

Section 1

Introduction

1.1 Project Identification

In 2007, the Town of Harwich, Massachusetts (“the Town”) began the process of developing a Comprehensive Wastewater Management Plan (CWMP), to guide the decisions pertaining to wastewater management over the next 40 years. The wastewater planning performed during the course of this process has been completed with guidance and oversight from the Town’s Wastewater Management Subcommittee (WMS), working with the Town’s consultant, CDM Smith. The information contained in this Draft CWMP/ Environmental Notification Form (ENF) represents the results of this multi-year planning effort and the associated recommendations for long-term wastewater management in Harwich.

The planning to date has been performed with several town-wide goals in mind. These include:

- Achieving the levels of wastewater nitrogen removal required to restore local aquatic ecosystems, according to the goals established through the Massachusetts Estuaries Project (MEP),
- Reducing nitrogen inputs to the Town’s drinking water supplies where necessary,
- Achieving phosphorus removal where needed to restore or stabilize the ecological health of the Town’s freshwater ponds,
- Providing alternative wastewater management strategies to areas of town where Title 5 standards have historically been difficult to meet, and
- Providing infrastructure to support the planned growth outlined in the Town’s Local Comprehensive Plan.

At the present time, Harwich has no large scale town-owned wastewater treatment facilities, and residents and businesses rely on on-site wastewater management systems regulated by the Massachusetts State Environmental Code, or Title 5. While Title 5 systems provide an adequate level of treatment for pathogens originating from wastewater, minimal nutrient (nitrogen) removal is achieved with a traditional Title 5 system. Furthermore, siting of a Title 5 system on each individual lot can restrict growth in areas of desired economic development. As the Town has increased in population and moved from a seasonal to a year-round community for many of its residents, continued reliance on Title 5 systems town-wide has become environmentally problematic. In order to meet the goals described above, alternative means of wastewater treatment and recharge are required.

This report describes existing conditions and wastewater needs in Harwich and concludes with the identification of a recommended wastewater management program.

1.2 Project Location

The Town is in the center of Cape Cod, as shown on Figure 1-1. The Town is bordered by Nantucket Sound to the south, the Town of Dennis to the west, the Town of Chatham to the east and the Town of Brewster to the north. The planning area for the CWMP encompasses the entire Town of Harwich, which is approximately 21 square miles. Harwich has approximately 11 miles of tidal shoreline, four harbors, 22 freshwater ponds, two reservoirs and two scenic river corridors (Herring River and Muddy Creek). Figure 1-2 shows Harwich and the surrounding communities, along with the major surface water bodies.

