

Chapter 1

Introduction

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1.1 REPORT IDENTIFICATION AND PURPOSE

This Plan Evaluation Report is written to provide a more detailed evaluation of the alternative wastewater management plans identified in the Interim Needs Assessment and Alternatives Screening Analysis Report. The purpose of the report is to provide prioritization and implementation guidance as it pertains to the drinking water and wastewater management plans developed for the areas of concern. Comments received from the Town on the Draft Interim Needs Assessment and Alternatives Screening Analysis Report were addressed in the Final Interim Needs Assessment and Alternatives Screening Analysis Report and further incorporated into this report where applicable. Appendix 1-1 contains a memorandum outlining responses to the Town comments received.

1.2 PROJECT BACKGROUND AND MAIN ISSUES

As discussed in the previous report, the Town of Eastham is located in the lower portion of Cape Cod as shown in Figure 1-1. The Town is a seasonal community with a year-round population of 5,450 that swells to approximately 21,800 when seasonal residents, tourists, and day trippers arrive for the summer season. The Town does not have a municipal drinking water supply system or a municipal wastewater management system. Nearly all properties are serviced by private drinking water wells except for a few residential properties along the southern boundary that are serviced by the Orleans Public Water System. All of the properties are serviced by individual on-site septic systems.

Sampling and nitrate analysis of the private drinking water supply wells since 1984 indicate that the number of private wells with elevated nitrate levels have increased. The increased nitrate levels indicate that groundwater quality is declining. The individual on-site septic systems

located on the same lots (or neighboring lot) as the private drinking water wells are believed to be the nitrate source.

There is concern that the nitrate is an indicator of many septic system contaminants currently not being analyzed in the groundwater (phosphorus, volatile organic compounds, personal care products, pharmaceuticals, etc.) that may be reaching the private wells and causing a public health threat.

There is also concern that these nutrients and contaminants may be reaching the coastal estuaries and the freshwater ponds in Eastham and causing excessive algae production which, in turn, causes degraded surface-water quality. This type of pond and estuary degradation is called eutrophication.

The Town is working on a municipal drinking water supply program and is proceeding with a plan to extend municipal water supply to all properties in Town. Efforts to fund implementation of the plan have met opposition at town meeting due, in part, to issues about wastewater management. One goal of this wastewater management project is to address these issues.

Massachusetts Department of Environmental Protection (MassDEP) (and residents in Town) is concerned about possible eutrophication in the coastal estuaries, and MassDEP has initiated the Massachusetts Estuaries Project (MEP) for a group of 89 estuaries in Southeastern Massachusetts. They plan to develop the nitrogen limits (quantity of nitrogen that enters the estuary from its watershed before eutrophication and water quality problems occur) for the estuaries. These nitrogen limits will then become regulatory limits called Total Maximum Daily Loads or TMDLs that will be enforced by the State or Federal Governments. The following three estuaries that have watersheds extending into Eastham will have TMDLs developed as part of this program:

- Rock Harbor
- Nauset Harbor / Salt Pond / Mill/Muddy Pond / Town Cove System (Nauset-Town Cove Estuary)
- Wellfleet Harbor

The TMDLs may require significant wastewater management to mitigate current nitrogen loadings from septic systems to the watersheds and estuaries.

The Cape Cod Commission and a dedicated group of “pond-watchers” are concerned about possible eutrophication in the freshwater ponds and have initiated a pond monitoring program and an assessment of water quality in several ponds. The water quality assessment (and subsequent evaluations) indicates that significant wastewater management may be required to correct current phosphorus loadings from septic systems to the watersheds and ponds.

The watersheds to these coastal estuaries and freshwater ponds are illustrated in Figure 1-1 with estimated wastewater removals to address estimated existing nitrogen and phosphorus loadings.

A primary goal of this report and overall project is to develop a more detailed evaluation of the drinking water and wastewater alternative management plans identified in the Interim Needs Assessment and Alternatives Screening Analysis Report. This focused evaluation will provide assistance to Town decision-making processes.

1.3 COMPREHENSIVE WASTEWATER MANAGEMENT PLANNING AND DEVELOPMENT OF A PLAN OF STUDY

This project has been developed to become a Comprehensive Wastewater Management Plan (CWMP) in accordance with MassDEP requirements if desired by the Town. A CWMP Plan of Study was prepared and transmitted to MassDEP as attached in Appendix 1-2. This Plan of Study has the following main tasks:

A. Phase I – Interim Needs Assessment, and Identification and Screening of Alternative Solutions and Sites

1. Review and Summarize Town Issues and Project Background.
2. Review and Summarize Regulatory Issues Affecting Wastewater Management Planning.
3. Evaluate, Summarize, and Describe Existing and Future Conditions in Town Including Nitrogen Limits.
4. Identify the Goals and Objectives of the Town Related to Wastewater Management.

