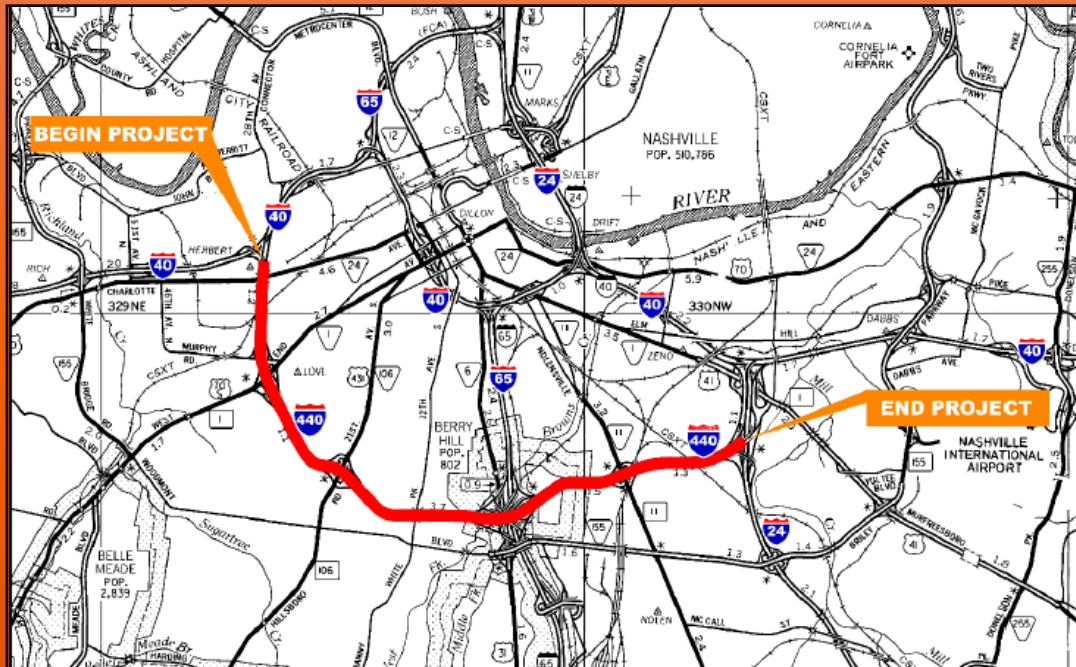


# ACTIVE CORRIDOR MANAGEMENT “LITE” DURING THE I-440 CONSTRUCTION PROJECT



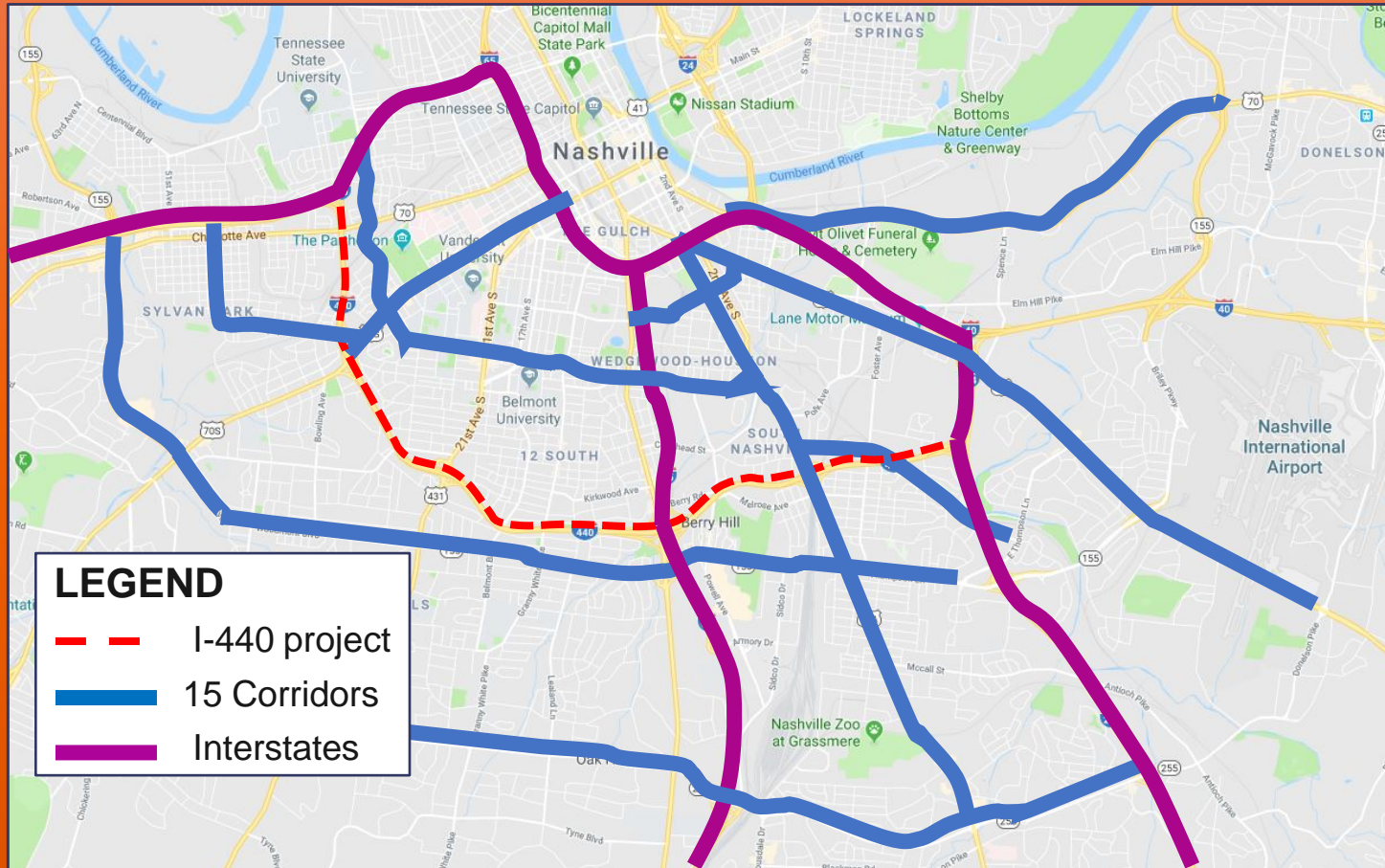
# I-440 Project Overview



- Nashville continues growing
- Safety improvements needed along 7.8 miles of I-440
- Crash rates on I-440 are nearly double (1.8 times) the statewide average
- Since 2008, there have been 16 fatalities on I-440
- Road widening, adding medians and landscaping enhancements
- Improvements funded by the Improve Act
- Project completion August 2020

