Bursting at the Seams – Serving Growth in a Small Water System

April 26, 2018
PNWS-AWWA Annual Conference
Tacoma, WA

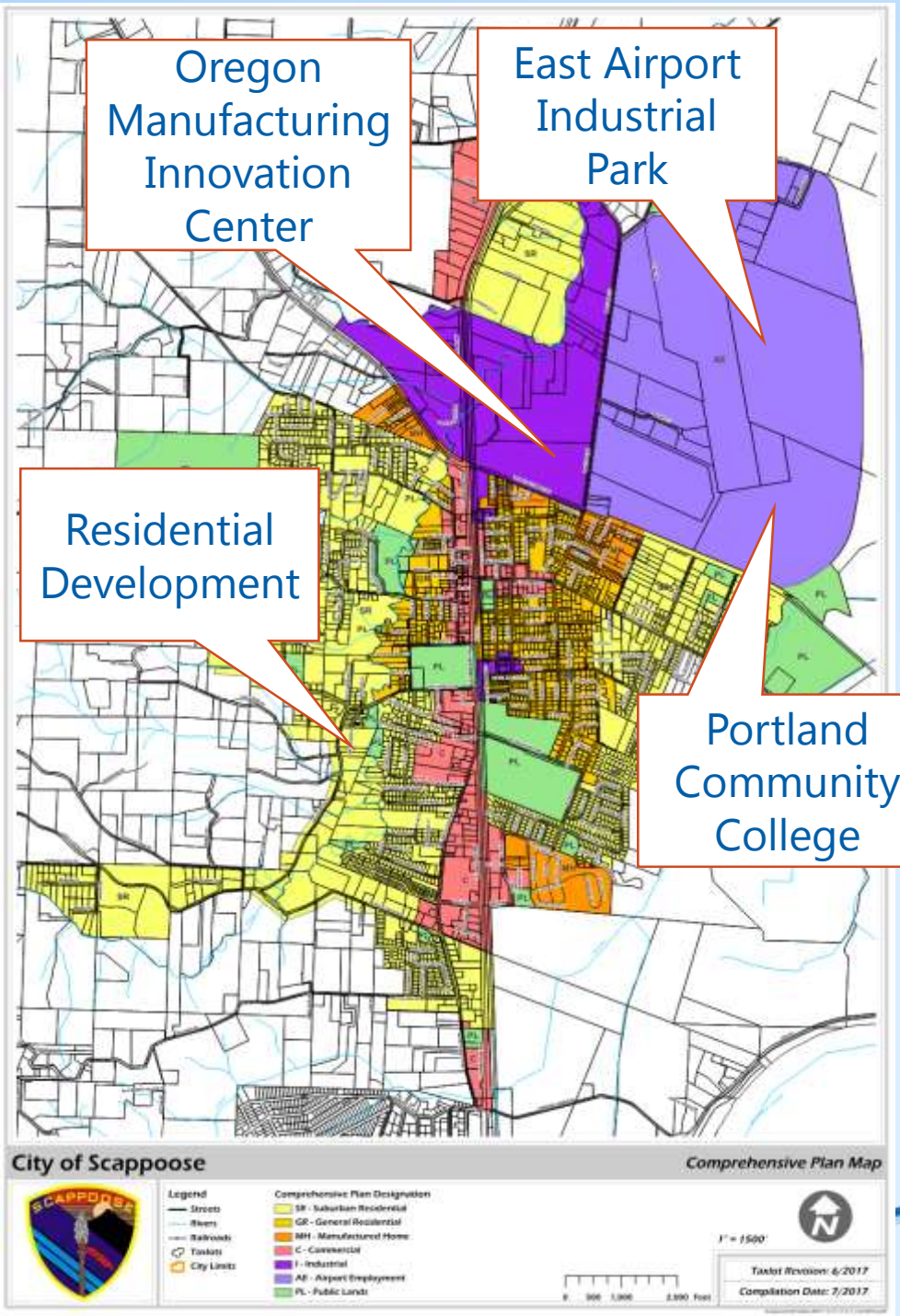
carollo
Engineers...Working Wonders With Water®

Agenda

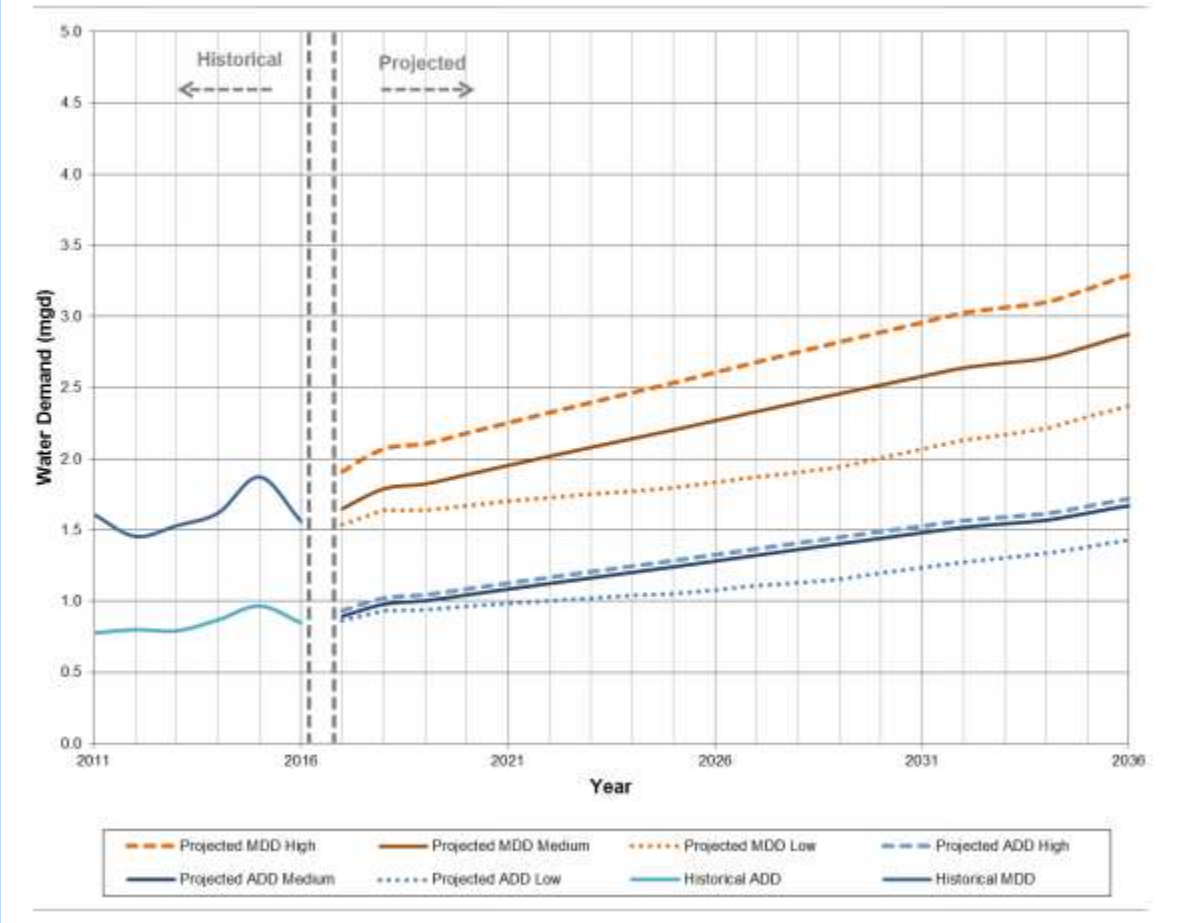
- Identifying and tracking level of service
- Establishing redundancy goals to aid in O&M
- Prioritizing new facilities to keep up with growth

Where is Scappoose?

