

Why History Matters Celebrating Our Water

- Catherine Howells, Ph.D.
- PNWS Conference
- May 8, 2014



Water: It's Complicated

- Electrification
- Automobile
- Airplane
- Water supply and distribution
- Electronics

Greatest Engineering Achievements OF THE 20TH CENTURY

◆ About ◆ Timeline ◆ The Book

Welcome!
How many of the 20th century's greatest engineering achievements will you use today? A car? Computer? Telephone? Explore our list of the top 20 achievements and learn how engineering shaped a century and changed the world.

1. Electrification	11. Highways
2. Automobile	12. Spacecraft
3. Airplane	13. Internet
4. Water Supply and Distribution	14. Imaging
5. Electronics	15. Household Appliances
6. Radio and Television	16. Health Technologies
7. Agricultural Mechanization	17. Petroleum and Petrochemical Technologies
8. Computers	18. Laser and Fiber Optics
9. Telephone	19. Nuclear Technologies
10. Air Conditioning and Refrigeration	20. High-performance Materials



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It's Local

- pipes
- pumps
- valves
- fire hydrants
- growth
- drought
- earthquakes
- regulations
- public health
- pressure
- water rights
- storage
- design
- backflow
- source(s)
- security
- financing and rates
- water treatment
- aging infrastructure
- streets
- mapping
- dams
- people/politics





Illustration taken and colored by B. B. B.

Entered according to act of Congress in the year 1836 by H. R. Robinson, in the Office of the Clerk of the District Court, Southern District of New York.

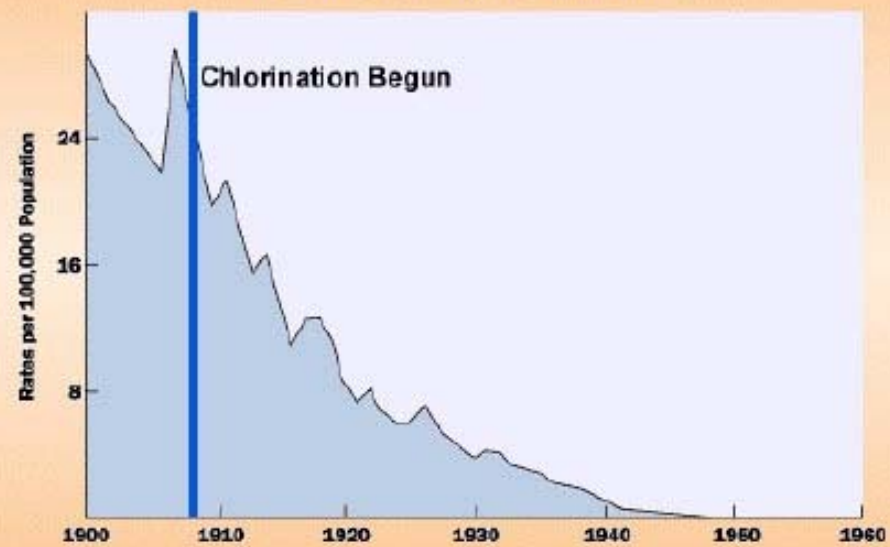
THE GREAT FIRE OF THE CITY OF NEW-YORK, 16 DECEMBER 1835.

Published January 1836 by the Proprietor, H. R. Robinson, No. 48 Courtland Street, New-York.

Printed and published by J. T. Bowen.



Death Rate for Typhoid Fever United States, 1900-1960



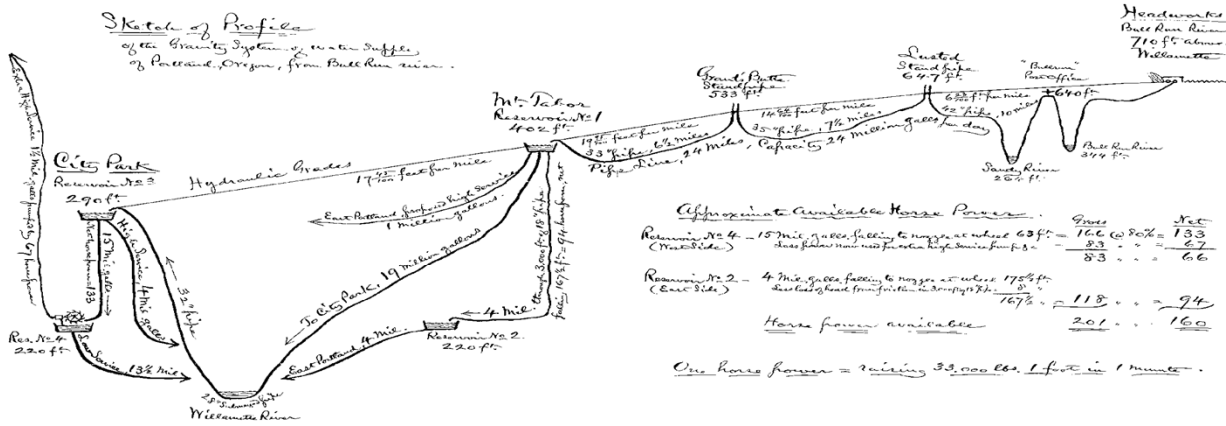
Source: U.S. Centers for Disease Control and Prevention, Summary of Notifiable Diseases, 1997.









