Orleans Citizens Forum

Water Quality and Wastewater Planning

October 2017 Special Town Meeting Warrant Articles

October 12, 2017

Overview and Current Status of the Wastewater Project

- **The Treatment Facility**
- **The Collection System**
- **The Disposal Site**
- **The Financial Model**

The Treatment Facility

Wastewater and Septage Treatment Preliminary Design

- **Cape Cod Commission Development of Regional Impact (DRI) Conditions Related to the Reuse Former Tri-Town Site**
- **Reserve Capacity to Treat Sewage/Septage from Town of Brewster and Town of Eastham**
- **Location: Former Tri-Town Septage Treatment Facility**

Wastewater Treatment Facility

- **Process Selection**
  - Identified the Design Basis for the Facility
  - Evaluated Various Unit Processes
  - Recommended Technologies for Selection – Sequencing Batch Reactors
  - Presented Preliminary Design Information
- **Flows and Loading**
  - Constructed in Two Phases
  - Projected “High-End” Septage Loading of 6 Million Gallons Annually or 16,000 Gallons per Day
  - Total Capacity (Downtown Area, Meetinghouse Pond Area and Septage) 360,000 Gallons per Day

Estimated Treatment Facility Costs and Schedule

Description (At Full Buildout/Capacity)	Estimated Cost
Capital	$16,720,000
Owner's Development Costs	$960,000
Engineering	$5,770,000
Contingency	$2,500,000
Total	$25,950,000
Annual O&M, Replacement, and Monitoring	$1,360,000

Description	Duration (months)
Draft Plans and Specifications	6 to 9
MassDEP, CCC and Town Reviews	3 to 4
Final Plans and Specifications	1
Permits (MassDEP, Old Kings Highway, etc.)	3 to 7
Bidding and Construction	14 to 21
Total	27 to 42

Next Steps

- **Address Comments on 25% Preliminary Design Report**
- **Obtain Funding**
  - 100% Contract Documents (Plans and Specifications)
  - Regulatory Review and Approvals
  - Permitting

The Collection System

Evaluation

- **Technologies**
  - Gravity Sewers
  - Low Pressure Sewers
  - Septic Tank Effluent Pumps
  - Septic Tank Effluent Gravity
  - Vacuum Sewers
- **Process**
  - Advantages and Disadvantages
  - Capital and Annual Operation and Maintenance Costs
- **Input**
  - Town Officials and OWQAP
  - Collection System Workgroup (12/20/16, 01/05/17 and 03/09/17)
  - Data/Information Collected/Received – Manufacturers, Individuals, Municipalities, etc.

Evaluation (cont.)

