

Developing a New Groundwater Supply

For Safe, Clean & Cost-Effective Drinking Water

2011-2015



New Drinking Water Treatment Building



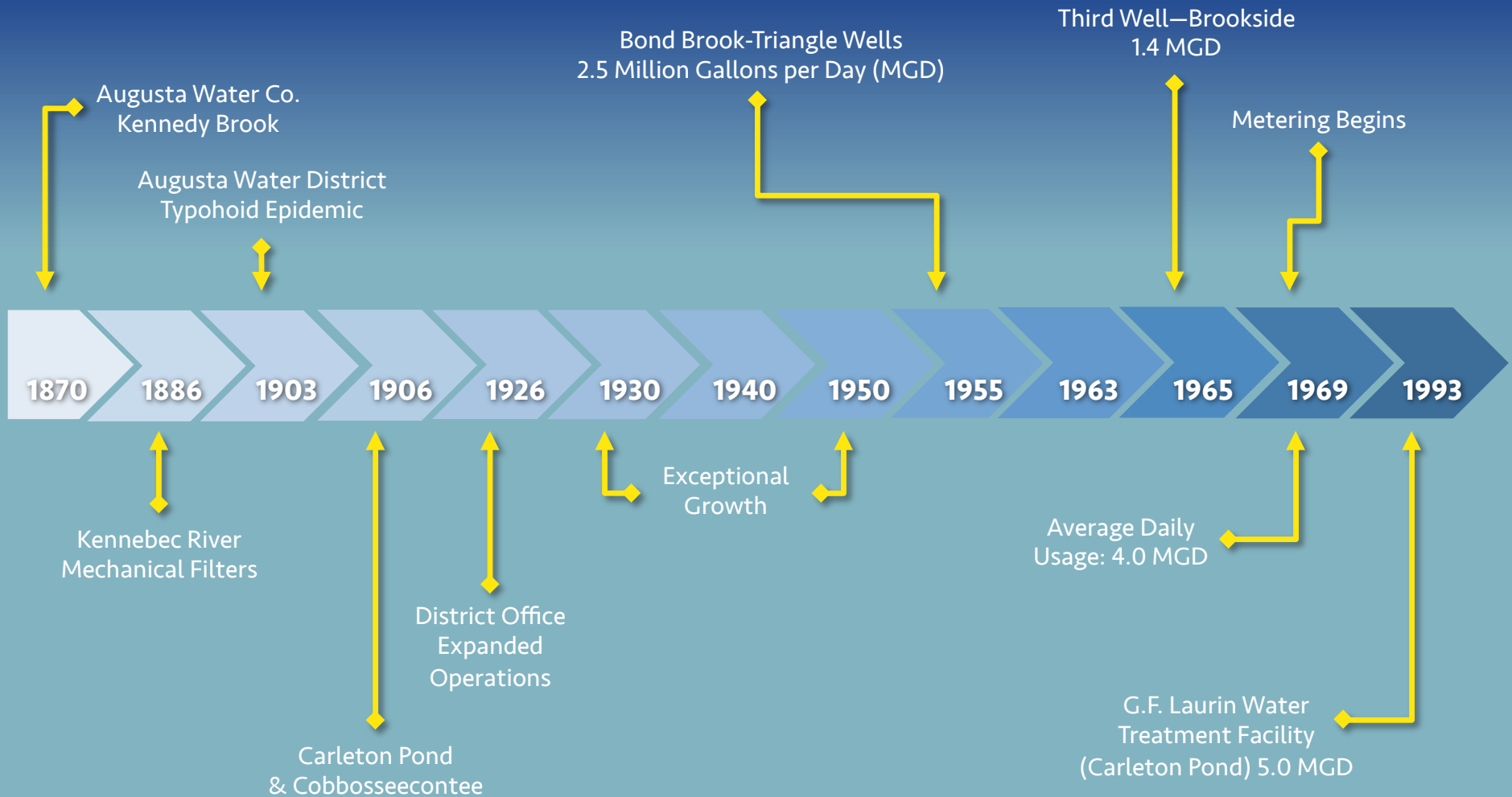
Greater Augusta
Utility District

Water | Wastewater | Stormwater

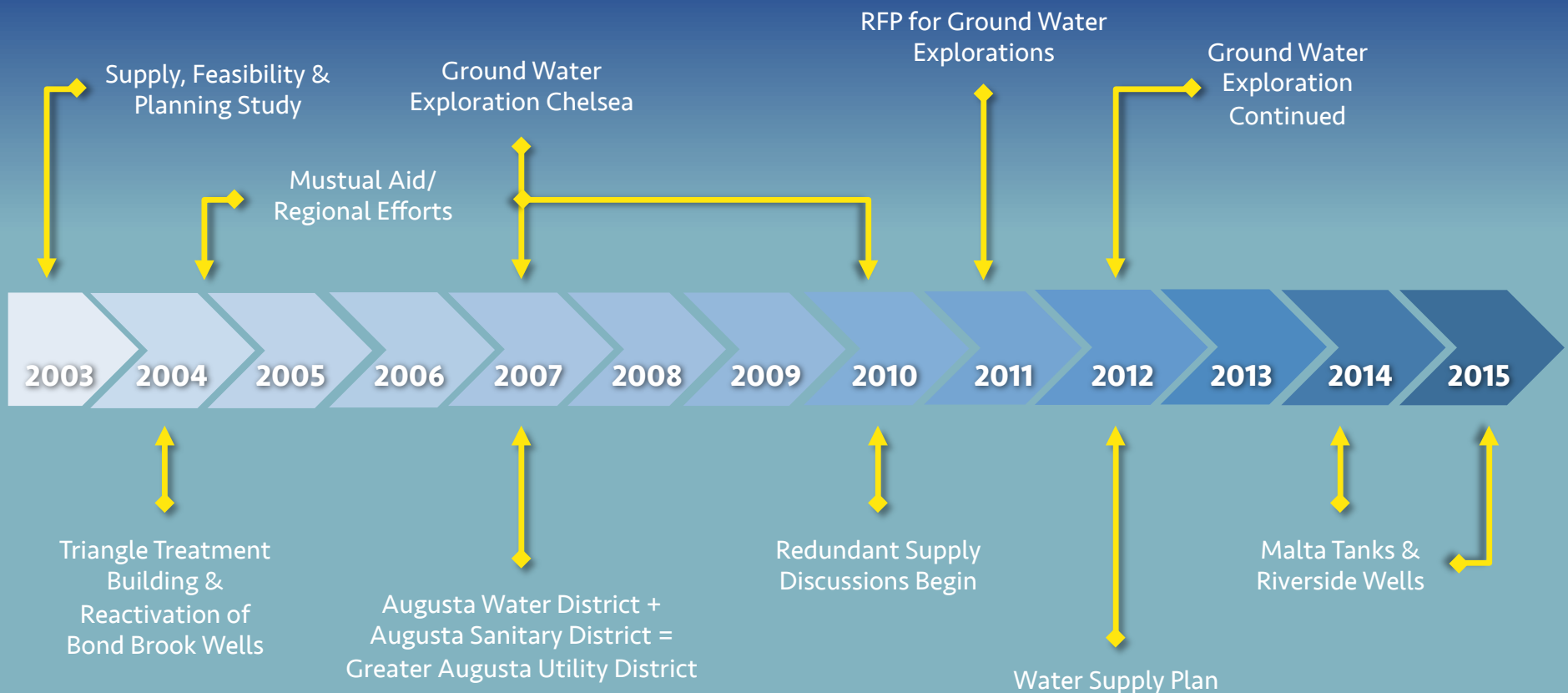
Outline

- History of the Greater Augusta Utility District
- Our Facilities
- Decommissioning of Water Treatment Facility
- New Riverside Well Development
- Successes and Challenges

