

Board of Selectmen and Wastewater Implementation Committee Joint Workshop on Wastewater Planning

Town of Harwich, Massachusetts



Peter Hughes
BOS Chairman

Peter de Bakker
WIC Chairman

David Young, P.E.
CDM Smith

Presentation on
June 17, 2015
6 pm



**CDM
Smith®**

Board of Selectmen (BOS)



- BOS Members:
 - Peter S. Hughes, Chair
 - Linda A. Cebula, Vice Chair
 - Jannell M. Brown, Clerk
 - Angelo S. LaMantia
 - Michael D. MacAskill
- Former BOS Members: Larry Ballantine and Ed McManus
- Town Administrator: Chris Clark

Wastewater Implementation Committee (WIC)



- WIC Members:
 - Peter de Bakker, Chair
 - Chris Harlow, Vice Chair
 - Allin Thompson, Clerk
 - Jeremy Gingras
 - Danette Gonsalves
 - Heinz Proft
 - Bob Cafarelli
- Liaisons: Michael MacAskill, Chris Clark, Noreen Donahue
- Consultant: CDM Smith

Meeting Agenda



- Wastewater Informational Workshop
 - Why is Harwich studying wastewater?
 - What is our proposed solution?
- Questions and answers.
- Public Hearing on Cost Recovery Model
 - How do we plan to pay for it?

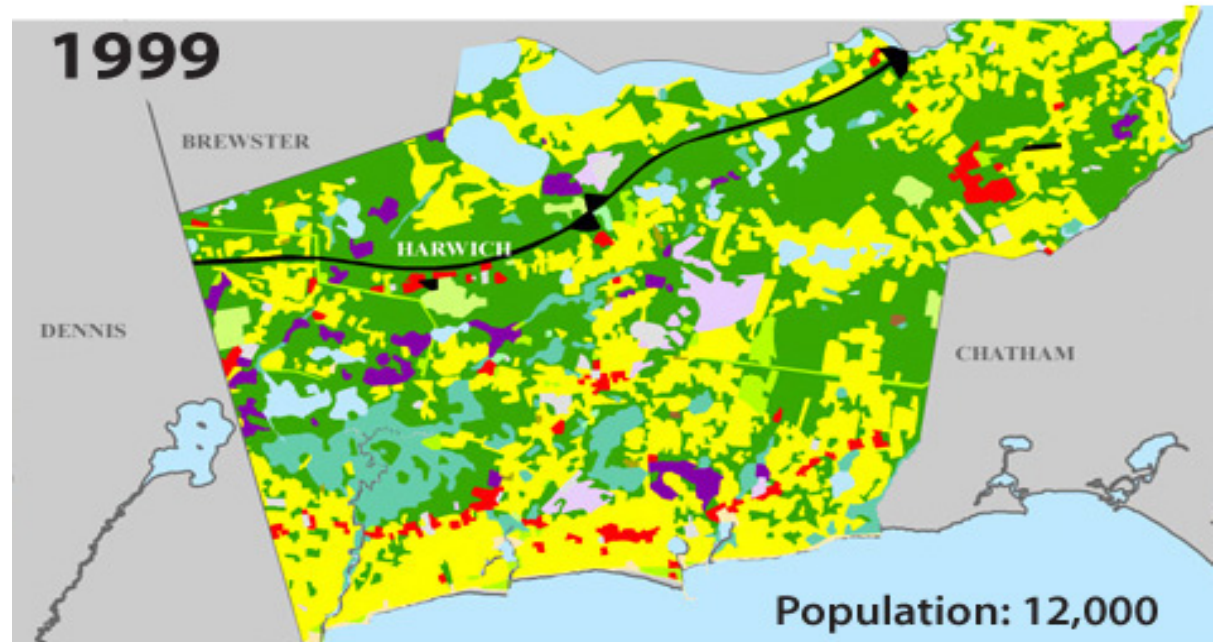
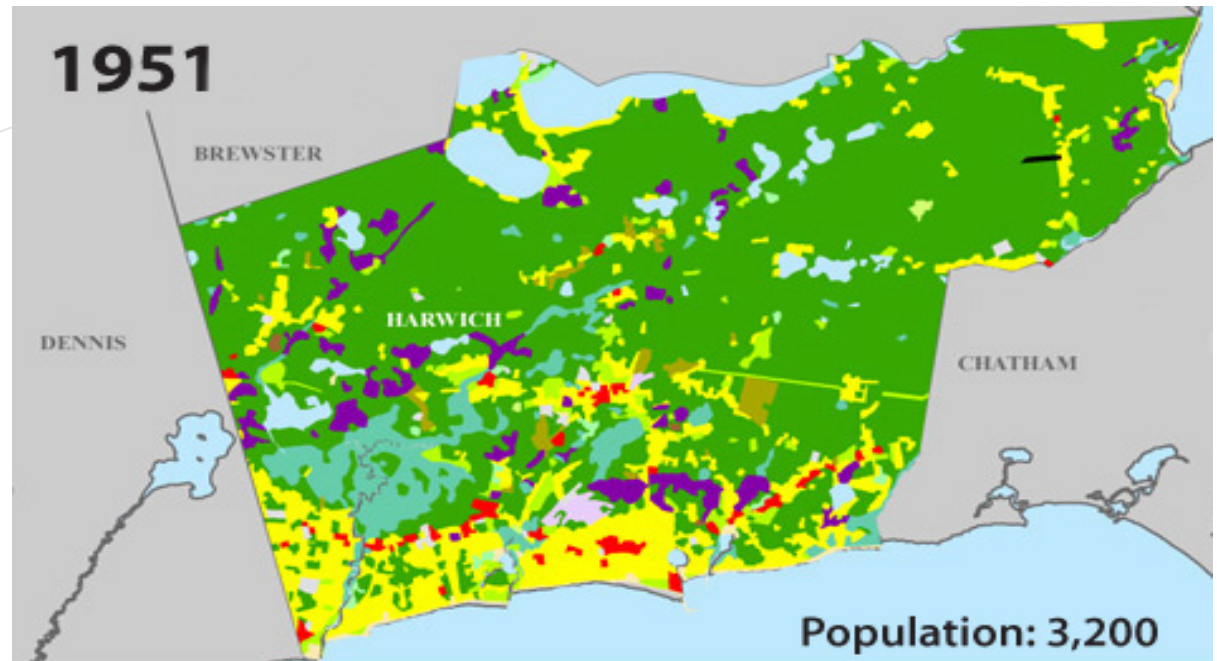
Meeting Agenda

- Why is Harwich studying wastewater?

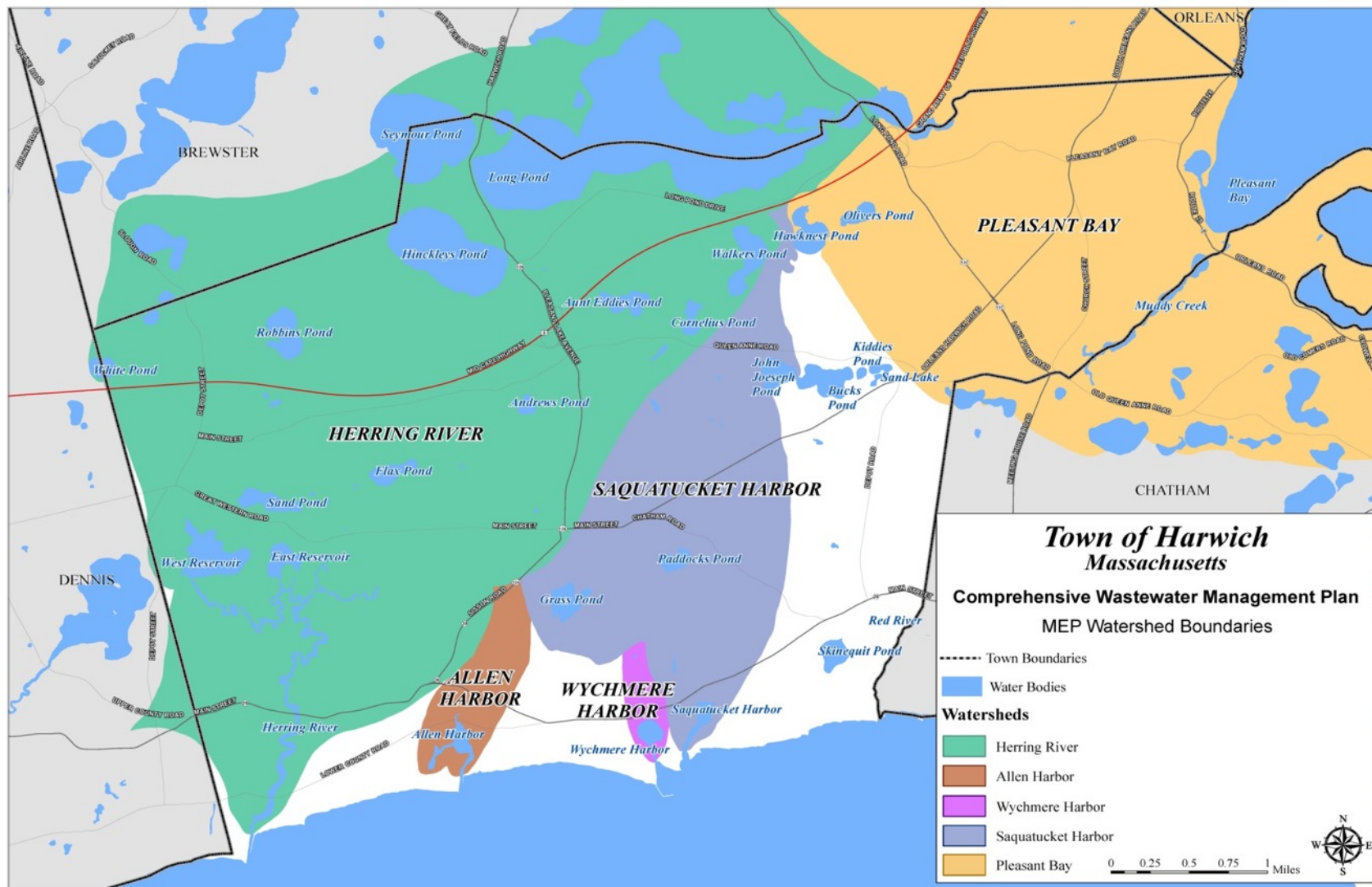


Harwich Land Use Development 1951 and 1999

- 400% population growth from 1951 to 1999



What is a watershed?



