

Project Prioritization through Data Driven Performance Measures



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North Carolina Alliance MPOs

The VHB Team – Crossing Disciplines

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Beginning in Florida



Project Prioritization



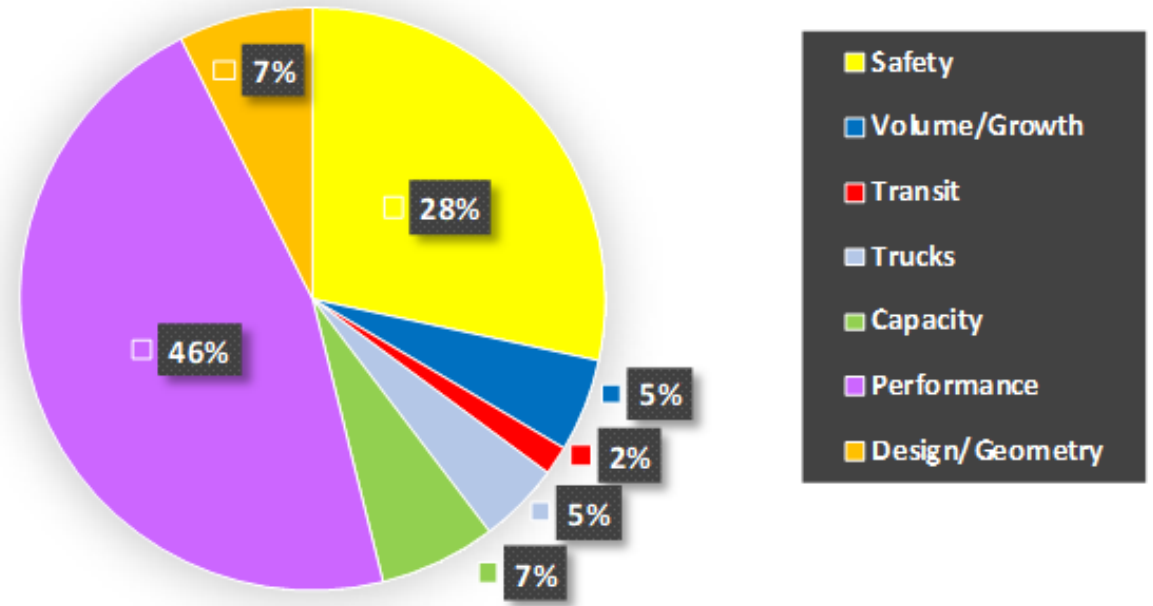
Prioritization Process

Data driven

Fully automated

20+ performance measurements compared

Scoring Breakdown



Where to Start???

Changes as Identified Below

All Data to be natural breaks rounded to nearest whole

Scoring Criteria/Grading Scale:

AADT - Average Annual Daily Traffic
Source: Available in LOS Capacity Analysis file used as base
Scoring Parameters: Range

Range:	Score:
>= 50,000	0
<= 50,000 and > 35,000	0.25
<= 35,000 and > 25,000	.5
<= 25,000 and > 10,000	.75
<= 10,000	1

Emphasize the Score and apply a high value

Calculated Capacity Analysis - The remaining capacity values calculated in the LOS Capacity Analysis file for each segment. Duplicate of V/C
Source: Available in LOS Capacity Analysis file used as base
Scoring Parameters: Range

Range:	Score:
Null (LOS F)	0
< 1,000	0
>= 1,000 and < 5,000	0
>= 5,000 and < 10,000	0
> 10,000	0

Volume/Capacity - AADT/Calculated Capacity - We may want to sway the counts to not double count with Capacity Analysis
Scoring Parameters: Range

Range:	Score:
>1.25	-0.5
<= 1.25 and > 1.0	-0.25
<= 1.0 and > 0.9	0
<= 0.9 and > 0.75	0.25
< 0.75	0.5

State Roads apart from the Other Roadways

KS

New Changes Applied

Scoring Criteria/Grading Scale:

AADT - Average Annual Daily Traffic
Source: Available in LOS Capacity Analysis file used as base
Scoring Parameters: Range

Range:	Score:
>= 35,000	0
>22,000 and <= 35,000	0.25
> 12,000 and <= 22,000	.5
> 6,000 and <= 12,000	.75
<= 6000	1

Emphasize the Score and apply a high value

Calculated Capacity Analysis - The remaining capacity values calculated in the LOS Capacity Analysis file for each segment. Duplicate of V/C
Source: Available in LOS Capacity Analysis file used as base
Scoring Parameters: Range

Range:	Score:
Null (LOS F)	0
< 1,000	0
>= 1,000 and < 5,000	0
>= 5,000 and < 10,000	0
> 10,000	0

Volume/Capacity - AADT/Calculated Capacity - We may want to sway the counts to not double count with Capacity Analysis
Scoring Parameters: Range

Range:	Score:
>0.9	-0.5
<= 0.9 and > 0.7	-0.25
<= 0.7 and > 0.5	0
<= 0.5 and > 0.25	0.25
< 0.25	0.5

What do we want to Measure?

What data is Available?

What data is Actually Available?

- **Transit Routes** to be collected to identify if availability exists on corridor or segment. Includes Transit Ridership information to be collected from providers

How to Score?