Drinking Water Supply History



Drinking Water Supply History (Continued)



Drinking Water Statistics

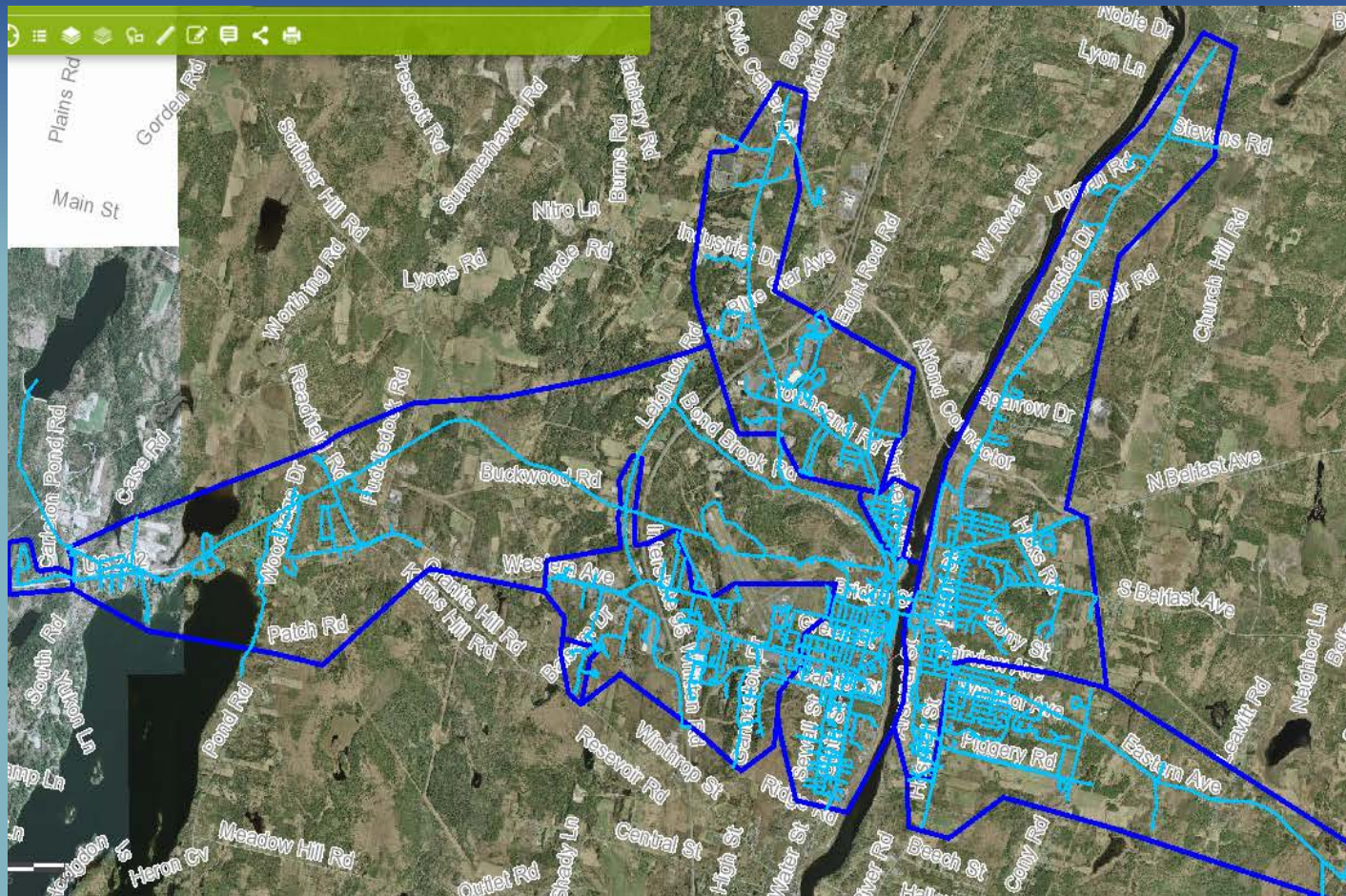
As of February, 2016



- Serves 13,000 Customers in Greater Augusta
Manchester, Chelsea Vassalboro,
East Winthrop & Hallowell
- 130 Miles of Water Piping
- 6,000 Connections
- 8 Storage Tanks (12 Previously)
- 4 Booster Pumping Stations
- 5 Wells
- 8 Pressure Zones



Augusta Service Area



G.F. Laurin Water Treatment Facility Supply Challenges (1993-2004)

- Declining Industrial Demand for Water
- Water Conservation
- Very High Operating Costs
- In 2004, GAUD reactivated Bond Brook Wells and put Water Treatment Facility in Standby Mode

Bond Brook Wells Overview (2004)



- Three Gravel-Packed Wells with Total Capacity of 2.8 MGD:
 - Triangle Well (1.0 MGD)
 - South Well (0.8 MGD)
 - Brookside Well (1.0 MGD)
- Treatment—Chlorination, Phosphate, Fluoridation
- Water Quality—Good, High Hardness (<100 mg/L)
- Location—Near Downtown Augusta/I-95

Well Locations



Why Develop Additional Water Sources?

Several large accidents (2011, 2013 & 2015) on I-95 caused concern about possible contamination

Augusta drinking water supply well back on following crash cleanup

centralmaine.com/2015/01/08/augusta-drinking-water-supply-well-back-on-following-crash-cleanup/

Staff report

AUGUSTA — A Greater Augusta Utility District well shut down as a precaution earlier this week after fuel spilled from a Sunday tractor-trailer crash on Interstate 95 was turned back on Thursday after fuel spilled in the crash was cleaned up.

