

Drainage and Wastewater System Planning

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DWW System Planning

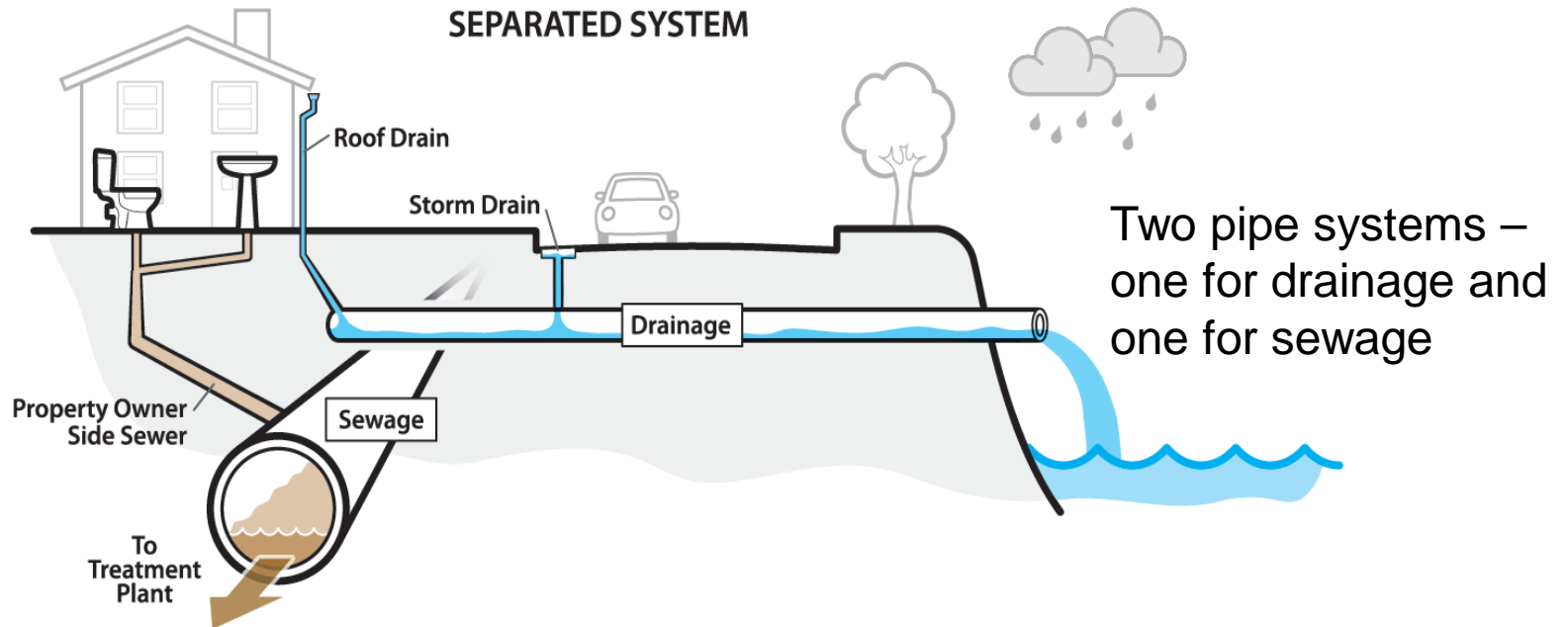
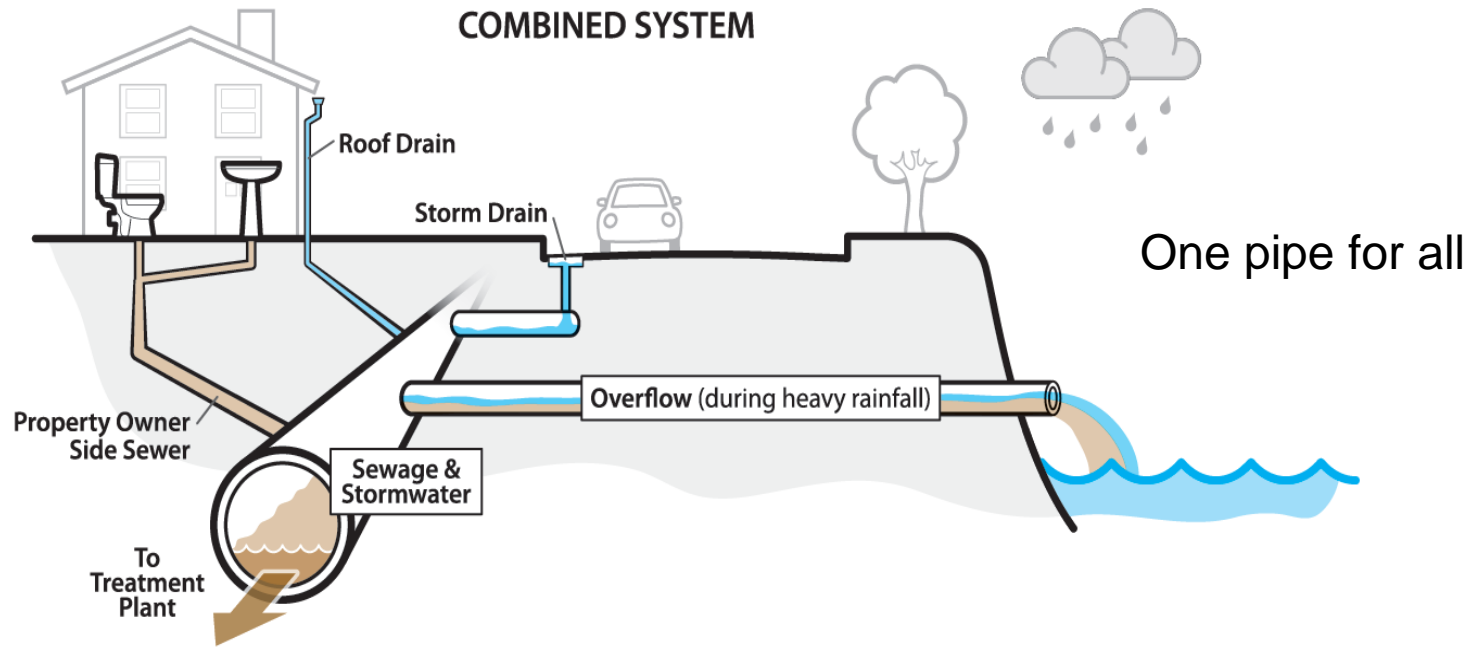
CDWAC-WSAC meeting