Discussed closely the process to determine Groupings and Score Ranges

This process allows Priorities to be set based on Focus Areas

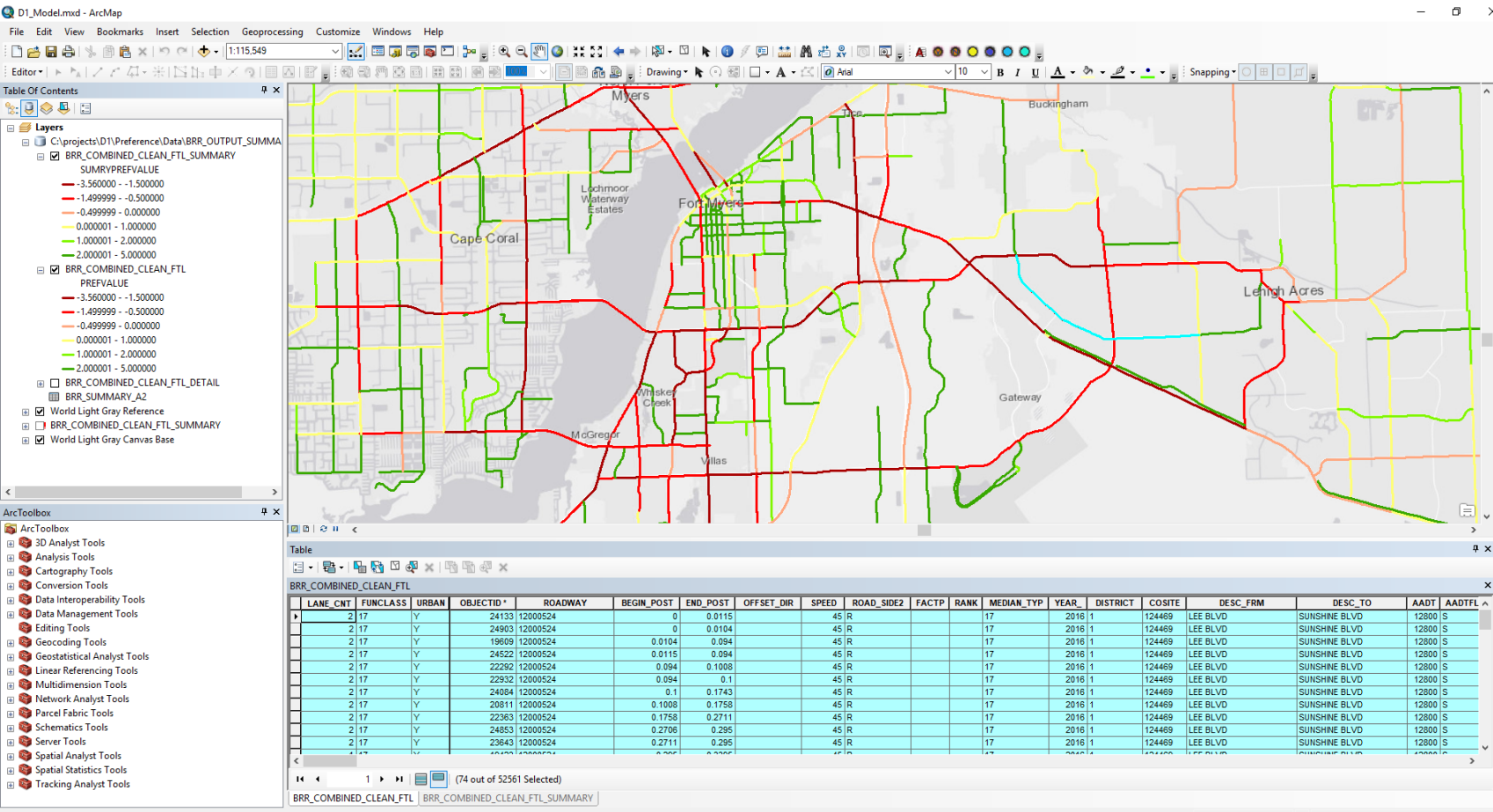
Groupings

Safety - 4	-3.15 to 1.25
Capacity - 2	-0.5 to 0.5
Performance - 7	-6 to 1.2
Trucks - 1	-0.5 to 0.2
Design/Geometry - 3	-0.8 to 0.35
Transit - 2	0 to 0.25
Volume/Growth - 2	-0.3 to 0.5

