NEWEA Biosolids Conference

Schlepping Southington Sludge while Saving Scents

October 2016

Presenting Team
Amy Sowitcky, P.E. Tighe & Bond Project Manager
Austin Weidner, Tighe & Bond Engineer

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Agenda

- **Southington Plant**
- **Historical Solids Handling**
  - Changes Needed
  - Options considered
- **Sludge Thickening and Odor Control Project**
  - Project elements
  - Lessons Learned
- **Current Solids Handling**
  - Sludge Thickening
  - Sludge Hauling
- **Future Solids Handling**
  - Low Level Phosphorous Removal Upgrade
  - Impacts

Southington Maintains an Extensive Wastewater System

- 7.4 million gallon per day Water Pollution Control Facility
- Ten pumping stations
- Over 120 miles of sanitary sewers
- Serves over 25,000

residents and businesses

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Southington Water Pollution Control Plant

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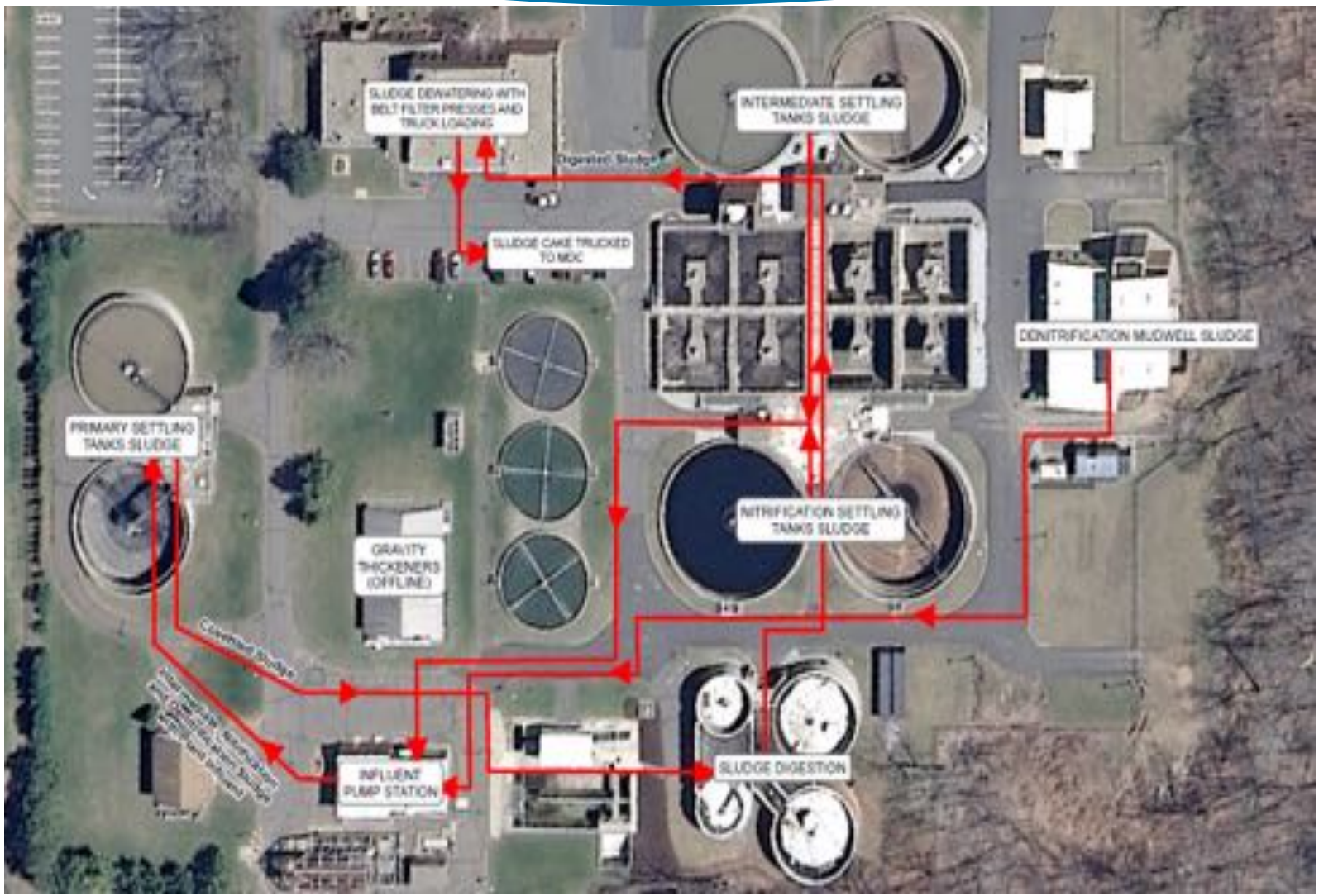
Historic Solid's Management



