City of Franklin

Integrated Water Resources Plan

August 9, 2011

BOMA Meeting Update

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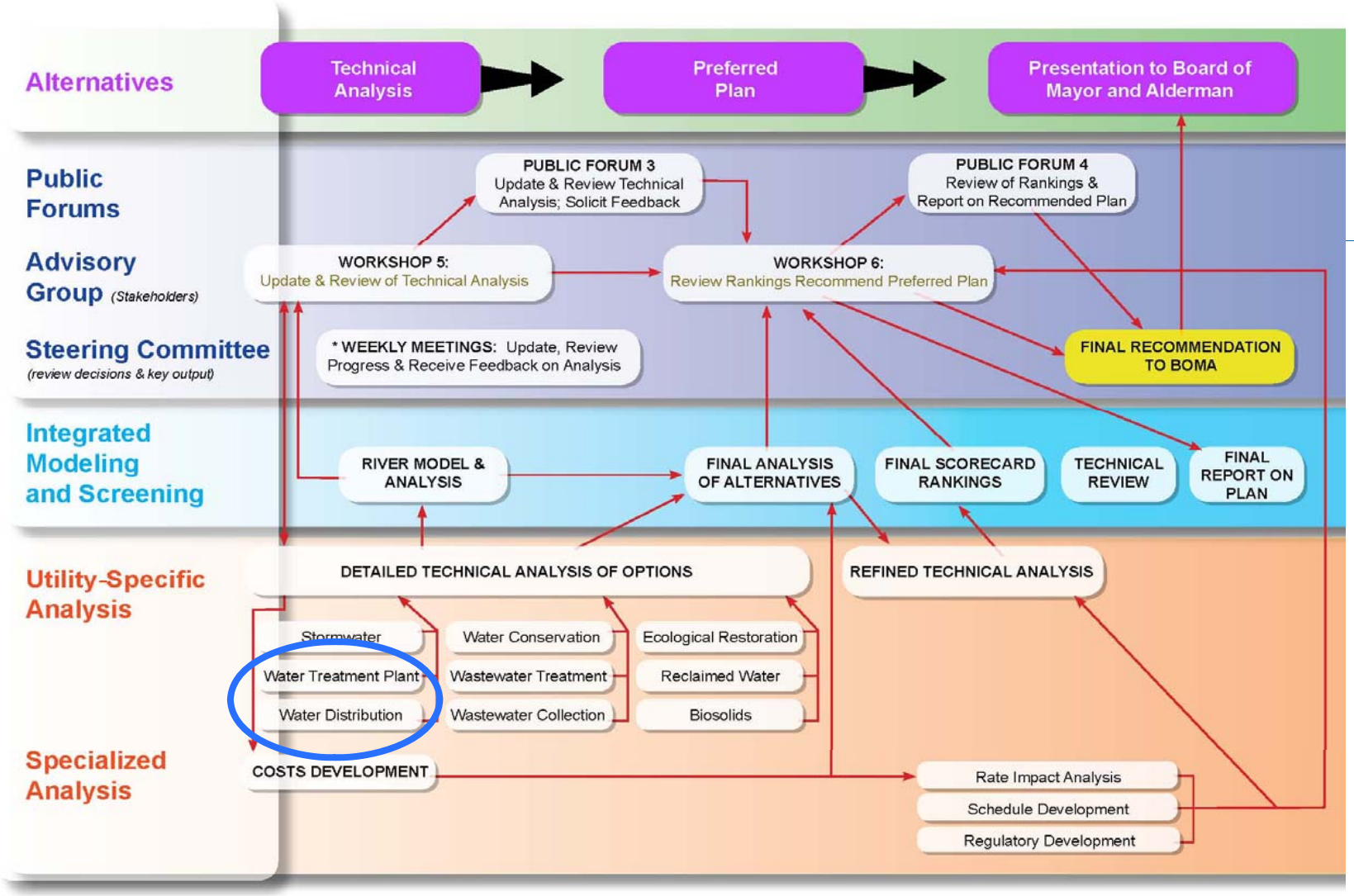
Franklin IWRP Phase II Work Plan



Upcoming Presentations for On-Going Technical Evaluations

1. **Stormwater/ Ecological Restoration Update – July 12th**
2. **Water Treatment/ Distribution Update - August 9th**
3. Wastewater/ Biosolids Update – August 23rd
4. Technical Analysis Summary – September 13th