1.2.1 Existing Conditions

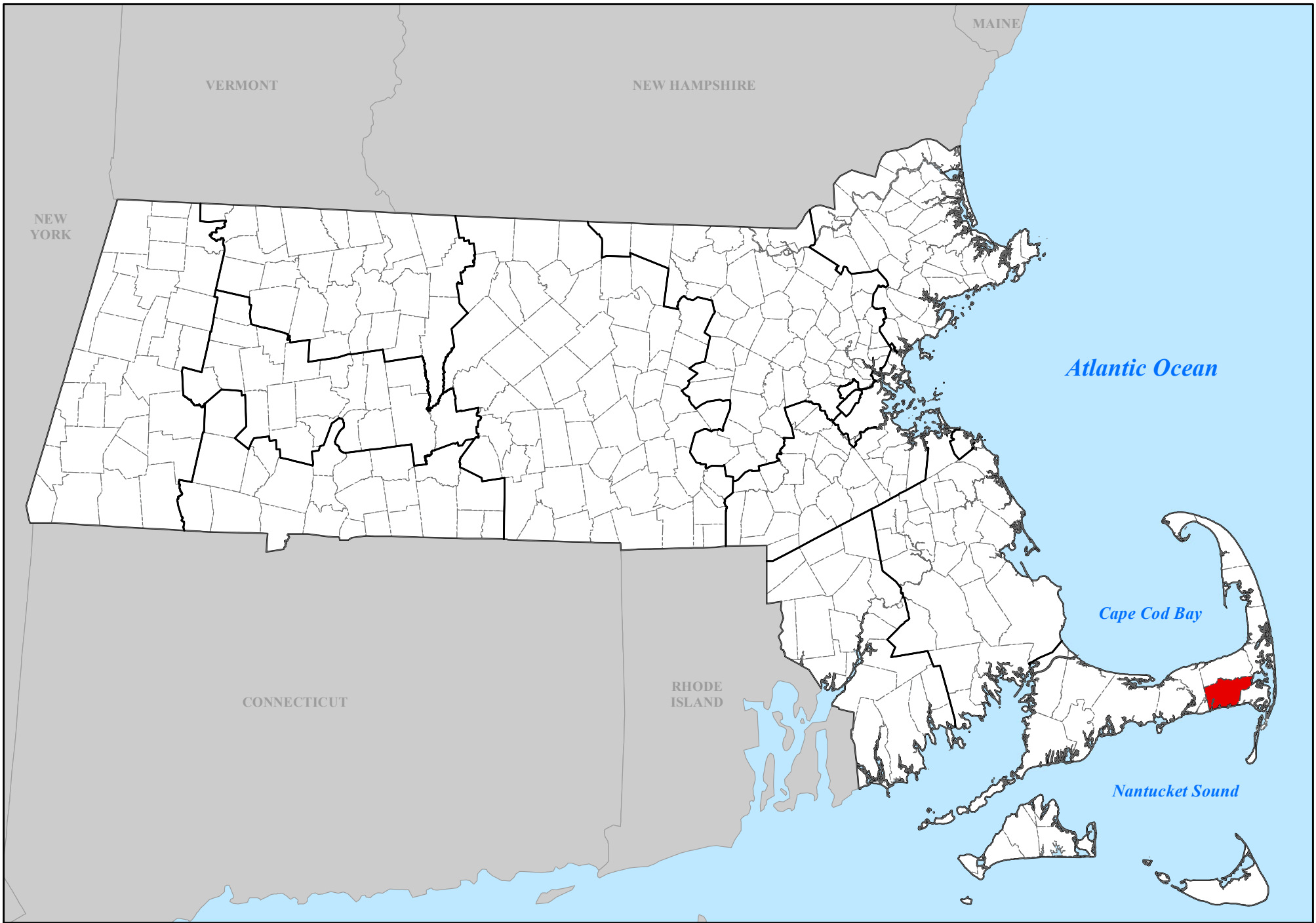
The Town is governed by an open town meeting form of government, led by a Town Administrator and a five-member Board of Selectmen. According to data from the 2010 U.S. Census, the Town has a population of 12,243 people, which is one percent less than the 2000 U.S. Census. The 2005-2009 American Community Survey 5-Year Estimates document 9,652 housing units, 58% occupied and 42% vacant. The vacant housing units most likely reflect seasonal homes considering that the total population of Harwich increases to approximately 37,000 people in the summer months. The median household income in 2009 was \$53,607. Harwich is primarily residential, with a seasonal tourist population that accounts for a large portion of the local economy.

Figure 1-3 shows the level of development in Harwich in 1951 compared to 1999. As seen in this figure, the increase in development has been significant, causing marked increases in nutrient (mainly nitrogen) inputs to the local ground and surface water resources.

The Town's public drinking water is supplied from municipal groundwater wells located throughout town. The Town does not have any wastewater collection system or municipal wastewater facility. Based on data in the Town's Geographic Information System (GIS), there were approximately 9,000 developed parcels out of 11,600 in Harwich in 2011. This is the Town's best estimate of the number of on-site wastewater treatment and disposal systems in town. This number includes 28 parcels that have on-site package treatment facilities. Five of these parcels operate systems designed to handle over 10,000 gallons-per-day (gpd), the state's threshold for regulation by the Massachusetts Department of Environmental Protection (MassDEP) via a groundwater discharge permit. These five parcels are as follows:

- Snow Inn, 23 Snow Inn Road
- Cranberry Point Nursing Home, 111 Headwaters Drive
- Harwich Middle and Elementary Schools, 263 South Street
- Harwich Laundry and Cleaners, 2 Doane Road
- Wequassett Resort and Golf Club, 2171 Route 28

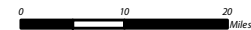
The remaining 23 systems are under the jurisdiction of the Harwich Board of Health Rules and Regulations. A complete list of these parcels can be found in Section 3.



