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MOBILITY INTELLIGENCE

SAFER ROADS

ITS Washington

11/6/2024

LEVERAGING DATA FOR SAFER MOBILITY

AGenda

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1

Introduction to MMI

- What is Michelin Mobility Intelligence?
- MMI's approach to analyzing driver behavior
- Example use cases

2

WTSC-MMI partnership

- Analysis scope
- 140th/132nd corridor risk evaluation
- City of Yakima intersection behavior severity analysis
- Kent-Kangley/116th intersection deep dive
- Interactive Kepler map demo

3

Implementation – WTSC

- Public health
- Infrastructure
- Law enforcement

Data Fusion and Insights Generation

THE POWER OF DATA
as a decision lever for:

- ✓ **Safer Infrastructure**
  Safety for all road users
- ✓ **Better Infrastructure**
  Savings for taxpayers
- ✓ **Greener Infrastructure**
  Sustainable environment for citizens

DATA COLLECTION
In-house & external data collection

- ✓ **Infrastructure** via scanning road assets
- ✓ **Users** via in-app use
- ✓ **Vehicles** and other transportation means

DATA FUSION
with multiple other sources

- ✓ **Public** and **open-source** data
- ✓ **Paid data** when required
- ✓ **Structured** and **unstructured** data

MMI Mission Statement

To empower communities and transportation agencies with data-driven insights, enabling safer, smarter, and more sustainable mobility solutions.

Mmi's data and approach to Safer roads

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Driving Event and Speed Data

- Captured via opt-in consumer apps from drivers in motor vehicles
- Fully anonymized dataset
- 45 million+ mobile devices generating this data across US

Speed Data Points
Captured every 15 seconds during trips – includes location, speed, heading, timestamp

Event Data Points
Captured whenever device detects a threshold is exceeded, such as acceleration or deceleration, speed, phone movement or unlocking

Harsh Braking

Harsh Acceleration

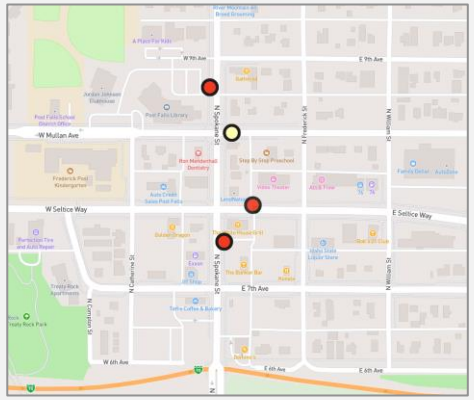
Excessive Speeding

Phone Handling

MMI Analytics Suite

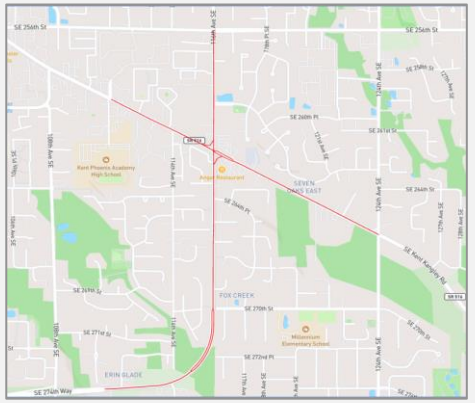
The above data is used in:

- Artificial intelligence clustering models to identify behavior patterns and dangerous road characteristics
- Focused analyses to explain localized risk factors
- Before/After analyses of infrastructure or enforcement changes



Driving behavior hotspot identification

Vulnerable Road User risk mapping



Point-of-interest and corridor evaluations

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Insights and real world applicatioN

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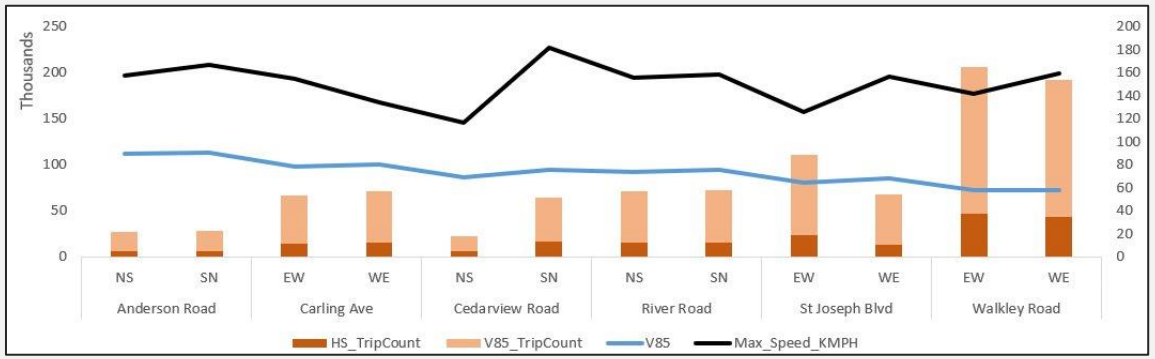
Ottawa speed camera analysis

The road network within Ottawa city limits was analyzed to identify the most optimal locations to place speed cameras. Aggregate speed was analyzed as well as extreme high-speed trips.

Findings

- Specific roads were identified as having **frequent high-speed trips**
- Temporal patterns were analyzed to indicate when and where additional enforcement would be most impactful



LA Corridor analysis

Data from before and after infrastructure improvements were made was analyzed to measure impact.

Findings

- Speed was reduced in certain stretches of the corridor, but **actually increased** in some stretches of parallel streets
- Certain types of intersection tightening led to a **16% decrease** in harsh braking event frequency

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Insights and real-world Application

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VRU ANALYSIS – Local and STATE

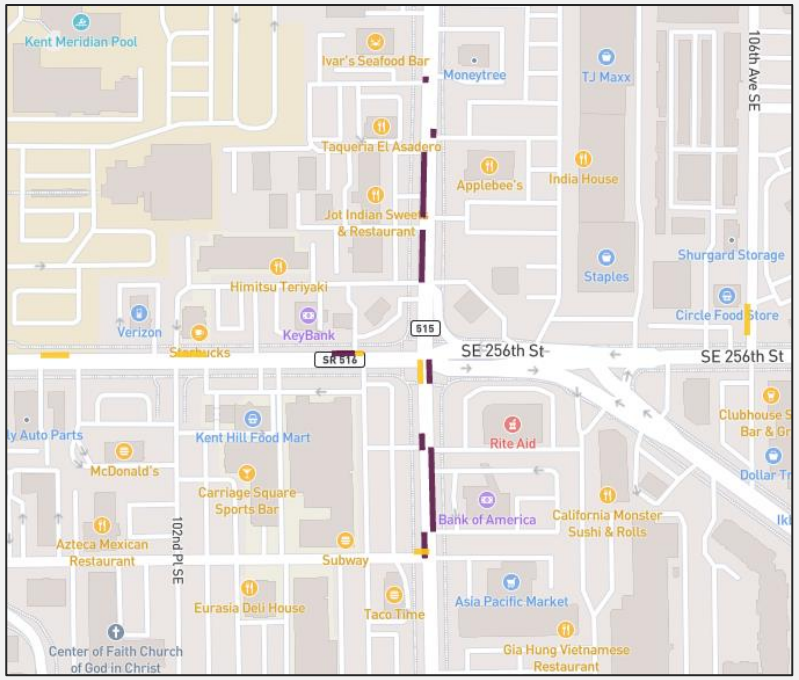
Driving behavior patterns, road characteristics, and historic crash data can all be combined to identify where pedestrians and cyclists are most at risk.