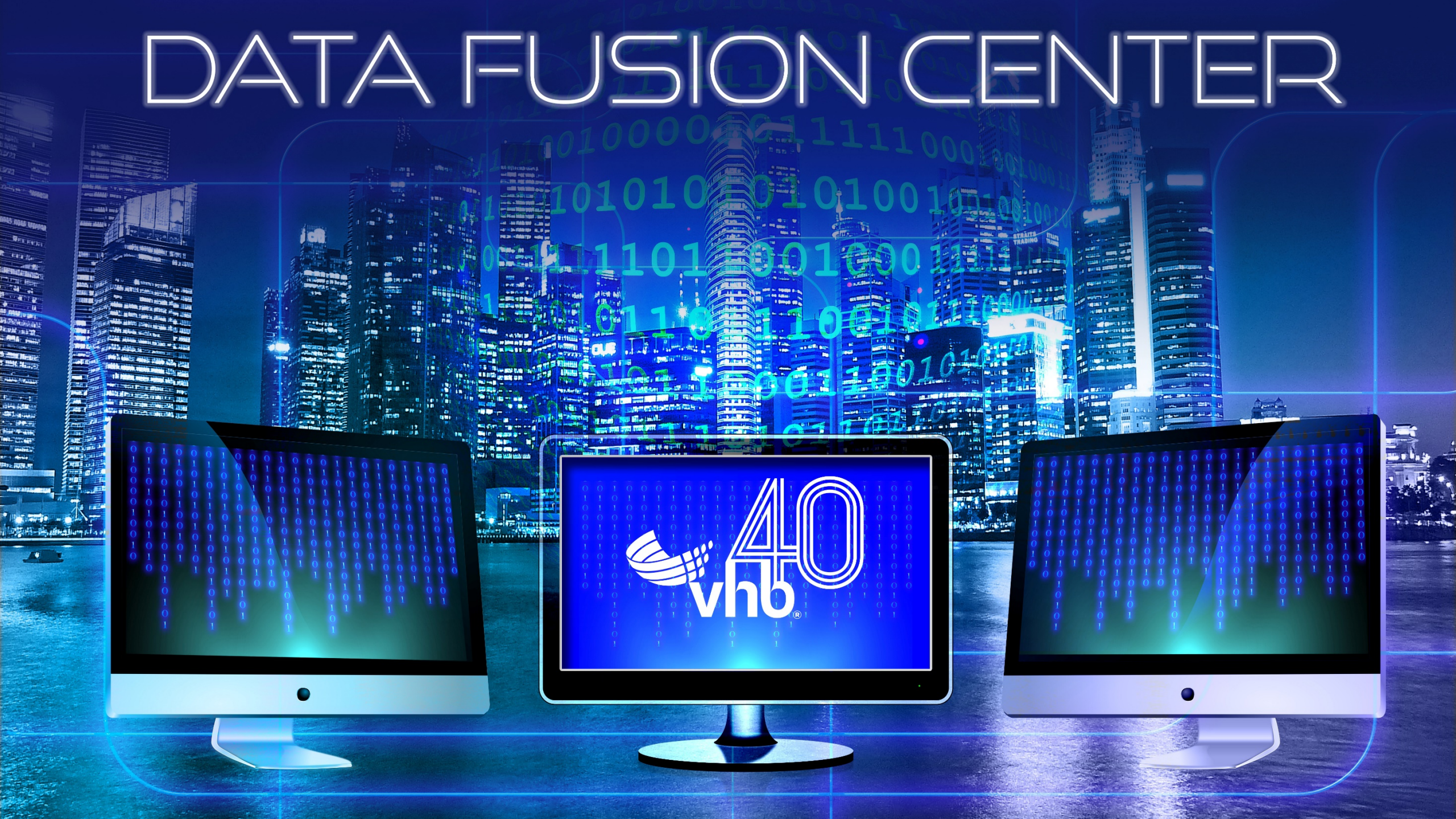
Finding Priorities

Using GIS, we evaluated both Spatial and Tabular Relationships

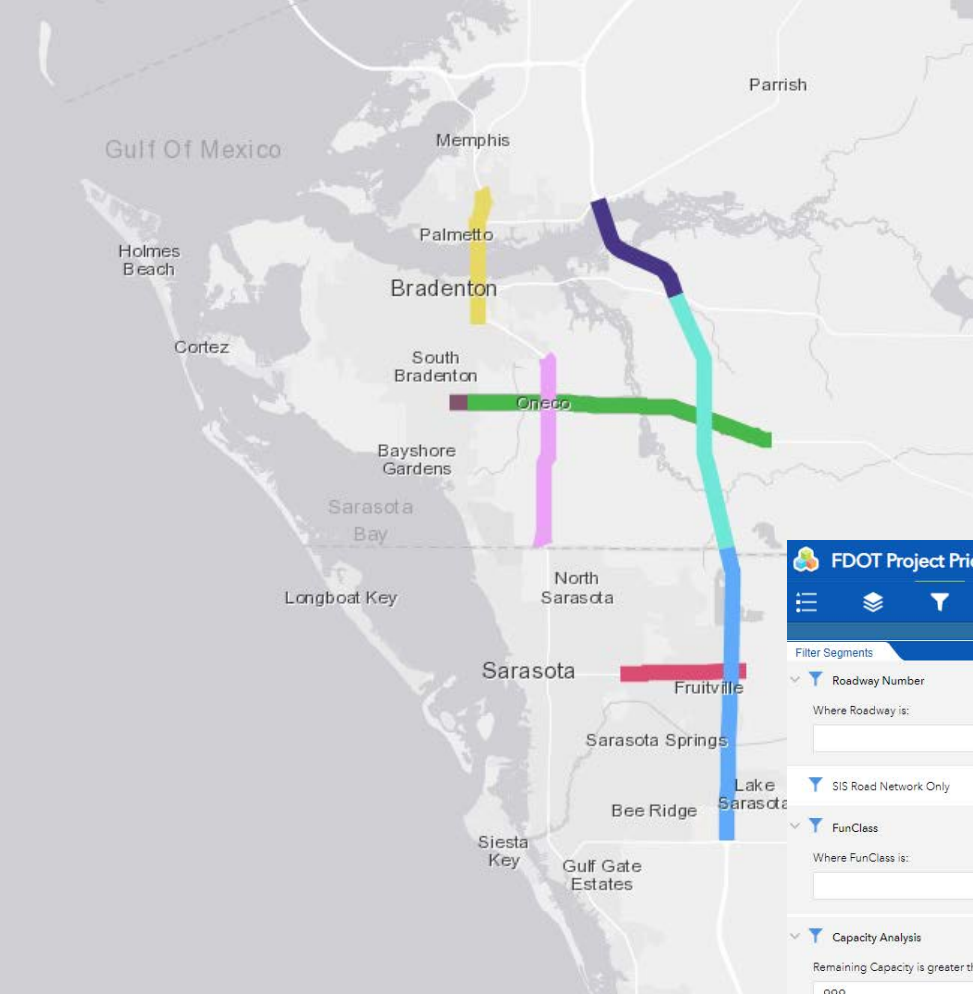
Setting the Prioritization Score Allowed Priorities to Surface



DATA FUSION CENTER



Top Scoring Roadway Segments Across Multiple Categories are Identified and Set as Priorities