Other Considerations

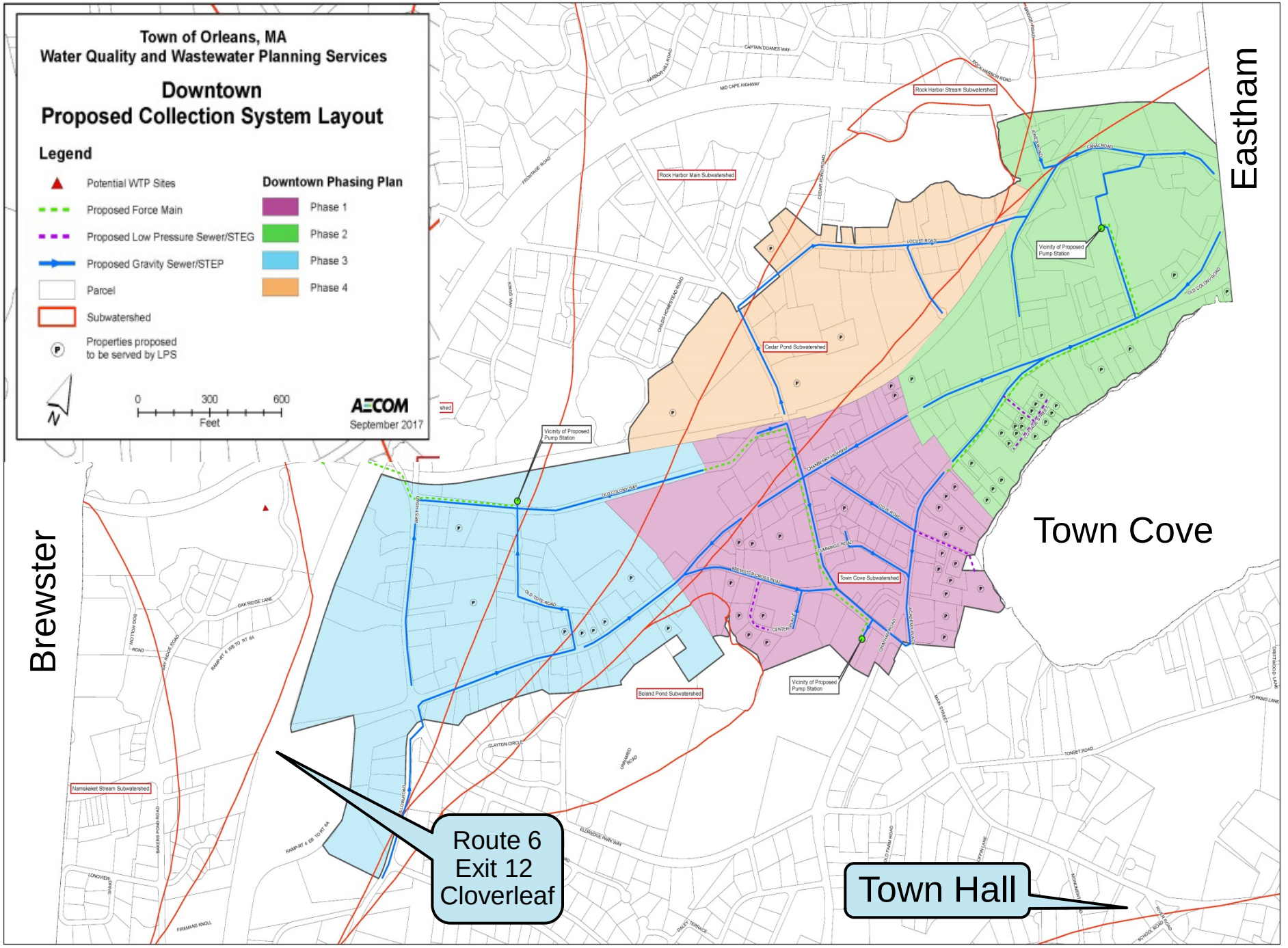
- Impact the Sizing of System From Flows (Initial, Design and Future))
- Potential Expansion
- Change in Use
- Impact of Zoning Changes on Flow
- Utilities
- Environmental
- Historical

Impacts of Improperly Designed Collection System

- Odors
- Sewer Overflows
- Excessive Operating Costs
- Short Equipment Life and Excess Energy Costs Due to Equipment Operating Outside of their Normal Operating Range
- Lack of Flexibility for Future Conditions

Collection System Recommendation

- **Recommendation**
  - Hybrid Collection System - Gravity Sewers and Low Pressure Sewers
- **Rationale**
  - Incorporated All Massachusetts Regulatory Requirements
  - Considered Input from Town Officials, Various Groups, Individuals and Other Professionals
  - Considered All Costs - Capital and O&M
  - Familiarity with System Components by General Contractors, Contract Operators and Possible Design-Built-Operate Teams Leads to Reduced Costs
  - Provides Flexibility - Phased Implementation and Potential Future Expansion


Town of Orleans, MA
Water Quality and Wastewater Planning Services
Downtown
Proposed Collection System Layout
Legend
Potential WTP Sites
Proposed Force Main
Proposed Low Pressure Sewer/STEG
Proposed Gravity Sewer/STEP
Parcel
Subwatershed
Properties proposed to be served by LPS
Downtown Phasing Plan
Phase 1
Phase 2
Phase 3
Phase 4
0
300
600
Feet
AECOM
September 2017
Eastham
Brewster
Town Cove
Rock Harbor Stream Subwatershed
Rock Harbor Main Subwatershed
Cedar Pond Subwatershed
Town Cove Subwatershed
Boland Pond Subwatershed
Namskaket Stream Subwatershed
Vicinity of Proposed Pump Station
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Vicinity of Proposed Pump Station
Route 6
Exit 12
Cloverleaf
Town Hall

