



Presented at the 2018
NEWEA Annual Conference

The Future of Wastewater Treatment in the Great Bay Estuary

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Presentation Overview

- **Background**
- **Permitting and Growth**
- **Treatment Process**
- **Funding**
- **Project Overview**
- **Challenges**
- **Treatment Results**
- **Rate Impacts, Planning**



Background Town of Newmarket

Water & Sewer Service

- Service Population: 8,000

Water Treatment

- 3 groundwater wells
- One water storage tank

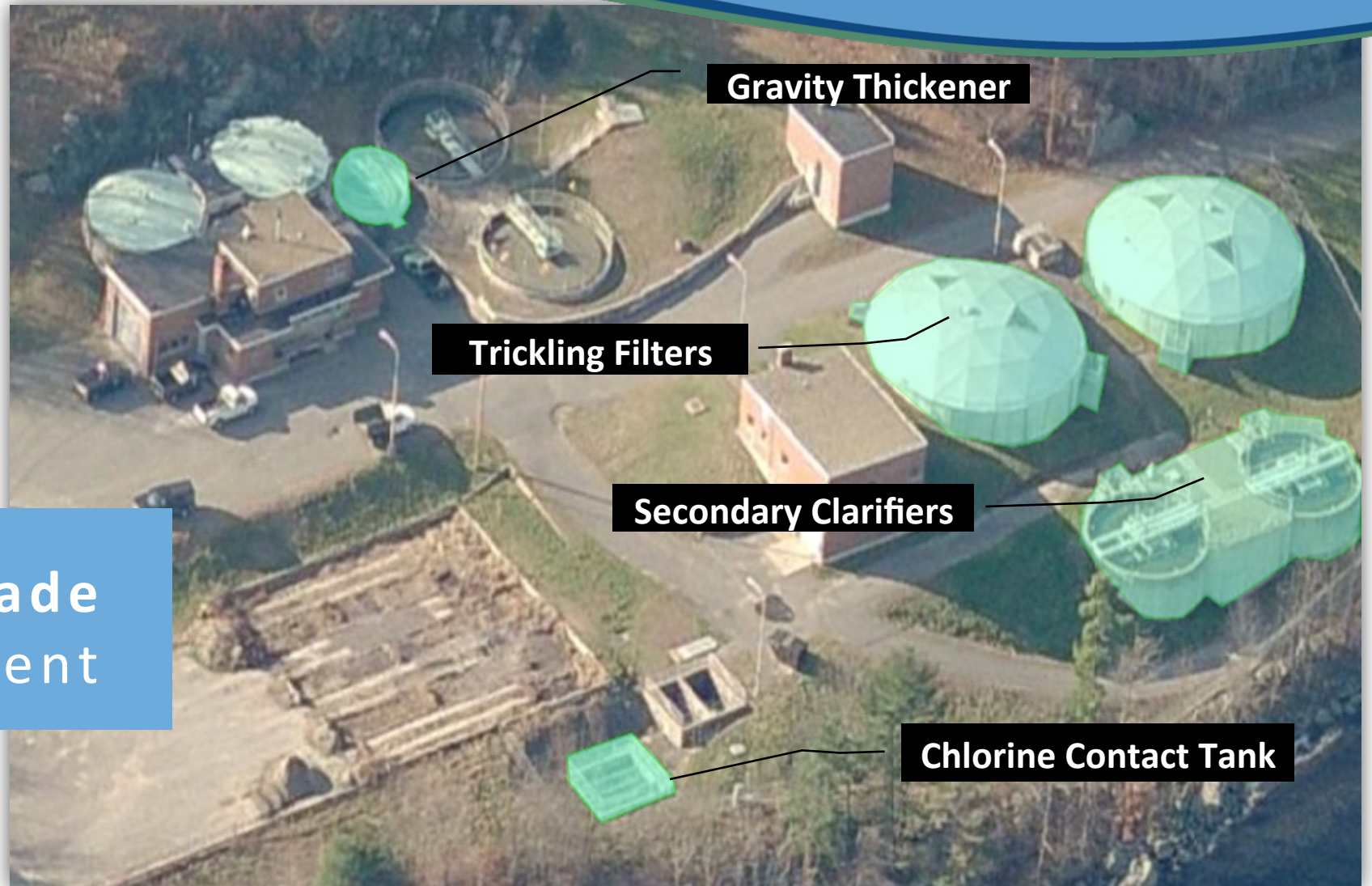
Wastewater

- Treatment Facility (0.85 ADF)
- Lamprey River discharge
- 6 Pump Stations
- 14 miles of gravity sewer
- 6,200 LF of force mains

