Borough of Chambersburg
Wastewater Treatment Plant Expansion and Upgrade Project

Presented by:
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Manny Parada, PE
Jake Rainwater, PE
Beverley Stinson, PhD
Don Lavine
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>$34,666,660</td>
<td>$2,126,928</td>
<td>46.6%</td>
</tr>
<tr>
<td>New Headworks</td>
<td>$10,000,000</td>
<td>$34,666,560</td>
<td>$2,126,928</td>
<td>46.6%</td>
</tr>
<tr>
<td>UV System Upgrade</td>
<td>$1,200,000</td>
<td>$34,666,560</td>
<td>$2,126,928</td>
<td>46.6%</td>
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<tr>
<td>Nutrient Credits</td>
<td>* $2,724,000</td>
<td>$600,000</td>
<td>$2,124,000</td>
<td>78.0%</td>
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<tr>
<td>Interceptors</td>
<td>$27,507,600</td>
<td>$2,000,000</td>
<td>$25,507,600</td>
<td>92.7%</td>
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<tr>
<td>TOTAL</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
<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 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:
- Current Permitted Flow: 6.8 Million Gallons Per Day (MGD)
- 537 Plan Flow Projections: 11.28 MGD Total Flow

<table>
<thead>
<tr>
<th>Municipality</th>
<th>Act 537 Plan Build-out Projection (MGD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chambersburg Borough</td>
<td>3.42</td>
</tr>
<tr>
<td>Hamilton Township</td>
<td>2.03</td>
</tr>
<tr>
<td>Greene Township</td>
<td>3.71</td>
</tr>
<tr>
<td>Guilford Township</td>
<td>2.12</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>11.28</strong></td>
</tr>
</tbody>
</table>
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

- **TN Discharge Limit Beginning Oct. 1, 2012**
- **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 Force Main

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

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

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: $34,466,560
Estimated Preliminary Opinion of Total Project Cost: $34,466,560

<table>
<thead>
<tr>
<th>Municipality</th>
<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>
<td>$5,308,466</td>
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<tr>
<td>Hamilton Township</td>
<td>0.76</td>
<td>1.27</td>
<td>28.35%</td>
<td>$9,770,654</td>
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<td>Greene Township</td>
<td>1.84</td>
<td>1.87</td>
<td>41.74%</td>
<td>$14,386,711</td>
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<td>Guilford Township</td>
<td>1.47</td>
<td>0.65</td>
<td>14.51%</td>
<td>$5,000,729</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>
<td><strong>$34,466,560</strong></td>
</tr>
</tbody>
</table>
THANK YOU FOR THE OPPORTUNITY TO PARTNER WITH THE BOROUGH!

QUESTIONS?