

2020 Decennial Flow Monitoring Interim Update

Presented to MWPAAC
Engineering and Planning Subcommittee
June 3, 2021



King County

Department of Natural Resources and Parks
Wastewater Treatment Division

Schedule Estimate

- Planning Phase: September 2017 – September 2018
 - Develop project plan, site selection and investigation
- Development Phase: October 2018 – July 2019
 - Procurement of monitoring equipment, project staffing and training
- Implementation Phase: August 2019 – May 2022
 - Installation and maintenance of flow meters, data review and reporting
- Closeout Phase: June 2022 – June 2023
 - Documentation, records and archiving, equipment reassignment, disposition, and storage

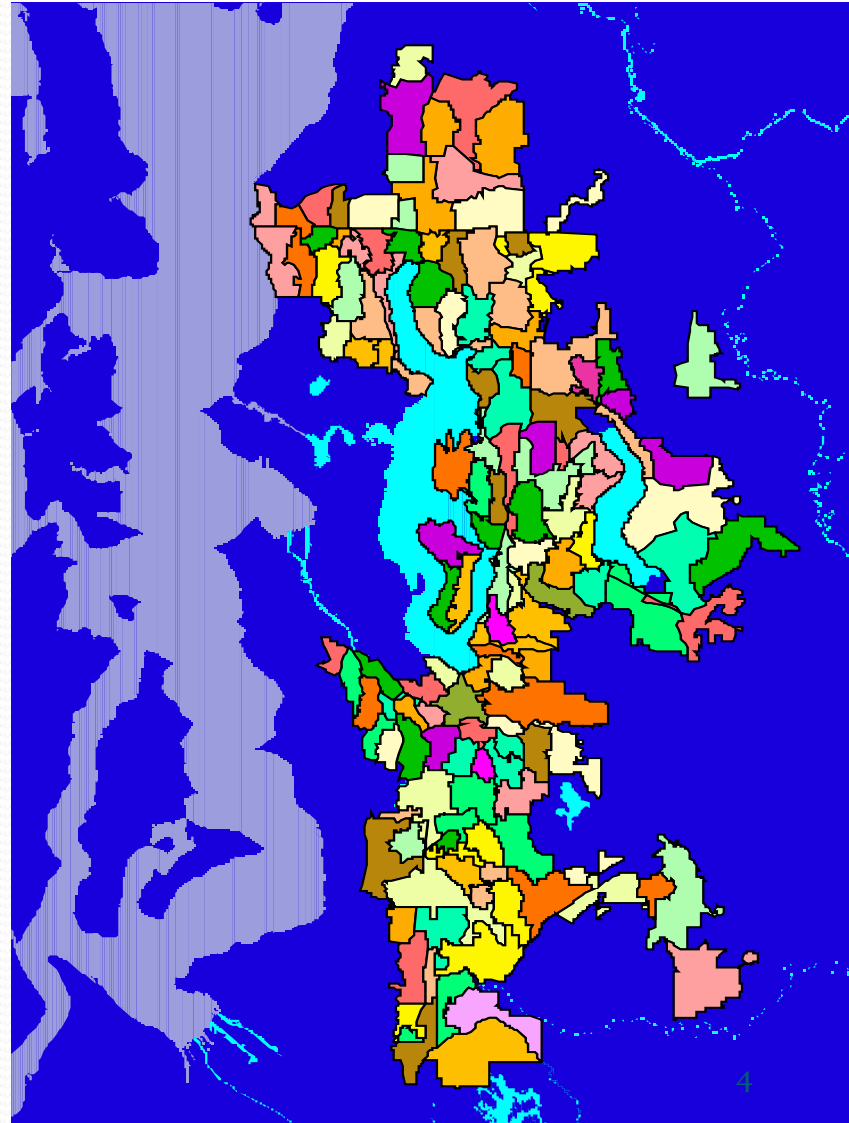
2020 Decennial Flow Monitoring Project Objective

The 2020 DFM Project will collect accurate flow data over three wet seasons coincident with the 2020 census, for use in updating:

- Prioritization/timing of projects for implementation
- Sizing of new conveyance facilities

