

City of Portsmouth, NH

Wastewater Master Plan

Work Plan

Prepared by: Weston & Sampson, Inc. / Brown and Caldwell

The City of Portsmouth has undertaken this Wastewater Master Plan (WMP) in response to the denial of the 301(h) waiver from secondary treatment at the Peirce Island Wastewater Treatment Facility (WWTF). The denial of this waiver necessitates the revisiting of the City's long-term comprehensive planning for not only its two wastewater treatment facilities (WWTFs) – the advanced-primary Peirce Island WWTF and the secondary Pease Development Authority (PDA) WWTF - but for the abatement of its three remaining Combined Sewer Overflows (CSOs) as well. Thus, the WMP encompasses the elements of two distinct planning programs: a Wastewater Treatment Facilities Plan Update (WWTFP) and a CSO Long-Term Control Plan Update (LTCP). Because the planning will consider possible flow shedding, or re-direction, between the WWTFs and/or other sites, and problem areas within both the combined and separately sewered areas, all aspects of the City's wastewater infrastructure will be addressed in the WMP.

This Work Plan outlines the tasks to complete the comprehensive wastewater facilities plan and update to the LTCP to allow the selection of the most environmentally sound, sustainable and cost effective solution to meet current and foreseeable water quality standards.

Public participation as discussed in Task 11 of this Work Plan will be critical to the selection, acceptance and implementation of the final option. Public meetings will be held through-out the development of the WMP to both solicit input and present results. The City's Web site will be used to post meeting schedules as well as interim reports which will allow interested parties to track the progress of the WMP.

This study will be conducted in a manner consistent with the New Hampshire Department of Environmental Services State Revolving Fund loan program to maximize the grant and loan eligibility of the selected option. In addition, this study will look at means of reducing the financial impact to the users by identifying regional opportunities that may help reduce the capital cost to the current users. These opportunities such as regional septage, biosolids, and fats oils and grease (FOG) treatment (Tasks 3.4 and 3.5) may be incorporated into a new WWTF at an economy of scale which would reduce the cost to the regional players while at the same time contributing to the funding of a new WWTF.

The WMP will be undertaken by the following project team:

- ***Client: The City of Portsmouth, New Hampshire***
- ***Planning Consultant Team: Weston & Sampson and Brown and Caldwell***
- ***City Advisory Consultant: Underwood Engineers, Inc.***

Task 1. Define Study Parameters And Develop Project Boundaries

The purpose of this task is to identify project parameters and to set the boundaries of the WMP. The parameters to be identified include geographic boundaries, political boundaries and public participation boundaries.

1.1. Three (3) meetings with project team will be held to define WMP parameters. The following subtasks will be performed:

1.1.1. Identify Study Area based on geographic and political boundaries.

1.1.2. Identify alternative wastewater treatment facility (WWTF) sites.

1.1.3. Identify regional communities that may be included in the Study Area. The Study Area identified in Task 1.1.1. may be modified based on the results of this Task.

1.1.3.1. Review the New Hampshire Seacoast Regional Wastewater Management Study and identify stakeholders.

1.1.3.2. Hold informal meetings with the City and officials from area communities to introduce the project.

1.1.4. Regional involvement may include the following entities:

- | | |
|-----------------|---|
| • Newcastle | • Greenland |
| • Rye | • Pease Development Authority |
| • Newington | • The Seacoast Regional Wastewater Management Study |
| • North Hampton | |

1.1.4.1. Perform a preliminary evaluation of need for the disposal of wastewater, biosolids, septage and fats, oils and grease (FOG) from surrounding communities.

1.1.4.2. In addition, other communities in the Seacoast Region may be included in the study for the purposes of providing regional biosolids, septage and fats, oils and grease (FOG) services in the context of WWTF capacity.

1.2. Define planning horizons for the WMP. Consideration will be given to equipment and structure life, land requirements and build-out conditions.

1.3. Define sustainability goals for the WMP based on the City's Global Master Plan and discussions with the City.

Task 2. Regulatory Requirements Review

The purpose of this task is to review current regulatory requirements including permits, guidance documents, etc. and to identify regulatory agency requirements that will be imposed on the City for both the WWTFP and LTCP Updates.

