City of Banks

Small City with Big Water Needs

Growing a Small City Water System on a Small City Budget

May 8, 2026

CwM

Kennedy Jenks



Introductions

Robert Peacock, *PE*

- Senior Associate Engineer with Kennedy/Jenks Consultants
- City Engineer for City of Banks



Ian Godwin, *RG, CWRE*

- Staff Hydrogeologist with CwM-H2O, LLC
- Hydrogeologist-of-Record for City of Banks
- Certified Water Rights Examiner



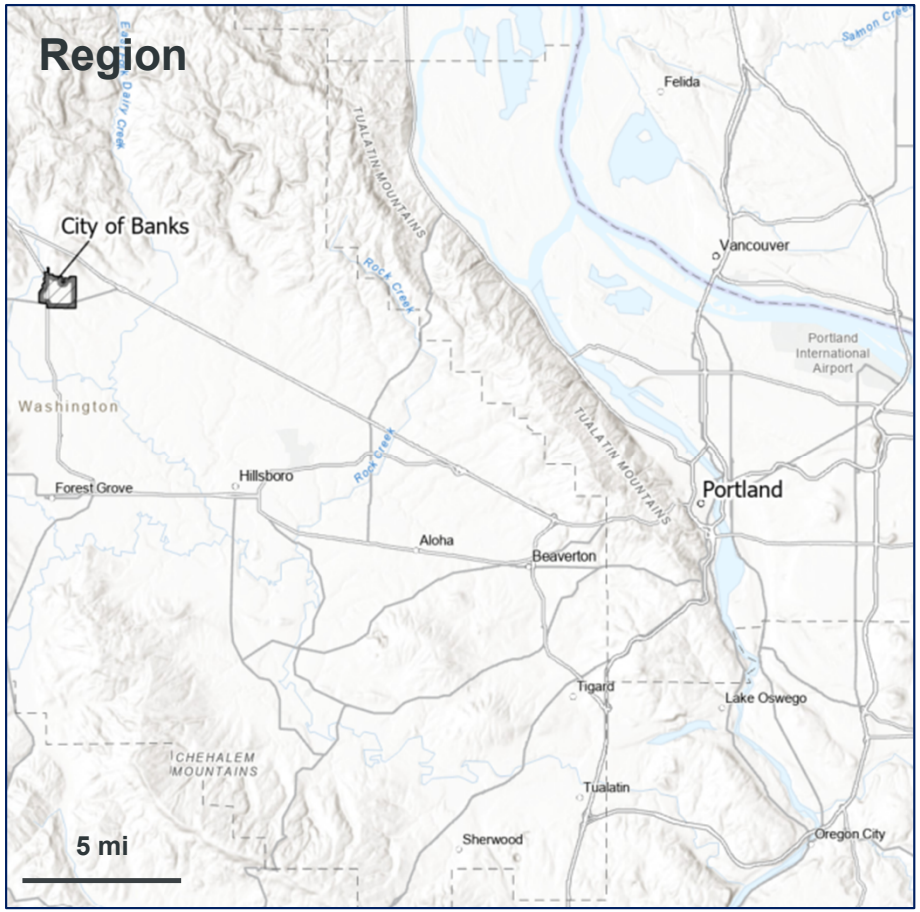
Agenda

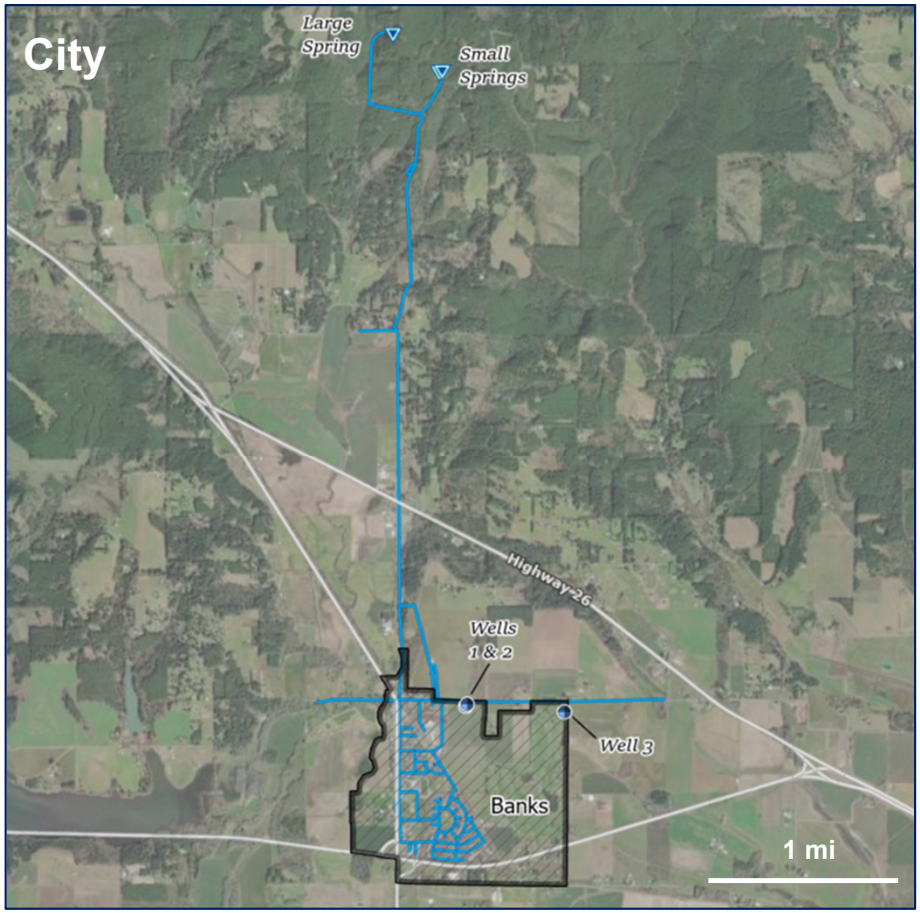
- A Small Water System with a Long History
  - *Banks System Overview*
  - *Water System History and Challenges*
  - *Future Growth and Demands*
- Maximizing Existing Assets
  - *Reducing Losses*
  - *Improving Surface Water Utilization*
- Targeted Water Supply Expansions
  - *Groundwater Rights, ASR, & Storage*
- Partnerships, Funding, and Path to 2050



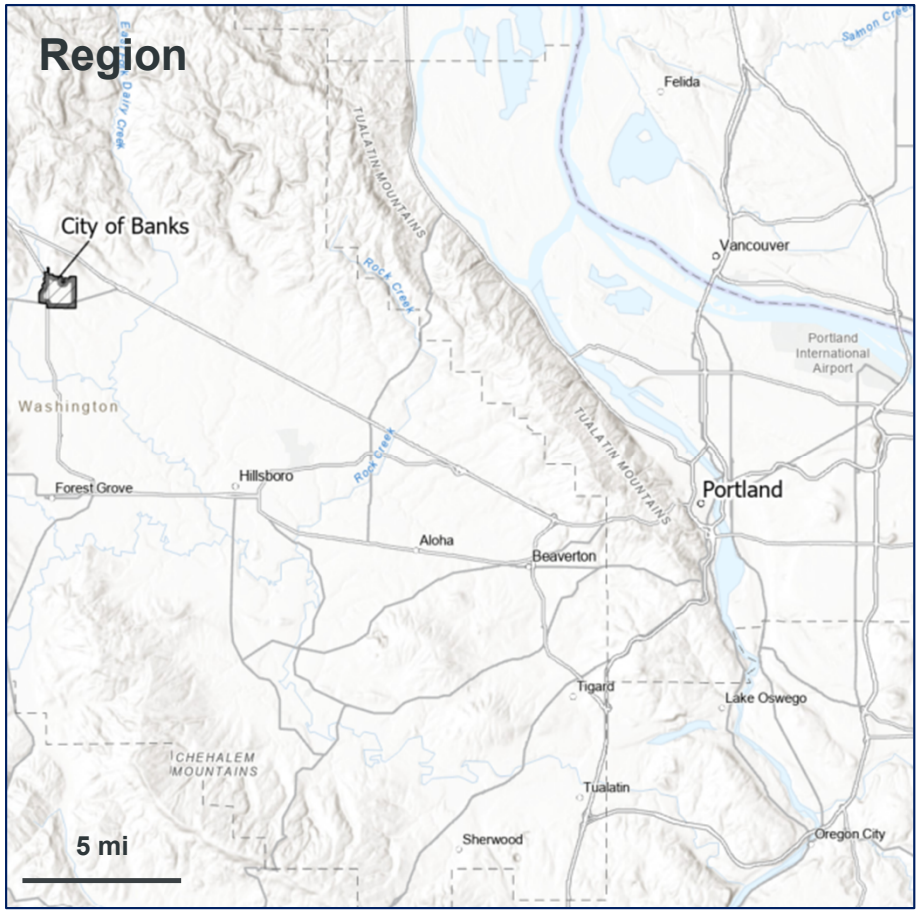
Quail Valley Golf Course Well during aquifer testing

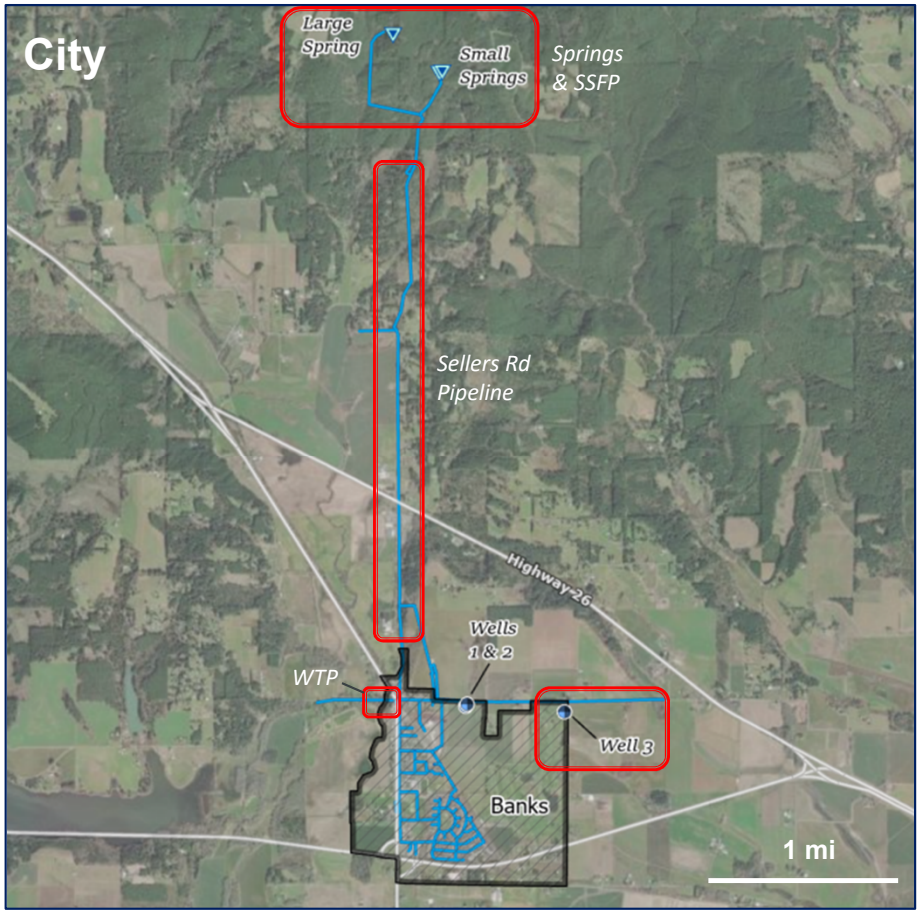
Banks Overview – Small City with Long History



