

# Executive Summary

## **Introduction**

On Friday June 4, 2010, the City submitted to the U.S. Environmental Protection Agency (EPA) and the NH Department of Environmental Services (NHDES) its draft Wastewater Master Plan (WMP). Required as part of a Consent Decree, this draft WMP is the culmination of a three-year planning effort.<sup>1</sup> It identifies a phased expansion of the Pease Wastewater Treatment Facility (WWTF) as the preferred alternative to serve the City's wastewater treatment needs and further recommends converting the current Peirce Island WWTF to a wet weather facility to handle storm water. This preferred alternative, as developed by the City's consultants, will require further review and input from the Portsmouth City Council. Significant federal and state regulatory and permitting issues are outstanding and the outcome of those issues could greatly influence affordability and design decisions. Thus, the draft WMP discusses additional alternatives, including expansion of the Peirce Island WWTF, in the event that the preferred alternative is not feasible or unaffordable. The draft WMP in its entirety is anticipated to be posted to the City's website by June 9.

## **Background**

The City of Portsmouth has undertaken this WMP in response to the denial of the 301(h) waiver from secondary treatment at the Peirce Island WWTF. The denial of this waiver required the City to revisit its 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 also for the abatement of its three remaining Combined Sewer Overflows (CSOs) as well. This draft 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 this effort includes possible flow shedding, or re-direction, between the WWTFs and/or other sites, and includes both the combined and separately sewered areas, all aspects of the City's wastewater infrastructure were included in this draft WMP. To complete this study, the City selected the team of Weston and Sampson Engineers and Brown and Caldwell (WMP Team). The goal of the WMP is to identify an environmentally sound, sustainable and cost effective solution to meet current and foreseeable water quality standards.

Public participation has been critical to this process and will be vital as the City moves toward the final selection, acceptance and implementation of the selected alternative. Throughout the development of the plan, public meetings have been held to both solicit input and present results. The City's web site has been used to post meeting schedules as well as interim reports which have allowed interested parties to track the progress of the WMP process.

This WMP process was conducted in a manner consistent with the New Hampshire Department of Environmental Services State Revolving Fund loan program guidelines to maximize the grant and loan eligibility of the selected alternative. In addition, this WMP

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<sup>1</sup> EPA and NHDES extended the City's original deadline from June 1, 2010, to facilitate the compiling of the multi-volume document and to accommodate the holiday weekend.

process looked at means of reducing the financial impact to the users such as construction phasing and potential 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 treatment 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.

### **Alternatives**

The WMP Team analyzed wastewater treatment alternatives using criteria such as: the ability of the alternative to achieve current and future permit limits; the potential for future expansion; the impact on CSO abatement and the LTCP; affordability for ratepayers; technical complexity (i.e. can current staff operate with no or little additional training); operability (to what extent can the new or expanded facility be operated within current staffing levels); accessibility for required truck traffic; ability to reclaim or at least preserve Peirce Island for the community; and consideration of other impacts such as those to wetlands and archeological sites.

From that analysis, the following alternatives rose to the top and are described in detail in the draft WMP:

1. Upgrade of the Peirce Island WWTF
2. Phased expansion of the Pease WWTF
  - a) Using the Pease Outfall Location
  - b) Using the Peirce Island Outfall Location

Based on the ranking results, phased expansion of the Pease WWTF using the Pease Outfall location became the recommended preferred alternative. The affordability analysis performed as part of the WMP process shows that even with this phased approach, the user rates will exceed two percent of the median household income. Phased construction:

- allows the City to use existing excess capacity of the Pease WWTF prior to full expansion of the WWTF, thereby providing environmental benefits sooner;
- allows the City to further evaluate design flows as sewer separation projects continue and “right-size” the WWTF, providing a more sustainable solution; and
- allows the City to continue to explore technological advancements to reduce overall project costs.

This recommendation holds true even if an effluent pump station and force main are required to send the WWTF effluent back to the vicinity of the current Peirce Island Outfall. The Pease Expansion ranked highest due to its overall benefit to the Portsmouth community from both a financial and cultural perspective. Since the expansion is constructed in phases it may represent the lowest impacts to user rates. There is also the benefit of being able to accommodate expansion in the future which, while not directly impacting current residents, will benefit future generations. The City Council will need to review the preferred alternative after considering future regulatory impacts and associated financial impacts.

