

# ITS Washington: Using Big Data for Incident Management

Case Study of I-5 Corridor near Seattle

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Customer Success Manager

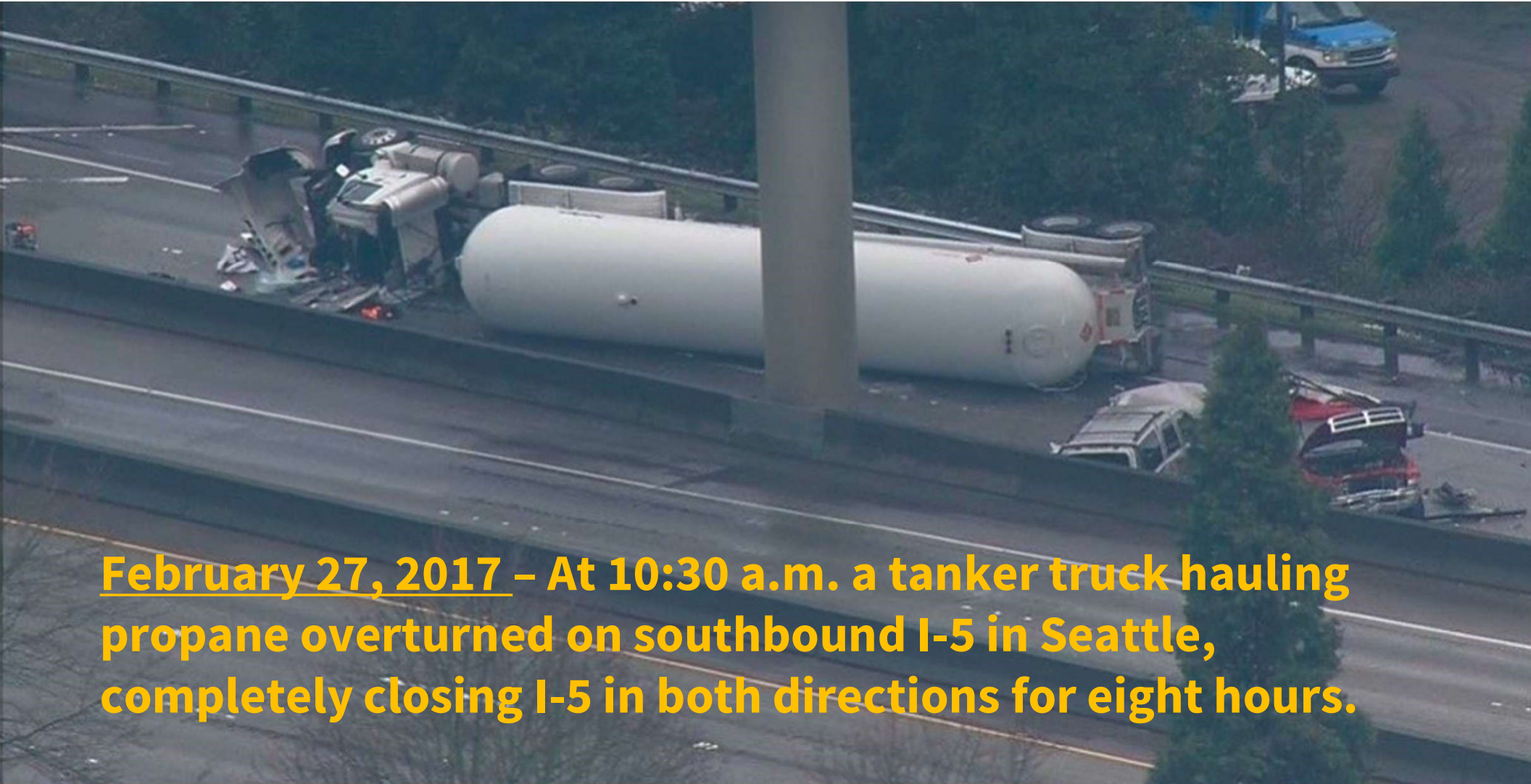
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# Agenda

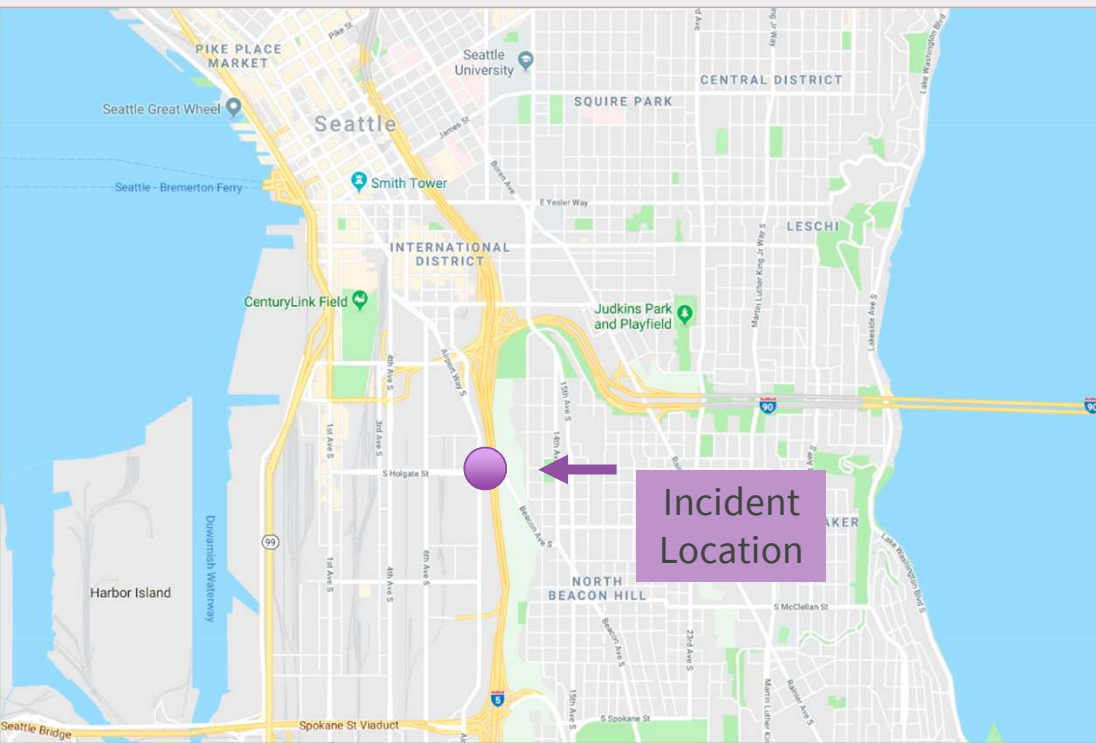
- I. Overview of Interstate 5 Seattle Truck Incident
- II. Big Data Description
- III. Overall I-5 Travel Behavior Patterns
- IV. What happened during the I-5 incident
- III. Recommendations
- IV. Conclusion





**February 27, 2017 – At 10:30 a.m. a tanker truck hauling propane overturned on southbound I-5 in Seattle, completely closing I-5 in both directions for eight hours.**

# Interstate 5 Incident Location and Traffic Impact



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# Significance and Urgency

- The Interstate 5 corridor is an important North-South corridor through the downtown Seattle Peninsula
- Although the truck incident occurred during the off-peak period, it resulted in significant delays to travelers in both directions throughout the day
- Traffic was forced out of the interstate and onto the local roadways
- Although incident cleared at 4PM, the Seattle area was hampered for the remainder of the day with the evening commute impacted severely

A nighttime photograph of a city skyline with several illuminated skyscrapers. In the foreground, a multi-lane highway is visible with light trails from moving vehicles. The sky is dark blue.

