



Mashpee Sewer Commission

Mashpee Water Resource Recovery Facility (WRRF) Design Development

GHD | October 17, 2019



Presentation Outline

Updated Site Plan

- Phasing
- Access
- Buffer zone
- Buffer comparison to existing Mashpee treatment plants

Processes

- Noise Control
- Odors Control
- Chemicals

Engineers Opinions of Probable Capital Costs

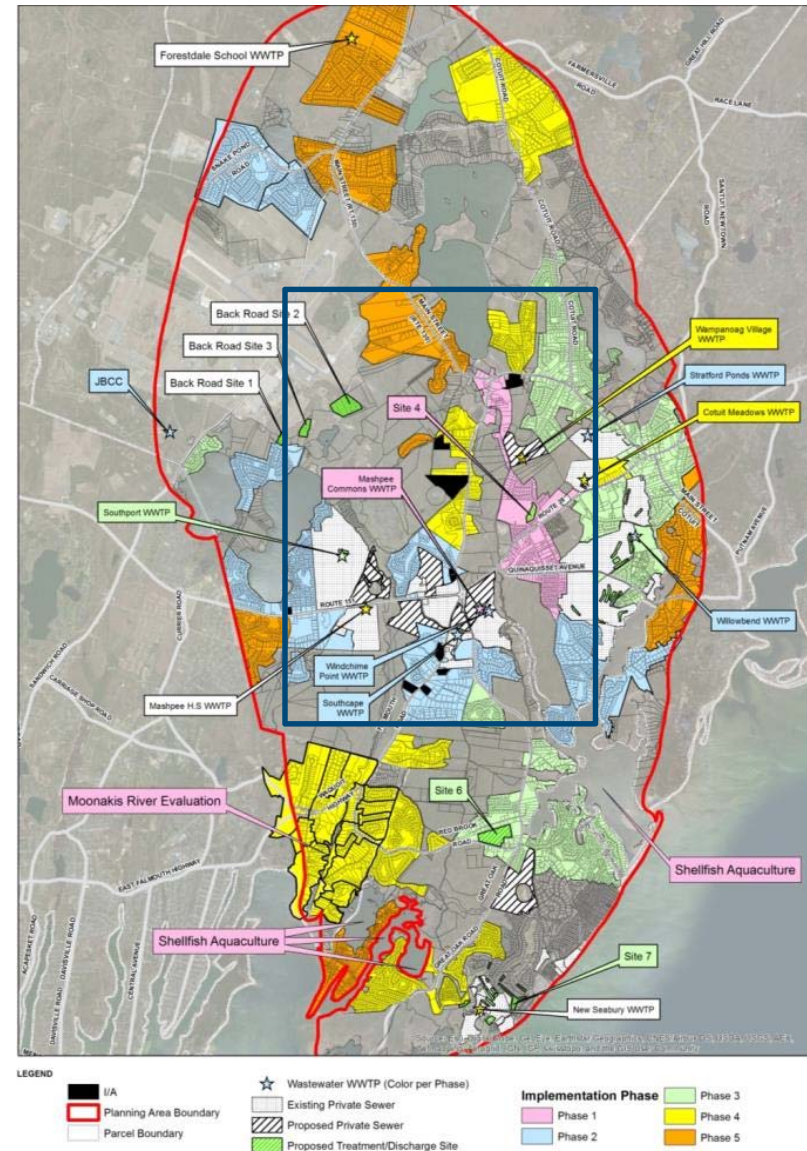
Schedule Update



Proposed phasing map

- **Phase 1 (2017-2021)**
 - **Site 4 Phase 1 Construction**
- **Phase 2 (2022-2026)**
- **Phase 3 (2027-2031)**
- **Phase 4 (2032-2036)**
- **Phase 5 (2037-2041)**

5 Phases divided into 4 potential construction stages



Project Staging

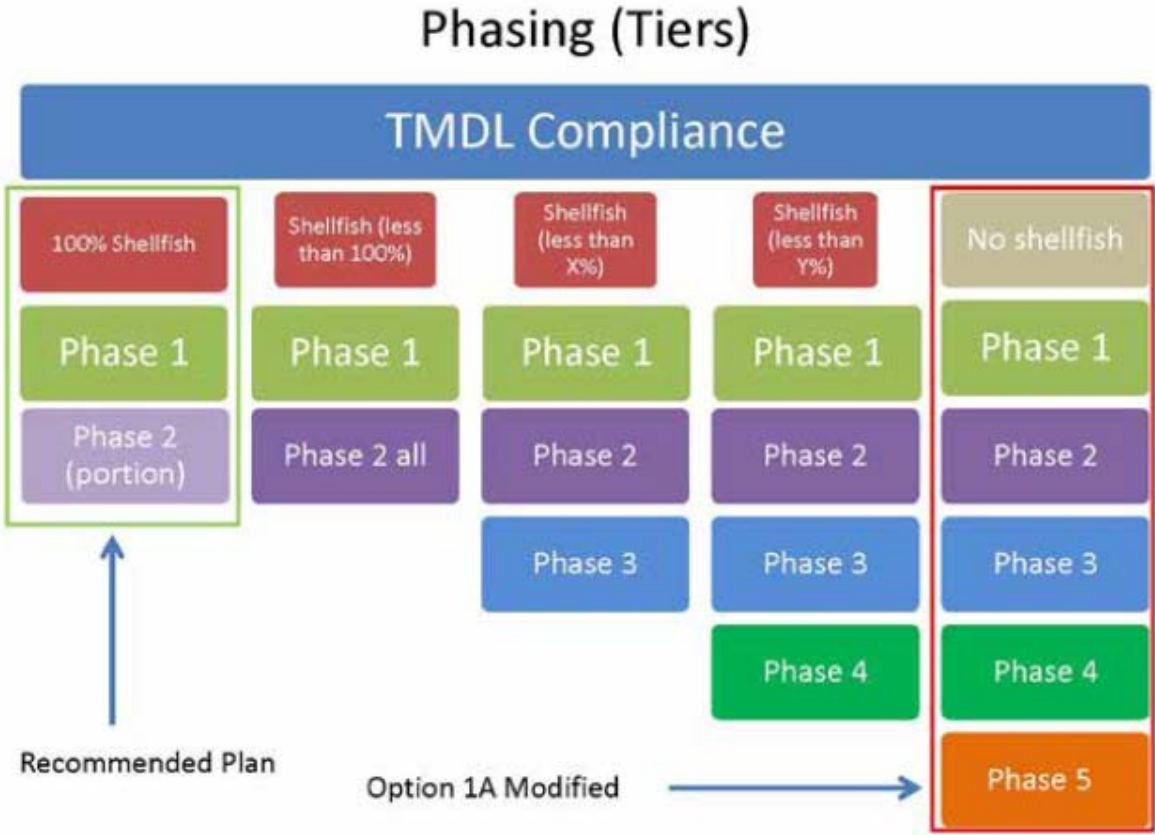
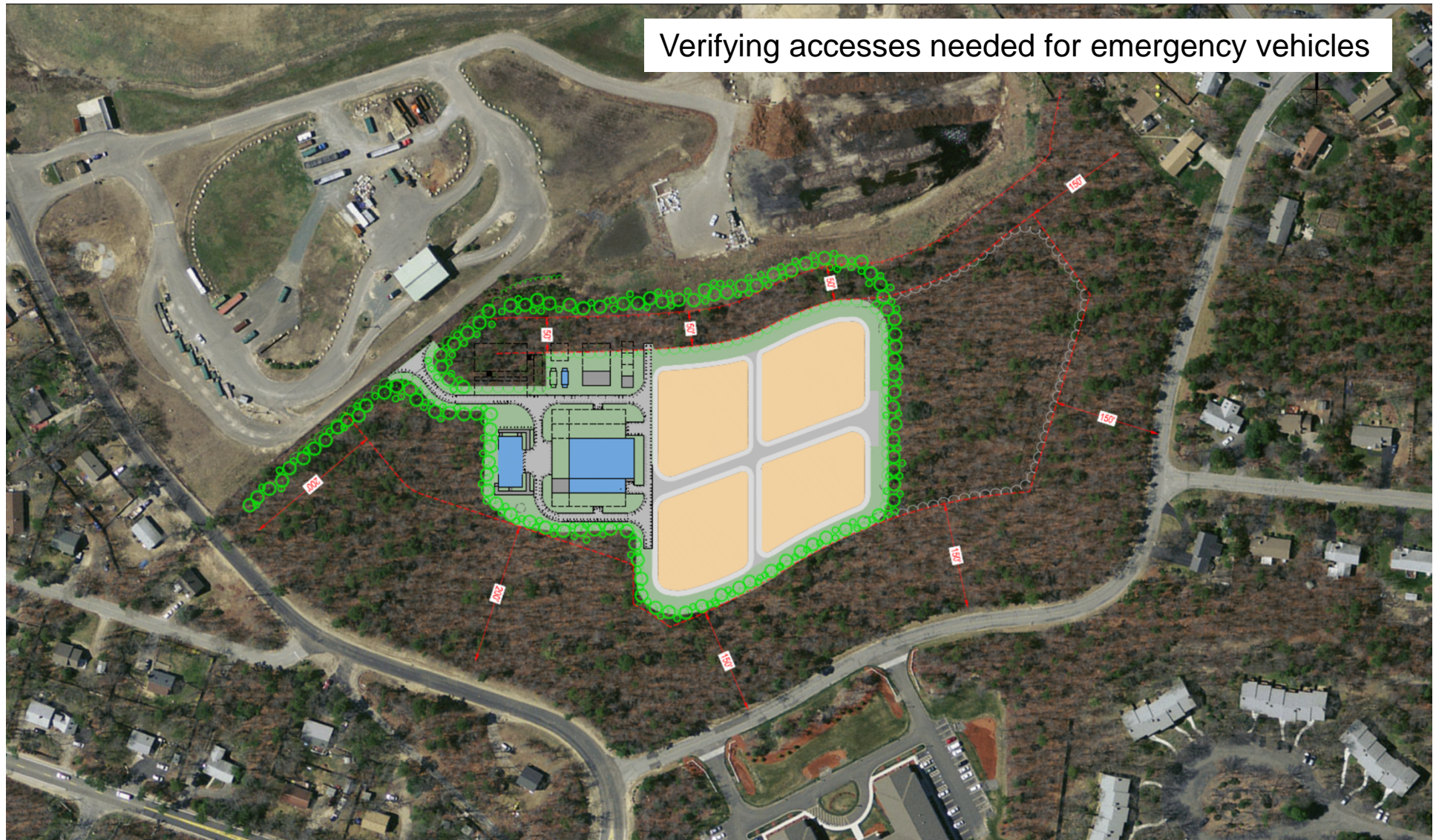


