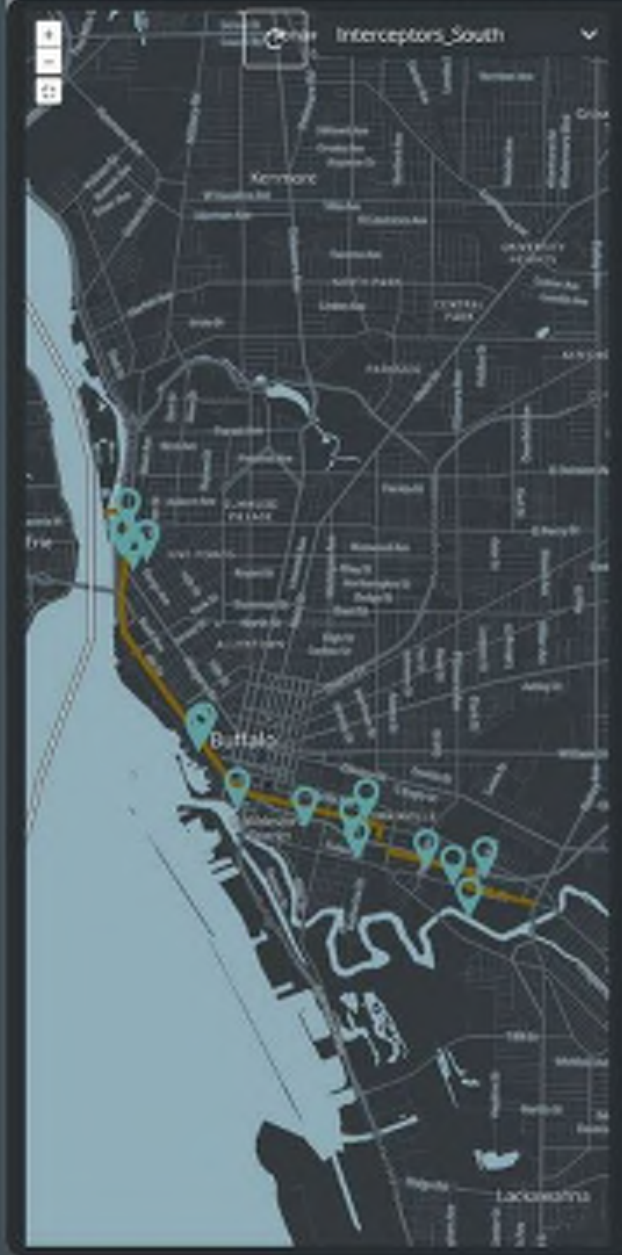


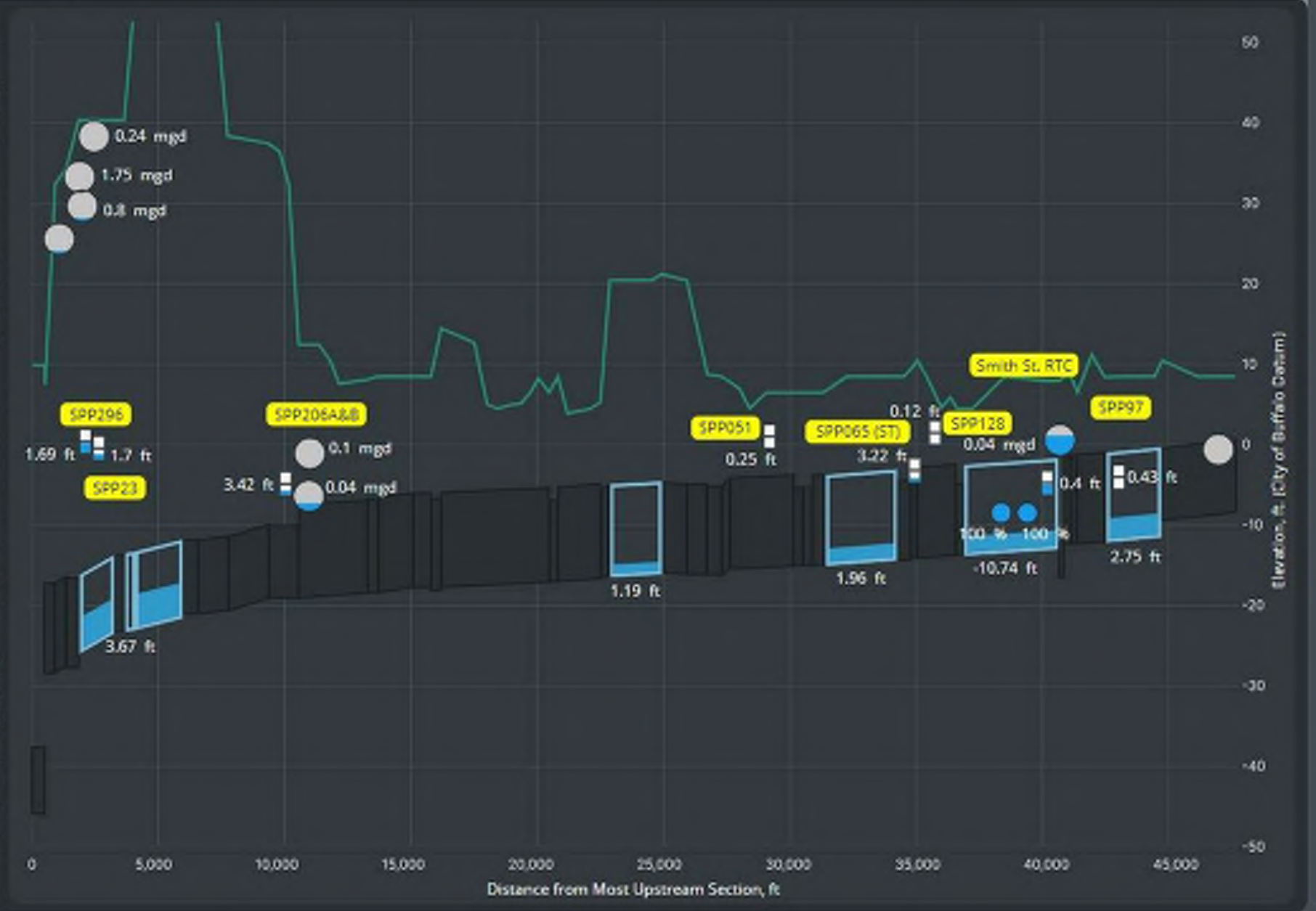


Interceptor profiler

xylem vue

North Interceptor | South Interceptor | Swan Trunk

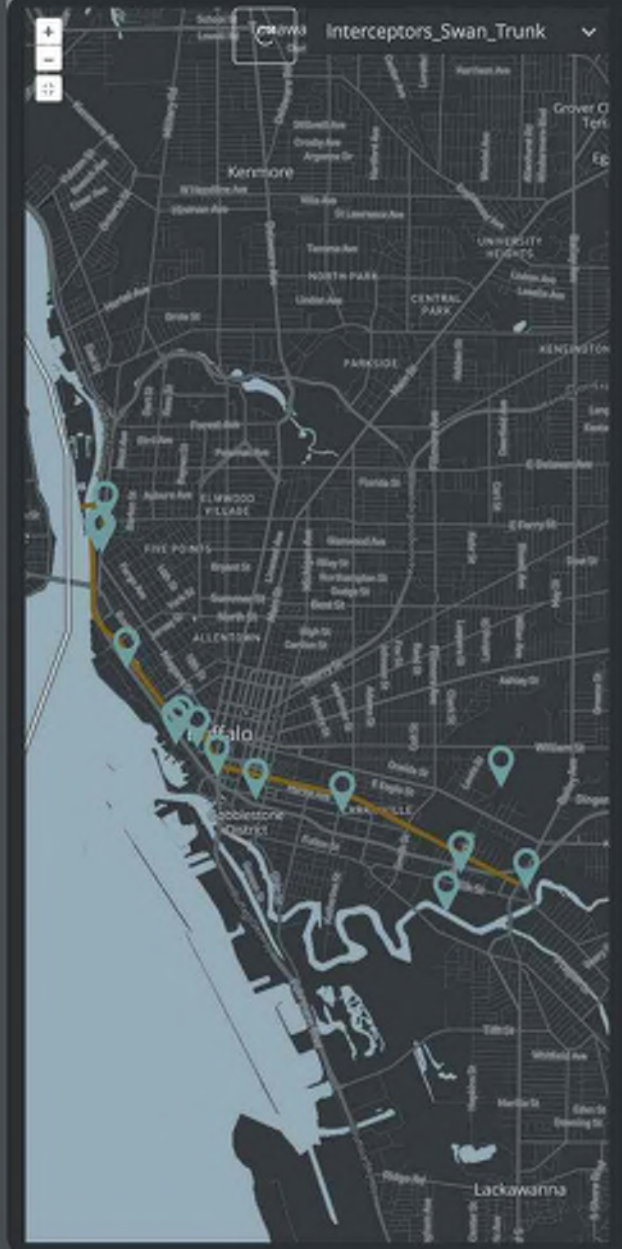


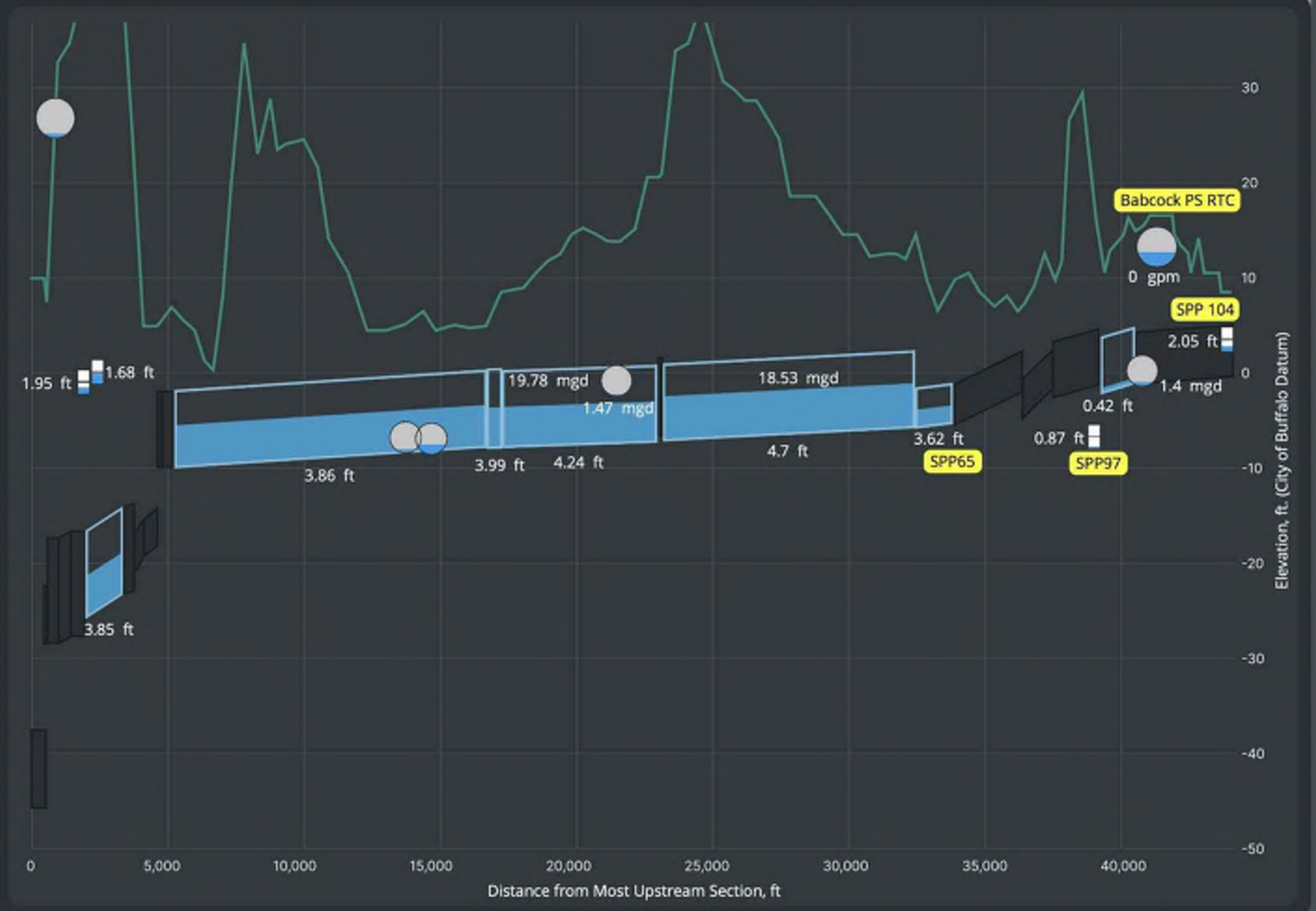


Interceptor profiler

xylem vue powered by go.applied

NORTH INTERCEPTOR | SOUTH INTERCEPTOR | SWAN TRUNK





SENSORS > BUFFALO > UNIFIED NETWORK MANAGEMENT > RTC CHAMBERS

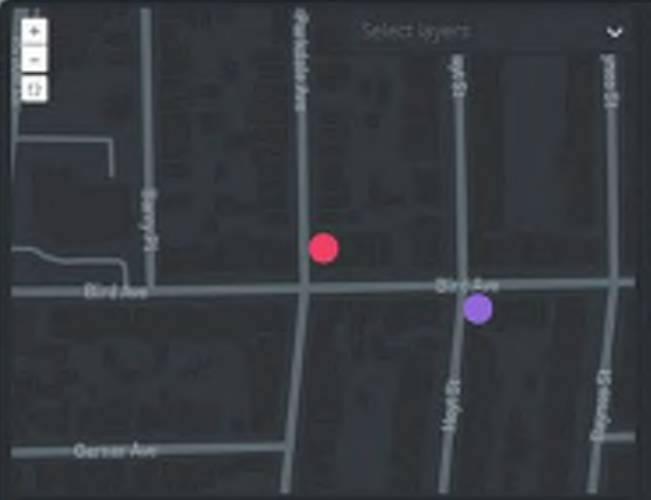
Bird Chamber

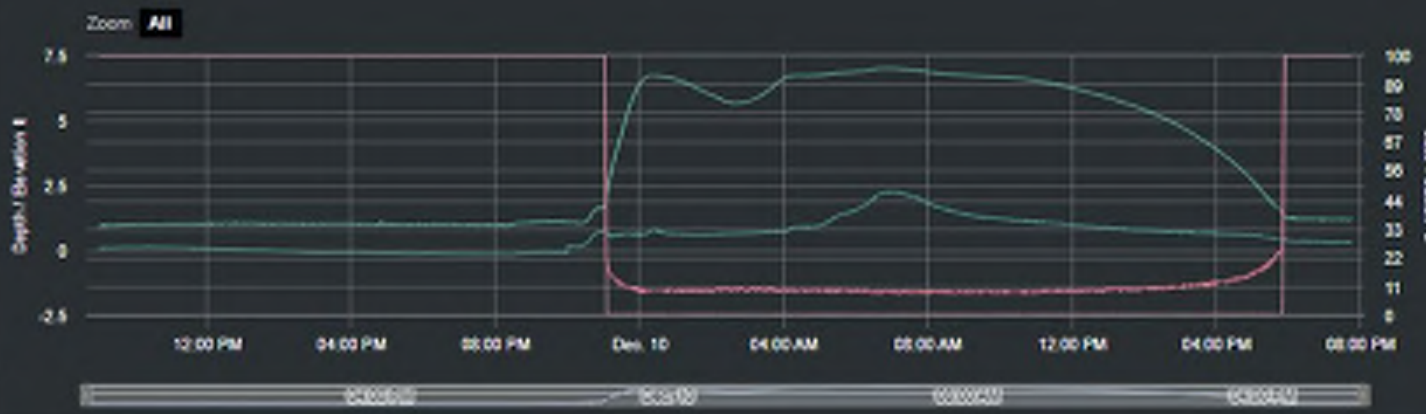
12/09/2023 9:00:00 AM - 12/10/2023 7:45:00 PM

1 minute

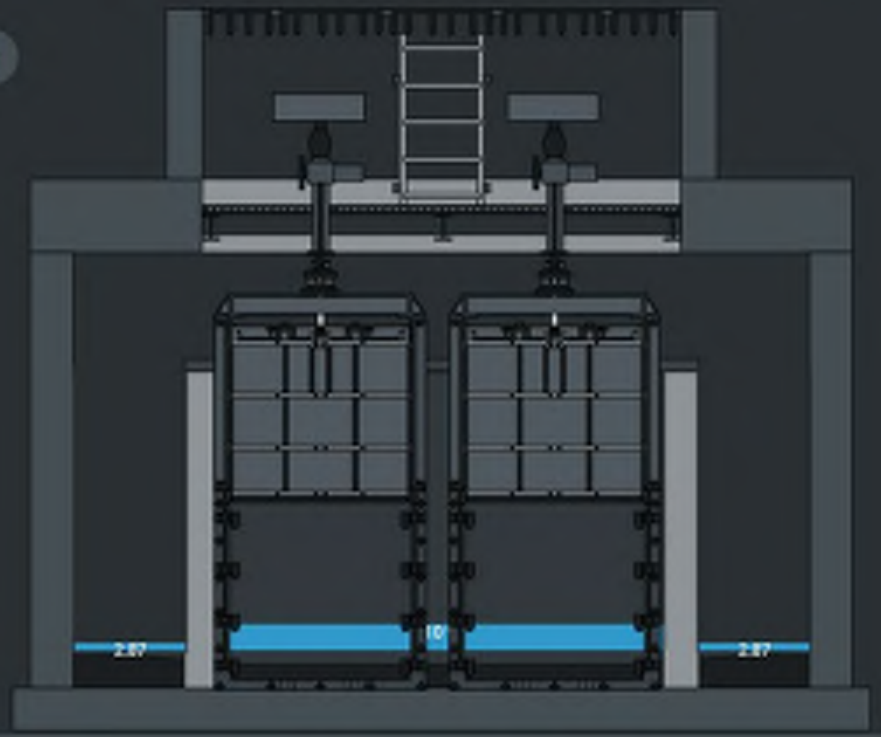
xylem vue

Table Graph





2D Isometric



3D Rendering

Standing at the intersection of Parkdale Avenue and Bird Avenue, looking East towards Hoyt Street.

12/09/2023 9:00:00 AM

12/10/2023 7:45:00 PM

Historical mode

Table

Select layers

Zoom All

Depth / Elevation ft

Gate Position %

Bird RTC Upstream Level

Bird RTC Downstream Level

Bird RTC Gate 1 Position

Bird RTC Gate 2 Position

12:00 PM 04:00 PM 08:00 PM Dec. 10 04:00 AM 08:00 AM 12:00 PM 04:00 PM 08:00 PM

2D Isometric

3D Rendering

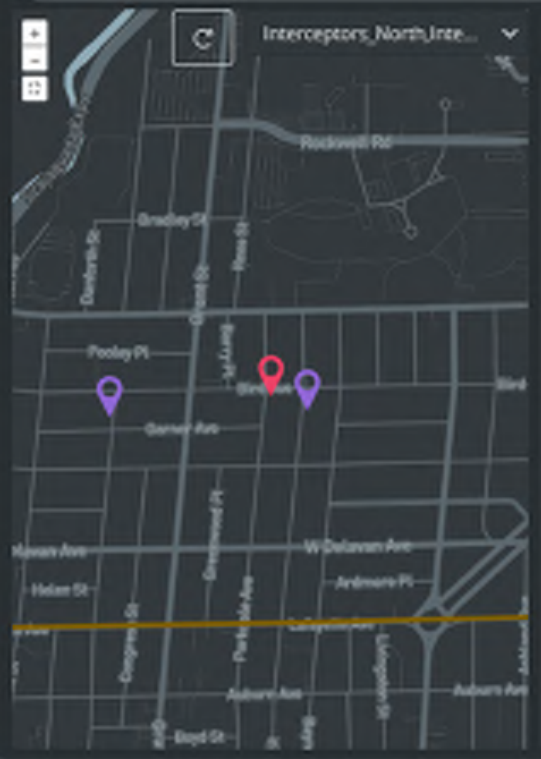
Standing at the intersection of Parkdale Avenue and Bird Avenue, looking East towards Hoye Street.

SENSORS » BUFFALO » UNIFIED NETWORK MANAGEMENT » AREA SENSORS

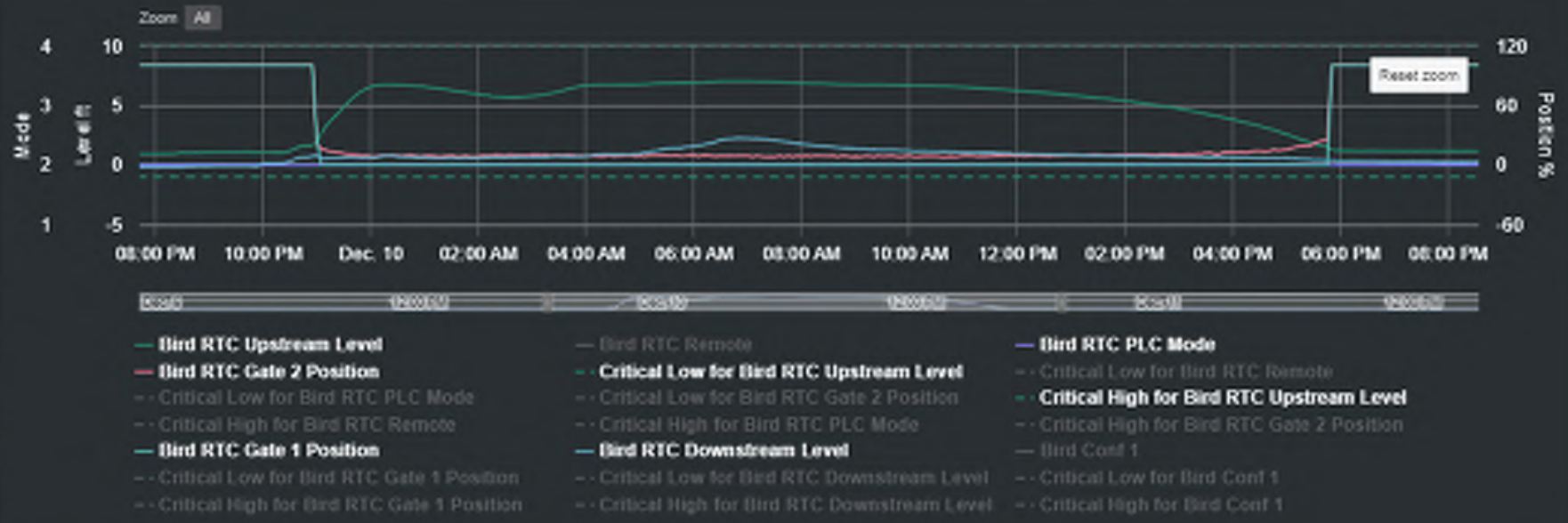
Group Bird RTC Chamber

xylem vue

Title	Sensor type	Critical low		Critical high		Reading		Utilization		Last collected
Bird RTC Upstream Level	Depth	-1	ft	10	ft	0.9	ft	9	%	03/13/2024 04:41 PM
Bird RTC Remote	Battery	0	bit	8.15	bit	0	bit	0	%	03/13/2024 04:41 PM
Bird RTC PLC Mode	Mode	0	mode	100	mode	2	mode	2	%	03/13/2024 04:41 PM
Bird RTC Gate 2 Position	Position	0	%	100	%	100.14	%	100.14	%	03/13/2024 04:41 PM
Bird RTC Gate 1 Position	Position	-1	%	100	%	100.08	%	100.08	%	03/13/2024 04:41 PM
Bird RTC Downstream Level	Depth	0	ft	1	ft	0.07	ft	0.72	%	03/13/2024 04:41 PM
Bird Conf 1	Mode	-1	mode	100	mode	0.12	mode	0.12	%	03/13/2024 04:41 PM



12/09/2023 12:00:00 AM - 12/11/2023 4:4 | Raw data | 5 minutes



Advanced chart

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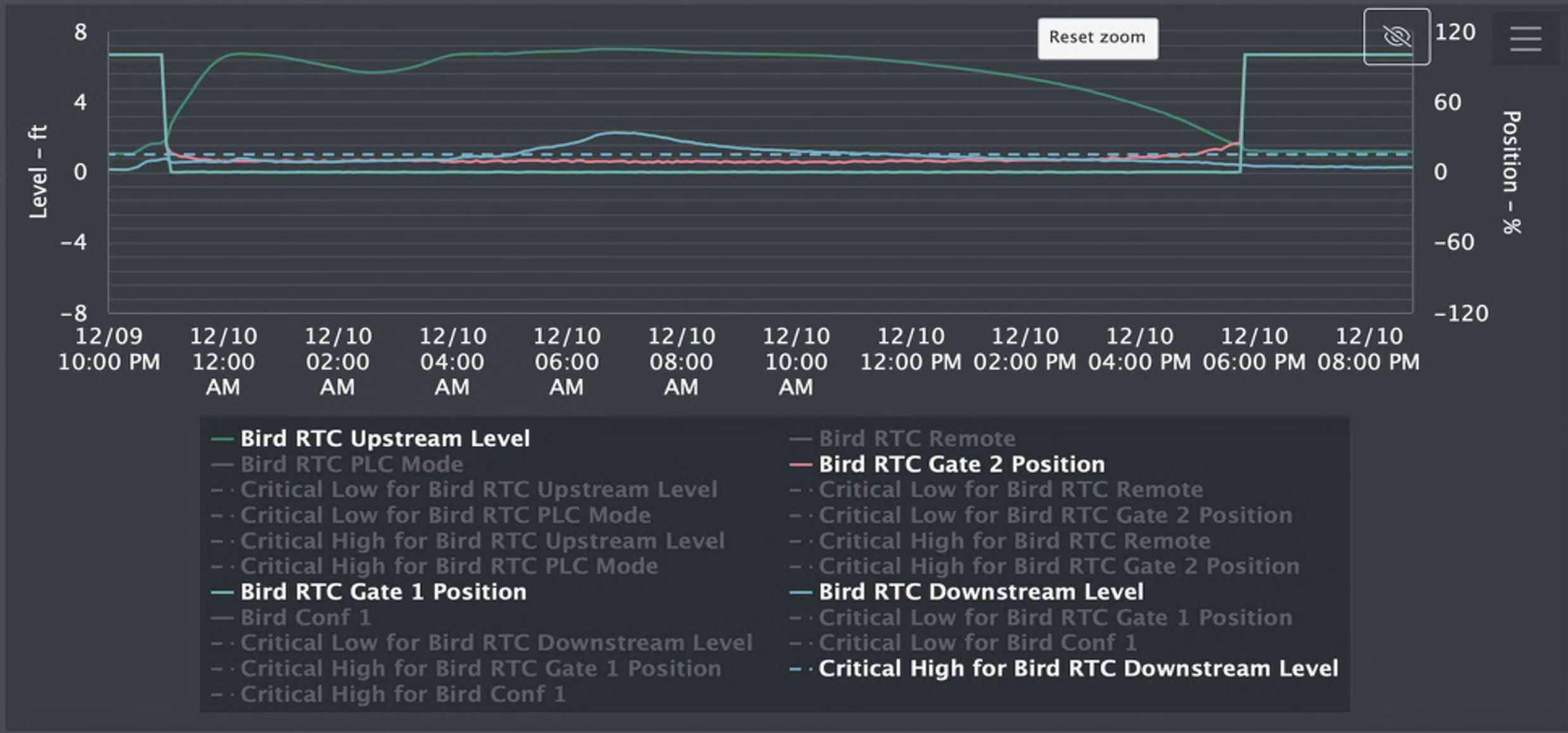


xylem
Let's Solve Water

5

Next Steps

Kristina Macro, Xylem

Next Steps for Buffalo Sewer Authority

- Complete transition to Xylem Vue powered by GoAigua platform
- Expand coordinated control for existing RTC sites
- Design, construct and commission additional RTC sites and incorporate coordinated control into future capital projects

Hertel at Deer RTC Commissioning, January 2020

BUFFALO

SEWER AUTHORITY

Thank You!

xylem
Let's Solve Water

xylem
Let's Solve Water

6

Q&A

BUFFALO

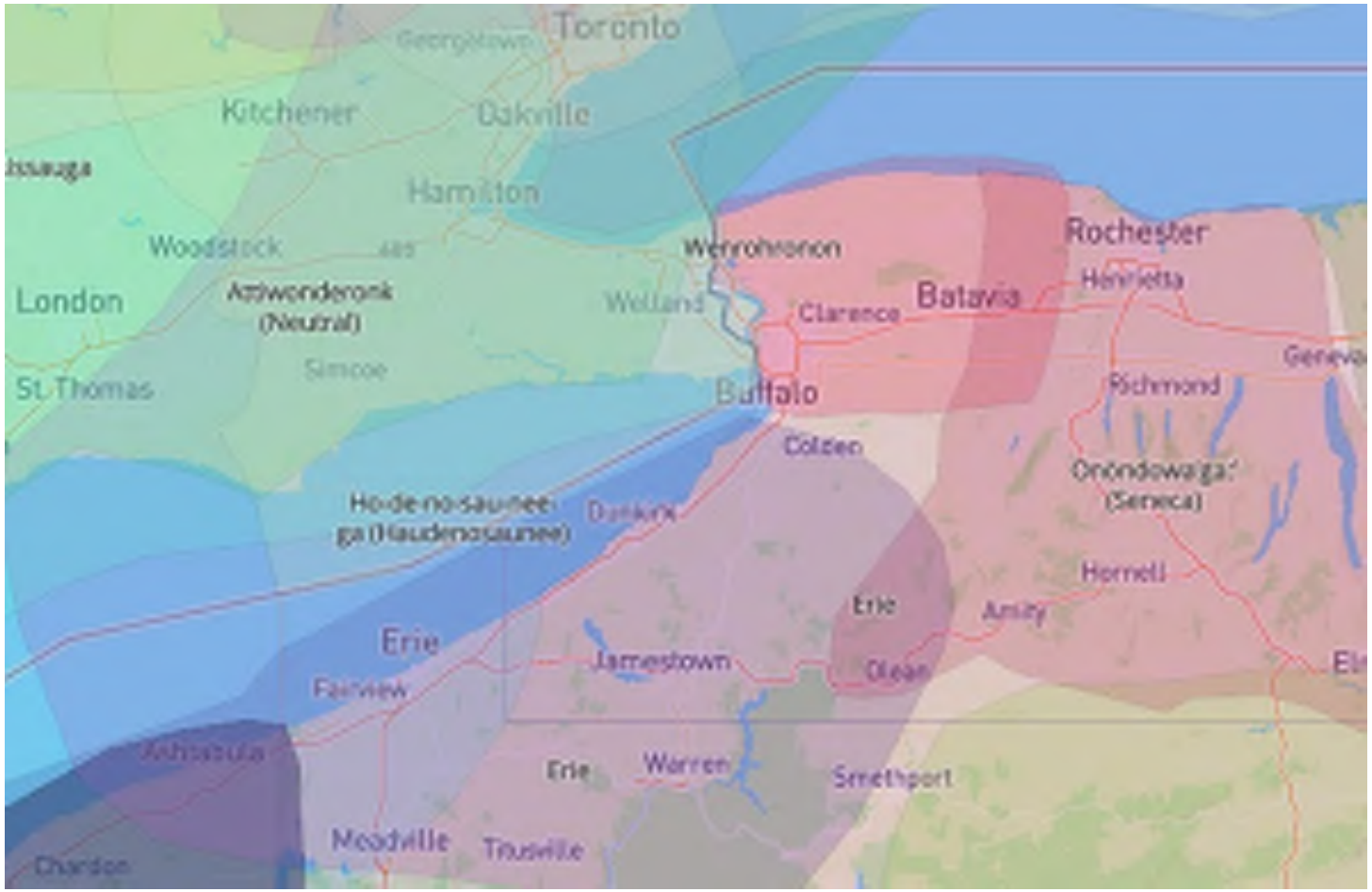
SEWER AUTHORITY

Building a Resilient City at the Place of the Basswood Trees

Rosaleen B. Nogle, PE, BCEE, BC WRE, CFM

M.S., B.S. Civil Engineering; M. Public Affairs (Public Admin Focus)

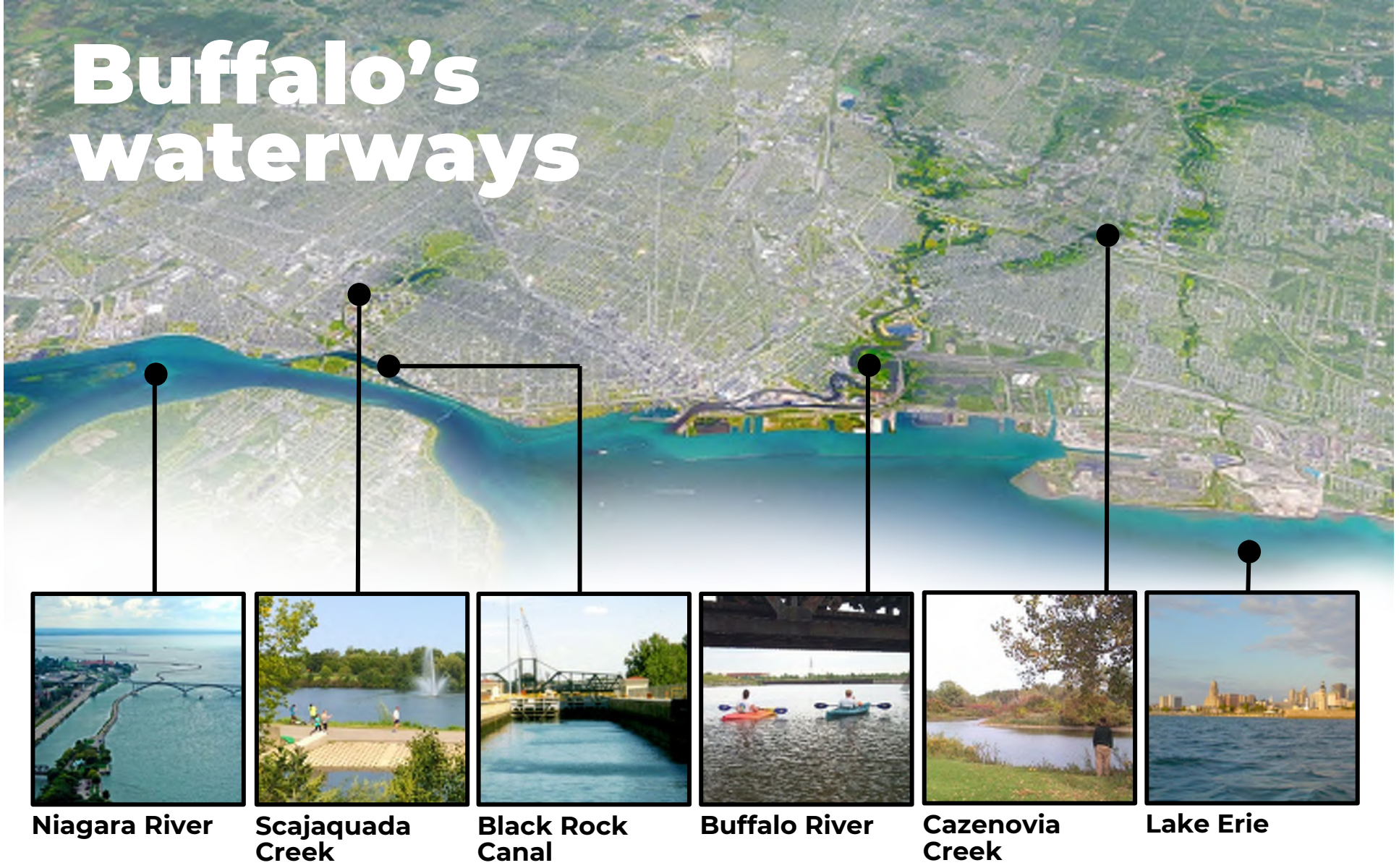
M.A. Pastoral Ministry, M. Div.,B.A. Anthropology



Land Acknowledgement

I would like to acknowledge the land on which the City of Buffalo is located, which is the territory of the Seneca Nation, a member of the Haudenosaunee/Six Nations Confederacy. This territory is covered by The Dish with One Spoon Treaty of Peace and Friendship, a pledge to peaceably share and care for the resources around the Great Lakes. It is also covered by the 1794 Treaty of Canandaigua, between the United States Government and the Six Nations Confederacy, which further affirmed Haudenosaunee land rights and sovereignty in the State of New York. Today, this region is still the home to the Haudenosaunee people, and we are grateful for the opportunity to live, work, and share ideas in this territory. In this acknowledgement, I hope to demonstrate respect for the treaties that were made on these territories and remorse for the harms and mistakes of the far and recent past; and we pledge to work toward partnership with a spirit of reconciliation and collaboration.

Buffalo's waterways



Niagara River

Scajaquada Creek

Black Rock Canal

Buffalo River

Cazenovia Creek

Lake Erie

Pre-1785: Frontier Villages and Native Lands

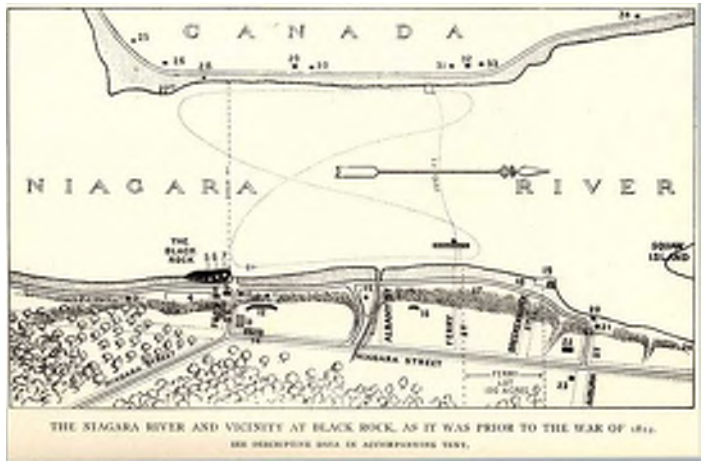
Buffalo's Name

- Big Buffalo Creek
- Buffalo

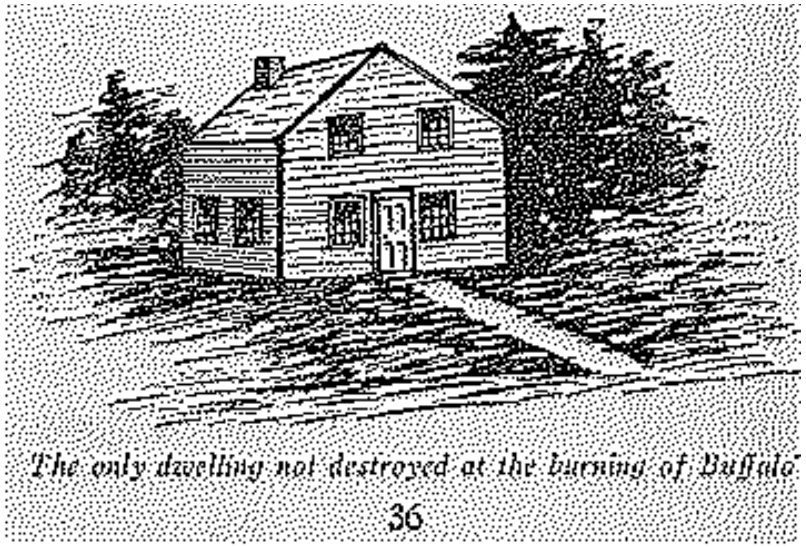
  "Tick-e-ack-gou"
- Place of the Basswoods

  "To-se-o-way"

1785-1825: Early Years



THE NIAGARA RIVER AND VICINITY AT BLACK ROCK, AS IT WAS PRIOR TO THE WAR OF 1812.


The only dwelling not destroyed at the burning of Buffalo

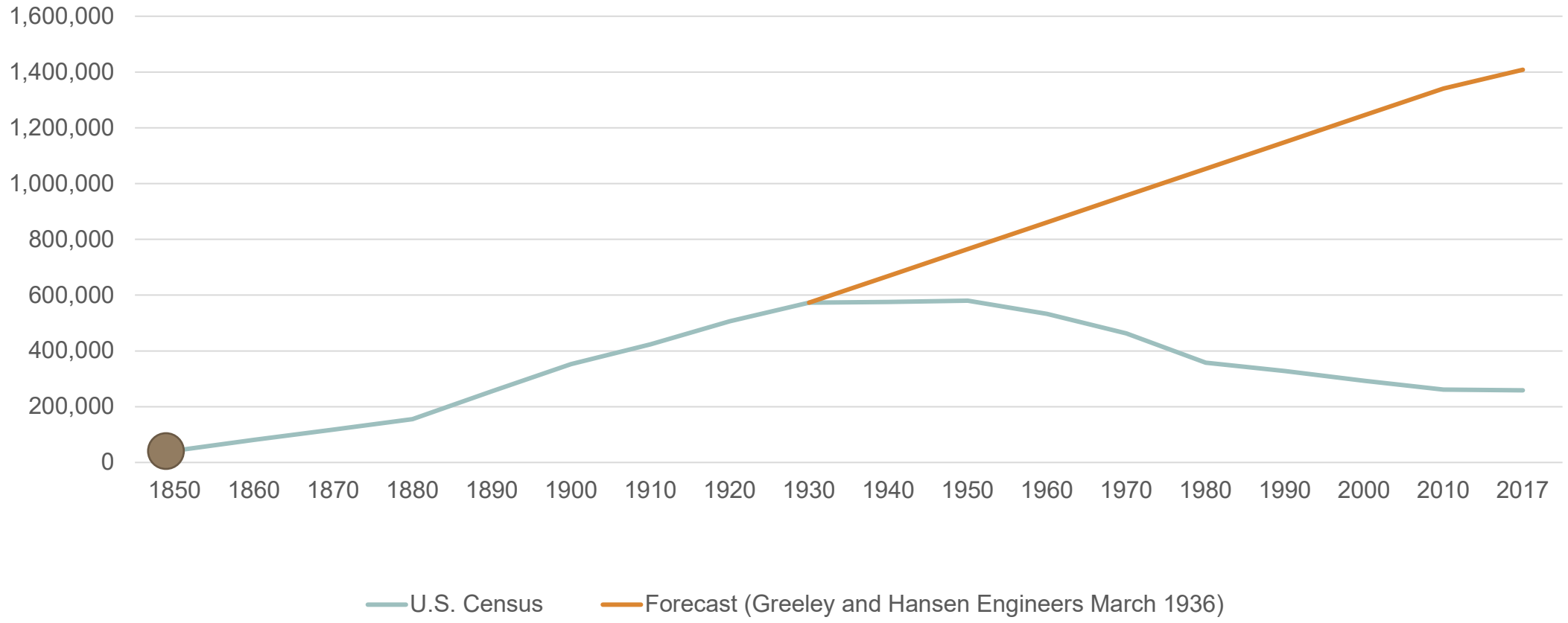
36

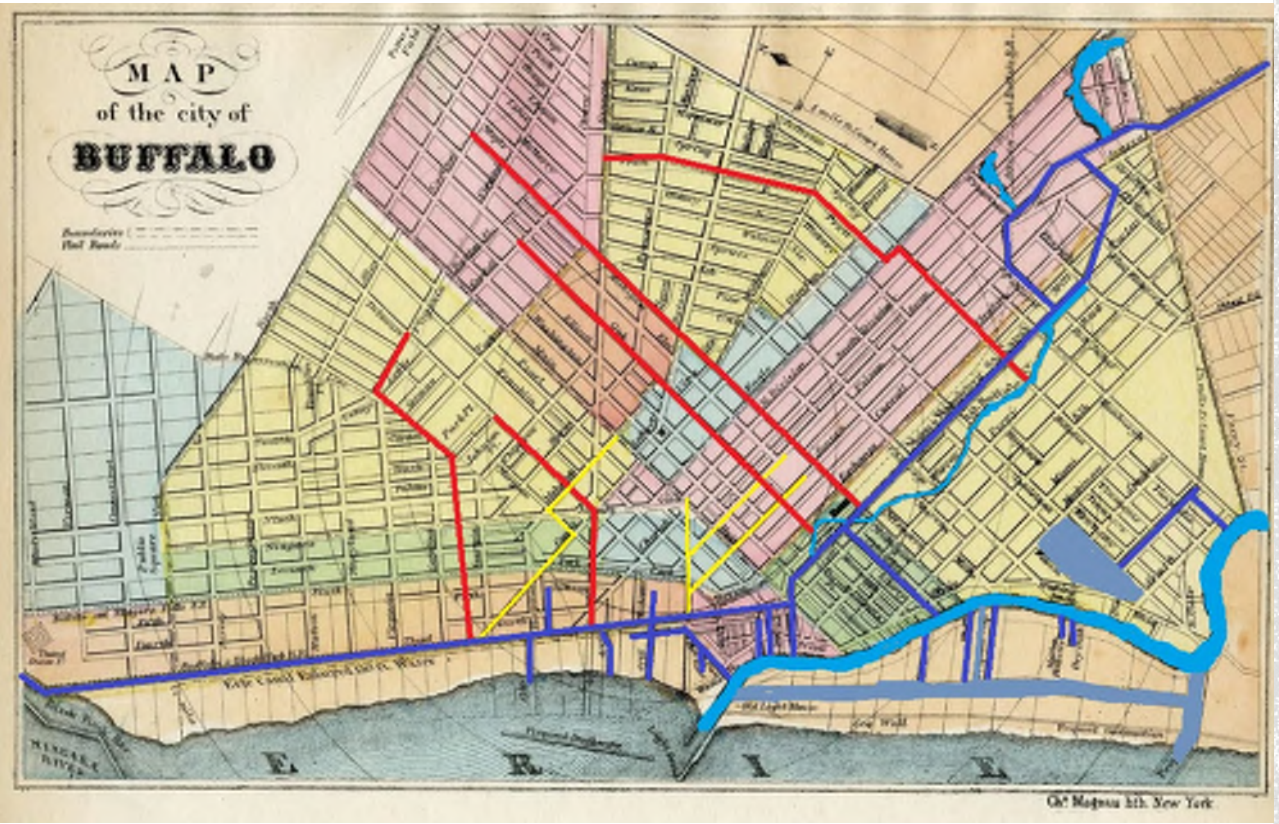
Big Buffalo and Little Buffalo Creek

1825-1848: Early Canal Years

- Drain to nearest water way
- Cholera epidemic 1832
- Private construction
- Oak Street 1834-1835
  - Dry brick
  - Board bottom
  - Triangular

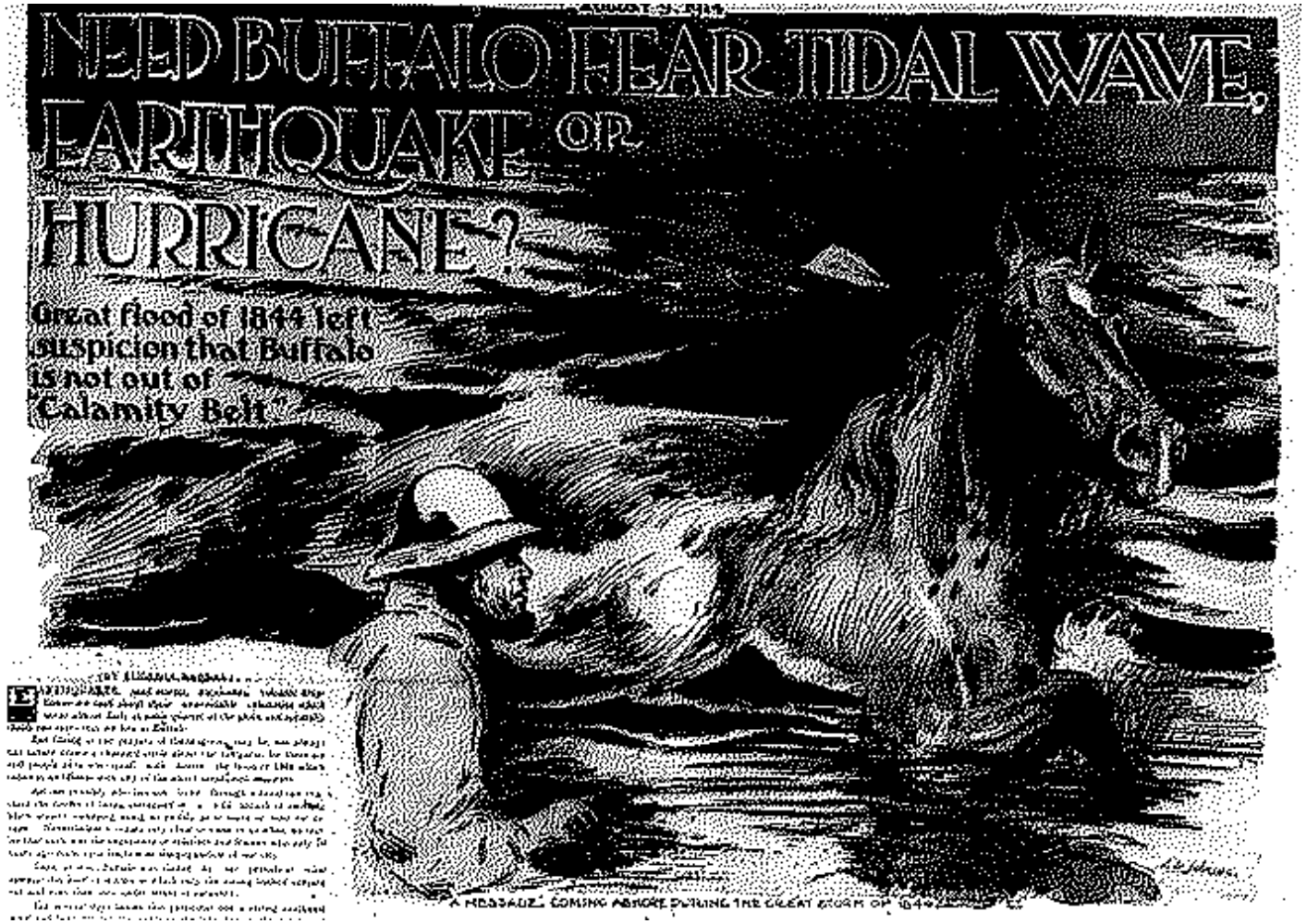
1825-1848: Early Canal Years





1848-1861: Later Canal Years

- Report of Committee on Sewers
  - 2/15/1848
  - Basis of design report
  - Property owners and taxes
- Cholera epidemics 1849, 1854
- 1852 Water Works Company
  - Bathing
  - Indoor toilets



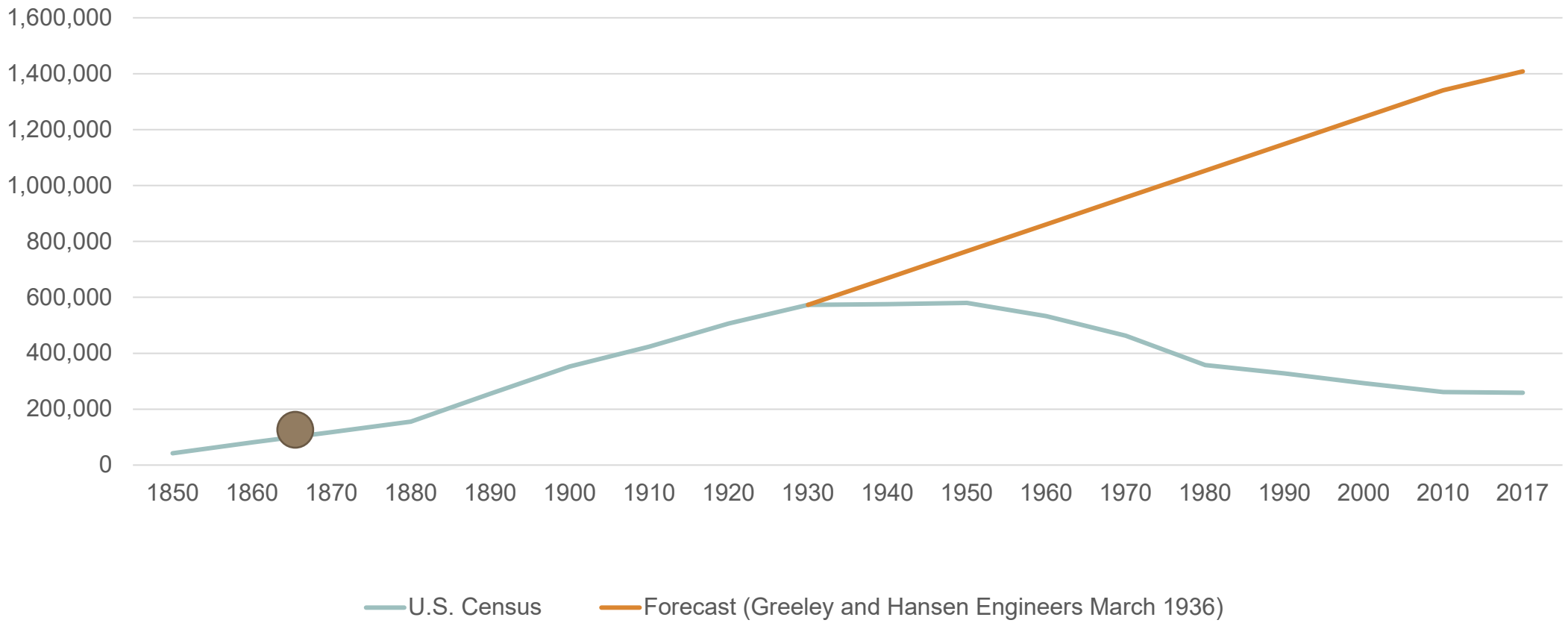
1844 Flood

- 78 Dead
- October 18, 1844
- Main and Ohio Streets six feet deep
- Michigan and Exchange Streets five feet deep

1861-1865: The Civil War

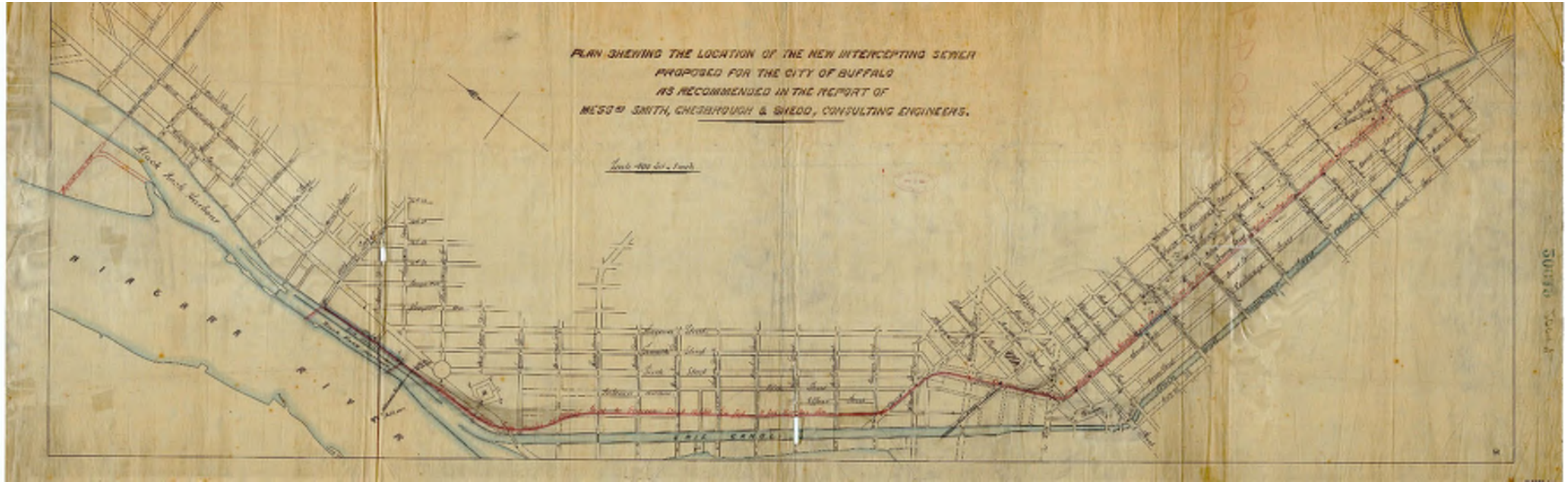
- The Civil War
  - Halt in construction
  - Materials and manpower needed for war
- Presentation to Historical Society Club
  - Oliver G. Steele, Esq. in 1866
  - Leader of 1848 Sewer Committee
  - Warned of need for more work
    - Issue of lack of proper traps
    - Too few catch basins and manholes

1861-1865: Civil War



1867-1899: Industrial Revolution

- George E. Waring, Jr. 1884
- Separate sewers and treatment considered, but not pursued
- Trunks
  - Genesee, Bird-Ferry, Hertel, Bailey, Mill Race
  - Swan
    - 3 Flushing gates
    - Main and Hamburg canal and Wilkenson Slip putrid
    - 90 degree turn at Albany Street

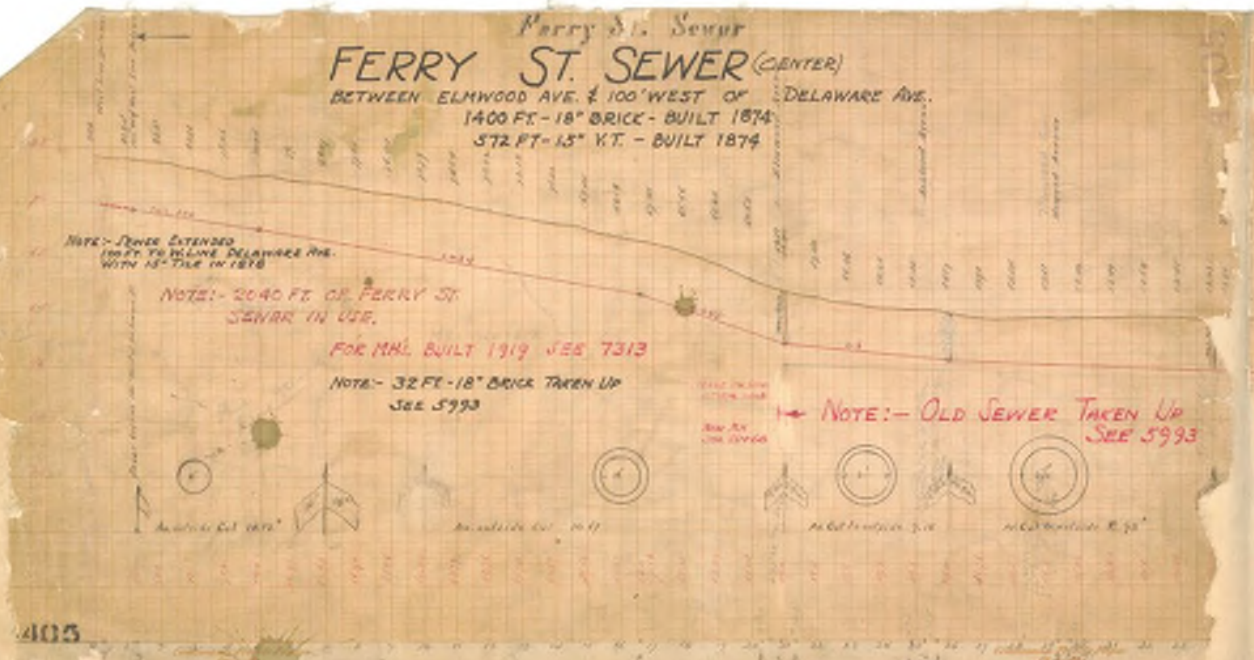


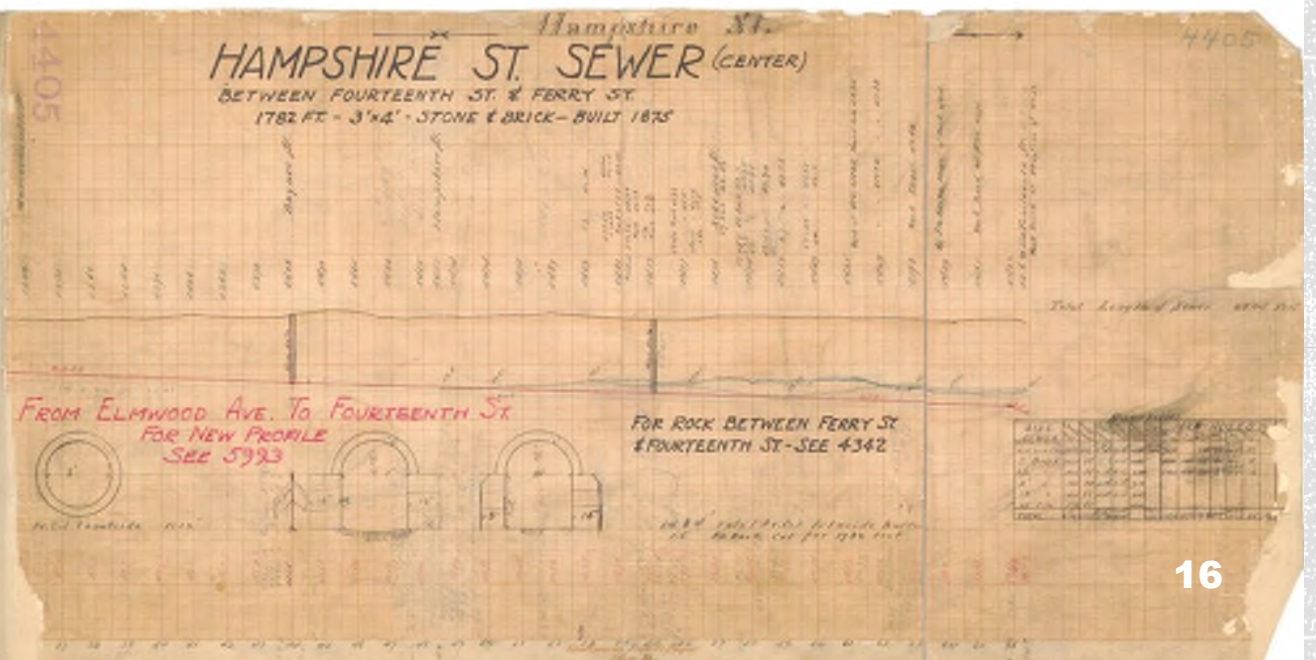
The Swan Trunk

15

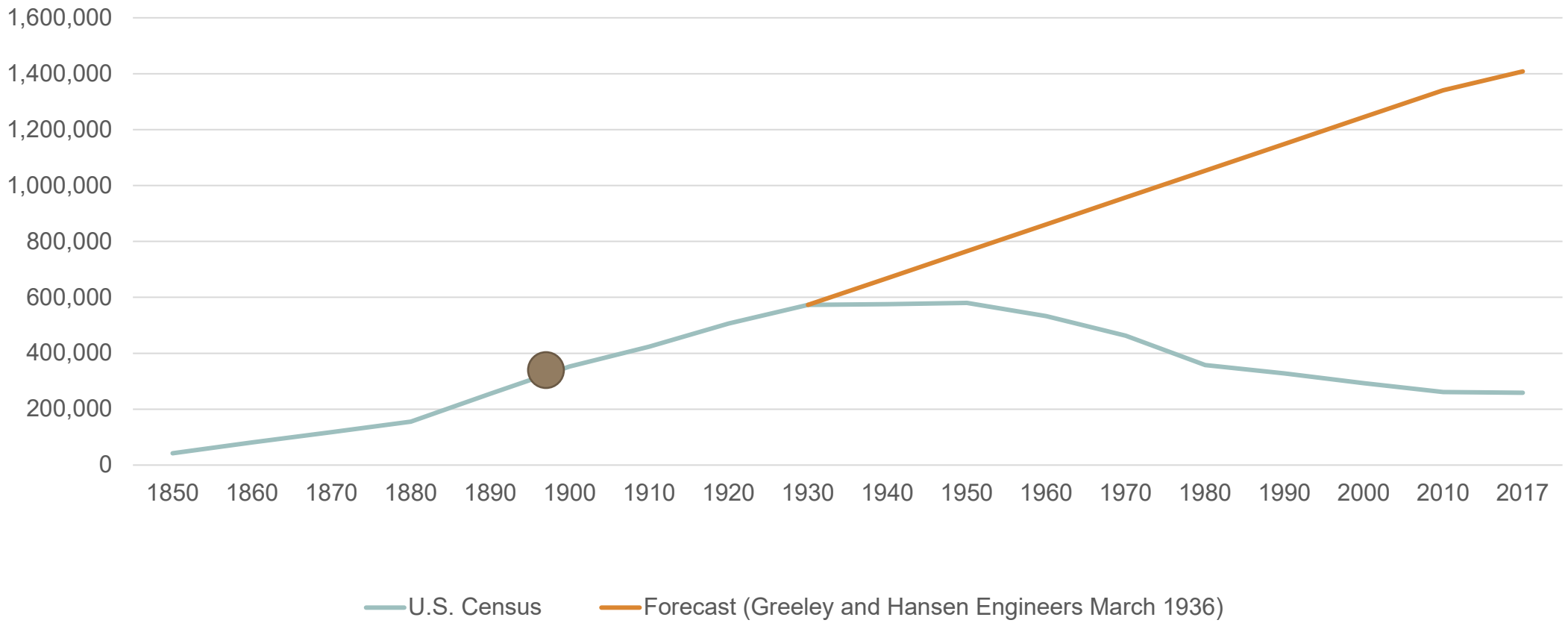
1867-1899: Industrial Revolution

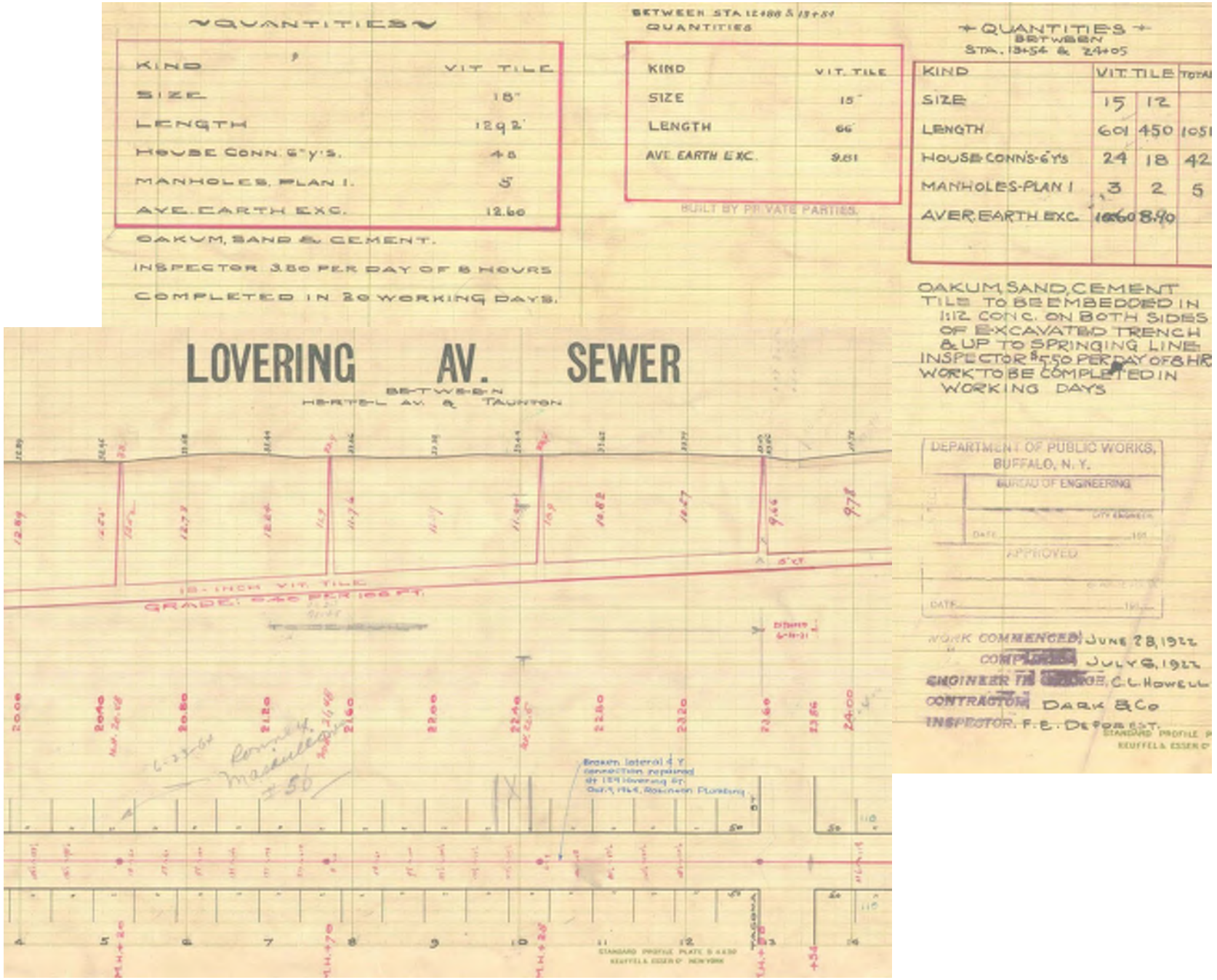
- Majority of existing system
- Hundreds of miles of pipe
- Brick 24”+
- Vitrified Tile Pipe (VTP) 8”-21”





1867-1899: Industrial Revolution





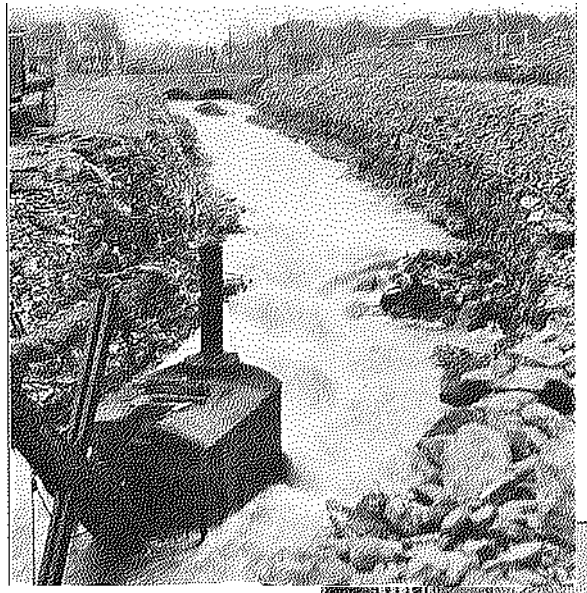
1900-1929: N. Buffalo & Burying of Waters

Sewers installed in North Buffalo for intra-city suburban developments

- Sandy soils
- Need to tie into former Cornelius Creek
- Into rock
- Laterals plunge suddenly into main

1900-1929: N. Buffalo & Burying of Waters

- Waterways → Sewers
  - Main Hamburg Canal to Hamburg Drain 1901-1903
  - Ohio Basin to Ohio Drain 1902-1904
  - Cornelius Creek to Hertel Avenue Overflow Drain 1914
  - Scajaquada Creek to Scajaquada Drain 1925



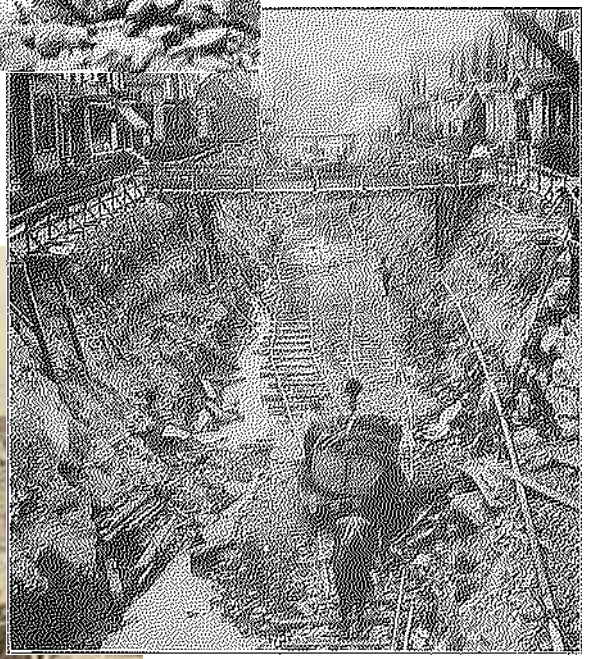
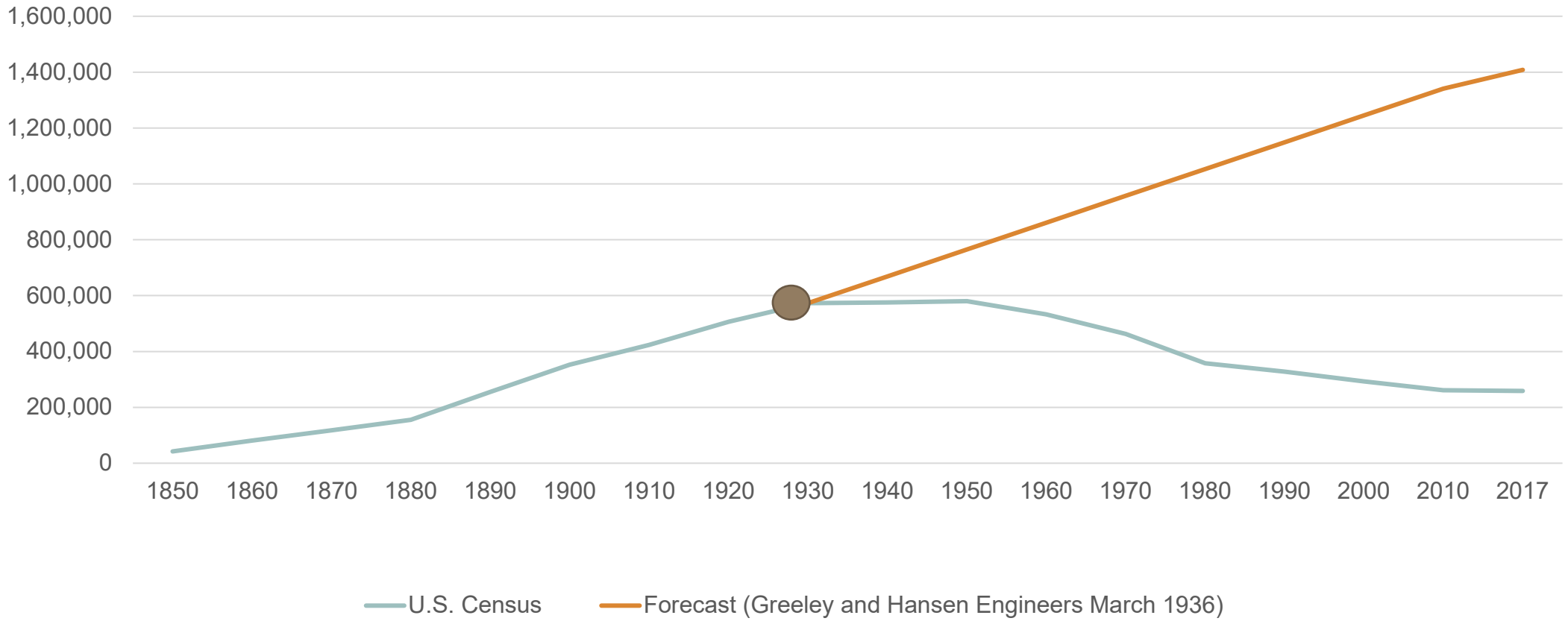


Photo Credit: https://www.wnyheritage.org/content/scajaquada_drian_project_-_1920s/index.html

History: 1929-1941 Creation of the Buffalo Sewer Authority



1929-1941: The Buffalo Sewer Authority

- 1907 Canadian Public Health Report
  - Niagara Falls, NY typhoid death rate
  - 222.4 deaths/100,000 persons/ year
- Establishment of International Joint Commission
  - January 11, 1909
  - "…boundary waters …shall not be polluted on either side to the injury of health or property on the other."

BUFFALO EVENING NEWS: MONDAY, DECEMBER 5, 1927

NEW BUFFALO PASTOR

Keitzel Assails Buffalo for 'Bathing in Own Filth'

on League Hits Dumping of Sewage

BUFFALO EVENING NEWS: TUESDAY, SEPTEMBER 24, 1929

NORTEL SEWER TO BE THRESHED OUT OCT. 7

Date for Hearing on Flood Relief Set by City Council.

50,000,000 Gallons of Waste Dumped Daily in Buffalo River

Report to Council by Fisk Stirs Perkins to Demand Check on Plants

1929-1941: The Buffalo Sewer Authority

1918 Report

- "In the Detroit and Niagara Rivers conditions exist which imperil the health and welfare of the citizens of both countries in direct contravention of the treaty."
- 80% of pollution of Niagara River originates in Buffalo
- "the sewage of Buffalo is polluting to a serious extent the available water supplies of the two Tonawandas and the city of Niagara Falls, NY"

1929-1941: The Buffalo Sewer Authority

- *Comprehensive Plan of Sewerage for Buffalo, NY*
  - George B. Gasciogne, Consulting Engineer
  - May 1930
- 10-12 year plan
- Sewage treatment through construction of 2 WWTFs
  - South-East by Tifft-Hopkins WWTF
  - North by Unity Island WWTF
- Construction of sewers
  - Interceptors
  - Swan Trunk extension
  - Storm relief sewers
- $23,000,000.00 ($362 M in 2021 dollars)

1929-1941: The Buffalo Sewer Authority

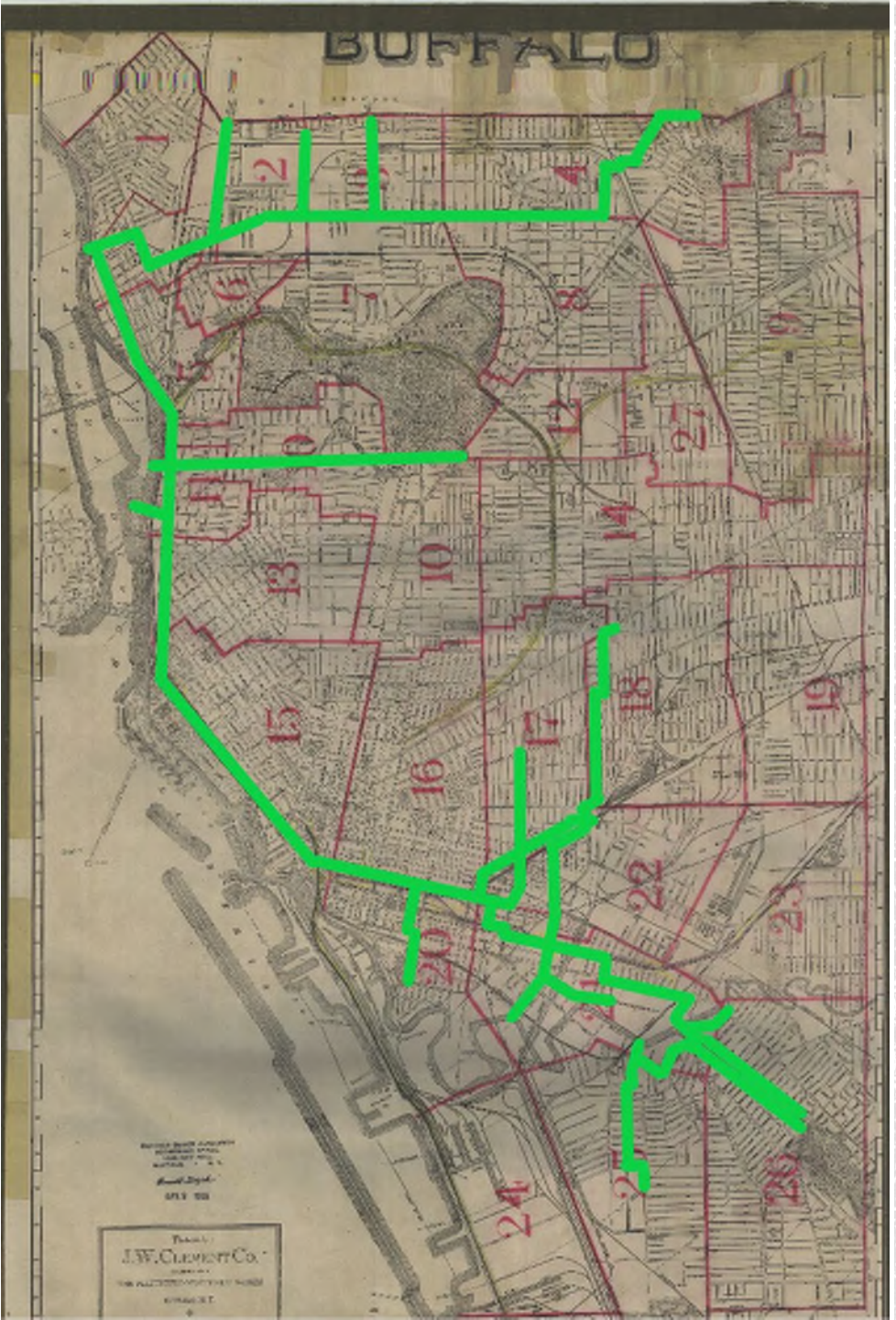
- NYS Dept. of Health mandate
  - March 1935
  - Primary Sewage Treatment Plant
  - Interceptor sewers
- Establishment of BSA
  - April 8, 1935
  - $15 million bonding capacity ($287 M in 2021 dollars)
  - After 5 years or after all bonds are paid off, system will revert to city and Buffalo Sewer will dissolve
  - Structures of any public service corporation must be removed at expense of corporation for Buffalo Sewer to construct project

1929-1941: The Buffalo Sewer Authority

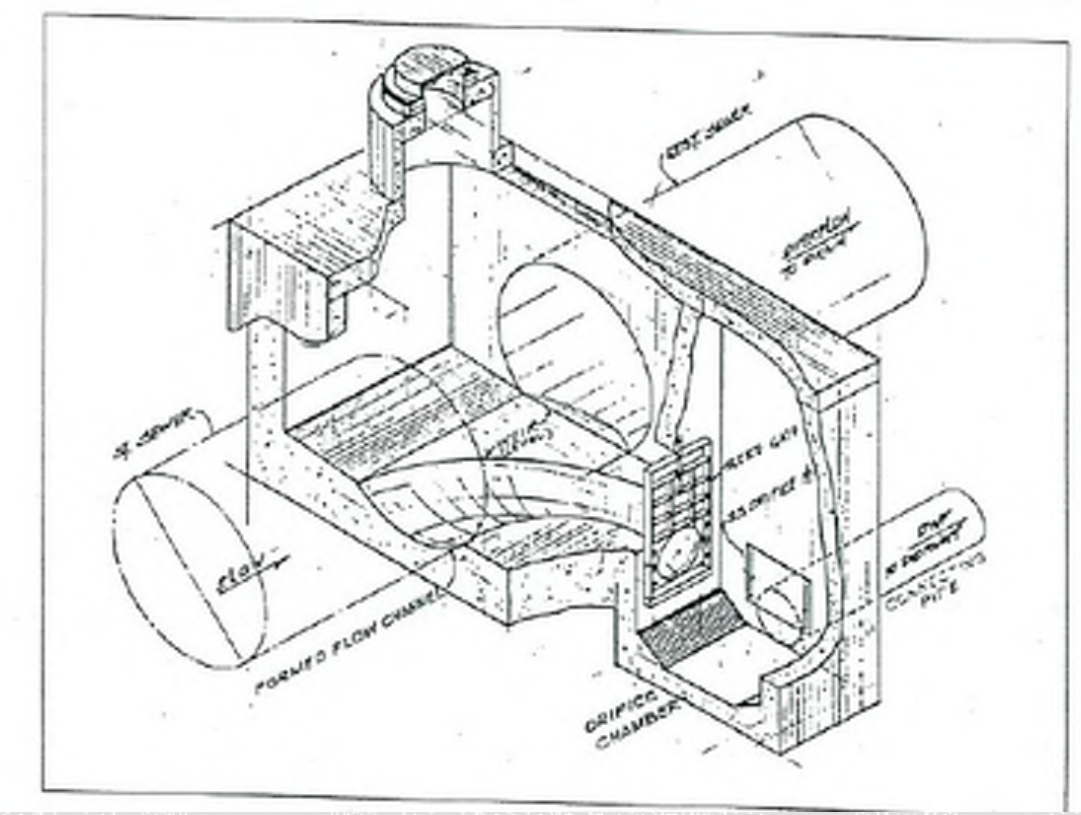
- *Buffalo Sewer Authority General Plan for Collecting and Treating the Sewage of Buffalo*
- Greeley and Hansen Engineers
  - Redid Gasciogne's calculations
  - March 1936
- Treatment and conveyance for treatment
  - Single WWTF on Bird Island
  - CSO diversion structures
  - Interceptors
- $15 million cost

1929-1941: The Buffalo Sewer Authority

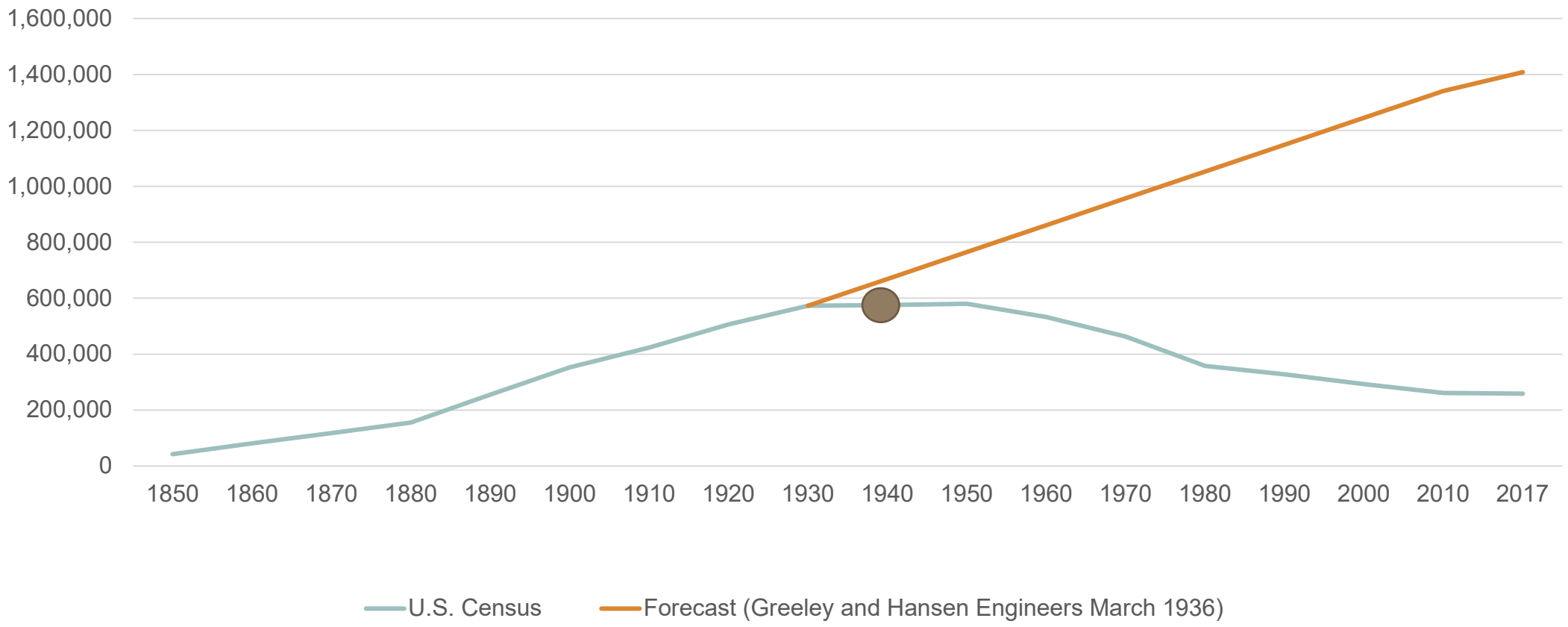
From: https://www.wnyheritage.org/content/scajaquada_drian_project_-_1920s/index.html



1929-1941: The Buffalo Sewer Authority



1941-1970 : Storm Relief and Sprawl



1941-1970: Storm Relief and Sprawl

- *Comprehensive Plan for Relief Sewers*
  - February 1941
  - Greeley and Hansen
  - WWTF online as of 1938
- Attack on Pearl Harbor December 7, 1941
- Post-1945 suburban development
- Floods of 1963
  - July 29: 3.8”: $1.5 M ($12.7 M in 2021 dollars) in damage
  - August 7: 3.88” in 5 hours: $35 M ($295.9 M in 2021 dollars) in damage

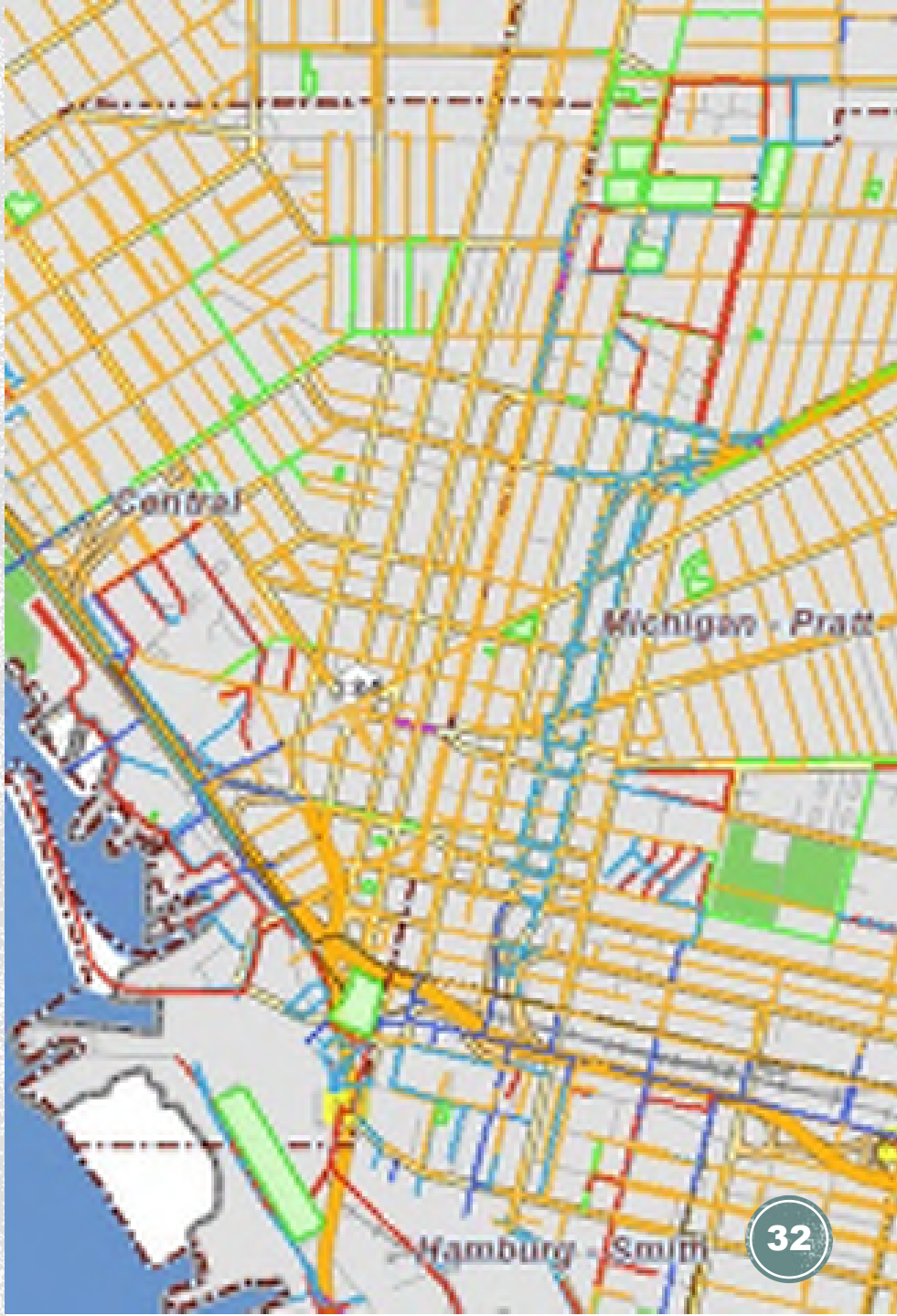
1941-1970: Storm Relief and Sprawl

- NYS Route 33
  - Severed Bird-Ferry Trunk
  - Stormwater added to system
  - New pump station for stormwater and groundwater
  - New trunk sewers constructed
- I-198
  - New storm sewers
  - Direct discharge to Scajaquada Creek
- I-190
  - Old Erie Canal bed
  - On top of
    - Swan Trunk
    - Interceptors
    - Hamburg Drain

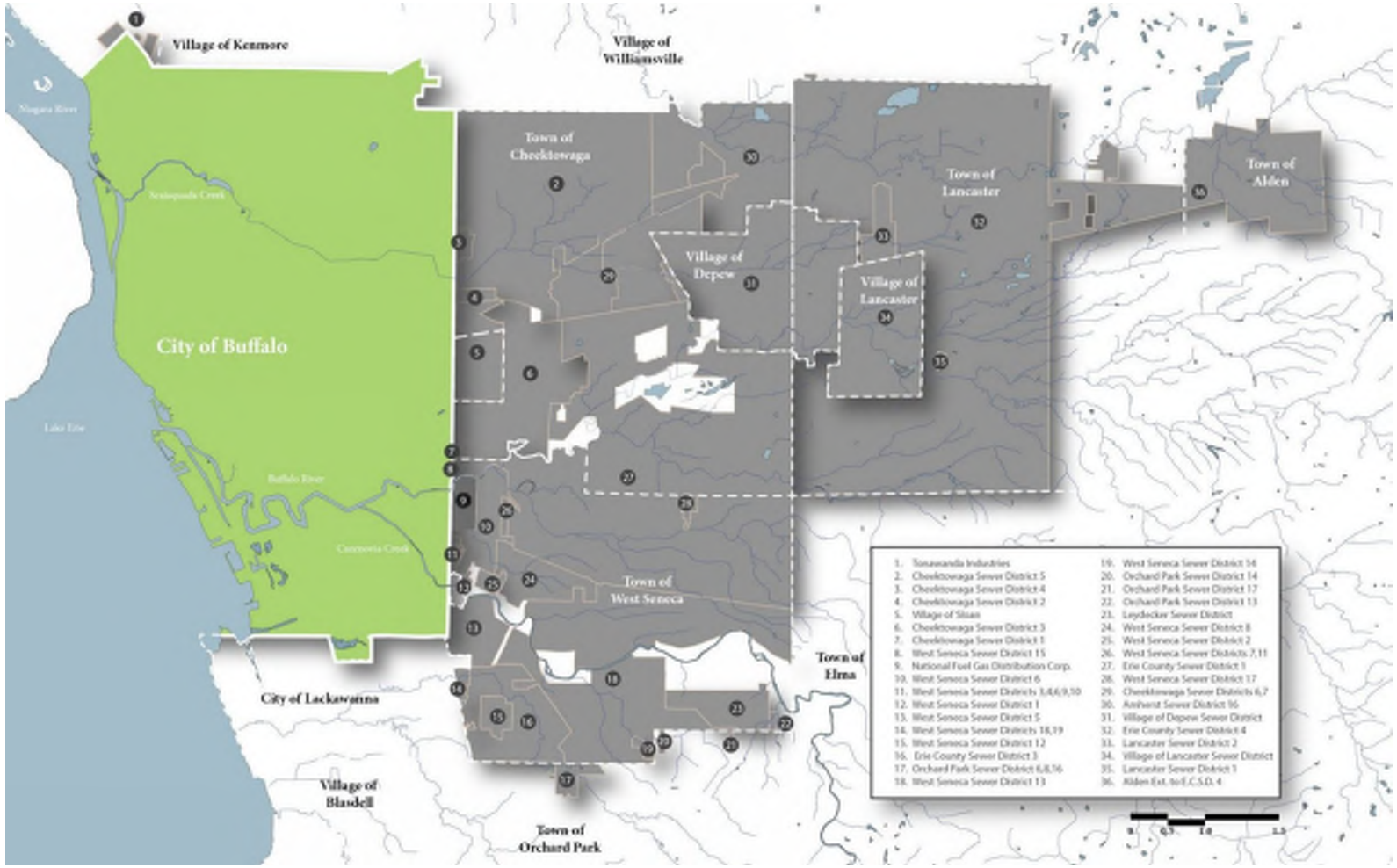
1941-1970: Storm Relief and Sprawl

1941-1970: Storm Relief and Sprawl

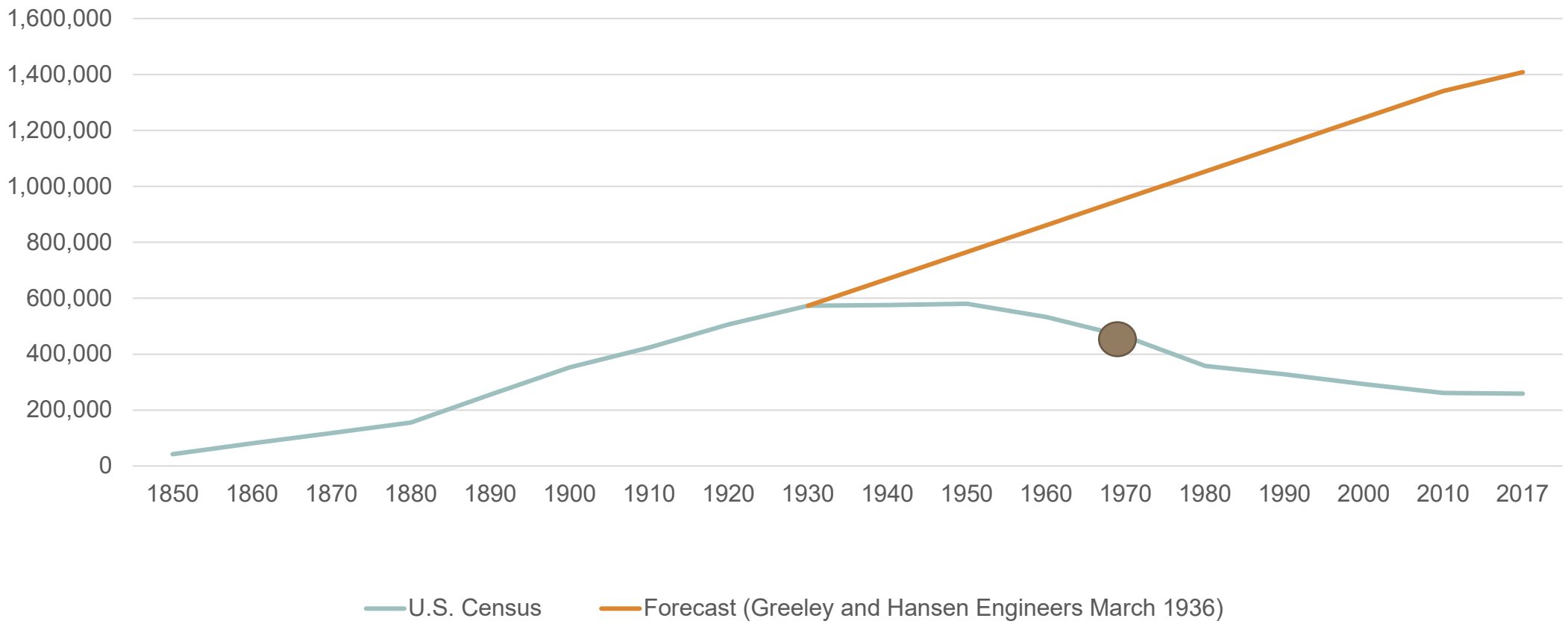
- Urban Renewal 1960-1970
- Demolition of tenement areas
  - Urban core
  - Oldest parts (and oldest sewers) of city
- New municipal housing projects
  - New separated sewers
  - Concrete storm sewers
  - Asbestos concrete pipe sanitary sewers
  - Intermunicipal Connections

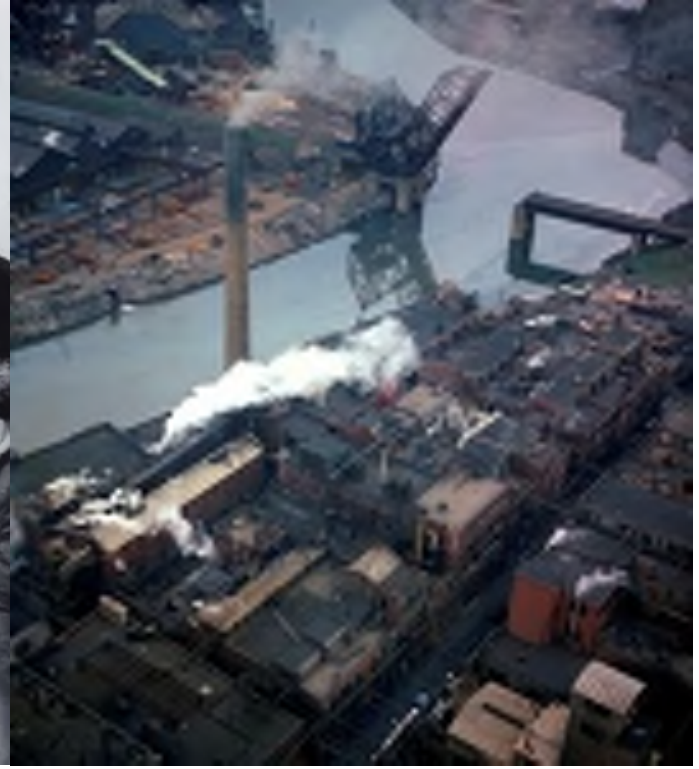


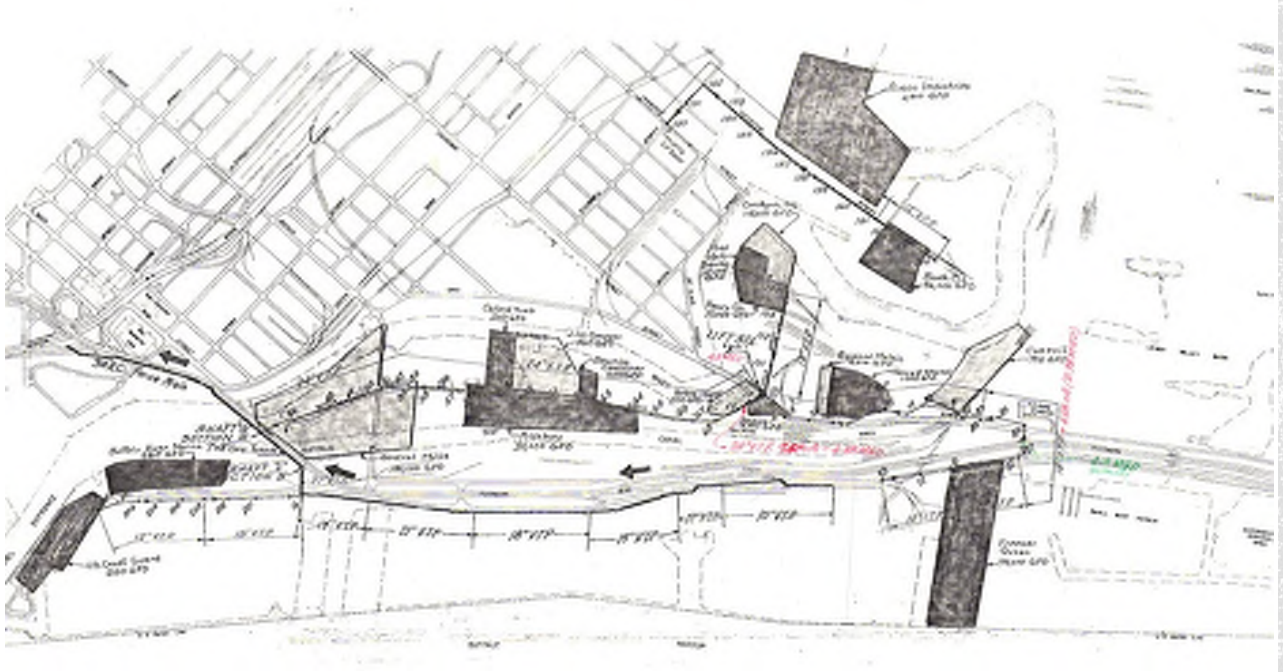
1941-1970: Storm Relief and Sprawl



1970-1982: Clean Water Act







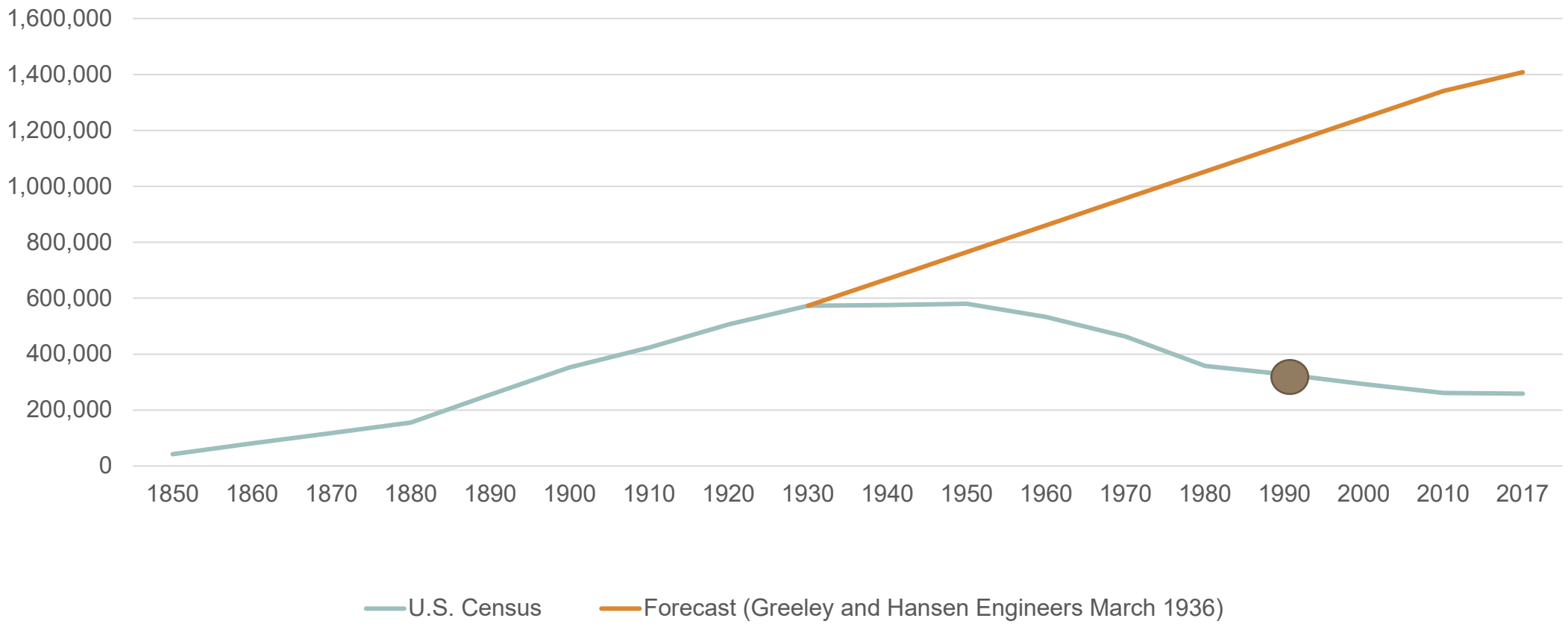
1970- 1982: Clean Water Act

- Kelly Island
  - “Outer Harbor”
  - Heavily industrialized
  - Never sewered
    - Direct discharge to waterways
    - Failing septic systems
- August 1966 Visit from LBJ
- Buffalo River Fire: 1968
- 1976 Project

1970-1982: Clean Water Act

- Scajaquada Tunnel 1977
- Weir Modifications 1980-1982
  - Diversion from Scajaquada Drain to Tunnel
  - Raising of weirs
- Backwater Gates
- Secondary Treatment Process
  - Completed 1980
  - Constructed on municipal landfill in Niagara River on piles
  - Liquid handling
  - Solids handling

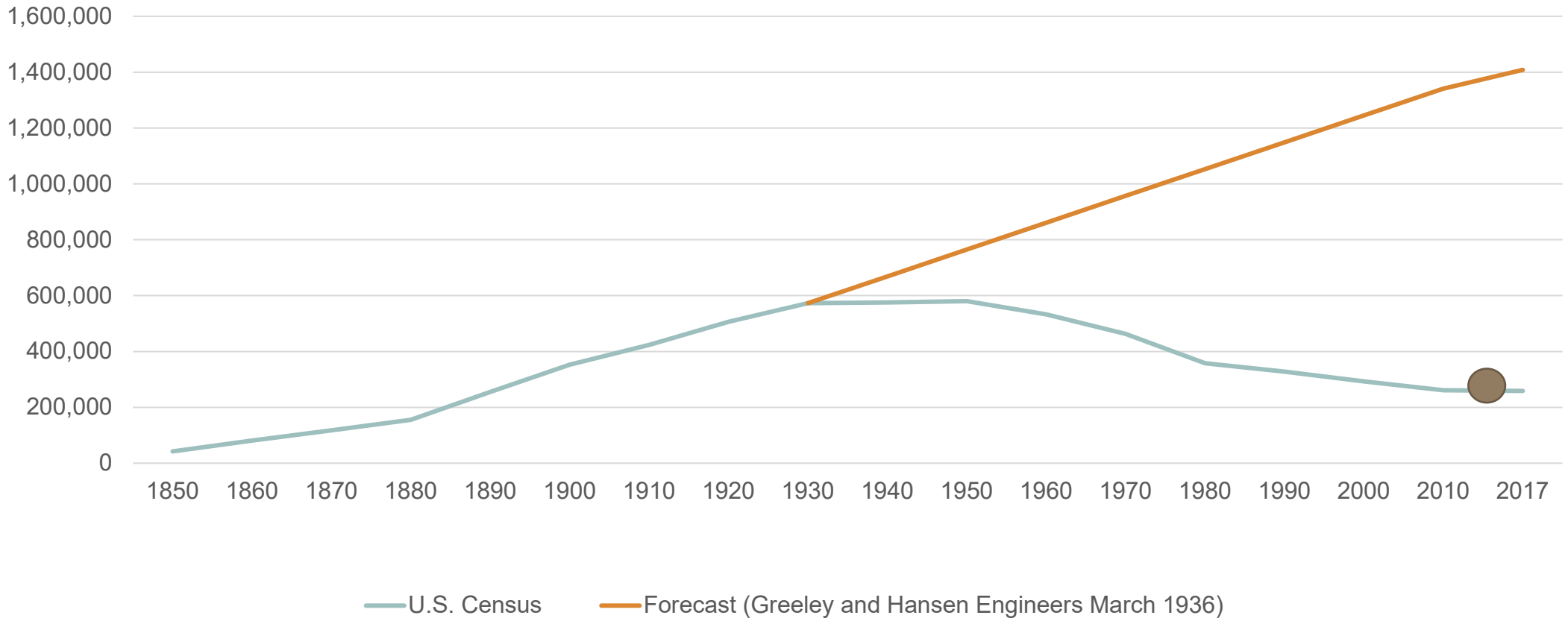
1983-2010: CSO Abatement Phase I

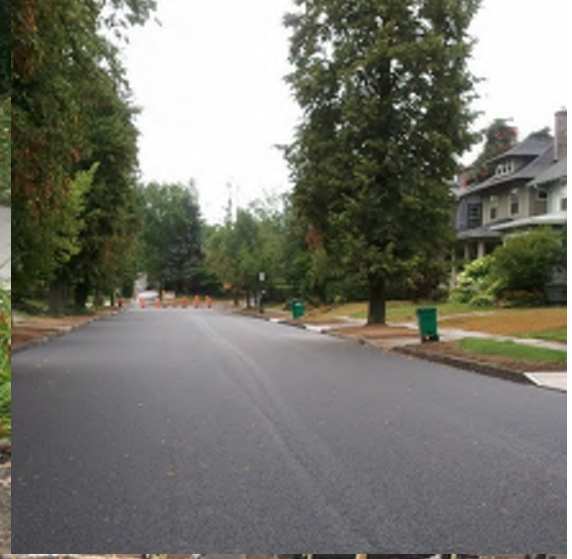


1983-2010: Combined Sewer Overflow (CSO) Abatement Phase I

- Sewer Separation
- Weir modifications
- Emphasis on eliminating number of CSO locations

CSO Abatement Phase II LTCP 2010-Today



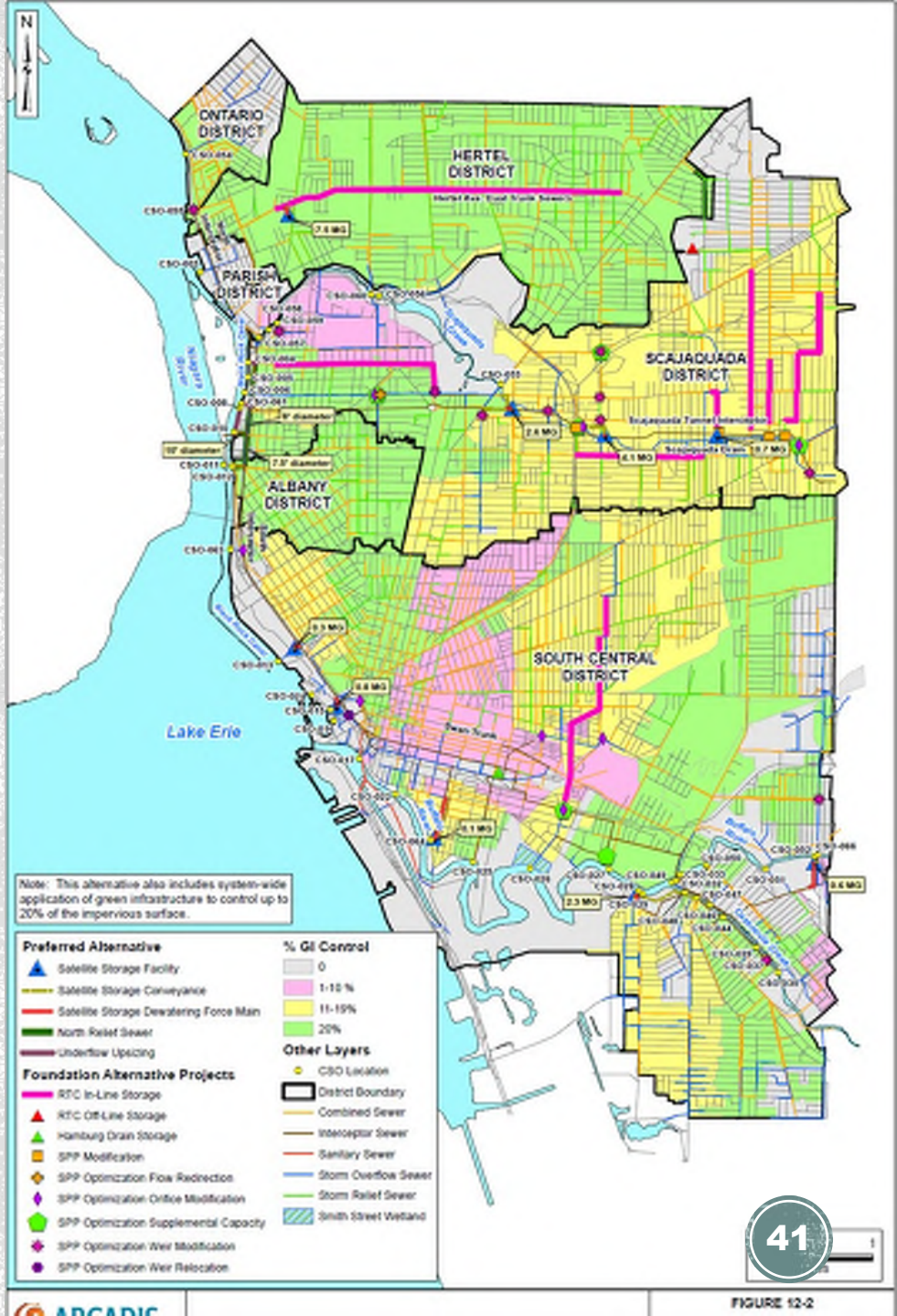


2010-Today: CSO Abatement Phase II

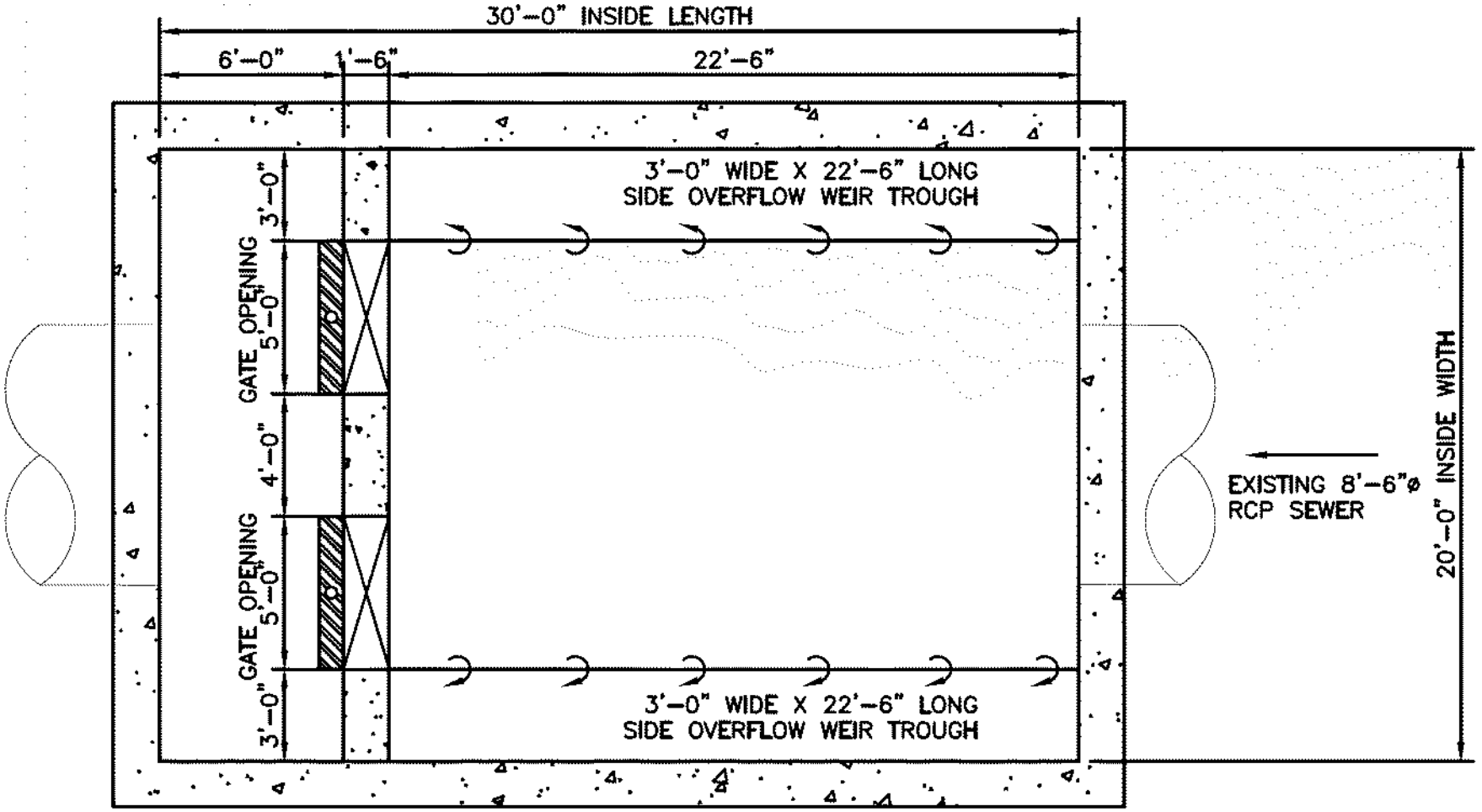
- Final Long-Term Control Plan (LTCP) approved March 18, 2014
- Decrease CSO activations
- $380 Million (2012 Dollars)
- Mix of gray
  - Wastewater Treatment Facility upgrades
  - Real Time Control “Smart Sewers”
  - Localized Sewer Separation
  - Underground detention tanks
- And green
  - Bioretention
  - Permeable pavement
  - Demolitions

2010-Today: Real Time Control (RTC) Smart Sewer Concept Viability

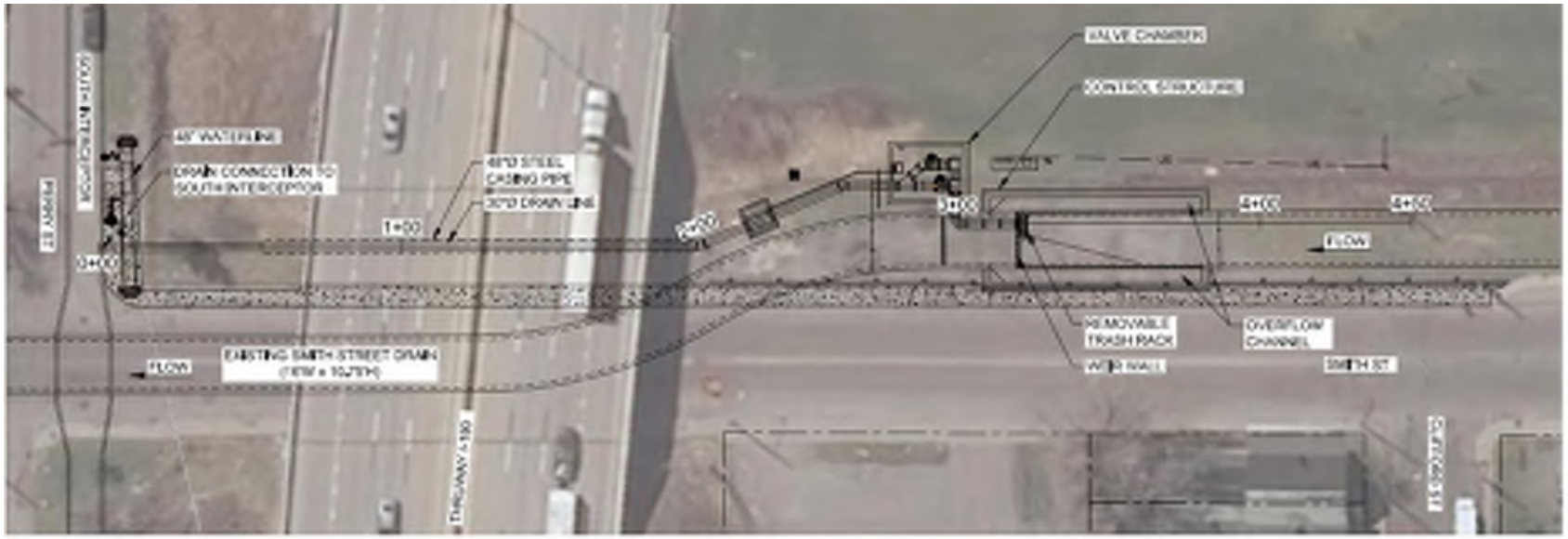
- Vacancy on East Side
  - Vacant lots absorbing water that would have gone into combined system
  - Sanitary and industrial discharges reduced
- Kensington Expressway cutting off half of the flows
- Hertel sewers are deep to capture Cornelius Creek



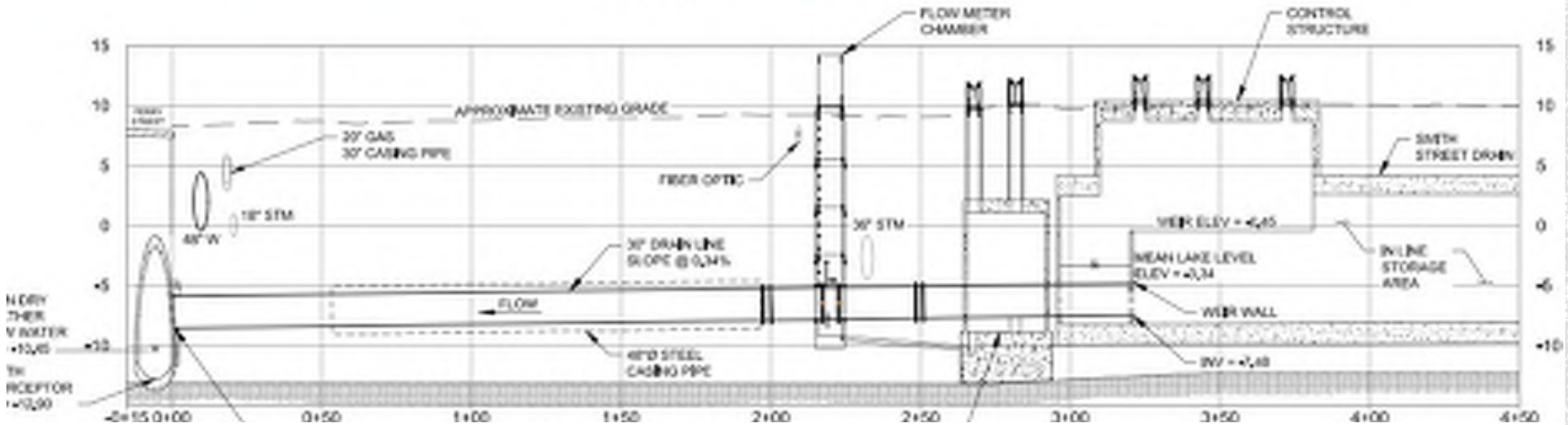
2010-Today: Real Time Control (RTC) Smart Sewer Inline Storage Concept



Long Term Control Plan: CSO 026 Smith Street RTC



PLAN
SCALE: 1" = 40'



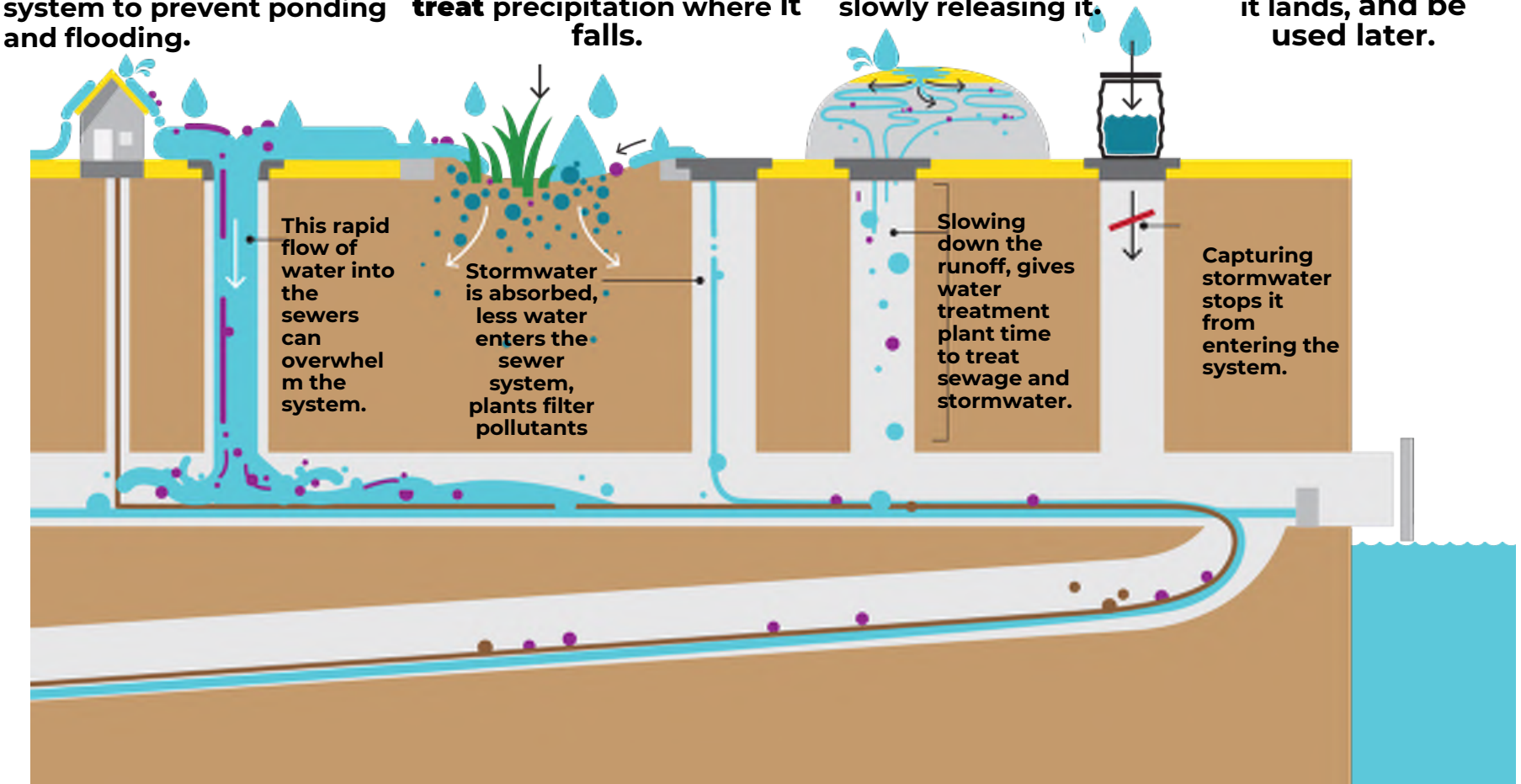
How green infrastructure helps us meet the stormwater challenge

Impervious surfaces are designed to quickly move water into the sewer system to prevent ponding and flooding.

Green infrastructure often involves plants and vegetation to **absorb and treat** precipitation where it falls.

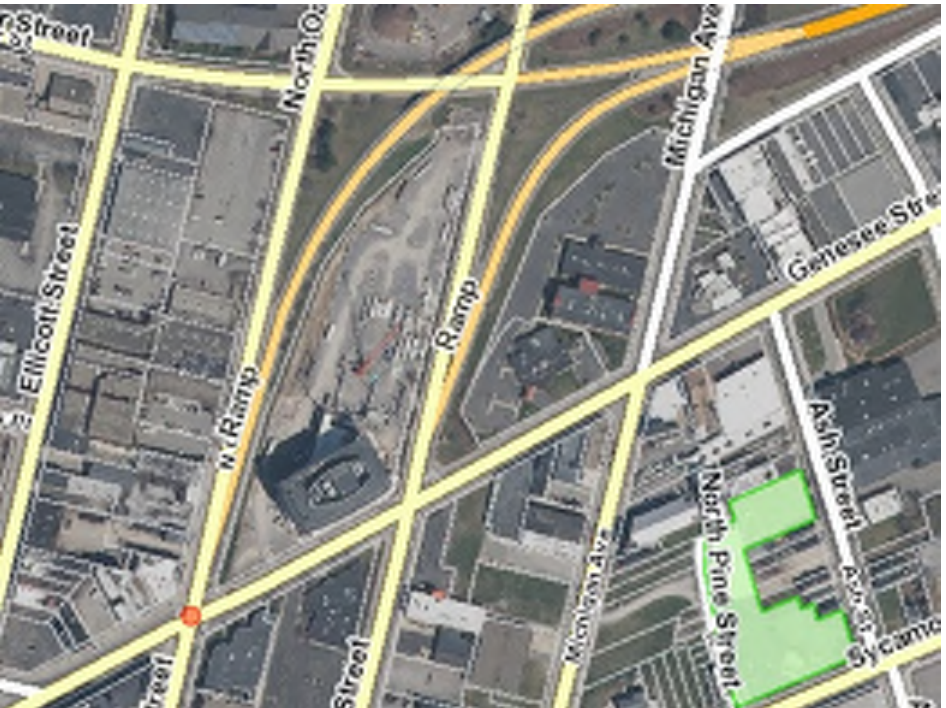
Green infrastructure can **temporarily store stormwater** before slowly releasing it.

Green infrastructure can **capture stormwater** where it lands, and be used later.



Long Term Control Plan Projects: Bioretention and VTP

Maintenance and Repairs: Pratt Street



Maintenance and Repairs: North Oak Street

- Call from contractor
  - Cut for DOT project for electrical line
  - Street gave way
- Hole in 1851 sewer
- Once repair started kept running into issues
  - 150 feet of sewer replacement
  - Washed out bottom area further up Oak

Maintenance and Repairs: Reactive to Preventative

- Observations
  - Part of Pratt Street sewer collapsed (pre-Civil War) in 2016
  - Part of North Oak Street sewer collapsed (pre-Civil War) in 2016
  - Parts of two other large diameter pre-Civil War sewers collapsed in 2017
  - Pre-Civil War sewers represent a very small portion of sewer system
- Conclusion: pre-Civil War sewers should be prioritized for inspection
- Problem: Buffalo Sewer's records for many pre-Civil War sewers are missing dates
- Solution: look at historical mapping for areas where older sewers would have been built and then cross-reference with sewers without dates

Maintenance and Repairs: Lost Waterways

Maintenance and Repairs: Lost Waterways

Modern Location

River is ~450 feet away

1870 Map

Buffalo Creek runs under location

Maintenance and Repairs: Non-Compliant Components

- Most sewers had manholes installed in 1930s
- Still some sewers without manholes or 1000+ feet between manholes
- Tempting to just order manholes to be installed
- But….

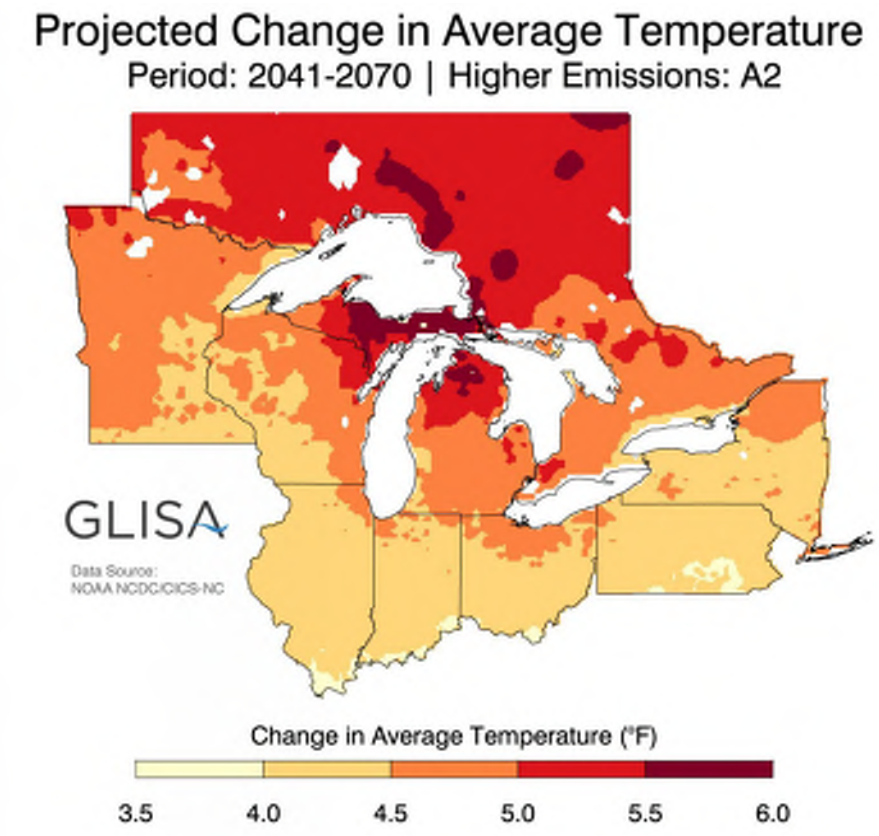
Climate Change Downscale Forecast

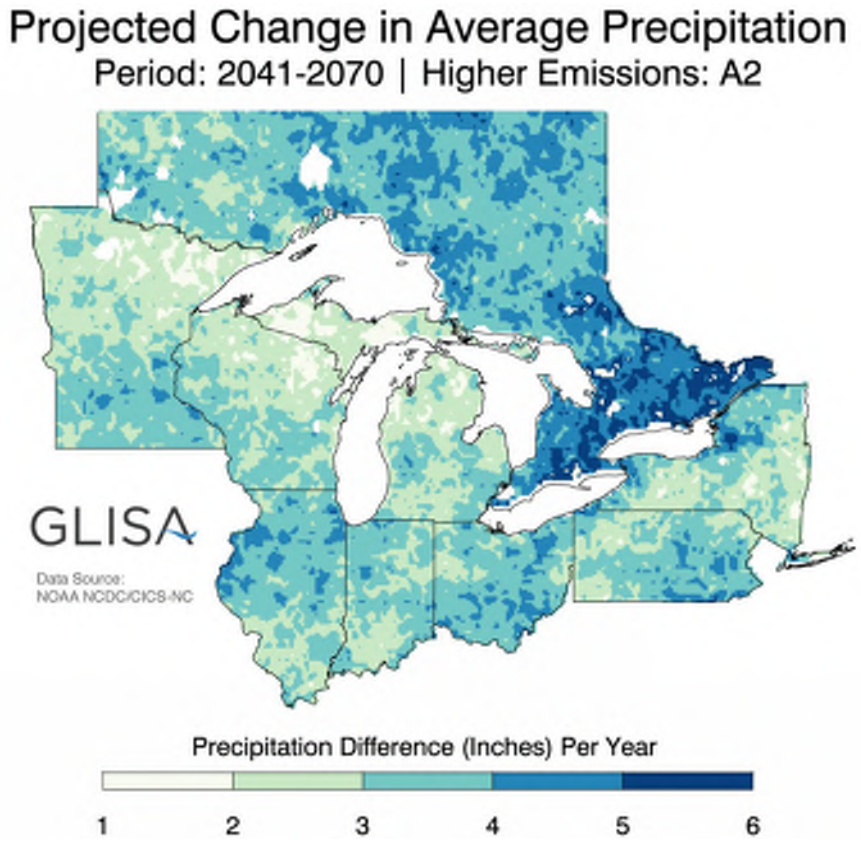
Variable of Interest	Sub-Variables of Interest	Historical/Current	Mid-Century Projected Changes	% Change Between Historic and Future; Mid Century % / End Century %
Precipitation	Total Annual Precip	40.5 in.	40 to 45 in.	-1 to 11% / 4 to 19%
Precipitation	Winter Avg Precip	9.6 in.	10 to 12 in.	4 to 25% / 4 to 25%
Precipitation	Spring Avg Precip	9.3 in.	7 to 11 in.	-25 to 18% / -14 to 29%
Precipitation	Summer Avg Precip	10.1 in.	8 to 10 in.	-21 to -1% / -21 to -1%
Precipitation	Fall Avg Precip	11.4 in.	11 to 12 in.	-4 to 5% / 5 to 14%
Precipitation	Heavy Precipitation Days(>1.25")	2.9 days (> 1.25")	2.6 to 5.3 days	-10 to 83% / 62 to 124%

Climate Change Downscale Forecast

Variable of Interest	Sub-Variables of Interest	Historical/Current	Mid-Century Projected Changes	% Change Between Historic and Future; Mid Century % / End Century %
Temperature	Avg Annual Temp	48.6°F	52 to 54°F	7 to 11% / 13 to 21%
Temperature	Winter Avg Temp	27.4°F	29 to 31°F	6 to 13% / 17 to 31%
Temperature	Spring Avg Temp	45.9°F	48 to 51°F	5 to 11% / 11 to 24%
Temperature	Summer Avg Temp	69.2°F	73 to 75°F	5 to 8% / 11 to 17%
Temperature	Fall Avg Temp	51.5°F	54 to 58°F	5 to 13% / 11 to 22%
Temperature	Avg Low Temp	40.5°F	45 to 46°F	11 to 14% / 19 to 28%
Temperature	Avg High Temp	56.7°F	60 to 62°F	6 to 9% / 8 to 18%
Temperature	Days/Year Greater Than 90F	2 days	9 to 26 days	350 to 1200% / 1050 to 2600%
Temperature	Days/Year Greater Than 95F	0.3 days	1 to 9 days	233% to 2900% / Not Available
Temperature	Days/Year Less Than 32F	117 days	91 to 95 days	-22% to -19% / Not Available

Downscale Model
Great Lakes as a Whole





SEICHE EVENTS

Historic Crests
(Station Established 4/1/1860)

(1) 12.08 ft on 12/02/1985
(2) 11.12 ft on 11/15/2020
(3) 11.06 ft on 01/30/2008
(4) 10.65 ft on 11/01/2019
(5) 10.65 ft on 04/06/1979
(6) 10.57 ft on 12/11/2021
(7) 10.36 ft on 12/12/2020
(8) 10.31 ft on 11/10/1975

Unofficial Data 12/23/2022: 10.51 ft

Niagara River Flow

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1926 - 2022, BY WATER YEAR (WY)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	202,200	202,900	203,800	199,000	195,600	202,000	210,400	218,600	217,700	214,600	210,500	205,400
Max	254,000	254,400	260,900	265,900	241,600	270,500	279,600	277,300	285,000	276,500	270,200	257,299
(WY)	(1987)	(2020)	(1986)	(2020)	(1987)	(2020)	(2020)	(2019)	(2019)	(2019)	(2019)	(2019)
Min	152,700	148,100	149,800	138,500	116,200	142,700	152,000	159,100	158,000	154,100	155,000	153,900
(WY)	(1935)	(1935)	(1965)	(1964)	(1936)	(1934)	(1935)	(1934)	(1934)	(1934)	(1934)	(1934)

Water-Data Report 2022

04216000 NIAGARA RIVER AT BUFFALO, NY -- Continued

Climate Change

- Climate Refuge???
  - Average Rainfall
    - Increasing Slightly to Moderately
    - Possibly Falling in the Near Term?
  - Average Temperature
    - Increasing Slightly to Moderately
    - May Have 100 + degree days by Century's End
  - Winds: Poorly Modeled, But Likely Increasing Significantly

Up-Lake Communities

Average Rainfall Increasing

2016- Current Historically High Lake Levels

- **Buffalo and Niagara Rivers**
- **Basement Back-ups**
- **Syphon Risks**
- **Smart Sewer Viability**

What Are We Doing?

- Back Water Valves
- Back Water Gates
- Working with Army Corps of Engineers
- New Development Green Code Ordinance

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Questions?

BSA's Proposed Project Schedules (GI Projects not included)

Project Name and Tag	Start - Completion
Jefferson & Florida (SPP 170B) (2.6 MG) (M), Replaced by CSO053_11, 1.5 MG Canisius/Jefferson Delevan OLS	9/7/28 - 4/9/32
Amherst Quarry OLS (M) Now CSO053_3.2 Bailey & Amherst, Amherst Quarry PS RTC	5/28/25 - 7/6/28
Underflow Upsizing (CSO 008/010, 061, 004) (M) Replaced by CSO010_1 Breckenridge Niagara RTC	8/26/25 - 1/31/29
CSO006_2 Gates Circle RTC	4/8/25 - 5/17/28
CSO053_10 SPP229A RTC	10/22/24 - 7/19/26
CSO053_12.2 Jefferson Ave GI	5/6/25 - 6/14/28
CSO053_12.1 Jefferson Ave GI	5/6/25 - 6/14/28
CSO053_3.3 Bailey & Minnesota SPP254 Modification	10/22/24 - 7/19/26
Colorado ILS (M) Replaced by CSO053_2.5 SPP337 Modification	4/24/26 - 11/20/27
South Bailey ILS (M) Replaced with CSO053_3.1 SPP338 Modification	4/23/27 - 6/1/30
SPP 341A Optimization Genesee & Kearns (M) Replaced by CSO053_8 SPP341A Modification	4/24/26 - 11/20/27
CSO053_1.5 SPP336B Modification	4/24/26 - 11/20/27
SPP 336 A/B (SPP165A, SPP165B, SPP336A, SPP 336B) (4.2 MG) (M), Replaced by CSO053_1.4, 3.26 MG Sidney OLS	6/18/27 - 5/29/32
CSO053_13 SPP165B Modification	4/24/26 - 11/20/27
CSO053_14 SPP175 Modification	4/24/26 - 11/20/27
CSO053_5.2 Edison Martha OLS	6/18/27 - 4/30/33
CSO014_1.1 SPP206A&B RTC	2/25/28 - 2/9/30
System_2 Schiller Park OLS	6/16/28 - 5/28/33
System_2_3 SPP339 Modification	4/23/27 - 11/18/28
System_2_4 Schiller Park OLS SPP340 Modification	4/23/27 - 4/7/29
CSO-013 (0.3 MG) (M), Replaced with CSO013_1 SPP304 Modification	4/22/28 - 11/18/29
CSO012_1.2 SPP023 Modification	4/22/28 - 11/18/29
CSO012_2.1 SPP296 Modification	4/22/28 - 11/18/29
CSO017_8 SPP326 Modification	4/22/28 - 11/18/29
CSO-014/015 (0.8 MG), (M) Updated to larger tank: CSO014_1.2 5.55 MG Erie Basin Marina OLS	3/24/29 - 3/5/34
CSO011_1.2 SPP024 Modification	4/22/28 - 11/18/29
CSO026_1.3 Collins Park OLS	6/18/30 - 5/30/35
CSO027_1 SPP 317 Modification	4/24/29 - 11/20/30
CSO027_2 Babcock PS Weir Modification	4/24/29 - 4/9/31
CSO-055 (7.5 MG) (M), Updated to larger tank with new location: CSO055_1.5 11.55 MG Military Rd OLS	12/12/30 - 1/2/37
Northern Relief Sewer/North Relief - Interceptor (M) New Configuration, tagged as System_1 Northern Relief Tunnel	6/23/33 - 6/1/40
CSO017_9 SPP059 Modification	4/25/31 - 11/20/32
CSO027_3 SPP097 modification	4/25/31 - 11/20/32
CSO033_2 Clinton St OLS	1/27/32 - 3/8/36
CSO033_3 SPP104 Modification	4/25/31 - 11/20/32
CSO017_10 SPP051 Modification	4/25/31 - 11/20/32
CSO006_3 Delavan Drain Weir Raising & RTC	2/25/33 - 4/5/36
CSO-064 (0.1 MG) (M), Replaced with CSO064_1.1 CSO-064 ILS	3/25/33 - 3/10/35
CSO064_1.2 SPP 137, Modification	4/23/32 - 11/19/33
CSO-028/044/047 (2.3 MG) (M) Updated to smaller tank: CSO028_1, 0.95 MG Hopkins & Osage OLS	3/24/34 - 3/5/39
CSO017_6 Bass Alley OLS	3/24/34 - 3/5/39
CSO033_1 Bailey & Regent OLS (Moreland Park)	3/24/35 - 3/4/40
CSO064_2 Perry Street Sanitary Sewer	3/26/36 - 6/3/38
CSO017_1.1 SPP054 Sewer Separation	3/26/36 - 6/3/38
Hertel North East ILS (M) Updated design (CSO055_1.1)	4/23/37 - 6/1/40

LEGEND

Scajaquada Creek · Erie Basin Marina · Niagra River

Black Rock Canal · Buffalo River

How does this project impact the City of Buffalo?

This project will reduce overflows from the City's sewers by helping flow reach the Bird Island Wastewater Treatment Facility during wet weather, instead of entering Buffalo's Creeks and river.

The implementation of this project, which includes 50 sites in total, will cost approximately $750M over the next 15 years.

Why is this work being done?

Hundreds of millions of gallons of storm water mixed with sanitary sewage overflows to the waterways of Western New York during rainfall and snow melt periods each year.

The Buffalo Clean Waters Program will reduce these events.

CONTACT US

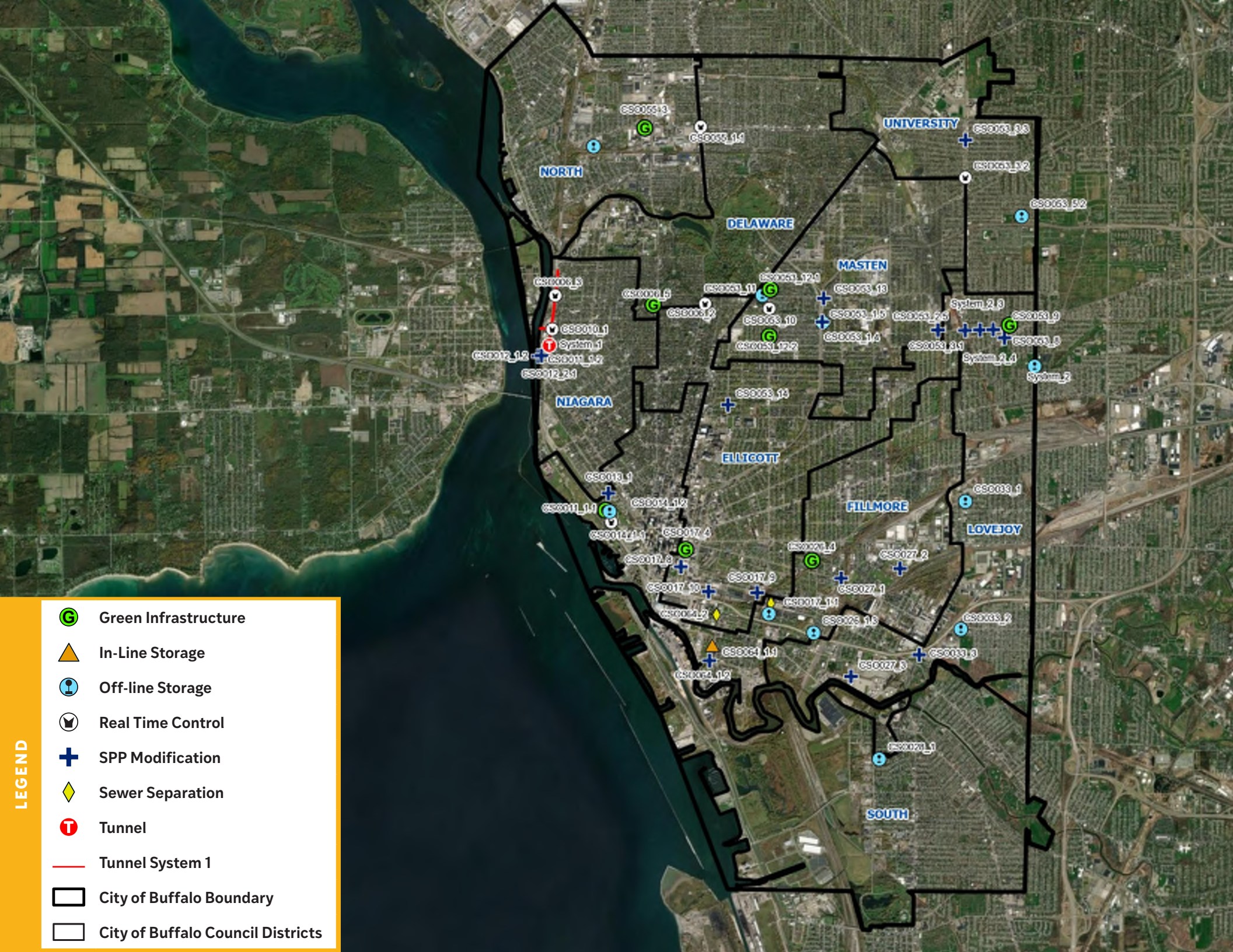
Buffalo Sewer Authority
1038 City Hall
65 Niagara Square
Buffalo, NY 14202

716-851-4664

BUFFALO
SEWER AUTHORITY

BUFFALO CLEAN WATERS PROGRAM

- Green Infrastructure
- Sewer Improvements & Modicfications
- Real-Time Control Smart Sewers
- Combined Sewer Overflow (CSO) Storage


NORTH
UNIVERSITY
DELAWARE
MASTEN
NIAGARA
ELLICOTT
FILLMORE
LOVEJOY
SOUTH
LEGEND
Green Infrastructure
In-Line Storage
Off-line Storage
Real Time Control
SPP Modification
Sewer Separation
Tunnel
Tunnel System 1
City of Buffalo Boundary
City of Buffalo Council Districts

The Who, What, Why, and How of RTC Design, Implementation, and O&M

ROSALEEN B. NOGLE, PE, BCEE, BC WRE
PRINCIPAL SANITARY ENGINEER

BUFFALO
SEWER AUTHORITY

The Who of Design

- Capital Projects Team
  - Planning
  - Project Manager
  - Accounting
  - Grants Management
  - Legal
- Operations
  - Collection System Maintenance
  - Instrument Technicians
  - Millwrights
  - SCADA Oversight
  - Treatment Facility Operators
- RTC Program Management
  - Capital Program Manager
  - System Modeler
  - Planner
  - Programmer
- Outside Legal Counsel
  - Assessor
  - Lawyer
  - Surveyor
- Regulatory Officials
- Project Design Consultant
  - Surveyor
  - Civil/Site
  - Structural
  - Mechanical
  - Controls
  - Electrical
  - Geotechnical
  - Geologist
  - Public Outreach Specialist

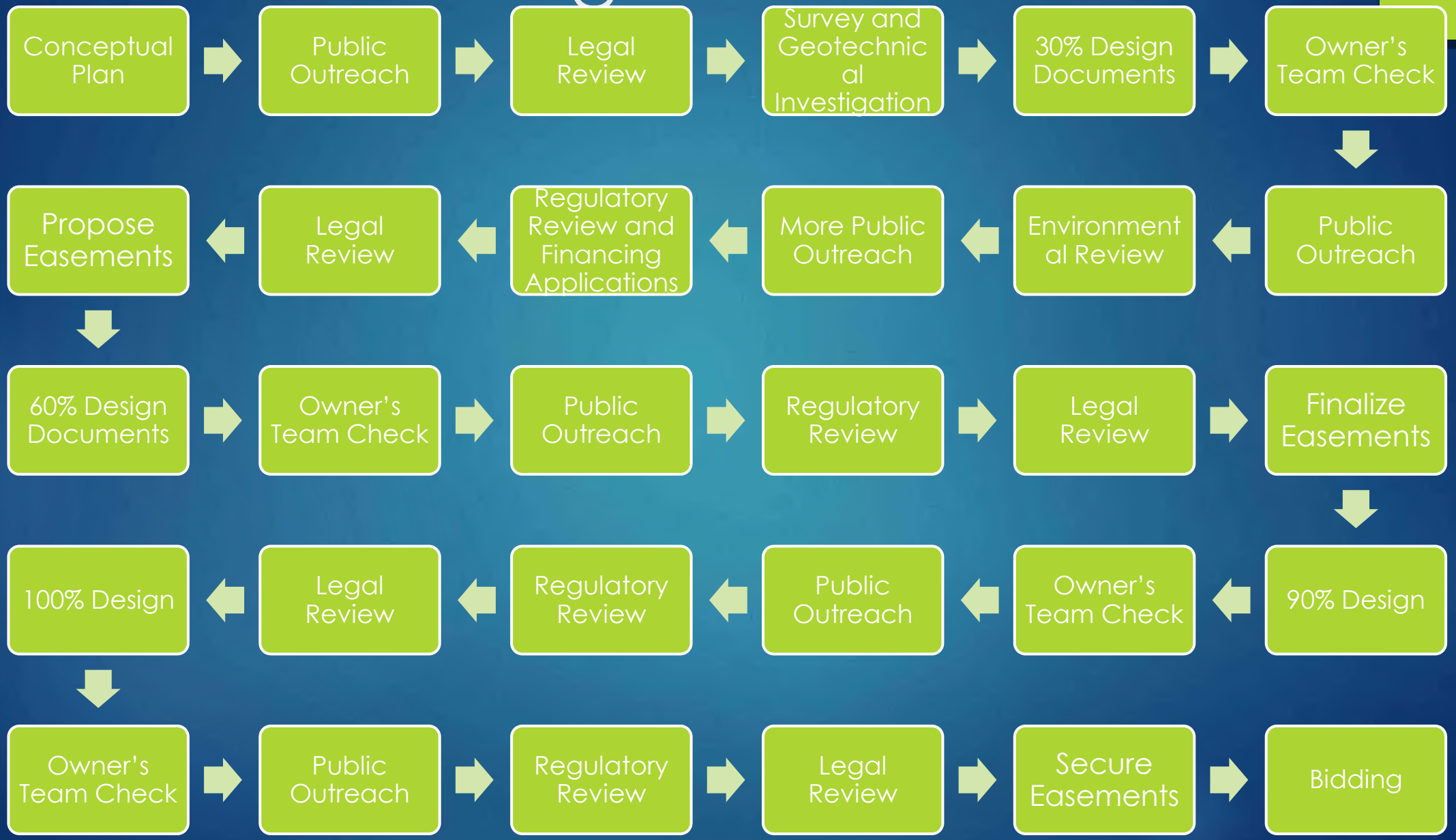
The What of Design

- In-line Storage
  - Existing Infrastructure Modifications
    - Gates
    - Weirs
  - New Storage System
- Off-line Storage
  - Pump Station?
  - Tank?
  - Tunnel?

The Why of Design

- Regulatory
  - Clean Water Act
  - Combined Sewer Overflows Long Term Control Act
- Climate Change
- Population Dynamics

The How of Design



The Who of Implementation

- Capital Projects Team
  - Planning
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  - Grants Management
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  - Collection System Maintenance
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  - Treatment Facility Operators
- RTC Program Management
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  - System Modeler
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  - Programmer
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  - Lawyer
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- Regulatory Officials
- Project Design Consultant
- Construction Administration and Inspection
  - Surveyor
  - Civil/Site
  - Structural
  - Mechanical
  - Controls
  - Electrical
  - Geotechnical
  - Geologist
  - Public Outreach Specialist
- Contractor
  - Electrical Subcontractor
  - Instrumentation Subcontractor
  - Shoring Subcontractor
  - Blasting Subcontractor
  - Suppliers
  - Haulers

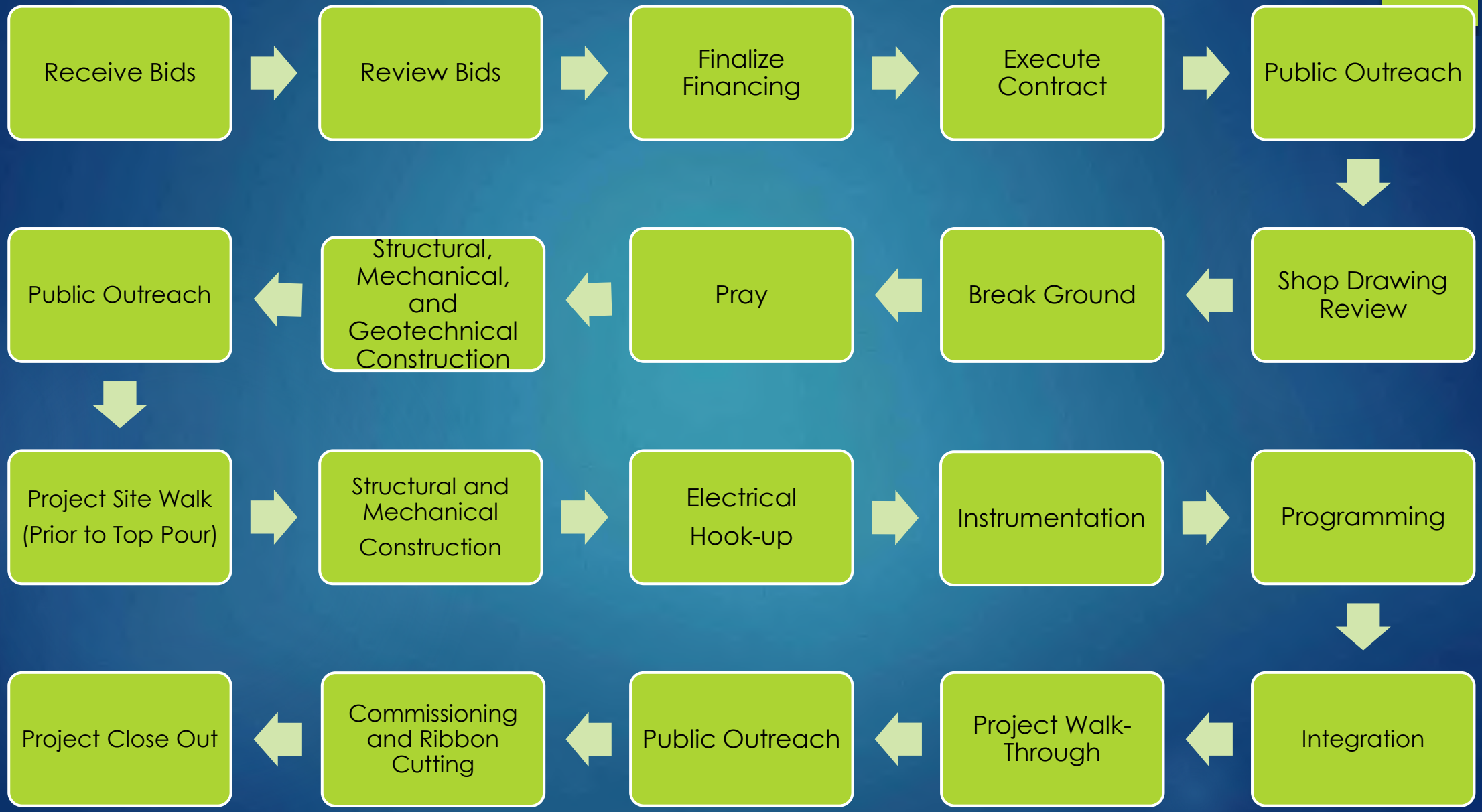
The What of Implementation

- In-line Storage
  - Existing Infrastructure Modifications
    - Gates?
    - Weirs?
  - New Storage System?
- Off-line Storage
  - Pump Station?
  - Tank?
  - Tunnel?
- Highway Permits?
- Electrical Connection?
- Radio/Wireless/Landline connection?

The Why of Implementation

- Regulatory
  - Clean Water Act
  - Combined Sewer Overflows Long Term Control Act
  - Stormwater Management
- Climate Change
- Population Dynamics

The How of Implementation



The Who of O&M

- Capital Projects Team
  - Planning
  - Project Manager
  - Accounting
  - Grants Management
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- Operations
  - Collection System Maintenance
  - Instrument Technicians
  - Millwrights
  - SCADA Oversight
  - Treatment Facility Operators
- RTC Program Management
  - Capital Program Manager
  - System Modeler
  - Planner
  - Programmer

The What of O&M

- Remote Monitoring
- Calibration
- Local Inspection
- Physical
  - Greasing
  - Grit Removal
  - Moisture Issues
  - Changing Batteries
  - Gages/Meters
- Reporting

The Why of O & M

- Maximize Storage
- New Technology
- Multiple Failure Points
- Regulatory Drivers
- Do Not Want Very Expensive Hole in the Ground

The How of O & M


Commissioning
Operations Monitoring
Preventative Maintenance
Programmer Post-Incident Review
Corrective Maintenance and Programming Adjustments
Operations Monitoring
Preventative Maintenance
Programmer Post-Incident Review
Corrective Maintenance and Programming Adjustments
Reporting
Planning
Design

BUFFALO

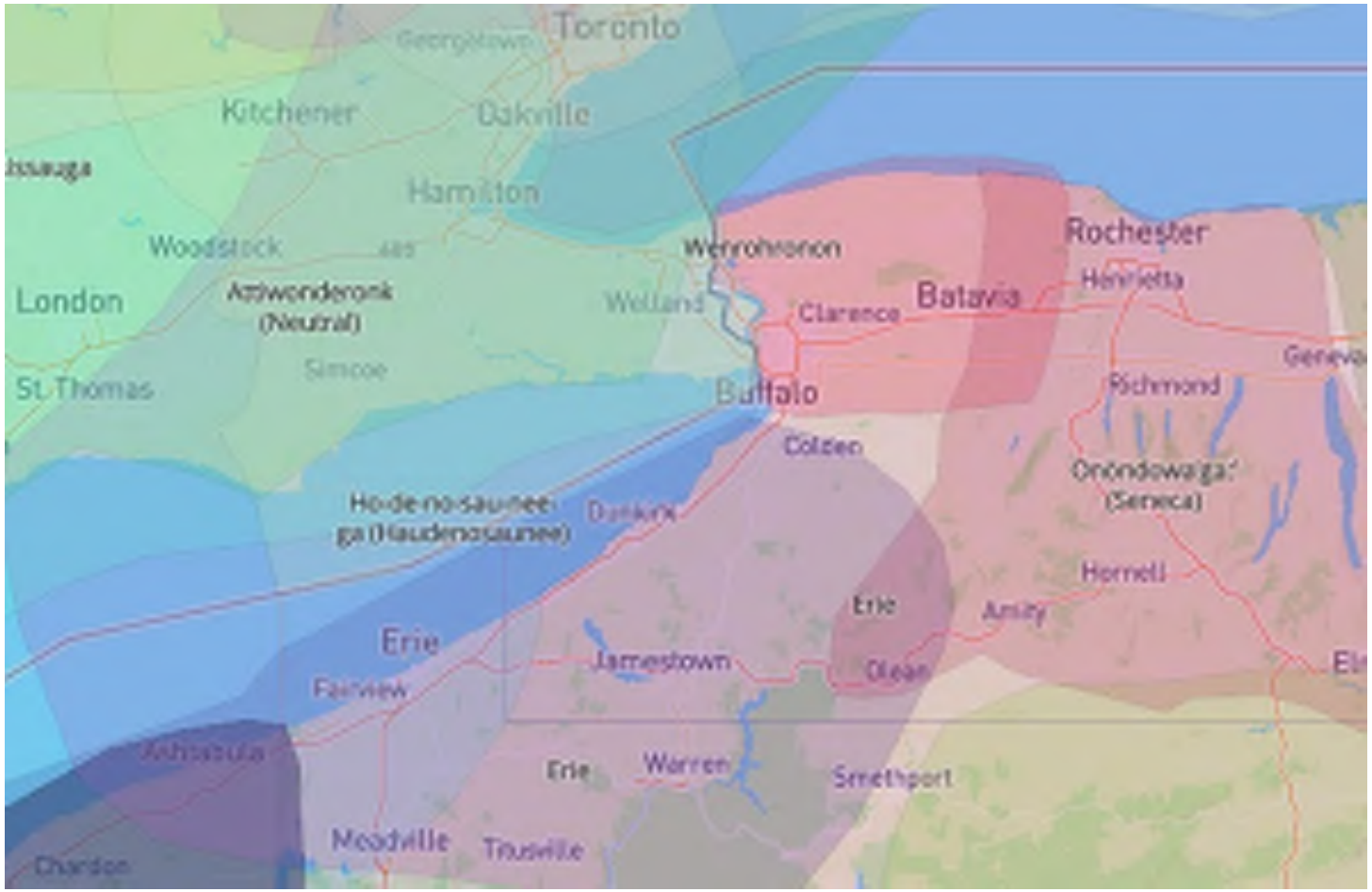
SEWER AUTHORITY

Building a Resilient City at the Place of the Basswood Trees

Rosaleen B. Nogle, PE, BCEE, BC WRE, CFM

M.S., B.S. Civil Engineering; M. Public Affairs (Public Admin Focus)

M.A. Pastoral Ministry, M. Div.,B.A. Anthropology



Land Acknowledgement

I would like to acknowledge the land on which the City of Buffalo is located, which is the territory of the Seneca Nation, a member of the Haudenosaunee/Six Nations Confederacy. This territory is covered by The Dish with One Spoon Treaty of Peace and Friendship, a pledge to peaceably share and care for the resources around the Great Lakes. It is also covered by the 1794 Treaty of Canandaigua, between the United States Government and the Six Nations Confederacy, which further affirmed Haudenosaunee land rights and sovereignty in the State of New York. Today, this region is still the home to the Haudenosaunee people, and we are grateful for the opportunity to live, work, and share ideas in this territory. In this acknowledgement, I hope to demonstrate respect for the treaties that were made on these territories and remorse for the harms and mistakes of the far and recent past; and we pledge to work toward partnership with a spirit of reconciliation and collaboration.

Buffalo's waterways

Niagara River

Scajaquada Creek

Black Rock Canal

Buffalo River

Cazenovia Creek

Lake Erie

Pre-1785: Frontier Villages and Native Lands

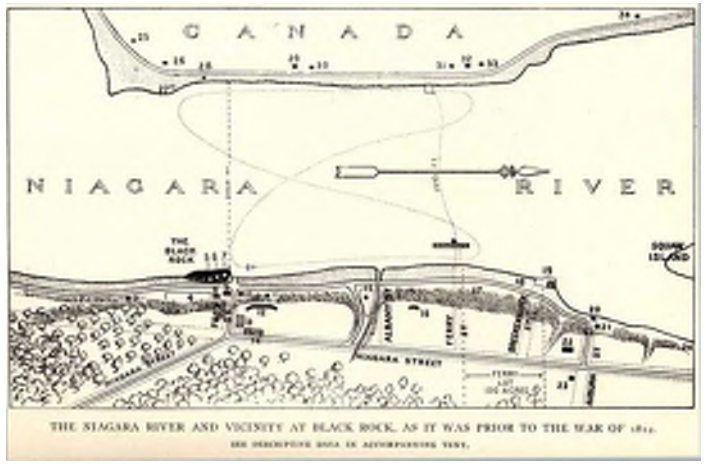
Buffalo's Name

- Big Buffalo Creek
- Buffalo

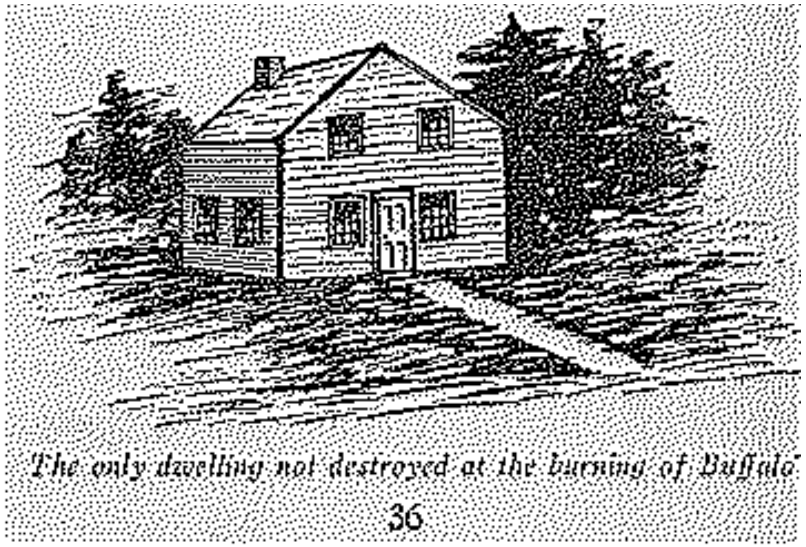
  "Tick-e-ack-gou"
- Place of the Basswoods

  "To-se-o-way"

1785-1825: Early Years



THE NIAGARA RIVER AND VICINITY AT BLACK ROCK, AS IT WAS PRIOR TO THE WAR OF 1812.


The only dwelling not destroyed at the burning of Buffalo

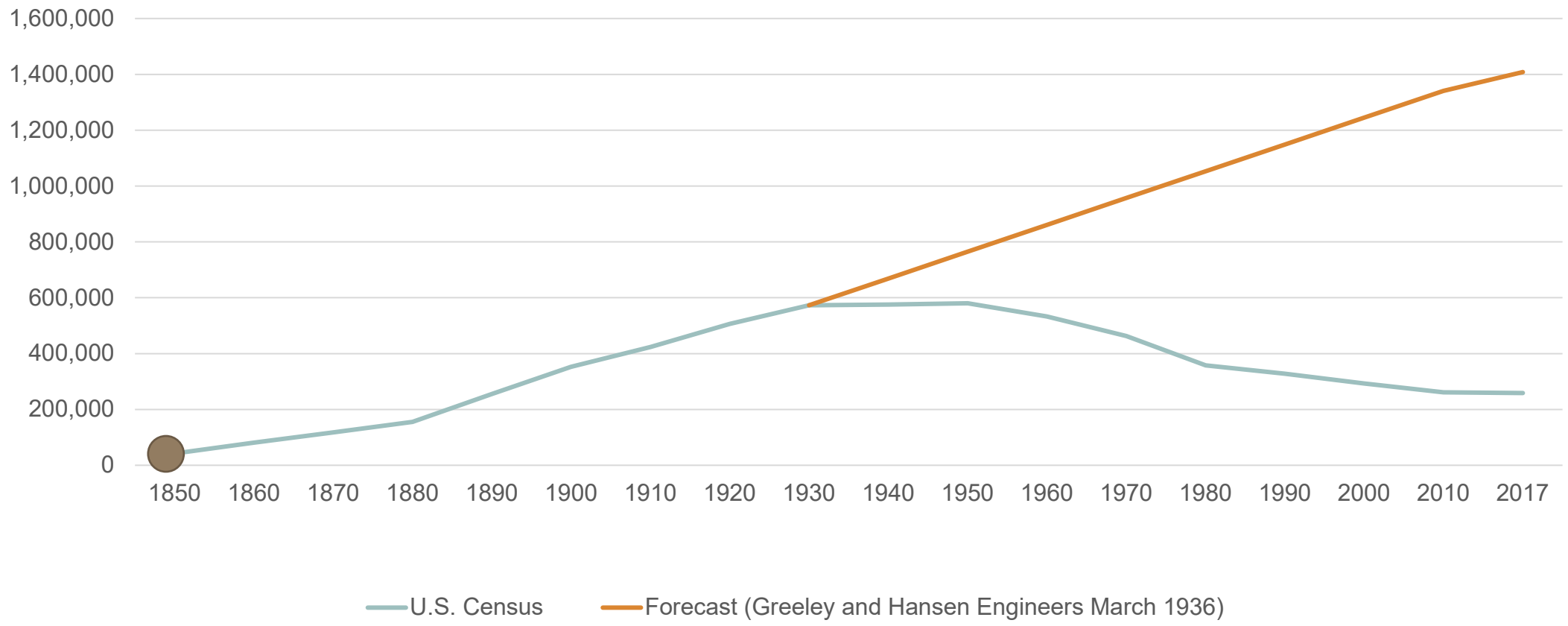
36

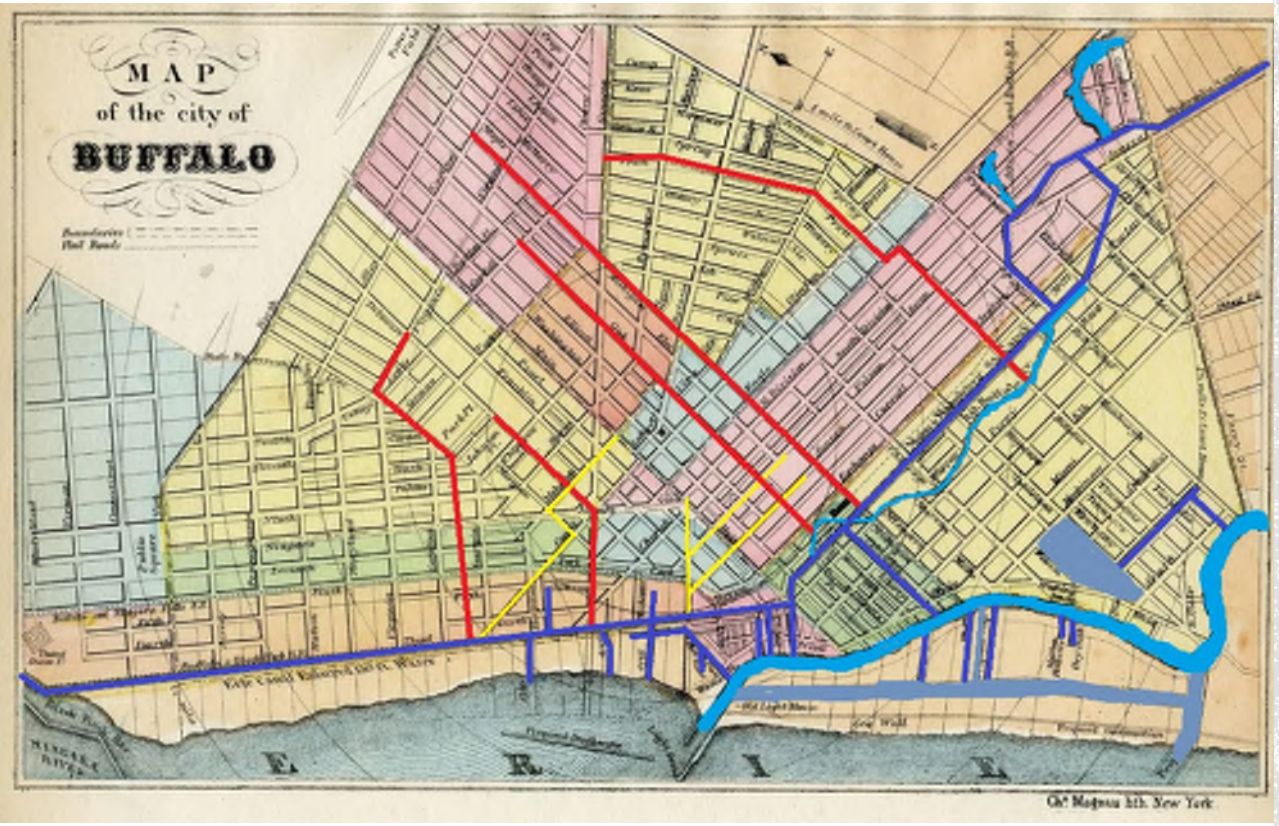
Big Buffalo and Little Buffalo Creek

1825-1848: Early Canal Years

- Drain to nearest water way
- Cholera epidemic 1832
- Private construction
- Oak Street 1834-1835
  - Dry brick
  - Board bottom
  - Triangular

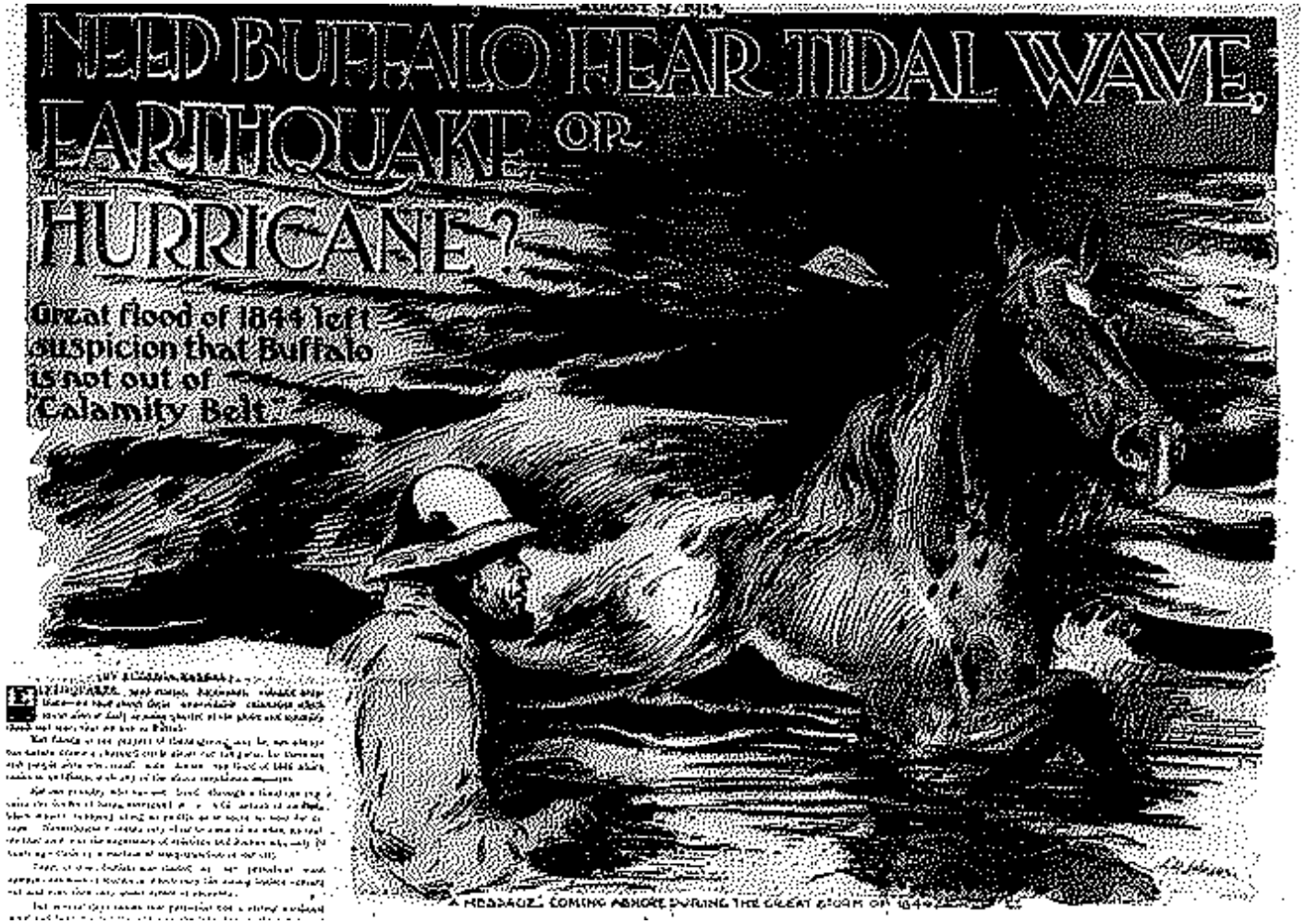
1825-1848: Early Canal Years





1848-1861: Later Canal Years

- Report of Committee on Sewers
  - 2/15/1848
  - Basis of design report
  - Property owners and taxes
- Cholera epidemics 1849, 1854
- 1852 Water Works Company
  - Bathing
  - Indoor toilets



1844 Flood

- 78 Dead
- October 18, 1844
- Main and Ohio Streets six feet deep
- Michigan and Exchange Streets five feet deep

Quiz: Up to 1861

- Why were these early sewers primarily constructed?

  Drainage

- What materials were used to construct these sewers?

  Stone, Wood, and Brick

- What events precipitated construction of additional sewers?

  Cholera and Piped Drinking Water

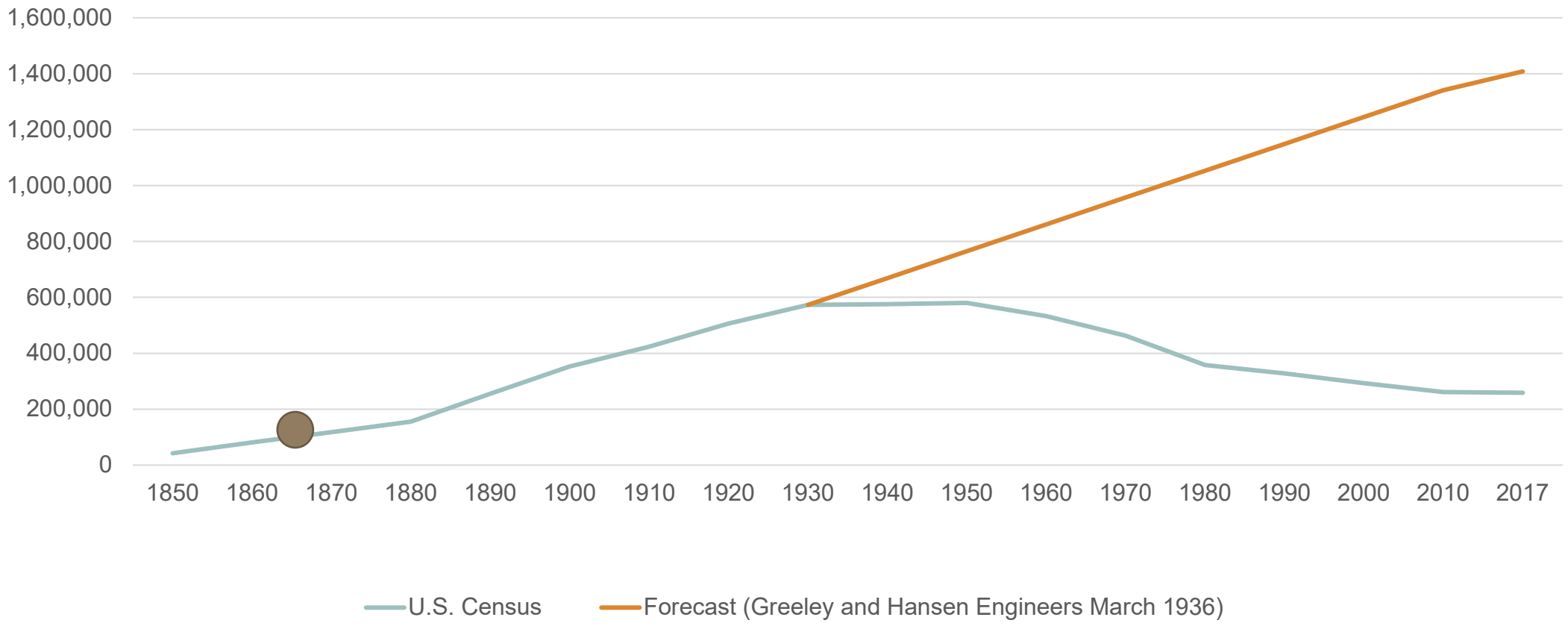
- What is a seiche?

  Bathtub rocking storm surge

1861-1865: The Civil War

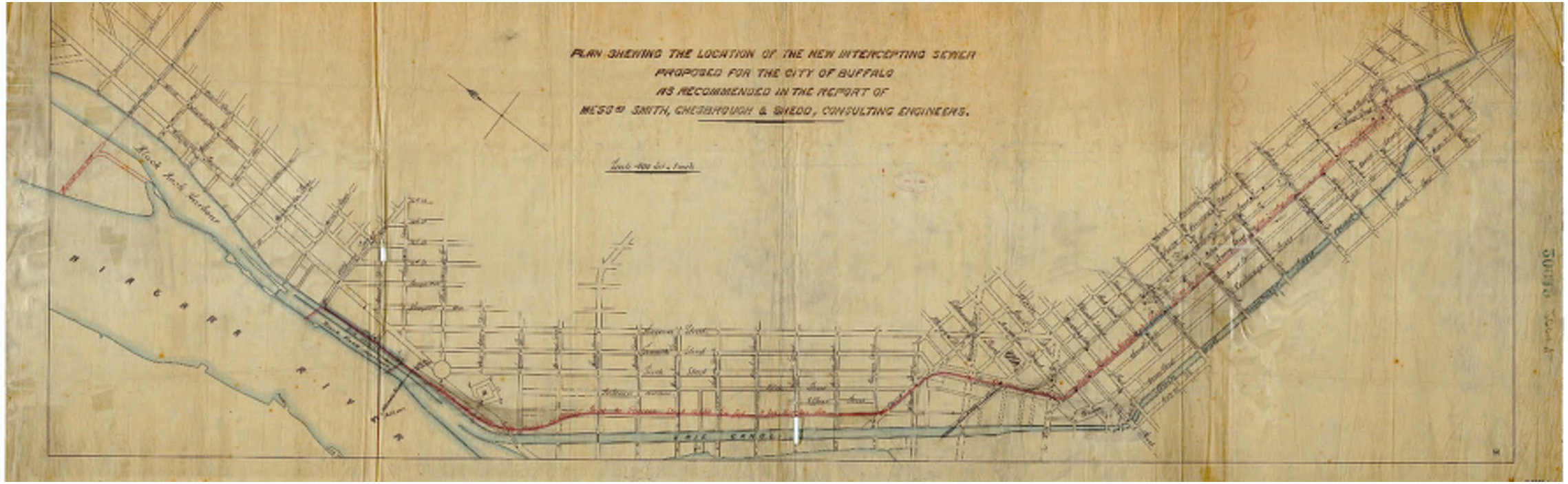
- The Civil War
  - Halt in construction
  - Materials and manpower needed for war
- Presentation to Historical Society Club
  - Oliver G. Steele, Esq. in 1866
  - Leader of 1848 Sewer Committee
  - Warned of need for more work
    - Issue of lack of proper traps
    - Too few catch basins and manholes

1861-1865: Civil War



1867-1899: Industrial Revolution

- George E. Waring, Jr. 1884
- Separate sewers and treatment considered, but not pursued
- Trunks
  - Genesee, Bird-Ferry, Hertel, Bailey, Mill Race
  - Swan
    - 3 Flushing gates
    - Main and Hamburg canal and Wilkenson Slip putrid
    - 90 degree turn at Albany Street

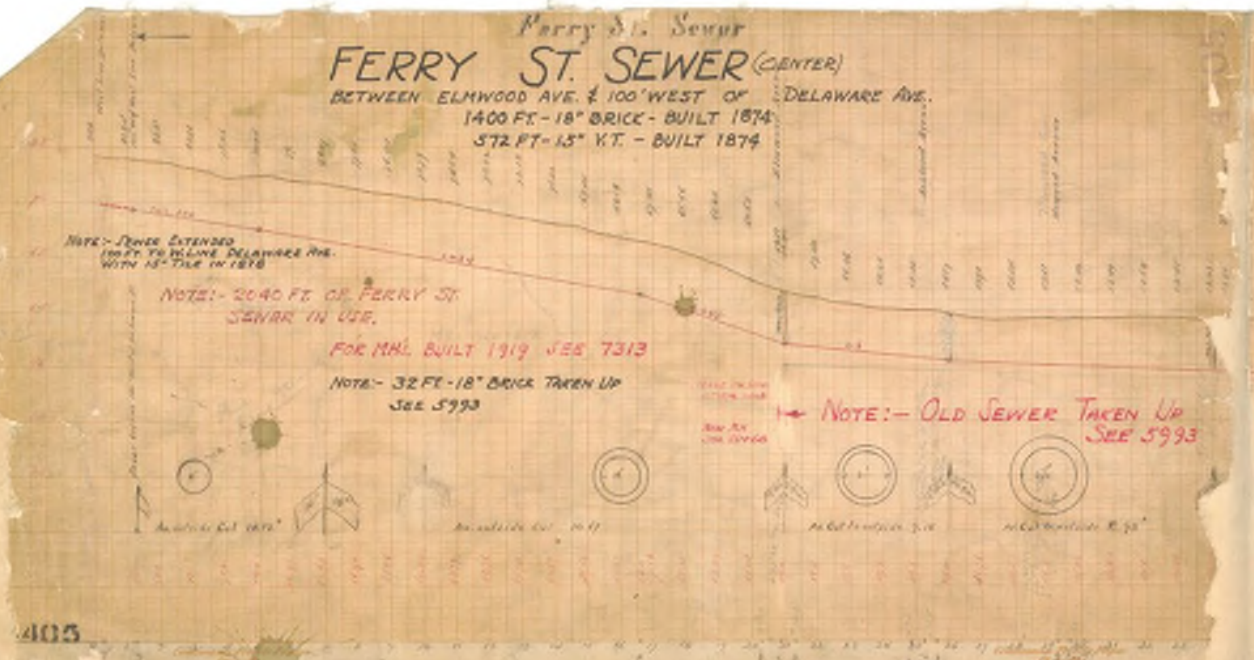


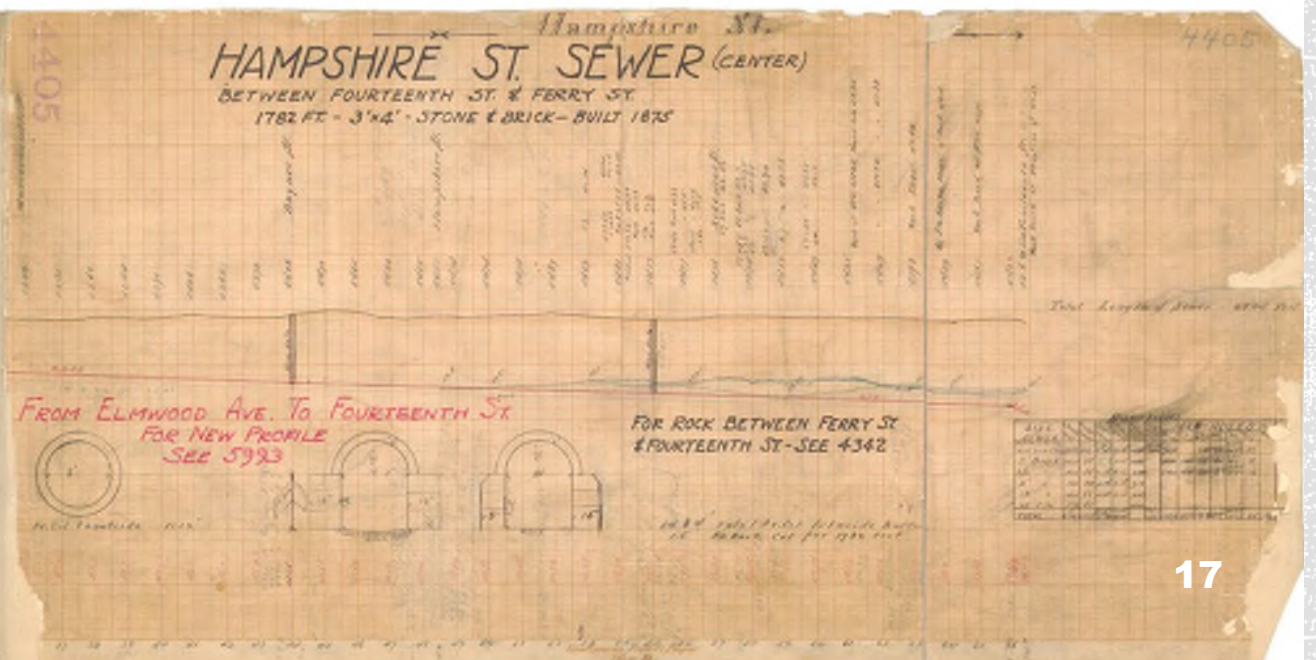
The Swan Trunk

16

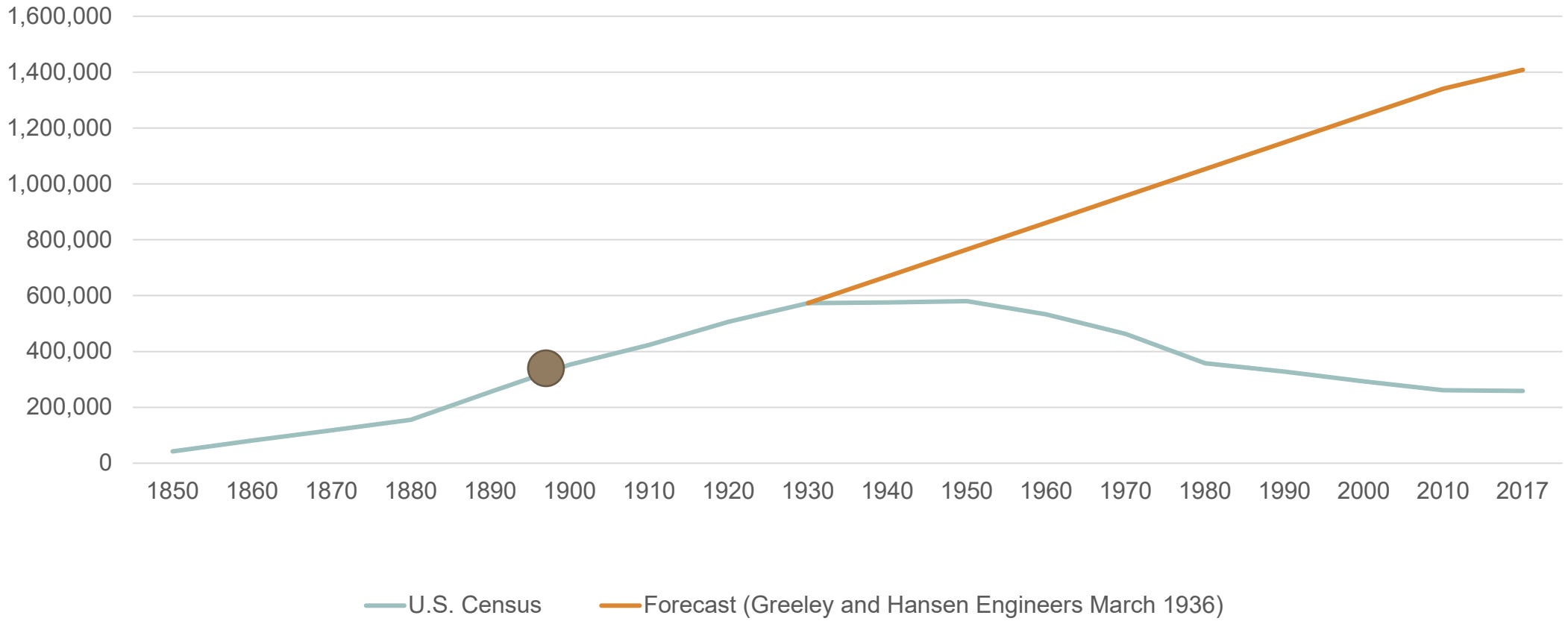
1867-1899: Industrial Revolution

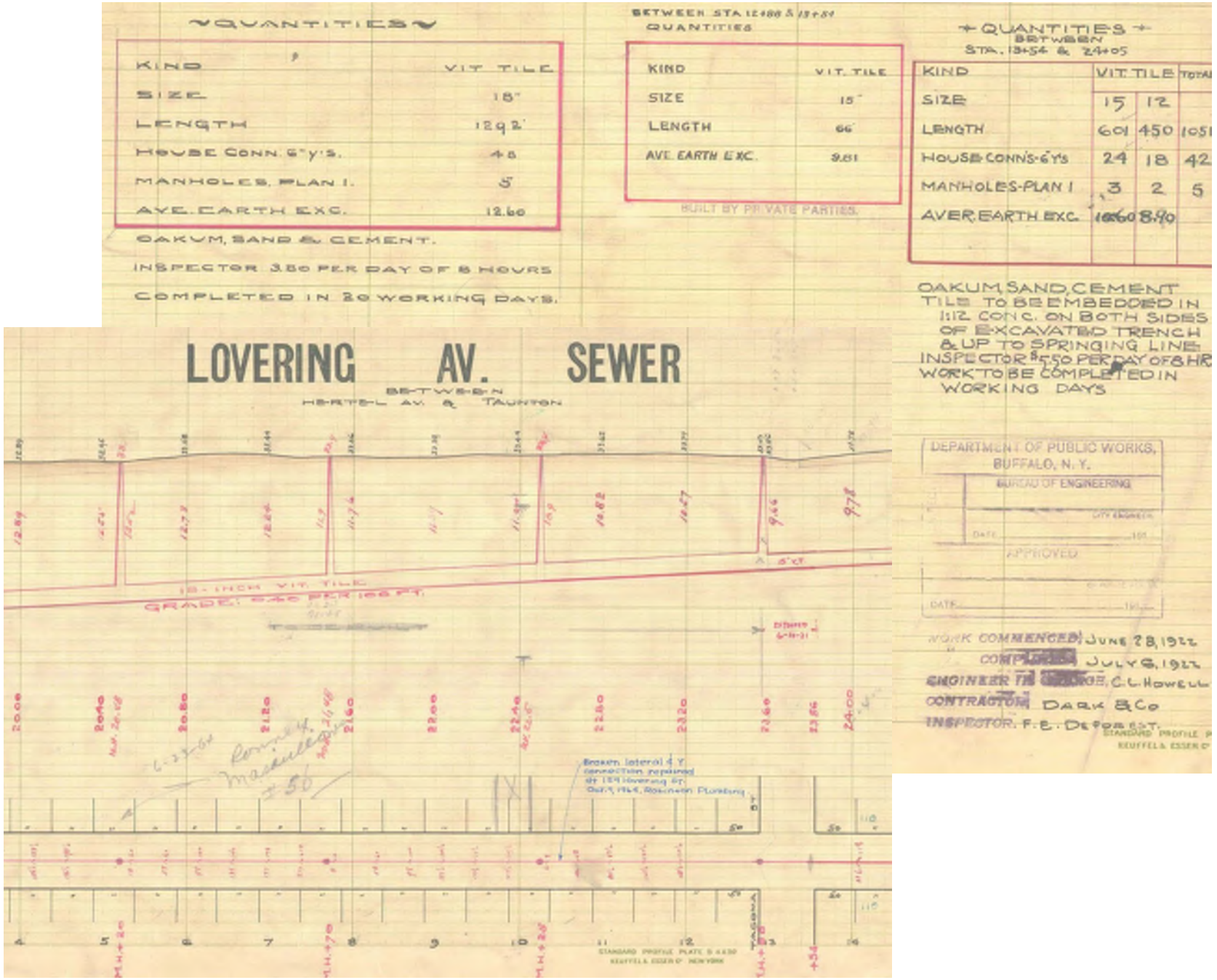
- Majority of existing system
- Hundreds of miles of pipe
- Brick 24”+
- Vitrified Tile Pipe (VTP) 8”-21”





1867-1899: Industrial Revolution





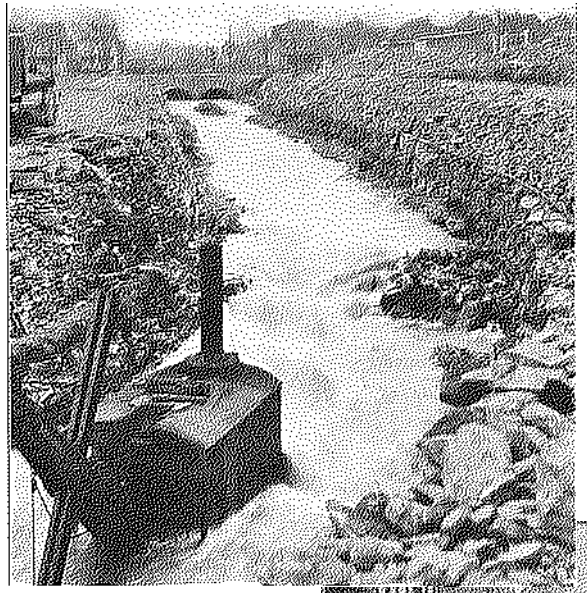
1900-1929: N. Buffalo & Burying of Waters

Sewers installed in North Buffalo for intra-city suburban developments

- Sandy soils
- Need to tie into former Cornelius Creek
- Into rock
- Laterals plunge suddenly into main

1900-1929: N. Buffalo & Burying of Waters

- Waterways → Sewers
  - Main Hamburg Canal to Hamburg Drain 1901-1903
  - Ohio Basin to Ohio Drain 1902-1904
  - Cornelius Creek to Hertel Avenue Overflow Drain 1914
  - Scajaquada Creek to Scajaquada Drain 1925



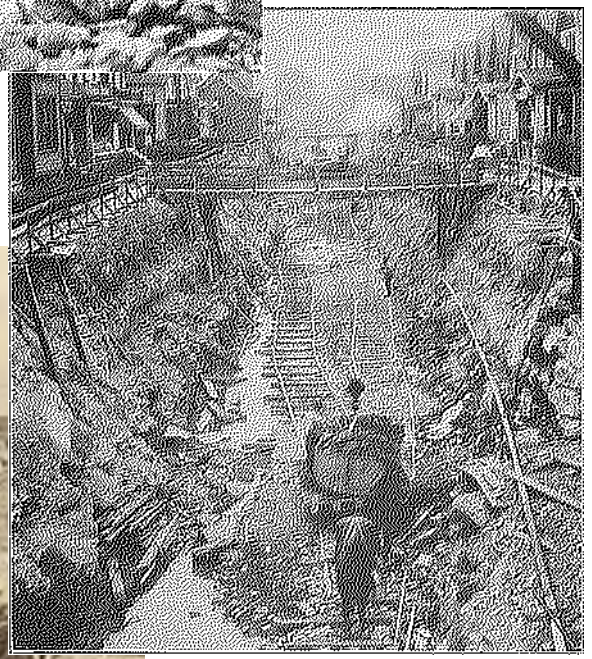


Photo Credit: https://www.wnyheritage.org/content/scajaquada_drian_project_-_1920s/index.html

Quiz: 1861-1929

- What was the primary reason for the construction of the Swan Trunk?

  Flushing of canals

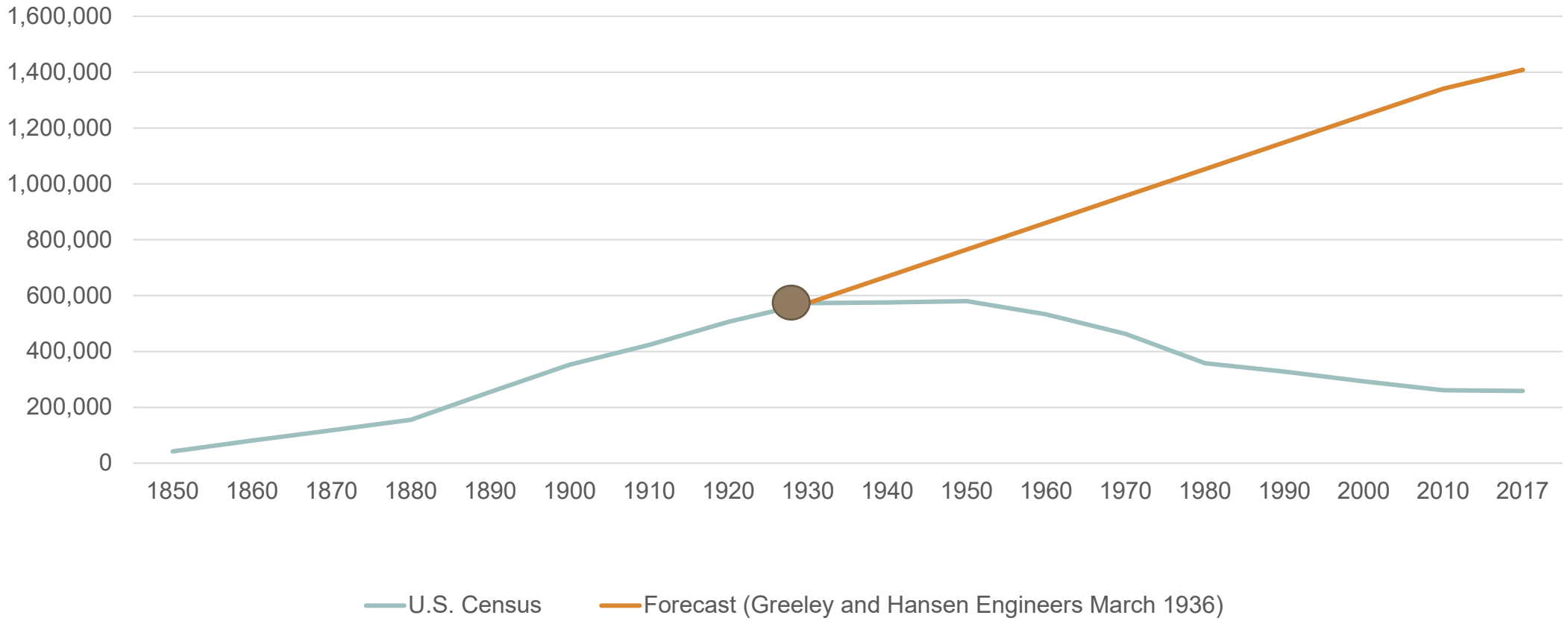
- Why were canals and other waterways buried/ covered?

  Heavily polluted and source of disease

- When were most of the sewers constructed in Buffalo?

  1880s-1890s

History: 1929-1941 Creation of the Buffalo Sewer Authority



1929-1941: The Buffalo Sewer Authority

- 1907 Canadian Public Health Report
  - Niagara Falls, NY typhoid death rate
  - 222.4 deaths/100,000 persons/ year
- Establishment of International Joint Commission
  - January 11, 1909
  - "…boundary waters …shall not be polluted on either side to the injury of health or property on the other."

BUFFALO EVENING NEWS: MONDAY, DECEMBER 5, 1927

NEW BUFFALO PASTOR

Keitzel Assails Buffalo for 'Bathing in Own Filth'

on League Hits Dumping of Sewage

BUFFALO EVENING NEWS: TUESDAY, SEPTEMBER 24, 1929

KERTEL SEWER TO BE THRESHED OUT OCT. 7

Date for Hearing on Flood Relief Set by City Council.