2.1. Review pertinent EPA and NHDES documents and correspondence that are in the City's possession, including the following:

- 2.1.1.1. Current NPDES permit*
- 2.1.1.2. Current Consent Decree (or modification there to)*
- 2.1.1.3. Pending Administrative Order*
- 2.1.1.4. New Consent Decree*

2.2. Review EPA and NHDES WWTFP and LTCP Requirements and Guidance Documents.

2.3. Prepare for, coordinate and attend up to two (2) regulatory requirements meeting with EPA and NHDES to review and establish:

- 2.3.1. Administrative Order and or Consent Decree findings, technical requirements, and schedule.*
- 2.3.2. WWTF Issues*
 - 2.3.2.1. Site permitting issues, and*
 - 2.3.2.2. Outfall permitting requirements and modeling requirements*
 - 2.3.2.3. Possible future, more stringent effluent limitations (i.e. total Nitrogen)*
- 2.3.3. CSO LTCP*
 - 2.3.3.1. CSO LTCP requirements*
 - 2.3.3.2. Applicable water quality standards*
 - 2.3.3.3. Pollutants of concern*
 - 2.3.3.4. Control levels for treated CSO discharges (i.e., Presumptive or Demonstrative Approach per 1994 EPA CSO Control Policy)*

2.3.3.5. *Treatment levels for satellite and/or primary-bypassed CSO discharges (i.e., will bypassing be allowed or will blending be required)*

2.3.3.6. *How compliance will be established*

2.4. Develop a regulatory requirements technical memorandum (TM) summarizing the findings of the above tasks.

2.4.1. *Provide a draft of the TM to the City for review.*

2.4.2. *Meet with City to review Draft TM and solicit comments.*

2.4.3. *Finalize Draft TM and submit to the City for submittal to NHDES and EPA.*

Task 3. Flow And Loads Forecasting

The purpose of this task is to forecast wastewater (dry weather) and stormwater (wet weather) flows and pollutant loadings for use in the planning process. Data outside of the Study Area will only be sought and evaluated if the wider regional biosolids, septage and FOG concept advances in the planning process.

3.1. Current sewered flows will be established based upon current zoning and the following efforts:

3.1.1. *Evaluate past reports, pump station flow records, WWTF records, collection system metering and CSO flow records..*

3.1.1.1. *Review and recommend, as necessary, improvements to data collection activities.*

3.1.2. *Collect, develop, and evaluate data to support development of flow including population data, water use records, land use, sewered area, basin boundaries, etc..*

3.1.3. *Define and determine wastewater generation rates for residential, commercial, and industrial customers.*

3.1.4. *Update existing report data summaries to current conditions based on the above tasks.*

3.2. Septic flows and septic system failures will be identified to evaluate the need for increased septage receiving capacity within the Study Area and the need for sewer system extensions within the Study Area to areas with failed septic systems.

- 3.2.1. *Estimates of biosolids generation, septage and FOG disposal needs from surrounding communities based on site visits and interviews with their WWTF staff, public works directors, DES staff and other appropriate parties.*
- 3.2.2. *Evaluate need for regional septage disposal based on:*
 - 3.2.2.1. *Septage receiving records for the Pease WWTF and WWTFs in communities within the Study Area.*
 - 3.2.2.2. *Informal interviews with commercial septage haulers that service the Study Area.*
 - 3.2.2.3. *Discussions with NHDES officials.*
- 3.2.3. *Review City records to quantify reported septic system failures.*
- 3.2.4. *Implement a septic system survey throughout the Study Area in areas where sewer system extensions tributary to the City's collection system are feasible to document need and establish funding eligibility.*
- 3.2.5. *Provide GIS data mapping information to City identifying septic system problem areas.*

3.3. Future sewered flow projections will be developed based upon current zoning and the following:

- 3.3.1. *Review open space availability based on the City's GIS system, Tax maps and available reports.*
- 3.3.2. *Attend two (2) meetings with City's Planning Department to determine areas of planned and potential sewered growth.*
 - 3.3.2.1. *Review proposed changes in zoning*
- 3.3.3. *Attend five (5) meetings with regional communities to determine areas of potential sewered growth outside the City of Portsmouth, and within the Study Area defined in Task 1.*
- 3.3.4. *Develop up to four (4) growth forecasts for the Study Area. These forecasts will be based on available growth data for the City, adjacent communities, and available regional planning efforts. Forecasts will include:*
 - Current baseline conditions
 - 20-year forecast
 - 50 year forecast
 - Build-out conditions

