Attachment A

WWTP Order

STATE OF CONNECTICUT :
V. :
CITY OF BRIDGEPORT :

ORDER

A. The Commissioner of Energy and Environmental Protection ("the Commissioner") finds:

1. The City of Bridgeport ("the Municipality") owns and operates a sanitary sewerage system, including a sewage treatment facility and discharges treated sanitary sewage under the terms and conditions of National Pollutant Discharge Elimination System (NPDES) Permit No. CT0101010 (East Side) and NPDES Wastewater Discharge Permit No. CT0100056 (West Side).

2. The Municipality maintains a sewerage system, which includes two activated sludge wastewater treatment plants. The East Side Plant has an annual average design flow capacity of 10 million gallons per day (mgd) and the West Side Plant has an annual average design flow capacity of 30 mgd. Both treatment plants serve a sewerage system which includes sewer that convey both stormwater and sanitary sewage ("combined sewers"). All wet weather flows in excess of secondary treatment capacity receive primary treatment before being blended with secondary effluent followed by disinfection with chlorine. The peak secondary treatment capacity of the East Side Plant is 24 mgd and the West Side Plant is 58 mgd.

3. The East Side and West Side plants completed nitrogen removal upgrades in the early 1990s and partial mechanical refurbishments between 1993 and 2001. These upgrades have exceed their design life leading to increased risk of equipment failure and effluent violations.

4. DEEP Order No. WC5498 issued March 20, 2009, required both plants to automate the chlorination and dechlorination systems. Both plants continue to operate chlorination and dechlorination systems manually.

5. On February 3, 2012, the Respondent submitted for the Commissioner's review and approval the Report entitled *Bridgeport Sludge Processing Systems Evaluation.* The Report was approved on April 3, 2018.

6. On November 21, 2013, the Respondent submitted for the Commissioner's Review and Approval the Report entitled *Bridgeport WPCA Low Level Nitrogen Removal Study.* The Report was approved in March 2, 2018.

7. On October 24, 2017, during a major storm event, the Bridgeport West Side Plant experienced screen failures resulting in floatables and debris not being removed from the influent. The bypass screen was repaired and the main screen was replaced. On January 17, 2018, Bridgeport reported that the West Side Plant main influent bar screen was out of service for scheduled repair/maintenance and not put back online until April 23, 2018.

8. On April 24, 2018, the Bridgeport West Side Plant reported an NPDES permit violation of the maximum daily limit for BOD5. On April 25, 2018, the Bridgeport West Side Plant reported an NPDES permit violation of the maximum daily limit and two times the limit for total suspended solids. The report listed out of service sludge collectors on one of the clarifier tanks, storm events and the main sewer trunks leading to the plant undergoing cleaning during the period as contributing factors.

9. During the June 6 and 8, 2018 inspection of the Bridgeport East Side Plant, it was noted that numerous equipment were out of service awaiting repair.

10. The Reports referenced in paragraphs A.5 and A.6 identify and include recommendations to upgrade the treatment plants to provide added reliability and additional pollutant removal. Action to design and construct such upgrades have not been made. Major long term recommendations include:

    a. West Side recommended improvements include adding computerized SCADA control of the biosolids process, adding odor control units, replacing the existing pumps, adding new sludge storage tanks, adding dewatering units, and anticipates a future additional drying building with dryers and possible energy recovery system. East Side recommended improvements include adding computerized SCADA control of the biosolids process, replacing existing pumps, adding a new scum handling system, replacing the existing sludge handling facility thickening equipment, adding new sludge storage tanks, building a truck bay, and a long term goal of shipping sludge to the West Side for final drying.

    b. The Nitrogen removal study long term plans for both the East and West Side Plants include enhanced nitrogen removal through the use of motor operated sluice gates at step feed points in the aeration basins. The installation of concrete baffles should be used to create an anoxic zone at the head of each pass of the basins with a top mounted mixer for each anoxic zone. In addition, new mixed liquor suspended solids (MLSS) recycle pumps are to be installed. Monitoring and control equipment for the aeration system, blowers, and sluice gates are recommended.

11. By virtue of the above, the Municipality is maintaining facilities or conditions that can reasonably be expected to create a source of pollution to the waters of the state.

B. The Commissioner, acting under §22a-6§22a-424, §22a-425, §22a-427, §22a-428, §22a-430, and §22a-431 of the Connecticut General Statutes, orders the Municipality as follows:

1. a. On or before August 31, 2019, the Municipality shall retain one or more qualified consultants acceptable to the Commissioner until this order is fully complied with, and, within ten days after retaining any consultant other than the one identified in this paragraph, the Municipality shall notify the Commissioner in writing of the identity of such other consultant. The consultant(s) retained shall be a qualified professional engineer licensed to practice in Connecticut and shall be acceptable to the Commissioner. The Municipality shall submit to the Commissioner a description of a consultant's education, experience and training which is relevant to the work required by this order within ten days after a request for such a description. Nothing in this paragraph shall preclude the Commissioner from finding a previously acceptable consultant unacceptable.

b. On or before November 30, 2020, a Facilities Planning Report shall be submitted for the Commissioner's review and approval. The Facilities report shall contain an assessment of critical components at the treatment plants, and include recommendations including a schedule to complete suggested upgrades to the treatment plants. The Respondent shall incorporate recommendations from the reports referenced in paragraphs A.5 and A.6.

c. On or before May 31, 2022, 100% design plans and specifications shall be submitted to the Commissioner for review and approval incorporating upgrades recommended by the Reports referenced in A.5 and A.6.

d. The Municipality shall begin construction of the approved remedial actions in accordance with the approved schedule, but in no event shall the approved remedial actions be begun later than 1644 calendar days from the effective date of this Order.

e. The Municipality shall complete construction of the approved remedial actions in accordance with the approved schedule, but in no event shall the approved remedial actions be completed later than 2739 calendar days after the effective date of this Order. Within fifteen days after completing such actions, the Municipality shall certify to the Commissioner in writing that the actions have been completed as approved.

2. Progress reports: On or before the last day of June, and December of each year after issuance of this order, and continuing until all actions required by this order have been completed as approved and to the Commissioner's satisfaction, the Municipality shall submit a progress report to the Commissioner describing the actions which Municipality has taken to date to comply with this order.

3. Full compliance. The Municipality shall not be considered in full compliance with this order until all actions required by this order have been completed as approved and to the Commissioner's satisfaction.

4. Approvals. The Respondent shall use best efforts to submit to the Commissioner all documents required by this order in a complete and approvable form. If the Commissioner notifies Respondent that any document or other action is deficient, and does not approve it with conditions or modifications, it is deemed disapproved, and the Respondent shall correct the deficiencies and resubmit it within the time specified by the Commissioner or, if no time is specified by the Commissioner, within 30 days of the Commissioner's notice of deficiencies. In approving any document or other action under this order, the Commissioner may approve the document or other action as submitted or performed or with such conditions or modifications as the Commissioner deems necessary to carry out the purposes of this order. Nothing in this paragraph shall excuse noncompliance or delay.

5. Definitions. As used in this order, "Commissioner" means the Commissioner or a representative of the Commissioner.

6. Dates. The date of "issuance" of this order is the date the order is deposited in the U.S. mail or personally delivered, whichever is earlier. The date of submission to the Commissioner of any document required by this order shall be the date such document is received by the Commissioner. The date of any notice by the Commissioner under this order, including but not limited to notice of approval or disapproval of any document or other action, shall be the date such notice is deposited in the U.S. mail or is personally delivered, whichever is earlier. Except as otherwise specified in this order, the word "day" as used in this order means calendar day. Any document or action which is required by this order to be submitted or performed by a date which falls on a Saturday, Sunday or a Connecticut or federal holiday shall be submitted or performed by the next day which is not a Saturday, Sunday or Connecticut or federal holiday.

7. Certification of documents. Any document, including but not limited to any notice, which is required to be submitted to the Commissioner under this order shall be signed by a principal executive officer or ranking elected official or duly authorized representative of such person, as those terms are defined in §22a-430-3(b)(2) of the Regulations of Connecticut State Agencies, and by the individual(s) responsible for actually preparing such document, and each such individual shall certify in writing as follows:

"I have personally examined and am familiar with the information submitted in this document and all attachments thereto, and I certify, based on reasonable investigation, including my inquiry of those individuals responsible for obtaining the information, that the submitted information is true, accurate and complete to the best of my knowledge and belief. I understand that any false statement made in the submitted information may be punishable as a criminal offense under §53a-157b of the Connecticut General Statutes and any other applicable law."

8. Noncompliance. This order is a final order of the Commissioner with respect to the matters addressed herein, and is nonappealable and immediately enforceable. Failure to comply with this order may subject the Respondent to an injunction and penalties under Chapters 439, and 445 or 446k of the Connecticut General Statutes.

9. False statements. Any false statement in any information submitted pursuant to this order may be punishable as a criminal offense under §22a-438 or 22a-131a of the Connecticut General Statutes or, in accordance with §22a-6, under Section 53a-157 of the Connecticut General Statutes and any other applicable law.

10. Notice of transfer; liability of the Respondent and others. Until the Respondent has fully complied with this order, the Respondent shall notify the Commissioner in writing no later than 15 days after transferring all or any portion of the facility, the operations, the site or the business which is the subject of this order or after obtaining a new mailing or location address. The Respondent's obligations under this order shall not be affected by the passage of title to any property to any other person or Respondent.

11. Commissioner's powers. Nothing in this order shall affect the Commissioner's authority to institute any proceeding or take any other action to prevent or abate violations of law, prevent or abate pollution, recover costs and natural resource damages, and to impose penalties for past, present, or future violations of law, including but not limited to violations of any permit issued by the Commissioner. If at any time the Commissioner determines that the actions taken by the Respondent pursuant to this order have not successfully corrected all violations, fully characterized the extent or degree of any pollution, or successfully abated or prevented pollution, the Commissioner may institute any proceeding to require Respondent to undertake further investigation or further action to prevent or abate violations or pollution.

12. The Respondent's obligations under law. Nothing in this order shall relieve Respondent of other obligations under applicable federal, state and local law.

13. No assurance by Commissioner. No provision of this order and no action or inaction by the Commissioner shall be construed to constitute an assurance by the Commissioner that the actions taken by Respondent pursuant to this order will result in compliance or prevent or abate pollution.

14. Access to site. Any representative of the Department of Energy and Environmental Protection may enter any sewage facility without prior notice for the purposes of monitoring and enforcing the actions required or allowed by this order.

15. No effect on rights of other persons. This order neither creates nor affects any rights of persons or municipalities that are not parties to this order.

16. Notice to Commissioner of changes. Within 15 days of the date Respondent becomes aware of a change in any information submitted to the Commissioner under this order,

or that any such information was inaccurate or misleading or that any relevant information was omitted, Respondent shall submit the correct or omitted information to the Commissioner.

17. Notification of noncompliance. In the event that Respondent becomes aware that it did not or may not comply, or did not or may not comply on time, with any requirement of this order or of any document required hereunder, Respondent shall immediately notify by telephone the individual identified in the next paragraph and shall take all reasonable steps to ensure that any noncompliance or delay is avoided or, if unavoidable, is minimized to the greatest extent possible. Within five (5) days of the initial notice, Respondent shall submit in writing the date, time, and duration of the noncompliance and the reasons for the noncompliance or delay and propose, for the review and written approval of the Commissioner, dates by which compliance will be achieved, and Respondent shall comply with any dates which may be approved in writing by the Commissioner. Notification by Respondent shall not excuse noncompliance or delay, and the Commissioner's approval of any compliance dates proposed shall not excuse noncompliance or delay unless specifically so stated by the Commissioner in writing.

18. Submission of documents. Any document required to be submitted to the Commissioner under this order shall, unless otherwise specified in this order or in writing by the Commissioner, be submitted in an electronic format to:

Catharine Chu, Sanitary Engineer 2
Department of Energy and Environmental Protection
Bureau of Water Protection and Land Reuse
Water Planning & Management Division
79 Elm Street
Hartford, Connecticut 06106-5127
E-mail: catharine.chu@ct.gov

Issued as a final order of the Commissioner of Energy and Environmental Protection.

Katharine S. Dykes
~~Acting~~ Commissioner

Date 3/1/19

Attachment B

CSO Order WRMU18002

Connecticut Department of
ENERGY &
ENVIRONMENTAL
PROTECTION

79 Elm Street • Hartford, CT 06106-5127 www.ct.gov/deep Affirmative Action/Equal Opportunity Employer

Fwk DEEP CSO LTCP 5900

June 14, 2018

Mayor Joseph P. Ganim,
City of Bridgeport
999 Broad Street
Bridgeport, CT 06604

Re: Administrative Order #WRMU18002

Honorable Mayor Ganim:

In line with recent discussions with City of Bridgeport staff, please find attached one original of Administrative Order #WRMU18002 for your use to finalize this enforcement action.

The Department of Energy and Environmental Protection ("DEEP") appreciates your cooperation in settling this matter.

If you have any questions, please contact Catharine Chu at (860) 424-3342 or catharine.chu@ct.gov.

Sincerely,

Denise Ruzicka

Denise Ruzicka
Director
Water Planning and Management Division
Bureau of Water Protection and Land Reuse

E-Copies w/Attachment: William Robinson, Consultant
Steven Walker, Interim Acting General Manager
Rob Klee, DEEP Commissioner
Bob Kaliszewski, DEEP Deputy Commissioner
Betsey Wingfield, WPLR Bureau Chief

Attachment: Administrative Order #WRMU18002

79 Elm Street • Hartford, CT 06106-5127 www.ct.gov/deep Affirmative Action/Equal Opportunity Employer

STATE OF CONNECTICUT :
V. :
CITY OF BRIDGEPORT :

ORDER

A. The Commissioner of Energy and Environmental Protection ("the Commissioner") finds:

1. The City of Bridgeport ("the Respondent") owns and operates a sanitary sewerage system, including sewage treatment facilities and discharges treated sanitary sewage under the terms and conditions of National Pollutant Discharge Elimination System (NPDES) Permit No. CT0101010 (East Side) and NPDES Permit No. CT0100056 (West Side).

2. The Respondent maintains a sewerage system, which includes sewers that convey both stormwater and sanitary sewage ("combined sewers"). During increased flow conditions associated with wet weather events, such combined sewers discharge untreated or partially treated sewage to the waters of the state at certain locations ("combined sewer overflows" or "CSOs"). Currently the Respondent has 30 active combined sewer overflow outfall locations within its collection system.

3. The United States Environmental Protection Agency ("EPA") has published the *Combined Sewer Overflow Control Policy, April 1994*, which requires compliance with the implementation of the "Nine Minimum Controls" and development of a "Long-Term Combined Sewer Overflow Control Plan".

4. On May 30, 2001, the Commissioner issued Order No. WC5320 to address the uncontrolled combined sewer overflows to Island Brook and the Pequonnock River.

5. On January 23, 2001, the Respondent submitted for the Commissioner's review and approval the Report entitled *Facility Plan 2000 Report, Water Pollution Control Authority of Bridgeport, Connecticut*, prepared by the Kasper Group Inc. The Commissioner found that the Respondent's report did not adequately address the requirements of a Long-Term Combined Sewer Overflow Control Plan and that the Respondent had not fully implemented all of the Nine Minimum Controls.

6. On August 18, 2008, the Commissioner issued Order No. WC5478 requiring a Long-Term Combined Sewer Overflow Control Plan, full compliance with the revised Nine Minimum Controls Plans as required by EPA's 1994 Combined Sewer Overflow Control Policy, a report defining acceptable mixing zones for achieving water quality standards for the Pequonnock River, Bridgeport Harbor, Black Rock Harbor and Cedar

Creek, and a Communication Plan.

7. The Connecticut Department of Environmental Protection has subsequently been renamed the Connecticut Department of Energy and Environmental Protection ("DEEP"). Any and all references within this Order are considered to be DEEP.

8. On April 29, 2009 the Respondent submitted for the Commissioner's review and approval the *Summary of Compliance with the Nine Minimum Controls (NMC) and Compliance Plan of Study* (POS) dated April 2009, prepared by Malcolm Pirnie. The NMC and POS were approved with three additions on June 24, 2009.

9. On June 1, 2009 the Respondent submitted for the Commissioner's review and approval a draft of the *Bridgeport WPCA CSO and Receiving Water Field Sampling and Quality Assurance Plan* (QAP) dated July 2009 prepared by Malcolm Pirnie. After DEEP comment, the final report was received July 27, 2009. The QAP was approved on August 12, 2009 with three additions.

10. The Communication Plan submitted on August 28, 2009 for the Commissioner's review and approval by the Respondent was approved on October 14, 2009.

11. On July 22, 2011, the Respondent submitted for the Commissioner's review and approval the *Bridgeport CSO Long Term Control Plan (*LTCP*)* prepared by Malcolm Pirnie. The plan outlines removal of CSOs to the 1 year, 24 hour storm.

12. On January 5, 2018, the Commissioner approved the LTCP report referenced in paragraph A.11 above. The project was approved upon an updated schedule submitted December 20, 2017 as Figure 9-2D.

13. The LTCP referenced in paragraphs A.11 and A.12 above recommends Combined Sewer Overflow control to the 1 year, 24-hour storm. The methods include an illicit connection elimination program, sewer separation, static weir control, Combined Sewer Overflow storage tanks, a continuous water quality monitoring and modeling program, Combined Sewer Overflow relief sewers, and the Tunnel Storage System.

14. This order supersedes orders WC5320 and WC5478.

15. By virtue of the above, the Respondent is causing pollution of the waters of the state and is maintaining facilities or conditions that can reasonably be expected to create a source of pollution to the waters of the state.

B. The Commissioner, acting under §22a-6, §22a-424, §22a-425, §22a-427, §22a-428, §22a-430, and §22a-431 of the Connecticut General Statutes, orders the Respondent as follows:

1. The Respondent has retained Arcadis, formerly known as Malcolm Pirnie, to complete documents and implement actions in regards to the approved LTCP. A qualified consultant is required until this order is fully complied with, and, within ten days after

retaining any consultant other than the one identified in this paragraph, the Respondent shall notify the Commissioner in writing of the identity of such other consultant. The consultant(s) retained shall be a qualified professional engineer licensed to practice in Connecticut and shall be acceptable to the Commissioner. The Respondent shall submit to the Commissioner a description of a consultant's education, experience and training which is relevant to the work required by this order within ten days after a request for such a description. Nothing in this paragraph shall preclude the Commissioner from finding a previously acceptable consultant unacceptable.

2. On or before January 31, 2021, the Respondent shall complete the Phase I and II Construction as indicated in the LTCP Schedule some of which is completed or underway. Included is:

   a. Storm water pump station H2 shall be substantially completed by the end of June 2018.

   b. Approximately 11 contract lining and sewer separation projects shall be completed by January 2021.

3. On or before January 31, 2021, the Respondent shall submit for the Commissioner's review and approval the design plans and specifications of the Phase III Ash Creek Storage Tank including any green components. Following approval by the Commissioner, the Respondent shall have 730 days to complete construction of the approved design.

4. On or before December 31, 2022, the Respondent shall submit for the Commissioner's review and approval the design plans and specifications of the SEAB Storage tank including any green components. Following approval by the Commissioner, the Respondent shall have 1095 days to complete construction of the approved design.

5. On or before December 31, 2021, and on a 5 year recurring schedule thereafter, the Respondent shall submit for the Commissioner's review and approval a LTCP Update to demonstrate the Respondent's progress to date and a plan for meeting the approved CSO control level until such CSO control has been achieved. The Respondent shall make appropriate revisions to such LTCP Update to address comments made by DEEP as necessary to obtain DEEP approval. Each LTCP Update shall at a minimum comply with the following:

   a. Each LTCP Update shall be a stand-alone document that builds upon its predecessor.

   b. Each LTCP Update shall include a public information process and provide an opportunity for receiving and responding to public comment.

   c. Each LTCP Update shall demonstrate to the Commissioner's satisfaction the Respondent's plans for meeting a 1 year, 24-hour storm of CSO control (zero

discharges) by December 31, 2039.

d. Each LTCP Update shall include a new five year CSO abatement construction schedule which shall be incorporated into this Order upon approval by DEEP.

6. Water quality monitoring shall be performed continuously with increased monitoring following the completion of each phase of construction. The results of the water quality program shall be incorporated into the LTCP update following construction of the storage tanks referenced in B.3 and B.4 but prior to the design of Combined Sewer Overflow Relief Sewers and determination of the necessity of the final phase and design of the Tunnel Storage System.

7. On or before December 31, 2039, the Respondent shall have constructed all of the improvements necessary to comply with the level of control as referenced in Paragraph A.13.

8. Progress reports: On or before the last day of June and December of each year after issuance of this order, and continuing until all actions required by this order have been completed as approved and to the Commissioner's satisfaction, the Respondent shall submit a progress report to the Commissioner describing the actions which Respondent has taken to date to comply with this order.

9. Full compliance. The Respondent shall not be considered in full compliance with this order until all actions required by this order have been completed as approved and to the Commissioner's satisfaction.

10. Approvals. The Respondent shall use best efforts to submit to the Commissioner all documents required by this order in a complete and approvable form. If the Commissioner notifies Respondent that any document or other action is deficient, and does not approve it with conditions or modifications, it is deemed disapproved, and the Respondent shall correct the deficiencies and resubmit it within the time specified by the Commissioner or, if no time is specified by the Commissioner, within 30 days of the Commissioner's notice of deficiencies. In approving any document or other action under this order, the Commissioner may approve the document or other action as submitted or performed or with such conditions or modifications as the Commissioner deems necessary to carry out the purposes of this order. Nothing in this paragraph shall excuse noncompliance or delay.

11. Definitions. As used in this order, "Commissioner" means the Commissioner or a representative of the Commissioner.

12. Dates. The date of "issuance" of this order is the date the order is deposited in the U.S. mail or personally delivered, whichever is earlier. The date of submission to the Commissioner of any document required by this order shall be the date such document is received by the Commissioner. The date of any notice by the Commissioner under this order, including but not limited to notice of approval or disapproval of any

this order, including but not limited to notice of approval or disapproval of any document or other action, shall be the date such notice is deposited in the U.S. mail or is personally delivered, whichever is earlier. Except as otherwise specified in this order, the word "day" as used in this order means calendar day. Any document or action which is required by this order to be submitted or performed by a date which falls on a Saturday, Sunday or a Connecticut or federal holiday shall be submitted or performed by the next day which is not a Saturday, Sunday or Connecticut or federal holiday.

13. Certification of documents. Any document, including but not limited to any notice, which is required to be submitted to the Commissioner under this order shall be signed by a principal executive officer or ranking elected official or duly authorized representative of such person, as those terms are defined in §22a-430-3(b)(2) of the Regulations of Connecticut State Agencies, and by the individual(s) responsible for actually preparing such document, and each such individual shall certify in writing as follows:

"I have personally examined and am familiar with the information submitted in this document and all attachments thereto, and I certify, based on reasonable investigation, including my inquiry of those individuals responsible for obtaining the information, that the submitted information is true, accurate and complete to the best of my knowledge and belief. I understand that any false statement made in the submitted information may be punishable as a criminal offense under §53a-157b of the Connecticut General Statutes and any other applicable law."

14. Noncompliance. This order is a final order of the Commissioner with respect to the matters addressed herein, and is nonappealable and immediately enforceable. Failure to comply with this order may subject the Respondent to an injunction and penalties under Chapters 439, and 445 or 446k of the Connecticut General Statutes.

15. False statements. Any false statement in any information submitted pursuant to this order may be punishable as a criminal offense under §22a-438 or 22a-131a of the Connecticut General Statutes or, in accordance with §22a-6, under Section 53a-157 of the Connecticut General Statutes and any other applicable law.

16. Notice of transfer; liability of the Respondent and others. Until the Respondent has fully complied with this order, the Respondent shall notify the Commissioner in writing no later than 15 days after transferring all or any portion of the facility, the operations, the site or the business which is the subject of this order or after obtaining a new mailing or location address. The Respondent's obligations under this order shall not be affected by the passage of title to any property to any other person or Respondent.

17. Commissioner's powers. Nothing in this order shall affect the Commissioner's authority to institute any proceeding or take any other action to prevent or abate violations of law, prevent or abate pollution, recover costs and natural resource damages, and to impose penalties for past, present, or future violations of law,

including but not limited to violations of any permit issued by the Commissioner. If at any time the Commissioner determines that the actions taken by the Respondent pursuant to this order have not successfully corrected all violations, fully characterized the extent or degree of any pollution, or successfully abated or prevented pollution, the Commissioner may institute any proceeding to require Respondent to undertake further investigation or further action to prevent or abate violations or pollution.

18. The Respondent's obligations under law. Nothing in this order shall relieve Respondent of other obligations under applicable federal, state and local law.

19. No assurance by Commissioner. No provision of this order and no action or inaction by the Commissioner shall be construed to constitute an assurance by the Commissioner that the actions taken by Respondent pursuant to this order will result in compliance or prevent or abate pollution.

20. Access to site. Any representative of the Department of Energy and Environmental Protection may enter any CSO facility without prior notice for the purposes of monitoring and enforcing the actions required or allowed by this order.

21. No effect on rights of other persons. This order neither creates nor affects any rights of persons or municipalities that are not parties to this order.

22. Notice to Commissioner of changes. Within 15 days of the date Respondent becomes aware of a change in any information submitted to the Commissioner under this order, or that any such information was inaccurate or misleading or that any relevant information was omitted, Respondent shall submit the correct or omitted information to the Commissioner.

23. Notification of noncompliance. In the event that Respondent becomes aware that it did not or may not comply, or did not or may not comply on time, with any requirement of this order or of any document required hereunder, Respondent shall immediately notify by telephone the individual identified in the next paragraph and shall take all reasonable steps to ensure that any noncompliance or delay is avoided or, if unavoidable, is minimized to the greatest extent possible. Within five (5) days of the initial notice, Respondent shall submit in writing the date, time, and duration of the noncompliance and the reasons for the noncompliance or delay and propose, for the review and written approval of the Commissioner, dates by which compliance will be achieved, and Respondent shall comply with any dates which may be approved in writing by the Commissioner. Notification by Respondent shall not excuse noncompliance or delay, and the Commissioner's approval of any compliance dates proposed shall not excuse noncompliance or delay unless specifically so stated by the Commissioner in writing.

24. Submission of documents. Any document required to be submitted to the Commissioner under this order shall, unless otherwise specified in this order or in writing by the Commissioner, be directed to:

Department of Energy and Environmental Protection
Bureau of Water Protection and Land Reuse
Water Planning & Management Division
79 Elm Street
Hartford, Connecticut 06106-5127

Issued as a final order of the Commissioner of Energy and Environmental Protection.

Robert J. Klee
Commissioner

6/14/2018
Date

ADMINISTRATIVE ORDER NO. WRMU18002

Attachment C

CSO Order WRMU18002 Order Modification

Connecticut Department of
ENERGY &
ENVIRONMENTAL
PROTECTION

79 Elm Street • Hartford, CT 06106-5127 www.ct.gov/deep Affirmative Action/Equal Opportunity Employer

ADMINISTRATIVE ORDER MODIFICATION

Administrative Order No: WRMU18002 issued on June 14, 2018 ("Order") to the City of Bridgeport

On, December 15, 2020, the Department of Energy and Environmental Protection ("DEEP" or "the Department") received a request from the City of Bridgeport (City) to modify the Order related to the Combined Sewer Overflow (CSO) Long-Term Control Plan (LTCP). To support its request, the City submitted the report, titled *Ash Creek Combined Sewer Overflow Evaluation of Alternatives dated December 17, 2020* and prepared by Kleinfelder, which outlined a new proposed schedule for the collection system upgrades required by the Order.

The Commissioner of Energy and Environmental Protection ("the Commissioner") hereby modifies the Order as follows:

- The original paragraph B.2.b is deleted and hereby replaced with the following:

  All H area CSO contract lining and sewer separation projects shall be completed by December 31, 2022.

- The original paragraph B.3 is deleted and hereby replaced by the following:

  On or before January 31, 2022 , the Respondent shall submit for the Commissioner's review and approval the design plans and specifications for approximately 1600 lf of new pipe on Commerce Drive to Fairfield Ave to Railroad Ave North, the replacement of pipe between the DEW CSO Outfall (located at State Street and Dewey Street) and downstream structure, and the new in-system regulator to direct flow to the new pipe. Following approval by the Commissioner, the Respondent shall have 790 days to complete construction of the approved design plans and specifications.

- The original paragraph B.4 is deleted and hereby replaced with the following:

  On or before December 31, 2024, the Respondent shall submit for the Commissioner's review and approval an evaluation of alternatives concerning the SEAB CSO Outfall (located at Brewster Street and Seabright Avenue) and proposed storage tank. The evaluation will describe the alternatives, identify the chosen alternative and provide a schedule for the chosen alternative that complies with the one-year storm Following approval by the Commissioner, the Respondent shall have 1095 days to complete construction of the approved design.

All other terms and conditions of the Order shall remain in full force and effect.

Issued as a final order modification of the Commissioner of Energy and Environmental Protection.

Betsey Wingfield Digitally signed by Betsey Wingfield Date: 2021.05.28 14:46:05 -04'00'

Betsey Wingfield
Deputy Commissioner

__May 28, 2021__
Date

Modification – Administrative Order No. WRMU18002M

Attachment D

Bridgeport Sewer Collection System Map

River Street
Pumping
Station

Attachment D

Attachment E

Section 4, 2011 Long Term Control Plan

4. CSO RAINFALL, FLOW, WATER QUALITY DATA COLLECTION PROGRAM

4.1. CSO and Receiving Water Field Sampling and Quality Assurance Plan

The CTDEP issued an administrative order to the WPCA that identified the need for additional receiving water quality sampling and designation of the critical uses of the waterways potentially affected by CSOs. Specifically, the order required development of a sampling plan to define acceptable mixing zones and identify where CSO discharges may potentially impair designated uses of the Pequonnock River, Yellow Mill Pond, Johnson's Creek and the adjacent areas of Bridgeport Harbor, including areas of concern in Long Island Sound. The plan, which was submitted and approved by CTDEP, defined a scope of sampling which focused on indicators of bacterial contamination and chemical/physical characteristics of water that could be used to define conditions during dry weather and mixing zones during wet weather discharge conditions. Subsequent discussions with CTDEP identified concerns regarding potential dissolved oxygen impacts in some of these waters as well. The plan also defined sampling of Cedar Creek and Ash Creek in the areas receiving CSO. The CSO and Receiving Water Field Sampling and Quality Assurance Plan (Plan) defined the sampling activities to be performed in support of the Plan of Study for the CSO Long Term Control Plan (LTCP) for the City of Bridgeport WPCA.

4.1.1. Water Quality Sampling Locations

The Plan identified 23 sites for monitoring/sampling. Discrete samples of receiving water were collected for laboratory analyses at 15 locations in the Bridgeport waterways that potentially could be affected by CSOs. Four representative CSO locations were selected to estimate bacterial pollutant loads. Samples were also collected at two recreational beach sites. Finally, two locations were selected as reference sites to indicate ambient conditions in the waters of Long Island Sound.

Figure 4-1 illustrates the locations of the following 23 monitoring sites:

- 15 CSO receiving water sites (2 of which are shellfish culture sites)
- 4 CSO discharge locations
- 2 recreational beach sites
- 2 reference sites

4.1.2. Frequency and Duration of Water Quality Sampling

The sampling program consisted of five dry weather and three wet weather sampling events. The 15 sites for the receiving water sampling/monitoring included both downstream locations in each tributary and upstream sites to determine representative background conditions.

4.1.3. Determination for Which Storm Events should be Targeted

Dry weather sampling occurred at specified times following 72 hours of no measurable rainfall. The five dry weather events were targeted to be collected within a 30 day period that does not have to correspond to a calendar month. Three wet weather events were sampled at the receiving water body locations. The goals for the sampled storms were to meet the following targets, though minor deviations may be required to meet the sampling schedule:

- Be a community-wide storm event. The decision on whether or not an event was a "community-wide" was an ongoing judgment by the Malcolm Pirnie Sampling Coordinator during the sampling event.
- Have a rainfall depth of at least 0.5 inches +/- 50% (0.25 to 0.75 inches)
- Have a minimum predicted duration of 6 hours +/- 50% (3 to 9 hours)
- Must trigger overflow discharge at all four CSO locations, or weather radar indicates that storm will trigger CSOs area-wide. There must be a minimum of 72 hours of antecedent dry weather prior to a storm event for the event to be sampled.