# Key Question:

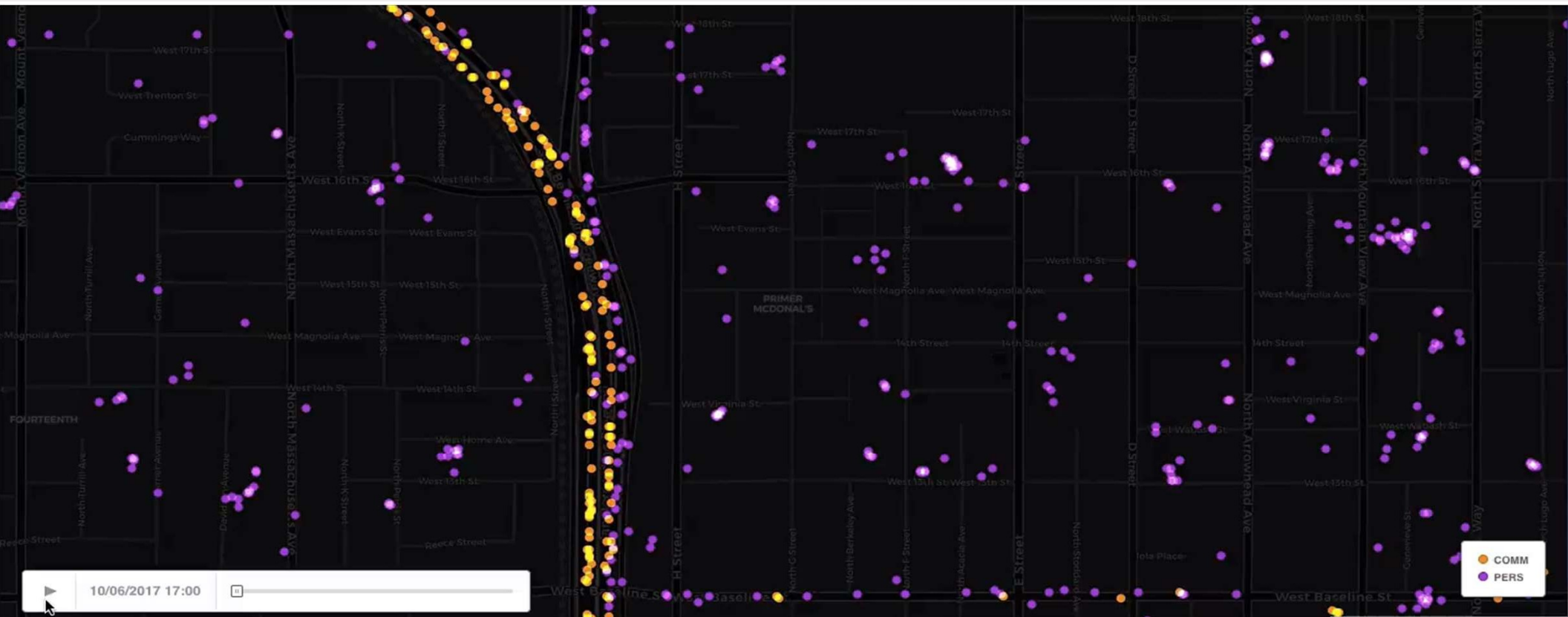
The Washington Department of Transportation (WSDOT) has a pilot subscription with StreetLight Data, which uses Big Data from mobile devices to deliver transportation analytics.

**Can WSDOT use Big Data to better plan re-routes and incident management in the future?**

# What is Big Data?

# Big Data is a Meaningless Buzzword...

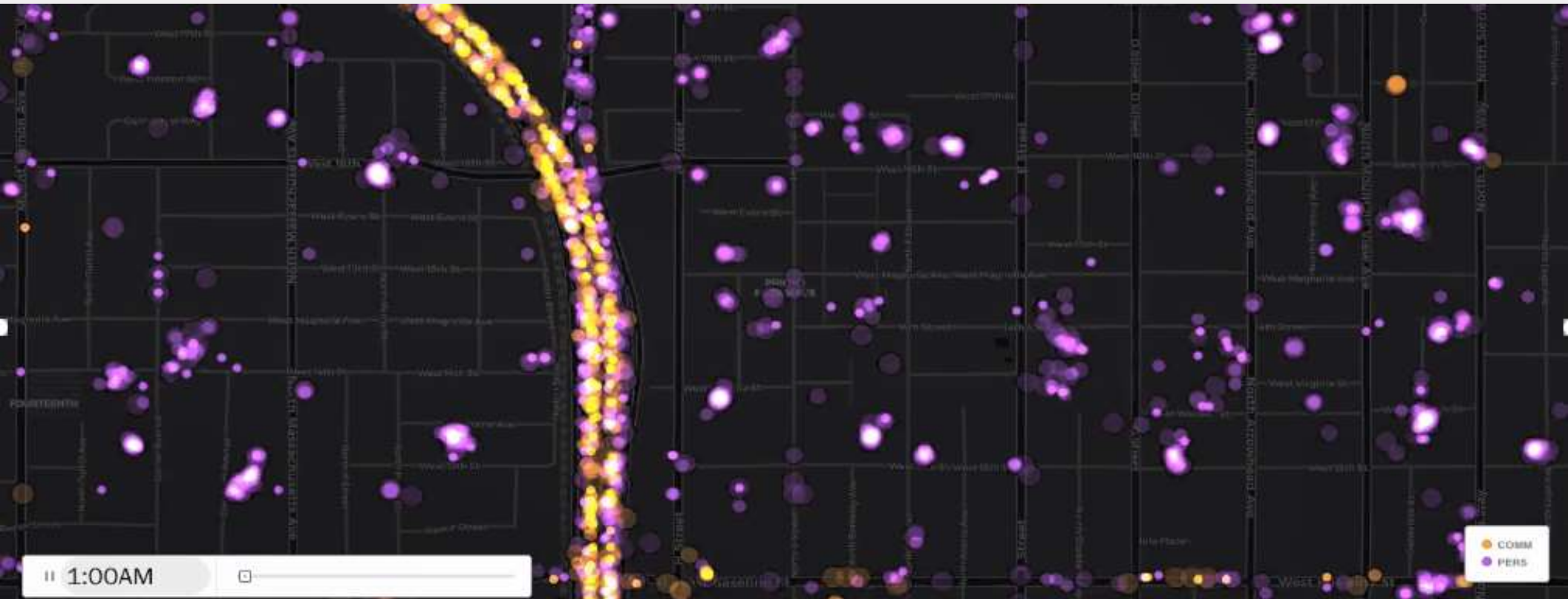
Mobile device data from ~23% of US and Canadian adults and ~12% of commercial truck trips





