

US 250 (SHORT PUMP AREA) CORRIDOR IMPROVEMENT STUDY

Preferred Alternatives Meeting

May 6, 2020



AGENDA

- **Project Update**
- **Concept Testing Results**
 - I-64 at US 250 Interchange – Partial Cloverleaf
 - Tom Leonard Drive
 - Brownstone Boulevard } Conventional vs. Thru-Cuts
 - Pouncey Tract Road – Southbound Triple Left Options
 - Short Pump Town Center – Superstreet
 - Northbound Route 288 to Eastbound US 250
- **Subarea Model Recommendations**
- **Project Implementation Plan**
- **Schedule and Next Steps**



CONCEPT TESTING RESULTS

ANALYSIS ASSUMPTIONS

■ Analysis Tools and Measures of Effectiveness

- Synchro 10
 - Control delay (seconds per vehicle)
 - Experienced Travel Time (seconds per vehicle)
 - Level of Service
 - 95th percentile queue length (feet)
- VISSIM 8
 - Maximum queue lengths
 - Average travel times

LOS Thresholds		
LOS	Signalized	Unsignalized
A	0 - 10	0 - 10
B	> 10 - 20	> 10 - 15
C	> 20 - 35	> 15 - 25
D	> 35 - 55	> 25 - 35
E	> 55 - 80	> 35 - 50
F	> 80	> 50

■ Analysis Periods

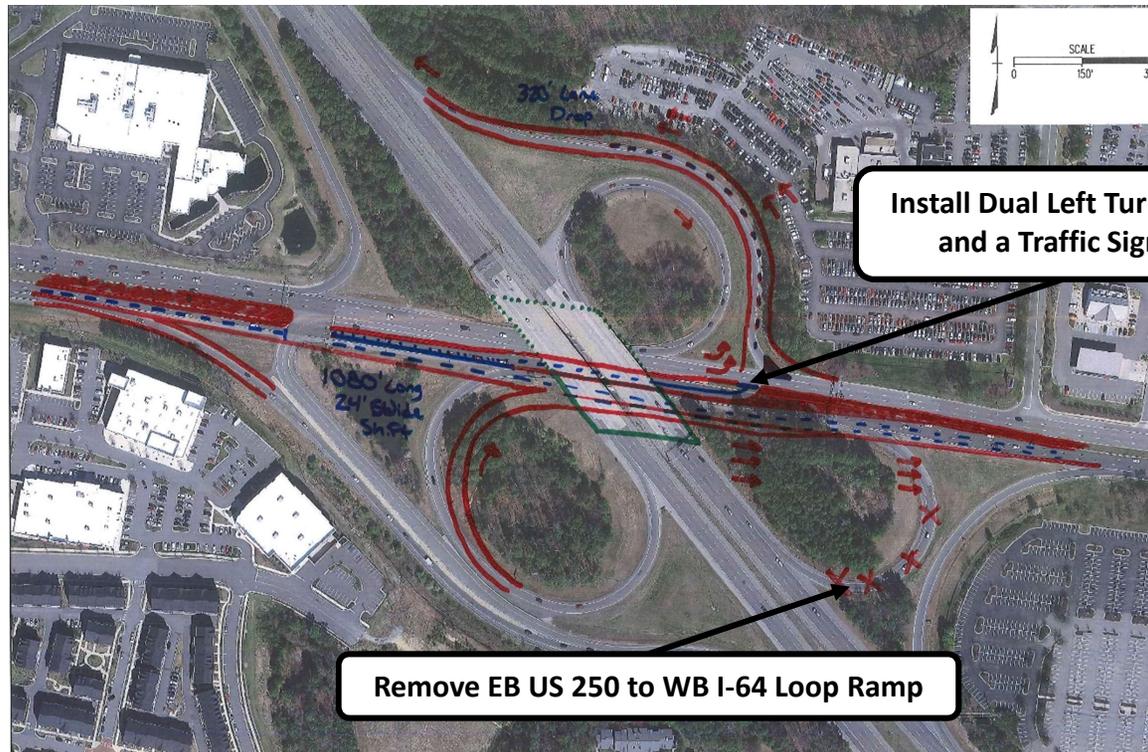
- 2040 AM and PM peak hours

■ Crash Analysis

- Latest five years (2014-2018)
- CMFs from VDOT published Preferred CMF List
 - Applied to all crashes and all severities

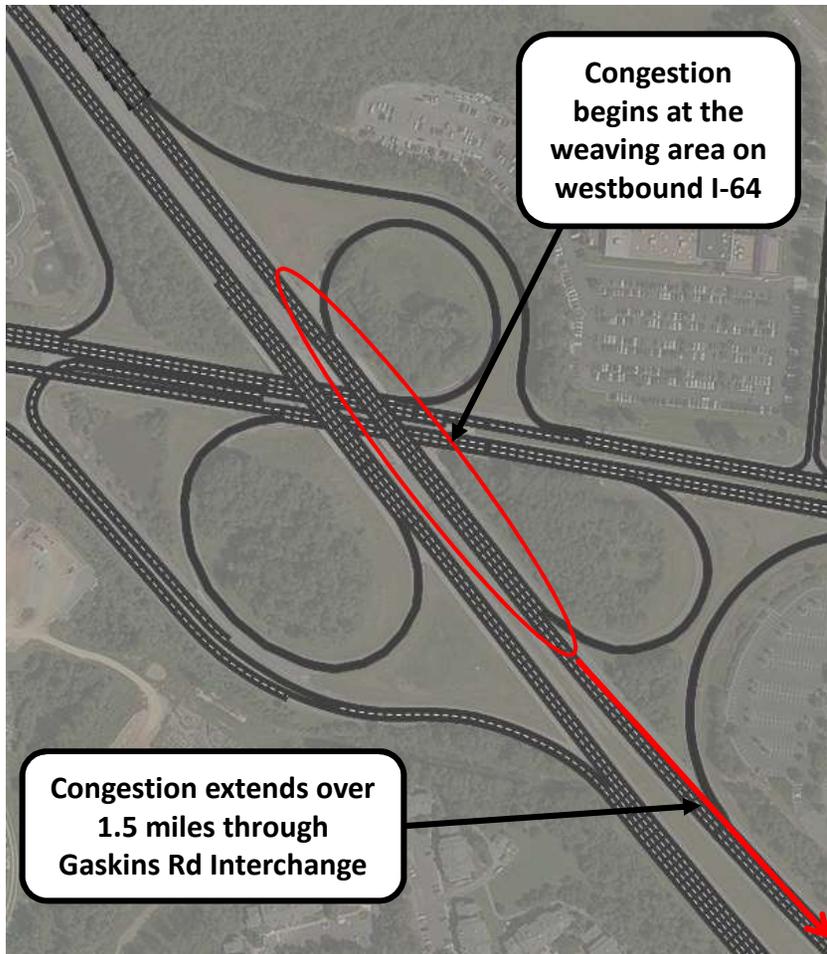
I-64 AT US 250 INTERCHANGE

- Preliminary 2040 VISSIM testing done to compare the No-Build interchange and the Parclo interchange with the recommended US 250 arterial improvements

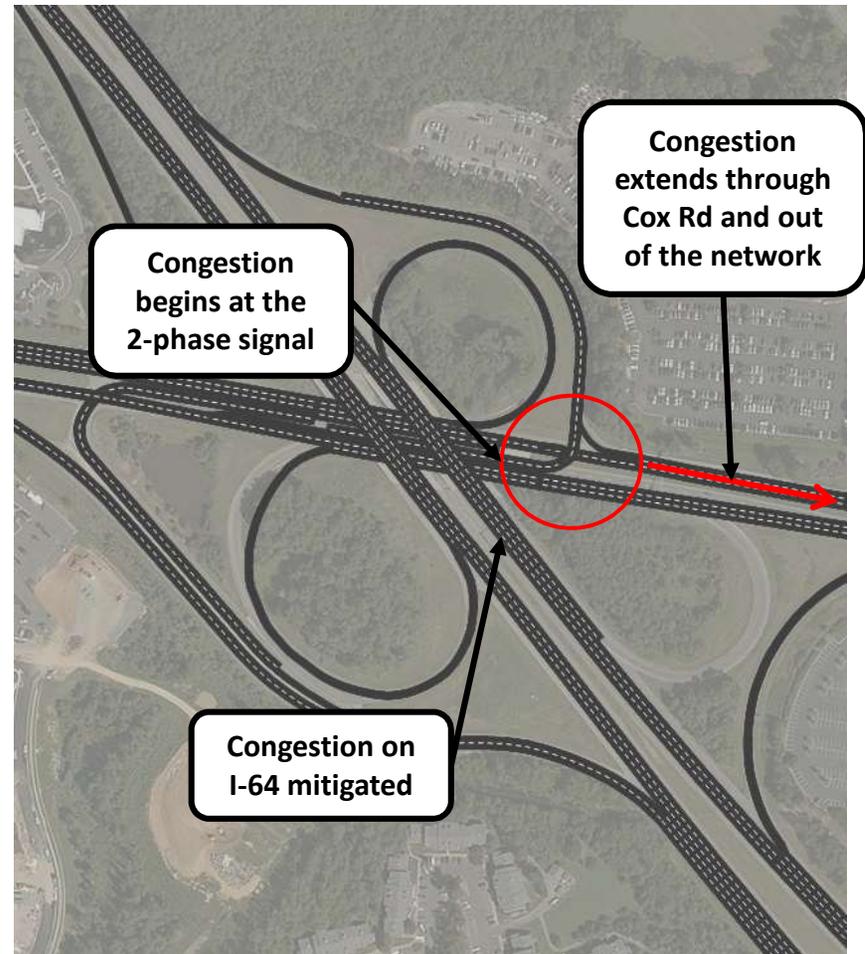


I-64 AT US 250 INTERCHANGE – 2040 PM PEAK HOUR

Existing Configuration



Modified Parclo Configuration



I-64 AT US 250 INTERCHANGE SUMMARY

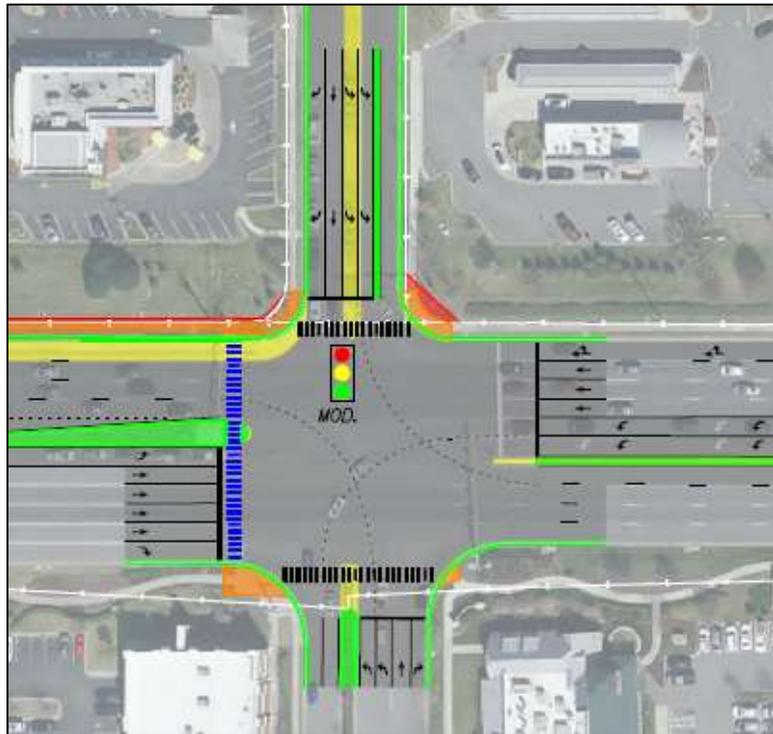
- **Previously reviewed innovative interchange options and determined the configurations were likely not feasible**
- **In 2040, severe congestion on either I-64 or US 250 remains under the existing configuration and the modified Parclo option**
- **There are likely no geometrically feasible options that operate acceptably under the forecasted 2040 volumes**

