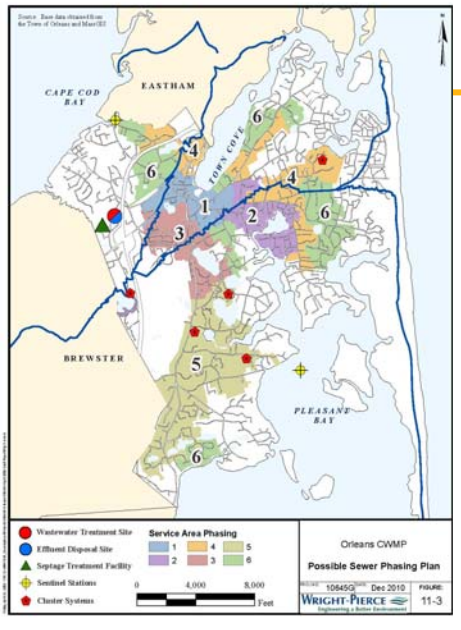
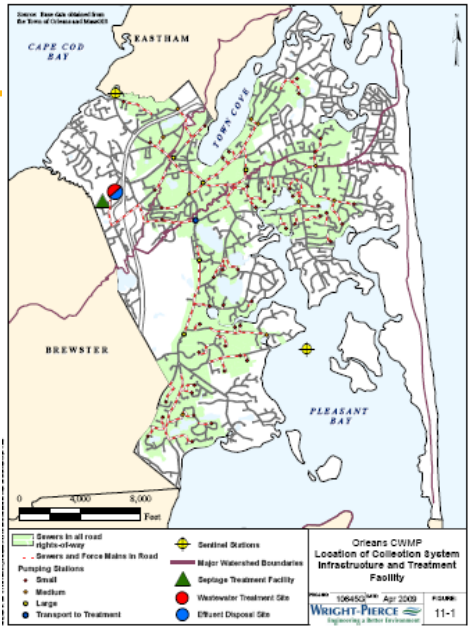
CAPE COD COMMISSION

Water Resource Comments on Orleans Comprehensive Wastewater Management Plan / DRI

April 14, 2011
6 PM
Assembly of Delegates

Six-Phased Core Sewer Plan





Topics

- **Minimum Performance Standards**
- **Questions**
  - Assimilative Capacity
  - Fresh Water Flow
  - Science
- **Preliminary Design and Areas of Agreement**

Water Resources Goal – WR2: Drinking Water Quality and Quantity

To maintain the overall quality and quantity of Cape Cod's groundwater to ensure a sustainable supply of untreated high-quality drinking water.

- **WR2.1 Five-ppm Nitrogen Loading Standard**
- **WR2.3 Restrictions on Public and Private Wastewater Treatment Facilities**

Water Resources Goal – WR3: Marine Water Embayments and Estuaries

- WR3.1 Critical Nitrogen Load Standard for Development
- WR3.2 Maintenance or Improvement of Nitrogen Loading
- WR3.3 Local Management Plans
- WR3.6 Public and Private Wastewater Treatment Facilities

Water Resources Goal – WR4: Freshwater Ponds and Lakes

To preserve and restore the ecological integrity of freshwater ponds and lakes.

- WR4.1 Limits on Subsurface Disposal Systems
- WR4.3 Public and Private Wastewater Treatment Facilities

Water Resources Goal – WR5: Water Quality Improvement Areas

- **WR5.1 Nitrogen Loading Standards**
- **WR5.2 Public and Private Wastewater Treatment Facilities**

Water Resources Goal – WR6: Public and Private Wastewater Treatment Facilities

- **WR6.2 Tertiary Treatment**
- **WR6.3 Hydrologic Balance**
- **WR6.8 Sludge Disposal**

Water Resources Goal – WR7: Stormwater Quality

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To protect the overall water quality of the aquifer and its resources by minimizing impervious surfaces and improving Stormwater quality as much as possible.

