

Town of Bethlehem

Department of Public Works



Future Water Supply Alternatives Presentation

September 22, 2010

DPW Mission



The Department of Public Works (DPW) is responsible for providing the following services to the Town of Bethlehem in a fiscally responsible manner that best meets the evolving needs of the residents:

- Purification and Distribution of Safe Drinking Water
- Collection and Treatment of Wastewater
- Engineering and Technical support
- Administrative Services
- Stormwater Management

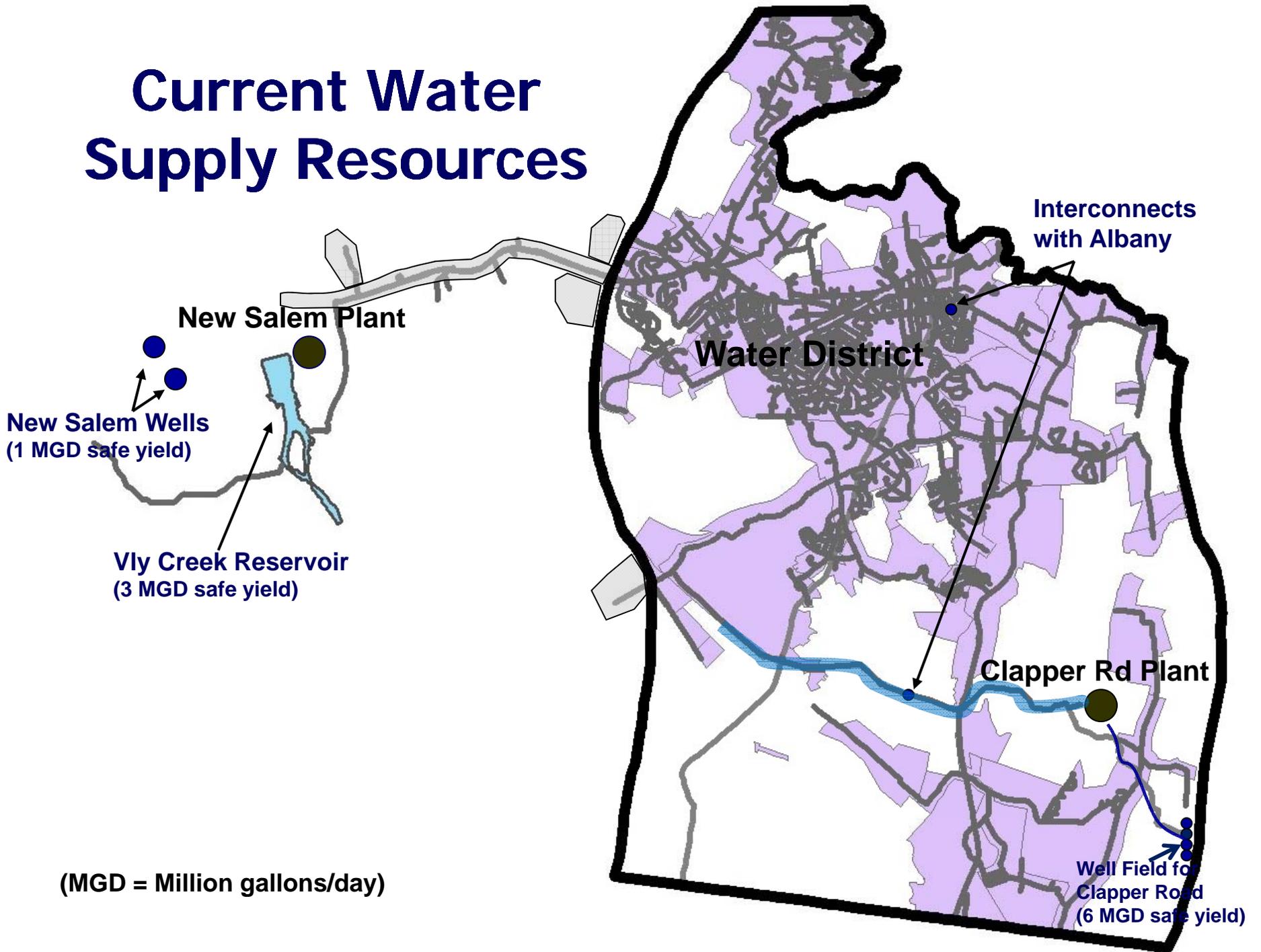
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Current Water Supply Resources



(MGD = Million gallons/day)

Water Treatment Plants



New Salem Water Treatment Plant

- Constructed 1958; expanded in 1972
- Max. Treatment Capacity is 6 MGD
- Avg. Treatment (2009) was 2.3 MGD
- Peak Treatment (2009) was 6 MGD
- Facility in need of major repairs
- Most equipment in need of replacement