# Traffic Diversion Analysis

## VISSIM and Synchro Models

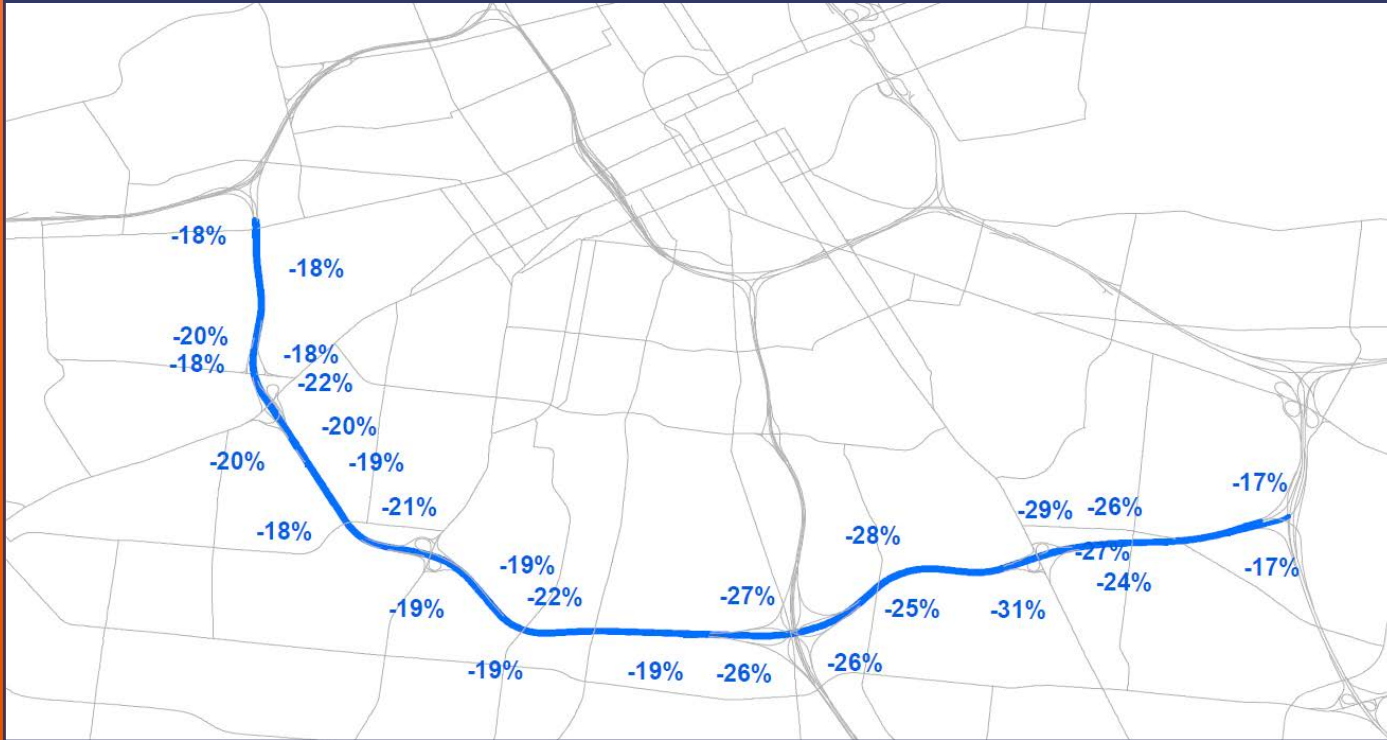




# Traffic Diversion Analysis

## Regional Travel Demand Model

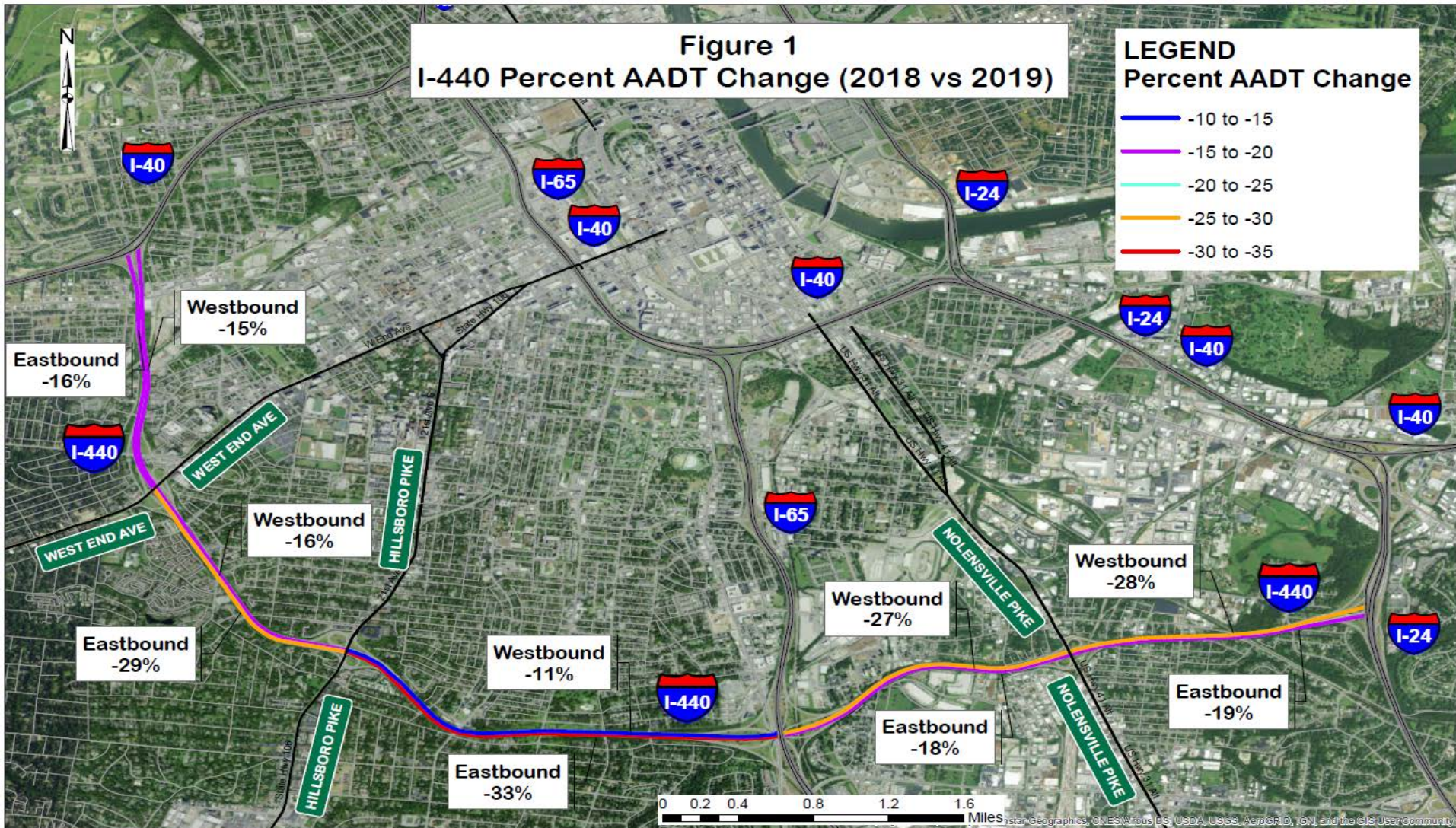
### Model predicted diversion percentages:



Model predicted a reduction in traffic volumes on I-440 ranging between -17% and -31%



# Actual I-440 Percent AADT Change (2018 vs. 2019)



Actual reduction in traffic volumes has ranged between -15% to -33%

# I-440 Percent AADT Change (2018 vs. 2019)

From	To	Begin Log Mile	End Log Mile	2018 AADT	2019 AADT	Percent Change
I-40	West End Avenue	0.00	1.50	83,050	69,975	-16%
West End Avenue	Hillsboro Pike	1.50	2.86	94,780	72,800	-23%
Hillsboro Pike	I-65	2.86	4.85	103,690	79,250	-24%
I-65	Nolensville Pike	4.85	6.33	109,280	84,000	-23%
Nolensville Pike	I-24	6.33	7.66	109,170	84,275	-23%
<b>I-440 Corridor (average)</b>				<b>99,994</b>	<b>78,060</b>	<b>-22%</b>





# Active Corridor Management

- Monitor real time traffic flow
- Adjust signal timing to minimize delay

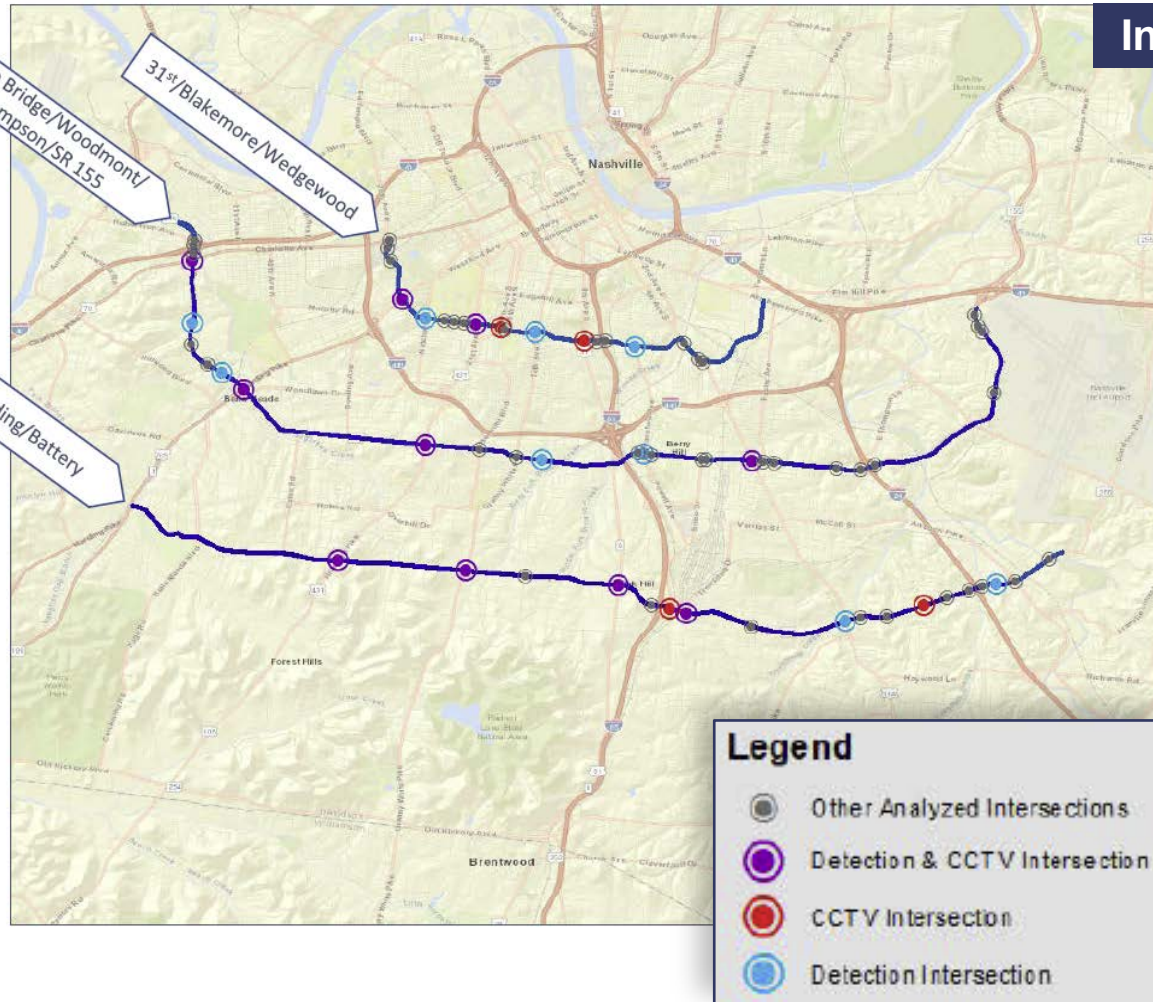
## Benefits

- Better utilization of street network ~ reduced delay
- Real time adjustments ~ instant queue reduction
- Decrease incident response times via CCTV surveillance.



