



Aquifer Storage and Recovery (ASR) Facilities Tour – Oregon

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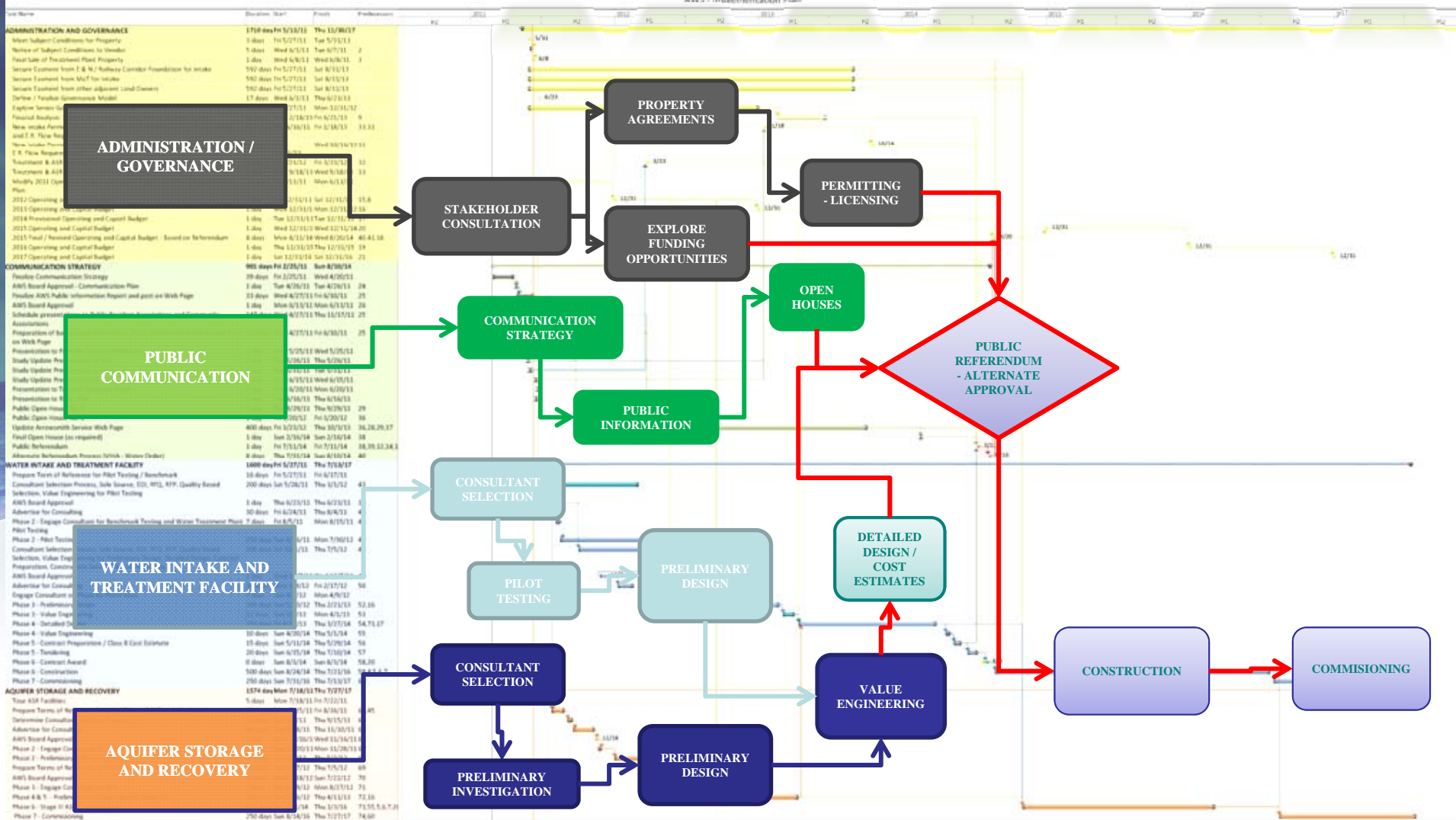
Prepared for : City of Parksville - Council