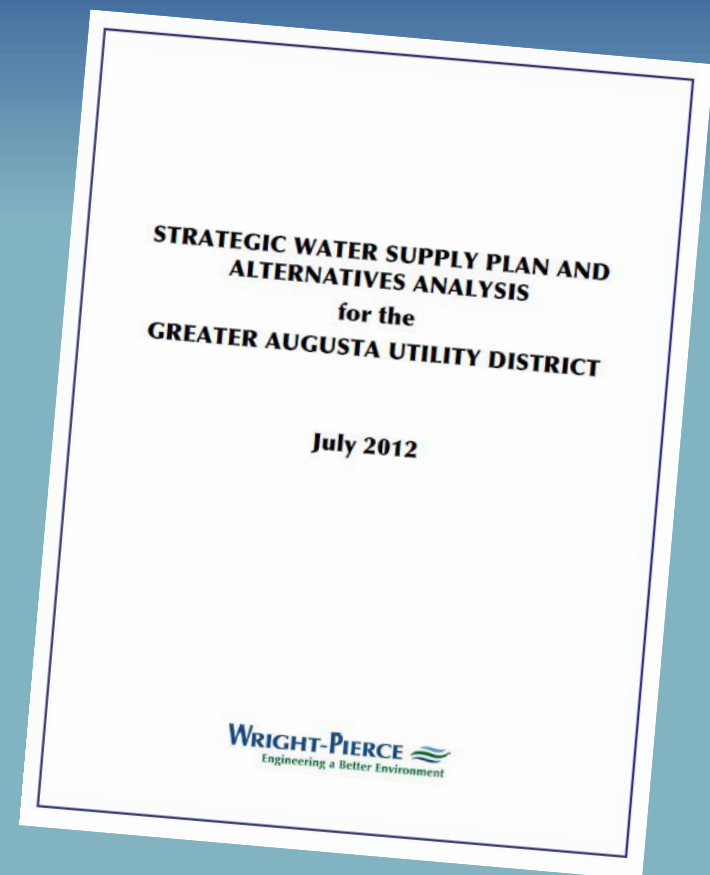
The crash was on the Bond Brook overpass above the well.

Additional Images



Action Plan for Additional Drinking Water Resources (2012)

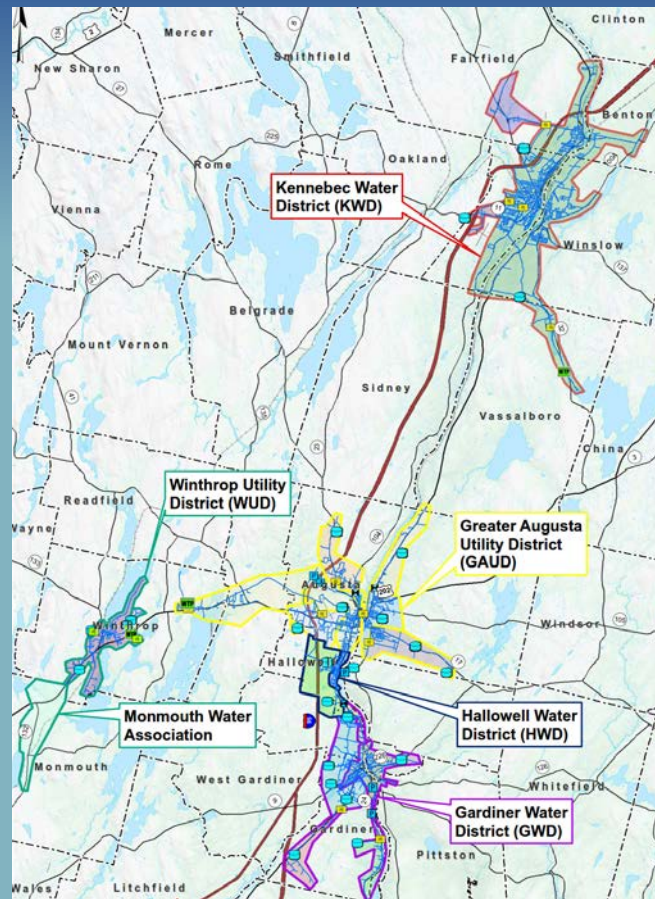
- Goal: Reduce vulnerability of Bond Brook well supply
- District commissions desktop study
- Alternative supply options identified



Options Considered

- Reactivate the Water Treatment Facility
- Interconnection with Neighboring Systems
 - Winthrop Utilities District
 - Hallowell Water District
 - Gardiner Water District
 - Kennebec Water District
- Create New Groundwater Supplies within District

