

EV-Charging Infrastructure Siting & Place Design For Urban Areas



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EV-Charging Infrastructure Siting & Place Design

For Urban Areas



How to best roll out EV charging infrastructure that is convenient and accessible for most EV drivers within a limited municipal budget.

Overview:

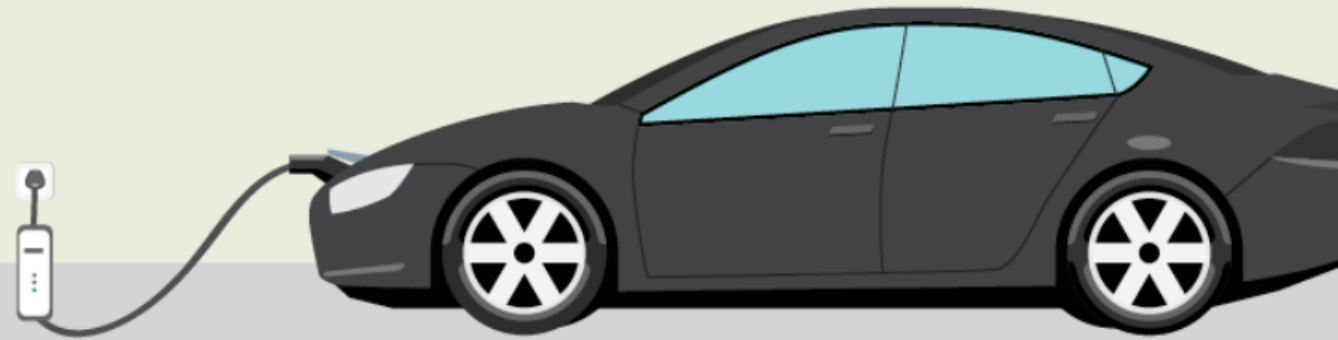
Charger types

Relevant Facts from Research

Recommendations

Detailed Siting and Design Considerations

AC Level One



VOLTAGE

120v 1-Phase AC

AMPS

12–16 Amps

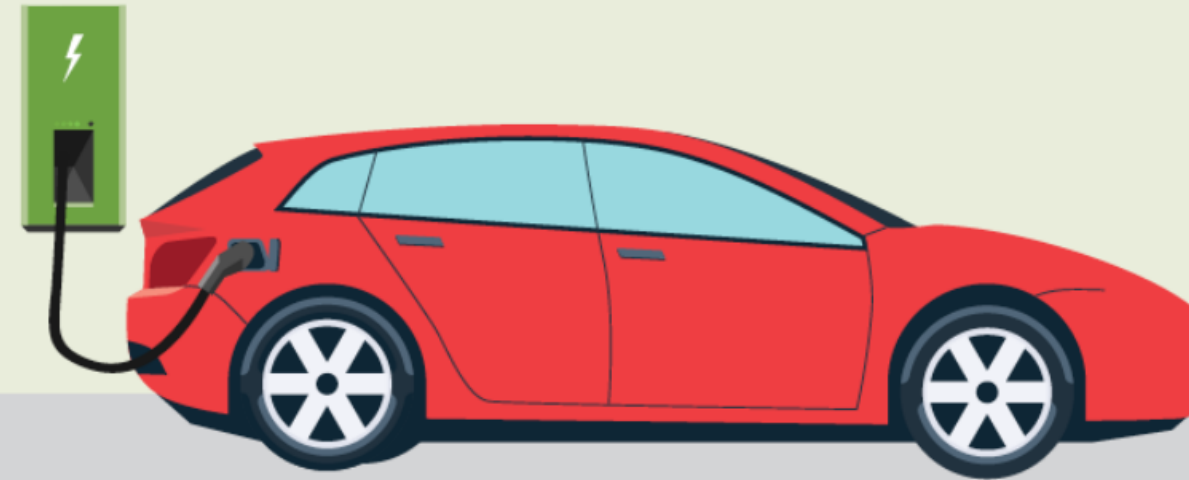
CHARGING LOADS

1.4 to 1.9 kW

CHARGE TIME FOR VEHICLE

3–5 Miles of Range Per Hour

AC Level Two



VOLTAGE

208V or 240V 1-Phase AC

AMPS

12–80 Amps (Typ. 32 Amps)