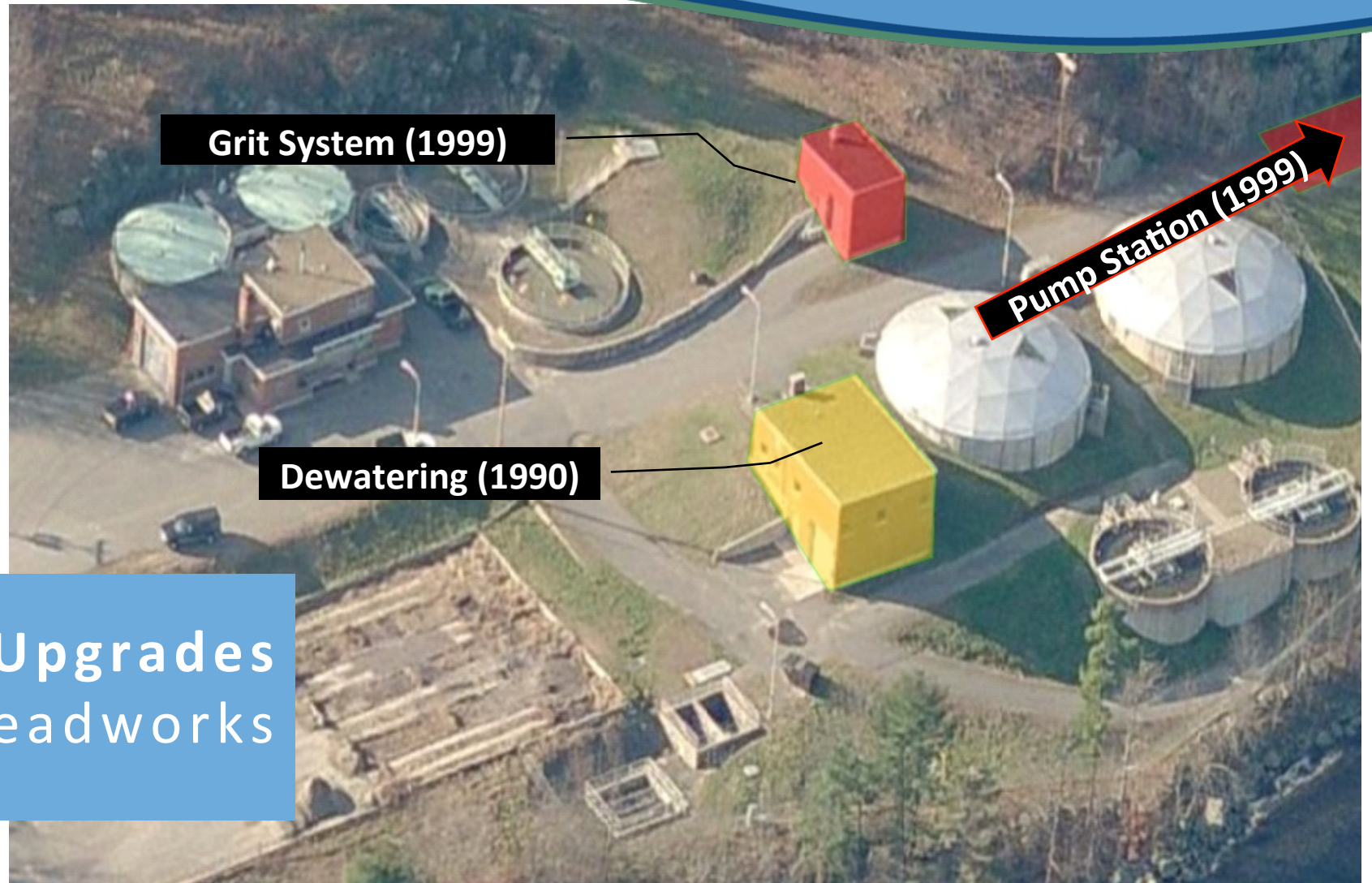




**Original WWTF 1967
Primary Facility**



1985 Upgrade Secondary Treatment



1990s Upgrades
Dewatering, Grit, Headworks

Permitting & Planning

Facility Plan

TN < 5 mg/L

2002

NHDES Great Bay Study

Water quality, TN concerns

2009

Facility Plan Update

TN < 5 mg/L, option for TN < 8 mg/L

2011

EPA Issues NPDES Permit

TN < 3mg/L
Town negotiates AOC with EPA

2012

AOC

TN < 8mg/L within 5 years
Non-point source TN



\$14.1M Project

Largest Public Works project in Town's history!

Short Term

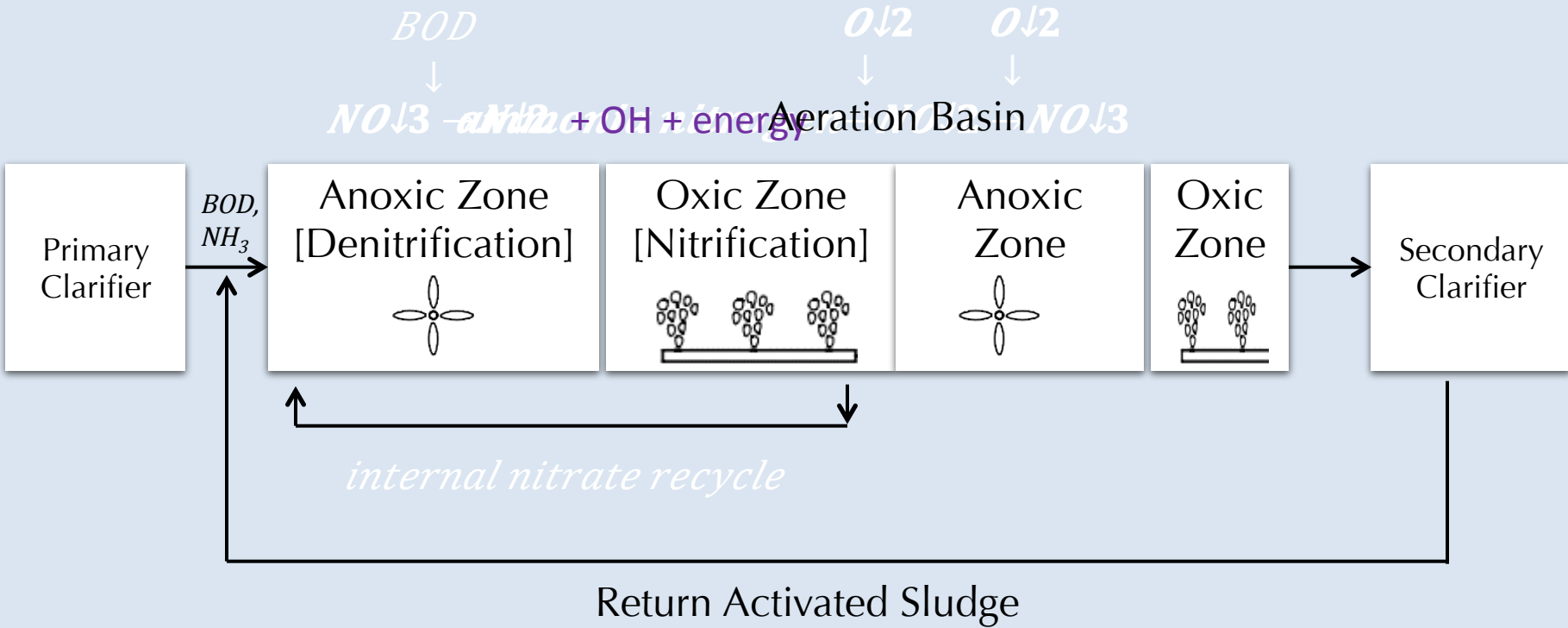
- Comply with AOC interim permit limit

Long Term

- Position Town for future EPA Permit limit
- Flexibility for:
 - Future Growth
 - Reliability
 - Operations
 - Process staging/sequencing