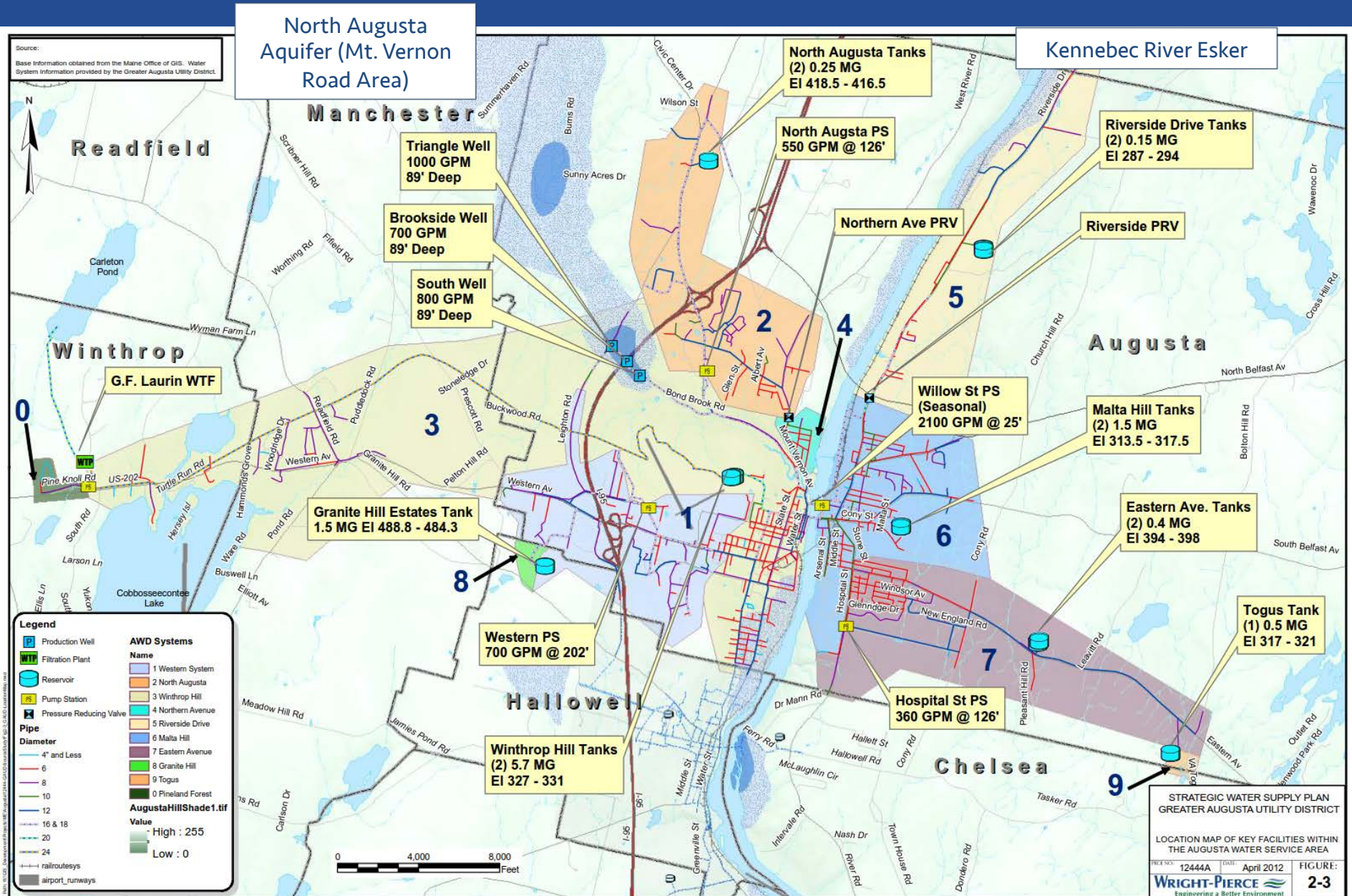
Locations of Various Options Considered



Options for New Groundwater Supply Development within District

- Objectives
 - Reduce vulnerability of Bond Brook
 - Supply on East Side of Kennebec
 - 2.0 MGD Capacity
- Possibilities:
 - Mount Vernon Road Area
 - Leighton Road Area
 - Kennebec Esker
 - Riverbank Filtration at Carleton Pond

Locations of Wells & Tanks in Augusta



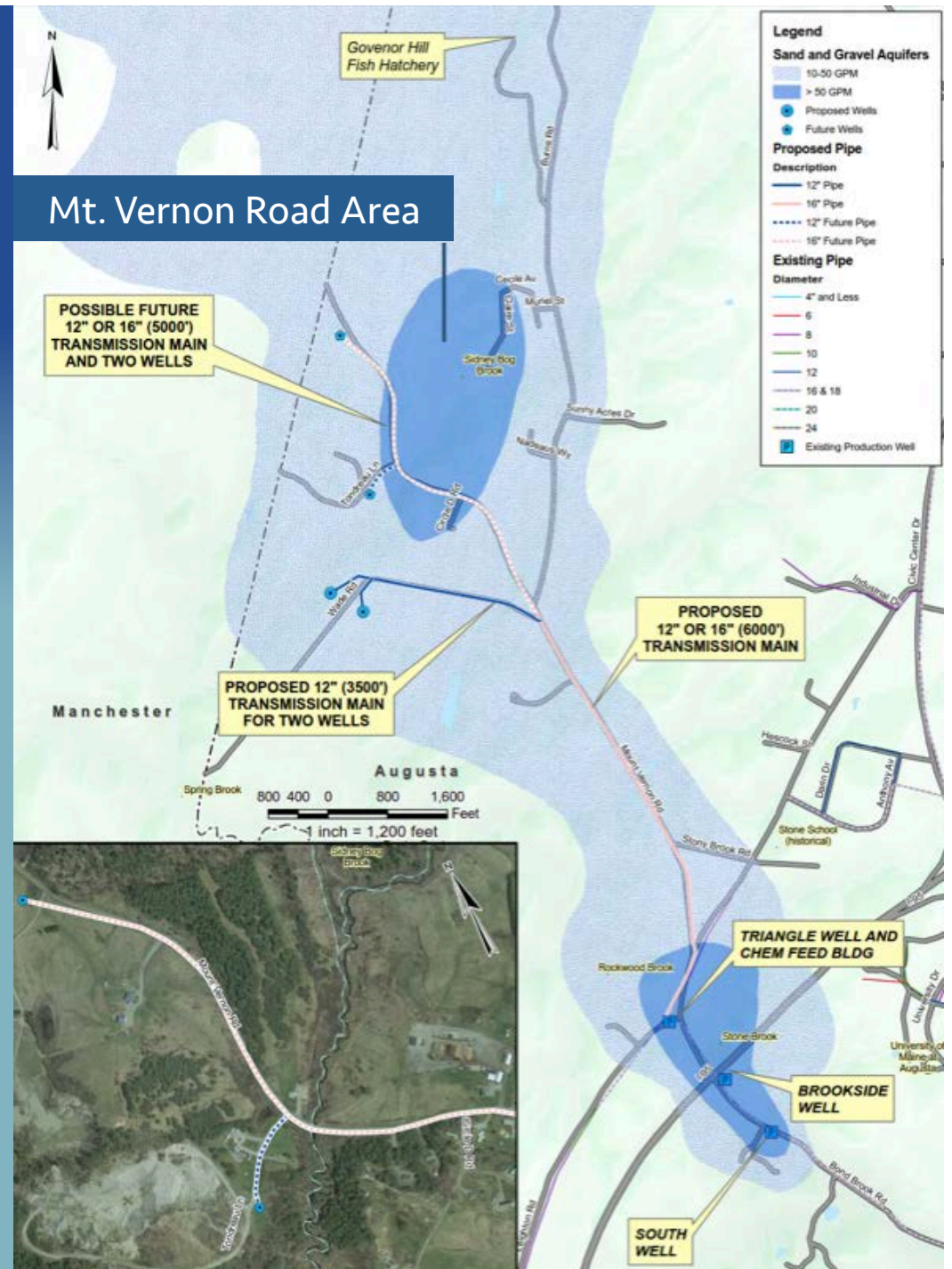
Option 1—Expand Development in Mount Vernon Road Area

• Projected Costs:

- Capital Cost: \$4.3 Million
- Operating Costs: \$432/Million Gallons

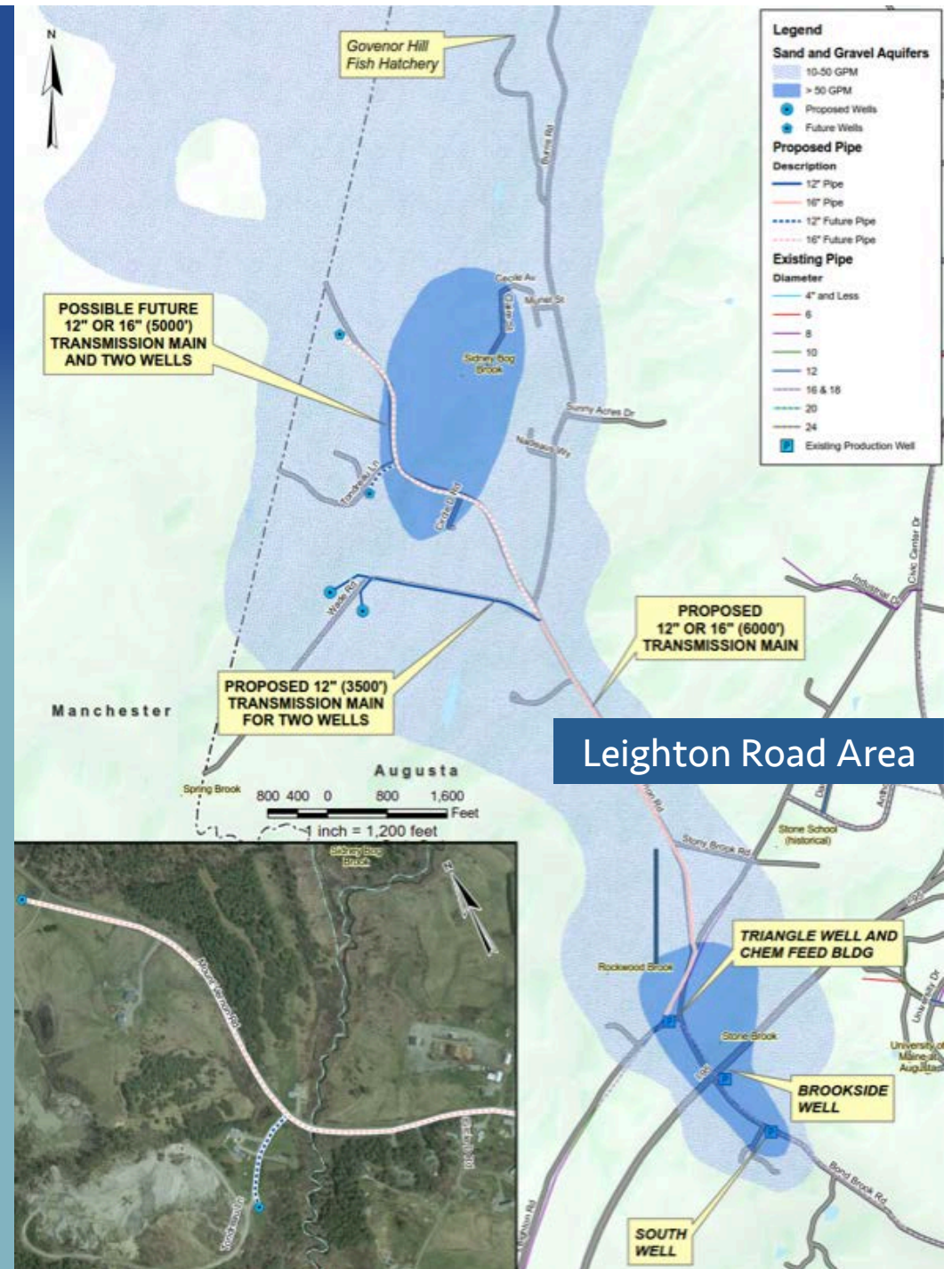
• Disadvantages:

- West Side of River
- Rural Area
- Limited Opportunity for New Customers
- Vulnerability to I-95 Remains
- Large Water Main Extension



Option 2—Expand Development in Leighton Road Area

- **Projected Cost:**
 - \$226/Million Gallons
- **Disadvantages:**
 - West Side of River
 - Rural Area
 - Limited Opportunity for New Customers
 - Vulnerability to I-95 Remains
 - Large Water Main Extension