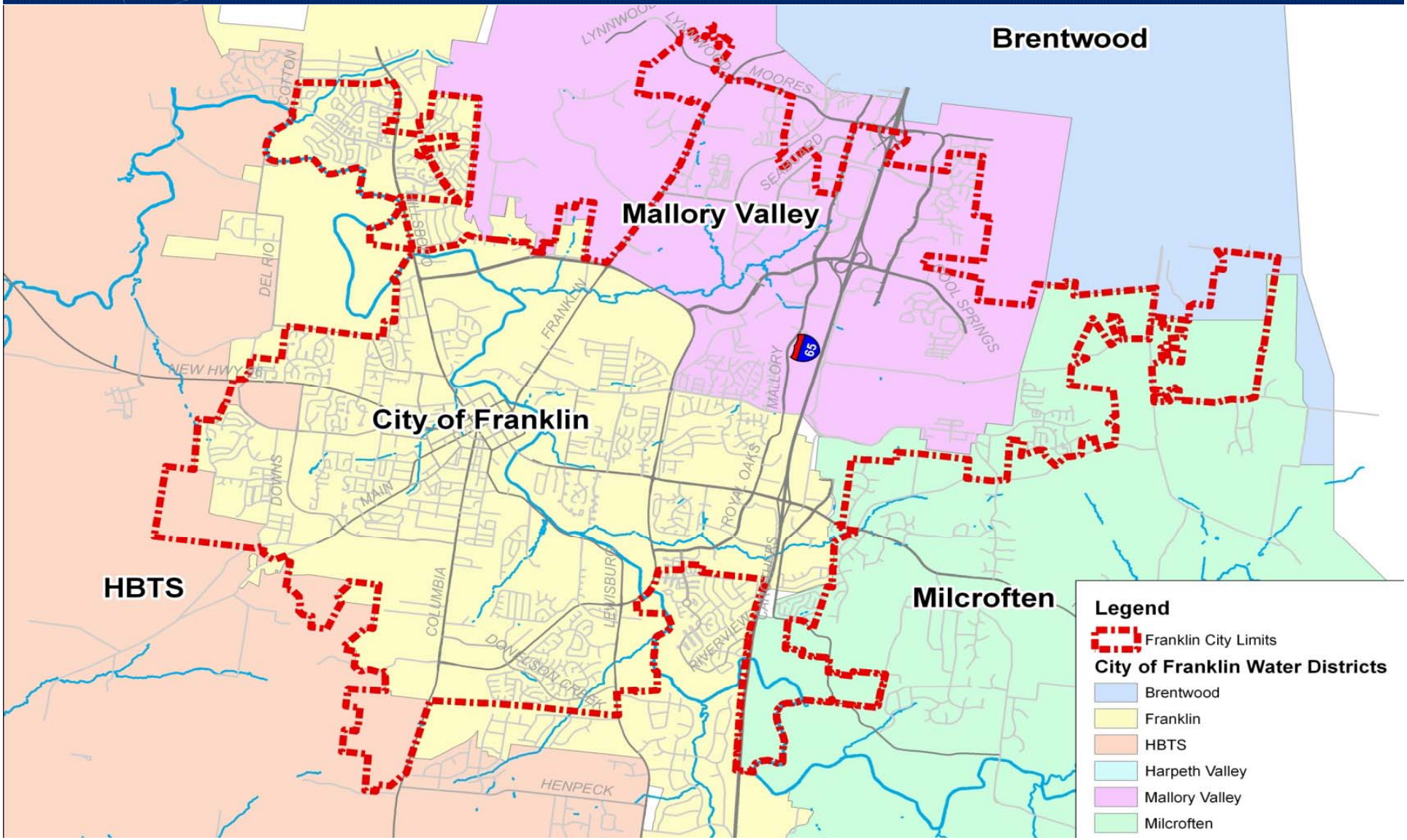
Meeting Agenda

- Water Demand and Supply
- Regulatory Requirements for Water Systems
- Water Treatment Plant
- Water Distribution System

