

King County Clean Water Plan

Meeting #4 Advisory Group Briefing Packet



December 16, 2019

Clean Water Plan

Making the right investments at the right time



King County

Department of Natural Resources and Parks
Wastewater Treatment Division

Clean Water Planning Process Check In

As a reminder, King County is convening this discussion because it is facing tough decisions that will shape the scope and focus of regional water quality investments and actions for decades to come. The Clean Water Plan represents a community investment that is a major opportunity to contribute to the economic, social, and ecological health of the region.

The fundamental question the planning process will address is:

What is the most appropriate path to ensure we direct the right public investments to the right actions at the right time for the best water quality outcomes?

Over the spring and summer of 2019, the King County planning team identified and evaluated trends and drivers that require explicit consideration during plan development. Significant trends can be highly impactful to regional water quality, water resource, or ecosystem management efforts, or to King County Wastewater Treatment Division (WTD) operations specifically. The magnitude or timing of the impacts of these trends range from relatively less uncertain to relatively more uncertain. The presence of significant *and* uncertain trends complicates long-range planning, particularly in contexts where investments are large and long-lived, such as in the wastewater utility sector.

These significant trends, when viewed within the context of the existing, relevant conditions of the region and WTD's infrastructure, translate into **eight key decision areas** that are to be addressed as part of the Clean Water Planning process.

Decision Areas and Key Questions

Treatment Plants*

What treatment plant investments should be made?

Pollutant Source Control / Product Stewardship*

Are there more efficient or effective methods than wastewater treatment to address pollutants of concern?

Stormwater and Combined Sewer Overflows*

What approach should be taken to address stormwater and combined sewer overflows in King County's system?

Wastewater Conveyance System

What are the best investments in collections systems to ensure sufficient capacity?

Asset Management, Resiliency, and Redundancy

What investments should be made to address risk of failure in an aging regional wastewater system and protect the investments that have been made?

Legacy Pollution

What are the opportunities to address legacy pollution?

Resource Recovery

What level of wastewater resource recovery should King County undertake?

Finance

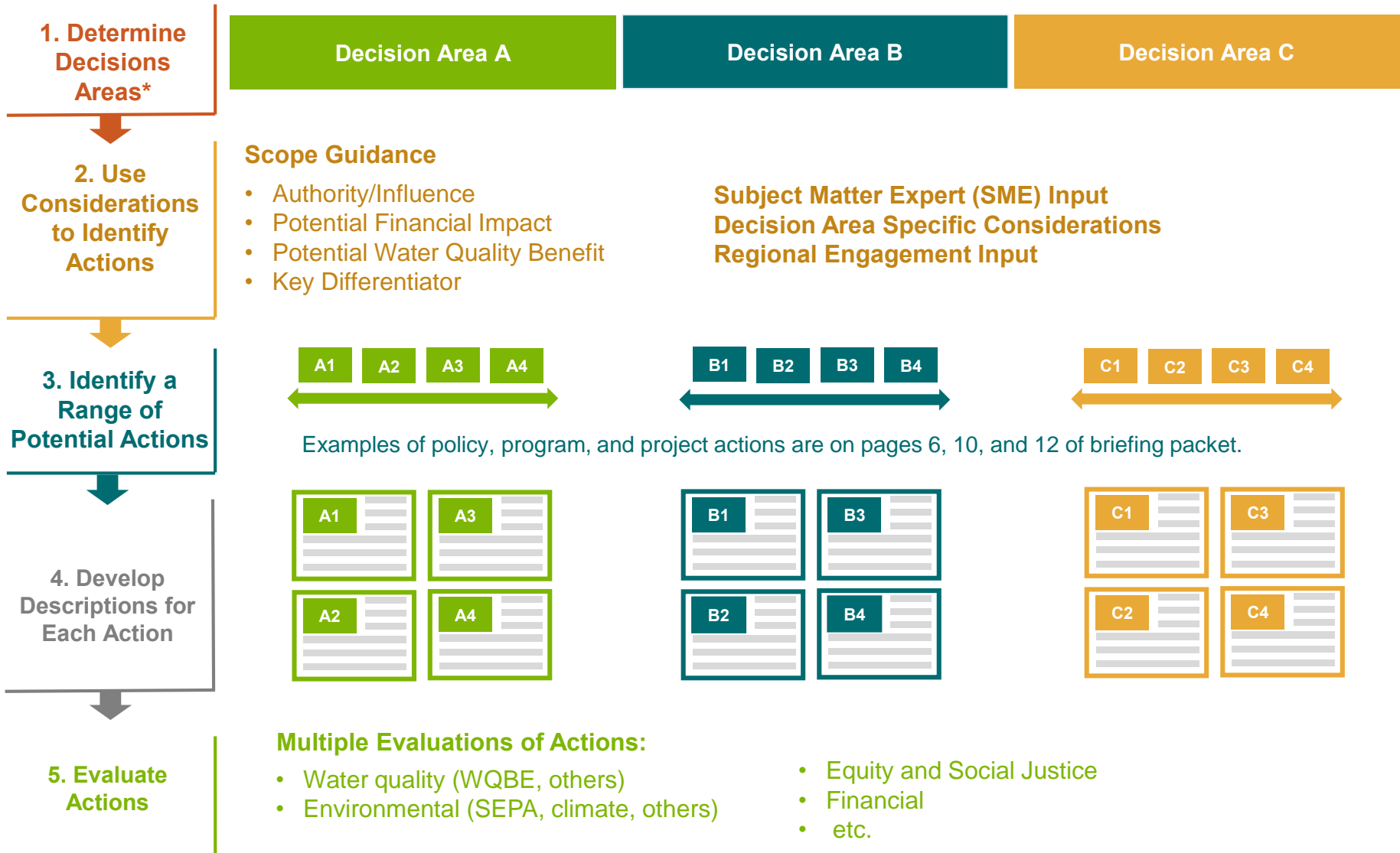
How will regional water quality investments be financed?