Legend

- County Boundary
- Town of Harwich
- Town Boundaries

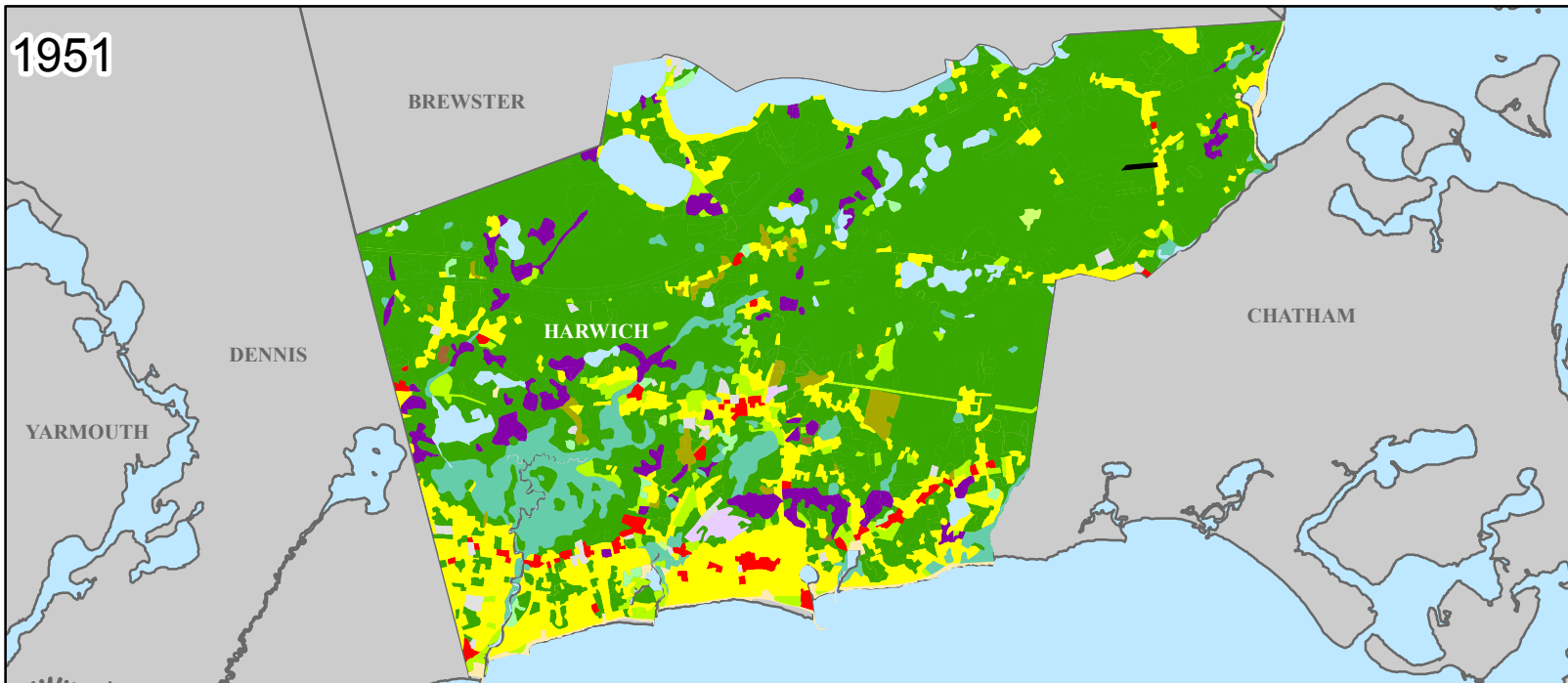
Town of Harwich
Comprehensive Wastewater Management Plan





