

STARS

STRATEGICALLY TARGETED AND
AFFORDABLE ROADWAY SOLUTIONS

HARRISONBURG 10 PSI INTERSECTIONS IMPROVEMENT STUDY

***Meeting #2 – Existing Conditions / Preliminary Findings
February 16th 2021.***



AGENDA/STUDY INFORMATION

Introduction

- Meeting Goals/Objectives
- Kickoff Meeting Recap
- Study Intersections & Count Locations
- Study Progress
- City Plans/Background

Individual Intersection Review

- Existing Operational Conditions
- Safety Analysis
- Preliminary Ideas for Consideration

Open Discussion

Schedule / Next Steps

Points of Contact:

Bill Guiher (STARS Program Manager)

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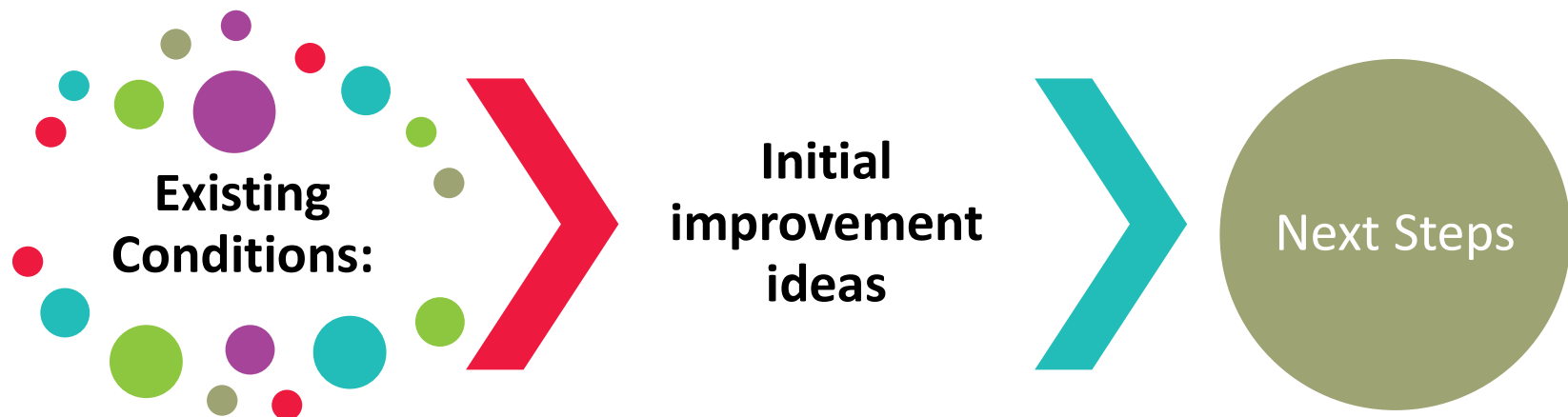
Nathan Umberger (ATCS Team Manager)

numberger@atcsplc.com



ATCS

MEETING GOALS/OBJECTIVES



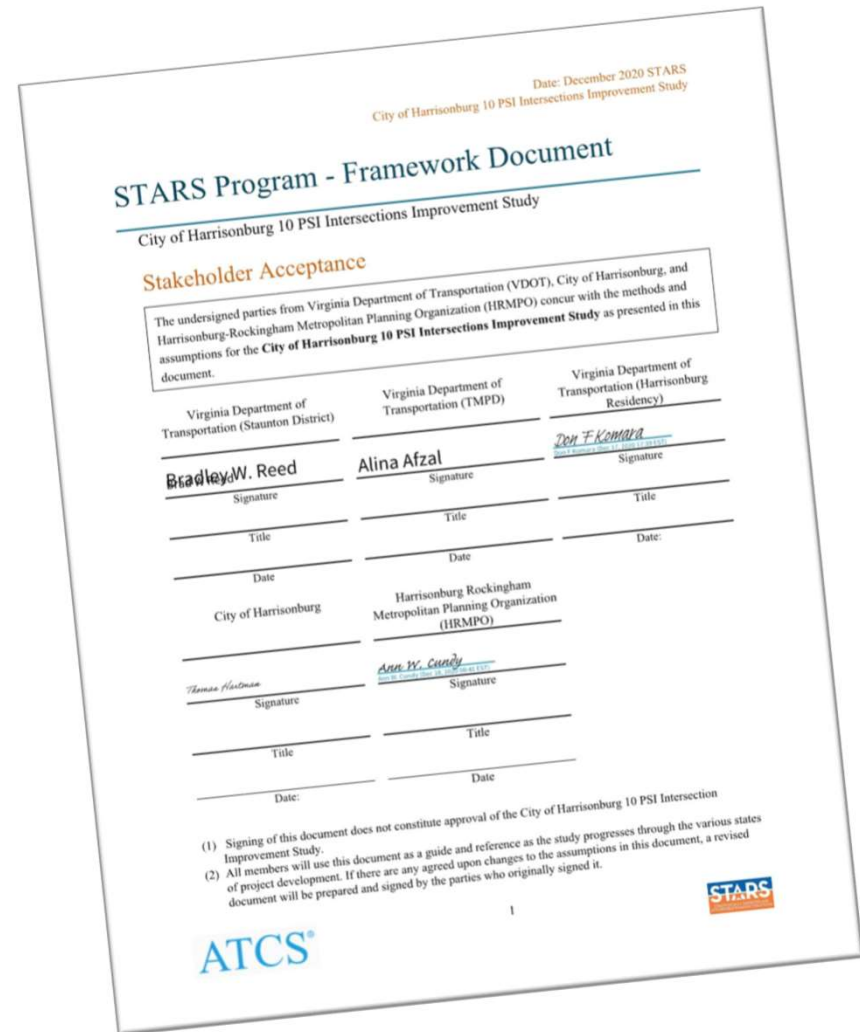
- Present safety and operational analysis outcomes
- Feedback on outcomes (does it match with daily observations?)

- Present initial improvement ideas
- Input/feedback on improvement ideas (What needs to be added/removed?)

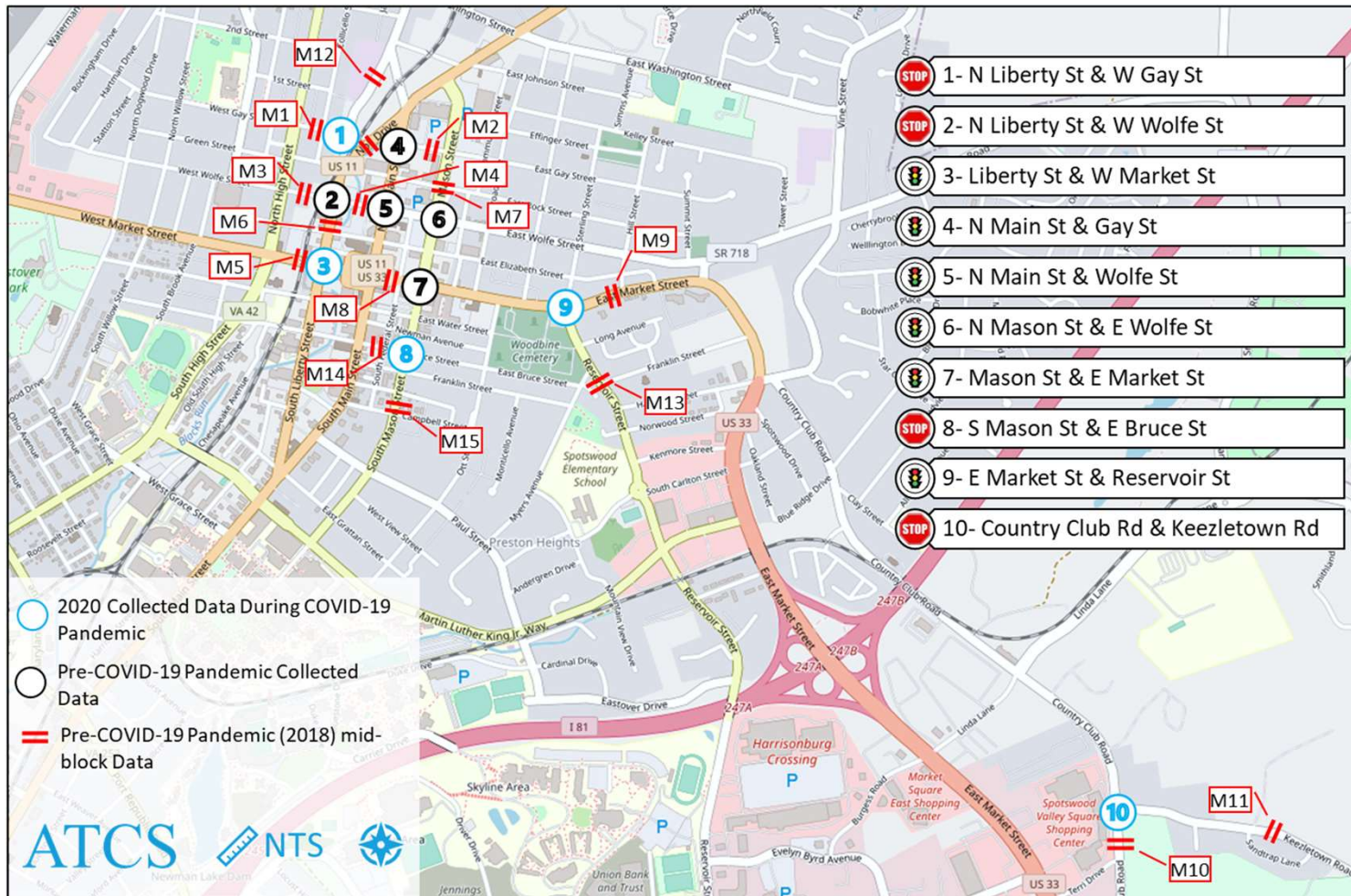
- Developing alternatives
- Alternative evaluation (qualitative/quantitative)

KICKOFF MEETING RECAP

- Study goals and objectives are defined.
- Study area background information discussed.
- Study framework discussed.



