Signalized Performance Measures WITHOUT Hardware

Data-driven mobility insights from CATT Lab

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Today's Presentation

- A brief introduction to signal analysis
- Use cases: how are agencies using Signal Analytics?
- Updates: what's new and coming soon
- Time for questions

Improving Operations with Traffic Signal Performance Measures

Benefits

- Issues can be identified quickly
- Proactive instead of reactive response
- More efficient traffic signal operations
- Data to communicate outcomes

Improving Safety and Sustainability Measures

Reduction of Fuel Consumption and GHG Emissions

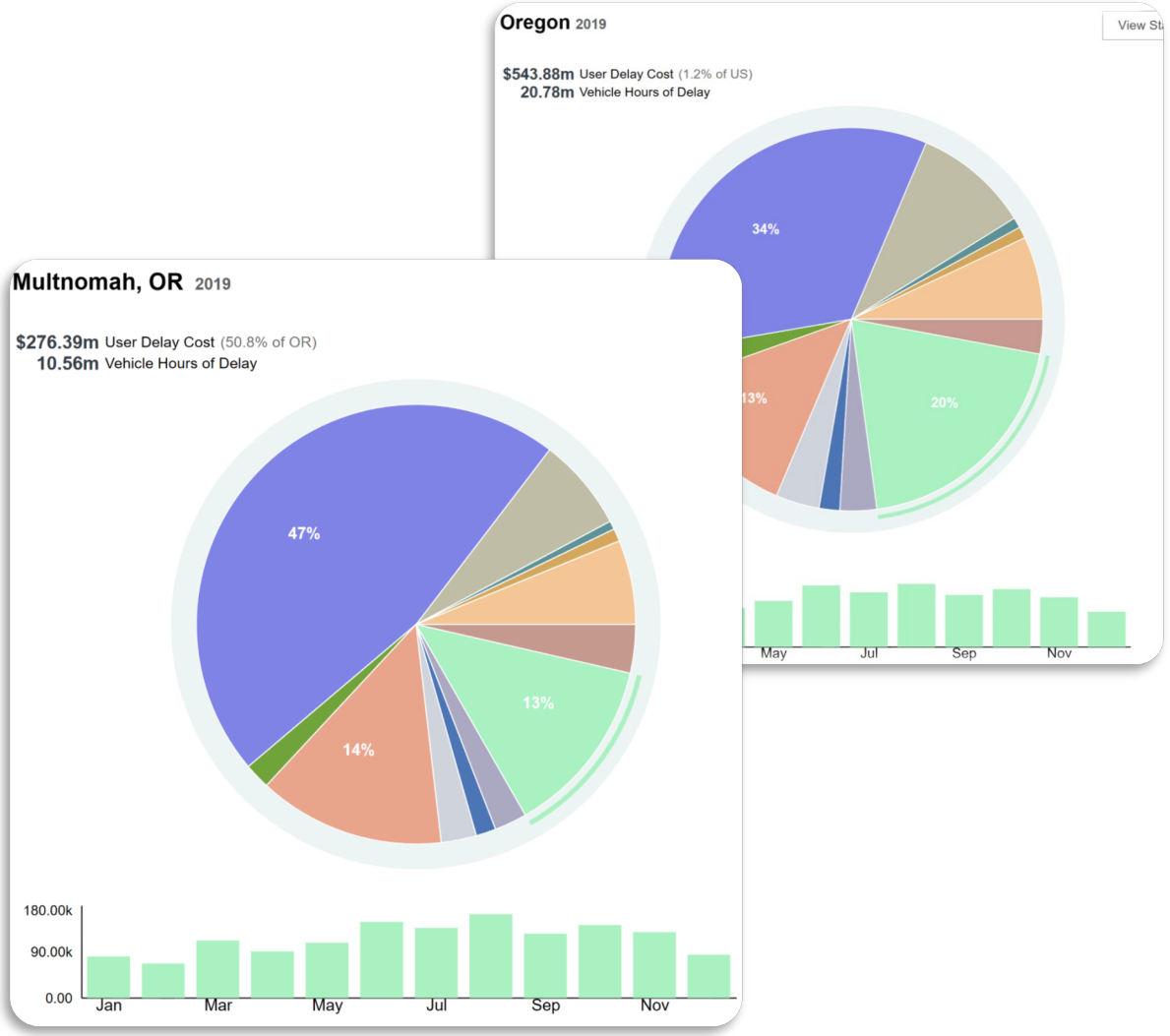
- Inst. of Transportation Engineers (ITE) estimates that properly timed signals decreases fuel consumption by 6% to 9%
- Aligns your with IIJA SMART program

Improve Safety

- Where queues exist, correlation to safety issues
- Reducing split failures, reduces more aggressive driving behaviors

Reduce Delay

- Recent calculations indicate that traffic signals account for roughly **9.3 million vehicle hours of delay** per year in **Oregon**
- ITE reports,signal retiming projects reduce motorist delay by between 15% to 37%.



Visit: https://congestion-causes.ritis.org/

SOURCE: [HRG Report on Traffic Signal Retiming Cost Benefits]

Traditional Traffic Signal Timing Processes

Trigger

- Complaint
- 3-5 Year Retiming

Design

- Hire a consultant
- Collect data and build models

Implement

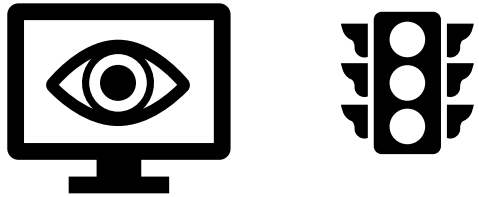
- Program
- Fine-Tune
- Evaluate

Done?

Move on to the next corridor or signal when triggered by complaint or next retiming cycle

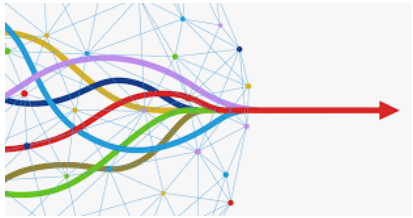
Performance-Based Traffic Signal Timing

Monitor Signals

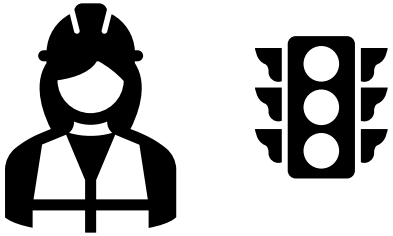


Identify Issues

Data Suggests Solutions



Deploy Fix



Rinse and Repeat!

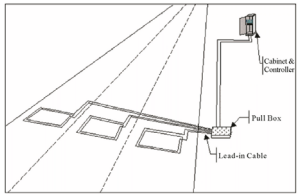
Traffic Signal Performance Measurement

Bottom-Up Approach

Derive traffic performance metrics

ATSPM
Automated Traffic Signal Performance Measures

Start with high-resolution detector data…



Top-Down Approach

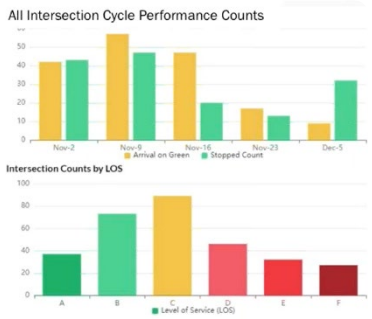
Start with high-resolution vehicle data…

Signal Analytics

Derive intersection performance metrics

No roadside infrastructure needed
Rapidly scalable anywhere in the nation

WHAT IS SIGNAL ANALYTICS



The Data

- 3 to 5 second frequency vehicle waypoints collected from connected vehicles
- Snapped to a free, open, and global map

The Metrics

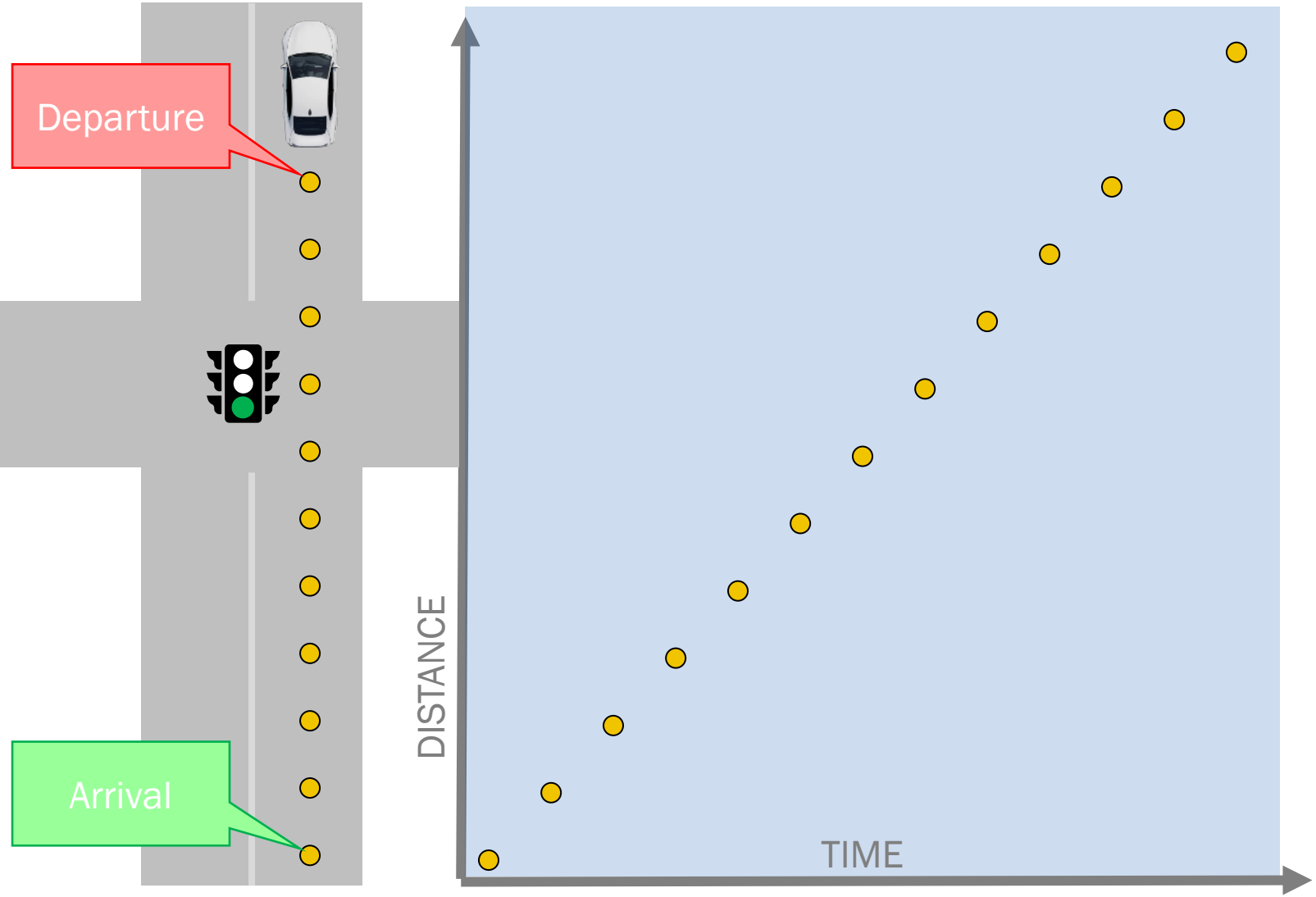
- Individual vehicle waypoints are used to determine the travel time of a vehicle moving through an intersection
- Other vehicle attributes include turning movement, vehicle stop, approach speed, or vehicle split failure and volume

The Tools – Cloud-based Solution as a Service

- Agency defines number of intersections to license
- Collaboration between CATT Lab and INRIX
- Aggregate the performance measures by intersection
- Report summary metrics over various time periods

High Fidelity Trajectory Data – Intersection Insights

THE METRICS – FROM EACH VEHICLE



Metrics for each vehicle

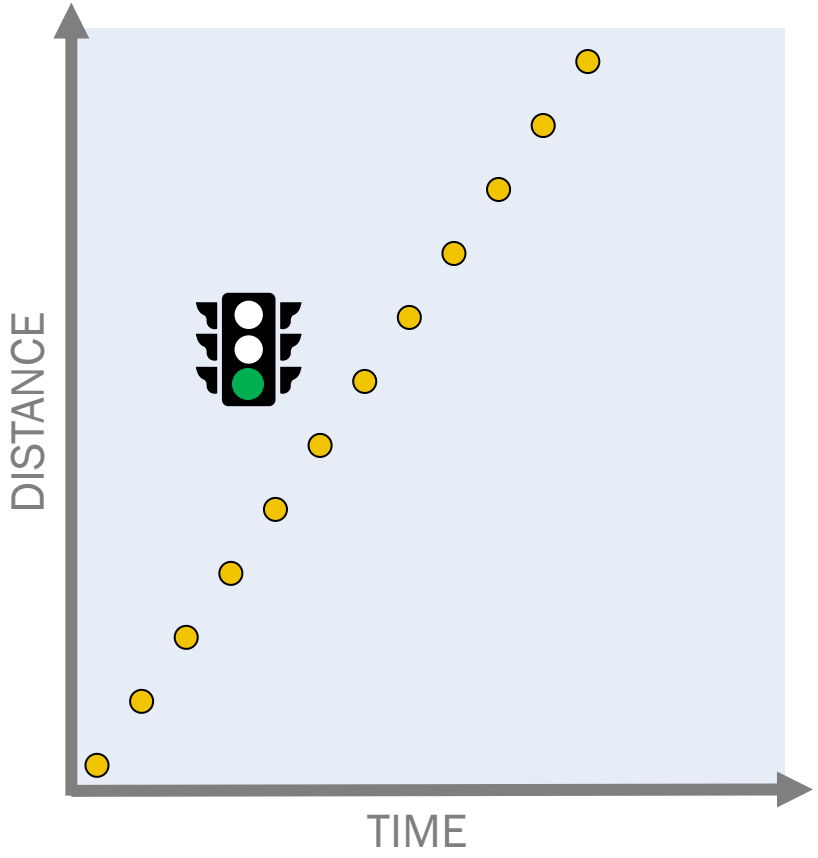
- Travel Time
- Approach Speed
- Vehicle Stop
- Vehicle Double Stop
- Movement (Left, Thru, Right)
- Volume