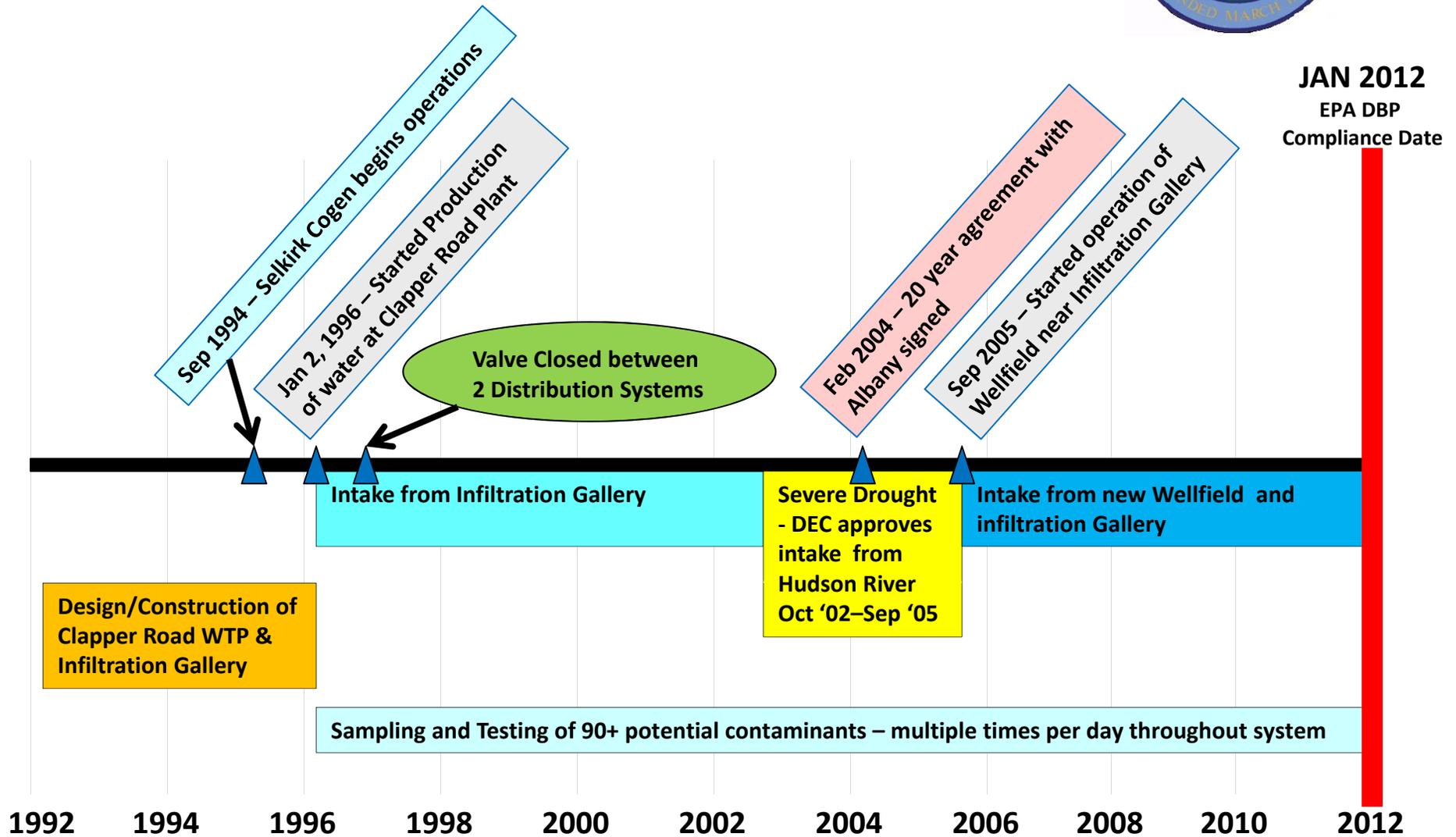


Clapper Road Water Treatment Plant

- Constructed 1994
- Max. Treatment Capacity is 6 MGD
- Avg. Treatment (2009) was 2.0 MGD
- Peak Treatment (2009) was 3 MGD



