6th Annual Kent County Economic Summit
Water & Wastewater Capacity and Availability
Hans Medlarz, P.E., Director of Public Works

September 23, 2014
<table>
<thead>
<tr>
<th>MUNICIPAL WATER SYSTEM</th>
<th>MAXIMUM ALLOCATION PER DAY</th>
<th>MAXIMUM ALLOCATION PER MONTH</th>
<th>ANNUAL ALLOCATION</th>
<th>MAXIMUM DAILY PRODUCTION</th>
<th>AVERAGE (ANNUALIZED) DAILY DEMAND</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAMDEN WYOMING SEWER &amp; WATER AUTHORITY</td>
<td>1.1 MGD</td>
<td>23.3 MGD</td>
<td>290 MGD</td>
<td>1.5 MGD</td>
<td>0.41 MGD</td>
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<tr>
<td>DOVER, CITY OF</td>
<td>15.72 MGD</td>
<td>438.2 MGD</td>
<td>3858 MGD</td>
<td>12.5 MGD</td>
<td>4.11 MGD</td>
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<tr>
<td>HARRINGTON, CITY OF</td>
<td>0.85 MGD</td>
<td>21.0 MGD</td>
<td>252.0 MGD</td>
<td>0.7 MGD</td>
<td>0.42 MGD</td>
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<tr>
<td>MILFORD, CITY OF</td>
<td>2.37 MGD</td>
<td>64.0 MGD</td>
<td>768 MGD</td>
<td>3.0 MGD</td>
<td>2.44 MGD</td>
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<tr>
<td>SMYRNA, TOWN OF</td>
<td>1.8 MGD</td>
<td>42 MGD</td>
<td>485 MGD</td>
<td>2.1 MGD</td>
<td>1.0 MGD</td>
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</tbody>
</table>
Kent County Sanitary Sewer System
Northern Area

• PS1 to PS 2 – Smyrna to Cheswold
  – 26,050 LF of 24” Ductile Iron Force Main
  – 12,500 LF of 30” Ductile Iron Force Main
  – 38,975 LF of original 16” Force Main used during emergency repairs

• PS2 – Denneys Road - Wetwell Upgrade
Kent County Sanitary Sewer System
Dover Area

• **PS2 to PS3 – Cheswold to Dover**
  – 23,700 LF of 24” Concrete Force Main

• **North Dover Transmission System Enhancements**

• **PS3 to PS4 – Dover to Rising Sun**
  – 27,800 LF of 30” Concrete Force Main
  – 2,150 LF of 36” Ductile Iron Force Main

• **COD7 to PS4 – Central Bypass**
  – 2,200 LF of 16” Force Main (original Dover Downs transmission)
  – 4,650 LF of 20” Force Main (original DAFB transmission)
  – 44,400 LF of 24” Ductile Iron Force Main
Kent County Sanitary Sewer System
Central Area

• **PS4 to KCRWTF – Original Main Transmission**
  – 43,850 LF of 36” Concrete Force Main
  – 2,150 LF of 48” Concrete Force Main
  – North Frederica Bypass – 2,250 LF of 30” Ductile Iron Force Main
  – DelDOT Route 1 – Main Transmission Relocations
    • Little Heaven Bypass - 15,850 LF of Planned 36” Force Main
    • South Frederica Bypass – 4,275 LF of Planned 24”/36” Force Main

• **PS4 to KCRWTF – South Central Bypass (Double Run)**
  – 63,500 LF of 24” Ductile Iron Force Main
  – 3,400 LF of 30” Ductile Iron Force Main

• **Central Transmission System Enhancements**
  – 21,450 LF of 16” Force Main
Kent County Sanitary Sewer System
Southern Area

- **PS17 to KCRWTF – Harrington**
  - 36,350 LF of 14” PVC Force Main
  - 18,050 LF of 18” Ductile Iron Force Main

- **PS7 to KCRWTF – Original Main Transmission**
  - 30,500 LF of 24” Concrete Force Main

- **PS7 to Harrington Transmission – Southern Bypass**
  - 17,900 LF of 18” Ductile Iron Force Main
The Secretary’s Order No. 2014-WS-0018 was signed approving proposed amendments to Regulation 7408 effective October 11, 2014.

2.0 The Total Maximum Daily Loads Regulation for the Murderkill River Watershed, Delaware

Article 1. The total nitrogen waste load from the Kent County Facility shall be limited to 897 pounds per day to be expressed as an annual average.

Article 2. The total phosphorus waste load from the Kent County Facility shall be limited to 51 pounds per day to be expressed as an annual average.

Article 3. The CBOD5 (5-day Carbonaceous Biochemical Oxygen Demand) waste load from the Kent County Facility shall be limited to 544 pounds per day.
$22 million WTF Upgrade and Nutrient Removal Project includes Clarification & Filtration Improvements increasing Capacity to 20 MGD from the current 16.3 MGD capacity, while addressing the Total Maximum Daily Loads Regulation for the Murderkill River Watershed.

Implementation is proceeding via combination of initial, direct equipment procurement followed by single construction project.

Directly procured equipment to be provided to the successful bidder for installation.

Equipment pre-purchase will utilize SRF funds exclusively.

Construction project will utilize USDA funds exclusively.
2014 WTF Process and Energy Conditions

- Solar PV: 1560 MWh/yr
- Grid: 9541 MWh/yr
- Natural Gas: 29,000 MMBTU/yr

Flowchart showing:
- Headworks
- ANOX Aeration
- Aeration
- Clarifier
- UV Disinfect
- Belt Press
  - 15% to Solar Dryer
  - 85% to Thermal Dryer

Blowers: 6,752 MWh/yr
The Air Blower Optimization Project anticipates air supply expansion and blower replacement as well as a main plant electric back-up generation component with an expected plant wide energy reduction of approximately 15%.

High energy consumption in the aeration system is driven by mixing limitations in addition to older 1990s diffuser technology.

Aeration basin diffuser study by the University of California determined poor diffuser efficiency and suggested improvement.

Thermal biosolids drying based on 25 old technology w/o incorporating combined heat and power (CHP) is very energy intensive and a target for improvement.
Anticipated Energy Consumption Reduction Steps

• Aeration Basin Improvements

• Primary Clarifier Additions

• Anaerobic Digestion with CHP

• Biological Nutrient Removal Upgrades