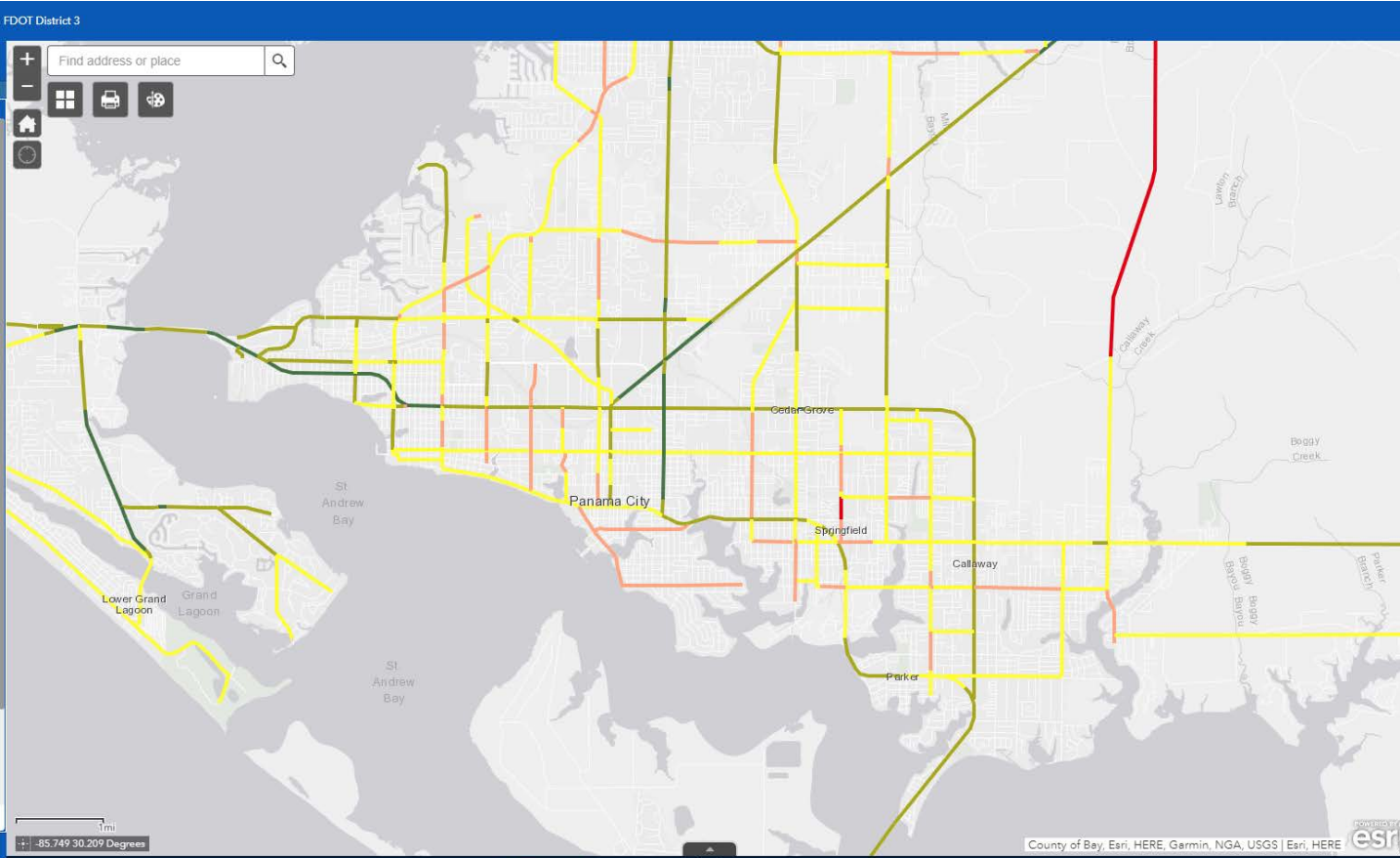
FDOT Project Prioritization Tool

FDOT District 3

Find address or place

Filter Segments

- Roadway Number
Where Roadway is:
- SIS Road Network Only
- FunClass
Where FunClass is:
- Capacity Analysis
Remaining Capacity is greater than:
- Capacity Analysis - less than
Remaining Capacity is less than:
- Crash Analysis
Crashes on segments greater than:
- Freight Preference Scoring - Greater Than
Find segments with a Freight Preference score higher than:

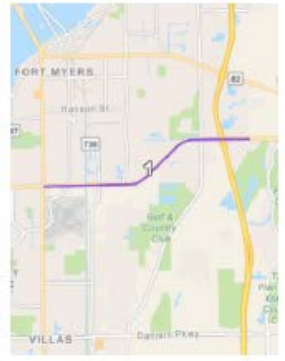


Data and Priority Reporting

ARTERIAL SEGMENT 1: Lee Blvd (US 41 to State R/W Line)

(Page 1 of 2)

SEGMENT 1 MAP

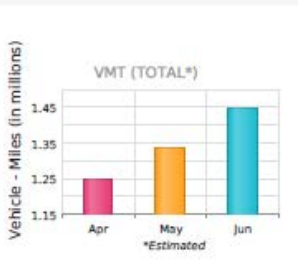
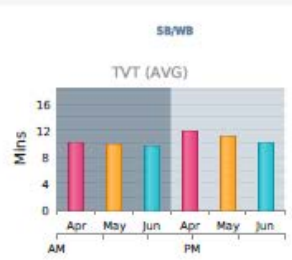
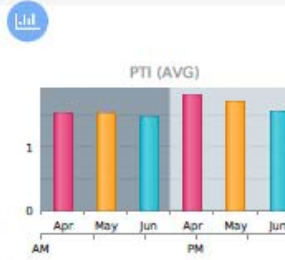
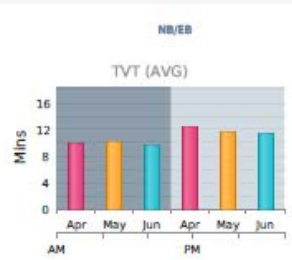
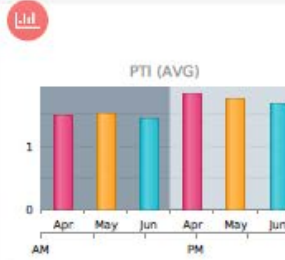
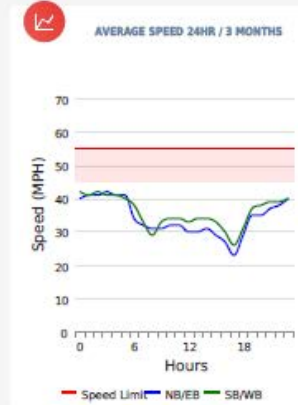
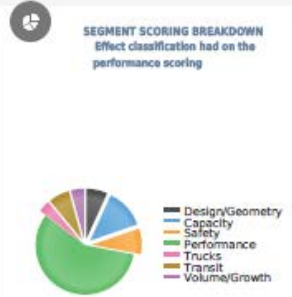


Cost of Congestion
(\$ per quarter based on time lost)

\$5.2M

SEGMENT 1 INFORMATION

Roadway ID	Common Name	Begin MP	Begin Name	End MP	End Name	County	Speed Limit Range	No. Lanes
12305000	Lee Blvd	1.17	US 41	6.46	State R/W Line	Lee	45-55 MPH	4-6



ARTERIAL SEGMENT 1: Lee Blvd (US 41 to State R/W Line)

(Page 2 of 2)



BLUETOOTH DATA 1 INFORMATION

BlueTooth Segment Information

NO DATA AVAILABLE

NO DATA AVAILABLE

NO DATA AVAILABLE

NO DATA AVAILABLE

NO DATA AVAILABLE

NO DATA AVAILABLE



Evolving to North Carolina



Finding Promising Rural Spot Mobility Projects

Objectives

- Develop a method to systematically scan NCDOT roadways outside of areas covered by MPOs to look for promising spot mobility sites
- Execute the new method and develop a ranked list of spot mobility sites with potential that NCDOT can utilize to develop candidate mobility projects

Data Sources

- HERE
 - 2017 Year used
 - 2nd Calendar week for each Month
 - 36 Days in total
 - Tuesday, Wednesday, and Thursday
 - Peak Time Periods
 - AM (7-9)
 - PM (4-6)

Parameter-Based Scoring

- An automated and parameter driven methodology to provide a scoring matrix.
- Multiple characteristics were considered with two used in the current analysis to identify segments based on operational performance and volumes.

Volume/Capacity

Range	Score
> 1.5	-1
<=1.5 and >1.1	-0.75
<=1.1 and > 0.9	-0.5
<=0.9 and > 0.5	0.5
< 0.5	1

TTI

Range	Score
<1.0	0.25
>=1.0 and < 1.25	-0.25
>=1.25 and < 1.5	-0.5
>=1.5 and < 2	-0.75
>=2	-1