- 3.3.5. *Develop up to four (4) flow/load forecast models based on the above tasks for various growth scenarios.*
- 3.3.6. *Develop a TM summarizing flow and load projections based on the above Task 3 efforts.*
 - 3.3.6.1. *Provide a draft of the TM to the City for review.*
 - 3.3.6.2. *Meet with City to review TM and solicit comments.*
 - 3.3.6.3. *Finalize TM and submit to the City.*
- 3.4. The need for a biosolids handling facility within the Study Area, will be evaluated based on current biosolids production and disposal methods.**
 - 3.4.1. *Establish regional biosolids generation projections based on growth forecasts, utilizing current conditions as a base line.*
 - 3.4.2. *Determine biosolids handling capacities at WWTF's within the Study Area based on available data and evaluate the potential for regional biosolids handling.*
 - 3.4.3. *Develop a TM summarizing the need for regional biosolids handling based on the above tasks.*
 - 3.4.3.1. *Provide a draft of the TM to the City for review.*
 - 3.4.3.2. *Meet with City to review TM and solicit comments.*
 - 3.4.3.3. *Finalize TM and submit to the City.*
- 3.5. The need for a regional FOG handling facility within the Study Area will be evaluated based on current FOG receiving and disposal methods.**
 - 3.5.1. *Establish regional FOG disposal projections based on growth forecasts, utilizing current conditions as a base line.*
 - 3.5.2. *Determine FOG handling capacities at WWTF's within the Study Area based on available data and evaluate the potential for regional FOG handling.*
 - 3.5.3. *Develop a TM summarizing the need for regional FOG handling based on the above tasks.*
 - 3.5.3.1. *Provide a draft of the TM to the City for review.*
 - 3.5.3.2. *Meet with City to review TM and solicit comments.*

3.5.3.3. *Finalize draft TM and submit to the City.*

Task 4. Collection System Evaluation

The purpose of this task is to establish a base line for system performance for dry weather and wet weather flows within the current collection system and to project the impact of future flows on the collection system. The evaluation will be used as part of the development of the LTCP Update portion of the WMP.

4.1. Conduct field observations during up to three (3) significant storm events with City personnel to confirm problem areas.

4.1.1. Review existing mapping and other pertinent data regarding known problem areas.

4.1.1.1. Document findings for incorporation in to Sewer System Model.

4.2. Develop a flow/rain monitoring program to supplement the current program, if needed, for the purposes of both compliance monitoring and the Sewer System Model update.

4.2.1. Meet with City and review data on current flow monitoring programs.

4.2.1.1. Evaluate current data collection efforts and recommend the following additional data collection methods, as required:

4.2.1.2. To supplement existing data, identify up to 12 metering sites, up to six (6) groundwater monitoring sites, and up to three (3) rain gauge locations throughout the collection system.

4.2.1.3. Install, operate and maintain flow meters and rain gauges, including data logging devices, for a period of up to 12 months.

4.2.1.4. Install, operate and maintain piezometers and data logging devices for a period of up to 36 months.

4.2.1.5. Analyze and process data on a monthly basis and make recommendations for changes, as appropriate.

4.3. Review historical regulatory compliance for the combined system.

4.3.1. Confirm CSO control goals as established by NHDES and EPA in Task 2.

- 4.3.2. *Assess compliance and success of current Nine Minimum Controls (NMC) implementation efforts.*
- 4.3.3. *Determine if additional activities to augment the NMC are warranted.*
- 4.3.4. *Evaluate success of recent abatement efforts.*
 - 4.3.4.1. *Incorporate representative flow data provided by the City for targeted sewer separation areas, pump station upgrades, and system optimization efforts into the Sewer System Model.*
 - 4.3.4.2. *Use the Sewer System Model to identify benefits of recent CSO abatement efforts.*
- 4.3.5. *Develop a TM summarizing the CSO abatement efforts and modeled benefits.*
 - 4.3.5.1. *Provide a draft of the TM to the City for review.*
 - 4.3.5.2. *Meet with City to review TM and solicit comments.*
 - 4.3.5.3. *Finalize TM and submit to the City.*

4.4. The existing Sewer System Model will be updated based on current flow data and hydraulic conditions will be confirmed.

