Regional Wastewater Services Plan and Conveyance System Improvement Program Planning Assumptions

PRESENTED TO:

ENGINEERING AND PLANNING SUBCOMMITTEE OF THE METROPOLITAN WATER POLLUTION ABATEMENT ADVISORY COMMITTEE

NOVEMBER 7, 2013

King County
Department of Natural Resources and Parks
Wastewater Treatment Division

Schedule for Briefings with E&P

Date	Planned Topic
May 2, 2013 COMPLETED	Overview of process to update planning assumptions
June 6, 2013 COMPLETED	Future population, planning horizon, and water conservation assumptions
August 1, 2013 COMPLETED	Sewered area growth rate and average wet-weather I/I degradation rate
September 5, 2013 COMPLETED	Follow-up from June 6 and August 1 discussions
October 3, 2013 COMPLETED	New system I/I and Peak I/I degradation rate -- procedures
November 7, 2013	New system I/I and Peak I/I degradation rate Follow-up from previous meetings as needed
December 5, 2013	Peak I/I degradation rate Summary of planning assumptions

Today's Presentation

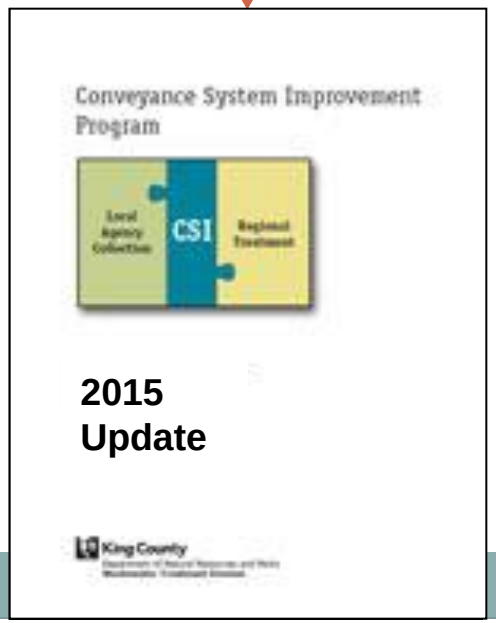
- Planning Assumption Background
- Present assumptions for use in CSI Update and RWSP Comprehensive Review
  - New system I/I proposed assumption
  - Analysis to develop Peak I/I degradation rate
- Next Steps
  - Peak I/I degradation rate proposed assumption

Update of Planning Assumptions

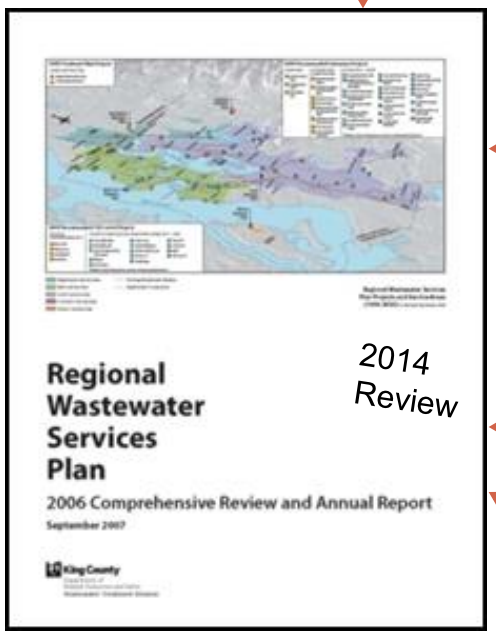
Regional Conveyance System Needs Assessment