STUDY INTERSECTIONS & COUNT LOCATIONS



STUDY PROGRESS

COVID-19 Traffic Volume Adjustment

- Pre-pandemic traffic volumes compared to during pandemic data
- Adjustment rates were proposed based on compared data and engineering judgement

Field Review and Safety Analysis

- Crash diagrams prepared
- Field review along with VDOT and City staff
- FR300 crash reports been reviewed

Existing Safety and Operational Analysis

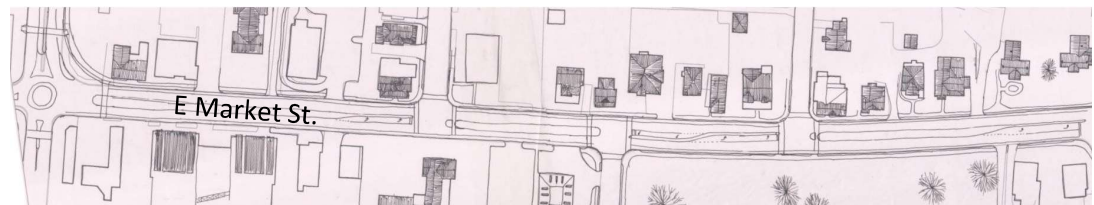
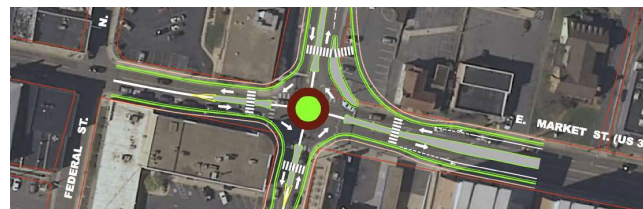
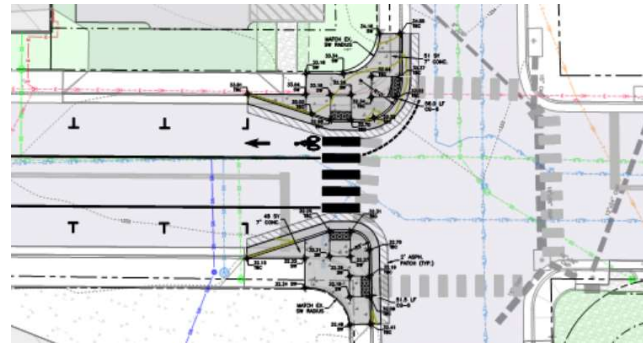
- Synchro model developed for adjusted turning movement counts 2020 PM peak
- No-Build 2030 model developed

SCHEDULE



CITY PLANS/BACKGROUND

- The Study will consider previously developed plans.
 - Downtown Streetscape plan
 - Parking Study
 - Downtown traffic study
 - Liberty Street. & Gay Street reconfiguration
 - APS implementation



STUDY INTERSECTIONS

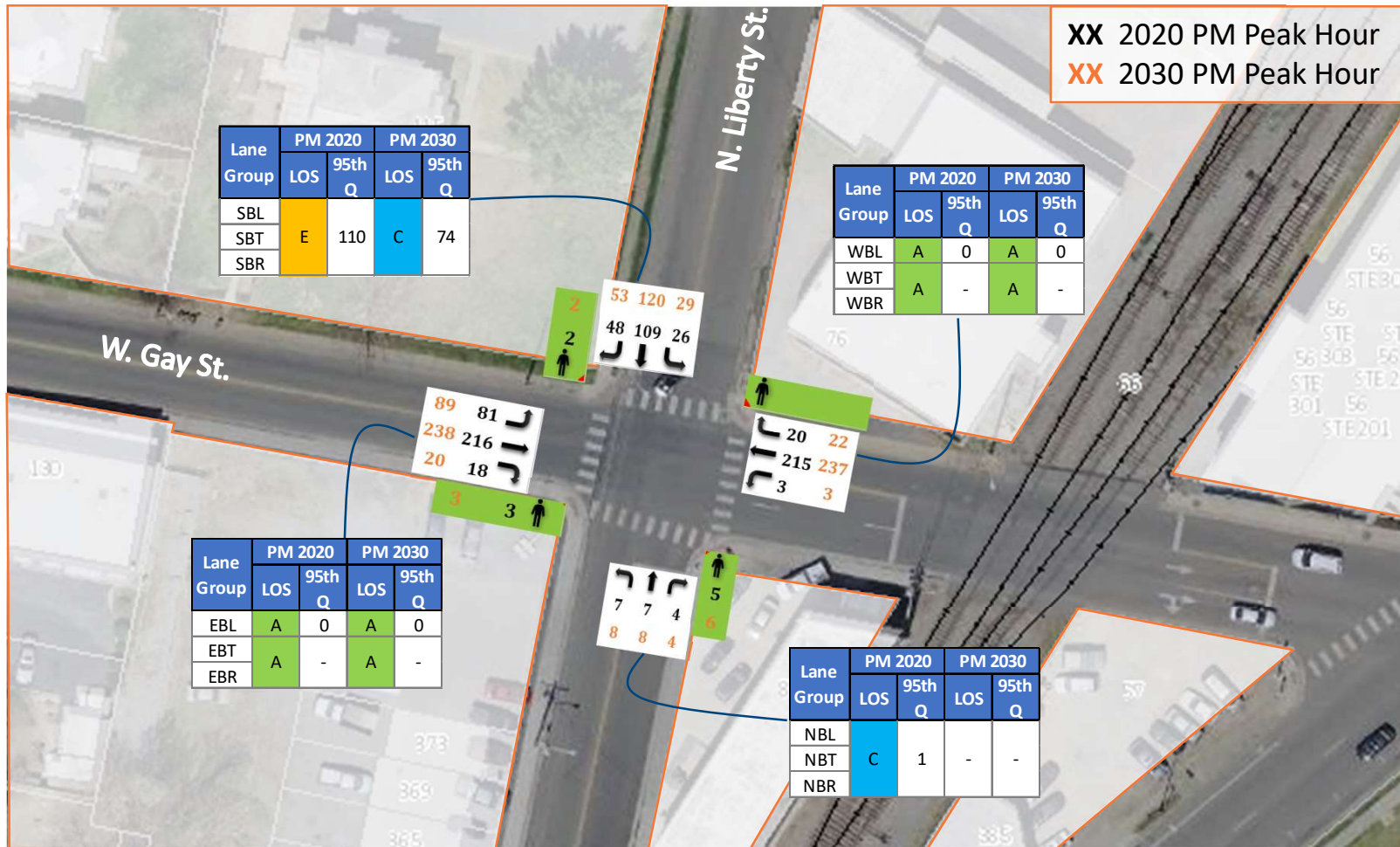


N Liberty St & W Gay St (1)

District PSI Rank #11

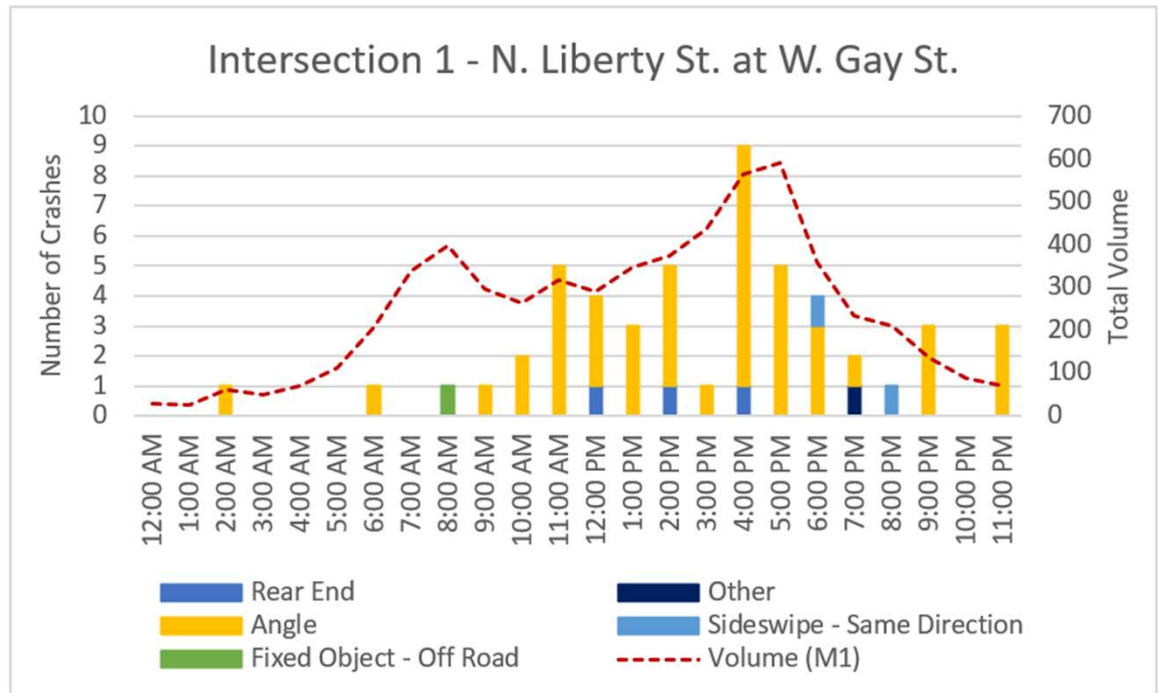
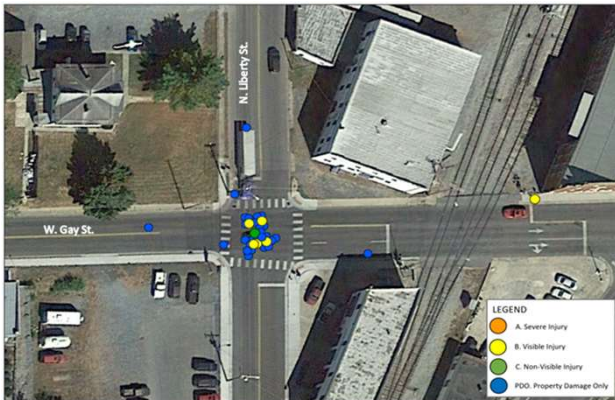
OPERATIONAL ANALYSIS

