

STARS

STRATEGICALLY TARGETED AND
AFFORDABLE ROADWAY SOLUTIONS

US-11/SOUTH MAIN ST STUDY ERICKSON AVE & PEAR STREET DESIGN

***Meeting #2 – Existing Conditions/Preliminary Screening
September 24th, 2019***

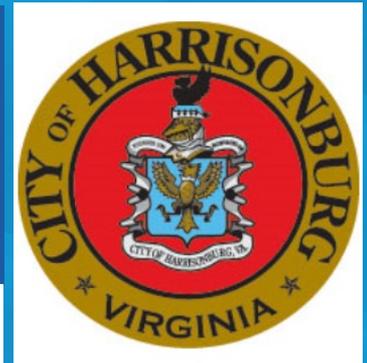
Agenda



- Kickoff Meeting Recap
- Public Input/Polling Results
- Existing Operational Conditions
 - TIA Coordination/New High School Discussion
- Safety Analysis
- Preliminary Screening & Alternatives Discussion
- Open Discussion
- Erickson/Pear
- Schedule/Next Steps

VDOT STARS S Main St-Erickson Ave PROJECT Points of Contact:

- STARS Program Manager – Bill Guiher
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- VDOT Project Manager – Brad Reed
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- ATCS Team Manager – Nathan Umberger
 - numberger@atcsplc.com



KICKOFF MEETING RECAP

Study Intersections/Segments

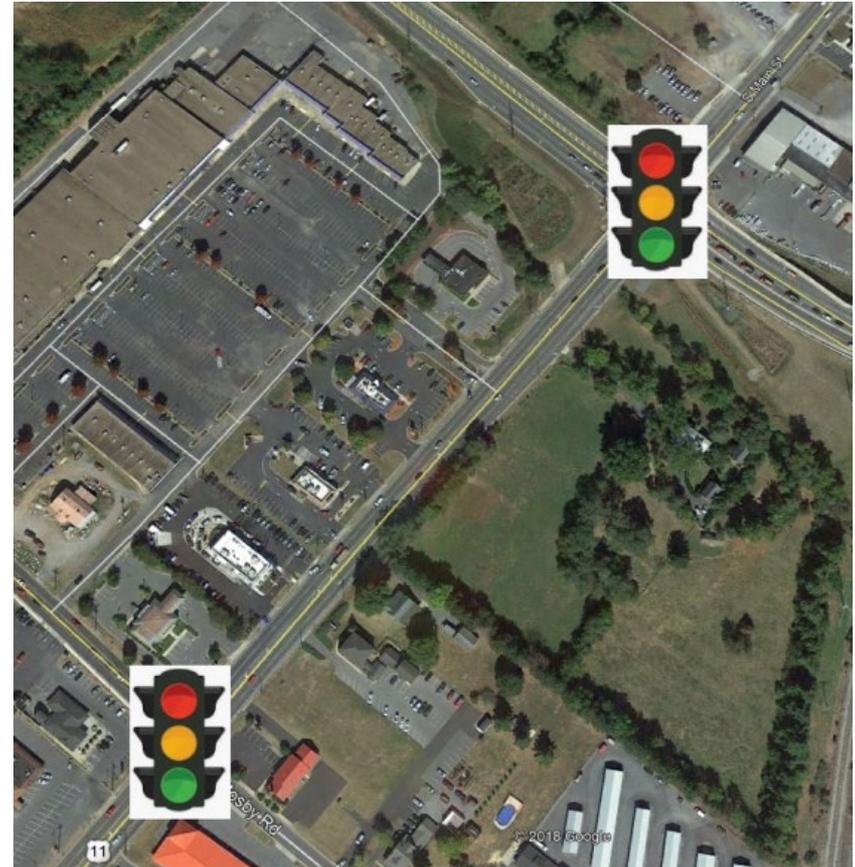


Intersections

- US-11 @ Stone Spring/Erickson
- US-11 @ Mosby Road
- Open Access Segment

Targeted Safety Needs

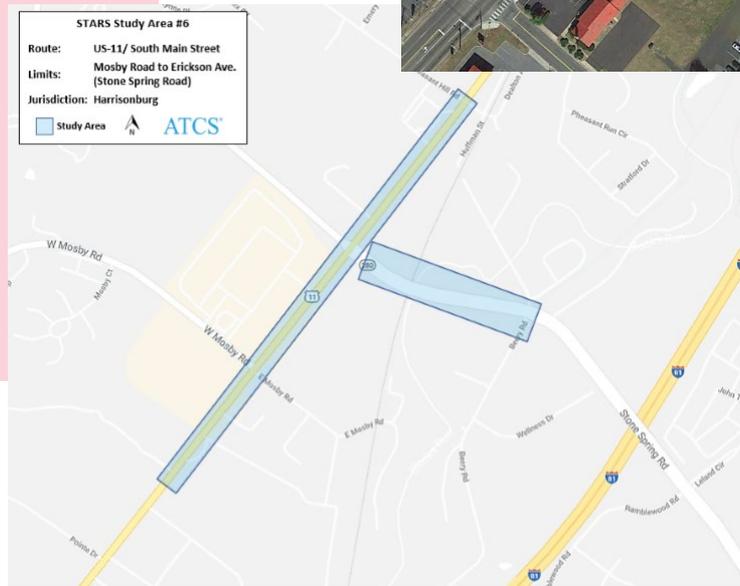
- Within #5 ranked PSI segment in VDOT Staunton District (Pleasant Hill Rd to Covenant Dr)
- S Main St/Mosby Rd #3 ranked PSI intersection



Corridor Overview

US-11/S Main Street

- Classified as Minor Arterial throughout study section
- Average Daily Traffic 21,000 vehicles/day South of Stone Spring, 19,000 vehicles/day North of Stone Spring
- Approximately 3-3.5% Heavy Vehicles
- Two primary signalized Intersections
- Five-lane typical section
 - Generally Open/Full Access Entrances
 - Includes Bike Lanes throughout
 - Sidewalk on W side of alignment
 - Pedestrian accommodations at signals

