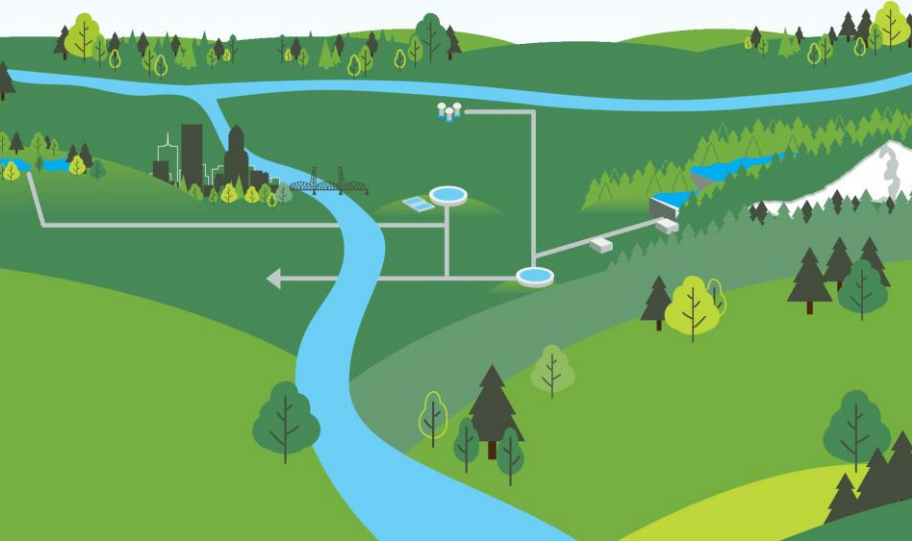


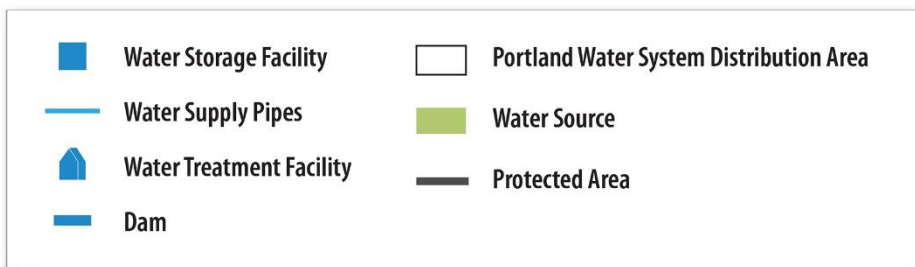
1 May 2019

PORTLAND WATER BUREAU Bull Run Treatment Program

HOW TO DECIDE, THE \$500M QUESTION

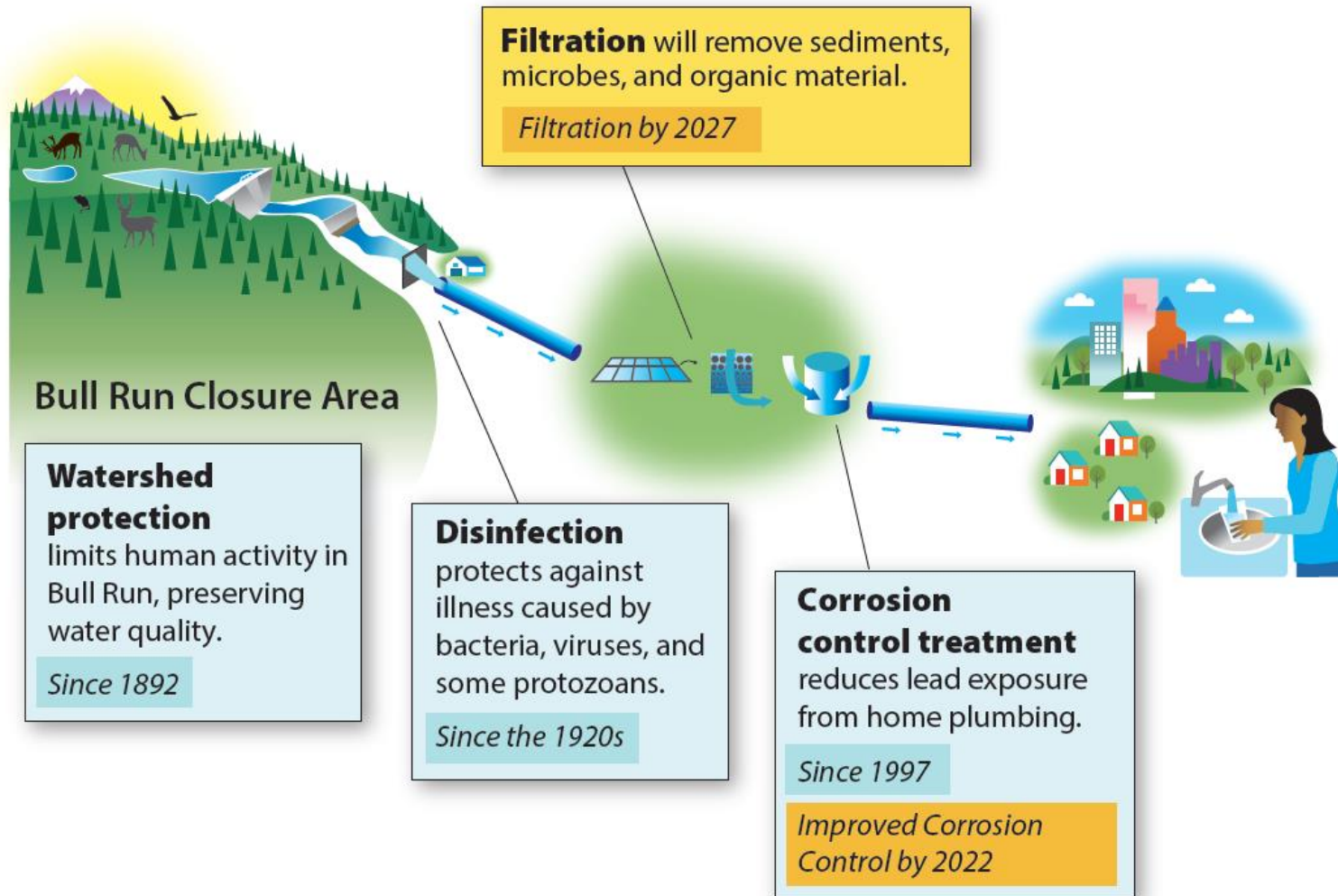


Portland's Water System



- Serves almost a million people
- Uses 100 million gallons of water on an average day
- Serves the City of Portland and 19 wholesale water districts

Bull Run Treatment Projects



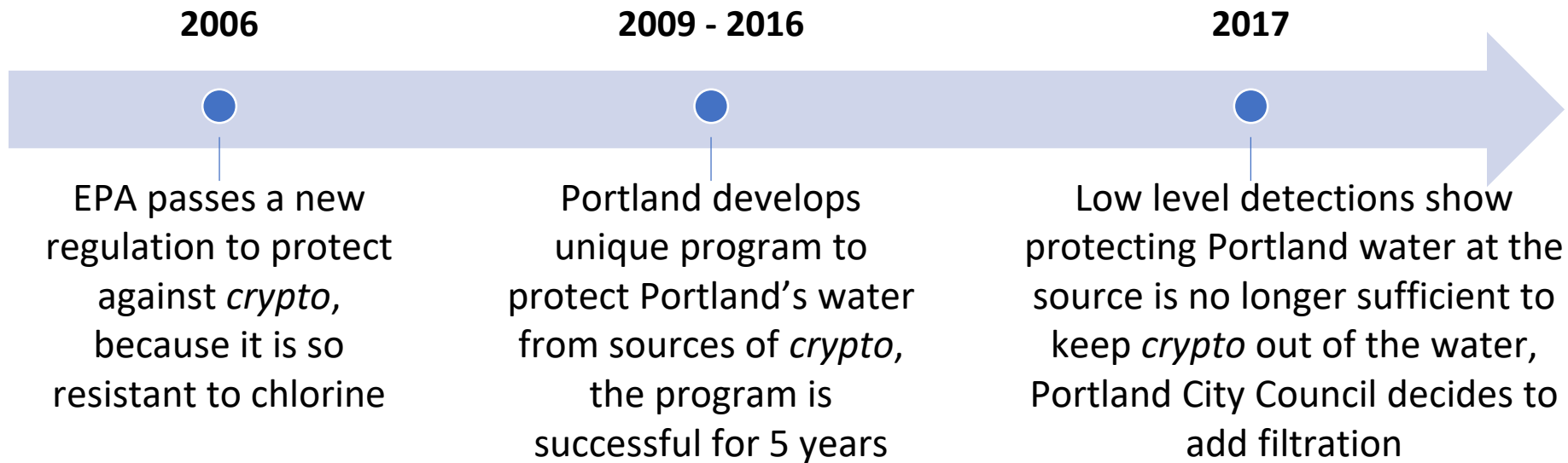
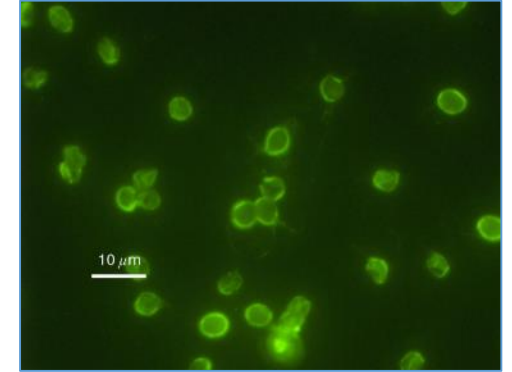
Why are the projects needed?

These projects are being built to comply with Environmental Protection Agency (EPA) regulations.

Oregon Health Authority has set compliance schedules.

Need for *Crypto* Treatment

Treatment improves public health by removing or inactivating *Cryptosporidium (crypto)* in the water



The Bull Run Filtration Project continues the City's commitment to serving the best possible water to Portland customers.

