



Town of

Orleans
Massachusetts

Board of Selectmen Water Quality and Wastewater Planning

Program Status Update

July 12, 2017

Agenda

- ❖ **Effluent Disposal Sites: Investigations and Results**
- ❖ **Financial Plan: Status and Next Steps**
- ❖ **Landfill Nitrate Plume: Investigations, Results and Plan**
- ❖ **Design/Build/Operate: Overview and Next Steps**
- ❖ **MassDOT Intersection Project**





Town of

Orleans
Massachusetts

Effluent Disposal Site Investigations and Results

Effluent Disposal Site Investigations and Results Status

❖ Hydrogeologic Evaluation for Two Sites

- Parcel 1/1A
- Route 6, Exit 12, Cloverleaf

❖ Hydrogeologic Evaluation Results

- Summary of Model Run Parameters: Locations, Flows, Flowpaths
- Analysis of Discharge Flow Paths
- Summary of Allocation of Discharges to Watersheds

❖ Effluent Disposal Plan for Downtown System

- Estimation of Discharge Capacities for Each Site
- Redundancy Requirements
- MEPA Notice of Project Change Consultation



Effluent Disposal Site Investigations and Results (cont.) Locations

Site 1/1A

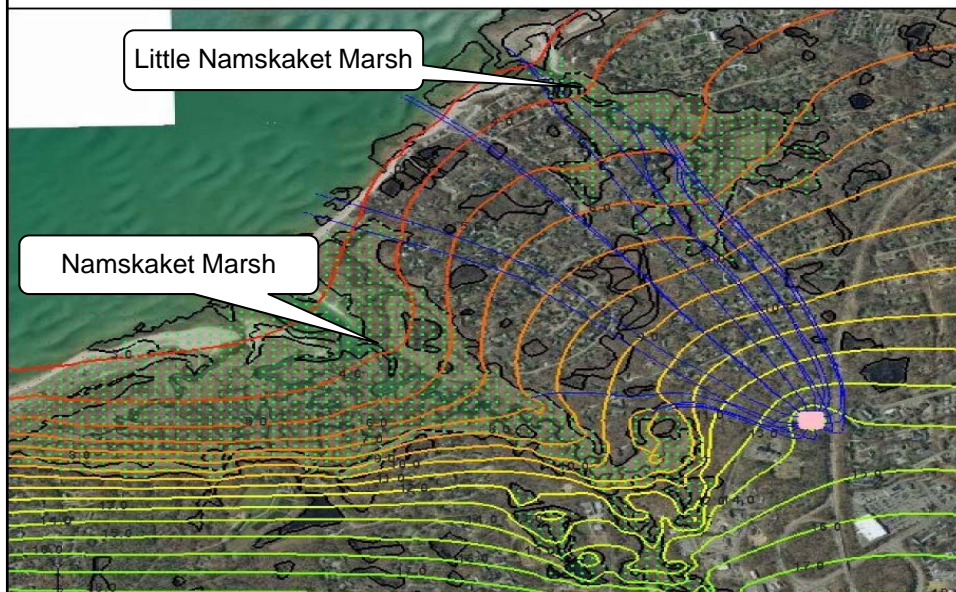
- ❖ Technology: Open Basins
- ❖ Rationale: Shallow Depth to Groundwater, Soil Type and Small Physical Area
- ❖ Design Capacity: 150,000 gpd

Route 6 Exit 12

- ❖ Technology: Wick Wells
- ❖ Rationale: Deep Depth to Groundwater, Soil Type, Large Physical Area, Dense Vegetation and Steep Contours
- ❖ Design Capacity: 400,000 gpd



Effluent Disposal Site Investigations and Results (cont.) Site 1/1A at 150,000 gpd



Effluent Disposal Site Investigations and Results (cont.) Estimated Nitrogen Loading to Watersheds (kg/yr)

Site 1/1A at 150,000 gpd

Location	Present Nitrate Load ¹	Present Nitrate Threshold Load ¹	Allowable Additional Watershed Load ²	Estimated WWTF Nitrate Load	Excess Watershed Load with WWTF Load ³
Namskaket Marsh	4,630	16,750	12,120	316	11,804
Little Namskaket Marsh	2,815	4,650	1,835	421	1,414
Rock Harbor	ND	ND ⁴	ND	0	ND
Cape Cod Bay	ND	ND	ND	1,335	ND