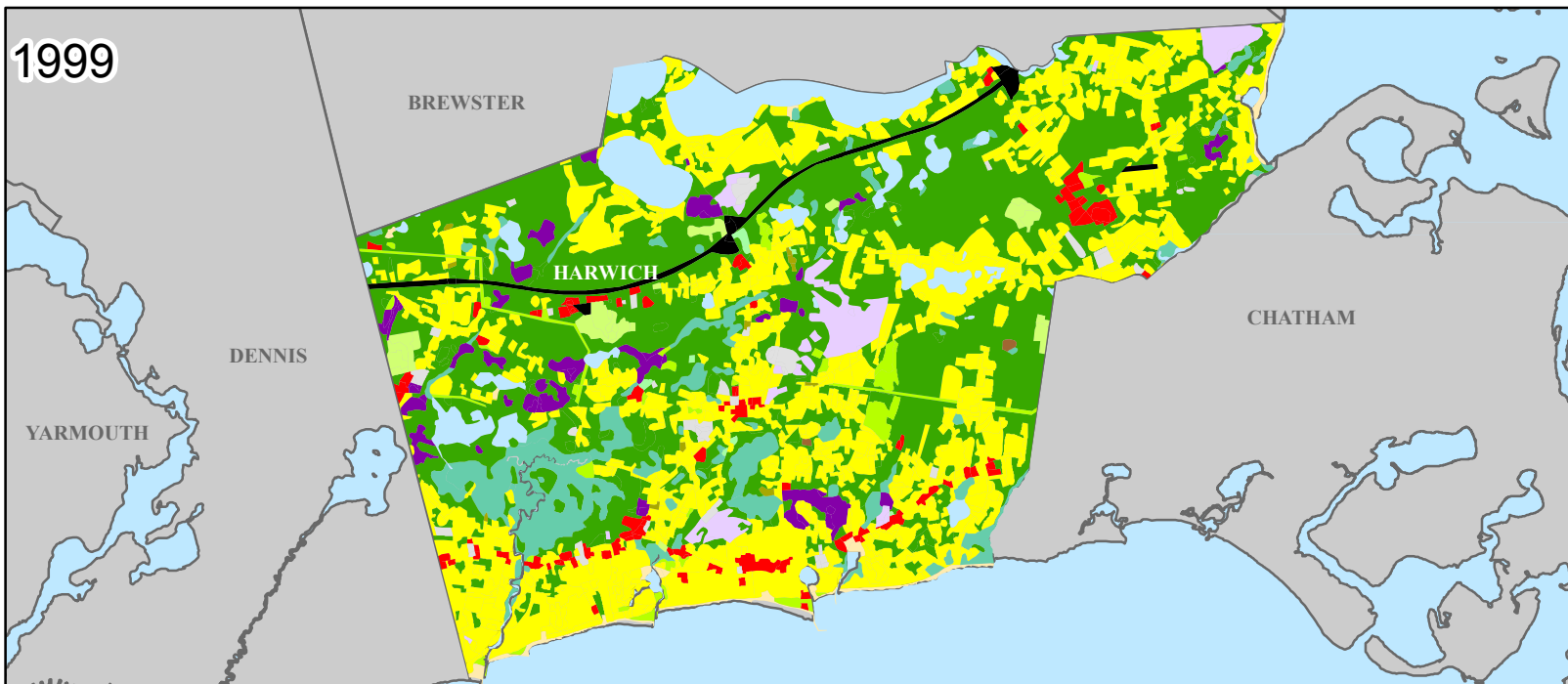
0 2 Miles

Town of Harwich
Comprehensive Wastewater Management Plan



Legend

- Crop Land
- Pasture
- Forest
- Wetland
- Mining
- Open Land
- Recreation
- Coastal
- Residential
- Commercial/Industrial
- Urban Open
- Transportation
- Waste Disposal
- Water
- Woody Perennial



Town of Harwich
Comprehensive Wastewater Management Plan

0 1 2 Miles

Figure 1-3
Land Use 1951 and 1999

**CDM
Smith**

1.2.2 Massachusetts Estuaries Project Watersheds

The Massachusetts Estuaries Project (MEP) is a multi-year study which evaluates the health of coastal bays and estuaries in southeastern Massachusetts, assesses nitrogen sources contributing to degraded conditions, and determines the nitrogen load reductions necessary to meet water quality standards. The University of Massachusetts Dartmouth's School for Marine Science and Technology (SMAST) is leading this effort by developing water quality models for approximately 89 Massachusetts estuaries. SMAST is working in conjunction with the MassDEP, the Cape Cod Commission (CCC), Coastal Zone Management, and other agencies and municipalities. The MEP uses comprehensive water quality testing and quantitative modeling to determine the specific levels and locations of nitrogen reduction required for the long-term preservation of surface and coastal water quality.