50,000,000 Gallons of Waste Dumped Daily in Buffalo River

Report to Council by Fisk Stirs Perkins to Demand Check on Plants

1929-1941: The Buffalo Sewer Authority

1918 Report

- "In the Detroit and Niagara Rivers conditions exist which imperil the health and welfare of the citizens of both countries in direct contravention of the treaty."
- 80% of pollution of Niagara River originates in Buffalo
- "the sewage of Buffalo is polluting to a serious extent the available water supplies of the two Tonawandas and the city of Niagara Falls, NY"

1929-1941: The Buffalo Sewer Authority

- *Comprehensive Plan of Sewerage for Buffalo, NY*
  - George B. Gasciogne, Consulting Engineer
  - May 1930
- 10-12 year plan
- Sewage treatment through construction of 2 WWTFs
  - South-East by Tifft-Hopkins WWTF
  - North by Unity Island WWTF
- Construction of sewers
  - Interceptors
  - Swan Trunk extension
  - Storm relief sewers
- $23,000,000.00 ($362 M in 2021 dollars)

1929-1941: The Buffalo Sewer Authority

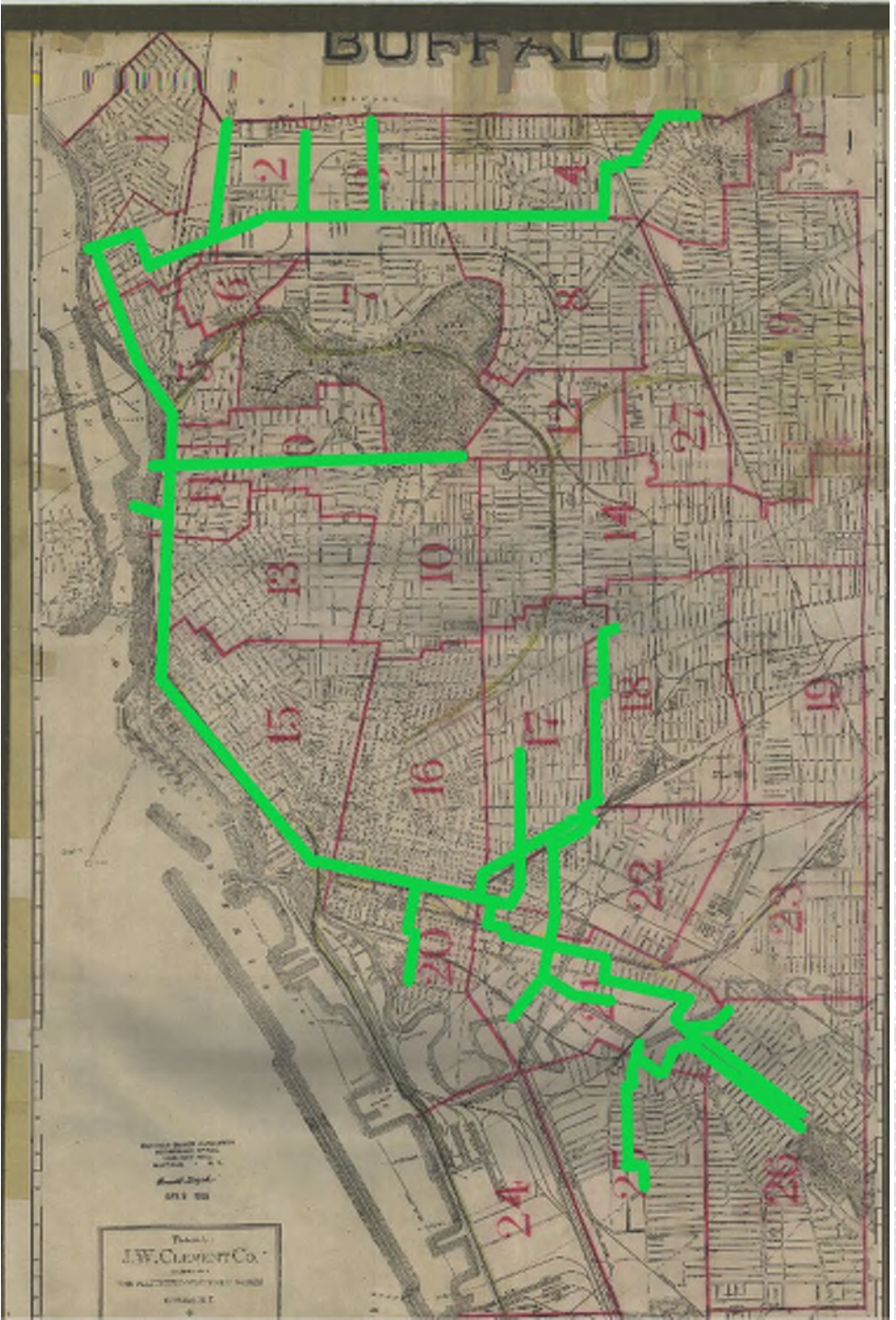
- NYS Dept. of Health mandate
  - March 1935
  - Primary Sewage Treatment Plant
  - Interceptor sewers
- Establishment of BSA
  - April 8, 1935
  - $15 million bonding capacity ($287 M in 2021 dollars)
  - After 5 years or after all bonds are paid off, system will revert to city and Buffalo Sewer will dissolve
  - Structures of any public service corporation must be removed at expense of corporation for Buffalo Sewer to construct project

1929-1941: The Buffalo Sewer Authority

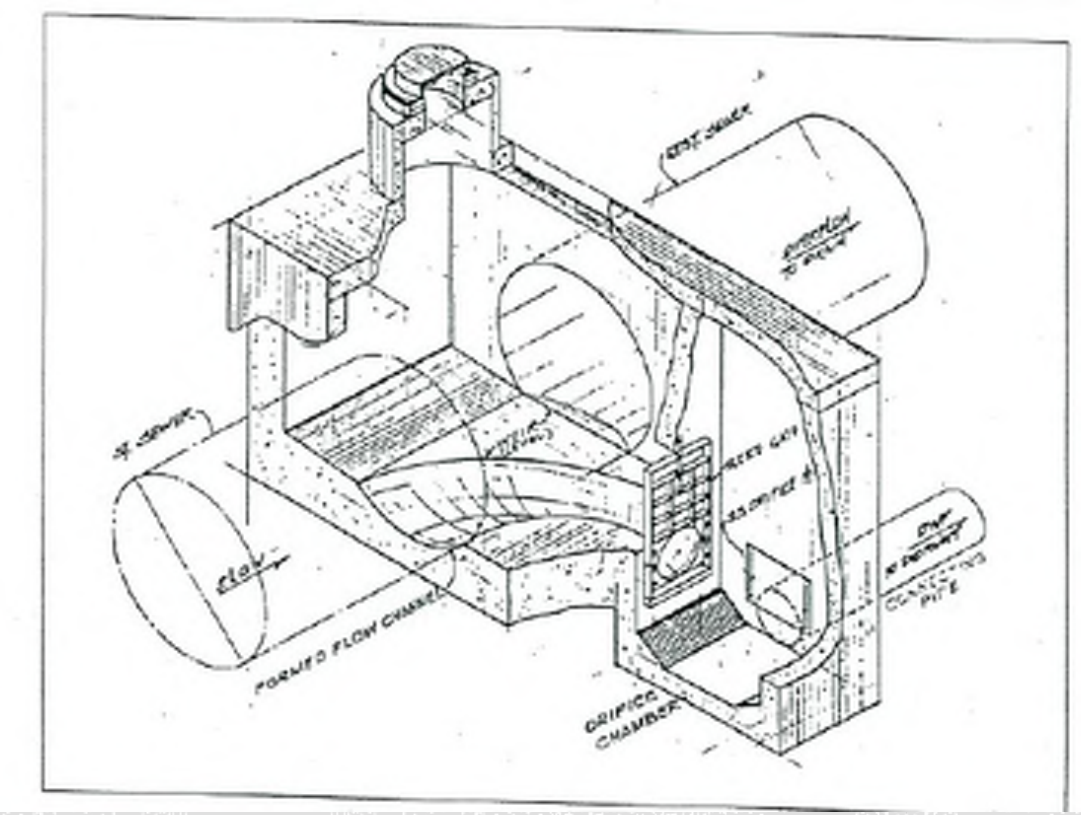
- *Buffalo Sewer Authority General Plan for Collecting and Treating the Sewage of Buffalo*
- Greeley and Hansen Engineers
  - Redid Gasciogne's calculations
  - March 1936
- Treatment and conveyance for treatment
  - Single WWTF on Bird Island
  - CSO diversion structures
  - Interceptors
- $15 million cost

1929-1941: The Buffalo Sewer Authority

From: https://www.wnyheritage.org/content/scajaquada_drian_project_-_1920s/index.html



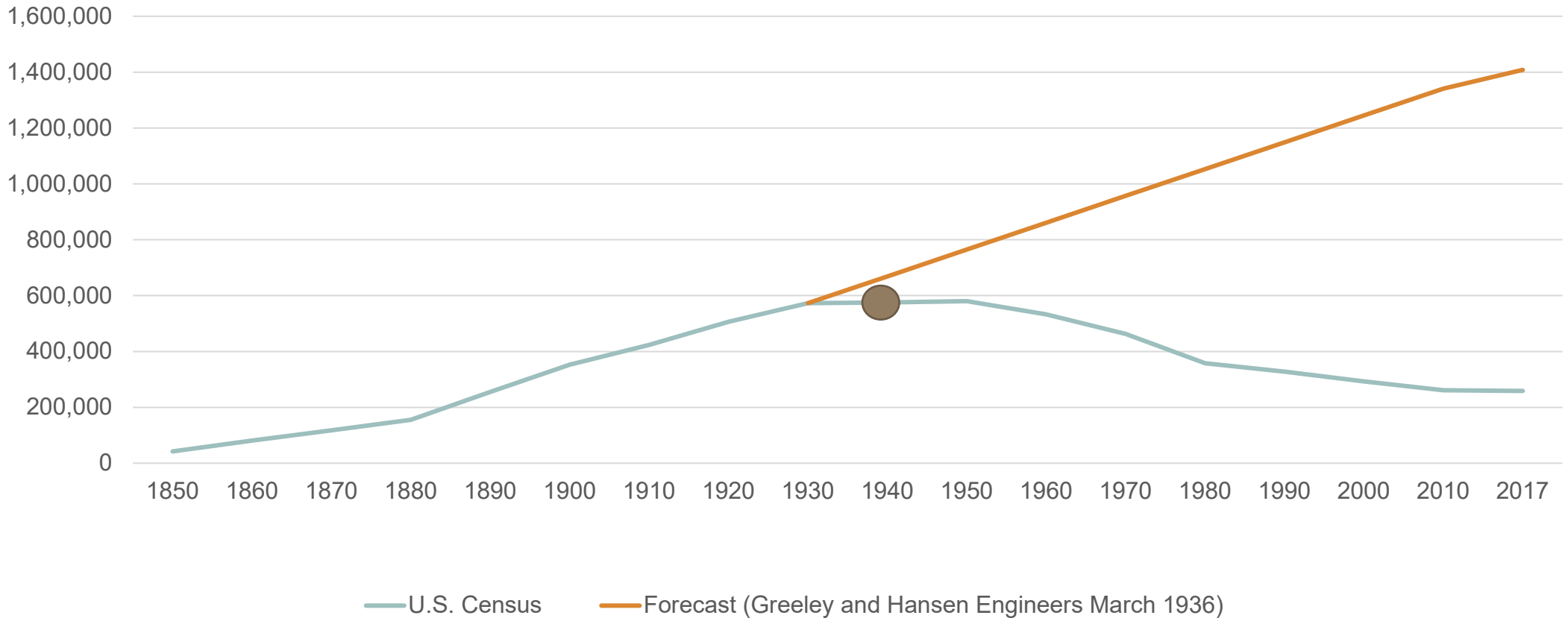
1929-1941: The Buffalo Sewer Authority

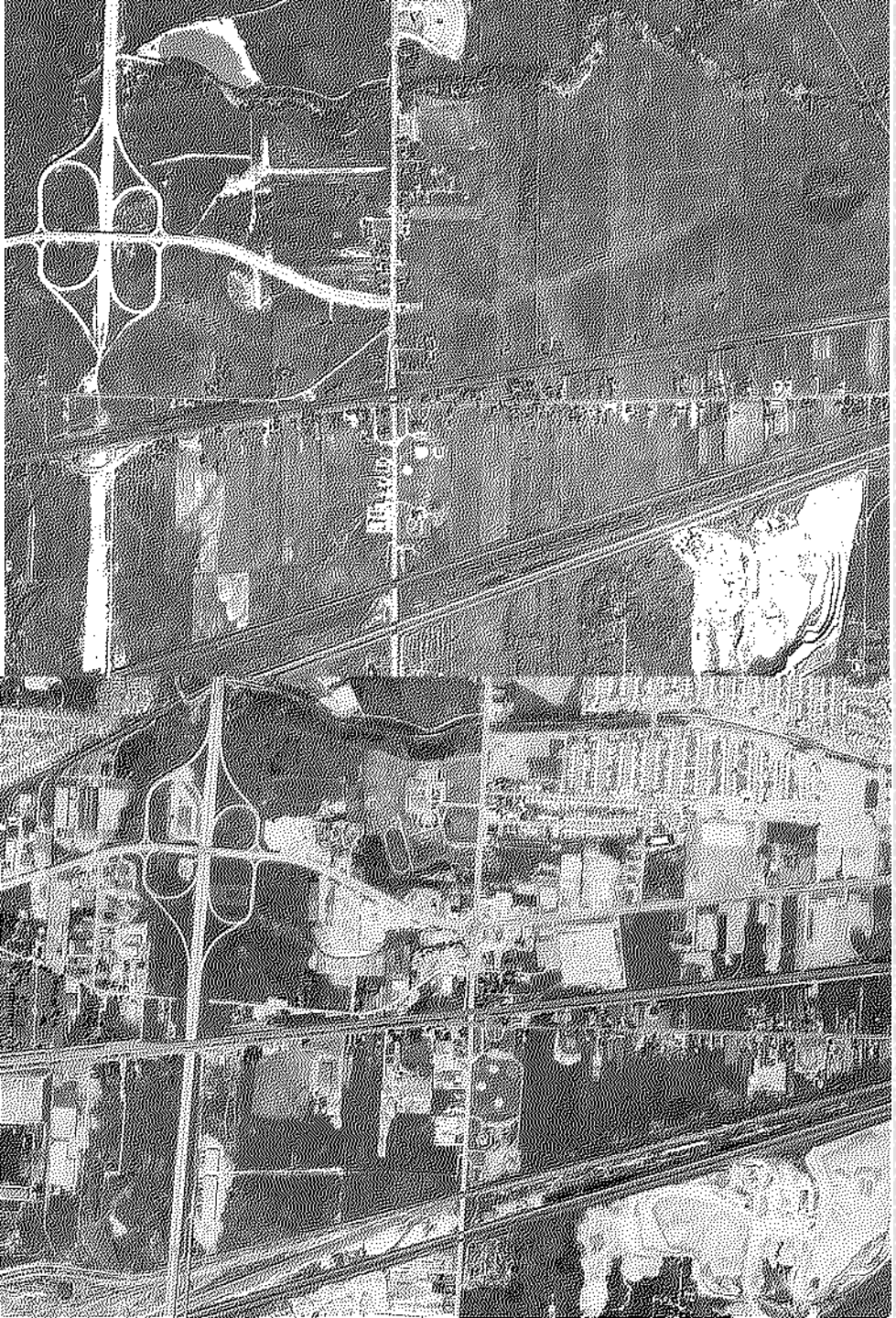


Quiz: 1929-1941

- What was the estimated cost for the Gasciogne plan (1930 dollars)?
  - **$23,000,000.00**
- When was the Buffalo Sewer Authority founded?
  - **April 8, 1935**
- What was the revised cost under Greeley-Hansen's redesign (1935 dollars)?
  - **$15,000,000.00**

1941-1970 : Storm Relief and Sprawl





1941-1970: Storm Relief and Sprawl

- *Comprehensive Plan for Relief Sewers*
  - February 1941
  - Greeley and Hansen
  - WWTF online as of 1938
- Attack on Pearl Harbor December 7, 1941
- Post-1945 suburban development
- Floods of 1963
  - July 29: 3.8”: $1.5 M ($12.7 M in 2021 dollars) in damage
  - August 7: 3.88” in 5 hours: $35 M
    ($295.9 M in 2021 dollars) in damage

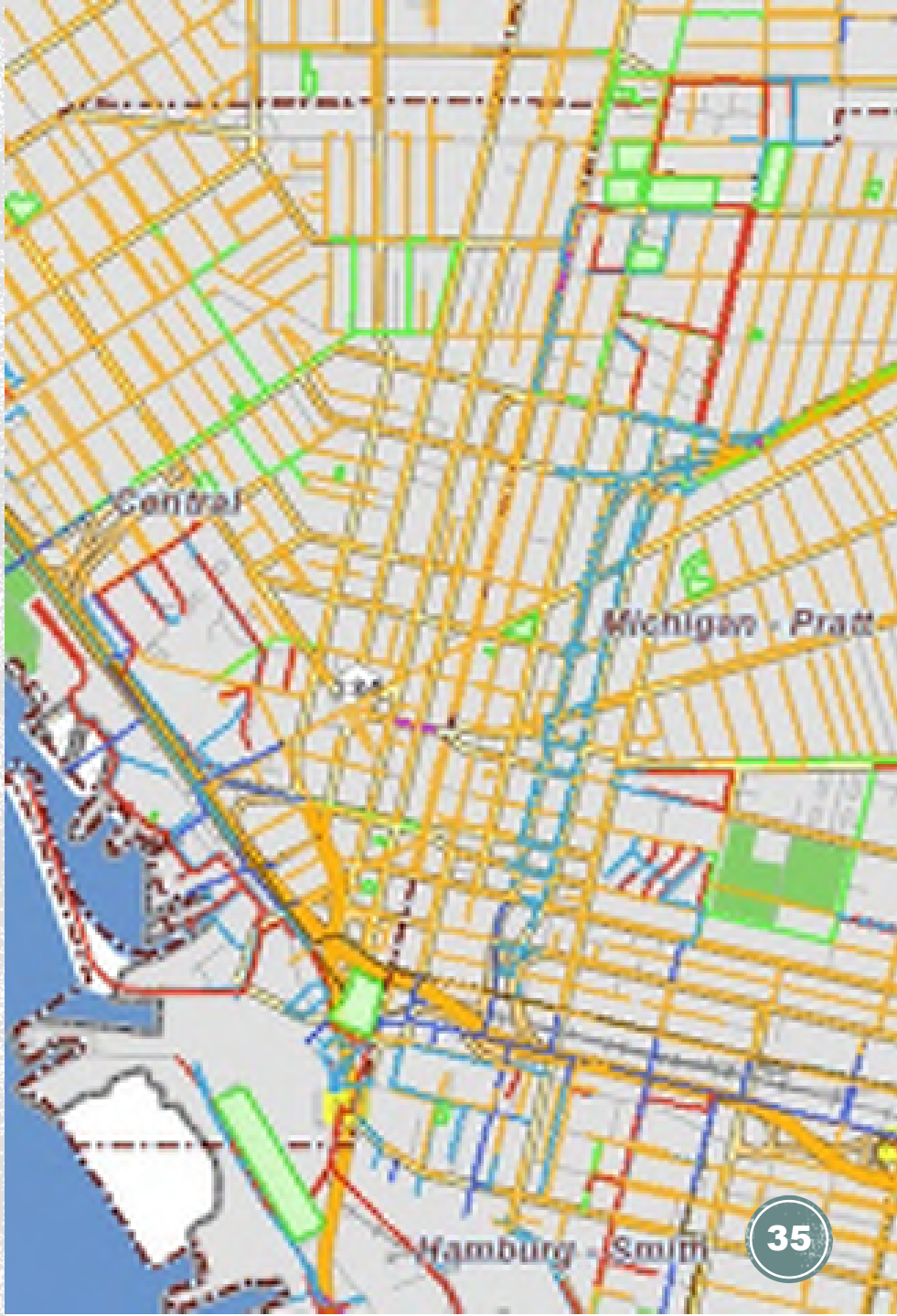
1941-1970: Storm Relief and Sprawl

- NYS Route 33
  - Severed Bird-Ferry Trunk
  - Stormwater added to system
  - New pump station for stormwater and groundwater
  - New trunk sewers constructed
- I-198
  - New storm sewers
  - Direct discharge to Scajaquada Creek
- I-190
  - Old Erie Canal bed
  - On top of
    - Swan Trunk
    - Interceptors
    - Hamburg Drain

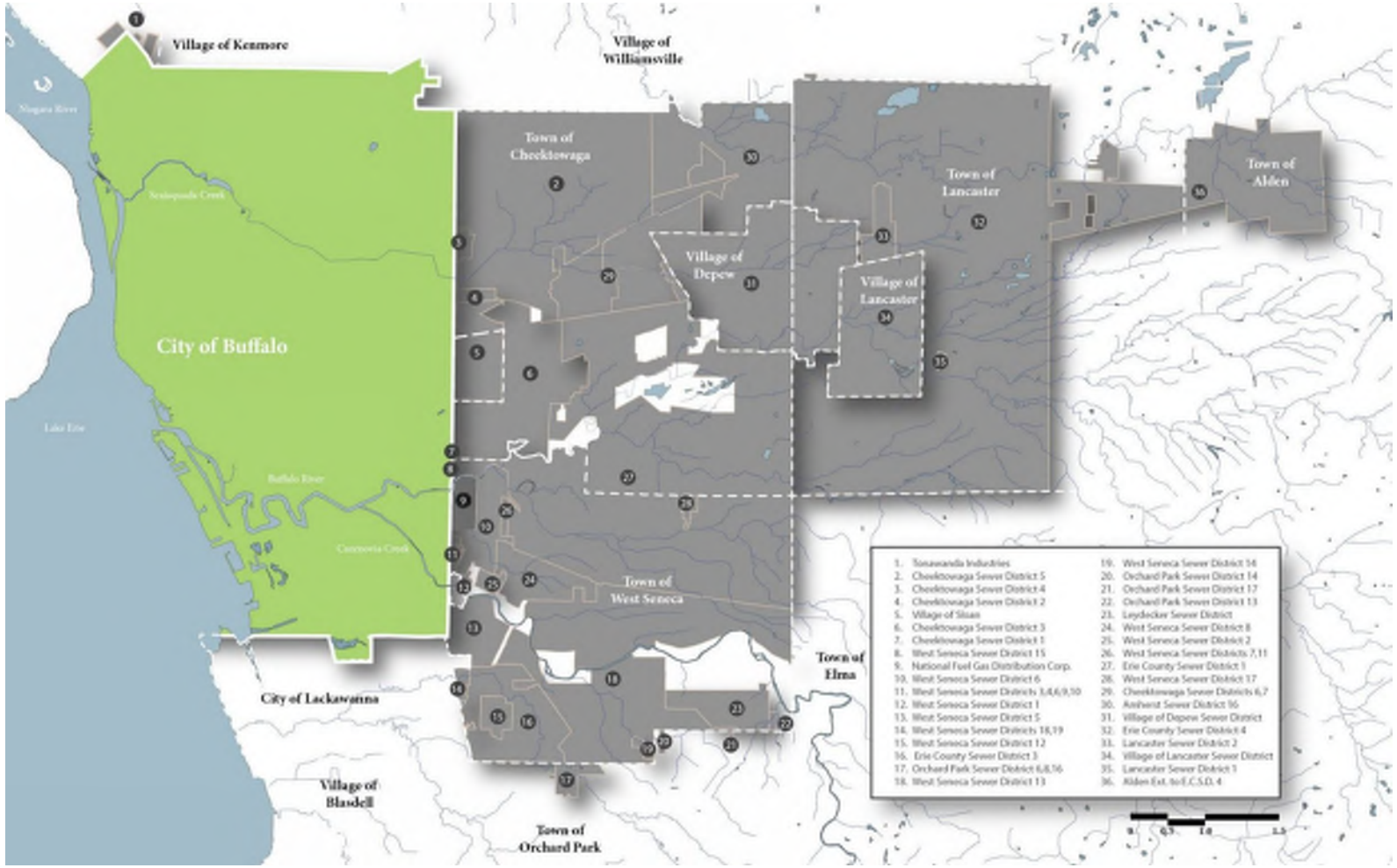
1941-1970: Storm Relief and Sprawl

1941-1970: Storm Relief and Sprawl

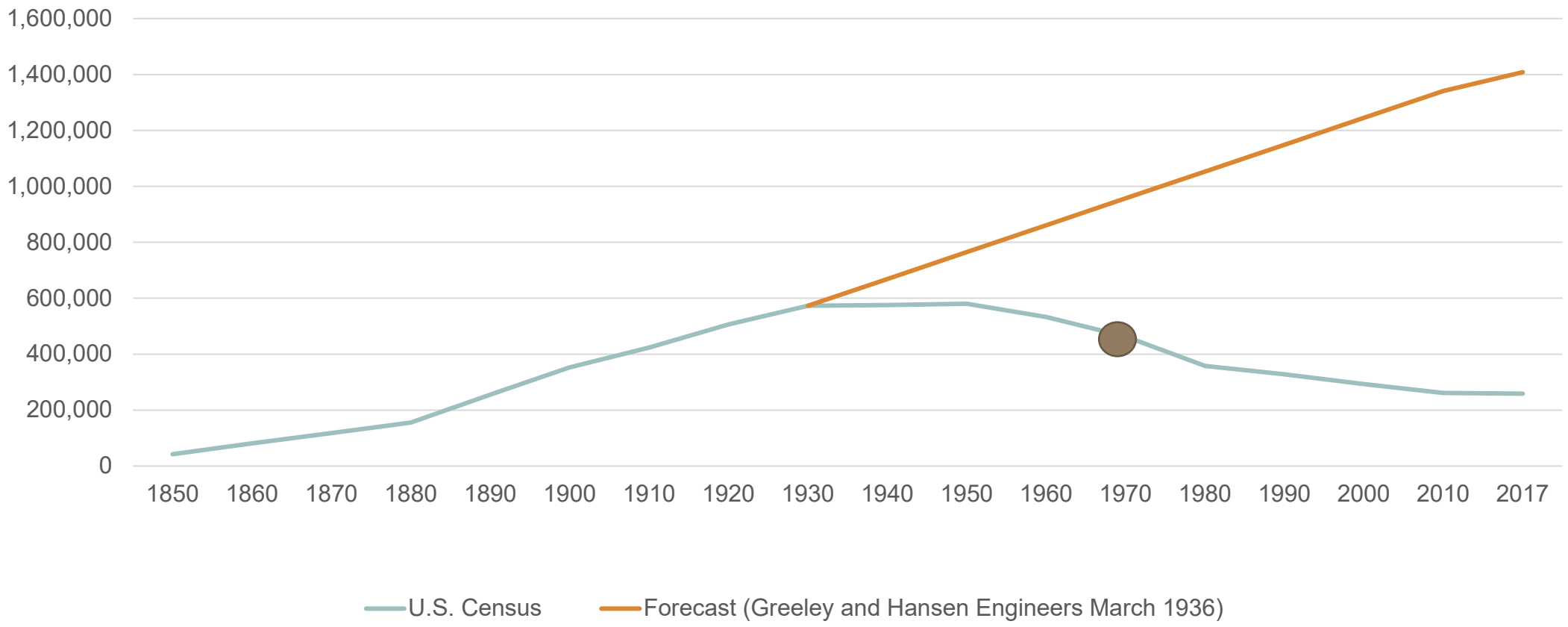
- Urban Renewal 1960-1970
- Demolition of tenement areas
  - Urban core
  - Oldest parts (and oldest sewers) of city
- New municipal housing projects
  - New separated sewers
  - Concrete storm sewers
  - Asbestos concrete pipe sanitary sewers
  - Intermunicipal Connections

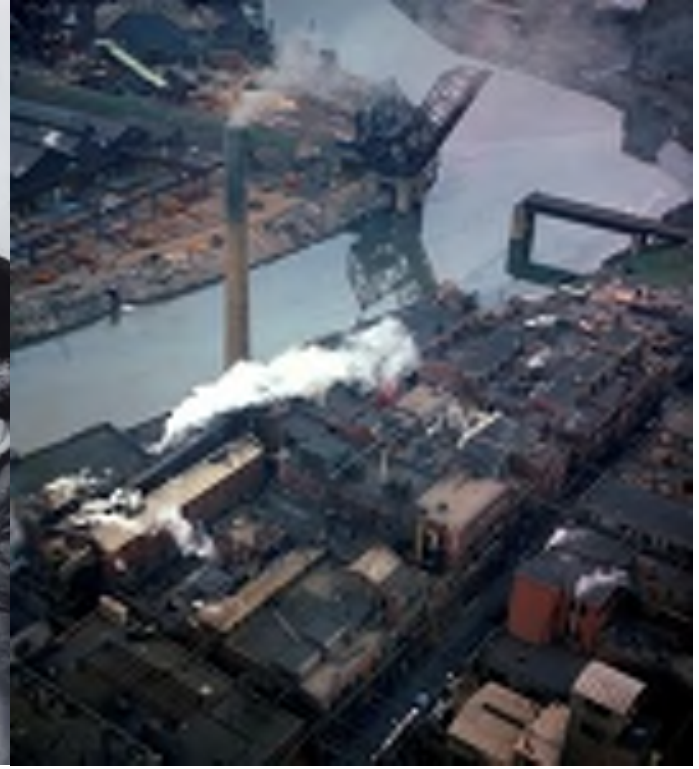


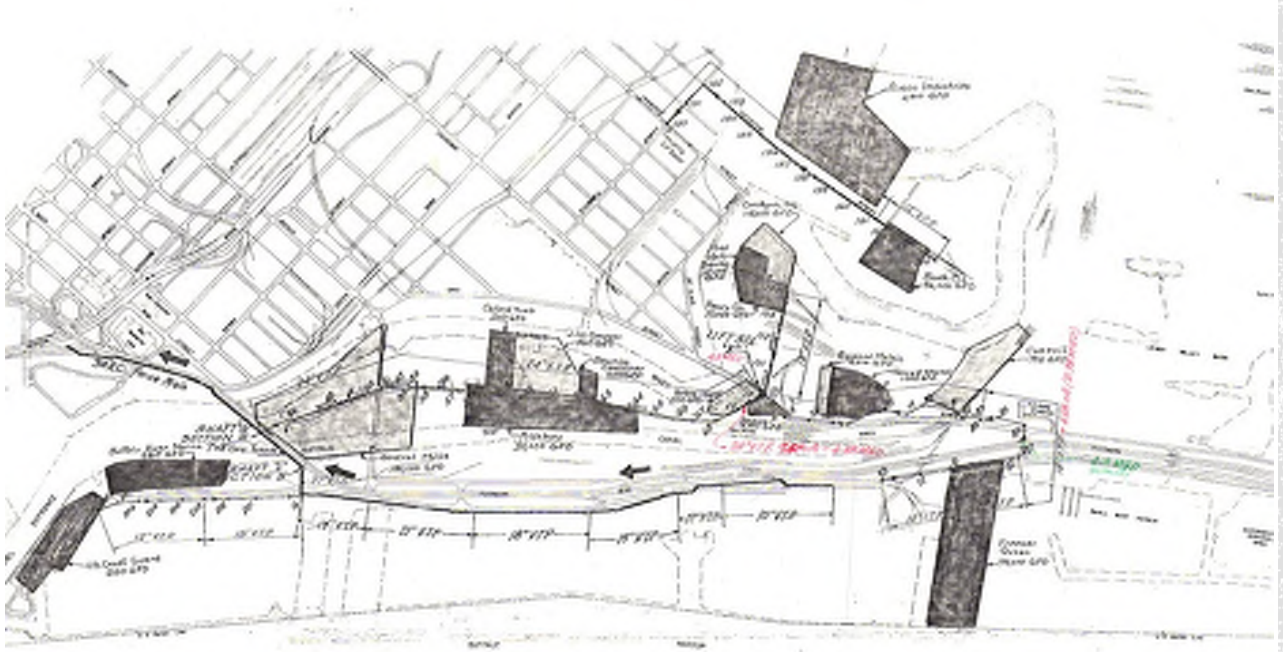
1941-1970: Storm Relief and Sprawl



1970-1982: Clean Water Act

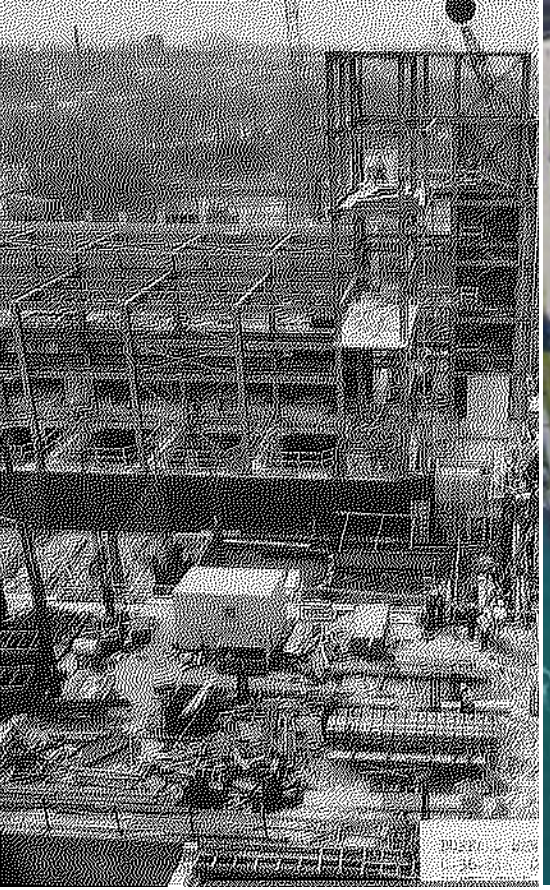






1970- 1982: Clean Water Act

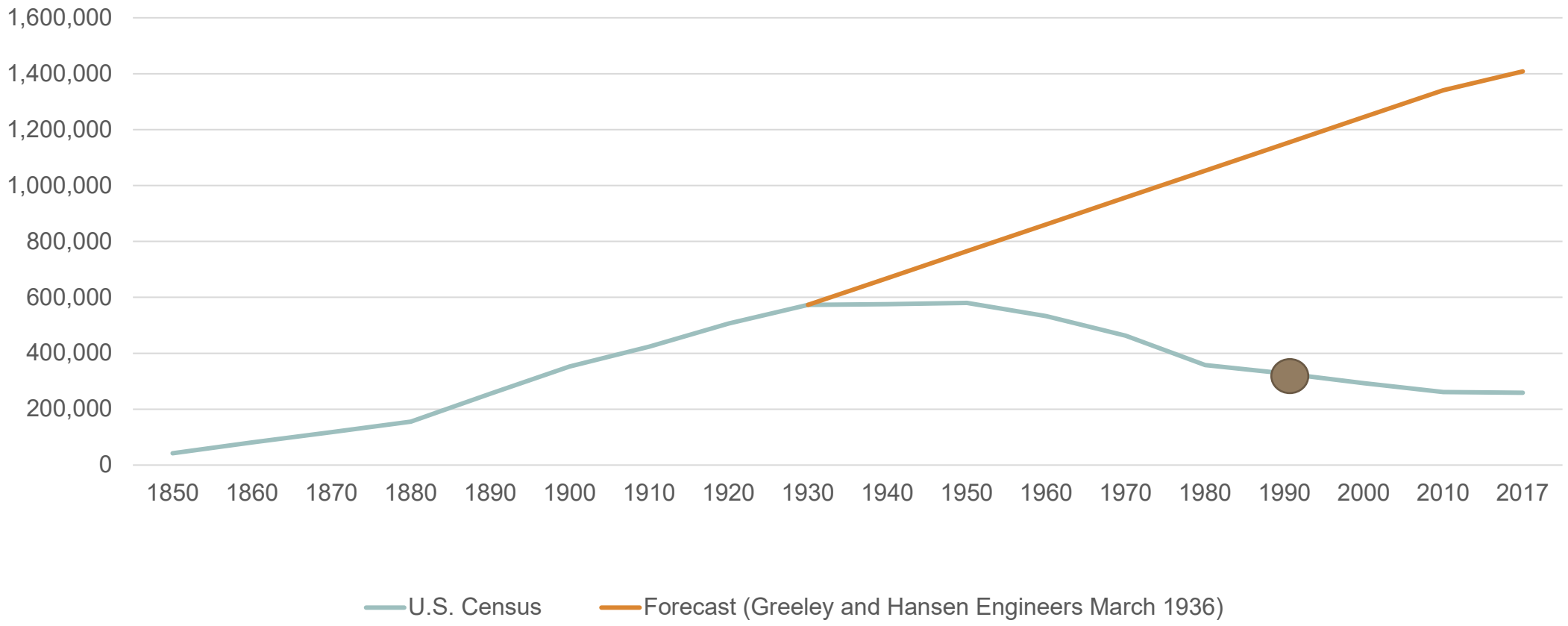
- Kelly Island
  - “Outer Harbor”
  - Heavily industrialized
  - Never sewered
    - Direct discharge to waterways
    - Failing septic systems
- August 1966 Visit from LBJ
- Buffalo River Fire: 1968
- 1976 Project



1970-1982: Clean Water Act

- Scajaquada Tunnel 1977
- Weir Modifications 1980-1982
  - Diversion from Scajaquada Drain to Tunnel
  - Raising of weirs
- Backwater Gates
- Secondary Treatment Process
  - Completed 1980
  - Constructed on municipal landfill in Niagara River on piles

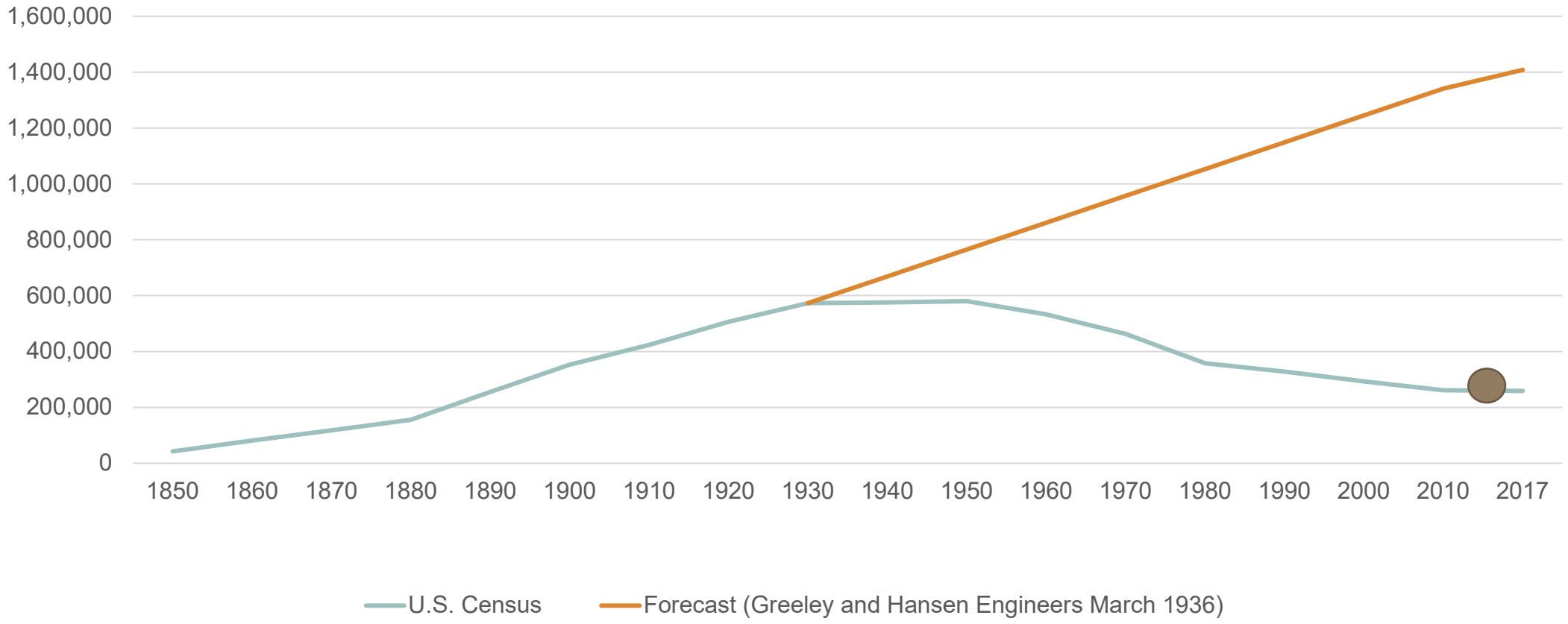
1983-2010: CSO Abatement Phase I



1983-2010: Combined Sewer Overflow (CSO) Abatement Phase I

- Sewer Separation
- Weir modifications
- Emphasis on eliminating number of CSO locations

CSO Abatement Phase II LTCP 2010-Today

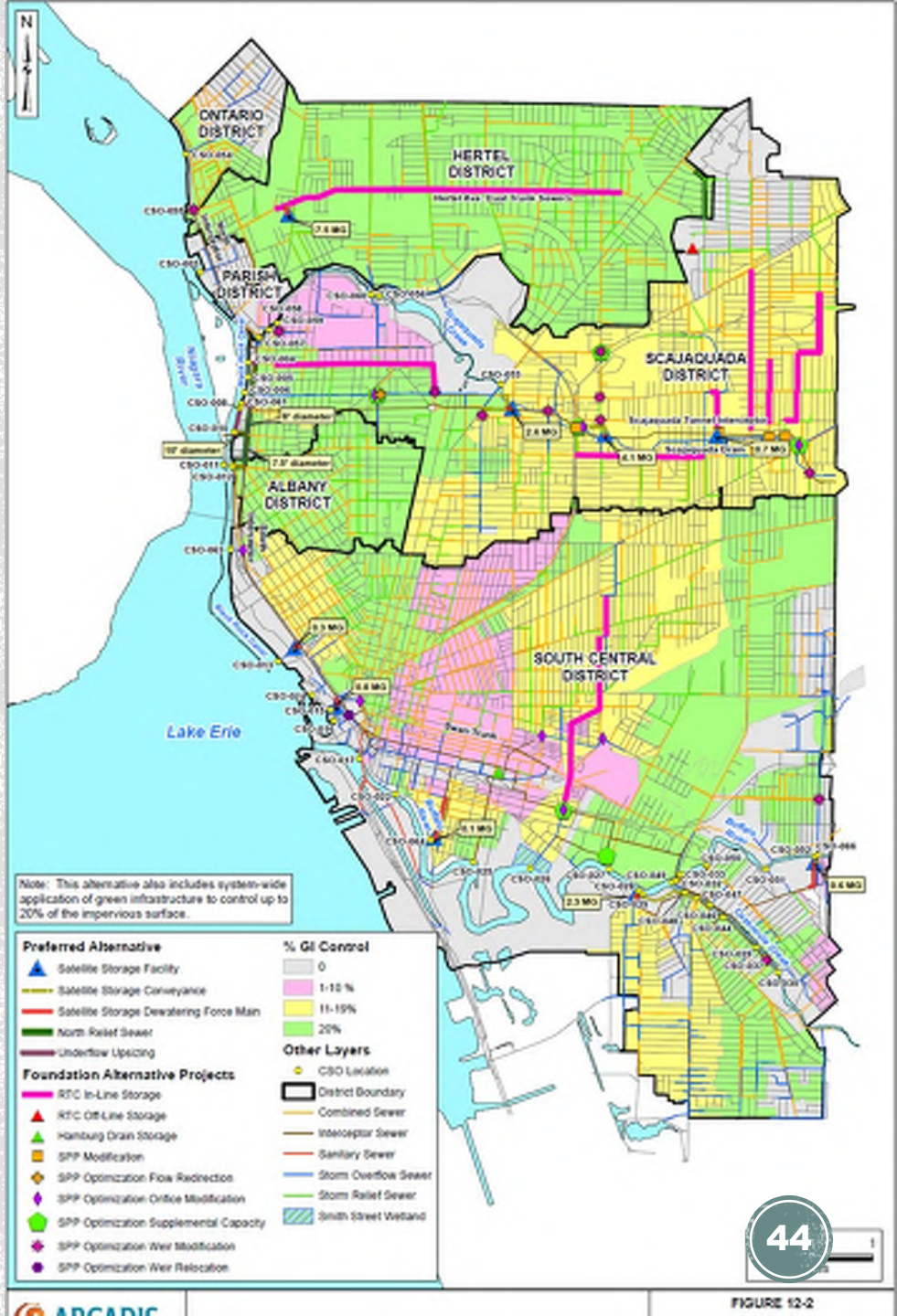


2010-Today: CSO Abatement Phase II

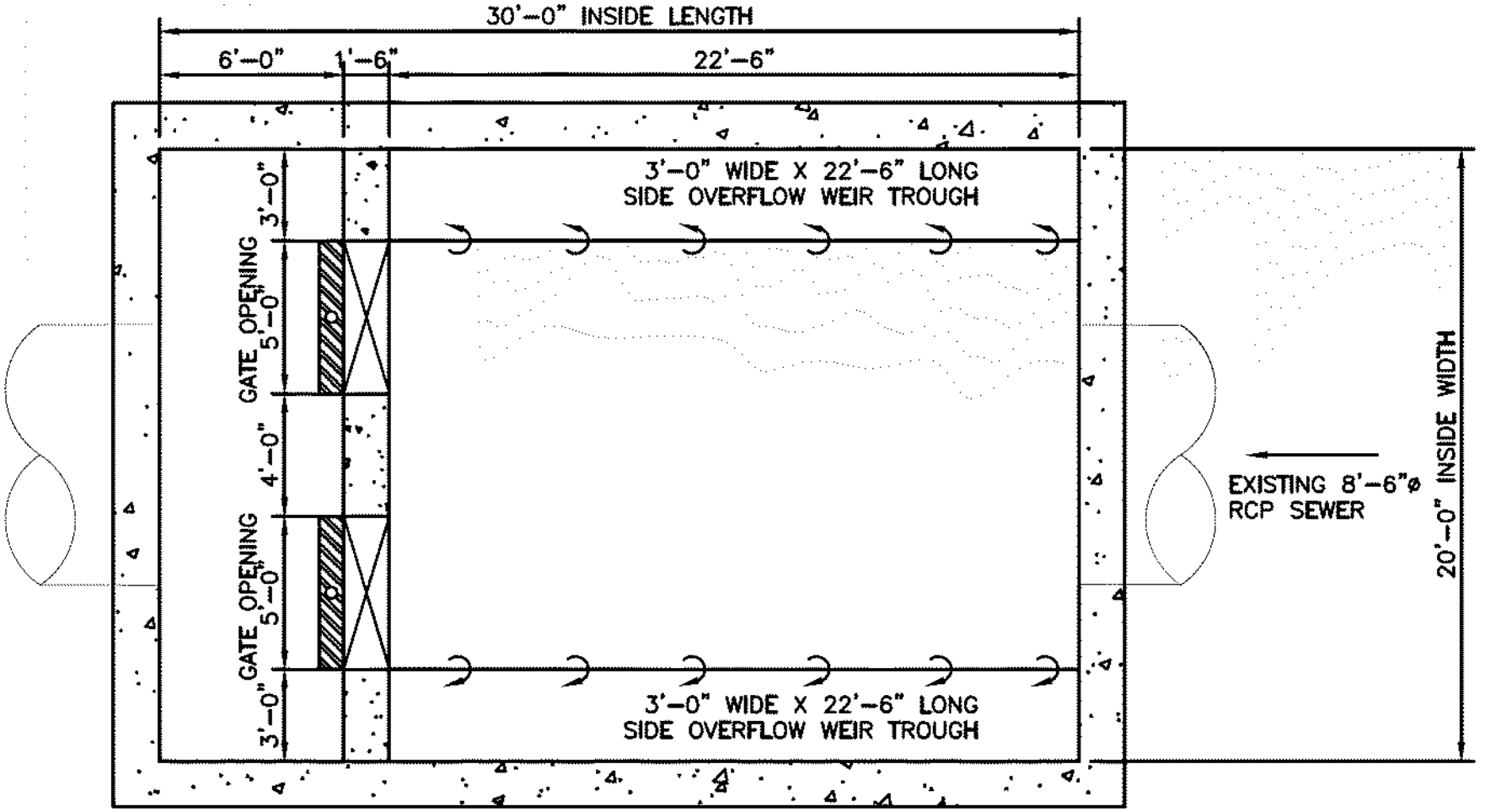
- Final Long-Term Control Plan (LTCP) approved March 18, 2014
- Decrease CSO activations
- $380 Million (2012 Dollars)
- Mix of gray
  - Wastewater Treatment Facility upgrades
  - Real Time Control “Smart Sewers”
  - Localized Sewer Separation
  - Underground detention tanks
- And green
  - Bioretention
  - Permeable pavement
  - Demolitions

2010-Today: Real Time Control (RTC) Smart Sewer Concept Viability

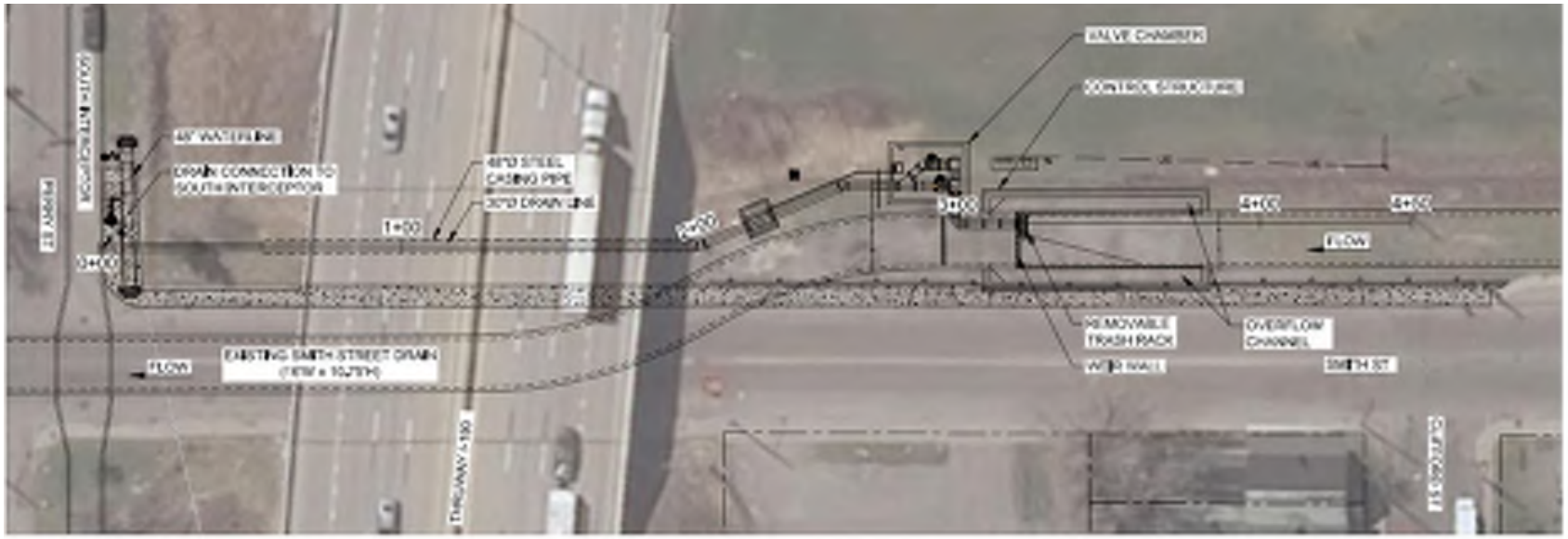
- Vacancy on East Side
  - Vacant lots absorbing water that would have gone into combined system
  - Sanitary and industrial discharges reduced
- Kensington Expressway cutting off half of the flows
- Hertel sewers are deep to capture Cornelius Creek
- Overflows to Historic Canals/Creeks



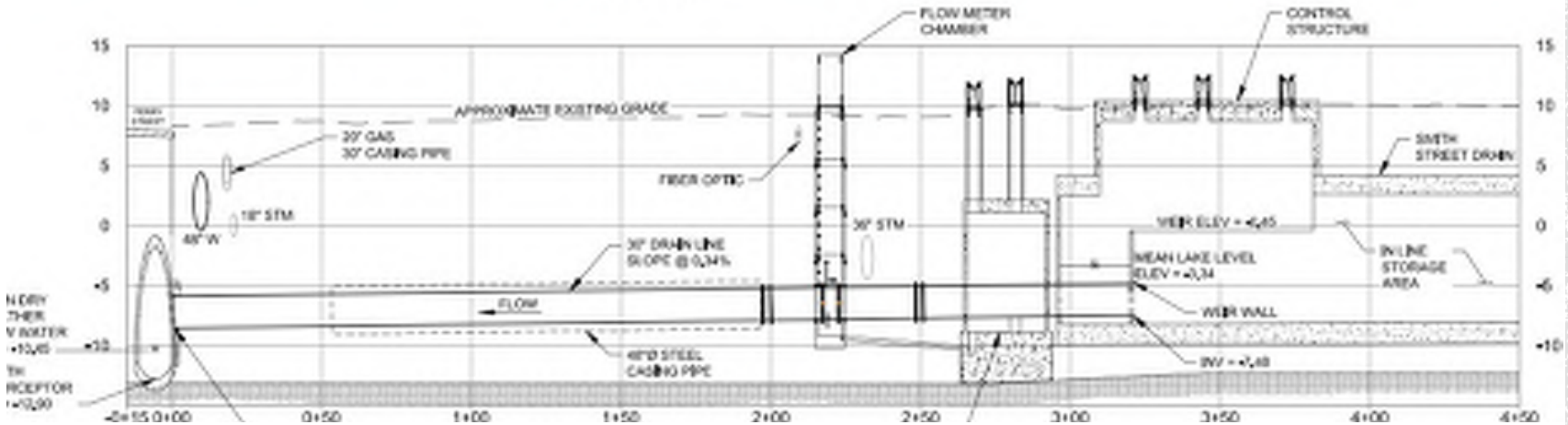
2010-Today: Real Time Control (RTC) Smart Sewer Inline Storage Concept



Long Term Control Plan: CSO 026 Smith Street RTC



PLAN
SCALE: 1" = 40'



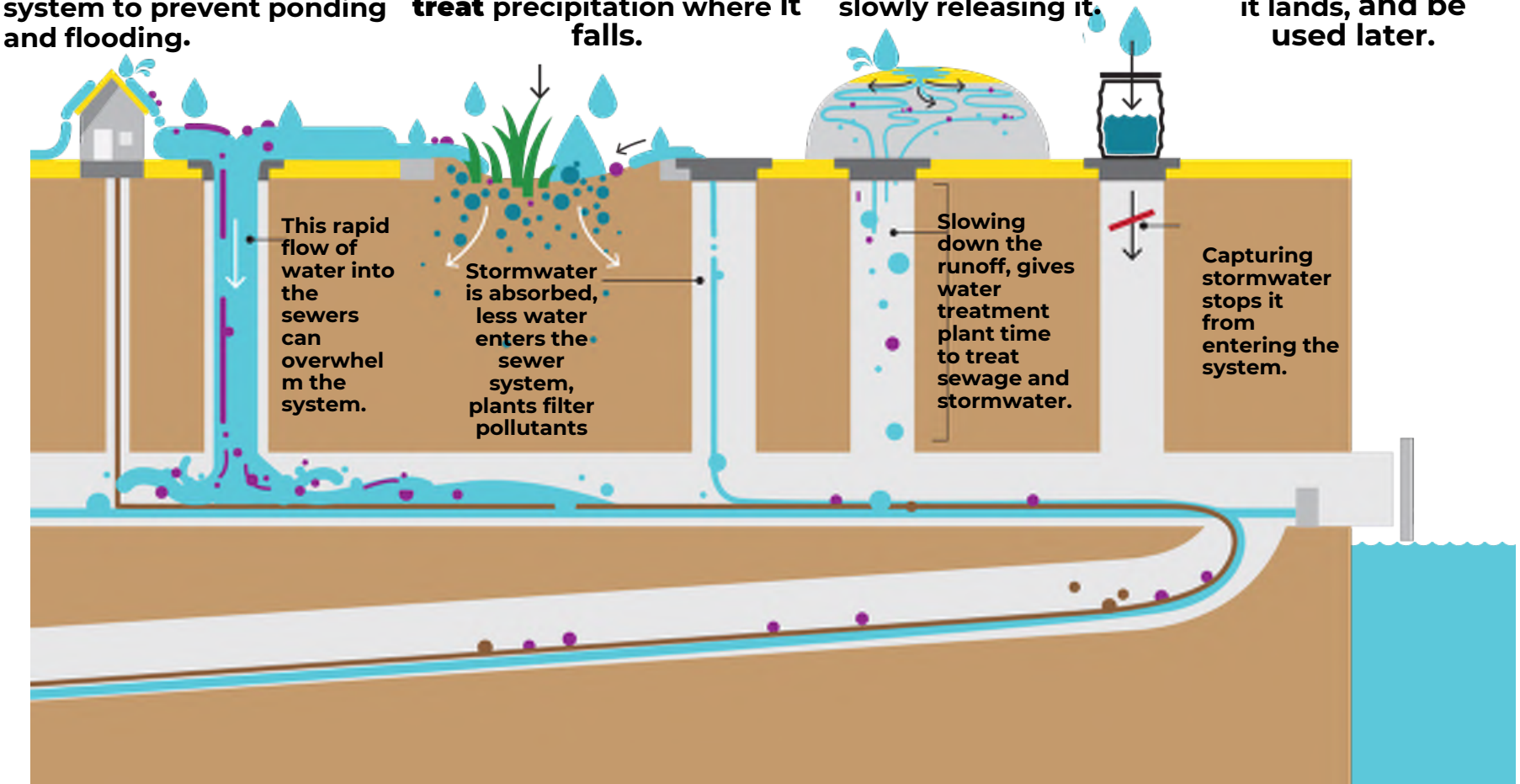
How green infrastructure helps us meet the stormwater challenge

Impervious surfaces are designed to quickly move water into the sewer system to prevent ponding and flooding.

Green infrastructure often involves plants and vegetation to **absorb and treat** precipitation where it falls.

Green infrastructure can **temporarily store stormwater** before slowly releasing it.

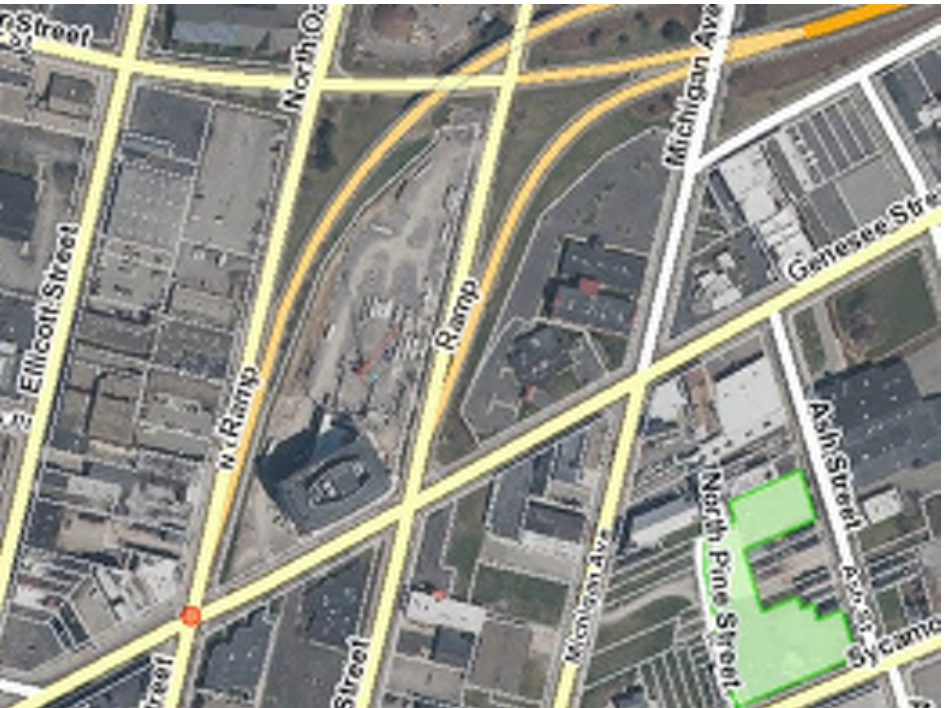
Green infrastructure can **capture stormwater** where it lands, and be used later.



Long Term Control Plan Projects: Bioretention and VTP

Quiz: 1941 - Today

- What impact did the construction of the NY-33 Kensington Expressway have on the sewer system?
  - **Cut off the Eastern part of the city (severed the Bird-Ferry Trunk)**
  - **Required additional storm sewers be constructed**
- What was the main criteria for CSO abatement in the 1980s, 1990s, and 2000s?
  - **Elimination of CSO outfalls**
- What is the main criteria for CSO abatement today?
  - **Elimination of CSO activations**



Pre-Civil War Sewers

- Pratt Street
- Oak Street
- Poor Records
  - Cross-Referencing No Dates and Historic Waterways
  - Downtown
  - Hydraulics/Larkinville
  - Black Rock

Lost Waterways

Lost Waterways

Modern Location

River is ~450 feet away

1870 Map

Buffalo Creek runs under location

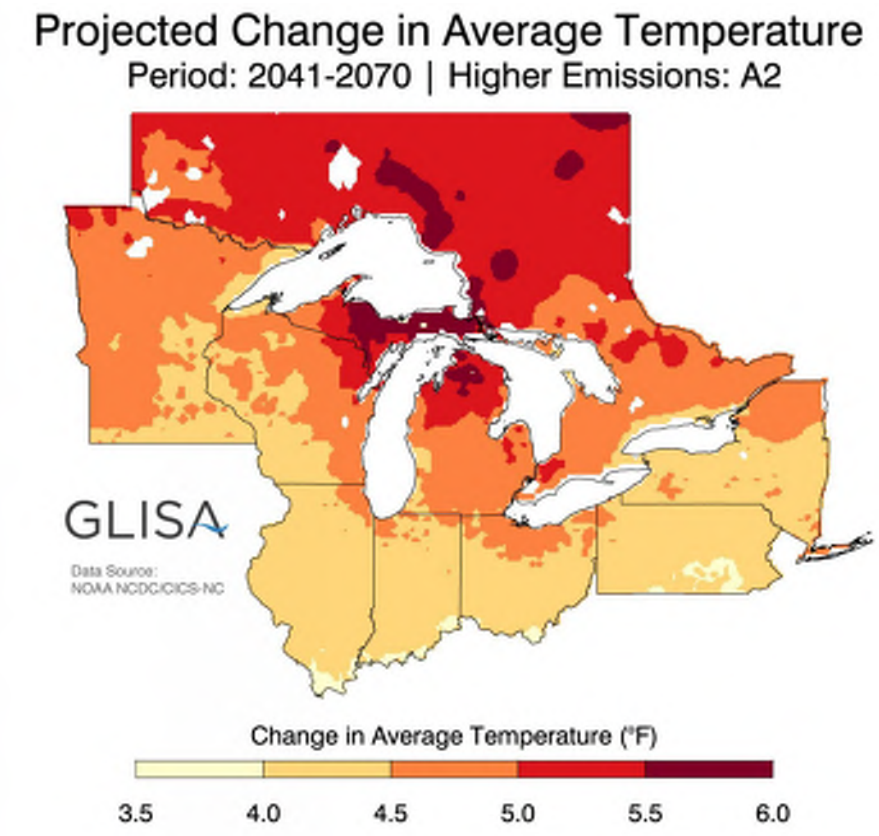
Climate Change Downscale Forecast

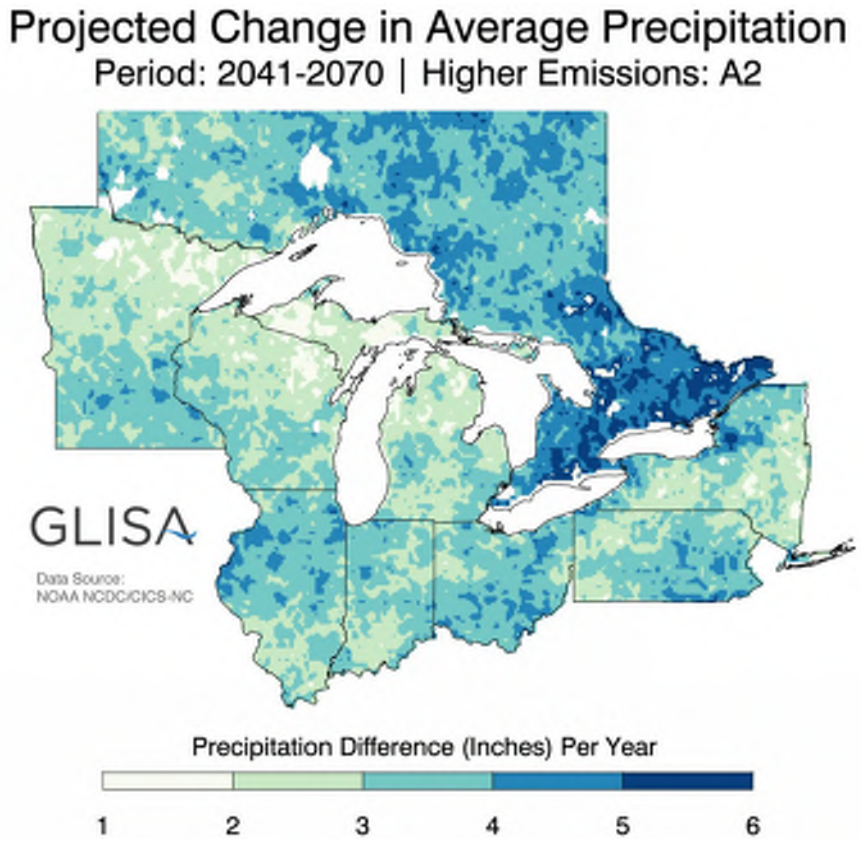
Variable of Interest	Sub-Variables of Interest	Historical/Current	Mid-Century Projected Changes	% Change Between Historic and Future; Mid Century % / End Century %
Precipitation	Total Annual Precip	40.5 in.	40 to 45 in.	-1 to 11% / 4 to 19%
Precipitation	Winter Avg Precip	9.6 in.	10 to 12 in.	4 to 25% / 4 to 25%
Precipitation	Spring Avg Precip	9.3 in.	7 to 11 in.	-25 to 18% / -14 to 29%
Precipitation	Summer Avg Precip	10.1 in.	8 to 10 in.	-21 to -1% / -21 to -1%
Precipitation	Fall Avg Precip	11.4 in.	11 to 12 in.	-4 to 5% / 5 to 14%
Precipitation	Heavy Precipitation Days(>1.25")	2.9 days (> 1.25")	2.6 to 5.3 days	-10 to 83% / 62 to 124%

Climate Change Downscale Forecast

Variable of Interest	Sub-Variables of Interest	Historical/Current	Mid-Century Projected Changes	% Change Between Historic and Future; Mid Century % / End Century %
Temperature	Avg Annual Temp	48.6°F	52 to 54°F	7 to 11% / 13 to 21%
Temperature	Winter Avg Temp	27.4°F	29 to 31°F	6 to 13% / 17 to 31%
Temperature	Spring Avg Temp	45.9°F	48 to 51°F	5 to 11% / 11 to 24%
Temperature	Summer Avg Temp	69.2°F	73 to 75°F	5 to 8% / 11 to 17%
Temperature	Fall Avg Temp	51.5°F	54 to 58°F	5 to 13% / 11 to 22%
Temperature	Avg Low Temp	40.5°F	45 to 46°F	11 to 14% / 19 to 28%
Temperature	Avg High Temp	56.7°F	60 to 62°F	6 to 9% / 8 to 18%
Temperature	Days/Year Greater Than 90F	2 days	9 to 26 days	350 to 1200% / 1050 to 2600%
Temperature	Days/Year Greater Than 95F	0.3 days	1 to 9 days	233% to 2900% / Not Available
Temperature	Days/Year Less Than 32F	117 days	91 to 95 days	-22% to -19% / Not Available

Downscale Model
Great Lakes as a Whole





SEICHE EVENTS

Historic Crests
(Station Established 4/1/1860)

1. 12.08 ft 12/2/1985
2. 11.12 ft 11/15/2020
3. 11.06 ft 1/30/2008
4. 10.67 ft 12/23/2022
5. 10.65 ft 11/1/2019
6. 10.65 ft 4/6/1979
7. 10.57 ft 12/11/2021
8. 10.36 ft 12/20/2020

Niagara River Flow

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1926 - 2022, BY WATER YEAR (WY)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	202,200	202,900	203,800	199,000	195,600	202,000	210,400	218,600	217,700	214,600	210,500	205,400
Max	254,000	254,400	260,900	265,900	241,600	270,500	279,600	277,300	285,000	276,500	270,200	257,299
(WY)	(1987)	(2020)	(1986)	(2020)	(1987)	(2020)	(2020)	(2019)	(2019)	(2019)	(2019)	(2019)
Min	152,700	148,100	149,800	138,500	116,200	142,700	152,000	159,100	158,000	154,100	155,000	153,900
(WY)	(1935)	(1935)	(1965)	(1964)	(1936)	(1934)	(1935)	(1934)	(1934)	(1934)	(1934)	(1934)

Water-Data Report 2022

04216000 NIAGARA RIVER AT BUFFALO, NY -- Continued

Climate Change

- Climate Refuge???
  - Average Rainfall
    - Increasing Slightly to Moderately
    - Possibly Falling in the Near Term?
  - Average Temperature
    - Increasing Slightly to Moderately
    - May Have 100 + degree days by Century's End
  - Winds: Poorly Modeled, But Likely Increasing Significantly

Up-Lake Communities

Average Rainfall Increasing

2016- Current Historically High Lake Levels

- **Buffalo and Niagara Rivers**
- **Basement Back-ups**
- **Syphon Risks**
- **Smart Sewer Viability**

What Are We Doing?

- Back Water Valves and Gates
- Working with Army Corps of Engineers to Rebuild Walls
- Revised Long-Term Control Plan
- New Development Green Code Ordinance
- Working with Multiple Partners to Develop Downscale Model with Wind
- Using CREAT to Identify Climate Change Mitigation Opportunities
- Advancing Projects with Synergistic Opportunities

Quiz: Modern Challenges

- What sort of issues with historic infrastructure are we confronting today?
  - **Pre-Civil War Sewer Failure**
  - **Historic Waterways Reestablishing Themselves**
- How is climate change most immediately impacting the City of Buffalo?
  - **Seiche Events**
  - **Flooding**
  - **CSO Backflow**

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Questions?

BUFFALO
SEWER AUTHORITY

QUEEN CITY CLEAN WATERS

Bird Island Treatment Facility Upgrades
Combined Sewer Overflow (CSO) Storage
Green Infrastructure
Real-Time Control Smart Sewers
Sewer Improvements & Modicfications

How does this project impact the City of Buffalo?

This project will reduce overflows from the City's sewers by helping flow reach the Bird Island Wastewater Treatment Facility during wet weather, instead of entering Buffalo's creeks and river.

The implementation of this project, which includes 50+ sites in total, will cost approximately $750M over the next 15 years.

Why is this work being done?

Hundreds of millions of gallons of storm water mixed with sanitary sewage overflows to the waterways of Western New York during rainfall and snow melt periods each year.

The Queen City Clean Waters program will reduce these events.

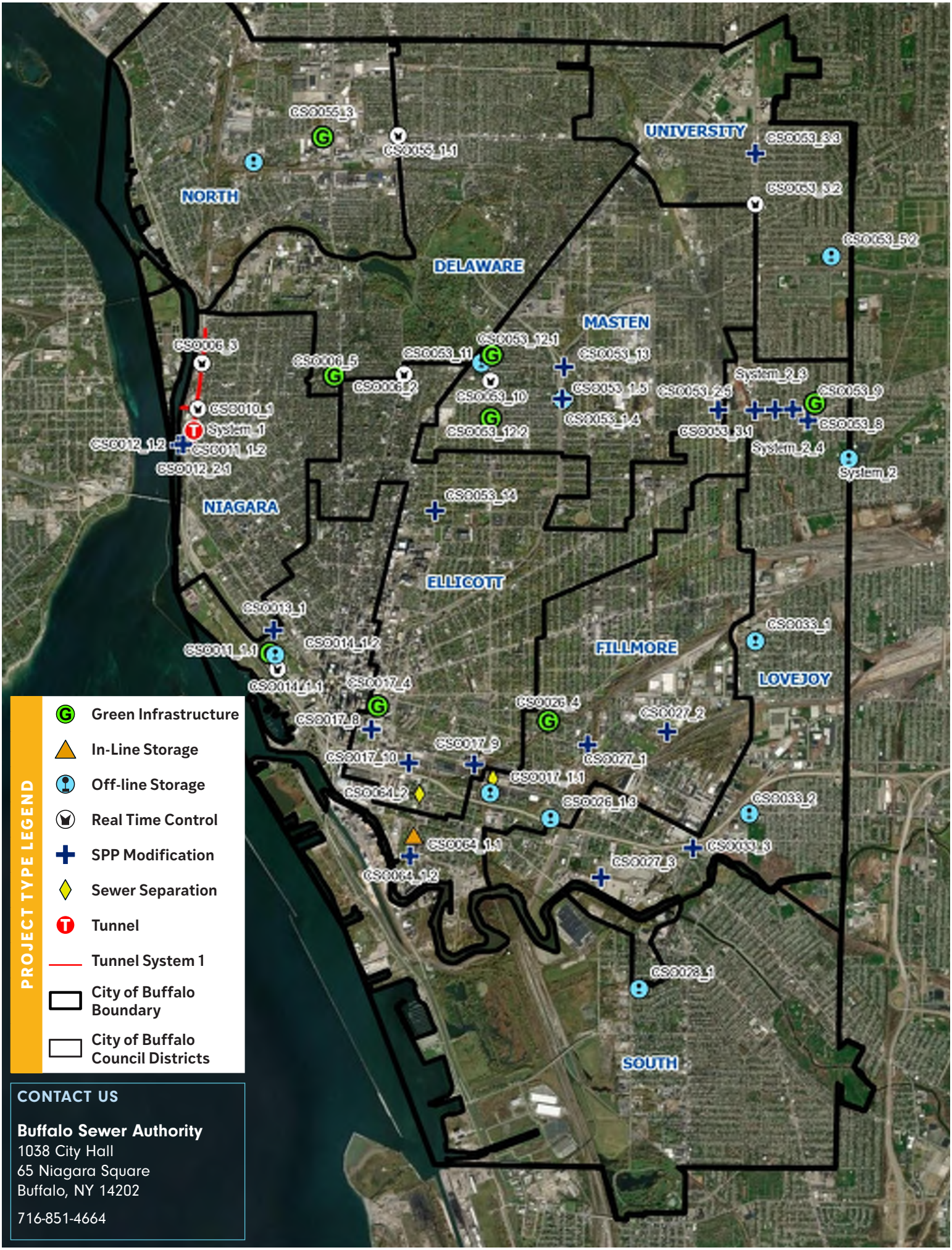
50+ SITES
$750 MILLION
15 YEARS

BSA's Proposed Project Schedules (GI Projects not included)

Project Name and Tag	Start - Completion
WWTF NFA Phase I	11/25/19 - 5/26/30
WWTF NFA Phase II	10/28/20 - 12/26/31
WWTF NFA Phase III	3/29/24 - 3/3/31
CSO053_11, 1.5 MG Canisius/Jefferson Delevan OLS	9/7/28 - 4/9/33
CSO053_3.2 Bailey & Amherst, Amherst Quarry PS RTC	5/28/25 - 7/6/28
CSO010_1 Breckenridge Niagara RTC	8/26/25 - 1/31/29
CSO006_2 Gates Circle RTC	4/8/25 - 5/17/28
CSO053_10 SPP229A RTC	10/22/24 - 7/19/26
CSO053_3.3 Bailey & Minnesota SPP254 Modification	10/22/24 - 7/19/26
CSO053_2.5 SPP337 Modification	4/24/26 - 11/20/27
CSO053_3.1 SPP338 Modification	4/23/27 - 6/1/30
CSO053_8 SPP341A Modification	4/24/26 - 11/20/27
CSO053_1.5 SPP336B Modification	4/24/26 - 11/20/27
CSO053_1.4, 3.26 MG Sidney OLS	6/18/27 - 5/29/32
CSO053_13 SPP165B Modification	4/24/26 - 11/20/27
CSO053_14 SPP175 Modification	4/24/26 - 11/20/27
CSO053_5.2 Edison Martha OLS	6/18/27 - 4/30/33
CSO014_1.1 SPP206A&B RTC	2/25/28 - 2/9/30
System_2 Schiller Park OLS	6/16/28 - 5/28/33
System_2_3 SPP339 Modification	4/23/27 - 11/18/28
System_2_4 Schiller Park OLS SPP340 Modification	4/23/27 - 4/7/29
CSO013_1 SPP304 Modification	4/22/28 - 11/18/29
CSO012_1.2 SPP023 Modification	4/22/28 - 11/18/29
CSO012_2.1 SPP296 Modification	4/22/28 - 11/18/29
CSO017_8 SPP326 Modification	4/22/28 - 11/18/29
CSO014_1.2 5.55 MG Erie Basin Marina OLS	3/24/29 - 3/5/34
CSO011_1.2 SPP024 Modification	4/22/28 - 11/18/29
CSO026_1.3 Collins Park OLS	6/18/30 - 5/30/35
CSO027_1 SPP 317 Modification	4/24/29 - 11/20/30
CSO027_2 Babcock PS Weir Modification	4/24/29 - 4/9/31
CSO055_1.5 11.55 MG Military Rd OLS	12/12/30 - 1/2/37
System_1 Northern Relief Tunnel	6/23/33 - 6/1/40
CSO017_9 SPP059 Modification	4/25/31 - 11/20/32
CSO027_3 SPP097 Modification	4/25/31 - 11/20/32
CSO033_2 Clinton St OLS	1/27/32 - 3/8/36
CSO033_3 SPP104 Modification	4/25/31 - 11/20/32
CSO017_10 SPP051 Modification	4/25/31 - 11/20/32
CSO006_3 Delavan Drain Weir Raising & RTC	2/25/33 - 4/5/36
CSO064_1.1 CSO-064 ILS	3/25/33 - 3/10/35
CSO064_1.2 SPP 137, Modification	4/23/32 - 11/19/33
CSO028_1, 0.95 MG Hopkins & Osage OLS	3/24/34 - 3/5/39
CSO017_6 Bass Alley OLS	3/24/34 - 3/5/39
CSO033_1 Bailey & Regent OLS (Moreland Park)	3/24/35 - 3/4/40
CSO064_2 Perry Street Sanitary Sewer	3/26/36 - 6/3/38
CSO017_1.1 SPP054 Sewer Separation	3/26/36 - 6/3/38
Hertel North East ILS (M) Updated Design (CSO055_1.1)	4/23/37 - 6/1/40

WATER SOURCE LEGEND

Scajaquada Creek | Black Rock Canal | Erie Basin Marina | Buffalo River | Niagra River



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Ways to pay

Review and pay

Total **$18,591.66**

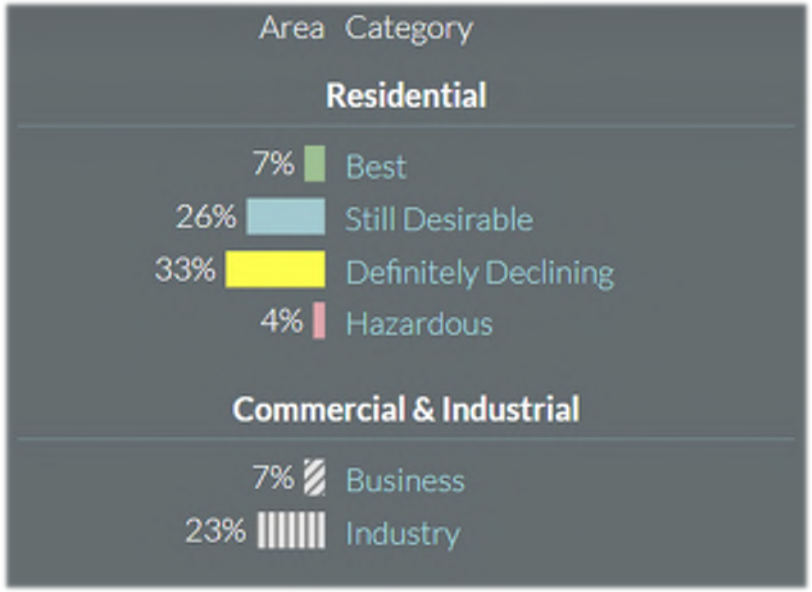
Overdue 07/03/2024

Operationalizing Equity

Case Study: Buffalo Sewer Authority Queen City Clean Waters (Long-Term Control Plan)

May 22, 2024

Redlining at work in Buffalo - 1937 federal underwriting map



The third version of *Mapping Inequality: Redlining in New Deal America*

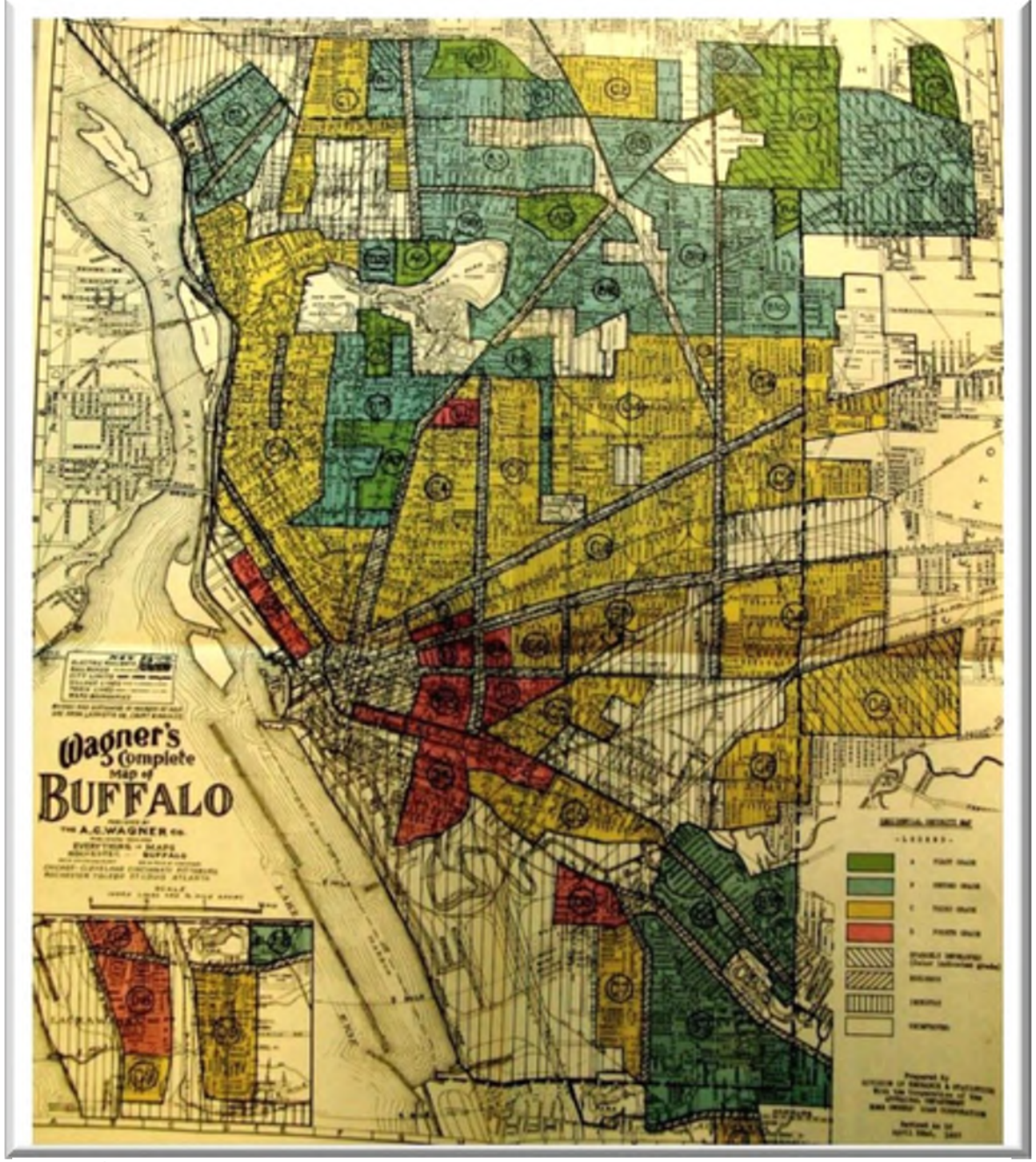


Figure 1. This 1937 federal underwriting map shows redlining at work. Most African Americans lived in the red zones.
Source: Residential Security Map, Buffalo, N.Y., City Survey File. Record Group 195. National Archives II, College Park MD. Image courtesy of Carl Nightingale

Consequences of Lack of Equity

***Environmental Injustice*:** Increased pollution, older housing stock, and the heightened presence of brownfields

Health Inequity: High risk of pollution related diseases, food deserts, and lower life expectancy

Vulnerable Communities: limited access to job and education opportunities

Buffalo's mayor has a plan to demolish about half of the city's vacant houses, like these two on Lombard Street. Credit...Doug Benz for The New York Times

Environmental Justice factors included as Part of Projects Prioritization for Queen City Clean Waters (QCCW)

51 Projects to mitigate Combined sewer overflow events, comply *with water quality requirements,* and maximize project benefits to the community:

- Green Infrastructure
- Sewer Improvements & Modifications
- Real-Time Control Smart Sewers
- Combined Sewer Overflow (CSO) Storage

Ranking Criteria

- **Sewer Patrol Point (SPP) Overflow Volume Rank**
- **Water Body Ranking**
- **SPP Project Rank**
- **Construction Priority**
- **CSO Cost Effectiveness**
- **Environmental Justice**

Note: All parameters were given equal weight except for the water body rank, which was weighted 1.1 times higher than the other factors.

Equity and EJ Considerations – Data Points

Designated Disadvantaged Community

Source: DAC Are state defined. State Law (State Drinking Water Act)

Examples: Intended Use Plan; Regulations

Socio-Economic Data

Source: Census Tract Data

Examples: Median Household Income; Density; Education; Age; Affordability

Economic Growth Focus Areas

Source: Federal, State, and Local designated communities

Examples: Opportunity Zones; Empowerment Zones

Environmental Justice Analysis

Source: Climate and Economic Justice Screening Tool (CEJST), EPA Environmental Justice Screening Tool (EJScreen)

Examples: Historically underserved and overburdened communities

Customer and Operational Data

Source: Utility

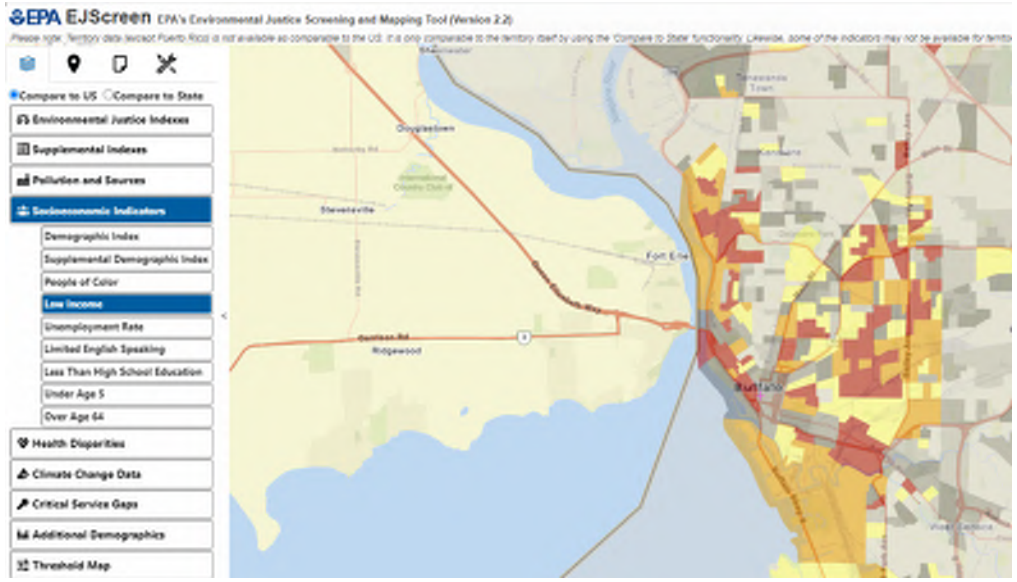
Examples: CSOs; SSOs; Consent Decrees; Customer assistance; delinquent accounts; Affordability

Additional Environmental Concerns/Citations

Source: Varies

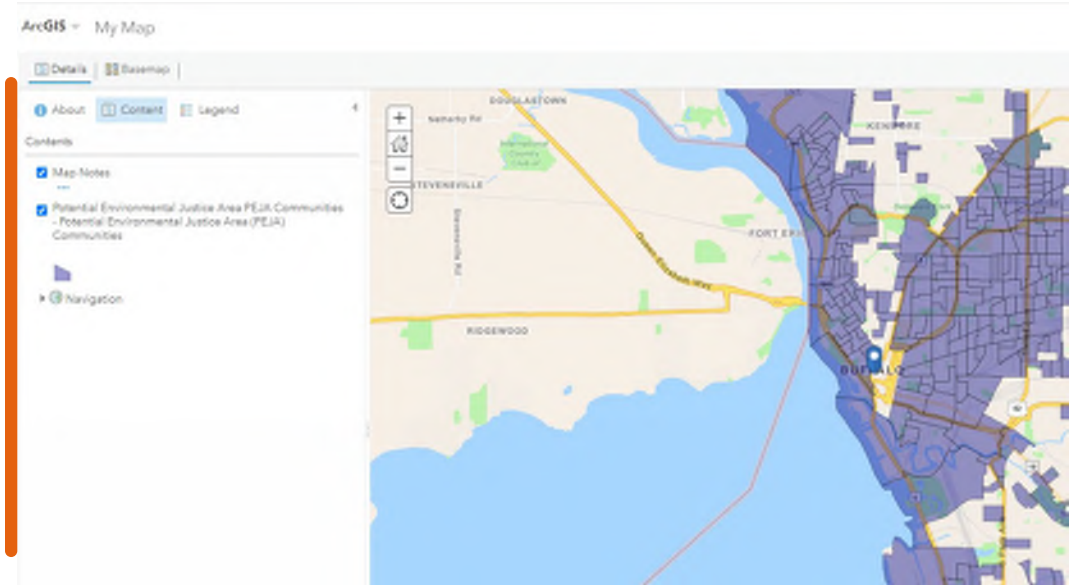
Examples: Floods; tree canopies/energy burden; etc.

Queen City Clean Waters Environmental Justice Data Point Selection

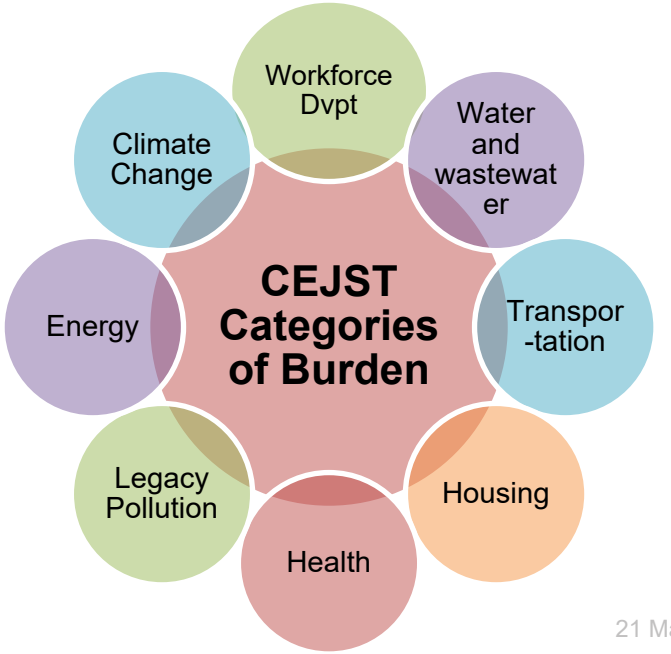


EPA EJScreen: Environmental Justice Screening and Mapping Tool

Buffalo Sewer Authority, "Rain Check 2.0 Opportunity Report"

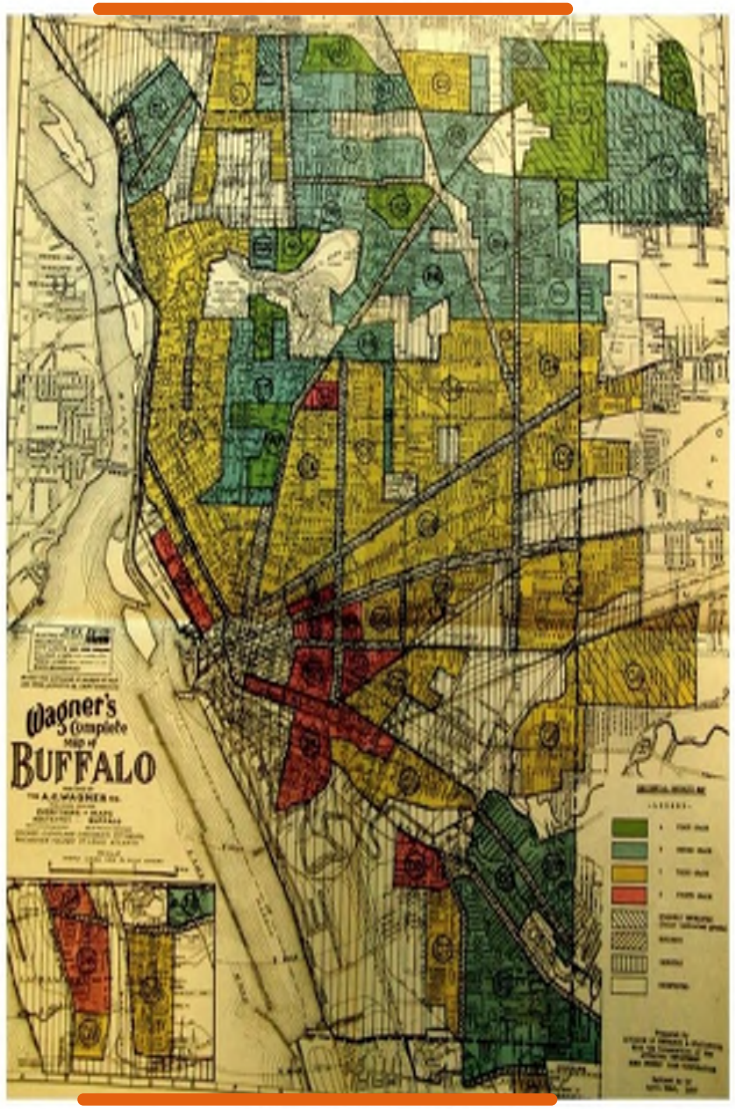


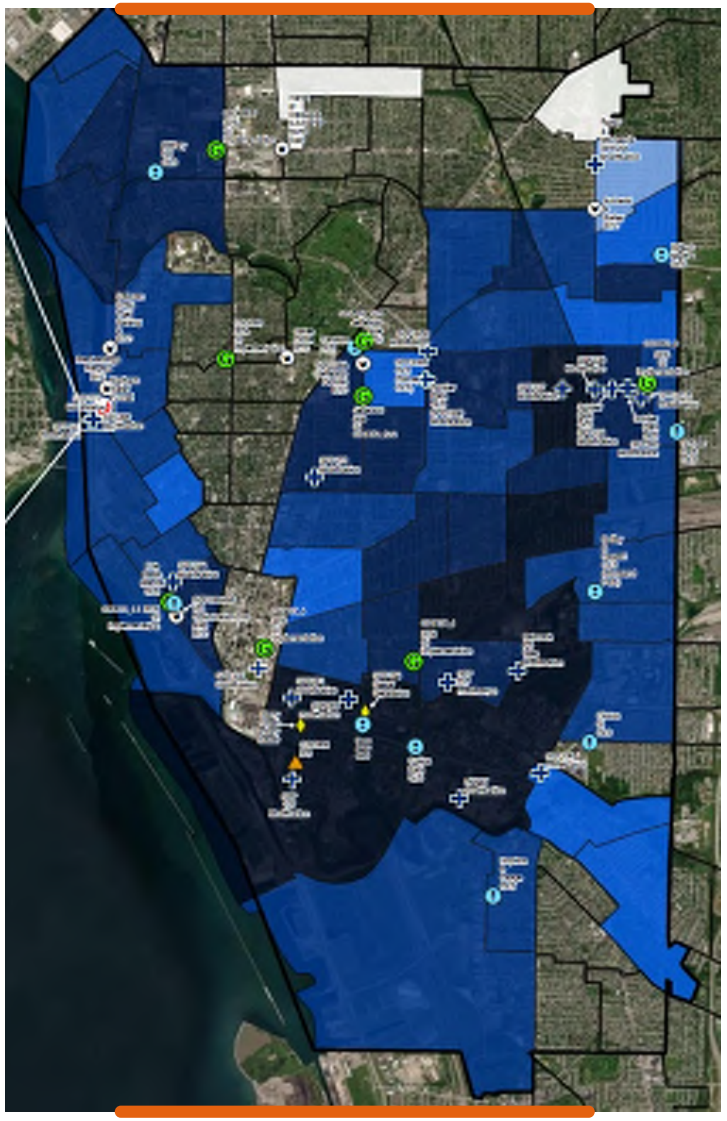
NYS Potential Environmental Justice Areas (PEJAs)



Council on Environmental Quality – Climate and Economic Justice Screening Tool

Environmental Justice Disadvantage Mapping





Legend

Disadvantage Rating

- 0
- 1
- 2
- 3
- 4
- 5
- 6

* Disadvantage Ratings of 7 & 8 were not observed in the City of Buffalo.

Project Type

- Green Infrastructure
- In-Line Storage
- Off-Line Storage
- Real Time Control
- SPP Modification
- Sewer Separation
- Tunnel
- City of Buffalo Boundary

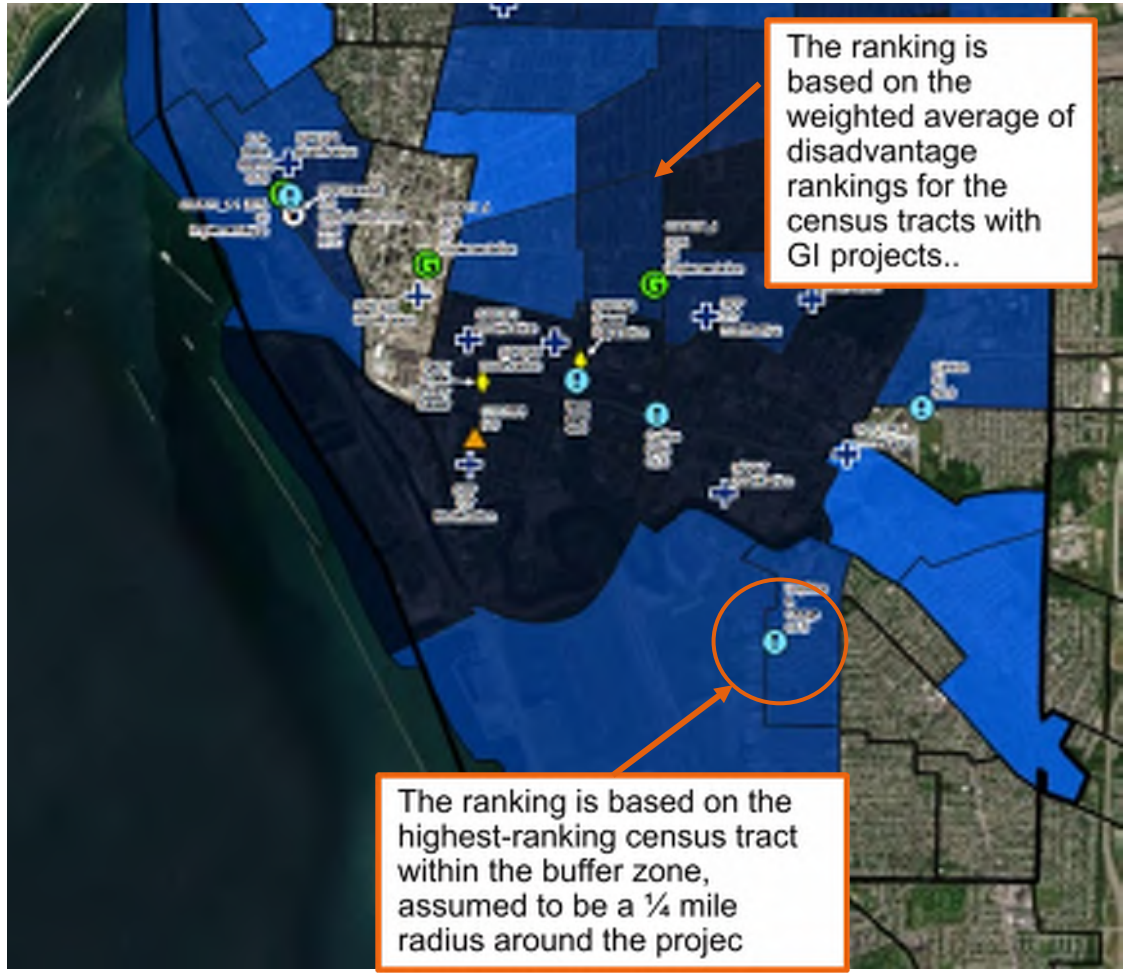
Disadvantage Rankings Calculations

Assessing Disadvantage Ranking:

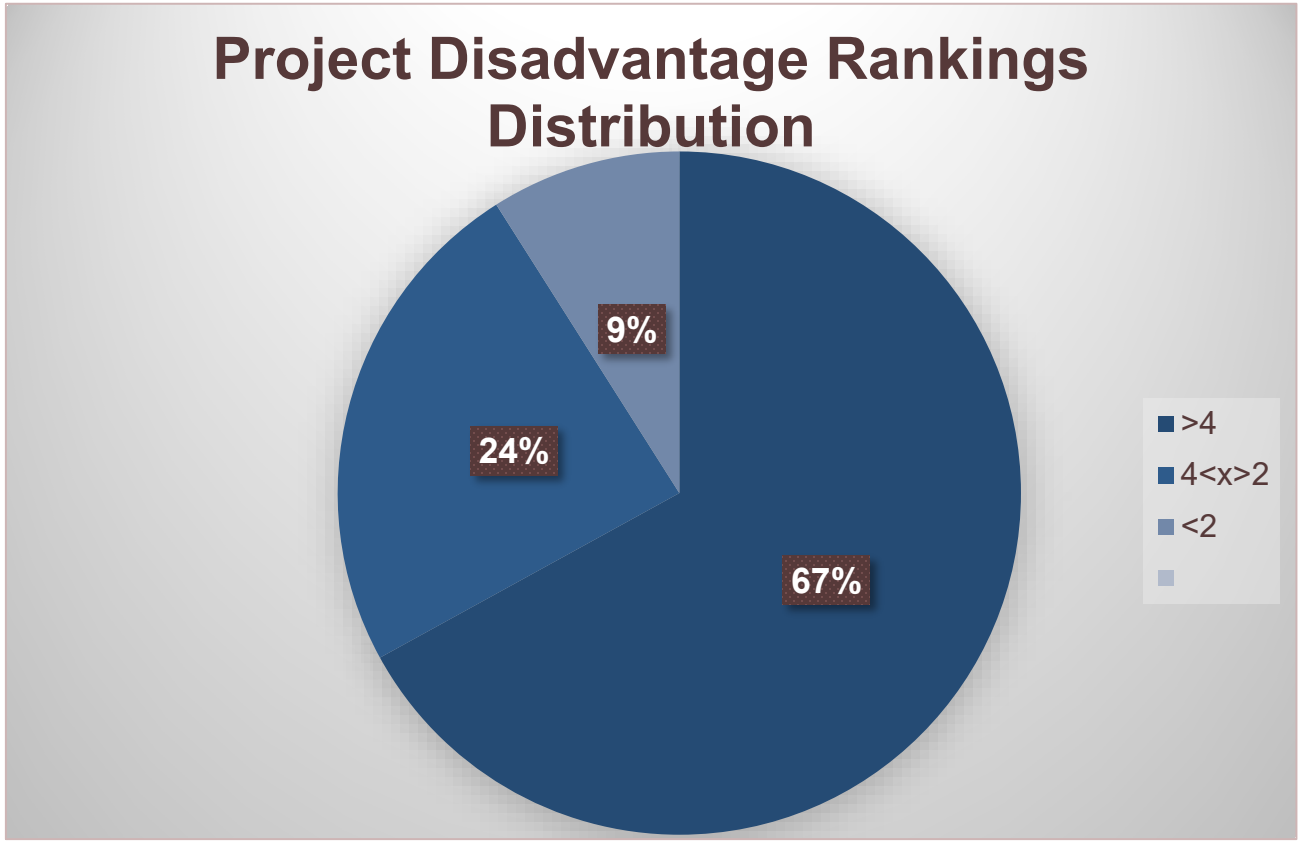
- Observed disadvantage rankings range from 0 to 6
- Projects' locations plotted on the disadvantaged community map to calculate their respective rankings.

Approaches for Ranking Calculation:

- Green Infrastructure (GI) Projects:
- Other Projects (OLS, RTC, ILS, SPP Modifications):



Results and Next Step



Conclusion:

The evaluation of disadvantage rankings provides several key insights:

- Increased awareness of the *impacts* on disadvantaged communities
- *Prioritization* of projects in vulnerable communities
- Guidance for *community engagement* efforts
- Promotion of equitable project implementation

Equity Best Practices - DEC Enhanced Public Participation Plan

NYSDEC Commissioner Policy 29

- Enacted 3/19/2003
- Applicants for certain major ECL permits with environmental impact in or near a Potential Environmental Justice Area (PEJA)
- Geared towards discrete project site and short time-line
- Requires identification of stakeholders and deliberate outreach to them "Enhanced Public Participation Plan"

9/27/2023 Draft CLCPA Policy issued

- Climate Leadership and Community Protection Act (CLCPA),
- Preventing disadvantaged communities from being disproportionately affected by greenhouse gas (GHG) or co-pollutant emissions;
- All applicants under policy will need to prepare Enhanced Public Participation Plan

Equitable Outcomes

- Prioritizing Projects in neighborhoods with greatest environmental justice concerns earlier
- Public outreach targeted towards neighborhoods most impacted during construction
- Workforce development and Green Infrastructure limited to neighborhoods with highest burdens
- Community benefit projects as requirement moving forward
- Credits for low and fixed income residents

Key Takeaways

Equity Practices are important in promoting community wellness and benefits,

Disadvantage rankings can be used to prioritize projects in vulnerable communities. *Remember: Equity looks different for different communities*

Stakeholder engagement is important for achieving equitable outcomes

Inclusive planning includes articulating project goals, identifying equity gaps, and engaging all members of the community.

Thank You!

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Approver's Signature:	Edmund Aplerh
Date:	7/15/2024
Proj. Acct. / Staff Nam	Nancy Gomez
UM Initial (if applies)	

Invoice details
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Terms: Net 30
Invoice date: 06/03/2024
Due date: 07/03/2024

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Ways to pay

Review and pay

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#	Date	Product or service	Description	Qty	Rate	Amount
1.			Prepare the Stakeholder advisory database and metric. Pre-evaluate each candidate to see if they would meet the criteria for the BSA indicators.			
2.			Develop the stakeholder advisory metric in Mural in preparation for the community engagement team to review.			
3.		**Services**	Modified the survey in Survey Monkey. We developed survey metrics to monitor efficiency, including Estimated Time to Complete and Estimated Completion Rate. The estimated time to complete the survey is 7 minutes, which falls within the 5-10 minute range, indicating a high likelihood of completion by the majority of participants. The estimated completion rate is 70%.	1	$0.00	$0.00
4.			Attended COB Clean Sweep in Lovejoy District. We spoke to residents throughout the clean sweep about Queen City Clean Water. Residents were encouraged to hear about the sewer Authority's efforts.			
5.			Made final updates to the electronic survey in preparation for distribution.			

6.		Started the initial phases of project the project website. We began examining the tools to create a virtual community for capturing and analyzing responses from the residents.			
7.	**Services**		1	$18,591.66	$18,591.66

Ways to pay

View and pay

Total **$18,591.66**

Overdue 07/03/2024

BUFFALO
SEWER AUTHORITY

UPCOMING WORK
IN THE
NIAGARA COMMON COUNCIL DISTRICT

Buffalo Sewer through its Queen City Clean Waters projects **is tackling stormwater challenges in Buffalo.**

This month, our team will be drilling small holes in the ground in your neighborhood to gather important information for these projects.

Here's what you need to know:

- **Location:** Our crews will wear yellow vests and hardhats as they drill:
  - **In the grass area along the East side of West Ave. at spots between Breckenridge St. and Lafayette Ave.**
  - **In the grass area at spots along the South side of Breckenridge St. between Dewitt St. and Herkimer St.**
- **Purpose:** We need to confirm the underground conditions.
- **Process:** We will drill small holes to collect soil and rock samples for testing. The area will be restored once the drilling is completed. In case monitoring wells are necessary, they will be cut flush to surface and capped.
- **Impact:** You might notice some noise. We will take precautions to minimize any inconvenience.

For more information please contact:
Rosaleen Nogle, Principal Sanitary Engineer
Buffalo Sewer Authority
rnogle@buffalosewer.org.
(716) 851-4664 Ext. 4203

https://buffalonews.com/news/local/buffalo-common-council-waterfront-committee-buffalo-waterfront-mitch-nowakowski/article_480c25cc-34b2-11ef-8eed-63a5ab55514f.html

EDITOR'S PICK

Council's Waterfront Committee had 12 years between meetings. Members had a lot of catching up to do

Vince Gasparini

Jun 29, 2024

Among the topics of discussion at one of the most recent meetings of the Buffalo Common Council's Waterfront Development Committee was revitalization of the waterfront, infrastructure to mitigate sewage overflows and tearing down the Skyway to replace it with a proposed Buffalo Harbor Bridge.

That meeting was adjourned on Feb. 23, 2012.

Long discussed, the DL&W is poised to become waterfront 'anchor'

The committee's next meeting was held this month. So what took so long?

"It's really because no Council member or its leadership called a meeting and filed items," committee member and Fillmore Council Member Mitch Nowakowski said.

That is until Nowakowski resurrected it to convene and – as was the intended purpose of the committee – heard from a group of whom have a stake in making sure that Buffalo's well-documented w teps and mistakes are

rectified and not repeated and that its future continues to serve diverse purposes.

People are also reading...

1. **Ryan O'Halloran: 10 thoughts on the Buffalo Bills' initial 53-man roster**
2. **Buffalo moving toward landmark status on 4 Catholic churches recommended for closure**
3. **ECC approves new Orchard Park location for its South Campus**
4. **Owners of Chef's face lawsuit after backing out on building purchase**

People flock to the Erie Basin Marina to catch the cool breeze off of Lake Erie on a sweltering Wednesday afternoon, June 19, 2024. (Derek Gee/Buffalo News)

Derek Gee/Buffalo News

"This topic of our waterfront and waterways should not be one of obscurity, but a collective conversation on the growth and develo[illegible]egion and our city," Nowakowski said in an opening statement at the

"In the last 14 years, no one's taken the initiative to talk about our waterfront in such a large way," he said, describing the revival of the committee as his "brainchild," having worked with Niagara Council Member and committee chair David Rivera to reactivate it.

A lot has changed in the more than 12 years between meetings. The waterfront of 2012 bears little resemblance to the 2024 version.

- The Skyway is still there, but Canalside has transformed the neighborhood around the site of the old Memorial Auditorium, led by construction of a hotel, parking ramp and restaurant after Terry Pegula purchased the Buffalo Sabres.
- Explore & More – The Ralph C. Wilson Jr. Children's Museum, which has become a waterfront destination for residents and visitors, just celebrated its fifth anniversary.
- Development around the grain elevators – including the Buffalo RiverWorks sports, dining and entertainment complex – transformed former industrial land.
- Just this year, an open-air music pavilion opened inside the metal frame of what was once the Terminal B warehouse on the Outer Harbor.

Those who attended the meeting had history and development on their minds.

A fisherman stands on a kayak while fishing in the waters of the Outer Harbor Turning Basin on Lake Erie near Gallagher Beach on Sunday, June 16, 2024.

Joshua Bessex/Buffalo News

Jill Jedlicka, executive director of Buffalo Niagara Waterkeeper, discussed efforts in climate resiliency, shoreline restoration and toxic remediation, which she says are being achieved through projects such as the Buffalo River Restoration Project and the Buffalo Blueway, a project that seeks to provide equitable access to Buffalo's waterways.

"The history and future of the City of Buffalo is certainly directly connected to our water," Jedlicka said. "Unfortunately, Buffalo's industrial heritage has left our community with a polluted legacy that we are still trying to recover from."

Jedlicka named climate change as "one of the most urgent issues facing Buffalo and Eastern Lake Erie," which she says is being addressed through a Buffalo Coastal Resiliency Study to monitor the effects on at-risk

"It is all of our responsibility to ensure that our collective decisions are based on the fact that a clean and accessible waterfront is a resource to protect, to restore," Jedlicka continued. "Not simply to exploit or develop."

A motorboat glides along the Buffalo River past Canalside.

Derek Gee/Buffalo News

Rosaleen Nogle, principal sanitary engineer at the Buffalo Sewer Authority, said the authority is working with the U.S. Environmental Protection Agency to revise its Long Term Control Plan, a decade-old plan meant to address and reduce sewage overflow, due to additional findings from metering done in 2015 and 2016.

Nogle says the revised plan will be called "Clean City, Clean Waters," and that it will cost close to $1 billion. The original plan cost $380 million when it was first introduced.

Along with its work with the EPA, Nogle said the authority is looking to secure funding from the Federal Emergency Management Agency for protection from overflow during flood events. She said the authority has done its own work to prevent flooding in areas such as Buffalo's Valley neighborhood, which is situated along the Buffalo River and whose residents have been directly affected by flooding in the past.

"Within the Valley neighborhood, we have installed a series of small backflow preventers," Nogle told the committee. "During several recent (flooding) events, we have received positive feedback from those residents that the basements that have always flooded are no longer flooding."

The committee was also joined by Christopher Seslar, a watershed management specialist at the EPA, who said that due to projects undertaken from the Great Lakes Restoration Initiative, the Buffalo River is close to being delisted as an area of concern as soon as 2027.

"There are 14 potential beneficial use impairments that can be associated with any area of concern," Seslar said. "We have removed all of the ones that were associated with the Buffalo River area of concern with the exception of three, and we are currently in the process of removing those, as well."

Development around the grain elevators on the Buffalo River — like RiverWorks, a sports bar and entertainment center — has taken off since the city's Waterfront Development Committee's last meeting in 2012.

Georgia Pressley, Buffalo News

Buffalo Niagara Waterkeeper announces expansion of its geographic scope

Buffalo's waterways have often received the brunt of the city's industrial pollution. Margaux Valenti, legal director at Buffalo Niagara Waterkeeper, describes the Buffalo River as a "testament to the City of Buffalo's industrial heritage."

"It has been plagued by legacy contaminants and an industrial history that, while it made the city a very important port and a very important piece of Great Lakes history, did leave us with a lake and a river that were declared dead prior to us getting environmental laws," she said.

Lynda Schneekloth, a founding member of the Buffalo Niagara Waterkeeper and a professor emerita in the Department of Architecture at the University at Buffalo, names the grain, steel and chemical industries as having been the main culprits in the pollution of Buffalo's waterways, despite their national contributions that put Buffalo on the map.

“Buffalo provided the nation, especially during wartime, with bread and steel, which was an amazing contribution to the nation during difficult times,” she said. “But all that had a cost, and that cost was contamination and pollution.”

But despite the polluted past of Buffalo’s waters, Schneekloth says the strides that have been made are promising.

“In the 1980s, the Buffalo River was truly dead. There weren’t even little microorganisms” she said. “Now, it’s in great shape, and people can use it for recreation, so that is a real significant change that has happened, as well as the whole cleanup of the Great Lakes. It’s not completely done, but the nature of the contamination is no longer quite the same.”

Going forward, the committee will meet every other month. Its next meeting is scheduled for Sept. 10 due to the Council’s August recess. Alongside Nowakowski and Rivera, North Council Member Joseph Golombek Jr. and University Council Member Rasheed N.C. Wyatt are also serving as members.

“The Waterfront Development Committee is super important when we’re talking about not just waterfront development, but also our Buffalo sewers and the status of our water,” Nowakowski said. “They’re all interconnected.”

By Vince Gasparini

News Staff Reporter

BUFFALO

SEWER AUTHORITY

Building a Resilient City at the Place of the Basswood Trees

Rosaleen B. Nogle, PE, BCEE, BC WRE, CFM

M.S., B.S. Civil Engineering; M. Public Affairs (Public Admin Focus)

M.A. Pastoral Ministry, M. Div.,B.A. Anthropology

Pre-1785: Frontier Villages and Native Lands

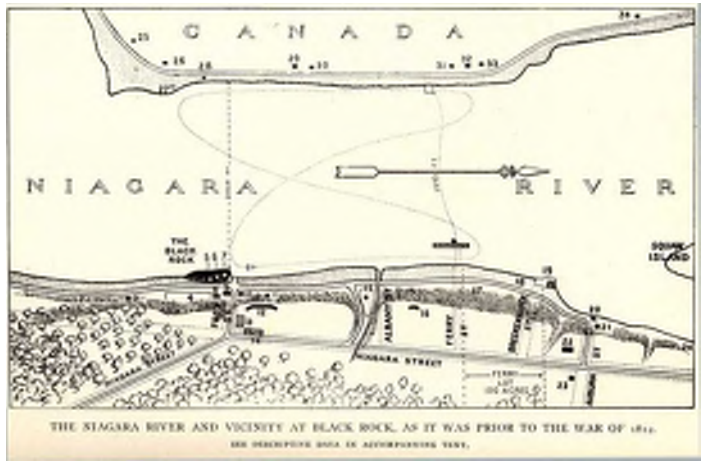
Buffalo's Name

- Big Buffalo Creek
- Buffalo

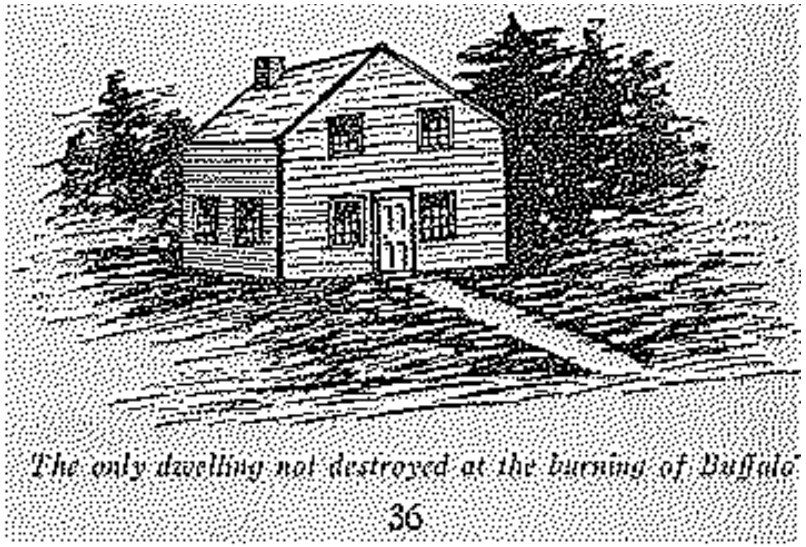
  "Tick-e-ack-gou"
- Place of the Basswoods

  "To-se-o-way"

1785-1825: Early Years



THE NIAGARA RIVER AND VICINITY AT BLACK ROCK, AS IT WAS PRIOR TO THE WAR OF 1812.


The only dwelling not destroyed at the burning of Buffalo

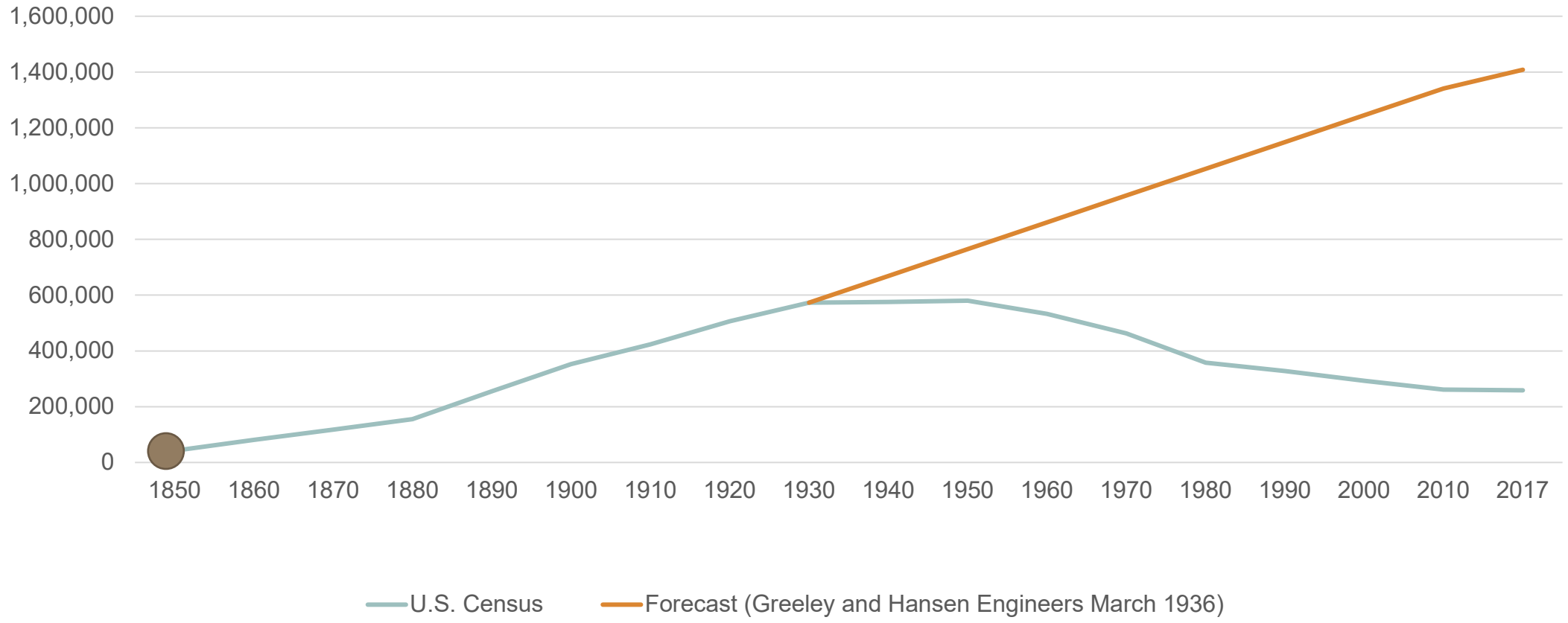
36

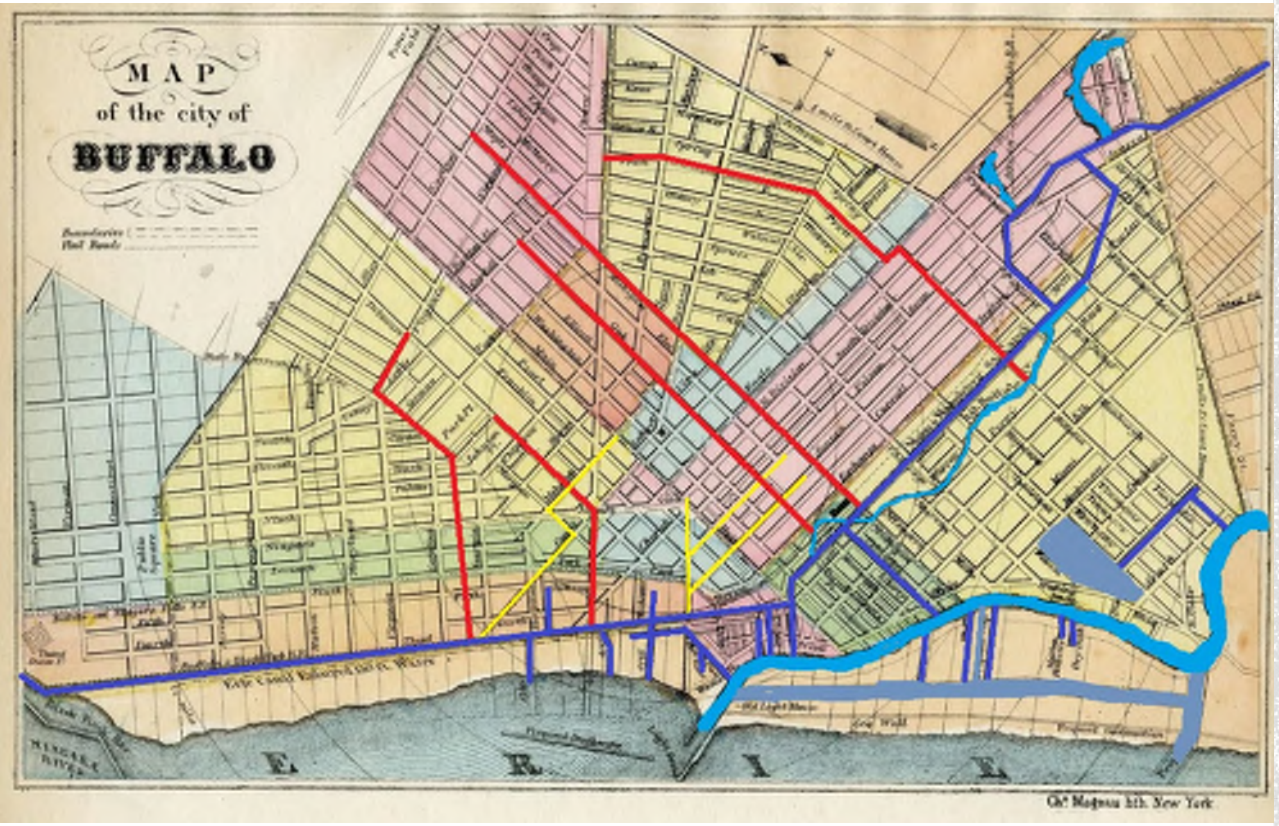
Big Buffalo and Little Buffalo Creek

1825-1848: Early Canal Years

- Drain to nearest water way
- Cholera epidemic 1832
- Private construction
- Oak Street 1834-1835
  - Dry brick
  - Board bottom
  - Triangular

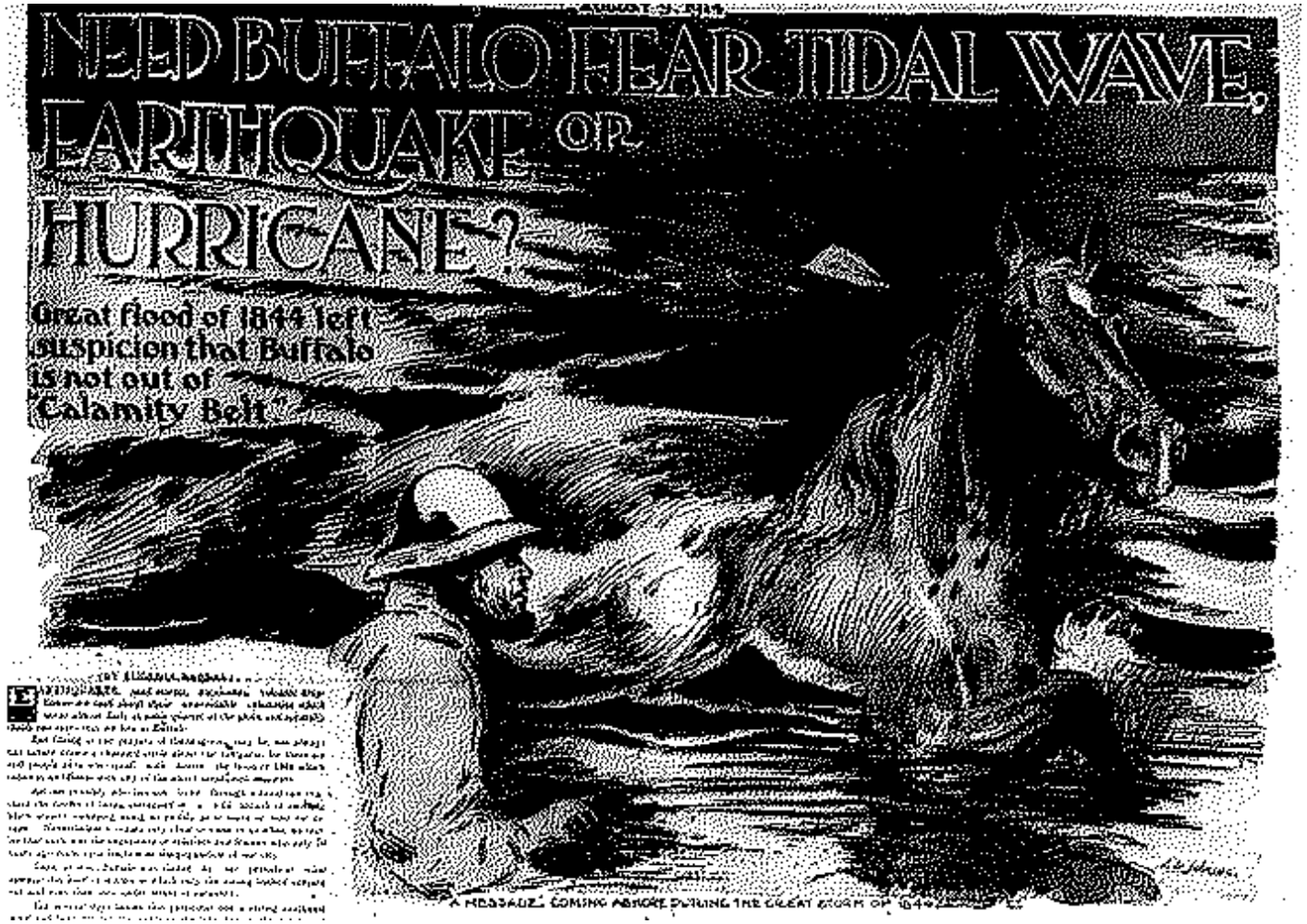
1825-1848: Early Canal Years





1848-1861: Later Canal Years

- Report of Committee on Sewers
  - 2/15/1848
  - Basis of design report
  - Property owners and taxes
- Cholera epidemics 1849, 1854
- 1852 Water Works Company
  - Bathing
  - Indoor toilets



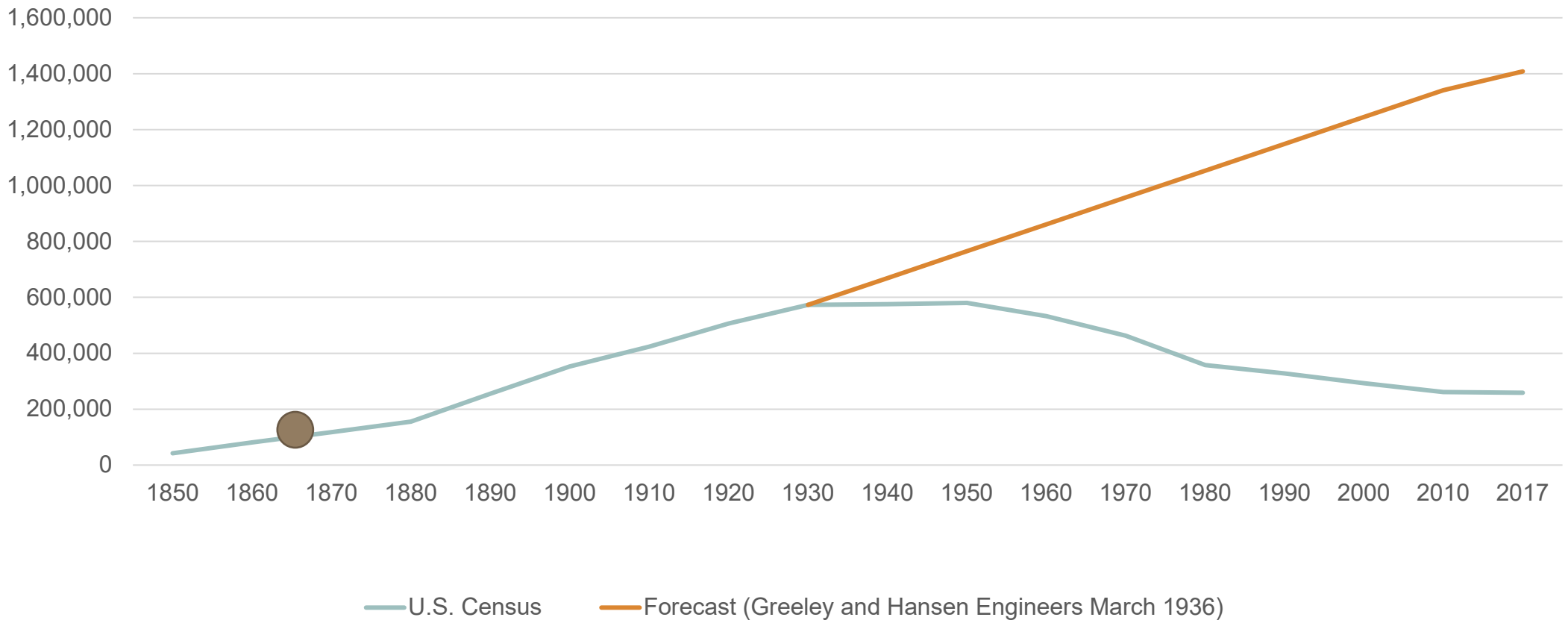
1844 Flood

- 78 Dead
- October 18, 1844
- Main and Ohio Streets six feet deep
- Michigan and Exchange Streets five feet deep

1861-1865: The Civil War

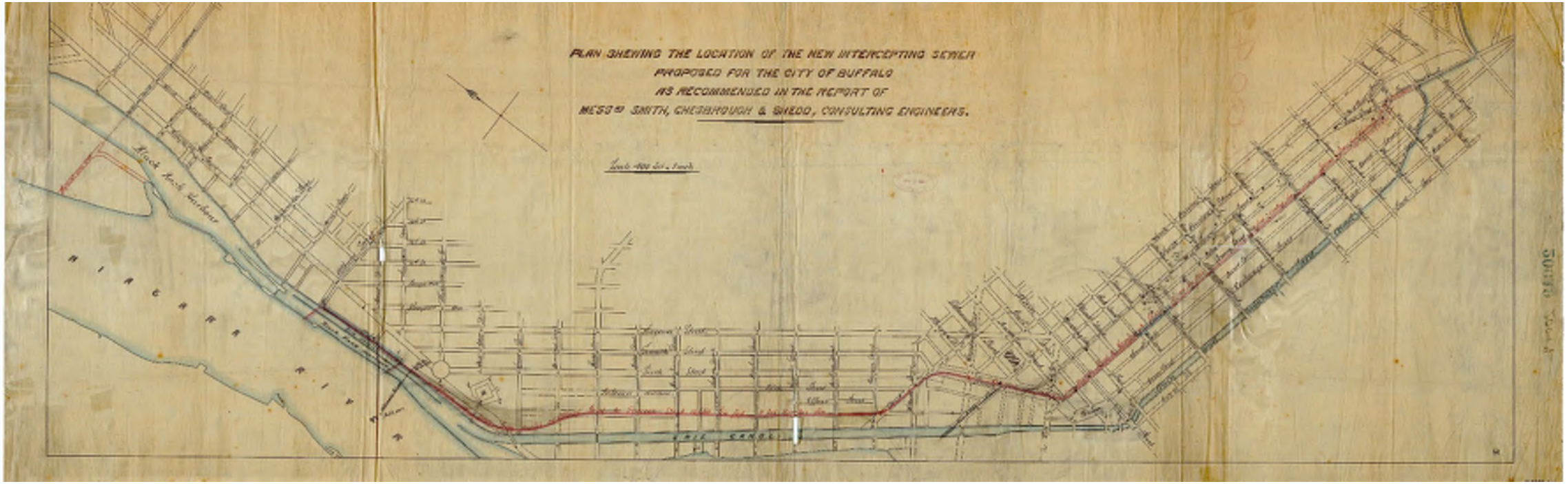
- The Civil War
  - Halt in construction
  - Materials and manpower needed for war
- Presentation to Historical Society Club
  - Oliver G. Steele, Esq. in 1866
  - Leader of 1848 Sewer Committee
  - Warned of need for more work
    - Issue of lack of proper traps
    - Too few catch basins and manholes

1861-1865: Civil War



1867-1899: Industrial Revolution

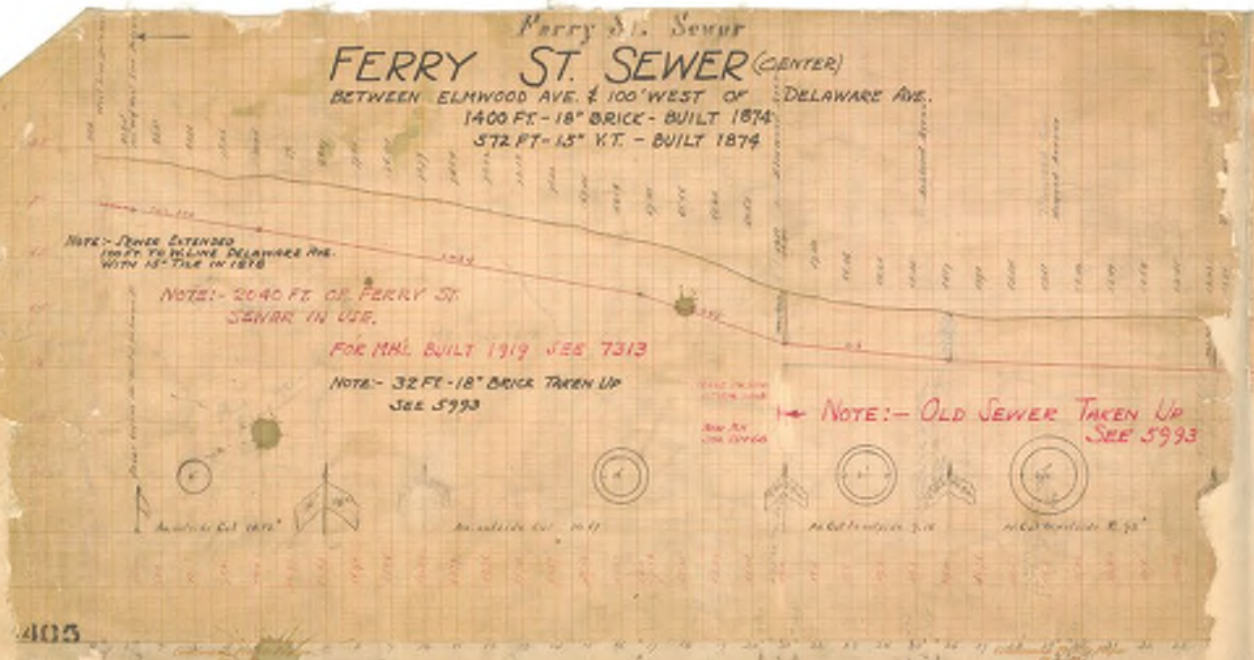
- George E. Waring, Jr. 1884
- Separate sewers and treatment considered, but not pursued
- Trunks
  - Genesee, Bird-Ferry, Hertel, Bailey, Mill Race
  - Swan
    - 3 Flushing gates
    - Main and Hamburg canal and Wilkenson Slip putrid
    - 90 degree turn at Albany Street

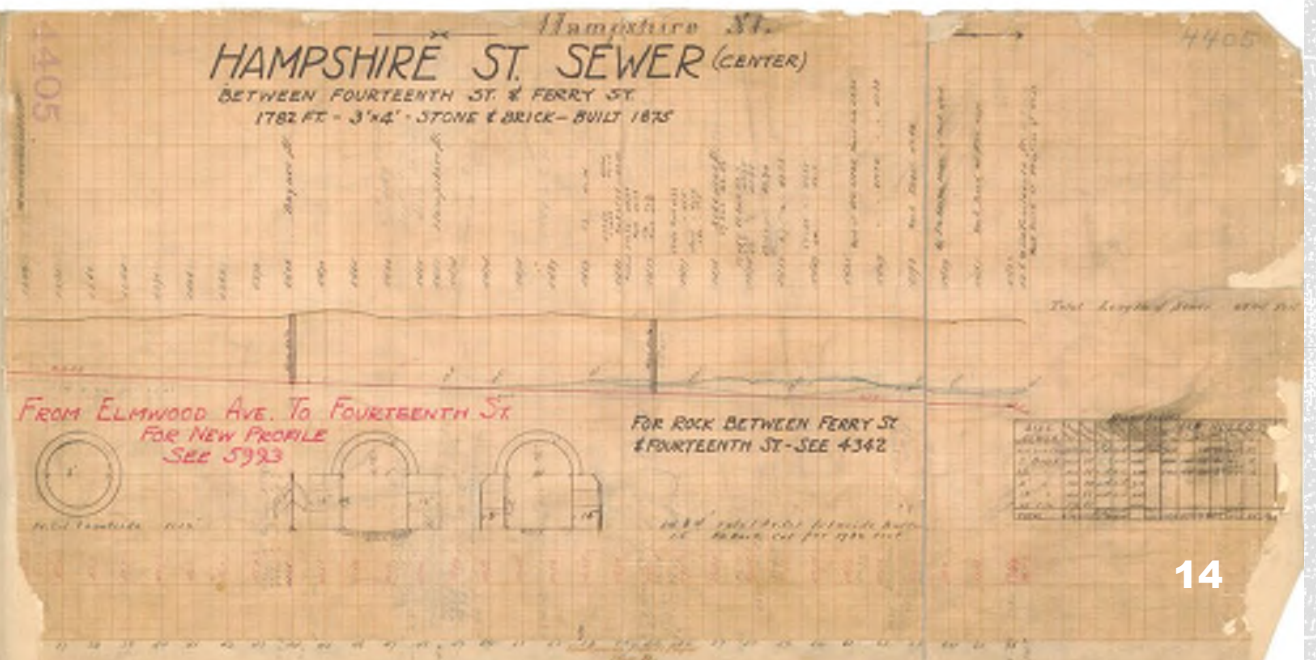


The Swan Trunk

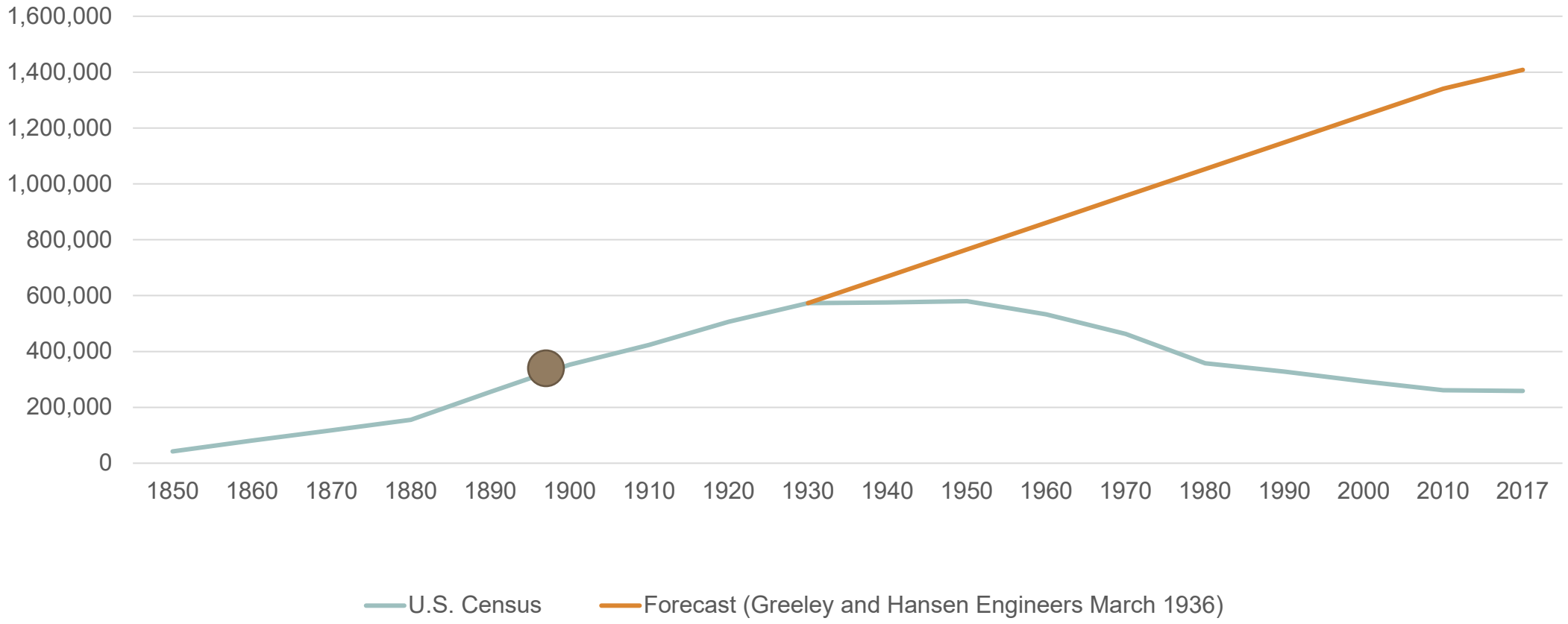
1867-1899: Industrial Revolution

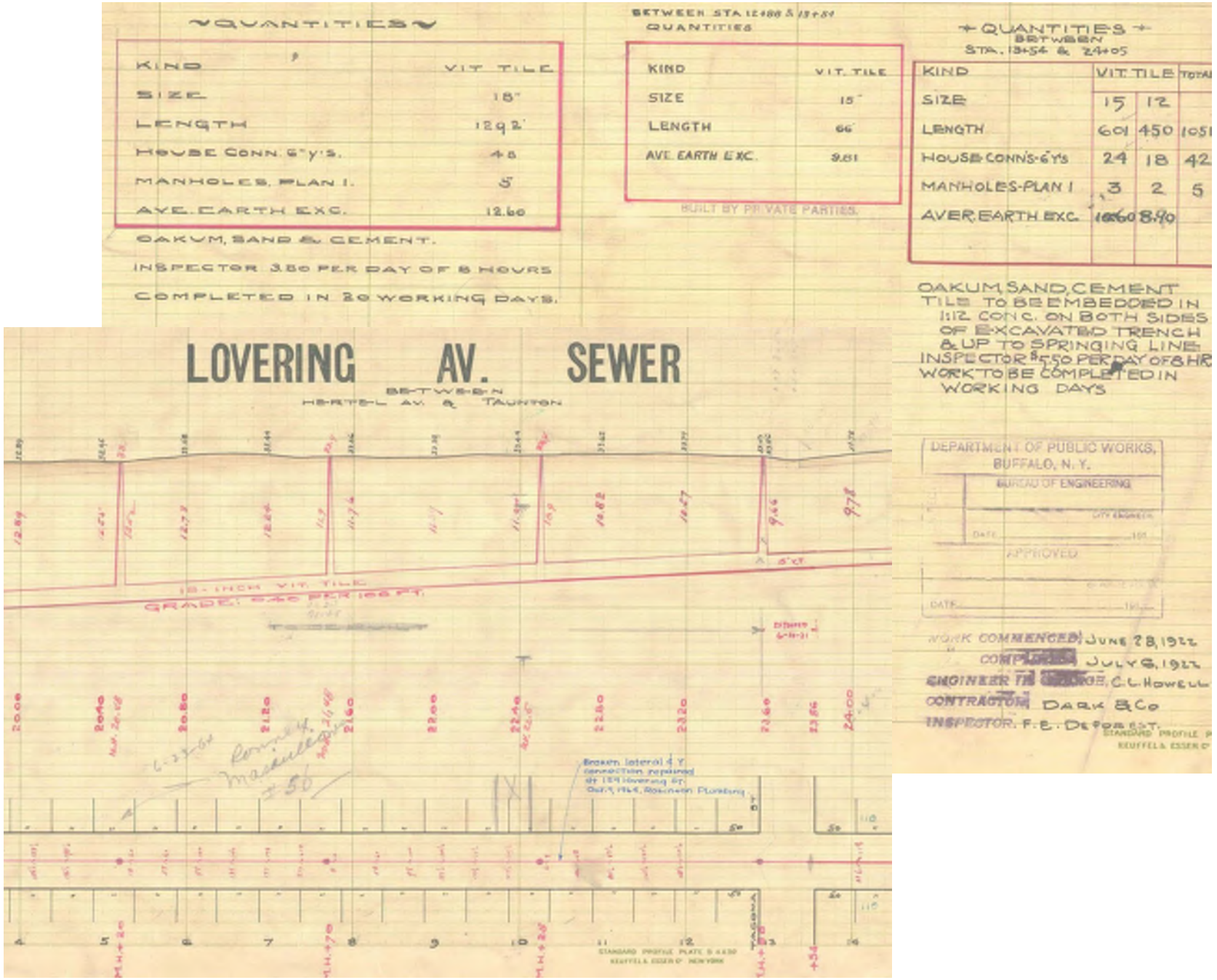
- Majority of existing system
- Hundreds of miles of pipe
- Brick 24”+
- Vitrified Tile Pipe (VTP) 8”-21”





1867-1899: Industrial Revolution





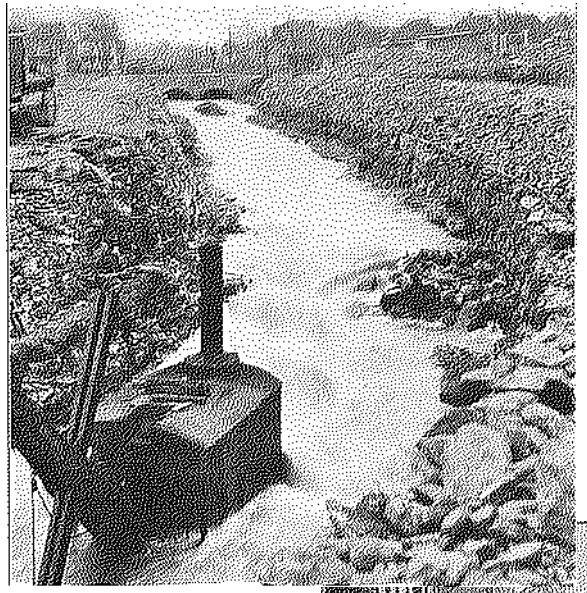
1900-1929: N. Buffalo & Burying of Waters

Sewers installed in North Buffalo for intra-city suburban developments

- Sandy soils
- Need to tie into former Cornelius Creek
- Into rock
- Laterals plunge suddenly into main

1900-1929: N. Buffalo & Burying of Waters

- Waterways → Sewers
  - Main Hamburg Canal to Hamburg Drain 1901-1903
  - Ohio Basin to Ohio Drain 1902-1904
  - Cornelius Creek to Hertel Avenue Overflow Drain 1914
  - Scajaquada Creek to Scajaquada Drain 1925



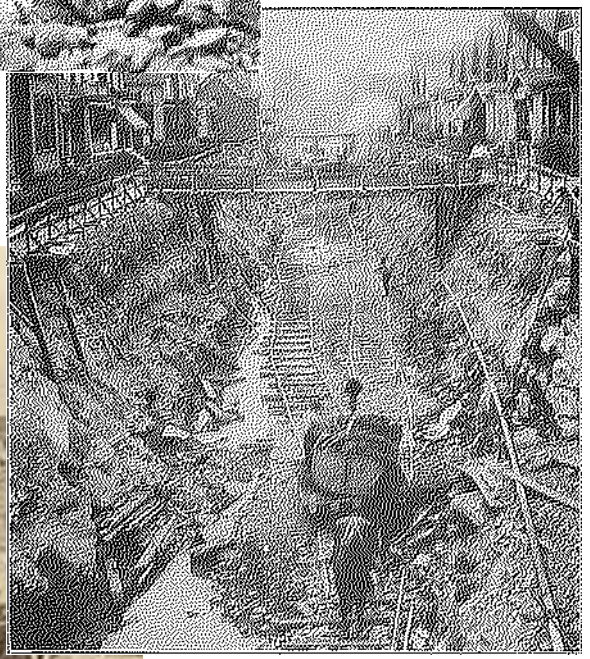
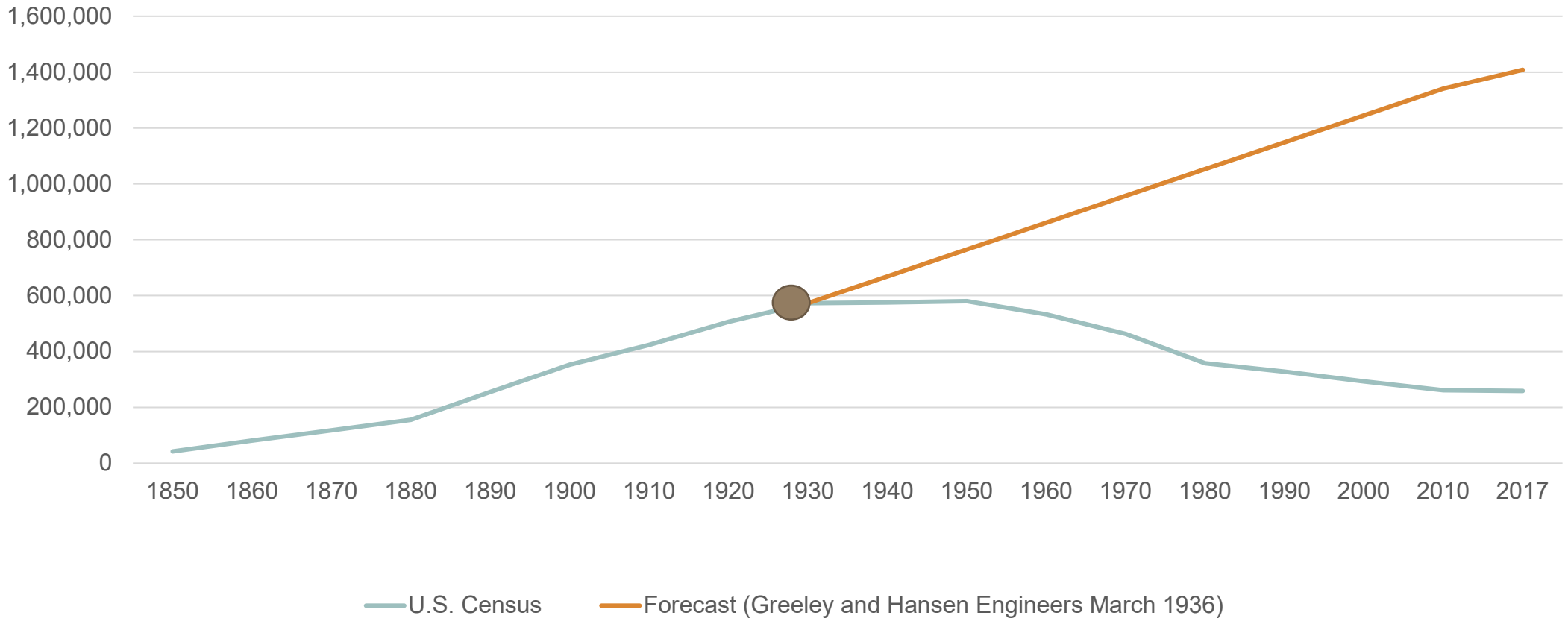


Photo Credit: https://www.wnyheritage.org/content/scajaquada_drian_project_-_1920s/index.html

History: 1929-1941 Creation of the Buffalo Sewer Authority



1929-1941: The Buffalo Sewer Authority

- 1907 Canadian Public Health Report
  - Niagara Falls, NY typhoid death rate
  - 222.4 deaths/100,000 persons/ year
- Establishment of International Joint Commission
  - January 11, 1909
  - "…boundary waters …shall not be polluted on either side to the injury of health or property on the other."

BUFFALO EVENING NEWS: MONDAY, DECEMBER 5, 1927

NEW BUFFALO PASTOR

Keitzel Assails Buffalo for 'Bathing in Own Filth'

on League Hits Dumping of Sewage

BUFFALO EVENING NEWS: TUESDAY, SEPTEMBER 24, 1929

NIAGARA SEWER TO BE THRESHED OUT OCT. 7

Date for Hearing on Flood Relief Set by City Council.

50,000,000 Gallons of Waste Dumped Daily in Buffalo River

Report to Council by Fiak Stirs Perkins to Demand Check on Plants

1929-1941: The Buffalo Sewer Authority

1918 Report

- "In the Detroit and Niagara Rivers conditions exist which imperil the health and welfare of the citizens of both countries in direct contravention of the treaty."
- 80% of pollution of Niagara River originates in Buffalo
- "the sewage of Buffalo is polluting to a serious extent the available water supplies of the two Tonawandas and the city of Niagara Falls, NY"

1929-1941: The Buffalo Sewer Authority

- *Comprehensive Plan of Sewerage for Buffalo, NY*
  - George B. Gasciogne, Consulting Engineer
  - May 1930
- 10-12 year plan
- Sewage treatment through construction of 2 WWTFs
  - South-East by Tifft-Hopkins WWTF
  - North by Unity Island WWTF
- Construction of sewers
  - Interceptors
  - Swan Trunk extension
  - Storm relief sewers
- $23,000,000.00 ($362 M in 2021 dollars)

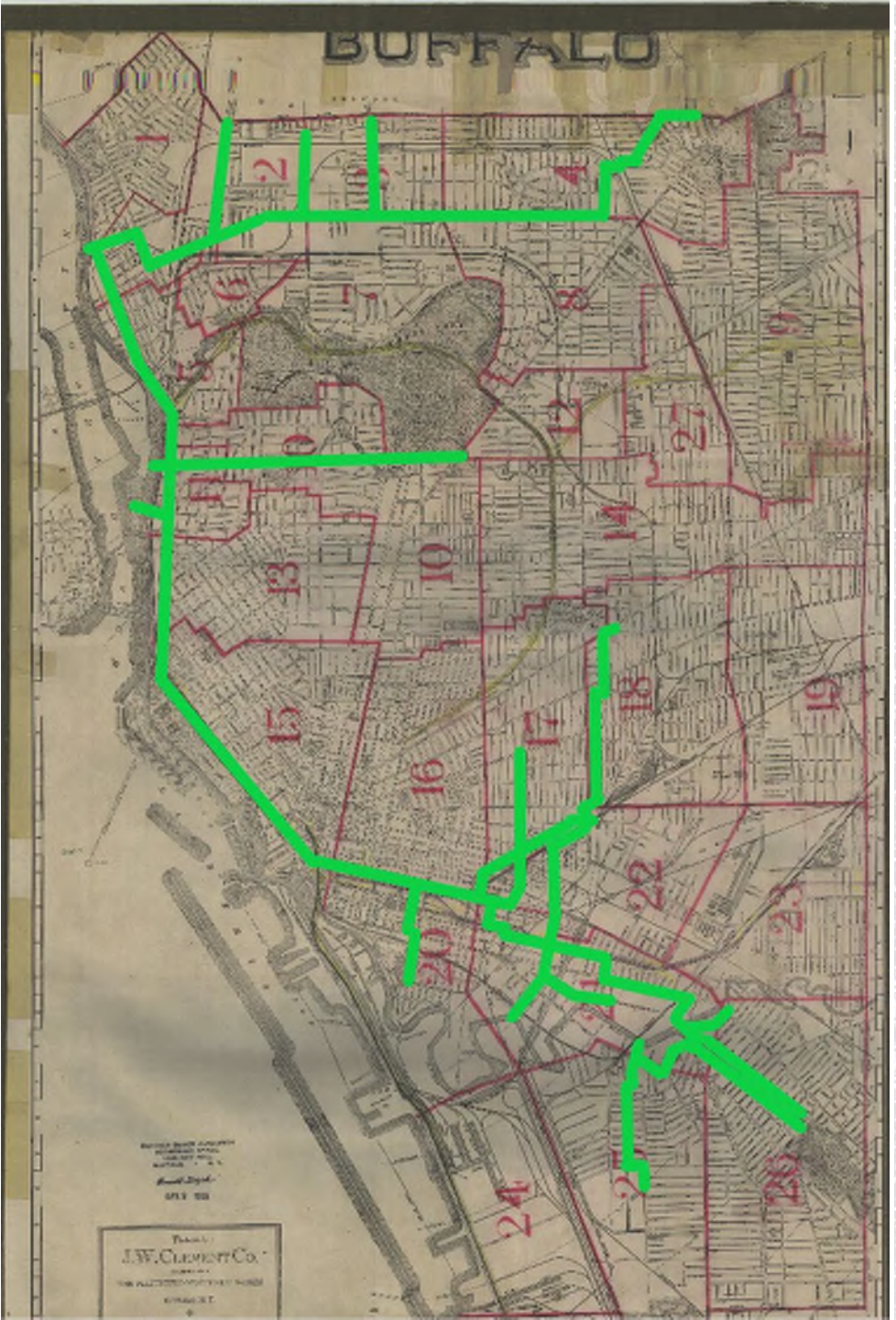
1929-1941: The Buffalo Sewer Authority

- NYS Dept. of Health mandate
  - March 1935
  - Primary Sewage Treatment Plant
  - Interceptor sewers
- Establishment of BSA
  - April 8, 1935
  - $15 million bonding capacity ($287 M in 2021 dollars)
  - After 5 years or after all bonds are paid off, system will revert to city and Buffalo Sewer will dissolve
  - Structures of any public service corporation must be removed at expense of corporation for Buffalo Sewer to construct project

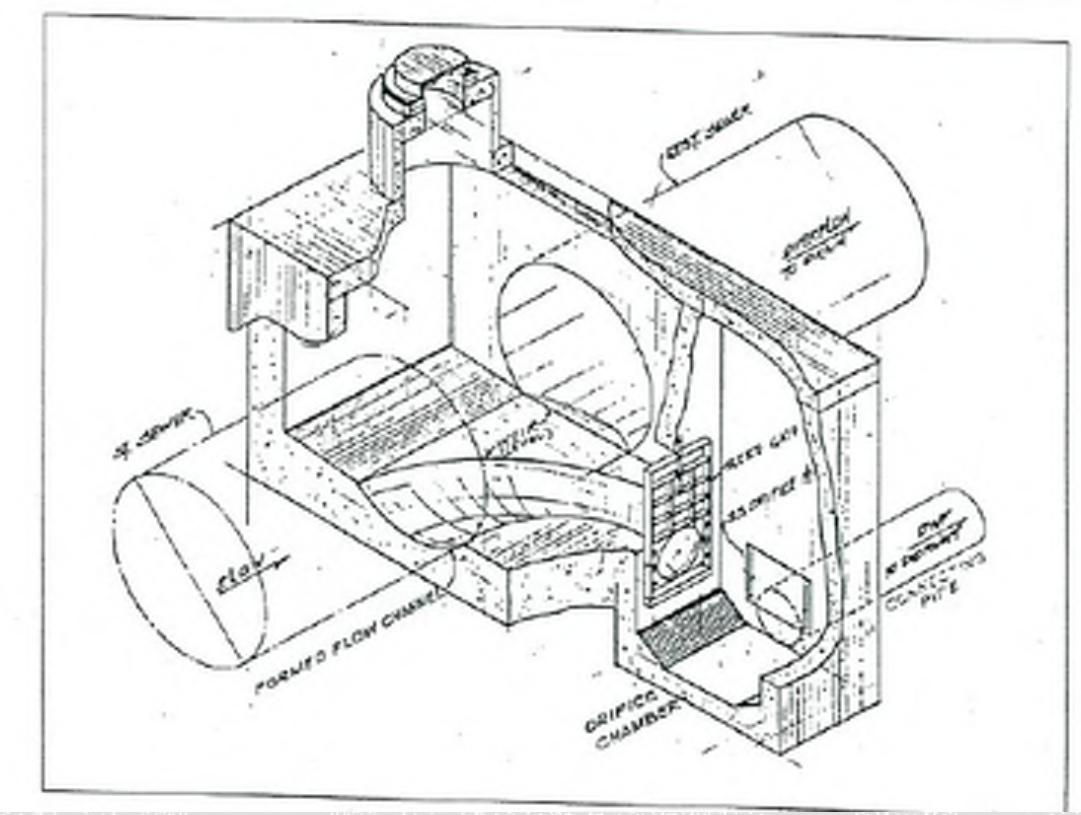
1929-1941: The Buffalo Sewer Authority

- *Buffalo Sewer Authority General Plan for Collecting and Treating the Sewage of Buffalo*
- Greeley and Hansen Engineers
  - Redid Gasciogne's calculations
  - March 1936
- Treatment and conveyance for treatment
  - Single WWTF on Bird Island
  - CSO diversion structures
  - Interceptors
- $15 million cost

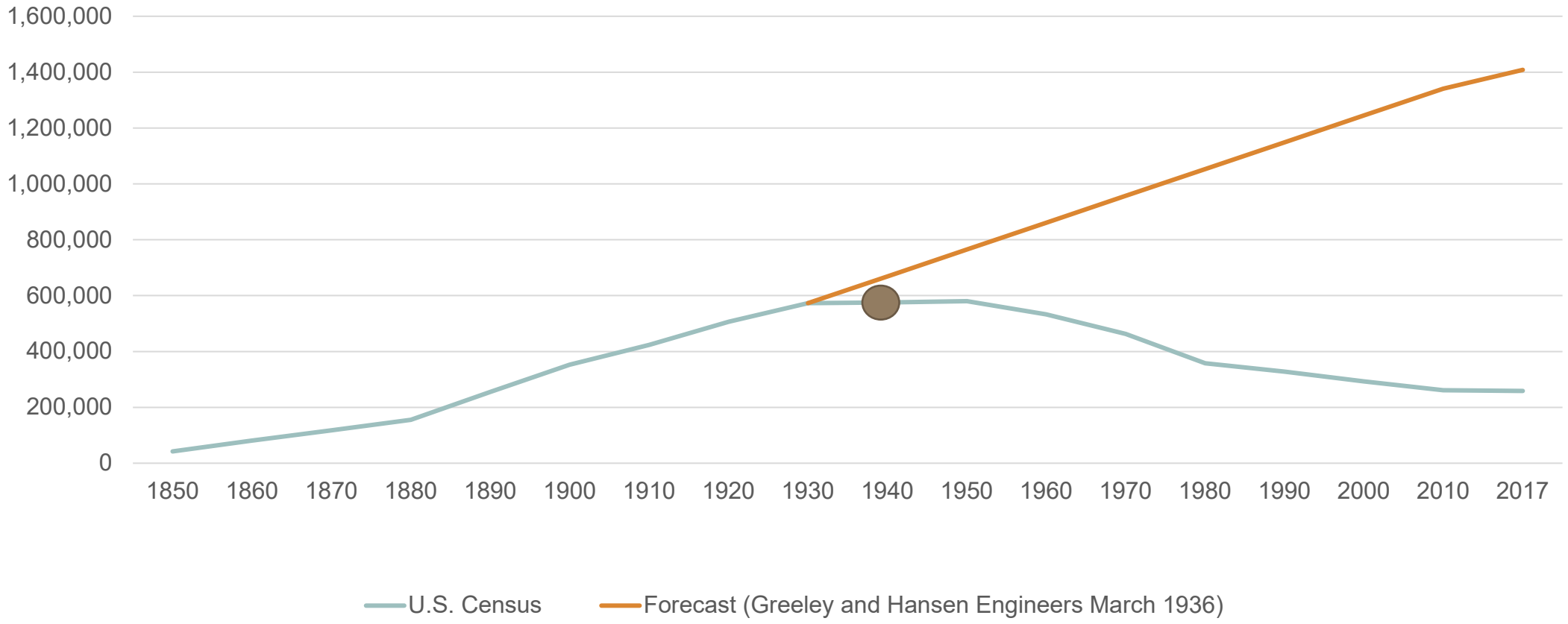
1929-1941: The Buffalo Sewer Authority



1929-1941: The Buffalo Sewer Authority



1941-1970 : Storm Relief and Sprawl



1941-1970: Storm Relief and Sprawl

- *Comprehensive Plan for Relief Sewers*
  - February 1941
  - Greeley and Hansen
  - WWTF online as of 1938
- Attack on Pearl Harbor December 7, 1941
- Post-1945 suburban development
- Floods of 1963
  - July 29: 3.8”: $1.5 M ($12.7 M in 2021 dollars) in damage
  - August 7: 3.88” in 5 hours: $35 M ($295.9 M in 2021 dollars) in damage

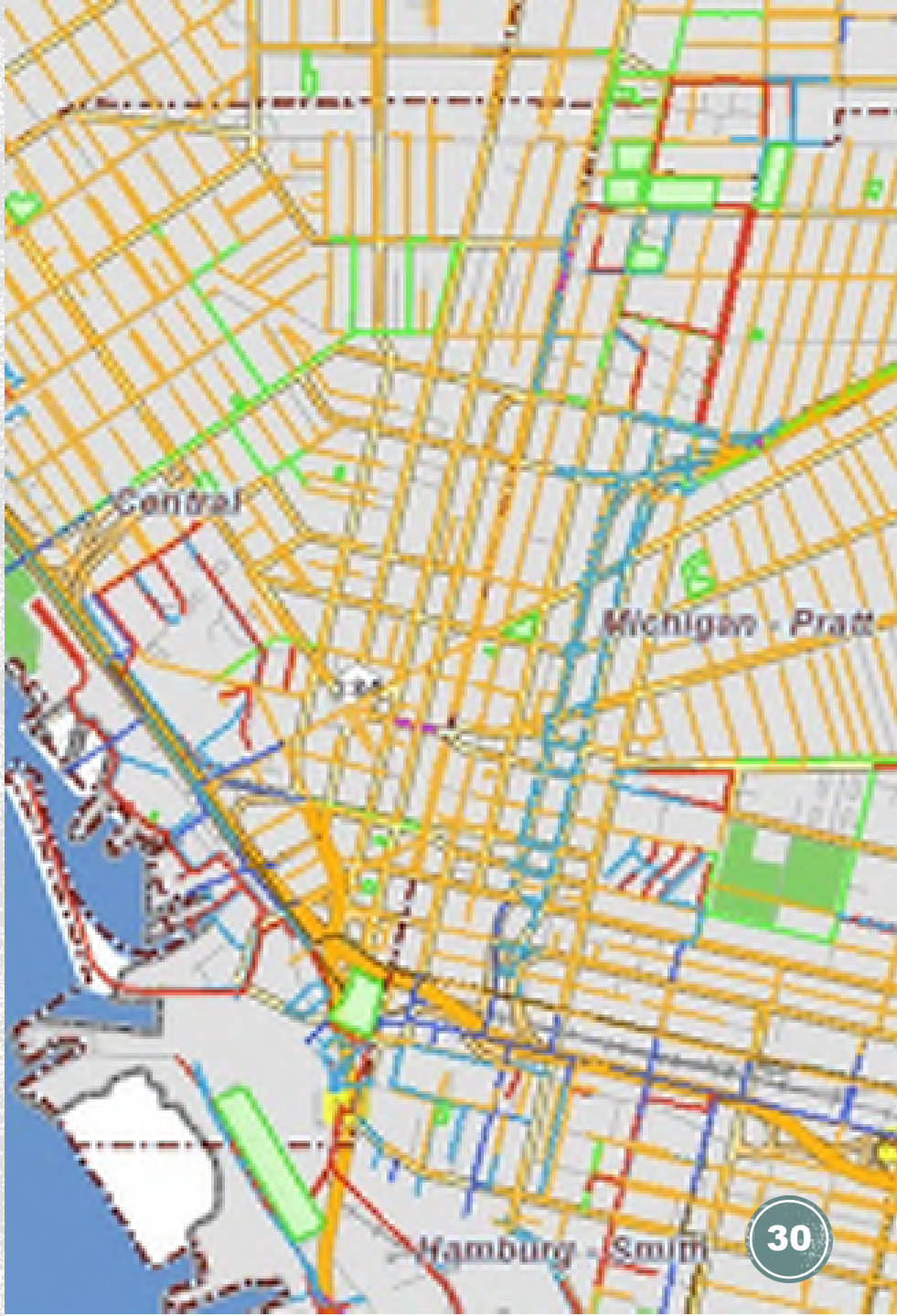
1941-1970: Storm Relief and Sprawl

- NYS Route 33
  - Severed Bird-Ferry Trunk
  - Stormwater added to system
  - New pump station for stormwater and groundwater
  - New trunk sewers constructed
- I-198
  - New storm sewers
  - Direct discharge to Scajaquada Creek
- I-190
  - Old Erie Canal bed
  - On top of
    - Swan Trunk
    - Interceptors
    - Hamburg Drain

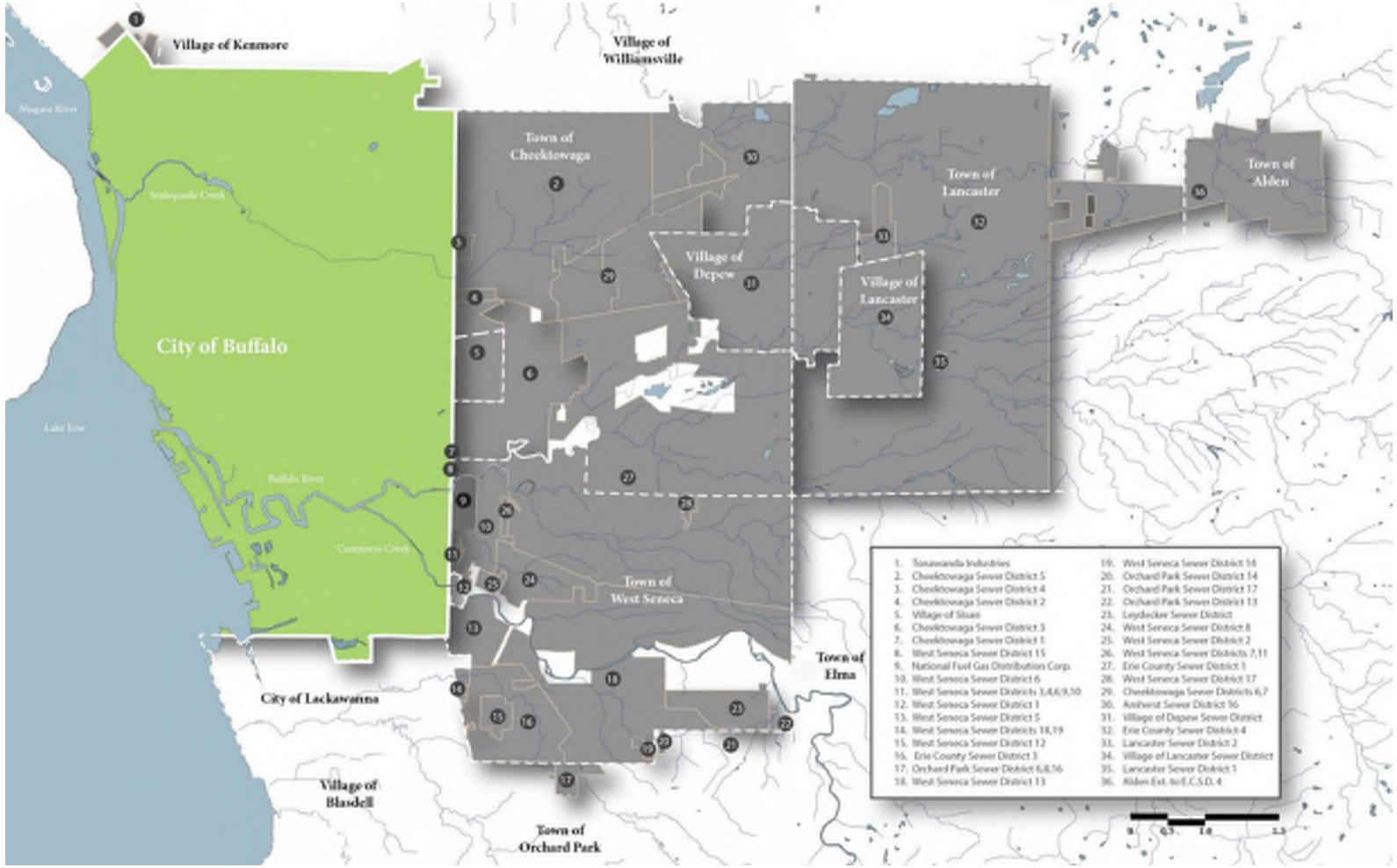
1941-1970: Storm Relief and Sprawl

1941-1970: Storm Relief and Sprawl

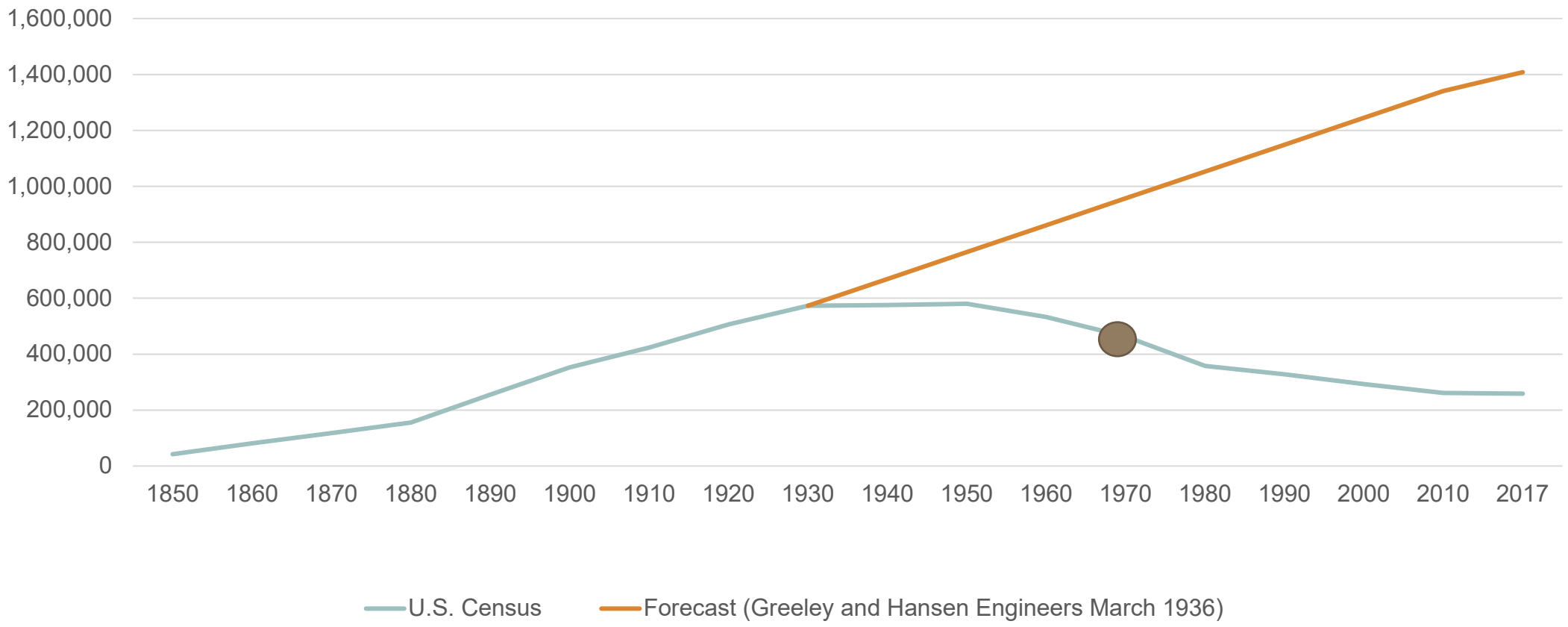
- Urban Renewal 1960-1970
- Demolition of tenement areas
  - Urban core
  - Oldest parts (and oldest sewers) of city
- New municipal housing projects
  - New separated sewers
  - Concrete storm sewers
  - Asbestos concrete pipe sanitary sewers
  - Intermunicipal Connections

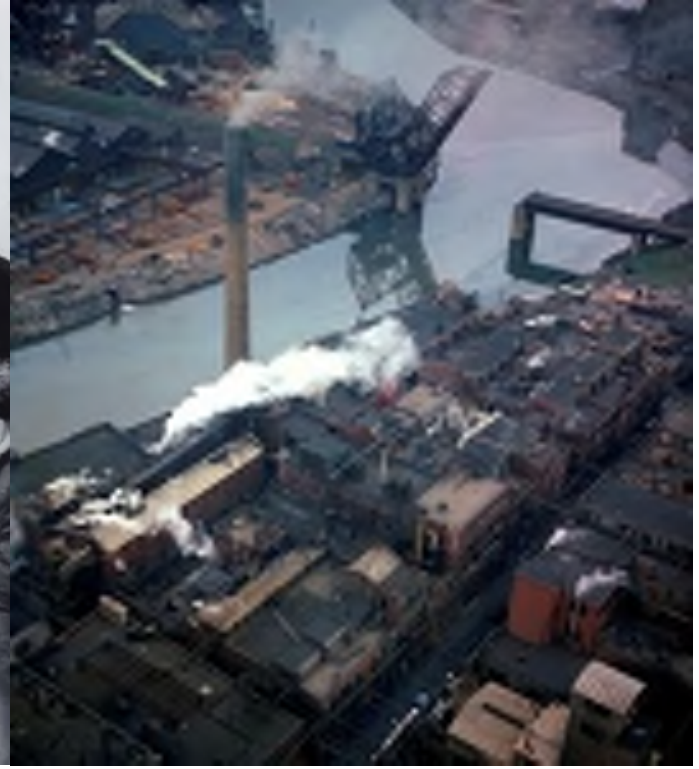


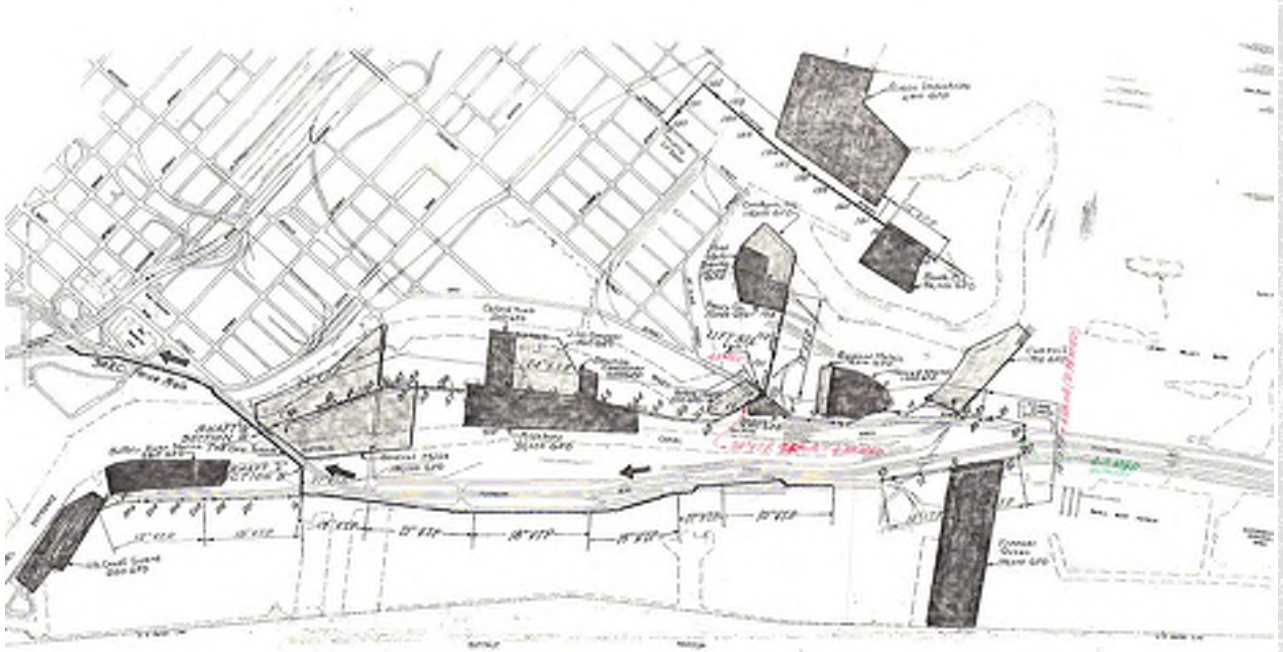
1941-1970: Storm Relief and Sprawl



1970-1982: Clean Water Act







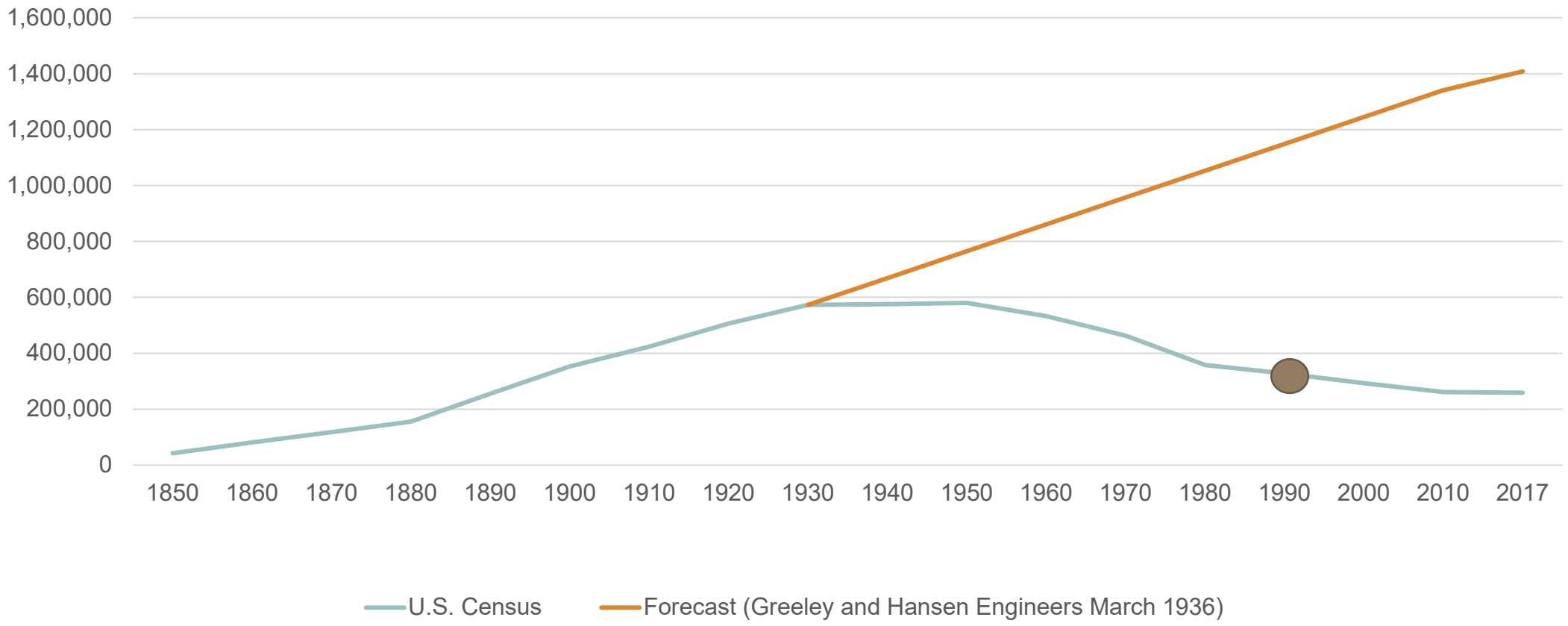
1970- 1982: Clean Water Act

- Kelly Island
  - “Outer Harbor”
  - Heavily industrialized
  - Never sewered
    - Direct discharge to waterways
    - Failing septic systems
- August 1966 Visit from LBJ
- Buffalo River Fire: 1968
- 1976 Project

1970-1982: Clean Water Act

- Scajaquada Tunnel 1977
- Weir Modifications 1980-1982
  - Diversion from Scajaquada Drain to Tunnel
  - Raising of weirs
- Backwater Gates
- Secondary Treatment Process
  - Completed 1980
  - Constructed on municipal landfill in Niagara River on piles

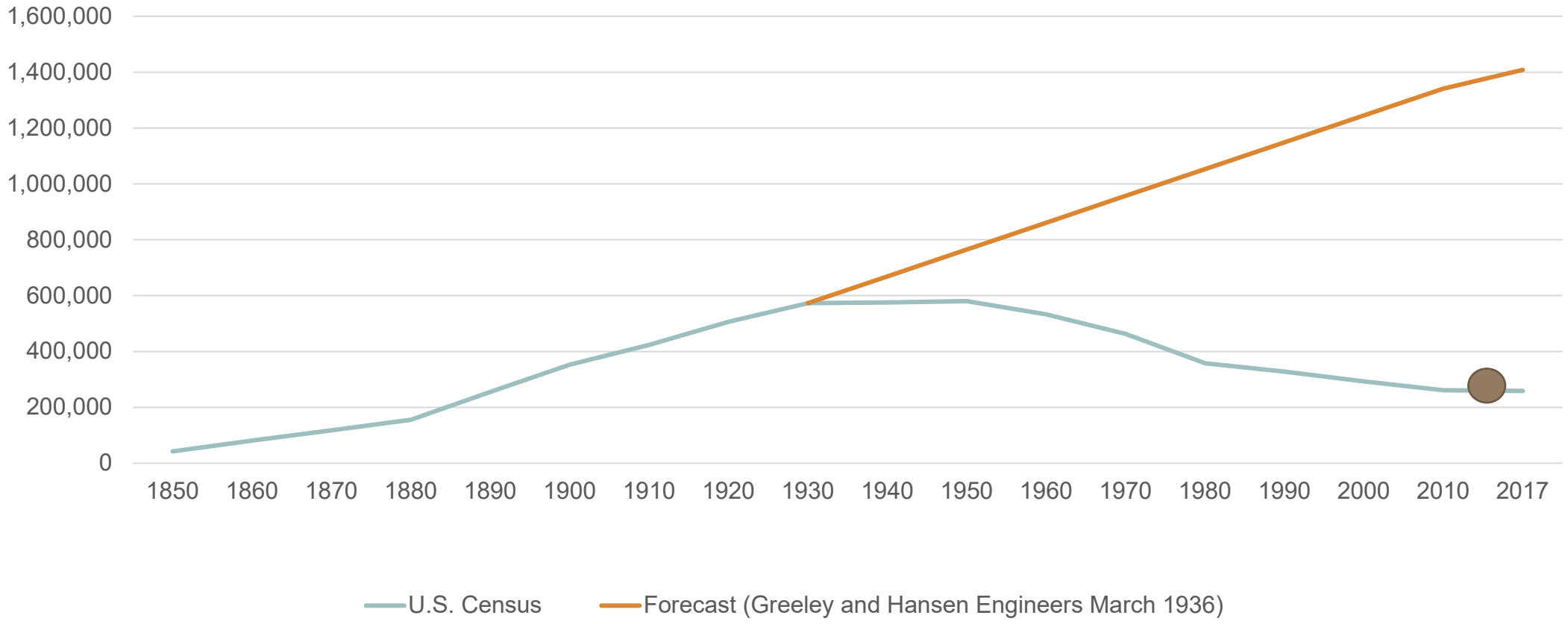
1983-2010: CSO Abatement Phase I



1983-2010: Combined Sewer Overflow (CSO) Abatement Phase I

- Sewer Separation
- Weir modifications
- Emphasis on eliminating number of CSO locations

CSO Abatement Phase II LTCP 2010-Today

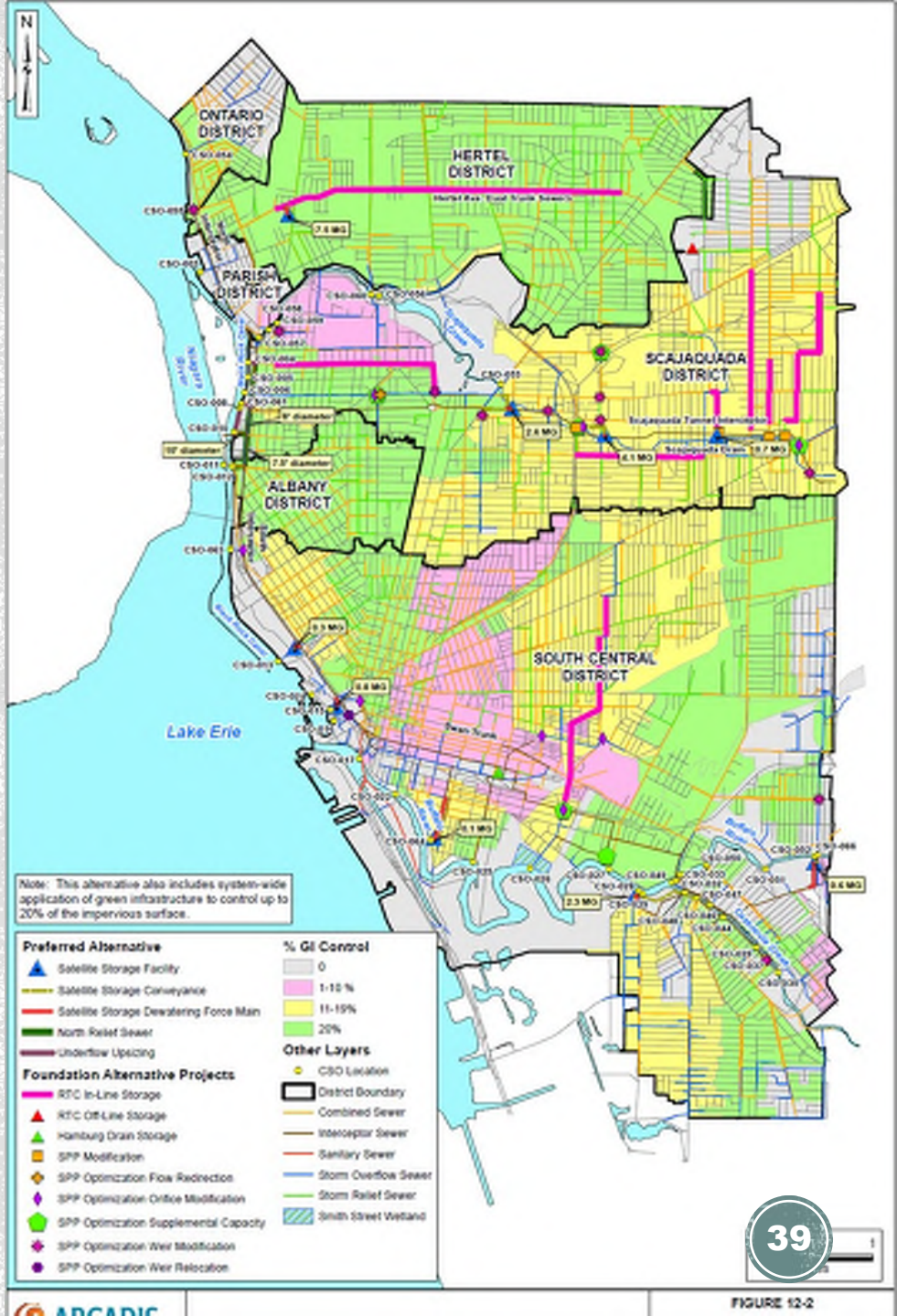


2010-Today: CSO Abatement Phase II

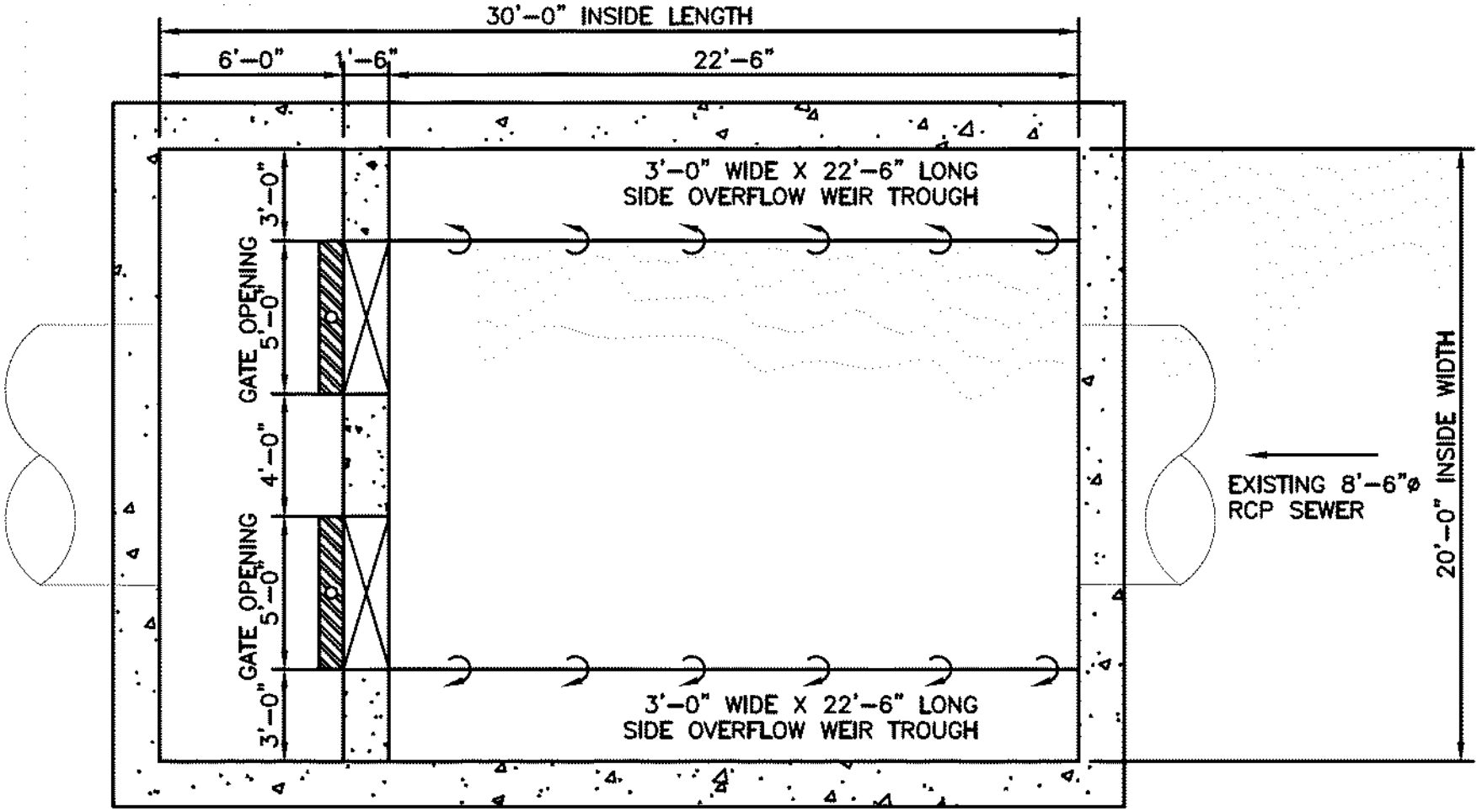
- Final Long-Term Control Plan (LTCP) approved March 18, 2014
- Decrease CSO activations
- $380 Million (2012 Dollars)
- Mix of gray
  - Wastewater Treatment Facility upgrades
  - Real Time Control “Smart Sewers”
  - Localized Sewer Separation
  - Underground detention tanks
- And green
  - Bioretention
  - Permeable pavement
  - Demolitions

2010-Today: Real Time Control (RTC) Smart Sewer Concept Viability

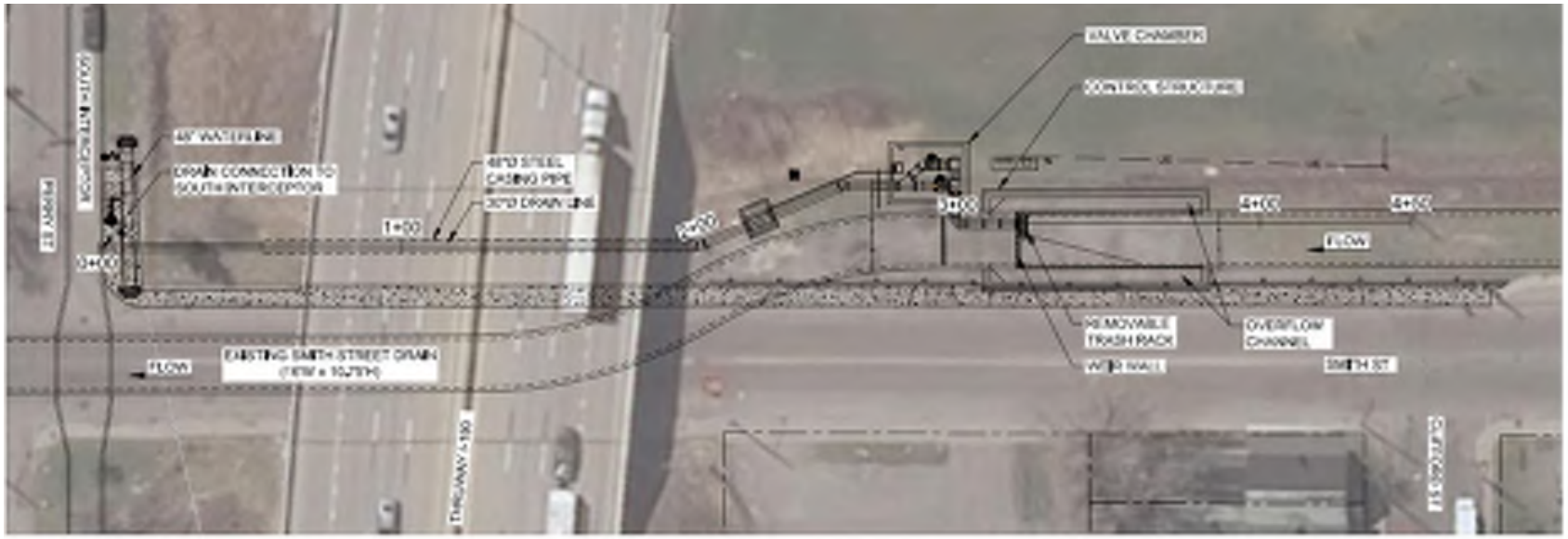
- Vacancy on East Side
  - Vacant lots absorbing water that would have gone into combined system
  - Sanitary and industrial discharges reduced
- Kensington Expressway cutting off half of the flows
- Hertel sewers are deep to capture Cornelius Creek
- Overflows to Historic Canals/Creeks



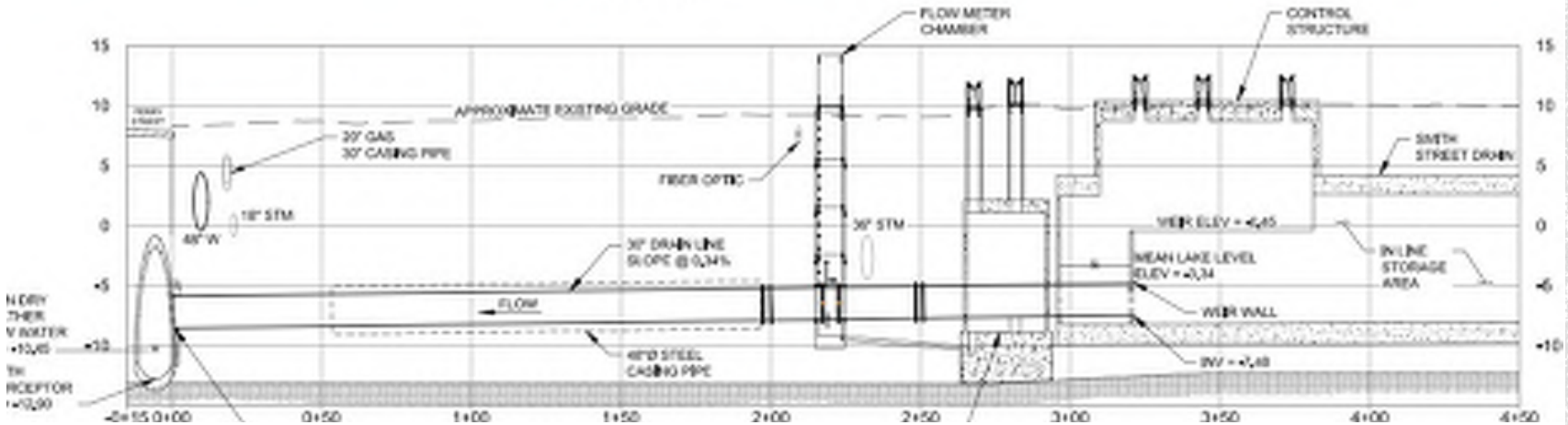
2010-Today: Real Time Control (RTC) Smart Sewer Inline Storage Concept



Long Term Control Plan: CSO 026 Smith Street RTC



PLAN
SCALE: 1" = 40'



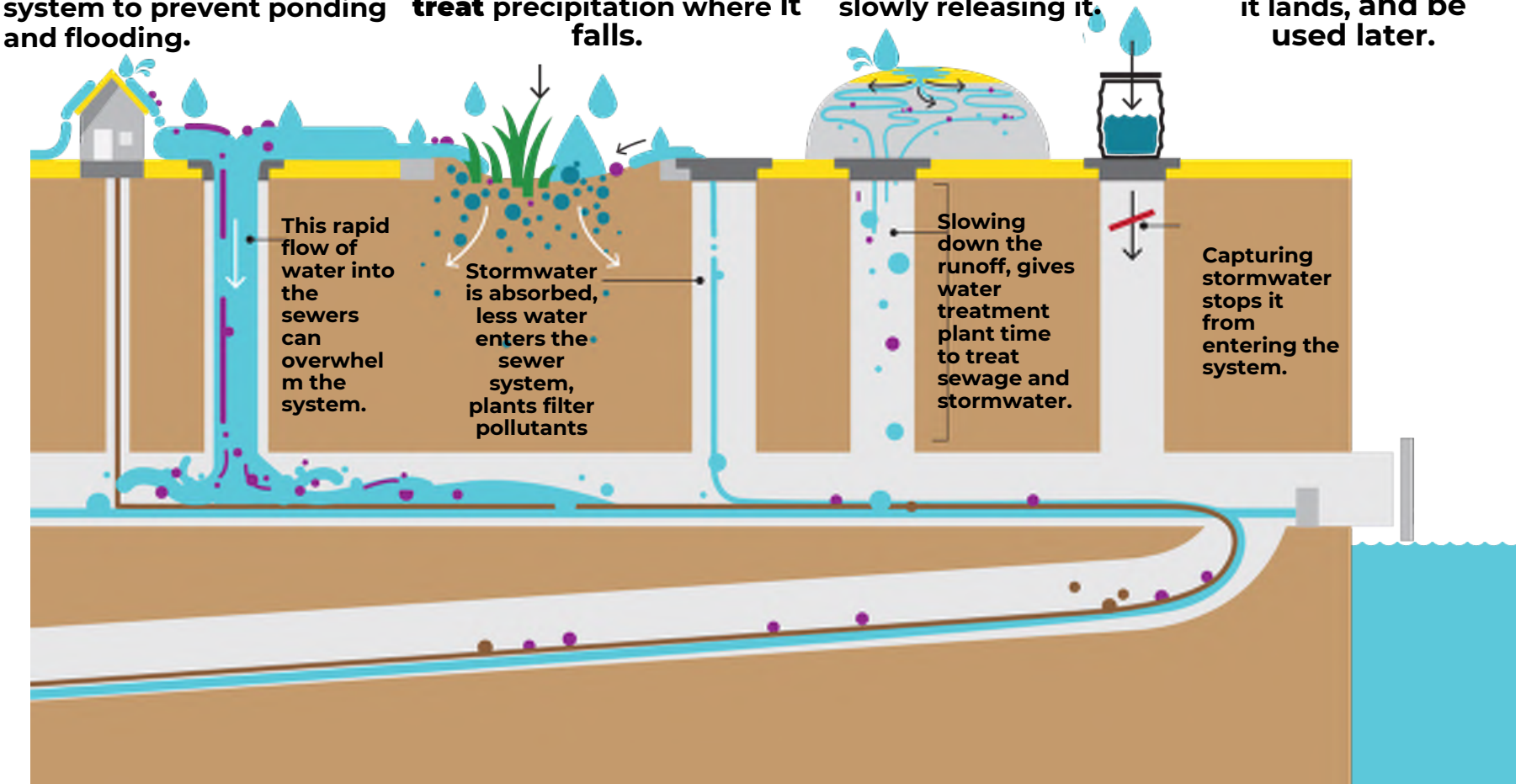
How green infrastructure helps us meet the stormwater challenge

Impervious surfaces are designed to quickly move water into the sewer system to prevent ponding and flooding.

Green infrastructure often involves plants and vegetation to **absorb and treat** precipitation where it falls.

Green infrastructure can **temporarily store stormwater** before slowly releasing it.

Green infrastructure can **capture stormwater** where it lands, and be used later.



Long Term Control Plan Projects: Bioretention and VTP

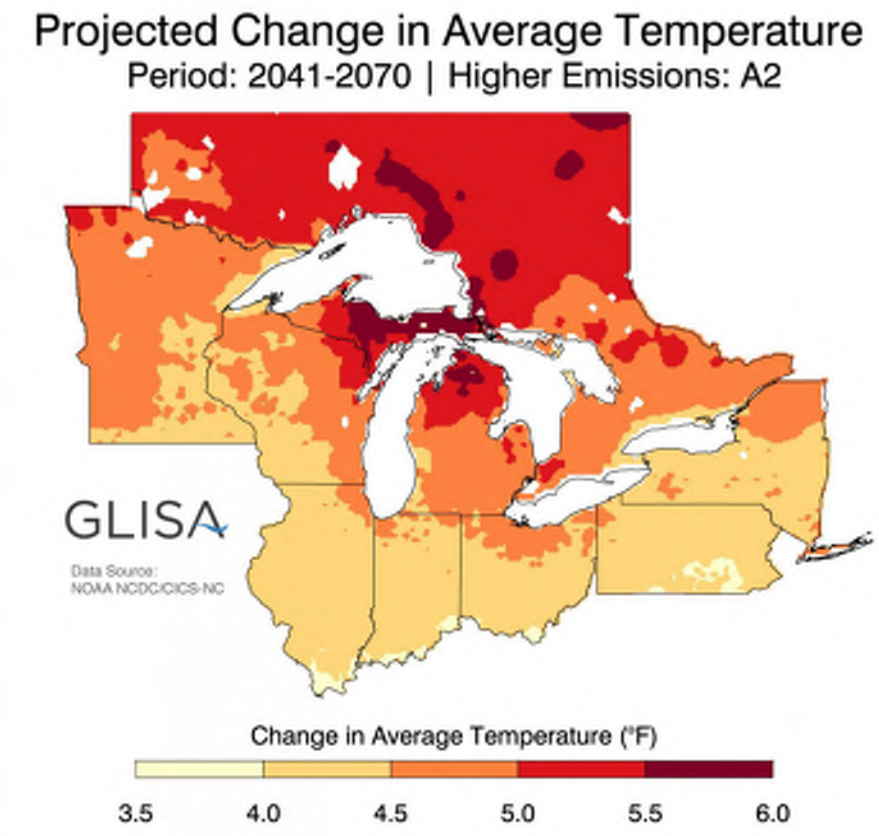
Climate Change Downscale Forecast

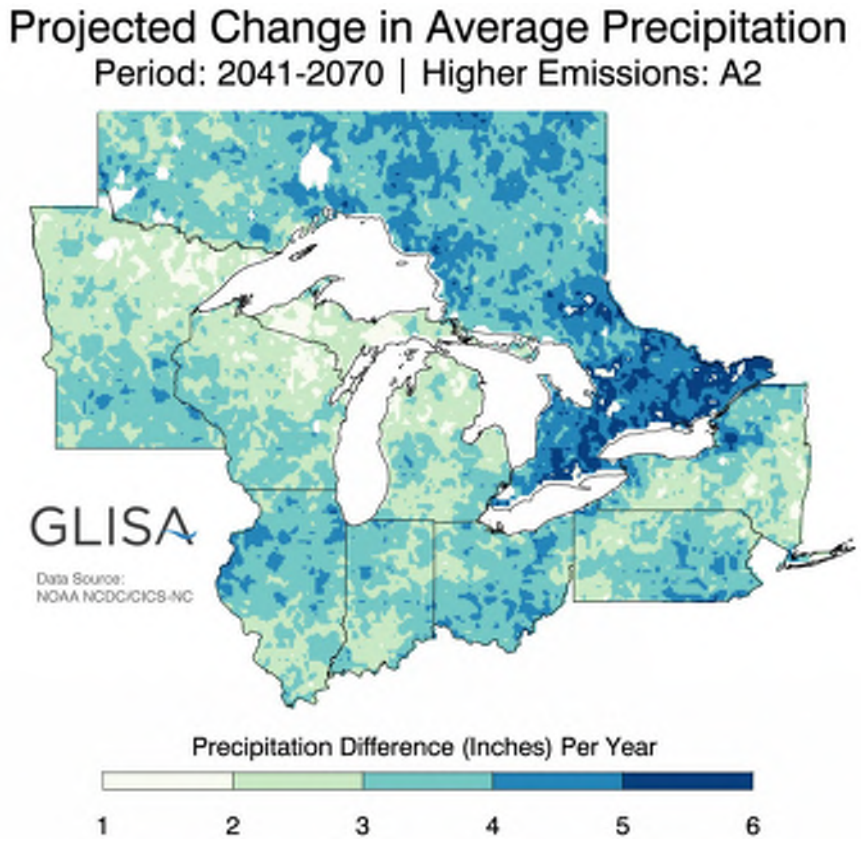
Variable of Interest	Sub-Variables of Interest	Historical/Current	Mid-Century Projected Changes	% Change Between Historic and Future; Mid Century % / End Century %
Precipitation	Total Annual Precip	40.5 in.	40 to 45 in.	-1 to 11% / 4 to 19%
Precipitation	Winter Avg Precip	9.6 in.	10 to 12 in.	4 to 25% / 4 to 25%
Precipitation	Spring Avg Precip	9.3 in.	7 to 11 in.	-25 to 18% / -14 to 29%
Precipitation	Summer Avg Precip	10.1 in.	8 to 10 in.	-21 to -1% / -21 to -1%
Precipitation	Fall Avg Precip	11.4 in.	11 to 12 in.	-4 to 5% / 5 to 14%
Precipitation	Heavy Precipitation Days(>1.25")	2.9 days (> 1.25")	2.6 to 5.3 days	-10 to 83% / 62 to 124%

Climate Change Downscale Forecast

Variable of Interest	Sub-Variables of Interest	Historical/Current	Mid-Century Projected Changes	% Change Between Historic and Future; Mid Century % / End Century %
Temperature	Avg Annual Temp	48.6°F	52 to 54°F	7 to 11% / 13 to 21%
Temperature	Winter Avg Temp	27.4°F	29 to 31°F	6 to 13% / 17 to 31%
Temperature	Spring Avg Temp	45.9°F	48 to 51°F	5 to 11% / 11 to 24%
Temperature	Summer Avg Temp	69.2°F	73 to 75°F	5 to 8% / 11 to 17%
Temperature	Fall Avg Temp	51.5°F	54 to 58°F	5 to 13% / 11 to 22%
Temperature	Avg Low Temp	40.5°F	45 to 46°F	11 to 14% / 19 to 28%
Temperature	Avg High Temp	56.7°F	60 to 62°F	6 to 9% / 8 to 18%
Temperature	Days/Year Greater Than 90F	2 days	9 to 26 days	350 to 1200% / 1050 to 2600%
Temperature	Days/Year Greater Than 95F	0.3 days	1 to 9 days	233% to 2900% / Not Available
Temperature	Days/Year Less Than 32F	117 days	91 to 95 days	-22% to -19% / Not Available

Downscale Model
Great Lakes as a Whole





SEICHE EVENTS

Historic Crests
(Station Established 4/1/1860)

1. 12.08 ft 12/2/1985
2. 11.12 ft 11/15/2020
3. 11.06 ft 1/30/2008
4. 10.67 ft 12/23/2022
5. 10.65 ft 11/1/2019
6. 10.65 ft 4/6/1979
7. 10.57 ft 12/11/2021
8. 10.36 ft 12/20/2020

Niagara River Flow

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1926 - 2022, BY WATER YEAR (WY)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	202,200	202,900	203,800	199,000	195,600	202,000	210,400	218,600	217,700	214,600	210,500	205,400
Max	254,000	254,400	260,900	265,900	241,600	270,500	279,600	277,300	285,000	276,500	270,200	257,299
(WY)	(1987)	(2020)	(1986)	(2020)	(1987)	(2020)	(2020)	(2019)	(2019)	(2019)	(2019)	(2019)
Min	152,700	148,100	149,800	138,500	116,200	142,700	152,000	159,100	158,000	154,100	155,000	153,900
(WY)	(1935)	(1935)	(1965)	(1964)	(1936)	(1934)	(1935)	(1934)	(1934)	(1934)	(1934)	(1934)

Water-Data Report 2022

04216000 NIAGARA RIVER AT BUFFALO, NY -- Continued

Climate Change

- Climate Refuge???
  - Average Rainfall
    - Increasing Slightly to Moderately
    - Possibly Falling in the Near Term?
  - Average Temperature
    - Increasing Slightly to Moderately
    - May Have 100 + degree days by Century's End
  - Winds: Poorly Modeled, But Likely Increasing Significantly

Up-Lake Communities

Average Rainfall Increasing

2016- Current Historically High Lake Levels

- **Buffalo and Niagara Rivers**
- **Basement Back-ups**
- **Syphon Risks**
- **Smart Sewer Viability**

What Are We Doing?

- Back Water Valves and Gates
- Working with Army Corps of Engineers to Rebuild Walls
- Revised Long-Term Control Plan
- New Development Green Code Ordinance
- Working with Multiple Partners to Develop Downscale Model with Wind
- Using CREAT to Identify Climate Change Mitigation Opportunities
- Advancing Projects with Synergistic Opportunities

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Questions?

BUFFALO
SEWER AUTHORITY

UPCOMING WORK IN THE UNIVERSITY COMMON COUNCIL DISTRICT

Buffalo Sewer through Queen City Clean Waters **is tackling stormwater challenges in Buffalo.**

This month, our team will be drilling small holes in the ground in University District to gather important information for these projects.

Here's what you need to know:

- **Location:** Our crews will wear yellow vests and hardhats as they drill:
  - **In the grass area at spots along the North, South, and West sides of the Charter School of Inquiry.**
  - **On the lawn at spots along the East side of the Roosevelt Playground.**
  - **At spots between the street and sidewalk along Lark St.**
  - **At a spot along the north side of the road on Sidney St.**
    - **One traffic lane on Sidney St. between Lark St and Humboldt Pkwy will be closed for two days once the drilling starts.**
- **Purpose:** We need to understand the underground conditions.
- **Process:** We will drill small holes to collect soil and rock samples for testing. The area will be restored once the drilling is completed.
- **Impact:** You might notice some noise. We will take precautions to minimize any inconvenience.

For more information please contact:
Rosaleen Nogle, Principal Sanitary Engineer
Buffalo Sewer Authority
rnogle@buffalosewer.org.
(716) 851-4664 Ext. 4203

BSA's Proposed Project Schedules (GI Projects not included)

Project Name and Tag	Start - Completion
WWTF NFA Phase I	9/27/22 - 5/25/30
WWTF NFA Phase II	7/23/26 - 12/26/31
WWTF NFA Phase III	1/13/28 - 9/3/31
CSO053_11, 1.5 MG Canisius/Jefferson Delavan OLS	9/7/28 - 4/9/32
CSO053_3.2 Bailey & Amherst, Amherst Quarry PS RTC	5/28/25 - 7/6/28
CSO010_1 Breckenridge Niagara RTC	8/26/25 - 1/31/29
CSO006_2 Gates Circle RTC	4/8/25 - 5/17/28
CSO053_10 SPP229A RTC	10/22/24 - 7/19/26
CSO053_3.3 Bailey & Minnesota SPP254 Modification	10/22/24 - 7/19/26
CSO053_2.5 SPP337 Modification	4/24/26 - 11/20/27
CSO053_3.1 SPP338 Modification	4/23/27 - 6/1/30
CSO053_8 SPP341A Modification	4/24/26 - 11/20/27
CSO053_1.5 SPP336B Modification	4/24/26 - 11/20/27
CSO053_1.4, 3.26 MG Sidney OLS	6/18/27 - 5/29/32
CSO053_13 SPP165B Modification	4/24/26 - 11/20/27
CSO053_14 SPP175 Modification	4/24/26 - 11/20/27
CSO053_5.2 Edison Martha OLS	6/18/27 - 4/30/33
CSO014_1.1 SPP206A&B RTC	2/25/28 - 2/9/30
System_2 Schiller Park OLS	6/16/28 - 5/28/33
System_2_3 SPP339 Modification	4/23/27 - 11/18/28
System_2_4 Schiller Park OLS SPP340 Modification	4/23/27 - 4/7/29
CSO013_1 SPP304 Modification	4/22/28 - 11/18/29
CSO012_1.2 SPP023 Modification	4/22/28 - 11/18/29
CSO012_2.1 SPP296 Modification	4/22/28 - 11/18/29
CSO017_8 SPP326 Modification	4/22/28 - 11/18/29
CSO014_1.2 5.55 MG Erie Basin Marina OLS	3/24/29 - 3/5/34
CSO011_1.2 SPP024 Modification	4/22/28 - 11/18/29
CSO026_1.3 Collins Park OLS	6/18/30 - 5/30/35
CSO027_1 SPP 317 Modification	4/24/29 - 11/20/30
CSO027_2 Babcock PS Weir Modification	4/24/29 - 4/9/31
CSO055_1.5 11.55 MG Military Rd OLS	12/12/30 - 1/2/37
System_1 Northern Relief Tunnel	6/23/33 - 6/1/40
CSO017_9 SPP059 Modification	4/25/31 - 11/20/32
CSO027_3 SPP097 Modification	4/25/31 - 11/20/32
CSO033_2 Clinton St OLS	2/27/32 - 3/8/36
CSO033_3 SPP104 Modification	4/25/31 - 11/20/32
CSO017_10 SPP051 Modification	4/25/31 - 11/20/32
CSO006_3 Delavan Drain Weir Raising & RTC	2/25/33 - 4/5/36
CSO064_1.1 CSO-064 ILS	3/25/33 - 3/10/35
CSO064_1.2 SPP 137, Modification	4/23/32 - 11/19/33
CSO028_1, 0.95 MG Hopkins & Osage OLS	3/24/34 - 3/5/39
CSO017_6 Bass Alley OLS	3/24/34 - 3/5/39
CSO033_1 Bailey & Regent OLS (Moreland Park)	3/24/35 - 3/4/40
CSO064_2 Perry Street Sanitary Sewer	3/26/36 - 6/3/38
CSO017_1.1 SPP054 Sewer Separation	3/26/36 - 6/3/38
CSO055_1.1 Hertel North East ILS	4/23/37 - 6/1/40

WATER BODY IMPACTED LEGEND

Scajaquada Creek · Erie Basin Marina · Niagara River · Black Rock Canal · Buffalo River

50+ SITES

$1 BILLION

15 YEARS

How does this project impact the City of Buffalo?

This project will reduce overflows from the City's sewers by helping flow reach the Bird Island Wastewater Treatment Facility during wet weather, instead of entering Buffalo's creeks and river.

The implementation of this project, which includes 50+ sites in total, will cost approximately $1B over the next 15 years including $250M in treatment facility upgrades.

Why is this work being done?

Hundreds of millions of gallons of storm water mixed with sanitary sewage overflows to the waterways of Western New York during rainfall and snow melt periods each year.

Queen City Clean Waters will reduce these events.

We want to hear from you!

Scan the QR code to share your feedback.

CONTACT US

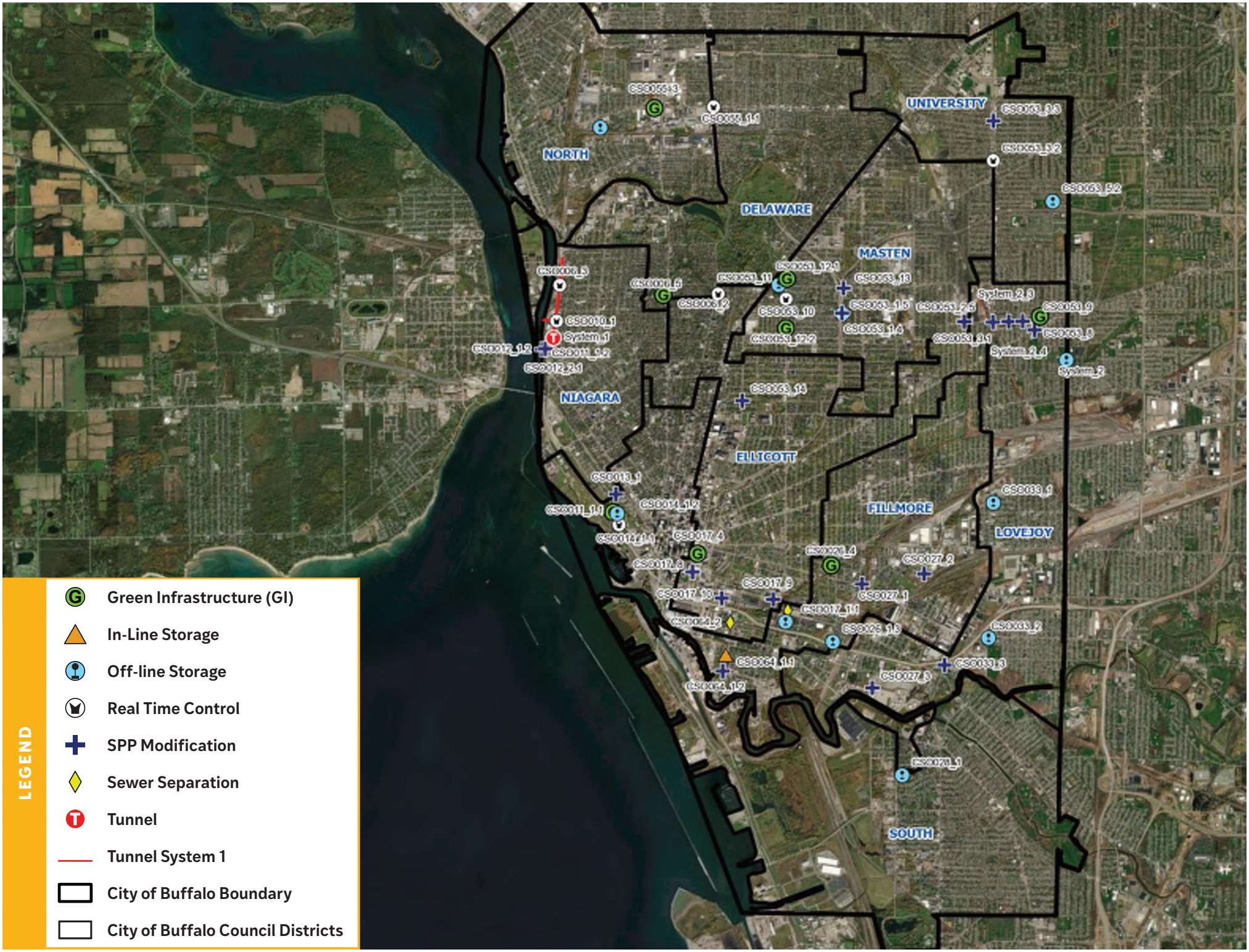
Buffalo Sewer Authority
1038 City Hall
65 Niagara Square
Buffalo, NY 14202

buffalosewer.org
716-851-4664

BUFFALO
SEWER AUTHORITY

QUEEN CITY CLEAN WATERS

- Bird Island Treatment Facility Upgrades
- Combined Sewer Overflow (CSO) Storage
- Green Infrastructure (GI)
- Real-Time Control Smart Sewers
- Sewer Improvements & Modifications


NORTH
UNIVERSITY
DELAWARE
MASTEN
NIAGARA
ELLICOTT
FILLMORE
LOVEJOY
SOUTH
LEGEND
Green Infrastructure (GI)
In-Line Storage
Off-line Storage
Real Time Control
SPP Modification
Sewer Separation
Tunnel
Tunnel System 1
City of Buffalo Boundary
City of Buffalo Council Districts

BUFFALO
SEWER AUTHORITY

UPCOMING WORK IN THE LOVEJOY COMMON COUNCIL DISTRICT

Buffalo Sewer, through **Queen City Clean Waters** is **tackling stormwater challenges in Buffalo.**

This month, our team will be drilling small holes in the ground in Lovejoy District to gather important information for these projects.

