Borough of Chambersburg
Wastewater Treatment Plant
Expansion and Upgrade Project

Presented by:
G. Bryan Salzmann, Esq.
Manny Parada, PE
Jake Rainwater, PE
Beverley Stinson, PhD
Don Lavine

February 27, 2012
Background: Where We Were, WWTP Upgrade Project

- Initial WWTP Upgrade Project Cost Estimate of over $39 Million

- Did not include replacing deficient Headworks, Influent Pump Station or Forcemain (Estimated $10 Million)

- Did not include upgrading UV System (required), over $1 Million Cost

- Total required WWTP Upgrade Costs over $50 Million
Update: Where We Are Now, WWTP Upgrade Project

• Estimated Total Project Costs of approximately $35 Million, including replacing deficient Headworks, Influent Pump Station, Influent Forcemain and UV System

• Higher efficiency, less energy intensive biosolids treatment process design
Background: Where We Were, Collection and Conveyance

• Initially projected Collection and Conveyance System Improvement Costs: $27,507,600.

• Frustrated relations and interactions with PA DEP
Update: Where We Are, Collection and Conveyance

• Updated Collection and Conveyance System Improvement Costs Estimated at $2,000,000.

• Cooperative and progressing interactions with PA DEP
# From There to Here: Summary of Costs

<table>
<thead>
<tr>
<th>Items</th>
<th>Previous</th>
<th>Today</th>
<th>Change in Cost</th>
<th>Cost Reduction Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>WWTP Expansion</td>
<td>$39,144,800</td>
<td>$34,466,560</td>
<td>$18,226,928</td>
<td>46.6%</td>
</tr>
<tr>
<td>CPI Adjustment (2% a year for 3 years)</td>
<td>$2,348,688</td>
<td>$18,226,928</td>
<td></td>
<td></td>
</tr>
<tr>
<td>New Headworks</td>
<td>$10,000,000</td>
<td>$34,466,560</td>
<td>$25,466,560</td>
<td>254.6%</td>
</tr>
<tr>
<td>UV System Upgrade</td>
<td>$1,200,000</td>
<td>$2,000,000</td>
<td>$800,000</td>
<td>66.6%</td>
</tr>
<tr>
<td>Nutrient Credits *</td>
<td>$2,724,000</td>
<td>$2,124,000</td>
<td></td>
<td>78.0%</td>
</tr>
<tr>
<td>Interceptors</td>
<td>$27,507,600</td>
<td>$25,507,600</td>
<td></td>
<td>73.7%</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>$82,925,088</td>
<td>$37,066,560</td>
<td>$45,858,528</td>
<td>55.3%</td>
</tr>
</tbody>
</table>

Note: All above based upon estimated costs
* at $9 per Nitrogen credit and $5 per Phosphorus credit for 3 years
## From There to Here: Cost Per Partner

<table>
<thead>
<tr>
<th>Municipality</th>
<th>Post Construction Flow</th>
<th>IMA Percent of Project</th>
<th>Previous</th>
<th>Today</th>
<th>Total Estimated Cost Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chambersburg</td>
<td>3.42</td>
<td>15.40%</td>
<td>$12,770,464</td>
<td>$5,708,250</td>
<td>$7,062,213</td>
</tr>
<tr>
<td>Hamilton</td>
<td>2.03</td>
<td>28.35%</td>
<td>$23,509,262</td>
<td>$10,508,370</td>
<td>$13,000,893</td>
</tr>
<tr>
<td>Greene</td>
<td>3.71</td>
<td>41.74%</td>
<td>$34,612,932</td>
<td>$15,471,582</td>
<td>$19,141,350</td>
</tr>
<tr>
<td>Guilford</td>
<td>2.12</td>
<td>14.51%</td>
<td>$12,032,430</td>
<td>$5,378,358</td>
<td>$6,654,072</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>11.28</strong></td>
<td><strong>100.00%</strong></td>
<td><strong>$82,925,088</strong></td>
<td><strong>$37,066,560</strong></td>
<td><strong>$45,858,528</strong></td>
</tr>
</tbody>
</table>

Note: Cost figures based upon estimates
Background: Where We Were, Municipal Partner Relations

• Lack of Communication

• Lack of Cooperation

• Disjointed and inconsistent correspondence with PA DEP
Update: Where We Are, Municipal Partner Relations

• Monthly meetings to provide updates and discuss progress

• Cooperative and productive interactions

• Consistent and beneficial correspondence with PA DEP
How Did We Get Here?