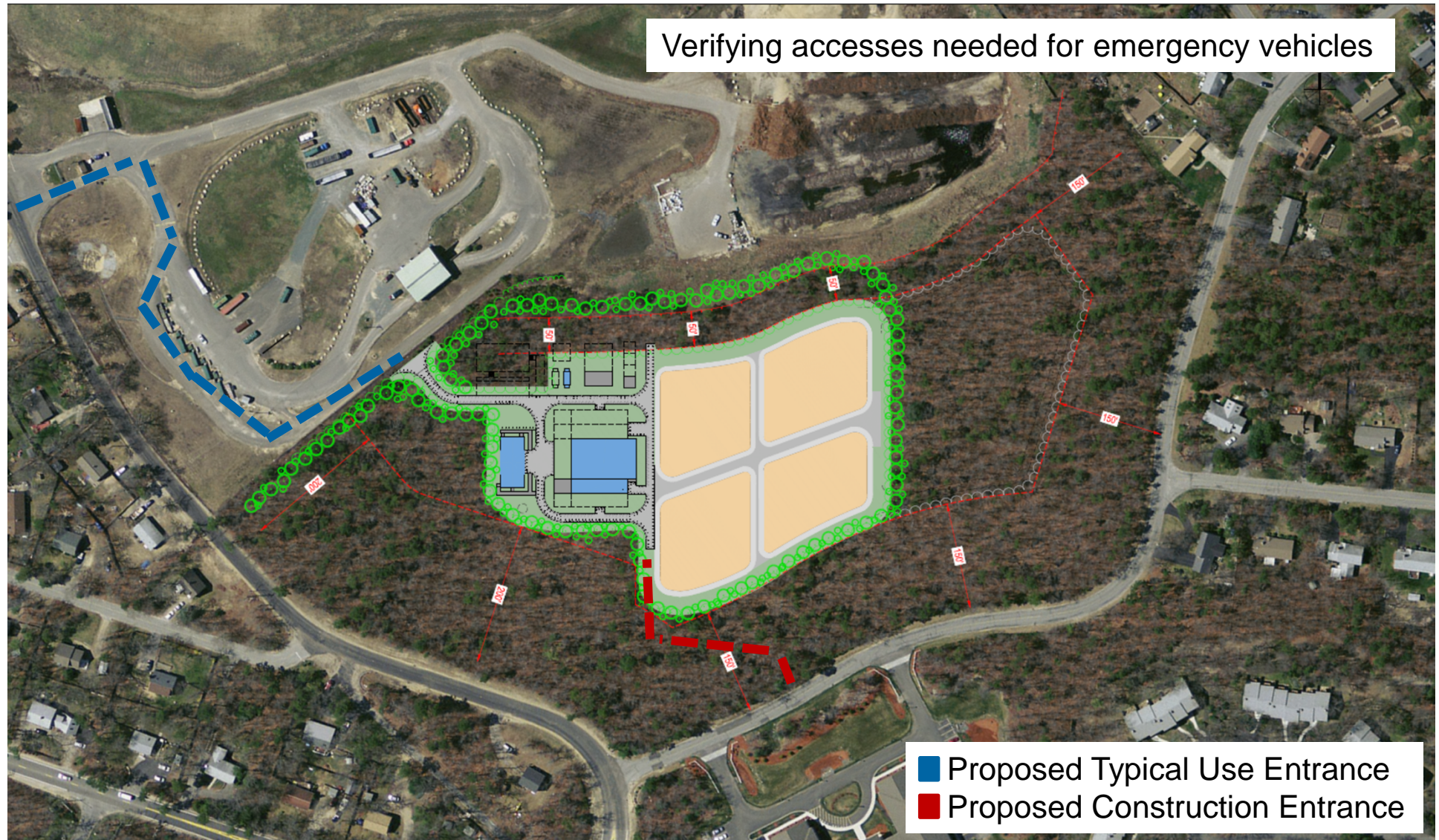
Figure 9-3 Implementation Plan Phasing to Achieve TMDLs