Clapper Road History



DEPARTMENT OF PUBLIC WORKS

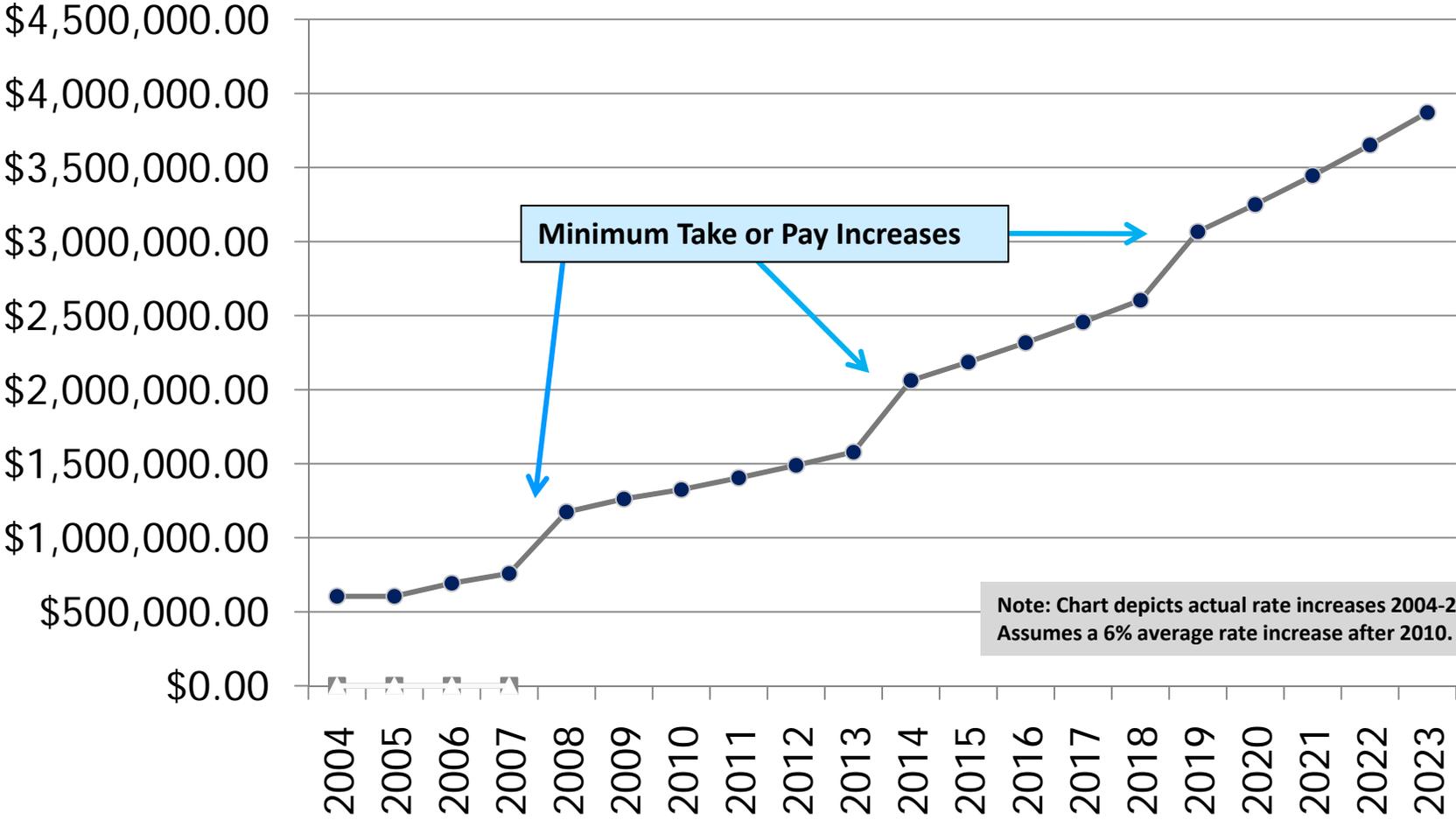
Current Albany Water Agreement



- **20 Year Contract for Finished Water (2004-2023)**
- **Minimum take or pay, increases every 5th year.**
 - Went from 250 MGY in 2007 to 365 MGY in 2008 (46% increase)
- **Rate increases based on Albany residential rate increases.**
 - Albany Rates have increased 50% since 2004
- **Increase to Water Budget last 6 years:**
 - 2004 - \$605,000
 - 2010 - \$1,320,000 **118%**
- **Cost per 1000 gallons is \$3.63**
 - Average Cost per 1000 gallons at New Salem Wells = \$0.72
 - Average Cost per 1000 gallons at two treatment plants = \$2.26

Albany Water Agreement

20-Year Finished Water Agreement (2004-2023)