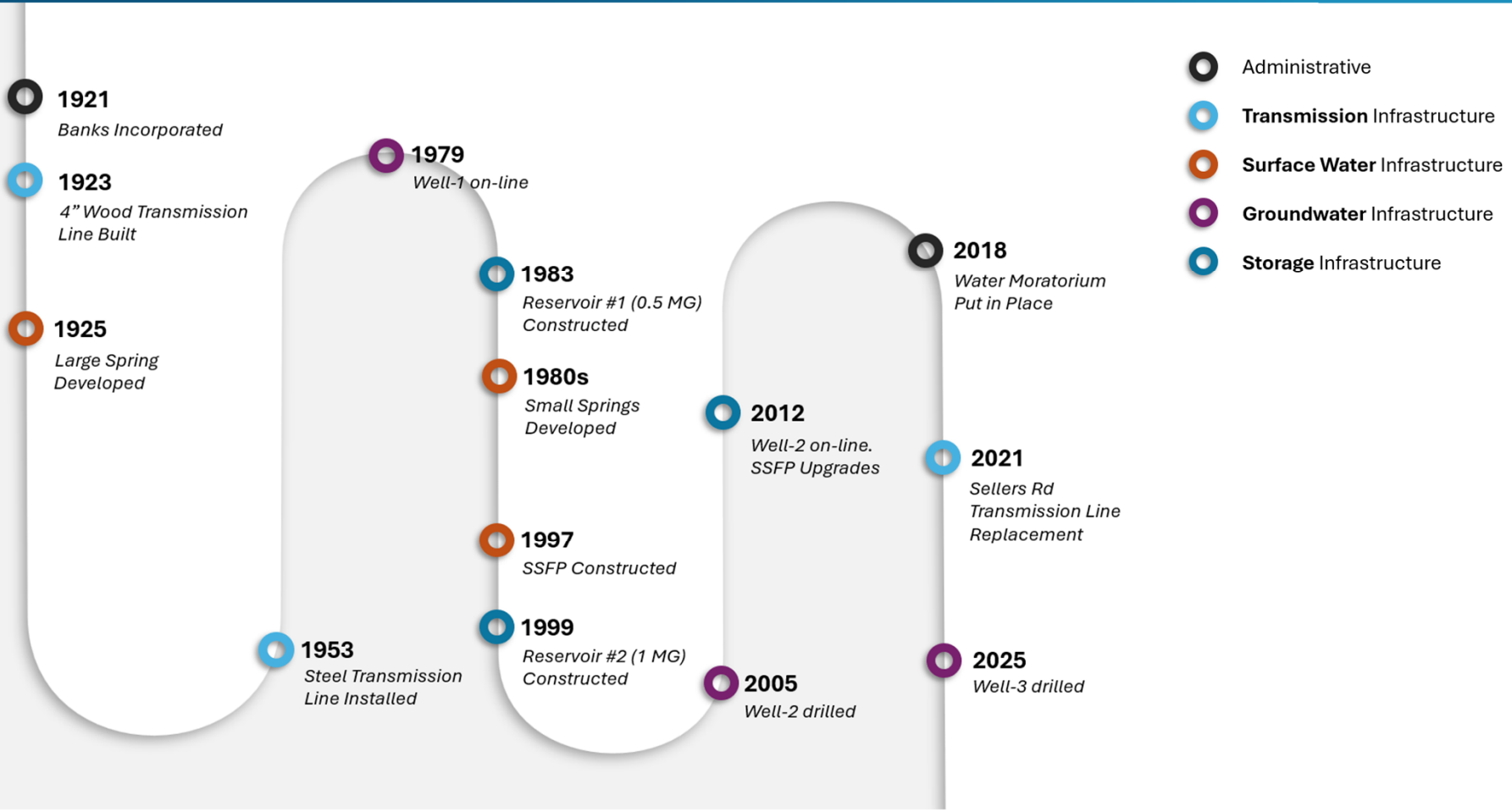


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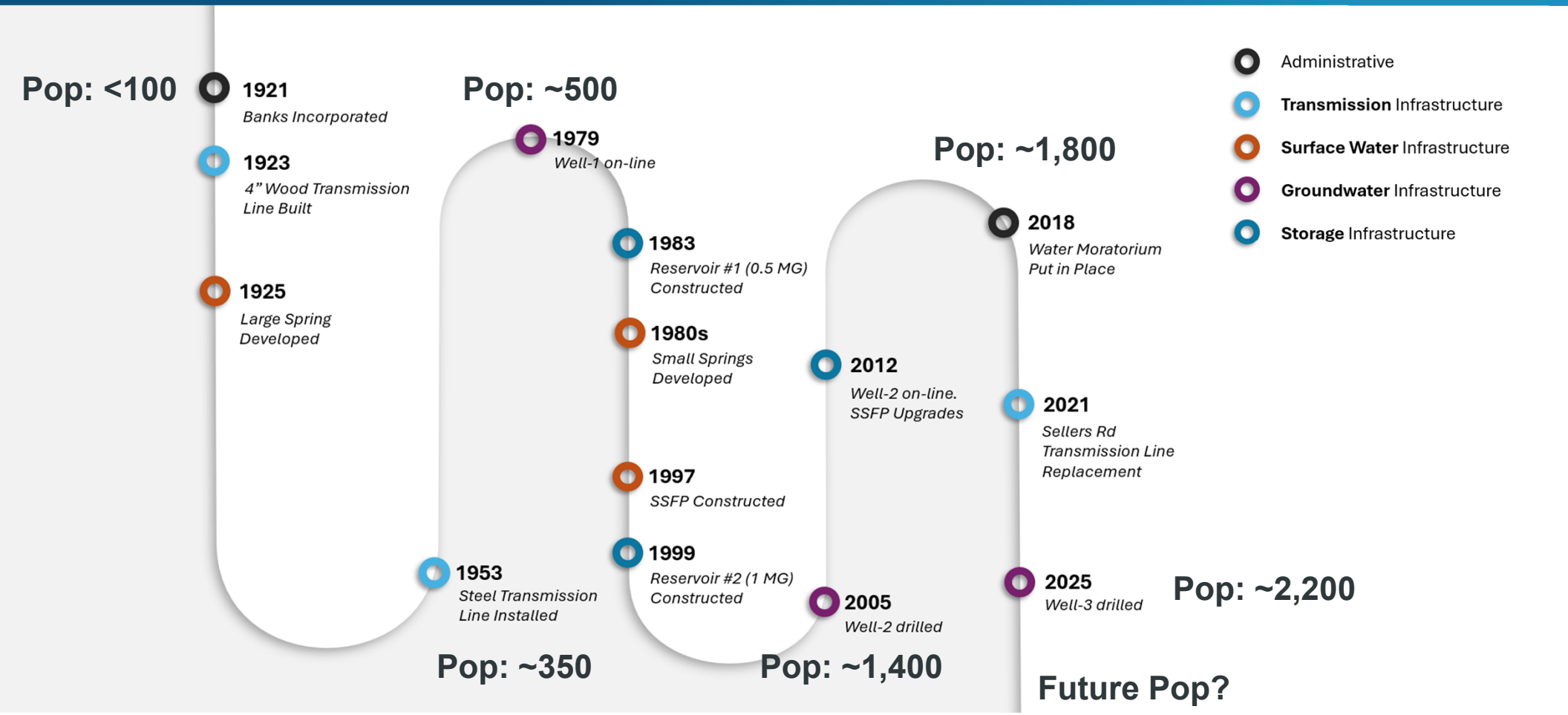




Banks Overview – Small City with Long History



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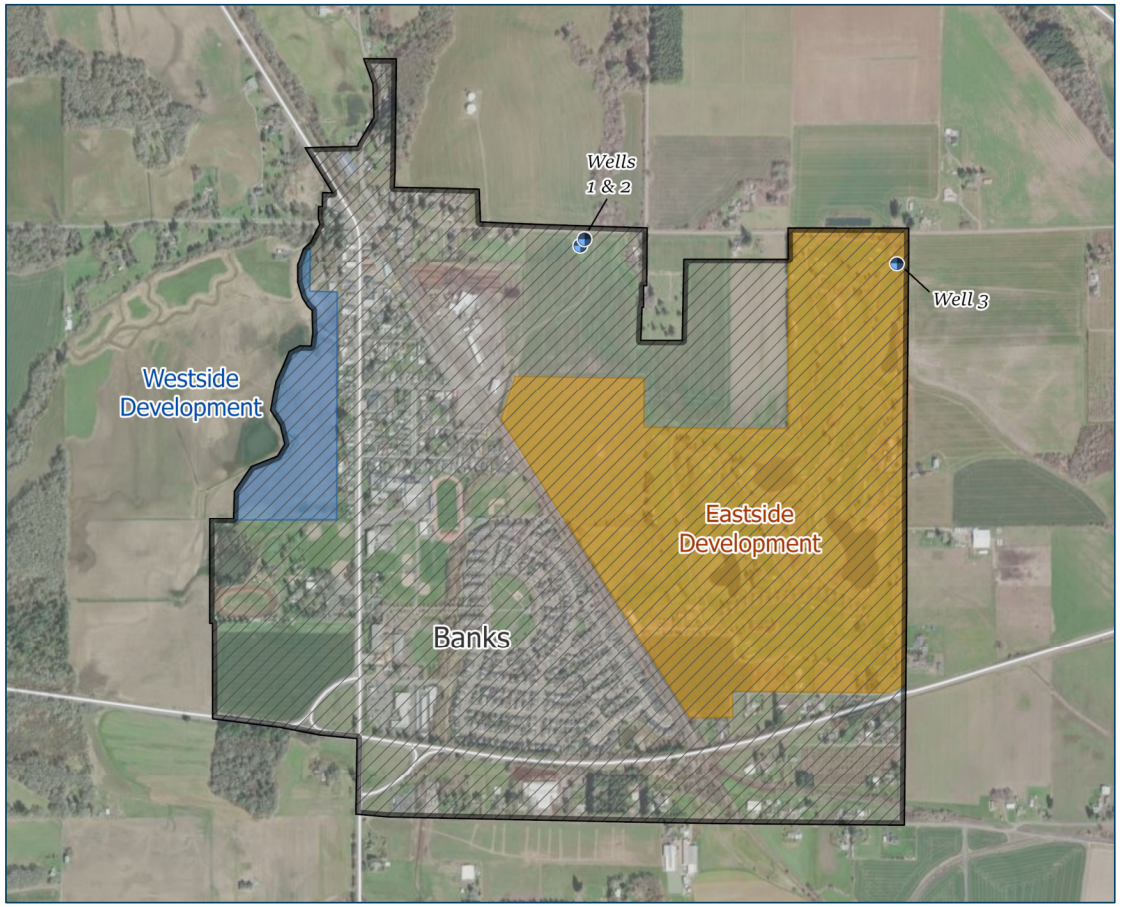


Proposed Developments – Growth in Next 10 Years

- ***1,144 homes*** in development
- 2 Large Developments
  - Eastside ⟶ 955 homes
  - Westside ⟶ 189 homes

- 2 large parks
- Growth in commercial use
- Future industrial use

- ***Significant increase in water demands!***



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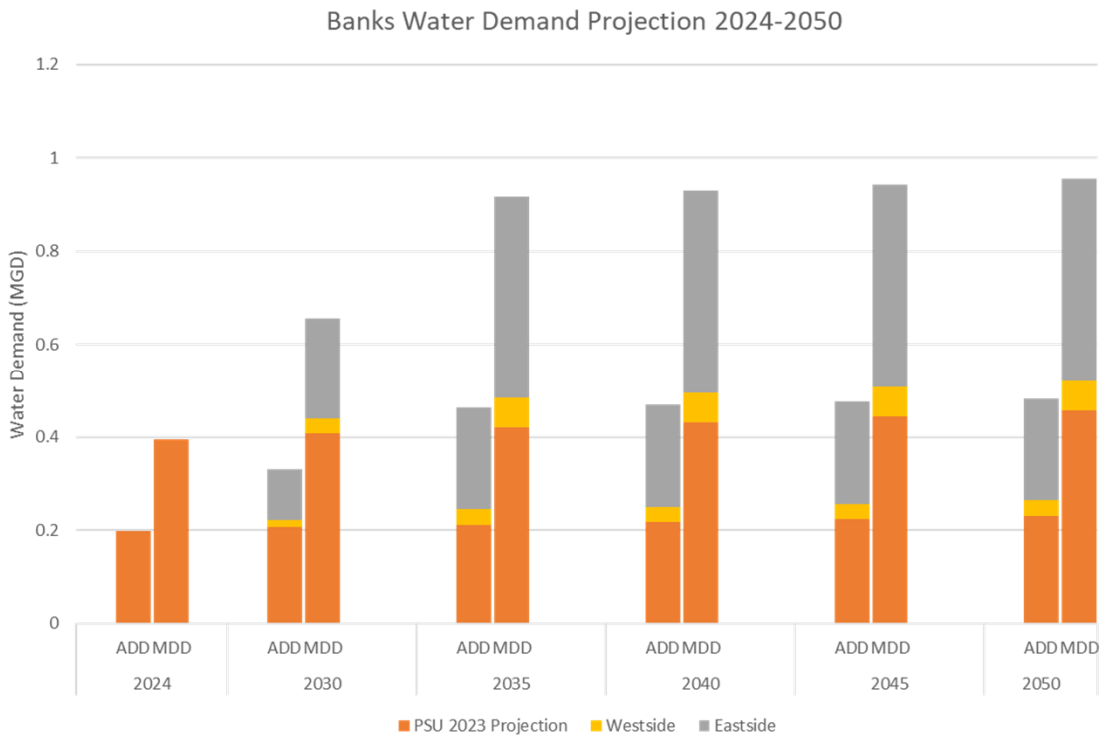
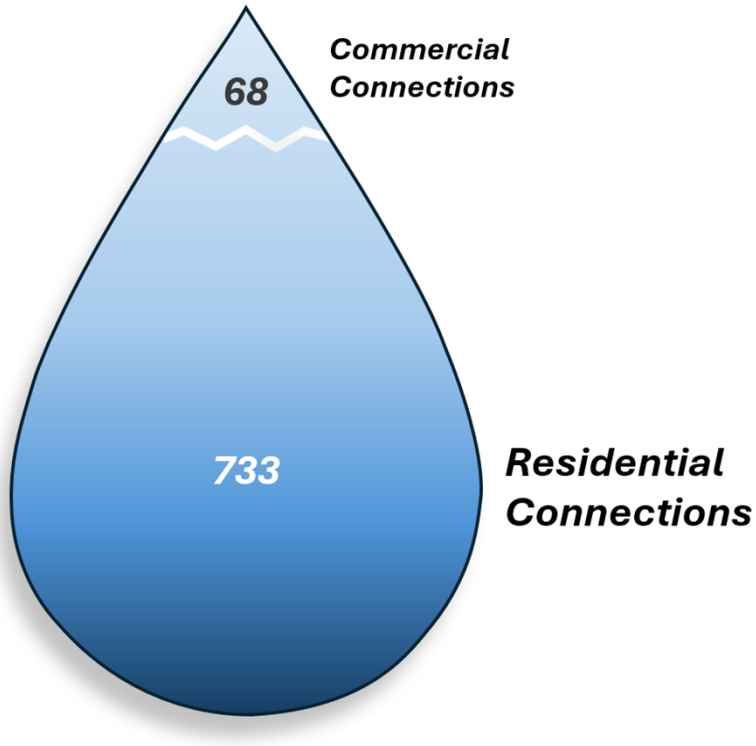


