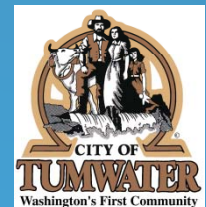


2010 Water System Plan Update

Chapter 4 – System Analysis
Chapter 6 – Capitol Improvement
July 9, 2010



Chapter 4 - System Analysis

- System Design Criteria
- Source Capacity Analysis
- Storage Capacity Analysis
- Distribution System Analysis

All Predicated Upon:

- a conservative peak demand analysis
- 24-hour/day operation
- Largest source inactive



Demand Considerations

- Conservative Forecast
 - 2.4 Peaking Factor (Maximum Day Demand) (*1.7, Avg.*)
 - Assumes 10% growth for largest consumer (6 yrs)
 - Assumes add'l 1.01 MGD for new consumers
 - No acquisition of add'l right (1,000 gpm / 300 acft)
 - No water conservation activities
 - *~110,000 gpd (~40 MG annually by 2015)*

Conservative (i.e. High) Scenario





System Design Criteria

- Storage
 - Operating & Dead Storage
 - Equalizing Volume (psi)
 - Fire Flow
 - Standby (outage)
- Source
 - Meet MDD
- Distribution System
 - 30 psi min (20 psi fire)
 - 100 psi max
 - PRVs above 100 psi
 - Fire flow: 1,000 – 3,500 gpm

**Design criteria meet DOH guidelines for system planning.*

Source Capacity (gpd)

| Source (System & 350 Zone) | 2009 | 2015 | 2029 |
|-----------------------------|------------------|--------------------|--------------------|
| Maximum Day Demand | 7,570,000 | 10,690,000 | 16,500,000 |
| Total Sources | 7,164,000 | 7,164,000 | 7,164,000 |
| Surplus / Deficiency | (406,000) | (3,526,000) | (9,336,000) |
| - Largest Source | (3,165,000) | (6,285,040) | (12,095,040) |
| + Future Sources | 648,000 | 12,415,680 | 18,501,120 |
| Surplus / Deficiency | 242,000 | 1,725,680 | 2,001,120 |
| - Largest Source | (2,517,000) | (1,154,320) | (1,204,320) |

*Add'l 1,000 gpm water right unaccounted for...
~1.4 MGD during peak season.





Source Analysis (cont)

| 454 Zone (gpd) | 2009 | 2015 | 2029 |
|--------------------|-----------|-------------|-------------|
| System Demands | 2,176,160 | 2,985,760 | 3,705,360 |
| Surplus/Deficiency | (294,080) | (1,103,680) | (1,823,280) |
| w/ future sources | n/a | 1,056,320 | 336,720 |

| 549 Zone (gpd) | 2009 | 2015 | 2029 |
|--------------------|---------|---------|---------|
| System Demands | 102,000 | 115,000 | 152,000 |
| Surplus/Deficiency | 870,000 | 857,000 | 820,000 |
| w/ future sources | n/a | n/a | n/a |

(Zone 549, in it's current state, is adequate to meet current and future demands)

Storage Analysis (gallons)

| | 2009 | 2015 | 2029 |
|----------------------------|--|-----------|-------------|
| Operational Storage Volume | 2,258,319 | 2,512,519 | 2,180,419 |
| Surplus/Deficiency | | | |
| Operational + Fire Flow | 1,244,659 | (115,932) | (2,284,534) |
| Surplus/Deficiency | | | |
| 350 Zone (at 20 psi) | | ~0.3 MG | ~2.1 MG |
| 454 Zone | ~0.1 MG | ~0.3 MG | ~0.66 MG |
| 549 Zone | Adequate storage through planning period | | |