4.2. Water Quality Sampling Study

This section includes the results and findings of the Bridgeport WPCA CSO and Receiving Water Field Sampling and Quality Assurance Plan. The detailed results of this study are presented in the document entitled, "Bridgeport WPCA Receiving Water Field Sampling Report". Overall Enterococci and fecal coliform sampling results were presented for ease of reference in areas where active CSO outfalls exist. Dissolved oxygen, temperature, pH and conductivity were also measured and the results are described in this section.

4.2.1. Dry Weather Receiving Water Sampling

Dry weather sampling began on August 14, 2009 and lasted through September 10, 2009. A total of 23 samples were collected from each site during each event. A total of approximately 120 dry weather fecal coliform samples were collected in this study, which included the five additional supplicate samples beyond what was planned. Additionally, five East Side Plant influent samples were collected for fecal coliform

analysis in order to provide a comparison between dry weather and wet weather concentrations.

4.2.2. Wet Weather Receiving Water Sampling

Wet weather sampling was performed for three qualified storm events between August and October 2009. A total of 353 discrete fecal coliform samples were collected during the receiving water wet weather monitoring periods. The plan called for only 321 samples to be collected for fecal coliform analysis, but false starts and other field issues called for additional tests. A total of 67 Enterococci samples were collected during these wet weather storm events as well, which was also more than identified in the plan.

4.2.3. Indicator Bacteria Results

4.2.3.1. Beach Results

As previously noted, the State of Connecticut fecal coliform standard for commercial shellfish harvesting in SB waters is a geometric mean of less than 88 cfu/100ml with 90% of samples less than 260 cfu/100ml. Two of the seven samples collected at Seaside Park 2 exceeded the 260 cfu/100 ml threshold for fecal coliform during dry weather events. These samples measured above 1000 cfu/100 ml. However, 1 of 5 samples at each of the background sites also exceeded the threshold during the dry weather sampling.

During wet weather Event 7, there were numerous increases and decreases over the sampling period. The geometric mean for fecal coliform for the Bridgeport sites was under 22 cfu/100ml while the geometric mean at Shoal Point was 250 cfu/100ml. The Shoal Point site is in the vicinity of an offshore outfall for another municipal wastewater treatment facility. Event 9 occurred on October 28th concurrently with collection of the first overflow samples from the ANTH regulator. After seven rounds of sampling, no consistent pattern of increase or decrease was found. The geometric means of all four beach sites during Event 9 meet the standard for commercial shellfish harvesting.

4.2.3.2. Harbor Results

The four harbor sites included two in Bridgeport and two in Black Rock Harbor. These sites were chosen to represent relatively open waters beyond the CSO receiving tributaries and before the open waters of the Long Island Sound. During dry weather events, none of the sites exceeded the threshold of 260 cfu/100 ml for 90% of samples. All of these samples were well below the threshold, three of the four being below the 14 cfu/100ml standard for direct consumption.

During wet weather Event 7, there were numerous inconsistent increases and decreases over the sample period. The geometric means of samples for all harbor sites were under 50. Event 9 was initiated on October 28th concurrently with collection of the first

overflow samples from the ANTH regulator. Again, seven rounds of sampling were conducted at the harbor sites over the following 60 hours. Throughout the first 9 hours, there seemed to be a slight increasing trend. However, no consistent increase or decrease was recorded and the magnitude of increase is small compared to what is typically seen in direct CSO receiving waters. All fecal coliform concentrations were less than 200 cfu/100ml in the samples from the four harbor sites.

4.2.3.3. Tributary Results

Receiving waters were sampled in the five main tributaries that run through Bridgeport. Sampling included upstream and downstream sites on each tributary and a third site midway through town on the largest tributary on the Pequonnock River. All of these waters are Class B or SB waters with the exception of the upstream section of Ash Creek which is classified as B/A.

During dry weather sampling of Ash Creek, all but one of the samples exceeded the threshold of 260 for 90% of samples. Concentrations of bacteria were consistently higher at the site upstream of the two CSO locations that discharge to Ash Creek during wet weather. Similar results were discovered in Cedar Creek. The location upstream of the CSO location had elevated concentrations of fecal coliform when compared to the downstream location which measured 21.1 cfu/100ml which meets the criteria for commercial shell fishing in those waters. The dry weather data from the three Pequonnock River sites showed concentrations greater than the 260 cfu/100ml criteria. The downstream measurements were lower on 4 out of the 5 dates sampled. The geometric means of the dry weather samples from all three sites were higher than the criteria of 88 cfu/100ml. However, the downstream mean was only 93.5 while Pequonnock River 2 had a geometric mean of 684.4 and the upstream sites had the highest geometric mean of 1149.2. The data from Yellow Mill Channel sites showed elevated fecal coliform at the upstream sites and concentrations at the downstream sites that were comparable to the harbor sites further out. The geometric mean of the upstream sites (Yellow Mill 1) was over 55,000 while the geometric mean at the downstream site adjacent to the marina area was only 19.6. Johnson's Creek data showed upstream concentrations of dry weather bacteria higher than downstream once again. The geometric mean of the upstream sites was over 7000, while the downstream geometric mean was 58.9 cfu/100ml.

The wet weather data obtained from Ash Creek was consistent with the dry weather results. The Ash Creek site exceeded the shellfish standard for 90% of samples to be below 260 cfu/100ml. The downstream results were consistent with what would be observed as rain water washes flow from the upstream site to the downstream one. The possible causes of excessive bacteria at the site locations upstream of the two CSOs are

illicit connections, and wild life fecal matter. The WPCA has launched an investigation to locate suspected illicit connections.

The wet weather data obtained in Cedar Creek for wet weather Event 5 shows that the fecal coliform concentrations exceeded the shellfish standards. Again, the upstream site concentrations were higher than those measured at Cedar Creek 2. During Event 7, the samples from Cedar Creek showed a slight increase during the first round of testing and then a decline for the remaining rounds. Upstream, the geometric mean was 158.1, which exceeds the shellfish harvesting criteria, while downstream it was 34.6, which meets the commercial harvesting criteria. Similar results were obtained during wet weather Event 9. The upstream geometric mean was 86.3 and the downstream geometric mean was 208.8. The downstream site also had two values which exceeded the 90% of samples criteria of 260 cfu/100ml. While the results for Events 7 and 9 are reversed they are confirmed to be correct. Plausible explanations are tidal flow direction variations and the higher rainfalls that occurred during Event 9.

Another tributary sampled was the Pequonnock River, where wet weather fecal coliform concentrations were elevated when compared to the dry weather samples. The bacteria concentrations seemed to be trend downwards towards dry weather values as the storm progressed. However, the geometric means of all samples exceeded the shellfish standards. During Event 9, the Pequonnock River 2 site located in an area of the stream with several CSOs showed an increase in fecal coliform bacteria concentration over the first three rounds of sampling which tapered off to become similar to both upstream and downstream concentrations about 24 hours after the rain event. This response is more typically seen in CSO receiving waters. The geometric means of all sites exceeded the criteria during Event 9 and more than half of the samples exceeded the 260 cfu/100ml criteria.

The wet weather pattern obtained during Event 7 at the Yellow Mill Channel sites was interesting. The upstream fecal coliform results decreased following the rain event as if diluted by rainwater. The downstream site increased following the rain which is consistent with upstream sources entering that area. The downstream concentrations were 1 to 2 orders of magnitude lower than upstream concentrations. The geometric mean of the downstream samples was 12. During Event 9, the samples did not clearly indicate the presence of an upstream source as was seen in dry weather and earlier events. Both upstream and downstream sites showed similar values and neither indicated a clear trend. The geometric mean of the downstream site during Event 9 was 90.4 which slightly exceeds the shellfish standard.

The final tributary tested was Johnson's Creek which showed similar concentrations of fecal coliform during wet weather testing as was seen during dry weather testing during

Event 5. The downstream site showed values higher than the dry weather values during Event 5. Events 7 and 9 showed similar values during wet weather testing. The fecal concentrations measured upstream were consistently 1 to 2 orders of magnitude greater than those observed at the downstream site. At this location, both sites exceeded the geometric mean standard during wet weather.

4.2.4. Enterococci Results

The Enterococci sampling was performed primarily to form a relationship between that index and the index for fecal coliform bacteria used by the Bureau of Aquaculture. The sites for Enterococci testing were chosen because these are sites of likely recreational use. The recreational use standard is a geometric mean of less than 35 cfu/100ml for all recreational waters and a single sample maximum of 104 cfu/100ml for designated swimming areas or 500 cfu/100ml for all other recreational waters. During dry weather events all of the samples taken at Cedar Creek 2 and Yellow Mill Channel 2 meet both the single sample maximum and geometric means standards for designated swimming areas. The Seaside Park 2 site had 1 of the 5 dry weather event samples in excess of a single sample maximum and the geometric mean of five sample events exceeded the standard of 35 cfu/100ml. Two of the five dry weather samples taken at the Pequonnock River 2 site exceeded the single sample maximum. The geometric mean of the Pequonnock River sites was 216.9. Dry weather samples at both Yellow Mill Channel 2 and Cedar Creek 2 were at or below the detection limit, showing that the concentration at these two sites does not exceed either recreational standard.

During wet weather events, 16 samples were collected at Seaside Park 2; 5 of those samples were at or below the detection limit of 10 cfu/100ml. Four of the 16 samples were above the single sample maximum for designated swimming areas while the geometric mean for the Seaside Park samples was 46.7 which is less than the geometric mean for the dry weather samples.

Nineteen samples were collected at Pequonnock River 2 during wet weather events. Four of the 19 were below the single sample maximum for all recreational uses. The geometric mean of the Pequonnock River samples was over 1800, almost 10 times higher than the geometric mean for dry weather samples.

Eighteen samples were collected during wet weather events from Cedar Creek 2. Five of those samples were at or below the detection limit. Four of the 18 samples were above the single sample maximum for all recreational uses. The geometric mean of the Cedar Creek samples was 73.2, which is greater than the geometric mean for dry weather samples. Overall, the geometric mean for both dry and wet weather samples in Cedar Creek exceeded the criteria for recreational use at 43 cfu/100ml.

Twenty-six samples were collected during wet weather events from Yellow Mill Channel 2. Ten of those samples were at or below the detection limit. One of the 26 samples was above the single sample maximum for all recreational uses. The geometric mean for wet weather events was 35.7 which is slightly above the standard for recreational uses while the geometric mean for dry weather was 28 which meets the criteria for recreational use.

When this data is plotted in a logarithmic scale, a weak regression with an r-squared coefficient of 0.613 is observed. Showing that as the concentration of fecal coliforms increased, the Enterococci concentration also increased.

4.2.5. Dissolved Oxygen Results

Continuous recording instruments were deployed at two fixed locations on the ends of boating piers to measure dissolved oxygen, pH, temperature and conductivity. These two locations are next to Yellow Mill Channel 2 and Cedar Creek 2. Dissolved oxygen (DO) was the variable most likely affected by CSO discharge.

The DO levels at Yellow Mill Channel 2 were generally above 5 mg/L at all times. At Cedar Creek 2, continuous monitoring showed a pattern of DO consistent with more eutrophic waters. The probe recorded wide fluctuations in DO diurnally. Many night-time readings swung below the state standard while daytime readings were well above saturation during the early part of the study. These conditions are typically observed when algal photosynthesis produces DO in the daytime and algal and other biological respiration in the water column consumes oxygen at night. These also cause a diurnal variation in pH. As a result of these low DO readings in Cedar Creek, additional tests were done in several locations in the basin at several depths in the channel. The results generally showed that deeper waters often contain low concentrations of dissolved oxygen.

4.2.6. Conclusions of the Bridgeport Water Quality Study and the March 2010 DEP Meeting

A Meeting was held on March 3, 2010 to present the preliminary findings of the Bridgeport WPCA Receiving Water Field Sampling Report.

The general conclusions which were discussed at the meeting are as follows:

- Upstream dry weather bacteria may be more of concern than wet weather CSO sources.
- Harbor and Beach areas show little effect on bacteria concentrations in wet weather.
- The combination of upstream sources and CSO elevates bacteria in some areas of the Pequonnock and in Cedar Creek during some rain events.

- Potential DO problems in Cedar Creek may be related to multiple factors, including channelization and lack of circulation.
- Mixing zones from CSO are neither observable visually nor readily with water chemistry.

CTDEP noted that most CT LTCP programs were based on a design storm level of control and CTDEP would expect to see comparisons of a range of storms. Meeting minutes are attached n Appendix A2.

4.3. Rain Gauge and Flow Monitoring

Graphical representations of data from 21 different flow meters in the year 1999 as well as five sets of graphical representations of data from the year 2009 are included in Appendix B-1. The main plot of each set of data includes rainfall and pipe flow depth, velocity of pipe flow and the calculated flow. Above each of these plots is the graph of 15-minute precipitation represented in black. Appendix B-2 includes Figure 2-1, entitled "1999 and 2009 CSO, Rain Gauge, and Flow Meter Locations". Attached in Appendix B-3 is the CD entitled, "1999 and 2009 Flow and Rainfall Data."

4.3.1. 1999 Rainfall and Flow Data

Table 4-1 summarizes the rain gauge and flow monitoring characteristics collected for the year 1999 in Bridgeport, Connecticut. The characteristics shown for each graph are rainfall depth, pipe flow depth, pipe velocity and pipe flow. Monitoring characteristics measured were as follows:

Table 4-1:
1999 Rainfall and Flow Data Figure Index Summary

Figures (B-1)	Meter #	From	To	Data Types
1 to 3	1	May 13, 1999	Sept. 26, 1999	Rainfall and Pipe Flow Depth (in.), Velocity (ft/sec), Flow (MGD)
4 to 6	2	May 13, 1999	Aug. 13, 1999	Rainfall and Pipe Flow Depth (in.), Velocity (ft/sec), Flow (MGD)
7 to 9	3	May 13, 1999	Sept.26, 1999	Rainfall and Pipe Flow Depth (in.), Velocity (ft/sec), Flow (MGD)
10 to12	4	May 13, 1999	Sept. 26, 1999	Rainfall and Pipe Flow Depth (in.), Velocity (ft/sec), Flow (MGD)
13 to 15	5	May 13, 1999	Aug. 17, 1999	Rainfall and Pipe Flow Depth (in.), Velocity (ft/sec), Flow (MGD)
16 to 18	6	May 13, 1999	Aug. 17, 1999	Rainfall and Pipe Flow Depth (in.), Velocity (ft/sec), Flow (MGD)
19 to 21	7	May 13, 1999	Aug. 17, 1999	Rainfall and Pipe Flow Depth (in.), Velocity (ft/sec), Flow (MGD)
22 to 24	8	May 13, 1999	Sept. 26, 1999	Rainfall and Pipe Flow Depth (in.), Velocity (ft/sec), Flow (MGD)
25 to 27	9	May 13, 1999	Aug. 17, 1999	Rainfall and Pipe Flow Depth (in.), Velocity (ft/sec), Flow (MGD)
28 to 30	10	May 13, 1999	Sept. 26, 1999	Rainfall and Pipe Flow Depth (in.), Velocity (ft/sec), Flow (MGD)
31 to 33	11	May 13, 1999	Sept. 26, 1999	Rainfall and Pipe Flow Depth (in.), Velocity (ft/sec), Flow (MGD)
34 to 36	12	May 13, 1999	Sept. 26, 1999	Rainfall and Pipe Flow Depth (in.), Velocity (ft/sec), Flow (MGD)
37 to 39	13	June 10, 1999	Aug. 17, 1999	Rainfall and Pipe Flow Depth (in.), Velocity (ft/sec), Flow (MGD)
40 to 42	14	May 13, 1999	Sept. 26, 1999	Rainfall and Pipe Flow Depth (in.), Velocity (ft/sec), Flow (MGD)
43 to 45	15	May 13, 1999	Aug. 17, 1999	Rainfall and Pipe Flow Depth (in.), Velocity (ft/sec), Flow (MGD)
46 to 48	16	May 13, 1999	Sept. 26, 1999	Rainfall and Pipe Flow Depth (in.), Velocity (ft/sec), Flow (MGD)
49 to 51	17	May 13, 1999	Sept. 25, 1999	Rainfall and Pipe Flow Depth (in.), Velocity (ft/sec), Flow (MGD)
52 to 54	18	May 20, 1999	Aug. 17, 1999	Rainfall and Pipe Flow Depth (in.), Velocity (ft/sec), Flow (MGD)
55 to 57	19	May 13, 1999	Jul. 8, 1999	Rainfall and Pipe Flow Depth (in.), Velocity (ft/sec), Flow (MGD)
58 to 60	20	May 13, 1999	Jul. 8, 1999	Rainfall and Pipe Flow Depth (in.), Velocity (ft/sec), Flow (MGD)
61 to 63	21	June 24, 1999	Sept. 26, 1999	Rainfall and Pipe Flow Depth (in.), Velocity (ft/sec), Flow (MGD)

4.3.2. 2009 Rainfall and Flow Data

Table 4-2 summarizes rainfall and flow data collected in the year 2009. This data was obtained using different meters in the city of Bridgeport, Connecticut. Included in Appendix B-1 are graphical representations of pipe velocity, flow, and depth and also rainfall depth. Each graph is divided into two separate plots in order to properly depict more accurate representations. The first page of each graph shows data taken from the time between August 15, 2009 and Sept. 27, 2009. The second page of each graph covers the time period between Sept. 27, 2009 and Nov. 9, 2009. Atop each depth and flow graph is a plot of 15-minute precipitation represented in black. Velocity diagrams do not show the 15-minute precipitation characteristics.

Table 4-2:
2009 Rainfall and Flow Data Figure Index Summary

Figure (B-1)	Meter	From	To	Data Type
63a	Ann	Aug. 15, 2009 12:00AM	Sept. 27, 2009 9:40PM	Velocity (ft/sec)
63b	Ann	Sept. 27, 2009 9:40PM	Nov. 9, 2009 7:00PM	Velocity (ft/sec) (Continued)
64a	Ann	Aug. 15, 2009 12:00AM	Sept. 27, 2009 9:40PM	Depth (in.)
64b	Ann	Sept. 27, 2009 9:40PM	Nov. 9, 2009 7:00PM	Depth (in.) (Continued)
65a	Ann	Aug. 15, 2009 12:00AM	Sept. 27, 2009 9:40PM	Flow (MGD)
65b	Ann	Sept. 27, 2009 9:40PM	Nov. 9, 2009 7:00PM	Flow (MGD) (Continued)
66a	ANTH	Aug. 15, 2009 12:00AM	Sept. 27, 2009 9:40PM	Velocity (ft/sec)
66b	ANTH	Sept. 27, 2009 9:40PM	Nov. 9, 2009 7:00PM	Velocity (ft/sec) (Continued)
67a	ANTH	Aug.15, 2009 12:00AM	Sept. 27, 2009 9:40PM	Depth (in.)
67b	ANTH	Sept. 27, 2009 9:40PM	Nov. 9, 2009 7:00PM	Depth (in.) (Continued)
68a	ANTH	Aug.15, 2009 12:00AM	Sept. 27, 2009 9:40PM	Flow (MGD)
68b	ANTH	Sept. 27, 2009 9:40PM	Nov. 9, 2009 7:00PM	Flow (MGD) (Continued)
69a	Bayel	Aug. 15, 2009 12:00AM	Sept. 27, 2009 9:40PM	Velocity (ft/sec)
69b	Bayel	Sept. 27, 2009 9:40PM	Nov. 9, 2009 7:00PM	Velocity (ft/sec) (Continued)
70a	Bayel	Aug. 15, 2009 12:00AM	Sept. 27, 2009 9:40PM	Depth (in.)
70b	Bayel	Sept. 27, 2009 9:40PM	Nov. 9, 2009 7:00PM	Depth (in.) (Continued)
71a	Bayel	Aug. 15, 2009 12:00AM	Sept. 27, 2009 9:40PM	Flow (MGD)
71b	Bayel	Sept. 27, 2009 9:40PM	Nov. 9, 2009 7:00PM	Flow (MGD) (Continued)
72a	Siphon	Aug, 15, 2009 12:00AM	Sept. 27, 2009 9:40PM	Velocity (ft/sec)
72b	Siphon	Sept, 27, 2009 9:40PM	Nov. 9, 2009 7:00PM	Velocity (ft/sec) (Continued)
73a	Siphon	Aug. 15, 2009 12:00AM	Sept. 27, 2009 9:40PM	Depth (in.)
73b	Siphon	Sept. 27, 2009 9:40PM	Nov. 9, 2009 7:00PM	Depth (in.) (Continued)
74a	Siphon	Aug. 15, 2009 12:00AM	Sept. 27, 2009 9:40PM	Flow (MGD)
74b	Siphon	Sept. 27, 2009 9:40PM	Nov. 9, 2009 7:00PM	Flow (MGD) (Continued)
75a	Trumbull	Aug. 15, 2009 12:00AM	Sept. 27, 2009 9:40PM	Velocity (ft/sec)
75b	Trumbull	Sept. 27, 2009 9:40PM	Nov. 9, 2009 7:00PM	Velocity (ft/sec) (Continued)
76a	Trumbull	Aug.15, 2009 12:00AM	Sept. 27, 2009 9:40PM	Depth (in.)
76b	Trumbull	Sept. 27, 2009 9:40PM	Nov. 9, 2009 7:00PM	Depth (in.) (Continued)
77a	Trumbull	August 15, 2009 12:00AM	Sept. 27, 2009 9:40PM	Flow (MGD)
77b	Trumbull	Sept. 27, 2009 9:40PM	Nov. 9, 2009 7:00PM	Flow (MGD) (Continued)
78a	WESP	Aug. 15, 2009 12:00AM	Sept. 27, 2009 9:40PM	Velocity (ft/sec)
78b	WESP	Sept. 27, 2009 9:40PM	Nov. 9, 2009 7:00PM	Velocity (ft/sec) (Continued)
79a	WESP	Aug.15, 2009 12:00AM	Sept. 27, 2009 9:40PM	Depth (in.)
79b	WESP	Sept. 27, 2009 9:40PM	Nov. 9, 2009 7:00PM	Depth (in.) (Continued)
80a	WESP	Aug. 15, 2009 12:00AM	Sept. 27, 2009 9:40PM	Flow (MGD)
80b	WESP	Sept. 27, 2009 9:40PM	Nov. 9, 2009 7:00PM	Flow (MGD) (Continued)

Table 4-3 presents data obtained during dry weather flows through each of the meters mentioned in the previous sections during the 1999 and 2009 flow monitoring periods. Table 4-4 presents a summary of data taken from the rain gauges during storm events in 1999 and 2009. Included in this summary are average, mean, minimum and maximum data values. Table 4-5 is a summary of statistics for depth, velocity and flow for all flow meters.

Bridgeport WPCA
Bridgeport CSO Long Term Control Plan
Table 4-4: Storm Summary Data by Rain Gauge (RG)

RG_East

Date	Total Rain (in)	Peak Hourly Rain (in)	Peak 5-Min Rain (in)	Event Duration (hours)	Average Intensity, Inches/hour	One hour duration Recurrence Interval (months)	Twenty four hour duration Recurrence Interval (months)
8/14/09	0.11	0.17	0.9	0.2	0.66	1.1	0.9
8/22/09	No Data Collected by Rain Gauge						
8/23/09	No Data Collected by Rain Gauge						
[illegible]	No Data Collected by Rain Gauge						
[illegible]	No Data Collected by Rain Gauge						
9/14/09	0.20	0.1	0.10	12.67	0.02	1.0	1.0
9/15/09	0.05	0.0	0.02	32.42	0.00	0.8	0.8
9/17/09	No Data Collected by Rain Gauge						
9/27/09	1.38	0.3	0.05	17.42	0.08	1.7	3.3
9/28/09	0.51	0.3	0.14	1.83	0.28	1.6	1.4
10/3/09	1.12	0.9	0.20	25.17	0.04	7.6	2.5
10/7/09	0.43	0.2	0.05	7.00	0.06	1.3	1.3
10/10/09	0.08	0.05	0.02	12.67	0.01	0.85	0.87
[illegible]	0.47	0.18	0.01	[illegible]	[illegible]	[illegible]	[illegible]
10/18/09	0.72	0.15	0.02	16.33	0.04	1.09	1.69
10/24/09	1.86	0.51	0.09	25.75	0.07	2.64	5.47
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
11/1/09	0.10	0.05	0.03	16.33	0.01	0.85	0.89

RG_West

Date	Total Rain (in)	Peak Hourly Rain (in)	Peak 5-Min Rain (in)	Event Duration (hours)	Average Intensity, Inches/hour	One hour duration Recurrence Interval (months)	Twenty four hour duration Recurrence Interval (months)
8/14/09	No Data Collected by Rain Gauge						
8/22/09	0.89	0.49	0.22	13.25	0.07	2.5	2.0
8/23/09	0.29	0.28	0.14	1.33	0.22	1.5	1.1
[illegible]	0.83	0.25	0.10	25.25	0.05	1.3	1.9
[illegible]	0.91	0.38	0.12	28.25	[illegible]	1.8	2.1
9/14/09	No Data Collected by Rain Gauge						
9/15/09	No Data Collected by Rain Gauge						
9/17/09	No Data Collected by Rain Gauge						
9/27/09	1.32	0.23	0.04	17.67	0.07	1.3	3.1
9/28/09	0.49	0.33	0.15	1.75	0.28	1.7	1.3
10/3/09	1.06	0.91	0.18	19.00	0.06	7.1	2.4
10/7/09	0.44	0.22	0.07	13.42	0.03	1.3	1.3
10/10/09	0.08	0.06	0.02	12.67	0.01	0.87	0.87
[illegible]	0.35	0.07	0.01	[illegible]	0.02	0.89	1.28
10/18/09	0.57	0.12	0.01	14.92	0.04	1.01	1.45
10/24/09	1.91	0.52	0.07	20.58	0.09	2.70	5.76
[illegible]	1.34	[illegible]	0.05	[illegible]	[illegible]	1.26	[illegible]
11/1/09	0.12	0.06	0.03	24.17	0.00	0.87	0.91

RG_Firesta

Date	Total Rain (in)	Peak Hourly Rain (in)	Peak 5-Min Rain (in)	Event Duration (hours)	Average Intensity, Inches/hour	One hour duration Recurrence Interval (months)	Twenty four hour duration Recurrence Interval (months)
8/14/09	0.11	0.11	0.10	0.2	0.11	1.0	0.9
8/22/09	No Data Collected by Rain Gauge						
8/23/09	No Data Collected by Rain Gauge						
[illegible]	No Data Collected by Rain Gauge						
[illegible]	0.79	0.32	0.08	26.92	0.03	1.7	[illegible]
9/14/09	No Data Collected by Rain Gauge						
9/15/09	No Data Collected by Rain Gauge						
9/17/09	0.14	0.12	0.08	40.25	0.00	1.0	0.9
9/27/09	1.11	0.24	0.05	17.08	0.06	1.4	2.5
9/28/09	0.45	0.32	0.18	1.75	0.26	1.7	1.3
10/3/09	0.87	0.78	0.25	5.08	0.17	5.1	2.0
10/7/09	0.36	0.17	0.05	5.75	0.06	1.1	1.2
10/10/09	0.08	0.04	0.02	12.67	0.01	0.83	0.9
[illegible]	[illegible]	0.08	0.01	[illegible]	0.02	[illegible]	[illegible]
10/18/09	0.63	0.14	0.02	16.42	0.04	1.06	1.5
10/24/09	No Data Collected by Rain Gauge						
[illegible]	No Data Collected by Rain Gauge						
11/1/09	No Data Collected by Rain Gauge						

RG_01							RG_02							
Date	Total Rain (in)	Peak Hourly Rain (in)	Peak 5-Min Rain (in)	Event Duration (hours)	Average Intensity, Inches/hour	One hour duration Recurrence Interval (months)	Twenty four hour duration Recurrence Interval (months)	Total Rain (in)	Peak Hourly Rain (in)	Peak 5-Min Rain (in)	Event Duration (hours)	Average Intensity, Inches/hour	One hour duration Recurrence Interval (months)	Twenty four hour duration Recurrence Interval (months)
5/20/99 1:30	2.06	0.44	0.14	38.25	0.05	2.2	6.7	2.06	0.44	0.14	38.25	0.05	2.2	6.7
5/25/99 4:30	1.76	0.47	0.33	46.25	0.04	2.4	4.9	1.76	0.47	0.33	46.25	0.04	2.4	4.9
6/14/99 22:45	0.17	0.09	0.06	29.25	0.01	0.9	1.0	0.16	0.11	0.05	29.25	0.01	1.0	0.9
[illegible]	[illegible]	0.14	0.04	5.25	0.05	[illegible]	[illegible]	0.12	0.05	0.01	[illegible]	0.01	0.8	[illegible]
[illegible]	0.47	0.47	[illegible]	0.50	[illegible]	[illegible]	[illegible]	0.42	0.42	[illegible]	0.50	0.84	[illegible]	[illegible]
7/2/99 22:30	0.65	0.23	0.23	45.75	0.01	1.3	1.6	0.56	0.37	0.27	45.75	0.01	1.9	1.4
7/13/99 3:15	0.08	0.05	0.02	3.25	0.02	0.8	0.9	0.04	0.03	0.01	3.25	0.01	0.8	0.8
7/19/99 16:15	0.49	0.31	0.16	18.50	0.03	1.6	1.3	0.14	0.11	0.11	18.50	0.01	1.0	0.9
7/22/99 16:30	0.08	0.05	0.03	14.25	0.01	0.8	0.9	0.01	0.01	0.01	14.25	0.00	0.8	0.8
8/8/99 8:15	0.26	0.16	0.09	1.75	0.15	1.1	1.0	0.45	0.34	0.18	1.75	0.26	1.7	1.3
8/8/99 10:00	0.25	0.16	0.09	3.25	0.08	1.1	1.0	0.52	0.34	0.21	3.25	0.16	1.7	1.4
8/15/99 6:30	1.20	0.56	0.28	36.25	0.03	3.0	2.8	2.27	1.08	0.49	36.25	0.06	10.8	8.3
8/21/99 1:30	0.67	0.35	0.09	36.25	0.02	1.8	1.6	0.63	0.33	0.10	36.25	0.02	1.7	1.5
[illegible]	[illegible]	0.35	0.09	45.00	[illegible]	[illegible]	[illegible]	0.62	0.33	0.10	45.00	0.01	1.7	1.5
8/27/99 3:45	0.46	0.16	0.09	21.75	0.02	1.1	1.3	0.34	0.15	0.06	21.75	0.02	1.1	1.1
9/10/99 15:00	0.88	0.62	0.27	6.00	0.15	3.5	2.0	0.50	0.27	0.08	6.00	0.08	1.5	1.3
[illegible]	[illegible]	[illegible]	[illegible]	41.25	[illegible]	[illegible]	[illegible]	3.51	0.58	0.23	41.25	0.09	[illegible]	[illegible]
9/22/99 11:15	1.25	0.18	0.08	27.50	0.05	1.2	2.9	0.97	0.22	0.08	27.50	0.04	1.3	2.2

Bridgeport WPCA
Bridgeport CSO Long Term Control Plan
Table 4-5: Summary Statistics for Depth, Velocity and Flow for All Flow Meters