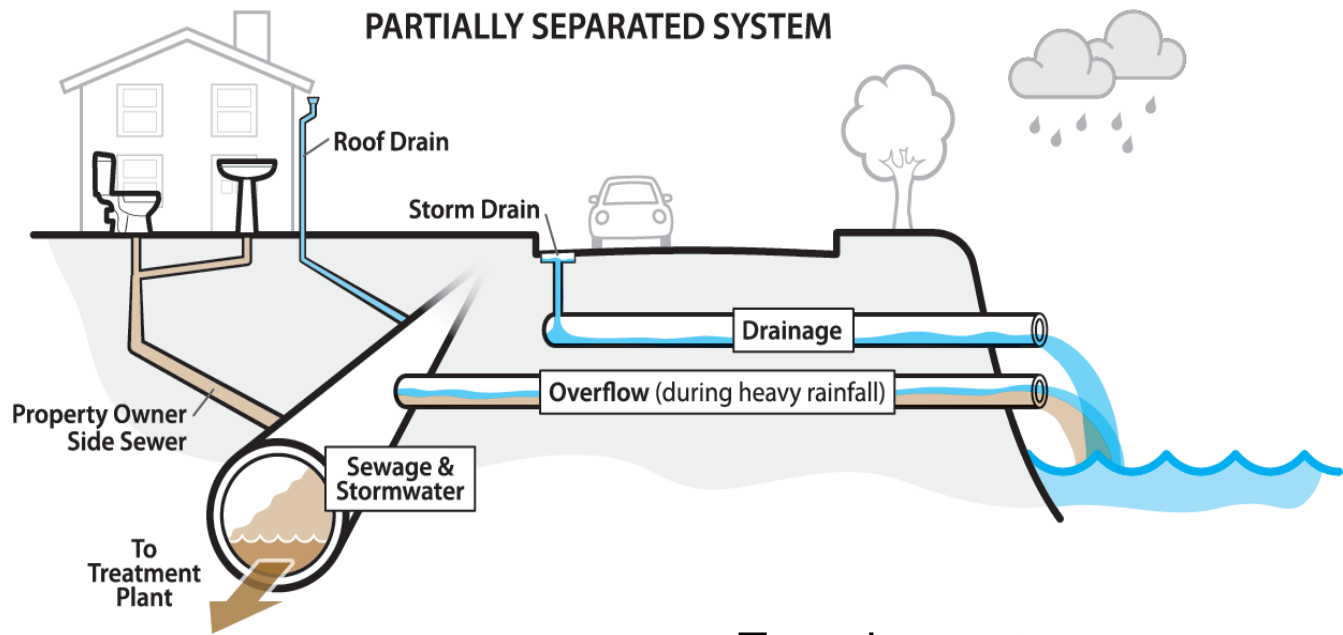
August 10, 2016

Seattle
 Public
Utilities

Presentation Agenda

- Background
- Planning Drivers
- Program Elements
- Wastewater Master Plan
- Questions



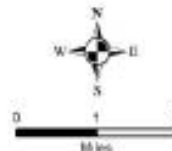


Two pipe systems –
one for some drainage
and one for sewage

Background

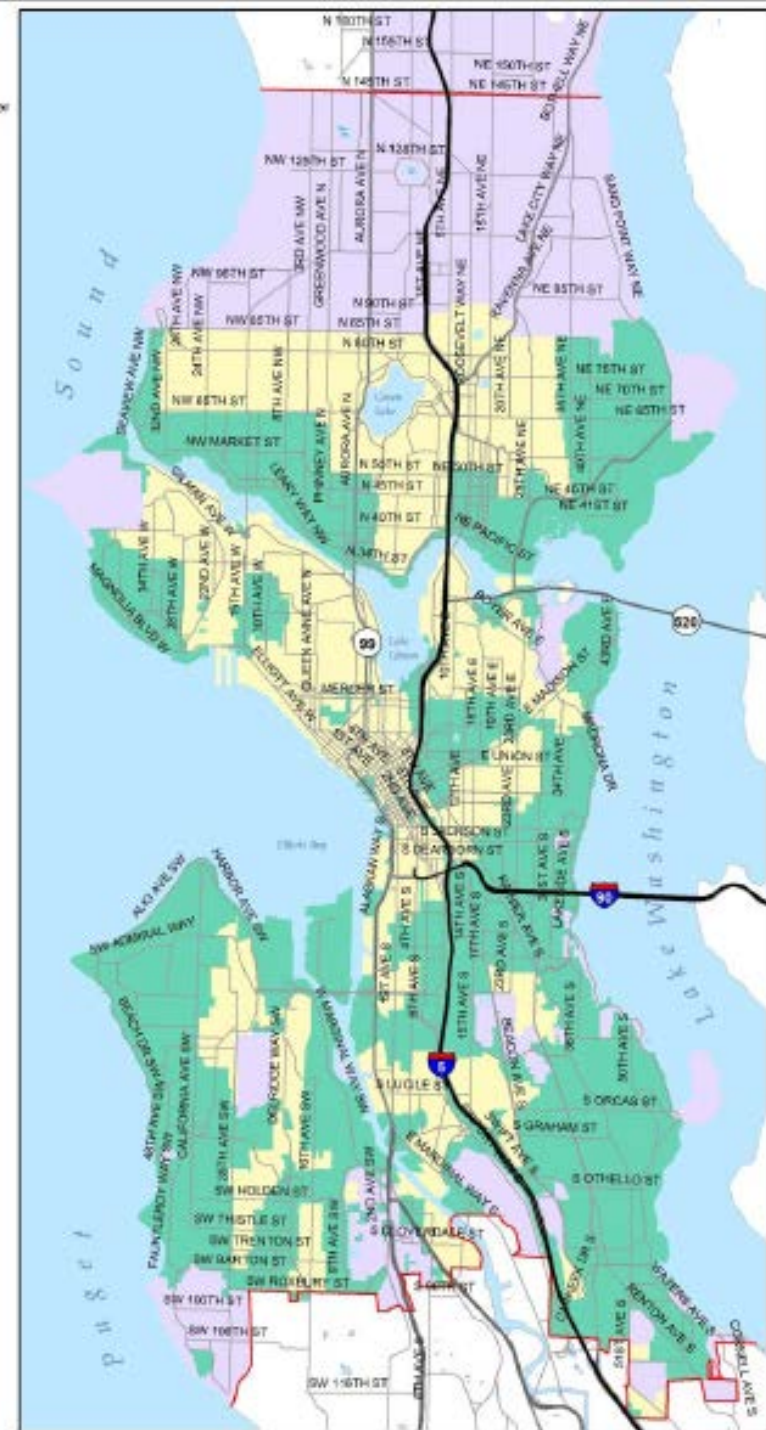
Seattle's drainage system is comprised of 483 miles of separated storm sewers, 59.3 miles of ditches, 46.2 miles of culverts, and more than 33,000 catch basins.