Localized

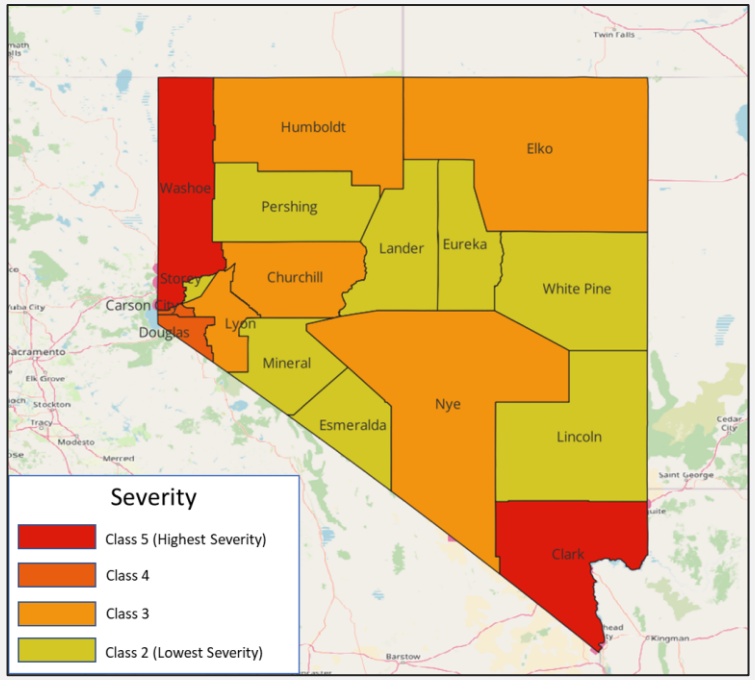
- Specific stretches of roads or intersections

Aggregate (city, county, state)

- Which areas may want to consider allocating more resources to pedestrian and cyclist infrastructure?



Washington:
Road segments in south King County with elevated VRU risk



Nevada:
VRU risk aggregated at the county level

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WTSC-MMI Partnership

South king & Yakima Counties

MMI Analysis overview

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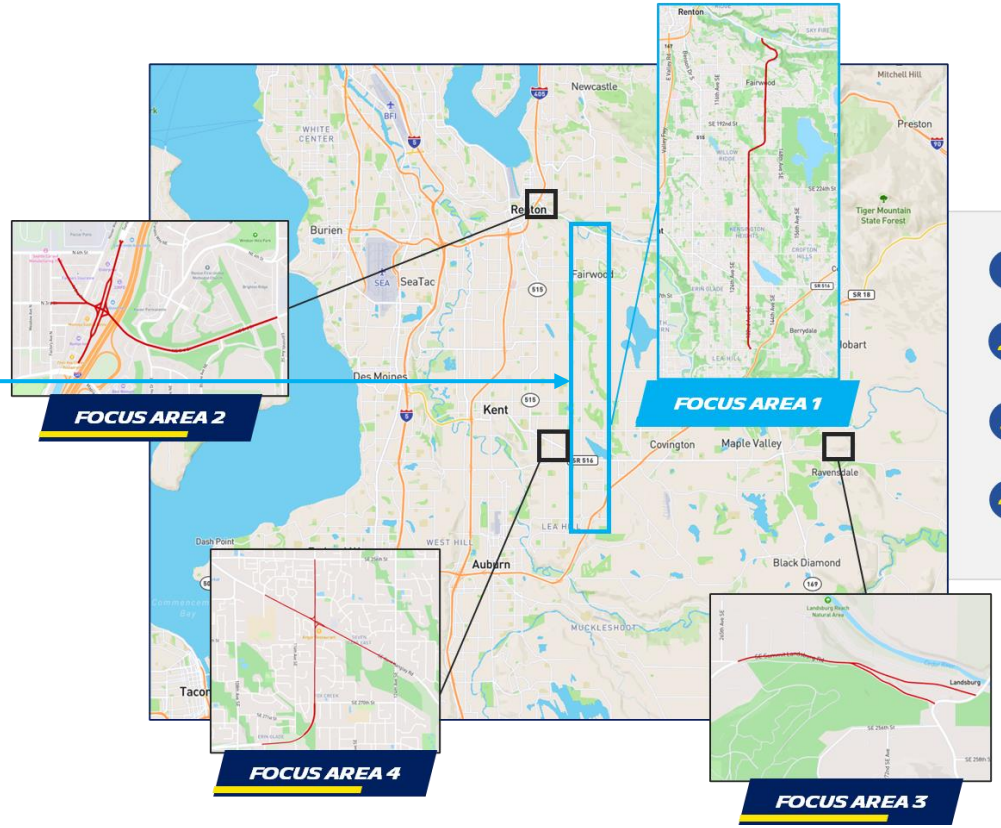
Yakima County

- City of Yakima intersection risk evaluation
- Sunnyside – S. 1st Street corridor analysis
- Moxee – Bell Rd. & Hwy. 24 corridor analysis
- Rural crash risk analysis – Day vs. night
- Toppenish – US-97 & Branch Rd. intersection analysis
- Toppenish – Wapato Rd. & McDonald Rd intersection analysis

South King County

- 140th/132nd Ave corridor analysis
- Renton – Sunset Blvd. & 3rd St. intersection analysis
- Ravensdale – 253rd & Summit-Landsburg intersection analysis
- Kent - 116th Ave. & Kent-Kangley Rd. intersection analysis

Analysis Scope	Count
Corridor	3
Intersection	5
Area	2



South King Focus Areas

1. 140th Avenue Corridor **WTSC Request*
2. Sunset Boulevard turn from N. 3rd Street
3. SE Summit Landsburg & 253rd Street
4. Kent-Kangley Road & 116th Avenue SE

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140th/132nd Corridor risk analysis

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Where along this corridor is driving behavior most severe?

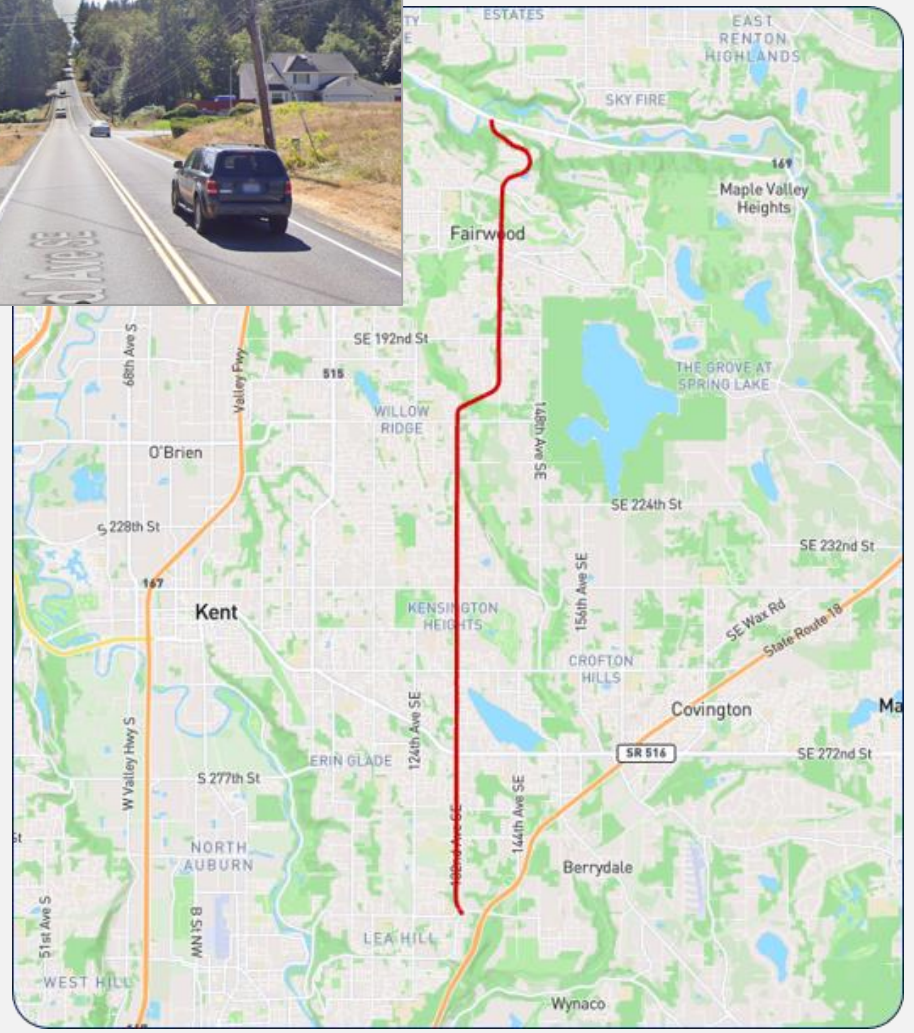
Driving behavior along this corridor is a significant concern of the south King County community. A major factor in selecting this stretch of road for deeper analysis was a recent tragic crash in March leading to four fatalities.

