

CSI PLAN UPDATE

UPDATED PLANNING ASSUMPTIONS FOR WASTEWATER FLOW FORECASTING

MWPAAC Engineering & Planning Subcommittee
October 3, 2024



King County

Department of Natural Resources and Parks
Wastewater Treatment Division

Purpose

- Provide an overview of the Conveyance System Improvement (CSI) Plan Update process
- Discuss the updated planning assumption recommendations
- Gather feedback by March 2025 from MWPAAC on the updated planning assumption recommendations

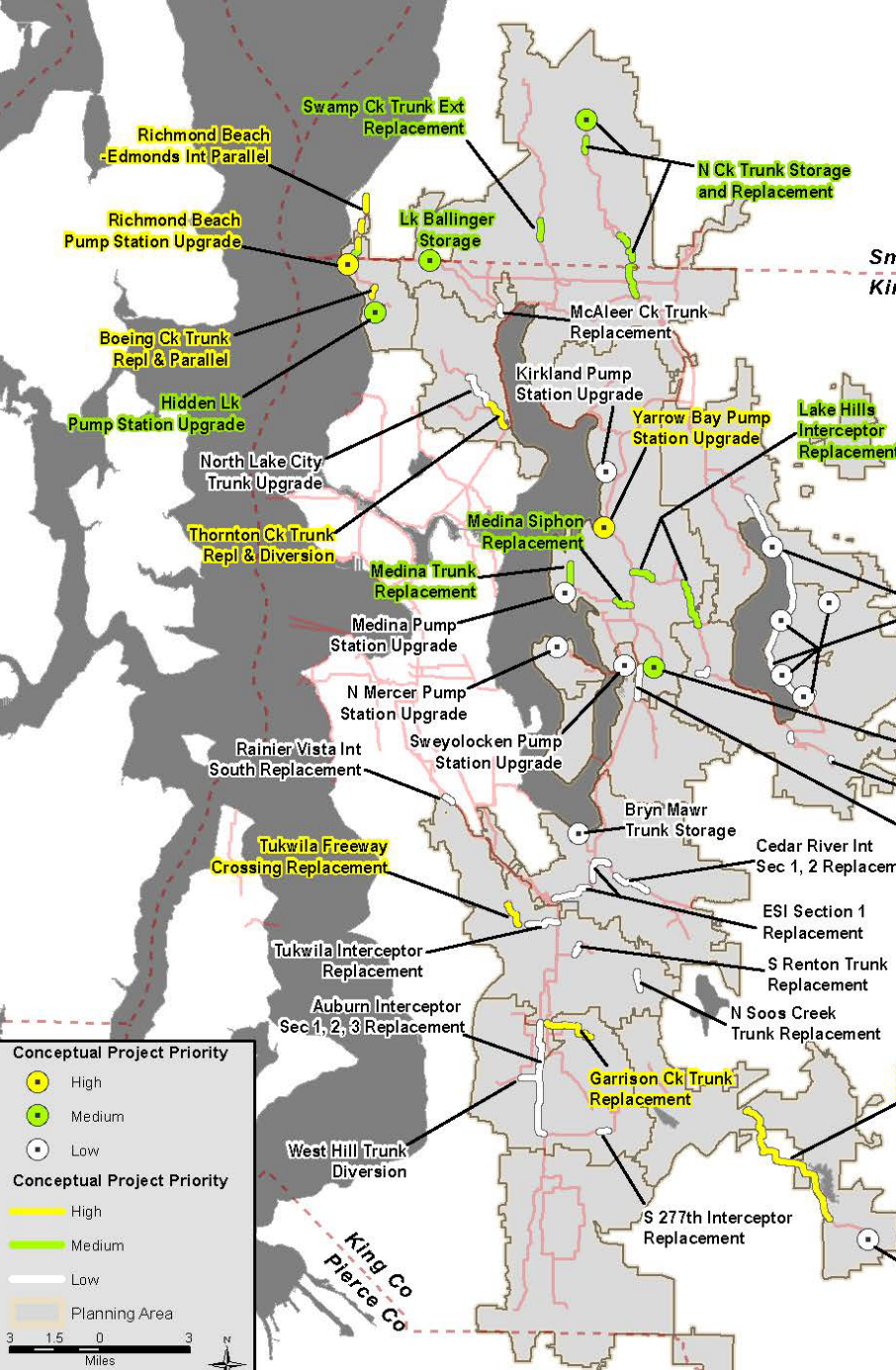
Background

Purpose of the CSI Program:

- To improve the King County wastewater conveyance system and address public health concerns
- Ensuring that the system has sufficient capacity to respond to regional growth

Purpose of the CSI Plan Update:

- Verifies, adjusts, and identifies new CSI projects needed for increasing capacity in the conveyance system to accommodate future flow from both the growth in population and infiltration and inflow



CSI Plan Overview

- CSI Plan last updated in 2017
- King County Policy calls for periodic updates
- Updates to include:
 - Flow Projections
 - Rate of Growth
 - Growth Patterns
- The next CSI Plan update is currently underway and will be incorporated into the RWSP Update



**We are
here**



**Update
planning
assumptions**

**MWPAAC
input**



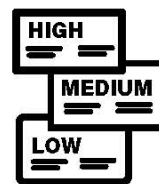
**Complete
regional
conveyance
system needs
assessment**

**MWPAAC
input**



**Develop
conceptual
projects
and cost
estimates**

**MWPAAC
input**



**Prioritize
projects**

**MWPAAC
input**

**Conveyance
System
Improvement
Plan Update**

Planning Assumptions – Background

Eight key planning assumptions:

- Design Flow
- Planning Horizon
- Future Service Area
- Water Conservation

Today's meeting

- Sewered Area Growth Rate
- Future Population
- I/I Degradation
- New Construction I/I