- LEGEND**
- City of Seattle Boundary
 - Combined Sewer
 - Partially Separated Storm Sewer
 - Separated Storm Sewer



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Coordinate System: State Plane, NAD83/01, Washington North
Vertical Datum: North American
Vertical Datum of 1988 (NAVD 88)



Background

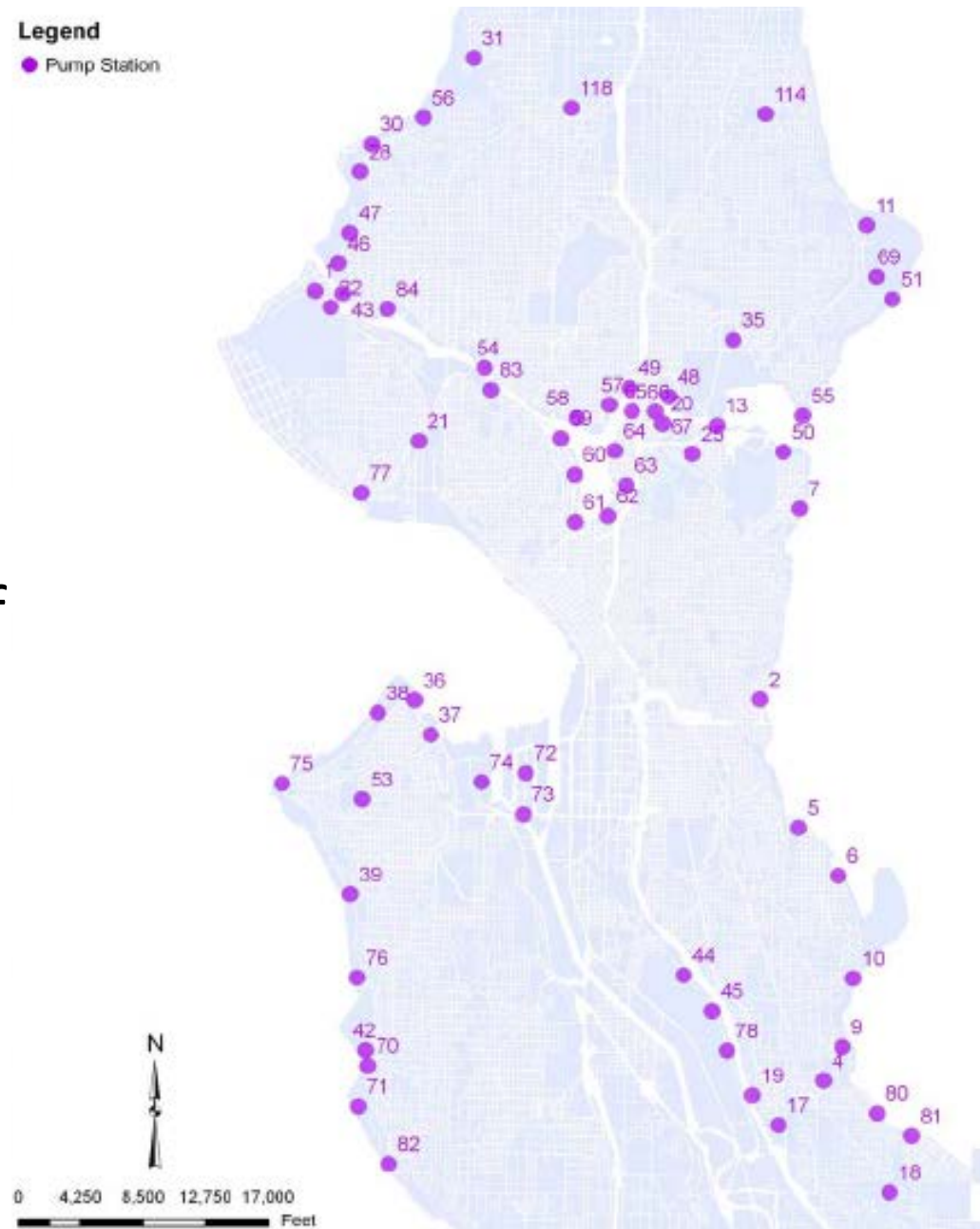
Seattle's Wastewater system is comprised of 475 miles of combined sewers, 379 miles of separated sanitary sewers and 568 miles of partially separated sewers.

Total: 1,422 miles
(75% of the collection system)