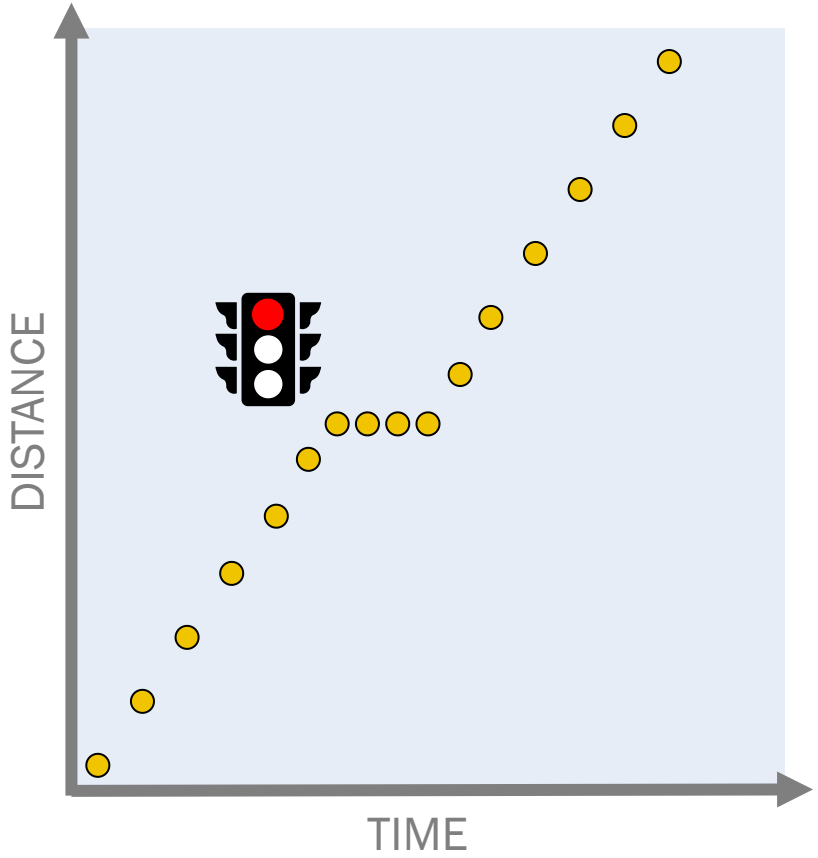
THE METRICS – INTERSECTION BUSINESS LOGIC

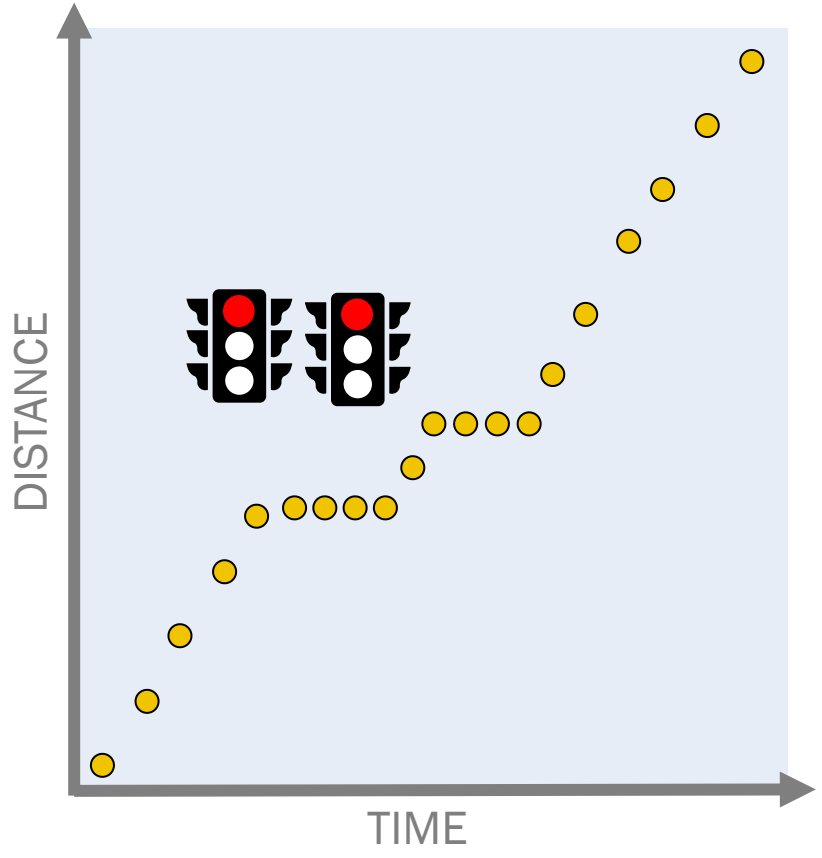
42 sec
ARRIVAL ON GREEN

61 sec
ARRIVAL ON RED

100 sec
SPLIT FAILURE

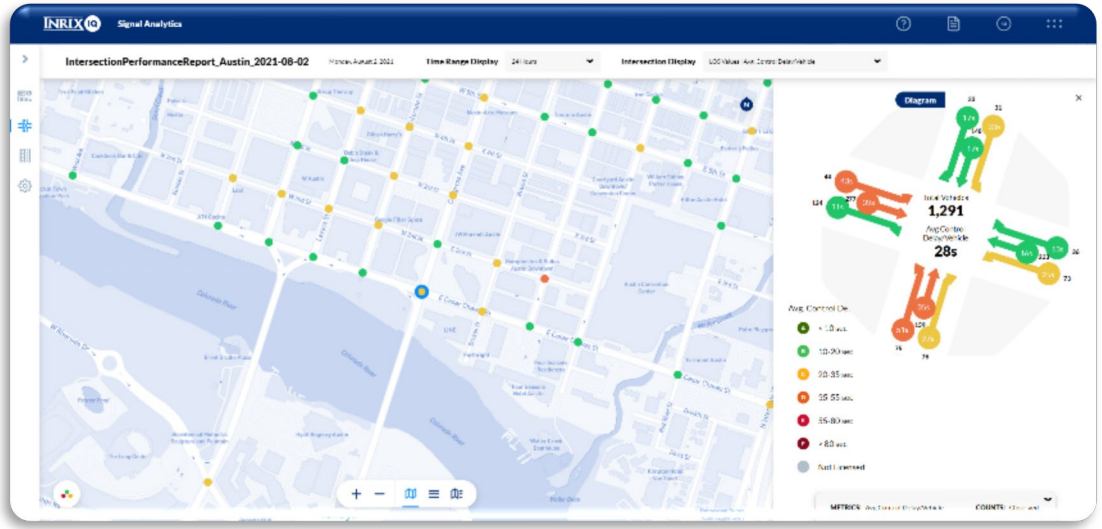


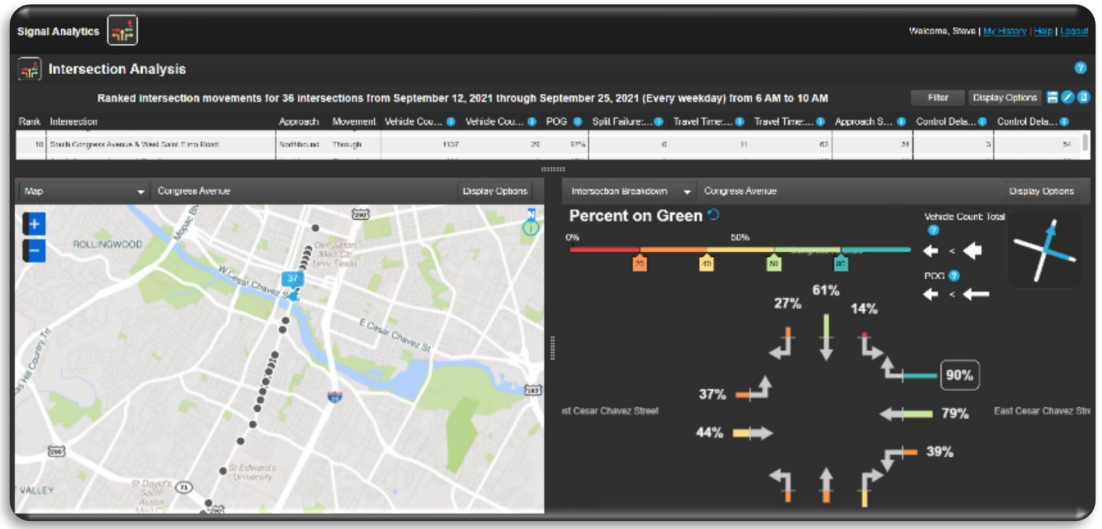




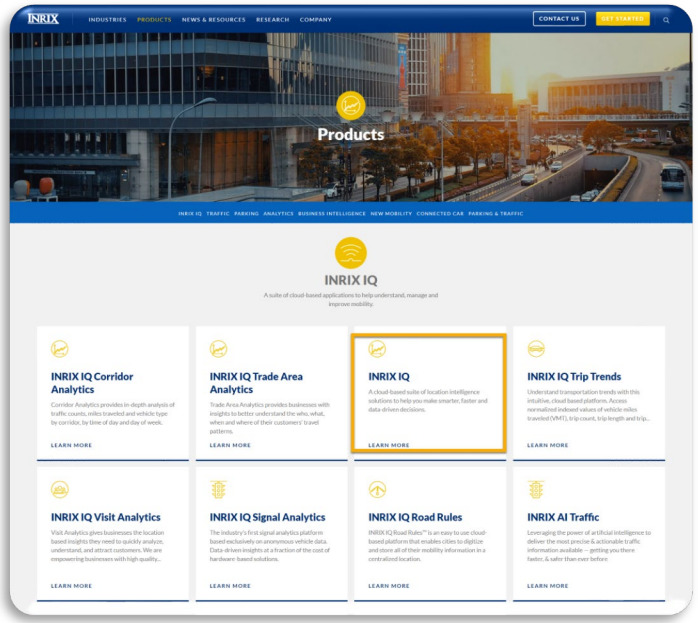
CORE USE CASES – SIGNAL ANALYTICS

- Safety and Emissions
  - Reducing split failures, reduces idling
  - Where queues exist, safety issues arise
- Project prioritization
  - Scan the entire traffic signal network to focus on problem intersections
- Performance
  - Identify underperforming intersections
  - Discover and measure iterative changes to signal timings
- Before and After studies
  - Did the retiming have a positive outcome
- Traffic Models
  - Validate the results of traffic modeling or simulation software



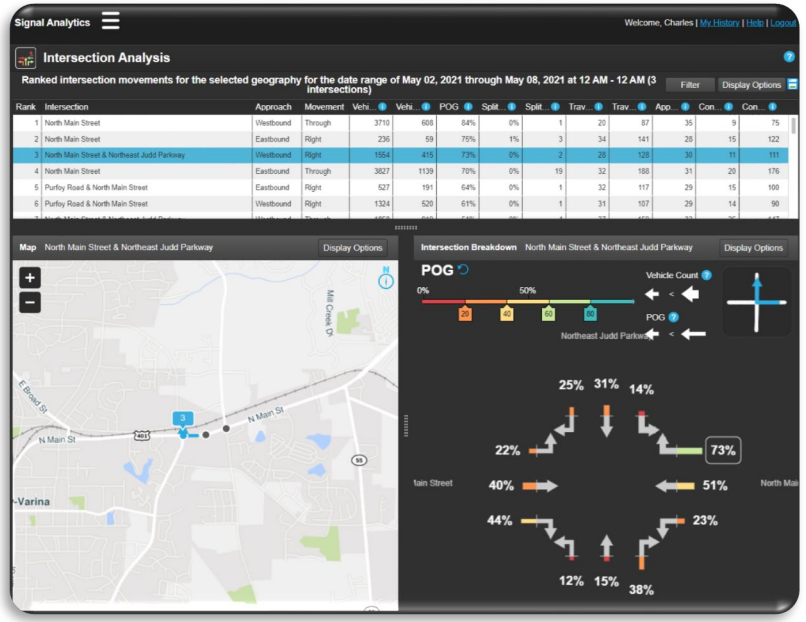


Two Complimentary Applications



INRIX IQ

Daily System Dashboard

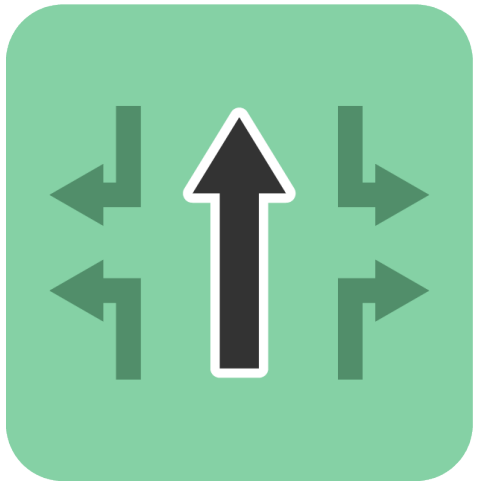


CATT Lab Signal Analytics

Deep Dive Analytics

signals.ritis.org

Signal Analytics Analysis Options…



Intersection Analysis

- Scan for issues
- Compare intersections across a region

Intersection Matrix

- Deep dive into intersection performance
- View one intersection at different times of day and different days of week

Data Available for Washington County, OR

Intersection Analysis

Intersection Analysis reports show key performance metrics per movement on selected intersection in tabular format, and allows for deeper dives using a map and intersection breakdown diagram.

1. Select intersections by road name or directly from the map

Select a region: Maryland

Use the controls on the map to define your intersection set. Controls with a '+' allow you to add intersections while controls with a '-' allow you to remove intersections from your selection.

Road: Enter road name

Add intersections

Your selection — Remove all

287 intersections

2. Create a time period to analyze

05/01/2023 - through - 05/31/2023

Add another date range

3. Select days of week

Sun | Mon | Tue | Wed | Thu | Fri | Sat

4. Select time of day

12:00 AM — 12:00 PM — 12:00 AM

4:00 PM 7:00 PM

Add another time of day

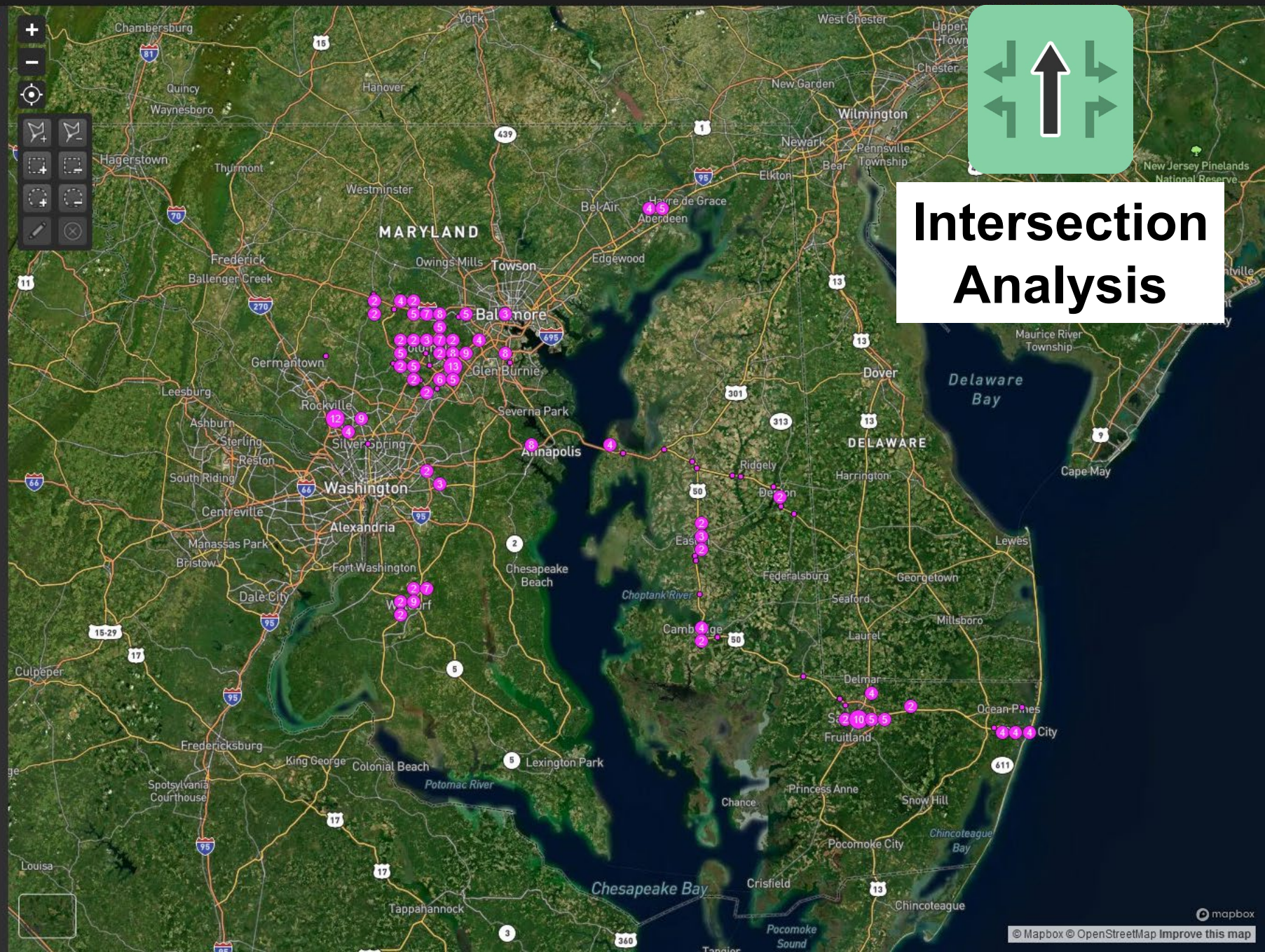
5. Provide a title for this report (optional)