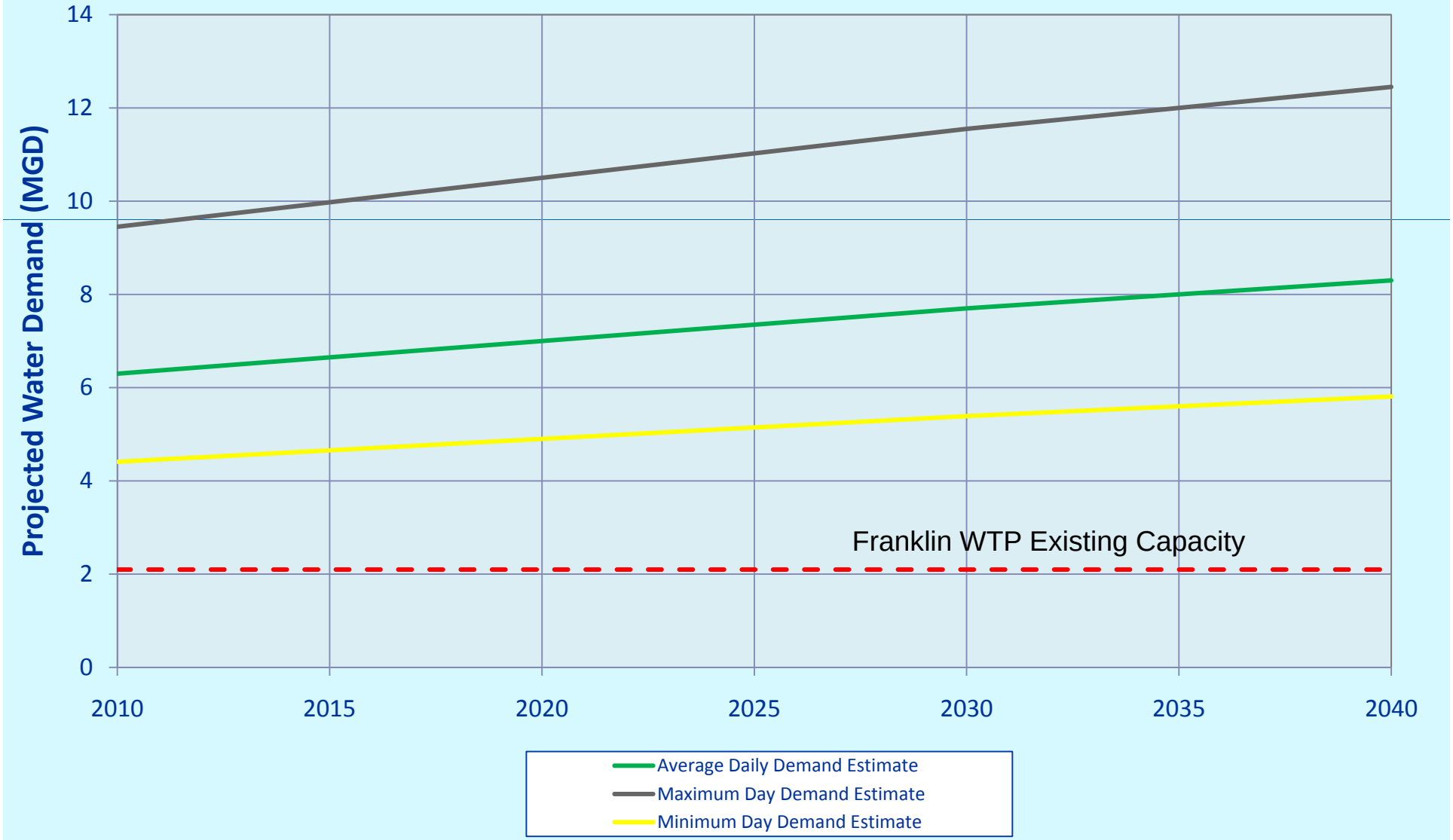
City of Franklin Integrated Water Resources Plan

WATER DEMAND AND SUPPLY

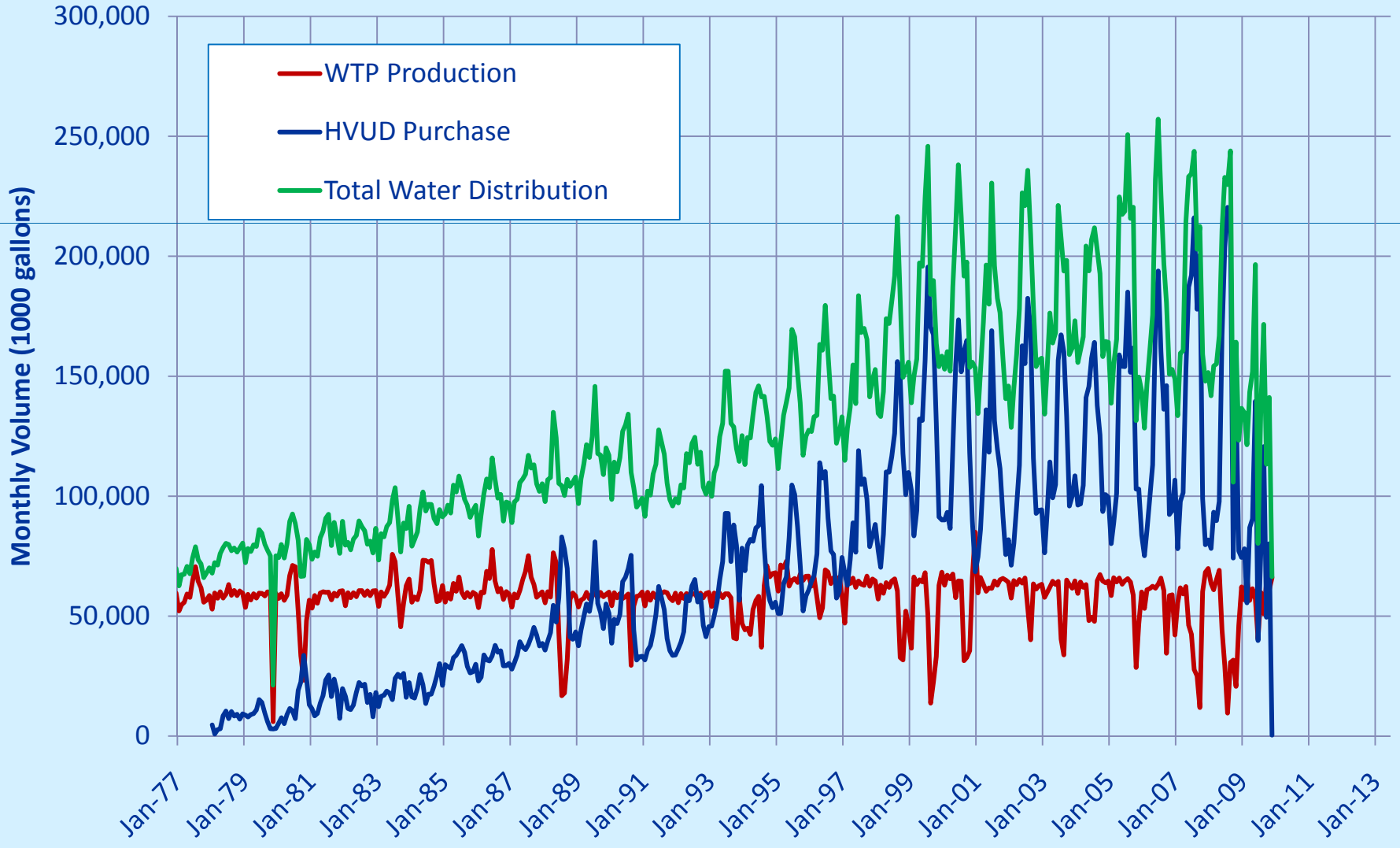
Water Systems Serving the City of Franklin