5. Summarize the Wastewater Related Needs of the Town.
6. Identify, Review and Summarize Alternative Solutions to Meet the Town's Wastewater Management Needs.
7. Screen the Alternative Solutions to Identify the Most Feasible Ones for Detailed Evaluation.
8. Identify and Screen Potential Sites for Wastewater Management Facilities.
9. Group Feasible Solutions and Sites into Alternative Wastewater Management Scenarios.
10. Prepare the Interim Needs Assessment and Alternatives Screening Analysis Report by Summarizing the Tasks of this Phase.

B. Phase II – Revised Needs Assessment, and Identification and Screening of Alternative Solutions and Sites

C. Phase III– Detailed Evaluation and Development of the Comprehensive Wastewater Management Plan

The first task will be to evaluate the alternative wastewater management plans developed in Phase I and II, and develop a broad based plan that can be presented at Town Meeting. If the Town wants to finalize the plan to a full Comprehensive Management Plan, the following tasks are needed:

1. Perform Subsurface and/or Environmental Investigations for Potential Wastewater Management Sites.
2. Prepare a Methodology of the Planned Detailed Evaluations for Project and Regulatory Review.
3. Perform Present-Worth Evaluations of the Alternative Scenarios.

4. Perform Non-Monetary Evaluations of the Alternative Scenarios.
5. Perform an Environmental Impact Analysis of the Alternative Scenarios.
6. Evaluate the Present-Worth, Non-Monetary Factors, and the Potential Environmental Impacts (and Benefits) of the Alternative Management Scenarios to Select the Most Appropriate One.
7. Develop and Present the Recommended Wastewater Management Plan, and Prepare the Draft Comprehensive Wastewater Management Plan (DCWMP) Report.
8. Submit The DCWMP Report For Regulatory and Public Reviews.

D. Phase IV – Resolution of Remaining Issues and Project Completion

1. Resolve Remaining Issues.
2. Modify the DCWMP to Prepare the Final Comprehensive Wastewater Management Plan (FCWMP) Report, and Submit it for Review.

E. Phase V – Complete Environmental and Public Review Processes

1. Utilize the Eastham Wastewater Management Planning Committee for Project Reviews and Public Outreach.
2. Prepare and Conduct a Public Participation Program.
3. Submit and Coordinate the Public Review of the Environmental Notification Form.
4. Submit and Coordinate the Public Review of the Draft Comprehensive Wastewater Management Plan and Draft Environmental Impact Report (DCWMP/DEIR)
5. Submit and Coordinate the Public Review of the Final Comprehensive Wastewater Management Plan and Final Environmental Impact Report (FCWMP/FEIR).

6. Coordinate the Needed Public Meetings and Hearings to Comply with State and Regional Regulations as well as Meet the Informational Needs of the Community.

Phase I and II have been completed with the completion of the Final Interim Needs Assessment and Alternatives Screening Analysis Report, and this Plan Evaluation Report initiates Phase III.

1.4 SUMMARY OF INTERIM NEEDS ASSESSMENT AND ALTERNATIVES SCREENING ANALYSIS REPORT

The Interim Needs Assessment and Alternatives Screening Analysis Report was written to summarize the tasks identified in Phase I and II of the Plan of Study. It is called an “interim” report because all of the nitrogen and phosphorus limits have not been developed by MassDEP and the Cape Cod Commission, and it is envisioned that the final needs will be determined once those limits are released. The Executive Summary from the Final Needs Assessment and Alternatives Screening Analysis Report is attached in Appendix 1-3.

The Needs Assessment section of the report describes the existing and future conditions which define the wastewater-related needs. Evaluations completed by the MEP identify individual on-site septic systems as the largest source of nitrogen and phosphorus to the groundwater. This groundwater contamination has created a serious threat to the drinking water quality of the individual water supplies at each property as well as to the water quality and natural habitat in the freshwater ponds and marine-water estuaries in Eastham. This threat is being evaluated as both a “Human Health Need” and “Environmental Health Need”.

The Alternatives Screening Analysis section of the report begins the process of identifying alternative technologies to meet the human health and environmental health needs and the screening criteria used to do so. A complete analysis was conducted to identify all feasible alternatives that could be a component in a future plan. The alternative solutions are divided into categories for on-site drinking water and wastewater treatment technologies; community/municipal drinking water supply and wastewater treatment technologies; collection system technologies; treated water recharge technologies; potential sites for drinking water supply, wastewater treatment and recharge facilities; flow and loading reduction alternatives; and additional non-wastewater nitrogen mitigation alternatives.

These alternatives are all discussed, and key advantages and disadvantages are summarized to provide an understanding of the usefulness of each alternative to solving the wastewater related needs in Eastham.