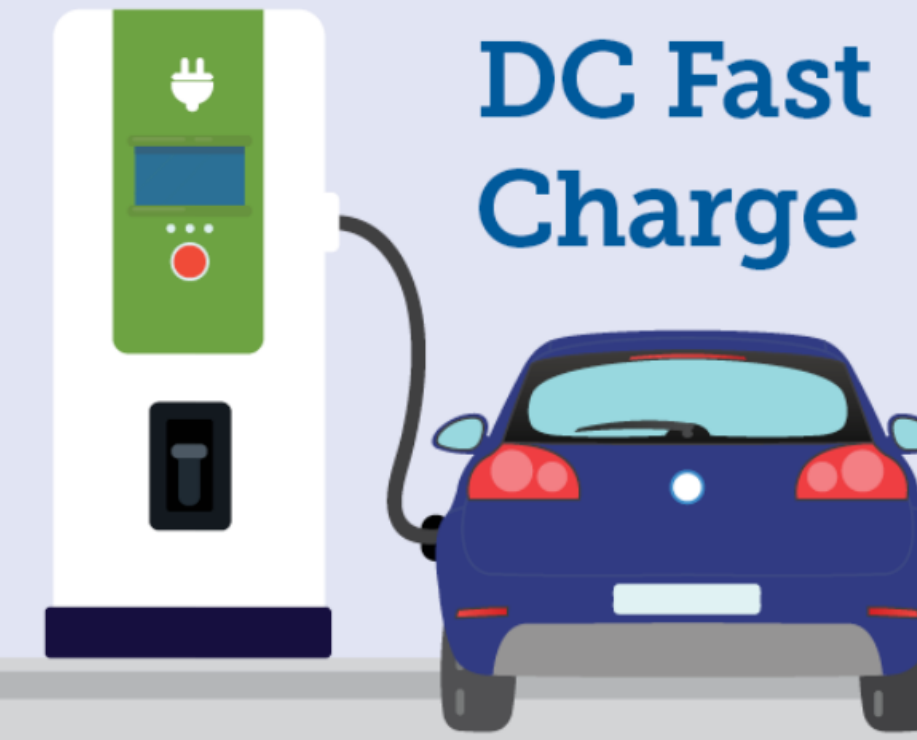
CHARGING LOADS

2.5 to 19.2 kW (Typ. 7 kW)

CHARGE TIME FOR VEHICLE

10–20 Miles of Range Per Hour

DC Fast Charge



VOLTAGE

208V or 480V 3-Phase AC

AMPS

<125 Amps (Typ. 60 Amps)

CHARGING LOADS

<90 kW (Typ. 50 kW)

CHARGE TIME FOR VEHICLE

80% Charge in 20–30 Minutes

Roll Out Strategies to Date

Demand Driven

Strategic Locations

Determine logical locations; shopping mall, transportation hub, airport, etc.

Monitor Utilization of Existing EV-charging Locations

Home Charging Facts

- 70% of daily driving nationally is under 40 miles and 95% under 100 miles
- 80% of charging is done overnight at home and provides enough range for most daily driving.
- The need for public charging infrastructure goes down dramatically when more EVs can charge at home. DOE 2017 models show that public L2 charging needs go down by 45% and DCFC needs by 61% when home charging increases from 82% to 88%

National Plug-In Electric Vehicle Infrastructure Analysis, Sept 2017, US Dept. of Energy, Office of Energy Efficiency & Renewable Energy.



Home Charging Facts

Many homes with a private parking area are already EV-Ready:

“if you have an electric laundry dryer in your home you are EV-Ready”

Exceptions: older homes, multi-family buildings

Workplace & Public Charging Facts

The next best charging option after home charging is within walking distance of the workplace. At EV ranges of 250 miles the need of workplace charges will be very low.