Maryland May 2023 PM Peak

6. Notes (optional)

Add notes

SUBMIT



Signal Analytics

Welcome, Charles | My History | Help | Logout

View Movements by Intersection

Intersection Analysis

Maryland May 2023 PM Peak

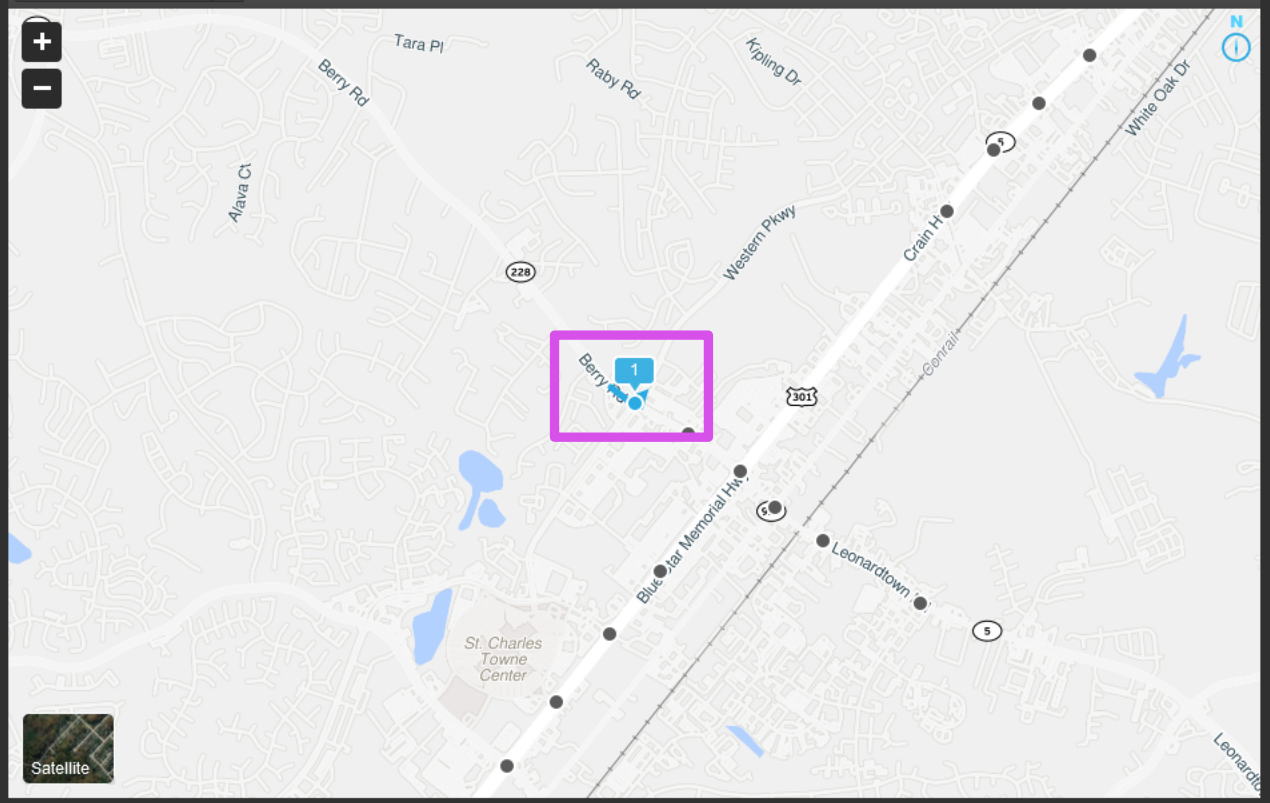
Movement | Approach | Intersection

Filters (1) | Columns (16/65)

Ranked movements for 288 intersections from May 01, 2023 through May 31, 2023 (Every weekday) from 4:00 PM to 7:00 PM

Rank	Intersection	Approach	Movement	Vehicle Coun...	Vehicle Coun...	POG	Turn Percent...	Split Failure: ...	Split Failu... ▼	LOS	Travel Time: ...	Travel Time: ...	Approach Sp...	Control Dela...	Control Dela...
1	MD 228 & Western Parkway	Eastbound	Left	713	673	6%	18%	29.5%	210	F	96	415	26	81	400
2	US 301 & Smallwood Drive	Southbound	Left	808	791	2%	16%	25.0%	202	F	197	423	26	184	410
4	US 301 & Clymer Drive	Westbound	Left	859	812	5%	65%	16.4%	141	F	181	498	24	166	483
5	MD 178 & Bestgate Road	Westbound	Right	1026	657	36%	55%	13.5%	139	D	60	246	24	43	229
6	Josiah Henson Parkway	Eastbound	Through	1065	543	49%	81%	12.5%	133	D	60	354	30	48	342
7	MD 108 & Ten Oaks Road	Northbound	Through	949	534	44%	87%	12.6%	120	C	48	118	26	34	104
8	Ocean Gateway & Mount Holly Road	Eastbound	Left	1304	736	44%	37%	7.4%	97	A	23	69	29	9	55
9	MD 2 & MD 710	Southbound	Left	912	864	5%	29%	10.6%	97	F	98	262	26	82	246

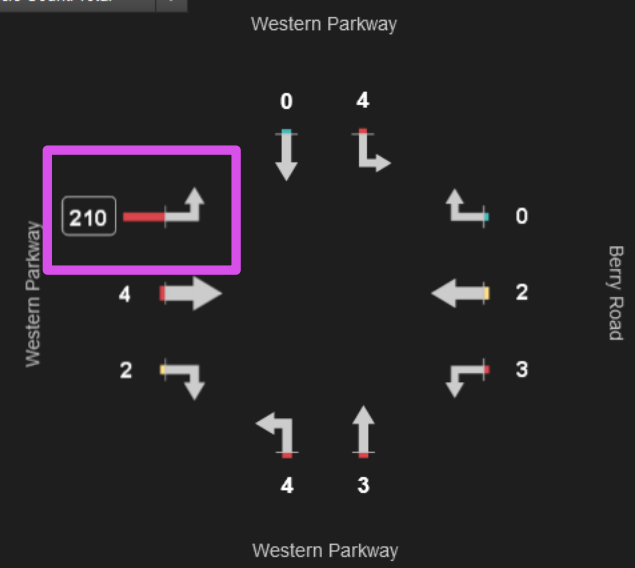
Map | MD 228 & Western Parkway | Display Options



Intersection Breakdown | MD 228 & Western Parkway

Primary Data Type: Split Failure: Count

Secondary Data Type: Vehicle Count: Total



Split Failure: Count

0 — 10

1 2

Vehicle Count: Total

Split Failure: Count

Signal Analytics

Welcome, Charles | My History | Help | Logout

Filter Movements by Intersection

Intersection Analysis

Maryland May 2023 PM Peak

Movement | Approach | Intersection

Filters (1) | Columns (16/65)

Ranked movements for 288 intersections from May 01, 2023 through May 31, 2023 (Every weekday) from 4:00

Rank	Intersection	Approach	Movement	Vehicle Coun...	Vehicle Coun...	POG	Turn Percent...	Split Failure: ...	Split Failu... ▼	LOS					ntrol Dela...
1	MD 228 & Western Parkway	Eastbound	Left	713	673	6%	18%	29.5%	210						400
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9	MD 2 & MD 710	Southbound	Left	912	864	5%	29%	10.6%	97	F	98	262	26	82	246

Filter Table

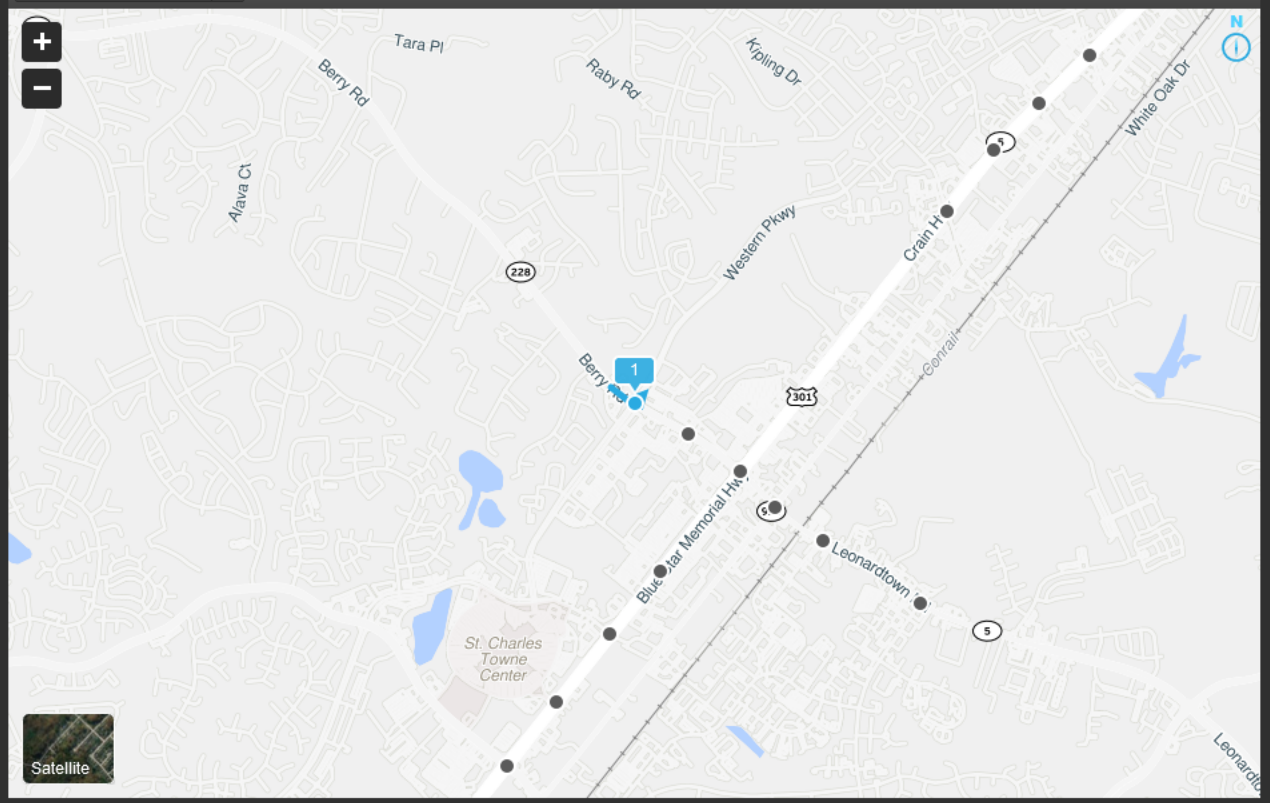
Clear all filters

Column: Vehicle Count: Total

Greater Than: 700

Add another constraint

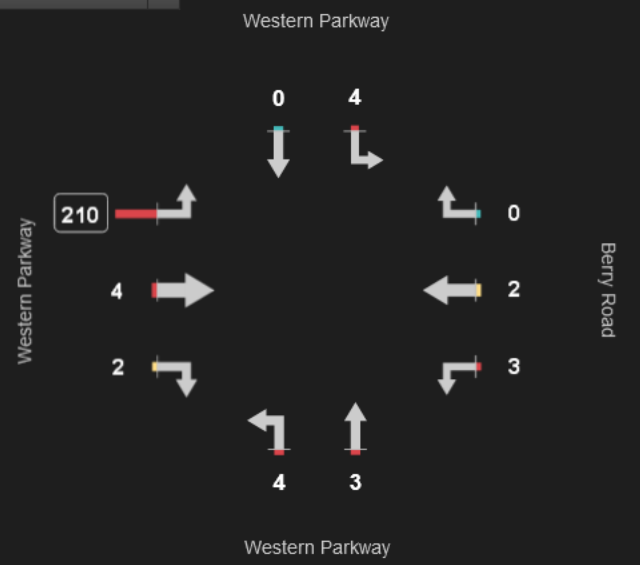
Map | MD 228 & Western Parkway | Display Options



Intersection Breakdown | MD 228 & Western Parkway

Primary Data Type: Split Failure: Count

Secondary Data Type: Vehicle Count: Total



Split Failure: Count

0 — 10

1 2

Vehicle Count: Total

Split Failure: Count

Movement Metrics - Side by Side

Movement | Approach | Intersection

Filters (1) | Columns (16/65)

Ranked movements for 288 intersections from May 01, 2023 through May 31, 2023 (Every weekday) from 4:00 PM to 7:00 PM

Rank	Intersection	Approach	Movement	Vehicle Coun...	Vehicle Coun...	POG	Turn Percent...	Split Failure: ...	Split Failu... ▼	LOS	Travel Time: ...	Travel Time: ...	Approach Sp...	Control Dela...	Control Dela...
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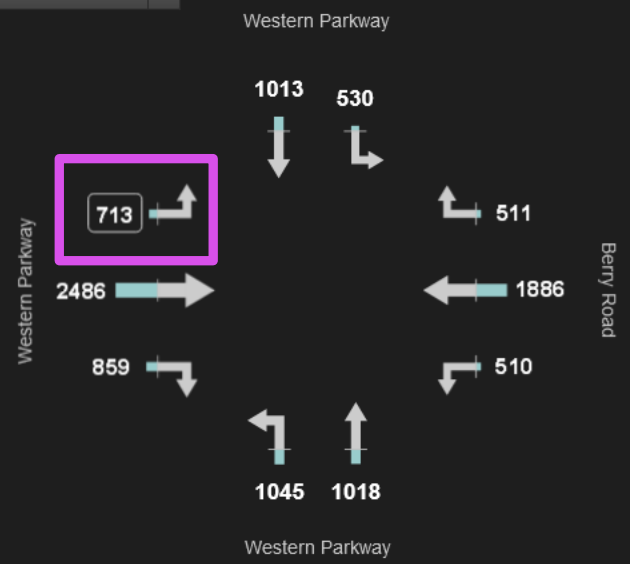
Intersection Breakdown | MD 228 & Western Parkway