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AWS – IMPLEMENTATION PLAN (CRITICAL PATH)

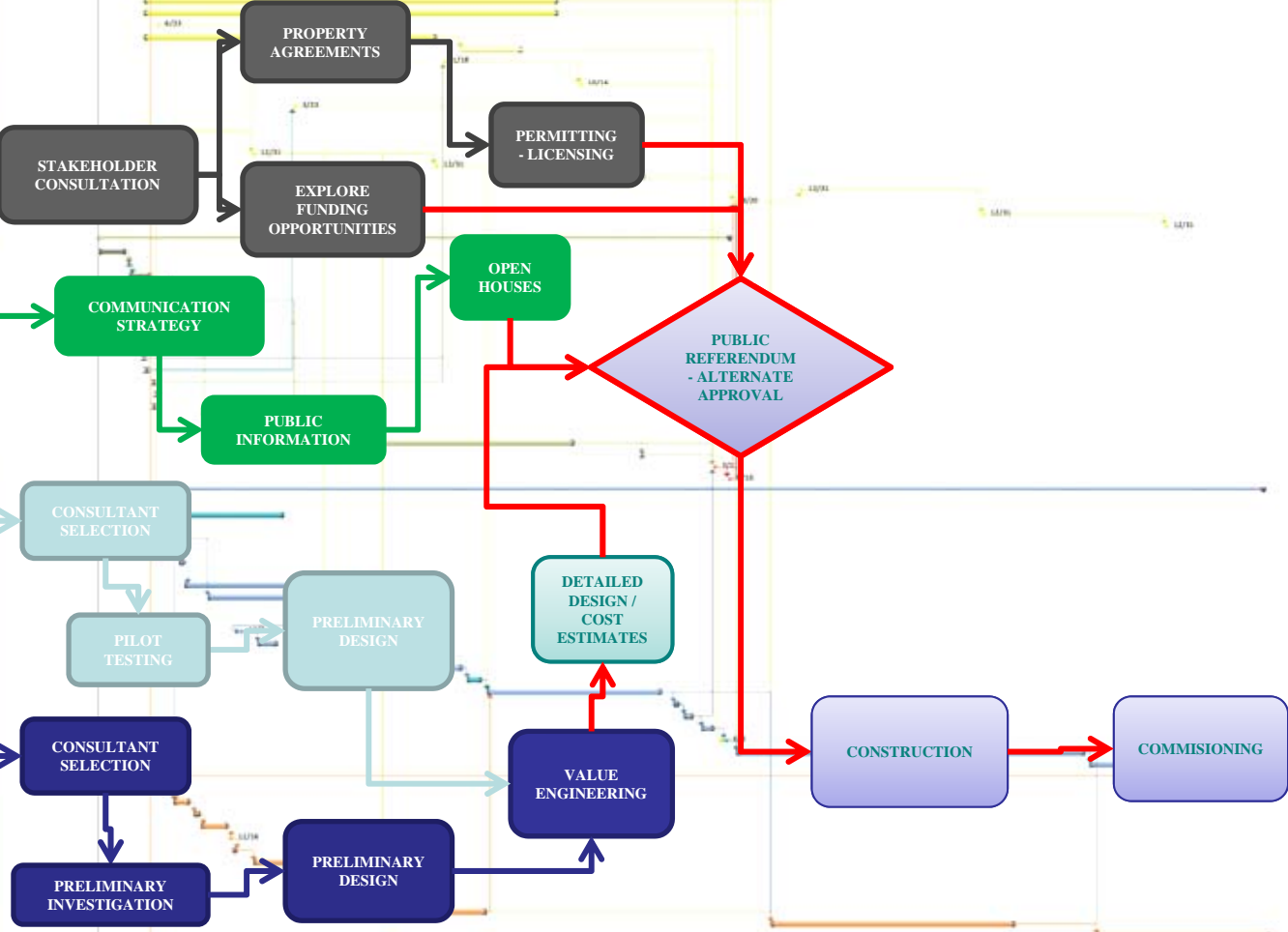


ADMINISTRATION / GOVERNANCE