# Active Corridor Management

## Detection & CCTV Intersections on Priority East-West Corridors



### Intersections

#### 31<sup>st</sup>/Blakemore/Wedgewood

31<sup>st</sup> Ave @ West End  
31<sup>st</sup> Ave @ Natchez Trace  
Blakemore @ 21<sup>st</sup> Ave  
Blakemore @ 17<sup>th</sup> Ave  
Wedgewood @ 12<sup>th</sup> Ave  
Wedgewood @ 8<sup>th</sup> Ave  
Wedgewood @ Bransford Ave

#### White Bridge/Woodmont/Thompson/SR 155

White Bridge Pike @ Charlotte Pike/Charlotte Ave  
White Bridge Pike @ Knob Rd  
White Bridge Pike @ Post Rd  
White Bridge Pike/Woodmont Blvd @ Harding Pike  
Woodmont Blvd @ Hillsboro Pike  
Woodmont Blvd @ Lealand Lane  
Woodmont Blvd/Thompson Lane @ Bransford Ave  
Thompson Lane @ Nolensville Pike

#### Harding/Battery

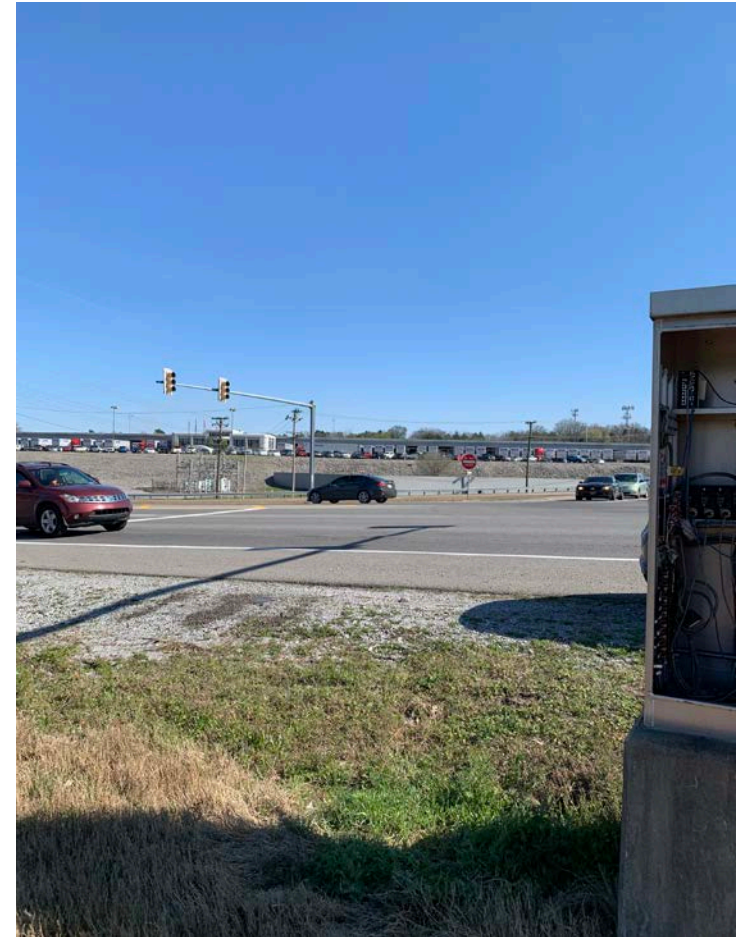
Harding Place @ Hillsboro Pike  
Harding Place/Batter Lane @ Granny White Pike  
Harding Place/Battery Lane @ Franklin Rd  
Harding Place @ I-65 NB Ramp  
Harding Place @ Trousdale Dr  
Harding Place @ Nolensville Pike  
Harding Place @ Tampa Dr  
Harding Place @ Metroplex Dr/Perimeter Park Dr



# Active Corridor Management

## Full Active Corridor Management was not achievable for this project:

- Time frame – lack of sufficient time to upgrade network before project began.
- Additional resources needed
- Existing signal interconnect consists of copper twisted pair that does not provide a reliable communication network.
- No existing Metro Traffic Management Center
- Lack of CCTVs on any of the project corridors make it difficult to monitor field conditions remotely



# I-440 Active Corridor Management “Lite”

- ❖ Updated Signal timing and time of day plans for 58 signals
  - Longer cycles to handle diversion traffic
- ❖ Arcadis Installed 21 BlueTOAD devices
  - Installed in January of 2019 to capture pre-construction data.
  - Allow staff to monitor changes in traffic patterns during the various phases of construction
- ❖ Respond / Investigate citizen and council member complaints
  - Pull BlueTOAD data to verify complaint
  - Provide response to complaint and corrective action taken if any