Dec 5 meeting

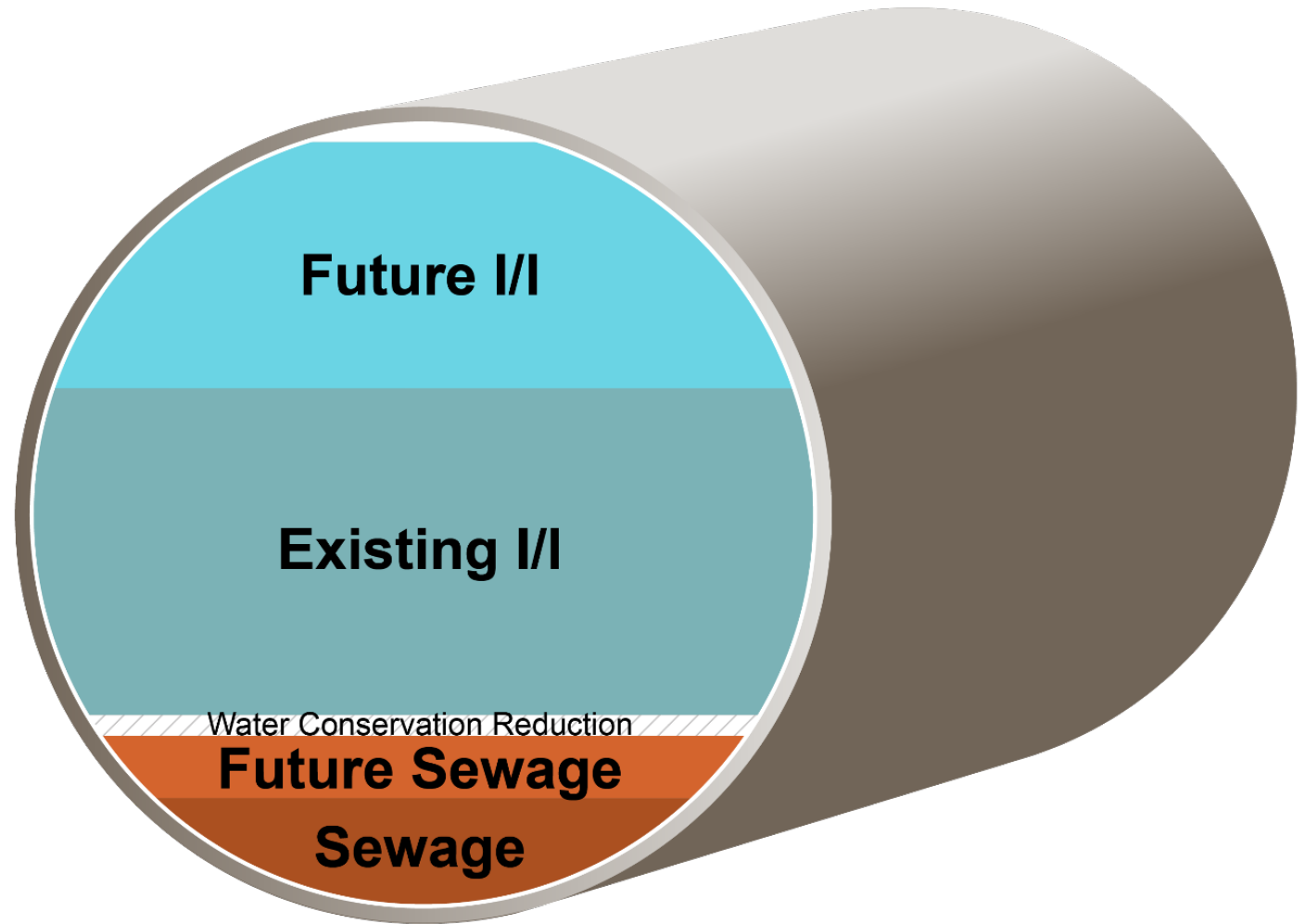
Feb 6 meeting

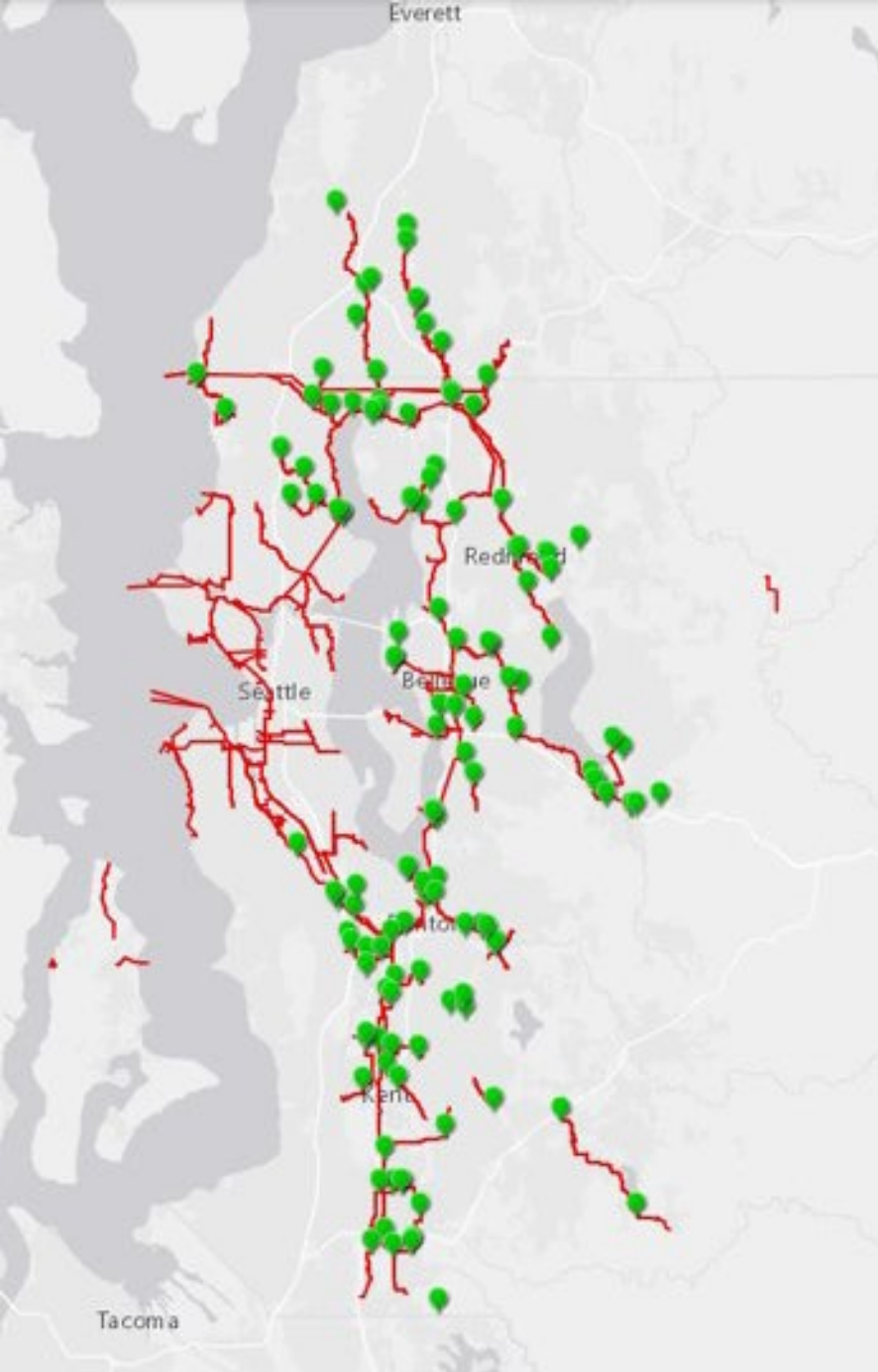
Used to:

- Identify future conveyance capacity and treatment needs to inform conveyance, treatment, and RWSP Update planning
- Guide decision on timing and sizing of facilities
- Prevent under or over building of facilities

Components of Future Flows

Planning Assumptions
I/I Degradation
New Construction I/I
Sewered Area Growth Rate
Future Service Area
Water Conservation
Future Population





Planning Assumption – Activities:

- Review and analyze Decennial Flow Monitoring data
- Update sewer model basin boundaries and sewerable lands data
- Calibrate wastewater model basins
- Collect population and employment data

Planning Assumptions

- **Design Flow**
- Planning Horizon
- Future Service Area
- Water Conservation
- Sewered Area Growth Rate
- Future Population
- I/I Degradation
- New Construction I/I

Assumption: Design Flow

Description: Design standard used for sizing and costing conveyance facilities in the portion of the wastewater system with separated sewers

Applied to: Used to determine need and timing for facility improvements

Previous Assumptions:

2007 CSI Program Update Assumption	2017 CSI Program Update Assumption
The 20-year peak flow standard per King County Code 28.86.060	No change

Recommendation: Design Flow

Updated Assumption: No change

Rationale for updated Design Flow assumption:

- King County Code 28.86.060, Conveyance Policy-1 requires the 20-year peak flow storm be used as the design standard for the county's separated wastewater system