Analytic Approach

MMI algorithms were used to scan all speed and event data points along the corridor, identifying and mapping hotspots of:

- Abnormal braking behavior
- Abnormal acceleration behavior
- Elevated speeding
- Risks to Vulnerable Road Users
- Crash history

After mapping the locations of these behaviors and outcomes, each stretch of road was given an aggregated score indicating the overall level of risk present.



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140th/132nd Corridor risk analysis

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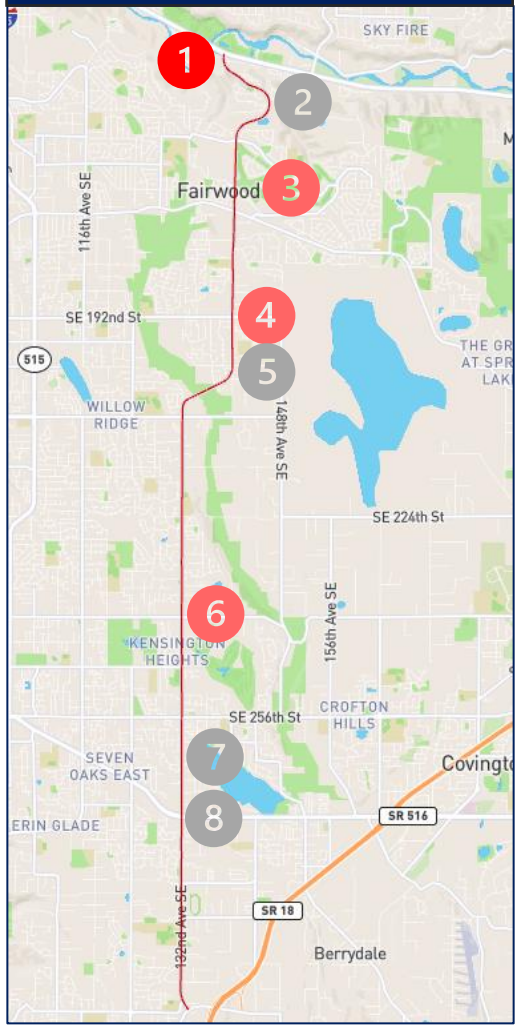
A global view of risk can indicate where resources will be most effectively used

Considering the various risk categories together shows which stretches of this corridor would benefit most from infrastructure changes or additional targeted enforcement.

Area	Braking Behavior Severity	Acceleration Behavior Severity	Speeding	VRU Crash Risk	Crash Frequency	Total Severity Score
1. Before SE 158	3	3	4 (8-10mph)	5	4	**19**
2. Northern Curve	2	4	3 (7mph)	0	2	11
3. Fairwood Golf	5	4	5 (10+mph)	0	1	**15**
4. SE 192nd St	4	5	4 (8-10mph)	0	2	**15**
5. SE 200th St	5	0	1 (4-5 mph)	0	1	7
6. SE 240th St	3	5	2 (5-7mph)	0	5	**15**
7. SE 266th St	3	0	3 (7-8mph)	0	1	7
8. SE 272nd St	1	1	3 (7-8mph)	5	2	12

RISK MAP



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City of Yakima Intersection Risk Evaluation

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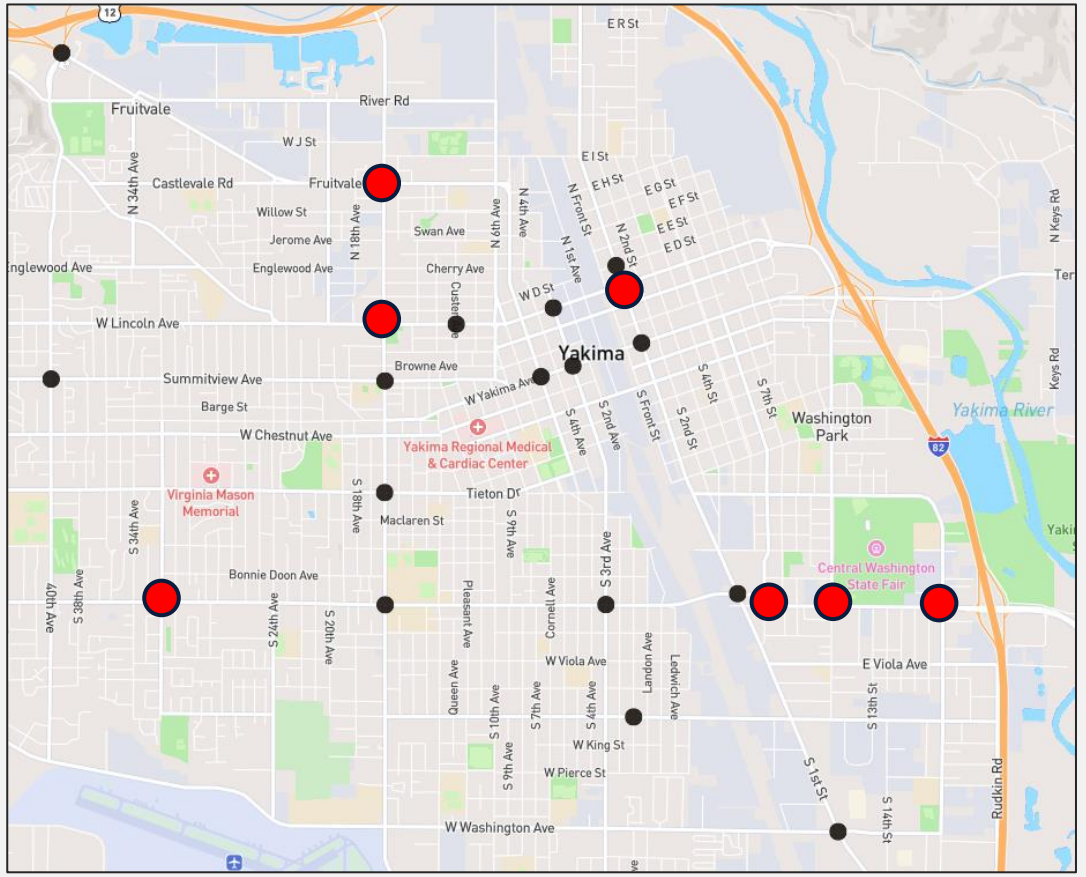
Does crash data tell the whole story of risk?

