



Town of

Orleans
Massachusetts

Beginning Anew – A Collection System, Effluent Treatment Facility and Effluent Disposal System Design from Scratch for a Small Cape Town

New England Water
Environment Association
Annual Conference & Exhibit

Session 24 – Small Community: Coastal
Solutions and Outreach Approaches
January 30, 2019

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Agenda

- ❖ **Prior Planning Work**
- ❖ **Scope of Work**
- ❖ **Downtown Area Collection System**
- ❖ **Pumping Stations**
- ❖ **Wastewater Treatment Facility
& Effluent Disposal Site**
- ❖ **Schedule & Funding**
- ❖ **Project Team**







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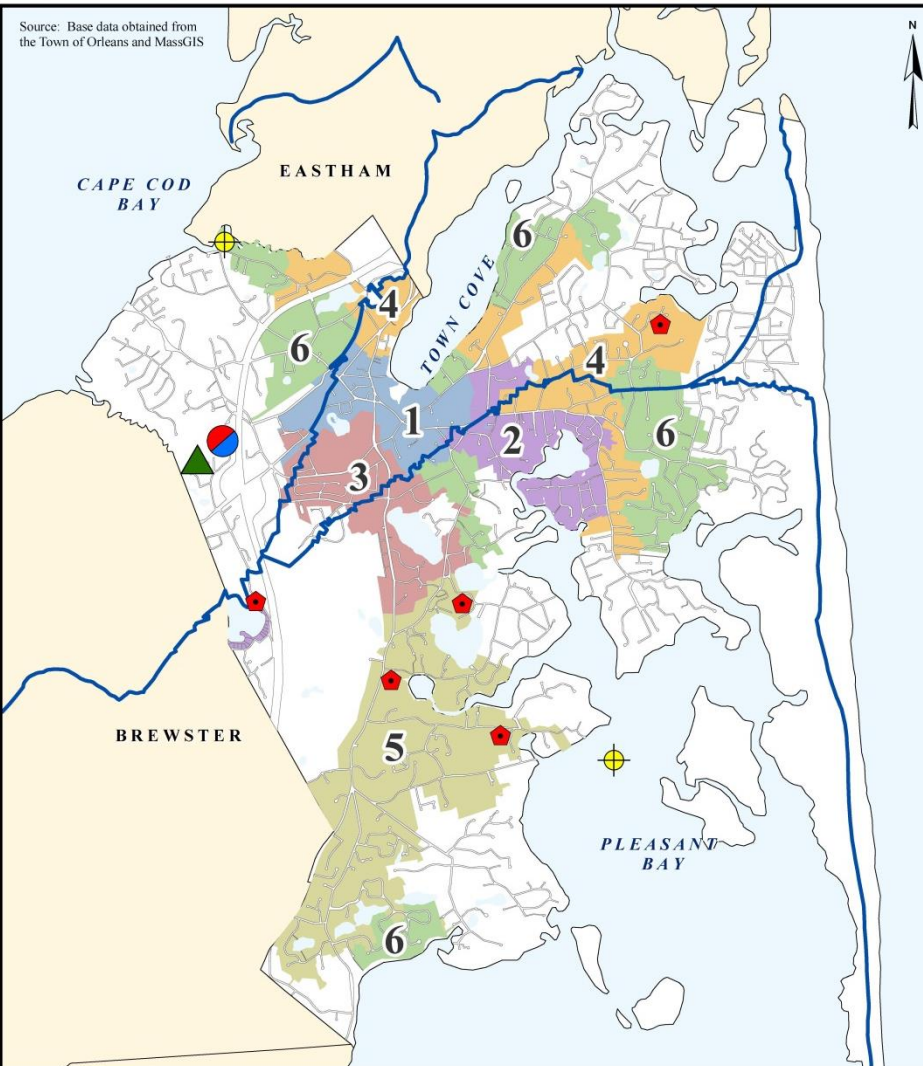
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Prior Planning Work

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Source: Base data obtained from the Town of Orleans and MassGIS



Wastewater Treatment Site
Effluent Disposal Site
Septage Treatment Facility
Sentinel Stations
Cluster Systems

