Phosphorus Reduction Improvements

Plymouth, CT Water Pollution Control Facility

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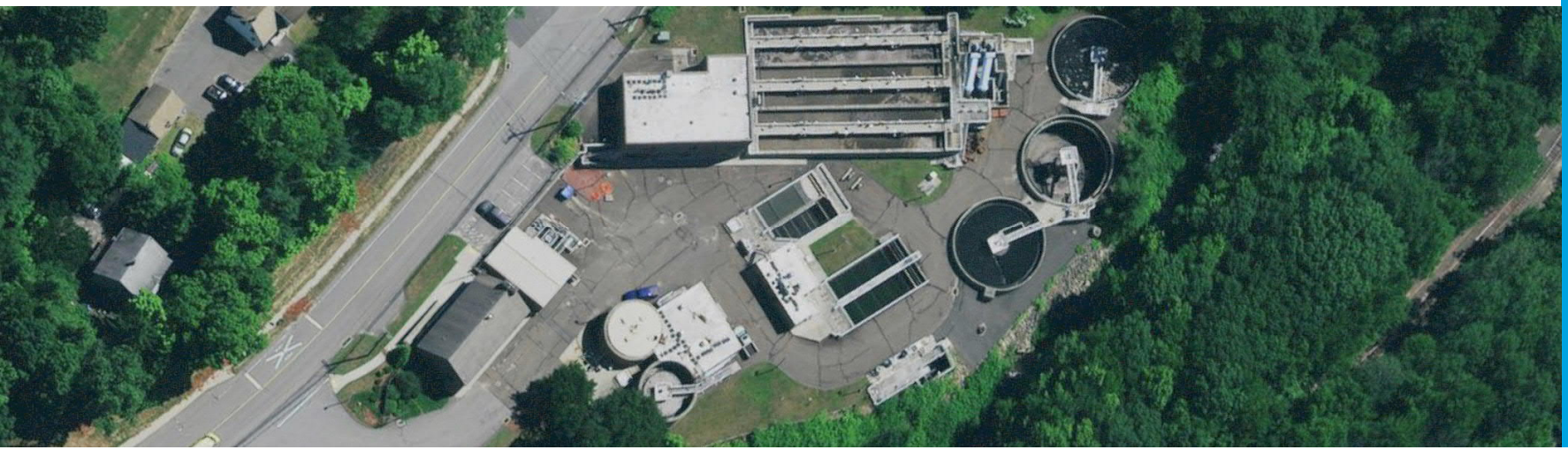

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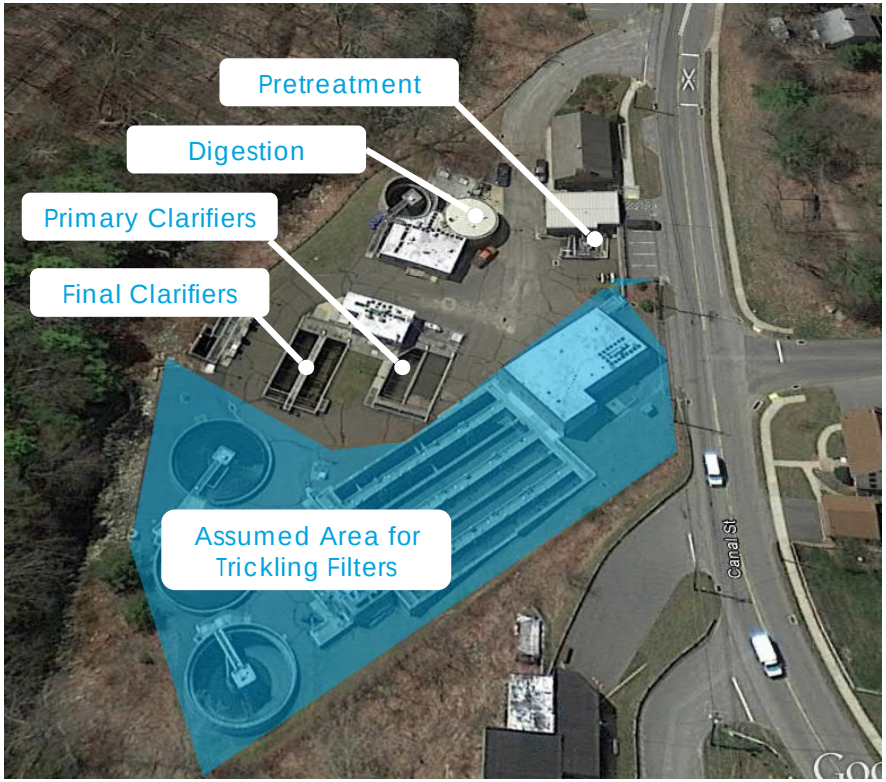
Presentation Overview