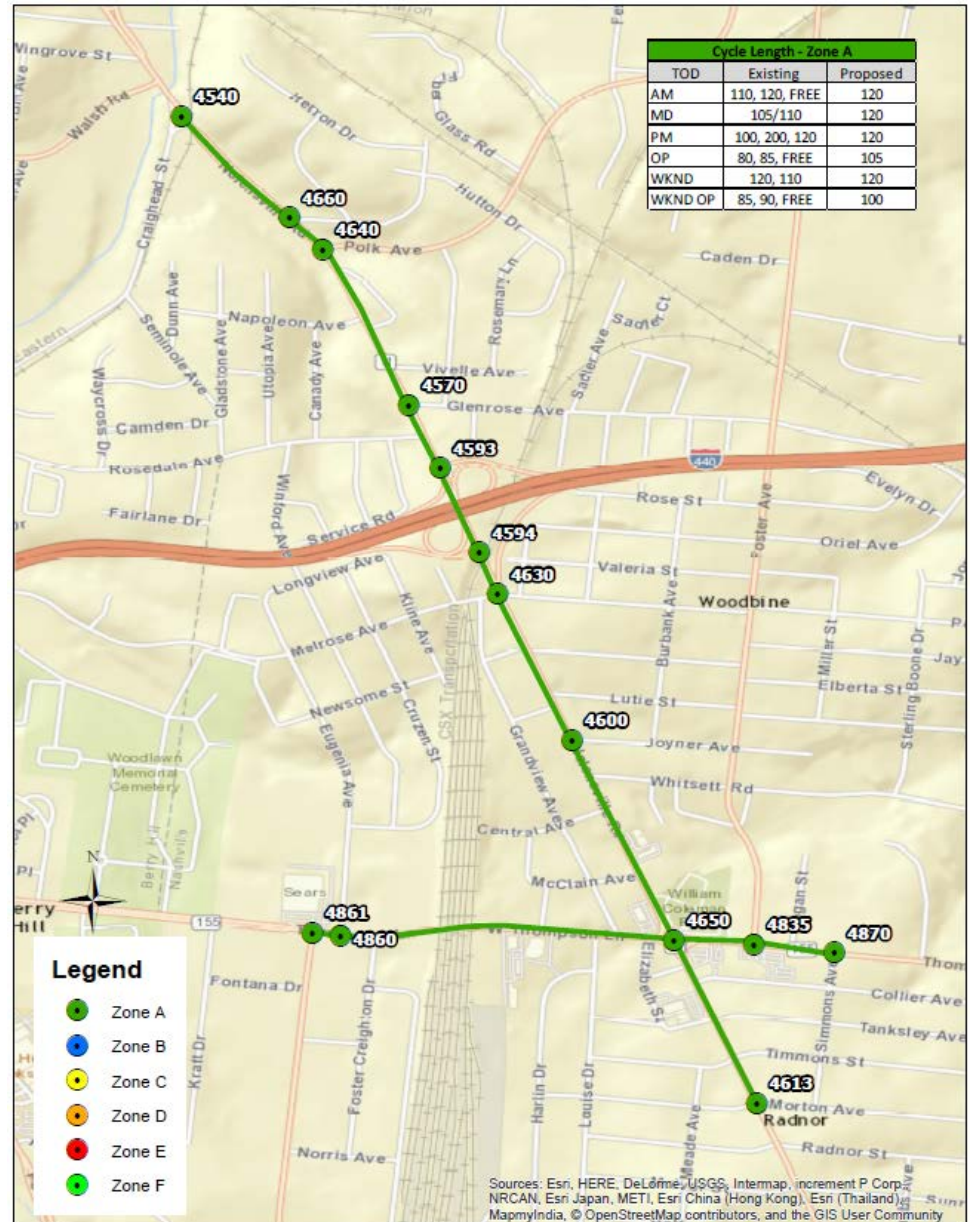




# I-440 Temporary Signal Timing

8 Signal Groups Updated:

- ✓ 58 Traffic Signals
- ✓ Optimized Coordination and Time of Day Settings



# I-440 Temporary Signal Timing

## Field Implementation Schedule:

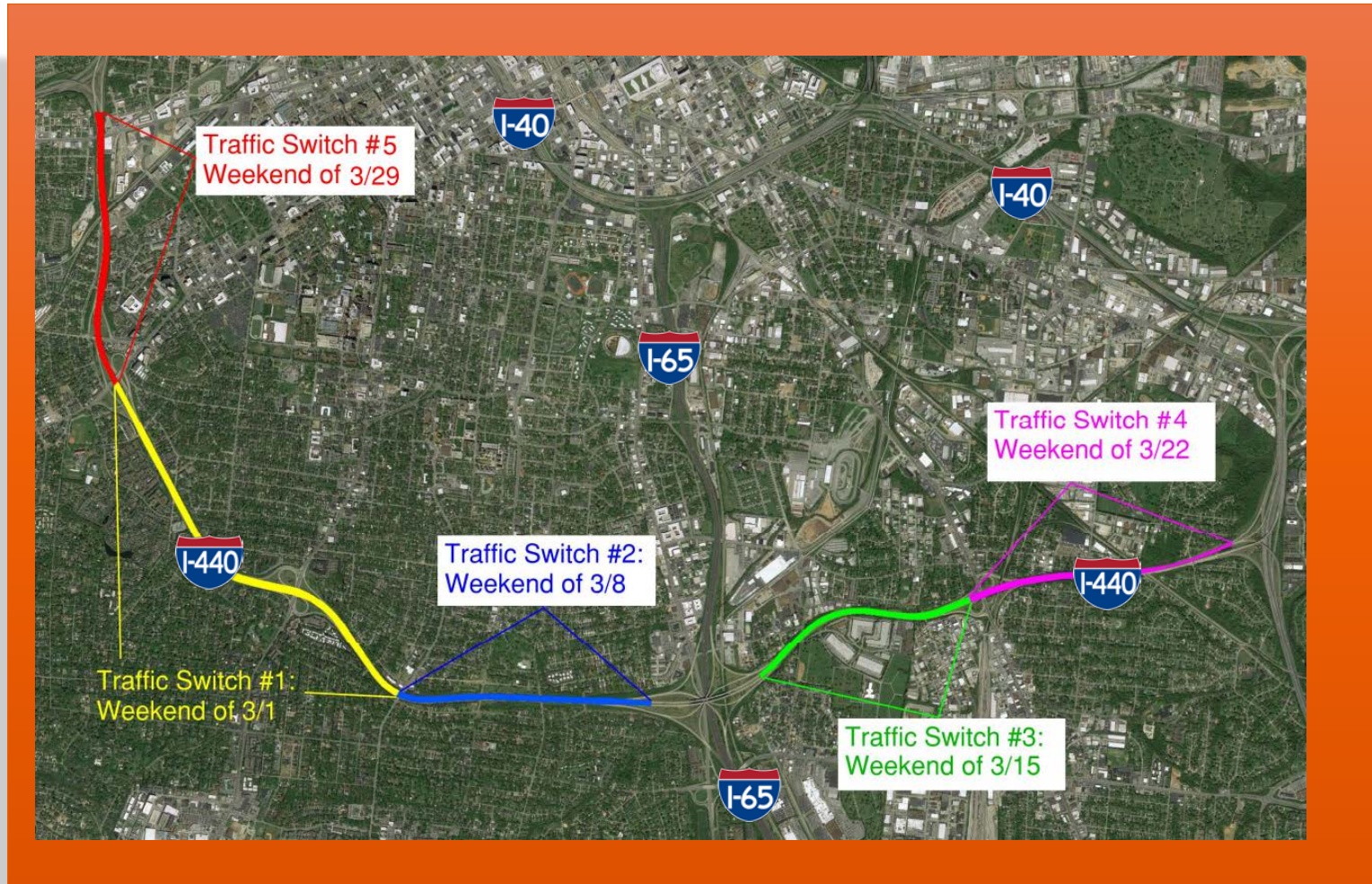
- ✓ March 11<sup>th</sup> to March 23<sup>rd</sup>
- ✓ Nashville Schools Spring Break March 11<sup>th</sup> to 15<sup>th</sup>
- ✓ Schedule set in January with limited information from contractor

## SIGNAL GROUP ASSIGNMENTS AND PRIORITY LIST 2019 TDOT I-440 TEMPORARY SIGNAL TIMING PROJECT *(Dates Tentative/Subject to Change)*

Priority	Group	Group Zone	Name	# of Signals	Submittal Date (All Dates 2019)			
					Proposed Timings / TOD Plan	Database Programming (MPW)	Begin Field Implementation	Download Proposed Timings to Controllers
4	17	17A-17B-17C	Franklin Road / Wedgewood	9	3/4	3/4	3/11	10:30 AM on Monday 3/11
5	25	25A	Wedgewood	4	3/4	3/4	3/11	10:30 AM on Monday 3/11
6	26	26A	Blakemore Ave	4	3/4	3/4	3/11	10:30 AM on Monday 3/11
1	5	5A	Nolensville Road	13	3/4	3/4	3/12	10:00 AM on Tuesday 3/12
2	27	27A-27B	Briley Pkwy / Thompson Ln	11	3/4	3/4	3/13	10:00 AM on Wednesday 3/13
3	10	10A-10B	Hillsboro Road	4	3/4	3/4	3/13	10:00 AM on Wednesday 3/13
7	3	3A-3B	21st Ave. S / Hillsboro Pike	5	3/4	3/4	3/14	10:00 AM on Thursday 3/14
8	4	4A	West End Ave / Murphy Rd	8	3/4	3/4	3/14	10:00 AM on Thursday 3/14