Here's what you need to know:

- **Location:** Our crews will wear yellow vests and hardhats as they drill **in the grass area at a spot on the Southwest corner of Genesee St and Countess Ave, Northwest of the Schiller Park Senior Center.**
- **Purpose:** We need to understand the underground conditions.
- **Process:** We will drill small holes to collect soil and rock samples for testing. The area will be restored once the drilling is completed. In some cases, a pipelined hole may be kept to watch changes in groundwater levels; this pipe will be cut down to prevent tripping and a small cap will be used to seal it.”.
- **Impact:** You might notice some noise. We will take precautions to minimize any inconvenience.

For more information please contact:
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Buffalo Sewer Authority
rnogle@buffalosewer.org.
(716) 851-4664 Ext. 4203

BUFFALO
SEWER AUTHORITY

UPCOMING WORK IN THE MASTEN COMMON COUNCIL DISTRICT

Buffalo Sewer, through **Queen City Clean Waters** is **tackling stormwater challenges in Buffalo.**

This month, our team will be drilling small holes in the ground in Masten District to gather important information for these projects. Here's what you need to know:

- **Location:** Our crews will wear yellow vests and hardhats as they drill
  - **In the grass area along the east side of Colorado Ave. at spots on the Northeast corner of the Scajaquada St and Colorado St intersection.**
  - **At spots along the East side of Humboldt Pkwy, between Northland Ave and East Delavan Ave. One traffic lane on Humboldt Pkwy between Northland Ave and East Delavan Ave. will be closed for two days once the drilling starts.**
- **Purpose:** We need to understand the underground conditions.
- **Process:** We will drill small holes to collect soil and rock samples for testing. The area will be restored once the drilling is completed. In some cases, a pipelined hole may be kept to watch changes in groundwater levels; this pipe will be cut down to prevent tripping and a small cap will be used to seal it.
- **Precautions to Ensure Public Safety:** To ensure the public will not be exposed to potentially contaminated soil or groundwater during the drilling operations, the following precautions will be taken:
  - **Dust Control Measures:** Dust suppression techniques, such as water spraying, will be used to prevent the spread of potentially contaminated dust.
  - **Protective Barriers:** Physical barriers and fencing will be installed around the drilling site to restrict public access.
  - **Monitoring:** Continuous air monitoring will be conducted to detect any airborne contaminants. If detected, additional control measures will be implemented immediately.
  - **Containment:** Potentially contaminated soil and groundwater will be contained and handled in accordance with state and federal regulations. Excess soil cuttings will be secured in drums and transported to appropriate disposal facilities.
  - **Safety Protocols:** All personnel on-site will adhere to strict health and safety protocols, including wearing personal protective equipment.

For more information please contact:
Rosaleen Nogle, Principal Sanitary Engineer
Buffalo Sewer Authority
rnogle@buffalosewer.org.
(716) 851-4664 Ext. 4203

INVOICE

Hallmark Planning & Development, LLC
505 Ellicott Street Suite 27A
Buffalo, NY 14203

art@thehallmarkfirm.com
+1 (716) 486-9763
thehallmarkfirm.com

HALLMARK
PLANNING & DEVELOPMENT

T.Y. LIN INTERNATIONAL & AFFILIATES		
INVOICE APPROVAL	Co.#	3035
Project #:	3035.0000228.001	
Task #:	8004	
GL Account #	5000.000000	
Approver's Name:	Edmund Aplerh-Doku	
Approver's Signature:	E. Aplerh-Doku	
Date:	7/26/2024	
Proj. Acct. / Staff Name:	Nancy Gomez	
UM Initial (if applies)		

Bill to
Greeley and Hansen LLC
100 South Wacker Drive Suite 1400
Chicago, Illinois 60606
United States

Ship to
Greeley and Hansen LLC
100 South Wacker Drive Suite 1400
Chicago, Illinois 60606
United States

Invoice details
Invoice no.: 1051
Terms: Net 30
Invoice date: 07/08/2024
Due date: 08/07/2024

#	Date	Product or service	Description	Qty	Rate	Amount
1.			Tuesday, June 4th - Hallmark Team meeting met to discuss community engagement and workforce development initiatives, as well as needs and funding opportunities. - 2hrs			
2.			Thursday, June 5th - The Hallmark Team met with a group of partner organizations, Erie County, and others to discuss general regional trends throughout the County and other municipalities, and how these trends impact engagement, economic development, infrastructure and workforce development.			
3.			Friday, June 7th - Urban Context Podcast. Hallmark hosted an interview with Developments By Jem to discuss the role of non-profits in community engagement and development within Urban Buffalo.			
4.			Monday, June 10th - Hallmark met with Rosie from BSA to finalize the Stakeholder Engagement list. Hallmark compiled the final list and instructed the BSA engagement team on scoring and selecting the candidates.			

5.	Tuesday, June 11th - Hallmark Team began preparing for the Juneteenth event. We reviewed some initial comments form the survey and began brainstorming potential programs, projects, and collaborative initiatives for the engagement plan. The Hallmark team also meet with Open Buffalo to discuss a potential collaboration on an environmental/water justice training cohort for the engagement plan.
6.	Saturday, June 15th - Hallmark participated in the 49th Annual Juneteenth event. Met with residents to discuss projects including the Queen City Clean Waters Project. Informed residents of potential events and opportunities with the project.
7.	Sunday, June 16th - Hallmark participated in the 49th Annual Juneteenth event. Met with residents to discuss projects including the Queen City Clean Waters Project. Informed residents of potential events and opportunities with the project.
8.	Wednesday, June 19th - Hallmark attended the Masten District Family Reunion Event at MLK Park. Spoke to several elected officials regarding the Queen City Clean Waters Project, workforce, and economic development.
9.	Monday, June 24th - Hallmark team met with Green Force Workforce Training & Development. Toured the OSC and Viridi facility. Reviewed workforce training model, partnerships, demographics, and metrics for effective workforce training output and placement.
10.	Tuesday, June 25th - Hallmark participated in the Focus Group for Regional Economic Development for the consortium of municipalities within Erie County. Focus: 5-year Capital improvements plan for infrastructure, parks and impediments to economic/workforce development.
11.	Thursday, June 27th - COB Clean Sweep. Door-to-door conversations with residents regarding the Queen City Clean Waters Initiative. We partnered with the BSA Engagement Team to distribute brochures and speak to the residents.
12.	

		Thursday, June 27th - Hallmark attended the Board of Block Clubs meeting. Fifty (50) Queen City Clean Waters initiative Flyers were distributed. Residents provided some brief feedback on the project.			
13.	**Services**	Friday, June 28th - Hallmark participated in the Resiliency Focus Group for the consortium of municipalities within Erie County. Focus: 5-year Capital improvements plan and impediments to economic/workforce development.	1	$18,591.66	$18,591.66

Total **$18,591.66**

Ways to pay

Pay invoice

Attachment D to the Semi-Annual Status Report: September 2024

Certificates of Acceptance and Occupancy

ITEM NO. 8

AUTHORIZATION TO ENTER INTO AN AGREEMENT WITH STANTEC CONSULTING SERVICES, INC., FOR PROFESSIONAL ENGINEERING SERVICES

WHEREAS: The Buffalo Sewer Authority issued a request for qualifications (RFQ) for the purposes of prequalifying various firms for delivery of green infrastructure capital improvement projects and approved these entities on September 30, 2020; and

WHEREAS: Stantec Consulting Services, Inc., as a prequalified firm, submitted a proposal for delivery of professional engineering services in support of Environmental Impact Bond Support; and

WHEREAS: Stantec Consulting Services, Inc., brings a wealth of experience in delivering programmatic large scale Green Infrastructure capital projects, and assessments, while managing risks and providing necessary engineering support; and

WHEREAS: Based upon the review of the Principal Sanitary Engineer and staff, it is recommended to proceed with the proposal and scope of work for professional services at an agreed upon cost not to exceed $3,270,248.31.

NOW THEREFORE
BE IT RESOLVED: That the Board of the Buffalo Sewer Authority hereby authorizes the General Manager to execute an agreement with Stantec Consulting Services, Inc. to provide professional engineering services at a cost not to exceed $3,270,248.31. The cost of this contract will be funded from account no. 02000585-432004.

MOTION TO APPROVE

MADE BY MRS. PETRUCCI

2ND BY MR. ROOSEVELT

AYES 3 NOES 0

Board Meeting of May 1, 2024

ITEM NO. 4

AUTHORIZATION TO PURCHASE 42" RING COUPLINGS- VICTAULIC STYLE

WHEREAS: Due to the ongoing Secondary System Rehabilitation project it has been determined that there will be a need to replace 46 Victaulic Couplings to accommodate Contract A RAS Piping Replacement, (82000052). and;

WHEREAS: Formal bids were advertised and solicited for the purchase of 42" ring couplings - Victaulic Style 44 (or equivalent). The following bids were received and opened by the Buffalo Sewer Authority on April 16, 2024:

Bidder	Cost Each	Total Cost
Core & Main	$4,875.00	$224,250.00
FW Webb	$5,093.00	$234,278.00
Commercial Pipe	No Response	No Response
Lake Pipe & Supply	No Response	No Response

; and

WHEREAS: The bids were received, and the contract will be awarded on the basis of unit bid and lump sum prices. The bids reflect the true amount of the item; and

WHEREAS: The Buffalo Sewer Authority's Treatment Plant Superintendent, Superintendent of Mechanical Maintenance, and capital improvement Staff have reviewed the bid packages and recommend awarding the contract to the lowest responsible bidder, Core & Main, at a cost not to exceed $224,250.00; and

NOW THEREFORE
BE IT RESOLVED: That the Board of the Buffalo Sewer Authority hereby authorizes the General Manager to enter into and execute a contract with Core & Main for the purchase of 42" ring couplings – Victaulic Style 44 (or equivalent) in an amount not to exceed $224,250.00. Expenses for this contract will be charged to account no. 00290107-474100.

MOTION TO APPROVE

MADE BY MRS. PETRUCCI

2ND BY MR. ROOSEVELT

AYES 3 NOES 0

Board Meeting of May 1, 2024

ITEM NO. 7

AMEND BOARD RESOLUTION NO. 18 FROM NOVEMBER 1, 2023 BOARD MEETING – CHANGE ORDER NO. 3– ADDITIONAL CONSTRUCTION OBSERVATION SERVICES CONTRACT NO. 81900016 BROADWAY AT OAK REAL TIME CONTROL STRUCTURE ENGINEERING SERVICES

WHEREAS: At the November 1, 2023 Board Meeting, the Board of the Buffalo Sewer Authority authorized a change order to CHA's Broadway at Oak Real Time Control Structure Engineering Services in an amount not to exceed $4,536.00 bringing their total contract to $498,470.00; and

WHEREAS: This contract was authorized to be funded from account no. 02000509-432004; and

WHEREAS: Account no. 02000490-432004 should have been assigned to fund this project.

NOW THEREFORE
BE IT RESOLVED: That the Board of the Buffalo Sewer Authority hereby amends Board Resolution No. 18 from the November 1, 2023, Board Meeting – Change Order No. 3- Additional Construction Observation Services Contract No. 81900016 Broadway at Oak Real Time Control Structure Engineering Services to read as follows:

"That the Board of the Buffalo Sewer Authority hereby approves Change Order No. 3 to Contract No. 81900016 as written in the above Agenda Item, increasing the contract cost in the amount of $4,536.00, making the adjusted contract cost $493,934.00. These funds shall be drawn from account no. 02000490-432004."

MOTION TO APPROVE

MADE BY MRS. PETRUCCI

2ND BY MR. ROOSEVELT

AYES 3 NOES 0

Board Meeting of May 1, 2024

ITEM NO. 18

AUTHORIZATION TO ENTER INTO AN AGREEMENT WITH ARCADIS INC., FOR CONSTRUCTION ADMINISTRATION AND CONSTRUCTION INSPECTION SERVICES FOR PRIMARY SYSTEM REHABILITATION AND UPGRADES

WHEREAS: The Buffalo Sewer Authority (BSA) issued a request for proposals (RFP) on October 20, 2023, for construction administration and construction inspection services for the Buffalo Sewer Authority Primary System Rehabilitation and Upgrades project; and

WHEREAS: The RFP was issued to multiple firms including AECOM USA, Inc., Arcadis, GHD, Ramboll, and Greeley and Hansen, LLC; and

WHEREAS: Arcadis, and Greeley & Hansen, LLC responded to the RFP by the specified deadline of 10:00 AM October 20, 2023; and

WHEREAS: A consultant selection committee appointed by the General Manager reviewed and ranked the proposals received; and

WHEREAS: Based upon the proposal review and interviews, the consultant selection committee recommends retaining Arcadis Inc, for the professional services outlined in the RFP at an agreed upon cost not to exceed $5,305.92500.

NOW THEREFORE
BE IT RESOLVED: That the Board of the Buffalo Sewer Authority hereby authorizes the General Manager to execute an agreement with Arcadis, at a cost not to exceed $5,305,925.00. to complete the professional services defined in the proposal dated October 20, 2023. The cost of this contract will be funded from account no. 02000579-432004.

MOTION TO APPROVE

MADE BY MR. ROOSEVELT

2ND BY MRS. PETRUCCI

AYES 3 NOES 0

Board Meeting of January 26, 2024

ITEM NO. 19

CHANGE ORDER NO. CR-C-02, BIRD ISLAND WASTEWATER TREATMENT FACILITY SECONDARY SYSTEM REHABILITATION AND UPGRADES, CONTRACT C – GATES CONTRACT NO. 82000048

CONTRACTOR:	ORIGINAL CONTRACT COST	$6,744,000.00
American Contracting & Environmental Services, Inc. 11075 Stratfield Court Marriottsville, MD 21104	PREVIOUS CHANGE ORDERS	$2,853,798.00
	THIS CHANGE ORDER	$959,586.66
	TOTAL ADJUSTED COST	$10,557,384.66
VENDOR NO. 17697	ACCOUNT NO.	02000533-490740

WORK: Contract C – Sluice Gates: This contract includes the installation of ninety (90) 54" stainless steel sluice gates, three (3) 120" cast iron Ni-Resist sluice gates, and eight (8) cast iron 72" sluice gates.

DESCRIPTION OF CHANGE OR EXTRA WORK:

Item #1 Furnish and install four (4) new stainless steel sluice gates in the aeration tank influent channels. Two (2) 7-foot wide by 10-foot-tall gates to be installed in each Battery A and Battery B influent channels just downstream from the existing stop log gates.

REASON FOR CHANGE OR EXTRA WORK:

Item #1 Inspection of the existing stop log gates in the aeration tank influent channels revealed they are incapable of providing watertight isolation due to a lack of structural integrity. A significant portion of the Phase I Secondary Rehabilitation work is to occur in the interior portions of the tanks and channels and cannot be completed without a safe, secure, and reliable watertight shutdown of the entire battery. Thus, the installation of two new stainless steel slide gates per each Battery will allow for isolation of the battery for the full 26-week shutdown duration and will allow work in the channels to commence safely.

COST OF CHANGE OR EXTRA WORK:

Item #1 $959,586.66

The Total INCREASE to the Contract as a result of this Change Order is $959,586.66

WHEREAS: On June 23, 2021, the Board of the Buffalo Sewer Authority authorized the General Manager to enter into and execute a contract with American Contracting & Environmental Services, Inc. (ACE), for Bird Island Treatment Facility Secondary System Rehabilitation and System Upgrades project as the responsible low bidder at a cost not to exceed $6,744,000.00; and

WHEREAS: On September 27, 2022, Notice to Proceed was issued for Contract No. 82000048 in accordance with the above Board approval; and

WHEREAS: On July 26, 2023, the Board of the Buffalo Sewer Authority authorized Change Order CR-C-01 in the amount of $2,853,798.00 under Board Item No. 13 for escalated bid pricing and installation and maintenance of temporary stormwater underdrainage systems; and

WHEREAS: The Senior Instrumentation Technician, Treatment Plant Superintendent and AECOM reviewed Change Order No. CR-C-02 to Contract No. 82000048 in the amount of $959,586.66 as detailed above and recommend approval.

CONTRACT SUPPLEMENT CONDITIONS:

1. The contract completion date established in the original contract or as modified by previous contract supplements is hereby changed by **0** calendar days, resulting in a final completion date of **March 31, 2027.**

2. Any additional work to be performed under this contract supplement shall be carried out in compliance with the specifications included in the preceding description of changes involved with the supplemental contract drawings designated none and under the provisions of the original contract, including compliance with applicable equipment specifications, general specifications, and project specifications for the same type of work.

3. This contract supplement unless otherwise provided herein does not relieve the Contractor from strict compliance with the guarantee provisions of the original contract, particularly those pertaining to performance and operation of equipment.

4. The Contractor expressly agrees that he will place under coverage of his performance and payment bonds and Contractor's Insurance all work covered by this contract supplement. The Contractor will furnish to the Owner evidence of increased coverage of his performance and payment bonds for the accrued value of all contract supplements that exceeds the original contract price by twenty percent (20%).

5. The costs established under this contract supplement are acknowledged as including any and all costs associated with the work described herein and including any and all costs associated with any and all work performed or to be performed by the Contractor that may be affected in any manner by the work described herein.

NOW THEREFORE
BE IT RESOLVED: That the Board of the Buffalo Sewer Authority hereby approves Change Order No. CR-C-02 to Contract No. 82000048 as written in the above Agenda Item, increasing the contract cost in the amount of $959,586.66 making the adjusted contract cost $10,557,384.66. Expenses from this contract will be paid from Account No. 02000533-490740.

MOTION TO APPROVE

MADE BY MRS. PETRUCCI

2ND BY MR. ROOSEVELT

AYES 3 NOES 0

Board Meeting of January 26, 2024

ITEM NO. 21

SEQRA TYPE II DETERMINATION REGARDING THE JEFFERSON AVENUE RTC SMART SEWER SYSTEM (DELAVAN TRUNK SEWER IMPROVEMENTS AT FLORIDA STREET (SPP 229A)) PROJECT

WHEREAS: On March 18, 2014, the United States Environmental Protection Agency, with concurrence by the New York State Department of Environmental Conservation, issued an Amended Administrative Order which approved the Buffalo Sewer Authority's Combined Sewer Overflow Long Term Control Plans (LTCP); and

WHEREAS: The Buffalo Sewer Authority, as lead agency pursuant to the New York State Environmental Quality Review Act (SEQRA), undertook a coordinated review of the LTCP, and on July 18, 2012, issued a Negative Declaration with respect to the LTCP; and

WHEREAS: The State Environmental Quality Review Act (SEQRA) with reference to 6 NYCRR §617.5, provides that certain classes of actions termed "Type II Actions", have been determined not to have a significant impact on the environment or are otherwise precluded from environmental review under New York Environmental Conservation Law; and

WHEREAS: 6 NYCRR 617.5 (c) (29) provides for the classification "a course of action specifically required to be undertaken pursuant to a judgment or order" as a Type II Action; and

WHEREAS: The Buffalo Sewer Authority is implementing the LTCP in conformance with an Administrative Order; and

WHEREAS: The Principal Sanitary Engineer and staff recommend that the Delavan Trunk Sewer Improvements at Florida Street (SPP 229A) Project be declared a Type II action; and

NOW THEREFORE
BE IT RESOLVED: That the Board of the Buffalo Sewer Authority hereby constitutes the Delavan Trunk Sewer Improvements at Florida Street (SPP 229A) Project as a· Type II Action in accordance with 6 NYCRR 617.5 (c) (29). Accordingly, no further review under SEQRA is required.

MOTION TO APPROVE

MADE BY MRS. PETRUCCI

2ND BY MR. ROOSEVELT

AYES 3 NOES 0

Board Meeting of January 26, 2024

CERTIFICATE

I, Oluwole A. McFoy, General Manager of the Buffalo Sewer Authority in the County of. Erie, State of New York, HEREBY CERTIFY that the foregoing attached extract from the Minutes of a meeting of the Board of Directors of said Authority, duly called and held on January 26, 2024, and at which a quorum was present and acting throughout and the resolution contained therein is a true and complete copy of the resolution thereupon adopted on January 26, 2024, and recorded in the Minutes of said Authority and that the foregoing extract has been compared by me with the original minutes as officially recorded in my office in the Minute Book of said Authority and is a true, complete and correct copy thereof and of the whole of said original minutes so far as the same relate to the subject matters referred to in said extract, and that said resolution has not been amended or repealed but is in full force and effect.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the corporate seal of said Authority this 26th day of January 2024

(SEAL)

Oluwole A. McFoy, PE
General Manager, Buffalo Sewer Authority

ITEM NO. 9

AUTHORIZATION FOR PURCHASE OF RUBBER SEATS AND RESIN EPOXY FOR EFFLUENT VALVES FOR BIRD ISLAND TREATMENT FACILITY AERATION TANKS

WHEREAS: The Buffalo Sewer Authority Secondary System Renovation project is underway. Part of that project requires the contractor to remove the 42" effluent valves on the A side of aeration for inspection. There will be a need to inspect twenty three (23) 42" valves on the A Side; and

WHEREAS: Due to the removal of the 42" valves for inspection there will be a need to replace the valves rubber seats and gaskets prior to reinstallation; and

WHEREAS: Upon request, Siewert Equipment, the authorized local representative, submitted a quote in the amount of $40,024.00 for the equipment for reseating of the additional effluent valves. The breakdown is as follows:

Description	Model	Quantity	Unit Cost	Total Cost
42" Pratt Triton XR-70 Rubber Seats	85570	23	$570.00	$13,110.00
Resin Epoxy Jug	2302809	46	$474	$21,804.00
5 gallon pressure pot injection kit for installation of rubber seats and gaskets	1312874	1	$5,110.00	$5,110.00
Grand Total				$40,024.00

; and

WHEREAS: The project consulting engineer, AECOM have reviewed the quote received and recommend this purchase, Buffalo Sewer Authority Capital Projects personnel concur; and

NOW THEREFORE
BE IT RESOLVED: That the Board of the Buffalo Sewer Authority hereby authorizes the General Manager to purchase the equipment for the rehabilitation of twenty-three (23) 42-inch effluent valves for the aeration tanks at the Bird Island Treatment Facility from Siewert Equipment, at a total cost of $40,024.00. This purchase will be charged to account no. 00290107-474100.

MOTION TO APPROVE

MADE BY MR. ROOSEVELT

2ND BY MRS. PETRUCCI

AYES 3 NOES 0

Board Meeting of April 3, 2024

ITEM NO. 8

REPORT ON BIDS RECEIVED – PRIMARY SYSTEM REHABILITATION AND UPGRADES -CONTRACT A-PRIMARY SETTLING TANKS AND SLUDGE PUMPING STATION REHABILITATION

WHEREAS: Formal bids were advertised and solicited for the Primary System Rehabilitation and Upgrades-Contract A-Primary Settling Tanks and Sludge Pumping Station Rehabilitation Project at the Bird Island Wastewater Treatment Plant. The following bids were received and opened by the Buffalo Sewer Authority on April 16, 2024:

Bidder	**Total Bid**
J.W. Danforth, Inc	$37,855,000.00
American Contracting Environmental Services	$46,000,000.00

; and

WHEREAS: The bids were received, and the contract will be awarded on the basis of lump sum prices. The bids reflect the true amount of the contract; and

WHEREAS: The Buffalo Sewer Authority's Consulting Engineer, Greeley & Hansen, Inc, has reviewed the bids and recommend awarding the contract to the lowest bidder, J.W. Danforth, Inc at a cost not to exceed $37,855,000.00; and

WHEREAS: The Buffalo Sewer Authority Facility Capital Improvements staff concur with the recommendation of the Consulting Engineer.

NOW THEREFORE
BE IT RESOLVED: That the Board of the Buffalo Sewer Authority hereby authorizes the General Manager to enter into and execute a contract with J.W. Danforth, Inc., in an amount not to exceed $37,855,000.00. Expenses for this contract will be charged to account no. 02000586-490740.

MOTION TO APPROVE

MADE BY MRS. PETRUCCI

2ND BY MR. ROOSEVELT

AYES 3 NOES 0

Board Meeting of May 29, 2024

ITEM NO. 30

CHANGE ORDER NO. 6 – CONTRACT NO. 82000017

CONTRACTOR:	ORIGINAL CONTRACT COST	$2,262,000.00
NOVA Site Companies	PREVIOUS CHANGE ORDERS	$769,738.09
6 Lena Court	THIS CHANGE ORDER	$379,535.53
West Seneca, New York 14224	ADJUSTED CONTRACT COST	$3,411,273.62

VENDOR# 9596 ACCOUNT# 02000507-490740

WORK: Smith at Eagle Real Time Control Project

DESCRIPTION OF CHANGE OR EXTRA WORK:

Item #1 Clinton St. Restoration - 1-1/2" milling and overlaying of Clinton Street between Fillmore and Smith Street, incorporating the camera system, epoxy striping and crosswalks, traffic protection and maintenance, and signage.

Item #2 Smith St Restoration - 1-1/2" milling and overlaying of Smith Street between Clinton and Fillmore Street (excluding areas already paved under the original Contract), incorporating the camera system, traffic protection and maintenance, and signage.

REASON FOR CHANGE OR EXTRA WORK:

Item #1 To restore the pavement along the Detour route on Clinton St. which was utilized during the construction of the RTC.

Item #2 To restore the pavement along the Detour route on Smith St. which was utilized during the construction of the RTC.

COST OF CHANGE OR EXTRA WORK:

Item #1 $219,327.85
Item #2 $160,207.68

THE TOTAL COST OF THE CHANGE OR EXTRA WORK: $379,535.53

The Total INCREASE to the Contract as a result of this Change Order is $379,535.53

WHEREAS: This project was awarded a Water Quality Improvement Program grant by the New York State Department of Environmental Conservation with a minimum local match of 25% for Construction; and

WHEREAS: In Item No. 20, on April 1, 2020 the Board of the Buffalo Sewer Authority authorized the General Manager to enter into and execute a contract with Nova Site Company, LLC for the Smith St. at Eagle St. Real Time Control Project at a cost not to exceed $2,262,000.00; and

WHEREAS: Change Order No. 1 to Contract No. 82000017 was approved by the Board on October 20, 2021 with no increase in cost but an increase in the construction schedule of 233 days; and

WHEREAS: Change Order No. 2 to Contract No. 82000017 was approved by the Board on June 22, 2022 in the amount of $235,406.63 for additional work and materials; and

WHEREAS: Change Order No. 3 to Contract No. 82000017 was approved by the Board on September 28, 2022 in the amount of $0.00 for retention reduction from 5% to 1%; and

WHEREAS: Change Order No. 4 to Contract No. 82000017 was approved by the Board on May 24, 2023 in the amount of $81,724.18 for check valve installation and modifications; and

WHEREAS: Change Order No. 5 to Contract No. 82000017 was approved by the Board on September 28, 2023 in the amount of $452,607.28 for check valve installation, manhole modifications and sewer extension in Great Arrow; and

WHEREAS: The Principal Sanitary Engineer and staff have reviewed a request for a Change Order No. 5 to Contract No. 82000017 as detailed above and recommend its approval.

CONTRACT SUPPLEMENT CONDITIONS:

1. The contract completion date established in the original contract or as modified by previous contract supplements is hereby changed by 233 calendar days to set a new final completion date.

2. Any additional work to be performed under this contract supplement shall be carried out in compliance with the specifications included in the preceding description of changes involved with the supplemental contract drawings designated none and under the provisions of the original contract, including compliance with applicable equipment specifications, general specifications, and project specifications for the same type of work.

3. This contract supplement unless otherwise provided herein does not relieve the Contractor from strict compliance with the guarantee provisions of the original contract, particularly those pertaining to performance and operation of equipment.

4. The Contractor expressly agrees that he will place under coverage of his performance and payment bonds and Contractor's Insurance all work covered by this contract supplement. The Contractor will furnish to the Owner evidence of increased coverage of his performance and payment bonds for the accrued value of all contract supplements that exceeds the original contract price by twenty percent (20%).

5. The costs established under this contract supplement are acknowledged as including any and all costs associated with the work described herein and including any and all costs associated with any and all work performed or to be performed by the Contractor that may be affected in any manner by the work described herein.

NOW THEREFORE
BE IT RESOLVED: That the Board of the Buffalo Sewer Authority hereby approves Change Order No. 6 to Contract No. 82000017 as written in the above Agenda Item, increasing the contract cost in the amount of $379,535.53 making the adjusted contract cost $3,411,273.62.

MOTION TO APPROVE

MADE BY MRS. PETRUCCI

2ND BY MR. ROSSEVELT

AYES 3 NOES 0

Board Meeting of June 26, 2024

ITEM NO. 31

AUTHORIZATION TO ENTER INTO AN AGREEMENT WITH WENDEL COMPANIES, INC., FOR PROFESSIONAL ENGINEERING SERVICES

WHEREAS: The Buffalo Sewer Authority issued a request for qualifications (RFQ) for the purposes of prequalifying various firms for delivery of green infrastructure capital improvement projects and approved these entities on September 30, 2020; and

WHEREAS: Wendel Companies, Inc., as a prequalified firm has developed preliminary plans for Hennepin Park Green Infrastructure; and

WHEREAS: Wendel Companies, Inc., submitted a proposal for delivery of professional engineering services in support of the Hennepin Park Green Infrastructure; and

WHEREAS: Based upon the review of the Principal Sanitary Engineer and staff, it is recommended to proceed with the proposal and scope of work for professional services at an agreed upon cost not to exceed $289,000.00.

NOW THEREFORE
BE IT RESOLVED: That the Board of the Buffalo Sewer Authority hereby authorizes the General Manager to execute an agreement with Stantec Consulting Services, Inc. to provide professional engineering services at a cost not to exceed $289,000.00. The cost of this contract will be funded from account no. 02000587-432004.

MOTION TO APPROVE

MADE BY MRS. PETRUCCI

2ND BY MR. ROOSEVELT

AYES 3 NOES 0

Board Meeting of June 26, 2024

ITEM NO.32

DECLARATION OF LEAD AGENCY FOR STATE ENVIRONMENTAL QUALITY REVIEW FOR DELAVAN TRUNK SEWER IMPROVEMENTS PROJECT

WHEREAS: The Buffalo Sewer Authority ("BSA") proposes to upgrade BSA's sewer collection system along Florida Street and Spillman Place to control combined sewer overflow (CSO) discharges to the Scajaquada Creek ("the Project"); and

WHEREAS: The Project area is located in the City of Buffalo's Masten District; and

WHEREAS: The Project will reduce both the number of CSO activation events to Scajaquada Creek and the total combined sewage discharge to Scajaquada Creek and the Black Rock Canal; and

WHEREAS: In accordance with Part 617 of the implementing regulations pertaining to Article 9 (State Environmental Quality Review Act – "SEQRA") of the Environmental Conservation Law, the Board has determined that the above project is classified as an Unlisted Action; and

WHEREAS: Part 1 of the SEQRA Long Environmental Assessment Form (EAF) has been completed (See Attachment); and

WHEREAS: The Buffalo Sewer Authority has identified Involved Agencies for the Project;

NOW THEREFORE
BE IT RESOLVED: The Board of the Buffalo Sewer Authority hereby announces its intent that the BSA will serve as Lead Agency to conduct an environmental review of the Project in accordance with SEQR and will notify the Involved Agencies of BSA's intention to act as Lead Agency.

MOTION TO APPROVE

MADE BY MRS. PETRUCCI

2ND BY MR. ROOSEVELT

AYES 3 NOES 0

Board Meeting of June 26, 2024

ITEM NO. 33

REPORT ON BIDS RECEIVED - DELAVAN TRUNK SEWER IMPROVEMENTS AT FLORIDA STREET PROJECT (SPP 229A CSO-053_10)

WHEREAS: Formal bids were advertised and solicited for the Delavan Trunk Sewer Improvements at Florida Street Project (SPP 229A CSO-053_10). The following bids were received and opened by the Buffalo Sewer Authority on June 7, 2024:

Bidder	**Total Bid**
PM Pavement	$2,082,678.00
Destro & Brothers Concrete Co., Inc.	$2,165,120.00
Kandey Co.	$2,282,828.00

; and

WHEREAS: The bids were received, and the contract will be awarded on the basis of lump sum prices. The bids reflect the true amount of the contract; and

WHEREAS: Upon review PM Pavement was found to be non-responsive due to several deficiencies including: bid prices did not include both written words and numbers, bid subtotals included mathematical errors, the page containing the full project total was missing, the bid security was insufficient, the Bidder's Qualification submittal was incomplete and referenced work completed by a different corporate entity, and the Non-Collusion Affidavit was unsigned; and

WHEREAS: Upon review Destro & Brothers Concrete Co., Inc. was found to be non-responsive due to lack of attendance at a mandatory pre-bid meeting and incomplete Bidder's Qualification submittal; and

WHEREAS: The Engineer's Estimate for this project was $2,336,684.00; and

WHEREAS: The Buffalo Sewer Authority's Consulting Engineer, Hazen and Sawyer, has reviewed the bids and recommend awarding the contract to the low responsive and responsible bidder, Kandey Co., at a cost not to exceed $2,282,828.00; and

WHEREAS: The Buffalo Sewer Authority Principal Sanitary Engineer and staff concur with the recommendation of the Consulting Engineer.

NOW THEREFORE
BE IT RESOLVED: The Board of the Buffalo Sewer Authority hereby authorizes the General Manager to enter into and execute a contract with Kandey Co., in an amount not to exceed $2,282,828.00. Expenses for this contract will be charged to account no. 02000588-490740.

MOTION TO APPROVE

MADE BY MRS. PETRUCCI

2ND BY MR. ROOSEVELT

AYES 3 NOES 0

Board Meeting of June 26, 2024

Attachment E to the Semi-Annual Status Report: September 2024

Engineering Reports

BUFFALO SEWER AUTHORITY

ARCADIS

CAPITAL PROJECTS PROGRAM MANAGEMENT | BSA CONTRACT NO. 82000075 | PRELIMINARY ENGINEERING REPORT

CSO053_5.2 Edison Martha Offline Storage (OLS) Tank

Prepared by ARCADIS of New York, Inc.

June 14, 2024

BSA Capital Projects Program Management Team:

Arcadis | JM Davidson Engineering | Hallmark Planning & Development | e3 Communications | Watts Architecture & Engineering | CORE Environmental | Atlantic Testing Laboratories | Frandina Engineering and Land Surveying | KHEOPS Architecture, Engineering and Survey | International Institute of Buffalo | Jade Stone Engineering | NASCO Construction Services | JKMuir

TYLin | Greeley and Hansen Water Solutions

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Executive Summary

The Buffalo Sewer Authority (Authority) provides wastewater conveyance and treatment services to approximately 550,000 residents and businesses located in the City of Buffalo and surrounding communities. The Authority operates the Bird Island Wastewater Treatment Facility (WWTF), originally built in 1935, and later expanded in the late 1970s to include secondary treatment capabilities. The WWTF treats wastewater collected from the service area and discharges the treated effluent to the Niagara River under authority of the Clean Water Act and the State Pollutant Discharge Elimination System Permitting (SPDES) process. The Authority owns, operates, and maintains the collection system that serves the City of Buffalo service area and the interceptor system, interceptors and pump stations, that conveys flow from the surrounding communities and the City residents to the WWTF.

In accordance with an Administrative Order (AO) from the New York State Department of Environmental Conservation (DEC), the United States Environmental Protection Agency (US EPA), and the United States Department of Justice (DOJ), the Authority implemented a Combined Sewer Overflow (CSO) Long Term Control Plan (LTCP) approved on March 18, 2014. This LTCP aims to minimize CSO activations in the existing collection system and mitigate flow surges at the WWTF.

The LTCP's compliance criteria involve limiting the number of CSO activations per typical precipitation year for the Sewer Patrol Point's (SPP's) receiving waterbody, as determined by the Authority's Combined Sewer System (CSS) hydraulic model. Following the LTCP's approval in 2014, the hydraulic model was updated and recalibrated to reflect the current conditions of the collection system.

The updated model indicated that some initially planned projects were no longer viable, while others could be further optimized to meet the established targets. The Authority undertook an optimization process that defined many projects, and selected alternatives were summarized in the "LTCP Optimization Selected Alternative" technical memo dated January 31, 2023, which constitutes the revised LTCP now named Queen City Clean Waters.

This report covers The Edison Martha Off-line Storage (OLS) Facility, one of the proposed projects under the Selected Alternative memo within the collection system tributary to CSO-053 discharging to Scajaquada Creek.

This project consists of constructing a 2.61 million gallon (MG) buried concrete tank, associated diversion structure, and tank inlet and outlet sewers near the northwest corner of Edison Avenue and Kensington Expressway for the purpose of relieving the Edison Avenue Storm Relief Sewer, the downstream Kensington Expressway Sewer at Edison Avenue and the Scajaquada Tunnel Interceptor during wet weather events to reduce CSO discharges to the Scajaquada Tunnel from SPP340. The tank will be a nominal 130 feet wide by 336 feet long and be constructed on land in what is the Roosevelt Playground. Flows in excess of the reported 0.4 million gallon per day (mgd) dry weather flow in the Edison Avenue Storm Relief Sewer will flow over a 20-foot-long weir at the proposed Diversion Structure to be constructed around the existing sewer in the Edison Avenue Right of way, and be conveyed via a 48-inch diameter Reinforced Concrete Pipe (RCP) to the tank. The storage tank will dewater via gravity through a 24-inch RCP pipe to the manhole where the Edison Avenue Storm Relief Sewer joins the Kensington Expressway Sewer at Edison Avenue, when there is available capacity in the downstream sewer. The tank will have inlet and outlet gates that will normally be open and be controlled from real time level signals. The outlet gate will be controlled by the level in the Hazelwood in-line-storage (ILS) facility downstream, whereas the inlet gate will be controlled by the tank level in the Edison Martha tank itself. The buried tank

will include semi-automated cleaning with a tipping bucket system and access will be provided to the tank for maintenance and for additional cleaning should it be required.

This project, together with multiple other projects in the tributary area of Scajaquada Tunnel Interceptor, have been selected to reduce typical year predicted activations at CSO-053 from 37 following the Phase 1 project implementation, to the target maximum number of four. If this project is not completed as scheduled, the Authority will be in violation of the AO.

An opinion of the Total Project Cost and a proposed implementation schedule are provided below.

Table ES-1: Opinion of Probable Total Project Cost

Project	Opinion of Total Project Cost
CSO053_5.2 Edison Martha Offline Storage (OLS) Tank	$84,500,000

Table ES-2: Anticipated Project Schedule

Description	Anticipated Completion Date
Design Completion	Winter 2026
Regulatory Review	Spring 2027
Bidding	Spring 2027
Construction Start Date	Summer 2027
Construction End Date	Spring 2033

SECTION 1 PROJECT BACKGROUND AND HISTORY

1.1 Site Information

1.1.1 Location

The site of the proposed project, known as the Edison Martha OLS, is located at 430 Edison Avenue, on what is otherwise known as the eastern portion of Roosevelt Playground situated just north of the Kensington Expressway and west of Edison Avenue in the northeast corner of the city. The site is behind the current Charter School of Inquiry, across from Gail and Martha Avenues. Easements for inlet and discharge sewer construction from the Edison Avenue Storm Relief Sewer to the storage tank and back will be sought from the charter school property owner.

Figure 1-1: Project Site Location

The site is located within the Scajaquada District of Authority's collection system, and the Edison Avenue Storm Relief Sewer is tributary to the regulator at Sewer Patrol Point (SPP)340 on the Scajaquada Tunnel Interceptor. During wet weather events, when the Scajaquada Tunnel Interceptor or the intercepting sewers it discharges into lack adequate hydraulic capacity to convey the flow, the interceptor can release the excess flow at SPP340 into the Scajaquada Drain. The Scajaquada Drain is a nearly four-mile channelized section of Scajaquada Creek that runs through the east side of the City of Buffalo. CSO-053 is where the Scajaquada Drain daylights near Forest Lawn Cemetery and once again becomes Scajaquada Creek.

1.1.2 Geologic Conditions

United State Geological Survey (USGS) maps place the proposed site at an elevation of between 665 and 675 feet above sea level. A copy of the USGS, Buffalo NE Quadrangle map for New York - Erie County can be found in Appendix A.

According to United States Department of Agriculture's (USDA's) Web soil Survey, the site soils are classified as: UrA- Urban land, Lima Complex with 1 to 6 percent slopes with a composition of roughly 60% Urban with 30% Lima and the remaining 10% minor components. The depth to "restrictive features" is listed as more than 80 inches with the typical depth to water table noted as 18-24 inches. The soils above the "restrictive feature" are expected to consist of primarily loam for the upper 16 inches with gravelly loam between that and the "restrictive layer". Refer to Appendix B for a copy of the Custom Soil Resource Report for the project site.

The 1965 Record Drawings for the Edison Avenue Storm Relief Sewer, notes "rock soundings" found along the path of the sewer at depths between 7 and 11 feet below grade which seems to confirm the information from USGS.

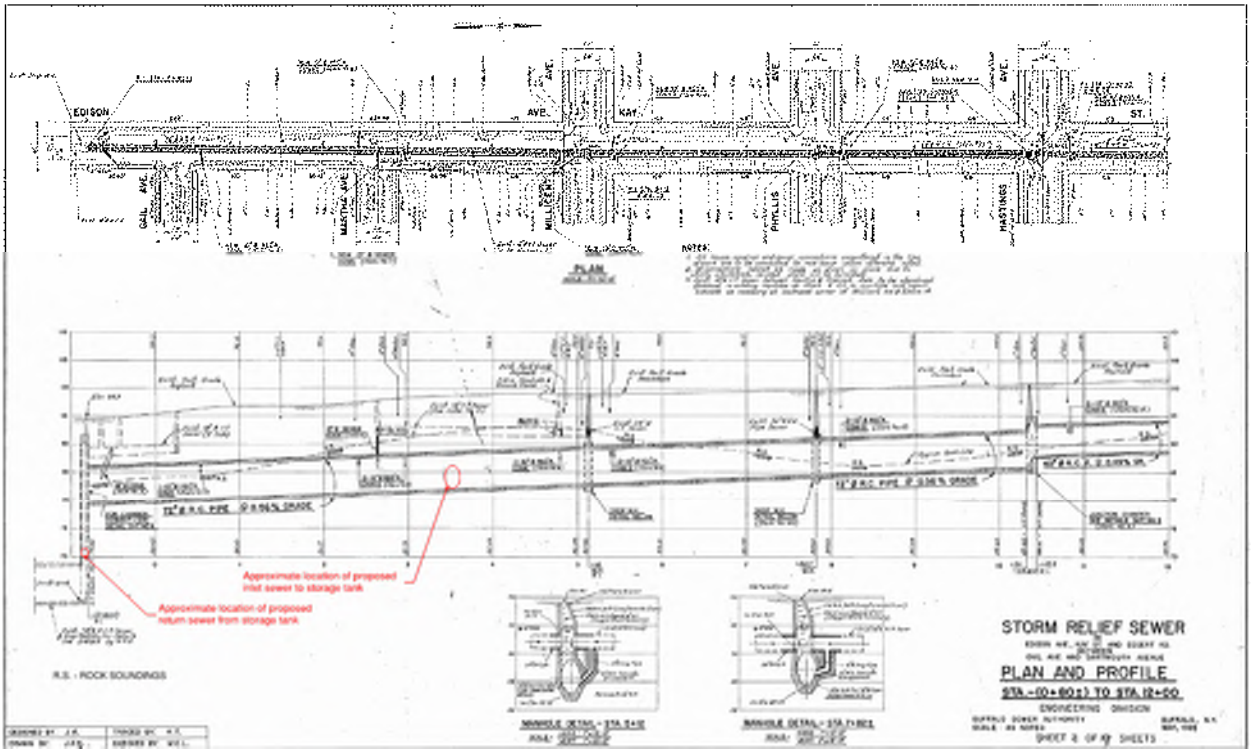


Figure 1-2: Edison Avenue Storm Relief Sewer Sheet 2 of 10

Per Figure 2-2, Bedrock Geology, of the 2014 LTCP, which can be found in Appendix C, the predominant form of bedrock found in the project area is Onondaga Limestone, which is what the "restrictive layer" is likely to consist of.

1.1.3 Impacted Environmental Resources

The United States Fish and Wildlife Service's Information for Planning and Conservation (IPaC) database was researched for the project location. The preliminary results from the IPaC are summarized below, with the full report available in Appendix D.

The database indicates that several endangered species may occur in the project area: the Northern Long-eared Bat, listed as an endangered species; the Salamander Mussel, listed as a proposed endangered species; and the Monarch Butterfly, listed as a candidate for threatened species. However, no critical habitat for these species is found in the project area, making it unlikely that the proposed project will impact these species.

Additionally, the database indicates that there are likely 23 migratory birds present in the project area. A probability of presence summary will be consulted prior to scheduling construction activities to avoid or minimize impacts on migratory birds.

Regarding U.S. Fish and Wildlife Service (USFWS) facilities, there are no refuge lands or fish hatcheries in the project location. Furthermore, the project location does not intersect any wetlands mapped by the National Wetlands Inventory (NWI).

The sewer system, of which the Edison Ave. Storm Relief Sewer is a part, discharges into two primary water bodies: Scajaquada Creek (PWL ID: 0101-0023) and the Niagara River (PWL ID: 0101-0006). According to the latest water quality assessment by NYSDEC, both water bodies are classified as "impaired" regarding fish consumption due to contaminants that degrade the habitat. Scajaquada Creek is also rated as "impaired" for both primary and secondary recreational activities, while the Niagara River is noted as a "threatened" water supply system with "stressed" aquatic life. The DEC reports that the high density of sanitary wastewater discharges significantly increases vulnerability to various contaminants, including fecal coliforms.

In addition, the Scajaquada Drain (the channelized portion of Scajaquada Creek) travels beneath the eastern half of the City of Buffalo for nearly four miles in a buried tunnel. This covered area is classified as a R4SBC wetland. The NWI Survey defines this wetland as:

- **System Riverine (R)**: The Riverine System includes all wetlands and deepwater habitats contained within a channel, with two exceptions: (1) wetlands dominated by trees, shrubs, persistent emergent, emergent mosses, or lichens, and (2) habitats with water containing ocean-derived salts of 0.5 ppt or greater. A channel is an open conduit either naturally or artificially created which periodically or continuously contains moving water, or which forms a connecting link between two bodies of standing water.
- **Subsystem Intermittent (4):** This Subsystem includes channels that contain flowing water only part of the year. When the water is not flowing, it may remain in isolated pools or surface water may be absent.
- **Class Streambed (SB):** Includes all wetlands contained within the Intermittent Subsystem of the Riverine System and all channels of the Estuarine System or of the Tidal Subsystem of the Riverine System that are completely dewatered at low tide.
- **Water Regime Seasonally Flooded (C):** Surface water is present for extended periods especially early in the growing season, but is absent by the end of the growing season in most years. The water table after flooding ceases is variable, extending from saturated to the surface to a water table well below the ground surface.

1.1.4 Flood Plain Considerations

The Federal Emergency Management Association (FEMA) Flood Insurance Risk Map places the proposed project site in "Zone X", an area of minimal Flood Hazard. Refer to Appendix E for the National Flood Hazard FIRMette for proposed project site.

1.1.5 Project Impacts to Potential Environmental Justice Areas (PEJAs) and/or Disadvantaged Communities (DAC)

The project site and the majority of the area that the Scajaquada Creek flows through from the eastern border of the City of Buffalo to its convergence with the Niagara River to the west are found on the NYSDEC map of Potential Environmental Justice Areas (PEJAs) as is nearly the entire area of the City of Buffalo bordering the Niagara River. The Project site is located within census block group 15000US360290067013, an area having a total population of 1,625, over 98 percent of which is minority, and twenty percent of which whose income falls below the poverty level. CSO-053 is located in census block group 15000US360290063023, an area having a total population of 557, over 58 percent of which is minority, and nearly 37 percent of which whose income falls below the poverty level.

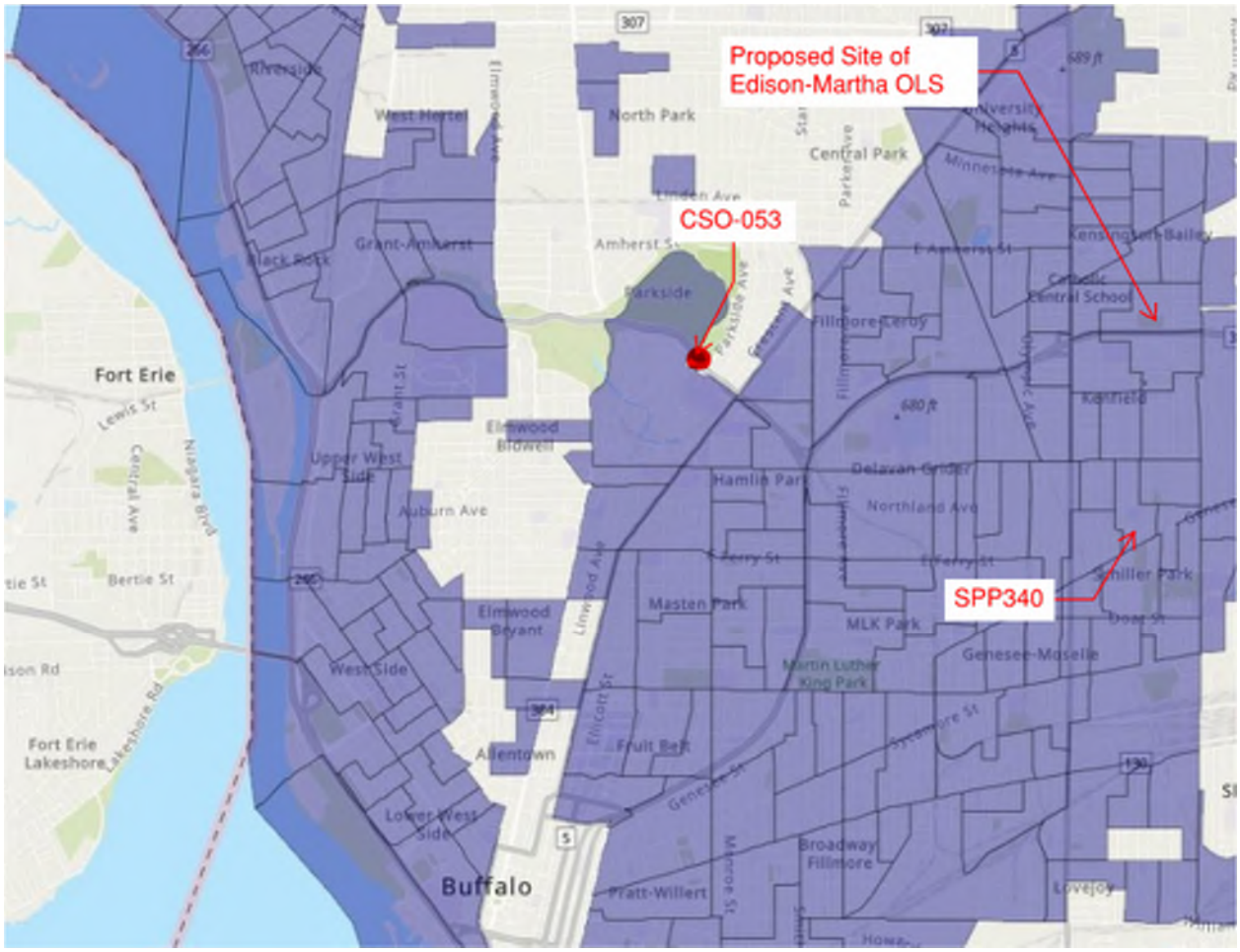


Figure 1-3: Potential Environmental Justice Areas, City of Buffalo

The project may offer some relief from sewage backups and basement flooding to the area upstream of the proposed project due to increased storage capacity in the sewer. Fish and other wildlife dwelling in or traversing through the Scajaquada Drain will benefit from improved water quality from SPP340, where the

Scajaquada Tunnel Interceptor overflows into Scajaquada Drain and downstream. However much of the environmental impacts of the project are not expected to be realized until the creek daylights in Forest Lawn Cemetery downstream of CSO-053 and flows through Delaware Park, eventually flowing into the Niagara River, Lake Ontario, and downstream. The water quality improvements that are expected to result from the project will have a positive impact on the recreational activities such as fishing and boating along the downstream reaches of Scajaquada Creek and the Niagara River. In addition to the PEJA areas of the City of Buffalo, there are several other areas with the PEJA designation downstream of the Scajaquada's confluence with the Niagara River that may also see environmental benefits such as positive impact on recreational activities as well as impact on their drinking water supplies from this project including the waterfront areas of: the City of Niagara Falls, and the Town of Tonawanda, NY.

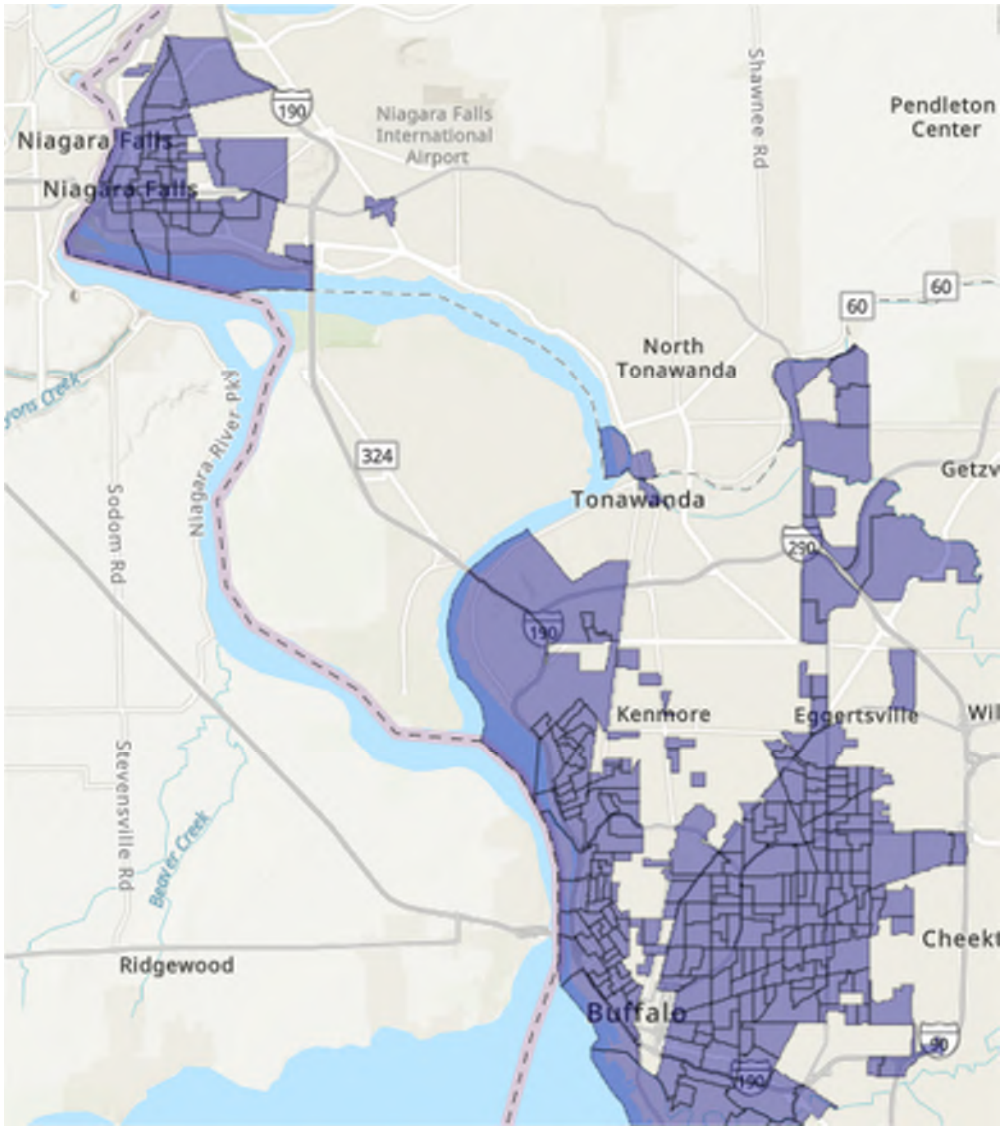


Figure 1-4: Potential Environmental Justice Areas Downstream of the City of Buffalo

1.2 Ownership and Service Area

The Authority's wastewater service area covers approximately 110 square miles, including the City of Buffalo and parts of the Towns of Alden, Cheektowaga, Elma, Lancaster, Tonawanda, and West Seneca, and the Villages of Depew, Lancaster, and Sloan, as well as Erie County Sewer District No. 1 and 4, as shown in Figure 1-5. The collection system serves a population of approximately 550,000 residents in 11 municipalities.

The Edison Avenue Storm Relief Sewer is part of the 850 miles of combined sewers, separate sanitary sewers and separate storm sewers owned by the Authority, a public benefit corporation of the State of New York established in 1935, that serves the City of Buffalo, NY. Of those 850 miles of sewers, 790 miles of those are combined sewers. The Edison Avenue Storm Relief sewer is one of them.

1.2.1 Outside Users

There are seven outside users connected to Buffalo Sewer's collection system, governed under individual intermunicipal agreements (IMAs) including:

- Erie County Sewer District #1
- Erie County Sewer District #4
- Town of Cheektowaga
- Village of Sloan
- West Seneca Town Sewer Districts #1, 2, 3, 4, 9 and 10
- West Seneca Town Sewer Districts #5, 13, and 14
- West Seneca Town Sewer District #1

Buffalo Sewer has wholesale agreements with these outside communities and does not own, operate, or maintain the wastewater collection systems within these communities. Each of these outside communities are charged by the Authority for their share of costs allocable to the treatment of their flows to the wastewater treatment facility (WWTF). Allocable costs include portions of administrative expenses, WWTF expenses, industrial waste expenses, the costs to maintain trunk sewers to convey flows from the city line to the WWTF, and debt service costs. The municipality or district is billed twice annually for services. Under the IMAs, each District is responsible for installing and maintaining meters at city lines. Buffalo Sewer has rights to challenge accuracy of meters, including through installation of test meters.

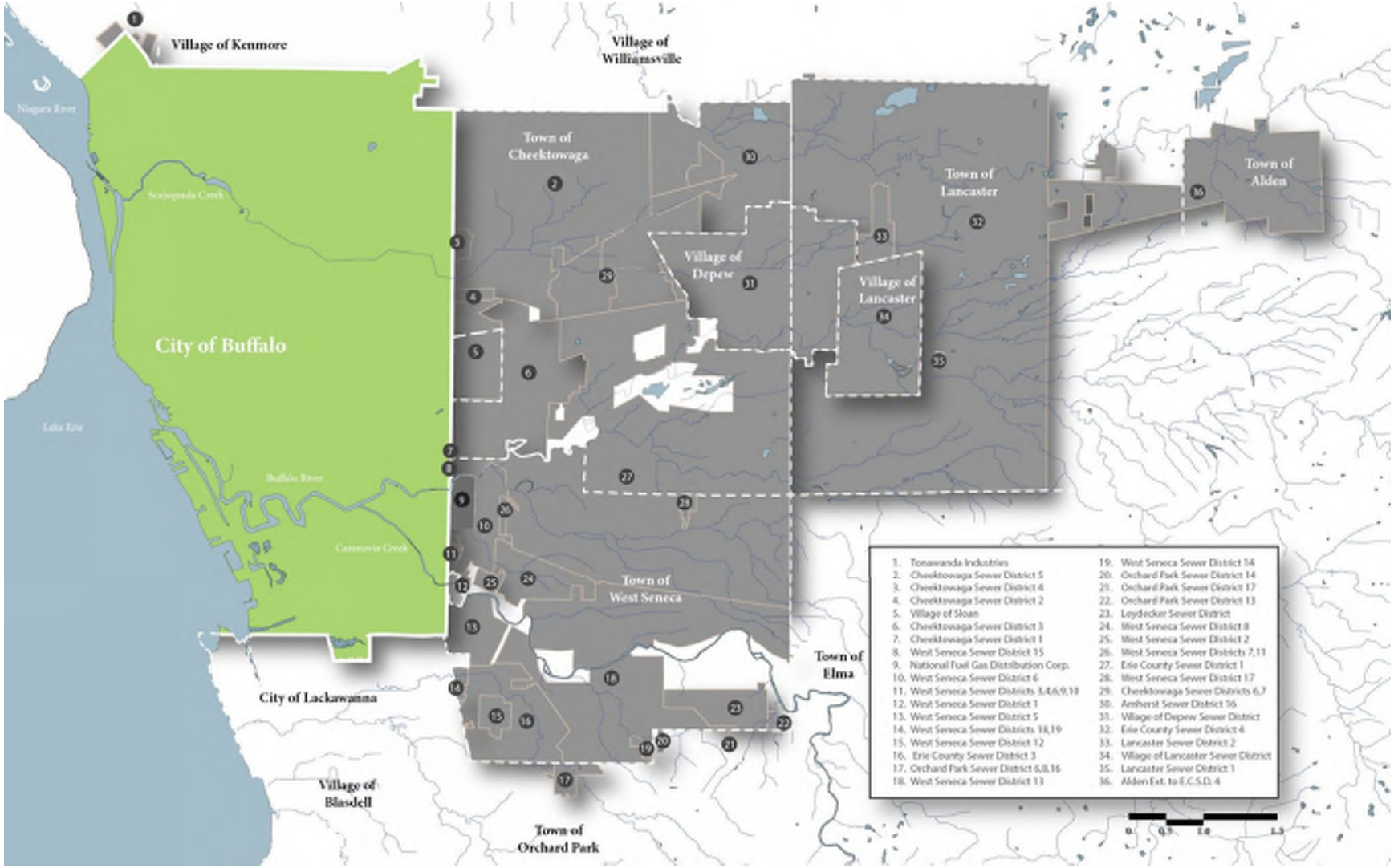


Figure 1-5: Buffalo Sewer Authority Service Area Map

1.2.2 Population Trends

Historically, the City of Buffalo has experienced population decline, unlike the population growth seen in New York State as a whole, as shown in Table 1 1. However, from 2010 to 2020, there was a population growth of 6.5%. Assuming an average population change based on the recent decade, it is projected the city's population will continue to grow at a rate of approximately 5.8% every ten years.

Table 1-1: Historical and Projected Population

Year	City of Buffalo		New York	
	Population	% Change	Population	% Change
1960	532,759		16,782,304	
1970	462,768	-13.1%	18,236,967	8.7%
1980	357,870	-22.7%	17,558,072	-3.7%
1990	328,123	-8.3%	17,990,455	2.5%
2000	292,648	-10.8%	18,976,457	5.5%
2010	261,310	-10.7%	19,378,102	2.1%
2020	278,349	6.5%	20,201,249	4.2%
2030*	295,388	5.8%	21,024,396	3.9%
2040*	312,427	5.8%	21,847,543	3.9%
2050*	329,466	5.8%	22,670,690	3.9%
2060*	346,505	5.8%	23,493,837	3.9%

*Projected

Source: US Census Bureau

As the population of the city is growing, the number of Buffalo Sewer connections has also increased over the past 11 years. Per the most recent Comprehensive Annual Financial Report (CAFR), as of FYE 2022, there are approximately 108,155 residential connections and 1,306 commercial, industrial, and governmental connections to the Authority's collection system. These connections increased by 4.4% and 132% respectively, from FY 2014 to FY 2023. Figure 1-6 shows the growth of connections since FY 2014.

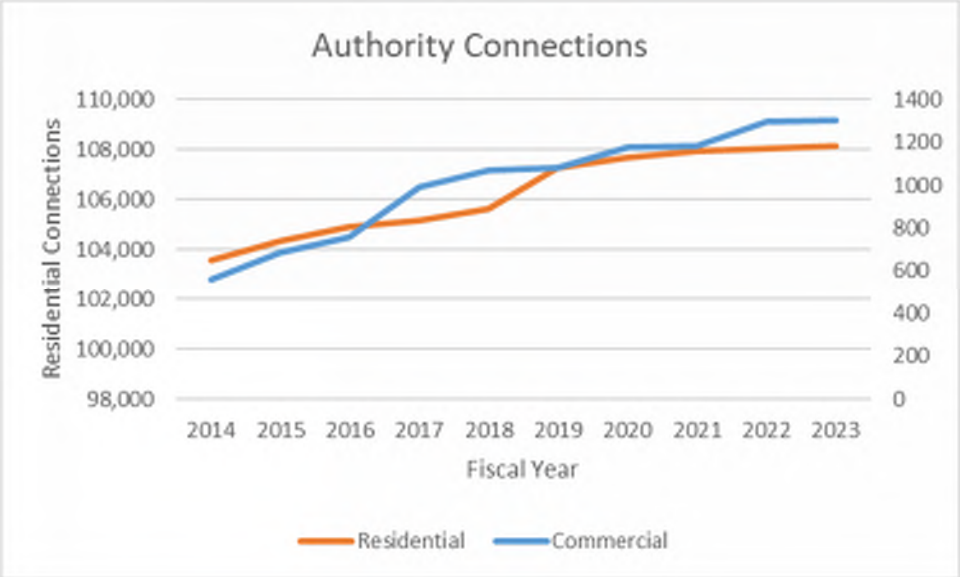


Figure 1-6: Buffalo Sewer Authority Connections

1.3 Existing Facilities and Present Condition

The 2014 LTCP provides an overview of the Authority's major system components including treatment and conveyance. The only existing Authority facility part of the proposed Edison Martha OLS project is the Edison Avenue Storm Relief Sewer.

1.3.1 General Description and History of Major System Components

The Edison Avenue Storm Relief Sewer was constructed in the early 1960s along Eggert Avenue, Kay St. and Edison Avenue north of the Kensington Expressway near the eastern border of the City of Buffalo to allow storm water flows which exceed the capacity of the adjacent combined sewers to be diverted from the combined sewers to the relief sewer in order to relieve sewage backups and basement flooding. The Edison Avenue Relief Sewer joins the Kensington Expressway Sewer at Edison Avenue just north of the intersection of Edison Avenue and the Kensington Expressway, which carries the excess storm water flow to the Scajaquada Tunnel Interceptor. When it was originally constructed, the Kensington Expressway Sewer at Edison Avenue originally discharged directly to the Scajaquada Drain. Later when the Scajaquada Tunnel Interceptor was built, the majority of the flow from the Kensington Expressway Sewer at Edison Avenue was directed to it.

However, when the Scajaquada Tunnel Interceptor does not have adequate capacity to convey the flow from the Kensington Expressway Sewer at Edison Avenue, the regulator at Sewer Patrol Point (SPP)340, located near the intersection of Hagen Street and Kerns Avenue, will overflow the excess flow to the Scajaquada Drain, a 3.7 mile underground culvert which carries the Scajaquada Creek through the eastside of the City of Buffalo from the border with the Town of Cheektowaga to Forest Lawn Cemetery where Scajaquada Drain eventually daylights and once again becomes Scajaquada Creek. The point where Scajaquada Creek emerges from its underground tunnel is known as CSO-053. Downstream, Scajaquada Creek joins the Black Rock Canal and eventually the Niagara River.

1.3.2 Current or Future Projects on the same Site

The existing recreational facilities at the Roosevelt Playground are in a derelict condition. The Buffalo Division of Parks and Recreation has been working with New City Parks, a non-profit organization whose mission is to work closely with small cities and their underserved communities to create parks where they are most needed, bringing greater health and happiness through play, exercise, and contact with nature, and building environmental and community resilience; to create a master plan for the Roosevelt Playground and to seek funding to implement the master plan. Photographs of the existing Roosevelt Playground facilities as well as the plan that New City Parks has created for the site can be viewed at: https://www.newcityparks.org/projects-grid/roosevelt-park. Some project funding has been secured, and they are currently in the process of securing additional funding for the project.

The plan moving forward would be that the planned park facilities work, predominantly located on the west side of the parcel, would overlap with the Edison Martha OLS work, so that at the conclusion of the projects a revitalized parkland would be returned to the community. The design team for the Edison Martha OLS basin will need to carefully coordinate the storage tank's above ground facilities with the design team for the park improvements to minimize any negative impact they could have on the plans for the park.

1.3.3 Existing Permits

The Authority currently holds State Pollution Discharge Elimination System (SPDES) permit and Publicly Operated Sewer System (POSS) number NY0028410 for its Bird Island Wastewater Treatment Plant and collection system. The permit was last renewed in 2019. Refer to Appendix F for a copy of the current permit.

The Authority currently operates under an administrative order with the US EPA, DEC and DOJ, that requires the Authority to comply with the LTCP that was developed and agreed upon by the parties to reduce the incidents of CSOs from its collection system. The requirements of the LTCP have been incorporated into their current SPDES permit. Refer to Appendix F for a copy of the 2015 Administrative Order.

1.3.4 Design Flows

The Edison Avenue Storm Relief Sewer begins to collect flow as a 42-inch diameter pipe set at a slope of 0.20 percent, having a hydraulic capacity of 29 million gallons per day (mgd), from where it is joined to an existing 24-inch diameter sewer just north of the intersection of Eggert Road and Dartmouth Avenue. It runs southward down Eggert Road increasing in size and slope, and therefore capacity, as sewers along Eggert Road, Dartmouth Avenue, Burke Drive, Hewitt Avenue, and Kensington Avenue discharge into it. The pipe size increases to 60-inches diameter with a slope of 0.24 percent having a hydraulic capacity of nearly 82.5 mgd where it turns from Eggert Road to Kay Street. The relief sewer continues to collect the flow from local sewers along Kay Street and intersecting streets of: Davidson, Hastings, Phyllis and Millicent Avenues, increasing its slope to 0.48 percent at Davidson Avenue for a hydraulic capacity of 116.6 mgd, and then increasing its size to 72-inch diameter with a slope of 0.56 percent for a capacity of nearly to 205 mgd at the intersection of Hastings Avenue. It continues at this size and slope as Kay Street becomes Edison Avenue south of Millicent Avenue. The relief sewer continues to collect flow from local sewers along Edison Avenue as well as local sewers along the intersecting streets of Gail and Martha Avenues before discharging into the Kensington Expressway Sewer at Edison Avenue just north of the intersection of Edison Avenue and the Kensington Expressway.

Figure 1-7: Edison Avenue Storm Relief Sewer

1.3.5 Existing flows

Flow monitoring was last conducted in the area from July of 2016 through May of 2017. The maximum flow level during the monitoring period in the 72-inch diameter sewer at the intersection of Kay Street and Hastings Avenue, approximately 700 feet upstream of the proposed inlet to the Edison Martha OLS, was 30 inches which would appear to indicate excess capacity in the sewer. However, the CSS modeling shows that for a ten-year design storm the 72-inch diameter sewer would enter a surcharged condition.

1.3.6 Existing Energy Consumption

The Edison Avenue Storm Relief Sewer is a gravity sewer and has no external energy input.

1.4 Definition of the Problem

One of the issues identified in the Remedial Action Plan (RAP) for the Niagara River, developed in response to its designation as an Area of Concern (AOC), was the impact of combined sewer overflows (CSOs). The RAP's recommendations to "ensure that combined sewer overflows do not significantly contribute to river impairment" include system modeling and assessment to identify areas for improvement, maintaining systems, and designing and implementing necessary improvements. These requirements align with the US EPA CSO Control Policy and are reflected in the Best Management Practices (BMPs) outlined in the Authority's SPDES permit and the Administrative Order.

As part of the 2014 Long-Term Control Plan (LTCP), it was determined that to meet the Water Quality Standards (WQS) of the Clean Water Act for Scajaquada Creek and downstream water bodies, the number of typical annual activations at CSO-053 needed to be reduced from 65 to a maximum of four. The 2023 LTCP optimization noted that efforts up to that point had reduced the annual activations at CSO-053 from 65 to 37 and reaffirmed that a maximum of four activations was still the target to achieve WQS goals for the downstream receiving waters.

During the 2023 optimization process, the original list of future projects was reviewed to determine their viability and effectiveness in reducing the number of activations. This evaluation revealed that the current project list would only reduce the annual activations at CSO-053 to 26, not the desired four. A major factor for this shortfall was the discovery of a previously unknown cross-connection between the SPP339 basin and the SPP340 basin, which resulted in significantly more activations at SPP340 than initially predicted.

Consequently, a new list of additional projects was developed and evaluated using the revised Combined Sewer System (CSS) model to determine the most cost-effective projects needed to achieve the goal of a maximum of four annual activations for CSO-053. The revised project list for the area upstream of regulator SPP340 included the Edison Martha Offline Storage (OLS) project as one of the key initiatives to achieve the desired reduction in CSOs.

1.4.1 Compliance with current standards (federal, state, and local laws)

The proposed project is an outcome of Administrative Order Docket No. CWA-02-2012-3024 (SPDES Permit No. NY0028410). The Administrative Order resulted in the preparation of an LTCP to refine the Authority's sewer collection system model and to reduce CSO overflow volumes and frequencies. A copy of this administrative order in included in Appendix F.

1.5 Financial Status

The Authority currently receives revenue from the sources noted in Table 1-2, below.

Table 1-2: Comparison of Revenues (Actual and Budgeted) since 2021

Revenues	2021-2022 Actual	2022-2023 Actual	2023-2024 Original	2024-2025 Proposed
Operating Revenues				
Assessed sewer rents	12,052,518	12,106,288	19,852,600	24,957,600
Metered water use sewer rents	24,716,758	24,708,243	24,460,000	25,136,900
Outside Contracts	23,414,326	12,665,958	13,750,000	15,000,000
Industrial Waste Charges	4,505,575	5,133,775	3,525,000	3,875,000
Miscellaneous Revenue	31,097,051	18,036,621	4,691,400	1,305,500

Revenues	2021-2022 Actual	2022-2023 Actual	2023-2024 Original	2024-2025 Proposed
Non-Operating Revenues				
Interest Charges	597,601	858,886	711,000	615,000
Interest Earnings	148,078	3,759,557	2,760,000	3,510,000
Total Revenues	**96,531,907**	**77,269,329**	**69,750,000**	**74,400,000**

Note: Values are rounded to the nearest dollar. For more detailed numbers, see the Authority's 2024-2025 Budget at 2024-2025-BSA-Budget-1.pdf (buffalosewer.org)

The Levy of Sewer Rents based on assessed value will be $24,900,000 for the 2024-2025 Budget. This represents the amount of Sewer Rent that the Buffalo Sewer Authority will collect from all real property in the City of Buffalo except those properties exempt by law. This amount, when spread over the total estimated assessment for sewer purposes from the Department of Assessment, will result in an annual sewer rent of approximately $1.98 for each $1,000 of assessed valuation.

Any further change in the assessed value of taxable properties will require an adjustment to the assessment sewer rent to maintain this levy. If the final assessed value as determined by the City Department of Assessment increases or decreases, the sewer rent per $1,000 will correspondingly increase or decrease by $.00015673 for each $1,000,000 change in assessed value.

All sewer rents based on water use will be subject to a three percent adjustment to reflect consumer price indices. Flat rate sewer rents continue to be charged based on property characteristics (i.e., number of stories, front footage, etc.). Sewer rent meter charges will be assessed at a rate of $11.42 per 1,000 cubic feet. All flat and meter accounts will be assessed a capacity/drainage charge at a minimum of $6.18 per month.

The appropriations from the 2024-2025 budget for various expenditures are as shown in Table 1-6.

Table 1-3: Summary of Appropriations in the Authority's 2024-2025 Budget.

Appropriation Category	2024-2025 Budgeted Appropriation
Personnel Services	17,731,441
Utility Services	5,609,810
Fringe Benefits	12,296,500
Debt Service and Reserves	10,360,256
Purchase of Services	17,681,274
Materials and Supplies	8,343,957
Capital Outlay	1,500,960
Insurance and Financial Charges	649,500
Professional Development	221,302
TOTAL	**74,400,000**

In 2024-2025, the Authority anticipates debt payments of $8,610,256, which is a slight increase over the 2023-2024 budgeted amount of $8,044,007. In 2023, the Authority had ~$21.5 million in net revenue available for debt service, with estimated principal of ~$3.3 million, interest of ~$2.9 million, for a total debt service coverage of 3.43 (from the Authority's Annual Comprehensive Financial Report for Fiscal Year ended June 30, 2023).

The Median Household Income (MHI) for the City of Buffalo is $46,184 in 2022 dollars, while the NYS MHI is $81,386 in 2022 dollars as per the data at https://www.census.gov/quickfacts/fact/table/NY,buffalocitynewyork/INC110222. Therefore, the City of Buffalo MHI is only 57% of the New York State MHI.

SECTION 2 ALTERNATIVES ANALYSIS

The Edison Martha OLS project is one of several projects under the umbrella of the LTCP developed by the Authority to abate their CSOs in compliance with the US EPA National CSO Control Policy and meet WQS required per the Clean Water Act. Several system-wide alternatives were developed and analyzed as part of the LTCP including: centralized treatment, satellite treatment, system-wide storage, system separation, conveyance, green infrastructure improvements, floatables control and various combinations of these.

The "no action" alternative would put the Authority in non-compliance with the Clean Water Act. Green Infrastructure was also included as a measure to address combined sewer overflows and urban flooding throughout the CSO 053 sewershed but was determined in the initial site evaluation to not be a feasible option to fully address the issues. The cost-effective alternative for the LTCP that was adopted includes a combination of centralized treatment improvements, system-wide storage, conveyance, green infrastructure and floatables control components. Details of the alternatives evaluated and selected as part of the overall system LTCP can be found in the 2014 LTCP documents and the 2023 LTCP Optimization documents previously submitted to NYSDEC.

2.1.1 Description

The Edison Martha OLS project falls within the Scajaquada Creek watershed and is one of the storage components proposed in the 2023 LTCP revision/optimization to reduce activations at CSO-053, and more specifically from the collection system upstream of SPP340. Since every overflow to the Scajaquada Drain ultimately results in an "activation" at CSO-053, it is necessary to reduce the overflows to the drain at the upstream regulators. As previously indicated, in the 2023 LTCP optimization, a previously unknown cross-connection between the SPP339 basin and the SPP340 basin was discovered. This cross connection was added to the revised sewer model. When the base list of original LTCP projects not yet completed was added to the model, it was determined that completing these projects would no longer bring the predicted number of activations from CSO-053 down to the desired number of four, but still leave 26 predicted activations in a typical year. The intent of this project in combination with the other LTCP projects noted for CSO-053 is to reduce annual combined sewer overflow activations from a predicted number of 37, based on the current model, to a maximum of four. In order to accomplish this for the collection system upstream of SPP340, it was determined that it would be necessary to provide an additional storage volume of at least 2.61 million gallons within the collection system and make certain modifications at the SPP. The intent of this project is to provide this 2.61 million gallons of storage in the collection system upstream of SPP340, which regulates the overflow of sewage from the Scajaquada Interceptor to the Scajaquada Tunnel at one of several locations in order to reduce the number of annual activations at CSO-053 downstream.

Two possible sites within the collection system upstream of SPP340 were originally selected for locating a portion of the 2.61 MG of storage volume, but the site known as Lang Webster was quickly ruled out as it was determined that the site had elevation constraints that made it not viable to provide any meaningful storage volume at that location.

Therefore, it was determined that the entire storage volume for the collection system tributary to SPP340 would need to be provided at the Edison Martha site.

SECTION 3 RECOMMENDED ALTERNATIVE

The Edison Martha OLS project includes building an underground offline storage (OLS) tank to receive and store up to 2.61 million gallons (MG) of combined sewage from the Edison Avenue Storm Relief Sewer during wet weather events, and the sewers needed to divert the sewage flow from the Edison Avenue Storm Relief Sewer to the underground tank and return the stored combined sewage from the tank to the relief sewer downstream when capacity is available.

The Edison Martha OLS will include a 2.61 MG underground concrete storage basin, a 48-inch diameter influent sewer and a 24-inch diameter effluent sewer connecting the storage basin to the existing relief sewer on Edison Avenue. The storage basin will include tipping buckets and associated water connections for the purposes of cleaning the underground storage basin, and instrumentation and controls to monitor conditions in the tank.

Figure 3-1: Proposed Project Plan

3.1 Basis of Selection

3.1.1 Prioritization of recommendations

In the 2023 LTCP Optimization Memo, each project included in the Selected Alternative was given a score based on the ranking system indicated in Table 3-1. These project scores were used to put together the proposed implementation schedule that would prioritize the projects which could provide the most impact.

Table 3-1: Project Ranking System

No.	Factor	Score Conditions		
		1	2	3
1	SPP Overflow Volume Rank	Baseline typical year SPP overflow volume > 5 MG	Baseline typical year SPP overflow between 1 and 5MG	Baseline typical year SPP overflow volume < 1 MG
2	Waterbody Rank	Black Rock Canal and Scajaquada Creek SPPs	Buffalo River SPPs	Erie Basin and Niagara River SPPs
3	SPP Project Rank	Highest priority project upstream of a particular SPP based	2nd Highest priority project upstream of a particular SPP based on	3rd highest priority project upstream of a particular SPP based on cost
4	Construction Priority	Construction planned/occurring soon	Normal priority	Avoiding construction in this area due to concerns such as contaminated soil,
5	CSO Cost Effectiveness	Combined cost effectiveness of projects in CSO	Combined cost effectiveness of projects in CSO basin $/gal	Combined cost effectiveness of projects in CSO basin $/gal reduction
6	Environmental Justice (EJ)	Disadvantage ranking > 4	Disadvantage ranking > 2 and ≤ 4	Disadvantage ranking ≤ 2

The Edison Martha OLS project received the following scores, which made it one of the highest priority projects to come out of the 2023 LTCP Optimization.

Table 3-2: Edison Martha OLS Prioritization Project Score

SPP Overflow Volume Rank	Waterbody Rank	SPP Project Rank	Construction Priority	CSO Cost Effectiveness	Environmental Justice (EJ)	Combined Score
1	1	1	2	1	1	7.1

3.1.2 Feasibility Constraints

The following feasibility constraints were considered when developing the Edison Martha OLS project for the 2023 LTCP Optimization in order to help minimize the cost burden on rate payers while maximizing resident's quality of life in relation to their construction and subsequent operation and maintenance.

- Cost Related Constraints
  - Space Consideration/Land Acquisition
  - Rock Excavation
  - Operations Costs
- Non-Monetary Factors
  - Social Justice

3.1.2.1 Space Considerations/Land Acquisition

Storage structures require a significant footprint to hold millions of gallons of combined wastewater. These structures can be centralized so that a single point collects the target volume, decentralized with many smaller storage facilities, or a combination of both. The City of Buffalo is fully developed, and the public right-of-way is crowded with existing utilities. To build these structures and enable the Authority to operate them in perpetuity, permanent easements would need to be acquired or land would need to be purchased. Alternatively, these structures can be constructed in existing public lands, such as parks.

Because of the fully developed nature of the City of Buffalo, most of the OLS tanks included in the LTCP, including the Edison Martha OLS, are planned to be located under City parks. Constructing the OLSs under the existing parks lands offers several advantages including time and monetary savings by bypassing the majority of land acquisition phase, and typically, following the construction, the land atop the structures can be returned to parkland, often with improvements from the preconstruction state.

The 9.6-acre Roosevelt Playground and the 2.1-acre Lang Weber Park were originally identified as a possible locations for storage within the SPP340 basin. The Lang Weber Park site was quickly eliminated from further consideration when it was determined that "No meaningful amount of storage" could be placed at the site, and all proposed storage for the SPP340 basin moved to the much larger Roosevelt playground site.

3.1.2.2 Rock Excavation

Bedrock is a significant constraint when configuring any underground structures. Most of the City was constructed on Onondaga Limestone, which separates shale formations that formed north and south of the City. It is a hard bedrock that forms outcrops along Lake Erie and in Ontario and is shallow throughout most of the city. Record drawings from previous sewer projects show that bedrock was a concern during construction of the interceptors and tunnels. New storage structures will require considerable effort to build within the rock.

Although the soils report for the site has not yet been completed, rock excavation is expected to be needed at the Edison Martha OLS site. When constructing the Edison Avenue Storm Relief Sewer, rock was encountered in the area between six to twelve feet below grade. Planning for the work will need to consider rock removal methods and their relation to construction costs, construction timelines, and residents' quality of life. Results of the soils report may also affect the location of the tank on the site as well as the footprint and depth of the tank if the results of the soils exploration indicates that adjusting the location and/or depth of the tank would result in cost and/or time savings by avoiding unnecessary rock excavation.

3.1.2.3 Operations Costs

Another constraint that needs to be considered is operations costs. Off-line storage tanks have traditionally been installed so that the hydraulic grade line (HGL) in the tank is lower than the target overflow HGL and pumped back to the system or pumped to an elevated tank for release by gravity at a later time. Both configurations require a significant amount of energy and manpower to operate and maintain the equipment installed in these structures. Selected storage configurations should attempt to minimize operation and maintenance costs by minimizing the use of mechanical equipment. Selected off-line storage sites should utilize existing grade changes within the system to fill and/or drain by gravity to the maximum extent possible. Structure hydraulics should also be optimized for self-cleaning.

The Edison Martha OLS site was selected with this in mind. The diversion structure is planned to be constructed on the Edison Avenue Storm Relief Sewer approximately 420 linear feet upstream of the manhole that joins that sewer to the Kensington Expressway Sewer at Edison Avenue. At the manhole,

there is a drop of approximately 17 and a half feet between the two sewers giving the ability to flow by gravity out of the Edison Avenue Storm Relief Sewer to and through the basin and back to the Kensington Expressway Sewer at Edison Avenue at the drop manhole.

3.1.2.4 Non-Monetary Factors

Land acquisition for structures also requires the Authority to be cognizant of environmental justice within the City. Much of the City of Buffalo, particularly the East Buffalo and the West Side neighborhoods, have been historically underserved and have large minority populations. Past public projects, like construction of the Kensington Expressway, divided neighborhoods and displaced families. Implementation of CSO control projects must be aware of these past injustices and find a way to meet the goals of the LTCP while improving the lives of residents.

3.2 Hydraulics Basis-of-Design

3.2.1.1 Hydraulic Model

The updated CSS model created for the LTCP and revised for the 2023 LTCP Optimization was used to determine the key hydraulic elements for this project including the overflow weir elevation and length, the peak flow over the weir and to the basin as well as the elevation that the storage basin would be considered "full". For specific details regarding the development and update of the hydraulic model see the 2014 LTCP and the 2023 LTCP Optimization documents previously submitted to NYSDEC.

3.2.1.2 Hydraulic Profile

The preliminary schematic diagram developed for this project is shown in Figure 3-2, below. The elevations noted are based upon the NAVD88 datum. To convert the NAVD88 datum to City Datum, subtract 574.9 feet. To convert the NAVD88 datum to CSS model datum, add 0.55 feet.

The tank "full" elevation has been set to the top of overflow weir elevation at the diversion structure on the Edison Avenue Storm Relief Sewer, and bottom of the basin elevations calculated to give the required storage volume, 2.61 million gallons, using the original 130 ft by 336 ft footprint given in the revised LTCP and the floor slopes necessary to facilitate the cleaning of the basin by the tipping bucket system. Once soils boring data is received, we will determine if it would be cost effective to modify the depth of the proposed basin and therefore the footprint, or shift the location of the proposed basin on the site to mitigate the need for rock excavation.

The peak dry weather flow in the Edison Avenue Storm Relief Sewer from the CSS model is expected to be 0.4 mgd. This would generally result in a flow depth of less than 2.5 inches in the 72-inch diameter sewer if it were clean, but sewers are rarely clean and downstream debris can cause upstream backups. To ensure that dry weather flow remains in the relief sewer and is not directed to the storage basin, the proposed elevation of the overflow weir has preliminarily been set at 657.34, five inches above the invert of the pipe at the overflow structure. The "full" level in the tank has also been set at the top of weir elevation of 657.34 to maximize the storage volume of the tank even during small wet weather events.

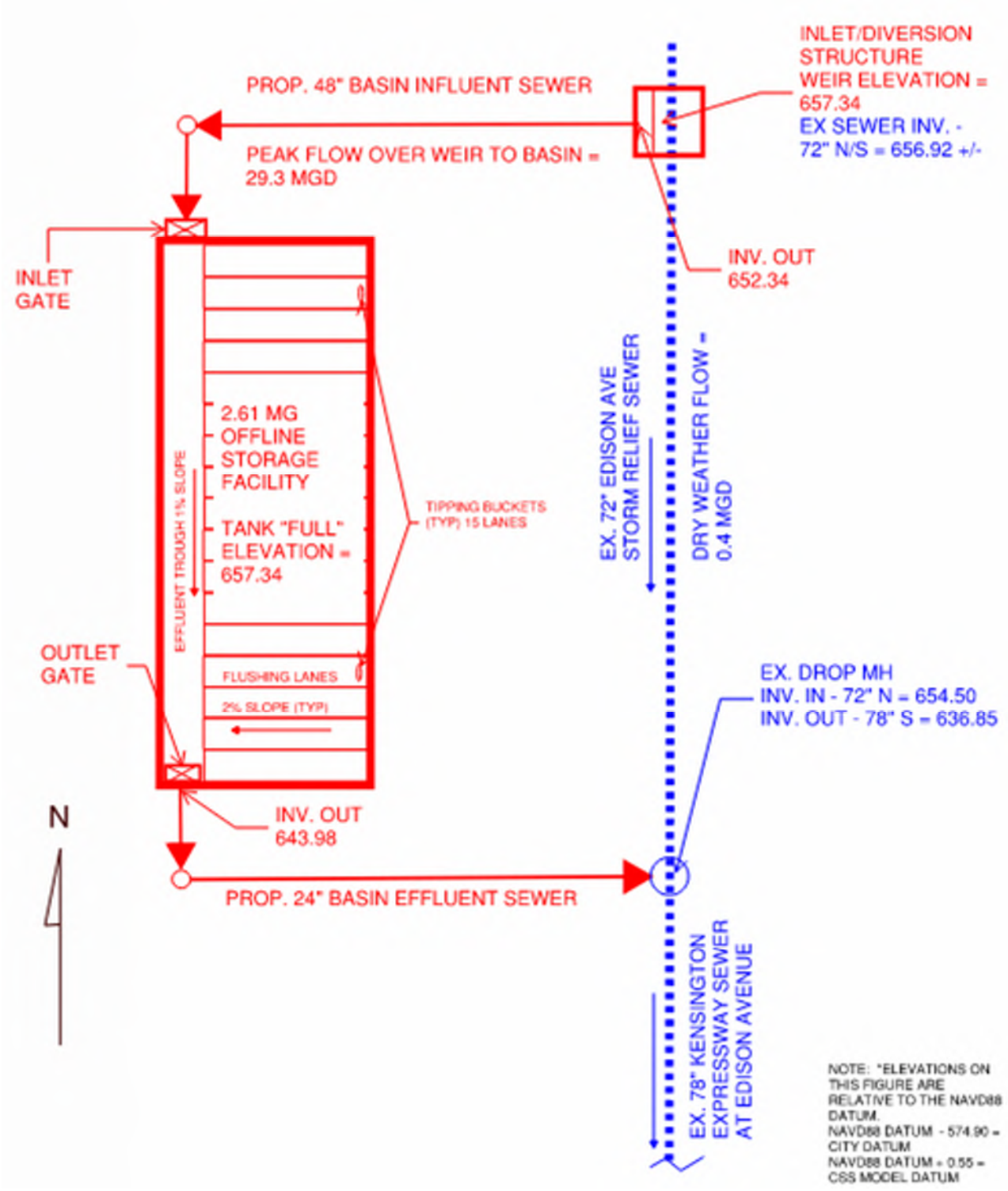


Figure 3-2: Edison Martha OLS Schematic Diagram

3.3 Process/ Mechanical Basis of Design

3.3.1 Governing Codes and Standards

The following codes and standards are applicable to the process mechanical work of the project.

- Guides for the Design of Wastewater Treatment Works. New England Interstate Water Pollution Control Commission (NEIWPCC), Lowell, MA, 2016 ("TRA16").
- Recommended Standards for Wastewater Facilities. Great Lakes – Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers, Health Research, Inc., Health Education Services Division, Albany, NY 2014 ("Ten States Standards").

3.3.2 Inlet and Outlet Sewers

A diversion chamber with a 20 ft. long weir will be constructed around the existing 72-inch diameter Edison Avenue Storm Relief Sewer approximately 420 linear feet upstream of the manhole that joins that sewer to the Kensington Expressway Sewer at Edison Avenue. As previously indicated the top of weir elevation for the overflow weir will be set to 5 inches above the invert elevation of the sewer. Based on the existing record drawings of the sewer, this elevation is predicted to be 657.89, but will need to be field verified at the time of construction. The crown of the 48-inch tank influent pipe has been preliminarily set at one ft below the elevation of the top of the overflow weir to allow free discharge over the weir and full flow capacity through the pipe until the elevation in the tank prevents this. In order to convey the peak flow of 29.3 mgd through the 48-inch diameter influent pipe, the pipe must be sloped at a minimum of 0.10%. It is not required that the downstream end of the influent pipe maintain a free discharge while filling the tank, so the invert elevation may be set by the slope needed to convey the peak flow rate. Since hydrogen sulfide and other odor compounds are often released from sewage when it undergoes turbulent flow, such as at abrupt elevation drops in the sewer, the final design should consider placing the invert of the inlet pipe as near the bottom of the tank as possible to minimize odor release at the outlet of the pipe. This potential for odor release will need to be weighed against the cost of additional rock excavation to lower the sewer. The Diversion Structure with the drop over the weir to the inlet pipe is also another location where odors might be released and the final design should consider the need for odor mitigation measures at that location as well.

The design criteria given for the tank drain pipe was that it should allow the contents of the tank to empty within a 24 hour time period. A 24-inch diameter pipe set at a slope of 0.080%, the minimum allowable slope for a pipe of that size, has a full flow capacity of over 4.1 mgd and should therefore have adequate capacity to dewater the 2.61 million gallons in the tank within the desired time. Keeping the discharge pipe at the minimum slope will help minimize any rock excavation that may be necessary.

3.3.3 Storage Tank

The storage tank will have electrically motorized slide gates at the inlet and outlet sewers. Both gates will typically be open to allow any flow that should overtop the weir during a dry weather period due to upstream debris causing flow backups in the sewer to pass through the tank and be returned to the sewer downstream.

The outlet gate should be located such that it is in a seating position when the tank is full, and will have a modulating actuator that is controlled through a real-time-control (RTC) signal received from the Hazelwood ILS Structure based upon the water surface level in that structure. When the level sensor at Hazelwood ILS indicates the water surface level has reached a quarter of a foot at that structure, the outlet gate at Edison OLS will begin to close and continue to close in an incremental fashion in relation to the water surface level recorded at Hazelwood ILS. The outlet gate at Edison Martha OLS will be completely closed when the water surface level at Hazelwood ILS reaches five feet. As the water surface level recedes

below the five foot level in the Hazelwood ILS structure, the process will reverse and the Edison Martha OL S outlet gate will begin to incrementally open, releasing the stored sewage to the downstream sewer.

The inlet gate which will be located such that it will be in a seating position when the level in the upstream sewer exceeds the level in the tank, to prevent the tank from over filling should the upstream sewer surcharge. The inlet gate will also have a modulating actuator that will be activated through a real-time-control (RTC) signal received when the water level in the tank reaches a predetermined level and will continue to close proportionally in relation to the level until reaching full closure when the level reaches the desired max water surface in the tank, which will match the top of weir elevation in the Diversion Structure. This elevation has tentatively been set at 657.34 ft. based on the top of weir elevation being 5 inches above the invert of the sewer at the connection point and the invert determined from the sewer record drawings. The existing sewer invert elevation will need to be confirmed at the time of construction.

The storage tank will be constructed with a minimum 2 feet freeboard above this max water surface, and any additional height required for operation of the tipping bucket cleaning system to function properly.

The storage tank will be configured with a series of tipping buckets along the east side for flushing any debris remaining in the bottom of the tank once it has been dewatered. Tipping buckets are a low energy input system consisting of containers referred to as "buckets" that are located near or above the max water surface and are suspended from pivot points on each side and water lines for filling the containers. When empty, the weight of the "buckets" keeps them upright so that they can be filled from the top. As the buckets are filled, the center of gravity is altered, causing the buckets to tip and spill their contents creating a wall of water that then travels down the wall of the tank and across the floor carrying any debris in its path with it. Typically, the only power inputs to this type of system are for solenoid valves that control the water flow to each bucket and the power to the level sensors in the tank that provide the "ready to flush" signal when the basin has been dewatered after an event and the limit switches that provide indication for when the "buckets" have tipped, releasing their contents and flushing the area below. For this system to function as intended, the tank will need to be constructed with a sloped bottom and short "training walls" to contain the water from each bucket within the "lane" it is intended to clean. This water will travel down individual flushing lanes for each bucket, from east to west where a recessed trough will direct the flushing water and debris to the outlet pipe. The bottom slab of the tank will be sloped at 2% from east to west for the flushing lanes. The collection trough along the western side of the tank will be recessed 0.5 ft. at the north end to prevent splash back into the flushing lane and be sloped at 1% from north to south so that debris does not collect in the trough. The reason the tank has been configured to flush to the west instead of the east, which would appear to be illogical as it is the opposite orientation would allow shortening the inlet and outlet sewers, is because each of the tipping buckets will require an access point in the top of the tank above it which conflicts with the park use plan of having an open grassy playing field area in the area where the tipping buckets would be located otherwise.

3.3.4 Utility Building

Since the water lines to fill the tipping buckets will be connected to a sewage storage tank, the potable water source will need to be provided with backflow protection. Backflow protection devices typically cannot be installed below grade, so a small above grade utility building will be needed to house the backflow preventer. This Utility Building should also be sized to house the water meter, flushing system solenoid valve manifold for the tipping bucket system along with the other power and control equipment for the tipping buckets, gates and level sensors.

3.3.5 Site Waterline

A 6-inch diameter site waterline is proposed from the 8-inch diameter watermain along Edison Avenue to the Utility Building which is tentatively planned to be located in the southeast corner of the park site. This waterline will share the permanent easement with the 24-inch diameter outlet sewer. The 6-inch diameter water line should be able to provide a minimum of 400 gpm of potable water to fill the tipping buckets while the pressure at the connection to the 8-inch diameter main remains above 40 psi. This 6 inch waterline will supply water to a flushing water manifold consisting of a 2-inch diameter pipe with a solenoid valve for each tipping bucket. The solenoid valves would be activated to fill the tipping buckets to release in sequential order from the north to the south of the basin. It is expected that a minimum of two of these buckets could be filling at any one point in time and that the fill time for each bucket would be less than 15 minutes in duration, resulting in a flushing duration of under 2 hours complete.

3.4 Cost Estimate

The opinion of probable total project costs for the recommended alternative are summarized in the Table 3-3 below and are presented in 3rd Quarter 2030 Dollars. Current (3rd Quarter 2024) construction costs were escalated to the presented dollars to represent the costs at the midpoint of construction timeframe. Note also that all Engineering Costs have been escalated to a timeframe for when they will be incurred. Detailed Cost Estimates are included in Appendix G.

The opinion of probable costs developed as part of this report are based on equipment manufacturer quotations, budgetary estimates for other, similar construction projects, and Arcadis experience. The costs include line items for construction work (labor, materials, and equipment), Contractor's overhead and profit, costs associated with the General Conditions (i.e. bonds, insurance, and mobilization), engineering design and construction services, and a 35 percent contingency for changes or refinement to the Project scope during the design phase. A dedicated line item for a contingency allowance is not included at this time but is anticipated to be included as the project progresses toward construction.

The information compiled in the probable costs is consistent with an AACE International Class 4 estimate where the Project definition and engineering is up to 30 percent complete. The typical purpose of this level of estimate is for concept screening. AACE guidelines indicate that that Class 4 estimates have typical accuracy ranges on the low side of -10 to -20 percent and on the high side between +20 to +30 percent. This range is based on the technical and construction staging complexity of the project, availability of accurate reference information, and inclusion of appropriate contingency factors to represent Work not yet defined.

Table 3-3: Opinion of Probable Total Project Cost

Project	Opinion of Total Project Cost
CSO053_5.2 Edison Martha Offline Storage (OLS) Tank	$84,500,000

3.5 Project Schedule

The Authority desires to begin construction of the Edison Martha OLS facility in June of 2027 and complete startup and commissioning for operation by May of 2033. To accomplish these milestone objectives, a scope of work has been developed by the Authority's Program Management team to produce preliminary design documents and begin the process of securing funding to build the Edison Martha OLS. The preliminary design document will establish the basis of design for the OLS and will be used to procure an engineering consultant to take the 30% design to the completion of bidding documents. The Program Management team will support the Authority in overseeing the retained consultant and the ensuing construction and startup and commissioning processes.

Table 3-4 Anticipated Project Schedule

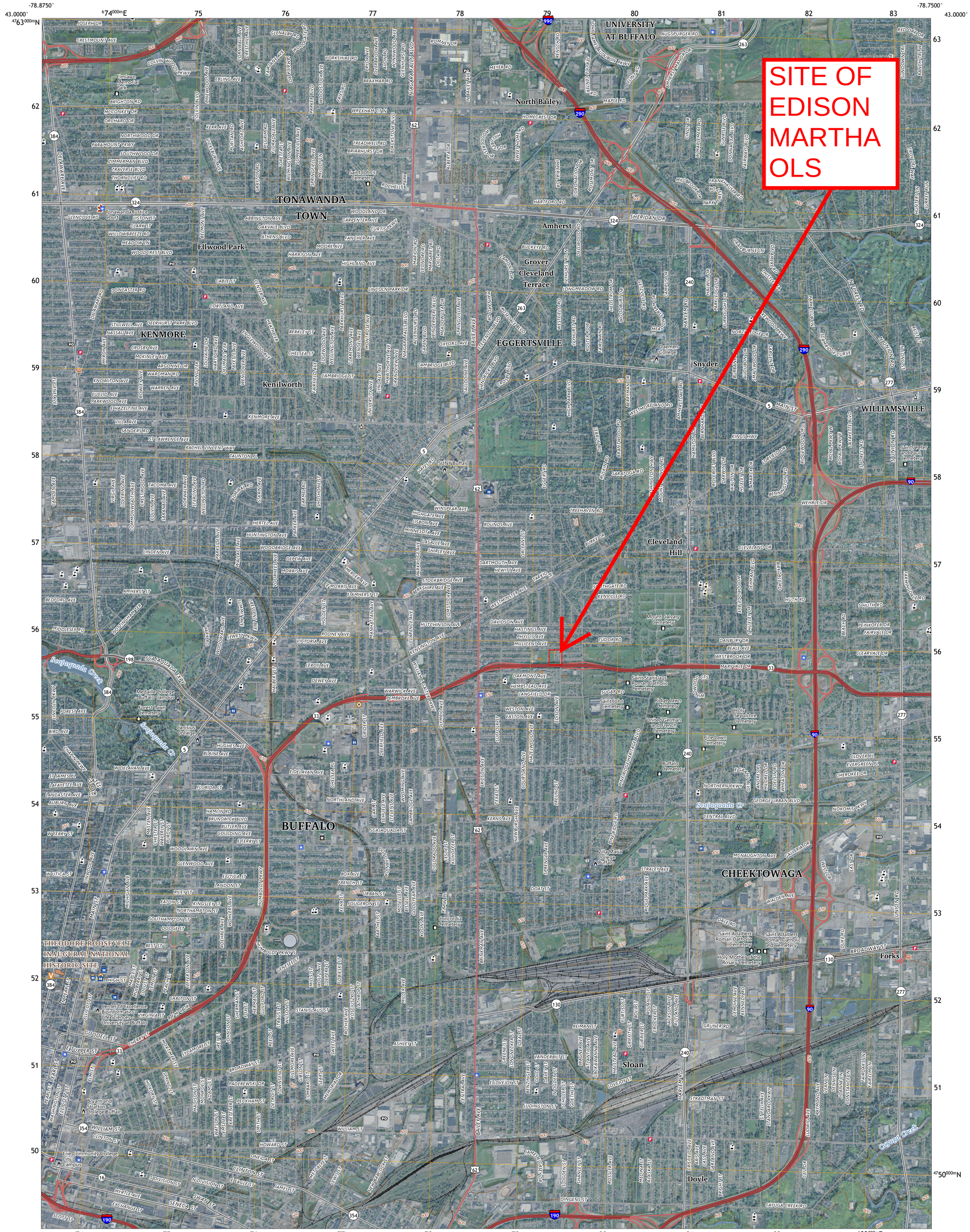
Description	Anticipated Completion Date
Design Completion	Winter 2026
Regulatory Review	Spring 2027
Bidding	Spring 2027
Construction Start Date	Summer 2027
Construction End Date	Spring 2033

APPENDIX A: USGS Buffalo NE Quadrangle Map, New York-Erie County, 7.5 Minute Topo

U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

The National Map
OnDemand Topo

BUFFALO NE QUADRANGLE
NEW YORK - ERIE COUNTY
7.5-MINUTE TOPO

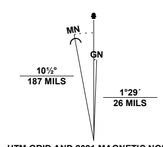


Produced by the United States Geological Survey
North American Datum of 1983 (NAD83)
World Geodetic System of 1984 (WGS84). Projection and
1 000-meter grid:Universal Transverse Mercator, Zone 17T

Data is provided by The National Map (TNM), is the best available at the time of map generation, and includes data content from supporting themes of Elevation, Hydrography, Geographic Names, Boundaries, Transportation, Structures, Land Cover, and Orthoimagery. Refer to associated Federal Geographic Data Committee (FGDC) Metadata for additional source data information.

This map is not a legal document. Boundaries may be generalized for this map scale. Private lands within government reservations may not be shown. Obtain permission before entering private lands. Temporal changes may have occurred since these data were collected and some data may no longer represent actual surface conditions.

Learn About The National Map: https://nationalmap.gov



UTM GRID AND 2021 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

U.S. National Grid
100,000 - m Square ID
PH
Grid Zone Designation
17T

SCALE 1:24 000

1 0.5 0 KILOMETERS 1 2
1000 500 0 METERS 1000 2000
1 0.5 0 1
MILES
1000 0 1000 2000 3000 4000 5000 6000 7000 8000 9000 10000
FEET

CONTOUR INTERVAL 10 FEET
NORTH AMERICAN VERTICAL DATUM OF 1988
CONTOUR SMOOTHNESS = High

QUADRANGLE LOCATION

Tonawanda West	Tonawanda East	Clarence Center
Buffalo NW	Buffalo NE	Lancaster
Buffalo SE OE W	Buffalo SE	Orchard Park

ADJOINING QUADRANGLES

ROAD CLASSIFICATION

Expressway
Secondary Hwy
Ramp
Local Connector
Local Road
4WD
Interstate Route
US Route
State Route

BUFFALO NE, NY
2024

APPENDIX B: USDA Soil Report for Proposed Project Site

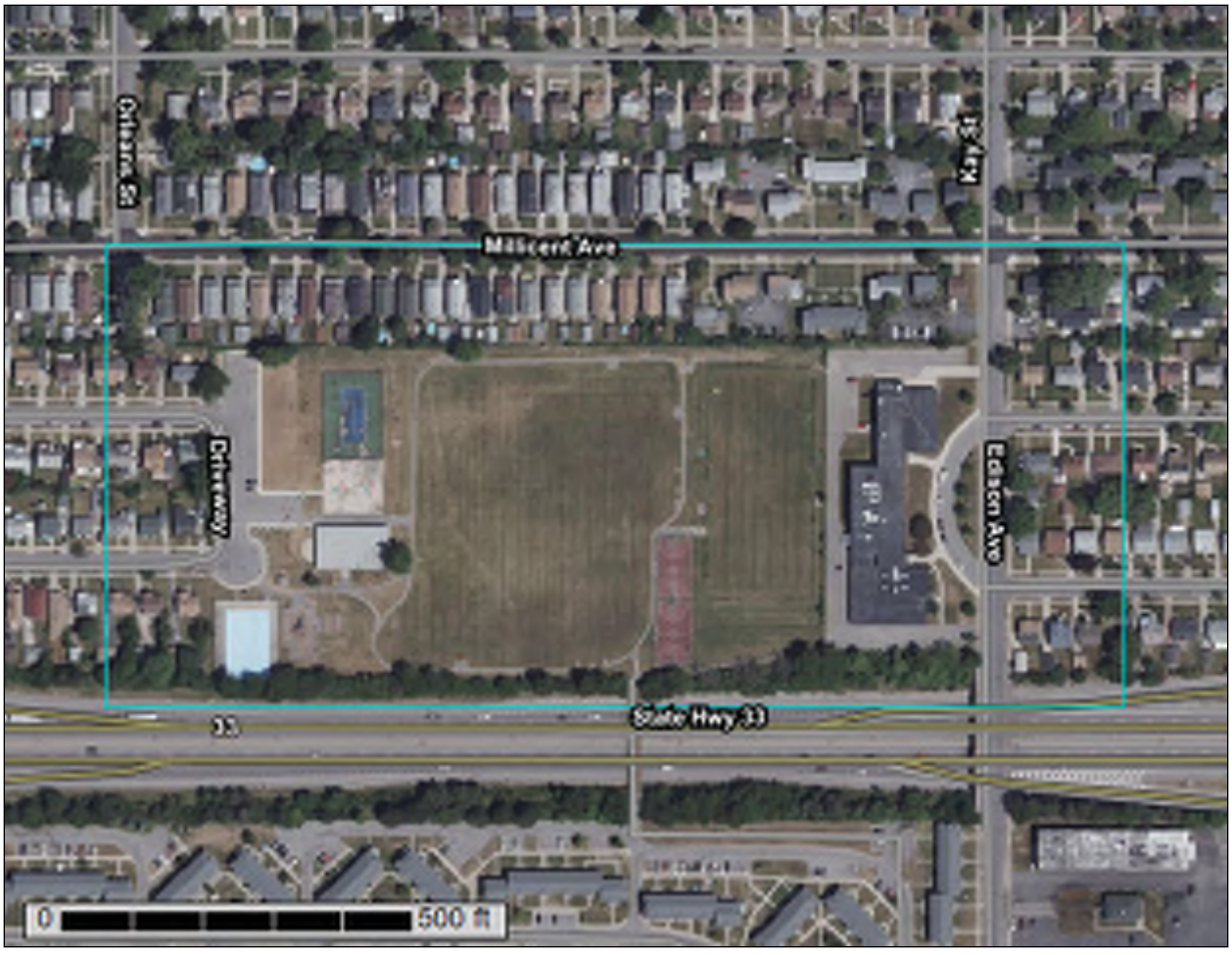
United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Erie County, New York



May 8, 2024

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map (Edison Marth OLS Proposed Site)

Map Scale: 1:2,420 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 35 70 140 210

Feet: 0 100 200 400 600

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 17N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Erie County, New York
Survey Area Data: Version 23, Sep 5, 2023

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 4, 2020—Aug 15, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend (Edison Marth OLS Proposed Site)

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Ug	Urban land-Cayuga complex	6.2	28.5%
Uh	Urban land-Churchville complex	0.0	0.0%
UrA	Urban land-Lima complex, 1 to 6 percent slopes	15.6	71.5%
Us	Urban land-Niagara complex	0.0	0.1%
Totals for Area of Interest		**21.8**	**100.0%**

Map Unit Descriptions (Edison Marth OLS Proposed Site)

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Erie County, New York

Ug—Urban land-Cayuga complex

Map Unit Setting

National map unit symbol: 9rq7
Elevation: 570 to 710 feet
Mean annual precipitation: 36 to 48 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 115 to 195 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 60 percent
Cayuga and similar soils: 30 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydric soil rating: Unranked

Description of Cayuga

Setting

Landform: Till plains, lake plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Crest, tread
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Clayey glaciolacustrine deposits over loamy till derived from limestone, dolomite, sandstone, or shale

Typical profile

H1 - 0 to 10 inches: silt loam
H2 - 10 to 26 inches: silty clay
H3 - 26 to 60 inches: gravelly loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 18 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Available water supply, 0 to 60 inches: Moderate (about 8.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w

Hydrologic Soil Group: D
Ecological site: F101XY009NY - Moist Lake Plain
Hydric soil rating: No

Minor Components

Collamer
Percent of map unit: 4 percent
Hydric soil rating: No

Udorthents
Percent of map unit: 2 percent
Hydric soil rating: No

Canandaigua
Percent of map unit: 2 percent
Landform: Depressions
Hydric soil rating: Yes

Unnamed soils
Percent of map unit: 2 percent
Hydric soil rating: No

Uh—Urban land-Churchville complex

Map Unit Setting
National map unit symbol: 9rq9
Elevation: 570 to 720 feet
Mean annual precipitation: 36 to 48 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 115 to 195 days
Farmland classification: Not prime farmland

Map Unit Composition
Urban land: 65 percent
Churchville and similar soils: 25 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Churchville

Setting
Landform: Till plains, lake plains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope, tread
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Clayey glaciolacustrine deposits over loamy till

Typical profile
H1 - 0 to 11 inches: silt loam

H2 - 11 to 26 inches: silty clay
H3 - 26 to 60 inches: gravelly loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Available water supply, 0 to 60 inches: Moderate (about 8.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: C/D
Ecological site: F101XY009NY - Moist Lake Plain
Hydric soil rating: No

Minor Components

Niagara

Percent of map unit: 3 percent
Hydric soil rating: No

Ovid

Percent of map unit: 3 percent
Hydric soil rating: No

Lakemont

Percent of map unit: 2 percent
Landform: Depressions
Hydric soil rating: Yes

Udorthents

Percent of map unit: 2 percent
Hydric soil rating: No

UrA—Urban land-Lima complex, 1 to 6 percent slopes

Map Unit Setting

National map unit symbol: 2w3k1
Elevation: 590 to 720 feet
Mean annual precipitation: 31 to 57 inches
Mean annual air temperature: 41 to 50 degrees F
Frost-free period: 100 to 190 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban: 60 percent
Lima and similar soils: 30 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydric soil rating: Unranked

Description of Lima

Setting

Landform: Till plains, ridges, drumlins
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Crest
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Calcareous loamy lodgment till derived from limestone, sandstone, and shale

Typical profile

Ap - 0 to 9 inches: loam
Bt/E - 9 to 12 inches: loam
Bt1 - 12 to 16 inches: loam
Bt2 - 16 to 25 inches: gravelly loam
C - 25 to 79 inches: gravelly loam

Properties and qualities

Slope: 1 to 6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 1.42 in/hr)
Depth to water table: About 18 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 40 percent
Available water supply, 0 to 60 inches: Moderate (about 7.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B/D
Ecological site: F101XY013NY - Moist Till
Hydric soil rating: No

Minor Components

Honeoye

Percent of map unit: 6 percent
Landform: Ridges, till plains, drumlins

Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Crest, side slope
Down-slope shape: Linear, convex
Across-slope shape: Convex
Hydric soil rating: No

Appleton

Percent of map unit: 3 percent
Landform: Ridges, drumlins, till plains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Lyons

Percent of map unit: 1 percent
Landform: Drainageways, depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Us—Urban land-Niagara complex

Map Unit Setting

National map unit symbol: 9rqh
Elevation: 560 to 670 feet
Mean annual precipitation: 36 to 48 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 115 to 195 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 60 percent
Niagara and similar soils: 30 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydric soil rating: Unranked

Description of Niagara

Setting

Landform: Lake plains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Silty and clayey glaciolacustrine deposits

Typical profile

H1 - 0 to 11 inches: silt loam
H2 - 11 to 27 inches: silt loam
H3 - 27 to 72 inches: silt loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Available water supply, 0 to 60 inches: High (about 10.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: C/D
Ecological site: F101XY009NY - Moist Lake Plain
Hydric soil rating: No

Minor Components

Udorthents

Percent of map unit: 3 percent
Hydric soil rating: No

Raynham

Percent of map unit: 3 percent
Hydric soil rating: No

Swormville

Percent of map unit: 2 percent
Hydric soil rating: No

Canandaigua

Percent of map unit: 2 percent
Landform: Depressions
Hydric soil rating: Yes

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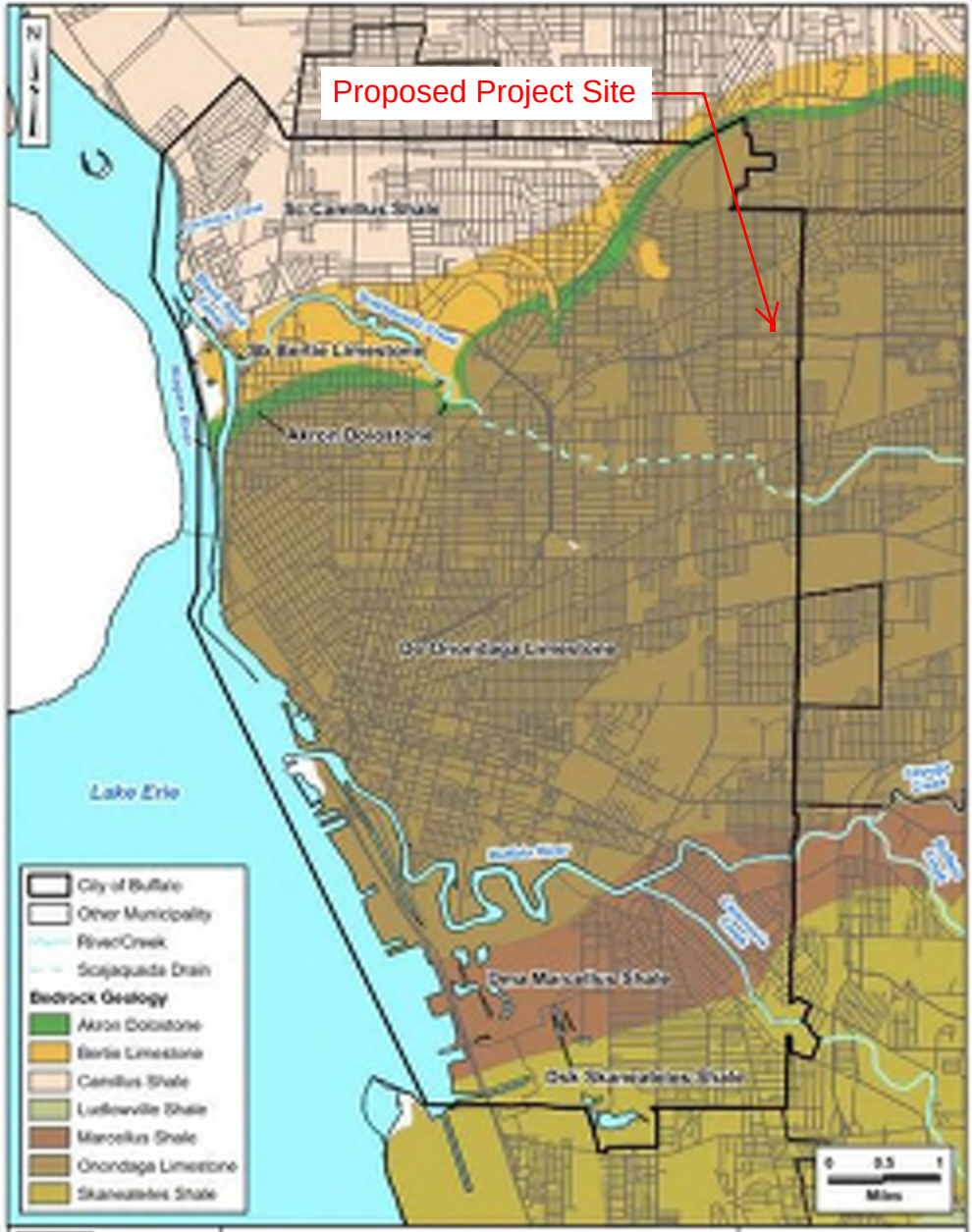
APPENDIX C: Figure 2-2 from 2012 Buffalo Sewer Authority LTCP Update.



BUFFALO SEWER AUTHORITY
Long Term Control Plan Update

FIGURE 2-2
BEDROCK GEOLOGY

APPENDIX D: United States Fish and Wildlife Service's Information for Planning and Conservation (IPaC) Database Results

IPaC **U.S. Fish & Wildlife Service**

IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Location

Erie County, New York

Local office

New York Ecological Services Field Office

(607) 753-9334
(607) 753-9699
fw5es_nyfo@fws.gov

3817 Luker Road
Cortland, NY 13045-9385

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

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1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information. IPaC only shows species that are regulated by USFWS (see FAQ).

2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS
Northern Long-eared Bat Myotis septentrionalis Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/9045	Endangered
Tricolored Bat Perimyotis subflavus Wherever found This species only needs to be considered if the following condition applies: • This species only needs to be considered if the project includes wind turbine operations. No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/10515	Proposed Endangered

Clams

NAME	STATUS
Salamander Mussel Simpsonaias ambigua Wherever found There is **proposed** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/6208	Proposed Endangered

Insects

NAME	STATUS
Monarch Butterfly Danaus plexippus Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/9743	Candidate

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

There are no critical habitats at this location.

You are still required to determine if your project(s) may have effects on all above listed species.

Bald & Golden Eagles

Bald and golden eagles are protected under the Bald and Golden Eagle Protection Act[1] and the Migratory Bird Treaty Act[2].

Any person or organization who plans or conducts activities that may result in impacts to bald or golden eagles, or their habitats[3], should follow appropriate regulations and consider implementing appropriate conservation measures, as described in the links below. Specifically, please review the "Supplemental Information on Migratory Birds and Eagles".

Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

There are likely bald eagles present in your project area. For additional information on bald eagles, refer to Bald Eagle Nesting and Sensitivity to Human Activity

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, see the PROBABILITY OF PRESENCE SUMMARY below to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle Haliaeetus leucocephalus This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Dec 1 to Aug 31
Golden Eagle Aquila chrysaetos This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1680	Breeds Jan 1 to Aug 31

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read "Supplemental Information on Migratory Birds and Eagles", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week

12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.

3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

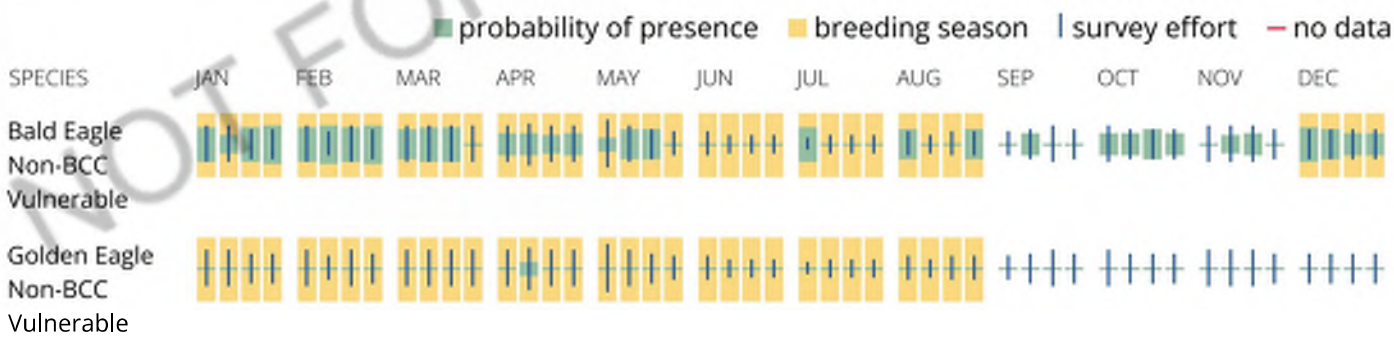
Breeding Season (▪)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



What does IPaC use to generate the potential presence of bald and golden eagles in my specified location?

The potential for eagle presence is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply). To see a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

What does IPaC use to generate the probability of presence graphs of bald and golden eagles in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur. Please contact your local Fish and Wildlife Service Field Office if you have questions.

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats[3] should follow appropriate regulations and consider implementing appropriate conservation measures, as described in the links below. Specifically, please review the "Supplemental Information on Migratory Birds and Eagles".

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-

golden-eagles-may-occur-project-action

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, see the PROBABILITY OF PRESENCE SUMMARY below to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Dec 1 to Aug 31
Belted Kingfisher *Megaceryle alcyon* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds Mar 15 to Jul 25
Black-billed Cuckoo *Coccyzus erythropthalmus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9399	Breeds May 15 to Oct 10
Blue-winged Warbler *Vermivora cyanoptera* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds May 1 to Jun 30
Bobolink *Dolichonyx oryzivorus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 20 to Jul 31

Canada Warbler Cardellina canadensis — Breeds May 20 to Aug 10
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Cerulean Warbler Setophaga cerulea — Breeds Apr 20 to Jul 20
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/2974

Chimney Swift Chaetura pelagica — Breeds Mar 15 to Aug 25
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Eastern Meadowlark Sturnella magna — Breeds Apr 25 to Aug 31
This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA

Eastern Whip-poor-will Antrostomus vociferus — Breeds May 1 to Aug 20
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Evening Grosbeak Coccothraustes vespertinus — Breeds May 15 to Aug 10
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Golden Eagle Aquila chrysaetos — Breeds Jan 1 to Aug 31
This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.
https://ecos.fws.gov/ecp/species/1680

Golden-winged Warbler Vermivora chrysoptera — Breeds May 1 to Jul 20
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/8745

Lesser Yellowlegs Tringa flavipes — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9679

Pectoral Sandpiper Calidris melanotos This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds elsewhere
Prairie Warbler Setophaga discolor This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 1 to Jul 31
Red-headed Woodpecker Melanerpes erythrocephalus This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 10 to Sep 10
Rose-breasted Grosbeak Pheucticus ludovicianus This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds May 15 to Jul 31
Ruddy Turnstone Arenaria interpres morinella This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds elsewhere
Semipalmated Sandpiper Calidris pusilla This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds elsewhere
Short-billed Dowitcher Limnodromus griseus This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9480	Breeds elsewhere
Upland Sandpiper Bartramia longicauda This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9294	Breeds May 1 to Aug 31
Wood Thrush Hylocichla mustelina This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 10 to Aug 31

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read

"Supplemental Information on Migratory Birds and Eagles", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

Breeding Season (■)

Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)

Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

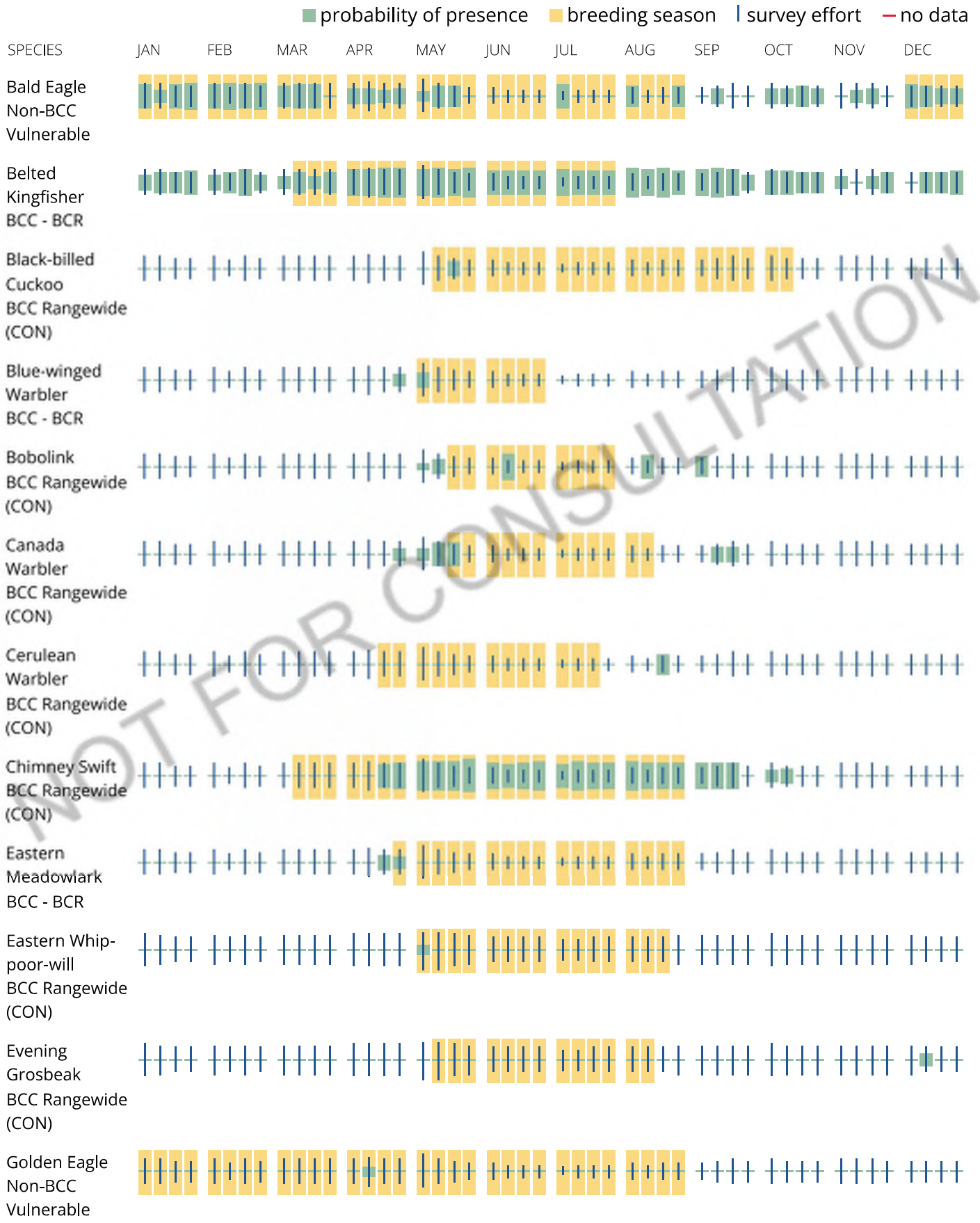
To see a bar's survey effort range, simply hover your mouse cursor over the bar.

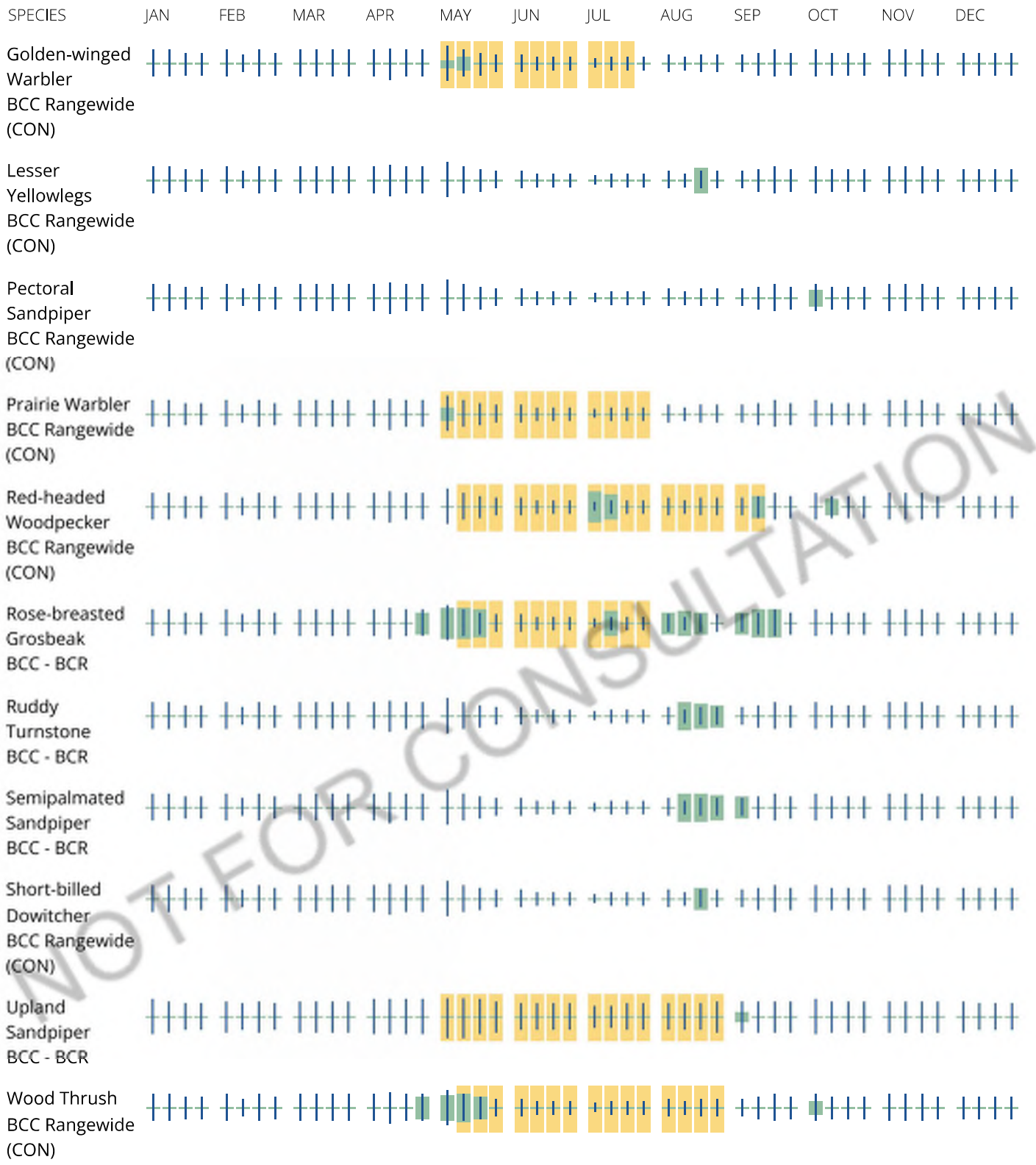
No Data (–)

A week is marked as having no data if there were no survey events for that week.

Survey Timeframe

Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.





Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure.

To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the list of migratory birds that potentially occur in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets.

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering or migrating in my area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may query your location using the RAIL Tool and look at the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in

offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

There are no refuge lands at this location.

Fish hatcheries

There are no fish hatcheries at this location.

Wetlands in the National Wetlands Inventory (NWI)

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

This location did not intersect any wetlands mapped by NWI.

NOTE: This initial screening does **not** replace an on-site delineation to determine whether wetlands occur. Additional information on the NWI data is provided below.

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate Federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

APPENDIX E: FEMA National Flood Hazard Layer FIRMette for Proposed Project Site

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APPENDIX F: NYSDEC Administrative Order CWA-02-2014-3033 and SPDES Permit

UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY
REGION 2

IN THE MATTER OF:

Buffalo Sewer Authority
1038 City Hall
Buffalo, New York 14202-3310

SPDES Permit No. NY0028410

Respondent

Amended Administrative Order for Compliance pursuant to Sections 308(a) and 309(a) of the Clean Water Act, 33 U.S.C. §§ 1318(a) and 1319(a).

AMENDED

ADMINISTRATIVE ORDER

CWA-02-2014-3033

(Amends CWA-02-2012-3024)

This Amended Administrative Order CWA-02-2014-3033 amends Administrative Order CWA-02-2012-3024 to include: developments in the enforcement action since the March 9, 2012 effective date of Administrative Order CWA-02-2012-3024; updated General Provisions to reflect current practice; and to correct a date in the Findings of Fact and Findings of Violation. The Amendments to Administrative Order CWA-02-2012-3024 reflect the developments leading up to and including the approval of Buffalo Sewer Authority's Combined Sewer Overflow Long Term Control Plan and associated implementation schedule by the United States Environmental Protection Agency and the New York State Department of Environmental Conservation. Amended provisions can be found in Paragraphs 4, 11 and 13-20 of the Findings of Fact and Findings of Violation, Paragraphs 2.a., 2.f., 3, 3.a., 3.d.ii of the Ordered Provisions and Paragraphs 1-8 of the General Provisions.

STATUTORY AUTHORITY

The following Findings of Violation and Order for Compliance ("Order") are made and issued pursuant to Sections 308(a) and 309(a) of the Clean Water Act ("CWA"), 33 U.S.C. §§ 1318(a) and 1319(a). This Authority has been delegated by the Administrator of the United States Environmental Protection Agency ("EPA") to the Regional Administrator, EPA Region 2 and further delegated to the Director of the Division of Enforcement and Compliance Assistance, Region 2, EPA.

1. Section 301(a) of the CWA, 33 U.S.C. § 1311 (a), makes it unlawful for any person to discharge any pollutant from a point source to waters of the United States, except, inter alia, with the authorization of, and in compliance with, a National Pollutant Discharge Elimination System ("NPDES") permit issued pursuant to Section 402 of the CWA, 33 U.S.C. § 1342.

2. Section 402 of the CWA, 33 U.S.C. § 1342, authorizes the Administrator of EPA to issue a NPDES permit for the discharge of any pollutant, or combination of pollutants subject to certain requirements of the CWA and conditions which the Administrator determines are necessary. The New York State Department of Environmental Conservation ("NYSDEC") is the agency with the authority to administer the federal NPDES program in New York pursuant to Section 402 of the CWA, 33 U.S.C. § 1342. EPA maintains concurrent enforcement

authority with authorized states for violations of the CWA. Additionally, under the authority granted to the NYSDEC by the EPA under Section 402(b) of the CWA, 33 U.S.C. § 1342(b), a State Pollutant Discharge Elimination System ("SPDES") permit is required to be issued to facilities by the NYSDEC for the discharge of pollutants from said facilities from a point source to a navigable water of the United States.

3. Section 308 of the Act, 33 U.S.C. § 1318, provides, in relevant part, that the Administrator of EPA may require the owner or operator of any point source to, among other things: establish and maintain such records; make such reports; install, use and monitor such equipment; sample such effluents; and provide such other information as may reasonably be required in order to carry out Section 402 of the Act, 33 U.S.C. § 1342.

4. "Person" is defined by Section 502(5) of the CWA, 33 U.S.C. § 1362(5), to include an individual, corporation, partnership, association or municipality.

5. "Municipality" is defined by Section 502(4) of the CWA, 33 U.S.C. § 1362(4), to include among other things, a city, town, borough, county, parish, district, associations, or other public body created by or pursuant to State law and having jurisdiction over disposal of sewage, industrial wastes, or other wastes.

6. "Pollutant" is defined by Section 502(6) of the CWA, 33 U.S.C. § 1362(6), to include among other things, solid waste, dredged spoil, rock, sand, cellar dirt, sewage, sewage sludge and industrial, municipal and agricultural waste discharged into water.

7. "Point source" is defined by Section 502(14) of the CWA, 33 U.S.C. § 1362(14), to include any discernible, confined and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, or vessel or other floating craft, from which pollutants are or may be discharged.

8. "Navigable waters" is defined by Section 502(7) of the CWA, 33 U.S.C. § 1362(7), to include the waters of the United States.

9. "Discharge of a pollutant" is defined by Section 502(12) of the CWA, 33 U.S.C. § 1362(12), to include any addition of any pollutant to navigable waters from any point source.

10. Section 402(q) of the CWA, 33 U.S.C. § 1342(q), provides that each permit, order, or decree issued pursuant to the chapter after December 21, 2000, for a discharge from a municipal combined storm and sanitary sewer shall conform to the Combined Sewer Overflow Policy ("CSO Policy") signed by the Administrator on April 11, 1994.

11. The CSO Policy states that "permittees with CSOs are responsible for developing and implementing long-term CSO control plans that will ultimately result in compliance with the requirements of the CWA."

12. Section 309(a) of the CWA, 33 U.S.C. § 1319(a), authorizes the Administrator to issue an order requiring compliance or commence a civil action when any person is found to be in violation of Section 301 of the CWA, 33 U.S.C. § 1311, or in violation of any permit condition or limitation in a permit issued under Section 402 of the CWA, 33 U.S.C. § 1342.

FINDINGS OF FACT AND FINDINGS OF VIOLATION

1. The Buffalo Sewer Authority ("BSA" or "Respondent"), is a public benefit municipal corporation, organized and existing under the laws of the State of New York, and located in Buffalo, New York. BSA has authority, control over and operates the sewer system within its boundaries, including, but not limited to the combined sewer system, the sanitary sewer system, and the related wastewater treatment plant.

2. BSA is a "person" and "municipality" within the meaning of Sections 502(5) and 502(4) of the CWA, 33 U.S.C. §§ 1362(5) and 1362(4).

3. BSA has discharged and continues to discharge "pollutants" within the meaning of Sections 502(6) and 502(12) of the CWA, 33 U.S.C. §§ 1362(6) and 1362(12), from the Buffalo wastewater treatment plant and sewer system through "point sources" within the meaning of Section 502(14) of the CWA, 33 U.S.C. § 1362(14) into the Niagara River, Black Rock Canal, Erie Basin, Buffalo River, Scajaquada Creek, Cazenovia Creek, and Cornelius Creek, each of which is a "navigable water" within the meaning of Section 502(7) of the CWA, 33 U.S.C. § 1362(7).

4. The NYSDEC, under the authority of Section 402(b) of the CWA, 33 U.S.C. § 1342(b), issued SPDES Permit No. NY0028410 (the "SPDES Permit") to BSA, with an effective date of July 1, 1999. The NYSDEC renewed the SPDES permit on February 3, 2004, on June 25, 2009, and again on December 31, 2013. It is scheduled to expire on June 30, 2019. The SPDES Permit authorizes BSA to discharge pollutants from a single wastewater treatment plant outfall and fifty-eight (58) combined sewer overflow structures ("CSO structures") at locations specified in the SPDES Permit, subject to certain limitations and conditions.

5. The Schedule of Compliance in the July 1, 1999 SPDES Permit provided in pertinent part as follows:

   "Development of Abatement Plan for Combined Sewer Overflow

   The permittee shall develop a combined sewer overflow abatement facility plan in accordance with the Phase I Long Term CSO Control Plan requirements specified in the USEPA Combined Sewer Overflow Policy (Federal Register Vo. 59, No. 75 4/19/94).

   This Abatement Plan shall contain all of the Long Term Plan elements specified in Section II C of the National CSO Policy, and further delineated in the USEPA document, "Combined Sewer Overflows, Guidance for Long-Term Control Plan" dated September, 1995. The permittee may choose either the "Presumption" or the "Demonstration" approach for the evaluation of alternatives.

   The Abatement Plan should integrate the pollutant reduction achievable by the implementation of the CSO Best Management Practices (BMPs) as required on pages 19-21 of this permit into the long term control plan. The Department will consider work or studies already completed or currently in progress for integration into the long term control plan.

   The permittee shall submit a completed CSO Abatement Facility Plan including a schedule of implementation to the Department.

The permittee shall report to the NYSDEC progress/status of plan development in intervals not to exceed 90 days.

Upon approval of the CSO Abatement Facility Plan, the NYSDEC will propose a SPDES permit modification, pursuant to Uniform Procedures – 6 NYCRR – Part 621, to include the schedule of implementation."

6. The SPDES Permit was modified October 2, 2001 to, among other changes, modify the deadline for submittal of a CSO Abatement Plan (hereinafter either "Abatement Plan," "combined sewer overflow abatement facility plan," "Long-Term Control Plan," "LTCP" or "updated LTCP") from July 1, 2001 to July 1, 2002. On August 29, 2002, the CSO Abatement Plan deadline was amended, by permit modification, again to July 1, 2003. On January 12, 2004, the CSO Abatement Plan deadline was again amended, by permit modification, to February 1, 2004.

7. BSA failed to submit the required Abatement Plan by February 1, 2004. BSA did not submit an Abatement plan until July 14, 2004, 164 days late.

8. BSA's failure to timely submit the required Abatement Plan is a violation of the SPDES Permit and is, therefore, a violation of Section 301 of the CWA, 33 U.S.C. § 1311.

9. Under a cover letter dated April 20, 2006, the NYSDEC notified the BSA that the Abatement Plan submitted by BSA on July 14, 2004 was not acceptable in that it would not meet the water quality objectives of the CSO Control Policy and had therefore failed to satisfy the SPDES Permit requirements of a combined sewer overflow abatement facility plan, as described in paragraph 5 above. This NYSDEC cover letter required that BSA revise its LTCP accordingly and submit it to the NYSDEC by July 31, 2006. BSA failed to submit such a revised LTCP to the NYSDEC by July 31, 2006.

10. Accordingly, EPA, NYSDEC, the U. S. Department of Justice ("USDOJ"), and the New York State Office of Attorney General commenced discussions with BSA to settle the violation. The settlement was to be embodied in a Consent Decree, under the auspices of federal court, for the development and implementation of a LTCP.

11. Since those discussions were on-going, the SPDES Permit was modified, effective January 1, 2010, to include Section VIII entitled "CSO LONG-TERM CONTROL PLAN," which states the following:

"BSA submitted a CSO Long-Term Control Plan (LTCP) in July 2004 in accordance with the requirements of their SPDES permit. Currently, the USEPA, USDOJ, NYSDEC and the permittee are engaged in negotiations concerning the LTCP, and anticipate that these negotiations will result in the entry of a Consent Decree. The Consent Decree will govern the permittee's obligations in ensuring that the WWTF and the combined sewer overflow discharges comply with the requirements of the Clean Water Act and the 1994 CSO Control Policy. This permit may be modified upon the ratification of the Consent Decree in accordance with 6 NYCRR Part 621."

12. To date, however, the parties have not reached a settlement nor entered into a Consent Decree.

13. On March 9, 2012, EPA, Region 2 issued an Administrative Order, Docket No. CWA-02-2012-3024 ("2012 Order"), to BSA, to address violations of the CWA (33 U.S.C. § 1251 et seq) and NYSDEC SPDES Permit number NY0028410. The 2012 Order requires that BSA update its CSO LTCP and that the Updated CSO LTCP include a schedule for the design, construction, and implementation of all control/treatment measures selected by BSA, to be completed as expeditiously as practicable, following any applicable environmental impact assessment review, pursuant to the New York State Environmental Quality Review Act, but in any event by no later than December 31, 2027.

14. In accordance with the 2012 Order, BSA submitted an Updated CSO LTCP, dated April 30, 2012, to the EPA and the NYSDEC for review and approval. Pursuant to "Ordered Provisions," Item 2.e of the 2012 Order, based on a joint review of the Updated CSO LTCP, the EPA and the NYSDEC declined to approve the Updated CSO LTCP and provided comments to BSA in a letter dated December 6, 2012.

15. The EPA and the NYSDEC met with BSA on February 12, 2013 to discuss the EPA's and the NYSDEC's comments. BSA followed up with a letter dated March 1, 2013 which, among other things, specified that BSA would submit a No Feasible Alternatives ("NFA") analysis and submit its Green Infrastructure ("GI") Master Plan to the Agencies by August 2, 2013, and would meet with the Agencies on or about August 15, 2013 to discuss those submittals.

16. Technical representatives of the EPA and the NYSDEC met with BSA to specifically discuss BSA's GI Master Plan on August 20, 2013. BSA followed up by providing the EPA and the NYSDEC with further information on its GI Master Plan on August 28, 2013. The EPA and the NYSDEC determined that an analogous technical meeting to discuss BSA's NFA analysis was not needed and indicated this to BSA in an email transmission dated September 11, 2013.

17. In a letter dated October 23, 2013 from EPA to BSA, EPA provided BSA with final written comments on BSA's Updated CSO LTCP. BSA was given until January 10, 2014 to submit its final revised CSO LTCP to EPA and NYSDEC. EPA's letter dated October 23, 2014 required that BSA provide a detailed implementation schedule as part of its final revised CSO LTCP and, based partly on work to be completed at the BSA wastewater treatment plant which was not originally contemplated, allowed a twenty year implementation schedule.

18. On January 10, 2014, BSA submitted its final revised CSO LTCP to EPA and to NYSDEC for review and approval. The final revised CSO LTCP includes a twenty year schedule.

19. In a letter dated March 18, 2014, EPA and NYSDEC approved BSA's final revised CSO LTCP. The approved CSO LTCP includes a twenty year implementation schedule, which is beyond the final compliance date of December 31, 2027, required by the EPA's 2012 Order.

20. Therefore, based on the above, EPA is issuing Amended Administrative Order, Docket No. CWA-02-2014-3033, to incorporate a twenty year implementation schedule and a final compliance date of March 18, 2034.

ORDERED PROVISIONS

Based on the Findings of Fact and Findings of Violation set forth above, and pursuant to the authority of Sections 308(a) and 309(a) of the CWA, 33 U.S.C. §§ 1318(a) and 1319(a), and in accordance with Section 402(q) of the CWA, 33 U.S.C. § 1342 (q), it is hereby ORDERED that:

1. Immediately upon receipt of the original copies of this Order, a responsible official of BSA shall complete and sign the acknowledgment of receipt of one of the originals of the Order and return said original to the Chief, Compliance Section, Water Compliance Branch, Division of Enforcement and Compliance Assistance, in the enclosed envelope to the address listed below.

2. Development of Updated Long Term Control Plan: BSA shall revise and implement an approved Updated LTCP consistent with the requirements of the CSO Policy and applicable State law and regulation. The Updated LTCP shall provide for the construction and implementation of all wastewater treatment plant ("WWTP") and sewer system improvements and other measures necessary to ensure that: (i) CSO discharges from all CSO discharge outfalls comply with the technology-based and water quality-based requirements of the CWA, the CSO Control Policy and state law and regulation; and (ii) bypasses at the WWTP are in compliance with the bypass conditions in 40 C.F.R. § 122.41(m), 327 IAC 5- 2-8(11), and shall demonstrate that there are no feasible alternatives to the remaining bypasses, in accordance with Section II.C.7 of the CSO Control Policy.
   a. By no later than April 30, 2012, BSA shall submit to EPA and NYSDEC an Updated LTCP. The schedule included in the Updated LTCP shall require the design, construction, and implementation of all control/treatment measures selected by BSA as expeditiously as practicable, following any applicable environmental impact assessment review pursuant to the New York State Environmental Quality Review Act ("SEQR review"), but in any event by no later than March 18, 2034.
   b. The Updated LTCP shall include, at a minimum:
      i. An update of the system characterization information, receiving water characterization information, existing conditions information, CSO control objectives, and any other information presented in the 2004 LTCP that is no longer current;
      ii. BSA's previous screening and subsequent evaluation of individual CSO control technologies and site-specific CSO controls. The Updated LTCP shall: (1) reassess the results of that original evaluation in light of the applicability of recreation-protective bacteria standards in BSA's receiving waters; (2) include, as appropriate, new technologies and controls (such as green infrastructure ("GI") and bio-ballasted flocculation treatment) not considered in the 2004 LTCP; and (3) in particular, carry out a new evaluation of a range of updated system-wide alternatives. Together, BSA's prior and updated system-wide alternatives evaluation shall include a sufficiently wide range of alternatives for eliminating, reducing, or treating CSO discharges, and for eliminating or reducing bypass discharges (except as permitted in the bypass conditions in 40 C.F.R. § 122.41(m) and 327 IAC 5-2-8(11)). The updated evaluation shall consider the costs and effectiveness (in terms of reduction in number of overflow events, overflow volume reduction, pollutant loading reductions, water quality improvements, etc.) predicted to result from implementation of each of the updated system-wide alternatives.

iii. In evaluating the relative performance of the updated system-wide alternatives and in selecting a preferred alternative, BSA shall give the highest priority to controlling overflows to sensitive areas as required under the CSO Control Policy, at section II.C.3.

iv. BSA's Updated LTCP shall include past and current alternative evaluation efforts that together include at a minimum: (1) taking no-action; (2) complete sewer separation (3) partial separation of various portions of the combined sewer system; (4) installation of various sizes of storage or equalization basins at the Buffalo Sewer Authority WWTP and/or in the sewer system; (5) construction of new secondary or advanced wastewater treatment plants; (6) construction of increased treatment capacities at the existing facilities; (7) construction of additional facilities (such as high rate treatment or ballasted flocculation facilities or its equivalent) for providing primary treatment or better than primary treatment of discharges from CSO discharge outfall structures; (8) construction of new intercepting sewers from the sewer system to the facilities; (9) construction of facilities for providing disinfection (and dechlorination, if necessary) of CSO discharges; (10) construction of facilities for removing floatables from CSO discharges; (11) construction of relief sewers; (12) relocation of CSO discharge outfall structures; (13) implementation of pretreatment measures to reduce flows and/or pollutants discharged into the sewer system from industrial users; (14) consideration of the use of GI where feasible, and (15) construction and/or implementation of combinations of these alternatives. These evaluations shall be carried out in accordance with Chapter 3 of EPA's "Combined Sewer Overflows Guidance for Long-Term Control Plan."

v. The Updated LTCP shall describe BSA's prior technology screening assessments and shall include, at a minimum, BSA's evaluation of the technical feasibility and applicability of each alternative or combination of alternatives at each CSO discharge outfall or grouping of CSO discharge outfalls. Where necessary, BSA shall update said assessments in light of the applicability of recreation-protective bacteria standards in BSA's receiving waters.

vi. BSA's updated evaluation of system-wide alternatives shall include:

1. An evaluation of a range of "sizes" of each updated system-wide alternative that will, for the typical year achieve an average volume of wet weather percent capture from 75 to 100 percent and reduce the average number of untreated CSO Discharge events to 0, 1-3, 4-7 and 8-12 per year. The updated LTCP shall include a detailed description of the 12 month rainfall record that BSA has utilized in developing its Updated LTCP, and that BSA will utilize in implementing its Post Construction Monitoring Program. The Updated LTCP shall describe in detail BSA's analysis of its available long term rainfall record, its basis for selecting its "typical year," and, in the event that BSA selects a "modified year" as its "typical year," shall discuss in detail all modifications made to the actual rainfall record to arrive at the "modified" rainfall record. The updated LTCP shall include a detailed tabular summary of the "modified" rainfall record, such that it is clear exactly what rainfall record shall be used in implementing the PCMP;

2. A determination of the estimated "project costs," as that term is described on pages 3-49 through 3-51 of the EPA's "Combined Sewer Overflows Guidance for Long-Term Control Plan," for each size of each updated system-wide alternative. The determination of the estimated "project costs" shall include: (a) "capital costs," "annual operation and maintenance costs," and "life cycle costs," as those terms are described on pages 3-49 through 3-51 of EPA's "Combined Sewer Overflows Guidance for Long-Term Control Plan;" and (b) an itemization of the "capital costs" and "annual operation and maintenance costs" used to determine the total "project costs" for each separate component of each alternative or combination of alternatives; and

3. An evaluation, using a validated collection system model, of the expected reduction in number of CSO events, CSO discharge volume and pollutant discharge quantity from each CSO discharge point for each size of each updated system-wide alternative. The evaluation shall include, at a minimum, an analysis of the improvement in every pollutant of concern, which are: fecal coliform in all receiving waters, and DO/BOD/SOD in the Buffalo River, Scajaquada Creek, and the Black Rock Canal.

vii. For each system-wide alternative, BSA's assessment shall include an evaluation, using water quality models, of the expected water quality improvements in the receiving waters that will result from implementation of each updated system-wide alternative. The evaluation shall include, at a minimum, an analysis of the improvement in every pollutant of concern in that receiving water.

viii. For each updated system-wide alternative, BSA shall include a cost-performance analysis, such as a "knee of the curve" analysis, for each alternative or combination of alternatives that will allow for the comparison of the costs to: (1) the associated expected water quality improvements; (2) the reduction of CSO discharge and bypass discharge volume; (3) the reduction in CSO discharge and bypass discharge events; (4) the increase in percent wet weather capture; and/or (5) the reduction in pollutant loading from CSO discharge and bypass discharge events.

ix. The Updated LTCP shall include a financial capability analysis that complies with USEPA's "Combined Sewer Overflows – Guidance for Financial Capability Analysis and Schedule Development" February 1997).

x. The Updated LTCP shall include the selection of CSO control measures, including the construction of all sewer system and facility improvements necessary to ensure compliance with the technology-based and water quality-based requirements of the CWA, state law and regulation and BSA's SPDES permit. The Updated LTCP shall include the selection of bypass discharge control measures, so as to ensure that all remaining bypasses are in compliance with the bypass conditions in 40 C.F.R. § 122.41(m), 327 IAC 5- 2-8(11), and shall demonstrate that there are no feasible alternatives to the remaining bypasses, in accordance with Section II.C.7 of the CSO Control Policy.

xi. The Updated LTCP shall include an expeditious schedule for the design, construction, and implementation of all CSO control measures selected by BSA. If it is not possible for BSA to design and construct all measures simultaneously, the Updated LTCP shall include a phased schedule based on the relative

importance of each measure, with highest priority being given to eliminating discharges to sensitive areas and to those projects which most reduce the discharge of pollutants. The schedule shall specify critical construction milestones for each specific measure, including, at a minimum, dates for: (1) submission of applications for all permits required by law; (2) start of design; (3) commencement of construction; (4) completion of construction; (5) completion of construction; and (6) achievement of full operation.

c. The alternatives evaluated should include the use of GI wherever feasible to reduce CSO volumes and handle separated storm water. GI shall generally mean systems and practices that use or mimic natural processes to infiltrate, evapotranspire, and/or harvest storm water on or near the site where it is generated. GI applications and approaches that may be considered include, but are not limited to, green roofs, downspout disconnection, trees and tree boxes, rain gardens, vegetated swales, pocket wetlands, infiltration planters, vegetated median strips, permeable pavements, reforestation, and protection and enhancement of riparian buffers and floodplains. EPA and NYSDEC encourage BSA to utilize GI projects as appropriate to reduce or replace gray infrastructure projects included in the Updated LTCP provided that any GI project proposed is anticipated to provide substantially the same or greater level of control as the alternative gray infrastructure project. Should BSA rely on other entities to implement GI projects, BSA must have in place agreements as appropriate, to ensure proper operation and maintenance of the GI project. For any GI project submitted as part of the Updated LTCP, BSA shall submit to EPA and NYSDEC a detailed GI project proposal outlining each proposed project.

   i. The GI project proposal shall be consistent with this Administrative Order and shall at a minimum include the following for each project:

      1. Data on location, sizing, design, and the performance criteria expected to be achieved with the implementation of the GI project, utilizing the information and models that BSA used in developing the Updated LTCP, and any monitoring information used in formulating the proposal; along with a demonstration of the long term effectiveness and performance expected to be achieved with implementation of the project;
      2. A description of the work required to implement the GI project and a schedule for completion of this work and implementation of the project that is consistent with this Administrative Order and the date set forth herein in Paragraph 2(a) for completion of construction and full implementation of all remedial and control measures;
      3. A description of the proposed ownership of and access to the GI project, and should BSA rely on other entities to implement the GI project, BSA must explain what agreements will be necessary to ensure proper operation and maintenance of the GI project (i.e., permanent access, sufficient control over key aspects of the project), and how they will be enforced to ensure proper operation and maintenance of the GI project; and
      4. A description of any post-construction monitoring and modeling to be performed that is necessary to determine whether the performance criteria set forth, as noted above, will be met upon completion and implementation of the GI project.

ii. Upon review of BSA's GI project proposal, EPA and NYSDEC will comment, approve, disapprove, or approve in part, the proposal:

1. BSA shall implement each GI project approved by EPA and NYDEC in accordance with the provisions and schedule in the approved proposal;
2. If the GI project proposal is approved in part, BSA shall, upon written direction from EPA and NYSDEC, take all actions in the approved portion of the GI proposal that EPA and NYSDEC determine are technically severable from any disapproved portions. For the disapproved portions, BSA shall, within 90 Days, correct all deficiencies and resubmit the proposal for approval. If the resubmission is approved in whole or in part, BSA shall proceed in accordance with this subparagraph; or
3. If the GI project proposal is disapproved, EPA and NYSDEC's decision is final. For each project which is disapproved, BSA shall propose an alternative GI project or gray infrastructure project, or combined green and gray infrastructure project, within 90 days of the date of disapproval. In the event that BSA's alternative proposal is disapproved by EPA and NYSDEC due to the GI project component of the proposal, BSA shall propose an alternative gray infrastructure project within 90 days of the date of disapproval.

iii. In the event that BSA implements an approved GI project proposal that fails to meet the specified performance criteria set forth in the project proposal and Updated LTCP, BSA shall propose, within 180 days after submittal of the applicable post-construction monitoring report documenting said failure, an additional green or gray infrastructure project designed to achieve the performance criteria with a schedule for completion of this work and implementation of the project that is consistent with this Administrative Order and the date set forth herein in Paragraph 2(a) for completion of construction and full implementation of all remedial and control measures. In the alternative, where BSA has substantially met the performance criteria, BSA may, within sixty (60) days after its knowledge of a project's failure to meet the performance criteria, petition EPA and NYSDEC for a change in the performance criteria. After consideration of any such request by BSA, EPA and NYSDEC's decision will be final. In the event that EPA and NYSDEC disapprove of BSA's request for a change in the performance criteria, BSA shall, within 180 days after EPA and NYSDEC's disapproval, propose additional control measures designed to achieve the performance criteria with a schedule for completion of this work and implementation of the Project that is consistent with this Administrative Order and the date set forth herein in Paragraph 2(a) for completion of construction and full implementation of all remedial and control measures.

iv. BSA shall submit to EPA an update on its implementation of GI projects as part of the semi-annual reports due on March 1st and September 1st of each year.

d. If BSA seeks to replace any gray infrastructure projects provided in the Updated LTCP, BSA shall submit to EPA and NYSDEC a detailed GI project proposal outlining each proposed project consistent with the requirements of Paragraph 2(c).

e. EPA and NYSDEC may approve the Updated LTCP or decline to approve it and provide written comments. Within 120 days of receiving EPA's and NYSDEC's written comments, BSA shall modify the Updated LTCP consistent with EPA's and

NYSDEC's written comments, and resubmit the Updated LTCP to EPA and NYSDEC for final approval.

f. Upon receipt of EPA's and NYSDEC's final approval of the Updated LTCP (hereinafter "Approved CSO LTCP"), BSA shall implement the measures in the Approved CSO LTCP in accordance with the schedule in the Plan, including certain milestones of which listed in the Appendix, "BSA Approved CSO LTCP Implementation Schedule," and shall complete the implementation of its Approved CSO LTCP by not later than March 18, 2034.

3. Post Construction Monitoring Plan: Within one year of approval of the Updated LTCP, BSA shall submit to EPA and NYSDEC for approval, a work plan for conducting an ongoing study or series of studies ("Post-Construction Monitoring Plan") to help determine: (1) whether the Approved CSO LTCP measures, when completed, meet all performance criteria specified in the Approved CSO LTCP; (2) whether BSA's CSOs comply with the technology-based and water quality-based requirements of the CWA, state law, the CSO Control Policy, all applicable federal and state regulations, and its SPDES Permit, for all CSO-receiving waters; and (3) whether all remaining bypasses are in compliance with the bypass conditions in 40 C.F.R. § 122.41(m), 327 IAC 5- 2-8(11), and demonstrate that there are no feasible alternatives to the remaining bypasses, in accordance with Section II.C.7 of the CSO Control Policy. The Post-Construction Monitoring Plan shall be consistent with the guidance "Combined Sewer Overflows Guidance for Long-Term Control Plan."

a. The Post-Construction Monitoring Plan shall contain a schedule for performance of the study or series of studies at key points during the course of the implementation of the remedial measures, as well as after completion of the remedial measures, specified in the Approved CSO LTCP. The Post-Construction Monitoring Plan also shall indicate the years (at least biannually) in which data generated during implementation of the Post-Construction Monitoring Plan will be submitted in the reports in Paragraph 4 to EPA and NYSDEC.

b. EPA and NYSDEC may approve the Post-Construction Monitoring Plan or may decline to approve it and provide written comments. Within ninety (90) days of receiving EPA's and NYSDEC's comments, BSA shall alter the Post-Construction Monitoring Plan consistent with EPA's and NYSDEC's comments, and resubmit the Plan to EPA and NYSDEC for final approval.

c. Upon final approval of the Post Construction Monitoring Plan, BSA shall implement, in accordance with the schedule therein, the Post-Construction Monitoring Plan. If the results of the Post-Construction Monitoring Plan indicate areas of non-compliance, BSA shall, within 120 days, (unless a different period is specified) of being requested in writing to do so, submit to EPA and NYSDEC a Supplemental Compliance Plan which includes the actions that BSA will take to achieve compliance and a schedule for taking such actions. Upon approval by the EPA and NYSDEC, BSA shall implement the Supplemental Compliance Plan, in accordance with the schedule specified in the approved Plan.

d. Within one hundred twenty (120) days after completion and implementation of the Post-Construction Monitoring Plan, BSA shall submit a Final Post-Construction-Monitoring Report to EPA and NYSDEC, for review, comment and approval, that:

i. demonstrates that BSA performed the Post-Construction Monitoring Plan in accordance with the approved Plan and schedule set forth in the approved Post-Construction Monitoring Plan; and

ii. summarizes the data collected during Post-Construction Monitoring and analyzes whether the completed control measures have met and/or are meeting the performance criteria specified in the Approved CSO LTCP; whether BSA's CSOs comply with the requirements of the CWA, state law, the CSO Control Policy, all applicable federal and state regulations, and BSA's SPDES Permits; and whether all remaining bypasses are in compliance with the bypass conditions in 40 C.F.R. § 122.41(m), 327 IAC 5- 2-8(11), and demonstrate that there are no feasible alternatives to the remaining bypasses, in accordance with Section II.C.7 of the CSO Control Policy.

e. EPA and NYSDEC may approve the Final Post-Construction Monitoring Report or may decline to approve it and provide written comments. Within sixty (60) days of receiving EPA's and NYSDEC's comments, BSA shall alter the Final Post-Construction Monitoring Report consistent with EPA's and NYSDEC's comments, and resubmit the Report to EPA and NYSDEC for final approval. Approval of the Final Post-Construction Monitoring Report only constitutes EPA's and NYSDEC's approval that the report contains the information required by this Administrative Order; it does not mean that EPA and NYSDEC believe BSA has complied with any other requirement of this Administrative Order or federal or state law.

4. Reporting Requirements

a. Semi-Annual Status Reports. Upon the effective date of this Administrative Order, until EPA and NYSDEC's approval of the Final Post-Construction-Monitoring Report, BSA shall submit written Semi-Annual Status Reports to EPA and NYSDEC. These reports shall be submitted by no later than March 1st of each year (for the "reporting period" from July 1 through December 31 of the previous calendar year) and September 1st of each year (for the "reporting period" from January 1 through June 30 of the current calendar year). The Semi-Annual Status Reports may be provided either as paper documents or in electronic format, provided that the electronic format is compatible with EPA and NYSDEC software and is accompanied by a written certification on paper in accordance with "General Provisions" Paragraph 1. The written certification must be sent via certified or overnight mail. The frequency of reports, and the reporting period, may be amended upon written agreement from EPA and NYSDEC. In each written Semi-Annual Status Report, BSA shall provide, at a minimum, the following:

i. a statement setting forth (1) the deadlines and other terms that BSA has been required to meet since the date of the last statement; (2) whether and to what extent BSA has met those requirements; and (3) the reasons for any noncompliance (notification to EPA and NYSDEC of any anticipated delay shall not, by itself, excuse the delay);

ii. (1) a general description of the work completed within the prior reporting period; (2) to the extent known, a statement as to whether the work completed in that period meets applicable design criteria; (3) a projection of work to be performed during the next six-month period; (4) notification of any anticipated delays for the upcoming six month period of time; and (5) any changes in key personnel.

iii. If any public meetings were held, the report should include a copy of any advertisements placed for the meeting, any materials or handouts, formal meeting notes, and a summary of the meeting.

iv. BSA shall also submit, with each written status report, copies (to EPA only) of all monthly monitoring reports or other reports pertaining to CSOs and bypasses that BSA submitted to NYSDEC during the reporting period.

b. Semi-Annual Status Meetings. Representatives of EPA, NYSDEC and BSA shall conduct semi-annual meetings to discuss BSA's compliance status with the provisions of this Order. These meetings shall be scheduled during the months of March or April to discuss the previous reporting period, and September or October to discuss the previous reporting period. The meetings can be conducted telephonically if agreed in writing (including electronic correspondence) by all parties in advance. The frequency of such compliance meetings may be reduced upon written agreement (including electronic correspondence) from EPA and NYSDEC.

c. Annual Post Construction Monitoring Report. Upon the effective date of this Administrative Order, until EPA and NYSDEC's approval of the Final Post-Construction-Monitoring Report, BSA shall submit annually with its September 1st Semi-Annual Reports, an Annual Post Construction Monitoring Report containing information generated in accordance with the Post-Construction Monitoring Plan. The Annual Post Construction Monitoring report may be provided either as paper documents or in electronic format, provided that the electronic format is compatible with EPA and NYSDEC software and is accompanied by a written certification on paper in accordance with "General Provisions" Paragraph 1. The written certification must be sent via certified or overnight mail. The frequency of reports, and the reporting period, may be amended upon written agreement from EPA and NYSDEC.

d. Permits or Approvals. When it is necessary for BSA to obtain a federal, state, or local permit or approval or perform SEQR review, BSA shall submit timely and complete applications, or timely perform the SEQR review, and take all other actions necessary to obtain all such permits or approvals or to ensure compliance with SEQR.

GENERAL PROVISIONS

1. Any documents to be submitted by BSA pursuant to this Administrative Order shall be signed by an official of BSA or an authorized representative of BSA (see 40 C.F.R. § 122.2) and include the following certification:

> "I certify under penalty of law that I have examined and am familiar with the information submitted in this document and all attachments and that this document and its attachments were prepared under my direction or supervision in a manner designed to ensure that qualified and knowledgeable personnel properly gather and present the information contained therein. I further certify, based on my inquiry of those individuals immediately responsible for obtaining the information, that I believe that the information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment."

2. All notifications, reports, submissions and communications required by this Order shall be sent by certified mail or its equivalent to the following addresses:

Doughlas McKenna, Chief
Water Compliance Branch
Division of Enforcement and Compliance Assistance
United States Environmental Protection Agency, Region 2
290 Broadway, 20th Floor
New York, New York 10007-1866

Joseph DiMura, P.E.
Director, Bureau of Water Compliance Programs
Division of Water
New York State Department of Environmental Conservation
625 Broadway
Albany, New York 12233-3506

Regional Water Engineer
New York State Department of Environmental Conservation
Region 9
270 Michigan Avenue
Buffalo, New York 14203-2915

3. The Respondent shall have the opportunity, for a period of twenty (20) days from the effective date of this Order, to confer, regarding the Amendments to Administrative Order CWA-02-2012-3024, with the following designated Agency Representative:

Doughlas McKenna, Chief
Water Compliance Branch
Division of Enforcement and Compliance Assistance
United States Environmental Protection Agency, Region 2
290 Broadway, 20th Floor
New York, New York 10007-1866
(212) 637-4244

4. Respondent may seek federal judicial review of this Order pursuant to Chapter 7 of the Administrative Procedure Act, 5 U.S.C. §§ 701-706.

5. This Order does not constitute a waiver from compliance with, or a modification of, the effective terms and conditions of the CWA, its implementing regulations, or any applicable permit, which remain in full force and effect. Issuance of this Order shall not be deemed an election by EPA to forego any civil or criminal actions for penalties, fines, imprisonment, or other appropriate relief under the CWA.

6. Notice is hereby given that should EPA commence an action in a United States District Court for a violation of any Ordered Provision of this Order, Respondent may be subject to (1) civil penalties up to $37,500 per day for each day of violation, pursuant to Section 309(d) of the CWA, 33 U.S.C. § 13199d); and/or (2) injunctive relief, pursuant to Section 309(b) of the CWA, 33 U.S.C. § 1319(b), as imposed by the Court.

7. If any provision of this Order is held by a court of competent jurisdiction to be invalid, any surviving provisions shall remain in full force and effect.

8. Provisions of Administrative Order CWA-02-2012-3024, incorporated herein, continue to be effective as of March 9, 2012. The Amendments to Administrative Order CWA-02-2012-3024 contained in this Order CWA-02-2014-3033 shall become effective upon the date of execution by the Director, Division of Enforcement and Compliance Assistance.

Dated: APRIL 11, 2014 Signed: _____

Dore LaPosta, Director
Division of Enforcement and Compliance Assistance

APPENDIX

BSA Approved CSO LTCP Implementation Schedule

Project Name	Project Milestones/Deadlines
Phase I Projects (see Table 11-11)	
Bird/Lang RTC Projects	Construction Start and Completion Dates: 3/17/2014 – 9/2/2014 Operations/Optimization (RTC): 9/3/2014 – 9/3/15
Foundation Projects (see Table 11-11)	
Foundation 1 - Smith Street Storage	Engineering Start: 3/18/2014 Engineering Completion: 3/18/2015 Notice to Proceed3/18/2015 Substantial Completion: 3/18/2017
Foundation 2 - SPP Optimization (20 projects)	Engineering Start: 3/1/14 Engineering Completion: 3/18/2015[1] Notice to Proceed: 3/1/14 Substantial Completion: 3/18/2017[1]
Foundation 3 - Remaining RTC (14 sites)	Engineering Start: 3/18/2016 Engineering Completion: 3/18/2023[1] Notice to Proceed: 3/18/2017 Substantial Completion: 3/18/2024[1]
Foundation 4 - Hamburg Drain Optimizations	Engineering Start: 3/18/2015 Engineering Completion: 3/18/2017[1] Notice to Proceed: 3/18/2016 Substantial Completion: 3/18/2018[1]
Foundation 4 – Hamburg Drain Storage	Engineering Start: 3/18/2028 Engineering Completion: 3/18/2030 Notice to Proceed: 3/18/2030 Substantial Completion: 3/18/2032
Green Projects (see GI Master Plan)	
Green Pilot Projects – 267-acres of GI control	Engineering Start:3/1/14 Engineering Completion: 3/18/2016[2] Construction Completion Date: 3/18/2018[2] PCM Start and Completion Dates: 3/18/2016 – 3/18/2019[2] Construction of controls for at least 134 acres will have started by 9/18/2017
Green 2 – 410-acres of GI control	Engineering Start: 3/18/2019 Engineering Completion: 3/18/2023[2] Construction Completion Date: 3/18/2024[2] Construction of controls for at least 205 acres will have started by 3/18/2022[2]

Green 3 – 375-acres of GI control	Engineering Start: 3/18/2023 Engineering Completion: 3/18/2028[2] Construction Completion Date:3/18/2029[2] Construction of controls for at least 188 acres will have started by 9/18/2026[2]
Green 4 – 263-acres of GI control	Engineering Start: 3/18/2028 Engineering Completion: 3/18/2033[2] Construction Completion Date:3/18/2034[2] Construction of controls for at least 132 acres will have started by 9/18/2031[2]
WWTP	
WWTP Improvements Project – Alternative C2 (two consecutive projects)	Engineering Start: 3/18/2015 Engineering Completion: 3/18/2019[1] Notice to Proceed: 3/18/2017 Substantial Completion 3/18/2022[1]
Gray Projects (see Section 12.3)	
CSOs 014/15 – In-line storage and optimization	Construction Start: 3/18/14 Substantial Completion: 3/18/15
CSO 013 – Satellite storage, conveyance, FM & PS	Engineering Start: 3/18/2019 Engineering Completion: 3/18/2020 Notice to Proceed: : 3/18/2020 Substantial Completion: 3/18/2022
North Relief – Interceptor	Engineering Start: 3/18/2019 Engineering Completion: 3/18/2022 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 Engineering Completion: 3/18/2023 Notice to Proceed: 3/18/2023 Substantial Completion: 3/18/2024
SPP 337 (CSO 053) – Satellite storage, conveyance, FM & PS	Engineering Start: 3/18/2023 Engineering Completion: 3/18/2025 Notice to Proceed: 3/18/2025 Substantial Completion: 3/18/2027
SPP 336 a+b (CSO 053) – Satellite storage, conveyance, FM & PS	Engineering Start: 3/18/2024 Engineering Completion: 3/18/2026 Notice to Proceed: 3/18/2026 Substantial Completion: 3/18/2029

Jefferson & Florida (SPP 170B – CSO 053) – Satellite storage, conveyance and FM	Engineering Start: 3/18/2025 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 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 (storage at Tops from CSO 47 west)	Engineering Start: 3/18/2028 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 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 Engineering Completion: 3/18/2032 Notice to Proceed: 3/18/2032 Substantial Completion: 3/18/2034
Post Construction Monitoring	
Submit PCM Plan	3/18/2015
Implement PCM	Per approved PCM Plan

NOTES:

References specified in the Implementation Schedule above refer to the Approved BSA CSO LTCP, including the Green Infrastructure Master Plan, approved by EPA and NYSDEC on March 18, 2014.

Engineering timeframes (from start to completion) include planning, design, permitting/SEQRA/Public Notice, regulatory review and approval, land/easement acquisition, funding, and bidding/award.

Substantial Completion is defined as the time at which the Project has progressed to the point where, in the opinion of Engineer, the Work is sufficiently complete, in accordance with the Contract Documents, so that the Project can be utilized for the purposes for which it is intended.

(1) Project consists of multiple smaller projects that will overlap in engineering and construction. Specific engineering completion and construction dates for each project site will determined and submitted to the Agencies as they are developed. In any case, all work associated with these blocks of projects will be completed within the overall timeframe shown.

(2) GI projects will consist of multiple smaller projects including building demolitions that will overlap in engineering and construction during a given GI phase. For each phase, the BSA will achieve the start of construction for at least 50 percent of the required acreage by the mid-point of each phase.

APPENDIX G: Detailed Project Cost Estimate, Edison-Martha OLS

ARCADIS

PROBABLE COST - JUNE 13, 2024

BUFFALO SEWER AUTHORITY - EDISON MARTHA OLS

APPENIDX G
OPINION OF PROBABLE TOTAL PROJECT COSTS

	Items	Quantities	Rate	Amount
0	Land Acquistion / Easements			$125,000.00
1	General Conditions and Division 1 Items		15%	$4,370,000.00
2	Sitework / Restoration	Lump Sum		$250,000.00
3	Storage Basin - Structural and Process	Lump Sum		$24,275,700.00
4	Basin Influent, Effluent Piping, Watermain	Lump Sum		$1,278,900.00
5	Influent Diversion Chamber	Lump Sum		$500,000.00
6	Tipping Bucket Equipment	Lump Sum		$1,221,600.00
7	Control / Electrical Buidling	Lump Sum		$155,300.00
8	Electrical and Lighting - 3% of above (2 thru 7)		3%	$830,000.00
9	Instrumentation - 2% of above (2 thru 7)		2%	$550,000.00
10	Electrical Service Cash Allowance	Lump Sum		$50,000.00
	Subtotal Construction Cost			**$33,606,500.00**
	General Contractor Ovehead & Profit		**15%**	**$5,050,000.00**
	Total Construction Cost (3rd Qtr. 2024)			**$38,656,500.00**
	Inflation to Mid Point of Construction (3rd Qtr. 2030)		**26.3%**	**$10,180,500.00**
	Total Construction Costs (3rd Qtr. 2030)			**$48,837,000.00**
	Engineering Planning (3rd Qrt. 2025)			**$276,000.00**
	Engineering Design (4th Qrt. 2026)			**$6,263,000.00**
	Engineering During Construction (3rd Qrt. 2030)			**$7,168,000.00**
	Total Engineering Costs			**$13,707,000.00**
	Total Project Costs Subtotal			**$62,550,000.00**
	Contigency		**35%**	**$21,900,000.00**
	Total Project Costs			**$84,500,000.00**

APPENDIX H: Engineering Report Certification

Engineering Report Certification

To Be Provided by the Professional Engineer Preparing the Report

During the preparation of this Engineering Report, I have studied and evaluated the cost and effectiveness of the processes, materials, techniques, and technologies for carrying out the proposed project or activity for which assistance is being sought from the New York State Clean Water State Revolving Fund. In my professional opinion, I have recommended for selection, to the maximum extent practicable, a project or activity that maximizes the potential for efficient water use, reuse, recapture, and conservation, and energy conservation, taking into account the cost of constructing the project or activity, the cost of operating and maintaining the project or activity over the life of the project or activity, and the cost of replacing the project and activity.

Title of Engineering Report: CSO053_5.2 Edison Martha Offline Storage (OLS) Tank

Date of Report: 06/14/2024

Professional Engineer's Name: Thomas Whetham

Signature:

Date: 06/13/2024

BUFFALO
SEWER AUTHORITY

BUFFALO SEWER AUTHORITY
SPDES PERMIT NO. NY0028410
CAPITAL PROJECTS PROGRAM MANAGEMENT
BSA CONTRACT NO. 82000075

CSO053_1.4 Sidney Offline Storage (OLS) Tank Preliminary Engineering Report

Prepared by TY Lin Greeley and Hansen Water Solutions

JUNE 14, 2024

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Executive Summary

The Buffalo Sewer Authority (Buffalo Sewer) provides wastewater service to approximately 550,000 people. Buffalo Sewer owns and operates the Bird Island Wastewater Treatment Facility (WWTF), constructed from 1937 through 1939, and manages 850 miles of sanitary, storm, and combined sewer lines. Buffalo Sewer has entered into an Administrative Order (AO) with the New York State Department of Environmental Conservation (DEC) and the United States Environmental Protection Agency (EPA) as part of their Combined Sewer Overflow (CSO) Long Term Control Plan (LTCP) that was approved on March 18, 2014. The purpose of the LTCP is to reduce CSO activations within the existing system.

Pursuant to the LTCP, Buffalo Sewer is developing a coordinated series of storage and flow-diversion structures within their collection system. A significant amount of storage volume is planned to be obtained using Real-Time Control (RTC) structures, as Buffalo Sewer anticipates installing sixteen RTC structures as part of the LTCP. The RTC sites optimize available inline storage (ILS) and conveyance capacity within the collection system through the utilization of overflow lines (referred to as outfall storage) and combined sewers.

The recommended alternative will involve constructing an off-line storage tank at the intersection of Sidney Street and Lark Street as part of the LTCP, which is being renamed as Queen City Clean Waters. The design includes adding a 48" gravity sewer going east from the Humboldt Parkway Sewer for the tank influent, and a 36" gravity sewer going north on Lark Street for the tank effluent. The effluent has a connection at the Scajaquada Tunnel Interceptor. The tank reduces flows at SPP336B and would store flow diverted until there is sufficient available capacity in the Scajaquada Tunnel Interceptor. This location was selected because of the ability to dewater by gravity into the Scajaquada Tunnel Interceptor. Also, the lot on the other side of Lark Street can be used for construction staging. The invert depth of the Scajaquada Tunnel Interceptor allows for an additional 10 feet of tank depth if desired.

The total project cost of the recommended alternative is estimated to be $44.62 million in 2024 dollars. This value also includes operations and maintenance cost associated with the tank.

The proposed upgrades will be essential to protecting the quality of the Black Rock Canal, Scajaquada Creek, and Niagara River, which receive discharges of untreated combined sewage during wet weather. The surface waters play an important role in supporting aquatic habitats and recreation and providing an aesthetic waterfront to potential environmental justice communities. Protecting these waters will support this recreational and tourism resource for the City of Buffalo.

SECTION 1 PROJECT BACKGROUND AND HISTORY

1.1 Site Information

1.1.1 Project Background and Location

Buffalo Sewer provides wastewater service to a population of approximately 550,000. As part of this service, Buffalo Sewer owns and operates the Bird Island Wastewater Treatment Facility (WWTF), constructed from 1937 through 1939, along with managing 850 miles of storm and combined sewer lines. Buffalo Sewer has entered an AO with the DEC and the EPA as part of their approved CSO LTCP that was approved on March 18, 2014. The purpose of the LTCP is to reduce CSO activation within the existing system and to alleviate overall influent to the WWTF. A copy of the AO is provided in **Appendix A**.

Buffalo Sewer is in the process of constructing a series of coordinated RTC sites as part of their LTCP. RTC sites use smart logic to optimize available ILS and conveyance capacity within the collection system, including overflow lines (referred to as outfall storage) and combined sewers. Buffalo Sewer committed to the installation of up to 16 RTCs under the LTCP.

The proposed alternative site is located at the intersection of Sidney and Lark St. in the City of Buffalo, Erie County, New York as shown in **Figure 1-1**.

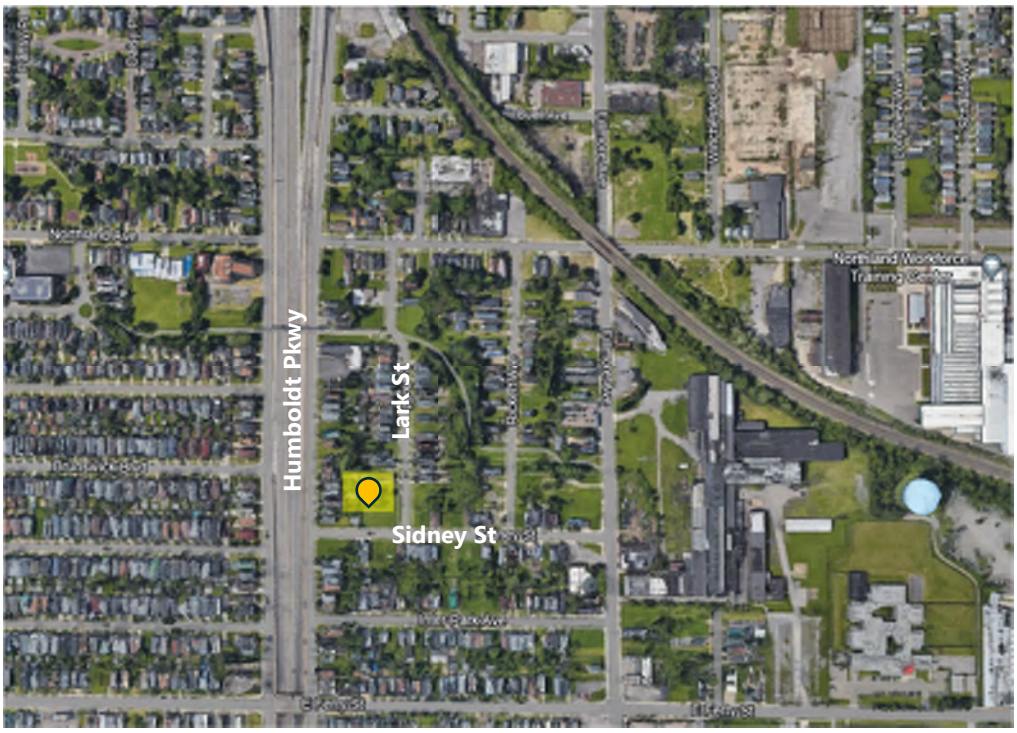


Figure 1-1: Location of Currently Proposed Project Site

1.1.2 Geologic Conditions

According to the Natural Resources Conservation Service's Web Soil Survey, the site soil types consist of Urban land and Urban land-collamer complex (1 to 6% slopes). A geologic map showing the RTC project

location with subsurface work is provided in **Figure 1-2**. Geologic investigations are ongoing, and site soil boring and rock coring information was not available when this report was created.

Figure 1-2: Geologic Map

1.1.3 Flood Zones

Flood zones are geographic areas that FEMA has defined according to varying levels of flood risk. The proposed location falls within FEMA's Zone X, which is an area of minimal flood hazard determined to be outside the 500-year flood zone. The flood zone maps for the project site can be seen in **Appendix B**.

1.1.4 Environmental Resources

The United States Fish and Wildlife Service's Information for Planning and Conservation (IPaC) database was researched for this site as subsurface work is planned. The IPaC preliminary results indicate that the Northern long-eared bat is an endangered species that may occur in the project area. The tricolored bat and salamander mussel are species likely to become endangered within the foreseeable future. The database also indicates that the monarch butterfly exists within the project area and is a candidate for listing as an endangered species. The project area also consists of habitat for 23 migratory birds. This project is unlikely to impact any of the aforementioned species where planned work is to occur within paved areas. The IPaC preliminary report for this project location can be found in **Appendix C**.

The sewer system has three major receiving water bodies: Scajaquada Creek (PWL ID: 0101-0023), Black Rock Canal (0101-0025), and the Niagara River (0101-0006). The latest water quality assessment provided by NYSDEC classifies all three waterbodies as "impaired" for fish consumption due to contaminants that

degrade the habitat. The Scajaquada Creek is also listed as "impaired" for both primary and secondary recreational use. Niagara River is classified as a "threatened" water supply system with "stressed" aquatic life. According to the DEC, the high density of sanitary wastewater discharges results in elevated susceptibility for numerous contaminant categories, including fecal coliforms.

1.1.5 Environmental Justice Areas

The project site falls within a Potential Environmental Justice Area (PEJA). The water quality in the Niagara River directly impacts the population on the east side of Buffalo, including the East Side community where this project is located. East Side has a minority population of approximately 83% and nearly 61% of the population lives below poverty level.

A map of the PEJAs surrounding the project site is shown in **Figure 1-3**.

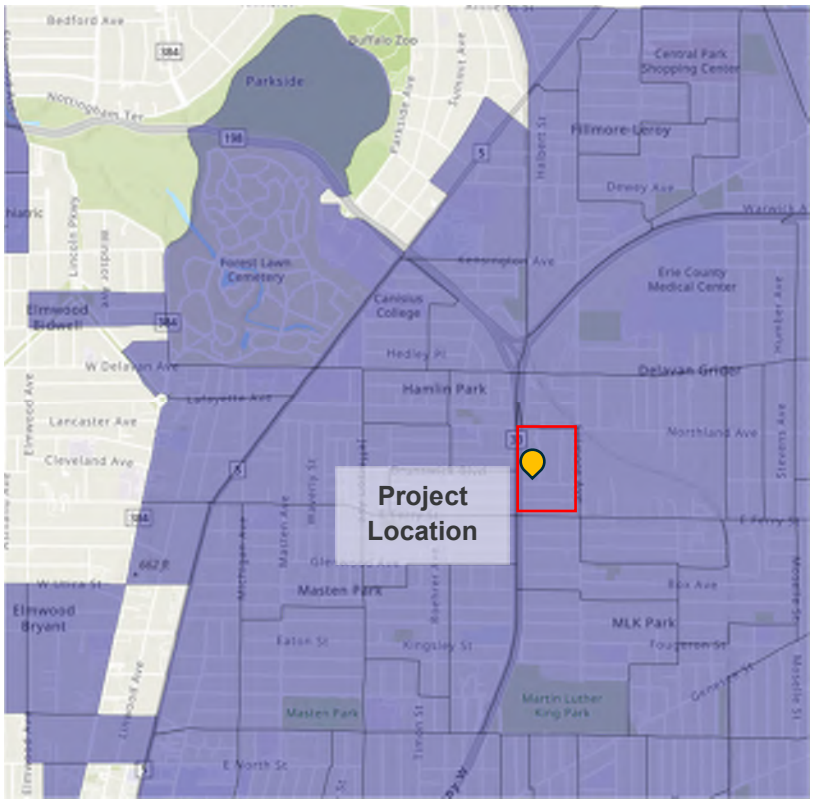


Figure 1-3: Potential Environmental Justice Areas

1.2 Ownership and Service Area

Buffalo Sewer's wastewater service area covers approximately 110 square miles, including the City and parts of the Towns of Alden, Cheektowaga, Elma, Lancaster, Tonawanda, and West Seneca, and the Villages of Depew, Lancaster, and Sloan, as well as Erie County Sewer District No. 1 and No. 4, as shown in Figure 1-4. The collection system serves a population of approximately 550,000 residents in 11 municipalities.

Buffalo Sewer's collection system consists of approximately 850 miles of sewer lines, of which 93% is made up of combined sewer systems that convey both sanitary and stormwater flows. The collection

system includes 52 CSO outfall relief points to prevent flooding damage to public and private infrastructure during wet weather events that exceed the capacity of the collection and treatment system.

1.2.1 Outside Users

There are seven outside users connected to Buffalo Sewer's collection system, governed under individual intermunicipal agreements (IMAs) including:

- Erie County Sewer District No. 1
- Erie County Sewer District No. 4
- Town of Cheektowaga
- Village of Sloan
- West Seneca Town Sewer District Nos. 1, 2, 3, 4, 9 and 10
- West Seneca Town Sewer District Nos. 5, 13, and 14
- West Seneca Town Sewer District No. 1

Buffalo Sewer has wholesale agreements with these outside communities and does not own, operate, or maintain the wastewater collection systems within these communities. Each of these outside communities are charged by Buffalo Sewer for their share of costs allocable to the treatment of their flows to the WWTF. Allocable costs include portions of administrative expenses, WWTF expenses, industrial waste expenses, the costs to maintain trunk sewers to convey flows from the city line to the WWTF, and debt service costs. The municipality or district is billed twice annually for services. Under the IMAs, each District is responsible for installing and maintaining meters at city lines. Buffalo Sewer has rights to challenge accuracy of meters, including through installation of test meters.

In 2023, Buffalo Sewer reported a total of 191 discharges in their Annual Pretreatment Report regarding industrial users and hauled waste activity.

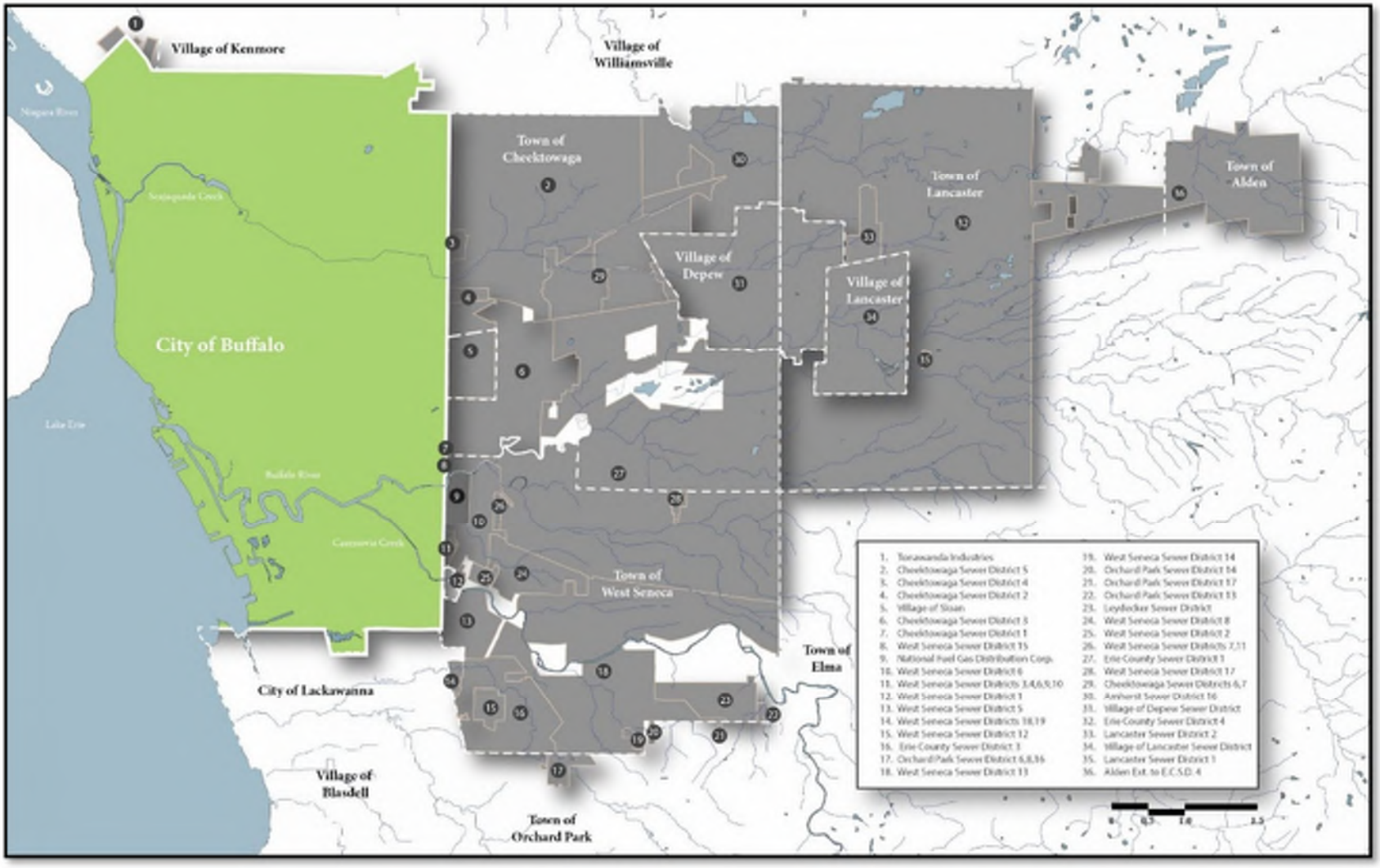


Figure 1-4: Buffalo Sewer Authority Service Area

1.2.2 Population Trends and Growth

Historically, the City of Buffalo has experienced population decline, unlike the population growth seen in New York State as a whole, as shown in Table 1-1. However, from 2010 to 2020, there was a population growth of 6.5%. Assuming an average population change based on the recent decade, it is projected the City's population will continue to grow at a rate of approximately 5.8% every ten years.

Table 1-1: Historical and Projected Population

Year	City of Buffalo		New York	
	Population	% Change	Population	% Change
1960	532,759		16,782,304	
1970	462,768	-13.1%	18,236,967	8.7%
1980	357,870	-22.7%	17,558,072	-3.7%
1990	328,123	-8.3%	17,990,455	2.5%
2000	292,648	-10.8%	18,976,457	5.5%
2010	261,310	-10.7%	19,378,102	2.1%
2020	278,349	6.5%	20,201,249	4.2%
2030*	295,388	5.8%	21,024,396	3.9%
2040*	312,427	5.8%	21,847,543	3.9%
2050*	329,466	5.8%	22,670,690	3.9%
2060*	346,505	5.8%	23,493,837	3.9%

*Projected
Source: US Census Bureau

As the population of the City is growing, the number of Buffalo Sewer connections has also increased over the past 11 years. Per the most recent Comprehensive Annual Financial Report (CAFR), as of FYE 2022, there are approximately 108,155 residential connections and 1,306 commercial, industrial, and governmental connections to Buffalo Sewer's collection system. These connections increased by 4.4% and 132% respectively, from FY 2014 to FY 2023. Figure 1-5 shows the growth of connections since FY 2014.

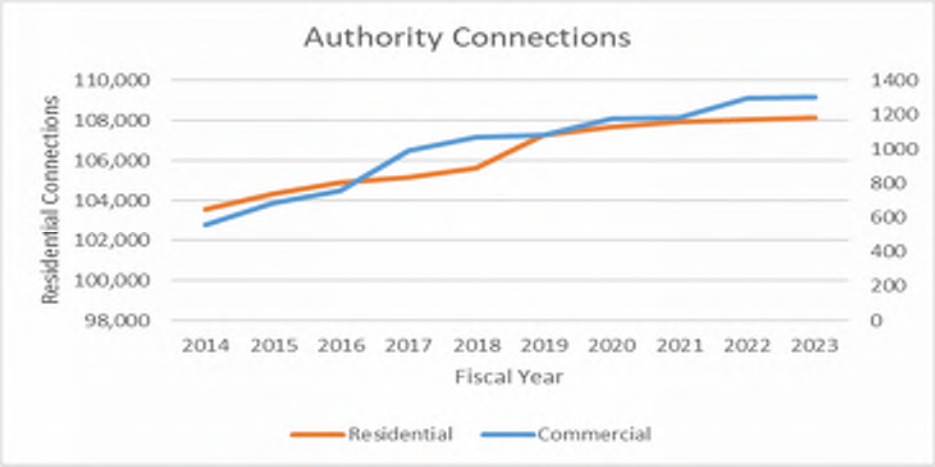


Figure 1-5: Buffalo Sewer Authority Connections

1.3 Existing Facilities and Present Conditions

1.3.1 General Description, History of Major System Components, and Description of Unit Processes

Construction on the sewer collection system began in the 1830s, and the WWTF was constructed from 1937 through 1939. Over the years, the WWTF has been upgraded to comply with new regulations. There is no known failure history within the system of note. The collection and conveyance system is not efficiently utilizing storage within its infrastructure, resulting in unnecessary discharges of combined sewage to surface waters. As part of this project, a storage tank will be constructed with the capacity to store 3.26 million gallons of wastewater thereby helping to reduce sanitary sewer overflows within the system.

A description of the alternative sites for this project is broken down below.

Sidney Street

Sidney Street, between Fillmore Avenue and Humboldt Parkway, has an existing combined sewer line located in the street flowing east to west. It conveys combined waste and storm water from Sidney Street and Lark Street to Humboldt Parkway's combined reinforced concrete sewer. As shown in **,** the sewer on Sidney Street begins as a 10-inch vitrified tile (VT) line and expands to 15 and 18-inch before connecting to the Humboldt Parkway sewer. The 10-inch, 15-inch and 18-inch lines are approximately 248 LF, 374 LF, and 300 LF, respectively, and are pitched at 0.40% slope with manholes throughout the line. The sewer on Lark Street begins as a 10-inch VT line and expands to a 12-inch before connecting to the Sidney Street sewer. The 10-inch and 12-inch lines are approximately 347 LF and 319 LF, respectively, and are pitched at 0.40% slope with manholes throughout the line.

Figure 1-6: Existing Conditions: Sidney Street and Lark Street

1.3.2 Permit Conditions

A copy of the WWTF State Pollution Discharge Elimination System (SPDES) Discharge Permit NY0028410, EDP July 1, 2014, expiration June 30, 2019, is included in **Appendix D**. BSA is in the process of renewing its SPDES permit.

1.3.3 Compliance Issues

The Project is an outcome of Administrative Order Docket No. CWA-02-2012-3024 (SPDES Permit No. NY0028410). The Administrative Order resulted in the preparation of an LTCP to refine Buffalo Sewer Authority's sewer collection system model and to reduce CSO overflow volumes and frequencies.

1.3.4 Existing Flows

According to the Combined Sewer Overflow Annual Report of 2023, CSO-53, which will have reduced activations from the proposed upgrades, had 31 events of sewer overflow for the year, discharging approximately 688 million gallons of untreated combined sewage into the Scajaquada Creek this past year. The previous year had 35 events which discharged approximately 481 million gallons of untreated combined sewage.

Flow conditions at the 90-inch Scajaquada Tunnel Interceptor downstream of the proposed Sidney OLS Tank and at the 30-inch Humboldt Parkway Sewer upstream of the proposed tank were observed by Xylem and are summarized in Table 1-2.

Table 1-2: Observed Flow Conditions at Upstream and Downstream Combined Sewers

Item	Scajaquada Tunnel Interceptor Flows (MGD)	Humboldt Parkway Sewer Flows (MGD)
Average Dry Weather	3.3	13.3
Peak 10 Year	111	178
Peak 10 Year 24 Hour Design Storm	172	226

1.3.5 Existing Energy Consumption

The existing infrastructure at the proposed site is gravity-based and does not consume energy.

1.4 Definition of the Problem

BSA is committed to reducing the total frequency of CSOs into the receiving waterbodies by increasing and maximizing storage capacity within the collection and conveyance infrastructure. According to the Combined Sewer Overflow Annual Report from 2023, there were a total of 31 CSO events at CSO-53 in the reporting year, while the goal for CSO-053's associated waterbody, Scajaquada Creek, is zero to four activations.

As described in Section 1.1.4, the receiving water bodies are impacted by discharge of untreated CSOs in several ways. The affected surface water quality poses a health and sanitation risk. Therefore, water contact for recreation must be limited when CSO activations occur and for a period afterwards. There are also longer-term implications for recreation: specifically, fishing is unsafe due to sewage stressing aquatic life and habitat. Restricting recreation limits the economic value it can bring through both tourism and improved quality of life of the local population. Furthermore, as described in Section 1.1.5, the impacted water resources affect historically marginalized communities that utilize the parks, waterfronts, and historical resources in various ways.

Although many factors negatively affect these receiving water bodies, the effects caused by CSO activations can be addressed by improving the overall efficiency of storage and conveyance of sewage within the collection system.

This project proposes to construct a 3.26 MG offline storage tank to store flow diverted from the sewer along Humboldt Parkway and dewater via gravity when there is sufficient available capacity in the Scajaquada Tunnel Interceptor. This will greatly reduce the magnitude and frequency of overflows at CSO-053.

1.5 Financial Status

1.5.1 BSA Revenues

The Median Household Income (MHI) for the Buffalo area is $46,184 per year, according to the 2022 US Census, while the New York State MHI is $81,386 per year. The MHI for Buffalo is 43.3% lower than the State MHI.

The main sources of income for the sewer system come from sewer rents, direct payments from outside users, and industrial waste disposal.

BSA is projecting an operating revenue increase of 35% over the forecast period attributable primarily to rate increases. The projected revenue increases are detailed in Appendix A. The purpose of these rate and revenue increases is to improve water equity, provide additional funds to close the CIP funding gap and improve financial resilience.

Table 1-3 shows past BSA revenues taken from BSA's Comprehensive Annual Financial Report (CAFR) for FYE 2014 through 2023. Tables 1-4 and 1-5 show projected total and net revenues, respectively, for FYE 2024 through 2028.

Table 1-3: Actual Revenues from FYE 2014 to 2023

FYE	$1,000	FYE	$1,000
2014	54,172	2019	58,268
2015	61,830	2020	55,406
2016	56,872	2021	65,355
2017	61,949	2022	58,847
2018	62,817	2023	71,477

Table 1-4: Estimated Total Revenues from FYE 2024 to 2028

FYE	Revenue (in $1000s)
2024	66,279
2025	70,275
2026	76,267
2027	82,313
2028	89,327

Table 1-5: Estimated Net Revenues from FYE 2024 to 2028

FYE	Revenue (in $1000s)
2024	7.444
2025	7.410
2026	10,966
2027	15,621
2028	20,936

Net revenues (total revenues less operating expenditures) are one source of funding the CIP. BSA's 5-year Capital Improvement Program (CIP) is currently $ 386.9M. The projected five-year amount available to fund this CIP is currently approximately $195M as detailed below:

- 2024 EFC bond issue - $39MM
- 2026 EFC bond issue - $70MM
- Capital contributions from reserves - $15MM
- Capital contributions from operations 2024-2028 - $27 MM
- Unspent funds from prior 2021 EIB - $49MM

1.5.2 Recent Rate Developments

BSA regularly performs rate reviews and formal rate studies to verify the accuracy and appropriateness of rates. BSA's last rate increase occurred July 1, 2005. On January 16, 2023, a Report on Fiscal Year 2022-23 Rates and Charges for Sewer Services was performed. The reports conclusions are presented below:

"The consistently stated goals of the Authority are to build a reserve balance to a level expected by rating agencies for a sewer system the size of the Buffalo Sewer Authority and to support capital improvements to the System over the long term. While there is no required rate increase necessary for Fiscal 2022-23, and there has been no increase to rates and charges since FY 2005-06, the Authority should consider a review of its overall rate structure over the next few years to make certain the anticipated improvements identified under its long-term control plan can be adequately supported. Those improvements were previously estimated to be over $781MM.

No immediate adjustments to current rates and/or drainage/capacity charges are proposed for FY2022-23 for consideration by the Authority at this time."

BSA has recently engaged Raftelis to review their rate system and financing strategy to close the capital program funding gap. In their study, Raftelis:

1. Prepared a baseline financial forecast, from FY 2025 to FY 2029, using the most recent operating budget and capital plan for the Authority and according to the funding assumptions included in the Authority's most recent Financial Capability Assessment Report.
2. Identified the cumulative five-year increase in assessment and user rate revenues that would be necessary to fund system operations and the capital program as part of the baseline forecast.
3. Prepared three alternative five-year rate plan scenarios showing the amount of capital investments that could be funded over the forecast period with a better optimized capital funding mix to expand funding capacity and to minimize rate impacts.

4. For the baseline forecast and the three alternative rate plans: a. Compared the amount of capital that could be funded over the forecast period, and b. Compared the cumulative five-year increase in assessment and user rate revenues.
5. Documented findings and conclusions resulting from the evaluation.

Using a $358 million LTCP and non-LTCP capital expenditures target for 2025-2029, Raftelis concluded that the cumulative revenue increase needed to fund the planned capital over this period was projected to be 66 percent. Three alternative five-year rate plans were prepared that included a more optimized capital funding mix:

- The 5 percent rate plan was projected to be able to provide $268 million in capital funding over the five-year forecast period and resulted in a cumulative five-year revenue increase of 30 percent. This is $90 million less funding capacity than is estimated to be needed over the forecast period.
- The 7 percent rate plan was projected to be able to provide $355 million in capital funding, while resulting in a five-year revenue increase of 43 percent. This is comparable to the amount of funding needed over the forecast period and resulted in a reduced customer impact as compared to the baseline scenario.
- The 9 percent plan was projected to provide over $440 million in capital funding and resulted in a cumulative five-year revenue increase of 58 percent.

Noting the uncertainties over the cost and timing of several high dollar value projects, Raftelis recommended that the financial forecast should be updated so that specific annual increases to assessment and user rates and charges can be provided.

1.5.3 Revenue Sources

BSA currently has nine (9) revenue sources:

- Assessed sewer rents in City
- Metered water use sewer rents
- Assessed sewer rents Outside City
- Metered sewer rents Outside City
- Flat rate water use rents
- Industrial waste
- Outside City Districts
- Miscellaneous fees and charges
- State and Federal Aid

1.5.3.1 Assessed Sewer Rents in City

An amount (currently $19,852,600) shall be collected from all real property in the City of Buffalo (the "City") by apportioning the said amount upon such property within the City as the same is set down on the last completed annual assessment roll of the City, except that no ad valorem sewer rent shall be assessed against real property exempt from real property taxes.

1.5.3.2 Metered Water Use Sewer Rents

If a customer is a user of water supplied by the Buffalo Water Board or from any other source, and the quantity of water used is measured by a water meter acceptable to BSA, then in each such case, the quantity

of water used, as measured by said meter, shall be used to determine the sewer charge or rental, and the charge for such use shall be as follows:

1. $48.30 for 0 to 4,000 cubic feet of water used per quarter year, if the meter is read quarterly, and any water used in excess thereof shall bear a sewer charge or rental of $11.09 per thousand cubic feet ($.0111 per cubic foot).
2. $16.10 for 0 to 1,333 cubic feet of water used per month, if the meter is read monthly, and any water used in excess thereof shall bear a sewer charge or rental of $11.09 per thousand cubic feet ($.0111 per cubic foot).

1.5.3.3 Assessed Sewer Rents Outside City

An annual service charge for the privilege of connecting with the facilities of BSA shall be due for any premises situated outside the limits of the City for each $1,000 of assessed valuation as determined on the last completed annual assessment. The 2021 – 2022 rate is $2.71239 per $1,000 of assessed valuation.

1.5.3.4 Metered Sewer Rents Outside City

If an outside City customer is a user of water supplied by the Buffalo Water Board or from any other source, and the quantity of water used is measured by a water meter acceptable to BSA, then in each such case, the quantity of water used, as measured by said meter, shall be used to determine the sewer charge or rental, and the charge for such use shall be as follows:

1. $48.30 for 0 to 4,000 cubic feet of water used per quarter year, if the meter is read quarterly, and any water used in excess thereof shall bear a sewer charge or rental of $11.09 per thousand cubic feet ($.0111 per cubic foot).

2. $16.10 for 0 to 1,333 cubic feet of water used per month, if the meter is read monthly, and any water used in excess thereof shall bear a sewer charge or rental of $11.09 per thousand cubic feet ($.0111 per cubic foot).

1.5.3.5 Flat Rate Water Use Rents

If a customer is a user of water supplied by the Buffalo Water Board, and the quantity of water used is not measured by a water meter acceptable to BSA, then the sewer charge or rental for all such accounts shall be determined through a table of descriptors (building height, fixtures, etc.).

1.5.3.6 Industrial Waste

As a condition of a Buffalo Discharge Elimination System Permit (BPDES), a user may be required to pay an industrial waste surcharge for discharging sewage or waste exhibiting a strength of sewage or waste greater than normal domestic sewage.

1.5.3.7 Outside City Districts

BSA currently has seven service contracts with municipalities and sewer districts outside the city limits. These districts are billed for their share of costs allocable to the treatment of their flow to the treatment plant. Allocable costs include portions of administrative expenses, Treatment Facility expenses, Industrial Waste expenses, the costs to maintain trunk sewers, and debt service costs. The municipality or district is billed twice annually for services. The municipality or district is billed, not individual property owners. Intermunicipal agreements (IMAs) with each Outside City District covers flow measurement. Under the IMAs,

each District is responsible for installing and maintaining meters at BSA city lines. BSA has rights to challenge accuracy of meters including installing test meters.

- Erie County Sewer District #1 connects to the Buffalo Sewer System through a 36" main on Mineral Springs Road at the City/Town line. Flows from this district are measured through a metering station located just to the east of the I-90 highway overpass of Mineral Springs Road.
- Erie County Sewer District #4 connects into the Buffalo Sewer Interceptor System through a 66" main at Bailey and Seneca Streets. There is one upstream Buffalo Sewer connection to this line at Cable Street and the Buffalo River through a 10" combined sewer. The flows from Erie County Sewer District #4 are measured at a Metering Station located at 75 South Pierce Street.
- The Town of Cheektowaga discharges to the Buffalo Sewer System through a 48" sewer connection the Scajaquada Tunnel in Schiller Park at the City/Town line. Flows are measured through a metering station at the point of interconnection.
- The Village of Sloan connects to the Buffalo Sewer System through three distinct connections: an 18" sanitary sewer connection to a 20" combined sewer on Vanderbilt Street at the City Line; an 8" sanitary sewer connection to the 15" combined sewer at the intersection of Richard and Cambria; and a 12" sanitary sewer connection to a 15" combined sewer at Richard Drive and the City line. The Village of Sloan is required to operate and maintain flow metering devices and provide records upon request for the first two connections and for the last charges are based on water usage.
- West Seneca Sewer Districts 1, 2, and 10 connect to the Buffalo Sewer System through a 20" sanitary sewer that discharges to a 20" combined sewer at Wildwood Avenue and Beyer Place. West Seneca Sewer District 3 discharges through a 10" sanitary sewer connection to the 10" combined sewer at Edson Street at the City line. West Seneca Sewer District 4 discharges to the Buffalo Sewer System through a 10" combined sewer connection at Duerstein and the City line. West Seneca Sewer District 9 discharges to the Buffalo Sewer System through a 12" sanitary sewer connection to a 12" combined sewer at Burch Street at the City line. The Town of West Seneca is required to operate and maintain flow metering devices for all of these points of interconnection.
- West Seneca Town Sewer Districts 5, 13, and 14 discharge to Buffalo Sewer through a 36" sanitary sewer which connects into the Buffalo Sewer System at its intersection with a 42" main in Cazenovia Park approximately 300 feet southeast of Cazenovia Parkway. The Town of West Seneca is required to operate and maintain flow metering devices this point of interconnection.
- West Seneca Sewer District connects to Buffalo's Sewer System through a 10" sanitary connection at Pierce and Casimir Streets. The Town of West Seneca is required to operate and maintain a flow metering device at this point of interconnection.

Debt service costs are allocated to outside City Districts based on historic flows to the treatment plant.

1.5.3.8 Miscellaneous Fees and Charges

Miscellaneous fees and charges include drainage connection service charges, waste hauler charges, interest charges on overdue bills and other fees and charges typical of a wastewater utility.

1.5.3.9 State and Federal Aid

BSA pursues State and Federal aid when available and appropriate. Although BSA will continue to pursue State and Federal aid throughout the projection period, this projection does not anticipate receiving State or Federal aid between FY 25 and FY 28.

1.5.4 Debt Service

The principal and interest payments on the outstanding bonds over the projection period are shown below:

Table 1-6 Debt Service Schedule FY2024-2028

Debt Service Schedule					
	FY24	FY25	FY26	FY27	FY28
Series J	$ 417,781	$ 415,467	$ 407,685	$ 409,478	$ 395,693
Series K	$ 281,725	$ 278,535	$ 279,992	$ 275,848	$ 271,450
Series L	$ 521,963	$ 513,424	$ 504,574	$ 500,297	$ 495,483
Series M	$ 494,093	$ 493,332	$ 486,666	$ 484,312	$ 476,270
Series N	$ 1,599,340	$ 1,581,570	$ 1,566,848	$ 1,545,427	$ 1,527,224
Series O	$ 218,948	$ 222,597	$ 226,231	$ 229,895	$ 233,544
2021 EIB	$ 2,669,488	$ 2,670,288	$ 2,669,088	$ 2,665,888	$ 2,666,888
(18) Proposed 2024 EFC $39M				$ 2,100,000	$ 2,100,000
Proposed 2026 EFC $70M					$ 3,800,000
Total Debt Service	$ 6,203,338	$ 6,175,213	$ 6,141,084	$ 8,211,145	$ 11,966,552

A portion of the interest for the 2024 EFC issue will be prepaid and the first debt service payment will be made after June 30, 2026.

