

# ARTERIAL

PRESERVATION PROGRAM

US 301 / Route 207 Arterial Preservation Plan – Final Recommendations

*April 25, 2018; 5:00 PM – 7:00 PM*

*L. E. Smoot Memorial Library*

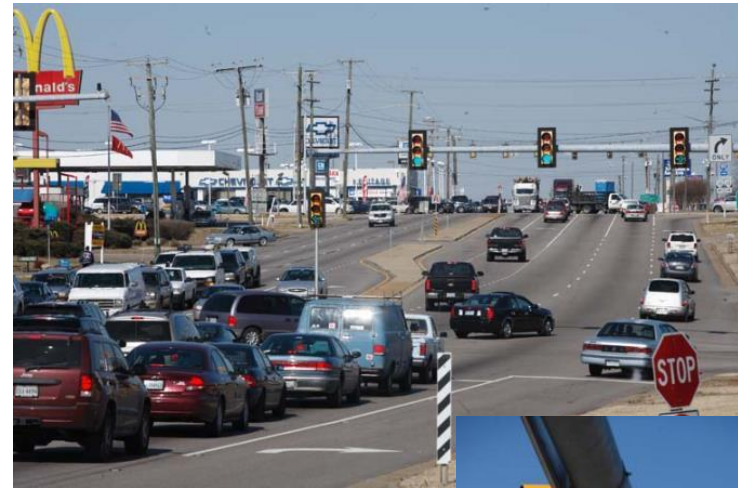


# Arterial Preservation Program

Background

# Slow Erosion of Safety and Capacity

- Virginia's arterials have become "main streets" for local growth
- Placing direct access and traffic signals at every business or residential development adds to congestion on primary routes.
- Serves the local economy and tax revenues but over time at the expense of safety, capacity and mobility – affecting movement of people and goods across the state and region.



# Why This Matters

- Preparing for future traffic and economic development reduces the need for expensive, disruptive "retrofit" projects
- Route 301 and Route 207 are anticipated to see additional commercial and residential development
- Additional traffic likely to use corridor with Governor Harry W. Nice Bridge replacement and construction on Interstate 95



# Arterial Preservation Program

Access Management Overview



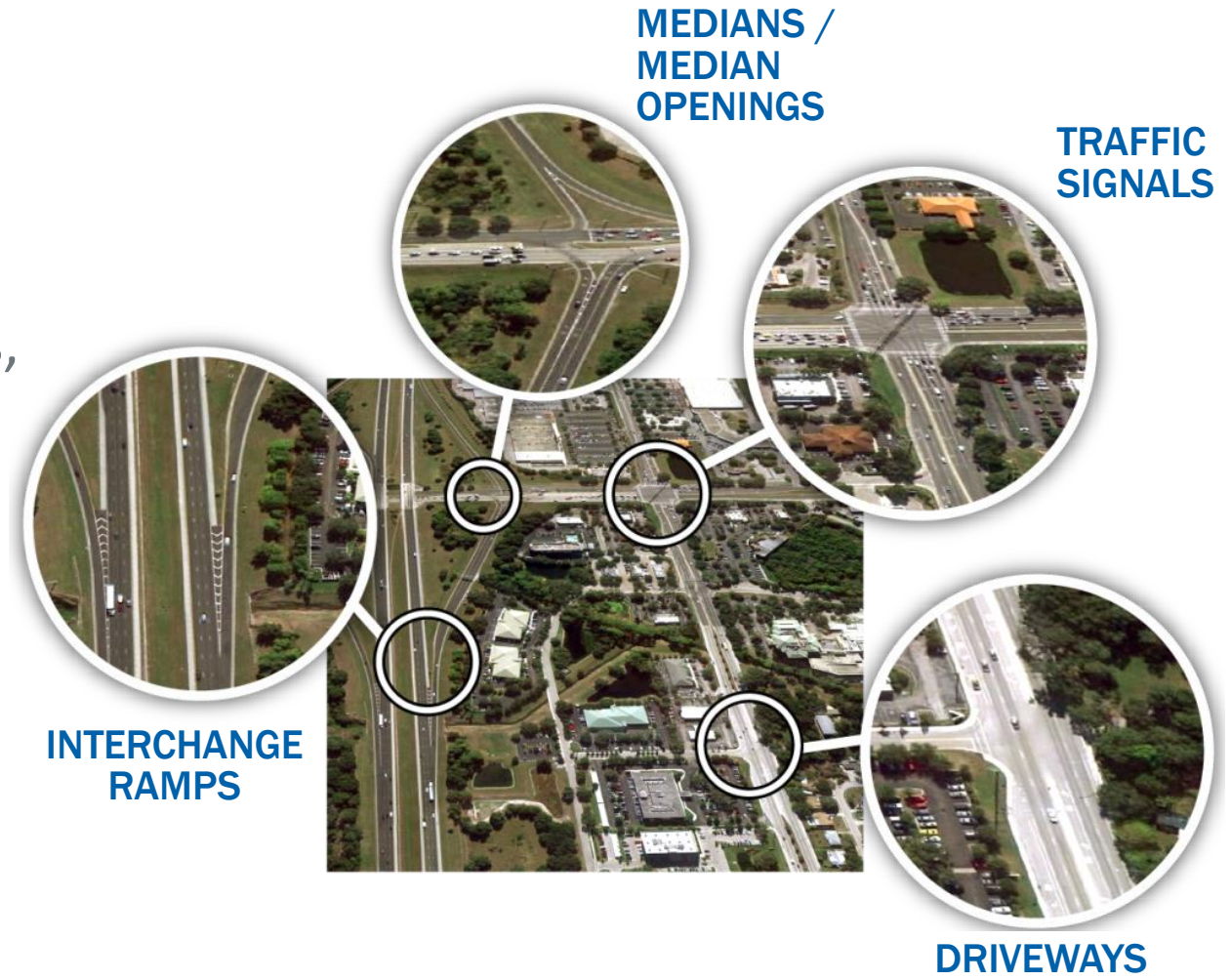
# Access Management

## What is Access Management?

Access management involves the location, spacing, and design of driveways, medians, median openings, traffic signals, and interchanges

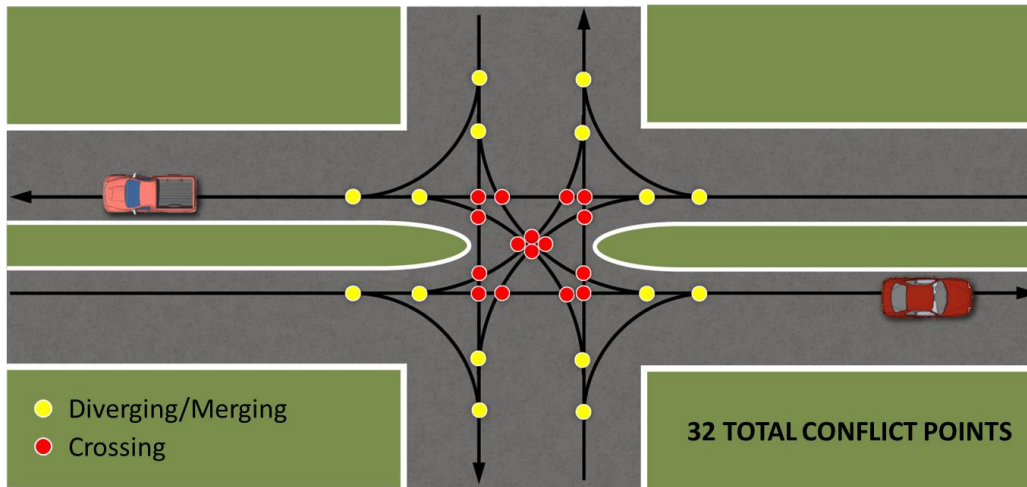
## Guiding Principles

- Limit the number of conflict points
- Separate conflict points
  - Reduce the number of median openings
  - Improve driveway design
  - Consolidate driveways to reduce frequency
- Look at conflict points from a network perspective

