

# Torrington Water Pollution Control Facility Upgrade



Presented by:

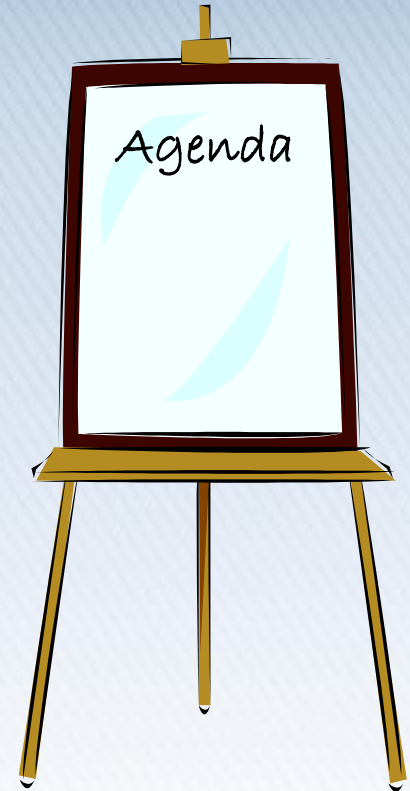
Jerry Rollett, Director of Public Works  
Raymond Drew, WPCA  
Christopher Pierce, PE, Wright-Pierce  
Christine Kurtz, PE, Wright-Pierce



**WRIGHT-PIERCE**   
Engineering a Better Environment

# Presentation Overview

- WPCF history
- Need for current project
- Facilities Plan Recommendations
- Preliminary design costs
- Value engineering
- Changes to recommended plan
- Current opinion of costs
- Schedule
- Impact
- Questions





# History of Past Improvements

- Originally Constructed 1939
- Secondary Treatment 1970
  - Sludge Processing
- Upgrade & Expansion 1994
  - Nitrification
  - Improved Disinfection
- Regional Fats, Oil & Grease (FOG) Receiving 2010