- 4.4.1. *Sewer sub-systems will be added to the Sewer System Model, as needed, to establish baseline conditions by further refining hydraulic conditions and to evaluate flow shedding and re-direction options as detailed in later tasks.*
- 4.4.2. *Review historic data and information on the physical characteristics of the collection system facilities.*
 - 4.4.2.1. *Review available inspection and television reports, as necessary, to verify existing conditions and identify additional needs.*
 - 4.4.2.2. *Recommend additional inspection needs that may be warranted.*
 - 4.4.2.3. *Review City's sewer rehabilitation program and targeted sewer separation efforts to date.*
- 4.4.3. *Update hydrological data to:*
 - 4.4.3.1. *Characterize I/I in sanitary system*

4.4.3.2. *Develop "desk top" summary of extraneous flows using the last 4 years of available data.*

4.4.3.3. *Compile available rainfall, CSO, collection system and WWTF flow data and evaluate*

- Dry and wet weather WWTF hydraulic loadings
- Dry and wet weather pump station flows
- Current wet weather percent capture and CSO volumes
- Duration and frequency of occurrence
- Minimum storm event which triggers CSOs
- Annual, seasonal and monthly statistics of CSO events

4.4.4. *Update combined Sewer System Model to reflect recent modifications.*

4.4.4.1. *Calibrate model to reflect existing conditions and generate a baseline model.*

4.4.5. *Evaluate hydraulic impacts of current planned and potential growth within City and regionally.*

4.4.5.1. *Based on the results of Task 3, incorporate selected regional planning data into the Sewer System Model.*

4.4.5.2. *Based on the results of Task 3, incorporate three (3) of the growth forecasts into the Sewer System Model to identify hydraulic restrictions and potential CSO impacts.*

4.4.6. *Develop a TM summarizing the baseline Sewer System Model and growth forecast impacts.*

4.4.6.1. *Provide a draft of the TM to the City for review.*

4.4.6.2. *Meet with City to review TM and solicit comments.*

4.4.6.3. *Finalize Draft TM and submit to the City.*

4.5. Evaluate the impacts of CSOs on receiving water quality.

4.5.1. *Review previous water quality data and projects from the 2005 LTCP Update and more recent reporting, if available, and determine if the water quality objectives are still attainable from a regulatory perspective.*

4.5.2. *Depending on the results of the above tasks, the need for additional ambient water quality analysis will be recommended. This effort is not included in this Scope.*

Task 5. Alternatives Evaluation

The purpose of this task is to evaluate the full range of alternatives necessary to meet regulatory compliance including potential nutrient limits (i.e. total Nitrogen). This evaluation will conform with DES funding requirements and will evaluate a full range of alternative processes, technologies and practices for the WWTP and LTCP Updates.

5.1. Select decision-making process and decision making criteria.

5.1.1. Prepare for and coordinate one (1) workshop for selection.

5.1.1.1. Submit TM summarizing decision making process and selection criteria to City for comment

5.1.1.2. Meet with City to discuss TM and modify as necessary.

5.1.1.3. Submit Final Draft TM to City

5.2. Public outreach meeting to discuss technologies, in concert with Task 11.

5.3. Perform environmental and societal evaluation of alternatives including but not limited to National Historic Preservation Act and National Environmental Policy Act.

5.4. Evaluate and screen alternatives

5.4.1. Prepare "Talking Points" technology memo and submit to City.

5.4.2. Prepare for, coordinate, and attend workshop session with the City to develop "Range of Alternatives" and perform screening to develop a set of applicable alternatives.