# Big Data is a Meaningless Buzzword

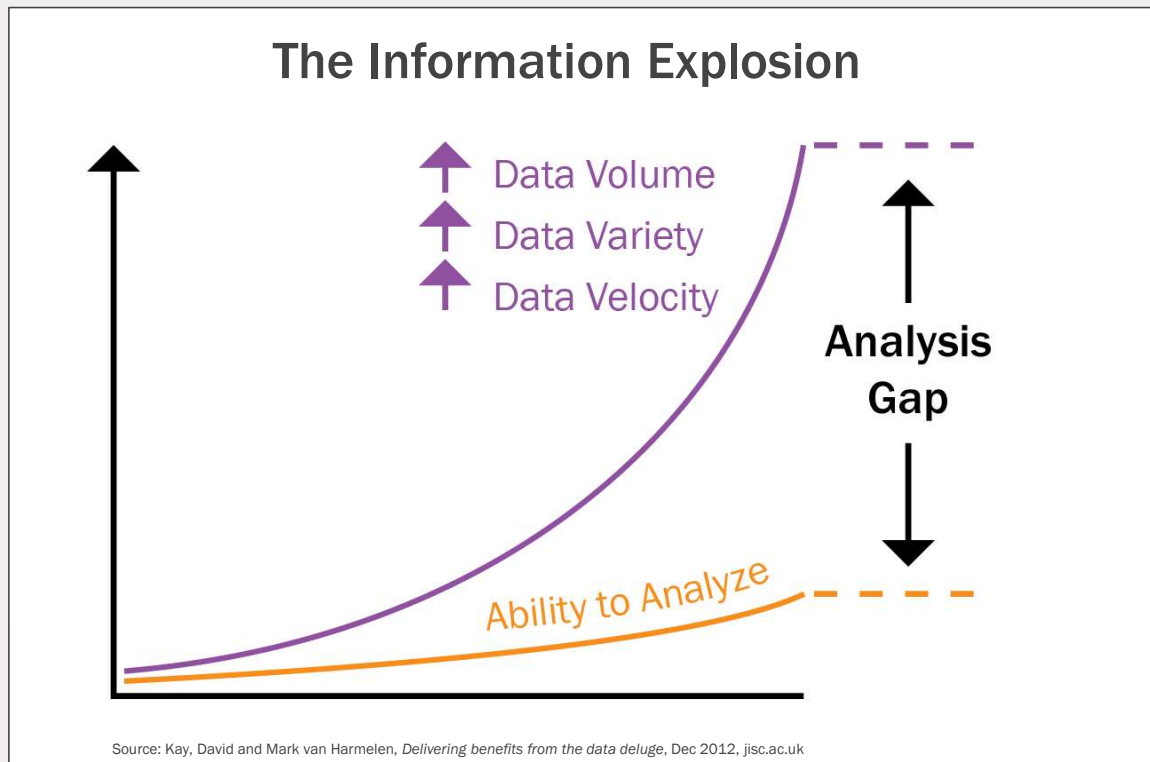
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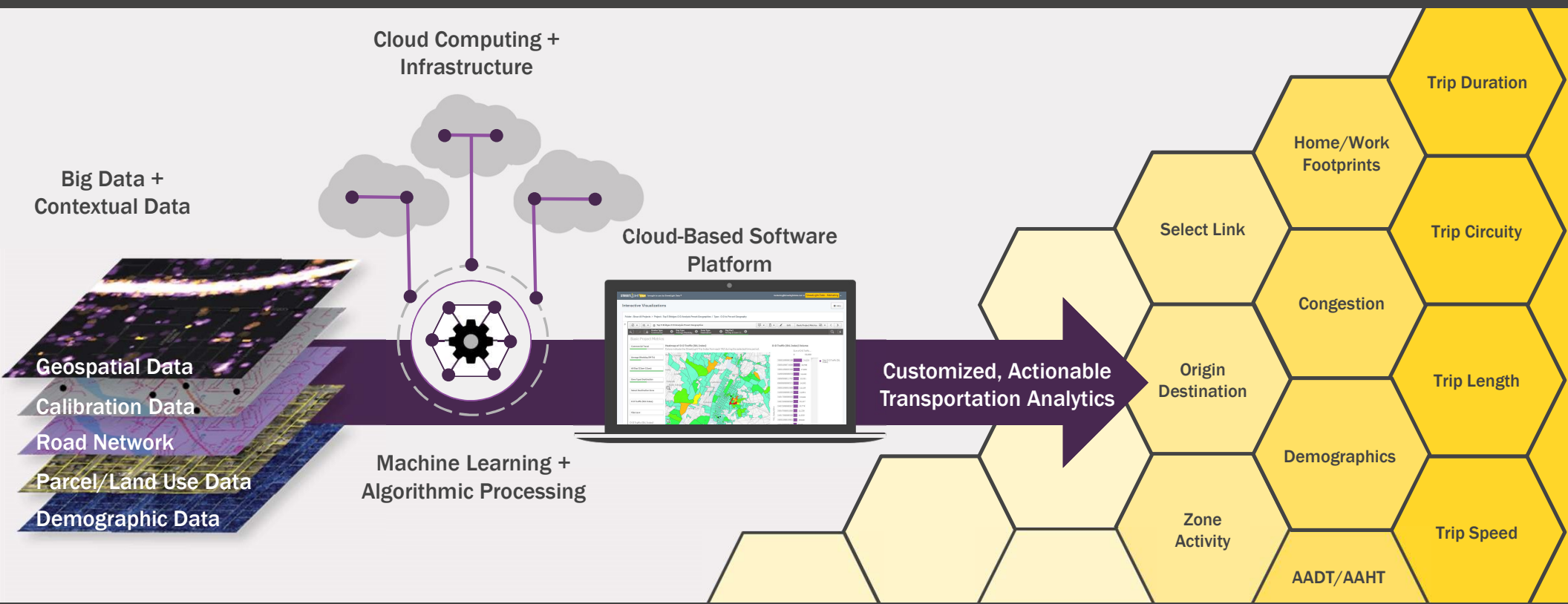
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# By Itself, Big Data is Not Useful Information – It is A Mess



# With the Right Processing Techniques, Big Data is Valuable and Useful



# Incident Management with *StreetLight InSight*

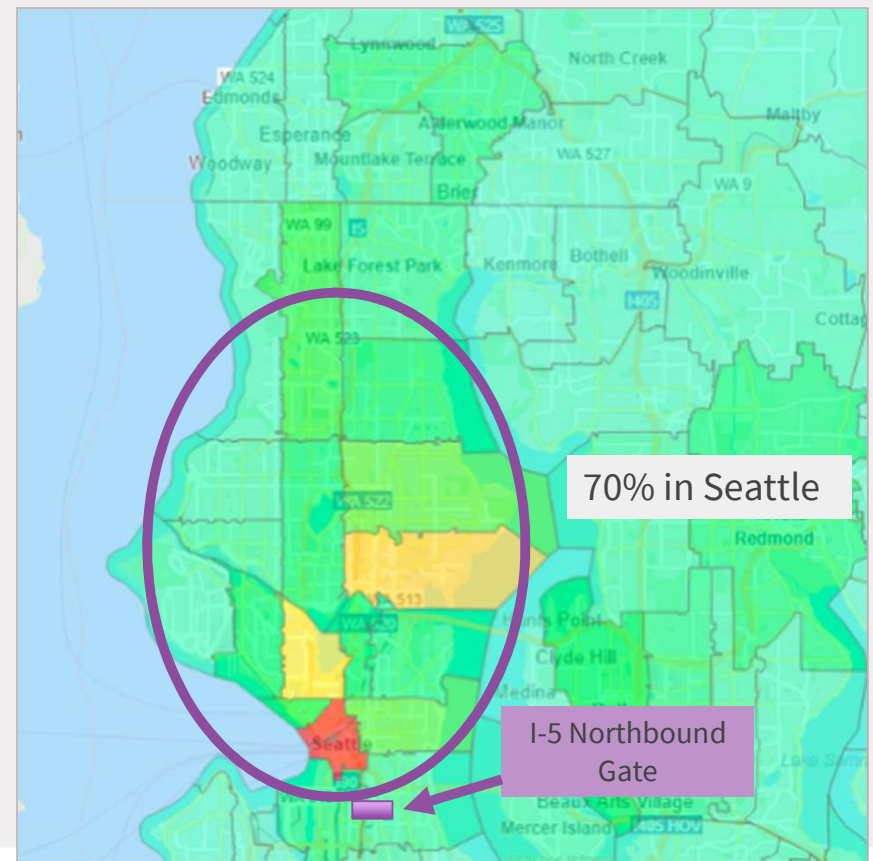
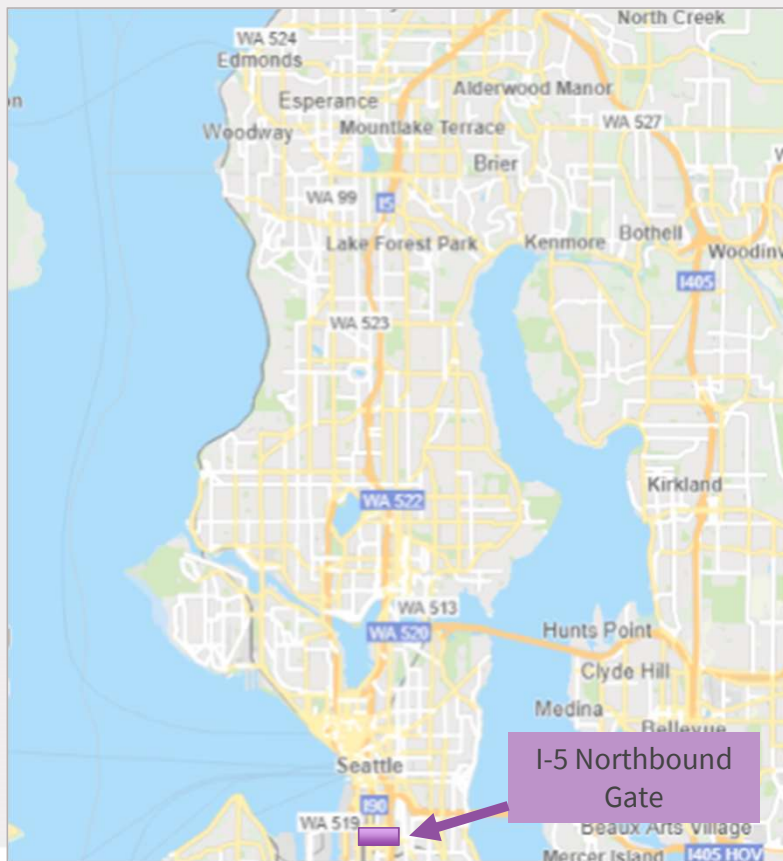