1999 METER DATA															
Model and Drainage Area	Sewer Branch	Meter Location Type	Flow Meter Number/Name	Depth*				Velocity*				Flow*			
				Average	Median	Minimum	Maximum	Average	Median	Minimum	Maximum	Average	Median	Minimum	Maximum
West	South	Most upstream	P1	4.3599312	3.329	0	58.722	0.7778779	0.765	0	1.6	0.2290909	0.189	0	10.323
West	cumulative	Most Downstream	P2	38.818514	37.9245	0	170.799	1.386763	1.37	0	4.147	11.530508	11.582	0	47.358
West	Middle	Most upstream	P3	9.7125652	10.364	0	68.139	1.6192479	1.882	0	3.469	1.9870444	2.082	0	14.374
West	West	Most upstream	P4	19.0608	19.251	0	72.222	1.7030344	1.855	0	3.644	1.7793384	1.844	0	17.021
West	West subbranch of East	Most upstream of 9	P7	21.205974	21.337	0	29.96	1.3010021	1.322	0	3.165	4.1467038	4.2275	0	10.377
West	most DS on east	next up from M. DS.	P8	25.483299	25.288	0	136.847	1.1412238	1.167	0	3.209	4.7376453	4.745	0	29.919
West	West subbranch of East	Next up S. from 8.	P9	22.796014	22.527	18.945	112.442	1.3080234	1.349	0	2.962	1.8802919	1.919	0	17.187
West	East subbranch of East		P10	18.964663	19.061	0	73.693	1.2347283	1.251	0	2.046	2.1516507	2.124	0	8.745
East	West	Next up S. from 13.	P11	14.181723	12.133	0	111.395	1.4557763	1.481	0	3.063	1.910739	1.879	0	11.106
East	West	Next up S. from 11.	P12	16.514923	16.4435	0	30	0.8671312	0.846	0	5.043	1.6188985	1.49	0	16
East	West	Most Downstream	P13	25.864509	21.043	0	152.237	1.0944967	1.078	0	2.748	2.925761	3.289	0	17.632
East	East	Most Downstream	P14	14.486323	9.132	0	36	1.5822042	1.864	0	2.896	1.751706	1.789	0	11.597
East	East	Next up S. from 12.	P15	11.089417	10.359	0	106.299	1.535621	1.649	0	2.895	1.0387079	1.114	0	4.032
East	West	Most upstream	P16	5.3773402	5.4455	3.378	13.304	2.7890743	2.689	1.282	6.534	0.8981123	0.889	0.22	5.472
West	East subbranch of East	Most upstream 10	P17	10.881529	10.785	0	48.25	0.4969707	0.508	0	2.866	0.7098489	0.701	0	21.733
Median				**16.515**	**16.444**	**0.000**	**72.222**	**1.308**	**1.349**	**0.000**	**3.063**	**1.880**	**1.879**	**0.000**	**14.374**
Average				**17.253**	**16.295**	**1.488**	**81.354**	**1.353**	**1.405**	**0.085**	**3.352**	**2.620**	**2.658**	**0.015**	**16.192**
2009 METER DATA															
East	West	Next to P11	ANN	9.147	7.220	5.210	116.570	2.449	2.520	0.390	5.480	1.667	1.564	0.727	9.914
West	East subbranch of East	Upstream of P2	ANTH	10.575	9.410	5.080	74.960	1.257	1.260	0.380	2.720	1.591	1.363	0.317	21.220
East	East	South P15	BAYEL	11.619	11.190	9.020	71.500	1.215	1.250	0.350	2.190	1.296	1.306	0.464	3.798
West	West subbranch of East	Trumbull Interceptor N. of Firestation (near P9)	TRUMBEL	21.740	19.660	14.380	144.660	1.722	1.760	0.180	2.760	6.407	6.249	1.319	29.190
West	cumulative	1 Seg. Downstream of P2	WESP	52.081	44.535	32.790	220.880	1.423	1.380	0.340	3.840	17.576	16.160	4.169	68.450
Median				**11.619**	**11.190**	**9.020**	**116.570**	**1.423**	**1.380**	**0.350**	**2.760**	**1.667**	**1.564**	**0.727**	**21.220**
Average				**21.032**	**18.367**	**13.296**	**125.714**	**1.609**	**1.634**	**0.328**	**2.998**	**5.708**	**5.328**	**1.399**	**26.514**

Depth, Velocity or Flow shown above is Higher than the Mininum and less than Median

Depth, Velocity or Flow shown above is Higher than the Median and less than Maximum

Bridgeport WPCA
Bridgeport CSO Long Term Control Plan
Table 4-3: Hourly Dry Weather Flows at Each Meter

Meter	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	WESP (1 Seg. Downstream of P2)	ANN (CORRESPONDS TO P11)	BAYEL (CLOSEST TO P15)	TRUMBEL (CLOSEST TO P9)	ANTH (CORRESPONDS TO P2)	Siphon (No Reference)
Maximum	**0.242**	**13.361**	**2.639**	**2.132**	**0.069**	**1.501**	**5.219**	**5.550**	**2.198**	**2.409**	**2.452**	**1.956**	**4.560**	**2.179**	**1.335**	**1.053**	**0.811**	**0.554**	**1.280**	**2.657**	**2.979**	**21.542**	**1.949**	**1.542**	**7.788**	**2.261**	**2.342**
Average	**0.214**	**11.519**	**2.056**	**1.750**	**0.053**	**1.129**	**4.124**	**4.654**	**1.813**	**2.079**	**1.988**	**1.560**	**3.598**	**1.820**	**1.093**	**0.866**	**0.702**	**0.481**	**0.973**	**1.948**	**2.147**	**18.994**	**1.542**	**1.314**	**6.721**	**1.711**	**2.163**
Minimum	**0.136**	**7.927**	**1.213**	**0.944**	**0.022**	**0.656**	**2.559**	**3.258**	**1.025**	**1.441**	**1.265**	**0.991**	**2.209**	**1.116**	**0.686**	**0.522**	**0.488**	**0.345**	**0.488**	**0.999**	**0.937**	**14.485**	**1.000**	**0.861**	**4.889**	**1.102**	**1.786**
0	0.207	12.523	2.169	1.854	0.048	1.096	4.372	4.779	1.881	2.170	2.078	1.555	3.564	1.943	1.092	0.860	0.695	0.505	1.012	2.044	2.140	20.287	1.518	1.229	6.690	1.494	2.120
1	0.210	12.328	1.892	1.555	0.035	0.922	3.955	4.310	1.575	1.934	1.861	1.380	3.309	1.691	0.931	0.734	0.608	0.451	0.874	1.776	1.766	18.847	1.268	1.054	6.105	1.276	2.017
2	0.206	11.567	1.584	1.247	0.027	0.774	3.438	3.905	1.336	1.719	1.604	1.176	3.015	1.503	0.793	0.622	0.557	0.401	0.702	1.494	1.380	17.009	1.106	0.927	5.584	1.102	1.934
3	0.188	10.663	1.348	1.027	0.024	0.694	2.990	3.556	1.153	1.543	1.416	1.047	2.648	1.266	0.726	0.551	0.518	0.373	0.591	1.233	1.044	15.420	1.045	0.885	5.173	1.119	1.838
4	0.166	9.469	1.252	0.944	0.022	0.656	2.722	3.405	1.071	1.459	1.305	1.008	2.385	1.170	0.688	0.522	0.510	0.351	0.523	1.081	0.937	14.485	1.000	0.861	4.964	1.178	1.786
5	0.173	8.470	1.237	0.974	0.023	0.659	2.577	3.376	1.025	1.450	1.271	0.991	2.250	1.152	0.686	0.541	0.488	0.345	0.488	0.999	0.987	14.745	1.069	0.902	4.889	1.316	1.797
6	0.136	7.927	1.213	0.997	0.035	0.744	2.559	3.258	1.081	1.441	1.265	0.991	2.209	1.116	0.752	0.550	0.514	0.353	0.495	1.042	1.022	15.394	1.153	1.009	5.066	1.471	1.868
7	0.207	7.946	1.380	1.338	0.054	1.064	2.810	3.549	1.379	1.635	1.339	1.071	2.527	1.313	0.982	0.686	0.613	0.396	0.627	1.369	1.550	15.940	1.321	1.244	5.424	1.631	2.028
8	0.228	8.895	2.013	1.784	0.065	1.413	3.467	4.091	1.746	1.923	1.567	1.307	3.005	1.743	1.200	0.875	0.754	0.473	0.920	1.930	2.442	17.241	1.575	1.428	6.386	1.830	2.163
9	0.232	10.403	2.542	1.954	0.066	1.501	4.338	4.699	1.933	2.156	1.895	1.558	3.279	2.065	1.297	0.980	0.804	0.520	1.169	2.414	2.898	18.289	1.632	1.473	7.080	1.753	2.223
10	0.228	11.628	2.635	2.062	0.067	1.452	4.946	5.131	2.033	2.273	2.071	1.670	3.620	2.118	1.311	1.010	0.811	0.554	1.260	2.647	2.979	19.112	1.645	1.490	7.552	1.758	2.225
11	0.238	12.761	2.639	2.125	0.065	1.394	5.197	5.400	2.166	2.356	2.168	1.687	3.794	2.161	1.335	1.053	0.800	0.551	1.280	2.657	2.945	19.676	1.755	1.516	7.750	1.971	2.261
12	0.227	13.248	2.581	2.132	0.065	1.336	5.219	5.550	2.198	2.409	2.244	1.779	4.030	2.179	1.316	1.043	0.786	0.548	1.247	2.544	2.872	20.647	1.751	1.508	7.735	1.908	2.294
13	0.241	13.361	2.470	2.036	0.063	1.256	5.098	5.513	2.143	2.400	2.299	1.804	3.998	2.115	1.275	1.025	0.769	0.534	1.202	2.406	2.655	20.774	1.719	1.486	7.641	1.863	2.293
14	0.240	13.303	2.326	2.015	0.058	1.206	4.857	5.348	2.104	2.343	2.329	1.880	4.109	2.050	1.220	0.996	0.754	0.530	1.149	2.245	2.490	20.520	1.719	1.476	7.427	1.865	2.342
15	0.230	12.976	2.214	1.983	0.055	1.151	4.633	5.261	2.054	2.311	2.385	1.938	4.408	2.041	1.170	0.955	0.739	0.517	1.083	2.112	2.350	20.808	1.666	1.422	7.177	1.758	2.337
16	0.242	12.744	2.117	1.954	0.054	1.109	4.473	5.162	2.021	2.324	2.360	1.878	4.560	1.994	1.130	0.922	0.731	0.505	1.062	2.042	2.201	20.462	1.619	1.380	6.986	1.731	2.311
17	0.218	12.340	2.056	1.979	0.056	1.139	4.380	5.089	1.974	2.312	2.364	1.900	4.496	1.964	1.132	0.962	0.719	0.507	1.030	1.999	2.178	20.027	1.636	1.390	6.931	1.855	2.283
18	0.207	12.113	2.110	1.989	0.059	1.197	4.320	5.080	2.084	2.300	2.443	1.955	4.539	1.916	1.164	0.955	0.744	0.515	1.056	2.010	2.265	20.137	1.788	1.438	7.131	2.084	2.288
19	0.216	12.094	2.212	1.998	0.066	1.281	4.424	5.088	2.123	2.316	2.452	1.956	4.481	1.987	1.209	0.976	0.778	0.525	1.089	2.042	2.418	20.610	1.862	1.502	7.253	2.261	2.286
20	0.221	12.213	2.325	2.003	0.065	1.281	4.485	5.111	2.182	2.318	2.397	1.893	4.391	2.009	1.205	0.996	0.777	0.524	1.128	2.086	2.548	21.234	1.949	1.528	7.505	2.175	2.294
21	0.222	12.438	2.346	1.989	0.069	1.270	4.539	5.047	2.104	2.268	2.284	1.749	4.262	2.145	1.197	0.998	0.782	0.515	1.131	2.154	2.530	21.374	1.840	1.542	7.753	2.028	2.325
22	0.220	12.467	2.361	2.031	0.069	1.270	4.585	5.012	2.091	2.269	2.170	1.644	3.814	2.020	1.229	1.003	0.802	0.519	1.136	2.215	2.514	21.542	1.750	1.470	7.788	1.920	2.338
23	0.228	12.575	2.317	2.023	0.063	1.222	4.603	4.967	2.059	2.269	2.139	1.628	3.666	2.024	1.197	0.961	0.788	0.528	1.088	2.221	2.405	21.282	1.628	1.375	7.307	1.711	2.250

Hours in the Day

Attachment F

Technical Memorandum M-01

Technical Memorandum M-01

Project: *Bridgeport, Connecticut Wastewater Treatment Plant Facilities Planning*

From: *Laurie Locke, Mitch Heineman, Giana Park, Sarah Jakositz*

Date: *July 2020; Updated October 2020*

Subject: *East and West Side Wastewater Treatment Plants*
Collection System Model Review and Update

Purpose

CDM Smith is currently developing a Wastewater Treatment Plant (WWTP) Facilities Plan (Facilities Plan) for the Water Pollution Control Authority, City of Bridgeport (WPCA). The Facilities Plan evaluates the current needs and future improvements to the two WWTPs operated by the WPCA—the East Side WWTP and the West Side WWTP. To support the development of the Facilities Plan, the City's existing collection system model was updated and used to evaluate peak flow delivered by the collection system to the East Side and West Side WWTPs. This technical memorandum summarizes the model development, data sources, validation, and updated baseline CSO estimates used as the basis for alternatives analysis in the Facilities Plan.

Data Sources

The collection system model was updated with the best-available information on the existing collection system, including several system improvement projects that WPCA has implemented since the last model update in 2010. Data gathering and analysis for this model update focused on both the physical attributes of the system and system performance. CDM Smith worked collaboratively with WPCA to collect and verify this information, as described in this section.

SWMM Model

A hydraulic model of WPCA's collection system was developed in 1999 to support development of a Long-Term Control Plan (LTCP). The original model was developed in Visual Hydro (a variant of XPSWMM). The model was converted to US Environmental Protection Agency Stormwater Management Model version 5 (EPA SWMM), updated, and calibrated in 2009 and 2010 to support WPCA's 2010 LTCP (Arcadis/Malcom Pirnie, 2017).

CDM Smith received the latest version of the model from WPCA in June 2019. The model had been maintained by Arcadis since the 2010 LTCP and most recently had been used to compare simulated and observed overflows during the 2016 and 2017 Pilot Telemetry Program (Arcadis, 2018). This version of the model was the starting point for this analysis.

Spatial and Timeseries Data

Several large, publicly available spatial and timeseries datasets were used to refine model hydrology and set model boundary conditions. These datasets were downloaded from national and state resources identified below:

- 2010 census block outlines and population data from the University of Connecticut State Data Center (US Census Bureau, 2012);
- 2012 imperviousness data from the Department of Energy and Environmental Protection (DEEP) Connecticut Environmental Conditions Online (CT ECO) system with 1-foot resolution (DEEP, 2012);
- Raster based digital elevation (DEM) from the CT ECO system. DEM was developed from 2016 Lidar mission completed in March and April, with 1-meter resolution (Capitol Region Council of Governments, 2016);
- Daily Norwalk River discharge from the United States Geologic Survey (USGS) station 01209700 at South Wilton, CT (USGS, 2020);
- Hourly precipitation, daily temperature, and daily snow depth data from Sikorsky Airport (USW00094702) from the National Centers for Environmental Information (NCEI) (NOAA, 2020a); and
- Hourly tidal stage data from the National Oceanic and Atmospheric Administration (NOAA) station 8467150 in Bridgeport (NOAA, 2020b).

Record Drawings

WPCA provided city-wide mapping including the Fuller Sewer Atlas and WPCA's geographic information system (GIS) data, as well as record drawings for key locations and projects throughout the collection system:

- CSO regulators;
- Marine CSO Improvement Contract C;
- Sewer Separation Contracts F-1, F-2, F-3, F-4, G-1, G-2, G-4, H-1, and H-2;
- Sewer Lining Contracts H-2, H-3, H-4, H-5, H-6, and H-7; and
- New River Street Pump Station.

Flow and CSO Monitoring

Existing monitoring data were used to calibrate system performance in dry and wet weather, as well as to add a variable baseflow component to the model. The following data sources were used to evaluate system performance and for validation of the updated model:

- CSO block testing results at all available CSO regulators for 2017 and 2019;
- Minimum, maximum, and average daily flow (ADF) and both the East Side and West Side WWTP's for 2017 – 2019.
- CSO level sensing at West Side regulators ANTH, ARBOR, GRAND, and HUNT and East Side regulators WANN, CHUR, STRAT, and BAYEL regulators from the 2016-2017 Pilot Telemetry Program (Arcadis, 2018);
- 2009 flow monitoring program, which included four area-velocity meters on the West Side and two area-velocity meters on the East Side deployed from August through November, 2009 (Malcom Pirnie, 2017); and
- 1999 flow monitoring program which included 21 area-velocity meters deployed from May through September 1999 (Malcom Pirnie, 2017).

Additional Information on System Performance

In addition to system monitoring, anecdotal information about system performance was provided by WPCA, including confirmation of the following:

- known flooding areas;
- general condition and verification of tide gates on CSO outfalls; and
- general locations of sediment and debris buildup throughout the collection system.

Model Update

The WPCA collection system model was updated and improved to develop baseline conditions for the existing system to support the Facilities Plan. The updated model incorporates revised hydraulics, hydrology, dry weather flow estimates, and wet weather response. This section describes the improvements made to the model.

Software

The WPCA collection system model uses EPA SWMM. SWMM is the preeminent model for planning, analysis, and design related to stormwater runoff, combined and sanitary sewers, and other drainage systems in urban areas. SWMM can be used with its EPA interface; it has also been adapted into commercial products that offer varying degrees of compatibility with the EPA program. For this project, much of the work was conducted using PCSWMM software from CHI, Inc.

PCSWMM offers strong GIS support and tools for model calibration and runs the EPA computational engine directly, attaining complete compatibility with the EPA standard. EPA SWMM version 5.1.013, released August 2018, was used for this project within PCSWMM 7.2. Modeling was supported with custom software developed by CDM Smith, NetSTORM (Heineman, 2004), which provides tools for meteorological data pre-processing and analysis and SWMM calibration.

Datum and Coordinates

All modeling inputs and outputs use the City of Bridgeport vertical datum and the Connecticut State Plane North American Datum 1983 (NAD83) coordinate system with length units of feet. Flows are reported in million gallons per day (mgd). Bridgeport City datum is 14.6 feet above the North American Vertical Datum of 1988 (NAVD88); elevations in NAVD88 (feet) can be converted to Bridgeport City Datum by adding 14.6 feet.

Hydraulics

The modeled pipe network builds upon the dataset described in the 2010 LTCP. The starting model network consisted of 3,958 links (pipes, weirs, orifices, and pumps). The updated model has 4,032 links. Details have been added at CSO regulators, and pipes were extended into the separated sanitary service area in the northern portion of the City. The updated model has a median pipe diameter of 15 inches, including 813 10-inch and smaller pipes. The model represents 156 miles of pipe (**Figure 1**).

The model previously represented flooding from manholes as losses from the collection system. The configuration was revised to allow surface ponding. A ponded area of 9,400 square feet was applied at most model junctions to better represent system dynamics during intense rainfall. The remaining 10 model nodes represent bolted manholes or non-manhole nodes associated with siphons and pump stations.

Hydraulics at all CSO regulators were thoroughly checked against record drawings, notes provided by WPCA, and video taken during CSO block inspections. The updated model has 22 active CSO regulators discharging to 19 outfalls on the West Side and six CSO regulators discharging to six East Side outfalls. CSO regulator configurations were discussed with WPCA and updated as appropriate, including the representation of recent WPCA efforts to raise weirs. Thirteen CSO outfalls have tide gates in the updated model, including two on the East Side and 11 on the West Side. A tidal boundary condition was applied to 23 of the 25 active CSO outfalls using data from the NOAA Bridgeport tide gage. The Ash Creek CSO outfalls (CEM/MAPE and DEW) are simulated as free discharges.

The hydraulics of all siphons were also reviewed and updated as needed. While no siphon record drawings were available, WPCA provided information about locations and capacity.

Six miles of 24-inch and larger pipe were added to the model to extend the network into separated sanitary sewersheds in the northern portion of the City. The model extension includes the new River Street Pump Station sewershed and two miles of the Bridgeport-Trumbull Interceptors (BTI),

which receives sanitary inflow from Trumbull via the Beardsley Pump Station and Sunnydale Crossover. No pipes in the Trumbull collection system are included in the updated model, but its sanitary flow and infiltration and inflow (I/I) are explicitly accounted for as loads to the BTI.

Simulated sediment depths were verified by WPCA and updated as needed. Friction and form losses were completely revised for the model update. The 2018 model had an average Manning's N (pipe roughness coefficient) of 0.017 with values ranging from 0.011 to 0.024, and no direct representation of form losses ("K" values). For this update, system-wide roughness was initially revised to 0.013 in most locations and to 0.015 in pipes with sediment build-up. Form losses were added as an exit loss coefficient at junctions where bend angles exceeded 15 degrees as specified in **Table 1**. Friction and form losses were tuned as needed during model validation, including entry loss coefficients at the DEAC and SEAB regulators to improve model validation.

Table 1 - Form Loss Values

Minimum Bend Angle	K
0-14	0
15-29	0.08
30-44	0.2
45-59	0.38
60-74	0.65
75-89	0.94
>=90	1.33
0-14	0
15-29	0.08

Note: Adapted from FHWA HEC-22 Urban Drainage Design Manual, Third Edition (2009)

Representations of both the East Side and West Side WWTPs were simplified and reflect current operations at both facilities. The starting model contained unique outlet rating curves at to control inflow to each facility based on the hydraulic grade line (HGL) in the collection system. The rating curves were removed from the updated model and replaced with a flow limit on the influent to each facility. Based on maximum daily flow data from WPCA, the flow limit of the West Side WPCA was set to 80 mgd and the flow limit of the East Side WPCA was set to 35 mgd.

Hydrology

The model's surficial hydrology was revised extensively. The 2018 model contained 395 subcatchments with no accompanying spatial representation. Subcatchment areas and properties had been calibrated to data collected during the 1999 and 2009 metering programs. The number of subcatchments in the model was small compared with the number of manholes, leaving many pipes dry throughout model simulations.

Subcatchments were re-delineated from 1900 census blocks within the city. Census blocks were subdivided as needed to eliminate dry pipes and were typically routed to the upstream-most model

node within the subcatchment. New subcatchments cover the City of Bridgeport and the sewered portion of Trumbull. The updated model contains 2,152 subcatchments in Bridgeport and two in Trumbull as shown in **Figure** .

Subcatchment area was assigned according to GIS area in fully combined sewersheds. Separated sanitary sewersheds in the northern portion of the City were assigned 5 percent of the GIS area. More recently separated areas within the combined portion of the system were reduced to 10 to 99 percent of the GIS area according to the reported degree of separation (Figure 2).

Imperviousness was assigned using 2012 impervious data (DEEP, 2012), which defines percent imperviousness statewide at 1-foot pixel resolution.

Effective imperviousness is calibrated in the model through adjustment of the Percent Routed parameter, which identifies the fraction of a subcatchment's impervious surface that drains onto adjacent pervious ground (e.g. roof leaders that drain to lawns). Routing fractions were specified as 100 minus imperviousness. This corresponds with the "mostly disconnected" condition described in Sutherland's method for estimating effective imperviousness (Rossman, 2015). CDM Smith has found that the mostly disconnected condition yields good initial estimates of runoff in New England communities.

SWMM's width parameter is a principal calibration parameter, as hydrograph timing has many controlling factors such as catch basin distribution and conveyance capacity of pipes omitted from the hydraulic model. For this study, widths were initially specified based on a regression relationship for existing widths in the model, with width (feet) estimated as $300*A^{0.6}$, where A is area in acres (e.g. the estimated width for a 10-acre subcatchment is 1200 feet).

Soil infiltration occurs in the pervious portion of each subcatchment and influences groundwater hydrology. The modified Green-Ampt infiltration method was assigned to all subcatchments. Infiltration parameters were assigned using a saturated conductivity of 1.4 inches per hour, a typical value for Charlton soil (UC Davis, 2020), a suction head of 2.9 inches, and initial moisture deficit of 0.33, both typical of sandy loam (Rossman, 2015).

Snowpack influences winter runoff and inflow rates. For this project, snow processes were calibrated based on Sikorsky Airport daily snow depth measurements for 2010-2019.

The updated model calculates daily potential evapotranspiration using Hargreaves' method (Hargreaves and Samani, 1985), which estimates potential evapotranspiration as a function of daily maximum and minimum temperatures (input to the model from Sikorsky Airport data), latitude, and day of year. Evaporation influences runoff and inflow through its impact on initial abstraction and snow processes.

Additional subcatchment properties were assigned using values typical of combined systems in the northeast. Catchment slope, impervious surface roughness, and pervious surface roughness were assigned values of 0.5 percent, 0.02, and 0.05, respectively. Depression storage was set to 0.05

inches on impervious surfaces and 0.2 inches on pervious surfaces. Twenty-five percent of the impervious area is assigned no depression storage.

Dry Weather Inflow

Dry weather flow in the model is simulated as the sum of three distinct components: sanitary flow, constant infiltration, and seasonal infiltration. Sanitary flow is specified as average discharge adjusted by hourly factors. Groundwater-driven infiltration is specified as a combination of a constant value derived from invert elevation and a seasonally-varied timeseries. Sanitary flow inputs were applied to 1,019 junctions, seasonal groundwater infiltration (GWI) was added to 1,274 junctions, and constant GWI was added to 391 deep junctions.

The City executed multiple contracts to line large interceptors and connected pipes on the West Side. Model junctions that are located within lining contracts H-2 through H-7 have reduced infiltration and do not have any base infiltration applied.

Sanitary flow was estimated for the West Side and East Side WWTP collection systems and for sanitary inflow from Trumbull using ADF data from each WWTP and monthly records from Trumbull. Sanitary flow was distributed throughout the system using population data from the 2010 census. Sanitary flow of 63 gallons per day per capita was applied to the East Side and West Side collection systems and 60 gallons per day per capita was applied to Trumbull. An hourly diurnal pattern is applied to all sanitary inflow nodes.

Constant GWI was applied to most modeled junctions with inverts below mean sea level (14.6 feet City Datum). This flow is correlated linearly with junction invert level and simulates GWI into large, deep pipes. A 5 mgd load was initially allocated across the system according to invert elevation excluding lined sections of principal interceptors. Values were subsequently adjusted through calibration.

A daily GWI timeseries was scaled from baseflow in Norwalk River at Wilton (USGS gage 01209700). The river was used for this purpose because its baseflow correlates well with observed GWI at the WWTPs, and it has nearly 60 years of continuous records. Daily GWI was estimated by applying a digital filter to separate baseflow from quickflow and scaling the flow to units of mgd per acre. The Norwalk River unit baseflow is applied to modeled junctions as a timeseries scaled according to the contributing area above each load point. Baseflow in the river averaged 0.68 mgd/mi^2 for the period 2010-2019. With a typical scaling factor of one-half the contributing area, a 10-acre subcatchment would contribute an average time-varying GWI of 0.005 mgd ([0.68 mgd/mi^2] x 0.5 x 10 acre / [640 acre/mi^2]), while every square mile of contributing sewershed would account for 0.34 mgd of average time-varying GWI.

Model Calibration

The model was calibrated to the available datasets with consideration of their differing ages and value. The following datasets supported model calibration and validation:

- 21 flow meters deployed throughout the system in 1999
- Six flow meters deployed in 2009
- CSO duration and frequency recorded at eight CSOs in the 2016-2017 Pilot Telemetry Program
- CSO frequency and tidal inflow occurrence observed in 2017-2018 block testing
- Monthly flow records from the two connection points from Trumbull for 2016-2019
- Daily average, maximum, and minimum flows recorded at the WWTPs for 2017-2019
- Thrice-weekly measurements of BOD at the WWTPs for 2017-2019 were used to inform the relative contributions of sewage and GWI
- Weekly measurements of chloride at the West Side WWTP from January 2019 through April 2020 were used to identify the magnitude of seawater leakage into the West Side collection system

Since WPCA has made many improvements to the collection system over the past two decades, data from the older programs has reduced value for calibration to current conditions. The improvements include sewer separation and lining, which reduce flows throughout the collection system, and weir modifications at CSO regulators, which reduce CSO and increase wet weather flow depth. Data from the older programs was used to verify model performance with consideration of the expected changes in system behavior. A higher level of scrutiny was placed on model performance compared with recent CSO measurements and the Trumbull and WWTP data, all of which represent current conditions.

Dry Weather

Dry weather flow includes diurnally-varied sanitary flow along with GWI. Modeled sanitary flows were estimated from ADF observed at the East Side and West Side WWTPs and monthly flows reported for Trumbull from 2016 through 2019 and allocated throughout the system according to 2010 census data. Groundwater infiltration is represented with both constant and seasonally-varied components. Constant groundwater baseflow was correlated linearly with model junction invert, representing infiltration to deep, large pipes. Seasonally varied groundwater infiltration was derived from flow observed in the Norwalk River correlated with observed flow at the WWTPs and scaled at each load point according to contributing sewershed area.

Manning's N for conduits was initially set to 0.013 and calibrated between 0.013 and 0.019 to calibrate dry weather depth and velocity. Higher calibrated roughness coefficients may be due to the combined effects of pipe age, unknown obstructions, and sediment accumulation. Form loss coefficients were increased at some conduits to account for large chambers, constrictions, and other obstructions.

Wet Weather

The model accounts for drainage from combined areas and I/I from separated and combined areas. Hydrology was calibrated to daily flow data at the WWTPs, depth data from the 2016-2017 Pilot Telemetry Program, and CSO frequency from 2017 and 2019 CSO block testing, and checked against the 1999 and 2009 flow monitoring programs.

Hydrology calibration to match observed flows involved:

- Adjusting sewer separation effectiveness to calibration hydrograph volume. Sewer separation is modeled as an area reduction to subcatchments located within a separated area. Sewer separation effectiveness is adjusted by increasing or decreasing the subcatchment area.
- Adjusting the width factor of each subcatchment to calibrate hydrograph slope.

Pipe friction and form losses were adjusted to match observed depths. Additional adjustments were made during wet weather validation.

Validation Results

A high level of scrutiny was placed on simulated flows at the WWTPs and simulated frequency of CSO. Long-term performance of the updated model at the East Side and West Side WWTPs is presented in the timeseries in **Figure** and **Figure 4**, respectively. Overall, simulated ADF tracks well with observed values at both facilities. The updated model mimics seasonal variation in baseflow and matches trends of higher spring ADF and lower summer and fall ADF at both facilities. The fall of 2018 was unseasonable rainy, resulting in high observed ADF at both facilities. The updated model matches observed data well during this period. Simulated ADF at the West Side WWTP is low during the second half of 2019. Discussions with WPCA identified that this is likely due to changes in the recycling rate at the WWTP.

Observed and simulated CSO frequency for 2017 and 2019 are compared in bar charts for the East Side and West Side in **Figure 5** and **Figure 6**, respectively. Observed tidal inflow events are shown in the bar charts for 2017. The updated model matches the block testing data reasonably well. East Side CSO and tidal inflow is much less frequent than on the West Side.

The model is reasonably calibrated to dry and wet weather conditions. It robustly represents flow to the WWTPs and discharge via CSOs. It offers a useful tool for assessing the existing state of the system and analyzing the impacts of potential improvements to the WWTPs.

Baseline Conditions

The updated model was used to characterize CSO and flow at the WWTPs for the 1-year design storm. This design storm is described in Section 5 the 2010 LTCP and is the same design storm referred to as the “1 year, 24-hour storm” in DEEP’s Administrator Order WRMU18002 issued to the City of Bridgeport on June 14, 2018 (DEEP, 2018). This storm was recorded at Sikorsky Airport

on August 20, 1950. Its hourly hyetograph was used to run the model. A total of 2.74 inches of rain was observed over 17 hours, with a peak hourly depth of 0.75 inches. Tidal boundary conditions were included in the design storm assessment. The current conditions sanitary flow used for model validation was also used for baseline conditions assessment. Since 1950 precedes the earliest discharge measurements collected by USGS in the Norwalk River, the baseline conditions assessment uses seasonal groundwater infiltration based on measurements from 2008.

Peak flows and total volumes for the 1-year design storm are summarized by CSO outfall and WWTP in **Table 2**. Total simulated East Side CSO volume is 5.4 million gallons (MG), with 6 of 6 CSOs active, based on a maximum capacity of 35 mgd at the East Side WWTP. West Side CSO totals 44.4 MG, with 21 of 22 CSO regulators active, based on a maximum capacity of 80 mgd at the West Side WWTP.

Table 2 – Baseline Conditions: 1-Year Design Storm Summary

WWTP	CSO	Overflow Volume (MG)	Peak Overflow Rate (mgd)	Duration of Overflow (hr)
East Side	BARN	0.3	4.1	3.8
	BAYEL	0.9	13.7	4.3
	CHUR	0.4	8.4	2.0
	DEAC	0.4	5.3	2.5
	STRAT	2.2	16.5	6.3
	WANN	1.2	8.8	6.3
West Side	ANTH[1]	5.8	28.1	11.3
	ARBOR[1]	8.2	84.4	6.5
	CAP	0.4	9.6	2.0
	CEM/MAPE	2.6	26.6	5.8
	CON	<0.01	0.2	1.0
	DEW	1.8	15.1	6.5
	EWAS	1.4	13.4	6.3
	FAIR	3.5	19.6	9.8
	GRAND	3.3	28.1	8.8
	HOUS	3.9	22.6	9.5
	HUNT	3.0	29.3	7.0
	OVER	0.3	5.4	2.5
	RAILS	0.2	7.8	1.5
	SEAB	2.3	22.5	7.0
	STATEA	3.0	24.1	8.5
	TERN[2]	1.8	10.8	7.5
	TERS[2]	1.1	6.9	9.0
	TIC	0.3	7.1	1.5
	WALL	1.5	10.0	9.0
	WORD	0	0	0

Notes:
1. ANTH and ARBOR regulators both have two regulating weirs. CSO reported in this table is the sum of the discharge over both weirs.
2. TERN and TERS share an outfall.