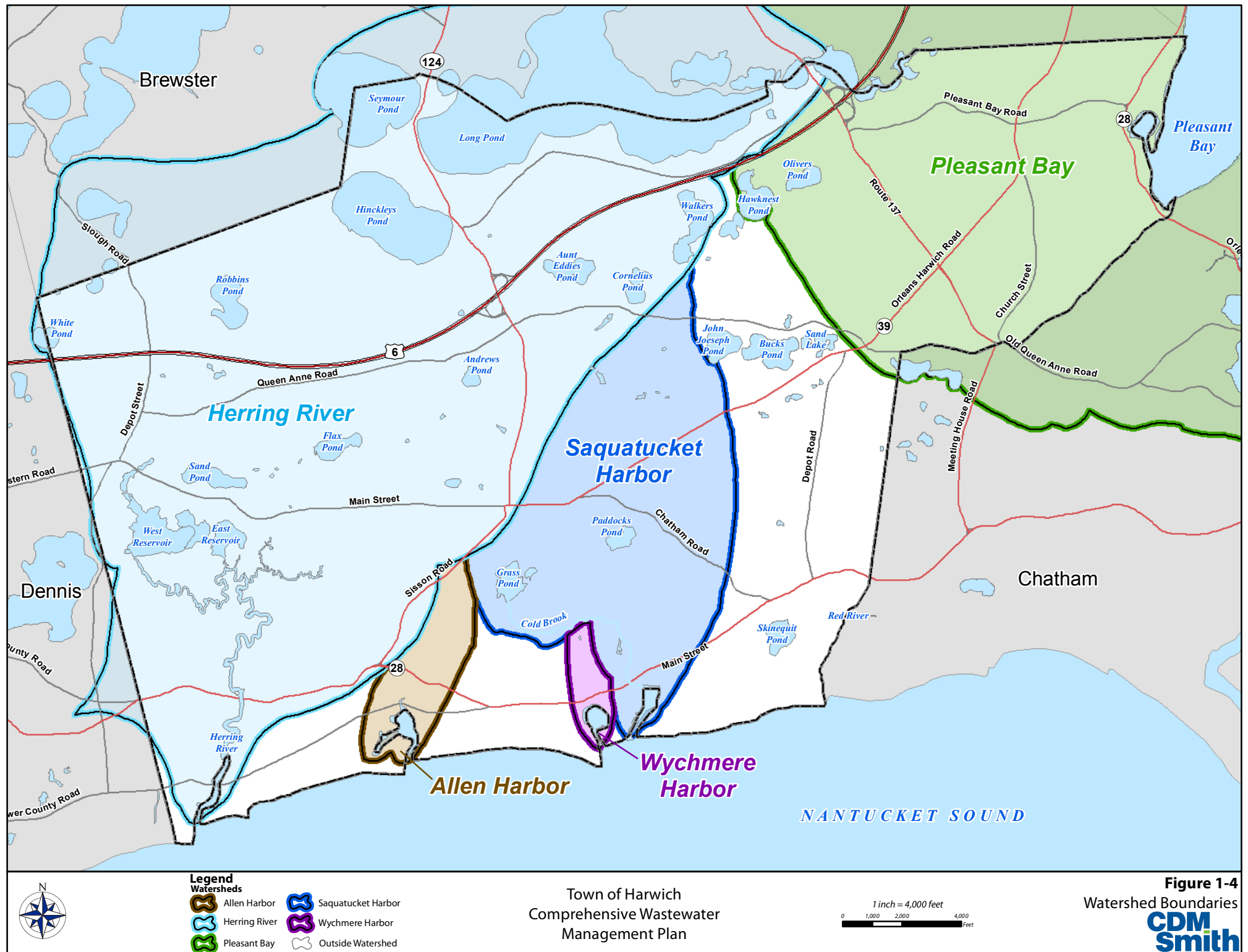
In Harwich, five embayments are being studied, as shown on Figure 1-4: Herring River, Allen Harbor, Wychmere Harbor, Saquatucket Harbor, and the Pleasant Bay. All studies were initiated in 2004 and reports have been issued for each Harwich watershed. The Pleasant Bay system is a shared watershed with the towns of Brewster, Chatham, Harwich, and Orleans, and the Herring River system is shared with the towns of Dennis and Brewster. Based on the MEP studies, MassDEP will be issuing watershed permits to the Town and surrounding communities requiring the towns to remove sufficient quantities of nitrogen to meet the Total Maximum Daily Load (TMDL) in each embayment. Pertinent results from the MEP work are summarized in Section 6 of this report and are integrated into the recommended wastewater management program presented in Section 13.

1.2.3 Harwich Village Centers

The revitalization of Harwich's Village Centers, such as Harwich Port and Harwich Center, provides additional motivation for wastewater management planning. Land use, traffic, and wastewater planning efforts are intended to revitalize businesses and communities in these village centers. These properties are presently limited by how much wastewater they can adequately treat and dispose of on-site, with local or MassDEP approval. Planning efforts intend to direct growth in certain areas which will be supported by existing and planned infrastructure. Wastewater management improvements are necessary to provide off-site wastewater treatment and effluent recharge for the proposed revitalization and/or desired higher density growth.

1.3 Harwich Wastewater Management Subcommittee

The Town's Wastewater Management Subcommittee was formed in 2007 as a subcommittee to the town-wide Water Quality Management Task Force (WQMTF). The WMS was developed to oversee the development of this CWMP. The WMS interacts and works cooperatively with state and federal agencies, especially in relation to the MEP, and seeks to understand the effects of wastewater discharges from septic systems and other nitrogen contributors on Harwich's estuaries and groundwater resources.



