



Town of

*Orleans*  
Massachusetts

# Water Resource and Wastewater Planning Collection System Working Group

December 20, 2016

# Agenda

- ❖ Goals of Meeting
- ❖ Downtown Area Flow Schematic and Preliminary Layout
- ❖ Meetinghouse Pond Area Flow Schematic and Preliminary Layout
- ❖ Program Costs
  - Elements of the Program
  - Major Cost Components
- ❖ Wastewater Collection System
  - Collection System Types
  - Cost Evaluation
  - Assumptions / Considerations



# Goals of the Meeting

## ❖ Review Collection System

- Geographic Area
- Flows
- On-going Activities

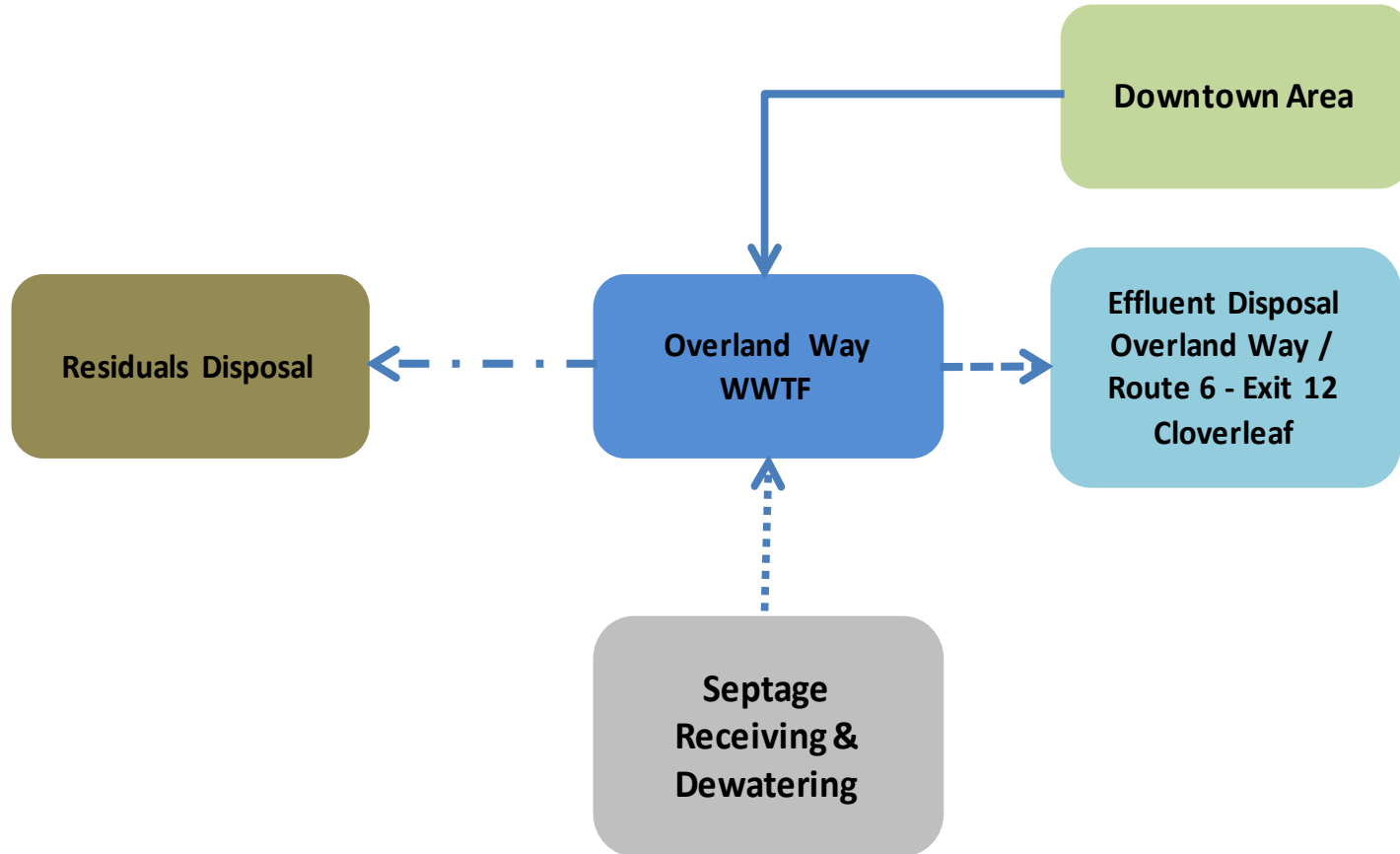
## ❖ Obtain Consensus

- Evaluation Process
- Inputs Utilized
- Assumptions



# Wastewater Collection System (cont.)

## Downtown Area Flow Schematic

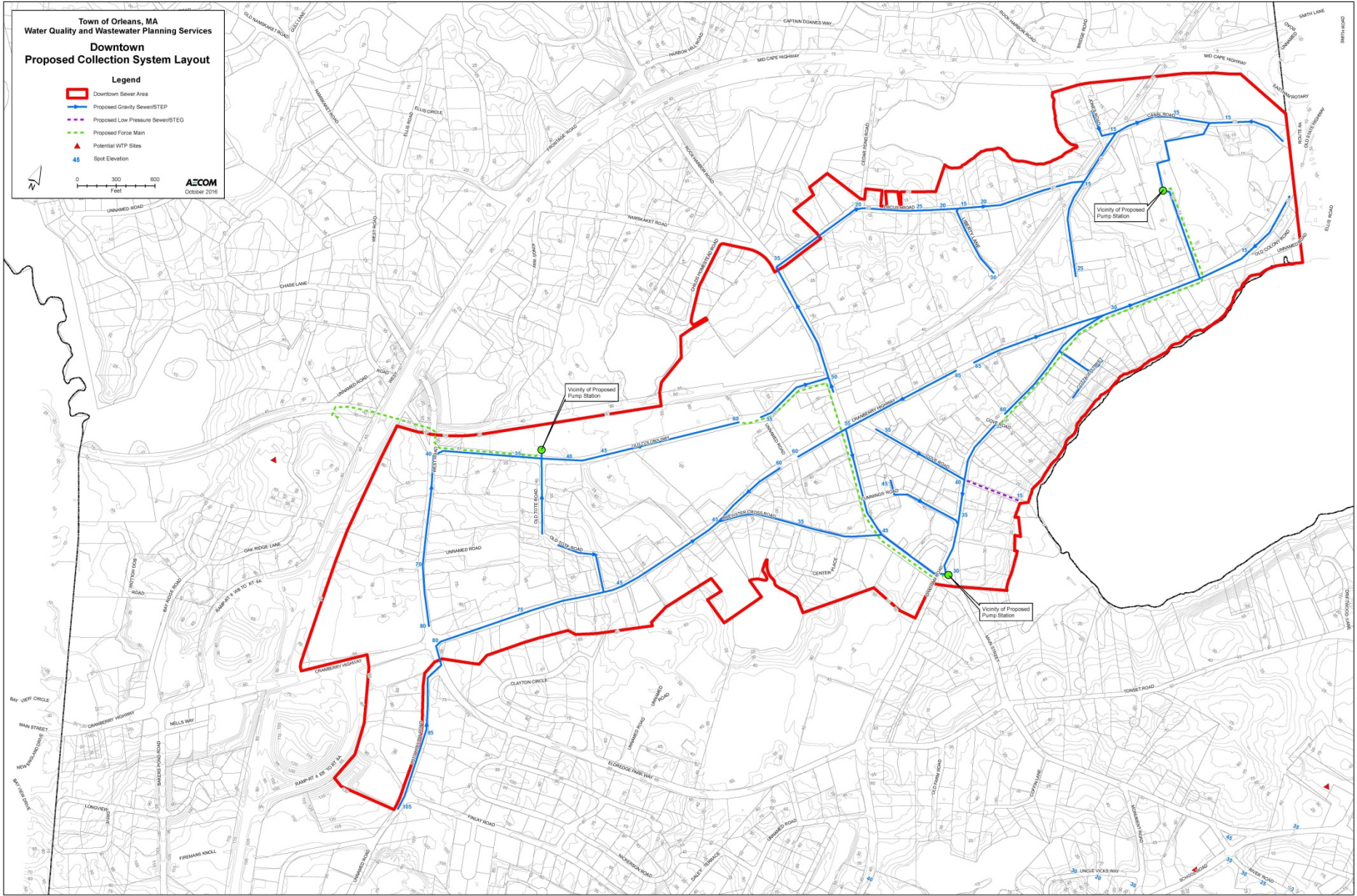


Town of Orleans, MA  
 Water Quality and Wastewater Planning Services  
**Downtown  
 Proposed Collection System Layout**