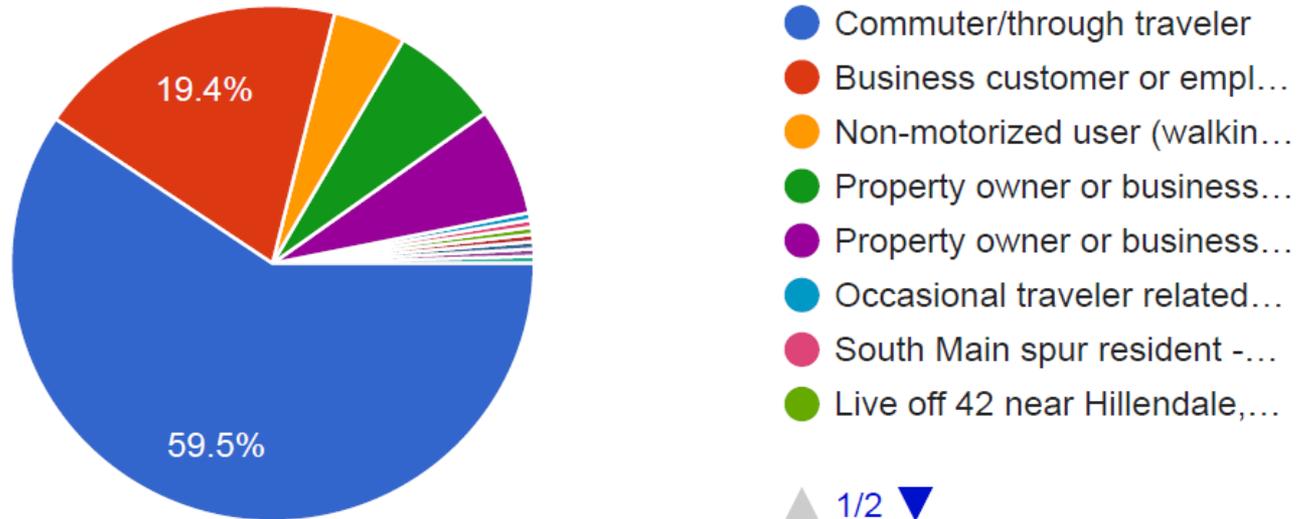


PUBLIC INVOLVEMENT SURVEY

QUESTION #1

1. What is your primary perspective as a user of South Main Street and/or Erickson Avenue?

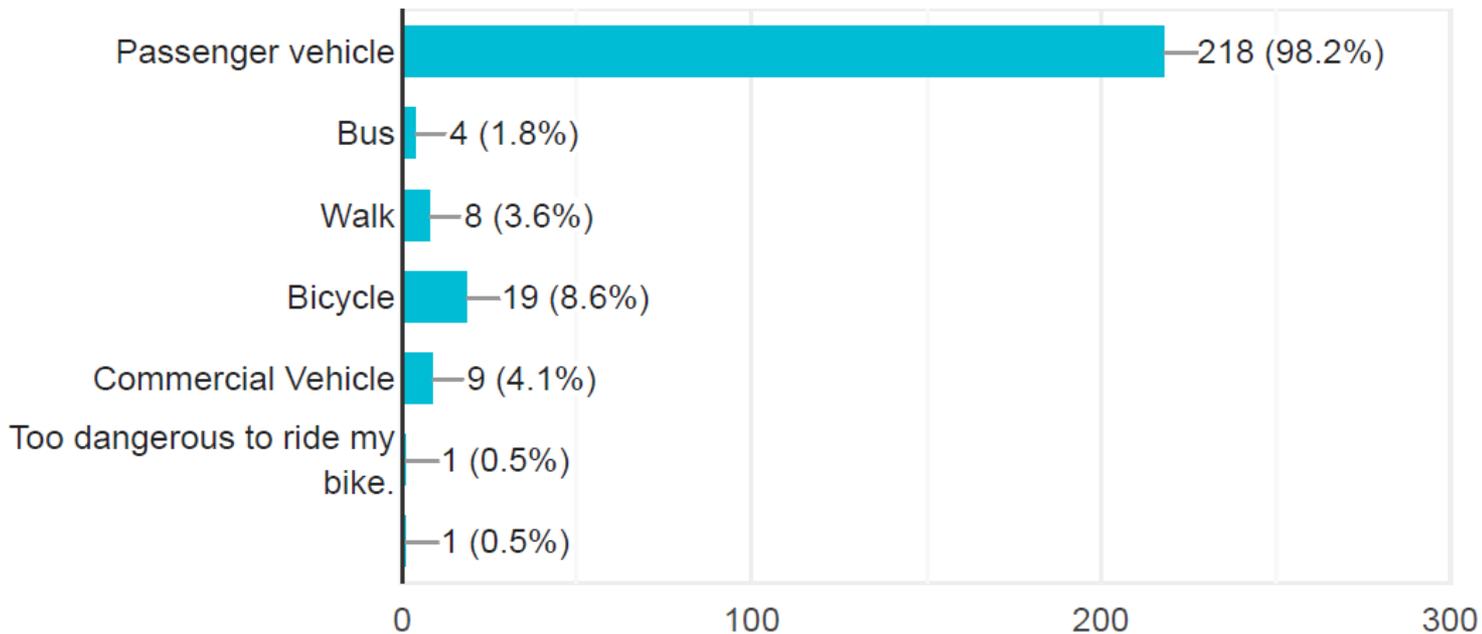
222 responses



QUESTION #2

2. What mode(s) of transportation do you typically use on South Main Street and/or Erickson Avenue? (check all that apply)

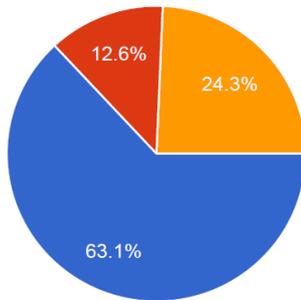
222 responses



QUESTION #3 & #4

3. From your perspective, are changes needed to improve travel conditions on South Main Street (US-11) between Stone Spring Road/Erickson Avenue and Mosby Road?

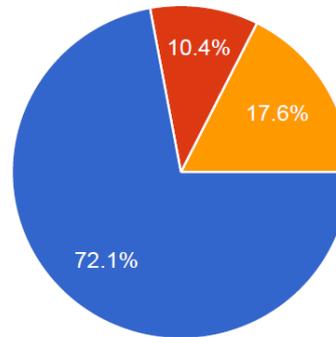
222 responses



- Yes
- No
- Neutral/Not sure

4. From your perspective, are changes needed to improve travel conditions at the intersection of Erickson Avenue & Pear Street?

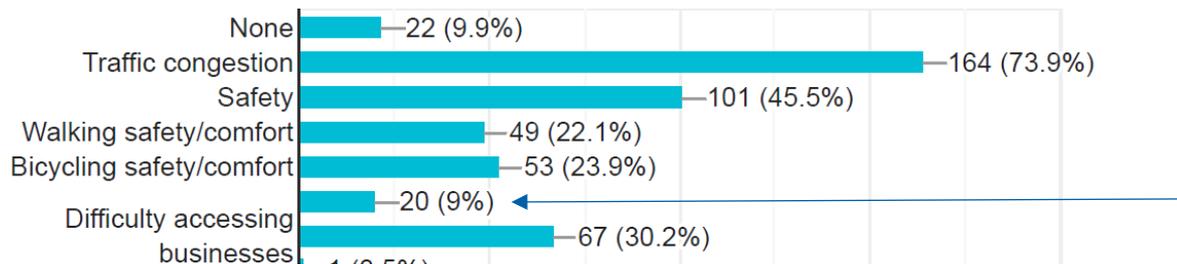
222 responses



- Yes
- No
- Neutral/Not sure

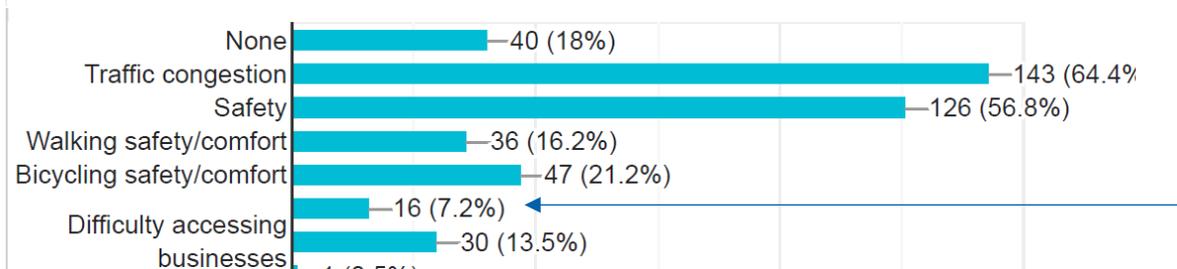
QUESTION #5 & #6

5. What specific concerns do you have about South Main Street (US-11) between Stone Spring Road/Erickson Avenue and Mosby Road? (check all that apply)



Bus Stop
access/safety/amenities

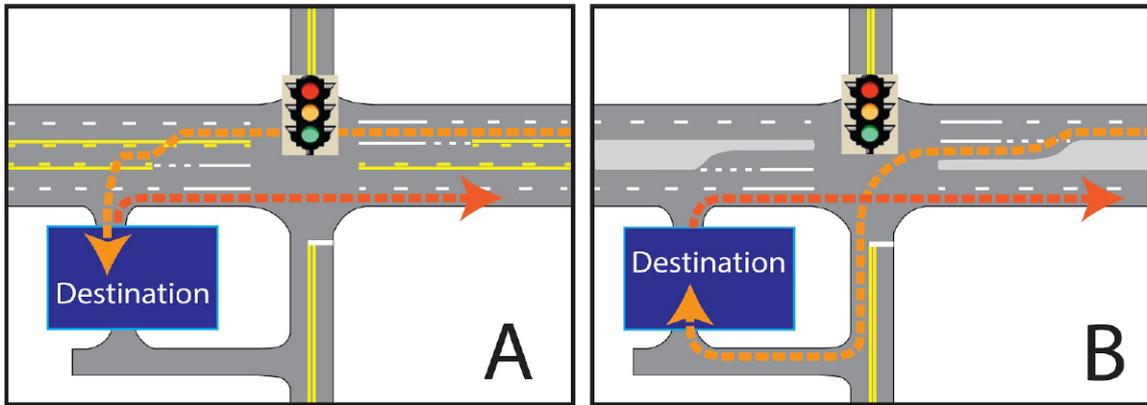
6. What specific concerns do you have about the intersection of Erickson Avenue & Pear Street? (check all that apply)



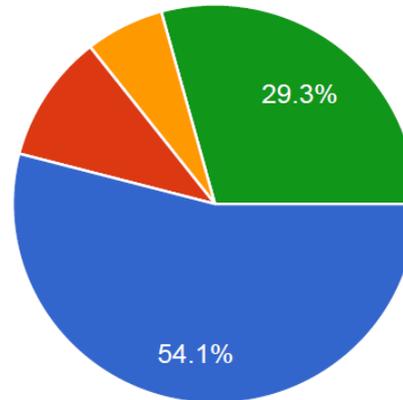
Bus Stop
access/safety/amenities

QUESTION #7

7. Conceptual images 'A' and 'B' below are located at a busy intersection with heavy through traffic. Concept 'A' provides direct left turn access to the destination shown, while concept 'B' directs left turns to the traffic signal for rear access to the destination. Would you be supportive of concept 'B' if it could decrease delays for through traffic and reduce potential crash conflicts for all road users? *



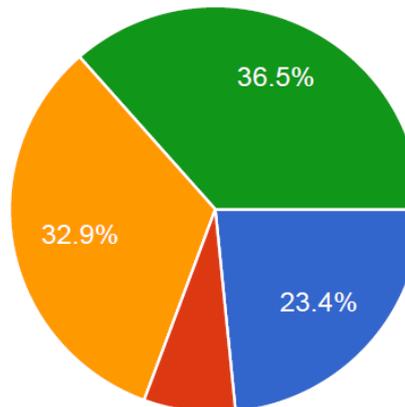
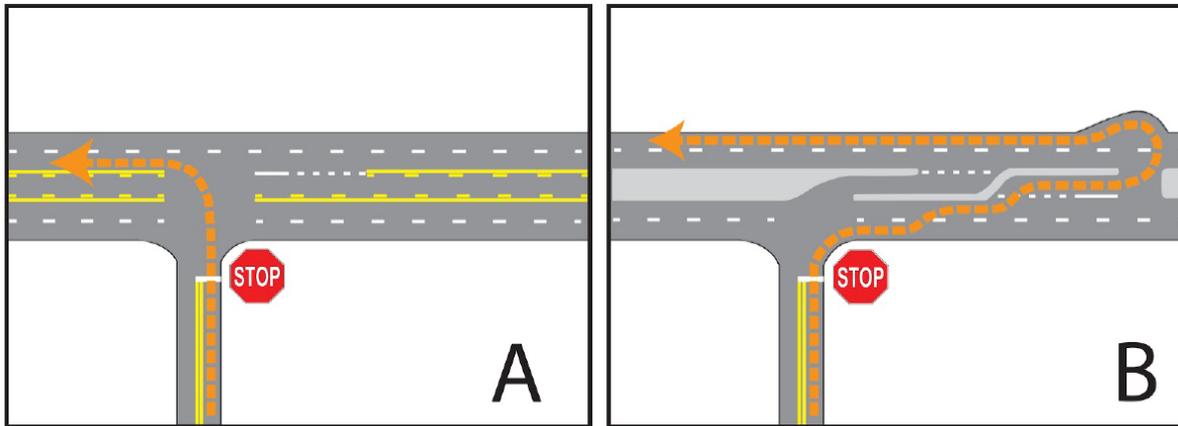
	Prefers 'A';	Prefers 'A' + it depends
Property/business owner	17%	41%
All others (owners removed)	4%	30%



- I support concept 'B' over concept 'A'
- I have no preference for one concept over the other
- I prefer concept 'A' over concept 'B'
- My support of concept 'B' depends on the amount of delay reduction and safety improvement associated wi...