Monitoring Approach

- 2000 – 2002 I/I Project deployed meters at the Mini Basin level
- 2010 DFM deployed meters at the Modeling Basin level
- 2020 DFM – Deploy meters at the Modeling Basin level, primarily in King County Wastewater Treatment Division pipes



Goals of 2020 DFM Monitoring Approach

- Maintain existing sewer model basins and update for growth and changes in local systems
- Install meters to monitor:
 - Areas primarily new construction/development
 - High priority Conveyance System Improvement needs
- Leverage existing sewer model to assess meter locations

Equipment Approach



Peak Combo Sensor



AV Gated Velocity

Smart Depth
Ultrasonic
Sensor



HACH Flo-Dar



Area Velocity Sensor



In-pipe Ultrasonic
Sensor

Typical Installations



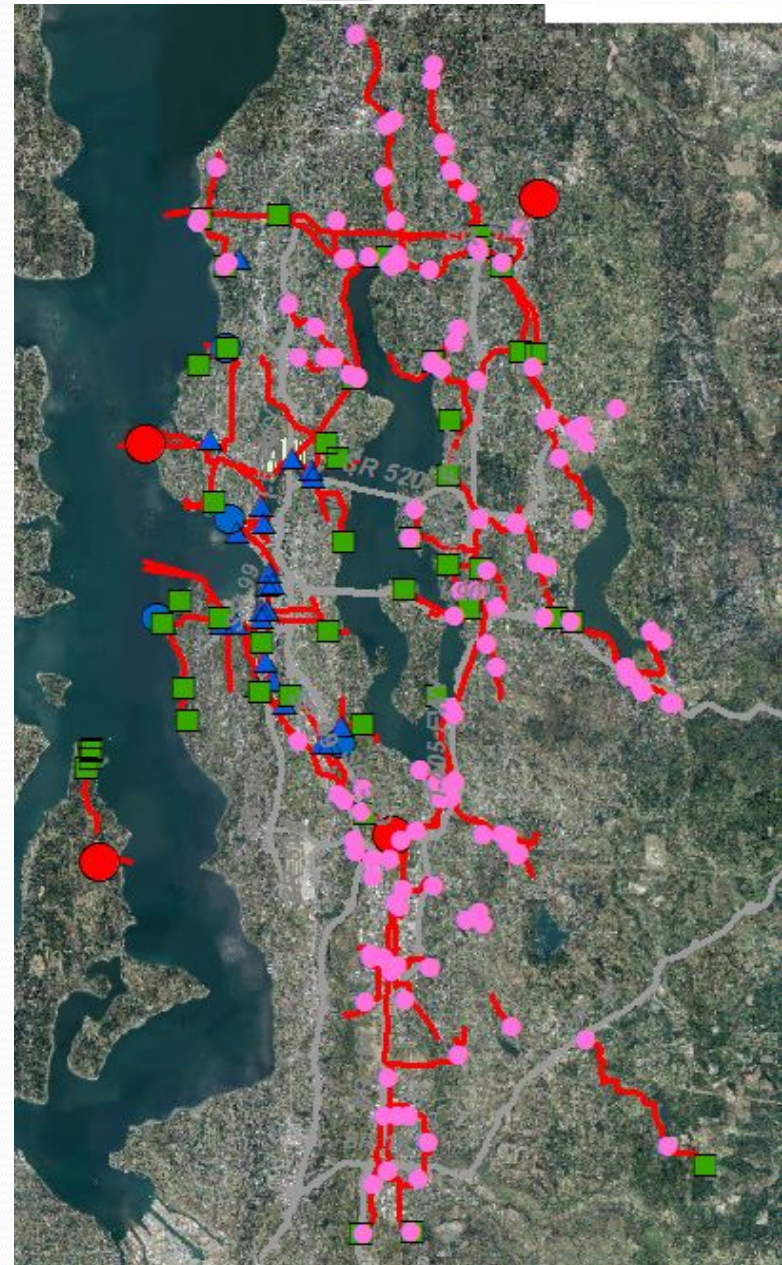
Flo-Dar Installation



Triton+ Installation
with Peak combo and
smart depth sensors

DFM Site Locations

<https://kingcounty.maps.arcgis.com/apps/webappviewer/index.html?id=b06cc1a256a947fe914bee06e47565e7>