What is the Massachusetts Estuaries Project (MEP)?



- Partnership
 - Massachusetts DEP (Department of Environmental Protection)
 - UMASS/Dartmouth School of Marine Science and Technology (SMAST)
 - Local communities
 - Also CCC and USGS
- Ongoing program to protect/improve coastal water quality
- Monitoring and evaluating environmental health of coastal embayments

What is a Comprehensive Wastewater Management Plan (CWMP)?



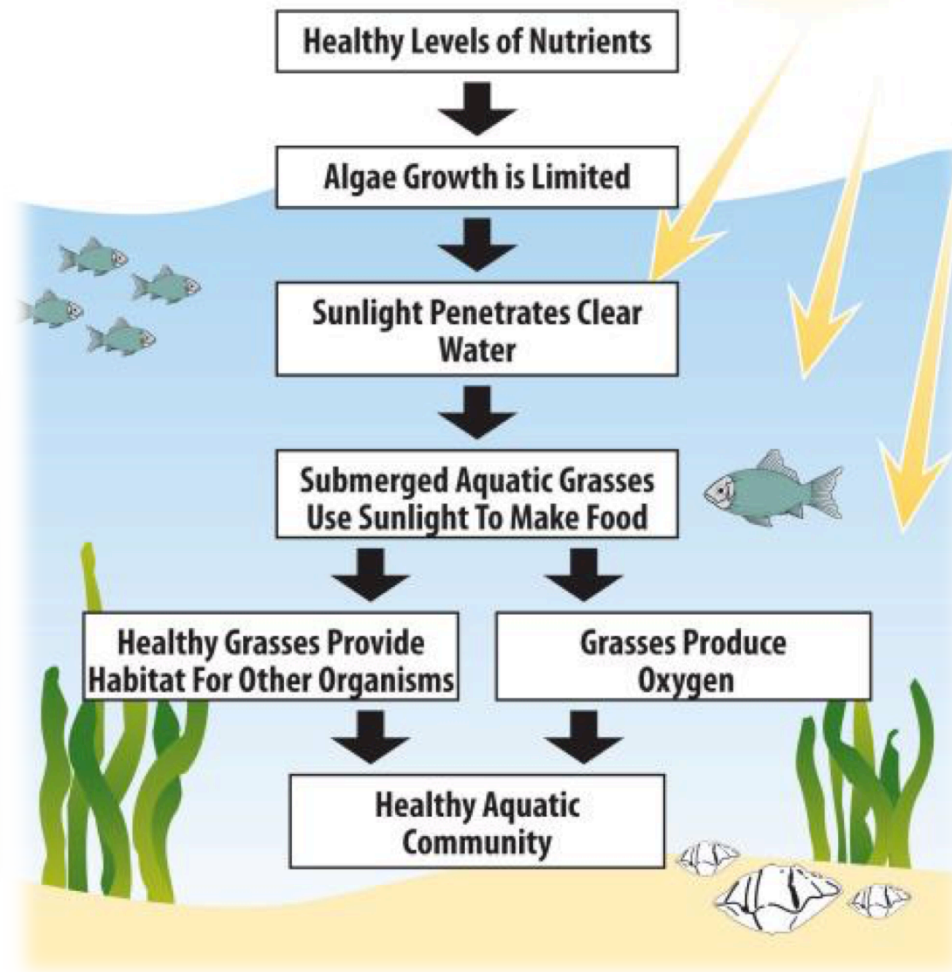
- Addresses Town-wide Wastewater Management Needs
 - Nitrogen Management (MEP)
 - Pond Water Quality
 - Drinking Water
 - Title 5 Issues
 - Socio – Economic