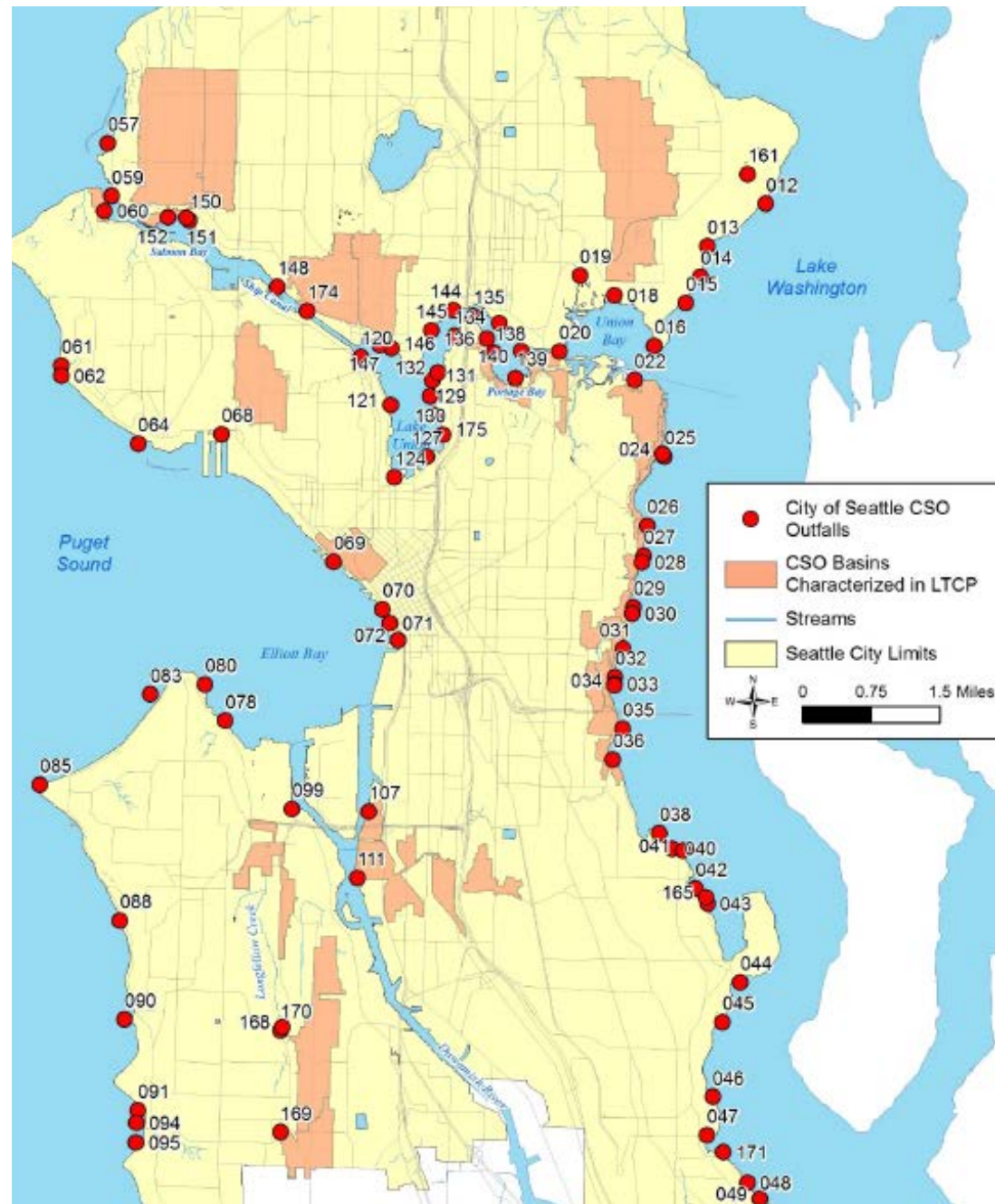
Background

Seattle's Wastewater system includes 68 pump stations and 34.5 miles of force mains.



Background

Seattle's has 86 city-owned and permitted combined sewer overflow (CSO) points.



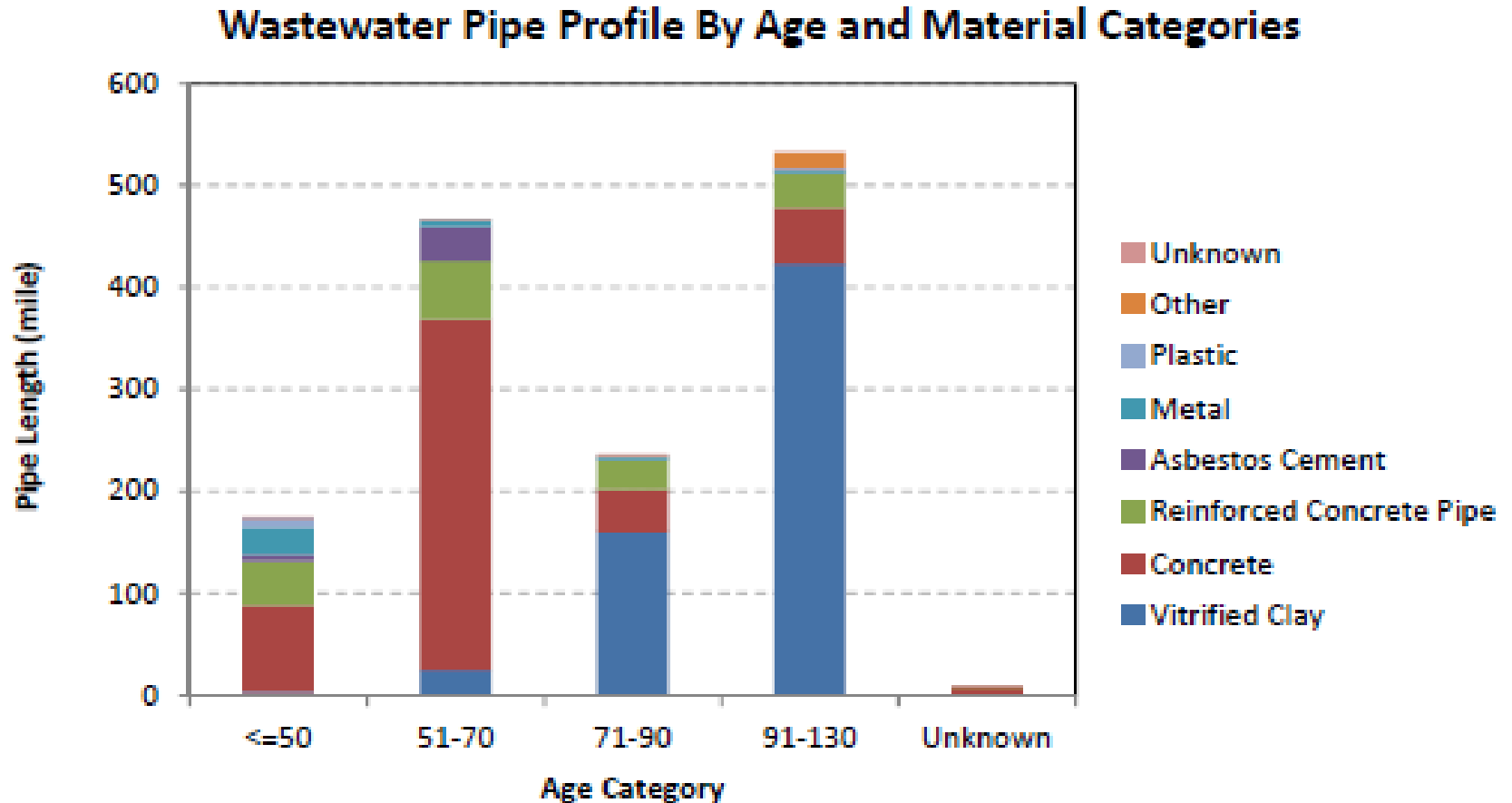
Drivers – Aging infrastructure

The median year of installation of SPU's 1,420 miles of wastewater collection mainlines occurred between 1930-1940. The average pipe is greater than 80 years old.