SECTION 2 ALTERNATIVES ANALYSIS

This section looks at several possible solutions to minimizing CSOs to surface waters and offers a brief discussion of the viability of each solution. Green Infrastructure has been included as a measure to address combined sewer overflows and urban flooding throughout the CSO 053 sewershed but has been determined in the initial site evaluation to not be a feasible option to fully address the issues. The recommended solution is expanded in greater detail in the Recommended Alternative section.

2.1 Description of Sidney OLS Alternatives

An Alternatives Evaluation Report was prepared by Xylem to look at possible solutions for reducing CSOs resulting from wet weather in the sewer system. The report is provided in **Appendix G**. It looked at three different alternatives:

- Alternative 1: Sidney and Lark Street OLS
- Alternative 2: East Ferry ILS
- Alternative 3: Schiller Park OLS
- Alternative 4: No Action

Alternative 2, East Ferry ILS, was in the 2014 Long-term Control Plan but was removed from consideration prior to optimization. Investigations demonstrated that storage is not available in this section due to low basement and side sewer connections.

Alternative 3, Schiller Park OLS, was considered an option on Hemingway Street. The tank has an area of 106,952 square feet with an 8.00-million-gallon capacity. It would require approximately 1,144 LF of new 48" gravity sewer for the tank influent and effluent lines. Figure 2.1 illustrates a conceptual design for this project.

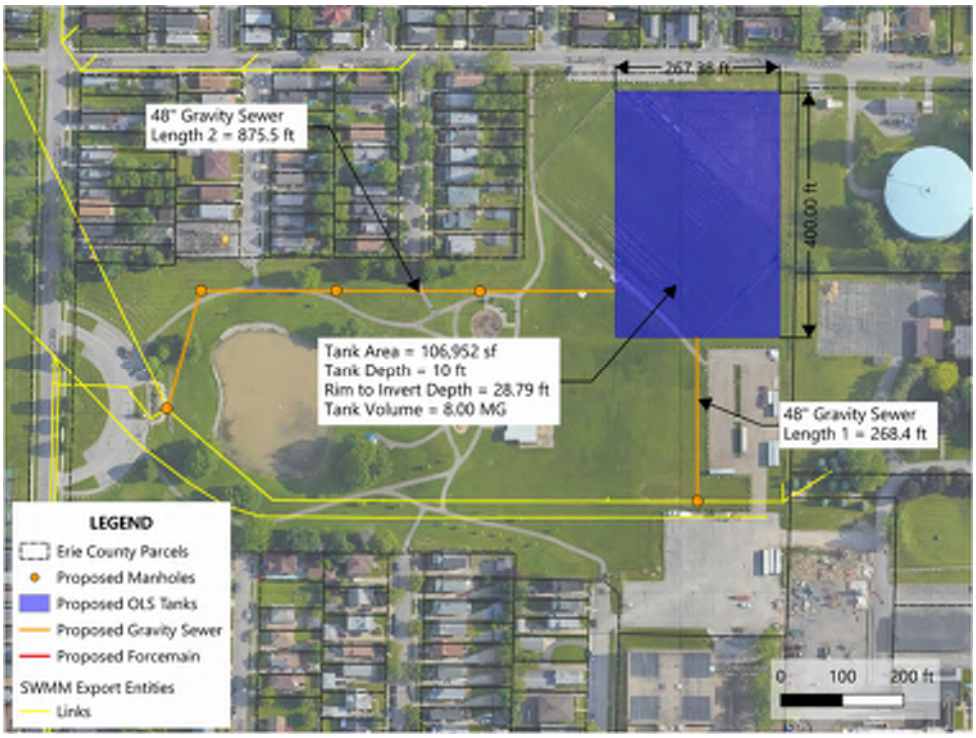


Figure 2-1: Proposed OLS Tank Location at Schiller Park

The No Action alternative can also be considered as an alternative to the Sidney OLS. Choosing to make no modification here will make no reduction in CSO activations, therefore leading to no increased protection of water quality or the community. Though this is the option with the lowest cost, it does not meet the mandates of the AO and is not considered further.

2.2 Opinion of Probable Construction Costs - Sidney OLS Alternatives

Below shows the opinion of probable construction costs for the two alternatives considered for CS0 53 storage tanks. The Class 5 estimate for Alternatives 1 and 3 are broken down in **Appendix E**. The appendix also includes annual operations and maintenance costs broken down by year in addition to rehabilitation and replacement costs.

Alternatives	OPCC (2022 in $ Million)
Alternative 1: Sidney and Lark Street OLS	30.93
Alternative 3: Schiller Park OLS	90.34

2.3 Non-monetary Factors Considered

Non-monetary factors considered included flexibility in design, construction challenges, and location that allows for adequate staging, and constraints related to the Scajaquada Tunnel.

Alternative 1 was recommended due to having the least construction challenges and cost, and most flexibility with tank design. Its location allows for adequate construction staging and flexibility in tank depth due to the invert of the Scajaquada Tunnel Interceptor.

SECTION 3 SUMMARY AND COMPARISON OF ALTERNATIVES

SECTION 4 RECOMMENDED ALTERNATIVE

4.1 Sidney Street and Lark Street

The design of the Sidney and Lark Street OLS Tank consists of a 125 ft. by 140 ft. tank holding 3.26 million gallons. The design includes adding a 48" gravity sewer going east from the Humboldt Parkway Sewer for the tank influent, and a 36" gravity sewer going north on Lark Street for the tank effluent. The effluent has a connection at the Scajaquada Tunnel Interceptor. **Figure 4-1** shows the proposed configuration. The tank reduces flows at SPP336B and would store flow diverted until there is sufficient available capacity in the Scajaquada Tunnel Interceptor. This location was selected because of the ability to dewater by gravity into the Scajaquada Tunnel Interceptor. Also, the lot on the other side of Lark Street can be used for construction staging. The invert depth of the Scajaquada Tunnel Interceptor allows for an additional 10 feet of tank depth.

Figure 4-1: Proposed OLS Tank Location at Sidney Street and Lark Street

Figure 4-2 and

Figure 4-3 show the existing plan and profile of the Humboldt Pkwy Sewer and Scajaquada Tunnel Interceptor.

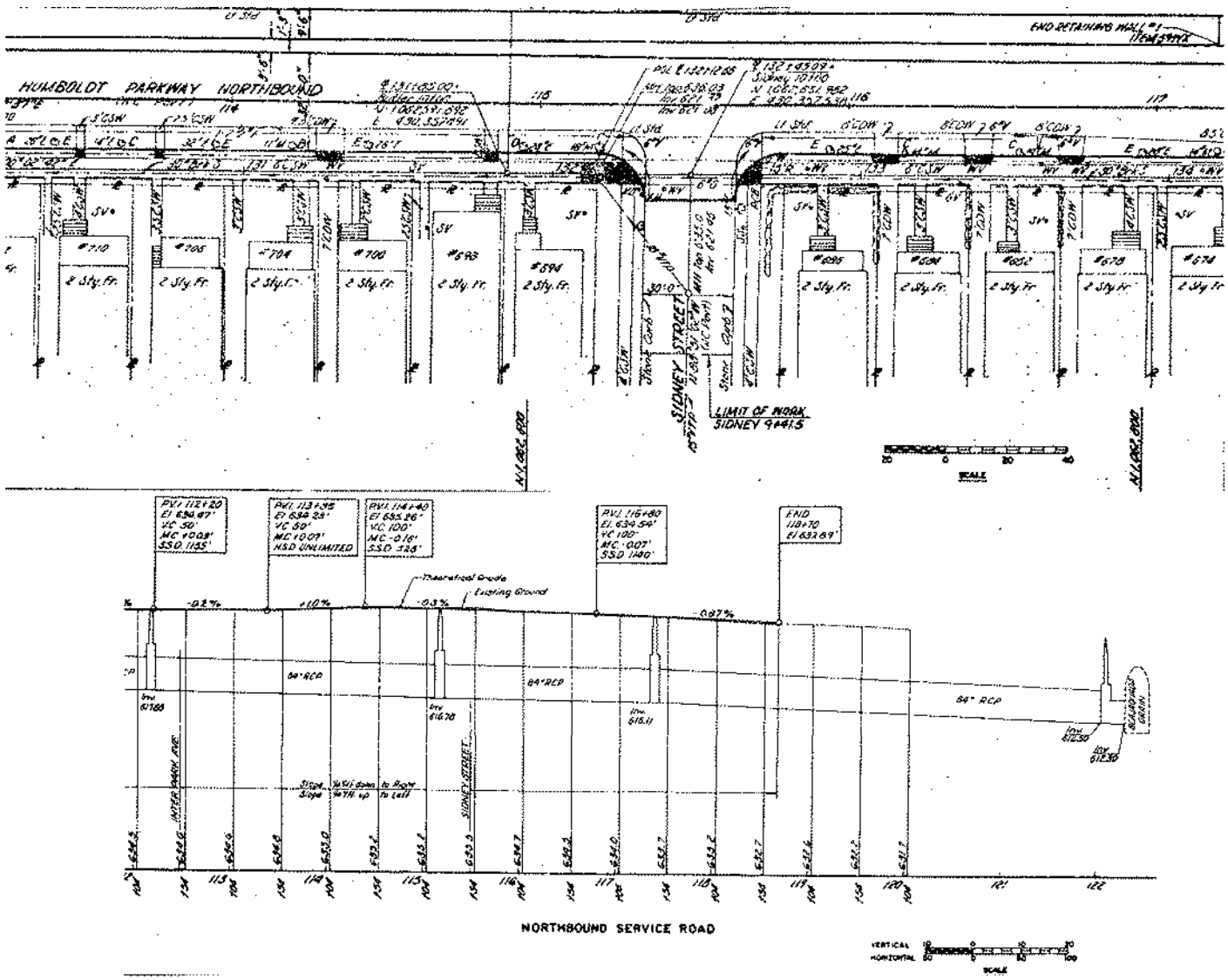


Figure 4-2: Existing Humboldt Pkwy Sewer Plan and Profile

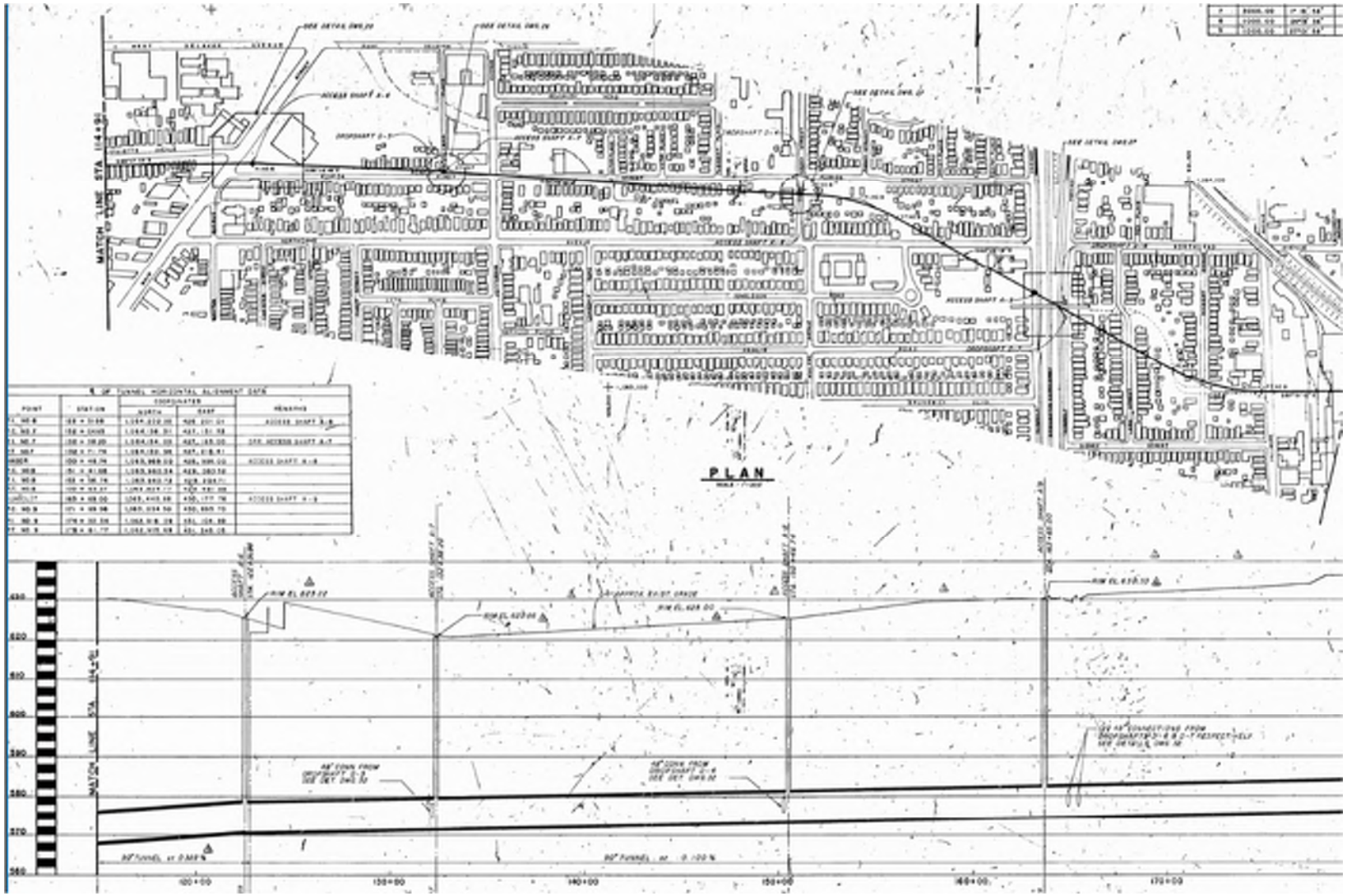


Figure 4-3: Existing Scajaquada Tunnel Interceptor Plan and Profile

4.2 Design Parameters

The main design parameters for the site are based on average and peak flows as noted in Section 1.3.4. Flow conditions are determined by SWMM modeling based on the Modified 1993 typical year and existing meters within the system. The area of the tank is constrained by the size of the lot at this location. The storage tanks will utilize weirs to move water from storage back into the system via gravity into the Scajaquada Tunnel Interceptor. The tank would also include a floor flushing system through flushing gates or tipping buckets to prevent the buildup of debris inside the tank.

4.3 Next Steps

As part of this project, potential impacts to environmental resources are being evaluated through the State Environmental Quality Review (SEQR) process. The project is an Unlisted action but will undergo a coordinated review as if it were a Type I action. Buffalo Sewer will act as the lead agency. Coordination, consultation, and permitting with state and federal agencies is concurrent with detailed design to ensure impacts to environmental resources are mitigated to the extent feasible.

This is a design/bid project, with independent prime subcontractors to be engaged.

Design of the work outlined in this report will proceed through Winter of 2024, with regulatory review occurring when the design is complete. If regulatory approvals are obtained in time, construction will begin in the Fall of 2025, with the goal of completion by Spring of 2026. The schedule is summarized in **Table 3-1**. Financing and regulatory approvals need to be secured for the Project to proceed along this timeline.

Table 4-1: Anticipated Project Schedule

Description	Anticipated Completion Date
Design	Winter 2026
Regulatory Review	Spring 2027
Bidding	Summer 2027
Construction Start Date	Fall 2027
Construction End Date	Spring 2032

Refer to **Appendix F** for the signed engineering report certification.

APPENDIX A: Buffalo Sewer Authority Administrative Order Issued by DEC/EPA

UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY
REGION 2

IN THE MATTER OF:

Buffalo Sewer Authority
1038 City Hall
Buffalo, New York 14202-3310

SPDES Permit No. NY0028410

Respondent

Amended Administrative Order for Compliance pursuant to Sections 308(a) and 309(a) of the Clean Water Act, 33 U.S.C. §§ 1318(a) and 1319(a).

AMENDED

ADMINISTRATIVE ORDER

CWA-02-2014-3033

(Amends CWA-02-2012-3024)

This Amended Administrative Order CWA-02-2014-3033 amends Administrative Order CWA-02-2012-3024 to include: developments in the enforcement action since the March 9, 2012 effective date of Administrative Order CWA-02-2012-3024; updated General Provisions to reflect current practice; and to correct a date in the Findings of Fact and Findings of Violation. The Amendments to Administrative Order CWA-02-2012-3024 reflect the developments leading up to and including the approval of Buffalo Sewer Authority's Combined Sewer Overflow Long Term Control Plan and associated implementation schedule by the United States Environmental Protection Agency and the New York State Department of Environmental Conservation. Amended provisions can be found in Paragraphs 4, 11 and 13-20 of the Findings of Fact and Findings of Violation, Paragraphs 2.a., 2.f., 3, 3.a., 3.d.ii of the Ordered Provisions and Paragraphs 1-8 of the General Provisions.

STATUTORY AUTHORITY

The following Findings of Violation and Order for Compliance ("Order") are made and issued pursuant to Sections 308(a) and 309(a) of the Clean Water Act ("CWA"), 33 U.S.C. §§ 1318(a) and 1319(a). This Authority has been delegated by the Administrator of the United States Environmental Protection Agency ("EPA") to the Regional Administrator, EPA Region 2 and further delegated to the Director of the Division of Enforcement and Compliance Assistance, Region 2, EPA.

1. Section 301(a) of the CWA, 33 U.S.C. § 1311 (a), makes it unlawful for any person to discharge any pollutant from a point source to waters of the United States, except, inter alia, with the authorization of, and in compliance with, a National Pollutant Discharge Elimination System ("NPDES") permit issued pursuant to Section 402 of the CWA, 33 U.S.C. § 1342.

2. Section 402 of the CWA, 33 U.S.C. § 1342, authorizes the Administrator of EPA to issue a NPDES permit for the discharge of any pollutant, or combination of pollutants subject to certain requirements of the CWA and conditions which the Administrator determines are necessary. The New York State Department of Environmental Conservation ("NYSDEC") is the agency with the authority to administer the federal NPDES program in New York pursuant to Section 402 of the CWA, 33 U.S.C. § 1342. EPA maintains concurrent enforcement

authority with authorized states for violations of the CWA. Additionally, under the authority granted to the NYSDEC by the EPA under Section 402(b) of the CWA, 33 U.S.C. § 1342(b), a State Pollutant Discharge Elimination System ("SPDES") permit is required to be issued to facilities by the NYSDEC for the discharge of pollutants from said facilities from a point source to a navigable water of the United States.

3. Section 308 of the Act, 33 U.S.C. § 1318, provides, in relevant part, that the Administrator of EPA may require the owner or operator of any point source to, among other things: establish and maintain such records; make such reports; install, use and monitor such equipment; sample such effluents; and provide such other information as may reasonably be required in order to carry out Section 402 of the Act, 33 U.S.C. § 1342.

4. "Person" is defined by Section 502(5) of the CWA, 33 U.S.C. § 1362(5), to include an individual, corporation, partnership, association or municipality.

5. "Municipality" is defined by Section 502(4) of the CWA, 33 U.S.C. § 1362(4), to include among other things, a city, town, borough, county, parish, district, associations, or other public body created by or pursuant to State law and having jurisdiction over disposal of sewage, industrial wastes, or other wastes.

6. "Pollutant" is defined by Section 502(6) of the CWA, 33 U.S.C. § 1362(6), to include among other things, solid waste, dredged spoil, rock, sand, cellar dirt, sewage, sewage sludge and industrial, municipal and agricultural waste discharged into water.

7. "Point source" is defined by Section 502(14) of the CWA, 33 U.S.C. § 1362(14), to include any discernible, confined and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, or vessel or other floating craft, from which pollutants are or may be discharged.

8. "Navigable waters" is defined by Section 502(7) of the CWA, 33 U.S.C. § 1362(7), to include the waters of the United States.

9. "Discharge of a pollutant" is defined by Section 502(12) of the CWA, 33 U.S.C. § 1362(12), to include any addition of any pollutant to navigable waters from any point source.

10. Section 402(q) of the CWA, 33 U.S.C. § 1342(q), provides that each permit, order, or decree issued pursuant to the chapter after December 21, 2000, for a discharge from a municipal combined storm and sanitary sewer shall conform to the Combined Sewer Overflow Policy ("CSO Policy") signed by the Administrator on April 11, 1994.

11. The CSO Policy states that "permittees with CSOs are responsible for developing and implementing long-term CSO control plans that will ultimately result in compliance with the requirements of the CWA."

12. Section 309(a) of the CWA, 33 U.S.C. § 1319(a), authorizes the Administrator to issue an order requiring compliance or commence a civil action when any person is found to be in violation of Section 301 of the CWA, 33 U.S.C. § 1311, or in violation of any permit condition or limitation in a permit issued under Section 402 of the CWA, 33 U.S.C. § 1342.

FINDINGS OF FACT AND FINDINGS OF VIOLATION

1. The Buffalo Sewer Authority ("BSA" or "Respondent"), is a public benefit municipal corporation, organized and existing under the laws of the State of New York, and located in Buffalo, New York. BSA has authority, control over and operates the sewer system within its boundaries, including, but not limited to the combined sewer system, the sanitary sewer system, and the related wastewater treatment plant.

2. BSA is a "person" and "municipality" within the meaning of Sections 502(5) and 502(4) of the CWA, 33 U.S.C. §§ 1362(5) and 1362(4).

3. BSA has discharged and continues to discharge "pollutants" within the meaning of Sections 502(6) and 502(12) of the CWA, 33 U.S.C. §§ 1362(6) and 1362(12), from the Buffalo wastewater treatment plant and sewer system through "point sources" within the meaning of Section 502(14) of the CWA, 33 U.S.C. § 1362(14) into the Niagara River, Black Rock Canal, Erie Basin, Buffalo River, Scajaquada Creek, Cazenovia Creek, and Cornelius Creek, each of which is a "navigable water" within the meaning of Section 502(7) of the CWA, 33 U.S.C. § 1362(7).

4. The NYSDEC, under the authority of Section 402(b) of the CWA, 33 U.S.C. § 1342(b), issued SPDES Permit No. NY0028410 (the "SPDES Permit") to BSA, with an effective date of July 1, 1999. The NYSDEC renewed the SPDES permit on February 3, 2004, on June 25, 2009, and again on December 31, 2013. It is scheduled to expire on June 30, 2019. The SPDES Permit authorizes BSA to discharge pollutants from a single wastewater treatment plant outfall and fifty-eight (58) combined sewer overflow structures ("CSO structures") at locations specified in the SPDES Permit, subject to certain limitations and conditions.

5. The Schedule of Compliance in the July 1, 1999 SPDES Permit provided in pertinent part as follows:

   "Development of Abatement Plan for Combined Sewer Overflow

   The permittee shall develop a combined sewer overflow abatement facility plan in accordance with the Phase I Long Term CSO Control Plan requirements specified in the USEPA Combined Sewer Overflow Policy (Federal Register Vo. 59, No. 75 4/19/94).

   This Abatement Plan shall contain all of the Long Term Plan elements specified in Section II C of the National CSO Policy, and further delineated in the USEPA document, "Combined Sewer Overflows, Guidance for Long-Term Control Plan" dated September, 1995. The permittee may choose either the "Presumption" or the "Demonstration" approach for the evaluation of alternatives.

   The Abatement Plan should integrate the pollutant reduction achievable by the implementation of the CSO Best Management Practices (BMPs) as required on pages 19-21 of this permit into the long term control plan. The Department will consider work or studies already completed or currently in progress for integration into the long term control plan.

   The permittee shall submit a completed CSO Abatement Facility Plan including a schedule of implementation to the Department.

The permittee shall report to the NYSDEC progress/status of plan development in intervals not to exceed 90 days.

Upon approval of the CSO Abatement Facility Plan, the NYSDEC will propose a SPDES permit modification, pursuant to Uniform Procedures – 6 NYCRR – Part 621, to include the schedule of implementation."

6. The SPDES Permit was modified October 2, 2001 to, among other changes, modify the deadline for submittal of a CSO Abatement Plan (hereinafter either "Abatement Plan," "combined sewer overflow abatement facility plan," "Long-Term Control Plan," "LTCP" or "updated LTCP") from July 1, 2001 to July 1, 2002. On August 29, 2002, the CSO Abatement Plan deadline was amended, by permit modification, again to July 1, 2003. On January 12, 2004, the CSO Abatement Plan deadline was again amended, by permit modification, to February 1, 2004.

7. BSA failed to submit the required Abatement Plan by February 1, 2004. BSA did not submit an Abatement plan until July 14, 2004, 164 days late.

8. BSA's failure to timely submit the required Abatement Plan is a violation of the SPDES Permit and is, therefore, a violation of Section 301 of the CWA, 33 U.S.C. § 1311.

9. Under a cover letter dated April 20, 2006, the NYSDEC notified the BSA that the Abatement Plan submitted by BSA on July 14, 2004 was not acceptable in that it would not meet the water quality objectives of the CSO Control Policy and had therefore failed to satisfy the SPDES Permit requirements of a combined sewer overflow abatement facility plan, as described in paragraph 5 above. This NYSDEC cover letter required that BSA revise its LTCP accordingly and submit it to the NYSDEC by July 31, 2006. BSA failed to submit such a revised LTCP to the NYSDEC by July 31, 2006.

10. Accordingly, EPA, NYSDEC, the U. S. Department of Justice ("USDOJ"), and the New York State Office of Attorney General commenced discussions with BSA to settle the violation. The settlement was to be embodied in a Consent Decree, under the auspices of federal court, for the development and implementation of a LTCP.

11. Since those discussions were on-going, the SPDES Permit was modified, effective January 1, 2010, to include Section VIII entitled "CSO LONG-TERM CONTROL PLAN," which states the following:

"BSA submitted a CSO Long-Term Control Plan (LTCP) in July 2004 in accordance with the requirements of their SPDES permit. Currently, the USEPA, USDOJ, NYSDEC and the permittee are engaged in negotiations concerning the LTCP, and anticipate that these negotiations will result in the entry of a Consent Decree. The Consent Decree will govern the permittee's obligations in ensuring that the WWTF and the combined sewer overflow discharges comply with the requirements of the Clean Water Act and the 1994 CSO Control Policy. This permit may be modified upon the ratification of the Consent Decree in accordance with 6 NYCRR Part 621."

12. To date, however, the parties have not reached a settlement nor entered into a Consent Decree.

13. On March 9, 2012, EPA, Region 2 issued an Administrative Order, Docket No. CWA-02-2012-3024 ("2012 Order"), to BSA, to address violations of the CWA (33 U.S.C. § 1251 et seq) and NYSDEC SPDES Permit number NY0028410. The 2012 Order requires that BSA update its CSO LTCP and that the Updated CSO LTCP include a schedule for the design, construction, and implementation of all control/treatment measures selected by BSA, to be completed as expeditiously as practicable, following any applicable environmental impact assessment review, pursuant to the New York State Environmental Quality Review Act, but in any event by no later than December 31, 2027.

14. In accordance with the 2012 Order, BSA submitted an Updated CSO LTCP, dated April 30, 2012, to the EPA and the NYSDEC for review and approval. Pursuant to "Ordered Provisions," Item 2.e of the 2012 Order, based on a joint review of the Updated CSO LTCP, the EPA and the NYSDEC declined to approve the Updated CSO LTCP and provided comments to BSA in a letter dated December 6, 2012.

15. The EPA and the NYSDEC met with BSA on February 12, 2013 to discuss the EPA's and the NYSDEC's comments. BSA followed up with a letter dated March 1, 2013 which, among other things, specified that BSA would submit a No Feasible Alternatives ("NFA") analysis and submit its Green Infrastructure ("GI") Master Plan to the Agencies by August 2, 2013, and would meet with the Agencies on or about August 15, 2013 to discuss those submittals.

16. Technical representatives of the EPA and the NYSDEC met with BSA to specifically discuss BSA's GI Master Plan on August 20, 2013. BSA followed up by providing the EPA and the NYSDEC with further information on its GI Master Plan on August 28, 2013. The EPA and the NYSDEC determined that an analogous technical meeting to discuss BSA's NFA analysis was not needed and indicated this to BSA in an email transmission dated September 11, 2013.

17. In a letter dated October 23, 2013 from EPA to BSA, EPA provided BSA with final written comments on BSA's Updated CSO LTCP. BSA was given until January 10, 2014 to submit its final revised CSO LTCP to EPA and NYSDEC. EPA's letter dated October 23, 2014 required that BSA provide a detailed implementation schedule as part of its final revised CSO LTCP and, based partly on work to be completed at the BSA wastewater treatment plant which was not originally contemplated, allowed a twenty year implementation schedule.

18. On January 10, 2014, BSA submitted its final revised CSO LTCP to EPA and to NYSDEC for review and approval. The final revised CSO LTCP includes a twenty year schedule.

19. In a letter dated March 18, 2014, EPA and NYSDEC approved BSA's final revised CSO LTCP. The approved CSO LTCP includes a twenty year implementation schedule, which is beyond the final compliance date of December 31, 2027, required by the EPA's 2012 Order.

20. Therefore, based on the above, EPA is issuing Amended Administrative Order, Docket No. CWA-02-2014-3033, to incorporate a twenty year implementation schedule and a final compliance date of March 18, 2034.

ORDERED PROVISIONS

Based on the Findings of Fact and Findings of Violation set forth above, and pursuant to the authority of Sections 308(a) and 309(a) of the CWA, 33 U.S.C. §§ 1318(a) and 1319(a), and in accordance with Section 402(q) of the CWA, 33 U.S.C. § 1342 (q), it is hereby ORDERED that:

1. Immediately upon receipt of the original copies of this Order, a responsible official of BSA shall complete and sign the acknowledgment of receipt of one of the originals of the Order and return said original to the Chief, Compliance Section, Water Compliance Branch, Division of Enforcement and Compliance Assistance, in the enclosed envelope to the address listed below.

2. Development of Updated Long Term Control Plan: BSA shall revise and implement an approved Updated LTCP consistent with the requirements of the CSO Policy and applicable State law and regulation. The Updated LTCP shall provide for the construction and implementation of all wastewater treatment plant ("WWTP") and sewer system improvements and other measures necessary to ensure that: (i) CSO discharges from all CSO discharge outfalls comply with the technology-based and water quality-based requirements of the CWA, the CSO Control Policy and state law and regulation; and (ii) bypasses at the WWTP are in compliance with the bypass conditions in 40 C.F.R. § 122.41(m), 327 IAC 5- 2-8(11), and shall demonstrate that there are no feasible alternatives to the remaining bypasses, in accordance with Section II.C.7 of the CSO Control Policy.
   a. By no later than April 30, 2012, BSA shall submit to EPA and NYSDEC an Updated LTCP. The schedule included in the Updated LTCP shall require the design, construction, and implementation of all control/treatment measures selected by BSA as expeditiously as practicable, following any applicable environmental impact assessment review pursuant to the New York State Environmental Quality Review Act ("SEQR review"), but in any event by no later than March 18, 2034.
   b. The Updated LTCP shall include, at a minimum:
      i. An update of the system characterization information, receiving water characterization information, existing conditions information, CSO control objectives, and any other information presented in the 2004 LTCP that is no longer current;
      ii. BSA's previous screening and subsequent evaluation of individual CSO control technologies and site-specific CSO controls. The Updated LTCP shall: (1) reassess the results of that original evaluation in light of the applicability of recreation-protective bacteria standards in BSA's receiving waters; (2) include, as appropriate, new technologies and controls (such as green infrastructure ("GI") and bio-ballasted flocculation treatment) not considered in the 2004 LTCP; and (3) in particular, carry out a new evaluation of a range of updated system-wide alternatives. Together, BSA's prior and updated system-wide alternatives evaluation shall include a sufficiently wide range of alternatives for eliminating, reducing, or treating CSO discharges, and for eliminating or reducing bypass discharges (except as permitted in the bypass conditions in 40 C.F.R. § 122.41(m) and 327 IAC 5-2-8(11)). The updated evaluation shall consider the costs and effectiveness (in terms of reduction in number of overflow events, overflow volume reduction, pollutant loading reductions, water quality improvements, etc.) predicted to result from implementation of each of the updated system-wide alternatives.

iii. In evaluating the relative performance of the updated system-wide alternatives and in selecting a preferred alternative, BSA shall give the highest priority to controlling overflows to sensitive areas as required under the CSO Control Policy, at section II.C.3.

iv. BSA's Updated LTCP shall include past and current alternative evaluation efforts that together include at a minimum: (1) taking no-action; (2) complete sewer separation (3) partial separation of various portions of the combined sewer system; (4) installation of various sizes of storage or equalization basins at the Buffalo Sewer Authority WWTP and/or in the sewer system; (5) construction of new secondary or advanced wastewater treatment plants; (6) construction of increased treatment capacities at the existing facilities; (7) construction of additional facilities (such as high rate treatment or ballasted flocculation facilities or its equivalent) for providing primary treatment or better than primary treatment of discharges from CSO discharge outfall structures; (8) construction of new intercepting sewers from the sewer system to the facilities; (9) construction of facilities for providing disinfection (and dechlorination, if necessary) of CSO discharges; (10) construction of facilities for removing floatables from CSO discharges; (11) construction of relief sewers; (12) relocation of CSO discharge outfall structures; (13) implementation of pretreatment measures to reduce flows and/or pollutants discharged into the sewer system from industrial users; (14) consideration of the use of GI where feasible, and (15) construction and/or implementation of combinations of these alternatives. These evaluations shall be carried out in accordance with Chapter 3 of EPA's "Combined Sewer Overflows Guidance for Long-Term Control Plan."

v. The Updated LTCP shall describe BSA's prior technology screening assessments and shall include, at a minimum, BSA's evaluation of the technical feasibility and applicability of each alternative or combination of alternatives at each CSO discharge outfall or grouping of CSO discharge outfalls. Where necessary, BSA shall update said assessments in light of the applicability of recreation-protective bacteria standards in BSA's receiving waters.

vi. BSA's updated evaluation of system-wide alternatives shall include:

1. An evaluation of a range of "sizes" of each updated system-wide alternative that will, for the typical year achieve an average volume of wet weather percent capture from 75 to 100 percent and reduce the average number of untreated CSO Discharge events to 0, 1-3, 4-7 and 8-12 per year. The updated LTCP shall include a detailed description of the 12 month rainfall record that BSA has utilized in developing its Updated LTCP, and that BSA will utilize in implementing its Post Construction Monitoring Program. The Updated LTCP shall describe in detail BSA's analysis of its available long term rainfall record, its basis for selecting its "typical year," and, in the event that BSA selects a "modified year" as its "typical year," shall discuss in detail all modifications made to the actual rainfall record to arrive at the "modified" rainfall record. The updated LTCP shall include a detailed tabular summary of the "modified" rainfall record, such that it is clear exactly what rainfall record shall be used in implementing the PCMP;

2. A determination of the estimated "project costs," as that term is described on pages 3-49 through 3-51 of the EPA's "Combined Sewer Overflows Guidance for Long-Term Control Plan," for each size of each updated system-wide alternative. The determination of the estimated "project costs" shall include: (a) "capital costs," "annual operation and maintenance costs," and "life cycle costs," as those terms are described on pages 3-49 through 3-51 of EPA's "Combined Sewer Overflows Guidance for Long-Term Control Plan;" and (b) an itemization of the "capital costs" and "annual operation and maintenance costs" used to determine the total "project costs" for each separate component of each alternative or combination of alternatives; and

3. An evaluation, using a validated collection system model, of the expected reduction in number of CSO events, CSO discharge volume and pollutant discharge quantity from each CSO discharge point for each size of each updated system-wide alternative. The evaluation shall include, at a minimum, an analysis of the improvement in every pollutant of concern, which are: fecal coliform in all receiving waters, and DO/BOD/SOD in the Buffalo River, Scajaquada Creek, and the Black Rock Canal.

vii. For each system-wide alternative, BSA's assessment shall include an evaluation, using water quality models, of the expected water quality improvements in the receiving waters that will result from implementation of each updated system-wide alternative. The evaluation shall include, at a minimum, an analysis of the improvement in every pollutant of concern in that receiving water.

viii. For each updated system-wide alternative, BSA shall include a cost-performance analysis, such as a "knee of the curve" analysis, for each alternative or combination of alternatives that will allow for the comparison of the costs to: (1) the associated expected water quality improvements; (2) the reduction of CSO discharge and bypass discharge volume; (3) the reduction in CSO discharge and bypass discharge events; (4) the increase in percent wet weather capture; and/or (5) the reduction in pollutant loading from CSO discharge and bypass discharge events.

ix. The Updated LTCP shall include a financial capability analysis that complies with USEPA's "Combined Sewer Overflows – Guidance for Financial Capability Analysis and Schedule Development" February 1997).

x. The Updated LTCP shall include the selection of CSO control measures, including the construction of all sewer system and facility improvements necessary to ensure compliance with the technology-based and water quality-based requirements of the CWA, state law and regulation and BSA's SPDES permit. The Updated LTCP shall include the selection of bypass discharge control measures, so as to ensure that all remaining bypasses are in compliance with the bypass conditions in 40 C.F.R. § 122.41(m), 327 IAC 5- 2-8(11), and shall demonstrate that there are no feasible alternatives to the remaining bypasses, in accordance with Section II.C.7 of the CSO Control Policy.

xi. The Updated LTCP shall include an expeditious schedule for the design, construction, and implementation of all CSO control measures selected by BSA. If it is not possible for BSA to design and construct all measures simultaneously, the Updated LTCP shall include a phased schedule based on the relative

importance of each measure, with highest priority being given to eliminating discharges to sensitive areas and to those projects which most reduce the discharge of pollutants. The schedule shall specify critical construction milestones for each specific measure, including, at a minimum, dates for: (1) submission of applications for all permits required by law; (2) start of design; (3) commencement of construction; (4) completion of construction; (5) completion of construction; and (6) achievement of full operation.

c. The alternatives evaluated should include the use of GI wherever feasible to reduce CSO volumes and handle separated storm water. GI shall generally mean systems and practices that use or mimic natural processes to infiltrate, evapotranspire, and/or harvest storm water on or near the site where it is generated. GI applications and approaches that may be considered include, but are not limited to, green roofs, downspout disconnection, trees and tree boxes, rain gardens, vegetated swales, pocket wetlands, infiltration planters, vegetated median strips, permeable pavements, reforestation, and protection and enhancement of riparian buffers and floodplains. EPA and NYSDEC encourage BSA to utilize GI projects as appropriate to reduce or replace gray infrastructure projects included in the Updated LTCP provided that any GI project proposed is anticipated to provide substantially the same or greater level of control as the alternative gray infrastructure project. Should BSA rely on other entities to implement GI projects, BSA must have in place agreements as appropriate, to ensure proper operation and maintenance of the GI project. For any GI project submitted as part of the Updated LTCP, BSA shall submit to EPA and NYSDEC a detailed GI project proposal outlining each proposed project.

   i. The GI project proposal shall be consistent with this Administrative Order and shall at a minimum include the following for each project:

      1. Data on location, sizing, design, and the performance criteria expected to be achieved with the implementation of the GI project, utilizing the information and models that BSA used in developing the Updated LTCP, and any monitoring information used in formulating the proposal; along with a demonstration of the long term effectiveness and performance expected to be achieved with implementation of the project;
      2. A description of the work required to implement the GI project and a schedule for completion of this work and implementation of the project that is consistent with this Administrative Order and the date set forth herein in Paragraph 2(a) for completion of construction and full implementation of all remedial and control measures;
      3. A description of the proposed ownership of and access to the GI project, and should BSA rely on other entities to implement the GI project, BSA must explain what agreements will be necessary to ensure proper operation and maintenance of the GI project (i.e., permanent access, sufficient control over key aspects of the project), and how they will be enforced to ensure proper operation and maintenance of the GI project; and
      4. A description of any post-construction monitoring and modeling to be performed that is necessary to determine whether the performance criteria set forth, as noted above, will be met upon completion and implementation of the GI project.

ii. Upon review of BSA's GI project proposal, EPA and NYSDEC will comment, approve, disapprove, or approve in part, the proposal:

1. BSA shall implement each GI project approved by EPA and NYDEC in accordance with the provisions and schedule in the approved proposal;
2. If the GI project proposal is approved in part, BSA shall, upon written direction from EPA and NYSDEC, take all actions in the approved portion of the GI proposal that EPA and NYSDEC determine are technically severable from any disapproved portions. For the disapproved portions, BSA shall, within 90 Days, correct all deficiencies and resubmit the proposal for approval. If the resubmission is approved in whole or in part, BSA shall proceed in accordance with this subparagraph; or
3. If the GI project proposal is disapproved, EPA and NYSDEC's decision is final. For each project which is disapproved, BSA shall propose an alternative GI project or gray infrastructure project, or combined green and gray infrastructure project, within 90 days of the date of disapproval. In the event that BSA's alternative proposal is disapproved by EPA and NYSDEC due to the GI project component of the proposal, BSA shall propose an alternative gray infrastructure project within 90 days of the date of disapproval.

iii. In the event that BSA implements an approved GI project proposal that fails to meet the specified performance criteria set forth in the project proposal and Updated LTCP, BSA shall propose, within 180 days after submittal of the applicable post-construction monitoring report documenting said failure, an additional green or gray infrastructure project designed to achieve the performance criteria with a schedule for completion of this work and implementation of the project that is consistent with this Administrative Order and the date set forth herein in Paragraph 2(a) for completion of construction and full implementation of all remedial and control measures. In the alternative, where BSA has substantially met the performance criteria, BSA may, within sixty (60) days after its knowledge of a project's failure to meet the performance criteria, petition EPA and NYSDEC for a change in the performance criteria. After consideration of any such request by BSA, EPA and NYSDEC's decision will be final. In the event that EPA and NYSDEC disapprove of BSA's request for a change in the performance criteria, BSA shall, within 180 days after EPA and NYSDEC's disapproval, propose additional control measures designed to achieve the performance criteria with a schedule for completion of this work and implementation of the Project that is consistent with this Administrative Order and the date set forth herein in Paragraph 2(a) for completion of construction and full implementation of all remedial and control measures.

iv. BSA shall submit to EPA an update on its implementation of GI projects as part of the semi-annual reports due on March 1st and September 1st of each year.

d. If BSA seeks to replace any gray infrastructure projects provided in the Updated LTCP, BSA shall submit to EPA and NYSDEC a detailed GI project proposal outlining each proposed project consistent with the requirements of Paragraph 2(c).

e. EPA and NYSDEC may approve the Updated LTCP or decline to approve it and provide written comments. Within 120 days of receiving EPA's and NYSDEC's written comments, BSA shall modify the Updated LTCP consistent with EPA's and

NYSDEC's written comments, and resubmit the Updated LTCP to EPA and NYSDEC for final approval.

f. Upon receipt of EPA's and NYSDEC's final approval of the Updated LTCP (hereinafter "Approved CSO LTCP"), BSA shall implement the measures in the Approved CSO LTCP in accordance with the schedule in the Plan, including certain milestones of which listed in the Appendix, "BSA Approved CSO LTCP Implementation Schedule," and shall complete the implementation of its Approved CSO LTCP by not later than March 18, 2034.

3. Post Construction Monitoring Plan: Within one year of approval of the Updated LTCP, BSA shall submit to EPA and NYSDEC for approval, a work plan for conducting an ongoing study or series of studies ("Post-Construction Monitoring Plan") to help determine: (1) whether the Approved CSO LTCP measures, when completed, meet all performance criteria specified in the Approved CSO LTCP; (2) whether BSA's CSOs comply with the technology-based and water quality-based requirements of the CWA, state law, the CSO Control Policy, all applicable federal and state regulations, and its SPDES Permit, for all CSO-receiving waters; and (3) whether all remaining bypasses are in compliance with the bypass conditions in 40 C.F.R. § 122.41(m), 327 IAC 5- 2-8(11), and demonstrate that there are no feasible alternatives to the remaining bypasses, in accordance with Section II.C.7 of the CSO Control Policy. The Post-Construction Monitoring Plan shall be consistent with the guidance "Combined Sewer Overflows Guidance for Long-Term Control Plan."

a. The Post-Construction Monitoring Plan shall contain a schedule for performance of the study or series of studies at key points during the course of the implementation of the remedial measures, as well as after completion of the remedial measures, specified in the Approved CSO LTCP. The Post-Construction Monitoring Plan also shall indicate the years (at least biannually) in which data generated during implementation of the Post-Construction Monitoring Plan will be submitted in the reports in Paragraph 4 to EPA and NYSDEC.

b. EPA and NYSDEC may approve the Post-Construction Monitoring Plan or may decline to approve it and provide written comments. Within ninety (90) days of receiving EPA's and NYSDEC's comments, BSA shall alter the Post-Construction Monitoring Plan consistent with EPA's and NYSDEC's comments, and resubmit the Plan to EPA and NYSDEC for final approval.

c. Upon final approval of the Post Construction Monitoring Plan, BSA shall implement, in accordance with the schedule therein, the Post-Construction Monitoring Plan. If the results of the Post-Construction Monitoring Plan indicate areas of non-compliance, BSA shall, within 120 days, (unless a different period is specified) of being requested in writing to do so, submit to EPA and NYSDEC a Supplemental Compliance Plan which includes the actions that BSA will take to achieve compliance and a schedule for taking such actions. Upon approval by the EPA and NYSDEC, BSA shall implement the Supplemental Compliance Plan, in accordance with the schedule specified in the approved Plan.

d. Within one hundred twenty (120) days after completion and implementation of the Post-Construction Monitoring Plan, BSA shall submit a Final Post-Construction-Monitoring Report to EPA and NYSDEC, for review, comment and approval, that:

i. demonstrates that BSA performed the Post-Construction Monitoring Plan in accordance with the approved Plan and schedule set forth in the approved Post-Construction Monitoring Plan; and

ii. summarizes the data collected during Post-Construction Monitoring and analyzes whether the completed control measures have met and/or are meeting the performance criteria specified in the Approved CSO LTCP; whether BSA's CSOs comply with the requirements of the CWA, state law, the CSO Control Policy, all applicable federal and state regulations, and BSA's SPDES Permits; and whether all remaining bypasses are in compliance with the bypass conditions in 40 C.F.R. § 122.41(m), 327 IAC 5- 2-8(11), and demonstrate that there are no feasible alternatives to the remaining bypasses, in accordance with Section II.C.7 of the CSO Control Policy.

e. EPA and NYSDEC may approve the Final Post-Construction Monitoring Report or may decline to approve it and provide written comments. Within sixty (60) days of receiving EPA's and NYSDEC's comments, BSA shall alter the Final Post-Construction Monitoring Report consistent with EPA's and NYSDEC's comments, and resubmit the Report to EPA and NYSDEC for final approval. Approval of the Final Post-Construction Monitoring Report only constitutes EPA's and NYSDEC's approval that the report contains the information required by this Administrative Order; it does not mean that EPA and NYSDEC believe BSA has complied with any other requirement of this Administrative Order or federal or state law.

4. Reporting Requirements

a. Semi-Annual Status Reports. Upon the effective date of this Administrative Order, until EPA and NYSDEC's approval of the Final Post-Construction-Monitoring Report, BSA shall submit written Semi-Annual Status Reports to EPA and NYSDEC. These reports shall be submitted by no later than March 1st of each year (for the "reporting period" from July 1 through December 31 of the previous calendar year) and September 1st of each year (for the "reporting period" from January 1 through June 30 of the current calendar year). The Semi-Annual Status Reports may be provided either as paper documents or in electronic format, provided that the electronic format is compatible with EPA and NYSDEC software and is accompanied by a written certification on paper in accordance with "General Provisions" Paragraph 1. The written certification must be sent via certified or overnight mail. The frequency of reports, and the reporting period, may be amended upon written agreement from EPA and NYSDEC. In each written Semi-Annual Status Report, BSA shall provide, at a minimum, the following:

i. a statement setting forth (1) the deadlines and other terms that BSA has been required to meet since the date of the last statement; (2) whether and to what extent BSA has met those requirements; and (3) the reasons for any noncompliance (notification to EPA and NYSDEC of any anticipated delay shall not, by itself, excuse the delay);

ii. (1) a general description of the work completed within the prior reporting period; (2) to the extent known, a statement as to whether the work completed in that period meets applicable design criteria; (3) a projection of work to be performed during the next six-month period; (4) notification of any anticipated delays for the upcoming six month period of time; and (5) any changes in key personnel.

iii. If any public meetings were held, the report should include a copy of any advertisements placed for the meeting, any materials or handouts, formal meeting notes, and a summary of the meeting.

iv. BSA shall also submit, with each written status report, copies (to EPA only) of all monthly monitoring reports or other reports pertaining to CSOs and bypasses that BSA submitted to NYSDEC during the reporting period.

b. Semi-Annual Status Meetings. Representatives of EPA, NYSDEC and BSA shall conduct semi-annual meetings to discuss BSA's compliance status with the provisions of this Order. These meetings shall be scheduled during the months of March or April to discuss the previous reporting period, and September or October to discuss the previous reporting period. The meetings can be conducted telephonically if agreed in writing (including electronic correspondence) by all parties in advance. The frequency of such compliance meetings may be reduced upon written agreement (including electronic correspondence) from EPA and NYSDEC.

c. Annual Post Construction Monitoring Report. Upon the effective date of this Administrative Order, until EPA and NYSDEC's approval of the Final Post-Construction-Monitoring Report, BSA shall submit annually with its September 1st Semi-Annual Reports, an Annual Post Construction Monitoring Report containing information generated in accordance with the Post-Construction Monitoring Plan. The Annual Post Construction Monitoring report may be provided either as paper documents or in electronic format, provided that the electronic format is compatible with EPA and NYSDEC software and is accompanied by a written certification on paper in accordance with "General Provisions" Paragraph 1. The written certification must be sent via certified or overnight mail. The frequency of reports, and the reporting period, may be amended upon written agreement from EPA and NYSDEC.

d. Permits or Approvals. When it is necessary for BSA to obtain a federal, state, or local permit or approval or perform SEQR review, BSA shall submit timely and complete applications, or timely perform the SEQR review, and take all other actions necessary to obtain all such permits or approvals or to ensure compliance with SEQR.

GENERAL PROVISIONS

1. Any documents to be submitted by BSA pursuant to this Administrative Order shall be signed by an official of BSA or an authorized representative of BSA (see 40 C.F.R. § 122.2) and include the following certification:

> "I certify under penalty of law that I have examined and am familiar with the information submitted in this document and all attachments and that this document and its attachments were prepared under my direction or supervision in a manner designed to ensure that qualified and knowledgeable personnel properly gather and present the information contained therein. I further certify, based on my inquiry of those individuals immediately responsible for obtaining the information, that I believe that the information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment."

2. All notifications, reports, submissions and communications required by this Order shall be sent by certified mail or its equivalent to the following addresses:

Doughlas McKenna, Chief
Water Compliance Branch
Division of Enforcement and Compliance Assistance
United States Environmental Protection Agency, Region 2
290 Broadway, 20th Floor
New York, New York 10007-1866

Joseph DiMura, P.E.
Director, Bureau of Water Compliance Programs
Division of Water
New York State Department of Environmental Conservation
625 Broadway
Albany, New York 12233-3506

Regional Water Engineer
New York State Department of Environmental Conservation
Region 9
270 Michigan Avenue
Buffalo, New York 14203-2915

3. The Respondent shall have the opportunity, for a period of twenty (20) days from the effective date of this Order, to confer, regarding the Amendments to Administrative Order CWA-02-2012-3024, with the following designated Agency Representative:

Doughlas McKenna, Chief
Water Compliance Branch
Division of Enforcement and Compliance Assistance
United States Environmental Protection Agency, Region 2
290 Broadway, 20th Floor
New York, New York 10007-1866
(212) 637-4244

4. Respondent may seek federal judicial review of this Order pursuant to Chapter 7 of the Administrative Procedure Act, 5 U.S.C. §§ 701-706.

5. This Order does not constitute a waiver from compliance with, or a modification of, the effective terms and conditions of the CWA, its implementing regulations, or any applicable permit, which remain in full force and effect. Issuance of this Order shall not be deemed an election by EPA to forego any civil or criminal actions for penalties, fines, imprisonment, or other appropriate relief under the CWA.

6. Notice is hereby given that should EPA commence an action in a United States District Court for a violation of any Ordered Provision of this Order, Respondent may be subject to (1) civil penalties up to $37,500 per day for each day of violation, pursuant to Section 309(d) of the CWA, 33 U.S.C. § 13199d); and/or (2) injunctive relief, pursuant to Section 309(b) of the CWA, 33 U.S.C. § 1319(b), as imposed by the Court.

7. If any provision of this Order is held by a court of competent jurisdiction to be invalid, any surviving provisions shall remain in full force and effect.

8. Provisions of Administrative Order CWA-02-2012-3024, incorporated herein, continue to be effective as of March 9, 2012. The Amendments to Administrative Order CWA-02-2012-3024 contained in this Order CWA-02-2014-3033 shall become effective upon the date of execution by the Director, Division of Enforcement and Compliance Assistance.

Dated: APRIL 11, 2014 Signed: _____

Dore LaPosta, Director
Division of Enforcement and Compliance Assistance

APPENDIX

BSA Approved CSO LTCP Implementation Schedule

Project Name	Project Milestones/Deadlines
Phase I Projects (see Table 11-11)	
Bird/Lang RTC Projects	Construction Start and Completion Dates: 3/17/2014 – 9/2/2014 Operations/Optimization (RTC): 9/3/2014 – 9/3/15
Foundation Projects (see Table 11-11)	
Foundation 1 - Smith Street Storage	Engineering Start: 3/18/2014 Engineering Completion: 3/18/2015 Notice to Proceed3/18/2015 Substantial Completion: 3/18/2017
Foundation 2 - SPP Optimization (20 projects)	Engineering Start: 3/1/14 Engineering Completion: 3/18/2015[1] Notice to Proceed: 3/1/14 Substantial Completion: 3/18/2017[1]
Foundation 3 - Remaining RTC (14 sites)	Engineering Start: 3/18/2016 Engineering Completion: 3/18/2023[1] Notice to Proceed: 3/18/2017 Substantial Completion: 3/18/2024[1]
Foundation 4 - Hamburg Drain Optimizations	Engineering Start: 3/18/2015 Engineering Completion: 3/18/2017[1] Notice to Proceed: 3/18/2016 Substantial Completion: 3/18/2018[1]
Foundation 4 – Hamburg Drain Storage	Engineering Start: 3/18/2028 Engineering Completion: 3/18/2030 Notice to Proceed: 3/18/2030 Substantial Completion: 3/18/2032
Green Projects (see GI Master Plan)	
Green Pilot Projects – 267-acres of GI control	Engineering Start:3/1/14 Engineering Completion: 3/18/2016[2] Construction Completion Date: 3/18/2018[2] PCM Start and Completion Dates: 3/18/2016 – 3/18/2019[2] Construction of controls for at least 134 acres will have started by 9/18/2017
Green 2 – 410-acres of GI control	Engineering Start: 3/18/2019 Engineering Completion: 3/18/2023[2] Construction Completion Date: 3/18/2024[2] Construction of controls for at least 205 acres will have started by 3/18/2022[2]

Green 3 – 375-acres of GI control	Engineering Start: 3/18/2023 Engineering Completion: 3/18/2028[2] Construction Completion Date:3/18/2029[2] Construction of controls for at least 188 acres will have started by 9/18/2026[2]
Green 4 – 263-acres of GI control	Engineering Start: 3/18/2028 Engineering Completion: 3/18/2033[2] Construction Completion Date:3/18/2034[2] Construction of controls for at least 132 acres will have started by 9/18/2031[2]
WWTP	
WWTP Improvements Project – Alternative C2 (two consecutive projects)	Engineering Start: 3/18/2015 Engineering Completion: 3/18/2019[1] Notice to Proceed: 3/18/2017 Substantial Completion 3/18/2022[1]
Gray Projects (see Section 12.3)	
CSOs 014/15 – In-line storage and optimization	Construction Start: 3/18/14 Substantial Completion: 3/18/15
CSO 013 – Satellite storage, conveyance, FM & PS	Engineering Start: 3/18/2019 Engineering Completion: 3/18/2020 Notice to Proceed: : 3/18/2020 Substantial Completion: 3/18/2022
North Relief – Interceptor	Engineering Start: 3/18/2019 Engineering Completion: 3/18/2022 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 Engineering Completion: 3/18/2023 Notice to Proceed: 3/18/2023 Substantial Completion: 3/18/2024
SPP 337 (CSO 053) – Satellite storage, conveyance, FM & PS	Engineering Start: 3/18/2023 Engineering Completion: 3/18/2025 Notice to Proceed: 3/18/2025 Substantial Completion: 3/18/2027
SPP 336 a+b (CSO 053) – Satellite storage, conveyance, FM & PS	Engineering Start: 3/18/2024 Engineering Completion: 3/18/2026 Notice to Proceed: 3/18/2026 Substantial Completion: 3/18/2029

Jefferson & Florida (SPP 170B – CSO 053) – Satellite storage, conveyance and FM	Engineering Start: 3/18/2025 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 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 (storage at Tops from CSO 47 west)	Engineering Start: 3/18/2028 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 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 Engineering Completion: 3/18/2032 Notice to Proceed: 3/18/2032 Substantial Completion: 3/18/2034
Post Construction Monitoring	
Submit PCM Plan	3/18/2015
Implement PCM	Per approved PCM Plan

NOTES:

References specified in the Implementation Schedule above refer to the Approved BSA CSO LTCP, including the Green Infrastructure Master Plan, approved by EPA and NYSDEC on March 18, 2014.

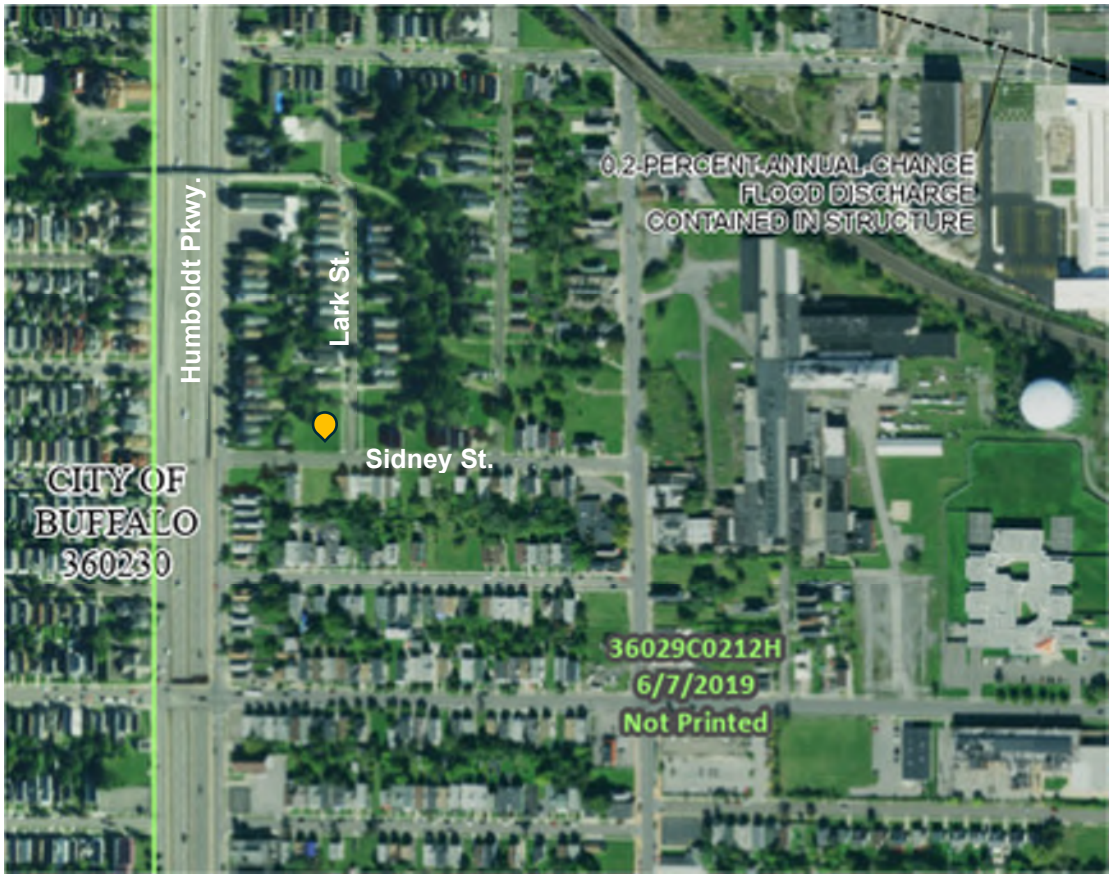
Engineering timeframes (from start to completion) include planning, design, permitting/SEQRA/Public Notice, regulatory review and approval, land/easement acquisition, funding, and bidding/award.

Substantial Completion is defined as the time at which the Project has progressed to the point where, in the opinion of Engineer, the Work is sufficiently complete, in accordance with the Contract Documents, so that the Project can be utilized for the purposes for which it is intended.

(1) Project consists of multiple smaller projects that will overlap in engineering and construction. Specific engineering completion and construction dates for each project site will determined and submitted to the Agencies as they are developed. In any case, all work associated with these blocks of projects will be completed within the overall timeframe shown.

(2) GI projects will consist of multiple smaller projects including building demolitions that will overlap in engineering and construction during a given GI phase. For each phase, the BSA will achieve the start of construction for at least 50 percent of the required acreage by the mid-point of each phase.

APPENDIX B: Flood Zone Map



APPENDIX C: IPaC Preliminary Report

IPaC **U.S. Fish & Wildlife Service**

IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Location

Erie County, New York

Local office

New York Ecological Services Field Office

(607) 753-9334
(607) 753-9699
fw5es_nyfo@fws.gov

3817 Luker Road
Cortland, NY 13045-9385

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

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1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information. IPaC only shows species that are regulated by USFWS (see FAQ).

2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS
Northern Long-eared Bat Myotis septentrionalis Wherever found This species only needs to be considered if the following condition applies: • This species only needs to be considered if the project includes wind turbine operations. No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/9045	Endangered
Tricolored Bat Perimyotis subflavus Wherever found This species only needs to be considered if the following condition applies: • This species only needs to be considered if the project includes wind turbine operations. No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/10515	Proposed Endangered

Clams

NAME	STATUS
Salamander Mussel Simpsonaias ambigua Wherever found There is **proposed** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/6208	Proposed Endangered

Insects

NAME	STATUS
Monarch Butterfly Danaus plexippus Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/9743	Candidate

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

There are no critical habitats at this location.

You are still required to determine if your project(s) may have effects on all above listed species.

Bald & Golden Eagles

Bald and golden eagles are protected under the Bald and Golden Eagle Protection Act[1] and the Migratory Bird Treaty Act[2].

Any person or organization who plans or conducts activities that may result in impacts to bald or golden eagles, or their habitats[3], should follow appropriate regulations and consider implementing appropriate conservation measures, as described in the links below. Specifically, please review the "Supplemental Information on Migratory Birds and Eagles".

Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

There are likely bald eagles present in your project area. For additional information on bald eagles, refer to Bald Eagle Nesting and Sensitivity to Human Activity

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, see the PROBABILITY OF PRESENCE SUMMARY below to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Dec 1 to Aug 31
Golden Eagle *Aquila chrysaetos* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1680	Breeds Jan 1 to Aug 31

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read "Supplemental Information on Migratory Birds and Eagles", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week

12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.

3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

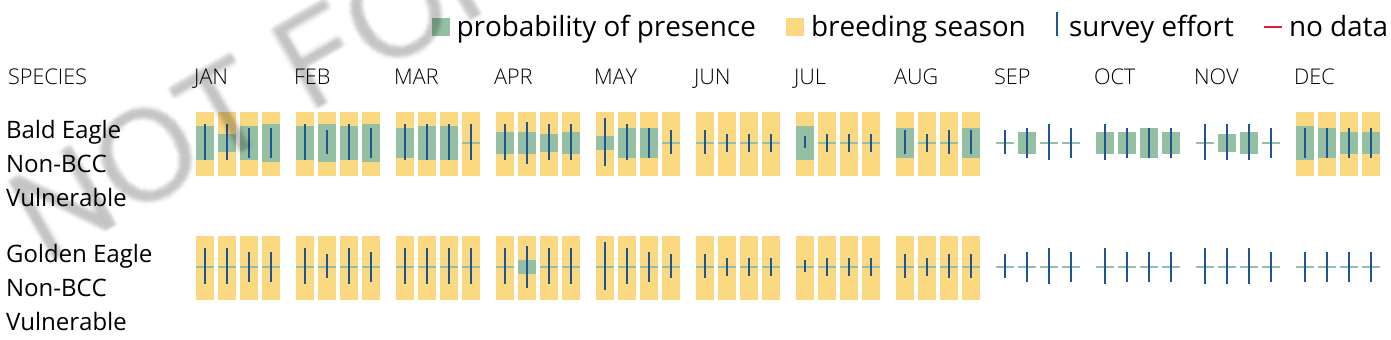
Breeding Season (▪)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



What does IPaC use to generate the potential presence of bald and golden eagles in my specified location?

The potential for eagle presence is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply). To see a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

What does IPaC use to generate the probability of presence graphs of bald and golden eagles in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur. Please contact your local Fish and Wildlife Service Field Office if you have questions.

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats[3] should follow appropriate regulations and consider implementing appropriate conservation measures, as described in the links below. Specifically, please review the "Supplemental Information on Migratory Birds and Eagles".

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-

golden-eagles-may-occur-project-action

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, see the PROBABILITY OF PRESENCE SUMMARY below to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Dec 1 to Aug 31
Belted Kingfisher *Megaceryle alcyon* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds Mar 15 to Jul 25
Black-billed Cuckoo *Coccyzus erythropthalmus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9399	Breeds May 15 to Oct 10
Blue-winged Warbler *Vermivora cyanoptera* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds May 1 to Jun 30
Bobolink *Dolichonyx oryzivorus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 20 to Jul 31

Canada Warbler Cardellina canadensis — Breeds May 20 to Aug 10
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Cerulean Warbler Setophaga cerulea — Breeds Apr 20 to Jul 20
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/2974

Chimney Swift Chaetura pelagica — Breeds Mar 15 to Aug 25
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Eastern Meadowlark Sturnella magna — Breeds Apr 25 to Aug 31
This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA

Eastern Whip-poor-will Antrostomus vociferus — Breeds May 1 to Aug 20
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Evening Grosbeak Coccothraustes vespertinus — Breeds May 15 to Aug 10
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Golden Eagle Aquila chrysaetos — Breeds Jan 1 to Aug 31
This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.
https://ecos.fws.gov/ecp/species/1680

Golden-winged Warbler Vermivora chrysoptera — Breeds May 1 to Jul 20
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/8745

Lesser Yellowlegs Tringa flavipes — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9679

Pectoral Sandpiper Calidris melanotos — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Prairie Warbler Setophaga discolor — Breeds May 1 to Jul 31
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Red-headed Woodpecker Melanerpes erythrocephalus — Breeds May 10 to Sep 10
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Rose-breasted Grosbeak Pheucticus ludovicianus — Breeds May 15 to Jul 31
This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA

Ruddy Turnstone Arenaria interpres morinella — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA

Semipalmated Sandpiper Calidris pusilla — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA

Short-billed Dowitcher Limnodromus griseus — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9480

Upland Sandpiper Bartramia longicauda — Breeds May 1 to Aug 31
This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA
https://ecos.fws.gov/ecp/species/9294

Wood Thrush Hylocichla mustelina — Breeds May 10 to Aug 31
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read

"Supplemental Information on Migratory Birds and Eagles", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

Breeding Season (■)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

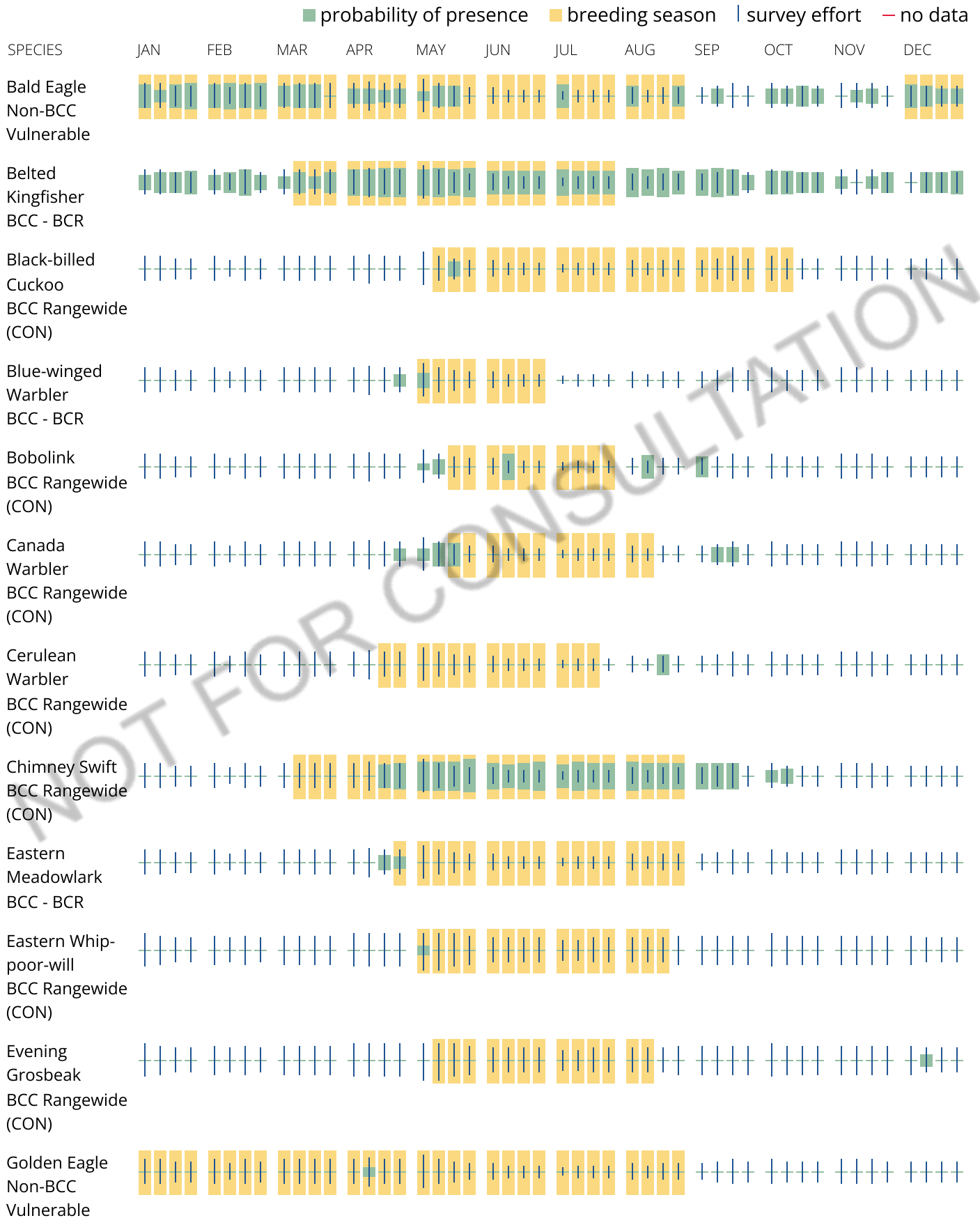
Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

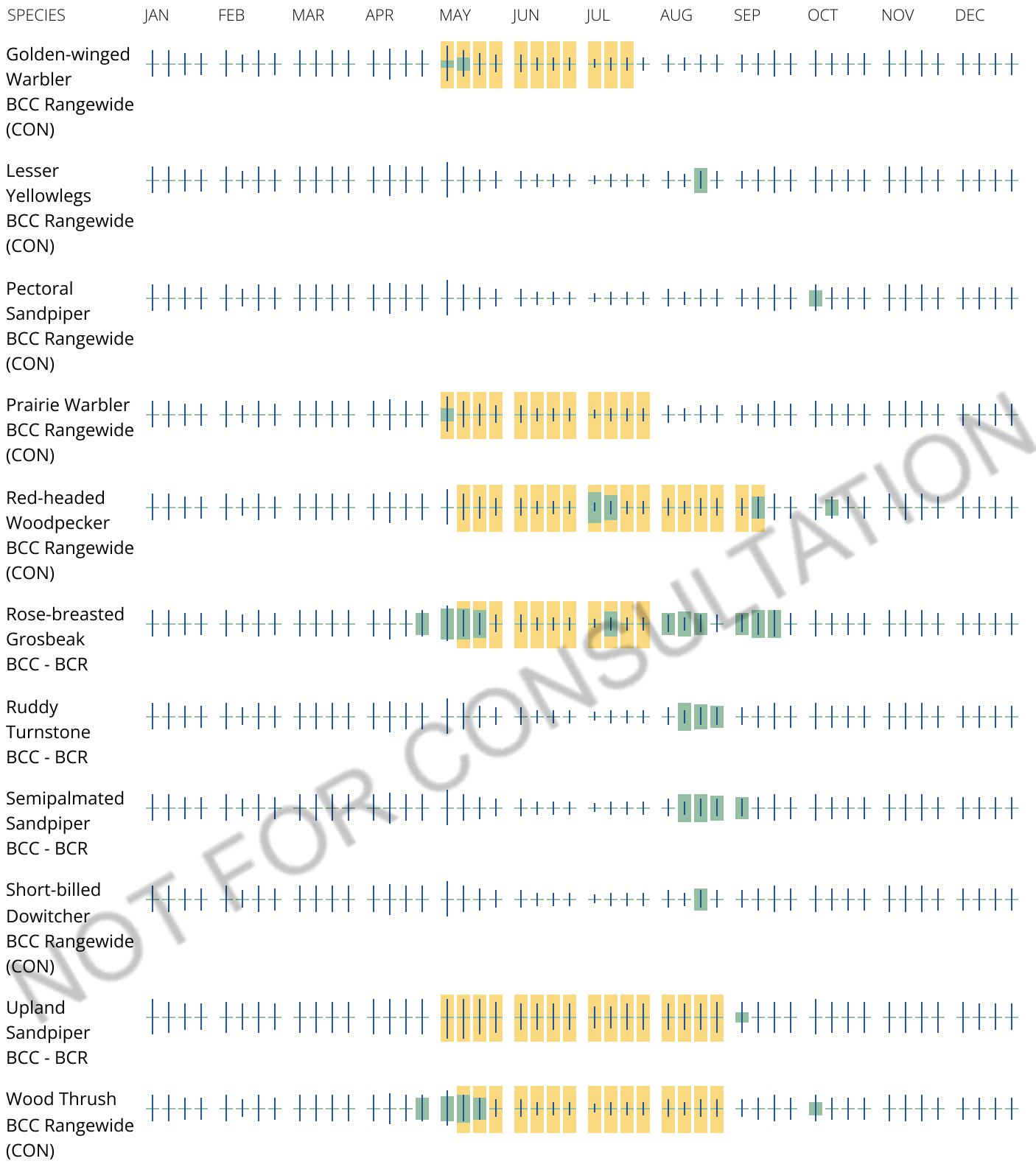
To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe

Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.





Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure.

To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the list of migratory birds that potentially occur in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets.

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering or migrating in my area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may query your location using the RAIL Tool and look at the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in

offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

There are no refuge lands at this location.

Fish hatcheries

There are no fish hatcheries at this location.

Wetlands in the National Wetlands Inventory (NWI)

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

This location did not intersect any wetlands mapped by NWI.

NOTE: This initial screening does **not** replace an on-site delineation to determine whether wetlands occur. Additional information on the NWI data is provided below.

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate Federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

APPENDIX D: State Pollution Discharge Elimination System (SPDES) Permit NY0028410

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

State Pollutant Discharge Elimination System (SPDES)
DISCHARGE PERMIT

First3.99

Industrial Code:	**4952**	SPDES Number:	**NY0028410**
Discharge Class (CL):	**05**	DEC Number:	**9-1402-00154/00002**
Toxic Class (TX):	**T**	Effective Date (EDP):	**07/01/2014**
Major Drainage Basin:	**01**	Expiration Date (ExDP):	**06/30/2019**
Sub Drainage Basin:	**01**	Modification Date (EDPM):	**10/01/2014**
Water Index Number:	**Ont 158**		
Compact Area:			

This SPDES permit is issued in compliance with Title 8 of Article 17 of the Environmental Conservation Law of New York State and in compliance with the Clean Water Act, as amended, (33 U.S.C. §1251 et.seq.) (hereinafter referred to as "the Act").

PERMITTEE NAME AND ADDRESS

Name: **Buffalo Sewer Authority** Attention: **David P. Comerford, General Manager**

Street: **1038 City Hall**

City: **Buffalo** State: **NY** Zip Code: **14202-3310**

is authorized to discharge from the facility described below:

FACILITY NAME AND ADDRESS

Name: **Bird Island Wastewater Treatment Facility** Contact: **James Keller Jr.,**

Location (C,T,V): **Buffalo (C)** County: **Erie**

Facility Address: **90 West Ferry Street**

City: **Buffalo** State: **NY** Zip Code: **14213**

NYTM -E: 181.42 NYTM - N: 4759.77

From Outfall No.: **002** at Latitude: **42 ° 55 ′ 16 ″** & Longitude: **78 ° 54 ′ 20 ″**

into receiving waters known as: **Niagara River** Class: **A-Special**

See additional outfalls listing on pages 3 through 5 of this permit.

in accordance with: effluent limitations; monitoring and reporting requirements; other provisions and conditions set forth in this permit; and 6 NYCRR Part 750-1.2(a) and 750-2.

DISCHARGE MONITORING REPORT (DMR) MAILING ADDRESS

Mailing Name: **Buffalo Sewer Authority**

Street: **90 West Ferry Street**

City: **Buffalo** State: **NY** Zip Code: **14213**

Responsible Official or Agent: **Sal LoTempio, Plant Superintendent** Phone: **(716) 883-1820**

This permit and the authorization to discharge shall expire on midnight of the expiration date shown above and the permittee shall not discharge after the expiration date unless this permit has been renewed, or extended pursuant to law. To be authorized to discharge beyond the expiration date, the permittee shall apply for permit renewal not less than 180 days prior to the expiration date shown above.

DISTRIBUTION:
BWP – Permit Writer
BWP – Permit Coordinator
Regional Water Engineer - Region 9
Regional Permit Administrator – Region 9
Michelle Josilo - EPA Region II

Regional Permit Administrator: David S. Denk

Address: NYSDEC - Division of Environmental Permits
270 Michigan Avenue
Buffalo, NY 14203-2915

Signature: Date: 8/20/14

TABLE OF CONTENTS

I. ADDITIONAL OUTFALLS

a) Treatment Plant

Outfall	Type	Location	Latitude	Longitude	Receiving Water
001	Primary Treatment Outfall	West Wall - Bird Island	42° 55' 10" N	78° 54' 16" W	Niagara River
01A	Headworks Bypass	West Wall - Bird Island	42° 55' 01" N	78° 54' 14" W	Niagara River
002	WWTF Outfall	West Wall - Bird Island	42° 55' 16" N	78° 54' 20" W	Niagara River

b) Combined Sewer Overflows

Outfall	Type	Location	Latitude	Longitude	Receiving Water
003	Weir & Orifice	Austin Street	42° 56' 14" N	78° 54' 26" W	Black Rock Canal
004	Leaping Weir	Bird Avenue	42° 55' 34" N	78° 53' 57"W	Black Rock Canal
005	Manhole	Potomac Avenue	42° 55' 27" N	78° 53' 27" W	Black Rock Canal
006	Weir & Orifice	W. Delevan Avenue	42° 55' 20" N	78° 53' 29" W	Black Rock Canal
007	Weir & Orifice	W. Delevan Avenue	42° 55' 20" N	78° 55' 20" W	Black Rock Canal
008	Leaping Weir	Brace Street	42° 55' 15" N	78° 54' 00" W	Black Rock Canal
009	Leaping Weir	Auburn Street	42° 55' 08" N	78° 54' 03" W	Black Rock Canal
010	Leaping Weir	Breckenridge Street	42° 55' 02" N	78° 54' 05" W	Black Rock Canal
011	Weir & Orifice	Albany St to W. Wall - Bird Island	42° 54' 49" N	78° 54' 12" W	Niagara River
012	Weir & Orifice	Albany Street	42° 54' 48" N	78° 54' 07" W	Black Rock Canal
013	Weir & Orifice	Virginia Street	42° 53' 20" N	78° 53' 37" W	Buffalo Harbor
014	Manhole	Fourth Street	42° 53' 01" N	78° 53' 12" W	Erie Basin Slip #3
015	Leaping Weir	Genesee Street	42° 52' 58" N	78° 53' 07" W	Erie Basin Slip
016	Weir & Orifice	Erie Street	42° 52' 55" N	78° 52' 57" W	Erie Basin
017	Manhole	Hamburg Drain, Main Street	42° 52' 38" N	78° 52' 47" W	Buffalo River
022	Manhole	Baltimore Street	42° 52' 23" N	78° 52' 29" W	Buffalo River
023	Manhole	Ohio Street	42° 52' 01" N	78° 52' 05" W	Buffalo River
025	Manhole	Hamburg Street	42° 51' 51" N	78° 51' 37" W	Buffalo River
026	Manhole	Smith Street	42° 51' 49" N	78° 51' 03" W	Buffalo River
027	Weir & Orifice	Babcock Street	42° 51' 48" N	78° 50' 16" W	Buffalo River
028	Manhole	Boone Street	42° 51' 38" N	78° 49' 56" W	Buffalo River

Outfall	Type	Location	Latitude	Longitude	Receiving Water
029	Weir & Orifice	Boone Street	42° 51' 38" N	78° 49' 56" W	Buffalo River
031	Manhole	Kimmel Avenue	42° 21' 37" N	78° 49' 29" W	Cazenovia Creek
032	Manhole	W. of Bailey Avenue	42° 51' 43" N	78° 49' 35" W	Buffalo River
033	Leaping Weir	Bailey Avenue	42° 51' 48" N	78° 49' 33" W	Buffalo River
035	Weir & Orifice	Cazenovia Park	42° 51' 02" N	78° 48' 31" W	Cazenovia Creek
037	Manhole	Salem Street	42° 51' 09" N	78° 48' 41" W	Cazenovia Creek
038	Manhole	Kingston Place	42° 51' 10" N	78° 48' 40" W	Cazenovia Creek
039	Leaping Weir	Tamarack Street	42° 51' 13" N	78° 48' 46" W	Cazenovia Creek
040	Manhole	Yale Place	42° 51' 15" N	78° 48' 46" W	Cazenovia Creek
042	Manhole	S. Ryan Street	42° 51' 19" N	78° 48' 51" W	Cazenovia Creek
044	Manhole	Mumford Street	42° 51' 27" N	78° 49' 06" W	Cazenovia Creek
046	Leaping Weir	Unger Avenue	42° 51' 32" N	78° 49' 13" W	Cazenovia Creek
047	Manhole	Southside Parkway	42° 51' 35" N	78° 49' 22" W	Cazenovia Creek
048	Weir & Orifice	E. of Bailey Ave.	42° 51' 38" N	78° 49' 29" W	Cazenovia Creek
049	Weir & Orifice	W. of Bailey Ave.	42° 51' 42" N	78° 49' 36" W	Buffalo River
050	Weir & Orifice	Seneca Street	42° 51' 20" N	78° 49' 16" W	Buffalo River
051	Weir & Orifice	Hillery Park	42° 51' 43" N	78° 48' 38" W	Buffalo River
052	Weir & Orifice	S. Ogden Street	42° 51' 54" N	78° 48' 08" W	Buffalo River
053	Weir & Gate	Scajaquada Drain	42° 55' 26" N	78° 51' 26" W	Scajaquada Creek
054	Manhole	Crowley Avenue	42° 57' 07" N	78° 54' 36" W	Niagara River
055	Weir	Niagara Street	42° 56' 35" N	78° 54' 35" W	Cornelius Creek, Niagara River
056	Weir	Nottingham Terrace	42° 56' 06" N	78° 52' 39" W	Scajaquada Creek
057	Weir	Tonawanda	42° 55' 43" N	78° 53' 52" W	Scajaquada Creek
058	Weir	West Avenue	42° 55' 49" N	78° 53' 45" W	Scajaquada Creek
059	Weir	DeWitt Street	42° 55' 51" N	78° 53' 39" W	Scajaquada Creek
060	Weir	Elmwood Avenue	42° 56' 04" N	78° 52' 42" W	Scajaquada Creek
061	Weir	Scajaquada Tunnel, Lafayette Avenue	42° 55' 15" N	78° 54' 01" W	Black Rock Canal
062	Weir	West Ferry Street	42° 54' 55" N	78° 54' 07" W	Black Rock Canal
063	Weir	Front Park	42° 54' 10" N	78° 54' 07" W	Black Rock Canal

Outfall	Type	Location	Latitude	Longitude	Receiving Water
064	Manhole	Ohio Drain, Ohio Street	42° 51' 59" N	78° 52' 06" W	Buffalo River
066	Manhole	Sloan Drain, S. Ogden Street	42° 51' 53" N	78° 49' 21" W	Buffalo River

II. PERMIT LIMITS, LEVELS AND MONITORING DEFINITIONS

OUTFALL	WASTEWATER TYPE	RECEIVING WATER	EFFECTIVE	EXPIRING
	This cell describes the type of wastewater authorized for discharge. Examples include process or sanitary wastewater, storm water, non-contact cooling water.	This cell lists classified waters of the state to which the listed outfall discharges.	The date this page starts in effect. (e.g. EDP or EDPM)	The date this page is no longer in effect. (e.g. ExDP)

PARAMETER	MINIMUM	MAXIMUM	UNITS	SAMPLE FREQ.	SAMPLE TYPE
e.g. pH, TRC, Temperature, D.O.	The minimum level that must be maintained at all instants in time.	The maximum level that may not be exceeded at any instant in time.	SU, °F, mg/l, etc.		

PARA-METER	EFFLUENT LIMIT	PRACTICAL QUANTITATION LIMIT (PQL)	ACTION LEVEL	UNITS	SAMPLE FREQUENCY	SAMPLE TYPE
	Limit types are defined below in Note 1. The effluent limit is developed based on the more stringent of technology-based limits, required under the Clean Water Act, or New York State water quality standards. The limit has been derived based on existing assumptions and rules. These assumptions include receiving water hardness, pH and temperature; rates of this and other discharges to the receiving stream; etc. If assumptions or rules change the limit may, after due process and modification of this permit, change.	For the purposes of compliance assessment, the analytical method specified in the permit shall be used to monitor the amount of the pollutant in the outfall to this level, provided that the laboratory analyst has complied with the specified quality assurance/quality control procedures in the relevant method. Monitoring results that are lower than this level must be reported, but shall not be used to determine compliance with the calculated limit. This PQL can be neither lowered nor raised without a modification of this permit.	Type I or Type II Action Levels are monitoring requirements, as defined below in Note 2 that trigger additional monitoring and permit review when exceeded.	This can include units of flow, pH, mass, Temperature, concentration. Examples include µg/l, lbs/d, etc.	Examples include Daily, 3/week, weekly, 2/month, monthly, quarterly, 2/yr and yearly.	Examples include grab, 24 hour composite and 3 grab samples collected over a 6 hour period.

Note 1: DAILY DISCHARGE: The discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for the purposes of sampling. For pollutants expressed in units of mass, the 'daily discharge' is calculated as the total mass of the pollutant discharged over the day. For pollutants with limitations expressed in other units of measurement, the 'daily discharge' is calculated as the average measurement of the pollutant over the day.

DAILY MAX.: The highest allowable daily discharge. DAILY MIN.: The lowest allowable daily discharge.

MONTHLY AVG: The highest allowable average of daily discharges over a calendar month, calculated as the sum of each of the daily discharges measured during a calendar month divided by the number of daily discharges measured during that month.

7 DAY ARITHMETIC MEAN (7 day average): The highest allowable average of daily discharges over a calendar week.

30 DAY GEOMETRIC MEAN: The highest allowable geometric mean of daily discharges over a calendar month, calculated as the antilog of : the sum of the log of each of the daily discharges measured during a calendar month divided by the number of daily discharges measured during that month.

7 DAY GEOMETRIC MEAN: The highest allowable geometric mean of daily discharges over a calendar week.

RANGE: The minimum and maximum instantaneous measurements for the reporting period must remain between the two values shown.

Note 2: ACTION LEVELS: Routine Action Level monitoring results, if not provided for on the Discharge Monitoring Report (DMR) form, shall be appended to the DMR for the period during which the sampling was conducted. If the additional monitoring requirement is triggered as noted below, the permittee shall undertake a short-term, high-intensity monitoring program for the parameter(s). Samples identical to those required for routine monitoring purposes shall be taken on each of at least three consecutive operating and discharging days and analyzed. Results shall be expressed in terms of both concentration and mass, and shall be submitted no later than the end of the third month following the month when the additional monitoring requirement was triggered. Results may be appended to the DMR or transmitted under separate cover to the same address. If levels higher than the Action Levels are confirmed, the permit may be reopened by the Department for consideration of revised Action Levels or effluent limits. The permittee is not authorized to discharge any of the listed parameters at levels which may cause or contribute to a violation of water quality standards. TYPE I: The additional monitoring requirement is triggered upon receipt by the permittee of any monitoring results in excess of the stated Action Level. TYPE II: The additional monitoring requirement is triggered upon receipt by the permittee of any monitoring results that show the stated action level exceeded for four of six consecutive samples, or for two of six consecutive samples by 20 % or more, or for any one sample by 50 % or more.

III. PERMIT LIMITS, LEVELS AND MONITORING

a) Effluent Limits for Outfall 002

OUTFALL No.	LIMITATIONS APPLY:	RECEIVING WATER	EFFECTIVE	EXPIRING
002	All Year unless otherwise noted	Niagara River	01/01/2010	06/30/2014

PARAMETER	EFFLUENT LIMIT					MONITORING REQUIREMENTS				FN
								Location		
	Type	Limit	Units	Limit	Units	Sample Frequency	Sample Type	Inf.	Eff.	
Flow	MRA	180	MGD			Continuous	Recorder	X		1, 5
BOD_5	Monthly average	30	mg/l	45036	lbs/d	1/day	24-hr. comp.	X	X	2
BOD_5	7 day average	45	mg/l	67554	lbs/d	1/day	24-hr. comp.	X	X	
Solids, Total Suspended	Monthly average	30	mg/l	45036	lbs/d	1/day	24-hr. comp.	X	X	2
Solids, Total Suspended	7 day average	45	mg/l	67554	lbs/d	1/day	24-hr. comp.	X	X	
Solids, Settleable	Daily Maximum	0.3	ml/l			6/day	grab	X	X	3
pH	Range	6.0 – 9.0	SU			6/day	grab	X	X	
Nitrogen, Ammonia (as NH_3)	Daily Maximum	Monitor	mg/l			1/month	24-hr. comp.	X	X	
Nitrogen, TKN (as N)	Daily Maximum	Monitor	mg/l			1/month	24-hr. comp.	X	X	
Temperature	Daily Maximum	Monitor	Deg F			6/day	grab	X	X	
Phenols, Total	Monthly average			36.6	lbs/d	1/month	24-hr. comp.		X	
Phosphorus, Total (as P)	Monthly average	1.0	mg/l			1/day	24-hr. comp.		X	
Mercury, Total	Daily Maximum	50	ng/l			1/month	Grab			4
Effluent Disinfection required: [X] All Year [ ] Seasonal from _____ to										
Coliform, Fecal	30 day geometric mean	200	No./ 100 ml			1/day	grab		X	6
Coliform, Fecal	7 day geometric mean	400	No./ 100 ml			1/day	grab		X	6
Chlorine, Total Residual	Daily Maximum	2.0	mg/l			6/day	grab		X	3, 6

FOOTNOTES:

1. The 12 month rolling average (MRA) shall be the average of the monthly average of the current month plus the monthly average of the eleven previous months.
2. A monthly effluent value shall not exceed 15 % and 15 % of influent values for BOD 5 & TSS respectively for flows up to 180 MGD.
3. The sample measurement for each day is calculated as the arithmetic mean of the total number of daily samples. Therefore the daily maximum is the highest of the approximately 30 daily arithmetic means calculated. The definition is derived from the DMR Manual, NYSDEC, 2002, Page 9, Section 4.4.
4. The proposed limit will be **50 ng/l** until the Department reviews the Mercury Minimization Program (MMP). The calculated Water Quality Based Effluent Limit (WQBEL) for Mercury is 0.7 ng/l based on the Water Quality Evaluation for this discharge. However available information indicates this concentration is not achievable by this treatment facility. Therefore, Best Professional Judgement (BPJ) has been used to determine an interim limit of 50 ng/L the permittee can comply with. The goal of the MMP is to attain calculated WQBEL.
5. This outfall shall be utilized in accordance with the existing Wet Weather Operating Plan.
6. Monitoring of these parameters is only required during the period when disinfection is required.

b) Type II Action Level Monitoring for Outfall 002

OUTFALL NUMBER	WASTEWATER TYPE	EFFECTIVE	EXPIRING
002	Municipal with contributing industries	01/01/2010	06/30/2014

PARAMETER	ACTION LEVEL	UNITS	PQL (lbs/day)	SAMPLE FREQUENCY	SAMPLE TYPE	FN
Cadmium, Total	3.0	lbs/d	0.6	1/month	24 hr. comp.	
Chromium, Total	12.5	lbs/d	6.0	1/month	24-hr. comp.	
Copper, Dissolved	Monitor	lbs/d		1/month	24-hr. comp.	
Copper, Total	31.9	lbs/d	6.0	1/month	24 hr. comp.	
Cyanide, Total	90.0	lbs/d	90	1/month	24-hr. comp.	
Lead, Total	66.2	lbs/d	6.0	1/month	24-hr. comp.	
Nickel, Total	43.8	lbs/d	6.0	1/month	24 hr. comp.	
Zinc, Total	174	lbs/d	0.3	1/month	24-hr. comp.	
Zinc, Dissolved	Monitor	lbs/d		1/month	24-hr. comp.	
Bis(2-Ethylhexyl)Phthalate	16.7	lbs/d	12.0	1/month	24-hr. comp.	

c) Monitoring Requirements for Outfall 001

OUTFALL No.	LIMITATIONS APPLY:	RECEIVING WATER	EFFECTIVE	EXPIRING
001	All Year unless otherwise noted	Niagara River	01/01/2010	06/30/2014

PARAMETER	EFFLUENT LIMIT			MONITORING REQUIREMENTS				FN
						Location		
	Type	Limit	Units	Sample Frequency	Sample Type	Inf.	Eff.	
Flow	Monthly Total	Monitor	MGD	Continuous	Recorder/Totalizer		X	I, 2
BOD_5	Daily Max.	Monitor	mg/l	1/Event	Composite		X	3
Solids, Suspended	Daily Max.	Monitor	mg/l	1/Event	Composite		X	3
Solids, Settleable	Daily Max.	Monitor	ml/l	1/Event	grab		X	4
Ammonia as N, mg/l, lbs/day	Daily Max.	Monitor	mg/l	1/Event	Composite		X	3
TKN as N	Daily Max.	Monitor	mg/l	1/Event	Composite		X	3
Phosphorus	Daily Max.	Monitor	mg/l	1/Event	Composite		X	3
Oil & Grease	Daily Max.	Monitor	mg/l	1/Event	grab		X	3
Coliform, Fecal	30 day geometric mean	Monitor	No./ 100 ml	1/Event	grab		X	4
Coliform, Fecal	7 day geometric mean	Monitor	No./ 100 ml	1/Event	grab		X	4
Chlorine, Total Residual	Daily Max.	2.0	mg/l	1/Event	grab		X	4

FOOTNOTES

1. Flows shall be managed in accordance to the existing Wet Weather Operating Plan. All flows up to the headworks capacity and not passed through outfall 002 shall be passed through outfall 001. This requirement may be superseded by the provisions in the ongoing Consent Decree.
2. Flow shall be continuously recorded and totalized. Flow reported on the Discharge Monitoring Report shall be the total flow discharge for the calendar month reporting period.
3. Samples shall be composite of grab samples, one taken every four hours.
4. Grab samples to be taken every four hours during each event.

IV. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS FOR HEADWORKS BYPASS ROUTINE MONITORING REQUIREMENTS

OUTFALL No.	LIMITATIONS APPLY:			EFFECTIVE		EXPIRING		
001A	All Year unless otherwise noted			01/01/2010		06/30/2014		
PARAMETER	EFFLUENT LIMIT			MONITORING REQUIREMENTS				
	Type	Limit	Units	Sample Frequency	Sample Type	Location		FN
						Inf.	Eff.	
Flow, MG	Monthly Total	Monitor	MGD	1/Event	Estimated	X		(1)
BOD,5-day mg/l	Daily Max.	Monitor	mg/l	1/Event	Grab		X	
Solids, Suspended mg/l	Daily Max.	Monitor	mg/l	1/Event	Grab		X	
Solids, Settleable ml/l	Daily Max.	Monitor	ml/l	1/Event	Grab		X	
Oil & Grease mg/l	Daily Max.	Monitor	mg/l	1/Event	Grab		X	

(1) This outfall shall be used in accordance with the existing Wet Weather Operating Plan and/or for emergency use only.

V. WHOLE EFFLUENT TOXICITY

PARAMETER	EFFLUENT LIMIT		PQL	MONITORING ACTION LEVEL		UNITS	SAMPLE FREQUENCY	SAMPLE TYPE
	Monthly Avg.	Daily Max.	Daily Max.	TYPE I	TYPE II			
WET - Chronic Invertebrate				101		TUc	Quarterly	Footnote 1
WET - Chronic Vertebrate				101		TUc	Quarterly	Footnote 1

Footnote
1. **Whole Effluent Toxicity Testing for Outfall 002**

Testing Requirements - WET testing shall consist of **Chronic only**. WET testing shall be performed in accordance with 40 CFR Part 136 and TOGS 1.3.2 unless prior written approval has been obtained from the Department. The test species shall be *Ceriodaphnia dubia* (water flea - invertebrate) and *Pimephales promelas* (fathead minnow - vertebrate). Receiving water collected upstream from the discharge should be used for dilution. All tests conducted should be static-renewal (two 24 hr composite samples with one renewal for Acute tests and three 24 hr composite samples with two renewals for Chronic tests). The appropriate dilution series bracketing the IWC and including one exposure group of 100% effluent should be used to generate a definitive test endpoint, otherwise an immediate rerun of the test is required. WET testing shall be coordinated with the monitoring of chemical and physical parameters limited by this permit so that the resulting analyses are also representative of the sample used for WET testing. The ratio of critical receiving water flow to discharge flow (i.e. dilution ratio) is **50:1** for acute, and **100:1** for chronic. Discharges which are disinfected using chlorine should be dechlorinated prior to WET testing or samples shall be taken immediately prior to the chlorination system.

Monitoring Period - WET testing shall be performed at the specified sample frequency **during calendar years ending in 2 and 7.**

Reporting - Toxicity Units shall be calculated and reported on the DMR as follows: TUa = (100)/(48 hr LC50) or (100)/(48 hr EC50) (note that Acute data is generated by both Acute and Chronic testing) and TUc = (100)/(NOEC) when Chronic testing has been performed or TUc = (TUa) x (10) when only Acute testing has been performed and is used to predict Chronic test results, where the 48 hr LC50 or 48 hr EC50 and NOEC are expressed in % effluent. This must be done for both species and using the Most Sensitive Endpoint (MSE) or the lowest NOEC and corresponding highest TUc. Report a TUa of 0.3 if there is no statistically significant toxicity in 100% effluent as compared to control.

The complete test report including all corresponding results, statistical analyses, reference toxicity data, daily average flow at the time of sampling and other appropriate supporting documentation, shall be submitted within 60 days following the end of each test period to the Toxicity Testing Unit. A summary page of the test results for the invertebrate and vertebrate species indicating TUa, 48 hr LC50 or 48 hr EC50 for Acute tests and/or TUc, NOEC, IC25, and most sensitive endpoints for Chronic tests, should also be included at the beginning of the test report.

WET Testing Action Level Exceedances - If an action level is exceeded then the Department may require the permittee to conduct additional WET testing including Acute and/or Chronic tests. Additionally, the permittee may be required to perform a Toxicity Reduction Evaluation (TRE) in accordance with Department guidance. If such additional testing or performance of a TRE is necessary, the permittee shall be notified in writing by the Regional Water Engineer. The written notification shall include the reason(s) why such testing or a TRE is required.

VI. PRETREATMENT PROGRAM IMPLEMENTATION REQUIREMENTS

A. DEFINITIONS. Generally, terms used in this Section shall be defined as in the General Pretreatment Regulations (40 CFR Part 403). Specifically, the following definitions apply to terms used in this Section (PRETREATMENT PROGRAM IMPLEMENTATION REQUIREMENTS):

1. Categorical Industrial User (CIU)- an industrial user of the POTW that is subject to Categorical Pretreatment Standards under 40 CFR 403.6 and 40 CFR Chapter I, Subchapter N;

2. Local Limits - General Prohibitions, specific prohibitions and specific limits as set forth in 40 CFR 403.5.

3. The Publicly Owned Treatment Works (the POTW) - as defined by 40 CFR 403.3(q) and that discharges in accordance with this permit.

4. Program Submission(s) - requests for approval or modification of the POTW Pretreatment Program submitted in accordance with 40 CFR 403.11 or 403.18 and approved by letter dated September 11, 1984.

5. Significant Industrial User (SIU) -

   a. CIUs;

   b. Except as provided in 40 CFR 403.3(v)(3), any other industrial user that discharges an average of 25,000 gallons per day or more of process wastewater (excluding sanitary, non-contact cooling and boiler blowdown wastewater) to the POTW;

   c. Except as provided in 40 CFR 403.3(v)(3), any other industrial user that contributes a process wastestream which makes up 5 percent or more of the average dry weather hydraulic or organic capacity of the POTW treatment plant;

   d. Any other industrial user that the permittee designates as having a reasonable potential for adversely affecting the POTW's operation or for violating a pretreatment standard or requirement.

6. Substances of Concern - Substances identified by the New York State Department of Environmental Conservation Industrial Chemical Survey as substances of concern.

B. IMPLEMENTATION. The permittee shall implement a POTW Pretreatment Program in accordance 40 CFR Part 403 and as set forth in the permittee's approved Program Submission(s). Modifications to this program shall be made in accordance with 40 CFR 403.18. Specific program requirements are as follows:

1. Industrial Survey. To maintain an updated inventory of industrial dischargers to the POTW the permittee shall:

   a. Identify, locate and list all industrial users who might be subject to the industrial pretreatment program from the pretreatment program submission and any other necessary, appropriate and available sources. This identification and location list will be updated, at a minimum, every five years. As part of this update the permittee shall collect a current and complete New York State Industrial Chemical Survey form (or equivalent) from each SIU.

   b. Identify the character and volume of pollutants contributed to the POTW by each industrial user identified in B.1.a above that is classified as a SIU.

   c. Identify, locate and list, from the pretreatment program submission and any other necessary, appropriate and available sources, all significant industrial users of the POTW.

2. Control Mechanisms. To provide adequate notice to and control of industrial users of the POTW the permittee shall:

a. Inform by certified letter, hand delivery courier, overnight mail, or other means which will provide written acknowledgment of delivery, all industrial users identified in B.1.a. above of applicable pretreatment standards and requirements including the requirement to comply with the local sewer use law, regulation or ordinance and any applicable requirements under section 204(b) and 405 of the Federal Clean Water Act and Subtitles C and D of the Resource Conservation and Recovery Act.

b. Control through permit or similar means the contribution to the POTW by each SIU to ensure compliance with applicable pretreatment standards and requirements. Permits shall contain limitations, sampling frequency and type, reporting and self-monitoring requirements as described below, requirements that limitations and conditions be complied with by established deadlines, an expiration date not later than five years from the date of permit issuance, a statement of applicable civil and criminal penalties and the requirement to comply with Local Limits and any other requirements in accordance with 40 CFR 403.8(f)(1).

3. Monitoring and Inspection. To provide adequate, ongoing characterization of non-domestic users of the POTW, the permittee shall:

a. Receive and analyze self-monitoring reports and other notices. The permittee shall require all SIUs to submit self-monitoring reports at least every six months unless the permittee collects all such information required for the report, including flow data.

b. The permittee shall adequately inspect each SIU at a minimum frequency of once per calendar year.

c. The permittee shall collect and analyze samples from each SIU for all priority pollutants that can reasonably be expected to be detectable at levels greater than the levels found in domestic sewage at a minimum frequency of once per year.

d. Require, through permits, each SIU to collect at least one 24 hour, flow proportioned composite (where feasible) effluent sample every six months and analyze each of those samples for all priority pollutants that can reasonably be expected to be detectable in that discharge at levels greater than the levels found in domestic sewage. The permittee may perform the aforementioned monitoring in lieu of the SIU except that the permittee must also perform the compliance monitoring described in 3.c.

4. Enforcement. To assure adequate, equitable enforcement of the industrial pretreatment program the permittee shall:

a. Investigate instances of noncompliance with pretreatment standards and requirements, as indicated in self-monitoring reports and notices or indicated by analysis, inspection and surveillance activities. Sample taking and analysis and the collection of other information shall be performed with sufficient care to produce evidence admissible in enforcement proceedings or in judicial actions. Enforcement activities shall be conducted in accordance with the permittee's Enforcement Response Plan developed and approved in accordance with 40 CFR Part 403.

b. Enforce compliance with all national pretreatment standards and requirements in 40 CFR Parts 406 - 471.

c. Provide public notification of significant non-compliance as required by 40 CFR 403.8(f)(2)(viii).

d. Pursuant to 40 CFR 403.5(e), when either the Department or the USEPA determines any source contributes pollutants to the POTW in violation of Pretreatment Standards or Requirements the Department or the USEPA shall notify the permittee. Failure by the permittee to commence an appropriate investigation and subsequent enforcement action within 30 days of this notification may result in appropriate enforcement action against the source and permittee.

5. Record keeping. The permittee shall maintain and update, as necessary, records identifying the nature, character, and volume of pollutants contributed by SIUs. Records shall be maintained in accordance with 6 NYCRR Part 750-2.5(c).

6. Staffing. The permittee shall maintain minimum staffing positions committed to implementation of the Industrial

Pretreatment Program in accordance with the approved pretreatment program.

C. SLUDGE DISPOSAL PLAN. The permittee shall notify NYSDEC, and USEPA as long as USEPA remains the approval authority, 60 days prior to any major proposed change in the sludge disposal plan. NYSDEC may require additional pretreatment measures or controls to prevent or abate an interference incident relating to sludge use or disposal.

D. REPORTING. The permittee shall provide to the offices listed on the Monitoring, Reporting and Recording page of this permit and to the Chief-Water Compliance Branch; USEPA Region II; 290 Broadway; New York, NY 10007; an annual report that briefly describes the permittee's program activities over the previous year. This report shall be submitted to the above noted offices within 60 days of the end of the reporting period. The reporting period shall be annual with reporting period(s) ending on April 30 of each year.

The annual report shall include:

1. Industrial Survey. Updated industrial survey information in accordance with 40 CFR 403.12(i)(1) (including any NYS Industrial Chemical Survey forms updated during the reporting period).

2. Implementation Status. Status of Pretreatment Program Implementation, to include:

   a. Any interference upset or permit violations experienced at the POTW directly attributable to industrial users.

   b. Listing of significant industrial users issued permits.

   c. Listing of significant industrial users inspected and/or monitored during the previous reporting period and summary of results.

   d. Listing of significant industrial users notified of promulgated pretreatment standards or applicable local standards that are on compliance schedules. The listing should include for each facility the final date of compliance.

   e. Summary of POTW monitoring results not already submitted on Discharge Monitoring Reports and toxic loadings from SIU's organized by parameter.

   f. A summary of additions or deletions to the list of SIUs, with a brief explanation for each deletion.

3. Enforcement Status. Status of enforcement activities to include:

   a. Listing of significant industrial users in Significant Non-Compliance (as defined by 40 CFR 403.8(f)(2)(viii)) with federal or local pretreatment standards at end of the reporting period.

   b. Summary of enforcement activities taken against non-complying significant industrial users. The permittee shall provide a copy of the public notice of significant violators as specified in 40 CFR Part 403.8(f)(2)(viii).

VII. BEST MANAGEMENT PRACTICES FOR COMBINED SEWER OVERFLOWS

The permittee shall implement the following Best Management Practices (BMPs). These BMPs are designed to implement operation & maintenance procedures, utilize the existing treatment facility and collection system to the maximum extent practicable, and implement sewer design, replacement and drainage planning, to maximize pollutant capture and minimize water quality impacts from combined sewer overflows. The BMPs are equivalent to the "Nine Minimum Control Measures" required under the USEPA National Combined Sewer Overflow policy. The EPA's policy is available at http://cfpub.epa.gov/npdes/cso/cpolicy.cfm?program_id=5.

1. CSO Maintenance/Inspection - The permittee shall develop a written maintenance and inspection program for all CSOs listed on page(s) 3-5 of this permit. This program shall include all regulators tributary to these CSOs, and shall be conducted during periods of both dry and wet weather. This is to insure that no discharges occur during dry weather and that the maximum amount of wet weather flow is conveyed to the Bird Island POTW for treatment. This program shall consist of inspections with required repair, cleaning and maintenance done as needed. This program shall consist of monthly inspections.

   Inspection reports shall be completed indicating visual inspection, any observed flow, incidence of rain or snowmelt, condition of equipment and work required. These reports shall be in a format approved by the Regional Office and submitted to the Region with the monthly operating report (Form 92-15-7).

2. Maximum Use of Collection System for Storage - The permittee shall optimize the collection system by operating and maintaining it to minimize the discharge of pollutants from CSOs. It is intended that the maximum amount of in-system storage capacity be used (without causing service backups) to minimize CSOs and convey the maximum amount of combined sewage to the treatment plant in accordance with Item 4 below.

   This shall be accomplished by an evaluation of the hydraulic capacity of the system but should also include a continuous program of flushing or cleaning to prevent deposition of solids and the adjustment of regulators and weirs to maximize storage.

3. Industrial Pretreatment - The approved Industrial Pretreatment Program shall consider CSOs in the calculation of local limits for indirect discharges. Discharge of persistent toxics upstream of CSOs will be in accordance with guidance under (NYSDEC Division of Water Technical and Operational Guidance Series **(TOGS) 1.3.8 New Discharges to POTWs**. (http://www.dec.ny.gov/regulations/2652.html). For industrial operations characterized by use of batch discharge, consideration shall be given to the feasibility of a schedule of discharge during conditions of no CSO. For industrial discharges characterized by continuous discharge, consideration must be given to the collection system capacity to maximize delivery of waste to the treatment plant. Non-contact cooling water should be excluded from the combined system to the maximum extent practicable. Direct discharges of cooling water must apply for a SPDES permit. To the maximum extent practicable, consideration shall be given to maximize the capture of non-domestic waste containing toxic pollutants and this wastewater should be given priority over residential/commercial service areas for capture and treatment by the POTW.

4. Maximize Flow to POTW - Factors cited in Item 2. above shall also be considered in maximizing flow to the POTW. Maximum delivery to the POTW is particularly critical in treatment of "first-flush" flows. The treatment plant shall be capable of receiving and treating: the peak design hydraulic loading rates for all process units; i.e., a minimum of 450MGD through the plant headworks; and a minimum of 300 MGD through the secondary treatment works during wet weather in accordance with the existing Wet Weather Operating Plan. The collection system and headworks must be capable of delivering these flows during wet weather. If the permittee cannot deliver maximum design flow for treatment, the permittee shall submit a plan and schedule for accomplishing this requirement within 12 months after the effective date of this permit.

5. Wet Weather Operating Plan - The permittee shall maximize treatment during wet weather events. This shall be accomplished by having a wet weather operating plan containing procedures so as to operate unit processes to treat maximum flows while not appreciably diminishing effluent quality or destabilizing treatment upon return to dry weather operation. The BSA must continue to implement the wet weather operations plan

   The submission of a wet weather operating plan is a one time requirement that shall be done to the Department's satisfaction once. However, a revised wet weather operating plan must be submitted whenever the POTW and/or sewer collection system is significantly replaced or modified in a manner that impacts flows at Bird Island WWTP. When this permit is administratively renewed by NYSDEC letter entitled "SPDES NOTICE/RENEWAL APPLICATION/PERMIT", the permittee is not required to repeat the submission. The above due dates are independent from the effective date of the permit stated in the letter of "SPDES NOTICE/RENEWAL APPLICATION/PERMIT".

6. Prohibition of Dry Weather Overflow - Dry weather overflows from the combined sewer system are prohibited. The occurrence of any dry weather overflow shall be promptly abated and reported to the NYSDEC Region 9 Office within 24 hours. A written report shall also be submitted within fourteen (14) days of the time the permittee becomes aware of the occurrence. The occurrence of any dry weather overflow shall be promptly abated and reported to the NYSDEC Regional Office in accordance with 6 NYCRR Part 750-2.7.

7. Control of Floatable and Settleable Solids - The discharge of floating solids, oil and grease, or solids of sewage origin which cause deposition in the receiving waters, is a violation of the NYS Narrative Water Quality Standards contained in Part 703. As such, the permittee shall implement best management practices in order to eliminate or minimize the discharge of these substances. All of the measures cited in Items 1, 2, 4 & 5 above shall constitute approvable "BMPs" for mitigation of this problem. If aesthetic problems persist, the permittee should consider additional BMP's including but not limited to: street sweeping, litter control laws, installation of floatables traps in catch basins (such as hoods), booming and skimming of CSOs, and disposable netting on CSO outfalls. In cases of severe or excessive floatables generation, booming and skimming should be considered an interim measure prior to implementation of final control measures. Public education on harmful disposal practices of personal hygienic devices may also be necessary including but not limited to: public broadcast television, printed information inserts in sewer bills, or public health curricula in local schools.

8. Combined Sewer System Replacement - Replacement of combined sewers shall not be designed or constructed unless approved by NYSDEC. When replacement of a combined sewer is necessary it shall be replaced by separate sanitary and storm sewers to the greatest extent possible. These separate sanitary and storm sewers shall be designed and constructed simultaneously but without interconnections to maximum extent practicable. When combined sewers are replaced, the design should contain cross sections which provide sewage velocities which prevent deposition of organic solids during low flow conditions.

9. Combined Sewer/Extension - Combined sewer/extension, when allowed should be accomplished using separate sewers. These sanitary and storm sewer extensions shall be designed and constructed simultaneously but without interconnections. No new source of storm water shall be connected to any separate sanitary sewer in the collection system.

   If separate sewers are to be extended from combined sewers, the permittee shall demonstrate the ability of the sewerage system to convey, and the treatment plant to adequately treat, the increased dry-weather flows. Upon a determination by the Regional Water Engineer an assessment shall be made by the permittee of the effects of the increased flow of sanitary sewage or industrial waste on the strength of CSOs and their frequency of occurrence including the impacts upon best usage of the receiving water. This assessment should use techniques such as collection system and water quality modeling contained in the 1999 Water Environment Federation Manual of Practice FD-17 entitled, Prevention and Control of Sewer System Overflows, 2nd edition.

10. Sewage Backups - If, there are documented, recurrent instances of sewage backing up into house(s) or discharges of raw sewage onto the ground surface from surcharging manholes, the permittee shall, upon letter notification from DEC, prohibit further connections that would make the surcharging/back-up problems worse.

11. Septage and Hauled Waste - The discharge or release of septage or hauled waste upstream of a CSO is prohibited.

12. Control of Run-off - It is recommended that the impacts of run-off from development and re-development in areas served by combined sewers be reduced by requiring compliance with the New York Standards for Erosion and Sediment Control and the quantity control requirements included in the New York State Stormwater Management Design Manual. (http://www.dec.ny.gov/chemical/8694.html).

13. Public Notification - The permittee shall continue to maintain identification signs at all CSO outfalls owned and operated by the permittee. The permittee shall place the signs at or near the CSO outfalls and ensure that the signs are easily readable by the public. The signs shall have **minimum** dimensions of eighteen inches by twenty four inches (18" x 24") and shall have white letters on a green background and contain the following information:

N.Y.S. PERMITTED DISCHARGE POINT
(wet weather discharge)
SPDES PERMIT No.: NY_____

OUTFALL No. :____

For information about this permitted discharge contact:

Permittee Name:

Permittee Contact:

Permittee Phone: ( ) - ### - ####

OR:

The permittee shall implement a public notification program to inform citizens of the location and occurrence of CSO events in accordance with the proposed Consent Order Decree.

14. Characterization and Monitoring - The permittee shall characterize the combined sewer system, determine the frequency of overflows, and identify CSO impacts in accordance with Combined Sewer Overflows, Guidance for Nine Minimum Controls, EPA, 1995, Chapter 10. These are minimum requirements, more extensive characterization and monitoring efforts which may be required as part of the Long Term Control Plan.

15. Annual Report - The permittee shall submit an annual report summarizing implementation of the above best management practices (BMPs). The report shall list existing documentation of implementation of the BMPs and shall be submitted by January 31st of each year to the Regional office listed on the Recording, Reporting and Additional Monitoring page of this permit and to the Bureau of Water Permits, 625 Broadway, Albany, NY 12233-3505. Examples of recommended documentation of the BMPs are found in Combined Sewer Overflows, Guidance for Nine Minimum Controls (NMC), EPA, 1995. The permittee may obtain an electronic copy of the NMC guidance at http://www.epa.gov/npdes/pubs/owm0030.pdf. For guidance on developing the annual report, a BMP checklist is available from DEC on-line at http://www.dec.ny.gov/docs/water_pdf/csobmp.pdf. The permittee must submit a completed copy of this checklist along with the annual report. The actual documentation shall be stored at a central location and be made available to DEC upon request.

VIII. CSO LONG-TERM CONTROL PLAN

The BSA CSO Long Term Control Plan (LTCP) was approved on March 18, 2014. BSA is required to implement the approved CSO LTCP.

The EPA issued an Amended Administrative Order (CWA-02-2014-3033) which addresses implementation of the LTCP. BSA shall implement the approved CSO LTCP in accordance with the EPA Order (CWA-02-2014-3033), and any subsequent amended/modified Administrative Orders.

This permit may be reopened for modification to include any additional requirements in accordance with 6 NYCRR Part 621.

IX. STORM WATER POLLUTANT PREVENTION PLAN FOR POTWs WITH STORMWATER OUTFALLS

1. General - The Department has determined that stormwater discharges from POTWs with design flows at or above one MGD shall be covered under the SPDES permit. If the permittee has already submitted a Notice of Intent to the Department for coverage under the General Storm Water permit, the permittee shall submit a Notice of Termination to the Department upon receipt of this final SPDES permit containing the requirement to develop a SWPPP.

The permittee is required to develop, maintain, and implement a Storm Water Pollutant Prevention Plan (SWPPP) to prevent releases of significant amounts of pollutants to the waters of the State through plant site runoff; spillage and leaks; sludge or waste disposal; and other stormwater discharges including, but not limited to, drainage from raw material storage.

The SWPPP shall be documented in narrative form and shall include the 13 minimum elements below and plot plans, drawings, or maps necessary to clearly delineate the direction of stormwater flow and identify the conveyance, such as ditch, swale, storm sewer or sheet flow, and receiving water body. Other documents already prepared for the facility such as a Safety Manual or a Spill Prevention, Control and Countermeasure (SPCC) plan may be used as part of the SWPPP and may be incorporated by reference. A copy of the current SWPPP shall be submitted to the Department as required in item (2.) below and a copy must be maintained at the facility and shall be available to authorized Department representatives upon request.

2. Compliance Deadlines – The BSA shall revise the February 2008 SWPPP developed under the General Permit. The revised plan shall be submitted by **07/01/2010** to the Regional Water Engineer. The SWPPP shall be implemented within 6 months of submission, unless a different time frame is approved by the Department. The SWPPP shall be reviewed annually and shall be modified whenever: (a) changes at the facility materially increase the potential for releases of pollutants; (b) actual releases indicate the SWPPP is inadequate, or (c) a letter from the Department identifies inadequacies in the SWPPP. The permittee shall certify in writing, as an attachment to the December Discharge Monitoring Report (DMR), that the annual review has been completed. All SWPPP revisions (with the exception of minimum elements - see item (4.B.) below) must be submitted to the Regional Water Engineer within 30 days. Note that the permittee is not required to obtain Department approval of the SWPPP (or of any minimum elements) unless notified otherwise. Subsequent modifications to or renewal of this permit does not reset or revise these deadlines unless a new deadline is set explicitly by such permit modification or renewal.

3. Facility Review - The permittee shall review all facility components or systems (including but not limited to material storage areas; in-plant transfer, process, and material handling areas; loading and unloading operations; storm water, erosion, and sediment control measures; process emergency control systems; and sludge and waste disposal areas) where materials or pollutants are used, manufactured, stored or handled to evaluate the potential for the release of pollutants to the waters of the State. In performing such an evaluation, the permittee shall consider such factors as the probability of equipment failure or improper operation, cross-contamination of storm water by process materials, settlement of facility air emissions, the effects of natural phenomena such as freezing temperatures and precipitation, fires, and the facility's history of spills and leaks. The relative toxicity of the pollutant shall be considered in determining the significance of potential releases.

The review shall address all substances present at the facility that are identified in Tables 6-10 of SPDES application Form NY-2C (available at *http://www.dec.state.ny.us/website/dcs/permits/olpermits/form2c.pdf*) as well as those that are required to be monitored by the SPDES permit.

4. A. 13 Minimum elements - Whenever the potential for a release of pollutants to State waters is determined to be present, the permittee shall identify Best Management Practices (BMPs) that have been established to prevent or minimize such potential releases. Where BMPs are inadequate or absent, appropriate BMPs shall be established. In selecting appropriate BMPs, the permittee shall consider good industry practices and, where appropriate, structural measures such as secondary containment and erosion/sediment control devices and practices. USEPA guidance for development of minimum elements of the SWPPP and BMPs is available in the September 1992 manual *Storm Water Management for Industrial Activities,* EPA 832-R-92-006 (available on-line at http://nepis.epa.gov/pubtitleOW.htm). At a minimum, the plan shall include the following elements:

1. Pollution Prevention Team
2. Reporting of BMP Incidents
3. Risk Identification & Assessment
4. Employee Training
5. Inspections and Records
6. Security
7. Preventive Maintenance
8. Good Housekeeping
9. Materials/Waste Handling, Storage, & Compatibility
10. Spill Prevention & Response
11. Erosion & Sediment Control
12. Management of Runoff
13. Street Sweeping

Note that for some facilities, especially those with few employees, some of the above may not be applicable. It is acceptable in these

cases to indicate "Not Applicable" for the portion(s) of the SWPPP that do not apply to your facility, along with an explanation, for instance if street sweeping did not apply because no streets exist at the facility.

B. Stormwater Pollution Prevention Plans (SWPPPs) Required for Discharges of Stormwater From Construction Activity to Surface Waters - As part of the erosion of and sediment control element, a SWPPP shall be developed prior to the initiation of any site disturbance of one acre or more of uncontaminated area. Uncontaminated area means soils or groundwater which are free of contamination by any toxic or non-conventional pollutants identified in Tables 6-10 of SPDES application Form NY-2C. Disturbance of any size contaminated area(s) and the resulting discharge of contaminated stormwater is not authorized by this permit unless the discharge is under State or Federal oversight as part of a remedial program or after review by the Regional Water Engineer; nor is such discharge authorized by any SPDES general permit for stormwater discharges. SWPPPs are not required for discharges of stormwater from construction activity to groundwaters.

The SWPPP shall conform to the *New York Standards and Specifications for Erosion and Sediment Control* and *New York State Stormwater Management Design Manual,* unless a variance has been obtained from the Regional Water Engineer, and to any local requirements. The permittee shall submit a copy of the SWPPP and any amendments thereto to the local governing body and any other authorized agency having jurisdiction or regulatory control over the construction activity at least 30 days prior to soil disturbance. The SWPPP shall also be submitted to the Regional Water Engineer if contamination, as defined above, is involved and the permittee must obtain a determination of any SPDES permit modifications and/or additional treatment which may be required prior to soil disturbance. Otherwise, the SWPPP shall be submitted to the Department only upon request. When a SWPPP is required, a properly completed *Notice of Intent* (NOI) form shall be submitted (available at *www.dec.state.ny.us/website/dow/toolbox/swforms.html*) prior to soil disturbance. Note that submission of a NOI is required for informational purposes; the permittee is not eligible for and will not obtain coverage under any SPDES general permit for stormwater discharges, nor are any additional permit fees incurred. SWPPPs must be developed and submitted for subsequent site disturbances in accordance with the above requirements. The permittee is responsible for ensuring that the provisions of each SWPPP is properly implemented.

Note:
If the permittee is covered under the MS4 permit, the permittee may substitute this to satisfy some of the conditions in this SWPPP.

X. DISCHARGE NOTIFICATION REQUIREMENTS

Sign Maintenance

The permittee shall periodically inspect the outfall identification sign(s) in order to ensure they are maintained, are still visible, and contain information that is current and factually correct. Signs that are damaged or incorrect shall be replaced within 3 months of inspection.

Data Retention

The permittee shall retain records for a minimum period of 5 years in accordance with 6NYCRR Part 750-1.12(b)(2) and Part 750-2.5(c)(1). These records, which include discharge monitoring reports (DMRs) and annual reports, must be retained at a repository accessible to the public. This repository shall be open to the public, at a minimum, during normal daytime business hours. The repository may be the business office, wastewater treatment plant, village, town, city, or county clerk's office, the local library, or other location approved by the Department.

XI. SCHEDULE OF COMPLIANCE

Short-term Hi-Intensity Sampling

Action Code	Outfall Number(s)	Compliance Action	Due Date
	001	The permittee shall conduct sampling for the following parameters detected in the WWTP effluent and listed in the permit application. Sampling shall be once per event for a minimum of **10 events.** The permittee submit the results of the analyses along with the daily flow:	06/01/2010

Parameters	EPA Method of Analysis Required	Sample Type
Arsenic, Total	200.7	24 hr. Comp.
Cadmium, Total	200.7	24 hr. Comp.
Chromium, Total	200.7	24 hr. Comp.
Copper, Total	200.7	24 hr. Comp.
Cyanide, Total	200.7	24 hr. Comp.
Lead, Total	200.7	24 hr. Comp.
Nickel, Total	200.7	24 hr. Comp.
Zinc, Total	200.7	24 hr. Comp.

The above compliance actions are one time requirements. The permittee shall comply with the above compliance actions to the Department's satisfaction once. When this permit is administratively renewed by NYSDEC letter entitled "SPDES NOTICE/RENEWAL APPLICATION/PERMIT", the permittee is not required to repeat the submission. The above due dates are independent from the effective date of the permit stated in the letter of "SPDES NOTICE/RENEWAL APPLICATION/PERMIT."

a) The permittee shall submit a written notice of compliance or non-compliance with each of the above schedule dates no later than 14 days following each elapsed date, unless conditions require more immediate notice in accordance with 6NYCRR Part 750-2.7. All such compliance or non-compliance notification shall be sent to the locations listed under the section of this permit entitled RECORDING, REPORTING AND ADDITIONAL MONITORING REQUIREMENTS. Each notice of non-compliance shall include the following information:

1. A short description of the non-compliance;
2. A description of any actions taken or proposed by the permittee to comply with the elapsed schedule requirements without further delay and to limit environmental impact associated with the non-compliance;
3. A description or any factors which tend to explain or mitigate the non-compliance; and
4. An estimate of the date the permittee will comply with the elapsed schedule requirement and an assessment of the probability that the permittee will meet the next scheduled requirement on time.

b) The permittee shall submit copies of any document required by the above schedule of compliance to NYSDEC Regional Water Engineer **and to the Bureau of Water Permits, 625 Broadway, Albany, N.Y. 12233-3505**, unless otherwise specified in this permit or in writing by the Department.

XII. MERCURY MINIMIZATION PROGRAM

1. **General** – Within 12 months of the effective date of this permit (**by 01/01/2011**), the permittee shall develop and immediately implement, and maintain a Mercury Minimization Program (MMP). The MMP is required because the 50 ng/L permit limit exceeds the state-wide calculated water quality based effluent limit (WQBEL) of 0.70 nanograms/liter (ng/L) for Total Mercury. The goal of the MMP will be to reduce mercury effluent levels in pursuit of the calculated WQBEL.

2. **MMP Elements** - The MMP shall be documented in narrative form and shall include any necessary drawings or maps. Other related documents already prepared for the facility may be used as part of the MMP and may be incorporated by reference. As a minimum, the MMP shall include an on-going program consisting of: periodic monitoring designed to quantify and, over time, track the reduction of mercury; an acceptable control strategy for reducing mercury discharges via cost-effective measures, which may include more stringent control of tributary waste streams; and submission of annual status reports.

A. Monitoring - All permit-related mercury monitoring shall be performed using EPA Method 1631 and shall be coordinated so that the results can be compared. All samples shall be grabs and use of EPA Method 1669 during sample collection is recommended. Minimum required monitoring is as follows:

i. Sewage Treatment Plant Influent & Effluent, and Type II SSO* Outfalls - Samples at each of these locations must be collected in accordance with the minimum frequency specified on the mercury permit limits page.

ii. Key Locations in the Collection System and Potential Significant Mercury Sources - The minimum monitoring frequency at these locations shall be semi-annual. Monitoring of properly treated dental facility discharges is not required.

iii. Hauled Wastes - Hauled wastes which may contain significant mercury levels must be periodically tested prior to acceptance to ensure compliance with pretreatment/local limits requirements.

iv. Additional monitoring must be completed as may be required elsewhere in this permit or upon Department request.

B. Control Strategy - An acceptable control strategy is required for reducing mercury discharges via cost-effective measures, including but not limited to more stringent control of industrial users and hauled wastes. The control strategy will become enforceable under this permit and shall contain the following minimum elements:

i. Pretreatment/Local Limits - The permittee shall evaluate and revise current requirements in pursuit of the water quality goal.

ii. Periodic Inspection - The permittee must inspect users as necessary to support the MMP. Each dental facility shall be inspected at least once every five years to verify compliance with the wastewater treatment and notification elements of 6NYCRR Part 374.4. Other mercury sources shall also be inspected once every five years. Alternatively, the permittee may develop an outreach program which informs these users of their responsibilities once every five years and is supported by a subset of site inspections. Monitoring shall be performed as required above.

iii. Systems with CSO & Type II SSO* Outfalls - Priority shall be given to controlling mercury sources upstream of CSOs and Type II SSOs through mercury reduction activities and/or controlled-release discharge. Effective control is necessary to avoid the need for the Department to establish mercury permit limits at these outfalls.

iv. A file shall be maintained containing all MMP documentation, including the dental forms required by 6NYCRR Part 374.4, which shall be available for review by DEC representatives.

C. Annual Status Report - An annual status report shall be submitted to the Regional Water Engineer and to the Bureau of Water Permits summarizing: (a) all MMP monitoring results for the previous year; (b) a list of known and potential mercury sources; (c) all action undertaken pursuant to the strategy during the previous year, (d) actions planned for the upcoming year, and (e) progress toward the goal. The first annual status report is due **01/01/2011** and follow-up reports are due annually thereafter. Note that the complete MMP documentation need not be submitted to the Department unless otherwise requested.

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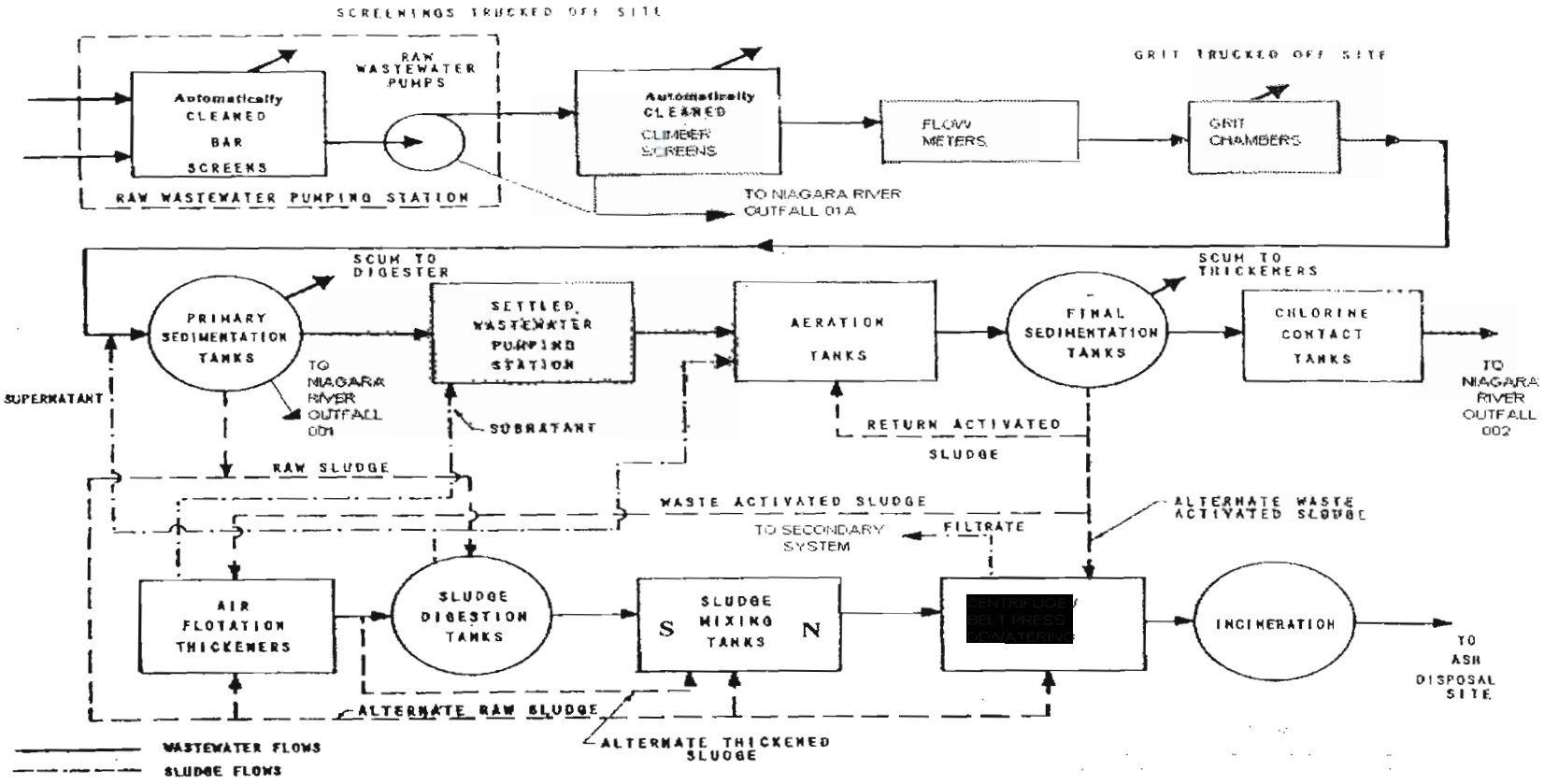
* Overflow Retention Facilities (ORF) or Peak Excess Flow Treatment Facilities (PEFTF). ORFs were designed, approved and constructed under an SSO abatement program. ORFs capture most sewer system flow surges and return them to the POTW for treatment. Under certain exceptionally high flow conditions, excess flow may be discharged.

3. **MMP Modification** - The MMP shall be modified whenever: (a)changes at the facility or within the collection system increase the potential for mercury discharges; (b) actual discharges exceed 50 ng/L; (c) a letter from the Department identifies inadequacies in the MMP; or, (d) pursuant to a permit modification.

MONITORING LOCATIONS

The permittee shall take samples and measurements, to comply with the monitoring requirements specified in this permit, at the location(s) specified below:



RECORDING, REPORTING AND ADDITIONAL MONITORING REQUIREMENTS

a) The permittee shall also refer to 6NYCRR Part 750 for additional information concerning monitoring and reporting requirements and conditions.

b) The monitoring information required by this permit shall be summarized, signed and retained for a period of three years from the date of the sampling for subsequent inspection by the Department or its designated agent. **Also, monitoring information required by this permit shall be summarized and reported by submitting;**

[X] (if box is checked) completed and signed Discharge Monitoring Report (DMR) forms for each __1__ month reporting period to the locations specified below. Blank forms are available at the Department's Albany office listed below. The first reporting period begins on the effective date of this permit and the reports will be due no later than the 28th day of the month following the end of each reporting period.

[ ] (if box is checked) an annual report to the Regional Water Engineer at the address specified below. The annual report is due by February 1 and must summarize information for January to December of the previous year in a format acceptable to the Department.

[X] (if box is checked) a monthly "Wastewater Facility Operation Report..." (form 92-15-7) to the:
[X] Regional Water Engineer and/or [ ] County Health Department or Environmental Control Agency specified below

Send the **original** (top sheet) of each DMR page to:

Department of Environmental Conservation
Division of Water
Bureau of Watershed Compliance Programs
625 Broadway
Albany, New York 12233-3506

Phone: (518) 402-8177

Send the **first copy** (second sheet) of each DMR page to:

Department of Environmental Conservation
Regional Water Engineer, Region 9
270 Michigan Avenue
Buffalo, New York 14203-2999

Phone: 716-851-7070

Send an **additional copy** of each DMR page to:

c) Noncompliance with the provisions of this permit shall be reported to the Department as prescribed in 6NYCRR Part 750.

d) Monitoring must be conducted according to test procedures approved under 40 CFR Part 136, unless other test procedures have been specified in this permit.

e) If the permittee monitors any pollutant more frequently than required by the permit, using test procedures approved under 40 CFR Part 136 or as specified in this permit, the results of this monitoring shall be included in the calculations and recording of the data on the Discharge Monitoring Reports.

f) Calculation for all limitations which require averaging of measurements shall utilize an arithmetic mean unless otherwise specified in this permit.

g) Unless otherwise specified, all information recorded on the Discharge Monitoring Report shall be based upon measurements and sampling carried out during the most recently completed reporting period.

h) Any laboratory test or sample analysis required by this permit for which the State Commissioner of Health issues certificates of approval pursuant to section five hundred two of the Public Health Law shall be conducted by a laboratory which has been issued a certificate of approval. Inquiries regarding laboratory certification should be sent to the Environmental Laboratory Accreditation Program, New York State Health Department Center for Laboratories and Research, Division of Environmental Sciences, The Nelson A. Rockefeller Empire State Plaza, Albany, New York 12201.

APPENDIX E: Opinion of Probable Construction Cost

BUFFALO SEWER AUTHORITY LONG TERM CONTROL PLAN SELECTED ALTERNATIVE
ENGINEER'S OPINION OF PROBABLE PROJECT COST

SPP336B OLS (Sidney OLS)

6/14/2024 **v3.4.0** **3.26** **MG**

Description	Material				Installation [1]		Total Cost [2]	Notes
	Basis	No. Units	Per Unit	Subtotal	Per Unit	Subtotal		
Satellite Storage								
Land Acquisition	Acres	0.5	$ 111,520	$ 56,003	$ -	$ -	$ 56,003	Assumed equal to site clearing quantity. COB perfecting title
Survey & Stake-out	LS	1	$ 40,649	$ 40,649	$ -	$ -	$ 40,649	
Site Clearing	SF	21,875	$ 3	$ 65,867	$ -	$ -	$ 65,867	SF of tank + 25%
Excavation	CY	8,912	$ 33	$ 298,161	$ -	$ -	$ 298,161	
Rock Excavation	CY	22,280	$ 223	$ 4,969,352	$ -	$ -	$ 4,969,352	
Piles / Foundation	LS		$ 557,600	$ -	$ -	$ -	$ -	Piles not needed on bedrock
Bedding	CY	1,620	$ 86	$ 139,142	$ -	$ -	$ 139,142	
Structural Concrete	CY	2,990	$ 1,338	$ 4,001,356	$ -	$ -	$ 4,001,356	
Site Dewatering and Erosion Control	LS	1	$ -	$ -	$ 675,000	$ 675,000	$ 675,000	
Sheeting/Bracing	SF	21,425	$ 51	$ 1,099,098	$ -	$ -	$ 1,099,098	
Backfill	CY	18,229	$ 49	$ 894,483	$ -	$ -	$ 894,483	
Hauling	CY	0	$ 15	$ -	$ -	$ -	$ -	Hauling and disposal rolled into excavation costs
Cleaning Equipment	LF	125	$ 5,018	$ 627,300	$ -	$ -	$ 627,300	Tipping buckets price per Koester
Access Manholes	EA	3	$ 3,457	$ 10,371	$ -	$ -	$ 10,371	
Miscellaneous Site Restoration	LS	1	$ 223,040	$ 223,040	$ -	$ -	$ 223,040	Misc site and pipe trench restoration
Grass Restoration	SY	2,431	$ 10	$ 24,395	$ -	$ -	$ 24,395	Assumed equal to site clearing quantity
Satellite Storage Conveyance 1 / Connection to OLS								
Excavation	CY	2,073	$ 33	$ 69,368	$ -	$ -	$ 69,368	
Bedding	CY	27	$ 86	$ 2,319	$ -	$ -	$ 2,319	
Site Dewatering and Erosion Control	LS	1	$ -	$ -	$ 67,500	$ 67,500	$ 67,500	
Sheeting/Bracing	SF	15,995	$ 51	$ 820,530	$ -	$ -	$ 820,530	
Backfill	CY	2,073	$ 49	$ 101,740	$ -	$ -	$ 101,740	Equals excavation volume
Hauling	CY	0	$ 15	$ -	$ -	$ -	$ -	Assumed included in excavation costs
4 ft Concrete Pipe	LF	208	$ 892	$ 185,326	$ -	$ -	$ 185,326	
Cut Access into Main Interceptor	LS	1	$ 75,276	$ 75,276	$ -	$ -	$ 75,276	
Manholes	EA	1	$ 3,457	$ 3,457	$ -	$ -	$ 3,457	
Satellite Storage Conveyance 2 / OLS Effluent to Collection System								
Excavation	CY	2,963	33	$ 99,128	$ -	$ -	$ 99,128	
Bedding	CY	39	86	$ 3,349	$ -	$ -	$ 3,349	
Site Dewatering and Erosion Control	LS	1	0	$ -	$ 221,040	$ 221,040	$ 221,040	
Sheeting/Bracing	SF	26,666	51	$ 1,367,969	$ -	$ -	$ 1,367,969	
Backfill	CY	2,963	49	$ 145,388	$ -	$ -	$ 145,388	Equals excavation volume
Hauling	CY	0	15	$ -	$ -	$ -	$ -	Assumed included in excavation costs
3 ft Concrete Pipe	LF	346	558	$ 193,107	$ -	$ -	$ 193,107	
Cut Access into Main Interceptor	EA	1	75,276	$ 75,276	$ -	$ -	$ 75,276	
Manholes	EA	2	3,457	$ 6,914	$ -	$ -	$ 6,914	
Inlet and Outlet Gates								
4 ft Diameter Inlet and Outlet Gate	EA	2	$ 111,520	$ 200,000	$ -	$ -	$ 200,000	Broadway Oak RTC gates $100,000 each
				$ -	$ -	$ -	$ -	

Subtotal	**$**	**16,761,905**
Electrical, Controls and Instrumentation (15%)	**$**	**2,514,286**
Utility Relocation / Coordination (5%)	**$**	**838,095**
MPT (5%)	**$**	**838,095**
General Conditions, Bonds & Insurance (5% of Subtotal)	**$**	**1,047,619**
Base Probable Construction Cost (Rounded)	**$**	**22,000,000**
Inflation to Mid Point of Construction (4th Qtr. 2029)	**$**	**27,293,509**
Engineering Planning (2nd Qtr 2025)	**$**	**270,633**
Engineering Design (2nd Qrt. 2027)	**$**	**2,560,184**
Engineering During Construction (2nd Qrt. 2030)	**$**	**2,934,052**
Total Engineering Costs	**$**	**5,764,869**
Total Project Costs Subtotal	**$**	**33,058,378**
Contingency (35%)	**$**	**11,570,432**
Inflation to Midpoint of Construction	**$**	**44,628,810**
Total Probable Construction Cost per Gallon	**$**	**13.69**

Additional Assumptions

Estimate Preparation Date	6/10/2024	
Target design start	6/18/2025	
Target design end	6/18/2026	2.02 Years from June 2024
Target const start	6/18/2027	
Target const end	5/29/2032	
Estimated Midpoint of Construction	12/7/2029	5.50 Years from June 2024
Estimated Project Duration (yrs)	4.95	
Assumed inflation rate	0.04	

For items without installation cost, installation cost is included in material price.

CSO053_1.4 - Life Cycle Cost Estimate (50 years) for Offline Storage Tank with Gravity Dewatering

Description	Quantity	Unit	Unit Cost	Total Annual Cost	Comments
Annual Operation & Maintenance					
OLS Tank with Gravity Dewatering					
Operations Expenses					
Licensed Wastewater Treatment Plant Operator	52	hour	$ 50.00	$ 2,600	SCADA monitoring of entire collection system @ 1 hour per week
Water for Tipping Buckets	68.51	1000 cft	$ 22.83	$ 1,564	Assumes anticipated no. activations x 100 gal/ft of tipping bucket x length of tipping buckets
	4	quarter	$ 399.20	$ 1,597	$399.20 quarterly for 2" connection (specs mention 2" solenoid valve so flushing line is assumed to have that diameter)
Communications	12	month	$ 50.00	$ 600	Cellular data, alarm system, etc.
Routine Maintenance Expenses					
Weekly Check	104	hr	$ 43.73	$ 4,547	1 millwright (1.5 x wage to capture fringe benefits) @ 2 hours per week
	104	hr	$ 37.31	$ 3,880	1 millwright's helper (1.5 x wage to capture fringe benefits) @ 2 hours per week
	26	hr	$ 43.73	$ 1,137	2 instrument techs @ 0.25 hour per week
Annual Maintenance Labor (clean tank)	160	hr	$ 45.00	$ 7,200	2 Vactor Crews: 2 EOs @ 5 days per year
	240	hr	$ 42.00	$ 10,080	2 ERC Crews: 3 SCW @ 5 days per year
ANNUAL LABOR AND UTILITY TOTAL				$ 33,205	
Millwright's Truck	104	hour	$ 20.00	$ 2,080	1 Millwright's Truck ($150,000, 5 year life) @ 104 hours per year (weekly check) rounded to $20/hr
ERC Truck	1	week	$ 1,153.85	$ 1,154	2 ERC Truck ($150,000, 5 year life) @ 1 week per year (annual maintenance)
Vactor Truck	1	week	$ 6,410.26	$ 6,410	2 Vactor Trucks ($500K each, 3 year life) @ 1 work week per year
Skid Steer	1	week	$ 346.15	$ 346	2 Skid Steers ($45K each, 5 year life) @ 1 work week per year
Lubricants / Misc. Supplies	1	LS	$ 500.00	$ 500	
ANNUAL PARTS AND EQUIPMENT TOTAL				$ 10,490	
				Total Cost	
Rehabilitation Expenses					
Instrumentation Upgrades (every 5 years)	1	LS	$ 15,000.00	$ 15,000	Level, pressure, temp sensors, I&C/communication equipment
Cleaning Equipment Replacement (every 20 years)	1	LS	$ 562,500.00	$ 562,500	May also require crane
Engineering Evaluation (at year 25)	1	LS	$ 50,000.00	$ 50,000	Structural inspection, global control strategy review, etc.
Misc Metal Replacement (at year 25)	1	LS	$ 50,000.00	$ 50,000	Grating, railing, hatches

CSO053_1.4 - OLS Tank with Gravity Dewatering

Assumed Interest Rate = i = 5.0%

Assumed Inflation Rate = I = 4.5%

	Tank Operation and Maintenance									
Year (n)	Annual Labor and Electrical Cost (Prev. maint.)[1,2]	Labor Cost (2 yr. maint.)[1,2]	Labor Cost (5 yr. maint.)[1,2]	Labor Cost (25 yr. maint.)[1,2]	Annual Parts Cost (Prev. maint.)[2]	Rehab Cost (5 yr. maint.)[2]	Rehab Cost (20 yr. maint.)[2]	Rehab Cost (25 yr. maint.)[2]	Total Annual Cost	PW Cost[3]
0										
1	$ 34,699				$ 10,962				$ 45,661	$ 43,487
2	$ 36,261				$ 11,456				$ 47,716	$ 43,280
3	$ 37,892				$ 11,971				$ 49,863	$ 43,074
4	$ 39,597				$ 12,510				$ 52,107	$ 42,869
5	$ 41,379				$ 13,073	$ 18,693			$ 73,145	$ 57,311
6	$ 43,241				$ 13,661				$ 56,902	$ 42,461
7	$ 45,187				$ 14,276				$ 59,463	$ 42,259
8	$ 47,221				$ 14,918				$ 62,139	$ 42,058
9	$ 49,346				$ 15,590				$ 64,935	$ 41,858
10	$ 51,566				$ 16,291	$ 23,295			$ 91,152	$ 55,959
11	$ 53,887				$ 17,024				$ 70,911	$ 41,460
12	$ 56,312				$ 17,790				$ 74,102	$ 41,263
13	$ 58,846				$ 18,591				$ 77,436	$ 41,066
14	$ 61,494				$ 19,427				$ 80,921	$ 40,871
15	$ 64,261				$ 20,302	$ 29,029			$ 113,592	$ 54,640
16	$ 67,153				$ 21,215				$ 88,368	$ 40,482
17	$ 70,174				$ 22,170				$ 92,344	$ 40,290
18	$ 73,332				$ 23,168				$ 96,500	$ 40,098
19	$ 76,632				$ 24,210				$ 100,842	$ 39,907
20	$ 80,081				$ 25,299	$ 36,176	$ 1,356,589		$ 1,498,145	$ 564,635
21	$ 83,684				$ 26,438				$ 110,122	$ 39,528
22	$ 87,450				$ 27,628				$ 115,078	$ 39,339
23	$ 91,385				$ 28,871				$ 120,256	$ 39,152
24	$ 95,498				$ 30,170				$ 125,668	$ 38,966
25	$ 99,795			$ 150,272	$ 31,528	$ 45,082		$ 150,272	$ 476,948	$ 140,844
26	$ 104,286				$ 32,947				$ 137,232	$ 38,595
27	$ 108,979				$ 34,429				$ 143,408	$ 38,412
28	$ 113,883				$ 35,978				$ 149,861	$ 38,229
29	$ 119,008				$ 37,597				$ 156,605	$ 38,047
30	$ 124,363				$ 39,289	$ 56,180			$ 219,832	$ 50,864
31	$ 129,959				$ 41,057				$ 171,017	$ 37,685
32	$ 135,807				$ 42,905				$ 178,712	$ 37,506
33	$ 141,919				$ 44,836				$ 186,754	$ 37,327
34	$ 148,305				$ 46,853				$ 195,158	$ 37,149
35	$ 154,979				$ 48,962	$ 70,010			$ 273,951	$ 49,665
36	$ 161,953				$ 51,165				$ 213,118	$ 36,796
37	$ 169,241				$ 53,467				$ 222,708	$ 36,621
38	$ 176,856				$ 55,873				$ 232,730	$ 36,447
39	$ 184,815				$ 58,388				$ 243,203	$ 36,273
40	$ 193,132				$ 61,015	$ 87,245	$ 3,271,705		$ 3,613,097	$ 513,225
41	$ 201,823				$ 63,761				$ 265,583	$ 35,929
42	$ 210,905				$ 66,630				$ 277,535	$ 35,757
43	$ 220,395				$ 69,628				$ 290,024	$ 35,587
44	$ 230,313				$ 72,762				$ 303,075	$ 35,418
45	$ 240,677				$ 76,036	$ 108,724			$ 425,437	$ 47,350
46	$ 251,508				$ 79,458				$ 330,965	$ 35,081
47	$ 262,826				$ 83,033				$ 345,859	$ 34,914
48	$ 274,653				$ 86,770				$ 361,422	$ 34,748
49	$ 287,012				$ 90,674				$ 377,686	$ 34,582
50	$ 299,928			$ 451,632	$ 94,755	$ 135,490		$ 451,632	$ 1,433,435	$ 125,001
										$ 3,214,370

1. Labor Rates are calculated on Life Cycle Costs worksheet.
2. Future Annual Cost = Present Annual Cost x (1 + Inflation Rate) ^{Year} = $A_o(1+I)^n$ (present annual costs located on the O&M Costs worksheet).
3. Present Worth Cost = PW = Future Annual Cost / (1 + Interest Rate) ^{Year} = $F / (1 + i)^n$

BUFFALO SEWER AUTHORITY LONG TERM CONTROL PLAN SELECTED ALTERNATIVE
ENGINEER'S OPINION OF PROBABLE PROJECT COST

Schiller Park OLS

1/17/2022 **v3.4.0** **8.00** **MG**

Description	Material				Installation [1]		Total Cost [2]	Notes
	Basis	No. Units	Per Unit	Subtotal	Per Unit	Subtotal		
Satellite Storage								
Land Acquisition	Acres	3.1	$ 100,000	$ 306,909	$ -	$ -	$ 306,909	Assumed equal to site clearing quantity. COB-owned (Schiller Park)
Survey & Stake-out	LS	1	$ 36,450	$ 36,450	$ -	$ -	$ 36,450	
Site Clearing	SF	133,690	$ 3	$ 360,963	$ -	$ -	$ 360,963	SF of tank + 25%
Excavation	CY	99,030	$ 30	$ 2,970,889	$ -	$ -	$ 2,970,889	
Rock Excavation	CY	43,524	$ 200	$ 8,704,704	$ -	$ -	$ 8,704,704	
Piles / Foundation	LS	0	$ 500,000	$ -	$ -	$ -	$ -	Piles not needed on bedrock
Bedding	CY	9,903	$ 77	$ 762,528	$ -	$ -	$ 762,528	
Structural Concrete	CY	16,736	$ 1,200	$ 20,083,360	$ -	$ -	$ 20,083,360	
Site Dewatering and Erosion Control	LS	1		$ -	$ 675,000	$ 675,000	$ 675,000	
Sheeting/Bracing	SF	40,349	$ 46	$ 1,856,060	$ -	$ -	$ 1,856,060	
Backfill	CY	102,941	$ 44	$ 4,529,417	$ -	$ -	$ 4,529,417	
Hauling	CY	0	$ 14	$ -	$ -	$ -	$ -	Hauling and disposal rolled into excavation costs
Cleaning Equipment	LF	267	$ 4,500	$ 1,203,210	$ -	$ -	$ 1,203,210	Tipping buckets price per Koester
Access Manholes	EA	3	$ 3,100	$ 9,300	$ -	$ -	$ 9,300	
Miscellaneous Site Restoration	LS	1	$ 200,000	$ 200,000	$ -	$ -	$ 200,000	to cover conveyance restoration
Grass Restoration	SY	14,854	$ 9	$ 133,690	$ -	$ -	$ 133,690	Assumed equal to site clearing quantity
Satellite Storage Conveyance 1 / Connection to OLS								
Excavation	CY	2,003	$ 30	$ 60,101	$ -	$ -	$ 60,101	
Bedding	CY	35	$ 77	$ 2,695	$ -	$ -	$ 2,695	
Site Dewatering and Erosion Control	LS	1		$ -	$ 67,500	$ 67,500	$ 67,500	
Sheeting/Bracing	SF	15,454	$ 46	$ 710,906	$ -	$ -	$ 710,906	
Backfill	CY	2,003	$ 44	$ 88,148	$ -	$ -	$ 88,148	Assumed to be the same as volume excavatec
Hauling	CY	0	$ 14	$ -	$ -	$ -	$ -	Assumed to be included with excavation
4 ft Concrete Pipe	LF	268	$ 800	$ 214,720	$ -	$ -	$ 214,720	
Cut Access into Main Interceptor	LS	1	$ 67,500	$ 67,500	$ -	$ -	$ 67,500	
Manholes	EA	2	$ 3,100	$ 6,200	$ -	$ -	$ 6,200	
Satellite Storage Conveyance 2								
Excavation	CY	6,535	$ 30	$ 196,041	$ -	$ -	$ 196,041	
Bedding	CY	114	$ 77	$ 8,778	$ -	$ -	$ 8,778	
Site Dewatering and Erosion Control	LS	1		$ -	$ 67,500	$ 67,500	$ 67,500	
Sheeting/Bracing	SF	50,411	$ 46	$ 2,318,888	$ -	$ -	$ 2,318,888	Assumed to be the same as volume excavatec
Backfill	CY	6,535	$ 44	$ 287,527	$ -	$ -	$ 287,527	Assumed to be included with excavation
Hauling	CY	0	$ 14	$ -	$ -	$ -	$ -	Hauling and disposal rolled into excavation costs
4 ft Concrete Pipe	LF	875	$ 800	$ 700,390	$ -	$ -	$ 700,390	
Cut Access into Main Interceptor	EA	1	$ 67,500	$ 67,500	$ -	$ -	$ 67,500	
Manholes	EA	4	$ 3,100	$ 12,400	$ -	$ -	$ 12,400	
Inlet and Outlet Gates								
4 ft Diameter Inlet Gate	EA	1	$ 100,000	$ 100,000	$ -	$ -	$ 100,000	Broadway Oak RTC gates $100,000 each
4 ft Diameter Outlet Gate	EA	1	$ 100,000	$ 100,000	$ -	$ -	$ 100,000	Broadway Oak RTC gates $100,000 each

Subtotal	**$**	**46,900,000**
Electrical, Controls and Instrumentation (15%)	**$**	**7,000,000**
Utility Relocation / Coordination (5%)	**$**	**2,300,000**
MPT (5%)	**$**	**2,300,000**
General Conditions, Bonds & Insurance (5% of Subtotal)	**$**	**2,900,000**
Base Probable Construction Cost (Rounded)	**$**	**61,400,000**
Contingency (40%)	**$**	**24,560,000**
Total Probable Construction Cost	**$**	**85,960,000**
Total Probable Construction Cost per Gallon	**$**	**10.75**

(1) For items without installation cost, installation cost is included in material price

(2) Year 2022 dollars. Does not include engineering, administrative, and legal costs or contingency

System_2 Schiller Park - Life Cycle Cost Estimate (50 years) for Offline Storage Tank with Gravity Dewatering

Description	Quantity	Unit	Unit Cost	Total Annual Cost	Comments
Annual Operation & Maintenance					
OLS Tank with Gravity Dewatering					
Operations Expenses					
Licensed Wastewater Treatment Plant Operator	52	hour	$ 50.00	$ 2,600	SCADA monitoring of entire collection system @ 1 hour per week
Water for Tipping Buckets	121.53	1000 cft	$ 22.83	$ 2,774	Assumes anticipated no. activations x 100 gal/ft of tipping bucket x length of tipping buckets
	4	quarter	$ 399.20	$ 1,597	$399.20 quarterly for 2" connection (specs mention 2" solenoid valve so flushing line is assumed to have that diameter)
Communications	12	month	$ 50.00	$ 600	Cellular data, alarm system, etc.
Routine Maintenance Expenses					
Weekly Check	104	hr	$ 43.73	$ 4,547	1 millwright (1.5 x wage to capture fringe benefits) @ 2 hours per week
	104	hr	$ 37.31	$ 3,880	1 millwright's helper (1.5 x wage to capture fringe benefits) @ 2 hours per week
	26	hr	$ 43.73	$ 1,137	2 instrument techs @ 0.25 hour per week
Annual Maintenance Labor (clean tank)	160	hr	$ 45.00	$ 7,200	2 Vactor Crews: 2 EOs @ 5 days per year
	240	hr	$ 42.00	$ 10,080	2 ERC Crews: 3 SCW @ 5 days per year
ANNUAL LABOR AND UTILITY TOTAL				$ 34,415	
Millwright's Truck	104	hour	$ 20.00	$ 2,080	1 Millwright's Truck ($150,000, 5 year life) @ 104 hours per year (weekly check) rounded to $20/hr
ERC Truck	1	week	$ 1,153.85	$ 1,154	2 ERC Truck ($150,000, 5 year life) @ 1 week per year (annual maintenance)
Vactor Truck	1	week	$ 6,410.26	$ 6,410	2 Vactor Trucks ($500K each, 3 year life) @ 1 work week per year
Skid Steer	1	week	$ 346.15	$ 346	2 Skid Steers ($45K each, 5 year life) @ 1 work week per year
Lubricants / Misc. Supplies	1	LS	$ 500.00	$ 500	
ANNUAL PARTS AND EQUIPMENT TOTAL				$ 10,490	
				Total Cost	
Rehabilitation Expenses					
Instrumentation Upgrades (every 5 years)	1	LS	$ 15,000.00	$ 15,000	Level, pressure, temp sensors, I&C/communication equipment
Cleaning Equipment Replacement (every 20 years)	1	LS	$ 1,203,210.00	$ 1,203,210	May also require crane
Engineering Evaluation (at year 25)	1	LS	$ 50,000.00	$ 50,000	Structural inspection, global control strategy review, etc.
Misc Metal Replacement (at year 25)	1	LS	$ 50,000.00	$ 50,000	Grating, railing, hatches

System_2 Schiller Park - OLS Tank with Gravity Dewatering

Assumed Interest Rate = i = 5.0%

Assumed Inflation Rate = I = 4.5%

	Tank Operation and Maintenance									
Year (n)	Annual Labor and Electrical Cost (Prev. maint.)[1,2]	Labor Cost (2 yr. maint.)[1,2]	Labor Cost (5 yr. maint.)[1,2]	Labor Cost (25 yr. maint.)[1,2]	Annual Parts Cost (Prev. maint.)[2]	Rehab Cost (5 yr. maint.)[2]	Rehab Cost (20 yr. maint.)[2]	Rehab Cost (25 yr. maint.)[2]	Total Annual Cost	PW Cost[3]
0										
1	$ 35,964				$ 10,962				$ 46,926	$ 44,692
2	$ 37,582				$ 11,456				$ 49,038	$ 44,479
3	$ 39,274				$ 11,971				$ 51,245	$ 44,267
4	$ 41,041				$ 12,510				$ 53,551	$ 44,056
5	$ 42,888				$ 13,073	$ 18,693			$ 74,653	$ 58,493
6	$ 44,818				$ 13,661				$ 58,479	$ 43,638
7	$ 46,834				$ 14,276				$ 61,110	$ 43,430
8	$ 48,942				$ 14,918				$ 63,860	$ 43,223
9	$ 51,144				$ 15,590				$ 66,734	$ 43,017
10	$ 53,446				$ 16,291	$ 23,295			$ 93,031	$ 57,113
11	$ 55,851				$ 17,024				$ 72,875	$ 42,609
12	$ 58,364				$ 17,790				$ 76,154	$ 42,406
13	$ 60,991				$ 18,591				$ 79,581	$ 42,204
14	$ 63,735				$ 19,427				$ 83,163	$ 42,003
15	$ 66,603				$ 20,302	$ 29,029			$ 115,934	$ 55,766
16	$ 69,600				$ 21,215				$ 90,816	$ 41,604
17	$ 72,732				$ 22,170				$ 94,902	$ 41,406
18	$ 76,005				$ 23,168				$ 99,173	$ 41,208
19	$ 79,426				$ 24,210				$ 103,636	$ 41,012
20	$ 83,000				$ 25,299	$ 36,176	$ 2,901,798		$ 3,046,273	$ 1,148,108
21	$ 86,735				$ 26,438				$ 113,173	$ 40,622
22	$ 90,638				$ 27,628				$ 118,265	$ 40,429
23	$ 94,716				$ 28,871				$ 123,587	$ 40,237
24	$ 98,979				$ 30,170				$ 129,149	$ 40,045
25	$ 103,433			$ 150,272	$ 31,528	$ 45,082		$ 150,272	$ 480,586	$ 141,918
26	$ 108,087				$ 32,947				$ 141,034	$ 39,664
27	$ 112,951				$ 34,429				$ 147,380	$ 39,476
28	$ 118,034				$ 35,978				$ 154,012	$ 39,288
29	$ 123,346				$ 37,597				$ 160,943	$ 39,101
30	$ 128,896				$ 39,289	$ 56,180			$ 224,365	$ 51,913
31	$ 134,696				$ 41,057				$ 175,754	$ 38,729
32	$ 140,758				$ 42,905				$ 183,663	$ 38,545
33	$ 147,092				$ 44,836				$ 191,928	$ 38,361
34	$ 153,711				$ 46,853				$ 200,564	$ 38,178
35	$ 160,628				$ 48,962	$ 70,010			$ 279,600	$ 50,689
36	$ 167,856				$ 51,165				$ 219,021	$ 37,816
37	$ 175,410				$ 53,467				$ 228,877	$ 37,636
38	$ 183,303				$ 55,873				$ 239,177	$ 37,456
39	$ 191,552				$ 58,388				$ 249,940	$ 37,278
40	$ 200,172				$ 61,015	$ 87,245	$ 6,998,308		$ 7,346,740	$ 1,043,573
41	$ 209,179				$ 63,761				$ 272,940	$ 36,924
42	$ 218,592				$ 66,630				$ 285,223	$ 36,748
43	$ 228,429				$ 69,628				$ 298,058	$ 36,573
44	$ 238,708				$ 72,762				$ 311,470	$ 36,399
45	$ 249,450				$ 76,036	$ 108,724			$ 434,210	$ 48,326
46	$ 260,676				$ 79,458				$ 340,133	$ 36,053
47	$ 272,406				$ 83,033				$ 355,439	$ 35,881
48	$ 284,664				$ 86,770				$ 371,434	$ 35,710
49	$ 297,474				$ 90,674				$ 388,148	$ 35,540
50	$ 310,860			$ 451,632	$ 94,755	$ 135,490		$ 451,632	$ 1,444,368	$ 125,954
										$ 4,379,800

1. Labor Rates are calculated on Life Cycle Costs worksheet.
2. Future Annual Cost = Present Annual Cost x (1 + Inflation Rate)^{Year} = $A_o(1+I)^n$ (present annual costs located on the O&M Costs worksheet).
3. Present Worth Cost = PW = Future Annual Cost / (1 + Interest Rate)^{Year} = $F / (1 + i)^n$

APPENDIX F: Engineering Report Certification

Engineering Report Certification

To Be Provided by the Professional Engineer Preparing the Report

During the preparation of this Engineering Report, I have studied and evaluated the cost and effectiveness of the processes, materials, techniques, and technologies for carrying out the proposed project or activity for which assistance is being sought from the New York State Clean Water State Revolving Fund. In my professional opinion, I have recommended for selection, to the maximum extent practicable, a project or activity that maximizes the potential for efficient water use, reuse, recapture, and conservation, and energy conservation, taking into account the cost of constructing the project or activity, the cost of operating and maintaining the project or activity over the life of the project or activity, and the cost of replacing the project and activity.

Title of Engineering Report: CSO-053_1.4 Sidney Offline Storage (OLS) Tank Draft Preliminary Engineering Report

Date of Report: 06/14/2024

Professional Engineer's Name: Edmund A. Aplerh-Doku, P.E.

Signature: Edmund Aplerh-Doku Digitally signed by Edmund Aplerh-Doku Date: 2024.06.13 06:49:15 -04'00'

Date: 06/14/2024

APPENDIX G: Xylem Alternatives Analysis

BSA Queen City Clean Waters Program Alternatives and Design Log

5/15/2024

Color Key

	OLS
	SPP modification (SPP mod)
	RTC

Abbreviations

DUC	Dynamic Underflow Control
GCCS	Globally Coordinated Control Strategy
GI	Green Infrastructure
ILS	In-line Storage
LTCP	Long Term Control Plan
OLS	Off-line Storage
PER	Preliminary Engineering Report
RTC	Real-Time Control
SPP	Sewer Patrol Point
SWMM	Stormwater Management Model

Xylem Deliverable References

BSA_CSO_TY_Results_Current_Status_Comments_220126.xlsx
Pres_BSA_299_LTCPOptimizationWorkshop6_220526.pdf
Pres_BSA_299_LTCPOptimizationWorkshop8_220728_v2.pdf
Pres_BSA_299_LTCPOptimizationWorkshop9_220825_v2.pdf
Pres_BSA_299_LTCPOptimizationWorkshop10_220928.pdf
TM_BSA_299_LTCP_Optimization_Selected_Alternative_230131.pdf
TM_BSA_299_BridgingDocument_230531_v2.pdf

SPP 336 A/B (SPP165A, SPP165B, SPP336A, SPP 336B) (4.2 MG) (M) Replaced by **CSO053_1.4 3.26 MG Sidney OLS**	
Lead Design Consultant	TY Lin / G&H (PER)
Conceptual Design Scope	To reduce flows at SPP336B, the Sidney Street OLS would store flow diverted from the sewer along Humboldt Parkway in a 3.26 MG tank at the corner of Sidney Street and Lark Street. The storage would dewater via gravity when there is sufficient available capacity in the Scajaquada Tunnel Interceptor.

SPP336B Alternatives Considered				
Tag	**Project**	**Project Type**	**Current Estimated Total Present Worth Cost (2022 Dollars)**	**Alternative Notes**
N/A	East Ferry ILS	ILS	N/A	**In 2014 LTCP**, but removed from consideration prior to optimization. Investigations have demonstrated that storage is not available in this section due to low basement and side sewer connections. This project is therefore no longer being contemplated.
N/A	SPP 336 A/B (SPP165A, SPP165B, SPP336A, SPP 336B) 4.2 MG OLS	OLS	N/A	**In the 2014 LTCP**, but the updated model indicates that 336A is already in compliance. Additionally, as described in the LTCP, the SPP 336 A/B OLS project would require the acquisition and demolition of occupied homes in East Buffalo near the site of the May 14, 2022, Tops Friendly Markets racially motivated massacre. Alternatives were explored on vacant land that would require less disruption in this neighborhood. Removed from consideration.
CSO053_1.4	SPP336B OLS (Sidney OLS)	OLS	$ 30,934,370	The SPP 336 A&B (CSO-053) Satellite Storage at Humboldt Parkway will be replaced with a smaller 3.26 MG tank at the corner of Sidney Street and Lark Street. This area is on vacant land that will be maintained as a parking lot or pocket park after Substantial Completion. Included **in Selected Alternative**, works with CSO053_1.5 to achieve compliance for SPP336B.
CSO053_1.5	Schiller Park OLS SPP336B Modification	SPP Mod	$ 175,380	Included **in Selected Alternative**, works with CSO053_1.4 to achieve compliance for SPP336B.

Design Log		
Date	**Phase**	**Note**
9/28/2022	Optimization	To get to compliance for SPP336B, updated Updated Sidney OLS configuration (deeper to get more storage volume)
4/11/2024	PER	Had tried to reduce to 2.62 MG to fit better on that parcel, but had to upsize to 3.26 MG to get to compliance. 4.2 MG was the original project size in the LTCP. Moving forward we should plan on 3.26 MG for Sidney OLS, unless site constraints dictate otherwise in the detailed design phase. Suggested running final 2039 conditions model (BSA_ProposedLTCP_010139Projects_TY_r5 _exp1) with the storage area reduced to 17,500 sq. ft. (2.62 MG volume) to confirm if that size achieves compliance. If it does, the design engineer can evaluate options for a range from 2.62-3.26 MG. If not, they will need to evaluate the best way to fit 3.26 MG of storage in that area.

BUFFALO
SEWER AUTHORITY

Engineering Services for Smart Sewer Projects
Contract No. 82000076

Breckenridge St. CSO Control Project

Engineering Report

Revised July 2024

GREELEY AND HANSEN

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Executive Summary

The Buffalo Sewer Authority (Buffalo Sewer) provides wastewater service to approximately 550,000 people. Buffalo Sewer owns and operates the Bird Island Wastewater Treatment Facility (WWTF), constructed from 1937 through 1939, and also manages 850 miles of sanitary, storm, and combined sewer lines. Buffalo Sewer has entered into an Administrative Order (AO) with New York State Department of Environmental Conservation (DEC) and the United States Environmental Protection Agency (EPA) as part of their Combined Sewer Overflow (CSO) Long Term Control Plan (LTCP) that was approved on March 18, 2014. The purpose of the LTCP is to reduce CSO activations within the existing system.

Pursuant to the LTCP, Buffalo Sewer is developing a coordinated series of storage and flow-diversion structures within their collection system. A significant amount of storage volume is planned to be obtained through the use of Real-Time Control (RTC) structures, as Buffalo Sewer anticipates installing sixteen RTC structures as part of the LTCP. The RTC sites optimize available inline storage (ILS) and conveyance capacity within the collection system, through the utilization of overflow lines (referred to as outfall storage) and combined sewers. The original Scajaquada Creek and Black Rock Canal Smart Sewer Project (Buffalo Sewer Contract No. 82000041) had three new RTC sites: Niagara Street at Breckenridge Street, Bailey Avenue at East Amherst Street, and Gates Circle at Delaware Avenue. However, the Niagara Street at Breckenridge Street RTC was eventually removed from Contract No. 82000041 to be handled as a separate project because design changes and constructability concerns tripled its expected cost. As a result, two potential options were identified as alternatives to the Niagara at Breckenridge RTC in a memorandum to Buffalo Sewer.

The recommended alternative will involve replacing the Breckenridge Street brick sewer from West Avenue to Herkimer Street, connecting to a new sewer line on West Avenue, and sending flow to Scajaquada Tunnel on Lafayette Avenue. The junction point at Breckenridge Street and West Avenue will be bulkheaded to divert this flow from SPP 21 and ultimately CSO-10. The existing sewer collection lines on West Avenue will be abandoned and the house connections will be reconnected to a new line on West Avenue. The new West Avenue line will run north and connect to a new, deep drop-pipe manhole structure to be constructed at the intersection of West Avenue and Lafayette Avenue connecting to the Scajaquada Tunnel. This alternative considers the existing Breckenridge sewer line's lifespan; due to its age, it will need replacement soon.

The total project cost of the recommended alternative is estimated to be $20.4 million in 2023 dollars**.**

The Median Household Income (MHI) for the Buffalo area is $46,184 per year based on 2018-2022 estimates, which is 43.3% lower than the State MHI. After covering operational expenditures, net revenues (income coming mainly from sewer rents, direct payments from outside users, and industrial waste disposal), were able to cover debt obligations while maintaining a reserve fund.

The proposed upgrades will be essential to protecting the quality of the Black Rock Canal, Scajaquada Creek, and Niagara River, which receive discharges of untreated combined sewage during wet weather. The surface waters play an important role in supporting aquatic habitats and recreation, as well as providing an aesthetic waterfront to potential environmental justice communities. Protecting these waters will support this recreational and tourism resource for the City of Buffalo.

Section 1 Project Background and History

1.1 Site Information

1.1.1 Project Background and Location

The Buffalo Sewer Authority (Buffalo Sewer) provides wastewater service to a population of approximately 550,000. As part of this service, Buffalo Sewer owns and operates the Bird Island Wastewater Treatment Facility (WWTF), constructed from 1937 through 1939, along with managing 850 miles of storm and combined sewer lines. Buffalo Sewer has entered into an Administrative Order (AO) with New York State Department of Environmental Conservation (DEC) and the United States Environmental Protection Agency (EPA) as part of their approved Combined Sewer Overflow (CSO) Long Term Control Plan (LTCP) that was approved on March 18, 2014. The purpose of the LTCP is to reduce CSO activation within the existing system and to also alleviate overall influent to the WWTF. A copy of the AO is provided in **Appendix A**.

Buffalo Sewer is in the process of constructing a series of coordinated Real Time Control (RTC) sites as part of their LTCP. RTC sites use smart logic to optimize available inline storage (ILS) and conveyance capacity within the collection system, including overflow lines (referred to as outfall storage) and combined sewers. Buffalo Sewer committed to the installation of up to 16 RTCs under the LTCP. The Scajaquada Creek and Black Rock Canal Smart Sewer Project (Buffalo Sewer Contract No. 82000041) has two RTC sites: Bailey Avenue at East Amherst Street, and Gates Circle at Delaware Avenue. Contract No. 82000041 previously included a third site at Niagara Street at Breckenridge Street. The design for the Niagara Street at Breckenridge Street RTC site had undergone several changes due to constraints related to obtaining easements on National Grid property and inability to relocate electric feeder lines coming from National Grid's substation. The opinion of probable construction (OPCC) for the project tripled between the 75% and 95% design milestones due to additional construction factors identified that would increase the difficulty of construction for those working on the site and those living in the nearby community. Given the added complications, the Niagara Street at Breckenridge Street site was removed from Contract No. 82000041 and Buffalo Sewer decided to investigate other cost-effective alternatives for diverting potential combined sewer overflow at this location.

On April 4, 2023, Greeley and Hansen submitted a memorandum to Buffalo Sewer presenting two potential gravity-based alternatives to the Niagara at Breckenridge RTC that would require further evaluation for viability:

1. Rerouting flow from the 36-inch brick sewer along Breckenridge Street directly northward to the Scajaquada Tunnel at the intersection of Breckenridge Street and West Avenue; and
2. Reversing flow in the 36-inch brick sewer along Breckenridge Street to head east from West Avenue to Herkimer Street, at which point it would run north and feed into the Scajaquada Tunnel via a drop manhole on Lafayette Avenue.

The memo concluded that West Avenue was not feasible due to a 115 kV electric power line located along West Avenue, while a cursory review of utilities in the area did not preclude rerouting through Herkimer Street as a viable alternative. Xylem has indicated that Herkimer Street, if constructable, would meet the target activations at CSO-10.

The proposed alternative sites are located in the City of Buffalo, Erie County, New York and are shown in **Figure 1-1**.The West Avenue alternate site is in red and the Herkimer Street alternate site is in yellow. Both alternative sites utilize Breckenridge Street's sewer line in orange. **Figure 1-1** also indicates the location of the previously proposed site in Contract No. 82000041 for Niagara Street at Breckenridge Street. An overview of the site location relative to collection system mapping is given in **Appendix B**.

Construction at all sites will occur within the existing City right-of-way.

Figure 1-1. Location of Previously Proposed and Currently Proposed Project Sites

1.1.2 Geologic Conditions

According to the Natural Resources Conservation Service's Web Soil Survey, the site soil types consist of Urban land and Urban land-lima complex (1 to 6% slopes). The depth to water table and depth to bedrock was greater than 200 cm at the location. Per the geotechnical report previously completed for Contract No. 82000041 at **Appendix K**, the Niagara at Breckenridge site's top of bedrock is at a depth of approximately 8 feet. The recovered bedrock cores are classified as sound, hard to very hard, with rock quality designation (RQD) values at and above 88%. A geologic map showing the RTC project location with subsurface work is provided in **Figure 1-2**.

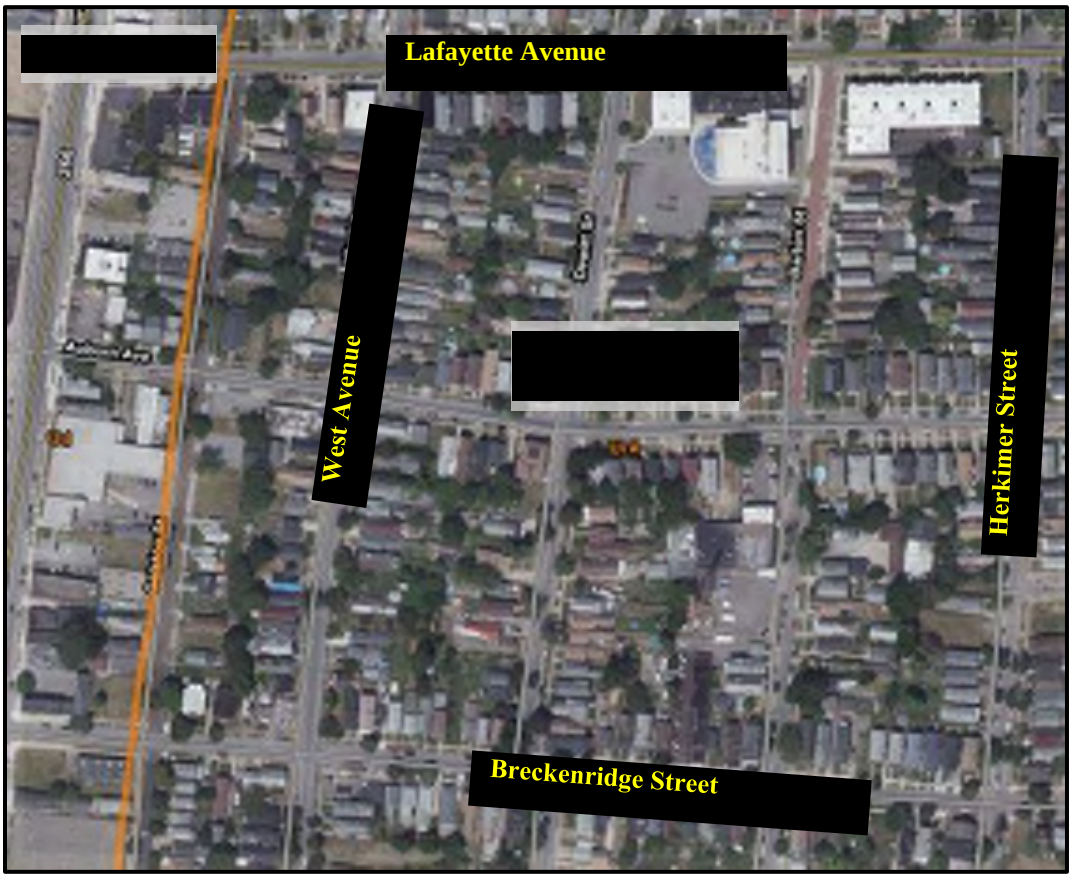


Figure 1-2. Geologic Map

1.1.3 Flood Zones

Flood zones are geographic areas that FEMA has defined according to varying levels of flood risk. The proposed location falls within FEMA's Zone X, which is an area of minimal flood hazard, determined to be outside the 500-year flood zone. The flood zone maps for the project site can be seen in **Appendix C**.

1.1.4 Environmental Resources

The United States Fish and Wildlife Service's Information for Planning and Conservation (IPaC) database was researched for this site as subsurface work is planned. The IPaC preliminary results indicate that the Northern long-eared bat is a threatened species that may occur in the project area. The Northern long-eared bat is a species likely to become endangered within the foreseeable future. The database also indicates that the monarch butterfly exists within the project area and is a candidate for listing as a threatened species. The project area also consists of habitat for 20 migratory birds. This project is unlikely to impact any of the aforementioned species where planned work is to occur within paved areas. The IPaC preliminary report for this project location can be found in **Appendix D**.

The sewer system has three major receiving water bodies: Scajaquada Creek (PWL ID: 0101-0023), Black Rock Canal (0101-0025), and the Niagara River (0101-0006). The latest water quality assessment provided by NYSDEC classifies all three waterbodies as "impaired" for fish consumption due to contaminants that degrade the habitat. The Scajaquada Creek is also listed as "impaired" for both primary and secondary recreational use. Niagara River is classified as a "threatened" water supply system with "stressed" aquatic life. According to the DEC, the high density of sanitary wastewater discharges results in elevated susceptibility for numerous contaminant categories, including fecal coliforms.

1.1.5 Environmental Justice Areas

The project sites fall within several Potential Environmental Justice Areas (PEJAs). The water quality in the Black Rock Canal directly impacts the population on the west side of Buffalo, including the Riverside and Upper West Side communities. Riverside has a minority population of approximately 70% and nearly 50% of the population lives below poverty level. Upper West Side has a minority population of approximately 75% and nearly 55% of the population lives below poverty level. In addition, near the area of the WWTF, there are several PEJAs where the population living below poverty line is nearly 70%, and others where more than 40% of the population lives below the poverty line. A map of the PEJAs surrounding the project site and along the affected waterbodies is given in **Figure 1-3**.

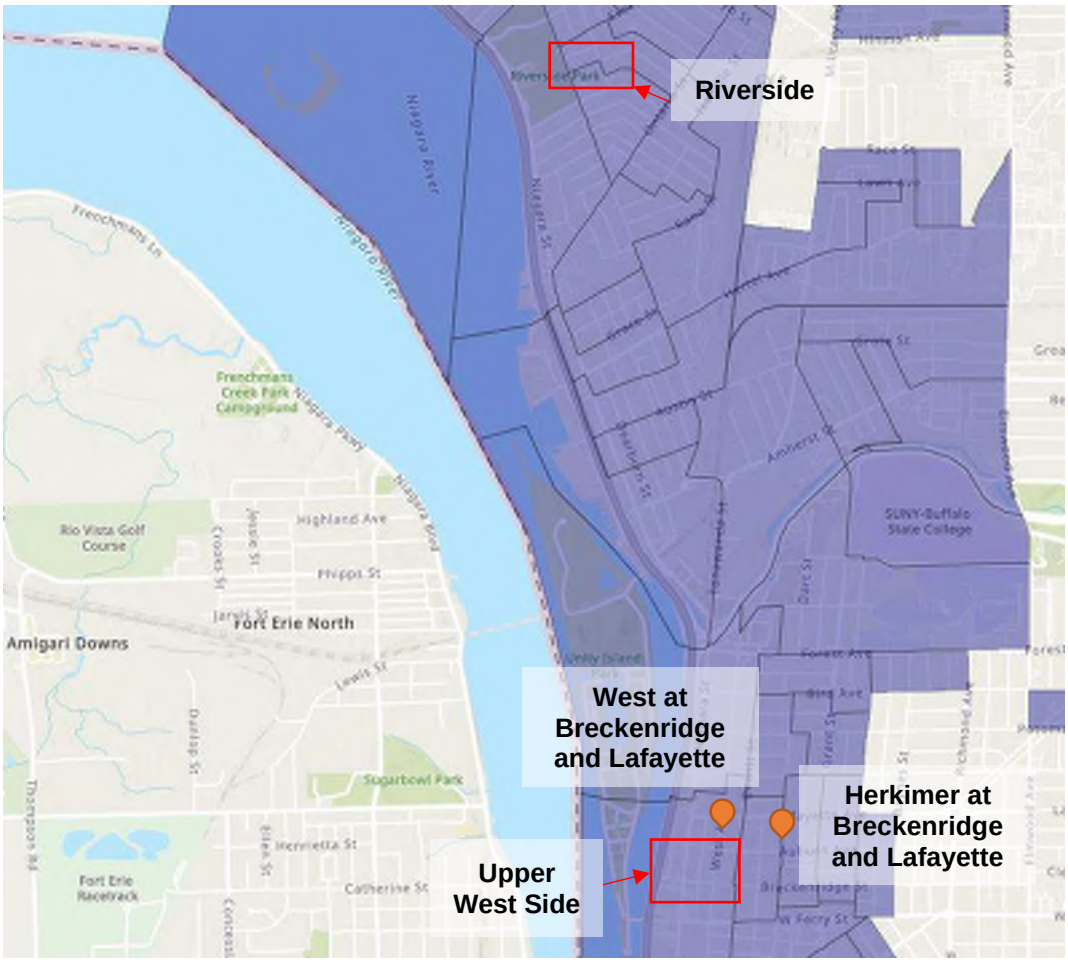


Figure 1-3. Potential Environmental Justice Areas

The project will also have positive environmental and aesthetic impacts on Broderick Park, a historic Underground Railroad site and an important community resource for the surrounding PEJAs. Although Broderick Park is technically upstream in the Black Rock Canal, when the canal locks are closed, flow can go back past Broderick Park from Scajaquada Creek, the Delavan Drain, and CSO-10 into the Niagara River to the north rather than to the south. Unity Island will also benefit from improved water quality as a result of the project, which is frequently utilized by the New American community and the Burmese community.

1.2 Ownership and Service Area

Buffalo Sewer's wastewater service area covers approximately 110 square miles, including the City and parts of the Towns of Alden, Cheektowaga, Elma, Lancaster, Tonawanda, and West Seneca, and the Villages of Depew, Lancaster, and Sloan, as well as Erie County Sewer District No. 1 and 4, as shown in

Figure 1-4. The collection system serves a population of approximately 550,000 residents in 11 municipalities.

Buffalo Sewer's collection system consists of approximately 850 miles of sewer lines, of which 93% is made up of combined sewer systems that convey both sanitary and stormwater flows. The collection system includes 52 CSO outfall relief points to prevent flooding damage to public and private infrastructure during wet weather events that exceed the capacity of the collection and treatment system.

1.2.1 Outside Users

There are seven outside users connected to Buffalo Sewer's collection system, governed under individual intermunicipal agreements (IMAs) including:

- Erie County Sewer District #1
- Erie County Sewer District #4
- Town of Cheektowaga
- Village of Sloan
- West Seneca Town Sewer Districts #1, 2, 3, 4, 9 and 10
- West Seneca Town Sewer Districts #5, 13, and 14
- West Seneca Town Sewer District #1

Buffalo Sewer has wholesale agreements with these outside communities and does not own, operate, or maintain the wastewater collection systems within these communities. Each of these outside communities are charged by Buffalo Sewer for their share of costs allocable to the treatment of their flows to the WWTF. Allocable costs include portions of administrative expenses, WWTF expenses, industrial waste expenses, the costs to maintain trunk sewers to convey flows from the city line to the WWTF, and debt service costs. The municipality or district is billed twice annually for services. Under the IMAs, each District is responsible for installing and maintaining meters at city lines. Buffalo Sewer has rights to challenge accuracy of meters, including through installation of test meters.

In 2021, Buffalo Sewer reported the following in their Annual Pretreatment Report regarding industrial users and hauled waste activity:

- There are a total of 151 discharges broken down as follows:
    - 27 Categorical Industrial Discharge Permits
    - 44 Non-Categorical Industrial Discharge Permits
    - 64 Trucker Permits
    - 16 Temporary Discharge Permits

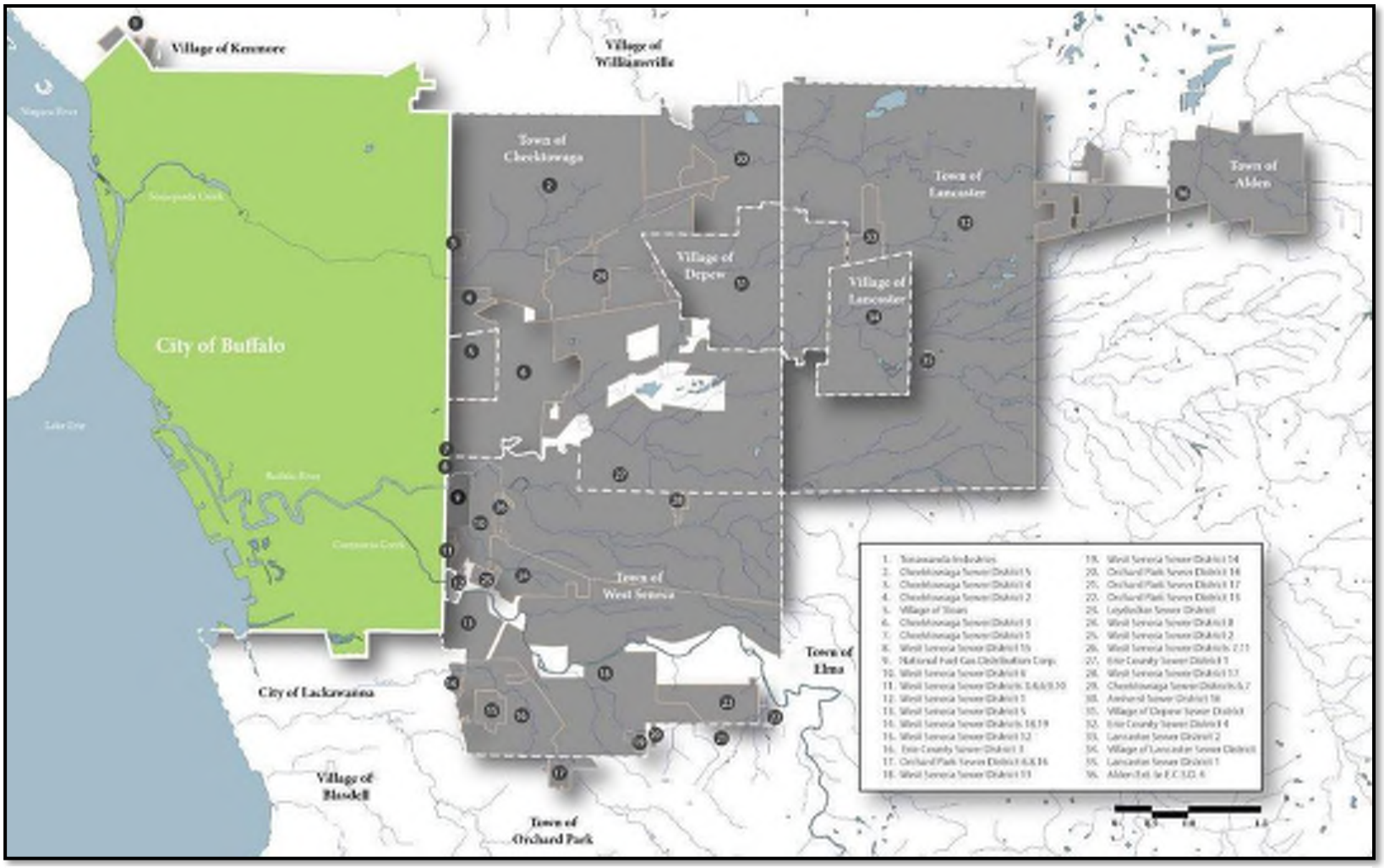


Figure 1-4. Buffalo Sewer Authority Service Area

1.2.2 Population Trends and Growth

Historically, the City of Buffalo has experienced population decline, unlike the population growth seen in New York State as a whole, as shown in **Table 1-1**. However, from 2010 to 2020, there was a population growth of 6.5%. Assuming an average population change based on the recent decade, it is projected the City's population will continue to grow at a rate of approximately 5.8% every ten years.

Table 1-1. Historical and Project Population

Year	City of Buffalo		New York	
	Population	% Change	Population	% Change
1960	532,759		16,782,304	
1970	462,768	-13.1%	18,236,967	8.7%
1980	357,870	-22.7%	17,558,072	-3.7%
1990	328,123	-8.3%	17,990,455	2.5%
2000	292,648	-10.8%	18,976,457	5.5%
2010	261,310	-10.7%	19,378,102	2.1%
2020	278,349	6.5%	20,201,249	4.2%
2030*	295,388	5.8%	21,024,396	3.9%
2040*	312,427	5.8%	21,847,543	3.9%
2050*	329,466	5.8%	22,670,690	3.9%
2060*	346,505	5.8%	23,493,837	3.9%

*Projected
Source: US Census Bureau

As the population of the City is growing, the number of Buffalo Sewer connections has also increased over the past 11 years. Per the most recent Comprehensive Annual Financial Report (CAFR), as of FYE 2022, there are approximately 108,051 residential connections and 1,295 commercial, industrial, and governmental connections to Buffalo Sewer's collection system. These connections increased by 6.5% and 160% respectively, from 2012 to 2022. **Figure 1-5** shows the growth of connections since 2012.

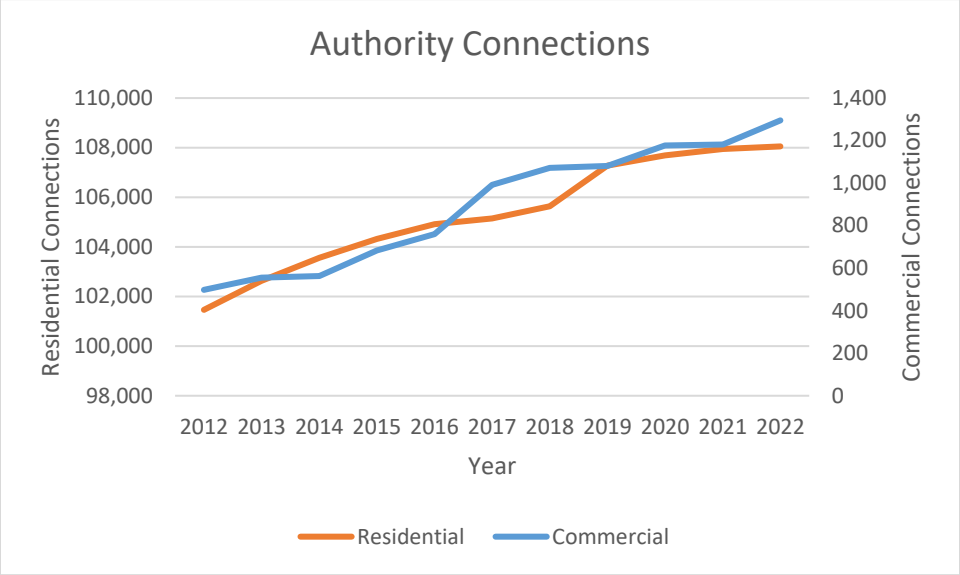


Figure 1-5. Sewer Connections

1.3 Existing Facilities and Present Condition

1.3.1 General Description, History of Major System Components, and Description of Unit Processes

Construction on the sewer collection system began in the 1830s, and the Bird Island WWTF was constructed from 1937 through 1939. Over the years, the WWTF has been upgraded to comply with new regulations. There is no known failure history within the system of note. The system is not efficiently utilizing storage within collection and conveyance infrastructure, resulting in unnecessary discharges of combined sewage to surface waters. There is no planned expansion or increased reception of sewage as part of this project.

A description of the alternative sites for this project is broken down below.

Breckenridge Street
Breckenridge Street, between West Avenue and Herkimer Street, has an existing 36-inch arch combined brick sewer that was constructed in 1888. The width of the sewer expands from 24-inch at Herkimer Street to 32-inch at West Avenue. The sewer west of West Avenue expands to 36-inch all the way to Sewer Patrol Point (SPP) 21. The length of sewer is approximately 1,124 LF from Herkimer Street to West Avenue and is pitched at approximately 0.45% slope with manholes on each end of the block. The brick sewer conveys wastewater to the west toward SPP 21, where it is either conveyed to the WWTF or released to the Black Rock Canal at the discharge point known as CSO-10.

The existing infrastructure at Breckenridge between Herkimer and West is show in **Figure 1-6**.

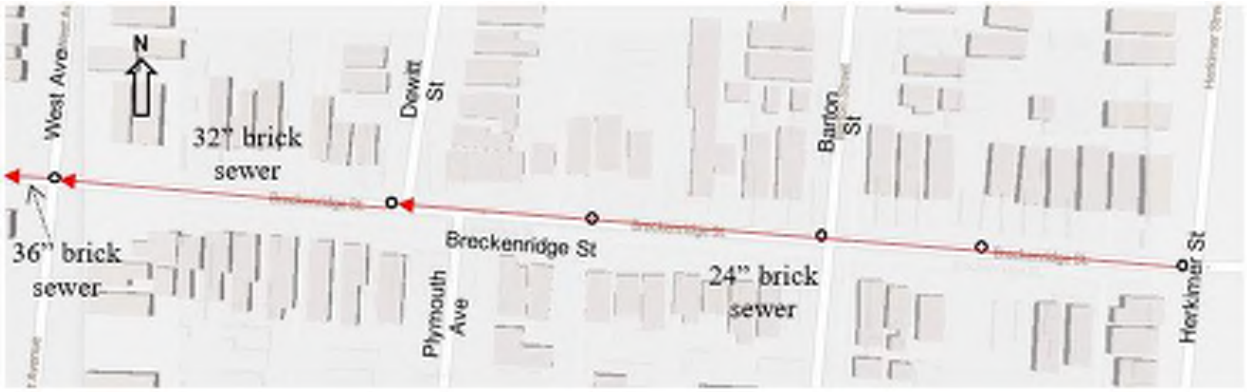


Figure 1-6: Existing Conditions: Breckenridge at Herkimer and West

West Avenue

West Avenue has existing collection sewer lines located on both sides street under the sidewalk, running north and south. They convey wastewater from West Avenue to Breckenridge Street's combined brick sewer. As seen in **Figure 1-7**, the eastern sewer collection line runs from Lafayette Avenue to Breckenridge Street, starting as a 10-inch vitrified tile (VT) and expanding to 12-inch. The eastern 10-inch and 12-inch lines are approximately 240 LF and 615 LF, respectively, and are pitched at 0.30% slope with manholes throughout the line and on each end. The western collection line is a 170 LF 10-inch VT from Lafayette Avenue to Breckenridge Street and is pitched at varying slopes. All VT sewers convey waste to the existing brick sewer on Breckenridge Street.

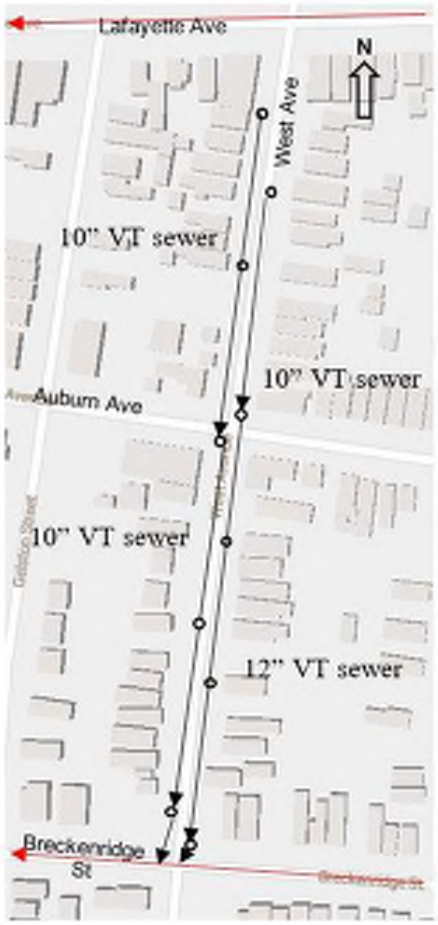


Figure 1-7: Existing Conditions: West at Breckenridge and Lafayette

Herkimer Street

Herkimer Street has existing collection sewer lines located on both sides of the street under the sidewalk, running north and south. They convey wastewater to the combined brick sewer on Breckenridge Street and Scajaquada Tunnel on Lafayette Avenue. On the eastern side of the street, there is a 15-inch VT sewer line that runs from Auburn Avenue and expands to 18-inch when it reaches Breckenridge Street. As seen in **Figure 1-8**, the 15-inch and 18-inch lines are approximately 261 LF and 310 LF, respectively, and are pitched at approximately 0.30% slope with manholes throughout the line and on each end. The western side of the street has a 492 LF 12-inch VT sewer line that runs from Auburn Avenue to Breckenridge Street. It is also pitched at approximately 0.30%. The VT sewer conveys waste to the existing brick sewer on Breckenridge Street.

Figure 1-8 also indicates the two 10-inch VT sewer lines that run on the east and west side of Herkimer Street from Auburn Avenue to Lafayette Avenue. Both are approximately 430 LF. The eastern and western lines are pitched at approximately 0.30% and 0.25%, respectively, with manholes on each end. Both lines convey waste to the Scajaquada Tunnel on Lafayette Avenue.

Figure 1-8: Existing Conditions: Herkimer at Breckenridge and Lafayette

1.3.1.1 Current or Future Projects on Site

Currently, Buffalo Sewer's 2014 LTCP projects are being revised and/or optimized. In general, there are 51 projects planned for the collection system that involve RTCs, other inline and offline storage structures, SPP modifications, and green infrastructure. This is the only project planned for CSO-10.

1.3.2 Permit Conditions

A copy of the WWTF State Pollution Discharge Elimination System (SPDES) Discharge Permit NY0028410, EDP July 1, 2014, expiration June 30, 2019, is included in **Appendix E**. Renewal of Buffalo Sewer's SPDES permit is currently underway.

1.3.3 Compliance Issues

The Project is an outcome of Administrative Order Docket No. CWA-02-2012-3024 (SPDES Permit No. NY0028410). The Administrative Order resulted in the preparation of a LTCP to refine Buffalo Sewer's sewer collection system model and to reduce CSO overflow volumes and frequencies. In order to meet the implementation schedule's substantial completion deadline on March 18, 2034, it is essential that the construction of the proposed alternate in this project occur immediately; this alternative site will be essential for Buffalo Sewer to meet the deadline given in the AO.

1.3.4 Existing Flows

According to the Combined Sewer Overflow Annual Report of 2021, CSO-10, which will have reduced activations from the proposed upgrades, had 30 events of sewer overflow, discharging approximately 22 million gallons of untreated combined sewage into Black Rock Canal over the past 2 years.

Flow conditions at the 36-inch combined sewer downstream of the junction at Breckenridge and West Ave were observed by Xylem and are summarized in **Table 1-2**. The average dry weather flow was 0.5 MGD while the peak design flow was observed to be 24.9 MGD.

Table 1-2. Observed Flow Conditions at Combined Sewer Junction at Breckenridge and West

Item	Flow (MGD)
Average Dry Weather	0.5
Peak in Typical Year	13.4
Peak Design	24.9

1.3.5 Existing Energy Consumption

The existing infrastructure at the proposed site is gravity-based and does not consume energy.

1.4 Definition of the Problem

Buffalo Sewer is committed to reducing the total frequency of CSOs into the receiving waterbodies by maximizing the ability to utilize storage capacity within the existing collection infrastructure. According to the Combined Sewer Overflow Annual Report from 2023, there were a total of 16 CSO events at CSO-10 in the reporting year, while the goal for CSO-10's associated waterbody, Black Rock Canal, is zero to four activations.

As described in Section 1.1.4, the receiving water bodies are impacted by discharge of untreated CSOs in several ways. The affected surface water quality poses a health and sanitation risk. Therefore, lake contact for recreation (swimming, boating, etc.) must be limited when CSO activations occur and for a period afterwards. There are also longer-term implications for recreation: specifically, fishing is unsafe due to sewage stressing aquatic life and habitat. Restricting recreation limits the economic value it can bring through both tourism and improved quality of life of the local population. Furthermore, as described in Section 1.1.5, the impacted water resources affect historically marginalized communities that utilize the parks, waterfronts, and historical resources in various ways.

Although many factors negatively affect these receiving water bodies, the effects caused by CSO activations can be addressed by improving the overall efficiency of storage and conveyance of sewage within the collection system. This project proposes to construct a diversion structure to redirect combined sewage in underutilized pipes within the system, greatly reducing the magnitude and frequency of overflows at CSO-10.

1.5 Financial Status

The Median Household Income (MHI) for the Buffalo area is $46,184 per year, according to the 2022 US Census, while the New York State MHI is $81,386 per year. The MHI for Buffalo is 43.3% lower than the State MHI.

The main sources of income for the sewer system come from sewer rents, direct payments from outside users, and industrial waste disposal. A portion of the expenditures include a series of seven bond projects, whose annual payments came to $3,407,146 in 2021, and was budgeted to be $6,239,959 in 2022. Nearly $15 million was spent on capital projects in 2021, while over $172 million was budgeted for 2022. After covering operational expenditures, net revenues were able to cover debt obligations while maintaining a reserve fund. A detailed breakdown of revenues and expenditures, along with a complete listing of bond projects is given in **Appendix F**.

Section 2 Alternative Analysis

This section looks at several possible solutions to minimizing CSOs to surface waters and offers a brief discussion of the viability of each solution. The recommended solution is expanded in greater detail in the Recommended Alternative section.

2.1 Niagara at Breckenridge RTC Alternatives

An Alternatives Evaluation Report was prepared by AECOM (December 2021) to look at possible solutions for reducing CSOs resulting from wet weather in the Niagara at Breckenridge sewershed. It looked at four different alternatives with costs in 2021:

- Alternative 1: Green Infrastructure to reduce surface runoff entering the collection system ($8,363,000)
- Alternative 2: Sewer Separation to collect stormwater and sewage in different pipes ($16,084,000)
- Alternative 3: Dry Weather Flow Sewer Upgrades to increase the size of the pipe from SPP 21 to the nearest interceptor to the WWTF ($850,000)
- Alternative 4: Upstream Flow Diversion from the 36-inch brick sewer on Breckenridge Street to the South Interceptor ($792,000)

As described in the report, the dry weather flow upgrades (Alternative 3) were not viable due to the deteriorating canal wall posing significant construction risks. In addition, at the time, the cost estimate for Alternative 4 was lower than the green infrastructure and sewer separation alternatives, Alternatives 1 and 2, respectively. Therefore, the report recommended Alternative 4 as it was the most affordable solution, had the least construction challenges and environmental impacts, and exhibited no more than the maximum allowable CSO activations per hydraulic modeling. The report is provided in **Appendix K**.

However, the 95% upstream flow diversion design for the Niagara Street at Breckenridge Street RTC site resulted in an estimated opinion of probable cost (OPCC) of three times more than that which was estimated for the 75% design. The 95% OPCC identified additional construction factors related to sewer bypassing, including trenching a bypass line across Niagara Street. Given the added complications, the Niagara Street at Breckenridge Street site was removed from Contract No. 82000041 and Buffalo Sewer decided to investigate for other cost-effective alternatives to diverting potential combined sewer overflow at this location.

An Alternatives Evaluation memorandum was prepared by Greeley and Hansen in April 2023 to consider possible solutions to reducing CSOs resulting from wet weather in the Niagara at Breckenridge sewershed. The evaluation considered two different alternatives:

- Alternative 5: Northern flow diversion from the replaced Breckenridge Street 36-inch brick sewer through West Avenue to a new drop-pipe manhole on Lafayette Avenue that feeds into the Scajaquada Tunnel
- Alternative 6: Eastern flow diversion from the replaced Breckenridge Street 36-inch brick sewer through Herkimer Street to an existing manhole on Lafayette Avenue that feeds into the Scajaquada Tunnel

The No Action alternative can also be considered as an alternative to the Niagara at Breckenridge RTC. Choosing to make no modifications here will make no reduction in CSO activations, therefore leading to no increased protection of water quality or the community. Though this is the option with the lowest cost, it does not meet the mandates of the AO, and is not considered further.

Alternative 5 involves replacing the existing 36-inch sewer line at Breckenridge Street between West Avenue and Herkimer Street (built in 1860 and 1888) and diverting flow north to West Avenue to connect to Scajaquada Tunnel on Lafayette Avenue. The junction point at Breckenridge Street and West Avenue will be bulkheaded to divert this flow from SPP 21. The West Avenue sewers collection sewer lines will be abandoned in place when the new sewer line is constructed. The existing house connections will then be connected to the new sewer line. This alternative considers the existing Breckenridge sewer line's lifespan; due to its age, it will need replacement soon. The memo originally stated that Alternative 5 was not viable due to the 115 kV underground pipe cable running along the east side of West Avenue. However, further conversations with National Grid determined that construction parallel to it is feasible but would require several additional safety precautions. Although constructing a new drop-pipe manhole to connect to the Scajaquada Tunnel at West Avenue and Lafayette Avenue would be very expensive due to the deep rock excavation to reach the tunnel, it is a more viable alternative compared to modifying the existing manhole on Herkimer Street. **Figure 2-1** illustrates a conceptual design for this site.

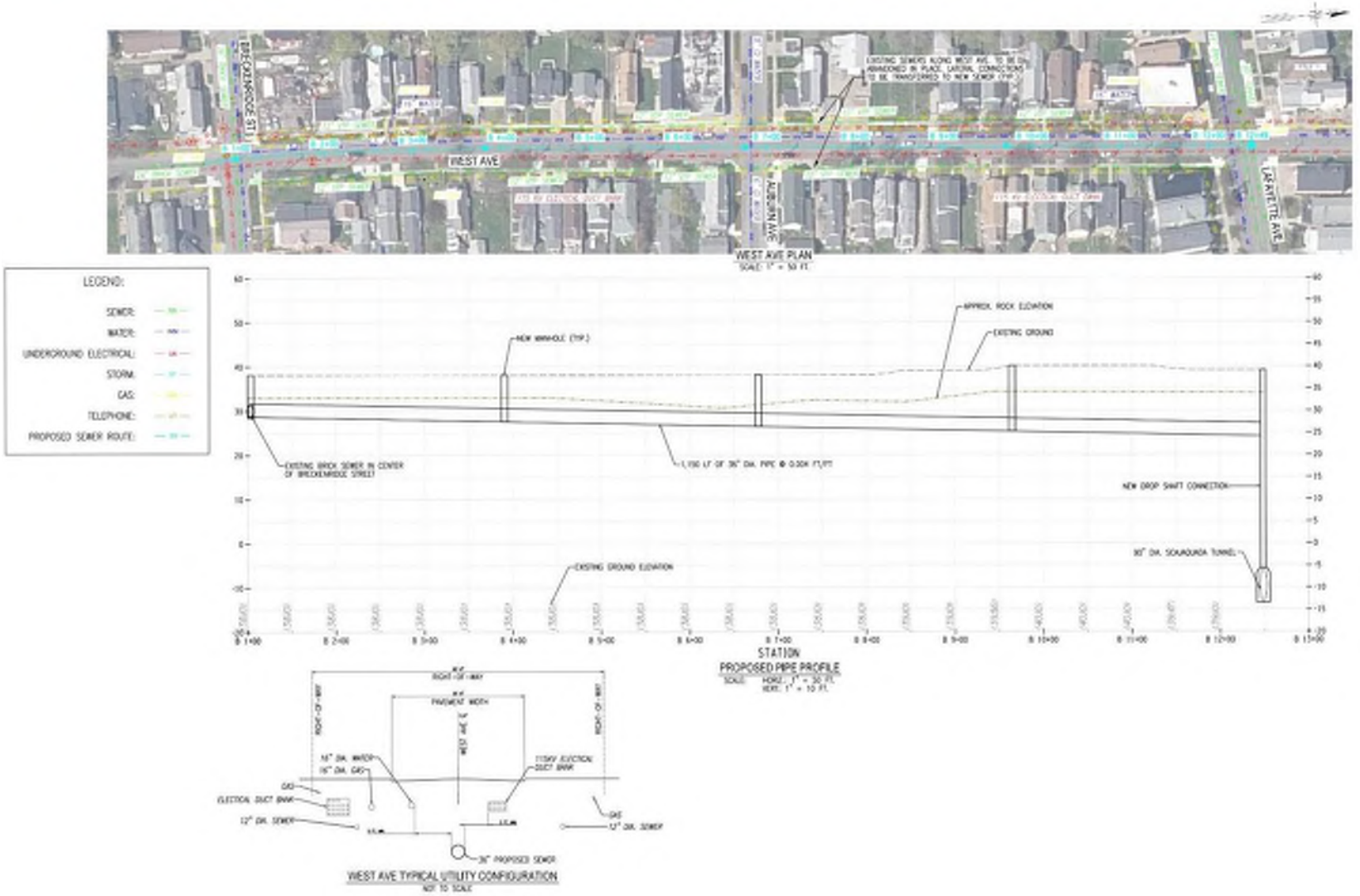


Figure 2-1: Proposed Route and Layout for West at Breckenridge and Lafayette

Alternative 6 involves replacing and back pitching the Breckenridge Street brick sewer between West Avenue to Herkimer Street and diverting flow north to Herkimer Street to connect to Scajaquada Tunnel on Lafayette Avenue. The junction point at Breckenridge Street and West Avenue will be bulkheaded to divert this flow from SPP 21. The existing sewer collection lines on Herkimer will be abandoned and the house connections will be reconnected to a new line on Herkimer. This alternative considers the existing Breckenridge sewer line's lifespan; due to its age, it will need replacement soon. The reversed Breckenridge sewer would run parallel to a 4-ft W x 3-ft H National Grid feeder line along Breckenridge Street coming from a substation nearby and will be in the same location as the existing Breckenridge combined brick sewer alignment. Test pitting performed in Breckenridge Street near its intersection with Niagara Street showed that there is at least 6-ft of clearance between the south edge of the existing brick sewer and the feeder line at this location. Underground electric runs approximately 100-ft in the grass along Herkimer Street from its intersection with Breckenridge Street before connecting to overhead electric lines. **Figure 2-2** illustrates a conceptual design for this site.

Figure 2-2: Proposed Route and Layout for Herkimer at Breckenridge and Lafayette

Below shows the OPCCs for alternatives considered for the Breckenridge Street CSO Control Project. The AACE Class V estimates for each proposed Alternatives 5 and 6 are broken down in **Appendix H**. The OPCC for Alternative 3 is not considered in the below analysis due to aforementioned construction infeasibility.

Alternatives	OPCC (2023 in $ Million)
Alternative 1: Green Infrastructure	9.2
Alternative 2: Sewer Separation	17.7
Alternative 4: Upstream Flow Diversion	10.9
Alternative 5: West Avenue at Breckenridge and Lafayette	20.4
Alternative 6: Herkimer Street at Breckenridge and Lafayette	16.5

The previous Alternative 1 (green infrastructure) was not considered, despite having a lower OPCC, because the Alternatives Evaluation Report determined that this alternative would only decrease the annual CSO-10 activation by one and the overflow volume decreases by 1.66 mg. This alternative would not meet the target activations. The previous Alternative 2 (sewer separation) was not considered as its OPCC is currently higher than that of Alternative 6. In addition, per the Alternative Evaluation Report, Alternative 2 also does not comply with the annual target activations requirement. The previous Alternative 4 (upstream flow diversion) was not considered despite its revised OPCC being cheaper than that of Alternative 6 due to the high constructability risk at the site. The depth of excavation for the proposed drop pipe was 50-ft and it would be difficult to maintain the existing duct bank in the area. In addition, the proposed interceptor to be tapped into was on a curve, so the combined factors of a deep excavation to a curved structure would make excavation accuracy difficult. Bypass pumping on Niagara Street would be needed but would significantly disrupt traffic as it would run from the east side of the street to the west side.

Both Alternatives 5 and 6 have similar lengths of new piping, house reconnections, potential utility relocations, and pavement restoration. The difference between alternatives is largely with the deep drop-pipe manhole reconstruction proposed in Alternative 6. Although the opinion of probable construction cost (OPCC) is higher for Alternative 5, modifying the existing deep manhole in Alternative 6 is not feasible for construction. Therefore, Alternative 5 was recommended, being the most feasible solution, having minimal construction challenges, and the greatest ability to reduce the number of CSO activations from 14 to 0 for the third highest activating CSOs to the Black Rock Canal behind Albany Street and Bird Avenue. An additional benefit of Alternative 5 is the replacement of the existing Breckenridge Street brick sewer which dates to the turn of the 19th century and at the end of its lifespan.