Current Status

- 132 flow meter installed
- 2 wet seasons worth of data
- 98.3% Average Uptime
- Focusing on data verification

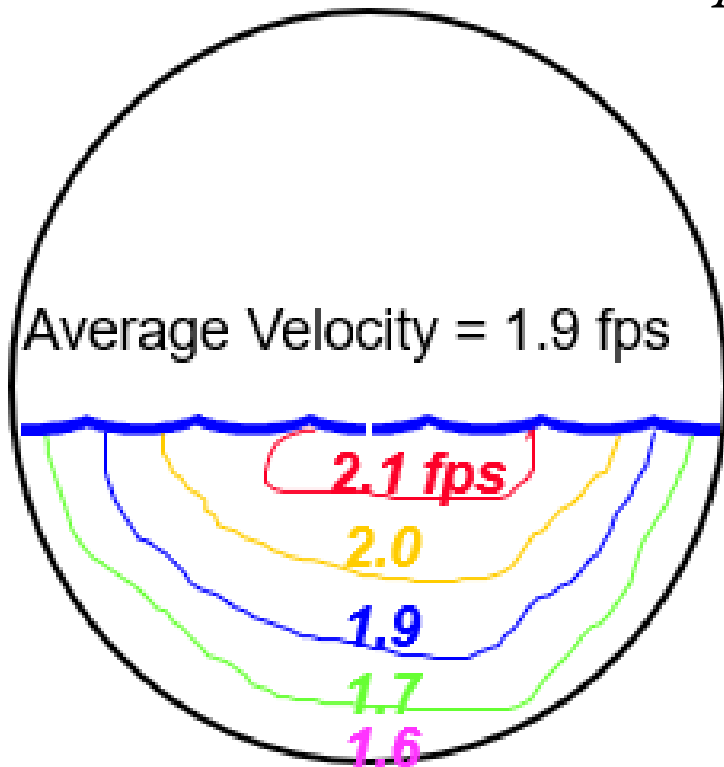
Data Review and Verifications

- Review data twice a week
- Verifications of flow meters
 - Manual depth
 - Hand-held velocity meter
 - Velocity Profiles



Velocity Profiles

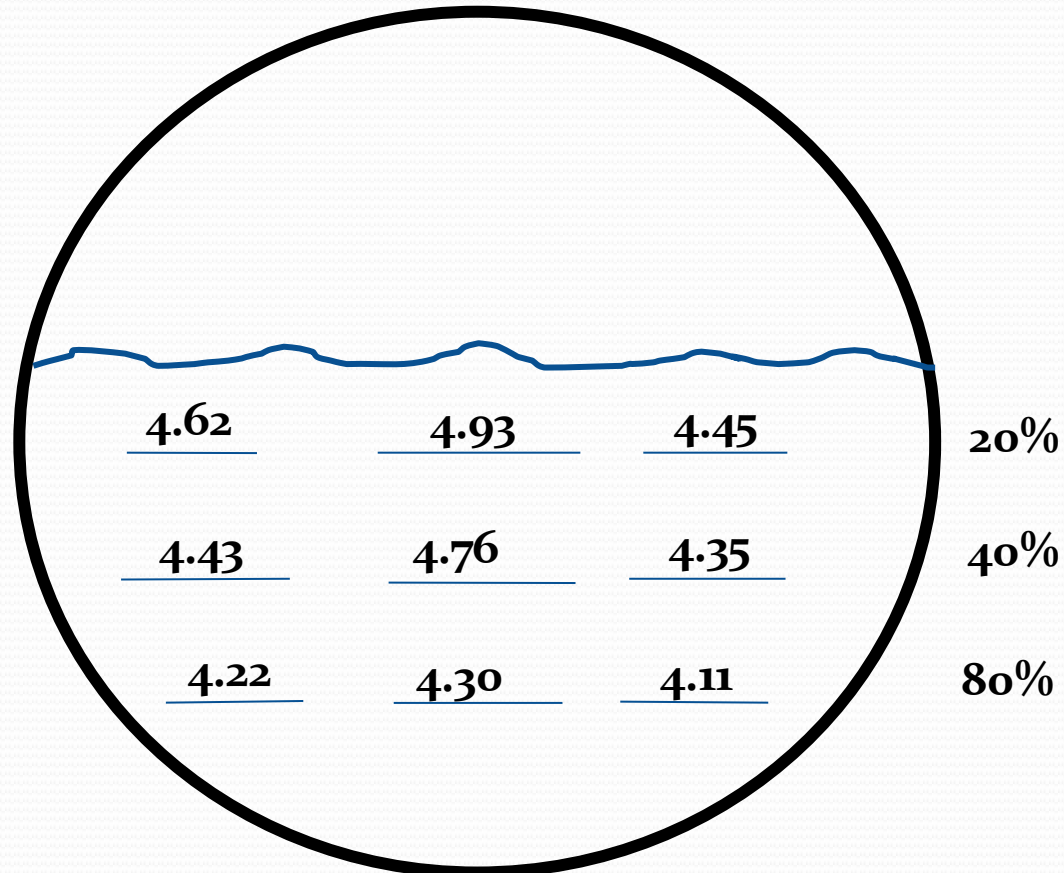
Average to Peak Velocity Ratio =
(1.9 feet per second/
2.1 feet per second) = 0.9