New Salem Plant Challenges



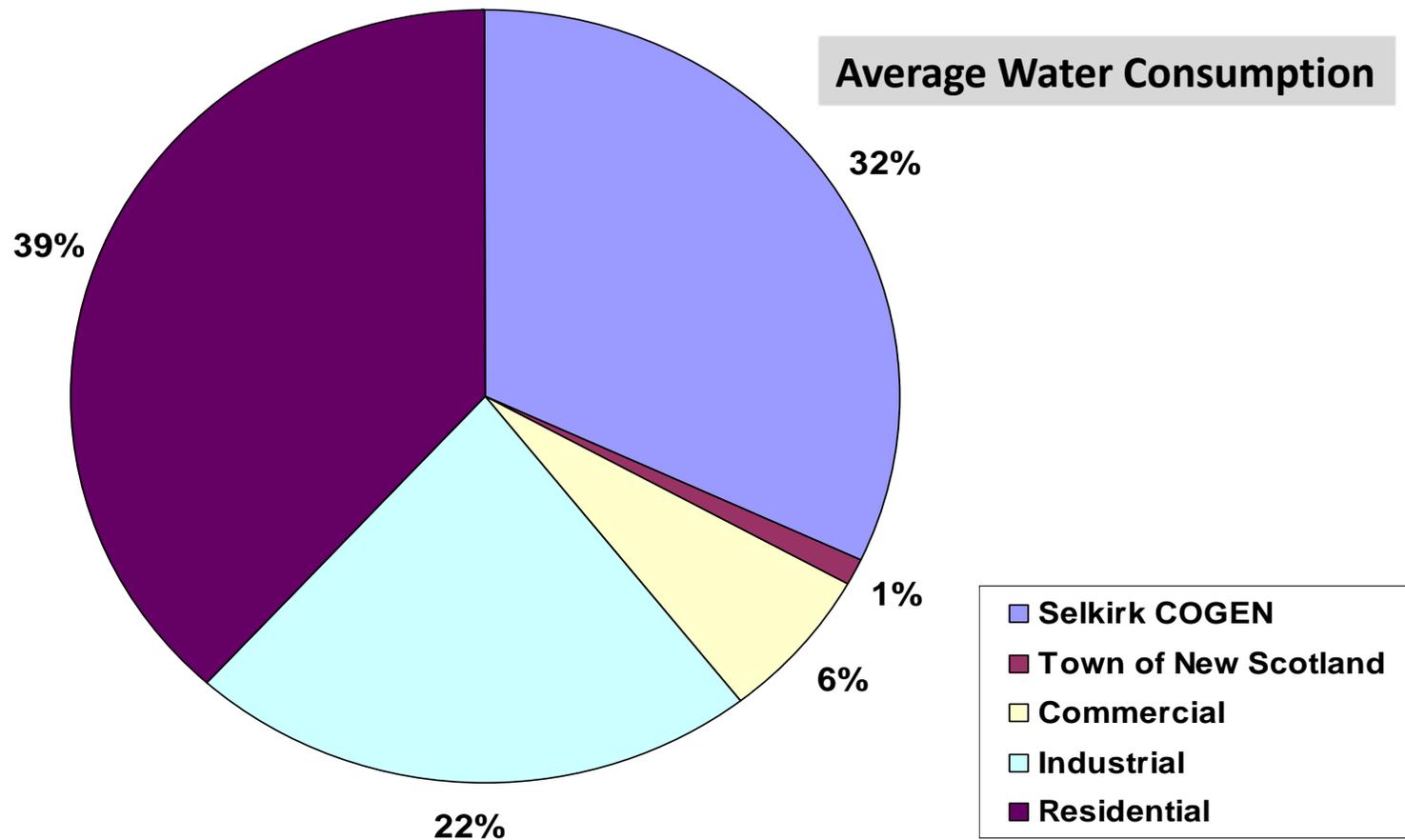
- **Regulatory changes – more stringent water quality requirements beginning in 2012.**
 - Requires significant treatment process changes
- **Aging New Salem WTP**
 - Clarifier baffle repairs
 - Flow meter replacements
 - Pump & motor replacements
 - Piping repairs
 - Roof replacements
 - Building repairs
- **Satisfy long-term water demands**
 - Reservoir yield limit



Demand Composition



Average Water Consumption



Other Considerations



- **Managing Exposure to Albany Water Outages**
 - Planned Maintenance
 - Emergency at WTP or transmission main
 - High Demand
 - Albany has +/- 10 days of storage vs. TOB having 3 days
- **Economic Development**
 - Comprehensive Plan goals – “balanced tax base”; “promote commercial & industrial growth...”
 - 20/20 Committee Report – fiscal sustainability & economic development goals – help address financial issues
 - Economic Development = diversified water customer base
 - Competitive rates needed to encourage Economic Development