Service Area Phasing

1	4	5
2	3	6

0 4,000 8,000 Feet

Orleans CWMP
Possible Sewer Phasing Plan

PROJ NO: 10645G DATE: Dec 2010 FIGURE: 11-3

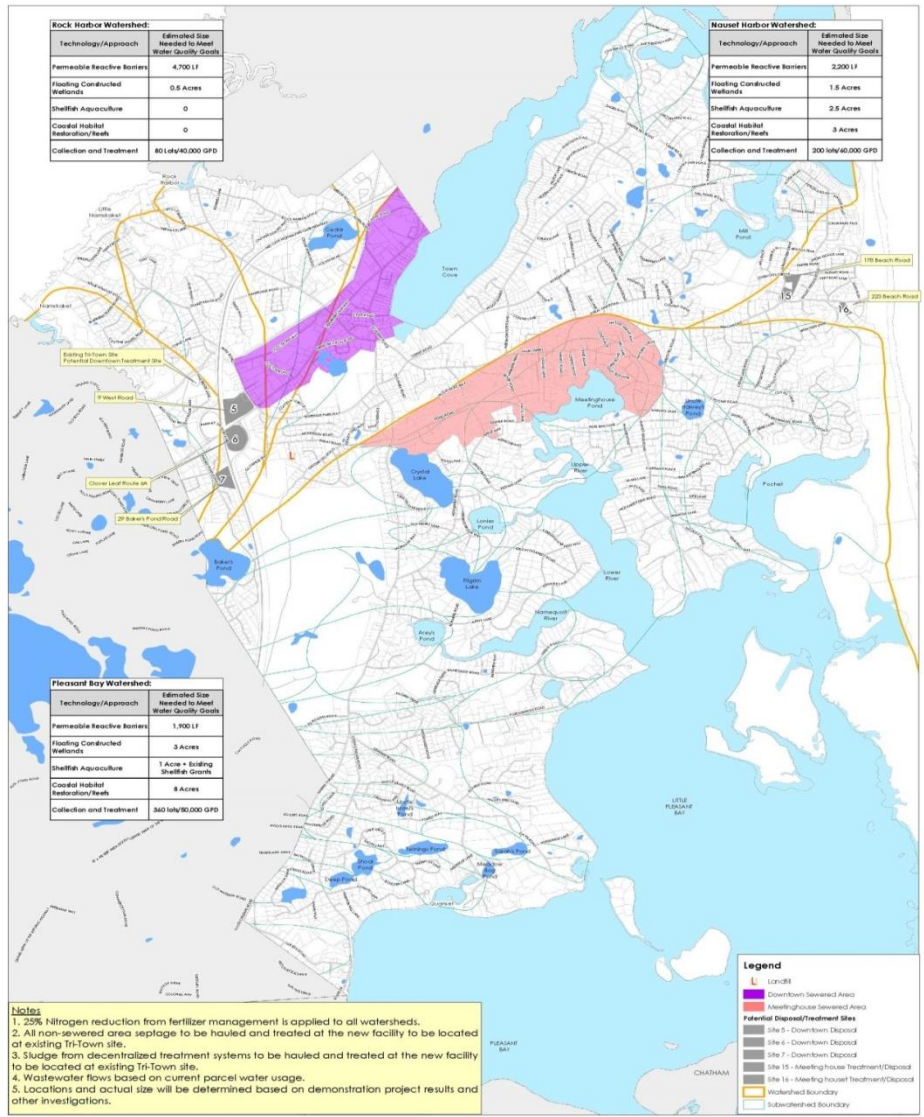
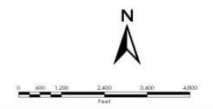
WRIGHT-PIERCE
 Engineering a Better Environment