A Brief History

1980
Last Major Upgrade

2012
Digesters Off-Line

Summer 2013
Odor Issue Arises

2009
Denitrification Filters Online

Spring 2013
New Permit

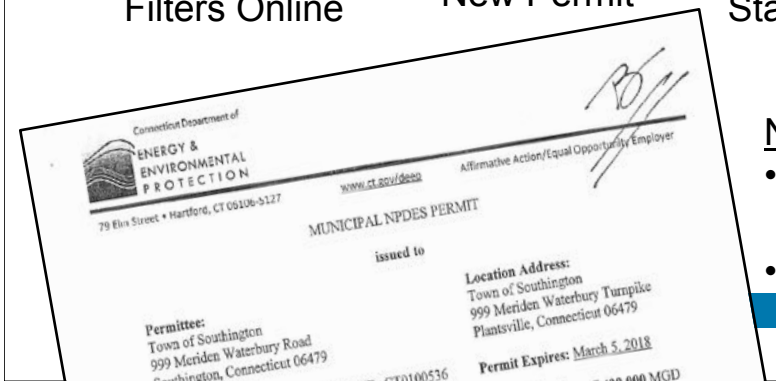
Fall 2013
RDT Project Starts

Problems:

- Additional 450 lb/day Intermediate Solids
- Lost the primary sludge blankets
- Significant Odors from the Primary Clarifiers and Tricklin Filters

Temporary Solution:

- Permanganate and Hypo Addition
- Stopped Cosettling
- Hauled Sludge more Frequently



Connecticut Department of ENERGY & ENVIRONMENTAL PROTECTION

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Affirmative Action/Equal Opportunity Employer

MUNICIPAL NPDES PERMIT

issued to

Permittee:
Town of Southington
999 Meriden Waterbury Road
Southington, Connecticut 06479

Location Address:
Town of Southington
999 Meriden Waterbury Turnpike
Plantsville, Connecticut 06479

Permit Expires: March 5, 2018

New Phosphorus Limit and Schedule

- Interim Limit: TP = 0.7 mg/L Immediately
- Future Limit: TP = <0.12 mg/L by 2022

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Most Sludge Handling Processes were Off-line and Inefficient

- **Sludge treatment processes**
  - *Sludge blending in the primary clarifiers (odorous)*
  - *Gravity thickening*
  - *Anaerobic digestion & GBT*
  - *Dewatering and hauling to MDC*
- **Immediate Needs**
  - *Control objectionable odors*
  - *Reduce sludge disposal costs*

Sludge Handling and Odor Control Options

- **Sludge treatment options**
  - ➢ *Continue current sludge disposal practice*

Option 1

Sludge Handling and Odor Control Options

- **Sludge treatment options**
  - ➢ *Thickener Project*
    - *Reuse gravity thickener to store sludges separately*
    - *Cover storage tanks*
    - *Keep sludges "fresh"*
    - *Provide odor control*
    - *Thicken to cut volume by 50%*

Option 2

Sludge Handling and Odor Control Options

- **Sludge treatment options**
  - ➢ *Thickener project **PLUS** rehab digesters and replace process equipment*

Option 3

Sludge Handling and Odor Control Options

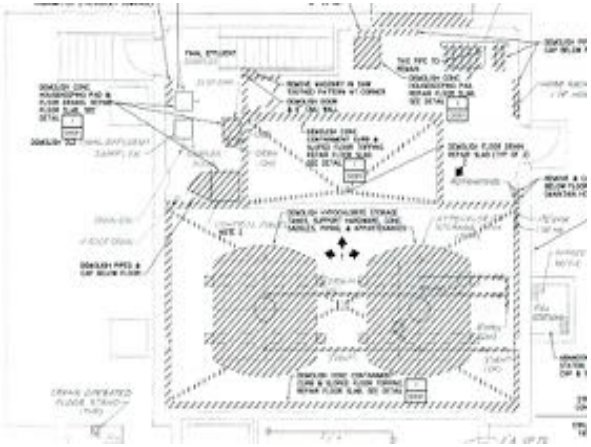
	Option 1 **Continue current sludge disposal practice**	*Option 2* **Thickener project only**	*Option 3* **Thickener project, rehab digesters, and replace process equip**
Capital Cost	$0	$5,520,000	$14,300,000
Annual O&M Cost	*$1,180,000*	*$589,000*	*$407,000*
Net Present Value Cost (for 20 years)	$21,300,000	$16,100,000	$21,700,000
Addresses Immediate Odors	*No*	*Yes*	*Yes*