Bursting at the seams



Strong growth projected for the next 20 years



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Level of service set by Public Works Standards

SECTION: 4.0000 — WATER MAINS

4.0010 — GENERAL DESIGN REQUIREMENTS

Performance Standards - Water distribution systems shall be designed to meet Oregon Administrative Rules Chapter 333 (inlcuding ORS448), AWWA Standards, and guidelines of the Water System Master Plan, April 1997, and its updates.

Water system design shall provide adequate flow for fire protection during projected maximum water usage and consumption. Required water system demands shall be met while maintaining the minimum operating pressures required by the State (20psi). For single family residential areas the minimum static pressure shall be 35 PSI, and the minimum fire flow shall be 1,000 GPM. For all ents, including areas with single family homes larger than 3,600 s.f. or mixed-use areas, flow shall be as determined by the Fire Department up to a maximum of 3,500 gpm. For ove 3,500 gpm, the development shall provide supplemental fire flow as approved by the

Water system design shall meet distribution needs for projected maximum daily demand within a given service area. New water systems shall allow for future extensions, beyond present developme nt with the Master Plan. New water systems shall be sized according to the current zo eds, velocity standards and water modeling determinations.

Min Pressure

Fire Flows

Sized based on water modeling

Identifying Level of Service Goals beyond the distribution system

- Supply Redundancy
- Treatment Reliability
- Seismic Resiliency – In progress

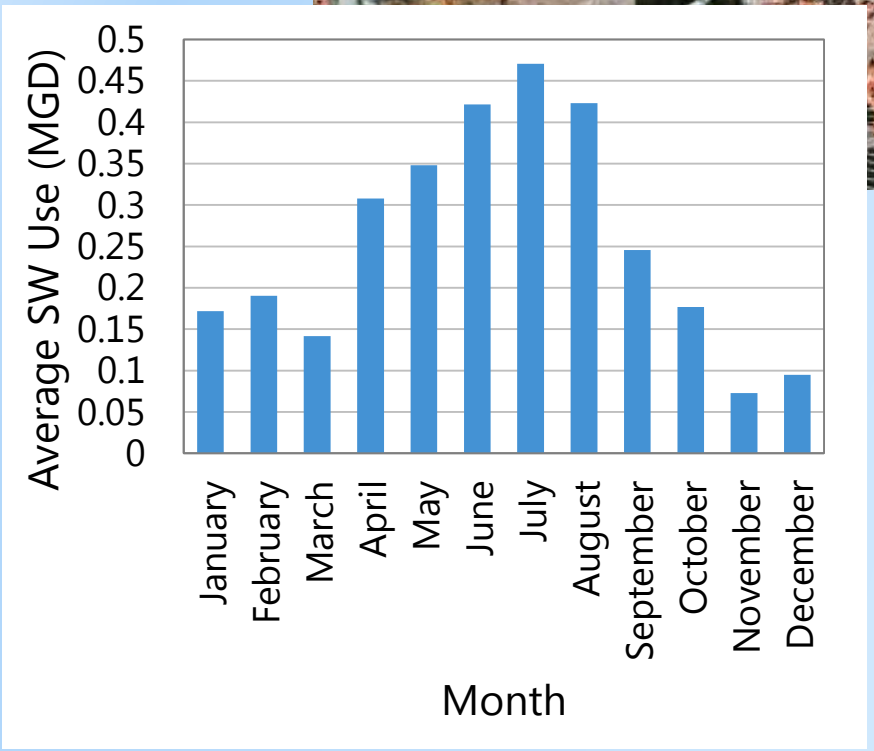
OHA Drinking Water Services (DWS) records show that a new master plan for [water system] is due soon or is past due.

There is a new requirement that any master plan submitted to DWS after January 10, 2018 must include a seismic risk assessment and mitigation plan if a water system is fully or partially in Areas VII to X based on the Map of Earthquake and Tsunami Potential. This map and other information about master plans can be found at http://www.healthoregon.org/DWP, then click on Plan Review. If your water system does not have facilities located in Areas VII to X, a statement to this affect must be included along with the master plan. Otherwise, the plan must include:

- Identifies critical facilities capable of supplying key community needs, including fire suppression, health and emergency response, and community drinking water supply points;
- Identifies and evaluates the likelihood and consequences of seismic failures for each critical facility;
- Encompasses up to a 50-year planning horizon and includes recommendations for minimizing water loss from each critical facility, capital improvements, or further study or analysis.

Establish parameters to track Level of Service

Example: Tracking Surface Water Use



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Multiple approaches to protect against loss of infrastructure