*Discussed at the October 9, 2019 Advisory Group meeting

Discussion: Decision Areas and Key Questions

What are your perspectives on the decision areas and/or key questions?

Moving from Decision Areas to Potential Actions (Actions = Policies, Programs, and Projects)



Recap from October 9th: Treatment Plant (Slide 1 of 2)

What treatment plant investments should be made?

Considerations

- Will construction of additional treatment plant(s) be needed to serve a growing population?
- Will construction of additional treatment plant(s) be needed to treat wastewater to a higher water quality standard?
- What is the cost of pollutant reduction as compared to water quality benefits given the diminishing marginal return on investment with additional pollutant removal?
- What does that tell us about how to best set priorities for our water quality and ecosystem health investments?
- In addition to water quality, what are the environmental impacts (positive and negative) of wastewater treatment plants?
- How can the County ensure that funding of treatment plant upgrades and siting of any potential new wastewater treatment facilities is equitable?

Developing Actions Under Decision Areas: Treatment Plant (Slide 2 of 2)

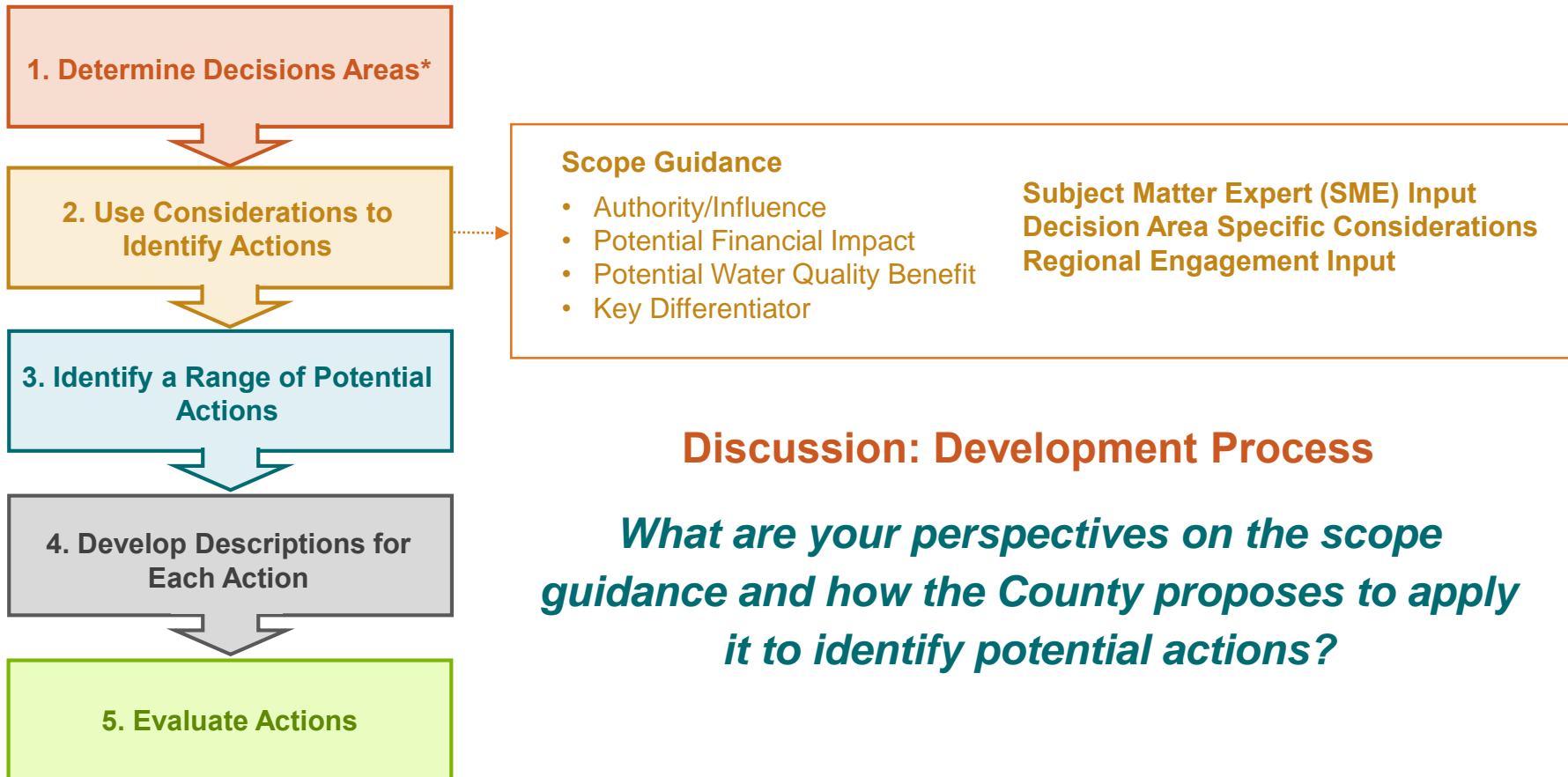
Potential Policies

- **Amendments to existing policies** – Amend existing King County Wastewater Treatment Policies (King County Code 28.86) to revise current guidance for additional wastewater treatment levels (e.g., nutrient removal, advanced treatment) and treatment plant capacity.
- **New policies** – Develop King County Wastewater Treatment Policies to establish new policy guidance, such as for additional treatment plants, incorporation of decentralized wastewater treatment technology in the system, and the use of highly treated wastewater resulting from advanced treatment (e.g., reverse osmosis).