Option 3—New Supply in Riverside Area of Augusta

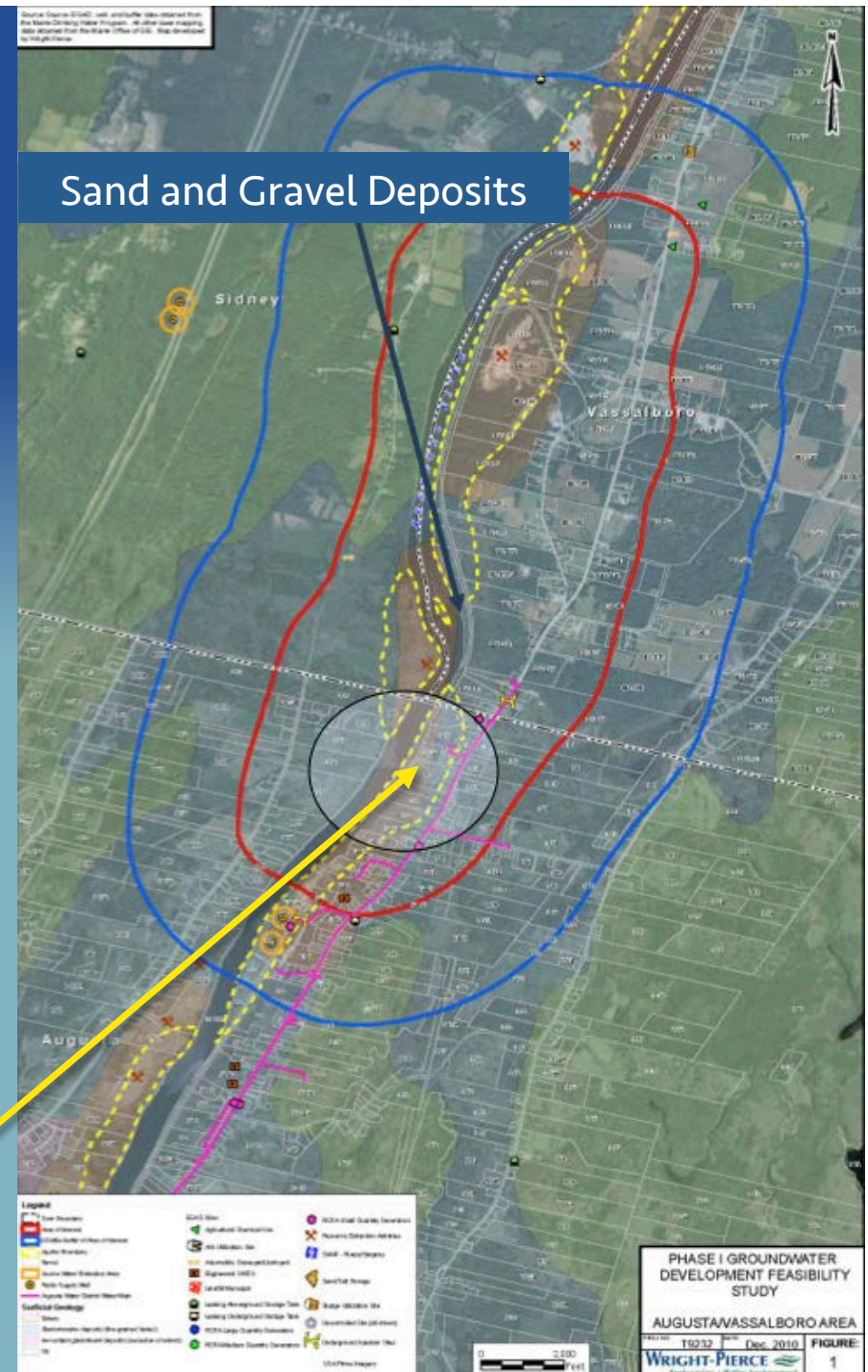
- **Projected Costs:**

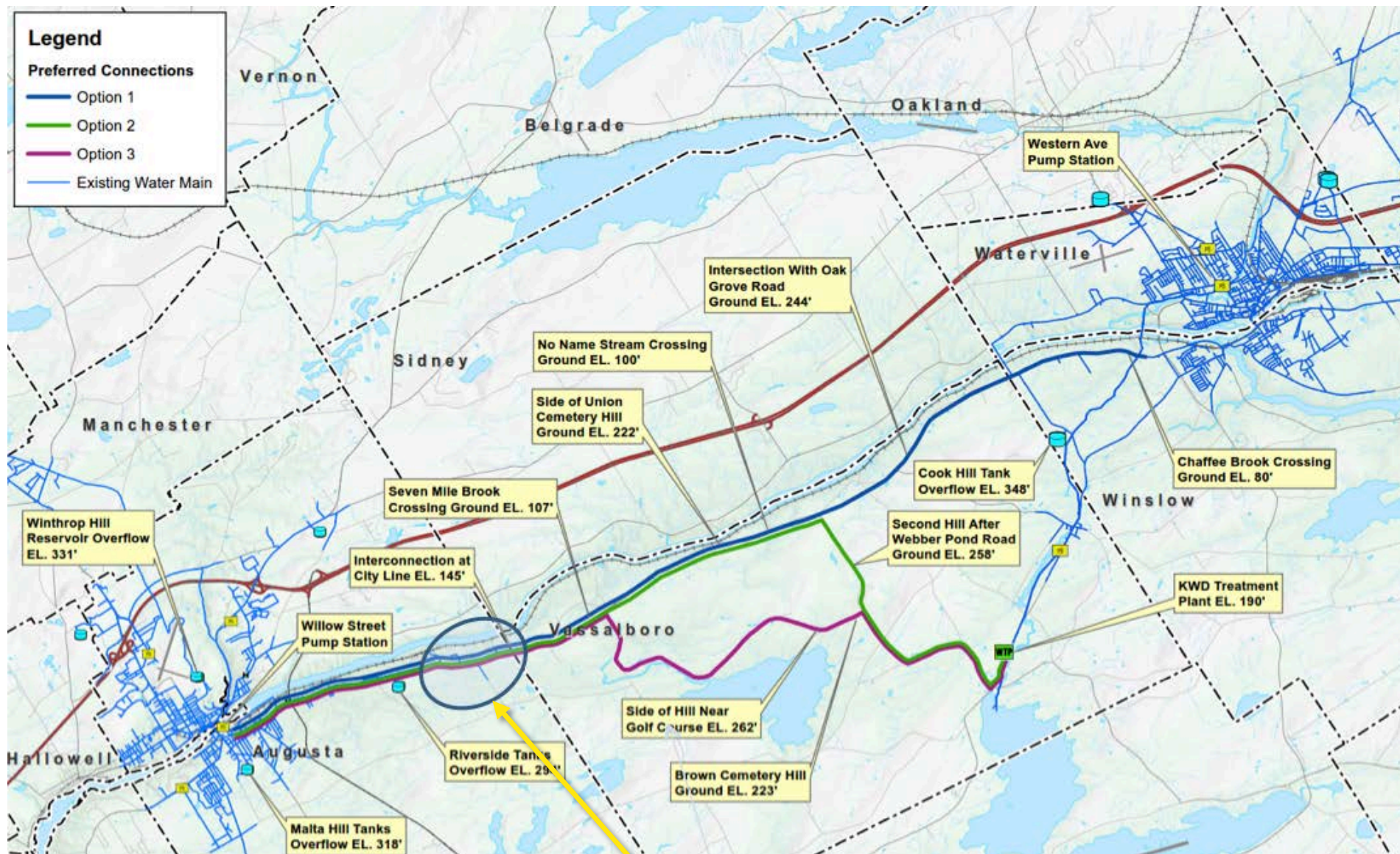
- Capital Cost: \$2.6M
- Operating Costs: \$191/Million Gallons

- **Advantages:**

- Supply on East Side of Kennebec River
- Extension of system towards Kennebec Water District
- Distribution System Simplification
 - Elimination of Riverside Zone
 - Elimination of 2 Riverside Tanks
 - Consolidation of Malta and Riverside Zones
 - Consolidated Zone—4 Tanks to 1 Tank

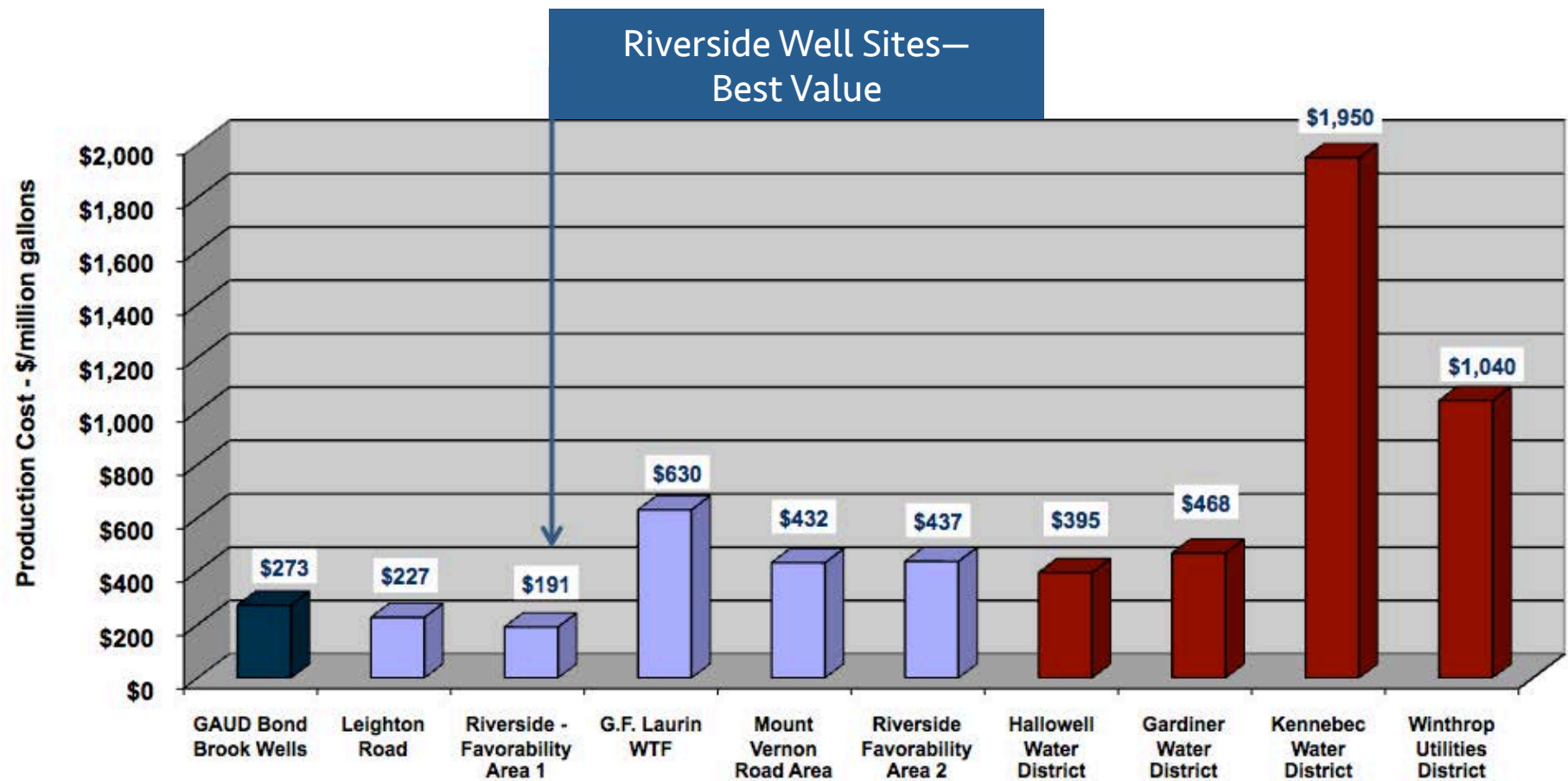
Priority Sites in Riverside Area of Augusta





