

Town of Sandwich

Comprehensive Water Resource Management Plan

EXECUTIVE SUMMARY

OVERVIEW

The Town of Sandwich has developed a Comprehensive Water Resource Management Plan to guide the improvement of water quality in groundwater, freshwater ponds and coastal estuaries, including the Nitrogen Total Maximum Daily Load (TMDL) requirements for certain coastal estuaries. The plan is highly adaptable to accommodate measured progress in water quality improvement, future regional opportunities, effectiveness of potentially lower-cost alternatives, and availability of favorable financing. This Plan is consistent with the requirements of the Cape Cod Commission's 208 Water Quality Plan Update (2015) and includes local, inter-municipal and regional collaboration to moderate the project costs.

INTRODUCTION

In 2011, the Town of Sandwich embarked on a multi-year, multi-phase process to determine the best ways to manage its water resources in order to protect and improve water quality. This process has been called Comprehensive Water Resource Management Planning, and the result is a Comprehensive Water Resource Management Plan or CWRMP. The CWRMP has three principal segments that are summarized herein:

- Needs Assessment
- Alternatives Analysis
- Recommended Plan

This process was informed by significant effort and input from Town's Health Department, Planning Department, Engineering Department and the Water Quality Advisory Committee (WQAC).

NEEDS ASSESSMENT

Private on-lot wastewater disposal, in conformance with the State Sanitary Code (Title 5) and local amendments, adequately protects Sandwich citizens from the potential public health problems associated with improperly designed or located wastewater disposal systems. That said, there are several areas of town with long-standing challenges associated with on-lot wastewater disposal. There are also challenges associated with wastewater disposal in public drinking water supply Zone II protection areas. Lastly, there is a need to protect coastal waters from excessive nitrogen loading and freshwater ponds from high phosphorus loading. Approximately 30% of the Town's existing wastewater flow needs better management to address one or more these challenges. The Needs Assessment is presented in Sections 2, 3 and 4 of this report.

ALTERNATIVES ANALYSIS

The first task of the Alternatives Analysis was to identify a host of traditional and non-traditional methods to address the needs identified in the CWRMP Needs Assessment phase. These methods were then short-listed and each watershed was assessed independently to determine the most applicable solutions for each watershed. The watershed-specific options were then combined into the following "composite wastewater plans", which include a hybrid of traditional and non-traditional wastewater management methods.

- Plan A** Hybrid Plan without Nitrogen Credit Trading
- Plan B** Hybrid Plan with Nitrogen Credit Trading
- No Action Plan**

The composite wastewater plans and the “no action plan” were evaluated against 20 criteria, including such factors as cost, energy use, environmental impact, treatment plant site suitability, regulatory acceptability, amenability to regionalization, and overall public acceptability. The Alternatives Analysis is presented in Sections 5, 6 and 7 of this report.