- Slow flow near pipe wall (friction)
- Fastest flow near surface and near center
- Velocity profile measured by a grid of point velocity measurements

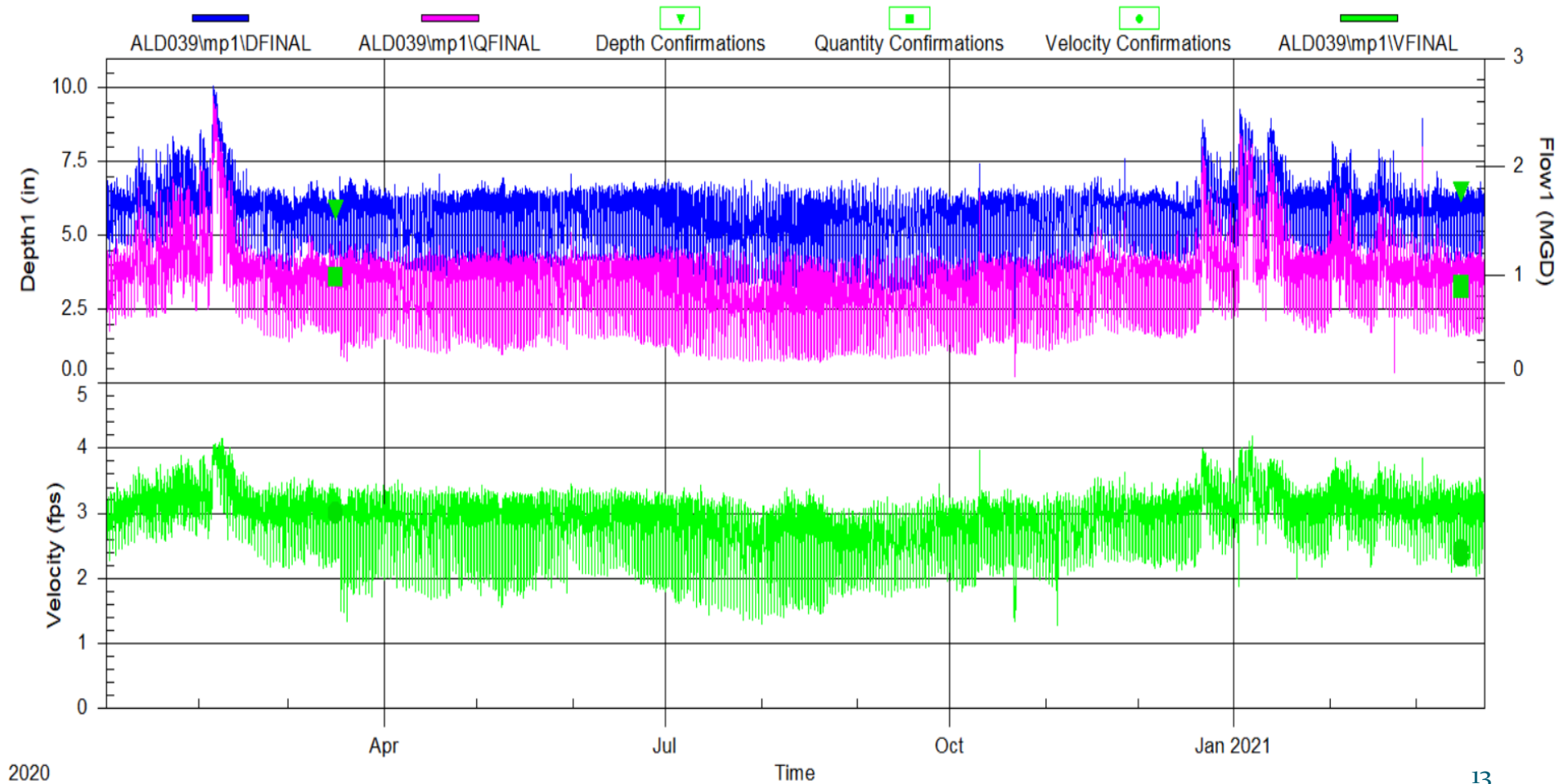