Primary Data Type: Vehicle Count: Total | Secondary Data Type: Vehicle Count: Total



Vehicle Count: Total

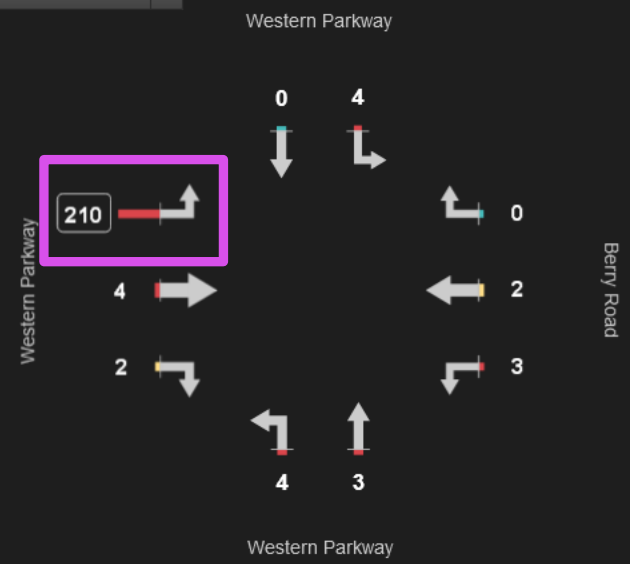
0 — 9283

Vehicle Count: Total

Vehicle Count: Total

Intersection Breakdown | MD 228 & Western Parkway

Primary Data Type: Split Failure: Count | Secondary Data Type: Vehicle Count: Total



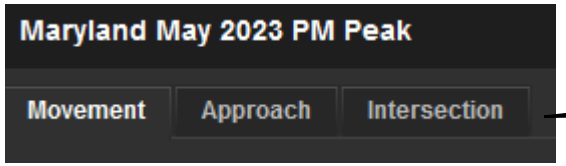
Split Failure: Count

0 — 10

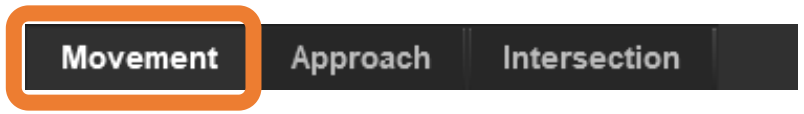
Vehicle Count: Total

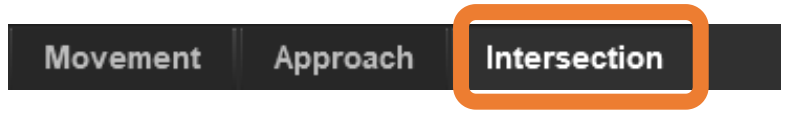
Split Failure: Count

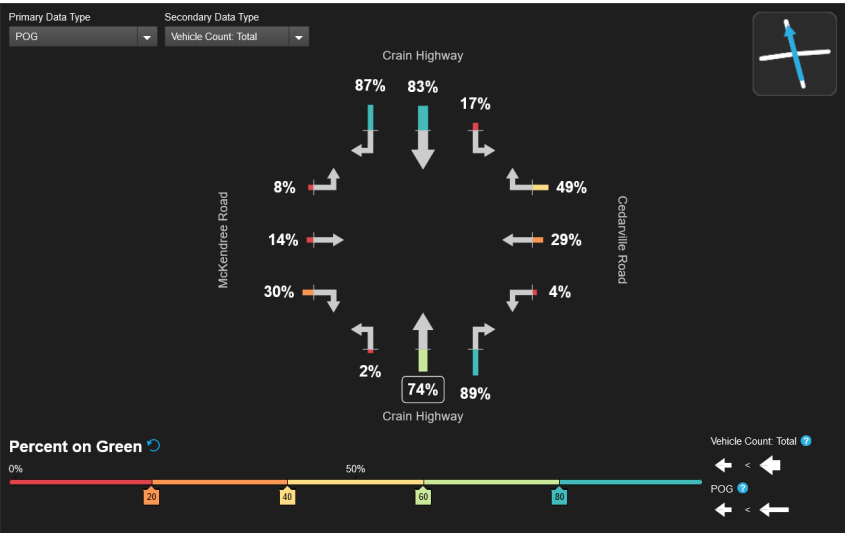
Aggregation Levels for Signal Performance Metrics

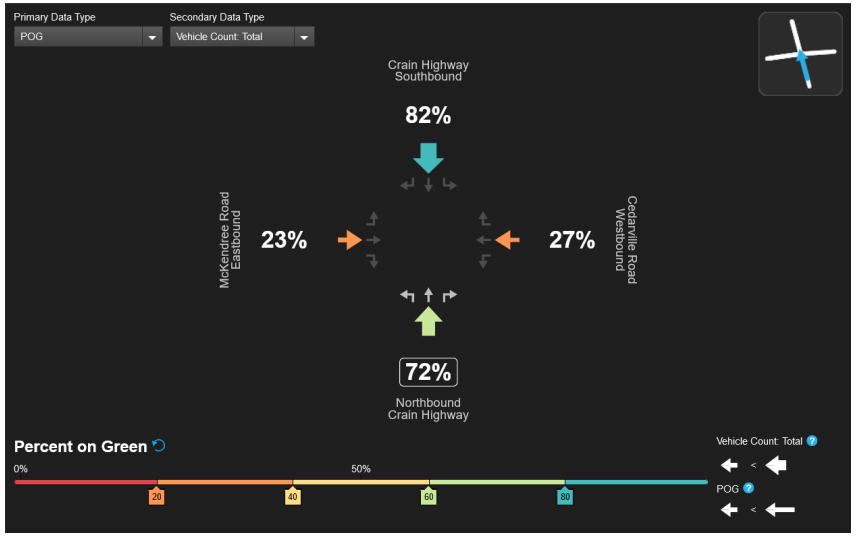


By default, data is presented by movement. Click the tabs near the top left of the screen to aggregate data by approach or intersection.









Intersection Matrix

Intersection Matrix lets you view aggregate performance of an intersection on a movement-by-movement basis across each hour of day (or 30-minute or 15-minute interval) and day of week. This allows you to easily determine how these performance metrics change over the course of a day or by day of the week.

1. Select an intersection

Select a region: Maryland

Find intersections on this road (optional):

Enter road name

MD 228 & Western Parkway

2. Create a time period to analyze

Signal Analytics reports for dates after June 1, 2023 are temporarily unavailable.

05/01/2023 - through - 05/31/2023

3. Select days of week

Sun Mon Tue Wed Thu Fri Sat

4. Select time of day

12:00 AM 12:00 PM 12:00 AM

12:00 AM 12:00 AM

5. Select granularity

1 hour (required)

- [x] 30 minutes
- [ ] 15 minutes

6. Provide a title for this report (optional)

MD 228 & Western Parkway: May 2023

7. Notes (optional)

Add notes to give additional context to your report. These notes will be visible to anyone you share the report with. You can edit these notes both from the results page and My History.

SUBMIT

Satellite

Intersection Matrix

Intersection Matrix

Berry and Western

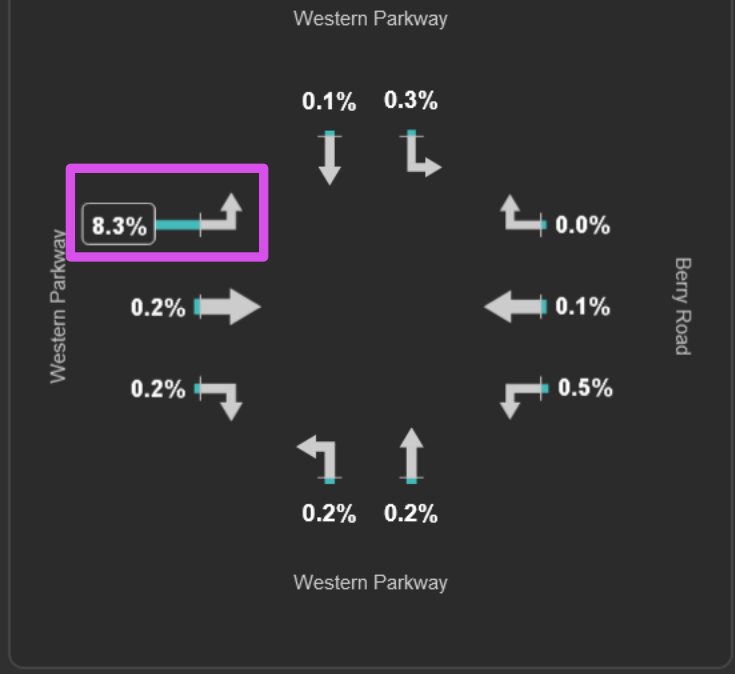
MD 228 & Western Parkway from May 01, 2023 through May 31, 2023

Movement | Approach | Intersection

Approach: Eastbound | Movement: Left | Vehicle Count: Total

Show Map

Split Failure: Percentage



Primary Data Type: Split Failure: Percentage | Secondary Data Type: Vehicle Count: Total

Legend: 0% 50% — 10 20 30 40

Granularity: 1 Hour

Split Failure: Percentage

	12 AM	1 AM	2 AM	3 AM	4 AM	5 AM	6 AM	7 AM	8 AM	9 AM	10 AM	11 AM	12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM	Daily Average
Mon	0.0%	0.0%	N/A	N/A	0.0%	0.0%	0.0%	0.0%	2.8%	0.0%	0.0%	0.0%	2.6%	6.1%	23.1%	28.6%	38.9%	20.9%	16.7%	2.3%	3.4%	0.0%	0.0%	0.0%	Mon 10.3%
Tue	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.9%	9.8%	1.6%	5.7%	0.0%	0.0%	7.3%	23.3%	21.1%	34.8%	13.3%	19.4%	0.0%	0.0%	0.0%	0.0%	0.0%	Tue 8.7%
Wed	0.0%	N/A	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	7.4%	2.1%	0.0%	2.9%	2.5%	5.7%	16.7%	17.5%	33.9%	44.6%	20.5%	0.0%	0.0%	0.0%	0.0%	0.0%	Wed 11.6%
Thu	0.0%	0.0%	0.0%	0.0%	N/A	0.0%	0.0%	0.0%	3.4%	3.6%	3.1%	3.0%	0.0%	3.4%	24.1%	12.8%	39.6%	21.1%	17.9%	2.8%	0.0%	0.0%	0.0%	0.0%	Thu 10.3%
Fri	0.0%	0.0%	0.0%	N/A	N/A	0.0%	0.0%	0.0%	17.2%	3.6%	0.0%	0.0%	0.0%	20.0%	25.0%	27.5%	43.4%	35.8%	27.5%	0.0%	0.0%	0.0%	0.0%	0.0%	Fri 13.9%
Sat	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.1%	2.6%	7.0%	3.1%	6.5%	0.0%	2.5%	2.3%	0.0%	0.0%	0.0%	0.0%	Sat 1.7%
Sun	0.0%	0.0%	0.0%	0.0%	0.0%	N/A	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.3%	2.6%	0.0%	3.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	Sun 0.6%
Weekday Average	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.7%	8.0%	2.1%	1.6%	1.1%	1.1%	7.8%	22.4%	21.6%	38.1%	28.5%	20.2%	1.1%	0.8%	0.0%	0.0%	0.0%	Weekday Average 11.0%
Weekend Average	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.1%	1.3%	4.7%	2.9%	3.2%	1.5%	1.4%	1.4%	0.0%	0.0%	0.0%	0.0%	Weekend Average 1.1%
Total Average	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.5%	5.7%	1.5%	1.1%	0.7%	1.1%	5.8%	16.1%	16.7%	31.3%	22.6%	15.5%	1.2%	0.6%	0.0%	0.0%	0.0%	Total Average 8.3%

Signal Analytics

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Intersection Matrix

Intersection Matrix

Berry and Western

MD 228 & Western Parkway from May 01, 2023 through May 31, 2023

Movement | Approach | Intersection

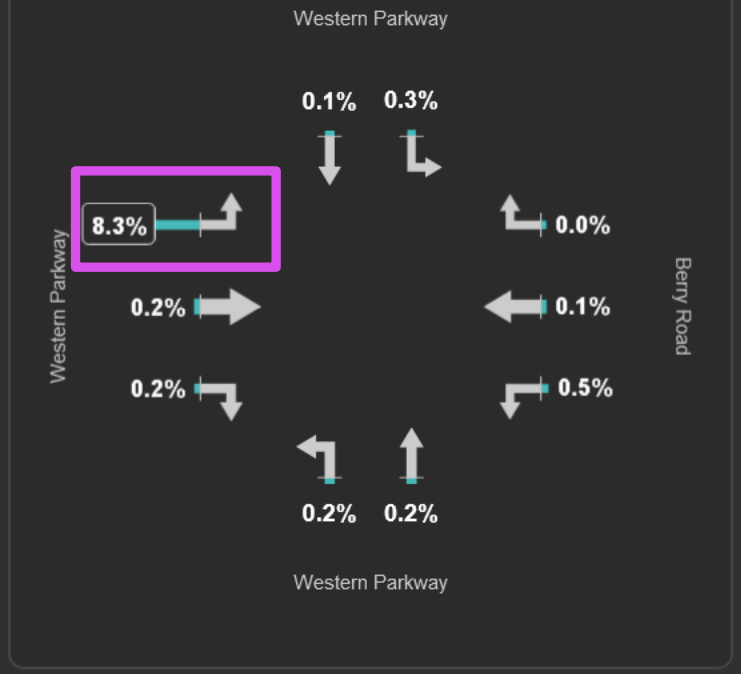
Approach: Eastbound

Movement: Left

Vehicle Count: Total

Split Failure: Percentage

Show Map



Primary Data Type: Split Failure: Percentage

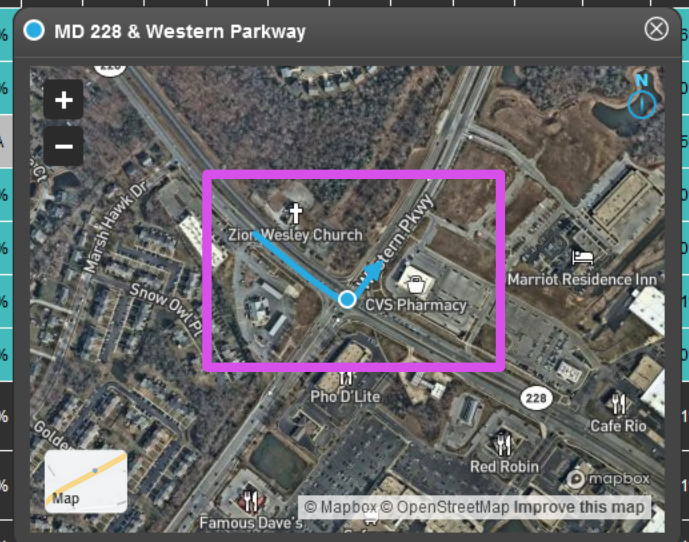
Secondary Data Type: Vehicle Count: Total