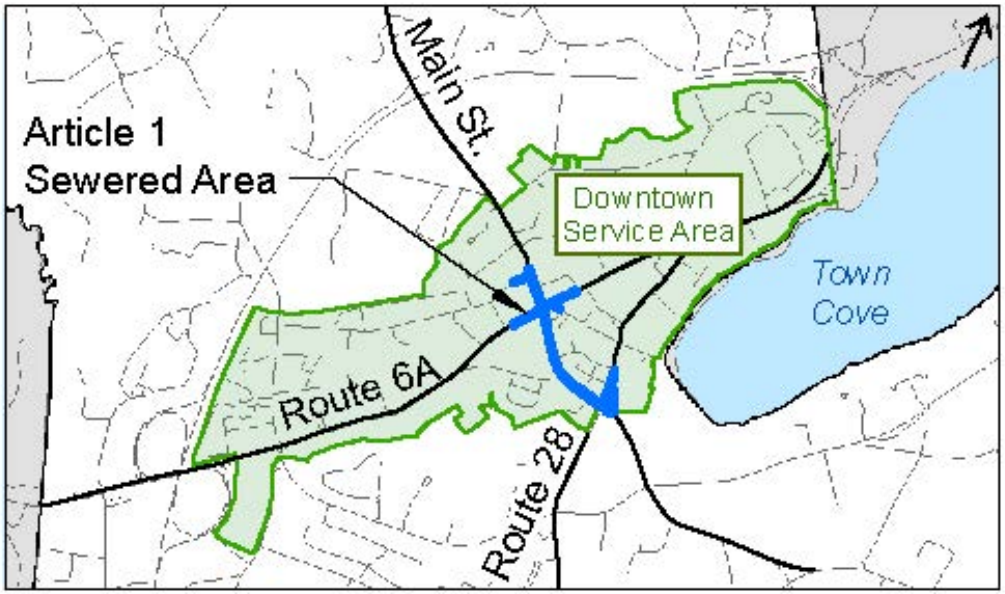
Estimated Collection System Costs and Schedule

Description (At Full Buildout/Capacity)	Estimated Cost
Capital	$11,830,000
Owner's Development Costs	$1,430,000
Engineering	$4,080,000
Contingency	$1,780,000
Total	$19,120,000
Annual O&M, Replacement, and Monitoring	$300,000

Description	Duration (months)
Draft Plans and Specifications	16 to 24
MassDEP, CCC and Town Reviews	3 to 4
Final Plans and Specifications	3
Permits (MassDEP, Old Kings Highway, etc.)	3 to 7
Bidding and Construction	24 to 36
Total	49 to 74

MassDOT Intersection Project
Key Facts

Description	MassDOT Project	MassDOT Project Percent of Entire Downtown Area
Gravity Sewer	3,340	11.3%
Low Pressure Sewer (l.f.)	0	0.0%
Force Main (l.f.)	1,140	15.2%
Project Cost	$3,679,700	19.2%
Number Parcels	35	10.0%



MassDOT Intersection Project - Budget Summary

Description	Budget
Construction Cost	$2,681,900
Owner's Development Costs	
Construction Contingency at 10%	$268,190
Police Details	$268,800
AECOM	
Project Management/Administrative	$58,520
Shop Drawing Review	$12,155
Design Revisions Due to Field Conditions	$7,150
RFI Responses	$17,160
As-Build Plans	$9,900
Periodic Site Visits	$16,940
Design (Contract Documents)	$69,700
Bidding Phase	$29,040
Resident Engineering	$240,240
Total Rounded	$3,679,700

Next Steps

- **Address Comments on 25% Preliminary Design Report**
- **Obtain Funding**
  - 100% Contract Documents (Plans and Specifications)
  - Regulatory Review and Approvals
  - Permitting

The Disposal Site

Aquifer Recharge Site Investigations Background

- **Tri-Town Septage Treatment Facility - 1987 thru 2016**
  - Permitted to Discharge 45,000 Gallons per Day to Namskaket and Little Namskaket Watersheds
  - Discharge Nitrogen Concentration = 50 mg/L
  - Existing Effluent Discharge Permit Based on 1985 MEPA Finding of "No Significant Impact"
- **2010 CWMP Approved by MassDEP, MEPA, and Cape Cod Commission**
  - 740,000 Gallons per Day from New WWTF to Namskaket and Little Namskaket Watersheds
  - Discharge Nitrogen Concentration = 10 mg/L
  - Based on USGS and SMAST studies concluding there would be no significant impact to either marsh system