Photo Credit: Farmington River Watershed Association

WPCF History
Need for current project
Recommended improvements
Future needs
Implementation & funding

History of WPCF Upgrades

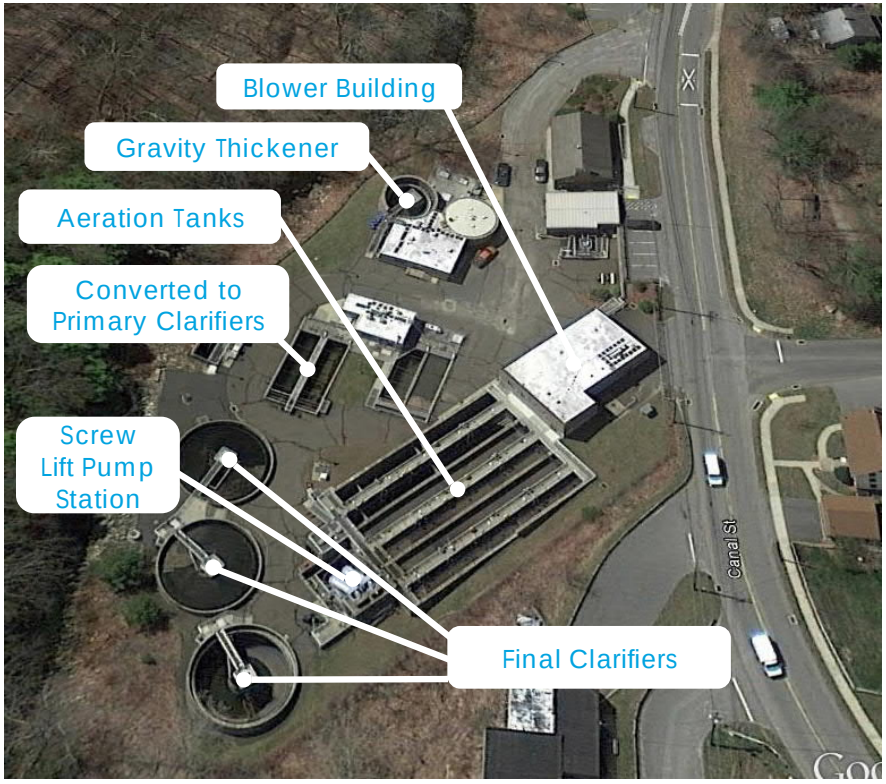
Existing WPCF Site



- Original construction – 1961
  - Pretreatment
  - Primary clarifiers
  - Trickling filters
  - Final clarifiers
  - Effluent disinfection
  - Anaerobic digestion
- Tankage/buildings in service for over 60 years