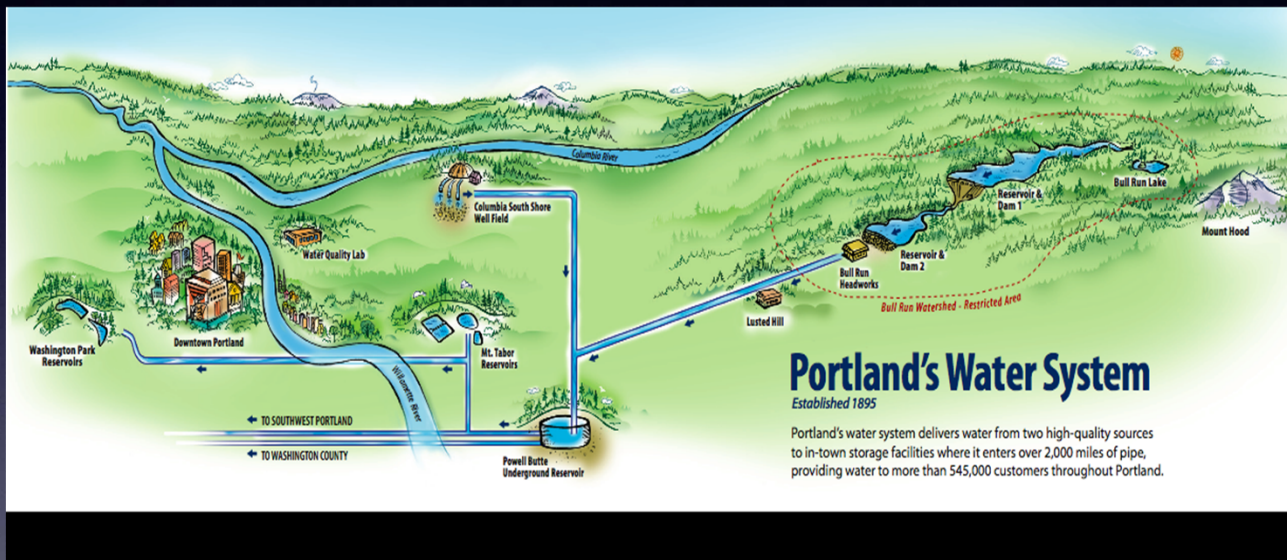


WATER: PORTLAND'S PRECIOUS HERITAGE

D.D. Clarke's schematic sketch of Portland's water system, with calculations of possible power generation