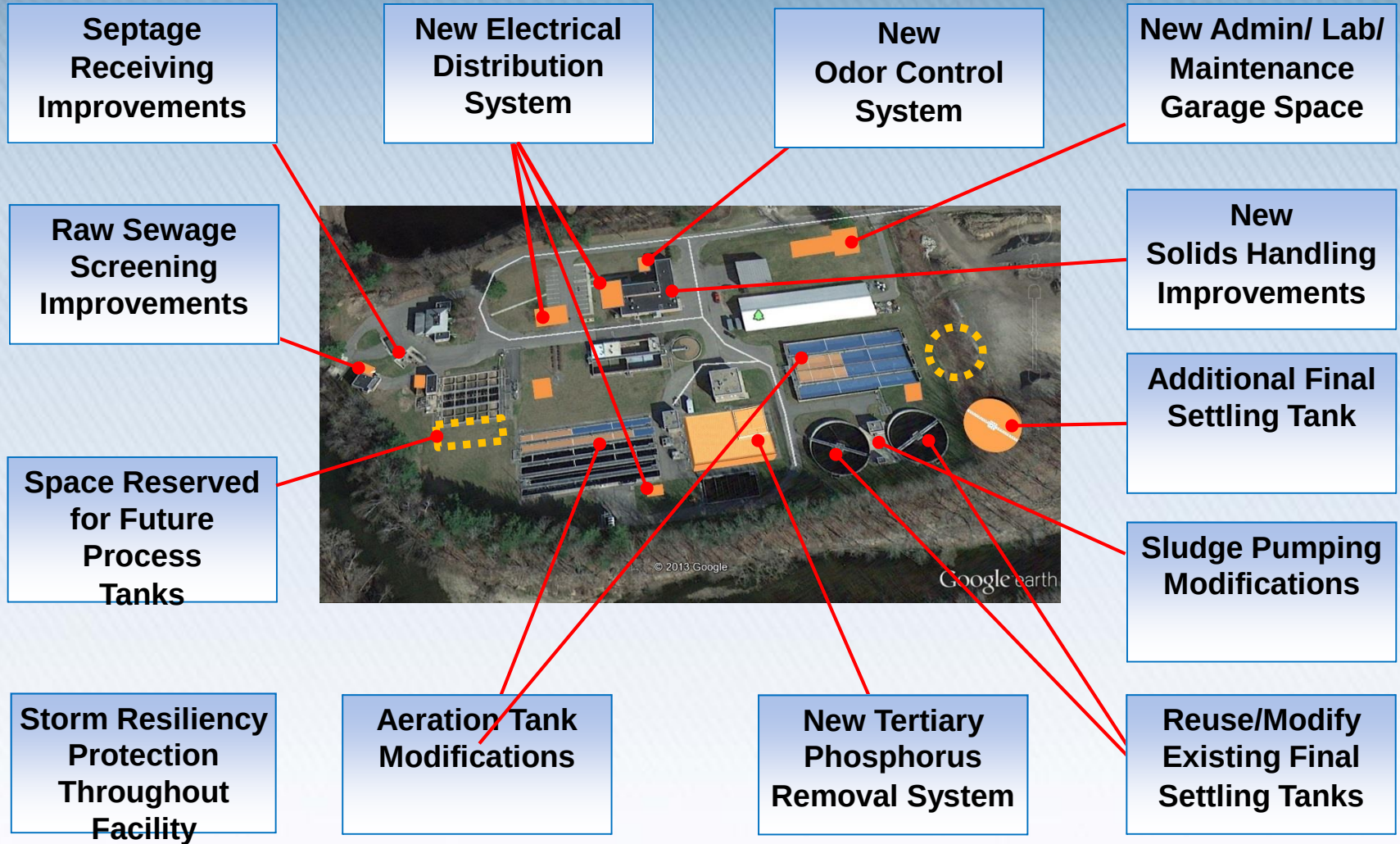
# Need for Current Project

- WPCA Goals
  - Capacity for projected flows and loads within existing permit
  - Upgrade aging infrastructure
  - More stringent permit limits
    - ◆ Nitrogen (Protect Long Island Sound)
    - ◆ Phosphorus (Protect Naugatuck River, decrease algae)
    - ◆ BOD<sub>5</sub>/TSS
  - Improve Energy Efficiency/Green Technologies
  - Increased Resiliency for Storm Events