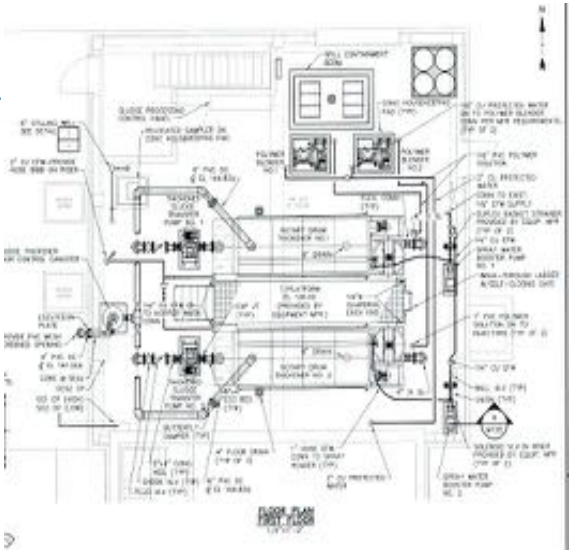
Sludge Thickening and Odor Control Project

- **Reuse the Gravity Thickener Tanks as aerated storage tanks while waiting for processing through the RDTs**
  - 3 blowers
  - Duckbill valve type aerators
  - Sludge piping
  - Covers
  - Radial odor control system
- **Add sludge feed pumps, thickened pumps and replace truck loading pumps**
  - Flow meters
  - Piping

Sludge Thickening

- **Repurpose the Hypochlorite Room**
  - *Two 300 gpm RDTs*
  - *Booster spray wash pumps*
  - *Thickened Pumps*
  - *Polymer storage and 2 systems*
  - *Carbon odor*
  - *Ventilation*
  - *Access doors*





STOC: Good News $$$

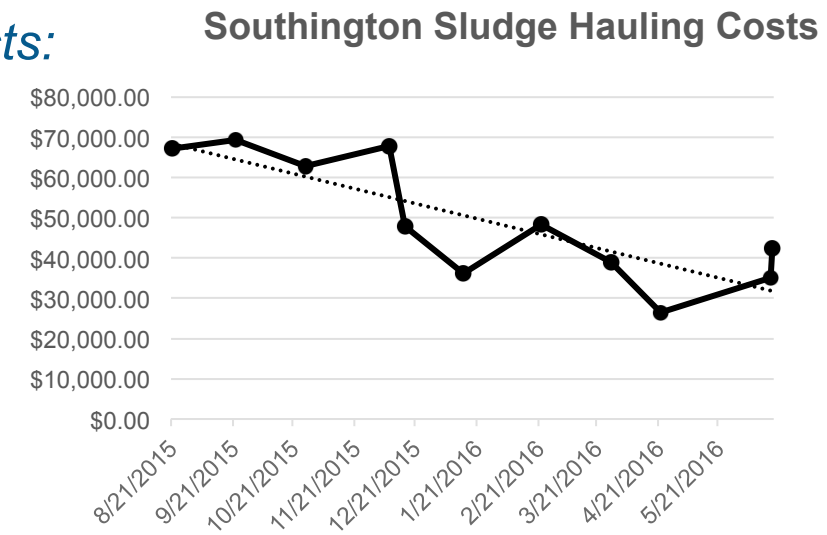
- *Goal: Under $4 million – construction $3,975,000*

Trucks reduced from 40 plus Monday – Saturday

to 20 Monday through Friday

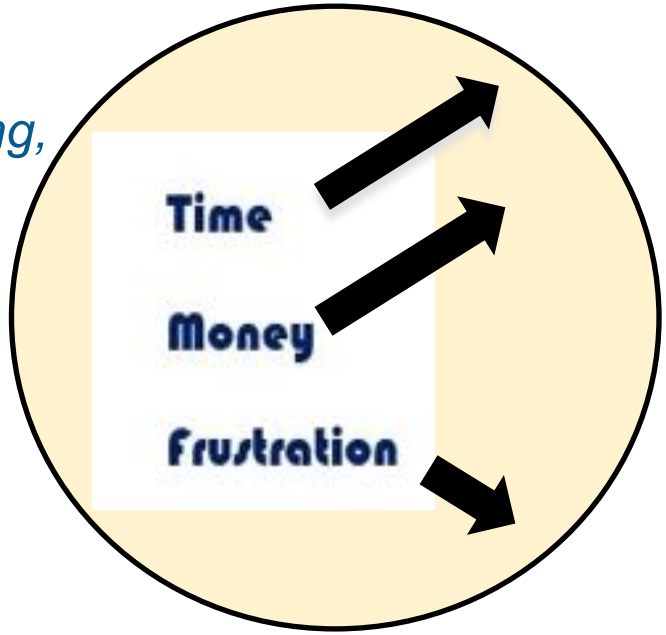
  - *Operator time*
  - *Reduced Sludge Removal Costs:*
    - *Truck Hauling*
    - *Tipping Fees*
  - *Reduces taxed sludge*