5.4.3. Develop a TM summarizing the applicable alternatives.

5.4.3.1. Provide a draft of the TM to the City for review.

5.4.3.2. Meet with City to review TM and solicit comments.

5.4.3.3. Finalize Draft TM and submit to the City.

5.5. From the screenings effort, evaluate up to four (4) feasible technologies to comply with regulatory requirements that may be implemented at each of three (3) potential WWTF sites (Peirce Island, Pease WWTF and a possible new WWTF site) and for the collection system. For each alternative, the following steps will be performed:

5.5.1. Evaluation of WWTF alternatives:

- 5.5.1.1. *For new sites (if needed), identify ownership, soil conditions, site constraints, regulatory constraints, etc.*
- 5.5.1.2. *Evaluate applicable treatment technologies for each site:*
- 5.5.1.3. *Dry weather flow options for the full secondary treatment of the dry weather component, with primary or advanced-primary treatment of wet weather flows.*
- 5.5.1.4. *Full secondary treatment of all dry and wet weather flows (only if required by EPA and NHDES).*
- 5.5.1.5. *Wet weather only options such as chemically enhanced primary treatment, vortex, ballasted sedimentation, compressed media filters, or other high-rate system, with dry weather flows treated at other locations.*
- 5.5.2. *Evaluation of collection system components of alternatives and impacts on LTCP:*
 - 5.5.2.1. *If flow shedding or re-direction of sewage flow is required for an alternative:*
 - Evaluate flow shedding of various percentages of dry weather flows currently tributary to the Peirce Island WWTF, and/or
 - Evaluate flow shedding of flows currently tributary to the Pease WWTF to a new site. The Sewer System Model will be used in the analysis as needed.
 - 5.5.2.2. *Identify collection system improvement needs*
 - 5.5.2.3. *For wet weather flows that will not be treated at existing or proposed WTF sites, evaluate treatment/mitigation alternatives that include, but are not limited to:*
 - Continued targeted or full sewer separation
 - Satellite treatment using chemically enhanced primary treatment
 - Vortex separation
 - Compressed media filters
 - Ballasted sedimentation
 - Other high-rate treatment system
 - Off-line storage, or
 - In-line or conduit storage.

5.6. Concept Level Design Evaluation

- 5.6.1. For WWTF alternatives, develop concept-level designs including size, layouts, process flow diagrams, and life-cycle costs.*
- 5.6.2. For CSO abatement alternatives, develop costs for a range of control levels per the EPA CSO Control Policy.*

5.7. Perform ranking evaluation of alternatives based on Task 5.1

- 5.7.1. Prepare for and present rankings review for both WWTFP and LTCP at one (1) public meeting. The presentation will include discussions regarding:*
 - 5.7.1.1. Development of ranking system*
 - 5.7.1.2. Development of evaluation criteria*
 - 5.7.1.3. Presentation of findings of Task 5.6.*

5.8. Development of Recommended Alternative

- 5.8.1. Perform additional site-specific evaluations to confirm findings for recommended alternatives.*
- 5.8.2. Pilot test recommended alternative(s), if warranted*
- 5.8.3. Prepare Draft Recommendation Report*
- 5.8.4. Submit Draft Recommendation Report to City for review*
- 5.8.5. Review Recommendation Report with City*
- 5.8.6. Finalize Recommendation Report and submit to EPA and NHDES*
- 5.8.7. Meet with EPA and NHDES*

5.9. Develop TM to document alternative evaluation

- 5.9.1. Submit TM to City for comment*
- 5.9.2. Meet with City to discuss TM*
- 5.9.3. Revise TM as needed*

5.10. Prepare for and present recommended alternative for WWTFP and LTCP at one (1) public meeting.

Task 6. Develop Funding Strategies

The purpose of this task is to identify and assist the City in procuring funding for the WMP implementation.

- 6.1. Meet with the City and City's Advisory Consultant throughout the development of the WMP to identify potential funding sources.**
- 6.2. Evaluate the debt retirement payments and long-term replacement/refurbishment costs and O&M costs for existing and proposed capital improvements and other proposed activities resulting from the WMP.**
- 6.3. Compile and evaluate all current and proposed water and wastewater capital programs, replacement/refurbishment activities, and O&M activities that will affect current water and sewer rates.**
- 6.4. Update water and sewer rate model based on proposed costs for implementing WMP over a range of implementation periods.**
- 6.5. Perform an Affordability Analysis per EPA Guidelines and determine affordability.**
- 6.6. Assist the City's Advisory Consultant and City with preparation of funding applications on behalf of the City, as appropriate.**

Task 7. Implementation Schedule

The purpose of this task is to develop an implementation schedule for the capital projects and other recommended practices and activities identified in the draft WMP and based on the previously performed Affordability Analysis.