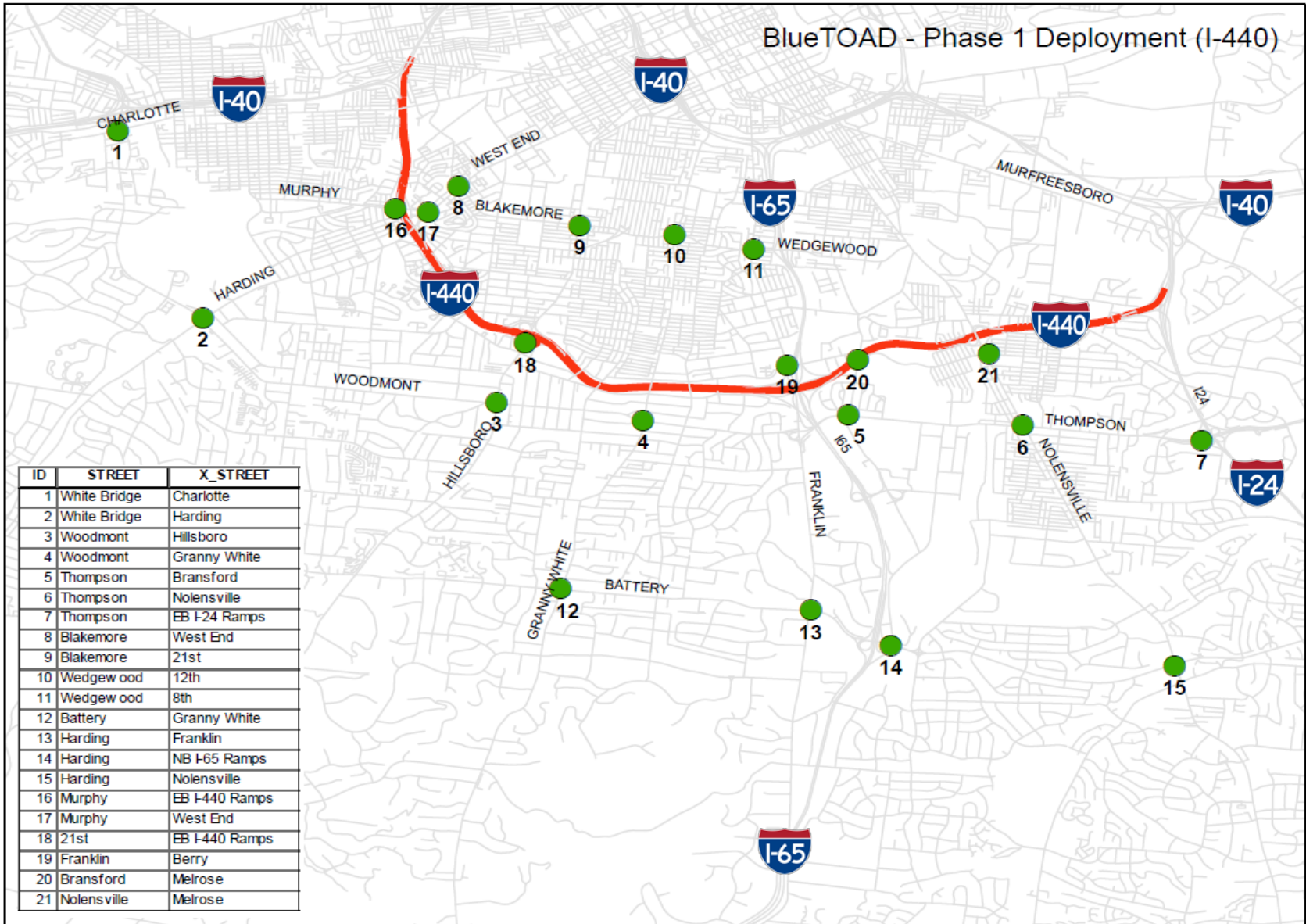


# I-440 Weekend Lane Shift Schedule: 3/1 to 3/29



# 21 BlueTOAD Deployment Locations

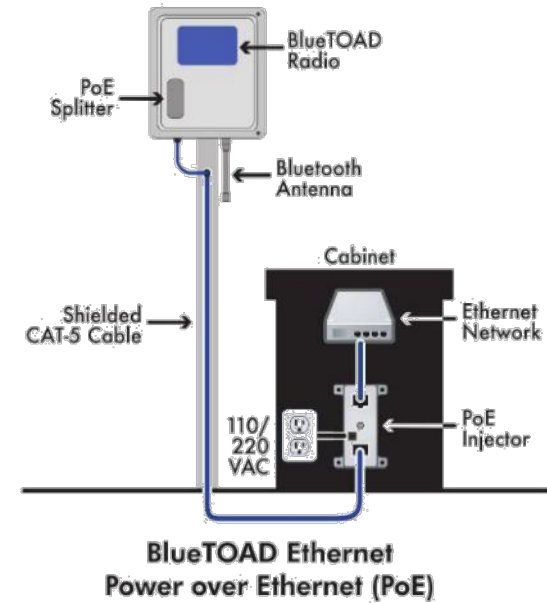
BlueTOAD - Phase 1 Deployment (I-440)





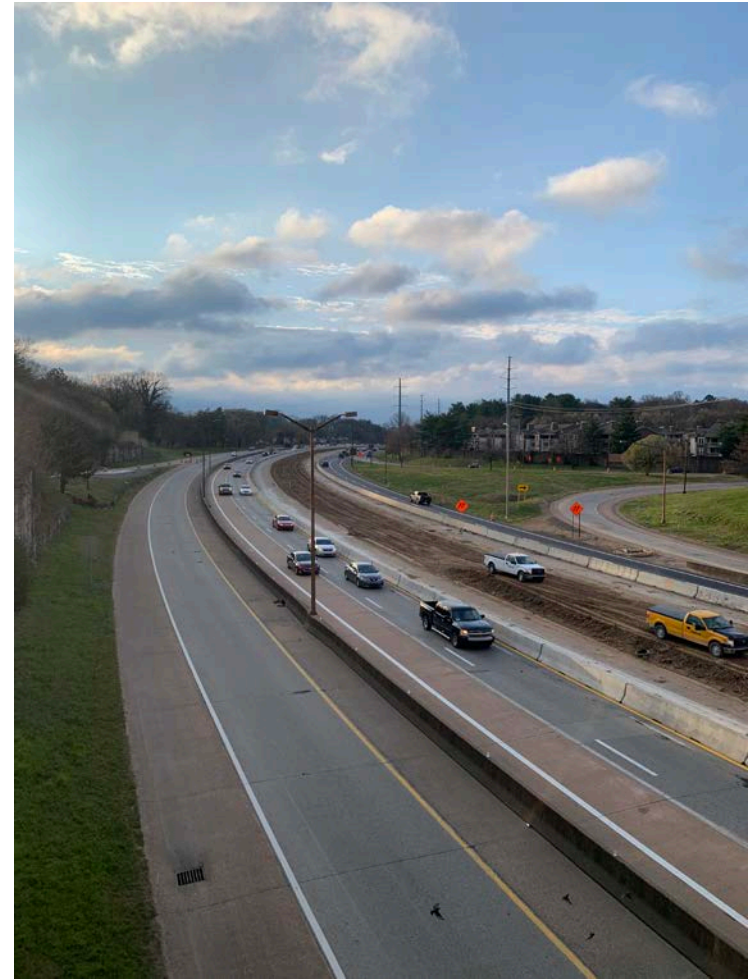
# What is BlueTOAD?

Bluetooth Travel-Time Origin And Destination



# Bluetooth Technology

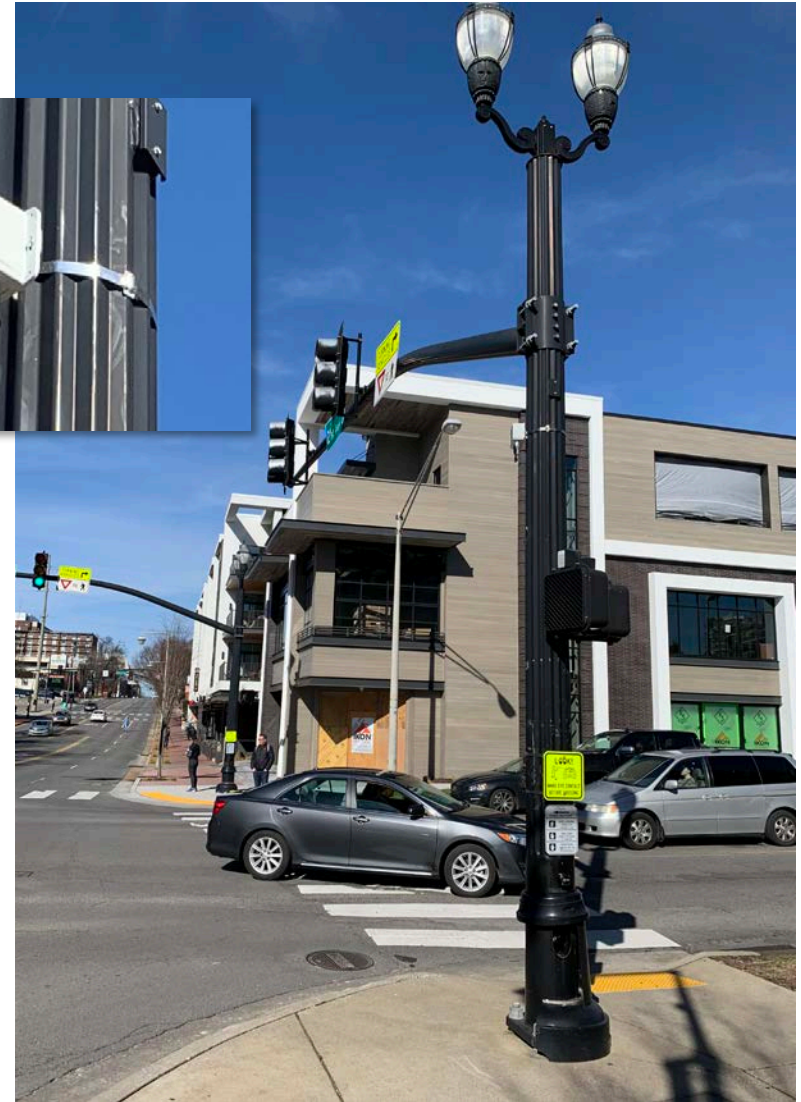
- Bluetooth is an open wireless technology standard for exchanging data over short distances from fixed and mobile devices: hands free technology in vehicles, head phones, mobile phones, wearable technology, etc.
- A MAC (Media Access Control) Address) is a unique, and anonymous, identifier assigned to Bluetooth devices





# Device info:

- Data Provided:
  - corridor speeds
  - travel time
  - origin-destination
  - Does NOT collect volumes
- 300' detection radius
- Devices must be “paired” to gather data
- Separated by at least ¼ mile
- Pairs collect data. Routes are a tool for viewing information
- Software removes outliers
  - Runners with Fitbits
  - Vehicles that stop between devices



# How is the information collected?





# From Hardware to Software



---

**BlueTOAD Devices**  
*Ethernet or Cellular Comm.  
to BlueARGUS Server*

**BlueARGUS Server**  
*TrafficCast OR customer hosted*

**BlueARGUS Applications**  
*Web Based Software Suite*

---

# BlueARGUS Dashboard: Real Time Traffic

**BlueARGUS** TRAFFICAST logged in as luke.dixon [Sign Out](#)

DASHBOARD **SPEED MAP** BlueTOAD SETUP REPORTS METRICS O/D STUDIES ALARMS DOCS ACCOUNT

## Speed Map - City of Nashville

Select a route:  
Show all pairs

Show all pairs

Map Satellite

Legend:

- No data
- Fast
- Normal
- Below Normal
- Slow
- Very Slow

Click on a path to see detailed pair information

Index determined by:

- speed limit
- avg last 12 Wednesdays
- custom historical avg [settings](#)

[Change Threshold Levels](#)


Refresh Interval: No Refresh

Updated 7/24/2019, 4:10:46 PM

Map data ©2019 Google Terms of Use Report a map error



# BlueARGUS Dashboard: Example Report

**BlueARGUS** TRAFFICCAST logged in as luke.dixon [Sign Out](#) 

[DASHBOARD](#) [SPEED MAP](#) [BlueTOAD SETUP](#) **[REPORTS](#)** [METRICS](#) [O/D STUDIES](#) [ALARMS](#) [DOCS](#) [ACCOUNT](#)