Section 3 Recommended Alternative

3.1 West Avenue at Breckenridge and Lafayette – Alternative 5

The design of the West Avenue at Breckenridge Street and Lafayette Avenue Alternative consists of a new 42-inch reinforced concrete pipe (RCP) sewer on Breckenridge Street between West Avenue and Herkimer Street, replacing the existing 36-inch brick sewer. As seen in **Figure 3-1**, the new Breckenridge sewer will be redirected upstream of the existing junction at Breckenridge Street and West Avenue. The existing brick sewer north of the junction will be bulkheaded to separate the western and eastern flow. The street plan on **Figure 2-1** shows how the new West Avenue sewer will collect flow from the rebuilt Breckenridge Street sewer line and flow from the West Avenue sewer line north of Breckenridge Street. It will also take flow from Dewitt Street, Barton Street, and the Herkimer line north of Breckenridge. It will be rebuilt in-kind, slope west to West Avenue and connect to a new 42-inch RCP to the north on West Avenue. The new West Avenue sewer will be routed through the center of the street, replacing the existing collection sewers on both sides of the street. The existing collection sewers will be abandoned in place and house connections will be reconnected to the new West Avenue line. The new West Avenue sewer will connect to a newly constructed drop-pipe manhole at Scajaquada Tunnel.

Figure 3-1: Proposed Connection Point at Breckenridge St and West Ave

Refer to **Figures 2-1 and 2-2** for the conceptual design for this site. The expected cost to implement this alternative is $21.5 million in 2024 dollars as broken down in **Appendix H**.

3.2 Design Parameters

The main design parameters for the site are based on average and peak flows relevant points in the system, as noted in Section 1.3.4. Flow conditions are determined by SWMM modeling based on the Modified 1993 typical year and existing meters within the system. The pipe design for the Herkimer at Breckenridge and Lafayette site will be based on not exceeding maximum allowable hydraulic grade line (HGL), required velocities given in the Ten States Standards, and achieving the minimum diversion flow to reduce activations to CSO-10.

The new pipe at Breckenridge is proposed to be a 42-inch RCP. As Breckenridge Street currently has a 36-inch brick sewer at the proposed junction joint, this size is assumed to be able to carry the full flow necessary. The new West Avenue line is also proposed to be a 42-inch RCP, under the same assumption. Further calculations will need to be completed in the future to verify and optimize pipe sizing at this site. To comply with Ten States Standards, the minimum average and maximum peak velocities of the flow within the new pipes need to be greater than 2 fps and less than 15 fps at the existing peak flow and average design flow of 24.9 MGD and 0.5 MGD, respectively.

3.3 Next Steps

One public stakeholder meeting is planned for the site as part of the Project where renderings of the proposed design will be shown to the public. The stakeholder meeting is an opportunity for the public to provide comments and input on the Project.

As part of this project, potential impacts to environmental resources are being evaluated through the State Environmental Quality Review (SEQR) process. The project is an Unlisted action but will undergo a coordinated review as if it were a Type I action. Buffalo Sewer will act as the lead agency. Coordination, consultation, and permitting with state and federal agencies is concurrent with detailed design to ensure impacts to environmental resources are mitigated to the extent feasible.

This is a design/bid project, with independent prime subcontractors to be engaged.

Design of the work outlined in this report will proceed through Winter of 2024, with regulatory review occurring when the design is complete. If regulatory approvals are obtained in time, construction will begin in the Summer of 2026, with the goal of completion by end of 2030. The schedule is summarized in **Table 3-1**. Financing and regulatory approvals need to be secured for the Project to proceed along this timeline.

Table 3-1. Anticipated Project Schedule

Description	Anticipated Completion Date
Design	Winter 2024
Regulatory Review	Spring 2025
Bidding	Summer 2025
Construction Start Date	Summer 2026
Construction End Date	Winter 2030

The signed engineering report certification can be found in **Appendix I** and the signed Smart Assessment form in **Appendix J.**

Section 4 Conclusion

The Buffalo Sewer Authority experiences excessive CSO activations, totaling over 3.8 billion gallons in the past two years, which contributes to the detrimental conditions of the receiving water bodies, the habitats they foster, and the communities that experience them. Buffalo Sewer has put into place a LTCP to reduce combined sewer overflows through implementation of RTCs, inline and offline storage structures, SPP modifications, and green infrastructure, in response to an AO approved in 2014 by the DEC and EPA. This project seeks an alternative to the Niagara at Breckenridge RTC that was removed from Contract No. 82000041 due to design changes and increased cost of construction. The proposed alternative, Alternative 5, is to replace the existing Breckenridge Street sewer line and reroute flow northward to a new sewer line on West Avenue. The new West Avenue line will connect to a new drop-pipe manhole structure at Scajaquada Tunnel, constructed at the intersection of West Avenue and Lafayette Avenue. The new Breckenridge line will route flow from Herkimer Street to West Avenue that was previously flowing west to SPP 21 to Scajaquada Tunnel, thereby reducing activations at CSO-10.

The total cost of the proposed work is $20.4 million in 2023 dollars.

The proposed project maximizes existing infrastructure as a cost-effective way of reducing CSO activations that impact surface waters. The improvements will have several positive environmental, social, and economic impacts. By constructing the site and replacing failing infrastructure to optimize conveyance within the sewer system during wet weather events, the water quality will also improve, increasing the value it can bring through both tourism and improved quality of life of the local population.

Section 5 References

Buffalo Sewer Authority, 2021, *Combined Sewer Overflows Annual Report*, New York State Department of Environmental Conservation, 2021.

Buffalo Sewer Authority, 2021, *Comprehensive Annual Financial Report for Fiscal Year Ended June 30, 2022*, Drescher & Malecki LLP, September 2021

Buffalo Sewer Authority, 2022, *Comprehensive Annual Financial Report for Fiscal Year Ended June 30, 2022*, Drescher & Malecki LLP, September 2022

Buffalo Sewer Authority, 2024, *2024 Annual Engineer's Certification Report*, Greeley and Hansen, A TYLin Company, et al., July 2024

Ten States Standards – Recommended Standards for Wastewater Facilities, 2014, Health Research Inc, 2014.

Appendix A:
Buffalo Sewer Authority Administrative Order Issued by DEC/EPA

UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY
REGION 2

IN THE MATTER OF:

Buffalo Sewer Authority
1038 City Hall
Buffalo, New York 14202-3310

SPDES Permit No. NY0028410

Respondent

Amended Administrative Order for Compliance pursuant to Sections 308(a) and 309(a) of the Clean Water Act, 33 U.S.C. §§ 1318(a) and 1319(a).

AMENDED

ADMINISTRATIVE ORDER

CWA-02-2014-3033

(Amends CWA-02-2012-3024)

This Amended Administrative Order CWA-02-2014-3033 amends Administrative Order CWA-02-2012-3024 to include: developments in the enforcement action since the March 9, 2012 effective date of Administrative Order CWA-02-2012-3024; updated General Provisions to reflect current practice; and to correct a date in the Findings of Fact and Findings of Violation. The Amendments to Administrative Order CWA-02-2012-3024 reflect the developments leading up to and including the approval of Buffalo Sewer Authority's Combined Sewer Overflow Long Term Control Plan and associated implementation schedule by the United States Environmental Protection Agency and the New York State Department of Environmental Conservation. Amended provisions can be found in Paragraphs 4, 11 and 13-20 of the Findings of Fact and Findings of Violation, Paragraphs 2.a., 2.f., 3, 3.a., 3.d.ii of the Ordered Provisions and Paragraphs 1-8 of the General Provisions.

STATUTORY AUTHORITY

The following Findings of Violation and Order for Compliance ("Order") are made and issued pursuant to Sections 308(a) and 309(a) of the Clean Water Act ("CWA"), 33 U.S.C. §§ 1318(a) and 1319(a). This Authority has been delegated by the Administrator of the United States Environmental Protection Agency ("EPA") to the Regional Administrator, EPA Region 2 and further delegated to the Director of the Division of Enforcement and Compliance Assistance, Region 2, EPA.

1. Section 301(a) of the CWA, 33 U.S.C. § 1311 (a), makes it unlawful for any person to discharge any pollutant from a point source to waters of the United States, except, inter alia, with the authorization of, and in compliance with, a National Pollutant Discharge Elimination System ("NPDES") permit issued pursuant to Section 402 of the CWA, 33 U.S.C. § 1342.

2. Section 402 of the CWA, 33 U.S.C. § 1342, authorizes the Administrator of EPA to issue a NPDES permit for the discharge of any pollutant, or combination of pollutants subject to certain requirements of the CWA and conditions which the Administrator determines are necessary. The New York State Department of Environmental Conservation ("NYSDEC") is the agency with the authority to administer the federal NPDES program in New York pursuant to Section 402 of the CWA, 33 U.S.C. § 1342. EPA maintains concurrent enforcement

authority with authorized states for violations of the CWA. Additionally, under the authority granted to the NYSDEC by the EPA under Section 402(b) of the CWA, 33 U.S.C. § 1342(b), a State Pollutant Discharge Elimination System ("SPDES") permit is required to be issued to facilities by the NYSDEC for the discharge of pollutants from said facilities from a point source to a navigable water of the United States.

3. Section 308 of the Act, 33 U.S.C. § 1318, provides, in relevant part, that the Administrator of EPA may require the owner or operator of any point source to, among other things: establish and maintain such records; make such reports; install, use and monitor such equipment; sample such effluents; and provide such other information as may reasonably be required in order to carry out Section 402 of the Act, 33 U.S.C. § 1342.

4. "Person" is defined by Section 502(5) of the CWA, 33 U.S.C. § 1362(5), to include an individual, corporation, partnership, association or municipality.

5. "Municipality" is defined by Section 502(4) of the CWA, 33 U.S.C. § 1362(4), to include among other things, a city, town, borough, county, parish, district, associations, or other public body created by or pursuant to State law and having jurisdiction over disposal of sewage, industrial wastes, or other wastes.

6. "Pollutant" is defined by Section 502(6) of the CWA, 33 U.S.C. § 1362(6), to include among other things, solid waste, dredged spoil, rock, sand, cellar dirt, sewage, sewage sludge and industrial, municipal and agricultural waste discharged into water.

7. "Point source" is defined by Section 502(14) of the CWA, 33 U.S.C. § 1362(14), to include any discernible, confined and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, or vessel or other floating craft, from which pollutants are or may be discharged.

8. "Navigable waters" is defined by Section 502(7) of the CWA, 33 U.S.C. § 1362(7), to include the waters of the United States.

9. "Discharge of a pollutant" is defined by Section 502(12) of the CWA, 33 U.S.C. § 1362(12), to include any addition of any pollutant to navigable waters from any point source.

10. Section 402(q) of the CWA, 33 U.S.C. § 1342(q), provides that each permit, order, or decree issued pursuant to the chapter after December 21, 2000, for a discharge from a municipal combined storm and sanitary sewer shall conform to the Combined Sewer Overflow Policy ("CSO Policy") signed by the Administrator on April 11, 1994.

11. The CSO Policy states that "permittees with CSOs are responsible for developing and implementing long-term CSO control plans that will ultimately result in compliance with the requirements of the CWA."

12. Section 309(a) of the CWA, 33 U.S.C. § 1319(a), authorizes the Administrator to issue an order requiring compliance or commence a civil action when any person is found to be in violation of Section 301 of the CWA, 33 U.S.C. § 1311, or in violation of any permit condition or limitation in a permit issued under Section 402 of the CWA, 33 U.S.C. § 1342.

FINDINGS OF FACT AND FINDINGS OF VIOLATION

1. The Buffalo Sewer Authority ("BSA" or "Respondent"), is a public benefit municipal corporation, organized and existing under the laws of the State of New York, and located in Buffalo, New York. BSA has authority, control over and operates the sewer system within its boundaries, including, but not limited to the combined sewer system, the sanitary sewer system, and the related wastewater treatment plant.

2. BSA is a "person" and "municipality" within the meaning of Sections 502(5) and 502(4) of the CWA, 33 U.S.C. §§ 1362(5) and 1362(4).

3. BSA has discharged and continues to discharge "pollutants" within the meaning of Sections 502(6) and 502(12) of the CWA, 33 U.S.C. §§ 1362(6) and 1362(12), from the Buffalo wastewater treatment plant and sewer system through "point sources" within the meaning of Section 502(14) of the CWA, 33 U.S.C. § 1362(14) into the Niagara River, Black Rock Canal, Erie Basin, Buffalo River, Scajaquada Creek, Cazenovia Creek, and Cornelius Creek, each of which is a "navigable water" within the meaning of Section 502(7) of the CWA, 33 U.S.C. § 1362(7).

4. The NYSDEC, under the authority of Section 402(b) of the CWA, 33 U.S.C. § 1342(b), issued SPDES Permit No. NY0028410 (the "SPDES Permit") to BSA, with an effective date of July 1, 1999. The NYSDEC renewed the SPDES permit on February 3, 2004, on June 25, 2009, and again on December 31, 2013. It is scheduled to expire on June 30, 2019. The SPDES Permit authorizes BSA to discharge pollutants from a single wastewater treatment plant outfall and fifty-eight (58) combined sewer overflow structures ("CSO structures") at locations specified in the SPDES Permit, subject to certain limitations and conditions.

5. The Schedule of Compliance in the July 1, 1999 SPDES Permit provided in pertinent part as follows:

   "Development of Abatement Plan for Combined Sewer Overflow

   The permittee shall develop a combined sewer overflow abatement facility plan in accordance with the Phase I Long Term CSO Control Plan requirements specified in the USEPA Combined Sewer Overflow Policy (Federal Register Vo. 59, No. 75 4/19/94).

   This Abatement Plan shall contain all of the Long Term Plan elements specified in Section II C of the National CSO Policy, and further delineated in the USEPA document, "Combined Sewer Overflows, Guidance for Long-Term Control Plan" dated September, 1995. The permittee may choose either the "Presumption" or the "Demonstration" approach for the evaluation of alternatives.

   The Abatement Plan should integrate the pollutant reduction achievable by the implementation of the CSO Best Management Practices (BMPs) as required on pages 19-21 of this permit into the long term control plan. The Department will consider work or studies already completed or currently in progress for integration into the long term control plan.

   The permittee shall submit a completed CSO Abatement Facility Plan including a schedule of implementation to the Department.

The permittee shall report to the NYSDEC progress/status of plan development in intervals not to exceed 90 days.

Upon approval of the CSO Abatement Facility Plan, the NYSDEC will propose a SPDES permit modification, pursuant to Uniform Procedures – 6 NYCRR – Part 621, to include the schedule of implementation."

6. The SPDES Permit was modified October 2, 2001 to, among other changes, modify the deadline for submittal of a CSO Abatement Plan (hereinafter either "Abatement Plan," "combined sewer overflow abatement facility plan," "Long-Term Control Plan," "LTCP" or "updated LTCP") from July 1, 2001 to July 1, 2002. On August 29, 2002, the CSO Abatement Plan deadline was amended, by permit modification, again to July 1, 2003. On January 12, 2004, the CSO Abatement Plan deadline was again amended, by permit modification, to February 1, 2004.

7. BSA failed to submit the required Abatement Plan by February 1, 2004. BSA did not submit an Abatement plan until July 14, 2004, 164 days late.

8. BSA's failure to timely submit the required Abatement Plan is a violation of the SPDES Permit and is, therefore, a violation of Section 301 of the CWA, 33 U.S.C. § 1311.

9. Under a cover letter dated April 20, 2006, the NYSDEC notified the BSA that the Abatement Plan submitted by BSA on July 14, 2004 was not acceptable in that it would not meet the water quality objectives of the CSO Control Policy and had therefore failed to satisfy the SPDES Permit requirements of a combined sewer overflow abatement facility plan, as described in paragraph 5 above. This NYSDEC cover letter required that BSA revise its LTCP accordingly and submit it to the NYSDEC by July 31, 2006. BSA failed to submit such a revised LTCP to the NYSDEC by July 31, 2006.

10. Accordingly, EPA, NYSDEC, the U. S. Department of Justice ("USDOJ"), and the New York State Office of Attorney General commenced discussions with BSA to settle the violation. The settlement was to be embodied in a Consent Decree, under the auspices of federal court, for the development and implementation of a LTCP.

11. Since those discussions were on-going, the SPDES Permit was modified, effective January 1, 2010, to include Section VIII entitled "CSO LONG-TERM CONTROL PLAN," which states the following:

"BSA submitted a CSO Long-Term Control Plan (LTCP) in July 2004 in accordance with the requirements of their SPDES permit. Currently, the USEPA, USDOJ, NYSDEC and the permittee are engaged in negotiations concerning the LTCP, and anticipate that these negotiations will result in the entry of a Consent Decree. The Consent Decree will govern the permittee's obligations in ensuring that the WWTF and the combined sewer overflow discharges comply with the requirements of the Clean Water Act and the 1994 CSO Control Policy. This permit may be modified upon the ratification of the Consent Decree in accordance with 6 NYCRR Part 621."

12. To date, however, the parties have not reached a settlement nor entered into a Consent Decree.

13. On March 9, 2012, EPA, Region 2 issued an Administrative Order, Docket No. CWA-02-2012-3024 ("2012 Order"), to BSA, to address violations of the CWA (33 U.S.C. § 1251 et seq) and NYSDEC SPDES Permit number NY0028410. The 2012 Order requires that BSA update its CSO LTCP and that the Updated CSO LTCP include a schedule for the design, construction, and implementation of all control/treatment measures selected by BSA, to be completed as expeditiously as practicable, following any applicable environmental impact assessment review, pursuant to the New York State Environmental Quality Review Act, but in any event by no later than December 31, 2027.

14. In accordance with the 2012 Order, BSA submitted an Updated CSO LTCP, dated April 30, 2012, to the EPA and the NYSDEC for review and approval. Pursuant to "Ordered Provisions," Item 2.e of the 2012 Order, based on a joint review of the Updated CSO LTCP, the EPA and the NYSDEC declined to approve the Updated CSO LTCP and provided comments to BSA in a letter dated December 6, 2012.

15. The EPA and the NYSDEC met with BSA on February 12, 2013 to discuss the EPA's and the NYSDEC's comments. BSA followed up with a letter dated March 1, 2013 which, among other things, specified that BSA would submit a No Feasible Alternatives ("NFA") analysis and submit its Green Infrastructure ("GI") Master Plan to the Agencies by August 2, 2013, and would meet with the Agencies on or about August 15, 2013 to discuss those submittals.

16. Technical representatives of the EPA and the NYSDEC met with BSA to specifically discuss BSA's GI Master Plan on August 20, 2013. BSA followed up by providing the EPA and the NYSDEC with further information on its GI Master Plan on August 28, 2013. The EPA and the NYSDEC determined that an analogous technical meeting to discuss BSA's NFA analysis was not needed and indicated this to BSA in an email transmission dated September 11, 2013.

17. In a letter dated October 23, 2013 from EPA to BSA, EPA provided BSA with final written comments on BSA's Updated CSO LTCP. BSA was given until January 10, 2014 to submit its final revised CSO LTCP to EPA and NYSDEC. EPA's letter dated October 23, 2014 required that BSA provide a detailed implementation schedule as part of its final revised CSO LTCP and, based partly on work to be completed at the BSA wastewater treatment plant which was not originally contemplated, allowed a twenty year implementation schedule.

18. On January 10, 2014, BSA submitted its final revised CSO LTCP to EPA and to NYSDEC for review and approval. The final revised CSO LTCP includes a twenty year schedule.

19. In a letter dated March 18, 2014, EPA and NYSDEC approved BSA's final revised CSO LTCP. The approved CSO LTCP includes a twenty year implementation schedule, which is beyond the final compliance date of December 31, 2027, required by the EPA's 2012 Order.

20. Therefore, based on the above, EPA is issuing Amended Administrative Order, Docket No. CWA-02-2014-3033, to incorporate a twenty year implementation schedule and a final compliance date of March 18, 2034.

ORDERED PROVISIONS

Based on the Findings of Fact and Findings of Violation set forth above, and pursuant to the authority of Sections 308(a) and 309(a) of the CWA, 33 U.S.C. §§ 1318(a) and 1319(a), and in accordance with Section 402(q) of the CWA, 33 U.S.C. § 1342 (q), it is hereby ORDERED that:

1. Immediately upon receipt of the original copies of this Order, a responsible official of BSA shall complete and sign the acknowledgment of receipt of one of the originals of the Order and return said original to the Chief, Compliance Section, Water Compliance Branch, Division of Enforcement and Compliance Assistance, in the enclosed envelope to the address listed below.

2. Development of Updated Long Term Control Plan: BSA shall revise and implement an approved Updated LTCP consistent with the requirements of the CSO Policy and applicable State law and regulation. The Updated LTCP shall provide for the construction and implementation of all wastewater treatment plant ("WWTP") and sewer system improvements and other measures necessary to ensure that: (i) CSO discharges from all CSO discharge outfalls comply with the technology-based and water quality-based requirements of the CWA, the CSO Control Policy and state law and regulation; and (ii) bypasses at the WWTP are in compliance with the bypass conditions in 40 C.F.R. § 122.41(m), 327 IAC 5- 2-8(11), and shall demonstrate that there are no feasible alternatives to the remaining bypasses, in accordance with Section II.C.7 of the CSO Control Policy.
   a. By no later than April 30, 2012, BSA shall submit to EPA and NYSDEC an Updated LTCP. The schedule included in the Updated LTCP shall require the design, construction, and implementation of all control/treatment measures selected by BSA as expeditiously as practicable, following any applicable environmental impact assessment review pursuant to the New York State Environmental Quality Review Act ("SEQR review"), but in any event by no later than March 18, 2034.
   b. The Updated LTCP shall include, at a minimum:
      i. An update of the system characterization information, receiving water characterization information, existing conditions information, CSO control objectives, and any other information presented in the 2004 LTCP that is no longer current;
      ii. BSA's previous screening and subsequent evaluation of individual CSO control technologies and site-specific CSO controls. The Updated LTCP shall: (1) reassess the results of that original evaluation in light of the applicability of recreation-protective bacteria standards in BSA's receiving waters; (2) include, as appropriate, new technologies and controls (such as green infrastructure ("GI") and bio-ballasted flocculation treatment) not considered in the 2004 LTCP; and (3) in particular, carry out a new evaluation of a range of updated system-wide alternatives. Together, BSA's prior and updated system-wide alternatives evaluation shall include a sufficiently wide range of alternatives for eliminating, reducing, or treating CSO discharges, and for eliminating or reducing bypass discharges (except as permitted in the bypass conditions in 40 C.F.R. § 122.41(m) and 327 IAC 5-2-8(11)). The updated evaluation shall consider the costs and effectiveness (in terms of reduction in number of overflow events, overflow volume reduction, pollutant loading reductions, water quality improvements, etc.) predicted to result from implementation of each of the updated system-wide alternatives.

iii. In evaluating the relative performance of the updated system-wide alternatives and in selecting a preferred alternative, BSA shall give the highest priority to controlling overflows to sensitive areas as required under the CSO Control Policy, at section II.C.3.

iv. BSA's Updated LTCP shall include past and current alternative evaluation efforts that together include at a minimum: (1) taking no-action; (2) complete sewer separation (3) partial separation of various portions of the combined sewer system; (4) installation of various sizes of storage or equalization basins at the Buffalo Sewer Authority WWTP and/or in the sewer system; (5) construction of new secondary or advanced wastewater treatment plants; (6) construction of increased treatment capacities at the existing facilities; (7) construction of additional facilities (such as high rate treatment or ballasted flocculation facilities or its equivalent) for providing primary treatment or better than primary treatment of discharges from CSO discharge outfall structures; (8) construction of new intercepting sewers from the sewer system to the facilities; (9) construction of facilities for providing disinfection (and dechlorination, if necessary) of CSO discharges; (10) construction of facilities for removing floatables from CSO discharges; (11) construction of relief sewers; (12) relocation of CSO discharge outfall structures; (13) implementation of pretreatment measures to reduce flows and/or pollutants discharged into the sewer system from industrial users; (14) consideration of the use of GI where feasible, and (15) construction and/or implementation of combinations of these alternatives. These evaluations shall be carried out in accordance with Chapter 3 of EPA's "Combined Sewer Overflows Guidance for Long-Term Control Plan."

v. The Updated LTCP shall describe BSA's prior technology screening assessments and shall include, at a minimum, BSA's evaluation of the technical feasibility and applicability of each alternative or combination of alternatives at each CSO discharge outfall or grouping of CSO discharge outfalls. Where necessary, BSA shall update said assessments in light of the applicability of recreation-protective bacteria standards in BSA's receiving waters.

vi. BSA's updated evaluation of system-wide alternatives shall include:

1. An evaluation of a range of "sizes" of each updated system-wide alternative that will, for the typical year achieve an average volume of wet weather percent capture from 75 to 100 percent and reduce the average number of untreated CSO Discharge events to 0, 1-3, 4-7 and 8-12 per year. The updated LTCP shall include a detailed description of the 12 month rainfall record that BSA has utilized in developing its Updated LTCP, and that BSA will utilize in implementing its Post Construction Monitoring Program. The Updated LTCP shall describe in detail BSA's analysis of its available long term rainfall record, its basis for selecting its "typical year," and, in the event that BSA selects a "modified year" as its "typical year," shall discuss in detail all modifications made to the actual rainfall record to arrive at the "modified" rainfall record. The updated LTCP shall include a detailed tabular summary of the "modified" rainfall record, such that it is clear exactly what rainfall record shall be used in implementing the PCMP;

2. A determination of the estimated "project costs," as that term is described on pages 3-49 through 3-51 of the EPA's "Combined Sewer Overflows Guidance for Long-Term Control Plan," for each size of each updated system-wide alternative. The determination of the estimated "project costs" shall include: (a) "capital costs," "annual operation and maintenance costs," and "life cycle costs," as those terms are described on pages 3-49 through 3-51 of EPA's "Combined Sewer Overflows Guidance for Long-Term Control Plan;" and (b) an itemization of the "capital costs" and "annual operation and maintenance costs" used to determine the total "project costs" for each separate component of each alternative or combination of alternatives; and

3. An evaluation, using a validated collection system model, of the expected reduction in number of CSO events, CSO discharge volume and pollutant discharge quantity from each CSO discharge point for each size of each updated system-wide alternative. The evaluation shall include, at a minimum, an analysis of the improvement in every pollutant of concern, which are: fecal coliform in all receiving waters, and DO/BOD/SOD in the Buffalo River, Scajaquada Creek, and the Black Rock Canal.

vii. For each system-wide alternative, BSA's assessment shall include an evaluation, using water quality models, of the expected water quality improvements in the receiving waters that will result from implementation of each updated system-wide alternative. The evaluation shall include, at a minimum, an analysis of the improvement in every pollutant of concern in that receiving water.

viii. For each updated system-wide alternative, BSA shall include a cost-performance analysis, such as a "knee of the curve" analysis, for each alternative or combination of alternatives that will allow for the comparison of the costs to: (1) the associated expected water quality improvements; (2) the reduction of CSO discharge and bypass discharge volume; (3) the reduction in CSO discharge and bypass discharge events; (4) the increase in percent wet weather capture; and/or (5) the reduction in pollutant loading from CSO discharge and bypass discharge events.

ix. The Updated LTCP shall include a financial capability analysis that complies with USEPA's "Combined Sewer Overflows – Guidance for Financial Capability Analysis and Schedule Development" February 1997).

x. The Updated LTCP shall include the selection of CSO control measures, including the construction of all sewer system and facility improvements necessary to ensure compliance with the technology-based and water quality-based requirements of the CWA, state law and regulation and BSA's SPDES permit. The Updated LTCP shall include the selection of bypass discharge control measures, so as to ensure that all remaining bypasses are in compliance with the bypass conditions in 40 C.F.R. § 122.41(m), 327 IAC 5- 2-8(11), and shall demonstrate that there are no feasible alternatives to the remaining bypasses, in accordance with Section II.C.7 of the CSO Control Policy.

xi. The Updated LTCP shall include an expeditious schedule for the design, construction, and implementation of all CSO control measures selected by BSA. If it is not possible for BSA to design and construct all measures simultaneously, the Updated LTCP shall include a phased schedule based on the relative

importance of each measure, with highest priority being given to eliminating discharges to sensitive areas and to those projects which most reduce the discharge of pollutants. The schedule shall specify critical construction milestones for each specific measure, including, at a minimum, dates for: (1) submission of applications for all permits required by law; (2) start of design; (3) commencement of construction; (4) completion of construction; (5) completion of construction; and (6) achievement of full operation.

c. The alternatives evaluated should include the use of GI wherever feasible to reduce CSO volumes and handle separated storm water. GI shall generally mean systems and practices that use or mimic natural processes to infiltrate, evapotranspire, and/or harvest storm water on or near the site where it is generated. GI applications and approaches that may be considered include, but are not limited to, green roofs, downspout disconnection, trees and tree boxes, rain gardens, vegetated swales, pocket wetlands, infiltration planters, vegetated median strips, permeable pavements, reforestation, and protection and enhancement of riparian buffers and floodplains. EPA and NYSDEC encourage BSA to utilize GI projects as appropriate to reduce or replace gray infrastructure projects included in the Updated LTCP provided that any GI project proposed is anticipated to provide substantially the same or greater level of control as the alternative gray infrastructure project. Should BSA rely on other entities to implement GI projects, BSA must have in place agreements as appropriate, to ensure proper operation and maintenance of the GI project. For any GI project submitted as part of the Updated LTCP, BSA shall submit to EPA and NYSDEC a detailed GI project proposal outlining each proposed project.

   i. The GI project proposal shall be consistent with this Administrative Order and shall at a minimum include the following for each project:

      1. Data on location, sizing, design, and the performance criteria expected to be achieved with the implementation of the GI project, utilizing the information and models that BSA used in developing the Updated LTCP, and any monitoring information used in formulating the proposal; along with a demonstration of the long term effectiveness and performance expected to be achieved with implementation of the project;
      2. A description of the work required to implement the GI project and a schedule for completion of this work and implementation of the project that is consistent with this Administrative Order and the date set forth herein in Paragraph 2(a) for completion of construction and full implementation of all remedial and control measures;
      3. A description of the proposed ownership of and access to the GI project, and should BSA rely on other entities to implement the GI project, BSA must explain what agreements will be necessary to ensure proper operation and maintenance of the GI project (i.e., permanent access, sufficient control over key aspects of the project), and how they will be enforced to ensure proper operation and maintenance of the GI project; and
      4. A description of any post-construction monitoring and modeling to be performed that is necessary to determine whether the performance criteria set forth, as noted above, will be met upon completion and implementation of the GI project.

ii. Upon review of BSA's GI project proposal, EPA and NYSDEC will comment, approve, disapprove, or approve in part, the proposal:

1. BSA shall implement each GI project approved by EPA and NYDEC in accordance with the provisions and schedule in the approved proposal;
2. If the GI project proposal is approved in part, BSA shall, upon written direction from EPA and NYSDEC, take all actions in the approved portion of the GI proposal that EPA and NYSDEC determine are technically severable from any disapproved portions. For the disapproved portions, BSA shall, within 90 Days, correct all deficiencies and resubmit the proposal for approval. If the resubmission is approved in whole or in part, BSA shall proceed in accordance with this subparagraph; or
3. If the GI project proposal is disapproved, EPA and NYSDEC's decision is final. For each project which is disapproved, BSA shall propose an alternative GI project or gray infrastructure project, or combined green and gray infrastructure project, within 90 days of the date of disapproval. In the event that BSA's alternative proposal is disapproved by EPA and NYSDEC due to the GI project component of the proposal, BSA shall propose an alternative gray infrastructure project within 90 days of the date of disapproval.

iii. In the event that BSA implements an approved GI project proposal that fails to meet the specified performance criteria set forth in the project proposal and Updated LTCP, BSA shall propose, within 180 days after submittal of the applicable post-construction monitoring report documenting said failure, an additional green or gray infrastructure project designed to achieve the performance criteria with a schedule for completion of this work and implementation of the project that is consistent with this Administrative Order and the date set forth herein in Paragraph 2(a) for completion of construction and full implementation of all remedial and control measures. In the alternative, where BSA has substantially met the performance criteria, BSA may, within sixty (60) days after its knowledge of a project's failure to meet the performance criteria, petition EPA and NYSDEC for a change in the performance criteria. After consideration of any such request by BSA, EPA and NYSDEC's decision will be final. In the event that EPA and NYSDEC disapprove of BSA's request for a change in the performance criteria, BSA shall, within 180 days after EPA and NYSDEC's disapproval, propose additional control measures designed to achieve the performance criteria with a schedule for completion of this work and implementation of the Project that is consistent with this Administrative Order and the date set forth herein in Paragraph 2(a) for completion of construction and full implementation of all remedial and control measures.

iv. BSA shall submit to EPA an update on its implementation of GI projects as part of the semi-annual reports due on March 1st and September 1st of each year.

d. If BSA seeks to replace any gray infrastructure projects provided in the Updated LTCP, BSA shall submit to EPA and NYSDEC a detailed GI project proposal outlining each proposed project consistent with the requirements of Paragraph 2(c).

e. EPA and NYSDEC may approve the Updated LTCP or decline to approve it and provide written comments. Within 120 days of receiving EPA's and NYSDEC's written comments, BSA shall modify the Updated LTCP consistent with EPA's and

NYSDEC's written comments, and resubmit the Updated LTCP to EPA and NYSDEC for final approval.

f. Upon receipt of EPA's and NYSDEC's final approval of the Updated LTCP (hereinafter "Approved CSO LTCP"), BSA shall implement the measures in the Approved CSO LTCP in accordance with the schedule in the Plan, including certain milestones of which listed in the Appendix, "BSA Approved CSO LTCP Implementation Schedule," and shall complete the implementation of its Approved CSO LTCP by not later than March 18, 2034.

3. Post Construction Monitoring Plan: Within one year of approval of the Updated LTCP, BSA shall submit to EPA and NYSDEC for approval, a work plan for conducting an ongoing study or series of studies ("Post-Construction Monitoring Plan") to help determine: (1) whether the Approved CSO LTCP measures, when completed, meet all performance criteria specified in the Approved CSO LTCP; (2) whether BSA's CSOs comply with the technology-based and water quality-based requirements of the CWA, state law, the CSO Control Policy, all applicable federal and state regulations, and its SPDES Permit, for all CSO-receiving waters; and (3) whether all remaining bypasses are in compliance with the bypass conditions in 40 C.F.R. § 122.41(m), 327 IAC 5- 2-8(11), and demonstrate that there are no feasible alternatives to the remaining bypasses, in accordance with Section II.C.7 of the CSO Control Policy. The Post-Construction Monitoring Plan shall be consistent with the guidance "Combined Sewer Overflows Guidance for Long-Term Control Plan."

a. The Post-Construction Monitoring Plan shall contain a schedule for performance of the study or series of studies at key points during the course of the implementation of the remedial measures, as well as after completion of the remedial measures, specified in the Approved CSO LTCP. The Post-Construction Monitoring Plan also shall indicate the years (at least biannually) in which data generated during implementation of the Post-Construction Monitoring Plan will be submitted in the reports in Paragraph 4 to EPA and NYSDEC.

b. EPA and NYSDEC may approve the Post-Construction Monitoring Plan or may decline to approve it and provide written comments. Within ninety (90) days of receiving EPA's and NYSDEC's comments, BSA shall alter the Post-Construction Monitoring Plan consistent with EPA's and NYSDEC's comments, and resubmit the Plan to EPA and NYSDEC for final approval.

c. Upon final approval of the Post Construction Monitoring Plan, BSA shall implement, in accordance with the schedule therein, the Post-Construction Monitoring Plan. If the results of the Post-Construction Monitoring Plan indicate areas of non-compliance, BSA shall, within 120 days, (unless a different period is specified) of being requested in writing to do so, submit to EPA and NYSDEC a Supplemental Compliance Plan which includes the actions that BSA will take to achieve compliance and a schedule for taking such actions. Upon approval by the EPA and NYSDEC, BSA shall implement the Supplemental Compliance Plan, in accordance with the schedule specified in the approved Plan.

d. Within one hundred twenty (120) days after completion and implementation of the Post-Construction Monitoring Plan, BSA shall submit a Final Post-Construction-Monitoring Report to EPA and NYSDEC, for review, comment and approval, that:

i. demonstrates that BSA performed the Post-Construction Monitoring Plan in accordance with the approved Plan and schedule set forth in the approved Post-Construction Monitoring Plan; and

ii. summarizes the data collected during Post-Construction Monitoring and analyzes whether the completed control measures have met and/or are meeting the performance criteria specified in the Approved CSO LTCP; whether BSA's CSOs comply with the requirements of the CWA, state law, the CSO Control Policy, all applicable federal and state regulations, and BSA's SPDES Permits; and whether all remaining bypasses are in compliance with the bypass conditions in 40 C.F.R. § 122.41(m), 327 IAC 5- 2-8(11), and demonstrate that there are no feasible alternatives to the remaining bypasses, in accordance with Section II.C.7 of the CSO Control Policy.

e. EPA and NYSDEC may approve the Final Post-Construction Monitoring Report or may decline to approve it and provide written comments. Within sixty (60) days of receiving EPA's and NYSDEC's comments, BSA shall alter the Final Post-Construction Monitoring Report consistent with EPA's and NYSDEC's comments, and resubmit the Report to EPA and NYSDEC for final approval. Approval of the Final Post-Construction Monitoring Report only constitutes EPA's and NYSDEC's approval that the report contains the information required by this Administrative Order; it does not mean that EPA and NYSDEC believe BSA has complied with any other requirement of this Administrative Order or federal or state law.

4. Reporting Requirements

a. Semi-Annual Status Reports. Upon the effective date of this Administrative Order, until EPA and NYSDEC's approval of the Final Post-Construction-Monitoring Report, BSA shall submit written Semi-Annual Status Reports to EPA and NYSDEC. These reports shall be submitted by no later than March 1st of each year (for the "reporting period" from July 1 through December 31 of the previous calendar year) and September 1st of each year (for the "reporting period" from January 1 through June 30 of the current calendar year). The Semi-Annual Status Reports may be provided either as paper documents or in electronic format, provided that the electronic format is compatible with EPA and NYSDEC software and is accompanied by a written certification on paper in accordance with "General Provisions" Paragraph 1. The written certification must be sent via certified or overnight mail. The frequency of reports, and the reporting period, may be amended upon written agreement from EPA and NYSDEC. In each written Semi-Annual Status Report, BSA shall provide, at a minimum, the following:

i. a statement setting forth (1) the deadlines and other terms that BSA has been required to meet since the date of the last statement; (2) whether and to what extent BSA has met those requirements; and (3) the reasons for any noncompliance (notification to EPA and NYSDEC of any anticipated delay shall not, by itself, excuse the delay);

ii. (1) a general description of the work completed within the prior reporting period; (2) to the extent known, a statement as to whether the work completed in that period meets applicable design criteria; (3) a projection of work to be performed during the next six-month period; (4) notification of any anticipated delays for the upcoming six month period of time; and (5) any changes in key personnel.

iii. If any public meetings were held, the report should include a copy of any advertisements placed for the meeting, any materials or handouts, formal meeting notes, and a summary of the meeting.

iv. BSA shall also submit, with each written status report, copies (to EPA only) of all monthly monitoring reports or other reports pertaining to CSOs and bypasses that BSA submitted to NYSDEC during the reporting period.

b. Semi-Annual Status Meetings. Representatives of EPA, NYSDEC and BSA shall conduct semi-annual meetings to discuss BSA's compliance status with the provisions of this Order. These meetings shall be scheduled during the months of March or April to discuss the previous reporting period, and September or October to discuss the previous reporting period. The meetings can be conducted telephonically if agreed in writing (including electronic correspondence) by all parties in advance. The frequency of such compliance meetings may be reduced upon written agreement (including electronic correspondence) from EPA and NYSDEC.

c. Annual Post Construction Monitoring Report. Upon the effective date of this Administrative Order, until EPA and NYSDEC's approval of the Final Post-Construction-Monitoring Report, BSA shall submit annually with its September 1st Semi-Annual Reports, an Annual Post Construction Monitoring Report containing information generated in accordance with the Post-Construction Monitoring Plan. The Annual Post Construction Monitoring report may be provided either as paper documents or in electronic format, provided that the electronic format is compatible with EPA and NYSDEC software and is accompanied by a written certification on paper in accordance with "General Provisions" Paragraph 1. The written certification must be sent via certified or overnight mail. The frequency of reports, and the reporting period, may be amended upon written agreement from EPA and NYSDEC.

d. Permits or Approvals. When it is necessary for BSA to obtain a federal, state, or local permit or approval or perform SEQR review, BSA shall submit timely and complete applications, or timely perform the SEQR review, and take all other actions necessary to obtain all such permits or approvals or to ensure compliance with SEQR.

GENERAL PROVISIONS

1. Any documents to be submitted by BSA pursuant to this Administrative Order shall be signed by an official of BSA or an authorized representative of BSA (see 40 C.F.R. § 122.2) and include the following certification:

> "I certify under penalty of law that I have examined and am familiar with the information submitted in this document and all attachments and that this document and its attachments were prepared under my direction or supervision in a manner designed to ensure that qualified and knowledgeable personnel properly gather and present the information contained therein. I further certify, based on my inquiry of those individuals immediately responsible for obtaining the information, that I believe that the information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment."

2. All notifications, reports, submissions and communications required by this Order shall be sent by certified mail or its equivalent to the following addresses:

Doughlas McKenna, Chief
Water Compliance Branch
Division of Enforcement and Compliance Assistance
United States Environmental Protection Agency, Region 2
290 Broadway, 20th Floor
New York, New York 10007-1866

Joseph DiMura, P.E.
Director, Bureau of Water Compliance Programs
Division of Water
New York State Department of Environmental Conservation
625 Broadway
Albany, New York 12233-3506

Regional Water Engineer
New York State Department of Environmental Conservation
Region 9
270 Michigan Avenue
Buffalo, New York 14203-2915

3. The Respondent shall have the opportunity, for a period of twenty (20) days from the effective date of this Order, to confer, regarding the Amendments to Administrative Order CWA-02-2012-3024, with the following designated Agency Representative:

Doughlas McKenna, Chief
Water Compliance Branch
Division of Enforcement and Compliance Assistance
United States Environmental Protection Agency, Region 2
290 Broadway, 20th Floor
New York, New York 10007-1866
(212) 637-4244

4. Respondent may seek federal judicial review of this Order pursuant to Chapter 7 of the Administrative Procedure Act, 5 U.S.C. §§ 701-706.

5. This Order does not constitute a waiver from compliance with, or a modification of, the effective terms and conditions of the CWA, its implementing regulations, or any applicable permit, which remain in full force and effect. Issuance of this Order shall not be deemed an election by EPA to forego any civil or criminal actions for penalties, fines, imprisonment, or other appropriate relief under the CWA.

6. Notice is hereby given that should EPA commence an action in a United States District Court for a violation of any Ordered Provision of this Order, Respondent may be subject to (1) civil penalties up to $37,500 per day for each day of violation, pursuant to Section 309(d) of the CWA, 33 U.S.C. § 13199d); and/or (2) injunctive relief, pursuant to Section 309(b) of the CWA, 33 U.S.C. § 1319(b), as imposed by the Court.

7. If any provision of this Order is held by a court of competent jurisdiction to be invalid, any surviving provisions shall remain in full force and effect.

8. Provisions of Administrative Order CWA-02-2012-3024, incorporated herein, continue to be effective as of March 9, 2012. The Amendments to Administrative Order CWA-02-2012-3024 contained in this Order CWA-02-2014-3033 shall become effective upon the date of execution by the Director, Division of Enforcement and Compliance Assistance.

Dated: APRIL 11, 2014 Signed: _____

Dore LaPosta, Director
Division of Enforcement and Compliance Assistance

APPENDIX

BSA Approved CSO LTCP Implementation Schedule

Project Name	Project Milestones/Deadlines
Phase I Projects (see Table 11-11)	
Bird/Lang RTC Projects	Construction Start and Completion Dates: 3/17/2014 – 9/2/2014 Operations/Optimization (RTC): 9/3/2014 – 9/3/15
Foundation Projects (see Table 11-11)	
Foundation 1 - Smith Street Storage	Engineering Start: 3/18/2014 Engineering Completion: 3/18/2015 Notice to Proceed3/18/2015 Substantial Completion: 3/18/2017
Foundation 2 - SPP Optimization (20 projects)	Engineering Start: 3/1/14 Engineering Completion: 3/18/2015[1] Notice to Proceed: 3/1/14 Substantial Completion: 3/18/2017[1]
Foundation 3 - Remaining RTC (14 sites)	Engineering Start: 3/18/2016 Engineering Completion: 3/18/2023[1] Notice to Proceed: 3/18/2017 Substantial Completion: 3/18/2024[1]
Foundation 4 - Hamburg Drain Optimizations	Engineering Start: 3/18/2015 Engineering Completion: 3/18/2017[1] Notice to Proceed: 3/18/2016 Substantial Completion: 3/18/2018[1]
Foundation 4 – Hamburg Drain Storage	Engineering Start: 3/18/2028 Engineering Completion: 3/18/2030 Notice to Proceed: 3/18/2030 Substantial Completion: 3/18/2032
Green Projects (see GI Master Plan)	
Green Pilot Projects – 267-acres of GI control	Engineering Start:3/1/14 Engineering Completion: 3/18/2016[2] Construction Completion Date: 3/18/2018[2] PCM Start and Completion Dates: 3/18/2016 – 3/18/2019[2] Construction of controls for at least 134 acres will have started by 9/18/2017
Green 2 – 410-acres of GI control	Engineering Start: 3/18/2019 Engineering Completion: 3/18/2023[2] Construction Completion Date: 3/18/2024[2] Construction of controls for at least 205 acres will have started by 3/18/2022[2]

Green 3 – 375-acres of GI control	Engineering Start: 3/18/2023 Engineering Completion: 3/18/2028[2] Construction Completion Date:3/18/2029[2] Construction of controls for at least 188 acres will have started by 9/18/2026[2]
Green 4 – 263-acres of GI control	Engineering Start: 3/18/2028 Engineering Completion: 3/18/2033[2] Construction Completion Date:3/18/2034[2] Construction of controls for at least 132 acres will have started by 9/18/2031[2]
WWTP	
WWTP Improvements Project – Alternative C2 (two consecutive projects)	Engineering Start: 3/18/2015 Engineering Completion: 3/18/2019[1] Notice to Proceed: 3/18/2017 Substantial Completion 3/18/2022[1]
Gray Projects (see Section 12.3)	
CSOs 014/15 – In-line storage and optimization	Construction Start: 3/18/14 Substantial Completion: 3/18/15
CSO 013 – Satellite storage, conveyance, FM & PS	Engineering Start: 3/18/2019 Engineering Completion: 3/18/2020 Notice to Proceed: : 3/18/2020 Substantial Completion: 3/18/2022
North Relief – Interceptor	Engineering Start: 3/18/2019 Engineering Completion: 3/18/2022 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 Engineering Completion: 3/18/2023 Notice to Proceed: 3/18/2023 Substantial Completion: 3/18/2024
SPP 337 (CSO 053) – Satellite storage, conveyance, FM & PS	Engineering Start: 3/18/2023 Engineering Completion: 3/18/2025 Notice to Proceed: 3/18/2025 Substantial Completion: 3/18/2027
SPP 336 a+b (CSO 053) – Satellite storage, conveyance, FM & PS	Engineering Start: 3/18/2024 Engineering Completion: 3/18/2026 Notice to Proceed: 3/18/2026 Substantial Completion: 3/18/2029

Jefferson & Florida (SPP 170B – CSO 053) – Satellite storage, conveyance and FM	Engineering Start: 3/18/2025 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 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 (storage at Tops from CSO 47 west)	Engineering Start: 3/18/2028 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 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 Engineering Completion: 3/18/2032 Notice to Proceed: 3/18/2032 Substantial Completion: 3/18/2034
Post Construction Monitoring	
Submit PCM Plan	3/18/2015
Implement PCM	Per approved PCM Plan

NOTES:

References specified in the Implementation Schedule above refer to the Approved BSA CSO LTCP, including the Green Infrastructure Master Plan, approved by EPA and NYSDEC on March 18, 2014.

Engineering timeframes (from start to completion) include planning, design, permitting/SEQRA/Public Notice, regulatory review and approval, land/easement acquisition, funding, and bidding/award.

Substantial Completion is defined as the time at which the Project has progressed to the point where, in the opinion of Engineer, the Work is sufficiently complete, in accordance with the Contract Documents, so that the Project can be utilized for the purposes for which it is intended.

(1) Project consists of multiple smaller projects that will overlap in engineering and construction. Specific engineering completion and construction dates for each project site will determined and submitted to the Agencies as they are developed. In any case, all work associated with these blocks of projects will be completed within the overall timeframe shown.

(2) GI projects will consist of multiple smaller projects including building demolitions that will overlap in engineering and construction during a given GI phase. For each phase, the BSA will achieve the start of construction for at least 50 percent of the required acreage by the mid-point of each phase.

Appendix B:
Buffalo Sewer Authority CSO Sewer Map

N

ONTARIO DISTRICT

HERTEL DISTRICT

Hertel Ave. Dual Trunk Sewers

CSO-054

CSO-055

North Interceptor

CSO-003

PARISH DISTRICT

CSO-060

CSO-056

Scajaquada Creek

CSO-058

CSO-059

CSO-057

SCAJAQUADA DISTRICT

CSO-004

CSO-005

CSO-006

CSO-061

CSO-008

CSO-053

Niagara River

Black Rock Canal

BSA Treatment Plant

CSO-010

Niagara at Breckenridge

Scajaquada Tunnel Interceptor

Scajaquada Drain

Cheektowaga SD #5

CSO-012

ALBANY DISTRICT

CSO-063

CSO-013

Lake Erie

Skyway

Fuh

CSO-005

CSO-006

CSO-061

CSO-008

Lafayette Ave

West Ave

Herkimer St

CSO-010

Breckenridge St

Niagara at Breckenridge

CSO-012

CSO-066

CSO-044

CSO-039

CSO-037

CSO-035

WSSD #13

Project Location

CSO Location

Pump Station

Treatment Plant Outfall

Connection to Outside Sewer District

Combined Sewer

Interceptor Sewer

Sanitary Sewer

Storm Overflow Sewer

Storm Relief Sewer

0 0.5 1

Miles

MALCOLM PIRNIE | ARCADIS

The Water Division of ARCADIS

2012 1777-122

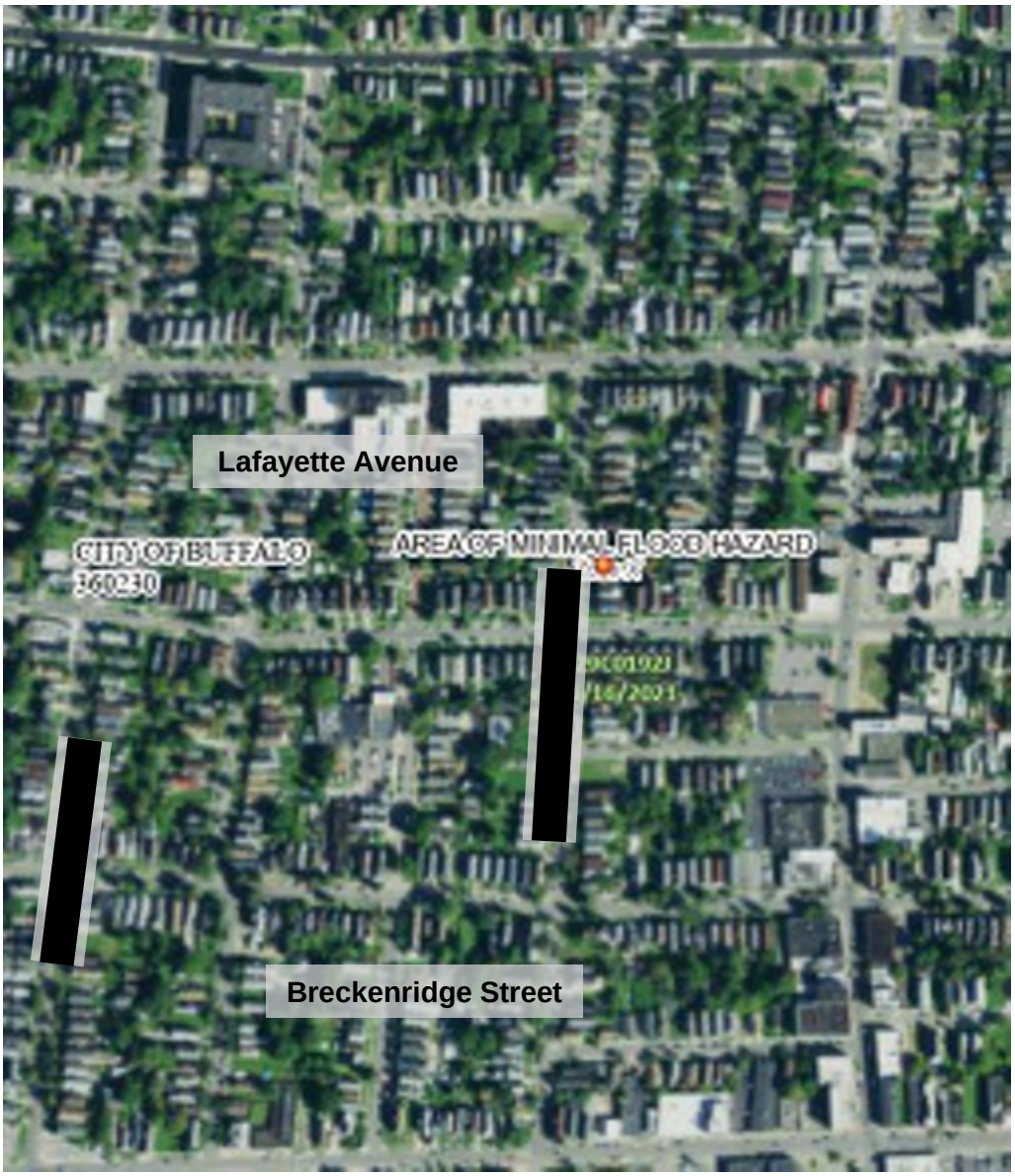
BUFFALO SEWER AUTHORITY
Long Term Control Plan Update

FIGURE 1-2

BSA INTERCEPTORS AND CSOs

Appendix C:
Flood Zone Map

1. West and Herkimer at Breckenridge and Lafayette



Flood Zone: West and Herkimer at Breckenridge and Lafayette

Appendix D:
IPaC Preliminary Report

IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Location

Erie County, New York

Local office

New York Ecological Services Field Office

(607) 753-9334
(607) 753-9699
fw5es_nyfo@fws.gov

3817 Luker Road
Cortland, NY 13045-9385

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

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1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information. IPaC only shows species that are regulated by USFWS (see FAQ).

2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS
Northern Long-eared Bat Myotis septentrionalis Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/9045	Endangered

Insects

NAME	STATUS
Monarch Butterfly Danaus plexippus Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/9743	Candidate

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

There are no critical habitats at this location.

You are still required to determine if your project(s) may have effects on all above listed species.

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern https://www.fws.gov/program/migratory-birds/species
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle Haliaeetus leucocephalus This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.	Breeds Dec 1 to Aug 31
Belted Kingfisher Megaceryle alcyon This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds Mar 15 to Jul 25

Black-billed Cuckoo *Coccyzus erythropthalmus* — Breeds May 15 to Oct 10

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9399

Blue-winged Warbler *Vermivora pinus* — Breeds May 1 to Jun 30

This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA

Bobolink *Dolichonyx oryzivorus* — Breeds May 20 to Jul 31

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Canada Warbler *Cardellina canadensis* — Breeds May 20 to Aug 10

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Cerulean Warbler *Dendroica cerulea* — Breeds Apr 20 to Jul 20

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/2974

Chimney Swift *Chaetura pelagica* — Breeds Mar 15 to Aug 25

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Eastern Meadowlark *Sturnella magna* — Breeds Apr 25 to Aug 31

This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA

Eastern Whip-poor-will *Antrostomus vociferus* — Breeds May 1 to Aug 20

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Evening Grosbeak *Coccothraustes vespertinus* — Breeds May 15 to Aug 10

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Golden Eagle *Aquila chrysaetos* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1680	Breeds Jan 1 to Aug 31
Golden-winged Warbler *Vermivora chrysoptera* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/8745	Breeds May 1 to Jul 20
Lesser Yellowlegs *Tringa flavipes* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9679	Breeds elsewhere
Prairie Warbler *Dendroica discolor* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 1 to Jul 31
Red-headed Woodpecker *Melanerpes erythrocephalus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 10 to Sep 10
Ruddy Turnstone *Arenaria interpres morinella* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds elsewhere
Short-billed Dowitcher *Limnodromus griseus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9480	Breeds elsewhere
Upland Sandpiper *Bartramia longicauda* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9294	Breeds May 1 to Aug 31
Wood Thrush *Hylocichla mustelina* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 10 to Aug 31

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

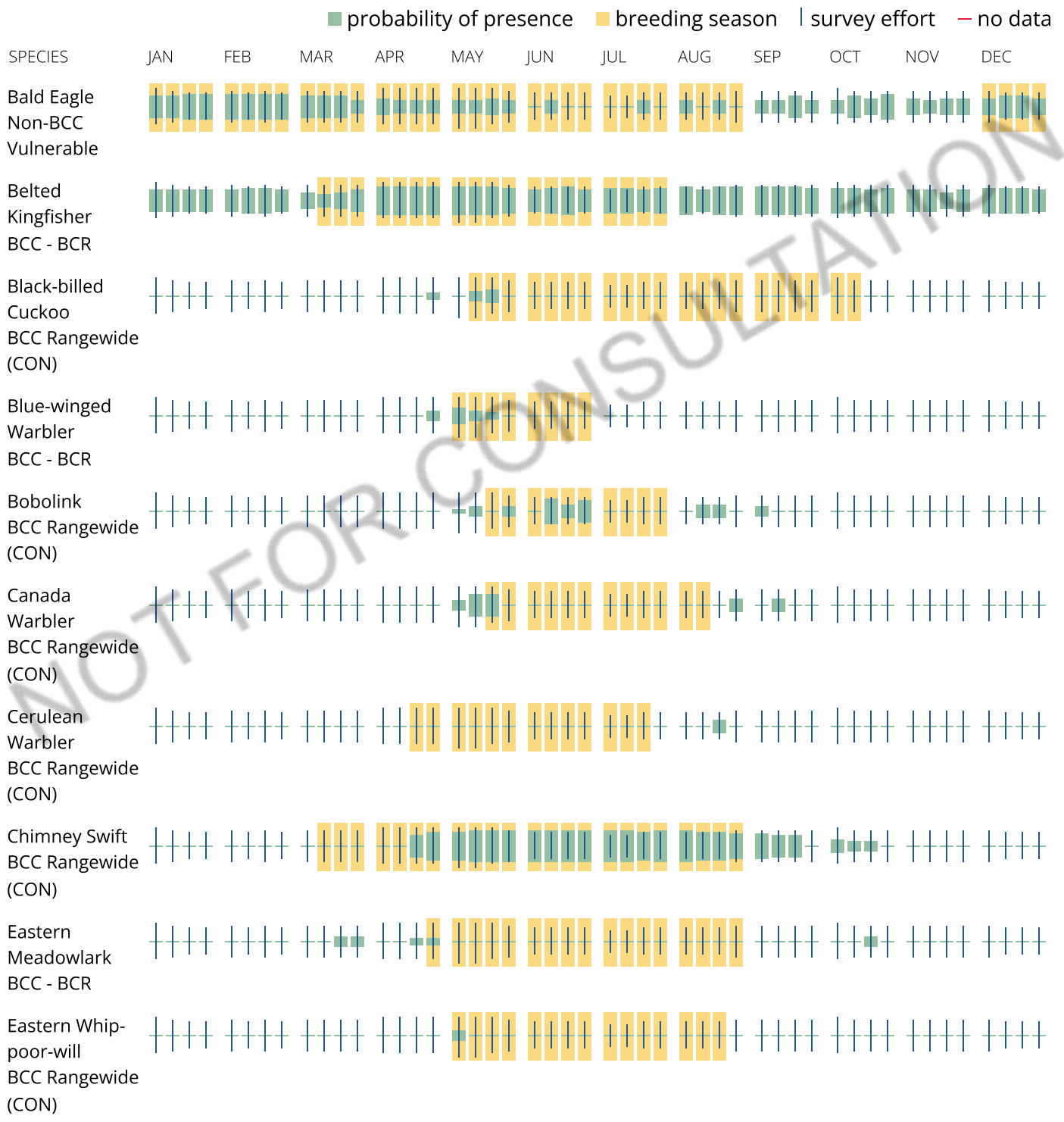
Breeding Season (■)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

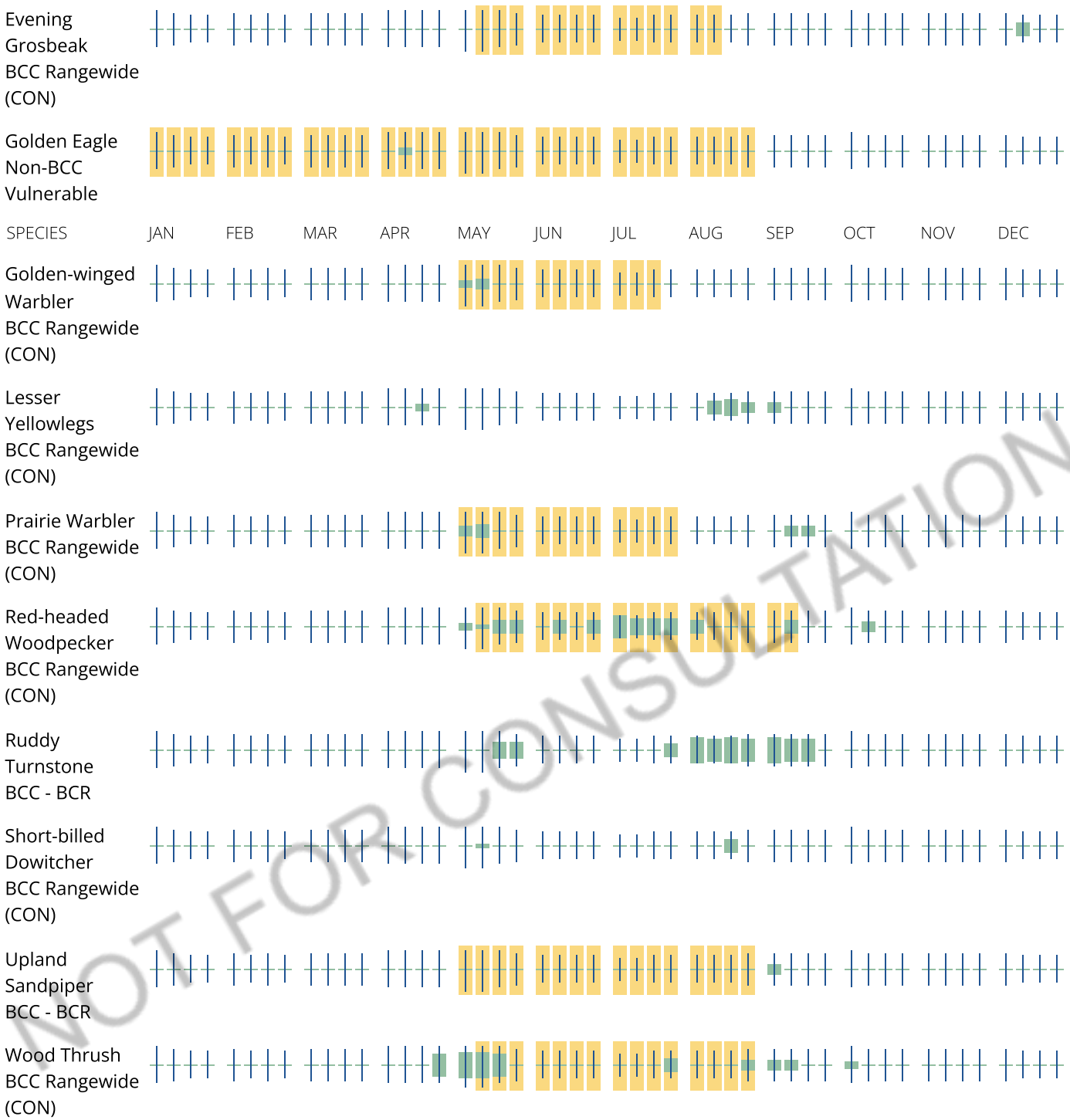
Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.





Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the list of migratory birds that potentially occur in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets.

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering or migrating in my area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may query your location using the RAIL Tool and look at the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

There are no refuge lands at this location.

Fish hatcheries

There are no fish hatcheries at this location.

Wetlands in the National Wetlands Inventory (NWI)

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Wetland information is not available at this time

This can happen when the National Wetlands Inventory (NWI) map service is unavailable, or for very large projects that intersect many wetland areas. Try again, or visit the NWI map to view wetlands at this location.

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate Federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

Appendix E:
State Pollution Discharge Elimination System (SPDES) Permit NY0028410

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

State Pollutant Discharge Elimination System (SPDES)
DISCHARGE PERMIT

First3.99

Industrial Code:	**4952**	SPDES Number:	**NY0028410**
Discharge Class (CL):	**05**	DEC Number:	**9-1402-00154/00002**
Toxic Class (TX):	**T**	Effective Date (EDP):	**07/01/2014**
Major Drainage Basin:	**01**	Expiration Date (ExDP):	**06/30/2019**
Sub Drainage Basin:	**01**	Modification Date (EDPM):	**10/01/2014**
Water Index Number:	**Ont 158**		
Compact Area:			

This SPDES permit is issued in compliance with Title 8 of Article 17 of the Environmental Conservation Law of New York State and in compliance with the Clean Water Act, as amended, (33 U.S.C. §1251 et.seq.) (hereinafter referred to as "the Act").

PERMITTEE NAME AND ADDRESS

Name: **Buffalo Sewer Authority** Attention: **David P. Comerford, General Manager**

Street: **1038 City Hall**

City: **Buffalo** State: **NY** Zip Code: **14202-3310**

is authorized to discharge from the facility described below:

FACILITY NAME AND ADDRESS

Name: **Bird Island Wastewater Treatment Facility** Contact: **James Keller Jr.,**

Location (C,T,V): **Buffalo (C)** County: **Erie**

Facility Address: **90 West Ferry Street**

City: **Buffalo** State: **NY** Zip Code: **14213**

NYTM -E: 181.42 NYTM - N: 4759.77

From Outfall No.: **002** at Latitude: **42 ° 55 ′ 16 ″** & Longitude: **78 ° 54 ′ 20 ″**

into receiving waters known as: **Niagara River** Class: **A-Special**

See additional outfalls listing on pages 3 through 5 of this permit.

in accordance with: effluent limitations; monitoring and reporting requirements; other provisions and conditions set forth in this permit; and 6 NYCRR Part 750-1.2(a) and 750-2.

DISCHARGE MONITORING REPORT (DMR) MAILING ADDRESS

Mailing Name: **Buffalo Sewer Authority**

Street: **90 West Ferry Street**

City: **Buffalo** State: **NY** Zip Code: **14213**

Responsible Official or Agent: **Sal LoTempio, Plant Superintendent** Phone: **(716) 883-1820**

This permit and the authorization to discharge shall expire on midnight of the expiration date shown above and the permittee shall not discharge after the expiration date unless this permit has been renewed, or extended pursuant to law. To be authorized to discharge beyond the expiration date, the permittee shall apply for permit renewal not less than 180 days prior to the expiration date shown above.

DISTRIBUTION:
BWP – Permit Writer
BWP – Permit Coordinator
Regional Water Engineer - Region 9
Regional Permit Administrator – Region 9
Michelle Josilo - EPA Region II

Regional Permit Administrator: David S. Denk

Address: NYSDEC - Division of Environmental Permits
270 Michigan Avenue
Buffalo, NY 14203-2915

Signature: Date: 8/20/14

TABLE OF CONTENTS

I. ADDITIONAL OUTFALLS

a) Treatment Plant

Outfall	Type	Location	Latitude	Longitude	Receiving Water
001	Primary Treatment Outfall	West Wall - Bird Island	42° 55' 10" N	78° 54' 16" W	Niagara River
01A	Headworks Bypass	West Wall - Bird Island	42° 55' 01" N	78° 54' 14" W	Niagara River
002	WWTF Outfall	West Wall - Bird Island	42° 55' 16" N	78° 54' 20" W	Niagara River

b) Combined Sewer Overflows

Outfall	Type	Location	Latitude	Longitude	Receiving Water
003	Weir & Orifice	Austin Street	42° 56' 14" N	78° 54' 26" W	Black Rock Canal
004	Leaping Weir	Bird Avenue	42° 55' 34" N	78° 53' 57"W	Black Rock Canal
005	Manhole	Potomac Avenue	42° 55' 27" N	78° 53' 27" W	Black Rock Canal
006	Weir & Orifice	W. Delevan Avenue	42° 55' 20" N	78° 53' 29" W	Black Rock Canal
007	Weir & Orifice	W. Delevan Avenue	42° 55' 20" N	78° 55' 20" W	Black Rock Canal
008	Leaping Weir	Brace Street	42° 55' 15" N	78° 54' 00" W	Black Rock Canal
009	Leaping Weir	Auburn Street	42° 55' 08" N	78° 54' 03" W	Black Rock Canal
010	Leaping Weir	Breckenridge Street	42° 55' 02" N	78° 54' 05" W	Black Rock Canal
011	Weir & Orifice	Albany St to W. Wall - Bird Island	42° 54' 49" N	78° 54' 12" W	Niagara River
012	Weir & Orifice	Albany Street	42° 54' 48" N	78° 54' 07" W	Black Rock Canal
013	Weir & Orifice	Virginia Street	42° 53' 20" N	78° 53' 37" W	Buffalo Harbor
014	Manhole	Fourth Street	42° 53' 01" N	78° 53' 12" W	Erie Basin Slip #3
015	Leaping Weir	Genesee Street	42° 52' 58" N	78° 53' 07" W	Erie Basin Slip
016	Weir & Orifice	Erie Street	42° 52' 55" N	78° 52' 57" W	Erie Basin
017	Manhole	Hamburg Drain, Main Street	42° 52' 38" N	78° 52' 47" W	Buffalo River
022	Manhole	Baltimore Street	42° 52' 23" N	78° 52' 29" W	Buffalo River
023	Manhole	Ohio Street	42° 52' 01" N	78° 52' 05" W	Buffalo River
025	Manhole	Hamburg Street	42° 51' 51" N	78° 51' 37" W	Buffalo River
026	Manhole	Smith Street	42° 51' 49" N	78° 51' 03" W	Buffalo River
027	Weir & Orifice	Babcock Street	42° 51' 48" N	78° 50' 16" W	Buffalo River
028	Manhole	Boone Street	42° 51' 38" N	78° 49' 56" W	Buffalo River

Outfall	Type	Location	Latitude	Longitude	Receiving Water
029	Weir & Orifice	Boone Street	42° 51' 38" N	78° 49' 56" W	Buffalo River
031	Manhole	Kimmel Avenue	42° 21' 37" N	78° 49' 29" W	Cazenovia Creek
032	Manhole	W. of Bailey Avenue	42° 51' 43" N	78° 49' 35" W	Buffalo River
033	Leaping Weir	Bailey Avenue	42° 51' 48" N	78° 49' 33" W	Buffalo River
035	Weir & Orifice	Cazenovia Park	42° 51' 02" N	78° 48' 31" W	Cazenovia Creek
037	Manhole	Salem Street	42° 51' 09" N	78° 48' 41" W	Cazenovia Creek
038	Manhole	Kingston Place	42° 51' 10" N	78° 48' 40" W	Cazenovia Creek
039	Leaping Weir	Tamarack Street	42° 51' 13" N	78° 48' 46" W	Cazenovia Creek
040	Manhole	Yale Place	42° 51' 15" N	78° 48' 46" W	Cazenovia Creek
042	Manhole	S. Ryan Street	42° 51' 19" N	78° 48' 51" W	Cazenovia Creek
044	Manhole	Mumford Street	42° 51' 27" N	78° 49' 06" W	Cazenovia Creek
046	Leaping Weir	Unger Avenue	42° 51' 32" N	78° 49' 13" W	Cazenovia Creek
047	Manhole	Southside Parkway	42° 51' 35" N	78° 49' 22" W	Cazenovia Creek
048	Weir & Orifice	E. of Bailey Ave.	42° 51' 38" N	78° 49' 29" W	Cazenovia Creek
049	Weir & Orifice	W. of Bailey Ave.	42° 51' 42" N	78° 49' 36" W	Buffalo River
050	Weir & Orifice	Seneca Street	42° 51' 20" N	78° 49' 16" W	Buffalo River
051	Weir & Orifice	Hillery Park	42° 51' 43" N	78° 48' 38" W	Buffalo River
052	Weir & Orifice	S. Ogden Street	42° 51' 54" N	78° 48' 08" W	Buffalo River
053	Weir & Gate	Scajaquada Drain	42° 55' 26" N	78° 51' 26" W	Scajaquada Creek
054	Manhole	Crowley Avenue	42° 57' 07" N	78° 54' 36" W	Niagara River
055	Weir	Niagara Street	42° 56' 35" N	78° 54' 35" W	Cornelius Creek, Niagara River
056	Weir	Nottingham Terrace	42° 56' 06" N	78° 52' 39" W	Scajaquada Creek
057	Weir	Tonawanda	42° 55' 43" N	78° 53' 52" W	Scajaquada Creek
058	Weir	West Avenue	42° 55' 49" N	78° 53' 45" W	Scajaquada Creek
059	Weir	DeWitt Street	42° 55' 51" N	78° 53' 39" W	Scajaquada Creek
060	Weir	Elmwood Avenue	42° 56' 04" N	78° 52' 42" W	Scajaquada Creek
061	Weir	Scajaquada Tunnel, Lafayette Avenue	42° 55' 15" N	78° 54' 01" W	Black Rock Canal
062	Weir	West Ferry Street	42° 54' 55" N	78° 54' 07" W	Black Rock Canal
063	Weir	Front Park	42° 54' 10" N	78° 54' 07" W	Black Rock Canal

Outfall	Type	Location	Latitude	Longitude	Receiving Water
064	Manhole	Ohio Drain, Ohio Street	42° 51' 59" N	78° 52' 06" W	Buffalo River
066	Manhole	Sloan Drain, S. Ogden Street	42° 51' 53" N	78° 49' 21" W	Buffalo River

II. PERMIT LIMITS, LEVELS AND MONITORING DEFINITIONS

OUTFALL	WASTEWATER TYPE	RECEIVING WATER	EFFECTIVE	EXPIRING
	This cell describes the type of wastewater authorized for discharge. Examples include process or sanitary wastewater, storm water, non-contact cooling water.	This cell lists classified waters of the state to which the listed outfall discharges.	The date this page starts in effect. (e.g. EDP or EDPM)	The date this page is no longer in effect. (e.g. ExDP)

PARAMETER	MINIMUM	MAXIMUM	UNITS	SAMPLE FREQ.	SAMPLE TYPE
e.g. pH, TRC, Temperature, D.O.	The minimum level that must be maintained at all instants in time.	The maximum level that may not be exceeded at any instant in time.	SU, °F, mg/l, etc.		

PARA-METER	EFFLUENT LIMIT	PRACTICAL QUANTITATION LIMIT (PQL)	ACTION LEVEL	UNITS	SAMPLE FREQUENCY	SAMPLE TYPE
	Limit types are defined below in Note 1. The effluent limit is developed based on the more stringent of technology-based limits, required under the Clean Water Act, or New York State water quality standards. The limit has been derived based on existing assumptions and rules. These assumptions include receiving water hardness, pH and temperature; rates of this and other discharges to the receiving stream; etc. If assumptions or rules change the limit may, after due process and modification of this permit, change.	For the purposes of compliance assessment, the analytical method specified in the permit shall be used to monitor the amount of the pollutant in the outfall to this level, provided that the laboratory analyst has complied with the specified quality assurance/quality control procedures in the relevant method. Monitoring results that are lower than this level must be reported, but shall not be used to determine compliance with the calculated limit. This PQL can be neither lowered nor raised without a modification of this permit.	Type I or Type II Action Levels are monitoring requirements, as defined below in Note 2 that trigger additional monitoring and permit review when exceeded.	This can include units of flow, pH, mass, Temperature, concentration. Examples include µg/l, lbs/d, etc.	Examples include Daily, 3/week, weekly, 2/month, monthly, quarterly, 2/yr and yearly.	Examples include grab, 24 hour composite and 3 grab samples collected over a 6 hour period.

Note 1: DAILY DISCHARGE: The discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for the purposes of sampling. For pollutants expressed in units of mass, the 'daily discharge' is calculated as the total mass of the pollutant discharged over the day. For pollutants with limitations expressed in other units of measurement, the 'daily discharge' is calculated as the average measurement of the pollutant over the day.

DAILY MAX.: The highest allowable daily discharge. DAILY MIN.: The lowest allowable daily discharge.

MONTHLY AVG: The highest allowable average of daily discharges over a calendar month, calculated as the sum of each of the daily discharges measured during a calendar month divided by the number of daily discharges measured during that month.

7 DAY ARITHMETIC MEAN (7 day average): The highest allowable average of daily discharges over a calendar week.

30 DAY GEOMETRIC MEAN: The highest allowable geometric mean of daily discharges over a calendar month, calculated as the antilog of : the sum of the log of each of the daily discharges measured during a calendar month divided by the number of daily discharges measured during that month.

7 DAY GEOMETRIC MEAN: The highest allowable geometric mean of daily discharges over a calendar week.

RANGE: The minimum and maximum instantaneous measurements for the reporting period must remain between the two values shown.

Note 2: ACTION LEVELS: Routine Action Level monitoring results, if not provided for on the Discharge Monitoring Report (DMR) form, shall be appended to the DMR for the period during which the sampling was conducted. If the additional monitoring requirement is triggered as noted below, the permittee shall undertake a short-term, high-intensity monitoring program for the parameter(s). Samples identical to those required for routine monitoring purposes shall be taken on each of at least three consecutive operating and discharging days and analyzed. Results shall be expressed in terms of both concentration and mass, and shall be submitted no later than the end of the third month following the month when the additional monitoring requirement was triggered. Results may be appended to the DMR or transmitted under separate cover to the same address. If levels higher than the Action Levels are confirmed, the permit may be reopened by the Department for consideration of revised Action Levels or effluent limits. The permittee is not authorized to discharge any of the listed parameters at levels which may cause or contribute to a violation of water quality standards. TYPE I: The additional monitoring requirement is triggered upon receipt by the permittee of any monitoring results in excess of the stated Action Level. TYPE II: The additional monitoring requirement is triggered upon receipt by the permittee of any monitoring results that show the stated action level exceeded for four of six consecutive samples, or for two of six consecutive samples by 20 % or more, or for any one sample by 50 % or more.

III. PERMIT LIMITS, LEVELS AND MONITORING

a) Effluent Limits for Outfall 002

OUTFALL No.	LIMITATIONS APPLY:	RECEIVING WATER	EFFECTIVE	EXPIRING
002	All Year unless otherwise noted	Niagara River	01/01/2010	06/30/2014

PARAMETER	EFFLUENT LIMIT					MONITORING REQUIREMENTS				FN
								Location		
	Type	Limit	Units	Limit	Units	Sample Frequency	Sample Type	Inf.	Eff.	
Flow	MRA	180	MGD			Continuous	Recorder	X		1, 5
BOD_5	Monthly average	30	mg/l	45036	lbs/d	1/day	24-hr. comp.	X	X	2
BOD_5	7 day average	45	mg/l	67554	lbs/d	1/day	24-hr. comp.	X	X	
Solids, Total Suspended	Monthly average	30	mg/l	45036	lbs/d	1/day	24-hr. comp.	X	X	2
Solids, Total Suspended	7 day average	45	mg/l	67554	lbs/d	1/day	24-hr. comp.	X	X	
Solids, Settleable	Daily Maximum	0.3	ml/l			6/day	grab	X	X	3
pH	Range	6.0 – 9.0	SU			6/day	grab	X	X	
Nitrogen, Ammonia (as NH_3)	Daily Maximum	Monitor	mg/l			1/month	24-hr. comp.	X	X	
Nitrogen, TKN (as N)	Daily Maximum	Monitor	mg/l			1/month	24-hr. comp.	X	X	
Temperature	Daily Maximum	Monitor	Deg F			6/day	grab	X	X	
Phenols, Total	Monthly average			36.6	lbs/d	1/month	24-hr. comp.		X	
Phosphorus, Total (as P)	Monthly average	1.0	mg/l			1/day	24-hr. comp.		X	
Mercury, Total	Daily Maximum	50	ng/l			1/month	Grab			4
Effluent Disinfection required: [X] All Year [ ] Seasonal from _____ to										
Coliform, Fecal	30 day geometric mean	200	No./ 100 ml			1/day	grab		X	6
Coliform, Fecal	7 day geometric mean	400	No./ 100 ml			1/day	grab		X	6
Chlorine, Total Residual	Daily Maximum	2.0	mg/l			6/day	grab		X	3, 6

FOOTNOTES:

1. The 12 month rolling average (MRA) shall be the average of the monthly average of the current month plus the monthly average of the eleven previous months.
2. A monthly effluent value shall not exceed 15 % and 15 % of influent values for BOD 5 & TSS respectively for flows up to 180 MGD.
3. The sample measurement for each day is calculated as the arithmetic mean of the total number of daily samples. Therefore the daily maximum is the highest of the approximately 30 daily arithmetic means calculated. The definition is derived from the DMR Manual, NYSDEC, 2002, Page 9, Section 4.4.
4. The proposed limit will be **50 ng/l** until the Department reviews the Mercury Minimization Program (MMP). The calculated Water Quality Based Effluent Limit (WQBEL) for Mercury is 0.7 ng/l based on the Water Quality Evaluation for this discharge. However available information indicates this concentration is not achievable by this treatment facility. Therefore, Best Professional Judgement (BPJ) has been used to determine an interim limit of 50 ng/L the permittee can comply with. The goal of the MMP is to attain calculated WQBEL.
5. This outfall shall be utilized in accordance with the existing Wet Weather Operating Plan.
6. Monitoring of these parameters is only required during the period when disinfection is required.

b) Type II Action Level Monitoring for Outfall 002

OUTFALL NUMBER	WASTEWATER TYPE	EFFECTIVE	EXPIRING
002	Municipal with contributing industries	01/01/2010	06/30/2014

PARAMETER	ACTION LEVEL	UNITS	PQL (lbs/day)	SAMPLE FREQUENCY	SAMPLE TYPE	FN
Cadmium, Total	3.0	lbs/d	0.6	1/month	24 hr. comp.	
Chromium, Total	12.5	lbs/d	6.0	1/month	24-hr. comp.	
Copper, Dissolved	Monitor	lbs/d		1/month	24-hr. comp.	
Copper, Total	31.9	lbs/d	6.0	1/month	24 hr. comp.	
Cyanide, Total	90.0	lbs/d	90	1/month	24-hr. comp.	
Lead, Total	66.2	lbs/d	6.0	1/month	24-hr. comp.	
Nickel, Total	43.8	lbs/d	6.0	1/month	24 hr. comp.	
Zinc, Total	174	lbs/d	0.3	1/month	24-hr. comp.	
Zinc, Dissolved	Monitor	lbs/d		1/month	24-hr. comp.	
Bis(2-Ethylhexyl)Phthalate	16.7	lbs/d	12.0	1/month	24-hr. comp.	

c) Monitoring Requirements for Outfall 001

OUTFALL No.	LIMITATIONS APPLY:	RECEIVING WATER	EFFECTIVE	EXPIRING
001	All Year unless otherwise noted	Niagara River	01/01/2010	06/30/2014

PARAMETER	EFFLUENT LIMIT			MONITORING REQUIREMENTS				FN
						Location		
	Type	Limit	Units	Sample Frequency	Sample Type	Inf.	Eff.	
Flow	Monthly Total	Monitor	MGD	Continuous	Recorder/Totalizer		X	I, 2
BOD_5	Daily Max.	Monitor	mg/l	1/Event	Composite		X	3
Solids, Suspended	Daily Max.	Monitor	mg/l	1/Event	Composite		X	3
Solids, Settleable	Daily Max.	Monitor	ml/l	1/Event	grab		X	4
Ammonia as N, mg/l, lbs/day	Daily Max.	Monitor	mg/l	1/Event	Composite		X	3
TKN as N	Daily Max.	Monitor	mg/l	1/Event	Composite		X	3
Phosphorus	Daily Max.	Monitor	mg/l	1/Event	Composite		X	3
Oil & Grease	Daily Max.	Monitor	mg/l	1/Event	grab		X	3
Coliform, Fecal	30 day geometric mean	Monitor	No./ 100 ml	1/Event	grab		X	4
Coliform, Fecal	7 day geometric mean	Monitor	No./ 100 ml	1/Event	grab		X	4
Chlorine, Total Residual	Daily Max.	2.0	mg/l	1/Event	grab		X	4

FOOTNOTES

1. Flows shall be managed in accordance to the existing Wet Weather Operating Plan. All flows up to the headworks capacity and not passed through outfall 002 shall be passed through outfall 001. This requirement may be superseded by the provisions in the ongoing Consent Decree.
2. Flow shall be continuously recorded and totalized. Flow reported on the Discharge Monitoring Report shall be the total flow discharge for the calendar month reporting period.
3. Samples shall be composite of grab samples, one taken every four hours.
4. Grab samples to be taken every four hours during each event.

IV. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS FOR HEADWORKS BYPASS ROUTINE MONITORING REQUIREMENTS

OUTFALL No.	LIMITATIONS APPLY:			EFFECTIVE		EXPIRING		
001A	All Year unless otherwise noted			01/01/2010		06/30/2014		
PARAMETER	EFFLUENT LIMIT			MONITORING REQUIREMENTS				
	Type	Limit	Units	Sample Frequency	Sample Type	Location		FN
						Inf.	Eff.	
Flow, MG	Monthly Total	Monitor	MGD	1/Event	Estimated	X		(1)
BOD,5-day mg/l	Daily Max.	Monitor	mg/l	1/Event	Grab		X	
Solids, Suspended mg/l	Daily Max.	Monitor	mg/l	1/Event	Grab		X	
Solids, Settleable ml/l	Daily Max.	Monitor	ml/l	1/Event	Grab		X	
Oil & Grease mg/l	Daily Max.	Monitor	mg/l	1/Event	Grab		X	

(1) This outfall shall be used in accordance with the existing Wet Weather Operating Plan and/or for emergency use only.

V. WHOLE EFFLUENT TOXICITY

PARAMETER	EFFLUENT LIMIT		PQL	MONITORING ACTION LEVEL		UNITS	SAMPLE FREQUENCY	SAMPLE TYPE
	Monthly Avg.	Daily Max.	Daily Max.	TYPE I	TYPE II			
WET - Chronic Invertebrate				101		TUc	Quarterly	Footnote 1
WET - Chronic Vertebrate				101		TUc	Quarterly	Footnote 1

Footnote
1. **Whole Effluent Toxicity Testing for Outfall 002**

Testing Requirements - WET testing shall consist of **Chronic only**. WET testing shall be performed in accordance with 40 CFR Part 136 and TOGS 1.3.2 unless prior written approval has been obtained from the Department. The test species shall be *Ceriodaphnia dubia* (water flea - invertebrate) and *Pimephales promelas* (fathead minnow - vertebrate). Receiving water collected upstream from the discharge should be used for dilution. All tests conducted should be static-renewal (two 24 hr composite samples with one renewal for Acute tests and three 24 hr composite samples with two renewals for Chronic tests). The appropriate dilution series bracketing the IWC and including one exposure group of 100% effluent should be used to generate a definitive test endpoint, otherwise an immediate rerun of the test is required. WET testing shall be coordinated with the monitoring of chemical and physical parameters limited by this permit so that the resulting analyses are also representative of the sample used for WET testing. The ratio of critical receiving water flow to discharge flow (i.e. dilution ratio) is **50:1** for acute, and **100:1** for chronic. Discharges which are disinfected using chlorine should be dechlorinated prior to WET testing or samples shall be taken immediately prior to the chlorination system.

Monitoring Period - WET testing shall be performed at the specified sample frequency **during calendar years ending in 2 and 7.**

Reporting - Toxicity Units shall be calculated and reported on the DMR as follows: TUa = (100)/(48 hr LC50) or (100)/(48 hr EC50) (note that Acute data is generated by both Acute and Chronic testing) and TUc = (100)/(NOEC) when Chronic testing has been performed or TUc = (TUa) x (10) when only Acute testing has been performed and is used to predict Chronic test results, where the 48 hr LC50 or 48 hr EC50 and NOEC are expressed in % effluent. This must be done for both species and using the Most Sensitive Endpoint (MSE) or the lowest NOEC and corresponding highest TUc. Report a TUa of 0.3 if there is no statistically significant toxicity in 100% effluent as compared to control.

The complete test report including all corresponding results, statistical analyses, reference toxicity data, daily average flow at the time of sampling and other appropriate supporting documentation, shall be submitted within 60 days following the end of each test period to the Toxicity Testing Unit. A summary page of the test results for the invertebrate and vertebrate species indicating TUa, 48 hr LC50 or 48 hr EC50 for Acute tests and/or TUc, NOEC, IC25, and most sensitive endpoints for Chronic tests, should also be included at the beginning of the test report.

WET Testing Action Level Exceedances - If an action level is exceeded then the Department may require the permittee to conduct additional WET testing including Acute and/or Chronic tests. Additionally, the permittee may be required to perform a Toxicity Reduction Evaluation (TRE) in accordance with Department guidance. If such additional testing or performance of a TRE is necessary, the permittee shall be notified in writing by the Regional Water Engineer. The written notification shall include the reason(s) why such testing or a TRE is required.

VI. PRETREATMENT PROGRAM IMPLEMENTATION REQUIREMENTS

A. DEFINITIONS. Generally, terms used in this Section shall be defined as in the General Pretreatment Regulations (40 CFR Part 403). Specifically, the following definitions apply to terms used in this Section (PRETREATMENT PROGRAM IMPLEMENTATION REQUIREMENTS):

1. Categorical Industrial User (CIU)- an industrial user of the POTW that is subject to Categorical Pretreatment Standards under 40 CFR 403.6 and 40 CFR Chapter I, Subchapter N;

2. Local Limits - General Prohibitions, specific prohibitions and specific limits as set forth in 40 CFR 403.5.

3. The Publicly Owned Treatment Works (the POTW) - as defined by 40 CFR 403.3(q) and that discharges in accordance with this permit.

4. Program Submission(s) - requests for approval or modification of the POTW Pretreatment Program submitted in accordance with 40 CFR 403.11 or 403.18 and approved by letter dated September 11, 1984.

5. Significant Industrial User (SIU) -

   a. CIUs;

   b. Except as provided in 40 CFR 403.3(v)(3), any other industrial user that discharges an average of 25,000 gallons per day or more of process wastewater (excluding sanitary, non-contact cooling and boiler blowdown wastewater) to the POTW;

   c. Except as provided in 40 CFR 403.3(v)(3), any other industrial user that contributes a process wastestream which makes up 5 percent or more of the average dry weather hydraulic or organic capacity of the POTW treatment plant;

   d. Any other industrial user that the permittee designates as having a reasonable potential for adversely affecting the POTW's operation or for violating a pretreatment standard or requirement.

6. Substances of Concern - Substances identified by the New York State Department of Environmental Conservation Industrial Chemical Survey as substances of concern.

B. IMPLEMENTATION. The permittee shall implement a POTW Pretreatment Program in accordance 40 CFR Part 403 and as set forth in the permittee's approved Program Submission(s). Modifications to this program shall be made in accordance with 40 CFR 403.18. Specific program requirements are as follows:

1. Industrial Survey. To maintain an updated inventory of industrial dischargers to the POTW the permittee shall:

   a. Identify, locate and list all industrial users who might be subject to the industrial pretreatment program from the pretreatment program submission and any other necessary, appropriate and available sources. This identification and location list will be updated, at a minimum, every five years. As part of this update the permittee shall collect a current and complete New York State Industrial Chemical Survey form (or equivalent) from each SIU.

   b. Identify the character and volume of pollutants contributed to the POTW by each industrial user identified in B.1.a above that is classified as a SIU.

   c. Identify, locate and list, from the pretreatment program submission and any other necessary, appropriate and available sources, all significant industrial users of the POTW.

2. Control Mechanisms. To provide adequate notice to and control of industrial users of the POTW the permittee shall:

a. Inform by certified letter, hand delivery courier, overnight mail, or other means which will provide written acknowledgment of delivery, all industrial users identified in B.1.a. above of applicable pretreatment standards and requirements including the requirement to comply with the local sewer use law, regulation or ordinance and any applicable requirements under section 204(b) and 405 of the Federal Clean Water Act and Subtitles C and D of the Resource Conservation and Recovery Act.

b. Control through permit or similar means the contribution to the POTW by each SIU to ensure compliance with applicable pretreatment standards and requirements. Permits shall contain limitations, sampling frequency and type, reporting and self-monitoring requirements as described below, requirements that limitations and conditions be complied with by established deadlines, an expiration date not later than five years from the date of permit issuance, a statement of applicable civil and criminal penalties and the requirement to comply with Local Limits and any other requirements in accordance with 40 CFR 403.8(f)(1).

3. Monitoring and Inspection. To provide adequate, ongoing characterization of non-domestic users of the POTW, the permittee shall:

a. Receive and analyze self-monitoring reports and other notices. The permittee shall require all SIUs to submit self-monitoring reports at least every six months unless the permittee collects all such information required for the report, including flow data.

b. The permittee shall adequately inspect each SIU at a minimum frequency of once per calendar year.

c. The permittee shall collect and analyze samples from each SIU for all priority pollutants that can reasonably be expected to be detectable at levels greater than the levels found in domestic sewage at a minimum frequency of once per year.

d. Require, through permits, each SIU to collect at least one 24 hour, flow proportioned composite (where feasible) effluent sample every six months and analyze each of those samples for all priority pollutants that can reasonably be expected to be detectable in that discharge at levels greater than the levels found in domestic sewage. The permittee may perform the aforementioned monitoring in lieu of the SIU except that the permittee must also perform the compliance monitoring described in 3.c.

4. Enforcement. To assure adequate, equitable enforcement of the industrial pretreatment program the permittee shall:

a. Investigate instances of noncompliance with pretreatment standards and requirements, as indicated in self-monitoring reports and notices or indicated by analysis, inspection and surveillance activities. Sample taking and analysis and the collection of other information shall be performed with sufficient care to produce evidence admissible in enforcement proceedings or in judicial actions. Enforcement activities shall be conducted in accordance with the permittee's Enforcement Response Plan developed and approved in accordance with 40 CFR Part 403.

b. Enforce compliance with all national pretreatment standards and requirements in 40 CFR Parts 406 - 471.

c. Provide public notification of significant non-compliance as required by 40 CFR 403.8(f)(2)(viii).

d. Pursuant to 40 CFR 403.5(e), when either the Department or the USEPA determines any source contributes pollutants to the POTW in violation of Pretreatment Standards or Requirements the Department or the USEPA shall notify the permittee. Failure by the permittee to commence an appropriate investigation and subsequent enforcement action within 30 days of this notification may result in appropriate enforcement action against the source and permittee.

5. Record keeping. The permittee shall maintain and update, as necessary, records identifying the nature, character, and volume of pollutants contributed by SIUs. Records shall be maintained in accordance with 6 NYCRR Part 750-2.5(c).

6. Staffing. The permittee shall maintain minimum staffing positions committed to implementation of the Industrial

Pretreatment Program in accordance with the approved pretreatment program.

C. SLUDGE DISPOSAL PLAN. The permittee shall notify NYSDEC, and USEPA as long as USEPA remains the approval authority, 60 days prior to any major proposed change in the sludge disposal plan. NYSDEC may require additional pretreatment measures or controls to prevent or abate an interference incident relating to sludge use or disposal.

D. REPORTING. The permittee shall provide to the offices listed on the Monitoring, Reporting and Recording page of this permit and to the Chief-Water Compliance Branch; USEPA Region II; 290 Broadway; New York, NY 10007; an annual report that briefly describes the permittee's program activities over the previous year. This report shall be submitted to the above noted offices within 60 days of the end of the reporting period. The reporting period shall be annual with reporting period(s) ending on April 30 of each year.

The annual report shall include:

1. Industrial Survey. Updated industrial survey information in accordance with 40 CFR 403.12(i)(1) (including any NYS Industrial Chemical Survey forms updated during the reporting period).

2. Implementation Status. Status of Pretreatment Program Implementation, to include:

   a. Any interference upset or permit violations experienced at the POTW directly attributable to industrial users.

   b. Listing of significant industrial users issued permits.

   c. Listing of significant industrial users inspected and/or monitored during the previous reporting period and summary of results.

   d. Listing of significant industrial users notified of promulgated pretreatment standards or applicable local standards that are on compliance schedules. The listing should include for each facility the final date of compliance.

   e. Summary of POTW monitoring results not already submitted on Discharge Monitoring Reports and toxic loadings from SIU's organized by parameter.

   f. A summary of additions or deletions to the list of SIUs, with a brief explanation for each deletion.

3. Enforcement Status. Status of enforcement activities to include:

   a. Listing of significant industrial users in Significant Non-Compliance (as defined by 40 CFR 403.8(f)(2)(viii)) with federal or local pretreatment standards at end of the reporting period.

   b. Summary of enforcement activities taken against non-complying significant industrial users. The permittee shall provide a copy of the public notice of significant violators as specified in 40 CFR Part 403.8(f)(2)(viii).

VII. BEST MANAGEMENT PRACTICES FOR COMBINED SEWER OVERFLOWS

The permittee shall implement the following Best Management Practices (BMPs). These BMPs are designed to implement operation & maintenance procedures, utilize the existing treatment facility and collection system to the maximum extent practicable, and implement sewer design, replacement and drainage planning, to maximize pollutant capture and minimize water quality impacts from combined sewer overflows. The BMPs are equivalent to the "Nine Minimum Control Measures" required under the USEPA National Combined Sewer Overflow policy. The EPA's policy is available at http://cfpub.epa.gov/npdes/cso/cpolicy.cfm?program_id=5.

1. CSO Maintenance/Inspection - The permittee shall develop a written maintenance and inspection program for all CSOs listed on page(s) 3-5 of this permit. This program shall include all regulators tributary to these CSOs, and shall be conducted during periods of both dry and wet weather. This is to insure that no discharges occur during dry weather and that the maximum amount of wet weather flow is conveyed to the Bird Island POTW for treatment. This program shall consist of inspections with required repair, cleaning and maintenance done as needed. This program shall consist of monthly inspections.

   Inspection reports shall be completed indicating visual inspection, any observed flow, incidence of rain or snowmelt, condition of equipment and work required. These reports shall be in a format approved by the Regional Office and submitted to the Region with the monthly operating report (Form 92-15-7).

2. Maximum Use of Collection System for Storage - The permittee shall optimize the collection system by operating and maintaining it to minimize the discharge of pollutants from CSOs. It is intended that the maximum amount of in-system storage capacity be used (without causing service backups) to minimize CSOs and convey the maximum amount of combined sewage to the treatment plant in accordance with Item 4 below.

   This shall be accomplished by an evaluation of the hydraulic capacity of the system but should also include a continuous program of flushing or cleaning to prevent deposition of solids and the adjustment of regulators and weirs to maximize storage.

3. Industrial Pretreatment - The approved Industrial Pretreatment Program shall consider CSOs in the calculation of local limits for indirect discharges. Discharge of persistent toxics upstream of CSOs will be in accordance with guidance under (NYSDEC Division of Water Technical and Operational Guidance Series **(TOGS) 1.3.8 New Discharges to POTWs**. (http://www.dec.ny.gov/regulations/2652.html). For industrial operations characterized by use of batch discharge, consideration shall be given to the feasibility of a schedule of discharge during conditions of no CSO. For industrial discharges characterized by continuous discharge, consideration must be given to the collection system capacity to maximize delivery of waste to the treatment plant. Non-contact cooling water should be excluded from the combined system to the maximum extent practicable. Direct discharges of cooling water must apply for a SPDES permit. To the maximum extent practicable, consideration shall be given to maximize the capture of non-domestic waste containing toxic pollutants and this wastewater should be given priority over residential/commercial service areas for capture and treatment by the POTW.

4. Maximize Flow to POTW - Factors cited in Item 2. above shall also be considered in maximizing flow to the POTW. Maximum delivery to the POTW is particularly critical in treatment of "first-flush" flows. The treatment plant shall be capable of receiving and treating: the peak design hydraulic loading rates for all process units; i.e., a minimum of 450MGD through the plant headworks; and a minimum of 300 MGD through the secondary treatment works during wet weather in accordance with the existing Wet Weather Operating Plan. The collection system and headworks must be capable of delivering these flows during wet weather. If the permittee cannot deliver maximum design flow for treatment, the permittee shall submit a plan and schedule for accomplishing this requirement within 12 months after the effective date of this permit.

5. Wet Weather Operating Plan - The permittee shall maximize treatment during wet weather events. This shall be accomplished by having a wet weather operating plan containing procedures so as to operate unit processes to treat maximum flows while not appreciably diminishing effluent quality or destabilizing treatment upon return to dry weather operation. The BSA must continue to implement the wet weather operations plan

   The submission of a wet weather operating plan is a one time requirement that shall be done to the Department's satisfaction once. However, a revised wet weather operating plan must be submitted whenever the POTW and/or sewer collection system is significantly replaced or modified in a manner that impacts flows at Bird Island WWTP. When this permit is administratively renewed by NYSDEC letter entitled "SPDES NOTICE/RENEWAL APPLICATION/PERMIT", the permittee is not required to repeat the submission. The above due dates are independent from the effective date of the permit stated in the letter of "SPDES NOTICE/RENEWAL APPLICATION/PERMIT".

6. Prohibition of Dry Weather Overflow - Dry weather overflows from the combined sewer system are prohibited. The occurrence of any dry weather overflow shall be promptly abated and reported to the NYSDEC Region 9 Office within 24 hours. A written report shall also be submitted within fourteen (14) days of the time the permittee becomes aware of the occurrence. The occurrence of any dry weather overflow shall be promptly abated and reported to the NYSDEC Regional Office in accordance with 6 NYCRR Part 750-2.7.

7. Control of Floatable and Settleable Solids - The discharge of floating solids, oil and grease, or solids of sewage origin which cause deposition in the receiving waters, is a violation of the NYS Narrative Water Quality Standards contained in Part 703. As such, the permittee shall implement best management practices in order to eliminate or minimize the discharge of these substances. All of the measures cited in Items 1, 2, 4 & 5 above shall constitute approvable "BMPs" for mitigation of this problem. If aesthetic problems persist, the permittee should consider additional BMP's including but not limited to: street sweeping, litter control laws, installation of floatables traps in catch basins (such as hoods), booming and skimming of CSOs, and disposable netting on CSO outfalls. In cases of severe or excessive floatables generation, booming and skimming should be considered an interim measure prior to implementation of final control measures. Public education on harmful disposal practices of personal hygienic devices may also be necessary including but not limited to: public broadcast television, printed information inserts in sewer bills, or public health curricula in local schools.

8. Combined Sewer System Replacement - Replacement of combined sewers shall not be designed or constructed unless approved by NYSDEC. When replacement of a combined sewer is necessary it shall be replaced by separate sanitary and storm sewers to the greatest extent possible. These separate sanitary and storm sewers shall be designed and constructed simultaneously but without interconnections to maximum extent practicable. When combined sewers are replaced, the design should contain cross sections which provide sewage velocities which prevent deposition of organic solids during low flow conditions.

9. Combined Sewer/Extension - Combined sewer/extension, when allowed should be accomplished using separate sewers. These sanitary and storm sewer extensions shall be designed and constructed simultaneously but without interconnections. No new source of storm water shall be connected to any separate sanitary sewer in the collection system.

   If separate sewers are to be extended from combined sewers, the permittee shall demonstrate the ability of the sewerage system to convey, and the treatment plant to adequately treat, the increased dry-weather flows. Upon a determination by the Regional Water Engineer an assessment shall be made by the permittee of the effects of the increased flow of sanitary sewage or industrial waste on the strength of CSOs and their frequency of occurrence including the impacts upon best usage of the receiving water. This assessment should use techniques such as collection system and water quality modeling contained in the 1999 Water Environment Federation Manual of Practice FD-17 entitled, Prevention and Control of Sewer System Overflows, 2nd edition.

10. Sewage Backups - If, there are documented, recurrent instances of sewage backing up into house(s) or discharges of raw sewage onto the ground surface from surcharging manholes, the permittee shall, upon letter notification from DEC, prohibit further connections that would make the surcharging/back-up problems worse.

11. Septage and Hauled Waste - The discharge or release of septage or hauled waste upstream of a CSO is prohibited.

12. Control of Run-off - It is recommended that the impacts of run-off from development and re-development in areas served by combined sewers be reduced by requiring compliance with the New York Standards for Erosion and Sediment Control and the quantity control requirements included in the New York State Stormwater Management Design Manual. (http://www.dec.ny.gov/chemical/8694.html).

13. Public Notification - The permittee shall continue to maintain identification signs at all CSO outfalls owned and operated by the permittee. The permittee shall place the signs at or near the CSO outfalls and ensure that the signs are easily readable by the public. The signs shall have **minimum** dimensions of eighteen inches by twenty four inches (18" x 24") and shall have white letters on a green background and contain the following information:

N.Y.S. PERMITTED DISCHARGE POINT
(wet weather discharge)
SPDES PERMIT No.: NY_____

OUTFALL No. :____

For information about this permitted discharge contact:

Permittee Name:

Permittee Contact:

Permittee Phone: ( ) - ### - ####

OR:

The permittee shall implement a public notification program to inform citizens of the location and occurrence of CSO events in accordance with the proposed Consent Order Decree.

14. Characterization and Monitoring - The permittee shall characterize the combined sewer system, determine the frequency of overflows, and identify CSO impacts in accordance with Combined Sewer Overflows, Guidance for Nine Minimum Controls, EPA, 1995, Chapter 10. These are minimum requirements, more extensive characterization and monitoring efforts which may be required as part of the Long Term Control Plan.

15. Annual Report - The permittee shall submit an annual report summarizing implementation of the above best management practices (BMPs). The report shall list existing documentation of implementation of the BMPs and shall be submitted by January 31st of each year to the Regional office listed on the Recording, Reporting and Additional Monitoring page of this permit and to the Bureau of Water Permits, 625 Broadway, Albany, NY 12233-3505. Examples of recommended documentation of the BMPs are found in Combined Sewer Overflows, Guidance for Nine Minimum Controls (NMC), EPA, 1995. The permittee may obtain an electronic copy of the NMC guidance at http://www.epa.gov/npdes/pubs/owm0030.pdf. For guidance on developing the annual report, a BMP checklist is available from DEC on-line at http://www.dec.ny.gov/docs/water_pdf/csobmp.pdf. The permittee must submit a completed copy of this checklist along with the annual report. The actual documentation shall be stored at a central location and be made available to DEC upon request.

VIII. CSO LONG-TERM CONTROL PLAN

The BSA CSO Long Term Control Plan (LTCP) was approved on March 18, 2014. BSA is required to implement the approved CSO LTCP.

The EPA issued an Amended Administrative Order (CWA-02-2014-3033) which addresses implementation of the LTCP. BSA shall implement the approved CSO LTCP in accordance with the EPA Order (CWA-02-2014-3033), and any subsequent amended/modified Administrative Orders.

This permit may be reopened for modification to include any additional requirements in accordance with 6 NYCRR Part 621.

IX. STORM WATER POLLUTANT PREVENTION PLAN FOR POTWs WITH STORMWATER OUTFALLS

1. General - The Department has determined that stormwater discharges from POTWs with design flows at or above one MGD shall be covered under the SPDES permit. If the permittee has already submitted a Notice of Intent to the Department for coverage under the General Storm Water permit, the permittee shall submit a Notice of Termination to the Department upon receipt of this final SPDES permit containing the requirement to develop a SWPPP.

The permittee is required to develop, maintain, and implement a Storm Water Pollutant Prevention Plan (SWPPP) to prevent releases of significant amounts of pollutants to the waters of the State through plant site runoff; spillage and leaks; sludge or waste disposal; and other stormwater discharges including, but not limited to, drainage from raw material storage.

The SWPPP shall be documented in narrative form and shall include the 13 minimum elements below and plot plans, drawings, or maps necessary to clearly delineate the direction of stormwater flow and identify the conveyance, such as ditch, swale, storm sewer or sheet flow, and receiving water body. Other documents already prepared for the facility such as a Safety Manual or a Spill Prevention, Control and Countermeasure (SPCC) plan may be used as part of the SWPPP and may be incorporated by reference. A copy of the current SWPPP shall be submitted to the Department as required in item (2.) below and a copy must be maintained at the facility and shall be available to authorized Department representatives upon request.

2. Compliance Deadlines – The BSA shall revise the February 2008 SWPPP developed under the General Permit. The revised plan shall be submitted by **07/01/2010** to the Regional Water Engineer. The SWPPP shall be implemented within 6 months of submission, unless a different time frame is approved by the Department. The SWPPP shall be reviewed annually and shall be modified whenever: (a) changes at the facility materially increase the potential for releases of pollutants; (b) actual releases indicate the SWPPP is inadequate, or (c) a letter from the Department identifies inadequacies in the SWPPP. The permittee shall certify in writing, as an attachment to the December Discharge Monitoring Report (DMR), that the annual review has been completed. All SWPPP revisions (with the exception of minimum elements - see item (4.B.) below) must be submitted to the Regional Water Engineer within 30 days. Note that the permittee is not required to obtain Department approval of the SWPPP (or of any minimum elements) unless notified otherwise. Subsequent modifications to or renewal of this permit does not reset or revise these deadlines unless a new deadline is set explicitly by such permit modification or renewal.

3. Facility Review - The permittee shall review all facility components or systems (including but not limited to material storage areas; in-plant transfer, process, and material handling areas; loading and unloading operations; storm water, erosion, and sediment control measures; process emergency control systems; and sludge and waste disposal areas) where materials or pollutants are used, manufactured, stored or handled to evaluate the potential for the release of pollutants to the waters of the State. In performing such an evaluation, the permittee shall consider such factors as the probability of equipment failure or improper operation, cross-contamination of storm water by process materials, settlement of facility air emissions, the effects of natural phenomena such as freezing temperatures and precipitation, fires, and the facility's history of spills and leaks. The relative toxicity of the pollutant shall be considered in determining the significance of potential releases.

The review shall address all substances present at the facility that are identified in Tables 6-10 of SPDES application Form NY-2C (available at *http://www.dec.state.ny.us/website/dcs/permits/olpermits/form2c.pdf*) as well as those that are required to be monitored by the SPDES permit.

4. A. 13 Minimum elements - Whenever the potential for a release of pollutants to State waters is determined to be present, the permittee shall identify Best Management Practices (BMPs) that have been established to prevent or minimize such potential releases. Where BMPs are inadequate or absent, appropriate BMPs shall be established. In selecting appropriate BMPs, the permittee shall consider good industry practices and, where appropriate, structural measures such as secondary containment and erosion/sediment control devices and practices. USEPA guidance for development of minimum elements of the SWPPP and BMPs is available in the September 1992 manual *Storm Water Management for Industrial Activities,* EPA 832-R-92-006 (available on-line at http://nepis.epa.gov/pubtitleOW.htm). At a minimum, the plan shall include the following elements:

1. Pollution Prevention Team
2. Reporting of BMP Incidents
3. Risk Identification & Assessment
4. Employee Training
5. Inspections and Records
6. Security
7. Preventive Maintenance
8. Good Housekeeping
9. Materials/Waste Handling, Storage, & Compatibility
10. Spill Prevention & Response
11. Erosion & Sediment Control
12. Management of Runoff
13. Street Sweeping

Note that for some facilities, especially those with few employees, some of the above may not be applicable. It is acceptable in these

cases to indicate "Not Applicable" for the portion(s) of the SWPPP that do not apply to your facility, along with an explanation, for instance if street sweeping did not apply because no streets exist at the facility.

B. Stormwater Pollution Prevention Plans (SWPPPs) Required for Discharges of Stormwater From Construction Activity to Surface Waters - As part of the erosion of and sediment control element, a SWPPP shall be developed prior to the initiation of any site disturbance of one acre or more of uncontaminated area. Uncontaminated area means soils or groundwater which are free of contamination by any toxic or non-conventional pollutants identified in Tables 6-10 of SPDES application Form NY-2C. Disturbance of any size contaminated area(s) and the resulting discharge of contaminated stormwater is not authorized by this permit unless the discharge is under State or Federal oversight as part of a remedial program or after review by the Regional Water Engineer; nor is such discharge authorized by any SPDES general permit for stormwater discharges. SWPPPs are not required for discharges of stormwater from construction activity to groundwaters.

The SWPPP shall conform to the *New York Standards and Specifications for Erosion and Sediment Control* and *New York State Stormwater Management Design Manual,* unless a variance has been obtained from the Regional Water Engineer, and to any local requirements. The permittee shall submit a copy of the SWPPP and any amendments thereto to the local governing body and any other authorized agency having jurisdiction or regulatory control over the construction activity at least 30 days prior to soil disturbance. The SWPPP shall also be submitted to the Regional Water Engineer if contamination, as defined above, is involved and the permittee must obtain a determination of any SPDES permit modifications and/or additional treatment which may be required prior to soil disturbance. Otherwise, the SWPPP shall be submitted to the Department only upon request. When a SWPPP is required, a properly completed *Notice of Intent* (NOI) form shall be submitted (available at *www.dec.state.ny.us/website/dow/toolbox/swforms.html*) prior to soil disturbance. Note that submission of a NOI is required for informational purposes; the permittee is not eligible for and will not obtain coverage under any SPDES general permit for stormwater discharges, nor are any additional permit fees incurred. SWPPPs must be developed and submitted for subsequent site disturbances in accordance with the above requirements. The permittee is responsible for ensuring that the provisions of each SWPPP is properly implemented.

Note:
If the permittee is covered under the MS4 permit, the permittee may substitute this to satisfy some of the conditions in this SWPPP.

X. DISCHARGE NOTIFICATION REQUIREMENTS

Sign Maintenance

The permittee shall periodically inspect the outfall identification sign(s) in order to ensure they are maintained, are still visible, and contain information that is current and factually correct. Signs that are damaged or incorrect shall be replaced within 3 months of inspection.

Data Retention

The permittee shall retain records for a minimum period of 5 years in accordance with 6NYCRR Part 750-1.12(b)(2) and Part 750-2.5(c)(1). These records, which include discharge monitoring reports (DMRs) and annual reports, must be retained at a repository accessible to the public. This repository shall be open to the public, at a minimum, during normal daytime business hours. The repository may be the business office, wastewater treatment plant, village, town, city, or county clerk's office, the local library, or other location approved by the Department.

XI. SCHEDULE OF COMPLIANCE

Short-term Hi-Intensity Sampling

Action Code	Outfall Number(s)	Compliance Action	Due Date
	001	The permittee shall conduct sampling for the following parameters detected in the WWTP effluent and listed in the permit application. Sampling shall be once per event for a minimum of **10 events.** The permittee submit the results of the analyses along with the daily flow:	06/01/2010

Parameters	EPA Method of Analysis Required	Sample Type
Arsenic, Total	200.7	24 hr. Comp.
Cadmium, Total	200.7	24 hr. Comp.
Chromium, Total	200.7	24 hr. Comp.
Copper, Total	200.7	24 hr. Comp.
Cyanide, Total	200.7	24 hr. Comp.
Lead, Total	200.7	24 hr. Comp.
Nickel, Total	200.7	24 hr. Comp.
Zinc, Total	200.7	24 hr. Comp.

The above compliance actions are one time requirements. The permittee shall comply with the above compliance actions to the Department's satisfaction once. When this permit is administratively renewed by NYSDEC letter entitled "SPDES NOTICE/RENEWAL APPLICATION/PERMIT", the permittee is not required to repeat the submission. The above due dates are independent from the effective date of the permit stated in the letter of "SPDES NOTICE/RENEWAL APPLICATION/PERMIT."

a) The permittee shall submit a written notice of compliance or non-compliance with each of the above schedule dates no later than 14 days following each elapsed date, unless conditions require more immediate notice in accordance with 6NYCRR Part 750-2.7. All such compliance or non-compliance notification shall be sent to the locations listed under the section of this permit entitled RECORDING, REPORTING AND ADDITIONAL MONITORING REQUIREMENTS. Each notice of non-compliance shall include the following information:

1. A short description of the non-compliance;
2. A description of any actions taken or proposed by the permittee to comply with the elapsed schedule requirements without further delay and to limit environmental impact associated with the non-compliance;
3. A description or any factors which tend to explain or mitigate the non-compliance; and
4. An estimate of the date the permittee will comply with the elapsed schedule requirement and an assessment of the probability that the permittee will meet the next scheduled requirement on time.

b) The permittee shall submit copies of any document required by the above schedule of compliance to NYSDEC Regional Water Engineer **and to the Bureau of Water Permits, 625 Broadway, Albany, N.Y. 12233-3505**, unless otherwise specified in this permit or in writing by the Department.

XII. MERCURY MINIMIZATION PROGRAM

1. **General** – Within 12 months of the effective date of this permit (**by 01/01/2011**), the permittee shall develop and immediately implement, and maintain a Mercury Minimization Program (MMP). The MMP is required because the 50 ng/L permit limit exceeds the state-wide calculated water quality based effluent limit (WQBEL) of 0.70 nanograms/liter (ng/L) for Total Mercury. The goal of the MMP will be to reduce mercury effluent levels in pursuit of the calculated WQBEL.

2. **MMP Elements** - The MMP shall be documented in narrative form and shall include any necessary drawings or maps. Other related documents already prepared for the facility may be used as part of the MMP and may be incorporated by reference. As a minimum, the MMP shall include an on-going program consisting of: periodic monitoring designed to quantify and, over time, track the reduction of mercury; an acceptable control strategy for reducing mercury discharges via cost-effective measures, which may include more stringent control of tributary waste streams; and submission of annual status reports.

A. Monitoring - All permit-related mercury monitoring shall be performed using EPA Method 1631 and shall be coordinated so that the results can be compared. All samples shall be grabs and use of EPA Method 1669 during sample collection is recommended. Minimum required monitoring is as follows:

i. Sewage Treatment Plant Influent & Effluent, and Type II SSO* Outfalls - Samples at each of these locations must be collected in accordance with the minimum frequency specified on the mercury permit limits page.

ii. Key Locations in the Collection System and Potential Significant Mercury Sources - The minimum monitoring frequency at these locations shall be semi-annual. Monitoring of properly treated dental facility discharges is not required.

iii. Hauled Wastes - Hauled wastes which may contain significant mercury levels must be periodically tested prior to acceptance to ensure compliance with pretreatment/local limits requirements.

iv. Additional monitoring must be completed as may be required elsewhere in this permit or upon Department request.

B. Control Strategy - An acceptable control strategy is required for reducing mercury discharges via cost-effective measures, including but not limited to more stringent control of industrial users and hauled wastes. The control strategy will become enforceable under this permit and shall contain the following minimum elements:

i. Pretreatment/Local Limits - The permittee shall evaluate and revise current requirements in pursuit of the water quality goal.

ii. Periodic Inspection - The permittee must inspect users as necessary to support the MMP. Each dental facility shall be inspected at least once every five years to verify compliance with the wastewater treatment and notification elements of 6NYCRR Part 374.4. Other mercury sources shall also be inspected once every five years. Alternatively, the permittee may develop an outreach program which informs these users of their responsibilities once every five years and is supported by a subset of site inspections. Monitoring shall be performed as required above.

iii. Systems with CSO & Type II SSO* Outfalls - Priority shall be given to controlling mercury sources upstream of CSOs and Type II SSOs through mercury reduction activities and/or controlled-release discharge. Effective control is necessary to avoid the need for the Department to establish mercury permit limits at these outfalls.

iv. A file shall be maintained containing all MMP documentation, including the dental forms required by 6NYCRR Part 374.4, which shall be available for review by DEC representatives.

C. Annual Status Report - An annual status report shall be submitted to the Regional Water Engineer and to the Bureau of Water Permits summarizing: (a) all MMP monitoring results for the previous year; (b) a list of known and potential mercury sources; (c) all action undertaken pursuant to the strategy during the previous year, (d) actions planned for the upcoming year, and (e) progress toward the goal. The first annual status report is due **01/01/2011** and follow-up reports are due annually thereafter. Note that the complete MMP documentation need not be submitted to the Department unless otherwise requested.

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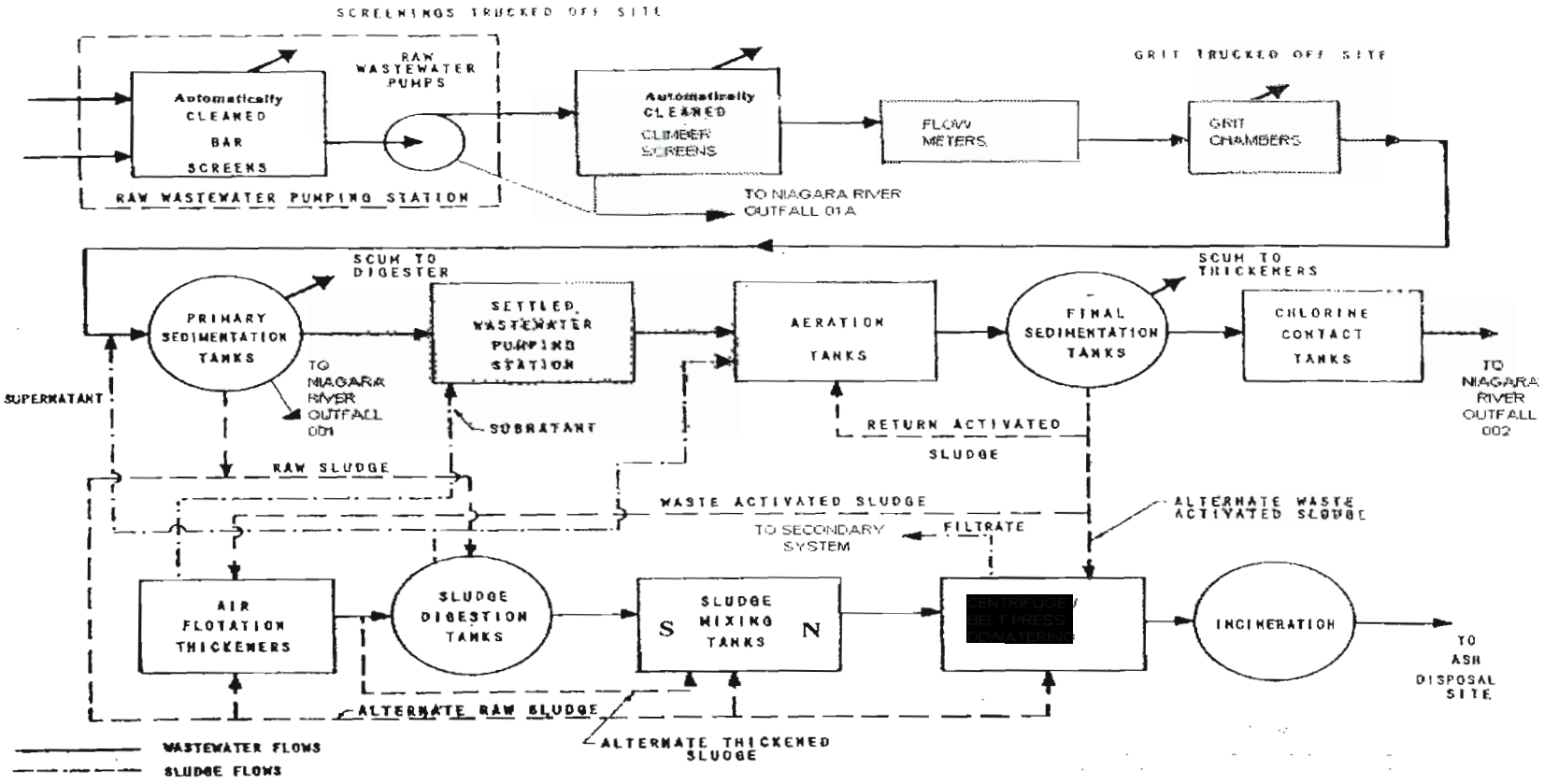
* Overflow Retention Facilities (ORF) or Peak Excess Flow Treatment Facilities (PEFTF). ORFs were designed, approved and constructed under an SSO abatement program. ORFs capture most sewer system flow surges and return them to the POTW for treatment. Under certain exceptionally high flow conditions, excess flow may be discharged.

3. **MMP Modification** - The MMP shall be modified whenever: (a)changes at the facility or within the collection system increase the potential for mercury discharges; (b) actual discharges exceed 50 ng/L; (c) a letter from the Department identifies inadequacies in the MMP; or, (d) pursuant to a permit modification.

MONITORING LOCATIONS

The permittee shall take samples and measurements, to comply with the monitoring requirements specified in this permit, at the location(s) specified below:



RECORDING, REPORTING AND ADDITIONAL MONITORING REQUIREMENTS

a) The permittee shall also refer to 6NYCRR Part 750 for additional information concerning monitoring and reporting requirements and conditions.

b) The monitoring information required by this permit shall be summarized, signed and retained for a period of three years from the date of the sampling for subsequent inspection by the Department or its designated agent. **Also, monitoring information required by this permit shall be summarized and reported by submitting;**

[X] (if box is checked) completed and signed Discharge Monitoring Report (DMR) forms for each __1__ month reporting period to the locations specified below. Blank forms are available at the Department's Albany office listed below. The first reporting period begins on the effective date of this permit and the reports will be due no later than the 28th day of the month following the end of each reporting period.

[ ] (if box is checked) an annual report to the Regional Water Engineer at the address specified below. The annual report is due by February 1 and must summarize information for January to December of the previous year in a format acceptable to the Department.

[X] (if box is checked) a monthly "Wastewater Facility Operation Report..." (form 92-15-7) to the:
[X] Regional Water Engineer and/or [ ] County Health Department or Environmental Control Agency specified below

Send the **original** (top sheet) of each DMR page to:

Department of Environmental Conservation
Division of Water
Bureau of Watershed Compliance Programs
625 Broadway
Albany, New York 12233-3506

Phone: (518) 402-8177

Send the **first copy** (second sheet) of each DMR page to:

Department of Environmental Conservation
Regional Water Engineer, Region 9
270 Michigan Avenue
Buffalo, New York 14203-2999

Phone: 716-851-7070

Send an **additional copy** of each DMR page to:

c) Noncompliance with the provisions of this permit shall be reported to the Department as prescribed in 6NYCRR Part 750.

d) Monitoring must be conducted according to test procedures approved under 40 CFR Part 136, unless other test procedures have been specified in this permit.

e) If the permittee monitors any pollutant more frequently than required by the permit, using test procedures approved under 40 CFR Part 136 or as specified in this permit, the results of this monitoring shall be included in the calculations and recording of the data on the Discharge Monitoring Reports.

f) Calculation for all limitations which require averaging of measurements shall utilize an arithmetic mean unless otherwise specified in this permit.

g) Unless otherwise specified, all information recorded on the Discharge Monitoring Report shall be based upon measurements and sampling carried out during the most recently completed reporting period.

h) Any laboratory test or sample analysis required by this permit for which the State Commissioner of Health issues certificates of approval pursuant to section five hundred two of the Public Health Law shall be conducted by a laboratory which has been issued a certificate of approval. Inquiries regarding laboratory certification should be sent to the Environmental Laboratory Accreditation Program, New York State Health Department Center for Laboratories and Research, Division of Environmental Sciences, The Nelson A. Rockefeller Empire State Plaza, Albany, New York 12201.

Appendix F:
Buffalo Sewer Authority Financial Summary

1. Buffalo Sewer Authority Budget for 2021 and 2022
2. Bond Issues

1. Buffalo Sewer Authority Budget for 2023 and 2024

	2023 (Actual)	2024 (Budgeted)
Operating Revenues		
Assessed sewer rents	12,106,289	19,852,600
Metered water use sewer rents	24,098,749	22,560,000
Flat rate water use sewer rents	1,946,244	1,900,000
Industrial Waste	5,133,775	3,525,000
Outside district connections	12,665,958	13,750,000
Miscellaneous revenues	1,283,502	1,691,400
Total Operating Revenues	57,234,517	66,279,000
Nonoperating Revenues		
Interest on Cash and Investments	3,785,393	2,760,000
Interest on delinquent sewer rents	1,169,461	711,000
Federal Aid	-	3,000,000
Debt Service	-	-
Total Revenues	62,189,371	69,750,000
(8) Operating Expenditures		
Salaries and wages	14,372,470	16,355,615
Other employee benefits	10,092,292	12,628,548
Professional services contracts	8,197,495	10,871,701
Supplies and materials	11,741,334	13,685,939
Other operating expenditures	1,492,863	3,112,301
Total Operating Expenditures	50,027,367	62,305,994
Net Revenues Available for Debt Service	12,162,004	7,444,006
Nonoperating Expenditures		
Series J	419,407	417,781
Series K	289,876	281,725
Series L	530,196	521,963
Series M	499,560	494,093
Series N	1,615,284	1,599,340
Series O	215,298	218,948
2023 EIB		4,500,000
Total Debt Service	6,236,309	6,203,338
20% Debt Service Reserve	1,247,262	1,240,668
Capital Projects	5,300,619	15,170,400
Total Expenditures	**55,327,986**	**77,476,394**

2. Buffalo Sewer Authority Bond Issues

Series	Date Issued	Amount	Purpose of Funding
First Series	9/1/1975	$35,000,000 Paid with proceeds of Series A Bonds	1)Secondary Wastewater Treatment Facilities 2)Kelly Island Sewer Lines 3)Improvements to Storm Water Drainage Facilities
Series A	7/1/1977	$57,025,000 Paid with proceeds of Series G Bonds	1)Payment of Prior Lien Bonds 2)Payment of First Series Bonds 3)Secondary Wastewater Treatment Facilities 4)Scajaquada Interceptor 5)Kelly Island Sanitary Sewer 6)Miscellaneous Sewer System capital improvements 7)Sewer System Overflow Study
Special Obligation Sewer System Bonds	7/1/1977	$9,465,000	1)Secondary Wastewater Treatment Facilities 2)Scajaquada Interceptor 3)Kelly Island Sanitary Sewer 4)Miscellaneous Sewer System capital improvements 5)Sewer System Overflow Study
Series B	6/1/1983	$14,880,000 Paid with proceeds of Series C Bonds	Payment of Series 1982 Notes which provided money for: 1)Light Rail Transit Program 2)Sewer System Rehab Program of 1983 (Sloan Drain) 3)Pumping Station Rehab. Programs 4)Hollywood Ave. Program 5)Porter Ave. Sanitary Sewer 6)Backwater Intrusion Gates 7) Miscellaneous Programs
Series C	12/1/1985	$17,010,000 Paid with proceeds of Series F Bonds	Refunding Series B

Series	Date Issued	Amount	Purpose of Funding
Series D	6/15/1986	$26,275,000 Paid with proceeds of Series G Bonds	Swan Trunk Sewer Cleaning Payment of Series 1985 Notes which provided money for: 1)Sewer System Rehab Program of 1983 (Sloan Drain) 2)Pumping Station Rehab. Programs 3)Pennsylvania Street Sewer 4)Backwater Intrusion Gates 5)South Buffalo Storm Drain Project Payment of Series 1986 Notes which provided money for: 1)Secondary Treatment Plant 2)Scajaquada Tunnel Interceptor 3)Kelly Island Sewerage Facilities 4)Combined Sewer Overflow Study 5) Miscellaneous Programs
Series E	6/1/1987	$10,145,000 Paid with proceeds of Series G Bonds	1)Sewer System Rehab. Program of 1983 (Sloan Drain) 2)CSO Study-Phase II 3)South Buffalo Sewer Project 4)Sludge Pump Station and Primary Clarifier Rehabilitation 5)Replacement of Vacuum Filters with Filter Belt Presses 6)Pennsylvania Street Sewer-Lakeview Housing Section
Series F	7/1/1991	$16,927,539.55 Final Payment 7/1/2013	Refunding Series C
Series G	5/1/1993	$83,000,000 Paid with proceeds of Series I Bonds	Refunding Series A, Series D, Series E
Series H NYSEFC 2003A	3/13/2003	$28,255,932 Paid with proceeds of Series N Bonds	1)Grit Collection System 2)Plant Transformer Replacement
Series I	9/10/2003	$48,375,000 Final Payment 7/1/2012	Refunding Series G

Series	Date Issued	Amount	Purpose of Funding
Series J NYSEFC 2004B Refinanced NYSEFC 2014B Wilmington Trust Acct #1004209	3/4/2004 6/5/2014	$7,740,611 $5,353,126	1)Tonawanda St. Storm Sewer Improvements 2)RAS/WAS Pump Replacement 3)Hertel Ave. Storm Sewer Improvements 4)Primary Clarifier Scum System
Series K NYSEFC 2004D Refinanced NYSEFC 2014B Wilmington Trust Acct # 1004925	7/22/2004 6/4/2014	$4,986,541 $3,614,143	Primary Digester Cleaning, Inspection, and Repair Project
Series L NYSEFC 2006C Refinanced NYSEFC 2015D	7/13/2006 8/20/2015	$9,526,664 $7,094,679	Primary Digester Cleaning, Inspection, and Repair Project
Series M NYSEFC 2014B	7/2/2014	$8,549,319	Hamburg Drain Facility
Series N NYSEFC 2012E	10/18/2012	$21,671,564	Refunding Series H
Series O NYSEFC 2021A	2/28/2021	$7,936,830	CSO-26 Sewer Separation Willet Park Green Infrastructure
2021 Environmental Impact Bond	6/16/2021	$49,160,000	City-Wide Green Infrastructure

Debt limit increased from $75,000,000 to $125,000,000 by bill No. 2448, chapter 19 of the laws of 1975 under date of 3/12/1975.

Debt limit increased from $125,000,000 to $250,000,000 by bill No. S7837, chapter 19 of the laws of 2018 under date of 3/1/2018.

Appendix G:
Opinion of Probable Construction Cost

1. West at Breckenridge and Lafayette OPCC
2. Herkimer at Breckenridge and Lafayette OPCC

PROJECT ESTIMATE SUMMARY SHEET

Phase Report: Feasibility Phase **Date:** June 8, 2023 **Proj. No.:** SCC P220214

Owner / Agency: Buffalo Sewer Authority **Title:** BSA Term Agreement - Task for Breckenridge Alternatives

Project Address: Breckenridge St. at Niagara St. ALT. **Location / Identification:** **Breckenridge Alternative** WEST AVE. OPTION

Cost Consultant: Singleton Construction Consultants **Start Construction Date:** June 1, 2024

Project Area, LF: 2311 LF of affected Sewer Main **End Construction Date:** June 1, 2026

DIV. NO.	DIVISION TITLE		TOTAL COST
02	EXISTING CONDITIONS		$ 235,222
31	EARTHWORK		$ 6,118,723
32	EXTERIOR IMPROVEMENTS		$ 777,465
33	UTILITIES		$ 1,923,798
	SUBTOTAL SITE ESTIMATE		***$ 9,055,207***
GENERAL CONDITIONS		10.00%	$ 905,521
OVERHEAD AND PROFIT		10.00%	$ 996,073
CONTINGENCIES (Design 15%, Bid 5%, Construction 25%)		45.00%	$ 4,930,560
SOFT COSTS		18.00%	$ 2,859,725
LOCAL COUNSEL			$ 20,845
BOND COUNSEL			$ 26,057
FISCAL SERVICES			$ 31,268
SPECIAL CONSIDERATIONS / ESCALATION		8.20%	$ 1,543,671
	TOTAL SITE ESTIMATE		***$ 20,368,928***

Description	Qty.	Unit	Unit Price	Mat'l.	Unit Price	Labor	Total
DIVISION 02 - EXISTING CONDITIONS							
Permits/notification/coordination allowance	1	LS	716.87	716.87	814.73	814.73	$1,531.60
MPOT, barricades, fences, etc: see Div 31/32	0	EA	0.00	0.00	0.00	0.00	$0.00
Manhole cover loosening/removal, no torch	5	EA	0.00	0.00	725.53	3,627.64	$3,627.64
Abatement: radiological screen of excav. material	1	EA	2856.62	2,856.62	20539.88	20,539.88	$23,396.50
Abatement: other - N/A	0	EA	0.00	0.00	0.00	0.00	$0.00
Temp. diversion of wastewater flow (bypass) minor	9	DAY	5819.04	52,371.37	2116.01	19,044.13	$71,415.50
Temp. diversion: road closure	1	LS	2582.13	2,582.13	7847.65	7,847.65	$10,429.78
Demolition: see Div 31	0	EA	0.00	0.00	0.00	0.00	$0.00
Flow test, after improvements (simple)	2	EA	245.56	491.13	868.20	1,736.40	$2,227.53
Restore full wastewater flow, after tests	2	EA	0.00	0.00	294.35	588.70	$588.70
As-built record drawings & images	1	EA	452.70	452.70	6593.52	6,593.52	$7,046.22
Breckenridge Sewer Replacement							
Permits/notification/coordination allowance	1	LS	716.87	716.87	814.73	814.73	$1,531.60
MPOT, barricades, fences, etc: see Div 31/32	0	EA	0.00	0.00	0.00	0.00	$0.00
Manhole cover loosening/removal, no torch	5	EA	0.00	0.00	725.53	3,627.64	$3,627.64
Abatement: radiological screening of excav. mat'l.	1	EA	3174.02	3,174.02	22822.09	22,822.09	$25,996.11
Abatement: other - N/A	0	EA	0.00	0.00	0.00	0.00	$0.00
Temp. diversion, wastewater flow (bypass) minor	10	DAY	5819.04	58,190.41	2116.01	21,160.15	$79,350.56
Temp. diversion: road closure: N/A	0	EA	0.00	0.00	0.00	0.00	$0.00
Demolition: see Div 31	0	EA	0.00	0.00	0.00	0.00	$0.00
Flow test, after improvements (simple)	2	EA	245.56	491.13	868.20	1,736.40	$2,227.53
Restore full wastewater flow, after tests	2	EA	0.00	0.00	294.35	588.70	$588.70
As-built record drawings & images	1	EA	252.70	252.70	1383.52	1,383.52	$1,636.22
02 EXIST. CONDITIONS TOTAL				**$122,296**		**$112,926**	**$235,222**
DIVISION 31 - EARTHWORK							
Temp. fence/gate (work zone, w/ staging area)	2,402	LF	17.42	41,839.82	7.69	18,479.83	$60,319.65
Jersey barricade crash barrier (owned), moved	8	EA	0.00	0.00	370.30	2,962.42	$2,962.42
Temp. diversion of wastewater - see Div 2	0	EA	0.00	0.00	0.00	0.00	$0.00
Dewatering (deep pit conditions, & in rock)	1	LS	5457.93	5,457.93	70754.44	70,754.44	$76,212.37
Inlet protection (for dewatering)	12	EA	42.30	507.59	50.06	600.78	$1,108.37
Lawn removal	1	LS	0.00	0.00	907.87	907.87	$907.87
Sidewalk/concrete removal	1	LS	459.05	459.05	913.69	913.69	$1,372.74
Sawcut asphalt, or concrete	2,307	LF	0.70	1,614.86	3.37	7,780.94	$9,395.81
Remove asphalt paving (HD, street), West Av.	57,500	SF	0.75	42,860.94	1.45	83,375.00	$126,235.94
Utility crossings, & sewer/ duct bank protection	1	LS	24941.00	24,941.00	52941.00	52,941.00	$77,882.00
Excavation and trench boxes (in dirt or fill)	10,005	CY	0.00	0.00	20.91	209,206.16	$209,206.16
Excavation haul & disposal (dirt or fill)	10,005	CY	0.00	0.00	52.56	525,862.80	$525,862.80
Excavation: rock fracturing, West Av.	6,901	CY	0.00	0.00	88.91	613,569.02	$613,569.02
Excavation: rock removal & carting, West Av.	6,901	CY	0.00	0.00	57.68	398,049.68	$398,049.68
Compacted fill at trench, West Av.	16,906	CY	26.36	445,642.16	16.76	283,344.56	$728,986.72
Remove sewer pipe, West Av.: excluded	0	EA	0.00	0.00	0.00	0.00	$0.00
West Av. Deep Drop Manhole Structure - including Truck Platforms & Truck Ramps							
Excavation support, West Av. dMH	1	LS	321672.78	321,672.78	160836.39	160,836.39	$482,509.16
Excavation support: add for Safety Plan/Meetings	1	LS	19064.51	19,064.51	39532.25	39,532.25	$58,596.76
Excavation support: add for Safety Inspector time	1	LS	0.00	0.00	20049.48	20,049.48	$20,049.48
Excavation support: stamped Erection Drawings	1	LS	0.00	0.00	3797.25	3,797.25	$3,797.25
Excavation: rock fracturing, West Av. dMH	10,352	CY	0.00	0.00	88.91	920,353.53	$920,353.53
Excavation: rock removal/cart, West Av. dMH	10,352	CY	0.00	0.00	57.68	597,074.52	$597,074.52
Temporary paving on rock ramp & platform	2,760	SF	3.97	10,966.69	2.34	6,459.17	$17,425.85
Compacted fill at ramp/platform (West Av. dMH)	10,352	CY	26.36	272,865.54	16.76	173,491.14	$446,356.68
Breckenridge Sewer Replacement							
Temp. fence/gate (work zone, w/ staging area)	2,402	LF	17.42	41,839.82	7.69	18,479.83	$60,319.65
Jersey barricade crash barrier (owned), moved	30	EA	0.00	0.00	370.30	11,109.08	$11,109.08
Temp. diversion of wastewater - see Div 2	0	EA	0.00	0.00	0.00	0.00	$0.00
Dewatering (in rock)	1	LS	2274.14	2,274.14	29481.02	29,481.02	$31,755.15
Inlet protection (for dewatering)	12	EA	42.30	507.59	50.06	600.78	$1,108.37
Rain garden removal: excluded	0	EA	0.00	0.00	0.00	0.00	$0.00
Lawn removal	1	LS	0.00	0.00	907.87	907.87	$907.87

Sidewalk/concrete removal	1	LS	459.05	459.05	913.69	913.69	$1,372.74
Sawcut asphalt, or concrete	2,366	LF	0.70	1,656.16	3.37	7,979.94	$9,636.10
Remove asphalt paving (HD, street) West Av.	33,350	SF	0.75	24,859.34	1.45	48,357.50	$73,216.84
Utility crossings, & utility protection - minor	1	LS	11876.67	11,876.67	25210.00	25,210.00	$37,086.67
Excavation and trench boxes (in dirt or fill)	4,025	CY	0.00	0.00	20.91	84,163.40	$84,163.40
Excavation haul & disposal (dirt or fill)	4,025	CY	0.00	0.00	52.56	211,554.00	$211,554.00
Excavation: rock fracturing, N/A	0	EA	0.00	0.00	0.00	0.00	$0.00
Compacted fill at trench, West Av.	4,025	CY	26.36	106,099.00	16.76	67,459.00	$173,558.00
Remove manhole (during excav./Demo), simple	4	EA	0.00	0.00	697.33	2,789.31	$2,789.31
Water main relocation work: see Div 33	0	EA	0.00	0.00	0.00	0.00	$0.00
Cut/cap exist. sewer: Breckenridge - excluded	0	EA	0.00	0.00	0.00	0.00	$0.00
Remove sewer pipe 32" brick, during excav.	1,161	LF	0.00	0.00	36.10	41,911.16	$41,911.16
31 EARTHWORK TOTAL				**$1,377,465**		**$4,741,258**	**$6,118,723**
DIVISION 32 - EXTERIOR IMPROVEMENTS							
Traffic maintenance/protection (owned)	1	EA	1,090.73	1,090.73	12370.03	12,370.03	$13,460.76
Signs, misc. jobsite (project sign, etc)	1	LS	675.84	675.84	483.67	483.67	$1,160
Traffic lane/signal changes before & during work	2	EA	582.96	1,165.92	900.36	1,800.73	$2,966.65
Investigation outside of immed. work area: N/A	0	EA	0.00	0.00	0.00	0.00	$0.00
Clean & sanitize work area, inside a structure	2	EA	158.70	317.40	582.76	1,165.52	$1,482.92
Mobilize work area inside a structure or pit	1	EA	0.00	0.00	458.27	458.27	$458.27
Sandblast old concrete for new conc. work	2	EA	79.35	158.70	291.38	582.76	$741.46
Powerwash old concrete for new conc. work	1	LS	95.22	95.22	679.07	679.07	$774.29
Curb repair - partial, spot-basis	1	LS	2392.70	2,392.70	3405.29	3,405.29	$5,797.99
Sidewalk/apron repair - partial, spot-basis	1	LS	2871.24	2,871.24	4086.35	4,086.35	$6,957.59
Asphalt paving, HD, West Av.	57,500	SF	5.30	304,630.15	2.34	134,566.03	$439,196.18
Fence replacement - partial, spot-basis	1	LS	669.28	669.28	883.45	883.45	$1,552.73
Lawn restoration	1	LS	926.94	926.94	2723.42	2,723.42	$3,650.36
Work fence demob., & asphalt patch	1	LS	436.47	436.47	837.94	837.94	$1,274.41
Traffic lane/signal changes after work	2	EA	290.95	581.90	449.65	899.31	$1,481.21
Breckenridge Sewer Replacement							
Traffic maintenance/protection (owned)	1	EA	1,090.73	1,090.73	12370.03	12,370.03	$13,460.76
Signs, misc. jobsite (project sign, etc)	1	LS	675.84	675.84	483.67	483.67	$1,160
Traffic lane/signal changes before & during work	2	EA	582.96	1,165.92	900.36	1,800.73	$2,966.65
Investigation outside of immed. work area: N/A	0	EA	0.00	0.00	0.00	0.00	$0.00
Clean & sanitize work area, inside a structure	2	EA	158.70	317.40	582.76	1,165.52	$1,482.92
Mobilize work area inside a structure or pit	2	EA	0.00	0.00	238.27	476.55	$476.55
Sandblast old concrete for new conc. work	2	EA	79.35	158.70	291.38	582.76	$741.46
Powerwash old concrete for new conc. work	1	LS	95.22	95.22	679.07	679.07	$774.29
Curb repair - partial, spot-basis	1	LS	2392.70	2,392.70	3405.29	3,405.29	$5,797.99
Rain garden removal & restoration: excluded	0	EA	0.00	0.00	0.00	0.00	$0.00
Sidewalk/apron repair - partial, spot-basis	1	LS	2871.24	2,871.24	4086.35	4,086.35	$6,957.59
Asphalt paving, HD, West Av.	33,350	SF	5.30	176,685.49	2.34	78,048.30	$254,733.78
Fence replacement - partial, spot-basis	1	LS	669.28	669.28	883.45	883.45	$1,552.73
Lawn restoration	1	LS	926.94	926.94	2723.42	2,723.42	$3,650.36
Work fence demob., & asphalt patch	1	LS	436.47	436.47	837.94	837.94	$1,274.41
Traffic lane/signal changes after work	2	EA	290.95	581.90	449.65	899.31	$1,481.21
32 EXTER. IMPROV. TOTAL				**$504,080**		**$273,384**	**$777,465**
DIVISION 33 - UTILITIES							
Utility crossings: incl. in Div 31	0	EA	0.00	0.00	0.00	0.00	$0.00
Rigging work, to UG work area (tools/materials)	1	EA	268.01	268.01	3449.64	3,449.64	$3,717.65
Water main relocation, complete (no bedrock), 12"	1,150	LF	1.99	2,294.05	122.70	141,105.00	$143,399.05
Reroute small utilities	1	LS	4174.69	4,174.69	18672.07	18,672.07	$22,846.76
New manhole on lateral, 5'd, West Av.	4	EA	5882.19	23,528.77	7065.39	28,261.57	$51,790.34
Drainage struct. (MH): ADD, conc. saddle	4	EA	900.64	3,602.55	2779.70	11,118.81	$14,721.35
Drainage struct.: connect new pipe to MH	8	EA	213.19	1,705.54	560.24	4,481.94	$6,187.48
Sewer pipe 36" RCP, w/ fittings & bed, West Av.	1,150	LF	155.37	178,670.67	183.63	211,179.33	$389,850.00
House sewers replacement (lateral, to Prop. Line)	45	EA	1677.00	75,465.00	4634.00	208,530.00	$283,995.00
House sewers: rock excavation & haul	45	EA	33.56	1,510.20	503.12	22,640.40	$24,150.60
House sewers: pipe connections	90	EA	112.45	10,120.50	212.87	19,158.30	$29,278.80

West Av. Deep Drop Manhole Structure							
New drop manhole, 60' deep	1	LS	19864.20	19,864.20	44555.05	44,555.05	$64,419.25
Drainage struct.: connect new pipe to drop MH	2	EA	213.19	426.39	560.24	1,120.49	$1,546.87
Breckenridge Sewer Replacement							
Utility crossings: incl. in Div 31	0	EA	0.00	0.00	0.00	0.00	$0.00
Rigging work, to UG work area (tools/materials)	1	EA	268.01	268.01	3449.64	3,449.64	$3,717.65
Water main relocation, complete (no bedrock), 12"	1,161	LF	1.99	2,315.99	194.85	226,226.21	$228,542.20
Reroute small utilities	1	LS	4174.69	4,174.69	18672.07	18,672.07	$22,846.76
New manhole (MH) on lateral, 5'd	4	EA	5882.19	23,528.77	7065.39	28,261.57	$51,790.34
Drainage struct. (MH): ADD, conc. saddle	4	EA	900.64	3,602.55	2779.70	11,118.81	$14,721.35
Drainage struct.: connect new pipe to MH	10	EA	213.19	2,131.93	560.24	5,602.43	$7,734.35
Sewer pipe 36" RCP, w/ fittings & bed	1,161	LF	155.37	180,379.69	183.63	213,199.31	$393,579.00
House sewers replacement (lateral, to Pr. Line)	22	EA	1677.00	36,894.00	4634.00	101,948.00	$138,842.00
House sewers: rock excavation & haul	22	EA	33.56	738.32	503.12	11,068.64	$11,806.96
House sewers: pipe connections	44	EA	112.45	4,947.80	212.87	9,366.28	$14,314.08
33 UTILITIES TOTAL				**$580,612**		**$1,343,186**	**$1,923,798**

Estimating Assumptions and Notations

1 Estimate assumes normal access to the work, normal operations and daytime work shifts for the Trades.
2 Estimate excludes Abatement - except for special handling of excavated soil.
3 Estimate assumes a normal public bid, with a minimum of three qualified Bidders.

PROJECT ESTIMATE SUMMARY SHEET

Phase Report: Feasibility Phase **Date:** June 8, 2023 **Proj. No.:** SCC P220214

Owner / Agency: Buffalo Sewer Authority **Title:** BSA Term Agreement - Task for Breckenridge Alternatives

Project Address: Breckenridge St. at Niagara St. ALT. **Location / Identification:** **Breckenridge Alternative** HERKIMER OPTION

Cost Consultant: Singleton Construction Consultants **Start Construction Date:** June 1, 2024

Project Area, LF: 2426 LF of affected Sewer Main **End Construction Date:** June 1, 2026

DIV. NO.	DIVISION TITLE		TOTAL COST
02	EXISTING CONDITIONS		$ 245,757
31	EARTHWORK		$ 4,282,377
32	EXTERIOR IMPROVEMENTS		$ 861,390
33	UTILITIES		$ 1,951,986
	SUBTOTAL SITE ESTIMATE		***$ 7,341,510***
GENERAL CONDITIONS		10.00%	$ 734,151
OVERHEAD AND PROFIT		10.00%	$ 807,566
CONTINGENCIES (Design 15%, Bid 5%, Construction 25%)		45.00%	$ 3,997,452
SOFT COSTS		18.00%	$ 2,318,522
LOCAL COUNSEL			$ 20,845
BOND COUNSEL			$ 26,057
FISCAL SERVICES			$ 31,268
SPECIAL CONSIDERATIONS / ESCALATION		8.20%	$ 1,252,744
	TOTAL SITE ESTIMATE		***$ 16,530,115***

Description	Qty.	Unit	Unit Price	Mat'l.	Unit Price	Labor	Total
DIVISION 02 - EXISTING CONDITIONS							
Permits/notification/coordination allowance	1	LS	716.87	716.87	814.73	814.73	$1,531.60
MPOT, barricades, fences, etc: see Div 31/32	0	EA	0.00	0.00	0.00	0.00	$0.00
Manhole cover loosening/removal, no torch	5	EA	0.00	0.00	725.53	3,627.64	$3,627.64
Abatement: radiological screening of excavated material	1	EA	3174.02	3,174.02	22822.09	22,822.09	$25,996.11
Abatement: other - N/A	0	EA	0.00	0.00	0.00	0.00	$0.00
Temp. diversion of wastewater flow (bypass) minor	10	DAY	5819.04	58,190.41	2116.01	21,160.15	$79,350.56
Temp. diversion: road closure	1	LS	2582.13	2,582.13	7847.65	7,847.65	$10,429.78
Demolition: see Div 31	0	EA	0.00	0.00	0.00	0.00	$0.00
Flow test, after improvements (simple)	2	EA	245.56	491.13	868.20	1,736.40	$2,227.53
Restore full wastewater flow, after tests	2	EA	0.00	0.00	294.35	588.70	$588.70
As-built record drawings & images	1	EA	452.70	452.70	6593.52	6,593.52	$7,046.22
Breckenridge Sewer Replacement							
Permits/notification/coordination allowance	1	LS	716.87	716.87	814.73	814.73	$1,531.60
MPOT, barricades, fences, etc: see Div 31/32	0	EA	0.00	0.00	0.00	0.00	$0.00
Manhole cover loosening/removal, no torch	5	EA	0.00	0.00	725.53	3,627.64	$3,627.64
Abatement: radiological screening of excav. mat'l.	1	EA	3174.02	3,174.02	22822.09	22,822.09	$25,996.11
Abatement: other - N/A	0	EA	0.00	0.00	0.00	0.00	$0.00
Temp. diversion, wastewater flow (bypass) minor	10	DAY	5819.04	58,190.41	2116.01	21,160.15	$79,350.56
Temp. diversion: road closure: N/A	0	EA	0.00	0.00	0.00	0.00	$0.00
Demolition: see Div 31	0	EA	0.00	0.00	0.00	0.00	$0.00
Flow test, after improvements (simple)	2	EA	245.56	491.13	868.20	1,736.40	$2,227.53
Restore full wastewater flow, after tests	2	EA	0.00	0.00	294.35	588.70	$588.70
As-built record drawings & images	1	EA	252.70	252.70	1383.52	1,383.52	$1,636.22
02 EXIST. CONDITIONS TOTAL				**$128,432**		**$117,324**	**$245,757**
DIVISION 31 - EARTHWORK							
Temp. fence/gate (work zone, w/ staging area)	2,642	LF	17.42	46,023.80	7.69	20,327.81	$66,351.62
Jersey barricade crash barrier (owned), moved	8	EA	0.00	0.00	370.30	2,962.42	$2,962.42
Temp. diversion of wastewater - see Div 2	0	EA	0.00	0.00	0.00	0.00	$0.00
Dewatering (in rock)	1	LS	2274.14	2,274.14	29481.02	29,481.02	$31,755.15
Inlet protection (for dewatering)	12	EA	42.30	507.59	50.06	600.78	$1,108.37
Lawn removal	1	LS	0.00	0.00	907.87	907.87	$907.87
Sidewalk/concrete removal	1	LS	459.05	459.05	913.69	913.69	$1,372.74
Sawcut asphalt, or concrete	2,538	LF	0.70	1,776.35	3.37	8,559.04	$10,335.39
Remove asphalt paving (HD, street), Herkimer	63,250	SF	0.75	47,147.03	1.45	91,712.50	$138,859.53
Utility crossings, & sewer/ duct bank protection	1	LS	24941.00	24,941.00	52941.00	52,941.00	$77,882.00
Excavation and trench boxes (in dirt or fill)	11,006	CY	0.00	0.00	20.91	230,126.77	$230,126.77
Excavation haul & disposal (dirt or fill)	11,006	CY	0.00	0.00	52.56	578,449.08	$578,449.08
Excavation: rock fracturing, Herkimer	7,591	CY	0.00	0.00	88.91	674,925.92	$674,925.92
Excavation: rock removal & carting, Herkimer	7,591	CY	0.00	0.00	57.68	437,854.65	$437,854.65
Compacted fill at trench, Herkimer	18,597	CY	26.36	490,206.38	16.76	311,679.02	$801,885.39
Remove sewer pipe, Herkimer St.: excluded	0	EA	0.00	0.00	0.00	0.00	$0.00
Breckenridge Sewer Replacement							
Temp. fence/gate (work zone, w/ staging area)	2,402	LF	17.42	41,839.82	7.69	18,479.83	$60,319.65
Jersey barricade crash barrier (owned), moved	30	EA	0.00	0.00	370.30	11,109.08	$11,109.08
Temp. diversion of wastewater - see Div 2	0	EA	0.00	0.00	0.00	0.00	$0.00
Dewatering (in rock)	1	LS	2615.26	2,615.26	33903.17	33,903.17	$36,518.43
Inlet protection (for dewatering)	12	EA	42.30	507.59	50.06	600.78	$1,108.37
Rain garden removal: excluded	0	EA	0.00	0.00	0.00	0.00	$0.00
Lawn removal	1	LS	0.00	0.00	907.87	907.87	$907.87
Sidewalk/concrete removal	1	LS	459.05	459.05	913.69	913.69	$1,372.74
Sawcut asphalt, or concrete	2,721	LF	0.70	1,904.59	3.37	9,176.93	$11,081.51
Remove asphalt paving (HD, street) Herkimer	38,353	SF	0.75	28,588.24	1.45	55,611.13	$84,199.37
Utility crossings, & utility protection - minor	1	LS	11876.67	11,876.67	25210.00	25,210.00	$37,086.67
Excavation and trench boxes (in dirt or fill)	4,629	CY	0.00	0.00	20.91	96,787.91	$96,787.91
Excavation haul & disposal (dirt or fill)	4,629	CY	0.00	0.00	52.56	243,287.10	$243,287.10
Excavation: rock fracturing, Herkimer	2,106	CY	0.00	0.00	88.91	187,244.80	$187,244.80
Excavation: rock removal & haul, Herkimer	2,106	CY	0.00	0.00	57.68	121,474.08	$121,474.08

Compacted fill at trench, Herkimer	6,735	CY	26.36	177,528.01	16.76	112,874.41	$290,402.42
Remove manhole (during excav./Demo), simple	4	EA	0.00	0.00	697.33	2,789.31	$2,789.31
Water main relocation work: see Div 33	0	EA	0.00	0.00	0.00	0.00	$0.00
Cut/cap exist. sewer: Breckenridge - excluded	0	EA	0.00	0.00	0.00	0.00	$0.00
Remove sewer pipe 32" brick, during excav.	1,161	LF	0.00	0.00	36.10	41,911.16	$41,911.16
31 EARTHWORK TOTAL				**$878,655**		**$3,403,723**	**$4,282,377**
DIVISION 32 - EXTERIOR IMPROVEMENTS							
Traffic maintenance/protection (owned)	1	EA	1,090.73	1,090.73	12370.03	12,370.03	$13,460.76
Signs, misc. jobsite (project sign, etc)	1	LS	675.84	675.84	483.67	483.67	$1,160
Traffic lane/signal changes before & during work	2	EA	582.96	1,165.92	900.36	1,800.73	$2,966.65
Investigation outside of immed. work area: N/A	0	EA	0.00	0.00	0.00	0.00	$0.00
Clean & sanitize work area, inside a structure	2	EA	158.70	317.40	582.76	1,165.52	$1,482.92
Mobilize work area inside a structure or pit	1	EA	0.00	0.00	458.27	458.27	$458.27
Sandblast old concrete for new conc. work	2	EA	79.35	158.70	291.38	582.76	$741.46
Powerwash old concrete for new conc. work	1	LS	95.22	95.22	679.07	679.07	$774.29
Curb repair - partial, spot-basis	1	LS	2631.97	2,631.97	3745.82	3,745.82	$6,377.79
Sidewalk/apron repair - partial, spot-basis	1	LS	3158.36	3,158.36	4494.98	4,494.98	$7,653.34
Asphalt paving, HD, Herkimer	63,250	SF	5.30	335,093.16	2.34	148,022.63	$483,115.79
Fence replacement - partial, spot-basis	1	LS	736.21	736.21	971.79	971.79	$1,708.00
Lawn restoration	1	LS	1019.64	1,019.64	2995.76	2,995.76	$4,015.39
Work fence demob., & asphalt patch	1	LS	436.47	436.47	837.94	837.94	$1,274.41
Traffic lane/signal changes after work	2	EA	290.95	581.90	449.65	899.31	$1,481.21
Breckenridge Sewer Replacement							
Traffic maintenance/protection (owned)	1	EA	1,090.73	1,090.73	12370.03	12,370.03	$13,460.76
Signs, misc. jobsite (project sign, etc)	1	LS	675.84	675.84	483.67	483.67	$1,160
Traffic lane/signal changes before & during work	2	EA	582.96	1,165.92	900.36	1,800.73	$2,966.65
Investigation outside of immed. work area: N/A	0	EA	0.00	0.00	0.00	0.00	$0.00
Clean & sanitize work area, inside a structure	2	EA	158.70	317.40	582.76	1,165.52	$1,482.92
Mobilize work area inside a structure or pit	2	EA	0.00	0.00	238.27	476.55	$476.55
Sandblast old concrete for new conc. work	2	EA	79.35	158.70	291.38	582.76	$741.46
Powerwash old concrete for new conc. work	1	LS	95.22	95.22	679.07	679.07	$774.29
Curb repair - partial, spot-basis	1	LS	2392.70	2,392.70	3405.29	3,405.29	$5,797.99
Rain garden removal & restoration: excluded	0	EA	0.00	0.00	0.00	0.00	$0.00
Sidewalk/apron repair - partial, spot-basis	1	LS	2871.24	2,871.24	4086.35	4,086.35	$6,957.59
Asphalt paving, HD Herkimer	38,353	SF	5.30	203,188.31	2.34	89,755.54	$292,943.85
Fence replacement - partial, spot-basis	1	LS	669.28	669.28	883.45	883.45	$1,552.73
Lawn restoration	1	LS	926.94	926.94	2723.42	2,723.42	$3,650.36
Work fence demob., & asphalt patch	1	LS	436.47	436.47	837.94	837.94	$1,274.41
Traffic lane/signal changes after work	2	EA	290.95	581.90	449.65	899.31	$1,481.21
32 EXTER. IMPROV. TOTAL				**$561,732**		**$299,658**	**$861,390**
DIVISION 33 - UTILITIES							
Utility crossings: incl. in Div 31	0	EA	0.00	0.00	0.00	0.00	$0.00
Rigging work, to UG work area (tools/materials)	1	EA	268.01	268.01	3449.64	3,449.64	$3,717.65
Water main relocation, complete (no bedrock), 12"	1,265	LF	1.99	2,523.45	122.70	155,215.50	$157,738.95
Reroute small utilities	1	LS	4174.69	4,174.69	18672.07	18,672.07	$22,846.76
New manhole on lateral, 5'd, Herkimer	7	EA	5882.19	41,175.34	7065.39	49,457.74	$90,633.09
Drainage struct. (MH): ADD, conc. saddle	7	EA	900.64	6,304.46	2779.70	19,457.91	$25,762.37
Drainage struct.: connect new pipe to MH	14	EA	213.19	2,984.70	560.24	7,843.40	$10,828.10
Sewer pipe 36" RCP, w/ fittings & bed, Herkimer	1,265	LF	155.37	196,537.74	183.63	232,297.26	$428,835.00
House sewers replacement (lateral, to Pr. Line)	43	EA	1677.00	72,111.00	4634.00	199,262.00	$271,373.00
House sewers: rock excavation & haul	43	EA	33.56	1,443.08	503.12	21,634.16	$23,077.24
House sewers: pipe connections	90	EA	112.45	10,120.50	212.87	19,158.30	$29,278.80
Breckenridge Sewer Replacement							
Utility crossings: incl. in Div 31	0	EA	0.00	0.00	0.00	0.00	$0.00
Rigging work, to UG work area (tools/materials)	1	EA	268.01	268.01	3449.64	3,449.64	$3,717.65
Water main relocation, complete (no bedrock), 12"	1,161	LF	1.99	2,315.99	194.85	226,226.21	$228,542.20
Reroute small utilities	1	LS	4174.69	4,174.69	18672.07	18,672.07	$22,846.76
New manhole (MH) on lateral, 5'd	4	EA	5882.19	23,528.77	7065.39	28,261.57	$51,790.34
Drainage struct. (MH): ADD, conc. saddle	4	EA	900.64	3,602.55	2779.70	11,118.81	$14,721.35

Drainage struct.: connect new pipe to MH	10	EA	213.19	2,131.93	560.24	5,602.43	$7,734.35
Sewer pipe 36" RCP, w/ fittings & bed	1,161	LF	155.37	180,379.69	183.63	213,199.31	$393,579.00
House sewers replacement (lateral, to Pr. Line)	22	EA	1677.00	36,894.00	4634.00	101,948.00	$138,842.00
House sewers: rock excavation & haul	22	EA	33.56	738.32	503.12	11,068.64	$11,806.96
House sewers: pipe connections	44	EA	112.45	4,947.80	212.87	9,366.28	$14,314.08
33 UTILITIES TOTAL				**$596,625**		**$1,355,361**	**$1,951,986**

Estimating Assumptions and Notations

1 Estimate assumes normal access to the work, normal operations and daytime work shifts for the Trades.
2 Estimate excludes Abatement - except for special handling of excavated soil.
3 Estimate assumes a normal public bid, with a minimum of three qualified Bidders.

Appendix H:
Engineering Report Certification

Engineering Report Certification

To Be Provided by the Professional Engineer Preparing the Report

During the preparation of this Engineering Report, I have studied and evaluated the cost and effectiveness of the processes, materials, techniques, and technologies for carrying out the proposed project or activity for which assistance is being sought from the New York State Clean Water State Revolving Fund. In my professional opinion, I have recommended for selection, to the maximum extent practicable, a project or activity that maximizes the potential for efficient water use, reuse, recapture, and conservation, and energy conservation, taking into account the cost of constructing the project or activity, the cost of operating and maintaining the project or activity over the life of the project or activity, and the cost of replacing the project and activity.

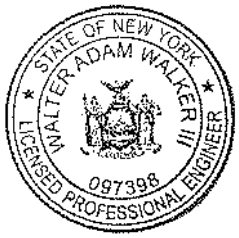
Title of Engineering Report: Breckenridge St. CSO Control Project

Date of Report: June 2023

Professional Engineer's Name: Walter A. Walker

Signature: Walter Walker

Date: 06/16/2023



Appendix I:
Smart Growth Assessment Form

NEW YORK STATE OF OPPORTUNITY. | Department of Health | Environmental Facilities Corporation

Smart Growth Assessment Form

This form should be completed by an authorized representative of the applicant, preferably the project engineer or other design professional.[1]

Section 1 – General Applicant and Project Information

Applicant: Buffalo Sewer Authority Project No.:

Project Name: Breckenridge St. CSO Control Project

Is project construction complete? ☐ Yes, date: ☑ No

Please provide a brief project summary in plain language including the location of the area the project serves:

The goal of this project is to reduce combined sewer overflows (CSOs) at CSO-10 in West Buffalo by rerouting the sewers along Breckenridge St to parts of the collection system with underutilized capacity. Achieving this goal will improve water quality in the Black Rock Canal.

Section 2 – Screening Questions

A. Prior Approvals

1. Has the project been previously approved for Environmental Facilities Corporation (EFC) financial assistance? ☐ Yes ☑ No
2. If yes to A(1), what is the project number(s) for the prior approval(s)? Project No.:
3. If yes to A(1), is the scope of the previously-approved project substantially the same as the current project? ☐ Yes ☐ No

If your responses to A(1) and A(3) are both yes, please proceed to Section 5, Signature.

B. New or Expanded Infrastructure

1. Does the project involve the construction or reconstruction of new or expanded infrastructure? ☐ Yes ☑ No

Examples of new or expanded infrastructure include, but are not limited to:

(i) The addition of new wastewater collection/new water mains or a new wastewater treatment system/water treatment plant where none existed previously;

(ii) An increase of the State Pollutant Discharge Elimination System (SPDES) permitted flow capacity for an existing wastewater treatment system; and OR

[1] If project construction is complete and the project was not previously financed through EFC, an authorized municipal representative may complete and sign this assessment.

(iii) An increase of the permitted water withdrawal or the permitted flow capacity for the water treatment system such that a Department of Environmental Conservation (DEC) water withdrawal permit will need to be obtained or modified, or result in the Department of Health (DOH) approving an increase in the capacity of the water treatment plant.

If your response to B(1) is no, please proceed to Section 5, Signature.

Section 3 –Smart Growth Criteria

Your project must be consistent will all relevant Smart Growth criteria. For each question below please provide a response and explanation.

1. Does the project use, maintain, or improve existing infrastructure?
   ☑ Yes ☐ No

   Explain your response: This project involves replacement and retrofit of the existing collection system. This project also uses existing infrastructure, such as the Scajaquada Tunnel.

2. Is the project located in a (1) municipal center, (2) area adjacent to a municipal center, or (3) area designated as a future municipal center, as such terms are defined herein (please select one response)?

   ☑ Yes, my project is located in a municipal center, which is an area of concentrated and mixed land uses that serves as a center for various activities, including but not limited to: central business districts, main streets, downtown areas, brownfield opportunity areas (see *www.dos.ny.gov* for more information), downtown areas of local waterfront revitalization program areas (see *www.dos.ny.gov* for more information), areas of transit-oriented development, environmental justice areas (see *www.dec.ny.gov/public/899.html* for more information), and hardship areas (projects that primarily serve census tracts or block numbering areas with a poverty rate of at least twenty percent according to the latest census data).

   ☐ Yes, my project is located in an area adjacent to a municipal center which has clearly defined borders, is designated for concentrated development in the future in a municipal or regional comprehensive plan, and exhibits strong land use, transportation, infrastructure, and economic connections to an existing municipal center.

   ☐ Yes, my project is located in an area designated as a future municipal center in a municipal or comprehensive plan and is appropriately zoned in a municipal zoning ordinance

   ☐ No, my project is not located in a (1) municipal center, (2) area adjacent to a municipal center, or (3) area designated as a future municipal center.

   Explain your response and reference any applicable plans:

   This project occurs within the City of Buffalo.

3. Is the project located in a developed area or an area designated for concentrated infill development in a municipally-approved comprehensive land use plan, local waterfront revitalization plan, and/or brownfield opportunity area plan?

☑Yes ☐No

Explain your response and reference any applicable plans:

This project is located in an area covered by the City of Buffalo Land Use Plan (September 2016).

4. Does the project protect, preserve, and enhance the State's resources, including surface and groundwater, agricultural land, forests, air quality, recreation and open space, scenic areas, and significant historic and archaeological resources?

☑Yes ☐No

Explain your response:

This project seeks to improve the water quality of the Black Rock Canal by minimizing activations of CSO-10.

5. Does the project foster mixed land uses and compact development, downtown revitalization, brownfield redevelopment, the enhancement of beauty in public spaces, the diversity and affordability of housing in proximity to places of employment, recreation and commercial development, and the integration of all income and age groups?

☑Yes ☐No

Explain your response:

The project seeks to improve water quality, which improves the aesthetic and community value of public resources such as waterfront parks.

6. Does the project provide mobility through transportation choices including improved public transportation and reduced automobile dependency?

☐Yes ☐No ☑N/A

Explain your response:

7. Does the project involve coordination between State and local government, intermunicipal planning, or regional planning?

☐Yes ☑No

Explain your response and reference any applicable plans:

8. Does the project involve community-based planning and collaboration?

   ☑Yes ☐No

   Explain your response and reference any applicable plans:

   A public meeting will be held to share the proposed designs with the public, to discuss potential community impacts, to gather feedback, and foster dialogue.

9. Does the project support predictability in building and land use codes?

   ☐Yes ☐No ☑N/A

   Explain your response:

10. Does the project promote sustainability by adopting measures such as green infrastructure techniques, decentralized infrastructure techniques, or energy efficiency measures?

    ☑Yes ☐No

    Explain your response and reference any applicable plans:

    The proposed project minimizes discharge of untreated sewage into receiving water bodies in the least construction-intensive way possible (through retrofits and reuse of existing infrastructure).

11. Does the project mitigate future physical climate risk due to sea-level rise, storm surges, and/or flooding, based on available data predicting the likelihood of future extreme weather events, including hazard risk analysis data, if applicable?

    ☑Yes ☐No

    Explain your response and reference any applicable plans:

    This project will improve the sewer collection system's ability to retain raw sewage to reduce the number of discharges to receiving waters. This proactively addresses CSO activations that would otherwise be expected to increase over time due to heavy rainfall events resulting from climate change.

Section 4 – Miscellaneous

1. Is the project expressly required by a court or administrative consent order? ☑ Yes ☐ No

   If yes, and you have not previously provided the applicable order to EFC/DOH, please submit it with this form.

Section 5 – Signature

By signing below, you agree that you are authorized to act on behalf of the applicant and that the information contained in this Smart Growth Assessment is true, correct and complete to the best of your knowledge and belief.

Applicant: Buffalo Sewer Authority	Phone Number: (716)851-4664 x4211
Name and Title of Signatory: Walter A. Walker, PE - Greeley and Hansen (Engineer of Record)	
Signature: Walter A. Walker Digitally signed by Walter A. Walker DN: C=US, E=wwalker@greeley-hansen.com, O=Greeley and Hansen, CN=Walter A. Walker Date: 2023.06.14 23:55:35-04'00'	Date: 06/14/2023

Appendix J:
Geotechnical Report

Note: Sites not relevant to the Breckenridge St. CSO Control Project were removed from the geotechnical report.

WMA ENGINEERING DPC|DBA
EMPIRE GEOTECHNICAL
ENGINEERING SERVICES

August 5, 2022
Project No. WB-22-073
(SJB Project No. BE-22-073

☒ CORPORATE/
BUFFALO OFFICE
5167 South Park Avenue
Hamburg, NY 14075
Phone: (716) 649-8110
Fax: (716) 649-8051

Greeley and Hansen
111 Broadway, Suite 2101
New York, New York
10006

Attn: May Sharif, P.E.
Civil Engineer

Re: Geotechnical Evaluation Report for
Proposed Real-Time Controlled (RTC) Smart Sewer Projects
Buffalo Sewer Authority – 3 Sites
City of Buffalo, New York

Dear May Sharif:

☐ CORTLAND OFFICE
60 Miller Street
Cortland, NY 13045
Phone: (607) 758-7182
Fax: (607) 758-7188

WMA Engineering DPC, dba Empire Geotechnical Engineering Services, is pleased to submit the enclosed Geotechnical Evaluation Report to Greeley and Hansen for the above referenced project. We have also e-mailed you an electronic copy (pdf file format) of this report, for your use and for distribution.

Please contact me should you have any questions or wish to discuss this report. Thank you for considering us for this work and we look forward to working with you through completion of this project.

Sincerely,

WMA Engineering DPC, dba
Empire Geotechnical Engineering Services

☐ ROCHESTER OFFICE
535 Summit Point Drive
Henrietta, NY 14467
Phone: (585) 359-2730
Fax: (585) 359-9668

Thomas R. Seider, P.E.
Senior Geotechnical Engineer

Enc.: Geotechnical Evaluation Report

WMA ENGINEERING DPC|DBA
EMPIRE GEOTECHNICAL
ENGINEERING SERVICES

☐ CORPORATE/
BUFFALO OFFICE
5167 South Park Avenue
Hamburg, NY 14075
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Fax: (716) 649-8051

☐ CORTLAND OFFICE
60 Miller Street
Cortland, NY 13045
Phone: (607) 758-7182
Fax: (607) 758-7188

☐ ROCHESTER OFFICE
535 Summit Point Drive
Henrietta, NY 14467
Phone: (585) 359-2730
Fax: (585) 359-9668

Geotechnical Evaluation Report for Proposed Real-Time Controlled (RTC) Smart Sewer Projects Buffalo Sewer Authority – 3 Sites City of Buffalo, New York

Prepared For:

Greeley and Hansen
111 Broadway, Suite 2101
New York, New York, 10006

Prepared By:

WMA Engineering, DPC dba
Empire Geotechnical Engineering Services
5167 South Park Avenue
Hamburg, New York, 14075

Project No. WB-22-073
(SJB Project No. BE-22-073
July 2022

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FIGURES

TABLES

APPENDICES

1.00 INTRODUCTION

1.10 GENERAL

This report presents the results of a geotechnical engineering evaluation completed by WMA Engineering, DPC, dba Empire Geotechnical Engineering Services (Empire), for the proposed Real-Time Controlled (RTC) Smart Sewer Projects, planned at three locations within the City of Buffalo, New York. The geotechnical engineering evaluation was completed by Empire at the request of and as authorized by SJB Services, Inc. (SJB), our affiliated drilling and testing company. SJB was retained by Greeley and Hansen to complete this work, which was done in general accordance with SJB's May 23rd, 2022 proposal.

1.20 SITE LOCATIONS AND PROJECT DESCRIPTIONS

The RTC Smart Sewer Projects are planned at three locations within the City of Buffalo, which include: the area southeast of the Breckenridge Street and Niagara Street intersection; the area northeast of the Gates Circle and Delaware Avenue intersection; and at the intersection of East Amherst Street and Bailey Avenue. The projects will include the installation of concrete manhole structures, ranging in size from about 10 feet by 10 feet to 20 feet by 20 feet, to house sewer monitoring and flow control devices. In addition, new piping will be installed at the Breckenridge / Niagara site. The piping and manholes at the Breckenridge / Niagara site will mostly be about 10 feet to 20 feet below grade, until reaching the interceptor sewer where the manhole will be about 50 to 60 feet deep. At the two other sites, the manholes will be about 25 to 30 feet deep. Figures 1, 2, and 3 provide additional details about the site locations and the proposed manhole and piping locations.

2.00 SUBSURFACE EXPLORATION PROGRAM

2.10 TEST BORING LOCATIONS

The subsurface exploration program included five test borings, designated as SB-1 through SB-4, and SB-6, completed by SJB between June 17th and June 21st, 2022. Test boring SB-5 was planned to be completed at a fourth site, but was eliminated from the exploration program. The test boring locations were initially established in the field by Greeley and Hansen. SJB then visited the sites and recorded the test boring locations using a hand held global positioning system (GPS) instrument. The approximate test boring locations are shown on Figures 1, 2, and 3, and the recorded coordinates are summarized in Table 1.

2.20 TEST BORINGS

The test borings were made using a Central Mine Equipment (CME) model 75, truck mounted drill rig, and were advanced through the overburden soils using hollow stem auger and split spoon soil sampling techniques. Split spoon samples and Standard Penetration Test (SPT) were taken continuously throughout the full depth of the test borings, in general accordance with *ASTM D1586 – "Standard Test Method for Penetration Test and Split-Barrel Sampling of Soils"*.

Test borings SB-1 and SB-2 (Breckenridge / Niagara site) were advanced through the overburden soils until encountering auger refusal conditions at the top of bedrock, at depths of 8.6 feet within test boring SB-1 and 7.8 feet within test boring SB-2. After encountering auger refusal within these test borings, 10 feet of rock coring was completed within test boring SB-1 and 5 feet of rock coring was completed within test boring SB-2. The rock coring was completed using an NQ'2' size core barrel, in accordance with *ASTM D2113 – "Standard Practice for Rock Core Drilling and Sampling of Rock for Site Investigation"*.

Test borings SB-3 (Gates Circle site) and SB-6 (East Amherst and Bailey site) were completed to their planned depths of 20 feet each, as specified by Greeley and Hansen. After advancing test boring SB-4 (Gates Circle site) to the planned 20 feet depth, it was determined that the fill layer had not been fully penetrated. Accordingly, the test boring was continued, with the bottom of the fill layer estimated to be about 22.5 feet below the ground surface. The test boring was ultimately terminated at a depth of 25.3 feet where sample spoon refusal conditions were encountered.

A geologist prepared the test boring logs based on visual observation of the recovered soil samples and rock cores, along with a review of the laboratory data and the driller's field notes. The soil samples were described based on a visual/manual estimation of the grain size distribution, along with characteristics such as color, relative density, consistency, moisture, etc. The recovered rock cores were also described, including characteristics such as color, rock type, hardness, weathering, bedding thickness, core recovery, and rock quality designation (RQD). The test boring logs are presented in Appendix A, along with general information and a key of terms and symbols used to prepare the logs. Photographs of the recovered bedrock cores and a summary of the core recoveries and RQDs are included in Appendix B.

2.30 GROUNDATER MONITORING WELLS

Groundwater monitoring wells were installed within completed test borings SB-2 and SB-4. The wells consist of two inch diameter PVC screen and riser pipe, extending from near the bottom of the test borings to above the ground surface. The sand pack extends from the bottom of the test borings to above the top of the well screens. A

bentonite chip seal was installed above the sand pack, with the remainder of the test borings backfilled with soil cuttings. Additional details regarding the construction of the monitoring wells are shown on the Monitoring Well Completion Records, included in Appendix A, following test boring logs SB-2 and SB-4.

3.00 FIELD SCREENING AND ENVIRONMENTAL TESTING

A geologist from SJB was on-site during completion of the test borings. The collected soil samples were screened for volatile organic compounds using a photoionization detector (PID). Soil samples from the test borings and subsequent groundwater samples from the monitoring wells were collected and submitted for analytical testing. The results from this work are summarized in SJB's July 14th, 2022 summary report, which is included in Appendix C.

The fill soils collected from test boring SB-4, from about 6 feet to 12, feet contained trace to some amounts of slag. As requested by Greeley and Hansen, SJB prepared a composite sample of these soils, which was then sent to a laboratory to be tested for radioactive materials. The results will be forwarded to Greeley and Hansen in a separate report.

4.00 SUBSURFACE CONDITIONS

The following sections provide a generalized summary of the soil, bedrock, and groundwater conditions encountered at the three sites. More detailed information is included on the test boring logs in Appendix A.

4.10 BRECKENRIDGE STREET / NIAGARA STREET SITE (SB-1 and SB-2)

Beneath the topsoil at test borings SB-1 and SB-2, fill soils were encountered, which extended to depths of about 4 to 6 feet. It should be expected that the fill thickness will vary between and away from the test boring locations and will extend at least to the bottom of the excavations made for the existing utilities or other structures. The fill soils consisted of a reworked mixture of silty clay, sands, and gravels with trace amounts of organics. The Standard Penetration Test (SPT) "N" values obtained within the fill layer ranged from 6 to 13, indicating the fill soils have a "loose" to "firm" relative density.

Beneath the fill layer within test boring SB-1, the indigenous soils consisted of silty clays with varying amounts of intermixed sand and gravel. These soils are classified as a CL group soil using the Unified Soil Classification System (USCS). The Standard Penetration Test (SPT) "N" values of 17 and 51 indicate these soils have a "very stiff" to "hard" consistency.

Beneath the fill layer within test boring SB-2, the indigenous soils consisted of sands with little amounts of clayey silts, which are classified as a SM-SC group soil using the USCS. The SPT "N" value of 61 indicate these indigenous soils have a "very compact" relative density.

Auger refusal conditions and rock coring identified the top of bedrock at a depth of 8.6 feet within test boring SB-1 and at a depth of 7.8 feet within test boring SB-2. The recovered bedrock cores are classified as sound, hard to very hard, laminated to massively bedded, Limestone. The core recoveries were each 100%. The rock quality designation (RQD) values were 88%, 98%, and 100%, indicating the rock mass quality is "good" to "excellent".

At the completion of overburden drilling and prior to rock coring, no water was observed within the test boring holes. Following rock coring, water was measured at depths of 4.2 feet within test boring SB-1, and 1.2 feet within test borings SB-2. However, because water was added into the test borings to facilitate the rock coring, these measurements should not be taken to represent an actual groundwater condition. As noted, a groundwater observation well was installed within completed test boring SB-2, with the screen and sand pack extending into the bedrock core hole. SJB measured the depth to groundwater on three occasions, and the data is summarized in the following table. Following the June 21st and June 30th, 2022 water level measurements, approximately five gallons and two gallons of water was removed from the well, respectively.

Summary of Water Levels within Observation Well SB-2

Observation Well	Date	Groundwater Depth Below Surface (feet)
SB-2	June 21, 2022	1.95
	June 30, 2022	8.00
	July 1, 2022	8.05

The groundwater level within the observation well was relatively consistent between the last two measurements. It appears the shallower depth to water on June 21, 2022 was the result of having the well cap on tight, thereby not allowing the water level to stabilize. Based on the last two measurements, the groundwater level is near the interface between the overburden soils and bedrock. It should be expected that groundwater conditions will vary with location and with changes in soil and bedrock conditions, precipitation, and seasonal conditions.

4.20 GATES CIRCLE / DELAWARE AVENUE SITE (SB-3 and SB-4)

Beneath the topsoil, fill soils were encountered, which extended to depths of about 9.5 feet within test boring SB-3, and about 22.5 feet within test boring SB-4. It should be expected that the fill thickness will vary between and away from the test boring locations and will extend at least to the bottom of the excavations made for the existing utilities or other structures. The fill soils consisted mostly of a reworked mixture of sands and gravels with varying amounts of intermixed silty clays. Trace amounts of organics, and variable amounts of brick fragments, concrete fragments, slag, and wood were also observed within several of the fill samples. The Standard Penetration Test (SPT) "N" values obtained within the fill layer ranged from 5 to 26, indicating the fill soils have a "loose" to "firm" relative density.

Beneath the fill layer within test boring SB-3, the indigenous soils consisted of silty clays with trace to little amounts of sand, which are classified as a CL group soil using the USCS. The Standard Penetration Test (SPT) "N" values obtained within these indigenous soils ranged from 5 to 25, indicating these soils have a "medium" to "very stiff" consistency.

Beneath the fill layer within test boring SB-4, the indigenous soils consisted of gravels and sands with little to some amounts of silty clays or clayey silts. These soils are classified as GC-GM and SM-SC group soils using the USCS. The SPT "N" value of 26 indicate these soils have a "firm" relative density.

Sample spoon refusal (i.e. more than 50 blows required to advance the sample spoon with six inches or less of penetration) was encountered within test boring SB-4 at a depth of 25.3 feet. Based on test borings completed at a nearby site, the sample spoon refusal may have resulted from encountering the top of Limestone bedrock. However, it is possible that a cobble / boulder or very compact soils caused the sample spoon refusal conditions. Rock coring would be necessary to determine the actual nature of the sample spoon refusal.

At the completion of overburden drilling at test boring SB-4, free standing water was measured at a depth of 18.3 feet. A water level reading was not made within completed test boring SB-3. As noted, a groundwater observation well was installed within completed test boring SB-4, with the screen and sand pack extending from 12 feet to the bottom of the test boring at 25.3 feet. SJB measured the depth to groundwater on three occasions, and the data is summarized in the following table. Following the June 22nd and June 30th, 2022 water level measurements, approximately three gallons of water was removed from the well.

Summary of Water Levels within Observation Well SB-4		
Observation Well	Date	Groundwater Depth Below Surface (feet)
SB-4	June 22, 2022	18.00
	June 30, 2022	18.13
	July 1, 2022	18.20

The groundwater level within the observation well was relatively consistent between the three measurements. The collected soil samples from test boring SB-4 were also described as "wet" beneath a depth of 18 feet. Accordingly, it appears a groundwater condition in the area of test boring SB-4 is near 18 feet.

Within test boring SB-3, the collected soil samples were described as "wet", beginning with the 14 feet deep sample. Accordingly, the depth to groundwater could be shallower within test boring SB-3. It should be expected that groundwater conditions will vary with location and with changes in soil conditions, precipitation, and seasonal conditions.

4.30 BAILEY AVENUE / EAST AMHERST STREET SITE (SB-6)

Beneath the asphalt pavement at test boring SB-6, fill soils were encountered, which extended to a depth of about 2 feet. It should be expected that the fill thickness will vary between and away from the test boring locations and will extend at least to the bottom of the excavations made for the existing utilities or other structures. The fill soils consisted of gravels and sands with silty clay and trace amounts of organics. The SPT "N" value of 10 indicates the fill soils have a "loose" to "firm" relative density.

Beneath the fill layer, and extending to the bottom of the test boring at 20 feet, the indigenous soils consisted of silty clays with trace to some amounts of intermixed sands and gravels. These soils are classified as a CL group soil using the USCS. At depths shallower than about 14 feet, the Standard Penetration Test (SPT) "N" values ranged from 20 to 40, correlating to soils with a "very stiff" to "hard" consistency. The SPT "N" values of 10 and 13, obtained from 14 feet to 18 feet, indicate "stiff" soil conditions. The last soil sample, collected at 18 feet to 20 feet, had an SPT "N" value of 2, indicating these deeper soils have a "soft" to "very soft" consistency.

At the completion of overburden drilling at test boring SB-6, free standing water was measured at a depth of 18.6 feet. However, it is likely that the groundwater did not have sufficient time to fully accumulate and stabilize in the test boring hole, within the time that had elapsed from the completion of drilling operations and the time of the measurement. The silty clay soils begin to soften at a depth of 14 feet. This information coupled with the water observed within the completed test boring, suggests a groundwater condition exist near a depth of about 14 feet. Installation of a groundwater observation well would be necessary to better define the groundwater conditions at the site.

5.00 GEOTECHNICAL CONSIDERATIONS AND RECOMMENDATIONS

5.10 GENERAL

Based on the proposed manhole structures and piping, along with the subsurface conditions encountered, the following items will need to be considered with regard to design and construction of the RTC Smart Sewer Projects.

- Manhole structure support, lateral earth pressures, and uplift;
- Excavation and shoring requirements;
- Bedrock excavation;
- Dewatering;
- Protection of existing structures and utilities;
- Seismic site class and design criteria; and
- Consideration for additional test borings and laboratory testing.

These considerations, along with associated recommendations are discussed in the following sections of this report.

5.20 MANHOLE STRUCTURES

5.20.1 Bearing Capacity

Construction of the manhole structures are expected to result in minor net bearing pressure increases to the bearing grades. This is due to the volume of soil that will be displaced by the manhole structures. The recommended allowable net bearing pressure for the three sites are provided in the following sections.

Breckenridge Street / Niagara Street Site

The several proposed 10 to 20 feet deep manhole structures at the site, along with the 50 to 60 feet deep manhole structure required to reach the interceptor sewer, will be bearing on the Limestone bedrock, or on excavated Limestone bedrock surfaces. The Limestone bedrock is adequate to support an allowable net bearing pressure increase in excess of 10 tons per square foot, which should be adequate for the proposed manhole structures. Bedrock excavation is discussed in Section 5.30.3 of this report. It may be desirable to level the bedrock bearing surface with concrete fill (f'c at 28 days > 3,000 psi), prior to construction of the manhole structures.

Gates Circle / Delaware Avenue Site

The proposed 25 to 30 feet deep manhole structures are expected to be bearing within the "frim" silty clayey gravel and sand soils, encountered near the bottom of test boring SB-4. These soils are adequate to support an allowable net bearing pressure increase of about 4,000 pounds per square foot. As described in Section 4.20, the sample spoon refusal conditions encountered within test boring SB-4 at 25.3 feet, may have resulted from encountering the top of bedrock. Accordingly, some bedrock excavation could become necessary.

A minimum 6 to 12 inches of Engineered Fill should be installed beneath the structure, to provide for a more uniform subgrade condition, and to assist in construction dewatering efforts, if necessary. The Engineered Fill layer should consist of Structural Fill, or Flowable backfill, as described in Section 5.50.

Bailey Avenue / East Amherst Site

Test boring SB-6 was completed to a depth of 20 feet, with the last sample consisting of soft to very soft silty clays. These soils would provide for a limited allowable net bearing pressure increase. The manhole structure, however, is expected to be about 25 to 30 feet deep. Accordingly, more favorable soil conditions, or possibly bedrock could exist with depth. An additional deeper test boring and rock coring would be necessary to define the soil conditions closer to the bottom of the proposed manhole structure.

Assuming more favorable soil conditions are not encountered, we recommend undercutting the softer silty clay bearing grade soils by a minimum of 2 feet and replacing it with an Engineered Fill layer (i.e. Structural Fill or Flowable Backfill). Recommendations for Engineered Fill are provided in Section 5.50. The manhole structure constructed over a minimum 2 feet of Engineered Fill, installed over the softer silty clay soils can be sized base on an allowable net bearing pressure increase of 500 pounds per square foot

5.20.2 Lateral Earth Pressures on Manhole Structure Walls

The manhole structure walls should be designed to resist the hydrostatic pressures as well as the lateral earth pressures acting the walls. The "at rest" lateral earth pressure should be computed based on a submerged soil unit weight below the design groundwater level. For the design of the portion of the wall below the design groundwater level, the hydrostatic pressure acting the wall must be added to the submerged or buoyant soil lateral earth pressures acting on the wall. In addition, the floor / bottom slab must be designed to resist the hydrostatic uplift pressure acting on it. For walls constructed against or near the existing soil conditions, the lateral earth pressures can be computed using the soil properties presented in Table 2a, 2b, and 2c. Data on these tables includes:

- soil layer depths;
- generalized soil descriptions;
- USCS group symbol;
- range of SPT "N" values within the soil layer;
- total unit weight;
- angle of internal friction (φ) for non-cohesive soils;
- undrained shear strength or cohesion (c) for cohesive soils;
- coefficient of at-rest lateral earth pressure; and
- OSHA Soil Classification.

Where excavations extend beyond the soils at-rest earth pressure failure plane, which are then backfilled with Structural Fill, as described in Section 5.50, the following soil properties can be used.

Recommended Soil Parameters for Structural Fill

- Angle of Internal Friction – 33 Degrees
- Moist Unit Weight of Soil – 140 pounds per cubic foot
- Submerged or Buoyant Unit Weight of Soil – 80 pounds per cubic foot
- Coefficient of At-Rest Lateral Earth Pressure – 0.46

Although a general groundwater condition is expected near depths of about 8 feet at the Breckenridge / Niagara site and about 14 feet at the other two sites, seasonally shallower perched groundwater conditions could potentially occur. Surface water or groundwater can also accumulate within the granular aggregates used to backfill the manhole structures. Accordingly, for design purposes, we recommend that groundwater conditions be assumed to exist at the ground surface for all manhole structure locations. Therefore, submerged or saturated soil unit weights should be used in the foundation analyses for all soils. The submerged unit weight should be calculated by subtracting

62.4 pounds per cubic foot from the total unit weights provided in Tables 2a, 2b, and 2c. This is the same as effective / buoyant unit weight.

5.20.3 Manhole Structure Uplift Resistance

Design of the manhole structures should consider the presence of groundwater conditions and hydrostatic pressures. As described above, it is recommended for design purposes that groundwater conditions be assumed to exist at the ground surface. A lip should be provided at the bottom of the structure in order to help mobilize the soil backfill weight against uplift. The weight of the soil column extending out at an angle of 15 degrees from vertical, above the bottom of the lip of the structure, can be added to the dead weight of the structure in computing the resistance to hydrostatic uplift. This assumes that any temporary shoring will be removed following construction, and is only for the portion of the manhole structure above any near vertical bedrock excavation.

If the shoring will remain in place, and for the portion of the manhole structure within a near vertical bedrock excavation, the weight of the soil column extending out at an angle of 15 degrees from vertical, (up to the width of the excavation), above the bottom of the lip of the structure, can be added to the dead weight of the structure in computing the resistance to hydrostatic uplift.

5.30 EXCAVATION / TEMPORARY SHORING

5.30.1 Open Cut Excavations

Open cut excavations could be used where there is sufficient room to cut back the excavation side slopes to safe and stable conditions, provided that any groundwater is depressed below the excavation bottom. The excavation must be adequately sloped back in accordance with OSHA requirements as a minimum. For preliminary planning and design purposes, Tables 2a, 2b, and 2c provide the anticipated OSHA Soil Classification for the various soil layers encountered. Based on the OSHA criteria, unsupported excavations less than 20 feet should be sloped backed to at least the following slope based on the above OSHA soil classification.

OSHA Soil Type*	**OSHA Required Minimum Side Slope**
Type A Soil	0.75 (min.) : 1.0 V
Type B Soil	1.0 H (min.) : 1.0 V
Type C Soil	1.5 H (min.) : 1.0 V
Stable Bedrock	Near Vertical

Note: H = Horizontal, V = Vertical

** For mixed soil profiles (i.e. Type B soil over Type C soil, Type C soil over Type B soil, etc.) the OSHA requirements should be referenced to determine the required minimum side slopes.*

The soil conditions could vary away from the test boring location. Accordingly, the Contractor should confirm the OSHA soil classification and excavation requirements at the time of construction based on actual location and soil and groundwater conditions present. The Contractor shall be solely responsible for all excavation safety, including the design and construction of all excavation support systems.

Excavations which encounter groundwater or unsuitable fill soils (i.e. wood, organics, etc.), could become unstable using the OSHA criteria summarized above. Therefore, flatter slopes could be required in conjunction with proper dewatering, in order to maintain stable and safe excavation slope conditions. The stockpiling of excavation spoil, bedding, and backfill materials adjacent to the open excavations should not be permitted.

5.30.2 Excavation Shoring

Where this is not adequate room to use an open cut excavation, the excavation side slopes should be supported by a properly designed and constructed shield/trench box system, or a sheeting and bracing system if determined appropriate.

Properly braced, or tied back shoring should be required at locations where existing structures, utilities, must be protected from potential detrimental soil movement as the result of soil relaxation/stress relief. It is noted that the use of cantilevered sheet piling (unbraced tight sheeting) or trench boxes will not be sufficient to prevent soil relaxation/stress relief (i.e. soil deformation) as excavations takes place.

Excavation support systems should be properly designed by a registered Professional Engineer, who is experienced in the design of earth support systems. The design requirements at each location must consider the subsurface conditions, the potential for undercutting subgrades, utilities, structures, construction sequence, lateral earth pressures, hydrostatic conditions, and surcharge effects associated with excavation wall and bottom stability. In addition, driving sheet piles can cause detrimental damage to nearby structures, surface features, and underground utilities and must be considered during design and construction. Removal of excavation support systems should also be properly evaluated so as not to affect the integrity of the adjacent infrastructure.

5.30.3 Bedrock Excavation

Limestone bedrock excavation is expected to be necessary at the Breckenridge / Niagara site. Bedrock excavation could also be necessary at the remaining two sites, pending the findings of additional deeper test borings, if completed. The generally hard to very hard, and sound nature of the Limestone bedrock, along with its relatively high RQD values indicates that it will not be rippable using a large excavator equipped with rock teeth. Therefore, it will be necessary to loosen the bedrock prior to excavation, using hydraulic/pneumatic breakers (i.e. "hoe rams"), rock grinders or through controlled drilling and blasting methods.

If blasting methods are permitted, they will need to be controlled and monitored to prevent uncontrolled rock heave and/or over-breakage of the bedrock subgrades that will support the manhole structures, as well as prevent potential detrimental impacts to existing adjacent structures and utilities. The Contractor should be required to prepare and submit a blasting operations plan. The plan should include all measures that will be employed to protect the public, workmen and structures during blasting events. A schedule of blast events should also be established and coordinated with all appropriate parties. The plan should also include measures which will be used for monitoring blast vibrations, and to confirm that no damage has occurred to existing structures and utilities and to subgrades for proposed manhole structures.

For sensitive structures and structures in poor structural condition, it is generally recommended that the peak particle velocity (ppv) measured at the structure location not exceed 5 mm/sec (0.2 inches/sec). Higher ppv thresholds, in the range of 25 mm/sec (1 inch/sec) are generally considered acceptable for structures and utilities of sound condition.

If warranted, a pre-condition survey should be made of the existing nearby structures, documenting the existing conditions, damaged areas and defects. Such documentation should include photographs, video taping, crack mapping, installation of "tell-tales", etc. This should also include documentation of doorway and window operation, and other features, which could be perceived as having been impacted or damaged.

Each blast event should be properly documented and monitored for vibration and over pressure by qualified personnel. Vibration monitoring for each blast event should be set up at the nearest structure/utility location, and at multiple locations, if appropriate. The vibrations should be limited to the thresholds stated above. In addition to the vibration monitoring the sound levels (over pressure) should not exceed 0.01 pounds per square inch (psi).

It should also be understood that quantity disputes for rock excavation can arise, as the result of bedrock heave and over-breakage from blasting. Accordingly, the construction Contract should be clear that the rock excavation pay quantity is to be based on the depth of the in-situ undisturbed bedrock surface prior to blasting, along with the design bottom and side wall neat lines. This will require probing of the existing bedrock surface to confirm its depth/elevation prior to blasting. Payment for additional rock excavation necessary due to heave and over-breakage beyond the trench width and bottom neat lines should not be allowed, and therefore should understood by the Contractor, in preparing its bid cost.

The bedrock bearing grade surfaces should be free of soil material and loose or fractured rock particles. It may also be desirable to level the bedrock bearing surface with concrete fill (f'c at 28 days > 3,000 psi), prior to installation or construction of the manhole structures.

5.30.4 Excavation Dewatering

A general groundwater condition at the time of our investigation was encountered near a depth of about 8 feet at the Breckenridge / Niagara site and at a depth of about 14 feet at the other two sites. However, some fluctuations in the groundwater elevation should be expected. Excavation dewatering should be implemented as necessary to allow for construction to proceed in the dry. In all cases construction dewatering procedures should depress and maintain the groundwater levels at least 1 to 2 feet below the excavation bottom.

The amount of groundwater that could be encountered will depend on the excavation depth, the type and depth of shoring installed, the surrounding soil and bedrock conditions, and the actual groundwater conditions at the time of construction. In addition, perched groundwater can also be expected in the bedding materials and other backfill materials of adjacent existing utilities. Groundwater seepage within the Limestone bedrock at the Breckenridge / Niagara site and within the more granular fill and indigenous soils at the Gates Circle / Delaware Avenue site should be expected to be more significant than the Bailey Avenue / East Amherst Street site, where the soils were finer grained. Excavation within non-plastic sand and gravel soils, below groundwater, can be expected to undergo relatively rapid excavation bottom degradation and excavation side slope instability if not properly dewatered and stabilized.

It is anticipated that sump and pump methods of dewatering will be necessary, as a minimum to control groundwater conditions, should they be encountered. More substantial methods, such as deep sumps, deep wells, and/or vacuum well points, could be necessary, both within the excavation and on the outside of the shoring system.

A stone working mat/drainage layer could be use within the bottom of excavations that are below the groundwater and within more granular soils, such as those encountered at the Gates Circle / Delaware Avenue site. This would help to protect the underlying subgrades, and assist with excavation dewatering. Accordingly, the following could be considered for the drainage stone layer. However, depending on the actual excavation depth and subgrade conditions encountered at the time of construction, as well as considering construction logistics, an alternative drainage layer/working mat system (i.e. thickness and components) may be appropriate.

- Undercut the below grade area subgrade at least 24 inches below the bottom of the manhole structure.
- Place a stabilization/drainage geotextile (Mirafi 160 N or suitable equivalent) over the exposed soil subgrade and up the excavation sidewalls.
- Place an 18 inch thick drainage stone layer of NYSDOT Standard Specifications Section 703-02, Size Designation No. 2, washed, crushed coarse aggregate.
- Place a second geotextile layer to completely encapsulate the drainage stone layer from the surrounding soils.
- Place an additional 6 inches of Structural Fill, as described in Section 5.50, over the encapsulated drainage stone layer after dewatering has commenced.

Dewatering systems should be operated on a continual basis, until enough of the structure has been constructed and backfilled to resist the hydrostatic uplift pressures.

5.30.5 Protection of Existing Structures

Existing building foundations, below grade walls, utilities, and the roadways should be protected against potential undermining and lateral instability during excavation and construction of the manhole structures. This will likely require some type of excavation shoring within portions of the three sites, where there is not adequate room to slope back the excavations.

5.40 SEISMIC DESIGN CONSIDERATIONS

Based on the subsurface conditions encountered in the test borings, and our knowledge of the regional geology, the Breckenridge Street / Niagara Street site can be classified as Seismic Site Class “C”, while the Gates Circle / Delaware Avenue site and the Bailey Avenue / East Amherst Street site should both be classified as Seismic Site Class “D”, in accordance with ASCE 7-16, Table 20.3-1, as referenced in the 2020 Building Code of New York State.

The spectral response accelerations at the project site were obtained by Empire using the SEAOC / OSHPD web site application https://seismicmaps.org, using the site

locations. For design purposes, these spectral response accelerations were then adjusted for the Seismic Site Class soil profile determined for the project site. The following table summarizes the spectral response accelerations for the short period (0.2 second) response (S_S) and for the one second response (S_1). The adjusted spectral response accelerations, based on the Seismic Site Class are also summarized in the table and include: the Short Period Response (S_{MS}); 1 Second Period Response (S_{M1}); and the corresponding five percent damped design spectral response accelerations (S_{DS} and S_{D1}).

Parameter	Breckenridge Street / Niagara Street	Gates Circle / Delaware Avenue	Bailey Avenue / East Amherst Street
Seismic Site Class	"C"	"D"	"D"
S_S	0.160	0.162	0.166
S_1	0.044	0.044	0.045
S_{MS}	0.209	0.260	0.266
S_{M1}	0.066	0.106	0.107
S_{DS}	0.139	0.173	0.177
S_{D1}	0.044	0.071	0.072

5.50 ENGINEERED FILL MATERIALS

Structural Fill or Flowable backfill material can be used beneath the manhole structures which are constructed over soils, as required. Recommendations for these materials are provided below.

5.50.1 Structural Fill Material

Structural Fill, placed beneath the manhole structures, or used as backfill, should consist of crusher run stone, which should be free of clay, organics and friable or deleterious particles. As a minimum, the crusher stone should meet the requirements of New York State Department of Transportation, Standard Specifications, Item 304.12 – Type 2 Subbase, with the following gradation requirements.

Sieve Size Distribution	Percent Finer by Weight
2 inch	100
¼ inch	25-60
No. 40	5-40
No. 200	0-10

The crusher run stone Structural Fill should be compacted to a minimum of 95 percent of the maximum dry density as measured by the modified Proctor test (ASTM D1557). Placement of fill should not exceed a maximum loose lift thickness of 8 to 10 inches. The loose lift thickness should be reduced in conjunction with the compaction equipment used so that the required density is attained. The crusher run stone should have a moisture content within two percent of the optimum moisture content at the time of compaction.

Where Structural Fill is installed beneath the manhole structures, it should extend out horizontally a distance equal to at least 0.5 times the thickness of the Structural Fill layer beneath the structure. Excavations, therefore, will need to be planned and sized accordingly.

5.50.2 Flowable Backfill Fill Material

Flowable backfill material, if used as the Engineered Fill layer, should be a non-swelling type material and should have a minimum 28-day compressive strength (f'c) of 300 pounds per square inch (psi). The flowable backfill should extend at least 12 inches horizontally beyond the manhole structure limits for its entire depth.

5.60 ADDITIONAL INVESTIGATIONS AND TESTING

Additional subsurface investigations, laboratory testing, and field testing could be considered to further define the subsurface conditions that will be encountered during construction. This could include but is not limited to the following:

Breckenridge Street / Niagara Street Site

- Rock core completed to the bottom of the deeper manhole structure.
- Unconfined compressive strength testing of the additional recovered bedrock cores.
- Groundwater drawdown test within the bedrock core hole to estimate the permeability of the bedrock.
- Obtain bi-monthly groundwater depth measurements from observation well(s), to evaluate for seasonal fluctuations.

Gates Circle / Delaware Avenue Site

- Deeper test boring / rock coring to determine if the sample spoon refusal conditions at 25.3 feet within test boring SB-4 is actually bedrock.
- Laboratory testing to further characterize the soil conditions.
- Obtain bi-monthly groundwater depth measurements from observation well, to evaluate for seasonal fluctuations.

East Amherst Street / Bailey Avenue Site

- Deeper test boring / rock coring to determine the soil conditions at and below the manhole structure bearing grade depth.
- Laboratory testing to further characterize the soil conditions.
- Install a groundwater observation well and obtain bi-monthly groundwater depth measurements to better define the groundwater depth, as well as seasonal fluctuations.

6.00 CONCLUDING REMARKS

This report was prepared to assist in the design and construction of the proposed Real-Time Controlled (RTC) Smart Sewer Projects, planned at three locations within the City of Buffalo, New York. These include: the area southeast of the Breckenridge Street and Niagara Street intersection; the area northeast of the Gates Circle and Delaware Avenue intersection; and at the intersection of East Amherst Street and Bailey Avenue. The report has been prepared for the exclusive use of Greeley and Hansen, Buffalo Sewer Authority, and other members of the design team, for specific application to this site and this project only.

The project information and recommendations presented in this report were prepared based on Empire's understanding of the proposed project and the subsurface exploration work completed by SJB Services, Inc. as described herein, and through the application of generally accepted soils and foundation engineering practices. Empire should be consulted with any questions regarding the interpretation of the findings of our work, and/or the geotechnical considerations and recommendations presented. In addition, the recommendations presented are provided as guidance to the designer and should not be considered a project specification. No warranties expressed or implied are made regarding the subsurface conditions present, or by the conclusions, opinions, recommendations or services provided.

Empire should be informed of any changes to the planned construction so that it may be determined if any modifications to the information presented in this report are necessary. Empire and/or its designated representative should also be retained to review final plans and specifications and to monitor the foundation and site work construction to verify that the recommendations were properly interpreted and implemented.

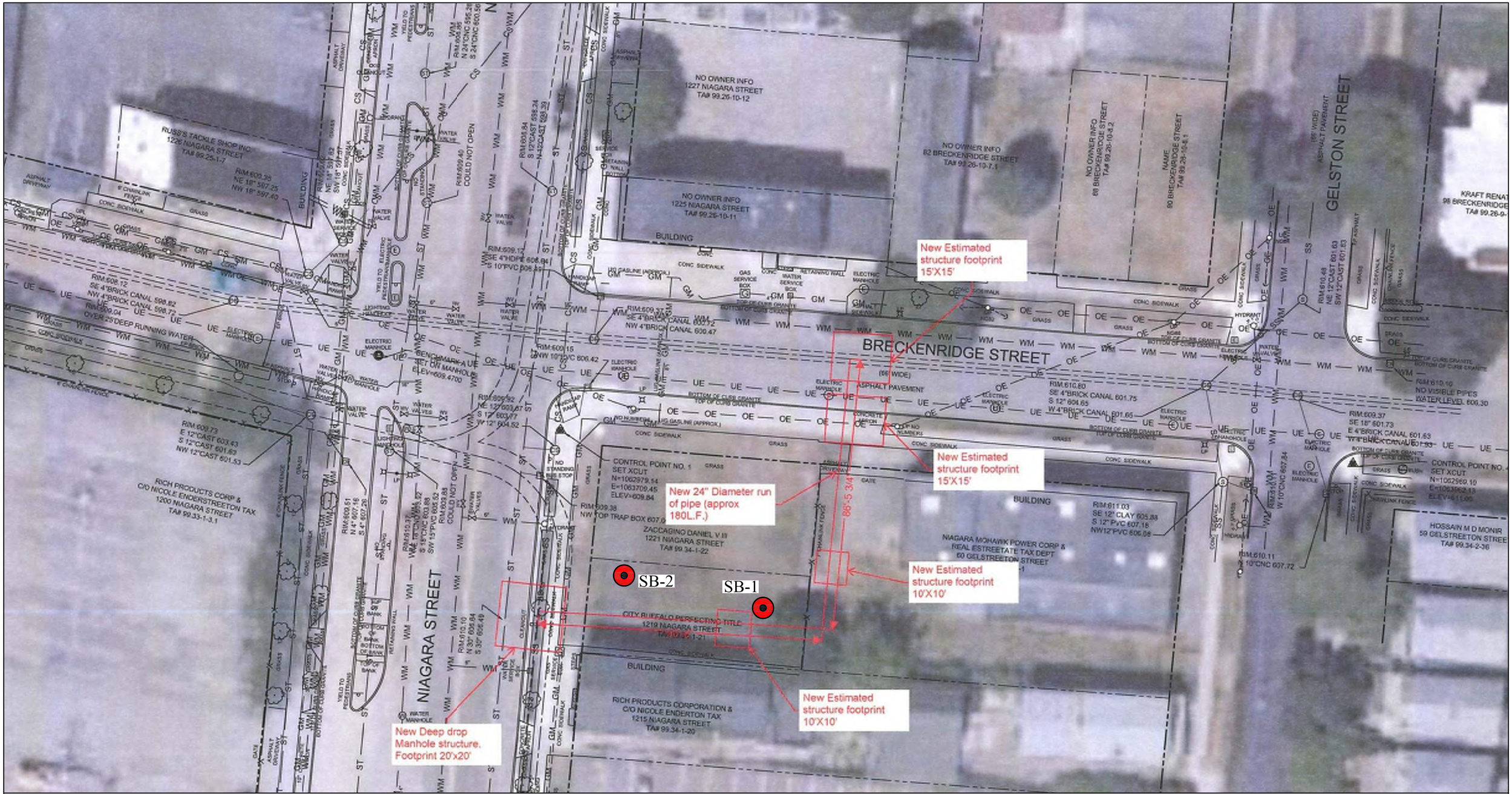
Additional information regarding the use and interpretation of this report is presented in Appendix D.

Respectfully Submitted:

WMA Engineering DPC, dba
Empire Geotechnical Engineering Services

Thomas R. Seider, P.E.
Senior Geotechnical Engineer

FIGURES



LEGEND:

SB-1 ◉ INDICATES APPROXIMATE LOCATION AND DESIGNATION OF TEST BORING.

NOTE: FIGURE DEVELOPED FROM JUNE 2022 EXISTING SITE PLAN WITH DEMOLITION, DRAWING C02, PREPARED BY GREELEY AND HANSON.

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WMA ENGINEERING DPC|DBA
EMPIRE GEOTECHNICAL ENGINEERING SERVICES

PROPOSED REAL-TIME CONTROLLED (RTC) SMART SEWER PROJECTS
BUFFALO SEWER AUTHORITY - BRECKENRIDGE STREET AND NIAGARA STREET
CITY OF BUFFALO, NEW YORK

EXPLORATION LOCATION PLAN (BRECKENRIDGE STREET AND NIAGARA STREET)	DR BY: BVB	SCALE: NTS	PROJECT NO.: WB-22-073
	CHKD BY: TRS	DATE: 7/11/2022	FIGURE NO: 1

TABLES

TABLE 1
Test Boring GPS Coordinates

Proposed Real-Time Controlled (RTC) Smart Sewer Projects
Buffalo Sewer Authority – 3 Sites
City of Buffalo, New York

Exploration Number	Project Name	Exploration Locations - GPS Coordinates	
		Latitude (Northing)	Longitude (Easting)
SB-1	Breckenridge Street and Niagara Street	42° 55' 0.7"	-78° 53' 56.5"
SB-2		42° 55' 0.6"	-78° 53' 55.9"
SB-3	Gates Circle and Delaware Avenue	42° 55' 15.6"	-78° 52' 2.4"
SB-4		42° 55' 15.4"	-78° 52' 2.8"
SB-6	Bailey Avenue and East Amherst Street	42° 56' 24.9	-78° 48' 50.5"

TABLE 2a - Recommended Soil Properties

Niagara Street and Breckenridge Street (Test Borings SB-1 and SB-2)

Proposed Real-Time Controlled (RTC) Smart Sewer Project
Buffalo Sewer Authority
City of Buffalo, New York

Test Boring	Soil Layer Depth (ft. bgs)	Generalized Soil Description	USCS Group Symbol	SPT "N" Values	Total Unit Weight (pcf) [see note 1]	Angle of Internal Friction (φ) (degrees)	Undrained Shear Strength (C) (psf)	Coeff of At-Rest Lateral Earth Pressure (K_0)	OSHA Soil Classification [see note 2]
SB-1	0 to 4	Silty Clay with Sand and Gravel	Fill	9 to 13	115	28	---	0.53	C
	4 to 8.6	Silty Clay with Sand and Gravel	CL	17 to 51	125	31	---	0.49	C
SB-2	0 to 6	Silty Clay with Sand and Gravel	Fill	6 to 10	115	28	---	0.53	C
	6 to 7.8	Sand with Clayey Silt	SM-SC	61	130	31	---	0.49	C

Notes:
1. Recommended depth to groundwater is 0 feet. Submerged soil unit weights should be used below this depth.
2. Contractor should confirm the OSHA soil classification and excavation requirements at the time of construction
3. ft. bgs = feet below ground surface.
4. USCS = Unified Soil Classification System.
5. pcf = pounds per cubic foot.
6. psf = pounds per square foot.

WMA Engineering DPC
dba Empire Geotechnical Engineering Services
5167 South Park Avenue
Hamburg, New York

APPENDIX A

SUBSURFACE EXPLORATION LOGS

GENERAL INFORMATION & KEY TO SUBSURFACE LOGS

The Subsurface Logs attached to this report present the observations and mechanical data collected by the driller at the site, supplemented by classification of the material removed from the borings as determined through visual identification by technicians in the laboratory. It is cautioned that the materials removed from the borings represent only a fraction of the total volume of the deposits at the site and may not necessarily be representative of the subsurface condition between adjacent borings or between the sampled intervals. The data presented of the Subsurface Logs together with the recovered samples provide a basis for evaluating the character of the subsurface conditions relative to the project. The evaluation must consider all the recorded details and their procedures to more accurately evaluate the subsurface conditions. Any evaluation of the contents of this report and recovered samples must be performed by qualified professionals. The following information defines some of the procedures and terms used of the Subsurface Logs to describe the conditions encountered, consistent with the numbered identifiers shown on the Key opposite this page.