Conveyance System Improvement Project Identification

Prioritize Projects and Update Cost Estimates



Treatment Plant Flow Projections

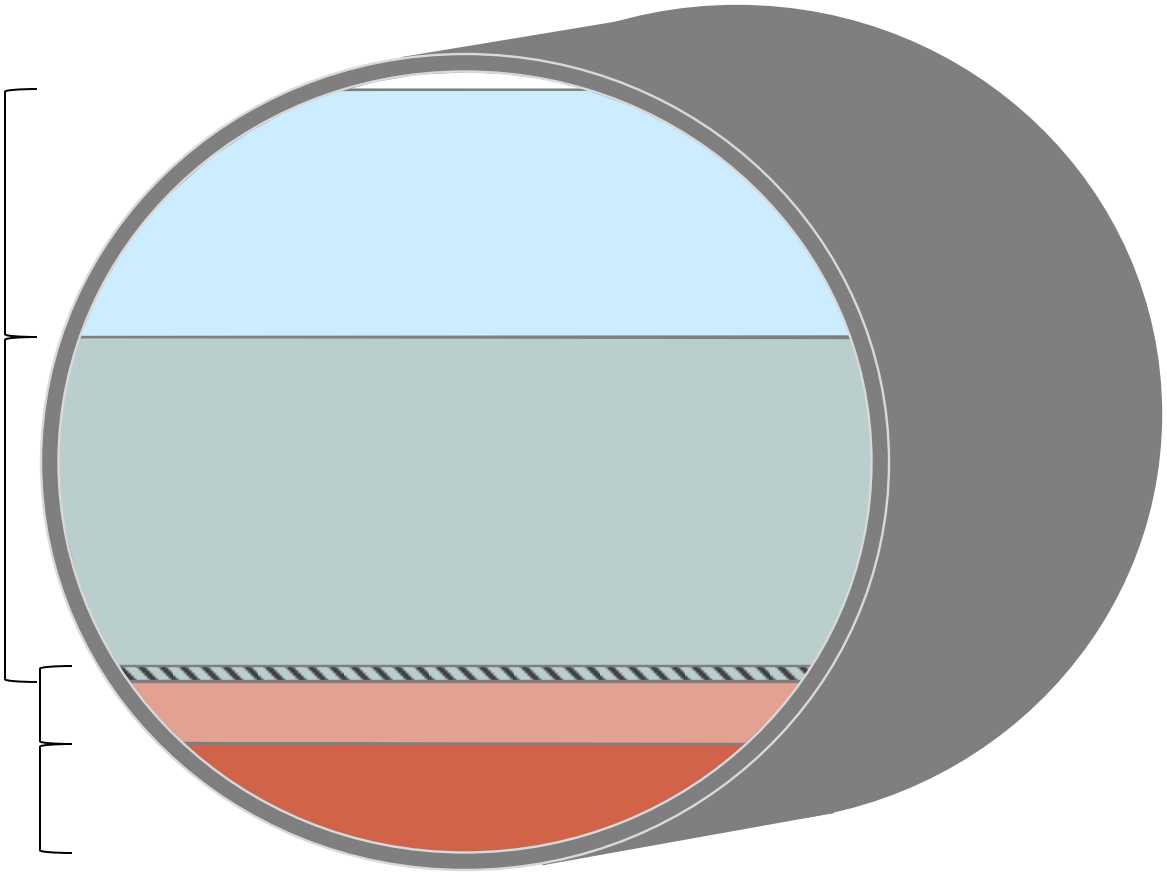


Review of RWSP Programs & Policies

Review of Asset Management Assumptions

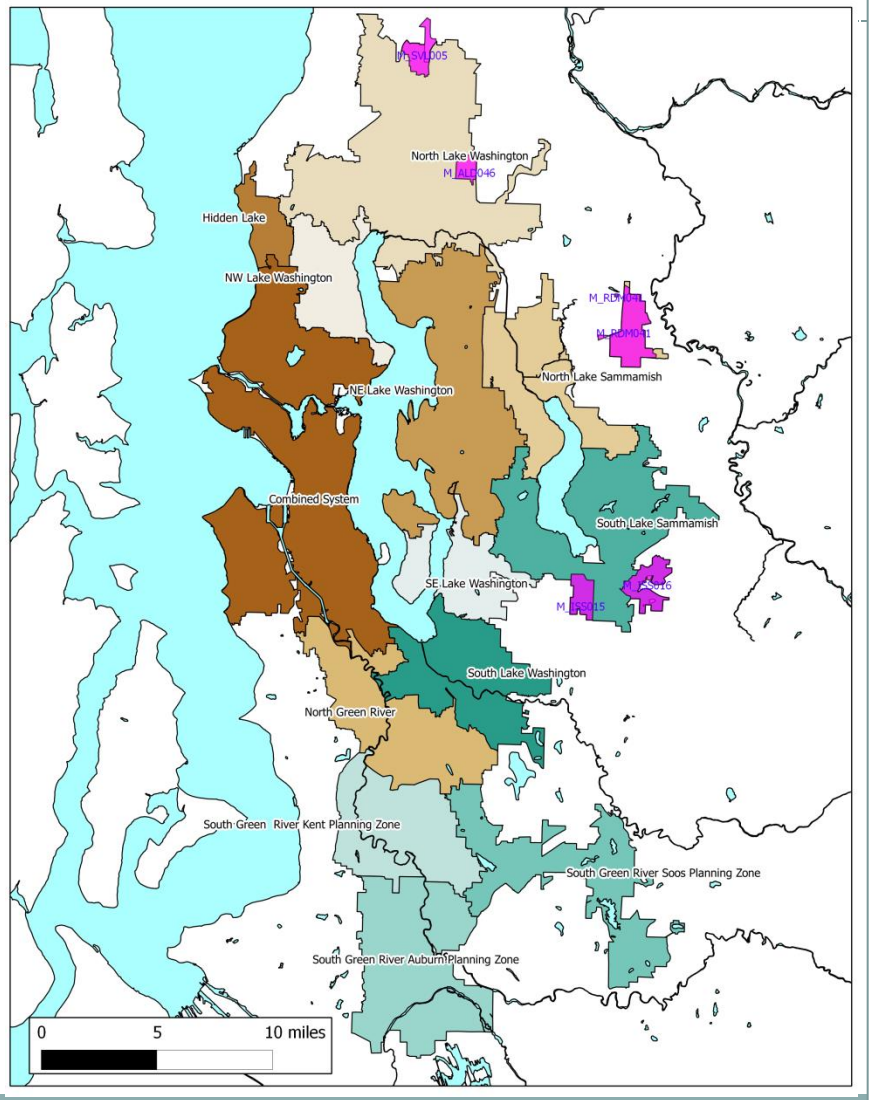
Review of Technology & Regulatory Trends

Components of Future Flows



New System I/I Basins

- 5 Basins:
  - Tallus
  - Issaquah Highlands
  - Novelty Hill
  - Silver Lake
  - Canyon Creek



New System I/I

basin	name	sewered acres (2010)	20yr peak I/I (gpad)	20yr Peak I/I (mgd)
ALD046	Canyon Creek	262	1160	0.30
ISS015	Tallus	103	2540	0.27
ISS016	Issaquah Highlands	344	5400	1.78
RDM041	Novelty Hill	636	2000	1.26
SVL005	Silver Lake	171	2000	0.34

New System I/I

Previous Assumption: Beginning 20-year peak I/I rate of 1,500 gpad.

Proposed Assumption: Beginning 20-year peak I/I rate of 2,000 gpad.