- Changes to the design flow standard will be explored through the RWSP Update

Planning Assumptions

- Design Flow
- **Planning Horizon**
- Future Service Area
- Water Conservation
- Sewered Area Growth Rate
- Future Population
- I/I Degradation
- New Construction I/I

Assumption: Planning Horizon

Description: The furthest point in the future that WTD estimates future wastewater flows

Applies to: Used to develop ultimate capacity needs

Previous Assumptions:

2007 CSI Program Update Assumption	2017 CSI Program Update Assumption
Year 2050 (year when service area was assumed to be fully developed)	50-year planning horizon (assumed service area would not run out of development capacity)

Recommendation: Planning Horizon

Updated Assumption: Year 2070 (assumes service area will not run out of development capacity)

Rationale for updated Planning Horizon assumption:

- King County Code 28.86.130 WWPP-4 states that “facility sizing shall take into account the need to accommodate build-out population”
- Population growth and changes to zoning for higher density land uses are expected to continue and we will not reach build-out population
- 50-years is considered reasonable given the useful life of wastewater assets
- The regular program updates at 10-year intervals allow for verification and refinement before projects are implemented

Planning Assumptions

- Design Flow
- Planning Horizon
- **Future Service Area**
- Water Conservation
- Sewered Area Growth Rate
- Future Population
- I/I Degradation
- New Construction I/I