The city of Yakima gave MMI 22 high-crash intersections and asked for a risk evaluation based on behavior.

After evaluating behavior patterns, a new picture of risk emerged, indicating that crash count alone doesn't tell the whole story of where risk is highest.

MMI driving behavior analysis was able to identify where crashes were more likely to lead to serious injury.



City of Yakima High-Crash Intersections

Intersection Name	Risk Group
16 TH AVE & FRUITVALE BLVD	5
6 TH ST & NOB HILL BLVD	5
3 RD AVE & NOB HILL BLVD	5
FAIR AVE & NOB HILL BLVD	5
16 TH AVE & LINCOLN AVE	5
1 ST ST & LINCOLN AVE	5
32 ND AVE & NOB HILL BLVD	5
CUSTER AVE & LINCOLN AVE	4
3 RD AVE & YAKIMA AVE	4
5 TH AVE & YAKIMA AVE	4
16 TH AVE & NOB HILL BLVD	4
1 ST ST & WASHINGTON AVE	4
1 ST ST & D ST	4
40 TH AVE & SUMMITVIEW AVE	4
18 TH ST & NOB HILL BLVD	3
1 ST ST & YAKIMA AVE	3
3 RD AVE & LINCOLN AVE	3
40 TH AVE & FRUITVALE BLVD	3
16 TH AVE & TIETON DR	3
16 TH AVE & SUMMITVIEW AVE	2
1 ST ST & NOB HILL BLVD	2
1 ST ST & MEAD AVE	1

Behavior-based Risk Groups

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Kent Kangley – 116th Intersection Risk Factors

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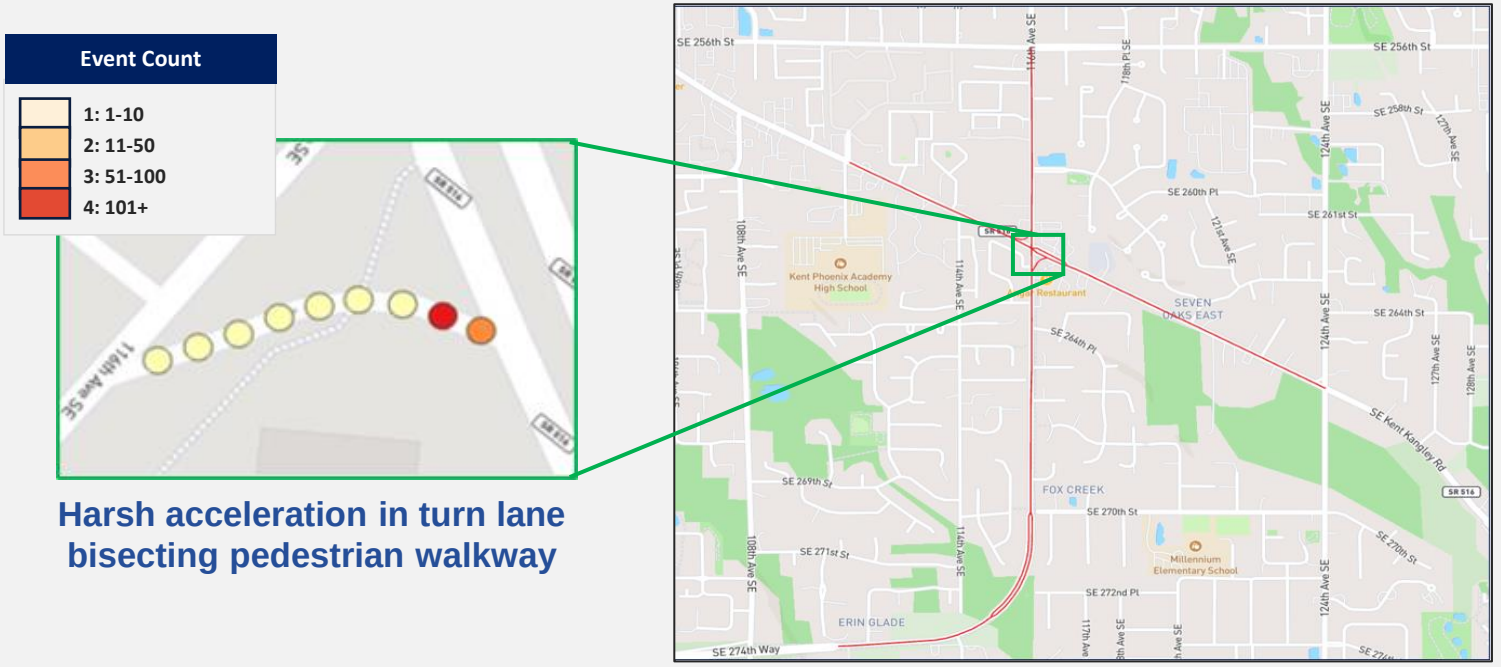
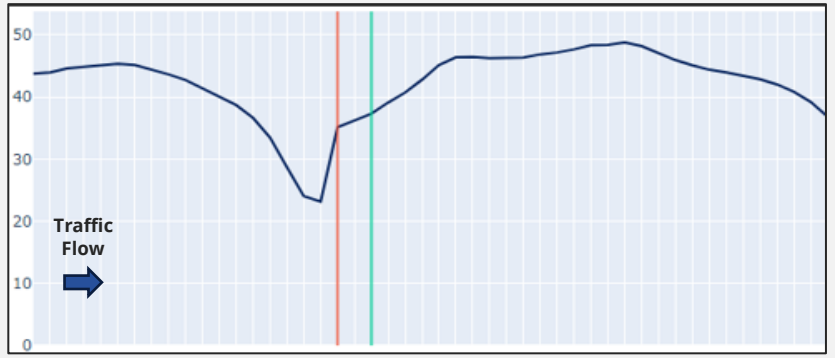
What factors specifically contribute to risk?

Focused analysis at individual intersections can identify behavioral or infrastructure concerns within specific road segments, helping understand the factors that contribute to both driver and VRU risk at a more granular level.

This understanding can help guide action plans to mitigate and eliminate certain risk factors.