1. **The figures in the Depth column define the scale of the Subsurface Log.**
2. **The Samples column shows, graphically, the depth range from which a sample was recovered. See Table I for descriptions of the symbols used to represent the various types of samples.**
3. **The Sample No. is used for identification on sample containers and/or Laboratory Test Reports.**
4. **Blows on Sampler – shows the results of the "Penetration Test", recording the number of blows required to drive a split spoon sampler into the soil. The number of blows required for each six inches is recorded. The first 6 inches of penetration is considered a seating drive. The number of blows required for the second and third 6 inches of penetration is termed the penetration resistance, N.**
5. **Blows on Casing – Shows the number of blows required to advance the casing a distance of 12 inches. The casing size, hammer weight, and length of drop are noted at the bottom of the Subsurface Log. If the casing is advanced by means other than driving, the method of advancement will be indicated in the Notes column or under the Method of Investigation at the bottom of the Subsurface Log. Alternatively, sample recovery may be shown in this column or other data consistent with the column heading.**
6. **All recovered soil samples are reviewed in the laboratory by an engineering technician, geologist, or geotechnical engineer, unless noted otherwise. Visual descriptions are made on the basis of a combination of the driller's field descriptions and noted observations together with the sample as received in the laboratory. The method of visual classification is based primarily on the Unified Soil Classification System (ASTM D 2487) with regard to the particle size and plasticity (See Table No. II), and the Unified Soil Classification System group symbols for the soil types are sometimes included with the soil classification. Additionally, the relative portion, by weight, of two or more soil types is described for granular soils in accordance with "Suggested Methods of Test for Identification of Soils" by D.M. Burmister, ASTM Special Technical Publication 479, June 1970. (See Table No. III). Description of the relative soil density or consistency is based upon the penetration records as defined in Table No. IV. The description of the soil moisture is based upon the relative wetness of the soil as recovered and is described as dry, moist, wet, and saturated. Water introduced into the boring either naturally or during drilling may have affected the moisture condition of the recovered sample. Special terms are used as required to describe soil deposition in greater detail; several such terms are listed in Table V. When sampling gravelly soils with a standard two inch diameter split spoon, the true percentage of gravel is often not recovered due to the relatively small sampler diameter. The presence of boulders and large gravel is sometimes, but not necessarily, detected by an evaluation of the casing and sampler blows or through the "action" of the drill rig as reported by the driller.**
7. **Rock description is based on review of the recovered rock core and the driller's notes. Frequently used rock classification terms are included in Table VI.**
8. **The stratification lines represent the approximate boundary between soil types and the transition may be gradual. Solid stratification lines delineate apparent changes in soil type, based upon review of recovered soil samples and the driller's notes. Dashed lines convey a lesser degree of certainty with respect to either a change in soil type or where such change may occur.**
9. **Miscellaneous observations and procedures noted by the driller are shown in this column, including water level observations. It is important to realize the reliability of the water level observations depends upon the soil type (water does not readily stabilize in a hole through fine grained soils), and that any drill water used to advance the boring may have influenced the observations. The ground water level will fluctuate seasonally, typically. One or more perched or trapped water levels may exist in the ground seasonally. All the available readings should be evaluated. If definite conclusions cannot be made, it is often prudent to examine the conditions more thoroughly through test pit excavations or groundwater observation wells.**
10. **The length of core run is defined as the length of penetration of the core barrel. Core recovery is the length of core recovered divided by the core run. The RQD (Rock Quality Designation) is the total length of pieces of NX core exceeding 4 inches divided by the core run. The size core barrel used is also noted in the Method of Investigation at the bottom of the Subsurface Log.**

DATE

STARTED _____

FINISHED _____

SHEET _____ OF _____

SJB SERVICES, INC.
SUBSURFACE LOG

PROJ. No. _____

HOLE No. _____

SURF. ELEV. _____

G.W. DEPTH _____

PROJECT _____ LOCATION _____

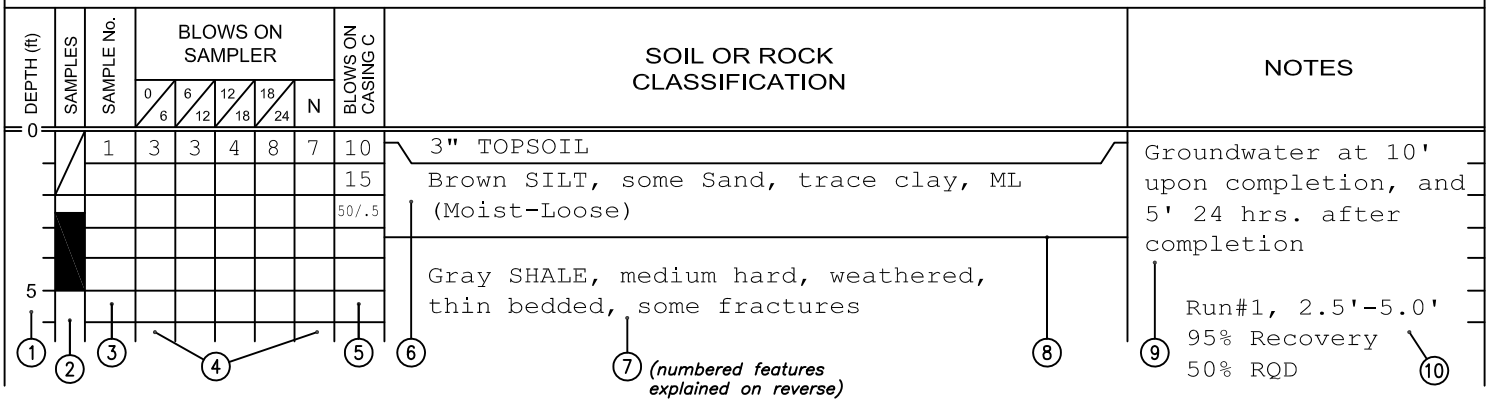


TABLE I

- Split Spoon Sample
- Shelby Tube Sample
- Geoprobe Macro-Core
- Auger or Test Pit Sample
- Rock Core

TABLE II

Identification of soil type is made on basis of an estimate of particle sizes, and in the case of fine grained soils also on basis of plasticity.

Soil Type	Soil Particle Size	
Boulder	>12"	Coarse Grained (Granular)
Cobble	3" - 12"	
Gravel - Coarse	3" - 3/4"	
- Fine	3/4" - #4	
Sand - Coarse	#4 - #10	
- Medium	#10 - #40	
- Fine	#40 - #200	
Silt - Non Plastic (Granular) Clay - Plastic (Cohesive)	<#200	Fine Grained

TABLE III

The following terms are used in classifying soils consisting of mixtures of two or more soil types. The estimate is based on weight of total sample.

Term	Percent of Total Sample
"and"	35 - 50
"some"	20 - 35
"little"	10 - 20
"trace"	less than 10

(When sampling gravelly soils with a standard split spoon, the true percentage of gravel is often not recovered due to the relatively small sampler diameter.)

TABLE IV

The relative compactness or consistency is described in accordance with the following terms:

Granular Soils		Cohesive Soils	
Term	**Blows per Foot, N**	**Term**	**Blows per Foot, N**
Very Loose	0 - 4	Very Soft	0 - 2
Loose	4 - 10	Soft	2 - 4
Firm	10 - 30	Medium	4 - 8
Compact	30 - 50	Stiff	8 - 15
Very Compact	>50	Very Stiff	15 - 30
		Hard	>30

(Large particles in the soils will often significantly influence the blows per foot recorded during the penetration test)

TABLE V

Varved	Horizontal uniform layers or seams of soil(s).
Layer	Soil deposit more than 6" thick.
Seam	Soil deposit less than 6" thick.
Parting	Soil deposit less than 1/8" thick.
Laminated	Irregular, horizontal and angled seams and partings of soil(s).

TABLE VI

Rock Classification Term		Meaning
Hardness	- Soft	Scratched by fingernail
	- Medium Hard	Scratched easily by penknife
	- Hard	Scratched with difficulty by penknife
	- Very Hard	Cannot be scratched by penknife
Weathering	- Very Weathered	Judged from the relative amounts of disintegration, iron staining, core recovery, clay seams, etc.
	- Weathered	
	- Sound	

Rock Classification Term		Meaning	
Bedding	- Laminated	(<1")	Natural breaks in Rock Layers
	- Thin Bedded	(1" - 4")	
	- Bedded	(4" - 12")	
	- Thick Bedded	(12" - 36")	
	- Massive	(>36")	

(Fracturing refers to natural breaks in the rock oriented at some angle to the rock layers)

DATE:
START 6/17/2022
FINISH 6/17/2022

SHEET 1 OF 1

SJB SERVICES, INC.
SUBSURFACE LOG

HOLE NO. SB-1
SURF. ELEV G.S.
G.W. DEPTH See Notes

PROJECT: REAL-TIME CONTROLLED SMART SEWER
PROJ. NO.: BE-22-073
LOCATION: NIAGARA ST. AND BRECKENRIDGE ST. BUFFALO,NY

DEPTH FT.	SMPL NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	N	PID	SOIL OR ROCK CLASSIFICATION	NOTES
	1	4	4				TOPSOIL	Geologist noted approximately 2" of Topsoil at the surface
		5	5		9	BKG	Brown Silty CLAY, little f-c Gravel, tr. sand, tr. organics (moist, FILL)	
	2	3	6					
		7	11		13	BKG		
5	3	3	8				Brown Silty CLAY, tr. sand, with Silt Partings	REF = Sample Spoon Refusal
		9	12		17	BKG	(moist-wet, v. stiff, CL)	
	4	13	20				Contains some fine Gravel, little f-c Sand	
		31	35		51	BKG	(moist-wet, v. stiff)	
	5	13	50/0.1		REF		Contains little fine Gravel (moist, hard)	HQ '2' Size Rock Core
10							Gray LIMESTONE Rock, sound, hard to v. hard, laminated to thickly bedded, with both natural and mechanical fractures, and occasional chert	Run #1: 8.6' - 13.6' REC = 100% RQD = 88%
15							Becomes thickly bedded to massively bedded	Run #2: 13.6' - 18.6' REC = 100% RQD = 100%
20							Boring Complete at 18.6'	No Free Standing Water encountered before coring
25								Free Standing Water recorded at 4.2' after coring
30								
35								
40								

N = NO. BLOWS TO DRIVE 2-INCH SPOON 12-INCHES WITH A 140 LB. PIN WT. FALLING 30-INCHES PER BLOW

CLASSIFIED BY: Geologist

DRILLER: R. STEINER

DRILL RIG TYPE : CME 75

METHOD OF INVESTIGATION ASTM D-1586 USING HOLLOW STEM AUGERS

DATE:
START 6/17/2022
FINISH 6/17/2022

SHEET 1 OF 1

SJB SERVICES, INC.
SUBSURFACE LOG

HOLE NO. SB-2
SURF. ELEV G.S.

G.W. DEPTH See Notes

PROJECT: REAL-TIME CONTROLLED SMART SEWER
PROJ. NO.: BE-22-073

LOCATION: NIAGARA ST. AND BRECKENRIDGE ST.
BUFFALO,NY

DEPTH FT.	SMPL NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	N	PID	SOIL OR ROCK CLASSIFICATION	NOTES
	1	3	4				TOPSOIL	Geologist noted approximately 3" of Topsoil at the surface
		6	8		10	BKG	Brown Silty CLAY, some fine Gravel, little f-c Sand, tr. concrete, tr. organics (moist, FILL)	
	2	4	3					
		4	6		7	BKG	Brown f-c SAND, some Silty Clay, little fine Gravel, tr. organics (moist, FILL)	
5	3	4	2					
		4	8		6	BKG	Brown Silty CLAY, little f-c Sand, tr. gravel, tr. organics (moist, FILL)	
	4	17	24					S-4: Contained Rock Chips
		37	50/0.3		61	BKG	Brown f-m SAND, little Clayey Silt, tr. gravel, with Clay Partings (wet, v. compact, SM-SC)	HQ '2' Size Rock Core
10							Gray LIMESTONE Rock, sound, hard to v. hard, bedded to thickly bedded, both natural and mechanical fractures	Run #1: 7.8' - 12.8' REC = 100% RQD = 98%
							Boring Complete at 12.8'	No Free Standing Water encountered before coring
15								Free Standing Water recorded at 1.2' after coring
20								Groundwater Observation well installed within completed test boring
25								Refer to Monitoring Well Completion record for details
30								
35								
40								

N = NO. BLOWS TO DRIVE 2-INCH SPOON 12-INCHES WITH A 140 LB. PIN WT. FALLING 30-INCHES PER BLOW

CLASSIFIED BY: Geologist

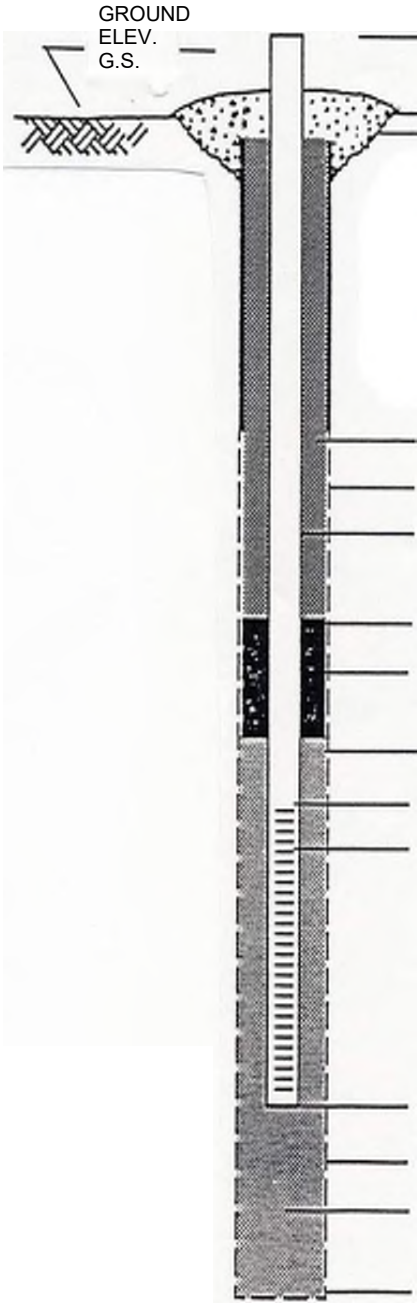
DRILLER: R. STEINER

DRILL RIG TYPE : CME 75

METHOD OF INVESTIGATION ASTM D-1586 USING HOLLOW STEM AUGERS

MONITORING WELL COMPLETION RECORD

WELL NUMBER: SB-2	
PROJECT: REAL-TIME CONTROLRED SMART SEWER	**DRILLING METHOD:** ASTM D-1586 USING HSA
PROJECT NUMBER: BE-22-073	**GEOLOGIST:** N/A
DRILLER: R. STEINER	**INSTALLATION DATE(S):** 6/17/22



STICK-UP/TOP OF RISER PIPE:	2.8'
TYPE OF SURFACE SEAL:	AUGER CUTTINGS
TYPE OF BACKFILL:	AUGER CUTTINGS
BOREHOLE DIAMETER:	8" ±
I.D. OF RISER PIPE:	2"
TYPE OF RISER PIPE:	PVC
DEPTH OF SEAL:	3.8'
TYPE OF SEAL:	BENTONITE CHIPS
DEPTH OF SAND PACK:	6.5'
DEPTH OF TOP OF SCREEN:	7.7'
TYPE OF SCREEN:	PVC
SLOT SIZE X LENGTH:	.010"x10.0'
I.D. OF SCREEN:	2"
TYPE OF SAND PACK:	MORIE '0' FILTER SAND
DEPTH BOTTOM OF SCREEN:	12.7'
DEPTH BOTTOM OF SAND PACK:	12.8'
TYPE OF BACKFILL BELOW OBSERVATION WELL:	MORIE '0' FILTER SAND
ELEVATION/ DEPTH OF HOLE:	12.8'

APPENDIX B

ROCK CORE PHOTOGRAPHS

ROCK CORE SUMMARY SB-1

REAL-TIME CONTROLLED SMART SEWER
NIAGARA ST. AND BRECKENRIDGE ST
BUFFALO, NEW YORK

Boring SB-1 Runs 1 and 2

RUN	DEPTH	RECOVERY	RQD
1	8.6’-13.6’	100%	88%
2	13.6’-18.6’	100%	100%

ROCK CORE SUMMARY SB-2

REAL-TIME CONTROLLED SMART SEWER
NIAGARA ST. AND BRECKENRIDGE ST
BUFFALO, NEW YORK

Boring SB-2 Run 1

RUN	DEPTH	RECOVERY	RQD
1	7.8’-12.8’	100%	98%

APPENDIX C

SOIL AND GROUNDWATER SAMPLING /ANALYTICAL TESTING REPORT

Contract
Drilling
and
Testing

BUFFALO OFFICE
CORPORATE OFFICE
5167 South Park Avenue
Hamburg, NY 14075
p: 716.649.8110
f: 716.649.8051

ROCHESTER OFFICE
535 Summit Point Drive
Henrietta, NY 14667
p: 585.359.2730
f: 585.359.9668

ALBANY OFFICE
P.O. Box 2199
Ballston Spa, NY 12020

5 Knabner Road
Mechanicville, NY 12118
p: 518.899.7491
f: 518.899.7496

CORTLAND OFFICE
60 Miller Street
Cortland, NY 13045
p: 607.758.7182
f: 607.758.7188

www.sjbempire.net
info@sjbempire.net

July 14, 2022
SJB Project No. BE-22-073

Greeley & Hansen
111 Broadway, Room 2101
New York, New York 10006

Attention: May Sharif, P.E.
msharif@greeley-hansen.com

Reference: Geotechnical Services
Buffalo Sewer Authority
- Breckenridge at Niagara RTC
- Gates Circle RTC
- Bailey Ave at East Amherst RTC

Dear May:

SJB Services, Inc. (SJB) is providing the results of environmental laboratory testing of 3 soil samples and two groundwater samples. The soil samples were collected as a composite from each location. The groundwater was collected from the monitoring wells within the first week of installation. The samples were placed into the appropriate laboratory containers and submitted to Paradigm Environmental Services, Inc. (Paradigm) located in Amherst, New York on June 22, 2022 and June 30, 2022. Paradigm is a New York State Department of Health (NYSDOH) certified laboratory. Chain-of- Custody documentation accompanied the samples.

Laboratory Analysis of Soil Samples

The soil samples were collected as a composite sample from the borings. The collected soil samples were placed into pre-cleaned, laboratory sampling containers, which were labeled with the date, time, and location. Chain of custody documentations was maintained with the samples.

The samples were analyzed for the following parameters:
- TCLP Benzene
- TCLP Lead
- TCLP Ignitability

The analytical results for the samples were compared to the EPA Toxicity Characteristic Leaching Procedure and Characteristic wastes (TCLP) limits and are summarized on page 3.

Soil Field Observations

During drilling, the SJB geologist screened the recovered soils with a MiniRAE Lite photoionization detector (PID). The PID is capable of detecting volatile organic vapor concentrations at a practical threshold of 1.0 part per million (ppm). The geologist also inspected the soils for evidence of environmental degradation (i.e. discoloration, staining, odors, etc.). No evidence of environmental degradation was observed in any of the borings.

Groundwater Sampling and Analysis

The monitoring wells were sampled by SJB on June 21, 2022 and June 30, 2022. Prior to sampling, SJB purged 3 well volumes from each well using dedicated polyethylene bailers. The collected groundwater samples were placed into pre-cleaned, pre-preserved laboratory sampling containers, which were labeled with the date, time, and location. Chain-of-custody documentation was maintained with the samples.

Samples were analyzed for the following parameters:

- TCLP Benzene
- TCLP Lead
- TCLP Flashpoint

The analytical results for the samples were compared to the EPA Toxicity Characteristic Leaching Procedure and Characteristic wastes (TCLP) limits

Groundwater Field Observations

The following observations were made during the groundwater sampling field work on June 21,30, 2022

Odor: None

Sheen: None

Groundwater Laboratory Results

The analytical results for the groundwater samples are summarized on page 3. All groundwater lab data are compared to the EPA Toxicity Characteristic Leaching Procedure and Characteristic wastes (TCLP) limits. Paradigm's analytical reports are attached.

Analytical Results

Niagara and Breckenridge	TCLP Benzene	TCLP Lead	TCLP Flashpoint	TCLP Ignitability
Soil	<20.0	<0.5		No Burn
Water	<20.0	<0.5	>70 C	
Gates Circle				
Soil	<20.0	<0.5		No Burn
Water	<20.0	<0.5	>70.0 C	
Bailey & E Amherst				
Soil	<20.0	<0.5		No Burn
Regulatory Limits	500	5	<60 C	

CLOSING

This report has been completed for Greenly and Hanson in accordance with generally accepted environmental practices. SJB appreciates the opportunity to provide these services. If you have any questions or we can provide further assistance, please contact our office at 716-649-8110.

Respectfully submitted,
SJB SERVICES, INC.

Garrett Lavelle
Geologist

Attachments:

Well Readings

Paradigm's Analytical Reports

Project BSA

Well ID	Date	Stick Up(FT)	Depth to Water (FT)	Depth to Bottom (ft)	Volume Removed	Well Sampled	Odor	Sheen	Color
SB-2	6/21/2022	2.5	4.45	15.2	5.16	Y	N	N	Brown
SB-4	6/22/2022	2.7	20.7	26.7	2.88	Y	N	N	Brown
SB-2	6/30/2022	2.5	10.5	15.2	2.26	Y	N	N	Brown
SB-4	6/30/2022	2.7	20.83	26.45	2.77	Y	N	N	Brown
SB-2	7/1/2022	2.5	10.55	15.2		N	N		
SB-4	7/1/2022	2.7	20.9	26.45		N	N		

PARADIGM

ENVIRONMENTAL SERVICES, INC

Analytical Report For

SJB Services, Inc.

For Lab Project ID

222961

Referencing

BSA

Prepared

Thursday, June 30, 2022

Any noncompliant QC parameters or other notes impacting data interpretation are flagged or documented on the final report or are noted below.

Certifies that this report has been approved by the Technical Director or Designee

179 Lake Avenue • Rochester, NY 14608 • (585) 647-2530 • Fax (585) 647-3311 • ELAP ID# 10958

PARADIGM
ENVIRONMENTAL SERVICES, INC.

Lab Project ID: 222961

Client: **SJB Services, Inc.**

Project Reference: BSA

Sample Identifier:	Niagara & Breckenridge		
Lab Sample ID:	222961-01	**Date Sampled**	6/17/2022 13:00
Matrix:	Soil	**Date Received**	6/23/2022

Ignitability

Analyte	Result	Units	Qualifier	Date Analyzed
Ignitability	No Burn	mm / sec		6/27/2022

Method Reference(s): EPA 1030

PARADIGM
ENVIRONMENTAL SERVICES, INC.

Lab Project ID: 222961

Client: **SJB Services, Inc.**

Project Reference: BSA

Sample Identifier:	Niagara & Breckenridge		
Lab Sample ID:	222961-01A	**Date Sampled**	6/17/2022 13:00
Matrix:	TCLP Extract	**Date Received**	6/23/2022

TCLP Volatile Organics

Analyte	Result	Units	Regulatory Limit	Qualifier	Date Analyzed
Benzene	< 20.0	ug/L	500		6/28/2022 17:20

Surrogate	Percent Recovery	Limits	Outliers	Date Analyzed
1,2-Dichloroethane-d4	**99.1**	81.1 - 136		6/28/2022 17:20
4-Bromofluorobenzene	**99.4**	75.8 - 132		6/28/2022 17:20
Pentafluorobenzene	**99.8**	82 - 132		6/28/2022 17:20
Toluene-D8	**103**	64.6 - 137		6/28/2022 17:20

Method Reference(s): EPA 8260C
EPA 1311 / 5030C
Data File: z10209.D

TCLP Metals (ICP)

Analyte	Result	Units	Regulatory Limit	Qualifier	Date Analyzed
Lead	< 0.500	mg/L	5		6/27/2022 15:16

Method Reference(s): EPA 6010C
EPA 1311 / 3005A
Preparation Date: 6/24/2022
Data File: 220627C

PARADIGM
ENVIRONMENTAL SERVICES, INC.

Lab Project ID: 222961

Client: **SJB Services, Inc.**

Project Reference: BSA

Sample Identifier:	Niagara & Breckenridge		
Lab Sample ID:	222961-04	**Date Sampled**	6/21/2022 12:00
Matrix:	Water	**Date Received**	6/23/2022

Flash Point

Analyte	Result	Units	Qualifier	Date Analyzed
Flash Point, Celsius	> 70.0	C		6/30/2022

Method Reference(s): EPA 1010A

ELAP does not offer this test for approval as part of their laboratory certification program.

Analytical Report Appendix

The reported results relate only to the samples as they have been received by the laboratory.

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All soil/sludge samples have been reported on a dry weight basis, unless qualified "reported as received". Other solids are reported as received.

Low level Volatiles blank reports for soil/solid matrix are based on a nominal 5 gram weight. Sample results and reporting limits are based on actual weight, which may be more or less than 5 grams.

The Chain of Custody provides additional information, including compliance with sample condition requirements upon receipt. Sample condition requirements are defined under the 2003 NELAC Standard, sections 5.5.8.3.1 and 5.5.8.3.2.

NYSDOH ELAP does not certify for all parameters. Paradigm Environmental Services or the indicated subcontracted laboratory does hold certification for all analytes where certification is offered by ELAP unless otherwise specified. Aliquots separated for certain tests, such as TCLP, are indicated on the Chain of Custody and final reports with an "A" suffix.

Data qualifiers are used, when necessary, to provide additional information about the data. This information may be communicated as a flag or as text at the bottom of the report. Please refer to the following list of analyte-specific, frequently used data flags and their meaning:

"<" = Analyzed for but not detected at or above the quantitation limit.
"E" = Result has been estimated, calibration limit exceeded.
"H" = Denotes a parameter analyzed outside of holding time.
"Z" = See case narrative.
"D" = Sample, Laboratory Control Sample, or Matrix Spike Duplicate results above Relative Percent Difference limit.
"M" = Matrix spike recoveries outside QC limits. Matrix bias indicated.
"B" = Method blank contained trace levels of analyte. Refer to included method blank report.
"J" = Result estimated between the quantitation limit and half the quantitation limit.
"L" = Laboratory Control Sample recovery outside accepted QC limits.
"P" = Concentration differs by more than 40% between the primary and secondary analytical columns.
"NC" = Not calculable. Applicable to RPD if sample or duplicate result is non-detect or estimated (see primary report for data flags). Applicable to MS if sample is greater or equal to ten times the spike added. Applicable to sample surrogates or MS if sample dilution is 10x or higher.
"" = Indicates any recoveries outside associated acceptance windows. Surrogate outliers in samples are presumed matrix effects. LCS demonstrates method compliance unless otherwise noted.*
"(1)" = Indicates data from primary column used for QC calculation.
"A" = denotes a parameter for which ELAP does not offer approval as part of their laboratory certification program.
"F" = denotes a parameter for which Paradigm does not carry certification, the results for which should therefore only be used where ELAP certification is not required, such as personal exposure assessment.

GENERAL TERMS AND CONDITIONS
LABORATORY SERVICES

These Terms and Conditions embody the whole agreement of the parties in the absence of a signed and executed contract between the Laboratory (LAB) and Client. They shall supersede all previous communications, representations, or agreements, either verbal or written, between the parties. The LAB specifically rejects all additional, inconsistent, or conflicting terms, whether printed or otherwise set forth in any purchase order or other communication from the Client to the LAB. The invalidity or unenforceability in whole or in part of any provision, tern or condition hereof shall not affect in any way the validity or enforceability of the remainder of the Terms and Conditions. No waiver by LAB of any provision, term, or condition hereof or of any breach by or obligation of the Client hereunder shall constitute a waiver of such provision, term, or condition on any other occasion or a waiver of any other breach by or obligation of the Client. This agreement shall be administered and interpreted under the laws of the state which services are procured.

Warranty. Recognizing that the nature of many samples is unknown and that some may contain potentially hazardous components, LAB warrants only that it will perform testing services, obtain findings, and prepare reports in accordance with generally accepted analytical laboratory principles and practices at the time of performance of services. LAB makes no other warranty, express or implied.

Scope and Compensation. LAB agrees to perform the services described in the chain of custody to which these terms and conditions are attached. Unless the parties agree in writing to the contrary, the duties of LAB shall not be construed to exceed the services specifically described. LAB wi use LAB default method for all tests unless specified otherwise on the Work Order.
Payment terms are net 30 days from the date of invoice. All overdue payments are subject to an interest charge of one and one-half percent (1-1/2%) per month or a portion thereof. Client shall also be responsible for costs of collection, including payment of reasonable attorney fees if such expense is incurred. The prices, unless stated, do not include any sale, use or other taxes. Such taxes will be added to invoice prices when required.

Prices. Compensation for services performed will be based on the current Lab Analytical Fee Schedule or on quotations agreed to in writing by the parties. Turnaround time based charges are determined from the time of resolution of all work order questions. Testimony, court appearances or data compilation for legal action will be charged separately. Evaluation and reporting of initial screening runs may incur additional fees.

Limitations of Liability. In the event of any error, omission, or other professional negligence, the sole and exclusive responsibility of LAB shall be to re-perform the deficient work at its own expense and LAB shall have no other liability whatsoever. All claims shall be deemed waived unless made in writing and received by LAB within ninety (90) days following completion of services.
LAB shall have no liability, obligation, or responsibility of any kind for losses, costs, expenses, or other damages (including but not limited to any special, direct, incidental or consequential damages) with respect to LAB's services or results.
All results provided by LAB are strictly for the use of its clients and LAB is in no way responsible for the use of such results by clients or third parties. All reports should be considered in their entirety, and LAB is not responsible for the separation, detachment, or other use of any portion of these reports. Client may not assign the lab report without the written consent of the LAB.
Client covenants and agrees, at its/his/her sole expense, to indemnify, protect, defend, and save harmless the LAB from and against any and all damages, losses, liabilities, obligations, penalties, claims, litigation, demands, defenses, judgments, suits, actions, proceedings, costs, disbursements and/or expenses (including, without limitation attorneys' and experts' fees and disbursements) of any kind whatsoever which may at any time be imposed upon, incurred by or asserted or awarded against client relating to, resulting from or arising out of (a) the breach of this agreement by this client, (b) the negligence of the client in handling, delivering or disclosing any hazardous substance, (c) the violation of the Client of any applicable law, (d) non-compliance by the Client with any environmental permit or (e) a material misrepresentation in disclosing the materials to be tested.

Hazard Disclosure. Client represents and warrants that any sample delivered to LAB will be preceded or accompanied by complete written disclosure of the presence of any hazardous substances known or suspected by Client. Client further warrants that any sample containing any hazardous substance that is to be delivered to LAB will be packaged, labeled, transported, and delivered properly and in accordance with applicable laws.

Sample Handling. Prior to LAB's acceptance of any sample (or after any revocation of acceptance), the entire risk of loss or of damage to such sample remains with Client. Samples are accepted when receipt is acknowledged on chain of custody documentation. In no event will LAB have any responsibility for the action or inaction of any carrier shipping or delivering any sample to or from LAB premises.
Client authorizes LAB to proceed with the analysis of samples as received by the laboratory, recognizing that any samples not in compliance with all current DOH-ELAP-NELAP requirements for containers, preservation or holding time will be noted as such on th final report.
Disposal of hazardous waste samples is the responsibility of the Client. If the Client does not wish such samples returned, LAB may add storage and disposal fees to the final invoice. Maximum storage time for samples is 30 days after completion of analysis unless modified by applicable state or federal laws. Client will be required to give the LAB written instructions concerning disposal of these samples.
LAB reserves the absolute right, exercisable at any time, to refuse to receive delivery of, refuse to accept, or revoke acceptance of any sample, which, in the sole judgment of LAB (a) is of unsuitable volume, (b) may be or become unsuitable for or may pose a risk in handling, transport, or processing for any health, safety, environmental or other reason whether or not due to the presence in the sample of any hazardous substance, and whether or not such presence has been disclosed to LAB by Client or (c) if the condition or sample date make the sample unsuitable for analysis.

Legal Responsibility. LAB is solely responsible for performance of this contract, and no affiliated company, director, officer, employee, or agent shall have any legal responsibility hereunder, whether in contract or tort including negligence.

Assignment. LAB may assign its performance obligations under this contract to other parties, as it deems necessary. LAB shall disclose to Client any assignee (subcontractor) by ELAP ID # on the submitted final report.

Force Majeure. LAB shall have no responsibility or liability to the Client for any failure or delay in performance by LAB, which results in whole or in part from any cause or circumstance beyond the reasonable control of LAB. Such causes and circumstances shall include, but not limited to, acts of God, acts or orders of any government authority, strikes or other labor disputes, natural disasters, accidents, wars, civil disturbances, difficulties or delays in transportation, mail or delivery services, inability to obtain sufficient services or supplies from LAB's usual suppliers, or any other cause beyond LAB's reasonable control.

Law. This contract shall be continued under the laws of the State of New York without regard to its conflicts of laws provision.

179 Lake Avenue, Rochester, NY 14608 Office (585) 647-2530 Fax (585) 647-3311

1 of 2

PARADIGM

CHAIN OF CUSTODY

REPORT TO:		INVOICE TO:		
CLIENT: SJB Services Inc		CLIENT: Same		LAB PROJECT ID: 272961
ADDRESS: 5167 S. Park ave		ADDRESS:		
CITY: Hamburg STATE: NY ZIP: 14075		CITY: STATE: ZIP:		Quotation #:
PHONE: 716-649-8110		PHONE:		Email: Glavelle@SJBempire.net
ATTN: Garrett Lavelle		ATTN:		

PROJECT REFERENCE

BSA

Matrix Codes:

AQ - Aqueous Liquid; NQ - Non-Aqueous Liquid; WA - Water; WG - Groundwater; DW - Drinking Water; WW - Wastewater; SO - Soil; SL - Sludge; SD - Solid; PT - Paint; WP - Wipe; CK - Caulk; OL - Oil; AR - Air

REQUESTED ANALYSIS

DATE COLLECTED	TIME COLLECTED	COMPOSITE	GRAB	SAMPLE IDENTIFIER	MATRIX CODES	NUMBER OF CONTAINERS	TCLP Flashpoint	TCLP Lead	TCLP Benzene	REMARKS	PARADIGM LAB SAMPLE NUMBER
6-17-22	1300	X		Niagara & Brechenridge	SO	1	X	X	X	* for TCLP extract 2f 6/23/22	-01
6-20-22	1330	X		Gates circle	SO	1	X	X	X		-02
6-21-22	1000	X		Bailey & E Amherst	SO	1	X	X	X		-03
6-21-22	1200		X	Niagara & Breckenridge	WA	4	X	X	X	Client to send in more sample-	-04
6-21-22	1300		X	Gates circle	WA	4	X	X	X	samples preserved incorrectly per BZ. edf 6/30	-05

Turnaround Time		Report Supplements			
Availability contingent upon lab approval; additional fees may apply.					
Standard 5 day	☒	None Required	☐	None Required	☐
10 day	☐	Batch QC	☐	Basic EDD	☐
Rush 3 day	☐	Category A	☐	NYSDEC EDD	☐
Rush 2 day	☐	Category B	☐		
Rush 1 day	☐				
Date Needed _____ please indicate date needed: _____		Other please indicate package needed: _____	☐	Other EDD please indicate EDD needed: _____	☐

Sampled By: [signature] Date/Time: 6-17-22 / 1300

Relinquished By: [signature] Date/Time: 6-22-22 / 1500

Received By: [signature] Date/Time: 6/22/22 1500

Received @ Lab By: [signature] @ 0856 6/23/22; COC read @ 0851 6/23/22

Total Cost:

P.I.F.

By signing this form, client agrees to Paradigm Terms and Conditions (reverse).

See additional page for sample conditions.

2 of 2

Chain of Custody Supplement

Client: STB Services **Completed by:** ZL

Lab Project ID: 222961 **Date:** 6/23/22

Sample Condition Requirements

Per NELAC/ELAP 210/241/242/243/244

Condition	NELAC compliance with the sample condition requirements upon receipt: Yes	No	N/A
Container Type	X	X XBenz	
Comments			
Transferred to method-compliant container		X XBenz	
Headspace (<1 mL)			X
Comments	Client resampling for correct container		
Preservation		X XBenz	X
Comments	HCl vial should be un preserved		
Chlorine Absent (<0.10 ppm per test strip)			X
Comments			
Holding Time	X		
Comments			
Temperature	X		X Melt
Comments	6°C reed		
Compliant Sample Quantity/Type	X		
Comments			

PARADIGM

ENVIRONMENTAL SERVICES, INC

Analytical Report For

SJB Services, Inc.

For Lab Project ID

223090

Referencing

BSA

Prepared

Tuesday, July 5, 2022

Any noncompliant QC parameters or other notes impacting data interpretation are flagged or documented on the final report or are noted below.

Certifies that this report has been approved by the Technical Director or Designee

179 Lake Avenue • Rochester, NY 14608 • (585) 647-2530 • Fax (585) 647-3311 • ELAP ID# 10958

PARADIGM
ENVIRONMENTAL SERVICES, INC.

Lab Project ID: 223090

Client: **SJB Services, Inc.**

Project Reference: BSA

Sample Identifier:	Niagara & Breckenridge		
Lab Sample ID:	223090-01	**Date Sampled**	6/30/2022 10:30
Matrix:	TCLP Extract	**Date Received**	6/30/2022

TCLP Volatile Organics

Analyte	Result	Units	Regulatory Limit	Qualifier	Date Analyzed
Benzene	< 20.0	ug/L	500		7/1/2022 17:03

Surrogate	Percent Recovery	Limits	Outliers	Date Analyzed
1,2-Dichloroethane-d4	**102**	81.1 - 136		7/1/2022 17:03
4-Bromofluorobenzene	**93.7**	75.8 - 132		7/1/2022 17:03
Pentafluorobenzene	**93.5**	82 - 132		7/1/2022 17:03
Toluene-D8	**95.3**	64.6 - 137		7/1/2022 17:03

Method Reference(s): EPA 8260C
EPA 1311 / 5030C
Data File: z10320.D

TCLP Metals (ICP)

Analyte	Result	Units	Regulatory Limit	Qualifier	Date Analyzed
Lead	< 0.500	mg/L	5		7/1/2022 17:32

Method Reference(s): EPA 6010C
EPA 1311 / 3005A
Preparation Date: 7/1/2022
Data File: 220701C

Analytical Report Appendix

The reported results relate only to the samples as they have been received by the laboratory.

Each page of this document is part of a multipage report. This document may not be reproduced except in its entirety, without the prior consent of Paradigm Environmental Services, Inc.

All soil/sludge samples have been reported on a dry weight basis, unless qualified "reported as received". Other solids are reported as received.

Low level Volatiles blank reports for soil/solid matrix are based on a nominal 5 gram weight. Sample results and reporting limits are based on actual weight, which may be more or less than 5 grams.

The Chain of Custody provides additional information, including compliance with sample condition requirements upon receipt. Sample condition requirements are defined under the 2003 NELAC Standard, sections 5.5.8.3.1 and 5.5.8.3.2.

NYSDOH ELAP does not certify for all parameters. Paradigm Environmental Services or the indicated subcontracted laboratory does hold certification for all analytes where certification is offered by ELAP unless otherwise specified. Aliquots separated for certain tests, such as TCLP, are indicated on the Chain of Custody and final reports with an "A" suffix.

Data qualifiers are used, when necessary, to provide additional information about the data. This information may be communicated as a flag or as text at the bottom of the report. Please refer to the following list of analyte-specific, frequently used data flags and their meaning:

"<" = Analyzed for but not detected at or above the quantitation limit.
"E" = Result has been estimated, calibration limit exceeded.
"H" = Denotes a parameter analyzed outside of holding time.
"Z" = See case narrative.
"D" = Sample, Laboratory Control Sample, or Matrix Spike Duplicate results above Relative Percent Difference limit.
"M" = Matrix spike recoveries outside QC limits. Matrix bias indicated.
"B" = Method blank contained trace levels of analyte. Refer to included method blank report.
"J" = Result estimated between the quantitation limit and half the quantitation limit.
"L" = Laboratory Control Sample recovery outside accepted QC limits.
"P" = Concentration differs by more than 40% between the primary and secondary analytical columns.
"NC" = Not calculable. Applicable to RPD if sample or duplicate result is non-detect or estimated (see primary report for data flags). Applicable to MS if sample is greater or equal to ten times the spike added. Applicable to sample surrogates or MS if sample dilution is 10x or higher.
"" = Indicates any recoveries outside associated acceptance windows. Surrogate outliers in samples are presumed matrix effects. LCS demonstrates method compliance unless otherwise noted.*
"(1)" = Indicates data from primary column used for QC calculation.
"A" = denotes a parameter for which ELAP does not offer approval as part of their laboratory certification program.
"F" = denotes a parameter for which Paradigm does not carry certification, the results for which should therefore only be used where ELAP certification is not required, such as personal exposure assessment.

GENERAL TERMS AND CONDITIONS
LABORATORY SERVICES

These Terms and Conditions embody the whole agreement of the parties in the absence of a signed and executed contract between the Laboratory (LAB) and Client. They shall supersede all previous communications, representations, or agreements, either verbal or written, between the parties. The LAB specifically rejects all additional, inconsistent, or conflicting terms, whether printed or otherwise set forth in any purchase order or other communication from the Client to the LAB. The invalidity or unenforceability in whole or in part of any provision, tern or condition hereof shall not affect in any way the validity or enforceability of the remainder of the Terms and Conditions. No waiver by LAB of any provision, term, or condition hereof or of any breach by or obligation of the Client hereunder shall constitute a waiver of such provision, term, or condition on any other occasion or a waiver of any other breach by or obligation of the Client. This agreement shall be administered and interpreted under the laws of the state which services are procured.

Warranty. Recognizing that the nature of many samples is unknown and that some may contain potentially hazardous components, LAB warrants only that it will perform testing services, obtain findings, and prepare reports in accordance with generally accepted analytical laboratory principles and practices at the time of performance of services. LAB makes no other warranty, express or implied.

Scope and Compensation. LAB agrees to perform the services described in the chain of custody to which these terms and conditions are attached. Unless the parties agree in writing to the contrary, the duties of LAB shall not be construed to exceed the services specifically described. LAB wi use LAB default method for all tests unless specified otherwise on the Work Order.
Payment terms are net 30 days from the date of invoice. All overdue payments are subject to an interest charge of one and one-half percent (1-1/2%) per month or a portion thereof. Client shall also be responsible for costs of collection, including payment of reasonable attorney fees if such expense is incurred. The prices, unless stated, do not include any sale, use or other taxes. Such taxes will be added to invoice prices when required.

Prices. Compensation for services performed will be based on the current Lab Analytical Fee Schedule or on quotations agreed to in writing by the parties. Turnaround time based charges are determined from the time of resolution of all work order questions. Testimony, court appearances or data compilation for legal action will be charged separately. Evaluation and reporting of initial screening runs may incur additional fees.

Limitations of Liability. In the event of any error, omission, or other professional negligence, the sole and exclusive responsibility of LAB shall be to re-perform the deficient work at its own expense and LAB shall have no other liability whatsoever. All claims shall be deemed waived unless made in writing and received by LAB within ninety (90) days following completion of services.
LAB shall have no liability, obligation, or responsibility of any kind for losses, costs, expenses, or other damages (including but not limited to any special, direct, incidental or consequential damages) with respect to LAB's services or results.
All results provided by LAB are strictly for the use of its clients and LAB is in no way responsible for the use of such results by clients or third parties. All reports should be considered in their entirety, and LAB is not responsible for the separation, detachment, or other use of any portion of these reports. Client may not assign the lab report without the written consent of the LAB.
Client covenants and agrees, at its/his/her sole expense, to indemnify, protect, defend, and save harmless the LAB from and against any and all damages, losses, liabilities, obligations, penalties, claims, litigation, demands, defenses, judgments, suits, actions, proceedings, costs, disbursements and/or expenses (including, without limitation attorneys' and experts' fees and disbursements) of any kind whatsoever which may at any time be imposed upon, incurred by or asserted or awarded against client relating to, resulting from or arising out of (a) the breach of this agreement by this client, (b) the negligence of the client in handling, delivering or disclosing any hazardous substance, (c) the violation of the Client of any applicable law, (d) non-compliance by the Client with any environmental permit or (e) a material misrepresentation in disclosing the materials to be tested.

Hazard Disclosure. Client represents and warrants that any sample delivered to LAB will be preceded or accompanied by complete written disclosure of the presence of any hazardous substances known or suspected by Client. Client further warrants that any sample containing any hazardous substance that is to be delivered to LAB will be packaged, labeled, transported, and delivered properly and in accordance with applicable laws.

Sample Handling. Prior to LAB's acceptance of any sample (or after any revocation of acceptance), the entire risk of loss or of damage to such sample remains with Client. Samples are accepted when receipt is acknowledged on chain of custody documentation. In no event will LAB have any responsibility for the action or inaction of any carrier shipping or delivering any sample to or from LAB premises.
Client authorizes LAB to proceed with the analysis of samples as received by the laboratory, recognizing that any samples not in compliance with all current DOH-ELAP-NELAP requirements for containers, preservation or holding time will be noted as such on th final report.
Disposal of hazardous waste samples is the responsibility of the Client. If the Client does not wish such samples returned, LAB may add storage and disposal fees to the final invoice. Maximum storage time for samples is 30 days after completion of analysis unless modified by applicable state or federal laws. Client will be required to give the LAB written instructions concerning disposal of these samples.
LAB reserves the absolute right, exercisable at any time, to refuse to receive delivery of, refuse to accept, or revoke acceptance of any sample, which, in the sole judgment of LAB (a) is of unsuitable volume, (b) may be or become unsuitable for or may pose a risk in handling, transport, or processing for any health, safety, environmental or other reason whether or not due to the presence in the sample of any hazardous substance, and whether or not such presence has been disclosed to LAB by Client or (c) if the condition or sample date make the sample unsuitable for analysis.

Legal Responsibility. LAB is solely responsible for performance of this contract, and no affiliated company, director, officer, employee, or agent shall have any legal responsibility hereunder, whether in contract or tort including negligence.

Assignment. LAB may assign its performance obligations under this contract to other parties, as it deems necessary. LAB shall disclose to Client any assignee (subcontractor) by ELAP ID # on the submitted final report.

Force Majeure. LAB shall have no responsibility or liability to the Client for any failure or delay in performance by LAB, which results in whole or in part from any cause or circumstance beyond the reasonable control of LAB. Such causes and circumstances shall include, but not limited to, acts of God, acts or orders of any government authority, strikes or other labor disputes, natural disasters, accidents, wars, civil disturbances, difficulties or delays in transportation, mail or delivery services, inability to obtain sufficient services or supplies from LAB's usual suppliers, or any other cause beyond LAB's reasonable control.

Law. This contract shall be continued under the laws of the State of New York without regard to its conflicts of laws provision.

179 Lake Avenue, Rochester, NY 14608 Office (585) 647-2530 Fax (585) 647-3311

1 of 2

CHAIN OF CUSTODY

PARADIGM ENVIRONMENTAL SERVICES, INC.

REPORT TO:		INVOICE TO:		
CLIENT: SJB Services		CLIENT: Same		LAB PROJECT ID: 223090
ADDRESS: 5167 S. Park Ave		ADDRESS:		
CITY: Hamburg STATE: NY ZIP: 14075		CITY: STATE: ZIP:		Quotation #:
PHONE: (716) 649-8110		PHONE:		Email: glavelle@SJBempire.net
ATTN: Garrett Lavelle		ATTN:		

PROJECT REFERENCE

BSA

Matrix Codes:

AQ - Aqueous Liquid; NQ - Non-Aqueous Liquid; WA - Water; WG - Groundwater; DW - Drinking Water; WW - Wastewater; SO - Soil; SL - Sludge; SD - Solid; PT - Paint; WP - Wipe; CK - Caulk; OL - Oil; AR - Air

REQUESTED ANALYSIS

DATE COLLECTED	TIME COLLECTED	COMPOSITE	GRAB	SAMPLE IDENTIFIER	MATRIX CODES	NUMBER OF CONTAINERS	TCLP Lead	TCLP Benzene								REMARKS	PARADIGM LAB SAMPLE NUMBER
6-30-22	10:30		X	Niagara & Brentenridge	WA	3	X	X									01
6-30-22	11:00		X	Grates circle	WA	3	X	X									02

Turnaround Time		Report Supplements			
Availability contingent upon lab approval; additional fees may apply.					
Standard 5 day	X	None Required	X	None Required	X
10 day		Batch QC		Basic EDD	
Rush 3 day		Category A		NYSDEC EDD	
Rush 2 day		Category B			
Rush 1 day					
Date Needed _____ please indicate date needed:		Other please indicate package needed:		Other EDD please indicate EDD needed :	

Sampled By — 6-30-22 / 1030 Date/Time

Relinquished By — 6-30-22 / 1830 Date/Time

Received By — 6/30/22 12:05 Date/Time

Received @ Lab By — 6/30/22 16:09 Date/Time

Total Cost:

P.I.F.

6°C iced 6/30/22 16:04

By signing this form, client agrees to Paradigm Terms and Conditions (reverse).

See additional page for sample conditions.

PARADIGM

Chain of Custody Supplement

Client: SJB
Completed by: Emilee Hyde

Lab Project ID: 223090
Date: 6/30/22

Sample Condition Requirements

Per NELAC/ELAP 210/241/242/243/244

Condition	Yes	No	N/A
Container Type	X		
Comments			
Transferred to method-compliant container			X
Headspace (<1 mL)	X VOA	~~X VOA~~ @ EH 6/31/22	X
Comments			
Preservation			X
Comments			
Chlorine Absent (<0.10 ppm per test strip)			X
Comments			
Holding Time	X		
Comments			
Temperature	X		X Met
Comments: 6°C iced			
Compliant Sample Quantity/Type	X		
Comments			

NELAC compliance with the sample condition requirements upon receipt

APPENDIX D

GEOTECHNICAL REPORT LIMITATIONS

GEOTECHNICAL REPORT LIMITATIONS

WMA Engineering DPC / DBA Empire Geotechnical Engineering Services (Empire) has endeavored to meet the generally accepted standard of care for the services completed, and in doing so is obliged to advise the geotechnical report user of our report limitations. Empire believes that providing information about the report preparation and limitations is essential to help the user reduce geotechnical-related delays, cost over-runs, and other problems that can develop during the design and construction process. Empire would be pleased to answer any questions regarding the following limitations and use of our report to assist the user in assessing risks and planning for site development and construction.

PROJECT SPECIFIC FACTORS: The conclusions and recommendations provided in our geotechnical report were prepared based on project specific factors described in the report, such as size, loading, and intended use of structures; general configuration of structures, roadways, and parking lots; existing and proposed site grading; and any other pertinent project information. Changes to the project details may alter the factors considered in development of the report conclusions and recommendations. *Accordingly, Empire cannot accept responsibility for problems which may develop if we are not consulted regarding any changes to the project specific factors that were assumed during the report preparation.*

SUBSURFACE CONDITIONS: The site exploration investigated subsurface conditions only at discrete test locations. Empire has used judgement to infer subsurface conditions between the discrete test locations, and on this basis the conclusions and recommendations in our geotechnical report were developed. It should be understood that the overall subsurface conditions inferred by Empire may vary from those revealed during construction, and these variations may impact on the assumptions made in developing the report conclusions and recommendations. *For this reason, Empire should be retained during construction to confirm that conditions are as expected, and to refine our conclusions and recommendations in the event that conditions are encountered that were not disclosed during the site exploration program.*

USE OF GEOTECHNICAL REPORT: Unless indicated otherwise, our geotechnical report has been prepared for the use of our client for specific application to the site and project conditions described in the report. *Without consulting with Empire, our geotechnical report should not be applied by any party to other sites or for any uses other than those originally intended.*

CHANGES IN SITE CONDITIONS: Surface and subsurface conditions are subject to change at a project site subsequent to preparation of the geotechnical report. Changes may include, but are not limited to, floods, earthquakes, groundwater fluctuations, and construction activities at the site and/or adjoining properties. *Empire should be informed of any such changes to determine if additional investigative and/or evaluation work is warranted.*

MISINTERPRETATION OF REPORT: The conclusions and recommendations contained in our geotechnical report are subject to misinterpretation. *To limit this possibility, Empire should review project plans and specifications relative to geotechnical issues to confirm that the recommendations contained in our report have been properly interpreted and applied.*

Subsurface exploration logs and other report data are also subject to misinterpretation by others if they are separated from the geotechnical report. This often occurs when copies of logs are given to contractors during the bid preparation process. *To minimize the potential for misinterpretation, the subsurface logs should not be separated from our geotechnical report and the use of excerpted or incomplete portions of the report should be avoided.*

OTHER LIMITATIONS: Geotechnical engineering is less exact than other design disciplines, as it is based partly on judgement and opinion. For this reason, our geotechnical report may include clauses that identify the limits of Empire's responsibility, or that may describe other limitations specific to a project. These clauses are intended to help all parties recognize their responsibilities and to assist them in assessing risks and decision making. Empire would be pleased to discuss these clauses and to answer any questions that may arise.

Appendix K:
AECOM Basis of Design Report

Buffalo Sewer Authority
Combined Sewer Overflow (CSO) No. 010
Basis of Design Report - Draft

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

March 2022

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F Watts Architecture & Engineering Niagara Street Gateway Project Site-Specific Drainage Plans
G Preliminary Calculations
H ADS Environmental Services Flow Monitoring Data
I Preliminary Drawings
J Preliminary Control Logic
K Opinion of Probable Construction Cost

References

1. ADS Environmental Services, SJD_FM32t Flow Monitoring, 2016 - 2017
2. AECOM, BSA CSO 008, 010, and 061 Alternatives Evaluation Report, December 2021
3. AECOM, BSA North Bailey RTC Basis of Design Report, February 2018
4. Arcadis, BSA Collection System Model Update, CSOs Activation Condition – Existing and Post LTCP Projects, April 16, 2020
5. Buffalo Sewer Authority Geographical Information System
6. GHD, BSA Bird Avenue Underflow SPP 13 Modifications, September 2017
7. GHD, BSA Mill Race RTC Structure, August 2021
8. Google Earth Pro
9. Greeley and Hansen Engineers, Buffalo Sewer Authority Intercepting Sewer Division N Drawings, July 1936
10. Malcolm Pirnie Arcadis, Buffalo Sewer Authority – Long Term Control Plan Final, January 2014
11. NYS GIS Clearinghouse
12. Watts Architecture & Engineering, Niagara Street Gateway Project, May 2019
13. Watts Architecture & Engineering, Subsurface Investigation and Infiltration Testing, October 2016

Abbreviations Sheet

AACE	Association for the Advancement of Cost Engineering
AB	Allen Bradley
AM	Ante Meridiem
BGS	Below Grade Surface
BITF	Bird Island Treatment Facility
CRIS	Cultural Resource Information System
CSO	Combined Sewer Overflow
DHP	Division for Historic Preservation
DIP	Ductile Iron Pipe
E+H	Endress and Hauser
H	Height
HGL	Hydraulic Grade Line
HMI	Human Machine Interface
I-190	Interstate 190
IECC	International Energy Conservation Code
L	Length
LF	Linear Feet
LTCP	Long Term Control Plan
MG	Million Gallons
MGD	Million Gallons per Day
MPT	Maintenance and Protection of Traffic
NEC	National Electric Code
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
NYSDEC	New York State Department of Environmental Conservation
OPCC	Opinion of Probable Construction Costs
PLC	Programmable Logic Controller
PM	Post Meridiem
PVC	Polyvinyl Chloride
RCP	Reinforced Concrete Pipe
RTC	Real Time Control
SCADA	Supervisory Control and Data Acquisition
SEQR	State Environmental Quality Review
SHPO	State Historic Preservation Office
SPDES	State Pollutant Discharge Elimination System
SPP	Sewer Patrol Point
UPS	Uninterruptible Power Supply
VTP	Vitrified Tile Pipe
W	Width

1. Introduction

The Buffalo Sewer Authority (Buffalo Sewer) retained AECOM USA, Inc. (AECOM) in 2021 to evaluate Combined Sewer Overflows (CSO) 008, 010, and 061, and provide recommendations for reducing the volumes of overflow and number of control activations into the receiving waterbody. The CSO 008, 010, and 061 Alternatives Evaluation Report findings were that CSO 008 and CSO 061 were already meeting the required level of CSO control, however CSO 010 required additional control. Evaluation of the alternatives resulted in the recommendation for an upstream flow diversion structure, which would be designed to achieve the target control activation requirements. Buffalo Sewer was in agreement with the recommended alternative and requested that AECOM further define the concept of the upstream flow diversion structure.

Buffalo Sewer has since retained AECOM to prepare the preliminary design of the upstream flow diversion structure. The upstream flow diversion structure will be a new Real Time Control (RTC) system located on Breckenridge Street in the general proximity of Niagara Street. The RTC system (Breckenridge Niagara RTC) will utilize upstream flow diversion by alleviating an existing combined sewer and re-routing the intercepted flow to an existing, nearby, larger diameter sewer (i.e., South Interceptor) with available capacity to accept the flow. The scope of services for this preliminary design includes preparation of this Basis of Design Report, which evaluates the design and implementation of the Breckenridge Niagara RTC.

1.1. Background Overview

Buffalo Sewer owns and operates the combined sewer collection and treatment system within the City of Buffalo. Through its State Pollution Discharge Elimination System (SPDES) Permit, Buffalo Sewer is permitted to operate CSO discharge locations. At the CSO locations, the combination of sanitary sewage and storm water is discharged into the local receiving waterbodies during wet weather events.

In 2002, Buffalo Sewer submitted a report titled *Combined Sewer Overflow Long Term Control Plan* (LTCP) to the New York State Department of Environmental Conservation (NYSDEC) that outlined various alternatives to control the CSO discharges. The LTCP was re-submitted to the NYSDEC in 2012 and was approved in 2014. The recommendations within the LTCP included the implementation of numerous RTC structures throughout the City of Buffalo in order to store wet weather flows within the existing collection system and reduce the volume of overflow into receiving waterbodies.

Buffalo Sewer is in the process of implementing the RTC structures at various locations in the collection system. The majority of the RTC structures are in-line storage sites, while some are overflow structures. The Breckenridge Niagara RTC structure detailed in this Basis of Design Report qualifies as an overflow structure. In general, overflow structures divert dry weather flow to underutilized sewers during dry weather flow conditions. During wet weather flow conditions, the increased flow volume cannot reliably be accepted at the identified underutilized sewer. In the event that the underutilized sewer cannot accept excess flow, the excess flow will follow the original flow path, overtop a weir structure, and discharge into the receiving water body as a CSO.

1.2. Project Background

CSO 010 was previously evaluated in the LTCP and the recommended alternative was underflow capacity sizing. The underflow capacity sizing alternative would increase the size of the existing combined sewer, upstream of CSO 010, that conveys wastewater to the Scajaquada Tunnel Interceptor and ultimately to the Bird Island Treatment Facility (BITF). However, recent modifications and improvements have been made within the City of Buffalo combined sewer collection and treatment system which presented the opportunity to consider alternative approaches to the LTCP alternative recommendation for CSO 010.

Buffalo Sewer maintains a LTCP Hydraulic Model to reflect modifications and improvements made throughout the City of Buffalo combined sewer collection and treatment system. April 16, 2020 is the latest LTCP Model Update that has been utilized in on-going design efforts for CSO 010 in order to accurately represent the current flow conditions. Based upon Model outputs provided by Buffalo Sewer, CSO 010 activates fourteen (14) times per year and overflows approximately 8.16 million gallons (MG) per year. The target control activations for CSO 010 were identified by Buffalo Sewer as no more than four (4) activations per year.

During development of the CSO 008, 010, and 061 Alternatives Evaluation Report (included in Appendix A), alternatives were selected that met the identified target control activations. During alternative evaluations, it was determined that the underflow capacity sizing recommendation included in the LTCP would present constructability and logistical challenges. The findings of the CSO 010 alternatives evaluation resulted in the determination that an upstream flow diversion structure would be the most feasible and economical solution toward meeting target control activations at CSO 010. This Basis of Design Report evaluates the design and implementation of an upstream flow diversion structure, otherwise known as the Breckenridge Niagara RTC.

1.3. Purpose

The purpose of this Basis of Design Report is to evaluate the design and implementation of the Breckenridge Niagara RTC. The Breckenridge Niagara RTC will be designed to utilize upstream flow diversion during dry weather flow conditions and manage excess flow during wet weather flow conditions. This Basis of Design Report will provide an overview of the Breckenridge Niagara RTC site location, spatial constraints, equipment and appurtenances, and opinion of probable construction costs (OPCC).

2. Existing Conditions

The Breckenridge Niagara RTC will be constructed within an existing combined sewer that discharges to CSO 010. CSO 010 is located in the City of Buffalo within the Scajaquada District. The main interceptor sewer within the Scajaquada District is the Scajaquada Tunnel Interceptor, which conveys flow from the sewershed toward the direction of the Black Rock Canal. The CSO 010 sewershed footprint is 104.12 acres and is shown in Figure 1 below.

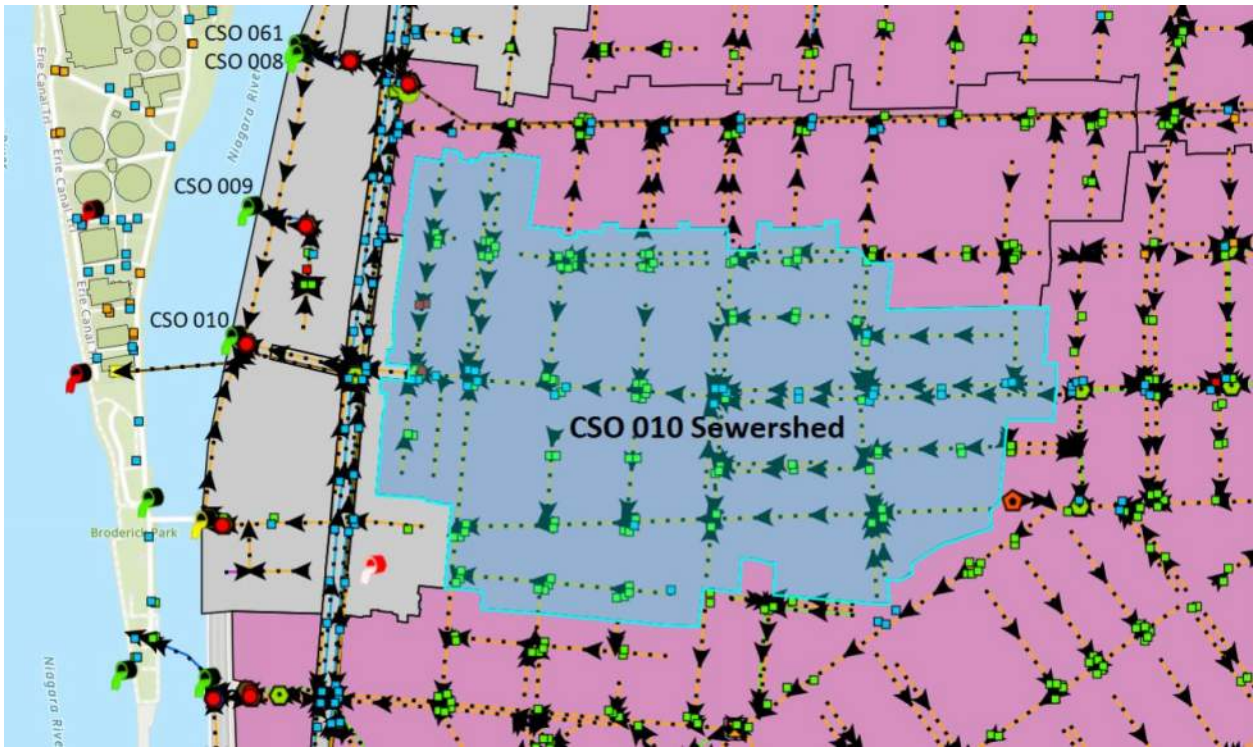

Figure 1. CSO 010 Sewershed

CSO 010 is located beyond Breckenridge Street, on the west side of the Interstate 190 (I-190) Thruway. CSO 010 is situated downstream from Sewer Patrol Point (SPP) 021, on the west side of the I-190 Thruway, and discharges to the Black Rock Canal. SPP 021 is a diversion structure that conveys flow to CSO 010 and the BITF. When the collection system experiences increased flow conditions, flow is conveyed to the BITF until capacity is reached. As capacity at the BITF is met, SPP 021 conveys the excess flow to CSO 010 through an existing 36-inch diameter reinforced concrete pipe (RCP) that is approximately fifty (50) linear feet (LF).

SPP 021 is located upstream from CSO 010 and downstream of an existing 36-inch diameter combined brick sewer. The existing 36-inch diameter combined brick sewer is the combined sewer that the Breckenridge Niagara RTC will be constructed in. The distance from SPP 021 to the Breckenridge Niagara RTC is approximately six hundred and fifty (650) LF in the east direction.

Figure 2. CSO 010, SPP 021, and Breckenridge Niagara RTC Locations

The locations of CSO 010, SPP 021, and Breckenridge Niagara RTC are shown above in Figure 2.

2.1. Breckenridge Niagara RTC Location

The Breckenridge Niagara RTC is located on Breckenridge Street in the general proximity of Niagara Street. AECOM performed a site visit in the fall of 2021 to inspect the site; Appendix B includes a Photo Log.

2.1.1 Public Resources

Breckenridge Street and Niagara Street are primarily commercial streets with scattered residences.

Buffalo Sewer completed a State Environmental Quality Review (SEQR) for the RTC structures included in the LTCP in 2012. The Breckenridge Niagara RTC structure qualifies under Order on Consent; therefore, a SEQR Type II Action is applicable and no further review is required under SEQR.

The New York State Historic Preservation Office (SHPO) Cultural Resource Information System (CRIS) was utilized to determine the project impact on nearby historical and archaeological resources. AECOM submitted the Breckenridge Niagara RTC project for consultation with SHPO on February 23, 2022 and received feedback on March 7, 2022 from the Division for Historic Preservation (DHP) of the Office of Parks, Recreation, and Historic Preservation (OPRHP). The DHP OPRHP noted that the project area is adjacent to the Upper Black Rock Historic District, which is eligible for listing in the State and National Registers of Historic Places. It is the opinion of DHP OPRHP that the Breckenridge Niagara RTC project will have No Adverse Impact on historic or archaeological resources. The DHP OPRHP Letter of Determination is included as Appendix C.

2.1.2 Alignment

The Breckenridge Niagara RTC will be constructed within an existing 36-inch diameter combined brick sewer located on Breckenridge Street in the general proximity of Niagara Street. The location of the Breckenridge Niagara RTC was selected in order to maximize the storage volume available within the City

of Buffalo combined sewer collection and treatment system, without increasing the risk of basement backups upstream of the location.

The Breckenridge Niagara RTC system will be constructed within the existing 36-inch diameter sewer and will include a flow diversion sewer that is constructed south of the Breckenridge Niagara RTC. The diversion sewer will tap into the existing 36-inch diameter sewer and run south through the Breckenridge Street pavement limits and through the sidewalk along the south side of Breckenridge Street.

Beyond the sidewalk limits, the diversion sewer will continue south through the Niagara Mohawk Power Corporation property. It is understood that Buffalo Sewer has held discussions with the Niagara Mohawk Power Corporation in regard to implementation of the Breckenridge Niagara RTC and that construction within the property limits is acceptable, by means of obtaining an easement, as long as the impervious covered areas are available for the Niagara Mohawk Power Corporation daily activity. The portion of the diversion sewer that will be installed on the Niagara Mohawk Power Corporation property is approximately fifty (50) LF.

The diversion sewer that runs south through the Niagara Mohawk Power Corporation property will change direction to the west. The west segment of the diversion sewer will run approximately seventy (70) LF through a vacant property owned by the City of Buffalo. The diversion sewer will tap into an existing 108-inch diameter interceptor RCP sewer that is located within the sidewalk limits along the east side of Niagara Street. The sidewalk has been newly renovated to include green infrastructure that captures stormwater runoff and improves water quality. A goal of this project is to protect the renovated space and minimize unnecessary damage during design and construction of the Breckenridge Niagara RTC.

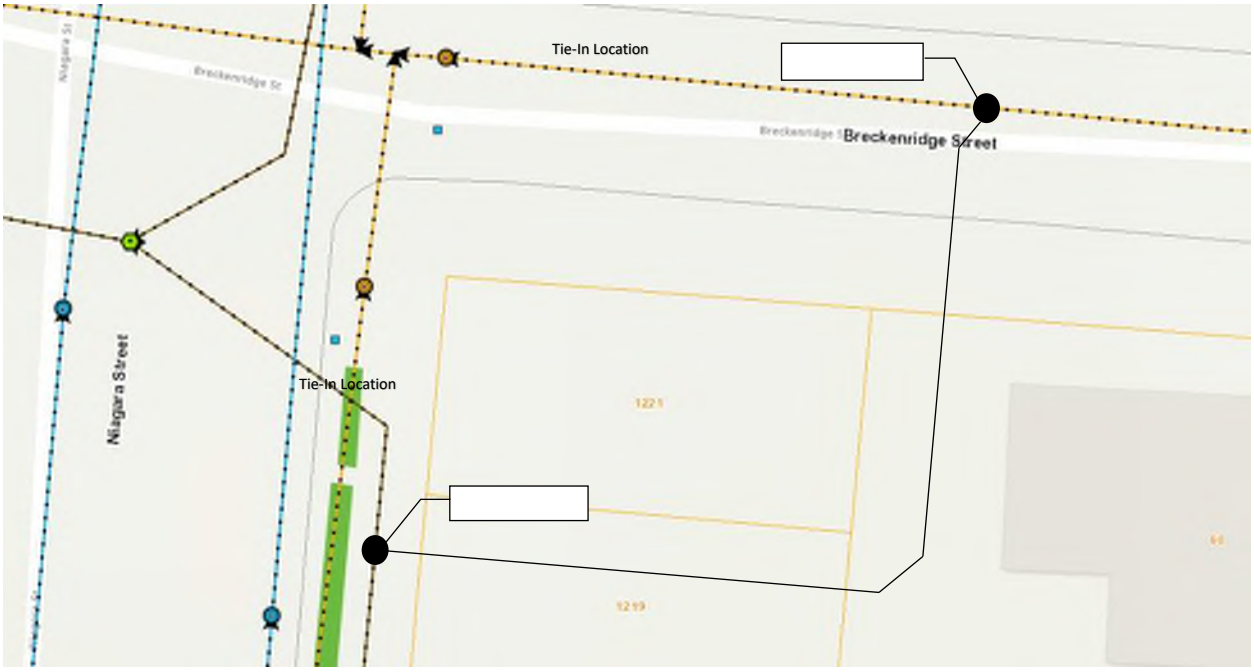

Figure 3. Breckenridge Niagara RTC Alignment

An overview of the Breckenridge Niagara RTC alignment is shown above in Figure 3.

2.1.3 Soil Classification

Buffalo Sewer retained Watts Architecture & Engineering to perform soil borings throughout the City of Buffalo in 2016. The soil borings collected in the Breckenridge Niagara RTC project vicinity were completed to seven (7) feet below grade surface (BGS) and eight (8) feet BGS. No water was discovered at completion of the borings. The soil column within the borings consists of the following characteristics:

- 0.0 feet – 1.2 feet BGS: Asphalt pavement
- 1.2 feet – 2.3 feet BGS: Sand and gravel fill
- 3.6 feet – 7.0 feet BGS: Clay soil fill with trace gravel, clay lake sediment

Available information was reviewed to determine the soil classification beyond 7 – 8 feet BGS. Based upon rock cores included in the Buffalo Sewer Authority Intercepting Sewer Division N Drawings prepared by Greeley and Hansen Engineers in July 1936, it is assumed that bedrock extends from 7 – 8 feet BGS to a minimum depth of sixty (60) feet BGS.

The Watts Architecture & Engineering project-specific soil borings are included as Appendix D and the relevant Greeley and Hansen, Buffalo Sewer Authority Intercepting Sewer Division N Drawing is included as Appendix E.

2.2. Breckenridge Street

Breckenridge Street is a one-way street, and the existing street pavement is approximately 30 feet wide.

2.2.1 Existing Combined Sewer

The existing 36-inch diameter combined brick sewer on Breckenridge Street was constructed circa 1860. The location along Breckenridge Street that the existing 36-inch diameter sewer will be utilized for the Breckenridge Niagara RTC is located between Gelston Street and Niagara Street. The length of the sewer that extends from Gelston Street to Niagara Street is approximately one hundred and ninety-six (196) LF and is pitched at approximately a 0.45% slope. The length of sewer that extends between the two streets has manhole structures on each end.

- Manhole No. 2235 is located within the Breckenridge Street pavement limits in the vicinity of Gelston Street. Manhole No. 2235 is the upstream manhole from the Breckenridge Niagara RTC site, and has a depth of 9.02 vertical feet, an invert elevation of 26.69, and a rim elevation of 35.71.
- Manhole No. 2234 is located within the Breckenridge Street pavement limits in the vicinity of Niagara Street. Manhole No. 2234 is the downstream manhole from the Breckenridge Niagara RTC site, and has a depth of 8.47 vertical feet, an invert elevation of 25.80, and a rim elevation of 34.27.

The Breckenridge Niagara RTC system is located approximately eighty-five (85) LF east of Manhole No. 2234. Figure 4 below provides an overview of the sewer configuration along Breckenridge Street.

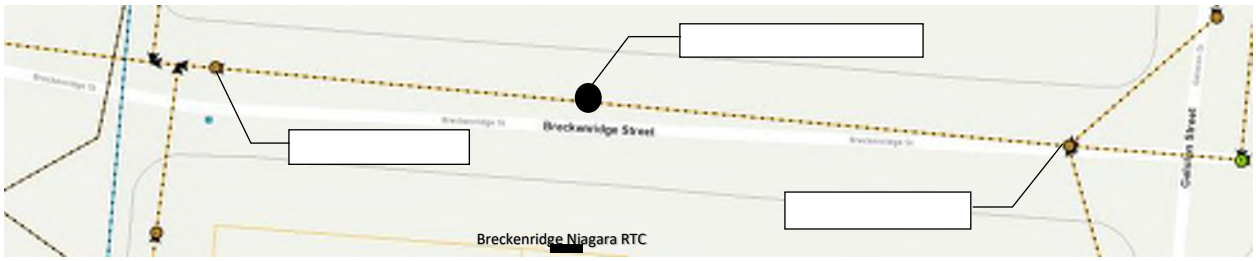

Figure 4. Sewer Configuration along Breckenridge Street

The aforementioned invert and rim elevations are in reference to the City of Buffalo Datum. The City of Buffalo Datum is approximately 575.45 feet lower than the NAD83 Datum.

2.2.2 Subsurface Utilities

Subsurface utilities along Breckenridge Street, within the proximity of the Breckenridge Niagara RTC, include a water main, electric line, gas line, and the existing combined sewer. Location information regarding the water main, electric line, and gas line in relation to the Breckenridge Niagara RTC system is provided below:

- Water Main: Located north of the Breckenridge Niagara RTC structure within the Breckenridge Street pavement limits. Horizontal distance estimated to be approximately six (6) LF.
- Electric Line: Located south of the Breckenridge Niagara RTC structure within the Breckenridge Street pavement limits. Horizontal distance estimated to be approximately eight (8) LF.
- Gas Line: Located south of the Breckenridge Niagara RTC structure within the concrete sidewalk along the south side of Breckenridge Street. Horizontal distance estimated to be approximately twenty-five (25) LF.

Appendix F includes site-specific Drainage Plans from Watts Architecture & Engineering, Niagara Street Gateway Project, May 2019 which depict locations of utilities utilized for the assumptions made in this Basis of Design Report.

2.3. Niagara Street

Niagara Street is a two-way, three-lane street with a center turning lane. The existing street pavement is approximately 60 feet wide. There is an existing bus stop located on the east side of Niagara Street, approximately 25 feet south of the intersection with Breckenridge Street.

The sidewalk along Niagara Street has been newly renovated to include green infrastructure that captures stormwater runoff and improves water quality. A goal of this project is to protect the newly installed green infrastructure and minimize unnecessary damage.

Figure 5. Niagara Street Green Infrastructure Improvements

Figure 5 above shows the newly installed green infrastructure along Niagara Street in the vicinity of the project.

2.3.1 Existing Interceptor Sewer

The existing 108-inch diameter interceptor RCP sewer (Scajaquada Tunnel Interceptor) on Niagara Street was constructed circa 1936. The existing interceptor sewer runs north along Niagara Street until it reaches the intersection between Niagara Street and Breckenridge Street. At the intersection, the existing interceptor sewer flows into a sewer chamber, where the south portion of the Scajaquada Tunnel Interceptor meets the north portion of the Scajaquada Tunnel Interceptor, i.e. the South Interceptor and North Interceptor, respectively. The South Interceptor and North Interceptor flow is combined at the sewer chamber and conveyed west through an existing 132-inch diameter interceptor RCP sewer to the BITF. Refer to Figure 3 in Section 2.1.2 for an overview of the existing interceptor sewer configuration.

The existing interceptor sewer will be utilized for the Breckenridge Niagara RTC system at a location between Breckenridge Street and West Ferry Street. The existing interceptor sewer is an underutilized sewer that has additional capacity to accept flow from the Breckenridge Niagara RTC system. The Breckenridge Niagara RTC system will convey flow to the existing interceptor sewer through a drop connection from the diversion sewer. The tie-in location for the drop connection from the diversion sewer into the existing interceptor sewer is approximately fifty (50) LF south of the intersection between Niagara Street and Breckenridge Street. The elevation at the top of pipe at the tie-in location is -16.58, the invert elevation is -25.58, and the existing surface elevation is approximately 35.75.

2.3.2 Subsurface Utilities

Subsurface utilities along Niagara Street within the proximity of the Breckenridge Niagara RTC system tie-in location include a storm sewer, combined sewer, and gas line. Location information regarding the storm sewer, combined sewer, and gas line in relation to the Breckenridge Niagara RTC system tie-in location is provided below:

- Storm Sewer: Located west of the Breckenridge Niagara RTC system tie-in location within the street pavement limits. Horizontal distance estimated to be approximately fourteen (14) LF.
- Combined Sewer: Located west of the Breckenridge Niagara RTC system tie-in location within the concrete sidewalk along the east side of Niagara Street. Horizontal distance estimated to be approximately four (4) LF.
- Gas Line: Located within the Breckenridge Niagara system tie-in location footprint within the concrete sidewalk along the east side of Niagara Street. Horizontal distance estimated to be zero (0) LF.

Appendix F includes the supporting documentation which depicts locations of utilities utilized for the assumptions made in this Basis of Design Report.

2.4. Existing Conveyance Capacity

The Breckenridge Niagara RTC is designed to accommodate the required flow capacity of the existing combined sewer flow volume without reaching an unsafe hydraulic grade line (HGL) and risking basement backups upstream of the location. In order to design the Breckenridge Niagara RTC flow capacity, the design flow of the existing 36-inch diameter combined brick sewer was evaluated using Manning's equation and flow measurement data.

2.4.1 Manning's Equation

Manning's equation was used to determine the capacity of the existing combined sewer that the Breckenridge Niagara RTC will be constructed in. The design flow of the existing combined sewer was determined to be 25.07 MGD. Supporting calculations are included in Appendix G.

2.4.2 Flow Measurements

Buffalo Sewer contracted ADS Environmental Services to perform flow monitoring during periods between 2016 – 2017 at a location within the existing combined sewer. The flow measurements were taken at Manhole No. 2233, which is located on Breckenridge Street, west of Niagara Street, approximately 200 feet downstream from the Breckenridge Niagara RTC location. It is understood that the location that the flow measurements were taken includes additional tributaries, which convey additional flow, compared to the upstream location of the Breckenridge Niagara RTC. A summary of the flow measurements that were obtained between 2016 – 2017 are summarized below in Table 1.

Table 1. Observed Flow Conditions within the Existing 36-inch Diameter Combined Brick Sewer

Observed Flow Conditions between September 15, 2016 – January 15, 2017			
Item	**Depth (in)**	**Velocity (ft/s)**	**Quantity (MGD)**
Minimum	5.53	1.14	0.799
Average	6.38	1.50	1.250
Maximum	34.72	6.02	28.855
Time of Minimum	10/14/2016 4:25 AM	11/15/2016 1:20 AM	11/15/2016 1:20 AM
Time of Maximum	09/17/2016 5:55 PM	09/17/2016 5:55 PM	09/17/2016 5:55 PM
Observed Flow Conditions between March 15, 2017 – June 15, 2017			
Item	**Depth (in)**	**Velocity (ft/s)**	**Quantity (MGD)**
Minimum	5.68	1.13	0.799
Average	6.81	1.57	1.477
Maximum	37.22	7.5	37.904
Time of Minimum	05/24/2017 4:30 AM	06/15/2017 4:35 AM	06/15/2017 4:35 AM
Time of Maximum	04/20/2017 5:30 PM	05/01/2017 12:00 AM	05/01/2017 12:00 AM

The maximum flow conditions observed during the flow monitoring periods exceed the design flow of the existing combined sewer. The maximum flow condition measurements are consistent with anticipated wet weather flow conditions at this downstream location from the Breckenridge Niagara RTC location. The flow monitoring data collected by ADS Environmental Services is included in Appendix H.

2.5. Constructability

The Breckenridge Niagara RTC system is located along Breckenridge Street and Niagara Street, which are primarily commercial streets with scattered residences. Several privately-owned parking lots are located in the vicinity of the project site. In future design and construction phases, Buffalo Sewer may consider coordinating with private property owners to negotiate use for Contractor staging areas.

2.5.1 Maintenance and Protection of Traffic

The Breckenridge Niagara RTC system is located within the pavement of Breckenridge Street, along the centerline of Breckenridge Street. Breckenridge Street is a one-way street, and the existing street pavement is approximately thirty (30) feet wide. Buffalo Sewer has indicated that vehicular and pedestrian traffic will need to be maintained on Breckenridge Street during construction. The following temporary maintenance and protection of traffic (MPT) measures may be considered in the project vicinity:

- Traffic lane along the north side of Breckenridge Street
- Restricted on-street parking on Breckenridge Street
- Pedestrian access along the south side of Breckenridge Street

For reference, Figure 6 below shows a street view of Breckenridge Street in the project vicinity.

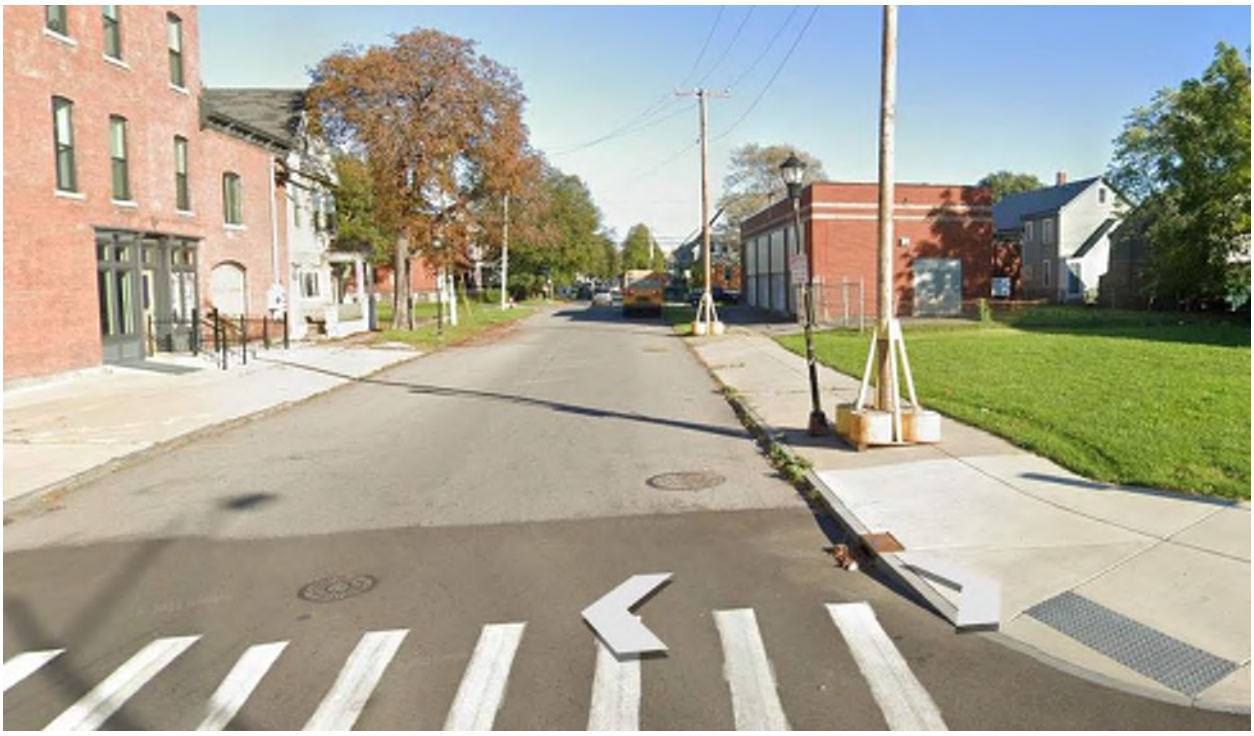

Figure 6. Breckenridge Street, Street View

Niagara Street is a two-way, three-lane street with a center turning lane. The existing street pavement is approximately sixty (60) feet wide. There is an existing bus stop located on the east side of Niagara Street, approximately twenty-five (25) feet south of the intersection with Breckenridge Street and in close proximity to the Breckenridge Niagara RTC system anticipated construction limits.

While it is not anticipated that work will occur within the Niagara Street pavement limits, vehicular and pedestrian traffic routes may be affected during construction. The following temporary MPT measures may be considered in the project vicinity:

- Right-lane traffic route relocated to the center turning lane on Niagara Street
- Relocation of bus stop on east side of Niagara Street
- Pedestrian access along the west side of Niagara Street

Figure 7. Niagara Street, Street View

Figure 7 above shows a street view of Niagara Street in the project vicinity.

2.5.2 Utilities Relocation

Subsurface utilities along Breckenridge Street within the proximity of the Breckenridge Niagara RTC include a water main, electric line, gas line, and the existing combined sewer. While it is assumed that the water main maintains adequate horizontal clearance from the Breckenridge Niagara RTC structure to circumvent relocation during construction activities, the electric line and gas line are installed within the alignment of the Breckenridge Niagara RTC system. Relocation and/or temporary utility services for the electric line and gas line are recommended prior to implementation of the Breckenridge Niagara RTC.

Subsurface utilities along Niagara Street within the proximity of the Breckenridge Niagara RTC system tie-in location include a storm sewer, combined sewer, and gas line. While it is assumed that the storm sewer and combined sewer maintain adequate horizontal clearance from the Breckenridge Niagara RTC system tie-in location to circumvent relocation during construction activities, the gas line is installed within the alignment of the Breckenridge Niagara RTC system. Prior relocation and/or temporary utility service for the gas line is recommended prior to implementation of the Breckenridge Niagara RTC.

2.5.3 Installation Methods

The majority of the Breckenridge Niagara RTC system will be installed below grade at a depth of approximately ten (10) feet. Based upon available information, it is understood that the depth to bedrock may be approximately 7 – 10 feet BGS in the project location. It is recommended that the Breckenridge

Niagara RTC system be installed using traditional open cut excavation methods due to economic feasibility.

2.5.4 Construction Phasing

In order to maintain utility services and vehicular/pedestrian traffic on Breckenridge Street and Niagara Street, it is recommended that the project be constructed in the following phases:

Phase 1 – Relocate and/or provide temporary utility services for the existing electric and gas utilities on Breckenridge Street and Niagara Street.

Phase 2 – Install a temporary traffic lane on the north side of Breckenridge Street. Install jersey barriers and traffic signs to direct pedestrian traffic to the south side of Breckenridge Street. Install jersey barriers and traffic signs to direct pedestrian traffic to the west side of Niagara Street. Temporarily shift bus stop location on the east side of Niagara Street.

Phase 3 – Construct Breckenridge Niagara RTC system on Breckenridge Street, through off-street property parcels, and along Niagara Street. Construction work includes, but is not limited to, the following:

- Pavement/concrete removal
- Temporary shoring
- Site dewatering
- Temporary sewer bypass system
- Soil and rock removal
- Partial removal of the existing brick sewer
- Overflow weir structure
- Valve vault installation
- Equipment installation
- Manhole construction
- Sewer installation
- Wet tap
- Instrumentation and controls
- Above-grade electrical enclosure

Due to the proximity of existing structures, rock blasting will not be permitted. Temporary sewer bypass methods will be delegated to the Contractor's means and methods; however, may include bypass pumping around the Breckenridge Niagara RTC structure from the upstream manhole to the downstream manhole.

Phase 4 – Site Restoration including removal of temporary MPT measures, installation of pavement and concrete patches to match existing conditions, utility relocations, and pervious ground cover restoration.

3. Breckenridge Niagara RTC System

The Breckenridge Niagara RTC system includes a flow diversion sewer that conveys dry weather flow to an existing 108-inch diameter interceptor RCP sewer. During wet weather flow conditions, the existing interceptor sewer may not have the capacity to accommodate the increased flow volume. In this scenario, the diversion sewer is controlled shut and the wet weather flow overtops an overflow weir structure that is constructed within the existing 36-inch diameter combined brick sewer and continues on its original flow path with discharge to CSO 010 at the Black Rock Canal. Preliminary Drawings are included in Appendix I.

3.1. Upstream Flow Diversion

The Breckenridge Niagara RTC system includes a flow diversion sewer that conveys dry weather flow from the existing 36-inch diameter combined brick sewer to an existing 108-inch diameter interceptor RCP sewer.

The diversion sewer is designed to achieve the annual target control activations at CSO 010. The LTCP Hydraulic Model Update was utilized by Arcadis in 2021 to determine the required diversion sewer diameter to meet the target control activations. The following information presented in Table 2 below was provided by Arcadis in 2021 and 2022.

Table 2. LTCP Model Update Outputs for CSO 010 Diversion Sewer Sizing

Scenario	Overflow Volume (MG) per year	No. of Activations per year	Selected Alternative
Base	8.16	14	
Upstream Flow Diversion through a 15-inch Diameter Dry Weather Flow Sewer	?	?	
Upstream Flow Diversion through an 18-inch Diameter Dry Weather Flow Sewer	?	4	
Upstream Flow Diversion through a 24-inch Diameter Dry Weather Flow Sewer	?	2	X

Implementation of a 24-inch diameter dry weather flow diversion sewer mitigates a larger overflow volume each year in addition to achieving a reduced number of target control activations per year. The 24-inch diameter diversion sewer was selected for the Breckenridge Niagara RTC system.

Using Manning's equation, the design flow of the 24-inch diameter diversion sewer was evaluated. The manning's roughness coefficient varies by pipe material, which directly impacts the flow characteristics of the pipe performance. Common pipe materials used for 24-inch diameter sewers in wastewater applications include polyvinyl chloride (PVC), RCP, and ductile iron pipe (DIP). The following information provided in Table 3 below was used in the evaluation and selection of the 24-inch diameter pipe material.

Table 3. Diversion Sewer Material Evaluation

Pipe Material	Manning's Coefficient	Design Flow (MGD)	Selected Alternative
Polyvinyl Chloride (PVC)	0.010	19.02	X
Reinforced Concrete Pipe (RCP)	0.013	14.63	
Ductile Iron Pipe (DIP)	0.012	15.85	

As outlined previously, PVC is a common pipe material for 24-inch diameter sewer installations in wastewater applications. Since PVC has the lowest Manning's roughness coefficient and produces the greatest design flow of the 24-inch diameter sewer materials evaluated, the PVC diversion sewer was selected for the Breckenridge Niagara RTC system. Supporting calculations are included in Appendix G.

3.2. Sewer Alignment

The diversion sewer taps into the existing combined sewer at a 45° angle to the southwest. Overtop the Breckenridge Niagara RTC structure tie-in point is a proposed manhole structure which will enable ease of maintenance. Due to spatial constraints in the project vicinity, the diversion sewer will include another 45° fitting that changes the flow direction from southwest to south and allows the diversion sewer to run perpendicular to the combined sewer alignment. Downstream of the two (2) fittings, a valve assembly is installed in the sewer alignment in order to control the use of the diversion sewer based upon the flow conditions. The valve assembly includes two (2) 24-inch diameter plug valves which are housed in a dry valve vault to provide ease of maintenance.

Downstream of the valve vault, the diversion sewer runs south for approximately sixty-five (65) LF. The diversion sewer ties into the existing interceptor sewer, which is located along Niagara Street, therefore the diversion sewer alignment includes two (2) additional 45° fittings to change the direction of the diversion sewer from south to west. The diversion sewer runs west for approximately seventy-five (75) LF before reaching a proposed drop manhole structure. The drop manhole structure will accept the flow from the diversion sewer and drop the captured flow into the interceptor sewer through a drop connection.

A detailed overview of the Breckenridge Niagara RTC sewer configuration is provided in Figure 8 below.

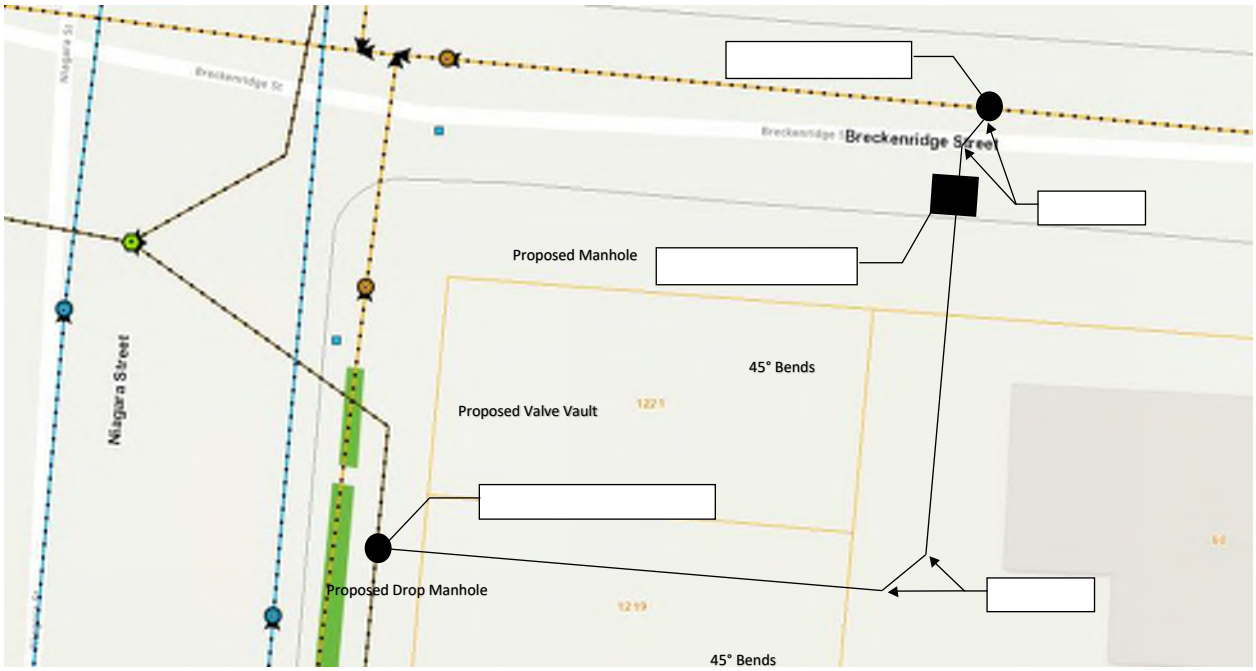

Figure 8. Breckenridge Niagara RTC Sewer Configuration

Due to hydraulic complications that 90° fittings can present within piping networks, the 45° fittings were selected for the Breckenridge Niagara RTC system sewer alignment.

3.3. Overflow Weir

The Breckenridge Niagara RTC includes a weir structure within the existing 36-inch diameter combined brick sewer. The proposed weir structure exists in two directions: perpendicular and parallel to the flow path. The weir structure was sized in order to maintain the current HGL upstream of the Breckenridge Niagara RTC.

The section that is perpendicular to the flow path is three (3) feet long and one (1) foot wide. The height (H) of the weir is two (2) feet. The section of the weir structure that is parallel to the flow path is nine (9) feet long (L) and one (1) foot wide (W). Table 4 below summarizes the dimensions and design flow of the weir structures. Supporting calculations are included in Appendix G.

Table 4. Weir Structure Sizing

Weir Component	L x W Dimensions (ft)	H Dimension (ft)	Design Flow (MGD)
Parallel to the Direction of Flow	9 x 1	2	17.30
Perpendicular to the Direction of Flow	3 x 1	2	5.77
Combined Weir Characteristics	12 x 1	2	23.07

3.4. Breckenridge Niagara RTC System

The Breckenridge Niagara RTC system design component summary is included in Table 5 below.

Table 5. Breckenridge Niagara RTC System Design Component Summary

Design Component	Dimension
Upstream Sewer Geometry	3 ft Circular Brick
Existing Sewer Design Flow	25.07 MGD
Overflow Weir Structure	12 ft L x 1 ft W x 2 ft H
Diversion Sewer	24 in Circular PVC
Diversion Sewer Design Flow	19.02 MGD

3.5. Mechanical

A valve assembly is incorporated into the Breckenridge Niagara RTC sewer alignment in order to control the use of the diversion sewer based upon flow conditions. The valve assembly will include two (2) 24-inch diameter plug valves which are housed in a dry valve vault below grade. The valves actuators will be Rotork or AUMA, in order to be consistent with other Buffalo Sewer RTC sites.

3.6. Structural

Based upon the information provided, the soil conditions BGS include sand and gravel fill, clay soil fill with trace gravel, clay lake sediment, and bedrock. Presence of bedrock indicates that there is minimal risk for settlement of the Breckenridge Niagara RTC structure. It is recommended that soil borings are taken during the final design phase to confirm existing subsurface soil conditions when designing and estimating excavation areas, sheeting, and bracing requirements. Sheeting and bracing will be used in construction as structural supports due to the deep excavations required.

Although there is no existing information regarding soil contamination in the Breckenridge Niagara RTC site location, it is recommended that an allowance be included in the bid documents to account for unforeseen environmental conditions.

The Breckenridge Niagara RTC structure will include at-grade access hatches overtop the dry valve vault. The at-grade hatches will be designed to support HS-20 highway loads. The Breckenridge Niagara RTC structure will be designed to resist full height hydrostatic loads and buoyant loads with a 1.50 factor of safety. The Breckenridge Niagara RTC structure, valve vault, and manhole structures will consist of reinforced concrete.

3.7. Electrical

Valve and instrumentation control require powering through on-site electrical work. An above ground electrical control cabinet will be located on the project site along Breckenridge Street near Niagara Street.

Existing power sources residing within the Breckenridge Street right-of-way will provide power to the Breckenridge Niagara RTC structure and control panel.

The following electrical construction parameters and materials will be used at the site:

- 120 volt, single phase power
- Use National Electrical Manufacturers Association (NEMA) 4X stainless steel enclosures. If in Class 1, Division 1, or Division 2 hazardous areas use NEMA 8.

In the event of power outages, emergency backup power will be provided by an on-site uninterruptable power supply (UPS). In this scenario, the programmable logic controller (PLC), instrumentation, and telemetry will be powered by the UPS, while the valves will fail to a closed position without further power.

All electrical design will be in accordance with National Electric Code (NEC) 2014, National Fire Protection Association (NFPA) 820, and International Energy Conservation Code (IECC).

3.8. Instrumentation and Controls

The Breckenridge Niagara RTC will utilize a PLC to implement the control logic. The PLC will implement logic based only on locally collected data at this time, but it may incorporate remote data into its decision logic in a future design phase.

The PLC will monitor the sewer instrumentation and execute the operational commands issued by the Operator at the BITF. There will be a human-machine interface (HMI) at the BITF and at a local control panel that will provide monitoring of the site and allow the Operator to issue commands when the valves are in the automatic or remote mode. The interface between the HMI and PLC will be through the existing Buffalo Sewer Ovation Supervisory Control and Data Acquisition (SCADA) system via cellular modem.

The control system configuration and control philosophy generally consist of the following components:

- Local manual control of the valves from the on-site cabinet
- Remote manual control of the valves through the SCADA system (to issue an emergency closed command only)
- Automatic local control of the valves based on local sensors; this mode of operation will be implemented in a future design phase
- Automatic remote control of the valves using the PLC to implement the logic based upon remote inputs from the BITF

The recommended control philosophy includes local control at the site for maintenance or emergency use and remote manual and automatic control from the PLC panel. The PLC panel will be secured at grade level in the control cabinet.

Local Control: The valves will have local manual control capability at the site. Since the valves can also be controlled remotely by the PLC, there will be a Local-Off-Remote selector switch on site to select the control location for the valves. An HMI in the local control panel will show the valve position within the Breckenridge Niagara RTC. If the selector switch is in the Local position, the local manual control will be enabled. The remote control capability from the PLC/HMI at the BITF will be disabled.

Remote Control: When the Local-Off-Remote selector switch is in the Remote position, the PLC control will be enabled. The local manual control capability will be disabled. The PLC will control the valves in either a remote manual or automatic mode of operation, as selected at the HMI at the BITF.

- PLC Manual Control: The PLC Manual mode of control requires the Operator to perform actions at the HMI at the BITF to change the operating status of the valves
- PLC Auto Control: The PLC Auto control allows the PLC to control the equipment based on Operator-entered set points and measured values

Specific conditions will be identified that will cause alarms; all other conditions will be events within the HMI software.

3.7.1 Programmable Logic Controllers

The Breckenridge Niagara RTC system will utilize Allen Bradley (AB) PLC hardware, to implement the control logic, in order to be consistent with other Buffalo Sewer RTC sites. In order for the Breckenridge Niagara RTC system to transmit data to the Xylem gateway, the AB PLC will communicate to a Modicon PLC using an RS-232 connection and Modbus protocol. An HMI will also be installed in the control cabinet at the Breckenridge Niagara RTC site to facilitate maintenance.

3.7.2 Human Machine Interfaces

The Breckenridge Niagara RTC system will be incorporated into the existing SCADA system and a new monitoring screen will be created at the BITF. This screen will be mirrored at the HMI in the local control panel on the project site.

3.7.3 Level Sensor Instruments

Level sensor instruments will be installed in the Breckenridge Niagara RTC in order to understand real time hydraulic conditions at the site. Level sensor instruments will be installed at two locations within the Breckenridge Niagara RTC: upstream of the weir structure and downstream of the diversion sewer.

In order to provide redundancy within the level sensing system at the Breckenridge Niagara RTC, two level sensor instrumentation systems will be utilized at each location within the Breckenridge Niagara RTC. This redundancy will allow for a main level sensing system and a back-up level sensing system.

- The main level sensing system will utilize radar level sensors. The make and model of the radar level sensor system is Endress and Hauser (E+H) Micropilot FMR62, in order to be consistent with other Buffalo Sewer RTC sites.
- The back-up level sensing system will be laser level measurement sensors. The make and model of the laser level measurement sensor system will be ABB LLT10, in order to be consistent with other Buffalo Sewer RTC sites.

3.7.4 Flow Instruments

A flow meter will be installed in the flow diversion sewer for post-construction tuning and analysis of the Breckenridge Niagara RTC system. The flow meter installed at the site will be Hach FLO-DAR, in order to be consistent with other Buffalo Sewer RTC sites.

3.7.5 Telemetry Hardware

A multi-carrier modem compatible with Verizon and AT&T cellular modem will be used to enable the PLC to communicate with the SCADA system. The cellular model that will be used at the Breckenridge Niagara RTC site is Red Lion, in order to be consistent with other Buffalo Sewer RTC sites.

3.7.6 Control Strategy

The preliminary control logic and requirements for the PLC of the Breckenridge Niagara RTC are summarized in Appendix J.

3.9. Operations and Maintenance

Due to the location, size, and below-grade construction, the Breckenridge Niagara RTC is being designed to standards that will result in a long life-expectancy and ease of maintenance. The safety and reduction of maintenance of the Breckenridge Niagara RTC system is an important objective of the design. In order to extend the life of the valve operations, the PLC will be programmed to exercise the valves during dry weather periods. This will prevent locking and/or buildup of debris on the valve moving parts. Locked access platforms and hatches will be placed above important equipment, such as valves, to create ease of access and safety in maintenance.

4. Conclusions and Recommendations

The Breckenridge Niagara RTC has been designed to effectively and efficiently reduce the estimated annual overflow volume from 8.16 MG to ? MG and the number of annual target activations from fourteen (14) per year to two (2) per year.

4.1. Conclusions

The location of the Breckenridge Niagara RTC system was selected to reduce disturbance of the residential community, facilitate ease of construction, access utilities for the Breckenridge Niagara RTC controls, and maximize potential storage volume. The layout includes two valves, a weir structure, a diversion sewer, and associated control/monitoring equipment.

4.2. Opinion of Probable Construction Costs

AECOM has prepared a total project cost estimate for the Breckenridge Niagara RTC system. The OPCC was developed using 2022 dollars and is presented in Table 6. A detailed breakdown of the OPCC is included in Appendix K.

Table 6. Breckenridge Niagara RTC Structure OPCC

Description	OPCC (2022 Dollars)
Total Estimated Capital Cost	$1,402,000
Low Range Estimate (-10%)	$1,262,000
High Range Estimate (+30%)	$1,823,000

The costs presented serve as a control estimate to secure project funding, with a level of project definition between 10% - 40%. A cost range of -10% to +30% was used, which is consistent with an AACE Class 3 cost estimate. A fixed percentage of 30% was added to the estimated construction cost to account for associated project costs, including but not limited to, change orders and market conditions. A fixed percentage of 20% was added to the estimated construction cost in order to account for price escalation.

Appendix A

CSO 008, 010, and 061 Alternatives Evaluation Report

Buffalo Sewer Authority

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

Alternatives Evaluation – Final Report

Prepared for:

Buffalo Sewer Authority
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65 Niagara Square
Buffalo, NY 14202

Prepared By:

AECOM
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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

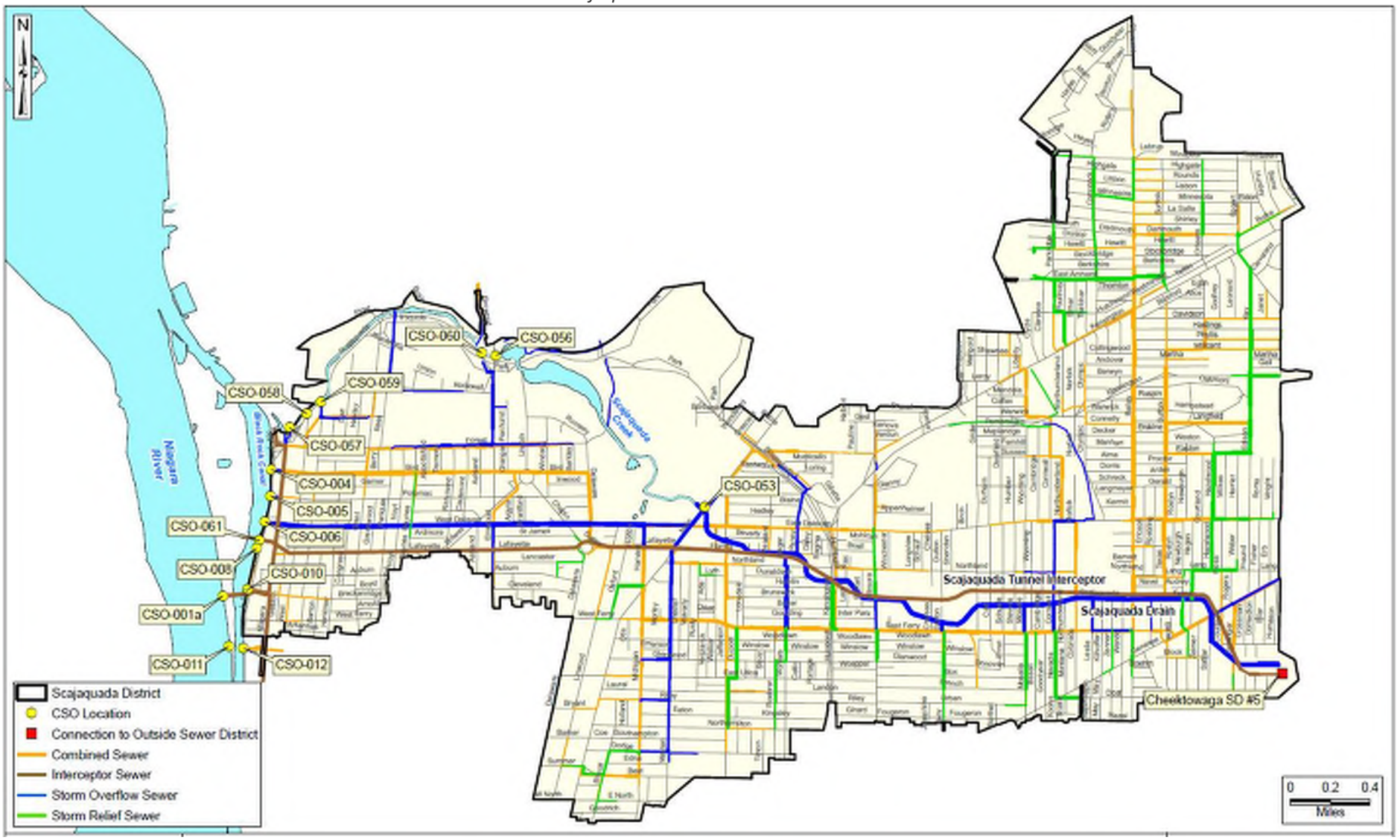


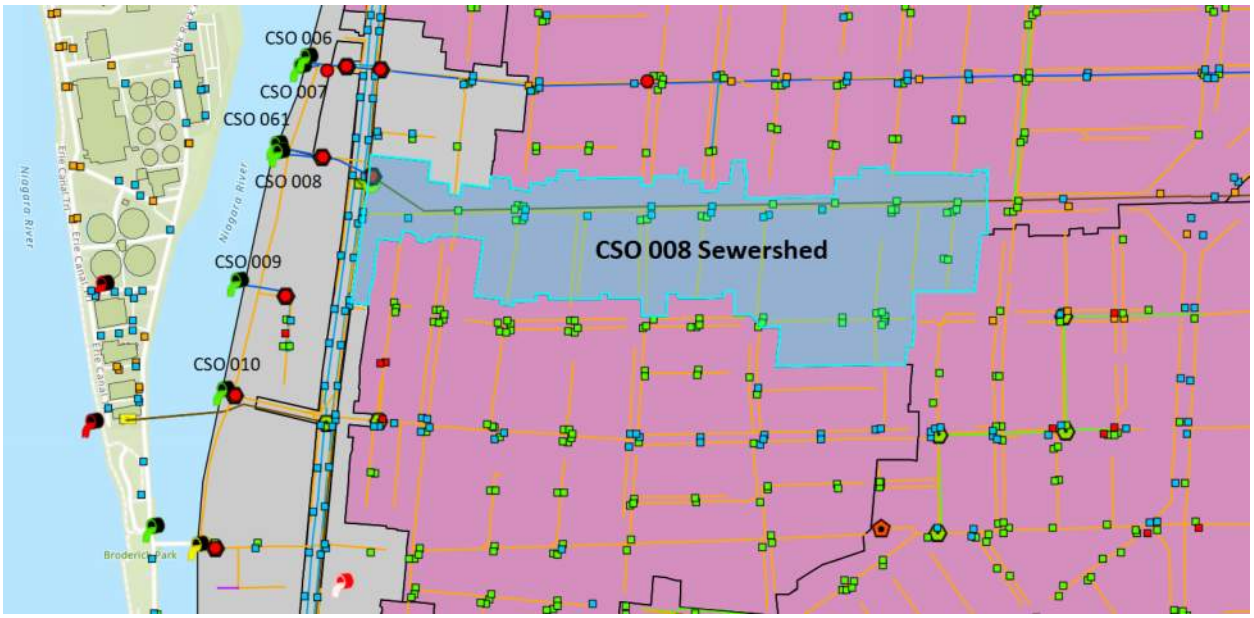
Figure 2
CSOs 008, 010, and 061 and Proposed Pipe Upsizing Location

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.

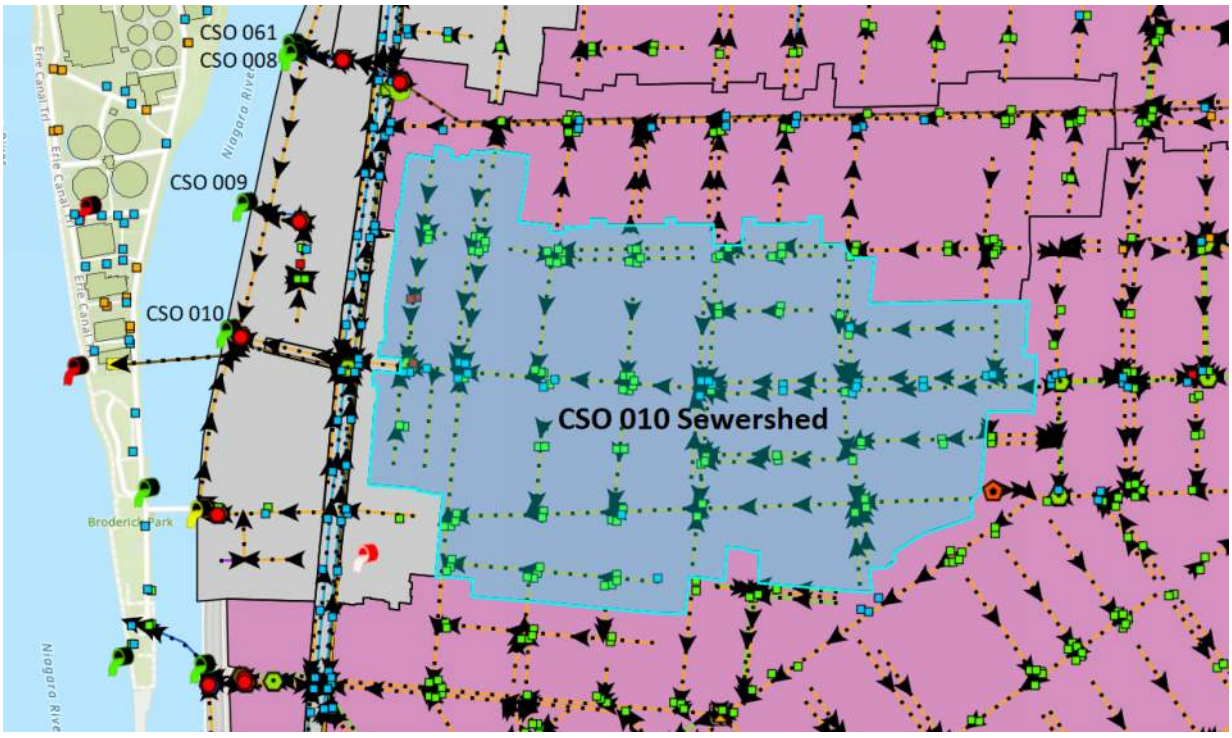
Arcadis provided BSA with a Model Update, dated April 16, 2020. Per the Model Update, the target control activations for this CSO is four (4) per year. CSO 008 has zero (0) activations per year with the completion of the sewer separation projects and mitigating the blockage issues. Therefore, CSO 008 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

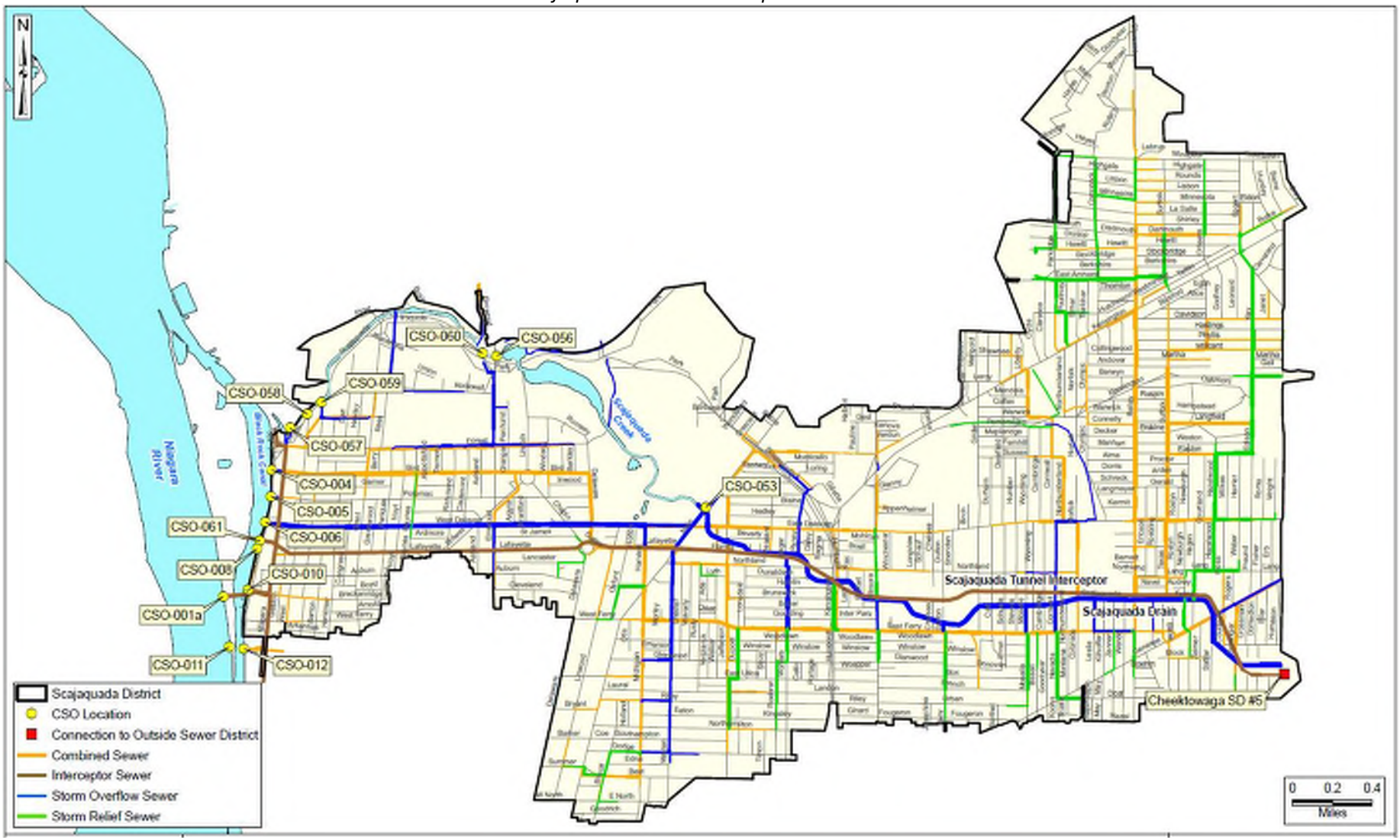
CSO 061 is located just north of CSO 008 at Brace Street on the west side of the I-190 Thruway. The CSO is downstream of SPP 330. Figure 8 shows the CSO 061 location.

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.

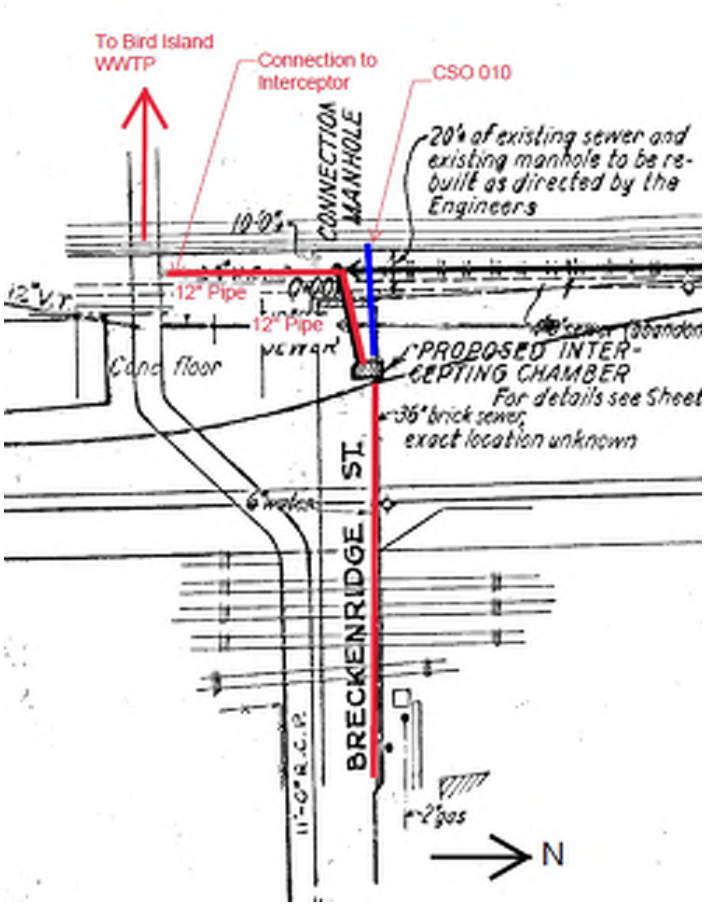
Based on the results of the BSA collection system model runs, 50 percent sewer separation does not comply with the annual target activations requirement (i.e., 4 activations). The 100 percent sewer separation approach does comply with the annual target activations with three (3) annual activations and 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.

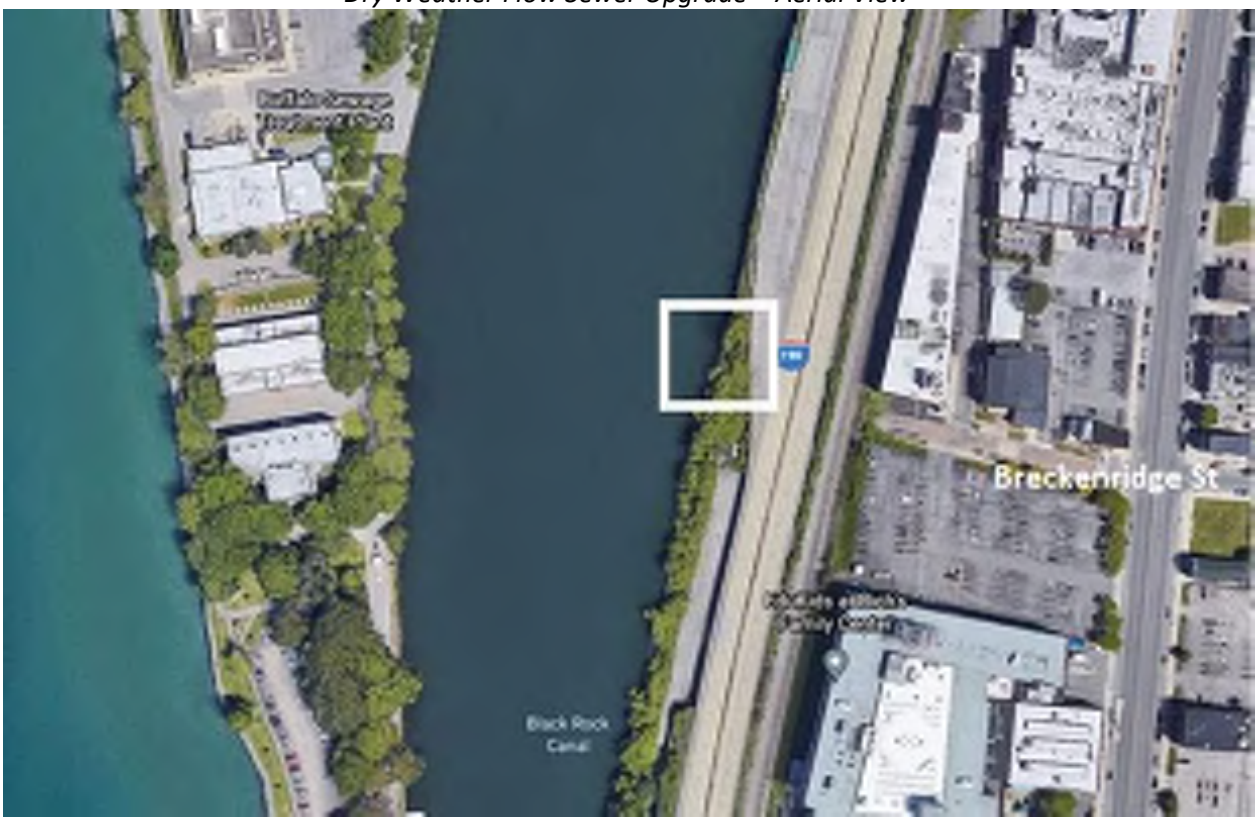
Figure 10
Existing Sewer Plan



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



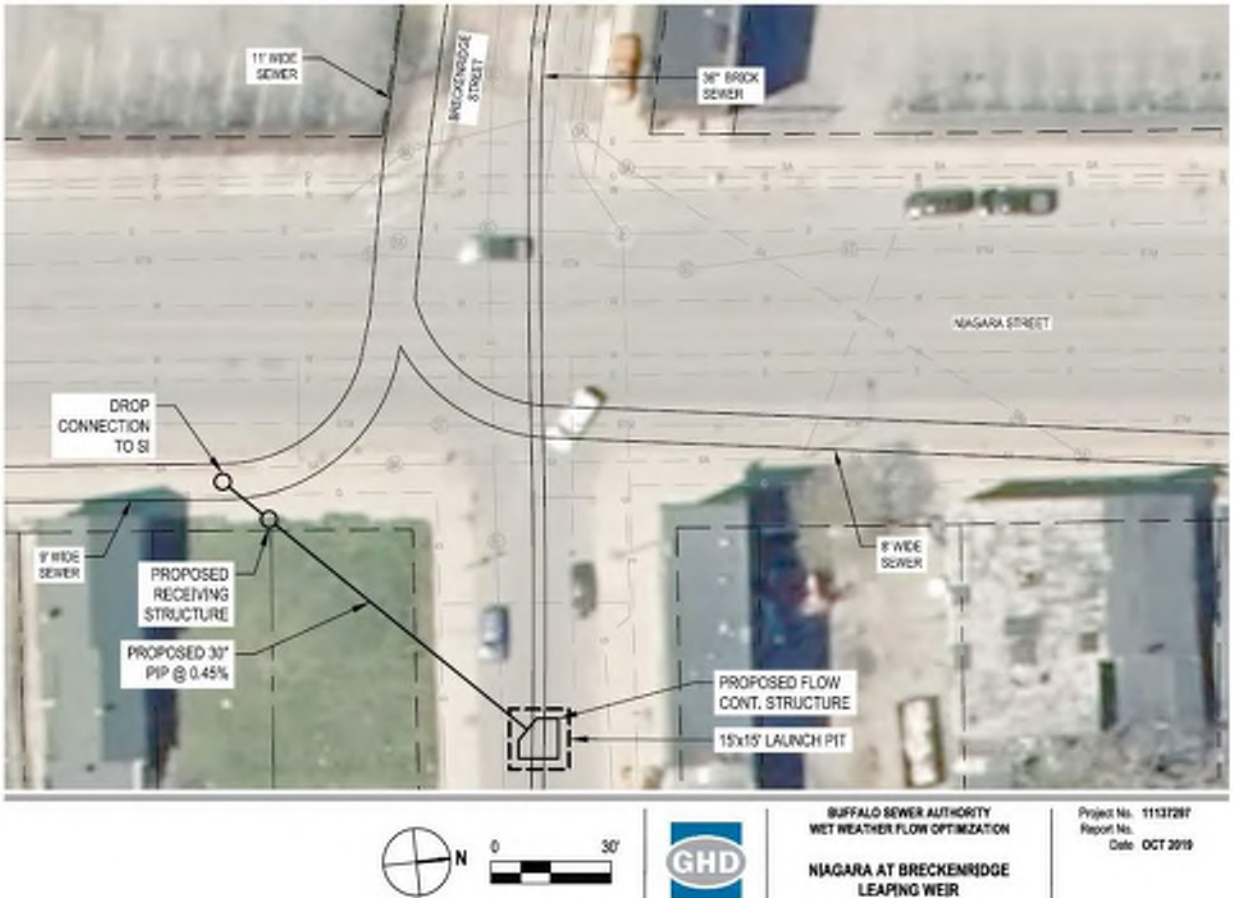
Two (2) model runs were performed to evaluate this alternative. The first model run assumed the existing 12-inch sewer is upsized to an 18-inch sewer. This scenario would result in approximately 1.58 MG of annual overflow volume and 4 annual activations. The second scenario evaluated upsizing the existing 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.

Appendix B

Photo Log

Figure 1. Niagara Street Facing East

Figure 2. Breckenridge Street Facing West

Figure 3. Breckenridge Street Facing East

Figure 4. Breckenridge Street Facing Southwest

Figure 5. Breckenridge Street Facing South

Figure 6. Breckenridge Street Facing Southwest

Figure 7. Niagara Street Green Infrastructure Improvements

Figure 8. Niagara Street Facing North

Figure 9. Niagara Street Facing South

Figure 10. Niagara Street Facing North

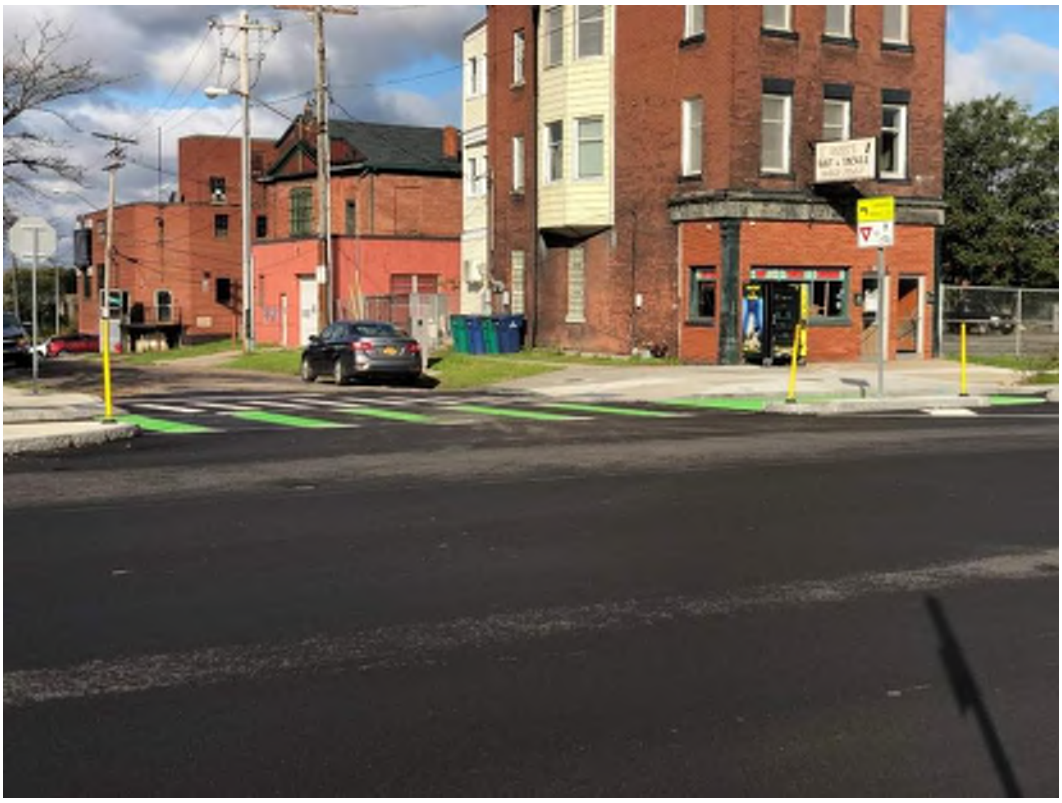


Figure 11. Niagara Street Facing West

Figure 12. Niagara Street Facing Southeast

Appendix C

DHP OPRHP Letter of Determination

NEW YORK STATE OF OPPORTUNITY. Parks, Recreation, and Historic Preservation

KATHY HOCHUL
Governor

ERIK KULLESEID
Commissioner

March 7, 2022

Christine Abplanalp
Civil Engineer - AECOM
One John James Audubon
Suite 210
Amherst, NY 14228

Re: DEC
Breckenridge Niagara Real Time Control Structure
Breckenridge and Niagara Streets, Buffalo, Erie County
22PR01265

Dear Christine Abplanalp:

Thank you for requesting the comments of the Division for Historic Preservation of the Office of Parks, Recreation and Historic Preservation (OPRHP). We have reviewed the submitted materials in accordance with the New York State Historic Preservation Act of 1980 (section 14.09 of the New York Parks, Recreation and Historic Preservation Law). These comments are those of the Division for Historic Preservation and relate only to Historic/Cultural resources. They do not include potential environmental impacts to New York State Parkland that may be involved in or near your project. Such impacts must be considered as part of the environmental review of the project pursuant to the State Environmental Quality Review Act (New York Environmental Conservation Law Article 8) and its implementing regulations (6NYCRR Part 617).

We note that the project area is adjacent to the Upper Black Rock Historic District, which is eligible for listing in the State and National Registers of Historic Places. Our office has reviewed the proposed real time control structure project received on 2/23/2022. Based upon our review, it is the OPRHP's opinion that the project will have No Adverse Impact on historic or archaeological resources.

If you have any questions, I am best reached by email.

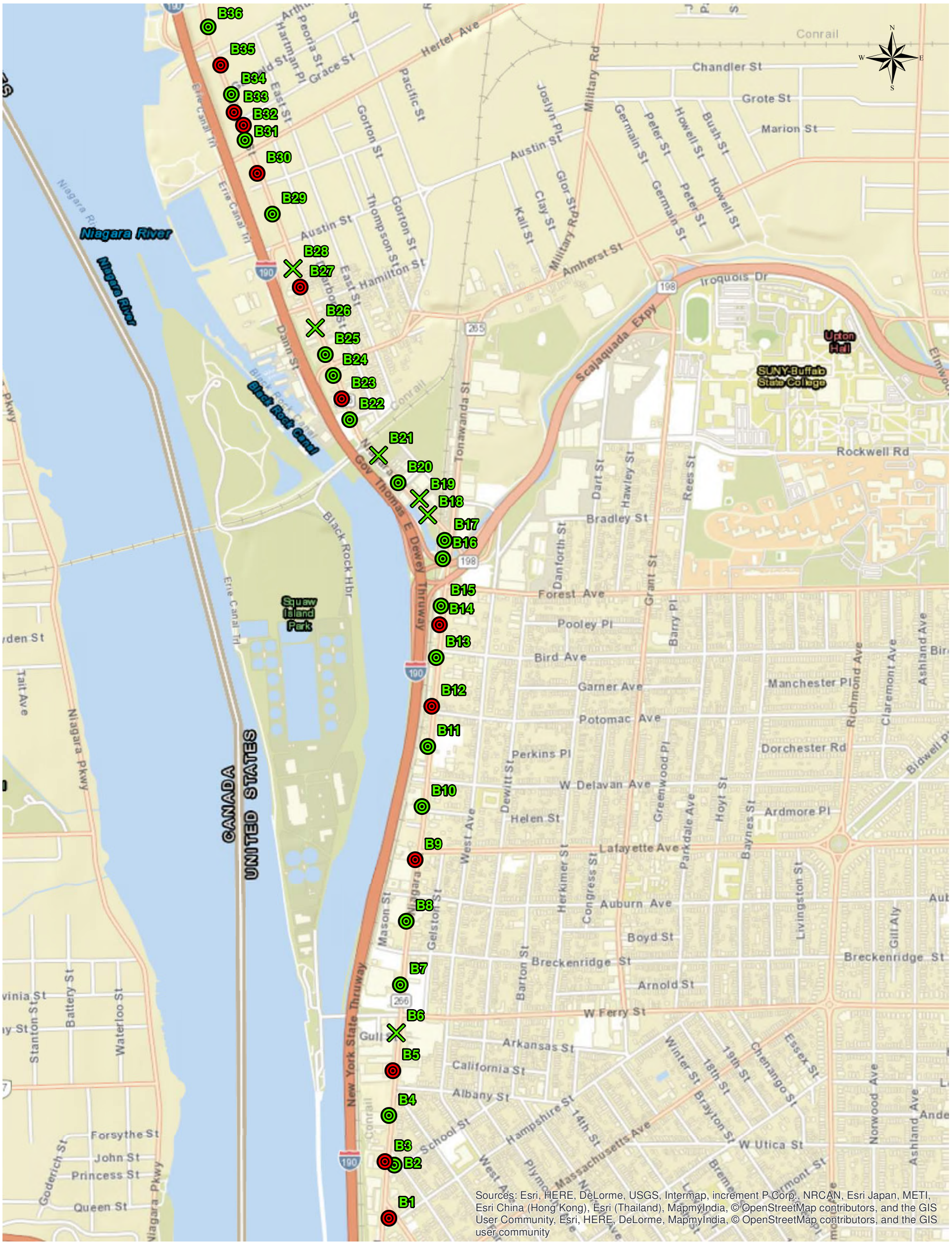
Sincerely,

Derek Rohde
Historic Site Restoration Coordinator
e-mail: derek.rohde@parks.ny.gov

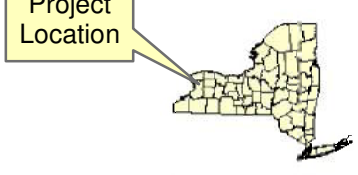
via e-mail only

Appendix D

Watts Architecture & Engineering Project-Specific Soil Borings



Project Location



Legend

Niagara Infiltration Tests

- Boring and Testing Performed
- Yes Boring, No Testing
- No Boring or Testing

0 900 1,800 3,600 Feet

WATTS ARCHITECTURE & ENGINEERING

Infiltration Test Borings Map
Niagara St Busti to Ontario Section Buffalo, NY
Date: 10/19/2016

NATURE'S WAY
ENVIRONMENTAL CONSULTANTS & CONTRACTORS, INC

3553 Crittenden Road
Alden, NY 14004
(716) 937- 6527
www.natureswayenvironmental.com

Hole Number: B7

DATE: 10/6/16 ELEVATION:

PROJECT: Subsurface Investigation and Infiltration Testing
Niagara St Gateway Proj Phase 4 from Porter Ave to Ontario St, Buff NY

PREPARED FOR: Watts Architecture & Engineering

BORING LOCATION: See Map

SN	0/6	6/12	12/18	18/24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
1							Asphalt pavement (1.2)	1.7'	Asphalt pavement to 1.2' over sand and gravel fill to 2.3' over clayey lake sediment to end of boring.
2							Moist, grey, very gravelly (SILTY-SAND) fill with 40 to 50% gravel, very fine to very coarse size sand, little silt. (2.3)	1.7'	
3							Moist, brown (CLAYEY-SILT) with some clay, blocky soil structure.	2.0'	
4							(7.0)	2.0'	
							Boring Completed at 7.0' bgs.		No Water at Completion.

LOGGED BY: Dale M. Gramza / Senior Geologist

NATURE'S WAY
ENVIRONMENTAL CONSULTANTS & CONTRACTORS, INC

3553 Crittenden Road
Alden, NY 14004
(716) 937- 6527
www.natureswayenvironmental.com

Hole Number: B8

DATE: 10/5/16 ELEVATION:

PROJECT: Subsurface Investigation and Infiltration Testing
Niagara St Gateway Proj Phase 4 from Porter Ave to Ontario St, Buff NY

PREPARED FOR: Watts Architecture & Engineering

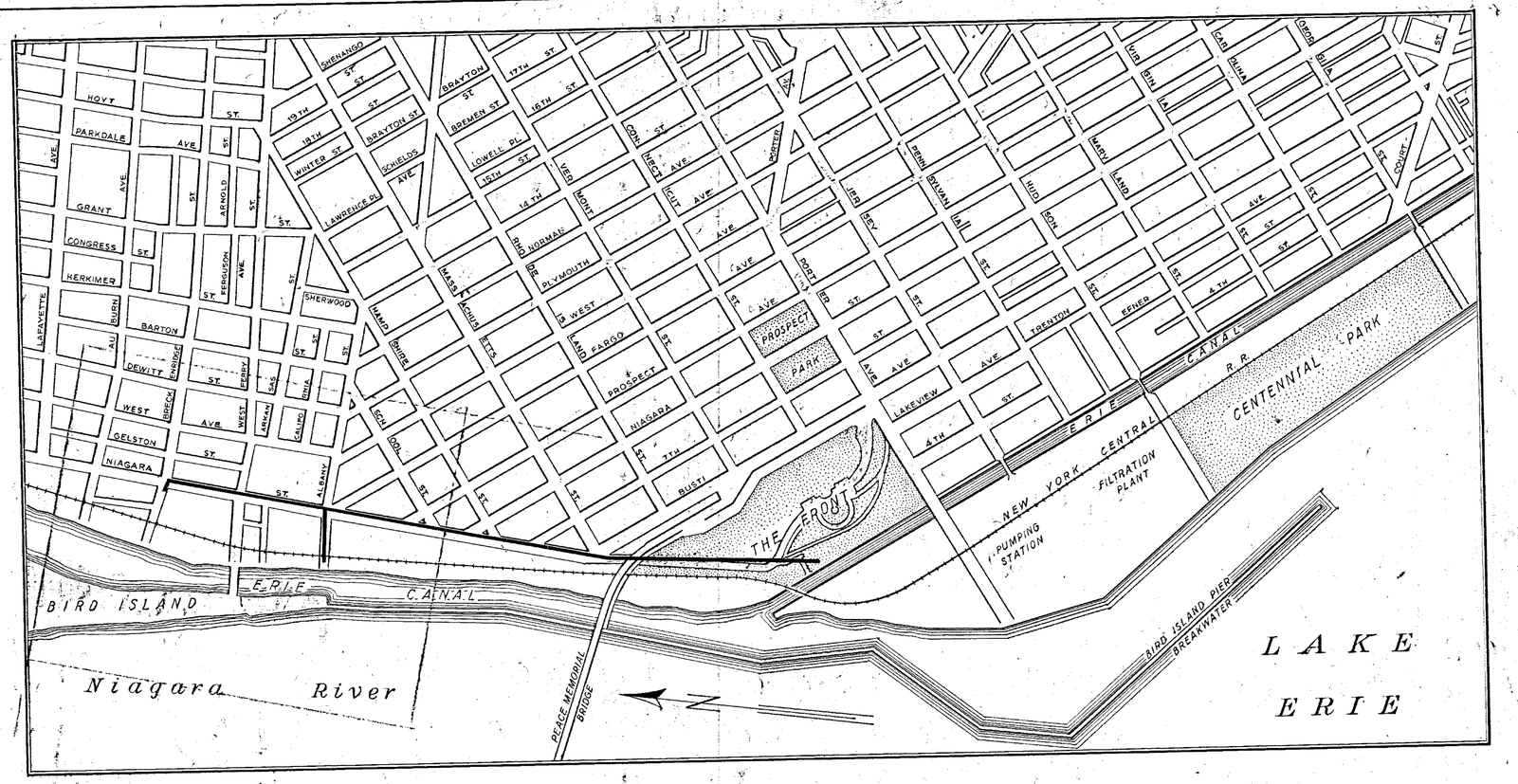
BORING LOCATION: See Map

SN	0/6	6/12	12/18	18/24	N	LITH	DESCRIPTION AND CLASSIFICATION	REC	COMMENTS
1							Asphalt pavement (1.2)	1.8'	Asphalt pavement to 1.2' over sand and gravel fill to 2.0' over clayey soil fill with trace gravel to 5.0' over clayey lake sediment to end of boring.
2							Moist, light grey, very gravelly (SILTY-SAND) fill with 40 to 50% gravel and slag, very fine to coarse size sand. (2.0) Moist to extremely moist, brown (CLAYEY-SILT) fill with 3 to 5% gravel with occasional red brick fragments, some clay.	1.8'	
3								1.8'	
4							Moist, faintly mottled, brown (CLAYEY-SILT) with some clay, blocky soil structure. (5.0)	1.8'	
							Boring Completed at 8.0' bgs. (8.0)		No Water at Completion.

LOGGED BY: Dale M. Gramza / Senior Geologist

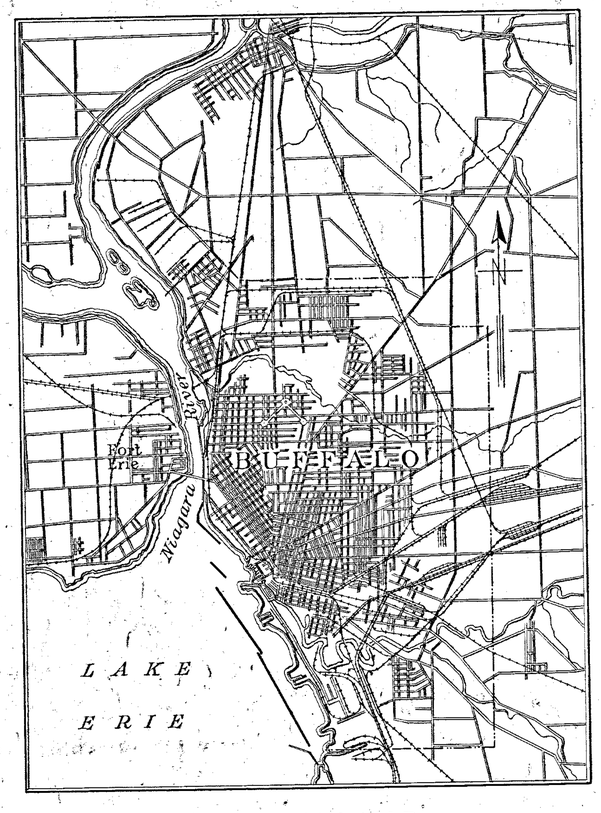
Appendix E

Greeley and Hansen, Buffalo Sewer Authority Relevant Intercepting Sewer Division N Drawing



GENERAL PLAN

0 600 1200 1800 Ft.



LOCATION MAP

0 1 2 3 Mi.

INTERCEPTING SEWER
DIVISION N···· FRONT SECTION
LIST OF PLANS

Sheet No.	Title
1	Location Maps and List of Plans
2	Index Map
3	Plan & Profile-Breckenridge St. to Albany St.
4	" " " Albany St. to Hampshire St.
5	" " " Hampshire St. to S. of Busti Ave.
6	" " " S. of Busti Ave. to Erie Canal
7	Albany Street Connection
8	Swan Trunk Sewer Crossing
9	" " " "
10	Sewer Sections and Manholes

NOTE

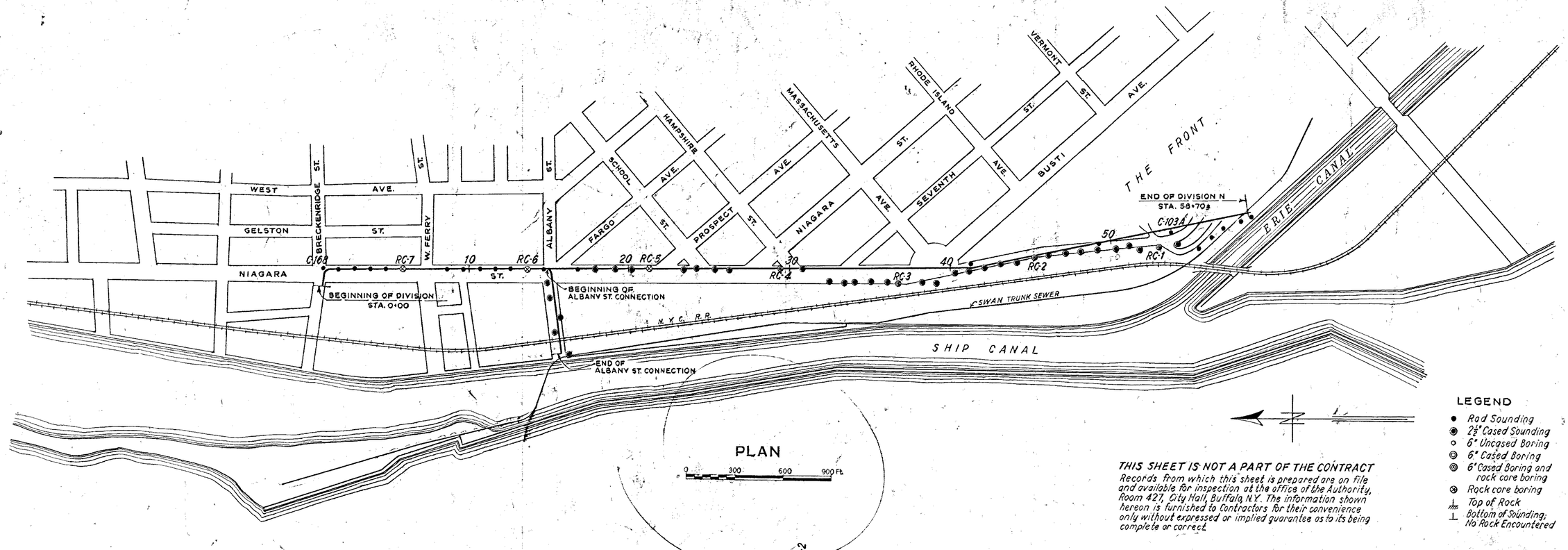
Elevations are referred to Buffalo City Datum. Buffalo City Datum is 575.89 feet above mean tide at New York by the level adjustment of 1903, used by U.S. Engineers, and is 577.0 feet above datum of N.Y. State Canal Surveys of 1900 and 1901.

APPROVED
ON BEHALF OF
THE FEDERAL EMERGENCY
ADMINISTRATION OF PUBLIC WORKS
UNDER DATE OF July 14th 1936
Harold Epstein
PROJECT ENGINEER, DOCKET N.Y. 1034-R
BUFFALO SEWER AUTHORITY
BUFFALO, N.Y.

APPROVED
BY RESOLUTION OF
BUFFALO SEWER AUTHORITY
UNDER DATE OF July 13th 1936
GREELEY AND HANSEN, ENGINEERS
BY [signature]
LICENSED PROFESSIONAL ENGINEER
UNDER DATE OF July 13th 1936

JUNE, 1936

BUFFALO, NEW YORK
BUFFALO SEWER AUTHORITY
INTERCEPTING SEWER
DIVISION N
FRONT SECTION
LOCATION MAPS
AND
LIST OF PLANS
RECORD DRAWING 10 SHEETS No. 1



PLAN

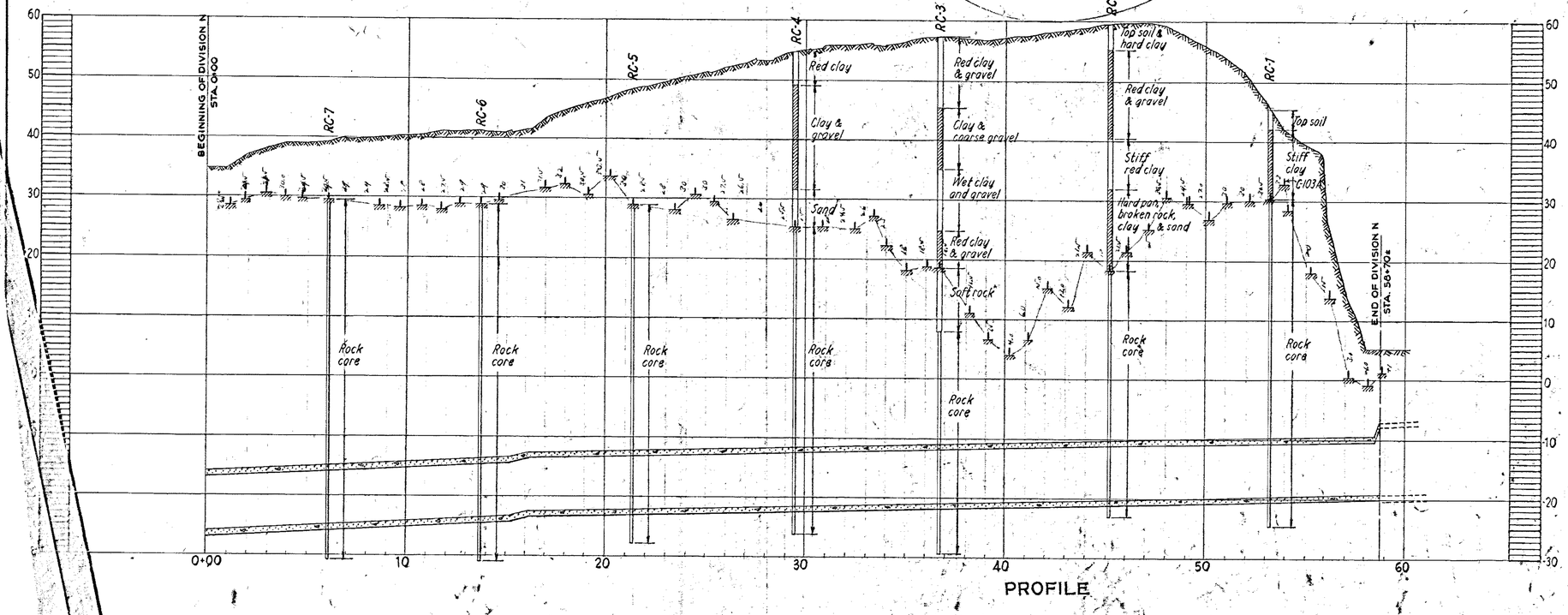
0 300 600 900 Ft.

THIS SHEET IS NOT A PART OF THE CONTRACT

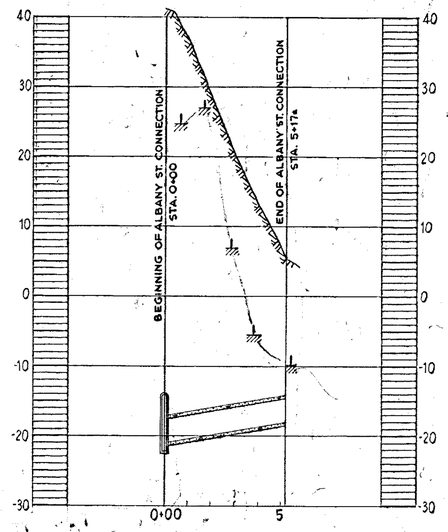
Records from which this sheet is prepared are on file and available for inspection at the office of the Authority, Room 427, City Hall, Buffalo, N.Y. The information shown hereon is furnished to Contractors for their convenience only without expressed or implied guarantee as to its being complete or correct.

LEGEND

- Rod Sounding
- 2½" Cased Sounding
- 6" Uncased Boring
- 6" Cased Boring
- 6" Cased Boring and rock core boring
- Rock core boring
- Top of Rock
- Bottom of Sounding; No Rock Encountered



PROFILE



PROFILE
ALBANY ST. CONNECTION

BUFFALO, NEW YORK
BUFFALO SEWER AUTHORITY

INTERCEPTING SEWER
DIVISION N
FRONT SECTION

PLAN AND PROFILE
SHOWING RESULTS OF BORINGS AND SOUNDINGS
RECORD DRAWING

EXISTING UNDERGROUND STRUCTURES

PLAN OF PROPOSED SEWER

0 50 100 150 Ft.

NOTE
For complete details of revised design at Breckenridge & Niagara Sts. see Sheet 6A, Div. O Record Drawings.

PROFILE

BUFFALO, NEW YORK
BUFFALO SEWER AUTHORITY

INTERCEPTING SEWER

DIVISION N
FRONT SECTION
PLAN AND PROFILE
NIAGARA STREET
FROM BRECKENRIDGE ST. TO ALBANY ST.

JUNE, 1938 RECORD DRAWING 10 SHEETS, NO. 3

Appendix F

Watts Architecture & Engineering Niagara Street Gateway Project
Drainage Plans

SUMMARY OF FIELD CHANGES	
NO.	DESCRIPTION
1	6-DS-4 SAND FILTER HAS BEEN MOVED TO THE CYCLE TRACK BUFFER. THE SAND BACKFILL LAYER HAS BEEN INCREASED TO 1 FOOT. THE LENGTH OF THE SAND FILTER HAS BEEN REDUCED TO 48 FEET AND THE WIDTH HAS BEEN INCREASED TO 3 FEET.
2	THE STORMWATER PLANTER UNDERDRAIN CONNECTION HAS BEEN ELIMINATED FROM 6-DS-4. THE STORAGE LAYER HAS BEEN ELIMINATED FROM THE STORMWATER PLANTERS AT STA. 71+25 TO 72+25, LT.
3	6-DS-4 HAS BEEN CONVERTED FROM A DOUBLE MANHOLE STRUCTURE TO A DOUBLE INLET STRUCTURE.

6-DS-3
6-DS-4
5" UD
5" UD
Clean out
5" ST
D
8" ST

FIELD CHANGE DRAWING
DATE: 03-09-2020
DRAWN BY: AAS
CHECKED BY: KW
THIS DRAWING SUPPLEMENTS THE DUP DWGS IN THE ORIGINAL CONTRACT DOCUMENTS. ORANGE TEXT INDICATES CHANGES FROM ORIGINAL CONTRACT DWG. NO. DUP-06.

BUFFER DRAINAGE GRATE AND OPENING. SEE DETAIL DWG. NO. DUD-10 (TYP.)

PLANTER DOES NOT REQUIRE GEOMEMBRANE

6-DS-1 (SEE NOTE 8)

SEE NOTE 9

6-DS-3 (SEE NOTE 8)

6-DS-4

UNDERDRAIN ELIMINATED FROM THESE PLANTERS

MATCHLINE STA. 69+00 SEE DUP-05

MATCHLINE STA. 74+00 SEE DUP-07

NIAGARA STREET

6-DS-5

6-DS-6

NIAGARA STREET

SEE NOTE 9

6-DS-7

6-DS-2

ADJUST SEWER MANHOLE. SEE TABLE ON DWG. NO. DUT-01 (TYP.)

NOTES:

1. UNDERDRAIN PIPE SHALL BE ITEM 605.1502, PERFORATED CORRUGATED POLYETHYLENE TUBING, WITHIN STORMWATER PLANTER AND SAND FILTER TRENCHES. THIS INCLUDES AREAS WHERE UNDERDRAIN IS ROUTED AROUND TREES, BENEATH THE STRUCTURAL SOIL LAYER (SEE DETAILS ON DWG. NOS. DUD-06 THRU DUD-08). UNDERDRAIN PIPE SHALL BE ITEM 664.010601ER ELSEWHERE UNLESS OTHERWISE INDICATED ON THE PLANS.
2. SEE DWG. NOS. DUT-02 THRU DUT-16 FOR DETAILED INFORMATION ON PROPOSED LATERALS INCLUDING PIPE SIZE, CONNECTION AND QUANTITIES.
3. NEW RUNS OF UNDERDRAIN PIPE AND STORM SEWER PIPE SHALL BE PLACED AT A MINIMUM 4-FOOT LATERAL OFFSET FROM ALL EXISTING AND PROPOSED TREES.
4. NEW RUNS OF UNDERDRAIN PIPE SHALL BE PLACED AT A 2-FOOT LATERAL OFFSET FROM ALL EXISTING SURFACE UTILITIES.
5. SEE DRAWING NO. DUD-01 TO DUD-10 FOR DRAINAGE DETAILS.
6. SEE DRAWING NOS. DUT-02 THRU DUT-16 FOR DRAINAGE TABLES.
7. DRAINAGE STRUCTURES ADJACENT TO THE NEW DEDICATED BICYCLE LANE SHALL BE SETBACK FROM THE EXISTING CURB LINE. SEE DETAIL ON DWG. NO. DUD-09.
8. TEST PITS, ITEM 206.05, SHALL BE PERFORMED TO CONFIRM LOCATION OF EXISTING UNDERGROUND UTILITIES PRIOR TO ORDERING DRAINAGE STRUCTURE.
9. PIPES SHOWN LATERALLY OFFSET TO REFLECT QUANTITY. ALL UNDERDRAIN PIPES SHALL BE HORIZONTALLY CENTERED WITHIN EACH SAND FILTER TRENCH. SEE DETAILS ON DWG. NOS. DUD-03 THRU DUD-08.

WATERLINE NOTES:

1. SEE WATER LINE NOTES ON DWG. NO. DUN-01.
2. ALL EXISTING WATERLINE, HYDRANTS AND VALVES ON THIS DRAWING ARE TO REMAIN
3. EXISTING VALVES WITHIN THE LIMITS OF WORK SHALL BE ADJUSTED PER THE TABLE ON DWG. DUT-01.

KEY

- SURFACE WATER FLOW DIRECTION ARROWS
- SAND FILTER TRENCH (SEE DETAIL ON DWG. NOS. DUD-06 THRU DUD-08 AND SAND FILTER TABLE ON DWG. NO. DUT-17)
- CURB INLET (SEE DWG. NOS. DUD-06 THRU DUD-09)
- CLEAN-OUT (SEE DWG. NO. DUD-09)
- 6" DIAMETER UNDERDRAIN PIPE (SEE NOTE 1)
- STORM SEWER PIPE (SEE NOTE 2)
- TREE (SEE DETAIL ON DWG. NO. MD-02 AND TREE PLANTING TABLES ON DWG. NO. MT-05 THRU MT-06)
- EXISTING TREE TO REMAIN
- TREE REMOVAL AND REPLACEMENT (SEE TREE REMOVAL AND TREE PLANTING TABLES ON DWG. NOS. MT-04 THRU MT-06)
- TREE REMOVAL (SEE TREE REMOVAL TABLE ON DWG. NO. MT-04)
- RIGHT OF WAY LINE
- STORMWATER PLANTER OUTLINE (SEE DWG. NOS. MD-07 THRU MD-19, AND GENERAL PLAN DWGS.)
- TREE PIT (SEE DETAIL ON DWG. NO. MD-02 AND TREE PLANTING TABLES ON DWG. NOS. MT-05 THRU MT-06)
- WATER VALVE ITEM 663.100600ER
- WATERLINE ITEM 663.01XX01ER
- HYDRANT ITEM 663.131000ER

0 10' 20' 40'

AFFIX SEAL:
ON:

STATE OF NEW YORK · KRISTOPHER J. WINKLER · 084011 · LICENSED PROFESSIONAL ENGINEER

ALTERED BY:
ON:

STATE OF NEW YORK · ALEXIS A SIGETI · 097618 · LICENSED PROFESSIONAL ENGINEER

11 MARCH 2020

AS-BUILT REVISIONS
DESCRIPTION OF ALTERATIONS:

BUFFALO SEWER AUTHORITY

WATTS ARCHITECTURE & ENGINEERING

ALL DIMENSIONS IN ft UNLESS OTHERWISE NOTED

NIAGARA STREET GATEWAY PROJECT
PHASE 3 - NIAGARA STREET - PIN 5760.81
HAMPSHIRE STREET TO SCAJAQUADA CREEK BRIDGE
DRAINAGE & UTILITY PLAN

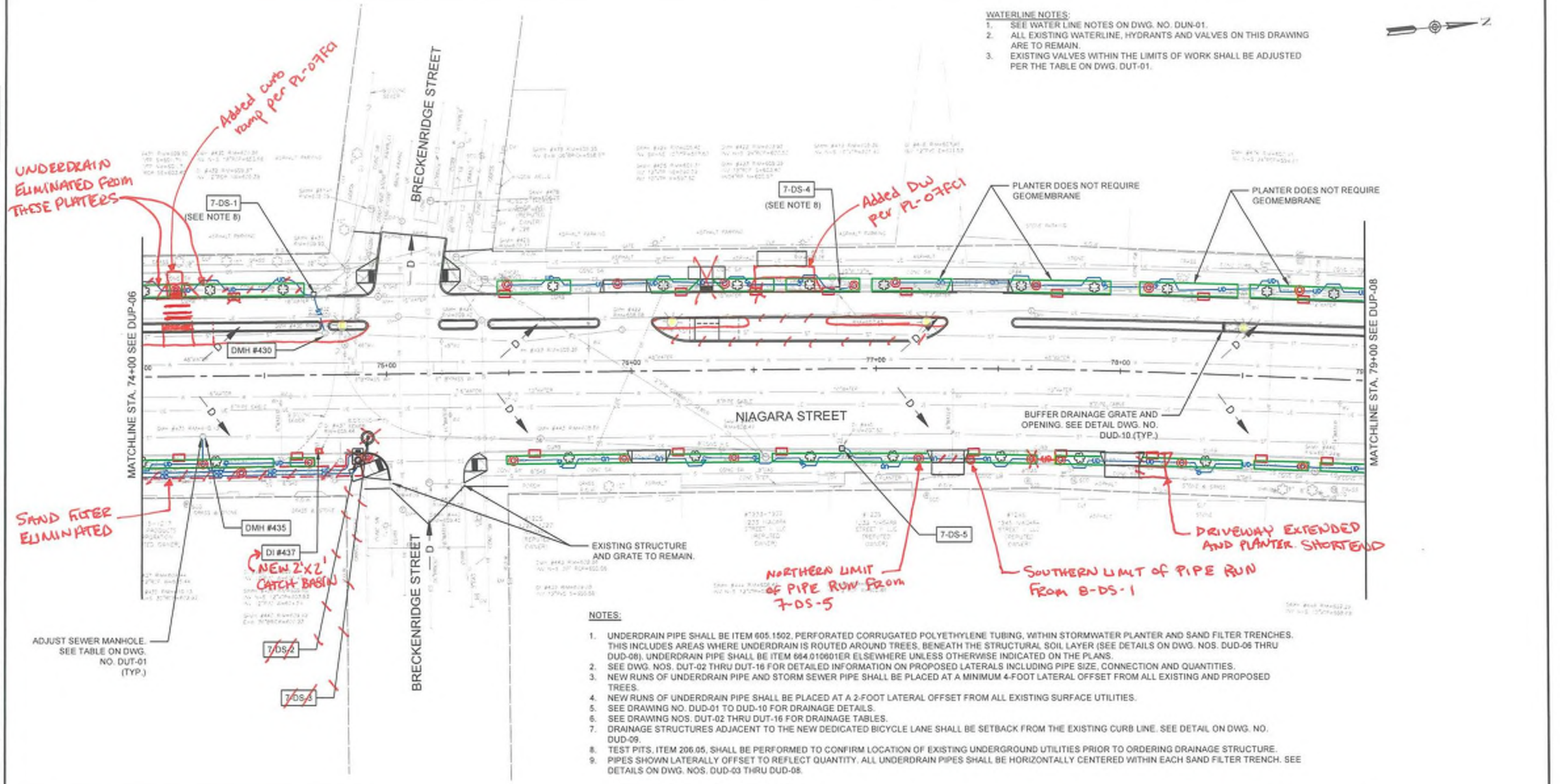
CITY OF BUFFALO
ERIE COUNTY, NEW YORK

DRAWING NO. DUP-06FC1
SHEET NO.

DRAFTING T. BUCKLEY | CHECK J. ROSS | PROJECT MANAGER P. GALBO
DESIGN J. KELLOGG/J. KOCH | CHECK J. ROSS
JOB MANAGER J. BIDELL/J. O'NEILL

FILE NAME = O:\2018\18085 Niagara St_Ph 3_C\#18. CADD\Trans\04. Phase 3\Field Change Dwgs West Side GI\Drainage Plan 02.dwg
DATE/TIME = 3/11/2020 11:17:05 AM
USER = Alexis Sigeti

WATERLINE NOTES:
1. SEE WATER LINE NOTES ON DWG. NO. DUN-01.
2. ALL EXISTING WATERLINE, HYDRANTS AND VALVES ON THIS DRAWING ARE TO REMAIN.
3. EXISTING VALVES WITHIN THE LIMITS OF WORK SHALL BE ADJUSTED PER THE TABLE ON DWG. DUT-01.



NOTES:

1. UNDERDRAIN PIPE SHALL BE ITEM 605.1502, PERFORATED CORRUGATED POLYETHYLENE TUBING, WITHIN STORMWATER PLANTER AND SAND FILTER TRENCHES. THIS INCLUDES AREAS WHERE UNDERDRAIN IS ROUTED AROUND TREES, BENEATH THE STRUCTURAL SOIL LAYER (SEE DETAILS ON DWG. NOS. DUD-06 THRU DUD-08). UNDERDRAIN PIPE SHALL BE ITEM 664.010601ER ELSEWHERE UNLESS OTHERWISE INDICATED ON THE PLANS.
2. SEE DWG. NOS. DUT-02 THRU DUT-16 FOR DETAILED INFORMATION ON PROPOSED LATERALS INCLUDING PIPE SIZE, CONNECTION AND QUANTITIES.
3. NEW RUNS OF UNDERDRAIN PIPE AND STORM SEWER PIPE SHALL BE PLACED AT A MINIMUM 4-FOOT LATERAL OFFSET FROM ALL EXISTING AND PROPOSED TREES.
4. NEW RUNS OF UNDERDRAIN PIPE SHALL BE PLACED AT A 2-FOOT LATERAL OFFSET FROM ALL EXISTING SURFACE UTILITIES.
5. SEE DRAWING NO. DUD-01 TO DUD-10 FOR DRAINAGE DETAILS.
6. SEE DRAWING NOS. DUT-02 THRU DUT-16 FOR DRAINAGE TABLES.
7. DRAINAGE STRUCTURES ADJACENT TO THE NEW DEDICATED BICYCLE LANE SHALL BE SETBACK FROM THE EXISTING CURB LINE. SEE DETAIL ON DWG. NO. DUD-09.
8. TEST PITS, ITEM 206.05, SHALL BE PERFORMED TO CONFIRM LOCATION OF EXISTING UNDERGROUND UTILITIES PRIOR TO ORDERING DRAINAGE STRUCTURE.
9. PIPES SHOWN LATERALLY OFFSET TO REFLECT QUANTITY. ALL UNDERDRAIN PIPES SHALL BE HORIZONTALLY CENTERED WITHIN EACH SAND FILTER TRENCH. SEE DETAILS ON DWG. NOS. DUD-03 THRU DUD-08.

KEY

- SURFACE WATER FLOW DIRECTION ARROWS
- SAND FILTER TRENCH (SEE DETAIL ON DWG. NOS. DUD-06 THRU DUD-08 AND SAND FILTER TABLE ON DWG. NO. DUT-17)
- CURB INLET (SEE DWG. NOS. DUD-06 THRU DUD-09)
- CLEAN-OUT (SEE DWG. NO. DUD-09)
- 6" DIAMETER UNDERDRAIN PIPE (SEE NOTE 1)
- STORM SEWER PIPE (SEE NOTE 2)
- TREE (SEE DETAIL ON DWG. NO. MD-02 AND TREE PLANTING TABLES ON DWG. NO. MT-05 THRU MT-06)
- EXISTING TREE TO REMAIN
- TREE REMOVAL AND REPLACEMENT (SEE TREE REMOVAL AND TREE PLANTING TABLES ON DWG. NOS. MT-04 THRU MT-06)
- TREE REMOVAL (SEE TREE REMOVAL TABLE ON DWG. NO. MT-04)
- RIGHT OF WAY LINE
- STORMWATER PLANTER OUTLINE (SEE DWG. NOS. MD-07 THRU MD-19, AND GENERAL PLAN DWGS.)
- TREE PIT (SEE DETAIL ON DWG. NO. MD-02 AND TREE PLANTING TABLES ON DWG. NOS. MT-05 THRU MT-06)
- WATER VALVE ITEM 663.100600ER
- 6-IN WATERLINE ITEM 663.010601ER
- HYDRANT ITEM 663.131000ER

0 10' 20' 40'

AFFIX SEAL:
ON:

ALTERED BY:
ON:

AS-BUILT REVISIONS
DESCRIPTION OF ALTERATIONS:

BUFFALO SEWER AUTHORITY

WATTS ARCHITECTURE & ENGINEERING

ALL DIMENSIONS IN ft UNLESS OTHERWISE NOTED

NIAGARA STREET GATEWAY PROJECT
PHASE 3 - NIAGARA STREET - PIN 5760.81
HAMPSHIRE STREET TO SCAJAQUADA CREEK BRIDGE
DRAINAGE PLAN

CITY OF BUFFALO
ERIE COUNTY, NEW YORK

DRAWING NO. DUP-07
SHEET NO. 164

JOB MANAGER J. BIDELLI, O'NEILL | DESIGN J. KELLOGG/J. KOCH | CHECK J. ROSS | DRAFTING T. BUCKLEY | PROJECT MANAGER P. GALBO

FILE NAME = O:\2015\15176 Niagara Street Phases 3_4\18. CADD\Transportation\02. Phase 4 - Niagara Street from Porter to Ontario\Drainage Plan 02.dwg
DATE/TIME = 3/16/2018 2:25:22 PM
USER = Tyler Buckley

Appendix G

Preliminary Calculations

Table of Contents

I. Determine Design Flow of Existing 36-inch Diameter Combined Brick Sewer

Assumptions
Pipe Diameter: 3 ft
Pipe Material: Brick
Slope: 0.0045
n_{brick}: 0.015

Area

$$A = \pi r^2$$
$$A = \pi(1.5\ ft^2)$$
$$A = 7.065\ ft^2$$

Hydraulic Radius

$$R_h = \frac{A}{P} = \frac{D}{4}$$
$$R_h = \frac{D}{4} = \frac{3\ ft}{4} = 0.75\ ft$$

Manning's Equation

$$Q = \frac{1.49}{n} A R_h^{2/3} \sqrt{s}$$
$$Q = \frac{1.49}{0.015}(7.065\ ft^2)\left(0.75\ ft^{2/3}\right)\left(\sqrt{0.0045}\right)$$
$$Q = 38.86 \frac{ft^3}{s}$$
$$Q = 38.86 \frac{ft^3}{s}\left(\frac{1\ MGD}{1.55\ CFS}\right) = 25.07\ MGD$$

Design Flow (Q) = 25.07 MGD

II. Determine Design Flow of 24-inch Diameter PVC Diversion Sewer

Assumptions
Pipe Diameter: 2 feet
Pipe Material: Polyvinyl Chloride (PVC)
Slope: 0.01
n_{PVC}: 0.010

Area

$$A = \pi r^2$$
$$A = \pi(1\ ft^2)$$
$$A = 3.14\ ft^2$$

Hydraulic Radius

$$R_h = \frac{A}{P} = \frac{D}{4}$$
$$R_h = \frac{D}{4} = \frac{2\ ft}{4} = 0.5\ ft$$

Manning's Equation

$$Q = \frac{1.49}{n} A R_h^{2/3} \sqrt{s}$$
$$Q = \frac{1.49}{0.010}(3.14\ ft^2)\left(0.5\ ft^{2/3}\right)\left(\sqrt{0.01}\right)$$
$$Q = 29.47 \frac{ft^3}{s}$$
$$Q = 29.47 \frac{ft^3}{s}\left(\frac{1\ MGD}{1.55\ CFS}\right) = 19.02\ MGD$$

Design Flow (Q) = 19.02 MGD

III. Determine Discharge Over Broad Crest Weir 3-feet in Length

Assumptions
Type: Broad Crested Weir
Weir H: 1.0 feet
Weir C: 2.98
Weir b: 1.0 feet
Weir L: 3.0 ft

Discharge over Broad Crested Weir

$$Q = CLH^{3/2}$$

$$Q = (2.98)(3)(1\ ft)^{3/2}$$

$$Q = 8.94\ \frac{ft^3}{s}$$

$$Q = 8.94 \frac{ft^3}{s}\left(\frac{1\ MGD}{1.55\ CFS}\right) = 5.77\ MGD$$

Design Flow (Q) = 5.77 MGD

IV. Determine Discharge Over Broad Crest Weir 9-feet in Length

Assumptions
Type: Broad Crested Weir
Weir H: 1.0 feet
Weir C: 2.98
Weir b: 1.0 feet
Weir L: 9.0 ft

Discharge over Broad Crested Weir

$$Q = CLH^{3/2}$$

$$Q = (2.98)(9)(1\ ft)^{3/2}$$

$$Q = 26.82\ \frac{ft^3}{s}$$

$$Q = 26.82 \frac{ft^3}{s}\left(\frac{1\ MGD}{1.55\ CFS}\right) = 17.30\ MGD$$

Design Flow (Q) = 17.30 MGD

V. Determine Discharge Over Broad Crest Weir 12-feet in Length

Assumptions
Type: Broad Crested Weir
Weir H: 1.0 feet
Weir C: 2.98
Weir b: 1.0 feet
Weir L: 12.0 ft

Discharge over Broad Crested Weir

$$Q = CLH^{3/2}$$

$$Q = (2.98)(12)(1\ ft)^{3/2}$$

$$Q = 35.76\ \frac{ft^3}{s}$$

$$Q = 35.76 \frac{ft^3}{s}\left(\frac{1\ MGD}{1.55\ CFS}\right) = 23.07\ MGD$$

Design Flow (Q) = 23.07 MGD

Appendix H

ADS Environmental Services Flow Monitoring Data

Site Commentary

Site Information

SJD_FM32t	
Pipe Dimensions (in.)	Std Horseshoe (35.63 x 36.5 in)
Silt (in.)	0.00

Overview

A review of the hydrograph and scattergraph for SJD_FM32t indicate this location functioned mostly in free-flow conditions for the monitoring period of Thursday, September 15, 2016 to Sunday, January 15, 2017 . Flow depth and velocity measurements recorded by the flow monitor are consistent with field confirmations conducted to date and support the relative accuracy of the flow monitor at this location.

Daily longtables displaying final quantities are also provided.

Observations

Average flow depth, velocity, and quantity data observed during Thursday, September 15, 2016 to Sunday, January 15, 2017 , along with observed minimum and maximum data, are provided in the following table.

Observed Flow Conditions			
Item	Depth (in)	Velocity (ft/s)	Quantity (MGD)
Average	6.38	1.50	1.250
Minimum	5.53	1.14	0.799
Maximum	34.72	6.02	28.855
Time of Minimum	10/14/2016 4:25 AM	11/15/2016 1:20 AM	11/15/2016 1:20 AM
Time of Maximum	9/17/2016 5:55 PM	9/17/2016 5:55 PM	9/17/2016 5:55 PM

Based upon the quality and consistency of the observed flow depth and velocity data, the Continuity equation was used to calculate flow rate and quantities during the monitoring period.
Graphical data reports are based on an hourly average.

Data Quality

Data uptime observed during the Thursday, September 15, 2016 to the Sunday, January 15, 2017 monitoring period is provided in the table below.

Percent Uptime	
Depth (in)	100
Velocity (ft/s)	100
Quantity (MGD)	100

ADS ENVIRONMENTAL SERVICES®

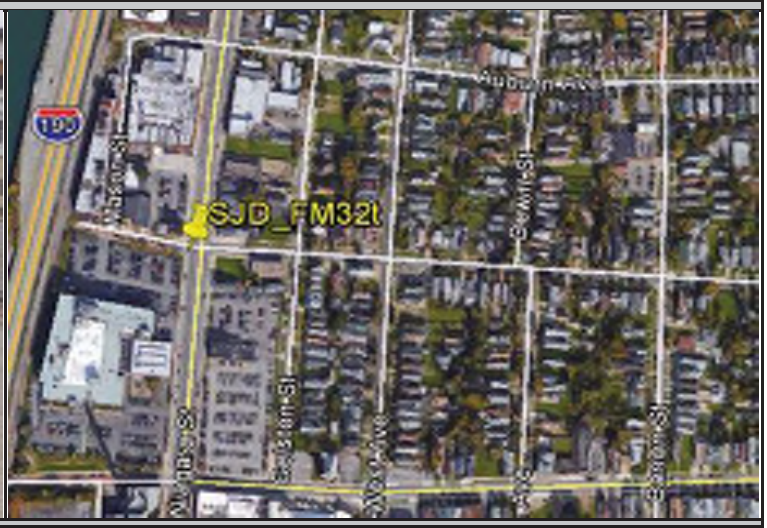
a division of ADS LLC.

Site Report

FM Initials: CJ/TB

Project Name: BUFFALO, NY

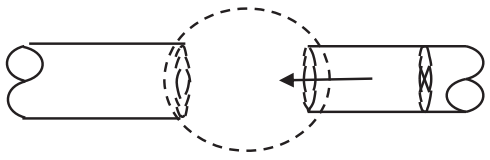
Site Name:	BUFFALO_SJD_FM32t	Meter Type:	TRITON +	Monitor S/N:	61507	Manhole #:	
Address / Location:	BRECKENRIDGE STREET WEST OF NIAGARA STREET			Map Page #:			
				Pipe Height:		35.63 Inches	
Access:	DRIVE	Type of System:	COMBINED	Pipe Width:		36.50 Inches	
				Phone Number:		I.P. 107.80.26.35	



Investigation Information:			Manhole Information:		
Date/Time of Investigation:	July 19, 2016	12:00 PM	Manhole Depth:	9.28 Feet	
Site Hydraulics:	GOOD		Manhole Material / Condition:	Brick	
			Active Drop Connections?		
Upstream Input: (L/S, P/S)			Pipe Material / Condition:	Brick	
Upstream Manhole:			Mini System Character:	COMMERCIAL	
Downstream Manhole:			**Telephone Information:**		
Depth of Flow (Wet Dof):	6 +/- 0.25		Access Pole #:	N/A	
Range (Air Dof):	+/-		Distance From Manhole:	N/A Feet	
Peak Velocity:	1.55 fps		Road Cut Length:	N/A Feet	
Silt:	0 Inches		Trench Length:	N/A Feet	

Other Information:

N 42.91707 W 78.89934



Planar N

Installation Information		Backup	Yes	No	?	Distance
Installation Type:	Doppler Special Installation	Trunk				
Sensors / Devices:	CS4 Peak Combo	Lift/Pump Station				
Surcharge Height:		WWTP				
Rain Gauge Zone:		Other				

Additional Site Information / Comments:

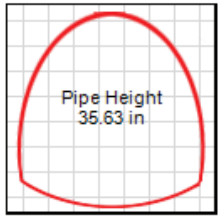
CS4 PO .50" SN 22605 HORSESHOE PIPE

SCATTERGRAPH REPORT

SJD_FM32t

Flow Monitor

SJD_FM32t

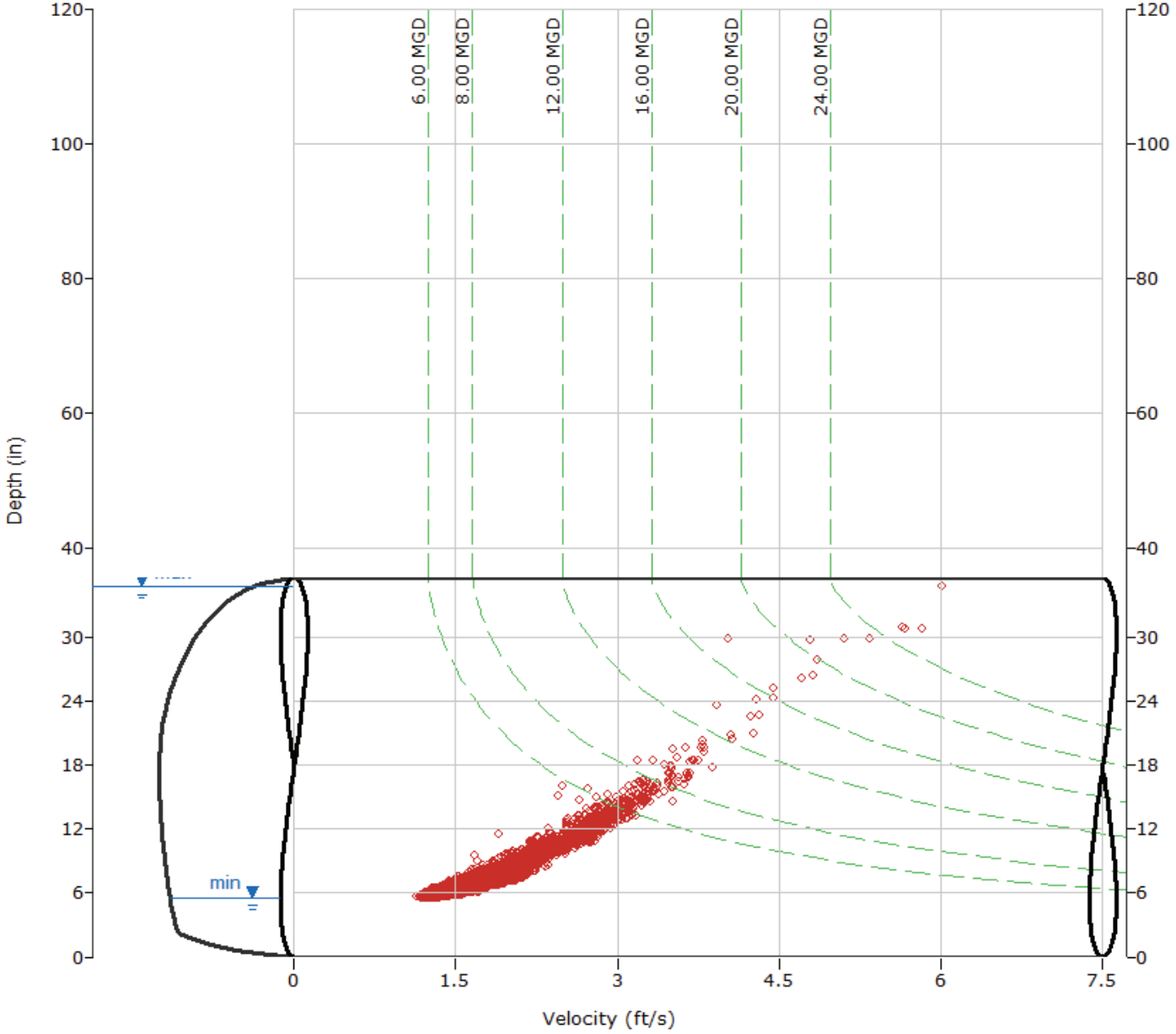


Report Period

9/15/2016
To
1/15/2017

Legend

- Depth - Velocity
- Iso-Q™
- Silt
- Min-Max Depth



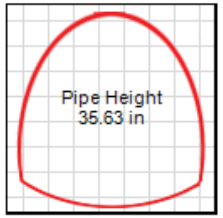
ADS ENVIRONMENTAL SERVICES

HYDROGRAPH REPORT

SJD_FM32t

Flow Monitor

SJD_FM32t

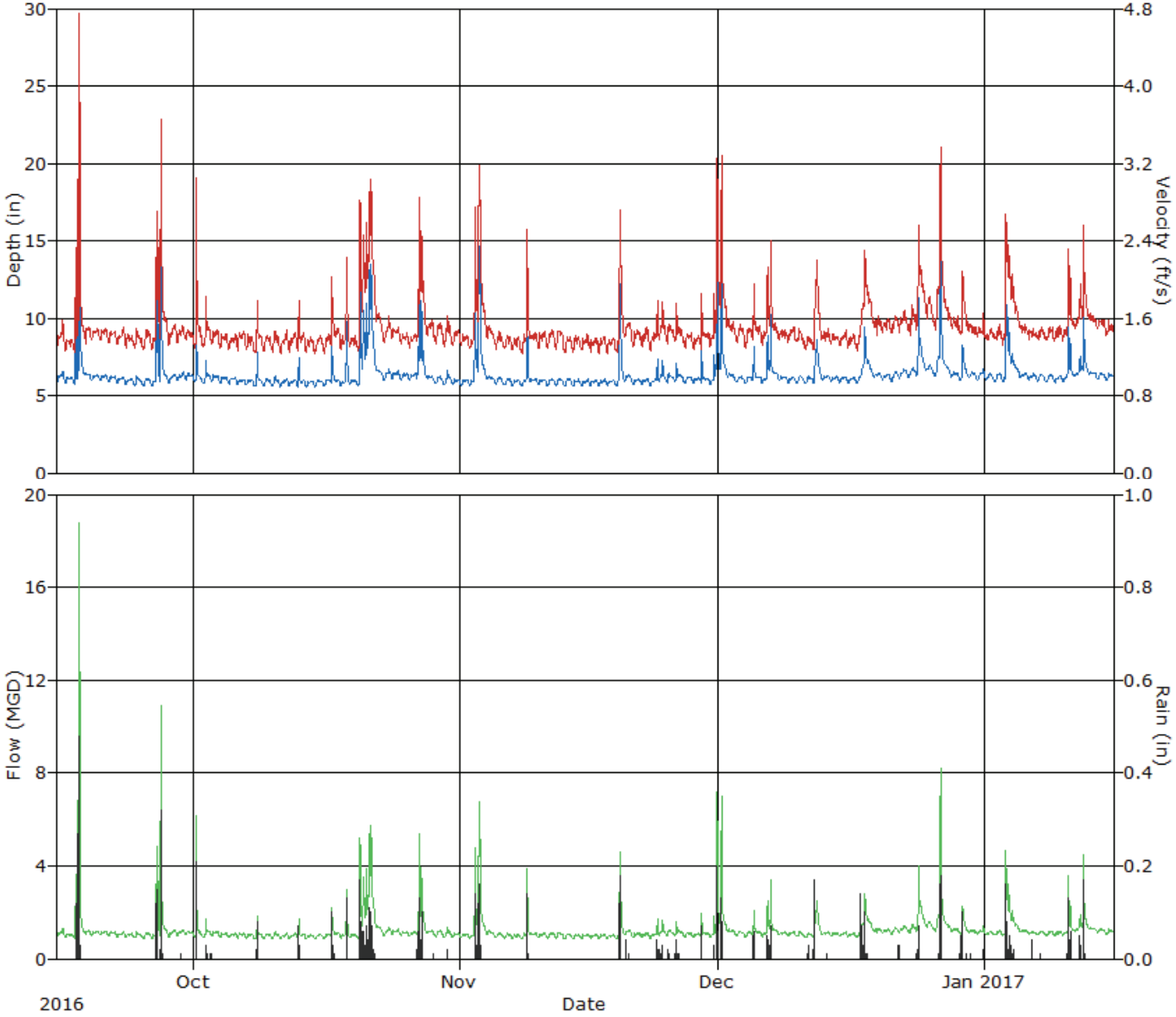


Report Period

9/15/2016
To
1/15/2017

Legend

- Depth
- Velocity
- Quantity
- Rain



ADS ENVIRONMENTAL SERVICES

Daily Tabular Report For The Period 09/15/2016 00:00 - 09/30/2016 23:59

SJD_FM32t, Pipe Height: 35.63 in, Silt: 0.00 in

Daily Tabular Report

Date	Depth (in)					Velocity (ft/s)					Quantity (MGD - Total MG)						Rain (in)
	Time	Min	Time	Max	Avg	Time	Min	Time	Max	Avg	Time	Min	Time	Max	Avg	Total	Total
09/15/2016	04:40	5.93	20:10	6.57	6.21	01:35	1.26	19:30	1.69	1.41	01:35	0.937	19:30	1.392	1.102	1.102	
09/16/2016	05:35	5.83	18:05	6.26	6.06	04:40	1.22	19:00	1.51	1.34	04:40	0.880	19:00	1.163	1.012	1.012	
09/17/2016	05:20	5.75	17:55	34.72	8.89	04:30	1.21	17:55	6.02	1.88	04:30	0.864	17:55	28.855	2.905	2.905	1.39
09/18/2016	17:05	6.30	00:00	7.51	6.46	06:05	1.28	00:25	1.68	1.48	06:05	1.026	00:25	1.591	1.207	1.207	
09/19/2016	04:40	5.95	20:25	6.38	6.18	04:40	1.37	20:25	1.50	1.44	04:40	1.012	20:25	1.206	1.114	1.114	
09/20/2016	05:15	5.97	07:55	6.36	6.18	05:15	1.38	07:55	1.50	1.44	05:15	1.024	07:55	1.197	1.116	1.116	
09/21/2016	04:35	5.87	08:20	6.28	6.11	04:35	1.35	08:20	1.47	1.42	04:35	0.980	08:20	1.160	1.084	1.084	
09/22/2016	03:20	5.80	21:05	6.20	6.02	16:10	1.29	20:30	1.65	1.41	03:20	0.949	20:30	1.272	1.057	1.057	
09/23/2016	04:20	5.71	21:00	6.13	5.94	03:00	1.21	20:05	1.59	1.38	03:00	0.856	20:05	1.211	1.017	1.017	
09/24/2016	04:10	5.66	09:55	6.31	5.92	04:00	1.27	09:25	1.59	1.38	04:10	0.885	09:25	1.249	1.015	1.015	
09/25/2016	04:15	5.59	14:25	6.13	5.89	07:20	1.22	11:50	1.59	1.38	04:15	0.843	11:50	1.205	1.012	1.012	
09/26/2016	04:40	5.62	19:50	24.12	7.08	03:30	1.24	19:50	4.29	1.65	03:30	0.861	19:50	15.358	1.736	1.736	0.48
09/27/2016	04:55	5.84	05:30	26.43	7.40	04:40	1.31	05:30	4.81	1.77	04:40	0.945	05:30	18.825	1.962	1.962	0.43
09/28/2016	04:10	5.77	18:30	6.41	6.12	00:30	1.25	17:10	1.62	1.43	04:00	0.912	18:25	1.284	1.098	1.098	
09/29/2016	03:40	5.94	20:10	6.50	6.24	02:55	1.31	20:05	1.62	1.44	02:55	0.966	20:05	1.330	1.129	1.129	0.01
09/30/2016	04:35	6.02	10:25	6.49	6.24	23:40	1.29	14:50	1.55	1.42	23:40	0.985	10:15	1.236	1.112	1.111	

Report Summary For The Period 09/15/2016 00:00 - 09/30/2016 23:59

	Depth (in)	Velocity (ft/s)	Quantity (MGD - Total MG)	Rain (in)
Total			20.678	2.31
Avg	6.43	1.48	1.292	

Daily Tabular Report For The Period 10/01/2016 00:00 - 10/31/2016 23:59

SJD_FM32t, Pipe Height: 35.63 in, Silt: 0.00 in

Daily Tabular Report

Date	Depth (in)				Velocity (ft/s)				Quantity (MGD - Total MG)					Rain (in)
	Time	Min	Time	Max	Avg	Time	Min	Time	Max	Avg	Time	Min	Time	Max	Avg	Total	Total
10/01/2016	03:35	5.90	07:55	17.01	6.79	05:10	1.21	07:55	3.52	1.58	05:10	0.894	07:55	8.649	1.497	1.497	0.36
10/02/2016	05:05	5.76	11:15	7.50	6.18	04:05	1.26	11:35	1.93	1.44	04:05	0.898	11:35	1.833	1.122	1.122	0.06
10/03/2016	04:45	5.92	14:40	6.82	6.16	03:45	1.26	14:40	1.67	1.41	03:45	0.932	14:40	1.451	1.090	1.090	0.01
10/04/2016	04:20	5.80	07:55	6.24	6.05	05:05	1.25	20:50	1.51	1.37	05:05	0.900	20:50	1.159	1.035	1.035	
10/05/2016	03:10	5.75	20:10	6.18	6.01	03:10	1.23	19:30	1.49	1.36	03:10	0.874	19:30	1.141	1.018	1.018	
10/06/2016	04:00	5.69	14:35	6.22	5.91	04:40	1.22	21:20	1.57	1.39	04:40	0.858	21:20	1.186	1.022	1.022	
10/07/2016	04:10	5.66	07:50	6.05	5.88	00:40	1.23	07:50	1.53	1.36	03:30	0.861	07:50	1.154	0.992	0.992	
10/08/2016	03:30	5.60	10:45	8.68	6.02	03:10	1.19	10:40	2.02	1.39	03:10	0.823	10:40	2.326	1.057	1.057	0.10
10/09/2016	04:55	5.59	12:25	6.10	5.85	03:10	1.19	13:50	1.53	1.35	03:10	0.819	13:50	1.155	0.976	0.976	
10/10/2016	05:00	5.61	12:15	6.29	5.87	04:40	1.17	11:40	1.59	1.36	04:40	0.809	11:40	1.238	0.989	0.989	
10/11/2016	03:55	5.58	19:50	6.11	5.85	03:40	1.18	21:05	1.53	1.35	03:40	0.809	21:05	1.148	0.981	0.981	
10/12/2016	04:40	5.59	20:05	6.07	5.84	05:15	1.20	20:10	1.52	1.36	05:15	0.826	20:10	1.150	0.983	0.983	
10/13/2016	04:45	5.54	06:10	8.02	5.96	04:50	1.22	06:15	2.00	1.40	04:50	0.831	06:15	2.072	1.047	1.047	0.10
10/14/2016	04:25	5.53	16:05	5.96	5.80	00:25	1.16	14:20	1.55	1.33	03:40	0.816	14:20	1.138	0.955	0.955	
10/15/2016	04:25	5.57	14:10	6.03	5.83	06:30	1.21	19:35	1.55	1.33	03:10	0.840	19:35	1.131	0.961	0.961	
10/16/2016	05:25	5.60	11:15	6.07	5.86	05:10	1.20	20:05	1.58	1.35	05:55	0.824	20:05	1.196	0.980	0.980	
10/17/2016	00:55	5.74	02:40	10.80	6.26	02:05	1.18	02:50	2.21	1.50	02:05	0.848	02:40	3.245	1.196	1.196	0.20
10/18/2016	03:30	5.62	19:55	12.61	6.20	03:45	1.17	19:55	2.84	1.44	03:45	0.811	19:55	4.999	1.156	1.156	0.18
10/19/2016	05:15	5.74	00:00	6.14	5.91	02:45	1.22	19:30	1.56	1.37	05:50	0.871	19:30	1.170	1.002	1.002	
10/20/2016	04:20	5.63	08:20	13.95	7.84	05:15	1.19	08:25	3.08	1.86	03:55	0.836	08:25	6.047	2.056	2.056	0.77
10/21/2016	01:25	7.13	12:20	14.69	10.04	01:10	1.72	12:25	3.22	2.38	01:10	1.597	12:25	6.728	3.341	3.341	1.18
10/22/2016	23:55	6.30	00:00	7.93	6.69	23:20	1.42	00:00	2.10	1.64	23:20	1.131	00:00	2.174	1.403	1.403	0.01
10/23/2016	04:15	5.99	17:40	6.72	6.32	03:20	1.32	17:40	1.74	1.46	03:20	0.990	17:40	1.489	1.160	1.160	
10/24/2016	03:20	6.06	19:15	6.66	6.36	23:55	1.35	20:10	1.61	1.45	02:40	1.029	20:10	1.350	1.164	1.164	
10/25/2016	03:40	6.00	10:20	6.90	6.27	05:05	1.30	06:55	1.53	1.39	02:35	0.984	10:20	1.317	1.095	1.095	
10/26/2016	04:15	5.99	16:25	6.44	6.25	03:50	1.26	06:20	1.51	1.38	04:40	0.942	19:20	1.191	1.081	1.081	
10/27/2016	01:10	6.06	08:35	14.79	8.03	00:40	1.30	08:25	3.15	1.92	00:40	0.992	08:25	6.602	2.108	2.108	0.77
10/28/2016	23:55	5.92	00:05	6.44	6.18	05:30	1.34	06:50	1.69	1.50	23:40	0.991	00:25	1.354	1.164	1.164	0.01
10/29/2016	05:20	5.77	17:15	6.31	6.01	00:55	1.23	17:10	1.72	1.46	00:55	0.901	17:10	1.356	1.092	1.092	0.00
10/30/2016	04:50	5.71	13:45	6.76	6.03	05:15	1.25	13:50	1.75	1.44	05:15	0.883	13:50	1.502	1.082	1.082	0.04
10/31/2016	04:25	5.74	07:55	6.09	5.91	03:35	1.25	20:45	1.57	1.42	03:45	0.889	20:45	1.171	1.041	1.040	

Report Summary For The Period 10/01/2016 00:00 - 10/31/2016 23:59

	Depth (in)	Velocity (ft/s)	Quantity (MGD - Total MG)	Rain (in)
Total			37.847	3.79
Avg	6.33	1.48	1.221	

Daily Tabular Report For The Period 11/01/2016 00:00 - 11/30/2016 23:59

SJD_FM32t, Pipe Height: 35.63 in, Silt: 0.00 in

Daily Tabular Report

Date	Depth (in)				Velocity (ft/s)				Quantity (MGD - Total MG)					Rain (in)
	Time	Min	Time	Max	Avg	Time	Min	Time	Max	Avg	Time	Min	Time	Max	Avg	Total	Total
11/01/2016	03:55	5.63	19:00	6.03	5.87	04:20	1.26	07:50	1.55	1.38	04:20	0.875	07:50	1.152	1.003	1.003	
11/02/2016	04:05	5.63	17:50	15.72	6.72	04:15	1.20	17:55	3.32	1.57	04:15	0.835	17:50	7.431	1.474	1.474	0.40
11/03/2016	23:55	6.31	06:55	19.85	8.42	23:20	1.46	06:55	3.80	2.04	23:25	1.179	06:55	11.061	2.471	2.471	0.65
11/04/2016	23:55	5.94	10:15	6.39	6.14	23:45	1.28	07:30	1.66	1.46	23:45	0.944	10:10	1.319	1.118	1.118	
11/05/2016	04:25	5.74	12:30	6.22	5.97	05:45	1.18	11:00	1.55	1.38	05:45	0.847	12:10	1.195	1.023	1.023	
11/06/2016	05:25	5.67	13:40	6.13	5.91	02:30	1.23	13:20	1.57	1.35	06:55	0.867	13:20	1.188	0.994	0.994	
11/07/2016	03:50	5.65	20:20	6.01	5.86	01:40	1.23	13:10	1.50	1.34	01:40	0.856	18:00	1.110	0.973	0.973	
11/08/2016	04:55	5.62	20:00	13.38	6.44	05:40	1.19	20:00	3.00	1.49	05:40	0.825	20:00	5.655	1.290	1.290	0.26
11/09/2016	23:55	5.84	00:00	6.41	6.03	12:25	1.25	00:00	1.61	1.42	12:25	0.920	00:00	1.301	1.065	1.065	0.01
11/10/2016	04:55	5.68	08:00	6.04	5.89	05:15	1.23	16:10	1.59	1.39	05:15	0.866	16:10	1.178	1.016	1.016	
11/11/2016	04:10	5.62	18:05	6.08	5.88	01:30	1.21	13:50	1.57	1.40	03:20	0.842	13:50	1.181	1.022	1.022	
11/12/2016	05:10	5.64	16:50	6.11	5.88	04:35	1.22	13:35	1.58	1.40	04:35	0.849	13:35	1.195	1.019	1.019	
11/13/2016	07:10	5.60	13:40	6.12	5.88	06:30	1.20	11:25	1.50	1.33	06:30	0.832	11:25	1.136	0.974	0.974	
11/14/2016	03:35	5.60	19:10	6.07	5.85	01:35	1.20	20:15	1.49	1.35	05:10	0.834	20:15	1.121	0.977	0.977	
11/15/2016	04:00	5.61	20:55	6.09	5.84	01:20	1.14	07:35	1.51	1.35	01:20	0.799	21:10	1.112	0.974	0.974	
11/16/2016	04:35	5.64	20:25	6.03	5.85	05:20	1.17	08:10	1.56	1.34	05:20	0.811	08:10	1.146	0.970	0.970	
11/17/2016	03:50	5.62	20:15	6.07	5.86	02:50	1.18	07:45	1.51	1.34	02:50	0.820	07:45	1.115	0.972	0.972	
11/18/2016	03:35	5.63	19:40	6.03	5.86	03:15	1.18	09:30	1.49	1.33	03:15	0.825	18:20	1.098	0.967	0.967	
11/19/2016	06:40	5.65	15:50	13.98	7.03	06:40	1.18	15:55	2.97	1.63	06:40	0.819	15:45	5.797	1.606	1.606	0.53
11/20/2016	05:05	5.90	14:40	6.36	6.16	04:55	1.28	13:05	1.71	1.49	04:55	0.937	13:05	1.342	1.152	1.152	0.06
11/21/2016	04:20	5.73	18:25	6.11	5.94	05:15	1.25	18:25	1.61	1.40	05:15	0.892	18:25	1.229	1.037	1.037	
11/22/2016	04:30	5.67	19:05	6.10	5.91	04:10	1.24	19:45	1.58	1.41	04:10	0.866	19:45	1.198	1.032	1.032	
11/23/2016	03:55	5.64	23:30	7.68	5.96	04:15	1.21	23:30	1.93	1.40	04:15	0.839	23:30	1.925	1.042	1.042	0.11
11/24/2016	06:00	5.85	14:25	7.42	6.22	06:15	1.26	14:20	2.01	1.49	06:15	0.916	14:20	1.917	1.162	1.162	0.07
11/25/2016	04:15	5.79	06:05	6.47	6.13	01:55	1.29	06:30	1.63	1.45	01:55	0.931	06:00	1.318	1.109	1.109	0.06
11/26/2016	01:15	5.87	04:35	7.70	6.29	01:00	1.29	04:30	2.04	1.46	01:00	0.938	04:30	2.033	1.160	1.160	0.12
11/27/2016	06:20	5.80	13:35	6.22	6.05	06:55	1.24	20:30	1.55	1.38	05:45	0.895	20:30	1.200	1.039	1.039	
11/28/2016	04:20	5.78	16:30	6.15	6.00	04:15	1.22	13:45	1.54	1.36	04:15	0.870	13:45	1.168	1.015	1.015	
11/29/2016	01:45	5.80	03:10	8.78	6.15	01:20	1.23	03:10	2.09	1.44	01:20	0.891	03:10	2.431	1.111	1.111	0.10
11/30/2016	03:50	5.72	21:20	18.38	7.16	06:25	1.24	21:20	3.71	1.66	04:50	0.884	21:20	9.957	1.743	1.742	0.58

Report Summary For The Period 11/01/2016 00:00 - 11/30/2016 23:59

	Depth (in)	Velocity (ft/s)	Quantity (MGD - Total MG)	Rain (in)
Total			34.509	2.95
Avg	6.17	1.44	1.150	

Daily Tabular Report For The Period 12/01/2016 00:00 - 12/31/2016 23:59

SJD_FM32t, Pipe Height: 35.63 in, Silt: 0.00 in

Daily Tabular Report

Date	Depth (in)				Velocity (ft/s)				Quantity (MGD - Total MG)					Rain (in)
	Time	Min	Time	Max	Avg	Time	Min	Time	Max	Avg	Time	Min	Time	Max	Avg	Total	Total
12/01/2016	23:45	6.55	10:15	16.76	7.98	06:10	1.59	10:15	3.66	1.98	23:45	1.342	10:15	8.852	2.183	2.183	0.35
12/02/2016	23:55	6.07	00:05	6.58	6.29	13:25	1.34	00:00	1.73	1.52	23:40	1.051	00:00	1.439	1.201	1.201	
12/03/2016	04:20	5.84	18:45	6.32	6.06	05:00	1.29	16:30	1.65	1.44	05:00	0.933	16:30	1.285	1.089	1.089	
12/04/2016	04:30	5.76	14:40	6.20	6.02	06:05	1.22	14:35	1.61	1.42	06:05	0.877	14:35	1.247	1.063	1.063	
12/05/2016	01:20	5.90	05:30	8.52	6.38	01:30	1.28	05:30	2.13	1.52	01:30	0.939	05:30	2.402	1.230	1.230	0.17
12/06/2016	04:30	5.79	19:30	9.12	6.47	04:20	1.22	19:45	2.27	1.54	04:20	0.877	19:20	2.749	1.289	1.289	0.24
12/07/2016	23:55	6.27	03:10	12.28	6.78	19:10	1.35	03:05	2.74	1.60	23:45	1.069	03:05	4.683	1.412	1.412	0.12
12/08/2016	05:00	5.96	00:00	6.27	6.13	18:00	1.28	17:25	1.60	1.44	04:35	0.962	17:25	1.252	1.100	1.100	
12/09/2016	04:35	5.83	17:50	6.23	6.04	02:50	1.21	21:55	1.58	1.44	02:50	0.881	17:40	1.219	1.084	1.084	
12/10/2016	05:10	5.81	12:10	6.31	6.05	01:40	1.25	14:30	1.58	1.40	01:40	0.907	14:30	1.243	1.059	1.059	
12/11/2016	05:05	5.76	14:35	6.25	6.01	03:25	1.22	14:10	1.48	1.35	05:15	0.870	14:10	1.148	1.010	1.010	0.06
12/12/2016	03:20	5.79	12:05	8.69	6.92	03:45	1.23	12:35	2.33	1.66	03:45	0.882	12:30	2.627	1.503	1.503	0.47
12/13/2016	05:20	6.01	00:00	6.36	6.18	08:50	1.26	00:15	1.55	1.42	08:50	0.979	00:15	1.231	1.100	1.100	0.01
12/14/2016	04:10	5.85	20:25	6.25	6.08	06:15	1.25	15:50	1.50	1.39	04:20	0.913	20:35	1.164	1.054	1.054	
12/15/2016	04:15	5.81	20:00	6.25	6.07	01:45	1.22	21:45	1.54	1.39	01:45	0.900	21:45	1.194	1.053	1.053	
12/16/2016	05:30	5.81	19:35	6.18	6.02	07:05	1.21	21:35	1.54	1.37	07:05	0.903	21:35	1.172	1.028	1.028	
12/17/2016	05:45	5.78	23:55	7.81	6.26	04:20	1.20	20:25	1.84	1.47	04:20	0.858	23:55	1.845	1.161	1.161	0.69
12/18/2016	23:55	6.42	01:00	9.51	7.38	22:10	1.51	02:15	2.38	1.88	23:55	1.230	02:15	2.951	1.811	1.811	0.17
12/19/2016	05:30	6.14	00:45	6.44	6.32	06:15	1.35	14:35	1.73	1.54	06:15	1.054	17:55	1.404	1.227	1.227	
12/20/2016	02:35	6.02	12:40	6.53	6.22	03:30	1.36	12:40	1.71	1.53	03:30	1.022	12:40	1.409	1.189	1.189	
12/21/2016	05:15	5.89	17:30	6.56	6.26	04:25	1.34	17:40	1.73	1.54	04:25	0.985	17:40	1.435	1.209	1.209	0.04
12/22/2016	03:30	6.05	15:00	6.70	6.45	03:25	1.37	16:30	1.75	1.58	03:25	1.035	16:30	1.484	1.285	1.285	0.04
12/23/2016	04:30	6.12	17:25	6.84	6.48	09:00	1.31	15:40	1.85	1.57	05:10	1.040	15:40	1.585	1.287	1.287	
12/24/2016	02:45	6.27	08:40	12.08	7.78	02:45	1.37	08:50	2.81	1.94	02:45	1.080	08:40	4.605	2.020	2.020	0.20
12/25/2016	23:50	6.59	00:00	7.08	6.78	07:00	1.48	00:10	2.00	1.73	05:55	1.254	00:10	1.815	1.492	1.492	
12/26/2016	05:30	6.26	22:35	19.67	7.72	07:50	1.39	22:40	3.81	1.87	07:50	1.100	22:40	10.933	2.082	2.082	0.43
12/27/2016	23:55	6.50	00:00	10.03	7.16	20:30	1.45	00:05	2.45	1.80	20:30	1.232	00:00	3.320	1.668	1.668	
12/28/2016	04:40	6.18	12:45	6.51	6.36	22:55	1.36	20:45	1.76	1.55	23:00	1.068	20:45	1.424	1.238	1.238	
12/29/2016	03:55	5.97	11:30	8.31	6.75	08:35	1.32	11:40	2.16	1.65	04:15	1.011	11:40	2.361	1.434	1.434	0.28
12/30/2016	05:55	6.15	14:10	6.51	6.34	16:05	1.34	09:45	1.66	1.50	05:05	1.046	12:55	1.339	1.192	1.192	0.02
12/31/2016	05:35	5.97	21:35	6.75	6.30	05:10	1.29	21:20	1.73	1.47	05:10	0.960	21:20	1.484	1.166	1.166	0.03

Report Summary For The Period 12/01/2016 00:00 - 12/31/2016 23:59

	Depth (in)	Velocity (ft/s)	Quantity (MGD - Total MG)	Rain (in)
Total			40.922	3.32
Avg	6.52	1.56	1.320	

Daily Tabular Report For The Period 01/01/2017 00:00 - 01/15/2017 23:59

SJD_FM32t, Pipe Height: 35.63 in, Silt: 0.00 in

Daily Tabular Report

Date	Depth (in)					Velocity (ft/s)					Quantity (MGD - Total MG)						Rain (in)
	Time	Min	Time	Max	Avg	Time	Min	Time	Max	Avg	Time	Min	Time	Max	Avg	Total	Total
01/01/2017	04:50	5.99	14:20	6.43	6.20	03:25	1.29	17:35	1.66	1.43	03:25	0.967	17:35	1.326	1.109	1.109	
01/02/2017	06:25	5.90	18:20	6.45	6.18	09:25	1.29	17:15	1.63	1.43	09:25	0.972	17:15	1.314	1.105	1.105	
01/03/2017	03:05	5.91	11:25	13.53	7.95	02:20	1.23	11:25	2.92	1.89	02:20	0.911	11:25	5.572	2.118	2.118	0.66
01/04/2017	23:55	6.51	04:45	7.78	6.99	22:55	1.47	04:30	2.14	1.78	22:55	1.215	04:30	2.151	1.599	1.599	0.09
01/05/2017	03:30	6.19	00:10	6.52	6.34	09:20	1.30	08:25	1.74	1.50	09:20	1.030	08:25	1.395	1.198	1.198	
01/06/2017	05:30	6.02	18:15	6.43	6.21	06:45	1.26	09:00	1.60	1.44	06:45	0.967	17:25	1.246	1.123	1.123	0.04
01/07/2017	05:20	5.92	15:50	6.37	6.17	07:55	1.29	17:55	1.64	1.44	04:40	0.960	17:55	1.303	1.112	1.112	0.01
01/08/2017	05:10	5.86	13:20	6.35	6.15	05:30	1.27	18:05	1.68	1.44	05:30	0.926	18:05	1.332	1.109	1.109	
01/09/2017	05:30	5.84	20:05	6.30	6.10	04:25	1.26	20:00	1.68	1.44	04:25	0.914	20:00	1.324	1.095	1.095	
01/10/2017	05:05	5.86	18:35	13.97	6.64	00:45	1.24	18:35	2.94	1.58	00:45	0.930	18:35	5.810	1.390	1.390	0.30
01/11/2017	10:50	6.25	01:30	9.51	6.57	11:10	1.33	01:30	2.30	1.60	11:10	1.053	01:30	2.942	1.338	1.338	0.12
01/12/2017	01:30	6.48	12:40	15.89	7.44	10:30	1.45	12:45	3.30	1.84	10:30	1.227	12:40	7.435	1.839	1.839	0.32
01/13/2017	23:50	6.28	00:00	6.66	6.44	17:25	1.39	10:15	1.80	1.60	23:35	1.111	08:25	1.468	1.300	1.300	
01/14/2017	04:35	6.06	14:20	6.49	6.28	05:45	1.35	10:10	1.74	1.55	05:45	1.022	10:10	1.382	1.220	1.220	
01/15/2017	05:10	5.95	11:25	6.44	6.21	04:50	1.31	18:05	1.74	1.49	04:50	0.971	18:05	1.401	1.158	1.158	

Report Summary For The Period 01/01/2017 00:00 - 01/15/2017 23:59

	Depth (in)	Velocity (ft/s)	Quantity (MGD - Total MG)	Rain (in)
Total			19.813	1.54
Avg	6.53	1.56	1.321	

Site Commentary

Site Information

SJD_FM32t	
Pipe Dimensions (in.)	Std Horseshoe (35.63 x 36.5 in)
Silt (in.)	0.00

Overview

A review of the hydrograph and scattergraph for SJD_FM32t indicate this location functioned mostly in free-flow conditions for the monitoring period of Wednesday, March 15, 2017 to Thursday, June 15, 2017 . Flow depth and velocity measurements recorded by the flow monitor are consistent with field confirmations conducted to date and support the relative accuracy of the flow monitor at this location.

Daily longtables displaying final quantities are also provided.

Observations

Average flow depth, velocity, and quantity data observed during Wednesday, March 15, 2017 to Thursday, June 15, 2017 , along with observed minimum and maximum data, are provided in the following table.

Observed Flow Conditions			
Item	Depth (in)	Velocity (ft/s)	Quantity (MGD)
Average	6.81	1.57	1.477
Minimum	5.68	1.13	0.799
Maximum	37.22	7.85	37.904
Time of Minimum	5/24/2017 4:30 AM	6/15/2017 4:35 AM	6/15/2017 4:35 AM
Time of Maximum	4/20/2017 5:30 PM	5/1/2017 12:00 AM	5/1/2017 12:00 AM

Based upon the quality and consistency of the observed flow depth and velocity data, the Continuity equation was used to calculate flow rate and quantities during the monitoring period.
Graphical data reports are based on an hourly average.

Data Quality

Data uptime observed during the Wednesday, March 15, 2017 to the Thursday, June 15, 2017 monitoring period is provided in the table below.