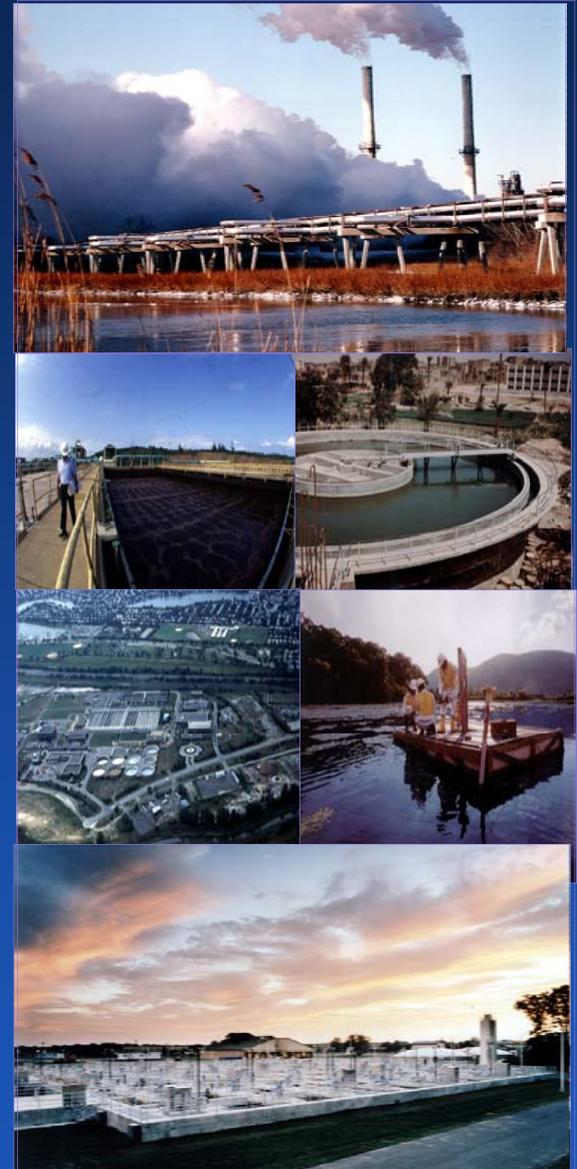
Experience Starts with History

For more than a century Malcolm Pirnie's engineers and scientists have helped clients nationwide and abroad solve problems of the environment – the earth, the water and the air around us. The Albany Office was opened in 1968.



Malcolm Pirnie's Integrated Services

- Drinking Water
- Wastewater
- Stormwater
- Hazardous Waste
- Solid Waste
- Air
- Permitting



Malcolm Pirnie's Drinking Water Services

- Water Supply
 - Source Development and Redevelopment
- Water Treatment
 - Facility Planning & Rehabilitation
- Water Distribution
 - Assessments, Planning, Modeling and Design
- Water Resources/
Watershed Management
- Residuals Management
- Security
 - Vulnerability Assessment
 - Emergency/Contingency Planning
 - Environmental Security Consulting
- Start-up Training, O&M Manuals



Public Interests Come First

The Public



Our Clients



Malcolm Pirnie

Malcolm Pirnie's Role

- Initiated services for Town in 2006
 - Water Supply Study initiated in 2008
- Satisfy Water Supply Objective
- Review Previous Studies
- Identify and Screen Alternatives
- Provide Independent and Objective Analysis

Water Supply Objective

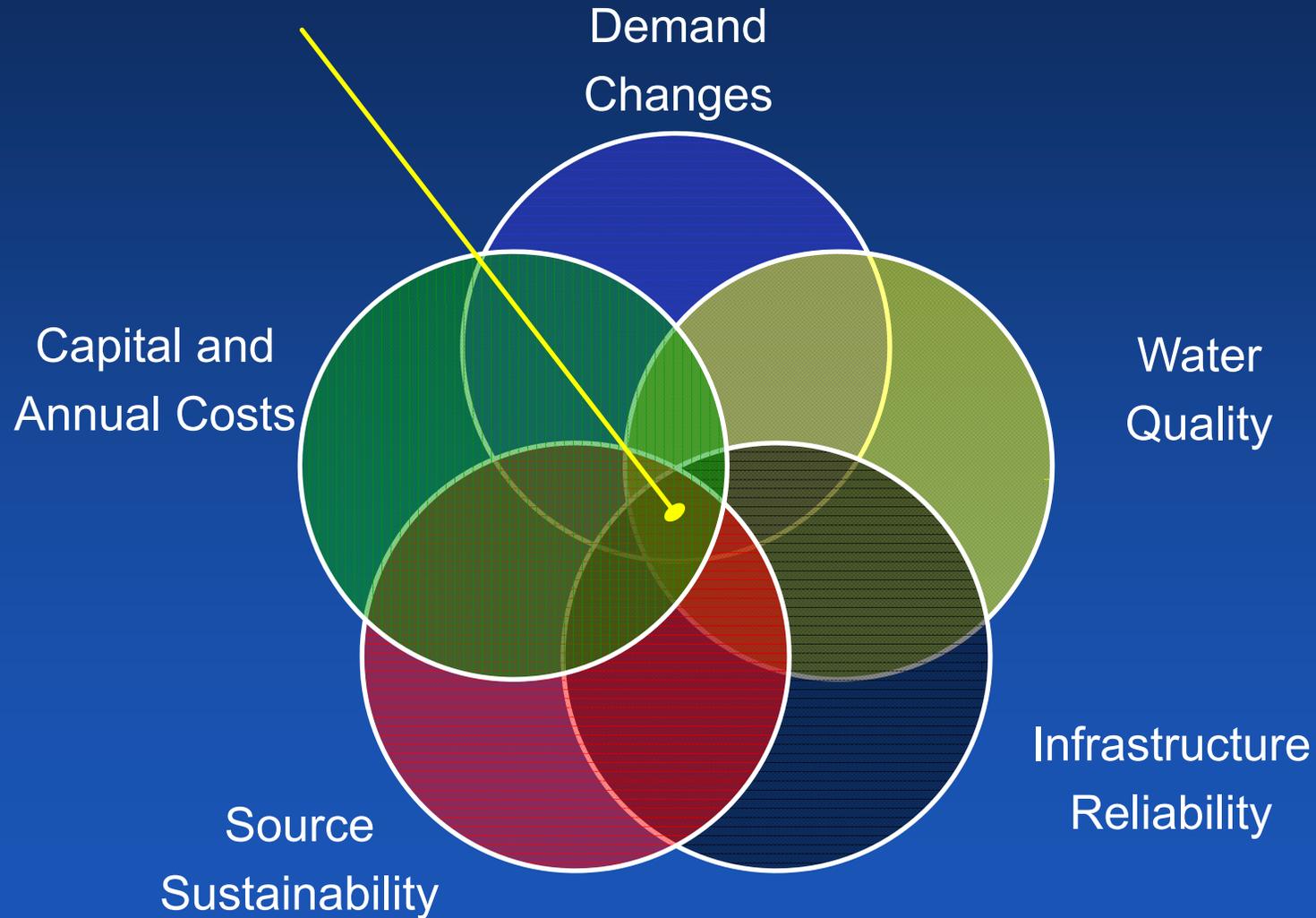
To cost effectively achieve a long term system of water supply to meet projected average and peak system demand through planning period.