QUESTION #8

8. Conceptual images 'A' and 'B' below are located at a busy intersection where making a left turn from the stop sign is difficult during rush hour. Concept 'A' allows direct left turns from the stop sign, while concept 'B' directs left turn traffic from the stop sign to make a right turn followed by a U-Turn. Would you be supportive of concept 'B' if it could decrease rush hour delays and reduce potential crash conflicts for all road users, including those taking the route shown? *



- I support concept 'B' over concept 'A'
- I have no preference for one concept over the other
- I prefer concept 'A' over concept 'B'
- My support of concept 'B' depends on the amount of delay reduction and safety improvement associated with it

SURVEY OPEN ANSWERS – SOUTH MAIN STREET

S Main St & Erickson Ave

Widen for Dual Lefts	9
General Traffic Improvements	5
Install Roundabout	1
Grade Separation	1

S Main St & Mosby Rd

Add SB Right Turn Lane	2
Widen Mosby Approach	1

Access Management

S Main St Access Management	11
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SURVEY OPEN ANSWERS – ERICKSON AVE & PEAR ST

Erickson Ave & Pear St

Install Signal	11
Restrict Pear St Left Turns	9
Install Roundabout	9
Turn Lane Improvement	4
U-Turn Concern	2

Access Management

Erickson Ave Access Management	3
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SURVEY OPEN ANSWERS – PEDESTRIAN & BIKE ISSUES

Pedestrian	
General Ped Improvement	4
Sidewalk Improvement	3
Crosswalk Improvement	1
Ped Refuge Island @ Erickson	1

Bike	
Bike Lane Improvement	11
General Bike Improvement	4

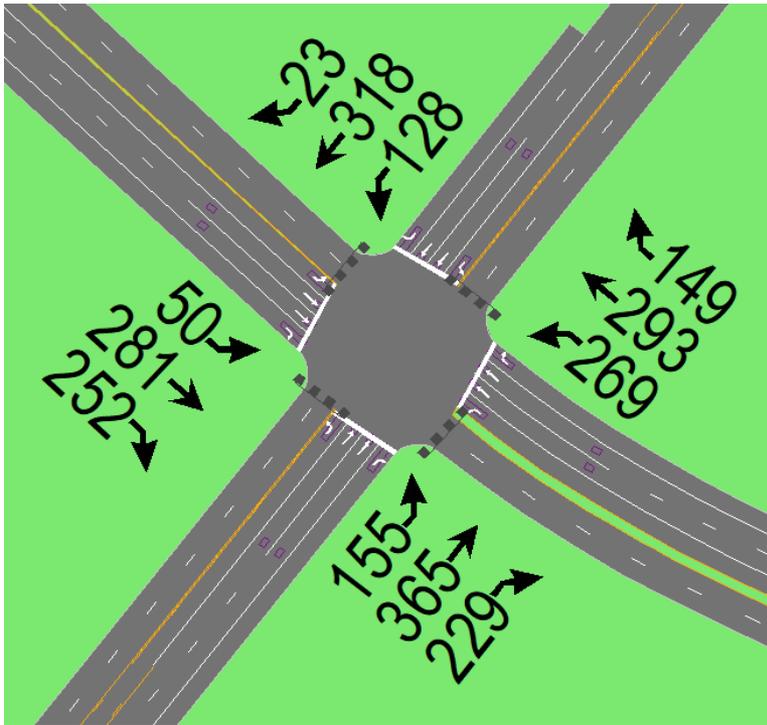
SURVEY OPEN ANSWERS – OTHER ISSUES

Erickson/Garbers Church Improvements	12
Traffic noise concern	2
Rt. 11 & Pointe Dr – Suggested Signal	2
Improve bus service	1
Increase speed on Erickson Ave	1
Limit development intensity on Pear St	1
Main & I-81 Improvements	1
Rt. 42 & Erickson Improvements	1
Rt. 11 & Kaylor Park – Suggested Signal	1

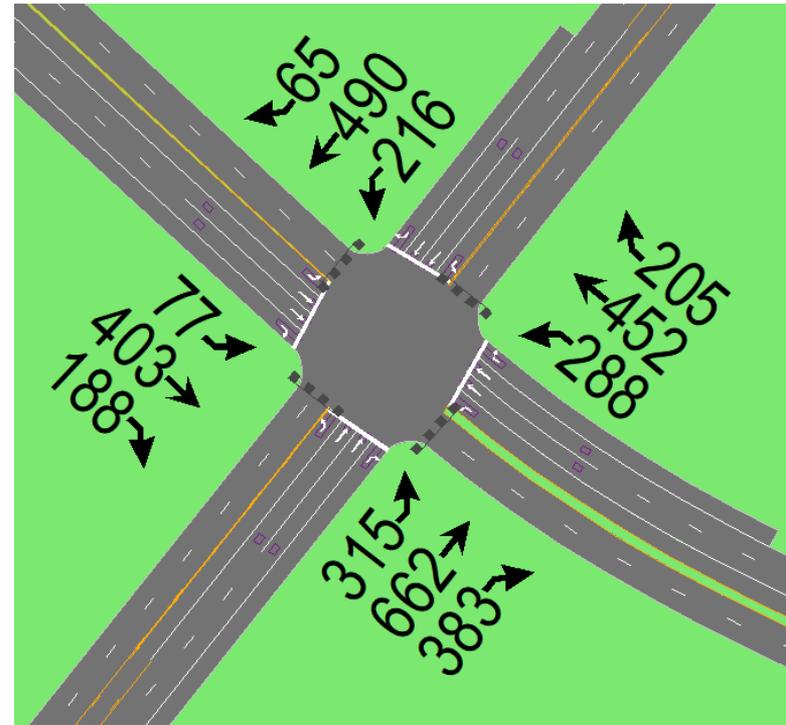
EXISTING OPERATIONAL ANALYSIS

Traffic Impact Study Provided Results

Existing Conditions Analysis – South Main Street and Stone Spring Road



AM Peak Hour Volumes



PM Peak Hour Volumes

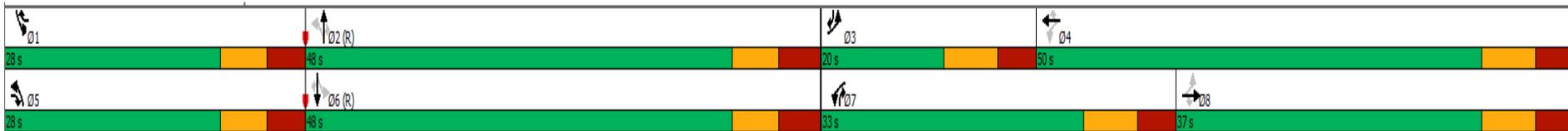
Existing Conditions Analysis – South Main Street and Stone Spring Road

- Heavy delay for the through and left turn movements.

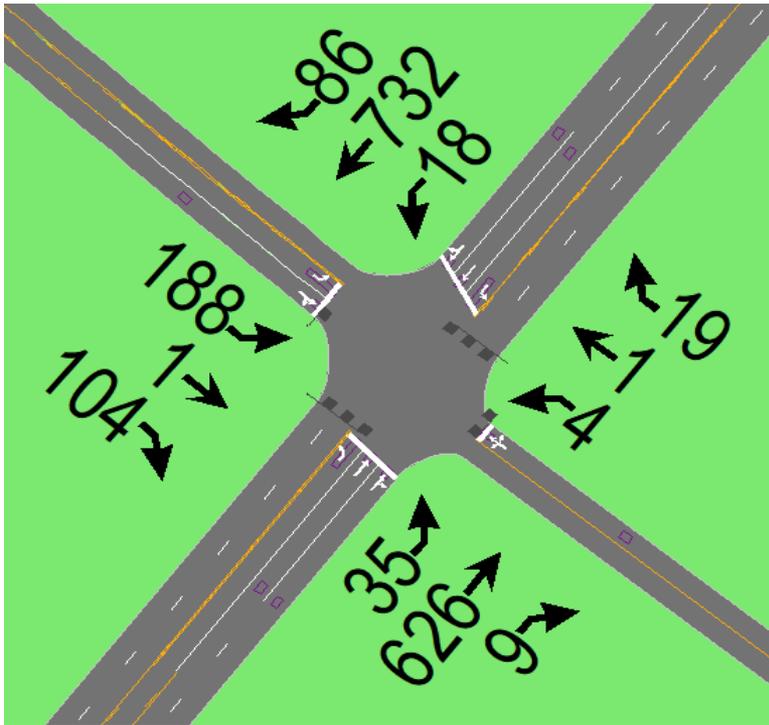
2019 Existing - LOS and Queue Summary								
Intersection	Roadway	Lane Group	AM Peak Hour			PM Peak Hour		
			Delay (Sec/Veh.)	LOS	Queue Length (Feet)	Delay (Sec/Veh.)	LOS	Queue Length (Feet)
South Main Street (Route 11) and Stone Spring Road	South Main Street	NBL	42.7	D	211	55.5	E	281
		NBT	50.7	D	242	50.5	D	315
		NBR	57.2	E	96	9.9	A	96
	South Main Street	SBL	41.9	D	113	55.4	E	287
		SBT	53.5	D	225	49.1	D	341
		SBR	34.1	C	3	32.0	C	45
	Erickson Avenue	EBL	24.3	C	50	32.7	C	81
		EBT	41.2	D	169	54.8	D	264
		EBR	32.2	C	104	34.0	C	79
	Stone Spring Road	WBL	31.1	C	234	47.6	D	296
		WBT	30.9	C	151	42.9	D	265
WBR		22.4	C	20	27.7	C	110	
Overall			40.7	D	-	43.0	D	-