Harsh acceleration in turn lane bisecting pedestrian walkway



Speed through intersection from west to east

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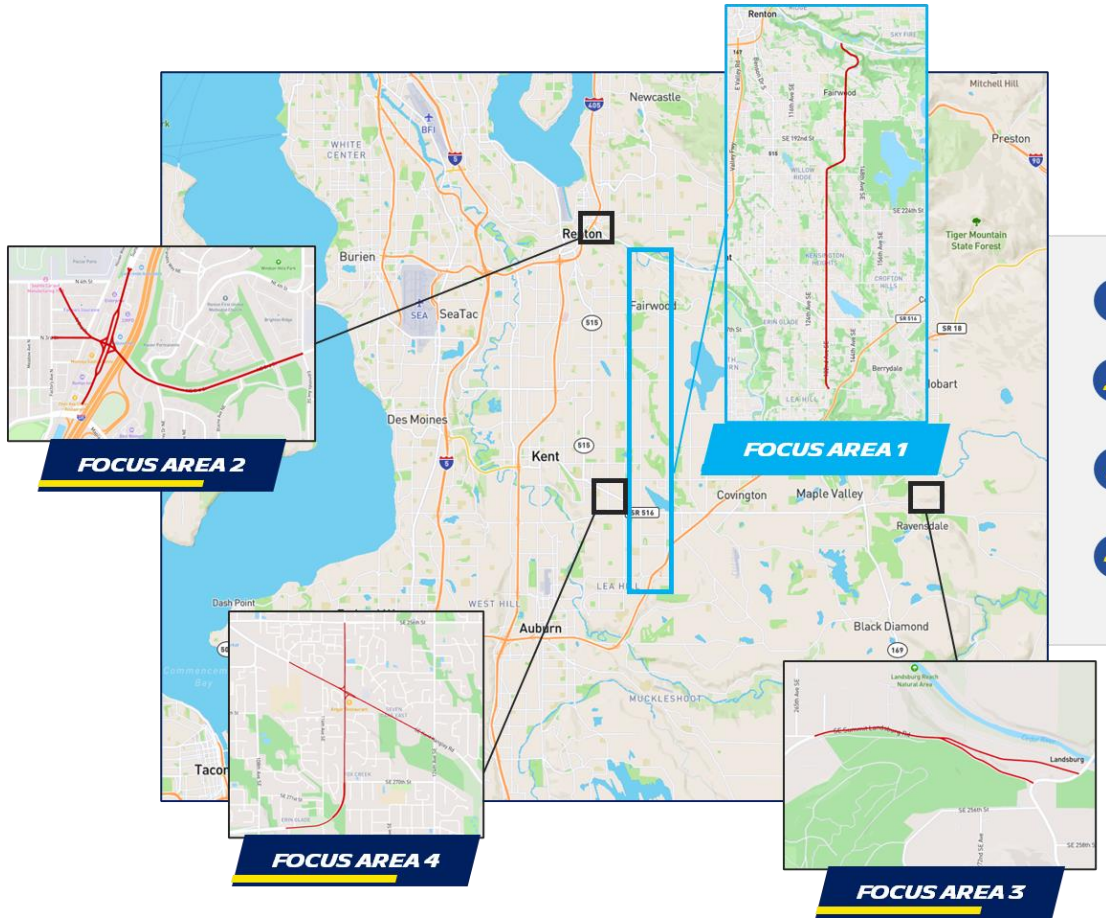
Interactive Map – Kepler Demo

Kepler maps are the tool used by MMI and partners to visualize and understand where behaviors and risk are present, both individually as well as in conjunction with one another.

Data in these maps can be filtered and toggled to present narrow or broader views of risk across an area.

Map of south King County

South King County - WTSC Delivery.html



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WTSC – AVENUES FOR IMPLEMENTATION

Using the Results

Community Engagement

WTSC Community Engagement Manager

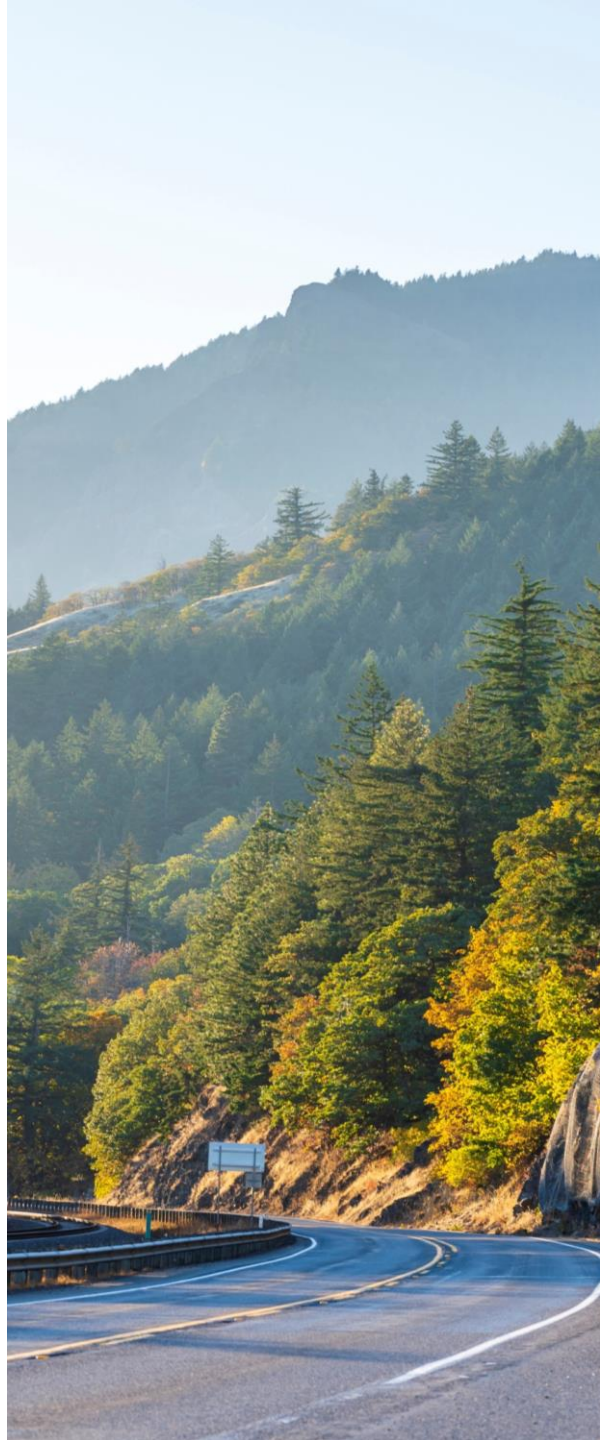
- Sharing results with Community-Based Organizations (CBOs) in digestible formats.
- Facilitating discussions to reconcile MMI-identified risk locations to community perception of risk locations to increase safety and perception of safety.
- Public reports and fact sheets for CBOs, media, legislature, and other stakeholders
- Target Zero Managers and Corridor Analysis

WA TRAFFIC SAFETY COMMISSION

Using the Results

Engineers

- Crash history combined with measures of naturalistic driver behavior provides a more comprehensive and accurate identification of areas with most potential for improvement.
- Safe Streets for All Grants – FY25 NOFO expected early 2025 and by March 30, 2025.
- Problem Identification for SS4A and other efforts.
- Evaluation – Direct change in driver speeding behavior, hard-braking, and VRU risk severity ranking after installing automated speed enforcement cameras.



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Using the Results

Law Enforcement

Targeted Enforcement Efforts

- Washington State Patrol Districts 1 and 3
- Yakima City Police, Yakima County Sheriff, Yakama Tribal Police

Evaluation/Resource Deployment

- Naturalistic driver behavior patterns and LE shift data/location saturation
- Evaluation of saturated enforcement emphasis, i.e. One Last Stop

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MMI Focus Area Analysis Report

https://wtsc.wa.gov/wp-content/uploads/2024/10/Washington_MMIStudy_Presentation_2024.pdf

Do you want the South King and Yakima County Kepler Maps?

User Guide: https://wtsc.wa.gov/wp-content/uploads/2024/10/Kepler-Maps-User-Guide_WASHINGTON_GHSA_MASTER_UPDATED-1.pdf

Contact Staci Hoff shoff@wtsc.wa.gov for download instructions!