1. Present and Threshold Loads from Draft and Final MEP Reports for Namskaket Marsh, Little Namskaket Marsh, and Rock Harbor.
 2. Watershed Load = Threshold Load - Present Load
 3. Estimated Watershed Load with WWTF = Threshold Load - (Present Load + Estimated WWTF Load)
 4. Threshold Load From Draft MEP Report for Rock Harbor - 1,951 kg/yr (Subject to Change)
- gpd = gallons per day
kg/yr = kilograms per year
ND = No Data

BOS Meeting

July 12, 2017

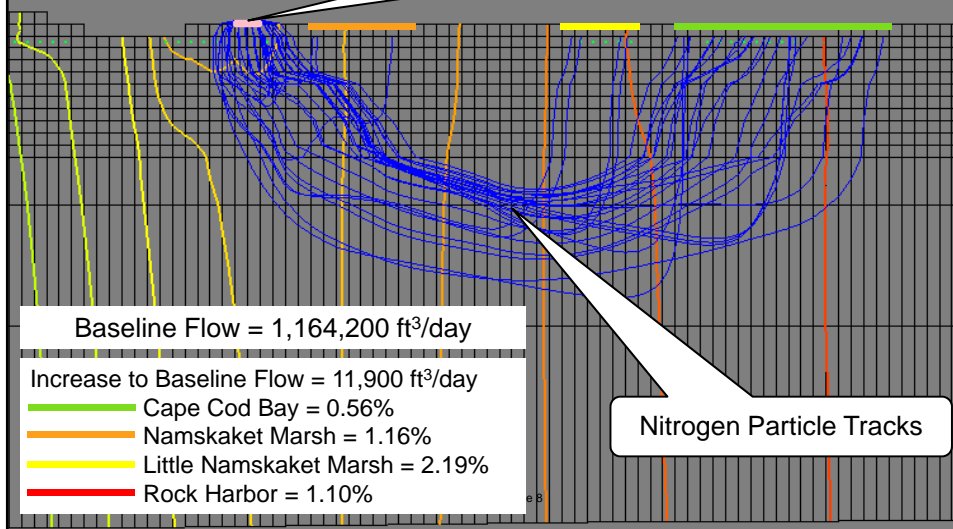
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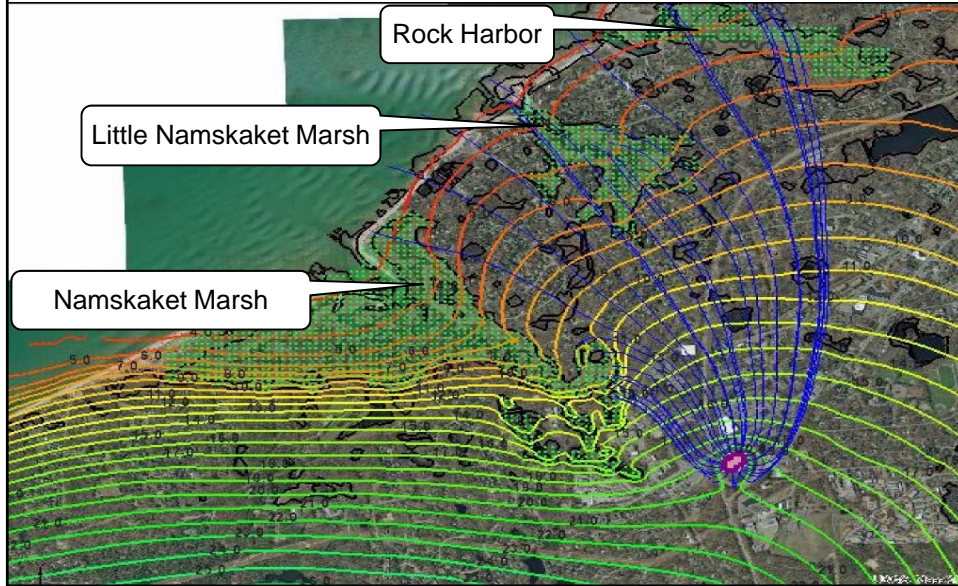
AECOM