CONCEPTUAL APPROACH TO MEET ORLEANS WATER QUALITY GOALS

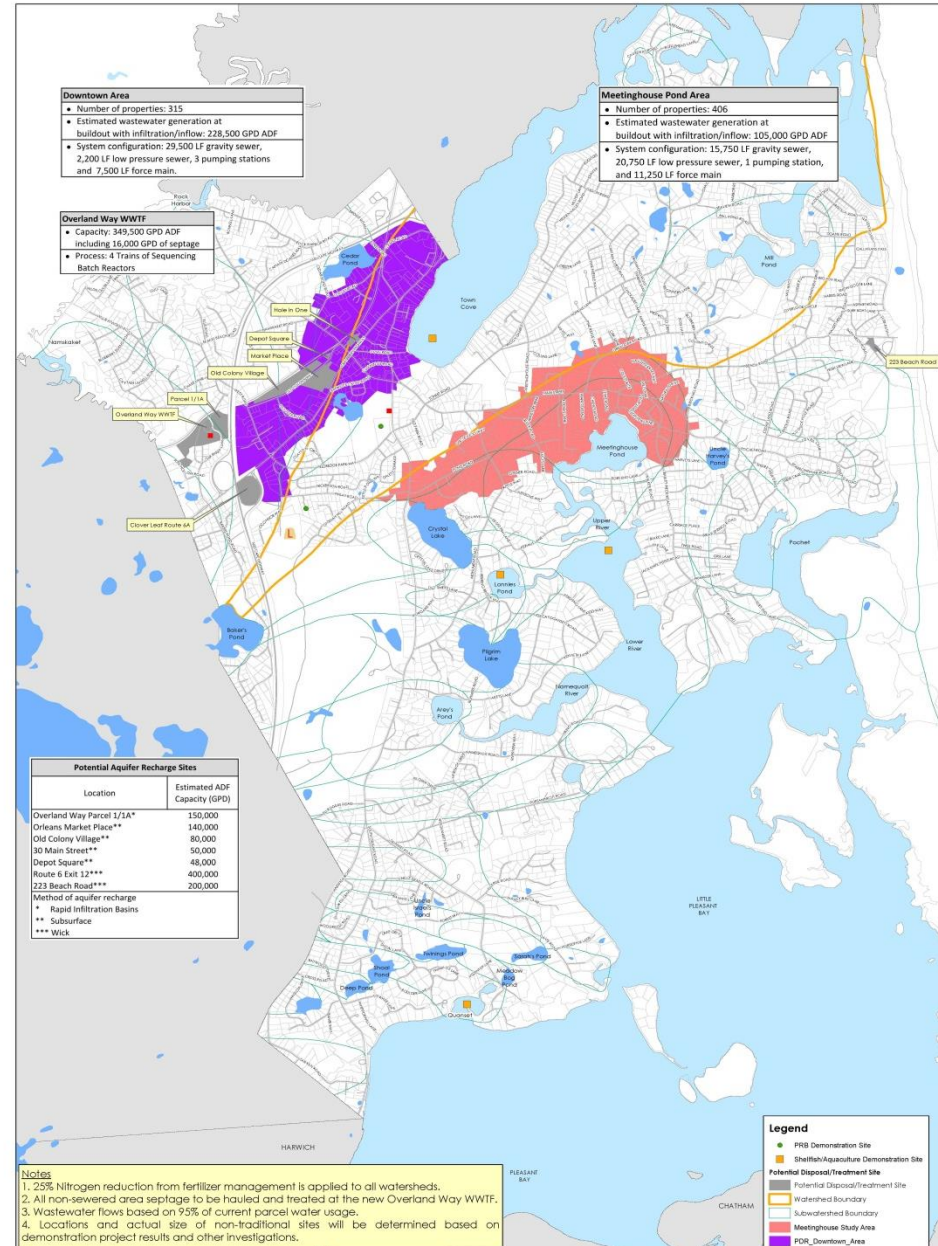
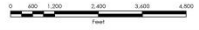
MARCH, 2015

TOWN OF ORLEANS MASSACHUSETTS



Water Quality and Wastewater Planning

- ❖ **Conceptual and Preliminary Design to Update the CWMP (2011) and To Reflect the Consensus Plan (2015)**
- ❖ **Goal: Minimize Proposed Sewered footprint to the Greatest Extent Possible**
- ❖ **Maximize Use of Non-traditional Technologies (Coastal Habitat Restoration, Aquaculture, Floating Constructed Wetlands, Permeable Reactive Barriers and Nitrogen Removing Barriers)**



Prior Planning Work (cont.)

Water Quality and Wastewater Planning

- ❖ **Reduces Collection System Area**
 - From CWMP: About 60 Percent of the Town and 650,000 gpd (ADF)
 - To: About 24 Percent of the Town and 350,000 gpd (ADF)
 - Downtown Area: 330 Parcels
 - Meetinghouse Pond Area: 360 Parcels

- ❖ **Reduces Project Costs from About \$180 M to About \$100 M**





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Scope of Work

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Scope of Work

- ❖ **Provide Engineering Services to Integrate Relevant Components of:**
 - Comprehensive Wastewater Management Plan (January 2011)
 - Consensus Plan (March 2015)
- ❖ **Prepare Contract Documents (specifications and drawings)**
 - Downtown Sewer Collection System and Pumping Stations
 - Downtown Sewer WWTF and Effluent Disposal System
- ❖ **Prepare a Downtown Area Impact Evaluation Based Upon Sewering the Meetinghouse Pond Area**
- ❖ **Bidding Phase Services**
- ❖ **Construction Phase Services**