Note: LOS and Delay generated using HCM 2000 methods, queues represent 95th percentile

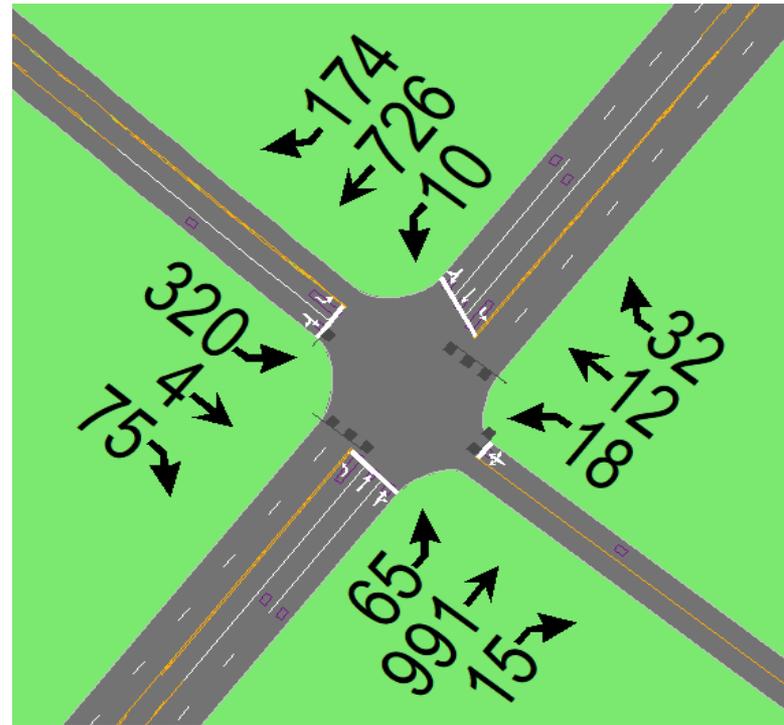
PM Timing Plan for Route 11 and Erickson/Stone Spring



Existing Conditions Analysis – South Main Street and Mosby Road



AM Peak Hour Volumes



PM Peak Hour Volumes

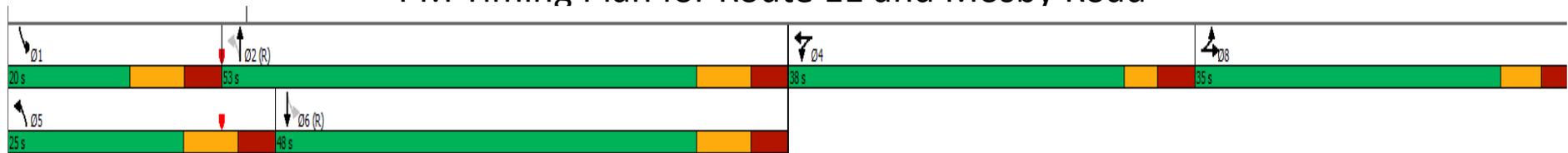
Existing Conditions Analysis – South Main Street and Mosby Road

- Heavy eastbound volume with only a single lane for left turning vehicles.
- Significant delays for all approaches.

2019 Existing - LOS and Queue Summary								
Intersection	Roadway	Lane Group	AM Peak Hour			PM Peak Hour		
			Delay (Sec/Veh.)	LOS	Queue Length (Feet)	Delay (Sec/Veh.)	LOS	Queue Length (Feet)
South Main Street (Route 11) and Mosby Road	South Main Street	NBL	16.7	B	23	33.1	C	70
		NBTR	24.1	C	257	73.3	E	682
	South Main Street	SBL	8.6	A	6	33.3	C	12
		SBTR	30.6	C	421	39.6	D	593
	Mosby Road	EBL	33.6	C	212	55.6	E	541
		EBTR	24.8	C	0	38.9	D	0
	Mosby Road	WBLTR	33.8	C	1	63.6	E	63
	Overall			27.7	C	-	57.0	E

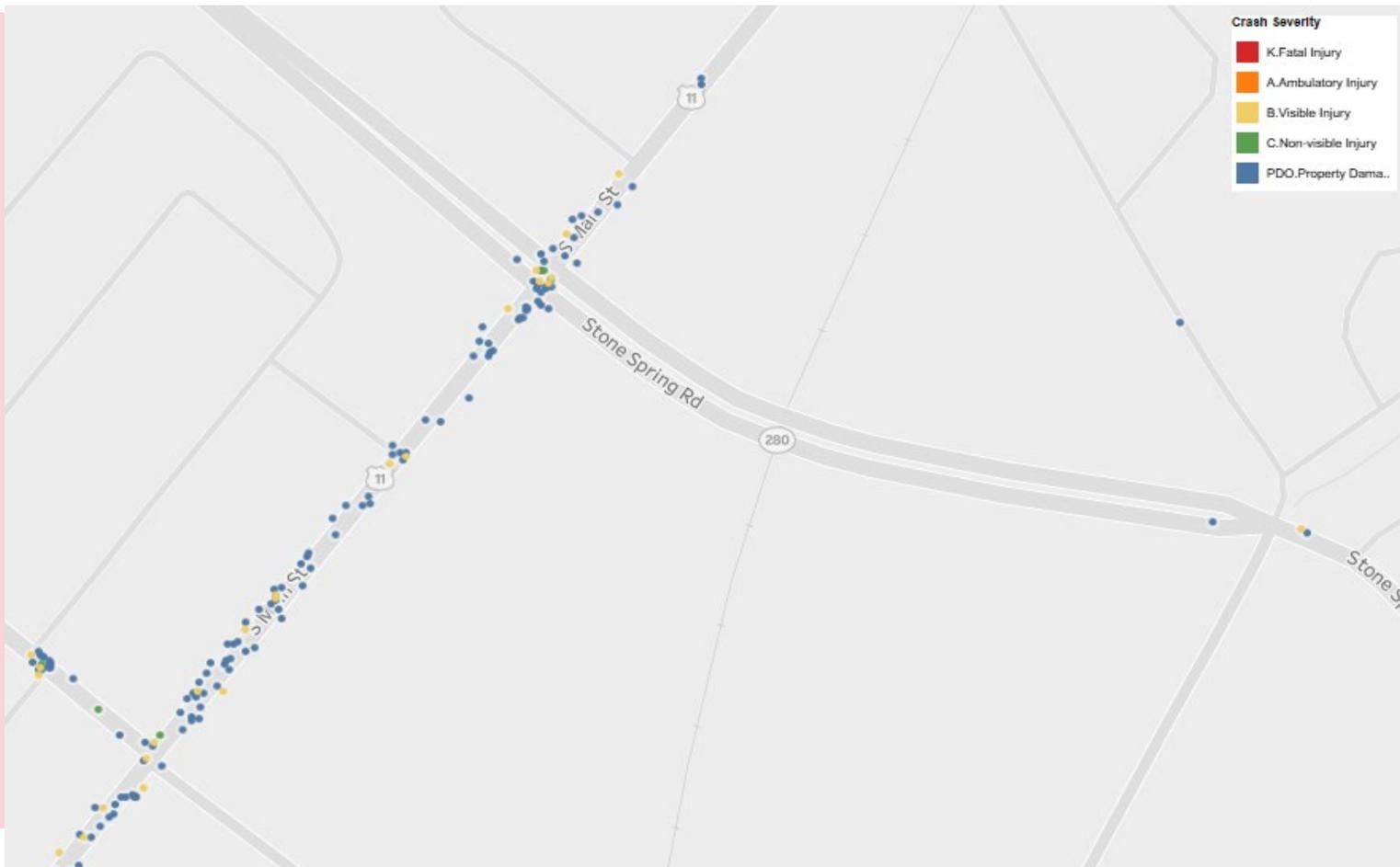
Note: LOS and Delay generated using HCM 2000 methods, queues represent 95th percentile

PM Timing Plan for Route 11 and Mosby Road



SAFETY ANALYSIS & FINDINGS

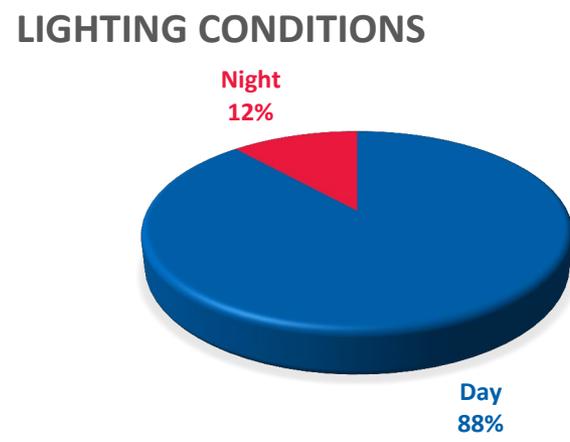
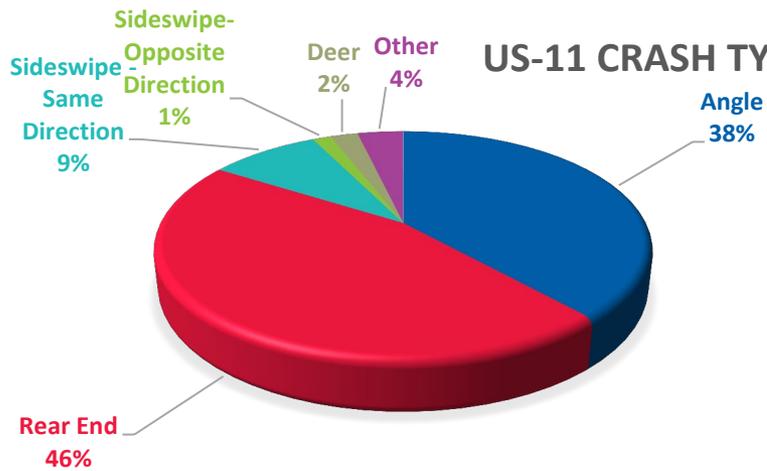
Crash Activity – January 2013 to April 2019