Site Layout

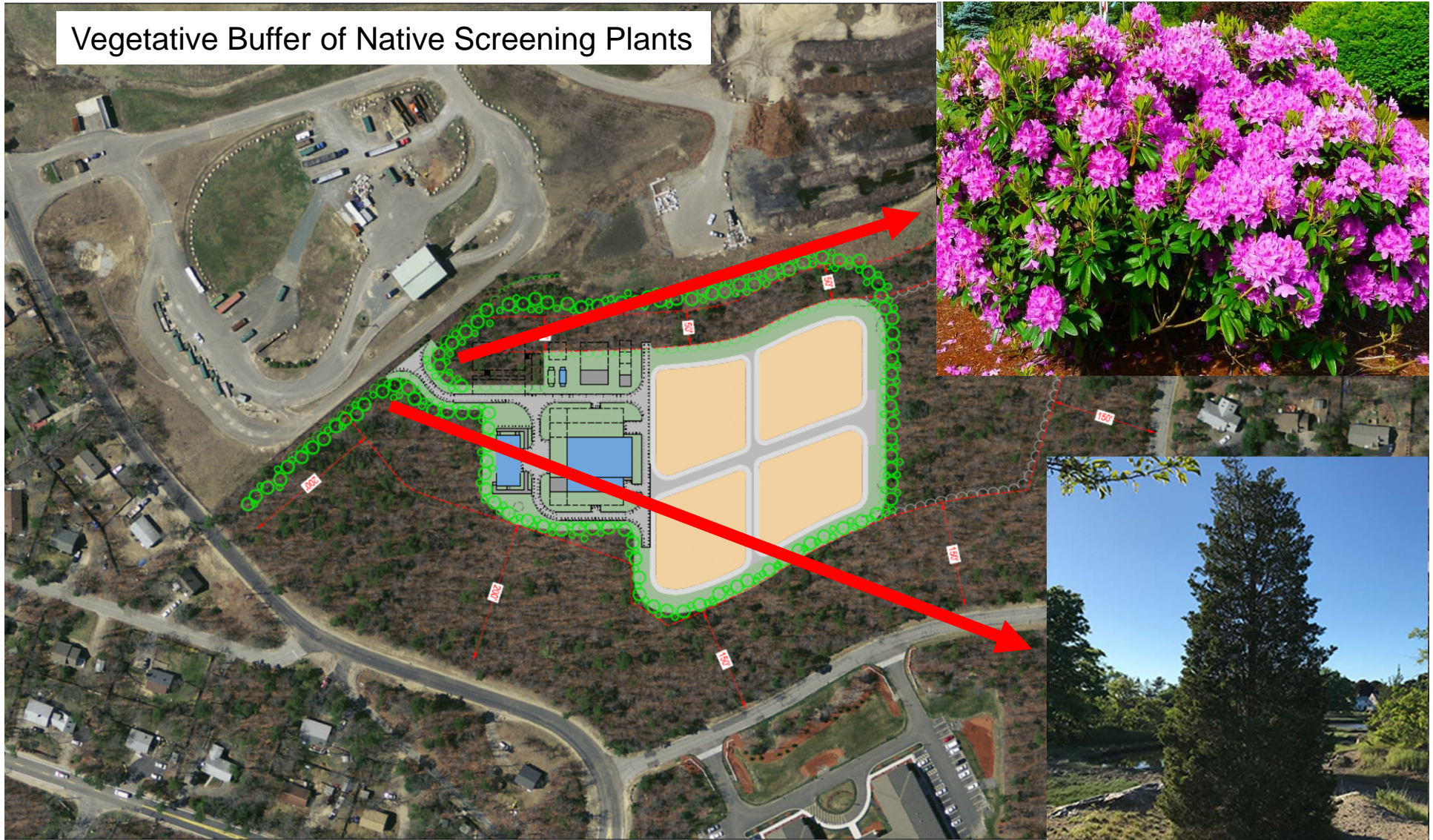


Site Access

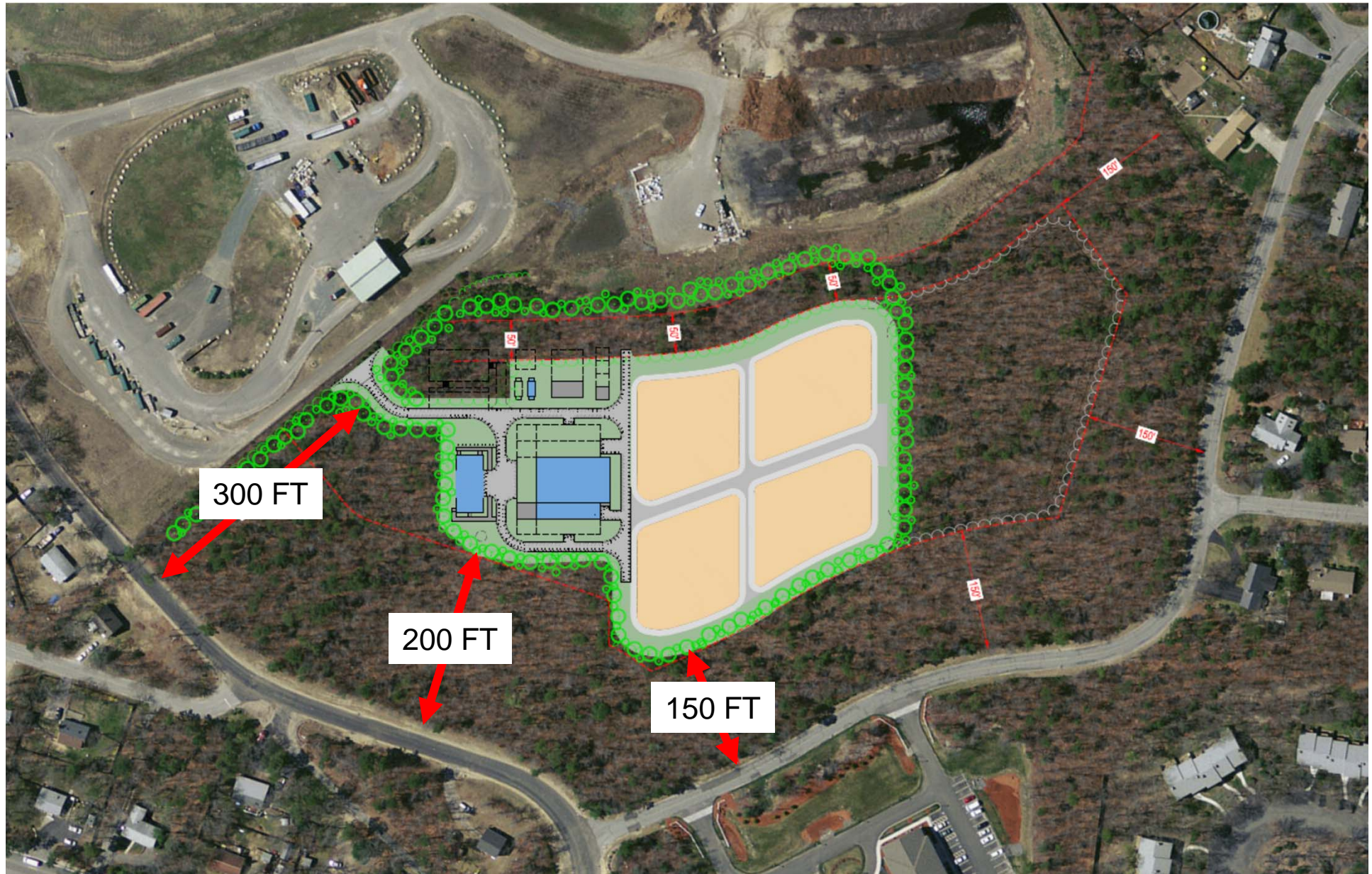


Site Landscaping

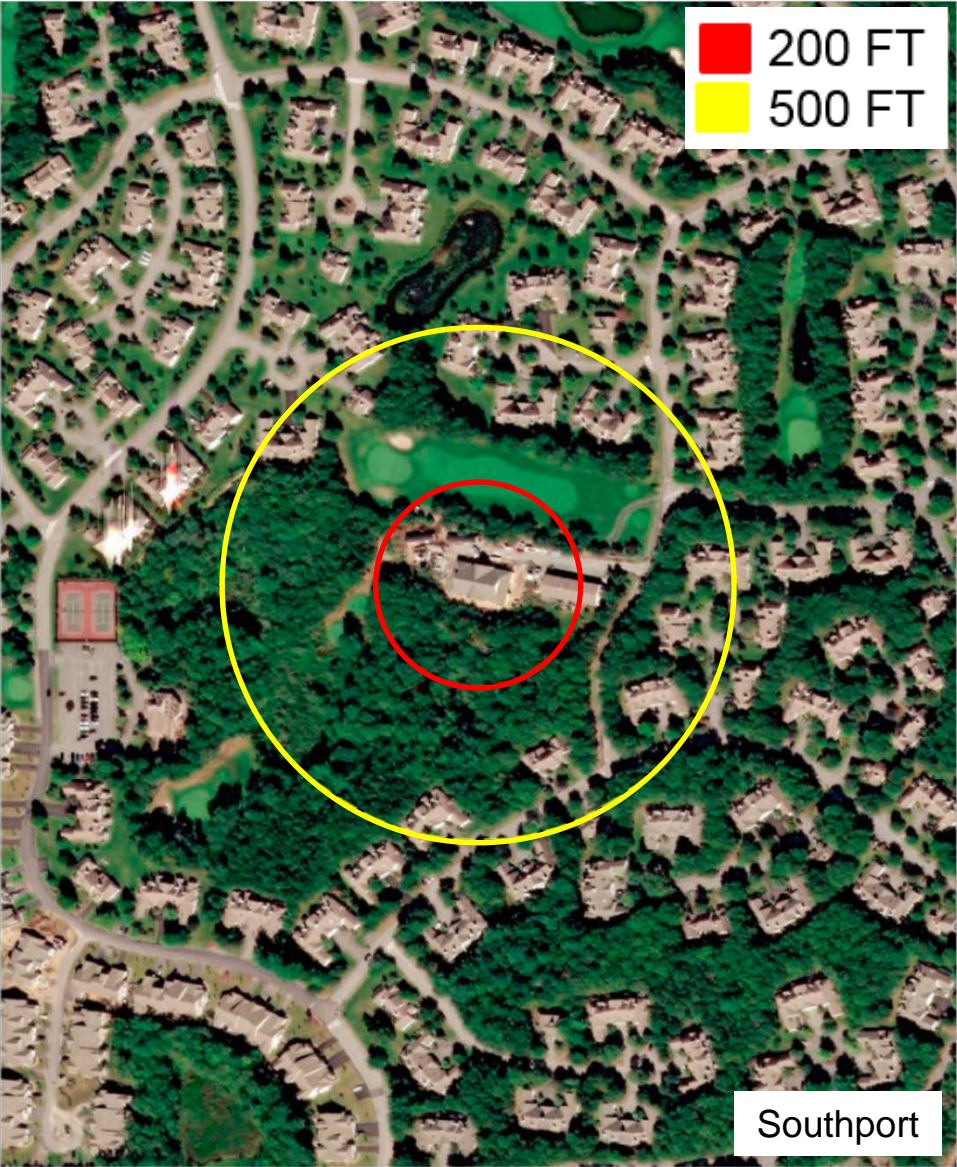
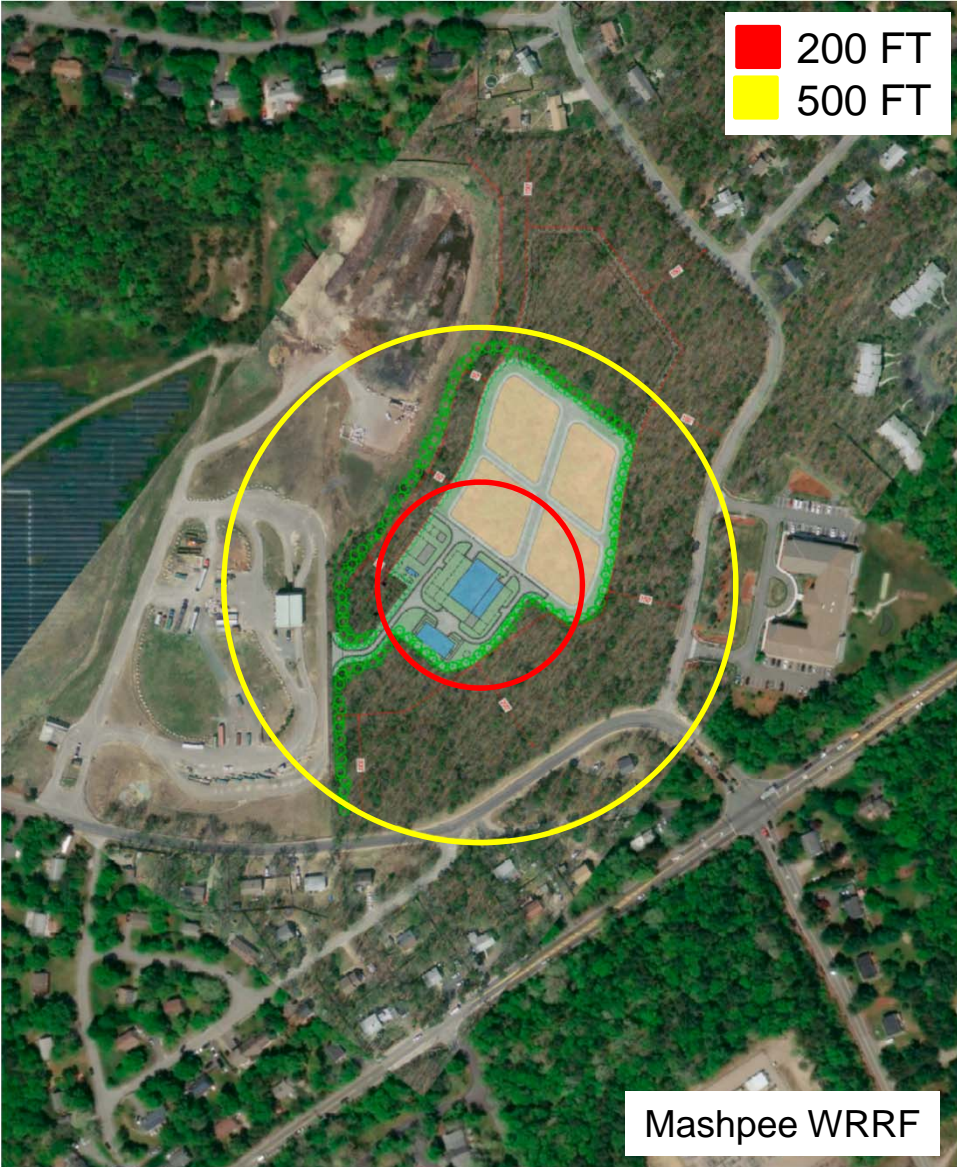
Vegetative Buffer of Native Screening Plants