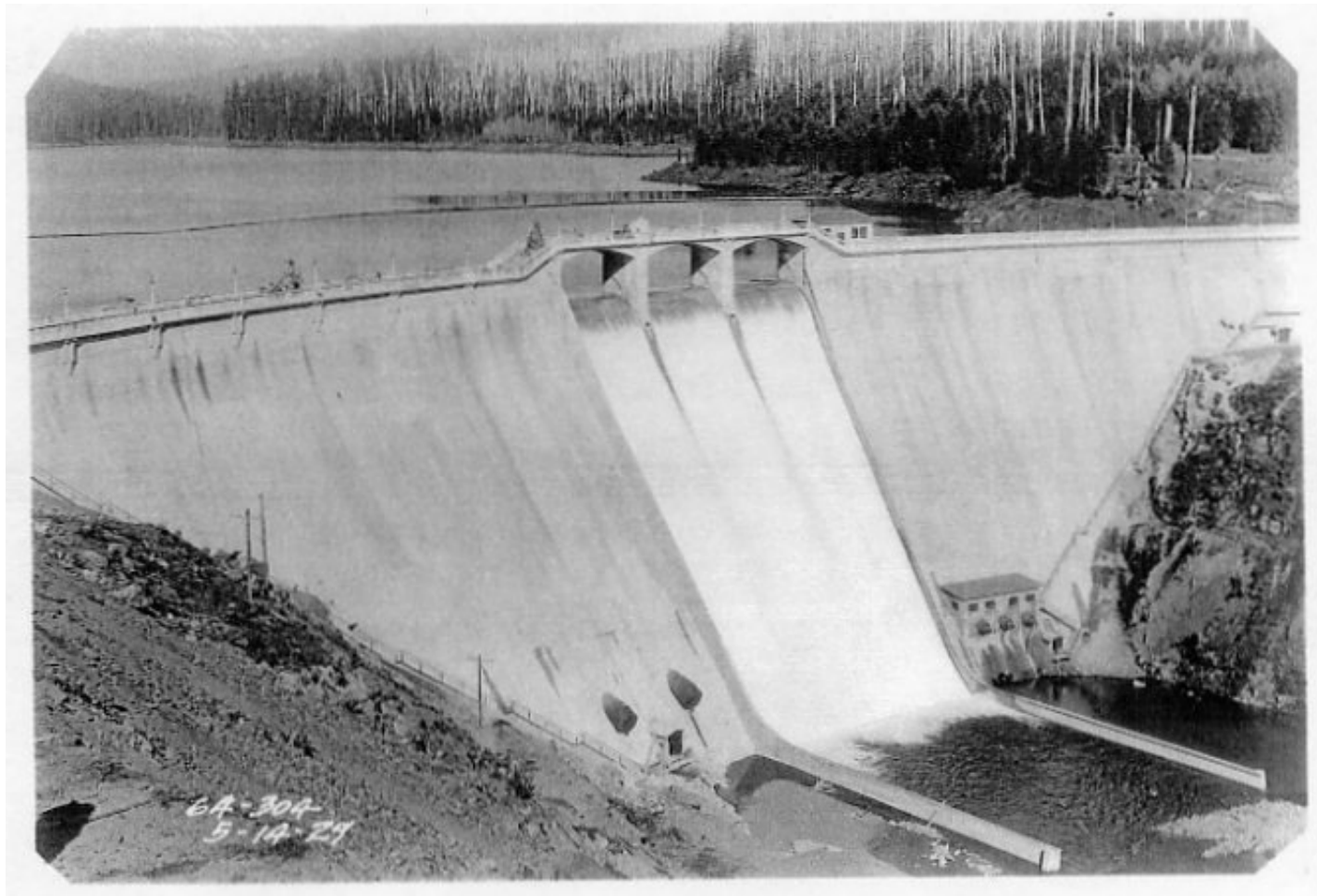


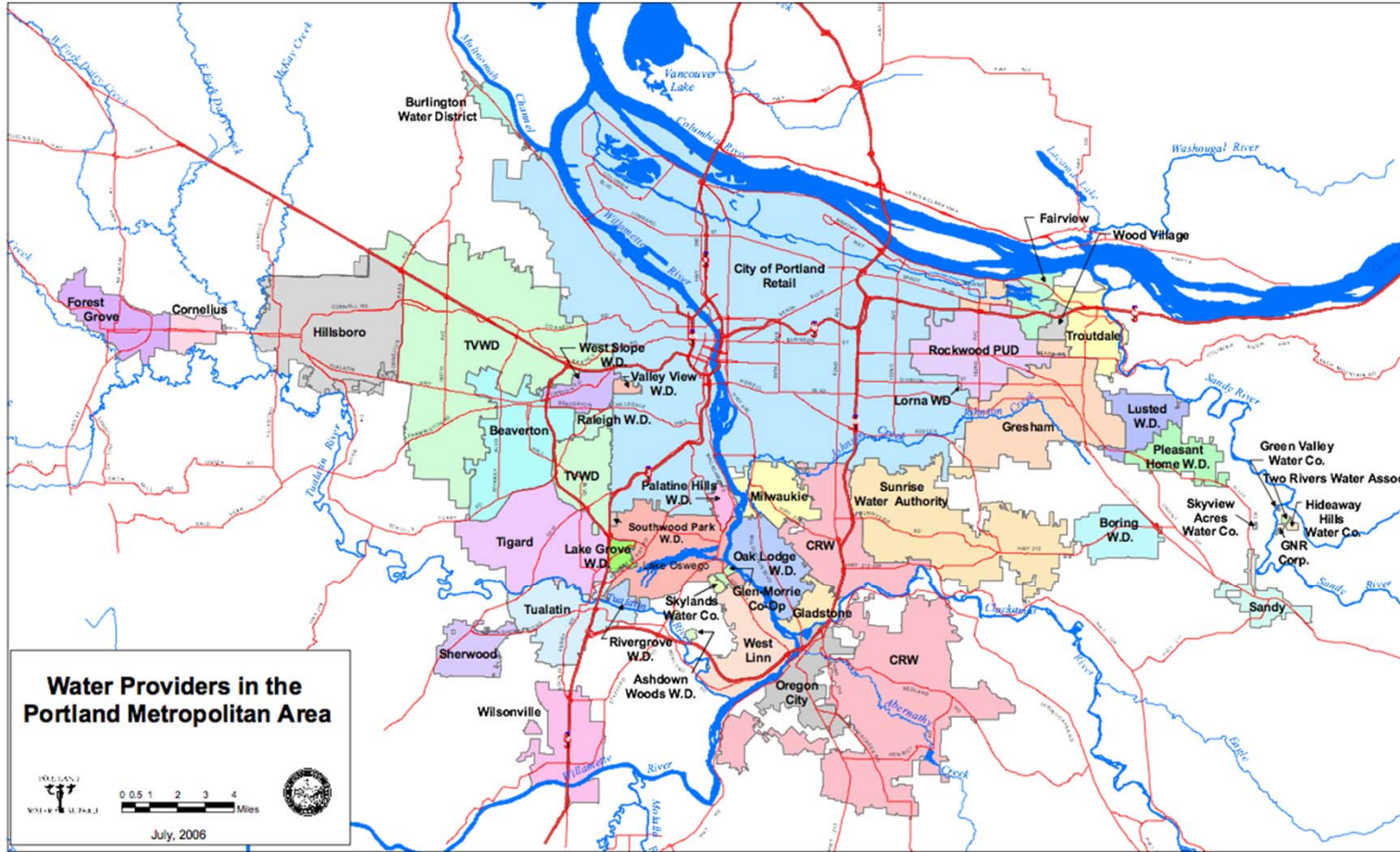


Portland's Water System

Established 1895

Portland's water system delivers water from two high-quality sources to in-town storage facilities where it enters over 2,000 miles of pipe, providing water to more than 545,000 customers throughout Portland.