EXISTING CONDITIONS

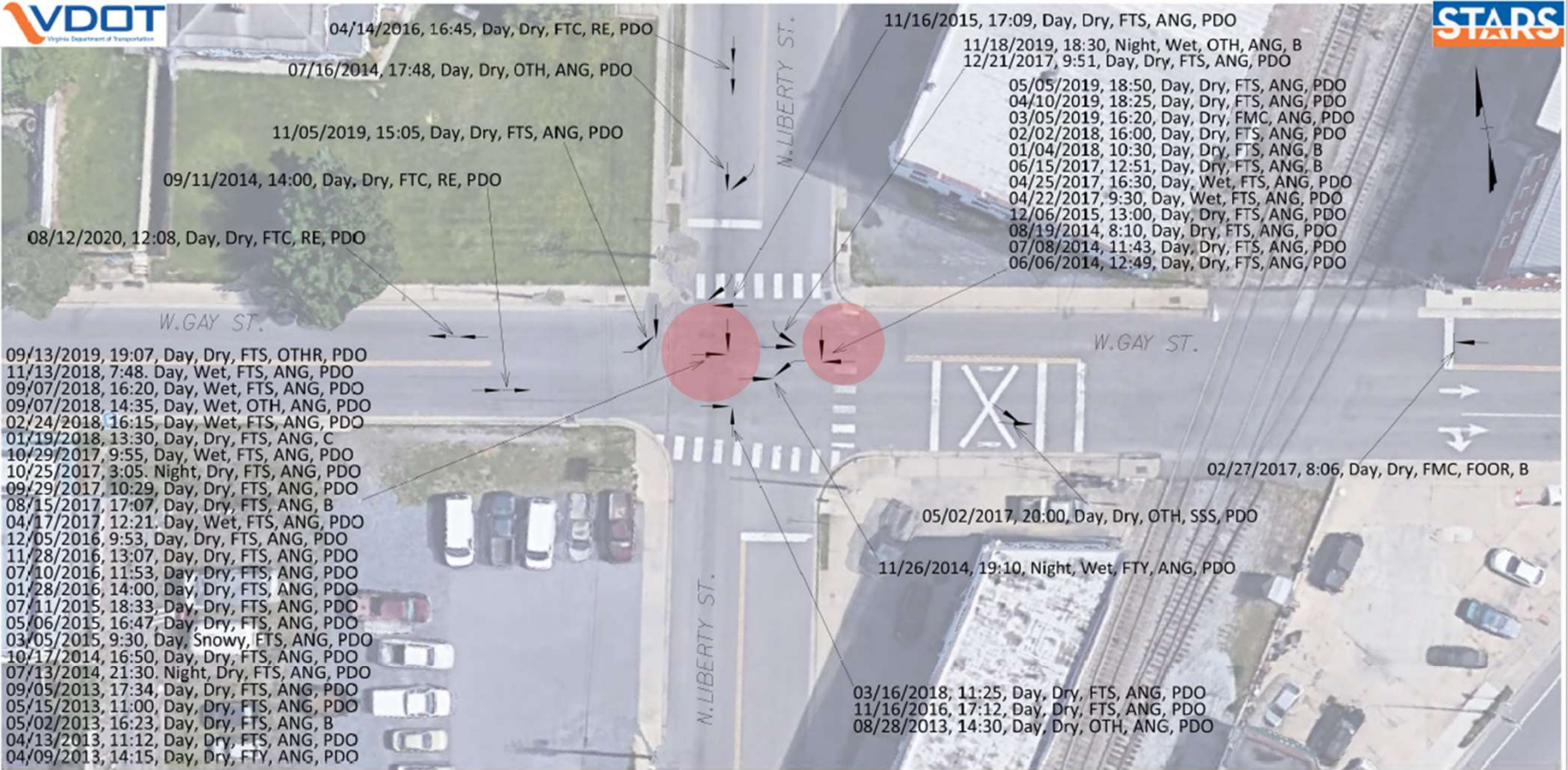


SAFETY ANALYSIS

- 6/51 injury crashes (12%)
- 44 angle crashes (EB/SB angle crashes are prominent safety concern)
- 3 rear end crashes



	2013	2014	2015	2016	2017	2018	2019	2020	Total
1. Rear End		1		1				1	3
16. Other							1		1
2. Angle	6	7	5	5	9	8	4		44
4. Sideswipe - Same Direction					1		1		2
9. Fixed Object - Off Road					1				1
Total	6	8	5	6	11	8	6	1	51



PDO, Property Damage Only - 45 C, Nonvisible Injury - 1 B, Visible Injury - 5 A, Severe Injury - 0 K, Fatal Injury - 0	Dry - 41 Wet - 9 Snowy - 1 Icy - 0	Day - 47 Night - 4	Total Accidents = 51 Years = 7.8 01/01/13 - 10/01/20	Angle Head On Single Vehicle Sideswipe Rear End Pedestrian	ATCS ENGINEERING PLANNING SURVEYING ENVIRONMENTAL 13861 RUNNING VALLEY DRIVE, SUITE 200 HARRISONBURG, VA 20151 703-817-3601 FAX 703-430-0800 http://www.atcsgc.com
NIA - No Improper Action ESS - Exceeded Safe Speed FTY - Failure to Yield FTS - Failure to Stop FTC - Following Too Close FMC - Failure to Maintain Control ULC - Unsafe Lane Change OTH - Other	RE - 1. Rear End ANG - 2. Angle HO - 3. Head On SSS - 4. Sideswipe - Same Direction SSO - 5. Sideswipe - Opposite Direction FOIR - 6. Fixed Object in Road TR - 7. Train NC - 8. Non-Collision	Severity Conditions Total	FOOR - 9. Fixed Object - Off Road DEER - 10. Deer OA - 11. Other Animal PED - 12. Ped BIC - 13. Bicyclist MOT - 14. Motorcyclist BI - 15. Backed Into OTHR - 16. Other	STARS Project Name Figure 1 - Collision Diagram N Liberty St @ W Gay St	DISTRICT Harrisonburg LOCALITY Harrisonburg DATE 01/2021 SCALE None



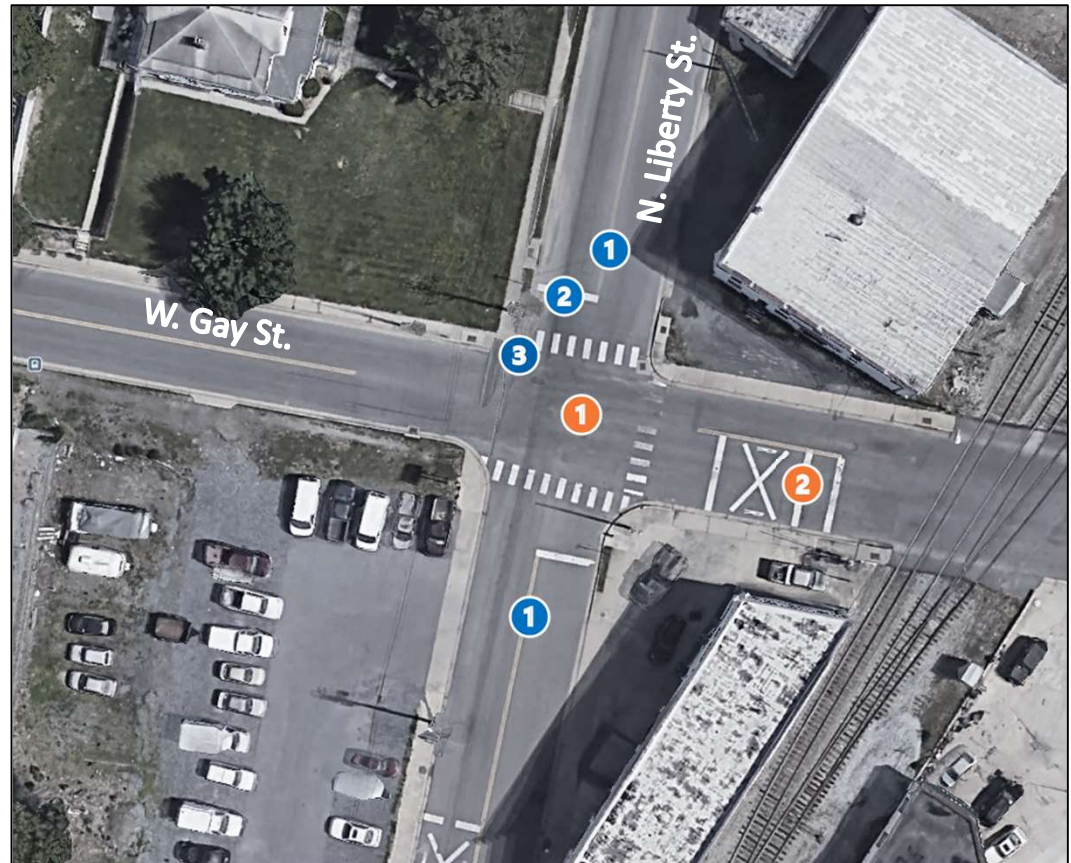
PRELIMINARY IDEAS FOR CONSIDERATION

Safety:

1. Convert N. Liberty St. to one-way (either NB or SB)
2. Relocate stop bars (NB/SB) closer to intersection
3. Enhance SB stop sign visibility

Operational:

1. All-way stop control evaluation
2. W Gay Street Lane reconfiguration; add bike lane and connect to streetscape planned lane configuration between Main Street and N Mason Street