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ALD046	Canyon Creek	262	1160	0.30
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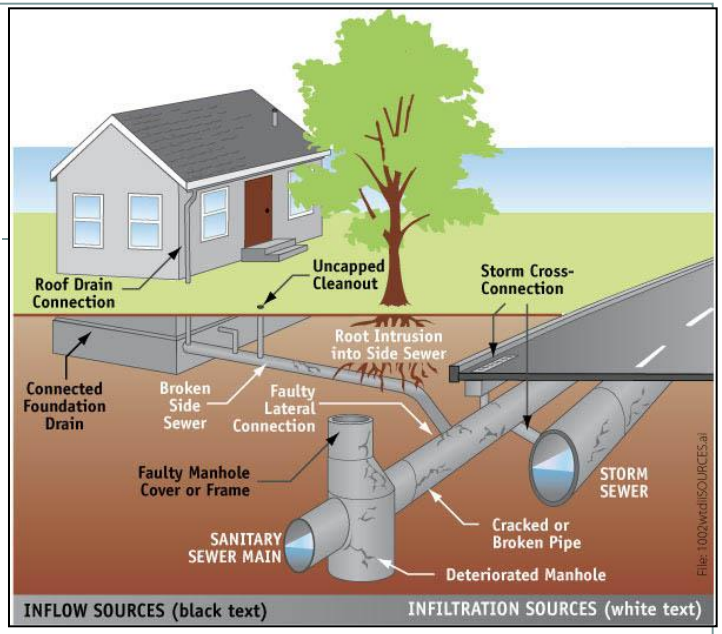
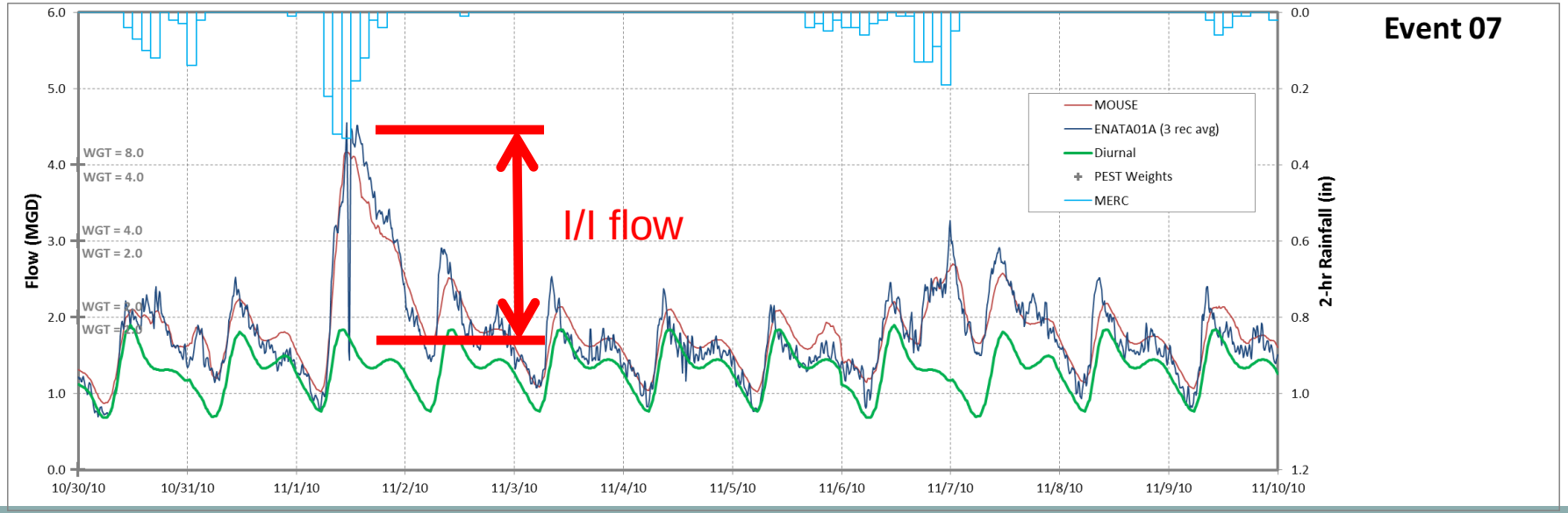
I/I Degradation Rate



- Concept:
  - Collection system becomes leakier over time due to physical changes (settling, tree roots, impacts) and corrosion
- Approach:
  - Identify basins that had minimal change over the last decade
    - Initially done by comparing sewered area
  - Compare predicted peak I/I flows between 2000 and 2010
- Difficulties:
  - I/I degradation rate has not been measured previously
  - Increase in I/I flow is small relative to other factors

Difficulty: Expected Change is Small

- 2000 I/I Degradation rate assumption was 7% per decade
- As a rough estimate, assume I/I is about two thirds the total flow during a large storm event
  - Anticipated increase in peak flow ~ 5%