Figure from 2024 analysis

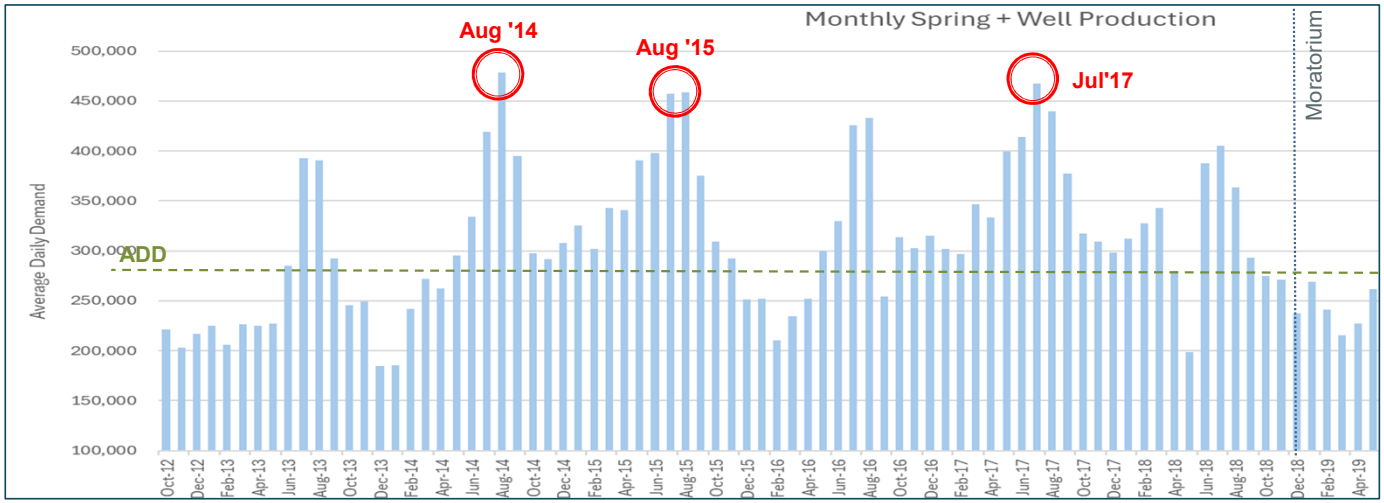
Current Water System Status

- Majority of water use is residential
  - 91% of connections & 70% of use
  - Use peaks in July-September
- Some commercial uses (~29% of use)
- City has 1.5 MG in storage (Carsten Reservoirs)
- ***ADD*** = 134 gpcd (~201 gpm)
- ***Peak season ADD*** = 169 gpcd (~254 gpm)
- ***MDD*** = 265 gpcd (398 gpm)



2014 – 2018 Water “Crisis” - Peak Demands

- High finished water losses + high demands during summers of 2014-2018
- Water loss between SSFP and City reservoirs (Sellers Rd) > **40%**
- Building Moratorium put in place Dec 2018 ended 2021



MDDs on peak days during these months exceeded system capacity

Naming the Limitations

WATER RIGHTS & SOURCES

Groundwater (Wells 1 & 2)

- Max rate = 750 gpm
- Max monthly volume = 32.8 MG


Well-1


Well-2

Green Mountain Springs (SSFP)

- Max rate = 350 gpm
- Max monthly volume = 12.1 MG

Small Spring catchment ---



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Green Mountain Springs (SSFP)

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- Max monthly volume = 12.1 MG

LIMITATIONS

- Wells interfere due to proximity
- 24/7 operation is not possible

- SSFP treatment capacity (~200 gpm) RP1
- High turbidity events slow treatment
- Seasonal variation in spring output

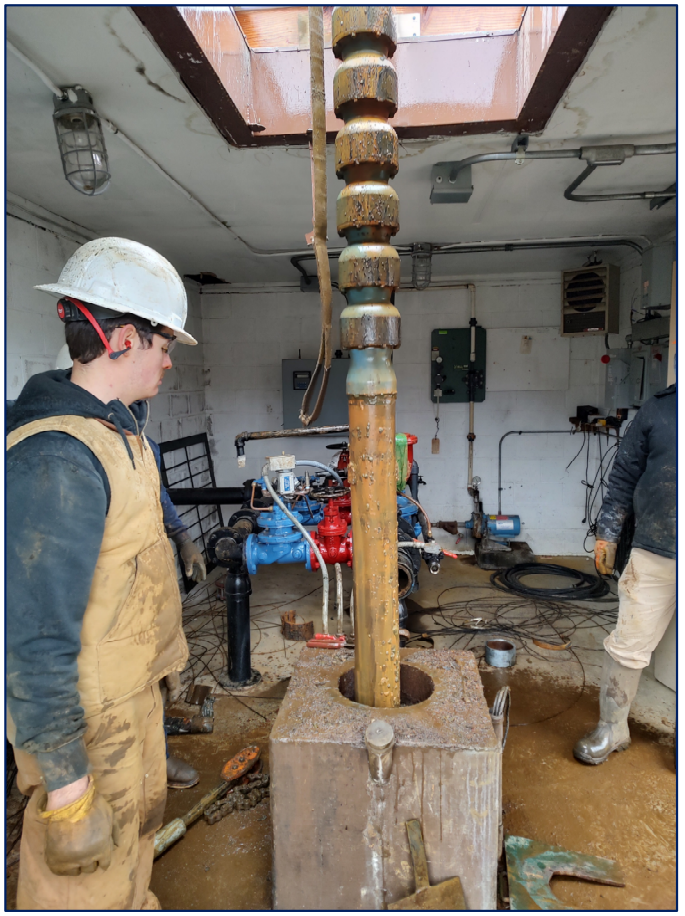
Slide 13

RP1 Currently ~200 gpm

Robert Peacock, 2026-04-12T21:37:32.745

Emerging Water Challenges

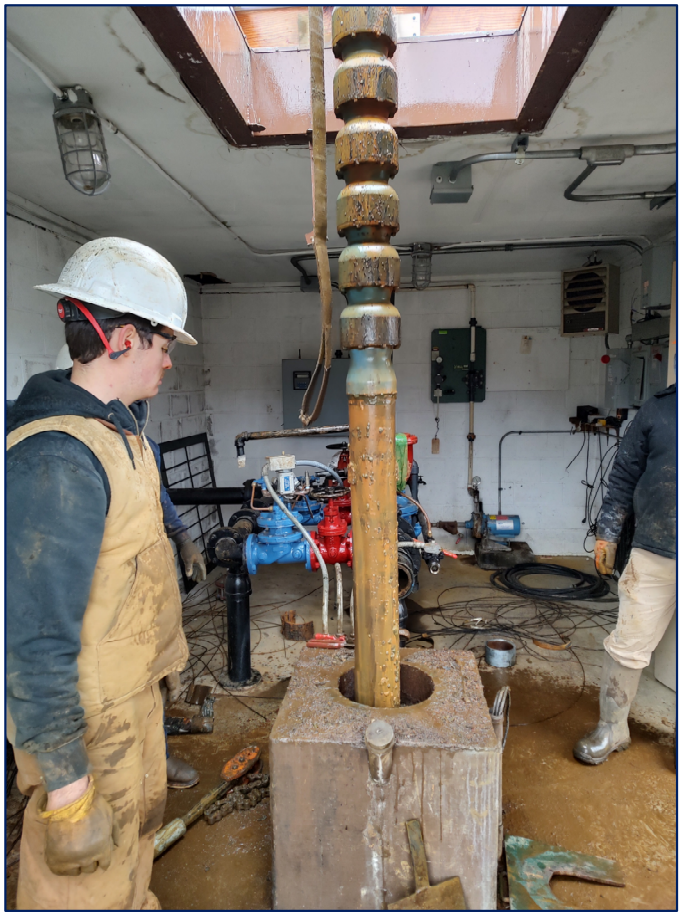
- Significant losses of finished water
- Limited treatment capacity at SSFP
- Wells 1 & 2 pumping limitations
- Peak demand curtailment events
- Large proposed development projects - *growth*



Well-1 pump being pulled ---

Phased Approach to Water Challenges

- Phase 1 – Maximize Existing Assets
  - *Leaks: low-hanging fruit (done!)*
  - *Identify and replace high-loss conveyance (done!)*
  - *Capture more raw water from springs*
  - *Increase efficiency and capacity of SSFP*
- Phase 2 – Expanding Groundwater & Storage
  - *Add new groundwater source (underway!)*
  - *Pilot testing ASR system*
  - *Expand above-ground storage*
- Phase 3 – Expand Surface Water Production
  - *Develop new water treatment plant on Dairy Creek*



Phase 1 – Maximizing Existing Assets – Reducing Water Loss

Monthly Inventory – Reconcile Results and Locate Lost Water

- Raw Water Meters
- Finished Water Meters
- Reservoir Outlet Meters
- Transmission Meters
- Customer Meters

Customer meter boxes ready to be installed ---



Well-1 and Well-2 readout---

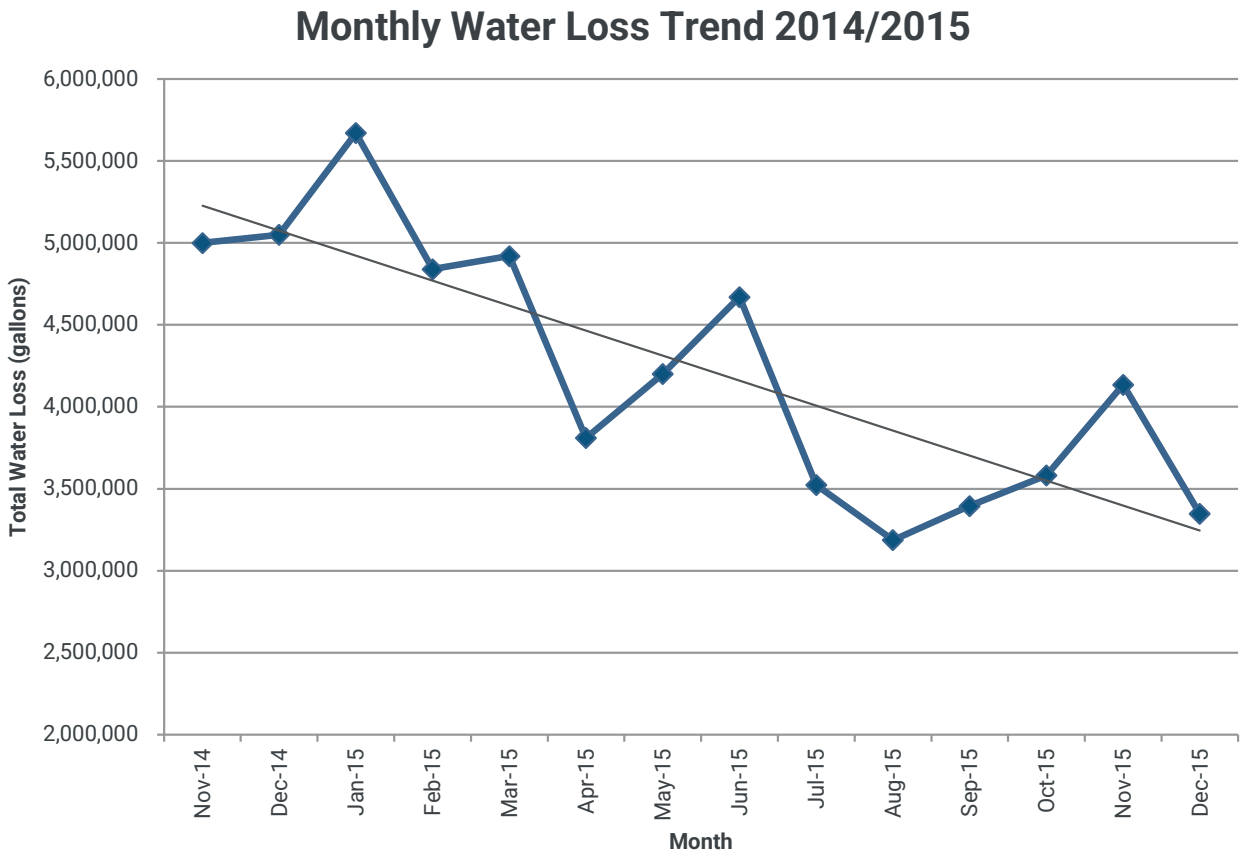


Phase 1 – Maximizing Existing Assets – Fixing Leaks

Low-Hanging Fruit

- Audio Leak Detection found leaks from 1 to 20 gpm
- Fire Hydrant Valve Service
- Steel Transmission Line Saddles
- Reservoir Leak Testing