Assumption: Future Service Area

Description: The extent of the planning area where WTD will provide services

Applies to: Wastewater flow projections

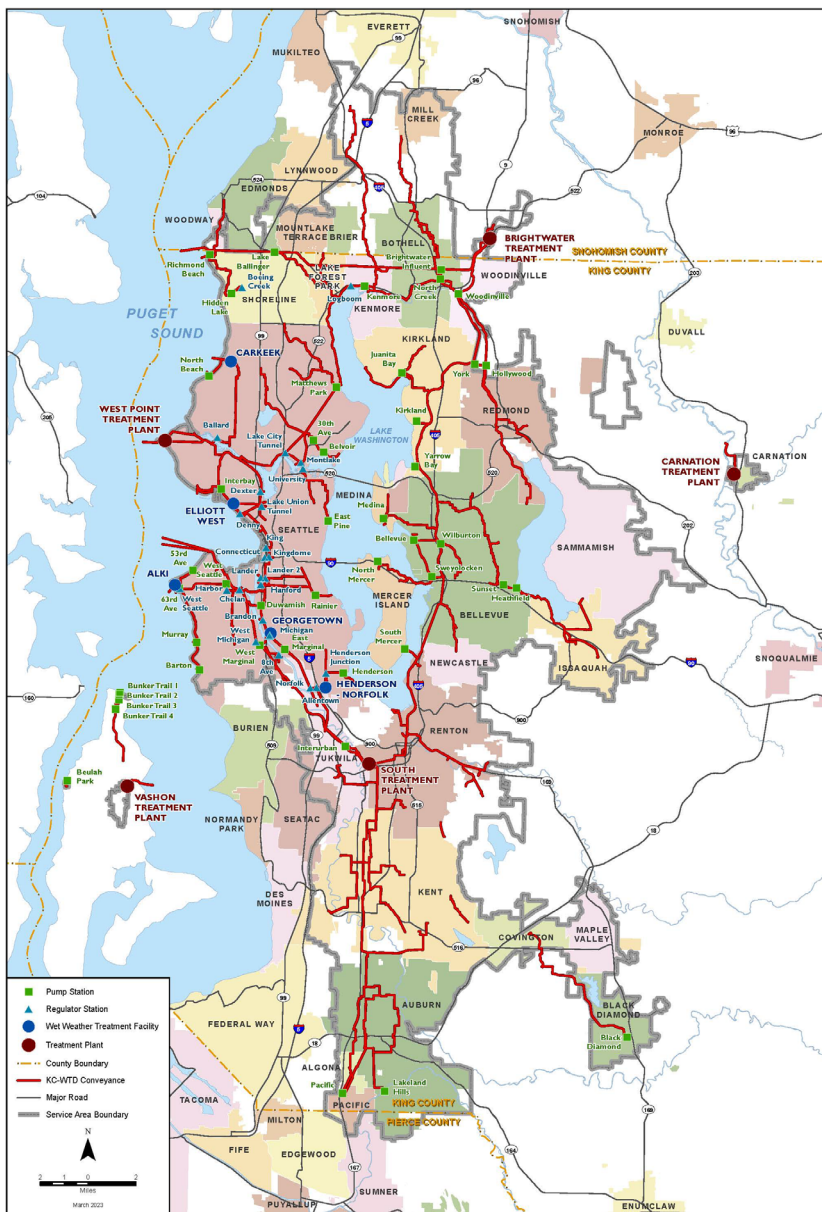
Previous Assumptions:

2007 CSI Program Update Assumption

Assumed only potentially sewerable areas in UGA's in King, Snohomish, and Pierce counties where WTD provides services

2017 CSI Program Update Assumption

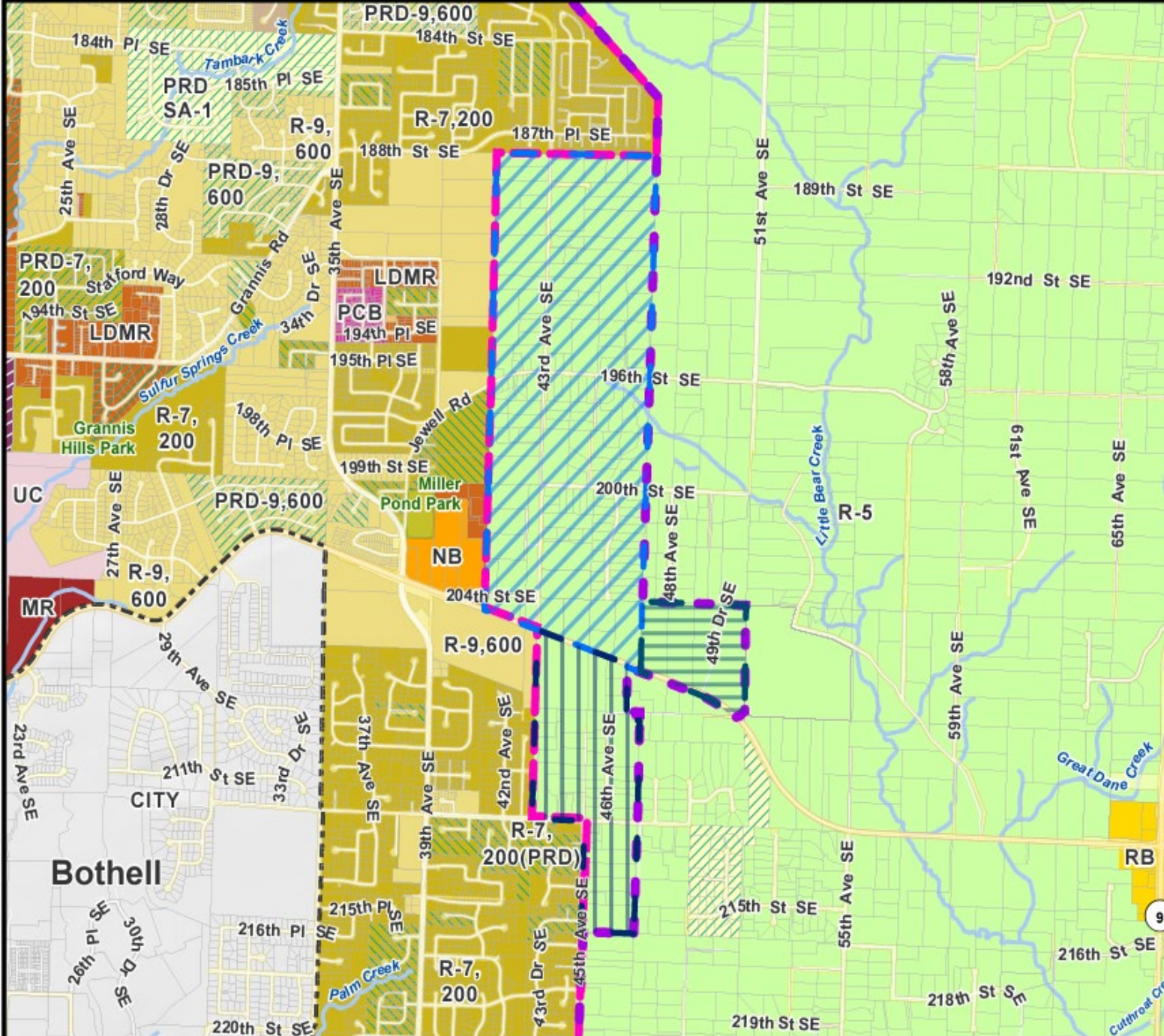
No changes to the UGA's expected in the three Counties in the next 10-20 years