Beaches, Rivers & Harbors Are Severely Impacted By Nitrogen



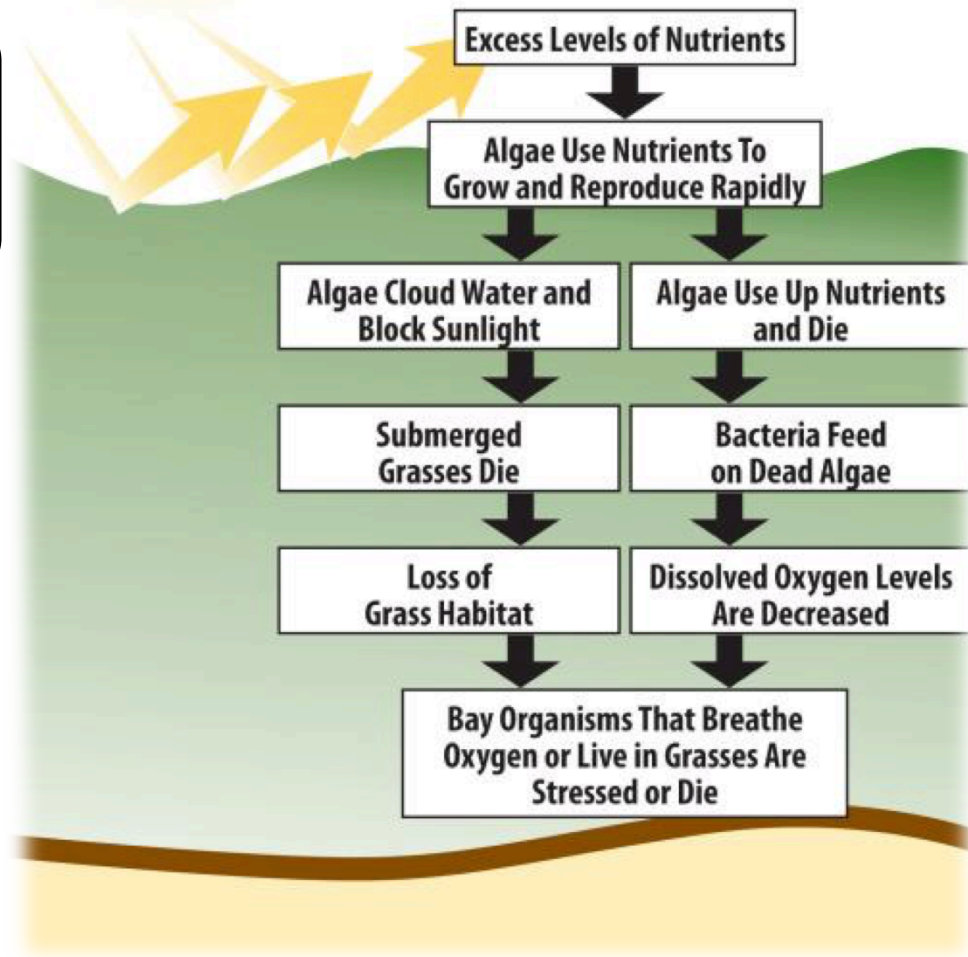
Healthy Nitrogen Levels



Beaches, Rivers & Harbors Are Severely Impacted By Nitrogen



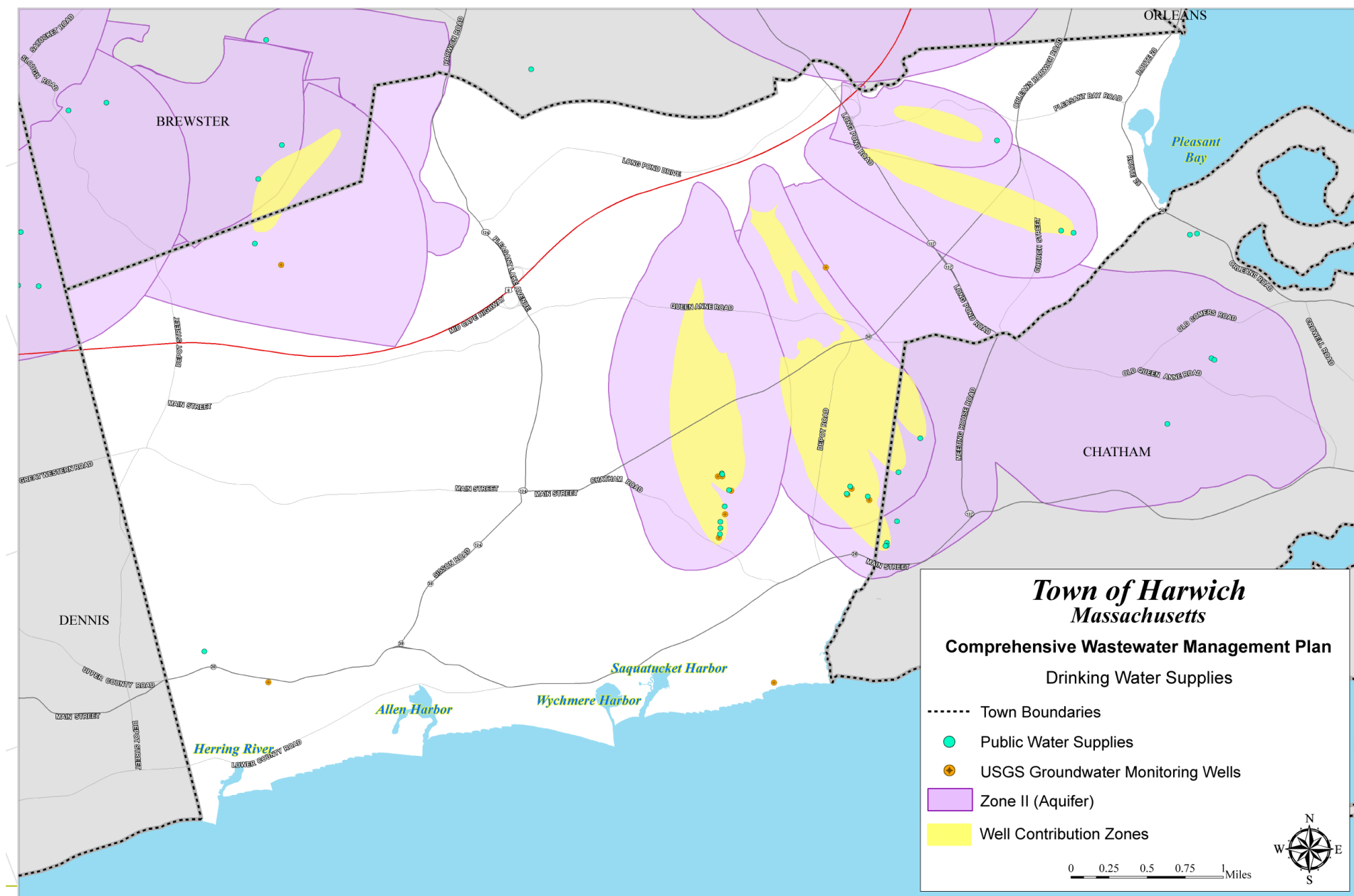
Unhealthy Nitrogen Levels



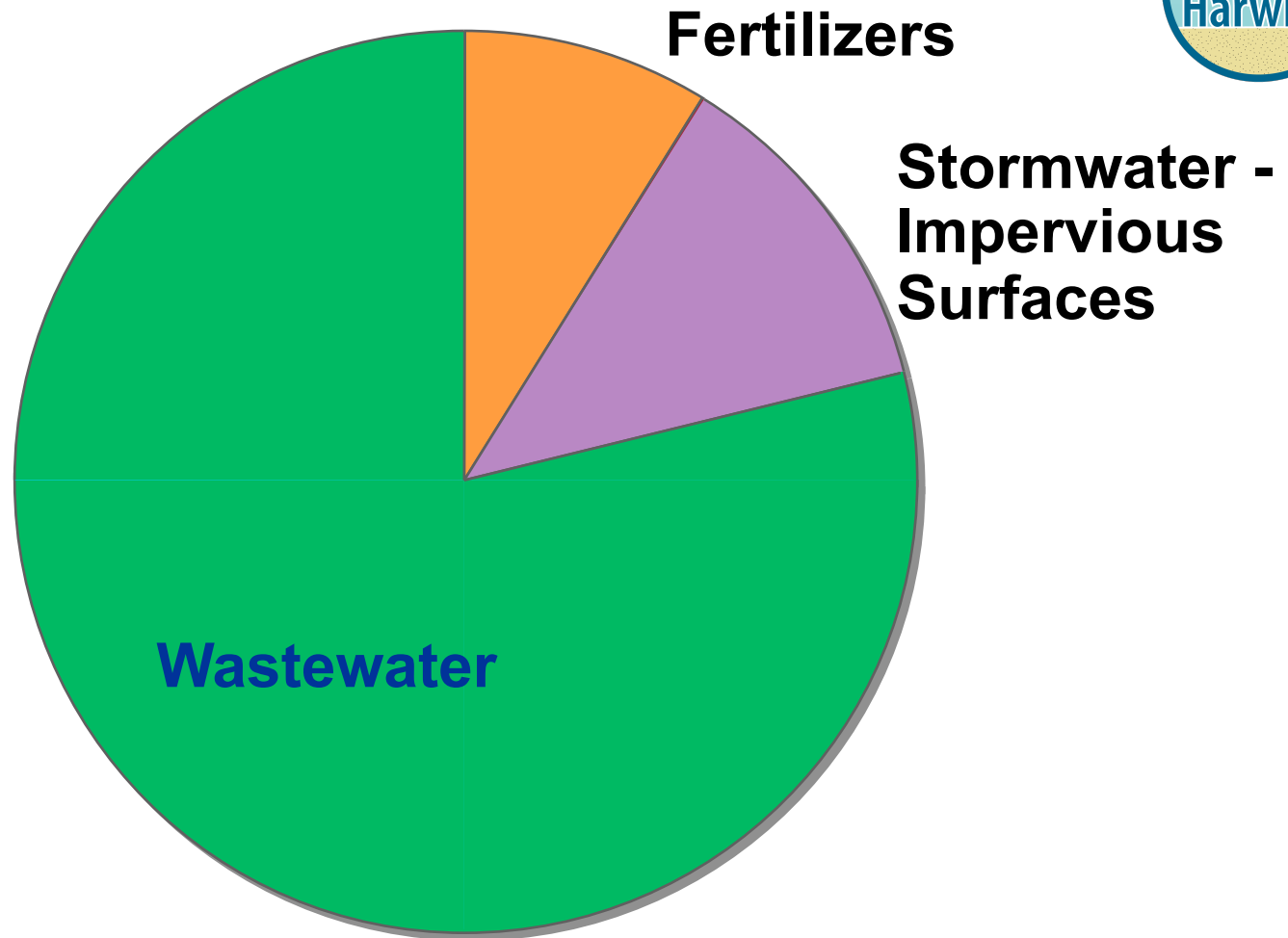
Allen Harbor Algae Bloom



Existing Conditions – Drinking Water Supplies



Controllable Sources of Nitrogen



Local Control - Typical

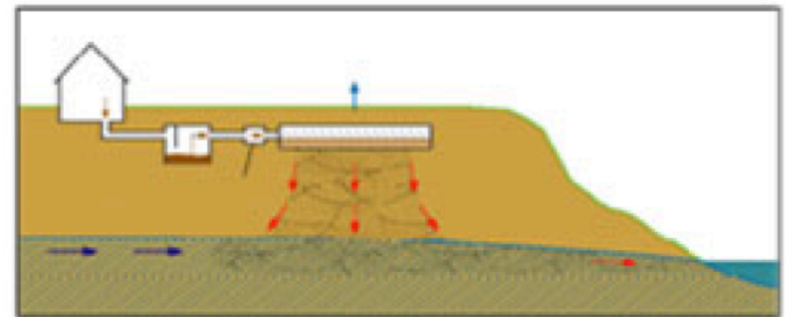
Nitrogen From Septic Systems Is Our Biggest Issue