Filtration Provides Other Benefits

- ✓ Makes Portland's water safer by removing microorganisms
- ✓ Makes our Bull Run supply more reliable
- ✓ Allows Bull Run to be used after an emergency, such as a fire
- ✓ May reduce the amount of chlorine needed for disinfection
- ✓ Prepares us to respond to future regulations



Council Choice

- Council conversation about the risk benefits
- Council decided to go with filtration. With this knowledge able to negotiate a compliance agreement. Obtained a 10 years schedule.

Cryptosporidium Found In Bull Run Water

5 months ago

comment



BLOGTOWN

NEWS • CITY HALL • \$\$\$

Portland Is Going to Build a Massive Filtration Plant for Its Oft-Lauded Water Supply

by [Dirk VanderHart](#) • Aug 2, 2017 at 5:26 pm

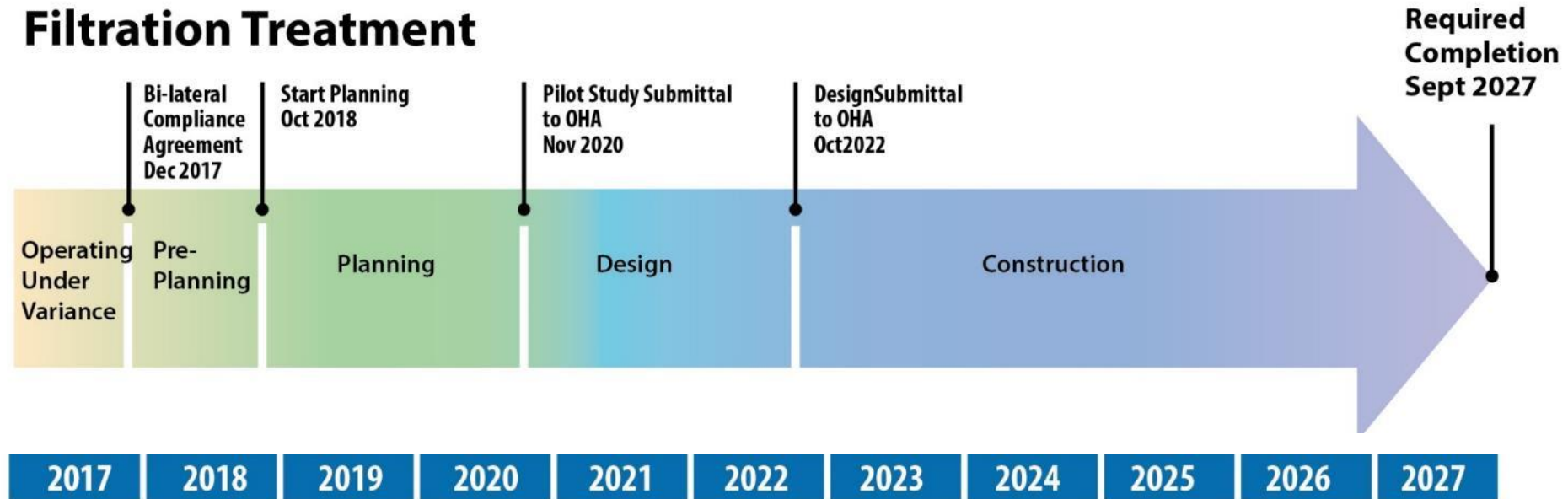
Like 104 Share Tweet



The Bull Run Watershed, source of most of Portland's water. CITY OF PORTLAND

Bull Run Filtration Schedule

Filtration Treatment



Questions, questions, questions...

Suddenly there are many questions...

- What types of filters are we going to use?
 - Where will the plant be located?
 - How big will we make the plant?
 - How can we get this done in 10 years?
 - How will we decide what to do?
-
- Envisioned a matrix: 3 filtration technologies, 10 possible sites to construct on, and any number of possibilities for the size.