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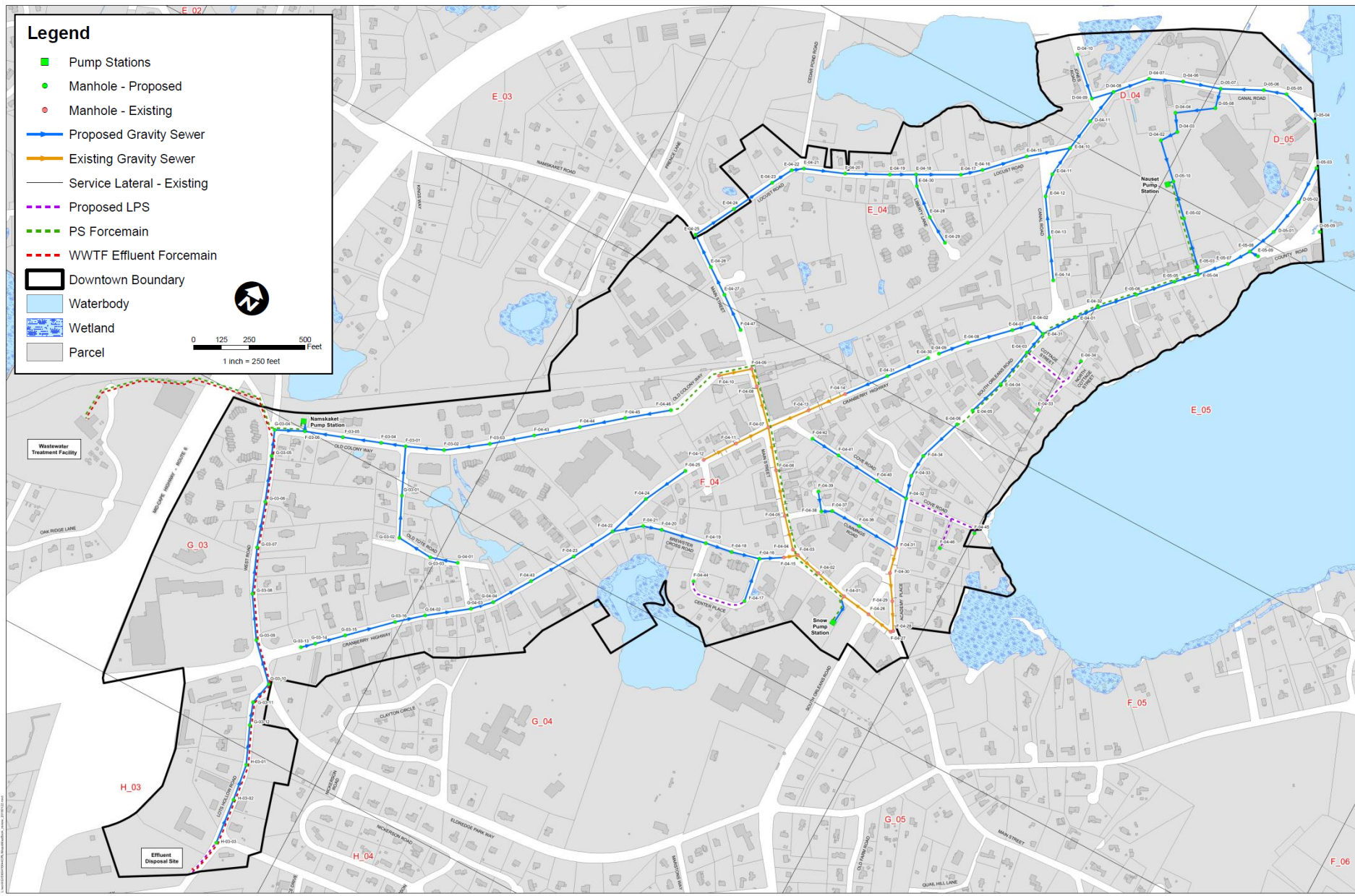
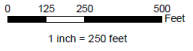
Downtown Area Collection System

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Legend

- Pump Stations
- Manhole - Proposed
- Manhole - Existing
- Proposed Gravity Sewer
- Existing Gravity Sewer
- Service Lateral - Existing
- - - Proposed LPS
- - - PS Foremain
- - - WWTF Effluent Forcemain
- Downtown Boundary
- Waterbody
- Wetland
- Parcel



Downtown Area Collection System - Summary

- ❖ **28,200 LF of Gravity Sewers (8-inch to 12-inch)**
- ❖ **2,100 LF of Low Pressure Sewers (1.5-inch to 2.5-inch)**
- ❖ **9,200 LF of Force Mains (6-inch to 8-inch)**
- ❖ **3 Pumping Stations**
- ❖ **Connections**
 - 1,090 Users
 - 57 Grinder Pumps (Privately Owned and Maintained)
- ❖ **Wastewater Flow**
 - Existing ADF Estimated At 140,000 GPD
 - Future ADF Estimated At 234,000 GPD
 - Plus 16,000 GPD Septage