Phase 1 – Maximizing Existing Assets – Fixing Leaks

Pipeline Replacement Projects

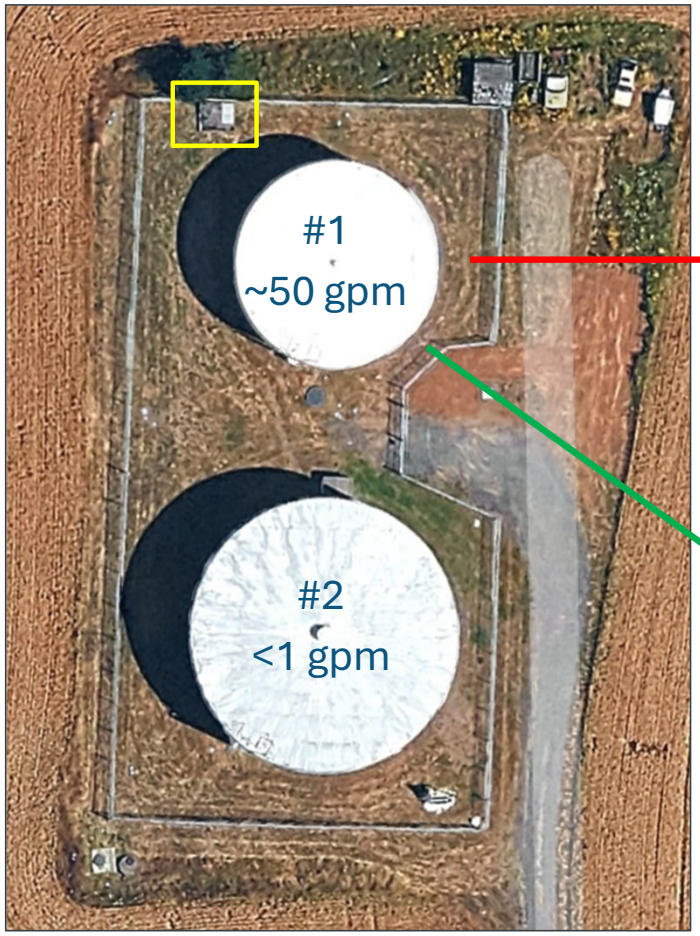
- Sellers Rd Pipeline in 2021 ***reduced loss by 25%+***
- Several smaller targeted replacements led to further improvements



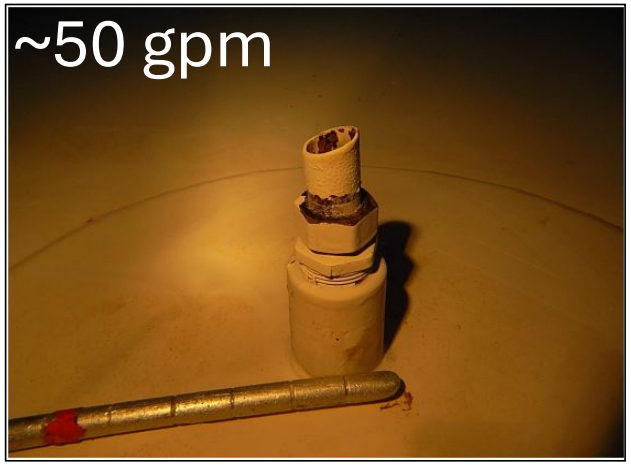


2017-2021

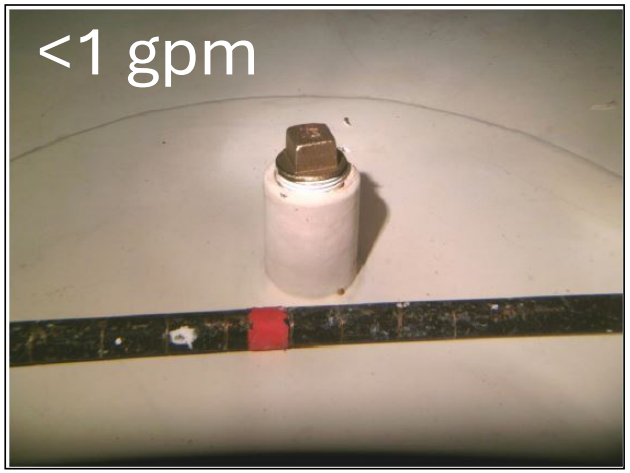
Phase 1 – Maximizing Existing Assets – Reservoir 24-hr Isolation Tests



BEFORE:



AFTER:



2014-2015

Phase 1 - Maximizing Existing Assets – Water Ordinance

Landscape Irrigation

- Public Spaces require water efficient plantings
- Public Space turf grass < 50% of area
- Residential spaces every-other-day irrigation
- Timers required for irrigation systems
- Penalties for violations

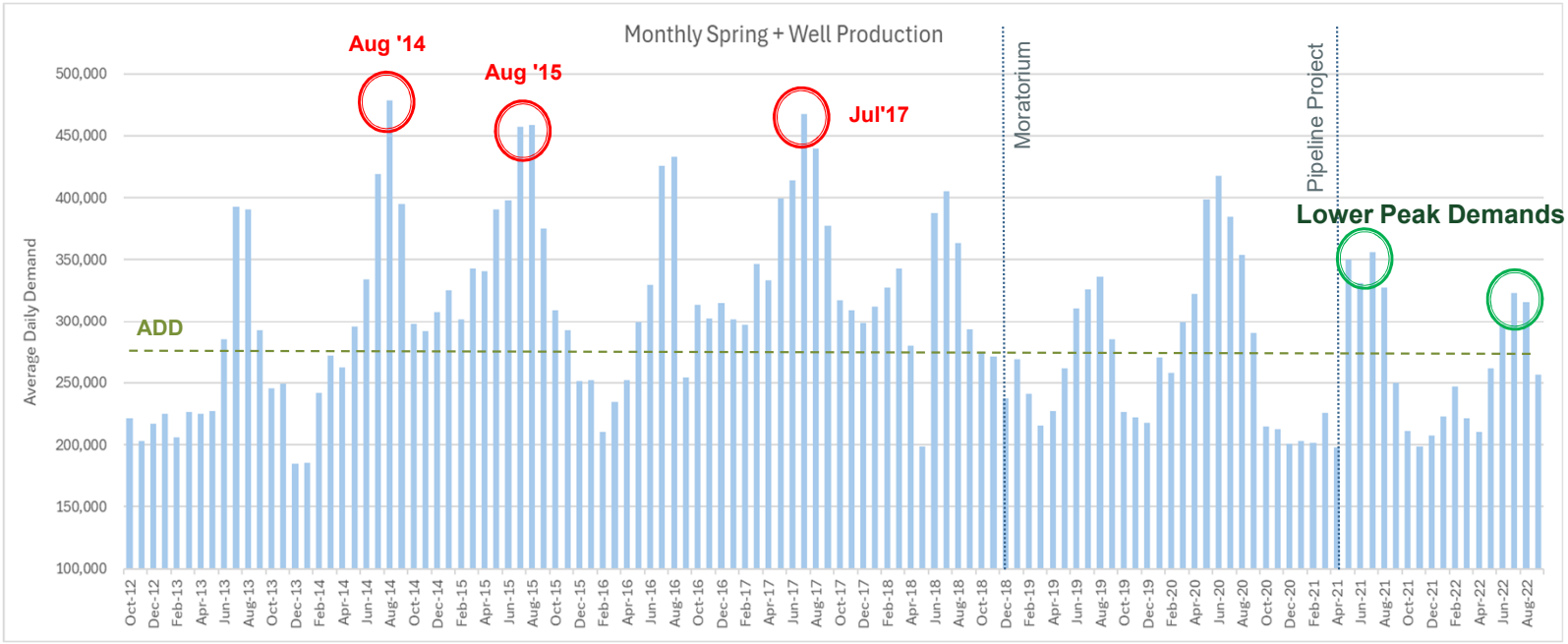
Water Efficient Fixture Ordinance

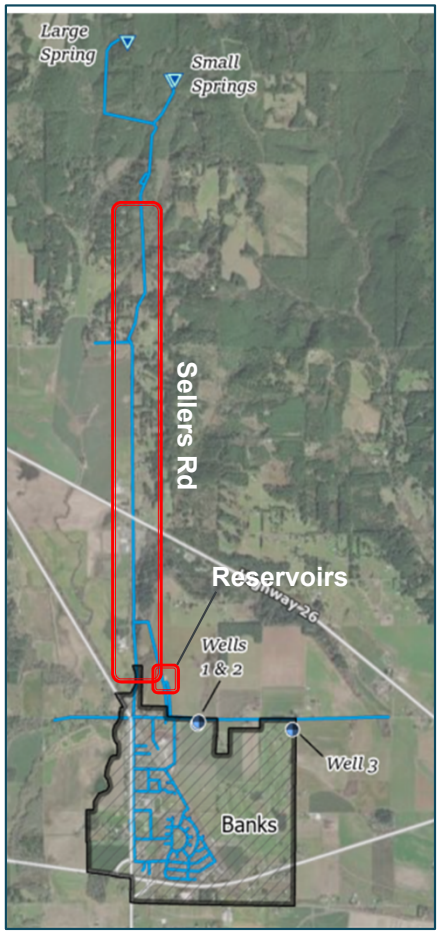
- High Efficiency (EPA WaterSense) Plumbing Fixtures Required



2021

Phase 1 – Maximizing Existing Assets – Fixing Leaks





reduced loss by 40%+

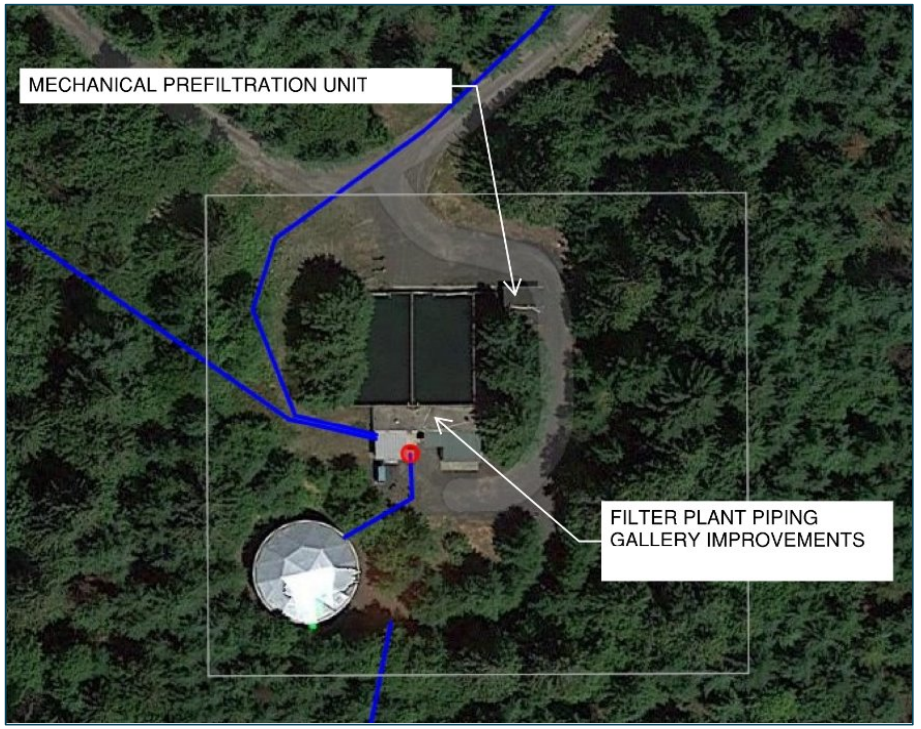
Phase 1 - Maximizing Existing Assets - Increasing SSFP Capacity

- Add pre-filtration system
- Engineering adjustments to spring catchments

+35 gpm capacity

- Converting an old sed. basin into a third filter bed
- New permit for extra winter spring water