Velocity Profiles

Typical Velocity Profile (feet per second)



Hydrograph with Verifications

Pipe Height: 18.00

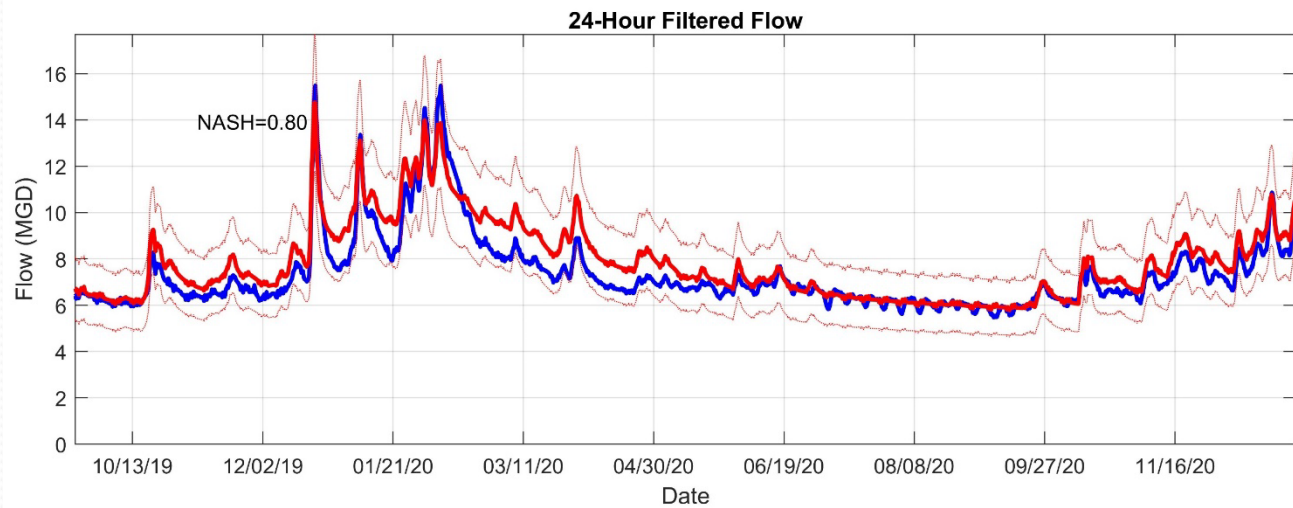
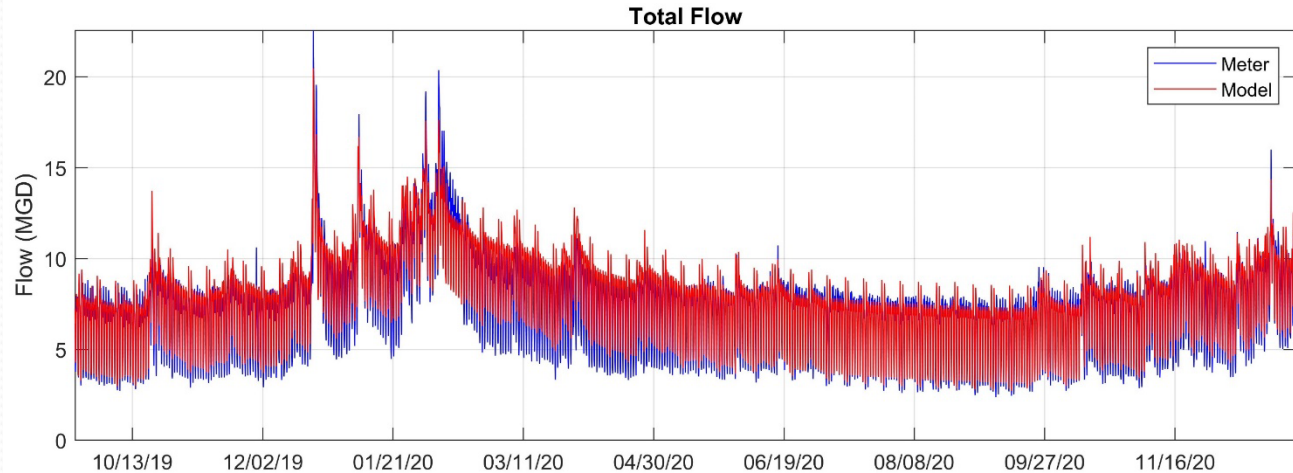