TOM LEONARD DR AND BROWNSTONE BLVD

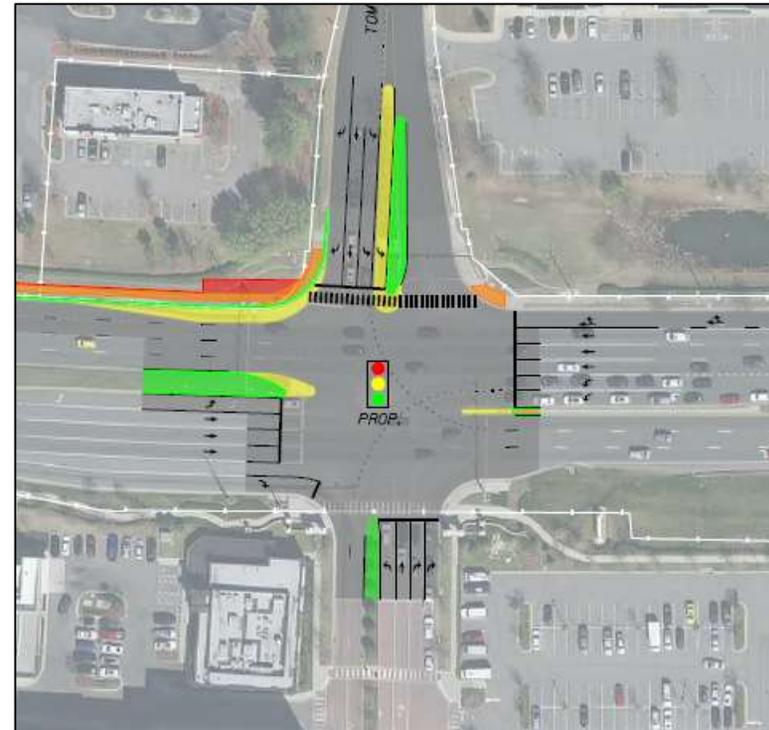
- **Narrowed down preferred concepts for Tom Leonard Dr and Brownstone Blvd at previous concept screening meeting**
 - Additional turn lanes and concurrent side street phasing
 - Thru-Cuts (restricting side street through movements)
- **No decision on restricting westbound left turn at Tom Leonard Dr from the eastbound I-64 off-ramp**

TRADITIONAL IMPROVEMENTS

Brownstone Blvd



Tom Leonard Dr



LEGEND

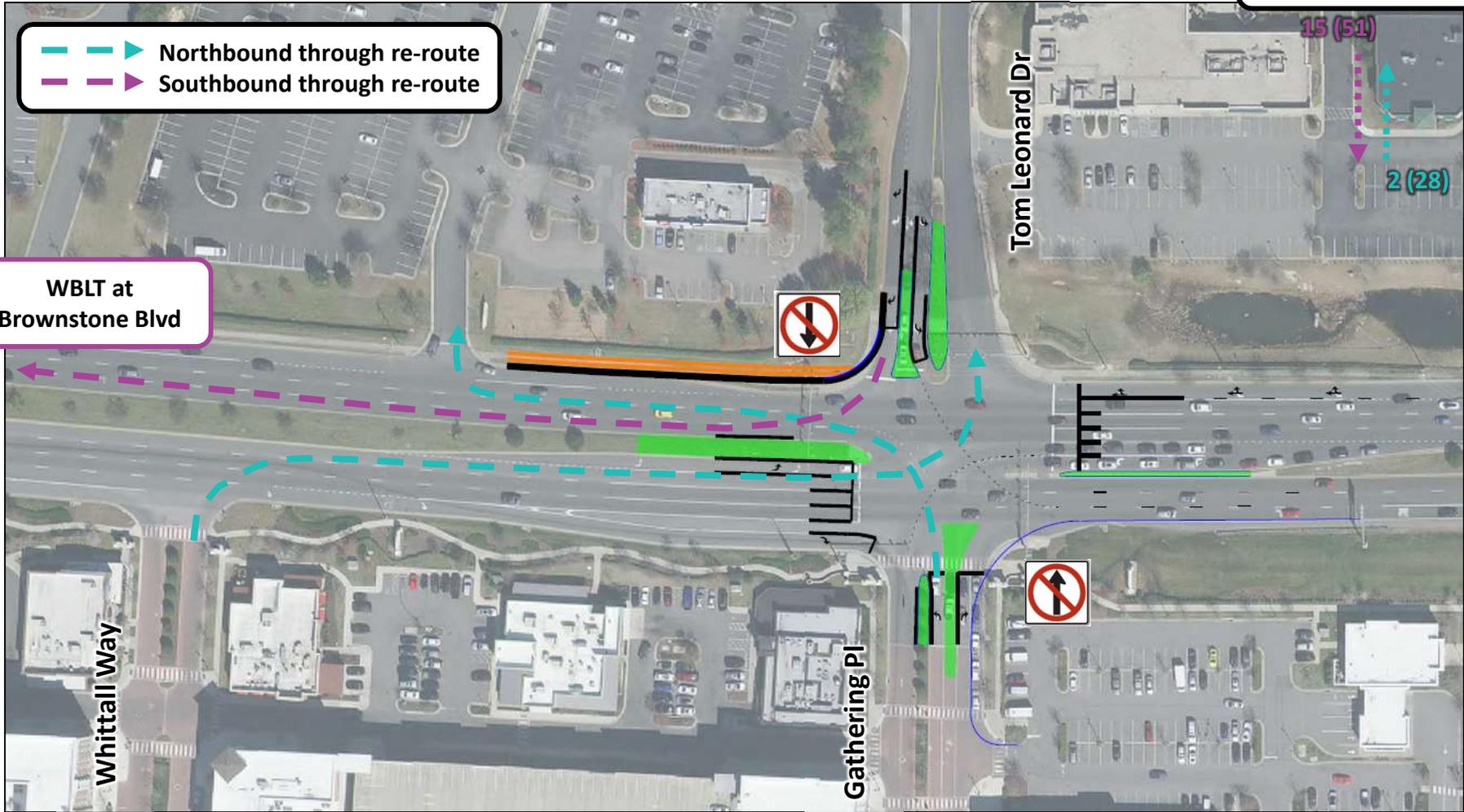
- | | | | |
|---|--------------------------------|---|---------------------------|
|  | EXISTING PAVEMENT |  | PROPOSED PAVEMENT |
|  | EXISTING PROPERTY LINES |  | PROPOSED CURB AND GUTTER |
|  | PROPOSED GRASS MEDIAN |  | PROPOSED MEDIAN CURB |
|  | PROPOSED CONCRETE ITEMS |  | PROPOSED RIGHT OF WAY |
|  | PROPOSED SIGNAL RECONSTRUCTION |  | PROPOSED ACQUISITION AREA |
| | |  | BY OTHERS |

