The County of Prince Edward

Sandy River Reservoir
Water Treatment and Distribution System
February 10, 2011
AGENDA

I. Background  
   • Sandy River Reservoir  
   • Drought of 2002  
   • Projected Demands  
   • Needs  

II. PPEA Proposal and Interim Agreement  

III. Project Scope  

IV. Final Estimate  

V. Schedule  

VI. Moving Forward
Location and Description

- 740 Total Acres
- 1,040 Acre Flood Pool
- 3.2 Billion Gallons of Water Stored
- 36 Feet Maximum Water Depth
History of the Sandy River Reservoir

• 1967 Bush River Watershed Project initiated by County citizens
  – Flood protection
  – Protection of agricultural land
  – Future water supply for Prince Edward and the Town of Farmville
  – Outdoor recreational opportunities for the region
  – Economic development

• 1970-71 County approval & citizens approve Bond Referendum
History of the Sandy River Reservoir
Continued

• 1971-1984
  – 1978 Approval from Congress
  – 1982 Federal funds became available
  – 1983 County citizens approve second bond referendum
History of the Sandy River Reservoir Continued

- 1984 Permit received from the Army Corp of Engineers
- 1988 Dam construction completed
- 1991 Authorization to fill reservoir (ISTEA)
History of the Sandy River Reservoir
Continued

• 1992-1995 Clearing of Reservoir basin and filling
• 1994 – 2003
  – Reservoir filled 1995
  – Boat ramp constructed
  – Recreational access road completed
  – Prime recreation facility
  – Sandy River Reservoir Board Committee
Drought of 2002

• 2002 Drought
  – Appomattox River flow at record low
  – Town of Farmville operating in emergency mode
    – Holiday Lake
    – Wilck’s Lake
    – Buffalo Watershed
• State-Wide Drought
Record of Flow in Appomattox River

2010 Average Daily CWS Demand 2.027 cfs or 1.31 MGD *

2030 Average Daily CWS Demand 3.33 cfs or 2.15 MGD *

* Projected Average Daily Demands for Town of Farmville, adjacent developed areas in Prince Edward County and Hampden-Sydney College
Population Change 2000 – 2010
(Prince Edward: +18.5%)

2010 Census

Between 2000 and 2010, the state's population grew by 13.03%. The map shows the rate of population growth for each city and county.

- 30% or Greater Growth
- 15 to 30% Growth
- 5 to 15% Growth
- 0 to 5% Growth
- Loss in Population
Projected Average Daily Demands
Prince Edward and Farmville Only
(2010 – 2050)
Projected Average Daily Demands
Prince Edward, Farmville, Crewe and Burkeville
(2010 – 2050)

<table>
<thead>
<tr>
<th>Year</th>
<th>Low-Range Projection</th>
<th>Mid-Range Projection</th>
<th>High-Range Projection</th>
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<tbody>
<tr>
<td>2010</td>
<td>1.74</td>
<td>2.17</td>
<td>2.39</td>
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<tr>
<td>2020</td>
<td>2.04</td>
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<td>2030</td>
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<td>2040</td>
<td>2.63</td>
<td>2.77</td>
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<td>2050</td>
<td>3.00</td>
<td>3.16</td>
<td>4.49</td>
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MGD

Graphs showing low, mid, and high range projections for specific years.
Other Potential Demands

• Longwood University expansion
• Expanded service area
• Commercial development
• Large water user
• DOC / DBHDS growth
• Growth in Nottoway County
Utilizing Sandy River as a Water Supply

• Discussions with Town of Farmville
• Options evaluated
  – Raw water to Town
  – Emergency water to Town-Joint project
  – County facility at Reservoir
• Safe yield analysis
  – 6.0 mgd at 5’ drawdown (average day)
  – 8.0 mgd at 10’ drawdown (average day)
• Withdrawal permit from VDEQ
  – Sept 7, 2006 – 6.3 mgd max day
  – Good for 15 years
  – Renewal 2021
Utilizing Sandy River as a Water Supply
Continued

• Joint project with Town of Farmville – indefinitely postponed
• Town of Farmville evaluating other options
• County decides to move forward
• November 2007, studies authorized
  – Treatability Study
  – Intake Structure Study
PPEA Proposal and SRR Interim Agreement

Crowder Construction Company / Draper Aden Associates Team

• To help Prince Edward County move forward with its long term goal.
  – To provide a long-term water supply that provides for growth, economic development, protection from impacts of future droughts and protects the environment.
PPEA Proposal and SRR Interim Agreement

• October 17, 2008 – Unsolicited proposal submitted
• November 2008 - Board of Supervisors advertised for competing proposals
• January 2009 - Crowder proposal accepted by BOS
• June 2009 – Public presentation to BOS
• September 2009 – BOS authorized the negotiation of Interim Agreement
• December 2009 – BOS approved Interim Agreement
• January 19, 2010 – Team received authorization to proceed
• Additional presentations / Board Workshops
  • June 8, 2010
  • June 29, 2010
  • October 26, 2010
  • November 16, 2010
Potential Partners / Customers

• Burkeville, Crewe, and Nottoway
• Hampden-Sydney College
• Emergency connections to Town of Farmville