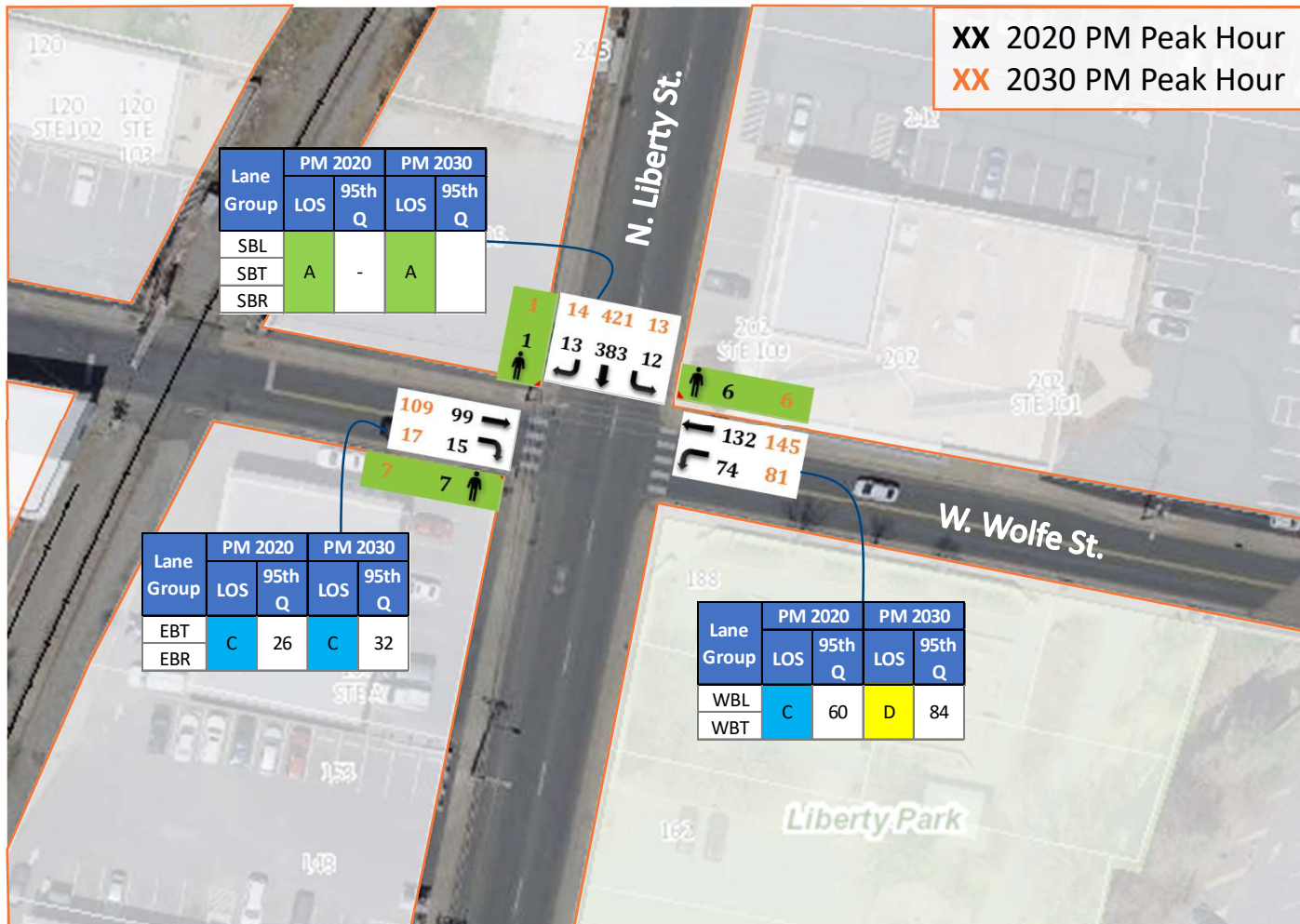
STUDY INTERSECTIONS



N Liberty St. and W Wolfe St. (2)

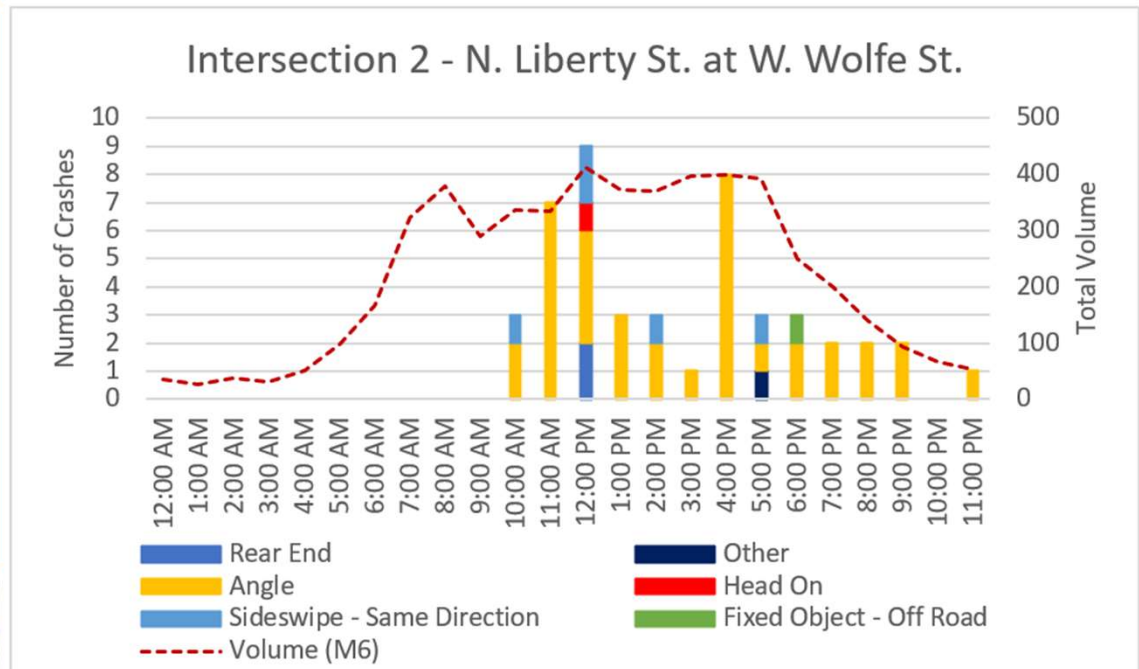
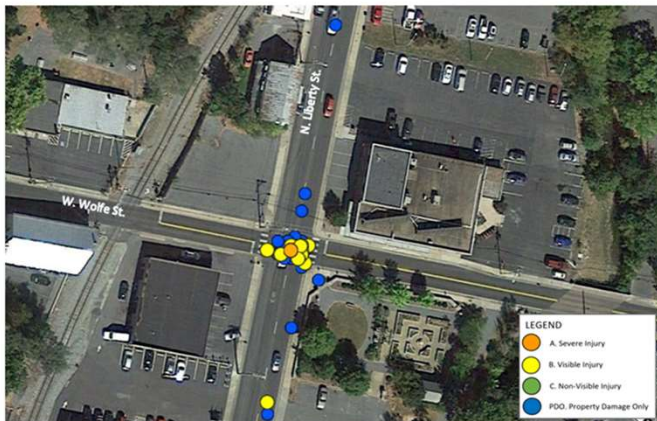
District PSI Rank #43

OPERATIONAL ANALYSIS

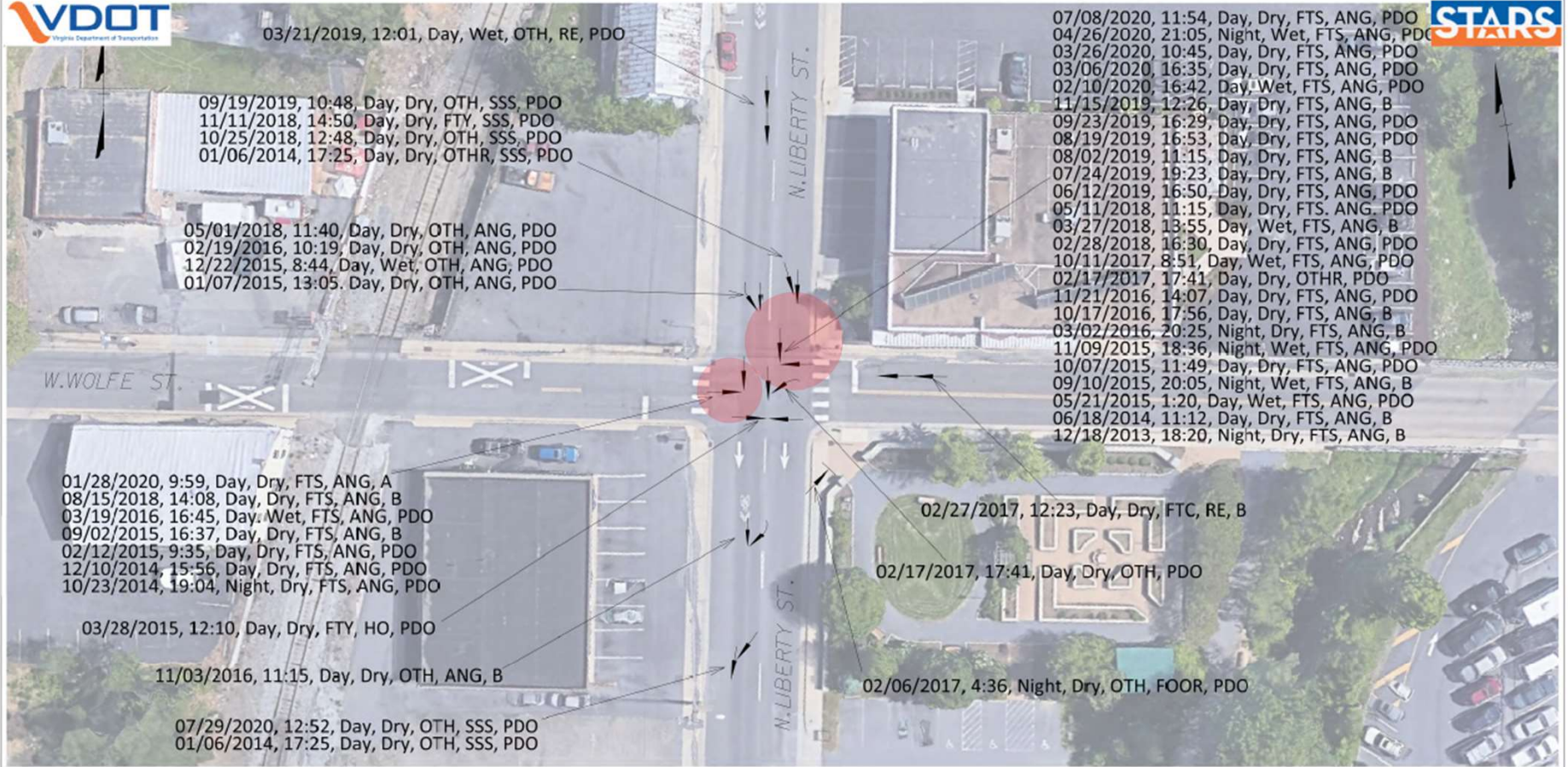


SAFETY ANALYSIS

- 14/47 injury crashes (30%)
- 37 angle crashes (WB/SB angle crashes are prominent safety concern)
- 5 sideswipe – same direction crashes