Legend: 0% 50% — 10 20 30 40

Granularity: 1 Hour

Split Failure: Percentage

	12 AM	1 AM	2 AM	3 AM	4 AM	5 AM	6 AM	7 AM	8 AM	9 AM	10 AM	11 AM	12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM	Daily Average
Mon	0.0%	0.0%											6%	6.1%	23.1%	28.6%	38.9%	20.9%	16.7%	2.3%	3.4%	0.0%	0.0%	0.0%	Mon 10.3%
Tue	0.0%	0.0%											0%	7.3%	23.3%	21.1%	34.8%	13.3%	19.4%	0.0%	0.0%	0.0%	0.0%	0.0%	Tue 8.7%
Wed	0.0%	N/A											5%	5.7%	16.7%	17.5%	33.9%	44.6%	20.5%	0.0%	0.0%	0.0%	0.0%	0.0%	Wed 11.6%
Thu	0.0%	0.0%											0%	3.4%	24.1%	12.8%	39.6%	21.1%	17.9%	2.8%	0.0%	0.0%	0.0%	0.0%	Thu 10.3%
Fri	0.0%	0.0%											0%	20.0%	25.0%	27.5%	43.4%	35.8%	27.5%	0.0%	0.0%	0.0%	0.0%	0.0%	Fri 13.9%
Sat	0.0%	0.0%											1%	2.6%	7.0%	3.1%	6.5%	0.0%	2.5%	2.3%	0.0%	0.0%	0.0%	0.0%	Sat 1.7%
Sun	0.0%	0.0%											0%	0.0%	2.3%	2.6%	0.0%	3.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	Sun 0.6%
Weekday Average	0.0%	0.0%											1%	7.8%	22.4%	21.6%	38.1%	28.5%	20.2%	1.1%	0.8%	0.0%	0.0%	0.0%	Weekday Average 11.0%
Weekend Average	0.0%	0.0%											1%	1.3%	4.7%	2.9%	3.2%	1.5%	1.4%	1.4%	0.0%	0.0%	0.0%	0.0%	Weekend Average 1.1%
Total Average	0.0%	0.0%											1.1%	5.8%	16.1%	16.7%	31.3%	22.6%	15.5%	1.2%	0.6%	0.0%	0.0%	0.0%	Total Average 8.3%



Signal Analytics

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Intersection Matrix

Intersection Matrix

Berry and Western

MD 228 & Western Parkway from May 01, 2023 through May 31, 2023

Movement | Approach | Intersection

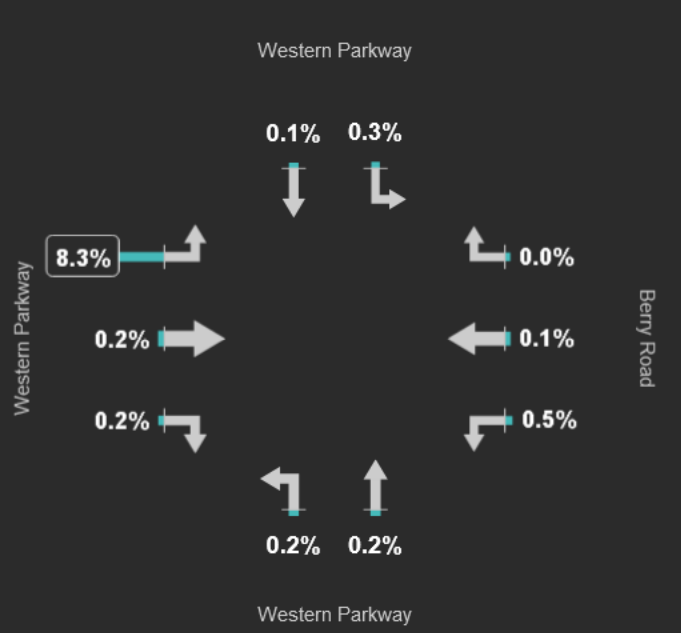
Approach: Eastbound

Movement: Left

Vehicle Count: Total

Split Failure: Percentage

Show Map



Primary Data Type: Split Failure: Percentage

Secondary Data Type: Vehicle Count: Total

Legend: 0% … 50%; 10, 20, 30, 40

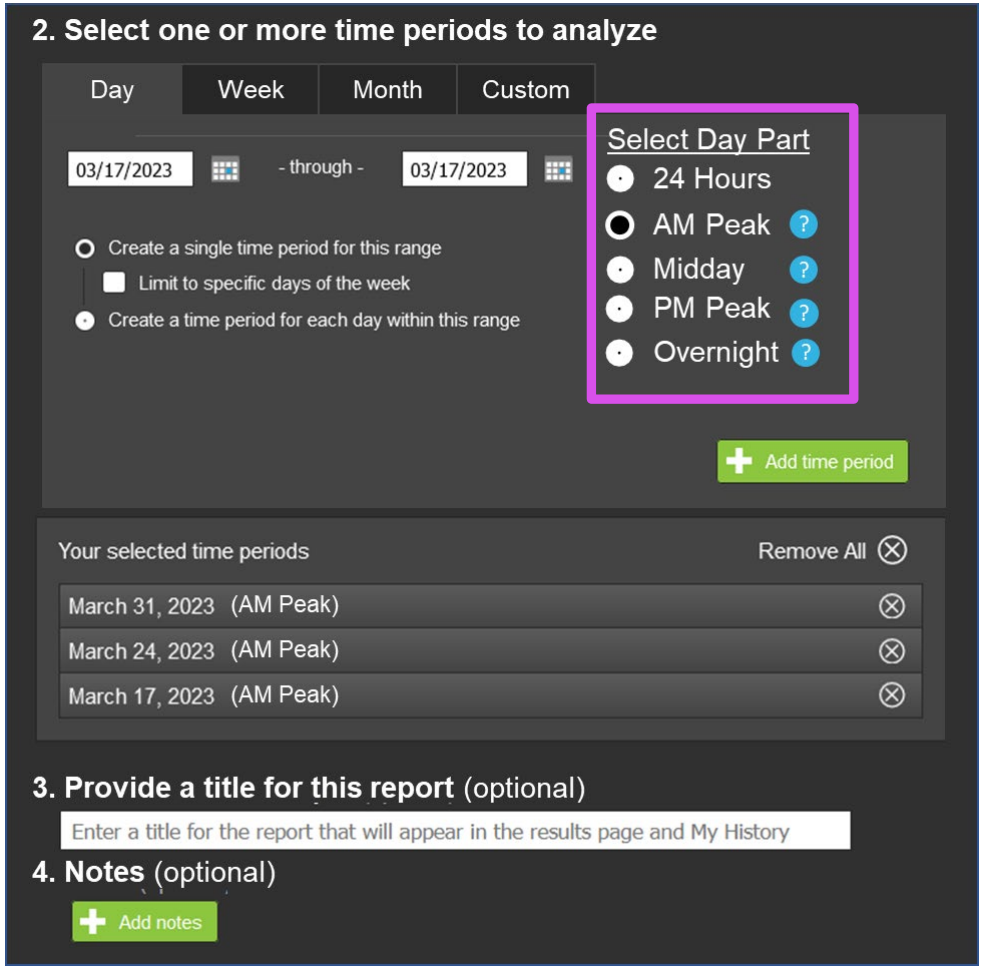
Granularity: 1 Hour

Split Failure: Percentage

	12 AM	1 AM	2 AM	3 AM	4 AM	5 AM	6 AM	7 AM	8 AM	9 AM	10 AM	11 AM	12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM	Daily Average
Mon	0.0%	0.0%	N/A	N/A	0.0%	0.0%	0.0%	0.0%	2.8%	0.0%	0.0%	0.0%	2.6%	6.1%	23.1%	28.6%	38.9%	20.9%	16.7%	2.3%	3.4%	0.0%	0.0%	0.0%	Mon 10.3%
Tue	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.9%	9.8%	1.6%	5.7%	0.0%	0.0%	7.3%	23.3%	21.1%	34.8%	13.3%	19.4%	0.0%	0.0%	0.0%	0.0%	0.0%	Tue 8.7%
Wed	0.0%	N/A	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	7.4%	2.1%	0.0%	2.9%	2.5%	5.7%	16.7%	17.5%	33.9%	44.6%	20.5%	0.0%	0.0%	0.0%	0.0%	0.0%	Wed 11.6%
Thu	0.0%	0.0%	0.0%	0.0%	N/A	0.0%	0.0%	0.0%	3.4%	3.6%	3.1%	3.0%	0.0%	3.4%	24.1%	12.8%	39.6%	21.1%	17.9%	2.8%	0.0%	0.0%	0.0%	0.0%	Thu 10.3%
Fri	0.0%	0.0%	0.0%	N/A	N/A	0.0%	0.0%	0.0%	17.2%	3.6%	0.0%	0.0%	0.0%	20.0%	25.0%	27.5%	43.4%	35.8%	27.5%	0.0%	0.0%	0.0%	0.0%	0.0%	Fri 13.9%
Sat	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.1%	2.6%	7.0%	3.1%	6.5%	0.0%	2.5%	2.3%	0.0%	0.0%	0.0%	0.0%	Sat 1.7%
Sun	0.0%	0.0%	0.0%	0.0%	0.0%	N/A	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.3%	2.6%	0.0%	3.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	Sun 0.6%
Weekday Average	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.7%	8.0%	2.1%	1.6%	1.1%	1.1%	7.8%	22.4%	21.6%	38.1%	28.5%	20.2%	1.1%	0.8%	0.0%	0.0%	0.0%	Weekday Average 11.0%
Weekend Average	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.1%	1.3%	4.7%	2.9%	3.2%	1.5%	1.4%	1.4%	0.0%	0.0%	0.0%	0.0%	Weekend Average 1.1%
Total Average	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.5%	5.7%	1.5%	1.1%	0.7%	1.1%	5.8%	16.1%	16.7%	31.3%	22.6%	15.5%	1.2%	0.6%	0.0%	0.0%	0.0%	Total Average 8.3%

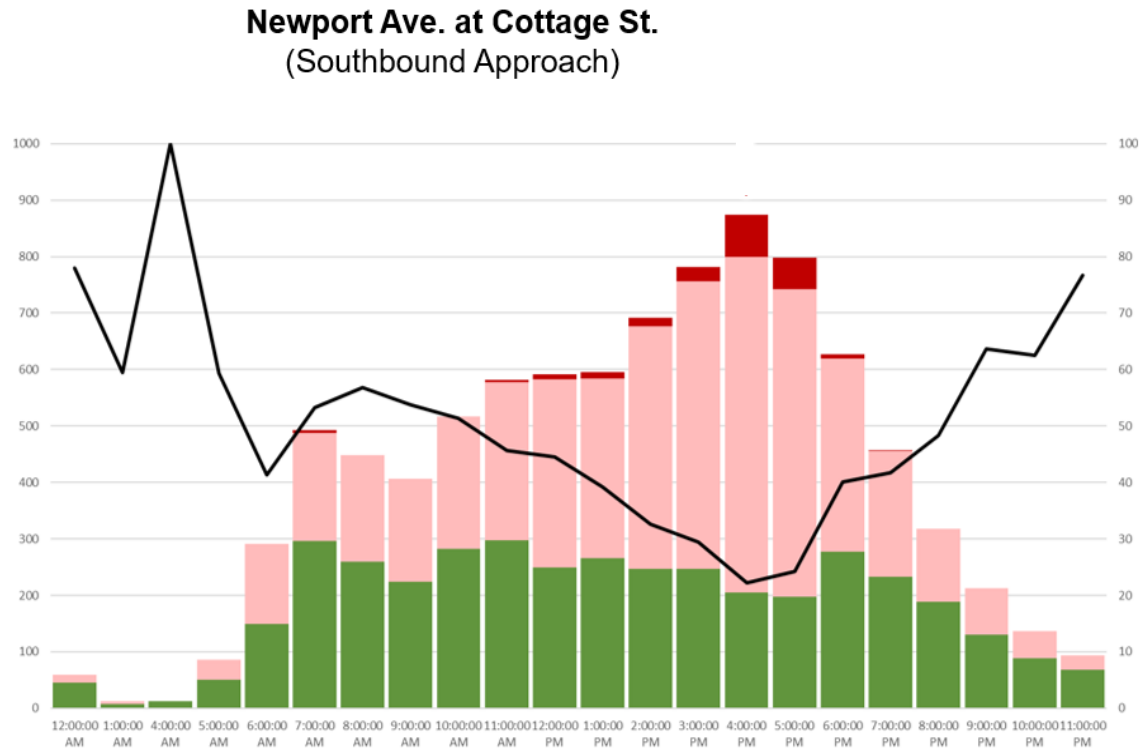
Might be special case on Fridays after lunch

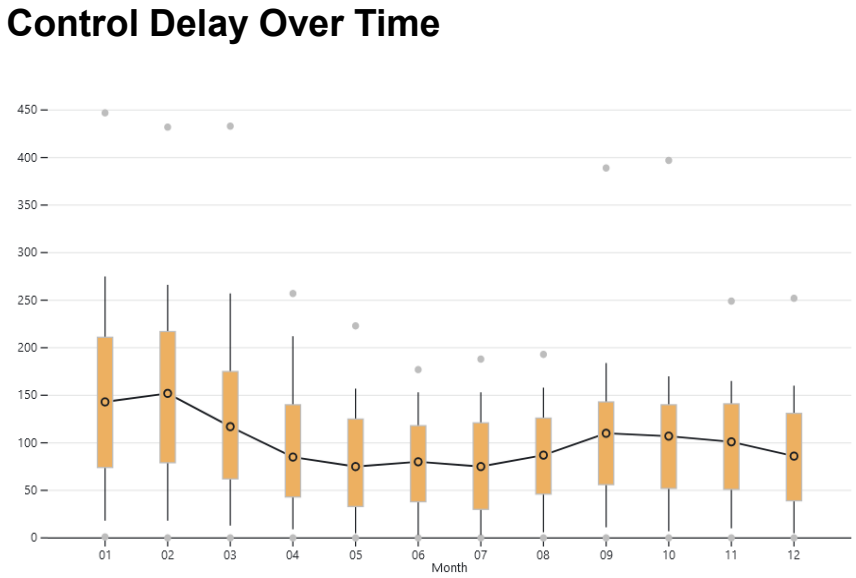
FUTURE: Application Enhancements



- Easier options to select standard time periods
- Performance improvements for report run time

FUTURE: Additional Data Visualizations





Use Case 1: How are the signals in my county performing?