Potential Programs and Projects

- **Nitrogen removal at individual treatment plants** – Phased upgrade of all King County Wastewater Treatment Division (WTD) secondary treatment plants or construction of new treatment plant(s) to include nitrogen removal. Treatment capacity expansions to accommodate population growth are completed at the same time as treatment level improvements.
- **King County WTD system nitrogen reduction target** – Upgrade one or more King County WTD secondary treatment plants to meet a systemwide nitrogen reduction limit. Treatment capacity expansions to accommodate population growth are completed at the same time as treatment level improvements.
- **King County WTD participates in Puget Sound-wide nitrogen reduction target** (e.g., water quality trading with other wastewater utilities and/or with non-point sources) – Upgrade one or more secondary treatment plant to meet a portion of Puget Sound-wide nitrogen limit. Treatment capacity expansions to accommodate population growth are completed at the same time as treatment level improvements.
- **Capacity through decentralized treatment** – King County WTD partially or fully addresses capacity and improved wastewater treatment levels through implementing decentralized wastewater treatment facilities. This could be done at the “micro” (e.g., building scale) or with small wastewater treatment facilities in high growth areas or points where existing large sewage pipes converge.
- **Advanced wastewater treatment** – Upgrade one or more King County WTD secondary treatment plants or construction of new treatment plant(s) to advanced treatment (e.g., reverse osmosis). Treatment capacity expansions to accommodate population growth are completed at the same time as treatment level improvements.