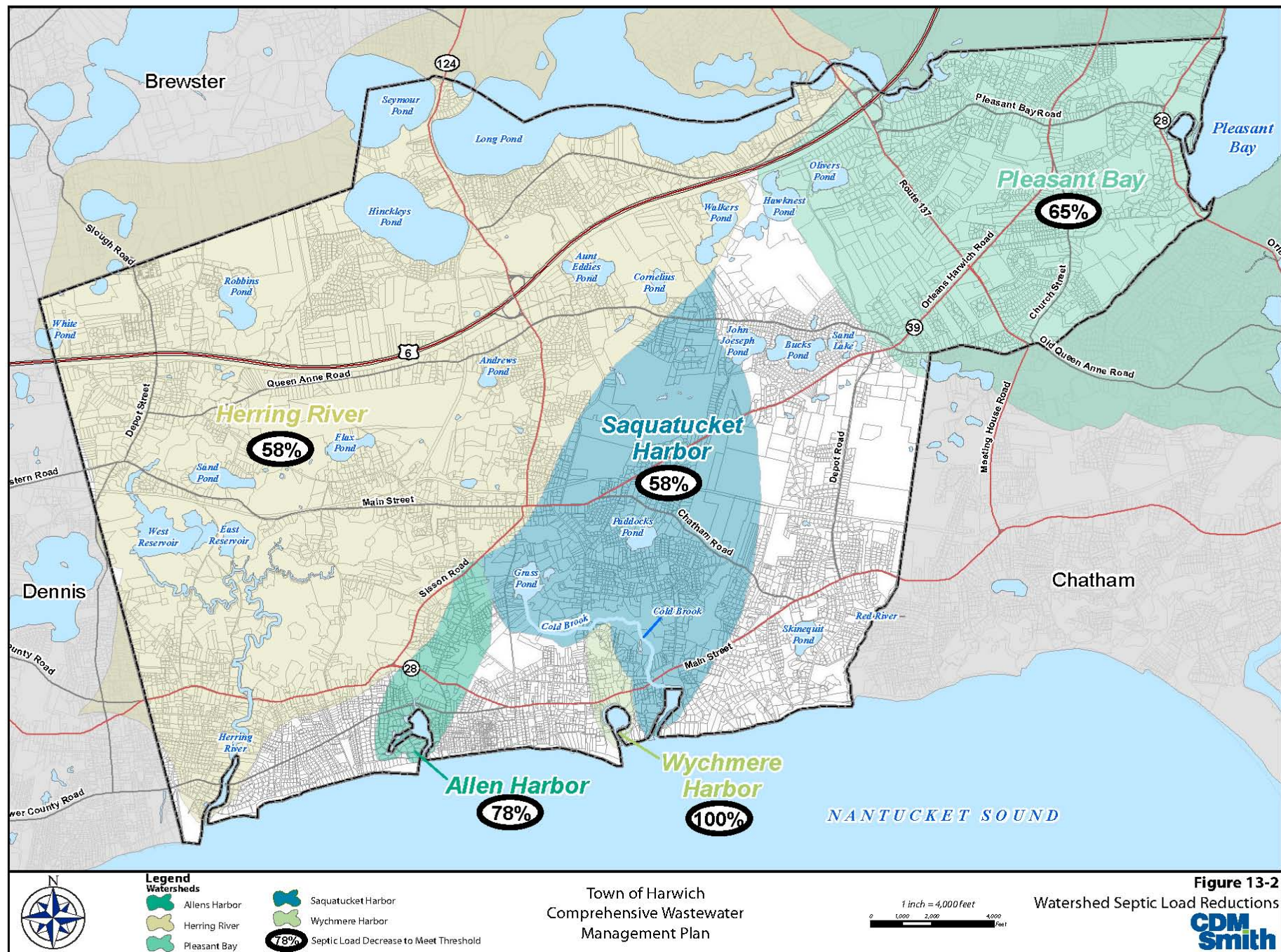


Septic Systems Permit Nitrogen to:

Invade Our Ground
Water

Travel with
Groundwater to the
Beaches & Rivers





Total Maximum Daily Load (TMDL) for Total Nitrogen



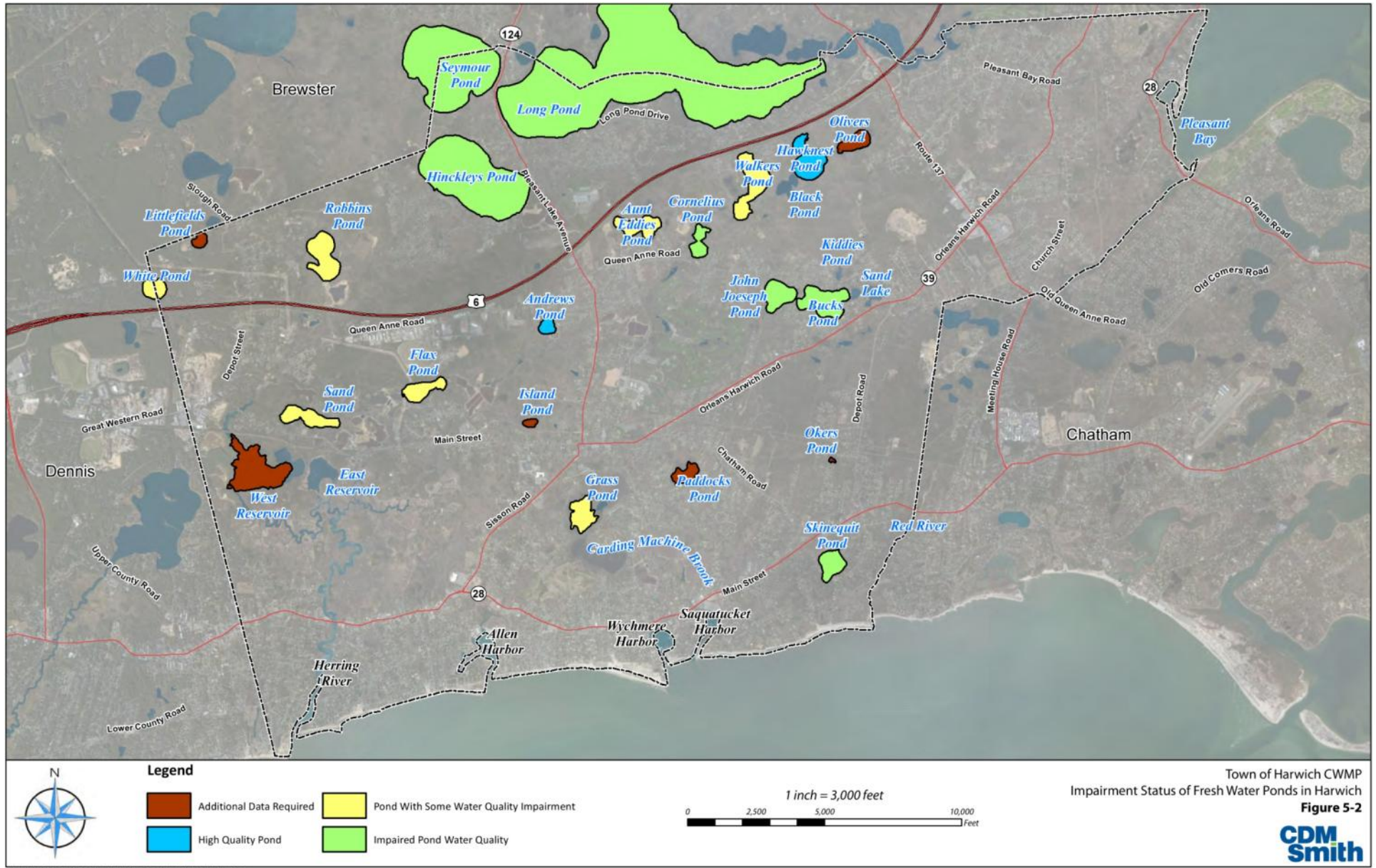
- MassDEP (Department of Environmental Protection) has issued pre-draft TMDLs for total nitrogen for the Herring River Estuarine System and the Allen, Wychmere and Saquatucket Harbor Embayment Systems.
- TMDLs based on information presented in the MEP reports.
- Public hearings will be held and formal permits issued in the next few months.
- Authority is provided by Federal Clean Water Act (CWA)

Conservation Law Foundation



- “Nitrogen pollution is driving the Cape to the brink of ecological disaster; how we enforce wastewater management is critical to restoring Cape’s waters to health”

Impaired Fresh Water Ponds in Harwich



Algae Bloom In Hinckleys Pond



Meeting Agenda

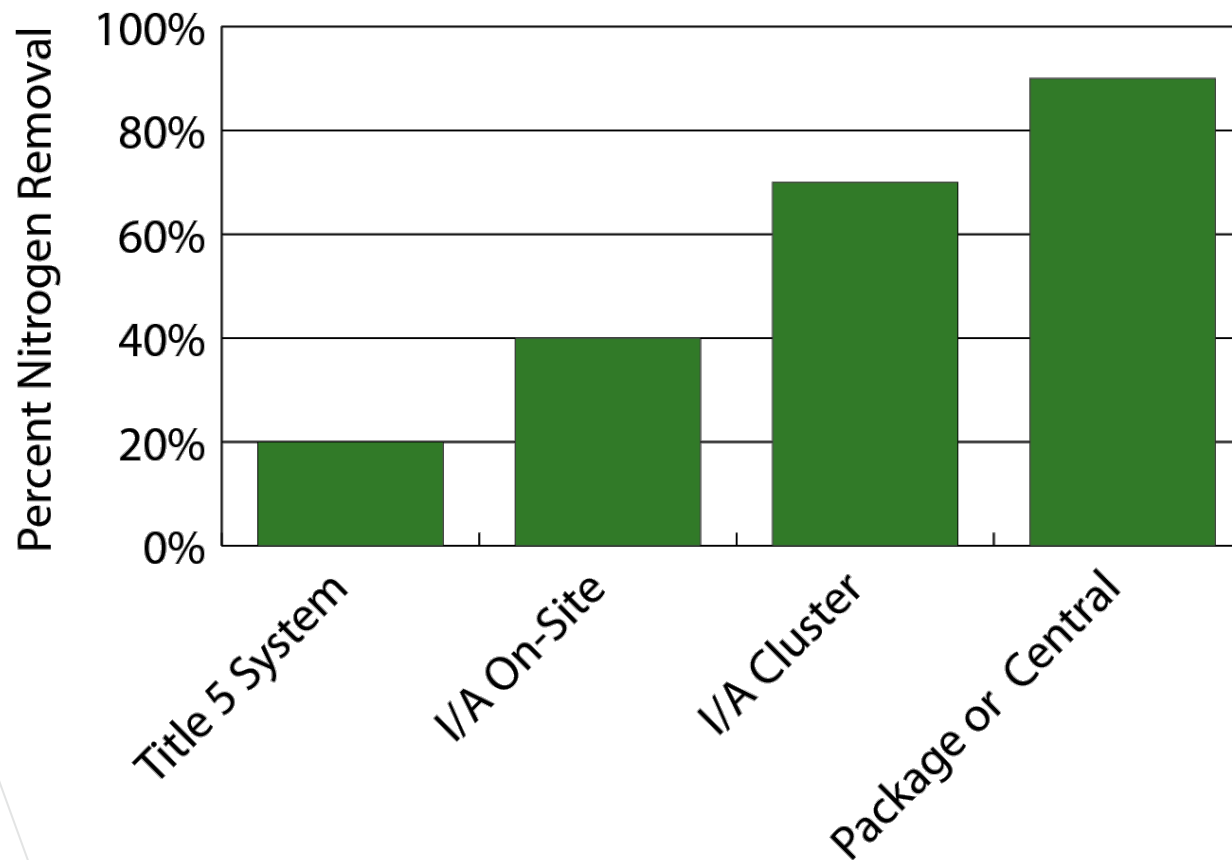


- Why is Harwich studying wastewater?
- What is our proposed solution?