Effluent Disposal Site Investigations and Results (cont.) Estimated Discharge to Watersheds

Site 1/1A at 150,000 gpd



**Effluent Disposal Site Investigations and Results (cont.)
Route 6 Exit 12 at 400,000 gpd**



**Effluent Disposal Site Investigations and Results (cont.)
Estimated Nitrogen Loading to Watersheds (kg/yr)**

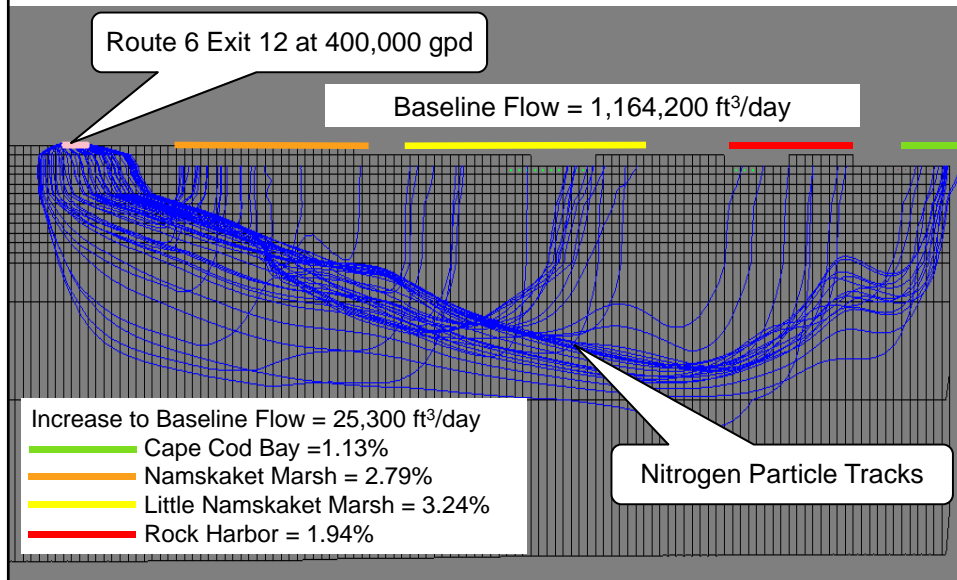
Route 6 Exit 12 at 400,000 gpd

Location	Present Nitrate Load ¹	Present Nitrate Threshold Load ¹	Allowable Additional Watershed Load ²	Estimated WWTF Nitrate Load	Excess Watershed Load with WWTF Load ³
Namskaket Marsh	4,630	16,750	12,120	1,610	10,510
Little Namskaket Marsh	2,815	4,650	1,835	945	890
Rock Harbor	ND	ND ⁴	ND	43	ND
Cape Cod Bay	ND	ND	ND	2,400	ND

1. Present and Threshold Loads from Draft and Final MEP Reports for Namskaket Marsh, Little Namskaket Marsh, and Rock Harbor.
 2. Watershed Load = Threshold Load - Present Load
 3. Estimated Watershed Load with WWTF = Threshold Load - (Present Load + Estimated WWTF Load)
 4. Threshold Load From Draft MEP Report for Rock Harbor - 1,951 kg/yr (Subject to Change)
 gpd = gallons per day
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Effluent Disposal Site Investigations and Results (cont.) Estimated Discharge to Watersheds



Effluent Disposal Site Investigations and Results (cont.) Next Steps

- ❖ **Site 1/1A**
 - Further Investigation of Soils under Compost Shed
- ❖ **Route 6 Exit 12 - MassDOT**
 - Wick Well Pumping Test
 - Long Term Agreement
- ❖ **MassDEP**
 - Submit Hydrogeologic Evaluation Reports





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Financial Plan

Financial Plan Enhancements

- ❖ **“De-couple” Septage Revenue from Septage Construction and Operation and Maintenance Costs: Ability to Utilize Revenue for Properties Who Continue to Utilize On-Site System**
- ❖ **Ability to Change Distribution of Operation and Maintenance Costs: By User Group and Revise Distribution of Costs**
- ❖ **Incorporate Minimum and Maximum Calculations with Input via the User Selection Tab: All Properties and Address Very High and Low Cost Allocations**
- ❖ **Incorporate Possible New Tax Revenue Source: Proposed Short Term Rental Tax to Off-set Operation and Maintenance Costs**
- ❖ **Ability to Better Represent the Per-parcel Results in Graphical or Table Format: Based on Input from BOS and Finance Committee Workshops**



Financial Plan (cont.)