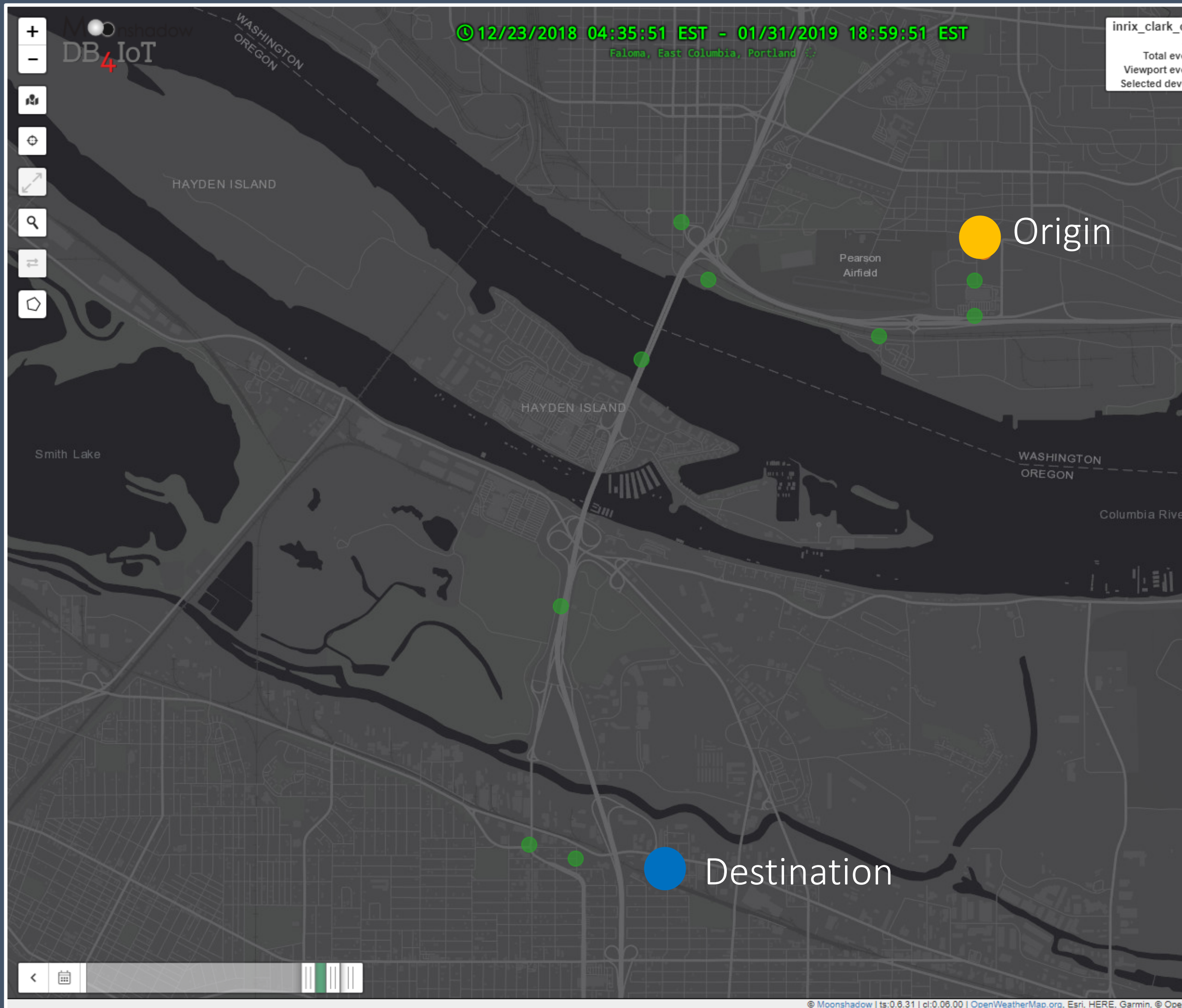
Public Level 2 charging usage is already low and with EV ranges of 250 miles will even be lower.

DC fast chargers located at interstate exits serve local traffic as much as long distance traffic.

