

Town of Nantucket Department of Public Works

Board of Selectman
Capital Improvements Workshop



March 24, 2009

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Agenda

- Sewer Projects Background
- Current Projects
- ATM Funded Projects
- Future Funding Considerations
- Low Pressure Sewers
- Action Items

Sewer Projects Background

- Projects Started in 1980s
- Comprehensive Wastewater Management Plan
 - Completed in September 2004
 - 2nd Community to Complete Plan
 - 1st Community to Begin Implementation of Plan
- Nantucket is Ahead of the Region
- Nantucket's Project Costs vs. Others

CWMP: The Goals and Objectives

- Goals
 - Minimize Potential For Pollution
 - Maximize Protection of Sole Source Aquifer
 - Considerations (Environmental Impacts, Economics, Quality of Life)
- Objectives
 - Identify Study Areas and Determine Areas of Need
 - Evaluate Conventional and Alternative Options
 - Recommend Environmentally and Economically Sound Solutions

CWMP: The Problems and Impacts

- Aging/Failing On-Site Systems
 - Potential Nuisance / Health Hazard / Environmental Contamination
 - Soil and Groundwater Limitations
 - Replacement Constraints - Environmental, Physical and Financial
- Existing Infrastructure
- Inadequate Treatment - Contamination
 - Surface, Groundwater and Harbor Water Quality Problems
 - May Pose Health Threat to Drinking Water Supplies
 - Limits Recreational Use of Surface Waters

Needs Analysis Summary

- Collected and Analyzed Data
 - Previous Studies
 - Existing Soils and Groundwater Data
 - Department of Public Works, Board of Health, Assessors, Zoning, Conservation Commission, NP&EDC and Marine Department
 - Field Investigations
 - Other Resources
- Evaluated Water Usage
- Identified 18 Study Areas

Nantucket's Profile

| <u>Description</u> | <u>Island Wide</u> | <u>Need Areas</u> |
|------------------------|------------------------|-----------------------|
| Lots Developed | 65% | 65% |
| Lots Built Before 1978 | 40% | 48% |
| Groundwater Limitation | 21% | 26% |
| Soil Limitation | 42% | 29% |
| Septic Failures | 18% | 26% |

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Evaluation

- Evaluated Wastewater Disposal Systems
 - Title 5 Systems
 - I/A Systems
 - Gravity Sewers
 - Low Pressure Sewers
 - Vacuum Sewers

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Key Facts of CWMP Recommendations

- Long-Term Wastewater Disposal Solution
- Updates Out Dated / Neglected Infrastructure
- Environmental Friendly
- Identifies Growth Potential
 - Low Pressure Sewers
 - WWTF Sizing
- Dynamic and Flexible Solution

State Approved Document Required For All Wastewater
System Improvements and Modifications

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Key Facts of CWMP Recommendations (cont.)

- WWTFs
 - Surfside
 - Siasconset
 - Madaket
- Madaket
 - 40,000 I.f. Low Pressure Sewer
 - 549 Connections
- Warren's Landing
 - 6,600 I.f. Low Pressure Sewer
 - 89 Connections
- Shimmo
 - 26,500 I.f. Low Pressure Sewer
 - 185 Connections
- Somerset
 - 13,000 I.f. Gravity Sewer
 - 7,200 I.f. Low Pressure Sewer
 - 205 Connections
- Monomoy
 - 4,800 I.f. Gravity Sewer
 - 14,500 I.f. Low Pressure Sewer
 - 227 Connections
- Other
 - Septage Management Plan
 - I/I Reduction
 - Stormwater Management

Capital Projects Summary

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Current Projects

- Surfside WWTF (Construction)
- Sewer System Rehabilitation (Construction)
- Stormwater Improvements – Phase I (Construction)

ATM Funded Projects

- Rehabilitation (Construction)
 - Minisystem N-1 (Phase II-B)
- Rehabilitation (Design and Construction)
 - Minisystem N-2
 - Minisystem N-3A
- System Expansion (Design Only)
 - Somerset
 - Shimmo
 - Monomoy
- Stormwater Improvements Phase II (Design Only)
 - Marine Fisheries
 - New Whale Street
 - Francis Street Beach
 - Commercial Wharf
 - Easy Street
 - Consue Springs

Future Funding Considerations

- Rehabilitation (Design and Construction)
 - Minisystem Phases 5 through 10
- System Expansion (Construction)
 - Somerset
 - Shimmo
 - Monomoy
- System Expansion (Design and Construction)
 - Madaket
 - Warren's Landing
- Stormwater Improvements Phase II (Construction)
 - Marine Fisheries
 - New Whale Street
 - Francis Street Beach
 - Commercial Wharf
 - Easy Street
 - Consue Springs
- Madaket WWTF