Nitrogen Removal By Technology



Effluent Nitrogen Levels of Treatment

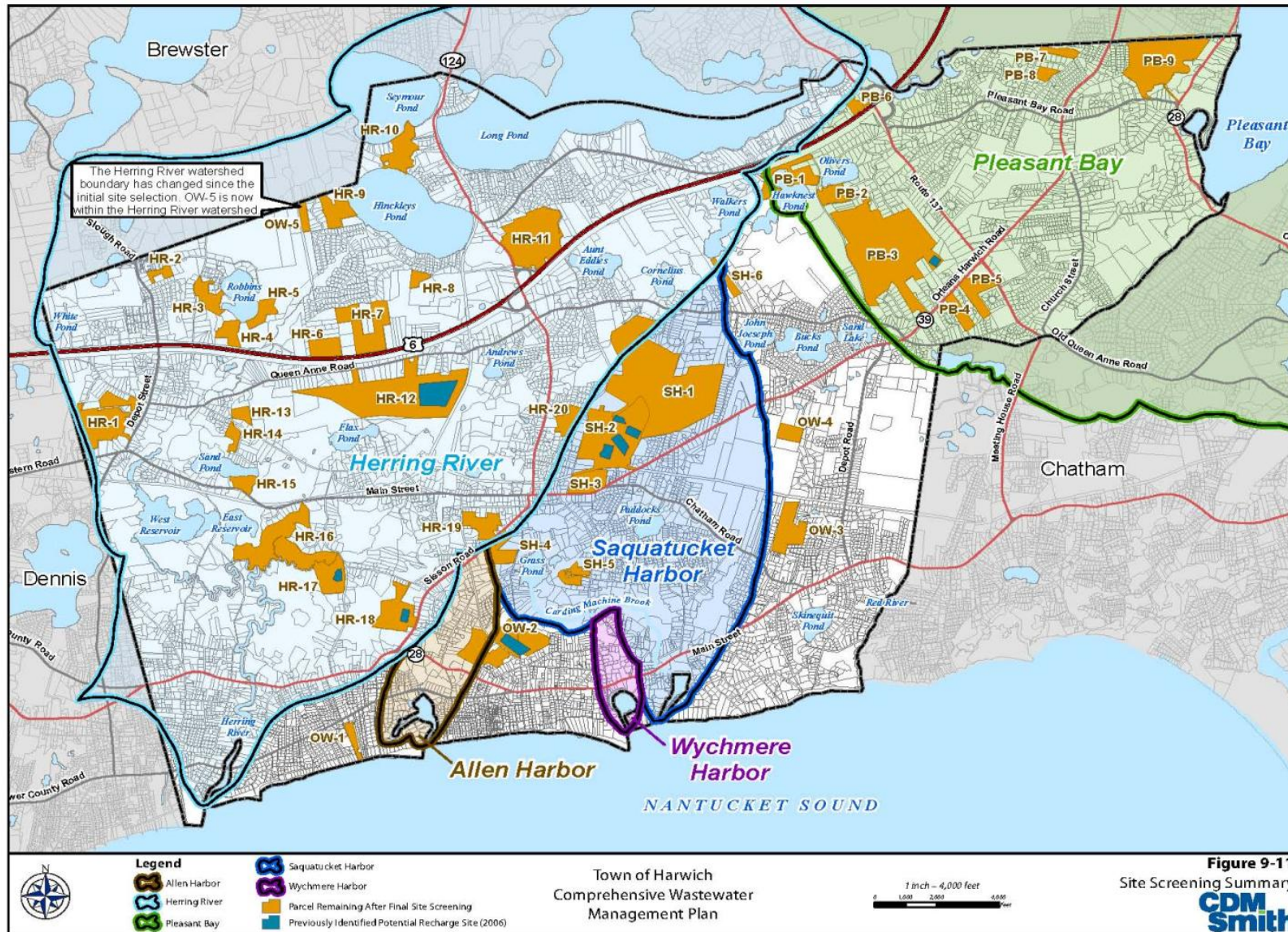


Treatment Site Screening Criteria



1. Outside of a Well Contribution Zone
2. Parcel Size Greater than 5 Acres
3. Outside of a 100-Year Floodplain Zone
4. Sites With Permeable Soils
5. Undeveloped Property
6. Parcels Outside of Wetlands
7. Favorable Depth to Groundwater
8. Outside Priority Habitat
9. Outside Municipal Wellhead Protection Zones
10. Town-Owned Property

Site Screening Summary



Alternative Solutions Evaluated

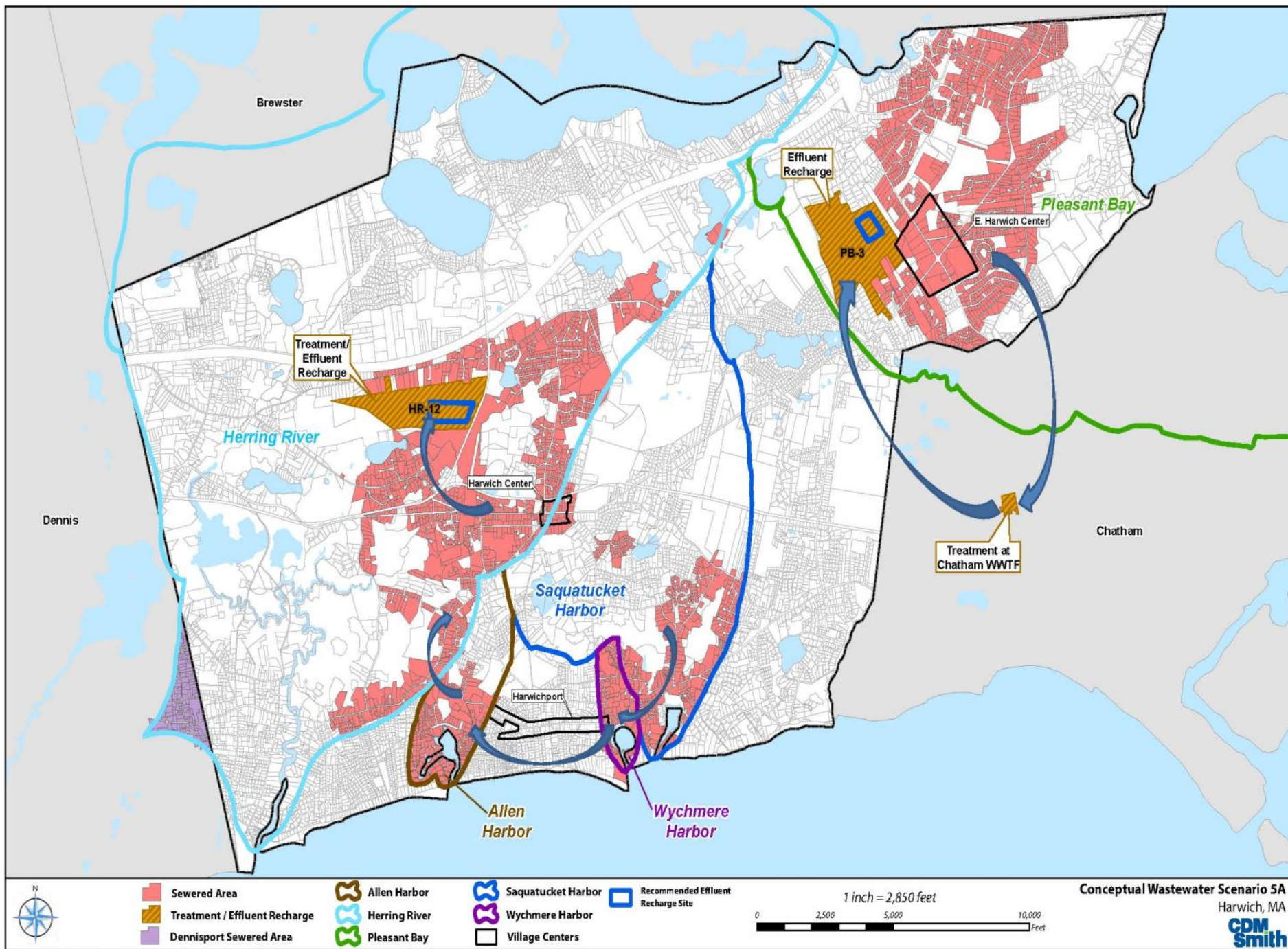


- On-site Innovative/ Alternative (I/A) systems
- Small treatment plants
- Large treatment plants
- Single and multiple treatment plants
- Singled and multiple effluent recharge locations
- Ocean outfall for effluent recharge
- Natural nitrogen attenuation systems
- Hybrid solutions

