What is ITS?

- Stands for Intelligent Transportation Systems

- ITS includes communication and other technologies that improve traffic flow and enhance the safety, efficiency, and reliability of the transportation system

- Examples include signal coordination, transit signal priority, ramp metering, emergency vehicle preemption, etc.
Overview of ITS Planning at PSRC

- Engaging with stakeholders on ITS topics and planning efforts through our Regional Traffic Operations Committee (RTOC)

- Maintaining the Regional ITS Architecture, which highlights existing and planned ITS systems in the region

- Incorporating ITS and emerging transportation technologies into regional planning
Regional ITS/Signals Inventory

- Identified as a key effort via stakeholder feedback and a peer review of ITS activities in other MPOs

- Why is an ITS inventory important?
  - Understanding where ITS assets are is critical to understanding where need exists
  - Will provide a consistent regional dataset that will inform local and regional planning
  - Will help regional partners facilitate coordination and cross-jurisdictional collaboration on ITS efforts
Informing Future Planning Efforts

- Develop a regional inventory of existing ITS
- System performance and other supporting analyses
- Regional ITS needs and gaps analysis
- Inform local and regional planning
• Conducted an online survey with stakeholder feedback to facilitate data collection on:

<table>
<thead>
<tr>
<th>Traffic Signals*</th>
<th>Additional ITS Assets</th>
</tr>
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<tbody>
<tr>
<td>• Where are they?</td>
<td>• Where are they?</td>
</tr>
<tr>
<td>• Data required for various ITS features such as Transit Signal Priority and signal coordination</td>
<td>• Includes Traffic Management Centers, data collection tools, and Active Traffic Management</td>
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<td>• Optional data includes technical aspects such as hardware and communication systems</td>
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*Only collected data for traffic signals along the National Highway System*
The National Highway System (NHS) includes all roads classified as Principal Arterials or above and some additional roads that connect to intermodal terminals.

In the central Puget Sound region there are approximately 6,390 intersections along the NHS.

- Approximately 680 intersecting with other NHS routes.
- Approximately 5,710 intersecting with non-NHS arterials, collectors and local roads.
Survey Results Summary

- 100% response rate
- ~41% of NHS intersections are signalized (~2,600 signals)
- Almost 90% of NHS-to-NHS intersections have traffic signals

Share of NHS Intersections with Signals

<table>
<thead>
<tr>
<th></th>
<th>NHS to NHS (88% Signalized)</th>
<th>NHS to Non-NHS (34% Signalized)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intersections</td>
<td>680</td>
<td>628</td>
</tr>
<tr>
<td>Signals</td>
<td>2,560</td>
<td>1,932</td>
</tr>
</tbody>
</table>

Signal Locations along the NHS in the Central Puget Sound Region

Source: PSRC, 2019

* Traffic signals are only shown along the NHS
Today’s discussion includes:

- Signal Coordination
- Adaptive Signal Control (ASC)
- Accessible Pedestrian Signal (APS)
- Transit Signal Priority (TSP)
What is Signal Coordination?

- Refers to when two or more signals along a corridor are synchronized and working together.

- Improves travel time and mobility along a corridor by minimizing the number of times vehicles must stop.

- Considered effective when signals are within ~\(\frac{3}{4}\) a mile of each other and there are relatively high traffic volumes along the corridor.
  
  - Signals are typically only coordinated during peak periods.
70% of signals along the NHS in the region are coordinated

6,390 NHS Intersections

2,560 Signalized

1,787 Coordinated Signals

Source: PSRC, 2019

* Traffic signals are only shown along the NHS
Application of Signal Coordination – SW Snohomish County/Everett

- 58% of signals on the NHS in Snohomish County are coordinated

- Downtown Everett and most of the high-volume urbanized corridors in SW Snohomish County are coordinated
  - Corridors further out on the periphery and/or with wider signal spacing are less likely to be coordinated

Source: PSRC, 2019

* Traffic signals are only shown along the NHS
What is Adaptive Signal Control (ASC)?

- Refers to signals that automatically and continuously adjust their signal timing to match traffic conditions on the ground.

- Improves mobility and travel time by moving traffic through more quickly and efficiently, as well as adapting to unforeseen events or conditions in real time.

- Most effective along heavily congested corridors and areas where traffic conditions can be inconsistent or unpredictable.
9% of signals along the NHS in the region have Adaptive Signal Control.

- 6,390 NHS Intersections
- 2,560 Signalized
- 239 Signals with ASC

Source: PSRC, 2019

* Traffic signals are only shown along the NHS.
• 100% of Bellevue’s traffic signals have Adaptive Signal Control

• Allows them to respond much more effectively to unpredicted incidents and special events
  
  o No need to spend resources on pre-timing signals

Source: PSRC, 2019

* Traffic signals are only shown along the NHS
What are Accessible Pedestrian Signals (APS)?

• Accessible Pedestrian Signals communicate WALK/DON’T WALK information in non-visual formats (i.e. audible tones and vibrating push-buttons)

• They make it easier and safer for pedestrians with visual impairments to cross the street and walk through an area

• Beneficial at any signalized intersection, especially those that have relatively higher volumes of pedestrian traffic
32% of signals along the NHS in the region meet Accessible Pedestrian Signal standards.
Application of Accessible Pedestrian Signals - Bremerton

- 47% of Bremerton’s traffic signals along the NHS meet APS standards

- All of Bremerton’s new signals meet APS standards and they upgrade existing signals when possible

- Bremerton has an ADA Committee that provides feedback on where APS is most needed, where volume levels are not high enough, etc.
What is Transit Signal Priority?

- Refers to technology that reduces delay for transit vehicles at intersections by modifying the signal timing

- Improves transit travel time, reliability, and efficiency

- Most effective along congested corridors where transit routes are frequently delayed
12% of signals along the NHS in the region have Transit Signal Priority

- 6,390 NHS Intersections
- 2,560 Signalized
- 318 Signals with TSP
• 48% of signals on the NHS in Tacoma have Transit Signal Priority

• Pierce Transit is currently upgrading the technology for some TSP signals, which will allow for better data analysis and more efficient maintenance and operations
Integration With Other Datasets

- The ITS inventory is intended to be integrated with other data as part of a broader needs and gaps assessment

  - Potential datasets include travel time, congestion, transit routes, traffic volumes, etc.
Integration With Other Datasets

- Example on the right shows Pierce Transit’s bus network in Tacoma overlayed with Transit Signal Priority signals.

Source: PSRC, 2019; Tacoma, 2019; Pierce Transit, 2017

* Traffic signals are only shown along the NHS

** Frequent routes come every 10-15 minutes throughout the day. Local routes do not come as frequently.
Next Steps

• Continue exploring options for visualizing the data and enhancing overall usefulness for stakeholders

• Integrate with other transportation asset and system performance data

• Use findings to inform local and regional planning efforts