Washington County, OR

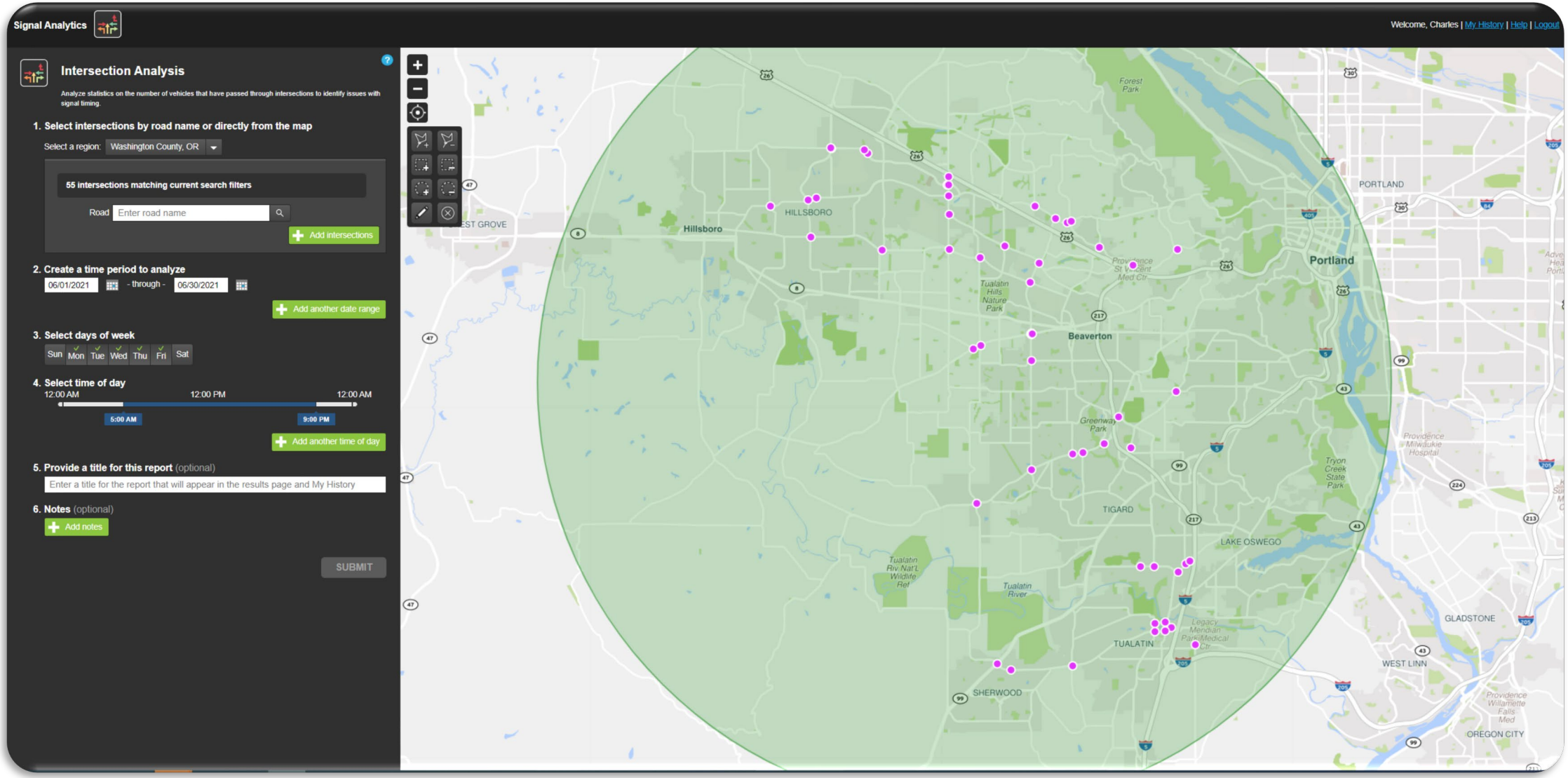
“Is there a way that I can rank the performance of my traffic signals across my entire county?”

“Can I see how much conditions change month by month?”

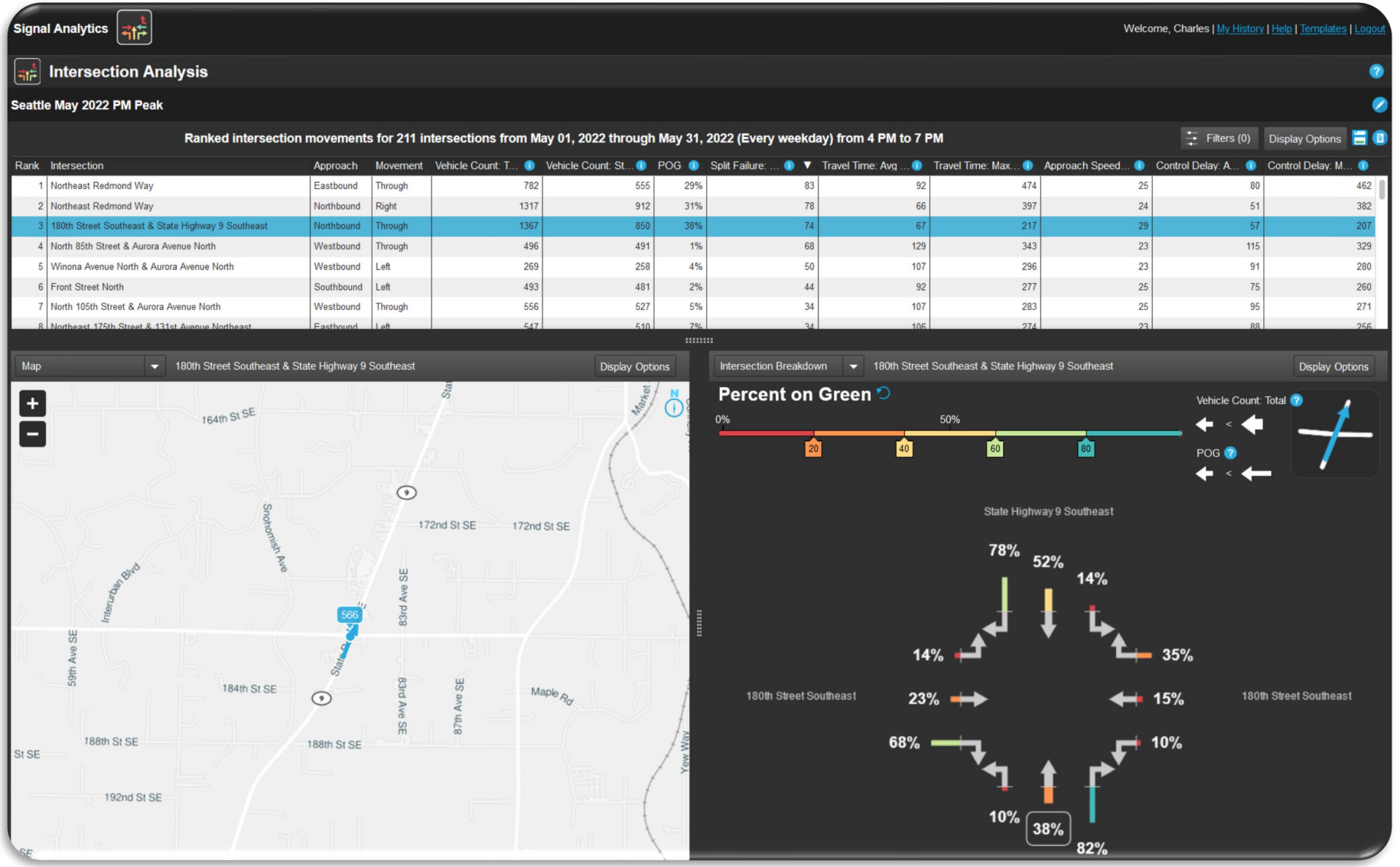
Solution: Use the Signal Analytics Ranked Intersection Table

Consider ranking by weekday split failures

Selecting the intersections in my county…



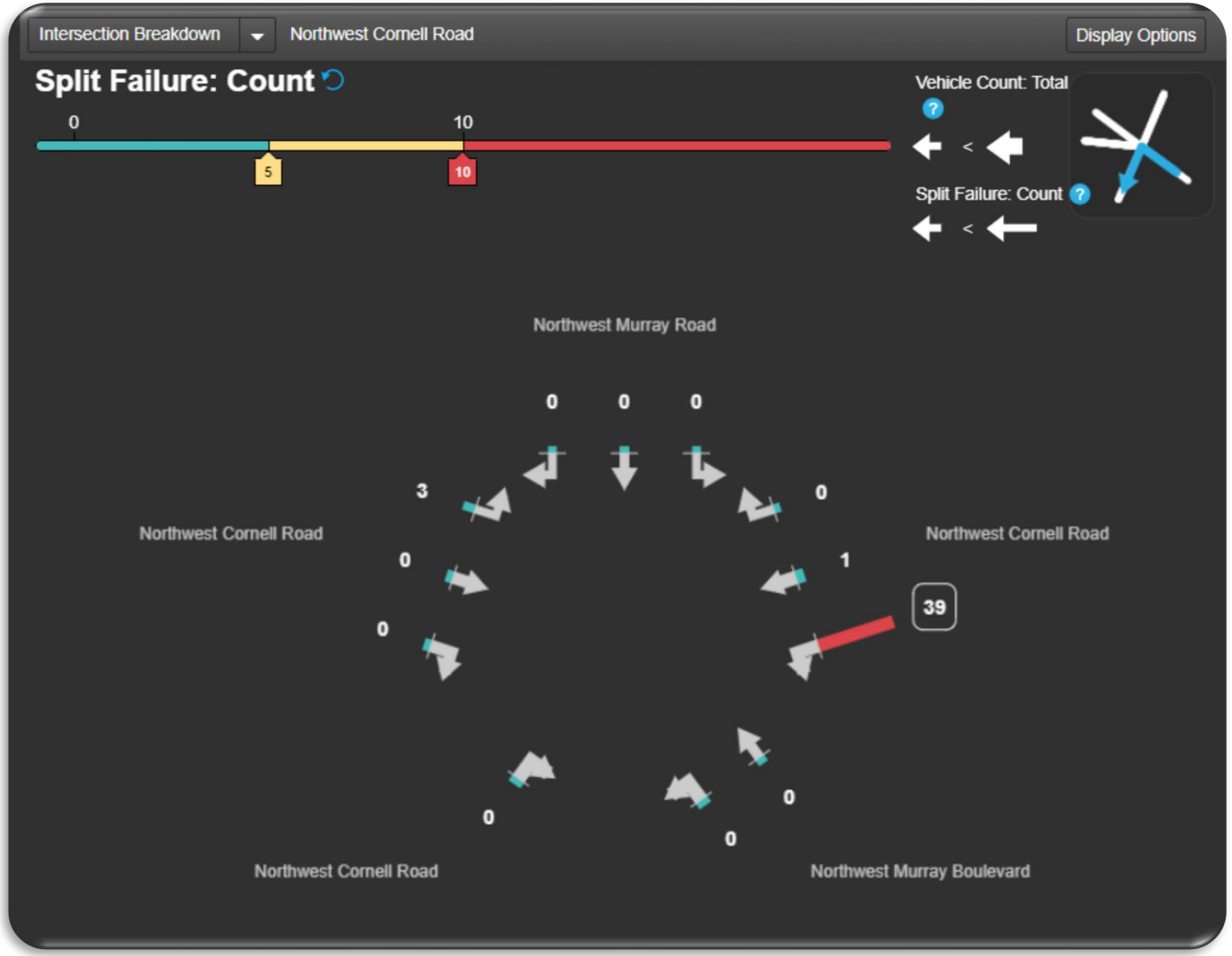
Sort the ranked intersection movement table by split failures



Countywide Analysis

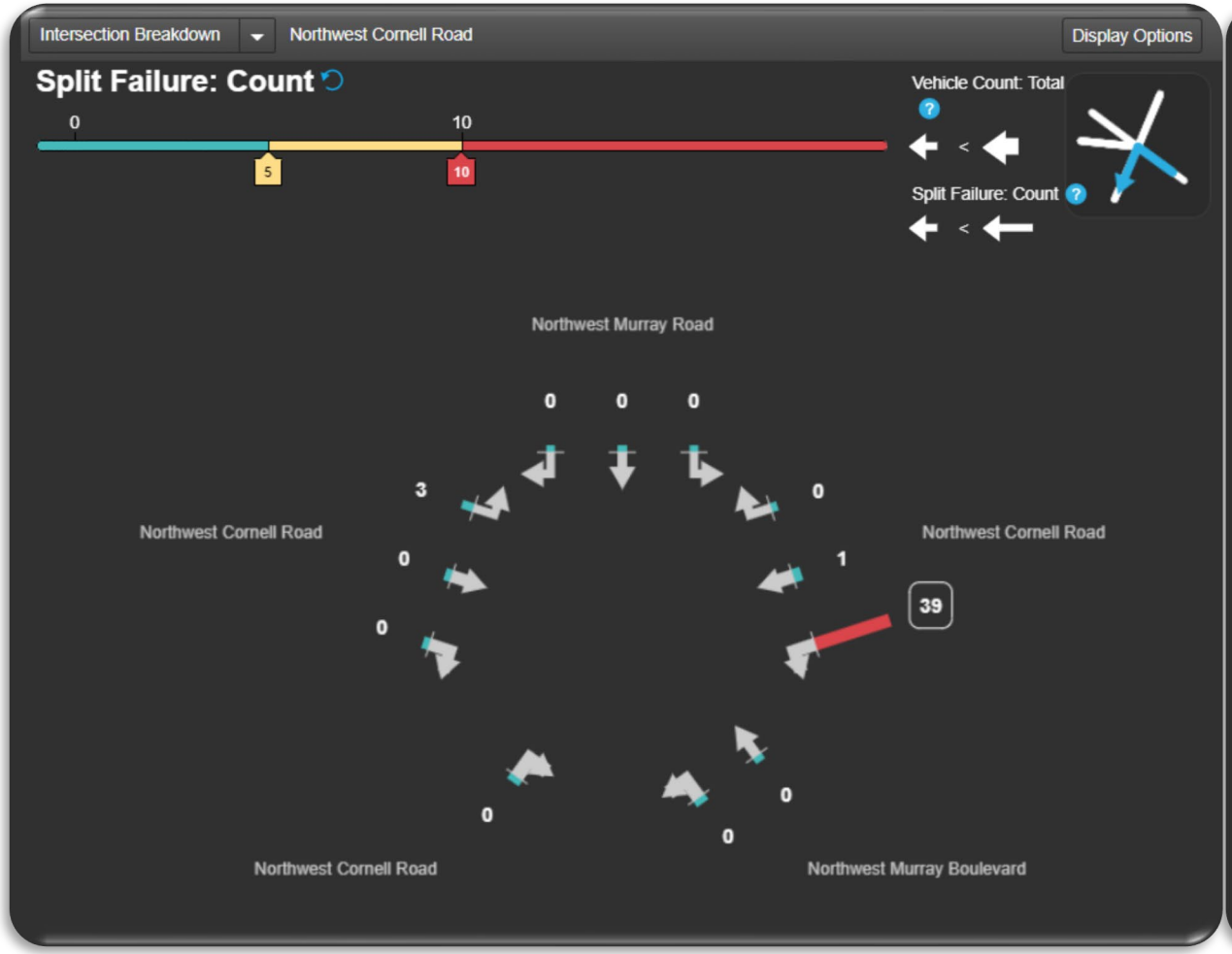
Frequency in Top 10 for Total # of Weekday Split Failures, 5am-9pm								
Intersection	**Approach**	**Maneuver**	**June**	**May**	**April**	**March**	**February**	**% in Top 10**
Southwest Pacific Highway & TSR	Southbound	Through	1	2	5	3	6	100%
Southwest 124th Avenue & Southwest Tualatin Sherwood Road	Westbound	Through	2					20%
Northwest 185th Avenue & Northeast Evergreen Parkway	Eastbound	Left	3	3				40%
Southwest Durham Road & Southwest Upper Boones Ferry Road	Eastbound	Left	4	7	3, 7		9	60%
Northwest Cornell Road & Murray Road	Westbound	Left	5	4	1	4	10	100%
Southwest Durham Road & Southwest Upper Boones Ferry Road	Northbound	Through	6	10	4	9		80%
Southwest Pacific Highway & TSR	Northbound	Through	7	6	2	2	1	100%
Northeast Brookwood Parkway & Northeast Cornell Road	Eastbound	Left	8		10			40%
Southwest Tualatin Sherwood Road & Southwest Boones Ferry Road	Westbound	Left	9		8	5	8	80%
Northwest 185th Avenue & Northeast Evergreen Parkway	Southbound	Left	10					20%
Southwest Baseline Road & 185th Avenue	Northbound	Through				7	2	40%
Southwest Martinazzi Avenue & Southwest Tualatin Sherwood Road	Eastbound	Through		1			3	40%
Southwest Baseline Road & 185th Avenue	Northbound	Left					4	20%
Southwest 92nd Avenue & Southwest Durham Road	Northbound	Left				1	5	40%
Southwest Baseline Road & 185th Avenue	Southbound	Through		9	6	6	7	80%
Southwest Tualatin Sherwood Road & Southwest Boones Ferry Road	Eastbound	Through		5				20%
Northwest Cornell Road & 48th Avenue	Eastbound	Left		8				20%
Southwest Nyberg Street & Fred Meyer Entrance	Southbound	Left				8		20%
Southwest Tualatin Sherwood Road & Southwest Boones Ferry Road	Southbound	Through				10		20%
Southwest Pacific Highway & TSR	Southbound	Right			9			20%