**Pair/Route** [Comparison](#) [Historical](#) [Device](#) [Alarm](#) [Schedules](#) [Recipients](#)

▼ **Edit Report Parameters**

Show inactive pairs/routes

**BlueTOAD Pair / Route \***

Pair NVTN-58068 : Thompson Ln - I24 to Nolensville Pk  [Map](#)

Include reverse Pair NVTN-58070 : Thompson Ln - Nolensville Pk to I24

**Start Date**  **End Date**   
Format: 07/24/2019

All  Weekdays  Sun  Mon  Tue  Wed  Thu  Fri  Sat

**Start Time**   **End Time**    Daily Start/End Times

**Report Type**

Show previous value if no current data (smoothed reports only)

Display Level of Service (LOS)

Show MAC addresses

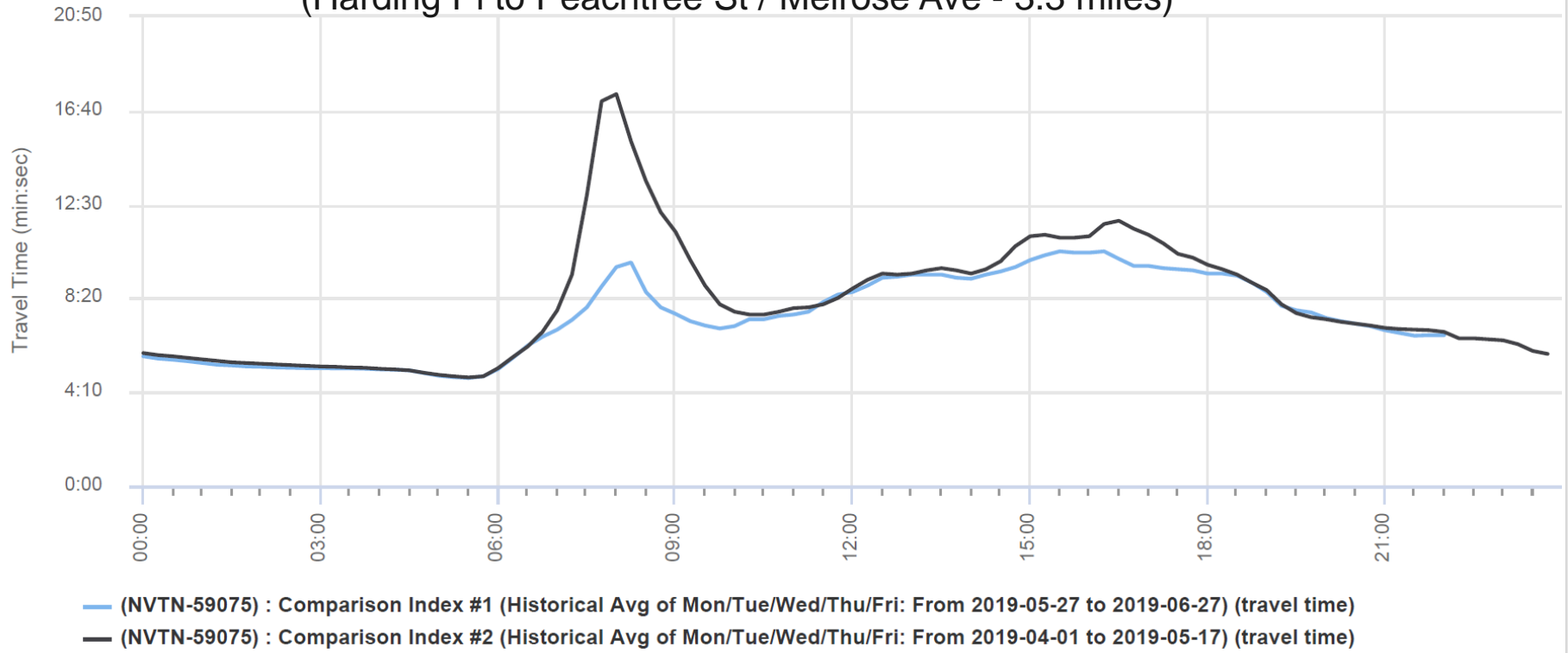
[Add Comparison Index](#)

**Output Type**

[Generate](#)

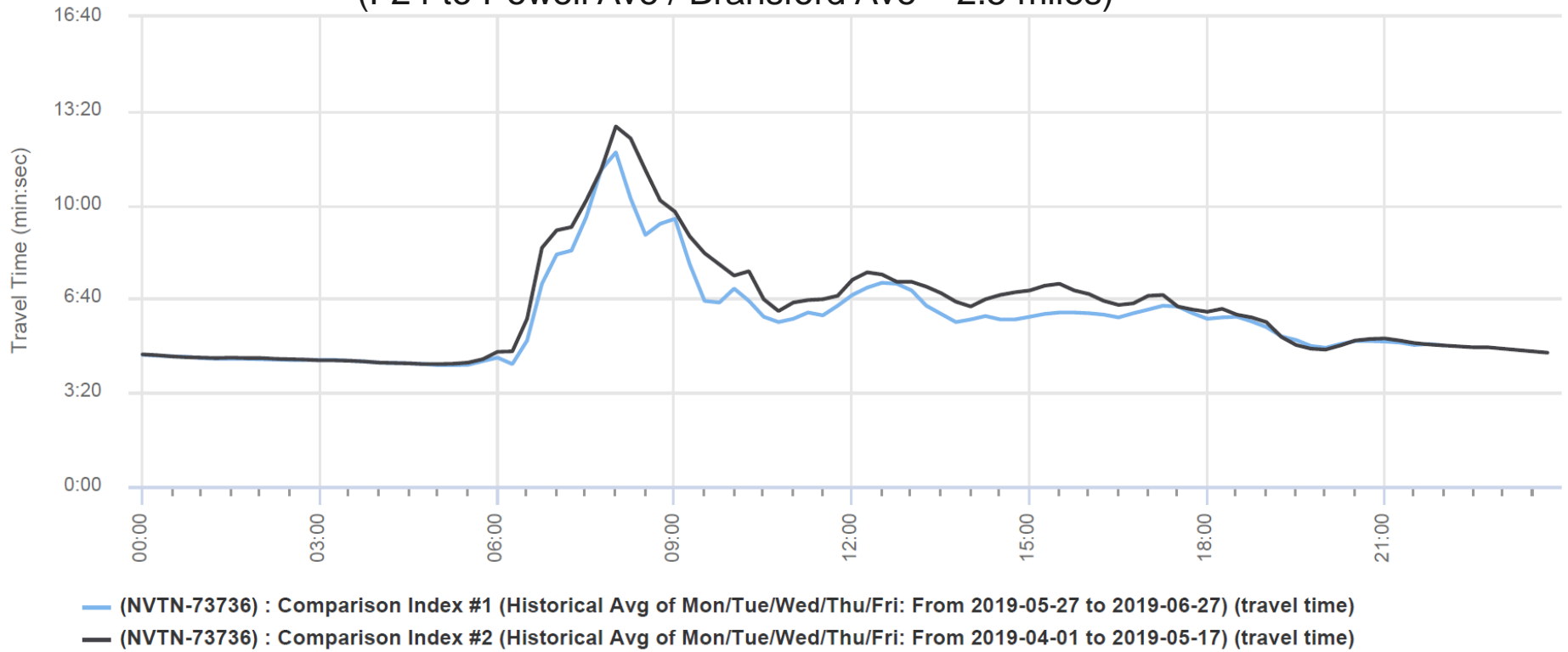
# BlueARGUS Dashboard: Example Report

Historical Trends for Nolensville Pk - NB  
(Harding PI to Peachtree St / Melrose Ave - 3.3 miles)



# BlueARGUS Dashboard: Example Report

Historical Trends for Thompson Ln WB  
(I-24 to Powell Ave / Bransford Ave – 2.5 miles)