- 7.1. Develop a draft implementation schedule for the WMP.**
- 7.2. Review draft schedule with City and City's Advisory Consultant.**
- 7.3. Finalize draft implementation schedule**
- 7.4. Submit draft implementation schedule to EPA and NHDES**
- 7.5. Meet with EPA and NHDES to discuss draft implementation schedule and revise as necessary**
- 7.6. Finalize implementation schedule and incorporate into final WMP.**

Task 8. Preparation of the WMP Document

8.1. The WMP will be comprised of a minimum of three (3) volumes:

8.1.1. Vol. 1 - Main body will contain sections common to both the WWTFP Update and CSO LTCP Update

8.1.2. Vol. 2 - WWTFP Update sections

8.1.3. Vol. 3 - CSO LTCP sections

8.2. The preparation of the WWTFP and CSO LTCP Updates are outlined in Sections 9 and 10.

Task 9. Wastewater Treatment Facilities Plan Update

The purpose of this task is to prepare the WWTP Update portion of the WMP.

9.1. From the previous tasks, compile and prepare the draft WWTFP Update.

9.2. Submit Draft Preliminary WWTFP Update to City for review

9.3. Meet with City to review Draft Preliminary WWTFP Update

9.4. Finalize Draft WWTFP Update based on City comments

9.5. Submit Draft Final WWTFP Update to EPA and NHDES

9.6. Meet with EPA and NHDES to discuss Draft Final WWTFP Update

9.7. Finalize Wastewater WWTFP Update

9.8. Present WWTFP Update to City Council

9.9. Submit Final WWTFP Update to EPA and NHDES

9.10. Coordinate and attend a Public Meeting to present the plan

9.11. Update website and issue newsletter

Task 10. CSO LTCP Update

The purpose of this task is to prepare the CSO LTCP Update portion of the WMP.

10.1. From the previous tasks, compile and prepare the Draft Preliminary LTCP Update

- 10.2. Submit Draft Preliminary LTCP Plan update to City for review**
- 10.3. Meet with City to review Draft Preliminary LTCP Plan update**
- 10.4. Finalize Draft LTCP Plan based on City comments**
- 10.5. Submit Draft Final LTCP Update to EPA and NHDES**
- 10.6. Meet with EPA and NHDES to discuss Draft Final LTCP Update**
- 10.7. Finalize LTCP Update**
- 10.8. Present LTCP Update to City Council**
- 10.9. Submit Final LTCP Update to EPA and NHDES**
- 10.10. Coordinate and attend a Public Meeting to present the Final LTCP Update**

Task 11. Public and Regulatory Participation Program

The purpose of this task is to develop a public participation program to garner approval of the project from interested parties. The subtasks associated with this task will be ongoing throughout the project.

- 11.1. At the onset of this project the consultant working with the City will develop a public information website to disseminate information regarding the WMP to the general public. All information to be posted to the website will be pre-approved by the City of Portsmouth.**
- 11.2. Prepare a press release for the City of Portsmouth to announce the WMP and inform citizens of the website. This press release may also include the regional communities identified in Task 1.1.**
- 11.3. Prepare and present a "Wastewater 101" public meeting to begin the education process of work necessary to perform and complete the WMP. This presentation may be recorded for broadcast on the local access cable channel.**

The specific sub-tasks associated with Task 11 will evolve as the project progresses. The actual Scope of Work to be performed under Task 11 will be based upon the City's needs and will be agreed upon prior to commencement of work associated with Task 11. Where specific Public and Regulatory Participation Tasks are known, they have been presented within the context of that main task (i.e. Task 5).

Task 12. Project Management

The purpose of this task is to provide project management oversight and provide the required effort to coordinate the project with applicable regulatory agencies.

- 12.1. In addition to the typical project management duties of project coordination, invoicing, and project communication, the Planning Consultant shall also:**
- 12.2. Prepare for and attend monthly update meetings with City and City's Advisory Consultant.**
- 12.3. Submit quarterly and annual status reports to City, EPA and DES**
- 12.4. Provide schedule updates to City, EPA and DES as warranted.**