THRU-CUT IMPROVEMENTS – TOM LEONARD DR

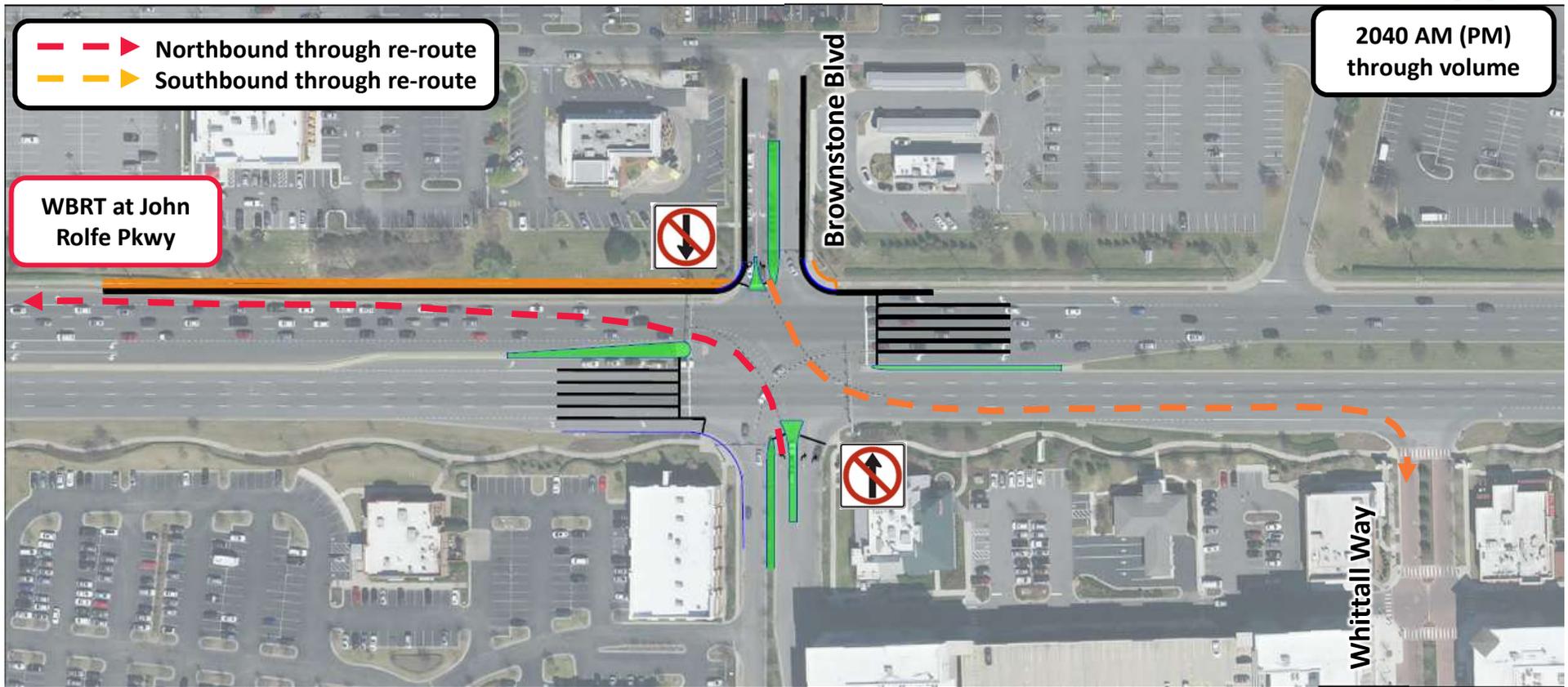
2040 AM (PM)
through volume

- Northbound through re-route
- Southbound through re-route

WBLT at
Brownstone Blvd



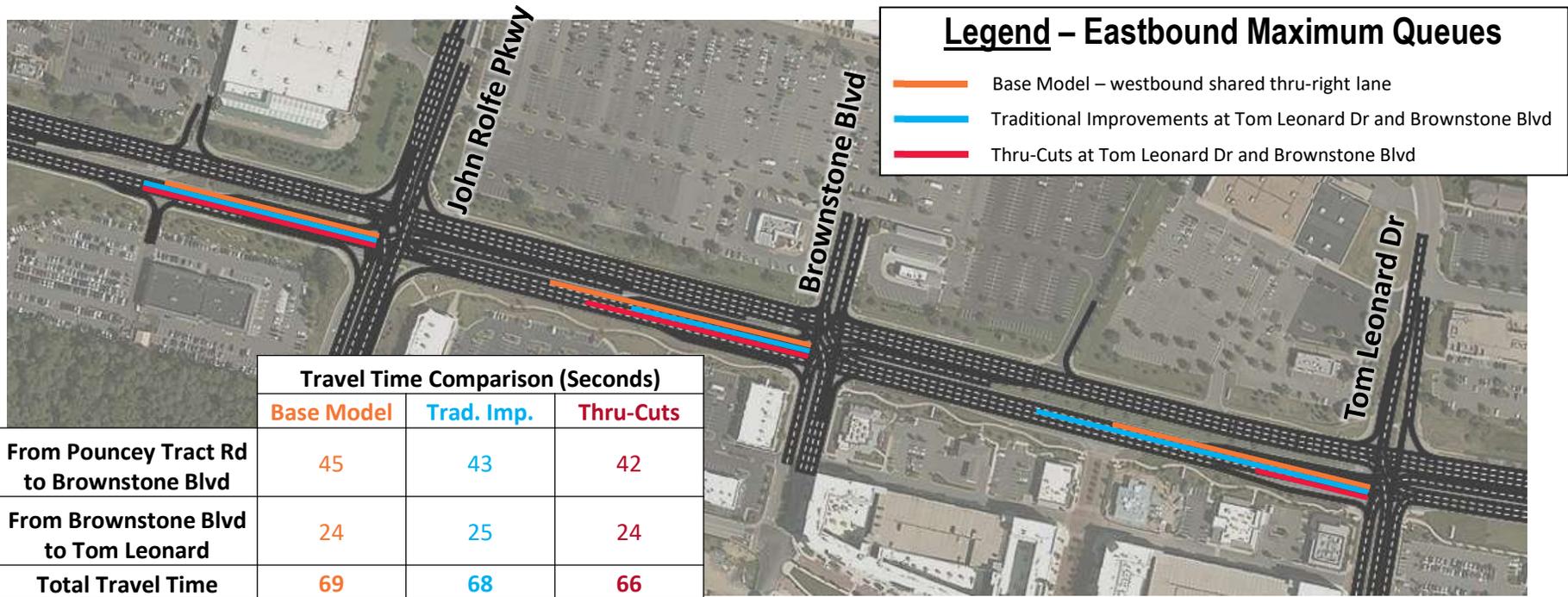
THRU-CUT IMPROVEMENTS – BROWNSTONE BLVD



THRU-CUT VS. TRADITIONAL IMPROVEMENTS VISSIM TESTING

- **Compared 3 scenarios to understand the operational benefits at Brownstone Blvd and Tom Leonard Dr:**
 - No side street improvements (WB shared thru-right only)
 - Traditional turn lane and phasing improvements
 - Thru-Cuts
- **All 3 scenarios include:**
 - Traditional side street improvements at John Rolfe Pkwy and Pouncey Tract Rd
 - Westbound shared thru-right lane from I-64 to Pouncey Tract Rd
 - Choose Lane at the eastbound US 250 on-ramp to eastbound I-64

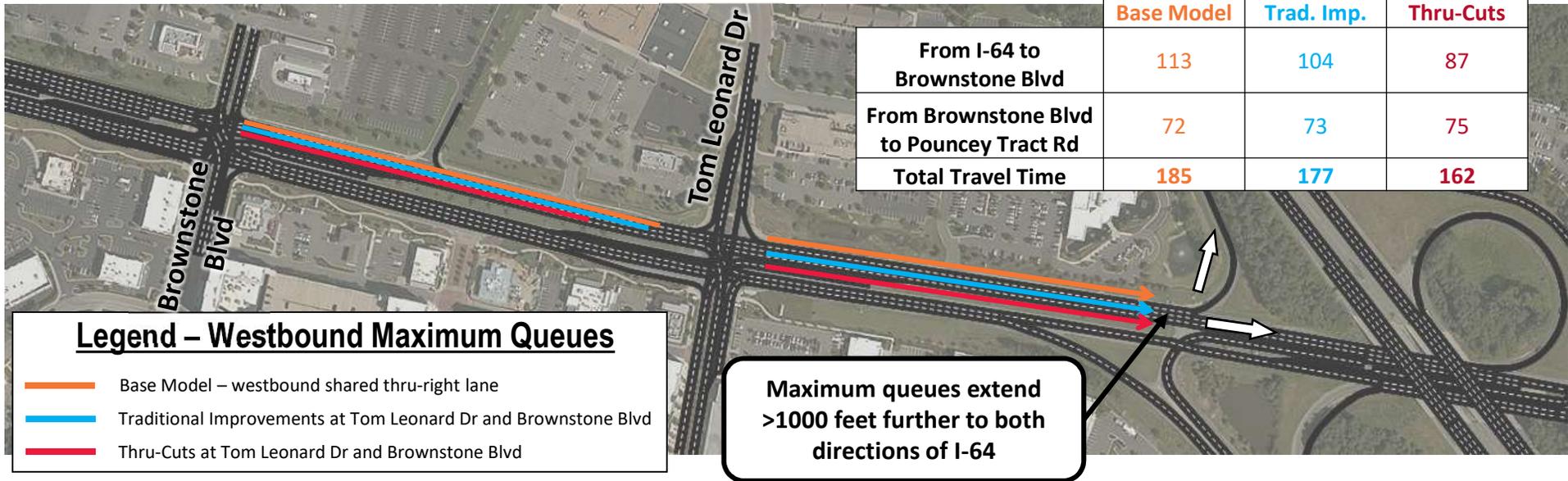
2040 AM PEAK VISSIM TESTING



- **Slight queuing and travel time benefits under both build concepts compared to base improvements**
 - Thru-Cut concept performs similarly to the traditional concept in the AM peak hour but does show shorter eastbound maximum queues at Tom Leonard Dr

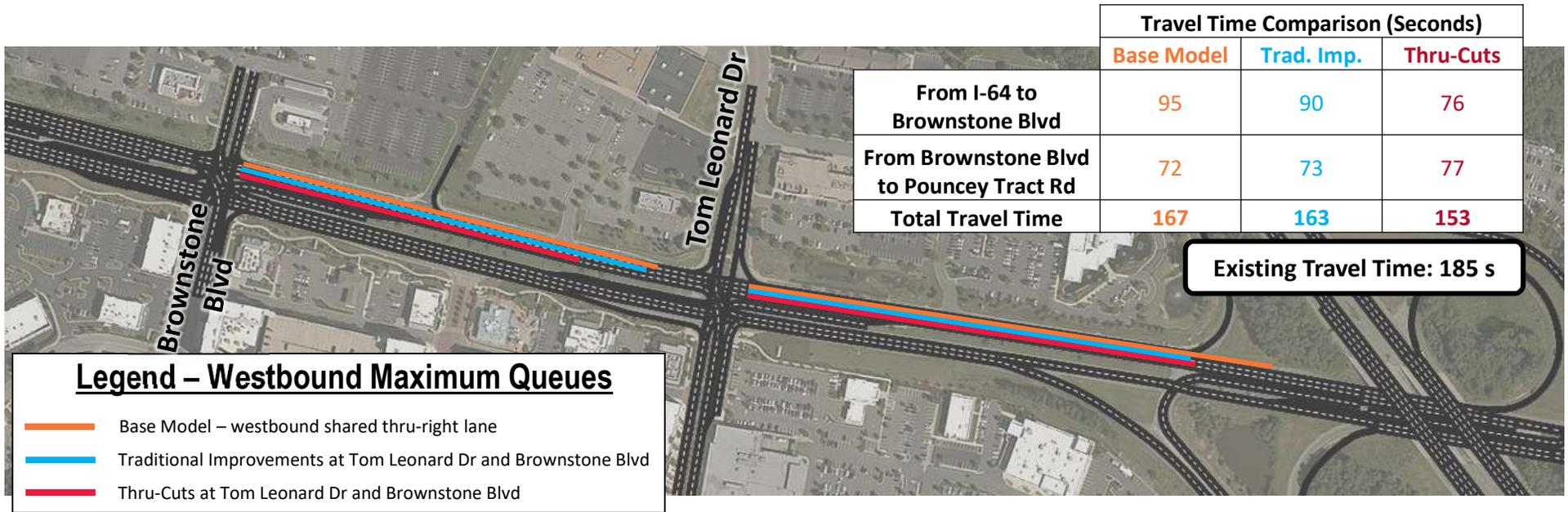
2040 PM PEAK VISSIM TESTING

Existing Travel Time: 185 s



- **Travel time reductions for both build concepts**
 - Thru-Cut travel time less than traditional improvements
- **Greater improvements when westbound left turns at Tom Leonard Drive are restricted from the eastbound I-64 off-ramp**

2040 PM PEAK VISSIM TESTING – RESTRICT RAMP MOVEMENTS



- Restricting westbound left turns at Tom Leonard from the eastbound I-64 off-ramp result in a 12-15% reduction in travel time between I-64 and Brownstone Blvd
- Queues do not extend to I-64 ramps

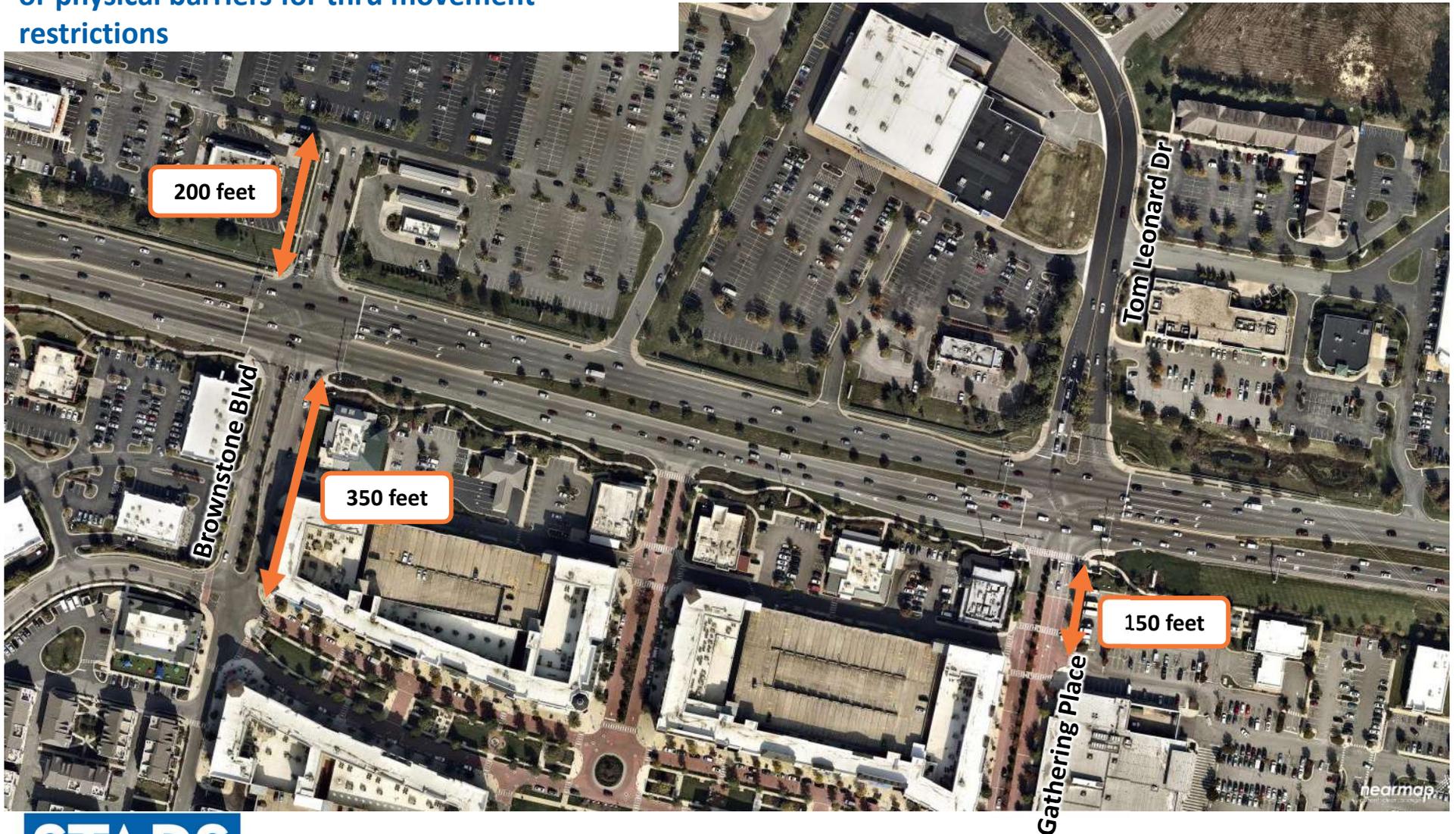
Thru-Cut vs. Traditional Improvements

Thru-Cut Concerns: Large intersection footprints present challenges providing adequate signage or physical barriers for thru movement restrictions