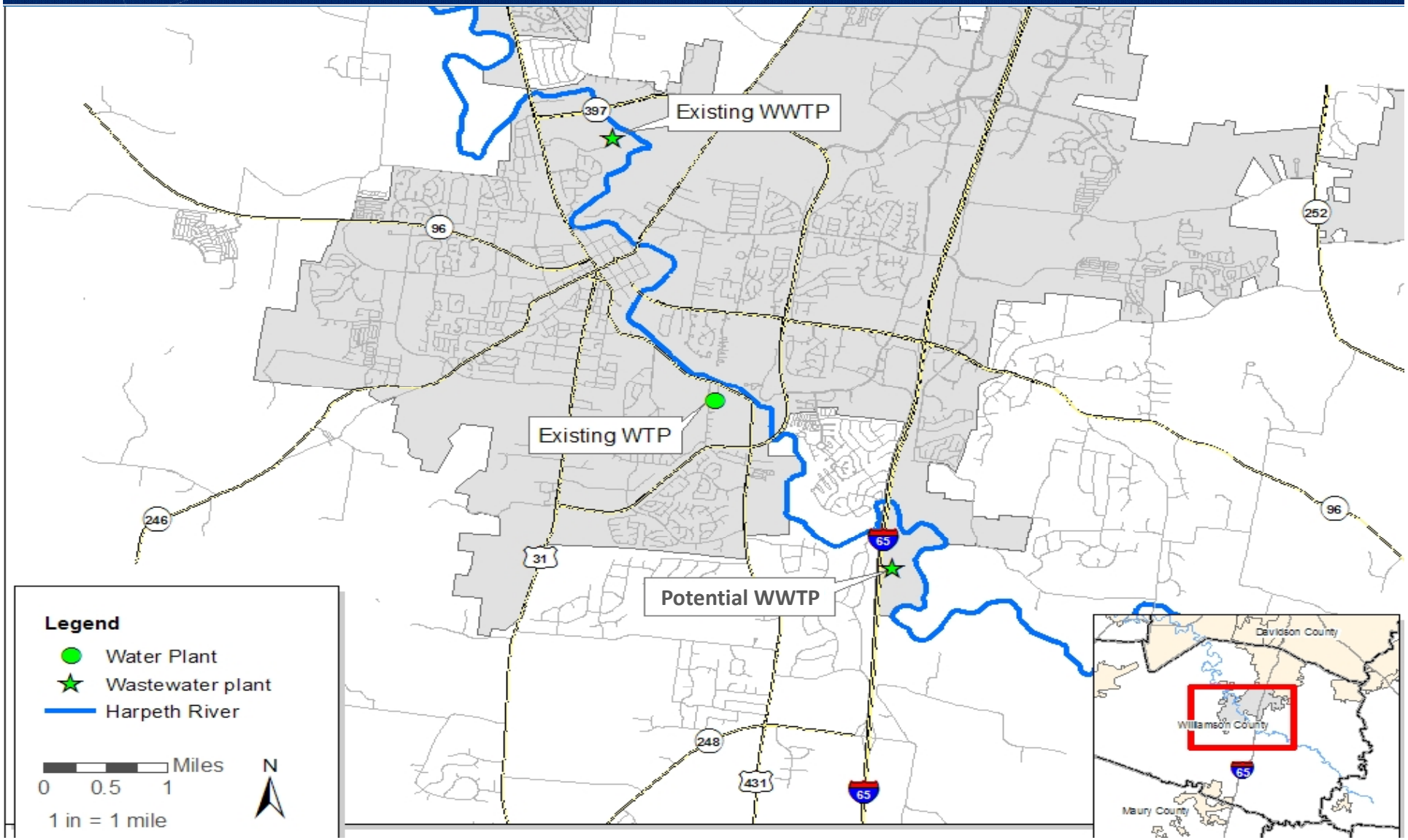
Water Demand
How Much Water Are We Talking About?



Water Supply
Where Does the City of Franklin Get Water?