Water Source and Supply Considerations

- Source Sustainability
- Demand Changes
- Infrastructure Reliability
- Capital and Annual Costs
- Water Quality



The Preferred Water Supply Solution



Shortlist of Feasible Alternatives

**Rebuild New Salem Water
Treatment Plant**

**Purchase Additional Finished
Water from Albany**

**Maximize Clapper Road Water
Production Capability**

Rebuild New Salem Water Treatment Plant

Capital Projects

- Pretreatment @ Clapper Road WTP
- New Salem WTP Rebuilt to 3 MGD avg., 6 MGD peak
- New Route 85 Finished Water Transmission Main

Financial Impacts

- Manage Debt for Capital Projects
- Project Cumulative Cost \approx \$140M (2023)
- Projected 2011 Rate Increase \approx 25%

Other Considerations

- No additional commitment to long term contracts
 - Increased risk to changes in demand
 - Maintain independence
- Investment in our own infrastructure

Purchase Additional Finished Water From Albany

Capital Projects

- Pretreatment @ Clapper Road WTP
- Creble–Esplande Finished Water Connection
 - pH Adjustment for Corrosion Control
- Upgrades and Maintenance for New Salem WTP

Financial Impacts

- Reduced Operating Costs at New Salem WTP
 - Manage Debt from Capital Projects
- Project Cumulative Cost ≈ \$130M (2023)
- Projected 2011 Rate Increase ≈ 40%

Other Considerations

- Improves terms of existing AWB contract
- Challenge of managing monthly take or pay
- Increased risk related to changes in demand
 - Increased dependency on Albany

Maximize Clapper Road Water Production Capability

Capital Projects

- Pretreatment @ Clapper Road WTP
- Minor upgrades at New Salem WTP

Financial Impacts

- Reduced Operating Costs at New Salem WTP
- Increased costs at Clapper Road well field
- Project Cumulative Cost \approx \$130M (2023)
 - Projected 2011 Rate Increase \approx 7%

Other Considerations

- Requires a unified distribution system
 - Increased maintenance at well fields
- No additional commitment to long term contracts
- Frees up money for other capital improvements
 - Minimize risk related to changes in demand
 - Maintain independence
- Expandable for demand beyond 2030

Water Quality Considerations for Clapper Road WTP

- Meets all Federal and State Drinking Water Standards
 - Same criteria for New Salem WTP and Albany Finished Water
 - 7,300 individual analyses since 1996
- Compliance reported in the Annual Water Quality Report since 1999
- 15 Years of demonstrated compliance
- Operation as residential supply supported by Department of Health