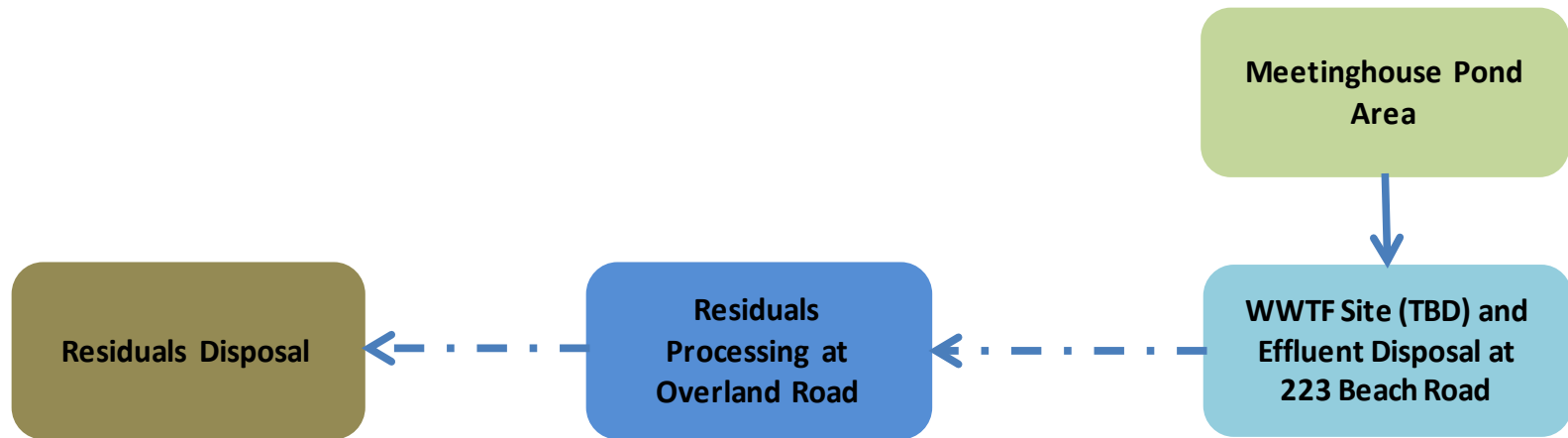
**Legend**

- ▭ Downtown Sewer Area
- Proposed Gravity Sewer/STEP
- - - Proposed Low Pressure Sewer/STEP
- - - Proposed Force Main
- ▲ Potential WTP Sites
- 45 Spot Elevation

0 300 600  
 Feet  
**AECOM**  
 October 2016



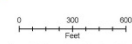
# Wastewater Collection System (cont.) Meetinghouse Pond Area Flow Schematic



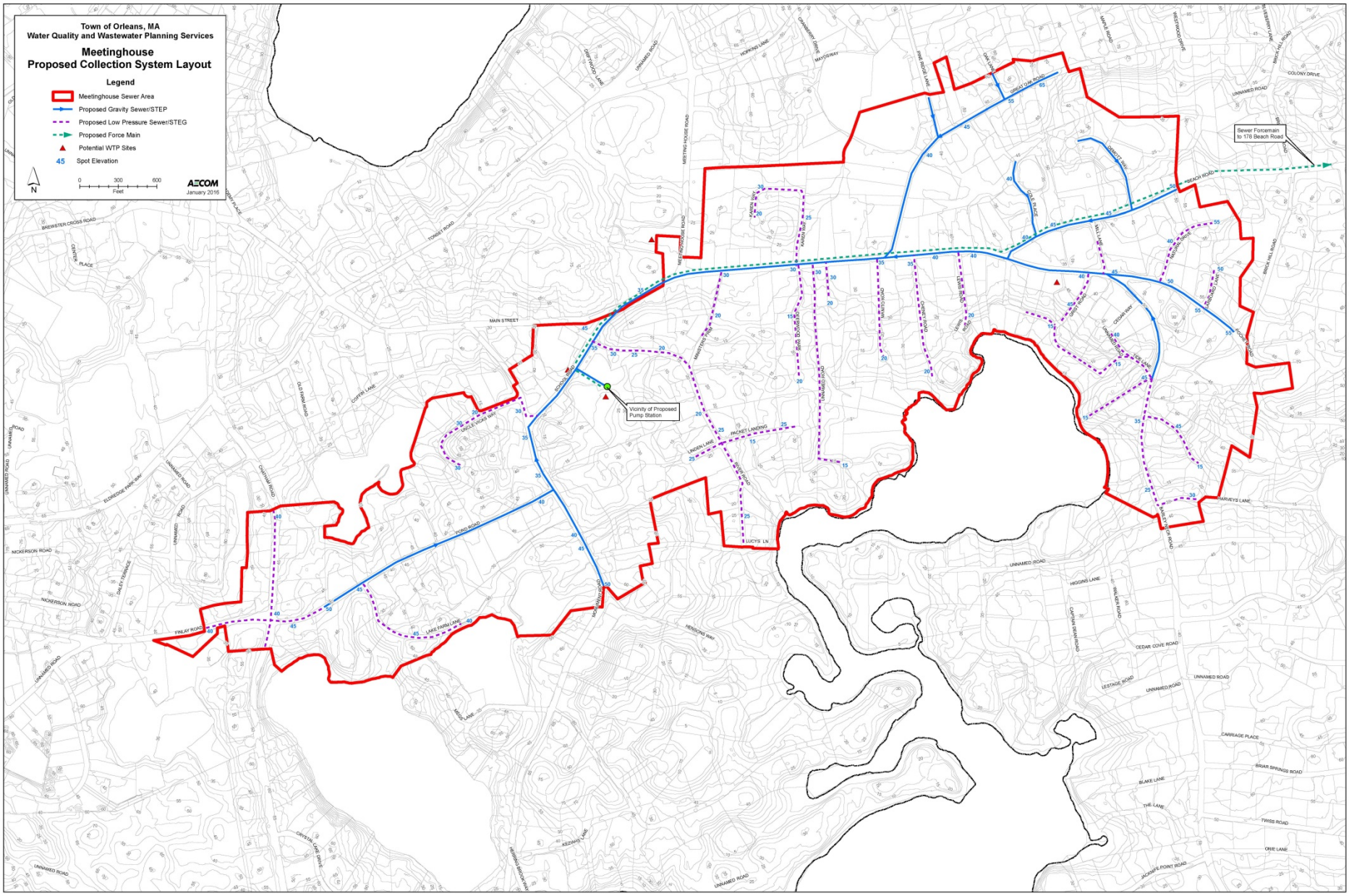
Town of Orleans, MA  
 Water Quality and Wastewater Planning Services  
**Meetinghouse**  
**Proposed Collection System Layout**