Alternatives Analysis

An alternatives analysis was conducted to evaluate the impact of expanded wet weather treatment capacity on the collection system. In each alternative, WWTP wet weather capacity was increased

and the resulting reduction of CSO volume was assessed. All alternatives assumed a "best case" maintenance scenario for the collection system through removal of all modeled sediment and reducing Manning's N to 0.013. This was done to evaluate the CSO benefit from capacity changes at each WWTP utilizing the maximum conveyance of the existing pipe network.

Design storm simulations were completed to assess the maximum system conveyance to each WWTP to select the wet weather capacities to evaluate for this study. The flow limit to each WWTP was removed from the model, all modeled sediment was removed, and Manning's N was reduced to 0.013. Under these conditions, 60 mgd reached the East Side WWTP and 160 mgd reached the West Side WWTP during the 1-yr design storm. Capacity alternatives exceeding these rates must thus be paired with increased upstream conveyance in order to deliver higher peak flow to each WWTP during the 1-yr design storm.

Five alternatives were evaluated at the West Side WWTP and three at the East Side WWTP. Wet weather capacities of 90, 140, 160, 180, and 200 mgd were simulated at the West Side WWTP and capacities of 40, 60, and 80 mgd were simulated at the East Side WWTP. The 180 and 200 mgd alternatives at West Side WWTP and the 80 mgd East Side alternative included collection system pipe replacement to attain adequate conveyance to the WWTPs. A map of replaced pipes is shown in **Figure 7**. The alternatives simulated are listed in **Table 3**.

Table 3 - Simulated Alternatives

Scenario	West Side WWTP Capacity (mgd)	East Side WWTP Capacity (mgd)	Sediment	Pipe Replacement
Validation Condition[1]	80	35	Existing	None
Baseline[2]	90	40	None	None
WSP1	140	40	None	None
WSP2	160	40	None	None
WSP3	180	40	None	▪ Upsize 4,300 ft of 24" to 42" from SEAB to interceptor ▪ Fix shallow slope in Ellsworth Park ▪ Upsize 1,400 ft of 12/15/18” downstream of ANTH to interceptor to 42" ▪ New 1,600 ft of 48-inch from DEW to interceptor
WSP4	200	40	None	Same as WSP3 pipe replacement
ESP1	90	60	None	None
ESP2	90	80	None	▪ 750 ft of 30” to 48” STRAT to confluence with WANN ▪ Plug recombined WANN stormwater connection ▪ 1,700 ft of 48/54” to 60” from STRAT/WANN confluence to East Side WWTP

Notes:
1. Validation conditions reflect the flow limits in the updated model, which were based on observed maximum daily flow at each WWTP from 2017 to 2019. This scenario has lower capacities at each WWTP than their design capacities.
2. Baseline reflects the wet weather design capacity of each WWTP.

Simulated CSO and surface-level flooding decrease as flow to the each WWTP is increased. Simulated results for the East Side are shown in **Figure 8** and **Figure 9**. Figure 8 plots East Side CSO and flooding volume versus WWTP capacity. Both CSO and flooding volume steadily decrease as WWTP capacity increases from 35 mgd to 80 mgd. Three East Side CSOs attain 1-year level of control (LOC) when capacity is increased to 80 mgd, including DEAC, WANN, and STRAT. This is better illustrated in Figure 9, which charts overflow volume at each East Side CSO. Benefits observed under alternative ESP2 (80 mgd) are due in part to pipe replacement described in Table 3 and shown in Figure 7.

West Side results are shown in **Figure 10** and **Figure 11.** Figure 10 plots West Side CSO and flooding volume versus WWTP capacity. Both CSO and flooding volume decrease as WWTP capacity is increased from 80 mgd to 200 mgd. Several key observations can be identified:

- Restoring design capacity of the West Side WWTP from 80 to 90 mgd results in a simulated reduction of 3.9 MG CSO and 0.2 MG flooding.
- Reduction in West Side flooding is small in comparison to CSO reduction.
- CSO reduction plateaus between 140 and 160 mgd. Despite the 20 mgd increase in WWTP capacity, CSO only drops by 0.9 MG.
- CSO volume reduction plateaus between 180 and 200 mgd. Despite the 20 mgd increase in WWTP capacity, CSO only drops by 1.5 MG.
- CSO WORD attains 1-year LOC in all modeled scenarios.
- CSOs RAILS and TIC achieve 1-yr LOC when West Side WWTP wet weather capacity is 140 mgd and 160 mgd.
- CSOs CEM/MAPE, DEW, ANTH, and SEAB achieve 1-year LOC when West Side WWTP wet weather capacity is 180 mgd and 200 mgd.

CSO control is illustrated in Figure 11, which charts overflow volume at each West Side CSO. Benefits observed under alternative WSP3 (180 mgd) and WSP4 (200mgd) are due in part to pipe replacement listed in Table 3 and shown in Figure 7.

Additional simulations were completed to quantify the impact of upgrading WWTP capacity without completing the pipe replacement listed in Table 3. In addition to the 1-yr design storm, the 2-yr and 5-yr design storms described in the LTCP and a 10-yr, 24-hr synthetic storm (SCS Type 3) were simulated with a maximum capacity of 200 mgd at the West Side WWTP, a maximum capacity of 80 mgd at the East Side WWTP, and clean pipes throughout the collection system. No other conveyance improvements or pipe replacement were included. The resulting peak flow received by both WWTPs and CSO volume are listed in **Table 4.**

- Key observations during the 1-yr storm simulation include: Peak flow delivered to the West Side WWTP is 163 mgd, which is 47 mgd less than the modeled maximum capacity.
- West Side CSO volume is 30.1 MG, which is 14.1 MG (32 percent) less than the baseline CSO volume listed in Table 2 but 8.2 MG higher than alternative WSP4 (200 mgd) which includes pipe replacement.
- Peak flow delivered the East Side WWTP is simulated to be 69 mgd, which is 11 mgd less than the modeled maximum capacity.

- East Side CSO volume is 1.9 MG, which is 3.4 MG (64 percent) less than the baseline CSO volume listed in Table 2 but 0.9 MG higher than alternative EPS2 (80 mgd) which includes pipe replacement.

While neither the East Side nor West Side WWTPs received the peak modeled design flows without pipe replacement during the 1-yr design storm, each WWTP may receive flows of that magnitude in larger storm events. Simulated peak flow received at the East Side WWTP during the 2-yr, 5-yr, and 10-yr events is mgd and mgd, respectively. Simulated peak flow received at the West Side WWTP during the 2-yr, 5-yr, and 10-yr events is mgd and mgd, respectively. The 5-yr design storm peak flows are low because this event occurs in January 1979 and the model simulates most of the event's precipitation as snow. These results suggest that each WWTP may receive flow as high as the maximum modeled capacity of 200 mgd and 80 mgd at the West Side and East Side, respectively, even without pipe replacement during large storm events.

Table 4 – Simulation Results – WWTP Upgrade without Pipe Replacement

Design Storm	Peak Flow to West Side WWTP[1] (mgd)	Peak Flow to East Side WWTP[2] (mgd)	1-yr West Side CSO Volume (MG)	1-yr East Side CSO Volume (MG)
1-yr	163	69	30.1	1.9
2-yr[3]	182	78	--	--
5-yr[4]	167	68	--	--
10-yr[5]	200	80	--	--

Notes:

1. Maximum capacity simulated is 200 mgd with clean pipes in the collection system.
2. Maximum capacity simulated is 80 mgd with clean pipes in the collection system.
3. Historic event observed at Sikorsky Airport on September 3, 1992. Listed in the LTCP (Arcadis, 2017).
4. Historic event observed at Sikorsky Airport on January 21, 1992. Listed in the LTCP (Arcadis, 2017). Simulated as a snow event due to cold temperatures, resulting in lower peak flow that storms with a lower return frequency.
5. Synthetic 24-hour event using a Soil Conservation Survey (SCS) Type 3 curve and 5.35 inches of rainfall (NOAA, 2020c).

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Attachments

Figure 1 - Model Network

Figure 2 - Model Subcatchments

Figure 3 - Long-Term Model Performance at East Side WWTP

Figure 4 - Long-Term Model Performance at West Side WWTP

Figure 5 – Simulated versus Observed East Side CSO Frequency

Figure 6 – Simulated versus Observed West Side CSO Frequency

Figure 7 - Pipe Replacement Map

Figure 8 - Alternative Analysis Results at East Side WWTP

Figure 9 - Alternative Analysis Results at East Side CSOs

Figure 10 - Alternative Analysis Results at West Side WWTP

Figure 11 - Alternative Analysis Results at West Side CSOs

Enter flow from Sunnydale Road Gravity Crossover from Trumbull

Enter flow from Beardsley Pump Station Force Main Crossover from Trumbull

CAP
HUNT
HOUS
GRAND
EWAS
CON
FAIR
WALL
TERS
TERN
STATEA
BARN
CHUR
DEAC
WANN
STRAT
BAYEL
East Side WWTP
RAILS
TIC
CEM/MAPE
DEW
ARBOR
WORD
ANTH
SEAB

0 0.25 0.5 1 Miles

N

Legend

- Model Extent
- Modeled Pipes
- Wastewater Treatment Plants
- Roads
- City Boundary

CSO Regulators

- Active
- Inactive

CSO Outfalls

- Active, Tidegate
- Active, No
- Closed
- Converted to Stormwater

Figure 1
Model Network

Water Pollution Control Authority
City of Bridgeport, CT

May 2020

CAP
HUNT
HOUS
GRAND
EWAS
BARN
CHUR
DEAC
CON
FAIR
WALL
WANN
STRAT
TERS
TERN
STATEA
BAYEL
CEM/MAPE
RAILS
East Side WWTP
DEW
TIC
ARBOR
WORD
ANTH
West Side WWTP
SEAB

0 0.25 0.5 1 Miles

N

Legend

- Wastewater Treatment Plants
- Roads
- City Boundary

CSO Regulators

- Active
- Inactive

CSO Outfalls

- Active, Tidegate
- Active, No Tidegate
- Closed
- Converted to Stormwater

Model Subcatchments

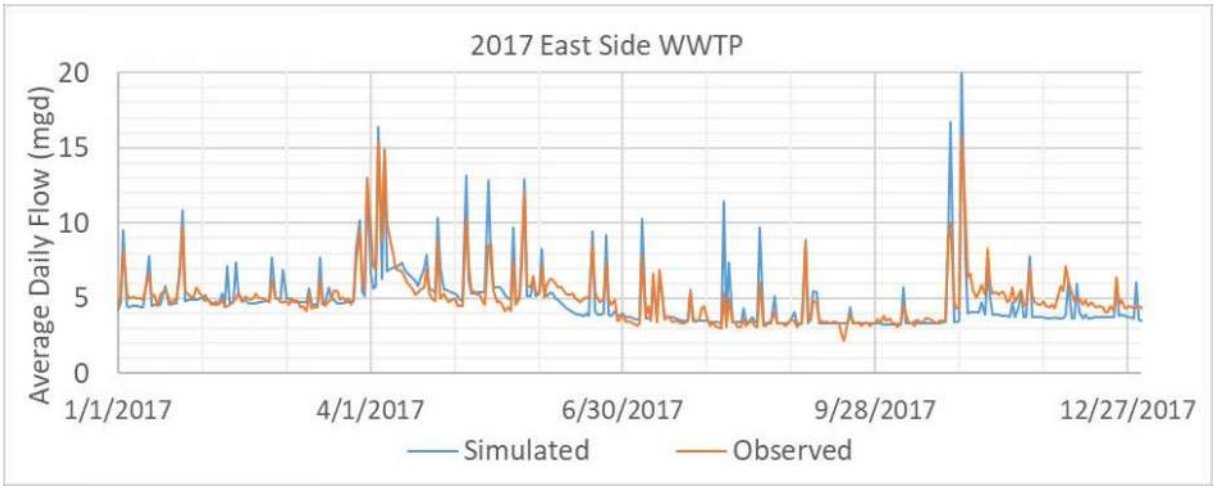
Percent GIS Area

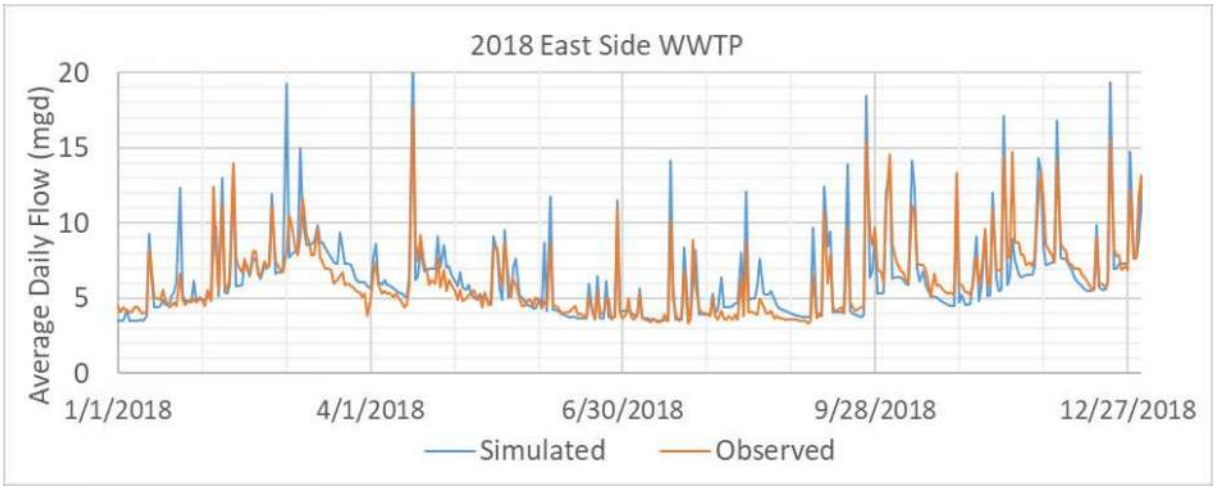
- 0 - 10%
- 10 - 20%
- 20 - 30%
- 30 - 40%
- 40 - 50%
- 50 - 60%
- 60 - 70%
- 70 - 80%
- 80 - 90%
- 90 - 100%

Figure 2
Model Subcatchments

Water Pollution Control Authority
City of Bridgeport, CT

October 2020





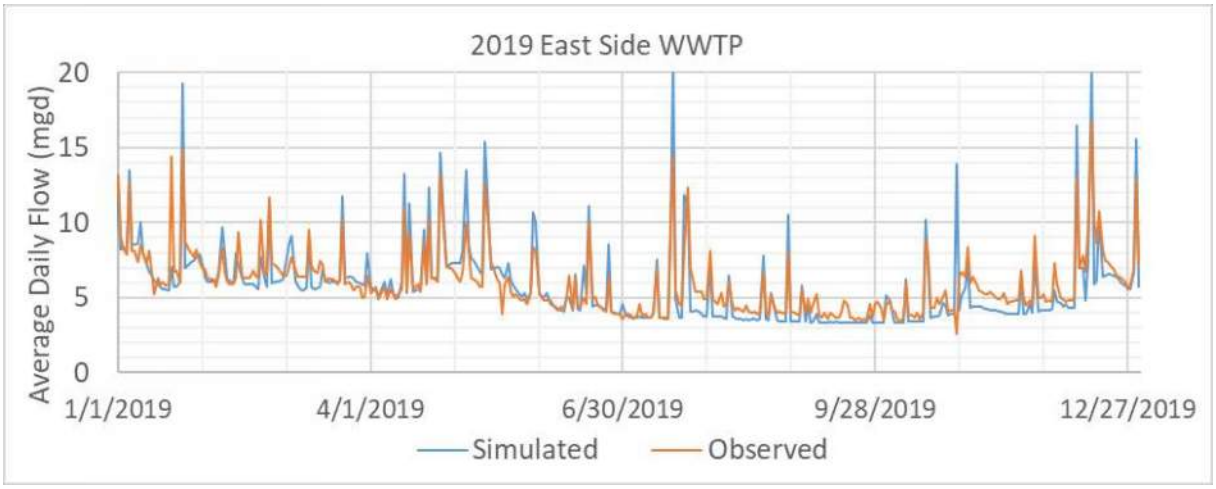
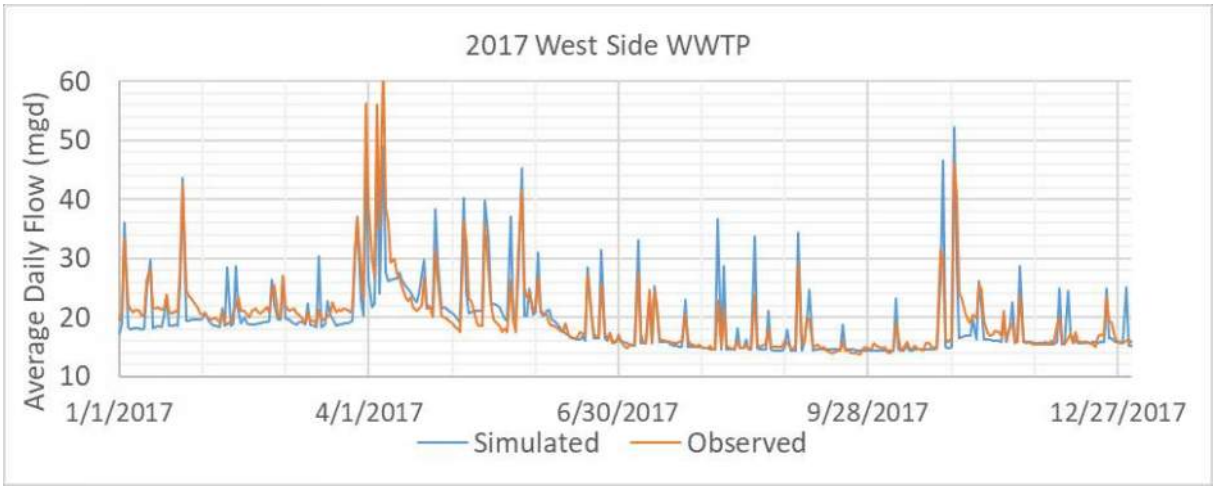
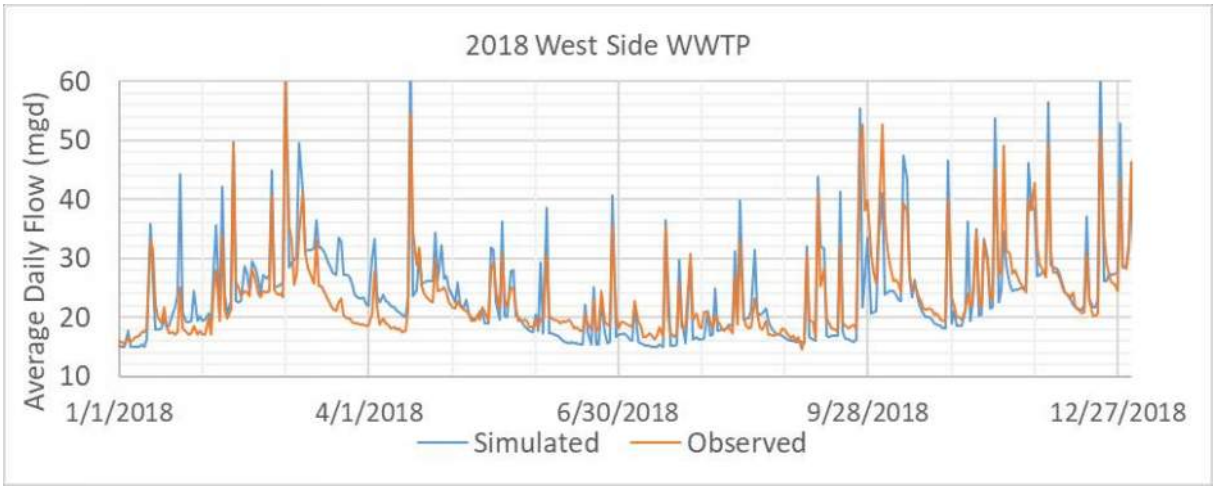


Figure 3 - Long-Term Model Performance at East Side WWTP





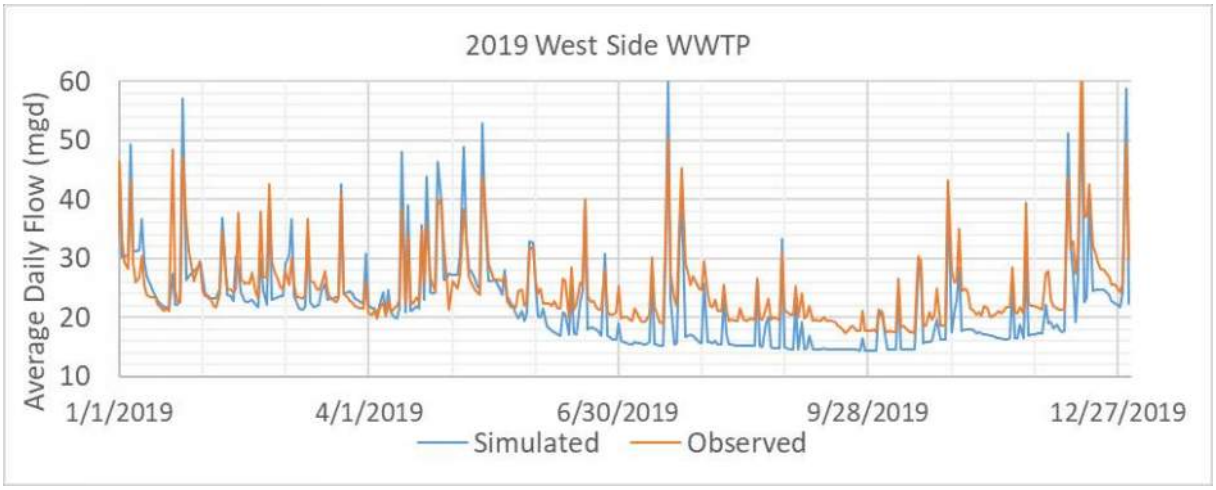
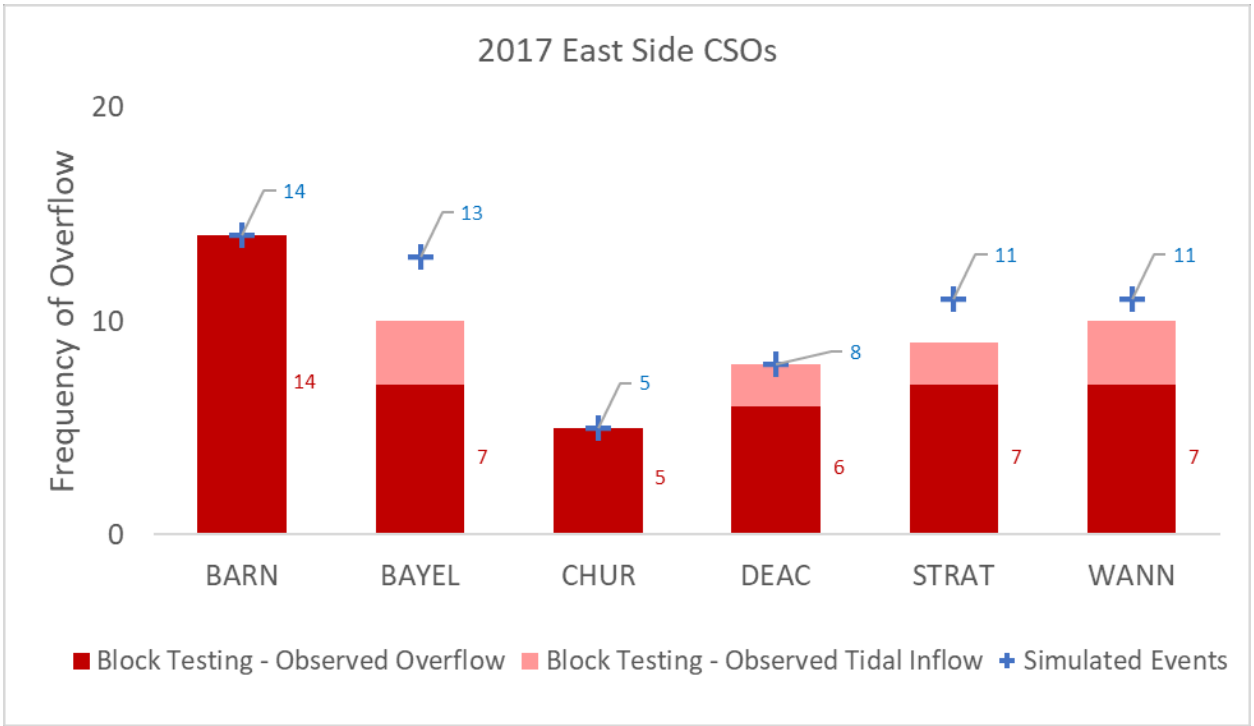