- ❖ **Prepare a Financial Model User Manual**
- ❖ **Apply Updated Program Costs Developed as Part of the Downtown Area Preliminary Design Report**
 - Reduction in Capital Costs for WWTF
 - Reduction in Capital Costs for Downtown Area Collection System
- ❖ **Recommend Cost Allocation and Financial Management Plan in August 2017**
- ❖ **BOS and/or Finance Committee Workshops in August and September 2017**



Landfill Nitrate Plume

Landfill Nitrate Plume Status

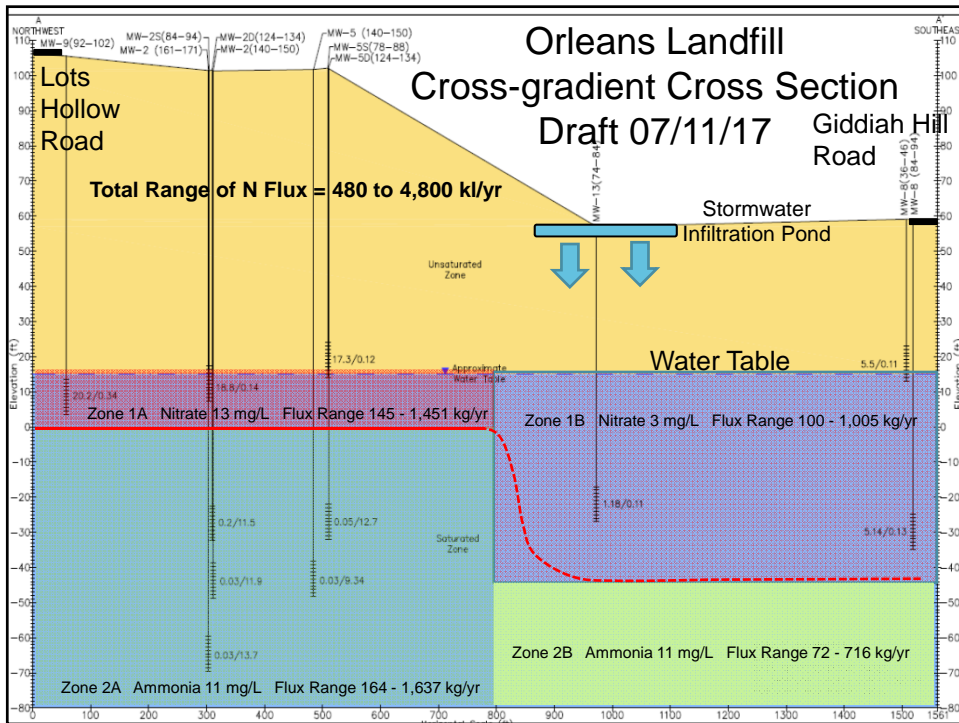
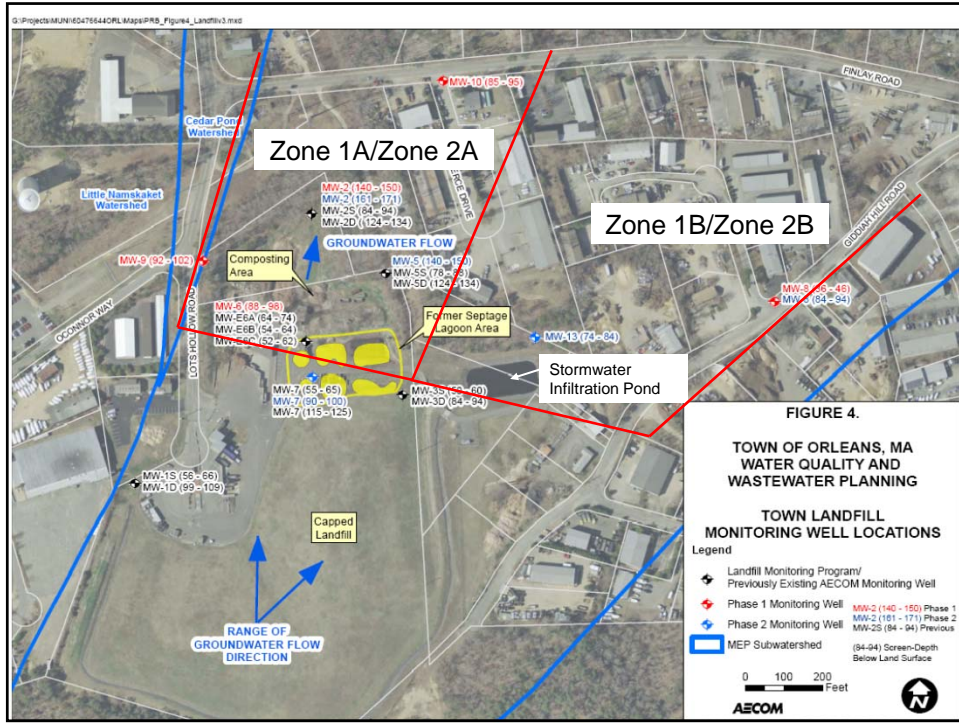
- ❖ Completed Phase 1 Field Investigation Plan
- ❖ Completed Phase 1 Field Investigation Report
- ❖ Completed Field Investigation and Risk Evaluation for 1,4-Dioxane
- ❖ Completed Phase 2 Field Investigation Report Being Completed
- ❖ Ongoing Coordination with UMass Dartmouth's School for Marine Science & Technology (SMAST)
- ❖ Confirming and Conducting the Next Phase of Investigations