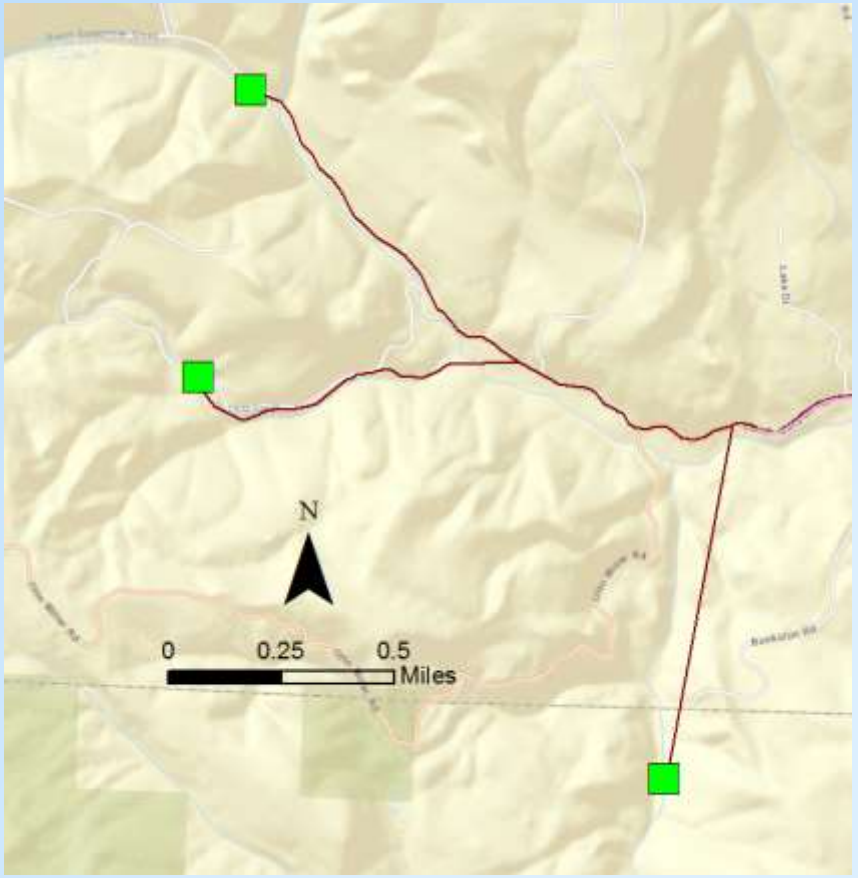
1. Maintenance Best Practices
2. Redundant Equipment
3. Backup Power
4. Supply Diversification
5. Excess Supply Capacity