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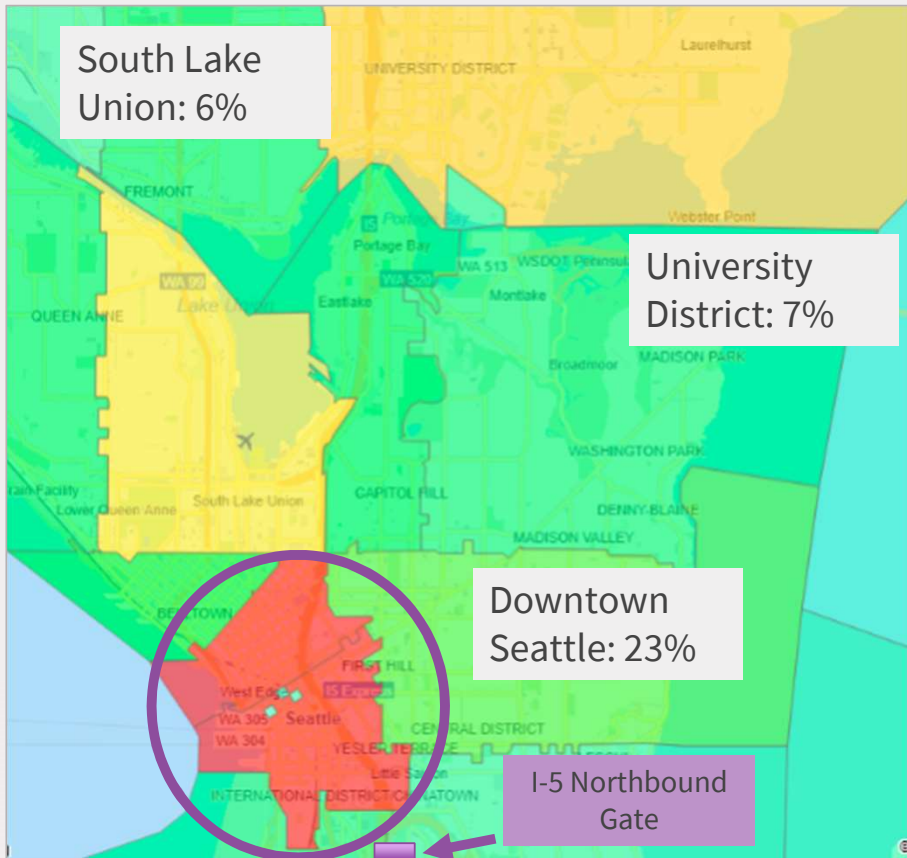
# Average Weekday: I-5 Corridor Typical Travel Behavior and Roadway conditions



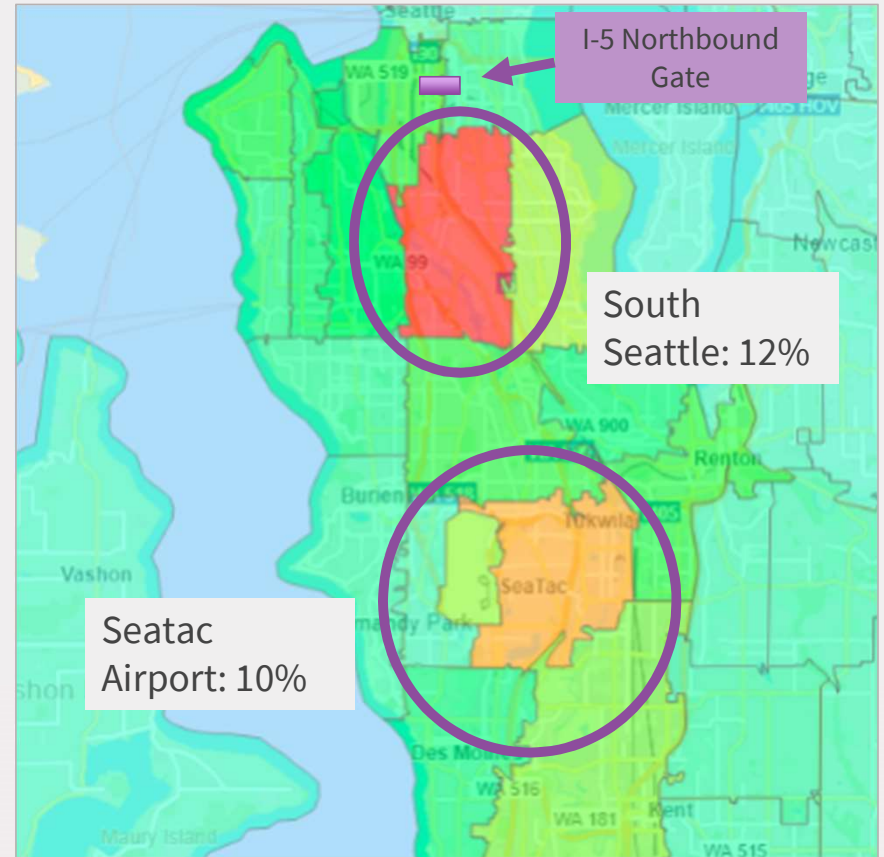
# Heat Map of Destinations for Northbound Trips on Interstate 5 in the AM Peak Period (6-10am)