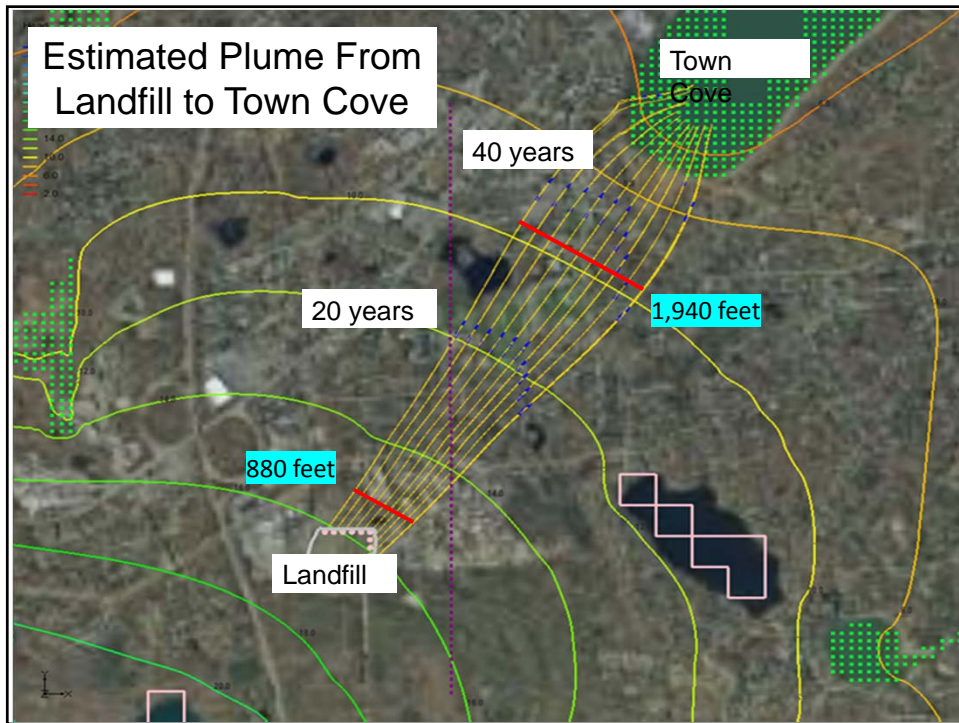
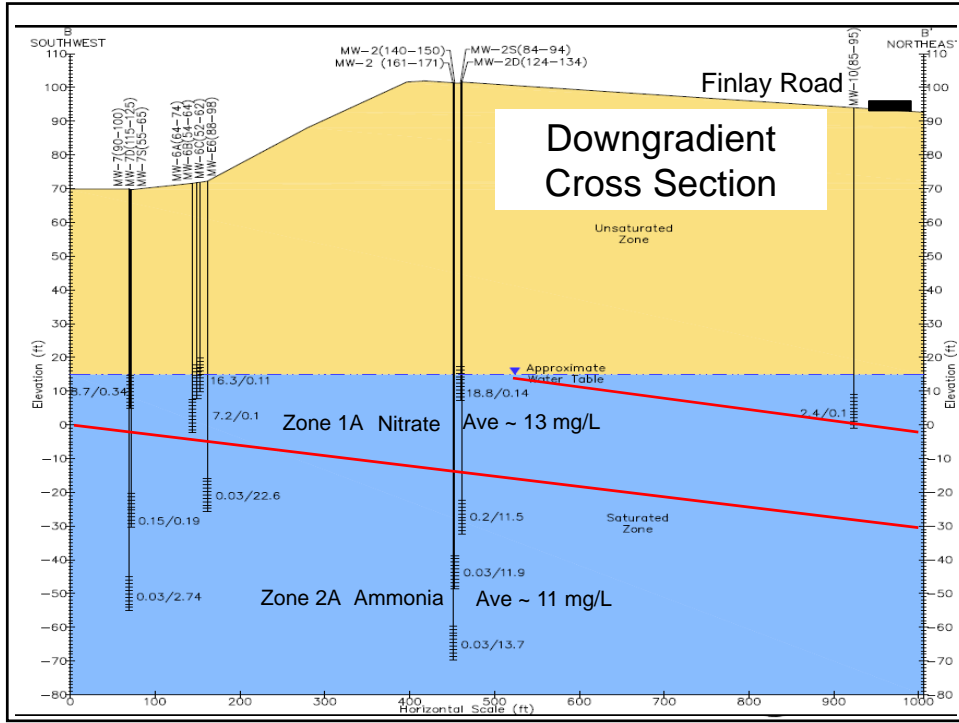