Reliability

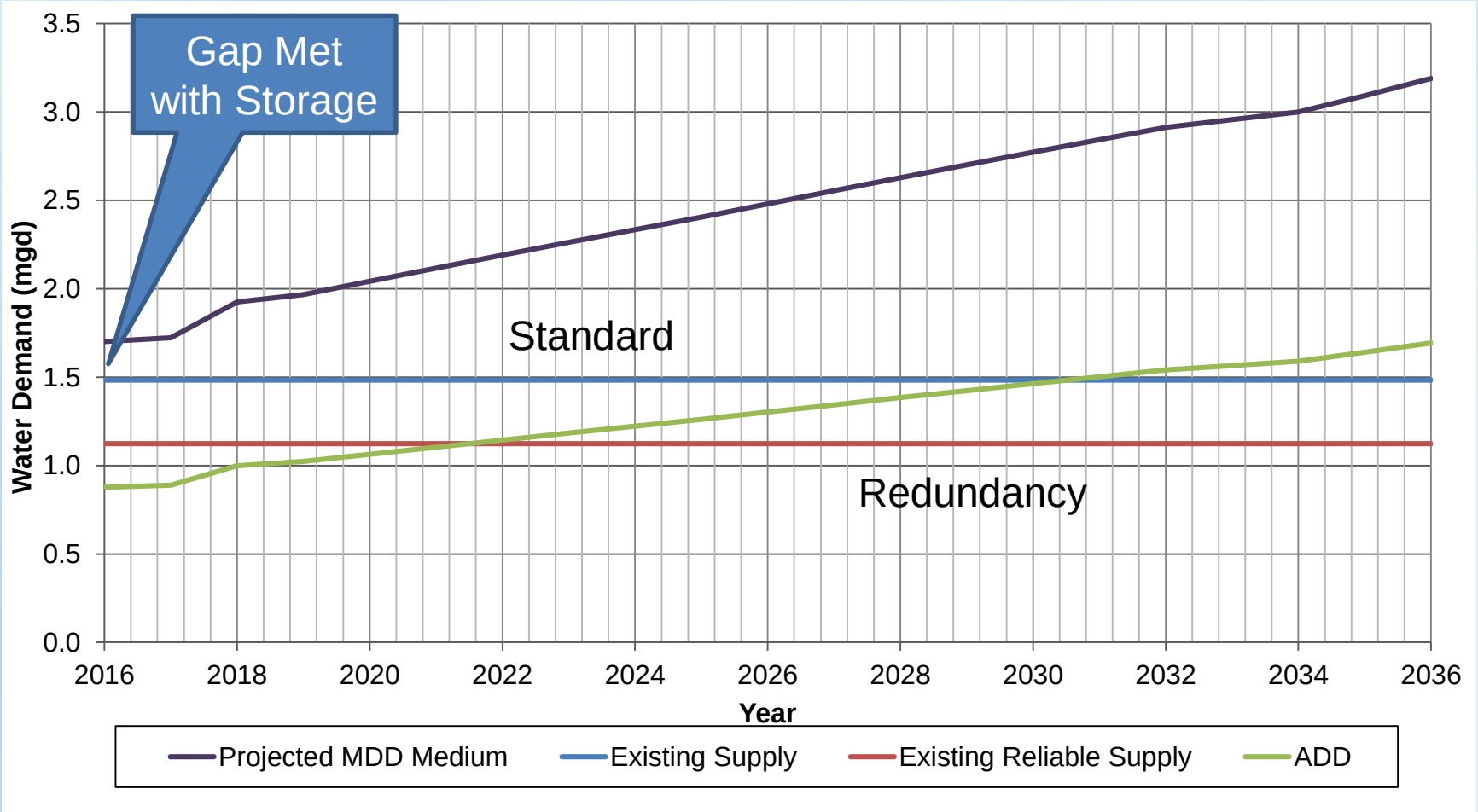
Redundancy

Supply redundancy criteria based on historical challenges

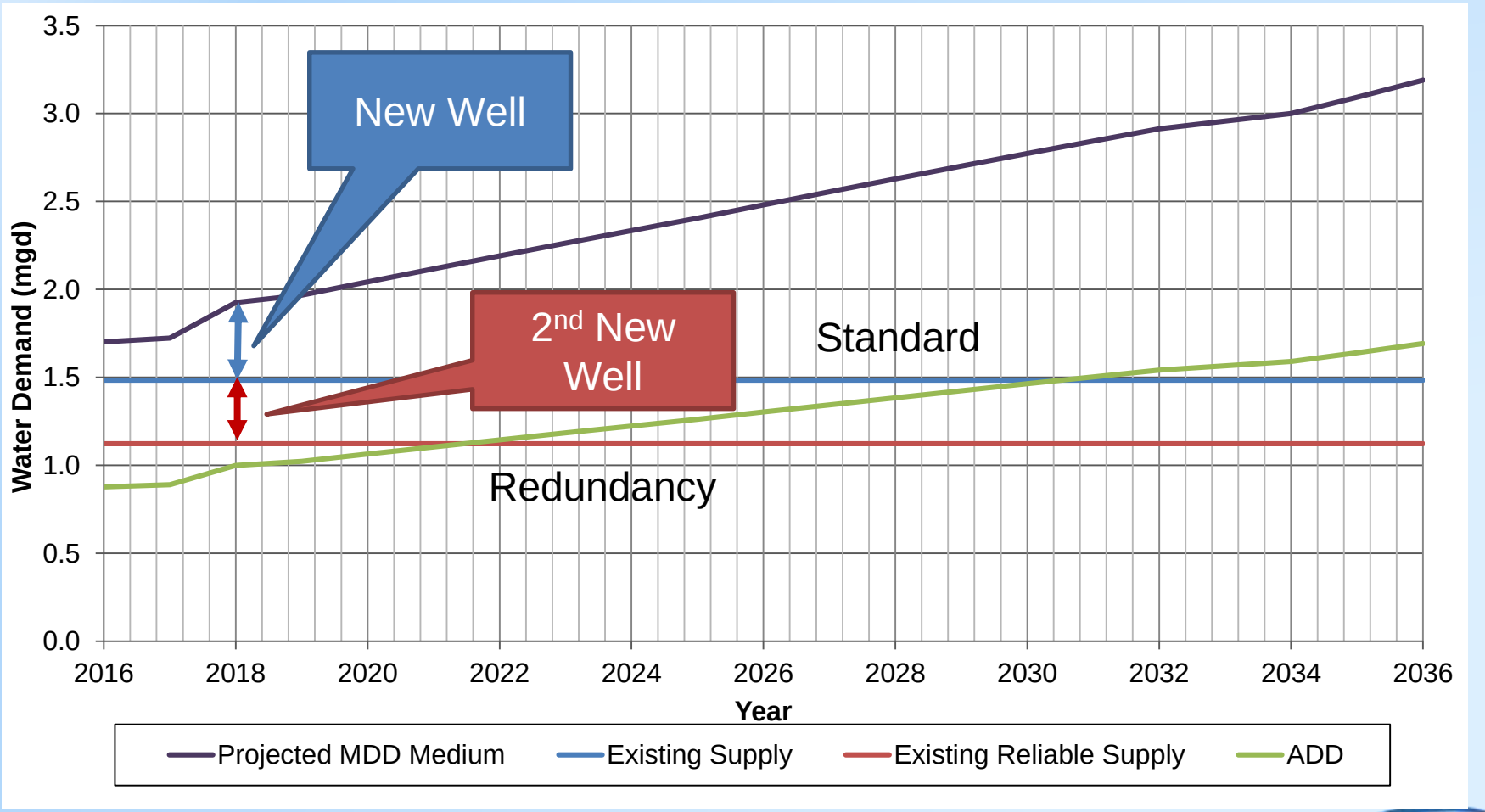
- Typical Criteria
  - Largest source out-of-service
  - 85% of capacity
- Scappoose
  - Surface water source offline



Redundant Supply Level of Service increases immediate supply needs



Additional infrastructure needed for supply redundancy



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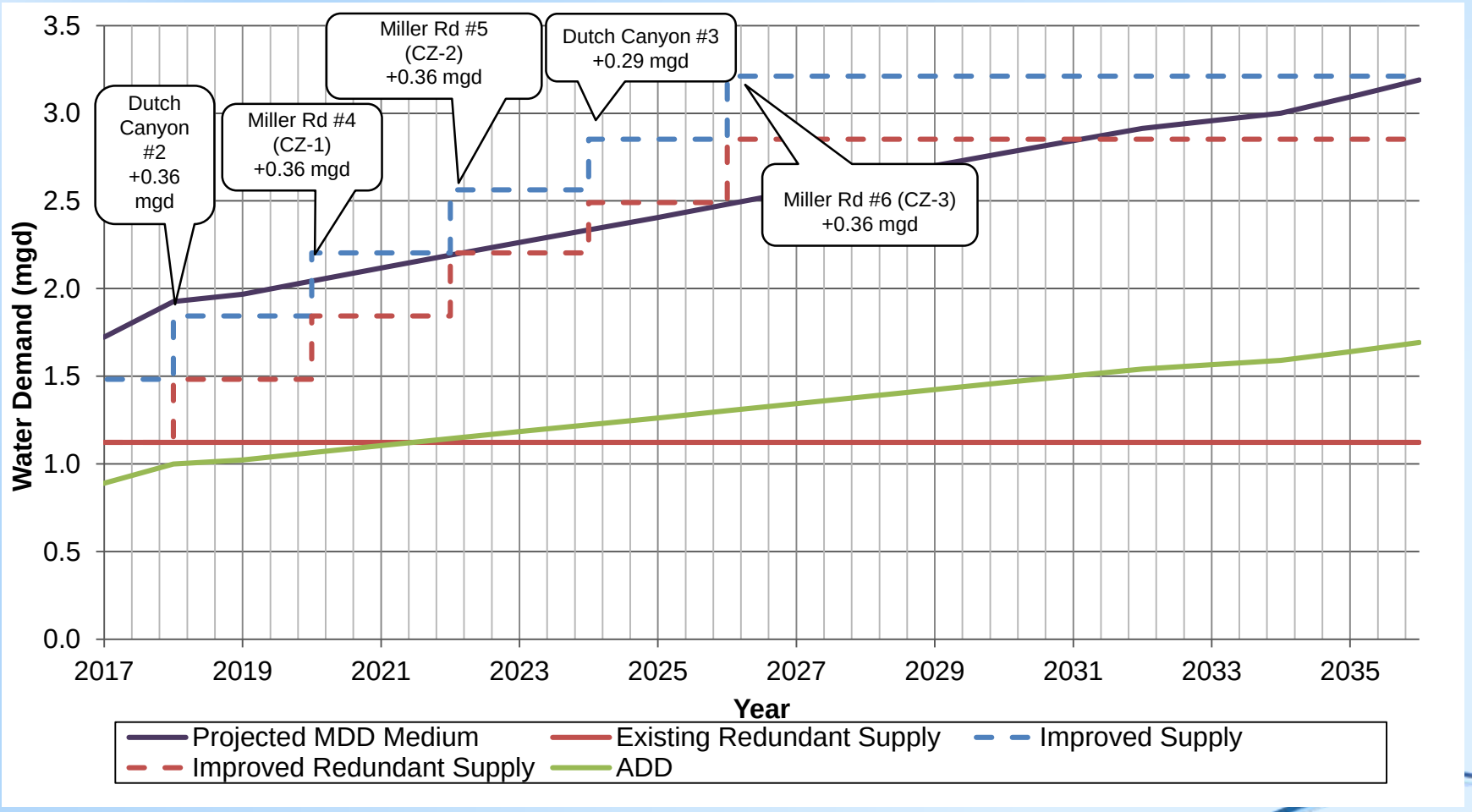
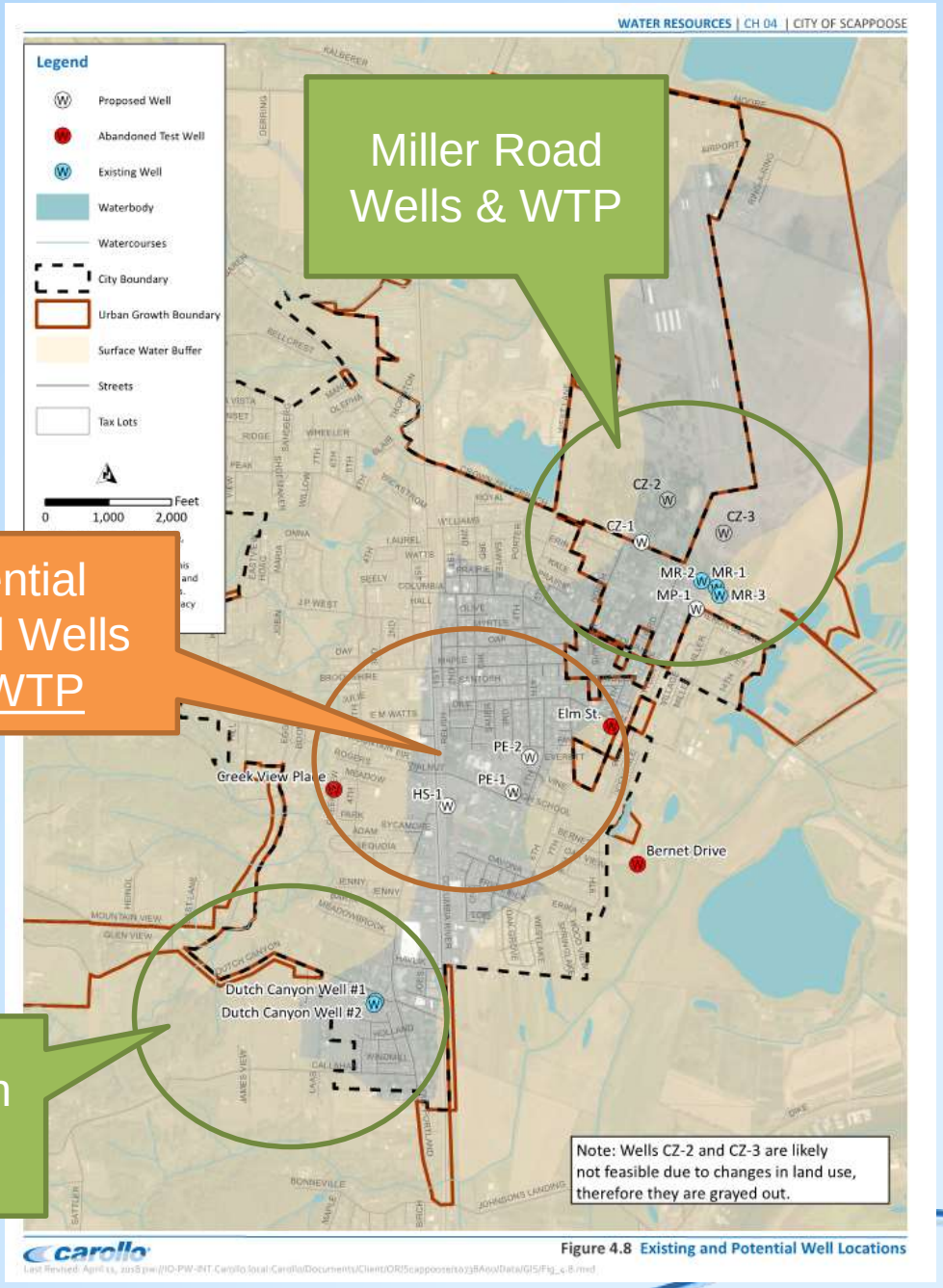
The City can build 5 new wells before needing new treatment