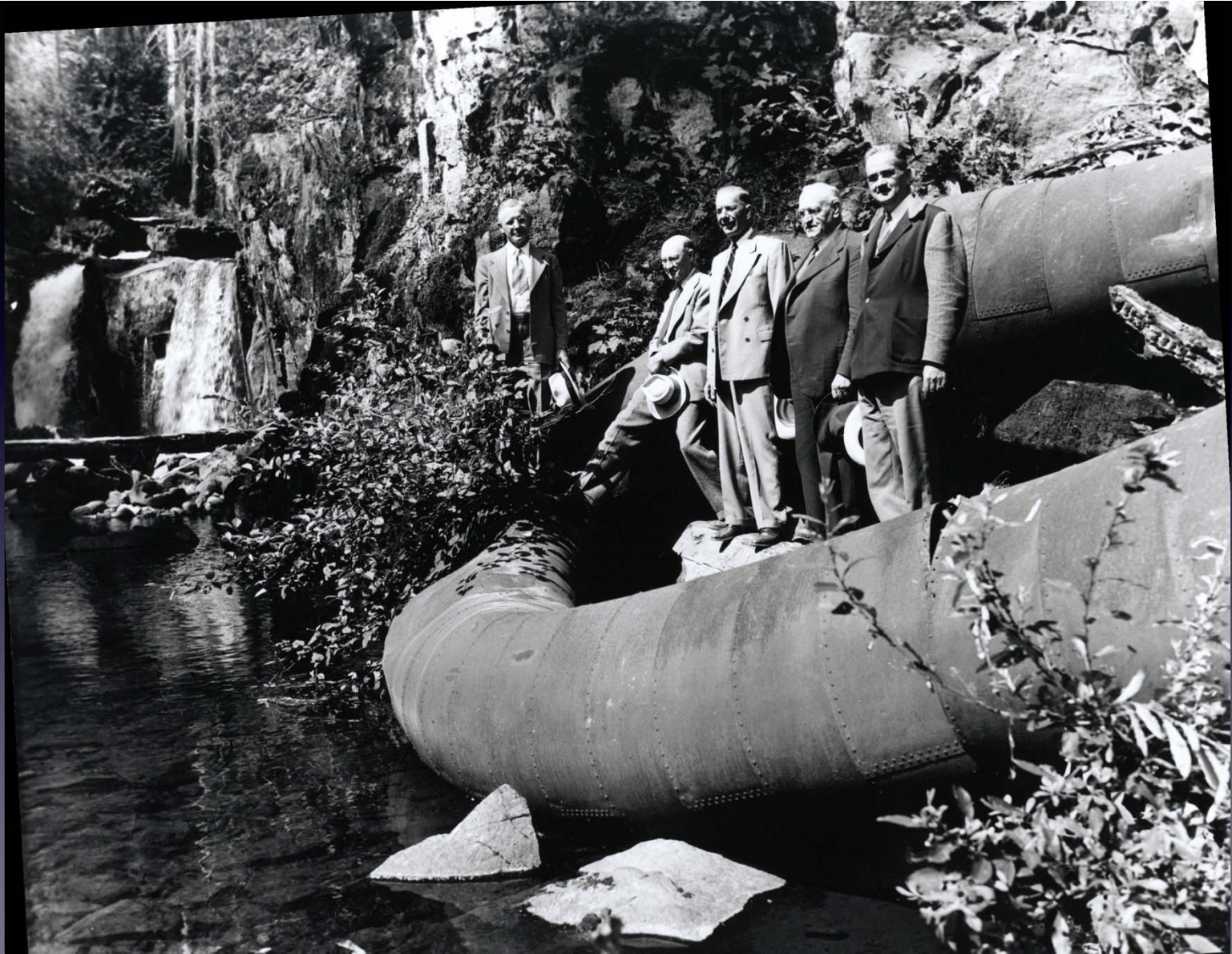




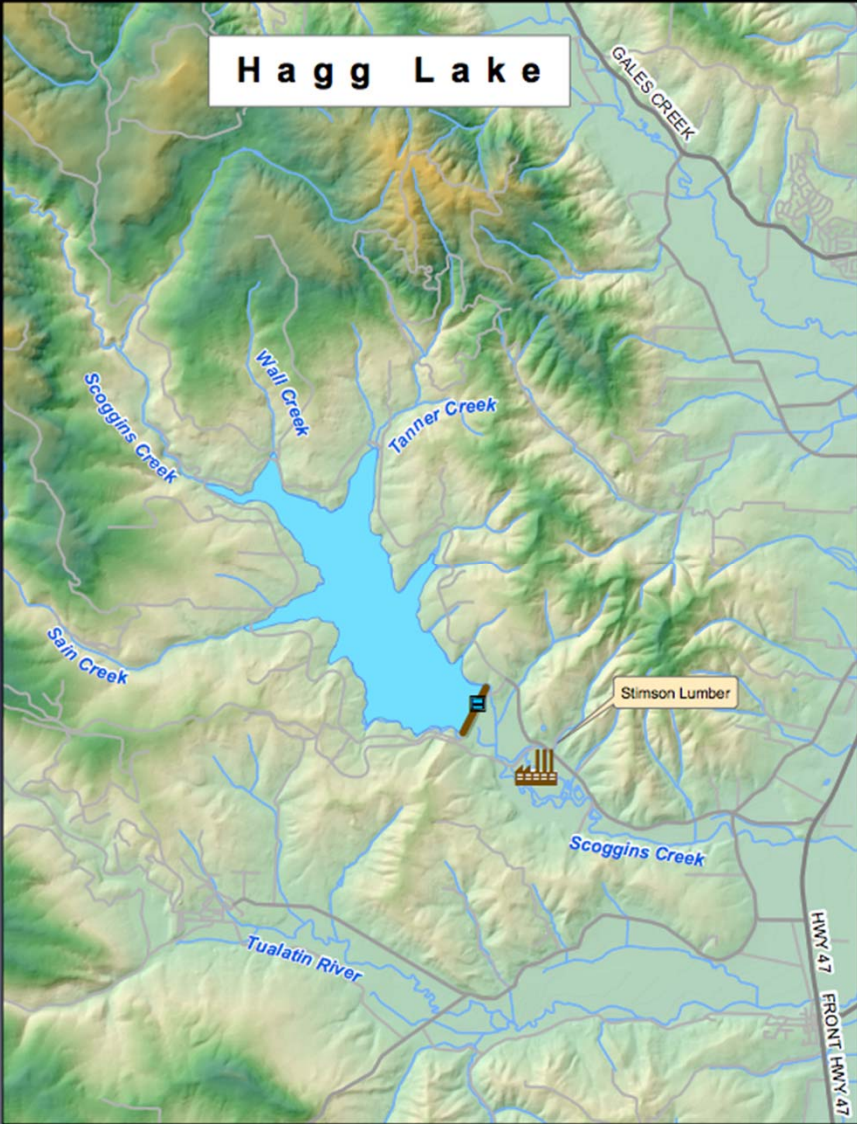




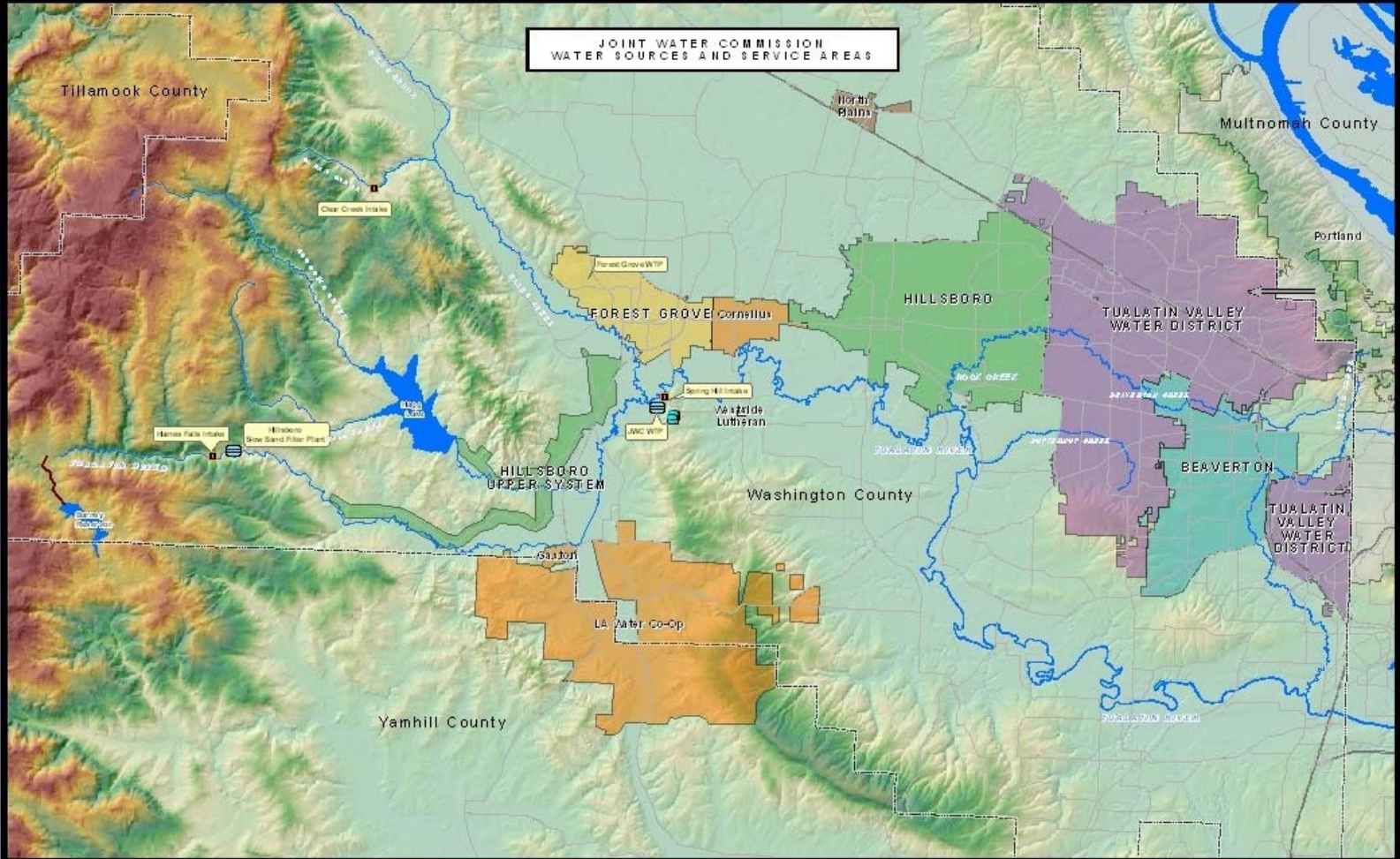


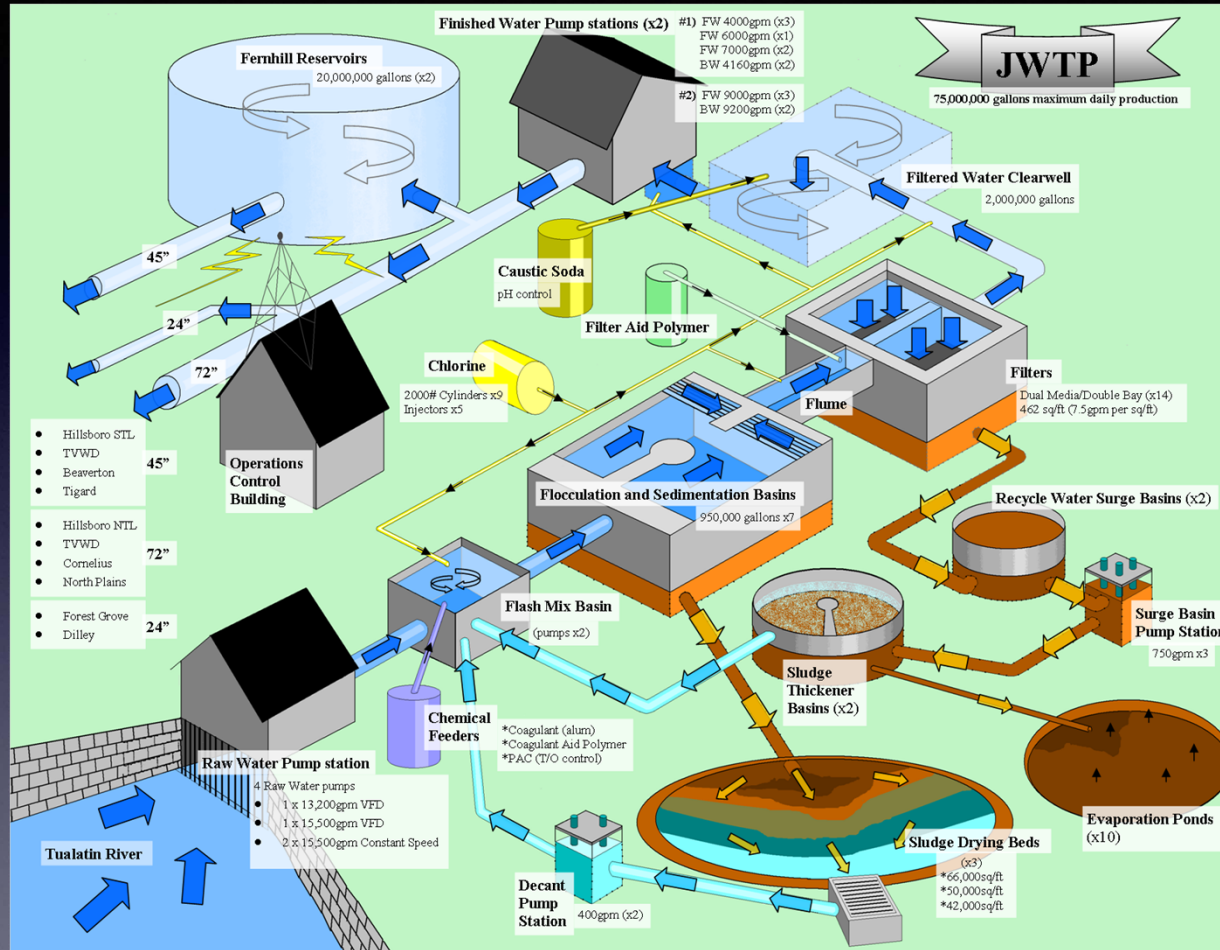