The WMS consists of six citizen members supported by town staff representing a variety of town interests, including health, planning and community development, conservation, and natural resources. At present time, the WMS includes the following members:

- Bradford Chase
- Peter de Bakker, Chair
- Danette Gonsalves
- Stanley Kocot
- George Myers
- Robert Owens
- Francis Sampson, Past Chair (2007 to 2010)

The Town support staff includes the following Members

- Larry Ballantine, Selectmen's Liaison
- Paula Champagne, Health Director, Town of Harwich
- Robert Cafarelli, Town Engineer, Town of Harwich
- Heinz Proft, Assistant Harbormaster/Natural Resources Officer, Town of Harwich
- David Spitz, Town Planner, Town of Harwich
- Craig Wiegand, Water Superintendent, Town of Harwich

The WMS typically held monthly meetings throughout this process. All WMS meetings were open to the public and were publically advertised on the Town's website. A list of WMS community meetings is provided in Section 2 of this report.

1.4 Purpose and Scope

1.4.1 Purpose

The primary purpose of this Draft CWMP/ENF is to evaluate the wastewater needs of the community and develop a recommended wastewater management program based on meeting the demands of the study areas considered to have the greatest need for off-site wastewater solutions. The wastewater management alternatives evaluated consider the needs of residents, business owners, tourists and the local environment. The purpose of this CWMP effort is to ultimately restore degraded water bodies, allow the return of productive shellfish areas, encourage revitalization of the business areas, continue to protect drinking water supplies, and keep the beaches open for all to enjoy.

This report has been developed as a Draft CWMP along with an Environmental Notification Form (ENF) pursuant to the regulations of the Massachusetts Executive Office of Energy and Environmental Affairs (EOEEA), Massachusetts Environmental Policy Act (MEPA) unit. Furthermore, it is being submitted for joint review by the Cape Cod Commission (CCC) under their Development of Regional Impact (DRI) review process. Thus, it will undergo simultaneous reviews by the EOEEA, MassDEP, the CCC, and other stakeholder groups and interested parties, via the public review and comment period associated with the MEPA process. Following the issuance of a Certificate by the MEPA unit, the Town intends to submit a single submittal that includes a CWMP/Single Environmental Impact Report (SEIR) which will address the comments received on this Draft CWMP/ENF.

Once the MEPA review process is complete the Town will formally begin the DRI review process with the Cape Cod Commission. This step is required even though the Cape Cod Commission will be involved throughout the MEPA process because the DRI can not formally begin until the final MEPA certificate is issued. The Commissions early involvement in the process is beneficial for the Town because it will help to ensure that any potential issues raised by the CCC will have have been addressed through the MEPA approval process.

The steps are listed below:

1. File Draft CWMP/ENF
 - a. Initiate Joint Review by the CCC, the MEPA unit EOEEA and MassDEP. (This joint review will continue through every step of the review process.)
2. Receive certificate from the MEPA unit
3. Town to submit CWMP/SEIR
4. Receive final certificate from the MEPA unit
5. Begin formal DRI review process with the CCC

1.4.2 Scope

This Draft CWMP/ENF summarizes relevant data and previous projects relating to wastewater management, explains public participation programs and coordination with other projects, summarizes the wastewater needs assessment, estimates wastewater flows, evaluates effluent recharge sites, proposes possible wastewater management alternatives, and selects a recommended alternative based on a preliminary comparison of costs as well as technical, institutional and environmental criteria. The recommended alternative is then rolled into a complete recommended program for wastewater management in Harwich. The recommended program is then analyzed in detail with regards to hydrogeologic considerations, construction and environmental impacts, and program financing.

The recommended wastewater management program put forth in this draft CWMP is a guide for the Town to follow based on current conditions and regulations. Should the Town desire to make changes to the program in the future based on water quality monitoring feedback, changing community interests or other pertinent factors, it may do so utilizing the appropriate regulatory review procedures.

1.5 Water Quality Discussion

The Harwich Comprehensive Wastewater Management Plan presents a recommended program that complies with current water quality regulations. However, due to the cost of this overall program some Harwich stakeholders have questioned the cost/benefit of full compliance and whether the appropriate standards are being applied to the specific scenarios encountered in town. The vast majority believe water quality is extremely important to the quality of life in town and that a nutrient problem exists that must be addressed in the near future. The critical question is how far does the program need to go in order to adequately address the issue. The Herring River and Pleasant Bay watershed are sensitive areas that have historically supported ecological diversity, including eelgrass and should be protected based on current water quality standards. However, the Allen, Wychmere and Saquatucket Harbor watersheds are essentially manmade harbors or boat marinas which have historically exhibited less sensitive ecological diversity and no eelgrass. Establishing water quality parameters to be attained based on the highest and best use versus the current use is the current regulatory answer. The discussion below is intended to provide an overview of the key regulations governing this process and some of the issues to monitor during the initial phases of implementation of this plan.