4 Stage Bardenpho Process



NHDES – State Revolving Fund Loan

- 1% interim interest
- \$1.76M principal forgiveness

USDA – Rural Development Loan and Grant

- RD Grant: \$1.96M
- \$10.34M low interest long term loan

\$3.7 M savings, 25% of total project cost



Project Funding

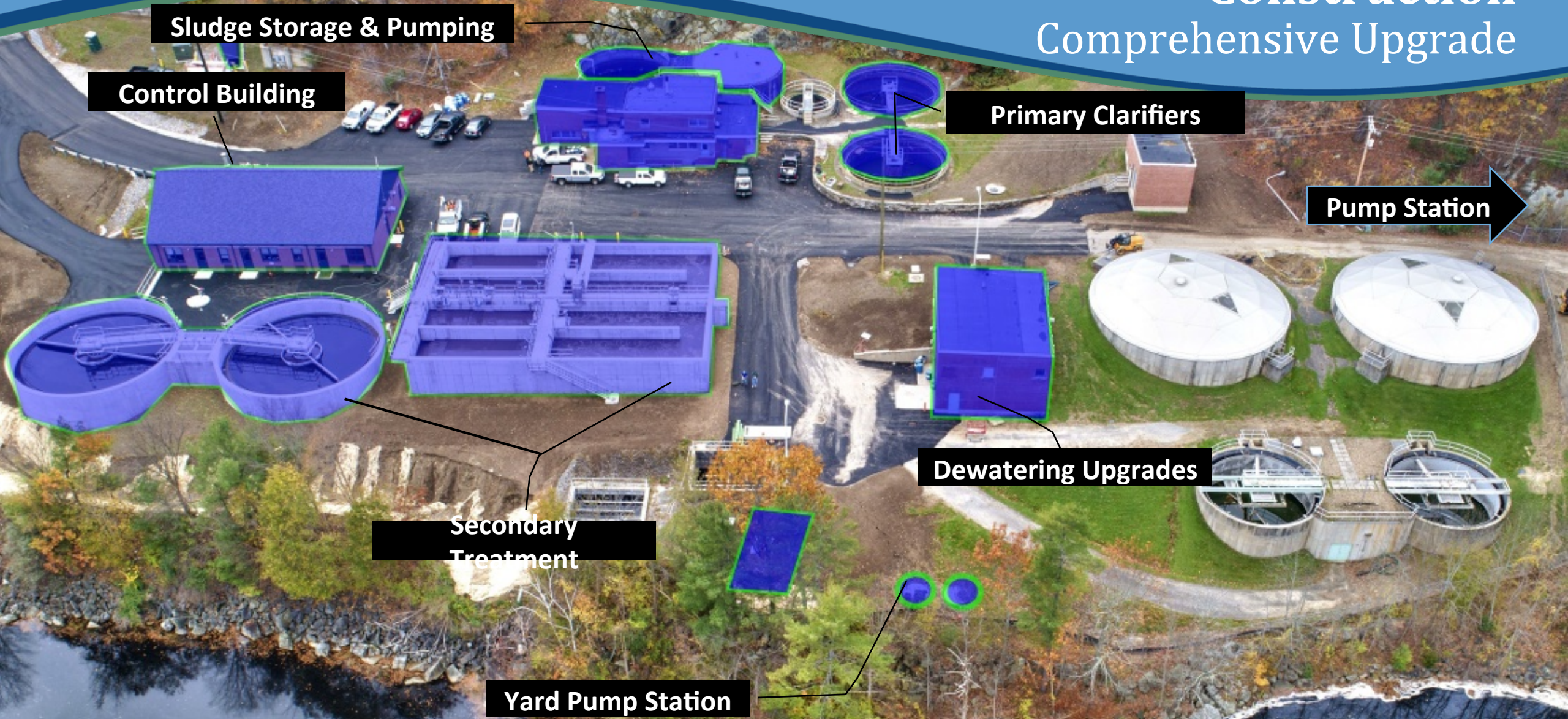
- Maximize grant and principal forgiveness
- Bid alternatives
 1. Primary Clarifier Mechanisms
 2. Sludge Dewatering Equipment and Modifications
 3. Yard Waste Pump Station Upgrades
 4. Plant Water System Upgrade
 5. Parshall Flume Upgrade
 6. Creighton Street Pump Station Modifications