Let's take a look at the intersection diagram…

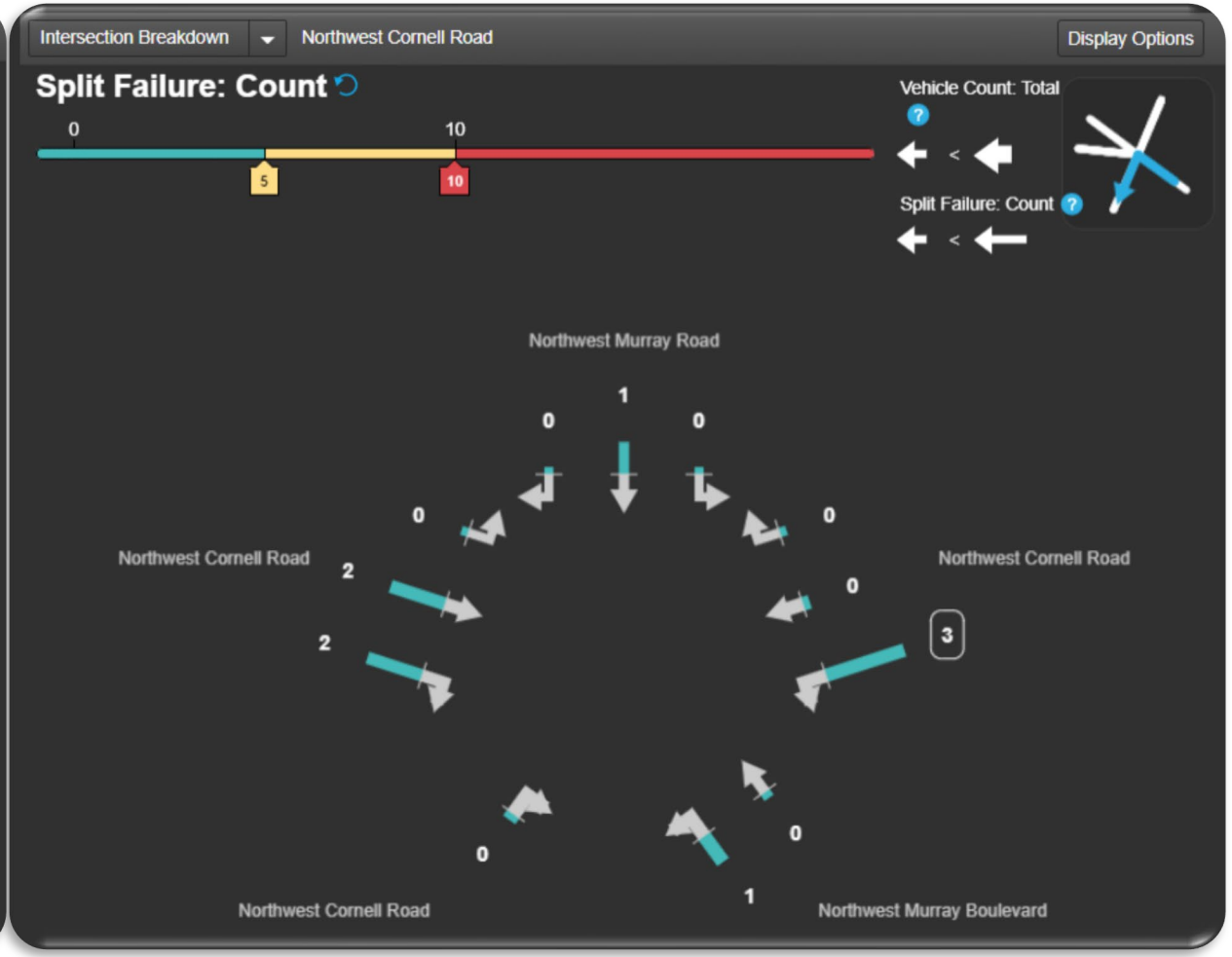


There are a lot more split failures on that left turn movement. **What would happen if I extended the max time for that movement?**

Before
(Jul. 22 – Aug. 11)



After
(Aug. 13 – Sep. 2)



Use Case 2: How do I compare conditions before and after a signal timing change?

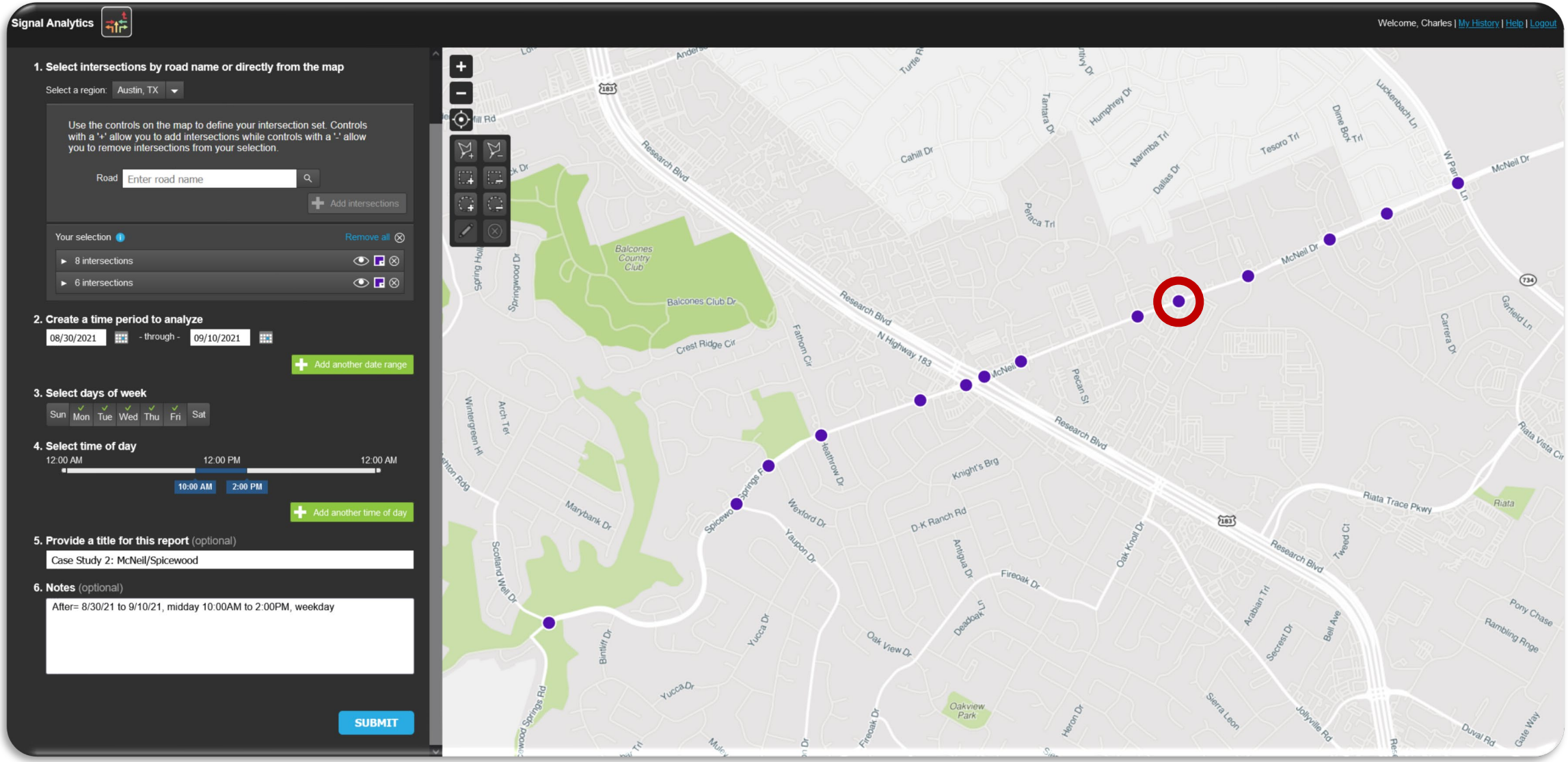
City of Austin, TX

"How can I measure changes to intersection performance if I don't have detection on all my approaches?"

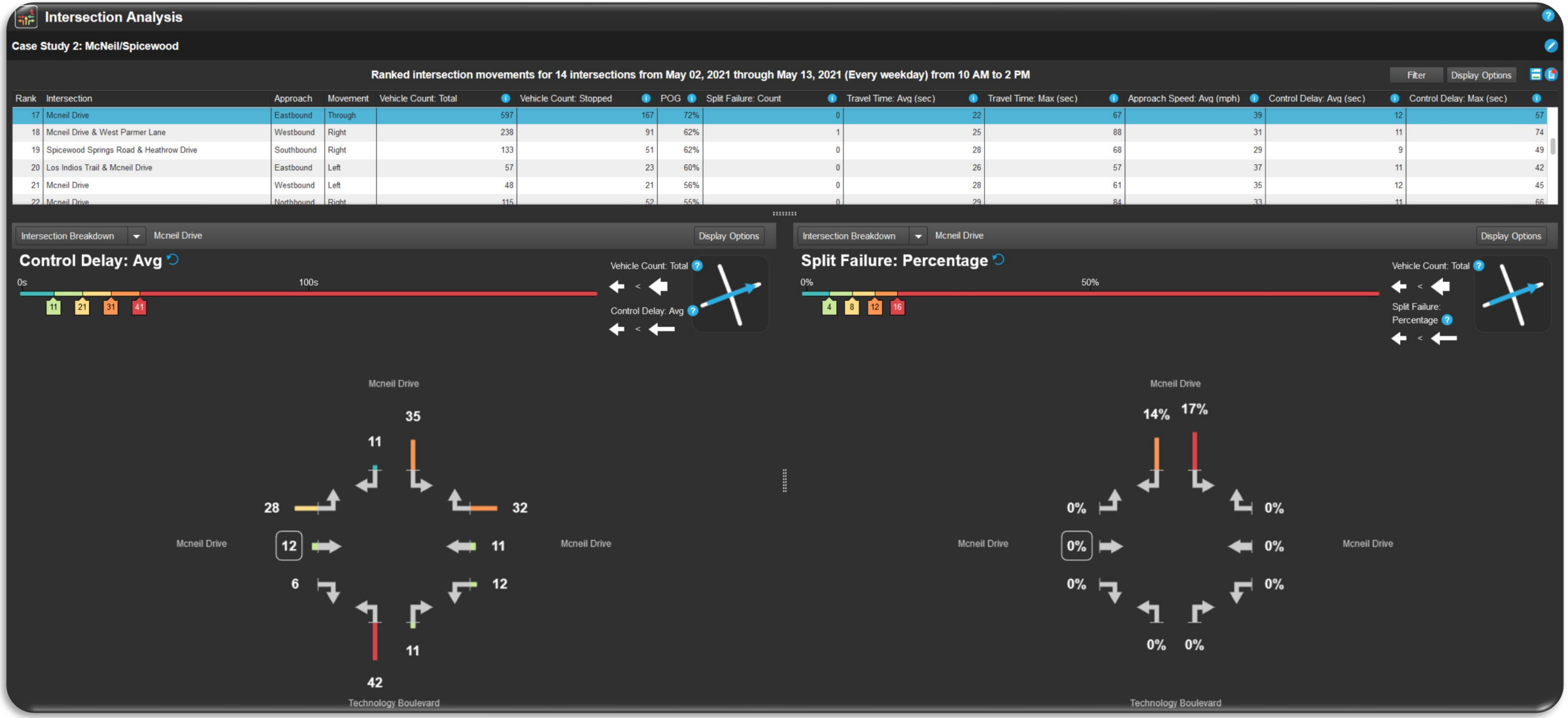
"Using corridor travel times to measure signal timing improvement can be good, but sometimes it seems they don't tell the whole story. Are there additional measures I can use?"