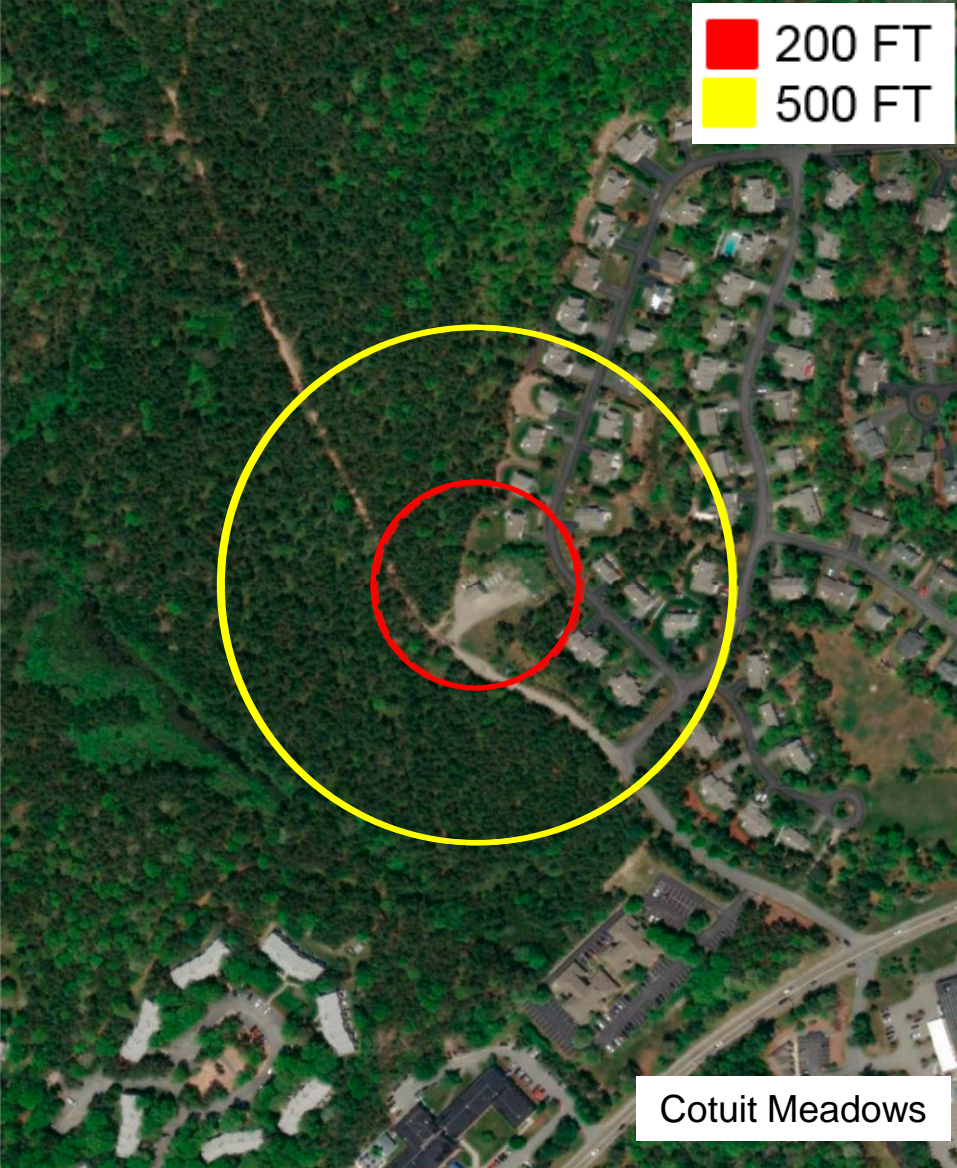
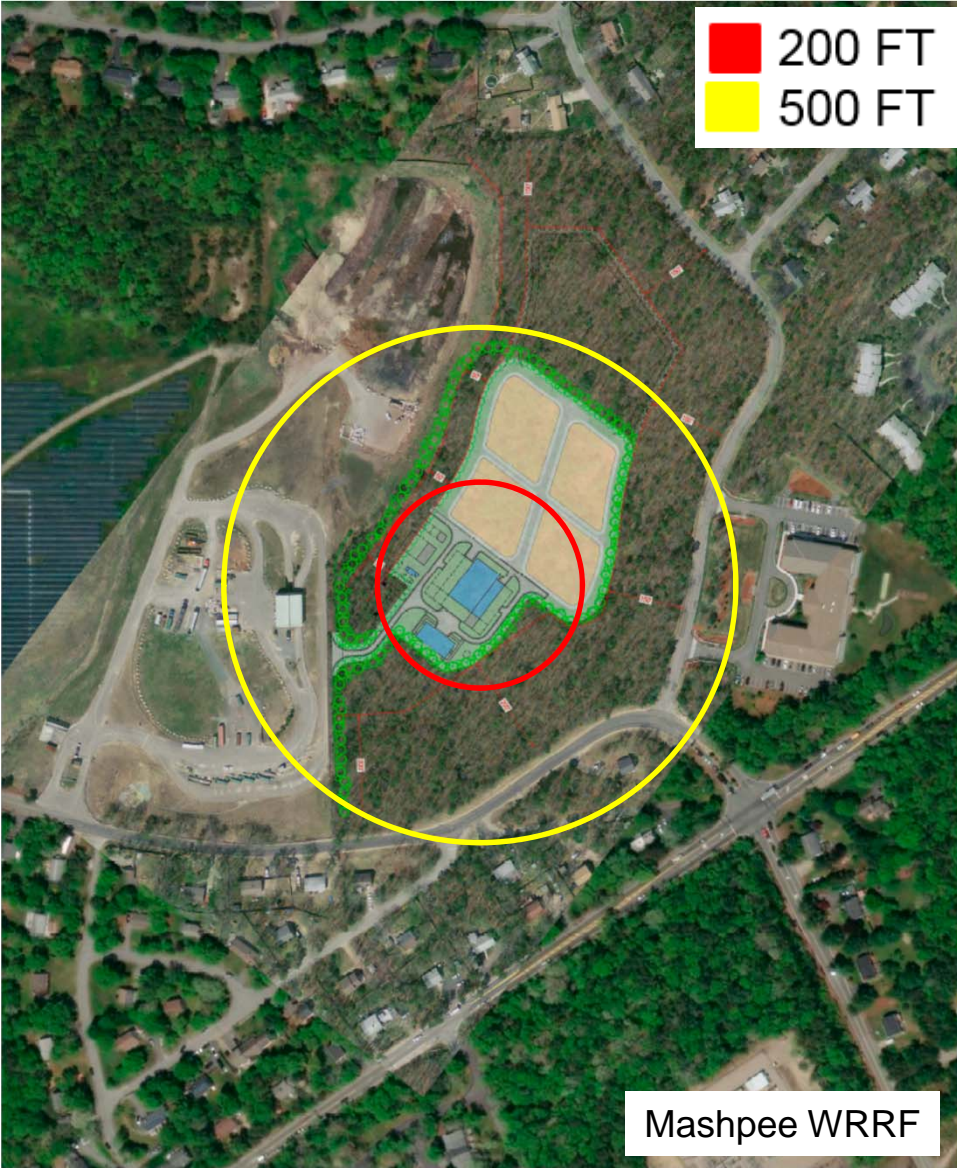
Site Buffer