- **WR7.1 No New Direct Discharges of Untreated Stormwater**
- **WR7.2 On-Site Infiltration**
- **WR7.3 Roof Runoff**
- **WR7.4 Biofiltration Practices**
- **WR7.9 Best Management Practices during Construction**

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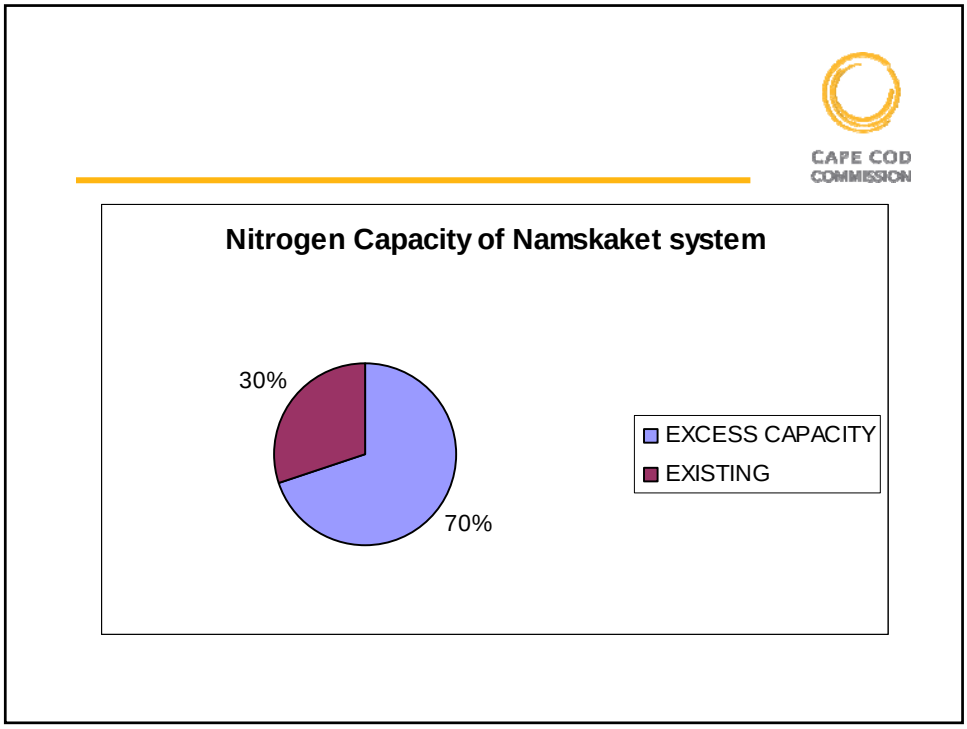
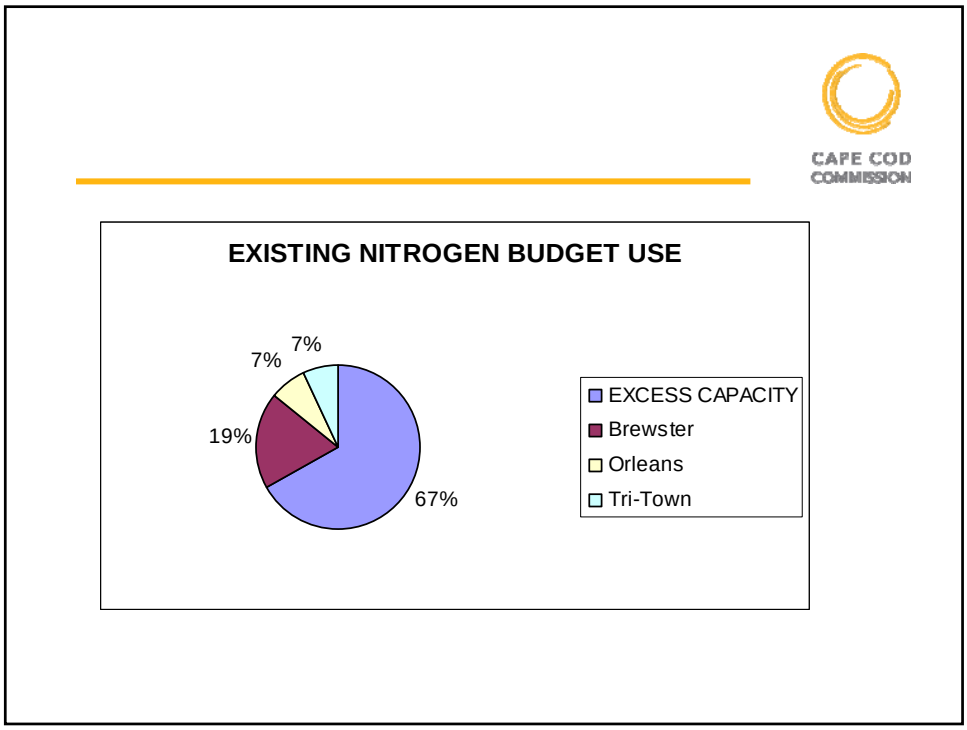
Assimilative Capacity?