Moving from Decision Areas to Potential Actions



Discussion: Development Process

What are your perspectives on the scope guidance and how the County proposes to apply it to identify potential actions?

Discussion of Decision Areas

Treatment Plants*

**Pollutant Source Control /
Product Stewardship***

**Stormwater and Combined
Sewer Overflows***

**Wastewater Conveyance
System**

**Asset Management,
Resiliency, and Redundancy**

Legacy Pollution

Resource Recovery

Finance

*Discussed at the October 9, 2019 Advisory Group meeting

Decision Area: Asset Management, Resiliency, and Redundancy (Slide 1 of 2)

What investments should be made to care for an aging regional wastewater system and protect the investments that have been made?

To answer this question, the planning process needs to determine what level of risk of failure the region is willing to accept as wastewater facilities continue to age and are vulnerable to natural hazards.

Considerations

- What level of investment does the region want to make to achieve a satisfactory level of risk in operating the wastewater utility?
- What level of investment in the regional wastewater system asset replacement and rehabilitation is needed given the age and condition of the system?
- What level of risk does the region want to take in preparing the system for climate change and natural hazards impacts?
- What level of power reliability and redundancy is desired to minimize risk?
- Are there resiliency priority areas that should be addressed sooner to support historically disadvantaged communities who may be more vulnerable to impacts or disproportionality impacted by pollution?

Decision Area: Asset Management, Resiliency, and Redundancy (Slide 2 of 2)

Potential Policies

- **New asset management policies** – Develop King County Wastewater Treatment Policies to establish new policy guidance that directs caring for the region's wastewater system, such as level of service, risk management, and goals for mitigating system failures.

Potential Programs and Projects

- **Highest industry standard asset management** – Set a goal for the lowest level of system failure risk and fund asset management program at a level to achieve the highest industry standard.
- **Moderate industry standard asset management** – Accept a level of system failure risk and fund asset management program in a manner that minimizes failure, but at the same time accepts system failures will occur at times.
- **Earthquake resiliency-focused** – Implement an aggressive earthquake resiliency program, funding projects to reinforce the regional wastewater system and mitigate the potential for earthquake damage.
- **Earthquake recovery-focused** – Facilities in the regional wastewater system are brought up to current earthquake building codes as they are replaced at the end of useful life. Prepare a regional wastewater system post-earthquake reconstruction plan to proactively prepare for and enable a speedy recovery.

Discussion: Development Process

- *What input do you have on this decision area?*
- *Are there other considerations that you see as important to asset management, resiliency, and redundancy?*

Decision Area: Legacy Pollution (Slide 1 of 2)

What are the opportunities to address legacy pollution?

To answer this question, the planning process needs to explore known and unknown legacy pollution sources and investigate if addressing these pollution sources can result in better water quality outcomes than other potential investments.

Considerations

- Are there existing legacy pollution sources in priority habitat areas around outfalls that should be addressed sooner to improve habitat and water quality?
- Are there priority areas around outfalls or wastewater facilities that should be addressed sooner to invest in communities who have been historically disproportionately affected by pollution?

Decision Area: Legacy Pollution (Slide 2 of 2)

Potential Policies

- **New legacy pollution policies** – Develop King County Wastewater Treatment Policies to establish new guidance for reducing pollution from legacy pollution sources, such as contaminated sediments, historical in water structures, and upland or brownfield sites.

Potential Programs and Projects

- **Current Sediment Management Plan (SMP)** – Implement the existing SMP that addresses legacy pollution.
- **Accelerated SMP** – Implement an accelerated SMP, prioritizing critical habitat and Equity and Social Justice communities for near term action.
- **Expanded SMP** – Implement a broad legacy pollution program. Program elements could include:
 - Investigating and developing a cleaning program for legacy sediments in sewer pipes.
 - Developing a source control program to remediate high-concentration legacy sources of PCBs (e.g., sidewalk caulks and road paints) and other contaminants of interest prior to entering the sewer system.
 - Investigating historical wastewater treatment and combined sewer overflow outfall locations for legacy pollutant cleanup and habitat restoration opportunities.
 - Developing an upland or brownfield contamination clean-up program with clearly defined boundaries. Focus on basins with known impairments linked to potential upland contamination sources with defined pathways to receiving waters.