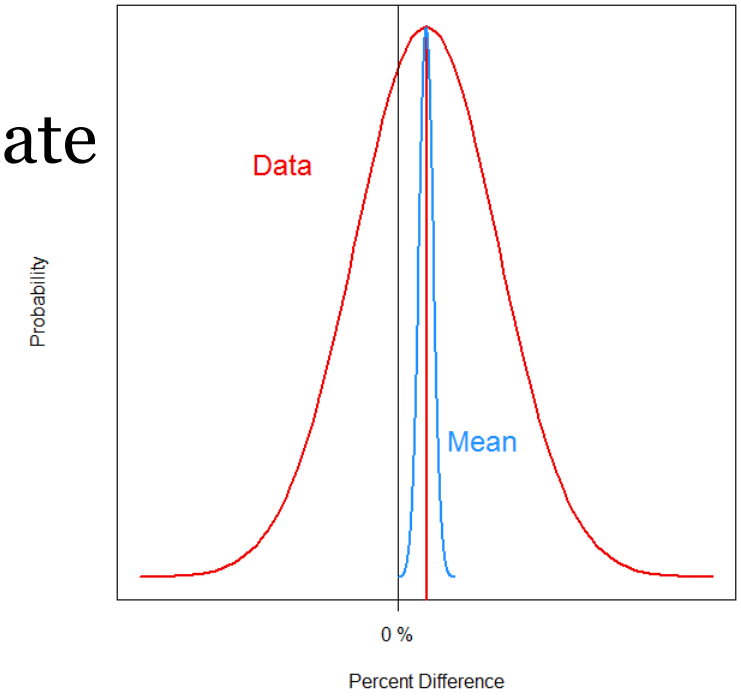


Difficulty: Expected Change is Small

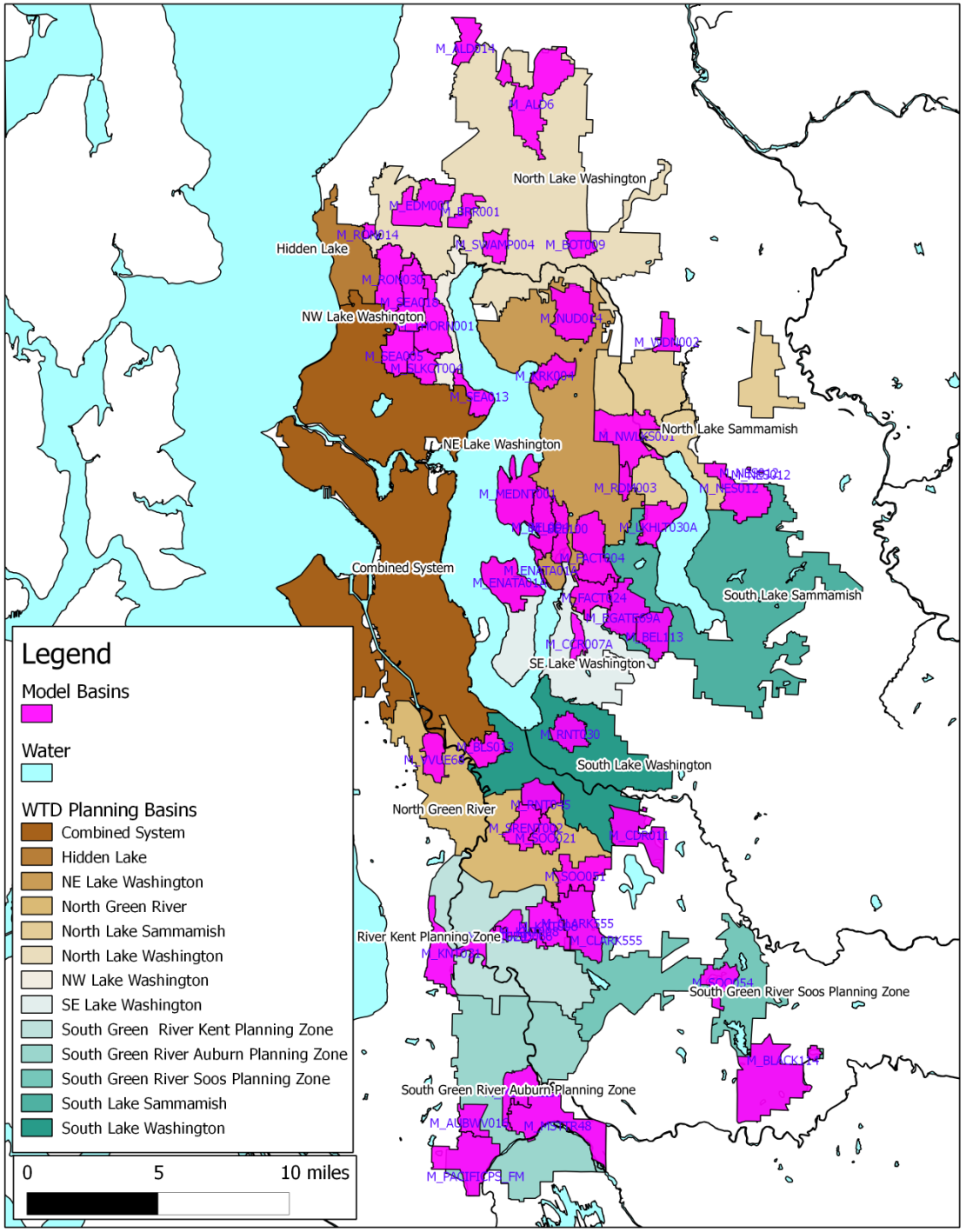
- Portable flow meters are generally accurate to 10 - 15% for good monitoring locations
  - Depends on installation, calibration, and flow conditions
- Models calibrated to peak meter flows within ~10%
  - Good calibrations may be within 5%
  - Expectation is that extrapolating model outside of calibration period will reduce performance
- Change in peak I/I is calculated from the difference between two models
  - Each model was calibrated to a flow meter