PUBLIC COMMUNICATION

WATER INTAKE AND TREATMENT FACILITY

AQUIFER STORAGE AND RECOVERY

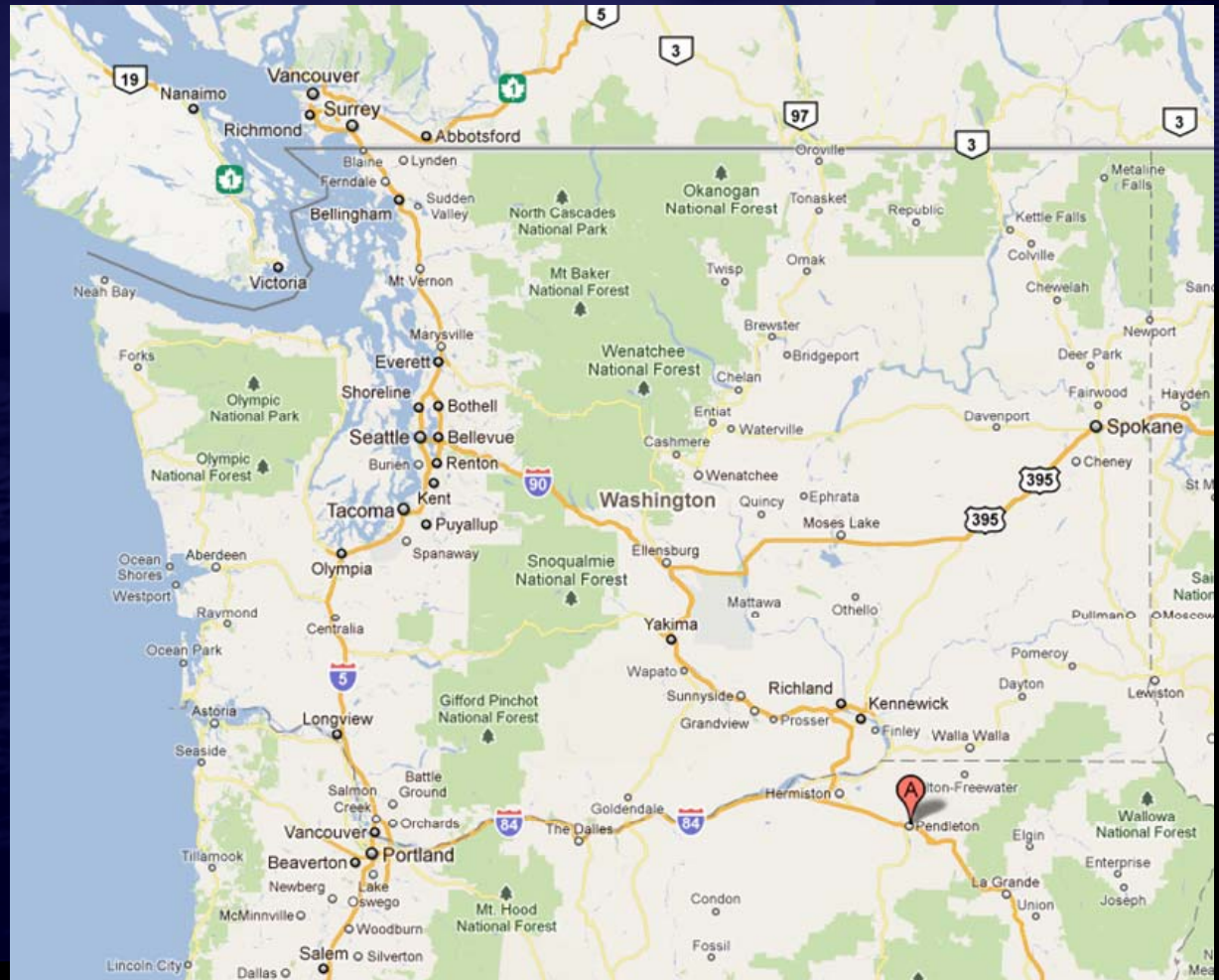




Pendleton, Oregon

Location:

350 Km east of
Portland



Pendleton, Oregon

Old West..... Meets Modern Technology

Background:

- City incorporated in 1880
- Population served is 17,000
- Growth Rate 1.4 %
- Prior to ASR (2003) they had two sources of Drinking Water
 - Wells
 - Old Springs / river

Challenges:

- Aquifer Levels were decreasing 2' – 4' per year
- Needed additional water
- Limited surface water withdrawal - Federal fishery regulations
- Surface water (Umatilla River) – required treatment (State Regulations)
- Very High Peak Summer Demand

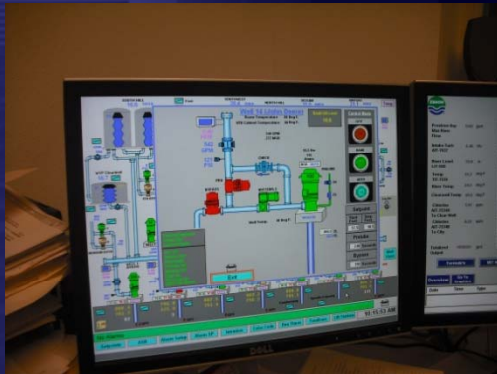




Pendleton, Oregon

Water Treatment Facility:

- Plant Capacity 57,000 m³ /day (15 million gallons per day)
- Using Zenon 500C membranes
- Will Reuse old membranes from the WTP for their future WWTP.
- Solar panels as part of a third party partnership with Honeywell.
- Removes all organics, viruses and bacteria
- Fully automated system, requires min. daily manual operation





Pendleton, Oregon

ASR Facility:

- Started ASR wells in 2003
- Have 3 wells with a Limited License of up to 7,600 m³ /day (2 million gallons)
- Total storage capacity of 1.5 million m³ (415 million gallons) storage and recovered annually
- Looking at doubling their capacity with future upgrades
- Recharge: November to May – Extract; June to October

Drinking Water In.....Drinking Water Out

Advantages:

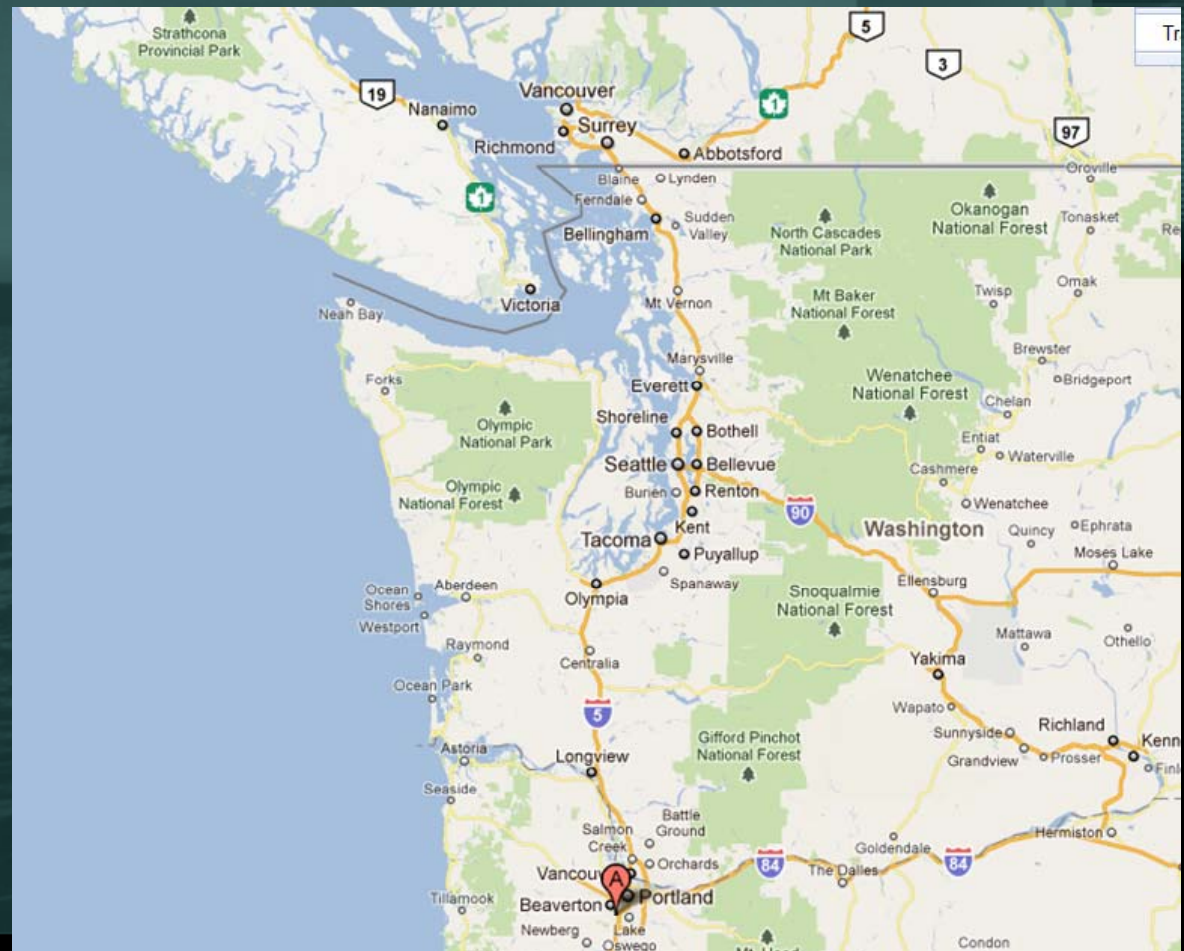
- Cooler water supplied in summer
- Augment summer peak demands
- Regenerate power when recharging
- Aquifer levels have stopped declining and are expected to increase with more ASR well production