Solution: Use the Signal Analytics to compare split failures, control delay, and percent on green over time

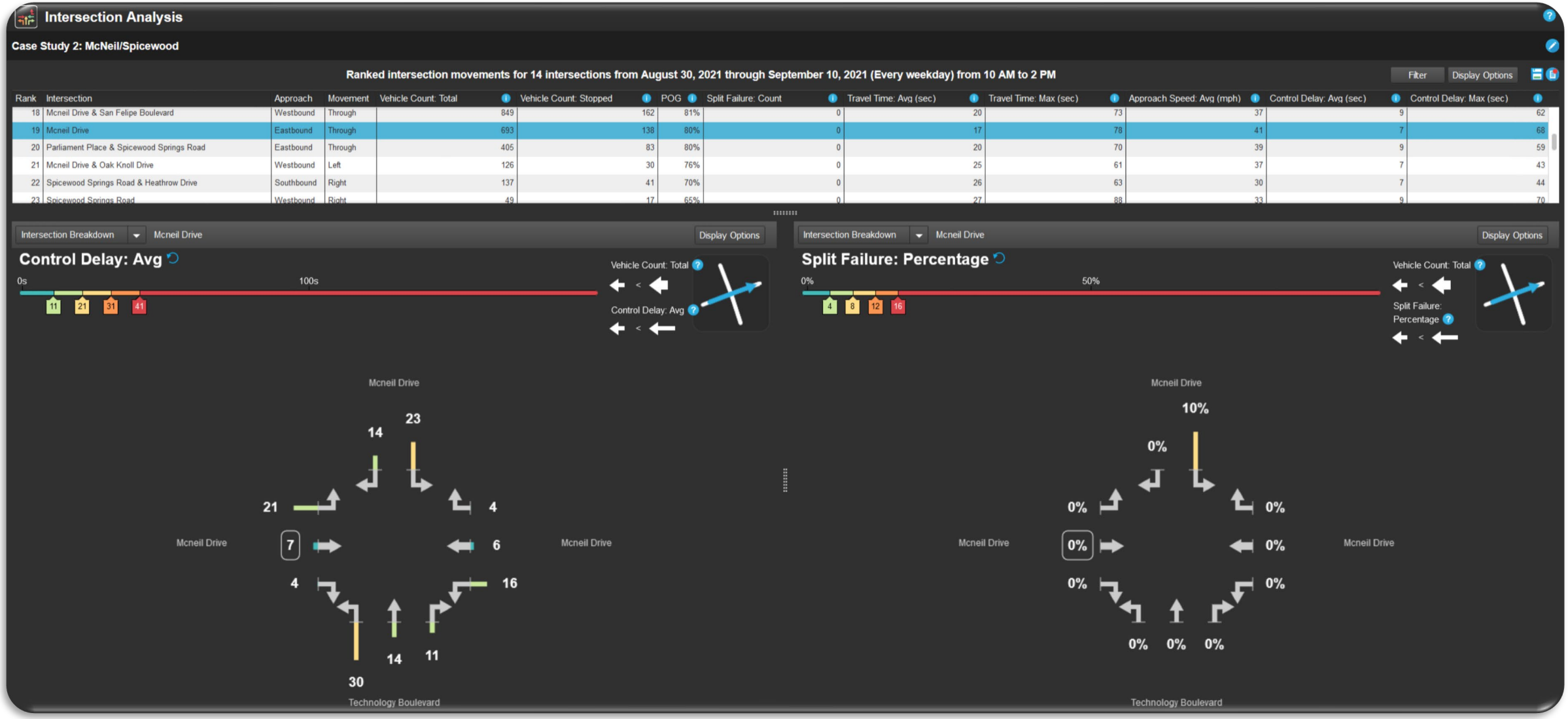
Selecting intersections on McNeil Dr.…



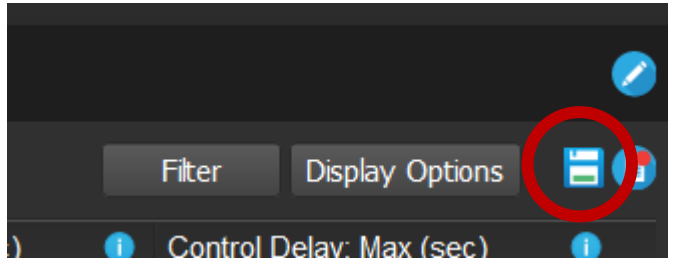
Before retiming



After retiming



Downloading Data

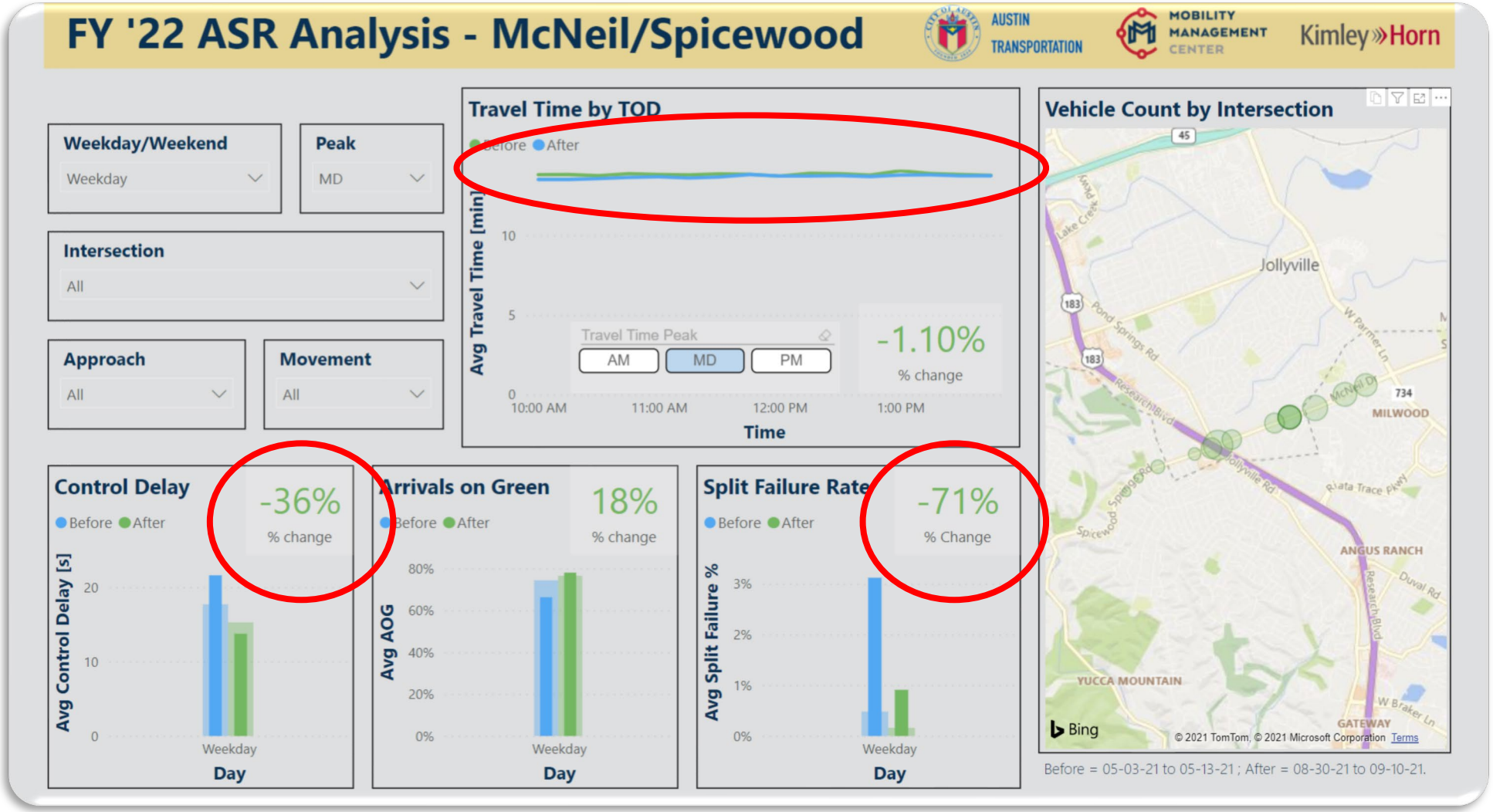


L29 | 28

Rank	Intersection	Intersection ID	Latitude	Longitude	Approach	Approach ID	Movement	Movement ID	Vehicle Count: Total	Vehicle Count: Stopped	Vehicle Count: Through	Estimated Volume: Total	Estimated Volume: Stopped	Estimated Volu
1	Mcneil Drive & Oak Knoll Drive	30.4394_-97.7542	30.4393591	-97.7542284	Westbound	30.4394_-97.7542-30.4394_-97.7542_3	Through	30.4394_-97.7542_X3Y2Z	852	15	837	25403	447	
2	Rustic Rock Drive & Spicewood Springs Road	30.4301_-97.7812	30.43014345	-97.78122745	Eastbound	30.4301_-97.7812-30.4301_-97.7812_1	Through	30.4301_-97.7812_DE3F	342	10	332	12838	375	
3	Rustic Rock Drive & Spicewood Springs Road	30.4301_-97.7812	30.43014345	-97.78122745	Westbound	30.4301_-97.7812-30.4301_-97.7812_3	Through	30.4302_-97.7813_2XW	317	10	307	11899	375	
4	Mcneil Drive & Oak Knoll Drive	30.4394_-97.7542	30.4393591	-97.7542284	Eastbound	30.4394_-97.7542-30.4394_-97.7542_2	Through	30.4394_-97.7542_3H3G	808	42	766	24091	1252	
5	Los Indios Trail & Mcneil Drive	30.4374_-97.7605	30.4373716	-97.7604817	Westbound	30.4374_-97.7605-30.4374_-97.7605_3	Through	30.4374_-97.7605_3Y	845	74	771	28414	2488	
6	Mcneil Drive & Heinemann Drive	30.4424_-97.7464	30.4423753	-97.7464263	Westbound	30.4424_-97.7464-30.4424_-97.7464_2	Through	30.4424_-97.7465_3Y	787	72	715	25773	2358	
7	Corpus Christi Drive & Mcneil Drive	30.4411_-97.7496	30.4411412	-97.74964205	Eastbound	30.4411_-97.7496-30.4411_-97.7496_1	Through	30.4411_-97.7496_4G	828	77	751	26539	2468	
8	Mcneil Drive & West Parmer Lane	30.4438_-97.7424	30.44384835	-97.74239143	Southbound	30.4438_-97.7424-30.4438_-97.7424_2	Right	30.4439_-97.7425_4P2Y	185	19	166	6449	662	
9	Corpus Christi Drive & Mcneil Drive	30.4411_-97.7496	30.4411412	-97.74964205	Westbound	30.4411_-97.7496-30.4411_-97.7496_3	Through	30.4412_-97.7497_5Y	853	89	764	27340	2853	
10	Spicewood Springs Road & Heathrow Drive	30.4316_-97.7783	30.43162835	-97.77829435	Westbound	30.4316_-97.7783-30.4316_-97.7783_3	Through	30.4317_-97.7783_3Z	262	33	229	8993	1133	
11	Mcneil Drive	30.4381_-97.7582	30.4381404	-97.7581562	Westbound	30.4381_-97.7582-30.4381_-97.7582_3	Through	30.4381_-97.7582_3Z3Y	824	109	715	23762	3143	
12	Mcneil Drive & Heinemann Drive	30.4424_-97.7464	30.4423753	-97.7464263	Eastbound	30.4424_-97.7464-30.4424_-97.7464_1	Through	30.4423_-97.7464_4G	739	101	638	24201	3308	
13	Spicewood Springs Road & Scotland Well Drive	30.4225_-97.7936	30.422528	-97.793613	Eastbound	30.4225_-97.7936-30.4225_-97.7936_1	Through	30.4225_-97.7936_2FEI	96	14	82	3797	554	
14	Spicewood Springs Road & Scotland Well Drive	30.4225_-97.7936	30.422528	-97.793613	Westbound	30.4225_-97.7936-30.4225_-97.7936_3	Through	30.4225_-97.7936_aYWX	132	22	110	5220	870	
15	Los Indios Trail & Mcneil Drive	30.4374_-97.7605	30.4373716	-97.7604817	Eastbound	30.4374_-97.7605-30.4374_-97.7605_1	Through	30.4374_-97.7605_5G	497	83	414	16712	2791	
16	Spicewood Springs Road & Heathrow Drive	30.4316_-97.7783	30.43162835	-97.77829435	Eastbound	30.4316_-97.7783-30.4316_-97.7783_1	Through	30.4316_-97.7783_F2H	361	65	296	12391	2231	
17	Mcneil Drive & West Parmer Lane	30.4438_-97.7424	30.44384835	-97.74239143	Southbound	30.4438_-97.7424-30.4438_-97.7424_2	Through	30.4439_-97.7425_6P	1167	219	948	40683	7635	
18	Mcneil Drive & San Felipe Boulevard	30.4352_-97.7670	30.4352045	-97.7670345	Westbound	30.4352_-97.7670-30.4352_-97.7670_3	Through	30.4352_-97.7670_6Y	849	162	687	29480	5625	
19	Mcneil Drive	30.4381_-97.7582	30.4381404	-97.7581562	Eastbound	30.4381_-97.7582-30.4381_-97.7582_1	Through	30.4381_-97.7582_4G2H	693	138	555	19984	3979	
20	Parliament Place & Spicewood Springs Road	30.4333_-97.7727	30.4333065	-97.77269095	Eastbound	30.4333_-97.7727-30.4333_-97.7727_1	Through	30.4333_-97.7727_5H	405	83	322	15521	3181	
21	Mcneil Drive & Oak Knoll Drive	30.4394_-97.7542	30.4393591	-97.7542284	Westbound	30.4394_-97.7542-30.4394_-97.7542_3	Left	30.4394_-97.7542_X3YV	126	30	96	3757	894	
22	Spicewood Springs Road & Heathrow Drive	30.4316_-97.7783	30.43162835	-97.77829435	Southbound	30.4316_-97.7783-30.4316_-97.7783_2	Right	30.4317_-97.7783_2QRZ	137	41	96	4703	1407	
23	Spicewood Springs Road	30.4283_-97.7831	30.4283	-97.78306185	Westbound	30.4283_-97.7831-30.4283_-97.7831_4	Right	30.4283_-97.7830_eD	49	17	32	1806	626	
24	Mcneil Drive & West Parmer Lane	30.4438_-97.7424	30.44384835	-97.74239143	Northbound	30.4438_-97.7424-30.4438_-97.7424_4	Right	30.4438_-97.7422_4hG	89	32	57	3103	1116	
25	Mcneil Drive & West Parmer Lane	30.4438_-97.7424	30.44384835	-97.74239143	Northbound	30.4438_-97.7424-30.4438_-97.7424_4	Through	30.4438_-97.7422_6h	792	329	463	27610	11469	
26	Mcneil Drive	30.4381_-97.7582	30.4381404	-97.7581562	Northbound	30.4381_-97.7582-30.4381_-97.7582_4	Right	30.4381_-97.7582_2Cj2H	139	58	81	4008	1673	
27	Mcneil Drive & West Parmer Lane	30.4438_-97.7424	30.44384835	-97.74239143	Westbound	30.4438_-97.7424-30.4438_-97.7424_3	Right	30.4440_-97.7423_ZYh	300	128	172	10458	4462	
28	Los Indios Trail & Mcneil Drive	30.4374_-97.7605	30.4373716	-97.7604817	Eastbound	30.4374_-97.7605-30.4374_-97.7605_1	Left	30.4374_-97.7605_4G2i	51	23	28	1715	773	
29	Mcneil Drive	30.4381 -97.7582	30.4381404	-97.7581562	Westbound	30.4381 -97.7582-30.4381 -97.7582 3	Left	30.4381 -97.7582 3ZRU	52	24	28	1500	692	

Little improvement in travel time

Significant improvement in control delay and split failure rate



Source: Kimley-Horn

Signal Analytics Resources

Resource Links

- Video Tutorials:
  https://ritis.org/tutorials/videos/

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