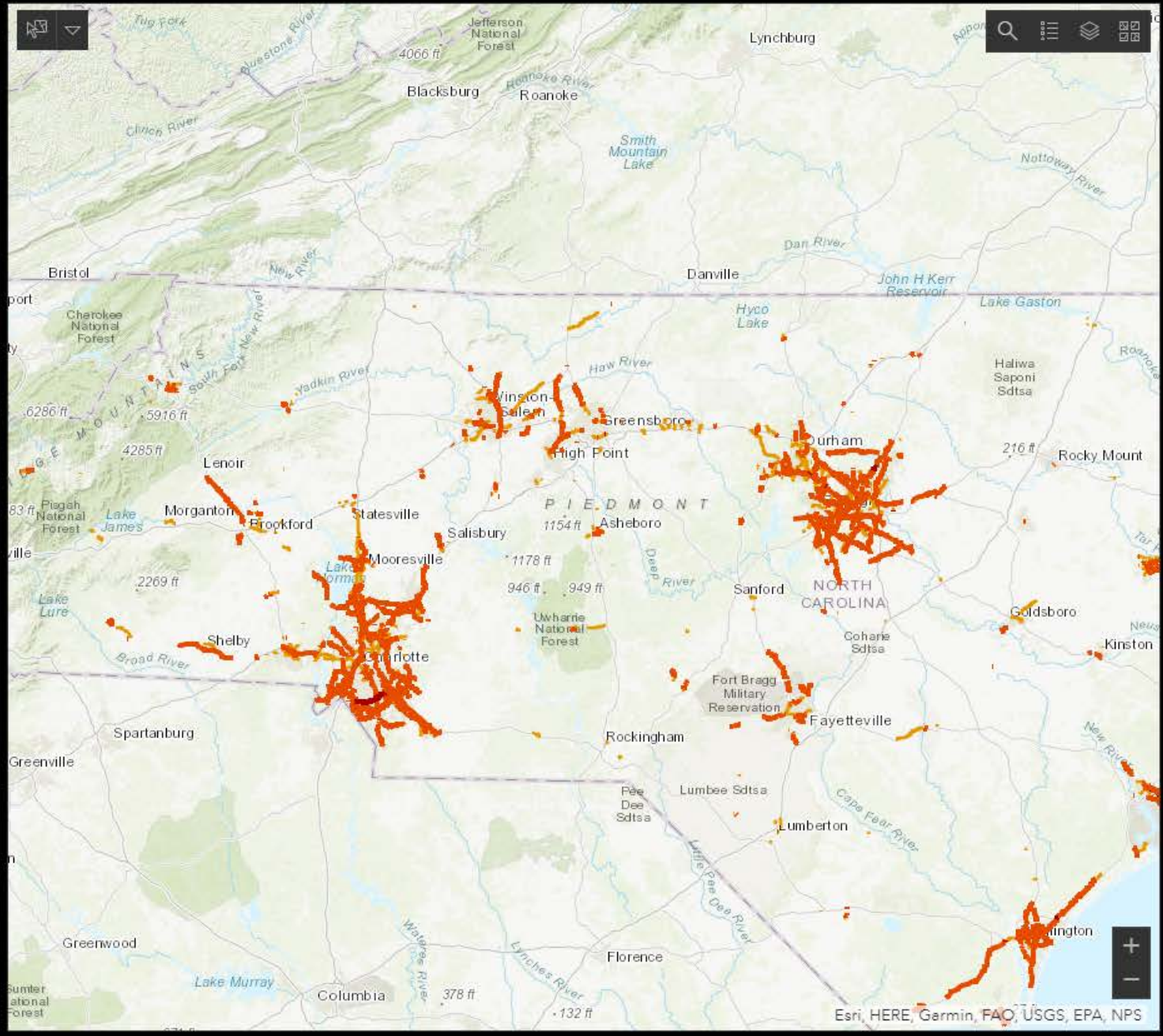
Filter by Region

- Select a Region
- Select a Region
- BLUE RIDGE MOUNTAINS
- CAPE FEAR
- CAPITAL
- EASTERN OBX
- HIGH COUNTRY AND FOOTHILLS
- METRO
- SANDHILLS
- TRIAD

Top 250 Roads - Click to view on map

- Route: NC-51 Score: -2
County: MecklenBurg, Division: 10
Region: METRO
- Route: NC-51 Score: -2
County: MecklenBurg, Division: 10
Region: METRO
- Route: NC-51 Score: -2
County: MecklenBurg, Division: 10
Region: METRO
- Route: NC-133 Score: -2
County: Brunswick, Division: 3
Region: CAPE FEAR
- Route: SR-2000 Score: -2
County: Wake, Division: 5
Region: CAPITAL
- Route: SR-2000 Score: -2
County: Wake, Division: 5
Region: CAPITAL
- Route: SR-2000 Score: -2
County: Wake, Division: 5
Region: CAPITAL
- Route: SR-2000 Score: -2
County: Wake, Division: 5
Region: CAPITAL
- Route: US-29 Score: -2
County: Guilford, Division: 7
Region: TRIAD
- Route: US-19 Score: -2
County: Buncombe, Division: 13
Region: BLUE RIDGE MOUNTAINS
- Route: I-540 Score: -2
County: Wake, Division: 5
Region: CAPITAL