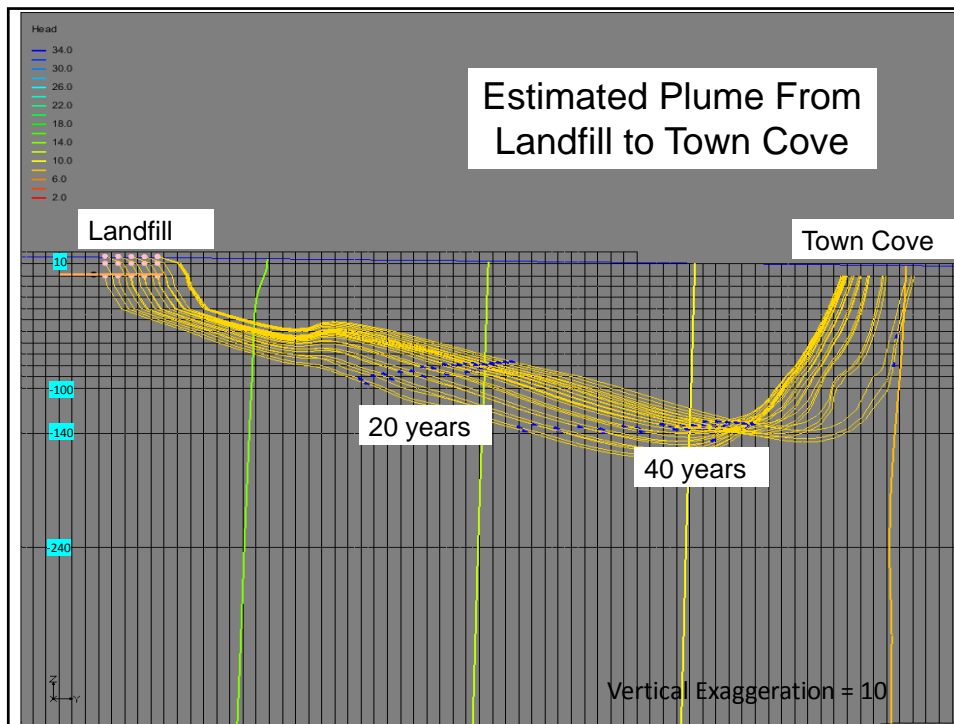
Landfill Nitrate Plume (cont.) Nitrogen Flux Questions

- ❖ What Nitrogen Load is Coming Out of the Landfill Now?
- ❖ What Nitrogen Load is in Transit to Town Cove?
- ❖ How Quickly is the Nitrogen Load Moving to Town Cove?