Plugged In: How Americans Charge Their Electric Vehicles

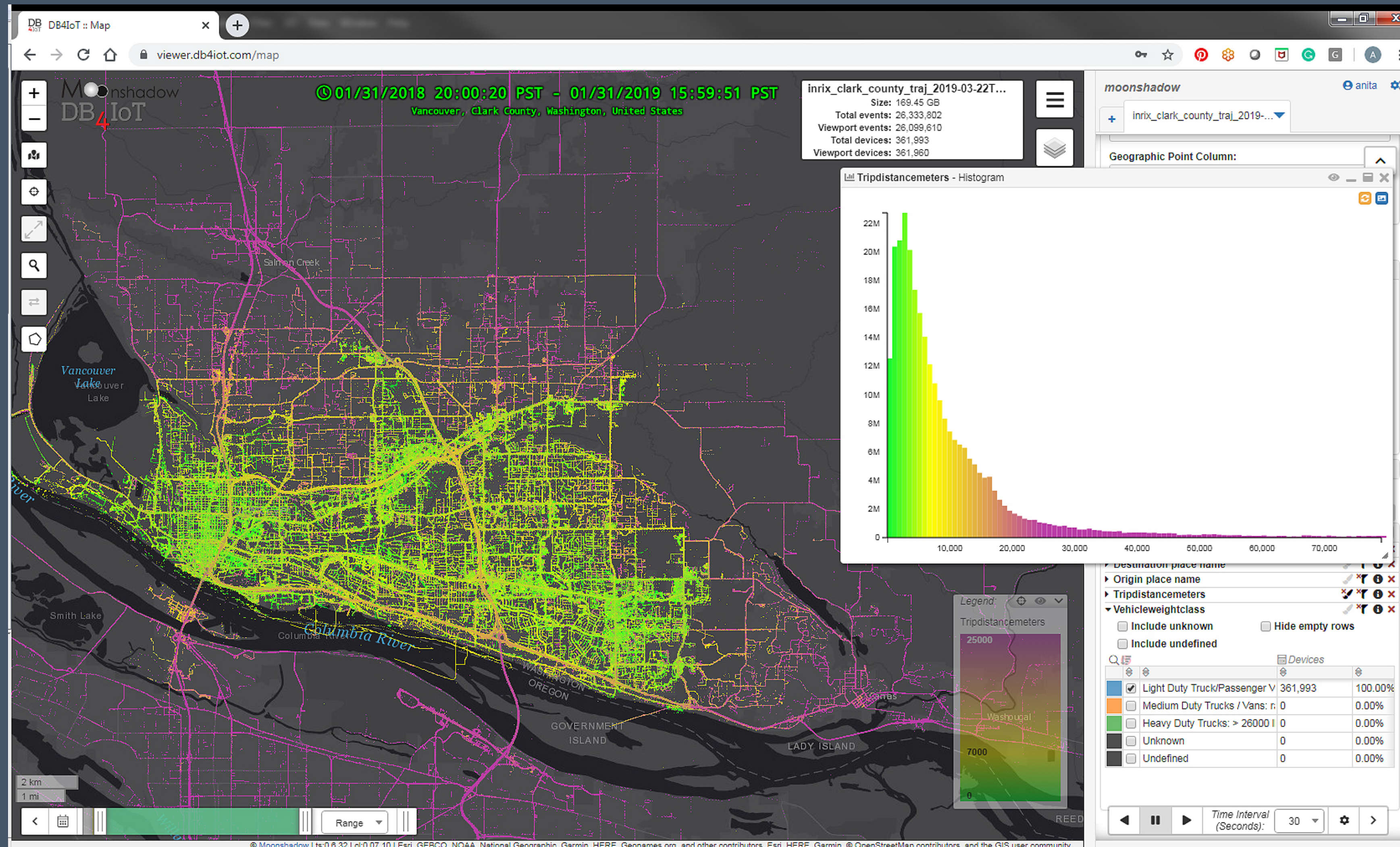
Recommendations for best use of Public Funds

- Use Incentives, Tax Rebates, Laws, Ordinances for existing homes and businesses.
- Adopt EV-Ready Building Codes and Charger Requirements for new construction.
- Use a demand driven approach for remaining home charging (mostly in denser older neighborhoods).
- Limit locating Level 2 public charging to walkable high density areas with dwell times 4-8 hours: Higher Density Workplaces, Downtown.
- Strategically locate DCFC at locations where visitors want to dwell at least 20-30 minutes such as restaurants or coffee shops within a short driving distance from workplaces and homes (local EV-drivers).



Analyze potential locations with Connected Vehicle (ICE) data.