New Wells 1 2 3 4 5

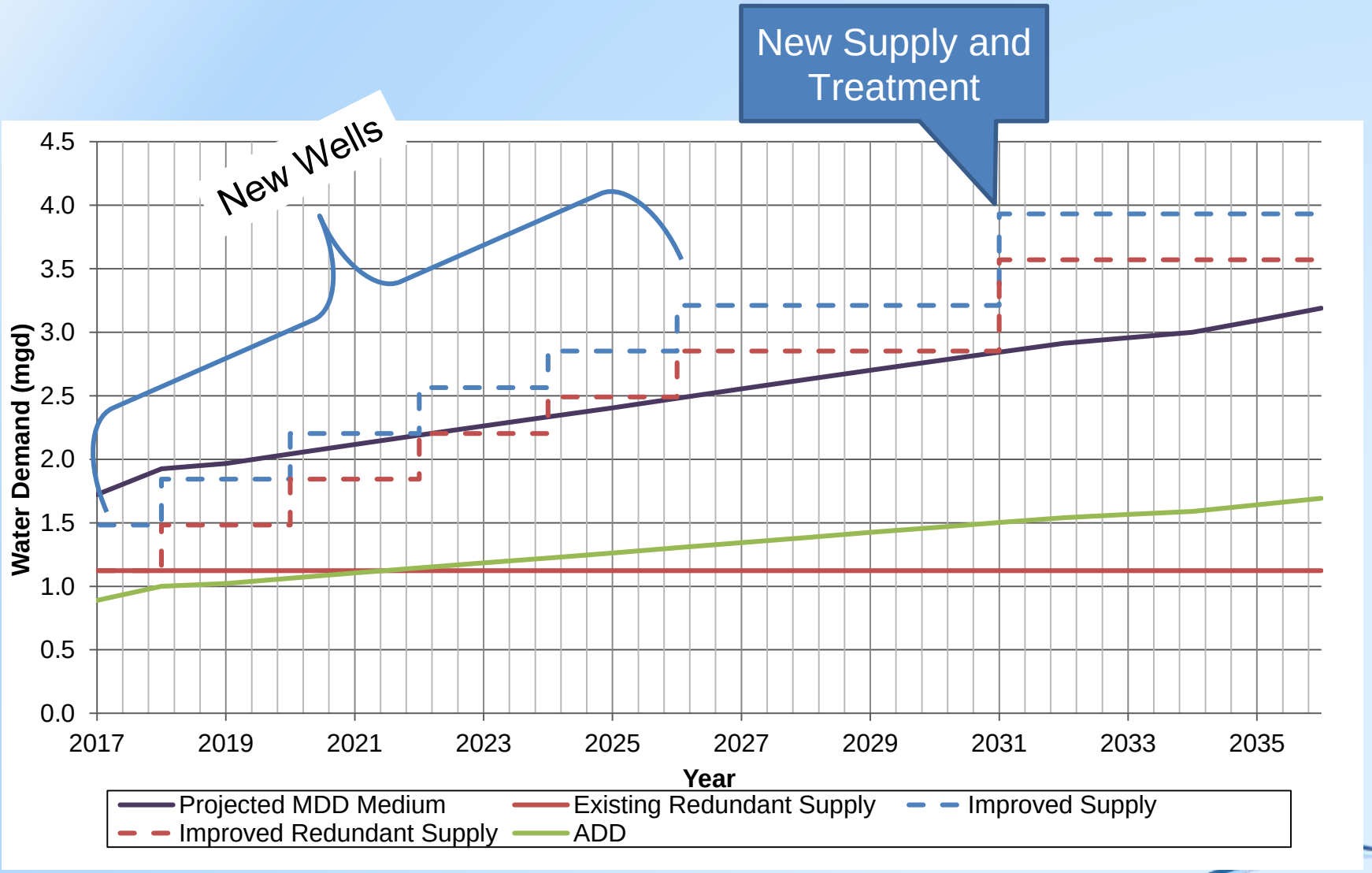


Where should the new wells go?