Landfill Nitrate Plume Near-term Response Actions with DPW

- ❖ Modify Salt Shed and Materials Area to Include Impermeable Pavement over Septage Lagoons
- ❖ Replace Leaching Drainage Swale on North Side of Landfill Cap with Swale or Culvert with Impermeable Base
- ❖ Add Stormwater Treatment BMPs Prior to General Stormwater and Compost Area Runoff Infiltration

Landfill Nitrate Plume Next Steps for Long-Term Planning

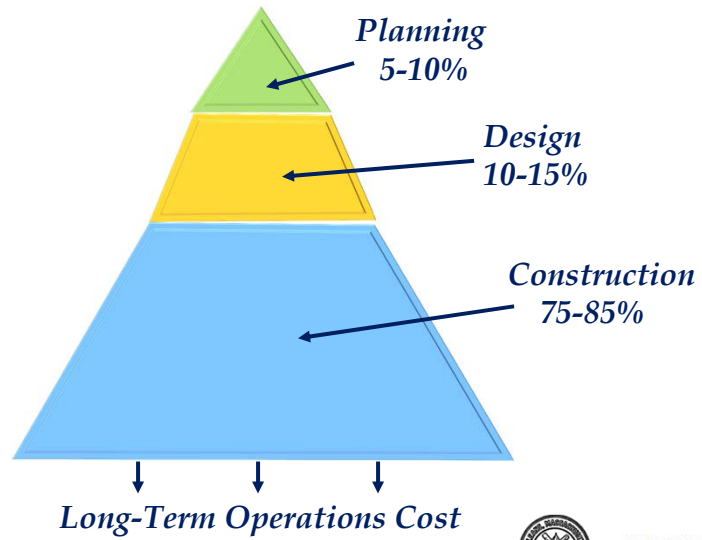
- ❖ Complete pump tests and other field work this Summer
- ❖ Update velocity, concentration, flux estimates
- ❖ Rerun MEP Model to determine impact on wastewater plan





Design/Build/Operate

Design/Build/Operate Typical Program Cost Allocation



Design/Build/Operate (cont.) Potential Benefits to Orleans

❖ Cost Savings

- DBO Contractor savings in design, construction and operations passed on to Owner
- Contractor's regional operations provide economies of scale
- Lower pay/benefit scales can save cost

❖ Time Savings

- Simultaneous design and construction may reduce time to start-up
- Procurement cycles may be reduced

❖ Shed Risk

- Regulatory compliance
- Marketplace changes in cost
- Improper operations or management

❖ Overall Management of Wastewater Systems



Design/Build/Operate (cont.) Key Considerations for Orleans

❖ Size of Project:

- Town's fixed costs for legal, pre-qualifications, procurement Lowers potential cost savings
- Larger project promotes competition and lower price

❖ Certainty of Project Definition Encourages Bidders:

- Firm phasing plan allows firm long-term contract
- 25% +/- Design Required (Soils, Utilities, Topography, On-site System Information)
- "Skin in the Game"

❖ Prospect for Future Changes in Project Scope

- Changes on project (e.g. phasing) provides "reopener" for contractor
- Reduces potential cost savings

❖ Goal of Town = Shed Risk; Goal of Contractor = Shed Risk

- Traditional vs. Non-Traditional Technologies



**Design/Build/Operate (cont.)
Status & Next Steps**

❖ **Filed Legislation Following Town Meeting Approval**

- Submitted Background Information Package on June 26, 2017
- “Bill Reported Favorably by Committee” on June 27, 2017
- Referred to House Ways & Means Committee

❖ **Next Steps**

- Conduct Workshop with Board of Selectman and Town Counsel on Key Issues and Risks in Summer 2017
- Monitor Legislation
- Decide on Design/Build/Operate or Traditional Design/Bid/Build by Early September



The slide features a blue header with the Town of Orleans logo on the left and the text "Town of Orleans Massachusetts" on the right. Below the header is a large green-to-blue gradient area containing the title "MassDOT Intersection Projects" in white text.