Thru-Cut vs. Traditional Improvements

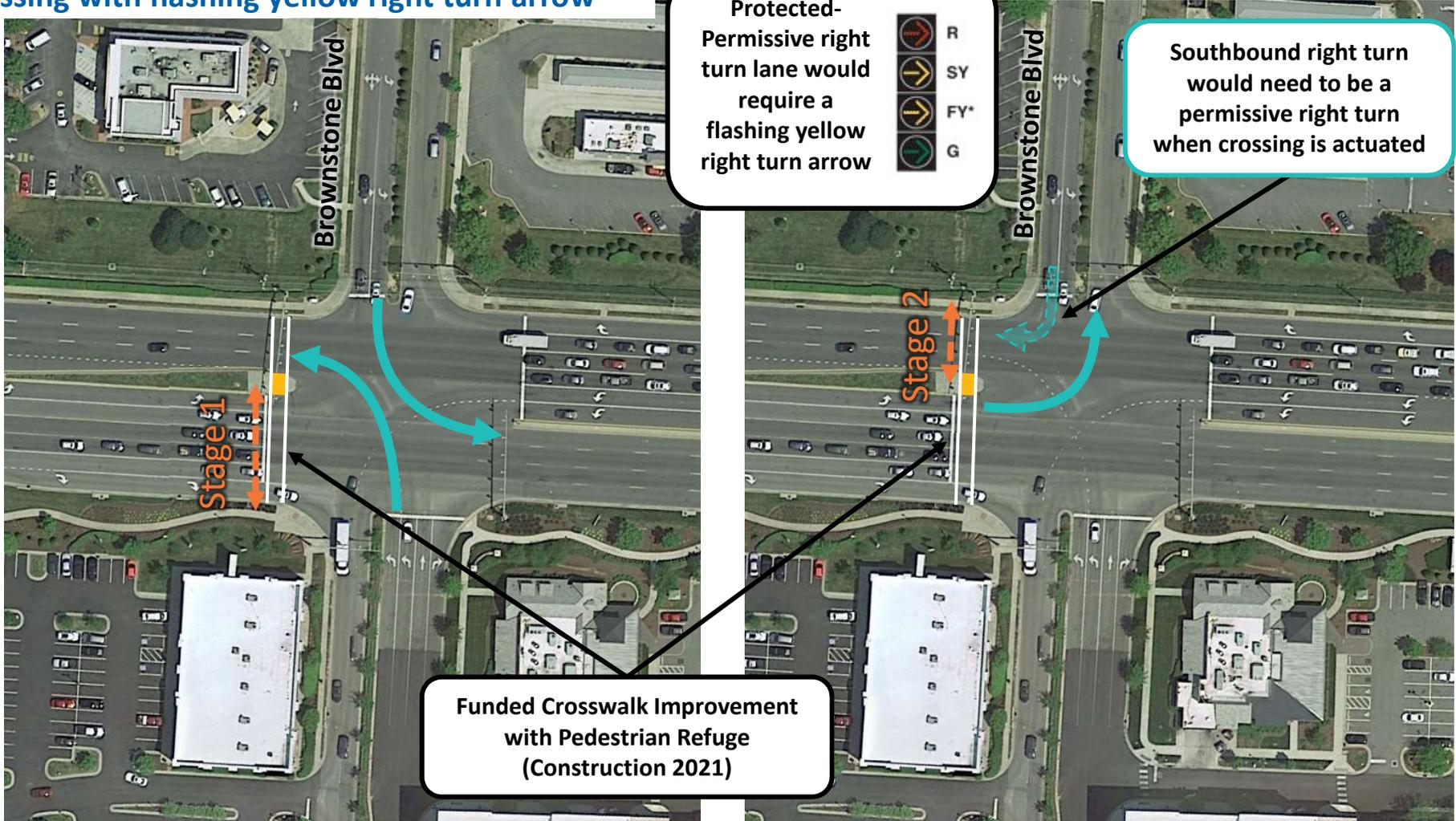
Thru-Cut Concerns: Large intersection footprints present challenges providing adequate signage or physical barriers for thru movement restrictions



Thru-Cut vs. Traditional Improvements

Thru-Cut Concerns: Thru-Cut signal would require the proposed pedestrian crossing of US 250 at Brownstone Boulevard to be a 2-stage crossing with flashing yellow right turn arrow

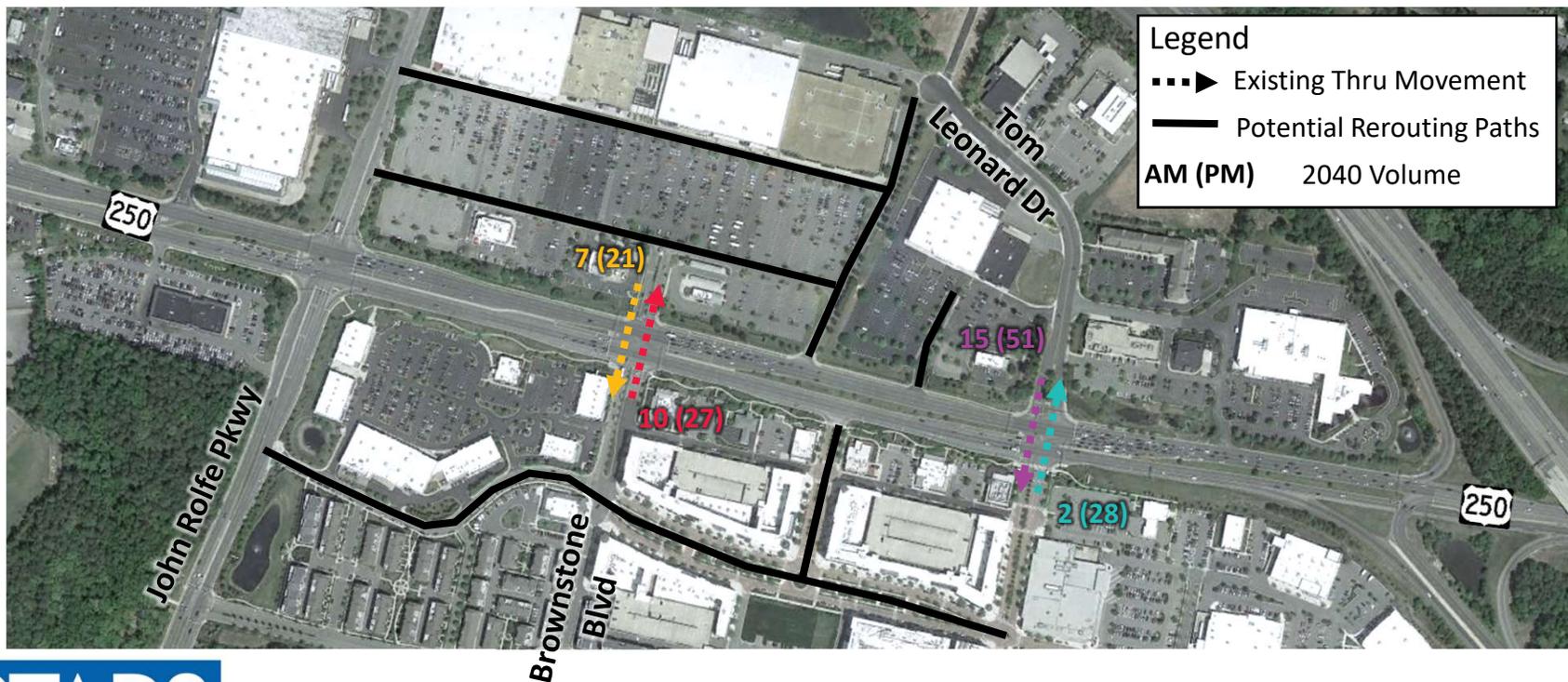
This would apply to a crossing of US 250 at Tom Leonard Dr (None Planned)