The final chapter provides a screening summary of these alternatives to identify the ones that are the most appropriate for the Town and outlines a group of alternative management plans (with typical costs per residence) for the whole Town and for areas of Town that have specific needs. In summary, the following alternative management plans are recommended for further evaluation:

- The ongoing Drinking Water Supply Plan which is currently evaluating water supply from new wells sited in Eastham and/or a water supply from the existing Town of Orleans water system.
- A group of three alternative management plans for the Nauset-Town Cove Estuary Watershed to meet the environmental health need and estimated nitrogen limit.
 - Nauset-Town Cove Estuary Watershed Plan 1: Sewering the properties in this watershed and wastewater treatment and recharge at a new community/municipal wastewater treatment facility at the Roach Property site in northern Eastham.
 - Nauset-Town Cove Estuary Watershed Plan 2: Connection of this proposed sewer area to the Orleans Wastewater Treatment Facility proposed to be constructed at the Tri-Town Facility site.
 - Nauset-Town Cove Estuary Watershed Plan 3: Individual on-site systems approved by MassDEP.
- A group of three alternative management plans for the Rock Harbor Watershed to meet the environmental health need and nitrogen limit.
 - Rock Harbor Plan 1: Same as Nauset-Town Cove Estuary Watershed Plan 1.
 - Rock Harbor Plan 2: Same as Nauset-Town Cove Estuary Watershed Plan 2.
 - Rock Harbor Plan 3: Further evaluation of possible aeration and dredging management of Rock Harbor.
- A group of three alternative management plans for the Freshwater Pond System Watershed to meet the environmental health need and estimated phosphorus limit.

- Freshwater Pond System Watershed Plan 1: Same as Nauset-Town Cove Estuary Watershed Plan 1 and Rock Harbor Plan 1.
- Freshwater Pond System Watershed Plan 2: Same as Nauset-Town Cove Estuary Watershed Plan 2 and Rock Harbor Plan 2.
- Freshwater Pond System Watershed Plan 3: Periodic pond treatments to remove the phosphorus in the ponds.

Also the following Best Management Practices for Town-wide application are recommended as part of all of the plans:

- Fertilizer use education to minimize over-fertilization. Reduction of fertilizer induced nitrogen into the environment would be best mitigated with public education. Educational flyers could be developed and distributed to homeowners, discussing the environmental effects of over-fertilization to lawns and other plants on their property. Barnstable County and the Water Protection Collaborative may assist in this effort in the future.
- Stormwater management practices on Town and State roadways as well as at individual homes. Stormwater Management is considered an enhancement to the wastewater management plans identified above. Most structural stormwater Best Management Practices are designed to mitigate bacterial contamination and reduce runoff from impervious surfaces and are not designed to remove nutrients such as nitrogen and phosphorus. However, some stormwater Best Management Practices such as bioretention areas, rain gardens, constructed stormwater wetlands and extended dry detention basins can remove varying amounts of nitrogen and phosphorus if designed and maintained correctly. As discussed in Chapter 13, stormwater should be directed to vegetated swales or basins where suspended solids and fecal coliform are removed and nitrogen and phosphorus is used by the biological material in the swale or basin. The Town of Eastham should develop improved stormwater management by identifying areas on Town roadways where runoff enters surface waters untreated. Homeowners can also participate in stormwater management by directing runoff from their roofs into natural environments, instituting the use of rain barrels, or by the installation of permeable materials in driveway locations.

The alternative management plans identified will receive additional detailed evaluation primarily during the development of Phase III of the Plan of Study but also in this report.

1.5 RELATED REGIONAL PROJECTS

As part of a study being completed by the Town of Orleans and funded by the Cape Cod Water Protection Collaborative “Shared Watershed, Shared Responsibilities” Grant Program, regional treatment of wastewater will be evaluated at the Tri-Town Facility site in Orleans. The Town of Eastham has been coordinating with the Town of Orleans during this funded project on regionalization of wastewater facilities. Attached in Appendix 1-4 is the letter sent to the Town of Orleans’ consultant, outlining preliminary wastewater needs for the Town of Eastham. Since that letter (which provided tentative sewer areas and approximate flows), continued coordination between the Towns of Eastham and Orleans has continued on feasible regionalization options.

In addition to the wastewater regionalization study, the Town of Eastham has also had preliminary discussions with the neighboring Towns of Orleans and Wellfleet about potential public water supply solutions.

1.6 ORGANIZATION OF THE PLAN EVALUATION REPORT

This Plan Evaluation Report follows the Interim Needs Assessment and Alternatives Screening Analysis Report and will assist the Town in developing future CWMP documents. Chapter 1 presents general introductory information about the report’s identification, purpose and organization, in addition to the project background and main issues. A summary of the Interim Needs Assessment and Alternatives Screening Analysis Report and related regional projects is also discussed.

Chapter 2 is the evaluation of drinking water and wastewater alternative management plans identified in the Interim Needs Assessment and Alternatives Screening Analysis Report. Cost comparisons and comparisons of non-monetary factors are discussed and evaluated in this chapter.

Chapter 3 concludes this report and further discusses the recommended drinking water and wastewater management plans with implementation and prioritization considerations.