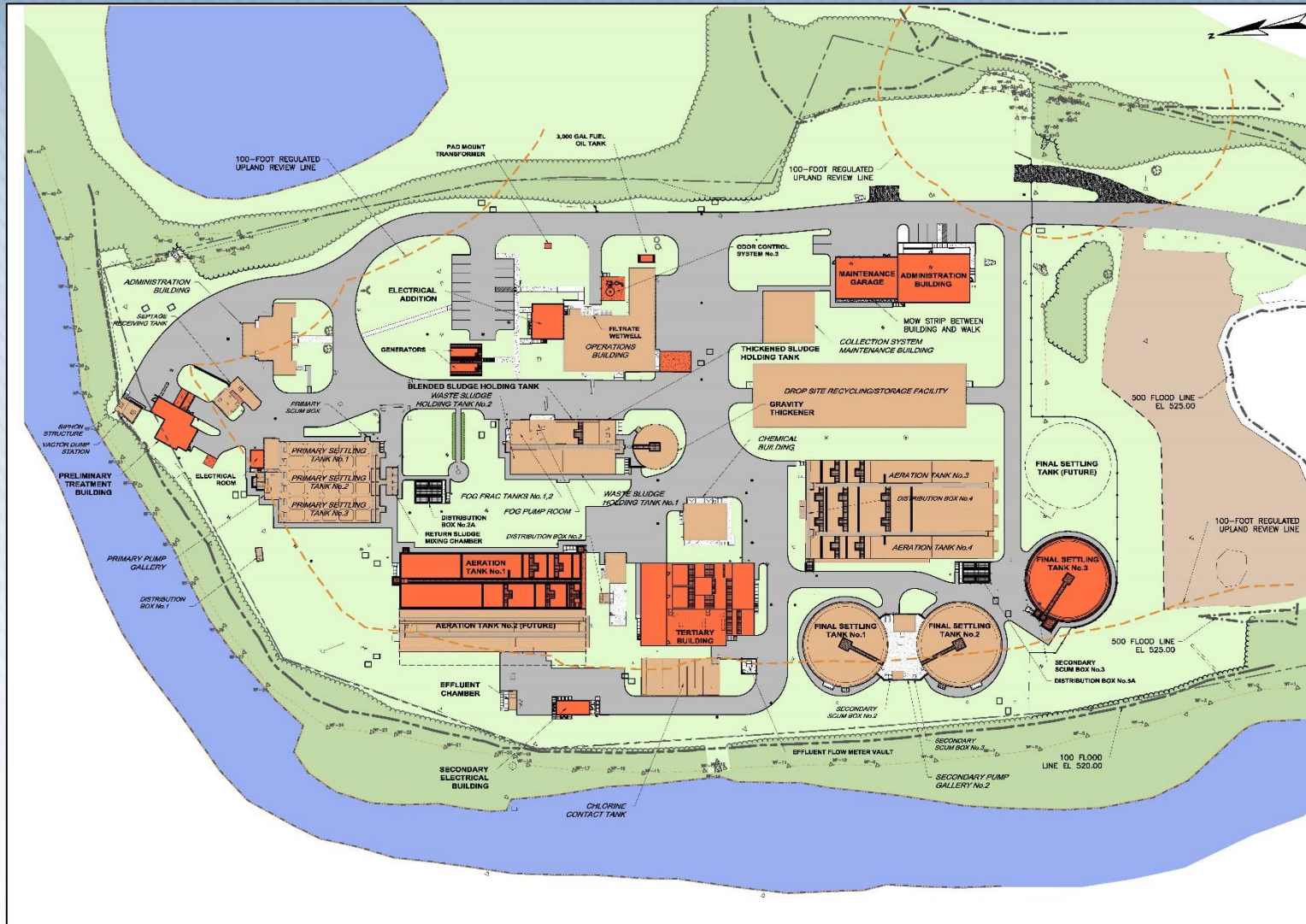




# Facilities Plan Recommendations



# Overall Site Modifications Plan





# Recommended Plan

- Upgrade Preliminary Treatment Process
- Provide new Septage Receiving Facility
- Upgrade Primary Treatment Process
- Re-purpose existing tanks for Nitrogen Removal
- Construct Phosphorus Removal Process
- Implement Sludge Dewatering
- New Secondary Clarifier
- Project Cost = \$72.26M

# What has changed?

- Flood protection rules
  - Current structures protected to/ below 100-yr flood elevation
  - New requirements (TR-16, CT DEEP)
  - Protect to 2-feet above /critical facilities to 3-feet above 100-yr flood Elev.
- Existing Tank Structural Design
  - Review of existing design details;
  - some tank reuse would not meet code and present operational difficulties meeting NPDES Permit
- Project timing
  - Original estimate based on 2014 costs
  - Current estimate escalated to mid 2019
- Adding UV disinfection to reduce chemicals
  - Initial higher capital cost; life cycle cost cheaper
- Other scope items added to project
  - Amount of hazardous material remediation
  - Hydraulic restrictions
  - Electrical Infrastructure / Construction Sequencing



# Project Cost Estimated Total

- Facility Plan Estimate \$51,300,000
  - Based on 2012 facilities plan
- Preliminary design estimate \$74,631,000
  - Completed January 2016
- Post 30% Value Engineering \$69,981,000
  - Completed March 2016
- Post 60% Value Engineering \$69,214,000
  - Completed October 2016
- Final Design \$72,260,000
  - Completed April 2017

Note:

Some costs (i.e. OH&P, Contingencies, etc) are based on percentage of totals

| Estimated Construction Costs                       |       | Facilities Plan Estimate |       | Post 30% VE Estimate |       | Post 60% VE Estimate |       | 90% Cost Estimate |
|----------------------------------------------------|-------|--------------------------|-------|----------------------|-------|----------------------|-------|-------------------|
| Civil/Site Work                                    |       | \$3,035,000              |       | \$3,396,000          |       | \$4,162,000          |       | \$5,119,000       |
| Septage Receiving                                  |       | \$465,000                |       | \$343,000            |       | \$135,000            |       | \$109,000         |
| Pretreatment Building                              |       | \$1,106,000              |       | \$1,122,500          |       | \$1,046,000          |       | \$1,170,000       |
| Operations Building/Sludge Dewatering              |       | \$1,915,650              |       | \$2,586,500          |       | \$2,729,000          |       | \$3,036,000       |
| Administration Building / Lab Expansion            |       | \$275,000                |       | \$252,400            |       | \$0                  |       | \$0               |
| Primary Treatment Area                             |       | \$1,507,100              |       | \$1,182,700          |       | \$1,221,000          |       | \$1,290,000       |
| Secondary Clarifier/Pump Building                  |       | \$1,530,200              |       | \$2,896,600          |       | \$2,561,000          |       | \$2,665,000       |
| Aeration Tanks 1 & 2                               |       | \$1,880,900              |       | \$2,732,000          |       | \$2,888,000          |       | \$2,790,000       |
| Aeration Tanks 3 & 4                               |       | \$1,302,300              |       | \$1,387,000          |       | \$1,922,000          |       | \$1,763,000       |
| Plant Water Building                               |       | \$145,100                |       | \$365,000            |       | \$0                  |       | \$0               |
| Tertiary Building / Effluent Disinfection          |       | \$5,374,650              |       | \$9,420,400          |       | \$9,086,000          |       | \$9,098,000       |
| Chemical Building                                  |       | \$145,100                |       | \$202,800            |       | \$212,000            |       | \$250,000         |
| Post-Aeration Tank                                 |       | \$0                      |       | \$818,000            |       | \$130,000            |       | \$134,000         |
| Generator Building                                 |       | \$0                      |       | \$297,000            |       | \$790,000            |       | \$500,000         |
| Sludge Storage Tanks & FOG                         |       | \$639,000                |       | \$1,142,000          |       | \$373,000            |       | \$497,000         |
| Miscellaneous Structures                           |       | (incl. above)            |       | \$1,126,000          |       | \$1,379,000          |       | \$1,384,000       |
| Maintenance Garage / Administration & Lab Building |       | \$1,750,000              |       | \$856,000            |       | \$793,000            |       | \$1,490,000       |
| Specials & Unit Bid Prices                         |       | \$505,000                |       | \$400,000            |       | \$2,127,500          |       | \$2,020,500       |
| HVAC/Plumbing                                      |       | \$1,780,000              |       | \$1,135,500          |       | \$1,203,500          |       | \$1,120,100       |
| Instrumentation                                    |       | \$750,000                |       | \$1,195,200          |       | \$1,100,000          |       | \$1,380,000       |
| Electrical                                         |       | \$2,725,000              |       | \$4,175,000          |       | \$4,756,097          |       | \$5,869,000       |
| SUBTOTAL, CONSTRUCTION                             |       | \$21,071,000             |       | \$37,031,600         |       | \$38,614,097         |       | \$41,684,600      |
| GENERAL CONTRACTOR OH&P / GENERAL CONDITIONS       | 20.0% | \$4,214,000              | 18.0% | \$6,666,000          | 18.0% | \$7,259,450          | 18.0% | \$7,836,705       |
| SUBTOTAL, SUBCONTRACTORS                           |       | \$5,760,000              |       | \$6,505,700          |       | \$7,849,597          |       | \$8,869,100       |
| GENERAL CONTRACTOR MARKUP                          | 7.5%  | \$432,000                | 5.0%  | \$325,000            | 5.0%  | \$392,480            | 5.0%  | \$443,455         |
| ELECTRICAL/ TELEPHONE ALLOWANCE                    |       | \$10,000                 |       | \$20,000             |       | \$50,000             |       | \$40,000          |
| BONDS & INSURANCES                                 | 2.0%  | \$630,000                | 3.0%  | \$1,516,000          | 3.0%  | \$1,283,530          | 3.0%  | \$1,385,600       |
| UNIT PRICE ITEMS                                   | 2.0%  | \$421,000                | 1.0%  | \$505,000            | 1.0%  | \$1,403,500          | 1.0%  | \$1,328,500       |
|                                                    |       |                          |       |                      |       |                      |       |                   |
| SUBTOTAL, CONSTRUCTION COSTS                       |       | \$32,538,000             |       | \$45,538,600         |       | \$47,549,600         |       | \$51,350,400      |
| PROJECT MULTIPLIER, DESIGN CONTINGENCY             | 1.20  | \$6,507,600              | 1.15  | \$6,830,790          | 1.12  | \$5,705,952          | 1.10  | \$5,135,040       |
| PROJECT MULTIPLIER, INFLATION TO MIDPT CONST.      | 1.08  | \$3,123,648              | 1.13  | \$6,546,174          | 1.08  | \$4,100,678          | 1.06  | \$3,445,612       |
|                                                    |       |                          |       |                      |       |                      |       |                   |
| ENGINEERS ESTIMATE OF CONSTRUCTION COST            |       | \$42,200,000             |       | \$58,382,000         |       | \$57,347,000         |       | \$59,926,000      |
| CONSTRUCTION CONTINGENCY                           | 5.0%  | \$ 2,110,000             | 5.0%  | \$ 2,920,000         | 5.0%  | \$ 2,870,000         | 5.0%  | \$ 3,000,000      |
| TECHNICAL SERVICES                                 | 15.0% | \$ 6,480,000             | 12.9% | \$ 7,519,217         | 13.0% | \$ 7,849,777         | 12.6% | \$ 8,136,380      |
| LEGAL / ADMINSTRATIVE / FINANCING                  |       | \$ 420,000               |       | \$ 1,160,000         |       | \$ 1,147,000         |       | \$ 1,198,000      |
| ENGINEERS ESTIAMTE OF PROJECT COSTS                |       | \$ 51,300,000            |       | \$ 69,981,000        |       | \$ 69,214,000        |       | \$ 72,260,000     |