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Questions

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SHOFF@WTSC.WA.GOV

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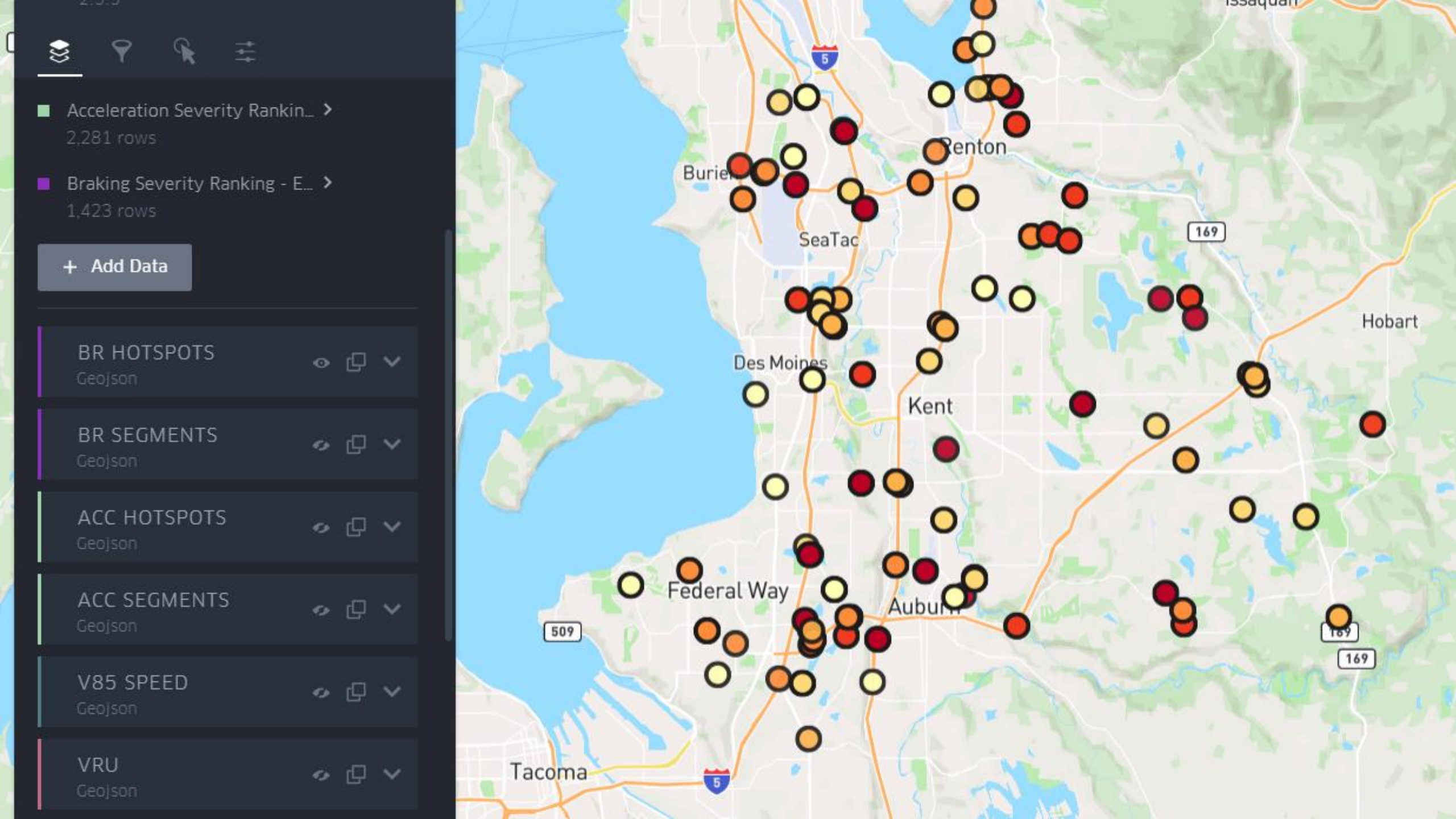
Appendix/
Kepler Screenshots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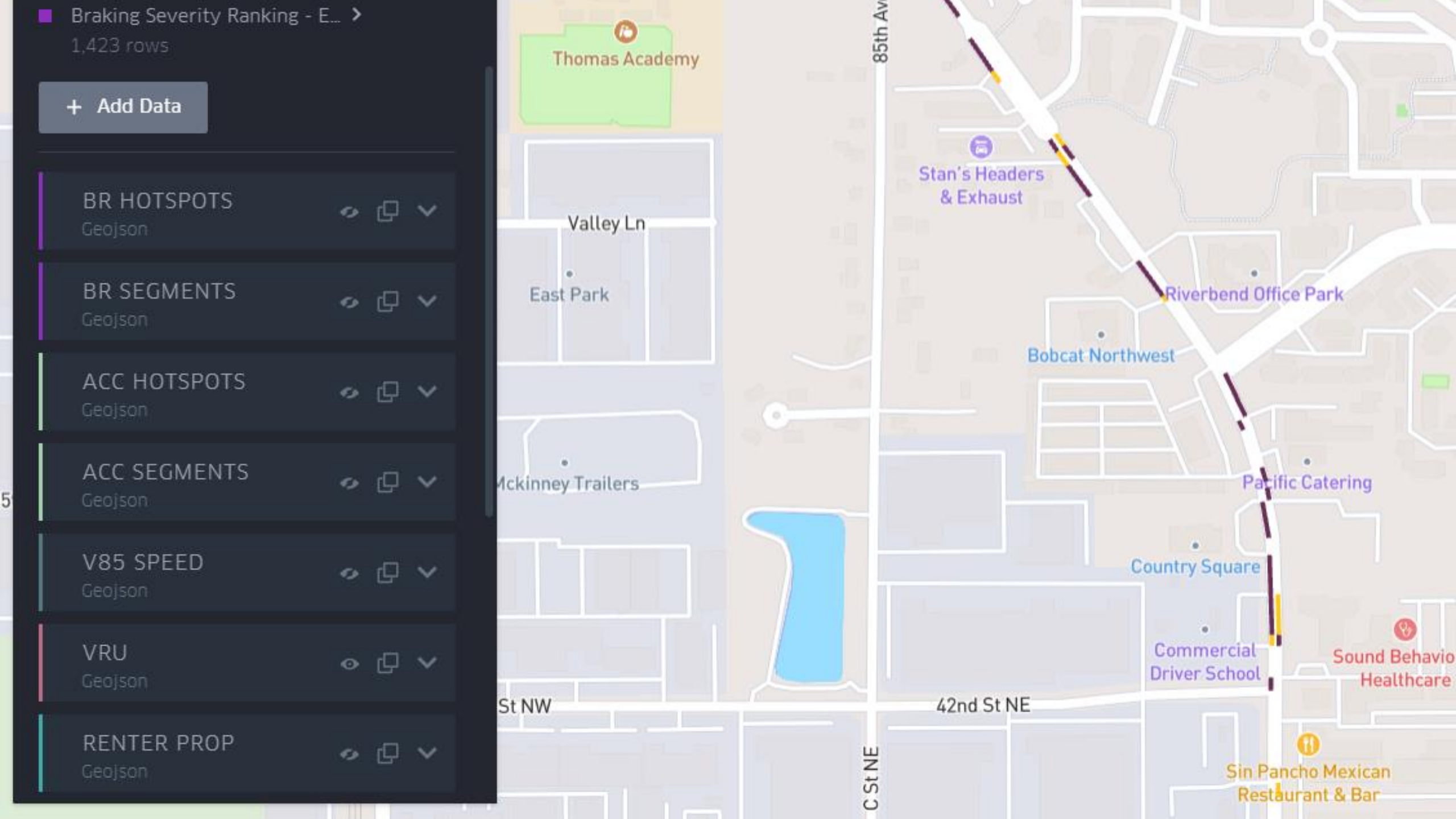