# Top Origins and Destinations of Trips on I-5 Northbound

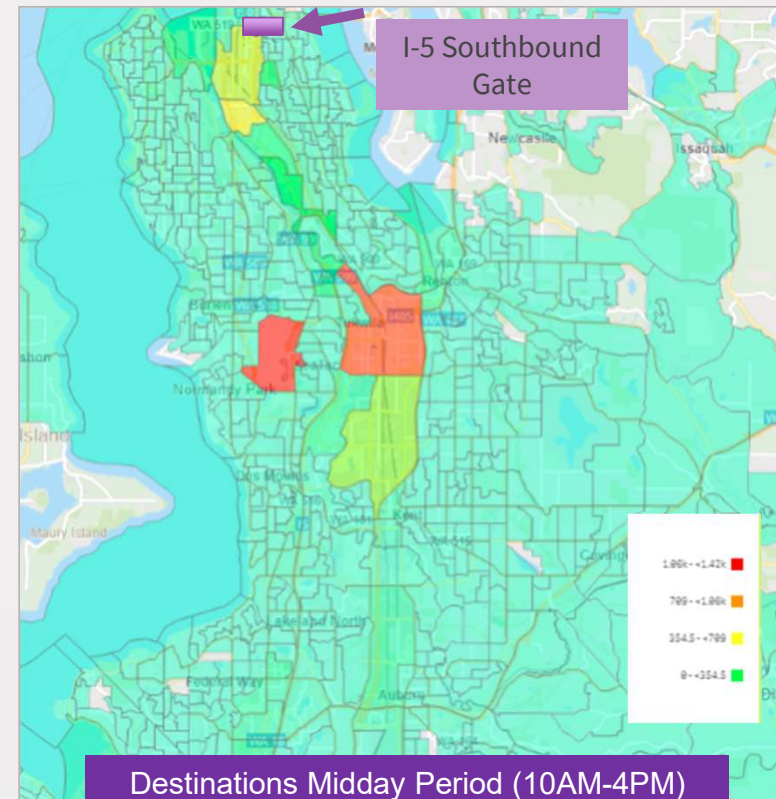
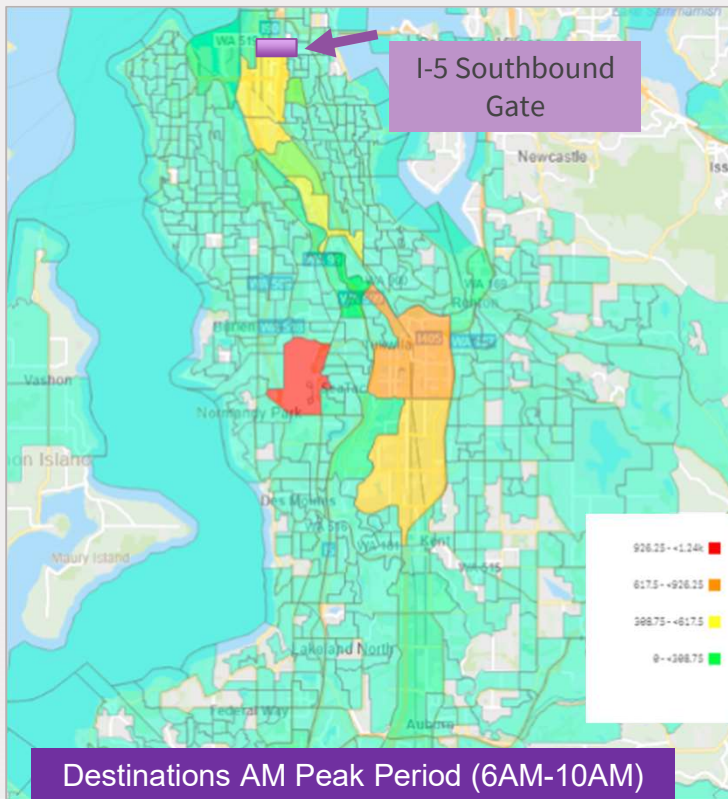


Destinations AM Peak Period (6AM-10AM)



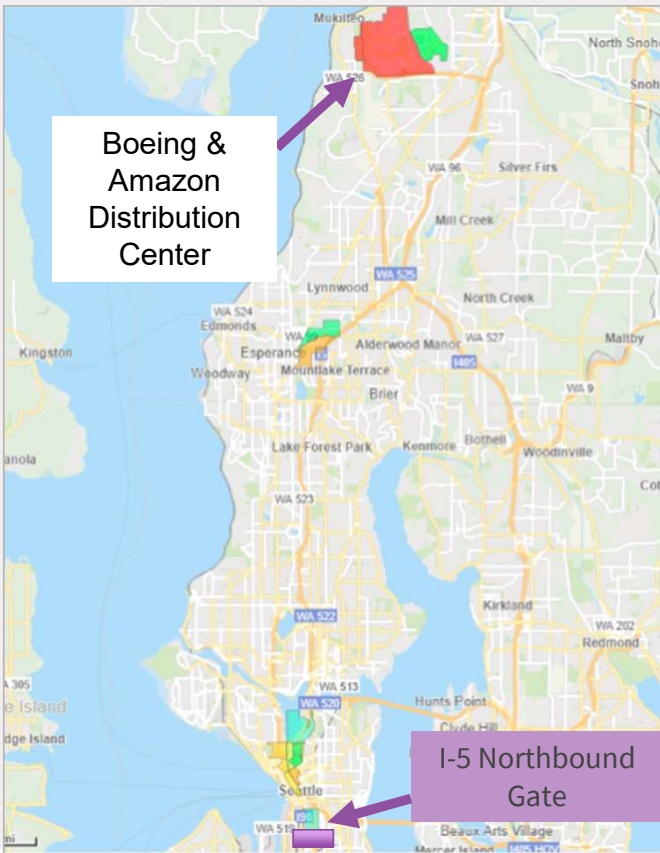
Origins AM Peak Period (6AM-10AM)

# Destinations of Southbound Trips in the Peak AM and Midday Periods





# Top Truck Destinations AM Peak & Midday Periods



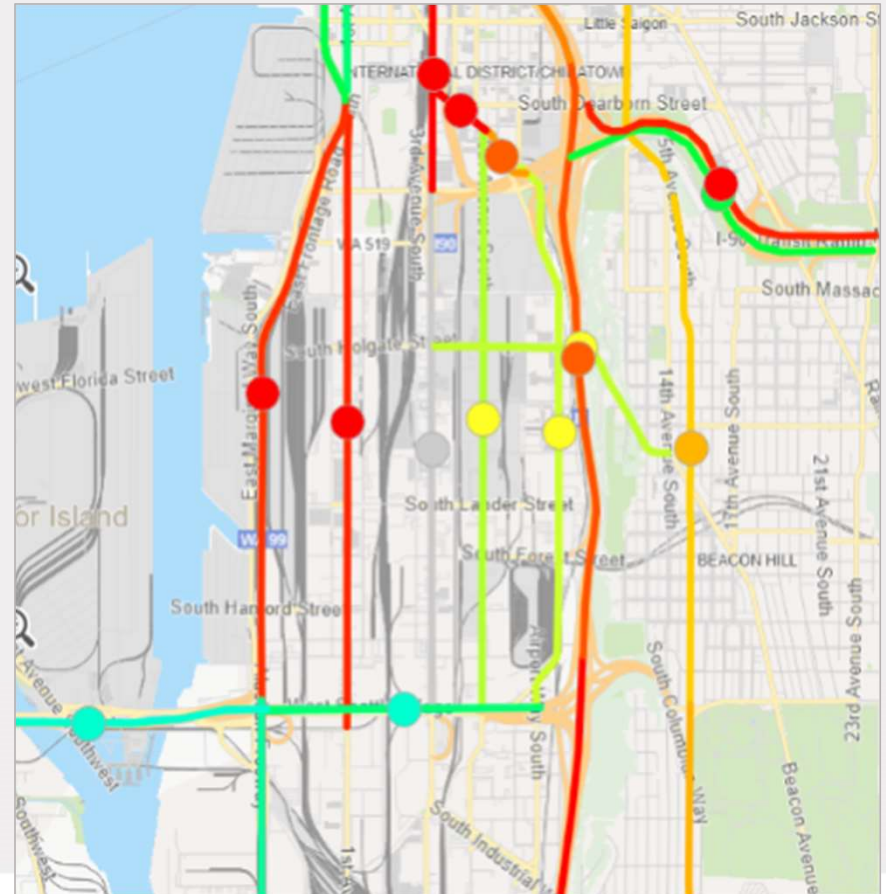
Destinations AM Peak Period (6AM-10AM)



Destinations Midday (10AM-4PM)