+70-150 gpm capacity



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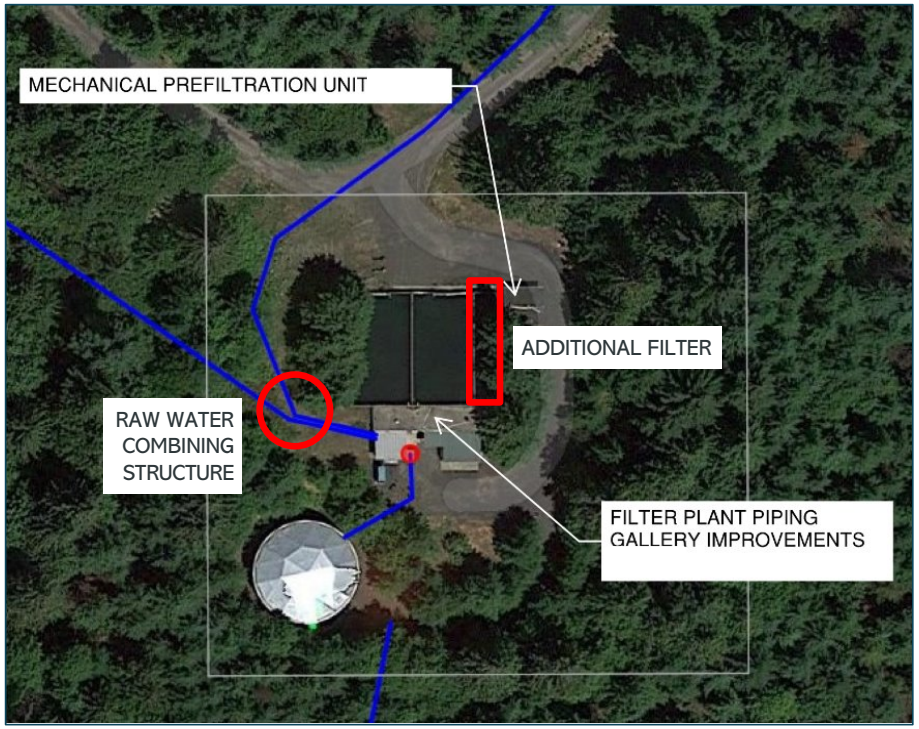
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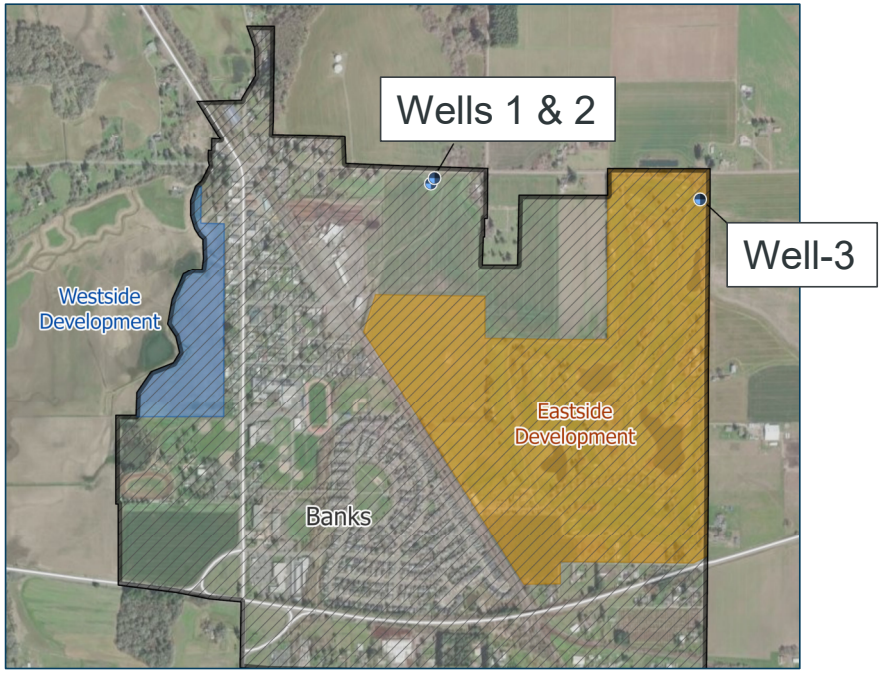
- SSFP will be able to fully capture and treat its water right rate/volume

+150,000 gal/day



Phase 2 - New Groundwater Source

- Well-3 was drilled and tested in 2025
- Location does not interfere with Wells 1 & 2





Drilling of Well-3 ---

Phase 2 - New Groundwater Source

- Well-3 was drilled and tested in 2025
- Location does not interfere with Wells 1 & 2

+350 gpm short-term capacity

- Allows for full use of Well-1 right
- Simultaneous pumping of Wells 2 & 3
- Projected to be online in the next year



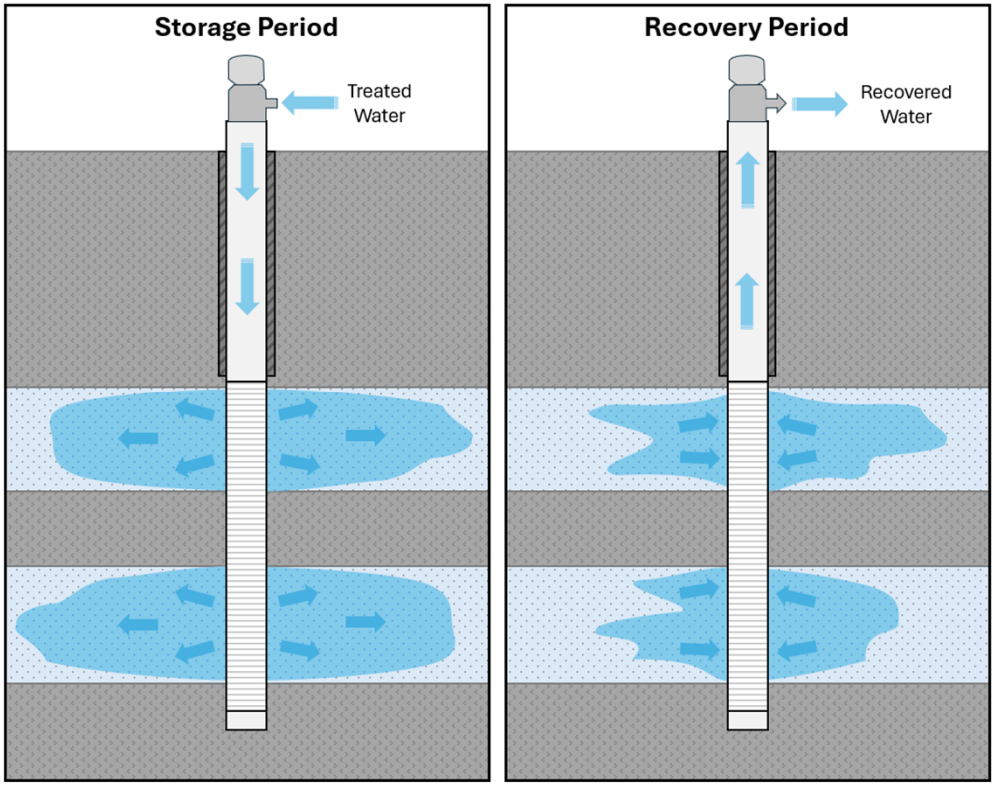
Drilling of Well-3 ---

Phase 2 - ASR Pilot Program

- CwM, 2018 - ASR Feasibility Study
- 40 MG/year of storage with two ASR wells

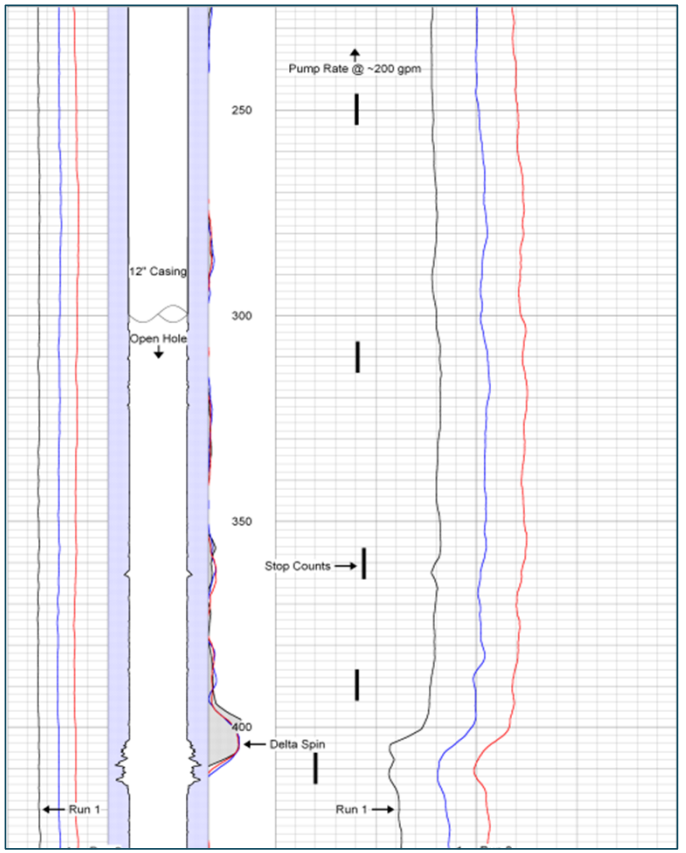
- ASR Limited License up to 18.6 MG/year granted in 2026

+450 gpm short-term capacity
-net benefit to aquifer system



Phase 2 - ASR Pilot Program

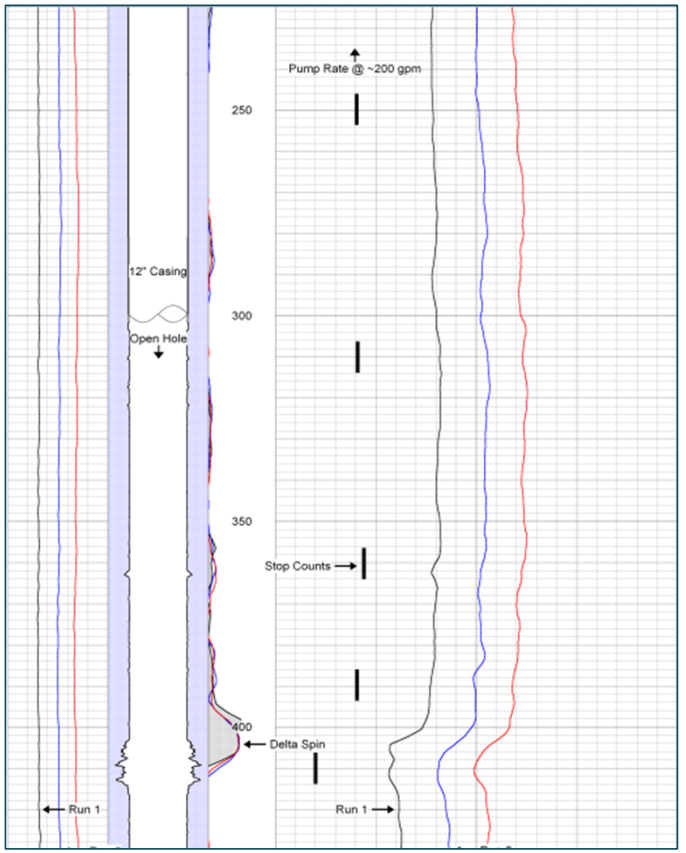
- Local basalt aquifer = two water-bearing zones
- Down-hole surveys and long-term monitoring
- Worked with Water Resources Department
- Concluded that both water-bearing zones are a *single aquifer system*



Spinner log of Well-2 ---

Phase 2 - ASR Pilot Program

- Local basalt aquifer = two water-bearing zones
- Down-hole surveys and long-term monitoring
- Worked with Water Resources Department
- Concluded that both water-bearing zones are a *single aquifer system*
- ASR Wells can develop both zones, and Well-2 can be used as ASR well



Spinner log of Well-2 ---

Phase 2 - ASR Pilot Program

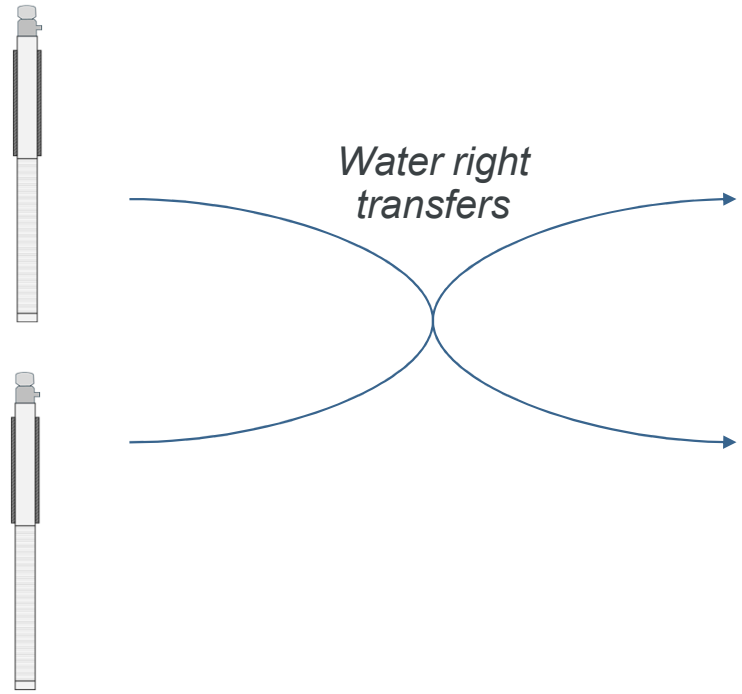
- ASR system required water right changes