Nitrogen Capacity of Namskaket system
30%
70%
EXCESS CAPACITY
EXISTING


EXISTING NITROGEN BUDGET USE
7%
7%
19%
67%
EXCESS CAPACITY
Brewster
Orleans
Tri-Town

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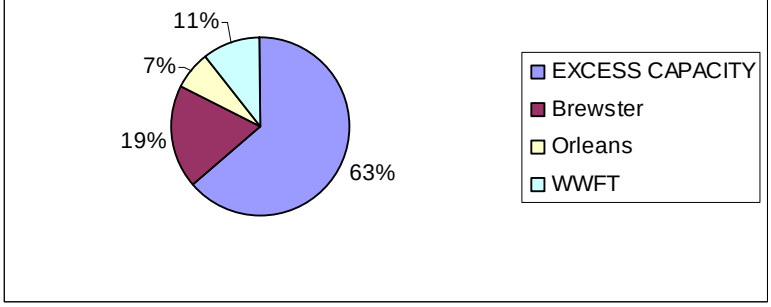
PROPOSED WWTF NITROGEN BUDGET



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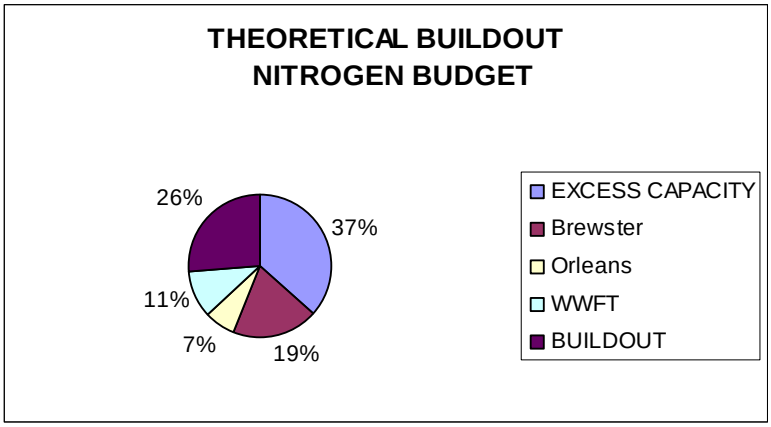
THEORETICAL BUILDOUT NITROGEN BUDGET



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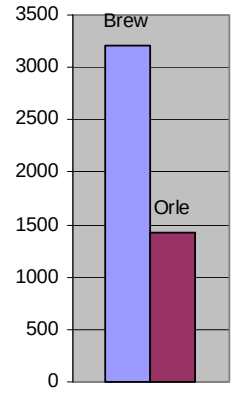
Relative Buildout Amount



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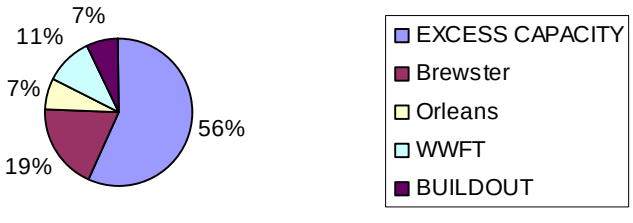
PRACTICAL BUILDOUT NITROGEN BUDGET



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FRESH WATER FLOWS and DILUTION?