Riverside Well (Kennebec Esker)

Supply Alternatives— Cost Comparison



Riverside Groundwater Exploration Process

- Desktop—Mapping of Threats
- Geophysical Surveys
- Test Well Exploration
- Initial Site Approval from DWP
- Prolonged Pumping Test
- Final Source Approval
- Well Construction
- Commissioning



New Riverside Wells Statistics

- Two Wells
 - MaineEx Well: 1.0 MGD
 - Bonenfant Well: 1.0 MGD
- Gravel-Packed Wells
 - 18" x 24" Wells
 - Hardness > 150 mg/L
 - 150-foot setback from river
 - Low Metals (Iron, Manganese, Arsenic)



Well Head

Riverside Wells Construction

- Pitless Adapters
- Local Power Disconnects
- Accessible for Pump Removal and Service



Bonenfant Well

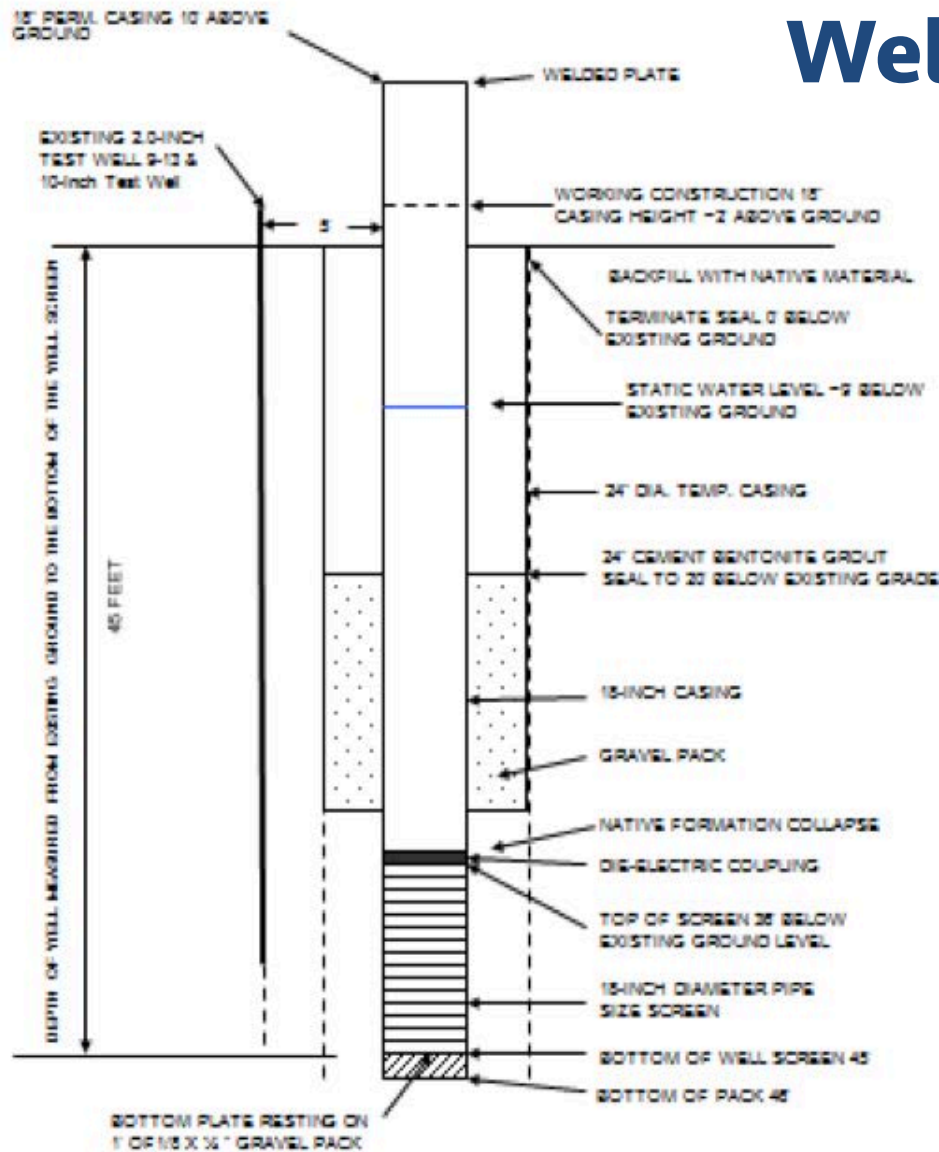


Bonenfant Well Head



MaineEx Well

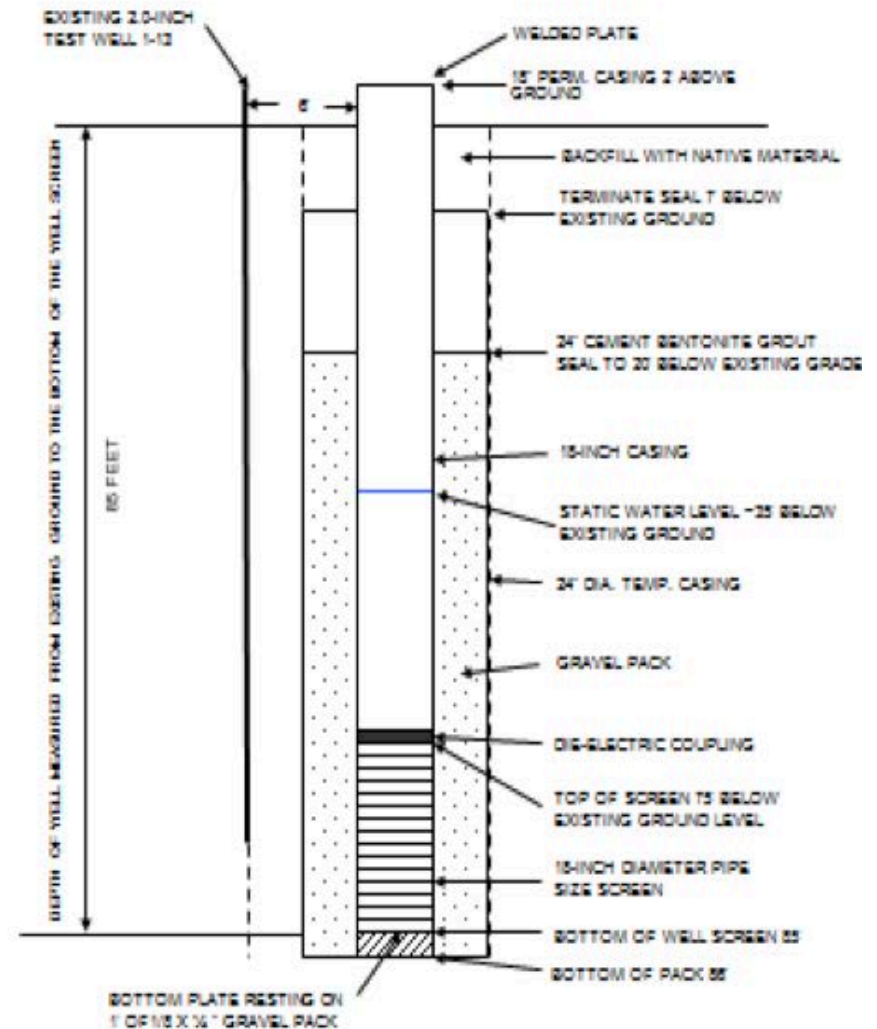
Well Core Composition



Note: See log of test well for formation description

PROPOSED WELL NO. 1
MAINEX SITE
GREATER AUGUSTA UTILITY DISTRICT
AUGUSTA, MAINE

Not To Scale



Note: See test well log for formation description. A fine sand layer may exist above the top of the proposed well screen.

PROPOSED WELL NO. 2
BONENFANT SITE
GREATER AUGUSTA UTILITY DISTRICT
AUGUSTA, MAINE

Not To Scale

Riverside Site Challenges

- Gravel Pit Reclamation
- Vernal Pool
- Steep Topography/
Slope Stability
- Access
- Security



Riverside Site

- Aerial image before reclamation activities



Gravel Pit Reclamation



MaineEx Well Location



Gravel Pit Reclamation



Reclamation Photos



Gravel Pit Looking Southerly after Reclamation

Kennebec River

MaineEx Well



Gravel Pit Looking Northerly after Reclamation

MaineEx Well

Bonenfant Well

Treatment Building



Bonenfant Well



Vernal Pool Restoration Plan

- Required Relocation of Access Road