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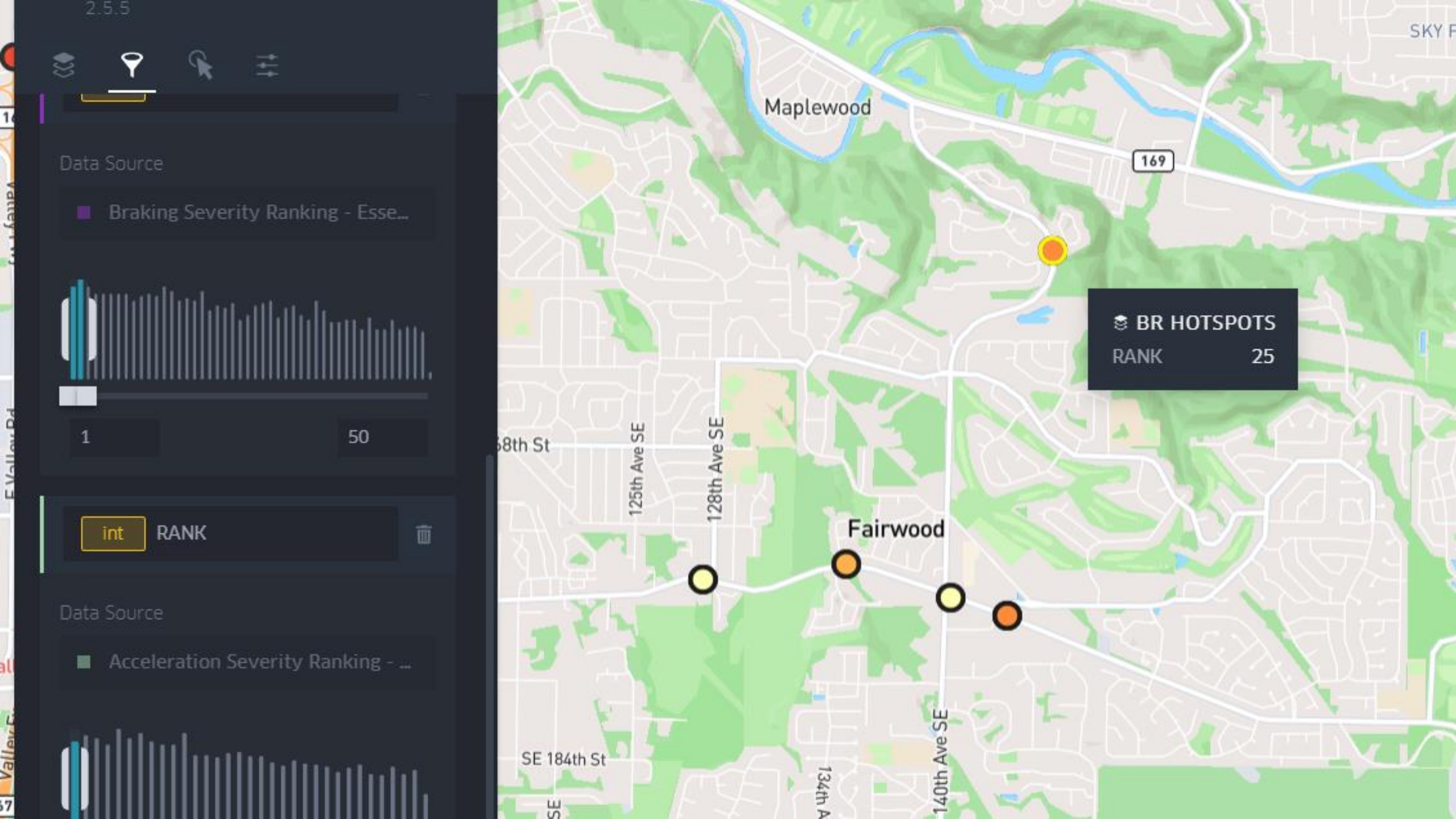
85th Av
Stan's Headers & Exhaust
Riverbend Office Park
Bobcat Northwest
Pacific Catering
Country Square
Commercial Driver School
Sound Behavio Healthcare
42nd St NE
C St NE
Sin Pancho Mexican Restaurant & Bar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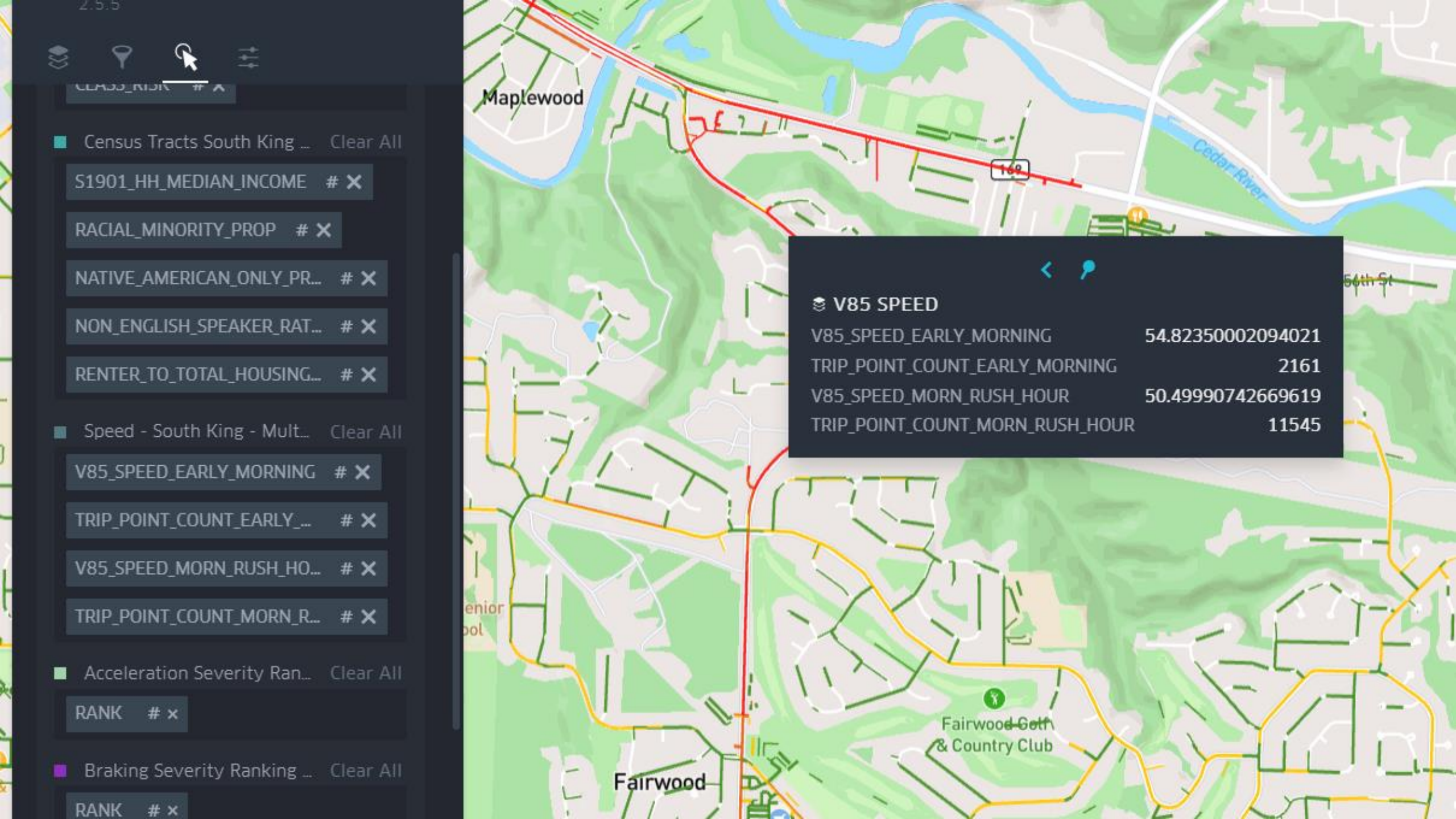
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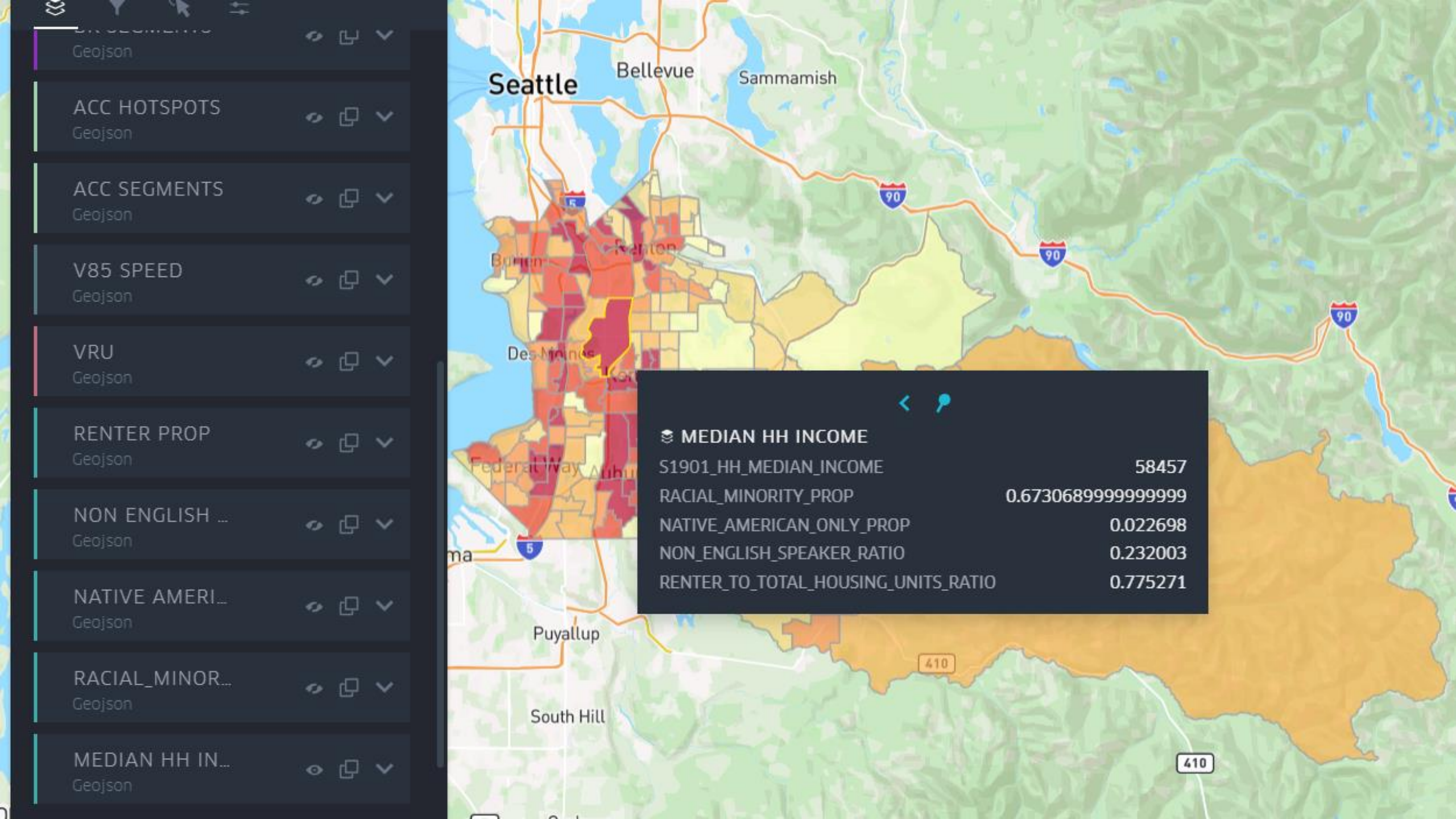