	2013	2014	2015	2016	2017	2018	2019	2020	Total
1. Rear End					1		1		2
16. Other					1				1
2. Angle	1	3	8	6	1	5	6	7	37
3. Head On			1						1
4. Sideswipe - Same Direction		1				2	1	1	5
9. Fixed Object - Off Road					1				1
Total	1	4	9	6	4	7	8	8	47



PDO. Property Damage Only - 33 C. Nonvisible Injury - 0 B. Visible Injury - 13 A. Severe Injury - 1 K. Fatal Injury - 0		Dry - 37 Wet - 10 Snowy - 0 Icy - 0		Day - 40 Night - 7		Total Accidents = 47 Years = 7.8 01/01/13 - 10/01/20		- Angle - Sideswipe		- Head On - Rear End		- Single Vehicle - Pedestrian		ATCS ENGINEERING PLANNING SURVEYING ENVIRONMENTAL 13801 BUNKERS VALLEY DRIVE, SUITE 200 HERRINGTON, VA 20171 703-817-3601 FAX 703-420-8880 http://www.atcsgc.com	
Severity		Conditions		Total		Type		Key		STARS Project Name Figure 2 - Collision Diagram N Liberty St @ W Wolfe St		DISTRICT Harrisonburg		LOCALITY Harrisonburg	
NIA - No Improper Action ESS - Exceeded Safe Speed FTY - Failure to Yield FTS - Failure to Stop FTC - Following Too Close FMC - Failure to Maintain Control ULC - Unsafe Lane Change OTH - Other		RE - 1. Rear End ANG - 2. Angle HO - 3. Head On SSS - 4. Sideswipe - Same Direction SSO - 5. Sideswipe - Opposite Direction FOIR - 6. Fixed Object in Road TR - 7. Train NC - 8. Non-Collision		FOOR - 9. Fixed Object - Off Road DEER - 10. Deer OA - 11. Other Animal PED - 12. Ped BIC - 13. Bicyclist MOT - 14. Motorcyclist BI - 15. Backed Into OTHR - 16. Other		DATE 01/2021		SCALE None							

PRELIMINARY IDEAS FOR CONSIDERATION

Safety:

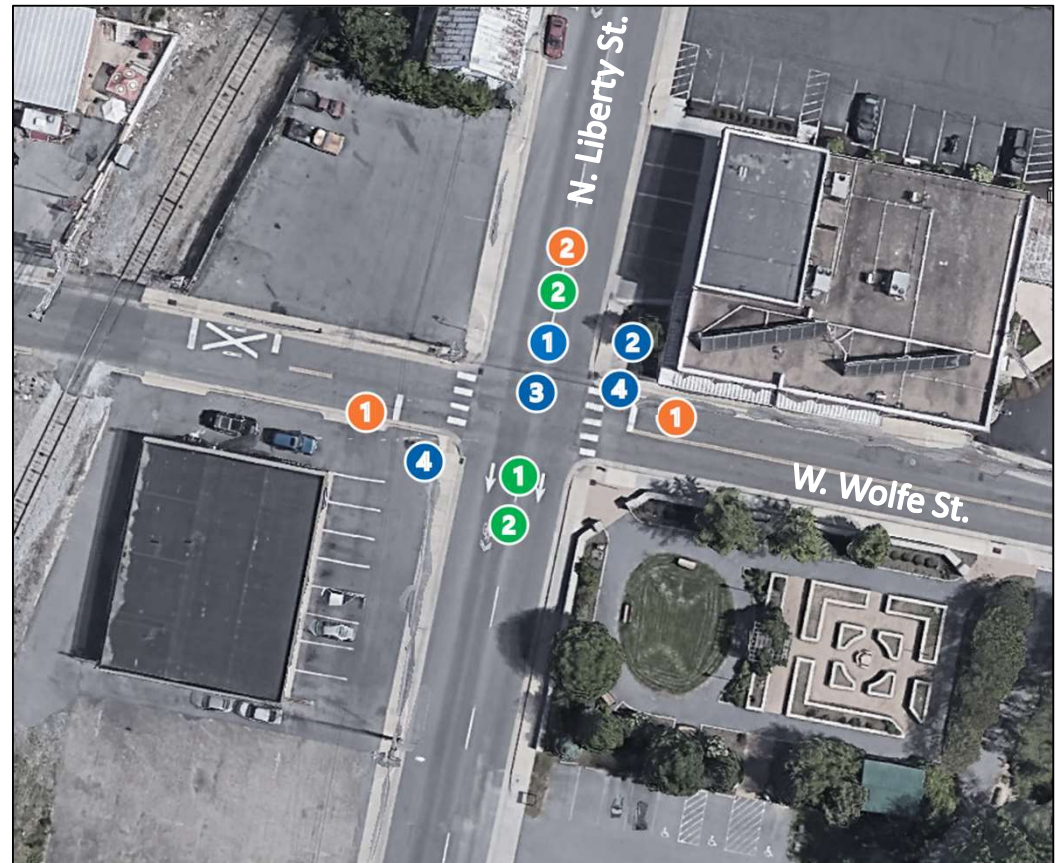
1. Add median channelization on Liberty St.
2. Improve sight distance
3. Direction arrow marking on Liberty Street
4. Cross traffic doesn't stop sign

Operational:

1. Evaluate stop bar location (Design Vehicle)
2. Lane reconfiguration from downtown traffic study (one lane southbound approach)

Bike/Ped Accommodation:

1. South side crosswalk on Liberty Street
2. Pedestrian Island / enhanced crosswalk



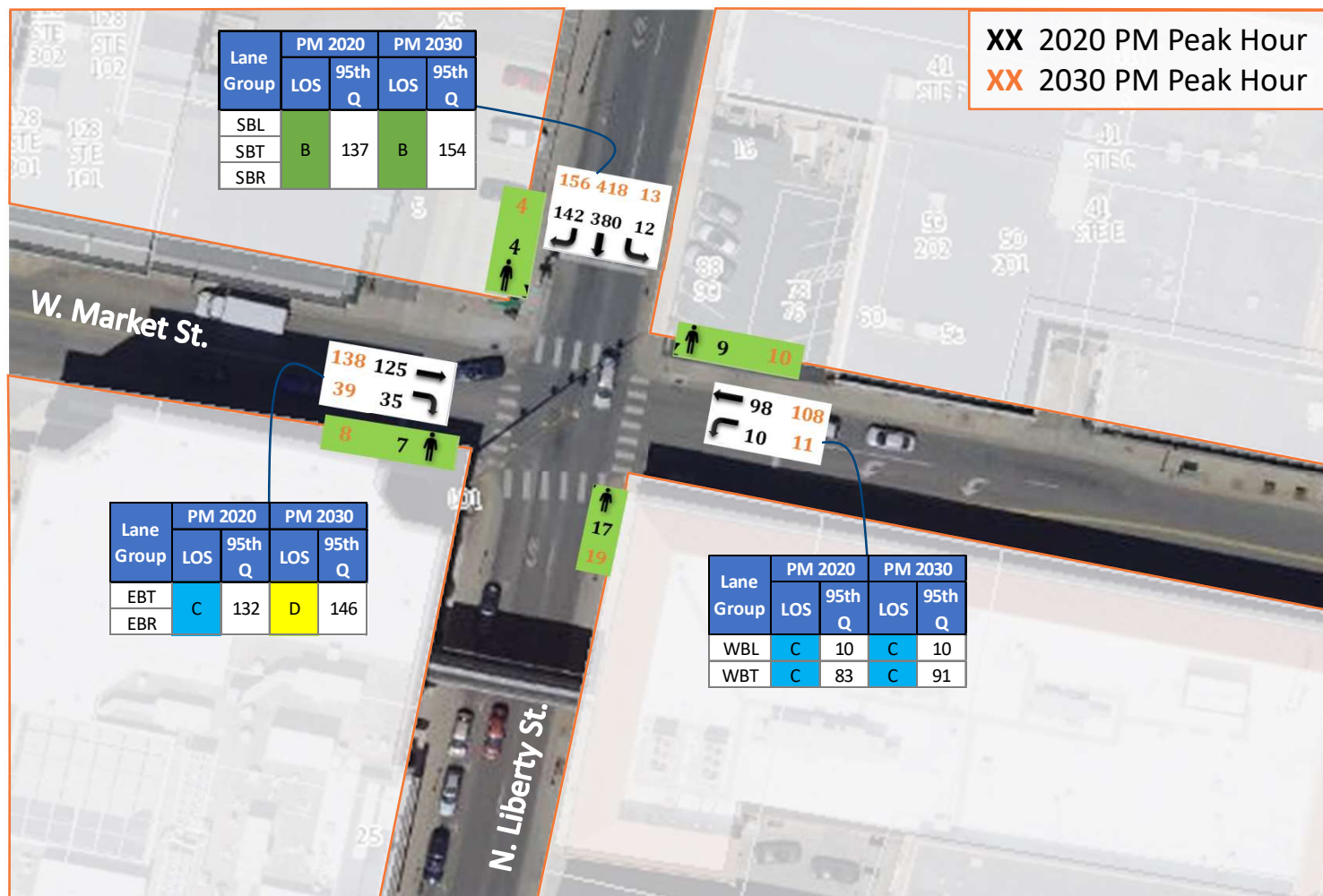
STUDY INTERSECTIONS



Liberty St. and W Market St. (3)