Figure 4 - Long-Term Model Performance at West Side WWTP



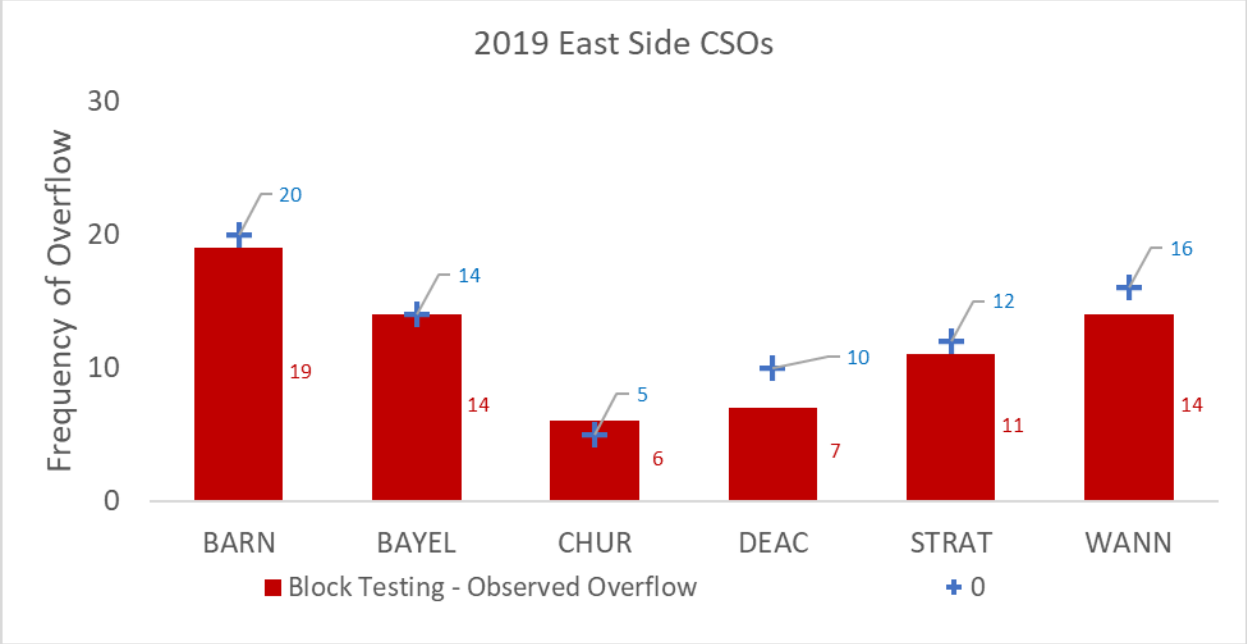


Figure 5 – Simulated versus Observed East Side CSO Frequency

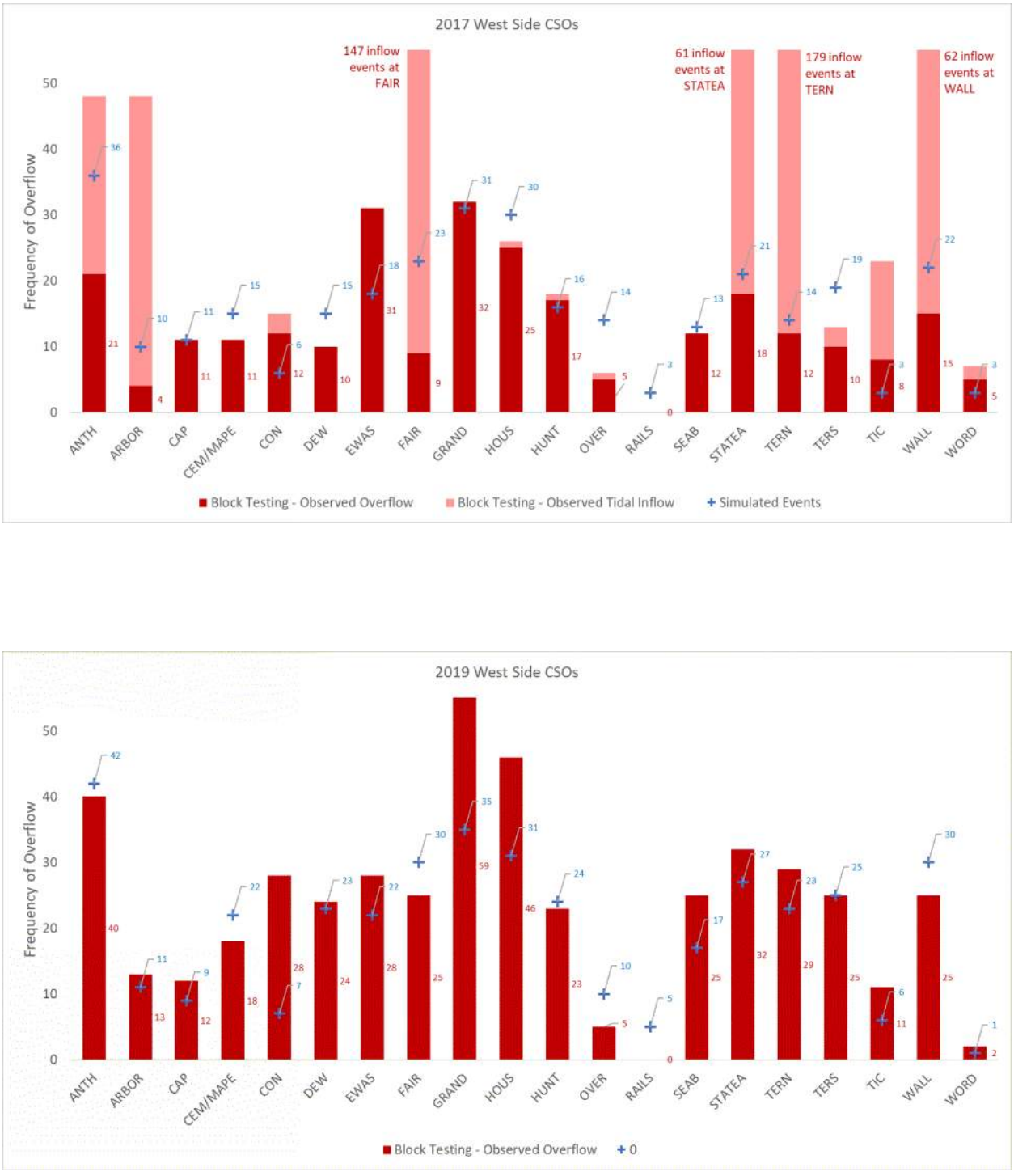


Figure 6 – Simulated versus Observed West Side CSO Frequency

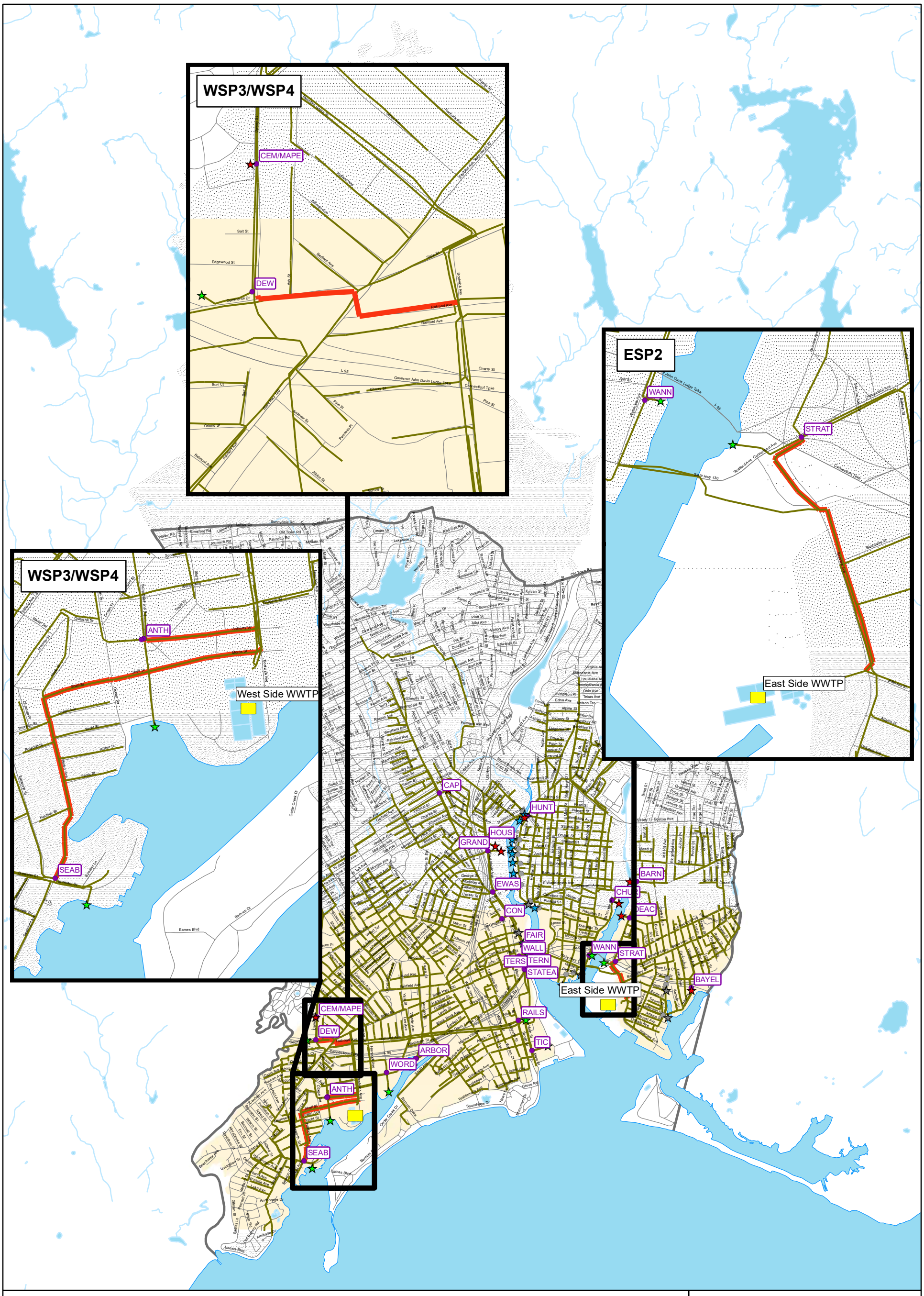


Figure 7
Pipe Replacement

Water Pollution Control Authority
City of Bridgeport, CT

October 2020

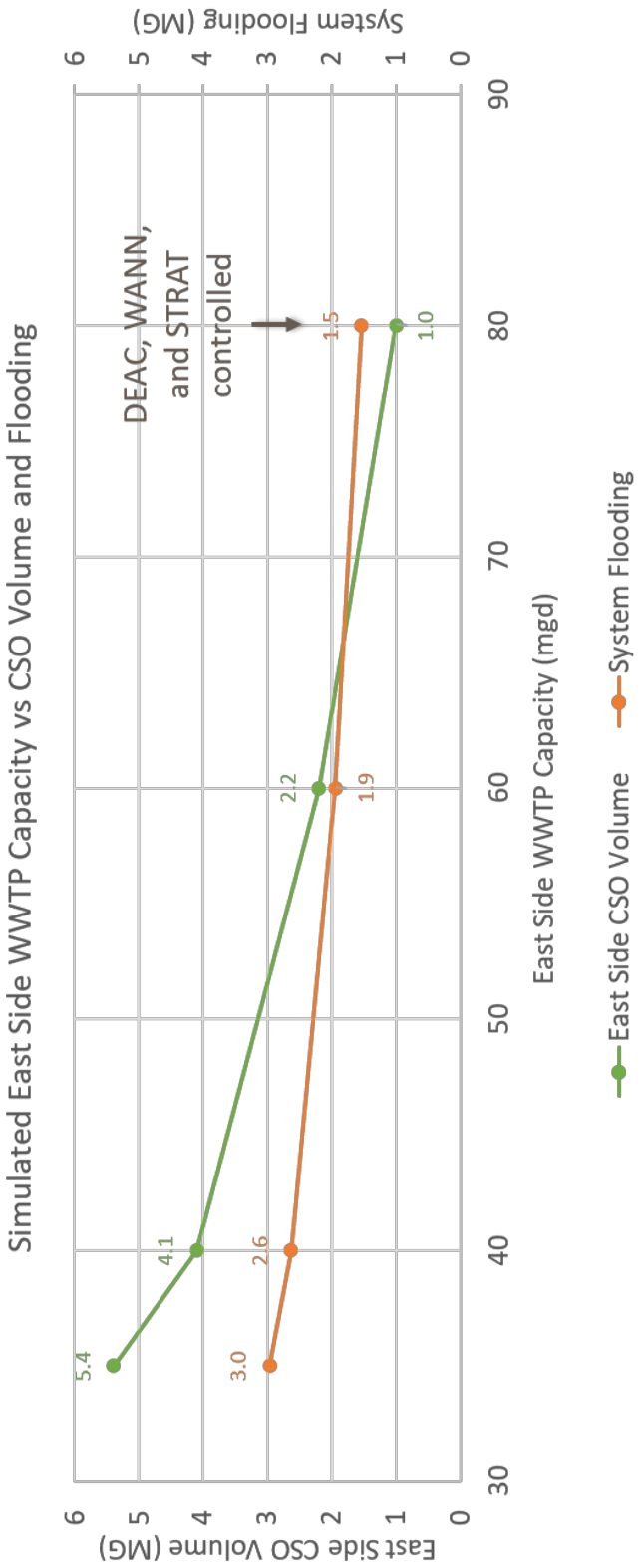


Figure 8 - Alternative Analysis Results at East Side WWTP

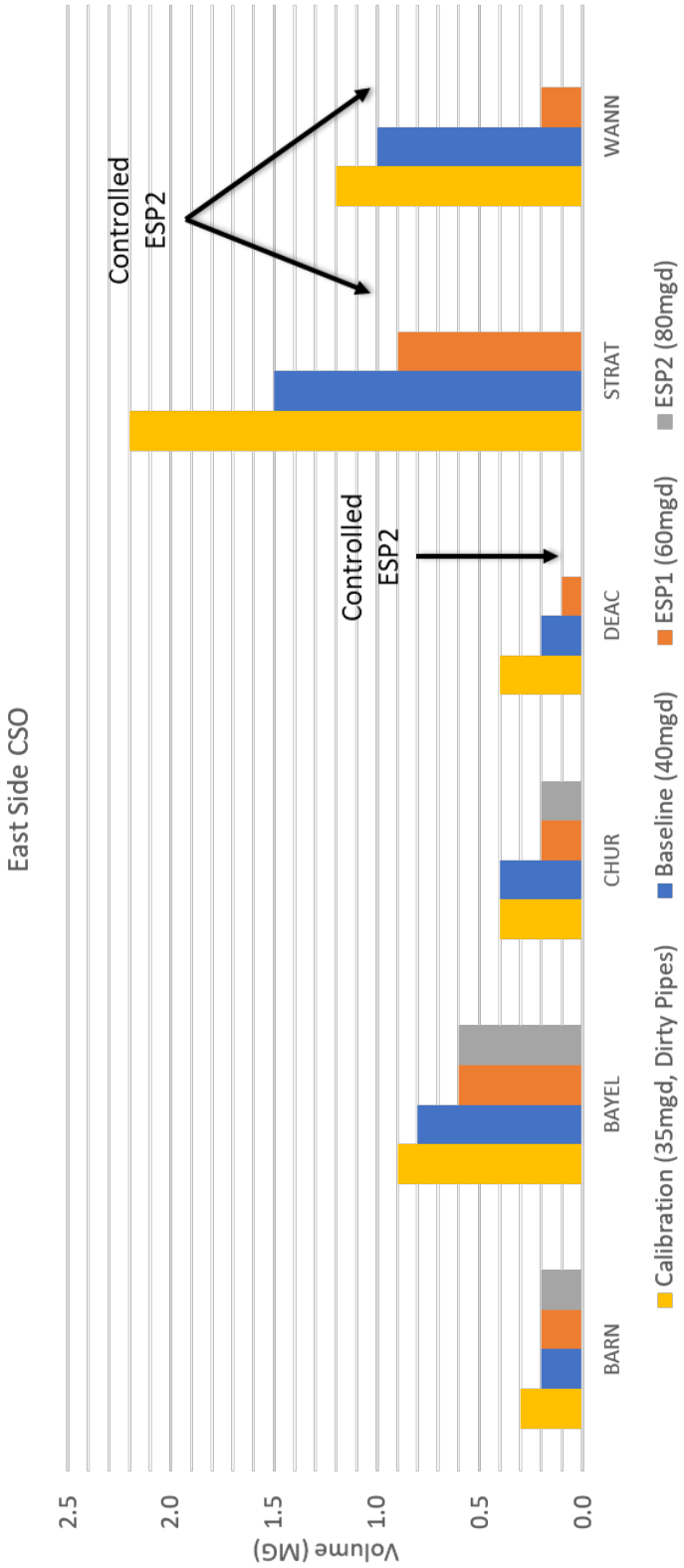


Figure 9 - Alternative Analysis Results at East Side CSOs

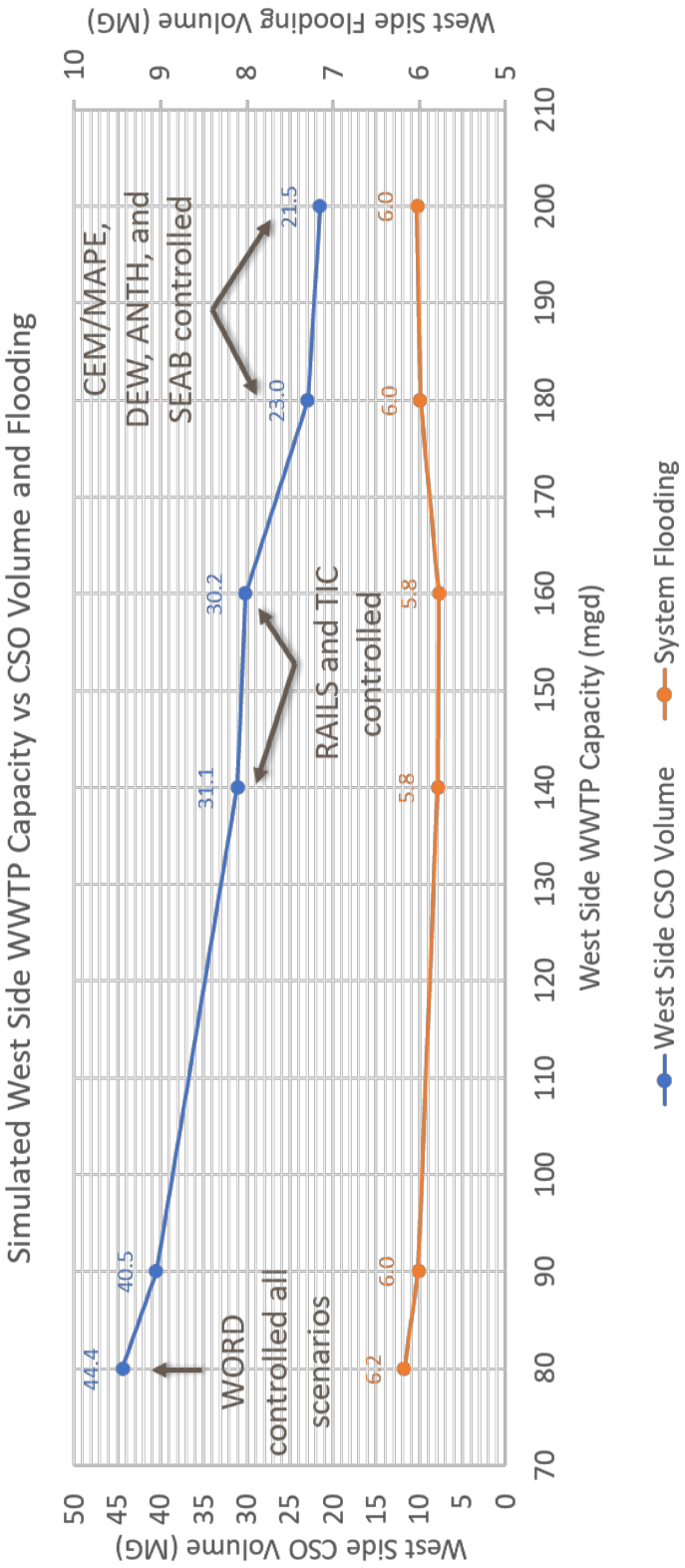


Figure 10 - Alternative Analysis Results at West Side WWTP

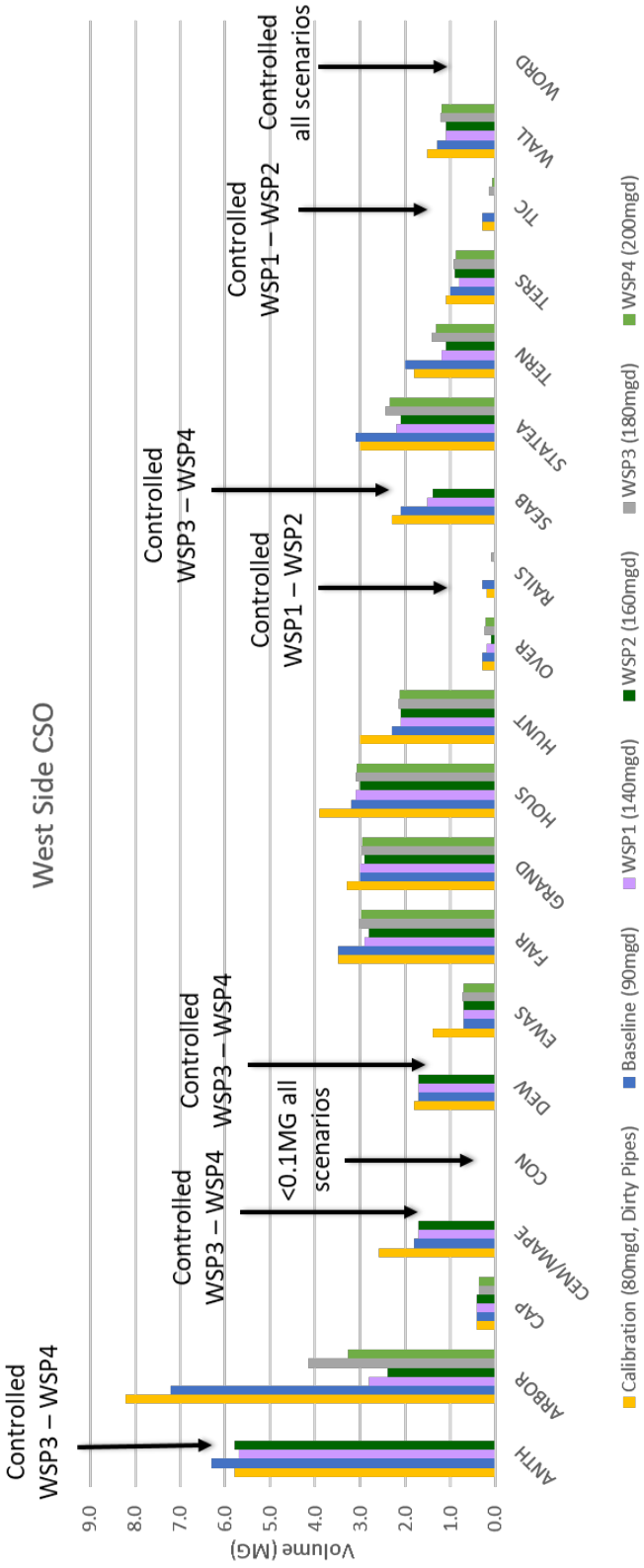


Figure 11 - Alternative Analysis Results at West Side CSOs

Attachment G

Section 8, Wastewater Facilities Plan (2020)

Section 8
Financial Capability Assessment

8.1 Introduction

Based on the evaluations presented in previous sections of this Facilities Plan, the most desirable options were carried forward to evaluate the financial impacts of the wastewater treatment plant (WWTP) upgrade and the combined sewer overflow (CSO) improvement program on the users and rate payers. The financial assessment described herein evaluated alternatives following the framework developed by the U.S. Environmental Protection Agency (EPA) in *Combined Sewer Overflows — Guidance for Financial Capability Assessment and Schedule Development*, published in February 1997 and modified in November 2014. The intent of the evaluation is to assess the affordability of the Water Pollution Control Authority's (WPCA's) capital improvement programs. The first phase of the EPA financial capability assessment estimates the impact of anticipated capital improvements and operating costs on the average residential ratepayer by evaluating the household burden. The household burden is an EPA defined metric that assesses the typical residential sewer bill as a percent of a community's median household income (MHI). Under the EPA guidance process, a household burden exceeding 2 percent of MHI is deemed a high burden.

The second phase of the EPA process details financial impact indicators, which are benchmarks defined by the US EPA. These indicators evaluate ancillary factors that may influence an entity's ability to fund the proposed capital plan.

8.2 Methodology and Assumptions

This report and financial capability assessment have been prepared in accordance with the EPA's financial capability assessment guidance document (as noted above) and standard industry practices. Data was obtained from various sources to develop a financial projection model to project the impact of the anticipated capital program on the future revenue requirements and rates for the City and its residents. All data used in this report have been gathered from either the WPCA or credible, public sources.

This financial capability assessment projects financial changes through FY 2045. Unless specified otherwise, all dollar figures in this section are in future year dollars, that is adjusted for estimated inflation. Given the forecasting horizon, numerous assumptions are necessary and have been used in this assessment. The following describes some of the critical assumptions used for this analysis:

- The FY 2021 approved budget is used as the basis for projections.
- Base year for capital is 2020.
- Consistent with the EPA guidance, only sewer and stormwater related costs are included in this analysis.

- It is assumed WPCA continues with its current practice of carrying $250,000 annually to support an operating reserve.
- The analysis assumes annual collection rate on billed rate revenue of 96% annually. Of the uncollected amount, 80% is assumed recovered as revenue the subsequent fiscal year.
- General operating and maintenance (O&M) costs are assumed to inflate at 2.0 percent annually.
- Salaries are assumed to increase at 2.0 percent annually.
- Benefits are assumed to increase 5.0 percent annually.
- Electric costs are projected to increase 1.5 percent on an annual basis.
- Indirect Costs are assumed to remain constant through projections at $475,000 annually.
- Collection Fees (attorney costs) are assumed to remain constant through projections $300,000.
- WPCA currently has a contract operations agreement with Inframark to operate and maintain WPCA's system. For the purposes of this analysis, it is assumed that the service agreement expense increases at 2.5 percent annually throughout projections.
- Miscellaneous revenues generally are assumed to remain constant over the projection period. Miscellaneous and non-rate revenues can be erratic and are generally beyond the control of WPCA, so WPCA has been conservative in holding them constant at current budgeted levels.
- Capital costs are projected to increase at an average annual rate of 3.0 percent.
- WPCA currently charges a usage rate based on consumption. For FY 2021, the current usage rate is $6.12 per hundred cubic feet (HCF).
- The WPCA has an agreement with the Town of Trumbull, where Trumbull receives a discounted usage rate, with the discount phased out over time. For FY 2021, Trumbull receives a 4.0 percent discounted user rate, which is reduced 1.0 percent each year until it is assumed Trumbull is charged the standard WPCA usage rate in FY 2025 and beyond.
- Median household income (MHI) for Bridgeport in 2018 was estimated to be $45,411, based on most recent U.S. Census Bureau, American Community Survey (ACS) data. MHI is assumed to increase 1.3 percent annually, which is consistent with the historical average increase since 2010.
- The typical residential consumption is assumed to be 80 HCF per year. Consumption is assumed to remain constant throughout the projection period.
- Two sets of financing projections have been used in this analysis. The first assumes that the WPCA proceeds using financing that it fully controls and has a reasonable basis for

projecting. The second relies on SRF loans and grants (Clean Water Fund) that will be of significant financial advantage to the WPCA, but the City has no guarantee that such funding will be available on the terms and for the size of program that is envisioned. The two financing projections are as follows:

- The WPCA (through the City of Bridgeport) issues bonds for all capital, except if it currently has a binding commitment for an SRF loan. It is assumed that General Obligation (GO) debt will be issued with an average interest rate of 5.0 percent and a 20-year amortization period.
- SRF loans will be executed with a 2.0 percent interest rate for a 20-year amortization period. Many of the capital items to be financed are eligible and are assumed to receive state grants that will reduce the debt financed requirement by between 20 and 50 percent depending on the type of project. The assumed level of grants is described in Section 9.

The following sections summarize the financial projections for four distinct alternative capital plans:

- Baseline. This assumes no WWTP upgrade or Long-Term CSO Control Plan (LTCP) spending. The baseline alternative assumes capital spending allowances for ongoing renewal and replacement of existing infrastructure. The capital spending carried in the baseline alternative is included in all other alternatives. The remainder of the expenses for the Facilities Plan ($1.4 million) is assumed to be covered through grants. The Combined Sewer Overflow Project H3 is anticipated to be 50% grant funded, 50% financed through SRF loans. The remainder of the capital spending for the baseline alternative is either cash funded or assumed financed though GO debt.
- 90/40 Consent Order Schedule. These alternatives (with and without Clean Water Fund (CWF) grant and loans) follow the capital plan detailed in the existing consent order schedule and assume that the plants would be constructed to match their current capacities (90 million gallons per day (mgd) at West Side plant and 40 mgd at East Side plant). This analysis shows the impact of assuming full eligibility for SRF and state grants, as well as the impact of assuming all city GO debt to finance the program.
- 200/80 Staggered Schedule. In this alternative the West Side plant would be upgraded followed by the East Side plant. Additionally, the wet weather treatment capacity of both plants would be increased to provide a significant CSO reduction benefit. The West Side plant capacity would be increased to 200 mgd and the East Side plant capacity would be increased to 80 mgd. Collection system improvements would be included to address the Ash Creek and Ellsworth Park consent order.

Table 8.2-1 breaks down the total capital spending for the 90/40 Consent Order Schedule through FY 2040 and the 200/80 Staggered Schedule alternative through FY 2036, with and without grants. The spending totals shown in this table do not include the amounts carried as part of the baseline, although those amounts have been included in the projections. The totals for the baseline are shown through FY 2045.

Table 8.2-1 Summary of Capital Spending

	No Grants		With Grants	
Alternative	**2020 $ Capital Cost**	**Inflated Capital Cost**	**2020 $ Capital Cost**	**Inflated Capital Cost**
Baseline	$73,393,000	$108,861,500	$70,455,300	$105,692,400
90/40 Consent Order Schedule	$904,000,000	$1,150,150,900	$570,320,000	$709,829,100
200/80 Staggered Schedule	$570,000,000	$687,512,300	$388,500,000	$468,874,300

Table 8.2-2 summarizes the assumed amount of grant funding and SRF loans available for each alternative. The total assumed grant amount for the 90/40 Consent Order Schedule is $443.5 million, which consists of $440.3 million in grants for projects in this alternative, plus the $3.2 million in grants for Baseline projects. The total assumed grant funding total for the 200/80 Staggered Schedule is $221.8 million, which consists of $218.6 million in grants for projects in this alternative, plus the $3.2 million in grants for Baseline projects. These projections also assume significant SRF funding at the level of $709.8 million and $468.9 million, respectively. With the addition of the Baseline projects ($1.7 million), the SRF funding totals $711.5 million and $470.6 million, respectively.

Table 8.2-2 Summary of Grant and Loan Funding

Alternative	Assumed Grant Availability	Assumed SRF Availability
Baseline	$3,169,100	$1,688,300
90/40 Consent Order Schedule	$440,321,800	$709,829,100
200/80 Staggered Schedule	$218,638,000	$468,874,300

The following sections summarize the revenue requirement projections and the estimated household burden on Bridgeport residents for each capital alternative.

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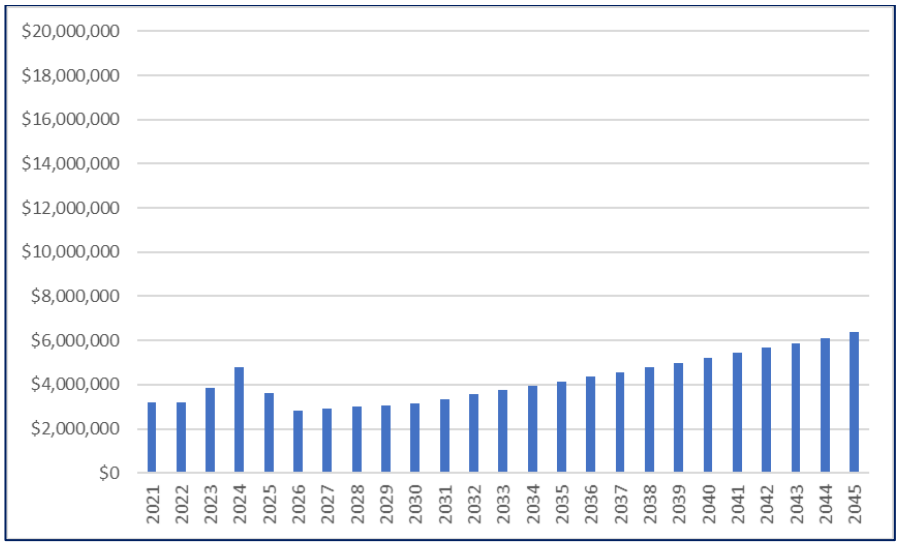
8.3 Baseline Financial Analysis

This section summarizes the projected sewer revenue requirements for WPCA, including the impact of the baseline capital program summarized in Section 8.2 through FY 2045. **Figure 8.3-1** details the annual capital spending for the baseline alternative net of assumed grants (thus the amount to be debt financed in each year).

Figure 8.3-1 Baseline Capital Spending by Year (Inflated $)



The projected revenue requirements will be summarized in three main components:

- Operations and maintenance costs (O&M)
- Debt service and capital expenditures
- Miscellaneous revenue

The following sections summarize the total projected sewer expenses and revenue requirements for the baseline alternative.

8.3.1 Baseline Operations and Maintenance

Operations and maintenance costs exist for all aspects of the sewer utility. O&M expenses have been separated into nine general categories, generally consistent with WPCA's current budgetary structure:

- Administration
- Natural Gas
- Electricity
- City Admin Allocation (Indirect Costs)
- Collection Fees (Attorney Costs)

- Operations, Maintenance, and Management Services Agreement
- Nitrogen Payment
- Operating Reserve
- Bad Debt Reserve

Total operating expenses are projected to grow from $34.5 million in FY 2021 to $60.0 million in FY 2045. This represents an average annual increase of 2.3 percent. Anticipated operating expenses over time are summarized in **Table 8.3-1**.

Table 8.3-1 Projected Operating Expenses

O&M Category	FY 2021	FY 2027	FY 2033	FY 2039	FY 2045
Administration	$2,055,853	$2,394,610	$2,803,105	$3,299,317	$3,906,619
Natural Gas	$140,000	$157,663	$177,554	$199,954	$225,181
Electricity	$2,475,000	$2,706,272	$2,959,155	$3,235,668	$3,538,019
City Admin Allocation	$475,000	$475,000	$475,000	$475,000	$475,000
Collection Fees	$300,000	$300,000	$300,000	$300,000	$300,000
Operations, Maintenance, and Management Services Agreement	$27,017,561	$31,332,088	$36,335,616	$42,138,175	$48,867,364
Nitrogen Credit Payment	$400,000	$0	$0	$0	$0
Operating Reserve	$250,000	$250,000	$250,000	$250,000	$250,000
Bad Debt Reserve	$1,400,154	$1,664,692	$1,896,375	$2,161,119	$2,480,857
Total O&M	**$34,513,568**	**$39,280,325**	**$45,196,805**	**$52,059,233**	**$60,043,040**

8.3.2 Baseline Debt Service and Capital Expenditures

Capital costs can be financed through annual cash payments as cash funded capital, or through bonded debt as debt service. The debt service and capital expenditures have been separated into three categories: existing debt service, anticipated debt service, and cash funded capital.

Existing debt service represents the sewer related debt that is currently outstanding. Anticipated debt service relates to the annual debt service payments projected from the implementation of future capital spending.

Cash funded capital is the annual capital projects that WPCA elects to fund directly through current year rate revenue without issuing debt. The WPCA has assumed some annual allowance for cash funded capital that ramps up over time, with the remainder of the baseline spending assumed debt financed. As mentioned, the baseline assumes that the Combined Sewer Overflow H3 project is eligible for SRF loans, while all other future baseline capital spending is assumed to be cash funded or financed through GO debt.

Table 8.3-2 shows the projected capital and debt obligations through FY 2045, including the costs associated with the assumed baseline capital spending.

Table 8.3-2 Debt Service and Capital Expenditures

	FY 2021	FY 2027	FY 2033	FY 2039	FY 2045
Existing Debt Service - Bond	$545,776	$611,854	$305,992	$200,021	$17,684
Existing Debt Service - SRF	$2,880,321	$2,250,959	$873,292	$173,237	$0
Anticipated Debt Service - Bond	$153,159	$1,705,604	$2,262,467	$2,855,314	$3,141,283
Anticipated Debt Service - SRF	$0	$114,380	$104,250	$94,121	$0
Cash Funded Capital	$150,000	$900,000	$2,300,000	$2,900,000	$3,500,000
Total Debt Service and Capital	**$3,729,256**	**$5,582,797**	**$5,846,001**	**$6,222,693**	**$6,658,967**

8.3.4 Miscellaneous Revenue

Miscellaneous or non-rate sewer revenue consists of all revenue generated by WPCA that is not directly related to sewer rates. **Table 8.3-3** summarizes the miscellaneous revenues through the projection period. For projection purposes, the majority of the miscellaneous revenues are assumed to remain constant over the forecast period, however arrearage collections are tied to the recovery of prior year uncollected rate revenue.

Table 8.3-3 Projected Miscellaneous Revenue

Miscellaneous Revenue	FY 2021	FY 2027	FY 2033	FY 2039	FY 2045
Interest on Investments	$17,000	$17,000	$17,000	$17,000	$17,000
Septic Ticket Revenue	$1,250,000	$1,250,000	$1,250,000	$1,250,000	$1,250,000
Other Revenue	$21,908	$21,908	$21,908	$21,908	$21,908
Industrial Surcharges	$18,192	$18,192	$18,192	$18,192	$18,192
Nitrogen Credits Received	$150,000	$0	$0	$0	$0
Arrearage Collections	$1,111,819	$1,293,873	$1,483,410	$1,696,486	$1,938,857
Total Miscellaneous Revenue	**$2,568,919**	**$2,600,973**	**$2,790,510**	**$3,003,586**	**$3,245,957**

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8.3.5 Revenue Requirement

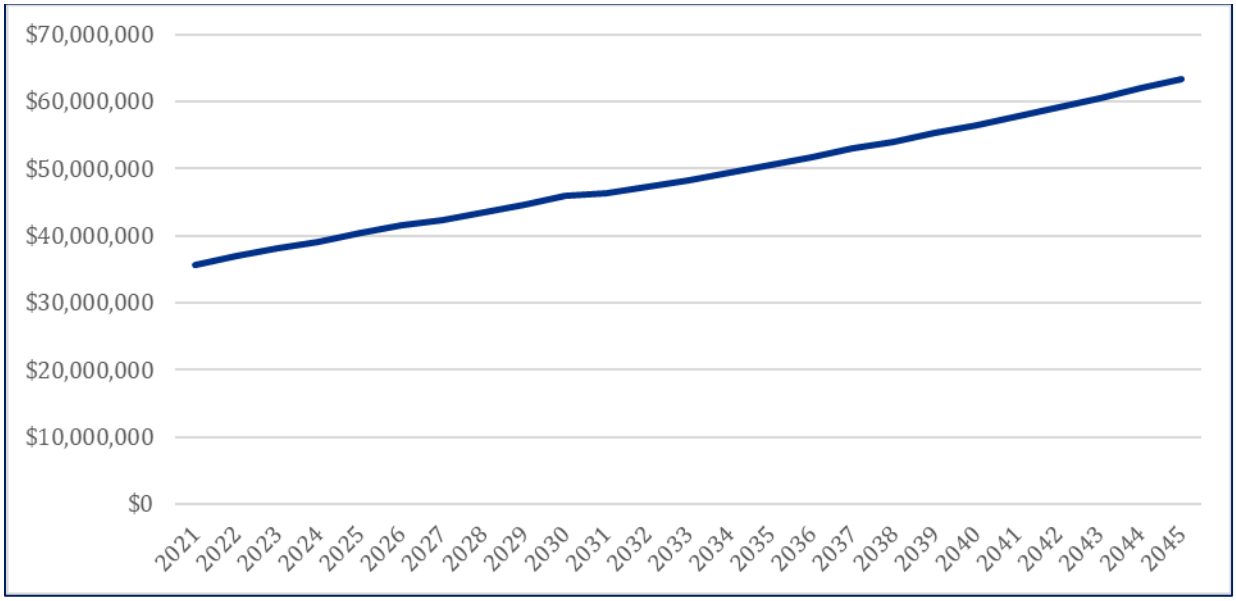
The revenue requirement is the total revenue that must be generated annually through sewer rates to fund WPCA's sewer expenses. The sewer revenue requirement is calculated by subtracting non-rate sewer revenue from total sewer expenses. **Table 8.3-4** shows the total revenue requirement for the baseline projections. The total revenue requirement is projected to grow from approximately $35.7 million in FY 2021 to approximately $63.5 million in FY 2045, equivalent to an average annual increase of 2.4 percent.