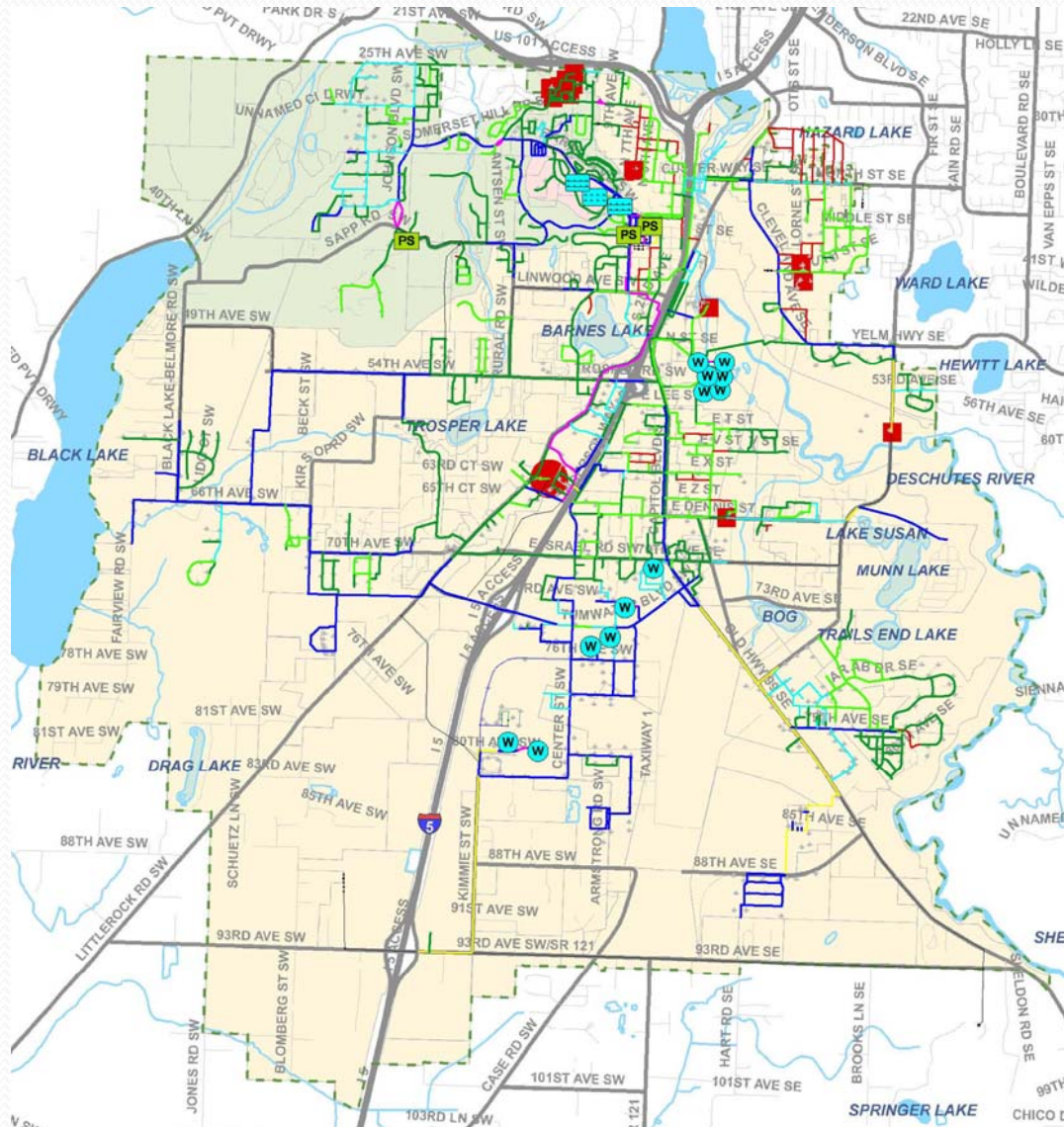


Distribution System Analysis

- ~626,000' of pipe (~118 miles)
- Modeled analysis / maintain psi
 - 2009 – no pressure deficiencies (some > 100 psi)
 - 2015 – no deficiencies (SW Wellfield)
 - 2029 – minor deficiency (no services)