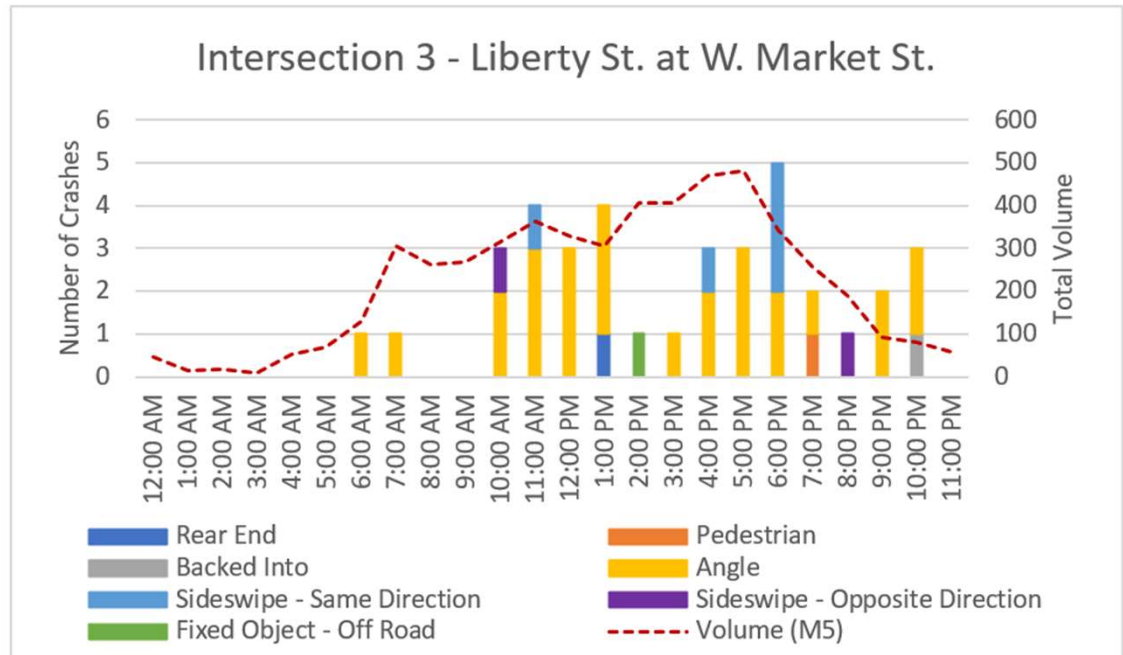
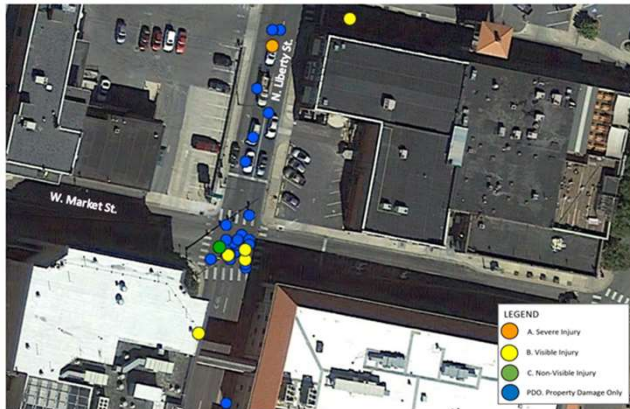
District PSI Rank #75

OPERATIONAL ANALYSIS

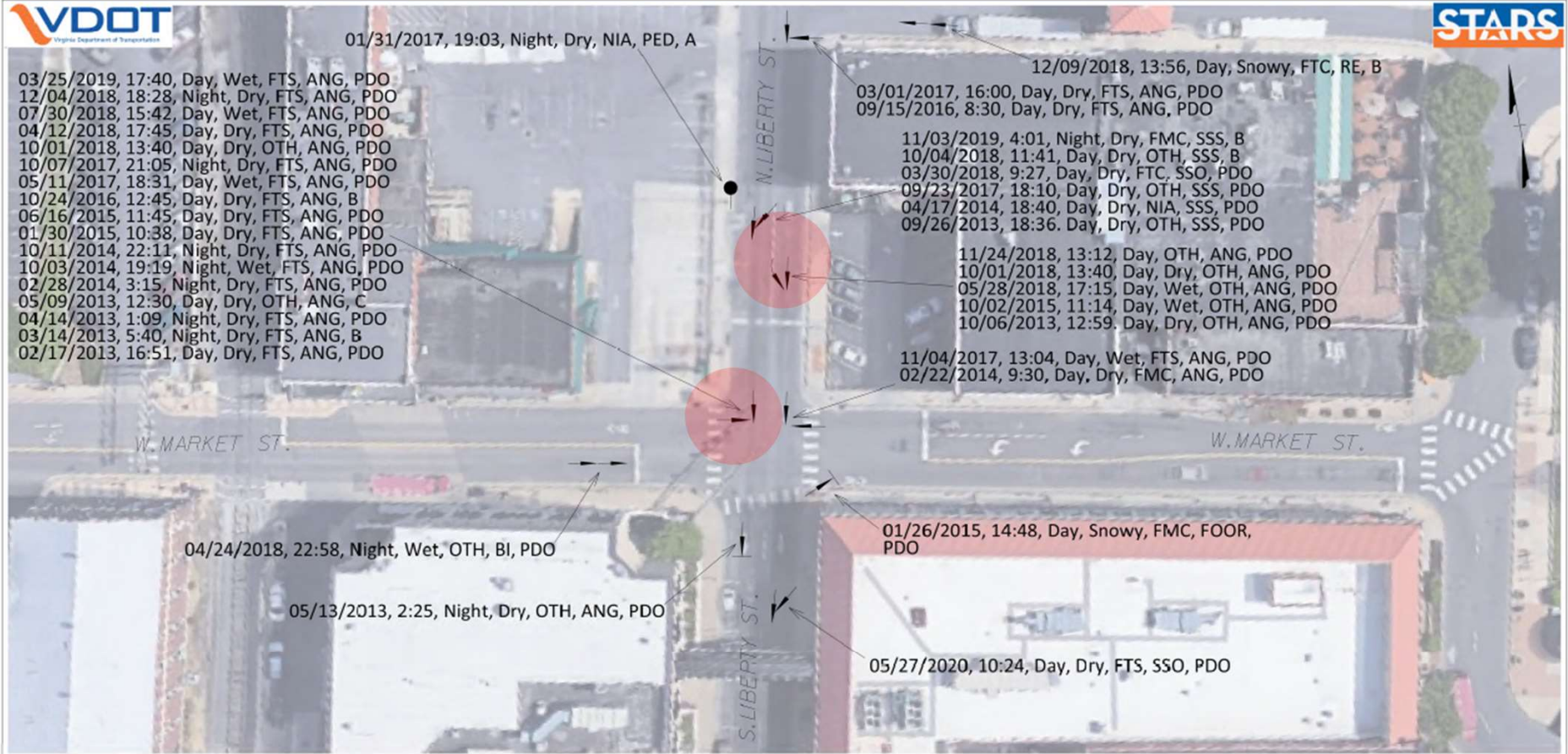


SAFETY ANALYSIS

- 7/37 injury crashes (12%)
- 26 angle crashes (17 SB/EB crashes, nearly half-half disregarded traffic light)
- 7 sideswipe crashes



	2013	2014	2015	2016	2017	2018	2019	2020	Total
1. Rear End						1			1
12. Ped					1				1
15. Backed Into						1			1
2. Angle	6	4	3	2	4	6	1		26
4. Sideswipe - Same Direction	1	1			1	1	1		5
5. Sideswipe - Opposite Direction						1		1	2
9. Fixed Object - Off Road			1						1
Total	7	5	4	2	6	10	2	1	37



PDO. Property Damage Only - 30 C. Nonvisible Injury - 1 B. Visible Injury - 5 A. Severe Injury - 1 K. Fatal Injury - 0		Dry - 26 Wet - 9 Snowy - 2 Icy - 0	Day - 26 Night - 11	Total Accidents = 37 Years = 7.8 01/01/13 - 10/01/20	↙ ↘ - Angle ↔ - Sideswipe	↔ - Head On ↔ - Rear End	- Single Vehicle ● - Pedestrian	ATCS ENGINEERING PLANNING SURVEYING ENVIRONMENTAL 11861 HUNTERS VALLEY DRIVE, SUITE 200 HERRINGTON, VA 20171 703.875.3600 FAX 703.420.8800 http://www.atcsgc.com/	
NIA - No Improper Action ESS - Exceeded Safe Speed FTY - Failure to Yield FTS - Failure to Stop FTC - Following Too Close FMC - Failure to Maintain Control ULC - Unsafe Lane Change OTH - Other		RE - 1. Rear End ANG - 2. Angle HO - 3. Head On SSS - 4. Sideswipe - Same Direction SSO - 5. Sideswipe - Opposite Direction FOIR - 6. Fixed Object in Road TR - 7. Train NC - 8. Non-Collision		FOOR - 9. Fixed Object - Off Road DEER - 10. Deer OA - 11. Other Animal PED - 12. Ped BIC - 13. Bicyclist MOT - 14. Motorcyclist BI - 15. Backed Into OTHR - 16. Other		STARS Project Name Figure 3 - Collision Diagram Liberty St @ W Market St		DISTRICT Harrisonburg LOCALITY Harrisonburg	DATE 01/2021 SCALE None