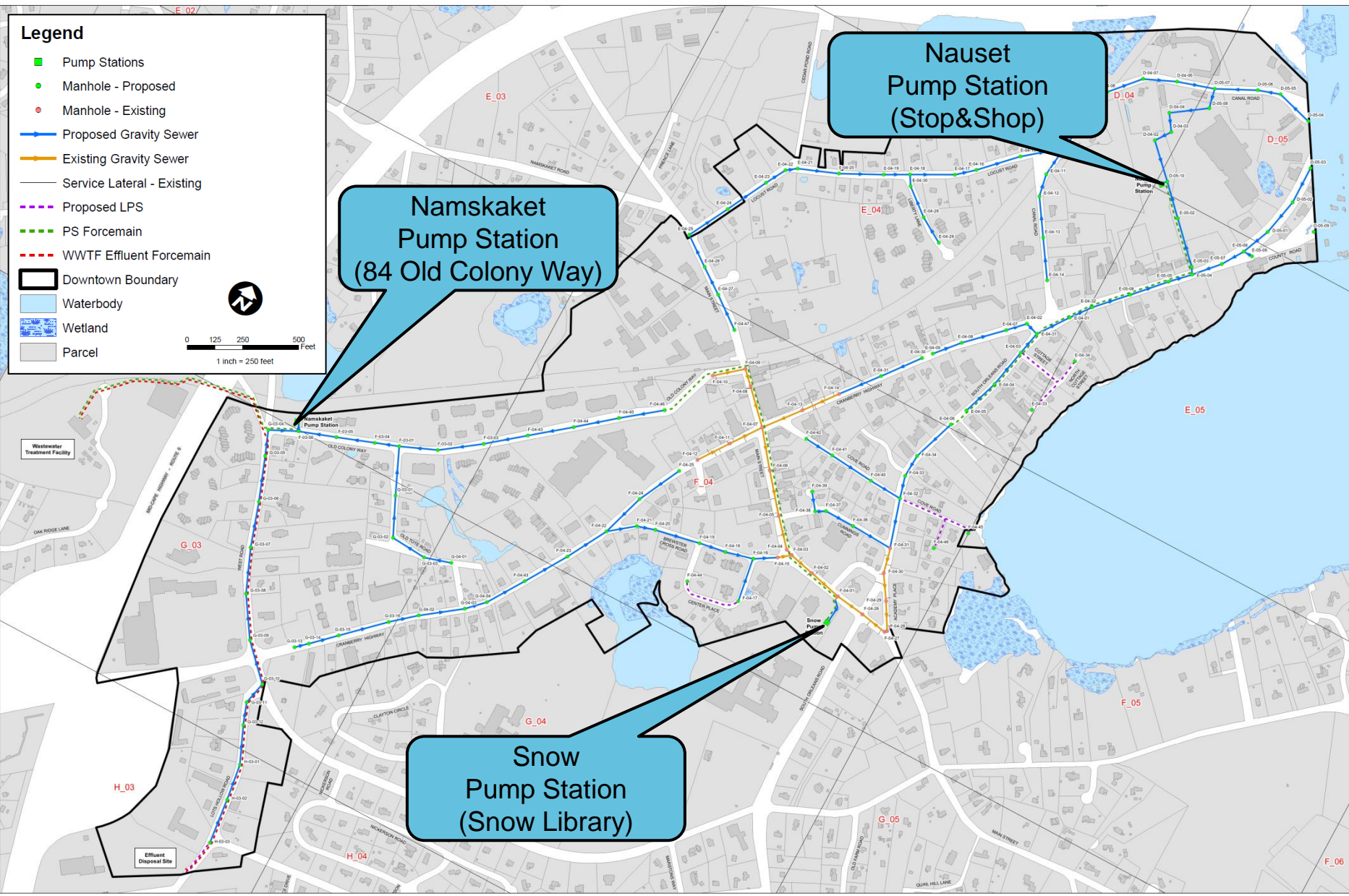
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Pumping Stations