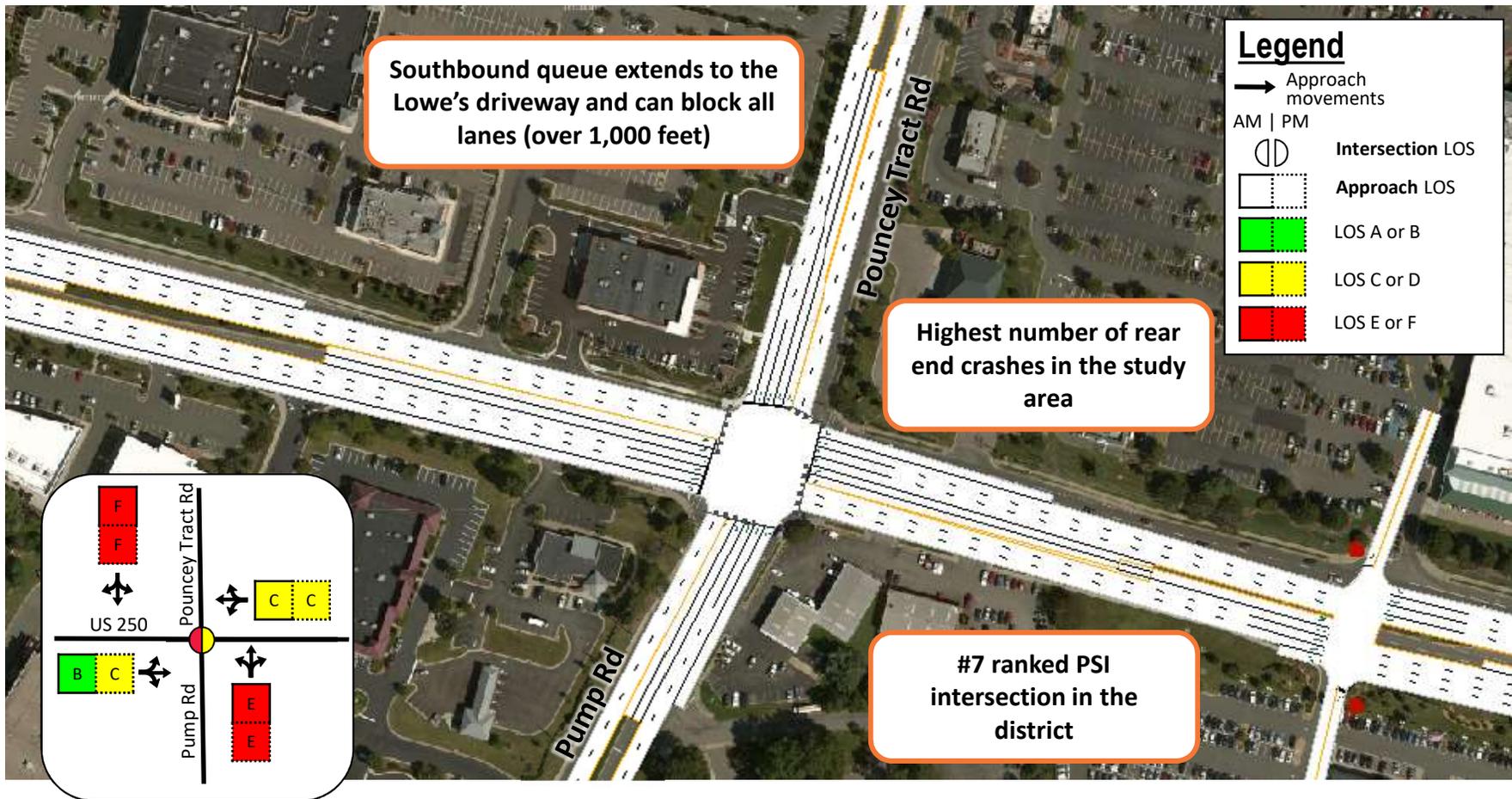
THRU-CUT VS. TRADITIONAL IMPROVEMENTS

■ Concerns with Thru-Cut Improvements

- Restricting through movements may encourage traffic to re-route through private roads



PUMP ROAD/POUNCEY TRACT ROAD NO-BUILD SUMMARY



PUMP ROAD/POUNCEY TRACT ROAD

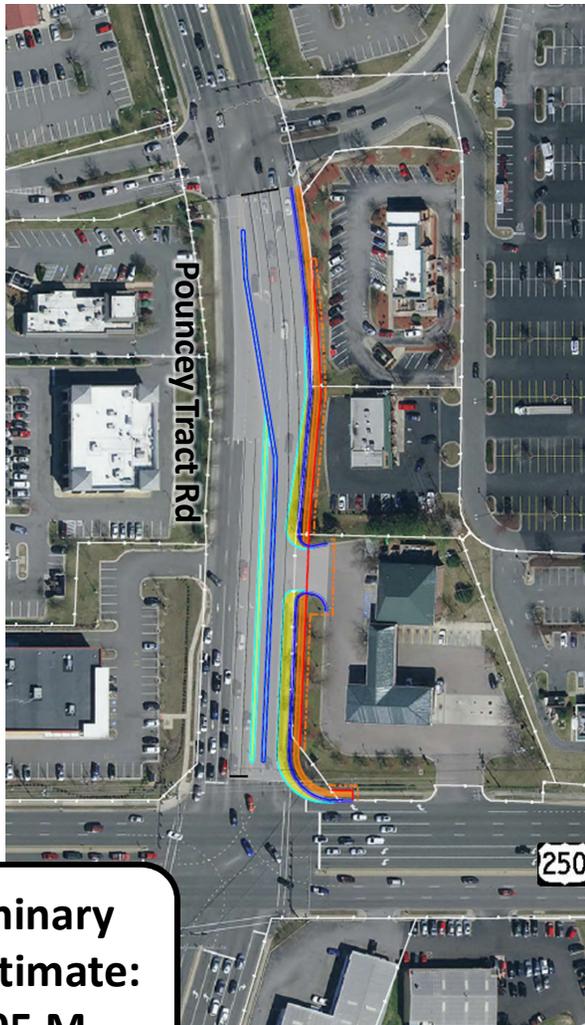
Alternatives Considered

- A. Widen to add third southbound left turn lane
 - 1. Option of widening approach to the east
 - 2. Option of widening approach to the west, remove right turn lane
- B. ~~Partial Displaced Left Turn~~
- C. ~~Full Displaced Left Turn~~
- D. ~~Partial Median U-turn~~
- E. ~~Bowtie~~
- F. Restripe through lane as a shared through-left lane and reconstruct signal*

*Analysis performed after
Concept Screening Meeting

PUMP ROAD/POUNCEY TRACT ROAD - CONCEPT A1

SUMMARY OF IMPROVEMENTS (TRIPLE SOUTHBOUND LEFT TURNS)



**Preliminary
Cost Estimate:
\$ 3.95 M**

■ Design Considerations

- Traditional capacity improvements
- One lane widening for northbound Pouncey Tract Rd north of US 250 (approx. 700')
 - R/W impacts to 7-Eleven and Jiffy Lube
 - Utility impacts
- Median reconstruction on Pouncey Tract Rd
- Northbound throughs shift through intersection

PUMP ROAD/POUNCEY TRACT ROAD - CONCEPT A2

SUMMARY OF IMPROVEMENTS (TRIPLE SOUTHBOUND LEFT TURNS)



**Preliminary
Cost Estimate:
\$ 3.60 M**

■ Design Considerations

- One lane widening for southbound Pouncey Tract Rd north of US 250 (approx. 700')
 - R/W impacts to Walgreens, Burger King and other retail
 - Utility impacts
- Right turn lane is replaced by a shared thru-right lane

PUMP ROAD/POUNCEY TRACT ROAD - CONCEPT F

SUMMARY OF IMPROVEMENTS (LANE + PHASING ADJUSTMENTS)

Convert southbound through lane to shared through/right lane



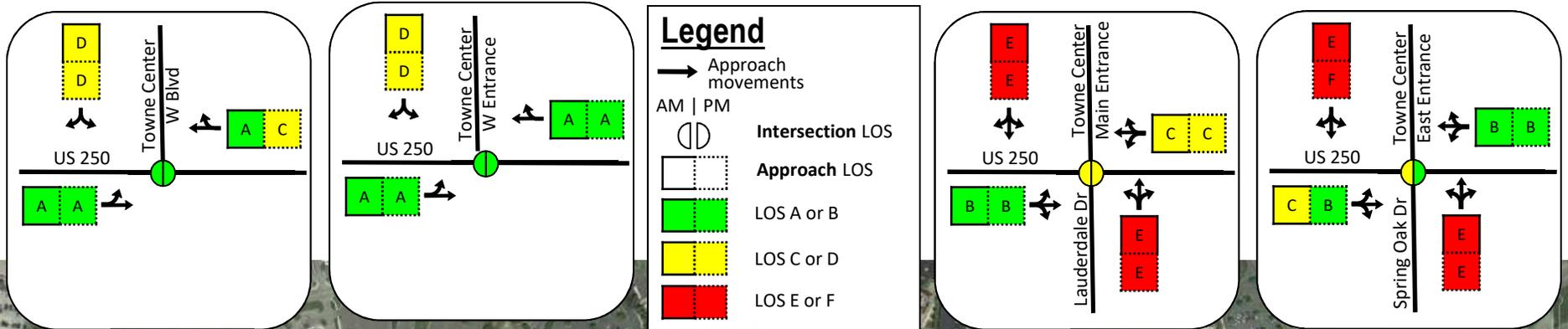
**Preliminary
Cost Estimate:
\$ 0.6 M**

■ Design Considerations

- Traditional capacity improvements
- Minor street split phasing
 - No R/W or utility impacts
- Decrease in AM peak delay
- Split phasing causes an increase in PM peak delay

SPRING OAK DRIVE TO TOWNE CENTER BOULEVARD

NO-BUILD SUMMARY

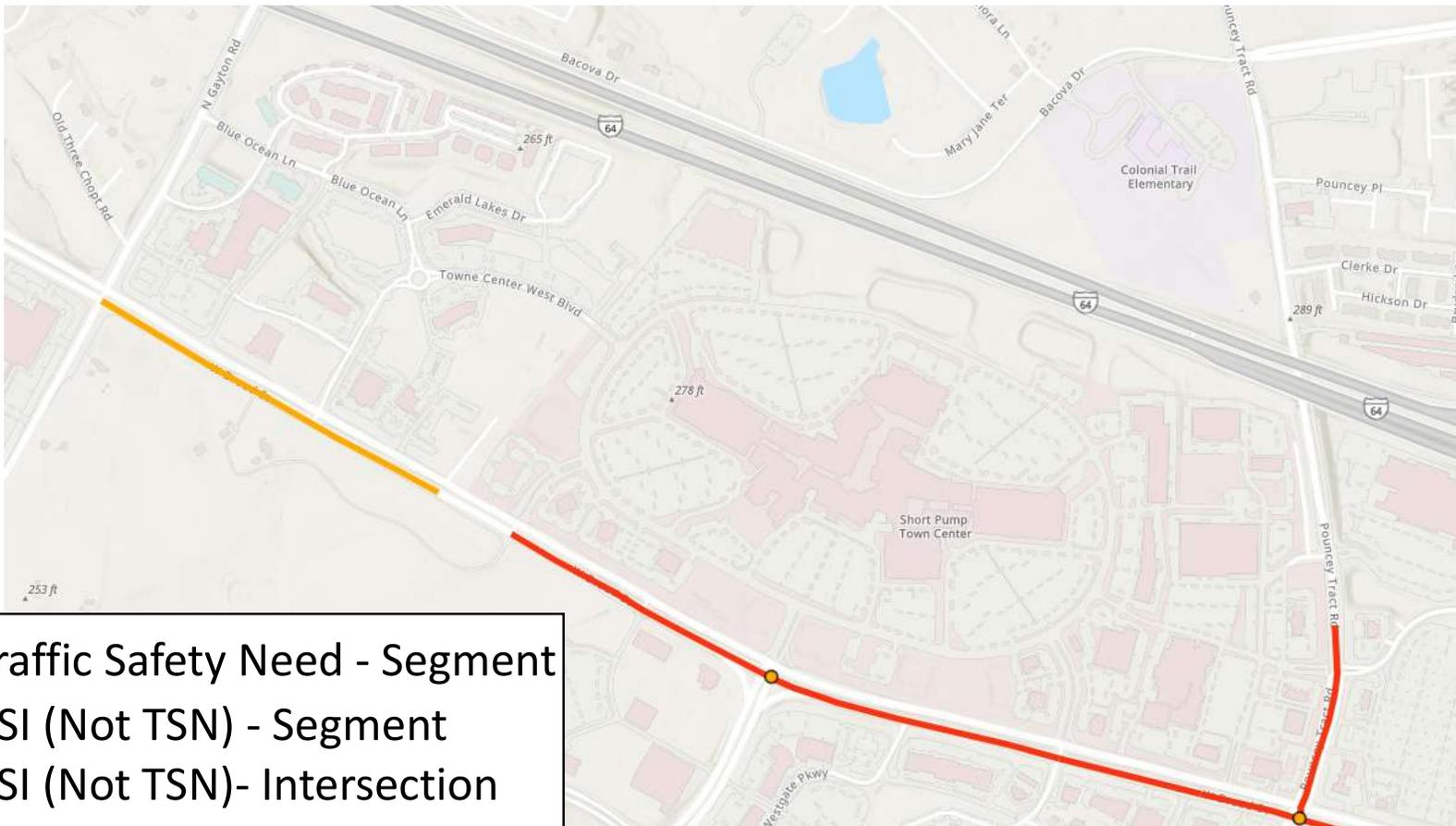


#20, #43, #138 ranked PSI segments
 All segments are TSN

Lauderdale Drive:
 #109 Ranked PSI Intersection



SPRING OAK DRIVE TO TOWNE CENTER BOULEVARD



- Traffic Safety Need - Segment
- PSI (Not TSN) - Segment
- PSI (Not TSN)- Intersection