**Legend**

- ▭ Meetinghouse Sewer Area
- Proposed Gravity Sewer/STEP
- - - Proposed Low Pressure Sewer/STEG
- Proposed Force Main
- ▲ Potential WTP Sites
- 45 Spot Elevation



**AECOM**  
 January 2016



# Program Costs

## Elements of the Program

- ❖ Collection/Treatment/Disposal
- ❖ Non-Traditional Technologies
- ❖ Adaptive Management

## Major Cost Components

- ❖ Project (Capital)
- ❖ Annual Operation and Maintenance
- ❖ Replacement
- ❖ Monitoring



# Wastewater Collection System

## Collection System Types

- ❖ Gravity Sewers (GS)
- ❖ Low Pressure Sewers (LPS)
- ❖ Septic Tank Effluent Pumping (STEP)
- ❖ Septic Tank Effluent Gravity (STEG)
- ❖ Vacuum Sewers (VS)
- ❖ Hybrid

## Cost Evaluation

- ❖ Prepared Preliminary System Layouts
- ❖ Developed Quantities
- ❖ Developed Unit Prices
  - Project (Capital)
  - Operation and Maintenance
  - Replacement
  - Monitoring
- ❖ Prepared Life-Cycle Cost Analysis



# Wastewater Collection System (cont.)

## Assumptions / Considerations

- ❖ Conventional and Alternative Construction
  - Off Season Construction
  - Full Roadway Restoration
  - No Topographic Survey or Geotechnical Investigations Available Yet
- ❖ Compared with 100% of Each Collection System Type
- ❖ Present Value
  - 20 Years
  - 3% Inflation Rate
  - 3% Value of Money



# Wastewater Collection System (cont.)

## Assumptions / Considerations

- ❖ Investigation of Capital Costs
  - Communities and Vendor Information
  - AECOM's Project Experiences
- ❖ Costs Adjusted to New England Market
  - Material Costs
  - Wage Rates
  - Local Conditions
- ❖ Land Purchase at \$250,000 per Acre
- ❖ Design-Bid-Construct Format
- ❖ Regulatory Requirements for Design and O&M



# Wastewater Collection System (cont.)

## Assumptions / Considerations

### Project (Capital)

- ❖ Public Property
  - Pipes
  - Pump Stations
  - Force Mains
- ❖ Private Property
  - Service Pipes
  - Replace Septic Tanks
  - Pump/Valve Units, as Applicable
  - Abandonment of On-Site Systems, as Applicable

### Operation and Maintenance

- ❖ 1 Full Time Employee Plus 260 Hours Per Pump Station
- ❖ Utilities, Chemicals, etc.
- ❖ Clean and TV 25% of Gravity Sewers per Year
- ❖ Clean 100% of Pressure Pipes per Year
- ❖ Private Property Components
- ❖ Pump-out Septic Tanks Every 3 Years, as Applicable



# Wastewater Collection System (cont.)

## Assumptions / Considerations

### Replacement

- ❖ Pump Stations at 1% of Capital Cost per Year
- ❖ Private Property Pumps/Valves at 5% of Total Number Installed

### Monitoring

- ❖ Pump Stations at \$2,500 per Year
- ❖ Private Property Pumps/Valves at 8 Hours Per Connection





Thank You