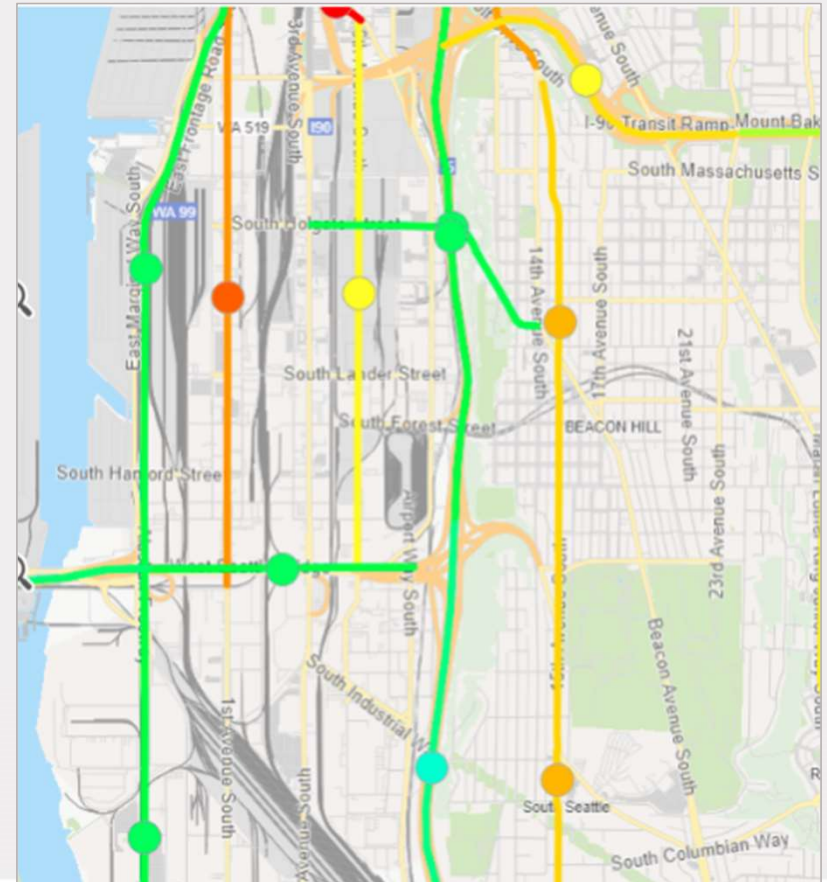
## Northbound Streets are Congested at Peak AM Hour (8-9am)

- Some alternative corridors are already congested in the AM Peak Period including the 99 corridor and 1<sup>st</sup> street
- But other corridors like 4<sup>th</sup> Street, 15<sup>th</sup> Street and Martin Luther King have capacity



## Southbound Corridors are Less Congested in the Peak AM Hour

- Comparatively, both I-5 SB and 99 SB are less congested in the AM Peak period
- Parallel corridors also have lighter levels of congestion compared to the northbound direction





# Summary of Average Day Travel Behavior

## Origins and Destinations

- Of all northbound trips - about 23% end in downtown Seattle, 6% end in South Union Lake, and 7% in the UW area;
- Commercial destinations are mostly located north of Seattle, with the Boeing area as a popular destination

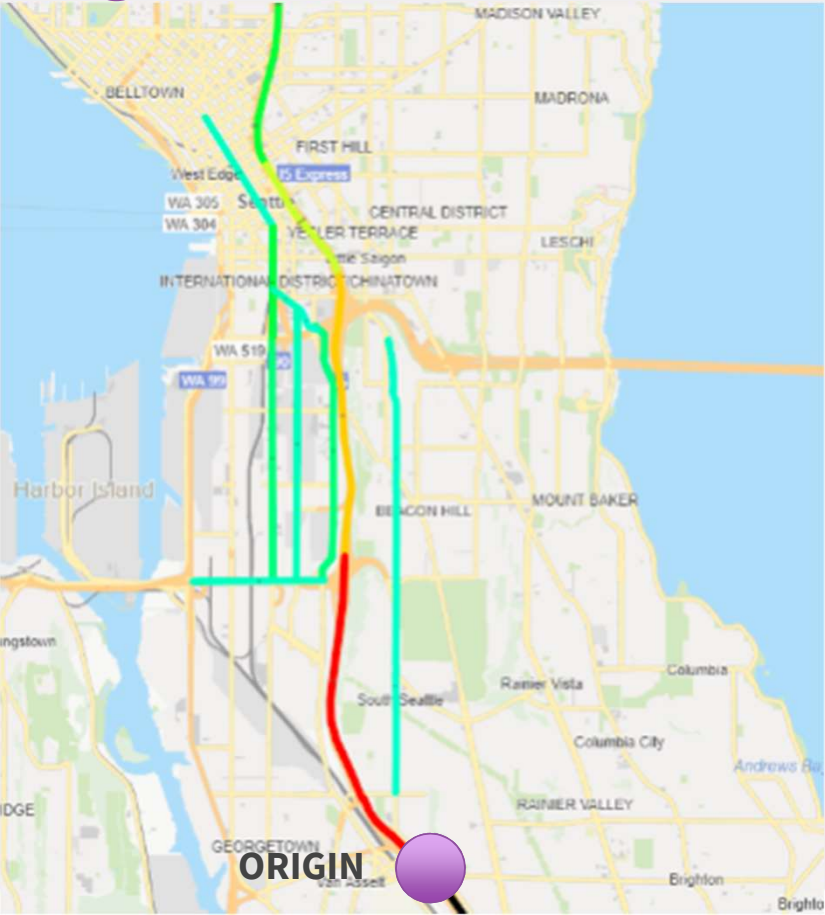
## Operations

- There is already some level of congestion on all corridors northbound in the AM peak period
- Average Local Roadway speeds Northbound ranged from 16 mph to 22 mph in the AM Peak period and 16mph to 27 mph in the midday (at time of incident).
- Average I-5 northbound speed at incident location is **27 mph** in the AM peak period and **42 mph** in the midday period (time of incident)

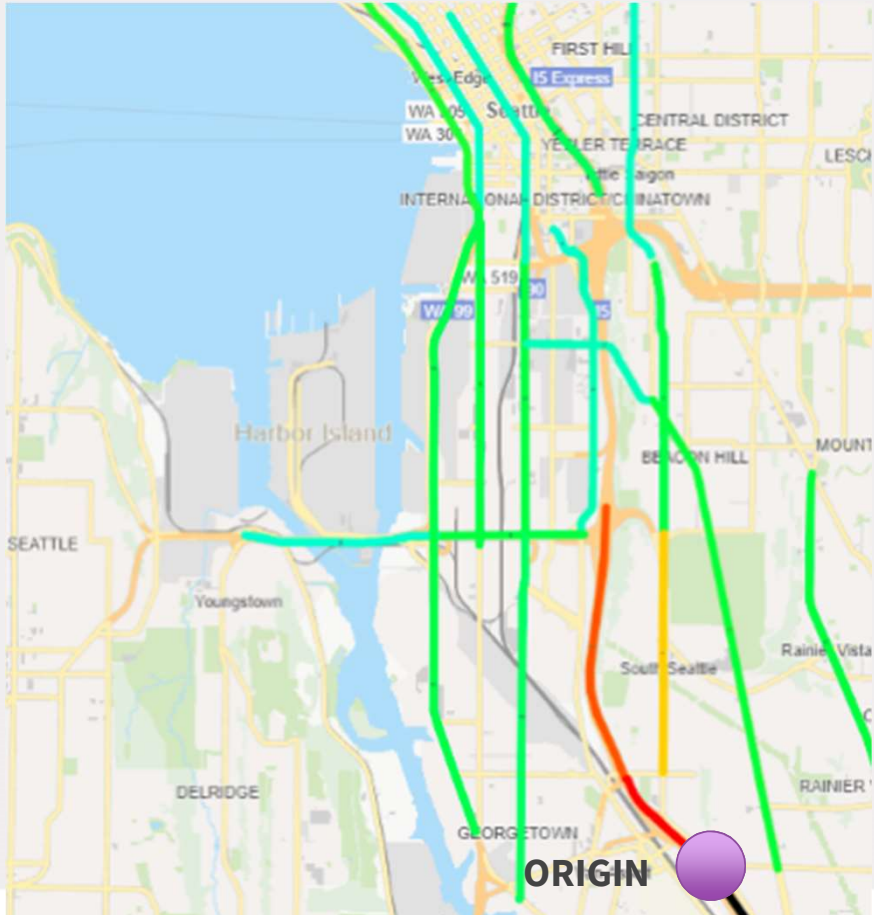
# Impacts of I-5 Closure to Trips and Operations