SPRING OAK DRIVE TO TOWNE CENTER BOULEVARD

Alternatives Considered

A. Superstreet Concept A

- ~~• A1 – Restricted Crossing U-Turns~~
- A2 – Restricted Crossing U-Turns with Geometry Modifications

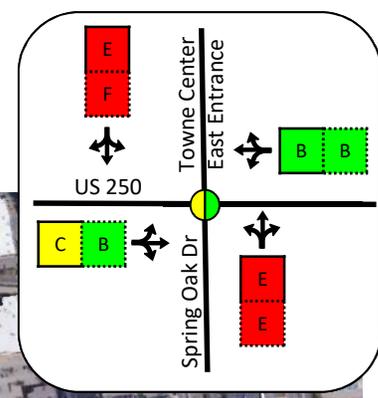
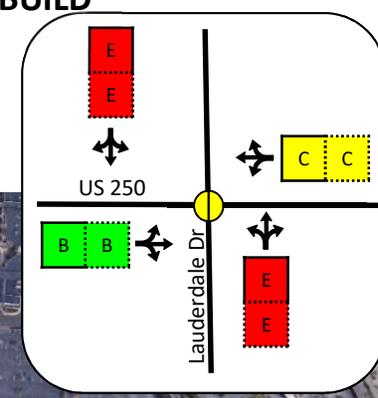
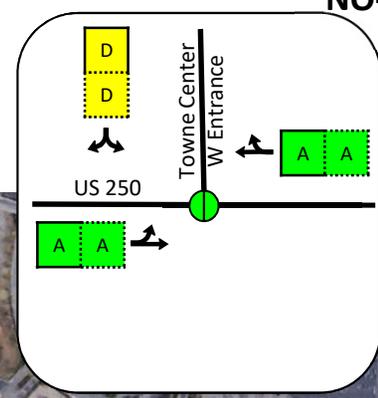
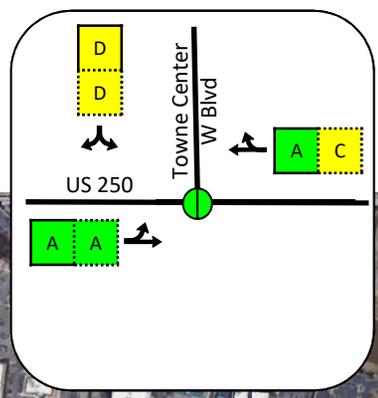
B. Superstreet Concept B

- ~~• Combination of Restricted Crossing U-Turns and Modified MUT at Spring Oak Dr~~

SPRING OAK DRIVE TO TOWNE CENTER BOULEVARD SUMMARY OF IMPROVEMENTS (SUPERSTREET CONCEPT A1)

NO-BUILD

Volume from
Towne Center W
Blvd rerouted to
N. Gayton Rd

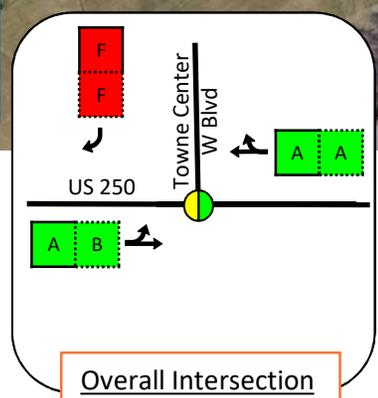


F + I CMF = 0.78
PDO CMF = 0.85
Crash reduction =
6.9 crashes per year

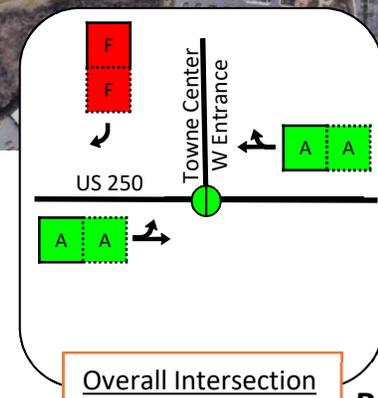
NO-BUILD



BUILD

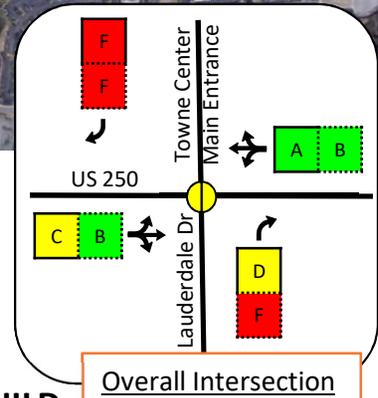


Overall Intersection
AM: +14.5s delay
PM: +0.8s delay

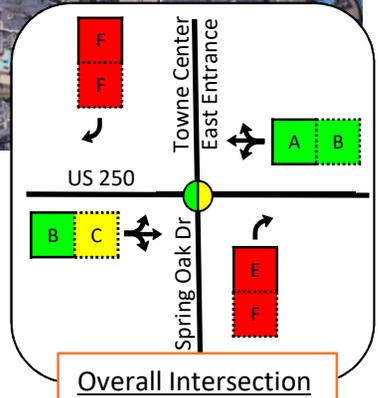


Overall Intersection
AM: +3.2s delay
PM: +1.7s delay

BUILD



Overall Intersection
AM: -8.8s delay
PM: +6.5s delay



Overall Intersection
AM: -6.8s delay
PM: +4.2s delay

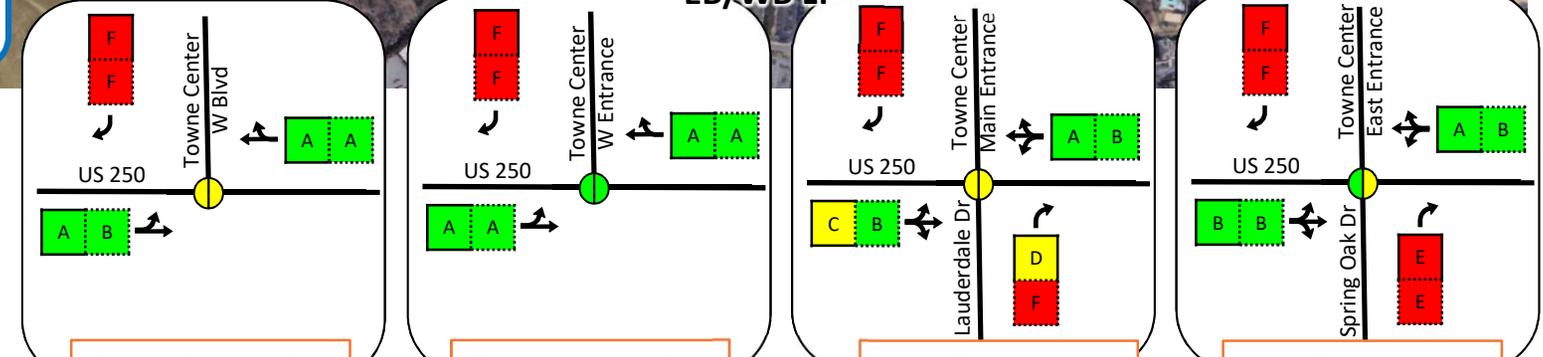
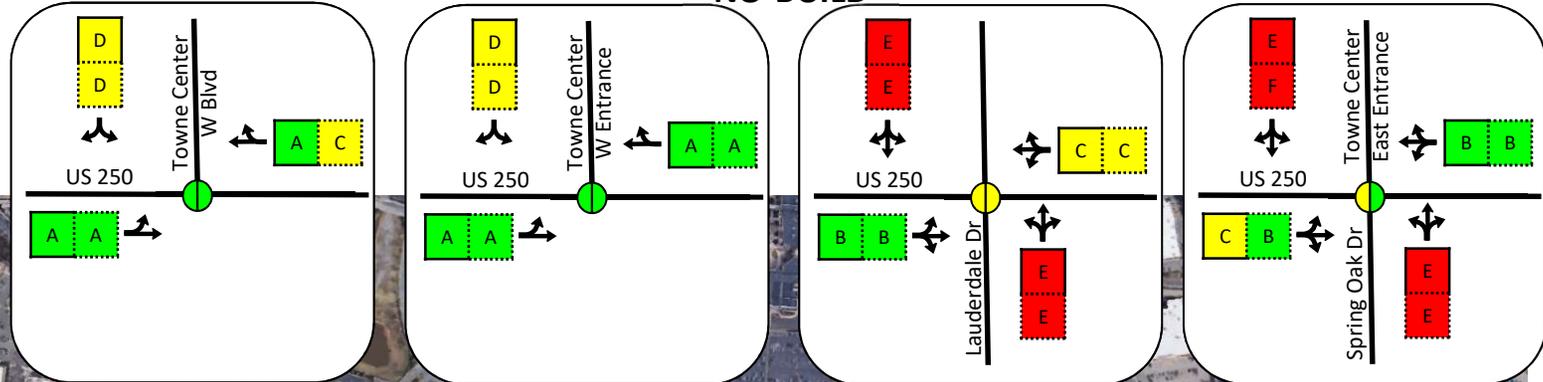


SPRING OAK DRIVE TO TOWNE CENTER BOULEVARD SUMMARY OF IMPROVEMENTS (SUPERSTREET CONCEPT A2)

NO-BUILD

Volume from
Towne Center W
Blvd rerouted to
N. Gayton Rd

F + I CMF = 0.78
PDO CMF = 0.85
Crash reduction =
6.9 crashes per year



Overall Intersection
AM: +14.1s delay
PM: +3.2s delay

Overall Intersection
AM: +1.0s delay
PM: +2.2s delay

Overall Intersection
AM: -10.0s delay
PM: +5.3s delay

Overall Intersection
AM: -5.2s delay
PM: +3.6s delay

NO-BUILD



BUILD



US 250 CORRIDOR

BUILD

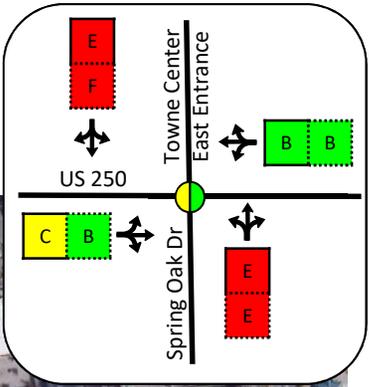
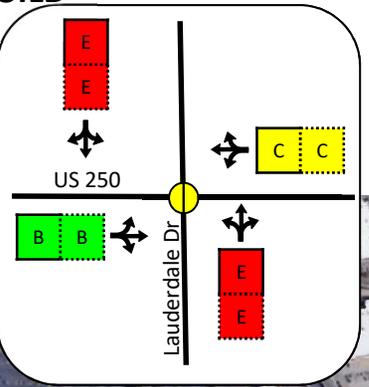
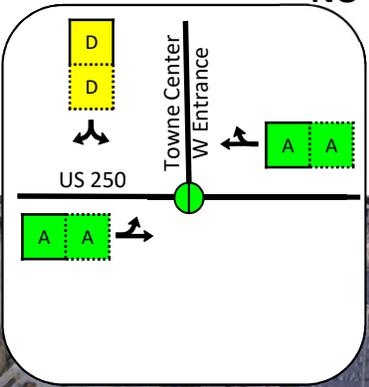
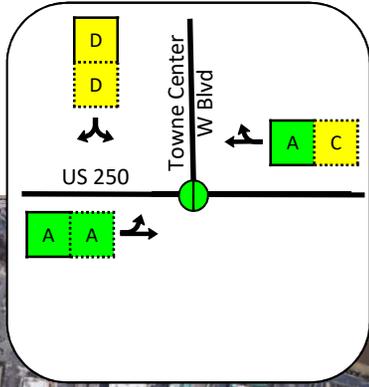
-  RCUT
-  Modified MUT
-  New Signalized Median Opening