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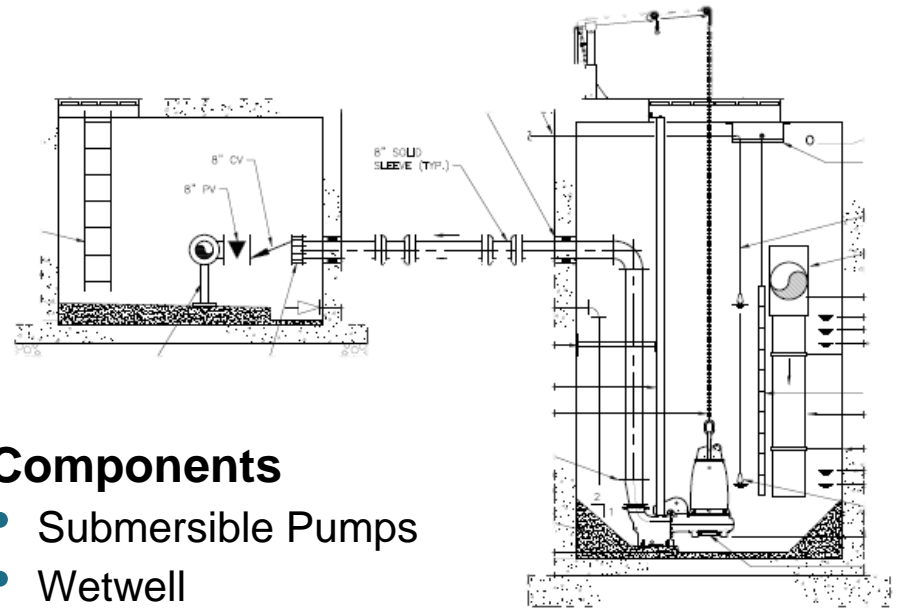
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Pumping Stations - Summary

❖ 3 Pumping Stations

- Namskaket PS
 - CAPACITY: 740 GPM
 - TDH: 65 Feet
 - FM: 1,750 LF 8" DIA
- Snow PS
 - CAPACITY: 500 GPM
 - TDH: 89 Feet
 - FM: 1,100 LF 6" DIA
- Nauset PS
 - CAPACITY: 310 GPM
 - TDH: 81 Feet
 - FM: 1,650 LF 6" DIA



❖ Components

- Submersible Pumps
- Wetwell
- Valve Vault
- Emergency Generator
- VFDs
- Flow Meter
- By-pass Pumping Connection
- Activated Carbon Barrel within Valve Vault
- Pig Launcher