PRELIMINARY IDEAS FOR CONSIDERATION

Safety:

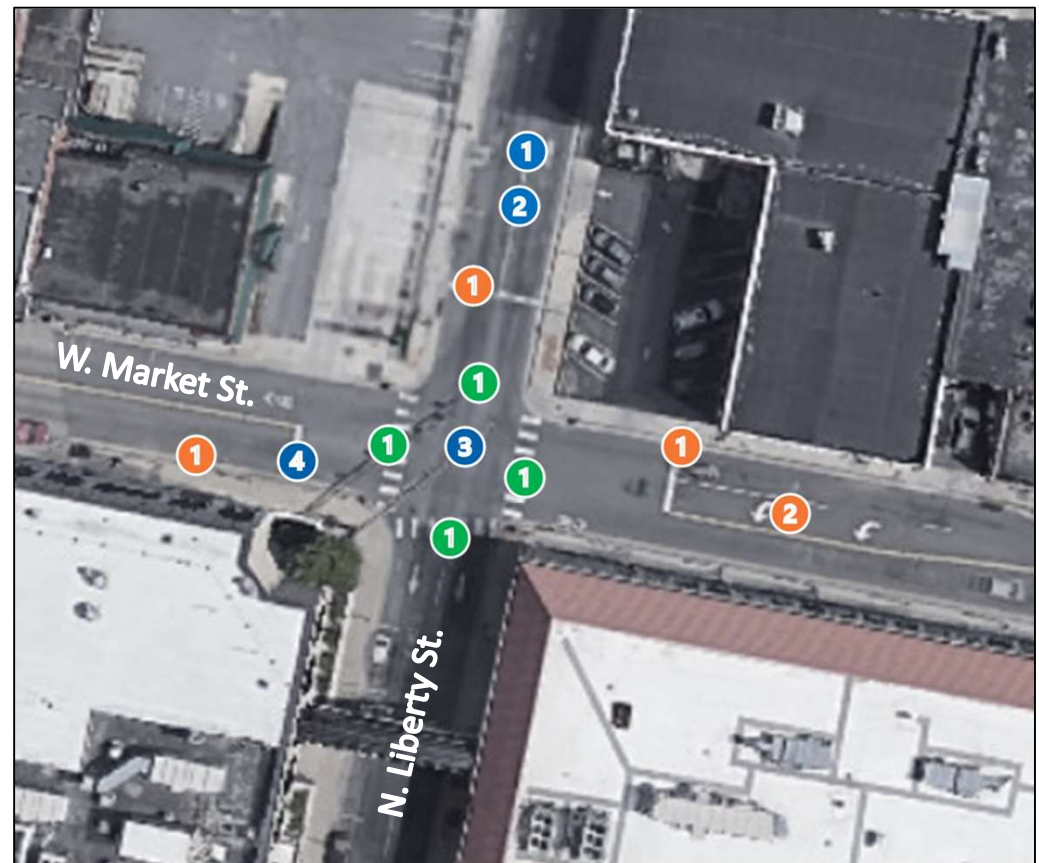
1. Add lane use markings on Liberty St
2. Add median channelization on Liberty St.
3. Update clearance interval
4. Consider "No Turn On Red" on EBR

Operational:

1. Relocate stop bars (SB/EB/WB) closer to intersection
2. Re-evaluate need/operation mode for WBL turn lane
3. Convert signal to all-way stop?

Bike/Ped Accommodation:

1. APS



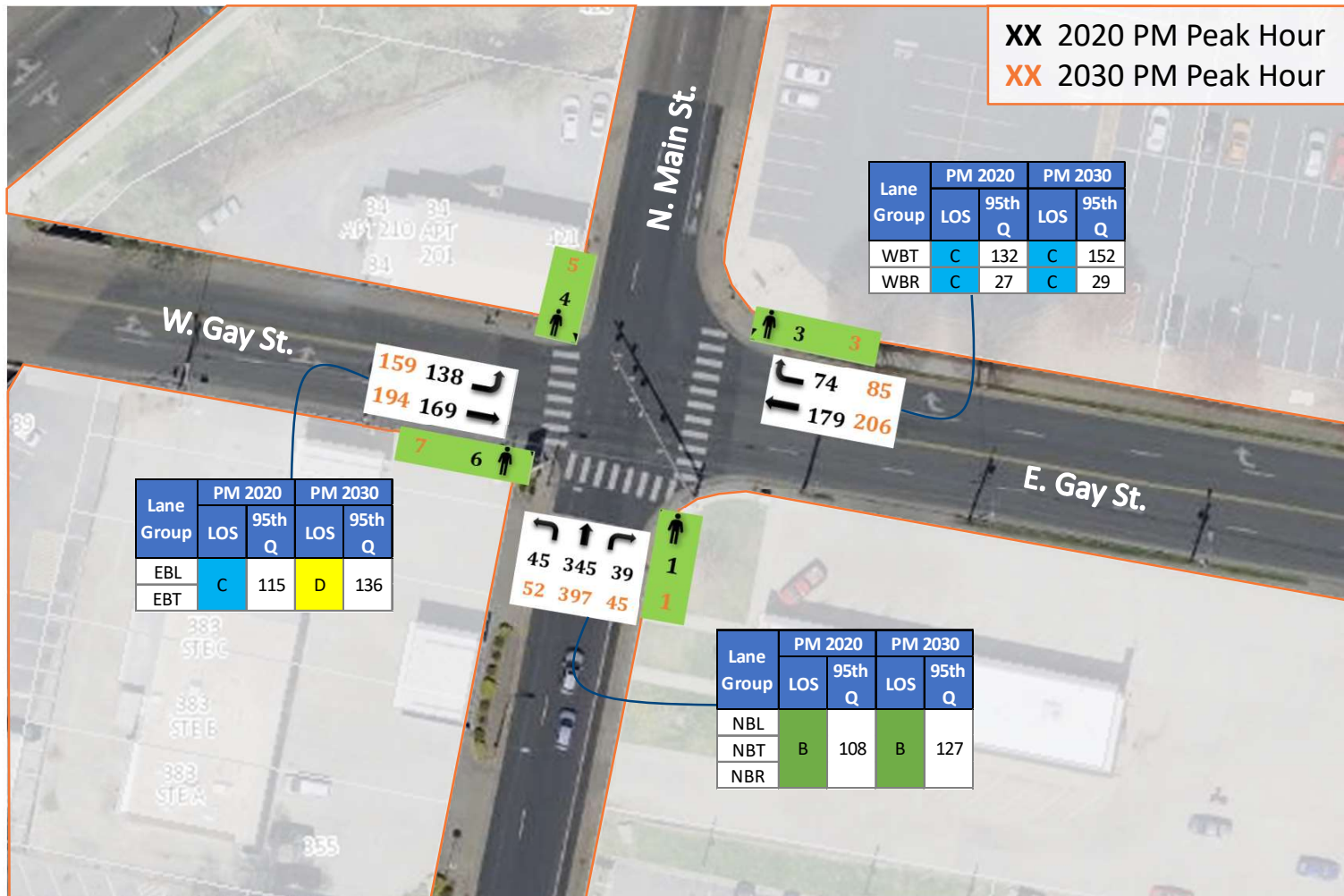
STUDY INTERSECTIONS



N Main St. and Gay St. (4)

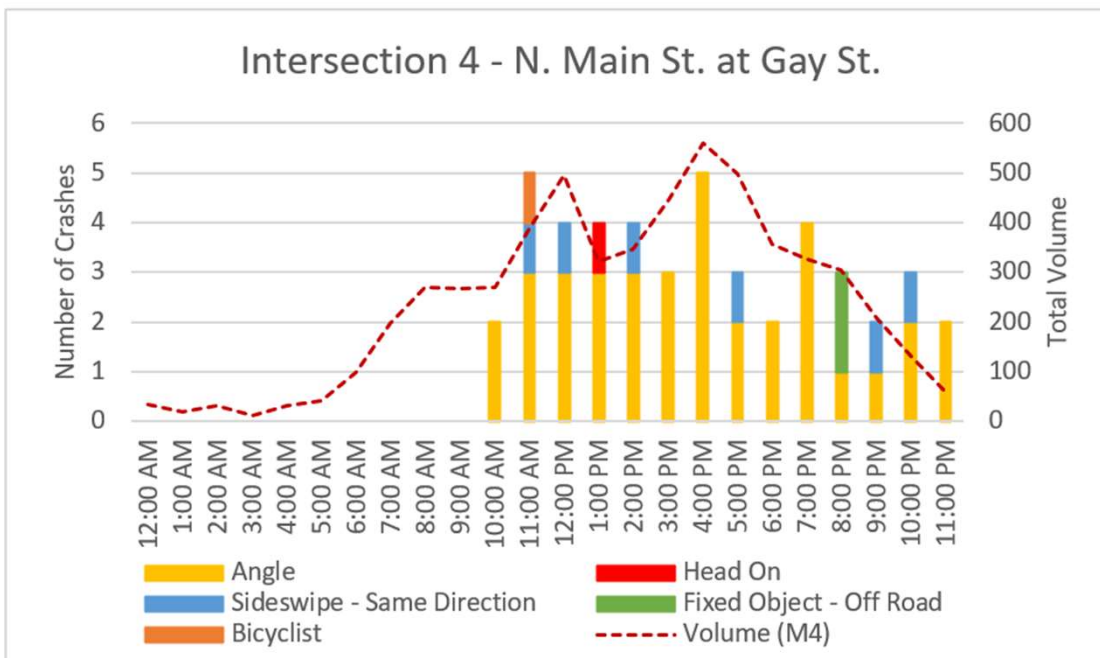
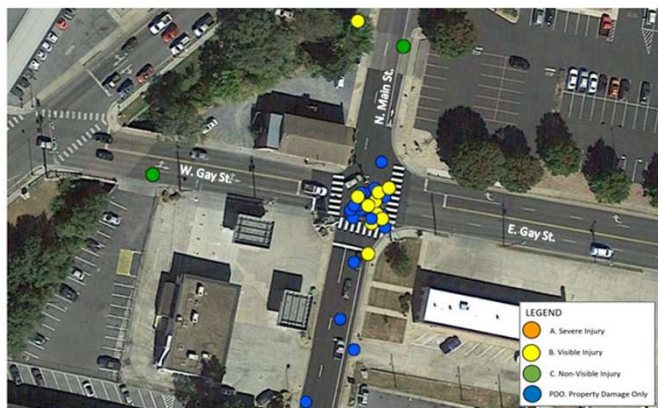
District PSI Rank #27