SPRING OAK DRIVE TO TOWNE CENTER BOULEVARD

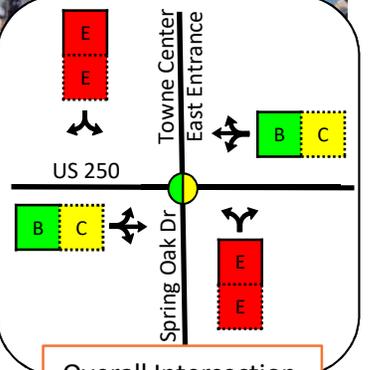
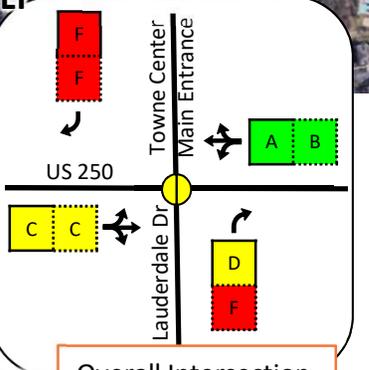
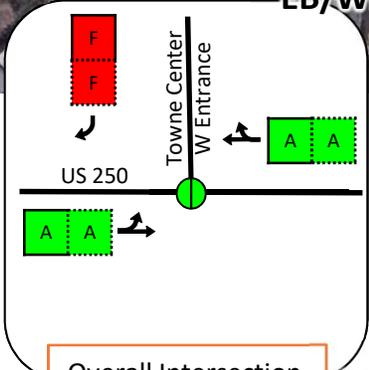
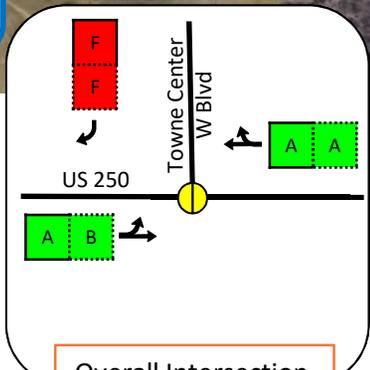
SUMMARY OF IMPROVEMENTS (SUPERSTREET CONCEPT B)

NO-BUILD

Volume from Towne Center W Blvd rerouted to N. Gayton Rd



F + I CMF = 0.7-0.78
 PDO CMF = 0.85-0.91
 Crash reduction = 6.4 crashes per year



NO-BUILD



BUILD

Overall Intersection
 AM: +14.1s delay
 PM: +3.2s delay

Overall Intersection
 AM: +1.0s delay
 PM: +2.2s delay

BUILD

Overall Intersection
 AM: -10.1s delay
 PM: +3.8s delay

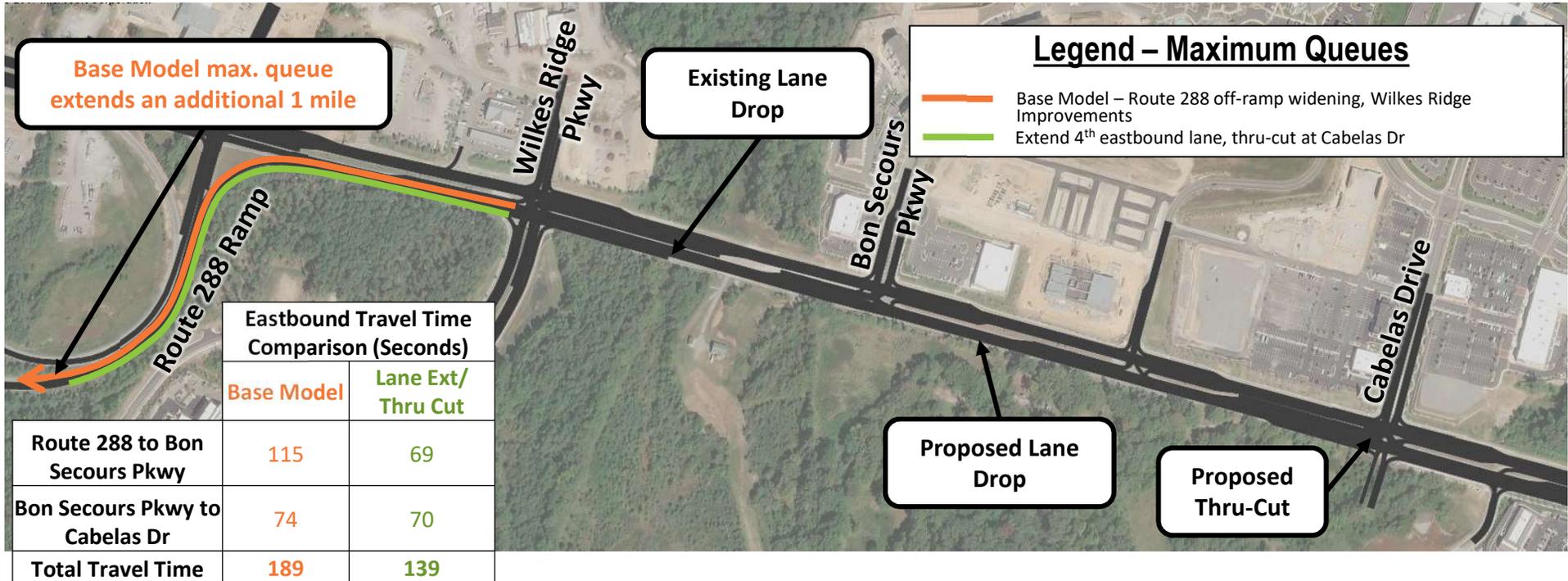
Overall Intersection
 AM: -4.2s delay
 PM: +9.2s delay



ROUTE 288 TO GAYTON ROAD

- **Northbound Route 288 2-lane off-ramp reduces ramp queueing but queues still extend to Route 288 mainline thru lanes**
- **Preliminary VISSIM testing showed queueing along eastbound US 250 in the PM peak**
 - Additional approaches and phases at intersections along US 250 could exacerbate issues
 - Congestion occurs where eastbound US 250 reduces from four lanes to three
- **Recommended improvements for the STARS 250 study:**
 - Thru-Cut at Cabelas Drive
 - Extend fourth eastbound lane through Bon Secours Parkway

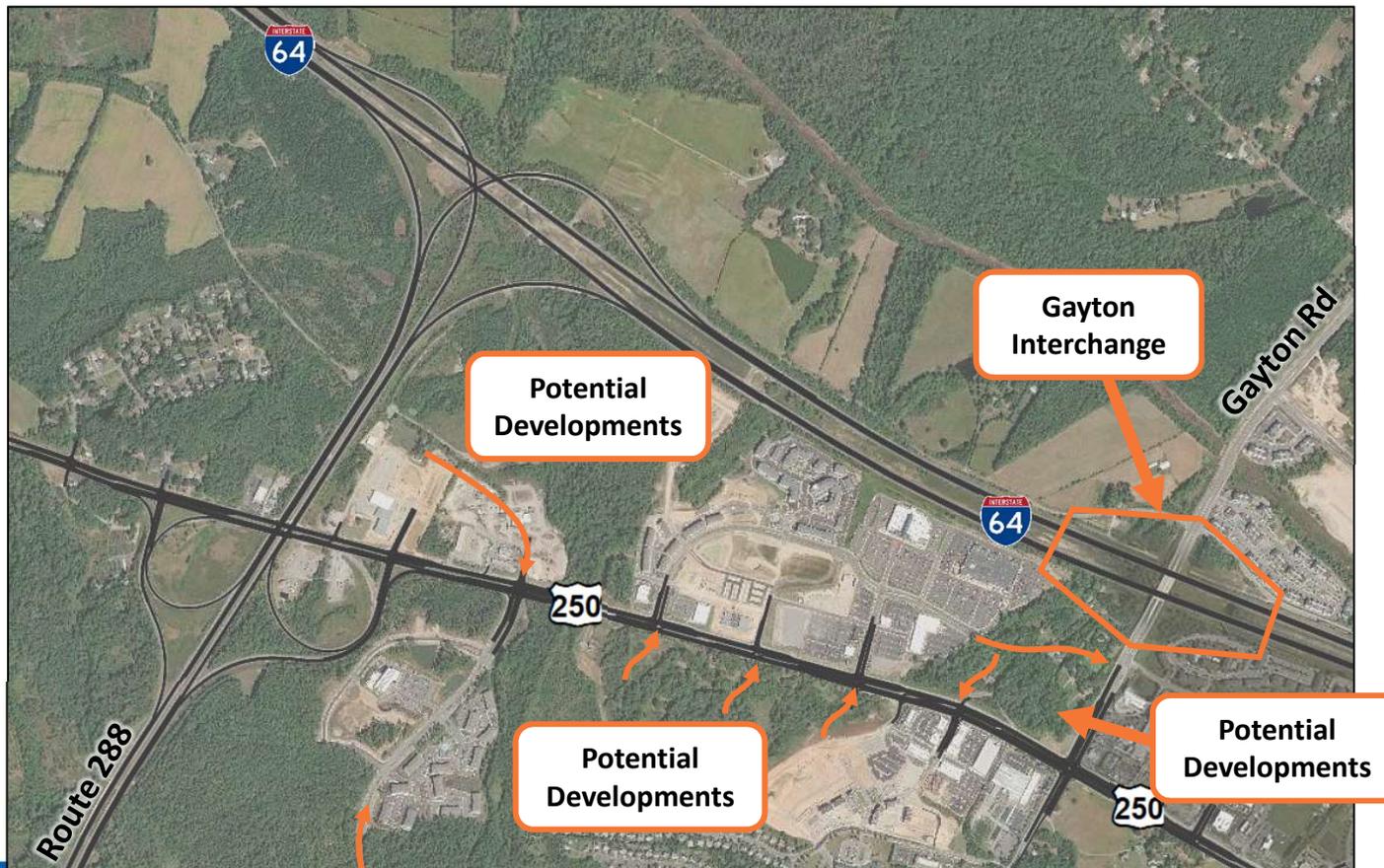
ROUTE 288 TO GAYTON ROAD



- Extending the 4th lane shortens off ramp queues by allowing better lane utilization at Wilkes Ridge Parkway
- Thru-Cut at Cabelas Dr mitigates queue spillback to upstream signals

ROUTE 288 TO GAYTON ROAD

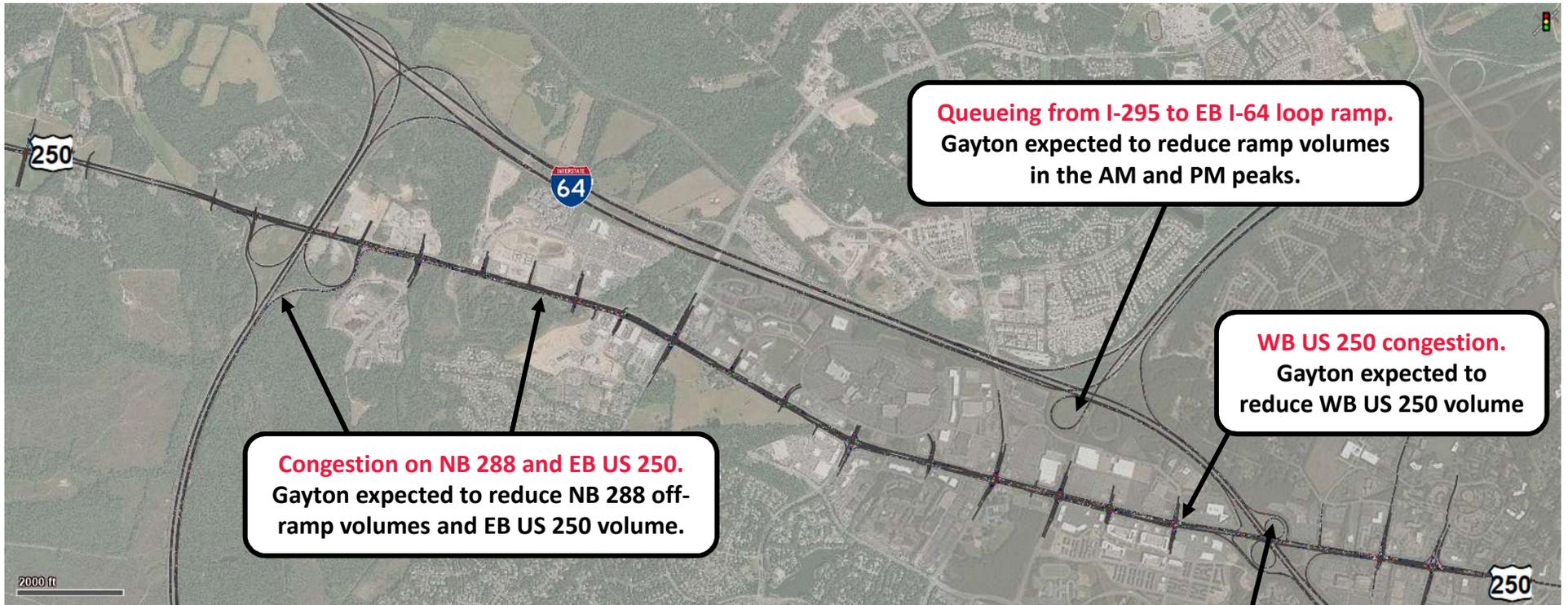
- Many unknowns related to future development and network connections



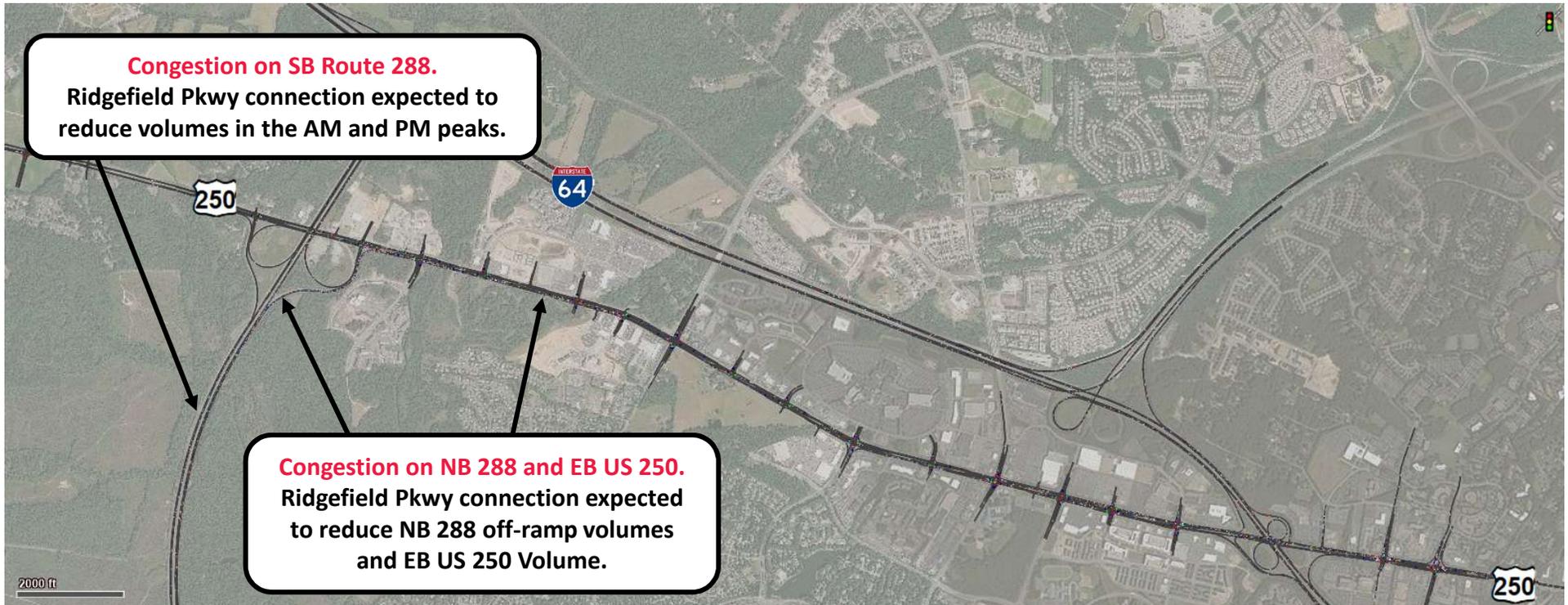
SUBAREA MODEL RECOMMENDATIONS

- **Both scenarios would decrease volume on portions of US 250 by over 10% in 2040 AM and PM peaks:**
 - Gayton Rd Interchange
 - Ridgefield Pkwy/Tuckahoe Creek Pkwy Connection
- **Scenarios could relieve capacity constraints at interchanges within the study area**

SUBAREA MODEL RECOMMENDATIONS – GAYTON INTERCHANGE



SUBAREA MODEL RECOMMENDATIONS – RIDGEFIELD PKWY/TUCKAHOE CREEK PKWY CONNECTION



SUBAREA MODEL RECOMMENDATIONS

■ **Gayton Interchange:**

- The Gayton Interchange is expected to improve the operations of the adjacent interchanges and arterials
 - Provides additional relief at I-64/US 250 and Route 288/US 250 interchanges because of expected re-routing
 - Expected to reduce volume on US 250 between Route 288 and Gayton Rd

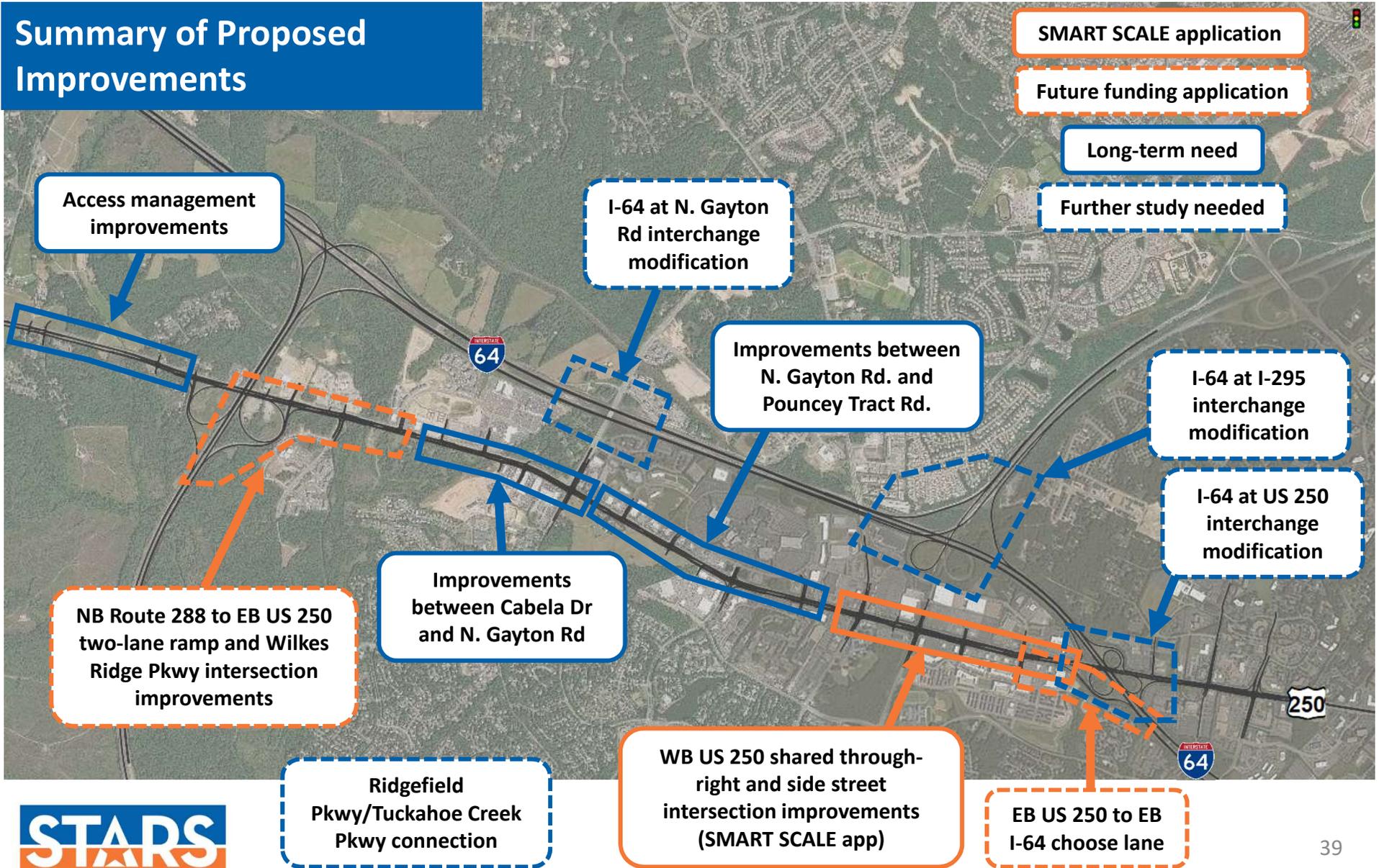
■ **Ridgefield Parkway/Tuckahoe Creek Parkway Connection:**

- Expected to reduce volume on US 250 between Route 288 and Gayton Rd
- Expected to reduce volume on Route 288 between Tuckahoe Creek Pkwy and Broad Street
- Impacts to local roadway network need further investigation



SUMMARY OF PROPOSED IMPROVEMENTS

Summary of Proposed Improvements





SCHEDULE AND NEXT STEPS

NEXT STEPS

- **Finalize No-Build and Build 2040 VISSIM analysis**
- **Incorporate pedestrian and transit improvements into proposed recommendations**
- **Finalize concept sketches and costs**
- **Second public outreach meeting?**

OVERALL SCHEDULE AND MILESTONES

- **May-June** – No-Build and Build Analysis, Cost Estimates, Schedules, Reporting
 - Sketches/Cost Estimates Technical Committee Review
- **June** – Online Public Outreach?, Finalize Reporting

STARS

STRATEGICALLY TARGETED AND
AFFORDABLE ROADWAY SOLUTIONS

US 250 (SHORT PUMP AREA) CORRIDOR IMPROVEMENT STUDY

Thank you.