## **Regulatory and Permitting Issues**

During the course of the WMP process, it became clear that there were a number of outstanding regulatory issues which may result in revisiting the preferred alternative for wastewater treatment and the CSO LTCP. Those issues for resolution include such matters as:

- a. What will be the anti-degradation requirements at the Pease WWTF outfall for flows in excess of its current capacity of 1.2 million gallon per day (mgd)?
- b. What credit will be considered in the anti-degradation analysis and “anti-backsliding” analysis for the Pease Outfall with respect to the Peirce Island WWTF outfall if all sanitary flow is treated at Pease WWTF?
- c. What are the regulatory impacts of retaining the Peirce Island WWTF for both sanitary and wet weather flow
- d. What will the total nitrogen (TN) limit be for either the Peirce Island WWTF or Pease WWTF?
- e. Will there be a phosphorus (TP) limit for either the Peirce Island WWTF or Pease WWTF and if so what will it be?
- f. Can a waiver from the four-hour travel time from an outfall to a shell fish bed be obtained if additional measures are taken?
- g. Will the nutrient limits for either outfall be based on year-round limits or seasonal limits, alternatively, will nutrient limits be based on an annual rolling average?

These regulatory and permitting issues are further complicated in that the City Portsmouth recently joined Dover, Durham, Exeter, Newmarket and Rochester in requesting that NHDES initiate a formal rulemaking that includes an open and independent peer review of NHDES’s approach in developing Nutrient Water Quality Standards for the Great Bay Estuary. The EPA’s own Scientific Advisory Board recently criticized a similar approach on the national level. The communities contend that if NHDES assumptions are indeed incorrect, as the communities suspect, municipalities around Great Bay could be forced to spend hundreds of millions of dollars on wastewater treatment upgrades without having a significant environmental impact. As EPA and NHDES agree, roughly 70% of the estuary’s nitrogen load comes from non-point sources such as lawn and agricultural runoff, and septic systems. NHDES has acknowledged that less than 10% of Peirce Island WWTF’s effluent reaches the Great Bay, and further hydrodynamic modeling to be undertaken may show even less.

## **Preferred Plan and Proposed Schedule**

The draft WMP recommends as the preferred alternative the expansion of the Pease Facility using the Pease Outfall in a phased approach to become the wastewater treatment plant for the City while the current Peirce Island plant becomes converted to a wet weather facility to enable to City to deal with storm water treatment for the reasons identified above. The draft WMP retains as a possible alternative the upgrade of the Peirce Island WWTF in the event that unresolved regulatory issues make the Pease expansion infeasible or overly costly.

The proposed phasing schedule is comprised of seven components. The first phase, scheduled to occur between January 2011 and July 2013, consists of the WWTP Pre-Design

work including site acquisition, environmental review and outfall design and approval. In the second phase, proposed for between March 2013 and August 2016, WWTP design work will be completed, including the design of all future phases to be constructed. This stage will include piloting of an emerging technology, Bio-Mag, which could, if successful, reduce treatment tank volume by half. During these two initial phases, the City will continue to move forward with its sewer separation projects. These projects deliver significant environmental benefits by alleviating the overflow of untreated sewage during significant rain events. In addition, performing this work first will allow the City to “right size” its new or expanded treatment facility as flow monitoring will take place to measure successes and better quantify future treatment needs.

The third phase (September 2015 to August 2017) represents the first WWTF construction phase, and will include the installation of force main(s) from the Deer Street Pump Station to the Pease WWTF and the modifications necessary to that pump station. This phase will deliver 0.6 mgd additional capacity (1.2 mgd if the Bio-Mag pilot test is successful) by August 2017 for secondary treatment at the Pease WWTF, which is approximately 25% of the City’s average dry weather sanitary flow, and thereby permitting the Peirce Island WWTF to treat an equivalent amount of additional storm water.

Under the fourth phase, the City will add an additional Sequencing Batch Reactor (SBR) unit to the Pease WWTF and make upgrades at the Peirce Island WWTF, providing an additional 0.6 mgd (1.2 mgd if Bio-Mag is successful) for secondary treatment at Pease by February 2020. This upgrade will furnish the Pease WWTF with capacity for roughly 100% of the City’s dry weather sanitary flow, and further increases the Peirce Island WWTF’s capacity to provide additional storm water treatment.

Under the fifth phase, the City will add an additional SBR unit and other treatment processes by September 2022 providing additional 0.6 mgd (1.2 mgd if Bio-Mag is successful) by September 2022. Additionally, a sludge storage tank and biosolids dewatering would be added.

In the sixth phase, two additional SBR units would be added, providing an additional 1.2 mgd (if Bio-Mag is successful total tank volume will be adjusted to bring plant capacity to 7.9 mgd) by April 2025, and adding additional methanol storage and pumping capability.

Finally, phase seven would only be completed if necessary, and includes two additional SBRs which will provide additional volume to bring the total plant capacity to 7.9 mgd and upgrades to the Peirce Island WWTF for wet weather treatment. If Bio-Mag has been successful, then this Phase will be unnecessary.

## **Conclusion**

The City looks forward to discussions with EPA and NHDES regarding this proposal. The City believes that the phased approach is warranted for the above reasons and because the current discharge from the Peirce Island WWTF is not causing a discernable impact to water quality in the Great Bay Estuary. Therefore, careful resolution of the outstanding scientific and regulatory issues is essential to make sure that the best decisions are made for the protection of the Great Bay and the interests of its citizens.