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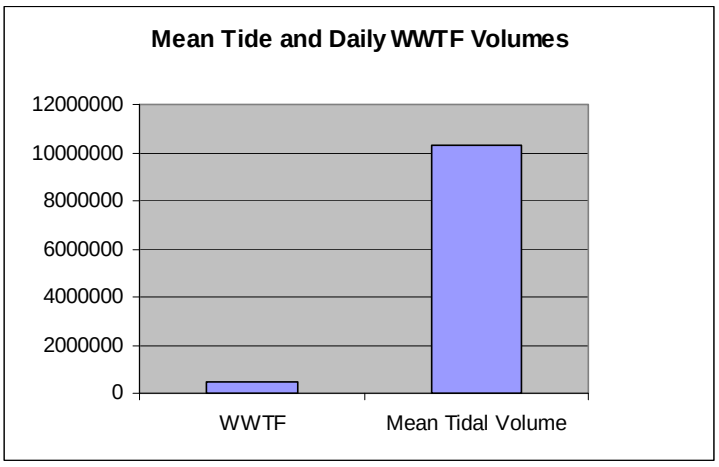


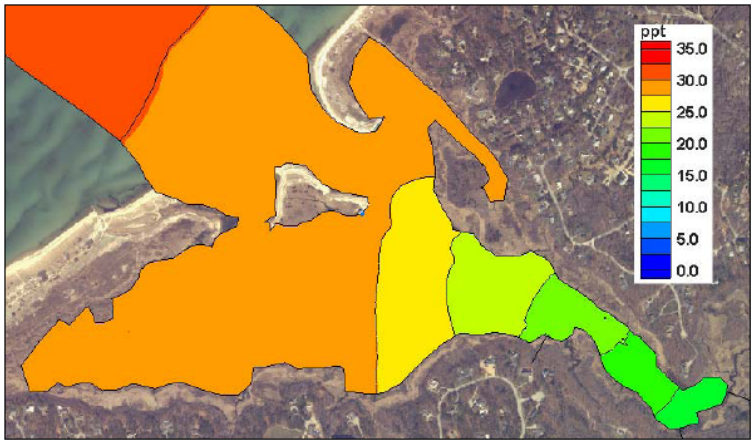
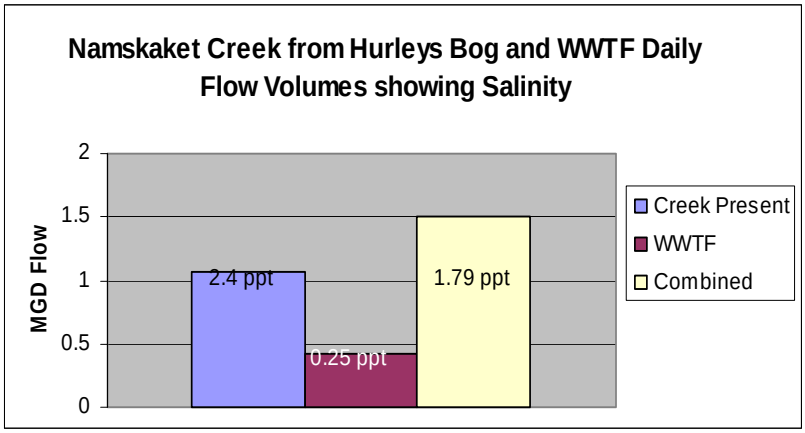


Figure VI-7. Contour Plot of modeled salinity (ppt) in Namskaket Creek system.



Conservative Assumptions and Hydrogeologic Uncertainty

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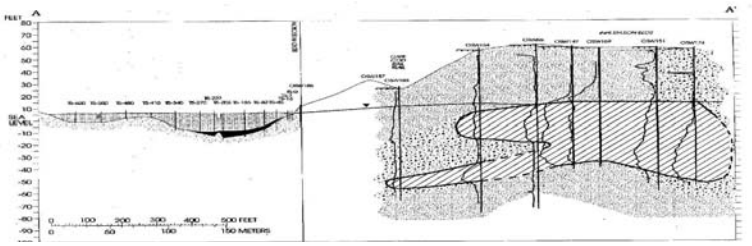
- Consultant Model conservatively indicates that 70% of effluent flow may discharge into Namskaket Creek
- USGS Studies indicate a larger percent of effluent flow passes beneath Marsh to Cape Cod Bay



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SCIENCE ???