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Drivers – Aging infrastructure



*From SPU 2015 Wastewater
Collection System SAMP*

Drivers – Capacity Shortfalls

Until recently, the design of combined sewers in Seattle has been based on a uniform runoff of 15 cubic feet per minute per acre. For many of the drainage areas, this amount of runoff can be expected to occur with storms having a recurrence interval of only two years.

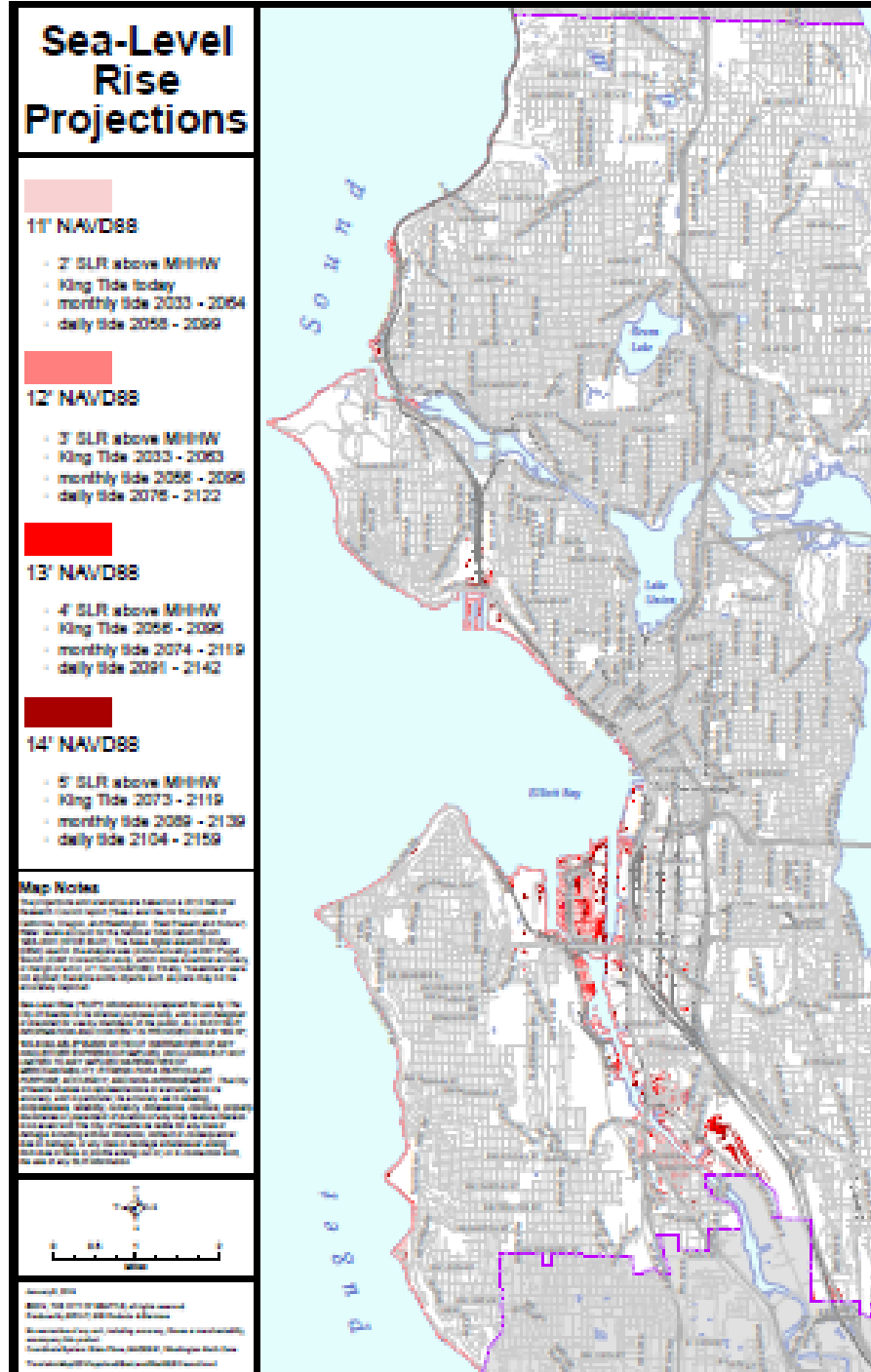
From Metropolitan Seattle Sewerage and Drainage Survey 1956-1958. Image from 2016 Sewer Capacity Analysis



Drivers – Climate Change

The current best available science projects sea level rise in the range of 3.9” to 56.3” for the Seattle area by 2100, with an additional 36” of storm surge during extreme events.

From “Sea Level Rise for the Coasts of California, Oregon and Washington: Past, Present and Future”. The National Academies Press, 2012.



Drivers – Climate Change

By the 2050s, winters will be wetter and summers dryer in Seattle. Projections for precipitations in spring and fall are not yet conclusive.

From SPU Combined Sewer Overflow Reduction Program: Precipitation Intensity, Duration and Frequency Update, Image from KPLU.org