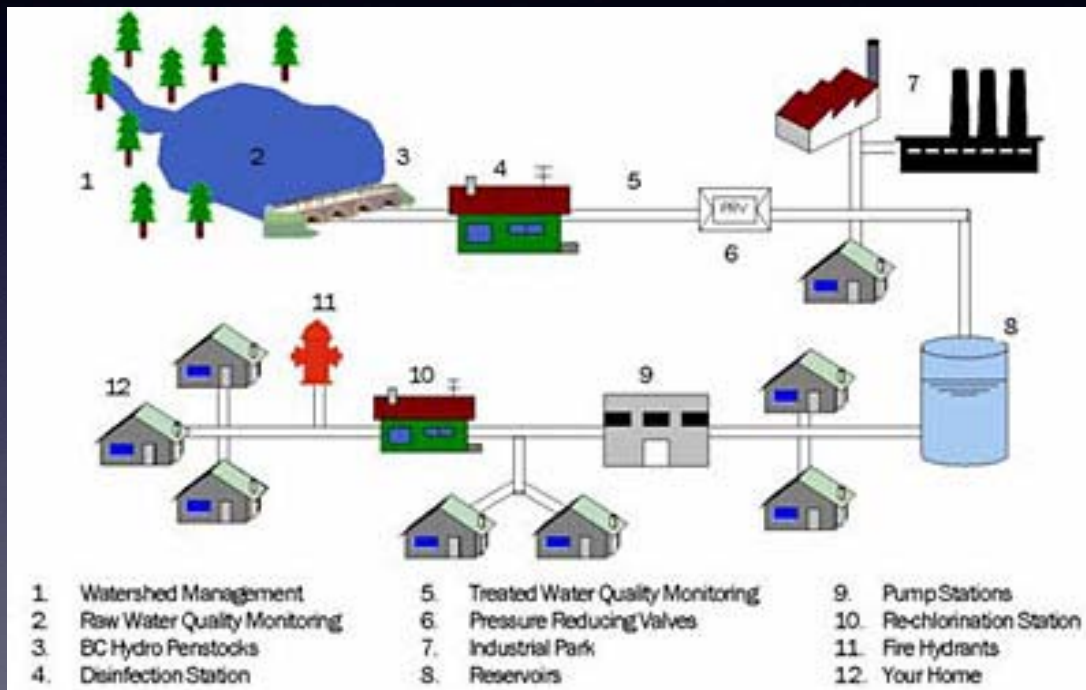




































Remove cover and slide clamp to cover exposed leak...