History of WPCF Upgrades

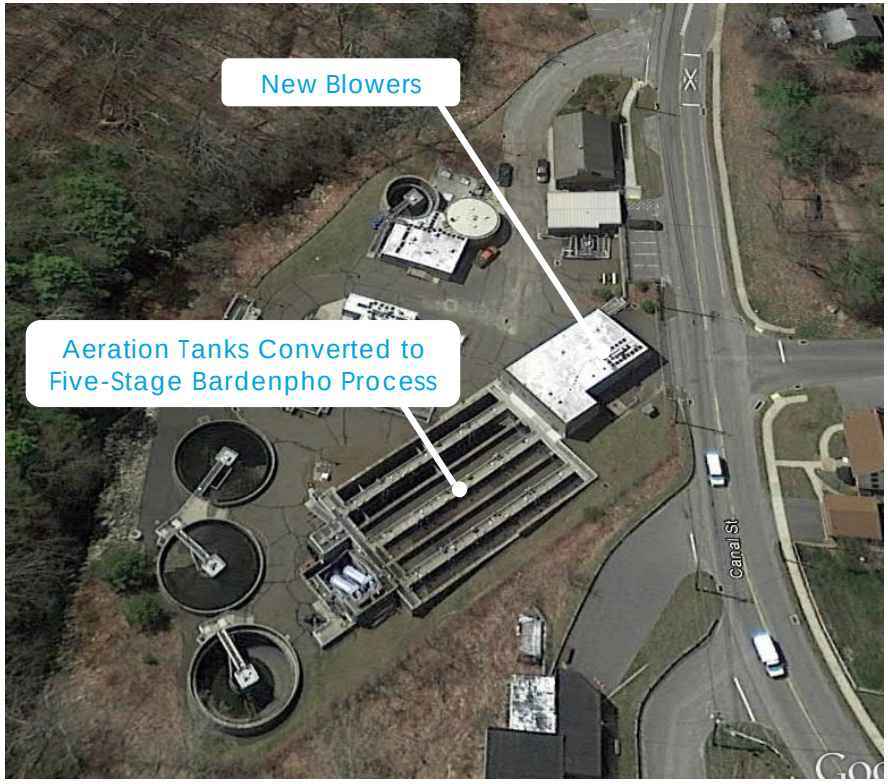
Existing WPCF Site



- Upgrade to activated sludge – 1991
  - Blower building
  - Aeration tanks
  - Screw lift pump station
  - Three circular final clarifiers
  - Converted original final clarifiers into primary clarifiers 3 and 4
  - UV disinfection
  - Converted digester to gravity thickener
- Tankage/buildings in service for over 30 years, some over 60 years

History of WPCF Upgrades

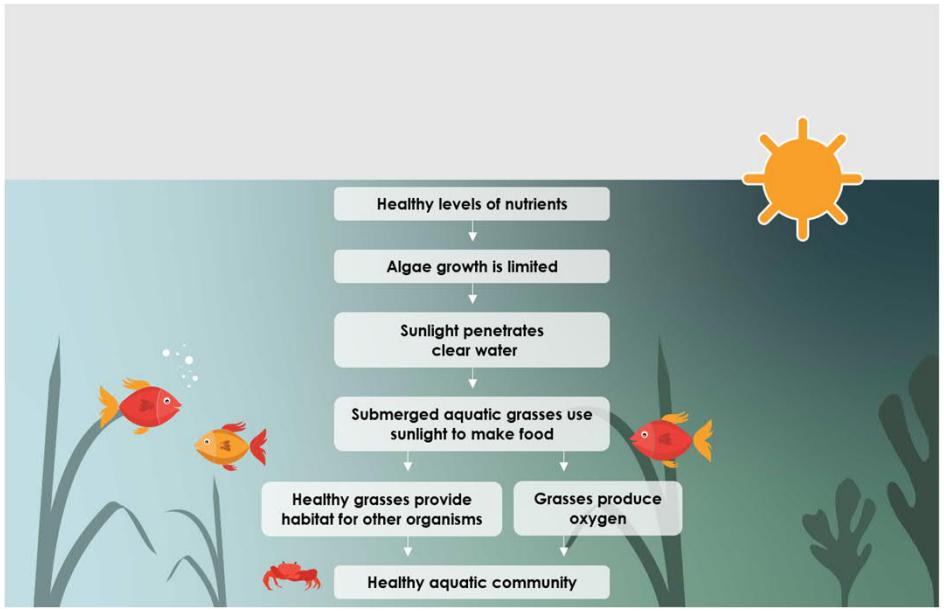
Existing WPCF Site



- Most recent upgrade – 2015
  - Reused existing tankage
  - Modified process to reduce nitrogen
  - Provided more energy efficient equipment
- Tankage/buildings in service for over 30 years, some over 60 years