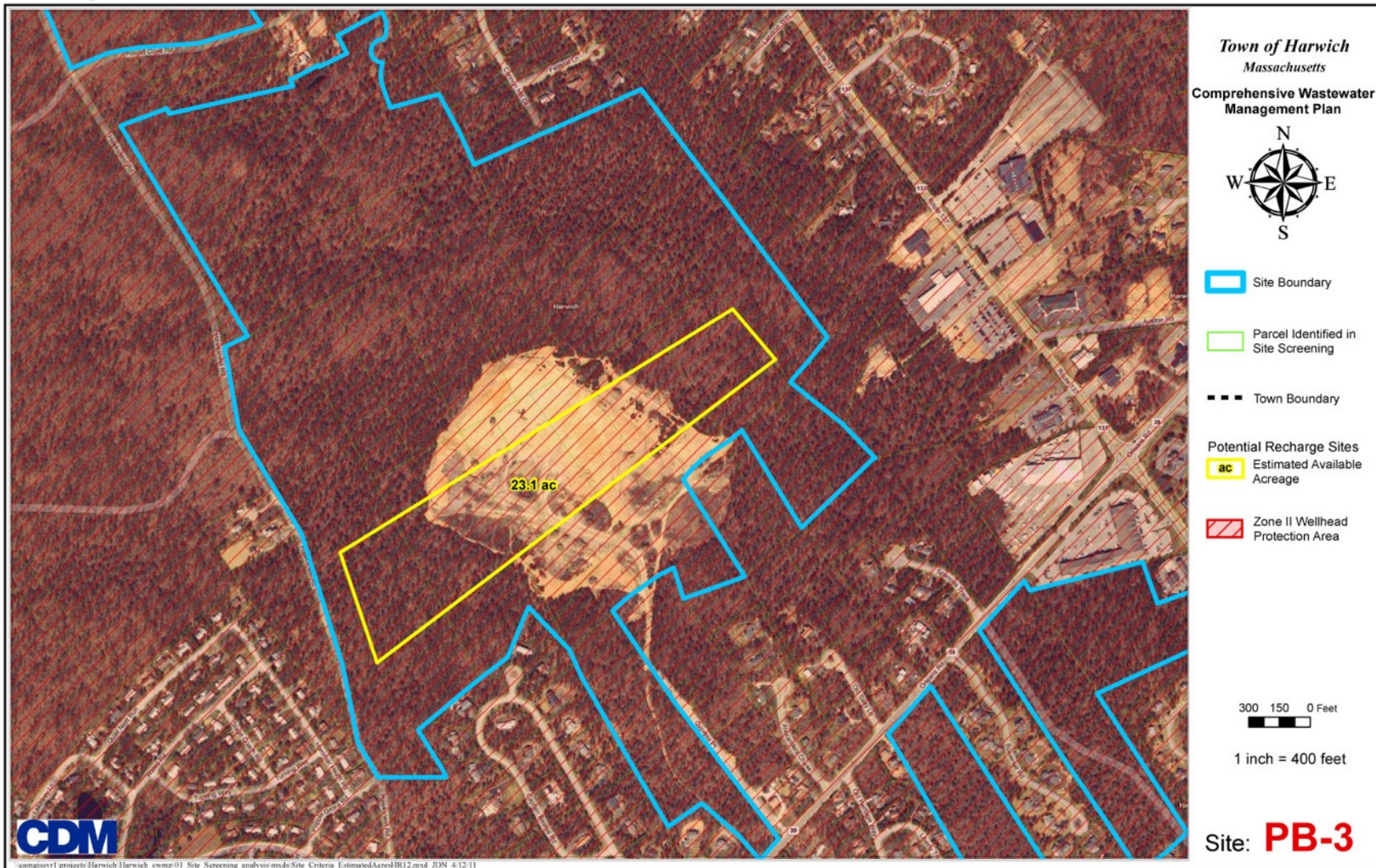
Summary of Wastewater Scenarios and Effluent Recharge Sites



<i>Wastewater Service</i>	<i>Herring River Recharge Site</i>	<i>Saquatucket Harbor Recharge Site</i>	<i>Pleasant Bay Recharge Site</i>	<i>Outside MEP Watershed Recharge Site</i>	<i>Treatment Only At HR-18 : Ocean Used for Recharge</i>
<i>Scenario</i>	<i>HR-12</i>	<i>SH-2</i>	<i>PB-3</i>	<i>OW-2</i>	<i>Outfall</i>
1A	x	x	x		
2A	x	x	x		
3A	x				
4A	x		x		
5A	x		x		
6A	x	x	x	x	
7A	x	x	x	x	
8A					x