S Main St Crash Activity



Year of CRASH_DT (copy) +	Pedestrians Killed	Pedestrians Injured	Persons Killed	A People	B People	C People	Fatal Crashes	A Crash	B Crash	C Crash	Injury Crashes	Pdo Crash	TOTAL CRASH
2013	0.0	0.0	0	0.0	8.0	1.0	0	0.0	4.0	0.0	4.0	16.0	20
2014	0.0	0.0	0	0.0	5.0	0.0	0	0.0	2.0	0.0	2.0	22.0	24
2015	0.0	0.0	0	0.0	5.0	1.0	0	0.0	4.0	0.0	4.0	13.0	17
2016	0.0	0.0	0	0.0	3.0	1.0	0	0.0	3.0	1.0	4.0	24.0	28
2017	0.0	0.0	0	0.0	5.0	1.0	0	0.0	5.0	0.0	5.0	14.0	19
2018	0.0	0.0	0	0.0	2.0	1.0	0	0.0	2.0	1.0	3.0	19.0	22
2019	0.0	0.0	0	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	6.0	6
Grand Total	0.0	0.0	0	0.0	28.0	5.0	0	0.0	20.0	2.0	22.0	114.0	136



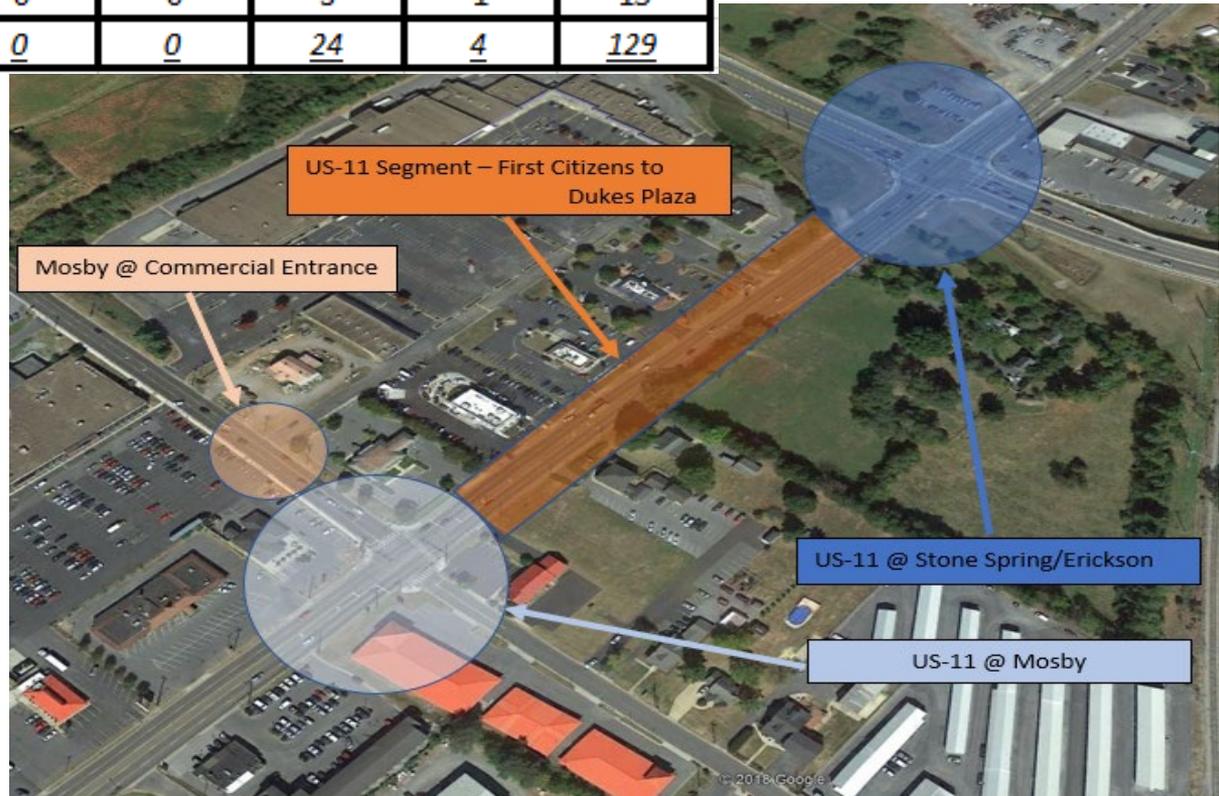
Analysis Segmentation



Crashes by Location

	Total	K	A	B	C	PDO
US-11 @ Stone Spring	47	0	0	7	1	39
US-11 @ Mosby	32	0	0	6	2	24
US-11 Segment	59	0	0	8	0	51
Mosby Commercial Entrance	19	0	0	3	1	15
<i>TOTAL AREA</i>	<i>157</i>	<i>0</i>	<i>0</i>	<i>24</i>	<i>4</i>	<i>129</i>

Crashes updated for
January 2013 –
May 2019

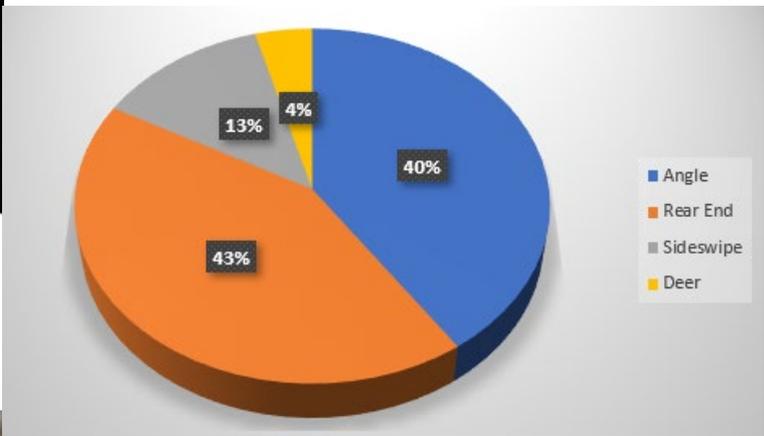


South Main Street @ Stone Spring/Ericksen



January 2013 – May 2019

South Main Street @ Stone Spring				
	Total	B	C	PDO
Angle	19	6	1	12
Rear End	20	1	0	19
Sideswipe	6	0	0	6
Deer	2	0	0	0



- 3 Angle Injuries from Northbound Left Turn
- 3 Angle Injuries due to Right Turn on Red Maneuvers

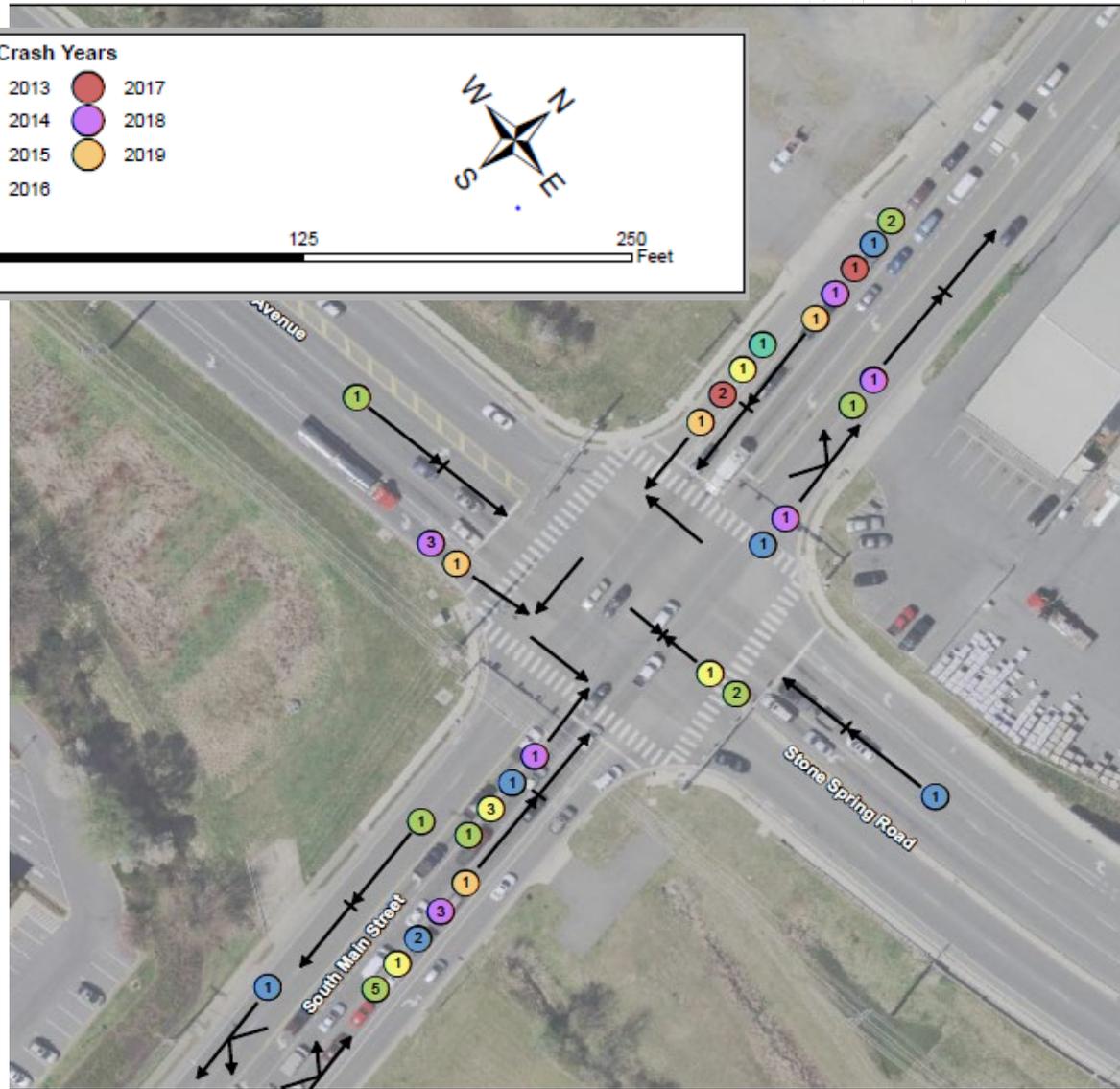


US-11 @ Stone Spring/Ericksen

South Main Street @ Stone Spring/Ericksen

Crash Types		Crash Years	
	Angle Crash		2013
	Rear-end Crash		2014
	Sideswipe Crash		2015
	Collision with Deer		2016
	Head On/Probable Angle		2017
			2018
			2019