Discussion: Development Process

- *What input do you have on this decision area?*
- *Are there other considerations that you see as important to legacy pollution?*

Appendix A: Background on Asset Management, Resiliency, and Redundancy



Appendix A: Slide 1 of 5

Asset Management

The King County Wastewater Treatment Division defines asset management as the systematic process of operating, maintaining, upgrading, and disposing of assets (our equipment and facilities - pumps, pipes, etc.) cost-effectively.

Nationally

Aging assets or infrastructure is an issue nationally. The American Society of Civil Engineers graded the nation's wastewater infrastructure at D+ in 2017.

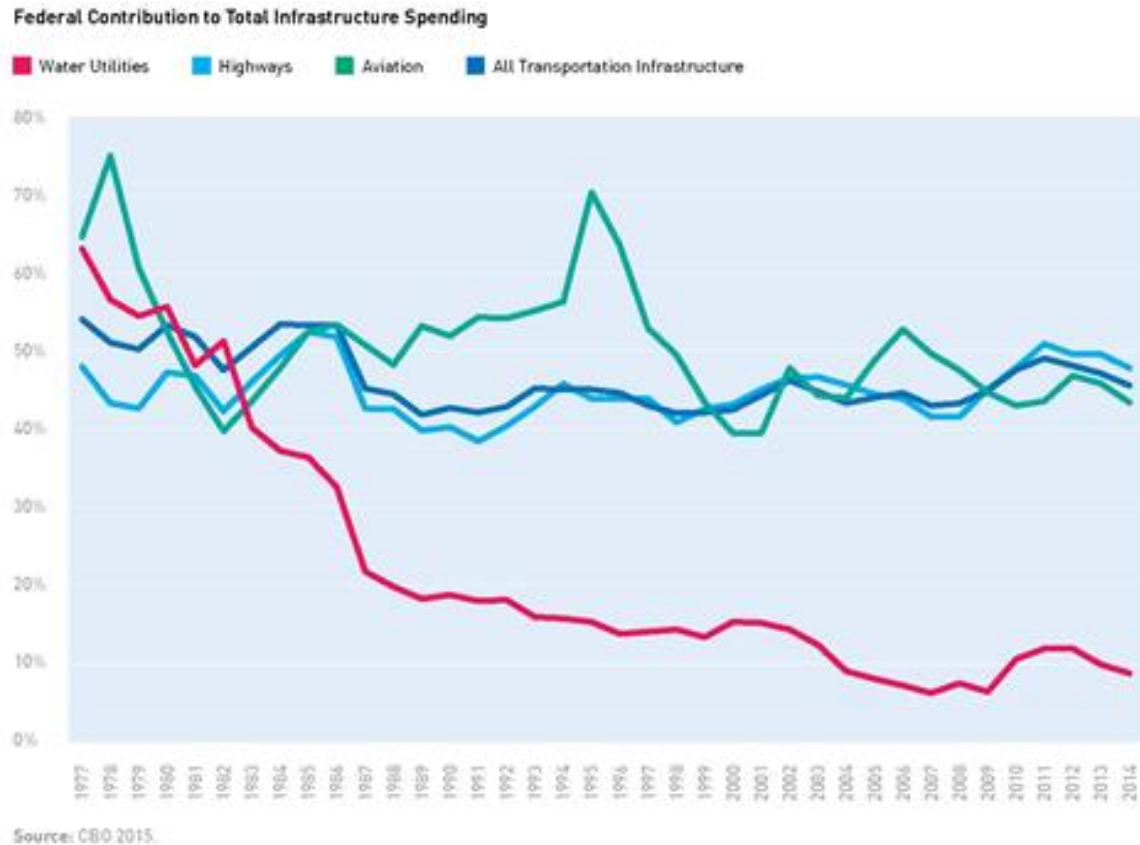
Washington State wastewater infrastructure received a grade of "C-" and Stormwater earned a "D+" in 2019.