Design



...today

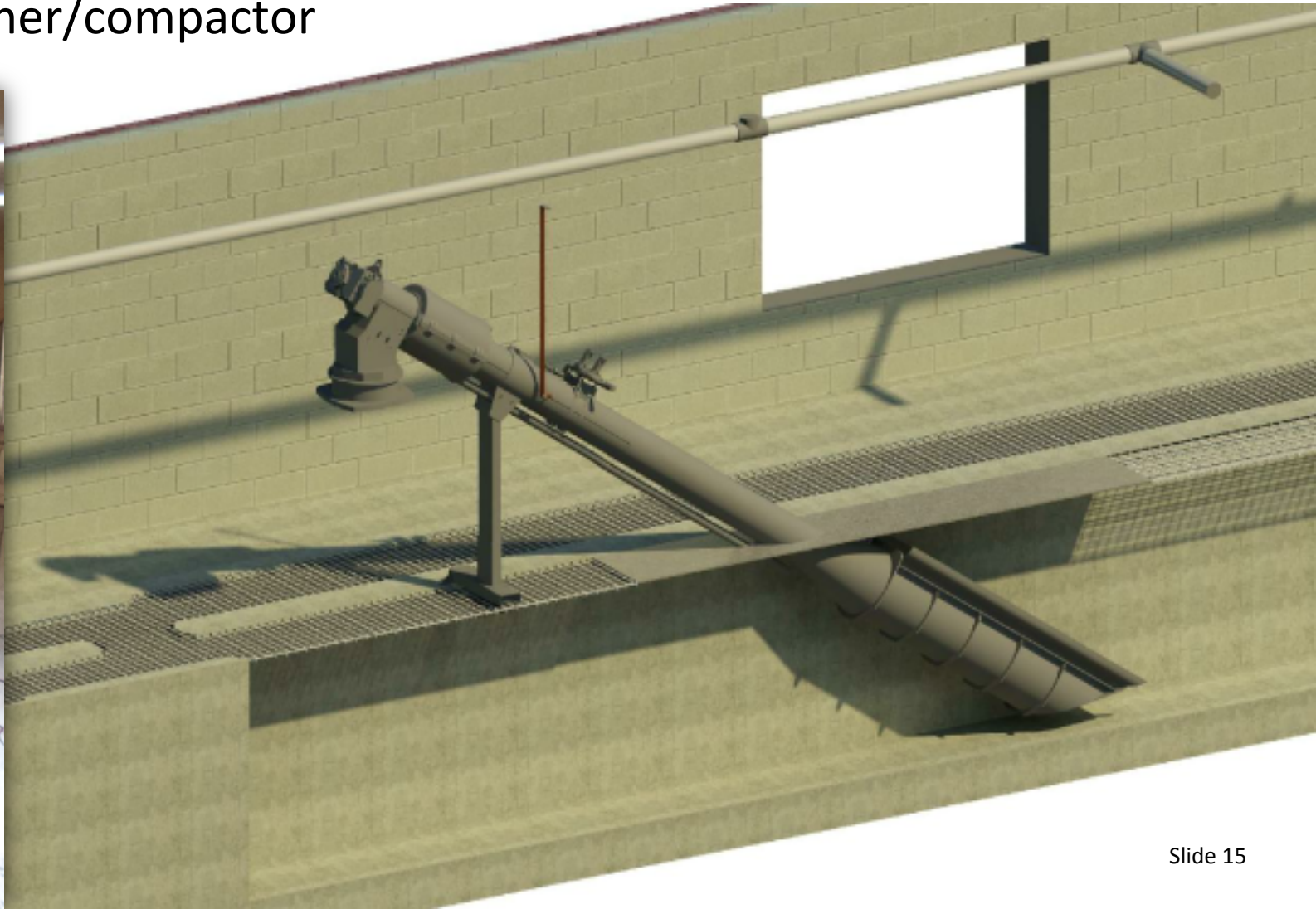
Construction Comprehensive Upgrade



Project Overview

Influent Fine Screen (Pump Station)

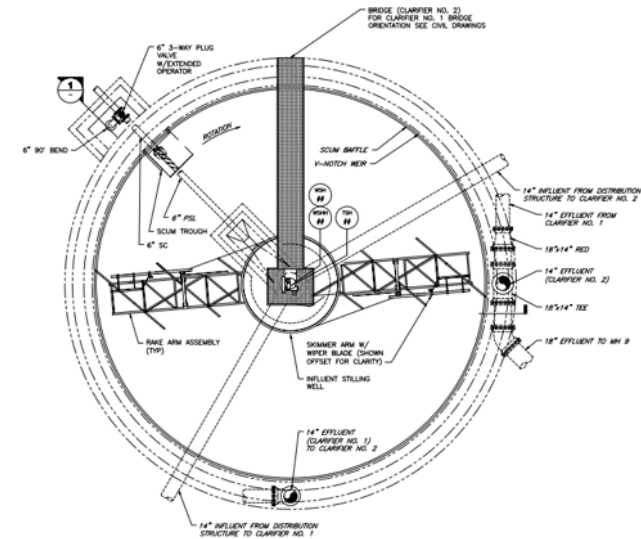
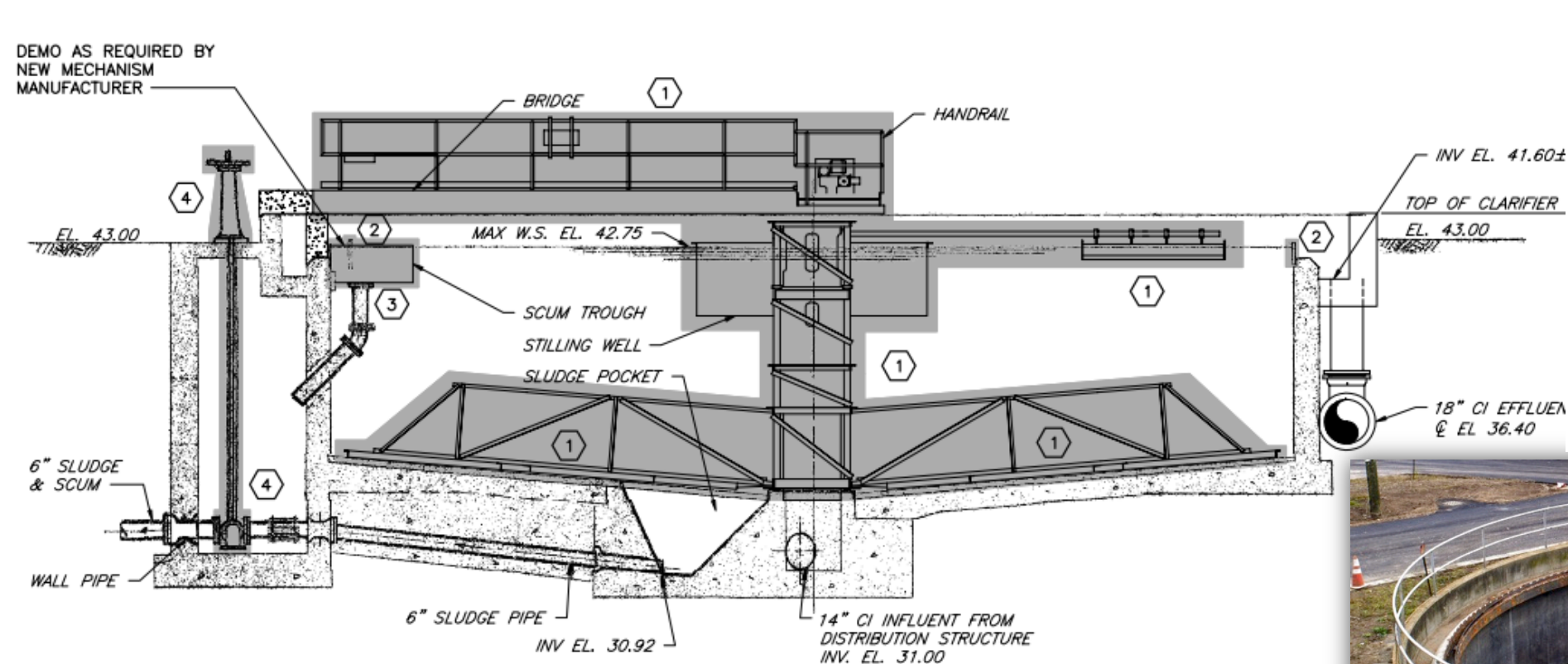
- ¼-inch perforated plate
- Integrated screenings washer/compactor