Early Modeling Involvement

- Lessons learned from pervious DFM 2010 project
- Bi-yearly schedule
- Ensure incorporation of modeling lens

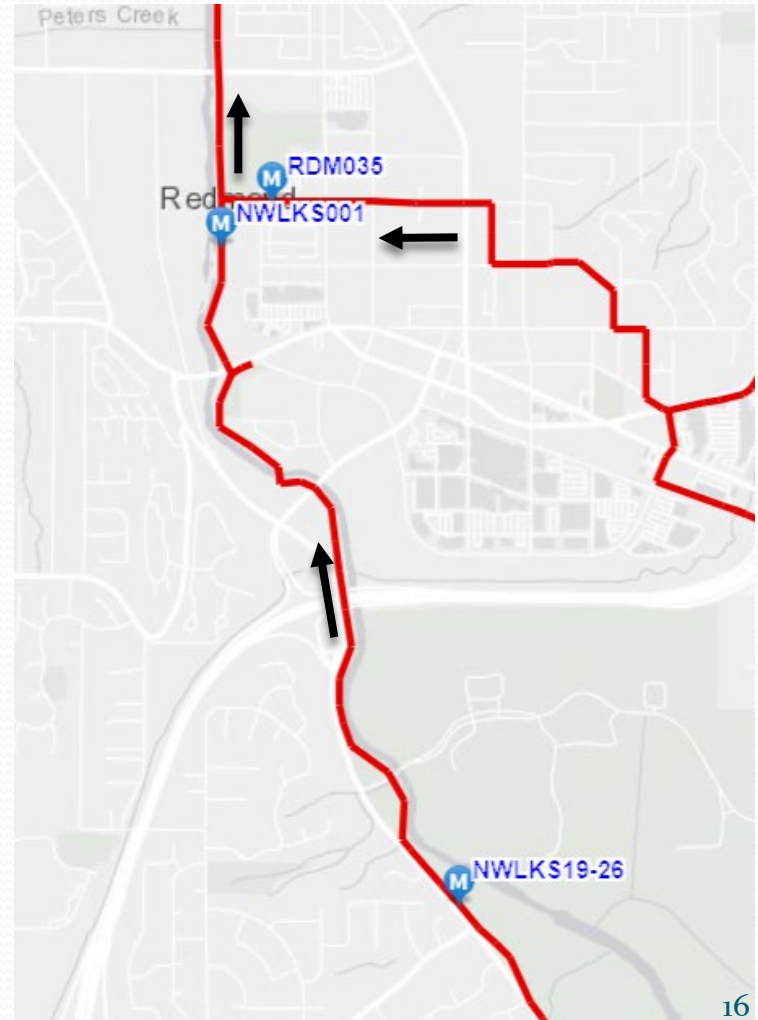
Modeling Lens Example

Location:
AUBURN⁵³



Upstream / Downstream

- Data Analysts to perform upstream / downstream comparison where applicable in the system



Upcoming

- Approximately one more year of data collection
- Maintenance and upkeep
- Field Verifications
- Modeling & monitoring feedback loop



Questions?

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