Urban Growth Area (UGA) is defined as an area around incorporated cities and towns where urban growth is encouraged

Snohomish County: Proposed Southwest UGA Expansion

- 378 acres expansion
- Adds 2,312 additional population capacity and 821 additional housing units



Recommendation: Future Service Area

Updated Assumption: The potentially sewerable areas within King, Snohomish, and Pierce Counties where WTD provides service, including the proposed Southwest UGA expansion

Rationale for updated Extent of Eventual Service Area assumption:

- King County and Pierce County Buildable Lands Reports state there is adequate housing and employment capacity within Countywide UGA's to accommodate the 20-year growth targets through 2044
- There are no planned UGA expansion in the King County Comprehensive Plan Update
- Snohomish County proposing expanding the Southwest UGA by 378 acres in the Comprehensive Plan Update

Planning Assumptions

- Design Flow
- Planning Horizon
- Future Service Area
- **Water Conservation**
- Sewered Area Growth Rate
- Future Population
- I/I Degradation
- New Construction I/I

Assumption: Water Conservation

Description: The ratio of the projected future per-person winter-time water use relative to the baseline per-person winter-time water use rate

Applied to: Wastewater flow projections

Previous Planning Assumptions:

2007 CSI Program Update Assumption	2017 CSI Program Update Assumption
10% reduction between 2000 and 2010; no additional reduction after 2010	10% reduction between 2010 and 2030; no additional reduction after 2030

Water Usage Data

Analyzed data from:

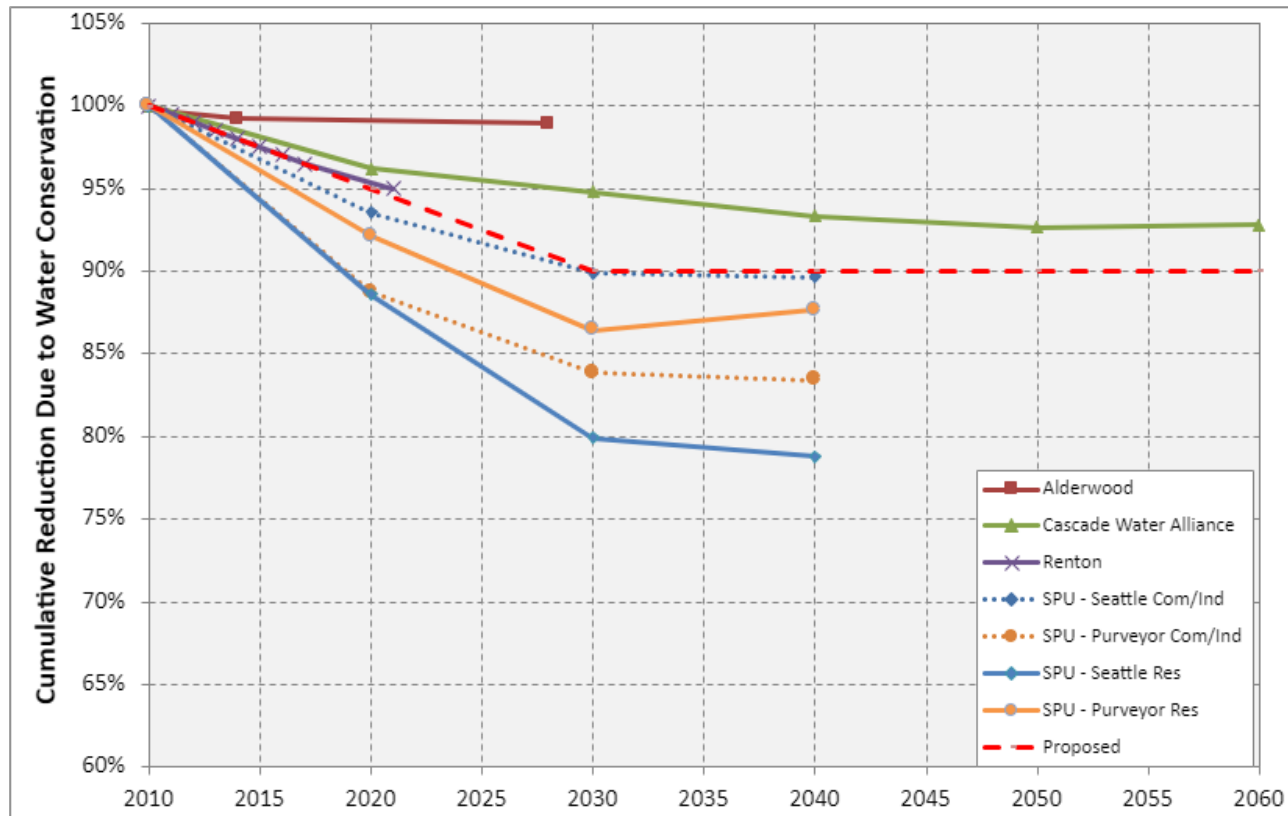
- Alderwood Water and Wastewater District
- City of Auburn
- Cascade Water Alliance
- City of Kent
- City of Renton
- Seattle Public Utilities