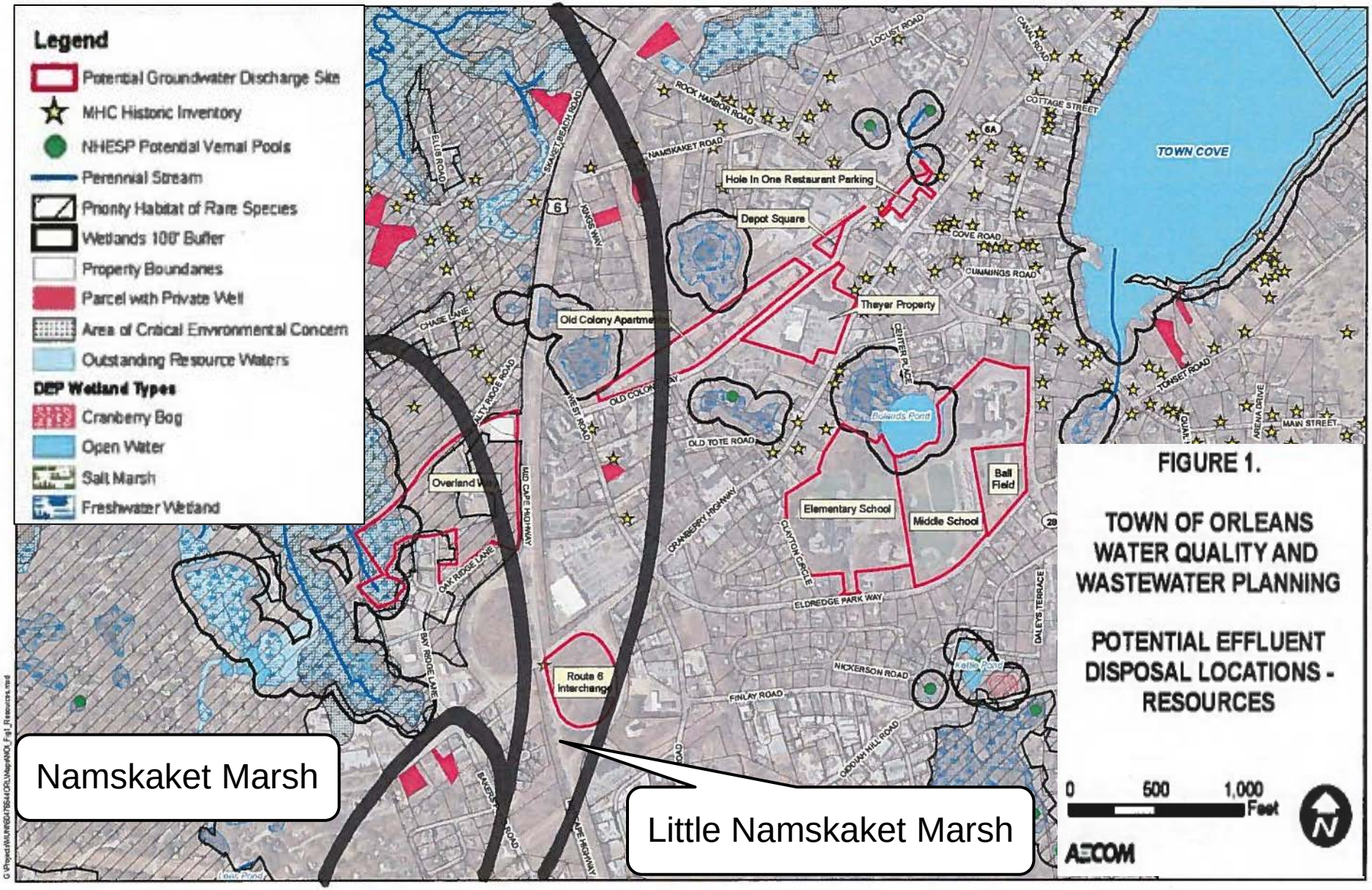
Aquifer Recharge Site Investigations Background

Alternative Recharge Locations

- Fourth Detailed Site Identification Study in Last 12 years
- Consensus Plan Called for Only Two Areas to be Sewered: Downtown Area and Meetinghouse Pond Area
- Recharge Capacity of Current Treated Flow From Downtown Area at 150,000 Gallons per Day

Selection Criteria for Sites

- Town-owned
- Non-nitrogen Sensitive Watershed
- Mass Historic Commission (archaeology)
- Rare/Endangered Species Habitat
- Wetlands on Site
- Distance from WWTF
- Site Uses (existing and historic)
- Depth to Groundwater
- Potable Water Wells in Area
- Other


Legend
Potential Groundwater Discharge Site
MHC Historic Inventory
NHESP Potential Vernal Pools
Perennial Stream
Priority Habitat of Rare Species
Wetlands 100' Buffer
Property Boundaries
Parcel with Private Well
Area of Critical Environmental Concern
Outstanding Resource Waters
DEP Wetland Types
Cranberry Bog
Open Water
Salt Marsh
Freshwater Wetland
TOWN COVE
Hole In One Restaurant Parking
Depot Square
Theyer Property
Old Colony Apartments
Overland Trail
Route 6 Interchange
Elementary School
Middle School
Ball Field
Namskaket Marsh
Little Namskaket Marsh
FIGURE 1.
TOWN OF ORLEANS
WATER QUALITY AND
WASTEWATER PLANNING
POTENTIAL EFFLUENT
DISPOSAL LOCATIONS -
RESOURCES
0
500
1,000
Feet
AECOM