<u>Well-1 Permit</u>

- Only Well-1
- 300 gpm

<u>Well-2 Cert.</u>

- Only Well-2
- 450 gpm



<u>Both Water Rights (shared sources)</u>

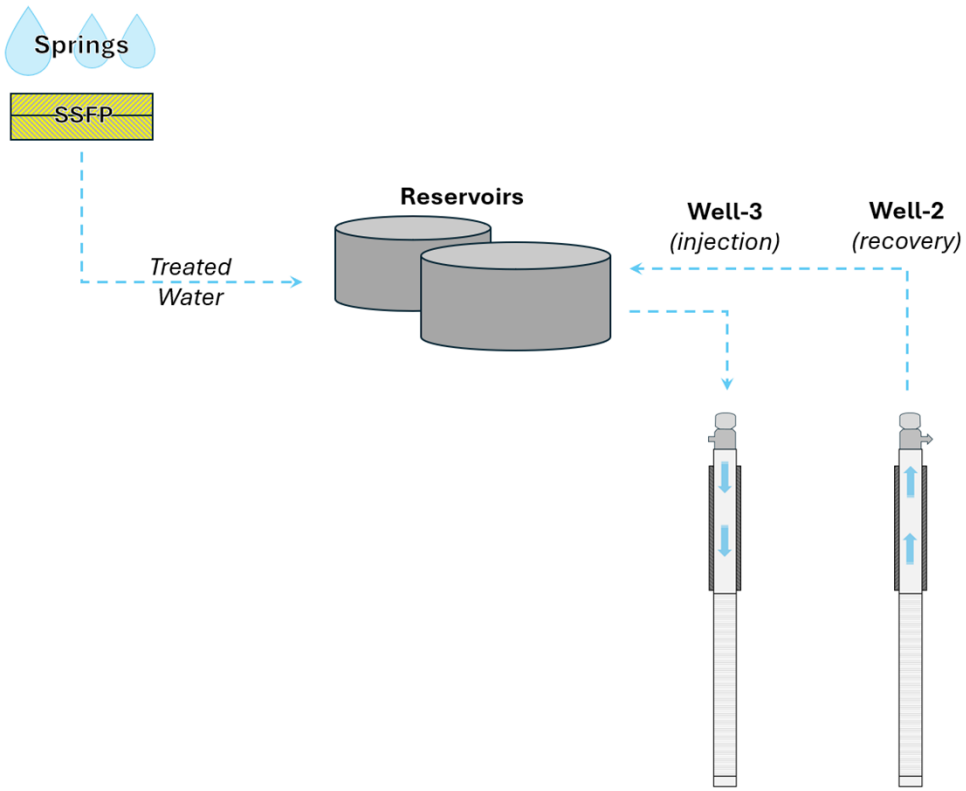
Total of 750 gpm

Well-1 & 2

5 additional well locations

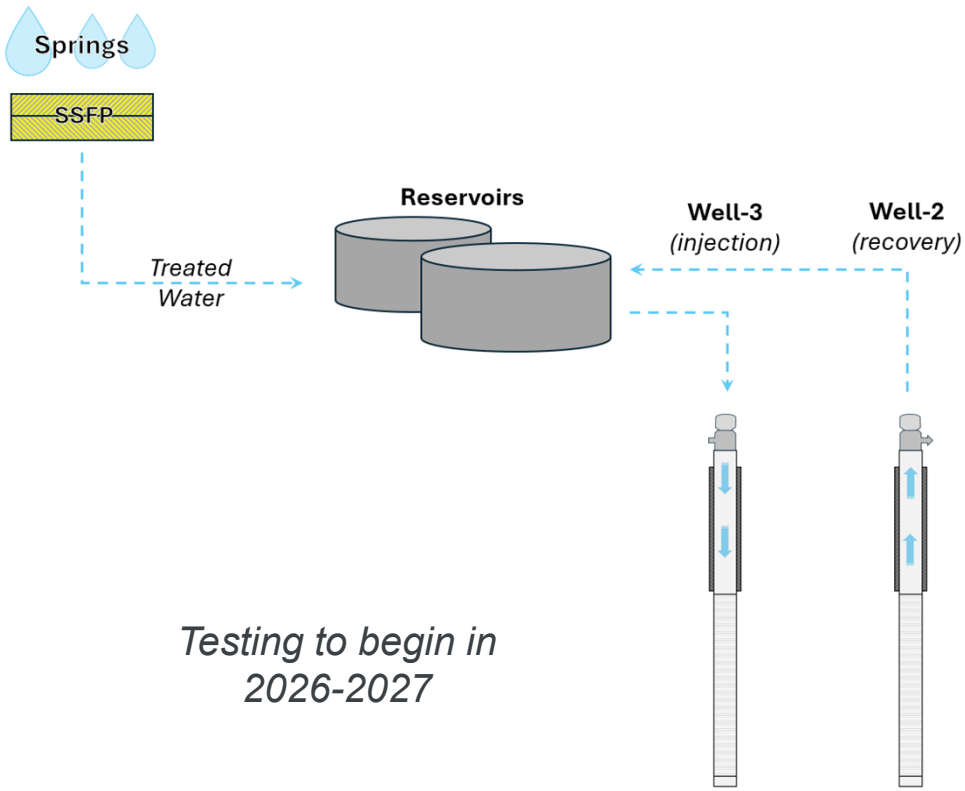
Phase 2 - ASR Pilot Program

- Pilot program to test injection and recovery at Well-3 (new well)
- Excess water from SSFP in winter-spring
- Injection = **270 gpm**



Phase 2 - ASR Pilot Program

- Pilot program to test injection and recovery at Well-3 (new well)
- Excess water from SSFP in winter-spring
- Injection = **270 gpm**
- Recovery at Wells 2 & 3 = **450 gpm**
- Allows for development of 5 additional recovery wells



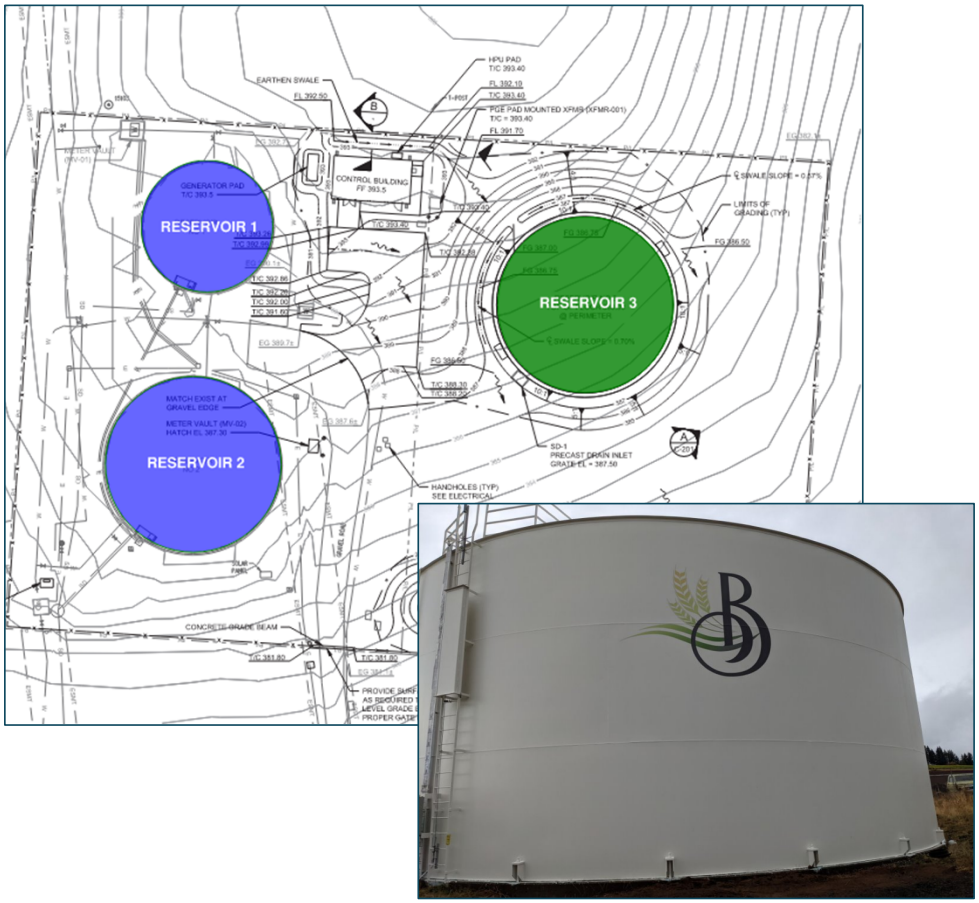
Testing to begin in 2026-2027

Phase 2 - Expanded Surface Storage

- City has 1.5 MG of storage in Carsten Reservoirs
- Propose 1.0 MG additional storage

Reservoir No. 1	(existing)	0.5 MG
Reservoir No. 2	(existing)	1.0 MG
Reservoir No. 3	(proposed)	1.0 MG
TOTAL MAIN ZONE		**2.5 MG**

*Provides **540,000** gal Required Fire Flow Volume*

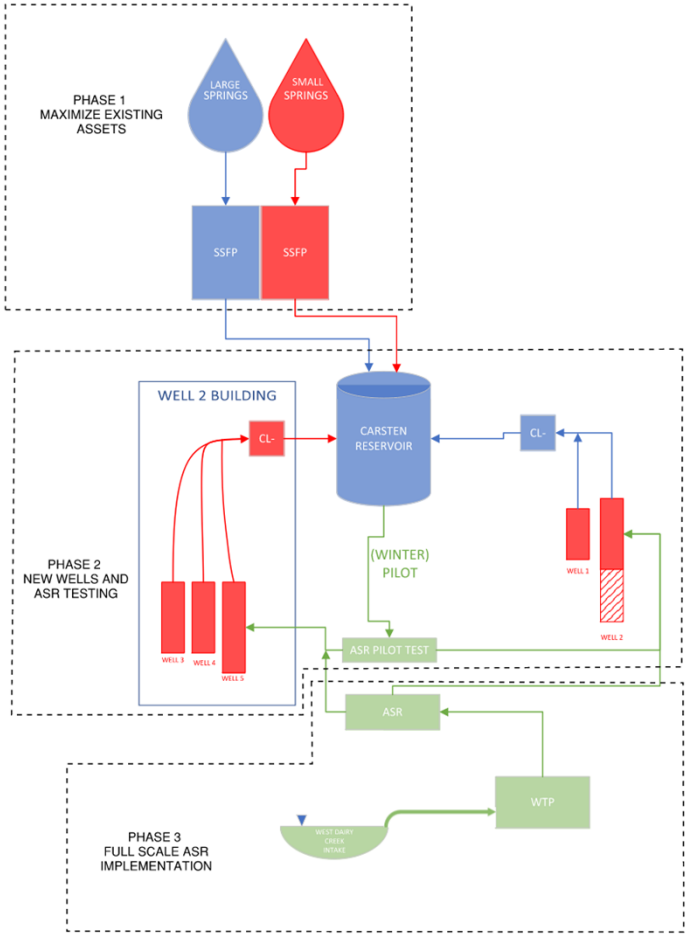


Phase 3 - Expanded Surface Water Supply

Full-scale ASR needs Water for Storage

Where can we find ~1-2 cfs of new water?

- Regional Supplier
  - Tualatin Valley Irrigation District? ✖
  - City of Forest Grove? ✖
  - City of Hillsboro? ✚
  - Joint Water Commission? ✚
- Surface Water Supply
  - Dairy Creek? ✚

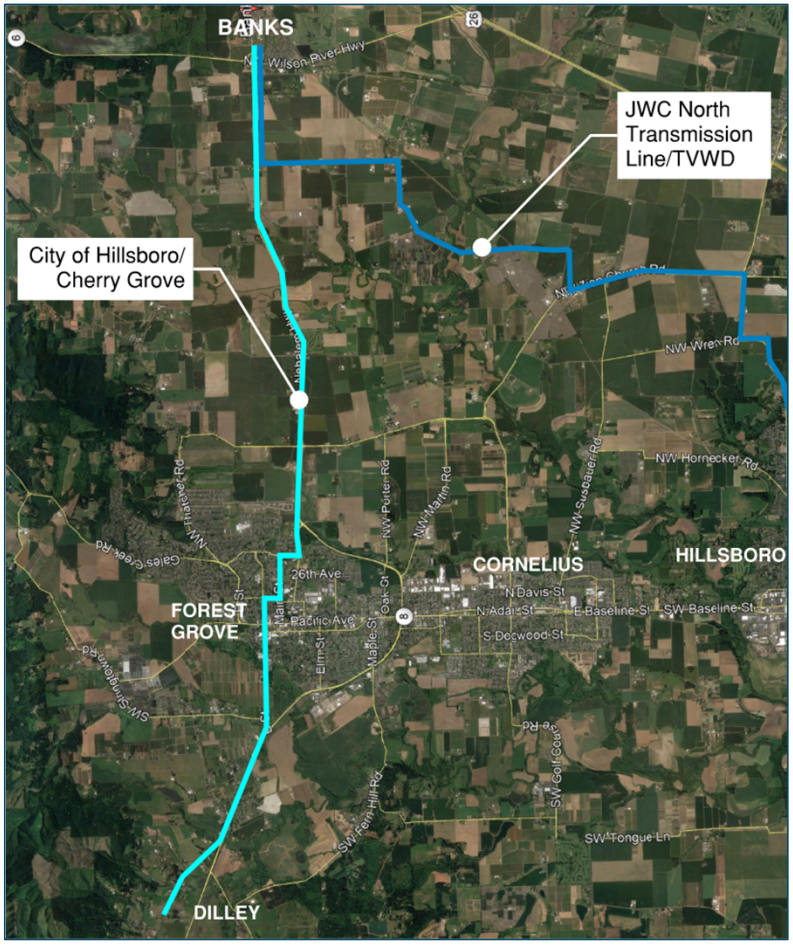


Phase 3 - Expanded Surface Water Supply

Full-scale ASR needs Water for Storage

- Wholesale Water from Regional Provider
  - Joint Water Commission/City of Hillsboro
  - 8-10 Miles
  - ~$17M (2020)

- New Surface Water Right/Treatment Plant
  - West Fork Dairy Creek Intake
  - Water Treatment Plant
  - ~$8M (2020)