MassDOT Intersection Projects Proposed Infrastructure

❖ Hybrid System

- Gravity Sewers
- Low Pressure Sewers

❖ Rationale

- Considered All Requirements (Capital and O&M)
- More Familiarity of Components for Contract Operations
- Provides Flexibility for Phased Implementation
- Provides Less Impact on Private Property Owners



MassDOT Intersection Projects Considerations

- ❖ Utilize Existing 25% Documents (Topographic Survey, Subsurface Investigation, etc.)
- ❖ Develop Specifications to Supplement Existing MassDOT Documents
- ❖ Obtain Cost Proposal From MassDOT Contractor
- ❖ Install System Using MassDOT Contractor
- ❖ Missing Window of Opportunity Results in MassDOT Five Year "No Dig" Moratorium



MassDOT Intersection Projects (cont.) Savings

Engineering

- ❖ Full Contract Documents
- ❖ Bidding Services
- ❖ Construction Administration

Construction

- ❖ Mobilization/Demobilization
- ❖ Control Density Fill
- ❖ Compaction Testing
- ❖ Roadway Reconstruction
- ❖ Sidewalk Reconstruction
- ❖ Engineer's Field Office
- ❖ Environmental Protection
- ❖ Planting



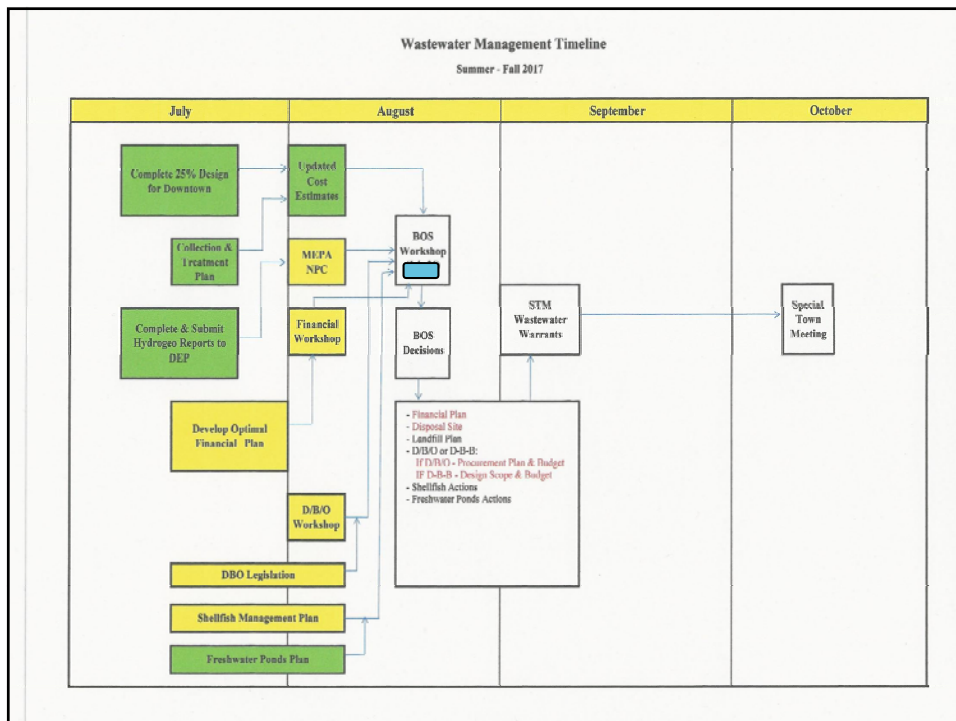
MassDOT Intersection Projects (cont.) AECOM's Estimated Costs

Component	Estimated Cost	Estimated Savings
Capital Cost	\$2,400,000	\$900,000
Contingency at 10%	<u>\$240,000</u>	<u>\$90,000</u>
Construction Total	\$2,640,000	\$990,000
Town Administration and Engineering	<u>\$960,000</u>	<u>\$610,000</u>
Totals	\$3,600,000	\$1,600,000





Key Decisions & Schedule





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Massachusetts

Thank You