Reviewed water comprehensive plans:

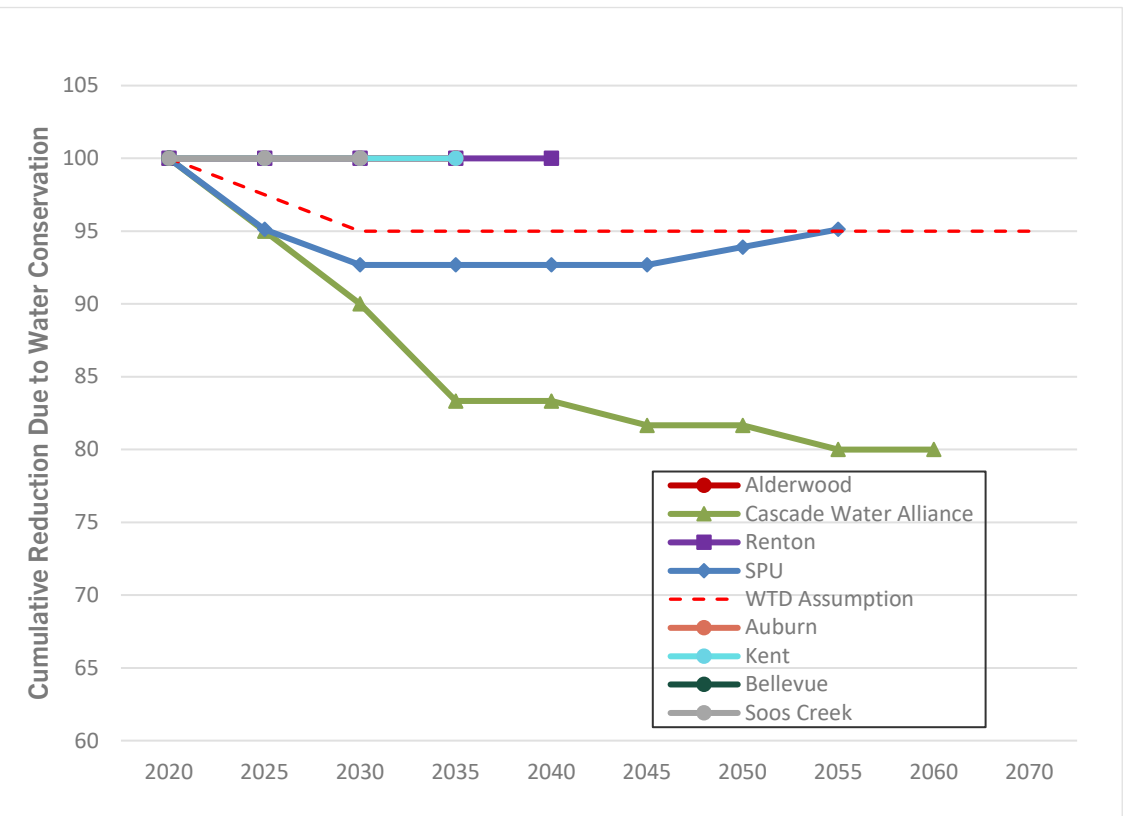
- Alderwood Water and Wastewater District
- City of Auburn
- City of Bellevue
- Cascade Water Alliance
- City of Kent
- City of Renton
- Seattle Public Utilities
- Soos Creek Water & Sewer District