Woods Hole Group Peer Review Report (June 2009) on Pleasant Bay MEP

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Public opinion: As a result of the high stakes, investment required to comply with the TMDLs, complexity of the technical issues, and lack of transparency there is some inherent level of skepticism in the process. There also exists the natural tendency to avoid major public expenditures. Given the complexity of the matters, there also is opportunity for various stakeholders to develop conclusions that may be inconsistent or at odds. The information presented within this peer review in some ways helps confirm and boost confidence in the findings of the MEP report, but also identifies, in some cases, significant potential sources of uncertainty, error, and bias in the results. We understand that some stakeholders will place more emphasis on different parts of our review. While this peer review might ideally help resolve all stakeholder concerns/differences that exist, this is not a reasonable expectation. This peer review merely reflects the educated opinions and findings on the three scope areas identified in the RFP. This peer review is focused on objective science, and it not intended to respond to or resolve public opinions.

April 7, 2011 Ammann and Eagles Letter

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" At issue here is not the "goodness" or adequacy of the MEP model as a tool for nitrogen of nutrient reduction. The issue is: will the recommended nitrogen reductions produce the expected improvements in habitat health and water quality? "

Pleasant Bay Conditions

- **Post 2007 Breach has improved Water Quality in some sectors of the Major embayment.**

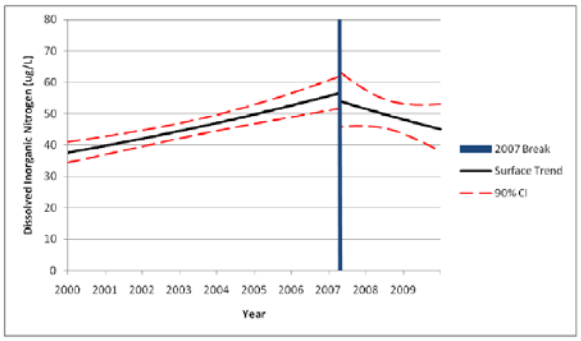
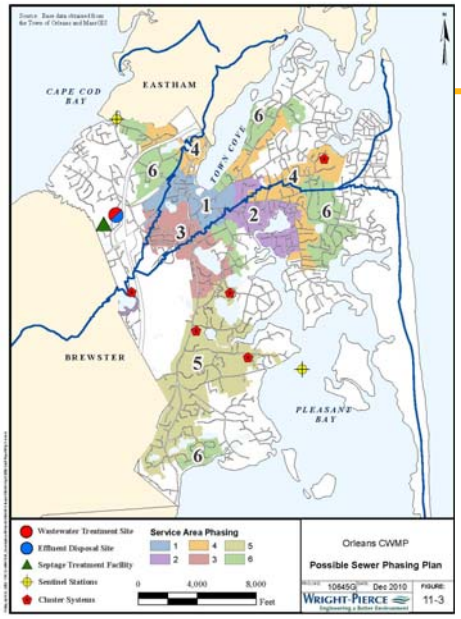


Figure 16 Bay-wide trends in dissolved inorganic nitrogen (DIN) surface concentrations over the 2000-2009 period. Dashed lines indicate approximate 90% confidence intervals (CI). Both pre-break and post-break trends are statistically significant.

Pleasant Bay Conditions

- **Headwaters in Orleans remain impaired:**
  - Meetinghouse Pond
  - Areys Pond
  - Paw Wah Pond
  - Lonney's Pond
  - Little Cove
- **Phased CWMP and decentralization allows expedited TMDL compliance in head waters**

Six-Phased Core Sewer Plan



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REGULATORY STATUS

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- **MEP technical reports are accepted by DEP and EPA as determining the nitrogen critical loads and become the established TMDLs which are adopted by Barnstable County according to the Regional Policy Plan.**

CWMP 11.12.10 Scope of Preliminary Design

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With the completion of the CWMP, perhaps the most important next step facing the Town is the preliminary design of the Recommended Plan.

In addition to establishing the precise nature and extent of infrastructure that will be included in construction contracts (the subsequent final design), the Preliminary Design serves to confirm and update decisions reached in the planning process.

1. Incorporate the results of the MEP technical report on the Nauset system and any new information from the Rock Harbor Technical Report reassessment on Cedar Pond.