Need for Current Project

Healthy Levels of Nutrients



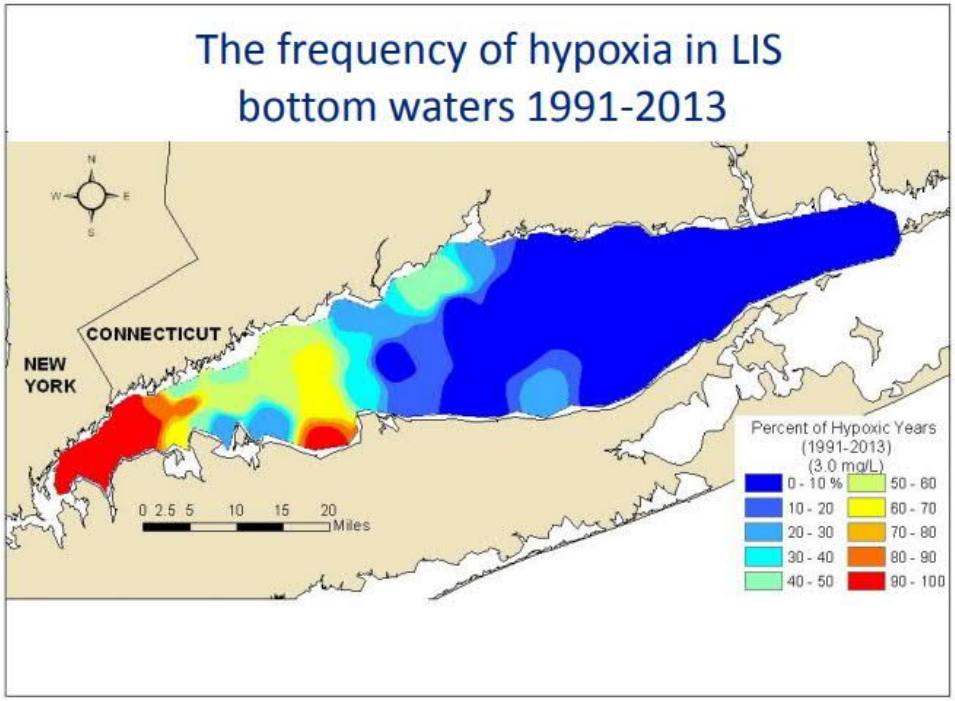
Excess Nutrients

Need for Current Project

Nutrients in the Environment

- Nitrogen limiting factor in marine waters
  - Excess nitrogen results in algae blooms
  - Impacts Long Island Sound
- Sources
  - Agricultural runoff/fertilizer
  - Stormwater
  - Other nonpoint sources
  - Wastewater treatment discharges
- Long Island Sound Program
  - Since 2002 ~ 60 WPCFs upgraded
  - Plymouth 2015 Upgrade for LIS

Long Island Sound Hypoxia Levels



Source: CT DEEP Presentation Connecticut's Nitrogen Credit Trading Program, 9/17/2014

Need for Current Project

Nutrients in the Environment

- Phosphorus limiting factor in fresh water
  - Excess phosphorus results in algae blooms
  - Impacts local water quality
- Sources
  - Similar to nitrogen
  - Wastewater treatment discharges
- Phosphorus reduction strategy
  - CT DEEP identified 43 WPCFs for limits
  - NPDES permit renewal compliance

Pequabuck River water quality


Photo Credit: Steve Grant, 2018

Need for Current Project

1

Discharge permit renewal

- Effective June 1, 2016
- New phosphorus limits
- Compliance schedule
- Meet limits in 3 years

2

Conduct study

- Permit requirement
- Approved by WPCA & CT DEEP
- Recommended improvements to meet phosphorus limits
  - Phased approach
  - Interim chemical treatment to meet permit

3

Design documents

- Prepare plans & specifications
- Phosphorus removal
- Process control improvements