Averaging Improves Confidence

- Measurement errors over many meters should average to zero
- The mean value has less variability or uncertainty than the sample data
- Average many basins to estimate I/I degradation rate



Initial Basins for I/I Degradation Rate



Ongoing Work: Refinement of Basin Selection

- Comparing 2000 and 2010 sewer collection systems
  - Were there changes in the collection system?
- Comparing base sewage flow to population based estimate
  - Do changes in base sewage flow match how population and water use have changed?
- Verifying meter placement and model flows
  - Was flow meter location changed?
  - Is flow meter data of high quality?
  - Are any upstream basins removed from model predictions?
  - Do changes in calibration procedure affect results?

Assumption Update Summary

Assumption	Previous	New
Extent of Service Area	Sewerable areas within UGA	Same
Design Flow	20-year peak flow	Same
Future Population	2003 PSRC Forecast	2013 PSRC Forecast
Planning Horizon	2050	2060
Water Use (gpcd or gped)	Seattle Residential: 55 Other Residential: 66 Commercial: 33 Industrial: 55	Seattle Residential: 46 Other Residential: 54 Commercial: 23 Industrial: 45
Water Conservation	A 10% reduction in per day water consumption between 2000 and 2010, with no additional reduction after 2010	A 10% reduction in indoor per capita and per employee water consumption between 2010 and 2030, with no additional reduction after 2030.

Assumption Update Summary (cont.)

Assumption	Previous	New
Sewered Area Growth Rate	90% of unsewered sewerable area sewered by 2030, 100% sewered by 2050.	Additional unsewered (but sewerable) area will continue to grow at the 2000-2010 rate until service area is fully sewered in 2060 (approx. 20% per decade)
AWW I/I Degradation (Treatment Plants)	Increase of 7% per decade up to a maximum of 28%.	No AWW I/I degradation.
New System I/I (Separated Conveyance)	Initial rate of 1500 gpad with degradation applied starting one decade after construction.	Proposed: Initial rate of 2000 gpad with degradation applied starting one decade after construction
Peak I/I Degradation (Separated Conveyance)	Increase of 7% per decade up to a maximum of 28%.	December Discussion

Next Meeting/Contacts

- Proposed assumptions:
  - Peak I/I degradation rate
  - Summary of planning assumption updates
- For questions on RWSP Comprehensive Review contact:

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- For questions on CSI Program Update contact:

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  steve.tolzman@kingcounty.gov