Project Overview

Primary Clarifier Upgrade

- Deferred to 2018



Project Overview

Sludge Pumping Upgrades

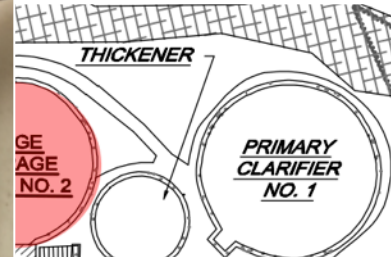
- RAS Pumps
- WAS Pumps
- Primary Sludge Pumps
- Dewatering Pumps



Project Overview

Sludge Storage

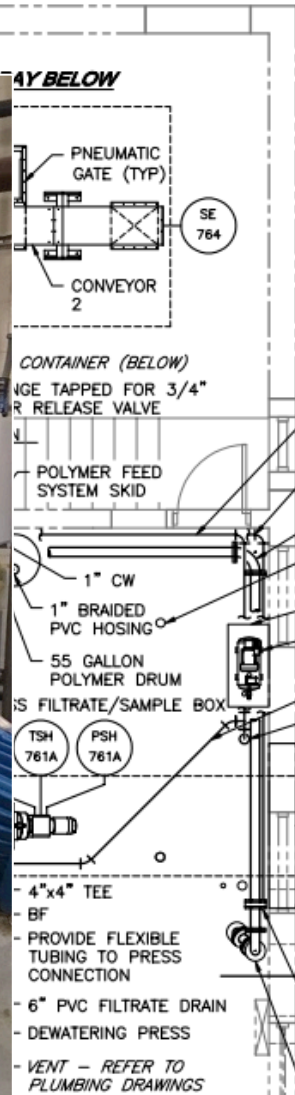
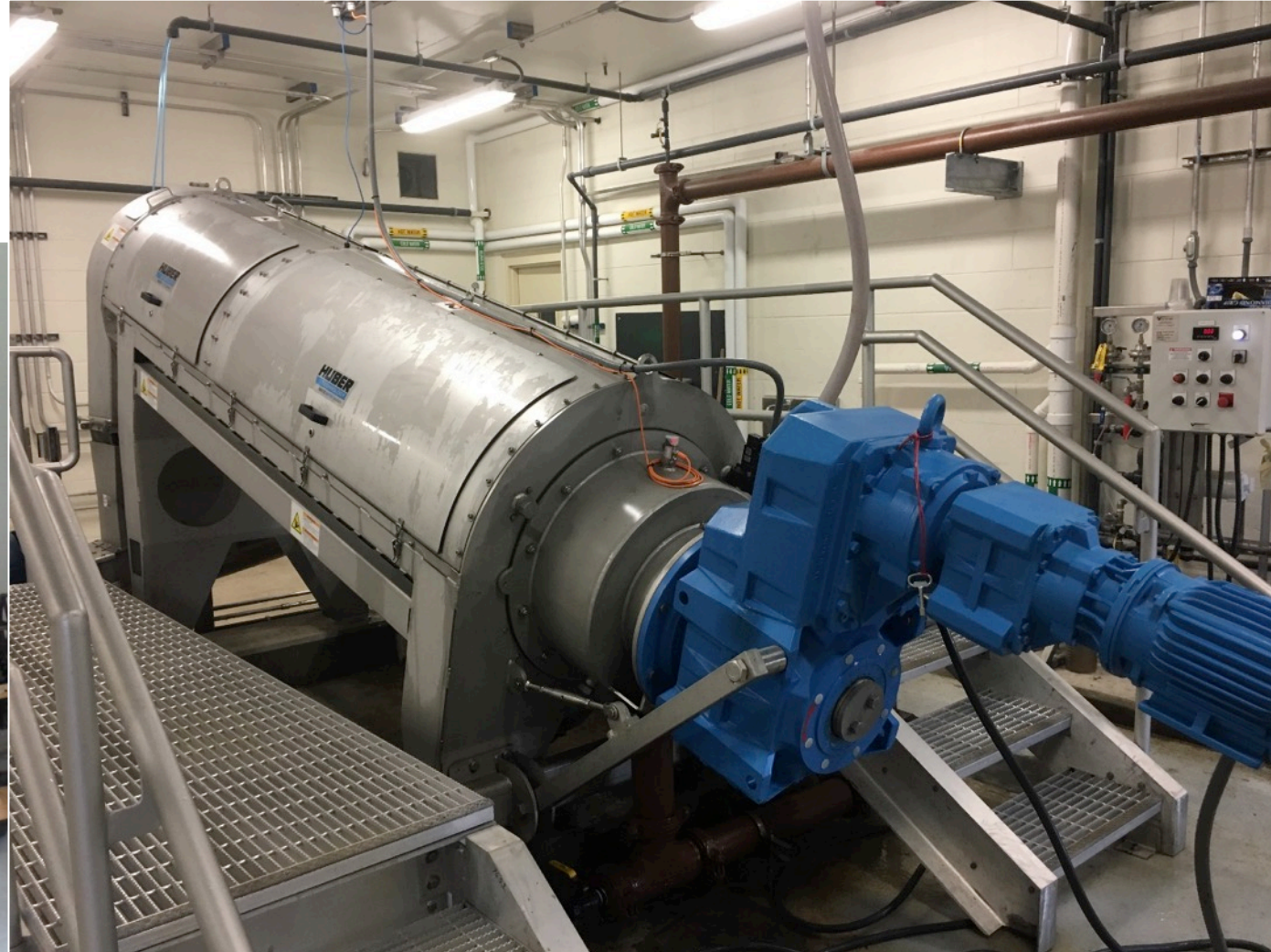
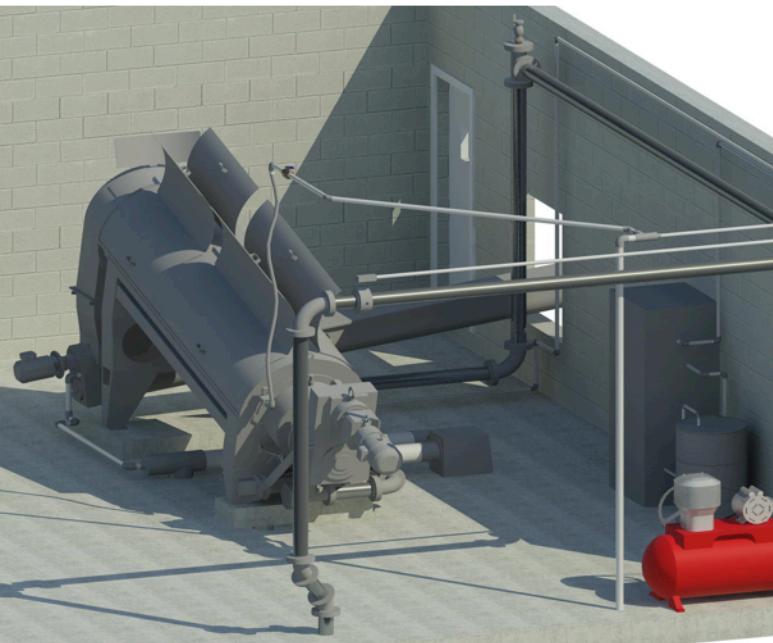
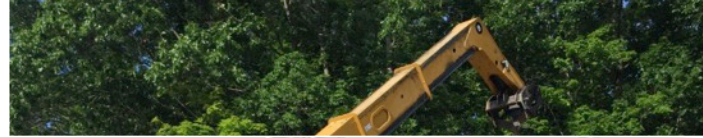
- Primary and secondary sludge
- Aerated Storage Tanks
- PD Blowers
- Grinder