Secure repair clamp...



Completed vertical
main break repair...









11/12/2010

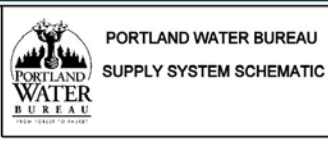
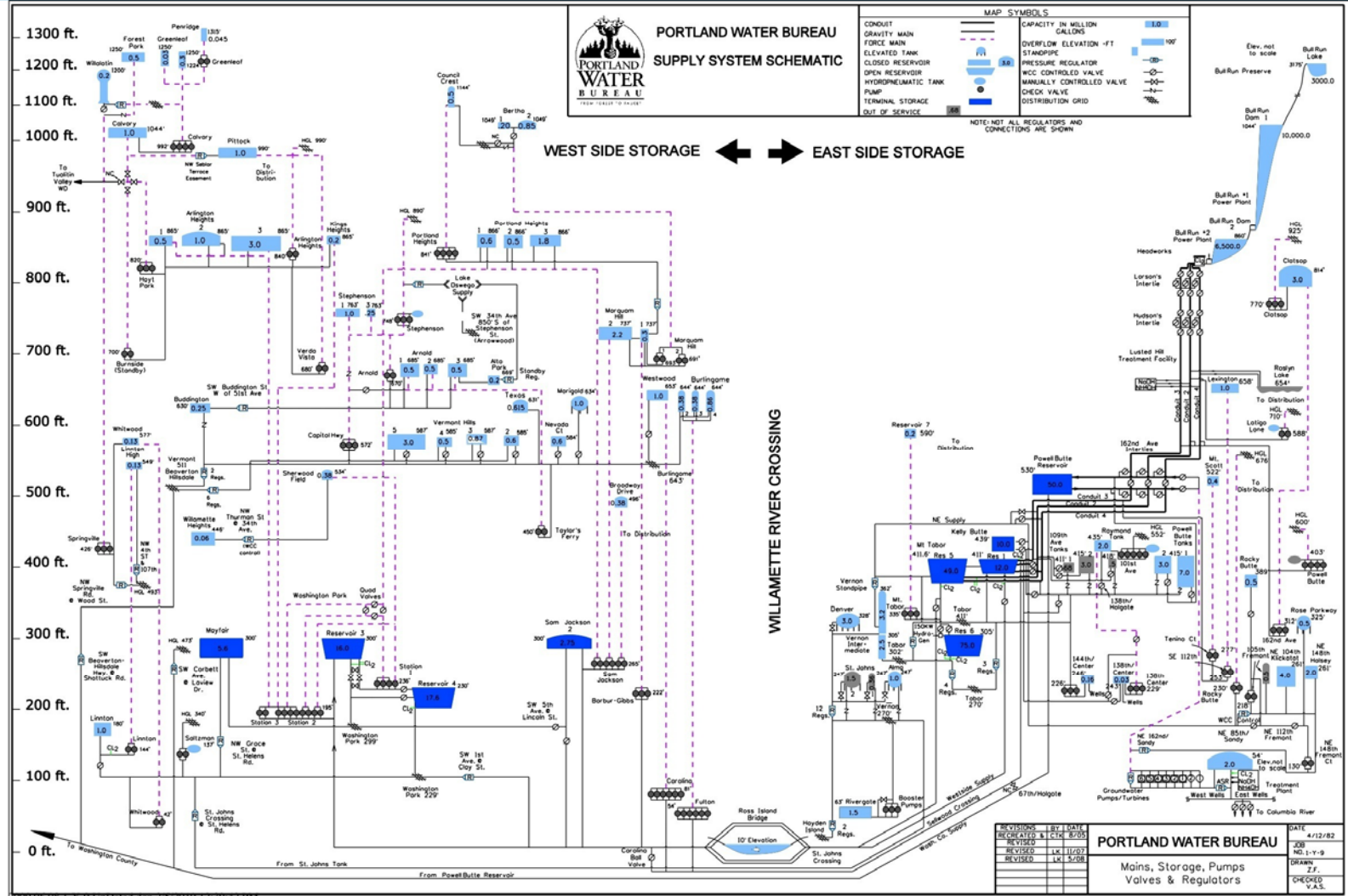


11/12/2010



6" Line Valve





**PORTLAND WATER BUREAU
SUPPLY SYSTEM SCHEMATIC**

MAP SYMBOLS

CONDUIT	CAPACITY IN MILLION GALLONS	10.0
GRAVITY MAIN	OVERFLOW ELEVATION - FT	100'
FORCE MAIN	STANDPIPE	100'
ELEVATED TANK	PRESSURE REGULATOR	100'
CLOSED RESERVOIR	WCC CONTROLLED VALVE	100'
OPEN RESERVOIR	MANUALLY CONTROLLED VALVE	100'
HYDROELECTRIC TANK	CHECK VALVE	100'
TERMINAL STORAGE	DISTRIBUTION GRID	100'
OUT OF SERVICE		