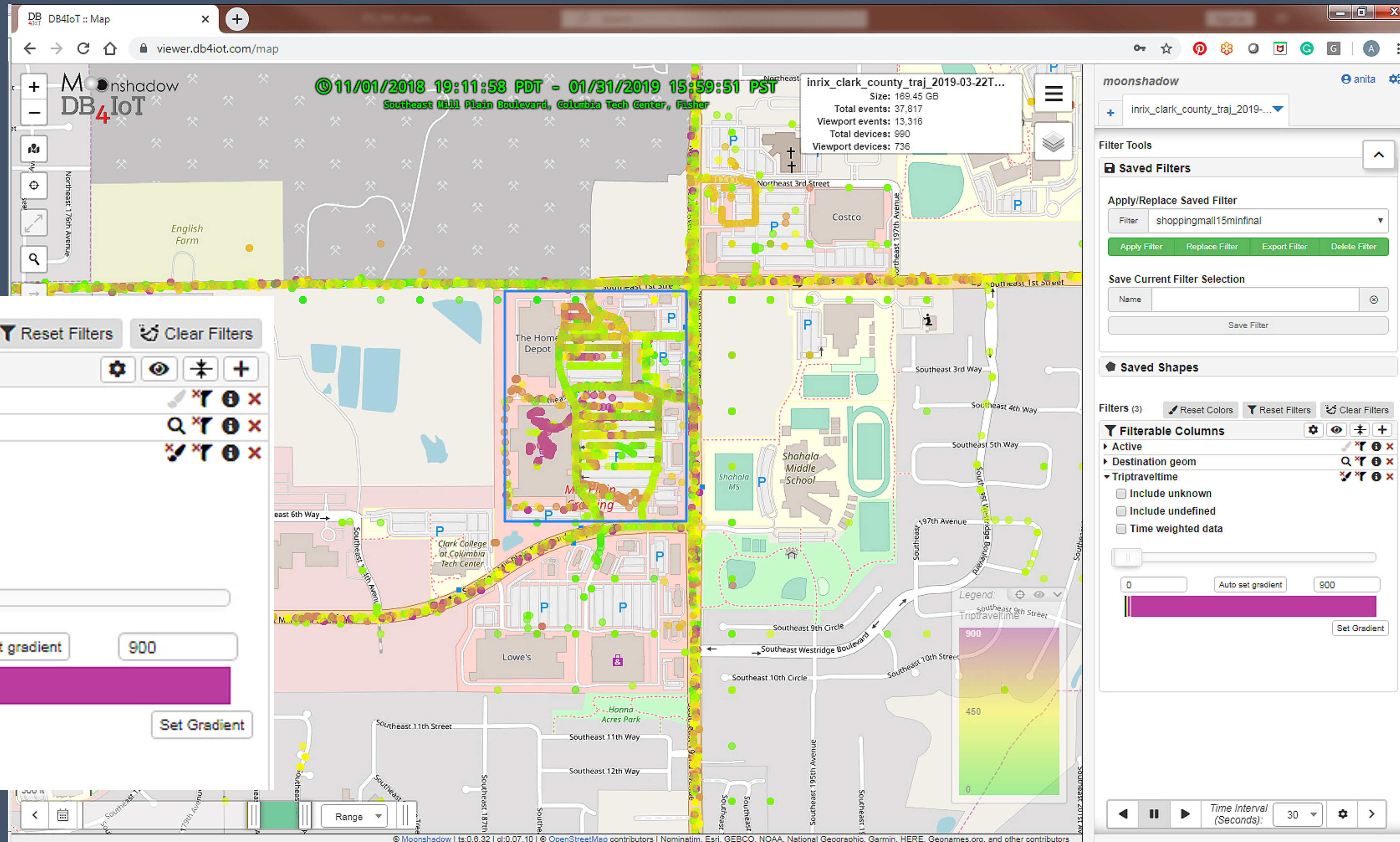
INRIX TRIP data
DB4IoT Mobility Analytics Platform