The federal Clean Water Act (CWA) was enacted 40 years ago (October 18, 1972) to mainly address the raw discharge of sewerage and other pollutants into our nation's waters. Point source pollution has been addressed through issuance of and compliance with National Pollution Discharge Elimination System (NPDES) permits. Significant progress in cleaning up our waters has been achieved and many of these water bodies are once again used for fishing, swimming and more. While progress has been made about 40 percent of the nation's lakes, ponds, rivers, wetlands and coastal waters remain impaired due to pollution. Thus, Massachusetts and other states are now addressing nonpoint sources of pollution including stormwater, septic systems and erosion to clean-up these waters. The Massachusetts Department of Environmental Protection (MassDEP) is charged with issuing on a watershed basis the Total Maximum Daily Loads (TMDLs) under the provisions of the CWA for a given water body. The TMDL is the greatest amount of a pollutant that a waterbody can accept and still meet water quality standards for protecting public health and maintaining the designated beneficial uses of those waters for drinking, swimming, recreation and fishing.

Pollution to waterbodies can be man-made or natural. It includes such things as stormwater run-off, nutrients in effluent from septic systems, effluent from wastewater treatment plants, applied chemicals, eroding soils, and naturally decaying organic matter. Pollutants include heavy metals, toxic chemicals, nutrients, fecal coliform bacteria and oil and grease.

The MassDEP has adopted several Code of Massachusetts Regulations (CMRs) that address Surface Water Quality Regulations (314 CMR 4.00), Groundwater Quality Regulations (314 CMR 5.00), and Ocean Sanctuaries (302 CMR 5.00). Each is briefly discussed below.

Surface Water Quality Regulations – designate the most sensitive uses for which the various waters of the Commonwealth shall be enhanced, maintained and protected; which prescribe the minimum water quality criteria required to sustain the designated uses; and which contain regulations necessary to achieve the designated uses and maintain existing water quality including, where appropriate, the prohibition of discharges. These regulations segment the waters of the Commonwealth into classes that are based upon the most sensitive, and therefore governing, water uses to be achieved and

protected. Class A is the highest inland water quality class while Class SA is the highest coastal and marine class and the one most relevant to this CWMP. Waters designated as SA are designated as an excellent habitat for fish, other aquatic life and wildlife, including for reproduction, migration, growth and other critical functions, and for primary and secondary contact recreation. These waters may also be designated for shell fishing and shall have excellent aesthetic value. Water quality standards for Class SA waters mainly include Dissolved Oxygen (DO), solids, turbidity, temperature, bacteria, pH and oil and grease. The classification of a water body is set based on its highest and best use versus what it current is today. Thus, most coastal and marine waters are designated Class SA, with very few Class SB, and no current Class SC waters in the Commonwealth (B. Dudley, MassDEP, 12-15-10).

The MEP studies conducted for Harwich establish water quality criteria with the goal to restore each embayment back to full compliance with Class SA criteria. This results in significant nitrogen removal requirements in order to achieve those criteria requiring costly programs. This has led to some questioning the value of 100 % compliance. For instance many have questioned the value of restoring Allen, Wychmere or Saquatucket Harbors back to fishable and swimmable water quality when they in fact act as functioning marinas/ boat basins. Similarly, some have questioned whether the oil and grease, turbidity and DO criteria can truly be attained with the present uses of these harbors. These harbors are quite different than the Herring River Embayment system which includes a large marshland system to the north and the Pleasant Bay system which is a large open water body. Yet the Class SA criteria are the same for each. Some groups, such as the Cape Cod Collaborative, have begun to discuss ways to try and meet the intent of the regulations while modifying the regulations to account for specific uses. Harwich stakeholders understand they have a nitrogen related issue in their harbors and embayments but like many communities facing costly restoration programs they wonder how the regulations might be modified to account for specific uses. Should modifications be allowed in the future then the recommended program put forth herein can be revised via adaptive management. The recommended phasing plan for the wastewater program is designed to account for some of these discussions should potential changes occur and

Groundwater Discharge Permit Program Regulations – control the discharge of pollutants to the groundwater of the Commonwealth to assure that groundwater is protected for actual and potential use as a source of potable water, that surface waters are protected for their existing and designated uses, and to assure the attainment of the Surface Water Quality Regulations. As these regulations relate to the Harwich CWMP, they govern the criteria that must be attained in the liquid effluent resulting from treatment of wastewater at a treatment plant that receives 10,000 gallons per day (GPD) or more. Criteria vary depending on the location of the effluent recharge to land and its relationship to a public water supply well. Criteria can include total suspended solids, turbidity, total organic carbon, biological oxygen demand, and total nitrogen or nitrate nitrogen. The parameters for these criteria change based on how close or far away the effluent recharge is to the well in terms of time of travel in the groundwater to the well. Hydrogeologic studies must be done to help support the requirements established in the groundwater discharge permit. The level of nitrogen allowed in the effluent will also be linked to the receiving coastal or marine water so that the nitrogen TMDL is attained.