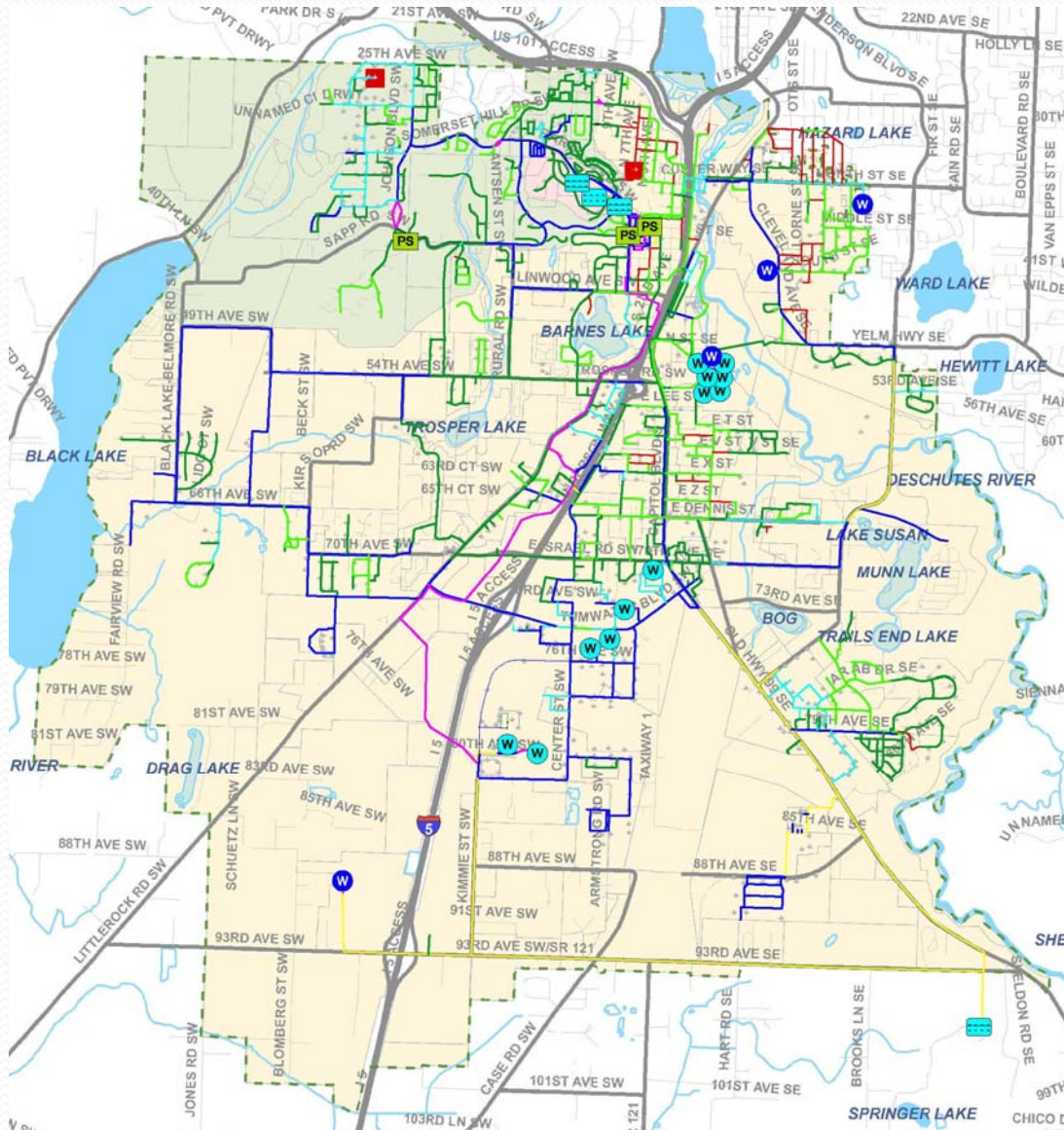


Fire Flow Analysis (2009)



Some deficiencies noted (> 500 gpm); most eliminated with planned projects.

Fire Flow 2029



Only remaining deficiencies include high elevations and dead-end mains.

No cost effective solutions.



Chapter 6 – Capitol Improvement

- Address deficiencies
- Recurring / Annual needs
- 20-year planning
 - Planning, Design and Construction
 - Inflation factors
- 6 Year CIP: ~\$24.3 M
- 7-20 Year CIP: ~\$68.0 M



6-year CIP → Supply Side

- Water System Disinfection (2010/~\$2.6 M)
- Palermo WF Improvements (2011/~\$845k)
- Brewery WF
 - Source Approval & Long-term Recommendations (2011/~\$42)
 - Infrastructure Development (2013/~\$1.8 M)
 - Treatment (2013/~\$6.2 M)
 - Abandonment (2013/~\$300k)
- SW WF Property Acq (2011/~\$676k)
- WHPA Plan Update (2011/~\$36k)
- Bush WF Improvement (2011/~\$22k)
- 2.5 MG Storage Tank (2015+/~\$7.0 M)
- 454 Zone BPS Upgrade (2015/~\$770k)