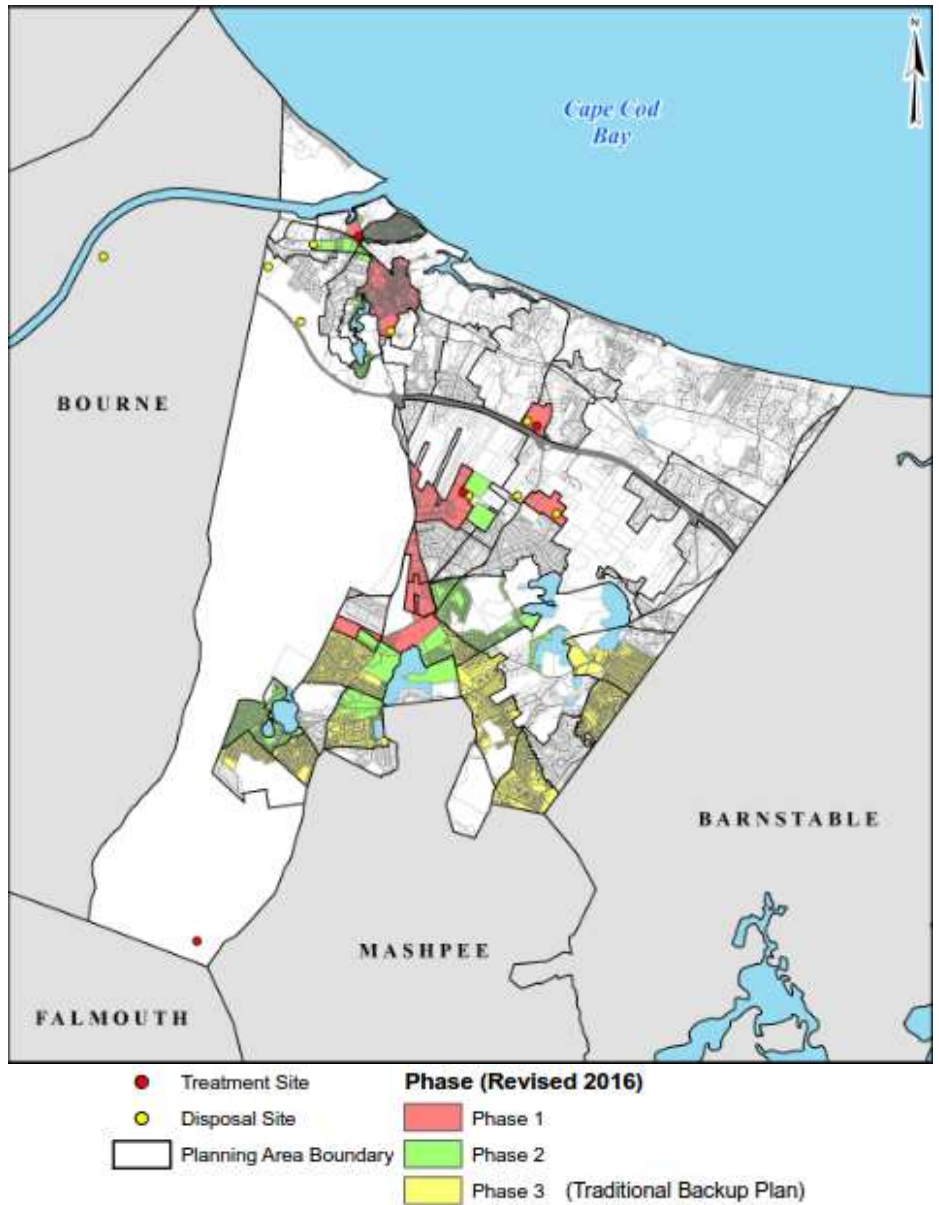
RECOMMENDED PLAN

Based on the evaluations conducted, the WQAC recommended selection of Plan B. The Board of Selectmen supported this recommendation.

A multi-faceted and multi-phased plan was developed around Plan B to manage costs, to allow time for neighboring towns to advance their wastewater planning and implementation and to take full advantage of an adaptive management framework, as espoused in the 208 Water Quality Management Plan Update. The recommended plan also includes an assessment of available funding sources, sewer user rates, general taxation impacts, overall affordability and general environmental impacts.

The Recommended Plan is presented in Sections 8, 9 and 10 of this report. A summary of the recommended plan is outlined below.

The Implementation Plan is presented in Section 11 of this report.



Traditional Elements of Phase 1 Plan

The principal traditional elements of the plan are as follows:

- **Wastewater Collection:** A municipal sewer system will be constructed to serve about 1,880 residential, commercial and industrial parcels. The collection system will remove sources of nitrogen to coastal estuaries and sources of phosphorus to freshwater ponds.
- **Wastewater Treatment:** Two new advanced wastewater treatment facilities (WWTFs) will be constructed, one located near the Sandwich Industrial Park and the other located near the Canal Marina. A connection to the existing WWTF at Joint Base Cape Cod (JBCC) is also proposed in Phase 2.