- *The MEP modeling information will inform the Town and Commission on the actual amount of nitrogen removal that will be required to achieve TMDL compliance for the Nauset Estuary. This information is critical to regional discussions relative to potential sewering in the Eastham side of the shared watershed and the extent of sewering in the Orleans portion.*

2. Conduct Confirmatory Estuary Modeling

- **Confirmatory modeling involves use of the MEP models for each estuary under various proposed sewering scenarios. This information will provide projections of anticipated reductions of nitrogen in the water column of impacted estuaries from each proposed phase of sewering.**

2. Confirmatory Estuary Modeling

Findings of the MEP scenarios will be incorporated into:

- **Phasing of sewer expansion areas to expedite nitrogen removal in the TMDL watersheds**
- **Wastewater effluent disposal limitations at the Tri-Town Site**
- **Reviewing the anticipated water quality improvements of the head waters of Pleasant Bay embayments due to Cluster systems and incorporating into decision to expedite nutrient removal and decentralize sewering.**

3. Adjust the Recommended Plan to reflect further negotiations among Brewster, Orleans and Eastham related to regionalization of both wastewater and septage facilities.

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The regional wastewater management solutions will be informed by new information and potential future opportunities, such as release of the MEP Nauset Report, confirmatory modeling and town plans and directives.

3. Regionalization

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- ***For regional solutions to remain viable, capacity to accommodate them must be reserved at the proposed WWTF until a decision can be reasonably made.***
- ***The first WWTF construction phase of the WWTF will be for 420,000 gpd (2015), the second WWFT construction phase is projected to begin in 2022 at the beginning of Phase 4 to expand capacity to 640,000 gpd***

7. Update the project schedule (both in general and with respect to timing of each phase)

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The project schedule for the first Phase will be adjusted as issues become resolved through the Preliminary Design task list. The schedule of its implementation and subsequent phases shall be updated in the Annual reports as part of the Adaptive Management Plan and Long Term Compliance

8. Re-assess the geography of sewer phasing plan (in general and with respect to Cedar Pond)

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The extent and prioritization of sewering is shown as the 5 phases of the core plan of the CWMP. Re-assessment of the geography may be subject to change due to final design of the Cluster systems to expedite nutrient removal in the upper pleasant Bay headwaters, need to expand or condense areas serviced based on updated MEP confirmatory modeling and regional infrastructure sharing.

9. If necessary to allow regionalization, plan for additional effluent disposal sites and effluent reuse

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Additional effluent disposal sites or capacity would be required if the Town proposes to proceed with both expanding the sewer service area to a majority of the Town beyond the Core Plan, while at the same time capacity is reserved for regional solutions.

The Tri-town site presently serves as a regional resource for septage disposal and staff recommend that it preferentially continue to serve as a regional wastewater facility asset.

10. Begin formal implementation of all aspects of the Non-Structural Program

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The non-Structural Program includes: Fertilizer Control, Storm water management, Density Controls, natural attenuation and Flushing enhancements.

Initial and Long Term Implementation

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- Complete CWMP Early 2011
- Preliminary Design Funds 2013 Spring
- Preliminary Design Resolutions and Engineering
- Construction Funds 2015
- Phase 1 construction 2015 to 2017
- Start-up of Phase 1 facilities mid 2017
- Phase 2 2016-2018
- Phase 3 2019-2021
- Phase 4 2022-2024
- Phase 5 2025-2027
- Phase 6 2028-2030

Cluster System Recommendations

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- ***Recommend that the Town conduct the review and design of the cluster system at the Preliminary Design so components of implementation can occur in Phase 1.***
- ***Recommend that the Town's Cluster Design evaluate expansion to achieve additional removal.***

Adaptive Management Plan Recommendations

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Recommend that the Commission incorporate specific items of the Adaptive Management Plan as a scope attachment to the DRI decision.

Adaptive Management

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- Implementation of the Plan and milestones
- Documentation of capital expenditures
- Compliance with the groundwater discharge permit
- Reporting on Estuary water quality monitoring
- Summary of habitat assessments that may be completed by the town, Mass DEP and others
- Non-Structural alternative progress
- Potential evaluations and changes as needed

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End of Water Presentation