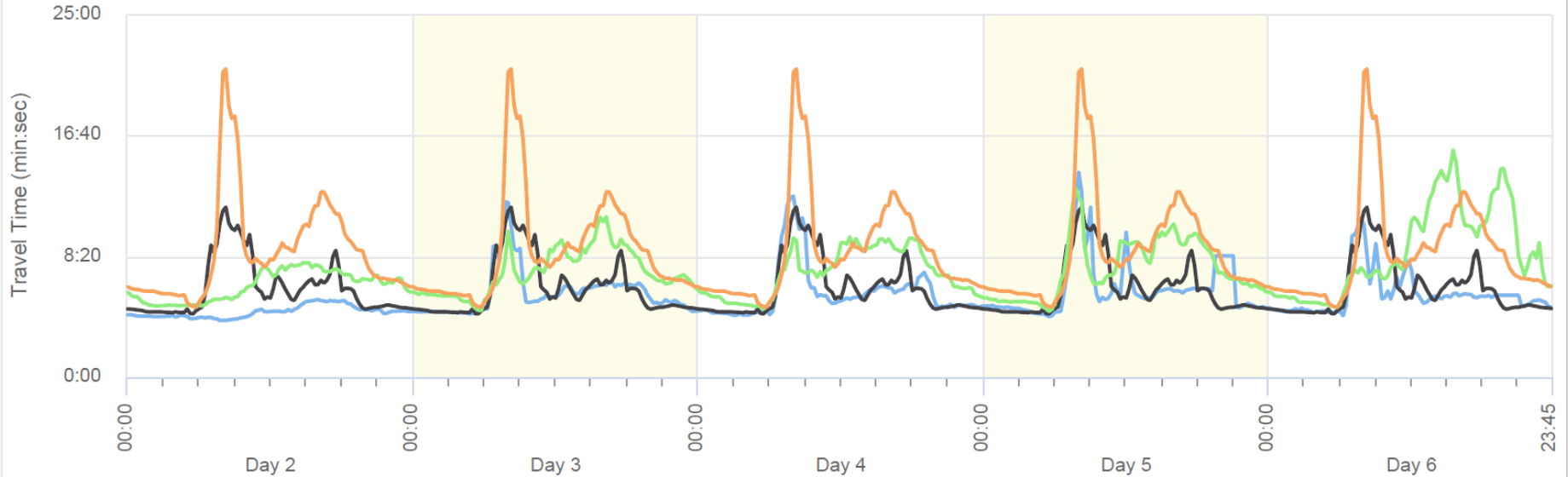




# BlueARGUS Dashboard: Example Report

## Comparison Report: Smoothed Speed (15-min)

Time Interval: 00:00:00 - 24:00:00

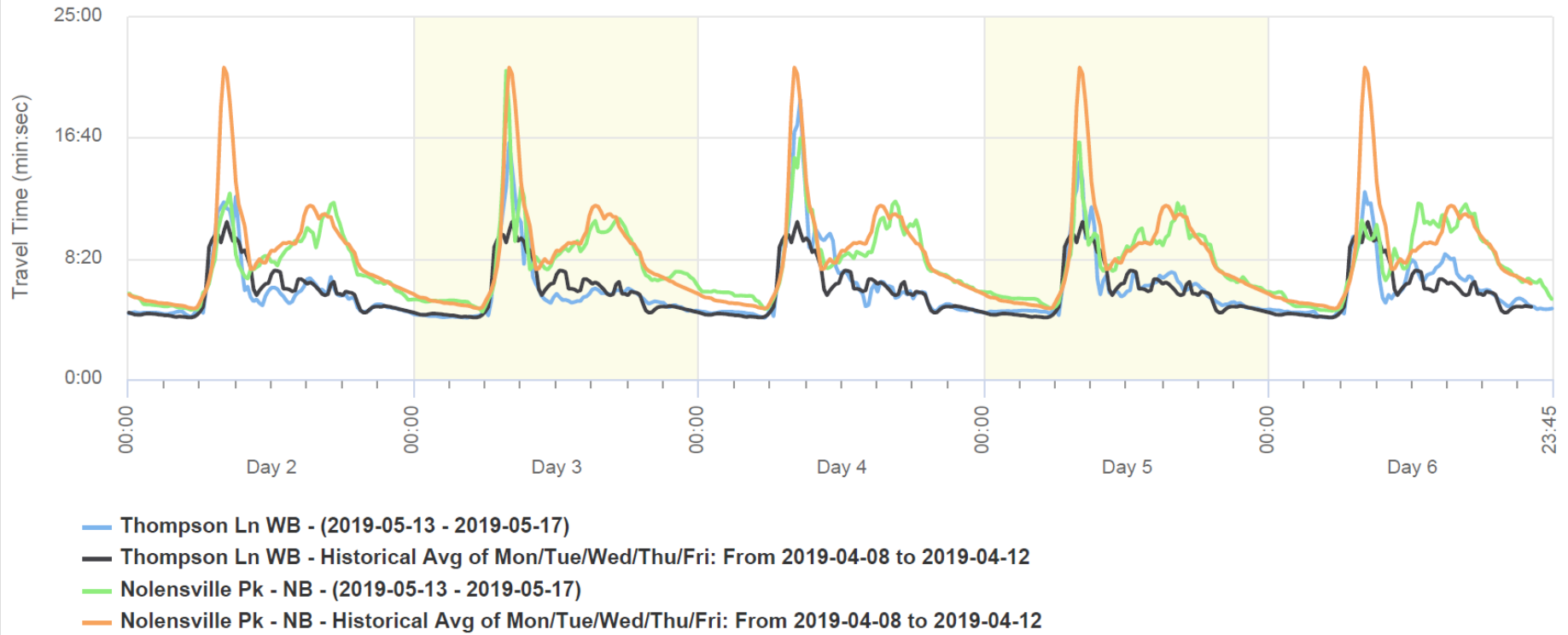


- Thompson Ln WB - (2019-05-27 - 2019-05-31)
- Thompson Ln WB - Historical Avg of Mon/Tue/Wed/Thu/Fri: From 2019-03-25 to 2019-03-29
- Nolensville Pk - NB - (2019-05-27 - 2019-05-31)
- Nolensville Pk - NB - Historical Avg of Mon/Tue/Wed/Thu/Fri: From 2019-03-25 to 2019-03-29