accepting facilities around CT



Good News Continues: Scents

- *Remove intermediate and nitrification sludges from the uncovered primary tanks*
  - *Reduced odors*
  - *No overtopping of weirs*
- *Containment and Treatment*
- *Greater flexibility for sludge holding, Processing*
  - *Operators control*



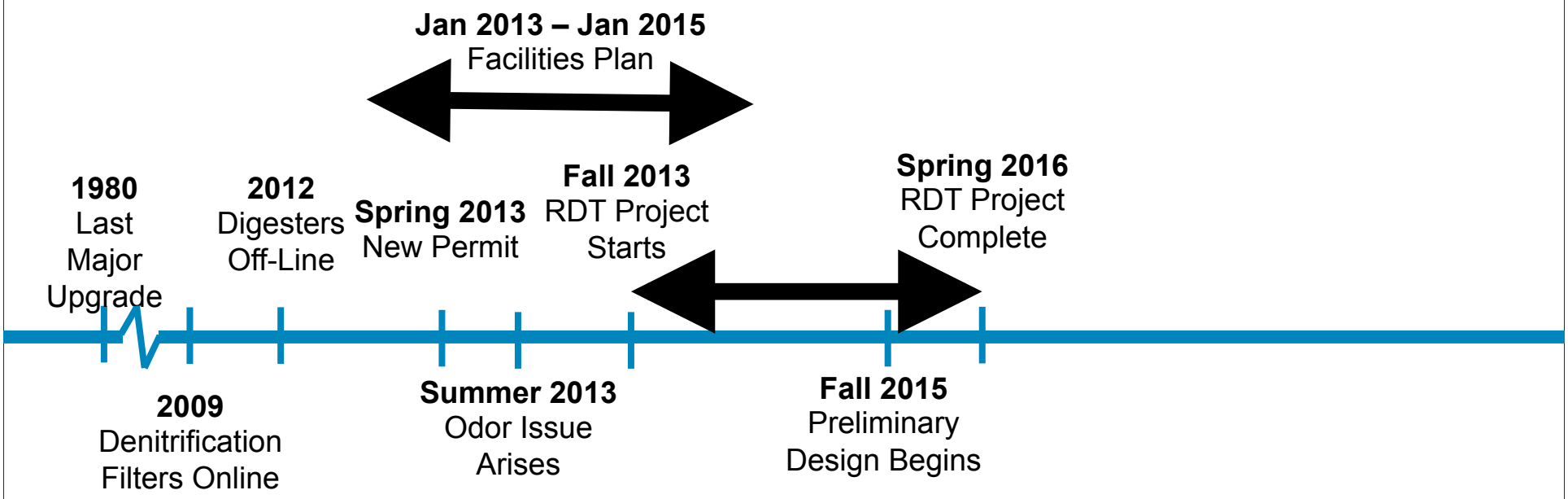
STOC: Polymer versus Solids Content

- **Lessons Learned**
  - *Sludge & Polymer:*
    - *Polymer selection - Bench scale testing by Parks*
      - *Day 1: Smoothest startup day ever*
      - *Day 2: Gelled, clumped and did not floc*
    - *Consistency: PS, Int. S, Nit. S*
    - *Age of the Sludge*
    - *Aerated sludge*