- ¼ mi surface water buffer very limiting
- Iron & Manganese treatment is required



New water supplies needed in 2031

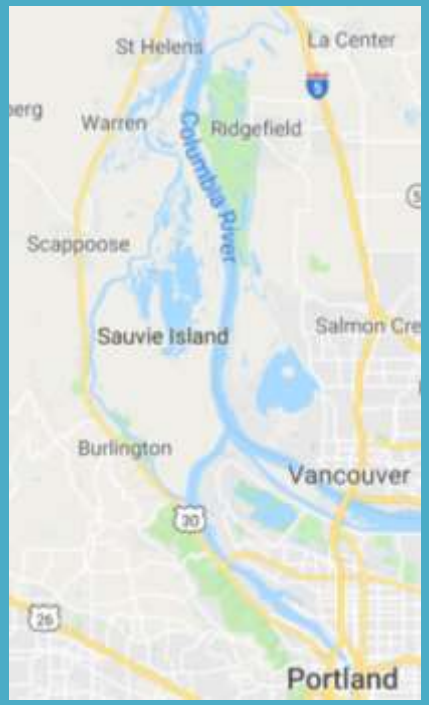


What supplies are available?

Existing Surface Water (South Scappoose Creek)

Dutch Canyon Groundwater

Miller Road Groundwater



GREEN SHORT-TERM
RED LONG-TERM
SEISMIC IMPROVEMENTS
LIFE-SAFETY IMPROVEMENTS
REPAIR AND REPLACE IMPROVEMENTS
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Interconnection with St. Helens (9.5 miles north)

New surface water sources balance available supply and water quality

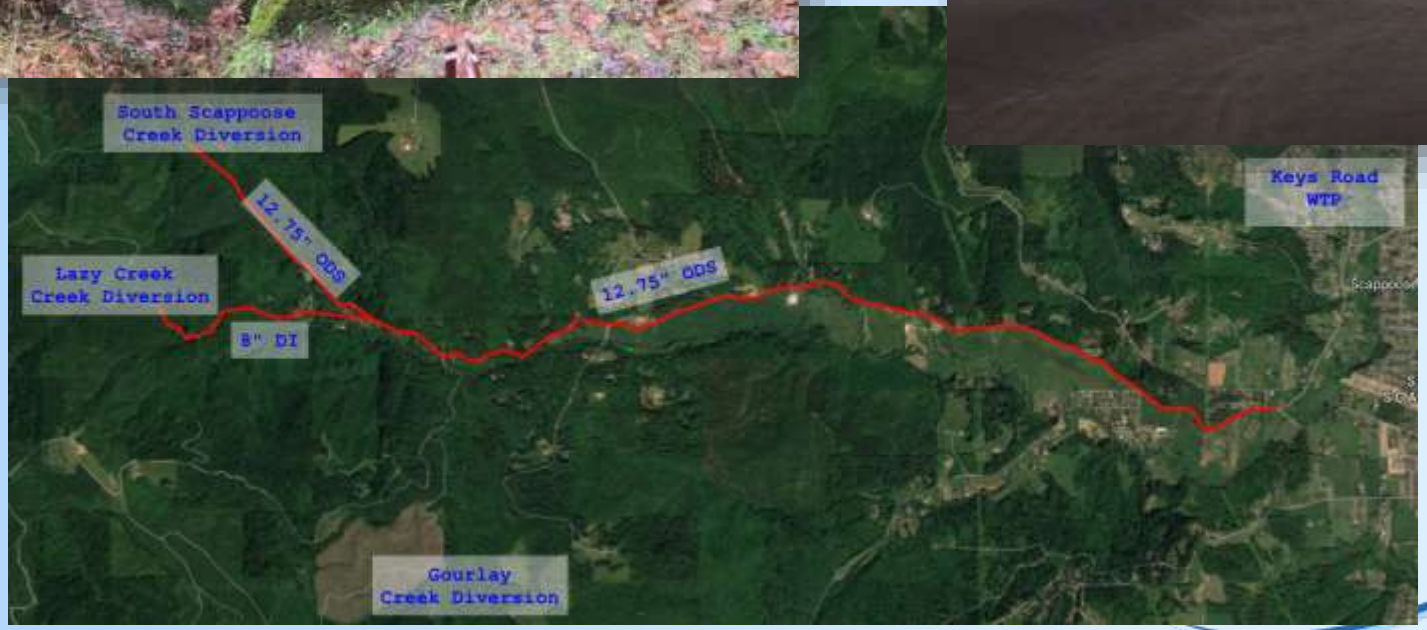
- Level of service for CEC not well defined