4

Implementation

- Advertise for bid
- Anticipated 2-year construction period

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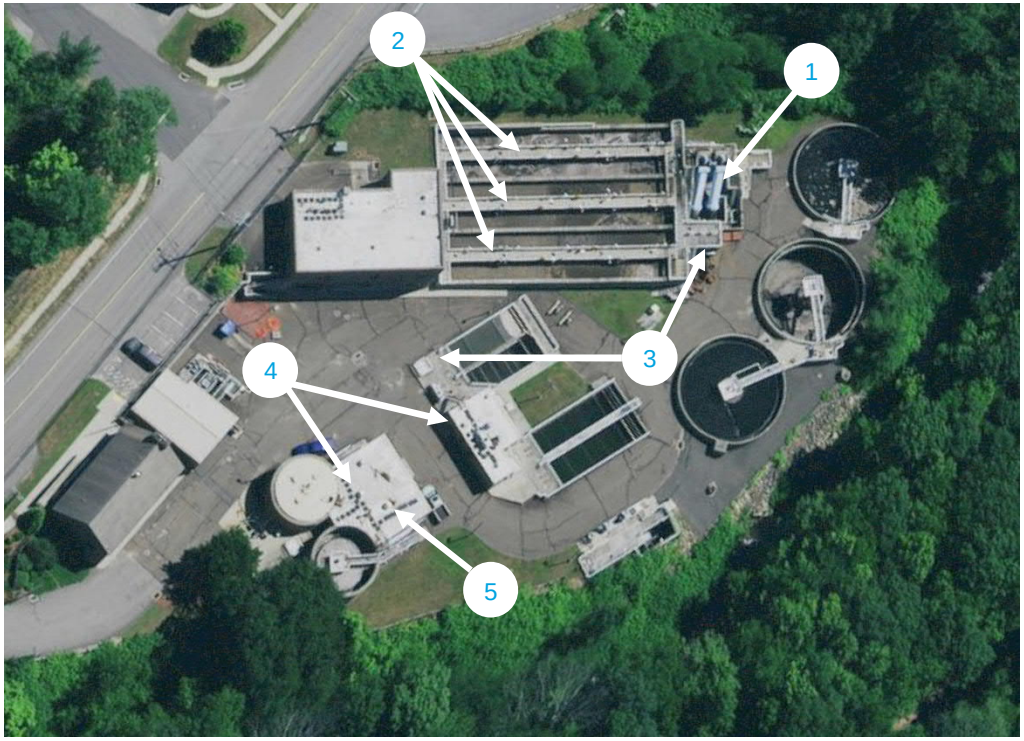
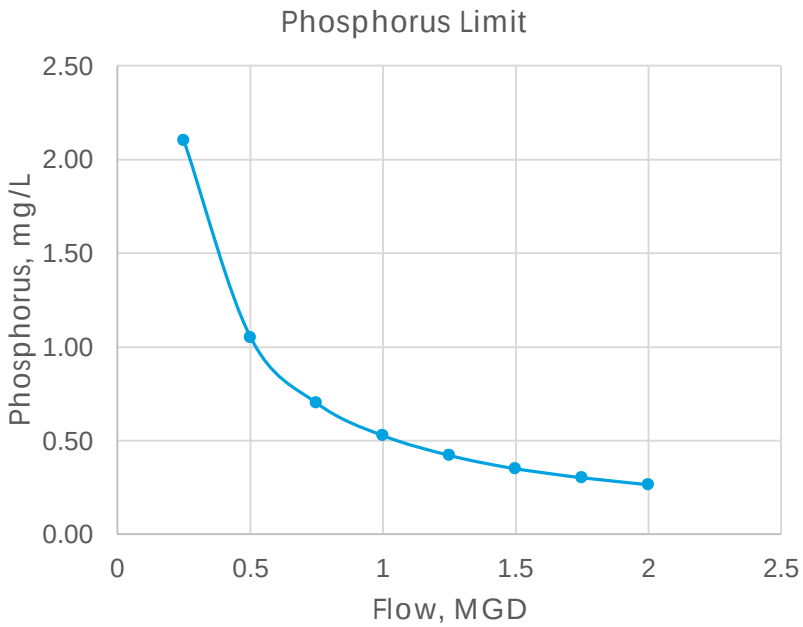
Recommended Improvements



1. New Primary Effluent/RAS Pump Station
   - New submersible pump station
   - Improve biological P removal/reduce chemicals
2. Air Flow Control Improvements
   - Improve biological P removal/reduce chemicals
3. Chemical Storage and Feed System
   - Better control/minimize usage
4. New Primary and Thickened Sludge Pumps
   - Improve biological P removal/reduce chemicals
5. Polymer Storage and Feed System
   - Minimize impact to biological P removal

Future Needs



- Phosphorus Limit = 4.38 lb/d (seasonal average)
- Concentration required decreases as flows increase
- Phased improvements
  - Phase 1 – biological P removal w/chemical polishing
  - Phase 2 – tertiary process/effluent filtration
- Phase 1 to flows of ~1 MGD
  - Concentration ~ 0.5 mg/L
  - Based on average flows between April and October
- Future needs
  - Collection system rehabilitation (reduce flows)
  - Other non-phosphorus plant improvements

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Implementation & Funding

Item	Anticipated Cost
Preliminary Opinion of Probable Cost (OPC)	$7,500,000*
Anticipated Clean Water Fund Grant (~20%)	$1,400,000*
Local Share (CWF Loan at 2% for 20 years)	$6,100,000*
Annual debt retirement	$373,200/yr*
Anticipated impact to user rates	~$85*/yr per unit

*Could change based on current bid climate

THANK YOU

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