# Changes in Route Choices NB Travelers After Incident



Before Incident

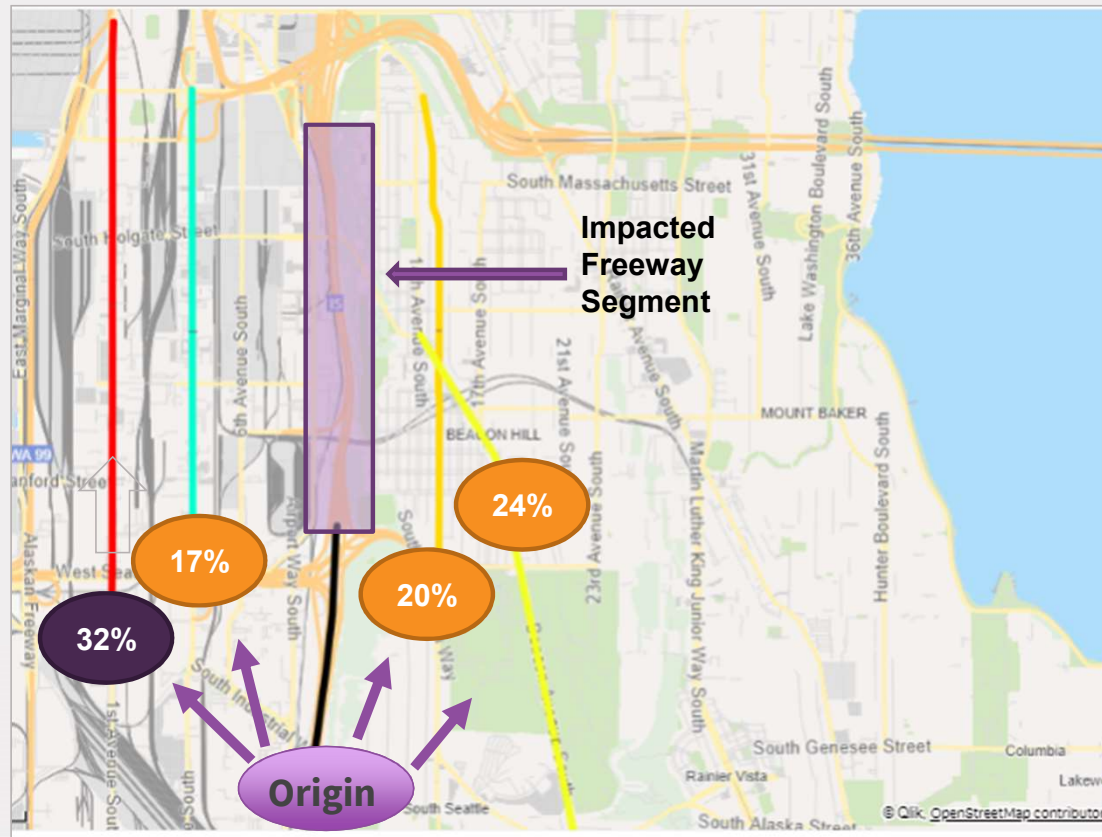


During Incident

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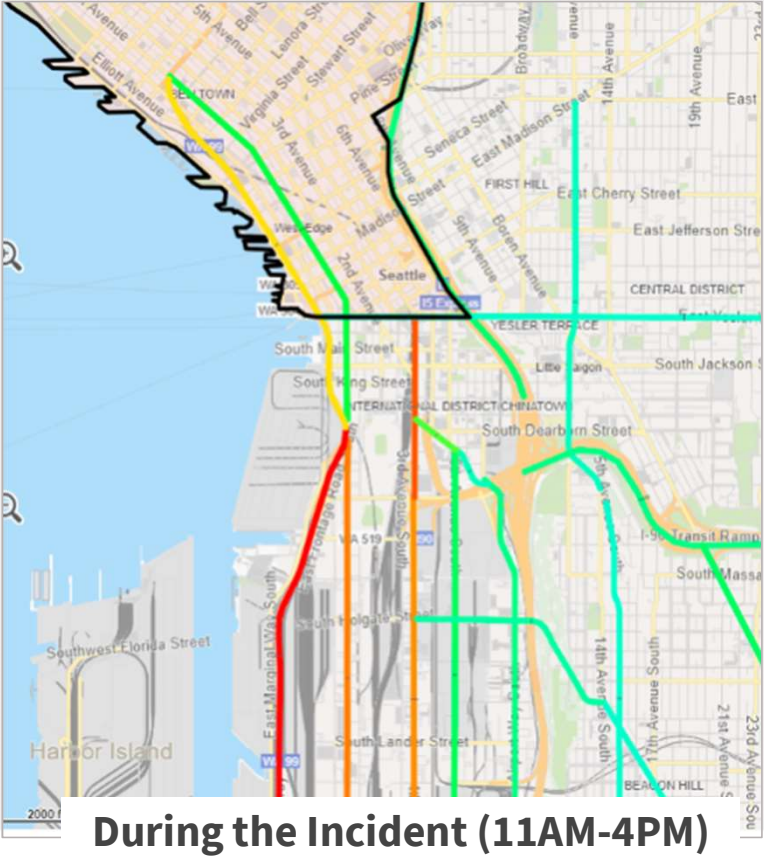