Aquifer Recharge Site Investigations
Site Evaluation Results

Potential Downtown Locations	Score	Rank
Parcel 1/1A	673	1
Route 6 Exit 12	492	4
Orleans Marketplace Site (Thayer Site)	510	3
Old Colony Apartments (Old Colony Way)	466	7
Hole in One Restaurant (Cranberry Highway)	411	9
Depot Square (Old Colony Way)	485	5
Orleans Elementary School (46 Eldredge Park Way)	477	6
Nauset Regional Middle School (70 Eldredge Park Way)	545	2
Firebirds Ball Field (76 Eldredge Park Way)	440	8

Aquifer Recharge Site Investigations
Feasible Sites

❖ Parcel 1/1A

- Town Owned
- Non-nitrogen Sensitive Watershed (Little Namskaket)
- Disturbed Site
- Adjacent to New WWTF
- Part of Original Site Proposed in CWMP
- Supported by MassDEP and Cape Cod Commission
- Minimal MEPA Notice of Project Change Requirement
- Consistent with Consensus Agreement

❖ Nauset Regional Middle School

- Eliminated Due to Nauset Regional Middle School District Committee Refusal to Consider

❖ Orleans Marketplace Site (Thayer Site)

- Privately Owned
- Nitrogen Sensitive Watershed
- Legal and Management Issues with Lease or Purchase

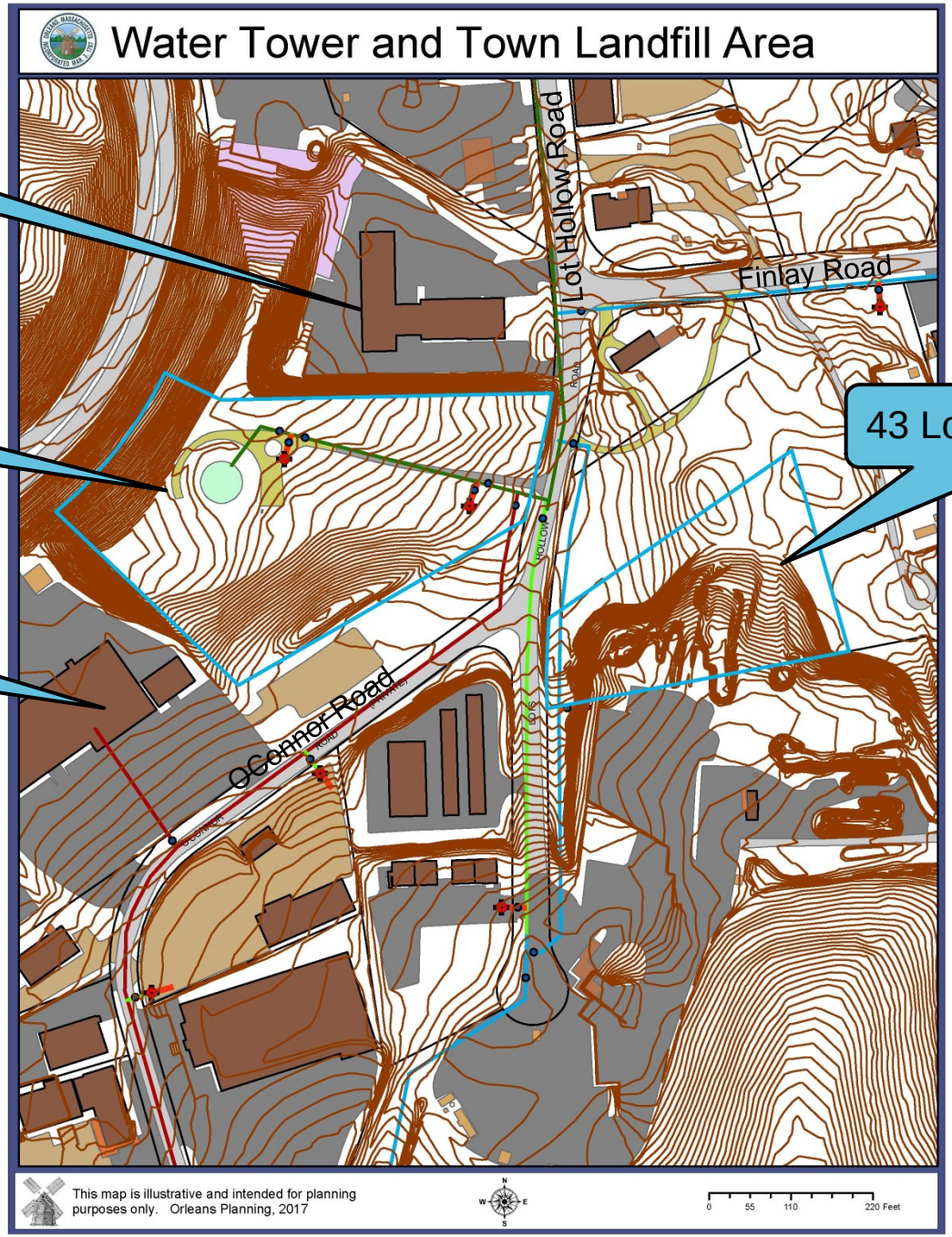
Aquifer Recharge Site Investigations
Feasible Sites (cont.)