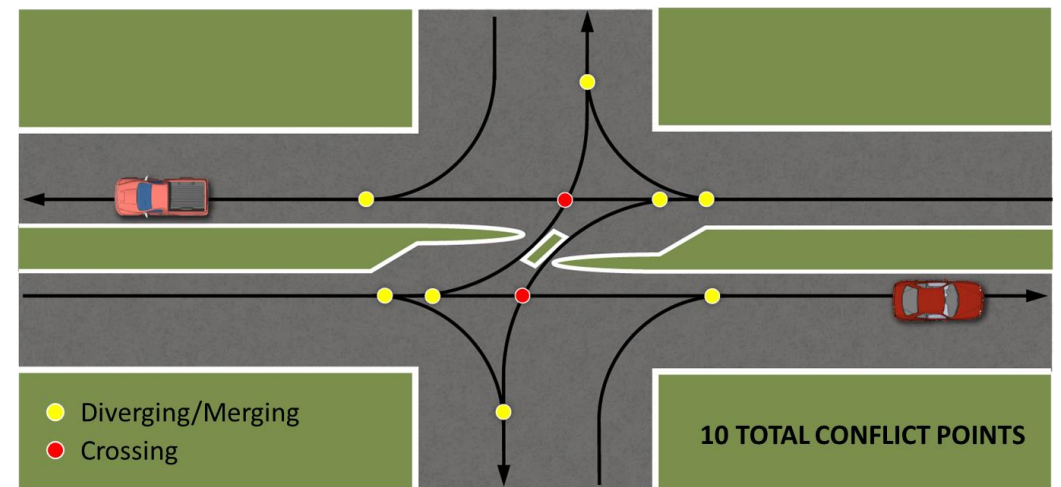


# Conflict Points

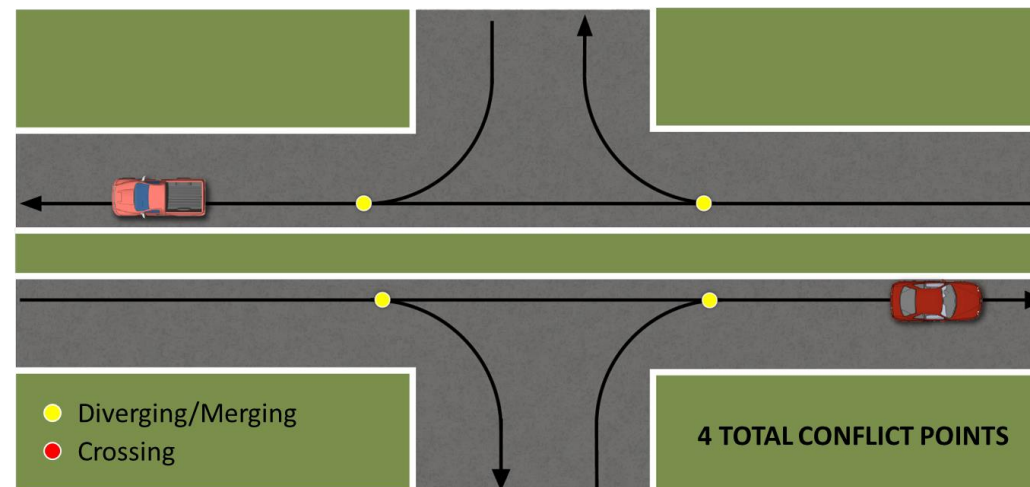
FULL UNSIGNALIZED MEDIAN OPENING



DIRECTIONAL MEDIAN OPENING

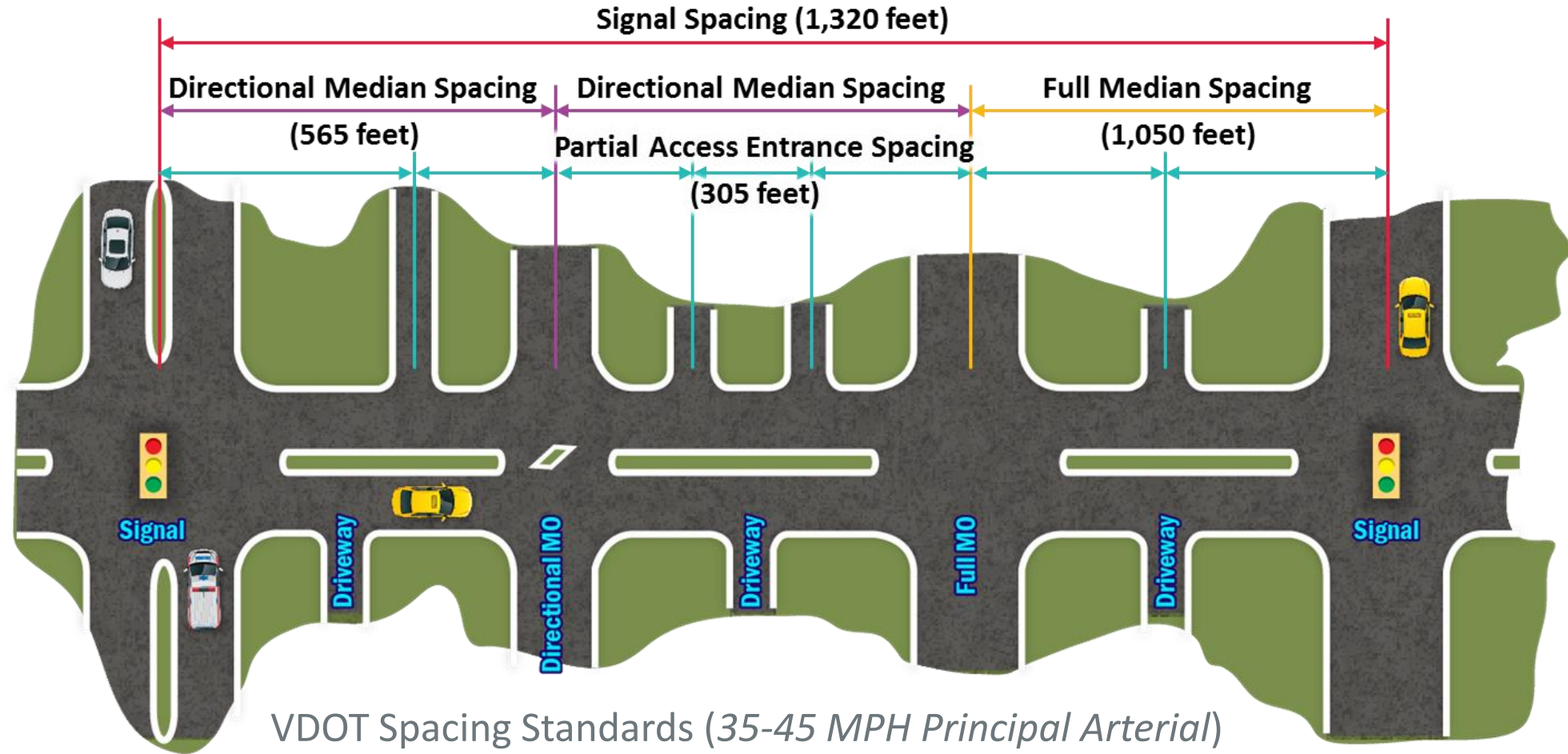


RIGHT-IN/RIGHT-OUT DRIVEWAY



# Access Management Guidelines

45



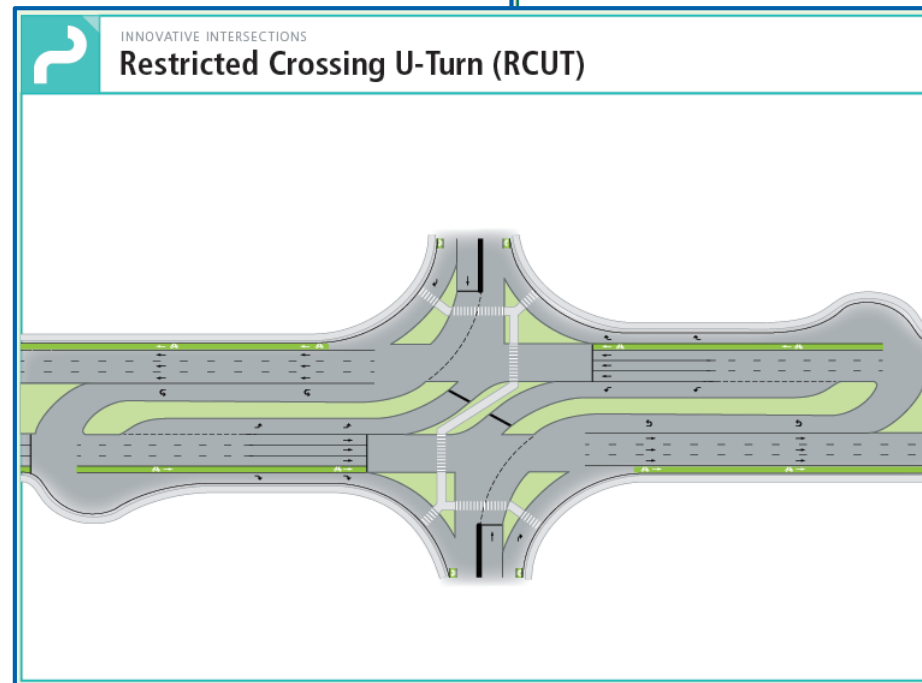
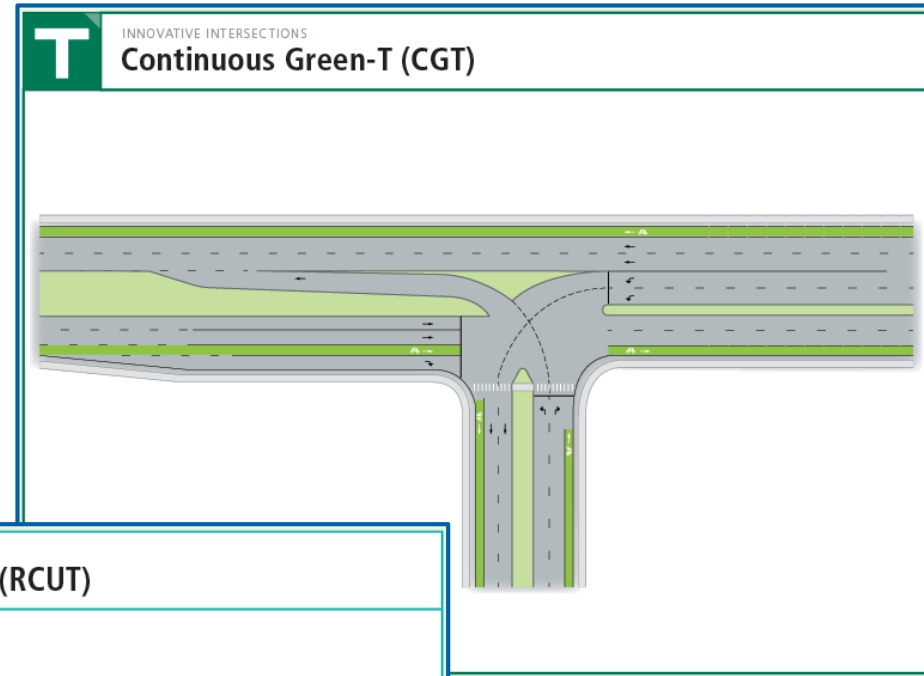


# Arterial Preservation Program

Innovative Intersections Overview

# Innovative Intersections

- Intersection designs which:
  - Improve safety
  - Reduce delay
  - Increase efficiency
- Can reduce delays and crashes as much as 50%
- Also known as:
  - Alternative
  - Non-traditional
  - Unconventional
  - Reduced Conflict

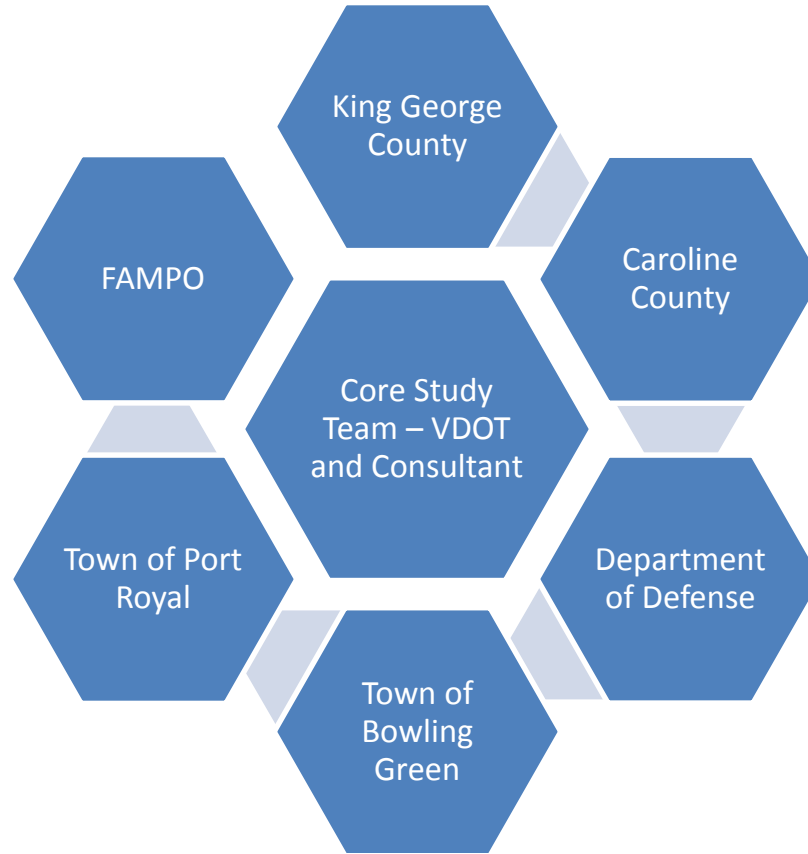


# Arterial Preservation Plan

US 301 / Route 207 Corridor



# Project Stakeholders / Working Group



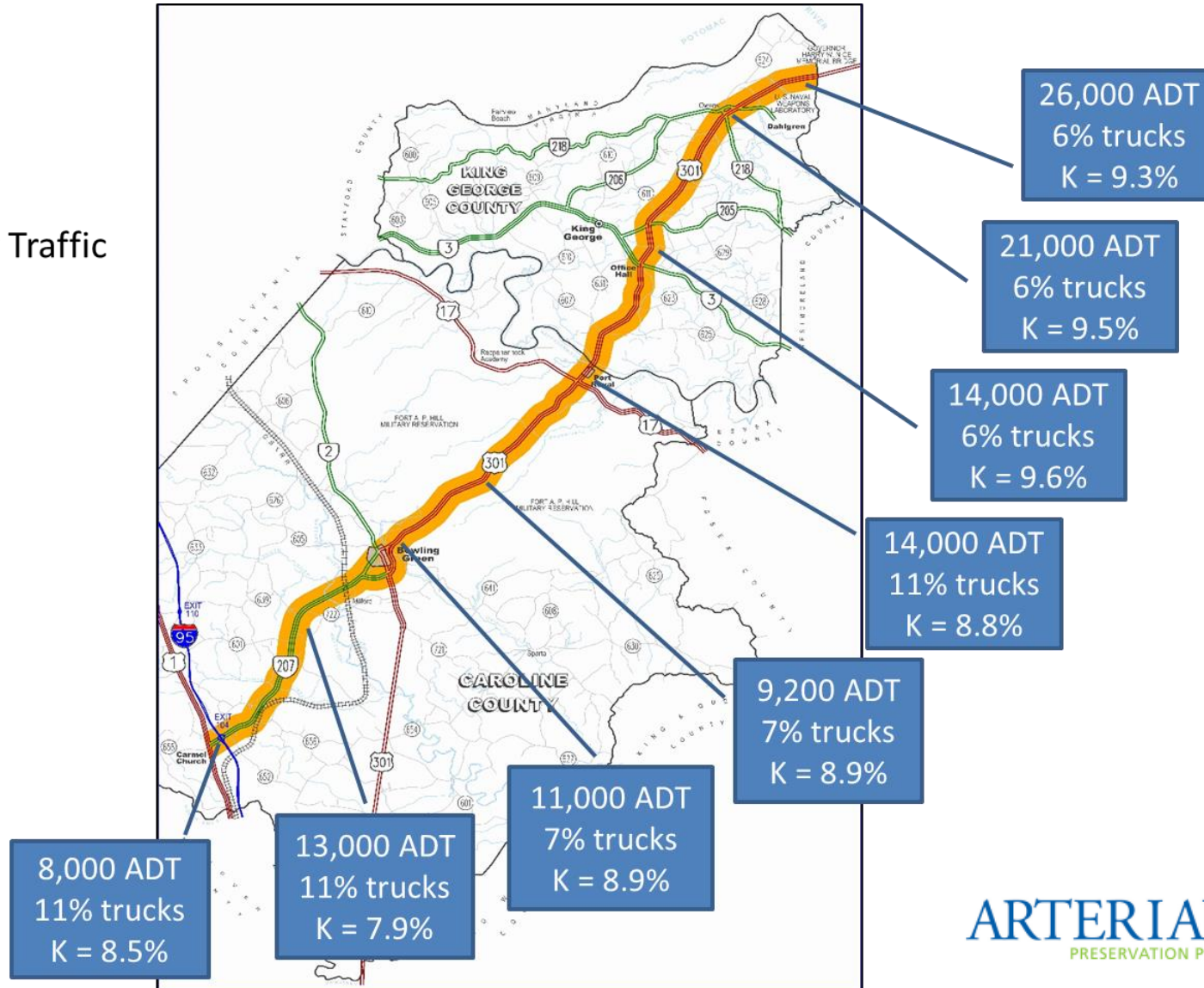


# Key challenges identified in study corridor

- Safety concerns
  - Lack of adequate shoulders
  - Poor sight distance in certain locations
- Operational challenges
  - High number of crossovers & new signals
  - Weekend congestion near Governor Nice Bridge
  - Weekday congestion near military facilities & other developed areas
- Future traffic growth
  - Continued development pressure
  - Widening of Governor Nice Bridge
  - Diversion to 301/207 due to significant construction along I-95

# Traffic count highlights

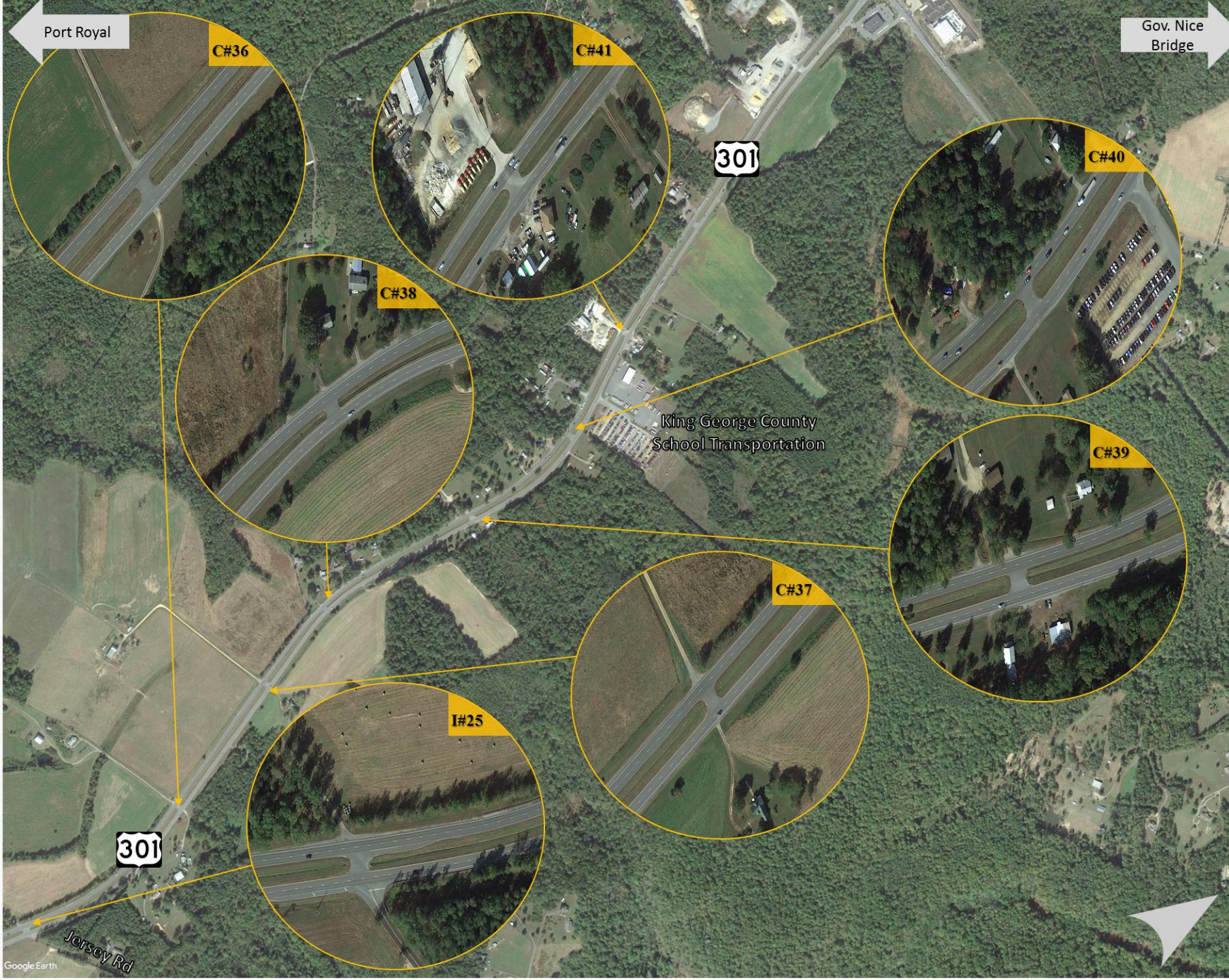
Year: 2016  
Average Daily Traffic



# Example recommendations

- There are 81 crossovers and 37 intersections along the corridor
- Recommendations were prepared for each of the above and are available tonight for your review
- The following slides show a few examples
- After the presentation, you can talk with staff and see individual recommendations at one of the viewing stations or look up a specific location in the printed copies on the tables

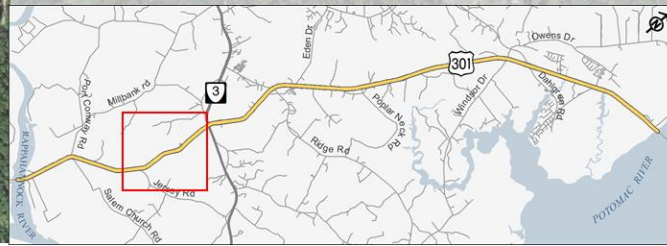




# Intersections & Median Crossovers King George County

I## - Intersection #  
C## - Crossover #

- Intersection #25: Jersey Rd with US 301**  
**Recommendation:** Lengthen existing turn lanes on US 301;  
 Widen median opening  
**Cost:** \$0.5M to \$0.6M
  
- Crossovers #36:**  
**Recommendation:** Remove Crossover  
**Cost:** \$0.2M to \$0.3M
  
- Crossovers #37:**  
**Recommendation:** Construct left-turn lanes on US 301  
**Cost:** \$0.4M to \$0.5M
  
- Crossovers #38:**  
**Recommendation:** Remove Crossover  
**Cost:** \$0.2M to \$0.3M
  
- Crossovers #39:**  
**Recommendation:** Construct left-turn lanes on US 301  
**Cost:** \$0.4M to \$0.5M
  
- Crossovers #40:**  
**Recommendation:** Remove Crossover  
**Cost:** \$0.2M to \$0.3M
  
- Crossovers #41:**  
**Recommendation:** Construct left-turn lanes on US 301; Widen  
 median opening  
**Cost:** \$0.5M to \$0.6M







Port Royal

Gov. Nice Bridge

Possible area for development opportunities if access management principles can be satisfied

301






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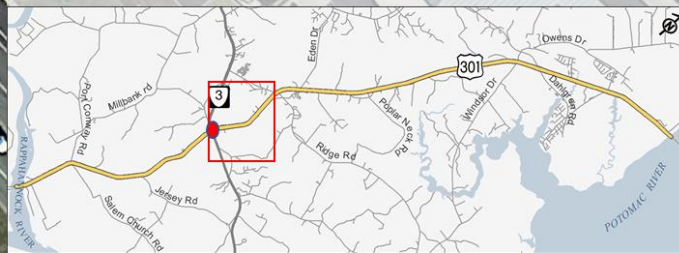
Option 1 of 2 improvements

# Intersection #26: US 301 with Route 3 Quadrant Roadway (QR) Improvement Type: Congestion, Economic Development

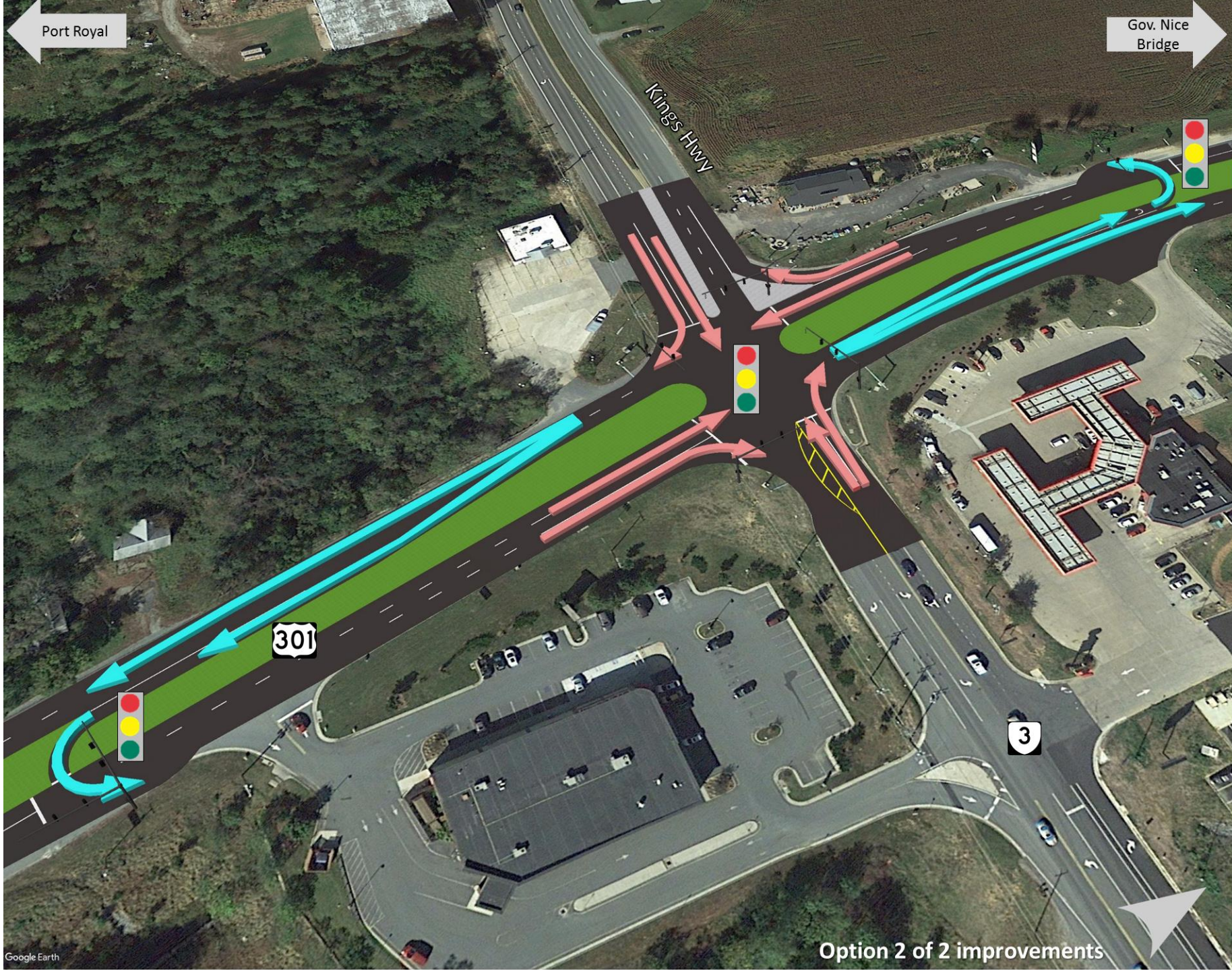
**Recommendation:** Reconfigure main intersection at Route 3 with US 301 disallowing lefts. Construct quadrant roadway with signaled intersection on US 301 and Unsignalized intersection on Route 3

**Quadrant Cost:** \$2.8M to \$4.8M

-  Standard Movements
-  Southbound US 301 to Eastbound Rte 3
-  Northbound US 301 to Westbound Rte 3
-  Eastbound Rte 3 to Northbound US 301
-  Westbound Rte 3 to Southbound US 301







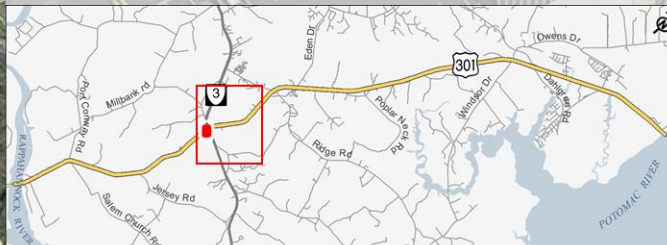


### Intersection #26: US 301 with Route 3 Median U-Turn (MUT) Improvement Type: Congestion, Economic Development

**Recommendation:** Reconfigure main intersection at Route 3 with US 301 disallowing lefts. Construct single lane signalized U-turn areas north and south of main intersection

**Median U-Turn Cost:** \$1.8M to \$3.2M

-  Standard Movements
-  Re-routed left turn movements







Port Royal

Gov. Nice Bridge

301

206

Dahlgren Rd






Possible area for development opportunities if access management principles can be satisfied

Option 1 of 2 improvements

**Intersection #33: US 301 with Dahlgren Rd**  
**Quadrant Roadway (QR)**  
**Improvement Type: Congestion, Economic Development**

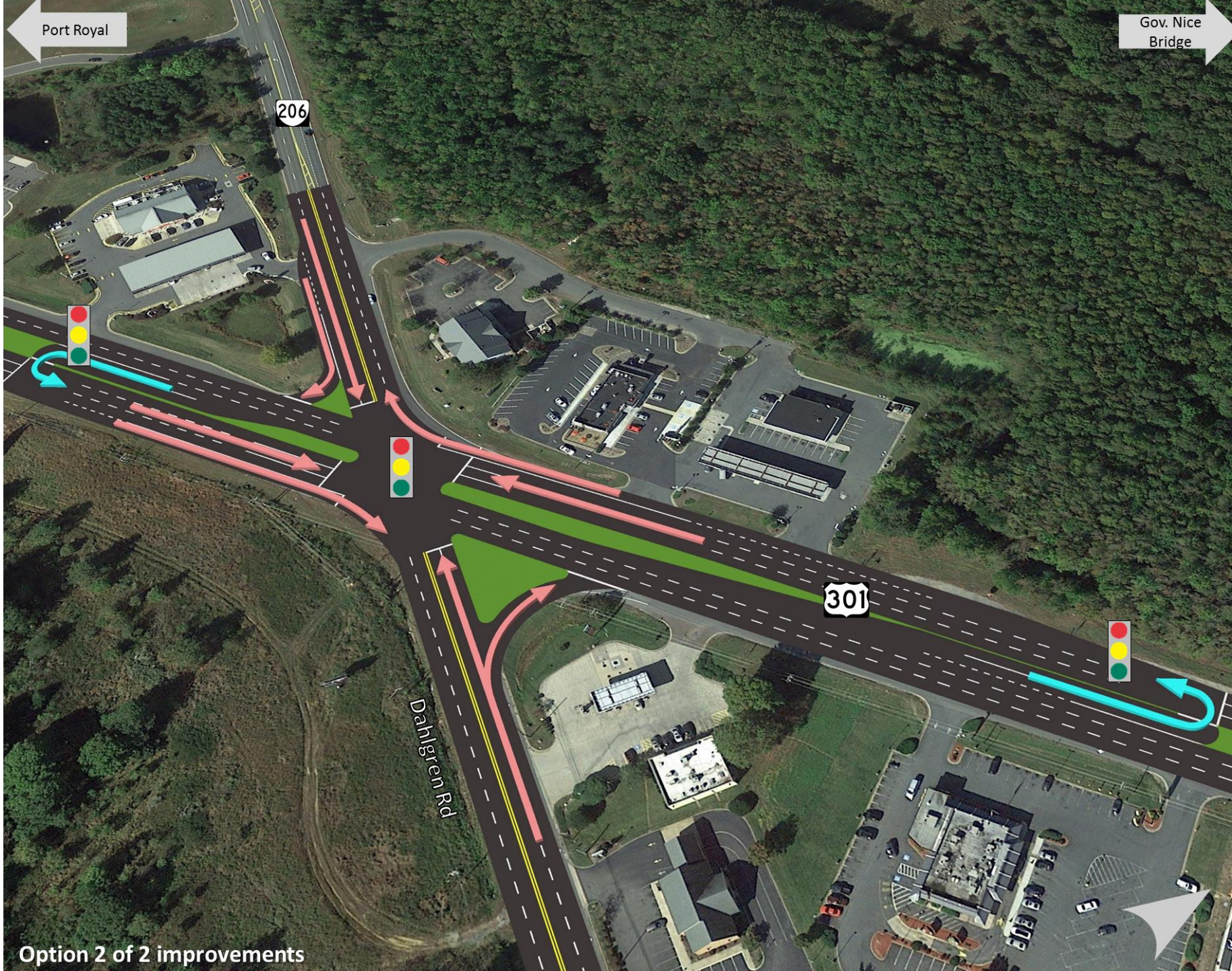
**Recommendation:** Reconfigure main intersection at Dahlgren Rd with US 301 disallowing lefts. Construct quadrant roadway with signaled continuous green-t intersection on US 301 and signaled intersection on Dahlgren Rd

**Quadrant Cost:** \$3.5M to \$6.1M

-  Standard Movements
-  Southbound US 301 to Eastbound Dahlgren Rd
-  Northbound US 301 to Westbound Dahlgren Rd
-  Westbound Dahlgren Rd to Southbound US 301
-  Eastbound Dahlgren Rd to Northbound US 301









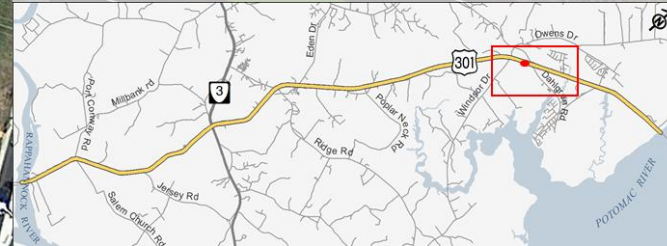
**US 301/Rte 207 Arterial Preservation Plan**  
**Figure 34**  
**Intersection #33: US 301 with Dahlgren Rd**  
**Median U-Turn (MUT)**  
**Improvement Type: Congestion, Economic Development**

**Recommendation:** Reconfigure main intersection at Dahlgren Rd with US 301 disallowing lefts, construct two-lane signaled U-turn areas north and south of main intersection.

**Cost:** \$2.6M to \$4.2M

-  Standard Movements
-  Re-routed left turn movements

Option 2 of 2 improvements





# Next Steps

- Finalize Study Report
  - Will be posted to project webpage by end of May 2018
- Work with County & Town officials to implement solutions
  - Identify priorities & seek funding
  - No date has been established for construction
  - Recommendations will be implemented as opportunity and funding permits

# How to find more information

- Arterial Preservation Program Website
  - [http://www.virginiadot.org/programs/vdot\\_arterial\\_preservation\\_program.asp](http://www.virginiadot.org/programs/vdot_arterial_preservation_program.asp)
  
- US 301 / Route 207 Project Web Page
  - [http://www.virginiadot.org/projects/fredericksburg/route\\_301\\_and\\_route\\_207\\_corridor\\_study.asp](http://www.virginiadot.org/projects/fredericksburg/route_301_and_route_207_corridor_study.asp)



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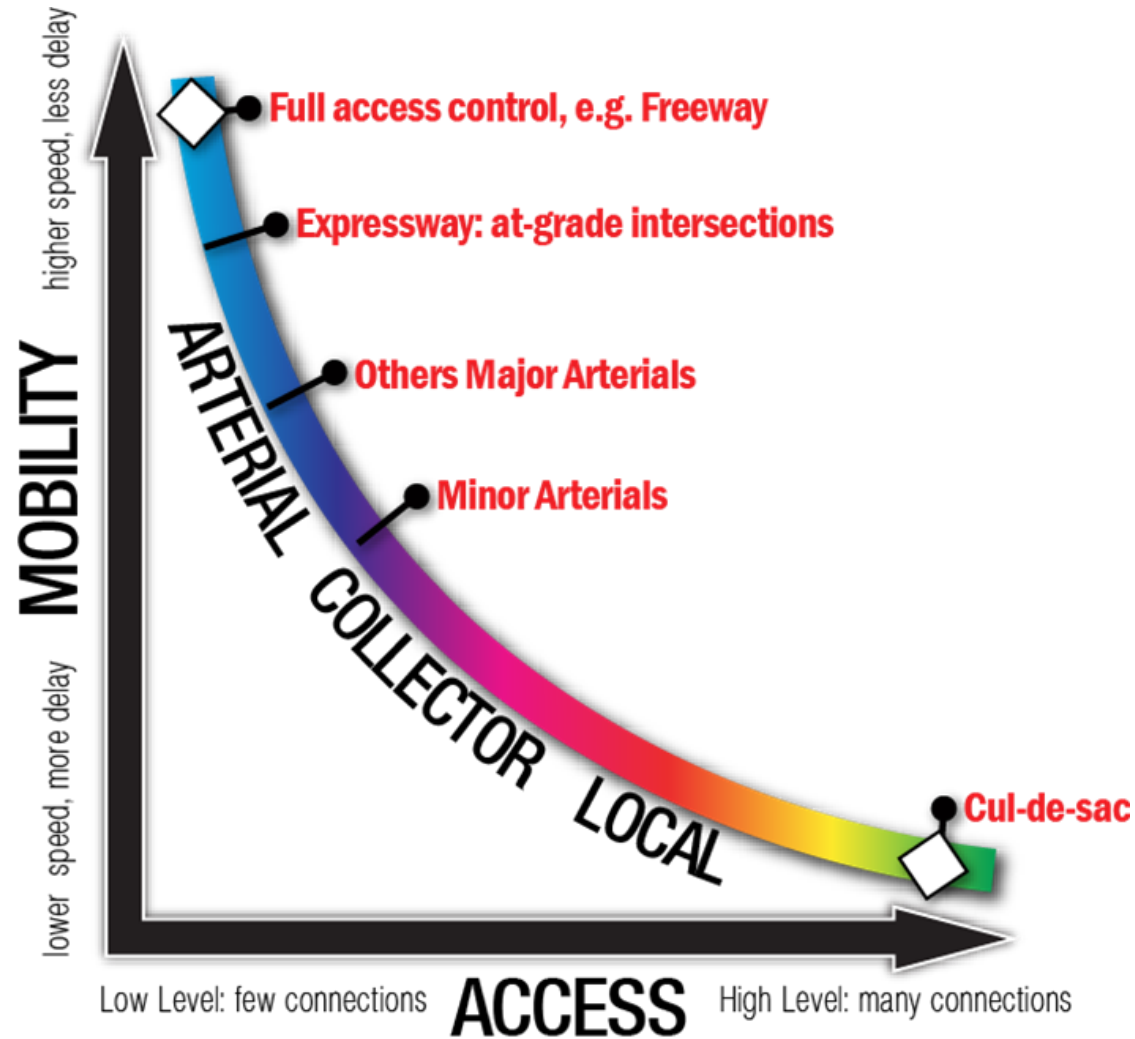
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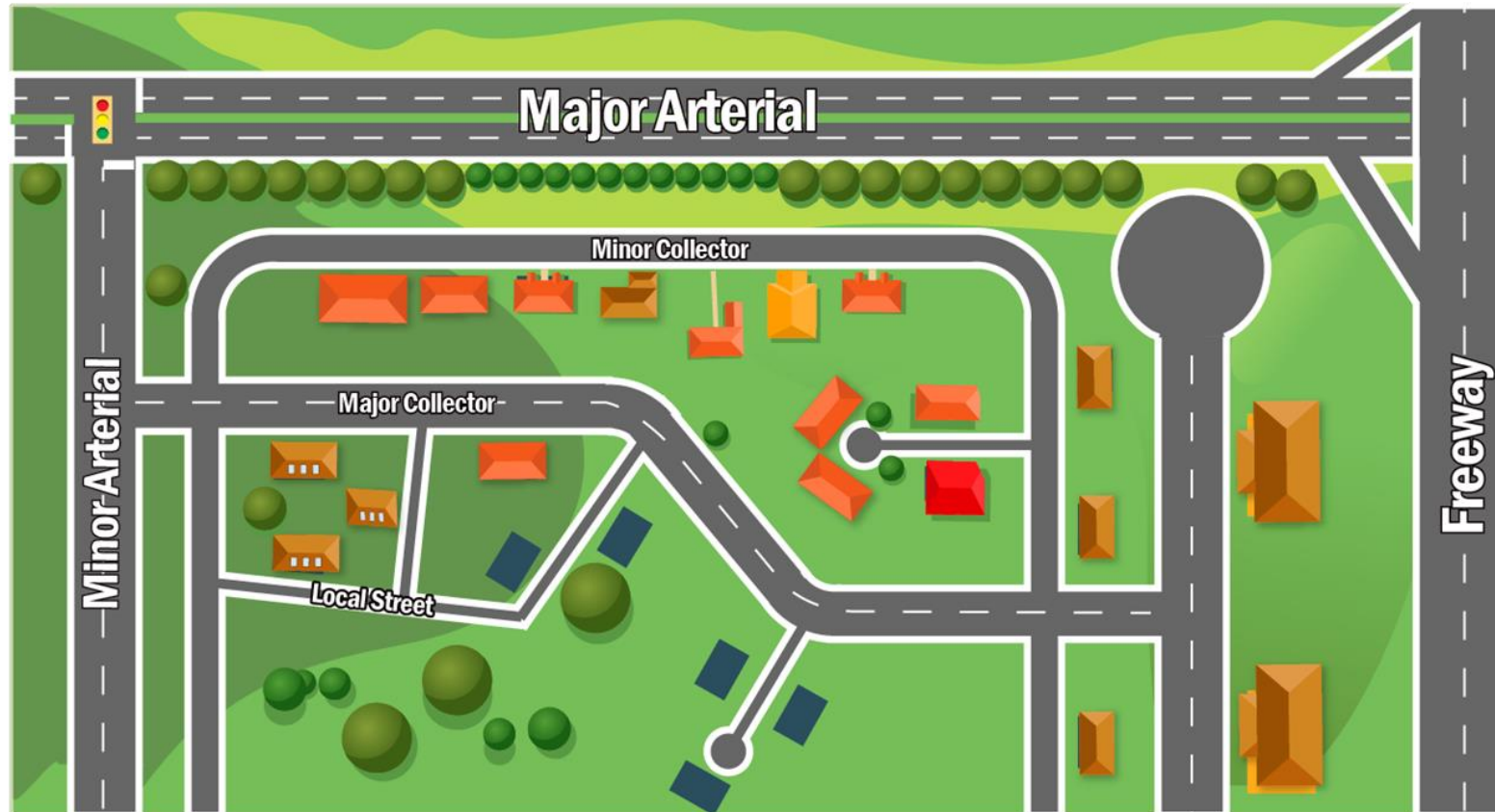
Extra slides beyond this point – not part of main presentation

# Balance between Mobility and Access



# Roadway Hierarchy

## Functional Classification



# Access Management Benefits

- Increased Signal Spacing Benefits
  - Improves traffic flow
  - Reduces congestion
  - Improves air quality

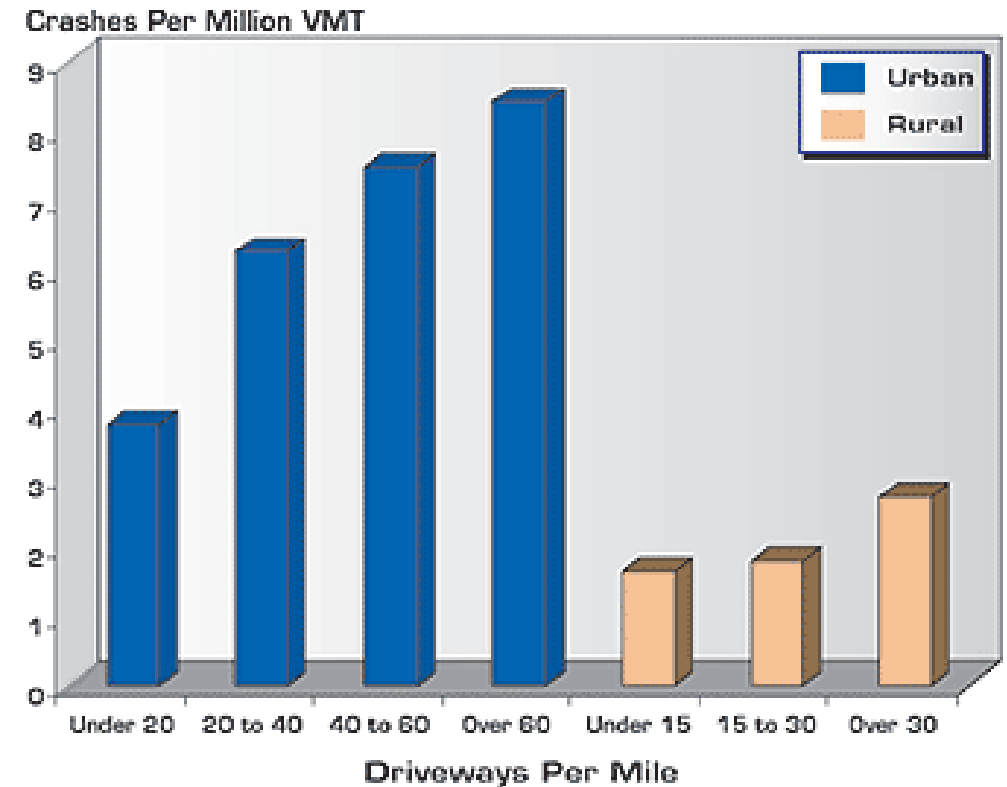
Signals per Mile	Increase in Travel Time (%)
2	-
3	9
4	16
5	23
6	29
7	34
8	39

Signals per Mile	Crashes per Million VMT
Under 2	3.53
2 to 4	6.89
4 to 6	7.49
6 +	9.11

Source: Federal Highway Administration (FHWA)  
[https://ops.fhwa.dot.gov/access\\_mgmt/docs/benefits\\_am\\_trifold.htm](https://ops.fhwa.dot.gov/access_mgmt/docs/benefits_am_trifold.htm)

# Access Management Benefits

- Increased Driveway Spacing Benefits
  - Reduces number of potential conflicts
  - Increases roadway speeds
  - Reduces the rate of car crashes



Source: Federal Highway Administration (FHWA)  
[https://ops.fhwa.dot.gov/access\\_mgmt/docs/benefits\\_am\\_trifold.htm](https://ops.fhwa.dot.gov/access_mgmt/docs/benefits_am_trifold.htm)



# Innovative Intersection Fundamentals

## Re-Route Left Turn Movements

- More efficiently serves through traffic



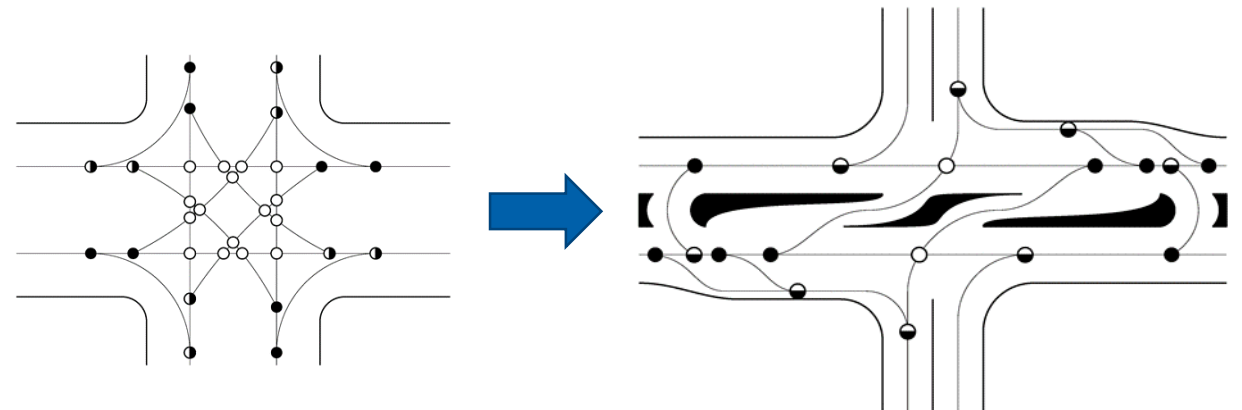
## Reduce Signal Phases

- Reduces delay



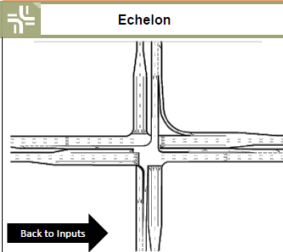
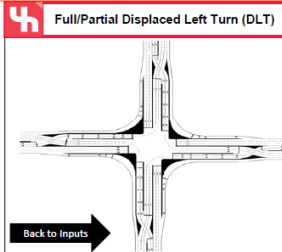
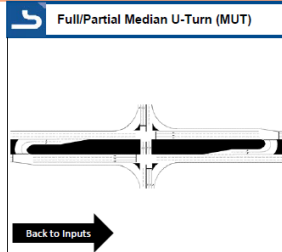
## Remove and Separate Conflicts

- Improves safety



# Innovative Intersection Tools

- VDOT Junction Screening Tool (VJuST)
  - Conceptually compares traditional vs. innovative intersections
  - Website  
[http://www.virginiadot.org/info/alternative\\_intersection\\_informational\\_design\\_guides.asp](http://www.virginiadot.org/info/alternative_intersection_informational_design_guides.asp)

VJuST VDOT Junction Screening Tool		DESIGN CONSIDERATIONS	
<b>Intersection Designs</b>			
 <b>Echelon</b>	 <b>Full/Partial Displaced Left Turn (DLT)</b>	 <b>Full/Partial Median U-Turn (MUT)</b>	
<p><b>Description</b> One approach on both the major and minor roadways is elevated to create two grade-separated intersections of two one-way roads. Each intersection operates under two-phase signal control.</p>	<p><b>Description</b> Left-turning vehicles cross over to the other side of the roadway at a signalized intersection several hundred feet in advance of the main intersection. The protected left turns occur simultaneously with the opposing through movements at the main intersection, allowing for two- (full) or three-phase (partial) signal control. This design is also referred to as a Continuous Flow Intersection or Crossover Displaced Left Intersection.</p>	<p><b>Description</b> Left-turn movements from the major roadway (partial) or both roadways (full) are removed from the main intersection. These vehicles instead execute a U-turn at a median opening on the major roadway downstream of the main intersection. Removing the left-turn movements allows for two- (full) or three-phase (partial) signal control. This tool assumes all intersections are signalized. However, this intersection can be designed as partially unsignalized.</p>	
<p><b>When Should This Design Be Considered?</b> The echelon intersection should be considered at high-volume urban or suburban intersections where the major and minor roadways have similar volumes.</p>	<p><b>When Should This Design Be Considered?</b> The displaced left turn intersection should be considered if opposing approaches have high and balanced through and left-turn volumes.</p>	<p><b>When Should This Design Be Considered?</b> The median U-turn intersection should be considered on high-speed, median-divided highways with moderate left-turn volumes on the major roadway and minor left-turn volumes on the minor roadway.</p>	