# Significant changes

- Primary Clarifiers
  - Flood Protection Walls
- Secondary clarifiers
  - Flood protection of all three clarifiers
- Aeration Tanks 1 & 2
  - Original plan to reuse
  - Limited by current codes
  - Need to increase wall height for flood protection
  - Construct one new larger aeration tank in footprint of existing tanks

# Significant changes

- Tertiary Building/Disinfection
  - Structural/flood protection issues with CCT 2
  - Switched to UV disinfection
  - Added UV as part of Tertiary Structure
- New flow splitting structures for hydraulics
- More structural repairs to process tanks
- Hazardous Material Remediation
  - PCB's, Lead, Asbestos
- Electrical Infrastructure
  - Flood proofing
  - Construction sequencing

# Value Engineering

- Eliminated fourth primary clarifier
- Combined Maintenance and Administration
- Eliminated some chemical feed systems
  - Not needed until flows increase
- Eliminated fourth aeration tank
  - May need to purchase nitrogen credits at design flow.
- Post VE Project Cost = \$72.26M



# Project Cost Estimated Total

| <b><u>Project Component</u></b>       | <b><u>Cost</u></b>          |
|---------------------------------------|-----------------------------|
| Construction                          | \$59,926,000                |
| Construction Contingency (5%)         | \$3,000,000                 |
| Technical Services                    | \$8,136,000                 |
| Legal / Administrative / Financing    | \$1,198,000                 |
| <br><b>Engineers Estimate Of Cost</b> | <br><b>\$72,260,000</b>     |
| <b>Approximate 22% Grant</b>          | <b><u>-\$15,897,000</u></b> |
| <b>Loan at 2%</b>                     | <b>\$56,363,000</b>         |
| <b>Annual Loan Payment</b>            | <b>\$3,421,600/yr</b>       |

# Anticipated Project Schedule

- |                         |                |
|-------------------------|----------------|
| • Preliminary Design    | December 2015  |
| • 30% Value Engineering | January 2016   |
| • 60% Design            | September 2016 |
| • Pre-Selection Bids    | September 2016 |
| • 60% Value Engineering | December 2016  |
| • Final Design          | September 2017 |
| • Public Bid            | November 2017  |
| • Award Contract        | February 2018  |
| • Construction Begins   | April/May 2018 |
| • Project Completion    | Spring 2021    |

# Taxpayer and Sewer User Impact

- Project Cost \$72,260,000
- Estimated Impact (Loan) \$56,363,000
  - Torr Taxpayers = \$1,655,300/yr
  - Torr Sewer Users = \$1,655,300/yr
  - IMA's(2) = \$111,000/yr



# Questions / Discussions