Project Overview

Dewatering Upgrades

- Screw Press
- Loading Conveyors



Project Overview

Nutrient Removal Upgrade



Secondary Clarifiers

Control Building

Aeration Tanks

Project Overview

Control Building

- Office Space
- Laboratory
- Process Equipment



Project Overview

Aeration Tanks

-
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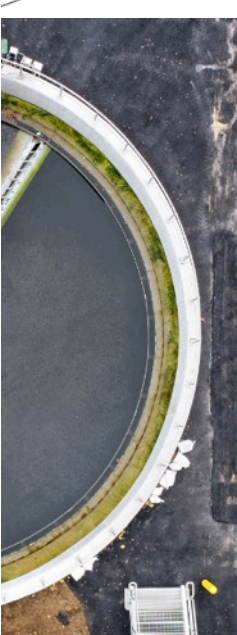
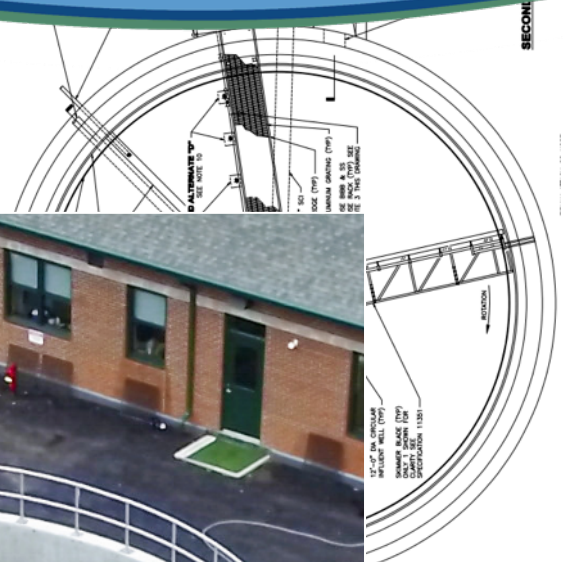
→ Internal Recycle