WEST SIDE STORAGE ← → EAST SIDE STORAGE

WILLAMETTE RIVER CROSSING

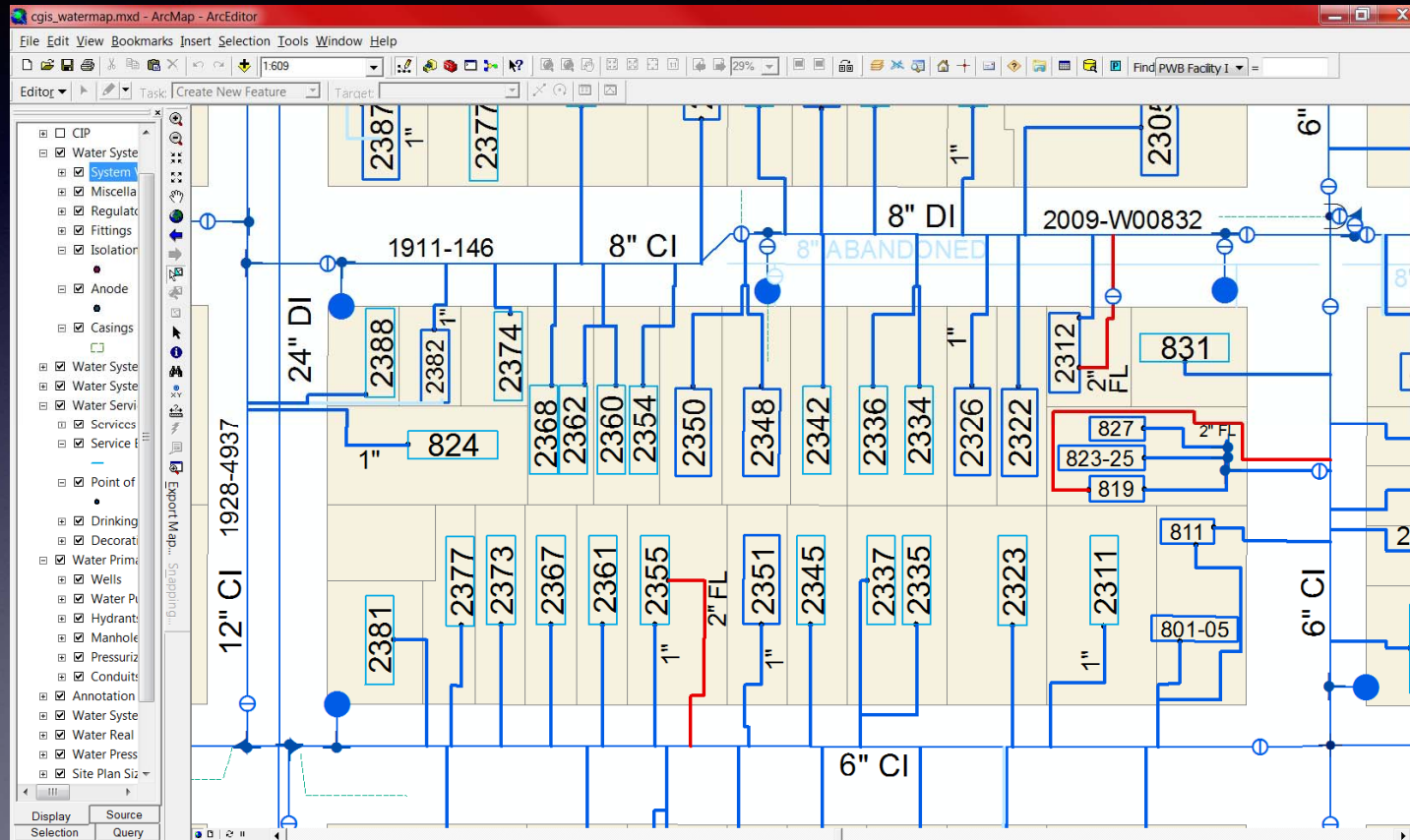
REVISIONS	BY	DATE	DATE
RECHECKED	CTR	8/05	4/12/82
REVISED	LK	11/07	JR
REVISED	LA	3/08	ND 1-Y-9

PORTLAND WATER BUREAU
Mains, Storage, Pumps
Valves & Regulators

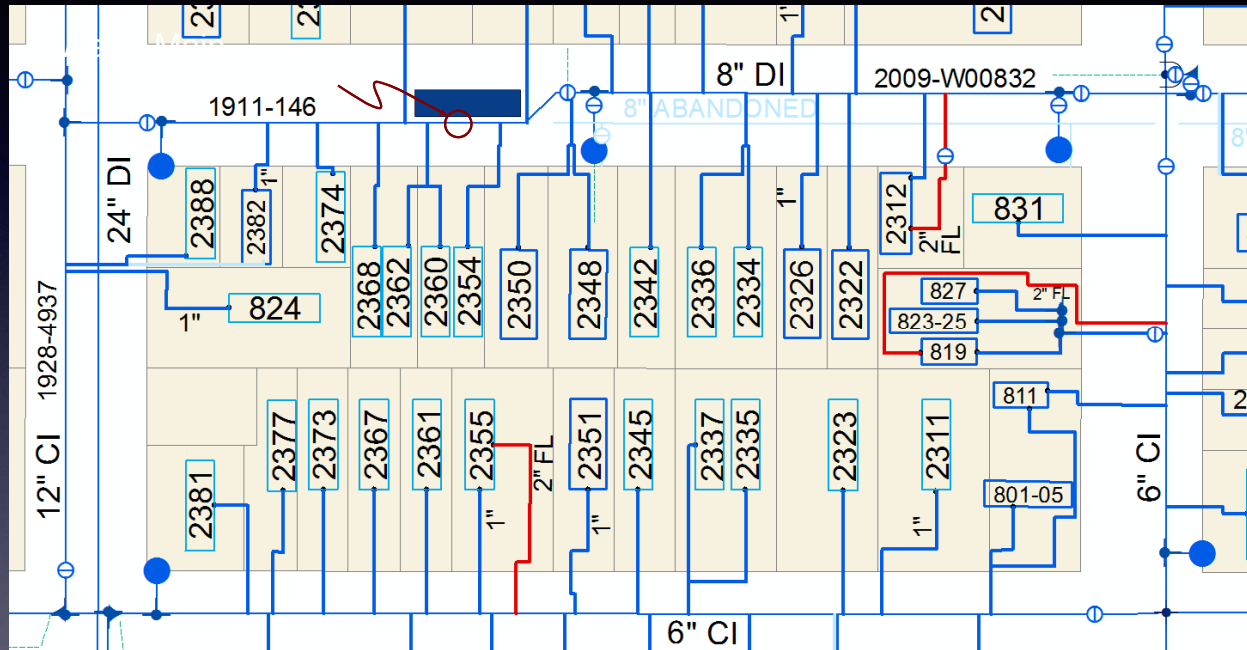
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The Water System



The Water System



1,722 ft of 6" & 8" DI Water Main
Costs \$190,000 to Install*

The Business District Block Water System

1,722 ft of 6" & 8" DI Water Main
Costs \$195,000 to Install

4 Fire Hydrants @ \$4,539 = \$18,156

34 1" Services @ \$2,428/ea. = \$82,552

Water Infrastructure for 1 City Block = \$291,000.*

*Does Not Include Permits, SDC, Engineering, Dump and Fill Costs,
Paving, Overhead, et al