❖ Route 6 Exit 12 (Cloverleaf)

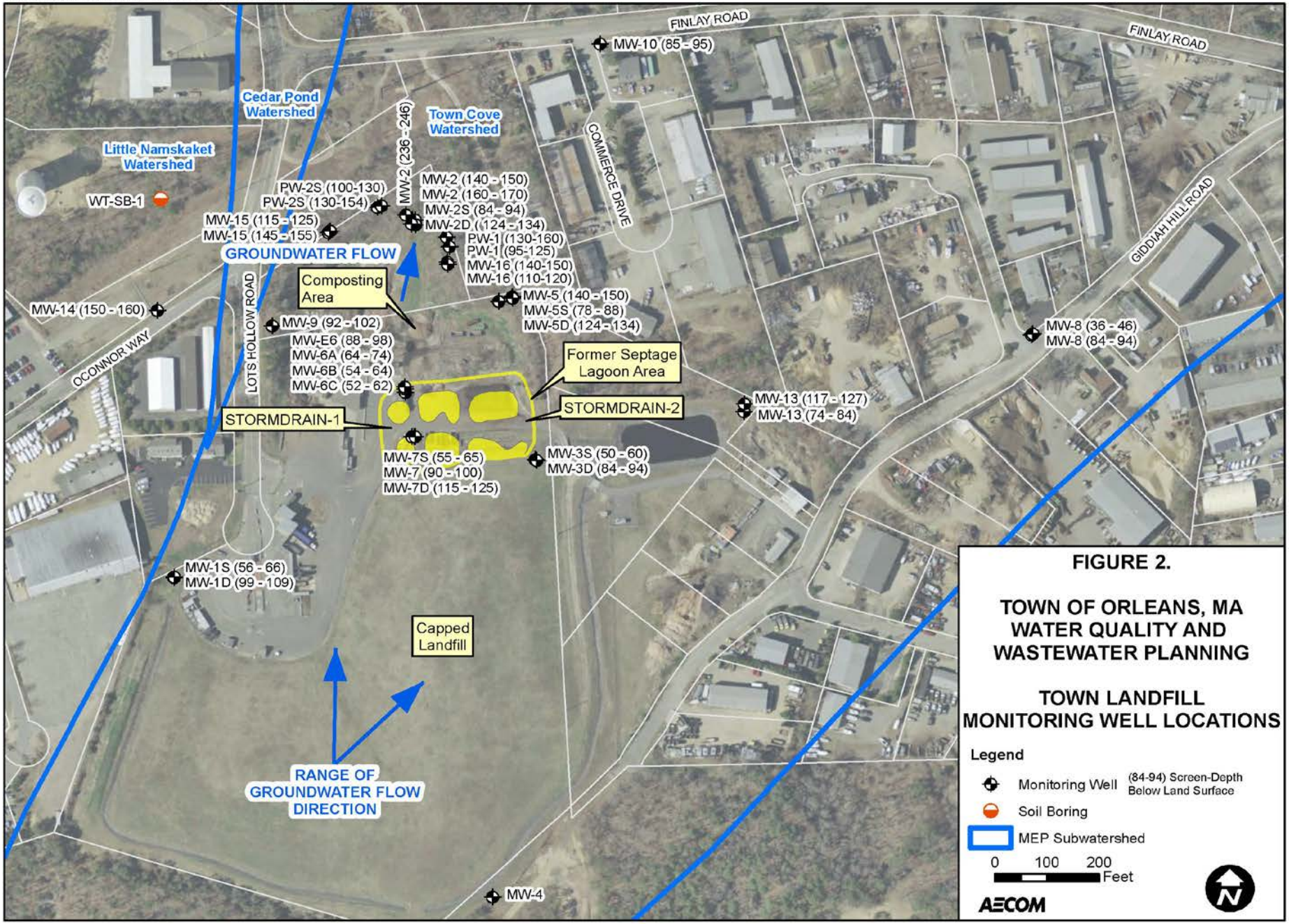
- Non-nitrogen Sensitive Waterbody (Little Namskaket)
- Capacity Sufficient for Downtown Area and Meetinghouse Pond Area
- No Existing Uses on Site
- IMA with MassDOT Required for Site Usage and Town Bonding
- Very Minimal Difference in Freshwater Discharge Compared to Parcel 1/1A