0 125 250 Feet



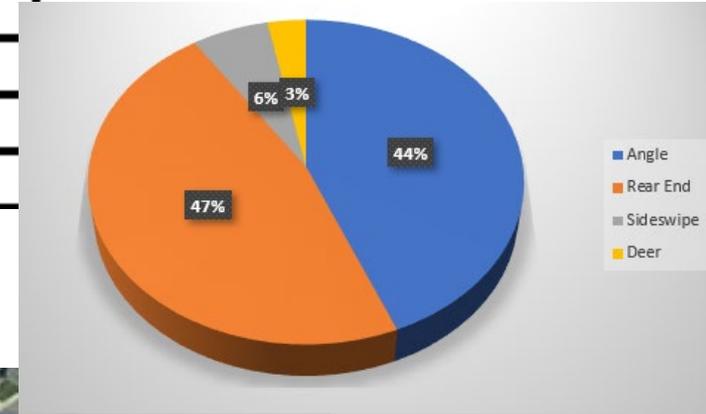
South Main Street @ Mosby Road



January 2013 – May 2019

South Main Street @ Mosby

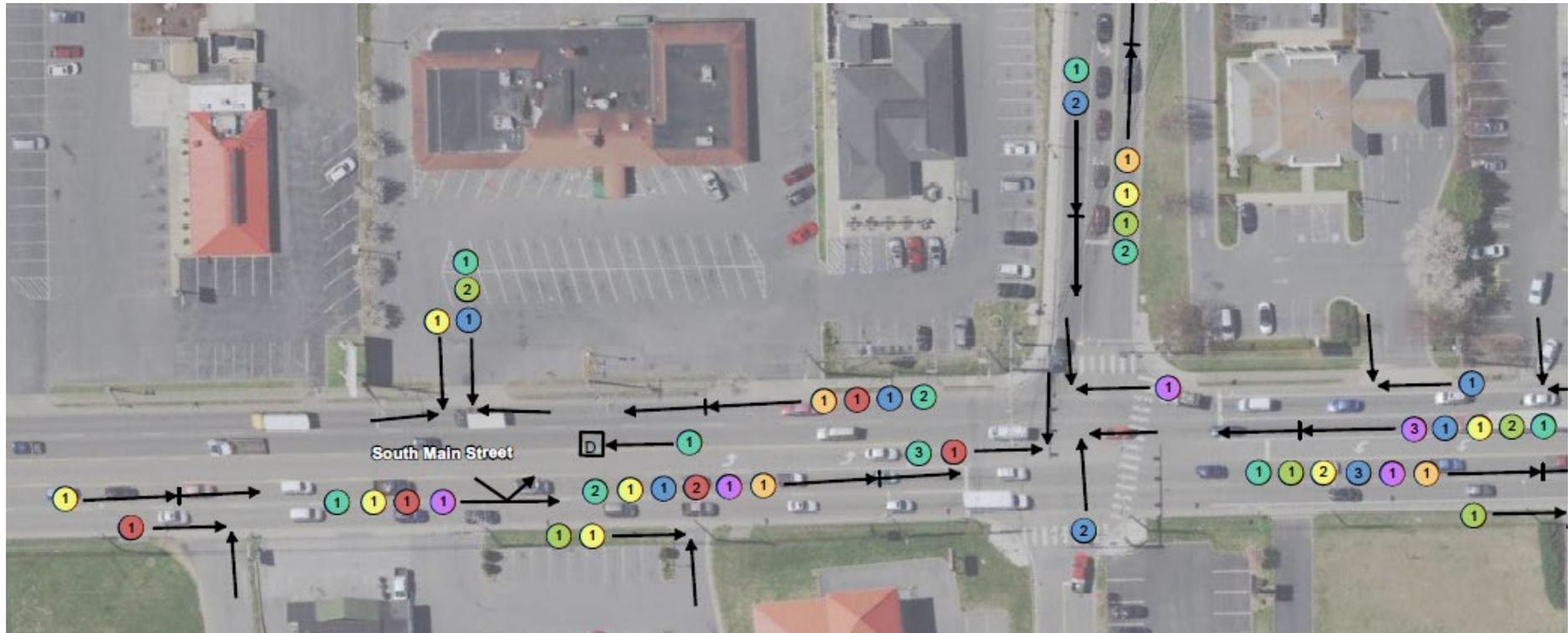
	Total	B	C	PDO
Angle	14	3	1	11
Rear End	15	3	1	11
Sideswipe	2	0	0	2
Deer	1	0	0	1



- 3 Angles explicitly mention commercial driveways
- Most injuries due to rear ends/red light running



South Main Street @ Mosby Road

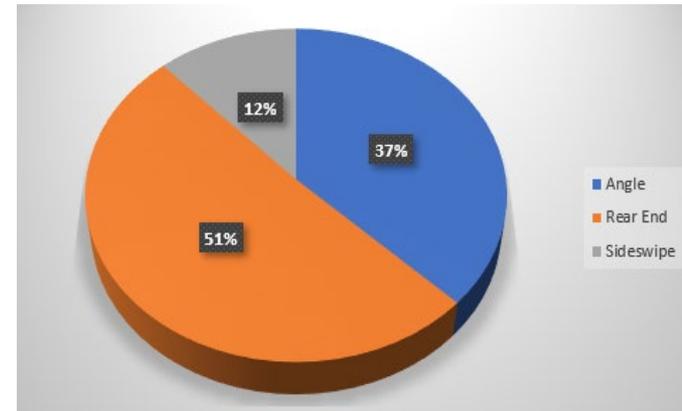


Crash Types		Crash Years	
	Angle Crash		2013
	Rear-end Crash		2014
	Sideswipe Crash		2015
	Collision with Deer		2016
	Head On/Probable Angle		2017
			2018
			2019

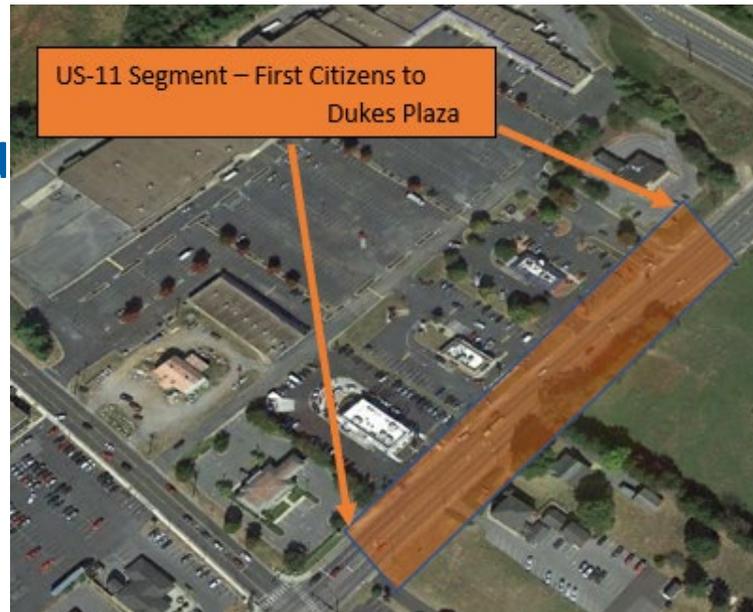
South Main Street Commercial Access Segment