Appendix A: Slide 2 of 5

Federal Funding for Water and Wastewater Systems

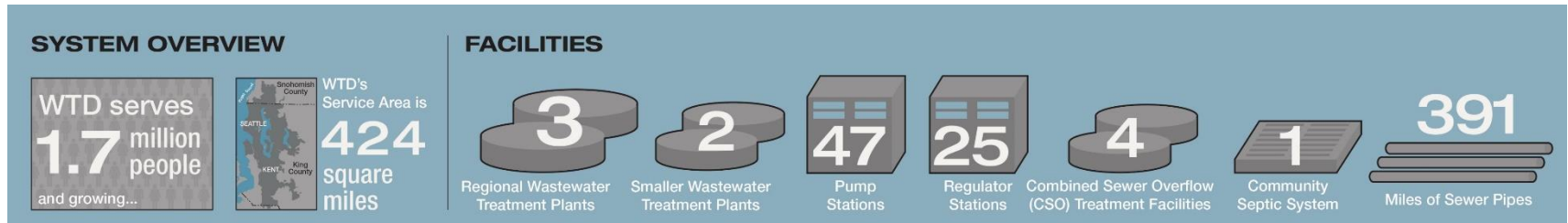
In 1977, 63% of Total Capital Spending for water and wastewater system came from federal agencies; today that number is less than 9% ([The Economic Benefits of Investing in Water Infrastructure](#)).



Appendix A: Slide 3 of 5

King County Assets

- King County protects water quality and public health in the central Puget Sound region by providing high-quality and effective treatment to wastewater collected from local sewer agencies. The County's Wastewater Treatment Division (WTD) serves about 1.7 million people within a 424-square-mile service area, which includes most urban areas of the County and parts of south Snohomish County and northeast Pierce County.



- King County Wastewater Treatment Division assets are aging. Much of the infrastructure in the system was built in the 1960s, some of it was constructed much earlier in Seattle's development. This includes major wastewater conveyance lines and treatment plants.

Treatment Plant	Brightwater	South Plant	West Point
Year Constructed	2011	1965	1966
Average Age of Asset (years):	7	13	14
Facility Total Net Present Value:	\$ 1.3 Billion	\$ 0.2 Billion	\$ 0.3 Billion

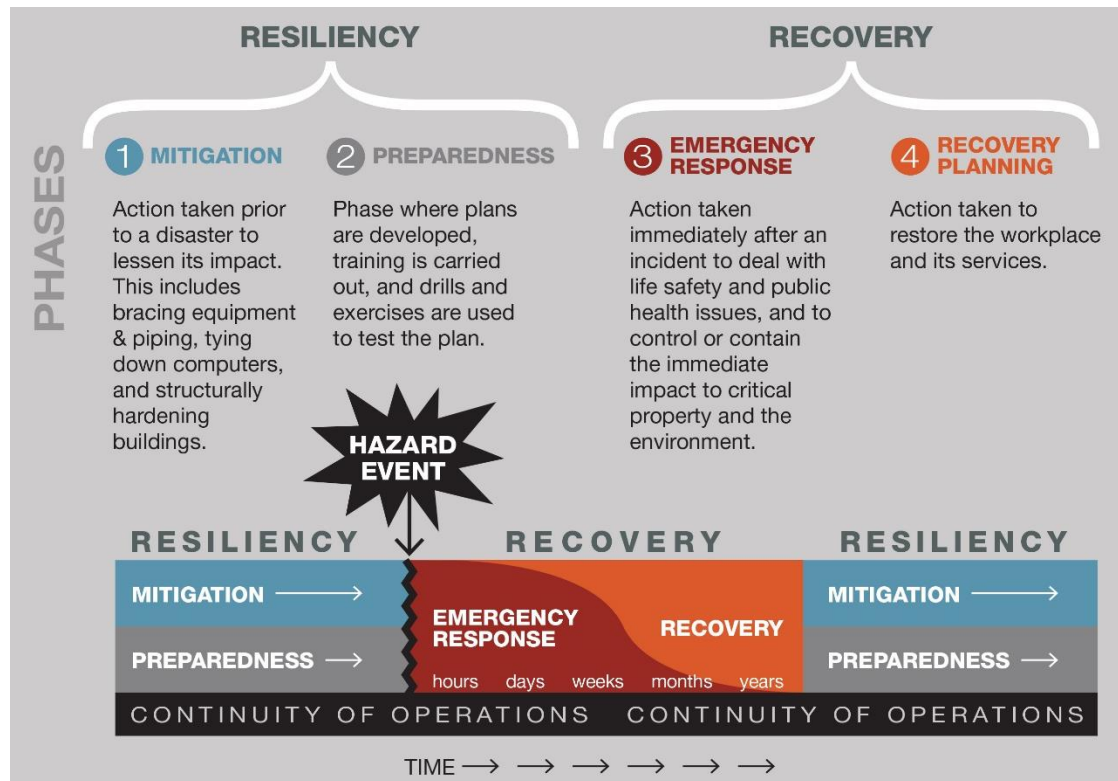
Conveyance Assets	Pipes	Pump Stations	Regulator Stations
Average Age of Asset (years):	45	38	40
Oldest Facility Age (years):	100	86	55