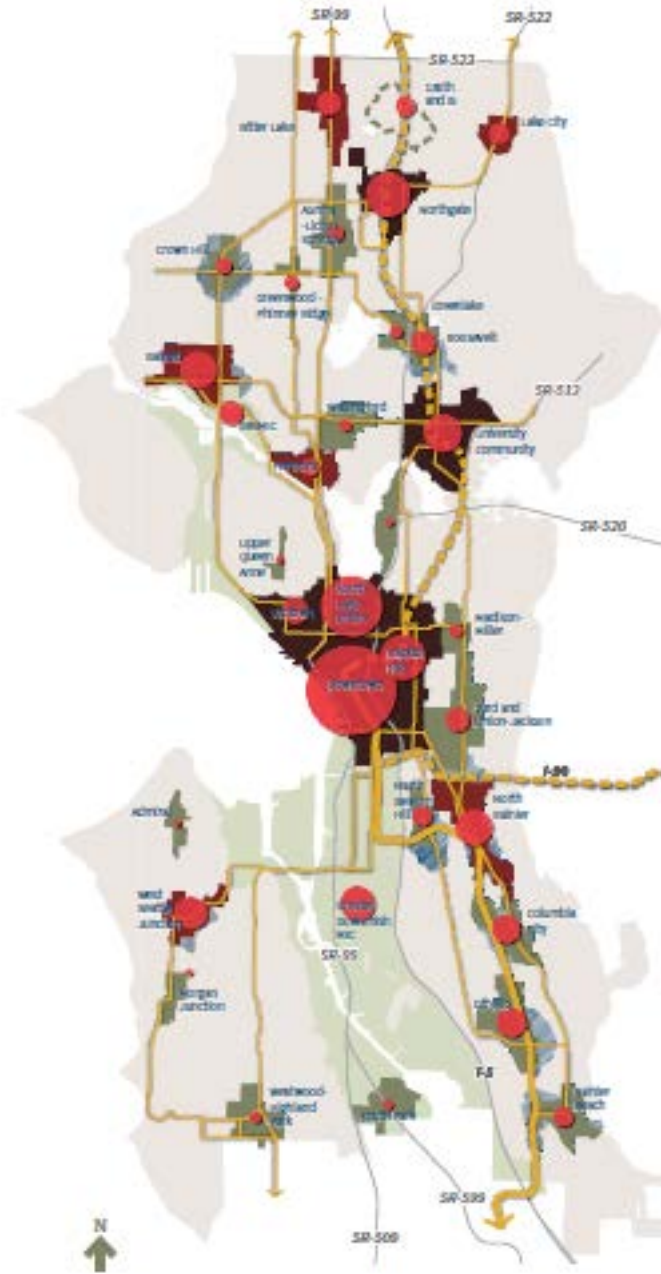


Drivers – Growth

Seattle's population density per square mile has increased by nearly 10 percent since 2010, making the city one of the most populous cities in the U.S.

By 2035, Seattle expects to grow by 120,000 residents & 115,000 jobs.

From U.S. Census Bureau, And Seattle 2035 Comprehensive Plan



Drivers – ‘One City’

SPU and SDOT ‘One City’ principles (April, 2016):

“Each department will explicitly seek the opportunity to jointly work on plans, schedule, projects, and public engagement for the benefit of both departments and the community, where partnering would prove more economical and efficient”



Drivers – Wastewater Regulations

Per the consent decree, Seattle has the goal of eliminating all SSOs. The performance threshold for SSOs is no more than 4 SSO's per 100 miles of pipe per year, over a 2-year running average.

If the City's SSO rate exceeds that performance threshold, then the City is required to develop and implement a focused corrective action plan for SSO elimination.

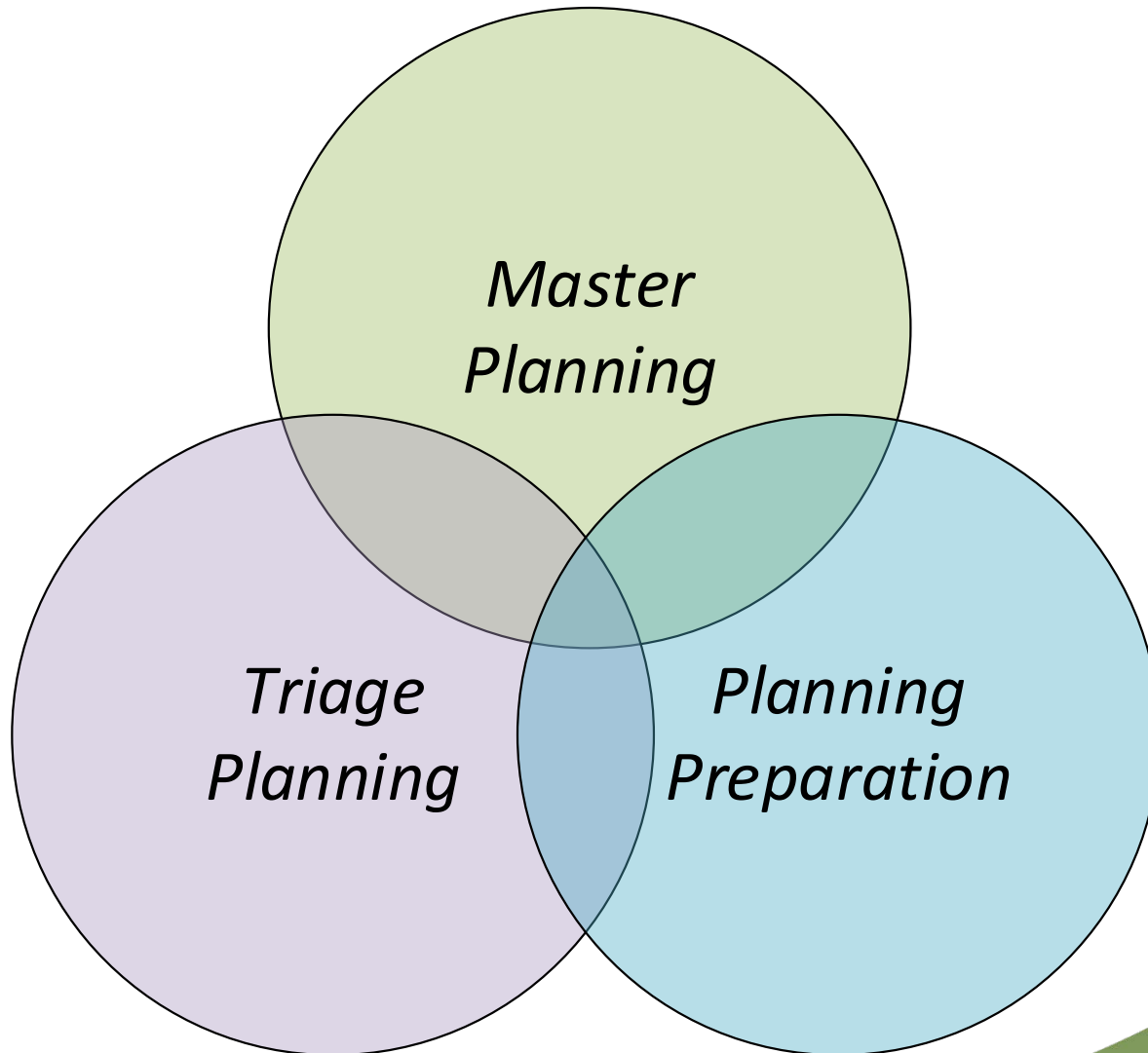
Sewer Overflow Terminology

Combined Sewer Overflow (CSO) -
An overflow from one of SPU's CSO
Outfalls that occurs as a result of rain.