❖ Other Short-listed Sites

- Insufficient Capacity for Downtown Area
- Nitrogen Sensitive Watersheds
- Not Town Owned
- Distance from WWTF
- Water and Sewer Commissioners Have Allowed the Study of 32 and 43 Lots Hollow Road


Water Tower and Town Landfill Area
Wilkinson Ecological Design
32 Lots Hollow Road
Orleans Toyota
43 Lots Hollow Road
Lot Hollow Road
Finlay Road
OConnor Road
This map is illustrative and intended for planning purposes only. Orleans Planning, 2017
0
55
110
220 Feet

G:\Projects\MUNI\60476644ORL\Maps\PRB_Figure2_Landfillv2.mxd



Estimated Aquifer Recharge Costs and Schedule

Description (At Full Buildout/Capacity)	Estimated Cost
Capital (2 Sites)	$3,170,000
Owner's Development Costs	$180,000
Engineering	$1,090,000
Contingency	$480,000
Total	$4,920,000
Annual O&M, Replacement, and Monitoring	$35,000

Description	Duration (months)
Draft Plans and Specifications	6 to 9
MassDEP, CCC and Town Reviews	3 to 4
Final Plans and Specifications	1
Permits (MassDEP, Old Kings Highway, etc.)	3 to 7
Bidding and Construction	14 to 21
Total	27 to 42

Next Steps

- **Parcel 1/1A and Route 6 Exit 12**
  - Submit Hydrogeologic Evaluation Reports – Fall 2017
  - Obtain Approval of Hydrogeological Plans – Fall 2017
  - Get Confirmation with SMAST on MEP Compliance
- **32 Lots Hollow Road and 43 Lots Hollow Road**
  - Confirm with MassDEP the Field Investigation Requirements
  - Prepare a Hydrogeologic Evaluation Proposal
  - Conduct Field Investigations
  - Perform Wick Testing
- **Complete Field Investigations and Analysis in Preparation for May 2018 Town Meeting**
- **File Notice of Project Change with MEPA - Based on Preferred Site(s)**

The Financial Model

Overview of Program Costs and Cost Allocation

Elements of the Program	Major Cost Components	Users
Collection, Treatment and Effluent Disposal	Capital	Sewered Areas
Non-Traditional Technologies	Annual Operation and Maintenance	Non-Traditional Technology Areas
Adaptive Management	Replacement	Septic Systems Only Areas (Retained)
	Monitoring	

Financial Plan Update
Objectives

- **Develop Functional Financial Model to Allow Inputs and Inform Town Decisions**
- **Allow Rate Payers to See Annual Wastewater Costs for Their Property**
- **Provide "Built-in Flexibility" to Allow Changes to Cost Allocations to User Groups to Produce Fair Financial Plan**
- **Provide Tool that Town Can Continue to Use in the Future**

Note: The Town Director of Finance is Now Managing Consultants Work on the Financial Model

Financial Plan Update (cont.)
Cost Allocation Considerations

- **Capital Costs- WWTF and Collection System – Tax Rate and Special Assessments**
- **Capital Costs Effluent Disposal and NT - 100% Tax Rate**
- **O&M&R&M - 100% User Fees Allocated to Respective User Groups**
- **Financing**
  - 30-year 0% SRF
  - 10% Grant
  - Short Term Rental Tax ($200,000)
  - Septage Revenue ($584,000 annually)
  - 15% Contingency for Capital/ Replacement Costs
- **Non-traditional and Septic Only Costs Do Not include Individual Owner Costs to Pump and Maintain Their On-site Septic Systems**

Financial Plan Update
Model Updates

- **Revise to Calculate the Range of Estimated Betterment from "Best" to "Worst" Case Scenarios**
- **Include only " Capital Costs" (No Annual Operating Costs)**
- **Create Visual to Best Display the Results – Similar Model Runs Compared on One Graph**
- **Complete Model Updates Working with Finance Director and Model Runs by Early January 2018 in Preparation for May 2018 Town Meeting**

Financial Plan Update (cont.)
"Best" to "Worst" Case Scenarios

- **BEST CASE – Current Plan NPV of Traditional Technology and Non-Traditional Technology of Total Capital Costs**
  - 100% on Tax Rate
  - 80% Betterment and 20% Tax Rate
  - 50% Betterment and 50% Tax Rate
- **WORST CASE – Approved CWMP NPV of Total Capital Costs**
  - 100% on Tax Rate
  - 80% Betterment and 20% Tax Rate
  - 50% Betterment and 50% Tax Rate
- **Current Plan NPV of Traditional Technology Total Capital Costs**
  - 100% on Tax Rate
  - 80% Betterment and 20% Tax Rate
  - 50% Betterment and 50% Tax Rate