WR Acq: 2011+/~\$2.6M
NE WF: 2022+/~\$12 M
SW WF: 2018+/~\$10.7 M



6-year CIP → Distribution

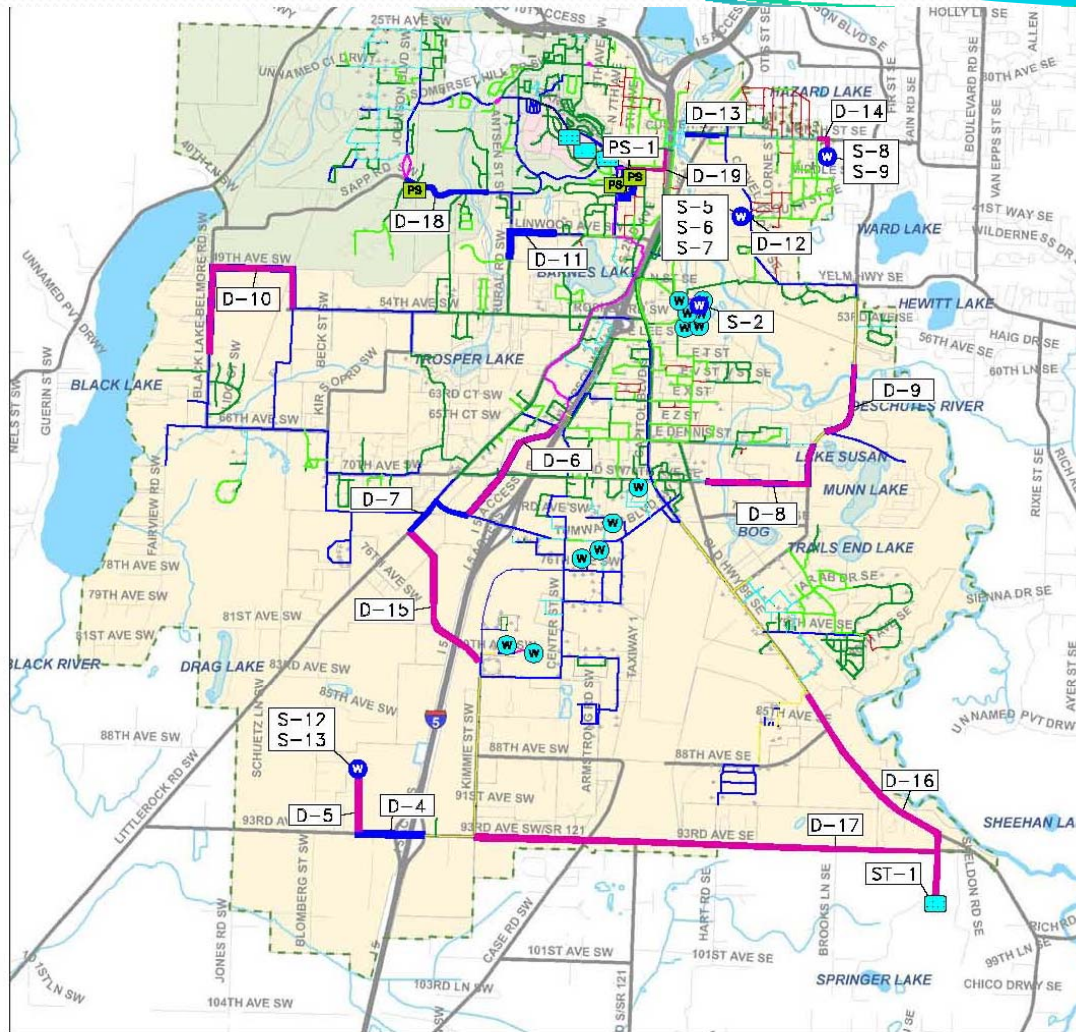
- Deficiencies
 - 16” Main to SW Wellfield (2015+/~\$2.4 M)
 - 12” Main to Brewery Wellfield (2013/~\$168k)
 - 8” Main on Sapp Rd (2013/~\$1.0 M)
- Growth (coordination with development)
 - ~\$29.5 Million
 - Includes over-sizing, main extensions, etc.
 - “Combo” funding
- Annual/Routine
 - Watermain Replacement (2012+/~\$7.4 M)
 - Reclaimed Water Distribution (2016+/~\$2.5 M)



6-year CIP: O&M & Gen. Improvement

- Telemetry System Improvements (2010+/~\$430k)
- Palermo WF Generator (2011/~\$110k)
- Palermo WF Security (2011/~\$220k)
- Bush WF Fiber Conversion (2012/~\$231k)
- VPN (Field Communications) (2015/~\$33k)
- Real-time Pressure Monitoring (2015/~\$67k)
- Data loggers/groundwater (2013/~\$18k)
- GIS-based Water Quality Data (2015/~\$27k)
- Water System Plan Update (2015+/~\$222k/~\$579k)





- Legend**
- 4 Inch
 - 6 Inch
 - 8 Inch
 - 10 inch
 - 12 Inch
 - 18 inch
 - 24 Inch
 - W Existing Well
 - W Planned Well
 - T Tank
 - PS Booster Pump Station
 - 350 Zone
 - 454 Zone
 - 549 Zone
 - 6 Year CIP
 - 20 Year CIP
 - D-X CIP No.
 - Tumwater UGA

FIGURE 6.1
CAPITAL IMPROVEMENT PROGRAM
CITY OF TUMWATER
WATER SYSTEM PLAN

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Questions?