Table 8.3-4 Projected Revenue Requirement

	FY 2021	FY 2027	FY 2033	FY 2039	FY 2045
Operating Expenses	$34,513,568	$39,280,325	$45,196,804	$52,059,233	$60,043,039
Existing Debt Service	$3,426,096	$2,862,812	$1,179,284	$373,258	$17,684
Anticipated Debt Service	$153,159	$1,819,984	$2,366,717	$2,949,435	$3,141,283
Cash Funded Capital	$150,000	$900,000	$2,300,000	$2,900,000	$3,500,000
Less: Miscellaneous Revenue	($2,568,919)	($2,600,973)	($2,790,510)	($3,003,586)	($3,245,957)
Revenue Requirement	**$35,673,904**	**$42,262,148**	**$48,252,295**	**$55,278,340**	**$63,456,049**

Figure 8.3-2 graphically depicts the projected revenue requirement for the baseline projections.

Figure 8.3-2 Projected Revenue Requirement – Baseline



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8.3.6 Residential Indicator

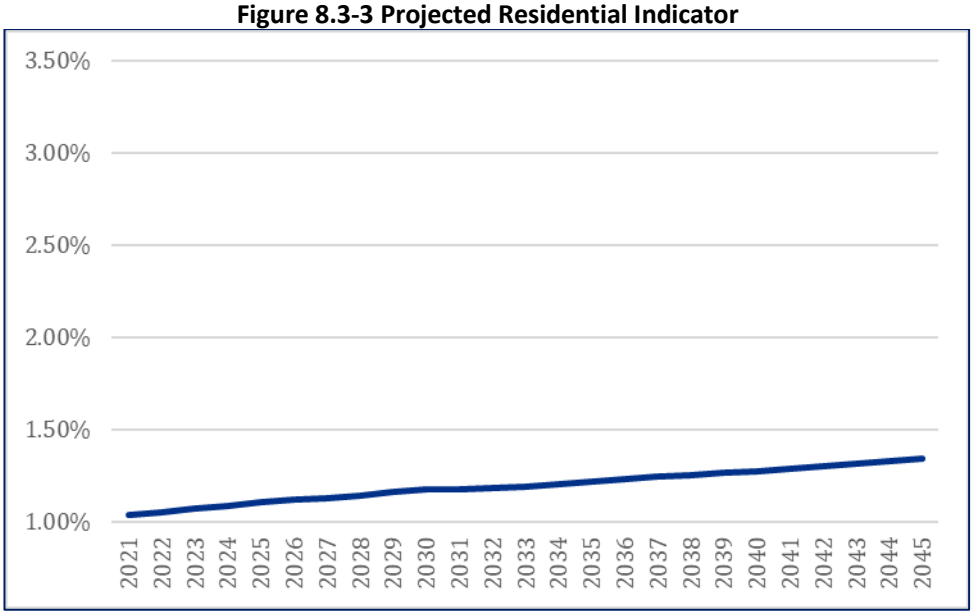
The "Residential Indicator" is defined as the typical dwelling unit sewer bill compared to MHI and is used as a benchmark by the EPA in assessing the affordability of a proposed program. The estimated sewer household bill for FY 2021 in Bridgeport is $490 based on an assumed annual sewer use of 80 HCF per residential dwelling unit.

The projected growth in the typical household sewer bill, MHI and the corresponding Residential Indicator are shown in **Table 8.3-5** for the baseline projection. **Figure 8.3-3** shows graphically the increase in the household burden through FY 2045. For the first 10 years, residents will face average annual rate increases of 2.5 percent.

Table 8.3-5 Projected Household Bill, MHI and Residential Indicator

	FY 2021	FY 2027	FY 2033	FY 2039	FY 2045
Estimated Household Bill	$490	$574	$655	$750	$861
MHI	$47,207	$50,949	$54,987	$59,345	$64,049
Residential Indicator	1.04%	1.13%	1.19%	1.26%	1.34%

Figure 8.3-3 Projected Residential Indicator



8.4 Financial Analysis - Capital Alternatives

This section summarizes the financial projections of the previously described capital plans. Each alternative builds off the baseline projection and includes the baseline capital spending. The O&M and miscellaneous revenue for all alternatives are assumed to remain the same as in the baseline projection, so the results are focused on the change in anticipated debt service as a result of the capital spending plans. The additional debt service will then impact the overall revenue requirement and the household burden.

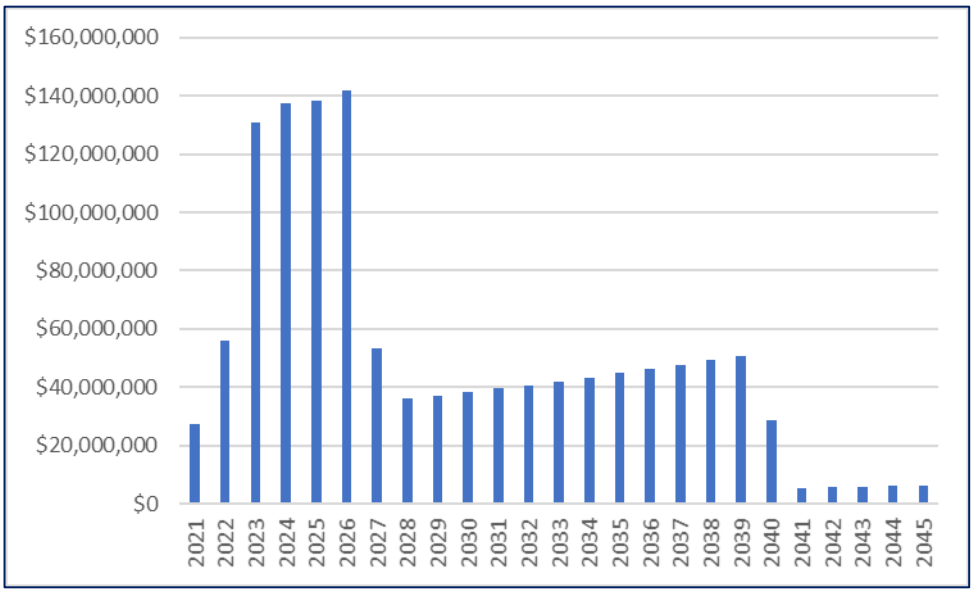
8.4.1 90/40 Consent Order Schedule; No SRF or State Grant Availability

This section summarizes the projected sewer revenue requirements for the 90/40 Consent Order Schedule alternative, assuming Bridgeport receives no financial assistance from the State (grants and/or SRF loans). This alternative shows the impact of WPCA financing the majority of the program through GO debt.

8.4.1.1 Capital Spending

This alternative carries an additional $1.15 billion in capital spending (Inflated) over the baseline, for a total capital spending of $1.26 billion ($1.15 billion plus $110 million as presented previously in Table 8.2-1) through FY 2045 when including baseline spending. **Figure 8.4-1** details the annual capital spending for this program.

Figure 8.4-1 Proposed Spending by Year (Inflated $) – 90/40 Consent Order Schedule; No SRF/Grants



8.4.1.2 Debt Service

Table 8.4-1 shows the projected capital and debt obligations through FY 2045, including the costs associated with the 90/40 Consent Order Schedule alternative. This alternative assumes no SRF or state grant availability, which means that the capital spending for the program is assumed to be issued through GO debt.

Table 8.4-1 Debt Service and Capital Expenditures – 90/40 Consent Order Schedule; No SRF/Grants

	FY 2021	FY 2027	FY 2033	FY 2039	FY 2045
Existing Debt Service - Bond	$545,776	$611,854	$305,992	$200,021	$17,684
Existing Debt Service - SRF	$2,880,321	$2,250,959	$873,292	$173,237	$0
Anticipated Debt Service - Bond	$1,353,821	$61,898,372	$73,710,111	$85,306,516	$57,391,742
Anticipated Debt Service - SRF	$0	$228,760	$208,501	$188,241	$0
Cash Funded Capital	$150,000	$900,000	$2,300,000	$2,900,000	$3,500,000
Total Debt Service and Capital	**$4,929,918**	**$65,889,945**	**$77,397,896**	**$88,768,015**	**$60,909,426**

8.4.1.3 Revenue Requirement

Table 8.4-2 shows the total revenue requirement, which includes the projections for implementing the projects in 90/40 Consent Order Schedule alternative, assuming no SRF or grant availability. The total revenue requirement is projected to grow from approximately $36.9 million in FY 2021 to approximately $118.3 million in FY 2045, equivalent to an average annual increase of 5.0 percent.

Table 8.4-2 Projected Revenue Requirement – 90/40 Consent Order Schedule; No SRF/Grants

	FY 2021	FY 2027	FY 2033	FY 2039	FY 2045
Operating Expenses	$34,513,568	$41,393,800	$48,012,668	$55,313,382	$63,182,854
Existing Debt Service	$3,426,096	$2,862,812	$1,179,284	$373,258	$17,684
Anticipated Debt Service	$1,353,821	$62,127,132	$73,918,611	$85,494,758	$57,391,742
Cash Funded Capital	$150,000	$900,000	$2,300,000	$2,900,000	$3,500,000
Less: Miscellaneous Revenue	($2,568,919)	($3,880,190)	($4,986,980)	($5,546,754)	($5,803,637)
Revenue Requirement	**$36,874,566**	**$103,403,554**	**$120,423,583**	**$138,534,644**	**$118,288,643**

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8.4.1.4 Residential Indicator

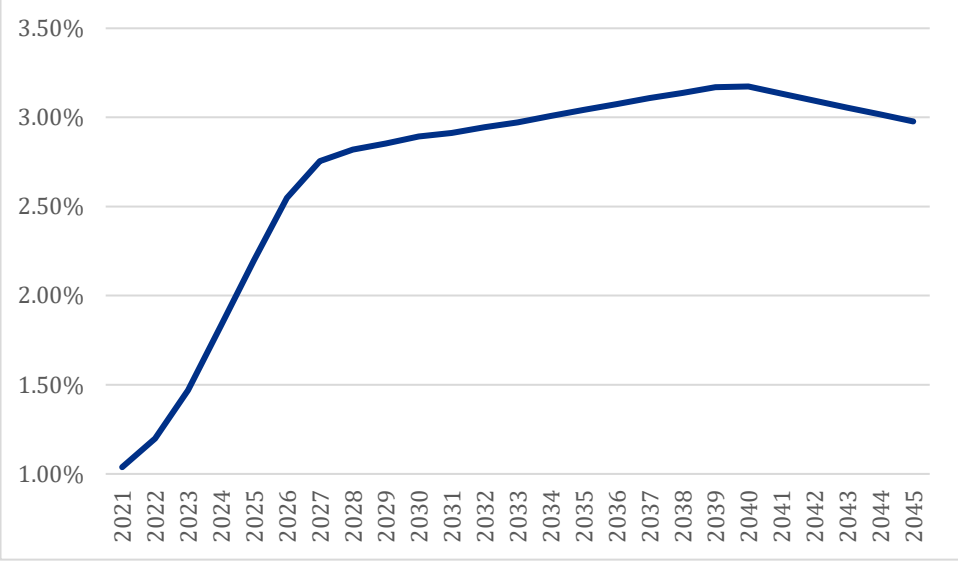
The projected growth in the typical household sewer bill, MHI and the corresponding Residential Indicator are shown in **Table 8.4-3** for the 90/40 Consent Order Schedule alternative, assuming no SRF or state grants. **Figure 8.4-2** shows graphically the increase in the household burden through FY 2045.

For the first 5 years, residents will face average annual rate increases of nearly 21.2 percent. The sewer rate is projected to triple within the first 10 years of this program.

Table 8.4-3 Projected Household Bill, MHI and Residential Indicator – 90/40 Consent Order Schedule; No SRF/Grants

	FY 2021	FY 2027	FY 2033	FY 2039	FY 2045
Estimated Household Bill	$490	$1,404	$1,635	$1,881	$1,907
MHI	$47,207	$50,949	$54,987	$59,345	$64,049
Residential Indicator	1.04%	2.75%	2.97%	3.17%	2.98%

Figure 8.4-2
Projected Household Bill, MHI, and Residential Indicator – 90/40 Consent Order Schedule; No SRF/Grants



The residential indicator reaches the 2 percent threshold in FY 2025 for this alternative. At its peak in FY 2040, the residential indicator nears 3.2 percent.

Given the magnitude of the household burden and increases in rates, this program assuming no grants or SRF presents a major financial and economic challenges and is likely not feasible.

8.4.2 90/40 Consent Order Schedule; with SRF and State Grant Availability

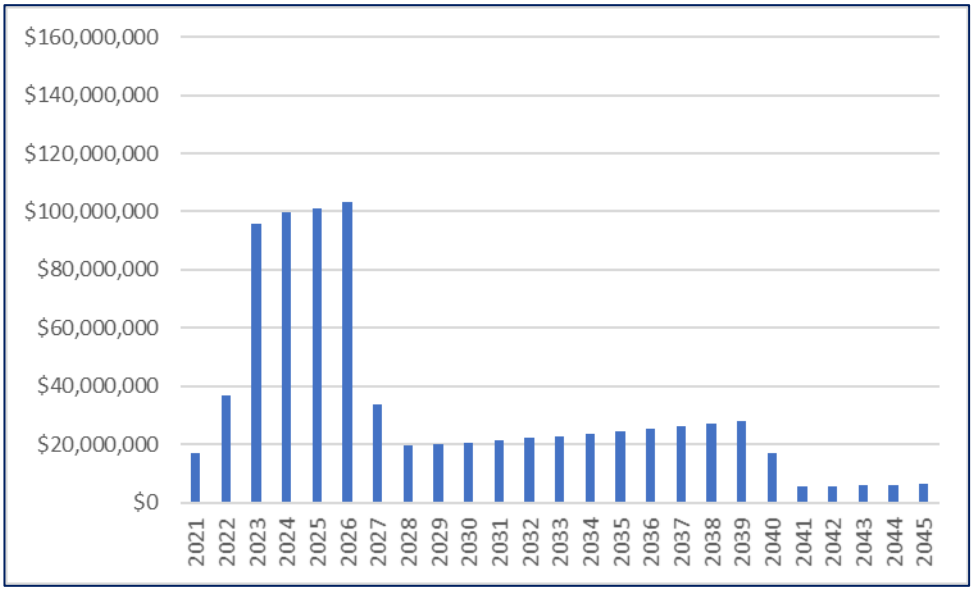
This section summarizes the projected sewer revenue requirements for the 90/40 Consent Order Schedule alternative, assuming that SRF loans and state grants as described in Section 9 are available.

8.4.2.1 Capital Spending

The capital spending for this alternative is identical to Section 8.4.1, with the difference in the projections being the financing mechanism for the capital spending. **Figure 8.4-3** below details the annual capital spending net of grants for this alternative, which totals $815.5 million (Inflated $).

This alternative assumes that Connecticut Department of Energy and Environmental Protection (DEEP) will provide WPCA with grants totaling $440 million, and $710 million in SRF loans.

Figure 8.4-3 Proposed Spending by Year (Inflated) – 90/40 Consent Order Schedule; With SRF/Grants



8.4.2.2 Debt Service

Table 8.4-4 shows the projected capital and debt obligations through FY 2045, including the costs associated with this alternative.

Table 8.4-4 Debt Service and Capital Expenditures – 90/40 Consent Order Schedule; With SRF/Grants

	FY 2021	FY 2027	FY 2033	FY 2039	FY 2045
Existing Debt Service - Bond	$545,776	$611,854	$305,992	$200,021	$17,684
Existing Debt Service - SRF	$2,880,321	$2,250,959	$873,292	$173,237	$0
Anticipated Debt Service - Bond	$153,159	$1,705,604	$2,262,467	$2,855,314	$3,141,283
Anticipated Debt Service - SRF	$278,036	$30,142,785	$35,243,639	$40,349,780	$26,539,880
Cash Funded Capital	$150,000	$900,000	$2,300,000	$2,900,000	$3,500,000
Total Debt Service and Capital	**$4,007,292**	**$35,611,202**	**$40,985,390**	**$46,478,352**	**$33,198,847**

8.4.2.3 Revenue Requirement

Table 8.4-5 shows the total revenue requirement, which includes the projections for implementing the projects in this alternative. The total revenue requirement is projected to grow from approximately $36.0 million in FY 2021 to approximately $90.3 million in FY 2045, equivalent to an average annual increase of 4.0 percent.

Table 8.4-5 Projected Revenue Requirement – 90/40 Consent Order Schedule; With SRF/Grants

	FY 2021	FY 2027	FY 2033	FY 2039	FY 2045
Operating Expenses	$34,513,568	$40,284,487	$46,583,115	$53,646,574	$61,525,617
Existing Debt Service	$3,426,096	$2,862,812	$1,179,284	$373,258	$17,684
Anticipated Debt Service	$431,195	$31,848,389	$37,506,106	$43,205,095	$29,681,162
Cash Funded Capital	$150,000	$900,000	$2,300,000	$2,900,000	$3,500,000
Less: Miscellaneous Revenue	($2,568,919)	($3,190,073)	($3,875,105)	($4,244,848)	($4,477,847)
Revenue Requirement	**$35,951,940**	**$72,705,615**	**$83,693,400**	**$95,880,079**	**$90,246,616**

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8.4.2.4 Residential Indicator

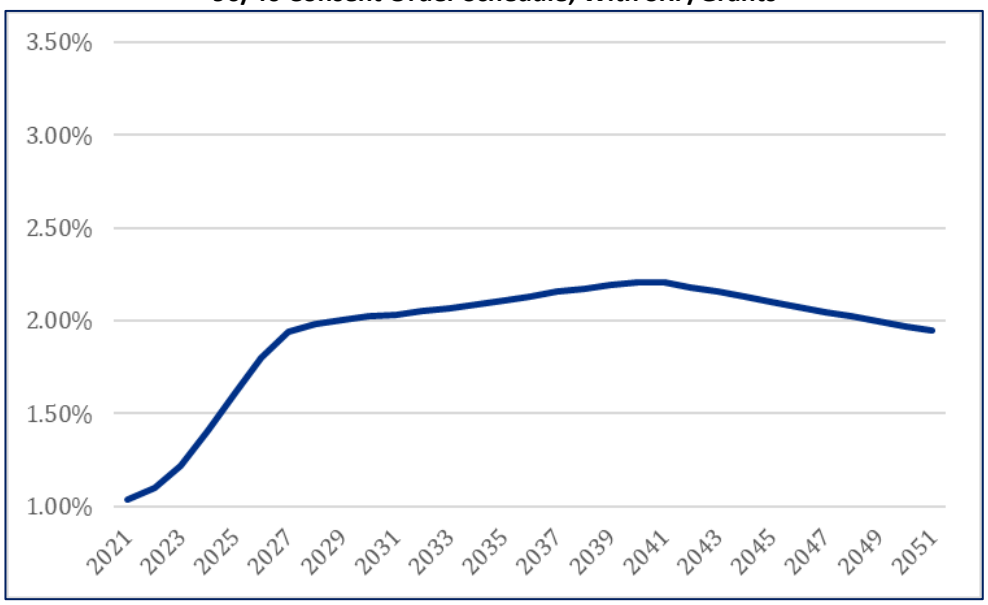
The projected growth in the typical household sewer bill, MHI and the corresponding Residential Indicator are shown in **Table 8.4-6** for this alternative. **Figure 8.4-4** shows graphically the increase in the household burden through FY 2045.

For the first 5 years, residents will face average annual rate increases of 13.1 percent. The sewer rate is projected to double within the first 10 years of this program.

Table 8.4-6 Projected Household Bill, MHI and Residential Indicator – 90/40 Consent Order Schedule; With SRF/Grants

	FY 2021	FY 2027	FY 2033	FY 2039	FY 2045
Estimated Household Bill	$490	$987	$1,136	$1,302	$1,345
MHI	$47,207	$50,949	$54,987	$59,345	$64,049
Residential Indicator	1.04%	1.94%	2.07%	2.19%	2.10%

Figure 8.4-4 Projected Household Bill, MHI, and Residential Indicator – 90/40 Consent Order Schedule; With SRF/Grants



The residential indicator reaches the 2 percent threshold in FY 2029. The household burden reaches a peak of 2.2 percent in FY 2040. Given the burden on Bridgeport residents and the relatively significant rate increases particularly over the short-term, this program will be potentially problematic to implement.

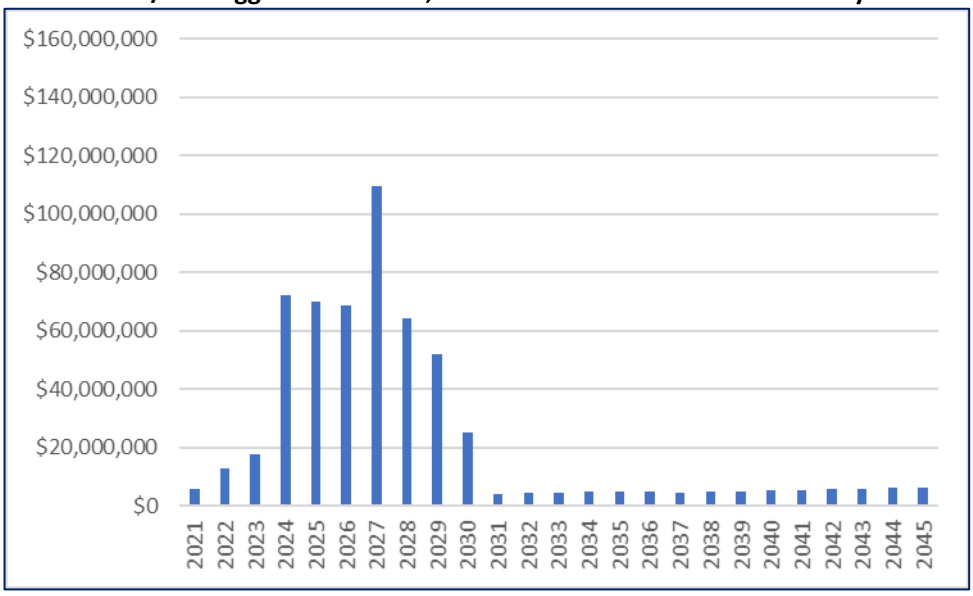
8.4.4 200/80 Staggered Schedule; with SRF and State Grant Availability

This section summarizes the projected sewer revenue requirements for the alternative that includes staggering the plant upgrades (and increasing plant sizes), and including Ash Creek, Ellsworth and Conveyance for the West Side collection system.

8.4.4.1 Capital Spending

This alternative carries an additional $469 million in capital spending over the baseline, for a total capital spending of $575 million ($469 million plus $106 million as presented previously in Table 8.2-1) through FY 2045. **Figure 8.4-5** details the annual capital spending net of grants for this alternative.

Figure 8.4-5 Proposed Spending by Year (Inflated $) –
200/80 Staggered Schedule; with SRF and State Grant Availability



This alternative assumes that CT DEEP will provide WPCA with grants totaling $218 million, and $469 million in SRF loans.

8.4.4.2 Debt Service

Table 8.4-7 shows the projected capital and debt obligations through FY 2045, including the costs associated with this alternative.

Table 8.4-7 Debt Service and Capital Expenditures –
200/80 Staggered Schedule; with SRF and State Grant Availability

	FY 2021	FY 2027	FY 2033	FY 2039	FY 2045
Existing Debt Service - Bond	$545,776	$611,854	$305,992	$200,021	$17,684
Existing Debt Service - SRF	$2,880,321	$2,250,959	$873,292	$173,237	$0
Anticipated Debt Service - Bond	$153,159	$1,705,604	$2,262,467	$2,855,314	$3,141,283
Anticipated Debt Service - SRF	$55,058	$17,709,613	$30,015,805	$27,370,215	$19,842,742
Cash Funded Capital	$150,000	$900,000	$2,300,000	$2,900,000	$3,500,000
Total Debt Service and Capital	**$3,784,314**	**$23,178,030**	**$35,757,556**	**$33,498,787**	**$26,501,709**

8.4.4.3 Revenue Requirement

Table 8.4-8 shows the total revenue requirement, which includes the projections for implementing the projects in this alternative. The total revenue requirement is projected to grow from approximately $35.7 million in FY 2021 to approximately $83.5 million in FY 2045, equivalent to an average annual increase of 3.6 percent.

Table 8.4-8 Projected Revenue Requirement – 200/80 Staggered Schedule; with SRF and State Grant Availability

	FY 2021	FY 2027	FY 2033	FY 2039	FY 2045
Operating Expenses	$34,513,568	$39,782,905	$46,420,632	$53,177,551	$60,995,553
Existing Debt Service	$3,426,096	$2,862,812	$1,179,284	$373,258	$17,684
Anticipated Debt Service	$208,217	$19,415,217	$32,278,272	$30,225,530	$22,984,024
Cash Funded Capital	$150,000	$900,000	$2,300,000	$2,900,000	$3,500,000
Less: Miscellaneous Revenue	($2,568,919)	($2,854,237)	($3,784,566)	($3,913,389)	($4,045,265)
Revenue Requirement	**$35,728,962**	**$60,106,697**	**$78,393,622**	**$82,762,950**	**$83,451,996**

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8.4.4.4 Residential Indicator

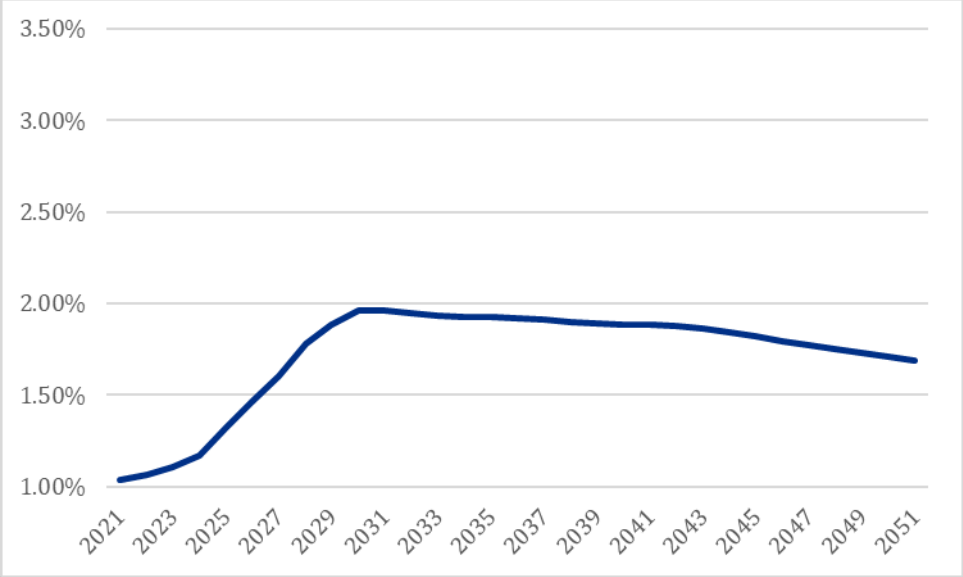
The projected growth in the typical household sewer bill, MHI and the corresponding Residential Indicator are shown in **Table 8.4-9** for this alternative. **Figure 8.4-6** shows graphically the increase in the household burden through FY 2045.

For the first 10 years, residents will face average annual rate increases of 7.9 percent, with multiple years of double-digit rate increases.

Table 8.4-9 Projected Household Bill, MHI and Residential Indicator – 200/80 Staggered Schedule; with SRF and State Grant Availability

	FY 2021	FY 2027	FY 2033	FY 2039	FY 2045
Estimated Household Bill	$490	$816	$1,064	$1,123	$1,165
MHI	$47,207	$50,949	$54,987	$59,345	$64,049
Residential Indicator	1.04%	1.60%	1.94%	1.89%	1.82%

Figure 8.4-6 Projected Household Bill, MHI, and Residential Indicator – 200/80 Staggered Schedule; with SRF and State Grant Availability



The residential burden peaks at 1.96 percent in FY 2030 for this alternative.

8.5 Phase 2 Evaluation

This section presents the Phase 2 financial impact indicators, which are benchmarks as defined by US EPA in the *Combined Sewer Overflows — Guidance for Financial Capability Assessment and Schedule Development* (EPA, February 1997). These indicators evaluate ancillary factors that may have an effect on an entity's ability to fund the proposed LTCP. The analysis is based on the city of Bridgeport as the proxy for WPCA. This assessment identifies three categories, each with two indicators as listed below:

- Debt Indicators:

  - Bond Rating
  - Overall Net Debt
- Socio-economic Indicators:
  - Median Household Income
  - Unemployment Rate
- Financial Management Indicators:
  - Property Tax Revenue
  - Property Tax Collection Rate

While the Phase 1 assessment (Residential Indicator) is a time-series analysis, the Phase 2 process involves comparing Bridgeport's position for each indicator with EPA defined benchmarks to determine a score of "strong", "mid-range", or "weak". The corresponding values assigned to each indicator are "3", "2", or "1", respectively.

8.5.1 Debt Indicators

The two debt indicators used in Phase 2 of the financial capability assessment are bond rating and overall net debt. These indicators are intended to be indicative of the City's capacity to gain access to capital markets to raise the necessary capital to implement the anticipated capital plan.

8.5.1.1 Bond Rating

The bond rating indicator is intended to address a general capacity to undertake debt. While rating designations vary by credit rating agencies, long-term bond ratings range from AAA/Aaa (high grade) to C/D (in default). **Table 8.5-1** shows the most recent ratings from Moody's Investors Service (MIS) and from Standard & Poor's (S&P). The scoring for this indicator includes the ratings as follows:

- ***Strong (Score = 3)*** — a high grade or strong bond (e.g., Aaa or AAA, Aa or AA, A).
- ***Mid-Range (Score = 2)*** — a medium grade bond (e.g., Baa or BBB). These are the minimum "investment grade" bond ratings.
- ***Weak (Score = 1)*** – a speculative or "junk" bond (e.g. Ba or BB, or lower)

Based on the benchmarks provided in the EPA guidance document, this indicator for the City is rated mid-range and earns a score of 2, based on the MIS bond rating from 2017.

Table 8.5-1 Current Bond Rating

Item	Rating
Moody's Investors Service (MIS)	Baa1
Bond Rating Indicator Score	2

8.5.1.2 Overall Net Debt as a Percent of Full Market Property Value

Overall net debt is the amount of tax-backed bonded debt for all taxing units not supported by revenue from sewer user fees. Indicator scores for overall net debt are based on the percentage of the full-market property value. The EPA guidance document benchmarks for overall net debt are:

- ***Strong (Score = 3)*** — overall net debt is below two percent of the full-market property value.
- ***Mid-Range (Score = 2***) — overall net debt is two to five percent of the full-market property value.
- ***Weak (Score = 1)*** — overall net debt is more than five percent of the full-market property value.