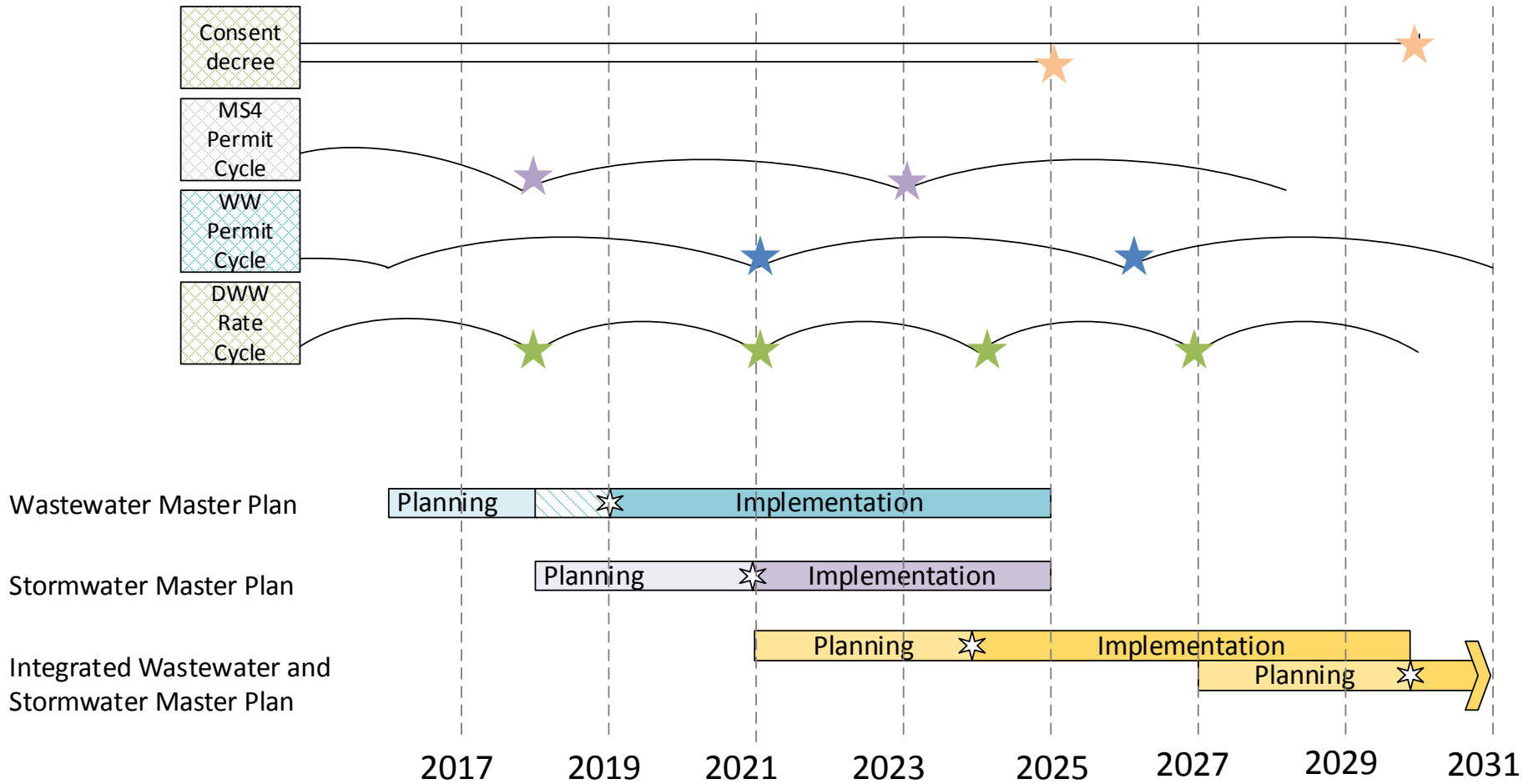
Dry Weather Overflow (DWO) -
An overflow from one of SPU's CSO
Outfalls that occurs when it's not raining.

Sewer Overflow (SSO) - An overflow that
occurs anywhere else in the sewer
system, whether or not it's raining.

Planning Program Elements

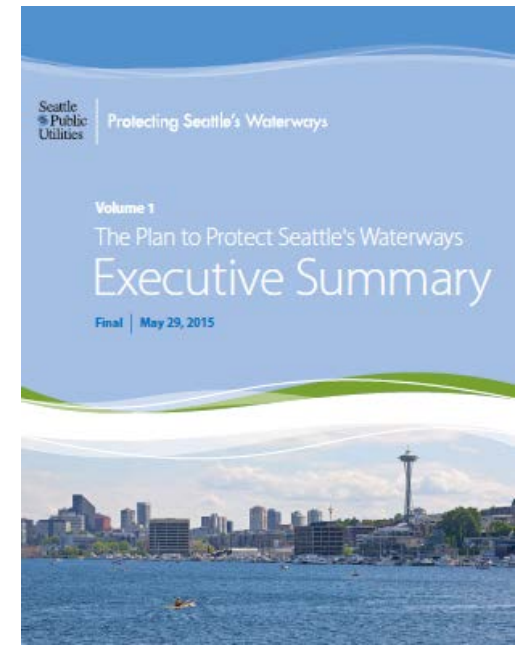
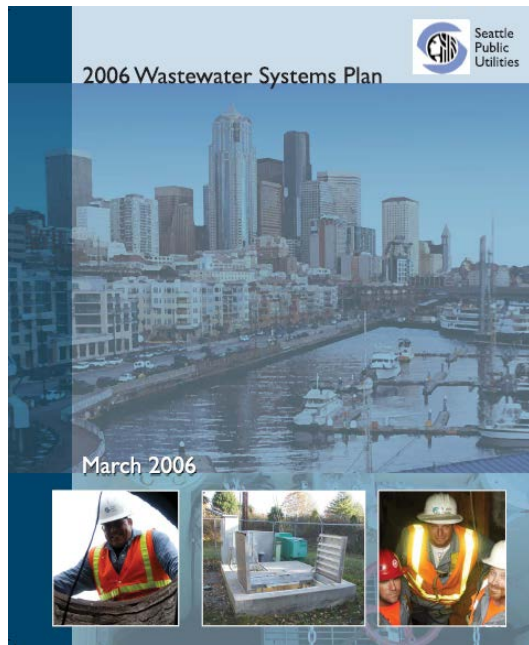


Master Planning Schedule



Past System Planning Efforts

- 2004 Drainage Comprehensive Plan
- 2006 Wastewater Systems Plan
- 2015 Plan to Protect Seattle's Waterways
 - Integrated Plan
 - Long Term Control Plan (LTCP)



Wastewater Master Plan - Objectives

Identify & understand WW system problems

...so that we can...

Set a transparent and consistent method to prioritize those WW system problems

...so that we can...