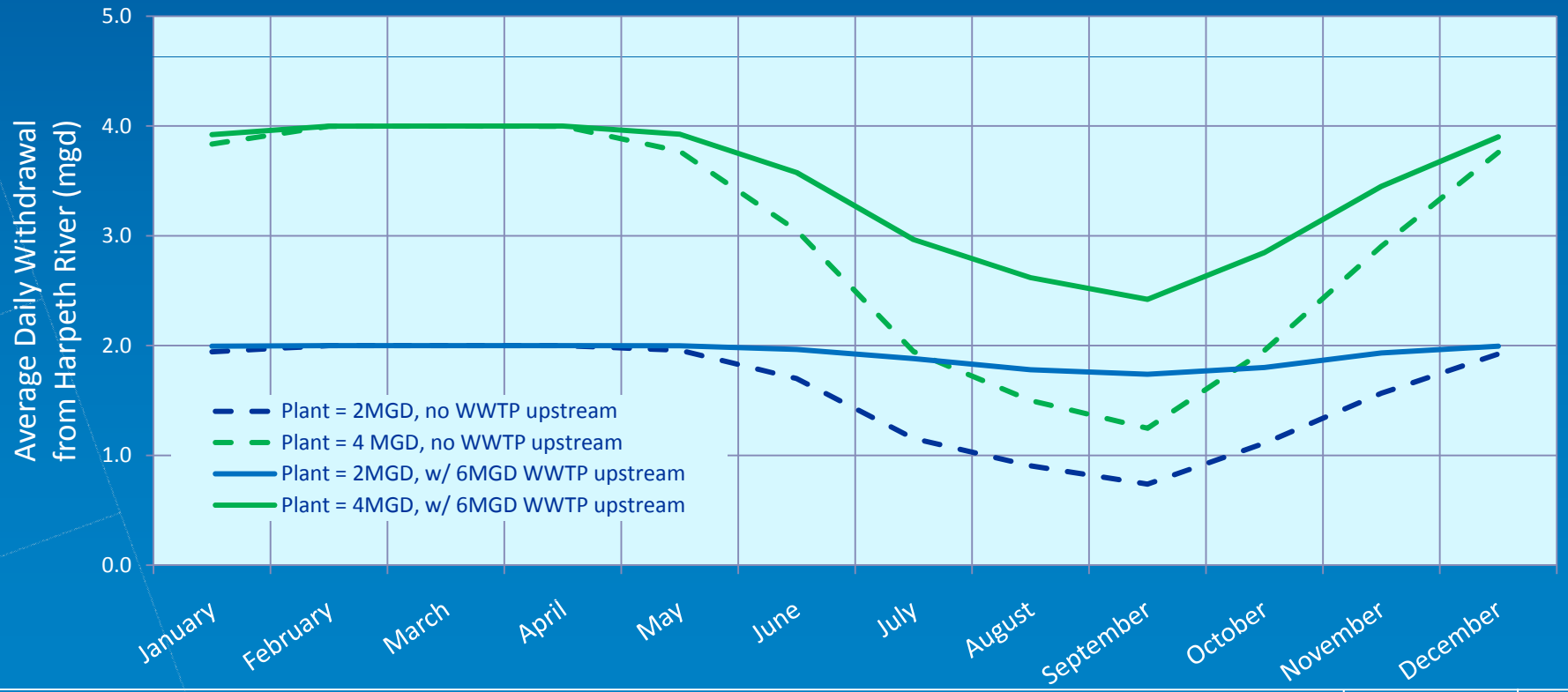


Overview of Facility Locations on the Harpeth River



Decreasing Demand and Increasing Supply

- Conservation measures and addressing water losses
- Reservoir management and indirect potable reuse



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REGULATORY REQUIREMENTS

Enhanced Surface Water Treatment Rule

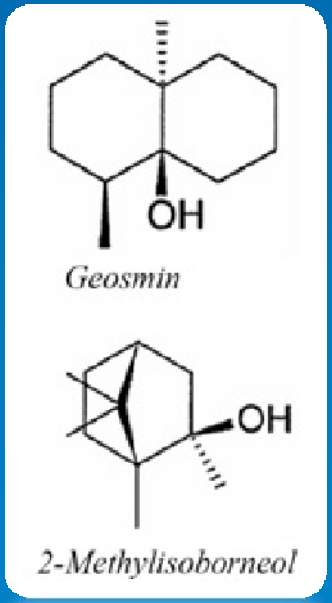
- The Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR), promulgated January 5, 2006, addresses control of microbial pathogens; implications are primarily on the WTP
  - The LT2ESWTR requires systems to conduct source water monitoring to determine *Cryptosporidium* concentrations
  - Systems are then classified into BINS each with specific treatment requirements ; Franklin is in BIN2
- Options for meeting compliance by October 2012 include:
  - Operations management practices
  - UV disinfection
  - Membrane filtration
  - Other options in the LT2ESWTR Toolbox