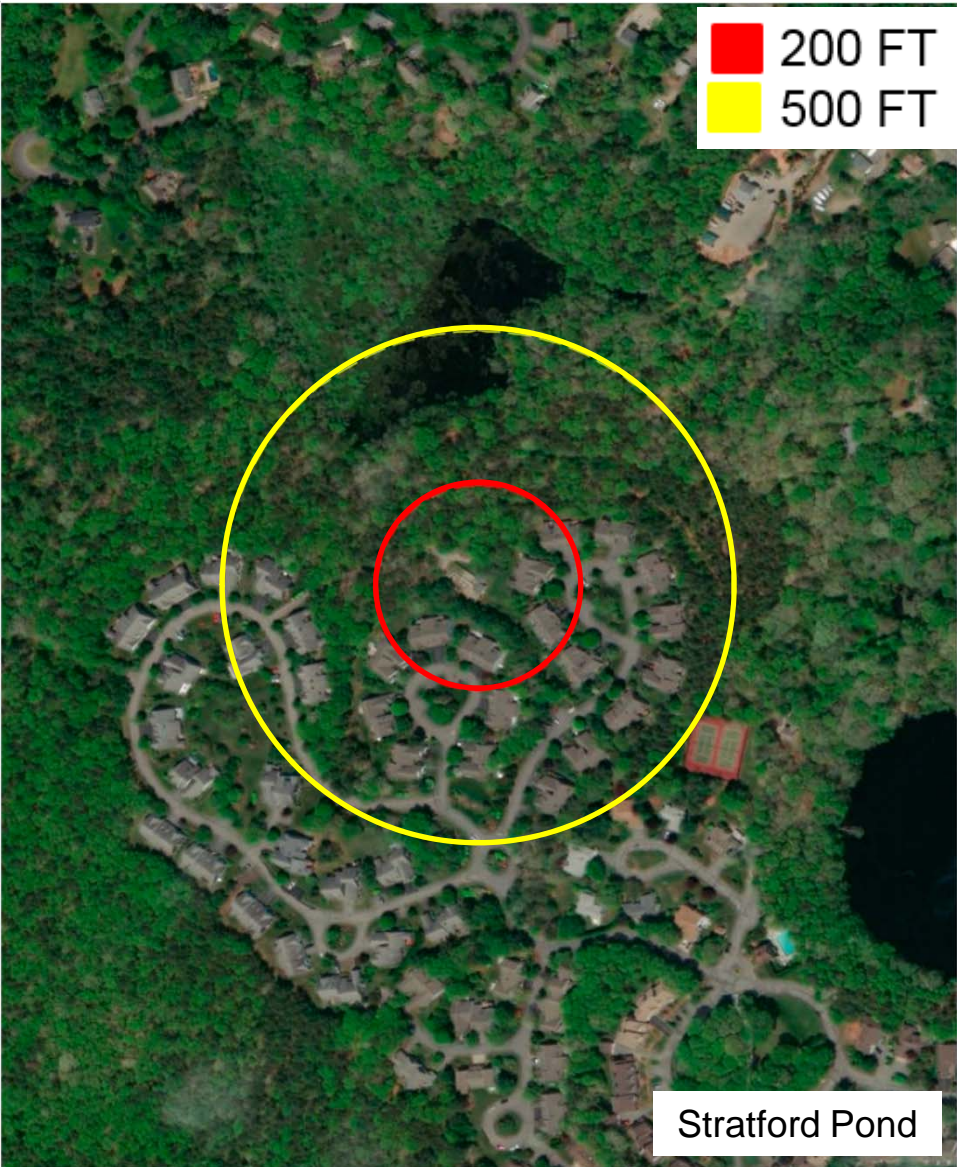
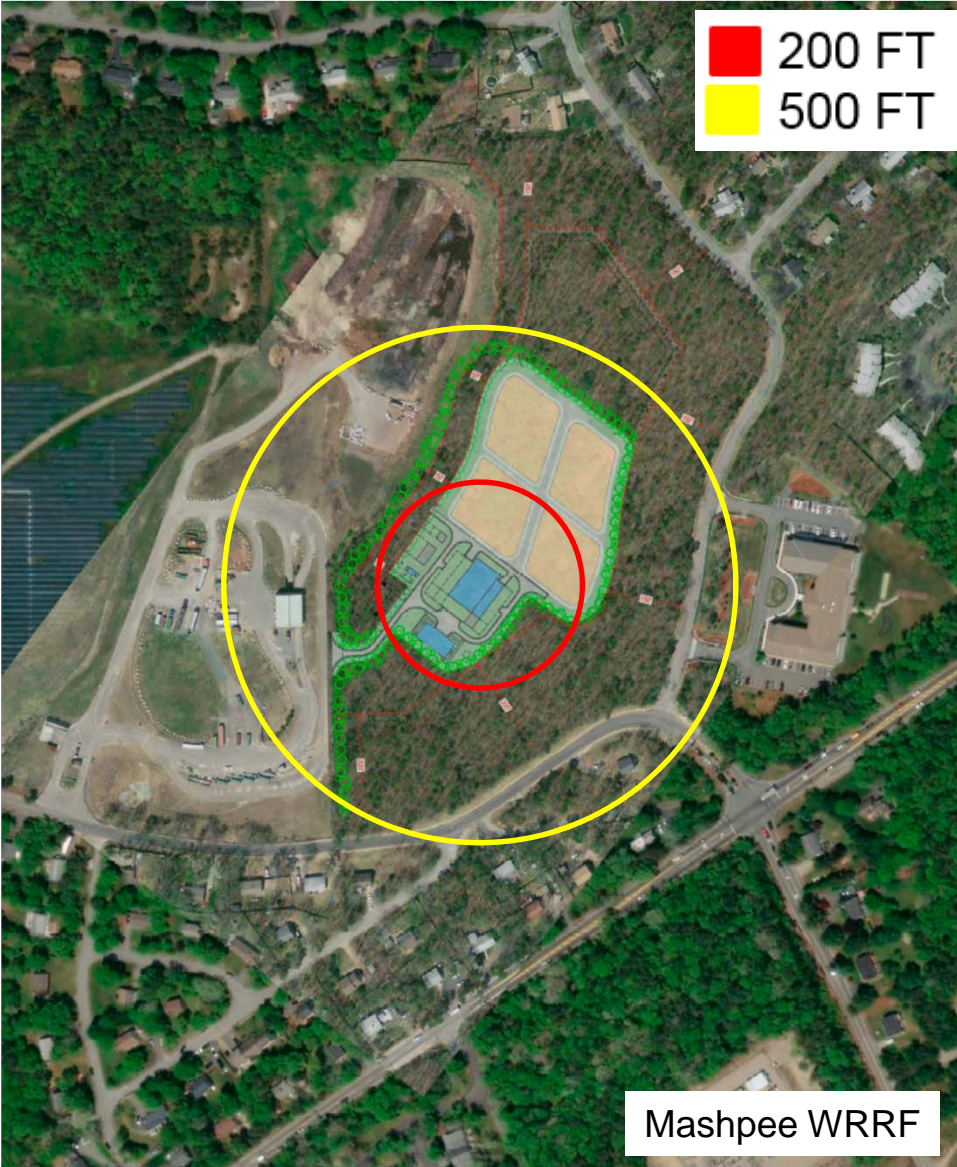
Buffer Comparison To Southport WWTF



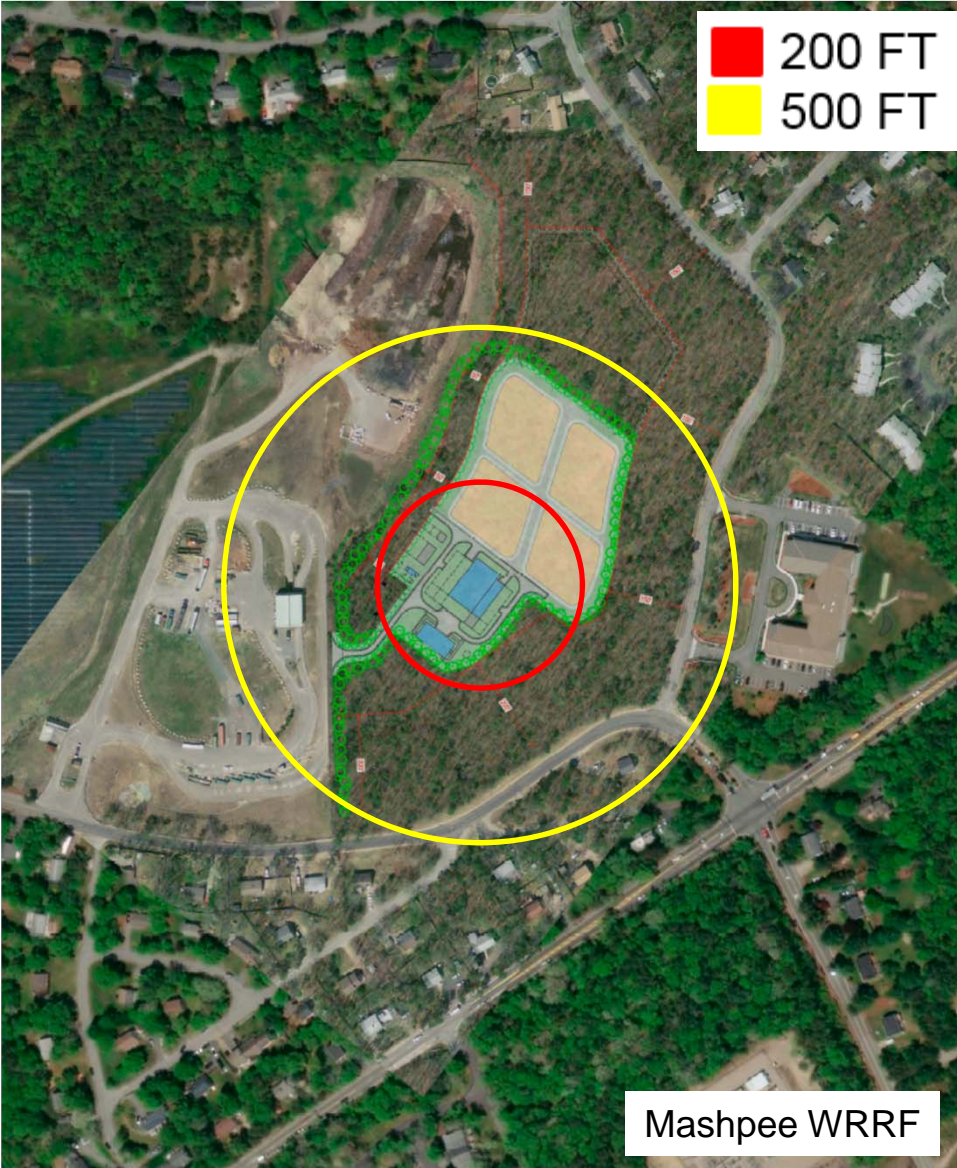
Buffer Comparison To Cotuit Meadows WWTF