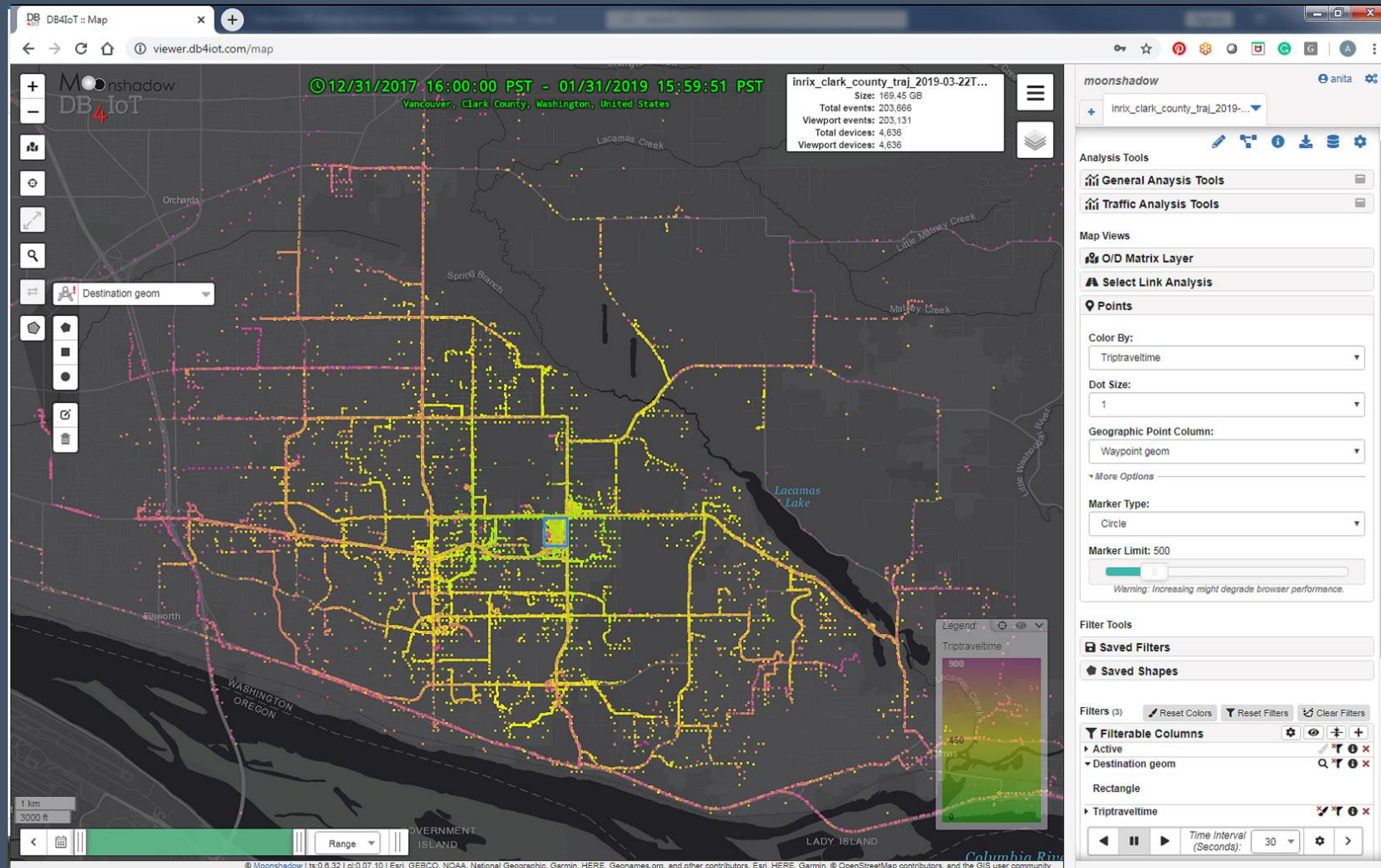
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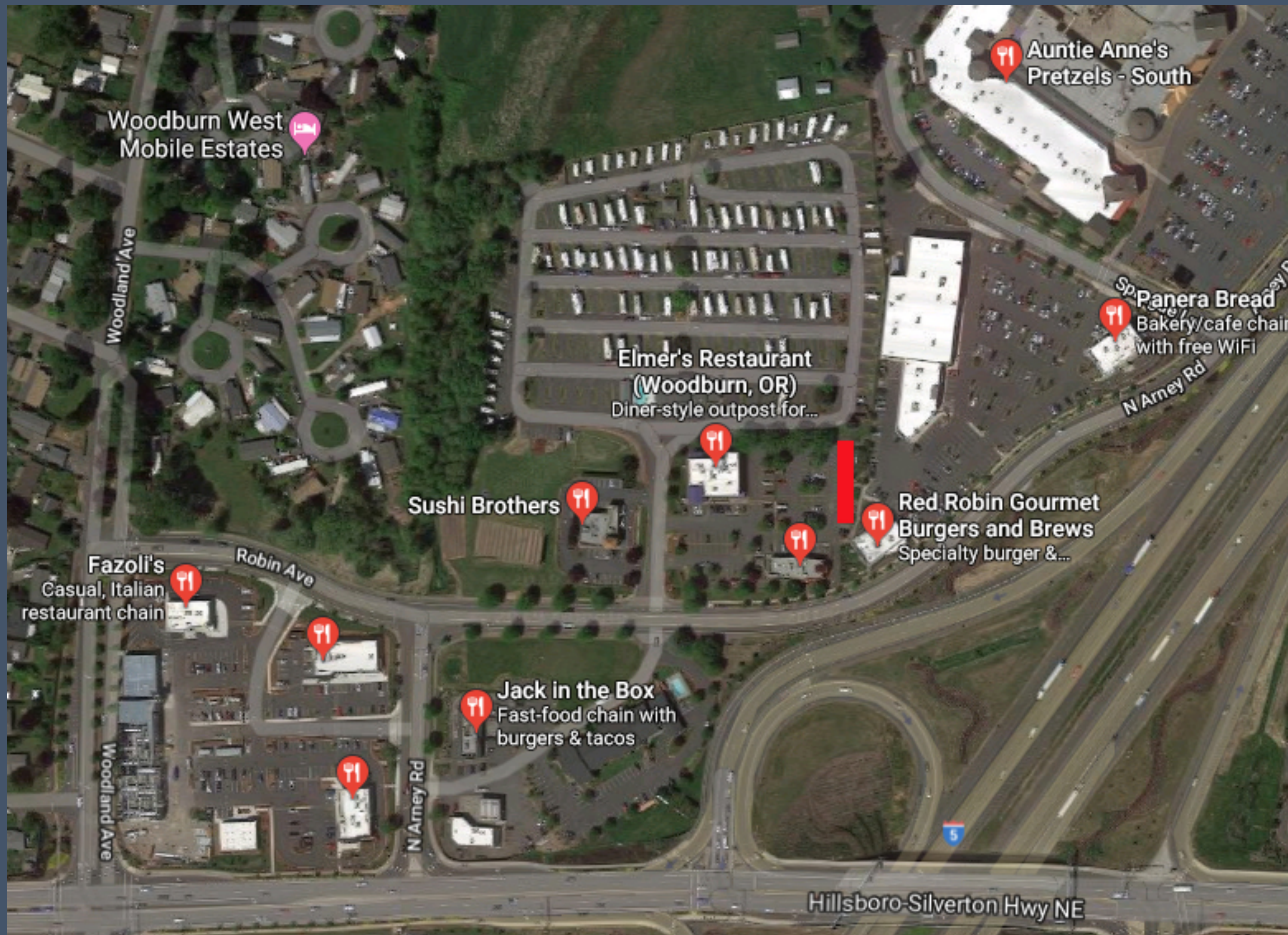