Disinfection By-Product Rule

- EPA finalized the Stage 2 DBPR in the *Federal Register on January 4, 2006* with the following requirements:
  - An Initial Distribution System Evaluation (IDSE) to identify compliance monitoring locations that represent high total trihalomethanes (TTHM) and haloacetic acids (HAA5) concentrations throughout the distribution system
  - Use of a locational running annual average (LRAA) calculated for each monitoring location in the distribution system for TTHM and HAA5 to determine compliance with the Stage 2 DBPR maximum contaminant levels (MCLs) for TTHM and HAA5
- Compliance with the LRAA is required by *October 2012* (for Schedule 2 systems) with TTHM < 80 ug/L and HAA < 60 ug/L

Secondary MCLs - Taste and Odor

- EPA has National Secondary Drinking Water Regulations for non-mandatory water quality standards, including odor
- EPA does NOT enforce "secondary maximum contaminant levels" (SMCLs) because there is no risk to human health
- Taste and Odor
  - Caused by geosmin and methylisoborneol (MIB)
  - Odor threshold 10 and 29 ng/L (parts per TRILLION)
  - Origin is blue-green algae in source water
  - Treatment options
    - *Activated carbon (limited)*
    - *Ozone-Enhanced Biofiltration (AWWA, 2005)*
    - *Advanced oxidation (can design for >99% removal)*



City of Franklin Integrated Water Resources Plan

WATER TREATMENT PLANT

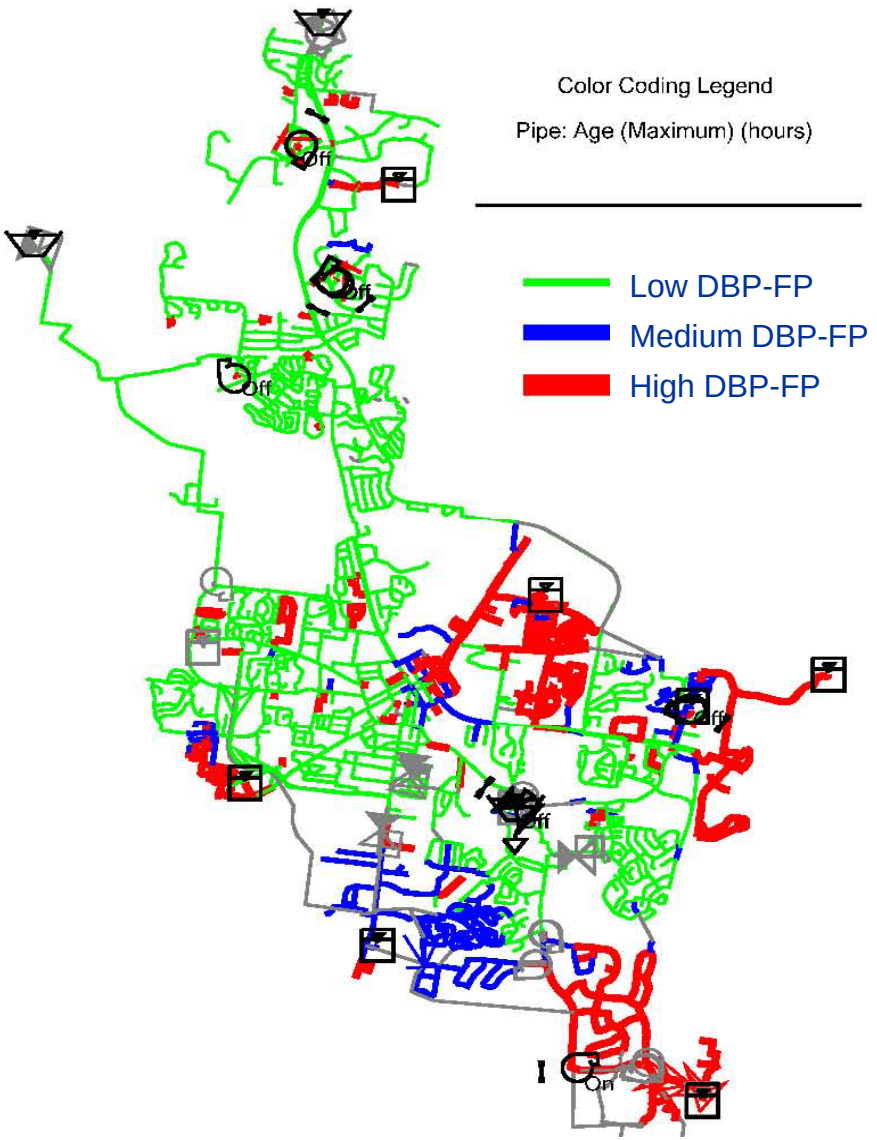
Water Treatment Plant Improvements Costs