South Scappoose Creek

Multnomah Channel

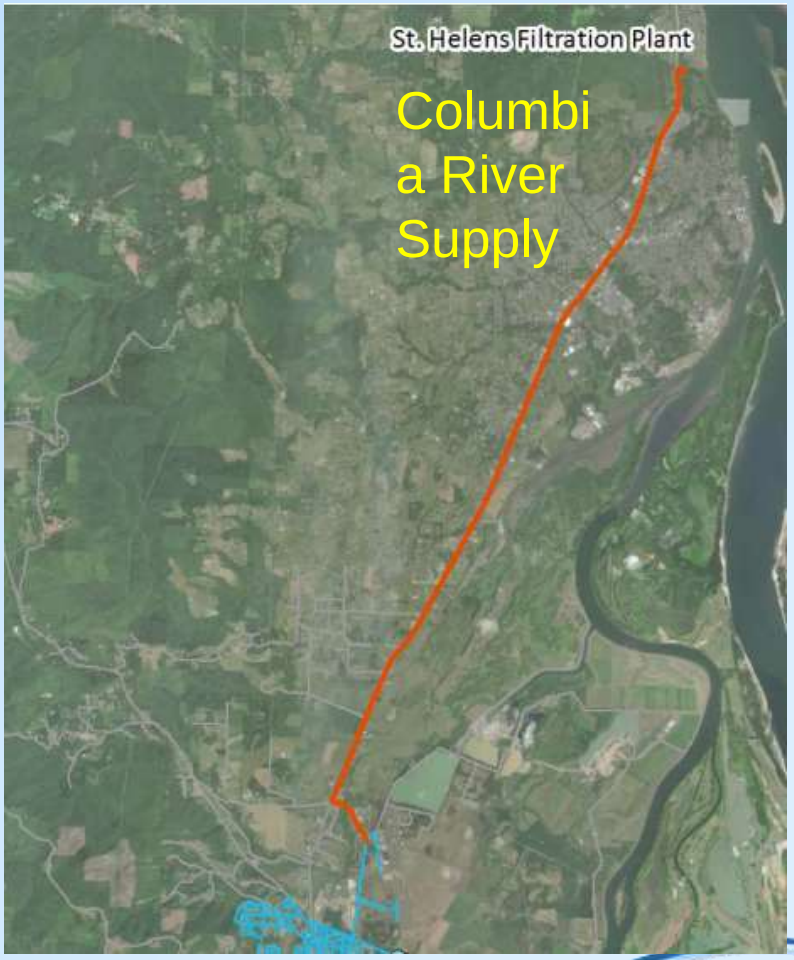
John Prazan, 2016

Existing surface water infrastructure needs R&R and is seismically vulnerable



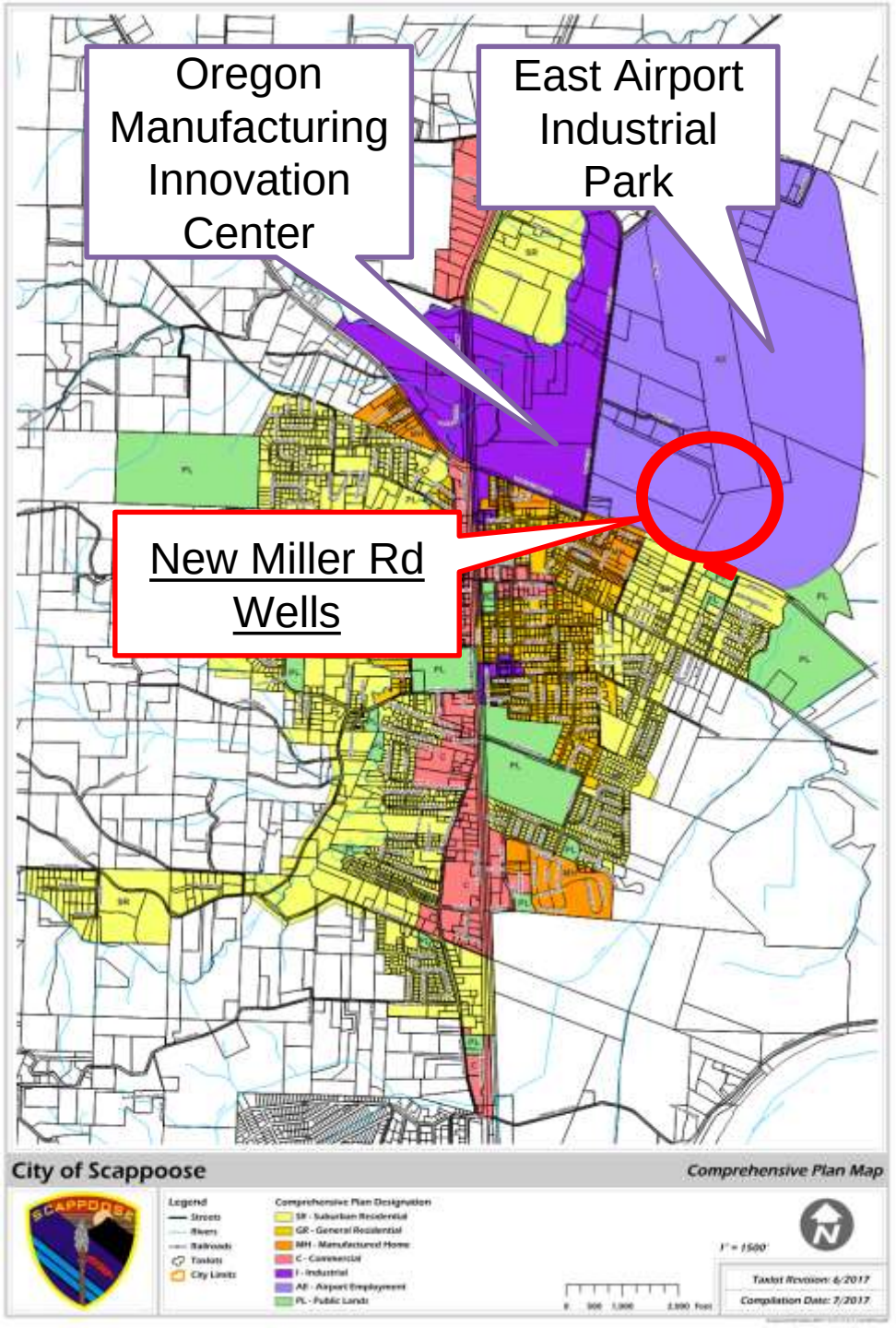
Long transmission makes St. Helens Interconnection less compelling

- Proven Supply
- Shared O&M
- Limited redundancy
- Seismic resiliency concerns
- Water age/mixing concerns



Are Miller Road wells the best use of the land?