Local Water Purveyor Planning Assumptions

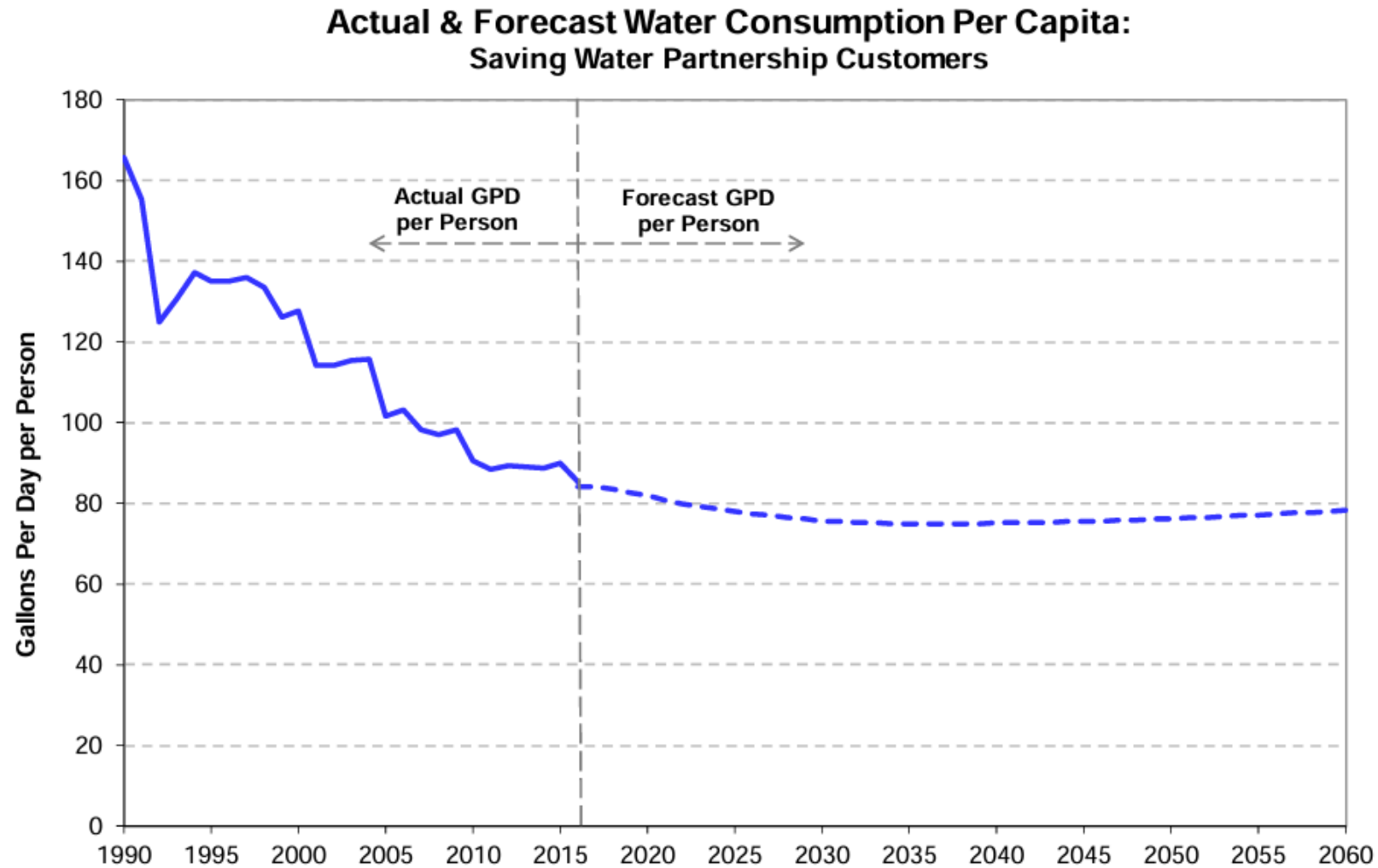
2010 Water Conservation Projections



2020 Water Conservation Projections



Actual Water Consumption Trend



SPU's 2019 Water System Plan, Appendix A

Uniform Plumbing Code Changes

Washington State Building Code, Chapters 51-56 WAC, Uniform Plumbing Code

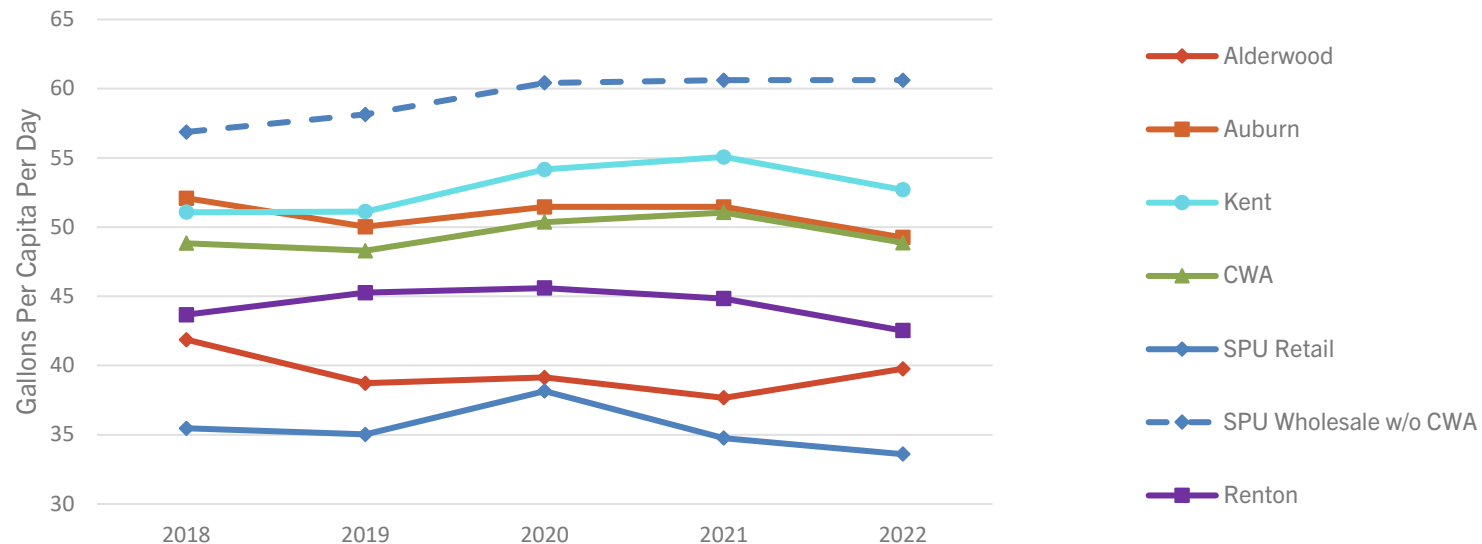
Type of Appliance	2009 Code	2012 Code	2015 Code	2018 Code	2021 Code (Effective March 15, 2024)
Showerheads	2.5 gpm	2.5 gpm	2.5 gpm	2.5 gpm	1.8 gpm
Water closets	1.6 gpf	1.6 gpf	1.6 gpf	1.6 gpf	1.28 gpf
Urinals	1 gpf	1 gpf	1 gpf	1 gpf	0.5 gpf
Kitchen faucets	2.5 gpm	2.5 gpm	2.5 gpm	2.2 gpm	1.8 gpm

gallons per minute = gpm

gallons per flush = gpf

Actual Usage Billing 2018-2022 (Gallons Per Capita Per Day)