Initial Decision: Four Foundational Elements



Procurement
Method



Filtration Plant
Location



Filtration Plant
Technology



Filtration Plant
Capacity

Community Conversations

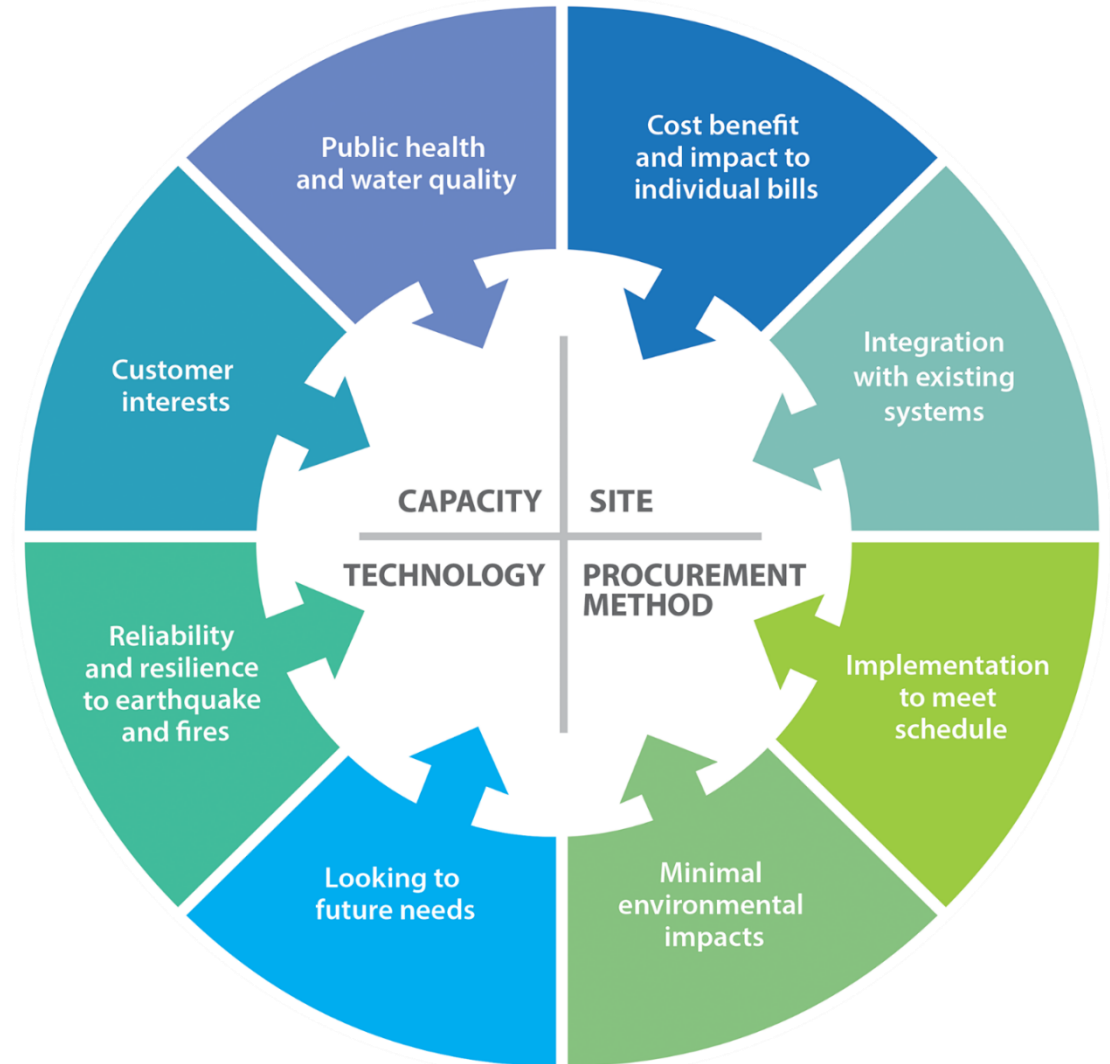
Prioritizing public outreach and communication to guide this work

- ✓ Online survey
- ✓ Digital/social media outreach
- ✓ Stakeholder interviews
- ✓ Community Forum