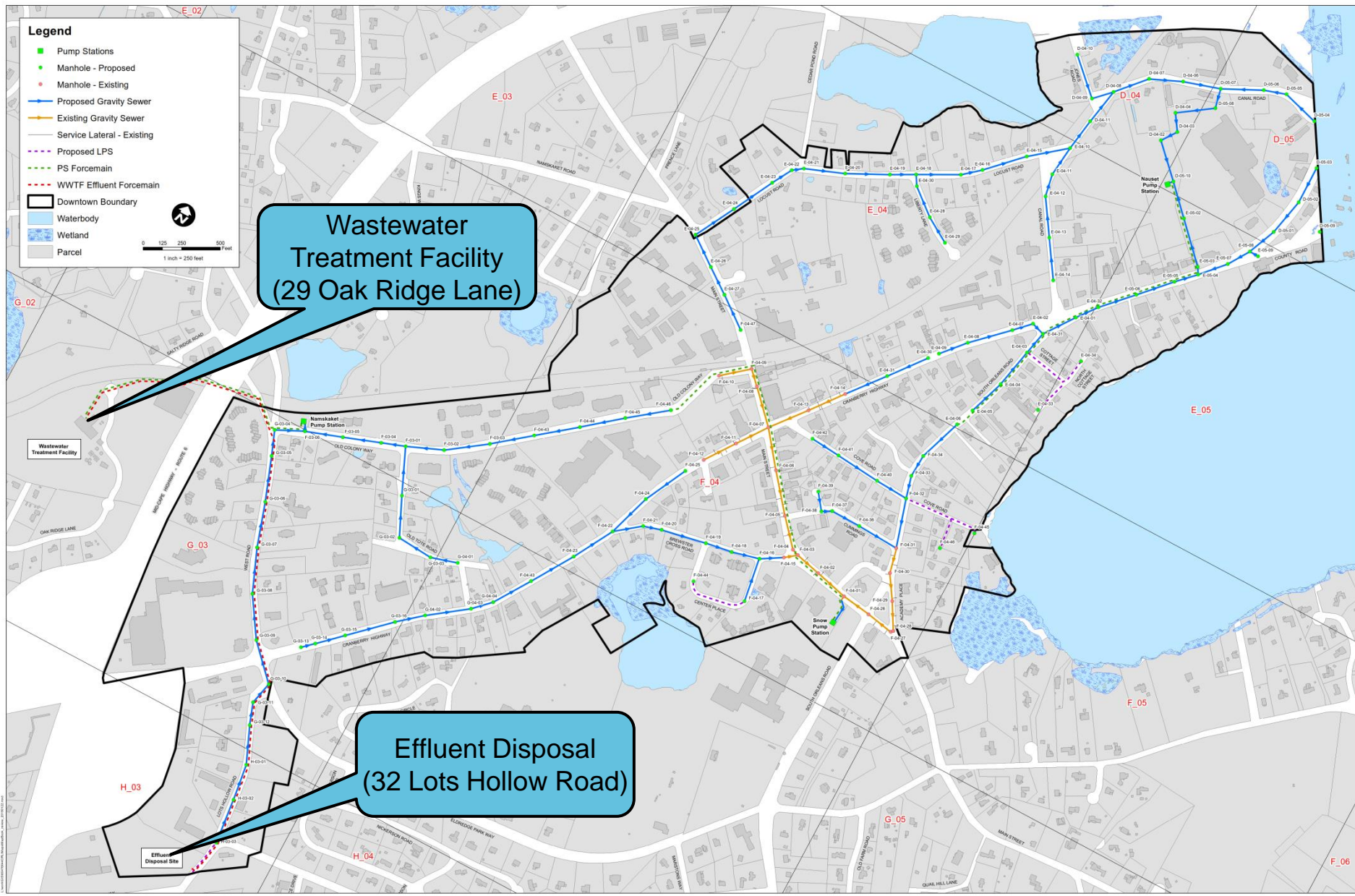
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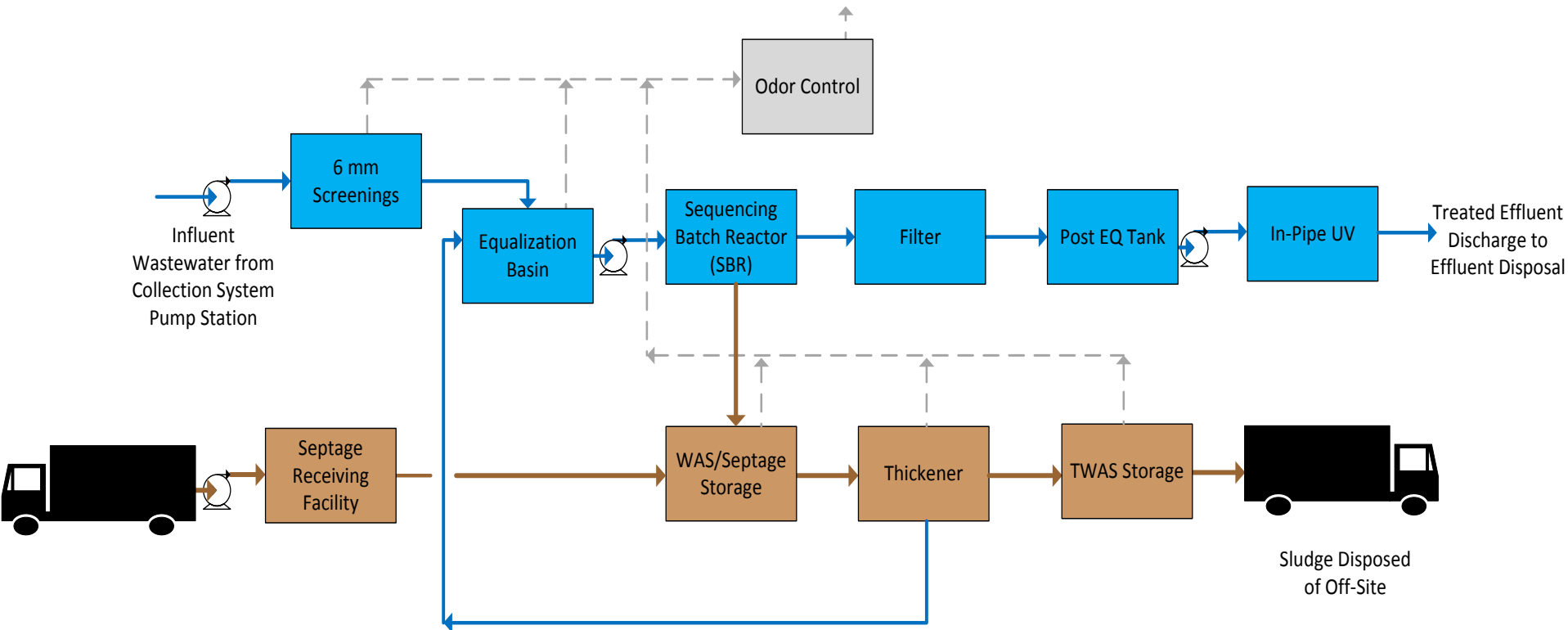
Wastewater Treatment Facility & Effluent Disposal

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Wastewater Treatment Facility and Effluent Disposal Process Flow Diagram