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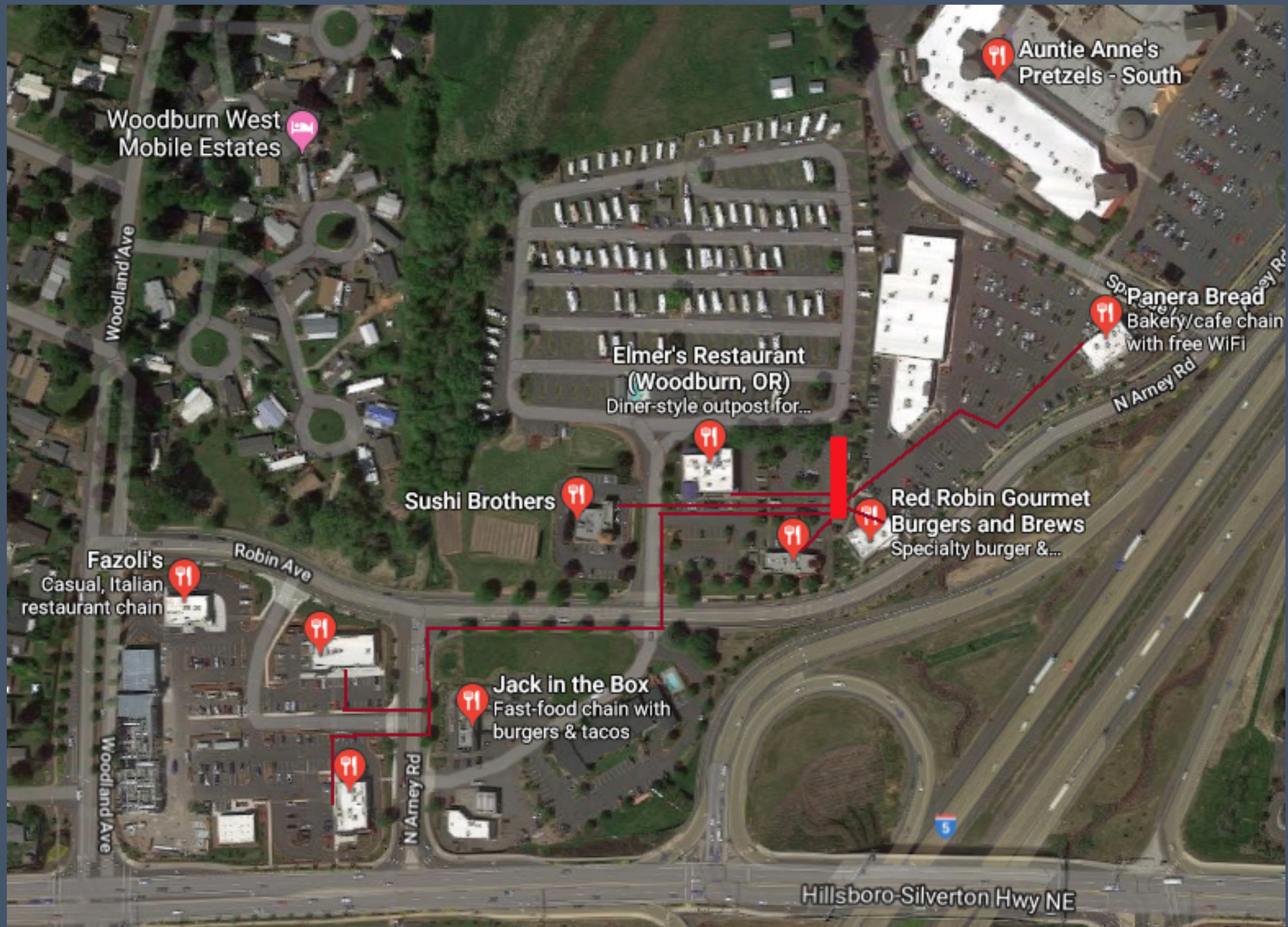
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Detailed Siting & Place Design