Average Performance Score for
0.561





FUNDING CATEGORY

>\$20B in funding



STATEWIDE

SELECTION BASED ON **100%** DATA

ADDRESS SIGNIFICANT CONGESTION AND BOTTLENECKS

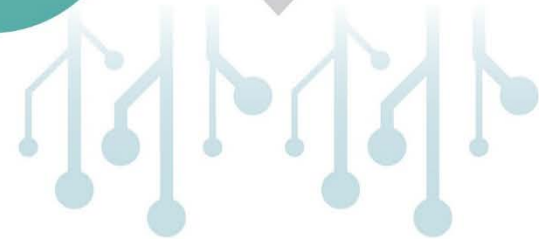
REGIONAL

SELECTION BASED ON **70%** DATA

IMPROVE CONNECTIVITY

DIVISION

SELECTION BASED ON **50%** DATA



BIG DATA

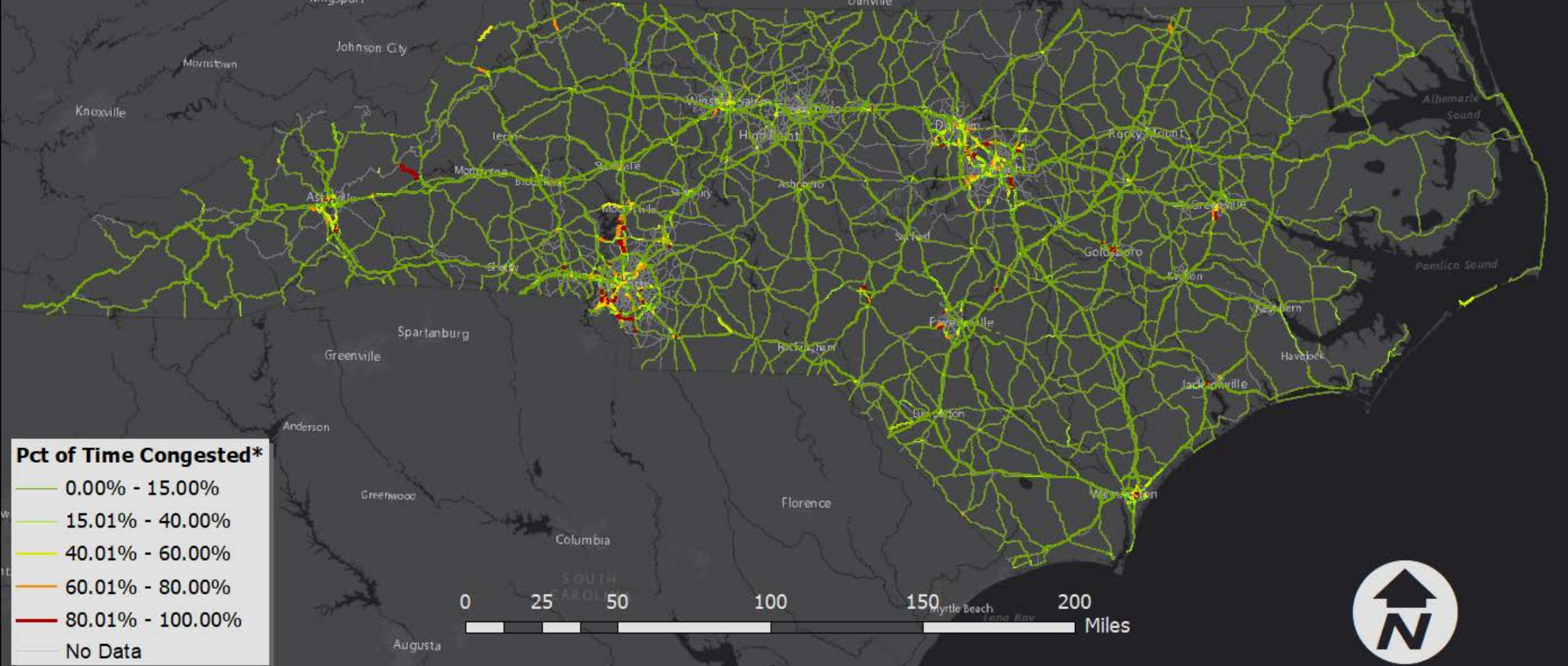
Changes to criteria based on big data

CRITERIA

Time travel reliability



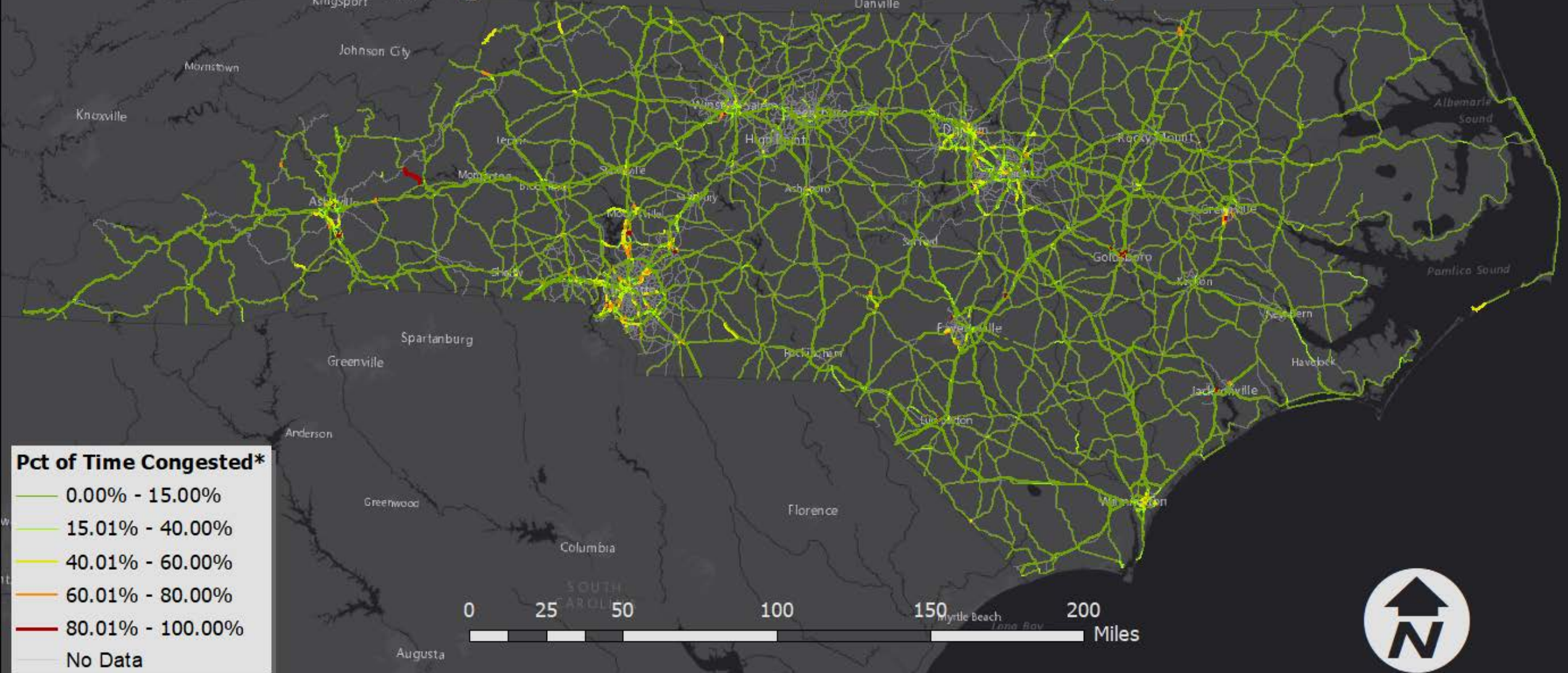
PM Peak Period Congestion Frequencies (16:00 - 18:00)



- Pct of Time Congested***
- 0.00% - 15.00%
 - 15.01% - 40.00%
 - 40.01% - 60.00%
 - 60.01% - 80.00%
 - 80.01% - 100.00%
 - No Data

*: For time intervals with a confidence score > 80%

PM Peak Period Congestion Frequencies (16:00-18:00, Wed-Sun)



*: For time intervals with a confidence score >80%

Head of Congestion

Congestion = travel speed < 75% of freeflow speed



	TMC	TMC1	TMC2	TMC3	TMC4	TMC5
Length	0.5	0.75	1	0.5	1.5	1.25
T-3	.86	.81	.80	.85	.81	.81
T-2	.82	.81	.82	.81	.80	.82
T-1	.83	.80	.80	.79	.77	.84
T	.81	.79	.80	.76	.65	.83
T2	.82	.80	.81	.60	.55	.82
T3	.82	.81	.72	.55	.45	.80
T4	.79	.71	.68	.55	.74	.79
T5	.78	.72	.59	.50	.80	.81
T6	.81	.76	.52	.48	.81	.82
T7	.82	.78	.65	.54	.79	.80
T8	.81	.80	.70	.67	.82	.82
T9	.77	.81	.76	.76	.85	.84
T10	.80	.82	.77	.80	.85	.85