January 2013 – May 2019

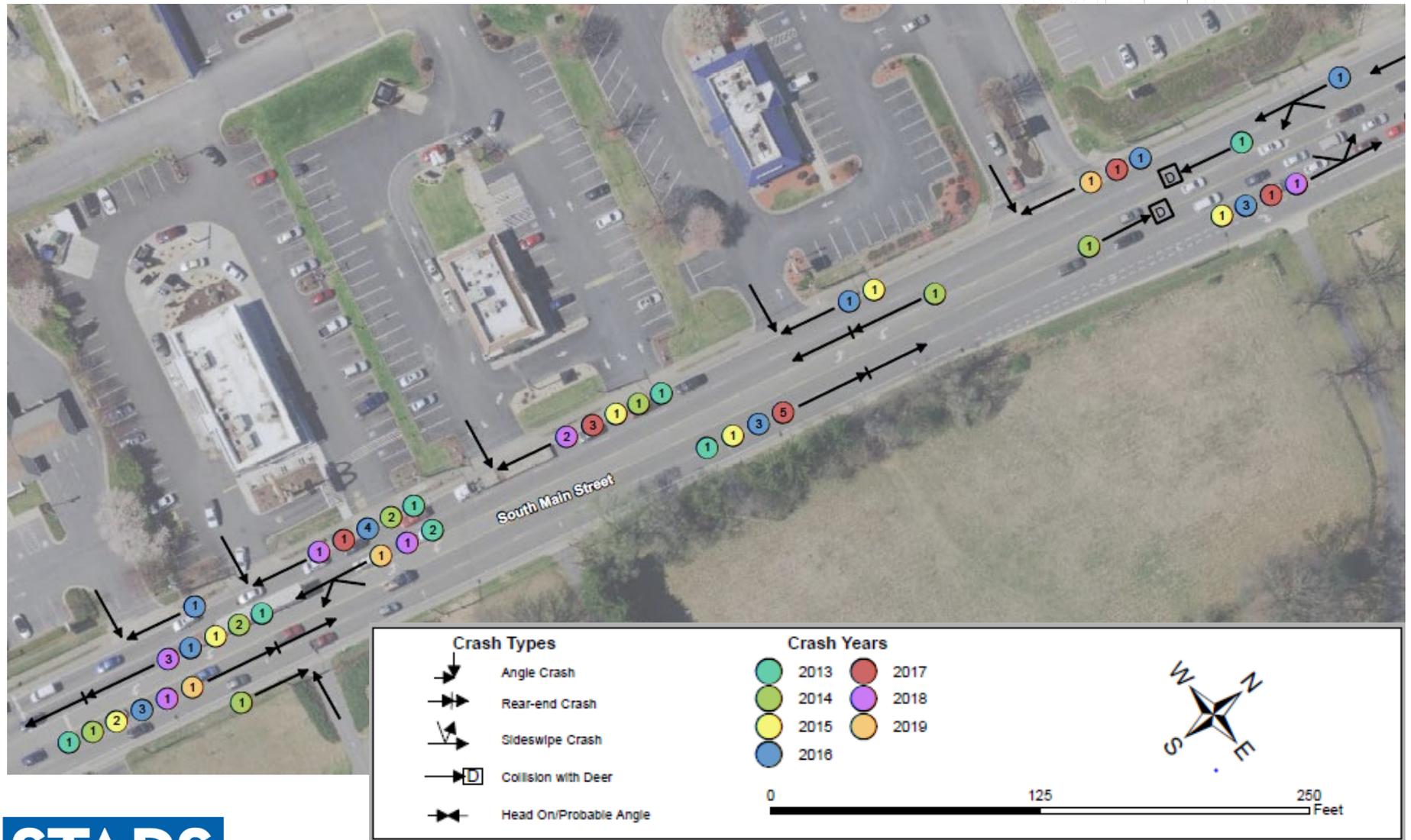
Commerical Access Segment - First Citizens to Dukes Plaza				
	Total	B	C	PDO
Angle	22	4	0	18
Rear End	30	2	0	28
Sideswipe	7	2	0	5



- 22 Crashes specifically mention ingress/egress from Commercial Accesses
- 6 Crashes specifically from conflicts in Two-Way Left Turn Lane
- 6 Crashes specifically from Southbound stopped vehicles at Mosby
- Majority of others due to Northbound congestion at Stone Spring



South Main Street Commercial Access Segment



SOUTH MAIN STREET COMMERCIAL ACCESS SEGMENT

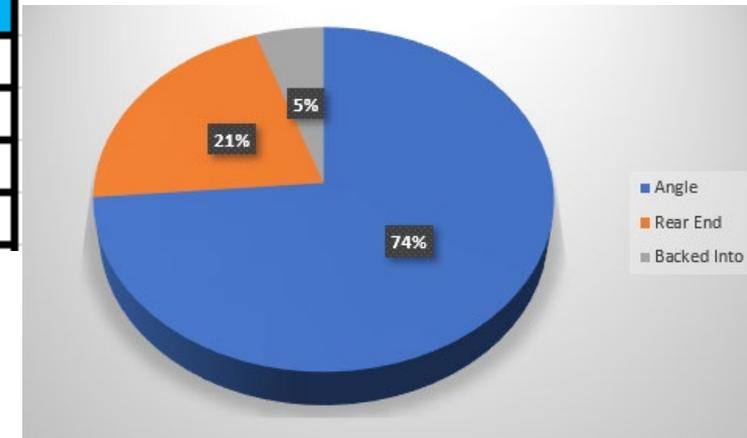


Highway Functional Classification	Legal Speed Limit (mph) ^①	Minimum Centerline to Centerline Spacing (Distance) in Feet			
		Spacing from Signalized Intersections to Other Signalized Intersections ^②	Spacing from Unsignalized Intersections & Full Median Crossovers to Signalized or Unsignalized Intersections & Full Median Crossovers ^③	Spacing from Full Access Entrances or Directional Median to Other Full Access Entrances and Any Intersection or Median Crossover ^④	Spacing from Partial Access One or Two Way Entrances to Any Type of Entrance, Intersection or Median Crossover ^⑤
Minor Arterial	< 30 mph	880	660	355	200
	35 to 45 mph	1,050	660	470	250
	≥ 50 mph	1,320	1,050	555	425

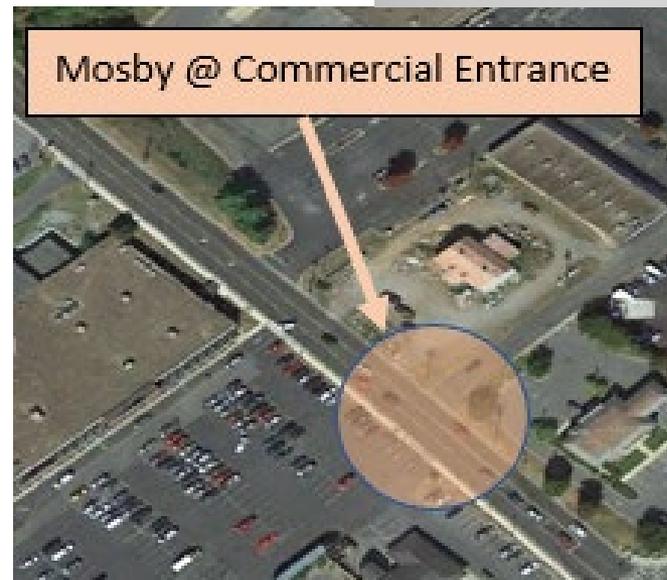
Mosby Commercial Access

January 2013 – May 2019

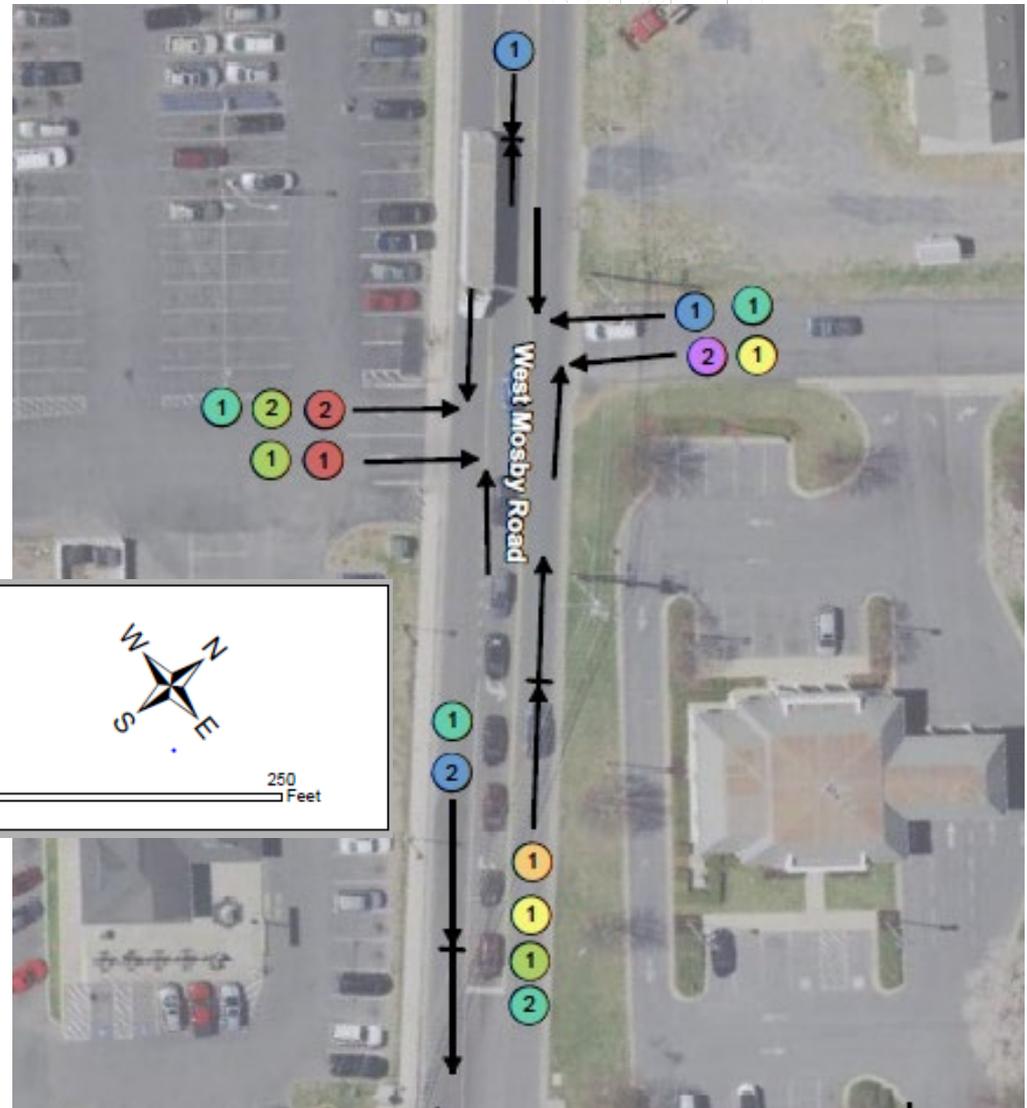
<i>Mosby Commercial Access Point</i>				
	Total	B	C	PDO
Angle	14	2	1	11
Rear End	4	1	0	3
Backed Into	1	0	0	1



- Majority of crashes associated with conflicts due to entering/exiting Shopping Plazas



South Main Street Commercial Access Segment



Crash Types		Crash Years	
	Angle Crash		2013
	Rear-end Crash		2017
	Sideswipe Crash		2014
	Collision with Deer		2018
	Head On/Probable Angle		2015
			2016
			2019