Year	Alderwood	Auburn	Kent	Cascade Water Alliance (CWA)	Seattle Public Utilities (SPU) Retail	SPU Wholesale	Renton
2018	41.9	52.1	51.1	48.8	35.5	56.9	43.6
2019	38.7	50.0	51.1	48.3	35.0	58.1	45.2
2020	39.1	51.5	54.2	50.4	38.2	60.4	45.6
2021	37.7	51.5	55.1	51.1	34.8	60.6	44.8
2022	39.8	49.3	52.7	48.9	33.6		42.5
Change	-5.0%	-5.4%	3.2%	0.0%	-5.3%	6.6%	-2.7%



Current Water Consumption

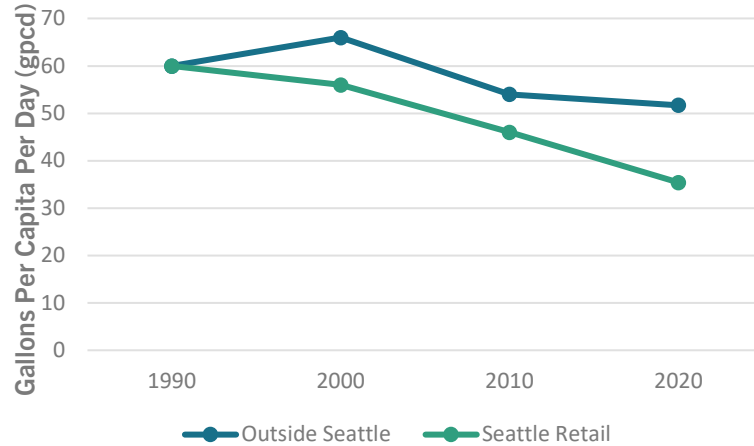
2020 Water Consumption:

	Residential (gallons per capita per day)	Commercial (gallons per employee per day)	Industrial (gallons per employee per day)
West Point	39	25	39
South Plant	52	19	34
Brightwater	45	16	24

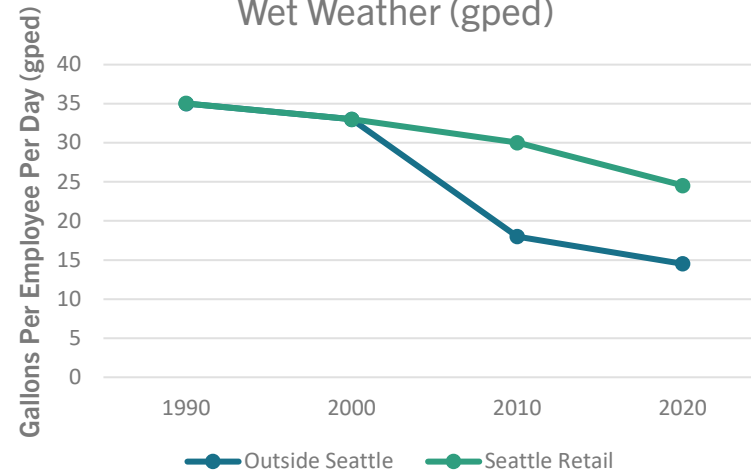
- Weighted averages based on billing data and population and employment from water purveyors
- Based on winter-time usage between January-April of 2018-2022

WTD Flow Factor Assumptions by Sector Over Time

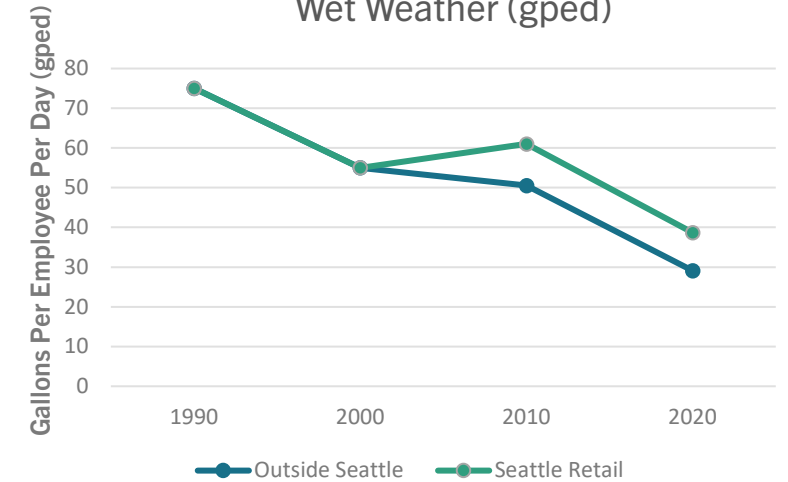
Daily Gallons of Water Used per Resident -Wet Weather (gpcd)



Daily Gallons of Water Used Per Commercial Employee Wet Weather (gped)



Daily Gallons of Water Used Per Industrial Employee Wet Weather (gped)



Recommendation: Water Conservation

Updated Assumption: 5% reduction per decade between 2020 and 2040. No additional reduction beyond 2040

Future water consumption:

= (current water consumption) X (cumulative water conservation factor)

	Proposed 2020	Proposed 2030	Proposed 2040	Proposed 2050
West Point Residential (gpcd)	39	37	35	35
South Plant Residential (gpcd)	52	49	47	47
Brightwater Residential (gpcd)	45	43	41	41

Planning Assumption Briefing Schedule

- Additional briefings to discuss remaining updated planning assumptions

Date	Topics
December 5, 2024	Future Population, Sewered Area Growth Rate
February 6, 2025	I/I Degradation, New Construction I/I
TBD	Follow-up discussion

Questions?

- For additional information or questions, please contact:
Ryan Bylsma, Separated Conveyance Program Manager
rbylsma@kingcounty.gov
206-263-8293