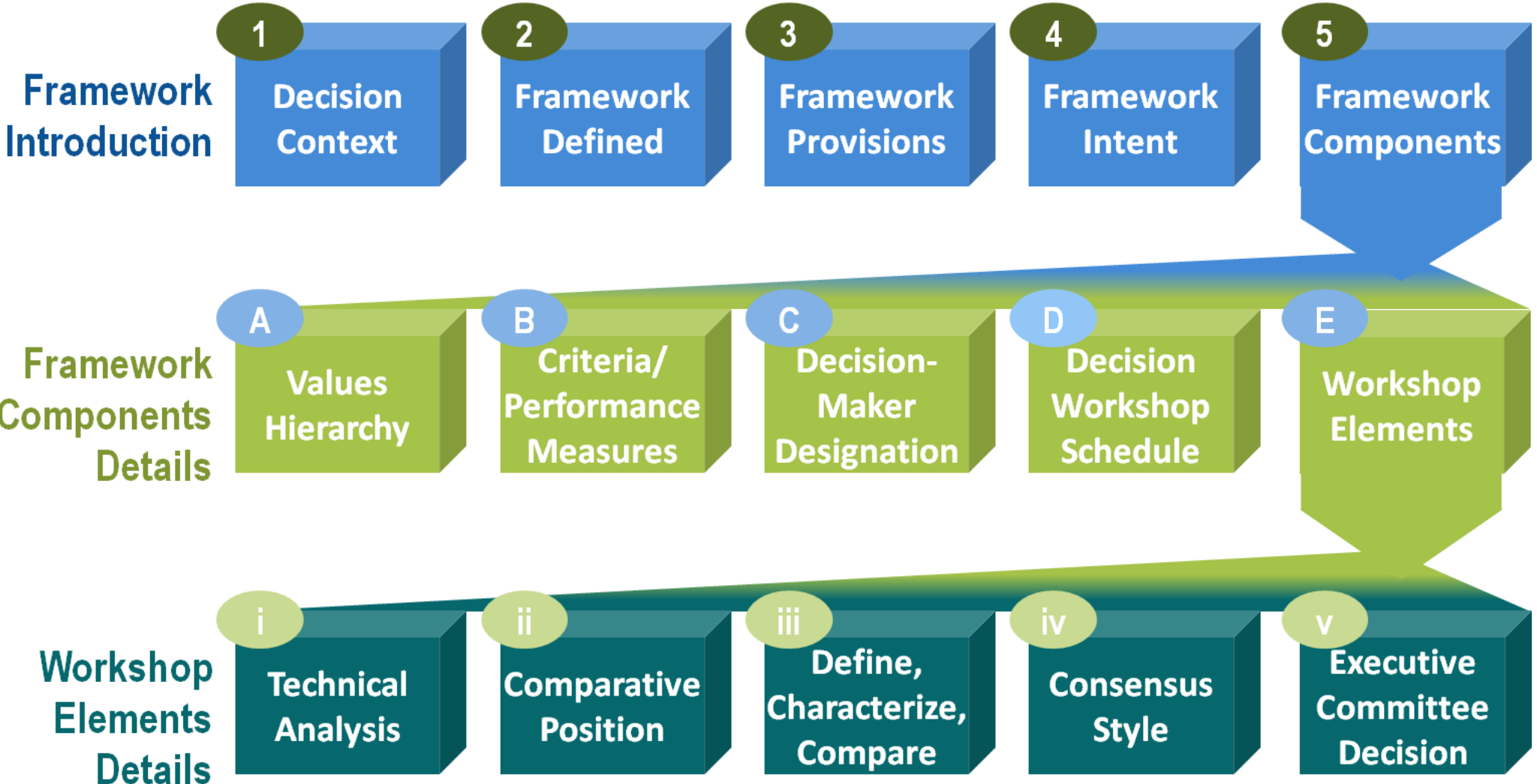


What's important to customers for the Bull Run Filtration Projects?

- Most important:
 - ✓ **Water quality**
 - ✓ **Cost benefit**
(getting good value from investments)



Decision Framework



Values Hierarchy

Value	Public Health and Water Quality	Resiliency/ Reliability	Community Interests	Cost Benefit
Value Description	Provide drinking water that is safe and consistent	Facility maximizes likelihood of continued water provision, even after a fire or disaster	Integrate