- Cooperation and hard work from Borough Manager, Staff, Borough Solicitor, Borough Engineers, Municipal Partners, and Municipal Partner’s Professional Consultants
Introductions

• G. Bryan Salzmann, Esq., Salzmann and Hughes – Borough Solicitor

• Manny Parada, P.E., AECOM – Branch Manager, Quality Assurance Role, Constructability Expert

• Jake Rainwater, P.E., AECOM – Project Manager

• Beverley Stinson, PhD, AECOM – Treatment Process Expert

• Don Lavine, ARRO – Client Satisfaction Manager
Project Goals

• Meet Future Growth Needs of Contributing Municipalities:

Act 537 Plan Flow Projections
Project Goals

• Meet **Chesapeake Bay Tributary Strategy Nutrient Removal Requirements**
  – Compliance required for compliance year starting October 1, 2012 through September 30, 2013
    • 16,560 lb/yr for Total Phosphorus (TP)
    • 124,199 lb/yr for Total Nitrogen (TN)

  – At current WWTP design flow (6.8 mgd), equivalent to 0.8 mg/l for TP and 6 mg/l for TN

  – At 20 year projected flow (11.28 mgd), equivalent to 0.48 mg/l for TP and 3.62 mg/l for TN
Projected Nitrogen Discharge Without Upgrade

Projected Exceedance of Allowable Nitrogen Discharge

- Projected TN Discharge without Improved Treatment

Pounds Per Year of TN

Year
Project Design Objectives

• Provide adequate treatment capacity to facilitate the planned future growth of the Borough and its partnering Townships

• Provide treatment processes that can meet the stringent nutrient reduction requirements of DEP

• Complete a design that is:
  – Cost Effective
  – Energy Efficient
  – Environmentally Sensitive
Key Project Components

- New “Headworks” and Influent Pump Station to replace the existing deficient facilities
- Improved Biological Treatment Process to provide nutrient (nitrogen and phosphorus) removal
- Improved biosolids treatment process – more energy efficient and improved final product quality
Project 1: UV Upgrade Project
1. A) Install New UV System and Upgrade Existing UV
   B) Install New Forcemain

Project 2: Main Upgrade Project
2. New Headworks/Influent Pump Station
3. New Grit Removal
4. Existing VLR Train 2 Converted to Pre-Anoxic Reactor
5. Post Aeration Tanks
6. Deoxygenation Tanks
7. Submersed Recycle Pump Station
8. Existing VLR Train 1 Converted to Post-Anoxic Reactor
9. 0.1 MG Re-aeration Tank
10. New Secondary Clarifiers
11. New Electrical Building
12. Converted to Gas Phase Digester
13. New Acid Phase Digester
14. New Maintenance Garage
Project Status

• Sewer Steering Committee Meetings, typically every month
  – Chambersburg Borough, Greene Township, Guilford Township, Hamilton Township, Solicitor, Engineer
  – Cooperative and interactive
  – Keeps all parties engaged and informed
  – Demonstrates teamwork and common objectives to PA DEP

• Regular and Cooperative Correspondence with PA DEP
  – Treatment portion of Act 537 Plan is approved
  – Collection and Conveyance Portion of Act 537 Plan currently working through approval process
Project Status

Project is currently in Design Phase. Upcoming milestones include:

- March 2012: 60% Design Submitted for Borough Review
- May 2012: Submit Water Quality Management (WQM) Part II Application to PA DEP for Review
- August 2012: Receive PA DEP WQM Part II Approval
- September 2012: Documents 100% Complete, Project Advertised for Bidding
- November 2012: Open Bids
- December 2012: Contract Awarded
- Summer 2014: Construction Complete, Start-up Performed
Project Status

• A First Phase UV Disinfection Project is currently approaching the end of construction
  – UV Project meets an immediate upgrade need
  – Separate UV Project allows for utilization of a time sensitive grant that Salzmann Hughes secured for the Borough
# Overall Preliminary Opinion of Probable Cost

## Project 1: UV Upgrade/New Forcemain & Yard Piping Installation

- **Project 1 Preliminary Opinion of Probable Construction Cost Estimate:** $1,388,800
- **20% (Before Grant Reduction) for Engineering, Legal, Admin. and Financial Services:** $277,760
- **Associated H2O Grant Allocation:** ($1,000,000)
- **Preliminary Opinion of Probable Capital Cost for Project 1:** $666,560

## Project 2: Main Upgrade Project

<table>
<thead>
<tr>
<th>Description</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Headworks/Influent Pump Station</td>
<td>$8,500,000</td>
</tr>
<tr>
<td>Grit Removal</td>
<td>$500,000</td>
</tr>
<tr>
<td>Existing VLR Tank Modifications</td>
<td>$700,000</td>
</tr>
<tr>
<td>New Process Tanks, Equipment, and Associated Piping</td>
<td>$7,000,000</td>
</tr>
<tr>
<td>New Secondary Clarifiers and Flow Splitter Box Modifications</td>
<td>$3,000,000</td>
</tr>
<tr>
<td>New RAS Pump Station</td>
<td>$800,000</td>
</tr>
<tr>
<td>Solids System Improvements</td>
<td>$2,700,000</td>
</tr>
<tr>
<td>Chemical Feed Systems and Associated Safety Provisions</td>
<td>$500,000</td>
</tr>
<tr>
<td>Electrical</td>
<td>$4,500,000</td>
</tr>
<tr>
<td>SCADA</td>
<td>$800,000</td>
</tr>
</tbody>
</table>

- **Main Upgrade Project Preliminary Opinion of Probable Construction Cost Estimate:** $29,000,000
- **20% for Engineering, Legal, Admin. and Financial Services:** $5,800,000
- **Associated H2O Grant Allocation:** ($1,000,000)
- **Preliminary Opinion of Probable Capital Cost for Project 2:** $33,800,000

## Total Preliminary Opinion of Probable Capital Costs for Projects 1 & 2

- **Total Preliminary Opinion of Probable Capital Costs for Projects 1 & 2:** $34,466,560
## Estimated Cost Per Municipality

**Estimated Preliminary Opinion of Total Project Cost:**

$34,466,560

<table>
<thead>
<tr>
<th>Existing Flow Allocation (mgd)</th>
<th>Flow Increase (MGD)</th>
<th>% of New Flow</th>
<th>Cost Share Portion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chambersburg</td>
<td>2.73</td>
<td>0.69</td>
<td>15.40%</td>
</tr>
<tr>
<td>Hamilton Township</td>
<td>0.76</td>
<td>1.27</td>
<td>28.35%</td>
</tr>
<tr>
<td>Greene Township</td>
<td>1.84</td>
<td>1.87</td>
<td>41.74%</td>
</tr>
<tr>
<td>Guilford Township</td>
<td>1.47</td>
<td>0.65</td>
<td>14.51%</td>
</tr>
<tr>
<td><strong>Totals:</strong></td>
<td><strong>6.8</strong></td>
<td><strong>4.48</strong></td>
<td><strong>100.00%</strong></td>
</tr>
</tbody>
</table>
THANK YOU FOR THE OPPORTUNITY TO PARTNER WITH THE BOROUGH!

Borough Staff:
Jeffrey Stonehill, Borough Manager
Lance Anderson PE, Superintendent
Ron Kelly, Plant Manager