Start: 2018-12-09 11:10, Head: 125P04834, Impact Score: 59.7704732022858, Distance: 1.36974 miles, Duration: 5 minutes, Impacts: {
11:10: [tmc: 125P04834, sp: 31, % of FF: 56%, tmc: 125+04834, sp: 31, % of FF: 56%]}

Start: 2018-12-09 13:45, Head: 125P04834, Impact Score: 188.575844494629, Distance: 1.36974 miles, Duration: 20 minutes, Impacts: {
13:45: [tmc: 125P04834, sp: 39.66, % of FF: 72%, tmc: 125+04834, sp: 39.66, % of FF: 72%],
13:50: [tmc: 125P04834, sp: 32.62, % of FF: 59%, tmc: 125+04834, sp: 32.62, % of FF: 59%],
13:55: [tmc: 125P04834, sp: 36, % of FF: 65%, tmc: 125+04834, sp: 36, % of FF: 65%],
14:00: [tmc: 125P04834, sp: 36, % of FF: 65%, tmc: 125+04834, sp: 36, % of FF: 65%]}

Start: 2018-07-29 07:00, Head: 125P04833, Impact Score: 26.9017330342102, Distance: 0.85973 miles, Duration: 5 minutes, Impacts: {
07:00: [tmc: 125P04833, sp: 37.79, % of FF: 69%, tmc: 125+04833, sp: 37.79, % of FF: 69%]}

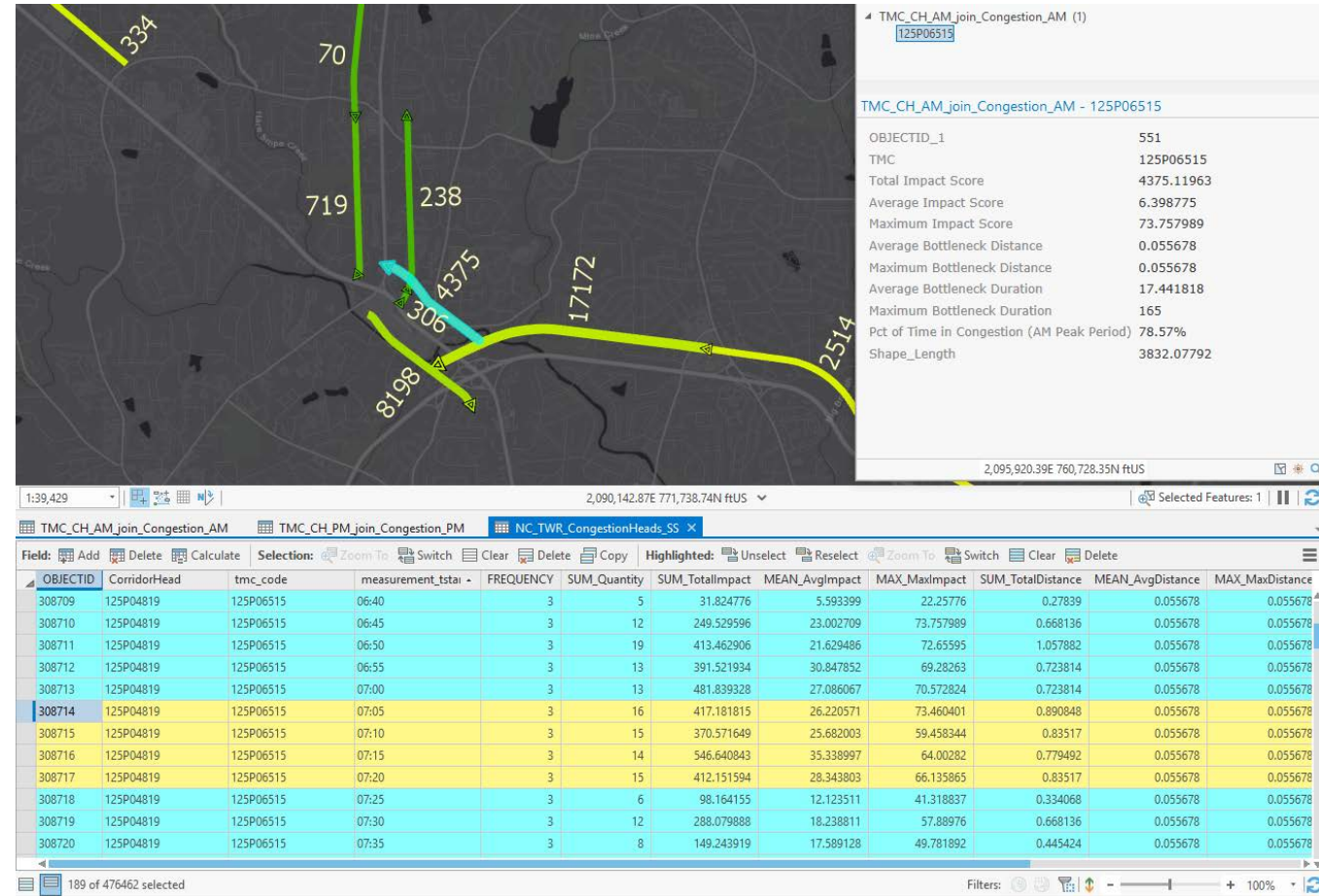
Start: 2018-07-29 07:30, Head: 125P04833, Impact Score: 453.593556526985, Distance: 0.85973 miles, Duration: 65 minutes, Impacts: {
07:30: [tmc: 125P04833, sp: 38.37, % of FF: 70%, tmc: 125+04833, sp: 38.37, % of FF: 70%],
07:35: [tmc: 125P04833, sp: 9.37, % of FF: 17%, tmc: 125+04833, sp: 9.37, % of FF: 17%],
07:40: [tmc: 125P04833, sp: 11.64, % of FF: 21%, tmc: 125+04833, sp: 11.64, % of FF: 21%],
07:45: [tmc: 125P04833, sp: 12.8, % of FF: 23%, tmc: 125+04833, sp: 12.8, % of FF: 23%],
07:50: [tmc: 125P04833, sp: 27, % of FF: 49%, tmc: 125+04833, sp: 27, % of FF: 49%],
08:00: [tmc: 125P04833, sp: 20.59, % of FF: 37%, tmc: 125+04833, sp: 20.59, % of FF: 37%],
08:05: [tmc: 125P04833, sp: 35.73, % of FF: 65%, tmc: 125+04833, sp: 35.73, % of FF: 65%],
08:20: [tmc: 125P04833, sp: 31.8, % of FF: 58%, tmc: 125+04833, sp: 31.8, % of FF: 58%],
08:25: [tmc: 125P04833, sp: 36.26, % of FF: 66%, tmc: 125+04833, sp: 36.26, % of FF: 66%],
08:30: [tmc: 125P04833, sp: 36.26, % of FF: 66%, tmc: 125+04833, sp: 36.26, % of FF: 66%]}