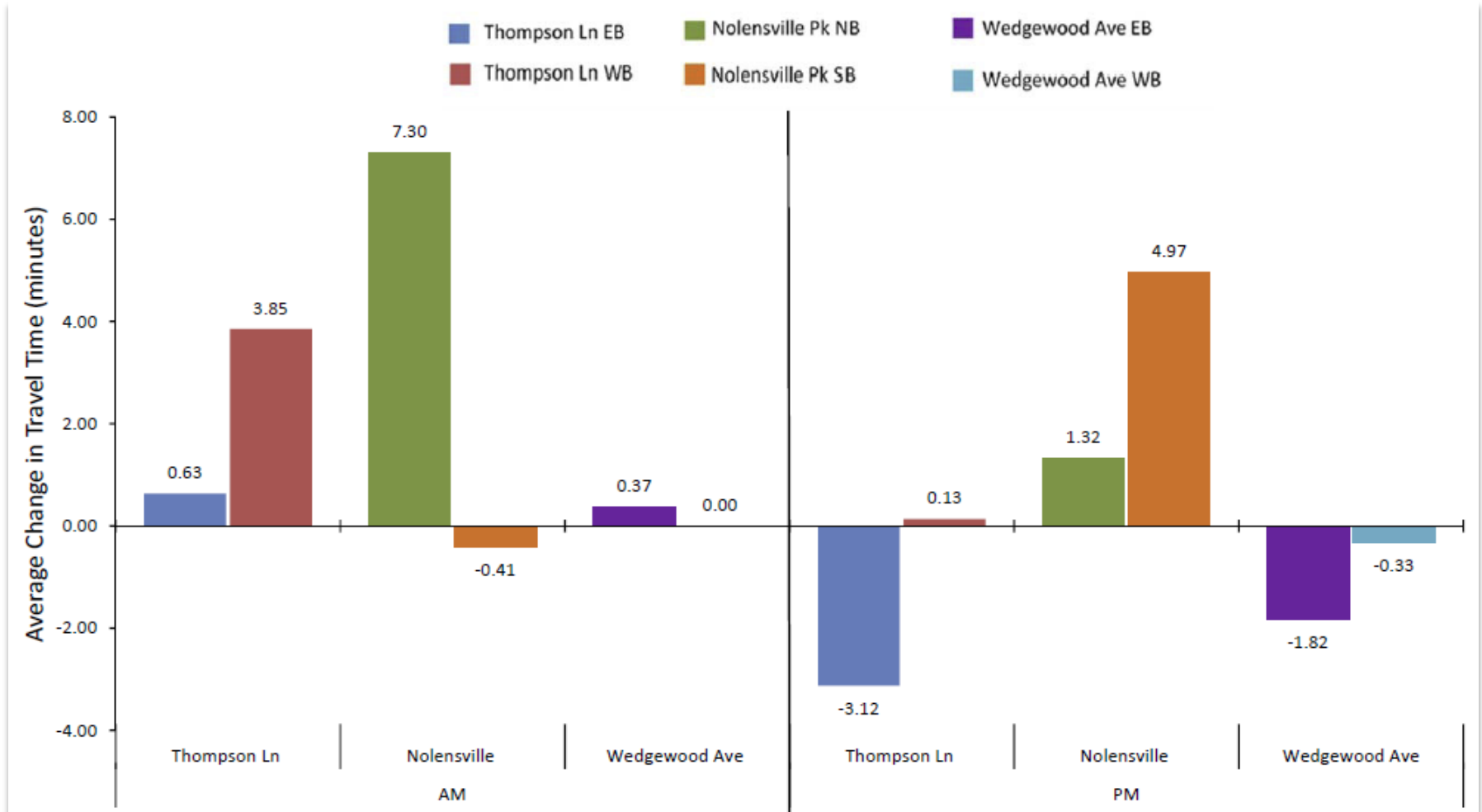
# BlueARGUS Dashboard: Example Report

## Comparison Report: Smoothed Speed (15-min)

Time Interval: 00:00:00 - 24:00:00



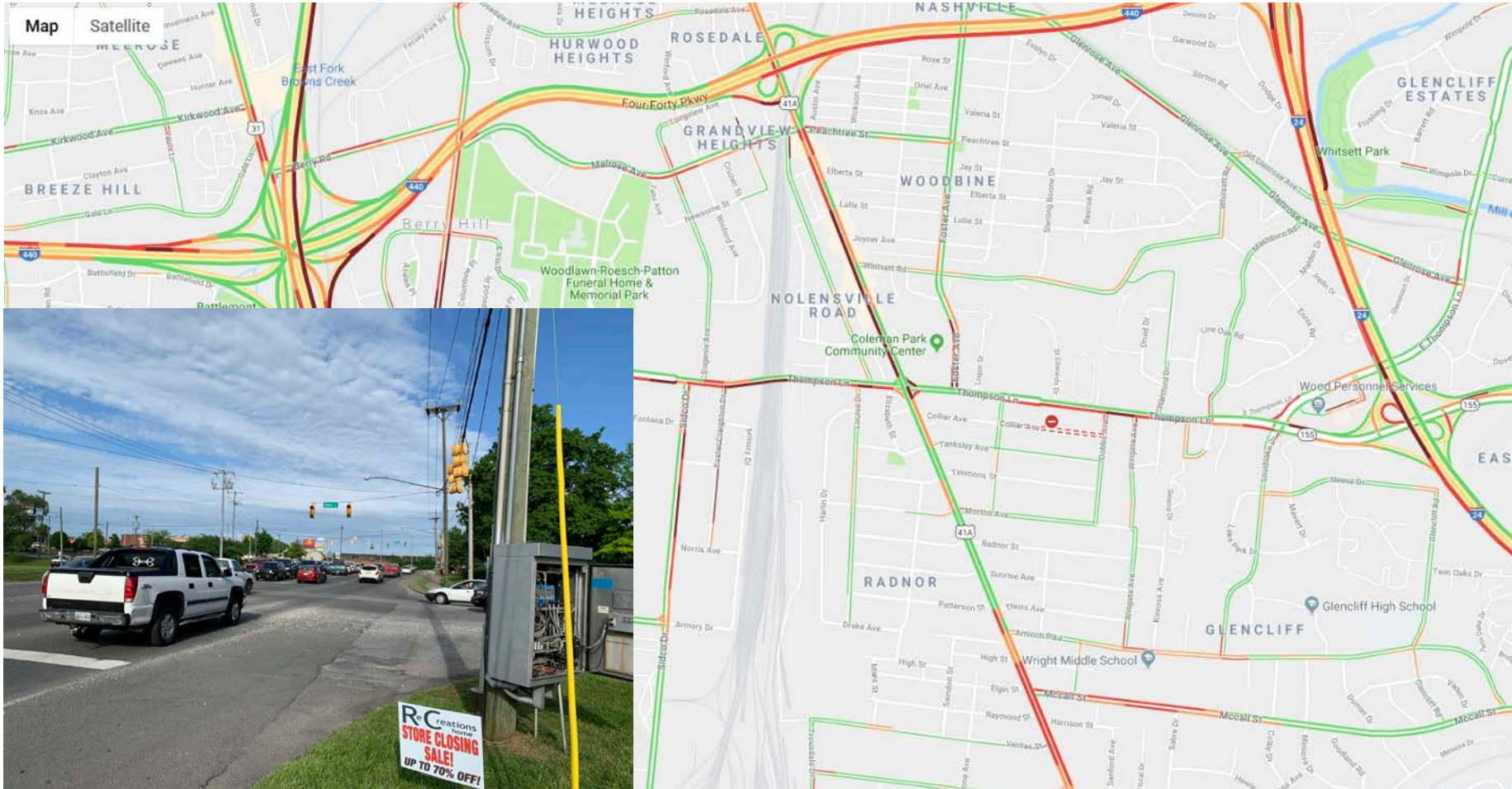
# Comparison of Peak Hour Average Travel Times



Analysis Periods: 1/1/19 to 3/1/19 compared to 3/25/19 to 5/17/19



# Corridor Management Challenges: Thompson Ln and Nolensville Pike



# Corridor Management Challenges: Citizen Complaints:

The screenshot shows an email client interface with three overlapping windows. The top window is titled "I-440 signal complaint - Message (HTML)". The middle window is titled "FW: Concerns over congestion on Sidco Drive - Message (HTML)". The bottom window is titled "Briley Parkway/Thompson Lane 155 at Nolensville Road Issues due to I-440 construction - Message (HTML) (Read-Only)".

The email content in the bottom window is as follows:

**Briley Parkway/Thompson Lane 155 at Nolensville Road Issues due to I-440 construction**

DS [REDACTED]

Ms. Schulte,

I wanted to reach part of the renaissance furnishing and re Drive. I wanted to

The traffic on Sid project. As people into traffic as they long because Sid

I believe that some particularly at No

I have reached out in January. That

I would like to ask

I would be happy

Thank you for your

Respectfully,

Carl

longer- See Map below.

Also, in the morning the lights traveling Briley Parkway over 24 are backing up. This back up goes from Nolensville Road all the way past the turn in Briley from around 6:30 am to 8:30 am

It takes about 20 minutes every afternoon to go 1 mile From Kraft Drive on Thompson Lane (155) to the Nolensville Road (41A) Light. Anytime after 3:30 pm to about 5:30 or 6 pm it is a total headache and if there is rain it is

The map shows a street grid in Nashville, Tennessee. A red line highlights the route from Kraft Drive on Thompson Lane (155) to the Nolensville Road (41A) Light. Various landmarks and businesses are labeled, including Sears Outlet, Wells Fargo Bank, First Tennessee Bank, Performance Studios, Krispy Kreme, White Castle, AutoZone Auto Parts, and Burger King. The map also shows the intersection of Briley Parkway and Thompson Lane.

The map shows a wider view of the area around Nolensville Road and Briley Parkway. It highlights the intersection and the surrounding streets, including South Nashville. The map shows the layout of the roads and the location of the intersection.



# Citizen Memo:

- Describes coordination between TDOT and Metro Nashville.
- Explains what is being done to address traffic issues caused by the I-440 project in simple terms
- For distribution to concerned council members and citizens

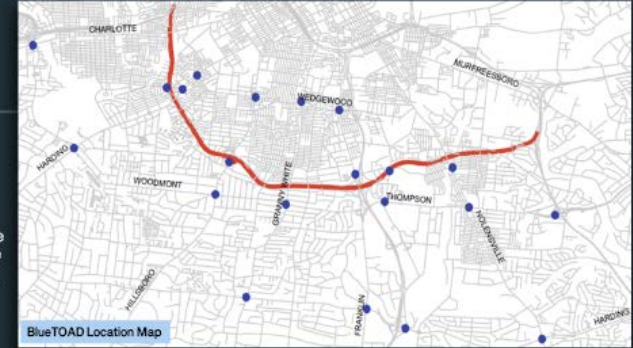
## TDOT'S I-440 TRAFFIC MANAGEMENT COORDINATION WITH METRO NASHVILLE

Before the I-440 construction project began, arterial streets near the project were analyzed extensively for potential impacts due to diverting I-440 traffic. TDOT coordinated with Metro Nashville Public Works on the retiming of the traffic signals on routes most affected by the construction. TDOT does not maintain or own traffic signals so coordination with Metro Nashville was essential. With the assistance of funding from TDOT, Metro Nashville implemented special construction signal timings for 58 traffic signals that engineers predicted would see a significant change in traffic patterns.

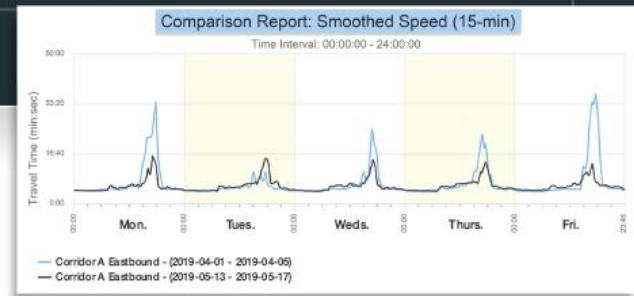
BlueTOAD unit



TDOT installed special devices to monitor traffic flow and delay on arterial streets near I-440 in advance of major construction. These devices also allow Metro Nashville staff to proactively make timing adjustments to traffic signals as traffic patterns change during the project.



To minimize vehicle queues, engineers ran longer cycles that delay the onset of saturated conditions and allow the coordinated signal systems to recover more quickly. Metro staff have tried to minimize and balance vehicle delay for all approaches during the peak periods. The average change in travel time has ranged from a decrease of 3 minutes to an increase of 7 minutes per trip during the peak periods. We expect an increase in delay along some corridors but the signal retiming work is intended to address the changes in traffic volumes during various phases of construction and mitigate it as best as possible. Engineers will continue to monitor the signal timings and make additional tweaks throughout the duration of the I-440 project.





# QUESTIONS?