Volatile Organic Chemical Sampling

-Required by NYSDOH & USEPA Safe Drinking Water Act

- Compound (maximum contaminant level in parts per billion)
- Benzene (5)
- Bromobenzene (n/a)
- Bromochloromethane (n/a)
- Bromomethane (n/a)
- N-Butylbenzene (n/a)
- Sec-Butylbenzene (n/a)
- Tert-Butylbenzene (n/a)
- Carbon Tetrachloride (5)
- Chlorobenzene (100)
- Chloroethane (n/a)
- Chloromethane (n/a)
- 2-Chlorotoluene (n/a)
- 4-Chlorotoluene (n/a)
- Dibromomethane (n/a)
- 1,2-Dibromomethane (n/a)
- 1,2-Dichlorobenzene (600)
- 1,3-Dichlorobenzene (n/a)
- 1,4-Dichlorobenzene (75)
- Dichlorodifluoromethane (n/a)
- 1,1-Dichloroethane (n/a)
- 1,2-Dichloroethane (5)
- 1,1-Dichloroethene (7)
- Cis-1,2-Dichloroethene (70)
- Trans-1,2-Dichloroethene (100)
- 1,2-Dichloropropane (5)
- 1,3-Dichloropropane (n/a)
- Methyl Tert Butyl Ether (MTBE) (10)
- 2,2-Dichloropropane (n/a)
- 1,1-Dichloropropene (n/a)
- 1,3-Dichloropropene (n/a)
- Ethylbenzene (700)
- Hexachlorobutadiene (n/a)
- Isopropylbenzene (n/a)
- P-Isopropyltoluene (n/a)
- Methylene Chloride (5)
- N-Propylbenzene (n/a)
- Styrene (100)
- 1,1,1,2-Tetrachloroethane (n/a)
- 1,1,2,2-Tetrachloroethane (n/a)
- Tetrachloroethene (5)
- Toluene (1,000)
- 1,2,3-Trichlorobenzene (n/a)
- 1,2,4-Trichlorobenzene (70)
- 1,1,1-Trichloroethane (200)
- 1,1,2-Trichloroethane (5)
- Trichloroethene (5)
- Trichlorofluoromethane (n/a)
- 1,2,3-Trichloropropane (n/a)
- 1,2,4-Trimethylbenzene (n/a)
- 1,3,5-Trimethylbenzene (n/a)
- Vinyl Chloride (2)
- M-Xylene (10,000 total)
- O-Xylene (10,000 total)
- P-Xylene (10,000 total)

Synthetic Organic Chemical Sampling

-Required by NYSDOH & USEPA Safe Drinking Water Act

- Compound (maximum contaminant level in parts per billion)
- Alachlor (2)
- Aldrin (n/a)
- Atrazine (3)
- Benzo(a)pyrene (0.2)
- Di(2-ethylhexyl)adipate (400)
- Di(2-ethylhexyl)phthalate (6)
- Butachlor (n/a)
- Endrin (2)
- Heptachlor (0.4)
- Heptachlor epoxide (0.2)
- Hexachlorobenzene (1)
- Hexachlorocyclopentadiene (50)
- Lindane (0.2)
- Methoxychlor (40)
- Metolachlor (n/a)
- Metribuzin (n/a)
- Propachlor (n/a)
- Simazine (4)
- Dieldrin (n/a)
- Aldicarb (n/a)
- Aldicarb Sulfone (n/a)
- Aldicarb Sulfoxide (n/a)
- Carbofuran (40)
- Oxamyl (200)
- Methomyl (n/a)
- 3-Hydroxy Carbofuran (n/a)
- Carbaryl (n/a)
- 1,2-Dibromomethane (0.05)
- 1,2-Dibromo-3-chloropropane (0.2)
- 2,4-D (50)
- Dalapon (200)
- Dicamba (n/a)
- Dinoseb (7)
- Pentachlorophenol (1)
- Picloram (500)
- 2,4,5-TP (10)
- PCBs (0.5)
- Chlordane (2)
- Toxaphene (3)

Inorganic Chemical, Physical Property, Bacteriological Sampling

Required by USEPA

Safe Drinking Water Act

- Compound (maximum contaminant level in parts per billion)

- Arsenic (10)
- Barium (2,000)
- Cadmium (5)
- Chromium (100)
- Mercury (2)
- Selenium (50)
- Fluoride (2,200)
- Antimony (6)
- Beryllium (4)
- Nickel (n/a)
- Thallium (2)
- Sulfate (250,000)
- Cyanide (200)
- Nitrate (10,000)
- Nitrite (1,000)
- Cryptosporidium
- Giardia lamblia
- Turbidity (1 monthly average)

Required by NYSDOH

- Chloride (250,000)
- Iron (300)
- Manganese (300)
- Sodium (n/a)
- Zinc (5,000)
- Color (15 units)
- Odor (3 units)
- pH (6.5-8.5 units)
- Total Dissolved Solids (n/a)
- Hardness (n/a)
- Lead (n/a)
- Copper (n/a)
- Silver (100)
- Alkalinity (n/a)