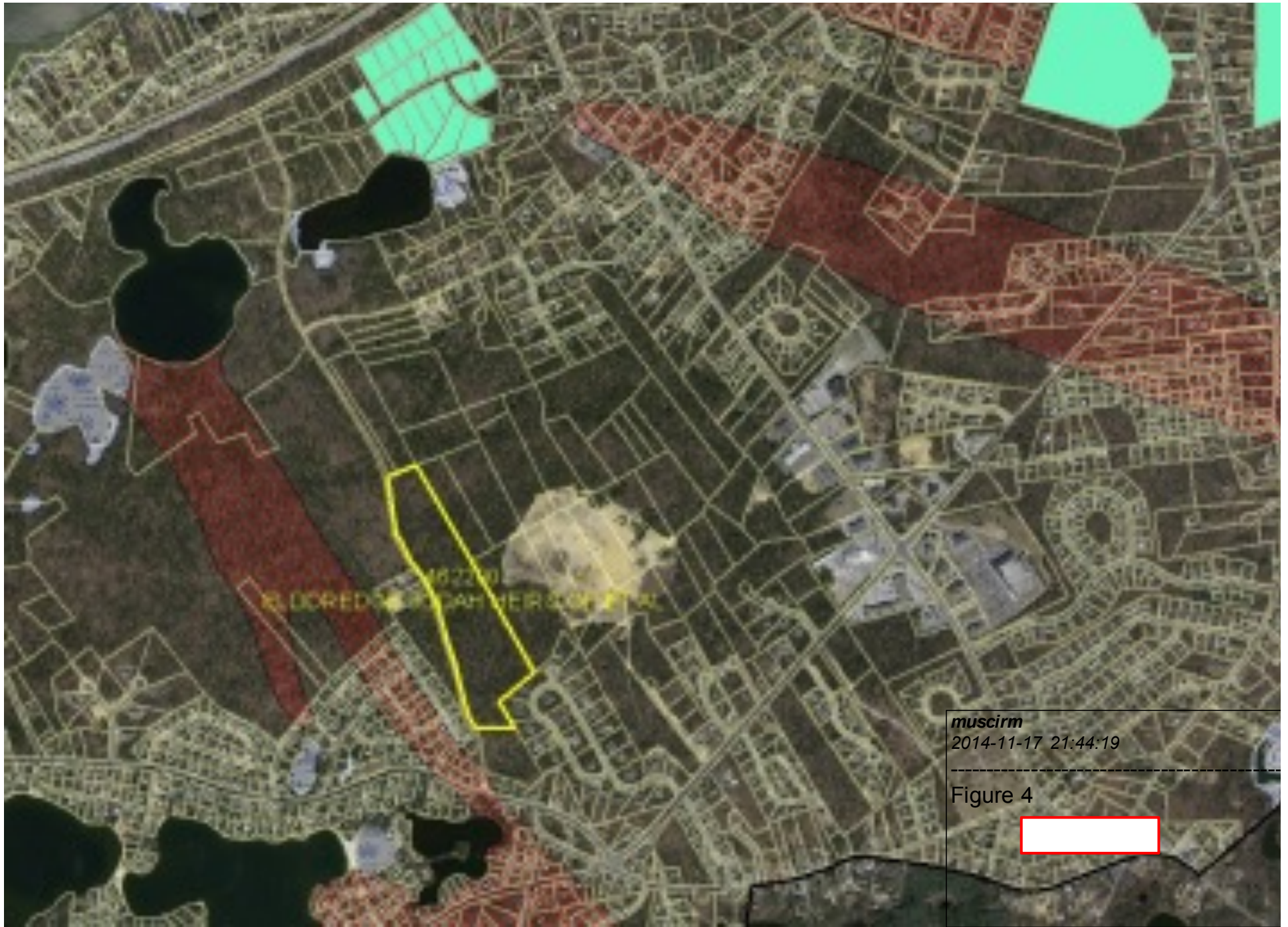


PB-3 – Privately Owned Gravel Pit In the Pleasant Bay Watershed



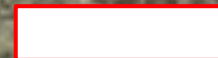
Article 27, Annual Town Meeting



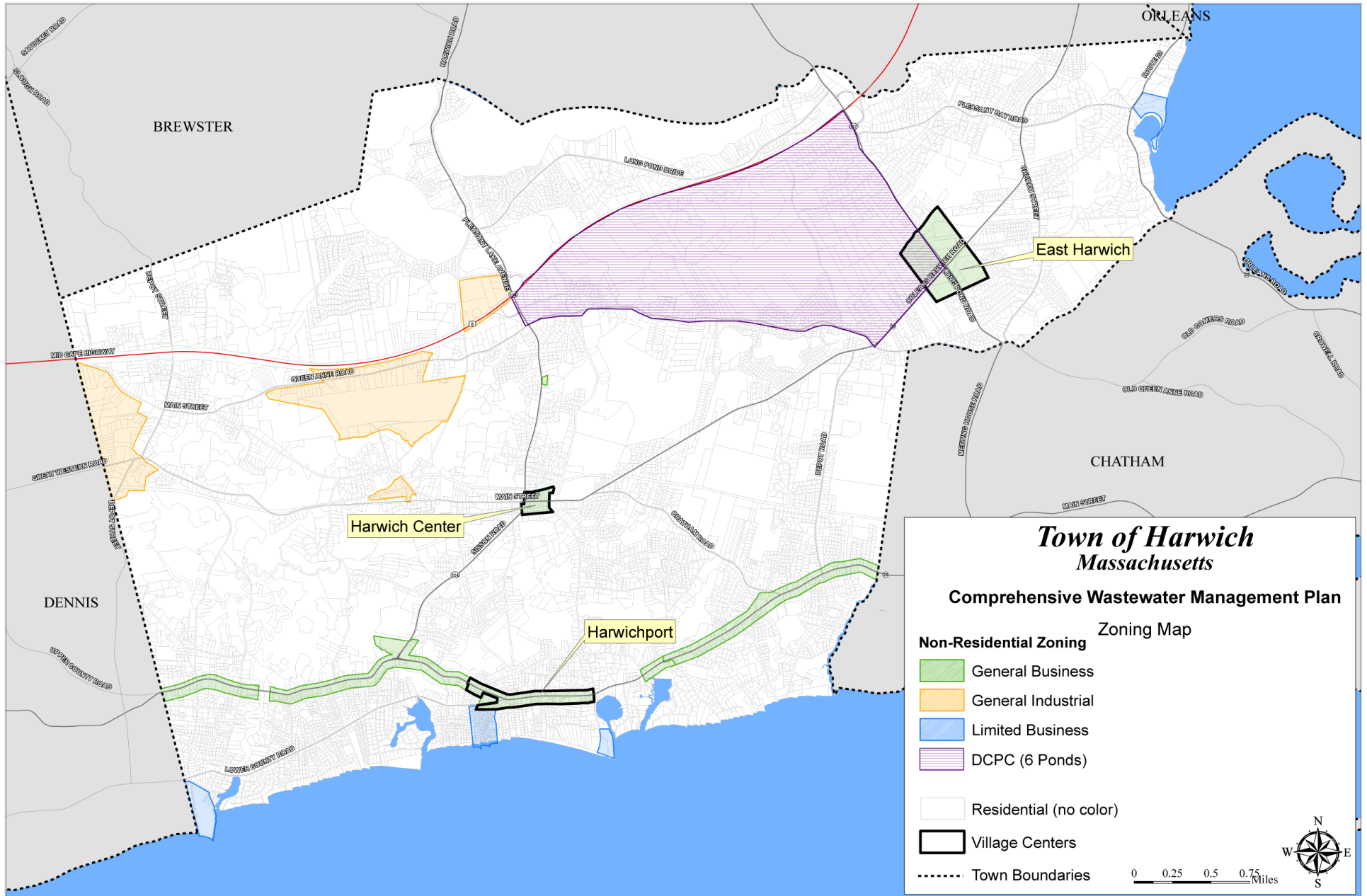


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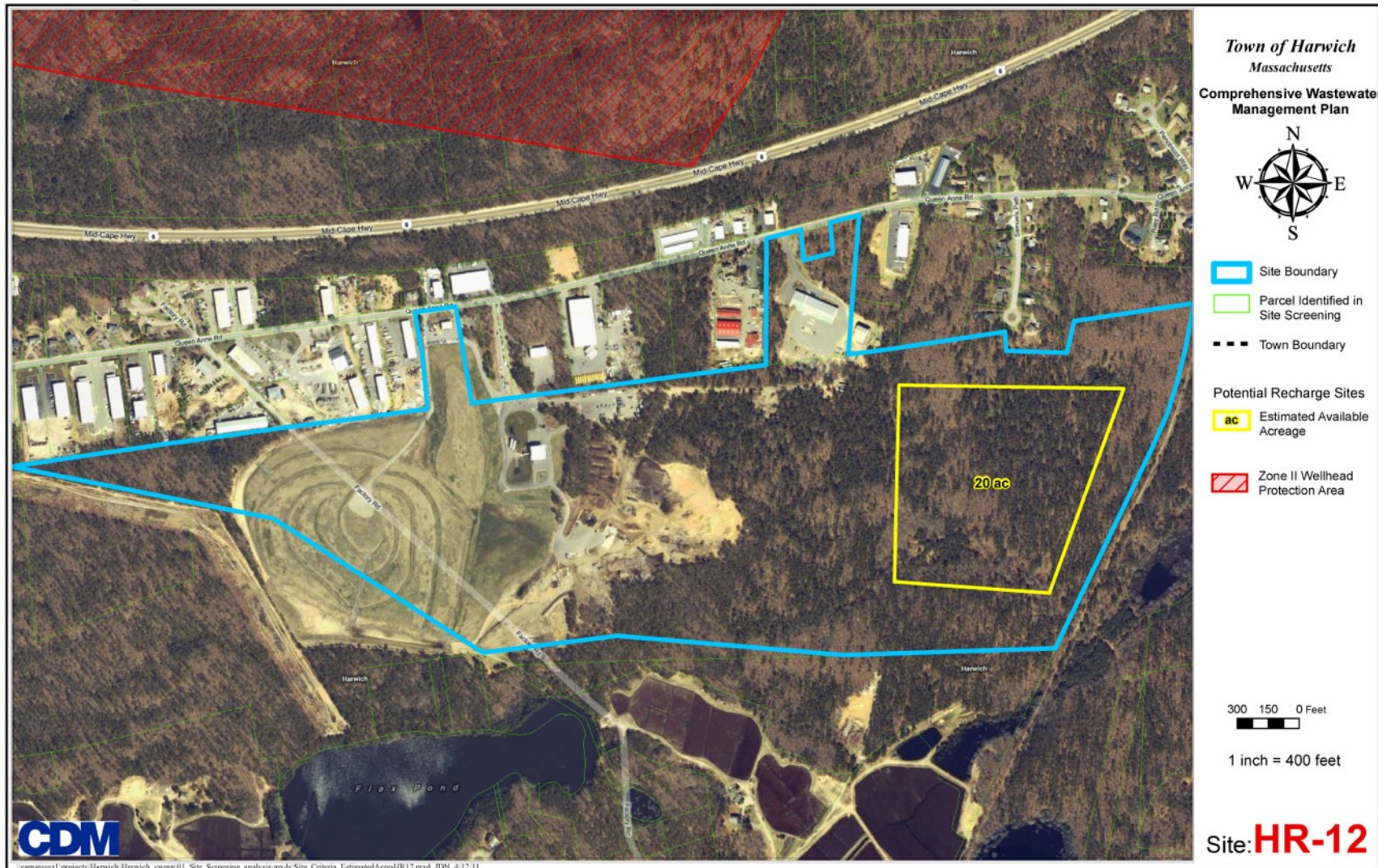
Figure 4