The Residential Block Water System

1,722 ft of 6" & 8" DI Water Main
Costs \$195,000 to Install

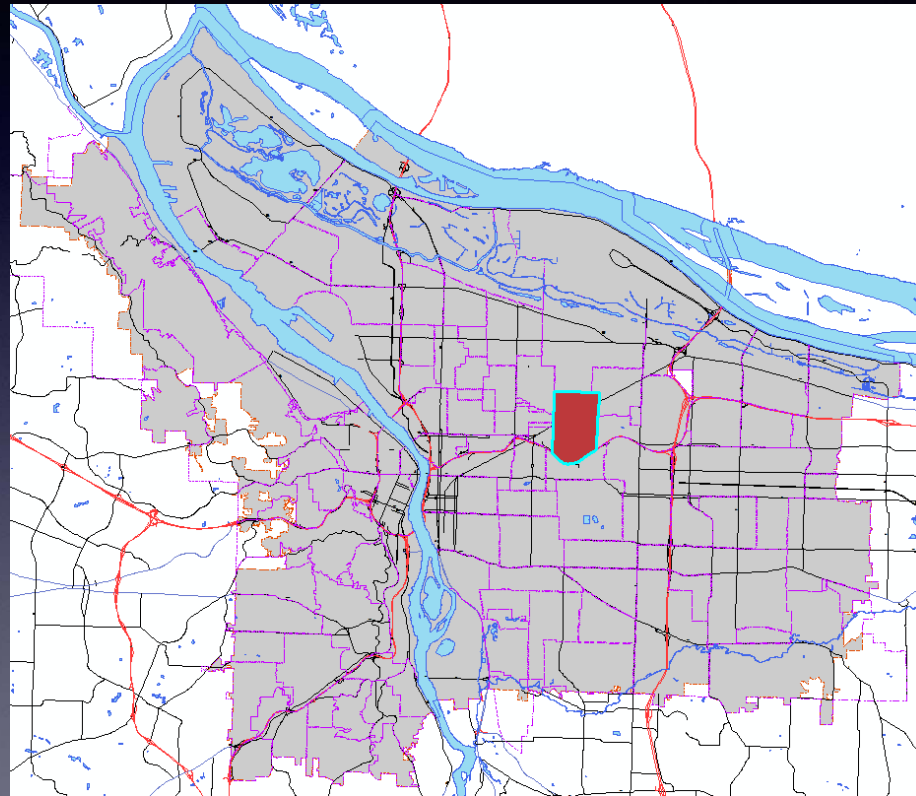
1 Fire Hydrant @ \$4,539 Cost = \$4,539

20 1" Services @ \$2,428/ea. = \$48,560

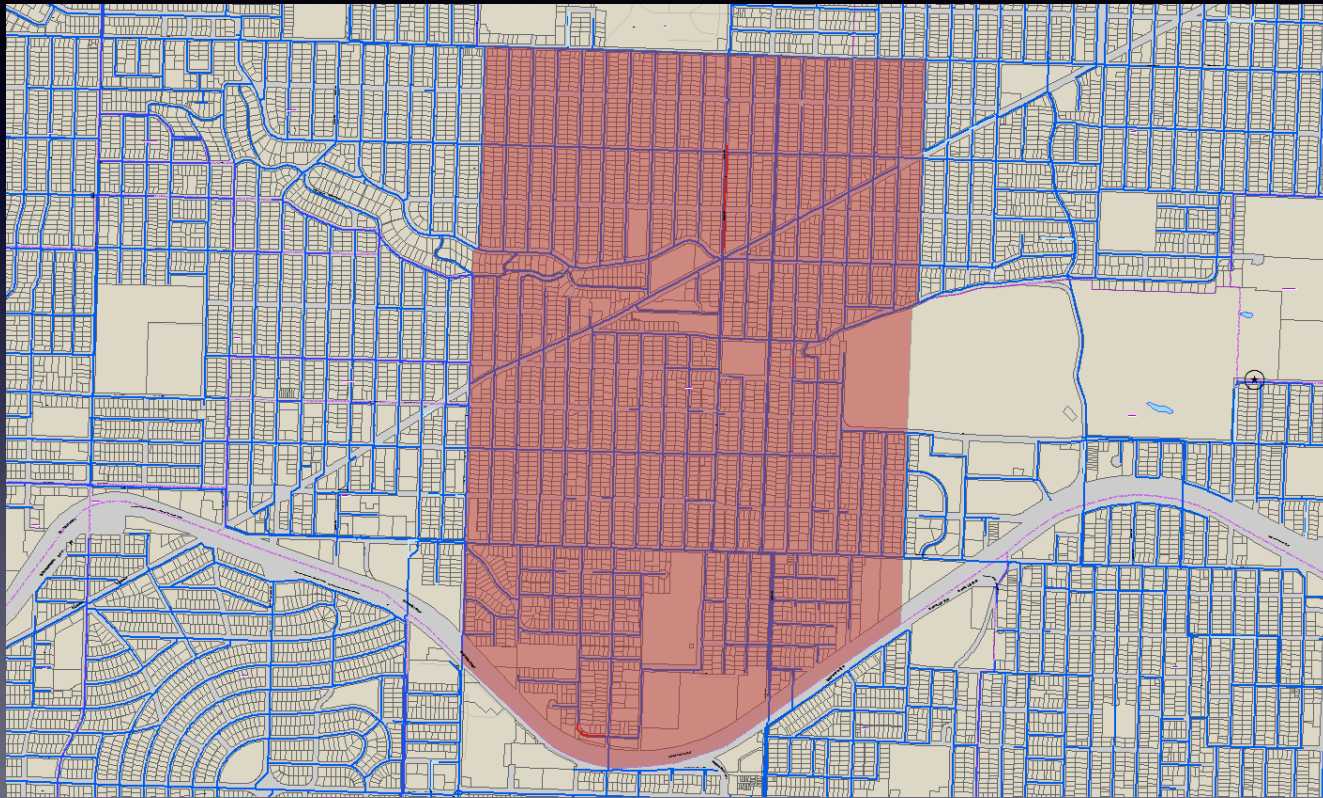
Water Infrastructure for 1 City Block = \$243,099.*

*Does Not Include Permits, SDC, Engineering, Dump and Fill Costs,
Paving, Overhead, et al

The Rose City Park Neighborhood



The Rose City Park Neighborhood



Approx 234 blocks, 3,600 Parcels

The Rose City Park Neighborhood Water System

178,473 ft of 6" & 8" DI Water Main
Costs \$20,246,000 to Install

221 Fire Hydrants @ \$4,539 = \$1,003,119

3,756 1" Services @ \$2,428/ea. = \$9,119,568

Water Infrastructure for Neighborhood
= \$30,369,000.*

*Does Not Include Water Supply & Transport, Tanks, Pump Stations, et al





“You don’t cut ribbons for new water mains, but that’s what really matters”

Stephanie Minor, Mayor of Syracuse, NY

Questions?

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