Percent Uptime	
Depth (in)	100
Velocity (ft/s)	100
Quantity (MGD)	100

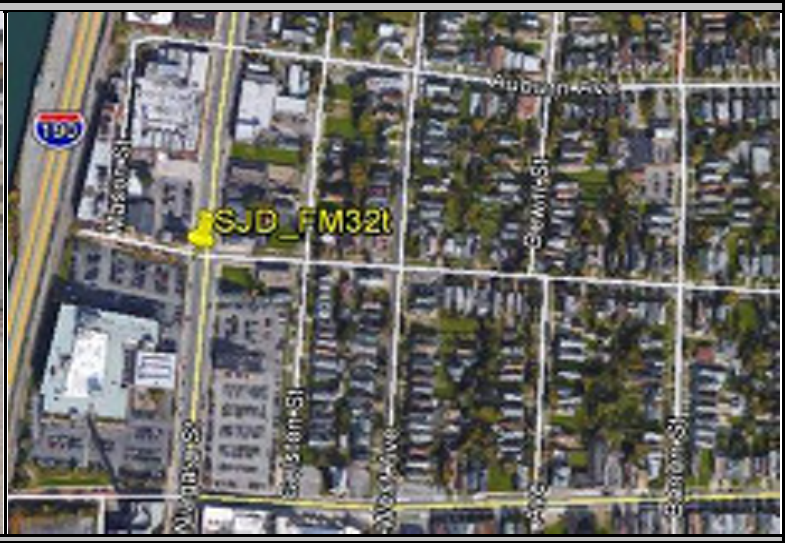
Site Report

a division of ADS LLC.

FM Initials: CJ/TB

Project Name: BUFFALO, NY

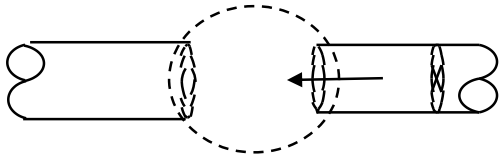
Site Name:	BUFFALO_SJD_FM32t	Meter Type:	TRITON +	Monitor S/N:	61507	Manhole #:	
Address / Location:	BRECKENRIDGE STREET WEST OF NIAGARA STREET			Map Page #:			
				Pipe Height:	35.63 Inches		
Access:	DRIVE	Type of System:	COMBINED	Pipe Width:	36.50 Inches		
				Phone Number:	I.P. 107.80.26.35		



Investigation Information:			Manhole Information:		
Date/Time of Investigation:	July 19, 2016	12:00 PM	Manhole Depth:	9.28 Feet	
Site Hydraulics:	GOOD		Manhole Material / Condition:	Brick	
			Active Drop Connections?		
Upstream Input: (L/S, P/S)			Pipe Material / Condition:	Brick	
Upstream Manhole:			Mini System Character:	COMMERCIAL	
Downstream Manhole:			**Telephone Information:**		
Depth of Flow (Wet Dof):	6 +/- 0.25		Access Pole #:	N/A	
Range (Air Dof):	+/-		Distance From Manhole:	N/A Feet	
Peak Velocity:	1.55 fps		Road Cut Length:	N/A Feet	
Silt:	0 Inches		Trench Length:	N/A Feet	

Other Information:

N 42.91707 W 78.89934



Planar N

Installation Information		Backup	Yes	No	?	Distance
Installation Type:	Doppler Special Installation	Trunk				
Sensors / Devices:	CS4 Peak Combo	Lift/Pump Station				
Surcharge Height:		WWTP				
Rain Gauge Zone:		Other				

Additional Site Information / Comments:

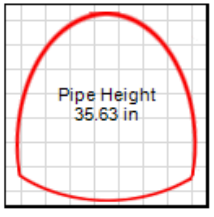
CS4 PO .50" SN 22605 HORSESHOE PIPE

SCATTERGRAPH REPORT

SJD_FM32t

Flow Monitor

SJD_FM32t

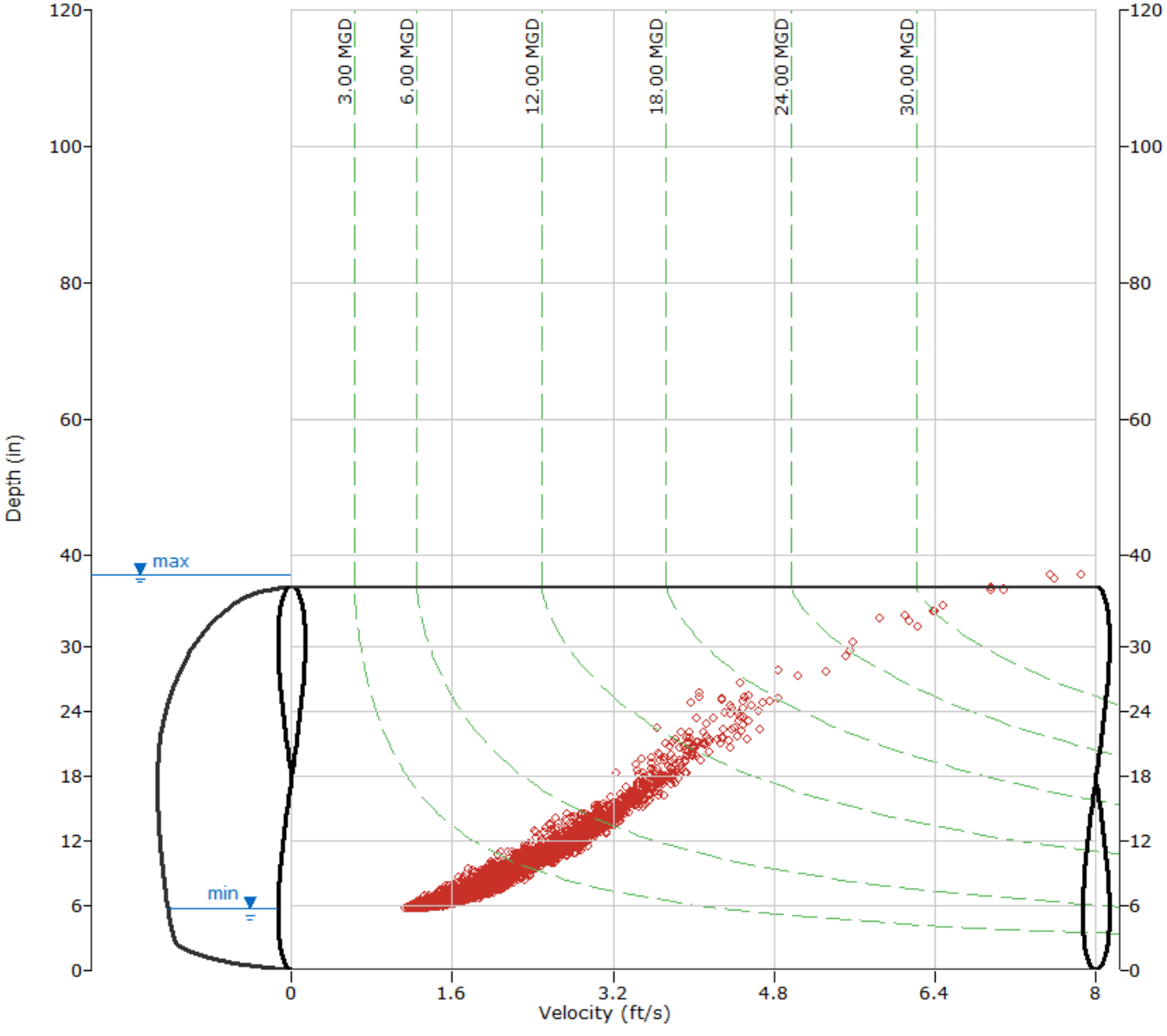


Report Period

3/15/2017
To
6/15/2017

Legend

- Depth - Velocity
- Iso-Q™
- Silt
- Min-Max Depth



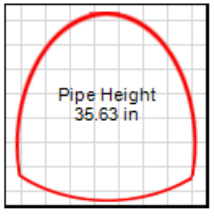
ADS ENVIRONMENTAL SERVICES

HYDROGRAPH REPORT

SJD_FM32t

Flow Monitor

SJD_FM32t

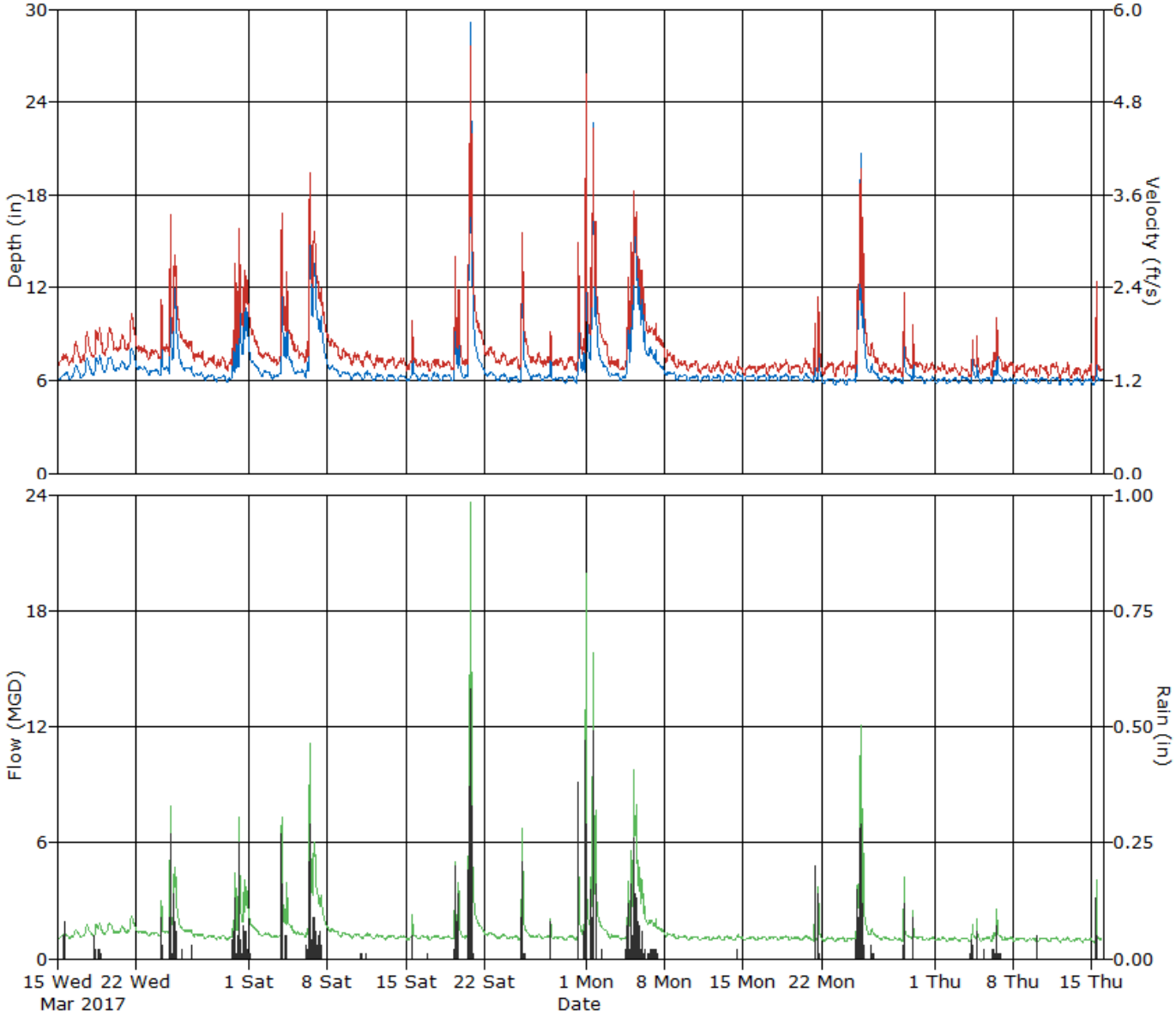


Report Period

3/15/2017
To
6/15/2017

Legend

- Depth
- Velocity
- Quantity
- Rain



ADS ENVIRONMENTAL SERVICES

Daily Tabular Report For The Period 03/15/2017 00:00 - 03/31/2017 23:59

SJD_FM32t, Pipe Height: 35.63 in, Silt: 0.00 in

Daily Tabular Report

Date	Depth (in)				Velocity (ft/s)				Quantity (MGD - Total MG)					Rain (in)
	Time	Min	Time	Max	Avg	Time	Min	Time	Max	Avg	Time	Min	Time	Max	Avg	Total	Total
03/15/2017	05:45	6.06	21:15	6.53	6.28	04:15	1.31	15:50	1.66	1.47	04:15	0.991	15:50	1.332	1.160	1.160	0.18
03/16/2017	05:30	6.06	15:40	6.98	6.46	04:50	1.36	15:20	1.78	1.52	04:50	1.028	15:40	1.562	1.247	1.247	
03/17/2017	04:20	6.15	17:15	7.46	6.67	03:55	1.33	16:25	1.94	1.58	03:55	1.023	16:25	1.859	1.348	1.348	
03/18/2017	06:15	6.34	19:50	7.71	6.95	04:50	1.41	21:00	1.96	1.67	04:50	1.134	19:55	1.945	1.493	1.493	0.18
03/19/2017	07:20	6.55	19:55	7.57	7.03	03:35	1.44	18:30	2.04	1.69	06:25	1.211	18:30	1.973	1.531	1.531	
03/20/2017	04:45	6.61	17:55	7.27	6.90	08:05	1.44	21:45	1.87	1.66	08:05	1.251	21:45	1.722	1.461	1.461	
03/21/2017	05:05	6.67	14:35	8.15	7.30	02:05	1.46	15:15	2.17	1.77	02:05	1.261	15:15	2.309	1.676	1.676	
03/22/2017	23:55	6.59	00:00	7.18	6.80	23:25	1.43	00:05	1.80	1.61	23:25	1.207	00:05	1.661	1.392	1.392	
03/23/2017	03:05	6.37	19:10	6.76	6.58	03:30	1.35	08:00	1.76	1.55	03:30	1.086	18:45	1.486	1.292	1.292	
03/24/2017	05:25	6.31	07:40	11.47	6.89	23:55	1.39	07:45	2.70	1.63	04:10	1.123	07:40	4.248	1.460	1.460	0.18
03/25/2017	01:05	6.43	02:35	18.63	9.15	00:00	1.39	02:35	3.89	2.19	00:00	1.145	02:35	10.580	2.841	2.841	0.88
03/26/2017	22:40	6.58	02:30	7.24	6.82	18:55	1.44	00:00	1.92	1.70	18:55	1.237	00:00	1.752	1.477	1.477	0.06
03/27/2017	05:10	6.25	00:00	6.71	6.39	23:20	1.34	00:00	1.76	1.52	05:35	1.051	00:00	1.502	1.227	1.227	
03/28/2017	04:45	6.01	17:55	6.36	6.24	04:10	1.31	20:40	1.62	1.45	04:10	0.980	20:40	1.295	1.133	1.133	
03/29/2017	05:40	5.91	20:10	6.36	6.16	14:15	1.26	19:45	1.61	1.43	05:30	0.952	19:45	1.281	1.106	1.106	
03/30/2017	04:35	5.86	20:05	12.47	6.76	07:00	1.22	20:15	2.84	1.58	07:00	0.922	20:00	4.894	1.435	1.435	0.35
03/31/2017	00:30	6.70	04:30	19.85	9.42	00:20	1.55	04:25	3.87	2.26	00:20	1.323	04:30	11.010	2.987	2.985	0.95

Report Summary For The Period 03/15/2017 00:00 - 03/31/2017 23:59

	Depth (in)	Velocity (ft/s)	Quantity (MGD - Total MG)	Rain (in)
Total			26.265	2.78
Avg	6.99	1.66	1.545	

Daily Tabular Report For The Period 04/01/2017 00:00 - 04/30/2017 23:59

SJD_FM32t, Pipe Height: 35.63 in, Silt: 0.00 in

Daily Tabular Report

Date	Depth (in)				Velocity (ft/s)				Quantity (MGD - Total MG)					Rain (in)
	Time	Min	Time	Max	Avg	Time	Min	Time	Max	Avg	Time	Min	Time	Max	Avg	Total	Total
04/01/2017	23:55	6.58	00:10	8.88	7.23	23:55	1.42	00:05	2.32	1.80	23:55	1.182	00:05	2.737	1.687	1.687	0.02
04/02/2017	06:15	6.28	12:40	6.65	6.48	02:35	1.36	02:20	1.69	1.53	02:35	1.099	11:55	1.409	1.249	1.249	
04/03/2017	04:45	6.10	23:40	19.46	6.66	16:45	1.25	23:50	3.74	1.53	16:45	0.989	23:45	10.508	1.385	1.385	0.35
04/04/2017	23:45	6.81	00:00	17.61	8.40	19:15	1.49	00:00	3.63	2.05	22:20	1.357	00:00	9.281	2.406	2.406	0.43
04/05/2017	05:30	6.42	00:00	6.83	6.56	18:05	1.35	02:00	1.80	1.57	12:45	1.127	02:00	1.488	1.299	1.299	
04/06/2017	03:55	6.16	11:25	24.20	10.40	03:30	1.33	11:20	4.49	2.38	03:30	1.023	11:25	15.727	3.833	3.833	1.50
04/07/2017	23:50	7.22	00:00	11.47	9.14	22:45	1.68	01:05	2.82	2.22	23:20	1.599	00:05	4.401	2.755	2.755	0.47
04/08/2017	23:55	6.59	00:15	7.23	6.82	20:35	1.50	01:40	1.97	1.69	06:35	1.286	01:40	1.762	1.469	1.469	
04/09/2017	05:55	6.24	11:45	6.59	6.43	05:05	1.37	13:30	1.72	1.53	05:05	1.081	13:30	1.424	1.242	1.242	
04/10/2017	03:45	6.09	17:55	6.51	6.32	04:35	1.31	18:30	1.64	1.48	04:35	1.000	18:30	1.340	1.179	1.179	0.01
04/11/2017	04:15	6.03	13:05	6.77	6.31	06:30	1.27	12:55	1.77	1.48	06:30	0.968	12:55	1.505	1.175	1.175	0.02
04/12/2017	04:20	5.99	10:15	6.54	6.23	01:35	1.28	18:40	1.63	1.45	01:35	0.968	10:15	1.325	1.128	1.128	
04/13/2017	04:50	5.95	13:30	6.36	6.19	07:10	1.31	20:45	1.62	1.44	04:15	0.970	20:45	1.286	1.116	1.116	
04/14/2017	04:15	5.94	14:20	6.35	6.18	06:05	1.29	20:45	1.59	1.42	06:05	0.962	20:45	1.265	1.101	1.101	
04/15/2017	05:50	5.95	14:20	10.53	6.37	06:40	1.26	14:20	2.54	1.45	06:40	0.937	14:20	3.646	1.174	1.174	0.10
04/16/2017	05:35	6.00	12:20	6.44	6.24	23:00	1.31	09:20	1.54	1.42	06:25	1.007	11:45	1.231	1.109	1.109	0.01
04/17/2017	05:35	5.96	12:50	6.66	6.23	02:30	1.29	20:45	1.56	1.41	02:35	0.971	12:45	1.305	1.102	1.102	0.00
04/18/2017	02:45	5.96	09:10	6.47	6.21	06:10	1.29	07:30	1.55	1.41	06:10	0.965	09:05	1.249	1.096	1.096	
04/19/2017	03:40	6.01	17:45	16.46	7.49	05:55	1.28	17:45	3.42	1.72	05:55	0.968	17:45	8.106	1.821	1.821	0.58
04/20/2017	05:25	6.12	17:30	37.22	11.28	05:55	1.33	17:30	7.55	2.43	05:55	1.019	17:30	36.440	4.980	4.980	2.05
04/21/2017	23:55	6.61	00:00	10.74	7.67	21:55	1.50	00:10	2.74	1.95	23:50	1.273	00:10	3.987	1.972	1.972	0.01
04/22/2017	23:55	6.20	13:35	6.63	6.41	02:50	1.37	11:55	1.76	1.56	23:30	1.094	11:55	1.446	1.262	1.262	
04/23/2017	05:45	5.98	19:20	6.45	6.21	21:55	1.30	20:20	1.67	1.47	04:25	0.991	18:45	1.350	1.149	1.149	
04/24/2017	04:00	5.88	21:00	6.25	6.10	01:10	1.30	23:10	1.62	1.45	01:45	0.959	18:10	1.260	1.106	1.106	
04/25/2017	05:40	5.85	09:10	20.24	7.26	01:45	1.24	09:10	3.93	1.72	04:05	0.900	09:10	11.680	1.746	1.746	0.52
04/26/2017	04:20	6.08	21:00	6.52	6.28	11:50	1.29	20:55	1.63	1.48	11:50	1.012	20:55	1.344	1.164	1.164	
04/27/2017	04:55	5.94	21:45	10.17	6.30	07:05	1.30	21:40	2.26	1.48	05:35	0.973	21:45	3.118	1.179	1.179	0.10
04/28/2017	03:55	5.97	00:00	6.27	6.12	02:05	1.29	20:45	1.62	1.44	04:50	0.967	20:45	1.255	1.098	1.098	
04/29/2017	05:15	5.83	13:00	6.31	6.09	09:35	1.28	19:45	1.65	1.43	04:35	0.925	19:45	1.298	1.087	1.087	
04/30/2017	04:35	5.80	23:55	33.71	7.47	05:55	1.22	23:55	6.48	1.72	05:55	0.879	23:55	30.695	1.964	1.963	1.00

Report Summary For The Period 04/01/2017 00:00 - 04/30/2017 23:59

	Depth (in)	Velocity (ft/s)	Quantity (MGD - Total MG)	Rain (in)
Total			48.035	7.17
Avg	6.97	1.64	1.601	

Daily Tabular Report For The Period 05/01/2017 00:00 - 05/31/2017 23:59

SJD_FM32t, Pipe Height: 35.63 in, Silt: 0.00 in

Daily Tabular Report

Date	Depth (in)				Velocity (ft/s)				Quantity (MGD - Total MG)					Rain (in)
	Time	Min	Time	Max	Avg	Time	Min	Time	Max	Avg	Time	Min	Time	Max	Avg	Total	Total
05/01/2017	10:10	7.24	00:00	37.20	12.04	10:00	1.61	00:00	7.85	2.68	10:00	1.502	00:00	37.904	5.287	5.287	1.53
05/02/2017	23:50	6.58	00:00	9.41	7.35	23:10	1.45	00:10	2.33	1.81	23:10	1.219	00:10	2.920	1.734	1.734	0.02
05/03/2017	04:45	6.24	00:00	6.56	6.38	05:10	1.28	07:45	1.62	1.43	05:10	1.008	07:45	1.334	1.151	1.151	
05/04/2017	04:10	5.99	19:20	12.40	7.01	09:50	1.24	20:30	2.74	1.58	01:50	0.945	19:25	4.598	1.501	1.501	0.43
05/05/2017	00:00	7.27	07:35	22.80	12.38	00:05	1.81	07:35	4.12	2.75	00:00	1.719	07:35	13.922	4.953	4.953	1.81
05/06/2017	11:55	7.55	00:00	12.44	8.32	17:25	1.64	00:45	2.84	1.99	17:25	1.656	00:00	4.710	2.212	2.212	0.29
05/07/2017	23:25	6.63	05:05	8.06	7.13	23:50	1.41	05:30	2.05	1.74	23:50	1.183	05:05	2.165	1.598	1.598	0.09
05/08/2017	23:55	6.30	00:00	6.61	6.45	23:40	1.32	00:00	1.71	1.51	23:40	1.052	00:00	1.429	1.226	1.226	
05/09/2017	04:35	6.02	21:15	6.41	6.24	04:40	1.27	11:00	1.57	1.41	04:40	0.953	19:45	1.243	1.102	1.102	
05/10/2017	04:50	5.95	21:30	6.34	6.16	02:50	1.26	19:05	1.55	1.39	02:50	0.936	19:05	1.229	1.073	1.073	
05/11/2017	04:10	5.93	21:10	6.36	6.16	03:25	1.21	20:00	1.51	1.36	03:25	0.895	20:00	1.188	1.047	1.047	
05/12/2017	03:50	5.97	19:40	6.39	6.17	03:15	1.24	20:20	1.51	1.36	03:15	0.924	18:35	1.193	1.054	1.054	
05/13/2017	04:15	5.93	13:35	6.48	6.19	02:05	1.26	13:35	1.53	1.37	04:35	0.929	13:35	1.251	1.061	1.061	
05/14/2017	04:55	5.94	13:25	6.65	6.22	03:55	1.25	13:10	1.63	1.36	03:55	0.923	13:10	1.340	1.060	1.060	0.02
05/15/2017	04:00	5.95	21:45	6.39	6.20	03:15	1.21	13:05	1.47	1.35	03:15	0.898	21:40	1.161	1.047	1.047	
05/16/2017	04:10	5.96	21:55	6.38	6.21	03:55	1.26	15:20	1.47	1.36	03:55	0.933	21:10	1.168	1.057	1.057	
05/17/2017	04:00	5.98	21:20	6.41	6.21	04:10	1.24	20:25	1.52	1.36	04:10	0.923	20:25	1.226	1.062	1.062	
05/18/2017	04:00	5.97	18:05	6.47	6.21	04:15	1.24	23:00	1.55	1.38	04:15	0.925	23:00	1.230	1.077	1.077	
05/19/2017	04:45	5.94	00:20	6.33	6.18	03:55	1.21	17:30	1.50	1.36	03:55	0.900	17:30	1.173	1.056	1.056	
05/20/2017	05:05	5.94	14:30	6.47	6.17	08:00	1.26	14:15	1.52	1.38	04:15	0.941	15:05	1.235	1.063	1.063	
05/21/2017	05:45	5.88	16:25	15.01	6.60	05:25	1.22	16:25	3.11	1.46	05:25	0.893	16:25	6.664	1.297	1.297	0.37
05/22/2017	05:15	5.79	17:45	6.14	6.00	03:55	1.20	22:40	1.59	1.36	03:55	0.861	22:40	1.209	1.019	1.019	
05/23/2017	05:20	5.73	21:20	6.11	5.94	03:50	1.16	21:45	1.56	1.36	03:50	0.819	21:45	1.184	1.005	1.005	
05/24/2017	04:30	5.68	09:10	6.13	5.94	02:25	1.19	17:15	1.56	1.35	02:25	0.843	17:15	1.161	1.000	1.000	
05/25/2017	00:35	5.85	11:10	25.32	10.68	00:50	1.26	11:10	4.55	2.35	00:35	0.929	11:10	17.084	3.897	3.897	1.89
05/26/2017	23:55	6.27	09:55	7.37	6.63	17:55	1.32	09:45	1.88	1.55	20:55	1.072	09:55	1.783	1.308	1.308	0.05
05/27/2017	23:55	5.99	13:50	6.32	6.16	23:35	1.25	13:20	1.55	1.37	06:05	0.937	13:20	1.229	1.052	1.052	
05/28/2017	05:50	5.82	14:00	6.25	6.02	18:05	1.21	13:50	1.50	1.33	07:05	0.891	13:50	1.174	0.996	0.996	
05/29/2017	05:40	5.76	07:45	19.44	6.59	05:25	1.19	07:45	3.67	1.48	05:25	0.851	07:45	10.463	1.316	1.316	0.19
05/30/2017	02:20	5.88	02:45	13.04	6.37	00:30	1.27	02:45	2.99	1.45	02:10	0.945	02:45	5.474	1.188	1.188	0.10
05/31/2017	03:00	5.83	20:05	6.26	6.03	13:10	1.24	19:35	1.58	1.36	04:20	0.902	19:35	1.240	1.024	1.023	

Report Summary For The Period 05/01/2017 00:00 - 05/31/2017 23:59

	Depth (in)	Velocity (ft/s)	Quantity (MGD - Total MG)	Rain (in)
Total			47.523	6.79
Avg	6.92	1.56	1.533	

Daily Tabular Report For The Period 06/01/2017 00:00 - 06/15/2017 23:59

SJD_FM32t, Pipe Height: 35.63 in, Silt: 0.00 in

Daily Tabular Report

Date	Depth (in)					Velocity (ft/s)					Quantity (MGD - Total MG)						Rain (in)
	Time	Min	Time	Max	Avg	Time	Min	Time	Max	Avg	Time	Min	Time	Max	Avg	Total	Total
06/01/2017	04:45	5.82	18:25	6.18	6.01	05:50	1.24	18:10	1.51	1.35	05:50	0.896	18:10	1.170	1.011	1.011	
06/02/2017	04:00	5.78	19:50	6.25	6.00	11:50	1.23	19:50	1.50	1.34	04:05	0.886	19:50	1.178	1.001	1.001	
06/03/2017	05:20	5.84	12:25	6.25	6.06	03:35	1.17	11:35	1.45	1.33	03:35	0.851	11:35	1.129	1.006	1.006	
06/04/2017	05:35	5.83	19:40	11.10	6.37	05:05	1.20	19:40	2.62	1.41	05:05	0.870	19:40	3.997	1.146	1.146	0.18
06/05/2017	05:30	5.80	18:40	6.23	6.04	03:40	1.20	15:20	1.50	1.36	03:40	0.870	20:05	1.162	1.024	1.024	0.02
06/06/2017	03:45	5.76	13:30	12.83	6.44	02:50	1.20	13:30	2.74	1.48	02:50	0.855	13:30	4.927	1.222	1.222	0.24
06/07/2017	05:20	5.87	18:50	6.16	6.04	11:05	1.21	21:05	1.57	1.38	11:05	0.909	21:05	1.197	1.041	1.041	
06/08/2017	03:20	5.75	21:50	6.21	6.00	10:40	1.19	23:45	1.54	1.35	02:15	0.860	21:40	1.173	1.009	1.009	
06/09/2017	05:40	5.78	20:30	6.14	5.98	04:00	1.21	16:50	1.48	1.33	04:00	0.867	16:50	1.114	0.989	0.989	
06/10/2017	02:20	5.82	03:00	6.30	6.04	01:05	1.19	11:00	1.47	1.33	02:20	0.864	02:50	1.144	1.005	1.005	0.05
06/11/2017	06:20	5.78	22:55	6.20	6.03	03:30	1.16	20:30	1.54	1.34	03:30	0.836	20:30	1.174	1.010	1.010	
06/12/2017	05:35	5.73	11:30	6.22	5.98	04:45	1.17	21:05	1.49	1.31	03:55	0.832	21:05	1.141	0.976	0.976	
06/13/2017	04:35	5.69	18:30	6.14	5.96	11:40	1.19	10:05	1.47	1.30	04:40	0.838	10:05	1.115	0.964	0.964	
06/14/2017	04:30	5.68	19:55	6.11	5.94	04:15	1.16	19:45	1.50	1.31	04:15	0.814	19:45	1.140	0.967	0.967	
06/15/2017	05:35	5.71	10:00	16.18	6.26	04:35	1.13	10:05	3.40	1.38	04:35	0.799	10:00	7.833	1.144	1.143	0.18

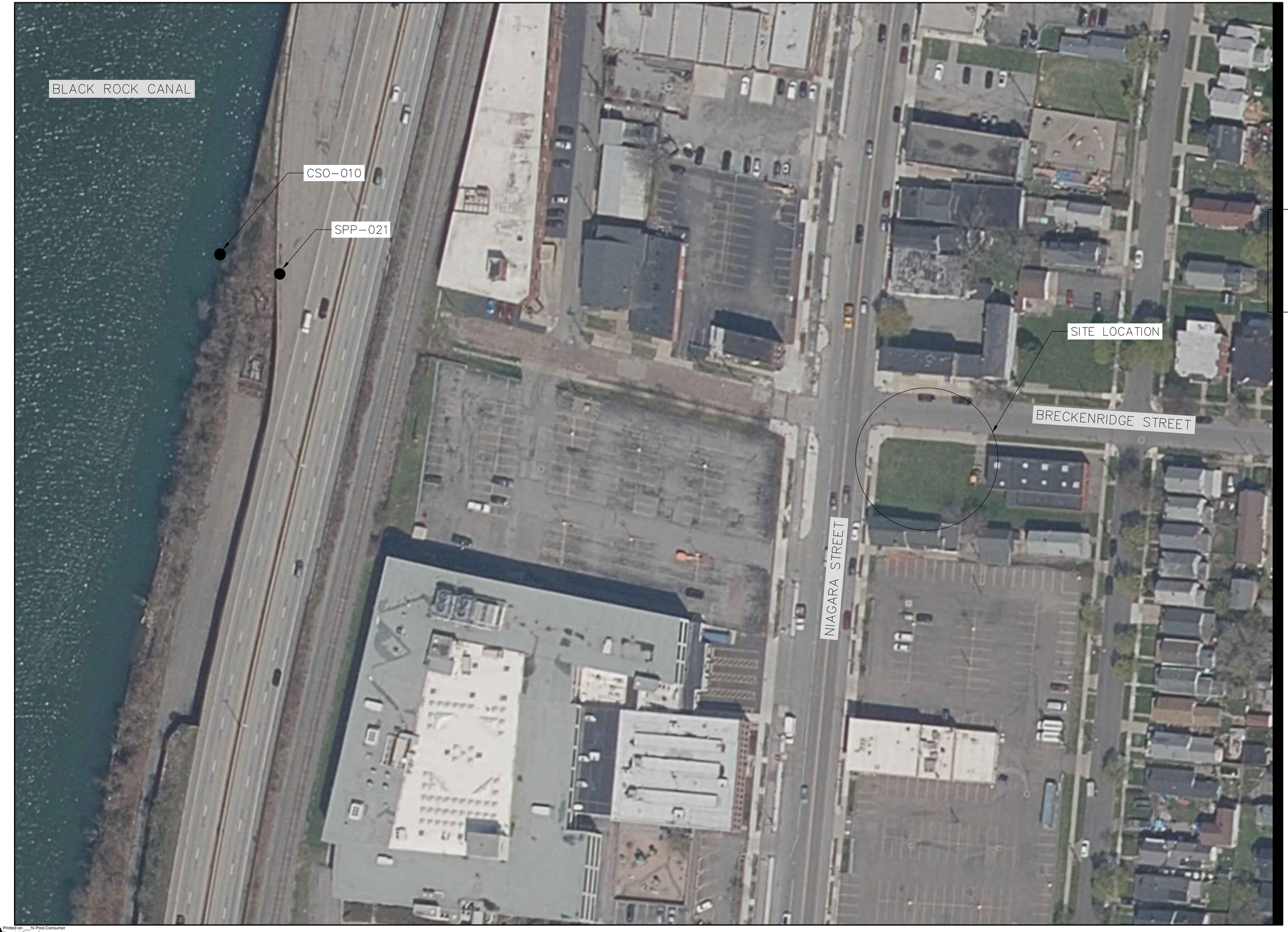
Report Summary For The Period 06/01/2017 00:00 - 06/15/2017 23:59

	Depth (in)	Velocity (ft/s)	Quantity (MGD - Total MG)	Rain (in)
Total			15.514	0.67
Avg	6.08	1.35	1.034	

Appendix I

Preliminary Drawings

ANSI D 22" X 34"



AECOM

PROJECT

Buffalo Sewer Authority
Breckenridge Niagara
Real Time Control Project

CLIENT

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Room 1038, City Hall
65 Niagara Square
Buffalo, New York 14202

CONSULTANT

AECOM
One John James Audubon Parkway
Suite 210
Amherst, New York 14228

ISSUE/REVISION

	MARCH 2022	BASIS OF DESIGN REPORT
I/R	DATE	DESCRIPTION

N

40 0 40
SCALE IN FEET

PROJECT NUMBER

60558987

SHEET TITLE

PRELIMINARY OVERALL SITE PLAN

SHEET NUMBER

G–01

ANSI D 22" X 34"

EXISTING 108–INCH RCP SEWER

EXISTING 36–INCH BRICK SEWER

BRECKENRIDGE STREET

PROPOSED 12'L x 1'W x 2'H WEIR

PROPOSED MANHOLE

OVERFLOW CHANNEL

PROPOSED 12' x 12' VALVE VAULT WITH INTERIOR PLATFORM AND AT–GRADE ACCESS HATCH

PROPOSED ELECTRIC LINE

DEMOLISH AND REPLACE EXISTING ELECTRIC LINE

DEMOLISH AND REPLACE EXISTING GAS LINE

BUS STOP

PROTECT IN PLACE GREEN INFRASTRUCTURE

PROPERTY BOUNDARY, TYP.

PROPOSED ABOVE–GRADE WATERPROOF, LOCKABLE ENCLOSURE WITH EQUIPMENT PAD

PROPOSED 24–INCH PVC SEWER

EXISTING 108–INCH RCP SEWER

DEMOLISH AND REPLACE EXISTING GAS LINE

PRIVATE PROPERTY

NIAGARA MOHAWK POWER CORP. PROPERTY

PROPOSED MANHOLE AND DROP CONNECTION

DEMOLISH AND REPLACE EXISTING FENCELINE, TYP.

PROPOSED CLEANOUT

NIAGARA STREET

PROPOSED 24–INCH PVC SEWER

CITY OF BUFFALO PROPERTY

DEMOLISH AND REPLACE EXISTING FENCELINE

PROTECT IN PLACE GREEN INFRASTRUCTURE

LEGEND

	EXISTING STRUCTURE
E	ELECTRIC
G	GAS
OHW	OVERHEAD WIRE
S	SANITARY
ST	STORM
W	WATER
	FENCELINE
	PROPERTY BOUNDARY
	CATCH BASIN
	MANHOLE
	LIGHT FIXTURE
	OFF–STREET PAVEMENT
	GREEN INFRASTRUCTURE
	PROPOSED STRUCTURE
E	ELECTRIC
G	GAS
	EXCAVATION LIMITS
	DEMOLITION
	CONCRETE SIDEWALK

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AECOM

PROJECT

Buffalo Sewer Authority
Breckenridge Niagara
Real Time Control Project

CLIENT

Buffalo Sewer Authority
Room 1038, City Hall
65 Niagara Square
Buffalo, New York 14202

CONSULTANT

AECOM
One John James Audubon Parkway
Suite 210
Amherst, New York 14228

ISSUE/REVISION

I/R	DATE	DESCRIPTION
	MARCH 2022	BASIS OF DESIGN REPORT

N

5' 0 5'
SCALE IN FEET

PROJECT NUMBER

60558987

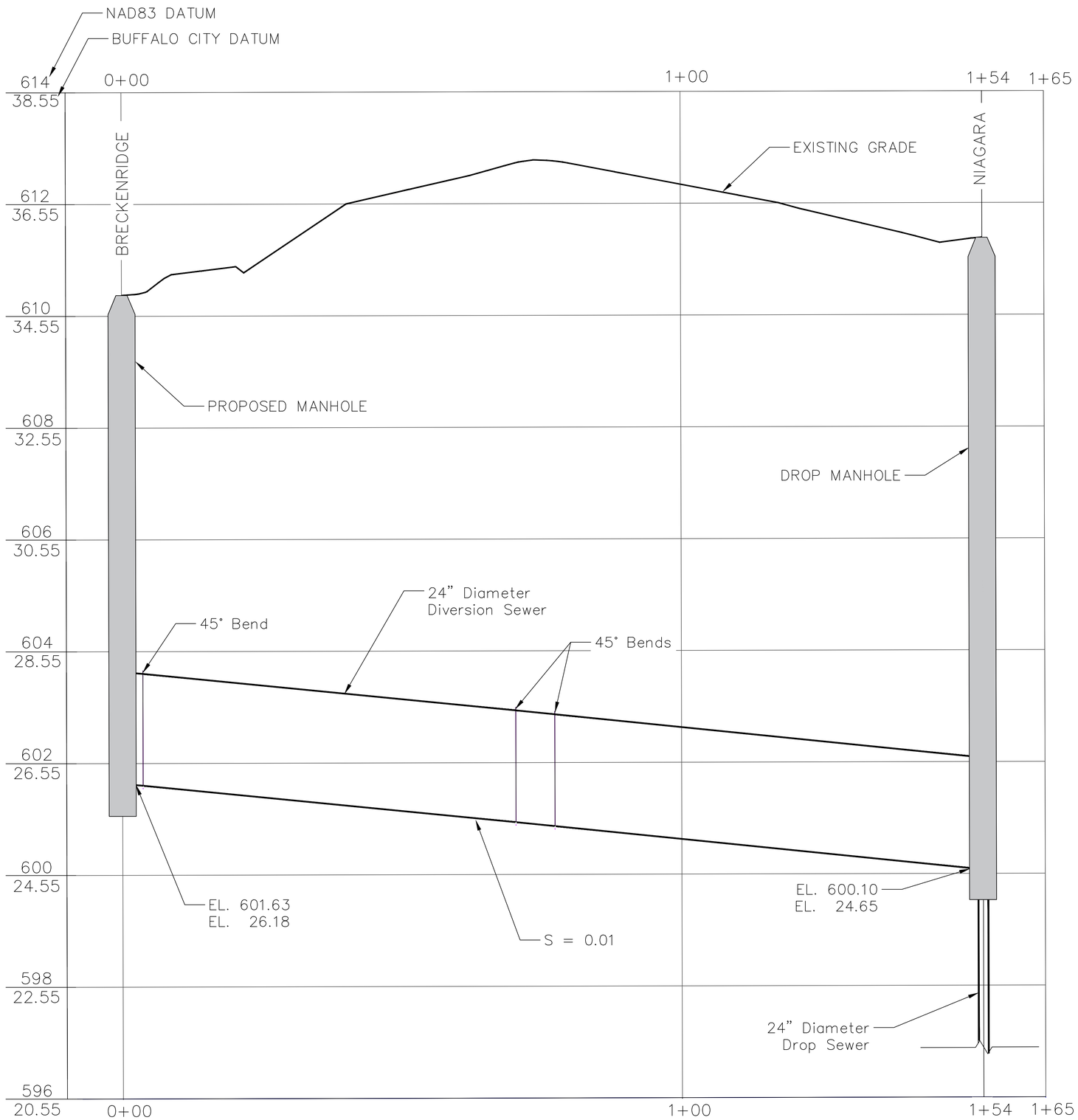
SHEET TITLE

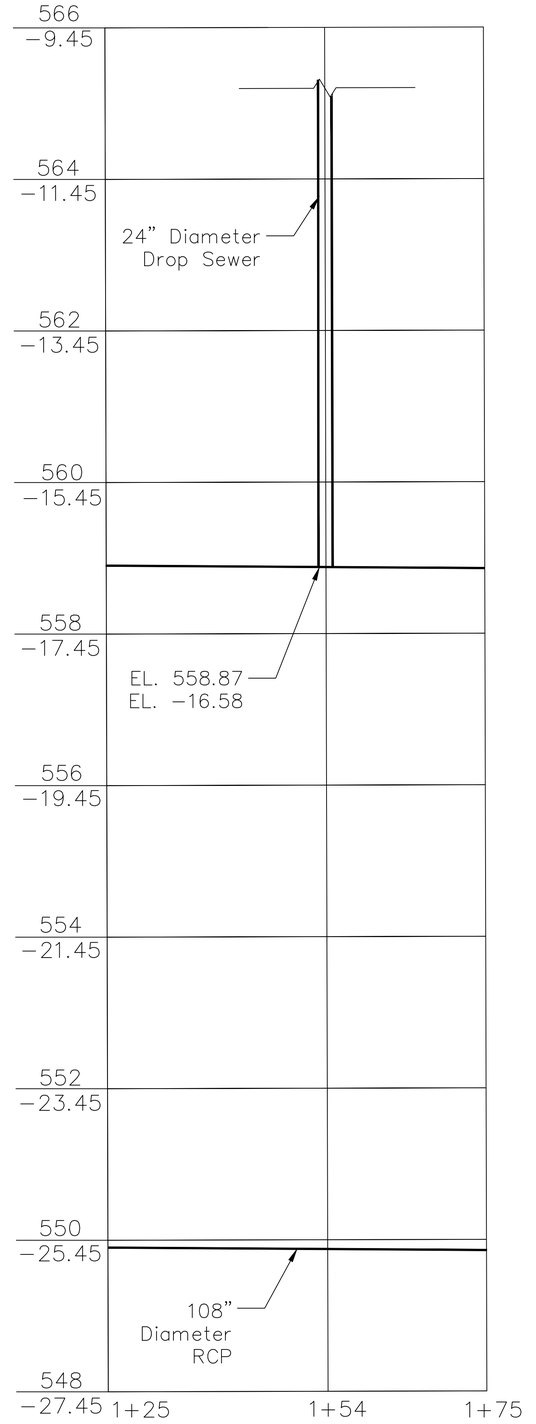
PRELIMINARY SITE PLAN

SHEET NUMBER

C–01

CONVERSION
BUFFALO CITY DATUM =
NAD83 DATUM – 575.45





PROJECT

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	MARCH 2022	BASIS OF DESIGN REPORT

PROJECT NUMBER

60558987

SHEET TITLE

PRELIMINARY HYDRAULIC PROFILE

SHEET NUMBER

C–02

Appendix J

Preliminary Control Logic

Xylem, Inc.
121 S. Niles Ave., Suite 22,
South Bend, IN 46617
574.855.1012
www.xylem.com

February 10, 2022
Technical Memorandum

Buffalo Sewer Authority
Wet Weather Operational Optimization

Preliminary Control Logic for Breckenridge Niagara

Introduction

The Buffalo Sewer Authority (BSA) is in the process of developing a coordinated Real Time Control (RTC) system as part of their Long-Term Control Plan (LTCP). The RTC sites optimize available inline storage (ILS) and conveyance capacity within the collection system, including combined sewers and overflow lines (referred to as outfall storage). Up to sixteen total RTC locations were included in BSA's LTCP and identified as early action projects.

As part of the BSA's continued efforts towards CSO abatement, another proposed RTC site is moving into the design phase. The new RTC site (Breckenridge Niagara) includes a static weir and two actuated dewatering valves. The dewatering valves are on a new connection between the combined sewer upstream of SPP021 (CSO010) and the North Interceptor, while the emergency relief weir is located in the SPP021 sewer. The valves will allow combined sewage to be sent to the North Interceptor/Bird Island Treatment Facility when there is capacity available. If the valves lose power or fail in some way, water will overflow the relief weir and continue downstream, preventing any risk of basement backups upstream of the site. The Breckenridge Niagara RTC project is expected to eliminate activations at SPP021 and reduced the systemwide overflow volume by 21 MG in the 1993 typical year SWMM simulation (model tag 8ef0626).

Objective

This technical memorandum summarizes the control logic of the new RTC site and the requirements for the programmable logic control (PLC). The objective of this technical memorandum is to provide a preliminary control logic to develop PLC logic.

Control Valves Operation

During dry weather, one of the dewatering valves at Breckenridge Niagara will be open (lead valve) and one will be closed (lag valve), except while being automatically exercised.

When wet weather begins, the lead valve will be controlled according to a Market-Based Optimization (MBO) strategy. In this strategy, the collection system is treated as a market with different areas of the system buying and selling conveyance, storage, or treatment capacity. In this analogy, the cost at a particular location will increase when it has less remaining capacity available and a higher risk for surcharging or overflows.

At Breckenridge Niagara, the lead valve will be modulated based on the wet well elevation at the Bird Island Treatment Facility (BITF) and the depth upstream of the Breckenridge Niagara static weir to minimize the market "cost". If the BITF "cost" or available treatment capacity is lower than the Breckenridge Niagara storage "cost", the PID controller will further open the lead valve to send more flow to the BITF. If the BITF is approaching its treatment capacity and there is no risk for overflow at Breckenridge Niagara, the PID controller will close the lead valve. This control will send more flow from Breckenridge Niagara when there is treatment capacity available at the beginning of a storm event, reducing the risk for overflow later in the storm.

Modes of Operation

There are four operation modes at this time, of which three will be immediately implemented:

- **Manual–Local** mode allows for manual control of the dewatering valves from the on-site cabinet. This mode allows the opening and/or closing of the valves with a percent open/closed feedback.
- **Manual-Remote** mode will allow the same functionality as the Manual-Local mode, but the operator can operate the dewatering valves from the SCADA control room. Currently, BSA only wants this mode to be used for emergency override (which closes both valves 100% and leaves them closed).
- **Auto-Local** mode implements a control logic that is based on local sensors (also known as Local Reactive control). This logic will not be implemented at this time.
- **Auto-Remote** mode implements the control logic that coordinates the actions of Breckenridge Niagara with other monitoring points in the system. The current version of the Auto-Remote mode logic will only consider remote inputs from the BITF.

Figure 1 displays the diagram of the four modes of operation described above. Mode will be changed at the operator's discretion.

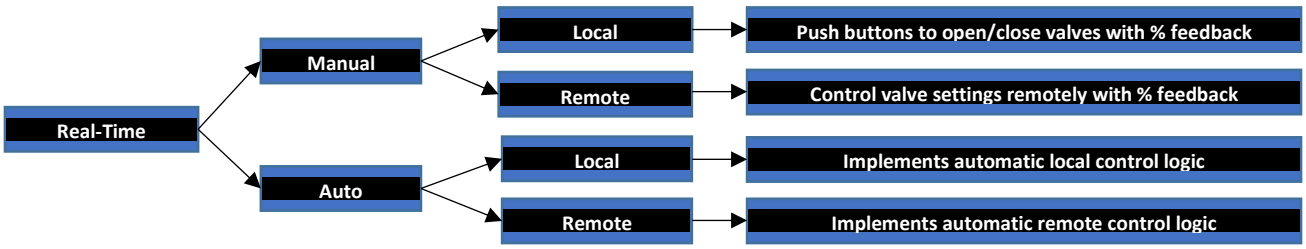


Figure 1. Modes of Operation

Control Logic for Auto-Remote Mode

The Breckenridge Niagara site will start storing flow when the depth at the sensor in the South Interceptor (SI) indicates the presence of wet weather flow. Four states will exist for the RTC site:

In the default Auto-Remote mode, Breckenridge Niagara will be operated based on current conditions at the BITF (BILEVEL) and the Breckenridge Niagara storage (BNLEVEL). In Auto-Local mode, Breckenridge Niagara will operate given upstream conditions only. The detailed control logic for the Auto Local mode will be developed once the structure plans are finalized.

The control strategy will be implemented using a state machine approach. A state machine is a PLC program that can be in one of a set number of stable conditions depending on its previous condition and on the present values of its inputs. Two states will exist for the RTC site:

- State 0: Dry Weather
- State 1: Market-Based Optimization

In State 0, the Breckenridge Niagara lead valve will be 100% open. In State 1, the valve setting will modulate to balance the available treatment capacity at the BITF and the overflow risk at SPP021. Figure 3 shows the control states and operations that will be used to develop PLC logic. The depth at the treatment facility influent wet well will be used to calculate the BITF seller cost. The depth upstream of the static weir at Breckenridge Niagara will be used to calculate the buyer cost. The Market-Based Proportional Integral Derivative (PID) controller will be used to adjust the Breckenridge Niagara lead valve setting, and flow will be sent to the area with the lowest cost.

Below are details for state conditions and transitions for Breckenridge Niagara. For the market-based optimization state, a proportional integral derivative (PID) controller is used for modulating valve setting values.

Operating Conditions by State for Breckenridge Niagara RTC

Dry Weather (BNState = 0)

In the Dry Weather state, the lead valve at Breckenridge Niagara is 100% open and the lag valve is 100% closed.

Market-Based Optimization (BNState = 1)

In the Market-Based Optimization State, the Breckenridge Niagara lead valve position is set by PID to maintain the cost difference between Breckenridge Niagara and the BITF at a setpoint of 0. For example, if the BITF supply cost is less than the Breckenridge Niagara demand cost (positive cost difference), the PID controller will increase the gate % opening to send more flow to the BITF. The gate setpoint is calculated as:

$$SetPoint = SetPoint + INTEGRALGAININCREASE * (BN\ Cost - BITF\ Cost)$$

If the BITF supply cost is greater than the Breckenridge Niagara demand cost (negative cost difference), the PID controller will reduce the lead valve % open position to send less flow to the BITF. The gate setpoint is calculated as:

$$SetPoint = SetPoint + INTEGRALGAINDECREASE * (BN\ Cost - BITF\ Cost)$$

Detailed Conditions to Transition Between States for Breckenridge Niagara RTC

BNState change from 0 to 1

BNState == 0 AND
BILEVEL ≥ BISTARTCONTROLTRIGGER

BNState change from 1 to 0

BNState == 1 AND
BILEVEL ≤ BINORMALTRIGGER

Figure 4 illustrates the Auto-Remote control logic described above. Additionally, the lead and lag valves will be alternated to minimize the strain on each valve. This “SwapValves” logic support function is illustrated in Figure 5. The lead and lag valves will be alternated once a week. If the scheduled time for the rotation is during a wet weather condition, then the rotation occurs one hour after the wet weather condition is completed.

Wait timers (set to 5 minutes) should be included in the PLC logic after each time the valve position is set to prevent valve operation in response to small fluctuations in depth, thus preventing frequent oscillation of the valves.

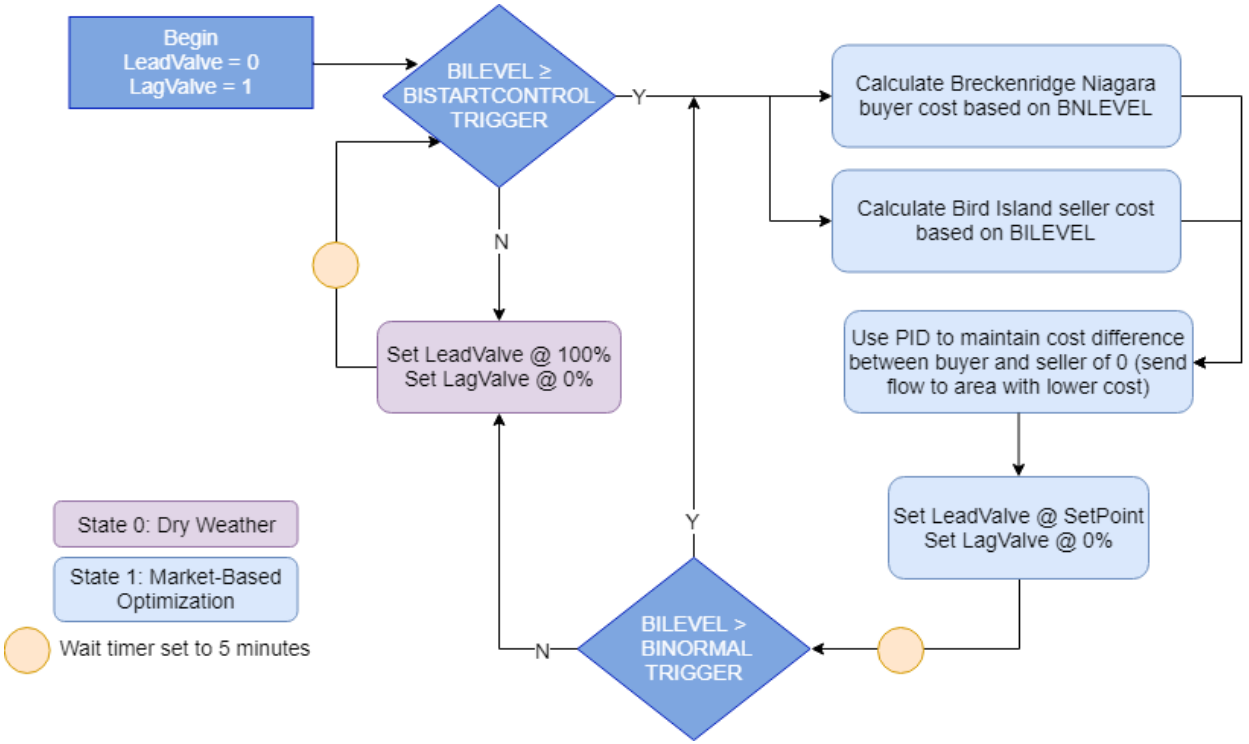


Figure 4. Breckenridge Niagara Auto-Remote Valve Operation Logic

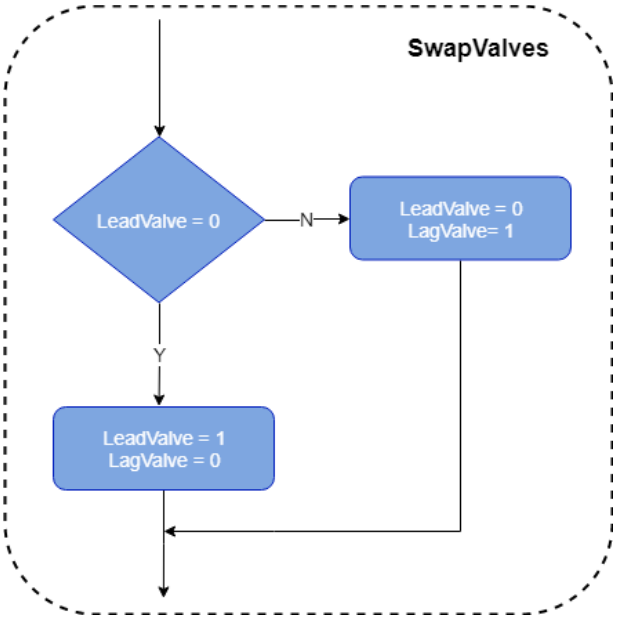


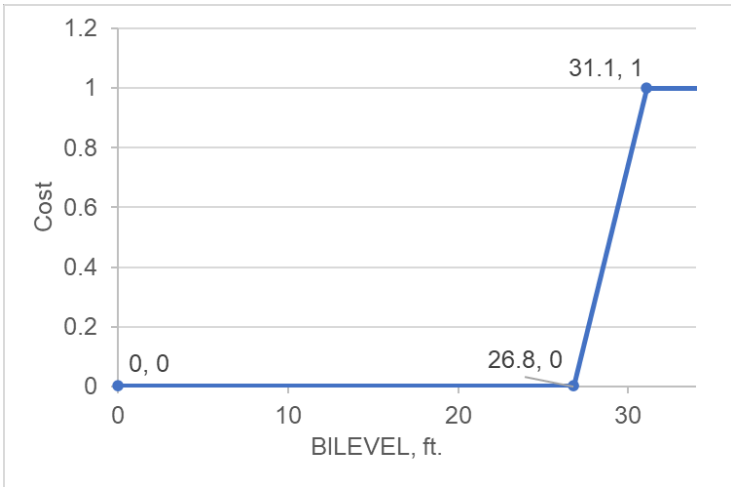
Figure 5. Breckenridge Niagara Auto-Remote Valve Operation Logic Support Functions

The control logic variables in the above logic should remain variables that can be tuned through a Modbus connection to the PLC. In previous deployments, Xylem deployed a cellular based Gateway in the cabinet that could read and write to the PLC. This enables Xylem to monitor the operation of the dewatering valves remotely and tune the initial values provided in Table 1 based on post event analysis.

Table 1. Initial Values for Control Logic Variables

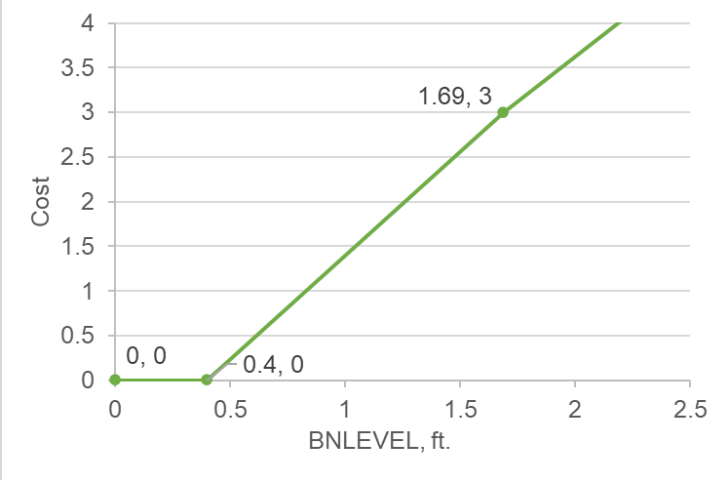
Variable Name	Description	Initial Value (ft)
BISTARTCONTROLTRIGGER	Depth in Bird Island Treatment Facility influent wet well where state changes from 0 to 1	27.0
BINORMALTRIGGER	Depth in Bird Island Treatment Facility influent wet well where state changes from 1 to 0	26.7

In addition to the state trigger variables, cost curves for the Market-Based Optimization state will need to be included in the logic (Figures 6 and 7). These cost curves will be adjusted based on observations in the field and the final structural plans for Breckenridge Niagara.



BILEVEL, ft.	Cost
0	0
26.8	0
31.1	1
100	1

Figure 6. BITF Supply Cost Curve



BNLEVEL, ft.	Cost
0	0
0.4	0
1.69	3
50	100

Figure 7. Breckenridge Niagara Demand Cost Curve

Error Conditions and Control Response

Since the control logic depends on sensor feedback, redundant control strategy must exist for when a break in the data stream occurs. If one of the input level sensors stops transmitting reliable data, the control logic will default the dry weather state. The minimum condition for reliable data is that the values must fall within a reasonable range for the sensor location.

PLC Screen Visualization

It is proposed that a visualization interface be included in this system that illustrates to users, in real time, the lead and lag valve settings and the up and downstream water surface elevations. This interface will also allow users to view the simulation mode to see how the system responds to simulated inputs. The same general layout is suggested for the visualization screens proposed for the Smith St. Drain RTC project.

Accessibility

To fine-tune and calibrate the control logic, as well as setting non-volatile parameters, it is necessary for the PLC to be accessible through Modbus. This can be either RTU or ASCII in RS-232 and in Slave mode. The following parameters will need to be accessible through Modbus:

- Mode
- BISTARTCONTROLTRIGGER
- BINORMALTRIGGER
- Bird Island Supply Cost Curve
- Breckenridge Niagara Demand Cost Curve

Conclusion and Next Steps

Prior to the development of the PLC logic, the values for control logic variables will be confirmed by Xylem. At that time, the preliminary control logic and schedule will be discussed between Xylem and the Systems Integrator. PLC code from previous RTC sites and a template for the Modbus template point list will be provided. The PLC code should be submitted to BSA and Xylem for review at least two weeks prior to the control logic startup.

After the startup of the valves is complete and the Systems Integrator has completed the programming and control panel work, the Systems Integrator must coordinate with Xylem and the RTC program team for commissioning of the Ovation screens and the control logic startup of the site. The Systems Integrator will configure the cellular modem and test the communication between the RTC site and the plant Ovation system before Xylem schedules the commissioning of the Ovation screens. During commissioning of the Ovation screens, the Systems Integrator will be on site to generate the signals from the RTC site to verify displays, alarms, and trends are displaying the correct data.

Prior to scheduling the control logic startup with BSA and Xylem, the contractor must verify all mechanical and electrical connections. This includes, but is not limited to:

- Verify power to cabinet and PLC and confirm switch between utility power and generator power
- Verify all inputs and outputs
    - Set valve travel limits to full open and full close
    - Ensure valve position feedbacks are calibrated between 0 – 100%
    - Confirm valve position feedback is accurate
    - Manually open and close valves from cabinet
- Calibrate level sensors and ensure level sensors are reading back to PLC
- Ensure that PLC and HMI are configured properly and are not in fail state
- Verify HMI is displaying correct information, such as valve position feedback
- Verify all separate items such as remotes and cables

After the Ovation screen commissioning and the verification of mechanical and electrical components, Xylem will conduct the control logic startup on site with the Systems Integrator and BSA. Depths will be simulated to ensure the valves move to the correct position and transition correctly between states. The Xylem startup will run through all the different states and scenarios described in this memo to ensure the control logic is working as designed.

Appendix K

Opinion of Probable Construction Cost

AECOM

Capital Cost Estimate

CLIENT: Buffalo Sewer Authority
Class 3 Cost Estimate (+30%/-10%)

Breckenridge Niagara RTC

DATE: 03/25/22
Rev. 0

Item	Unit Design Criteria	Quantity	Unit	Basis	Unit Cost	Estimated Cost
24-inch Plug Valve	Includes Actuators	2	EA	Estimate	$ 20,000	$ 40,000
Flow Meter		1	EA	RS Means	$ 2,530	$ 2,600
Radar Level Sensor		1	EA	Estimate	$ 3,755	$ 3,800
Laser Level Sensor		1	EA	Estimate	$ 4,300	$ 4,300
Stainless Steel Enclosure	NEMA 4X	1	EA	Estimate	$ 5,000	$ 5,000
Human Machine Interface		1	EA	Estimate	$ 6,810	$ 6,900
Programmable Logic Controller		2	EA	Estimate	$ 3,295	$ 6,600
Cellular Modem		1	EA	Estimate	$ 1,389	$ 1,400
Uninterruptible Power Supply		1	EA	Estimate	$ 712	$ 800
Access Hatch	HS-20	1	EA	Estimate	$ 5,000	$ 5,000
Valve Vault Platform		1	EA	Estimate	$ 5,000	$ 5,000
Total Equipment Cost (TEC)						**$ 82,000**
Freight		5%	%	of TEC		$ 4,100
Spare Parts		5%	%	of TEC		$ 4,100
Purchased Equipment Cost - Delivered (PEC-D)						**$ 9,000**
Equipment Installation		100%	%	of TEC		$ 82,000
Instrumentation and Controls - SCADA Programming		90%	%	of TEC		$ 73,800
Electrical - Installation		90%	%	of TEC		$ 73,800
CONSTRUCTION - DIRECT						
Brick Sewer Demolition		13	LF	Estimate	$ 50	$ 700
Brick Sewer Bypass Pumping		1	MO	Estimate	$ 50,000	$ 50,000
Gas Utility Demolition		35	LF	RS Means	$ 2	$ 100
Temporary Gas Bypass Piping		150	LF	RS Means	$ 18	$ 2,700
Gas Utility Relocation Piping		40	LF	RS Means	$ 18	$ 800
Electric Utility Demolition		25	LF	RS Means	$ 14	$ 400
Large Feeder Temporary Electric Bypass Piping		50	LF	RS Means	$ 142	$ 7,100
Large Feeder Electric Utility Relocation Piping		50	LF	RS Means	$ 710	$ 35,500
Proposed Electric Utility		20	LF	RS Means	$ 549	$ 11,000
Fenceline Demolition		20	LF	RS Means	$ 2	$ 100
Fenceline Restoration		20	LF	RS Means	$ 18	$ 400
Sidewalk / Pavement Removal		990	SF	Estimate	$ 4	$ 4,000
Excavation	Includes Disposal	378	CY	Estimate	$ 18	$ 6,900
Deep / Rock Excavation	Includes Disposal	37	CY	Estimate	$ 148	$ 5,500
Steel Plates		2	EA	RS Means	$ 1,063	$ 2,200
Backfill		325	CY	Estimate	$ 45	$ 14,700
6-inch PVC Pipe	Cleanout Piping	20	LF	RS Means	$ 9	$ 200
6-inch PVC Pipe Fittings	Cleanout Fittings and Components	1	LS	Estimate	$ 8,330	$ 8,400
24-inch PVC Pipe		155	LF	RS Means	$ 88	$ 13,700
24-inch PVC Pipe Fittings		1	LS	Estimate	$ 19,211	$ 19,300
24-inch PVC Pipe - Deep Installation		40	LF	Estimate	$ 436	$ 17,500
24-inch PVC Pipe - Connection to Interceptor		1	LS	Estimate	$ 35,000	$ 35,000
Manhole		2	EA	Estimate	$ 15,000	$ 30,000
Concrete	Includes Reinforcing	5	CY	Estimate	$ 500	$ 2,500
Valve Vault Concrete	Includes Reinforcing	9	CY	Estimate	$ 1,000	$ 8,600
Sidewalk Restoration	Includes Reinforcing	3	CY	Estimate	$ 500	$ 1,500
Pavement Restoration		56	SY	RS Means	$ 57	$ 3,200
Topsoil and Seeding		1	LS	Estimate	$ 10,000	$ 10,000
Maintenance and Protection of Traffic		2	MO	Estimate	$ 25,000	$ 50,000
Total Direct Cost (TDC)						**$ 663,000**
Indirects						
Contractor's Field Indirects	Includes Construction Equipment, Sheeting, Shoring, Labor, Power, QA/QC	10%	%	of TDC		$ 66,300
Contractor's Overhead		15%	%	of TDC		$ 99,500
Bonds, Insurance	Insurance + Bonds of TDC	1%	%	of TDC		$ 6,700
Mobilization & demobilization	Mobilization, Demobilization of TDC	6%	%	of TDC		$ 39,800
Subtotal (Indirects)						**$ 213,000**
Total Direct Cost + Indirect Cost						**$ 876,000**
Contractor's Profit		5%	%	of TDC+TDIC		$ 43,800
Total Direct + Indirect Costs, including Profit	**Total Probable Construction Cost (TPCC)**					**$ 920,000**
Unforeseen Environmental Conditions Allowance		1	LS	Estimate		$ 30,000
Contingency		30%	%	of TPCC		$ 276,000
Estimated Man-Months		26	man-months			-
Men per Crew		5	per crew			-
Estimated Duration		6	months			-
Escalation		20%	%			$ 175,300
Total Estimated Capital Cost						**$ 1,402,000**
Low Range Estimate (-10%)						**1,262,000**
High Range Estimate (+30%)						**1,823,000**

BUFFALO
SEWER AUTHORITY

BUFFALO SEWER AUTHORITY | SPDES PERMIT NO. NY0028410 | CAPITAL PROJECTS PROGRAM MANAGEMENT | BSA CONTRACT NO. 82000075

CSO-053 Sewer Patrol Point (SPP) Modifications – Preliminary Engineering Report

Prepared by JM Davidson Engineering, DPC

JUNE 14, 2024, REVISED JUNE 19, 2024

TYLin | Greeley and Hansen Water Solutions

BSA Capital Projects Program Management Team:

Arcadis | JM Davidson Engineering | Hallmark Planning & Development | e3 Communications | Watts Architecture & Engineering | CORE Environmental | Atlantic Testing Laboratories | Frandina Engineering and Land Surveying | KHEOPS Architecture, Engineering and Survey | International Institute of Buffalo | Jade Stone Engineering | NASCO Construction Services | JKMuir

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Executive Summary

The Buffalo Sewer Authority (BSA) provides wastewater service to approximately 550,000 people. As part of this service, the BSA owns and operates the Bird Island Wastewater Treatment Facility (WWTF), constructed in 1935 and expanded in the late 1970's to include secondary treatment, along with managing 850 miles of collection system.

The BSA entered into an Administrative Order (AO) with New York State Department of Environmental Conservation (DEC) and the United States Environmental Protection Agency (EPA) as part of their approved Combined Sewer Overflow (CSO) Long Term Control Plan (LTCP) that was approved on March 18, 2014. The purpose of the LTCP is to reduce CSO activations within the existing collection system and to alleviate flow spikes for influent flow to the WWTF.

Compliance with the LTCP is defined by the number of activations allowed in the typical precipitation year for the Sewer Patrol Point's (SPP's) receiving waterbody as determined by BSA's collection system hydraulic model. Following the approval of the LTCP in 2014 by the regulatory agencies, the collection system hydraulic model used in the LTCP was updated and recalibrated to reflect current system conditions.

The updated and re-calibrated LTCP (now re-named the Queen City Clean Waters Program) model suggested that some projects originally envisioned in the 2014 LTCP are no longer feasible and that other planned projects can be further optimized to meet targets. The BSA undertook an optimization process that defined many projects within a Selected Alternative.

This report covers the alternatives evaluated for the following recommended capital projects within the collection system tributary to CSO-053 to further reduce CSO activations. Preliminary drawings for these capital projects are given in **Appendix F:**

- CSO053_2.5 SPP337 Modification – Colorado Avenue at Scajaquada Street.
  - Installation of a new vortex-style drop shaft to the Scajaquada Tunnel to accommodate a peak flow of 48 MGD.
- CSO053_13 SPP165B Modification – East Delavan Avenue at Humboldt Parkway
  - Replacement of approximately 1,000 linear feet of 24-in pipe with 36-in pipe and expansion of a junction chamber.
- CSO053_3.1 SPP338 Modification – Bailey Avenue near Kerns Avenue and Scajaquada Street.
  - Installation of a new labyrinth weir to increase weir length from 14.75 ft to 30-ft and raise the height of the weir by 1.83 ft.
- CSO053_8 SPP341A Modification – Genesee Street near Kerns Avenue.
  - Installation of a new vortex-style drop shaft to the Scajaquada Tunnel to accommodate a peak flow of 26.4 MGD.

- CSO053_14 SPP175, 176, and 177 Modifications – Michigan Avenue at Dodge Street, Riley Street, and Glenwood Street, respectively.
    - Increasing the weir heights in the three SPPs.

Opinions of Probable Construction Costs for the recommended capital project and a proposed implementation schedule are given below. In addition to the projects discussed here, other projects in the area tributary to CSO-053 also needed to achieve CSO activation target compliance are being completed as separate projects that are currently either in design or construction.

Project Component	OPCC (2024 Dollars)	OPCC (2027 Dollars)	Engineering (2027 Dollars)	Misc. (2027Dollars)	Contingency (2027 Dollars)	TOTAL (2027 Dollars)
Colorado Ave – CSO053_2.5 SPP337 Modification	$7,738,000	$8,588,000	$2,576,000	$429,000	$4,058,000	$15,652,000
Humboldt Parkway – CSO053_13 SPP165B Modification	$2,108,000	$2,340,000	$702,000	$117,000	$1,105,000	$4,264,000
Genesee Street – CSO053_8 SPP341A Modification	$4,224,000	$4,689,000	$1,407,000	$235,000	$2,215,000	$8,545,000
Michigan Ave – CSO053_14 SPP175, SPP176, and SPP177 Modifications	$133,000	$148,000	$44,000	$7,000	$70,000	$269,000
S. Bailey CSOO53_3.1 SPP338 Modification	$159,000	$176,000	$53,000	$9,000	$83,000	$321,000
TOTAL CAPITAL COST	**$14,362,000**	**$15,941,000**	**$4,782,000**	**$797,000**	**$7,531,000**	**$29,051,000**

Description	Anticipated Completion Date
Design	Fall 2024 - Winter 2025
Regulatory Review	Spring 2025
Bidding	Summer 2025
Construction Start Date	Fall 2025

Description	Anticipated Completion Date
Construction End Date	Spring 2027

SECTION 1 PROJECT BACKGROUND AND HISTORY

1.1 Site Information

1.1.1 Project Background and Location

The Buffalo Sewer Authority (BSA) provides wastewater service to approximately 550,000 people. As part of this service, the BSA owns and operates the Bird Island Wastewater Treatment Facility (WWTF), constructed in 1935 and expanded in the late 1970s to include secondary treatment, along with managing 850 miles of collection system.

The BSA entered an Administrative Order (AO) with New York State Department of Environmental Conservation (DEC) and the United States Environmental Protection Agency (EPA) as part of their Combined Sewer Overflow (CSO) Long Term Control Plan (LTCP) that was approved on March 18, 2014. The purpose of the LTCP is to reduce CSO activations within the existing collection system and to alleviate flow spikes for influent flow to the WWTF.

Compliance with the LTCP is defined by the number of activations allowed in the typical precipitation year for the Sewer Patrol Points (SPPs) receiving waterbodies (**Table 1-1**), as determined by BSA's collection system hydraulic model. The target number of activations is different for each receiving water body due to the differing levels of water quality associated with the specific water bodies.

Table 1-1: Target Number of Activations in the Typical Year by Receiving Waterbody

Receiving Waterbody	Target Number of Activations in Typical Year
Black Rock Canal	4
Buffalo River	6
Cazenovia Creek	4-6*
Cornelius Creek	9
Erie Basin Marina	2
Niagara River	9
Scajaquada Creek	4

* Dependent on location along Cazenovia Creek

The approved LTCP outlined a multi-year plan for implementing projects to reduce overflows in the BSA sewer collection system to target levels. Potential projects included a mix of in-line storage (ILS), off-line storage (OLS), real time control (RTC), and green infrastructure (GI).

Following the approval of the LTCP in 2014 by the regulatory agencies, the collection system hydraulic model used in the LTCP was updated and recalibrated to reflect current system conditions. To determine the ability of projects to mitigate activations, the recalibrated PC-SWMM model was populated with the LTCP projects implemented to date, as well as the remaining planned LTCP projects. It was expected that the use of the new calibrated PC-SWMM model would result in more refined results than the XP-SWMM model used in the 2014 LTCP because:

- The new PC-SWMM model incorporated additional nodes and links not incorporated in the original XP-SWMM model.
- The recent calibration utilized flow data that should reflect more current conditions.
- More hydrological subbasins were defined, allowing for more representative parameters for a given area.

The updated and re-calibrated LTCP model suggested that some projects originally envisioned in the 2014 LTCP are no longer feasible and that other planned projects can be further optimized to meet targets. As a result, the BSA undertook a program with Xylem and several subconsultants that worked collaboratively with BSA to compile a revised list of potential projects to be considered. The list included both new projects and those projects from the 2014 LTCP preferred alternative that have not since been ruled infeasible or unnecessary. An optimization process was then leveraged to evaluate the impacts of implementing different variations and combinations of these projects with the goal of minimizing both CSO activations and construction costs. The project team also optimized the distributed control scheme to find the optimal combination of control set points that maximize the system's conveyance and storage capacity. The result of these activities is a new set of recommended projects (the Selected Alternative) for achieving LTCP compliance.

The optimization process began with a collaborative effort between the BSA and the project team to identify projects to be considered. Potential projects were added or removed from the list based on a variety of factors including:

- Property ownership
- Underground contamination concerns
- Ability to utilize gravity flow rather than pumping where possible
- Impact on SPPs with low target activations and high overflow volume in the LTCP baseline
- Potential coordination with other construction projects

A total of 77 projects were considered during the optimization. Each project was initially identified as a general concept, with sizing and configuration specifics modified through the optimization process. The project optimization process consisted of three rounds:

- Round 1 narrowed the set of project alternatives per SPP. Component models were developed for out of compliance SPPs and test events established for each component model as a proxy for the typical year. These events varied according to the SPP's activations in the baseline model typical year. Projects were added to and removed from the component models to determine which projects were most cost effective for removing out-of-compliance activations. Projects were removed from consideration after Round 1 if they did not have a significant impact on the number of activations.
- In Round 2, the scope of the optimization expanded to the full system with the objective of achieving compliance at all SPPs. Instead of component models, a skeletonized, full system model was used. A new set of test events was selected to include activations at all SPPs that were out of compliance in the baseline. Along with model adjustments, the test events allowed more project implementation scenarios to be evaluated efficiently. These scenarios included different combinations of the projects to be implemented, structure sizing, and real-time control timing. The results of the Round 2 optimization informed what size ranges and configurations would be included in Round 3.
- The objective of Round 3 was to minimize the project cost while still achieving compliance. The refined project configurations from Round 2 were applied to the skeletonized, full system model. The upper and lower bounds for the optimization parameters were adjusted based on the outcomes of Round 2, and cost was included in the multi-objective optimization along with the volume of untreated flow and the number of out of compliance activations for the optimization test event group. The project set from Round 3 that minimized the number of out of compliance activations in the skeletonized model test events for the lowest cost was incorporated into the full model for the official Typical Year simulation. The first typical year simulation showed 8 SPPs still out of compliance. Project configurations were subsequently updated until compliance was achieved. To

achieve compliance and generate reasonable detailed cost estimates, the project configurations were updated. The resulting set of projects is termed the Selected Alternative.

1.1.2 CSO-053 Projects

The Scajaquada District has 12 CSOs that discharge to either Black Rock Canal or Scajaquada Creek. Per the results using typical year rainfall, CSO-053 in the Scajaquada District was still projected to exceed its target activations of four per year. The following SPPS are tributary to CSO-053 and contribute to the CSO activations: SPPs 229A, 175, 165B, 340, 338, 337, 339, and 336B.

A variety of projects were evaluated upstream of the SPPs that overflow to CSO-053 on Scajaquada Creek. The following decisions were made as part of the alternatives analysis:

- The operational North Bailey RTC project would be impacted by these new projects and would have its control setpoints adjusted accordingly.
- Three projects considered upstream of SPP337 were not included in the Selected Alternative because SPP modifications were more cost-effective.
- An additional RTC project upstream of SPP338 was not needed to achieve compliance for that SPP.
- One additional OLS site was considered upstream of SPP340 but was not included in the Selected Alternative to consolidate the project area.

Ultimately, the Selected Alternative achieves compliance for all the CSO-053 SPPs that were out of compliance in the baseline plan model. This report is the preliminary engineering report for five sites requiring Sewer Patrol Point (SPP) Modifications. **Figure 1-1** shows the locations of the sites included in this report:

- CSO053_2.5 SPP337 Modification – Colorado Avenue at Scajaquada Street
- CSO053_13 SPP165B Modification – East Delavan Avenue at Humboldt Parkway
- CSO053_3.1 SPP338 Modification – Bailey Avenue near Kerns Avenue and Scajaquada Street
- CSO053_8 SPP341A Modification – Genesee Street near Kerns Avenue
- CSO053_14 SPP175, 176, and 177 Modifications – Michigan Avenue at Dodge Street, Riley Street, and Glenwood Street, respectively.

Maps of the individual project locations are included in **Appendix A.**

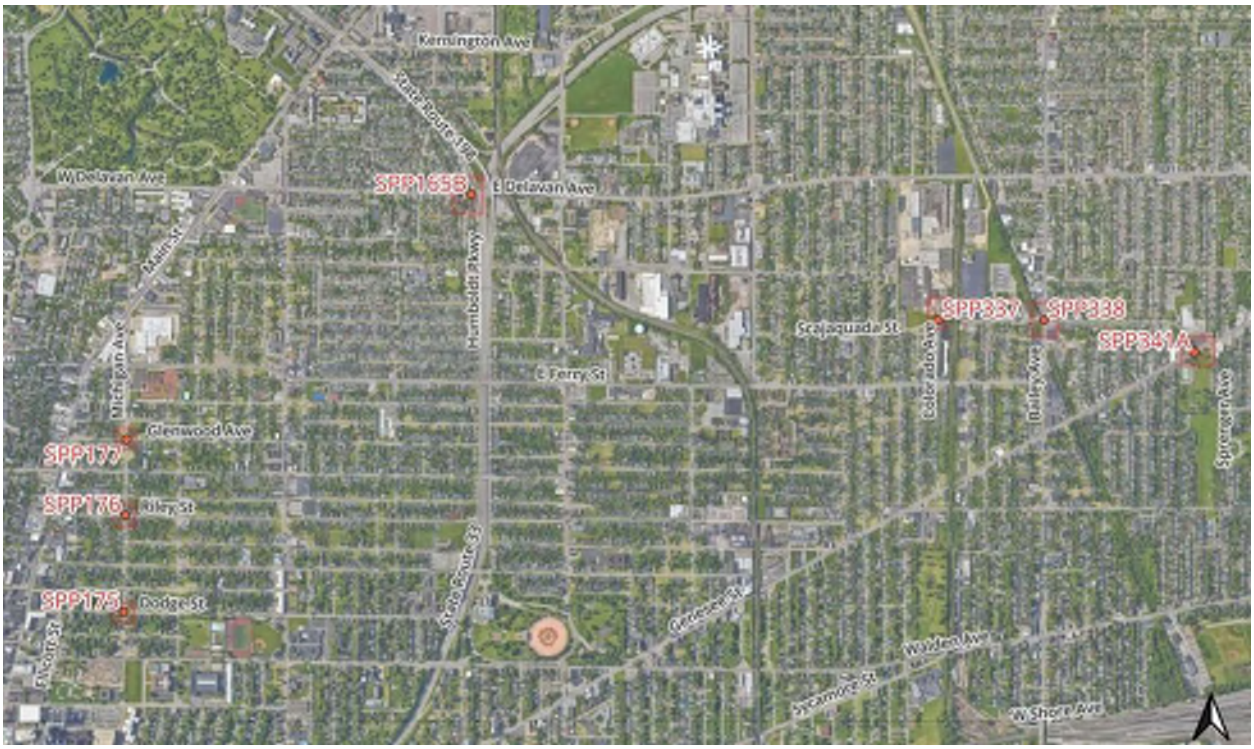

Figure 1-1: Project Locations

1.1.3 Geological Conditions

According to the Natural Resources Conservation Service's Web Soil Survey, the soil types for the five project locations are:

- CSO053_2.5 SPP337 Modification – Urban land (Ud). This site was previously known to be contaminated due to the actions of former property owners; General Motors (GM) and American Axle & Manufacturing, Inc. (AAM). Polychlorinated Biphenyls (PCBs) were primarily found in environmental samples taken from 250 Colorado Street.
- CSO053_13 SPP165B Modification – Urban land-Cayuga complex (Ug) and Urban land-Collamer complex (UmA, 1 to 6% slopes).
- CSO053_3.1 SPP338 Modification – Urban land (Ud), Urban land-Odessa Complex (Ut, 0 to 3% slopes), and Urban land-Teel complex (Uw).
- CSO053_8 SPP341A Modification – Urban land-Odessa Complex (Ut, 0 to 3% slopes), and Urban land-Teel complex (Uw).
- CSO053_14 SPP175, 176, and 177 Modification – Urban land-Odessa Complex (Ut, 0 to 3% slopes), Urban land-Claverack complex (Uk), Urban land-Cosad complex (Uo), Urban land-Niagara complex (Us), and Urban land-Collamer complex (UmA, 1 to 6% slopes).

More detailed soil descriptions are included in Appendix B; however, the urban soils present are typically moderately to well-drained soils consisting heavily of silt loam underlaid by gravelly silt loam, silty clay loam, silty clay, and sandy loam.

The depth to water table and depth to bedrock is generally greater than 200 cm (6.5 ft) at all locations. The geologic maps for the SPP modifications projects with subsurface work are provided in **Appendix B.**

As design progresses, soil borings will be completed at each location requiring excavation, so that more detailed information will be obtained.

1.1.4 Flood Zones

Flood zones are geographic areas that FEMA has defined according to varying levels of flood risk. All five sites fall within FEMA's Zone X, which is an area of minimal flood hazard determined to be outside the 500-year flood zone. The flood zone maps for each project site can be seen in **Appendix C**.

1.1.5 Environmental Resources

The United States Fish and Wildlife Service's Information for Planning and Conservation (IpaC) database was researched for all locations where subsurface work is planned. The IpaC preliminary results indicate that the Northern long-eared bat is a threatened species that may occur in the project area. The Northern long-eared bat is a species likely to become endangered within the foreseeable future. The database also indicates that the monarch butterfly exists within the project area and is a candidate for listing as a threatened species. The project area also consists of habitat for 23 migratory birds. This project is unlikely to impact any of the aforementioned species where planned work is to occur within existing paved areas. The IPaC preliminary report for the project locations can be found in **Appendix D.**

The sewer system has three major receiving water bodies: Scajaquada Creek (PWL ID: 0101-0023), Black Rock Canal (0101-0025), and the Niagara River (0101-0006). The latest water quality assessment provided by NYSDEC classifies all three waterbodies as "impaired" for fish consumption due to contaminants that degrade the habitat. The Scajaquada Creek is also listed as "impaired" for both primary and secondary recreational use. Niagara River is classified as a "threatened" water supply system with "stressed" aquatic life. According to the DEC, the high density of sanitary wastewater discharges results in elevated susceptibility for numerous contaminant categories, including fecal coliforms.

The Scajaquada Drain (a portion of Scajaquada Creek that was covered and is currently directed in an underground pipe) is classified as an R4SBC wetland. The National Wetland Inventory Survey defines this wetland as:

- **System Riverine (R)**: The Riverine System includes all wetlands and deepwater habitats contained within a channel, with two exceptions: (1) wetlands dominated by trees, shrubs, persistent emergents, emergent mosses, or lichens, and (2) habitats with water containing ocean-derived salts of 0.5 ppt or greater. A channel is an open conduit either naturally or artificially created which periodically or continuously contains moving water, or which forms a connecting link between two bodies of standing water.
- **Subsystem Intermittent (4):** This Subsystem includes channels that contain flowing water only part of the year. When the water is not flowing, it may remain in isolated pools or surface water may be absent.
- **Class Streambed (SB):** Includes all wetlands contained within the Intermittent Subsystem of the Riverine System and all channels of the Estuarine System or of the Tidal Subsystem of the Riverine System that are completely dewatered at low tide.
- **Water Regime Seasonally Flooded (C):** Surface water is present for extended periods especially early in the growing season, but is absent by the end of the growing season in most years. The water table after flooding ceases is variable, extending from saturated to the surface to a water table well below the ground surface.

1.1.6 Environmental Justice Areas

The project sites fall within several Potential Environmental Justice Areas (PEJAs). The water quality in the Black Rock Canal, Scajaquada Creek and Niagara River impacts the population in the Ellicott, Lovejoy, and Masten Common Council District neighborhoods. All five sites have a minority population of approximately 81-100%, and nearly 34-38% of the population lives below poverty. Unity Island will also benefit from improved water quality as a result of the project, which is frequently utilized by the New American community and the Burmese community. A map of the PEJAs surrounding the project sites and along the affected waterbodies is given in **Figure 1-2**.

Figure 1-2: Potential Environmental Justice Areas

1.2 Ownership and Service Area

BSA's wastewater service area covers approximately 110 square miles including the City of Buffalo and parts of the Towns of Alden, Cheektowaga, Elma, Lancaster, Tonawanda, and West Seneca and the Villages of Depew, Lancaster and Sloan, as well as Erie County Sewer District Numbers 1 and 4. Overall, the collection system serves a population of approximately 550,000 residents in 11 Western New York municipalities.

BSA's collection system is comprised of both combined and separate sewers and appurtenances, including manholes, drop inlets, siphons, and sewer patrol points (SPPs); outlying stations, including real-time control structures, pumping stations, gates, and additional facilities; and green infrastructure.

Ninety-three (93) percent of the collection system owned by BSA is a combined sanitary and stormwater system, but the City has separate sanitary and storm sewers as well. The collection system includes:

- Approximately 850 miles of gravity sewers (790 miles of which are combined sewers)
- 52 combined sewer overflows (CSOs)
- 21,300 manholes
- 240+ Sewer Patrol Points (SPPs, otherwise known as regulators)

The SPPs were designed as part of the original combined sewer system and typically consist of a two-tiered chamber separated by a regulating weir. During dry weather conditions, the SPP conveys flow along one invert to the Bird Island WWTF; however, in wet weather, the weir is overtopped, and excess flow is diverted through a secondary invert to either under-capacity parts of the collection system or directly to receiving water bodies to prevent basement flooding and protect the WWTF.

Gravity sewers and drains range in size from 6-inch to 33-feet in diameter. Flow is conveyed through the collection system network to the Bird Island WWTF for treatment via two reinforced concrete intercepting sewers built in the 1930s: the North Interceptor and the South Interceptor. Major trunk sewers that are tributary to the North Interceptor are the Hertel Avenue sewers, Bird Avenue sewer, and the Scajaquada Tunnel Interceptor. The Babcock Street sewer, Swan Trunk sewer, Hamburg Street Pump Station, South Buffalo Pump Station, and the Kelly Island Pump Stations are all tributary to the South Interceptor.

As reported in BSA's Annual CSO Report, the annual CSO volume discharged in 2023 is 2,922 million gallons (MG) in a total of 49 overflow events. All CSO flow volumes and event frequencies reported to the NYSDEC represent the predicted combined sewer overflows only (excluding stormwater and stream inflows) utilizing the combined system model from BSA's approved Long-Term Control Plan (LTCP).

1.2.1 Outside Users

There are seven (7) satellite systems connected to BSA's collection system. These satellite systems include:

- Erie County Sewer District #1
- Erie County Sewer District #4
- Town of Cheektowaga
- Village of Sloan
- West Seneca Town Sewer Districts #1, 2, 3, 4, 9 and 10
- West Seneca Town Sewer Districts #5, 13, and 14
- West Seneca Town Sewer District #15

BSA has wholesale agreements with the outside community systems and does not own, operate, or maintain the wastewater collection systems within these communities. Each outside community is charged by BSA for their share of allocatable costs. Allocatable costs include portions of administrative expenses, WWTF expenses, industrial waste expenses, costs to maintain trunk sewers to convey flows from the city line to the WWTF, and debt service costs. The municipality or district is billed twice annually for services. Under the agreements with the outside satellite systems, each District or municipality is responsible for installing and maintaining meters at city lines.

As of 2023, there are approximately 108,155 residential connections as well as 1,306 commercial, industrial, and governmental connections to BSA's collection system. The BSA has pretreatment permits with 52 of the industrial users, who are labeled as Significant Industrial Users, or SIUs.

1.2.2 Population Trends and Growth

Historically, the City of Buffalo has experienced population decline, unlike the population growth seen in New York State as a whole, as shown in **Table 1-2**. From 2010 to 2020, there was a population growth of 6.52%. However, given the decades of negative population change, a more conservative growth factor of 3.36% was used for the City of Buffalo and 2.12% for the state of New York.

Table 1-2: Historical and Projected Population for the City of Buffalo and New York State

	City of Buffalo		New York State	
Year	Population	% Change	Population	% Change
1960[1]	532,759		16,782,304	
1970[1]	462,768	-13.14%	18,236,967	8.67%
1980[2]	357,870	- 22.67%	17,558,072	-3.72%
1990[2]	328,123	- 8.31%	17,990,455	2.46%
2000[3]	292,648	- 10.81%	18,976,457	5.48%
2010[4]	261,310	- 10.71%	19,378,102	2.12%
2020[4]	278,349	6.52%	20,201,249	4.25%
2030[5]	287,423	3.26%	20,630,324	2.12%
2040[5]	296,793	3.26%	21,068,512	2.12%
2050[5]	306,469	3.26%	21,516,007	2.12%
2060[5]	316,460	3.26%	21,973,007	2.12%

[1] Source: U.S. National Park Service, A Brief Chronology of the Development of the City of Buffalo (U.S. National Park Service) (nps.gov)
[2] Source: Boston University Arts & Sciences, Boston University (physics.bu.edu) Buffalo Population History
[3] Source: Office of the New York State Comptroller, Population Trends in New York State's Cities (ny.gov)
[4] Source: U.S. Census Bureau, P1: RACE - Census Bureau Table
[5] Source: Author calculated. To be conservative, projected values for 2030, 2040, 2050, and 2060 assume half of the percent change from the 2020 Census.

As the population of the City has grown, the number of Buffalo Sewer connections have also increased over the past 10 years. Per the most recent Comprehensive Annual Financial Report (CAFR), as of FYE 2023, there are approximately 108,155 residential connections and 1,306 commercial, industrial, and governmental connections to Buffalo Sewer's collection system. These connections increased by 4.4% and 132% respectively, from 2014 to 2023. **Figure 1-3**: Buffalo Sewer Connection from 2014-2023 shows the growth of connections since 2014.

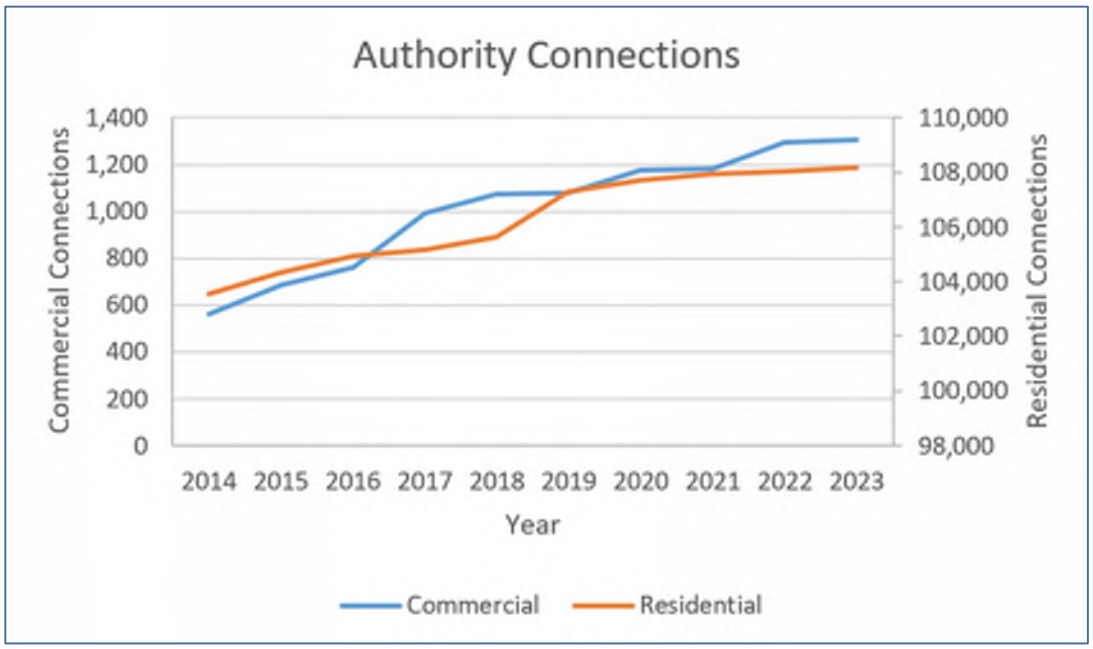

Figure 1-3: Buffalo Sewer Connection from 2014-2023

1.3 Existing Facilities and Present Condition

1.3.1 General Description, History of Major System Components, and Description of Unit Processes

The following describes the layout and configuration of the components of the five SPP projects undertaken under this project.

1.3.1.1 SPP337 Modification (CSO053_2.5)

SPP337 is located near the intersection of Scajaquada Street and Colorado Avenue. Combined sewer flows are conveyed by gravity south along Colorado Avenue and enter the SPP chamber at the intersection of the two streets. Dry weather flows are conveyed via a drop shaft to the Scajaquada Tunnel. Wet weather flows overtop a weir in the chamber and are conveyed south along Colorado Avenue and ultimately to CSO-053. See **Figure 1-4** and **Figure 1-5**.

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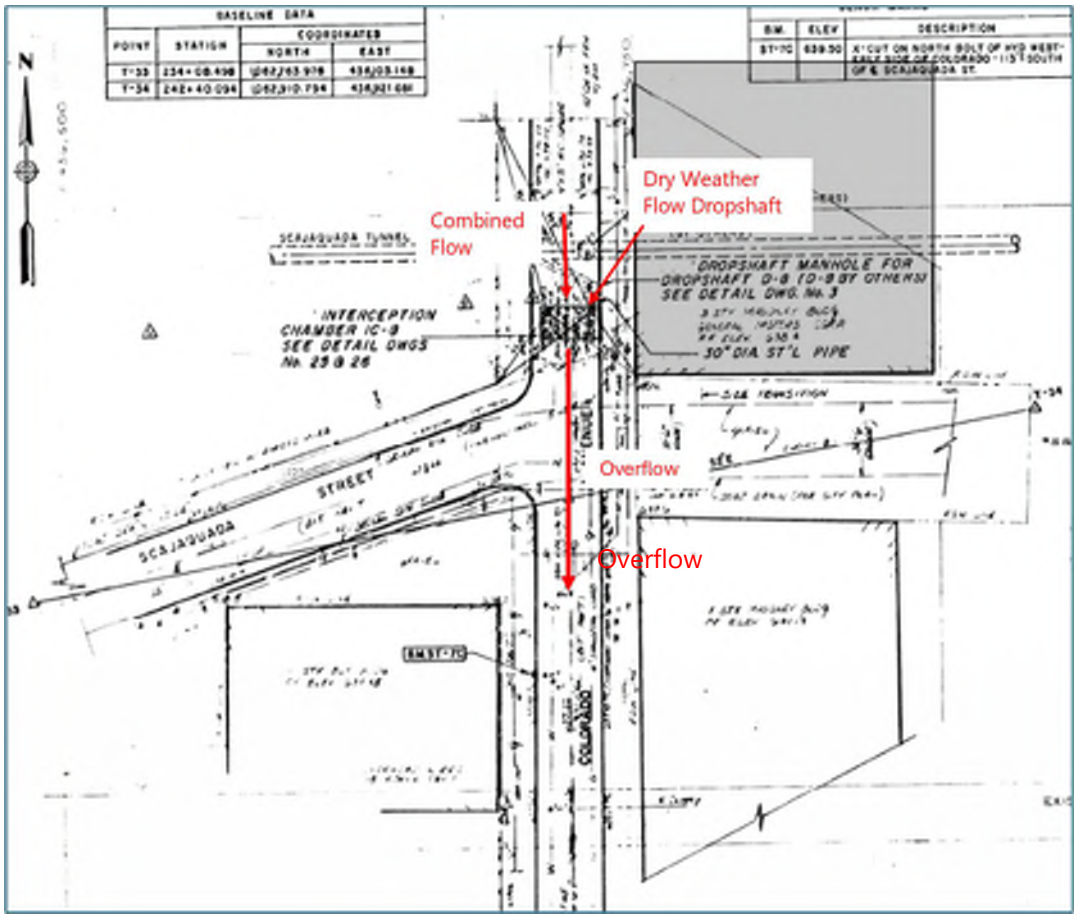


Figure 1-4: Configuration of SPP 337

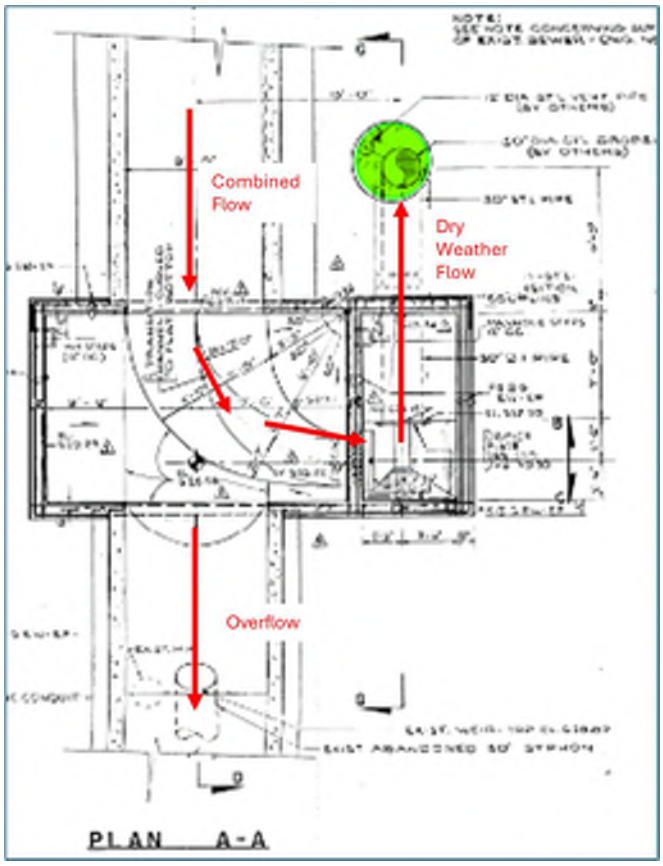


Figure 1-5: Plan View of SPP 337

1.3.1.2 SPP338 Modification (CSO053_3.1)

SPP338 is located south of the intersection of Scajaquada Street and Bailey Avenue. Combined flows are conveyed south along Bailey Avenue to SPP338. Under dry weather conditions, flow is directed to the west and is conveyed via a drop shaft to the Scajaquada Tunnel. In wet weather, when flow depths in the primary tunnel exceed approximately 1-ft of depth, excess flow is conveyed over a roughly 14.75-ft long and 38-in wide concrete weir and continues south along Bailey Avenue to CSO-053 (**Figure 1-6** and **Figure 1-7**).

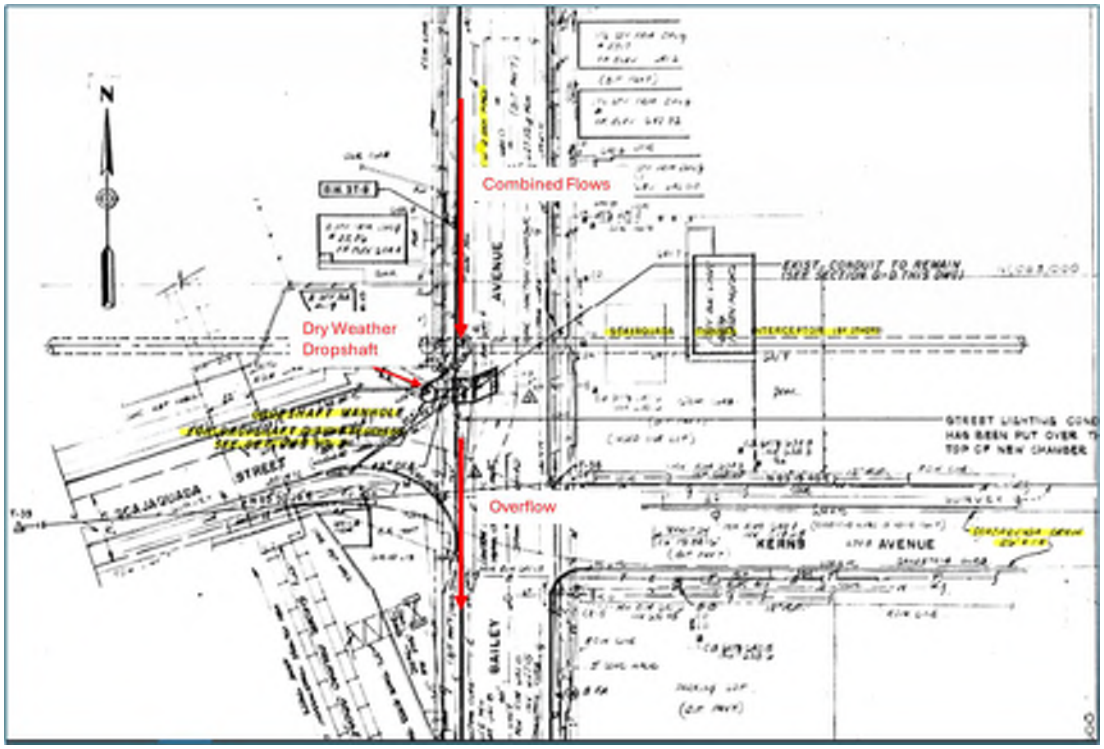


Figure 1-6: Configuration of SPP-338

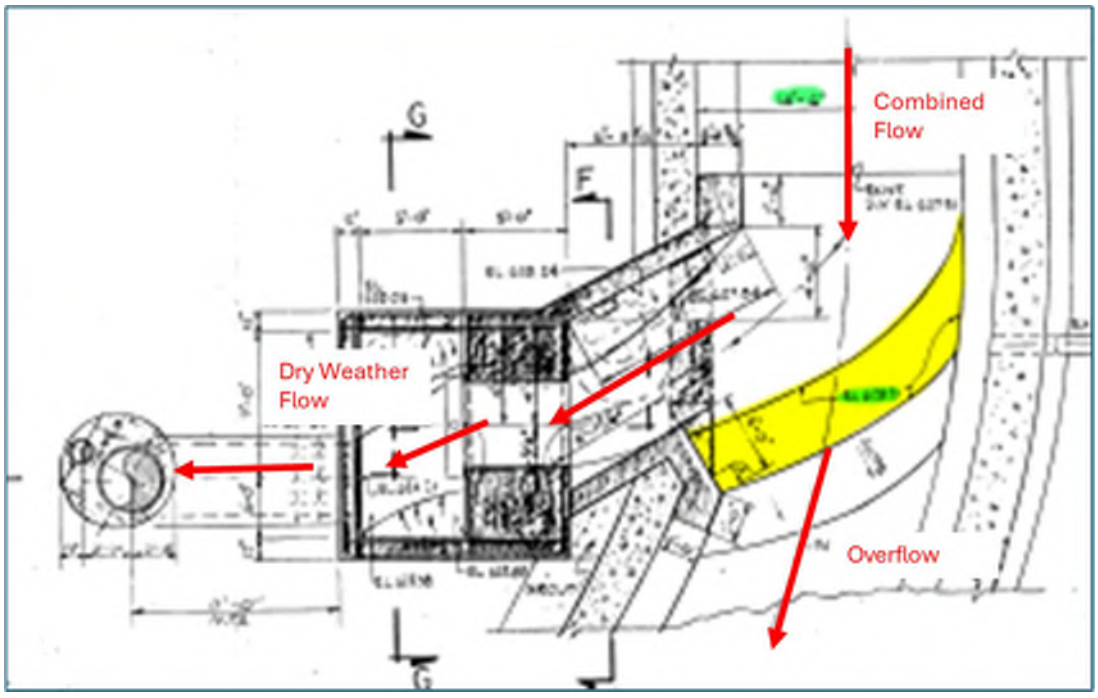


Figure 1-7: Plan of SPP 388

1.3.1.3 SPP341A Modification (CSO053_8)

SPP341A is located on Genesee Street east of Kerns Avenue. This SPP is a double-chamber unit in which two combined sewers coming from the east enter the chamber. Dry weather flows from each of the combined influent sewers are directed southeast through Schiller Park to a drop shaft to the Scajaquada Tunnel, while wet weather flows pass over a weir and into two overflow pipes that head further southwest along Genesee Street towards CSO-053 (**Figure 1-8** and **Figure 1-9**).

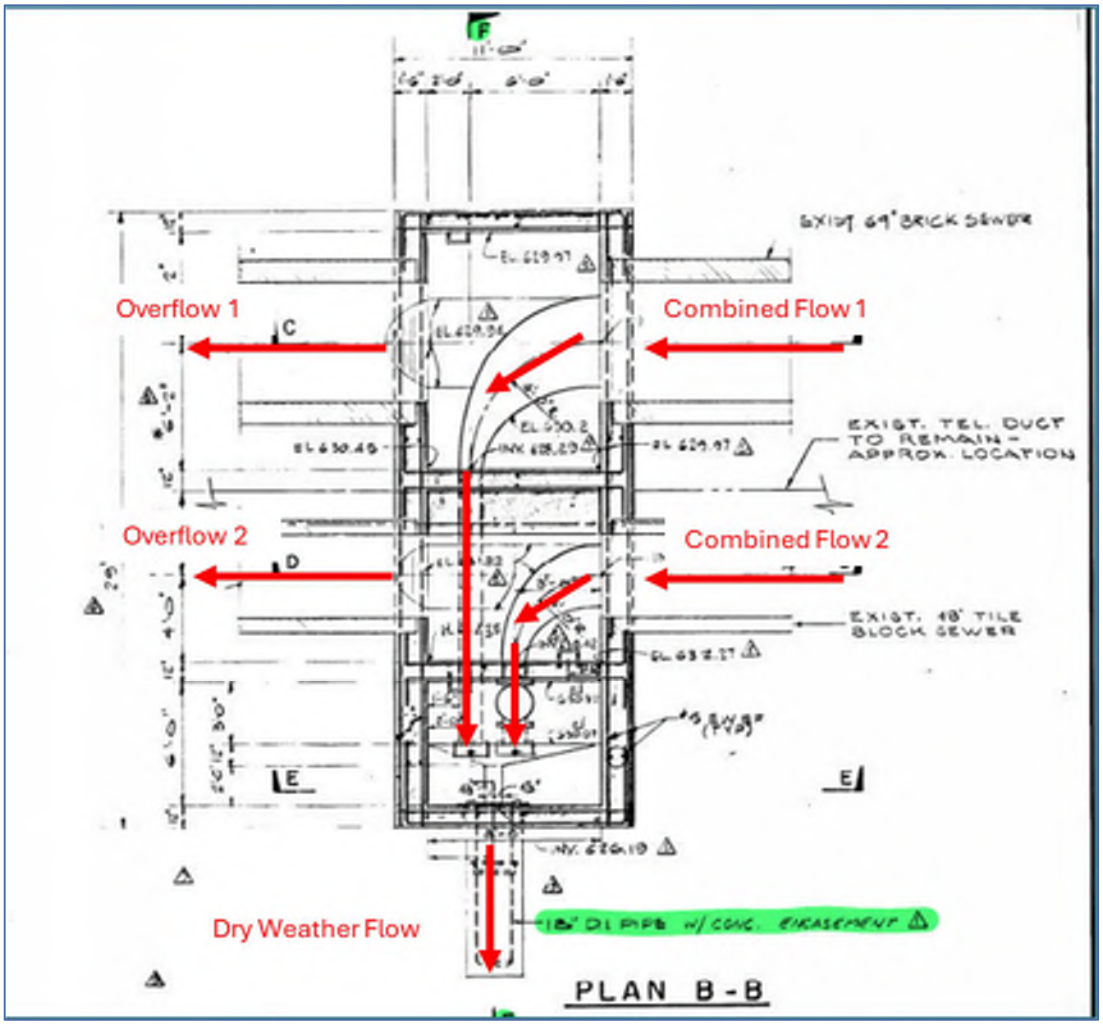


Figure 1-8: Configuration of SPP 341A

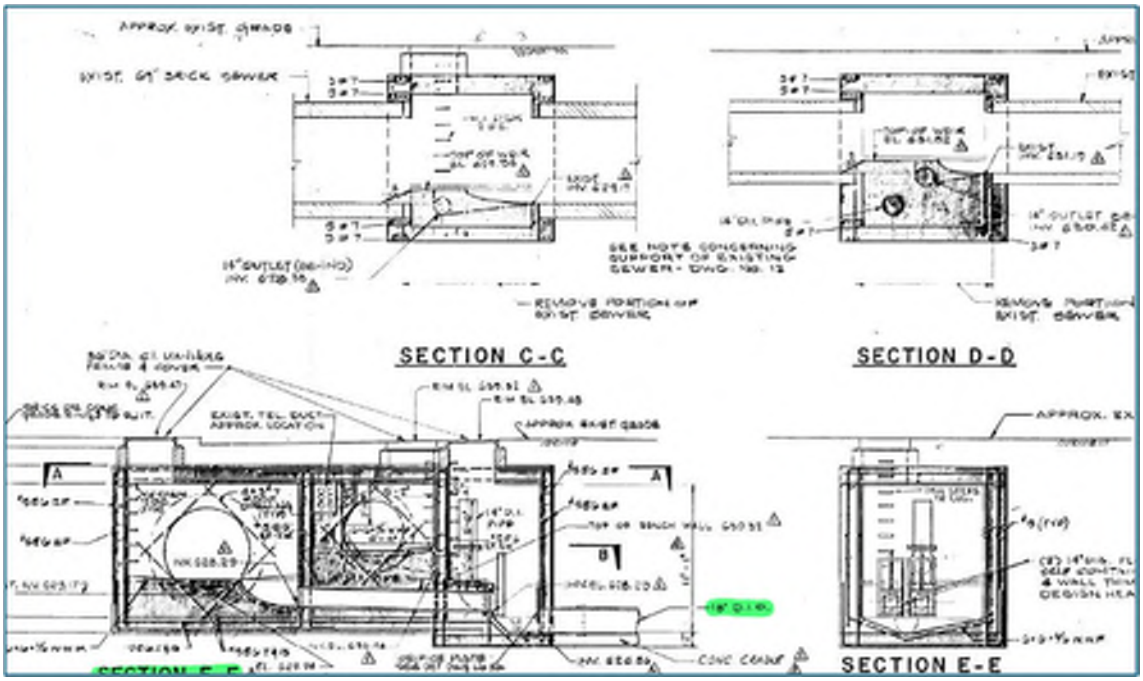


Figure 1-9: Sections through SPP 341A

1.3.1.4 SPP165B Modification (CSO053_13)

SPP165B is located at the intersection of East Delavan Avenue and Humboldt Parkway. Combined sewer flow enters the east from along East Delavan Avenue. Dry weather flow is directed to a drop shaft and is conveyed south along Humboldt Parkway to the Scajaquada Tunnel. During wet weather events, flows exceeding the capacity of the drop shaft are conveyed in a southwesterly direction from the SPP towards CSO053 (**Figure 1-10** and **Figure 1-11**).

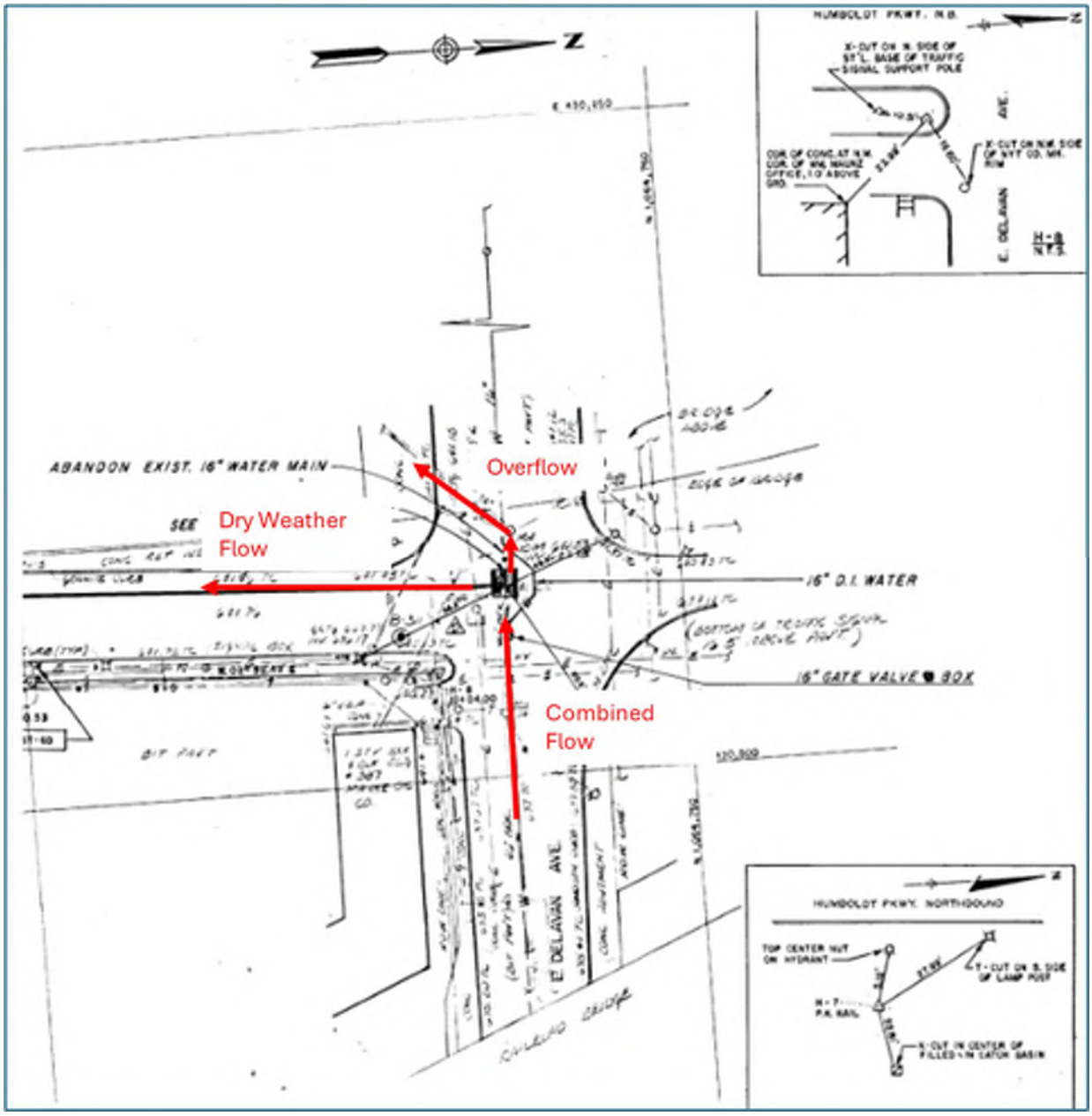


Figure 1-10: Configuration of SPP 165B

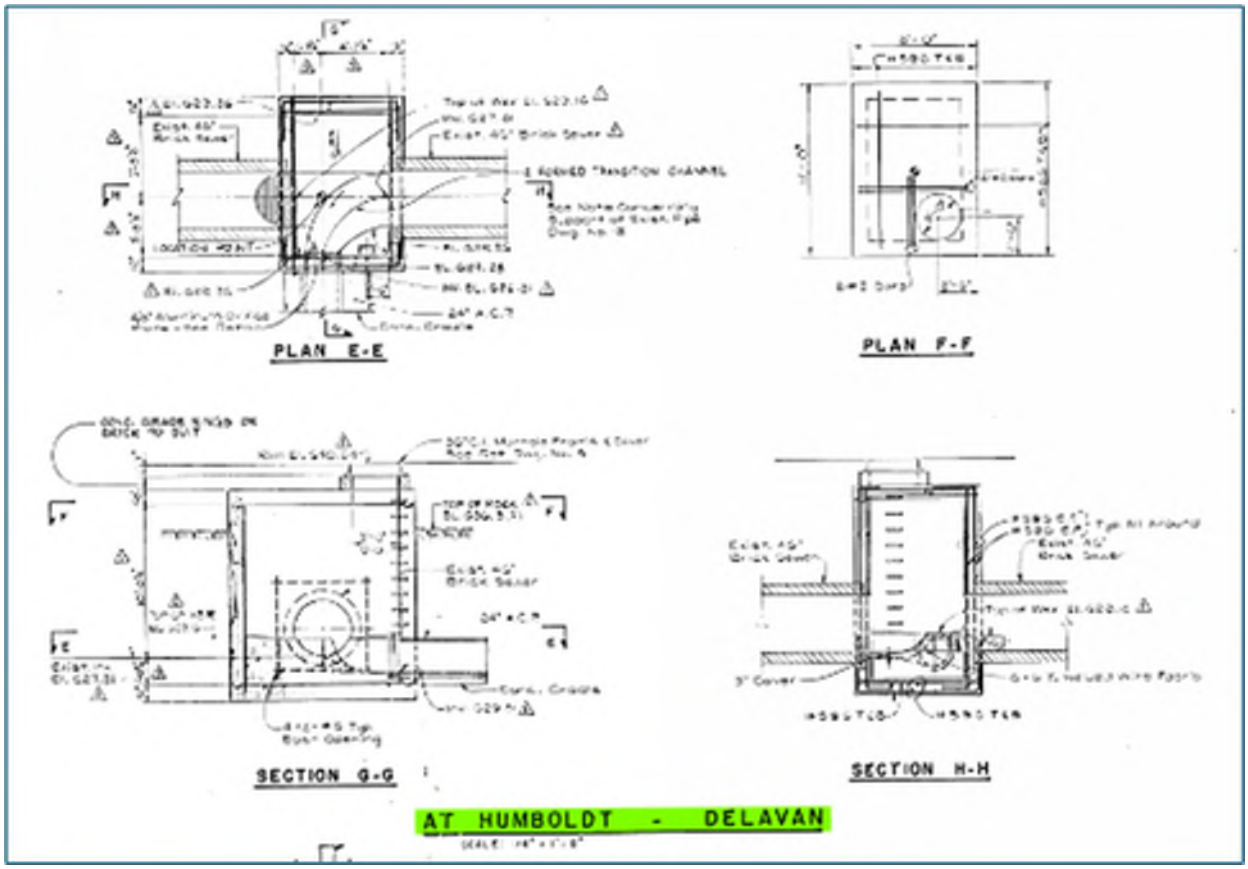


Figure 1-11: Plan and profile of SPP 165B

1.3.1.5 SPP175, 176, & 177 Modifications (CSO053_14)

SPP175 (**Figure 1-12**), 176 (**Figure 1-13**), and 177 (**Figure 1-14**) are located at the intersection of Michigan Avenue with Dodge, Riley, and Glenwood Avenues, respectively. The three SPPs are similar in configuration with dry weather flow conveyed north straight through the chamber, while higher flows overtop a weir and are conveyed east in conduits along the respective cross streets.

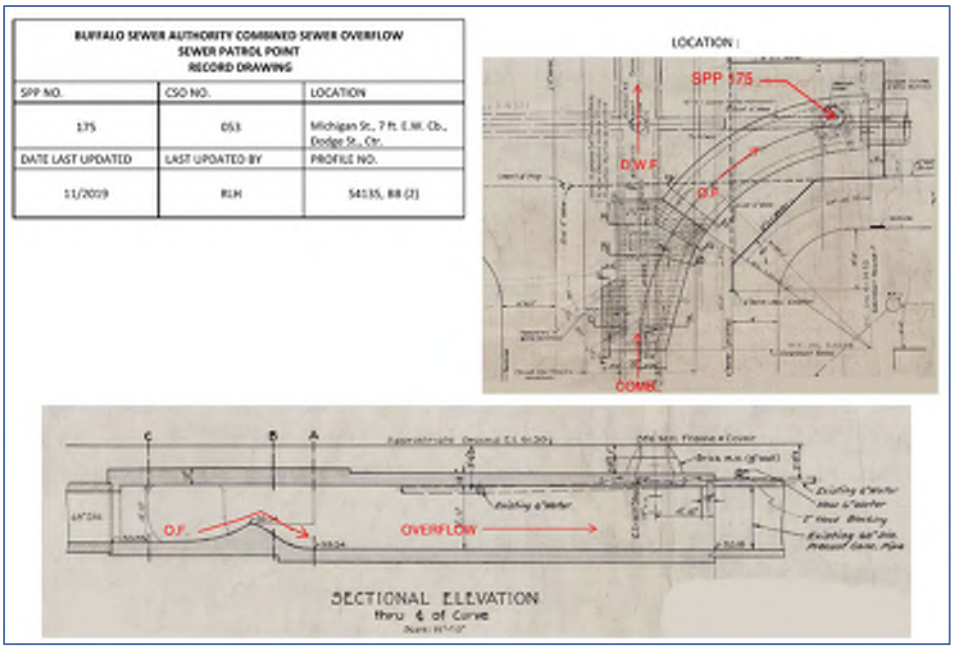


Figure 1-12: Plan and Profile of SPP 175

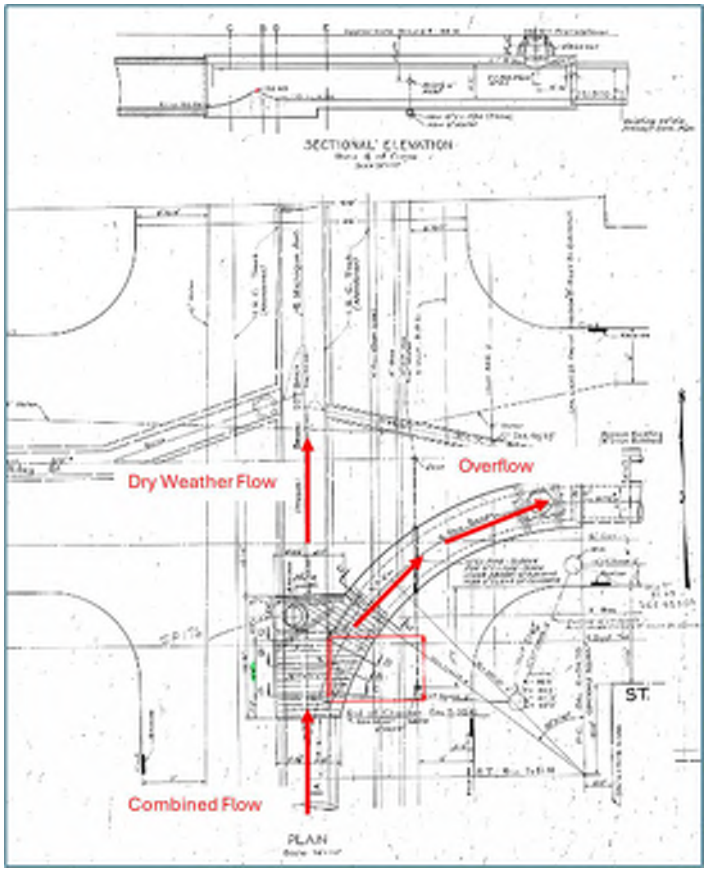


Figure 1-13: Plan and Profile of SPP 176

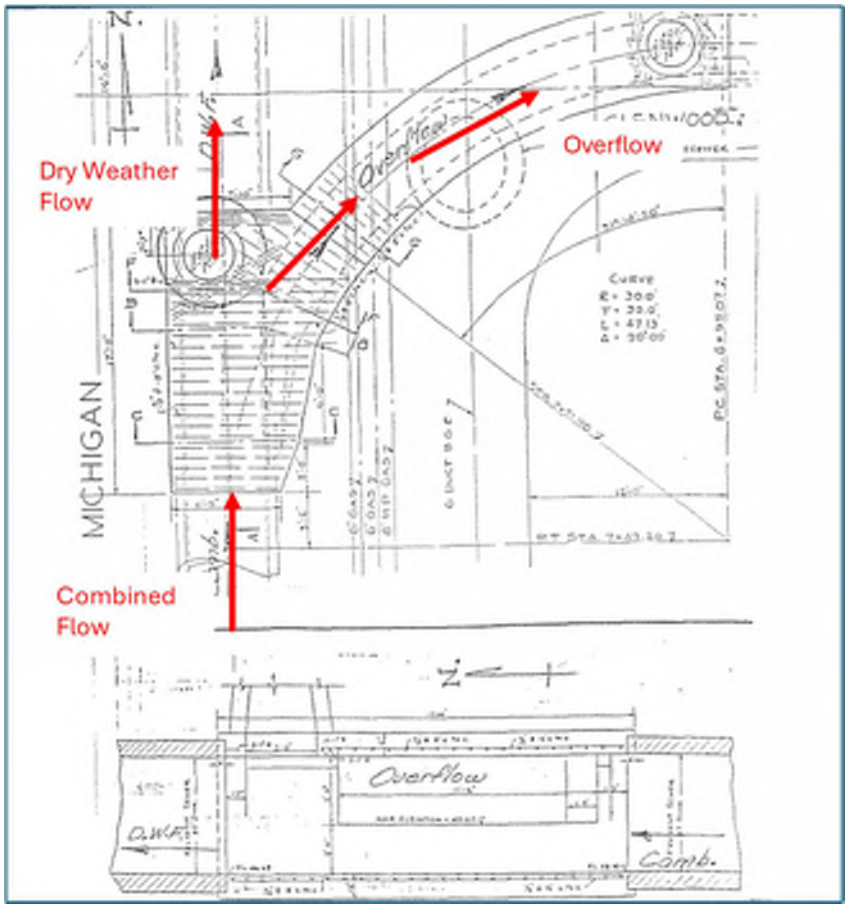


Figure 1-14: Plan and Profile of SPP 177

1.3.2 Permit Conditions

The BSA is currently operating under State Pollution Discharge Elimination System (SPDES) Permit No. NY0028410, which had an effective date of July 1, 2014, and an expiration date of June 30, 2019. The permit was administratively extended past its expiration date and as a result, the BSA is currently still held to the 2014 permit.

All active CSOs are listed in the SPDES permit and are subject to the Nine Minimum Control Measures required under the USEPA's Combined Sewer Overflow policy. The projects in this report fall under NMC No. 2, Maximum Use of Collection System for Storage, which requires the BSA to optimize the collection system by operating and maintaining it to minimize the discharge of pollutants from CSOs. The permit indicates that "It is intended that the maximum amount of in-system storage capacity be used (without causing service backups) to minimize CSOs and convey the maximum amount of combined sewage to the treatment plant…" and "This shall be accomplished by an evaluation of the hydraulic capacity of the system, but should also include a continuous program of flushing or cleaning to prevent deposition of solids and the adjustment of regulators and weirs to maximize storage."

The BSA's LTCP was approved on March 18, 2014, and the USEPA subsequently issued a revised Administrative Order (CWA-02-2014-3033) which addressed implementation of the approved LTCP. Both the SPDES permit, and the Administrative Order are included in **Appendix H**.

1.3.3 Compliance Issues

As indicated in Section 1.1, compliance of the LTCP is determined by using the hydraulic collection system model and a typical year precipitation data set to determine the number of activations for each CSO and the estimated annual volume from each CSO in the typical precipitation year. During recalibration of the model, it was determined that some of the originally envisioned projects outlined in the LTCP were either not required, needed to be replaced and/or relocated, or needed to be resized. The projects outlined in this report involve those projects that were further optimized since the acceptance of the 2014 LTCP.

1.3.4 Existing Underflow and Drop Shaft Capacity

Table 1-3 below shows the current existing peak underflow for the two drop shafts that will need to be upsized. The modifications at the other locations involve raising the weir within the structure, so underflows will remain the same; however, the level within the sewers will be higher due to the weir raising improvements.

Table 1-3: Summary of Existing Underflows for Targeted SPPS

SPP	Maximum Current Underflow (MGD)
CSO053_2.5 SPP337 Modification – Colorado Avenue at Scajaquada Street*	16.61*
CSO053_8 SPP341A Modification – Genesee Street near Kerns Avenue*	4.43*

Notes: *maximum capacity per the Scajaquada Tunnel Interceptor Facility Plan, Step 1, Section VII, The Selected Plan, Leonard S. Wegman Co. Inc., February 1976

1.3.5 Existing Energy Consumption

All sites considered under this project do not consume any electricity. All improvements are to existing fixed weirs or upsizing of underflow pipes and do not require any equipment that require electricity.

1.4 Definition of the Problem

As indicated previously in Section 1.1, the updated and re-calibrated LTCP model suggested that some projects originally envisioned in the 2014 LTCP are no longer feasible in that they are no longer needed or that the originally envisioned projects in the LTCP, if implemented, would no longer meet the target activations for the individual waterbodies. In addition, it was recognized that the sizing, location, or scope of proposed projects could be further modified based on the performance of previously implemented projects and the corresponding model results in the typical year to meet target activations. The optimization efforts conducted in 2022 and 2023 provided a Selected Alternative, which is comprised of a number of projects that seek to achieve target activation compliance. These projects discussed herein are several of the projects included within the Selected Alternatives.

The Level of Control required per the LTCP is 4 activations per year for Scajaquada Creek. While these projects alone will not bring the number of activations into full compliance for CSO-053, they are part of a larger effort that is currently in progress to achieve full compliance.

Table 1-4 shows the expected reduction in both number of activations and CSO volumes expected with the implementation of these projects, along with the other projects currently in design or construction, to meet the overall goals. While many of these SPPs already met the target activation, improvements were needed to enhance the performance of the other projects in the same sewershed; therefore, the reduction

in volume and number of activations can only be reported on a CSO-level, and not on an individual SPP-level.

Table 1-4: Summary of Change in CSO Volumes and Activations Expected with Improvements

	Baseline		Projected Post Improvement Implementation			
CSO	CSO Volume (MG)	No. of Activations	CSO Volume (MG)	No. of Activations	Volume Reduction (MG)	No. of Activation Reductions
053	300.08	37	27.15	4	272.93	33

1.5 Financial Status

The BSA currently receives revenue from the following (see **Table 1-5**):

- Sewer rents
- Direct payments from outside users
- Industrial waste disposal

Table 1-5: Comparison of Revenues (Actual and Budgeted) since 2021

	2021-2022 Actual	2022-2023 Actual	2023-2024 Original	2024-2025 Proposed
Operating Revenues				
Assessed sewer rents	12,052,518	12,106,288	19,852,600	24,957,600
Metered water use sewer rents	24,716,758	24,708,243	24,460,000	25,136,900
Outside Contracts	23,414,326	12,665,958	13,750,000	15,000,000
Industrial Waste Charges	4,505,575	5,133,775	3,525,000	3,875,000
Miscellaneous Revenue	31,097,051	18,036,621	4,691,400	1,305,500
Non-Operating Revenues				
Interest Charges	597,601	858,886	711,000	615,000
Interest Earnings	148,078	3,759,557	2,760,000	3,510,000
Total Revenues	96,531,907	77,269,329	69,750,000	74,400,000

Note: Values are rounded to the nearest dollar. For more detailed numbers, see the BSA's 2024-2025 Budget at 2024-2025-BSA-Budget-1.pdf (buffalosewer.org)

The Levy of Sewer Rents based on assessed value will be $24,900,000 for the 2024-2025 Budget. This represents the amount of Sewer Rent that the Buffalo Sewer Authority will collect from all real property in the City of Buffalo except those properties exempt by law. This amount, when spread over the total estimated assessment for sewer purposes from the Department of Assessment, will result in an annual sewer rent of approximately $1.98 for each $1,000 of assessed valuation.

Any further change in the assessed value of taxable properties will require an adjustment to the assessment sewer rent to maintain this levy. If the final assessed value as determined by the City Department of Assessment increases or decreases, the sewer rent per $1,000 will correspondingly increase or decrease by $.00015673 for each $1,000,000 change in assessed value.

All sewer rents based on water use will be subject to a three percent adjustment to reflect consumer price indices. Flat rate sewer rents continue to be charged based on property characteristics (i.e., number of stories, front footage, etc.). Sewer rent meter charges will be assessed at a rate of $11.42 per 1,000 cubic feet. All flat and meter accounts will be assessed a capacity/drainage charge at a minimum of $6.18 per month.

In the 2024-2025 budget, the budgeted appropriations for various expenditures are as shown in **Table 1-6**.

Table 1-6: Summary of Appropriations in BSA's 2024-2025 Budget

Appropriation Category	2024-2025 Budgeted Appropriation
Personnel Services	17,731,441
Utility Services	5,609,810
Fringe Benefits	12,296,500
Debt Service and Reserves	10,360,256
Purchase of Services	17,681,274
Materials and Supplies	8,343,957
Capital Outlay	1,500,960
Insurance and Financial Charges	649,500
Professional Development	221,302
TOTAL	74,400,000

In 2024-2025, the BSA anticipates debt payments of $8,610,256, which is a slight increase over the 2023-2024 budgeted amount of $8,044,007. In 2023, the BSA had ~$21.5 million in net revenue available for debt service, with estimated principal of ~$3.3 million, interest of ~$2.9 million, for a total debt service coverage of 3.43 (from BSA's Annual Comprehensive Financial Report for Fiscal Year ended June 30, 2023).

The Median Household Income (MHI) for the City of Buffalo is $46,184 in 2022 dollars, while the NYS MHI is $81,386 in 2022 dollars as per the data at https://www.census.gov/quickfacts/fact/table/NY,buffalocitynewyork/INC110222. Therefore, the City of Buffalo MHI is only 57% of the New York State MHI.

SECTION 2 ALTERNATIVES ANALYSIS

The following sections describe the alternatives evaluated for each SPP modification location discussed in this report. Note that the alternatives were all evaluated for compliance with the LTCP by inputting into the hydraulic collection system model. If an alternative was deemed to not meet compliance or was deemed otherwise infeasible, the alternative was adjusted within the model to try and achieve compliance. This iterative process was used to arrive at the recommended alternative. As such, costs for all alternatives evaluated were not assessed at that time, as compliance was the major concern in determining project viability. In addition, because the alternatives were only defined as abstract representations in the model during evaluation, there was not enough information to fully understand and develop costs until the design was further progressed. Once an alternative was deemed to achieve compliance, a more robust design concept was developed (as discussed in Sections 3 and 4) to provide a much more accurate basis for cost estimation. Green Infrastructure has been included as a measure to address combined sewer overflows and urban flooding throughout the CSO 053 sewer shed but has been determined in the initial site evaluation to not be a feasible option to fully address the issues.

2.1 Colorado Ave – CSO053_2.5 SPP337 Modification

SPP337 is located near the intersection of Scajaquada Street and Colorado Avenue. For this project, SPP 337 would be modified by incorporating an additional 30-inch diameter underflow pipe. This modification would reduce overflows at CSO053 and would benefit from the installation of the Schiller Park Offline Storage (OLS) or the Sidney OLS to free up additional capacity within the Scajaquada Tunnel. This project was not originally included in the 2014 LTCP.

As part of the recent LTCP optimization project, several alternatives for this location were evaluated as follows.

2.1.1 Colorado Alternative 1 - SPP 337 Satellite Storage, Conveyance, Force Main, and Pump Station

This project was first identified within the 2014 LTCP and envisioned as an 0.7-million-gallon (MG) storage tank at the intersection of Scajaquada Street and Colorado Avenue. However, there were significant land acquisition and constructability concerns, as this area is within a congested industrial corridor with significant utilities and existing buildings providing project implementation concerns. The 0.7-MG tank also was determined to not achieve compliance in the new recalibrated collection system model; therefore, this alternative was discarded prior to optimization efforts.

2.1.2 Colorado Alternative 2 - Inline Storage (ILS)

This project was to be located on Colorado Street near Scajaquada Street within the footprint of the former American Axle property on East Delavan Street. Construction of an RTC structure at this location would require an easement from a private property owner in a known Superfund site and would entail excavation of what are highly suspected contaminated soils. Due to the high cost-benefit ratio and the extended legal process associated with this project, implementation was delayed infinitely. This project was later replaced with other projects (see below).

2.1.3 Colorado Alternative 3 - Colorado Dynamic Underflow Control (DUC)

Colorado DUC was more cost-effective than some other alternatives for SPP337 and can get SPP337 into compliance in conjunction with weir modification. Eventually though, it was removed from consideration because DUC did not achieve compliance during the full typical year simulation and additional underflow

capacity was needed for compliance. Removing automated control at this location was expected to reduce disturbance and overall cost while still achieving compliance.

2.1.4 Colorado Alternative 4 - Delavan and Moselle Off-line Storage (OLS)

This alternative envisioned an 0.5 MG offline storage facility but was removed from consideration due to high projected cost from the offline cost curve and did not achieve compliance for SPP337.

2.1.5 Colorado Alternative 5 - William Gaiter Relief Sewer to Amherst Quarry

Under this alternative, a relief sewer to send more flow to Amherst Quarry was envisioned. The existing utility corridor runs from Warwick and William Gaiter Parkway; the original intent was to connect into the sewers along both of these streets and reroute flow up the extension from William Gaiter Parkway to East Amherst and to the Quarry. This alternative showed more impact on SPP337 overflow reduction than the Delavan and Moselle OLS in the SPP component model but did not achieve compliance in the typical year. The Estimated costs for this alternative were also much greater than the costs associated with the other alternatives considered and therefore, this alternative was removed from further consideration.

2.1.6 Colorado Alternative 6 - SPP337 Modification

This alternative was ultimately pursued as part of the Selected Alternative as one of the projects that, if implemented, would contribute to bringing CSO-053 into compliance with the target activation goal of four activations per year. This would be achieved by incorporating an additional 30-inch diameter underflow pipe. The modification would reduce overflows at CSO053 and would benefit from the implementation of the Schiller Park OLS or Sidney OLS to free up capacity in the Scajaquada Tunnel.

2.2 Humboldt Parkway – CSO053_13 SPP165 Modification

Only one alternative was considered at this location, as it was discovered that SPP165B was out of compliance in achieving the targeted number of activations in a typical year. Underflow capacity was subsequently added within the hydraulic system model to achieve compliance. As a result, the SPP165B underflow orifice needs to be upsized to 24-inches and the underflow pipe upsized to 36-inches. The overflow weir would also be raised to 54.81 (city datum). These modifications would reduce overflows at CSO-053 and would benefit from the installation of the Sidney OLS project to make more capacity available in the Scajaquada Tunnel.

2.3 Genesee Street – CSO053_8 SPP341A Modification

SPP341A is located near the intersection of Genesee Street and Kerns Avenue. For this project, SPP 341A would be modified by upsizing the existing underflow pipe under Alternative 2 to achieve a new total flow of 26.4 MGD. This modification would reduce overflows at CSO-053.

As part of the recent LTCP optimization project, the alternatives for this location evaluated were as follows

2.3.1 Genesee Alternative 1 - SPP341A Optimization at Genesee and Kearns

The original optimization was included in the 2014 LTCP and involved significantly more work than originally anticipated due to site conditions and thus was not completed. In addition, it was determined that due to its complexity, this project was best accomplished in conjunction with other larger system modifications.

2.3.2 Genesee Alternative 2 - SPP341A Modification (Optimized)

Under this alternative, Alternative 1 was modified to achieve the target number of activations for the SPP.

2.3.3 Genesee Alternative 3 - 20% Green Infrastructure Implementation

It was determined, using the collection system hydraulic model, that providing green infrastructure to address 20% of the total impermeable area had the least impact on overflow volumes out of all the project alternatives. Despite this, GI was included in the Selected Alternative for other community benefits.

2.4 Michigan Ave – CSO053_14 SPP175, SPP176, and SPP177 Modifications

Only one alternative was evaluated for this project as SPP175 was out of compliance in full model typical precipitation year simulations after the first round of optimization. The weirs were raised at each of these SPPs along Michigan Avenue in the model to achieve compliance without shifting overflows to other SPPs.

2.5 S. Bailey CSOO53_3.1 SPP338 Modification

While several alternatives were evaluated for this location during the recent optimization efforts as noted below, the Selected Alternative that was developed out of those evaluations indicated that implementation of Alternatives 2, 3, and 4 was required for compliance. The projects described under Alternatives 3 and 4 are being implemented separately and are currently under construction, while the implementation of Alternative 2 is included in the SPP modification projects included in this report.

2.5.1 South Bailey Alternative 1 - In-Line (ILS) Storage

Compliance strategies in this location originally envisioned an in-line RTC in the LTCP to utilize capacity in the Bailey Avenue Sewer. However, this would result in having to install and maintain automated control infrastructure in the very busy intersection of Scajaquada Street and Bailey Avenue. This was not amenable to BSA from a maintenance standpoint; therefore, the alternative was eliminated from further consideration.

2.5.2 South Bailey Alternative 2 - SPP338 Modification

Further simulations within the model incorporated a combination of measures within the Selected Alternative to reduce the frequency of overflows at CSO-053. One of these measures included modifications at the SPP itself, namely raising the weir from 1.3 ft to 3.18 ft and increasing the overall length from 15 ft to 30 ft. The addition of an orifice plate upstream from the SPP would also be required to store flow in the upstream sewers during wet weather.

2.5.3 South Bailey Alternative 3 - Amherst and Bailey RTC

The SPP338 modifications, as listed in subsection 2.5.2 above, would need to be implemented in conjunction with the Amherst and Bailey RTC project for the storage of flows. The Amherst and Bailey RTC is currently under construction.

2.5.4 South Bailey Alternative 4 - Bailey and Minnesota SPP254 Modification

This alternative was also a required alternative in conjunction with the implementation of the SPP338 modifications and the Amherst and Bailey RTC installation. This project is currently under construction.

2.5.5 South Bailey Alternative 5 - Kensington and Poultney RTC

An RTC structure at Kensington Avenue and Poultney Street was modeled as another option that had the potential to decrease activations at SPP338. However, it was found that implementing this structure would not make a large impact on the SPP338 overflow volume in the typical year; therefore, this alternative was not pursued further.

2.6 Summary of Improvements Under a Capital Project

The following is a brief summary of alternatives that were selected for implementation.

- CSO053_2.5 SPP337 Modification – Colorado Avenue at Scajaquada Street.
    - Installation of a new vortex-style drop shaft to the Scajaquada Tunnel to accommodate a peak flow of 48 MGD.
- CSO053_13 SPP165B Modification – East Delavan Avenue at Humboldt Parkway
    - Replacement of approximately 1,000 linear feet of 24-in pipe with 36-in pipe and expansion of a junction chamber.
- CSO053_3.1 SPP338 Modification – Bailey Avenue near Kerns Avenue and Scajaquada Street.
    - Installation of a new labyrinth weir to increase weir length from 14.75 ft to 30-ft and raise the height of the weir by 1.83 ft.
- CSO053_8 SPP341A Modification – Genesee Street near Kerns Avenue.
    - Installation of a new vortex-style drop shaft to the Scajaquada Tunnel to accommodate a peak flow of 26.4 MGD.
- CSO053_14 SPP175, 176, and 177 Modifications – Michigan Avenue at Dodge Street, Riley Street, and Glenwood Street, respectively.
    - Increasing the weir heights in the three SPPs.

Section 3 of this report further discusses site-specific considerations for implementation of the improvements noted above.

SECTION 3 SUMMARY AND COMPARISON OF ALTERNATIVES

Preliminary design drawings for the pursued alternatives are included in **Appendix E.**

3.1 Colorado Ave – CSO053_2.5 SPP337 Modification

Colorado Alternative 6 was ultimately included within the Selected Alternative as one of the projects that would contribute to bringing CSO-053 into compliance with the target goal of four activations per year. The scope of Alternative 6 is to incorporate an additional 30-inch diameter underflow pipe to help direct more flow to the Scajaquada Tunnel Interceptor. However, further investigation into the original design of the Scajaquada Tunnel Interceptor drop shaft at Colorado Street indicated that the design capacity of the existing drop shaft is 16.61 MGD, as shown in **Table 3-1** below (sized to handle six times dry weather flow). The required design flow developed in the collection system model through the optimization efforts is 48 MGD, effectively tripling the amount of flow through the drop shaft from what it was originally intended to convey. To obtain the necessary flow capacity, a new sewer diversion chamber and drop shaft connection to the Scajaquada Tunnel Interceptor is needed.

Replacement of the drop shaft connection at Colorado Ave is not without several construction challenges. The existing drop shaft is located about 17 ft west of an existing two-story commercial building which will need to be accounted for in excavation protection system designs and limits the amount of room available for a new drop shaft design.

Also, the construction site is bordered by a brownfield so it is imperative that all work stay contained within the existing right of way and not require easements. The SPP side on Colorado Ave is adjacent to the property of 1001 East Delavan Avenue, which is currently listed in the NYSDEC's Environmental Site Remediation Database. The site contains a large portion of the former General Motors (GM) and American Axle Manufacturing (AAM) and surrounds a 2.54 acre listed Class 2 New York State Inactive Hazardous Waste Site (Site No. 915196). Most of the site is covered in buildings and pavement. Potential contamination from lead, polychlorinated biphenyls (PCBs) and petroleum products is possible. A Brownfield Cleanup Agreement was executed in March 2018 with the owner of the property, East Delavan Property, LLC. Environmental data for a previous soil boring suggests that soil contamination is not present in the proximal area of the boring with exception of a nominal detection for chromium just above the BCP unrestricted use soil cleanup objectives (basically "clean" soil).

Table 3-1: Original Design Criteria for Colorado Avenue at Scajaquada Drop Shaft

TABLE 7.1
DELAVAN AVENUE SEWER SERVICE INPUTS

DROP SHAFT PEAK DESIGN FLOW RATE

	Connecting Sewer Location	Approximate Location of Intersection	Service Area (acres)	Service Population (000's)	Size of Exist. Sewer (in)	1 DWF* (mgd)	4 DWF (mgd)	6 DWF (mgd)	
	Sprenger St.	Schiller Park	38	0.88	36 & 24	0.19	0.81	1.22	
SPP341A	Genesee St.	Floss Ave.	137	3.30	48 & 69	0.71	2.94	4.43	PROPOSED= 26.4 MGD
	Hagen St.	Kerns Ave.	343	8.25	102	1.79	7.38	11.11	
	Newburgh St.	Kerns Ave.	26	0.60	42	0.13	0.55	0.83	
	Texas St.	Kerns Ave.	378	9.12	48 x 162	1.98	8.14	12.25	
	Bailey Ave.	Kerns Ave.	949	17.82	(2) 78	4.99	20.45	30.76	
SPP337	Colorado Ave.	Scajaquada St.	488	7.83	60 x 108	3.36	11.31	16.61	PROPOSED= 48 MGD

Source: Scajaquada Tunnel Interceptor Facility Plan, Step 1, Section VII, The Selected Plan, Leonard S. Wegman Co. Inc., February 1976

The hydraulic design of a new sewer drop shaft focuses on managing the flow of sewage as it descends, dissipating energy from the falling flow and minimizing the amount of air that gets entrained in the process. Proper hydraulic design ensures efficient flow, reduces wear on the shaft, and maintains the overall performance and longevity of the sewer system.

The existing drop shaft was first evaluated to confirm the flow rates shown in **Table 3-1**. Using capacity analysis methods for structures of a similar configuration, the original design capacities were confirmed, and it was determined that the existing drop shaft would need to be replaced to convey the desired 48 MGD to the tunnel. It should be noted that the design of the existing drop shafts does not align directly with any modern design drop shaft guidance or drop shaft models so capacity calculations were performed using modern designs with similar design configuration. It is also of note that modern drop shaft designs of this plunge style drop shaft typically require much longer deaeration chambers that allow the air that is mixed with the water to escape prior to entering the main tunnel conduit.

Three types of drop structures for Colorado Ave. were evaluated for a replacement connection to the tunnel:

3.1.1 Plunge Drop Shaft

A plunge drop structure (**Figure 3-1**) works by allowing sewage to fall freely down a vertical shaft into a plunge pool or basin at the bottom. As the sewage falls, it gains kinetic energy, which is then dissipated upon impact with the water in the plunge pool. Turbulence in the plunge pool reduces the velocity and energy of the flow, preventing high-velocity impacts on the downstream sewer system. The design helps to manage the force of the falling sewage, mitigating the risk of structural damage, erosion, and blockages. By converting the kinetic energy into turbulence, the plunge drop structure ensures a smoother and more controlled flow into the subsequent sewer lines, enhancing the overall efficiency and longevity of the sewer system.

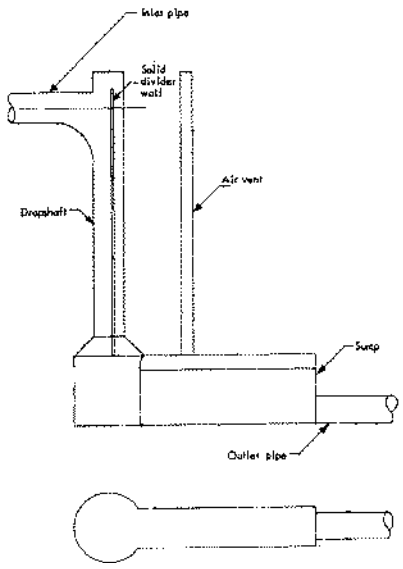


Figure 3-1: Typical Baffle Drop Shaft

Plunge drop structures, while effective in managing sewage flow, allow for a high-energy impact from falling sewer flow that can cause significant turbulence, leading to wear and erosion over time. To overcome this, the structural components face considerable stress from the impact, necessitating more robust construction materials. They also require substantial space for the plunge pool and deaeration chamber, which in the limited right of way available at Colorado Street, eliminated this type of drop structure from further consideration.

3.1.2 Baffle Drop Shaft

Baffle sewer drop structures (**Figure 3-2**) manage the descent of sewage through a series of baffles or shelves strategically placed along the vertical shaft. As sewage flows down the shaft, each baffle interrupts the fall, gradually dissipating the kinetic energy and reducing the velocity step-by-step. This staged energy dissipation minimizes the impact force at the bottom, lowering the risk of structural damage and erosion. Baffle drop structures effectively reduce turbulence and wear within the shaft, providing a smoother and more controlled flow. However, their design can be complex and requires precise engineering to ensure the baffles are correctly spaced and angled. Additionally, these structures can be more challenging to maintain, as debris can accumulate on the baffles, necessitating regular cleaning and inspection to prevent blockages and ensure efficient operation.

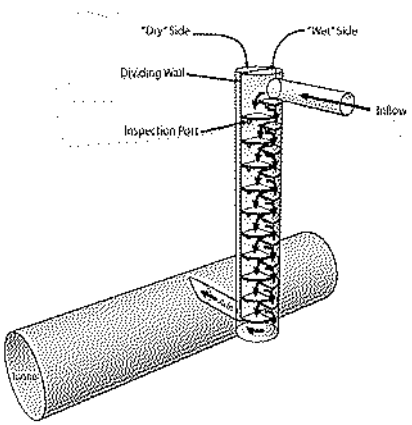


Figure 3-2: Typical Baffle Drop Shaft

Access for maintenance can be difficult due to the internal structure, complicating inspection and repair work.

3.1.3 Vortex Drop Shaft

Vortex drop structures (**Figure 3-3**) are designed to manage the descent of sewage in a controlled manner by inducing a swirling motion as the flow enters the vertical shaft. This spiral movement reduces the velocity of the sewage gradually, minimizing the kinetic energy before it reaches the bottom. The swirling flow creates a stable vortex, which helps to evenly dissipate energy and prevent hydraulic jumps that could cause structural damage or erosion. Vortex drop structures are particularly effective in reducing turbulence and wear within the shaft, enhancing the durability of the infrastructure. Additionally, this design minimizes splashing and noise, reducing odors and making maintenance easier compared to other types of drop structures. The controlled energy dissipation and reduced structural stress make vortex drop structures an efficient solution for managing high-velocity sewage flows in a relatively small footprint compared to other designs.

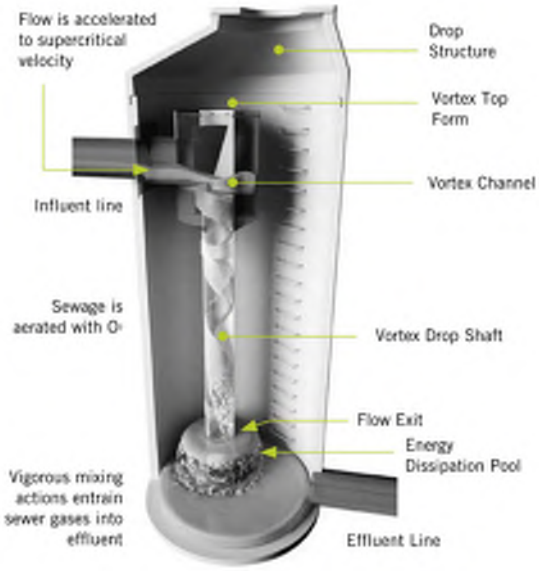


Figure 3-3: Typical Vortex Drop Shaft

Compared to the plunge structure, vortex structures can be more complex to design and construct compared to simpler drop structures, often requiring precise engineering and important consideration of the upstream flow conditions. To generate the swirling flow pattern in the vertical drop shaft, proprietary pre-engineered inserts are required that condition the flow and direct it into a vortex flow pattern.

The geometry associated with each drop shaft configuration is summarized in **Table 3-2**.

Table 3-2: Summary of Drop Shaft Geometry for SPP 337 – Colorado Avenue

VORTEX INSERT (IPEX)				
DROP SHAFT INSIDE DIAMETER	VORTEX INSERT DIAMETER	VORTEX INSERT HEGIHT	VORTEX BOX WIDTH	VORTEX BOX LENGTH
3'-0"	7'1"	10'-10"	12'-0"	12'-0"

BAFFLE STROP STRUCTURE		
BAFFLE WIDTH	BAFFLE VERTICAL SPACING	BAFFLE DROP SHAFT DIAMETER
9'-0"	4'-4"	13'-6"

PLUNGE INLET WITH DEAERATION CHAMBER*				
DROP SHAFT INSIDE DIAMETER	MINIMUM AIR VENT DIAMETER	DROP SHAFT INFLOW DIAMETER	DEAERATION CHAMBER LENGTH	DEAERATION CHAMBER HEIGHT
3'-11"	1'-7"	3'-11"	28'-4"	9'-4"

*SIZING BASED ON TARP

Since the SPP 337 site is extremely limited in the amount of real estate available for construction of a new drop shaft, it is recommended that a new vortex style drop shaft be constructed as it provides the increase in flow capacity in the connection to the tunnel, efficient energy dissipation in a small footprint, and doesn't require the long deaeration chamber that a new plunge drop shaft would require. **Table 3-3** summarizes the design criteria for the new vortex style drop shaft.

Table 3-3: Summary of Design Criteria for SPP 337 New Vortex Style Drop Shaft

Design Parameter	Value
Peak Typical Year Water Surface Elevation in Scajaquada Tunnel	40.02 ft (City datum)
Peak Flow in Drop Shaft	48 MGD
Peak Water Surface Elevation at SPP	54.97 ft (City datum)

To simplify the design, and work within the small footprint of real estate available, the new drop shaft will be connected directly to a new diversion chamber constructed in line with the existing sewer along Colorado Avenue. Flow will enter the diversion chamber and be directed towards the drop shaft as the primary flow path. Any high flow event that exceeds the 48 MGD flow for the new drop shaft connection will pass over a weir in the structure and continue down the sewer in Colorado Avenue which outlets to the Scajaquada Drain.

Construction sequencing and bypass pumping during the drop shaft replacement will need to be addressed in detailed design. A new manhole access point could be created in the sewer roof along Colorado Avenue upstream of the proposed diversion chamber to access the flow. From that point, flow could be bypass pumped to the tunnel through an adjacent access drop shaft located next to the SPP. It is anticipated that the current capacity of the drop shaft, 16.6 MGD, would be the minimum bypass pump capacity and wet weather flows would continue to bypass the site as they do currently. This will also require the existing SPP drop shaft connection to the tunnel to be temporarily bulkheaded and sealed at the tunnel interface to create a dry work area for the drop shaft replacement work.

3.2 Humboldt Parkway – CSO053_13 SPP165B Modification

To accommodate conveyance of the peak flow of 11.3 MGD through the underflow sewer, approximately 1,000 linear feet (fly) of existing 24-inch diameter pipe between East Delavan Avenue and Northland Avenue will be replaced with a 36-inch diameter pipe. Also, due to the small size of the existing junction chamber at East Delavan Avenue, where the 24-inch pipe currently connects to the 46-inch brick sewer under East Delavan Avenue, there is not enough room to connect the 36-inch pipe, create a new flow channel to the pipe, and accommodate a larger orifice plate so that junction chamber will also be replaced and upsized. This project was not originally included in the 2014 LTCP.

The proposed sewer will need to cross under an existing electrical duct bank and an 8-inch high pressure natural gas main. As the pipe will be taller with the increased diameter, during detailed design the utilities in this replacement corridor will need to be test pitted to confirm there is adequate clearance to the proposed sewer pipe.

Table 3-4 shows the design criteria for SPP165B.

Table 3-4: Summary of Design Criteria for SPP 165B Modification

Design Parameter	Value
Peak Flow	11.3 MGD
Peak Water Surface Elevation (SPP165B Structure)	55.31 ft (City datum)
Peak Water Surface Elevation (48-in brick sewer)	49.51 ft (City datum)
Size of Upsized Sewer	36 inches
Approximate Length of Sewer to Be Upsized	1,000 lf

3.3 Genesee Street – CSO053_8 SPP341A Modification

The general configuration for the Genesee Street SPP is very similar to that of the Colorado Street SPP discussed above and faces similar challenges but on a smaller scale in terms of flow conveyance.

The existing drop shaft connection to the Scajaquada Tunnel Interceptor at SPP 341A was reviewed and determined to be undersized for the proposed flow of 26.4 MGD, with an original design flow of only 4.43 as shown in **Table 3-5.**

Table 3-5: Summary of Original Design Flow for Genesee Drop Shaft

TABLE 7.1
DELAVAN AVENUE SEWER SERVICE INPUTS

DROP SHAFT PEAK DESIGN FLOW RATE

	Connecting Sewer Location	Approximate Location of Intersection	Service Area (acres)	Service Population (000's)	Size of Exist. Sewer (in)	1 DWF* (mgd)	4 DWF (mgd)	6 DWF (mgd)	
	Sprenger St.	Schiller Park	38	0.88	36 & 24	0.19	0.81	1.22	
SPP341A	Genesee St.	Floss Ave.	137	3.30	48 & 69	0.71	2.94	4.43	PROPOSED= 26.4 MGD
	Hagen St.	Kerns Ave.	343	8.25	102	1.79	7.38	11.11	
	Newburgh St.	Kerns Ave.	26	0.60	42	0.13	0.55	0.83	
	Texas St.	Kerns Ave.	378	9.12	48 x 162	1.98	8.14	12.25	
	Bailey Ave.	Kerns Ave.	949	17.82	(2) 78	4.99	20.45	30.76	
SPP337	Colorado Ave.	Scajaquada St.	488	7.83	60 x 108	3.36	11.31	16.61	PROPOSED= 48 MGD

Source: Scajaquada Tunnel Interceptor Facility Plan, Step 1, Section VII, The Selected Plan, Leonard S. Wegman Co. Inc.

The same three types of drop structures evaluated for Colorado Avenue were also evaluated for the replacement connection to the tunnel at Genesee Street. See the discussion in Section 3.1 for the advantages and disadvantages of each style of drop structure. The two primary differences between the Colorado Avenue and Genesee Street sites are the proposed flow to be conveyed and real estate available to construct the drop shaft replacement. At Genesee Street, the drop shaft replacement will be within the limits of Schiller Park which offers more room for excavation shoring, construction access and staging, and a larger buildable footprint for a replacement solution. See **Table 3-6** for a summary of the geometry associated with each drop shaft configuration for this site.

Table 3-6: Summary of Drop Shaft Geometry for SPP 341A – Genesee Street

VORTEX INSERT (IPEX)				
DROP SHAFT INSIDE DIAMETER	VORTEX INSERT DIAMETER	VORTEX INSERT HEGIHT	VORTEX BOX WIDTH	VORTEX BOX LENGTH
2'-6"	6'-5"	5'-5"	14'-0"	14'-0"

BAFFLE STROP STRUCTURE		
BAFFLE WIDTH	BAFFLE VERTICAL SPACING	BAFFLE DROP SHAFT DIAMETER
7'-4"	3'-10"	11'-0"

PLUNGE INLET WITH DEAERATION CHAMBER*				
MINIMUM DROP SHAFT INSIDE DIAMETER	MINIMUM AIR VENT DIAMETER	DROP SHAFT INFLOW DIAMETER	DEAERATION CHAMBER LENGTH	DEAERATION CHAMBER HEIGHT
3'-1"	1'-3"	3'-1"	22'-4"	7'-4"

*SIZING BASED ON TARP

The plunge style drop structure was eliminated from consideration due to the additional cost associated with extending the existing deaeration chamber, need for a larger diameter deaeration chamber than the existing, and the large plunge pool required to dissipate the energy of the falling flow.

While there is plenty of room for construction of a baffle drop structure, the added construction complexity and consequently, the cost associated with construction of this style of structure, it was determined that the vortex style drop structure would be the most cost-effective solution to achieving the desired increased capacity.

The small footprint of the vortex plunge design combined with its ability to reuse the existing tunnel connection from the existing drop shaft make this style drop shaft the preferred alternative. Design criteria are given below in **Table 3-7.**

Table 3-7: Summary of Design Criteria for SPP 341A New Vortex Style Drop Shaft

Design Parameter	Value
Peak Typical Year Water Surface Elevation in Scajaquada Tunnel	41.2 ft (City datum)
Peak Water Surface Elevation at SPP	55.96 ft (City datum)
Total Drop Shaft Flow	26.4 MGD
Drop Shaft Flow from SPP341A only	25 MGD
Drop Shaft Flow from SPP341B only	1.4 MGD

The drop shaft replacement would be constructed next to the existing drop shaft and completed offline. During detailed design, the goal will be to design a connection between the existing and proposed drop shaft that could be completed in the wet to save money on pumping costs. However, there is a potential that temporary modifications to the existing drop shaft connection to the tunnel will be required to allow bypass pumping of flows around the existing drop shaft for a short period of time for removal and connection of the new drop shaft to the existing drop shaft. To be conservative, the cost estimate for this project includes short term bypass pumping.

3.4 Michigan Ave – CSO053_14 SPP175, SPP176, and SPP177 Modifications

Under this project, the weirs at SPP175, SPP176, and SPP177 would be modified per the design values as shown in **Table 3-8**. These projects were not originally included in the 2014 LTCP.

Table 3-8: Summary of Design Criteria for SPP 175, 176 and 177 Modifications

Design Parameters	Site		
	SPP175 (WEIR#99)	SPP176 (WEIR#100)	SPP177 (WEIR#98)
Design peak flow, mgd	43.20	58.81	60.26
Weir coefficient, C_d	3.10	3.30	3.40
Weir Length, ft.	13.50	6.50	10.50
Site Invert Elevation, ft. (BSA Datum)	53.85	50.94	46.10
Maximum Weir Elevation, ft. (BSA Datum)	56.86	53.00	48.83
Critical Elevation, ft. (BSA Datum)	58.35	55.69	50.85
Critical Elevation Basis	contained in pipe at 4953 (SPP175 chamber, Michigan & Dodge)	contained in pipe at 4941 (SPP176 Chamber, Michigan & Riley)	contained in pipe at 4931 (Michigan & Glenwood)
Design Weir Elevation, ft.	56.10	52.85	48.35

The existing weirs are constructed of concrete which poses a challenge for making the small height adjustments required above without substantial removal of existing concrete necessary to properly bond a new layer of concrete to a taller elevation. In lieu of concrete removal, weir modifications will be designed from fabricated stainless steel so they can be anchored into the existing concrete. BSA sewer maintenance staff have confirmed that the weirs at these three SPPs are flat-topped weirs making raising of the weirs simpler than if the weirs were of some other configuration. This reduces the amount of work required to modify the existing structure, thereby reducing the amount of time workers will need to be in the sewer to do that work, improving safety.

3.5 S. Bailey CSOO53_3.1 SPP338 Modification

For this project, the SPP338 underflow orifice would be enlarged. The overflow weir would be raised 1.83 ft to 55.24 ft (City datum), and the length increased to 30-ft in the structure that diverts flow to the existing drop shaft connection to the Scajaquada Tunnel Interceptor away from the Scajaquada Drain. The design criteria provided from the initial model review for the new weir are shown in **Table 3-9.**

This project would reduce overflows at CSO-053 and would benefit from the implementation of the Schiller Park OLS or Sidney OLS that would allow for storage of wet weather flows. This project was not originally included in the 2014 LTCP. Note that the Schiller Park and Sidney OLS projects are currently being completed as separate projects to this SPP modification.

Table 3-9: Summary of Design Criteria for 338 Modification

Design Parameter	Value
Design Peak Flow	213.38 MGD (330 cfs)
Site Invert Elevation from record plans	52.06 ft (City datum)
Proposed Weir Elevation (48-in brick sewer)	55.24 ft (City datum)
Critical Elevation (based on flow contained within pipe at E-MH-1963)	57.46 (City datum)

The typical equation for weir design is

$$Q = {}^{2}/_{3}\, C_d L \sqrt{2gH^{1.5}}$$

Where Q = discharge in cfs; L = length of weir in feet, g = acceleration of gravity, H = total head at the crest of the weir, and C_d = dimensionless discharge coefficient that varies based on the head, upstream pool depth, and type of weir.

To pass the design peak flow without impacting the critical upstream elevation, the weir must not create more than 2.22-ft of head at the design peak flow. A typical linear weir matching the dimensions of the existing weir, would have over 3.7-ft of head at the design peak flow. To reduce the head, a longer, more efficient weir is needed. However, due to the space constrictions, the only way to lengthen the weir is to utilize a labyrinth style weir.

Labyrinth weirs fold in plan view (**Figure 3-4**) to provide longer total effective weir lengths within a given footprint. The constructability of a new weir at this location is difficult due to access, flow control/dewatering, and is further complicated by the horizontal curvature in the alignment of the existing weir. As such, it is recommended that the proposed weir modifications will be designed as fabricated stainless steel which can be made in a fabrication shop and installed in pieces small enough to fit through the 36-inch manhole opening in the structure and mounted on the surface of the existing concrete weir crest. In addition, the steel weir plate minimizes the amount of formwork and water control needed to make the weir modifications.

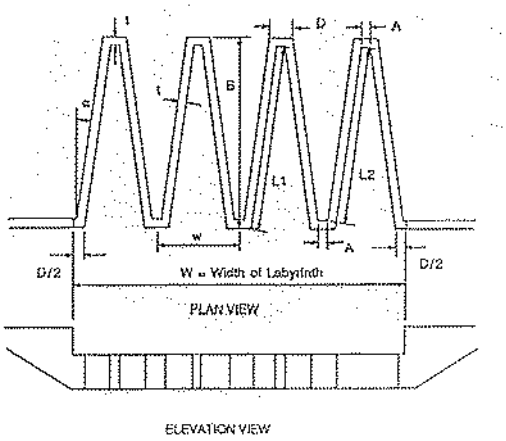


Figure 3-4: Typical labyrinth weir configuration.

Labyrinth weirs generally have lower discharge coefficients (C_d) than linear weirs. The C_d is impacted by the head above the weir (H), pool depth behind the weir (P), the angle between folds, and the flow within the nape. The most efficient labyrinth weirs are those with the highest α value, or angle from perpendicular to flow. Higher α values also lead to wider weirs to accommodate the same weir length. A concern with the use of a labyrinth weir in this application is that rags or other debris may get caught in the folds, reducing the efficiency and/or the effective length of the weir; therefore, utilizing a larger angle is recommended.

Two potential weir layouts (**Figure 3-5**) were evaluated for preliminary alternatives:

- 35° Labyrinth Weir with length of 35 LF, tight configuration on existing weir.
- 18° Labyrinth Weir with length of 35 LF, expanded configuration on through tunnel.

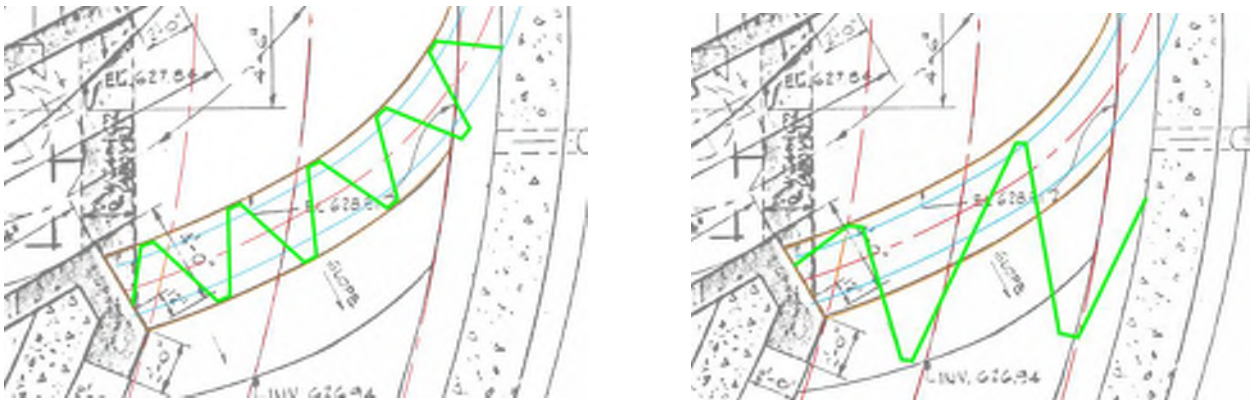


Figure 3-5: Compact weir layout (left), expanded weir layout (right)

The compact layout would be easier to construct and appears to meet the design criteria; however, at the peak design with 2-ft of head over the crest of the weir, the tight configuration may lead to increased head due to flow within the nape. The expanded layout on the right would likely operate with less head during higher flow events. Additional modeling during detailed design may be required to confirm a layout configuration.

SECTION 4 RECOMMENDED CAPITAL PROJECT

Section 3 discussed the implementation of the preferred alternatives for each of the five sites contemplated in this report, which collectively are the recommended capital project.

4.1 Opinion of Probable Construction Costs

Opinions of probable construction costs (OPCCs) were determined for each of the preferred alternatives and are summarized in **Table 4-1**. Detailed cost estimates are included in **Appendix F**. Note that costs were rounded to the nearest $1,000 in this table so totals differ slightly from the values in Appendix F because of rounding of values.

Table 4-1: Summary of OPCC for the Recommended SPP Modifications Capital Projects

Project Component	OPCC (2024 Dollars)	OPCC (2027 Dollars)	Engineering (2027 Dollars)	Misc. (2027Dollars)	Contingency (2027 Dollars)	TOTAL (2027 Dollars)
Colorado Ave – CSO053_2.5 SPP337 Modification	$7,738,000	$8,588,000	$2,576,000	$429,000	$4,058,000	$15,652,000
Humboldt Parkway – CSO053_13 SPP165B Modification	$2,108,000	$2,340,000	$702,000	$117,000	$1,105,000	$4,264,000
Genesee Street – CSO053_8 SPP341A Modification	$4,224,000	$4,689,000	$1,407,000	$235,000	$2,215,000	$8,545,000
Michigan Ave – CSO053_14 SPP175, SPP176, and SPP177 Modifications	$133,000	$148,000	$44,000	$7,000	$70,000	$269,000
S. Bailey CSOO53_3.1 SPP338 Modification	$159,000	$176,000	$53,000	$9,000	$83,000	$321,000
TOTAL CAPITAL COST	**$14,362,000**	**$15,941,000**	**$4,782,000**	**$797,000**	**$7,531,000**	**$29,051,000**

Notes: *Engineering assumed at 30% of OPCC, **Miscellaneous for legal and administration at 5% of OPCC, and Contingency at 35% of total of OPCC, Engineering, and Miscellaneous (per EFC recommendation). Escalation to midpoint of construction in Feb 2027 at 4% per year.

Capital costs were developed for each project (even those that may not be implemented in the short-term) and are presented in Feb 2027 (estimated midpoint of construction) dollars. Costs were developed using New York State Department of Transportation costs and costs from recently estimated projects. Opinions of probable construction costs (OPCC) are consistent with Class III estimates as defined by the Association for the Advancement of Cost Engineering (AACE). Class III estimates are typically -15 percent to +20 percent accurate (AACE, 2012) and are estimated when the project is only approximately 10 to 40

percent defined. This level of accuracy is typically considered sufficient for design development, budget authorization, and feasibility level evaluations.

4.2 Next Steps

Table 4-2 shows the proposed schedule for key milestones for the CSO-053 SPP modification processes.

Table 4-2: Anticipated Project Schedule

Description	Anticipated Completion Date
Design	Fall 2024 / Winter 2025
Regulatory Review	Spring 2025
Bidding	Summer 2025
Construction Start Date	Fall 2025
Construction End Date	Spring 2027

SECTION 5 REFERENCES

BSA Queen City Clean Waters Program Alternatives and Design Log, May 13, 2024, Xylem

Buffalo Sewer Authority 2024-2025 Operating Budget, BSA Administrative Department, available at: 2024-2025-BSA-Budget-1.pdf (buffalosewer.org)

Buffalo Sewer Authority Comprehensive Annual Financial Report (CAFR) for Fiscal Year Ended June 30, 2023, BSA Administrative Department, available at Buffalo-Sewer-Authority-ACFR-6.30.2023.pdf (buffalosewer.org)

Environmental Site Remediation Database Search details for 1001 East Delavan Avenue Site, NYSDEC.

LTCP Optimization Bridging Document, technical memorandum. Xylem, Arcadis, GHD, and JM Davidson Engineering. May 2023.

LTCP Optimization Selected Alternative, technical memorandum. Xylem, Arcadis, GHD, and JM Davidson Engineering. Draft Jan 2023.

Record Drawings for the Associated SPPs, dates vary.

Remedial Investigation Report, Brownfield Cleanup Program Site #C915196B, 1001 East Delavan Avenue, Buffalo, NY. Inventum Engineering, PC, Draft Oct 2023.

Scajaquada Tunnel Interceptor Facility Plan, Step 1, Section VII, The Selected Plan, Leonard S. Wegman Co. Inc., February 1976

APPENDIX A: Site Maps

APPENDIX A

BUFFALO SEWER AUTHORITY

CSO053_2.5 SPP337 MODIFICATION

JMDavidson Engineering, D.P.C.

APPENDIX A

BUFFALO SEWER AUTHORITY

CSO053_13 SPP165B MODIFICATION

JMDavidson Engineering, D.P.C.

APPENDIX A

BUFFALO SEWER AUTHORITY

CSO053_3.1 SPP338 MODIFICATION

JMDavidson Engineering, D.P.C.

APPENDIX A

BUFFALO SEWER AUTHORITY

CSO053_8 SPP341A MODIFICATION

JMDavidson Engineering, D.P.C.

APPENDIX A

BUFFALO SEWER AUTHORITY

CSO053_14 SPP175 MODIFICATION

JMDavidson Engineering, D.P.C.

APPENDIX A

BUFFALO SEWER AUTHORITY

CSO053_14 SPP176 MODIFICATION

JMDavidson Engineering, D.P.C.

APPENDIX A

BUFFALO SEWER AUTHORITY

CSO053_14 SPP177 MODIFICATION

JMDavidson Engineering, D.P.C.

APPENDIX B: Geological Information

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Erie County, New York
Survey Area Data: Version 23, Sep 5, 2023

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: May 9, 2022—Aug 15, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Soil Map—Erie County, New York
(CSO053_2.5 SPP337 Modification)

Map Scale: 1:2,140 if printed on A portrait (8.5" x 11") sheet.

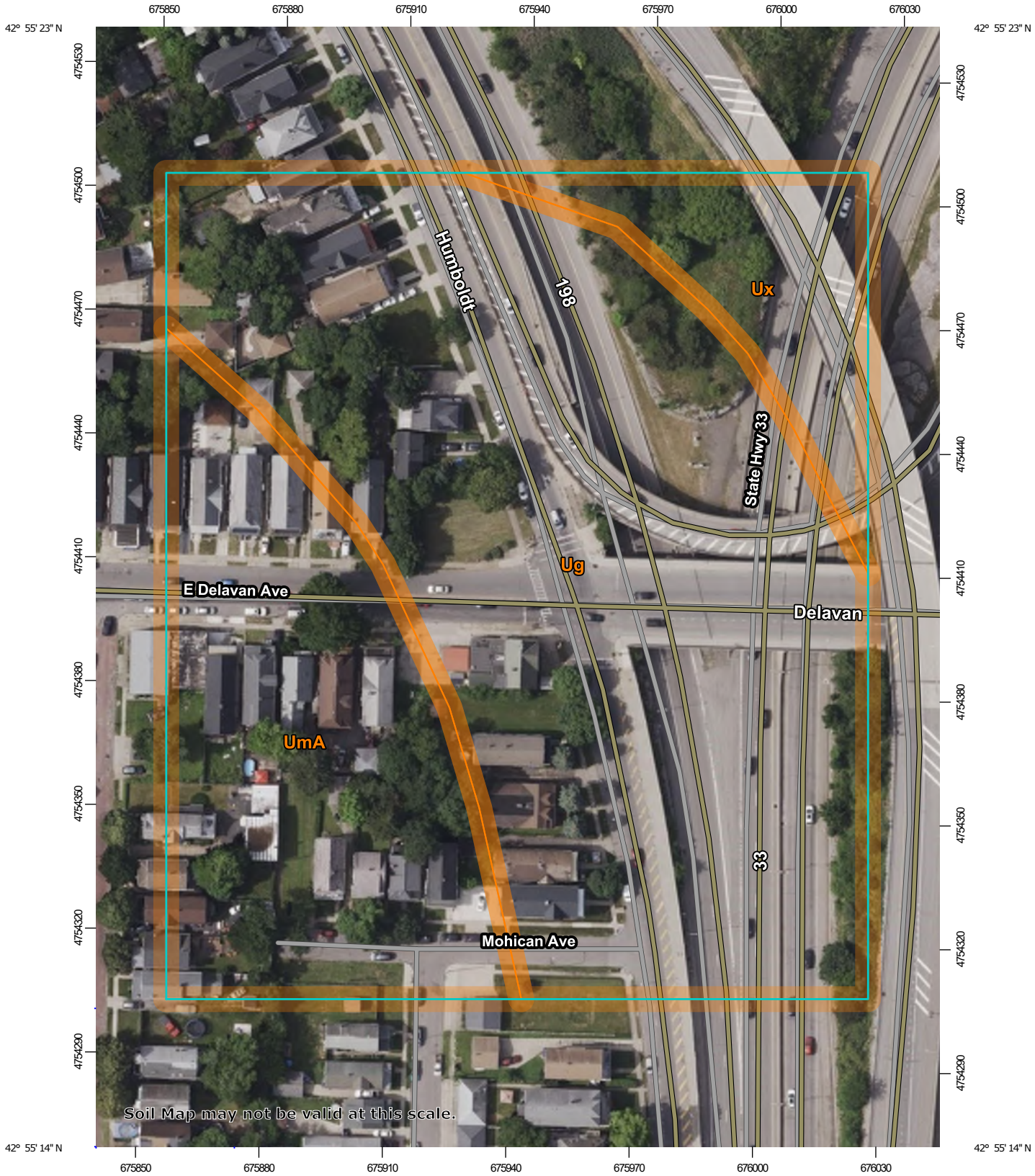
N

Meters: 0 30 60 120 180

Feet: 0 100 200 400 600

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 17N WGS84

Soil Map—Erie County, New York
(CSO053_13 SPP165B Modification)



Map Scale: 1:1,320 if printed on A portrait (8.5" x 11") sheet.

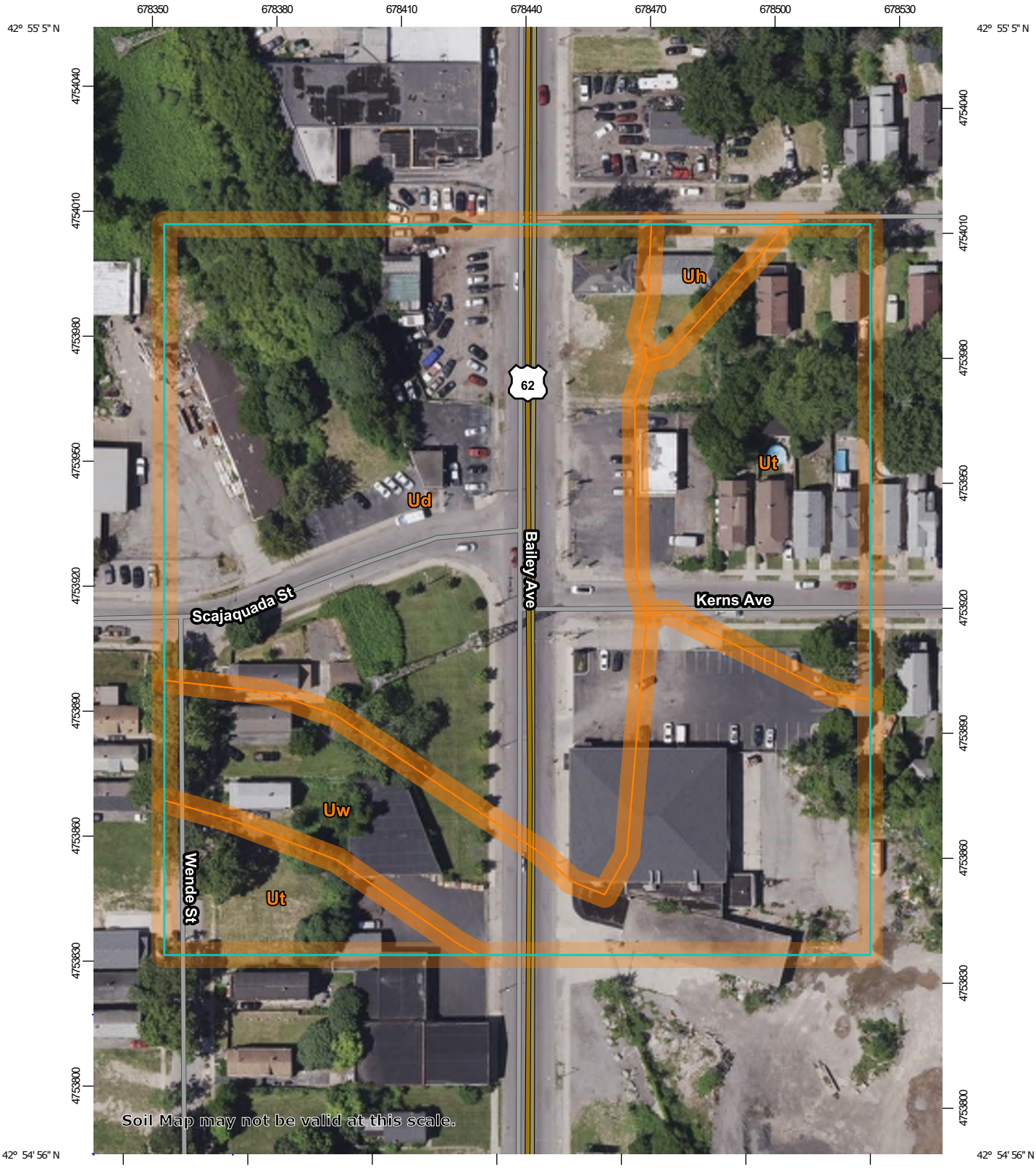
N

Meters
0 15 30 60 90

Feet
0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 17N WGS84

Soil Map—Erie County, New York
(CSO053_3.1 SPP338 Modification)



Map Scale: 1:1,320 if printed on A portrait (8.5" x 11") sheet.

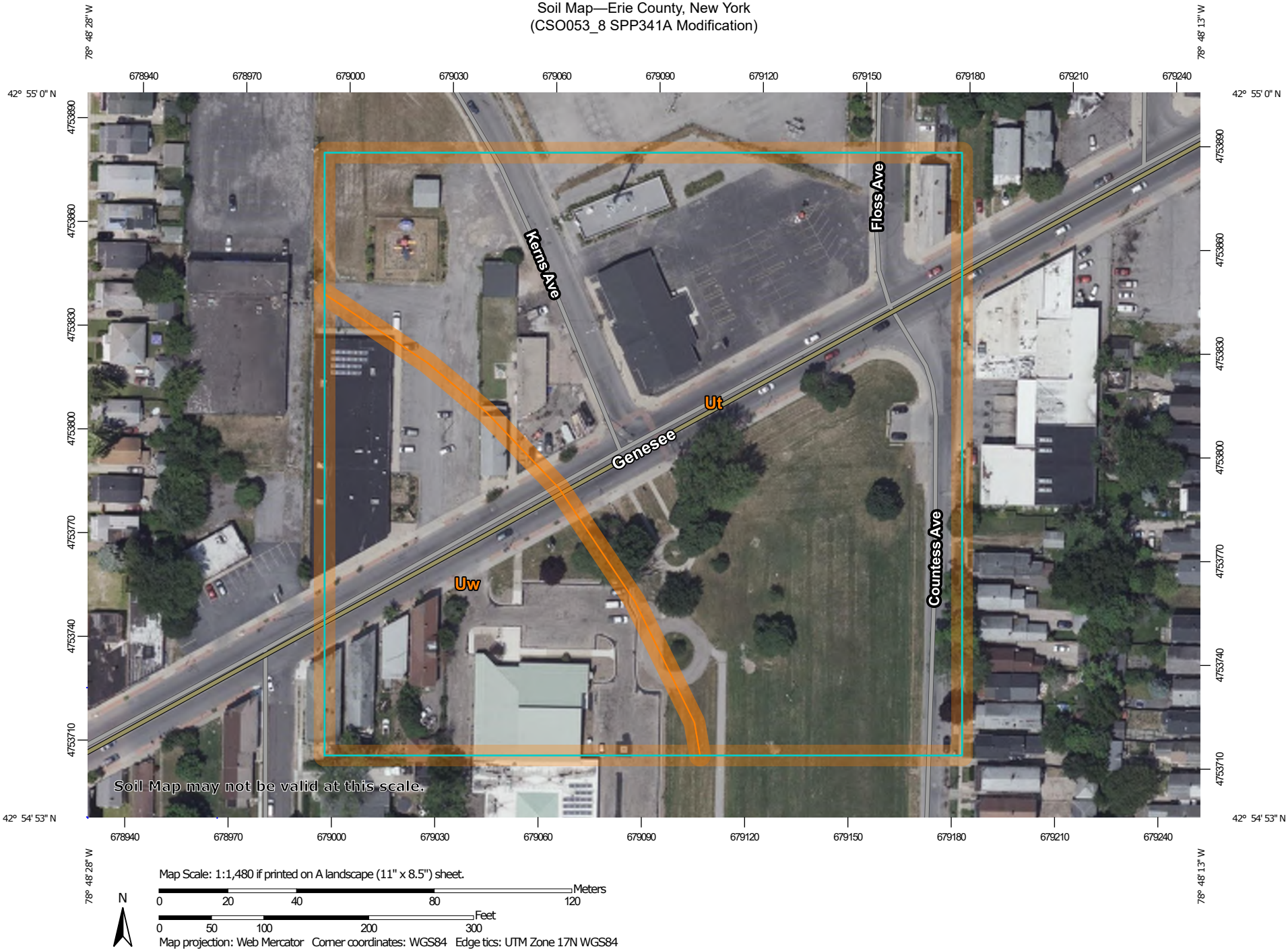
N

Meters: 0 15 30 60 90

Feet: 0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 17N WGS84

Soil Map—Erie County, New York
(CSO053_8 SPP341A Modification)



Map Scale: 1:1,480 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 20 40 80 120

Feet
0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 17N WGS84

Soil Map—Erie County, New York
(CSO053_14 SPP177 Modification)

Map Scale: 1:1,590 if printed on A portrait (8.5" x 11") sheet.

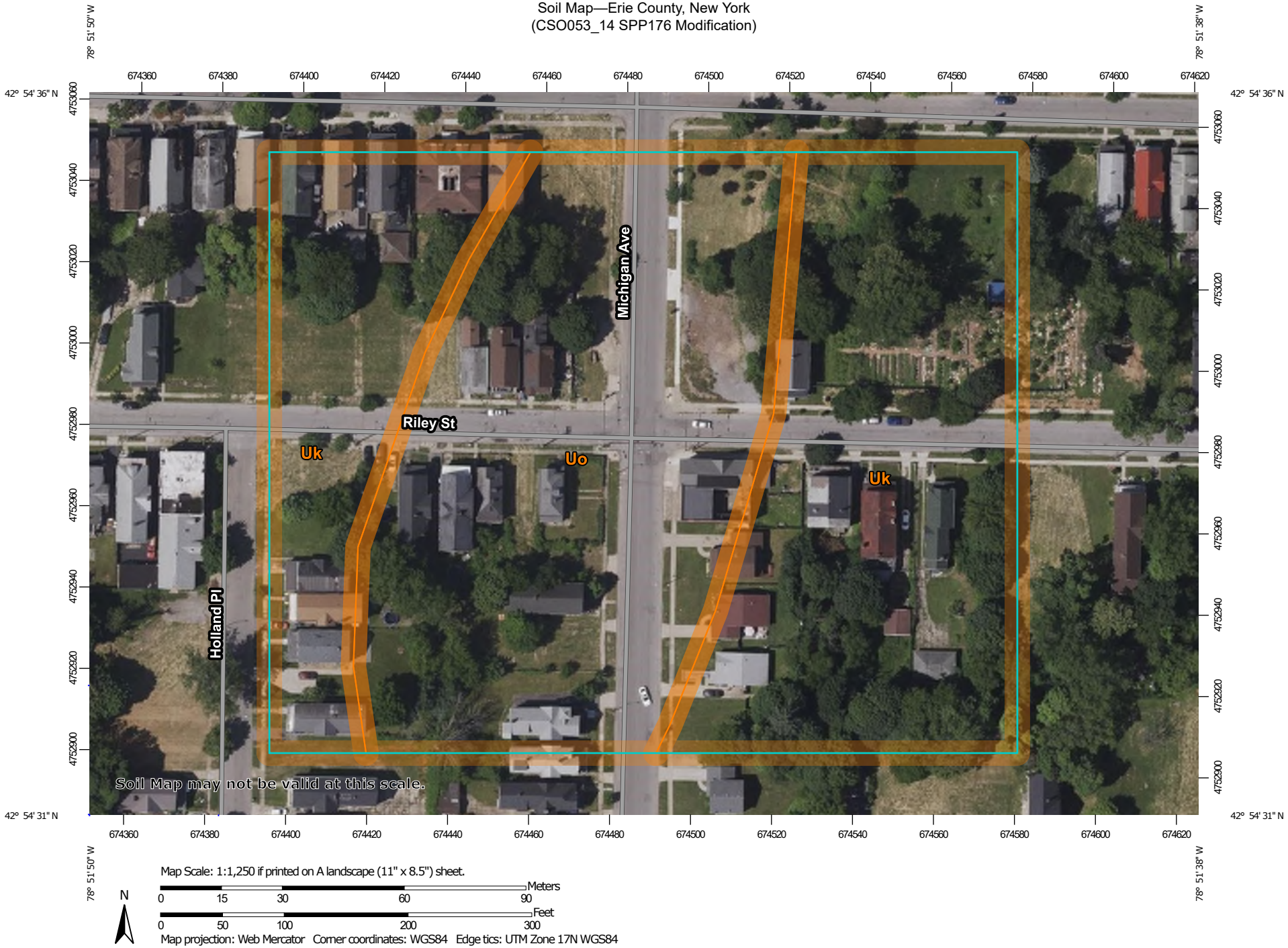
N

Meters: 0 20 40 80 120

Feet: 0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 17N WGS84

Soil Map—Erie County, New York
(CSO053_14 SPP176 Modification)



Map Scale: 1:1,250 if printed on A landscape (11" x 8.5") sheet.