Ocean Sanctuaries Act – designed to work through the Commonwealth’s Coastal Zone Management Program to protect ecologically significant resource areas for their contributions to marine productivity and value as natural habitats and storm buffers. Specifically excluded activities in the

Cape Cod Ocean Sanctuary, the Cape Cod Bay Sanctuary and the Cape and Island Ocean Sanctuary include municipal wastewater treatment discharges. Potential variances include proving the ocean discharge would be the only feasible alternative which includes detailing there is no approvable method of land application for the effluent recharge and that the ocean discharge is of equal or greater effectiveness in avoiding degradation of the water quality of the affected ocean sanctuary. Several communities on Cape Cod have discussed trying to implement a regional ocean outfall mainly due to the very high quality of the treated effluent and the difficulty in finding acceptable land recharge sites. Harwich stakeholders remain interested in those discussions and could revise their recommended program in the later phases through adaptive management should this prohibition be overcome. An ocean outfall scenario for Harwich only has been included in the alternatives analysis herein for comparative purposes. Currently, MassDEP policy and the opinion of some stakeholder groups in Harwich is that effluent recharge to the land is the preferred approach as it helps replenish the groundwater table.

The Massachusetts Department of Environmental Management (MassDEM) is charged with enforcing 302 CMR 5.00: Ocean Sanctuaries which was promulgated to carry out the provisions of M.G.L. c. 132A, 13 through 16 and 18, the Ocean Sanctuaries Act. This Act created five ocean sanctuaries of which three relate to Cape Cod: Cape Cod Ocean Sanctuary, Cape Cod Bay Ocean Sanctuary and Cape and Islands Ocean Sanctuary. Per 302 CMR 5.08(9)(a) no municipal wastewater treatment discharge into these ocean sanctuaries shall be allowed.

In summary, each of the five MEP watershed study areas in Harwich needs to have nitrogen removed and the program developed in this CWMP is designed to do so according to water quality regulations as they exist today. However, several groups and communities are discussing the ultimate criteria or endpoint standards that must be attained in these regulations since getting to that endpoint is a costly endeavor. Harwich stakeholders understand something needs to be done and that nitrogen needs to be reduced to help restore the water quality in its valuable marine waters. As that plan for nitrogen reduction is implemented, discussions about the ultimate water quality endpoints should continue and the recommended program modified in the later phases via adaptive management based on those discussions. That flexibility has been built into the program developed for Harwich.

1.6 Organization of this Phase I CWMP

This report is divided into fourteen sections. The sections are as follows:

- Executive Summary presents an overview of the report and the findings.
- Section 1 introduces the CWMP project and details the purpose, the scope, existing conditions, and the organization of the report.
- Section 2 discusses public participation programs, as well as ongoing projects and groups relevant to the CWMP development.
- Section 3 summarizes past and present data related to the CWMP.
- Section 4 provides a summary of existing water quality data in Harwich.

- Section 5 discusses the health of the Town’s freshwater ponds and associated wastewater needs identified to help protect these resources.
- Section 6 describes the findings of the Massachusetts Estuaries Project for the five applicable watersheds in Harwich.
- Section 7 summarizes the existing wastewater flow quantities in Harwich and establishes the baseline flow data for the evaluation of wastewater management alternatives.
- Section 8 provides details of the wastewater needs assessment identifying the areas of town requiring off-site solutions.
- Section 9 describes the evaluation of potential effluent recharge sites and recommends specific sites to be carried forward into Section 10.
- Section 10 presents eight wastewater management alternative scenarios and a comparative analysis to narrow down to three preferred alternatives.
- Section 11 summarizes the hydrogeologic evaluations of the preferred effluent recharge sites.
- Section 12 provides a further analysis of alternatives, narrowing the three preferred alternatives from Section 10 down to one recommended alternative for wastewater management.
- Section 13 presents the recommended program for wastewater management, incorporating the recommended alternative from Section 12 and other components to enhance environmental protection and meet other town goals.

The appendices contain backup analyses, figures and documentation.

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