Start: 2018-07-29 09:35, Head: 125P04833, Impact Score: 24.8852715815735, Distance: 0.85973 miles, Duration: 5 minutes, Impacts: {
09:35: [tmc: 125P04833, sp: 39.08, % of FF: 71%, tmc: 125+04833, sp: 39.08, % of FF: 71%]}

Start: 2018-07-29 10:40, Head: 125P04833, Impact Score: 340.707360930557, Distance: 1.54241 miles, Duration: 35 minutes, Impacts: {
10:40: [tmc: 125P04833, sp: 34.54, % of FF: 63%, tmc: 125+04833, sp: 34.54, % of FF: 63%, tmc: 125P04832, sp: 23.11, % of FF: 42%, tmc: 125+04832, sp: 23.11, % of FF: 42%],
10:45: [tmc: 125P04833, sp: 33.63, % of FF: 61%, tmc: 125+04833, sp: 33.63, % of FF: 61%],
10:50: [tmc: 125P04833, sp: 16.7, % of FF: 30%, tmc: 125+04833, sp: 16.7, % of FF: 30%],
10:55: [tmc: 125P04833, sp: 12.07, % of FF: 22%, tmc: 125+04833, sp: 12.07, % of FF: 22%],
11:05: [tmc: 125P04833, sp: 23.42, % of FF: 43%, tmc: 125+04833, sp: 23.42, % of FF: 43%],
11:10: [tmc: 125P04833, sp: 17, % of FF: 31%, tmc: 125+04833, sp: 17, % of FF: 31%]}

Next Steps - Potential Aggregations

- 5 Minute
- Maximum Impact during Each Peak Period or
- Aggregate of all Impact during Each Peak Period
- When Occurrence as Head of Congestion is greater than 40%
- Historical Data – 2016, 2017





Find address or place

Map navigation controls: zoom in (+), zoom out (-), home, refresh, full screen, list

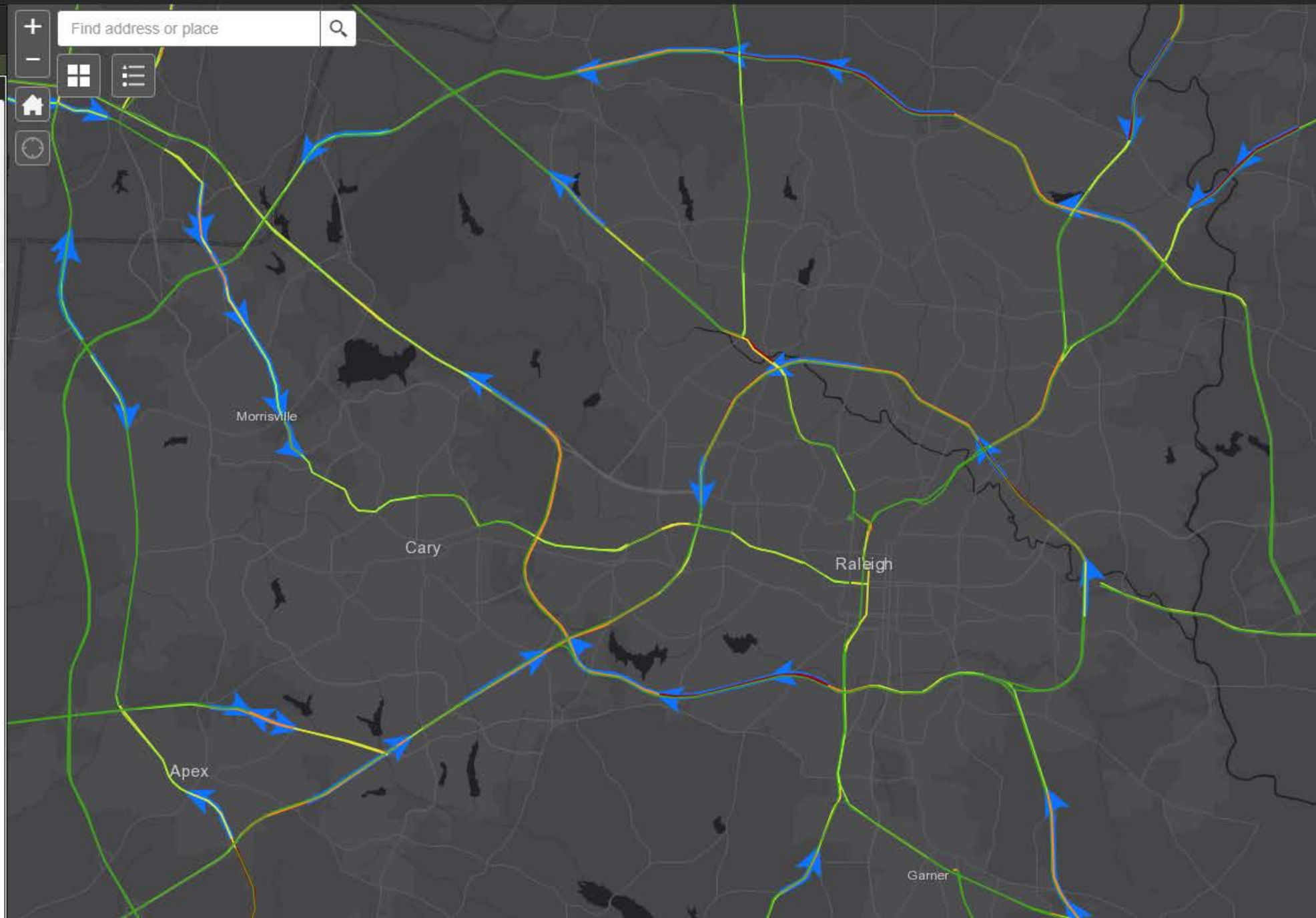
Filter

NCDOT_PILOT_Service - TMCmerged Congestion HEAD - PM 2 -7

PM Congestion Head Average Impact Score is greater than

NCDOT_PILOT_Service - TMCmerged Congestion HEAD - AM 5 -10

AM Congestion Head Average Impact Score is greater than



In the Future





We are ready to go!

Big Data Management

Dashboards

Healthy Community
and Smart City

Connected/

Autonomous Vehicles

Machine Learning &

Artificial Intelligence