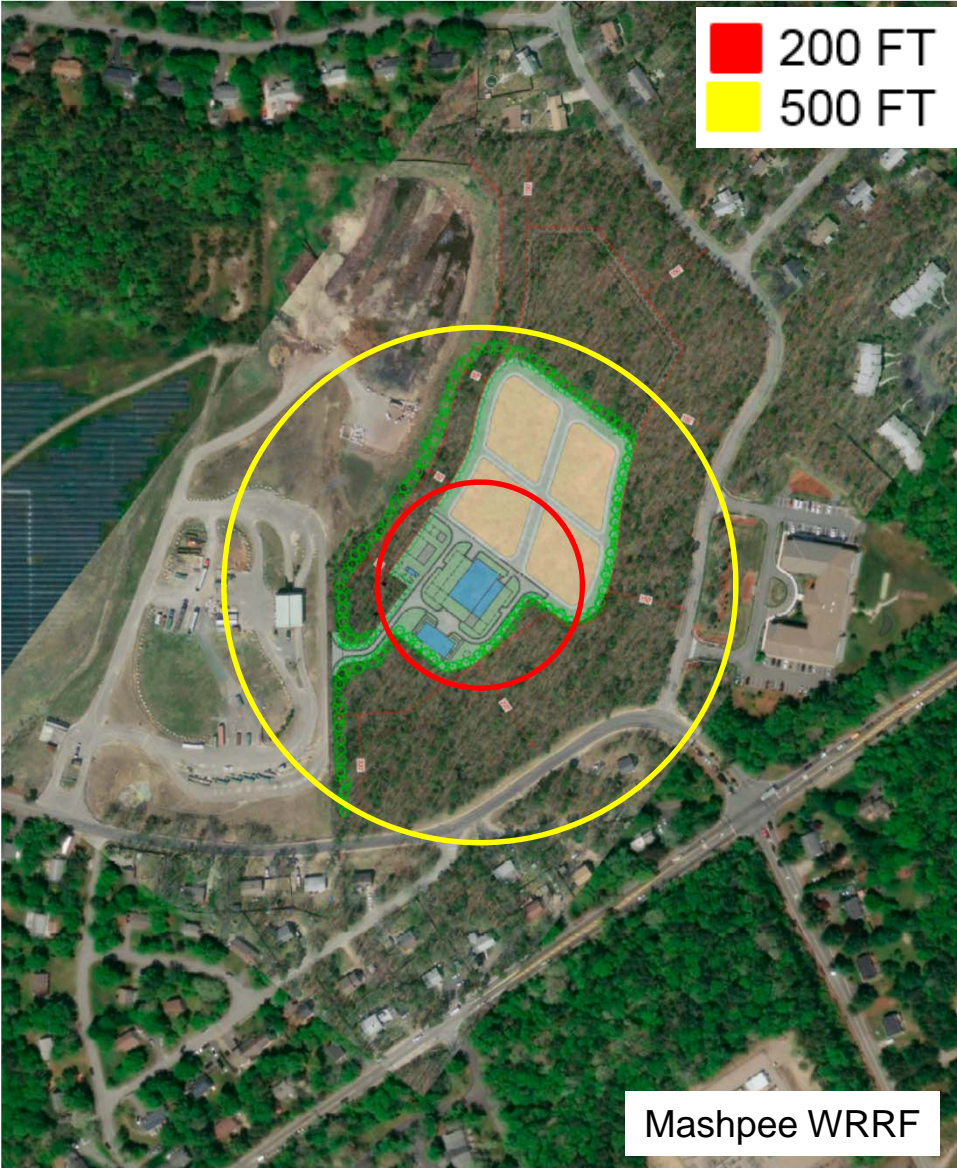
Buffer Comparison To Stratford Pond WWTF



Buffer Comparison To New Seabury WWTF



Buffer Comparison To Mashpee Village WWTF



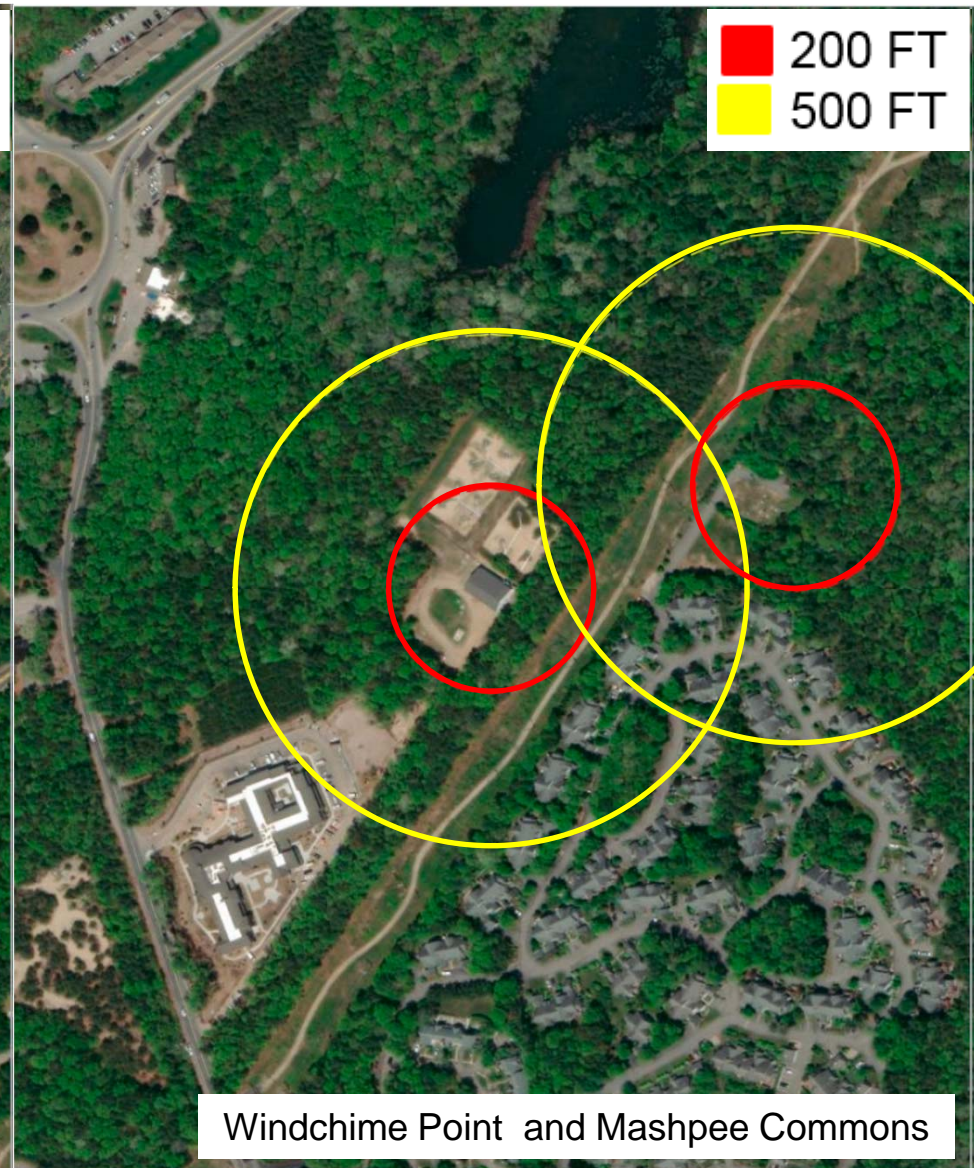
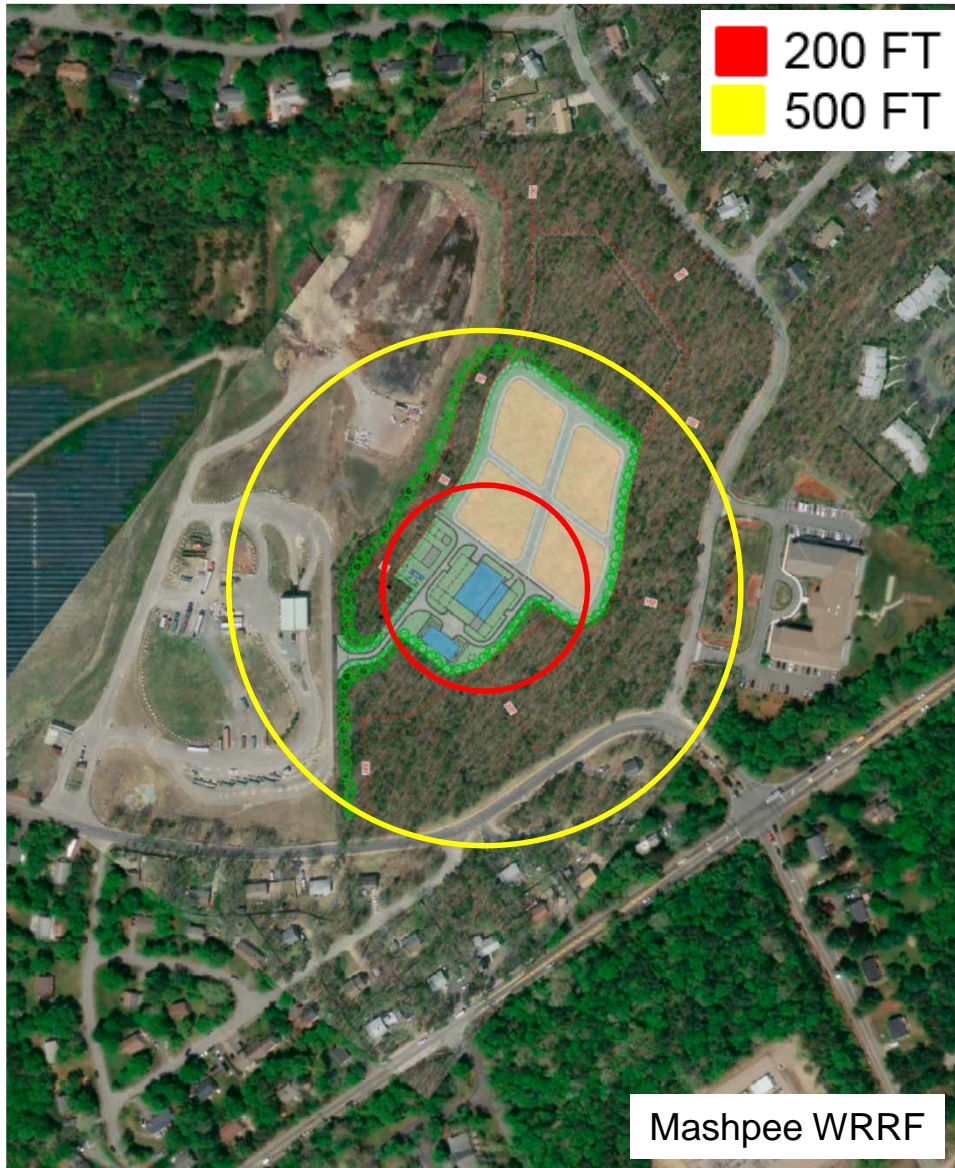
Mashpee WRRF