Project Overview

Secondary Clarifiers

- 50-ft diameter
- Suction header



Challenges Site Constraints

West: Significant Ledge, Steep Increase in Grade

East: Lamprey River, Floodway

North: Significant Ledge, Steep Decrease in Grade

South: NH F&G Access, Town DPW, Driveway



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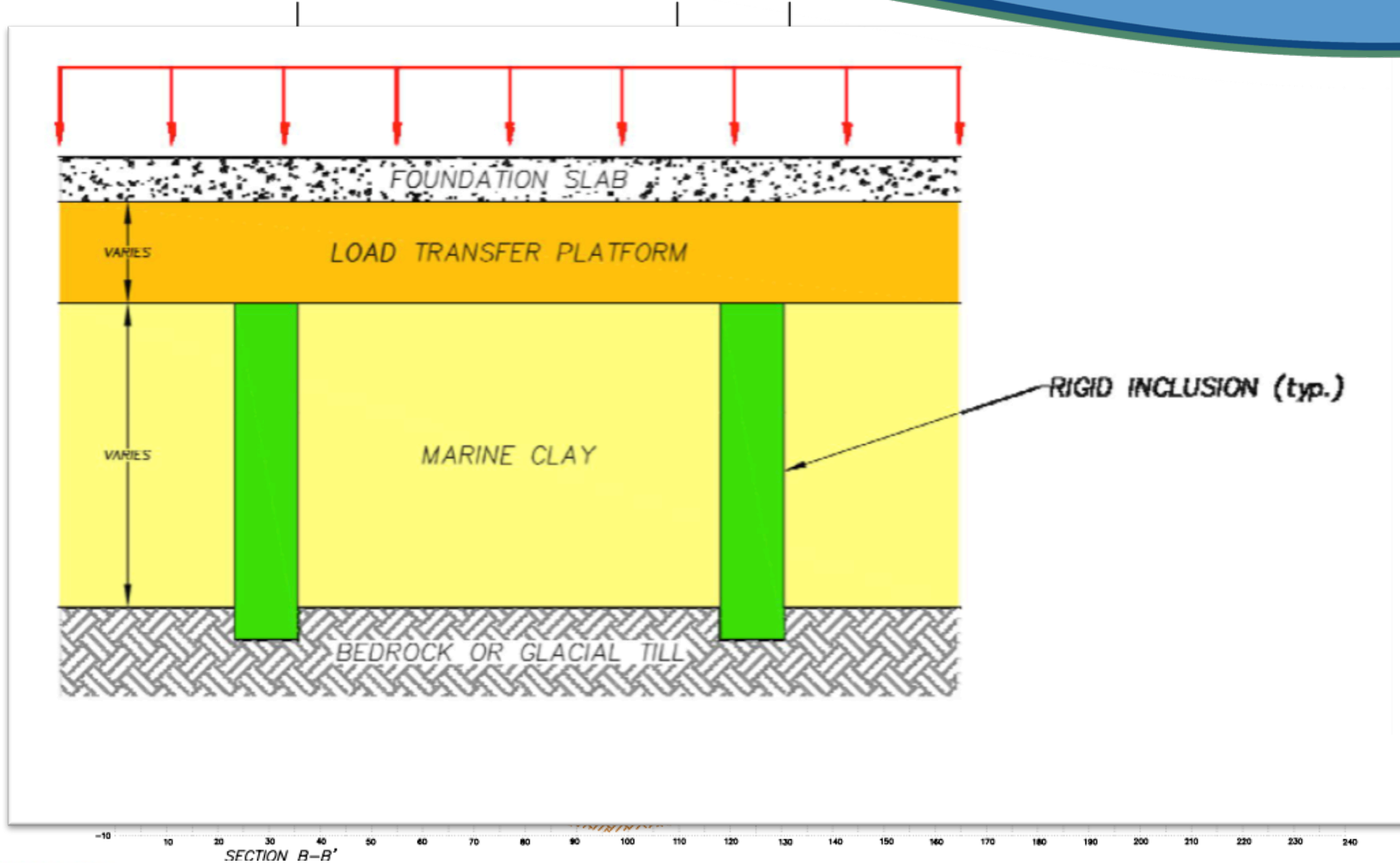
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South: NH F&G Access, Town DPW, Driveway