The information for this indicator is from Bridgeport's 2019 Comprehensive Annual Financial Report. The information is shown in **Table 8.5-2**.

Table 8.5-2 Overall Net Debt Rating

Item	Value
Direct net debt	$803,151,864
Debt of overlapping entities (proportionate share of multi-jurisdictional debt)	$0
Overall net debt	$803,151,864
Market value of property	$9,155,540,000
Overall net debt as a percent of full market property value	8.7 percent
Overall Net Debt Indicator Score	1

The overall net debt for the City in 2019 was approximately $803 million. The City's market value of property (equalized valuation) is approximately $9.2 billion, which makes the overall net debt approximately 8.7 percent of full-market property value. Thus, this indicator is rated as weak using the EPA guidelines, which equates to a score of 1.

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8.5.2 Socio-economic Indicators

The two socio-economic indicators used in Phase 2 of the financial capability assessment are unemployment rate and median household income. These indicators are intended to be indicative of the City's general economic condition.

8.5.2.1 Unemployment Rate

Unemployment rate is a measure of the City's labor force that is unemployed but seeking employment. The EPA guidance document benchmarks for unemployment rate are:

- ***Strong (Score = 3)*** — unemployment rate is more than one percent below the national average.
- ***Mid-Range (Score = 2)*** — unemployment rate is within one percent (+/-) of the national average.
- ***Weak (Score = 1)*** — unemployment rate is more than one percent above the national average.

The unemployment rate for Bridgeport, as compared to the national average, is shown in **Table 8.5-3**. The City's average unemployment rate in 2019, according to the U.S. Bureau of Labor Statistics, was 13.4 percent, 6.9 percent more than the state average rate of 6.5 percent, and 7.5 percent more than the national average rate of 5.9 percent. Based on EPA standards, this results in a parameter score of 1.

Table 8.5-3 Unemployment Rate Comparison

Item	Value
Bridgeport: Unemployment Rate	13.4 percent
Connecticut: Unemployment Rate	6.5 percent
National: Unemployment Rate	5.9 percent
Comparison of Bridgeport with National	7.5 percent above
Unemployment Rate Indicator Score	1

8.5.2.2 Median Household Income

This indicator is related to the Residential Indicator in that they both consider MHI. While the Residential Indicator is a comparison of MHI and average annual household bills, the median household income indicator focuses solely on Bridgeport's MHI by comparing it to the national median household income. The benchmark then is a measure of the relative wealth or poverty of the service area. The EPA guidance document benchmarks for median household income are:

- ***Strong (Score = 3)*** — MHI is more than 25 percent above the national average.
- ***Mid-Range (Score = 2)*** — MHI is within 25 percent (+/-) of the national average.
- ***Weak (Score = 1)*** — MHI is more than 25 percent below the national average.

The City and national MHI values, shown in **Table 8.5-4**, are based on the most recent Census Bureau, American Community Survey (ACS) data.

Table 8.5-4 Median Household Income Comparison

Item	Value
Most recent Bridgeport estimate (2018 ACS)	$45,411
Most recent National estimate (2018 ACS)	$60,293
Compare Permittee with Average National MHI	24.7 percent below
Median Household Income Indicator Score	2

In addition to the City slightly lagging behind in MHI, the U.S. Census Bureau estimated that in 2018, 21.4 percent of the City's residents are living below the poverty line, as compared to a national average of 14.1 percent and a state average of 10 percent.

8.5.3 Financial Management Indicators

The two financial management indicators are property tax revenues and tax collection efficiency. The indicators are used to assess a community's capacity to support debt.

8.5.3.1 Property Tax Revenues as a Percent of Full Market Property

Property tax revenue as a percent of full market property value is an indicator related to the funding capacity available to support debt, based on the wealth of the community. The EPA guidance document benchmarks for property tax revenues are:

- ***Strong (Score = 3)*** — property tax revenue is below two percent of the full-market property value.
- ***Mid-Range (Score = 2)*** — property tax revenue is two to four percent of the full-market property value.
- ***Weak (Score = 1)*** — property tax revenue is more than four percent of the full-market property value.

In the City, property tax revenues collected in 2019 were approximately $315 million, with a full-market property value of $9.2 billion. As shown in **Table 8.5-5**, the calculated property tax revenue indicator for the City is 3.4 percent, which places the City in "mid-range" with a rating score of 2.

Table 8.5-5 Property Tax Revenues

Item	Value
Full market value of real property	$9,155,540,000
Property tax revenue	$314,663,125
Property tax revenue as a percentage of full market property value	3.4 percent
Property Tax Revenue Indicator Score	2

8.5.3.2 Property Tax Collection Efficiency

The last Phase 2 indicator is the property tax collection rate. This indicator represents the relationship of property taxes collected versus property taxes levied. The EPA guidance document benchmarks for property tax collection efficiency are:

- ***Strong (Score = 3)*** — property taxes collected are above 98 percent of the property taxes levied.
- ***Mid-Range (Score = 2)*** — property taxes collected are between 94 and 98 percent of the property taxes levied.
- ***Weak (Score = 1)*** — property taxes collected are less than 94 percent of the property taxes levied.

Computation of this indicator rating is shown in **Table 8.5-6**, and is based on the City's data for the 2019 tax year. The City's property tax collection rate is just above 98 percent of the taxes levied, which results in an EPA parameter score of 3.

Table 8.5-6 Property Tax Collection Efficiency

Item	Value
Property tax revenue collected	$314,663,125
Property taxes levied	$319,856,486
Property tax revenue collection rate	98.4 percent
Property Tax Collection Efficiency Indicator Score	3

8.5.4 Summary of Financial Impact Indicators

Table 8.5-7 shows the EPA's Phase 2 Financial Impact Indicator benchmarks used to evaluate the six indicators. The indicators are shown in the left-hand column. The corresponding EPA benchmarks for each indicator are shown for "strong", "mid-range" or "weak" ratings. The highlighted boxes in this table indicate where the City falls within the framework of these indicators.

Table 8.5-7 Financial Impact Assessment Benchmarks

Indicator	Strong (Score=3)	Mid-Range (Score=2)	Weak (Score=1)
1. Bond Rating	AAA to A (S&P) or	BBB (S&P) or	BB to D (S&P) or
	Aaa to A (MIS)	Baa (MIS)	Ba to C (MIS)
2. Overall Net Debt	Below 2 percent	2 percent to 5 percent	Above 5 percent
3. Unemployment Rate	>1 percent below National Average	±1 percent of National Average	>1 percent above National Average
4. Median Household Income	>25 percent above adjusted National MHI	±25 percent of adjusted National MHI	>25 percent below adjusted National MHI
5. Property Tax Revenue	Below 2 percent	2 percent to 4 percent	Above 4 percent
6. Property Tax Collection Rate	Above 98 percent	94 percent to 98 percent	Below 94 percent

Note: The highlighted values represent Bridgeport's benchmark scores

The values and scores of the six indicators for Bridgeport are summarized in **Table 8.5-8**. An overall (average) score below 1.5 is considered weak and an overall score above 2.5 is considered strong by EPA guidelines. An overall score between 1.5 and 2.5 is considered mid-range. Overall, the un-weighted average score for the Phase 2 evaluation is 1.8 which falls in the mid-range of the financial capability scale.

Table 8.5-8 Financial Impact Assessment Summary

Financial Impact Indicator	Value	Score
1. Bond rating	Baa1	2
2. Overall net debt as a percent of property value	8.7 percent	1
3. Unemployment rate compared with national average	7.5 percent above	1
4. Median household income compared with national average	24.7 percent below	2
5. Property tax revenue as a percent of property value	3.4 percent	2
6. Property tax collection rate	98.4 percent	3
Overall Financial Impact Indicator Score		**1.8**

8.6 Additional Socioeconomic Indicators

In addition to the traditional impacts considered in the FCA, a supplementary discussion of socioeconomic indicators has been included to provide a more complete assessment. This section outlines the financial and economic profile of the city of Bridgeport specifically to highlight the economic burden that higher sewer rates would place on this population.

In some cases, the indicators in this section expand on previously included data, such as unemployment and MHI. In other cases, data expands on the scope of the analysis to include information on demographic and social data that provides additional perspective about the City's current and anticipated financial capability.

8.6.1 Unemployment and Labor Force Participation

Average unemployment in Bridgeport was 13.4 percent in 2019, compared to the national average of 5.9 percent according to the Bureau of Labor Statistics.

In addition to high unemployment in Bridgeport, most recent census data estimates the City's labor force participation rate at 67.6 percent. Often individuals that are unemployed over long periods of time or are chronically unemployed, drop out of the labor force. Once individuals are no longer actively looking for employment, they are not counted in unemployment statistics, which has the effect of artificially lowering the full extent of unemployment. Taken with this additional context, the unemployment situation in the City is likely more severe than is indicated by current unemployment statistics.

8.6.2 Median Household Income - County Communities Comparison

The MHI for Bridgeport in 2018 is estimated to be $45,411, which places the MHI for the City at24.7 percent below national MHI. While this indicates a mid-range capability, it is at the upper limits of the threshold. To add additional context, **Table 8.6-1** lists the MHI for the communities in the same county as the City.

Table 8.6-1 MHI Comparison - 2018

Community	Median Household Income[1]
Bridgeport	$45,411
Fairfield	$134,559
Norwalk	$82,474
Stamford	$89,309

[1]Census Bureau, American Community Survey

8.6.3 Poverty Statistics

In addition to MHI statistics, a useful factor in assessing a City's financial capabilities is the rate of poverty, which indicates a lack of income to meet basic needs. Currently, the Census Bureau estimates that 21.4 percent of the City's residents are living below the poverty line, compared to a national average of 14.1 percent.

In the context of other communities, Fairfield County has a poverty rate of 8.8 percent which is below the national average and significantly lower than Bridgeport's. This indicates an overall financial and economic base for these communities far stronger than Bridgeport's.

8.6.4 Educational Attainment

Educational attainment is often an indicator of an individual's long-term earning potential. The Census estimates that 76.5 percent of Bridgeport residents have a high school degree or higher, compared to a national average of 87.7 percent. Bridgeport residents with a bachelor's degree or higher is estimated at 18.3 percent, compared to a national average of 31.5 percent.

The relatively lower levels of educational attainment in Bridgeport complicates long term earning trends for its residents. Continuation of these trends over time suggest that Bridgeport's MHI will continue to lag behind national averages, and further complicate the financial situation for the city and its residents.

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8.7 Overall Summary

Based on the Phase 1 and Phase 2 evaluations presented in this Section, completing projects on the current Consent Order schedules will put a high burden on the sewer rate payers in Bridgeport per current EPA guidance. As noted in Section 8.6, the City has and continues to experience economic stress as evidenced by the relatively low-income growth over the past 20 years and the very high poverty rate. The City will face a significant financial challenge implementing any significant capital program as contemplated herein. This problem is intensified if the WPCA were forced to self-fund the projects.

Staggering the design and construction of both treatment plants, with the Ash Creek and other collection system improvements (as presented above) is projected to keep sewer rates below EPA's 2 percent high burden, but only if CWF assistance is available in the form of 2 percent loans and grant funding per the current programs. Even with such assistance, the magnitude of the required rate increases is anticipated to present major financial challenges for the WPCA. **If CWF assistance is not available in the amounts assumed in this report, the financial capabilities of the WPCA, and the schedule for completion of the recommended projects, will need to be re-evaluated.**

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Attachment H

Public Comments & Responses, Wastewater Facilities Plan Environmental Impact Evaluation (EIE)

Bridgeport Wastewater Treatment Plants Public Scoping Comment Response Document

Compiled Responses from CT DEEP, Bridgeport WPCA and CDM Smith representing the Bridgeport WPCA
December 22, 2020

The City of Bridgeport Water Pollution Control Authority (WPCA) submitted a Wastewater Treatment Facilities Plan in accordance with Administrative Order WRMU19001 to the CT Department of Energy and Environmental Protection (DEEP). The Bridgeport WPCA retained CDM Smith as their engineering consultant to complete this Facilities Plan. As part of the requirements of the Connecticut Environmental Policy Act (CEPA), a virtual public scoping meeting was scheduled by DEEP and advertised to the public. This public information session was held on October 29, 2020. CDM Smith presented the recommended plans for upgrading both the East Side and West Side WWTPs on behalf of the Bridgeport WPCA.

Public comments on the presentation and the project were accepted through November 5, 2020. The questions and comments received as part of this public participation progress are included herein. Many of these questions and comments have been abbreviated, but the substance of the public comment has not been altered. DEEP, CDM Smith and the Bridgeport WPCA have provided corresponding responses in italics.

Public Comment 1 (Submitted via Email): From Bill Lucey, Long Island Soundkeeper, Save the Sound:

A. "I am interested if there has ever been an effects analysis completed examining cumulative impacts from permitted sewage outfalls as part of the issuance of a NPDES permit."

Response to 1A:

DEEP RESPONSE: Yes, by looking at the effects of multiple discharges on a waterbody. CT DEEP requires chronic toxicity testing for waters that are impaired or dominated by discharges. Part of the chronic test requires testing of the receiving water upstream and downstream of the discharge. Water health as measured through the toxicity report. Ambient monitoring (program is run by Chris Belluscci) is completed for indicators of chronic and biological health. All of this is considered into whether there is an impact or impairment on the water. CT DEEP is just starting to implement the WQ based targets for P so must wait to determine effect(s). CT has a TMDL for N for LIS and all facilities have their limits. EPA and states will update model and update the N TMDL for the open water sound. CT DEEP is starting studies in coastal embayments, so no basis for changing permit requirements yet for WWTPs until embayment studies are completed by that plant outfall or EPA updates LIS N TMDL. CT DEEP Will get to all the embayments eventually but cannot get them all at once. CT DEEP has partnered to do Statewide SPF testing with private groups including USGS year one. CT DEEP has hired a modeling contractor and there is testing of rivers and lakes. The Pawcatuck project with RI is the demo project for this. Using freshwater impact of nutrients and what goes down to the LIS. Mystic and Norwalk are the next 2 embayments to be done. MS4 program has additional requirement to manage stormwater and nutrients in stormwater that are discharging to P streams and N BMP installation. CT DEEP is using HSPF modeling – Hydrologic Simulation P Fortran. The model will provide a better basis for updating permit limits.

B. "Understanding that there are certain allowances within "Zones of Influence", what is the responsibility of the permit holder when discharging into an impaired water body? More specifically what is the course of action when the impairment encompasses both the ZOI as well as the rest of the waterbody in cases where the waterbody is an enclosed harbor or bay?"

Response to 1B:

DEEP RESPONSE: The permittee's responsibility it to meet the permit limits whether MS4 or WWTP. If an impairment moves beyond the permit and requires a TMDL or if the cause is unknown, a study is performed to determine the cause and then CT DEEP floats a load allocation that gets incorporated in the permit(s). The permittee doesn't do anything. A watershed plan is made and then the TMDL is put into the permit during the next revision.

C. "Has there ever been **mitigation** required during a permitting or CEPA process for chronic inputs of nutrients and solids from a permitted discharge when these activities are identified as the primary source of the impairment?"

Response to 1C:

DEEP RESPONSE: Permits generally do not go through a CEPA process. Are you talking natural resource damages? CT DEEP does not put that in a permit. Chronic issues (not meeting effluent limits) will go into an order. Newly discovered issues (not meeting a metals limit) going into a permit during renewal. If a designated use is impaired, CT DEEP would determine the issue and then consider a TMDL.

D. "Physical and chemical impacts include interruption of diurnal DO cycling, chronic hypoxia associated with high BOD and conversion of pre-discharge benthic sediments to post-discharge sediments characterized by high carbon concentrations and fine particle loading."

"Biological impacts include reduction in biomass and diversity of aquatic species and fish kills."

"Finally, understanding that in CT SLR is taken into consideration when upgrading facilities with state funds, are the effects of warming waters on chemical processes within the zone of influence (ZOI) and the impaired waterbody also considered?"

Response to 1D:

DEEP RESPONSE: DEEP does not have a good model yet to evaluate and implement temperature changes however, the ZOI for thermal is not expected to be as large as the total ZOI.

- **Public Comment 2 (Submitted via Email):** From Kevin Blagys, Bridgeport Resident, Business Owner of KB Dive Services, and Coordinator of the Black Rock Harbor Study

A. "Kevin Blagys, Bridgeport Resident, business owner of KB Dive Services and Coordinator of the Black Rock Harbor Study. I attended the Zoom meeting and asked 2 questions regarding the CSO tunnel and plans for moving the outfall pipe."

"Having just played the video presentation again, and studied the questions and answers, here are my thoughts as a resident who works on the water, and has been studying Black Rock Harbor since 2019."

"The 14-minute zoom presentation by Dan and Joe of CDM Smith was the first time seeing the actual expansion plans of the East and West treatment plants."

"It seems that a project of this scale is being rushed through without appropriate time for public Comment. Black Rock harbor just completed its 2nd year, monitoring the harbor for the Unified Water Study (UWS) (monitoring program through Save the Sound). Prior to 2019 Black Rock was not included in the Long Island Sound Report published by Save the Sound."

Response to 2A:

CDM SMITH / BRIDGEPORT WPCA RESPONSE: The WPCA's Administrative Order with CT DEEP required the submittal of this Facilities Plan by November 30, 2020. Over the last 12 months CDM Smith has been working diligently with the WPCA to assess both treatment plants and develop a long-term vision of the capital needs of the facilities to improve the performance and reliability of the treatment facilities over the 30-year planning period. The plan is also designed to dovetail with the recommendations in the CSO Long Term Control Plan (LTCP) and provide a holistic view of the collection and treatment systems to result in the most cost-effective, timely solutions to improve water quality in the receiving waters. Numerous meetings have been conducted with the WPCA Board to keep them abreast of the project; these meetings are open to the public. Moving forward additional public meetings will be conducted with the WPCA Board, the public and the neighborhoods to ensure stakeholders are engaged in the solution. The recommended plan developed takes advantage of existing infrastructure and results in improved water quality in the receiving waters in a cost-effective and timely fashion.

The milestone dates included in the Administrative Order, that the WPCA is required to comply with, contribute to the seemingly rushed schedule. That said, as you understand, the treatment plants are in desperate need of upgrade so the sooner that this can be accomplished the better for Black Rock Harbor.

DEEP RESPONSE: In addition to what is stated above, there will be a chance to review the facility plan, response to comments and the environmental impact statement and submit comments sometime in the first half of 2021. Please watch the CT CEQ website (https://portal.ct.gov/CEQ) for updates to the Environmental Monitor. The facility plan is still a draft and has not been approved by DEEP. Approvals cannot be issued until the EIE scoping and post-scoping is complete. There is still plenty of time to review and comment.

B. "With the community seeking answers to the water quality in the harbor, a group of resident volunteers and students from the Aquaculture school began monitoring Black Rock Harbor for 5 months From May thru Oct. We go out on a boat before sunrise and sample 6 locations in the harbor 2 times per month."

"The 2019 Results for our sampling show Black Rock Harbor with an overall grade of D. Consisting of 5 parts:

1) Dissolved oxygen – F
2) Macrophyte (seaweed) D
3) Chlorophyll a (plankton) D
4) Oxygen Saturation B
5) Water clarity A

The results of our 2020 sampling will not be available till 2021."

"My business is KB Dive Service, maintaining boats underwater and marine services. I have been diving in Black Rock harbor since 2006 when I started the business. I dive regularly in the harbor from April thru November. Being on the front lines of actually diving in the harbor has made me aware of how stressed Black rock harbor is as a direct result of the Westside Treatment plant. It is because of the state of the harbor that I got involved in studying it, in an effort to save it. And I am not alone. The participation in the UWS water study was led by the Ash Creek Conservation Assoc, and funded through local Business leader: Santa Fuel."

"The Community and businesses are invested in cleaning up the harbor...

"Having reviewed the proposal: The improvements in treatment of the Westside plant and expansion are welcome for the 90mg/d. However, expanding the plant, doubling it...to 200mg/d are not welcome without relocating the Outfall pipe from in the harbor to outside the harbor. (As was originally planned, and as Fairfield does)"

"Reduction of CSOs seems to be the main focus of this plan, and the problem isn't the CSO's....it's what comes out of the Outfall pipe."

"Black Rock harbor has been on the front line of what comes out of the treatment plant, and the harbor is basically fertilized by the nitrogen, and that reduces the oxygen in the water which has been stressing plant, animals."

"If the plant is going to expand to 200 mg/d then relocating the outfall pipe under Seaside park into the sound would be recommended. Relocating the Pipe was also addressed by CT Rep Steve Stafstrom."

Response to 2B:

CDM SMITH / BRIDGEPORT WPCA RESPONSE: We appreciate your commitment to the environment and your efforts in sample collection and documentation of the water quality conditions in Black Rock Harbor. This will not only provide baseline water quality conditions but will also help to assess the positive impacts resulting from an upgraded treatment facility.

It is clear, as documented in the Facilities Plan, that the West Side Wastewater Treatment Plant suffers from aging, undersized and inadequate treatment processes which directly and indirectly impact the ability of the treatment facility to meet permit limits. The Wastewater Facilities Plan has developed a plan to remedy the situation through the design and construction of a state-of-the-art treatment facility that will dramatically improve the efficiency, effectiveness and reliability of the treatment processes while reducing the pollutant load to the receiving waters.

We agree that Black Rock Harbor is stressed, and that some of the stress is due to the effluent from the West Side WWTP discharge. Stressors also include the four combined sewer overflows discharging to Black Rock Harbor, as well as non-point source due to urban runoff, stormwater discharges and landfill leachate from the Seaside Landfill. The prime focus of this Facilities Plan was to address the upgrade to the treatment facilities to improve effluent quality. Concurrently, we assessed the system holistically to identify the most cost-effective solutions that integrate CSO control with treatment plant upgrades to simplify operations and avoid sunk costs.

With the treatment plant upgrade we expect that the annual total nitrogen mass loading of 1,041 lb/day will be consistently achieved, which was not the case in the three years between 2017 and 2019. In fact, process modeling shows an expected annual total nitrogen load of 938 lb/day in the design year 2050, 10 percent less than permitted. In addition, under average conditions, it is expected that the 5-day biochemical oxygen demand (BOD_5) and total suspended solids (TSS) discharged will be consistently below 10 mg/L.

Currently, during storm events, the existing treatment plant is incapable of accepting more than 80 mgd for treatment (due to the current pumping and treatment capacity) at the West Side plant. Influent flow, up to 58 mgd, receives secondary treatment and disinfection. Influent flow greater than 58 mgd, receives primary treatment and disinfection prior to discharge to Black Rock Harbor. Combined sewer flow (sanitary sewer flow and storm water) beyond the current capacity of the WWTP is discharged

through combined sewer overflow (CSO) outfalls with no treatment. There are four such combined sewer overflows tributary to Black Rock Harbor. During a 1-year, 24-hour storm event it is estimated that 44.4 MG of CSO from the West Side service area is discharged to receiving waters.

Increasing the West Side WWTP's wet weather capacity to provide preliminary treatment, primary treatment and disinfection for flows up to 200 mgd will reduce the volume of untreated CSO that is discharged by over 50 percent on the West Side during a 1-year, 24-hour storm event. Given the new, expanded preliminary treatment, primary filtration system and UV disinfection systems proposed, the primary effluent bypassed during high flow events is expected to achieve superior removal efficiencies, further improving the effluent quality of the discharge.

It is important to understand the expected frequency of these peak flows. Based on the collection system modeling, under existing conditions (2017-2019), influent flow is expected to be greater than 90 mgd only 10 percent of the time (36 days per year). Influent flow is expected to be greater than 120 mgd only 5 percent of the time (18 days per year). Again, based on 2017-2019 conditions, the peak flow that was conveyed to the West Side plant over the three-year period modeled was 186 mgd. We elected to increase the peak flow capacity to 200 mgd, since with some collection system improvements, more flow could be conveyed to the plant and further reduce CSOs to Black Rock Harbor.

DEEP RESPONSE: To add to the above, the CSOs affecting Black Rock Harbor are addressed in the CSO Long-Term Control Plan (LTCP) which went through the CEPA process of scoping and post-scoping starting October 3, 2017. As part of that document, it was noted that historically there were 9 CSOs that discharged directly into Burr Creek, Cedar Creek and Black Rock Harbor. Of those, only 4 remain: 1 in Burr Creek, 2 in Cedar Creek and 1 in Black Rock Harbor. All of these historical discharges have led to the current conditions in the harbor. By increasing the plant size and reducing the amount these untreated raw sewage discharges occur, the water quality in this embayment should continue to improve. In addition, the CSO LTCP also requires additional work on the collection system in the area surrounding Black Rock Harbor to ensure that initial discharge in a 1year 24hour storm is captured. That being said, the facility plan we are discussing here only addresses the upgrades at the wastewater treatment plants.

Refer to Comment Response 2D and 3B for a discussion of a new outfall pipe.

C. As a "rate payer" to the WPCA for its service, I disagree with the comment that "We can only pay so much"

"This project is looking for funding from the Clean Water Act, and but residents should not be held responsible for plan.... The Clean Water Act is Responsible."

Response to 2C:

CDM SMITH / BRIDGEPORT WPCA RESPONSE: CT DEEP's Clean Water Fund (CWF) provides grants and loans for these types of projects. Grants typically provide 50% funding for CSO projects, 30% for biological nitrogen removal (BNR) components, and 20% for general WWTP upgrade projects, with the balance eligible for a low interest loan. The final grant percentage awarded to the project would be based on the combination of the grants as eligibility for certain aspects of the treatment plant upgrades vary. However, the grant will not cover the entire project cost and the remainder would be funded through the CWF with a 2% loan payable over a 20-yeear period.

DEEP RESPONSE: While the Clean Water Act may be "responsible" for holding the Bridgeport wastewater treatment plants to a certain standard in order to meet water quality standards, it is not responsible for the operations, maintenance and any required upgrades. That falls to the City and the ratepayers. Federal funds are provided to the state through the Clean Water Fund and the state provides matching monies used to enable CT to award some of the largest grants under the Clean Water State Revolving Fundprogram nationwide.

D. "Also commented was: what's the priority? All 3 are a priority, CSO, Plant and Outfall."

Response to 2D:

CDM SMITH / BRIDGEPORT WPCA RESPONSE: The project priority is to develop a cost-effective plan to holistically address water quality issues across Bridgeport – this is accomplished through CSO reduction and improving the performance and reliability of the two WWTPs. Cost-effectiveness is the critical component to the plan. By increasing the treatment plant capacity at both plants, we found we were able to significantly reduce CSOs sooner for less money, than previously recommended in the CSO LTCP. The cost-effectiveness of a new outfall was also assessed. The analysis revealed an estimated cost of a new outfall discharging about 11,000 ft offshore would cost on the order of $200 million, whereas the benefit of the extended outfall, especially with improved effluent quality from the West Side plant was not immediately apparent. It is recommended that the water quality in Black Rock Harbor continue to be assessed subsequent to the proposed wastewater treatment plant improvements. If at that time, water quality in Black Rock Harbor is not showing signs of improvement, the WPCA could re-evaluate outfall relocation.

DEEP RESPONSE: Water quality is the priority. Because of that a plan is developed to address areas that affect water quality, in this case both of the treatment plants and all of the CSOs. In addition to what was said above in 2E and 3B regarding the outfall, it is not as simple as just "moving" the outfall. There is a lot of permitting and approvals that would be involved including the Army Corp of Engineers. Moving the outfall can not be done in the timeframe required by the Order to update the treatment plants but is something that DEEP is monitoring. The Municipal Wastewater Facilities Unit has

requested that the Block Rock Harbor embayment be considered for the next round of testing and modeling described in answer 1A above.

E. "I hope that the EIE plan under consideration shows that Black Rock Harbor has been directly affected over the years by the Current plant, and if the plant is going to increase its size, then now is the time to relieve the harbor and relocate the outfall pipe."

Response to 2E:

CDM SMITH / BRIDGEPORT WPCA RESPONSE: As presented in the response to Comment 2B, the age and condition of the existing West Side WWTP has impacted its performance and there is no question that the facility needs to be upgraded to improve the effluent quality discharged. The increase in capacity of the West Side WWTP, however, is not expected to increase the loading to Black Rock Harbor. On the contrary, the increased capacity is expected to significantly decrease the volume of combined sewer overflows that discharge untreated wastewater into the Harbor sooner than would be accomplished under the CSO LTCP.

Although relocation of the effluent outfall could be considered in the future, we are confident that the investment in the treatment plant and collection system infrastructure will result in measurable improvements to Black Rock Harbor. Therefore, it is recommended that the relocation of the outfall be deferred until additional water quality data can be collected to justify or refute the need.

Public Comment 3 (Submitted via Chat during Public Meeting): From Kevin Blagys, Bridgeport Resident, Business Owner of KB Dive Services, and Coordinator of the Black Rock Harbor Study

A. "Please explain the CSO tunnel and reduction of CSOs....in Black Rock we have 4 CSOs, will they be reduced with the CSO tunnel?"

Response to 3A:

CDM SMITH / BRIDGEPORT WPCA RESPONSE: The CSO tunnel was recommended in the WPCA's 2011 LTCP. The 2011 LTCP recommended a schedule of collection system projects that achieved a 1-year level of CSO control by the year 2039 as required in the WPCA's CSO consent order. The 1-year control is defined as no CSO discharges during the 1-year, 24-hour storm. The CSO tunnel was proposed to be constructed toward the end of the LTCP schedule (2039). Upon completion of the LTCP projects, all CSOs on the West Side (including Black Rock Harbor) would not be expected to overflow in rain events smaller than the 1-year, 24-hour level. Several CSOs on the East Side would remain active upon implementation of the LTCP projects.

You are correct, there are 4 CSOs that currently discharge to Black Rock Harbor (ARBOR, WORD, ANTH and SEAB). Under our proposed plan to increase the capacity of the West Side WWTP ANTH, WORD, and SEAB will be controlled under the 1-year, 24-

hour storm event. Discharges from ARBOR will be reduced by approximately 60 percent during the 1-year event. Because of the complex nature of the collection system hydraulics, it is proposed that additional collection system metering, modeling and calibration be conducted subsequent to the proposed improvements to determine what more, if anything, needs to be done to control the remaining CSO.

B. "Follow up....Will the Main outflow pipe be addressed? Is extending the pipe under seaside park an option? Today 10/29 at 4pm the main outflow was clearly in Bypass event."

Response to 3B:

CDM SMITH / BRIDGEPORT WPCA RESPONSE: The West Side WWTP currently discharges through a 72-inch pipe at the headwall along the north side of Cedar Creek in Black Rock Harbor near the Captain's Cove Seaport restaurant and marina across from the Seaside Landfill. Options for the West Side Plant outfall evaluated in the Facilities Plan included:

- *No Action, maintaining the existing outfall as is*
- *Inspect, clean and rehabilitate existing outfall as necessary (note that an inspection was performed as a part of the planning process and the outfall was deemed to be in good condition)*
- *Move outfall offshore to about 28-ft deep water (MLW) west of the terminus of the dredged channel*
- *Move outfall further offshore to about 50-ft deep water (MLW) south of Penfield Reef.*

The location south of Penfield Reef was eliminated from consideration because the mixing at the site near the dredged channel was judged to be sufficient to not warrant the higher cost of an outfall to the south of Penfield Reef location. Planning level cost for cleaning and rehabilitating the existing outfall is estimated at $100,000 to $150,000. Planning level estimate for an extended to location near the terminus of the dredged channel is in the range of $200 million. Due to the improved effluent quality from the new West Side plant, ability to meet the requirements of the plant's NPDES permit, potential impacts to shellfish lease holders, cost, required permitting, and construction risks associated with the extended outfall, it is recommended that a new outfall pipe be deferred until the water quality conditions in the harbor can be assessed after the new treatment facility is operating.