Legend

- Wastewater/Liquid
- Sludge/Solids
- - - → Vapor



Wastewater Treatment Facility and Effluent Disposal

Basis of Design

❖ Influent Flows & Loads/Seasonal Variation

- 95 Percent of 2 Years of Water Records
- Downtown Area Buildout Analysis
- Used 2.6 Seasonal Peaking Factor based on TR-16 and Comparison to Existing Cape Cod WWTFs
- Loadings Derived from M&E Text Book and Existing Cape Cod WWTFs

❖ Septage Acceptance

- Loadings from Tri-Town Septage Treatment Facility Operating Data
- 16,000 gpd (7 Day Average)

Concentrations		
Constituent	Influent	Effluent
BOD, mg/L	270	30
TSS, mg/L	310	30
TKN, mg/L	55	10



Conceptual Wastewater Treatment Facility Layout







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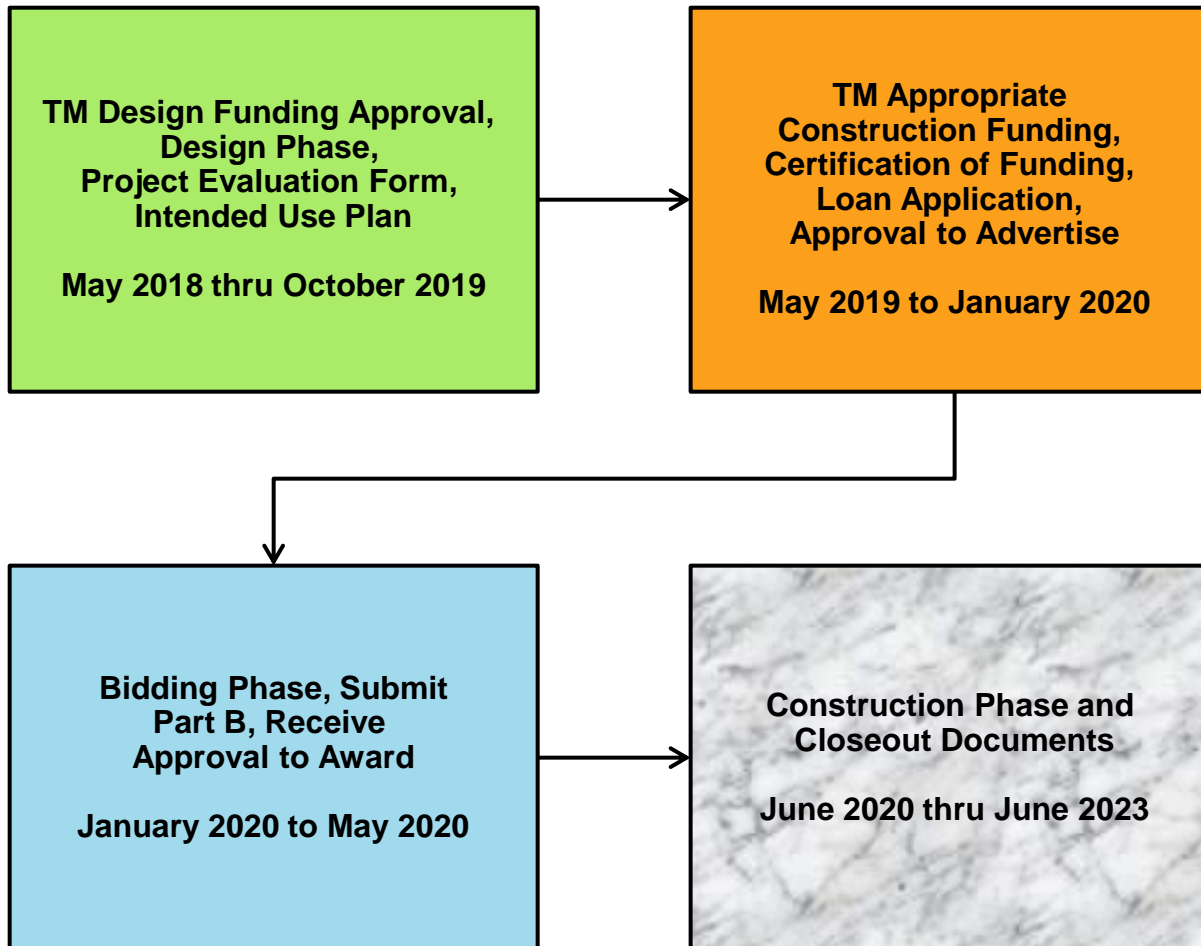
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Schedule & Funding

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SRF Funding Submittal Status and Schedule



Project Team

❖ The Town of Orleans

- Board of Selectmen
- Public Works and Natural Resources
- Board of Water and Sewer Commission
- Finance Committee
- Planning Department

❖ Tighe & Bond

❖ AECOM





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Thank You