0 125 250 Feet

KEY SMART SCALE CMFs FOR SAFETY SCORING

2018 SCORING VALUES – NOTE SUBJECT TO CHANGE

Project Extent	Improvement Type/Features	F+I CMF
Intersections	Signal: New	
	<i>Convert stop/yield control to signal</i>	0.65
	Signal Upgrade	
	<i>Convert pedestal to mast arm</i>	0.55
	<i>Enhanced conspicuity</i>	0.85
Intersections	Intersection Lighting	0.45
	Convert Unsignalized Intersection Warning Beacons from Static to Dynamic	0.95
	Reduce Conflicts	
	<i>Two-way Stop Control to RCUT</i>	0.65 0.45
	<i>Signal Control to Signalized RCUT</i>	0.80 0.65
	<i>Signal Control to Continuous Green T Signal</i>	0.85
	<i>Displaced Left Turn</i>	0.80
	<i>Median U-Turn</i>	0.70
	<i>Median Acceleration Lane</i>	0.85
	<i>New Quadrant Roadway</i>	Design Dependent

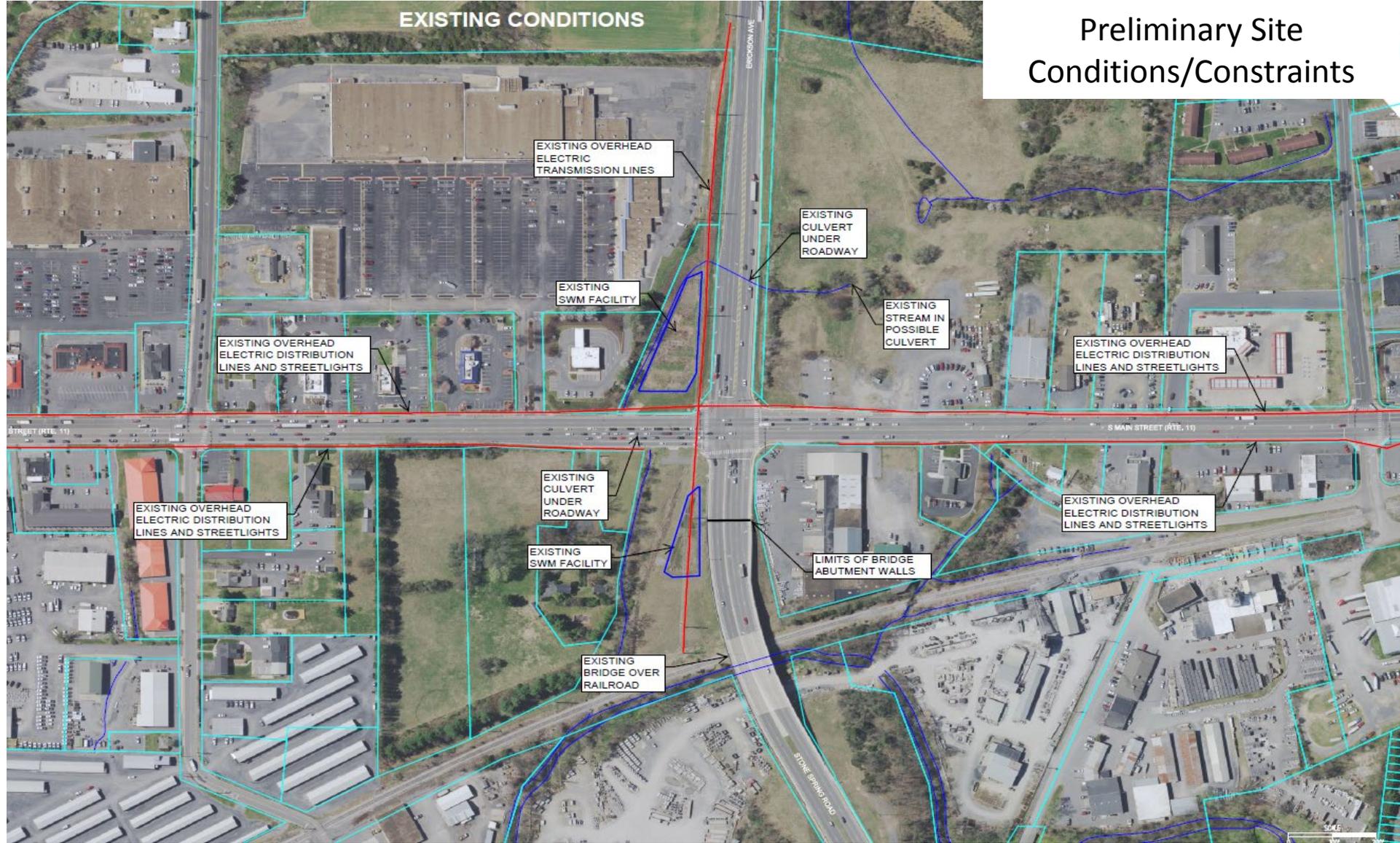
KEY SMART SCALE CMFs FOR SAFETY SCORING

Project Extent	Improvement Type/Features	F+I CMF
Intersections		
	Turn Lane(s)	
	<i>New Turn Lane (none present)</i>	0.85
	<i>Add Turn Lane (to existing)</i>	0.97
	<i>Extend Turn Lane</i>	0.97
	Access Management - Close median opening (allow right-in right-out only)	0.40
	Improve skew angle	
	<i>3 Leg Intersection</i>	0.70
	<i>4 Leg Intersection</i>	0.60
	Increase intersection radii	0.95

ALTERNATIVE SCREENING/PRELIMINARY CONCEPTS

Preliminary Site Conditions/Constraints

EXISTING CONDITIONS



South Main Street @ Stone Spring/Ericksen



AM Peak Hour

PM Peak Hour

Type	Dir	Maximum V/C	Accommodation Compared to Conventional	Weighted Total Conflict Points	Maximum V/C	Accommodation Compared to Conventional	Weighted Total Conflict Points
Conventional	-	0.49		48	0.67		48
Bowtie	-	0.89	+	24	1.44	+	24
Center Turn Overpass	-	0.37	+	32	0.47	+	32
Full Displaced Left Turn	-	0.32	-	40	0.45	-	40
Median U-Turn	-	0.70	+	20	0.79	+	20
Partial Displaced Left Turn	-	0.40	-	44	0.61	-	44
Partial Median U-Turn	-	0.55	+	28	0.68	+	28
	N-W	0.37		40	0.52		40
Quadrant Roadway	N-E	0.58		40	0.70		40
	S-E	0.40		40	0.59		40
	S-W	0.48		40	0.54		40
Restricted Crossing U-Turn	-	1.03		20	1.31		20
Single Loop	-	0.39	-	28	0.74	-	28
Split Intersection	-	0.46		36	0.59		36

- Based on 2019 Collected AM/PM Counts
- Conventional can be improved with capacity improvements –
 - Northbound only Dual Lefts creates 0.52/0.56
 - Northbound & Westbound Dual Lefts reduces to 0.43/0.48



South Main Street @ Mosby Road

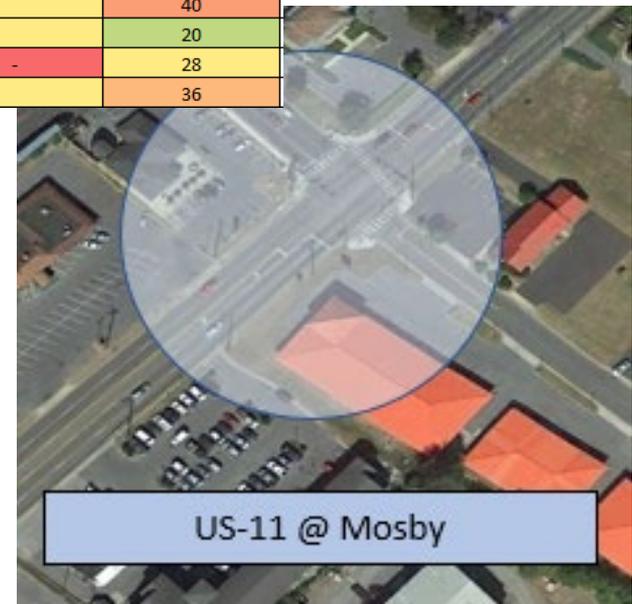


AM Peak Hour

PM Peak Hour

Type	Dir	Maximum V/C	Accommodation Compared to Conventional	Weighted Total Conflict Points	Maximum V/C	Accommodation Compared to Conventional	Weighted Total Conflict Points
Conventional	-	0.44		48	0.57		48
Bowtie	-	0.83	+	24	1.34	+	24
Center Turn Overpass	-	0.33	+	32	0.37	+	32
Full Displaced Left Turn	-	0.36	-	40	0.53	-	40
Median U-Turn	-	0.49	+	20	0.72	+	20
Partial Displaced Left Turn	-	0.37	-	44	0.53	-	44
Partial Median U-Turn	-	0.39	+	28	0.57	+	28
Quadrant Roadway	N-W	0.39		40	0.54		40
	N-E	0.42		40	0.58		40
	S-E	0.40		40	0.55		40
	S-W	0.39		40	0.53		40
Restricted Crossing U-Turn	-	0.46		20	0.59		20
Single Loop	-	0.40	-	28	0.55	-	28
Split Intersection	-	0.34		36	0.55		36

- Alternative intersections don't offer significant improvements under existing conditions
- By improving Eastbound lanes/revising signal phasing overall improved operations are possible



NEXT STEPS

- **Develop future volumes & growth rates**
- **Focus on priority improvements**
 - Analysis
 - Concepts
 - Design
 - Cost Estimates

STARS

STRATEGICALLY TARGETED AND
AFFORDABLE ROADWAY SOLUTIONS

QUESTIONS/COMMENTS?

Thank you!