CSO Treatment Facilities	Alki	Carkeek	Elliot West	Henderson
Year Constructed/Upgraded	1984	1964	2004	2001
Average Age of Facilities (years):	35			
Oldest Facility Age (years):	55			

Appendix A: Slide 4 of 5

Emergency Preparedness

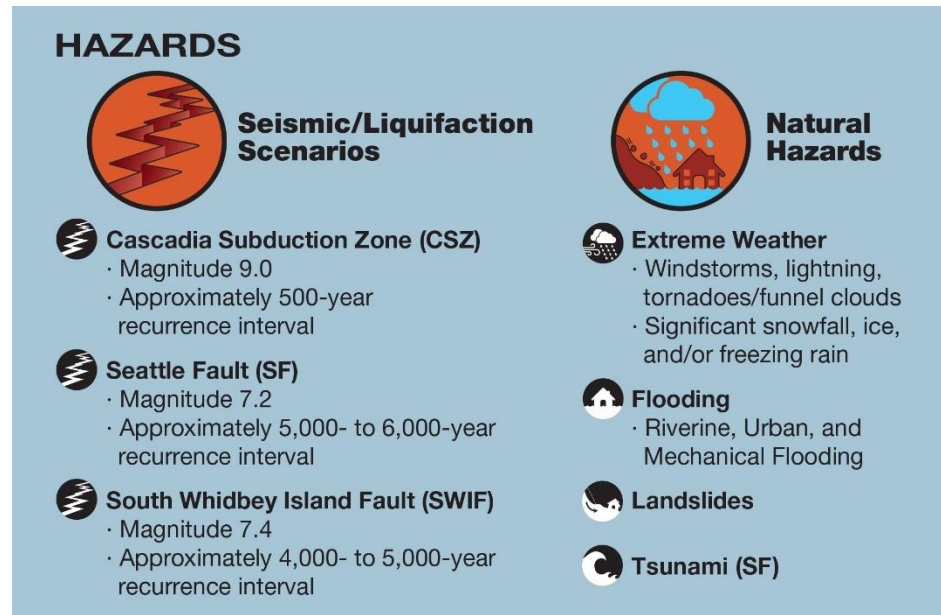
- Depending on the severity of a major natural hazard event, the WTD service area could result in portions of the wastewater system having downtimes ranging from a month to several years.
- Recovery operations begin as soon as possible after a disaster. There is no clearly defined separation between response and recovery.
- Implementation of prioritized capital improvement projects and programmatic initiatives may address these risks to the treatment system.



Appendix A: Slide 5 of 5

The benefits to be realized from implementation of resiliency and recovery programs/projects are intended to include the following:

- Minimize injury or loss of life among WTD staff during a natural hazard event and in the response and recovery phases by improving the resilience of WTD facilities
- Minimize public health risks following a disaster by improvement in facility resilience and more rapid resumption of conveyance and treatment operations
- Reduce the expected cost of recovery by, where possible, mitigating identified weaknesses in the system to prevent damage before an earthquake occurs
- Improve ability to accomplish post-hazard rebuilding and to expeditiously restore the system through consideration of long-term survivability and resiliency of WTD facilities