Item	Upgrade Existing 2.1 mgd WTP	4.0 mgd Treatment Alternative		
		No. 1 (Conventional)	No. 2 (DAF)	No. 3 (Membranes)
Raw Water P.S. w/ Travelling Water Screen	$ 1,330,000	$ 1,330,000	$ 1,330,000	$ 1,330,000
Replace or Upgrade Existing Flocculation Equipment	$ 50,000	$ 50,000	-	$ 50,000
Upgrade Existing Settling Basin Nos. 1, 2, & 3	$ 340,000	$ 340,000	-	-
Construct Settling Basin Nos. 4 & 5	-	$ 2,040,000	-	-
Add DAF to Existing Settling Basin No. 3	-	-	$ 2,480,000	-
Upgrade Existing Filters	$ 1,530,000	$ 1,530,000	$ 1,530,000	-
Replace 2 mgd Clearwell Transfer Pump with 4 mgd Pump	-	$ 260,000	$ 260,000	-
Convert Existing Filters to Membranes	-	-	-	$ 6,500,000
Replace 2 mgd High Service Pumps with 4 mgd Pump	-	$ 760,000	$ 760,000	$ 760,000
Upgrade Existing Chemical Feeders	$ 40,000	$ 70,000	$ 70,000	$ 70,000
Sitework and Buried Piping	-	$ 750,000	$ 750,000	$ 750,000
Subtotal	**$ 3,290,000**	**$ 7,130,000**	**$ 7,180,000**	**$ 9,460,000**
Optional UV Disinfection System	$ 684,000	$ 684,000	$ 684,000	$ 684,000
Optional AOP Adder	$ 750,000	$ 750,000	$ 750,000	$ 750,000
Project Total with UV and AOP Option	**$4,724,000**	**$ 8,564,000**	**$ 8,614,000**	**$10,894,000**
Legal, Technical and Other Costs (15%)	$ 709,000	$ 1,285,000	$ 1,292,000	1,634,000
Project Total	**$ 5.4 M**	**$ 9.8 M**	**$ 9.9 M**	**$ 12.5 M**

WATER DISTRIBUTION SYSTEM

City of Franklin
Hydraulic Model of Distribution System

- High water age near tanks and dead-end mains
- Low tank turnover due to high pressures from HVUD
- Tanks in south are more difficult to fill than tanks in northern part of service area