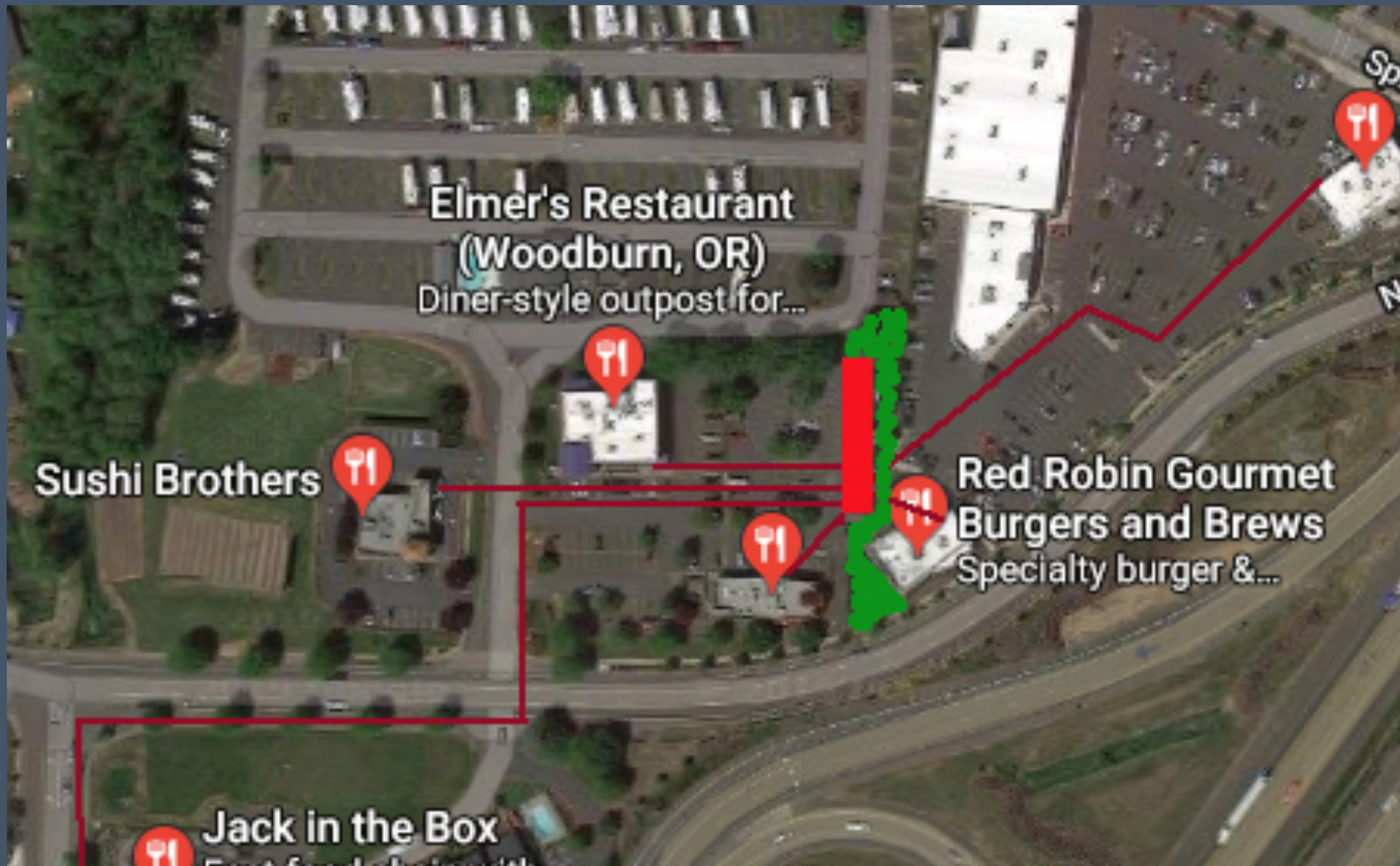
- All charging locations need to be safe, well lit with eyes on the charger.
- DCFC charging is best located within an pleasant pedestrian environment with access to multiple places to stay at least 20 minutes: Supermarkets, Restaurants, Coffee places



Detailed siting & Place design



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EV Charging Places are place to recharge the car AND the driver AND the passengers.

Combine the amenities of a Rest stop and a Gas Station:

- Restrooms
- Trash cans
- Picnic Tables
- Play area
- Dog area
- Shade for cars and for people.
- Convenience Store
- Car vacuum
- Window wash

Detailed siting & Place design



Detailed siting & Place design



Detailed siting & Place design



Source: aasarchitecture.com

Home Charging on site has top priority.
Many house are EV-Ready.

Work Charging on site
or in dense pedestrian workplace areas.

DCFC is for interstate travelers
and for local drivers.

Charging station need to be
designed as Places where people and cars
can recharge.



Source: aasarchitecture.com

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