Challenges

Geotechnical Concerns



Challenges Geotechnical Concerns

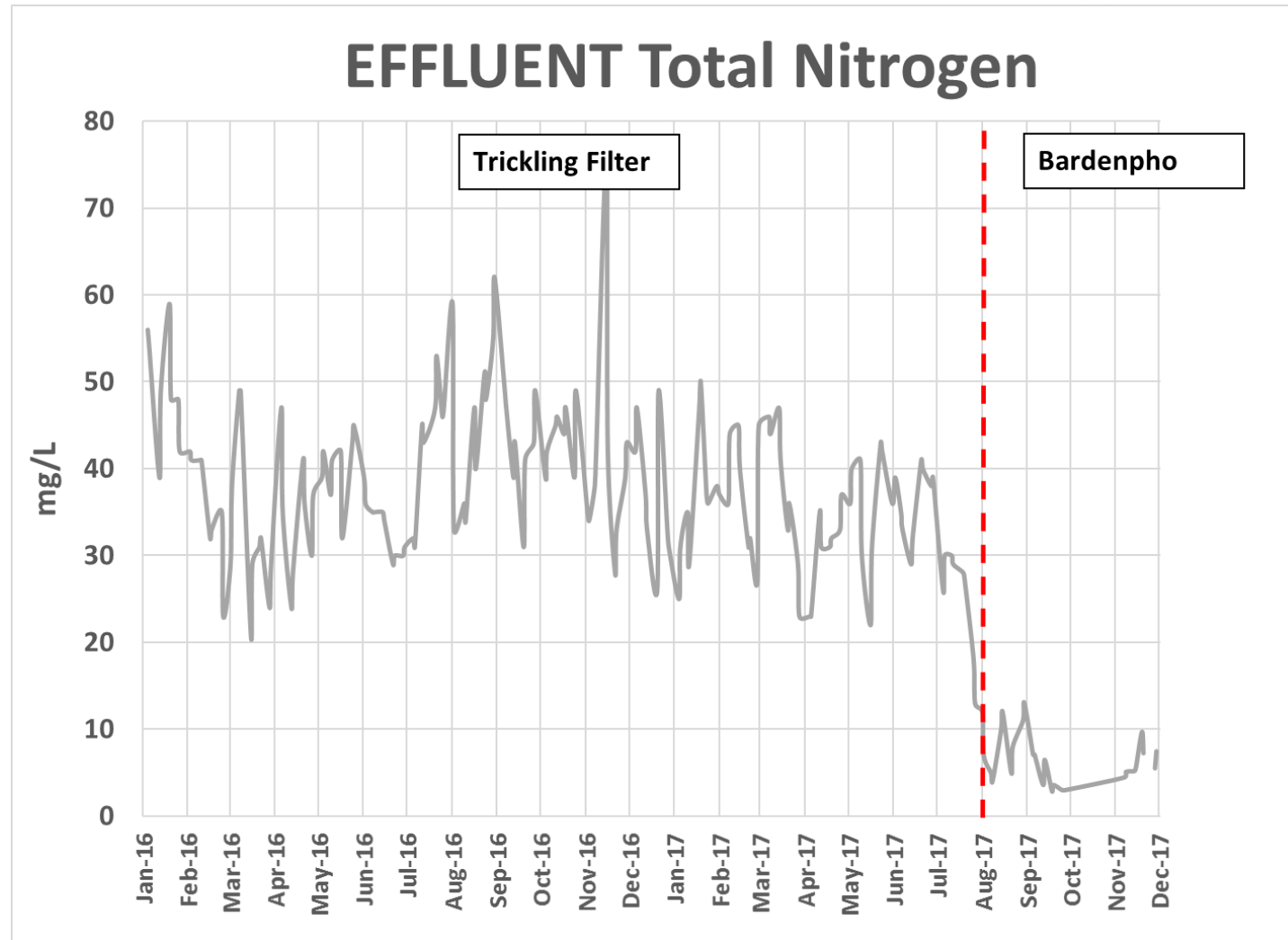


Challenges Geotechnical Concerns

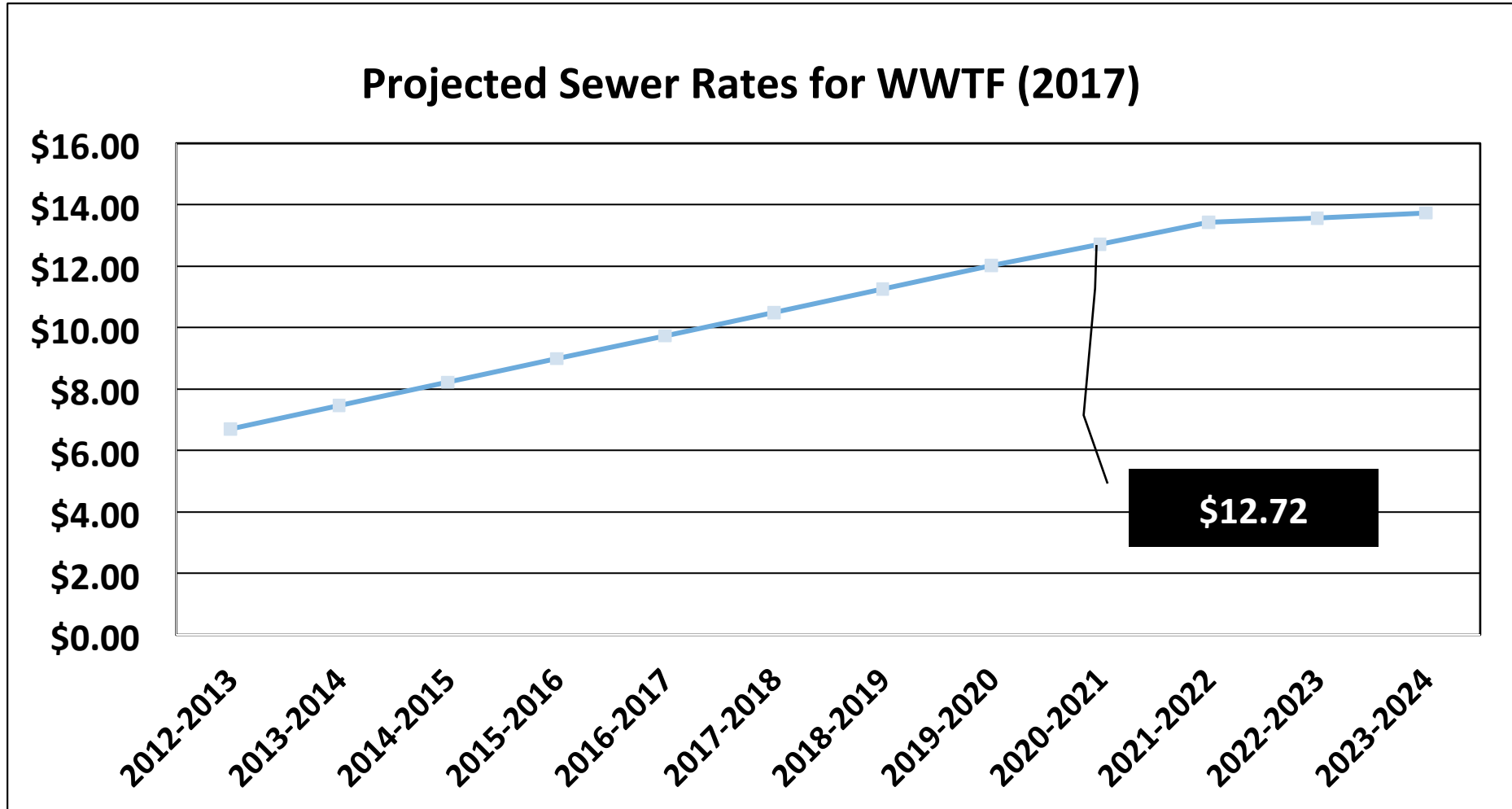


Challenges Geotechnical Success





User Rate Impacts



Equipment Replacement Fund

- System wide approach
- Equipment forecasting
- \$150,000/year for capital improvements

	Year Installed	Cost	Escalation	Engineering	Total Cost	Life Expectancy	1	2
			1%	15%			2017-18	2018-19
CREIGHTON STREET PUMP STATION								
HEADWORKS BUILDING								
	1969							
Roof	2000	20,000	5,000	0	25,000	25	\$2,778	\$2,778
Mechanical Screen	2016	90,000	13,500	15,525	119,025	15	\$7,935	\$7,935
HVAC	2017	15,000	2,250	2,588	19,838	15	\$1,323	\$1,323
PUMP BUILDING								
	1969							
Roof	2000	10,000	2,500	0	12,500	25	\$1,389	\$1,389
Pump 1	2000	40,000	14,000	8,100	62,100	35	\$3,268	\$3,268
Pump 2	2000	40,000	14,000	8,100	62,100	35	\$3,268	\$3,268
Pump 3	2000	40,000	14,000	8,100	62,100	35	\$3,268	\$3,268
VFD 1	2000	8,000	2,000	1,500	11,500	25	\$1,278	\$1,278
VFD 2	2000	8,000	2,000	1,500	11,500	25	\$1,278	\$1,278
VFD 3	2000	8,000	2,000	1,500	11,500	25	\$1,278	\$1,278
SCADA Panel	2000	14,000	3,500	2,625	20,125	25	\$2,236	\$2,236
HVAC	2000	10,000	2,000	1,800	13,800	20	\$3,450	\$3,450
Generator Transfer Switch	2000	10,000	4,000	2,100	16,100	40	\$671	\$671
Generator	2000	45,000	11,250	8,438	64,688	25	\$7,188	\$7,188

Acknowledgements



OWNER

Steve Fournier

Town Administrator

Sean Greig

Environmental Services

Director

WWTF Staff

Todd Gianotti, Sam

Heffron, Corey Mello, Joel

Drelick, Ben Trotter

Town Council



GENERAL CONTRACTOR

Apex Construction



FUNDING AGENCIES

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Environmental Services**



ENGINEER

Tim Vadney

Michael Theriault

Michael Curry

Franz Vail