Appendix B: Background on Legacy Pollution



Appendix B: Slide 1 of 3

Legacy Pollution

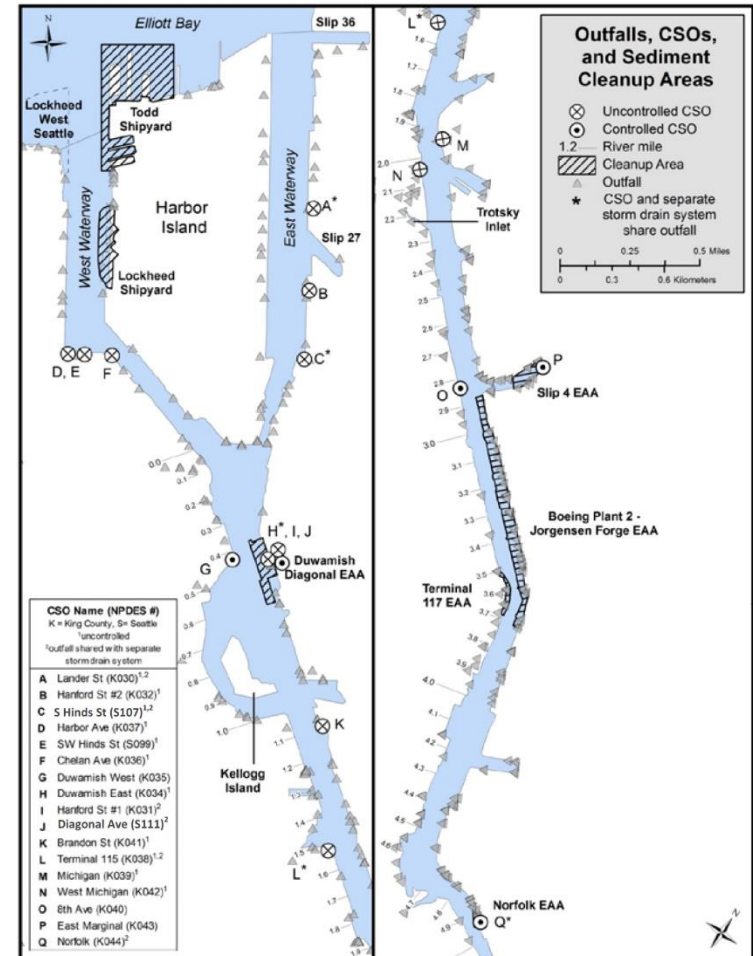
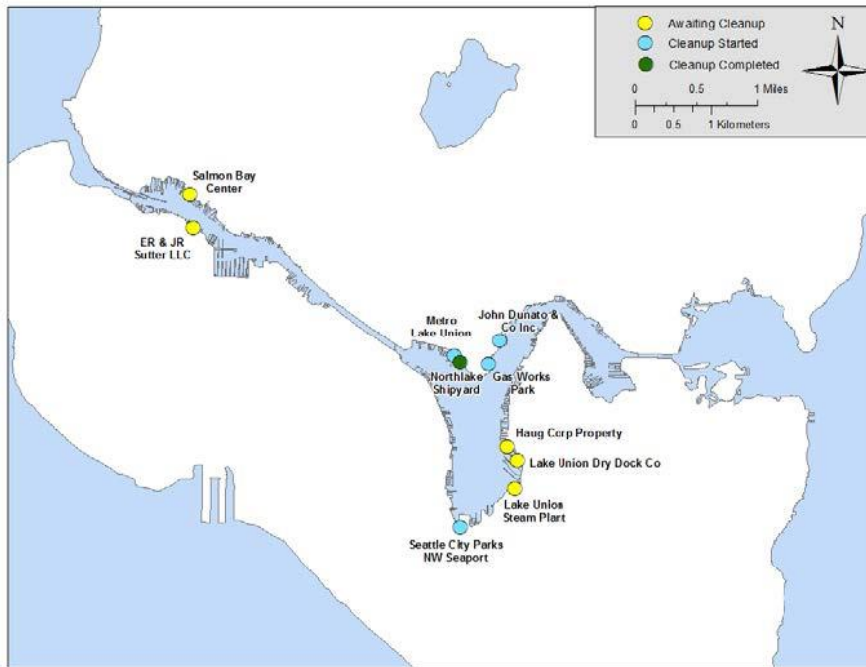
- Legacy pollutants are contaminants that have been left in the environment by historical sources. Examples are a discharge from an old industry that has since left the area and ongoing leaching of pollutants from historical structures.

Examples of Legacy Pollution

- Contaminated sediments under waterways that are have pollutants, such as PCBs, other organic chemicals, and metals. The Lower Duwamish Waterway and Lake Union/Ship Canal have contaminated sediments.

Appendix B: Slide 2 of 3

Contamination sites and clean up status in Lake Union, Ship Canal, and Duwamish River.



Appendix B: Slide 3 of 3

Creosote-treated wood pilings contain pollutants, including PAHs. Removal and proper disposal results in elimination of ongoing pollution source.



Photo Credit: WA DNR Creosote Piling Removal Program