- **Effluent Recharge:** A series of subsurface infiltration basins will be built at four sites in the Sandwich Harbor and Scorton Creek watersheds (i.e., watersheds of non-nitrogen sensitive embayments).
- **Effluent Reuse:** A cost allowance has been included for effluent reuse at the Sandwich Industrial Park or the Marina area.
- **Septage Handling:** Septage generated in town will continue to be hauled to other Cape Cod or off-Cape WWTFs for treatment (i.e., no provisions will be made for septage at the Sandwich WWTFs).
- **Sludge Handling:** Biosolids generated at the new WWTFs will be thickened and transported to other Cape Cod or off-Cape WWTFs for processing and disposal.
- **School WWTFs:** The school WWTFs are each approaching the end of their design life. The Forestdale School WWTF and the Wing School system will be connected to the new advanced WWTF. The Oak Ridge School WWTF will be connected to the existing Sandwich High School WWTF. The Sandwich High School WWTF will be upgraded. The school WWTFs will be addressed as a part of Phase 1.
- **Public Water Extension:** three public water extensions are proposed – one based on proximity to a proposed effluent disposal site and two based on existing high concentrations of nitrate in groundwater.
- **Stormwater Best Management Practices:** a series of stormwater best management practices (BMPs) are proposed to address sediment and nutrient loadings to Snake Pond, Peters Pond, Pimlico Pond, Hoxie Pond, Upper Shawme Pond and Lower Shawme Pond.
- **Greenhouse Gas Emissions:** The design phase activities will consider methods to minimize greenhouse gas emissions of the CWRMP.
- **Climate Adaptation:** The design phase will consider selection of sites for pumping station and collective system components that reflect a long-term view towards climate change. The Town will also consider climate adaptation in its planning and permitting regulatory framework.

The traditional measures (structural facilities) described above are expected to cost approximately \$86 million to build, and \$1.25 million to operate annually, both expressed in 2017 dollars (ENR CCI 10280). Traditional measures address approximately 36% of the nitrogen removal requirements associated with TMDLs.

Non-Traditional Elements of Plan

Several key non-traditional elements have been included in the CWRMP. These non-traditional elements reduce the amount of traditional sewerage:

- Continued expansion of the **water conservation programs** of the Sandwich Water District;
- A **wastewater flow and load reduction** initiative, including eliminating garbage grinders and testing of alternative toilets;
- **Land use controls** to make this a “flow neutral” plan and to avoid unwanted sewer-induced growth;
- Use of **innovative/alternative on-site wastewater treatment systems** for future development in nitrogen-sensitive watersheds which are outside of identified sewer service areas;
- A **fertilizer control program** to reduce nitrogen leaching from golf courses, lawns and parks;
- A “**fertigation**” program (i.e., pumping groundwater with nitrogen in it for use on turf irrigation) to reduce nitrogen already in the groundwater resulting from golf courses, lawns and parks;
- An **enhanced natural attenuation initiative** through improved understanding and management of freshwater pond systems;
- Supporting a County **atmospheric/air quality monitoring** initiative to determine if current and future reductions in atmospheric nitrogen result in reductions in traditional land-based measures; and

- Developing a **watershed nitrogen credit trading program with inter-municipal agreements** to maximize the effectiveness of each dollar spent on achieving the Nitrogen TMDLs by implementing the most cost-effective measures on a watershed basis vs a municipal boundary basis.

The non-traditional measures described above are treated as operational expenses (i.e., no capital cost for construction) and are expected to cost approximately \$0.58 million annually, expressed in 2017 dollars (ENR CCI 10280), including a new staff hire to manage the program (in an existing department or new department) and nitrogen credit trading costs for Phase 1. Non-traditional measures address approximately 64% of the nitrogen removal requirements associated with TMDLs.