Mashpee Village



Buffer Comparison To Windchime Point and Mashpee Commons WWTFs



Major Process Components

Preliminary Treatment

Remove grit and screen out larger materials

Secondary/Tertiary Treatment

Biological process in tanks

Membrane for physical separation

Disinfection

Disinfect effluent with UV light

Effluent Recharge

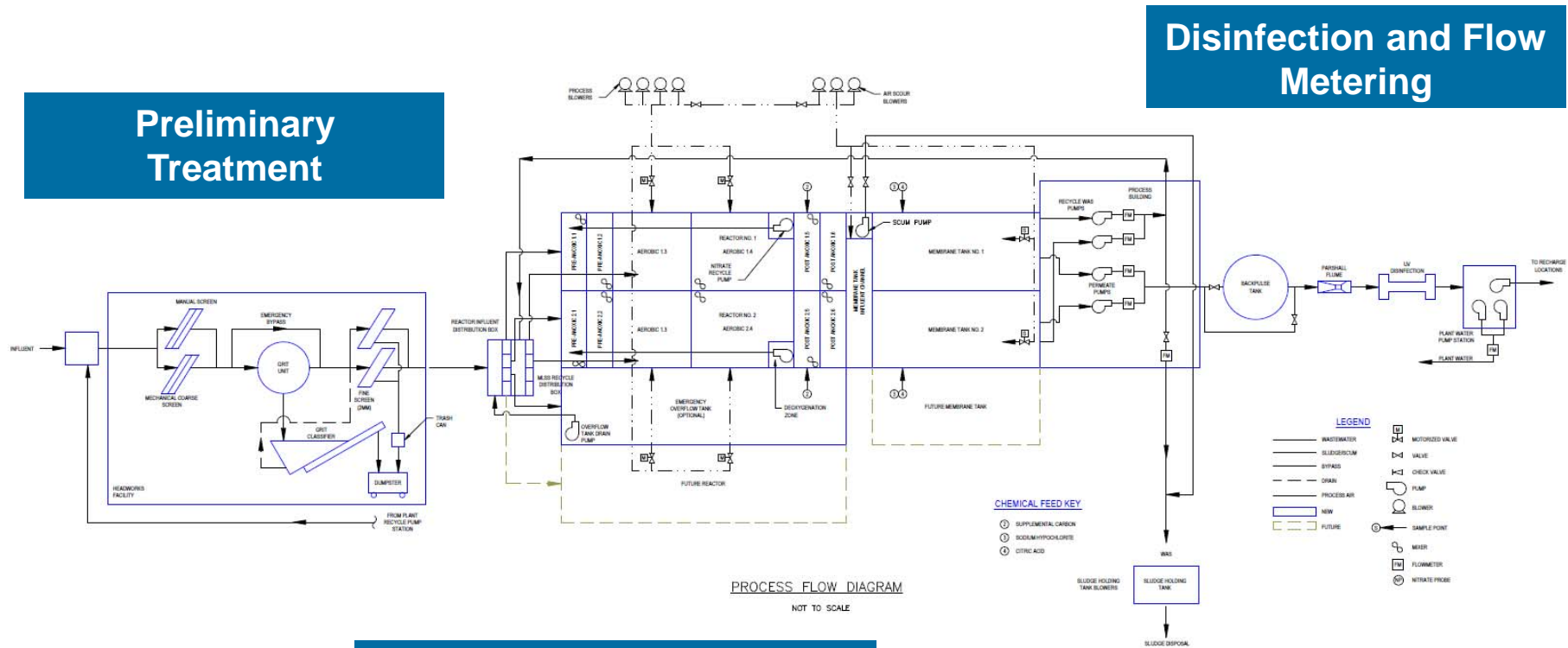
Sand Beds

Biosolids

Removal of solid material from preliminary and tertiary treatment



Membrane Bioreactor (MBR) Process Schematic



Preliminary Treatment

Disinfection and Flow Metering

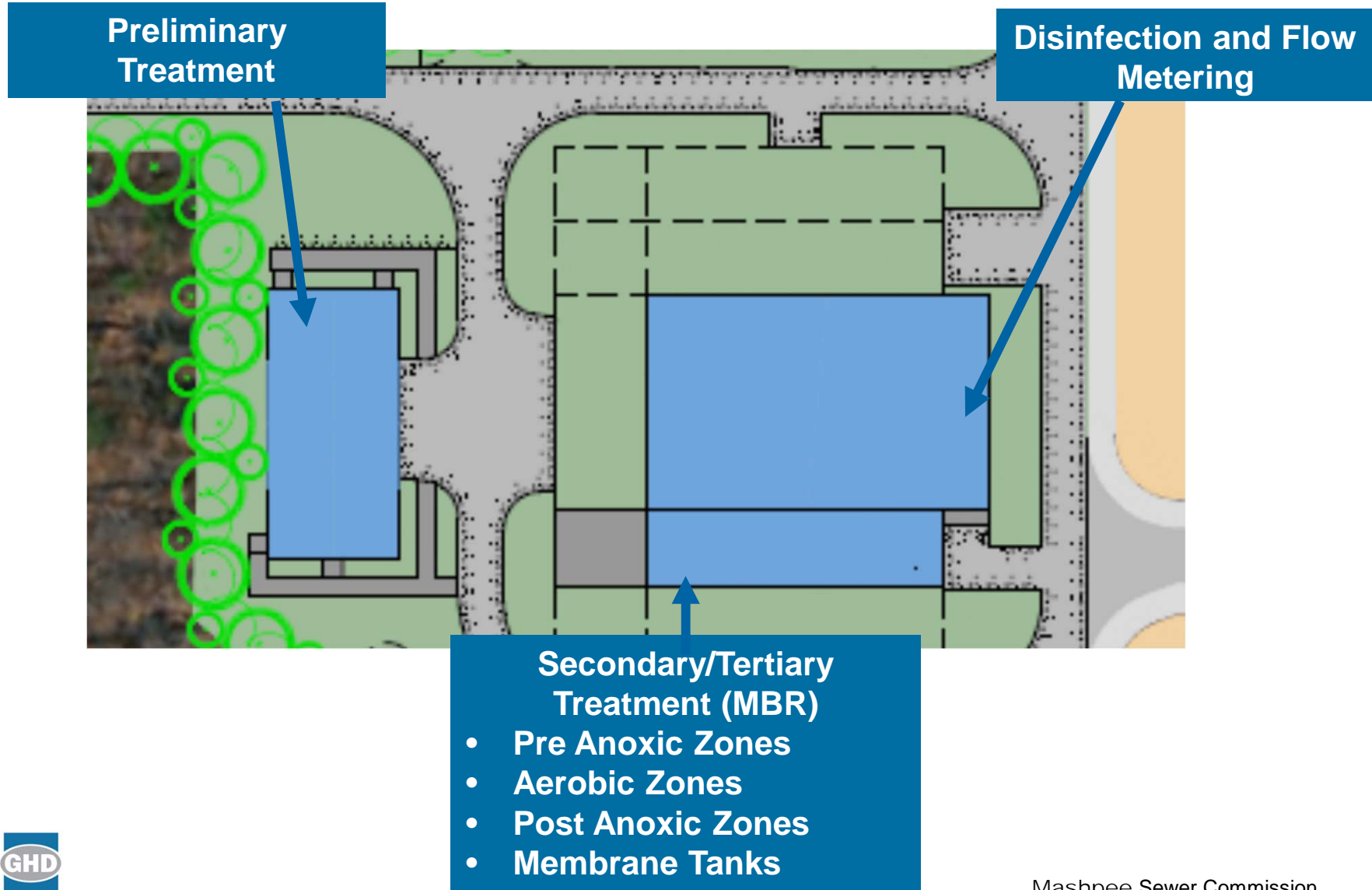
Secondary/Tertiary Treatment (MBR)