community interests in the decision-making process	Getting the most benefit for the dollar

Value	Meet Future Needs	Environmental Impacts	Integration	Implementation
Value Description	Maximizes ability to make adjustments in future	Minimize environmental impacts	Optimize operability & integration with PWB's systems & practices	Increases ability to implement and meet compliance schedule

Value Benefit

Figure 10: Team Weighting Value Scores

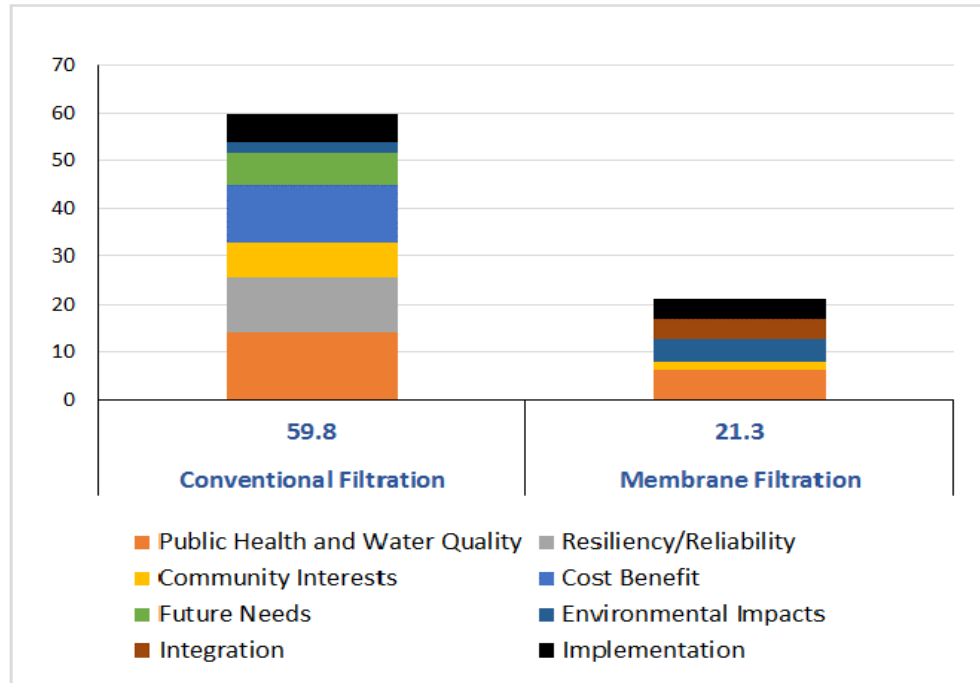
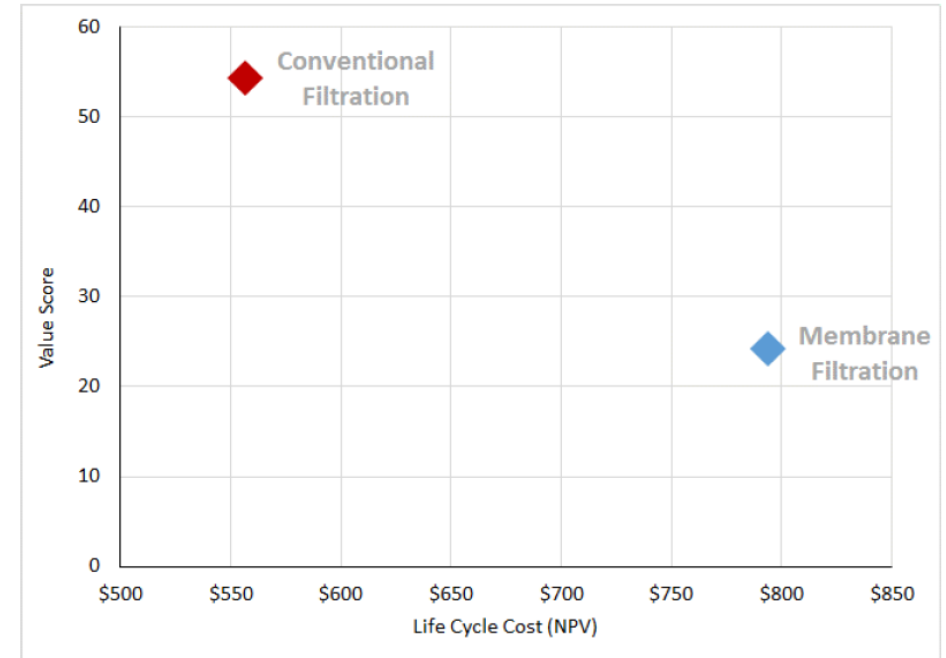