Fairwood Golf & Country Club
Fairwood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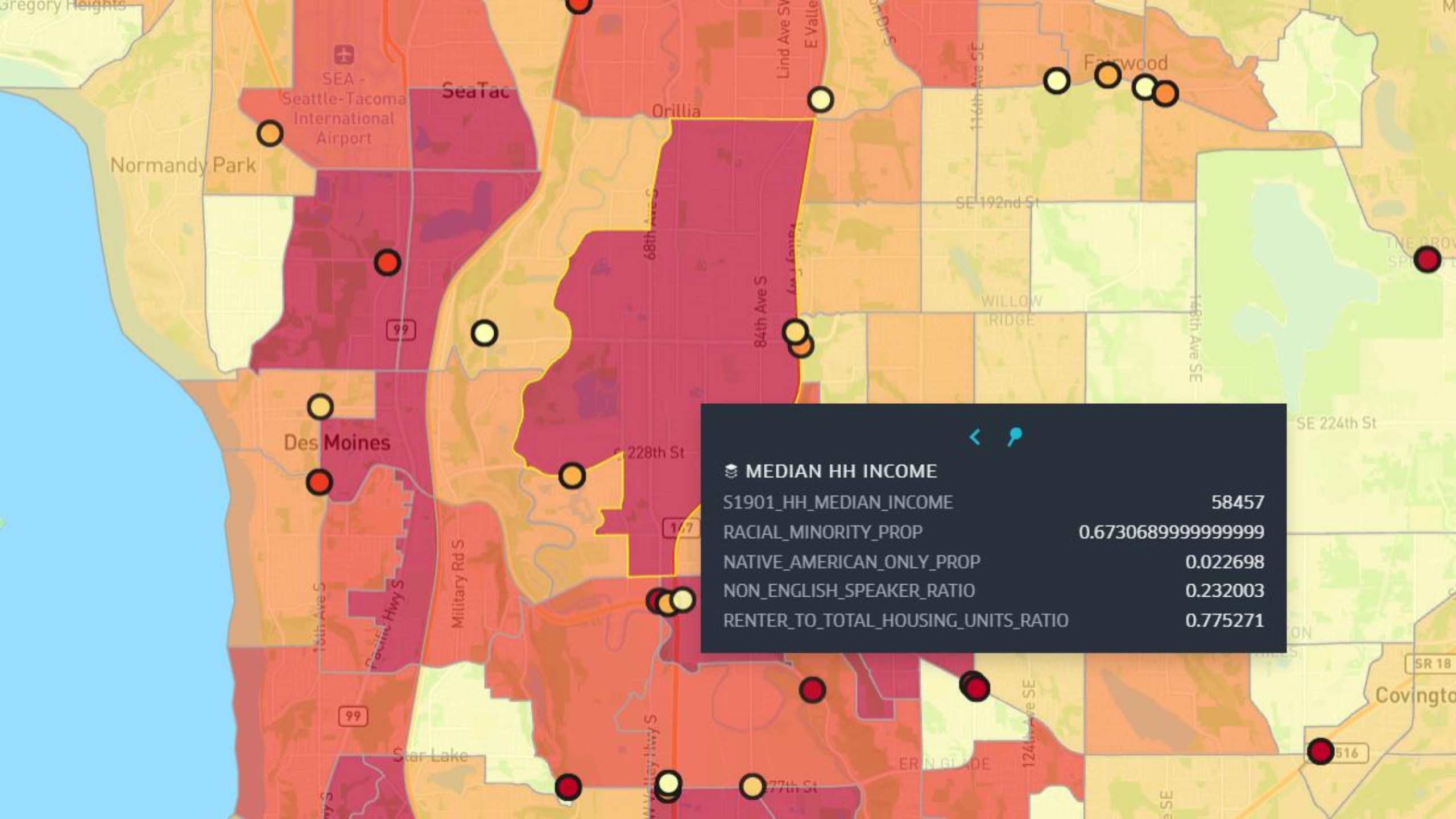
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SeaTac
Orillia
Fairwood
Normandy Park
SE 192nd St
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148th Ave SE
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