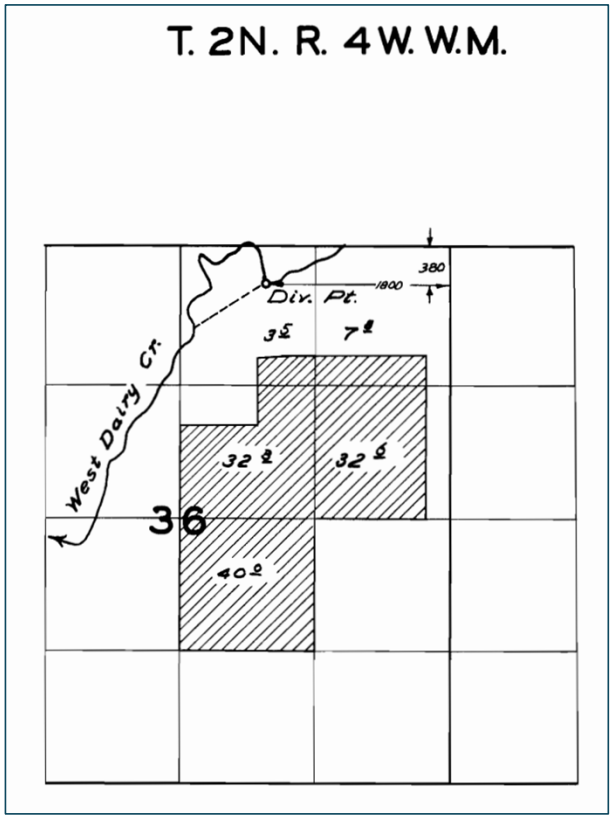


Phase 3 - Expanded Surface Water Supply

Dairy Creek Water Rights

- Two irrigation rights near City UGB in Dairy Creek
- City acquired rights via developer agreement
- Currently protected as instream rights

- Goal to transfer rights to City
  - *Change of use from irrigation to municipal (Mar-Oct)*
  - *Change of place of use to City UGB*
  - *Change of point of diversion to City WTP*



Phase 3 - Expanded Surface Water Supply

New Water Supply & Treatment

- Full-scale ASR will require more winter water for storage
- New permit for 2 cfs of winter water on Dairy Creek (2025)

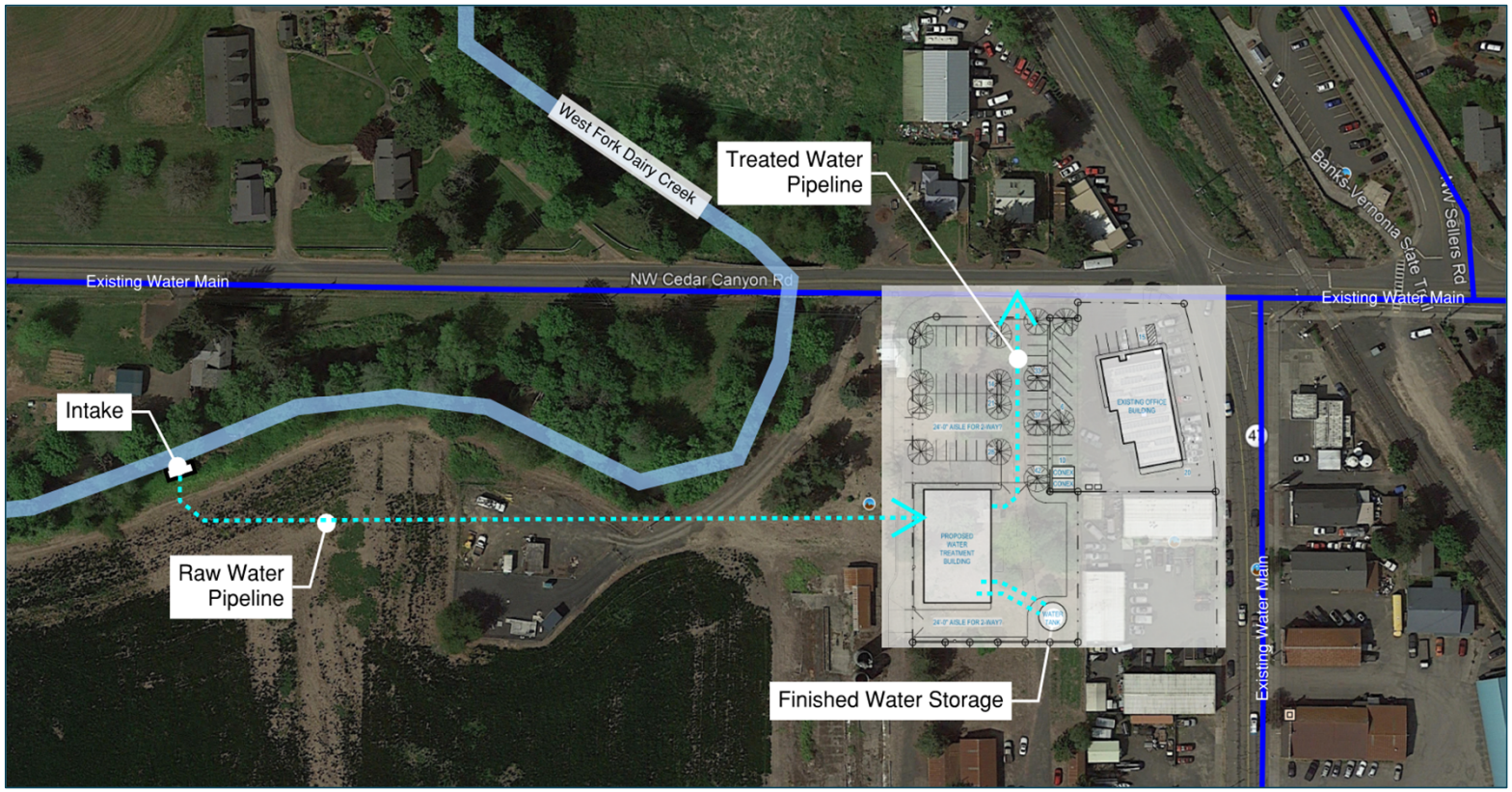
+900 gpm winter capacity

- Agreement reached for transfer of summer season rights on Dairy Creek to City
- City to build new WTP on Dairy Creek (long-term goal)
  - Flocculation
  - Filtration (media or membrane)
  - Chlorination

+570 gpm summer capacity

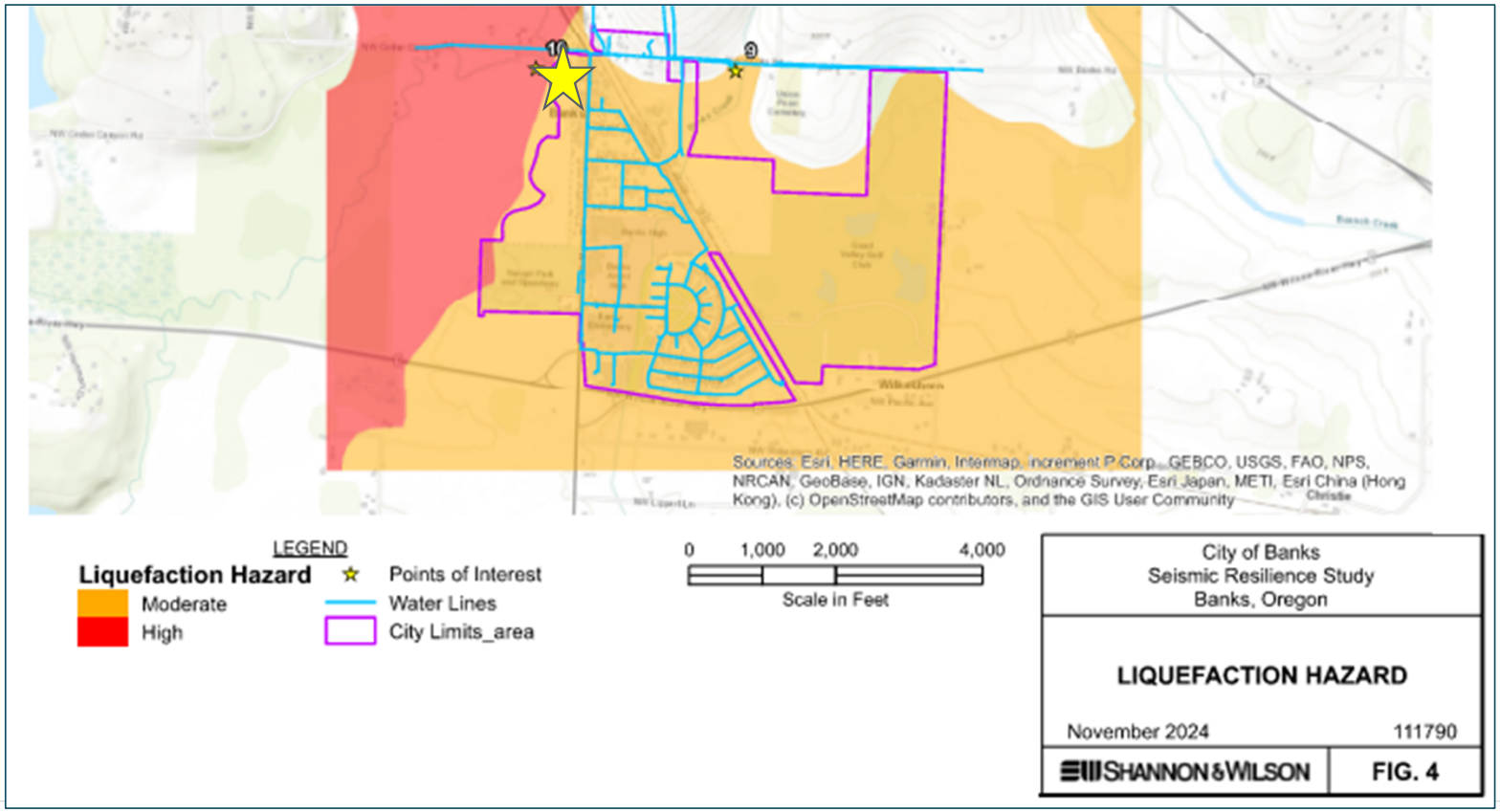
Phase 3 - Expanded Surface Water Supply

Dairy Creek Water Treatment Plant Overall Concept



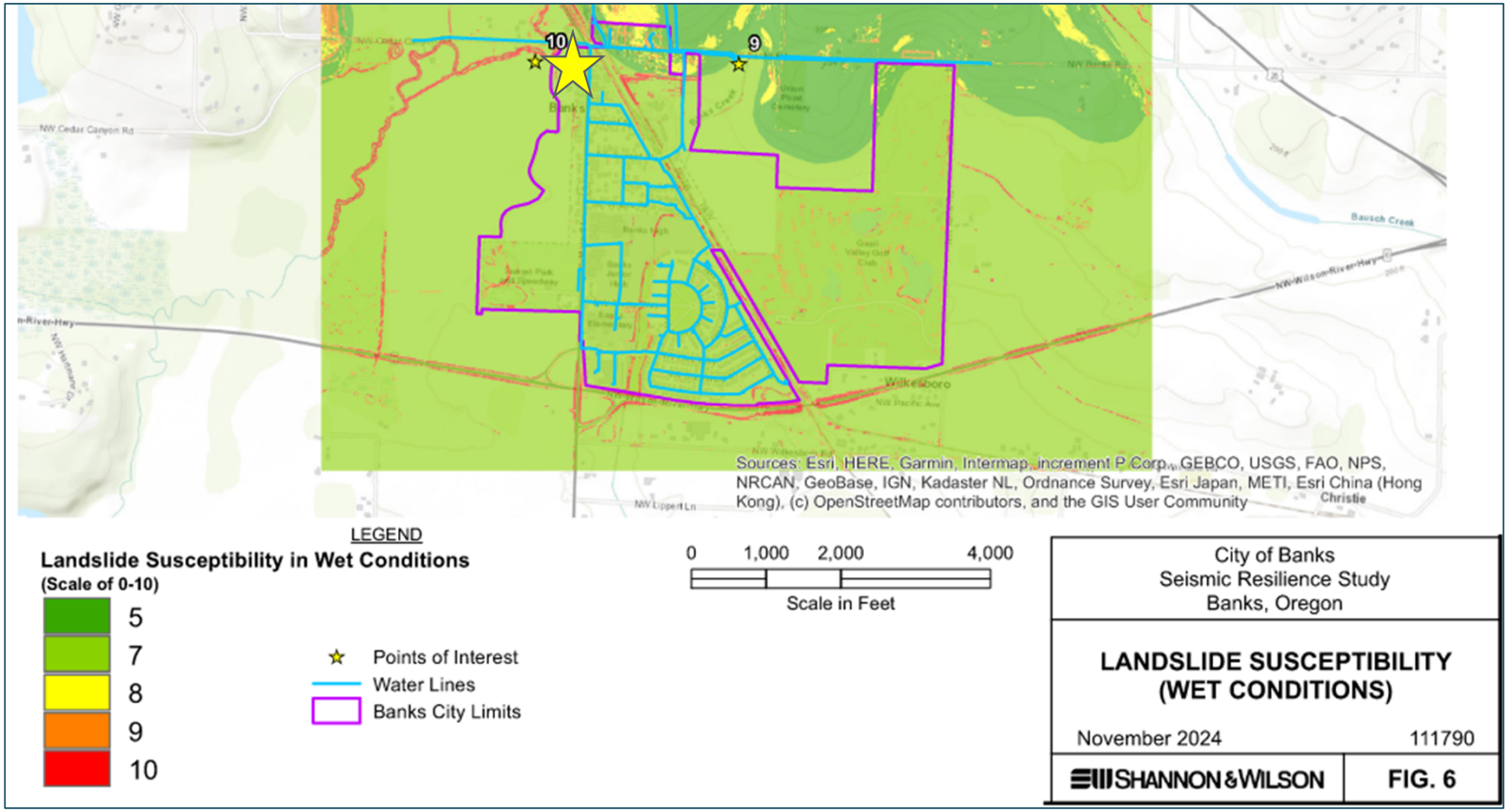
Additional Efforts – Seismic Risk Mitigation