Figure 13: Team Weighting Scatter Plot and Table



	Value Score	Lifecycle Cost \$M	\$M per unit of value (lower better)	Additional value	Additional Lifecycle Cost \$M	Additional \$M per unit of value
Conventional	54.3	\$ 557.00	\$ 10.25	---	---	---
Membrane	24.2	\$ 794.00	\$ 32.75	-30.1	\$ 237.00	-7.87

Numbers don't make decisions people do.

Initial decisions focus on four foundational elements



Procurement Method

City Council decision 8-29-18



Filtration Plant Capacity

City Council decision 12-12-18



Filtration Plant Location

City Council decision 12-12-18



Filtration Plant Technology

City Council decision 12-12-18

Procurement Method

Construction Manager/General Contractor (CM/GC)

- ✓ Provides strong cost and schedule control
- ✓ Promotes participation of disadvantaged, minority and women owned businesses
- ✓ Provides Portland with a high level of control so that the project stays in alignment with community values
- ✓ Has been used successfully by Portland in the past

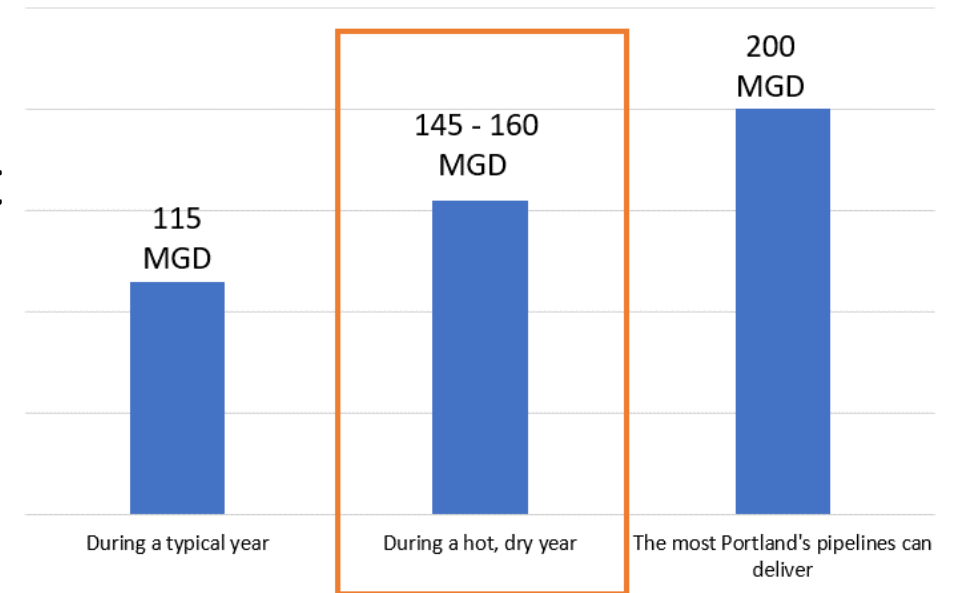


Filtration Plant Capacity

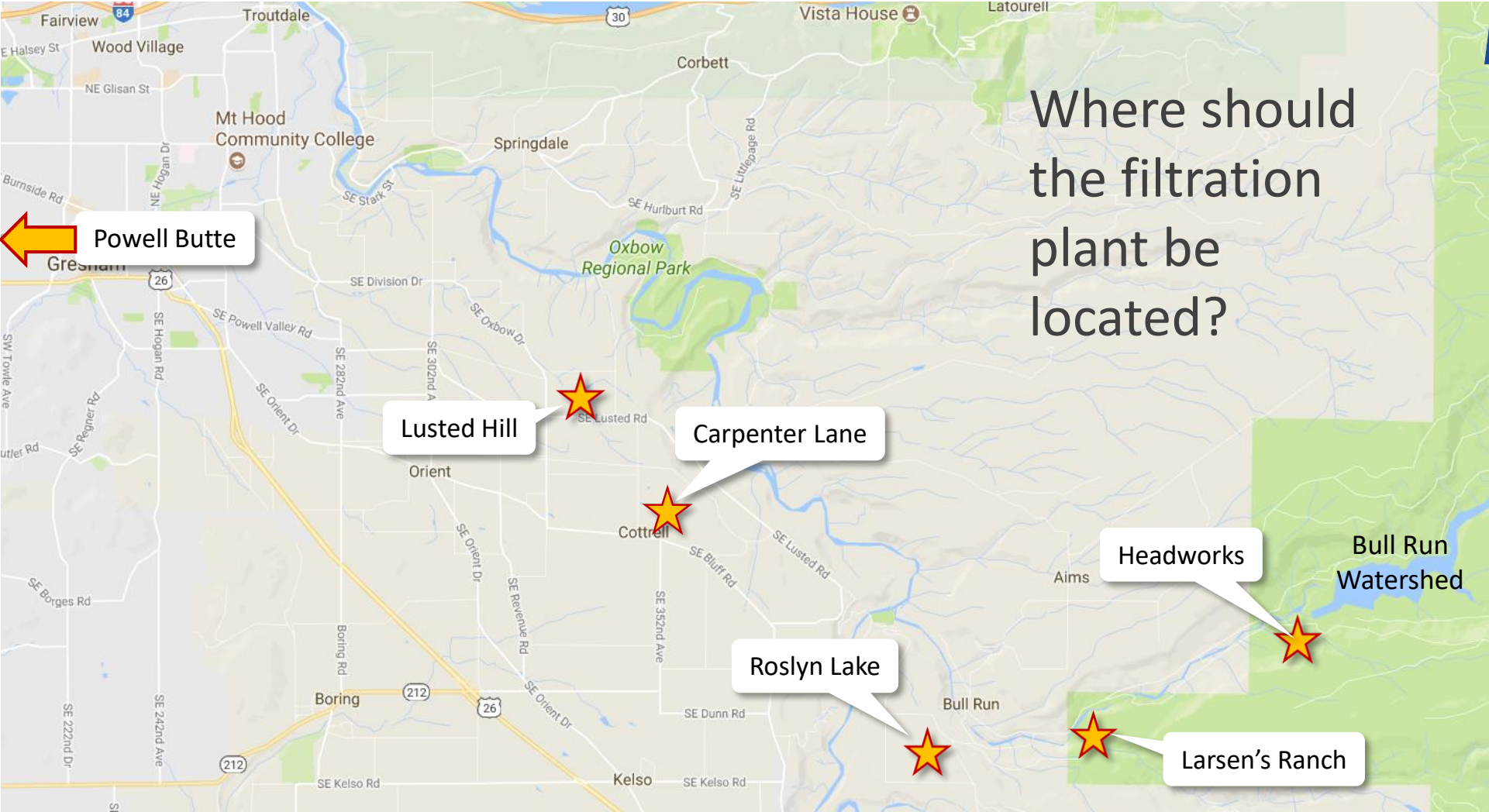


145-160 MGD

- ✓ Continues Bull Run as Portland's main water supply, meeting demands on most days in most years
- ✓ Manages costs by matching filtration plant size to expected water use
- ✓ Allows for future expansion if needed



Analysis: Filtration Plant Location



Analysis: Filtration Plant Location



Site	HGL	Proximity to Conduits	Tax Lot Size	Slopes and Geologic Hazards	Schedule
Carpenter Lane	Pass ✓	Pass ✓	Pass ✓	Pass ✓	Pass ✓
Headworks	Fail	Pass	Fail	Fail	Pass
Larson's Ranch	Fail	Pass	Pass	Pass	Pass
Lusted Hill	Pass	Pass	Pass (with site expansion)	Pass	Pass
Powell Butte	Pass	Pass	Pass	Pass	Fail
Roslyn Lake	Fail	Pass	Pass	Pass	Pass

Filtration Plant Location



95-acre property purchased by Portland for a future filtration facility

- ✓ Site is at the right elevation and location, so that less pumping is needed
- ✓ Property is already owned by Portland Water Bureau so avoids the cost of purchasing a new property
- ✓ Zoning allows a filtration facility
- ✓ Site is large enough to provide a buffer around the facility and its neighbors