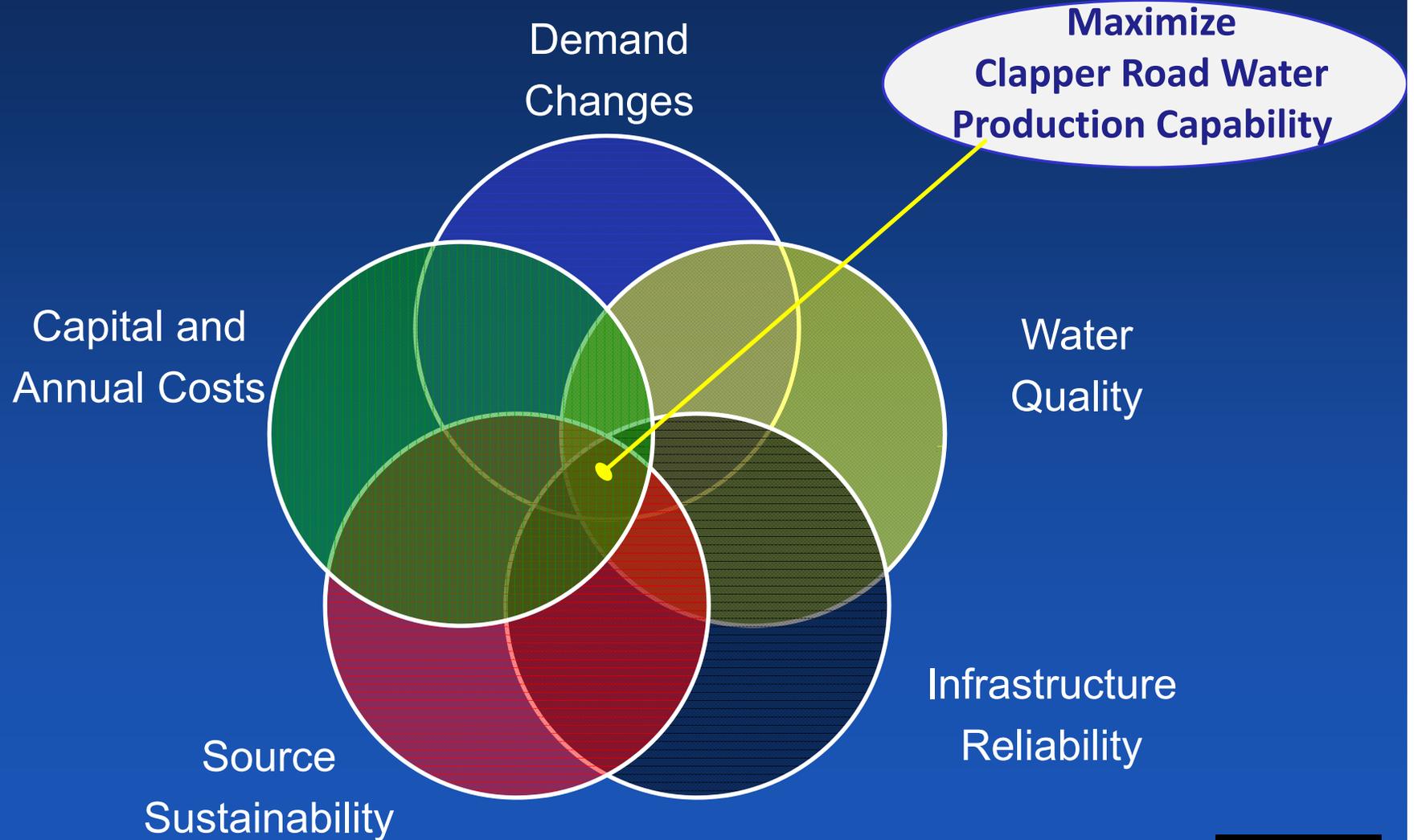
Ranking of Alternatives

Considerations	Rebuild New Salem Water Treatment Plant	Purchase Additional Finished Water from Albany	Maximize Clapper Road Water Production Capability
Source Sustainability	3	1	2
Demand Changes	2	3	1
Infrastructure Reliability	1	2	1
Capital and Annual Costs	3	2	1
Water Quality *	1	1	1

1 = Most Favorable / 3 = Least Favorable Alternative

* All options meet or exceed Federal and State safe drinking water standards

Recommended Alternative



Cost Comparison



Alternative	Initial Capital Cost	Cumulative Cost (thru 2023)	Initial Budget Impact \$	Initial Water Rate Increase
Rebuild New Salem Water Treatment Plant	\$18.2M	\$140M	\$1,114,257	25%
Purchase Additional Finished Water from Albany	\$7.3M	\$130M	\$1,845,089	40%
Maximize Clapper Road Water Production Capability	\$4.5M	\$130M	\$276,262	7%