Town of Orleans Massachusetts

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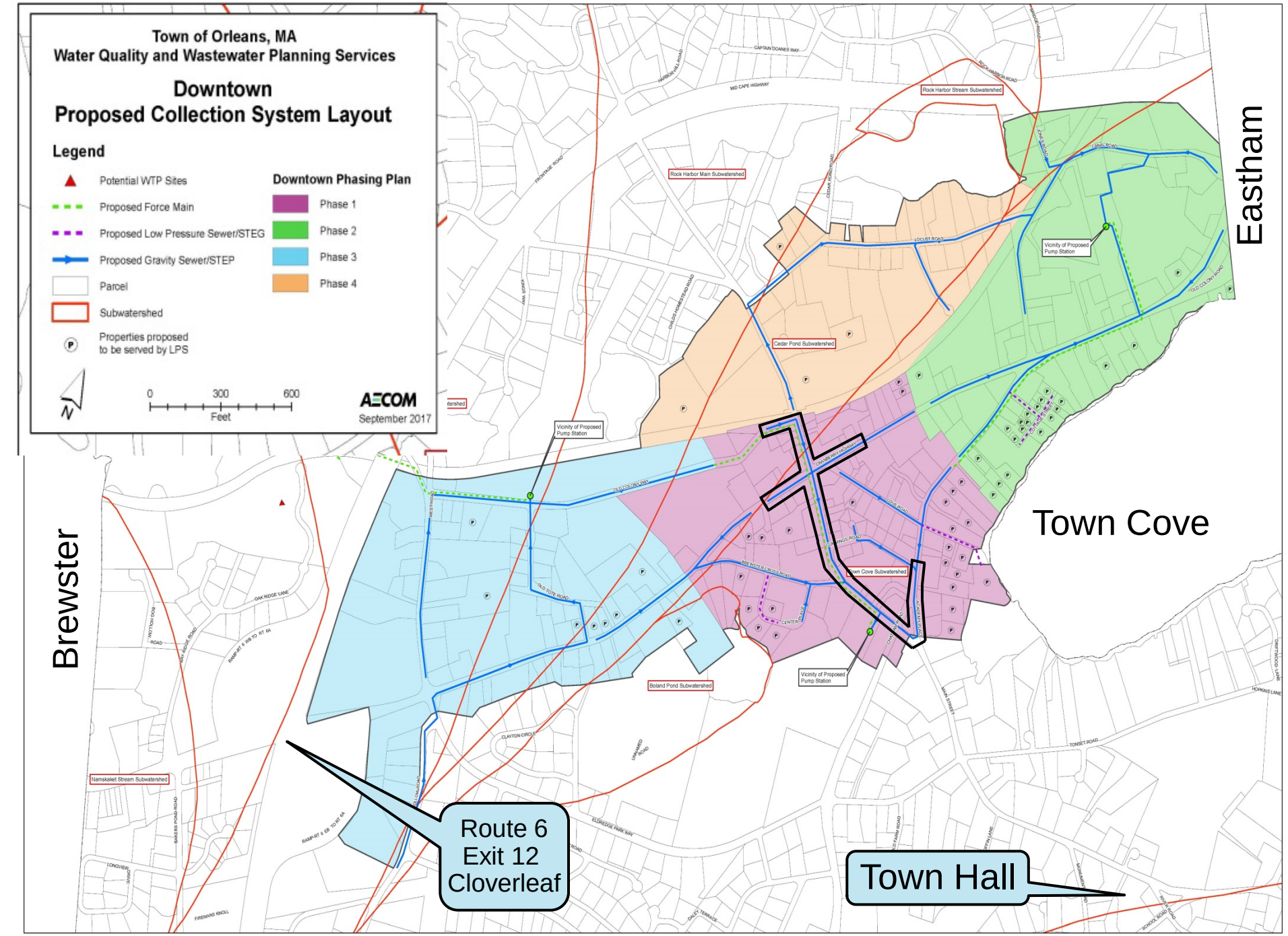
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October 2017 Special Town Meeting Warrant Articles

- **Funding of Construction of Downtown Collection System Main Spine with MassDOT Intersection Project - $3,679,700**
- **Authorize Negotiation of Lease with MassDOT for Use of Route 6, Exit 12 for Groundwater Recharge**
- **Funding of Year 3 of Lonnies Pond Demonstration Project (Thru June 30, 2018) - $93,950**
- **Independent Review of 25% Design of Downtown Area System - $75,000**

Town of Orleans Massachusetts

Thank You