Thickening

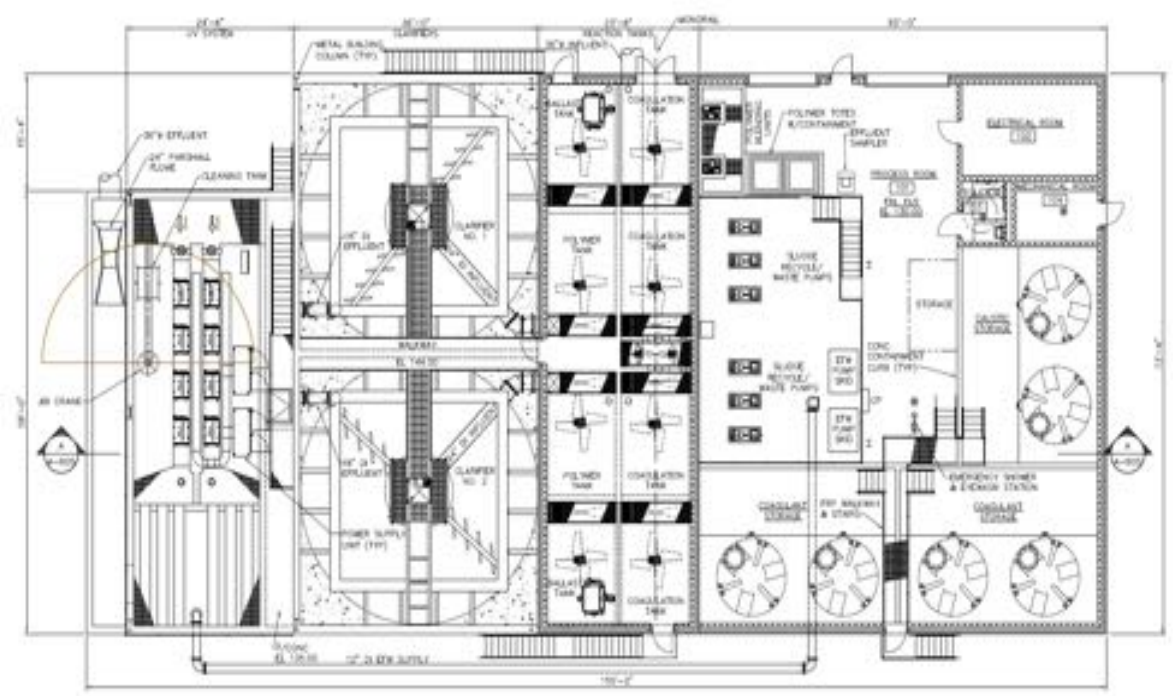
- *Polymer versus Solids Content*
- *How much / what to process*
- *Current sweet spot (PAC addition)*
  - *From 0.4% solids of intermediate and nitrification sludge to 4.7%-6%*
  - *This is added to the former digester, which has straight primary sludge at 2.5%-3%*

A Brief History



Phosphorus Removal Upgrade Project

- **Goals**
  - *Meet 0.12 mg/L Total Phosphorus Limit*
  - *Complete Construction by 2022 Permit Deadline*
  - *Secure 50% Grant from CT DEEP*
- **Implementation**
  - *Preselect Ballasted Flocculation Vendor*
  - *Determine Impact fror Additional Sludge*
  - *Phos Sludge Cosettle in Primary Clarifiers*



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Sludge Production Estimate

- **Basis of Design**
  - *Existing Sludge Volume from Observed Data*
  - *Vendor guaranteed chemical dosing*
  - *Season Permit Season*

	Current Conditions (ADF = 4.5 MGD)[1]			Future Conditions (ADF = 6.04 MGD)		
	AVG	MAX	MIN[2]	AVG[3]	MAX[4]	MIN[2,5]
Total WPCP Sludge (incl Multipoint) (lbs/day)	6,240	10,457	3,262	8,480	14,210	4,433
Low-level Phos (lbs/day)[6,7]	0	0	0	518	805	0
Total (dry lbs/day)	6,240	10,457	3,262	8,997	15,015	4,433
Estimated % Solids of Combined Sludges (with Thickening)[8]	5%	4%	5.5%	5%	4%	5.5%
Total Sludge Volume (gal)	**14,816**	**31,036**	**7,041**	**21,362**	**44,564**	**9,568**

Additional Sludge & Odor Improvements

- **Convert two digesters to thickened sludge holding tanks**
  - Demo all digester piping
  - New fixed covers
  - New pumped mixing systems
  - Dedicated odor control system for tanks
- **Full Covers on Grit Tanks & Primary Clarifiers**
- **Odor Control System for Headworks and Primary Clarifiers**

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Jan 2013 – Jan 2015
Facilities Plan

Fall 2013
RDT Project Starts

Fall 2015
Preliminary Design Begins

Winter 2016
Phos System Preselection Evaluation

Spring 2016
RDT Project Complete

May 2016
CoMag Validation Testing

Design & Construction

Fall 2021
Construction Complete

Closing

- **Acknowledgements**
  - Mike Finoia, Town of Southington
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  - Fred Mueller, P.E., Tighe & Bond
- **Discussion & Questions**

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