# Focus on I-5 Route Choice at West Seattle Bridge



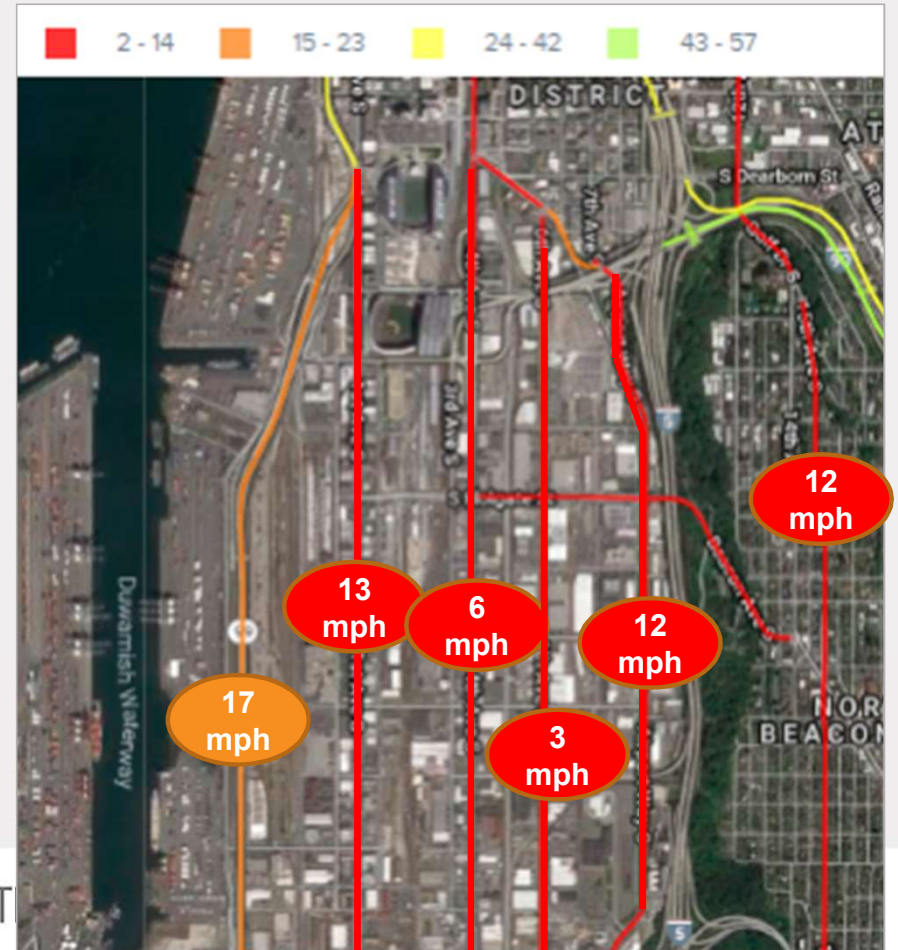
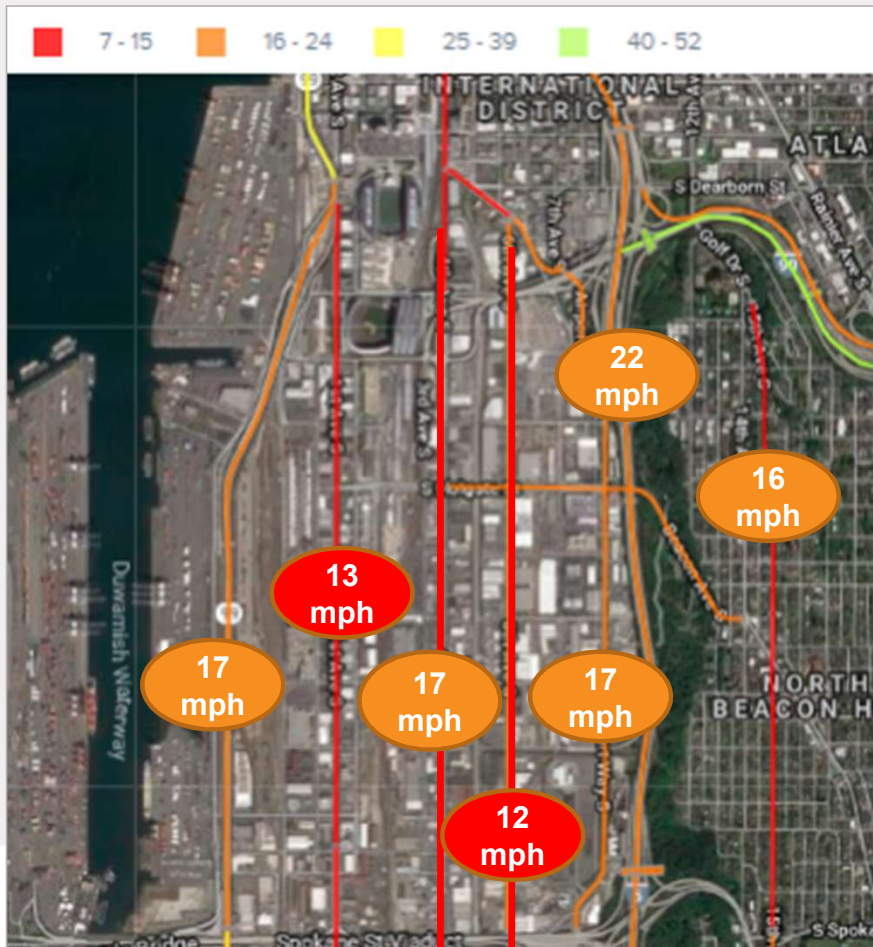


# Route Choice Changes for Southbound Trips from Downtown Seattle



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# Local Roadways Experience Severe Drop in Speeds, particularly airport Way and 4<sup>th</sup> Street Northbound



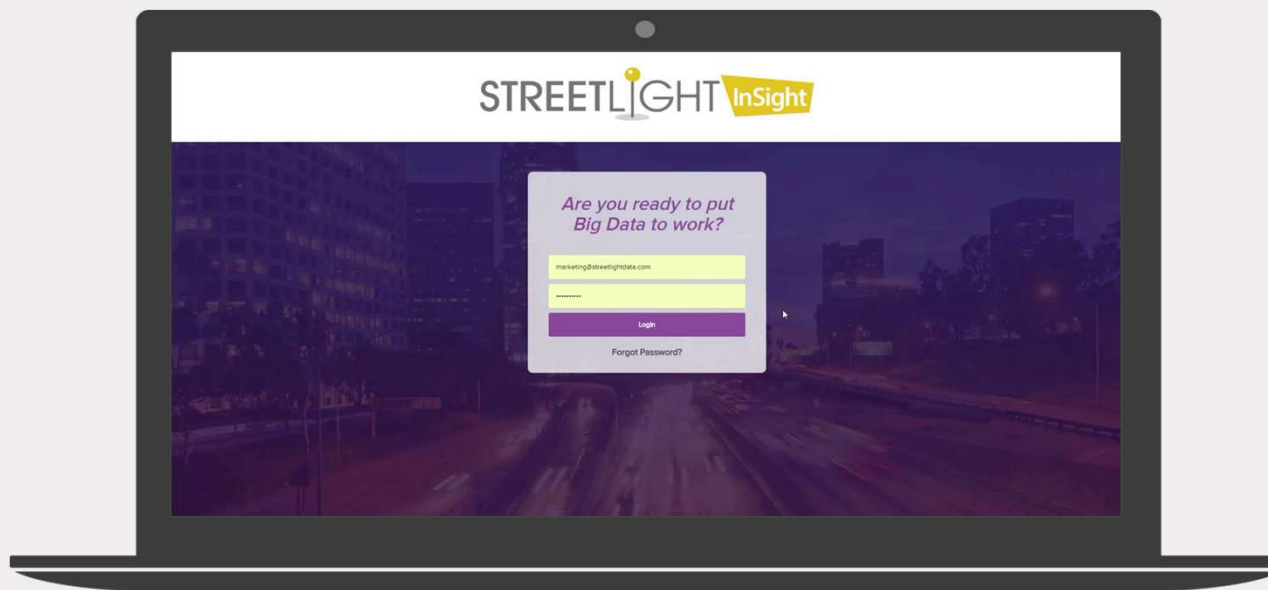
# Summary of Incident Impacts

- Impacts were substantial to local street operations in both directions
- Operational speeds on local roadways reduced by half in the northbound direction
- Diversions in the northbound direction begin several miles from the incident
- Southbound trips beginning in Downtown Seattle re-route to 99, 1<sup>st</sup> Street and 4<sup>th</sup> Street
- Impacts could have been worse if the incident occurred at either of the peak periods

# Recommendations

- In the northbound direction, begin messaging of incident further back to Seattle-Tacoma Airport, many more alternative routes exist at this point
- Many southbound trips (all day) go to the airport area where there is great transit alternatives with LRT Line and ;
- Truck reroutes are particularly challenging as they are traveling long-distances to Boeing Field and Beyond - perhaps 405 is a better alternative for long-distance trips
- Martin Luther King is a potential reroute option if messaged early

# Data is Just a Cost Until You Put it to Work



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Transportation Analytics

# Summary of StreetLight Data Process

- 1) Start with the Big Picture:** Understand the purpose of the study first, and the overall conditions of the region
- 2) Go deep with key metrics:** Metrics mean different things depending on where you are running them and what you're measuring.
- 3) Know when to stop:** StreetLight Data has many capabilities and with unlimited runs, there are many ways you can slice the data. So be cognizant of when your story is formed.
- 4) Use visualizations to generate quick insights:** the visualizations are very capable to giving you great information. However, to finalize a presentation for a broader audience, additional visualization tools are needed.

# Acknowledgement:

Thanks Lisa Bollard (WSDOT) for contribution to this analysis.

## Thank You!

Questions?

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