Find the most effective set of solutions for those problems.

Project Objectives

Identify & understand WW system problems by:

- Setting levels of service (LOS) that are consistent with SPU's economic realities, customer values, and SPU risk tolerance.
- Incorporating appropriate projections for growth and development, climate change, and regulatory mandates.
- Furthering our knowledge of the contribution of Inflow and Infiltration (I&I) to capacity problems.
- Furthering our knowledge of the condition of the WW system.
- Improving the wastewater system models to better understand capacity problems.

Project Objectives

Set a transparent and consistent method to prioritize those WW system problems by:

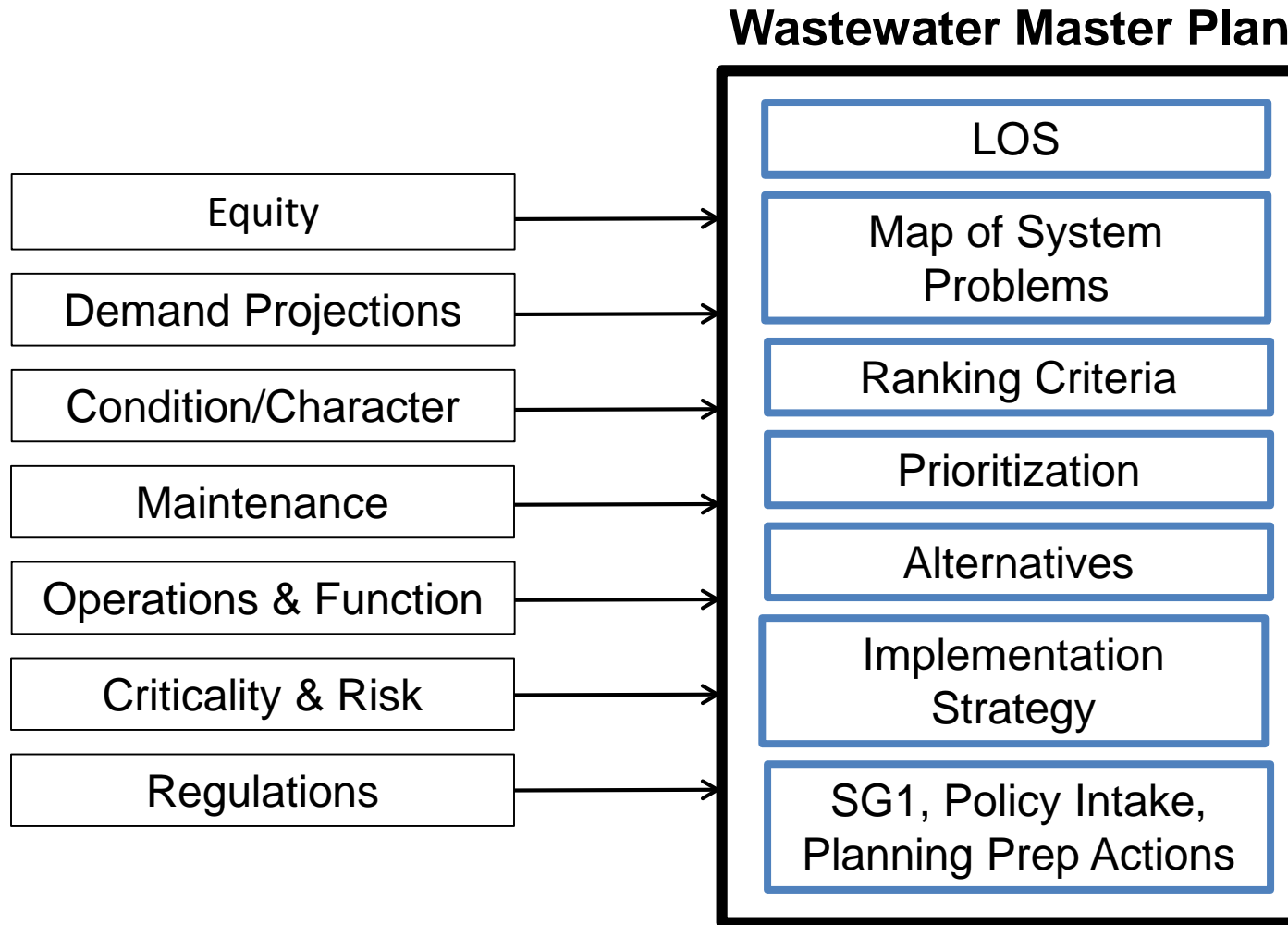
- Applying appropriate criteria to prioritize SPU investments in system improvements and partnership projects.
- Incorporating equity, social and environmental justice into those criteria.
- Linking those criteria back to the SPU Strategic Business Plan priorities.

Project Objectives

Find the most effective set of solutions for those problems that:

- Balances near-term and long-term actions.
- Balances recommendations for projects, policies and programs.
- Includes a sequenced six-year CIP list.
- Reduces the impact of I&I on the wastewater system.
- Optimizes O&M and asset reinvestment in capacity constrained areas.
- Analyzes financial sustainability and affordability.
- Analyzes potential new sources of revenue.
- Leverages major public and private projects to incrementally improve SPU's WW system over time.

Inputs and Deliverables



Preliminary Project Schedule

Activity	Estimated Completion
Calibrate and refine the wastewater model	Q3, 2017
Develop Wastewater Performance Goals and Targets	Q3, 2017
Final Draft the Wastewater Master Plan, ready for City and external approval, as needed.	Q4, 2018
City Council Approval	Q2, 2019
Capital Plan implementation	Q2, 2019-2025

Pre-planning initiatives in 2016

- Capacity analysis methodology
- Flow monitoring for model improvements
- Future flow projections methodology
- Level of Service framework
- System problem ranking criteria
- Other policy & program development
 - *Inflow and Infiltration Policy*
 - *Sewer Backup Prevention Policy*
 - *Climate Change Policy*
 - *Ditch and culvert policy*

Relationship to CSO Planning

The WWMP will incorporate the CSO program plans so that the final plan represents the complete wastewater system. Planning to achieve CSO program goals are not within the scope of this project, but assessment of capacity constrained areas within CSO basins is.



DWW Planning Contacts

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Stormwater Master Plan:	<i>Holly Scarlett</i>
Triage Planning:	<i>Holly Scarlett</i>
Move Seattle:	<i>Annalisa McDaniel</i>
Planning Preparation:	<i>Shannon Kelleher</i>
Interagency Coordination:	<i>Shannon Kelleher</i>