Analysis: Filtration Technology

Membranes

- ✗ High energy use
- ✗ High capital and operating costs

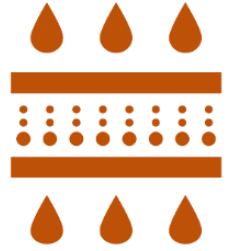
Slow Sand

- ✗ Significant size
- ✗ Comparative poor water quality

Granular Media

- ✓ Best operating capabilities
- ✓ Good water quality
- ✓ Most flexibility

Membrane



Slow Sand



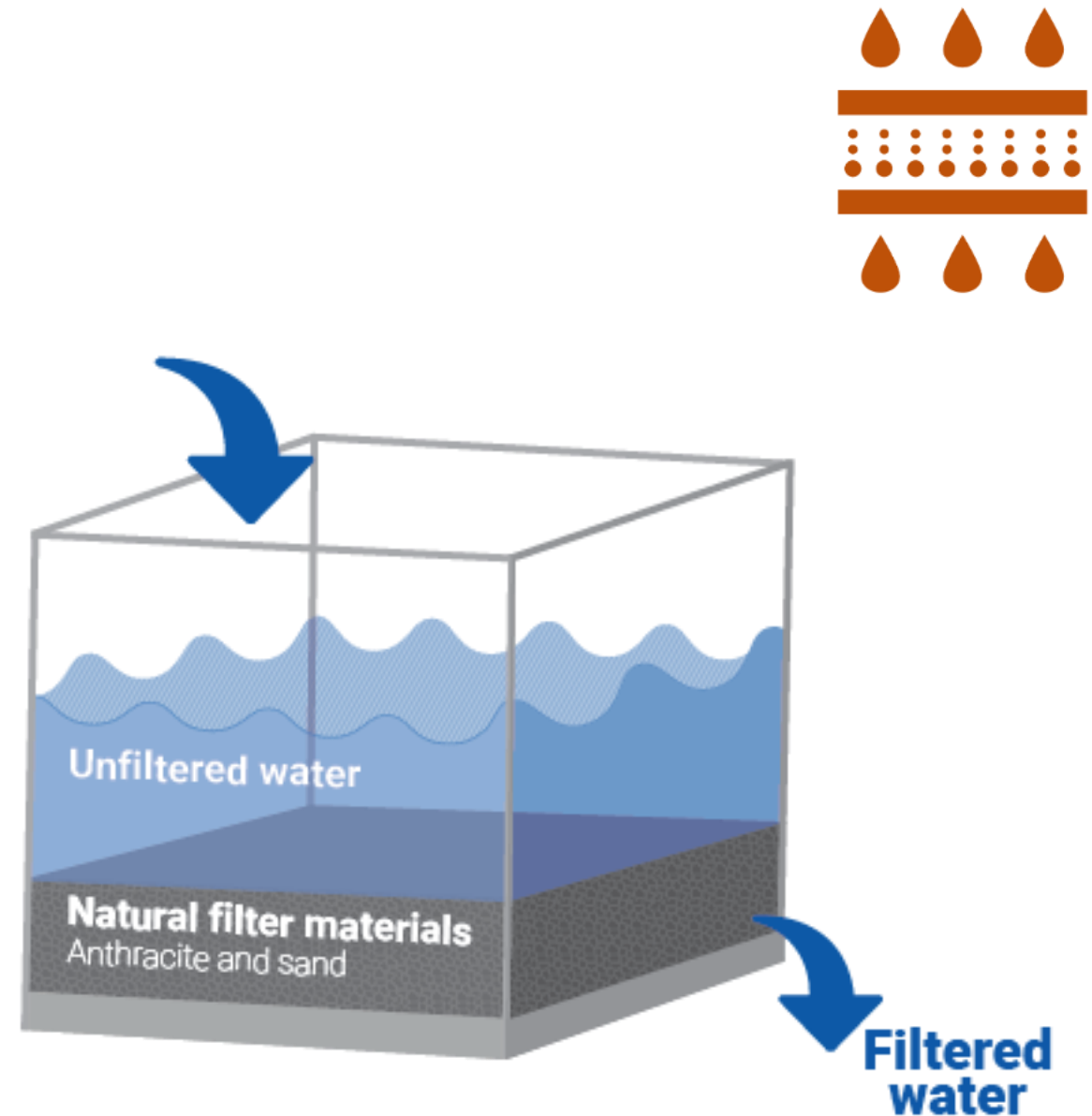
Granular Media



Filtration Technology

Granular media filtration

- ✓ Proven technology that produces excellent water quality
- ✓ Lowest cost technology that can meet desired water quality
- ✓ Very flexible – it can be adapted to different water conditions and new water quality requirements
- ✓ Fits on the filtration plant site with room to grow in the future



Questions?

David Peters, P.E.
Portland Water Bureau
david.peters@portlandoregon.gov

Dan Speicher
Jacobs
Dan.Speicher@Jacobs.com