- Hydrogeology
- Wellhead protection



Even with the best LOS, you still need land in a fast growing community

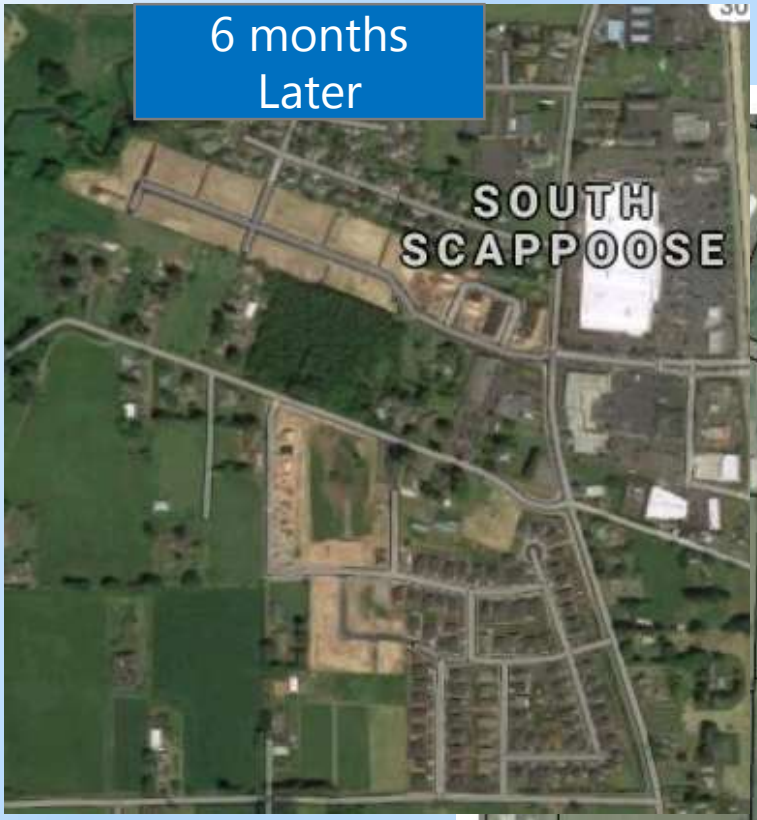
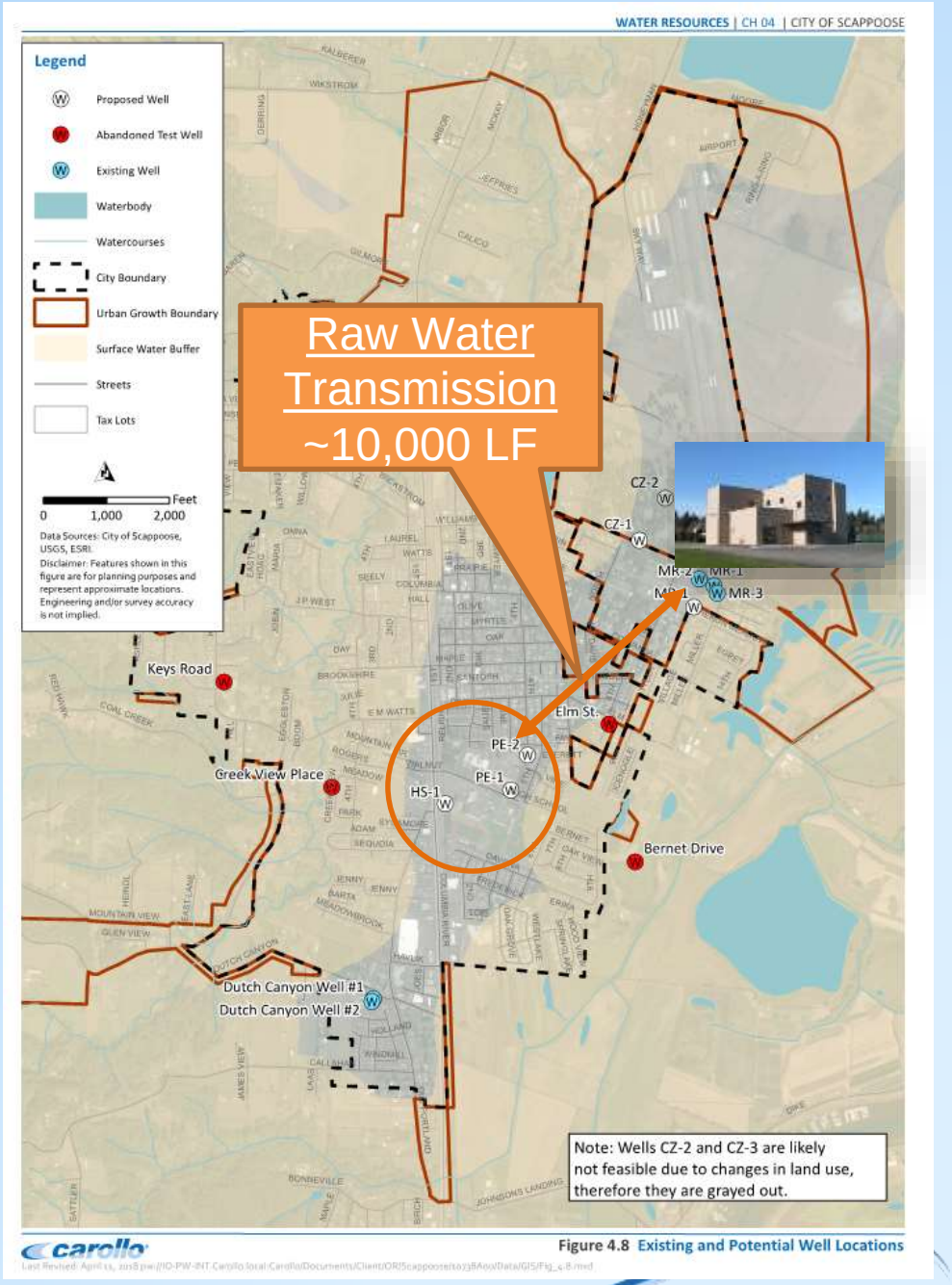


Figure 4.4 Dutch Canyon Wells and Surrounding Area

Other well locations require long conveyance

- Limited Redundancy
- Unknown water quality



The answer is “we don’t know” what the future supply should be

- Highly sensitive to the location and yield of groundwater wells
  - 7 wells X 0.36 mgd (250 gpm) OR
  - 5 wells X 0.50 mgd (350 gpm)

- Collect additional information for 3 years to refine choices
  - 2 wells to be completed in period

Action Items defined for City to investigate Future Supplies

Table 4.22 Summary of Action Items for Developing Future Supplies

Supply Option	0 – 2 Years	2 – 5 Years
Existing Surface Water Supplies	Measure streamflow at existing diversion structures.	Perform leak detection on raw water transmission mains. Install pigging ports for sediment removal. Perform life-safety and other rehab improvements to existing Keys Road surface water facility.
New Miller Road Wells	Drill test well at MP-1 site.	Acquire property and drill test well for CZ-1 well. Drill test well for high school/elementary school wells. Perform life-safety, seismic, and other repair improvements to the existing Miller Road WTP.
New Dutch Canyon Well	Finalize combined production capacity from existing Dutch Canyon wells.	Acquire property for third well site. Perform life-safety, seismic, and other repair improvements to the existing Keys Road groundwater treatment. Investigate construction of a high-rate iron and manganese treatment system at Dutch Canyon site.
New Ranney Collector Well		Drill a test well to determine hydrogeological feasibility. Perform water quality sampling for test well and in Multnomah Channel.
Interconnection with St. Helens		Determine buy-in and other costs associated with the existing St. Johns Ranney Well. Work with NW Natural to identify transmission project costs and right-of-way. Determine buy-in and other costs associated with water treatment.

Level of Service should drive decision making

- Define general Level of Service goals
- Identify quantifiable tracking parameters
- Reliability and Redundancy require additional infrastructure and O&M practices
- Seismic Resiliency must now be considered in Oregon
- Improvements driven by new level of service goals may require collection of additional information

Questions

Dan Reisinger

206.684.6532

dreisinger@carollo.com

Engineers...Working Wonders With Water®

Chris Negelspach, P.E.

City Engineer

City of Scappoose

(503) 543-7184

cnegelspach@cityofscappoose.org