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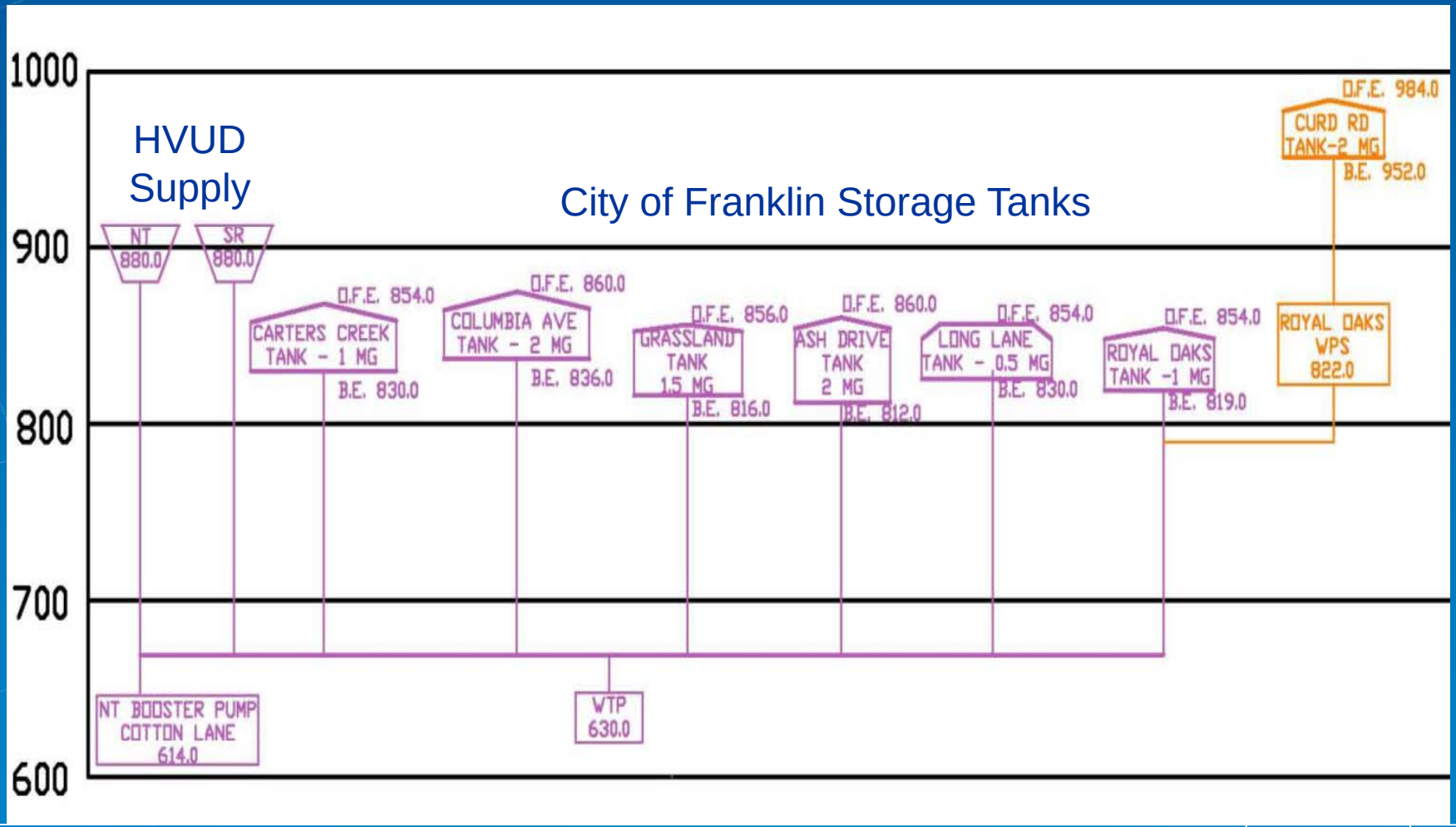
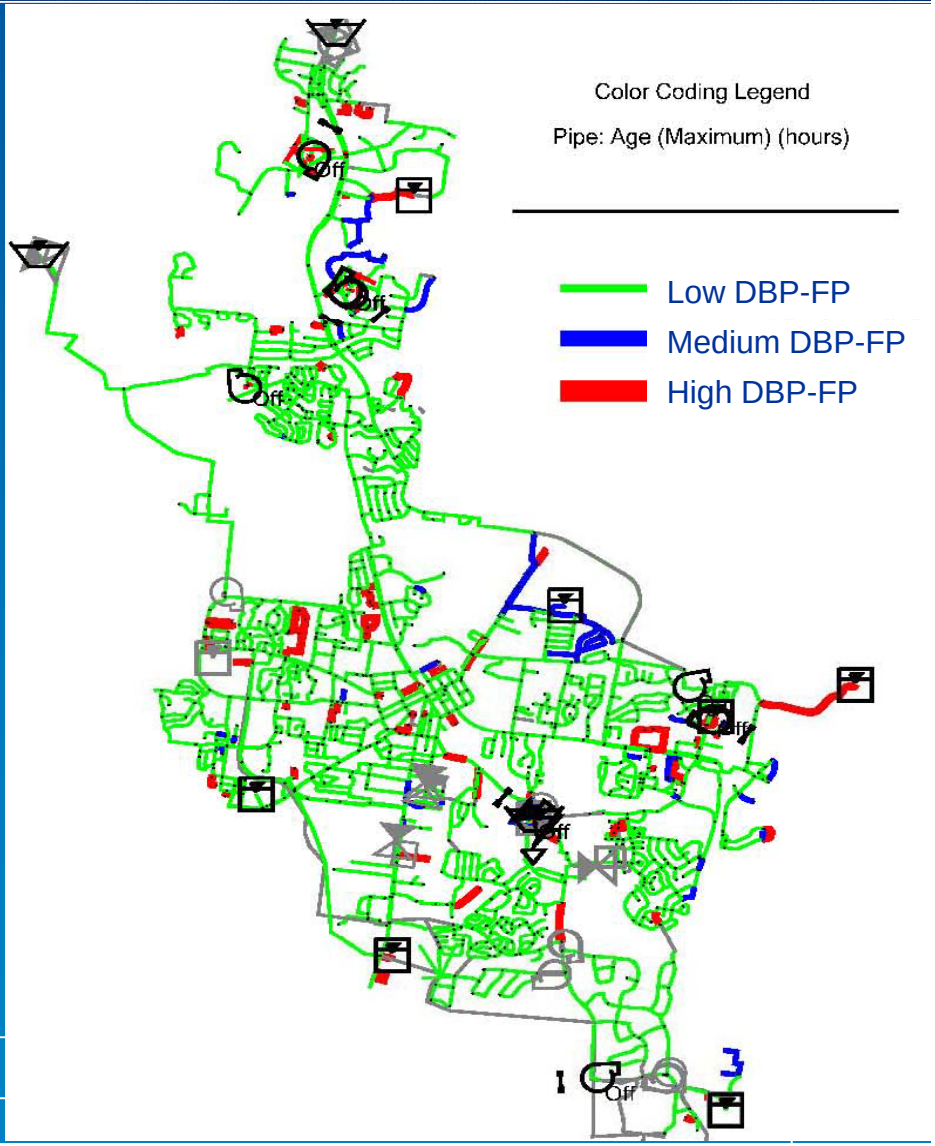
HVUD and City of Franklin Hydraulic Grade



Distribution System Options

- Install PRVs at HVUD supply points
  - Regulate high pressures
  - Can be adjusted seasonally
- Evaluate tanks with low turnover
- Install booster pump station to serve elevated area
- Install mains or add booster pumping to improve ability to fill tanks in south
- Flush dead-end mains
- Verify existing hydraulic model with field testing



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Next Steps

- Incorporate results of analyses into integrated model
  - Water demand reduction options
  - Water supply options
  - Water treatment plant improvement options
  - Distribution system improvement options
- Staff to consider compliance options for LT2 and DBPR
- Additional BOMA Updates
  - August 23rd Collection System/Wastewater/ Biosolids Update
  - September 13th Technical Analysis Summary
  - September 28th Stakeholder Workshop (Tentative)