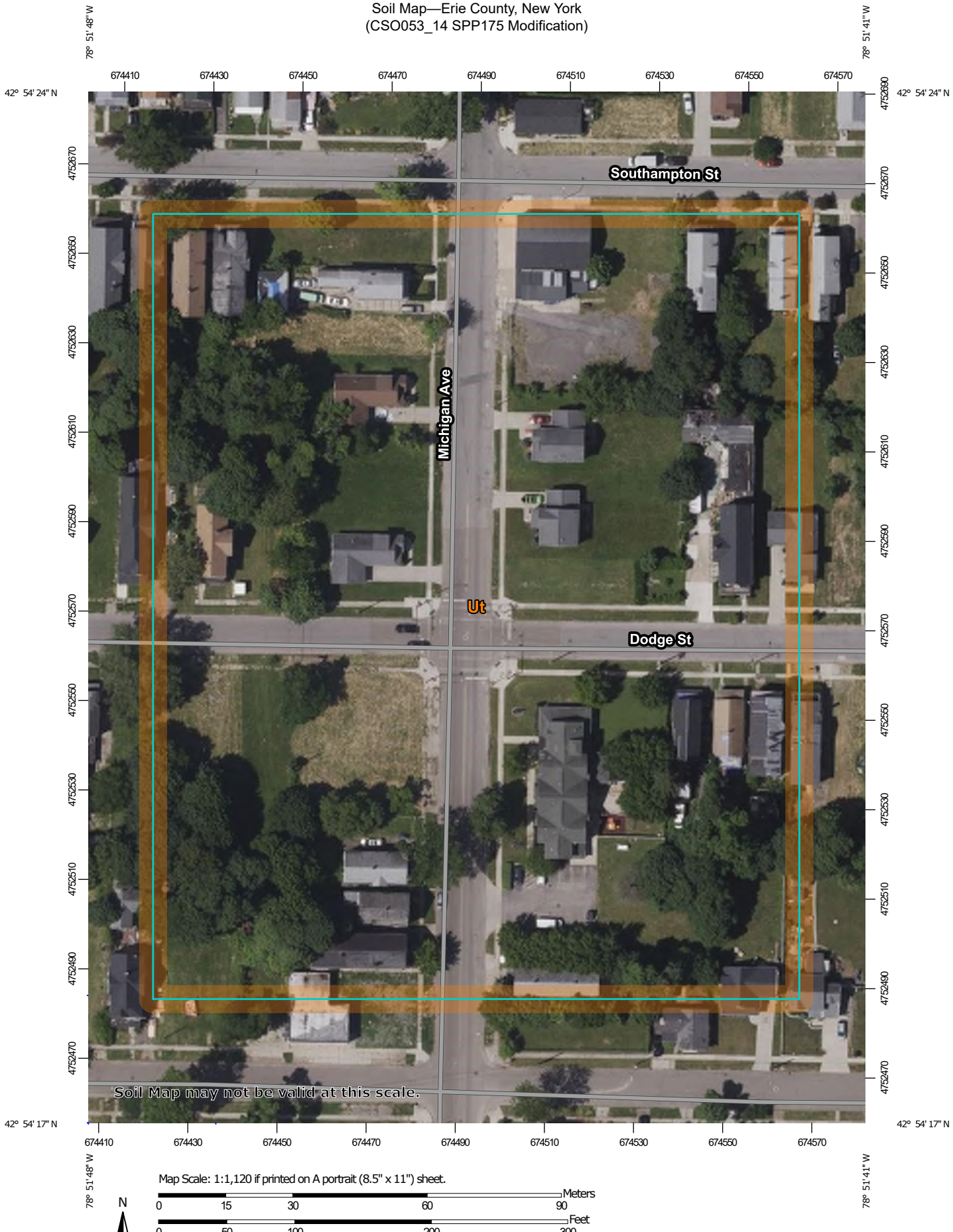
N

Meters: 0 15 30 60 90

Feet: 0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 17N WGS84

Soil Map—Erie County, New York
(CSO053_14 SPP175 Modification)



Map Scale: 1:1,120 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 15 30 60 90

Feet: 0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 17N WGS84

Ud—Urban land

Map Unit Setting

- *National map unit symbol:* 9rq4
- *Mean annual precipitation:* 36 to 48 inches
- *Mean annual air temperature:* 45 to 50 degrees F
- *Frost-free period:* 115 to 195 days
- *Farmland classification:* Not prime farmland

Map Unit Composition

- *Urban land:* 80 percent
- *Minor components:* 20 percent
- *Estimates are based on observations, descriptions, and transects of the mapunit.*

Ug—Urban land-Cayuga complex

Map Unit Setting

- *National map unit symbol:* 9rq7
- *Elevation:* 570 to 710 feet
- *Mean annual precipitation:* 36 to 48 inches
- *Mean annual air temperature:* 45 to 50 degrees F
- *Frost-free period:* 115 to 195 days
- *Farmland classification:* Not prime farmland

Map Unit Composition

- *Urban land:* 60 percent
- *Cayuga and similar soils:* 30 percent
- *Minor components:* 10 percent
- *Estimates are based on observations, descriptions, and transects of the mapunit.*

Description of Urban Land

Interpretive groups

- *Land capability classification (irrigated):* None specified
- *Land capability classification (nonirrigated):* 8s
- *Hydric soil rating:* Unranked

Description of Cayuga

Setting

- *Landform:* Till plains, lake plains
- *Landform position (two-dimensional):* Summit
- *Landform position (three-dimensional):* Crest, tread
- *Down-slope shape:* Concave
- *Across-slope shape:* Convex
- *Parent material:* Clayey glaciolacustrine deposits over loamy till derived from limestone, dolomite, sandstone, or shale

Typical profile

- *H1 - 0 to 10 inches:* silt loam
- *H2 - 10 to 26 inches:* silty clay
- *H3 - 26 to 60 inches:* gravelly loam

Properties and qualities

- *Slope:* 0 to 3 percent
- *Depth to restrictive feature:* More than 80 inches
- *Drainage class:* Moderately well drained
- *Capacity of the most limiting layer to transmit water (Ksat):* Moderately low to moderately high (0.06 to 0.20 in/hr)
- *Depth to water table:* About 18 to 36 inches
- *Frequency of flooding:* None
- *Frequency of ponding:* None
- *Calcium carbonate, maximum content:* 15 percent
- *Available water supply, 0 to 60 inches:* Moderate (about 8.4 inches)

Interpretive groups

- *Land capability classification (irrigated):* None specified
- *Land capability classification (nonirrigated):* 2w
- *Hydrologic Soil Group:* D
- *Ecological site:* F101XY009NY - Moist Lake Plain
- *Hydric soil rating:* No

Uh—Urban land-Churchville complex

Map Unit Setting

- *National map unit symbol:* 9rq9
- *Elevation:* 570 to 720 feet
- *Mean annual precipitation:* 36 to 48 inches
- *Mean annual air temperature:* 45 to 50 degrees F
- *Frost-free period:* 115 to 195 days
- *Farmland classification:* Not prime farmland

Map Unit Composition

- *Urban land:* 65 percent
- *Churchville and similar soils:* 25 percent
- *Minor components:* 10 percent
- *Estimates are based on observations, descriptions, and transects of the mapunit.*

Description of Churchville

Setting

- *Landform:* Till plains, lake plains
- *Landform position (two-dimensional):* Footslope
- *Landform position (three-dimensional):* Base slope, tread
- *Down-slope shape:* Concave
- *Across-slope shape:* Linear
- *Parent material:* Clayey glaciolacustrine deposits over loamy till

Typical profile

- *H1 - 0 to 11 inches:* silt loam

- *H2 - 11 to 26 inches:* silty clay
- *H3 - 26 to 60 inches:* gravelly loam

Properties and qualities

- *Slope:* 0 to 3 percent
- *Depth to restrictive feature:* More than 80 inches
- *Drainage class:* Somewhat poorly drained
- *Capacity of the most limiting layer to transmit water (Ksat):* Moderately low to moderately high (0.06 to 0.20 in/hr)
- *Depth to water table:* About 6 to 18 inches
- *Frequency of flooding:* None
- *Frequency of ponding:* None
- *Calcium carbonate, maximum content:* 15 percent
- *Available water supply, 0 to 60 inches:* Moderate (about 8.4 inches)

Interpretive groups

- *Land capability classification (irrigated):* None specified
- *Land capability classification (nonirrigated):* 3w
- *Hydrologic Soil Group:* C/D
- *Ecological site:* F101XY009NY - Moist Lake Plain
- *Hydric soil rating:* No

Uk—Urban land-Claverack complex

Map Unit Setting

- *National map unit symbol:* 9rq8
- *Elevation:* 600 to 1,800 feet
- *Mean annual precipitation:* 36 to 48 inches
- *Mean annual air temperature:* 45 to 50 degrees F
- *Frost-free period:* 115 to 195 days
- *Farmland classification:* Not prime farmland

Map Unit Composition

- *Urban land:* 60 percent
- *Claverack and similar soils:* 30 percent
- *Minor components:* 10 percent
- *Estimates are based on observations, descriptions, and transects of the mapunit.*

Description of Urban Land

Interpretive groups

- *Land capability classification (irrigated):* None specified
- *Land capability classification (nonirrigated):* 8s
- *Hydric soil rating:* Unranked

Description of Claverack

Setting

- *Landform:* Lake plains
- *Landform position (two-dimensional):* Summit
- *Landform position (three-dimensional):* Tread
- *Down-slope shape:* Concave
- *Across-slope shape:* Convex

- *Parent material:* Sandy glaciolacustrine deposits, derived primarily from non-calcareous sandstone or granite, that overlie clayey glaciolacustrine deposits

Typical profile

- *H1 - 0 to 10 inches:* loamy fine sand
- *H2 - 10 to 35 inches:* loamy fine sand
- *H3 - 35 to 60 inches:* clay

Properties and qualities

- *Slope:* 0 to 3 percent
- *Depth to restrictive feature:* More than 80 inches
- *Drainage class:* Moderately well drained
- *Capacity of the most limiting layer to transmit water (Ksat):* Moderately low to moderately high (0.06 to 0.20 in/hr)
- *Depth to water table:* About 18 to 24 inches
- *Frequency of flooding:* None
- *Frequency of ponding:* None
- *Calcium carbonate, maximum content:* 15 percent
- *Available water supply, 0 to 60 inches:* Moderate (about 6.1 inches)

Interpretive groups

- *Land capability classification (irrigated):* None specified
- *Land capability classification (nonirrigated):* 2w
- *Hydrologic Soil Group:* C/D
- *Ecological site:* F101XY006NY - Moist Outwash
- *Hydric soil rating:* No

UmA—Urban land-Collamer complex, 1 to 6 percent slopes

Map Unit Setting

- *National map unit symbol:* 9rqb
- *Elevation:* 570 to 660 feet
- *Mean annual precipitation:* 36 to 48 inches
- *Mean annual air temperature:* 45 to 50 degrees F
- *Frost-free period:* 115 to 195 days
- *Farmland classification:* Not prime farmland

Map Unit Composition

- *Urban land:* 60 percent
- *Collamer and similar soils:* 30 percent
- *Minor components:* 10 percent
- *Estimates are based on observations, descriptions, and transects of the mapunit.*

Description of Urban Land

Interpretive groups

- *Land capability classification (irrigated):* None specified
- *Land capability classification (nonirrigated):* 8s
- *Hydric soil rating:* Unranked

Description of Collamer

Setting

- *Landform:* Lake plains
- *Landform position (two-dimensional):* Summit
- *Landform position (three-dimensional):* Tread
- *Down-slope shape:* Concave
- *Across-slope shape:* Convex
- *Parent material:* Silty and clayey glaciolacustrine deposits

Typical profile

- *H1 - 0 to 10 inches:* silt loam
- *H2 - 10 to 15 inches:* silt loam
- *H3 - 15 to 32 inches:* silty clay loam
- *H4 - 32 to 60 inches:* stratified silt loam to very fine sand to silty clay loam

Properties and qualities

- *Slope:* 0 to 6 percent
- *Depth to restrictive feature:* More than 80 inches
- *Drainage class:* Moderately well drained
- *Capacity of the most limiting layer to transmit water (Ksat):* Moderately low to moderately high (0.06 to 0.57 in/hr)
- *Depth to water table:* About 18 to 24 inches
- *Frequency of flooding:* None
- *Frequency of ponding:* None
- *Calcium carbonate, maximum content:* 15 percent
- *Available water supply, 0 to 60 inches:* High (about 10.2 inches)

Interpretive groups

- *Land capability classification (irrigated):* None specified
- *Land capability classification (nonirrigated):* 2e
- *Hydrologic Soil Group:* C/D
- *Ecological site:* F101XY009NY - Moist Lake Plain
- *Hydric soil rating:* No

Uo—Urban land-Cosad complex

Map Unit Setting

- *National map unit symbol:* 9rqd
- *Elevation:* 200 to 800 feet
- *Mean annual precipitation:* 36 to 48 inches
- *Mean annual air temperature:* 45 to 50 degrees F
- *Frost-free period:* 115 to 195 days
- *Farmland classification:* Not prime farmland

Map Unit Composition

- *Urban land:* 60 percent
- *Cosad and similar soils:* 25 percent
- *Minor components:* 15 percent
- *Estimates are based on observations, descriptions, and transects of the mapunit.*

Description of Urban Land

Interpretive groups

- *Land capability classification (irrigated):* None specified
- *Land capability classification (nonirrigated):* 8s
- *Hydric soil rating:* Unranked

Description of Cosad

Setting

- *Landform:* Lake plains
- *Landform position (two-dimensional):* Footslope
- *Landform position (three-dimensional):* Tread
- *Down-slope shape:* Concave
- *Across-slope shape:* Linear
- *Parent material:* Sandy glaciofluvial or deltaic deposits over clayey glaciolacustrine deposits

Typical profile

- *H1 - 0 to 9 inches:* loamy fine sand
- *H2 - 9 to 21 inches:* loamy fine sand
- *H3 - 21 to 24 inches:* fine sandy loam
- *H4 - 24 to 60 inches:* silty clay

Properties and qualities

- *Slope:* 0 to 3 percent
- *Depth to restrictive feature:* More than 80 inches
- *Drainage class:* Somewhat poorly drained
- *Capacity of the most limiting layer to transmit water (Ksat):* Moderately low to moderately high (0.06 to 0.20 in/hr)
- *Depth to water table:* About 6 to 18 inches
- *Frequency of flooding:* None
- *Frequency of ponding:* None
- *Calcium carbonate, maximum content:* 15 percent
- *Available water supply, 0 to 60 inches:* Moderate (about 7.1 inches

Us—Urban land-Niagara complex

Map Unit Setting

- *National map unit symbol:* 9rqh
- *Elevation:* 560 to 670 feet
- *Mean annual precipitation:* 36 to 48 inches
- *Mean annual air temperature:* 45 to 50 degrees F
- *Frost-free period:* 115 to 195 days
- *Farmland classification:* Not prime farmland

Map Unit Composition

- *Urban land:* 60 percent
- *Niagara and similar soils:* 30 percent
- *Minor components:* 10 percent
- *Estimates are based on observations, descriptions, and transects of the mapunit.*

Description of Urban Land

Interpretive groups

- *Land capability classification (irrigated):* None specified

- *Land capability classification (nonirrigated):* 8s
- *Hydric soil rating:* Unranked

Description of Niagara

Setting

- *Landform:* Lake plains
- *Landform position (two-dimensional):* Footslope
- *Landform position (three-dimensional):* Tread
- *Down-slope shape:* Concave
- *Across-slope shape:* Linear
- *Parent material:* Silty and clayey glaciolacustrine deposits

Typical profile

- *H1 - 0 to 11 inches:* silt loam
- *H2 - 11 to 27 inches:* silt loam
- *H3 - 27 to 72 inches:* silt loam

Properties and qualities

- *Slope:* 0 to 3 percent
- *Depth to restrictive feature:* More than 80 inches
- *Drainage class:* Somewhat poorly drained
- *Capacity of the most limiting layer to transmit water (Ksat):* Moderately high (0.20 to 0.57 in/hr)
- *Depth to water table:* About 6 to 18 inches
- *Frequency of flooding:* None
- *Frequency of ponding:* None
- *Calcium carbonate, maximum content:* 15 percent
- *Available water supply, 0 to 60 inches:* High (about 10.3 inches)

Interpretive groups

- *Land capability classification (irrigated):* None specified
- *Land capability classification (nonirrigated):* 3w
- *Hydrologic Soil Group:* C/D
- *Ecological site:* F101XY009NY - Moist Lake Plain
- *Hydric soil rating:* No

Ut—Urban land-Odessa complex, 0 to 3 percent slopes

Map Unit Setting

- *National map unit symbol:* 2wrdb
- *Elevation:* 560 to 720 feet
- *Mean annual precipitation:* 31 to 57 inches
- *Mean annual air temperature:* 41 to 50 degrees F
- *Frost-free period:* 100 to 195 days
- *Farmland classification:* Not prime farmland

Map Unit Composition

- *Urban:* 60 percent
- *Odessa and similar soils:* 25 percent
- *Minor components:* 15 percent
- *Estimates are based on observations, descriptions, and transects of the mapunit.*

Description of Urban

Interpretive groups

- *Land capability classification (irrigated):* None specified
- *Land capability classification (nonirrigated):* 8s
- *Hydric soil rating:* Unranked

Description of Odessa

Setting

- *Landform:* Lake terraces
- *Landform position (two-dimensional):* Footslope
- *Landform position (three-dimensional):* Tread
- *Down-slope shape:* Concave
- *Across-slope shape:* Linear
- *Parent material:* Red clayey glaciolacustrine deposits derived from calcareous shale

Typical profile

- *Ap - 0 to 8 inches:* silt loam
- *Bt/E - 8 to 10 inches:* silty clay loam
- *Bt1 - 10 to 15 inches:* silty clay
- *Bt2 - 15 to 25 inches:* silty clay
- *C - 25 to 79 inches:* silty clay

Properties and qualities

- *Slope:* 0 to 3 percent
- *Depth to restrictive feature:* More than 80 inches
- *Drainage class:* Somewhat poorly drained
- *Runoff class:* Very high
- *Capacity of the most limiting layer to transmit water (Ksat):* Very low to moderately low (0.00 to 0.14 in/hr)
- *Depth to water table:* About 6 to 18 inches
- *Frequency of flooding:* None
- *Frequency of ponding:* None
- *Calcium carbonate, maximum content:* 25 percent
- *Available water supply, 0 to 60 inches:* High (about 9.5 inches)

Interpretive groups

- *Land capability classification (irrigated):* None specified
- *Land capability classification (nonirrigated):* 3w
- *Hydrologic Soil Group:* D
- *Ecological site:* F101XY009NY - Moist Lake Plain
- *Hydric soil rating:* No

Uu—Urban land-Schoharie complex, 0 to 3 percent slopes

Map Unit Setting

- *National map unit symbol:* 2xggf
- *Elevation:* 560 to 670 feet
- *Mean annual precipitation:* 31 to 57 inches
- *Mean annual air temperature:* 41 to 50 degrees F
- *Frost-free period:* 100 to 190 days
- *Farmland classification:* Not prime farmland

Map Unit Composition

- *Urban land:* 60 percent
- *Schoharie and similar soils:* 35 percent

- *Minor components:* 5 percent
- *Estimates are based on observations, descriptions, and transects of the mapunit.*

Description of Urban Land

Interpretive groups

- *Land capability classification (irrigated):* None specified
- *Land capability classification (nonirrigated):* 8s
- *Hydric soil rating:* Unranked

Description of Schoharie

Setting

- *Landform:* Lake terraces
- *Landform position (two-dimensional):* Summit
- *Landform position (three-dimensional):* Tread
- *Down-slope shape:* Convex
- *Across-slope shape:* Convex
- *Parent material:* Red clayey glaciolacustrine deposits derived from calcareous shale

Typical profile

- *Ap - 0 to 8 inches:* silty clay loam
- *E - 8 to 11 inches:* silt loam
- *Bt/E - 11 to 18 inches:* silty clay
- *Bt - 18 to 33 inches:* clay
- *C1 - 33 to 52 inches:* silty clay
- *C2 - 52 to 79 inches:* silty clay

Properties and qualities

- *Slope:* 0 to 3 percent
- *Depth to restrictive feature:* More than 80 inches
- *Drainage class:* Moderately well drained
- *Runoff class:* Very low
- *Capacity of the most limiting layer to transmit water (Ksat):* Very low to moderately low (0.00 to 0.14 in/hr)
- *Depth to water table:* About 18 to 36 inches
- *Frequency of flooding:* None
- *Frequency of ponding:* None
- *Calcium carbonate, maximum content:* 25 percent
- *Available water supply, 0 to 60 inches:* High (about 9.3 inches)

Uw—Urban land-Teel complex

Map Unit Setting

- *National map unit symbol:* 9rqm
- *Elevation:* 600 to 1,800 feet
- *Mean annual precipitation:* 36 to 48 inches
- *Mean annual air temperature:* 45 to 50 degrees F
- *Frost-free period:* 115 to 195 days
- *Farmland classification:* Not prime farmland

Map Unit Composition

- *Urban land:* 60 percent

- *Teel and similar soils:* 25 percent
- *Minor components:* 15 percent
- *Estimates are based on observations, descriptions, and transects of the mapunit.*

Description of Urban Land

Interpretive groups

- *Land capability classification (irrigated):* None specified
- *Land capability classification (nonirrigated):* 8s
- *Hydric soil rating:* Unranked

Description of Teel

Setting

- *Landform:* Flood plains
- *Landform position (two-dimensional):* Summit
- *Landform position (three-dimensional):* Talf
- *Down-slope shape:* Concave
- *Across-slope shape:* Convex
- *Parent material:* Silty alluvium

Typical profile

- *H1 - 0 to 9 inches:* silt loam
- *H2 - 9 to 48 inches:* silt loam
- *H3 - 48 to 60 inches:* stratified very fine sandy loam to silt loam

Properties and qualities

- *Slope:* 0 to 3 percent
- *Depth to restrictive feature:* More than 80 inches
- *Drainage class:* Moderately well drained
- *Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.57 to 1.98 in/hr)
- *Depth to water table:* About 18 to 24 inches
- *Frequency of flooding:* Occasional
- *Frequency of ponding:* None
- *Calcium carbonate, maximum content:* 1 percent
- *Available water supply, 0 to 60 inches:* High (about 10.2 inches)

Interpretive groups

- *Land capability classification (irrigated):* None specified
- *Land capability classification (nonirrigated):* 2w
- *Hydrologic Soil Group:* B/D
- *Ecological site:* F101XY002NY - Low Floodplain
- *Hydric soil rating:* No

Ux—Urban land-Wassaic complex

Map Unit Setting

- *National map unit symbol:* 9rqn
- *Elevation:* 800 to 1,750 feet
- *Mean annual precipitation:* 36 to 48 inches
- *Mean annual air temperature:* 45 to 50 degrees F
- *Frost-free period:* 115 to 195 days
- *Farmland classification:* Not prime farmland

Map Unit Composition

- *Urban land:* 60 percent
- *Wassaic and similar soils:* 35 percent
- *Minor components:* 5 percent
- *Estimates are based on observations, descriptions, and transects of the mapunit.*

Description of Urban Land

Interpretive groups

- *Land capability classification (irrigated):* None specified
- *Land capability classification (nonirrigated):* 8s
- *Hydric soil rating:* Unranked

Description of Wassaic

Setting

- *Landform:* Till plains, ridges, benches
- *Landform position (two-dimensional):* Summit
- *Landform position (three-dimensional):* Crest
- *Down-slope shape:* Convex
- *Across-slope shape:* Convex
- *Parent material:* Loamy till derived mainly from limestone, with varying amounts of sandstone, shale, and crystalline rock

Typical profile

- *H1 - 0 to 10 inches:* silt loam
- *H2 - 10 to 23 inches:* gravelly silt loam
- *C - 23 to 28 inches:* gravelly loam
- *R - 28 to 32 inches:* unweathered bedrock

Properties and qualities

- *Slope:* 0 to 3 percent
- *Depth to restrictive feature:* 20 to 40 inches to lithic bedrock
- *Drainage class:* Well drained
- *Capacity of the most limiting layer to transmit water (Ksat):* Very low (0.00 to 0.00 in/hr)
- *Depth to water table:* About 19 to 39 inches
- *Frequency of flooding:* None
- *Frequency of ponding:* None
- *Calcium carbonate, maximum content:* 1 percent
- *Available water supply, 0 to 60 inches:* Low (about 4.2 inches)

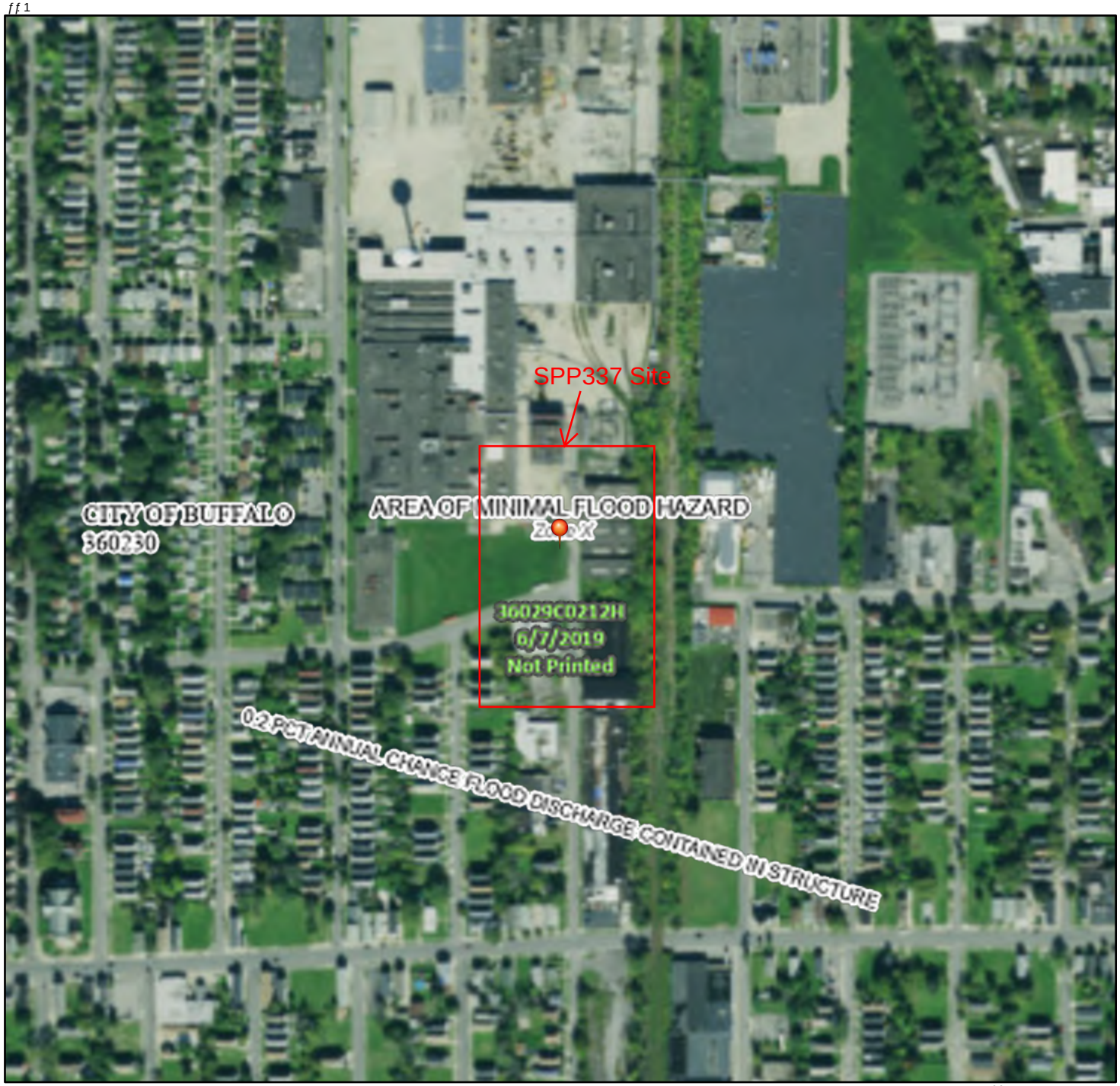
Interpretive groups

- *Land capability classification (irrigated):* None specified
- *Land capability classification (nonirrigated):* 2s
- *Hydrologic Soil Group:* C
- *Ecological site:* F101XY012NY - Till Upland
- *Hydric soil rating:* No

APPENDIX C: Flood Zone Maps

1DWLRQDO)ORRG+D]DUG'DWD)6WWH

FEMA



)HHW

ff 1

%DVHPHQW%RXQGDU\6XUYH 86 1DWLRQDO DS

ff 1

/HJHQG

6)(5 $FFHSWDEOH

L:WKRXW %DVH)ORRG(OHYDWLRQ %)(
=RQH$ 9 $
L:WK%DVH)ORRG(OHYDWLRQ =RQH$($($9 (9 $
5HGXFHG)ORRG5LVN'XH7R/HYHH =RQH;

$UHDV1RW6XEMHFW7R)ORRG+D]DUG
5HVWULFWHG)ORRG$UHDV
*HRPRUSKLF)ORRG+D]DUG$UHDV:LWKRXW)ORRG(OHYDWLRQV
/HYHH6\VWHPV =RQH;
$UHDV:LWK5HGXFHG)ORRG5LVNGXHWR/HYHH
/HYHH6\VWHPV
$UHDV:LWK)ORRG5LVNGXHWR/HYHH =RQH'

$UHDRI0LQLPDO)ORRG+D]DUG =RQH;
(IIHFWLYH/LQH
$UHDRI8QGHWHUPLQHG)ORRG+D]DUG =RQH'

&KDQQHO &OYHUW RU 6WUXFWXUH
/HYHH/LNH RU)ORRGZDOO

&URVV6HFWLRQVZLWK$QQXDO &KDQFH
DWHU6XUIDFH(OHYDWLRQ
&RDVWDO7UDQVHFW
%DVH)ORRG(OHYDWLRQ/LQH %)(
/LPLW6WUXFWXUH
-XULVGLFWLRQ%RXQGDU\
&RDVWDO7UDQVHFW%DVH/LQH
3URILOH%DVH/LQH
*HRJUDSKLF)HDWXUH

L:LWKDDWD$VO/DEHO
1R'LWKDDWD$VO/DEHO
8QSSHG

7KHSLQGLVSODHGRQWKHSLVDQDSSURSULDWH
SRQW VHOHFWHGEWKHXHU DQGGRHVQRW UHSUHV
DQDWWKRULWDWLYHSURSHUW\ORFDWLRQ

7KLVPSFRRDLHVZLWKWKVWDQGDUGVIRU WKHXHR
GLLWDO IORRGPS/LI LW LVQRW YRLGDV/GHVFULEHGEHORZ
7KHEDVHPHVVKRZQFRRDLHVZLWKWKVEDVHPHS
DFFXUDWHWDQGDUG/

7KHIORRGKDUGLQRUPWLRQLV GHULYHGGLUHFWO\IURPWKH
DWWRULWDWLYHHZEVHUYLFHVSURYLGHGEWKH7KLVPS
ZVHSURWHGRQ DW 3 DQGGRHVQW
UHOHFW FKQHVRU DRQGRQWV VXEVHXHQW WRWKLVGDWHDQG
WLFH 7KHHDQGHHIHFWLYHLQRUPWLRQPHKQDQRU
EHFRPVXSUVHGEQHZGDWDRYHU WLFH

7KLVPSLPHLV YRLGLI WKHIRQHRU RUHR WKHIRO ORZLQJPS
HOHPQWV GR QRW DSSHDU EDVHPSLPHU\ IORRGRQHODEHOV
OHHQG VFDOHEDU PSFRHDWRQGDWH FRRQLW\LGHQWLILHUV
)5$DQHO QXEU DQG)5$IIHFWLYHDWH DSLPHV IRU
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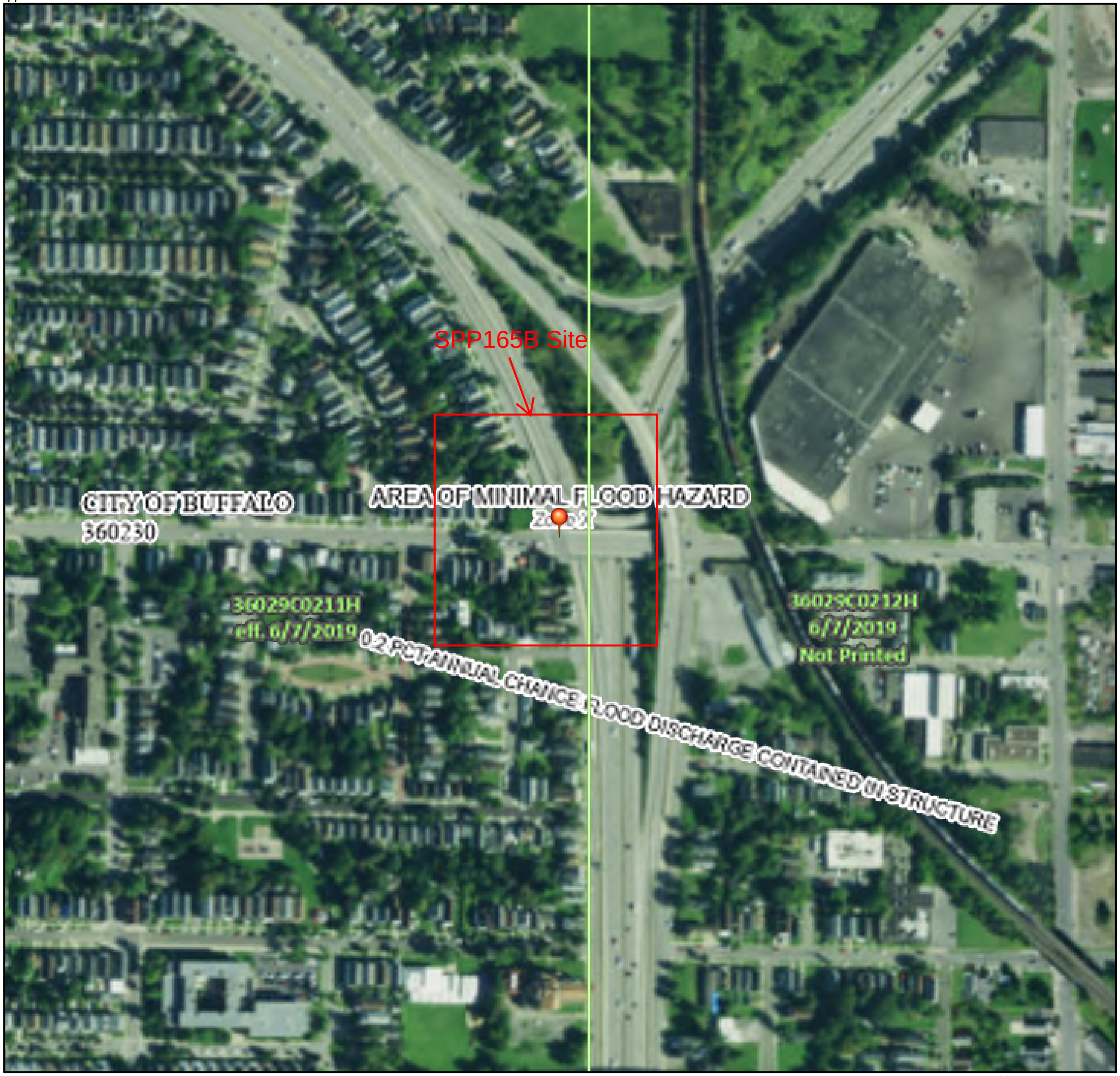
UHDOWRU\SUSRVHV



SPP165B Site
CITY OF BUFFALO
360230
AREA OF MINIMAL FLOOD HAZARD
36029C0211H
eff. 6/7/2019
36029C0212H
6/7/2019
Not Printed
0.2 PCT ANNUAL CHANCE FLOOD DISCHARGE CONTAINED IN STRUCTURE

1DWLRQDO)ORRG +D]DUG /D\HU)‚50HWWH

FEMA

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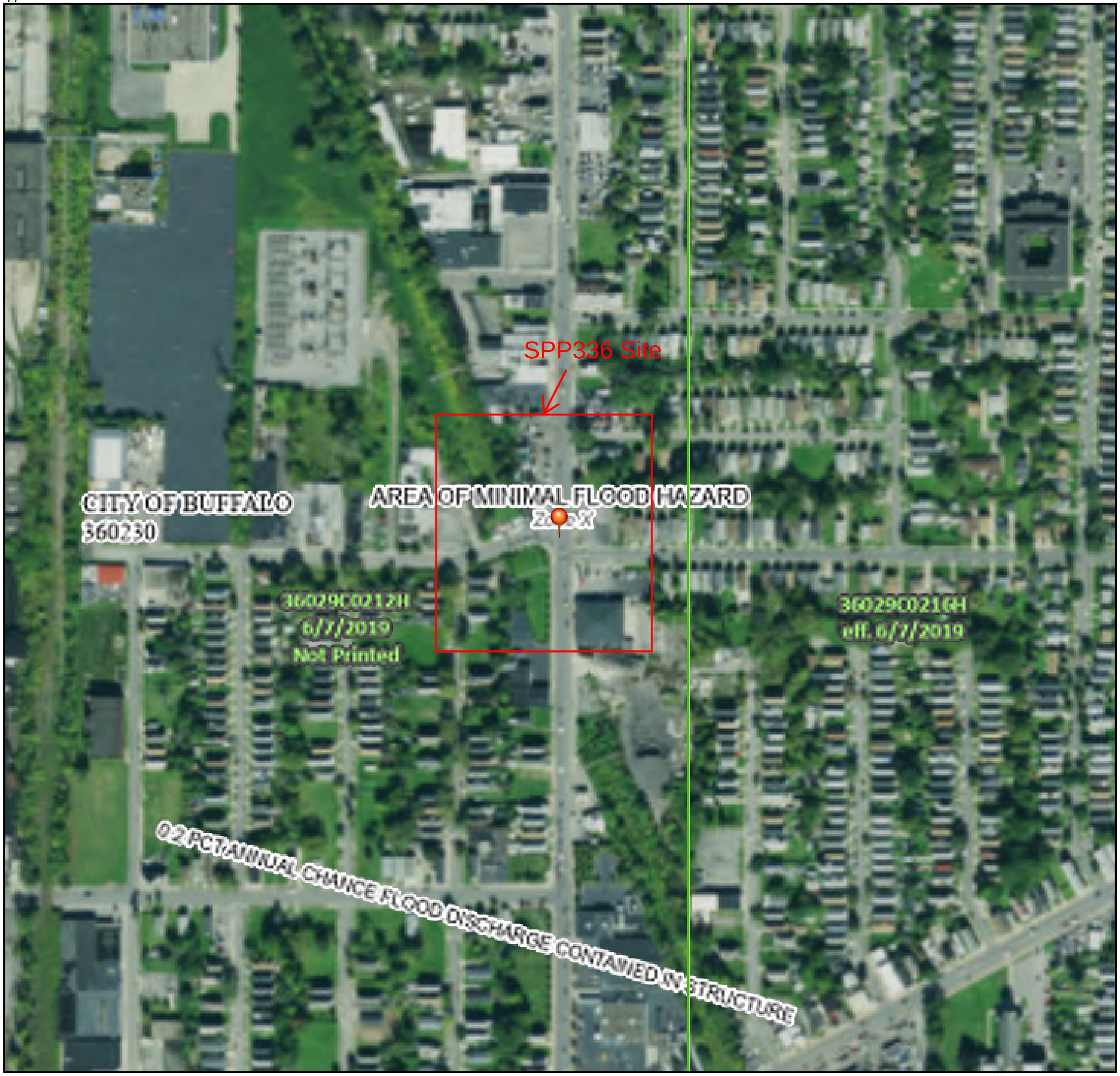

)HHW

ƒƒ1

/HJHQG

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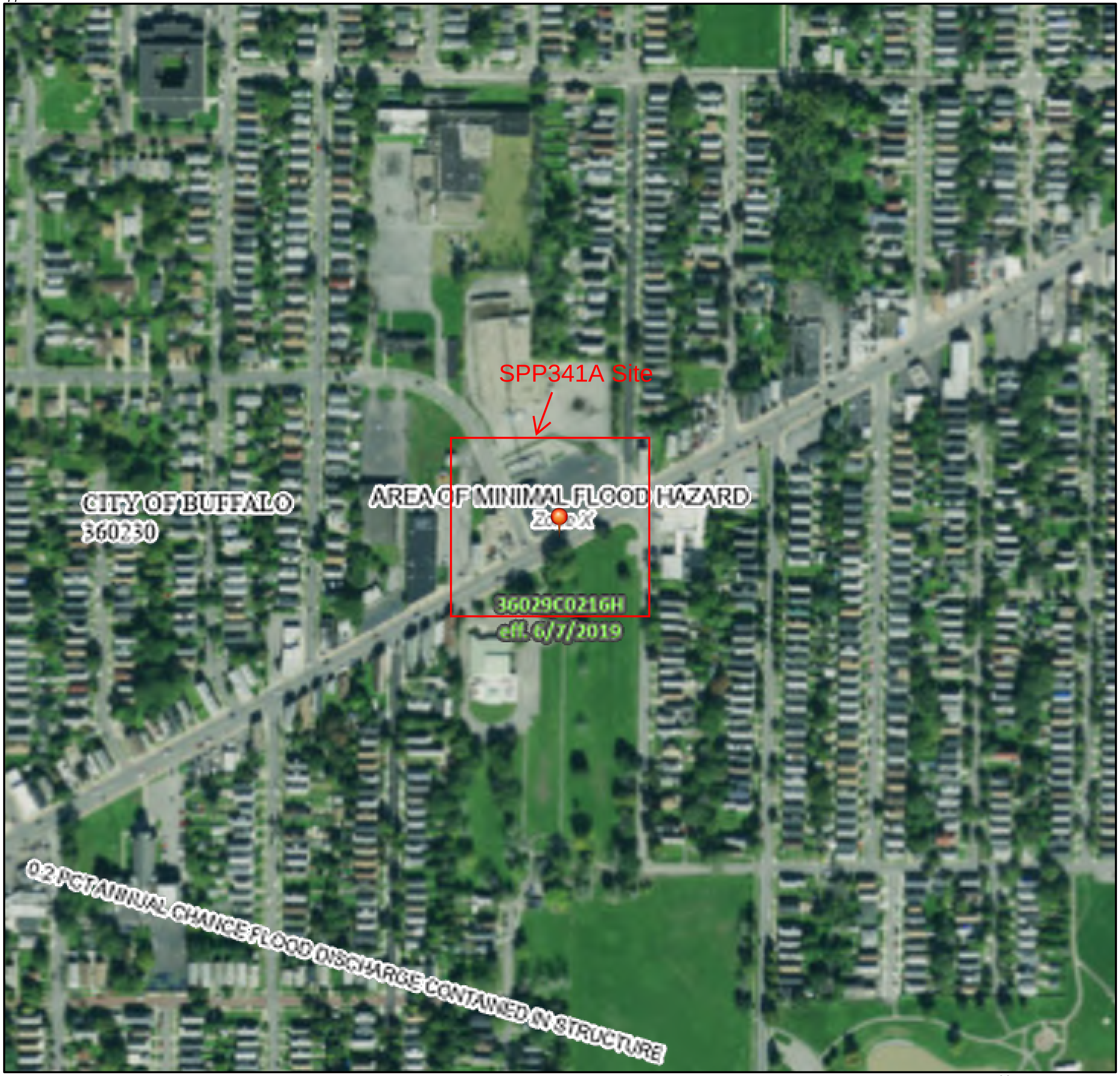
7KLV PDS FRPSOLHV ZLWK)(0\$V VWDQGDUGV IRU WKH XVH RI GLJLWDO IORRG PDSV LI LW LV QRW YRLG DV GHVFULEHG EHORZ. 7KH EDVHPDS VKRZQ FRPSOLHV ZLWK)(0\$V EDVHPDS DFFXUDF\ VWDQGDUGV

7KH IORRG KD]DUG LQIRUPDWLRQ LV GHULYHG GLUHFWO\ IURP WKH DXWKRULWDWLYH 1)+/ ZHE VHUYLFHV SURYLGHG E\ )(0\$. 7KLV PDS ZDV H[SRUWHG RQ DW 30 DQG GRHV QRW UHIOHFW FKDQJHV RU DPHQGPHQWV VXEVHTXHQW WR WKLV GDWH DQG WLPH.

7KLV PDS LPDJH LV YRLG LI WKH RQH RU PRUH RI WKH IROORZLQJ PDS HOHPHQWV GR QRW DSSHDU: EDVHPDS LPDJHU\, IORRG]RQH ODEHOV, OHJHQG, VFDOH EDU, PDS FUHDWLRQ GDWH, FRPPXQLW\ LGHQWLILHUV,)\$50 SDQHO QXPEHU, DQG)\$50 HIIHFWLYH GDWH.

%DVHPDS ,PDJHU\ 6RXUFH: 86*6 1DWLRQDO 0DS

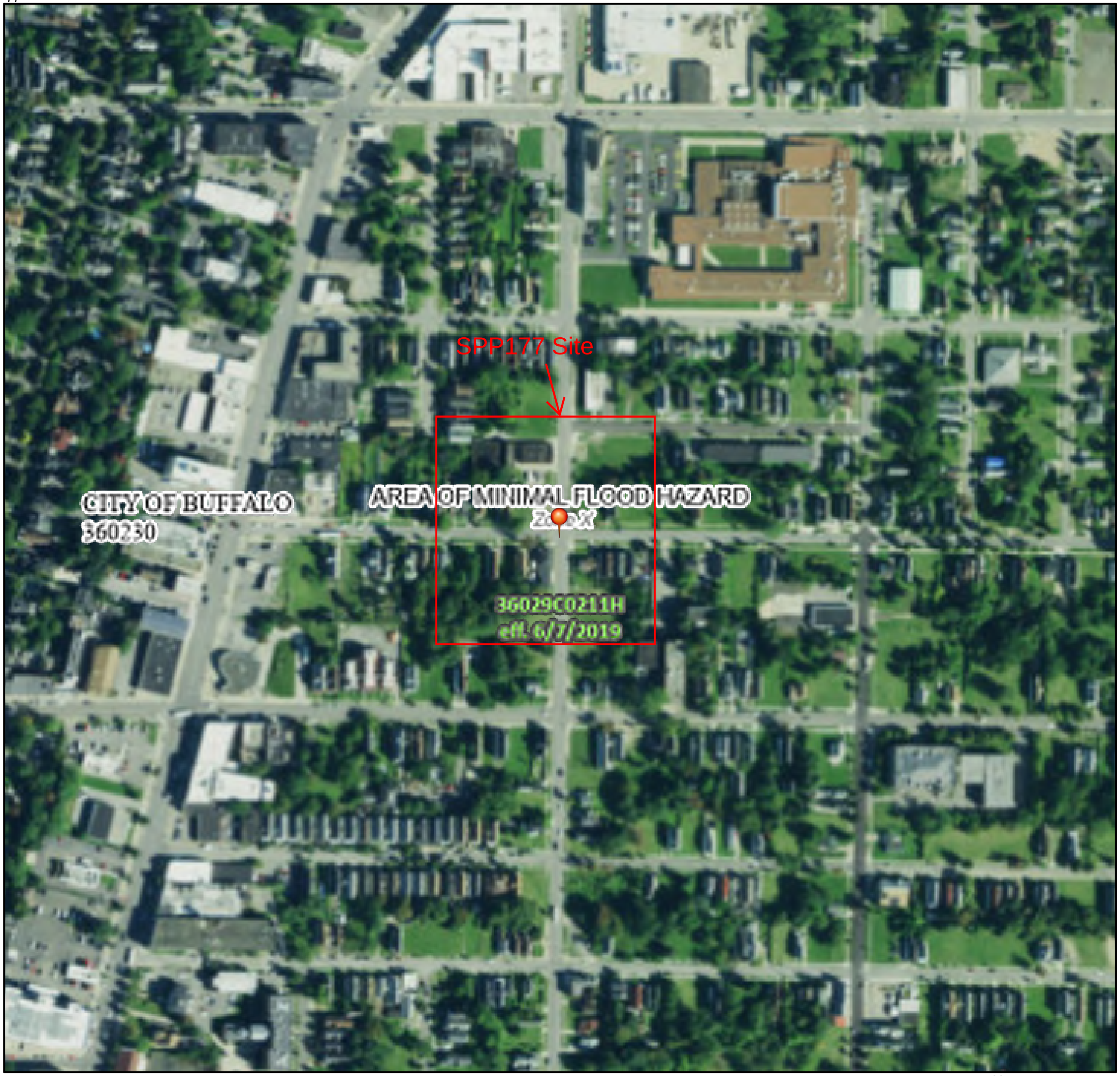
FEMA



SPP341A Site
AREA OF MINIMAL FLOOD HAZARD
Zone X
CITY OF BUFFALO
360230
36029C0216H
eff. 6/7/2019
0.2 PCT ANNUAL CHANCE FLOOD DISCHARGE CONTAINED IN STRUCTURE

1DWLRQDO)ORRG +D]DUG /D\HU)LUPHWWH

FEMA



/HJHQG

7KH SLQ GLVSOD\HG RQ WKH PDS LV DQ DSSUR[LPDWH SRLQW VHOHFWHG E\ WKH XVHU DQG GRHV QRW UHSUHVHQW DQ DXWKRULWDWLYH SURSHUW\ ORFDWLRQ

7KLV PDS FRPSOLHV ZLWK)(0\$V VWDQGDUGV IRU WKH XVH RI GLJLWDO IORRG PDSV LI LW LV QRW YRLG DV GHVFULEHG EHORZ

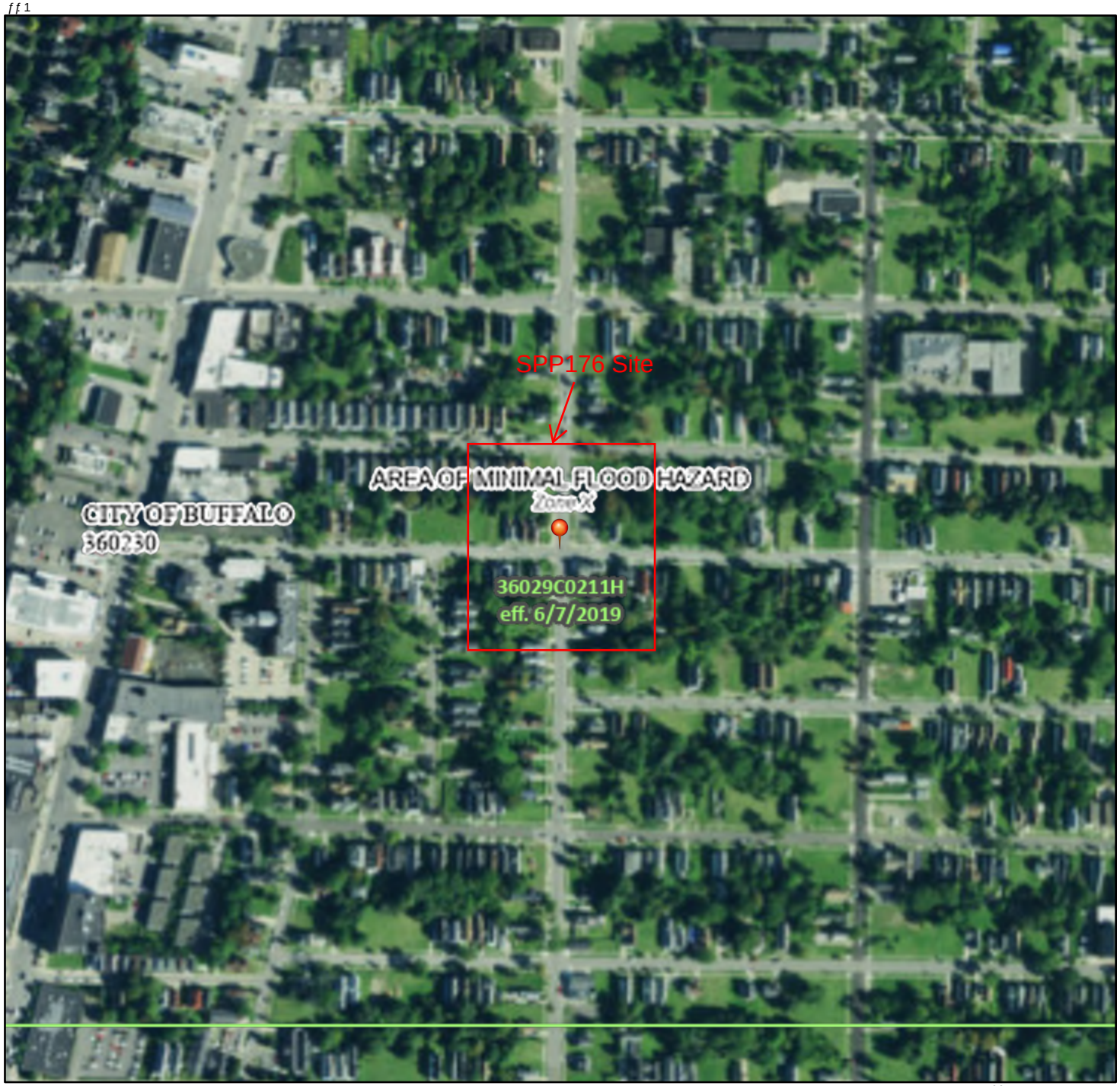
)HHW

%DVHPDS ,PDJHU\ 6RXUFH 86* 1DWLRQDO 0DS

1DWLRQDO)ORRG+D]DUG'DWD)ORRGSODLQ

FEMA

ff 1



)HHW

ff 1

%DVHPDS,QIRUPDWLRQ 86 1DWLRQDO DS

/HJHQG

6)(5 $5($6 2) 0,1,0$/)/22' +$=$5'

L:WHRAW %DVH)ORRG(OHYDWLRQ %)(
=RQH$ 9 $
L:WK%RUHSWK =RQH$($ 9($
5HMODWRU\)ORRGZD\

$QQXDO &KDQFH)ORRG+D]DUG $UHDV
R DQQXDO FKDQFH IORRG ZDWHU DUHDV
G+BWKROHV WKDQRQH IRRW RU ZKGUDLQDJH
DUHDV R OHVV WKDQ RQH VTXDUH PLOH=RQH;

)WXUH&RQGLWLRQV $QQXDO &KDQFH)ORRG+D]DUG =RQH;

$UHDZLWK5HGXFHG)ORRG5LVNGXHWR /HYHH 6HH1RWHV =RQH;

$UHDZLWK)ORRG5LVNGXHWR/HYHH =RQH'

$UHDR1RQLBO)ORRG+D]DUG =RQH;

(IIHFWLYH/LQH

$UHDR8QGHWHUPLQHG)ORRG+D]DUG =RQH'

&KDQQHO &XOYHUW RU 6WUXFWXUH

/HYHH/LNH RU)ORRGZDOO

&URVV6HFWLRQVZLWK$QQXDO &KDQFH
DWHU 6XUIDFH(OHYDWLRQ
&RDVWDO 7UDQVHFW
%DVH)ORRG(OHYDWLRQL1H %)(
/LPLW R 6WUXFWXUH
-XULVGLFWLRQ%RXQGDU\
&RDVWDO 7UDQVHFW %DVHOLQH
3URILOH%DVHOLQH
+GURJUDSKLF)HDWXUH

L'LWDO DWD$YDLODEOH
1R'LWDO DWD$YDLODEOH
8QPDSSHG

7KHSLQGLVSODHGRQWKHPDSLV DQDSSURSULDWH
SRQW VHOHFWHGE WKHXVHU DQGGRHV QRW UHSUHV
DQDWKRULWDWLYHSURSHUW\ORFDWLRQ

7KLVPSFRROLHVZLWKSVVWDQGDUGIRU WKHXVHR
GLLWDO IORRGPS/LI LW LVQRW YRLGV/GHVFULEHGEHORZ
7KHEDVHPSVKRZQFRROLHVZLWKSVEDVHPS
DFFXUDWHWDQGDUG/

7KHIORRGKDUGLQRUPWLRQLV GHULYHGGLUHFWO\IURPWKH
DWKRULWDWLYHJZEVHUYLFHVSURYLGHGE\ 7KLVPS
ZVHSRUWHGRQ DW 3 DQGGRHV QRW
UHOHFW FKDQHVRU DPQGPQWV VXEVHXHQW WR WKLVGDWH DQG
WLFH 7KHJHDQGHHFWLYHLQRUPWLRQPD FKDQGHRU
EHFRPVXSUVHGEQHZGDWDRYHU WLFH

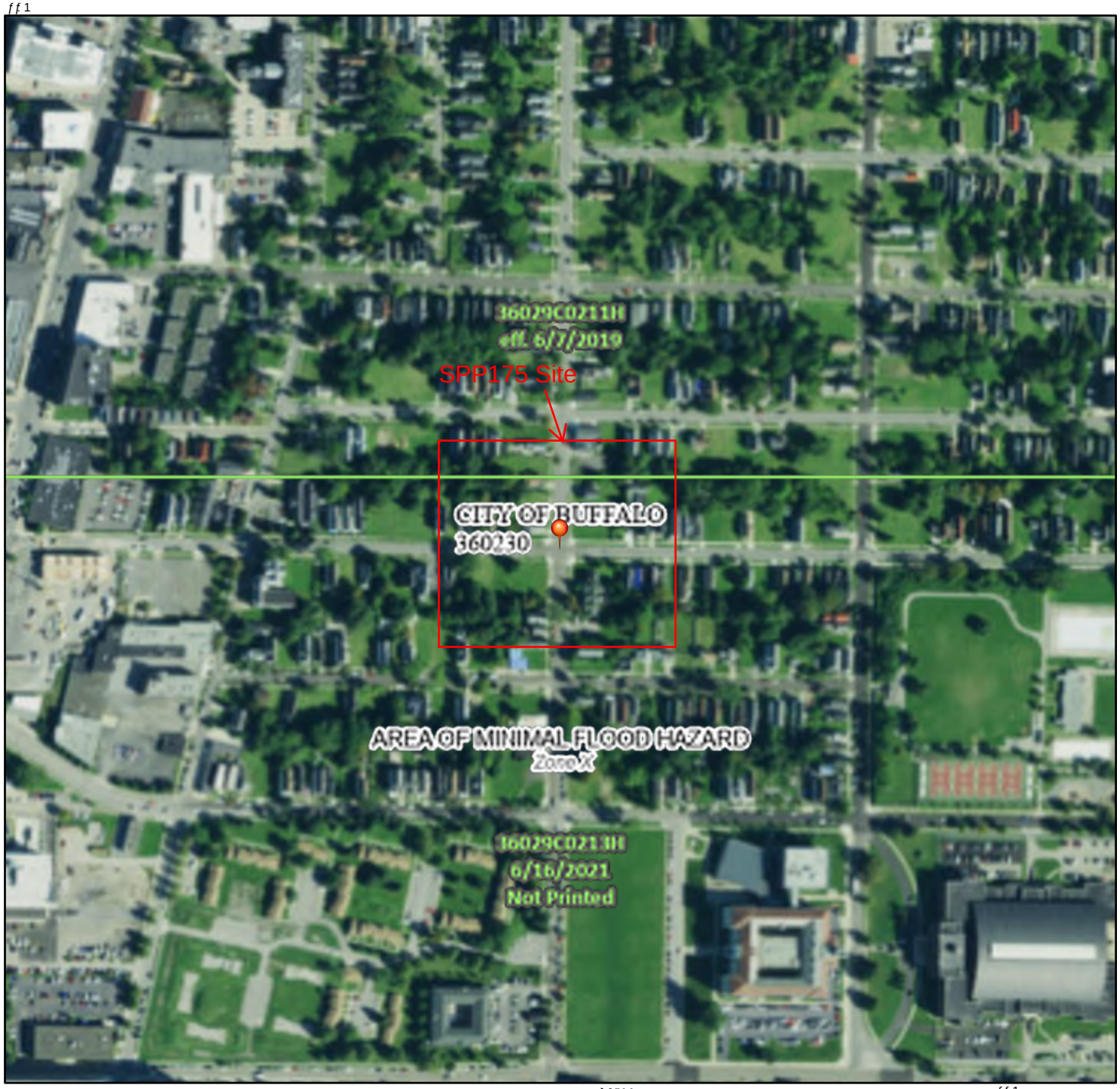
7KLVPSLBHLV YRLGLI WKHRQHRU RHWKHIO ORZLQJPS
HOHPQWV GR QRW DSSHDU EDVHPSLBHU\ IORRGRQHODEHOV
OHHQG VFDOHEDU PSFUHDWLRQGDWH FRQWLWLHUV
)5$QO QXEU DQG)5HIHFWLYHGDWH DSLBHV IRU
XQPSSHGDQGXQRGHUQL}GDUHDV FDQQRW EH XVHGIRU
UHDODWRU\SUSRVHV

%DVHPS,BHU\6XUFH 86 1DWLRQDO DS

1DWLRQDO)ORRG+D]DUG'DWD)6WWH

FEMA

ff 1



)HHW

ff 1

%DVHPDS,PDJHU\6RXUFH 86 1DWLRQDO DS

/HJHQG

6()6$57 $5($6(1(5$//<6867$,1('

L:WKRXW %DVH)ORRG(OHYDWLRQ %)(
=RQH$ 9 $
L:WK%RUHSWK =RQH$ $ 9 $
5HGXFHG)ORRGZD

$QQXDO &KDQFH)ORRG+D]DUG $UHDV
R DQQXDO FKDQFHIORRGZDWHUDH
G+BWKOHV WKDQRQHIRRW RU ZKGUDLQDJH
DUHDV R OHVV WKDQRQHVTXDUHPLOH=RQH;

)WXUH&RQGLWLRQV$QQXDO
&KDQFH)ORRG+D]DUG =RQH;

$UHDZKHUH5HGXHG)ORRG5LVNGXHWR
/HYHH 6HH1RWHV =RQH;

$UHDZKH)ORRG5LVNGXHWR/HYHH =RQH'

$UHDRI0LQLPDO)ORRG+D]DUG =RQH;
(IIHFWLYH/LQH
$UHDR8QGHWHUPLQHG)ORRG+D]DUG =RQH'

&KDQQHO &XOYHUW RU 6WUXFWXUH
/HYHH'LNH RU)ORRGZDOO

&URVV6HFWLRQVZLWK$QQXDO &KDQFH
DWHU6XUIDFH(OHYDWLRQ
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APPENDIX D: IPaC Preliminary Environmental Report

IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Project information

NAME

SPP Location 1
CSO053_2.5 SPP337 Modification

LOCATION

Erie County, New York

DESCRIPTION

None

Local office

New York Ecological Services Field Office

(607) 753-9334
(607) 753-9699
fw5es_nyfo@fws.gov

3817 Luker Road
Cortland, NY 13045-9385

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Log in to IPaC.
2. Go to your My Projects list.
3. Click PROJECT HOME for this project.
4. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

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1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information. IPaC only shows species that are regulated by USFWS (see FAQ).
2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of

Commerce.

The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS
Northern Long-eared Bat Myotis septentrionalis Wherever found This species only needs to be considered if the following condition applies: • This species only needs to be considered if the project includes wind turbine operations. No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/9045	Endangered
Tricolored Bat Perimyotis subflavus Wherever found This species only needs to be considered if the following condition applies: • This species only needs to be considered if the project includes wind turbine operations. No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/10515	Proposed Endangered

Clams

NAME	STATUS
Salamander Mussel Simpsonaias ambigua Wherever found There is **proposed** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/6208	Proposed Endangered

Insects

NAME	STATUS
Monarch Butterfly Danaus plexippus Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/9743	Candidate

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

There are no critical habitats at this location.

You are still required to determine if your project(s) may have effects on all above listed species.

Bald & Golden Eagles

Bald and golden eagles are protected under the Bald and Golden Eagle Protection Act[1] and the Migratory Bird Treaty Act[2].

Any person or organization who plans or conducts activities that may result in impacts to bald or golden eagles, or their habitats[3], should follow appropriate regulations and consider implementing appropriate conservation measures, as described in the links below. Specifically, please review the "Supplemental Information on Migratory Birds and Eagles".

Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

There are likely bald eagles present in your project area. For additional information on bald eagles, refer to Bald Eagle Nesting and Sensitivity to Human Activity

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, see the PROBABILITY OF PRESENCE SUMMARY below to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Dec 1 to Aug 31
Golden Eagle *Aquila chrysaetos* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1680	Breeds Jan 1 to Aug 31

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read "Supplemental Information on Migratory Birds and Eagles", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12

(0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.

3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

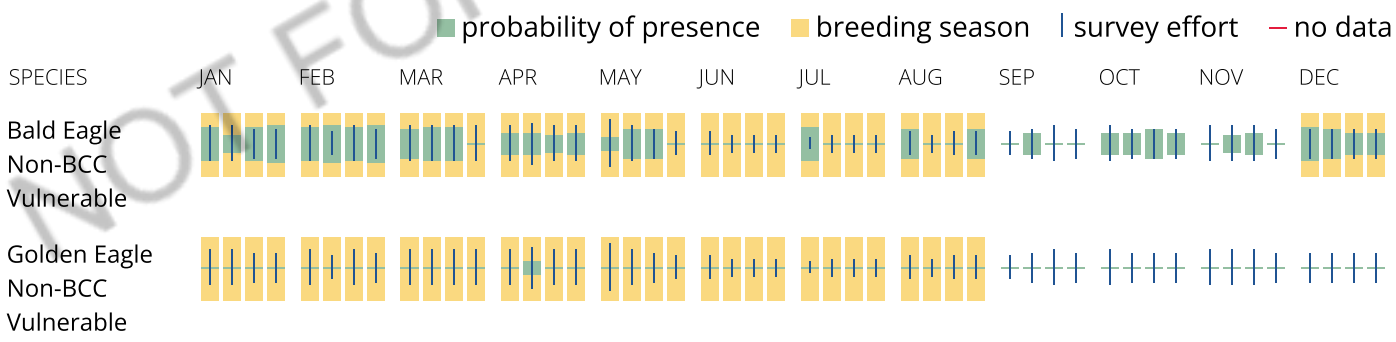
Breeding Season (▪)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



What does IPaC use to generate the potential presence of bald and golden eagles in my specified location?

The potential for eagle presence is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply). To see a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

What does IPaC use to generate the probability of presence graphs of bald and golden eagles in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur. Please contact your local Fish and Wildlife Service Field Office if you have questions.

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats[3] should follow appropriate regulations and consider implementing appropriate conservation measures, as described in the links below. Specifically, please review the "Supplemental Information on Migratory Birds and Eagles".

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-

golden-eagles-may-occur-project-action

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, see the PROBABILITY OF PRESENCE SUMMARY below to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Dec 1 to Aug 31
Belted Kingfisher *Megaceryle alcyon* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds Mar 15 to Jul 25
Black-billed Cuckoo *Coccyzus erythropthalmus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9399	Breeds May 15 to Oct 10
Blue-winged Warbler *Vermivora cyanoptera* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds May 1 to Jun 30
Bobolink *Dolichonyx oryzivorus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 20 to Jul 31

Canada Warbler Cardellina canadensis — Breeds May 20 to Aug 10

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Cerulean Warbler Setophaga cerulea — Breeds Apr 20 to Jul 20

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/2974

Chimney Swift Chaetura pelagica — Breeds Mar 15 to Aug 25

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Eastern Meadowlark Sturnella magna — Breeds Apr 25 to Aug 31

This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA

Eastern Whip-poor-will Antrostomus vociferus — Breeds May 1 to Aug 20

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Evening Grosbeak Coccothraustes vespertinus — Breeds May 15 to Aug 10

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Golden Eagle Aquila chrysaetos — Breeds Jan 1 to Aug 31

This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.
https://ecos.fws.gov/ecp/species/1680

Golden-winged Warbler Vermivora chrysoptera — Breeds May 1 to Jul 20

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/8745

Lesser Yellowlegs Tringa flavipes — Breeds elsewhere

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9679

Pectoral Sandpiper Calidris melanotos This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds elsewhere
Prairie Warbler Setophaga discolor This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 1 to Jul 31
Red-headed Woodpecker Melanerpes erythrocephalus This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 10 to Sep 10
Rose-breasted Grosbeak Pheucticus ludovicianus This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds May 15 to Jul 31
Ruddy Turnstone Arenaria interpres morinella This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds elsewhere
Semipalmated Sandpiper Calidris pusilla This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds elsewhere
Short-billed Dowitcher Limnodromus griseus This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9480	Breeds elsewhere
Upland Sandpiper Bartramia longicauda This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9294	Breeds May 1 to Aug 31
Wood Thrush Hylocichla mustelina This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 10 to Aug 31

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read

"Supplemental Information on Migratory Birds and Eagles", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

Breeding Season (■)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

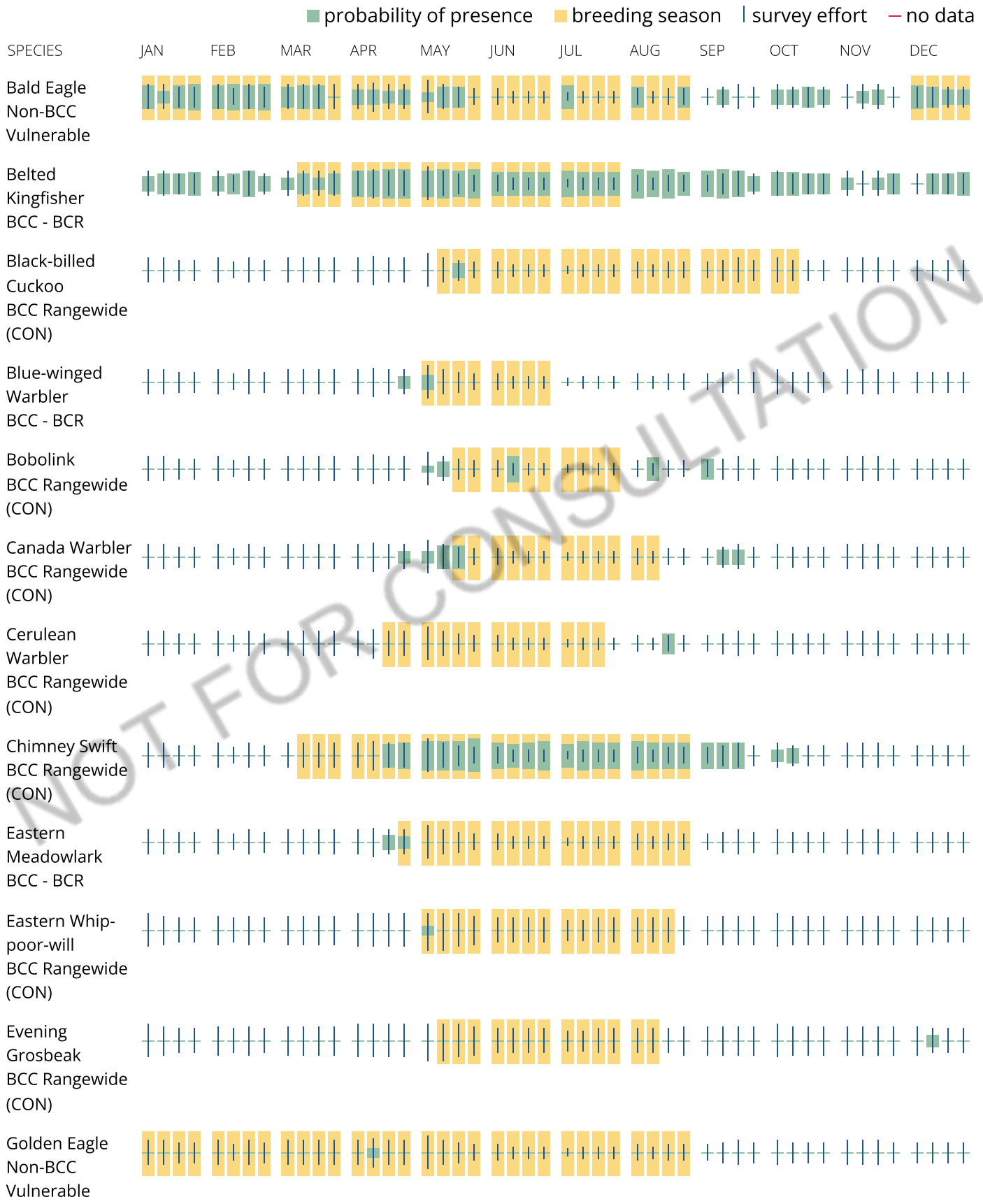
Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

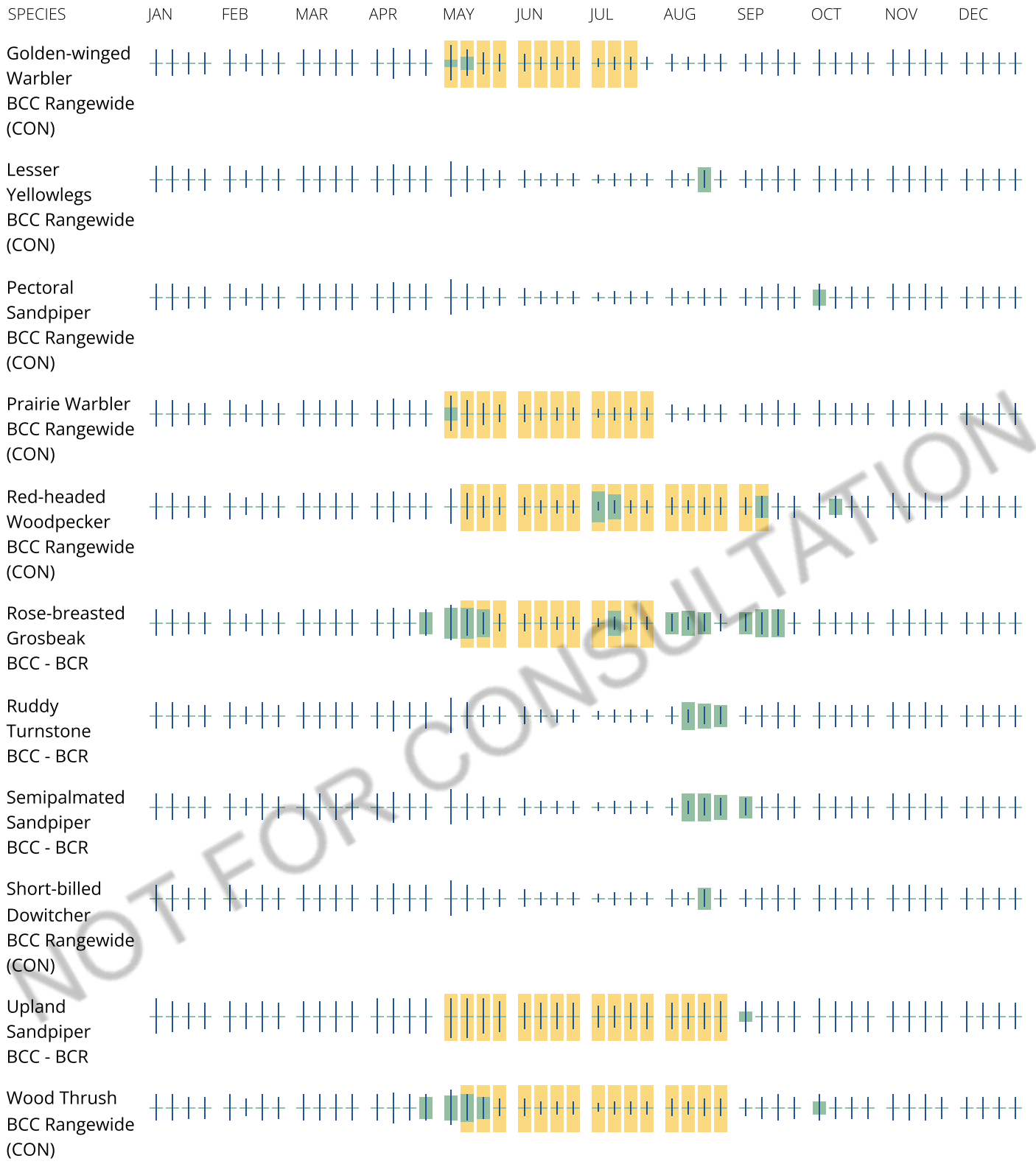
To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe

Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.





Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure.

To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the list of migratory birds that potentially occur in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets.

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering or migrating in my area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may query your location using the RAIL Tool and look at the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in

offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

There are no refuge lands at this location.

Fish hatcheries

There are no fish hatcheries at this location.

Wetlands in the National Wetlands Inventory (NWI)

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

This location overlaps the following wetlands:

RIVERINE

R4SBC

A full description for each wetland code can be found at the National Wetlands Inventory website

NOTE: This initial screening does **not** replace an on-site delineation to determine whether wetlands occur. Additional information on the NWI data is provided below.

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

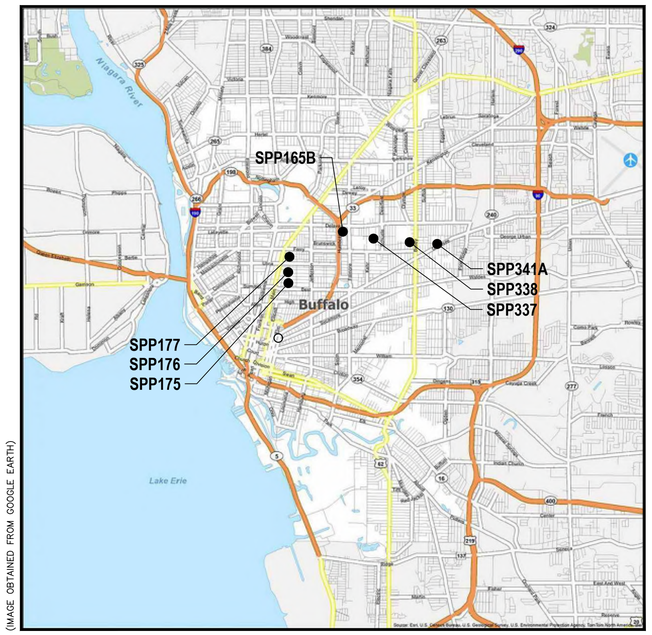
Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

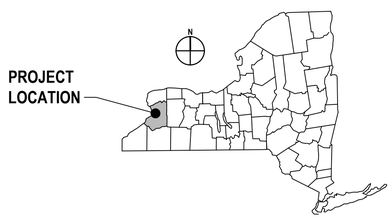
Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate Federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

APPENDIX E: Project Drawings



(IMAGE OBTAINED FROM GOOGLE EARTH)

LOCATION PLAN
NOT TO SCALE



BUFFALO SEWER AUTHORITY
CSO-053 SEWER PATROL POINT MODIFICATIONS

PRELIMINARY DESIGN

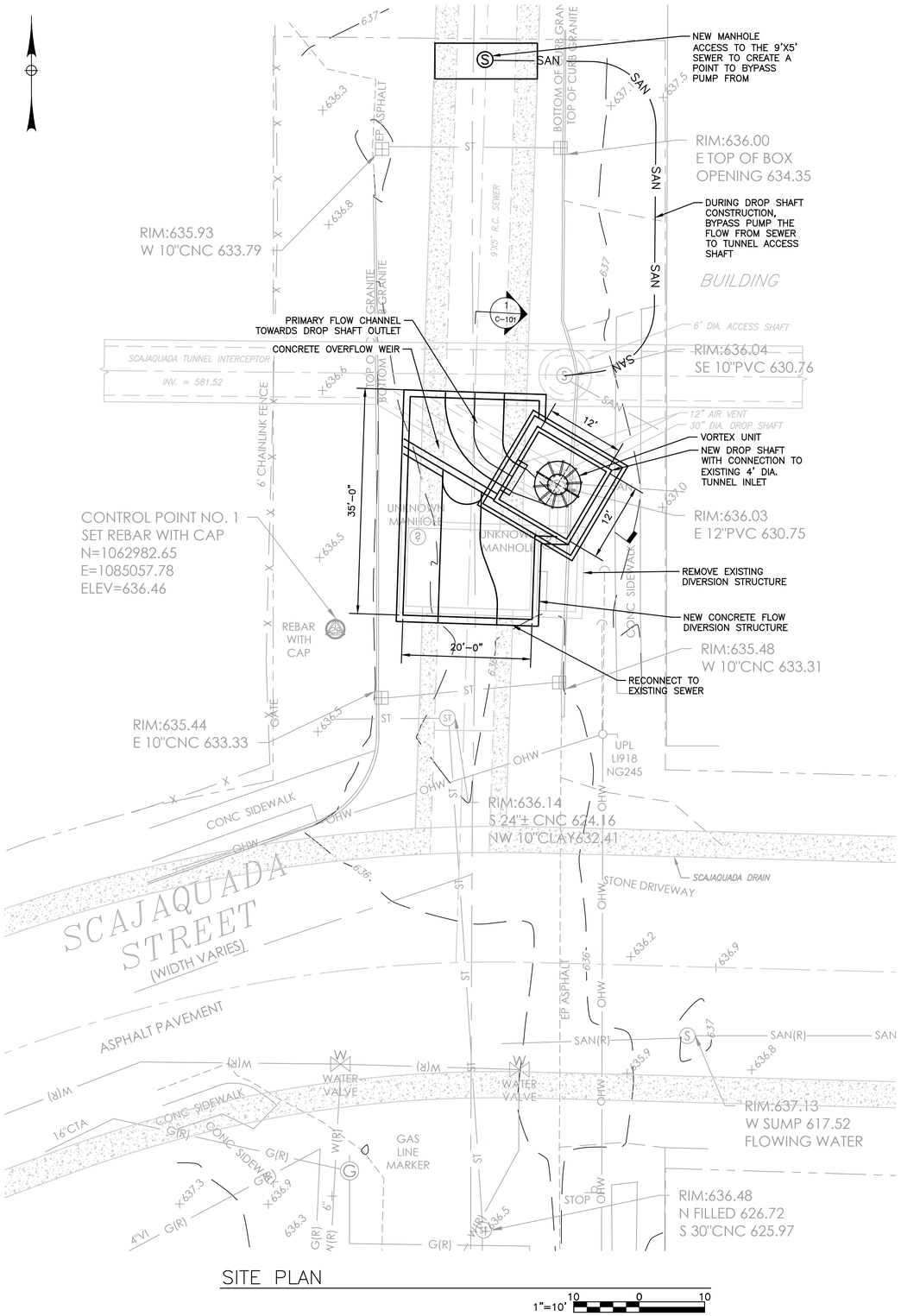
SEWER PATROL POINT MODIFICATION LOCATIONS:
SPP337 - COLORADO AVE.
SPP165B - HUMBOLDT PKWY.
SPP338 - BAILEY AVE.
SPP341A - GENESEE ST.
SPP175 - MICHIGAN AVE. AT DODGE ST.
SPP176 - MICHIGAN AVE. AT RILEY ST.
SPP177 - MICHIGAN AVE. AT GLENWOOD AVE.

BUFFALO SEWER AUTHORITY BOARD
HERBERT L. BELLAMY, JR. CHAIRMAN
CHRISTOPHER ROOSEVELT ASST. VICE-CHAIRMAN
ELEANOR C. PERTRUCCI SECRETARY

GENERAL MANAGER
OLUWOLE A. McFOY, P.E.

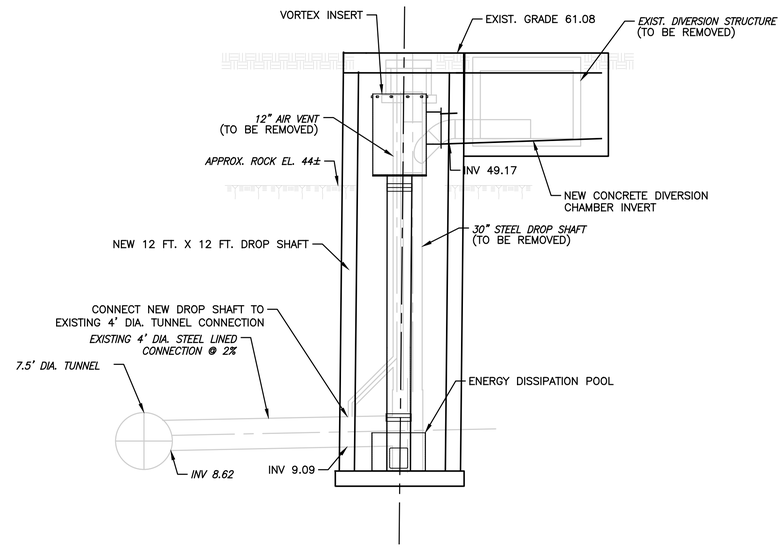
PRINCIPAL SANITARY ENGINEER
ROSALEEN B. NOGLE, P.E.

PREPARED BY:
JMDavidson Engineering, D.P.C.
935 SHERIDAN DRIVE - SUITE 120
TONAWANDA, NEW YORK 14150 PHONE:
716-453-1646
WWW.JMDAVIDSONENG.COM



SITE PLAN

1"=10' 10 0 10



1 C-101 DROP SHAFT REPLACEMENT SECTION

1"=10' 10 0 10

OWNER:

BUFFALO SEWER AUTHORITY

ROOM 1038
BUFFALO CITY HALL
65 NIAGARA SQUARE
BUFFALO, NEW YORK 14202

QUEEN CITY CLEAN WATERS PROGRAM

SEWER PATROL POINT MODIFICATIONS
SPP165B – HUMBOLDT PKWY.
SPP175,176,&177 – MICHIGAN AVE.
SPP337 – COLORADO AVE.
SPP338 – BAILEY AVE.
SPP341A – GENESEE ST.

PREPARED BY:

JMDavidson Engineering, D.P.C.
935 SHERIDAN DRIVE – SUITE 120
TONAWANDA, NEW YORK 14150
PHONE: 716-453-1646
WWW.JMDAVIDSONENG.COM

SEAL:

NOT FOR CONSTRUCTION

MARK	DATE	DESCRIPTION
1	6/3/2024	PRELIMINARY DESIGN

PROJECT NO:	
DESIGNER PROJECT NO:	
CAD DWG FILE:	
DRAWN BY:	MAT
CHECKED BY:	JMD
SCALE:	AS NOTED
DWG. SHEET SIZE:	22" X 34"

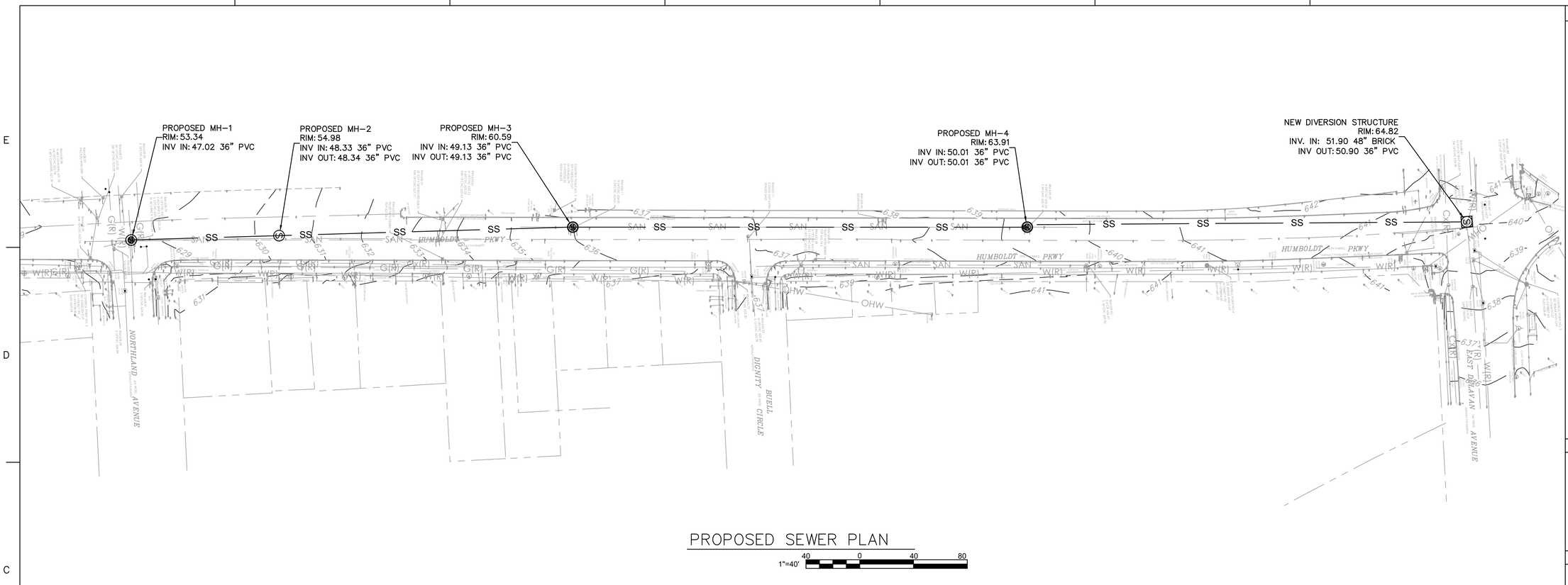
SHEET TITLE:

SPP337 COLORADO AVE AT SCAJAQUADA ST MODIFICATIONS

DRAWING#

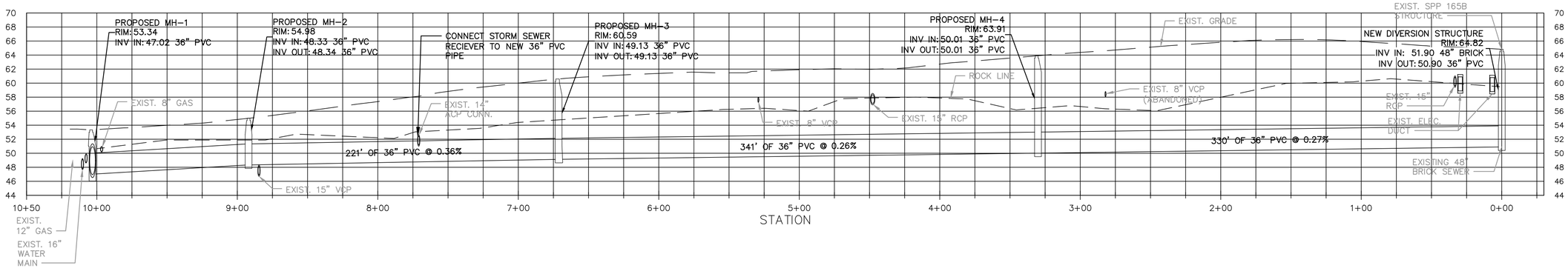
C-101

BAR IS ONE INCH ON UNMODIFIED DRAWING



PROPOSED SEWER PLAN

1"=40'



PROPOSED SEWER PROFILE

HORIZONTAL: 1"=40'

VERTICAL: 1"=5'

OWNER:

BUFFALO SEWER AUTHORITY

ROOM 1038
BUFFALO CITY HALL
65 NIAGARA SQUARE
BUFFALO, NEW YORK 14202

QUEEN CITY CLEAN WATERS PROGRAM

SEWER PATROL POINT MODIFICATIONS
SPP165B – HUMBOLDT PKWY.
SPP175,176,&177 – MICHIGAN AVE.
SPP337 – COLORADO AVE.
SPP338 – BAILEY AVE.
SPP341A – GENESEE ST.

PREPARED BY:

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SEAL:

NOT FOR CONSTRUCTION

MARK	DATE	DESCRIPTION
1	6/3/2024	PRELIMINARY DESIGN

PROJECT NO:	
DESIGNER PROJECT NO:	
CAD DWG FILE:	
DRAWN BY:	MAT
CHECKED BY:	JMD
SCALE:	AS NOTED
DWG. SHEET SIZE:	22" X 34"

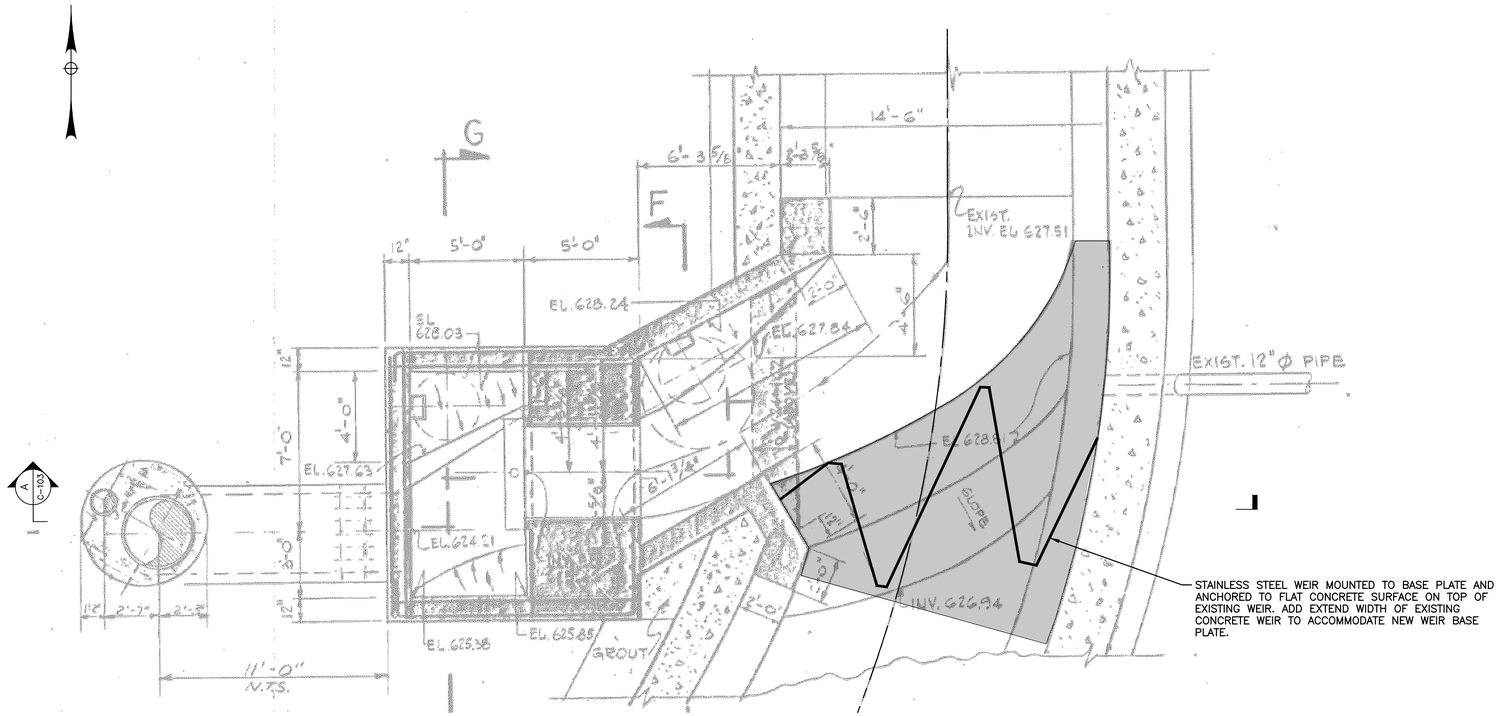
SHEET TITLE:

SPP165B EAST DELAVAN AVE. AT HUMBOLT PKWY. MODIFICATIONS

DRAWING#

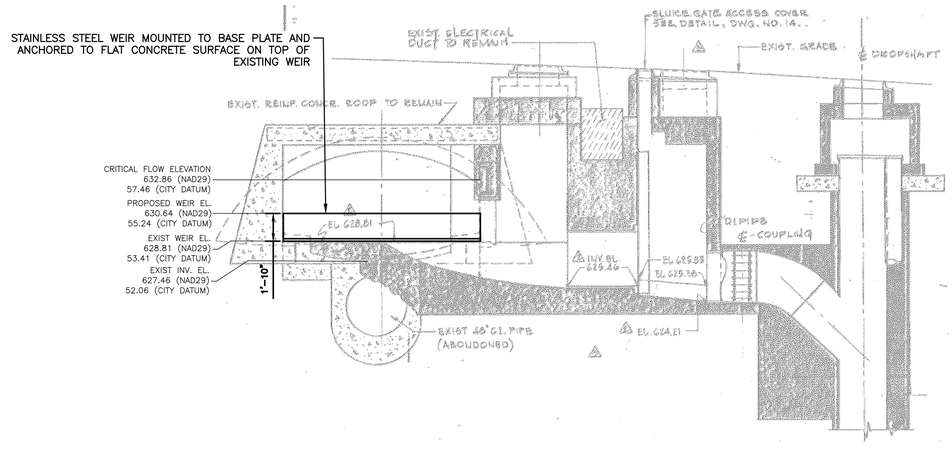
C-102

SHEET 3 OF 7



SPP338 – BAILEY AVE. PLAN

1"=5'



A C-103 SECTION

3/8"=1'-0"

OWNER:

BUFFALO SEWER AUTHORITY

ROOM 1038
BUFFALO CITY HALL
65 NIAGARA SQUARE
BUFFALO, NEW YORK 14202

QUEEN CITY CLEAN WATERS PROGRAM

SEWER PATROL POINT MODIFICATIONS
SPP165B – HUMBOLDT PKWY.
SPP175,176,&177 – MICHIGAN AVE.
SPP337 – COLORADO AVE.
SPP338 – BAILEY AVE.
SPP341A – GENESEE ST.

PREPARED BY:

JMDavidson Engineering, D.P.C.
935 SHERIDAN DRIVE – SUITE 120
TONAWANDA, NEW YORK 14150
PHONE: 716-453-1646
WWW.JMDAVIDSONENG.COM

SEAL:

NOT FOR CONSTRUCTION

MARK	DATE	DESCRIPTION
1	6/3/2024	PRELIMINARY DESIGN

PROJECT NO:	
DESIGNER PROJECT NO:	
CAD DWG FILE:	
DRAWN BY:	MAT
CHECKED BY:	JMD
SCALE:	AS NOTED
DWG. SHEET SIZE:	22" X 34"

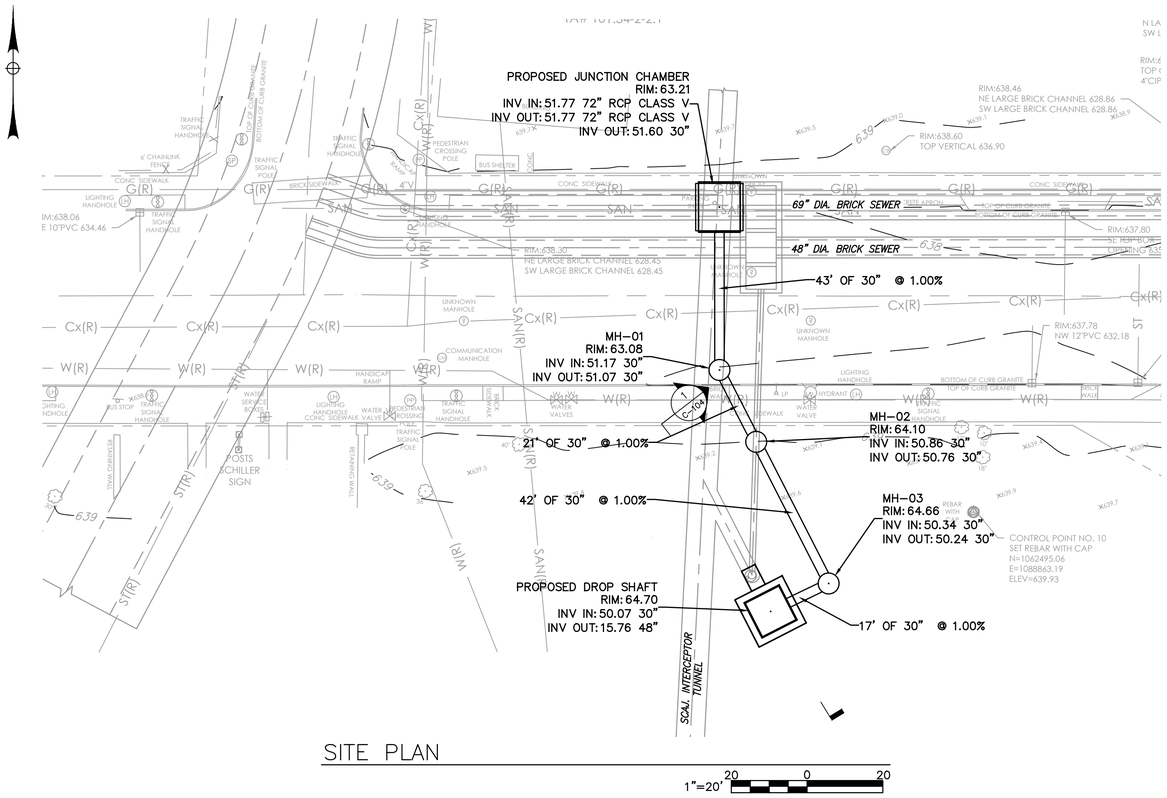
SHEET TITLE:

SPP338 BAILEY AVE. MODIFICATIONS

DRAWING#

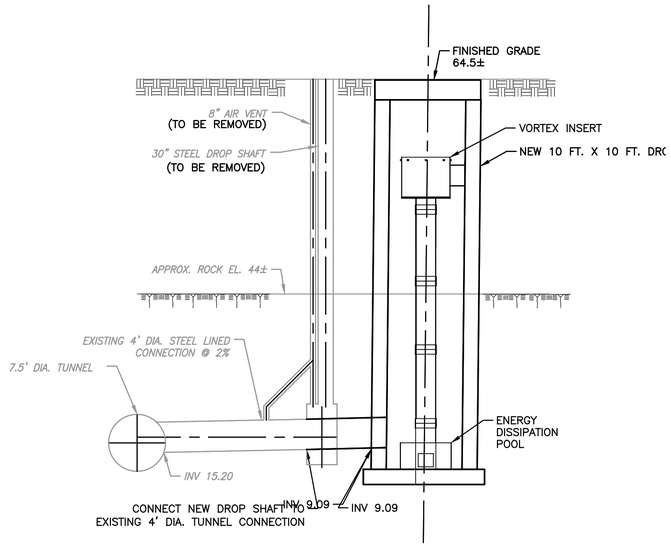
C–103

SHEET 4 OF 7



SITE PLAN

1"=20' 20 0 20



1 C-104 DROP SHAFT REPLACEMENT SECTION

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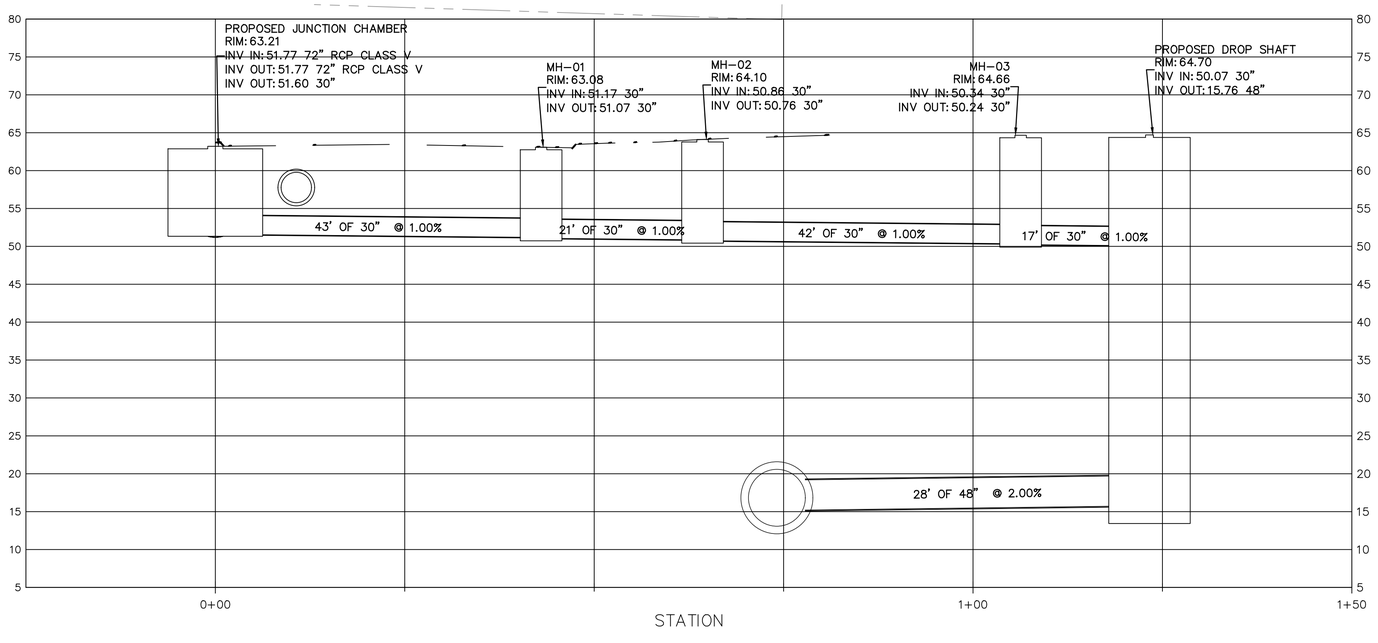

SEWER AND DROP SHAFT PROFILE

1"=10' 10 0 10

OWNER:

BUFFALO SEWER AUTHORITY

ROOM 1038
BUFFALO CITY HALL
65 NIAGARA SQUARE
BUFFALO, NEW YORK 14202

QUEEN CITY CLEAN WATERS PROGRAM

SEWER PATROL POINT MODIFICATIONS
SPP165B – HUMBOLDT PKWY.
SPP175,176,&177 – MICHIGAN AVE.
SPP337 – COLORADO AVE.
SPP338 – BAILEY AVE.
SPP341A – GENESEE ST.

PREPARED BY:

JMDavidson Engineering, D.P.C.
935 SHERIDAN DRIVE – SUITE 120
TONAWANDA, NEW YORK 14150
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SEAL:

NOT FOR CONSTRUCTION

MARK	DATE	DESCRIPTION
1	6/3/2024	PRELIMINARY DESIGN

PROJECT NO:	
DESIGNER PROJECT NO:	
CAD DWG FILE:	
DRAWN BY:	MAT
CHECKED BY:	JMD
SCALE:	AS NOTED
DWG. SHEET SIZE:	22" X 34"

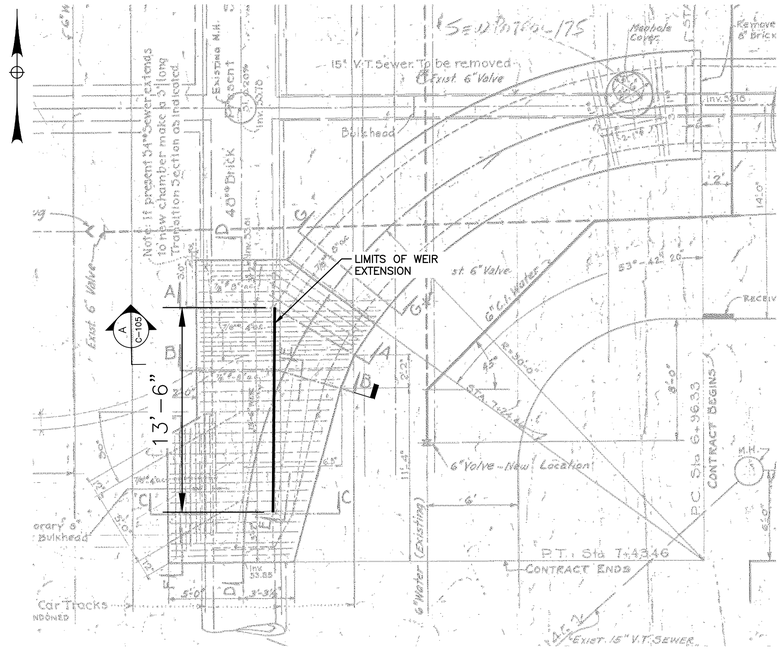
SHEET TITLE:

SPP341A GENESEE ST NEAR KERNS AVE MODIFICATIONS

DRAWING#

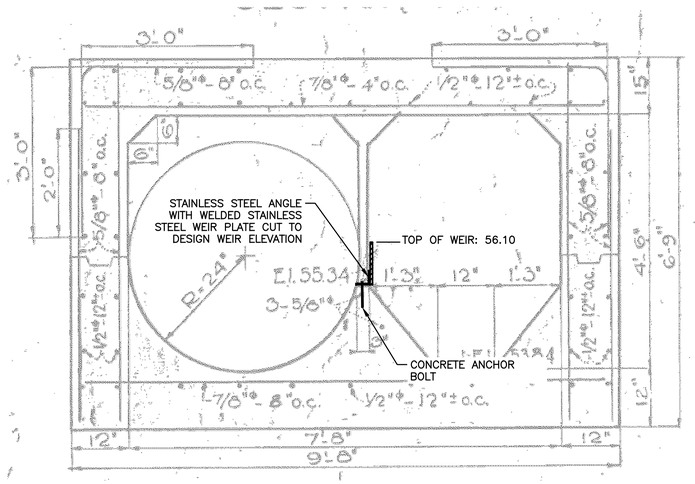
C-104

SHEET 5 OF 7



SPP175 – MICHIGAN AVE. AT DODGE STREET PLAN

1"=5' 5 0 5



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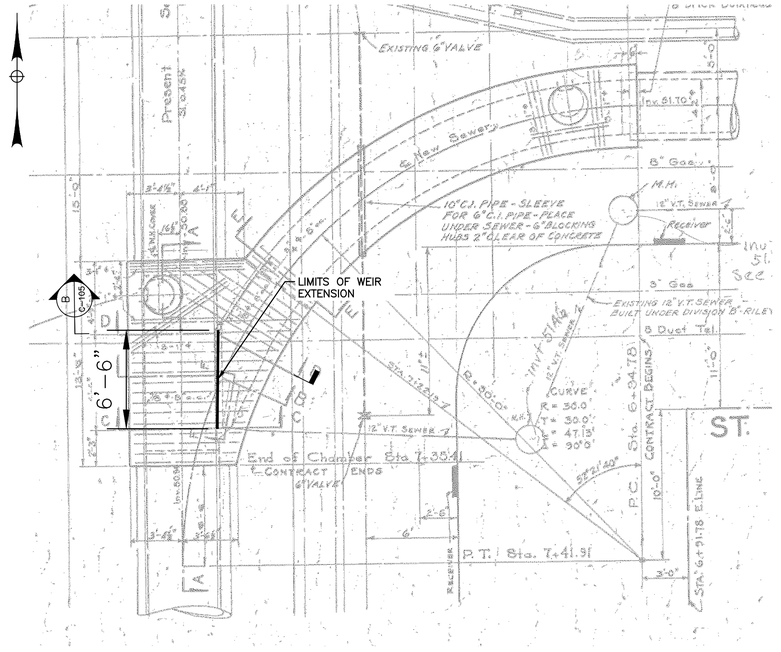
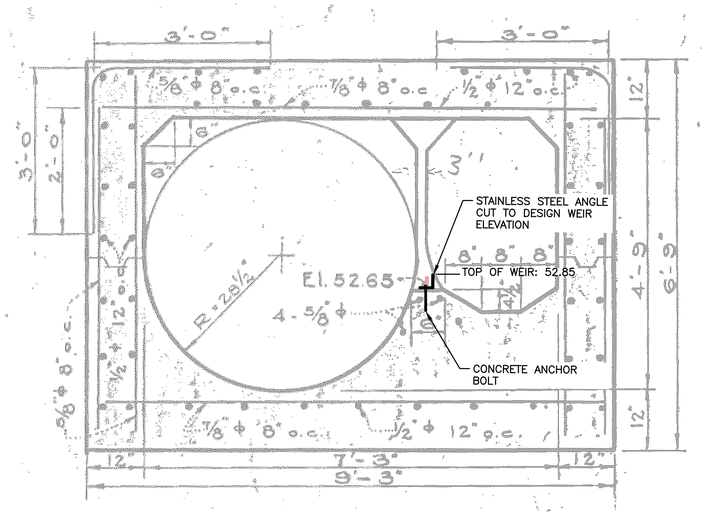
3/8"=1'-0" 1 0 1 2 3 4



SPP176 – MICHIGAN AVE. AT RILEY STREET PLAN

1"=5' 5 0 5



B (C-105) SECTION

3/8"=1'-0" 1 0 1 2 3 4

OWNER:

BUFFALO SEWER AUTHORITY

ROOM 1038
BUFFALO CITY HALL
65 NIAGARA SQUARE
BUFFALO, NEW YORK 14202

QUEEN CITY CLEAN WATERS PROGRAM

SEWER PATROL POINT MODIFICATIONS
SPP165B – HUMBOLDT PKWY.
SPP175,176,&177 – MICHIGAN AVE.
SPP337 – COLORADO AVE.
SPP338 – BAILEY AVE.
SPP341A – GENESEE ST.

PREPARED BY:

JMDavidson Engineering, D.P.C.

935 SHERIDAN DRIVE – SUITE 120
TONAWANDA, NEW YORK 14150
PHONE: 716-453-1646
WWW.JMDAVIDSONENG.COM

SEAL:

NOT FOR CONSTRUCTION

MARK	DATE	DESCRIPTION
1	6/3/2024	PRELIMINARY DESIGN

PROJECT NO:	
DESIGNER PROJECT NO:	
CAD DWG FILE:	
DRAWN BY:	MAT
CHECKED BY:	JMD
SCALE:	AS NOTED
DWG. SHEET SIZE:	22" X 34"

SHEET TITLE:

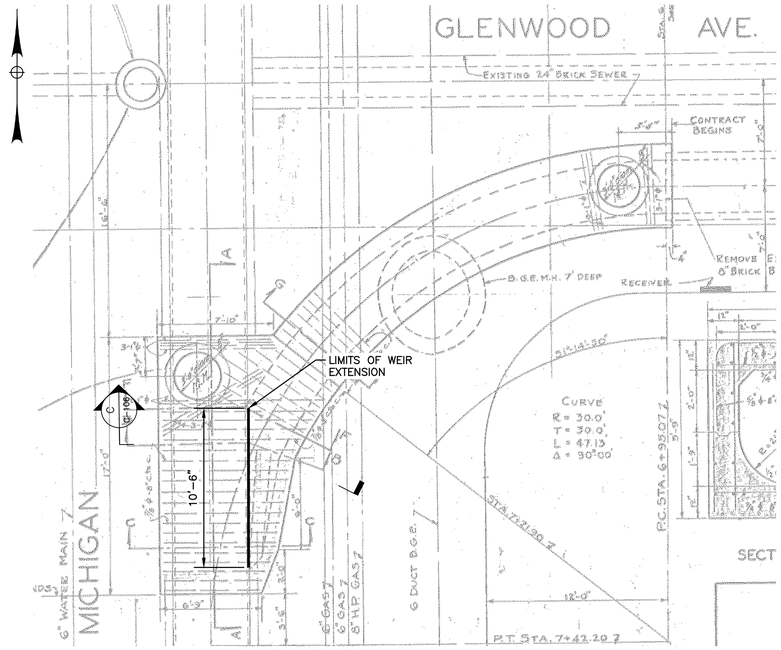
SPP175 MICHIGAN AVE AT DODGE ST & SPP 176 MICHIGAN ST AT RILEY ST MODIFICATIONS

DRAWING#

C-105

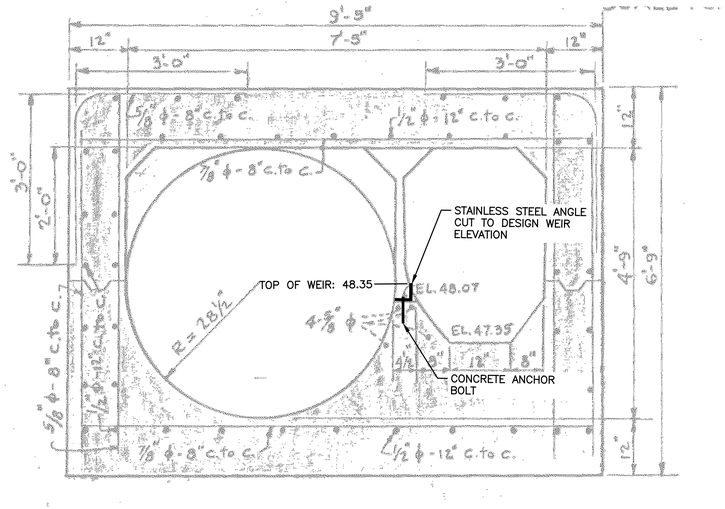
BAR IS ONE INCH ON UNSCALED DRAWING

User:MICHAELTERRANA Spec:### File:C103-MICHIGAN.DWG Scale:1:1 SavedDate:5/31/2024 Time:13:56 Plot Date: Michael Terrana; 5/31/2024; 14:07 ; Layout:MICHIGAN 1



SPP177 – MICHIGAN AVE. AT GLENWOOD AVE. PLAN

1"=5'



C C-106 SECTION

3/8"=1'-0"

OWNER:

BUFFALO SEWER AUTHORITY

ROOM 1038
BUFFALO CITY HALL
65 NIAGARA SQUARE
BUFFALO, NEW YORK 14202

QUEEN CITY CLEAN WATERS PROGRAM

SEWER PATROL POINT MODIFICATIONS
SPP165B – HUMBOLDT PKWY.
SPP175,176,&177 – MICHIGAN AVE.
SPP337 – COLORADO AVE.
SPP338 – BAILEY AVE.
SPP341A – GENESEE ST.

PREPARED BY:

JMDavidson Engineering, D.P.C.

935 SHERIDAN DRIVE – SUITE 120
TONAWANDA, NEW YORK 14150
PHONE: 716-453-1646
WWW.JMDAVIDSONENG.COM

SEAL:

NOT FOR CONSTRUCTION

MARK	DATE	DESCRIPTION
1	6/3/2024	PRELIMINARY DESIGN

PROJECT NO:	
DESIGNER PROJECT NO:	
CAD DWG FILE:	
DRAWN BY:	MAT
CHECKED BY:	JMD
SCALE:	AS NOTED
DWG. SHEET SIZE:	22" X 34"

SHEET TITLE:

SPP177 MICHIGAN AVE AT GLENWOOD ST MODIFICATIONS

DRAWING#

C-106

SHEET 7 OF 7

APPENDIX F: Opinions of Probable Project Costs

BUFFALO SEWER AUTHORITY

CSO-053 SEWER PATROL POINT (SPP) MODIFICATIONS

PRELIMINARY ENGINEERING OPINION OF PROBABLE CONSTRUCTION COST

DATE: 6/3/2024

SPP337 - COLORADO AVE.

ITEM NO.	DESCRIPTION		COST
1	DIVERSION STRUCTURE AND DROP SHAFT	$	2,790,000.00
2	NEW ACCESS POINT IN EXISTING SEWER	$	100,000.00
3	SITE RESTORATION	$	213,000.00
4	HANDLING AND DISPOSAL OF CONTAMINATED SOIL	$	2,462,000.00
5	WORK ZONE TRAFFIC CONTROL	$	39,000.00
6	BYPASS PUMPING	$	970,000.00
	SUBTOTAL:	$	6,574,000.00
	CONSTRUCTION CONTINGENCY 10%	$	657,400.00
	SUBTOTAL:	$	7,231,400.00
	CONTRACTOR MOBILIZATION 4%	$	289,256.00
	GENERAL CONDITIONS, BONDS, INSURANCES 3%	$	216,942.00
	SUBTOTAL:	$	7,737,598.00

Today	6/10/2024	
Target const start	4/24/2026	
Target const end	11/20/2027	
Estimated Midpoint	2/5/2027	2.66
Estimated Project Duration (yrs)	1.58	
Assumed inflation rate	0.04	

Budget for IUP Listing	Amount	Escalated to midpoint of construction
1. Construction Costs:	$ 7,737,598.00	$ 8,588,081.92
2. Equipment Costs:		$ -
3. Work Force Costs:		$ -
4. Engineering Fees:		$ -
4.a. Planning:		$ -
4.b. Design:	$ 1,160,639.70	$ 1,288,212.29
4.c. Construction:	$ 1,160,639.70	$ 1,288,212.29
5. Other Expense:		$ -
5.a. Local Counsel:		$ -
5.b. Bond Counsel:		$ -
5.c. Fiscal Services:		$ -
5.d. Miscellaneous:	$ 386,879.90	$ 429,404.10
6. Contingencies*:	$ 3,656,015.06	$ 4,057,868.71
Total Project Costs:	$ 14,101,772.36	$ 15,651,779.30

BUFFALO SEWER AUTHORITY

CSO-053 SEWER PATROL POINT (SPP) MODIFICATIONS
PRELIMINARY ENGINEERING OPINION OF PROBABLE CONSTRUCTION COST
DATE: 6/3/2024

Today	6/10/2024	
Target const start	4/24/2026	
Target const end	11/20/2027	
Estimated Midpoint	2/5/2027	2.66
Estimated Project Duration (yrs)	1.58	
Assumed inflation rate	0.04	

SPP341A - GENESEE ST.

ITEM NO.	DESCRIPTION	COST
1	DROP SHAFT	$ 1,910,000.00
2	DIVERSION STRUCTURE	$ 500,000.00
3	SEWER PIPE AND MANHOLES	$ 370,000.00
4	SITE RESTORATION	$ 340,000.00
5	WORK ZONE TRAFFIC CONTROL	$ 103,000.00
6	UTILITY COORDINATION AND WATERLINE RELOCATION	$ 80,000.00
7	BYPASS PUMPING	$ 286,200.00
	SUBTOTAL:	$ 3,589,200.00
	CONSTRUCTION CONTINGENCY 10%	$ 358,920.00
	SUBTOTAL:	$ 3,948,120.00
	CONTRACTOR MOBILIZATION 4%	$ 157,924.80
	GENERAL CONDITIONS, BONDS, INSURANCES 3%	$ 118,443.60
	SUBTOTAL:	$ 4,224,488.40

Budget for IUP Listing	Amount	Escalated to midpoint of construction
1. Construction Costs:	$ 4,224,488.40	$ 4,688,826.23
2. Equipment Costs:		$ -
3. Work Force Costs:		$ -
4. Engineering Fees:		$ -
4.a. Planning:		$ -
4.b. Design:	$ 633,673.26	$ 703,323.93
4.c. Construction:	$ 633,673.26	$ 703,323.93
5. Other Expense:		$ -
5.a. Local Counsel:		
5.b. Bond Counsel:		$ -
5.c. Fiscal Services:		$ -
5.d. Miscellaneous:	$ 211,224.42	$ 234,441.31
6. Contingencies*:	$ 1,996,070.77	$ 2,215,470.39
Total Project Costs:	$ 7,699,130.11	$ 8,545,385.80

BUFFALO SEWER AUTHORITY

CSO-053 SEWER PATROL POINT (SPP) MODIFICATIONS

PRELIMINARY ENGINEERING OPINION OF PROBABLE CONSTRUCTION COST

DATE: 6/3/2024

SPP165B - HUMBOLDT PKWY.

ITEM NO.	DESCRIPTION		COST
1	NEW DIVISION STRUCTURE	$	160,000.00
2	SEWER PIPE AND MANHOLES	$	1,341,000.00
3	SITE RESTORATION	$	157,000.00
4	WORK ZONE TRAFFIC CONTROL	$	133,000.00
	SUBTOTAL:	$	1,791,000.00
	CONSTRUCTION CONTINGENCY 10%	$	179,100.00
	SUBTOTAL:	$	1,970,100.00
	CONTRACTOR MOBILIZATION 4%	$	78,804.00
	GENERAL CONDITIONS, BONDS, INSURANCES 3%	$	59,103.00
	SUBTOTAL:	$	2,108,007.00

Today	6/10/2024	
Target const start	4/1/2026	
Target const end	6/1/2030	
Estimated Midpoint	2/5/2027	2.66
Estimated Project Duration (yrs)	4.17	
Assumed inflation rate	0.04	

Humboldt

Budget for IUP Listing	Amount	Escalated to midpoint of construction
1. Construction Costs:	$ 2,108,007.00	$ 2,339,584.48
2. Equipment Costs:		$ -
3. Work Force Costs:		$ -
4. Engineering Fees:		$ -
4.a. Planning:		$ -
4.b. Design:	$ 316,201.05	$ 350,937.67
4.c. Construction:	$ 316,201.05	$ 350,937.67
5. Other Expense:		$ -
5.a. Local Counsel:		$ -
5.b. Bond Counsel:		$ -
5.c. Fiscal Services:		$ -
5.d. Miscellaneous:	$ 105,400.35	$ 116,979.22
6. Contingencies*:	$ 996,033.31	$ 1,105,453.67
Total Project Costs:	$ 3,841,842.76	$ 4,263,892.71
	In 2024	Midpoint of construction

*Overall project contingency

BUFFALO SEWER AUTHORITY

CSO-053 SEWER PATROL POINT (SPP) MODIFICATIONS

PRELIMINARY ENGINEERING OPINION OF PROBABLE CONSTRUCTION COST

SPP338 - BAILEY AVE.

Today 6/10/2024

Target const start 4/1/2026

ITEM NO.	DESCRIPTION		COST
1	FURNISH AND INSTALL FABRICATED STAINLESS STEEL WEIR	$	100,000.00
2	WORK ZONE TRAFFIC CONTROL	$	10,000.00
3	MISC. CONCRETE REPAIR	$	25,000.00
	SUBTOTAL:	$	135,000.00
	CONSTRUCTION CONTINGENCY 10%	$	13,500.00
	SUBTOTAL:	$	148,500.00
	CONTRACTOR MOBILIZATION 4%	$	5,940.00
	GENERAL CONDITIONS, BONDS, INSURANCES 3%	$	4,455.00
	SUBTOTAL:	$	158,895.00

Bailey

Budget for IUP Listing	**Amount**	**Escalated to midpoint of construction**
1. Construction Costs:	$ 158,895.00	$ 176,350.59
2. Equipment Costs:		$ -
3. Work Force Costs:		$ -
4. Engineering Fees:		$ -
4.a. Planning:		$ -
4.b. Design:	$ 23,834.25	$ 26,452.59
4.c. Construction:	$ 23,834.25	$ 26,452.59
5. Other Expense:		$ -
5.a. Local Counsel:		$ -
5.b. Bond Counsel:		$ -
5.c. Fiscal Services:		$ -
5.d. Miscellaneous:	$ 7,944.75	$ 8,817.53
6. Contingencies*:	$ 75,077.89	$ 83,325.65
Total Project Costs:	$ 289,586.14	$ 321,398.95

BUFFALO SEWER AUTHORITY

CSO-053 SEWER PATROL POINT (SPP) MODIFICATIONS

PRELIMINARY ENGINEERING OPINION OF PROBABLE CONSTRUCTION COST

SPP175 - MICHIGAN AVE. AT DODGE ST.

ITEM NO.	DESCRIPTION	COST
1	INSTALL FABRICATED STAINLESS STEEL WEIR MODIFICATION	$ 36,000.00
2	WORK ZONE TRAFFIC CONTROL	$ 8,000.00
3	MISC. CONCRETE REPAIR	$ 10,000.00
	SUBTOTAL:	$ 54,000.00
	CONSTRUCTION CONTINGENCY 10%	$ 5,400.00
	SUBTOTAL:	$ 59,400.00
	CONTRACTOR MOBILIZATION 4%	$ 2,376.00
	GENERAL CONDITIONS, BONDS, INSURANCES 3%	$ 1,782.00
	SUBTOTAL:	$ 63,558.00

SPP176 - MICHIGAN AVE. AT RILEY ST.

ITEM NO.	DESCRIPTION	COST
1	INSTALL FABRICATED STAINLESS STEEL WEIR MODIFICATION	$ 13,000.00
2	WORK ZONE TRAFFIC CONTROL	$ 6,000.00
3	MISC. CONCRETE REPAIR	$ 10,000.00
	SUBTOTAL:	$ 29,000.00
	CONSTRUCTION CONTINGENCY 10%	$ 2,900.00
	SUBTOTAL:	$ 31,900.00
	CONTRACTOR MOBILIZATION 4%	$ 1,276.00
	GENERAL CONDITIONS, BONDS, INSURANCES 3%	$ 957.00
	SUBTOTAL:	$ 34,133.00

Today 6/10/2024

Target const start 4/1/2026

Michigan

Budget for IUP Listing	Amount	Escalated to midpoint of construction
1. Construction Costs:	$ 133,001.00	$ 147,611.97
2. Equipment Costs:		$ -
3. Work Force Costs:		$ -
4. Engineering Fees:		$ -
4.a. Planning:		$ -
4.b. Design:	$ 19,950.15	$ 22,141.80
4.c. Construction:	$ 19,950.15	$ 22,141.80
5. Other Expense:		$ -
5.a. Local Counsel:		$ -
5.b. Bond Counsel:		$ -
5.c. Fiscal Services:		$ -
5.d. Miscellaneous:	$ 6,650.05	$ 7,380.60
6. Contingencies*:	$ 62,842.97	$ 69,746.66
Total Project Costs:	$ 242,394.32	$ 269,022.82

BUFFALO SEWER AUTHORITY

CSO-053 SEWER PATROL POINT (SPP) MODIFICATIONS

PRELIMINARY ENGINEERING OPINION OF PROBABLE CONSTRUCTION COST

SPP177 - MICHIGAN AVE. AT GLENWOOD AVE.

Today 6/10/2024

Target const start 4/1/2026

ITEM NO.	DESCRIPTION	COST
1	INSTALL FABRICATED STAINLESS STEEL WEIR MODIFICATION	$ 14,000.00
2	WORK ZONE TRAFFIC CONTROL	$ 6,000.00
3	MISC. CONCRETE REPAIR	$ 10,000.00
	SUBTOTAL:	$ 30,000.00
	CONSTRUCTION CONTINGENCY 10%	$ 3,000.00
	SUBTOTAL:	$ 33,000.00
	CONTRACTOR MOBILIZATION 4%	$ 1,320.00
	GENERAL CONDITIONS, BONDS, INSURANCES 3%	$ 990.00
	SUBTOTAL:	$ 35,310.00

APPENDIX G: Engineering Report Certification

Engineering Report Certification

To Be Provided by the Professional Engineer Preparing the Report

During the preparation of this Engineering Report, I have studied and evaluated the cost and effectiveness of the processes, materials, techniques, and technologies for carrying out the proposed project or activity for which assistance is being sought from the New York State Clean Water State Revolving Fund. In my professional opinion, I have recommended for selection, to the maximum extent practicable, a project or activity that maximizes the potential for efficient water use, reuse, recapture, and conservation, and energy conservation, taking into account the cost of constructing the project or activity, the cost of operating and maintaining the project or activity over the life of the project or activity, and the cost of replacing the project and activity.

Title of Engineering Report: CSO-053 Sewer Patrol Point (SPP) Modifications

Date of Report: 6/19/2024

Professional Engineer's Name: Michael A. Terrana, PE

Signature:

Date: 06/19/2024

APPENDIX H: SPDES Permit and Administrative Order

New York State Department of Environmental Conservation
Division of Environmental Permits, Region 9
270 Michigan Avenue, Buffalo, New York 14203-2915
Phone: (716) 851-7165 **Fax:** (716) 851-7168
Website: www.dec.ny.gov

Joe Martens
Commissioner

August 15, 2014

CERTIFIED MAIL, RETURN RECEIPT

Mr. David P. Comerford
General Manager
Buffalo Sewer Authority
1038 City Hall
Buffalo, New York 14202-3310

Dear Mr. Comerford:

NOTICE OF INTENT TO MODIFY
STATE POLLUTANT DISCHARGE ELIMINATION SYSTEM (SPDES) PERMIT
DEC NO. 9-1402-00154/00002
SPDES NO. NY 0028410

This is to inform you that pursuant to Environmental Conservation Law, Article 17, Title 8 and 6 NYCRR Part 750, the New York State Department of Environmental Conservation has made a determination to modify your referenced State Pollutant Discharge Elimination System Permit. The modified permit contains the following change from the previous version:

> The BSA CSO Long Term Control Plan (LTCP) was approved on March 18, 2014. The EPA subsequently issued a revised Administrative Order (CWA-02-2014-3033) which addressed implementation of the LTCP.
>
> BSA shall implement the approved CSO LTCP in accordance with the EPA Order (CWA-02-2014-3033) and the implementation schedules contained therein.
>
> This change to this permit is contained on page 18.

This modification will become effective on October 1, 2014 unless you either submit on or prior to September 2, 2014 a written statement giving reasons why the permit should not be so modified or petition for a hearing, and if no written objection is received by this office from the Regional Administrator of the U.S. Environmental Protection Agency. Any such petition for a hearing shall contain specific evidence to support your contention that a hearing is necessary in accordance with 6 NYCRR, Part 621.

Thank you for your cooperation.

Respectfully,

David S. Denk
Regional Permit Administrator

MFP
Enclosures
ecc: Mr. Jeffrey Konsella, NYSDEC, Division of Water, Buffalo, Attn: Mr. William Smythe (w/enc)
Ms. Cheri Jamison, NYSDEC, Bureau of Water Permits, Albany (w/enc)
Mr. Brian Baker, NYSDEC, Division of Water, Albany (w/enc)
Ms. Michelle Josilo, U.S. Environmental Protection Agency, Region II (w/enc)
Erie County Health Department (w/enc)

SPDES Permit Statement of Basis

Permittee: Buffalo Sewer Authority
Facility: Bird Island WWTP
SPDES No: SPDES NO. 0028410

Date: August 15, 2014
Permit Writer: J. Robert Smythe

The department initiated modified draft SPDES permit is proposed and includes new language for implementation of the Buffalo Sewer Authority Long Term Control Plan (LTCP) approved March 18, 2014.

The only change to this permit is contained on page 18, with the following language added:

The BSA CSO Long Term Control Plan (LTCP) was approved on March 18, 2014. The EPA subsequently issued a revised Administrative Order (CWA-02-2014-3033) which addressed implementation of the LTCP.

BSA shall implement the approved CSO LTCP in accordance with the EPA Order (CWA-02-2014-3033) and the implementation schedules contained therein.

This permit may be reopened for modification to include any additional requirements in accordance with 6 NYCRR Part 621.

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

State Pollutant Discharge Elimination System (SPDES)
DISCHARGE PERMIT

First3.99

Industrial Code:	**4952**	SPDES Number:	**NY0028410**
Discharge Class (CL):	**05**	DEC Number:	**9-1402-00154/00002**
Toxic Class (TX):	**T**	Effective Date (EDP):	**07/01/2014**
Major Drainage Basin:	**01**	Expiration Date (ExDP):	**06/30/2019**
Sub Drainage Basin:	**01**	Modification Date (EDPM):	**10/01/2014**
Water Index Number:	**Ont 158**		
Compact Area:			

This SPDES permit is issued in compliance with Title 8 of Article 17 of the Environmental Conservation Law of New York State and in compliance with the Clean Water Act, as amended, (33 U.S.C. §1251 et.seq.) (hereinafter referred to as "the Act").

PERMITTEE NAME AND ADDRESS

Name: **Buffalo Sewer Authority** Attention: **David P. Comerford, General Manager**
Street: **1038 City Hall**
City: **Buffalo** State: **NY** Zip Code: **14202-3310**

is authorized to discharge from the facility described below:

FACILITY NAME AND ADDRESS

Name: **Bird Island Wastewater Treatment Facility** Contact: **James Keller Jr.,**
Location (C,T,V): **Buffalo (C)** County: **Erie**
Facility Address: **90 West Ferry Street**
City: **Buffalo** State: **NY** Zip Code: **14213**
NYTM -E: 181.42 NYTM - N: 4759.77
From Outfall No.: **002** at Latitude: **42 ° 55 ′ 16 ″** & Longitude: **78 ° 54 ′ 20 ″**
into receiving waters known as: **Niagara River** Class: **A-Special**

See additional outfalls listing on pages 3 through 5 of this permit.

in accordance with: effluent limitations; monitoring and reporting requirements; other provisions and conditions set forth in this permit; and 6 NYCRR Part 750-1.2(a) and 750-2.

DISCHARGE MONITORING REPORT (DMR) MAILING ADDRESS

Mailing Name: **Buffalo Sewer Authority**
Street: **90 West Ferry Street**
City: **Buffalo** State: **NY** Zip Code: **14213**
Responsible Official or Agent: **Sal LoTempio, Plant Superintendent** Phone: **(716) 883-1820**

This permit and the authorization to discharge shall expire on midnight of the expiration date shown above and the permittee shall not discharge after the expiration date unless this permit has been renewed, or extended pursuant to law. To be authorized to discharge beyond the expiration date, the permittee shall apply for permit renewal not less than 180 days prior to the expiration date shown above.

DISTRIBUTION:
BWP – Permit Writer
BWP – Permit Coordinator
Regional Water Engineer - Region 9
Regional Permit Administrator – Region 9
Michelle Josilo - EPA Region II

Regional Permit Administrator: David S. Denk
Address: NYSDEC - Division of Environmental Permits
270 Michigan Avenue
Buffalo, NY 14203-2915
Signature: Date: 8/15/14

TABLE OF CONTENTS

I. ADDITIONAL OUTFALLS

a) Treatment Plant

Outfall	Type	Location	Latitude	Longitude	Receiving Water
001	Primary Treatment Outfall	West Wall - Bird Island	42° 55' 10" N	78° 54' 16" W	Niagara River
01A	Headworks Bypass	West Wall - Bird Island	42° 55' 01" N	78° 54' 14" W	Niagara River
002	WWTF Outfall	West Wall - Bird Island	42° 55' 16" N	78° 54' 20" W	Niagara River

b) Combined Sewer Overflows

Outfall	Type	Location	Latitude	Longitude	Receiving Water
003	Weir & Orifice	Austin Street	42° 56' 14" N	78° 54' 26" W	Black Rock Canal
004	Leaping Weir	Bird Avenue	42° 55' 34" N	78° 53' 57"W	Black Rock Canal
005	Manhole	Potomac Avenue	42° 55' 27" N	78° 53' 27" W	Black Rock Canal
006	Weir & Orifice	W. Delevan Avenue	42° 55' 20" N	78° 53' 29" W	Black Rock Canal
007	Weir & Orifice	W. Delevan Avenue	42° 55' 20" N	78° 55' 20" W	Black Rock Canal
008	Leaping Weir	Brace Street	42° 55' 15" N	78° 54' 00" W	Black Rock Canal
009	Leaping Weir	Auburn Street	42° 55' 08" N	78° 54' 03" W	Black Rock Canal
010	Leaping Weir	Breckenridge Street	42° 55' 02" N	78° 54' 05" W	Black Rock Canal
011	Weir & Orifice	Albany St to W. Wall - Bird Island	42° 54' 49" N	78° 54' 12" W	Niagara River
012	Weir & Orifice	Albany Street	42° 54' 48" N	78° 54' 07" W	Black Rock Canal
013	Weir & Orifice	Virginia Street	42° 53' 20" N	78° 53' 37" W	Buffalo Harbor
014	Manhole	Fourth Street	42° 53' 01" N	78° 53' 12" W	Erie Basin Slip #3
015	Leaping Weir	Genesee Street	42° 52' 58" N	78° 53' 07" W	Erie Basin Slip
016	Weir & Orifice	Erie Street	42° 52' 55" N	78° 52' 57" W	Erie Basin
017	Manhole	Hamburg Drain, Main Street	42° 52' 38" N	78° 52' 47" W	Buffalo River
022	Manhole	Baltimore Street	42° 52' 23" N	78° 52' 29" W	Buffalo River
023	Manhole	Ohio Street	42° 52' 01" N	78° 52' 05" W	Buffalo River
025	Manhole	Hamburg Street	42° 51' 51" N	78° 51' 37" W	Buffalo River
026	Manhole	Smith Street	42° 51' 49" N	78° 51' 03" W	Buffalo River
027	Weir & Orifice	Babcock Street	42° 51' 48" N	78° 50' 16" W	Buffalo River
028	Manhole	Boone Street	42° 51' 38" N	78° 49' 56" W	Buffalo River

Outfall	Type	Location	Latitude	Longitude	Receiving Water
029	Weir & Orifice	Boone Street	42° 51' 38" N	78° 49' 56" W	Buffalo River
031	Manhole	Kimmel Avenue	42° 21' 37" N	78° 49' 29" W	Cazenovia Creek
032	Manhole	W. of Bailey Avenue	42° 51' 43" N	78° 49' 35" W	Buffalo River
033	Leaping Weir	Bailey Avenue	42° 51' 48" N	78° 49' 33" W	Buffalo River
035	Weir & Orifice	Cazenovia Park	42° 51' 02" N	78° 48' 31" W	Cazenovia Creek
037	Manhole	Salem Street	42° 51' 09" N	78° 48' 41" W	Cazenovia Creek
038	Manhole	Kingston Place	42° 51' 10" N	78° 48' 40" W	Cazenovia Creek
039	Leaping Weir	Tamarack Street	42° 51' 13" N	78° 48' 46" W	Cazenovia Creek
040	Manhole	Yale Place	42° 51' 15" N	78° 48' 46" W	Cazenovia Creek
042	Manhole	S. Ryan Street	42° 51' 19" N	78° 48' 51" W	Cazenovia Creek
044	Manhole	Mumford Street	42° 51' 27" N	78° 49' 06" W	Cazenovia Creek
046	Leaping Weir	Unger Avenue	42° 51' 32" N	78° 49' 13" W	Cazenovia Creek
047	Manhole	Southside Parkway	42° 51' 35" N	78° 49' 22" W	Cazenovia Creek
048	Weir & Orifice	E. of Bailey Ave.	42° 51' 38" N	78° 49' 29" W	Cazenovia Creek
049	Weir & Orifice	W. of Bailey Ave.	42° 51' 42" N	78° 49' 36" W	Buffalo River
050	Weir & Orifice	Seneca Street	42° 51' 20" N	78° 49' 16" W	Buffalo River
051	Weir & Orifice	Hillery Park	42° 51' 43" N	78° 48' 38" W	Buffalo River
052	Weir & Orifice	S. Ogden Street	42° 51' 54" N	78° 48' 08" W	Buffalo River
053	Weir & Gate	Scajaquada Drain	42° 55' 26" N	78° 51' 26" W	Scajaquada Creek
054	Manhole	Crowley Avenue	42° 57' 07" N	78° 54' 36" W	Niagara River
055	Weir	Niagara Street	42° 56' 35" N	78° 54' 35" W	Cornelius Creek, Niagara River
056	Weir	Nottingham Terrace	42° 56' 06" N	78° 52' 39" W	Scajaquada Creek
057	Weir	Tonawanda	42° 55' 43" N	78° 53' 52" W	Scajaquada Creek
058	Weir	West Avenue	42° 55' 49" N	78° 53' 45" W	Scajaquada Creek
059	Weir	DeWitt Street	42° 55' 51" N	78° 53' 39" W	Scajaquada Creek
060	Weir	Elmwood Avenue	42° 56' 04" N	78° 52' 42" W	Scajaquada Creek
061	Weir	Scajaquada Tunnel, Lafayette Avenue	42° 55' 15" N	78° 54' 01" W	Black Rock Canal
062	Weir	West Ferry Street	42° 54' 55" N	78° 54' 07" W	Black Rock Canal
063	Weir	Front Park	42° 54' 10" N	78° 54' 07" W	Black Rock Canal

Outfall	Type	Location	Latitude	Longitude	Receiving Water
064	Manhole	Ohio Drain, Ohio Street	42° 51' 59" N	78° 52' 06" W	Buffalo River
066	Manhole	Sloan Drain, S. Ogden Street	42° 51' 53" N	78° 49' 21" W	Buffalo River

II. PERMIT LIMITS, LEVELS AND MONITORING DEFINITIONS

OUTFALL	WASTEWATER TYPE	RECEIVING WATER	EFFECTIVE	EXPIRING
	This cell describes the type of wastewater authorized for discharge. Examples include process or sanitary wastewater, storm water, non-contact cooling water.	This cell lists classified waters of the state to which the listed outfall discharges.	The date this page starts in effect. (e.g. EDP or EDPM)	The date this page is no longer in effect. (e.g. ExDP)

PARAMETER	MINIMUM	MAXIMUM	UNITS	SAMPLE FREQ.	SAMPLE TYPE
e.g. pH, TRC, Temperature, D.O.	The minimum level that must be maintained at all instants in time.	The maximum level that may not be exceeded at any instant in time.	SU, °F, mg/l, etc.		

PARA-METER	EFFLUENT LIMIT	PRACTICAL QUANTITATION LIMIT (PQL)	ACTION LEVEL	UNITS	SAMPLE FREQUENCY	SAMPLE TYPE
	Limit types are defined below in Note 1. The effluent limit is developed based on the more stringent of technology-based limits, required under the Clean Water Act, or New York State water quality standards. The limit has been derived based on existing assumptions and rules. These assumptions include receiving water hardness, pH and temperature; rates of this and other discharges to the receiving stream; etc. If assumptions or rules change the limit may, after due process and modification of this permit, change.	For the purposes of compliance assessment, the analytical method specified in the permit shall be used to monitor the amount of the pollutant in the outfall to this level, provided that the laboratory analyst has complied with the specified quality assurance/quality control procedures in the relevant method. Monitoring results that are lower than this level must be reported, but shall not be used to determine compliance with the calculated limit. This PQL can be neither lowered nor raised without a modification of this permit.	Type I or Type II Action Levels are monitoring requirements, as defined below in Note 2 that trigger additional monitoring and permit review when exceeded.	This can include units of flow, pH, mass, Temperature, concentration. Examples include µg/l, lbs/d, etc.	Examples include Daily, 3/week, weekly, 2/month, monthly, quarterly, 2/yr and yearly.	Examples include grab, 24 hour composite and 3 grab samples collected over a 6 hour period.

Note 1: DAILY DISCHARGE: The discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for the purposes of sampling. For pollutants expressed in units of mass, the 'daily discharge' is calculated as the total mass of the pollutant discharged over the day. For pollutants with limitations expressed in other units of measurement, the 'daily discharge' is calculated as the average measurement of the pollutant over the day.

DAILY MAX.: The highest allowable daily discharge. DAILY MIN.: The lowest allowable daily discharge.

MONTHLY AVG: The highest allowable average of daily discharges over a calendar month, calculated as the sum of each of the daily discharges measured during a calendar month divided by the number of daily discharges measured during that month.

7 DAY ARITHMETIC MEAN (7 day average): The highest allowable average of daily discharges over a calendar week.

30 DAY GEOMETRIC MEAN: The highest allowable geometric mean of daily discharges over a calendar month, calculated as the antilog of : the sum of the log of each of the daily discharges measured during a calendar month divided by the number of daily discharges measured during that month.

7 DAY GEOMETRIC MEAN: The highest allowable geometric mean of daily discharges over a calendar week.

RANGE: The minimum and maximum instantaneous measurements for the reporting period must remain between the two values shown.

Note 2: ACTION LEVELS: Routine Action Level monitoring results, if not provided for on the Discharge Monitoring Report (DMR) form, shall be appended to the DMR for the period during which the sampling was conducted. If the additional monitoring requirement is triggered as noted below, the permittee shall undertake a short-term, high-intensity monitoring program for the parameter(s). Samples identical to those required for routine monitoring purposes shall be taken on each of at least three consecutive operating and discharging days and analyzed. Results shall be expressed in terms of both concentration and mass, and shall be submitted no later than the end of the third month following the month when the additional monitoring requirement was triggered. Results may be appended to the DMR or transmitted under separate cover to the same address. If levels higher than the Action Levels are confirmed, the permit may be reopened by the Department for consideration of revised Action Levels or effluent limits. The permittee is not authorized to discharge any of the listed parameters at levels which may cause or contribute to a violation of water quality standards. TYPE I: The additional monitoring requirement is triggered upon receipt by the permittee of any monitoring results in excess of the stated Action Level. TYPE II: The additional monitoring requirement is triggered upon receipt by the permittee of any monitoring results that show the stated action level exceeded for four of six consecutive samples, or for two of six consecutive samples by 20 % or more, or for any one sample by 50 % or more.

III. PERMIT LIMITS, LEVELS AND MONITORING

a) Effluent Limits for Outfall 002

OUTFALL No.	LIMITATIONS APPLY:	RECEIVING WATER	EFFECTIVE	EXPIRING
002	All Year unless otherwise noted	Niagara River	01/01/2010	06/30/2014

PARAMETER	EFFLUENT LIMIT					MONITORING REQUIREMENTS				FN
	Type	Limit	Units	Limit	Units	Sample Frequency	Sample Type	Location Inf.	Location Eff.	
Flow	MRA	180	MGD			Continuous	Recorder	X		1, 5
BOD_5	Monthly average	30	mg/l	45036	lbs/d	1/day	24-hr. comp.	X	X	2
BOD_5	7 day average	45	mg/l	67554	lbs/d	1/day	24-hr. comp.	X	X	
Solids, Total Suspended	Monthly average	30	mg/l	45036	lbs/d	1/day	24-hr. comp.	X	X	2
Solids, Total Suspended	7 day average	45	mg/l	67554	lbs/d	1/day	24-hr. comp.	X	X	
Solids, Settleable	Daily Maximum	0.3	ml/l			6/day	grab	X	X	3
pH	Range	6.0 – 9.0	SU			6/day	grab	X	X	
Nitrogen, Ammonia (as NH_3)	Daily Maximum	Monitor	mg/l			1/month	24-hr. comp.	X	X	
Nitrogen, TKN (as N)	Daily Maximum	Monitor	mg/l			1/month	24-hr. comp.	X	X	
Temperature	Daily Maximum	Monitor	Deg F			6/day	grab	X	X	
Phenols, Total	Monthly average			36.6	lbs/d	1/month	24-hr. comp.		X	
Phosphorus, Total (as P)	Monthly average	1.0	mg/l			1/day	24-hr. comp.		X	
Mercury, Total	Daily Maximum	50	ng/l			1/month	Grab			4
Effluent Disinfection required: [X] All Year [ ] Seasonal from _____ to										
Coliform, Fecal	30 day geometric mean	200	No./ 100 ml			1/day	grab		X	6
Coliform, Fecal	7 day geometric mean	400	No./ 100 ml			1/day	grab		X	6
Chlorine, Total Residual	Daily Maximum	2.0	mg/l			6/day	grab		X	3, 6

FOOTNOTES:

1. The 12 month rolling average (MRA) shall be the average of the monthly average of the current month plus the monthly average of the eleven previous months.
2. A monthly effluent value shall not exceed 15 % and 15 % of influent values for BOD 5 & TSS respectively for flows up to 180 MGD.
3. The sample measurement for each day is calculated as the arithmetic mean of the total number of daily samples. Therefore the daily maximum is the highest of the approximately 30 daily arithmetic means calculated. The definition is derived from the DMR Manual, NYSDEC, 2002, Page 9, Section 4.4.
4. The proposed limit will be **50 ng/l** until the Department reviews the Mercury Minimization Program (MMP). The calculated Water Quality Based Effluent Limit (WQBEL) for Mercury is 0.7 ng/l based on the Water Quality Evaluation for this discharge. However available information indicates this concentration is not achievable by this treatment facility. Therefore, Best Professional Judgement (BPJ) has been used to determine an interim limit of 50 ng/L the permittee can comply with. The goal of the MMP is to attain calculated WQBEL.
5. This outfall shall be utilized in accordance with the existing Wet Weather Operating Plan.
6. Monitoring of these parameters is only required during the period when disinfection is required.

b) Type II Action Level Monitoring for Outfall 002

OUTFALL NUMBER	WASTEWATER TYPE	EFFECTIVE	EXPIRING
002	Municipal with contributing industries	01/01/2010	06/30/2014

PARAMETER	ACTION LEVEL	UNITS	PQL (lbs/day)	SAMPLE FREQUENCY	SAMPLE TYPE	FN
Cadmium, Total	30	lbs/d	0.6	1/month	24 hr. comp.	
Chromium, Total	12.5	lbs/d	6.0	1/month	24-hr. comp.	
Copper, Dissolved	Monitor	lbs/d		1/month	24-hr. comp.	
Copper, Total	31.9	lbs/d	6.0	1/month	24 hr. comp.	
Cyanide, Total	90.0	lbs/d	90	1/month	24-hr. comp.	
Lead, Total	66.2	lbs/d	6.0	1/month	24-hr. comp.	
Nickel, Total	43.8	lbs/d	6.0	1/month	24 hr. comp.	
Zinc, Total	174	lbs/d	0.3	1/month	24-hr. comp.	
Zinc, Dissolved	Monitor	lbs/d		1/month	24-hr. comp.	
Bis(2-Ethylhexyl)Phthalate	16.7	lbs/d	12.0	1/month	24-hr. comp.	

c) Monitoring Requirements for Outfall 001

OUTFALL No.	LIMITATIONS APPLY:	RECEIVING WATER	EFFECTIVE	EXPIRING
001	All Year unless otherwise noted	Niagara River	01/01/2010	06/30/2014

PARAMETER	EFFLUENT LIMIT			MONITORING REQUIREMENTS				FN
						Location		
	Type	Limit	Units	Sample Frequency	Sample Type	Inf.	Eff.	
Flow	Monthly Total	Monitor	MGD	Continuous	Recorder/Totalizer		X	1, 2
BODs	Daily Max.	Monitor	mg/l	1/Event	Composite		X	3
Solids, Suspended	Daily Max.	Monitor	mg/l	1/Event	Composite		X	3
Solids, Settleable	Daily Max.	Monitor	ml/l	1/Event	grab		X	4
Ammonia as N, mg/l, lbs/day	Daily Max.	Monitor	mg/l	1/Event	Composite		X	3
TKN as N	Daily Max.	Monitor	mg/l	1/Event	Composite		X	3
Phosphorus	Daily Max.	Monitor	mg/l	1/Event	Composite		X	3
Oil & Grease	Daily Max.	Monitor	mg/l	1/Event	grab		X	3
Coliform, Fecal	30 day geometric mean	Monitor	No./ 100 ml	1/Event	grab		X	4
Coliform, Fecal	7 day geometric mean	Monitor	No./ 100 ml	1/Event	grab		X	4
Chlorine, Total Residual	Daily Max.	2.0	mg/l	1/Event	grab		X	4

FOOTNOTES

1. Flows shall be managed in accordance to the existing Wet Weather Operating Plan. All flows up to the headworks capacity and not passed through outfall 002 shall be passed through outfall 001. This requirement may be superseded by the provisions in the ongoing Consent Decree.
2. Flow shall be continuously recorded and totalized. Flow reported on the Discharge Monitoring Report shall be the total flow discharge for the calendar month reporting period.
3. Samples shall be composite of grab samples, one taken every four hours.
4. Grab samples to be taken every four hours during each event.

IV. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS FOR HEADWORKS BYPASS ROUTINE MONITORING REQUIREMENTS

OUTFALL No.	LIMITATIONS APPLY:			EFFECTIVE		EXPIRING		
001A	All Year unless otherwise noted			01/01/2010		06/30/2014		
PARAMETER	EFFLUENT LIMIT			MONITORING REQUIREMENTS				
	Type	Limit	Units	Sample Frequency	Sample Type	Location		FN
						Inf.	Eff.	
Flow, MG	Monthly Total	Monitor	MGD	1/Event	Estimated	X		(1)
BOD,5-day mg/l	Daily Max.	Monitor	mg/l	1/Event	Grab		X	
Solids, Suspended mg/l	Daily Max.	Monitor	mg/l	1/Event	Grab		X	
Solids, Settleable ml/l	Daily Max.	Monitor	ml/l	1/Event	Grab		X	
Oil & Grease mg/l	Daily Max.	Monitor	mg/l	1/Event	Grab		X	

(1) This outfall shall be used in accordance with the existing Wet Weather Operating Plan and/or for emergency use only.

V. WHOLE EFFLUENT TOXICITY

PARAMETER	EFFLUENT LIMIT		PQL	MONITORING ACTION LEVEL		UNITS	SAMPLE FREQUENCY	SAMPLE TYPE
	Monthly Avg.	Daily Max.	Daily Max.	TYPE I	TYPE II			
WET - Chronic Invertebrate				101		TUc	Quarterly	Footnote 1
WET - Chronic Vertebrate				101		TUc	Quarterly	Footnote 1

Footnote
1. **Whole Effluent Toxicity Testing for Outfall 002**

Testing Requirements - WET testing shall consist of **Chronic only**. WET testing shall be performed in accordance with 40 CFR Part 136 and TOGS 1.3.2 unless prior written approval has been obtained from the Department. The test species shall be *Ceriodaphnia dubia* (water flea - invertebrate) and *Pimephales promelas* (fathead minnow - vertebrate). Receiving water collected upstream from the discharge should be used for dilution. All tests conducted should be static-renewal (two 24 hr composite samples with one renewal for Acute tests and three 24 hr composite samples with two renewals for Chronic tests). The appropriate dilution series bracketing the IWC and including one exposure group of 100% effluent should be used to generate a definitive test endpoint, otherwise an immediate rerun of the test is required. WET testing shall be coordinated with the monitoring of chemical and physical parameters limited by this permit so that the resulting analyses are also representative of the sample used for WET testing. The ratio of critical receiving water flow to discharge flow (i.e. dilution ratio) is **50:1** for acute, and **100:1** for chronic. Discharges which are disinfected using chlorine should be dechlorinated prior to WET testing or samples shall be taken immediately prior to the chlorination system.

Monitoring Period - WET testing shall be performed at the specified sample frequency **during calendar years ending in _2_ and _7.**

Reporting - Toxicity Units shall be calculated and reported on the DMR as follows: TUa = (100)/(48 hr LC50) or (100)/(48 hr EC50) (note that Acute data is generated by both Acute and Chronic testing) and TUc = (100)/(NOEC) when Chronic testing has been performed or TUc = (TUa) x (10) when only Acute testing has been performed and is used to predict Chronic test results, where the 48 hr LC50 or 48 hr EC50 and NOEC are expressed in % effluent. This must be done for both species and using the Most Sensitive Endpoint (MSE) or the lowest NOEC and corresponding highest TUc. Report a TUa of 0.3 if there is no statistically significant toxicity in 100% effluent as compared to control.

The complete test report including all corresponding results, statistical analyses, reference toxicity data, daily average flow at the time of sampling and other appropriate supporting documentation, shall be submitted within 60 days following the end of each test period to the Toxicity Testing Unit. A summary page of the test results for the invertebrate and vertebrate species indicating TUa, 48 hr LC50 or 48 hr EC50 for Acute tests and/or TUc, NOEC, IC25, and most sensitive endpoints for Chronic tests, should also be included at the beginning of the test report.

WET Testing Action Level Exceedances - If an action level is exceeded then the Department may require the permittee to conduct additional WET testing including Acute and/or Chronic tests. Additionally, the permittee may be required to perform a Toxicity Reduction Evaluation (TRE) in accordance with Department guidance. If such additional testing or performance of a TRE is necessary, the permittee shall be notified in writing by the Regional Water Engineer. The written notification shall include the reason(s) why such testing or a TRE is required.

VI. PRETREATMENT PROGRAM IMPLEMENTATION REQUIREMENTS

A. DEFINITIONS. Generally, terms used in this Section shall be defined as in the General Pretreatment Regulations (40 CFR Part 403). Specifically, the following definitions apply to terms used in this Section (PRETREATMENT PROGRAM IMPLEMENTATION REQUIREMENTS):

1. Categorical Industrial User (CIU)- an industrial user of the POTW that is subject to Categorical Pretreatment Standards under 40 CFR 403.6 and 40 CFR Chapter I, Subchapter N;

2. Local Limits - General Prohibitions, specific prohibitions and specific limits as set forth in 40 CFR 403.5.

3. The Publicly Owned Treatment Works (the POTW) - as defined by 40 CFR 403.3(q) and that discharges in accordance with this permit.

4. Program Submission(s) - requests for approval or modification of the POTW Pretreatment Program submitted in accordance with 40 CFR 403.11 or 403.18 and approved by letter dated September 11, 1984.

5. Significant Industrial User (SIU) -

   a. CIUs;

   b. Except as provided in 40 CFR 403.3(v)(3), any other industrial user that discharges an average of 25,000 gallons per day or more of process wastewater (excluding sanitary, non-contact cooling and boiler blowdown wastewater) to the POTW;

   c. Except as provided in 40 CFR 403.3(v)(3), any other industrial user that contributes a process wastestream which makes up 5 percent or more of the average dry weather hydraulic or organic capacity of the POTW treatment plant;

   d. Any other industrial user that the permittee designates as having a reasonable potential for adversely affecting the POTW's operation or for violating a pretreatment standard or requirement.

6. Substances of Concern - Substances identified by the New York State Department of Environmental Conservation Industrial Chemical Survey as substances of concern.

B. IMPLEMENTATION. The permittee shall implement a POTW Pretreatment Program in accordance 40 CFR Part 403 and as set forth in the permittee's approved Program Submission(s). Modifications to this program shall be made in accordance with 40 CFR 403.18. Specific program requirements are as follows:

1. Industrial Survey. To maintain an updated inventory of industrial dischargers to the POTW the permittee shall:

   a. Identify, locate and list all industrial users who might be subject to the industrial pretreatment program from the pretreatment program submission and any other necessary, appropriate and available sources. This identification and location list will be updated, at a minimum, every five years. As part of this update the permittee shall collect a current and complete New York State Industrial Chemical Survey form (or equivalent) from each SIU.

   b. Identify the character and volume of pollutants contributed to the POTW by each industrial user identified in B.1.a above that is classified as a SIU.

   c. Identify, locate and list, from the pretreatment program submission and any other necessary, appropriate and available sources, all significant industrial users of the POTW.

2. Control Mechanisms. To provide adequate notice to and control of industrial users of the POTW the permittee shall:

a. Inform by certified letter, hand delivery courier, overnight mail, or other means which will provide written acknowledgment of delivery, all industrial users identified in B.1.a. above of applicable pretreatment standards and requirements including the requirement to comply with the local sewer use law, regulation or ordinance and any applicable requirements under section 204(b) and 405 of the Federal Clean Water Act and Subtitles C and D of the Resource Conservation and Recovery Act.

b. Control through permit or similar means the contribution to the POTW by each SIU to ensure compliance with applicable pretreatment standards and requirements. Permits shall contain limitations, sampling frequency and type, reporting and self-monitoring requirements as described below, requirements that limitations and conditions be complied with by established deadlines, an expiration date not later than five years from the date of permit issuance, a statement of applicable civil and criminal penalties and the requirement to comply with Local Limits and any other requirements in accordance with 40 CFR 403.8(f)(1).

3. Monitoring and Inspection. To provide adequate, ongoing characterization of non-domestic users of the POTW, the permittee shall:

a. Receive and analyze self-monitoring reports and other notices. The permittee shall require all SIUs to submit self-monitoring reports at least every six months unless the permittee collects all such information required for the report, including flow data.

b. The permittee shall adequately inspect each SIU at a minimum frequency of once per calendar year.

c. The permittee shall collect and analyze samples from each SIU for all priority pollutants that can reasonably be expected to be detectable at levels greater than the levels found in domestic sewage at a minimum frequency of once per year.

d. Require, through permits, each SIU to collect at least one 24 hour, flow proportioned composite (where feasible) effluent sample every six months and analyze each of those samples for all priority pollutants that can reasonably be expected to be detectable in that discharge at levels greater than the levels found in domestic sewage. The permittee may perform the aforementioned monitoring in lieu of the SIU except that the permittee must also perform the compliance monitoring described in 3.c.

4. Enforcement. To assure adequate, equitable enforcement of the industrial pretreatment program the permittee shall:

a. Investigate instances of noncompliance with pretreatment standards and requirements, as indicated in self-monitoring reports and notices or indicated by analysis, inspection and surveillance activities. Sample taking and analysis and the collection of other information shall be performed with sufficient care to produce evidence admissible in enforcement proceedings or in judicial actions. Enforcement activities shall be conducted in accordance with the permittee's Enforcement Response Plan developed and approved in accordance with 40 CFR Part 403.

b. Enforce compliance with all national pretreatment standards and requirements in 40 CFR Parts 406 - 471.

c. Provide public notification of significant non-compliance as required by 40 CFR 403.8(f)(2)(viii).

d. Pursuant to 40 CFR 403.5(e), when either the Department or the USEPA determines any source contributes pollutants to the POTW in violation of Pretreatment Standards or Requirements the Department or the USEPA shall notify the permittee. Failure by the permittee to commence an appropriate investigation and subsequent enforcement action within 30 days of this notification may result in appropriate enforcement action against the source and permittee.

5. Record keeping. The permittee shall maintain and update, as necessary, records identifying the nature, character, and volume of pollutants contributed by SIUs. Records shall be maintained in accordance with 6 NYCRR Part 750-2.5(c).

6. Staffing. The permittee shall maintain minimum staffing positions committed to implementation of the Industrial

Pretreatment Program in accordance with the approved pretreatment program.

C. SLUDGE DISPOSAL PLAN. The permittee shall notify NYSDEC, and USEPA as long as USEPA remains the approval authority, 60 days prior to any major proposed change in the sludge disposal plan. NYSDEC may require additional pretreatment measures or controls to prevent or abate an interference incident relating to sludge use or disposal.

D. REPORTING. The permittee shall provide to the offices listed on the Monitoring, Reporting and Recording page of this permit and to the Chief-Water Compliance Branch; USEPA Region II; 290 Broadway; New York, NY 10007; an annual report that briefly describes the permittee's program activities over the previous year. This report shall be submitted to the above noted offices within 60 days of the end of the reporting period. The reporting period shall be annual with reporting period(s) ending on April 30 of each year.

The annual report shall include:

1. Industrial Survey. Updated industrial survey information in accordance with 40 CFR 403.12(i)(1) (including any NYS Industrial Chemical Survey forms updated during the reporting period).

2. Implementation Status. Status of Pretreatment Program Implementation, to include:

   a. Any interference upset or permit violations experienced at the POTW directly attributable to industrial users.

   b. Listing of significant industrial users issued permits.

   c. Listing of significant industrial users inspected and/or monitored during the previous reporting period and summary of results.

   d. Listing of significant industrial users notified of promulgated pretreatment standards or applicable local standards that are on compliance schedules. The listing should include for each facility the final date of compliance.

   e. Summary of POTW monitoring results not already submitted on Discharge Monitoring Reports and toxic loadings from SIU's organized by parameter.

   f. A summary of additions or deletions to the list of SIUs, with a brief explanation for each deletion.

3. Enforcement Status. Status of enforcement activities to include:

   a. Listing of significant industrial users in Significant Non-Compliance (as defined by 40 CFR 403.8(f)(2)(viii)) with federal or local pretreatment standards at end of the reporting period.

   b. Summary of enforcement activities taken against non-complying significant industrial users. The permittee shall provide a copy of the public notice of significant violators as specified in 40 CFR Part 403.8(f)(2)(viii).

VII. BEST MANAGEMENT PRACTICES FOR COMBINED SEWER OVERFLOWS

The permittee shall implement the following Best Management Practices (BMPs). These BMPs are designed to implement operation & maintenance procedures, utilize the existing treatment facility and collection system to the maximum extent practicable, and implement sewer design, replacement and drainage planning, to maximize pollutant capture and minimize water quality impacts from combined sewer overflows. The BMPs are equivalent to the "Nine Minimum Control Measures" required under the USEPA National Combined Sewer Overflow policy. The EPA's policy is available at http://cfpub.epa.gov/npdes/cso/cpolicy.cfm?program_id=5.

1. CSO Maintenance/Inspection - The permittee shall develop a written maintenance and inspection program for all CSOs listed on page(s) 3-5 of this permit. This program shall include all regulators tributary to these CSOs, and shall be conducted during periods of both dry and wet weather. This is to insure that no discharges occur during dry weather and that the maximum amount of wet weather flow is conveyed to the Bird Island POTW for treatment. This program shall consist of inspections with required repair, cleaning and maintenance done as needed. This program shall consist of monthly inspections.

   Inspection reports shall be completed indicating visual inspection, any observed flow, incidence of rain or snowmelt, condition of equipment and work required. These reports shall be in a format approved by the Regional Office and submitted to the Region with the monthly operating report (Form 92-15-7).

2. Maximum Use of Collection System for Storage - The permittee shall optimize the collection system by operating and maintaining it to minimize the discharge of pollutants from CSOs. It is intended that the maximum amount of in-system storage capacity be used (without causing service backups) to minimize CSOs and convey the maximum amount of combined sewage to the treatment plant in accordance with Item 4 below.

   This shall be accomplished by an evaluation of the hydraulic capacity of the system but should also include a continuous program of flushing or cleaning to prevent deposition of solids and the adjustment of regulators and weirs to maximize storage.

3. Industrial Pretreatment - The approved Industrial Pretreatment Program shall consider CSOs in the calculation of local limits for indirect discharges. Discharge of persistent toxics upstream of CSOs will be in accordance with guidance under (NYSDEC Division of Water Technical and Operational Guidance Series **(TOGS) 1.3.8 New Discharges to POTWs**. (http://www.dec.ny.gov/regulations/2652.html). For industrial operations characterized by use of batch discharge, consideration shall be given to the feasibility of a schedule of discharge during conditions of no CSO. For industrial discharges characterized by continuous discharge, consideration must be given to the collection system capacity to maximize delivery of waste to the treatment plant. Non-contact cooling water should be excluded from the combined system to the maximum extent practicable. Direct discharges of cooling water must apply for a SPDES permit. To the maximum extent practicable, consideration shall be given to maximize the capture of non-domestic waste containing toxic pollutants and this wastewater should be given priority over residential/commercial service areas for capture and treatment by the POTW.

4. Maximize Flow to POTW - Factors cited in Item 2. above shall also be considered in maximizing flow to the POTW. Maximum delivery to the POTW is particularly critical in treatment of "first-flush" flows. The treatment plant shall be capable of receiving and treating: the peak design hydraulic loading rates for all process units; i.e., a minimum of 450MGD through the plant headworks; and a minimum of 300 MGD through the secondary treatment works during wet weather in accordance with the existing Wet Weather Operating Plan. The collection system and headworks must be capable of delivering these flows during wet weather. If the permittee cannot deliver maximum design flow for treatment, the permittee shall submit a plan and schedule for accomplishing this requirement within 12 months after the effective date of this permit.

5. Wet Weather Operating Plan - The permittee shall maximize treatment during wet weather events. This shall be accomplished by having a wet weather operating plan containing procedures so as to operate unit processes to treat maximum flows while not appreciably diminishing effluent quality or destabilizing treatment upon return to dry weather operation. The BSA must continue to implement the wet weather operations plan

   The submission of a wet weather operating plan is a one time requirement that shall be done to the Department's satisfaction once. However, a revised wet weather operating plan must be submitted whenever the POTW and/or sewer collection system is significantly replaced or modified in a manner that impacts flows at Bird Island WWTP. When this permit is administratively renewed by NYSDEC letter entitled "SPDES NOTICE/RENEWAL APPLICATION/PERMIT", the permittee is not required to repeat the submission. The above due dates are independent from the effective date of the permit stated in the letter of "SPDES NOTICE/RENEWAL APPLICATION/PERMIT".

6. Prohibition of Dry Weather Overflow - Dry weather overflows from the combined sewer system are prohibited. The occurrence of any dry weather overflow shall be promptly abated and reported to the NYSDEC Region 9 Office within 24 hours. A written report shall also be submitted within fourteen (14) days of the time the permittee becomes aware of the occurrence. The occurrence of any dry weather overflow shall be promptly abated and reported to the NYSDEC Regional Office in accordance with 6 NYCRR Part 750-2.7.

7. Control of Floatable and Settleable Solids - The discharge of floating solids, oil and grease, or solids of sewage origin which cause deposition in the receiving waters, is a violation of the NYS Narrative Water Quality Standards contained in Part 703. As such, the permittee shall implement best management practices in order to eliminate or minimize the discharge of these substances. All of the measures cited in Items 1, 2, 4 & 5 above shall constitute approvable "BMPs" for mitigation of this problem. If aesthetic problems persist, the permittee should consider additional BMP's including but not limited to: street sweeping, litter control laws, installation of floatables traps in catch basins (such as hoods), booming and skimming of CSOs, and disposable netting on CSO outfalls. In cases of severe or excessive floatables generation, booming and skimming should be considered an interim measure prior to implementation of final control measures. Public education on harmful disposal practices of personal hygienic devices may also be necessary including but not limited to: public broadcast television, printed information inserts in sewer bills, or public health curricula in local schools.

8. Combined Sewer System Replacement - Replacement of combined sewers shall not be designed or constructed unless approved by NYSDEC. When replacement of a combined sewer is necessary it shall be replaced by separate sanitary and storm sewers to the greatest extent possible. These separate sanitary and storm sewers shall be designed and constructed simultaneously but without interconnections to maximum extent practicable. When combined sewers are replaced, the design should contain cross sections which provide sewage velocities which prevent deposition of organic solids during low flow conditions.

9. Combined Sewer/Extension - Combined sewer/extension, when allowed should be accomplished using separate sewers. These sanitary and storm sewer extensions shall be designed and constructed simultaneously but without interconnections. No new source of storm water shall be connected to any separate sanitary sewer in the collection system.

   If separate sewers are to be extended from combined sewers, the permittee shall demonstrate the ability of the sewerage system to convey, and the treatment plant to adequately treat, the increased dry-weather flows. Upon a determination by the Regional Water Engineer an assessment shall be made by the permittee of the effects of the increased flow of sanitary sewage or industrial waste on the strength of CSOs and their frequency of occurrence including the impacts upon best usage of the receiving water. This assessment should use techniques such as collection system and water quality modeling contained in the 1999 Water Environment Federation Manual of Practice FD-17 entitled, Prevention and Control of Sewer System Overflows, 2nd edition.

10. Sewage Backups - If, there are documented, recurrent instances of sewage backing up into house(s) or discharges of raw sewage onto the ground surface from surcharging manholes, the permittee shall, upon letter notification from DEC, prohibit further connections that would make the surcharging/back-up problems worse.

11. Septage and Hauled Waste - The discharge or release of septage or hauled waste upstream of a CSO is prohibited.

12. Control of Run-off - It is recommended that the impacts of run-off from development and re-development in areas served by combined sewers be reduced by requiring compliance with the New York Standards for Erosion and Sediment Control and the quantity control requirements included in the New York State Stormwater Management Design Manual. (http://www.dec.ny.gov/chemical/8694.html).

13. Public Notification - The permittee shall continue to maintain identification signs at all CSO outfalls owned and operated by the permittee. The permittee shall place the signs at or near the CSO outfalls and ensure that the signs are easily readable by the public. The signs shall have **minimum** dimensions of eighteen inches by twenty four inches (18" x 24") and shall have white letters on a green background and contain the following information:

N.Y.S. PERMITTED DISCHARGE POINT
(wet weather discharge)
SPDES PERMIT No.: NY_____

OUTFALL No. :____

For information about this permitted discharge contact:

Permittee Name:

Permittee Contact:

Permittee Phone: ( ) - ### - ####

OR:

The permittee shall implement a public notification program to inform citizens of the location and occurrence of CSO events in accordance with the proposed Consent Order Decree.

14. Characterization and Monitoring - The permittee shall characterize the combined sewer system, determine the frequency of overflows, and identify CSO impacts in accordance with Combined Sewer Overflows, Guidance for Nine Minimum Controls, EPA, 1995, Chapter 10. These are minimum requirements, more extensive characterization and monitoring efforts which may be required as part of the Long Term Control Plan.

15. Annual Report - The permittee shall submit an annual report summarizing implementation of the above best management practices (BMPs). The report shall list existing documentation of implementation of the BMPs and shall be submitted by January 31st of each year to the Regional office listed on the Recording, Reporting and Additional Monitoring page of this permit and to the Bureau of Water Permits, 625 Broadway, Albany, NY 12233-3505. Examples of recommended documentation of the BMPs are found in Combined Sewer Overflows, Guidance for Nine Minimum Controls (NMC), EPA, 1995. The permittee may obtain an electronic copy of the NMC guidance at http://www.epa.gov/npdes/pubs/owm0030.pdf. For guidance on developing the annual report, a BMP checklist is available from DEC on-line at http://www.dec.ny.gov/docs/water_pdf/csobmp.pdf. The permittee must submit a completed copy of this checklist along with the annual report. The actual documentation shall be stored at a central location and be made available to DEC upon request.

VIII. CSO LONG-TERM CONTROL PLAN

The BSA CSO Long Term Control Plan (LTCP) was approved on March 18, 2014. The EPA subsequently issued a revised Administrative Order (CWA-02-2014-3033) which addressed implementation of the LTCP.

BSA shall implement the approved CSO LTCP in accordance with the EPA Order (CWA-02-2014-3033) and the implementation schedules contained therein.

This permit may be reopened for modification to include any additional requirements in accordance with 6 NYCRR Part 621.

IX. STORM WATER POLLUTANT PREVENTION PLAN FOR POTWs WITH STORMWATER OUTFALLS

1. General - The Department has determined that stormwater discharges from POTWs with design flows at or above one MGD shall be covered under the SPDES permit. If the permittee has already submitted a Notice of Intent to the Department for coverage under the General Storm Water permit, the permittee shall submit a Notice of Termination to the Department upon receipt of this final SPDES permit containing the requirement to develop a SWPPP.

The permittee is required to develop, maintain, and implement a Storm Water Pollutant Prevention Plan (SWPPP) to prevent releases of significant amounts of pollutants to the waters of the State through plant site runoff; spillage and leaks; sludge or waste disposal; and other stormwater discharges including, but not limited to, drainage from raw material storage.

The SWPPP shall be documented in narrative form and shall include the 13 minimum elements below and plot plans, drawings, or maps necessary to clearly delineate the direction of stormwater flow and identify the conveyance, such as ditch, swale, storm sewer or sheet flow, and receiving water body. Other documents already prepared for the facility such as a Safety Manual or a Spill Prevention, Control and Countermeasure (SPCC) plan may be used as part of the SWPPP and may be incorporated by reference. A copy of the current SWPPP shall be submitted to the Department as required in item (2.) below and a copy must be maintained at the facility and shall be available to authorized Department representatives upon request.

2. Compliance Deadlines – The BSA shall revise the February 2008 SWPPP developed under the General Permit. The revised plan shall be submitted by **07/01/2010** to the Regional Water Engineer. The SWPPP shall be implemented within 6 months of submission, unless a different time frame is approved by the Department. The SWPPP shall be reviewed annually and shall be modified whenever: (a) changes at the facility materially increase the potential for releases of pollutants; (b) actual releases indicate the SWPPP is inadequate, or (c) a letter from the Department identifies inadequacies in the SWPPP. The permittee shall certify in writing, as an attachment to the December Discharge Monitoring Report (DMR), that the annual review has been completed. All SWPPP revisions (with the exception of minimum elements - see item (4.B.) below) must be submitted to the Regional Water Engineer within 30 days. Note that the permittee is not required to obtain Department approval of the SWPPP (or of any minimum elements) unless notified otherwise. Subsequent modifications to or renewal of this permit does not reset or revise these deadlines unless a new deadline is set explicitly by such permit modification or renewal.

3. Facility Review - The permittee shall review all facility components or systems (including but not limited to material storage areas; in-plant transfer, process, and material handling areas; loading and unloading operations; storm water, erosion, and sediment control measures; process emergency control systems; and sludge and waste disposal areas) where materials or pollutants are used, manufactured, stored or handled to evaluate the potential for the release of pollutants to the waters of the State. In performing such an evaluation, the permittee shall consider such factors as the probability of equipment failure or improper operation, cross-contamination of storm water by process materials, settlement of facility air emissions, the effects of natural phenomena such as freezing temperatures and precipitation, fires, and the facility's history of spills and leaks. The relative toxicity of the pollutant shall be considered in determining the significance of potential releases.

The review shall address all substances present at the facility that are identified in Tables 6-10 of SPDES application Form NY-2C (available at *http://www.dec.state.ny.us/website/dcs/permits/olpermits/form2c.pdf*) as well as those that are required to be monitored by the SPDES permit.

4. A. 13 Minimum elements - Whenever the potential for a release of pollutants to State waters is determined to be present, the permittee shall identify Best Management Practices (BMPs) that have been established to prevent or minimize such potential releases. Where BMPs are inadequate or absent, appropriate BMPs shall be established. In selecting appropriate BMPs, the permittee shall consider good industry practices and, where appropriate, structural measures such as secondary containment and erosion/sediment control devices and practices. USEPA guidance for development of minimum elements of the SWPPP and BMPs is available in the September 1992 manual *Storm Water Management for Industrial Activities,* EPA 832-R-92-006 (available on-line at http://nepis.epa.gov/pubtitleOW.htm). At a minimum, the plan shall include the following elements:

1. Pollution Prevention Team
2. Reporting of BMP Incidents
3. Risk Identification & Assessment
4. Employee Training
5. Inspections and Records
6. Security
7. Preventive Maintenance
8. Good Housekeeping
9. Materials/Waste Handling, Storage, & Compatibility
10. Spill Prevention & Response
11. Erosion & Sediment Control
12. Management of Runoff
13. Street Sweeping

Note that for some facilities, especially those with few employees, some of the above may not be applicable. It is acceptable in these

cases to indicate "Not Applicable" for the portion(s) of the SWPPP that do not apply to your facility, along with an explanation, for instance if street sweeping did not apply because no streets exist at the facility.

B. Stormwater Pollution Prevention Plans (SWPPPs) Required for Discharges of Stormwater From Construction Activity to Surface Waters - As part of the erosion of and sediment control element, a SWPPP shall be developed prior to the initiation of any site disturbance of one acre or more of uncontaminated area. Uncontaminated area means soils or groundwater which are free of contamination by any toxic or non-conventional pollutants identified in Tables 6-10 of SPDES application Form NY-2C. Disturbance of any size contaminated area(s) and the resulting discharge of contaminated stormwater is not authorized by this permit unless the discharge is under State or Federal oversight as part of a remedial program or after review by the Regional Water Engineer; nor is such discharge authorized by any SPDES general permit for stormwater discharges. SWPPPs are not required for discharges of stormwater from construction activity to groundwaters.

The SWPPP shall conform to the *New York Standards and Specifications for Erosion and Sediment Control* and *New York State Stormwater Management Design Manual,* unless a variance has been obtained from the Regional Water Engineer, and to any local requirements. The permittee shall submit a copy of the SWPPP and any amendments thereto to the local governing body and any other authorized agency having jurisdiction or regulatory control over the construction activity at least 30 days prior to soil disturbance. The SWPPP shall also be submitted to the Regional Water Engineer if contamination, as defined above, is involved and the permittee must obtain a determination of any SPDES permit modifications and/or additional treatment which may be required prior to soil disturbance. Otherwise, the SWPPP shall be submitted to the Department only upon request. When a SWPPP is required, a properly completed *Notice of Intent* (NOI) form shall be submitted (available at *www.dec.state.ny.us/website/dow/toolbox/swforms.html*) prior to soil disturbance. Note that submission of a NOI is required for informational purposes; the permittee is not eligible for and will not obtain coverage under any SPDES general permit for stormwater discharges, nor are any additional permit fees incurred. SWPPPs must be developed and submitted for subsequent site disturbances in accordance with the above requirements. The permittee is responsible for ensuring that the provisions of each SWPPP is properly implemented.

Note:
If the permittee is covered under the MS4 permit, the permittee may substitute this to satisfy some of the conditions in this SWPPP.

X. DISCHARGE NOTIFICATION REQUIREMENTS

Sign Maintenance

The permittee shall periodically inspect the outfall identification sign(s) in order to ensure they are maintained, are still visible, and contain information that is current and factually correct. Signs that are damaged or incorrect shall be replaced within 3 months of inspection.

Data Retention

The permittee shall retain records for a minimum period of 5 years in accordance with 6NYCRR Part 750-1.12(b)(2) and Part 750-2.5(c)(1). These records, which include discharge monitoring reports (DMRs) and annual reports, must be retained at a repository accessible to the public. This repository shall be open to the public, at a minimum, during normal daytime business hours. The repository may be the business office, wastewater treatment plant, village, town, city, or county clerk's office, the local library, or other location approved by the Department.

XI. SCHEDULE OF COMPLIANCE

Short-term Hi-Intensity Sampling

Action Code	Outfall Number(s)	Compliance Action	Due Date
	001	The permittee shall conduct sampling for the following parameters detected in the WWTP effluent and listed in the permit application. Sampling shall be once per event for a minimum of **10 events.** The permittee submit the results of the analyses along with the daily flow:	06/01/2010

Parameters	EPA Method of Analysis Required	Sample Type
Arsenic, Total	200.7	24 hr. Comp.
Cadmium, Total	200.7	24 hr. Comp.
Chromium, Total	200.7	24 hr. Comp.
Copper, Total	200.7	24 hr. Comp.
Cyanide, Total	200.7	24 hr. Comp.
Lead, Total	200.7	24 hr. Comp.
Nickel, Total	200.7	24 hr. Comp.
Zinc, Total	200.7	24 hr. Comp.

The above compliance actions are one time requirements. The permittee shall comply with the above compliance actions to the Department's satisfaction once. When this permit is administratively renewed by NYSDEC letter entitled "SPDES NOTICE/RENEWAL APPLICATION/PERMIT", the permittee is not required to repeat the submission. The above due dates are independent from the effective date of the permit stated in the letter of "SPDES NOTICE/RENEWAL APPLICATION/PERMIT."

a) The permittee shall submit a written notice of compliance or non-compliance with each of the above schedule dates no later than 14 days following each elapsed date, unless conditions require more immediate notice in accordance with 6NYCRR Part 750-2.7. All such compliance or non-compliance notification shall be sent to the locations listed under the section of this permit entitled RECORDING, REPORTING AND ADDITIONAL MONITORING REQUIREMENTS. Each notice of non-compliance shall include the following information:

1. A short description of the non-compliance;
2. A description of any actions taken or proposed by the permittee to comply with the elapsed schedule requirements without further delay and to limit environmental impact associated with the non-compliance;
3. A description or any factors which tend to explain or mitigate the non-compliance; and
4. An estimate of the date the permittee will comply with the elapsed schedule requirement and an assessment of the probability that the permittee will meet the next scheduled requirement on time.

b) The permittee shall submit copies of any document required by the above schedule of compliance to NYSDEC Regional Water Engineer **and to the Bureau of Water Permits, 625 Broadway, Albany, N.Y. 12233-3505**, unless otherwise specified in this permit or in writing by the Department.

XII. MERCURY MINIMIZATION PROGRAM

1. **General** – Within 12 months of the effective date of this permit (**by 01/01/2011**), the permittee shall develop and immediately implement, and maintain a Mercury Minimization Program (MMP). The MMP is required because the 50 ng/L permit limit exceeds the state-wide calculated water quality based effluent limit (WQBEL) of 0.70 nanograms/liter (ng/L) for Total Mercury. The goal of the MMP will be to reduce mercury effluent levels in pursuit of the calculated WQBEL.

2. **MMP Elements** - The MMP shall be documented in narrative form and shall include any necessary drawings or maps. Other related documents already prepared for the facility may be used as part of the MMP and may be incorporated by reference. As a minimum, the MMP shall include an on-going program consisting of: periodic monitoring designed to quantify and, over time, track the reduction of mercury; an acceptable control strategy for reducing mercury discharges via cost-effective measures, which may include more stringent control of tributary waste streams; and submission of annual status reports.

A. Monitoring - All permit-related mercury monitoring shall be performed using EPA Method 1631 and shall be coordinated so that the results can be compared. All samples shall be grabs and use of EPA Method 1669 during sample collection is recommended. Minimum required monitoring is as follows:

i. Sewage Treatment Plant Influent & Effluent, and Type II SSO* Outfalls - Samples at each of these locations must be collected in accordance with the minimum frequency specified on the mercury permit limits page.

ii. Key Locations in the Collection System and Potential Significant Mercury Sources - The minimum monitoring frequency at these locations shall be semi-annual. Monitoring of properly treated dental facility discharges is not required.

iii. Hauled Wastes - Hauled wastes which may contain significant mercury levels must be periodically tested prior to acceptance to ensure compliance with pretreatment/local limits requirements.

iv. Additional monitoring must be completed as may be required elsewhere in this permit or upon Department request.

B. Control Strategy - An acceptable control strategy is required for reducing mercury discharges via cost-effective measures, including but not limited to more stringent control of industrial users and hauled wastes. The control strategy will become enforceable under this permit and shall contain the following minimum elements:

i. Pretreatment/Local Limits - The permittee shall evaluate and revise current requirements in pursuit of the water quality goal.

ii. Periodic Inspection - The permittee must inspect users as necessary to support the MMP. Each dental facility shall be inspected at least once every five years to verify compliance with the wastewater treatment and notification elements of 6NYCRR Part 374.4. Other mercury sources shall also be inspected once every five years. Alternatively, the permittee may develop an outreach program which informs these users of their responsibilities once every five years and is supported by a subset of site inspections. Monitoring shall be performed as required above.

iii. Systems with CSO & Type II SSO* Outfalls - Priority shall be given to controlling mercury sources upstream of CSOs and Type II SSOs through mercury reduction activities and/or controlled-release discharge. Effective control is necessary to avoid the need for the Department to establish mercury permit limits at these outfalls.

iv. A file shall be maintained containing all MMP documentation, including the dental forms required by 6NYCRR Part 374.4, which shall be available for review by DEC representatives.

C. Annual Status Report - An annual status report shall be submitted to the Regional Water Engineer and to the Bureau of Water Permits summarizing: (a) all MMP monitoring results for the previous year; (b) a list of known and potential mercury sources; (c) all action undertaken pursuant to the strategy during the previous year, (d) actions planned for the upcoming year, and (e) progress toward the goal. The first annual status report is due **01/01/2011** and follow-up reports are due annually thereafter. Note that the complete MMP documentation need not be submitted to the Department unless otherwise requested.

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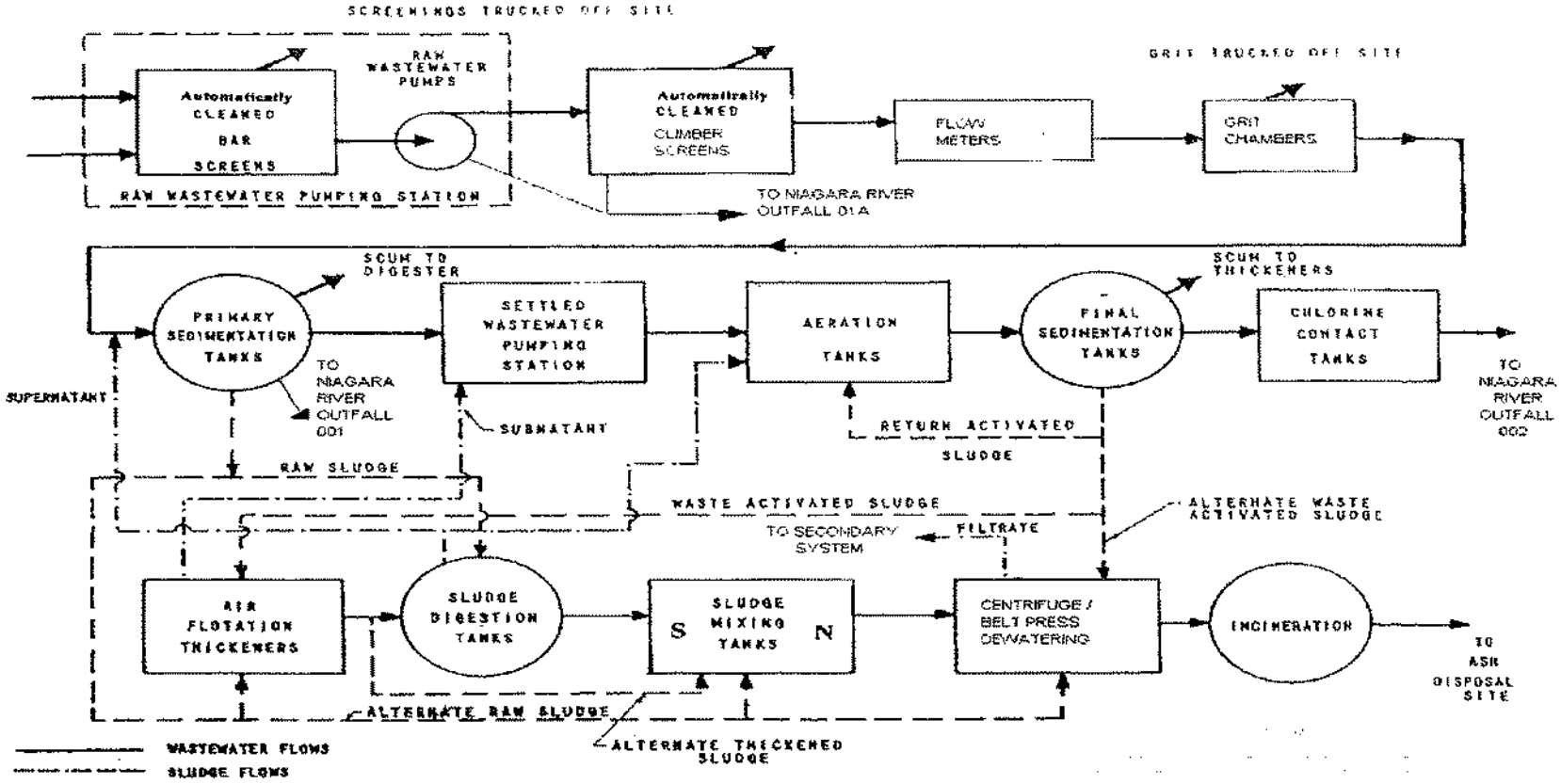
* Overflow Retention Facilities (ORF) or Peak Excess Flow Treatment Facilities (PEFTF). ORFs were designed, approved and constructed under an SSO abatement program. ORFs capture most sewer system flow surges and return them to the POTW for treatment. Under certain exceptionally high flow conditions, excess flow may be discharged.

3. **MMP Modification** - The MMP shall be modified whenever: (a)changes at the facility or within the collection system increase the potential for mercury discharges; (b) actual discharges exceed 50 ng/L; (c) a letter from the Department identifies inadequacies in the MMP; or, (d) pursuant to a permit modification.

MONITORING LOCATIONS

The permittee shall take samples and measurements, to comply with the monitoring requirements specified in this permit, at the location(s) specified below:



RECORDING, REPORTING AND ADDITIONAL MONITORING REQUIREMENTS

a) The permittee shall also refer to 6NYCRR Part 750 for additional information concerning monitoring and reporting requirements and conditions.

b) The monitoring information required by this permit shall be summarized, signed and retained for a period of three years from the date of the sampling for subsequent inspection by the Department or its designated agent. **Also, monitoring information required by this permit shall be summarized and reported by submitting;**

[X] (if box is checked) completed and signed Discharge Monitoring Report (DMR) forms for each 1 month reporting period to the locations specified below. Blank forms are available at the Department's Albany office listed below. The first reporting period begins on the effective date of this permit and the reports will be due no later than the 28th day of the month following the end of each reporting period.

[ ] (if box is checked) an annual report to the Regional Water Engineer at the address specified below. The annual report is due by February 1 and must summarize information for January to December of the previous year in a format acceptable to the Department.

[X] (if box is checked) a monthly "Wastewater Facility Operation Report..." (form 92-15-7) to the:
[X] Regional Water Engineer and/or [ ] County Health Department or Environmental Control Agency specified below

Send the **original** (top sheet) of each DMR page to:

Department of Environmental Conservation
Division of Water
Bureau of Watershed Compliance Programs
625 Broadway
Albany, New York 12233-3506

Phone: (518) 402-8177

Send the **first copy** (second sheet) of each DMR page to:

Department of Environmental Conservation
Regional Water Engineer, Region 9
270 Michigan Avenue
Buffalo, New York 14203-2999

Phone: 716-851-7070

Send an **additional copy** of each DMR page to:

c) Noncompliance with the provisions of this permit shall be reported to the Department as prescribed in 6NYCRR Part 750.

d) Monitoring must be conducted according to test procedures approved under 40 CFR Part 136, unless other test procedures have been specified in this permit.

e) If the permittee monitors any pollutant more frequently than required by the permit, using test procedures approved under 40 CFR Part 136 or as specified in this permit, the results of this monitoring shall be included in the calculations and recording of the data on the Discharge Monitoring Reports.

f) Calculation for all limitations which require averaging of measurements shall utilize an arithmetic mean unless otherwise specified in this permit.

g) Unless otherwise specified, all information recorded on the Discharge Monitoring Report shall be based upon measurements and sampling carried out during the most recently completed reporting period.

h) Any laboratory test or sample analysis required by this permit for which the State Commissioner of Health issues certificates of approval pursuant to section five hundred two of the Public Health Law shall be conducted by a laboratory which has been issued a certificate of approval. Inquiries regarding laboratory certification should be sent to the Environmental Laboratory Accreditation Program, New York State Health Department Center for Laboratories and Research, Division of Environmental Sciences, The Nelson A. Rockefeller Empire State Plaza, Albany, New York 12201.

UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY
REGION 2

IN THE MATTER OF:

Buffalo Sewer Authority
1038 City Hall
Buffalo, New York 14202-3310

SPDES Permit No. NY0028410

Respondent

Amended Administrative Order for Compliance pursuant to Sections 308(a) and 309(a) of the Clean Water Act, 33 U.S.C. §§ 1318(a) and 1319(a).

AMENDED

ADMINISTRATIVE ORDER

CWA-02-2014-3033

(Amends CWA-02-2012-3024)

This Amended Administrative Order CWA-02-2014-3033 amends Administrative Order CWA-02-2012-3024 to include: developments in the enforcement action since the March 9, 2012 effective date of Administrative Order CWA-02-2012-3024; updated General Provisions to reflect current practice; and to correct a date in the Findings of Fact and Findings of Violation. The Amendments to Administrative Order CWA-02-2012-3024 reflect the developments leading up to and including the approval of Buffalo Sewer Authority's Combined Sewer Overflow Long Term Control Plan and associated implementation schedule by the United States Environmental Protection Agency and the New York State Department of Environmental Conservation. Amended provisions can be found in Paragraphs 4, 11 and 13-20 of the Findings of Fact and Findings of Violation, Paragraphs 2.a., 2.f., 3, 3.a., 3.d.ii of the Ordered Provisions and Paragraphs 1-8 of the General Provisions.

STATUTORY AUTHORITY

The following Findings of Violation and Order for Compliance ("Order") are made and issued pursuant to Sections 308(a) and 309(a) of the Clean Water Act ("CWA"), 33 U.S.C. §§ 1318(a) and 1319(a). This Authority has been delegated by the Administrator of the United States Environmental Protection Agency ("EPA") to the Regional Administrator, EPA Region 2 and further delegated to the Director of the Division of Enforcement and Compliance Assistance, Region 2, EPA.

1. Section 301(a) of the CWA, 33 U.S.C. § 1311 (a), makes it unlawful for any person to discharge any pollutant from a point source to waters of the United States, except, inter alia, with the authorization of, and in compliance with, a National Pollutant Discharge Elimination System ("NPDES") permit issued pursuant to Section 402 of the CWA, 33 U.S.C. § 1342.

2. Section 402 of the CWA, 33 U.S.C. § 1342, authorizes the Administrator of EPA to issue a NPDES permit for the discharge of any pollutant, or combination of pollutants subject to certain requirements of the CWA and conditions which the Administrator determines are necessary. The New York State Department of Environmental Conservation ("NYSDEC") is the agency with the authority to administer the federal NPDES program in New York pursuant to Section 402 of the CWA, 33 U.S.C. § 1342. EPA maintains concurrent enforcement

authority with authorized states for violations of the CWA. Additionally, under the authority granted to the NYSDEC by the EPA under Section 402(b) of the CWA, 33 U.S.C. § 1342(b), a State Pollutant Discharge Elimination System ("SPDES") permit is required to be issued to facilities by the NYSDEC for the discharge of pollutants from said facilities from a point source to a navigable water of the United States.

3. Section 308 of the Act, 33 U.S.C. § 1318, provides, in relevant part, that the Administrator of EPA may require the owner or operator of any point source to, among other things: establish and maintain such records; make such reports; install, use and monitor such equipment; sample such effluents; and provide such other information as may reasonably be required in order to carry out Section 402 of the Act, 33 U.S.C. § 1342.

4. "Person" is defined by Section 502(5) of the CWA, 33 U.S.C. § 1362(5), to include an individual, corporation, partnership, association or municipality.

5. "Municipality" is defined by Section 502(4) of the CWA, 33 U.S.C. § 1362(4), to include among other things, a city, town, borough, county, parish, district, associations, or other public body created by or pursuant to State law and having jurisdiction over disposal of sewage, industrial wastes, or other wastes.

6. "Pollutant" is defined by Section 502(6) of the CWA, 33 U.S.C. § 1362(6), to include among other things, solid waste, dredged spoil, rock, sand, cellar dirt, sewage, sewage sludge and industrial, municipal and agricultural waste discharged into water.

7. "Point source" is defined by Section 502(14) of the CWA, 33 U.S.C. § 1362(14), to include any discernible, confined and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, or vessel or other floating craft, from which pollutants are or may be discharged.

8. "Navigable waters" is defined by Section 502(7) of the CWA, 33 U.S.C. § 1362(7), to include the waters of the United States.

9. "Discharge of a pollutant" is defined by Section 502(12) of the CWA, 33 U.S.C. § 1362(12), to include any addition of any pollutant to navigable waters from any point source.

10. Section 402(q) of the CWA, 33 U.S.C. § 1342(q), provides that each permit, order, or decree issued pursuant to the chapter after December 21, 2000, for a discharge from a municipal combined storm and sanitary sewer shall conform to the Combined Sewer Overflow Policy ("CSO Policy") signed by the Administrator on April 11, 1994.

11. The CSO Policy states that "permittees with CSOs are responsible for developing and implementing long-term CSO control plans that will ultimately result in compliance with the requirements of the CWA."

12. Section 309(a) of the CWA, 33 U.S.C. § 1319(a), authorizes the Administrator to issue an order requiring compliance or commence a civil action when any person is found to be in violation of Section 301 of the CWA, 33 U.S.C. § 1311, or in violation of any permit condition or limitation in a permit issued under Section 402 of the CWA, 33 U.S.C. § 1342.

FINDINGS OF FACT AND FINDINGS OF VIOLATION

1. The Buffalo Sewer Authority ("BSA" or "Respondent"), is a public benefit municipal corporation, organized and existing under the laws of the State of New York, and located in Buffalo, New York. BSA has authority, control over and operates the sewer system within its boundaries, including, but not limited to the combined sewer system, the sanitary sewer system, and the related wastewater treatment plant.

2. BSA is a "person" and "municipality" within the meaning of Sections 502(5) and 502(4) of the CWA, 33 U.S.C. §§ 1362(5) and 1362(4).

3. BSA has discharged and continues to discharge "pollutants" within the meaning of Sections 502(6) and 502(12) of the CWA, 33 U.S.C. §§ 1362(6) and 1362(12), from the Buffalo wastewater treatment plant and sewer system through "point sources" within the meaning of Section 502(14) of the CWA, 33 U.S.C. § 1362(14) into the Niagara River, Black Rock Canal, Erie Basin, Buffalo River, Scajaquada Creek, Cazenovia Creek, and Cornelius Creek, each of which is a "navigable water" within the meaning of Section 502(7) of the CWA, 33 U.S.C. § 1362(7).

4. The NYSDEC, under the authority of Section 402(b) of the CWA, 33 U.S.C. § 1342(b), issued SPDES Permit No. NY0028410 (the "SPDES Permit") to BSA, with an effective date of July 1, 1999. The NYSDEC renewed the SPDES permit on February 3, 2004, on June 25, 2009, and again on December 31, 2013. It is scheduled to expire on June 30, 2019. The SPDES Permit authorizes BSA to discharge pollutants from a single wastewater treatment plant outfall and fifty-eight (58) combined sewer overflow structures ("CSO structures") at locations specified in the SPDES Permit, subject to certain limitations and conditions.

5. The Schedule of Compliance in the July 1, 1999 SPDES Permit provided in pertinent part as follows:

   "Development of Abatement Plan for Combined Sewer Overflow

   The permittee shall develop a combined sewer overflow abatement facility plan in accordance with the Phase I Long Term CSO Control Plan requirements specified in the USEPA Combined Sewer Overflow Policy (Federal Register Vo. 59, No. 75 4/19/94).

   This Abatement Plan shall contain all of the Long Term Plan elements specified in Section II C of the National CSO Policy, and further delineated in the USEPA document, "Combined Sewer Overflows, Guidance for Long-Term Control Plan" dated September, 1995. The permittee may choose either the "Presumption" or the "Demonstration" approach for the evaluation of alternatives.

   The Abatement Plan should integrate the pollutant reduction achievable by the implementation of the CSO Best Management Practices (BMPs) as required on pages 19-21 of this permit into the long term control plan. The Department will consider work or studies already completed or currently in progress for integration into the long term control plan.

   The permittee shall submit a completed CSO Abatement Facility Plan including a schedule of implementation to the Department.

The permittee shall report to the NYSDEC progress/status of plan development in intervals not to exceed 90 days.

Upon approval of the CSO Abatement Facility Plan, the NYSDEC will propose a SPDES permit modification, pursuant to Uniform Procedures – 6 NYCRR – Part 621, to include the schedule of implementation."

6. The SPDES Permit was modified October 2, 2001 to, among other changes, modify the deadline for submittal of a CSO Abatement Plan (hereinafter either "Abatement Plan," "combined sewer overflow abatement facility plan," "Long-Term Control Plan," "LTCP" or "updated LTCP") from July 1, 2001 to July 1, 2002. On August 29, 2002, the CSO Abatement Plan deadline was amended, by permit modification, again to July 1, 2003. On January 12, 2004, the CSO Abatement Plan deadline was again amended, by permit modification, to February 1, 2004.

7. BSA failed to submit the required Abatement Plan by February 1, 2004. BSA did not submit an Abatement plan until July 14, 2004, 164 days late.

8. BSA's failure to timely submit the required Abatement Plan is a violation of the SPDES Permit and is, therefore, a violation of Section 301 of the CWA, 33 U.S.C. § 1311.

9. Under a cover letter dated April 20, 2006, the NYSDEC notified the BSA that the Abatement Plan submitted by BSA on July 14, 2004 was not acceptable in that it would not meet the water quality objectives of the CSO Control Policy and had therefore failed to satisfy the SPDES Permit requirements of a combined sewer overflow abatement facility plan, as described in paragraph 5 above. This NYSDEC cover letter required that BSA revise its LTCP accordingly and submit it to the NYSDEC by July 31, 2006. BSA failed to submit such a revised LTCP to the NYSDEC by July 31, 2006.

10. Accordingly, EPA, NYSDEC, the U. S. Department of Justice ("USDOJ"), and the New York State Office of Attorney General commenced discussions with BSA to settle the violation. The settlement was to be embodied in a Consent Decree, under the auspices of federal court, for the development and implementation of a LTCP.

11. Since those discussions were on-going, the SPDES Permit was modified, effective January 1, 2010, to include Section VIII entitled "CSO LONG-TERM CONTROL PLAN," which states the following:

"BSA submitted a CSO Long-Term Control Plan (LTCP) in July 2004 in accordance with the requirements of their SPDES permit. Currently, the USEPA, USDOJ, NYSDEC and the permittee are engaged in negotiations concerning the LTCP, and anticipate that these negotiations will result in the entry of a Consent Decree. The Consent Decree will govern the permittee's obligations in ensuring that the WWTF and the combined sewer overflow discharges comply with the requirements of the Clean Water Act and the 1994 CSO Control Policy. This permit may be modified upon the ratification of the Consent Decree in accordance with 6 NYCRR Part 621."

12. To date, however, the parties have not reached a settlement nor entered into a Consent Decree.

13. On March 9, 2012, EPA, Region 2 issued an Administrative Order, Docket No. CWA-02-2012-3024 ("2012 Order"), to BSA, to address violations of the CWA (33 U.S.C. § 1251 et seq) and NYSDEC SPDES Permit number NY0028410. The 2012 Order requires that BSA update its CSO LTCP and that the Updated CSO LTCP include a schedule for the design, construction, and implementation of all control/treatment measures selected by BSA, to be completed as expeditiously as practicable, following any applicable environmental impact assessment review, pursuant to the New York State Environmental Quality Review Act, but in any event by no later than December 31, 2027.

14. In accordance with the 2012 Order, BSA submitted an Updated CSO LTCP, dated April 30, 2012, to the EPA and the NYSDEC for review and approval. Pursuant to "Ordered Provisions," Item 2.e of the 2012 Order, based on a joint review of the Updated CSO LTCP, the EPA and the NYSDEC declined to approve the Updated CSO LTCP and provided comments to BSA in a letter dated December 6, 2012.

15. The EPA and the NYSDEC met with BSA on February 12, 2013 to discuss the EPA's and the NYSDEC's comments. BSA followed up with a letter dated March 1, 2013 which, among other things, specified that BSA would submit a No Feasible Alternatives ("NFA") analysis and submit its Green Infrastructure ("GI") Master Plan to the Agencies by August 2, 2013, and would meet with the Agencies on or about August 15, 2013 to discuss those submittals.

16. Technical representatives of the EPA and the NYSDEC met with BSA to specifically discuss BSA's GI Master Plan on August 20, 2013. BSA followed up by providing the EPA and the NYSDEC with further information on its GI Master Plan on August 28, 2013. The EPA and the NYSDEC determined that an analogous technical meeting to discuss BSA's NFA analysis was not needed and indicated this to BSA in an email transmission dated September 11, 2013.

17. In a letter dated October 23, 2013 from EPA to BSA, EPA provided BSA with final written comments on BSA's Updated CSO LTCP. BSA was given until January 10, 2014 to submit its final revised CSO LTCP to EPA and NYSDEC. EPA's letter dated October 23, 2014 required that BSA provide a detailed implementation schedule as part of its final revised CSO LTCP and, based partly on work to be completed at the BSA wastewater treatment plant which was not originally contemplated, allowed a twenty year implementation schedule.

18. On January 10, 2014, BSA submitted its final revised CSO LTCP to EPA and to NYSDEC for review and approval. The final revised CSO LTCP includes a twenty year schedule.

19. In a letter dated March 18, 2014, EPA and NYSDEC approved BSA's final revised CSO LTCP. The approved CSO LTCP includes a twenty year implementation schedule, which is beyond the final compliance date of December 31, 2027, required by the EPA's 2012 Order.

20. Therefore, based on the above, EPA is issuing Amended Administrative Order, Docket No. CWA-02-2014-3033, to incorporate a twenty year implementation schedule and a final compliance date of March 18, 2034.

ORDERED PROVISIONS

Based on the Findings of Fact and Findings of Violation set forth above, and pursuant to the authority of Sections 308(a) and 309(a) of the CWA, 33 U.S.C. §§ 1318(a) and 1319(a), and in accordance with Section 402(q) of the CWA, 33 U.S.C. § 1342 (q), it is hereby ORDERED that:

1. Immediately upon receipt of the original copies of this Order, a responsible official of BSA shall complete and sign the acknowledgment of receipt of one of the originals of the Order and return said original to the Chief, Compliance Section, Water Compliance Branch, Division of Enforcement and Compliance Assistance, in the enclosed envelope to the address listed below.

2. Development of Updated Long Term Control Plan: BSA shall revise and implement an approved Updated LTCP consistent with the requirements of the CSO Policy and applicable State law and regulation. The Updated LTCP shall provide for the construction and implementation of all wastewater treatment plant ("WWTP") and sewer system improvements and other measures necessary to ensure that: (i) CSO discharges from all CSO discharge outfalls comply with the technology-based and water quality-based requirements of the CWA, the CSO Control Policy and state law and regulation; and (ii) bypasses at the WWTP are in compliance with the bypass conditions in 40 C.F.R. § 122.41(m), 327 IAC 5- 2-8(11), and shall demonstrate that there are no feasible alternatives to the remaining bypasses, in accordance with Section II.C.7 of the CSO Control Policy.
   a. By no later than April 30, 2012, BSA shall submit to EPA and NYSDEC an Updated LTCP. The schedule included in the Updated LTCP shall require the design, construction, and implementation of all control/treatment measures selected by BSA as expeditiously as practicable, following any applicable environmental impact assessment review pursuant to the New York State Environmental Quality Review Act ("SEQR review"), but in any event by no later than March 18, 2034.
   b. The Updated LTCP shall include, at a minimum:
      i. An update of the system characterization information, receiving water characterization information, existing conditions information, CSO control objectives, and any other information presented in the 2004 LTCP that is no longer current;
      ii. BSA's previous screening and subsequent evaluation of individual CSO control technologies and site-specific CSO controls. The Updated LTCP shall: (1) reassess the results of that original evaluation in light of the applicability of recreation-protective bacteria standards in BSA's receiving waters; (2) include, as appropriate, new technologies and controls (such as green infrastructure ("GI") and bio-ballasted flocculation treatment) not considered in the 2004 LTCP; and (3) in particular, carry out a new evaluation of a range of updated system-wide alternatives. Together, BSA's prior and updated system-wide alternatives evaluation shall include a sufficiently wide range of alternatives for eliminating, reducing, or treating CSO discharges, and for eliminating or reducing bypass discharges (except as permitted in the bypass conditions in 40 C.F.R. § 122.41(m) and 327 IAC 5-2-8(11)). The updated evaluation shall consider the costs and effectiveness (in terms of reduction in number of overflow events, overflow volume reduction, pollutant loading reductions, water quality improvements, etc.) predicted to result from implementation of each of the updated system-wide alternatives.

iii. In evaluating the relative performance of the updated system-wide alternatives and in selecting a preferred alternative, BSA shall give the highest priority to controlling overflows to sensitive areas as required under the CSO Control Policy, at section II.C.3.

iv. BSA's Updated LTCP shall include past and current alternative evaluation efforts that together include at a minimum: (1) taking no-action; (2) complete sewer separation (3) partial separation of various portions of the combined sewer system; (4) installation of various sizes of storage or equalization basins at the Buffalo Sewer Authority WWTP and/or in the sewer system; (5) construction of new secondary or advanced wastewater treatment plants; (6) construction of increased treatment capacities at the existing facilities; (7) construction of additional facilities (such as high rate treatment or ballasted flocculation facilities or its equivalent) for providing primary treatment or better than primary treatment of discharges from CSO discharge outfall structures; (8) construction of new intercepting sewers from the sewer system to the facilities; (9) construction of facilities for providing disinfection (and dechlorination, if necessary) of CSO discharges; (10) construction of facilities for removing floatables from CSO discharges; (11) construction of relief sewers; (12) relocation of CSO discharge outfall structures; (13) implementation of pretreatment measures to reduce flows and/or pollutants discharged into the sewer system from industrial users; (14) consideration of the use of GI where feasible, and (15) construction and/or implementation of combinations of these alternatives. These evaluations shall be carried out in accordance with Chapter 3 of EPA's "Combined Sewer Overflows Guidance for Long-Term Control Plan."

v. The Updated LTCP shall describe BSA's prior technology screening assessments and shall include, at a minimum, BSA's evaluation of the technical feasibility and applicability of each alternative or combination of alternatives at each CSO discharge outfall or grouping of CSO discharge outfalls. Where necessary, BSA shall update said assessments in light of the applicability of recreation-protective bacteria standards in BSA's receiving waters.

vi. BSA's updated evaluation of system-wide alternatives shall include:

1. An evaluation of a range of "sizes" of each updated system-wide alternative that will, for the typical year achieve an average volume of wet weather percent capture from 75 to 100 percent and reduce the average number of untreated CSO Discharge events to 0, 1-3, 4-7 and 8-12 per year. The updated LTCP shall include a detailed description of the 12 month rainfall record that BSA has utilized in developing its Updated LTCP, and that BSA will utilize in implementing its Post Construction Monitoring Program. The Updated LTCP shall describe in detail BSA's analysis of its available long term rainfall record, its basis for selecting its "typical year," and, in the event that BSA selects a "modified year" as its "typical year," shall discuss in detail all modifications made to the actual rainfall record to arrive at the "modified" rainfall record. The updated LTCP shall include a detailed tabular summary of the "modified" rainfall record, such that it is clear exactly what rainfall record shall be used in implementing the PCMP;

2. A determination of the estimated "project costs," as that term is described on pages 3-49 through 3-51 of the EPA's "Combined Sewer Overflows Guidance for Long-Term Control Plan," for each size of each updated system-wide alternative. The determination of the estimated "project costs" shall include: (a) "capital costs," "annual operation and maintenance costs," and "life cycle costs," as those terms are described on pages 3-49 through 3-51 of EPA's "Combined Sewer Overflows Guidance for Long-Term Control Plan;" and (b) an itemization of the "capital costs" and "annual operation and maintenance costs" used to determine the total "project costs" for each separate component of each alternative or combination of alternatives; and

3. An evaluation, using a validated collection system model, of the expected reduction in number of CSO events, CSO discharge volume and pollutant discharge quantity from each CSO discharge point for each size of each updated system-wide alternative. The evaluation shall include, at a minimum, an analysis of the improvement in every pollutant of concern, which are: fecal coliform in all receiving waters, and DO/BOD/SOD in the Buffalo River, Scajaquada Creek, and the Black Rock Canal.

vii. For each system-wide alternative, BSA's assessment shall include an evaluation, using water quality models, of the expected water quality improvements in the receiving waters that will result from implementation of each updated system-wide alternative. The evaluation shall include, at a minimum, an analysis of the improvement in every pollutant of concern in that receiving water.

viii. For each updated system-wide alternative, BSA shall include a cost-performance analysis, such as a "knee of the curve" analysis, for each alternative or combination of alternatives that will allow for the comparison of the costs to: (1) the associated expected water quality improvements; (2) the reduction of CSO discharge and bypass discharge volume; (3) the reduction in CSO discharge and bypass discharge events; (4) the increase in percent wet weather capture; and/or (5) the reduction in pollutant loading from CSO discharge and bypass discharge events.

ix. The Updated LTCP shall include a financial capability analysis that complies with USEPA's "Combined Sewer Overflows – Guidance for Financial Capability Analysis and Schedule Development" February 1997).

x. The Updated LTCP shall include the selection of CSO control measures, including the construction of all sewer system and facility improvements necessary to ensure compliance with the technology-based and water quality-based requirements of the CWA, state law and regulation and BSA's SPDES permit. The Updated LTCP shall include the selection of bypass discharge control measures, so as to ensure that all remaining bypasses are in compliance with the bypass conditions in 40 C.F.R. § 122.41(m), 327 IAC 5- 2-8(11), and shall demonstrate that there are no feasible alternatives to the remaining bypasses, in accordance with Section II.C.7 of the CSO Control Policy.

xi. The Updated LTCP shall include an expeditious schedule for the design, construction, and implementation of all CSO control measures selected by BSA. If it is not possible for BSA to design and construct all measures simultaneously, the Updated LTCP shall include a phased schedule based on the relative

importance of each measure, with highest priority being given to eliminating discharges to sensitive areas and to those projects which most reduce the discharge of pollutants. The schedule shall specify critical construction milestones for each specific measure, including, at a minimum, dates for: (1) submission of applications for all permits required by law; (2) start of design; (3) commencement of construction; (4) completion of construction; (5) completion of construction; and (6) achievement of full operation.

c. The alternatives evaluated should include the use of GI wherever feasible to reduce CSO volumes and handle separated storm water. GI shall generally mean systems and practices that use or mimic natural processes to infiltrate, evapotranspire, and/or harvest storm water on or near the site where it is generated. GI applications and approaches that may be considered include, but are not limited to, green roofs, downspout disconnection, trees and tree boxes, rain gardens, vegetated swales, pocket wetlands, infiltration planters, vegetated median strips, permeable pavements, reforestation, and protection and enhancement of riparian buffers and floodplains. EPA and NYSDEC encourage BSA to utilize GI projects as appropriate to reduce or replace gray infrastructure projects included in the Updated LTCP provided that any GI project proposed is anticipated to provide substantially the same or greater level of control as the alternative gray infrastructure project. Should BSA rely on other entities to implement GI projects, BSA must have in place agreements as appropriate, to ensure proper operation and maintenance of the GI project. For any GI project submitted as part of the Updated LTCP, BSA shall submit to EPA and NYSDEC a detailed GI project proposal outlining each proposed project.

   i. The GI project proposal shall be consistent with this Administrative Order and shall at a minimum include the following for each project:

      1. Data on location, sizing, design, and the performance criteria expected to be achieved with the implementation of the GI project, utilizing the information and models that BSA used in developing the Updated LTCP, and any monitoring information used in formulating the proposal; along with a demonstration of the long term effectiveness and performance expected to be achieved with implementation of the project;
      2. A description of the work required to implement the GI project and a schedule for completion of this work and implementation of the project that is consistent with this Administrative Order and the date set forth herein in Paragraph 2(a) for completion of construction and full implementation of all remedial and control measures;
      3. A description of the proposed ownership of and access to the GI project, and should BSA rely on other entities to implement the GI project, BSA must explain what agreements will be necessary to ensure proper operation and maintenance of the GI project (i.e., permanent access, sufficient control over key aspects of the project), and how they will be enforced to ensure proper operation and maintenance of the GI project; and
      4. A description of any post-construction monitoring and modeling to be performed that is necessary to determine whether the performance criteria set forth, as noted above, will be met upon completion and implementation of the GI project.

ii. Upon review of BSA's GI project proposal, EPA and NYSDEC will comment, approve, disapprove, or approve in part, the proposal:

1. BSA shall implement each GI project approved by EPA and NYDEC in accordance with the provisions and schedule in the approved proposal;
2. If the GI project proposal is approved in part, BSA shall, upon written direction from EPA and NYSDEC, take all actions in the approved portion of the GI proposal that EPA and NYSDEC determine are technically severable from any disapproved portions. For the disapproved portions, BSA shall, within 90 Days, correct all deficiencies and resubmit the proposal for approval. If the resubmission is approved in whole or in part, BSA shall proceed in accordance with this subparagraph; or
3. If the GI project proposal is disapproved, EPA and NYSDEC's decision is final. For each project which is disapproved, BSA shall propose an alternative GI project or gray infrastructure project, or combined green and gray infrastructure project, within 90 days of the date of disapproval. In the event that BSA's alternative proposal is disapproved by EPA and NYSDEC due to the GI project component of the proposal, BSA shall propose an alternative gray infrastructure project within 90 days of the date of disapproval.

iii. In the event that BSA implements an approved GI project proposal that fails to meet the specified performance criteria set forth in the project proposal and Updated LTCP, BSA shall propose, within 180 days after submittal of the applicable post-construction monitoring report documenting said failure, an additional green or gray infrastructure project designed to achieve the performance criteria with a schedule for completion of this work and implementation of the project that is consistent with this Administrative Order and the date set forth herein in Paragraph 2(a) for completion of construction and full implementation of all remedial and control measures. In the alternative, where BSA has substantially met the performance criteria, BSA may, within sixty (60) days after its knowledge of a project's failure to meet the performance criteria, petition EPA and NYSDEC for a change in the performance criteria. After consideration of any such request by BSA, EPA and NYSDEC's decision will be final. In the event that EPA and NYSDEC disapprove of BSA's request for a change in the performance criteria, BSA shall, within 180 days after EPA and NYSDEC's disapproval, propose additional control measures designed to achieve the performance criteria with a schedule for completion of this work and implementation of the Project that is consistent with this Administrative Order and the date set forth herein in Paragraph 2(a) for completion of construction and full implementation of all remedial and control measures.

iv. BSA shall submit to EPA an update on its implementation of GI projects as part of the semi-annual reports due on March 1st and September 1st of each year.

d. If BSA seeks to replace any gray infrastructure projects provided in the Updated LTCP, BSA shall submit to EPA and NYSDEC a detailed GI project proposal outlining each proposed project consistent with the requirements of Paragraph 2(c).

e. EPA and NYSDEC may approve the Updated LTCP or decline to approve it and provide written comments. Within 120 days of receiving EPA's and NYSDEC's written comments, BSA shall modify the Updated LTCP consistent with EPA's and

NYSDEC's written comments, and resubmit the Updated LTCP to EPA and NYSDEC for final approval.

f. Upon receipt of EPA's and NYSDEC's final approval of the Updated LTCP (hereinafter "Approved CSO LTCP"), BSA shall implement the measures in the Approved CSO LTCP in accordance with the schedule in the Plan, including certain milestones of which listed in the Appendix, "BSA Approved CSO LTCP Implementation Schedule," and shall complete the implementation of its Approved CSO LTCP by not later than March 18, 2034.

3. Post Construction Monitoring Plan: Within one year of approval of the Updated LTCP, BSA shall submit to EPA and NYSDEC for approval, a work plan for conducting an ongoing study or series of studies ("Post-Construction Monitoring Plan") to help determine: (1) whether the Approved CSO LTCP measures, when completed, meet all performance criteria specified in the Approved CSO LTCP; (2) whether BSA's CSOs comply with the technology-based and water quality-based requirements of the CWA, state law, the CSO Control Policy, all applicable federal and state regulations, and its SPDES Permit, for all CSO-receiving waters; and (3) whether all remaining bypasses are in compliance with the bypass conditions in 40 C.F.R. § 122.41(m), 327 IAC 5- 2-8(11), and demonstrate that there are no feasible alternatives to the remaining bypasses, in accordance with Section II.C.7 of the CSO Control Policy. The Post-Construction Monitoring Plan shall be consistent with the guidance "Combined Sewer Overflows Guidance for Long-Term Control Plan."

a. The Post-Construction Monitoring Plan shall contain a schedule for performance of the study or series of studies at key points during the course of the implementation of the remedial measures, as well as after completion of the remedial measures, specified in the Approved CSO LTCP. The Post-Construction Monitoring Plan also shall indicate the years (at least biannually) in which data generated during implementation of the Post-Construction Monitoring Plan will be submitted in the reports in Paragraph 4 to EPA and NYSDEC.

b. EPA and NYSDEC may approve the Post-Construction Monitoring Plan or may decline to approve it and provide written comments. Within ninety (90) days of receiving EPA's and NYSDEC's comments, BSA shall alter the Post-Construction Monitoring Plan consistent with EPA's and NYSDEC's comments, and resubmit the Plan to EPA and NYSDEC for final approval.

c. Upon final approval of the Post Construction Monitoring Plan, BSA shall implement, in accordance with the schedule therein, the Post-Construction Monitoring Plan. If the results of the Post-Construction Monitoring Plan indicate areas of non-compliance, BSA shall, within 120 days, (unless a different period is specified) of being requested in writing to do so, submit to EPA and NYSDEC a Supplemental Compliance Plan which includes the actions that BSA will take to achieve compliance and a schedule for taking such actions. Upon approval by the EPA and NYSDEC, BSA shall implement the Supplemental Compliance Plan, in accordance with the schedule specified in the approved Plan.

d. Within one hundred twenty (120) days after completion and implementation of the Post-Construction Monitoring Plan, BSA shall submit a Final Post-Construction-Monitoring Report to EPA and NYSDEC, for review, comment and approval, that:

i. demonstrates that BSA performed the Post-Construction Monitoring Plan in accordance with the approved Plan and schedule set forth in the approved Post-Construction Monitoring Plan; and

ii. summarizes the data collected during Post-Construction Monitoring and analyzes whether the completed control measures have met and/or are meeting the performance criteria specified in the Approved CSO LTCP; whether BSA's CSOs comply with the requirements of the CWA, state law, the CSO Control Policy, all applicable federal and state regulations, and BSA's SPDES Permits; and whether all remaining bypasses are in compliance with the bypass conditions in 40 C.F.R. § 122.41(m), 327 IAC 5- 2-8(11), and demonstrate that there are no feasible alternatives to the remaining bypasses, in accordance with Section II.C.7 of the CSO Control Policy.

e. EPA and NYSDEC may approve the Final Post-Construction Monitoring Report or may decline to approve it and provide written comments. Within sixty (60) days of receiving EPA's and NYSDEC's comments, BSA shall alter the Final Post-Construction Monitoring Report consistent with EPA's and NYSDEC's comments, and resubmit the Report to EPA and NYSDEC for final approval. Approval of the Final Post-Construction Monitoring Report only constitutes EPA's and NYSDEC's approval that the report contains the information required by this Administrative Order; it does not mean that EPA and NYSDEC believe BSA has complied with any other requirement of this Administrative Order or federal or state law.

4. Reporting Requirements

a. Semi-Annual Status Reports. Upon the effective date of this Administrative Order, until EPA and NYSDEC's approval of the Final Post-Construction-Monitoring Report, BSA shall submit written Semi-Annual Status Reports to EPA and NYSDEC. These reports shall be submitted by no later than March 1st of each year (for the "reporting period" from July 1 through December 31 of the previous calendar year) and September 1st of each year (for the "reporting period" from January 1 through June 30 of the current calendar year). The Semi-Annual Status Reports may be provided either as paper documents or in electronic format, provided that the electronic format is compatible with EPA and NYSDEC software and is accompanied by a written certification on paper in accordance with "General Provisions" Paragraph 1. The written certification must be sent via certified or overnight mail. The frequency of reports, and the reporting period, may be amended upon written agreement from EPA and NYSDEC. In each written Semi-Annual Status Report, BSA shall provide, at a minimum, the following:

i. a statement setting forth (1) the deadlines and other terms that BSA has been required to meet since the date of the last statement; (2) whether and to what extent BSA has met those requirements; and (3) the reasons for any noncompliance (notification to EPA and NYSDEC of any anticipated delay shall not, by itself, excuse the delay);

ii. (1) a general description of the work completed within the prior reporting period; (2) to the extent known, a statement as to whether the work completed in that period meets applicable design criteria; (3) a projection of work to be performed during the next six-month period; (4) notification of any anticipated delays for the upcoming six month period of time; and (5) any changes in key personnel.

iii. If any public meetings were held, the report should include a copy of any advertisements placed for the meeting, any materials or handouts, formal meeting notes, and a summary of the meeting.

iv. BSA shall also submit, with each written status report, copies (to EPA only) of all monthly monitoring reports or other reports pertaining to CSOs and bypasses that BSA submitted to NYSDEC during the reporting period.

b. Semi-Annual Status Meetings. Representatives of EPA, NYSDEC and BSA shall conduct semi-annual meetings to discuss BSA's compliance status with the provisions of this Order. These meetings shall be scheduled during the months of March or April to discuss the previous reporting period, and September or October to discuss the previous reporting period. The meetings can be conducted telephonically if agreed in writing (including electronic correspondence) by all parties in advance. The frequency of such compliance meetings may be reduced upon written agreement (including electronic correspondence) from EPA and NYSDEC.

c. Annual Post Construction Monitoring Report. Upon the effective date of this Administrative Order, until EPA and NYSDEC's approval of the Final Post-Construction-Monitoring Report, BSA shall submit annually with its September 1st Semi-Annual Reports, an Annual Post Construction Monitoring Report containing information generated in accordance with the Post-Construction Monitoring Plan. The Annual Post Construction Monitoring report may be provided either as paper documents or in electronic format, provided that the electronic format is compatible with EPA and NYSDEC software and is accompanied by a written certification on paper in accordance with "General Provisions" Paragraph 1. The written certification must be sent via certified or overnight mail. The frequency of reports, and the reporting period, may be amended upon written agreement from EPA and NYSDEC.

d. Permits or Approvals. When it is necessary for BSA to obtain a federal, state, or local permit or approval or perform SEQR review, BSA shall submit timely and complete applications, or timely perform the SEQR review, and take all other actions necessary to obtain all such permits or approvals or to ensure compliance with SEQR.

GENERAL PROVISIONS

1. Any documents to be submitted by BSA pursuant to this Administrative Order shall be signed by an official of BSA or an authorized representative of BSA (see 40 C.F.R. § 122.2) and include the following certification:

> "I certify under penalty of law that I have examined and am familiar with the information submitted in this document and all attachments and that this document and its attachments were prepared under my direction or supervision in a manner designed to ensure that qualified and knowledgeable personnel properly gather and present the information contained therein. I further certify, based on my inquiry of those individuals immediately responsible for obtaining the information, that I believe that the information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment."

2. All notifications, reports, submissions and communications required by this Order shall be sent by certified mail or its equivalent to the following addresses:

Doughlas McKenna, Chief
Water Compliance Branch
Division of Enforcement and Compliance Assistance
United States Environmental Protection Agency, Region 2
290 Broadway, 20th Floor
New York, New York 10007-1866

Joseph DiMura, P.E.
Director, Bureau of Water Compliance Programs
Division of Water
New York State Department of Environmental Conservation
625 Broadway
Albany, New York 12233-3506

Regional Water Engineer
New York State Department of Environmental Conservation
Region 9
270 Michigan Avenue
Buffalo, New York 14203-2915

3. The Respondent shall have the opportunity, for a period of twenty (20) days from the effective date of this Order, to confer, regarding the Amendments to Administrative Order CWA-02-2012-3024, with the following designated Agency Representative:

Doughlas McKenna, Chief
Water Compliance Branch
Division of Enforcement and Compliance Assistance
United States Environmental Protection Agency, Region 2
290 Broadway, 20th Floor
New York, New York 10007-1866
(212) 637-4244

4. Respondent may seek federal judicial review of this Order pursuant to Chapter 7 of the Administrative Procedure Act, 5 U.S.C. §§ 701-706.

5. This Order does not constitute a waiver from compliance with, or a modification of, the effective terms and conditions of the CWA, its implementing regulations, or any applicable permit, which remain in full force and effect. Issuance of this Order shall not be deemed an election by EPA to forego any civil or criminal actions for penalties, fines, imprisonment, or other appropriate relief under the CWA.

6. Notice is hereby given that should EPA commence an action in a United States District Court for a violation of any Ordered Provision of this Order, Respondent may be subject to (1) civil penalties up to $37,500 per day for each day of violation, pursuant to Section 309(d) of the CWA, 33 U.S.C. § 13199d); and/or (2) injunctive relief, pursuant to Section 309(b) of the CWA, 33 U.S.C. § 1319(b), as imposed by the Court.

7. If any provision of this Order is held by a court of competent jurisdiction to be invalid, any surviving provisions shall remain in full force and effect.

8. Provisions of Administrative Order CWA-02-2012-3024, incorporated herein, continue to be effective as of March 9, 2012. The Amendments to Administrative Order CWA-02-2012-3024 contained in this Order CWA-02-2014-3033 shall become effective upon the date of execution by the Director, Division of Enforcement and Compliance Assistance.

Dated: APRIL 11, 2014 Signed: _____

Dore LaPosta, Director
Division of Enforcement and Compliance Assistance

APPENDIX

BSA Approved CSO LTCP Implementation Schedule

Project Name	Project Milestones/Deadlines
Phase I Projects (see Table 11-11)	
Bird/Lang RTC Projects	Construction Start and Completion Dates: 3/17/2014 – 9/2/2014 Operations/Optimization (RTC): 9/3/2014 – 9/3/15
Foundation Projects (see Table 11-11)	
Foundation 1 - Smith Street Storage	Engineering Start: 3/18/2014 Engineering Completion: 3/18/2015 Notice to Proceed3/18/2015 Substantial Completion: 3/18/2017
Foundation 2 - SPP Optimization (20 projects)	Engineering Start: 3/1/14 Engineering Completion: 3/18/2015[1] Notice to Proceed: 3/1/14 Substantial Completion: 3/18/2017[1]
Foundation 3 - Remaining RTC (14 sites)	Engineering Start: 3/18/2016 Engineering Completion: 3/18/2023[1] Notice to Proceed: 3/18/2017 Substantial Completion: 3/18/2024[1]
Foundation 4 - Hamburg Drain Optimizations	Engineering Start: 3/18/2015 Engineering Completion: 3/18/2017[1] Notice to Proceed: 3/18/2016 Substantial Completion: 3/18/2018[1]
Foundation 4 – Hamburg Drain Storage	Engineering Start: 3/18/2028 Engineering Completion: 3/18/2030 Notice to Proceed: 3/18/2030 Substantial Completion: 3/18/2032
Green Projects (see GI Master Plan)	
Green Pilot Projects – 267-acres of GI control	Engineering Start:3/1/14 Engineering Completion: 3/18/2016[2] Construction Completion Date: 3/18/2018[2] PCM Start and Completion Dates: 3/18/2016 – 3/18/2019[2] Construction of controls for at least 134 acres will have started by 9/18/2017
Green 2 – 410-acres of GI control	Engineering Start: 3/18/2019 Engineering Completion: 3/18/2023[2] Construction Completion Date: 3/18/2024[2] Construction of controls for at least 205 acres will have started by 3/18/2022[2]

Green 3 – 375-acres of GI control	Engineering Start: 3/18/2023 Engineering Completion: 3/18/2028[2] Construction Completion Date:3/18/2029[2] Construction of controls for at least 188 acres will have started by 9/18/2026[2]
Green 4 – 263-acres of GI control	Engineering Start: 3/18/2028 Engineering Completion: 3/18/2033[2] Construction Completion Date:3/18/2034[2] Construction of controls for at least 132 acres will have started by 9/18/2031[2]
WWTP	
WWTP Improvements Project – Alternative C2 (two consecutive projects)	Engineering Start: 3/18/2015 Engineering Completion: 3/18/2019[1] Notice to Proceed: 3/18/2017 Substantial Completion 3/18/2022[1]
Gray Projects (see Section 12.3)	
CSOs 014/15 – In-line storage and optimization	Construction Start: 3/18/14 Substantial Completion: 3/18/15
CSO 013 – Satellite storage, conveyance, FM & PS	Engineering Start: 3/18/2019 Engineering Completion: 3/18/2020 Notice to Proceed: : 3/18/2020 Substantial Completion: 3/18/2022
North Relief – Interceptor	Engineering Start: 3/18/2019 Engineering Completion: 3/18/2022 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 Engineering Completion: 3/18/2023 Notice to Proceed: 3/18/2023 Substantial Completion: 3/18/2024
SPP 337 (CSO 053) – Satellite storage, conveyance, FM & PS	Engineering Start: 3/18/2023 Engineering Completion: 3/18/2025 Notice to Proceed: 3/18/2025 Substantial Completion: 3/18/2027
SPP 336 a+b (CSO 053) – Satellite storage, conveyance, FM & PS	Engineering Start: 3/18/2024 Engineering Completion: 3/18/2026 Notice to Proceed: 3/18/2026 Substantial Completion: 3/18/2029

Jefferson & Florida (SPP 170B – CSO 053) – Satellite storage, conveyance and FM	Engineering Start: 3/18/2025 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 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 (storage at Tops from CSO 47 west)	Engineering Start: 3/18/2028 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 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 Engineering Completion: 3/18/2032 Notice to Proceed: 3/18/2032 Substantial Completion: 3/18/2034
Post Construction Monitoring	
Submit PCM Plan	3/18/2015
Implement PCM	Per approved PCM Plan

NOTES:

References specified in the Implementation Schedule above refer to the Approved BSA CSO LTCP, including the Green Infrastructure Master Plan, approved by EPA and NYSDEC on March 18, 2014.

Engineering timeframes (from start to completion) include planning, design, permitting/SEQRA/Public Notice, regulatory review and approval, land/easement acquisition, funding, and bidding/award.

Substantial Completion is defined as the time at which the Project has progressed to the point where, in the opinion of Engineer, the Work is sufficiently complete, in accordance with the Contract Documents, so that the Project can be utilized for the purposes for which it is intended.

(1) Project consists of multiple smaller projects that will overlap in engineering and construction. Specific engineering completion and construction dates for each project site will determined and submitted to the Agencies as they are developed. In any case, all work associated with these blocks of projects will be completed within the overall timeframe shown.

(2) GI projects will consist of multiple smaller projects including building demolitions that will overlap in engineering and construction during a given GI phase. For each phase, the BSA will achieve the start of construction for at least 50 percent of the required acreage by the mid-point of each phase.