- Pre Anoxic Zones
- Aerobic Zones
- Post Anoxic Zones
- Membrane Tanks

Residuals Management / Solids Handling



Mashpee WRRF Major Processes

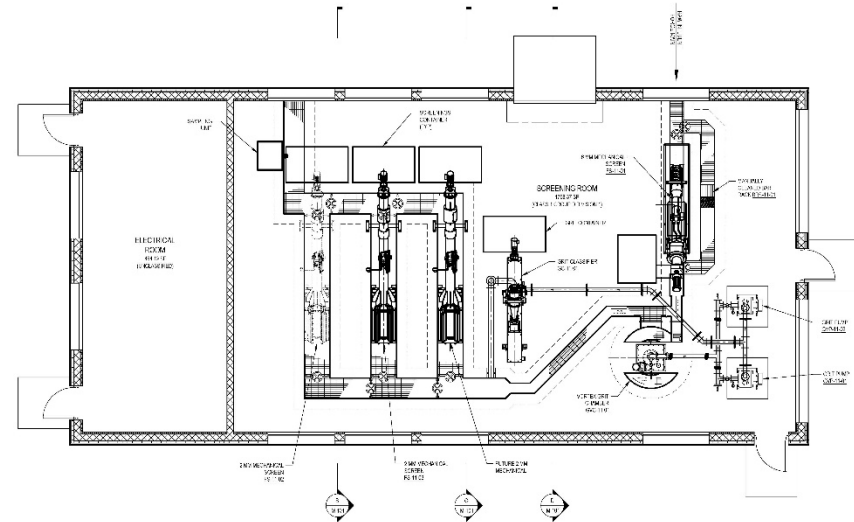


Preliminary Treatment Building

- Influent screening and grit removal
- All equipment enclosed in building
- Air treated by odor control unit

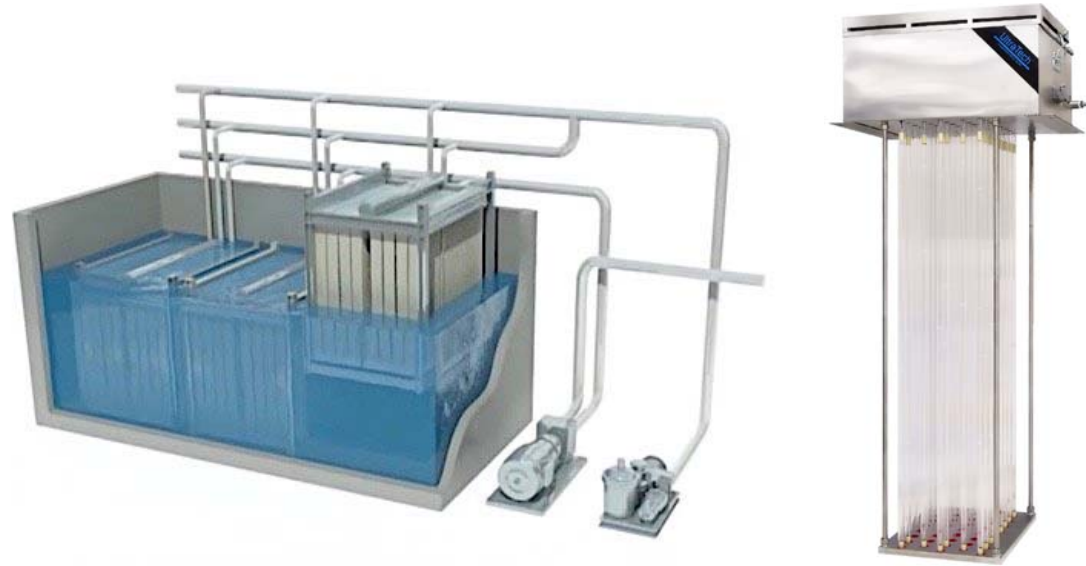


Length	72 FT
Width	31 FT
Height to Roofline	16 FT
Height to Peak	26 FT



Process Building

- Secondary Treatment (covered tanks)
 - Process Tanks
 - MBR Tanks
- Disinfection
- Pump Room
- Blower Room
- Chemical Room

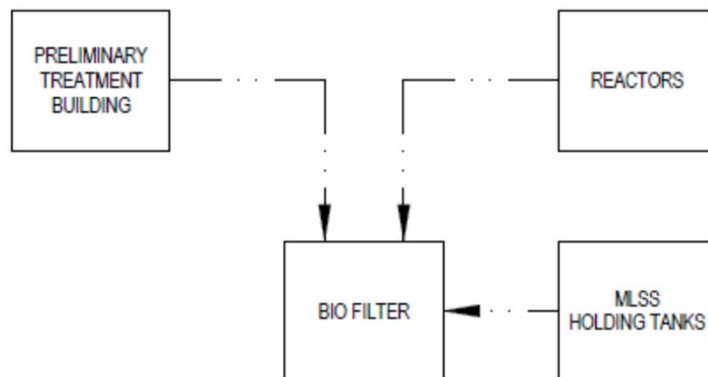
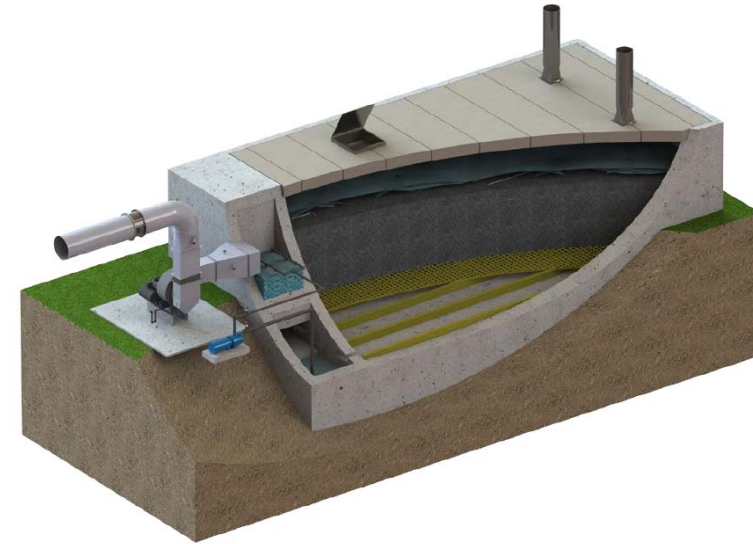


Length	90 FT
Width	66 FT
Height to Roofline	16 FT
Height to Peak	26 FT



Odor Control

- Robust odor control system
- All odorous processes contained in building with odor control air handling



Noise Control

- All processes contained in buildings
- Blowers and air handling equipment contained in buildings
- Coordinating with acoustical engineers to incorporate architectural features to contain noise



Chemicals Used in Treatment Process

Sodium Hypochlorite

Related Names: Bleach

Uses: Cleaning

Processes: Membranes, UV modules

Citric Acid

Related Names: Lemon juice

Uses: Cleaning

Processes: Membranes, UV modules

Supplemental Carbon (MicroC[®])

Related Names: Glycerin, MicroC[®]

Uses: assists in denitrification

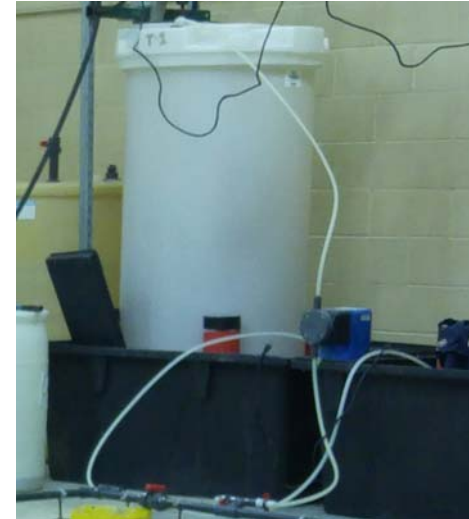
Processes: Secondary treatment tanks

Sodium Hydroxide

Related Names: Lye

Uses: pH adjustment

Processes: Preliminary treatment



Secondary Containment
(125% of volume)



Chemical Dosing Pumps



Biosolids

- Biosolids stored in aerated, covered tanks
- Biosolids processed offsite
- Storage tank air treated by odor control unit
- Piped connection between tank and truck



Effluent Recharge

- Sand Beds
- Recharge to groundwater
- 7 gallons per day per square foot
- 70,000 square feet active recharge for Phase 1 flows



Engineers Opinion of Probable Costs

Capital Costs (Millions of US Dollars)¹	
Collection System	33.3
Treatment Facility	16.7
Recharge Facility	1.2
Total	51.2

1. Based on an ENR of July 2019



Schedule

- Sewer Commission reviews GHD design drawings and provides comments to GHD – October 2019
- Review package submitted to VE team– November 15, 2019
 - Basis of Design Memos
 - Drawings of Facility design
 - Engineers opinion of probable costs
- VE review – November 2019
- GHD prepares VE Engineering Review Memo – December 2019





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