Planning for Seismic Resilience – Liquefaction Hazard



Additional Efforts – Seismic Risk Mitigation

Planning for Seismic Resilience – Landslide Hazard



Developing Public Works Capacity

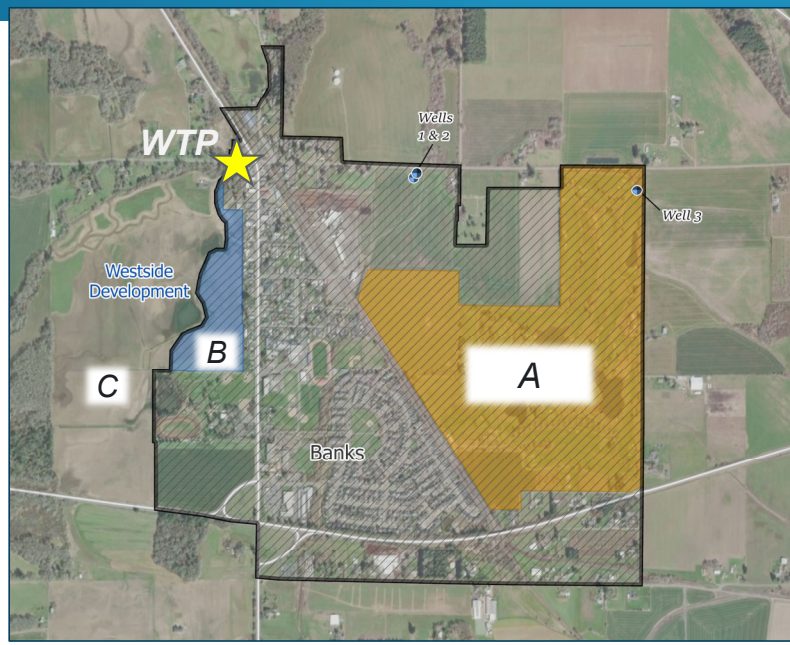
- The City's current system needs only a small staff
- With growth comes complexity...
  - An additional filter bed to operate,
  - An additional well to run and monitor,
  - A pilot ASR system to manage (injection/recovery),
  - 1,000+ new water connections
  - Miles of new Distribution Piping
  - Dozens of new Fire Hydrants
  - A second WTP with new treatment technology
- Working with other City's with ASR systems in the area
  - City of Beaverton
  - City of Tigard
  - Tualatin Valley Water District



Partnerships – Growth-Driven Planning

The City partnered with Developers

- **Developer A** (955 homes) Provided funding for:
  - Well No. 3
  - Reservoir No. 3
  - Slow Sand Filter Treatment Plant upgrades
- **Developer B** (189 homes) Provided support for:
  - Dairy Creek Water Right Acquisition
  - Easements for pipelines and other utilities
  - City purchase of 1 acre for Water Treatment Plant site
- **Developer C (Wetland Bank)**
  - Removed land from agriculture, freed agricultural water right for transfer
  - Facilitated transfer of agricultural water right to City



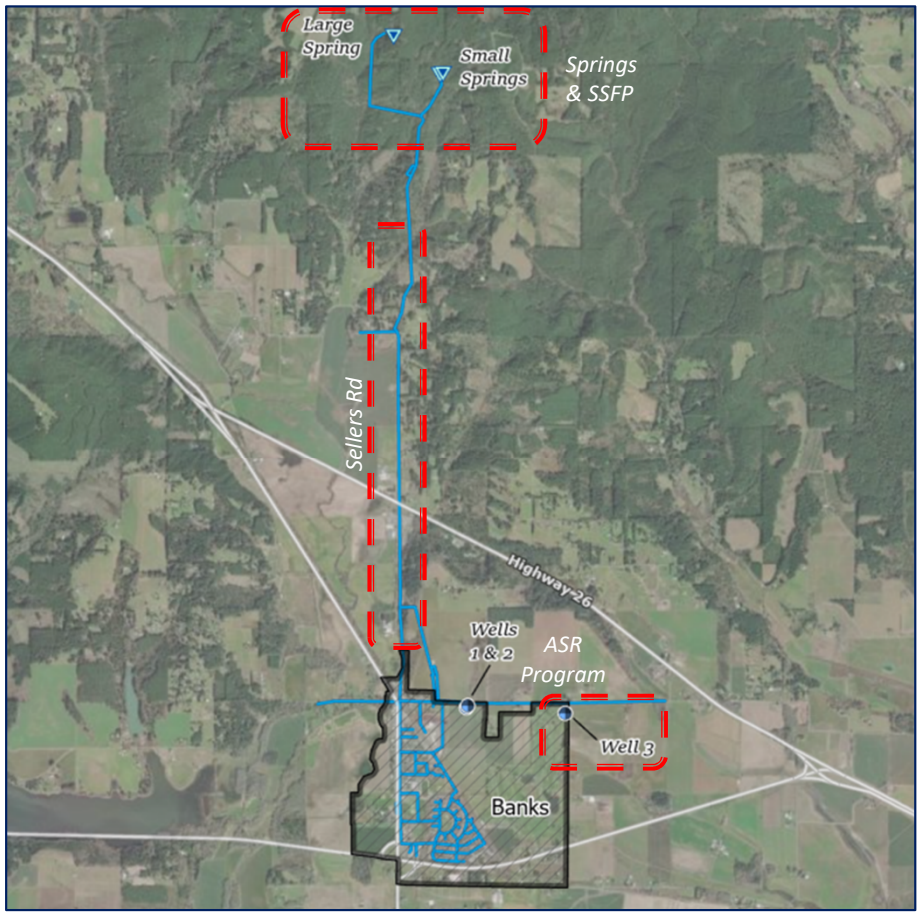
Funding Strategies – Beyond Public/Private Partnerships

- The City plans to seek feasibility study grants for ASR Pilot Study
  - *OWRD Water Project Grants and Loans Process – Summer 2026*
  - *Business Oregon's Sustainable Infrastructure Planning Projects*

- Low Interest Loans
  - *Rural Utilities Services*
  - *Water/Wastewater Fund*
  - *Safe Drinking Water Loan Fund*
  - *Special Public Works Fund*
  - *Lo-Cap Loans*



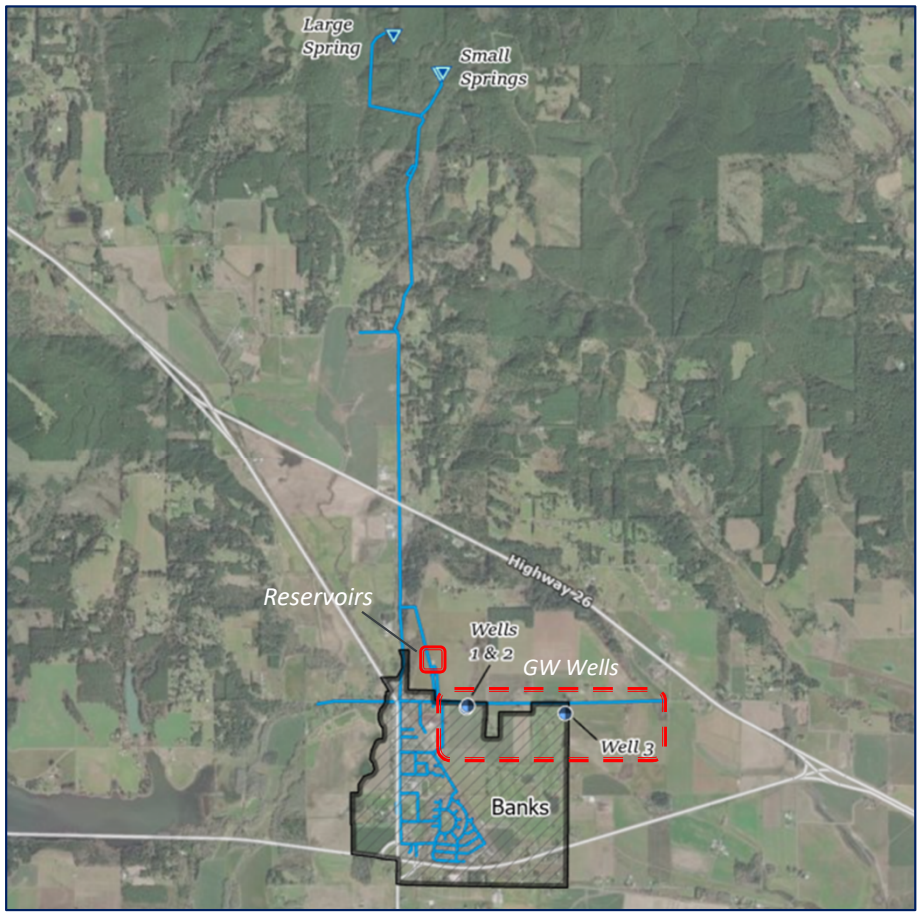
Water Supply - Pathway to 2050



Phase 1 (1-5 years)

- Loss reduction and conservation (system wide)
- Expanding SSFP capacity
- Optimizing groundwater production (Well-3)
- ASR Pilot Testing and Funding

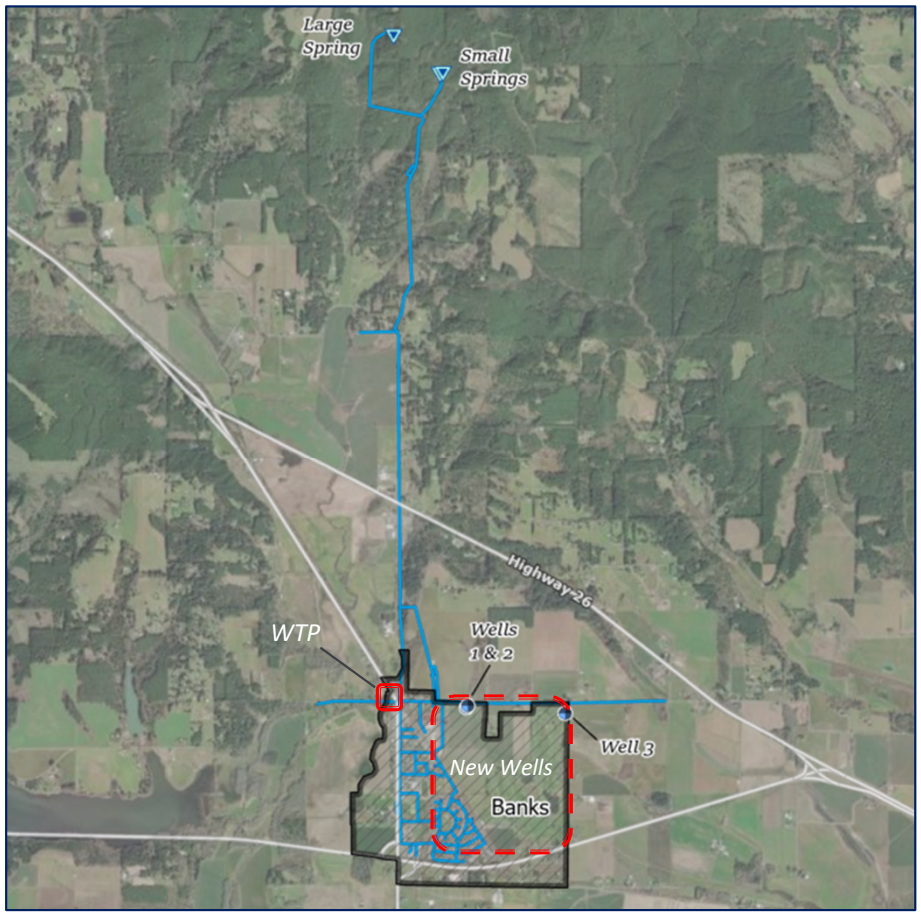
Water Supply - Pathway to 2050



Phase 2 (5-10 years)

- Expanding surface storage (3rd reservoir)
- ASR system build-out
- Expanding groundwater production
- Transfer surface water rights to City

Water Supply - Pathway to 2050



Phase 3 (10-15+ years)

- Dairy Creek Treatment Plant
- Expand surface water production
- Additional groundwater wells
- Perfect City water rights

Lessons Learned & Key Take-aways

- Short-term operational challenges can reveal long-term planning needs
- Optimize existing sources and infrastructure first
- Water rights optimization is as important as infrastructure improvement
- Partnerships enable small communities to embrace growth
- Phased planning increases flexibility and reduces risk
- Long-term planning improves water resilience

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Q & A

Kennedy Jenks | CwM