Phasing and Adaptive Management Plan

A formal phasing plan is recommended to serve as a blueprint for the Town's adaptive management approach. The Town's phasing and adaptive management plan is summarized as follows:

- **Three phase implementation plan** occurring over 60 years, which represents “one groundwater travel time period” from Sandwich to the south-facing coastal estuaries. Phase 1 and Phase 2 consist of traditional and non-traditional measures. Phase 3 consists of the remainder of the nitrogen credit trading elements or the required “traditional backup plan” if the non-traditional measures are not sufficiently effective.
- An **environmental monitoring program** to assess changes in the quality of WWTF effluent, groundwater, freshwater ponds, coastal estuaries and atmospheric air quality. The Town anticipates conducting estuary and air quality monitoring in collaboration with other communities.
- A **technology and progress monitoring program** which will be documented in an **Annual Progress Report** and an **Adaptive Management Update Report** (at 5-year increments). The Adaptive Management Update Report will also consider any positive and negatives implications of climate adaptation.

The Town will have completed several Adaptive Management Update Reports prior to making decisions on implementation of Phase 2. These Adaptive Management Update Reports should be used to “steer the program” over time based on growth/development, water quality and marine habitat monitoring.

Opportunities for Regionalization

As described above, the CWRMP includes three significant opportunities for regionalization: 1) connection to the JBCC WWTF; 2) enhanced natural attenuation; and 3) watershed nitrogen credit trading. These elements will require continued monitoring and leadership by the Town, but these elements appear highly feasible at this time.

Implementation Schedule

Based on input from the WQAC, the Recommended Plan outlines the following implementation schedule based on Table 11-1 (“aggressive”):

Complete CWRMP	2017
Complete hydrogeologic studies	2018
Complete supplemental pond water quality study	2018
Complete MEPA review (and DRI review if required)	2018
Town Meeting appropriation for Phase 1 design	2018
Design of Phase 1 facilities	2019 to 2020
Town Meeting appropriation for Phase 1 construction	2020
Bidding of Phase 1 facilities	2020

Phase 1 construction	2021 to 2024
Start-up of Phase 1 facilities	2024
Adaptive Management Report (5-year)	2024

Project Financing Scenario and Affordability

Section 9.9 of this report presents a project financing scenario which includes paying for project costs by a combination of general taxation and sewer user fees. A decision on the use of betterment assessments has not been made at this time. Based on the “with some grants” project financing scenario presented in Section 9, a typical residential homeowner with a \$400,000 home and with a sewer connection would have a sewer user fee of approximately \$1,320 per year and an increase in general taxation of \$267 per year for the Phase 1 program. These cost impacts can be reduced by obtaining additional grants and no-interest loans.

The primary criterion used to assess affordability is the percentage of the median household income (MHI) spent on wastewater-related expenses. According to the 2010 Census, the MHI for Sandwich is \$84,167. EPA considers annual debt service and operating expenses of less than 1% of MHI as having a “low economic impact” and considers greater than 2% of MHI as having a “large economic impact”. Communities with a mid-range to large economic impact can conduct secondary screening analyses for affordability. Based on the cost impacts noted above, the Phase 1 program approaches the 2% of MHI. Refer to Table 9-4 for additional information.

Evaluation of Environmental Impacts

An evaluation of environmental impacts of the project was prepared in the development of the Alternatives Analysis and Recommended Plan. This evaluation of environmental impacts is described in Section 10 of this report. The CWRMP will need to be submitted to the Massachusetts Executive Office of Energy and Environmental Affairs (EOEEA) for review under the Massachusetts Environmental Policy Act (MEPA). A concurrent submittal may need to be made to the Cape Cod Commission for review under its Development of Regional Impact (DRI) program, unless it is superseded by its 208 Consistency Determination Guidance (regulatory amendments are currently being deliberated at the County level).

CONCLUSION

The CWRMP recommends a highly adaptable phased approach to water resource management that allows the Town of Sandwich to address its water resource management needs and its share of Nitrogen TMDL removal requirements with relatively low risk, controllable costs and limited environmental impact.