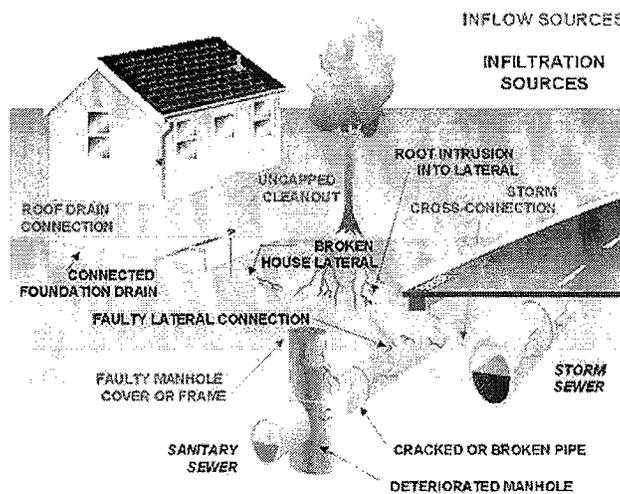
Project Cost Summary

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Rehabilitation



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Low Pressure Sewers

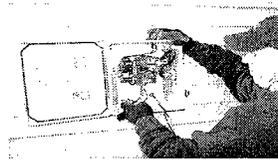
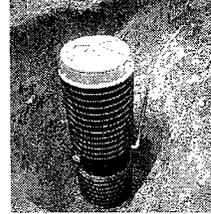
- Alternate to Conventional Gravity Sewer
- Series of Small Diameter Pipes that Connect to Individual Grinder Pumps
- Pump Wastewater from Individual Lots through the Main Line to a Gravity System or Wastewater Treatment Facility

Gravity Sewer versus LPS

- | <u>Gravity Sewers</u> | <u>Low Pressure Sewers</u> |
|---|---|
| ➤ Depths Greater Than 6'; Up To 25' For Flat Terrain | ➤ Consistent 5' to 6' Depth Regardless of Terrain |
| ➤ Trenches 5' to 7' Wide | ➤ Trenches 2' to 4' Wide |
| ➤ Larger / Deeper Trenches = More Disturbances and Longer Construction Duration | ➤ Narrow / Shallow Trenches = Minimizes Disturbance and Construction Duration |
| ➤ <u>Large Pump Stations For Varied Terrain</u> | ➤ Individual Grinder Pump Units = Smaller Footprint |
| ➤ <u>Large Pumps and Controls = Higher Operations And Maintenance Costs</u> | ➤ Simpler and Smaller Controls |
| ➤ Pipe Sizes From 8" Diameter | ➤ Pipe Sizes From 1-1/2" Diameter |
| ➤ Typically No Private Property Construction | ➤ Public and /or Private Property Construction |

Components of LPS

- Grinder Pump
- Control Panel
- Gravity Sewer to Grinder Pump (6")
- Cleanout / Curb Stop
- LPS Service from Pump to Main Line (1-1/4")
- Electrical Feed from Panel to Pump
- Main Line Sewer (1-1/2" to 4")

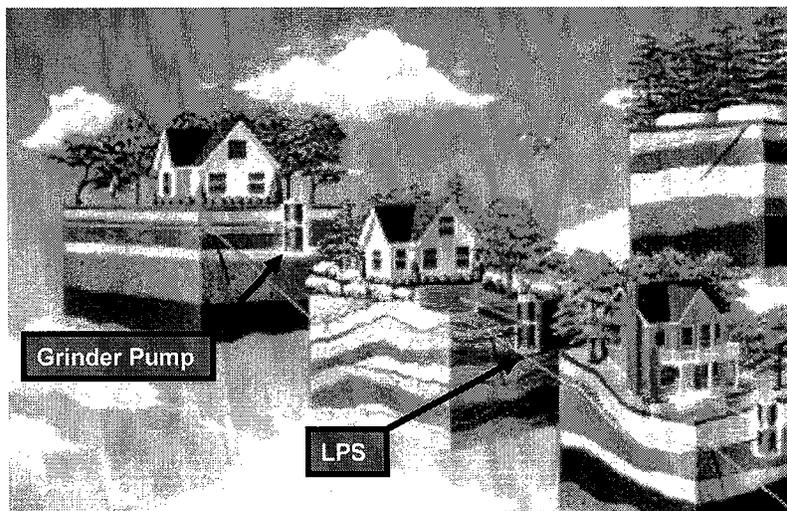


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Low Pressure Sewers



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Action Items

- Low Pressure Sewers
 - Private vs. Public
 - Ownership (Design vs. Operations)
 - Type
 - Vacant Buildable Lots
- Implementation Schedule
 - Establish Project Priority
 - Financing
- Preliminary Layout
 - Ground Survey
 - Subsurface Exploration
 - Environmental Permitting
- Develop RFQ for Grinder Pumps
 - Warranty Agreement
 - Service Contract
- Public Outreach Program
 - Buy-in
 - Betterments, Privilege Fees, and Connection Fees
 - Legal Right of Entry
 - Service Connection Forms
 - Internal Electrical / Plumbing
- Modify/Amend Town Bylaws
 - LPS System
 - Zoning
 - Mandatory Hook-ups
- Contract Documents
 - Plans and Specifications