Existing Conditions – Zoning Map



HR-12 – Adjacent to Former Town Landfill In the Herring River Watershed



Chatham Wastewater Treatment Plant



Water Reuse - Kingston Massachusetts

Indian Pond Golf Course – 300,000gpd effluent recharge site



Site Scale

Neighborhood

Watershed

Cape-Wide

Prevention

Nitrogen Removal Possibilities



Remediation of Existing Development



Fertilizer Management



Transfer of Development Rights



Stormwater BMPs



Compact Development

Reduction



Standard Title 5 Systems



Conventional Treatment



I/A Title 5 Systems



Cluster & Satellite Treatment Systems



Advanced Treatment



I/A Enhanced Systems



Wastewater Collection Systems



Effluent Disposal Systems



Toilets: Urine Diverting



Constructed Wetlands: Surface Flow



Toilets: Composting



Constructed Wetlands: Subsurface Flow



Toilets: Packaging



Stormwater: Bioretention / Soil Media Filters



Toilets: Incinerating



Stormwater: Wetlands



Phytoirrigation



Eco-Machines & Living Machines



Phytobuffers



Fertigation Wells



Permeable Reactive Barrier



Shellfish and Salt Marsh Habitat Restoration



Aquaculture/Shellfish Farming

Remediation



Inlet / Culvert Widening



Pond and Estuary Dredging



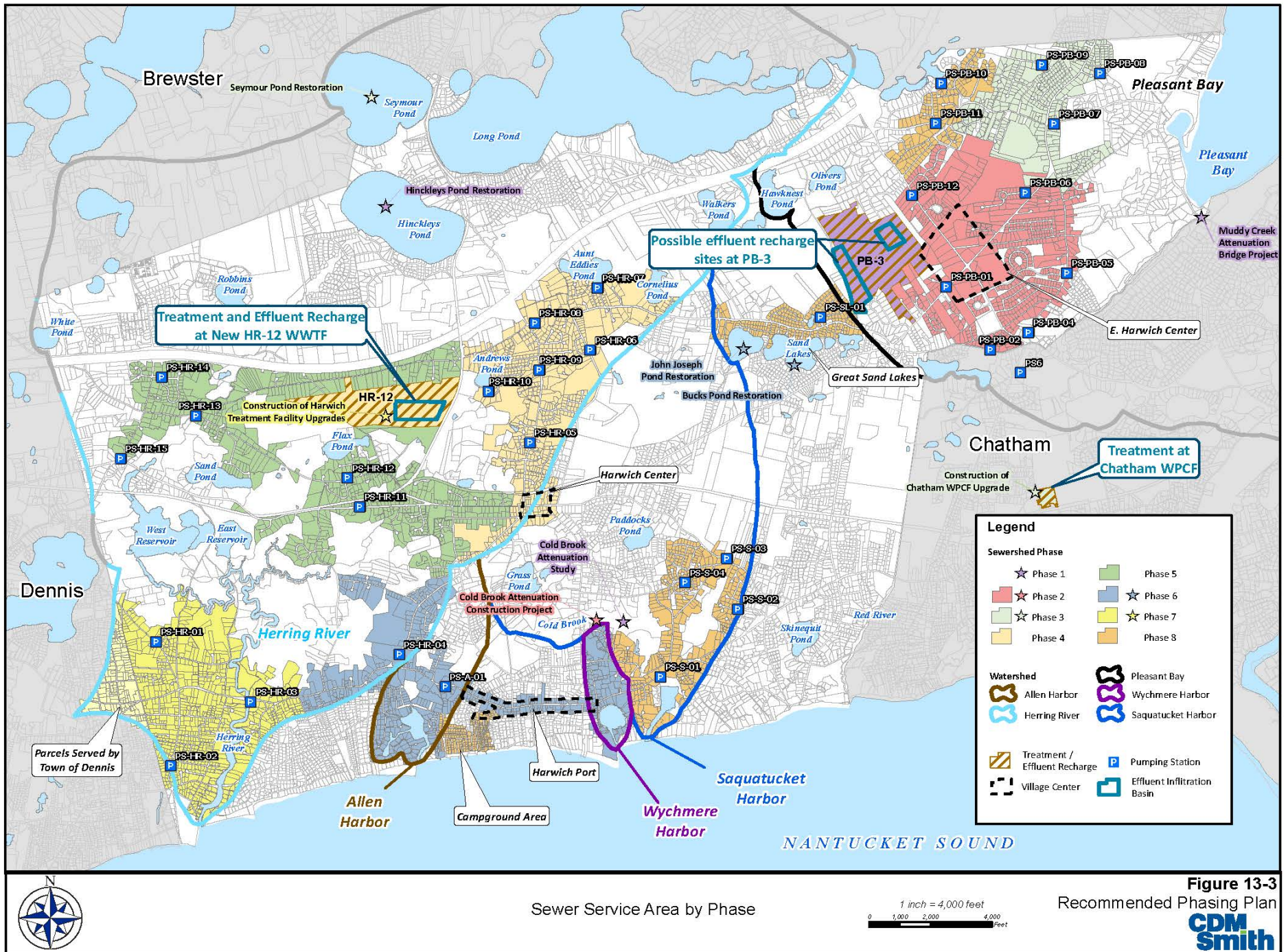
Coastal Wetlands, Groundwater, Salt Water, Flooding

Nitrogen Reduction via Increased Flushing at Muddy Creek



Nitrogen Reduction by Natural Attenuation at Cold Brook Bogs – Bank Street





Why East Harwich in Early Phases



- Phase 1 focuses on natural nitrogen attenuation aspects.
- Phases 2 and 3 address East Harwich
 - Pleasant Bay watershed is largest watershed requiring greatest amount of nitrogen removal.
 - Utilizes regional approach for cost efficiencies
 - Protects only Harwich drinking water wells which have shown some impact from nitrogen.
 - Provides sewer utility to East Harwich Village Commercial District.
 - Pushes Harwich only treatment plant out 15 years.

Summary



- This is a complex planning process – one that will continue indefinitely – as things will change – adaptive management
- The CWMP is intended to be a living document that will adapt depending on results of earlier implementation phases
- Most properties in town contribute to the problem – not just those along a water body or those proposed for sewerage
- All benefit from improved water quality

The Consequences...



- “The cost of doing nothing is economically devastating to every Cape homeowner.”
 - Cape Cod Commission, 2014
 - Draft 208 Water Quality Plan



Algae Bloom in Swan Pond, Dennis and in Mill Creek, Yarmouth

Questions and Comments:



Board of Selectmen Public Hearing – Cost Recovery Model

Town of Harwich, Massachusetts



Peter Hughes
BOS Chairman

David Young, P.E.
CDM Smith

Presentation on
June 17, 2015



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Meeting Agenda



- Why is Harwich studying wastewater?
- What is our proposed solution?
- How do we plan to pay for it?

WIC Strategy



- Wastewater program is proposed to be implemented in eight phases over 40 years. Many variables will change over that timeframe.
- Focus cost recovery model on first three implementation phases.
- Keep the cost model simple.

WIC Strategy



- Everyone in town contributes to the nitrogen problem so everyone should help pay for the restoration of water quality.
- Develop a dedicated funding source that will help stabilize costs over the life of the program.
- Include a component that links water use (nitrogen contributed) to the amount a resident or business owner pays.

Recommended WIC Cost Recovery Model Components - Percentages



- Infrastructure investment fund at 1.5% of annual property tax (lower CPA from 3% to 1.5%).
- For remaining debt service:
 - Town-wide property tax for 75%.
 - Sewer enterprise account/ water use surcharge for 25%.

Recommended WIC Cost Recovery Model Components



- Infrastructure investment fund
- Town-wide property tax
- Sewer enterprise account/ water use surcharge

Infrastructure Investment Fund



- Pro: Town-wide program dedicated to wastewater infrastructure.
- Pro: Progressive and doesn't count against Prop 2.5
- Pro: Could shift percentage away from existing CPA program (no net increase).
- Pro: Tax deductible.
- Con: In essence, an additional tax.
- Still have to pay off land bank

Town-wide Property Tax



- Pro: Town-wide funding source as all property owners contribute to water quality degradation (and solution).
- Pro: Simple to implement.
- Pro: Property tax system is progressive and aligns with property owner's ability to pay fair share.
- Pro: Could be used to pay capital and O&M costs.
- Con: All property owners will pay even though only half of town projected to be on a sewer.
- Con: Property owner nitrogen contributions are not proportional to assessed values.

Sewer Enterprise Account



- Pro: Town-wide funding source dedicated to wastewater program (based on surcharge to water bill).
- Pro: Water use essentially proportional to amount of nitrogen contributed.
- Pro: Can be used to pay capital and O&M costs.
- Con: Requires formation of sewer district and enterprise account.
- Con: Requires means to capture fee from 250 residences using on-site wells.

Wastewater Program Costs by Phase



- Phase 1: 2015 to 2016 \$2,550,000
Natural nitrogen attenuation projects
(Muddy Creek and Cold Brook) and effluent recharge site.
- Phase 2: 2016 to 2020 \$24,300,000
Design and Construct Pleasant Bay collection system (south).
- Phase 3: 2021 to 2025 \$21,010,000
Additional Pleasant Bay sewers and Chatham connection costs.

Harwich Cost Assumptions



- Average home assessed value is \$400,000.
- FY15 property tax revenue \$47 million and will increase at 2.5 % annually.
- Tax rate for FY15 is \$8.97/ \$1,000 valuation.
- Average homeowner water consumption is 70,000 gallons per year.
- Used 638 Million gallons average annual water volume billed to calculate average water rate.
- Highest debt service is in Year 2026

Costs to Homeowner on Sewer



- Infrastructure investment fund \$ 54
- Property tax increase \$133
- Sewer enterprise cost \$ 57
- Total \$ 244
- Plus initial hook-up loan cost
- Plus annual O&M cost initially estimated to be \$145-\$175

Costs to Homeowner Not on Sewer



- Infrastructure investment fund \$ 54
- Property tax increase \$133
- Sewer enterprise cost \$ 57
- Total \$ 244
- Plus O&M cost to pump their septic system once every three years estimated to be \$300 to \$350 and septic system replacement/upgrade every 20 to 25 years at \$13,000.

Comparison: Costs to Homeowner Using 100% Property Tax



• Infrastructure investment fund	\$ 0
• Property tax increase	\$254
• Sewer enterprise cost	\$ 0
• Total	\$ 254

Comparison: Costs to Homeowner Using 75% Property Tax and 25% Sewer Enterprise Account



• Infrastructure investment fund	\$ 0
• Property tax increase	\$190
• Sewer enterprise cost	\$ 82
• Total	\$ 272

2012 Sewer Rate Survey by T&B

Typical Annual Costs



- Range of annual sewer service costs \$210 to \$1,440
- Average annual sewer cost \$690
- Median annual sewer cost \$646

Summary of Harwich Utility



- 180 Miles of Utility Pipes
- 5 Pumping Stations
- 3 Storage Tanks
- Treatment Facility
- Administration Offices and Maintenance Garages
- Capital Cost Range (Today's Dollars):

**\$215 to \$255
Million**



Action Item



- Town needs to adopt a policy for cost recovery to implement the first phases of their recommended wastewater program so that it can be included in the filing of the Final Comprehensive Wastewater Management Plan (CWMP). That is the only missing component before re-filing the documents with the State and County. Goal is to do that this summer.

Potential Motion



- The Harwich Board of Selectmen endorse a cost recovery policy for wastewater program implementation that utilizes the combination of town wide property taxes, an infrastructure investment fund and a sewer enterprise account based on water consumption. Where appropriate, grant funds will be applied for and if awarded will be used to offset costs as applicable.

Potential Motion Cont'd



- This policy will be utilized to support the implementation of at least the first three phases of the eight phase program and is subject to change should other potential beneficial funding programs become available to the town and the actions of town meeting and subsequent ballot results.

Questions and Comments:

