4B. Why Virginia iCAP? – Stories from Across the Commonwealth

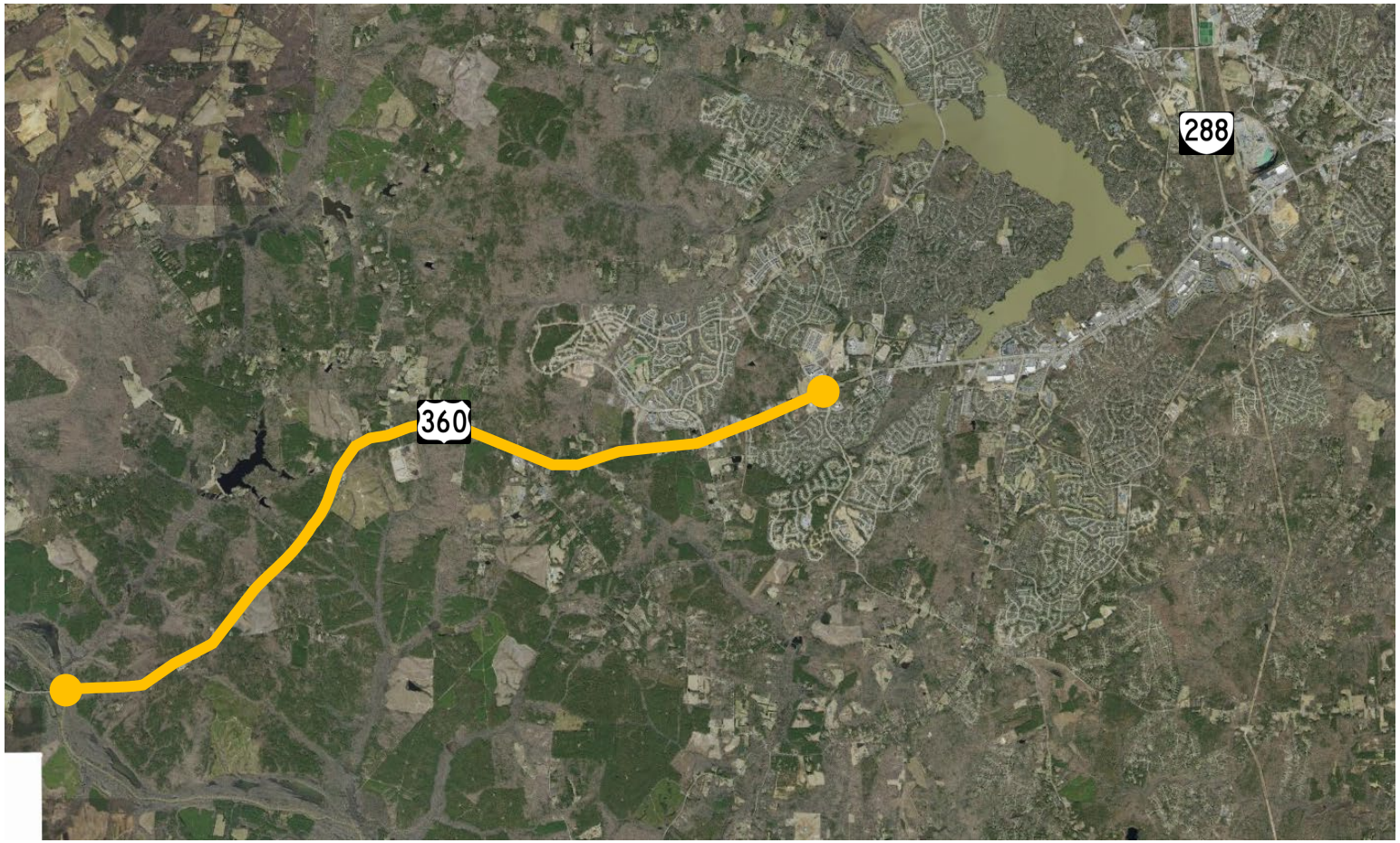
Example #1: Route 360 Arterial Management Plan, Chesterfield, VA

VASITE Annual Meeting 2022 | June 16, 2022

Chessa Walker
Chesterfield County – Department of Transportation

Example: Route 360 Arterial Management Plan (AMP)

- **Applicability**
  - Route 360 = APN
- **Purpose and Need**
  - Identify an access management strategy that accommodates future development safely and efficiently without large-scale roadway widenings or increased signal proliferation



iCAP Stage 1: Concept Screening

- **Preliminary Alternatives**

Intersection	Alternative
Spring Run Road to Magnolia Green Parkway	RCUT Superstreet
Winterpock Road	Conventional Turn-Lane Improvements
	WB Shared T/R Extension (Southshore Rd to Winterpock Rd)
	Signalized RCUT
	Thru-Cut
Hancock Village Drive/Duckridge Boulevard	Conventional Turn-Lane Improvements
	Thru-Cut
	MUT
	Signalized RCUT
Ashlake Parkway	NBR Overlap (Short-Term)
	Continuous Green-T (Single NBL)
	Continuous Green-T (Dual NBL)
	Signalized RCUT
Woodlake Village Parkway	Conventional Turn-Lane Improvements
	Continuous Green-T
	Signalized RCUT
Fox Club Parkway/Hampton Park Drive	Conventional Turn-Lane Improvements
	Conventional (NBR accel-lane)
	MUT
	Signalized RCUT
	Quadrant Roadway
Otterdale Road	Conventional Turn-Lane Improvements
	RCUT
	Bowtie (potential long-term)
Magnolia Green Parkway/Baldwin Creek Road	Conventional Turn-Lane Improvements
	Thru-Cut
	Signalized RCUT

- **Screened Alternatives in vJuST**

ASSESSMENT STAGE 1

SCREENING TO ESTABLISH A LIST OF VIABLE INTERSECTION TYPES

- ✓ Congestion (V/C)
- ✓ Safety (Conflict Points)
- Ped/Bike (Accommodation)
- Cost (Planning Level)

iCAP Stage 1: Right of Way Impacts

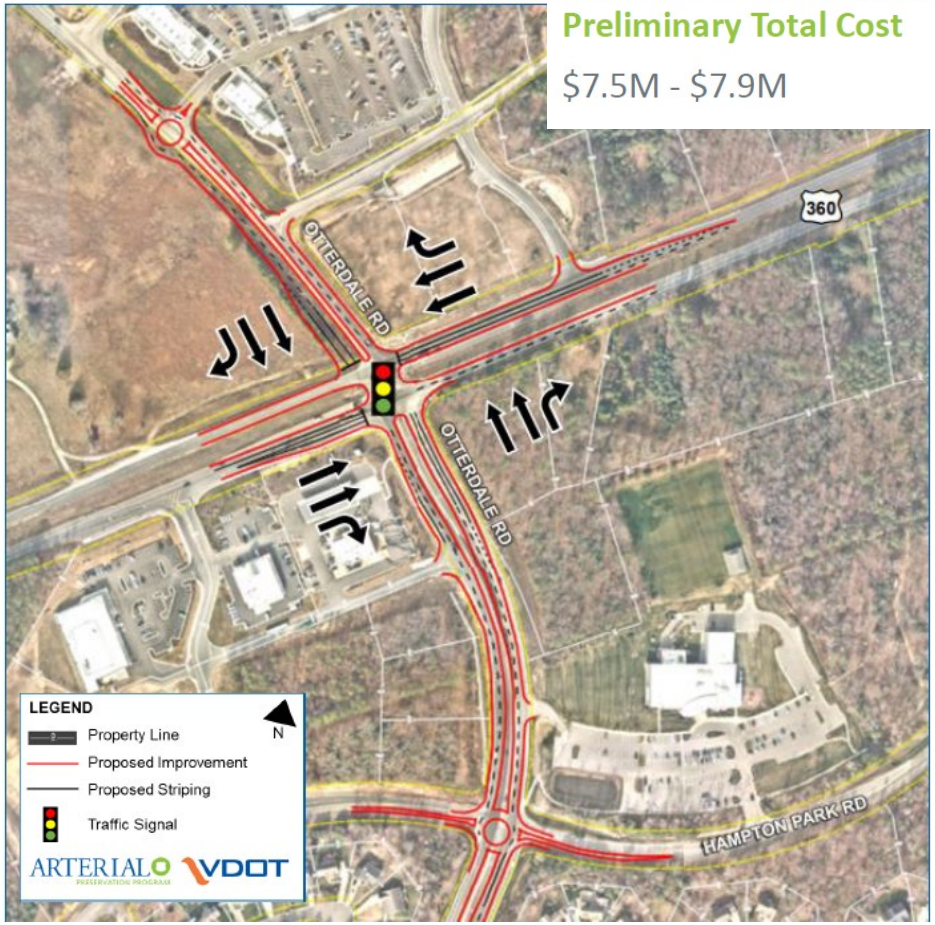
Cost	
Preliminary Engineering	$795,000
Right of Way and Utility Relocation	$798,000
Construction	$7,925,000
Total	**$9,518,000**

US 360 at Otterdale Rd

Concept B – Full Bowtie

Preliminary Total Cost

$7.5M - $7.9M



iCAP Stage 2: Alternative Evaluation

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PSI 42

US 360 at Hancock Village Dr/Duckridge Blvd

Concept Screening Summary

Concept	Approach	AM		PM		Estimated 5-Year Crash Reduction
		Difference	% Difference	Difference	% Difference	
Turn Lane Improvements (Dual NB Left)	EB	-13.7	-60%	0.2	2%	3 F+I crashes
	WB	7.1	59%	-4.6	-9%	
	NB	2.4	3%	-6.9	-7%	
	SB	-3.6	-5%	-2	-3%	
	Intersection	**-6.3**	**-29%**	**-2.9**	**-7%**	
Thru-Cut	EB	-19.5	-86%	-0.3	-3%	*No CMF available*
	WB	2.2	18%	-26.1	-51%	
	NB	3.1	4%	-29.1	-28%	
	SB	-5.2	-7%	27.6	38%	
	Intersection	**-11.5**	**-53%**	**-15.8**	**-39%**	
Partial MUT	EB	*No analysis completed*		14.9	162%	6 F+I crashes
	WB			16.9	33%	
	NB			7.8	8%	
	SB			31.5	43%	
	Intersection			**15.6**	**38%**	
RCUT (Superstreet)	EB	-16.5	-72%	21.8	237%	7 F+I crashes
	WB	-2.5	-21%	-40.6	-80%	
	NB	22	30%	-11	-11%	
	SB	19.1	26%	17	23%	
	Intersection	**-10.1**	**-46%**	**-13.4**	**-33%**	

ASSESSMENT STAGE 2

EVALUATE ALTERNATIVES TO NARROW SELECTION

- Traffic Operations (MOEs based on PPN)
- Safety (Crash and Crash Reduction)
- Cost (Right of Way, Construction)
- Optimal Benefit

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iCAP Stage 2: Alternative Evaluation

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PSI 42

US 360 at Hancock Village Dr/Duckridge Blvd

Concept Screening Summary

PREFERRED

Concept	Approach	AM		PM		Estimated 5-Year Crash Reduction	Preliminary Total Cost
		Delay	LOS	Delay	LOS		
RCUT	EB	7.9	A	42.9	D	7 F+I crashes	$6 Million
	WB	6.9	A	11.1	B		
	NB	114.9	F	93	F		
	SB	83.3	F	133.1	F		
	Intersection	**19.2**	B	**33.1**	C		
Thru-Cut	EB	9.1	A	43.1	D	*No CMF available*	$2.7 Million
	WB	4.3	A	28.5	C		
	NB	109.7	F	90.8	F		
	SB	72.4	E	91.6	F		
	Intersection	**12.4**	B	**41.1**	D		

ASSESSMENT STAGE 2

EVALUATE ALTERNATIVES TO NARROW SELECTION

- Traffic Operations (MOEs based on PPN)
- Safety (Crash and Crash Reduction)
- Cost (Right of Way, Construction)
- Optimal Benefit

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Benefits of iCAP Process

- **Consistency**
  - **vJuST**
    - Documents comprehensive list of alternatives considered
    - Quickly screen out impractical alternatives (ex. roundabout)
  - **Prioritizes pedestrian accommodations**
    - Start to compare across alternatives, not just check box item
  - **Prioritizes cost**
    - Funding limited
- **Transparency**
  - **Consistent holistic approach and documentation**
  - **Helps with public outreach**

4B. Why Virginia iCAP? – Stories from Across the Commonwealth

Example #2: I-95/SR 10 Interchange, Chesterfield, VA

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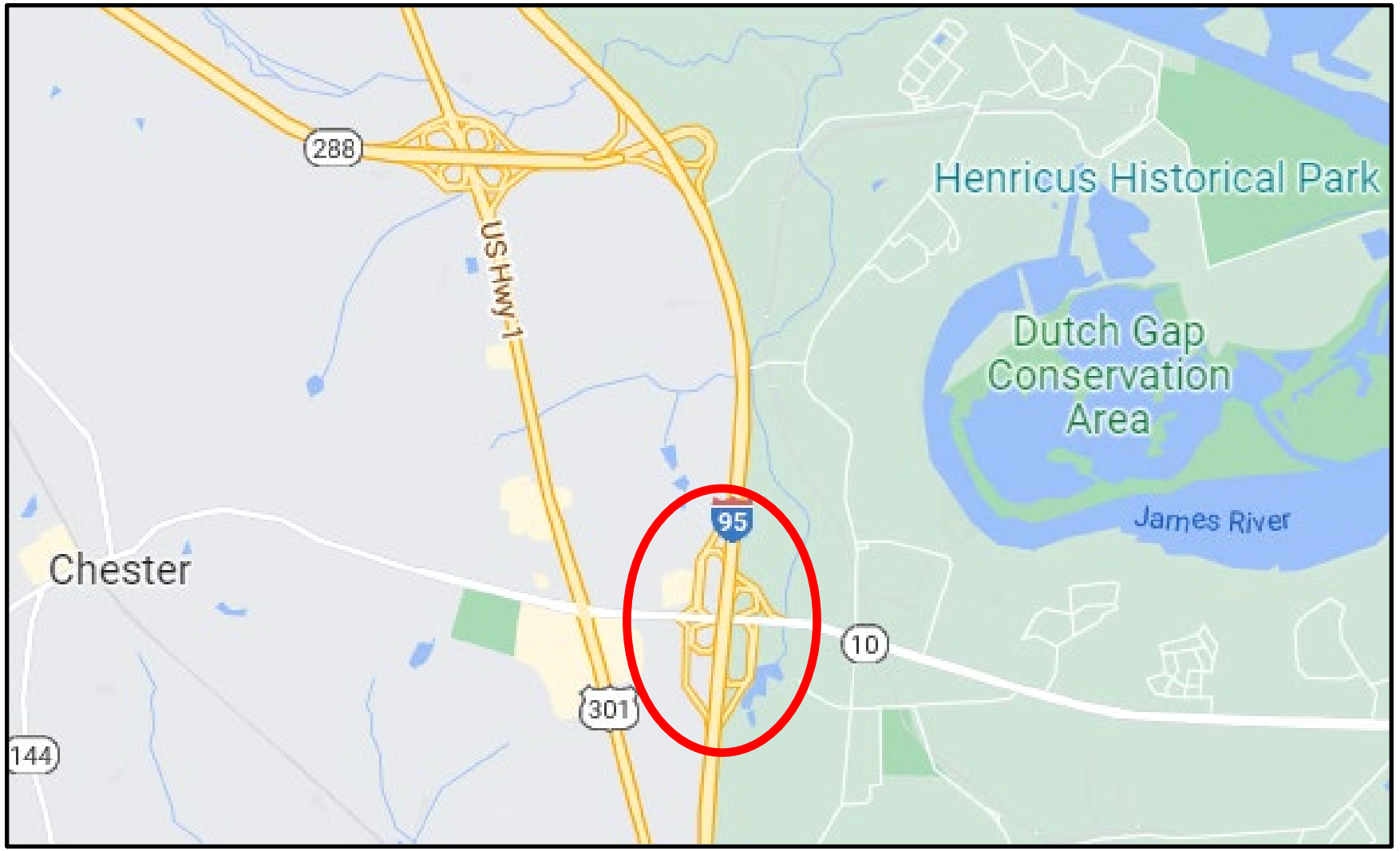
Robert Vilak
VDOT – Richmond District

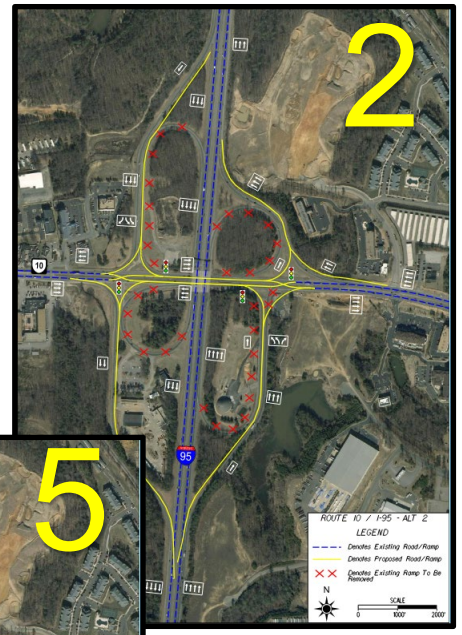
I-95/SR 10 Interchange, Chesterfield, VA

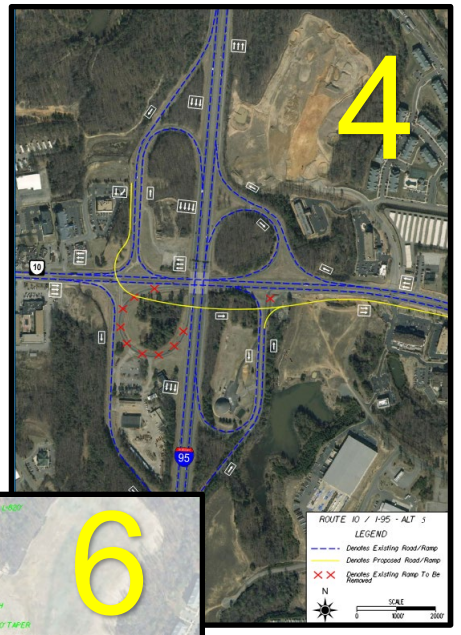


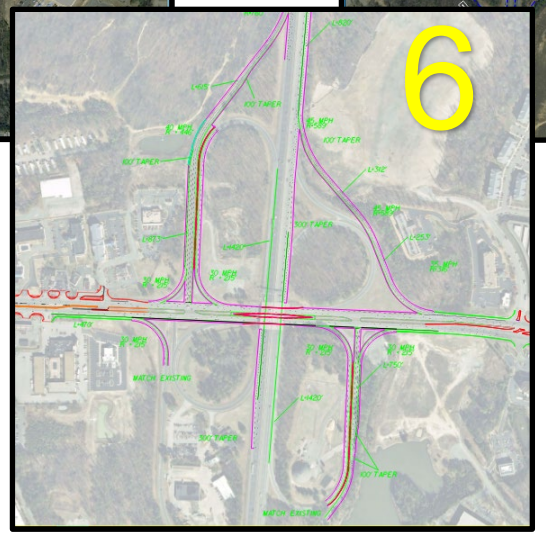
I-95/SR 10 Interchange, Chesterfield, VA

- Larger example - Demonstrate scalability of process
- Evaluate new interchange design for I-95 @ SR 10 (W. Hundred Rd), Chesterfield
- SR 10 – Identified on the Arterial Preservation Network (APN)
- Study completed in March 2017 (Pre-iCAP)

I-95/SR 10 Interchange, Chesterfield, VA







I-95/SR 10 Interchange, Chesterfield, VA

Alternatives		ROW and Utility Impacts	Safety Improvements	Operational Improvements	Constructability	Environmental Impact	Cost of Construction	Score (out of 100 possible)	Rank (out of 7)
Points Possible		10	25	25	10	10	20		
No-Build	None	+	-	-	0	+	0	35	7
		10	0	0	5	10	10		
Alternative 1	SmartScale Application	+	0	0	-	0	+	61	4
		10	13	13	0	5	20		
Alternative 2	Diverging Diamond Interchange	+	+	0	+	0	0	73	3
		10	25	13	10	5	10		
Alternative 3	Northbound I-95 off-ramp extension to Old Stage Road	+	+	+	+	+	+	100	1
		10	25	25	10	10	20		
Alternative 4	Westbound Route 10 to northbound I-95 ramp to Route 288	-	0	0	0	0	+	56	6
		0	13	13	5	5	20		
Alternative 5	Southbound I-95 flyover to eastbound Route 10	-	0	+	0	0	0	58	5
		0	13	25	5	5	10		
Alternative 6	Signalized Ramps (Parclo)	-	+	+	+	+	+	90	2
		0	25	25	10	10	20		

I-95/SR 10 Interchange, Chesterfield, VA

4B. Why Virginia iCAP? – Stories from Across the Commonwealth

Example #3: US Route 15 and Braddock Road Intersection Study, Loudoun, VA

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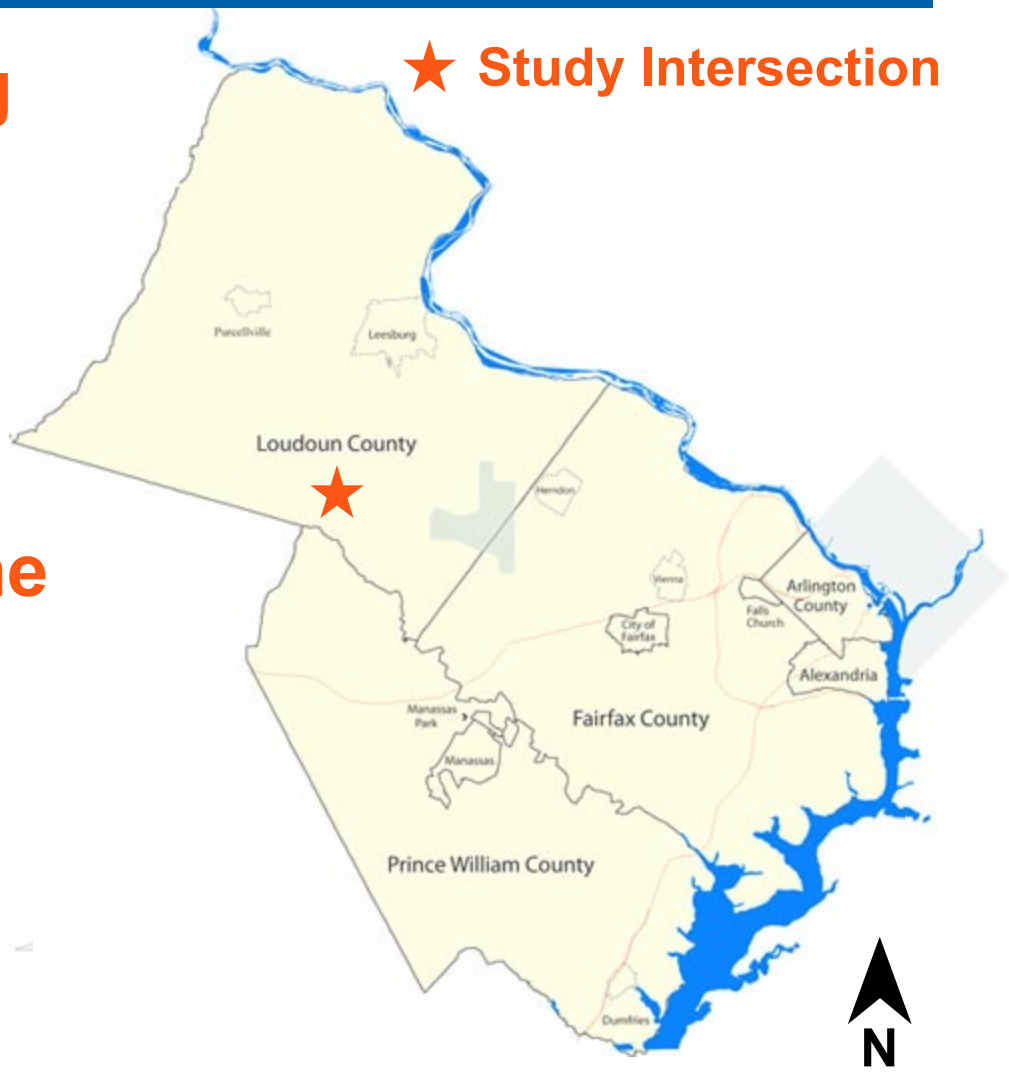
Craig Schneider
VDOT – NOVA District

Study Goals

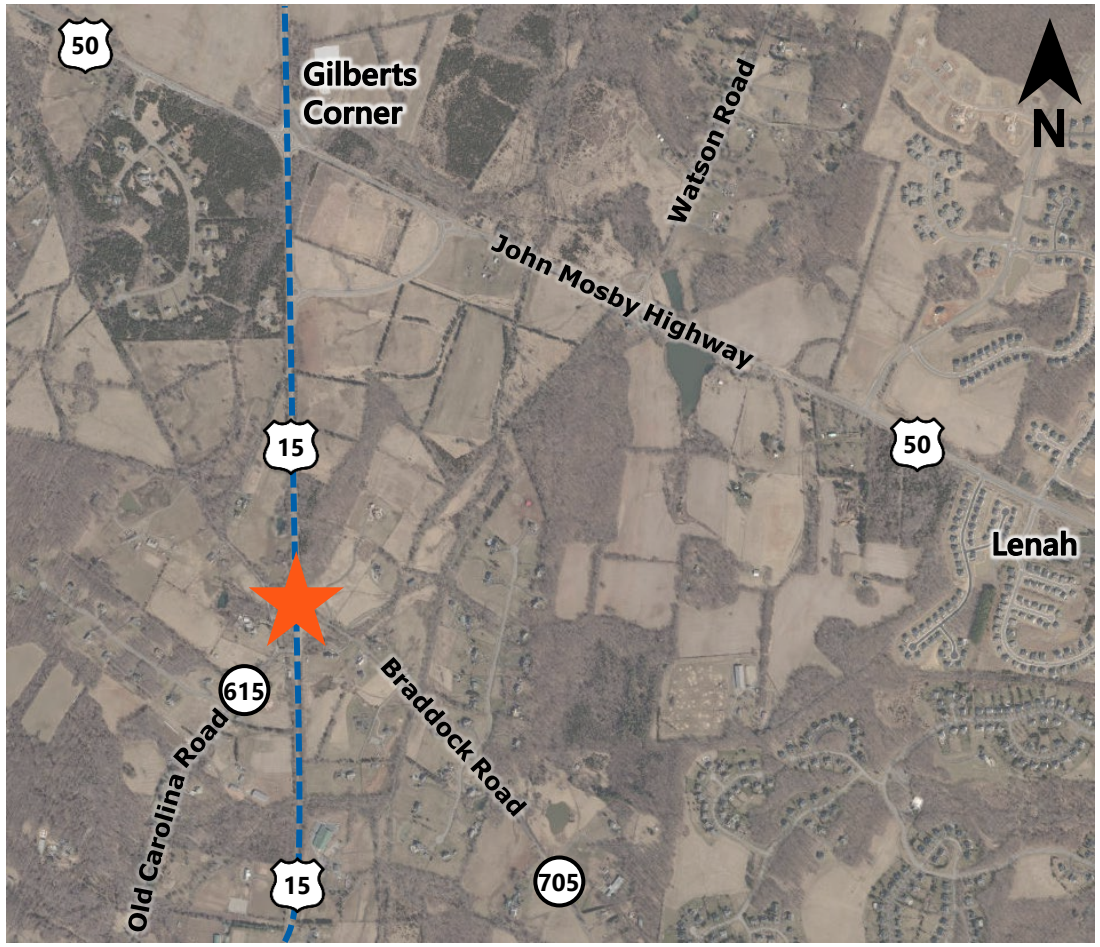
- **Support Loudoun County by analyzing recent and future traffic operations in the spirit of VA iCAP Policy to identify an optimal alternative**
- **Develop a conceptual design sketch and planning-level cost estimate for the optimal alternative**
- **Leveraged pre-scoping funds to strengthen the County's SMART SCALE application**



Existing Conditions

- Route 15 is on the VDOT Arterial Preservation Network (APN)
- Part of the Journey Through Hallowed Ground (JTHG) National Heritage Area
- Mainline Route 15 is a rural 2 lane undivided roadway
- 2 skewed T-intersections with stop control along the side streets

Study Area Map



★ Study Intersection --- APN

Background & Preliminary Activities

2018

- SMART SCALE application was developed for a 3-leg roundabout
- VDOT evaluated a traffic signal – not warranted at that time

2019

- Loudoun County conducted a corridor planning study along Route 15 South

2020

- VDOT implemented an Intersection Collision Warning System (ICWS)

SMART SCALE
Funding the Right Transportation Projects in Virginia

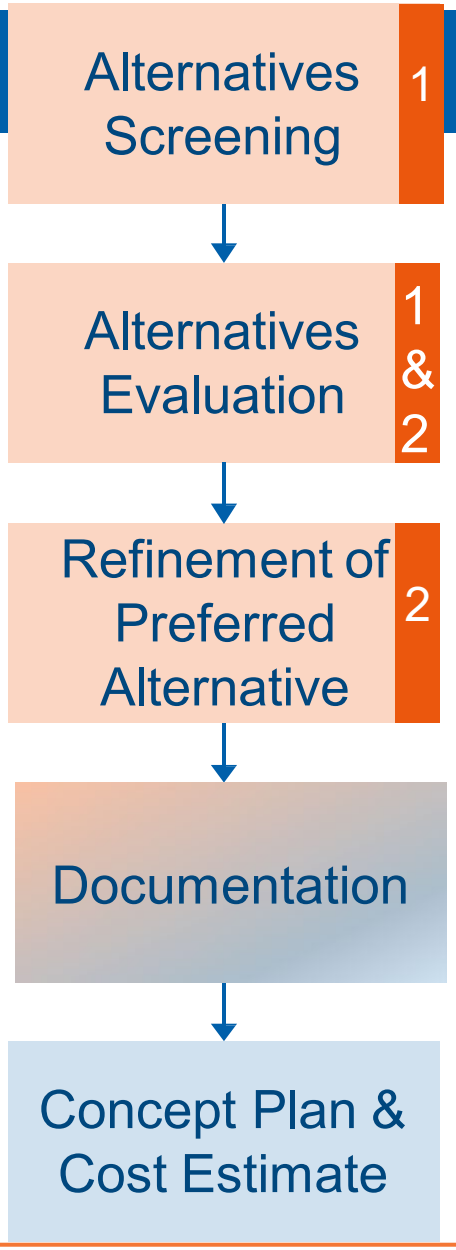
LOUDOUN COUNTY VIRGINIA
ROUTE 15 SOUTH
Safety and Operational Study Leesburg to Prince William County

https://www.loudoun.gov/5308/Route-15-South-Safety-Operational-Study

Source: Google Earth

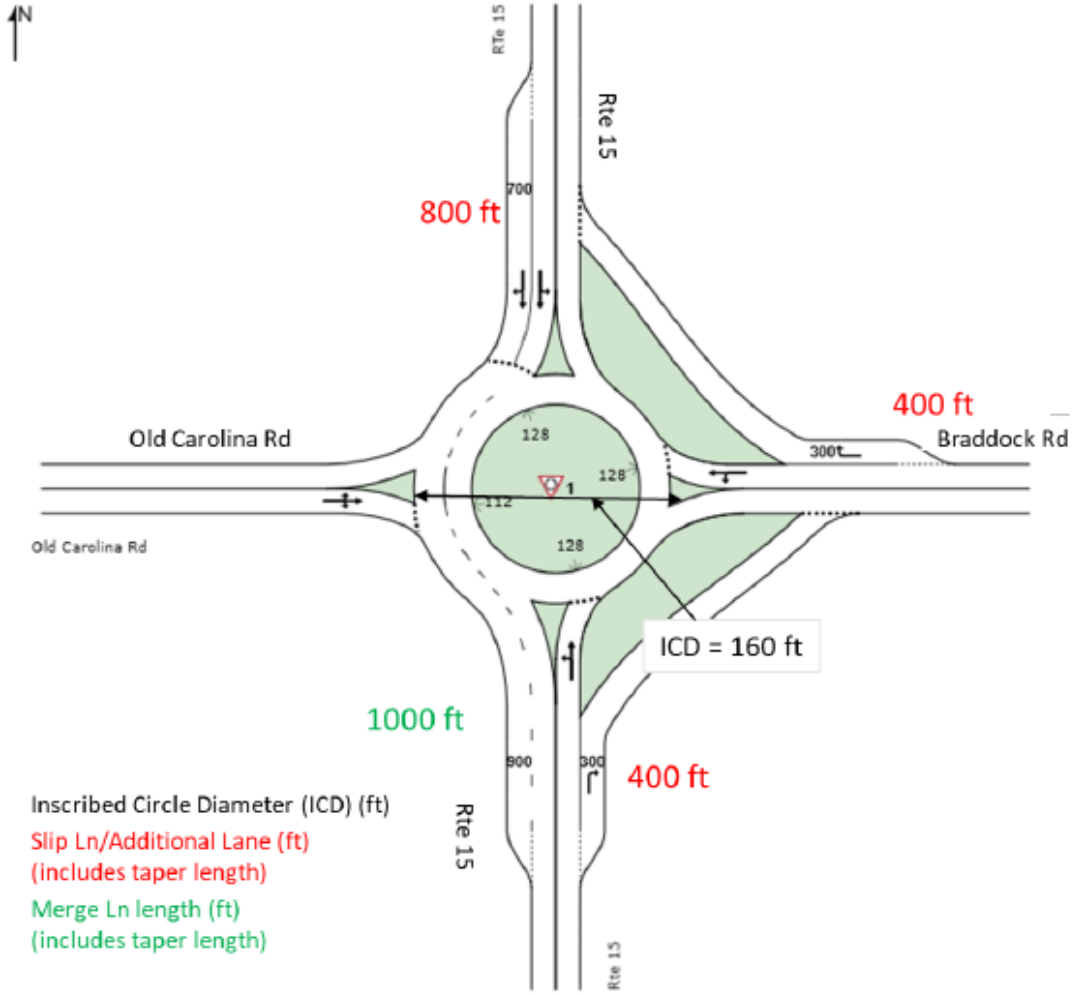
Summary of Analyses

- Developed traffic forecast for 2040 (interim) and 2050 (design) years
- Evaluated signal warrant screening using VA Supplement to the MUTCD for ADT
- Screened alternatives in VJuST
- Detailed operational analysis evaluated 3 alternatives in Synchro/SIDRA
  - Traffic signal
  - Roundabout
  - RCUT
- Qualitative evaluation was conducted to select the optimal alternative



Preferred Alternative

- Hybrid roundabout was selected for further refinement in SIDRA
  - 2 circulating SB lanes
  - Slip lanes for NB and WB right turns
- Alternative selected for
  - Operations
  - Safety
  - ROW impacts
- The design sketch and planning-level cost estimate are currently under review



Questions/Comments

Thank You!

Loudoun County VIRGINIA
WHERE TRADITION MEETS INNOVATION

T3 design

vhb