Potential Partner Impacts

• Funding
• Capital and operation cost
• Water quality
• Long-term water supply needs
Water Distribution System
Western Alignment

Legend
- Proposed Booster Station
- Proposed Ground Tank
- Proposed WTP
- Existing Vault
- Existing Elevated Water Tank
- Proposed Water Line
- Town of Farmville Boundary
- Town of Farmville Service Area

RECOMMENDED DISTRIBUTION SYSTEM ALIGNMENT - WESTERN PORTION
SANDY RIVER RESERVOIR TO HAMPDEN-SYDNEY COLLEGE

FIGURE 6.3
Raw Water Intake

- Intake Structure Located in the Reservoir
- Intake Pumps Located on the Shore Line
- Intake Control Building Located Near Dam Access Road
- Intake Infrastructure Capacity – 8mgd
Project Overview

• 2.0 mgd facility
• Easily upgraded to 4.0 mgd
• 8 mgd intake – maximum withdrawal
Project Overview

- Conventional filtration
- Powdered activated carbon
- Proven technology
Cost Reductions

- 30% Design Documents – Actual Costs
- Competitive Pricing
- Constructability Reviews & Value Engineering Sessions
- Pilot Study – Verification of Treatment Process
  - Significantly Reduced Size of Raw Water Contactor
- Received VDH Comments – Reduced Risk
- Geotechnical Investigations – Reduced Risk
- Identified Multiple Routes for Waterlines
- Reduction of Finished Water Storage
## Competitive Pricing

<table>
<thead>
<tr>
<th>Site Work</th>
<th>Fencing</th>
<th>Rebar</th>
<th>Paint</th>
<th>Plumbing/HVAC</th>
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<tbody>
<tr>
<td>Asphalt</td>
<td>Landscaping</td>
<td>Concrete</td>
<td>Architectural Components</td>
<td>Instrumentation</td>
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<td>Stone</td>
<td>Pipe</td>
<td>Masonry</td>
<td>Process Equipment</td>
<td>Electrical Equipment</td>
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<td>Hauling</td>
<td>Valves</td>
<td>Metals</td>
<td>Metal Building</td>
<td>Generators</td>
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<tr>
<td>Underwater Work</td>
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</table>
Local Opportunities

• Local Labor
• Material Suppliers
• Equipment Rental
• Subcontractors –
  – Earthwork, Paving, Fencing
  – Architectural, Masonry, Doors, Windows, Painters
  – Pipelines, Plumbing, HVAC
  – And Others
## Estimate Summary

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<th></th>
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<tbody>
<tr>
<td>RW Intake and Pump Station</td>
<td>3,924,119</td>
<td>3,723,000</td>
<td>3,700,000</td>
<td>3,525,000</td>
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<tr>
<td>Water Treatment Plant</td>
<td>16,942,379</td>
<td>14,330,000</td>
<td>14,102,000</td>
<td>12,987,000</td>
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<tr>
<td>Water Distribution System</td>
<td>12,906,502</td>
<td>11,722,000</td>
<td>9,116,000</td>
<td>8,367,000</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>33,773,000</strong></td>
<td><strong>29,775,000</strong></td>
<td><strong>26,918,000</strong></td>
<td><strong>24,879,000</strong></td>
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</table>

**Estimated Project Indirect Costs - 841,900**
PPEA Process

**Scope / Price Development**

1. Team Selection
2. Design Concept Review
3. Solicit Sub & Vendor Quotes
4. Receive and Review Pricing
5. Approval to Obtain Pricing
6. Permitting
7. Board Decision
8. Finalize Comprehensive Agreement

**Implementation**

1. Final Design
2. Construction
3. Construction Substantial Completion
4. Startup and Performance Testing
5. Owner Training
6. Progress Meetings
7. O&M Manuals
8. Project Acceptance
9. Substantial Completion

Legend:
- Blue: Team Action
- Diamond: Public Body Action
- Arrow: Milestone Event/Checking Stop

Draper Aden Associates
Engineering • Surveying • Environmental Services
## Schedule – Moving Forward

<table>
<thead>
<tr>
<th>Activity</th>
<th>Dates</th>
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<tbody>
<tr>
<td>Presentation to the Board:</td>
<td>February 10, 2011</td>
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<td>Meetings with Funding Agencies:</td>
<td>February 11, 2011 – March 25, 2011</td>
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<tr>
<td>Workshops to Determine Final Scope:</td>
<td>February 11, 2011 – March 25, 2011</td>
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<td>Lump Sum Proposal:</td>
<td>March 31, 2011</td>
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<td>Decision by Board of Supervisors:</td>
<td>April 12, 2011</td>
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<td>Execute Contracts &amp; Issue NTP:</td>
<td>May 12, 2011</td>
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<tr>
<td>Begin Construction:</td>
<td>October 2011</td>
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Benefits – Moving Forward

- Take advantage of current construction market (pricing)
- Take advantage of low interest rates
- Benefit to local contractors, suppliers, and workforce
- Momentum of state agencies
- Investment to assure a safe, reliable, and long-term water supply
- Being prepared for the next drought
- Achieve Prince Edward County’s long term goals