- Requires Annual April Assessment



Salamander Egg Masses



Woodland Vernal Pool

Riverside Wells Treatment Building Construction



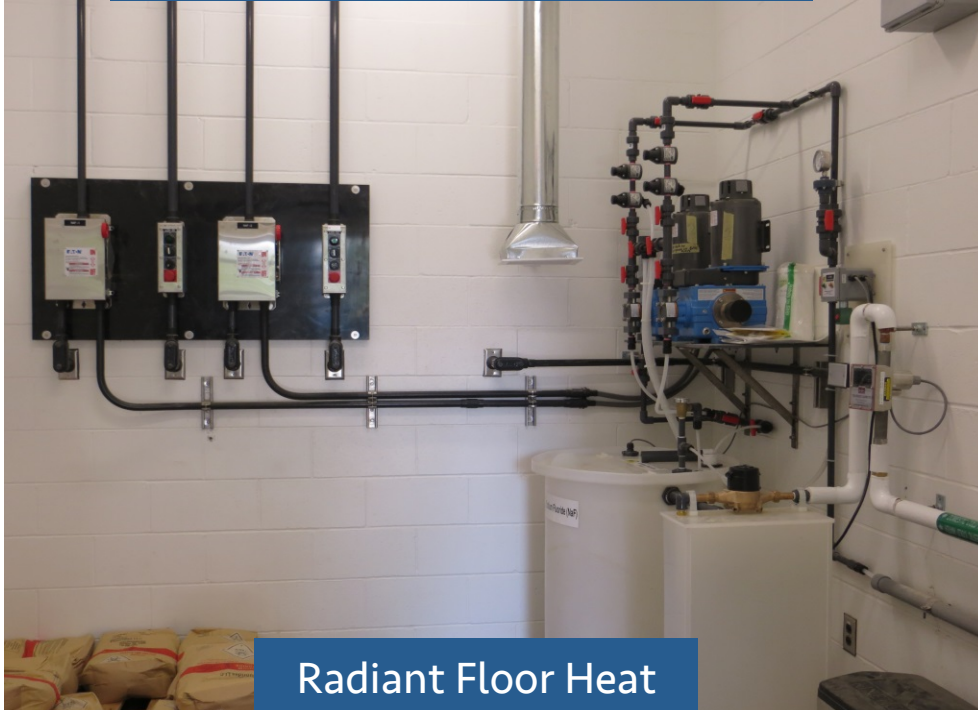
- Chemical Treatment
 - Disinfection with sodium hypochlorite
 - Sequestering agent (hardness control)
 - Fluoridation
 - Propane generator relocated from G.F. Laurin Water Treatment Facility
 - Brick masonry
 - Radiant floor heat
 - No windows and floors drains
 - Power isolation at wells (supplied underground)
- Groundwater rule-ready



Relocation of Propane Generator



Fluoride Feed System



Radiant Floor Heat



Sodium Hypochlorite Feed System

New Treatment Building



Project Costs

Construction Bids

- Pumping station and mains	\$1,794,000*
- Wells	100,000
- Controls/Integration	65,000

Change Orders	21,760
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Professional Services	296,000
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Total Design/Construction Cost	\$2,276,000
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*Not including land acquisition and gravel pit restoration

New Drinking Water Supply Project Partnership



- GAUD
 - Construction Administration
 - Resident Observation
 - Gravel Pit Restoration
 - Land Acquisition
 - Public Engagement
- Woodard and Curran—SCADA/Integration
- Wright-Pierce
 - Permitting, design and bidding
 - Support during construction

Stakeholders

- Maine DEP (Vernal Pool)
- Maine Drinking Water Program
- Augusta Planning Board
- Guilford Transportation (Railroad)
- Landowners
- GAUD
- City of Augusta

Acknowledgements

- Maine DEP
- Brian Tarbuck, P.E. General Manager, GAUD
- GAUD Board of Trustees
- Layne Construction
- CH Stevenson Construction
- Maine Drinking Water Program