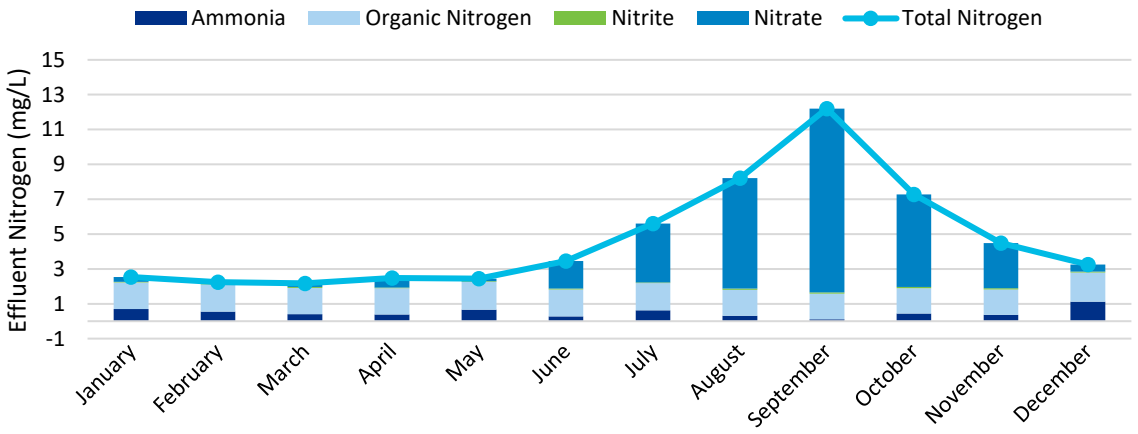
Public Comment 4 (Submitted via Email): From Peter D. Spain, MPH, Bridgeport Resident:

A. "If the proposed improvements are made, what is the expected change in the average nitrogen ppm to Cedar Creek and Black Rock Harbor -- on or around the first day of each month of the year?"

Response to 4A:

CDM SMITH / BRIDGEPORT WPCA RESPONSE: The existing West Side WWTP has not met the annual total nitrogen mass loading limit of 1,041 lbs/day over the last three years (2017-2019), ranging from an annual average load of 1,277 to 1,761 lbs/day. During this period the annual effluent Total Nitrogen (TN) concentration ranged from 8.5 to 10.6 mg/L (ppm). The proposed treatment plant improvements incorporating a four-stage nitrogen removal process with integrated fixed film activated sludge (IFAS) will increase the plant's capacity to achieve total nitrogen limits under all flow and load conditions and under all influent temperatures with an estimated annual average TN loading of 938 lbs/day (4.7 mg/L) in the design year (2050). Expected monthly TN from the West Side discharge is presented in the Figure 1 below. If supplemental carbon is added to the treatment process the annual load could be reduced to 664 lbs/day (3.4 mg/L). Understand, the results below are based on process modeling which is often conservative. Actual results could be even more favorable when the new treatment facility is put into operation.

Figure 1 - Projected Monthly Total Nitrogen Discharges from the West Side WWTP



B. "If the proposed improvements are made, what will be the maximum number of gallons a day that the Bridgeport WPCA can process at the West Side Plant? How much will this improvement and increased capacity cost?"

Response to 4B:

CDM SMITH / BRIDGEPORT WPCA RESPONSE: With a plant peak capacity of 200 mgd, the Bridgeport WPCA will be able to process 58 million gallons per day through primary and secondary treatment, and an additional 142 million gallons per day through the wet weather treatment system (preliminary treatment, primary treatment, and disinfection). The cost of the West Side WWTP upgrade and expansion, including engineering and contingencies, escalated to the midpoint of construction is $383 million. The cost of the West Side WWTP upgrade with a 90 mgd peak flow capacity is $297 million. There is an economy of scale realized with the increased plant capacity (that is, the 90 mgd facility equates to $3.3/gallon treated versus $1.9/gallon treated for the 200 mgd facility). The

$86 million differential between the two, plus the some anticipated collection system modifications (estimated between $20 and $60 million) result in a 50 percent reduction of CSOs in the West Side service area in a 1-year, 24-hour storm event, and the complete control 7 of the 19 CSOs in the service area (WORD, RAILS, TIC, CEM/MAPE, DEW, and SEAB), including two of the four CSOs that discharge into Black Rock Harbor. This cost differential can be compared against the estimated cost included in the CSO LTCP of $496 million (2020 dollars) to control all 19 CSOs in the West Side service area. It is our hope that subsequent to the construction and operation of the expanded and upgraded treatment facility additional collection system metering and modeling could be conducted to result in limited additional work, at a reduced cost, to control the remaining CSOs.

DEEP RESPONSE: In addition to the CDM Smith / Bridgeport WPCA answer, the City is not seeking to increase the Design Flow Rate from 30MGD. The plant would continue to function as it currently does during a storm: All flows during a storm up to 58MGD flow through the plant and are fully treated; Flows above 58MGD flow through a side stream that receives primary treatment and is disinfected before being recombined with the treated effluent and is discharged through the existing effluent pipe. This combined treated effluent must still meet all the requirements of the NPDES permit.

C. "Any thought to integrating the management of the plant and the environmental monitoring of the harbor with the adjacent Aquaculture Regional Magnet School?"

Response to 4C:

CDM SMITH / BRIDGEPORT WPCA RESPONSE: Yes. We believe that there could be significant synergy between the treatment facility on the West Side and the Aquaculture school. The proposed layout of the new administration, laboratory and control building faces the Aquaculture School to provide a welcoming connection between the two. The WPCA administration will be moved from the East Side to the West Side and it is anticipated that a new visitor/educational center will be incorporated into the lobby of the new control building to highlight the benefits of and need for wastewater treatment. The upgraded West Side WWTP will be a "plant of the future" with vastly improved treatment processes that can be highlighted and provide educational opportunities for individuals of all levels. There would appear to be value for both parties in a partnership with the aquaculture school.

D. "In line with, but adding to, point raised by State Rep Stafstrom during the Q&A: Has the draft proposed upgrade plan for the West Side plant to "potential 200[million gallons per day]" capacity (see the slides) been evaluated for its potential adverse impacts, in terms of noise and air pollution and daily/nightly nuisance, from the perspective of the next-door residents in the PT Barnum Apartments complex? If not, when will this evaluation take place, how long will it take, and how many public meetings will it include? How will members of the community know about this/these meeting(s)?"

Response to 4D:

CDM SMITH / BRIDGEPORT WPCA RESPONSE: The West Side WWTP site is extremely space limited. When evaluating site layouts for varying treatment plant capacities our designers were cognizant of the proximity of the adjacent apartment complex and considered how best to minimize impacts to the abutters, while also enabling the construction of the new treatment facility while maintaining operation of the existing facility. It is proposed that the new treatment plant headworks (influent pumping, screening and grit removal) be constructed on the northern portion of the site adjacent to the public housing complex.

The buildings proposed to abut the PT Barnum Apartments would be completely contained. Building openings facing the apartments will be limited to mitigate fugitive odors and noise. New odor control units will be provided to further reduce the impact of odors, and HVAC and other noise generating equipment will be designed to contain noise. In addition, landscaping along the northern property line will soften the visual impact of the new facility. The WPCA and our consultant welcomes further discussions with the neighborhood to refine and improve the design to further mitigate impacts. As the design develops 3D tools can be used to portray the new facilities from different vantage points at public meetings to be scheduled in 2021. CDM Smith and the WPCA conducted a site visit with State Representative Stafstrom and City Council member Scott Burns on November 12, 2020 to visit the location and further discuss the potential concerns.

E. "In line with, but adding to, point raised by State Rep Stafstrom during the Q&A: Does the plan include a way to extend the large pipe that now spills out, and for decades has spilled out, from the West Side plant into the harbor (just below the office building at Captain's Cove) and to run the pipe out of the harbor and into the Sound for significantly greater flushing/dilution of the plant's outflows? Like Fairfield's and other towns'. What would be the time and money required to do this?"

Response to 4E:

CDM SMITH / BRIDGEPORT WPCA RESPONSE: Please see the response to public comment 2D and 3B regarding the effluent outfall.

Public Comment 5 (Submitted via Chat during Public Meeting): From Peter D. Spain, MPH, Bridgeport Resident:

A. "For West Side plant upgrade: What will be expected life expectancy of this, if it is online around 2026?"

Response to 5A:

CDM SMITH / BRIDGEPORT WPCA RESPONSE: In general, for planning purposes, the life of new structures (buildings and concrete tankage) are expected to be 50 to 100 years, process equipment is expected to be 20 to 30 years, and electrical systems and

instrumentation and controls are expected to have a 15 to 20 year life. The design of the new facilities have considered expected sea level rise and all critical structures and equipment will be designed to protect against the 100-year flood elevation plus 3-feet.

Public Comment 6 (Submitted via Email): From Peter D. Spain, MPH, Bridgeport Resident:

A. "Thank you for the WPCA's presentation and public Q&A last night on the facility planning update for the two wastewater treatment plants in Bridgeport.

"It was good that the Zoom meeting could be resumed and completed."

"I would like to be sure that people in the community – especially those who either (A) prematurely left the Zoom meeting due to prurient piracy (AKA Zoom blitzing), or (B) could not attend the meeting but are interested – can access the excellent slides that CDM Smith presented last night."

Response to 6A:

CDM SMITH / BRIDGEPORT WPCA RESPONSE: The WPCA appreciates and acknowledges the feedback. The slides from the public meeting are included as an attachment to this memorandum. In addition, the entire report including an Executive Summary will be made available on the WPCA and CT DEEP websites.

Public Comment 7 (Submitted via Email): From Roger Reynolds, Senior Legal Counsel, Save the Sound

A. "We are writing to comment upon the Scoping for City of Bridgeport Facilities Planning for East Side and West Side Wastewater Treatment Plants. Save the Sound strongly urges a strong Environmental Impact Evaluation in full compliance with the Connecticut Environmental Policy Act ("CEPA") that will fully and comprehensively address the environmental problems of ongoing water quality impairments in Black Rock harbor due to nitrogen discharges and combined sewer overflows. We request that the following significant environmental impacts be studied in substantial detail: (1) the impact of the continuing nitrogen discharge onto Black Rock Harbor, (2) requiring monitoring of the harbor system going forward to fully understand the environmental impacts and necessary actions, (3) a full evaluation of alternatives to address the negative impacts from the discharge including additional nitrogen treatment and relocation of the discharge pipe, (4) a full analysis of whether, and to what extent, the upgrades can shorten the amount of time to implement the Long Term Control Plan for combined sewer overflows,(5) whether and to what extent there is opportunity to capture combined sewer overflows above and beyond the proposed 280 MGD, (6) whether the upgrades will violate a DEEP Consent Order, and (7) whether and to what extent the Consent Order non-compliance will impact the environment."

"Finally, we would note that the responses to these and other comments should be addressed BEFORE DEEP receives and/or approves any facilities plan or moves forward with it under the Consent Order. If that did not occur, this would be a cynical

and meaningless exercise, and frustrate the letter and spirit of CEPA as well as the public's ability to understand and to influence these plans."

Response to 7A:

CDM SMITH / BRIDGEPORT WPCA RESPONSE: Please see the WPCA's responses to the above concerns as outlined in Public Comments 7B through 7E.

B. "The City of Bridgeport should address the impact of the continuing nitrogen impact on Black Rock Harbor including long term monitoring of the system and a full evaluation of alternatives to address the activity causing or contributing to such impairment."

"Under CEPA, C.G.S. Sec. 22a-1b, for an action significantly impacting the environment, an Environmental Impact Evaluation must provide a "detailed written evaluation of its environmental impact" and alternatives to avoid or mitigate environmental impacts. Thus, under law, the various environmental impacts, as detailed below, and alternatives to address them must be thoroughly studied."

"Black Rock Harbor is a severely polluted and impaired water body according to the 2020 Integrated Water Quality Report issued by DEEP pursuant to the federal Clean Water Act. It does not support aquatic life, recreation or shell fishing. Causes of these impairments include the nitrogen discharge from the pipe as well as combined sewer overflows, each of which are impacted by this project. According to a 2016 study of embayment's across Connecticut, approximately 95% of the nitrogen impairment for Black Rock Harbor can be directly attributed to the sewage treatment plants. (Vaudrey, J. M., Yarish, C., Kim, J. K., Pickerel, C., Brousseau, L., Eddings, J., & Sautkulis, M. (2016). Comparative analysis and model development for determining the susceptibility to eutrophication of Long Island Sound embayment's. Connecticut Sea Grant Final Project Report, 38.)"

"Under the Clean Water Act and Connecticut law, it is illegal to maintain a discharge that causes or contributes to a violation of water quality standards. The Environmental Impact Evaluation must document (1) whether and to what extent the water quality is impaired, (2) whether and to what extent the discharge from the plant and the combined sewer overflows are causing and contributing to this impairment and (3) the measures available to address these impairments."

"To do this effectively, DEEP should require a period of long-term monitoring of the harbor. Because this project is explicitly designed to address this impairment, it should include long term modeling of such impairment and its causes to fully understand the dynamics of the waterbody and how it should be addressed."

"The second thing that needs to be addressed is the evaluation of alternatives that would address this impairment. With respect to the aquatic life and dissolved oxygen impairments, the nitrogen discharge from the sewage treatment plant should be fully addressed. The two most obvious alternatives would be (1) the additional treatment of nitrogen from the pipe and (2) the relocation of the pipe such that it is not discharging into the inner harbor. The analyses should include whether and to what extent each of

these would address the impairment and any other measures that might be necessary or feasible."

Response to 7B:

DEEP RESPONSE: It has already been determined that an EIE will be prepared for the project. The effluent must meet the NPDES permit standards and in doing so is considered to not impair the water quality that already exists with the current exception of Nitrogen. The wastewater treatment plant is required to address the Nitrogen shortfall. The harbor is monitored by several groups and the information that has been shared with DEEP is available through the Water Quality unit. In addition, there will be targeted monitoring and modeling done on each embayment along the Long Island Sound. However, none of that affects the current permit or the standards used to determine the requirements of the upgrade. The Nitrogen requirements are being addressed in the upgrade with the added benefit of removing the first storm flush from the 4 remaining CSOs in Black Rock Harbor which will removed non-source point Nitrogen.

C. "The City of Bridgeport should more fully document what alternatives are available to speed up the implementation of the Long-Term Control Plan and how those alternatives will impact water quality in Bridgeport"

"Combined sewer overflows from the West and East side plants are also causing and contributing to the impairments and impeding recreation and shell fishing. On page 14 of the PowerPoint presented at the scoping meeting, entitled, "Upgraded Plants Will Provide CSO Reduction" there is a chart indicating that the facilities plan may lead to a more gradual reduction in CSOs over time, rather than a sudden reduction once a tunnel is constructed in 2040. This chart is unclear and confusing on many levels. First, it is unclear why the assumed level of CSO capture, 280 MGD, would not accelerate the time in which the CSOs are reduced to the level of the one-year storm. In both scenarios, it would not be until 2040 until the CSOs were reduced this substantially. Accelerating the time to eliminate these CSOs would have a huge environmental impact and thus, under law, must be studied as an alternative. Moreover, it is not clear from a logical basis why, if a final tank will no longer have to be constructed, the time frame to reduce the CSOs would not be substantially shortened. This should be fully explored including all of the environmental benefits that such an acceleration in time frame would entail."

"While the City stated, in the scoping meeting, that it did not feel that it had to address this because this project was not necessarily designed to decrease combined sewer overflows, such reduction is clearly a major environmental consequence of this action. Indeed, the ability to address CSOs and the extent to which they will be addressed take up several pages of the presentation. A full analysis of this issue must include the various alternatives to use this extra storage to accelerate the time schedule to complete the CSO reductions."

"Second, if the west side upgrades won't be completed until 2026 and the East Side upgrades not until 2030, it is unclear why it shows a gradual decrease until that time, instead of a sudden drop once those projects are completed."

"Finally, it is unclear how the 200 and 80 MGD storage capacities were reached. The EIE should set out other alternatives, such as having even more capacity for CSOs, along with their feasibility and environmental benefits."

Response to 7C:

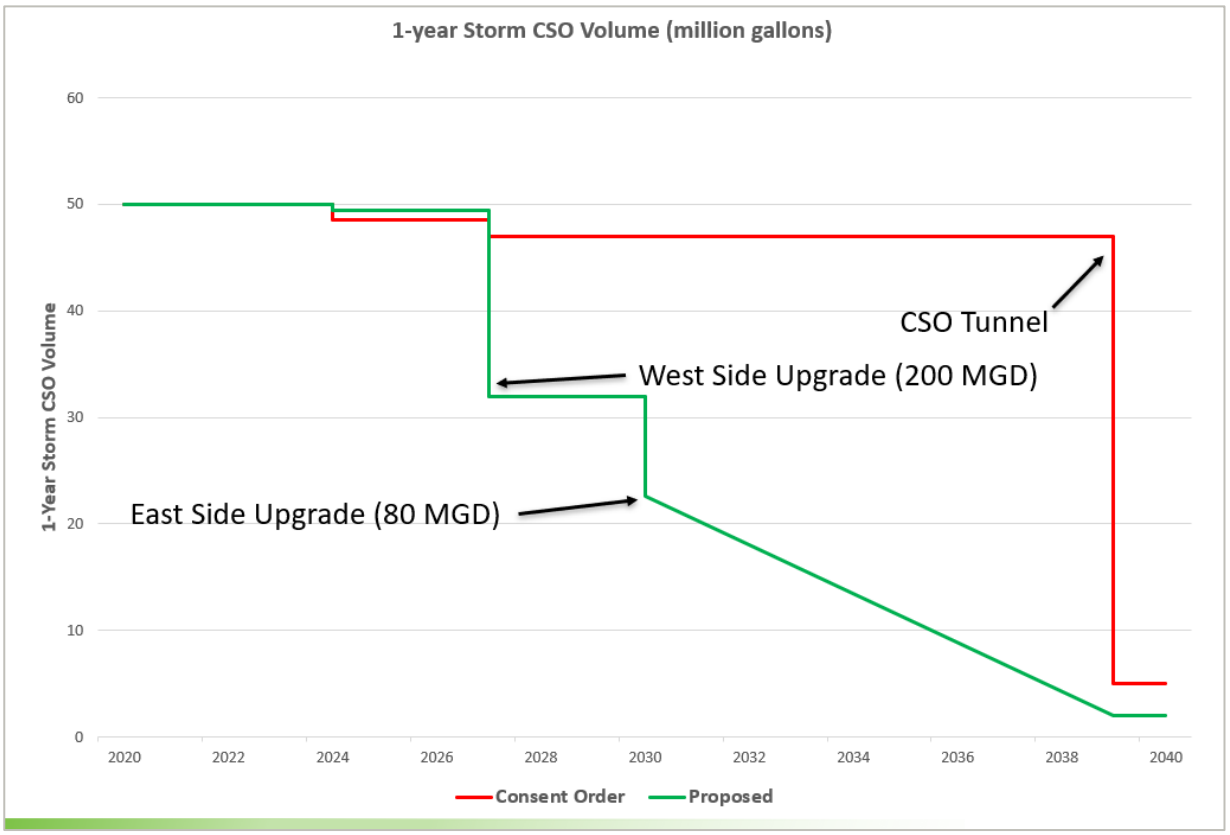
CDM SMITH / BRIDGEPORT WPCA RESPONSE: The WPCA contracted with CDM Smith to prepare the Wastewater Treatment Plant Facilities Plan as required by the Administrative Order. The goal of the facilities plan was to assess both treatment plants and develop a long-term vision of the capital needs of the facilities to improve the performance and reliability of the treatment facilities over the 30-year planning period. The plan was also designed to dovetail with the recommendations in the CSO Long Term Control Plan (LTCP) and provide a holistic view of the collection and treatment systems to result in the most cost-effective, timely solutions to improve water quality in the receiving waters. Early in the planning process CDM Smith recognized that the Bridgeport collection system had the capability of conveying much more flow to the treatment facilities than the treatment facilities can currently accept. In addition, surprisingly, the CSO Long Term Control Plan (prepared by others) did not assess increasing the capacity of the two plants as a means of controlling CSOs nor did it consider the cost to upgrade the plants. As a part of the wastewater treatment facilities plan, CDM Smith then assessed, through collection system modeling, the impact of increased plant capacity on CSO reduction. This assessment, as documented in the Facilities Plan, revealed that increasing the plant capacity had a profound impact on the reduction of CSOs (over 50 percent) and could be implemented, cost-effectively, as part of the treatment plant upgrades, to reduce CSOs in a more timely fashion.

The WPCA agrees that the graph originally presented in the public meeting did not accurately represent the benefits of increasing the plant capacity. A revised version of this graph is included below. The full CSO benefit of the increased plant size will not be seen until the WWTP construction is completed, at which point the WWTP can treat a larger peak flow, and thus reduce the volume of CSO in the 1-year, 24-hour design storm. After the completion of the East Side WWTP upgrade, more than half of the CSO volume is eliminated during the 1-year storm.

The WPCA is under a CSO consent order to abate all CSOs to 1-year level of control by 2039. The gradual decrease from completion of the East Side WWTP until 2039 represents the removal of the remaining CSO volume in the system to reach the 1-year control level as defined in the order. This decline would not be provided by the WWTPs but instead would need to be achieved through collection system improvements, such as sewer separation or other methods, that have yet to be fully defined or scheduled. Because of the complexity of the combined sewer collection system, we recommend additional metering and modeling subsequent to the construction of the expanded treatment facilities to better understand how to best control the remaining CSOs.

In assessing treatment plant capacities, the wastewater Facilities Plan assessed peak flow capacities of 80, 90, 140, 180 and 200 mgd at the West Side Plant and 35, 40, 60 and 80

mgd at the East Side plant. The recommended 200 and 80 mgd peak flow capacities of the two plants, represented the most cost-effective capacities to enable the reduction of CSOs. These values were reached through hydraulic modeling to determine the flow that could reach the WWTPs and the commensurate reduction of CSOs. Currently the West and East Side WWTPs can pump and treat a maximum of approximately 80 and 35 mgd, respectively. However, the collection system can deliver 200 and 80 mgd to the plant during larger storms. Today, flow to the two plants is restricted by partially closing the influent gates to avoid flooding of the influent pumping. When the influent gates are partially closed, the collection system backs up, ultimately resulting in CSO discharges.



Updated Chart from Slide 14 of the Public Meeting Slides

DEEP RESPONSE: Regarding the upgraded graph, the first bump down is due to collection system improvements that are in process and not part of this facility plan.

D. "The EIE must address whether and to what extent the facilities plan complies with orders issued by DEEP and, if not, what impact such non-compliance will have on the environment."

"A consent order entered by DEEP on March 1, 2019 required the West and East side plants to be fully upgraded no later than 2739 days after the date of the order which occurs in late 2026. This was to address the discharge and the impairment to Black Rock Harbor and Long Island Sound. Yet the scoping power point, with no explanation,

puts the completion date of the East Side plant at 2030. The EIE must explain whether and to what extent this complies with the Consent Order and, if not (as it appears), what the impact of that non-compliance will be, and the alternatives available to remedy this."

Response to 7D:

CDM SMITH / BRIDGEPORT WPCA RESPONSE: The Administrative Ordered schedule for the wastewater treatment plants is summarized in the table below:

Date	Action
On or before November 30, 2020	Submit Facilities Planning Report
On or before May 31, 2022	Submit 100% design plans and specifications for WWTP upgrades
No later than August 2023	Commence construction of remedial actions
No later than August 2026	Complete construction of remedial actions

The Facilities Planning Report has been submitted in accordance with the schedule. Based on the information presented in this Facilities Plan, the WPCA will be requesting a modification to the design and construction project schedule to accommodate the significant amount of work that is necessary to mitigate current issues at both plants and the significant impacts on sewer use rates to the citizens of Bridgeport.

First, it is proposed that the design and construction of the two facilities occur sequentially, versus concurrently as presented in the Administrative Order. All previous projects, whether large or small, conducted for the WPCA occurred sequentially to enable the limited resources at the WPCA to provide adequate and timely input and review of the design documents and construction issues, and to better manage the costs incurred by the WPCA. It is proposed that the construction at the West Side Plant commence first, followed by the construction at the East Side Plant.

Second, because of current difficulties securing SRF funding for design, it appears that the design start will be delayed. Previously, a December 2020 start date was anticipated.

Lastly, the Administrative Order proposed a three-year (36 month) construction duration. Given the complexity of the improvements, especially regarding maintenance of plant operations during construction and the need to get certain systems up and running before others can be decommissioned and demolished to make room for new facilities, a minimum 42-month construction schedule, and more likely at least 48 months will be necessary.

Based on these factors, a revised schedule is proposed. As presented, the West Side WWTP upgrade and expansion will be completed one year after the original construction

date presented in the Administrative Order. The East Side WWTP will be completed by the end of 2029. Achieving these milestones will require SRF funding in addition to timely reviews and approvals of submittals by the CT DEEP.

DEEP RESPONSE: While expediency is always desired, DEEP must factor in affordability. This City will make its pitch for a longer timeframe and DEEP will consider the effect(s) to the environment and the ability of the users to pay in addition to other criteria spelled out in the EPA Affordability Analysis documents.

E. "These and other comments should be considered and addressed BEFORE DEEP approves the proposed facilities plan"

"This should be obvious, but before approving any facilities plan that would have a significant impact on the outstanding DEEP consent order or the Long Term Control Plan, DEEP and/or the City of Bridgeport should address these and other comments received through the scoping process. Otherwise, this would be a meaningless and cynical exercise, violating both the spirit and the letter of the Connecticut Environmental Policy Act."

Response to 7E:

CDM SMITH / BRIDGEPORT WPCA RESPONSE: The WPCA agrees with this sentiment. Addressing concerns of customers and the public is a priority. We believe that this Facilities Plan recommends improvements at each WWTP that will provide great environmental benefit for years to come, while also being mindful of our rate payers and what is affordable at this time.

DEEP RESPONSE: There are a few more steps before approval can occur including the response to comments, post-scoping of the initial planning post, completion and scoping of an EIE and then making a final determination and post-scoping. Once all these steps are completed, then DEEP will determine whether to approve the plan or not.

Public Comment 8 (Submitted via Email): From Suzanne Murray, Bridgeport Resident:

A. "I am writing to you to express my support to upgrade plans for the West End Treatment Plant as soon as possible. Damage done by excess nitrogen and the fecal bacterial pollution is obvious as our health and our water quality are put at risk every day. Further, it contributes to Cumulative ecological damage that must not be ignored."

"The good news: It is a SOLVABLE problem. We must eliminate all CSOs as part of our overall resiliency planning to adapt to the imminent changes that global warming brings. Doing this NOW is the right step for our water and earth neighborhoods and for our planet."

Response to 8A:

CDM SMITH / BRIDGEPORT WPCA RESPONSE: The WPCA appreciates and acknowledges the feedback.

Public Comment 9 (Submitted via Email): From Tim Kendzia:

A. "I read about the scoping notice for facilities planning for Bridgeport's wastewater treatment plants."

"I'm very interested in staying updated on this and other coastal infrastructure projects in the state. I have two comments and a question on this project."

"I think that an anaerobic digester should be considered for this project, especially if consolidation is being proposed. I am not the most well versed in the capacity requirements, but I think generally an anaerobic digester needs a large population base to contribute several millions of gallons per day to be efficient. Bridgeport, being the largest municipality in the state, ought to meet the sizing requirements for an anaerobic digester. The benefits of anaerobic digestion can include odor control, a reduction in nutrient effluent, and biogas production. Biogas can be used directly to power generators onsite, or it can be converted into hydrogen gas and usable in fuel cell applications. Surely the WWTP has some form of on-site generation in the case of emergencies, but with a biogas generator it can reduce its use of fossil fuels and increase the projects ability to function during storm events."

Response to 9A:

CDM SMITH / BRIDGEPORT WPCA RESPONSE: Anaerobic digestion was evaluated as part of the facilities planning process. It was not included in the recommended improvements due to the space limitations at the West Side WWTP site and added cost and operability of the system. The most pressing needs at this time are water quality improvements, so at this time the primary focus is the liquid treatment train. It is recommended that the facility continue to truck thickened sludges off-site for disposal.

B. "The second comment is in regard to preserving and enhancing natural infrastructure along the coast. The project must be consistent with the Connecticut Coastal Management Act which calls for ""feasible, less environmentally damaging alternatives" to flood and erosion control structures. Among the alternatives is to consider moving the infrastructure further landward. As both the plants are located adjacent to the coast, they both will be at heightened risk of flooding via storm surge. Flooding the WWTPs would be an extreme risk to public health and the environment. To mitigate the risk, these facilities either can be surrounded by protective infrastructure (potentially nature-based such as living shorelines, or the facilities can be relocated further inland. I propose that for the scoping of this project that relocation is given serious consideration as an alternative."

"My question is related to sea-level rise forecasting. I am curious what the planning horizon is for this project and to what height sea level rise is being planned for."

Response to 9B:

CDM SMITH / BRIDGEPORT WPCA RESPONSE: Relocation or consolidation of both WWTPs was evaluated during the facilities planning process. Through this evaluation, relocation

and/or consolidation of the plants was determined to be infeasible. Bridgeport is heavily developed City, with few, if any, open areas available for construction of a new WWTP. The recommendation to relocate either or both facilities would certainly delay implementation due to the expected push-back from parcels and neighborhoods adjacent to the proposed site. Additionally, relocation of either WWTP would require extensive collection system alterations to convey the flow to the new site for treatment. The relocation or consolidation of WWTPs was determined to not be infeasible at this time.

Due to both the treatment plants' proximity to the Long Island Sound, tidal flooding occurs at the plant sites during intense storms and hurricanes. Tidal flooding is typically the result of several factors such as tidal fluctuation, intense rainfall (which cannot drain from the sites when tides are high) and wind driven coastal storm surge. With the current threat of sea level rise, TR-16 design guidelines were revised in 2016 to incorporate significant modifications to flood protection and resiliency. This includes requiring existing treatment plants that are planned for upgrade or expansion be improved to the maximum extent possible to meet the following flood protection criteria:

Provide for uninterrupted operation of all units during conditions of a 100-year (1% annual chance) flood, and

Be placed above or protected against the structural, process and electrical equipment damage that might occur in an event that results in a water elevation above the 100-year (1% annual chance) flood.

Critical equipment should be protected against damage up to a water surface elevation that is 3 feet above the 100-year flood elevation

Non-critical equipment should be protected against damage up to a water surface elevation that is 2 feet above the 100-year flood elevation

The planning horizon for these projects was 30 years. The above criteria were the planning basis for this Facilities Plan and will be adhered to in the final design of these facilities.

Public Comment 10 (Submitted via Email): From Brad Burns-Howard, Bridgeport Resident:

A. "Does the plan include a way to extend the large pipe that now spills out, and for decades has spilled out, from the West Side plant into the harbor (just below the office building at Captain's Cove) and to run the pipe out of the harbor and into the Sound for significantly greater flushing/dilution of the plant's outflows? Like Fairfield's and other towns'."

"The answer last night: No. The consultant engineer suggested that the costs for that pipeline would be hard to cover in addition to the costs for the planned major overhaul to the two plants."

"These "costs for that pipeline" should be specifically identified in relation to the costs of the existing plans and publicized to Bridgeport residents, as well as Fairfield County and Connecticut residents who are adversely affected by poor quality water as a result

of effluent discharges into Long Island Sound."

"With the additional costs identified, residents and voters will be able to bring educated public opinion to bear on city, county and state officials and force them to FIND THE MONEY!"

Response to 10A:

CDM SMITH / BRIDGEPORT WPCA RESPONSE: Please refer to responses to Comment 2C, 2D and 3B.

Attachment I

DEEP Facility Plan Approval Letter

Connecticut Department of
ENERGY &
ENVIRONMENTAL
PROTECTION

79 Elm Street • Hartford, CT 06106-5127 www.ct.gov/deep Affirmative Action/Equal Opportunity Employer

FACILITY PLAN APPROVAL

December 10, 2021

Honorable Joseph P. Ganim
City of Bridgeport
999 Broad Street
Bridgeport, CT 06604

Re: Facilities Plan for the West and East Side Wastewater Treatment Plants
CWF-734PG

Dear Mayor Ganim:

The engineering report titled *Facilities Plan for the West and East Side Wastewater Treatment Plants* dated November 2020 and prepared for the City of Bridgeport by CDM Smith has been reviewed by the Department of Energy and Environmental Protection (DEEP). This report complies with the DEEP Bureau of Water Protection and Land Reuse Administrative Order No. AOWRMU19001, fulfilling the requirement of Step B.1.b of the Order in submitting a Facilities Planning report by November 30, 2020.

In accordance with the requirements of Section 22a-482-3 of the Regulations of Connecticut State Agencies, the report is hereby approved. This letter represents final approval of this document.

This APPROVAL does not relieve you of the obligation to obtain any other authorizations as may be required by Federal, State or Local laws or regulations.

If you have any questions relative to this matter, please contact Christopher Falk at christopher.falk@ct.gov.

Sincerely,

Graham J. Stevens, Chief
Bureau of Water Protection and Land Reuse

GS/cpf

cc: Lauren McBennett Mappa, Bridgeport WPCA
Joseph L. Laliberte, CDM Smith
Daniel R. Murphy, CDM Smith