Tigard, Oregon

Location:

South of Portland





Tigard, Oregon



Background:

- Population served is 57,000
- Growth Rate 16% (buildable land)
- Over 18,000 service connections

Challenges:

- Aquifer Levels were decreasing
- Mandated by State to stop using existing wells
- Moratorium was put on Well Development
- Needed additional water
- No secondary source of water
- Limited supply of wholesale water from Portland Water District
- Decommission old wells



Tigard, Oregon

ASR Facility:

- Started ASR program in 2001 – first system
- wells 600' – 1000' Columbia Basalt Aquifer
- 568,000 m³ (150 million gallons) of storage
- Extract 95 % of water
- Converted 2 existing wells into ASR
- Currently constructing new ASR Well – development funded
- Operational period: injection October – May, extraction June – September
- Use treated water from other jurisdictions (Portland) to store in ASR wells





Tigard, Oregon

Benefits:

- Cooler water supplied in summer
- Augment summer flows
- Postponed costly capital water treatment expansions
- Aquifer levels have stopped declining
- Have found old abandoned artesian well came back into service
- Onsite generation of CL2 – ‘just add salt’ = no CL2 gas in local neighbourhoods

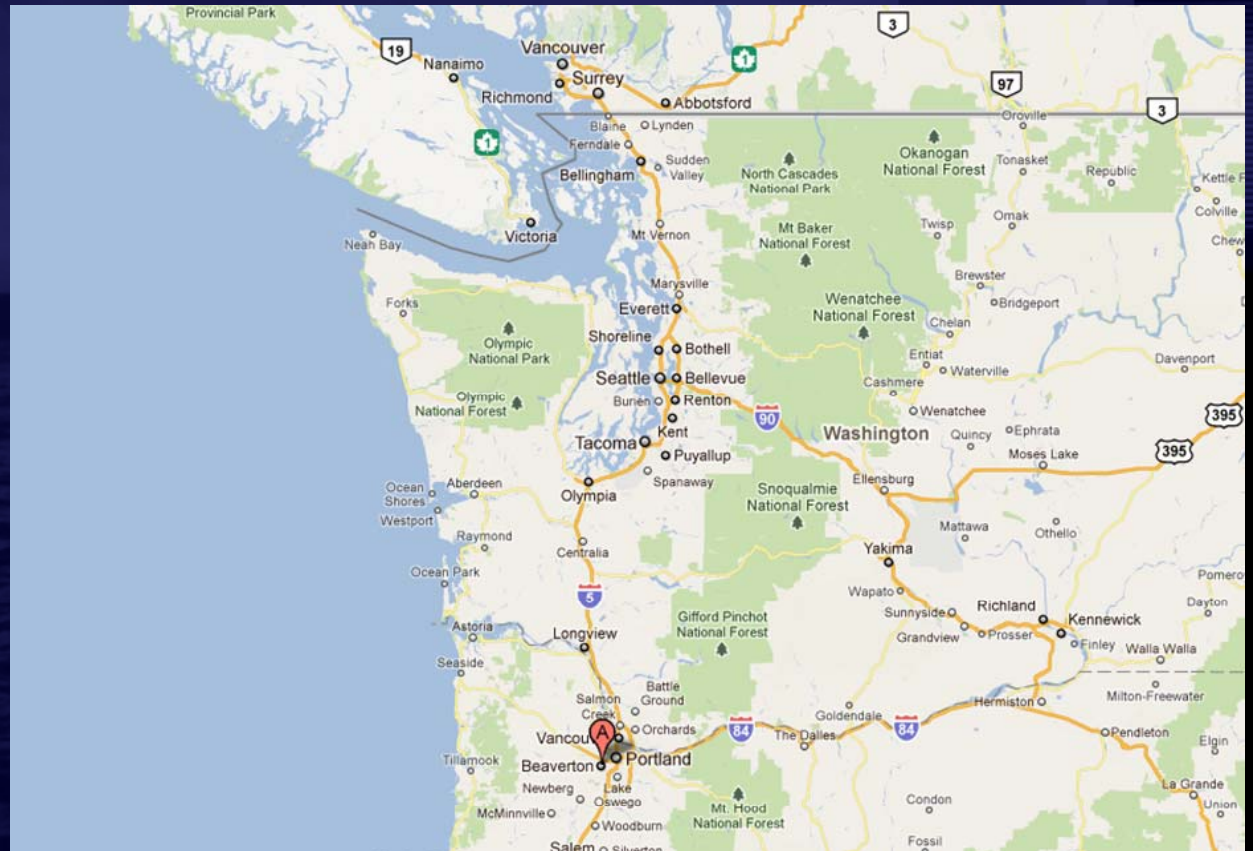




Beaverton, Oregon

Location:

South-West of Portland





Beaverton, Oregon



Background:

- Population served is 90,000

Challenges:

- Receive bulk water from Joint Water Commission
- Looking at major water improvement facilities (pipelines, reservoirs & treatment)
- Existing well production was limited
- needed to bridge the gap when peak summer demands exceeded available supply capacity





Beaverton, Oregon

ASR Facility:

- Started ASR over 15 years ago
- Used 2 existing wells and developed one new well
- wells 600' – 1000' Columbia Basalt Aquifer
- 568,000 m³ (150 million gallons) of storage
- Can extract 23,000 m³ per day
- Recover over 95 %
- Converted 2 existing wells into ASR plus one new construction
- Operational period: injection October – May, extraction June – September
- Use treated water from other jurisdictions to store in ASR wells





Beaverton, Oregon



Benefits:

- Cooler water supplied in summer
- Augment summer flows
- Postponed costly capital water treatment expansions
- Aquifer levels have stopped declining
- Have improved native groundwater quality – reduced iron and manganese concentrations
- Onsite generation of CL2 – ‘just add salt’ = no CL2 gas in local neighbourhoods
- Integrate ASR wells in existing neighbourhoods





AWS Status Update:

- **AWS / ERWS governance**
- **Financial Budget**
- **ASR Grant Application (Gas Tax Rebate)**
- **Water Treatment Pilot Program – Fall**
- **Water Quality Analysis**
- **Servicing Concepts for WTP Site**
- **Permit Applications**

Thank You.....

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