OPERATIONAL ANALYSIS



SAFETY ANALYSIS

- 12/46 injury crashes (26%)
- 36 angle crashes (19 NB/EB crashes, 12 of them NB drivers disregarded traffic light)
- 6 sideswipe – same direction crashes
- 6 sideswipe – same direction crashes



	2013	2014	2015	2016	2017	2018	2019	2020	Total
2. Angle	2	10	3	7	3	2	8	1	36
3. Head On						1			1
4. Sideswipe - Same Direction		1	2	2		1			6
9. Fixed Object - Off Road			1		1				2
Bicyclist						1			1
Total	2	11	6	9	4	5	8	1	46



PDO. Property Damage Only - 34 C. Nonvisible Injury - 2 B. Visible Injury - 10 A. Severe Injury - 0 K. Fatal Injury - 0	Dry - 40 Wet - 5 Snowy - 0 Icy - 1	Day - 35 Night - 11	Total Accidents = 46 Years = 7.8 01/01/13 - 10/01/20	↓ ↘ ↙ - Angle ↔ - Sideswipe	→ ← - Head On ← → - Rear End	- Single Vehicle ● - Pedestrian	ATCS ENGINEERING PLANNING SURVEYING ENVIRONMENTAL 13801 HUMMINGBIRD VALLEY DRIVE, SUITE 300 HERRINGTON, VA 20171 703-897-3601 FAX 703-430-9599 http://www.atcsinc.com
NIA - No Improper Action ESS - Exceeded Safe Speed FTY - Failure to Yield FTS - Failure to Stop FTC - Following Too Close FMC - Failure to Maintain Control ULC - Unsafe Lane Change OTH - Other	RE - 1. Rear End ANG - 2. Angle HO - 3. Head On SSS - 4. Sideswipe - Same Direction SSO - 5. Sideswipe - Opposite Direction FOIR - 6. Fixed Object in Road TR - 7. Train NC - 8. Non-Collision	FOOR - 9. Fixed Object - Off Road DEER - 10. Deer OA - 11. Other Animal PED - 12. Ped BIC - 13. Bicyclist MOT - 14. Motorcyclist BI - 15. Backed Into OTHR - 16. Other	Total	Key	STARS Project Name Figure 4 - Collision Diagram N Main St @ Gay St	DISTRICT Harrisonburg LOCALITY Harrisonburg	DATE 01/2021 SCALE None
Severity	Conditions	Type	Action	Type	Type	Type	Type

PRELIMINARY IDEAS FOR CONSIDERATION

Safety:

1. Directional arrows
2. Update clearance interval

Operational:

1. Lane reconfiguration on Gay Street.
2. Lane configuration on Main Street (one lane approach from downtown traffic study)

Bike/Ped Accommodation:

1. Add crosswalk on north leg
(Planned APS system)



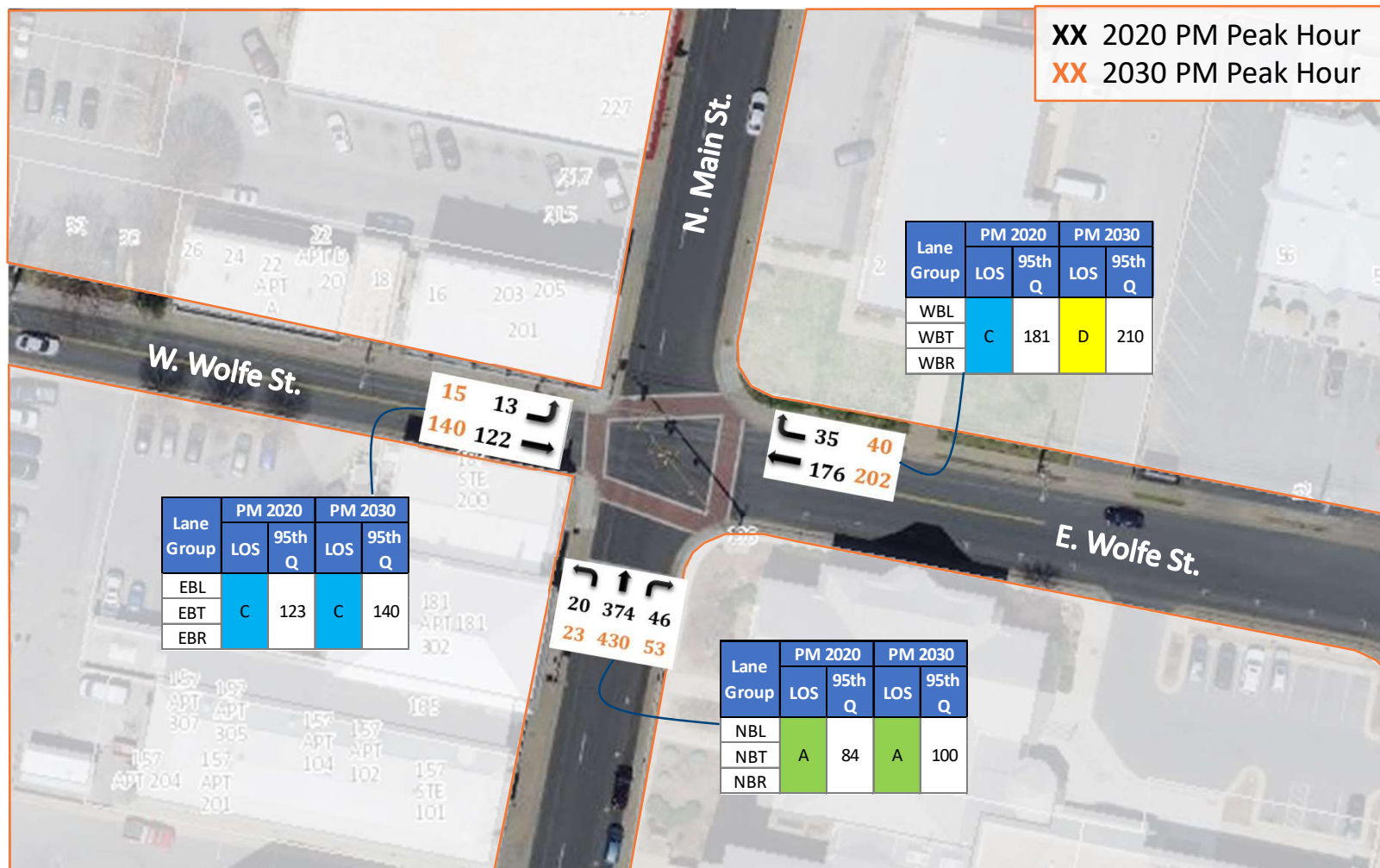
STUDY INTERSECTIONS



N Main St. and Wolfe St. (5)

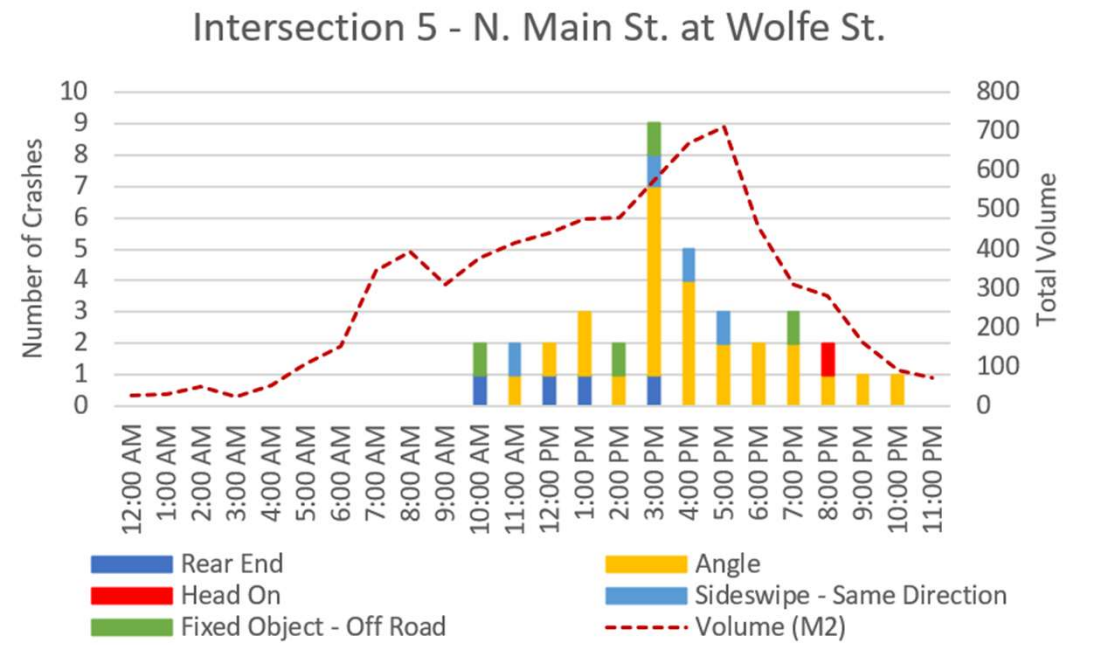
District PSI Rank #58

OPERATIONAL ANALYSIS

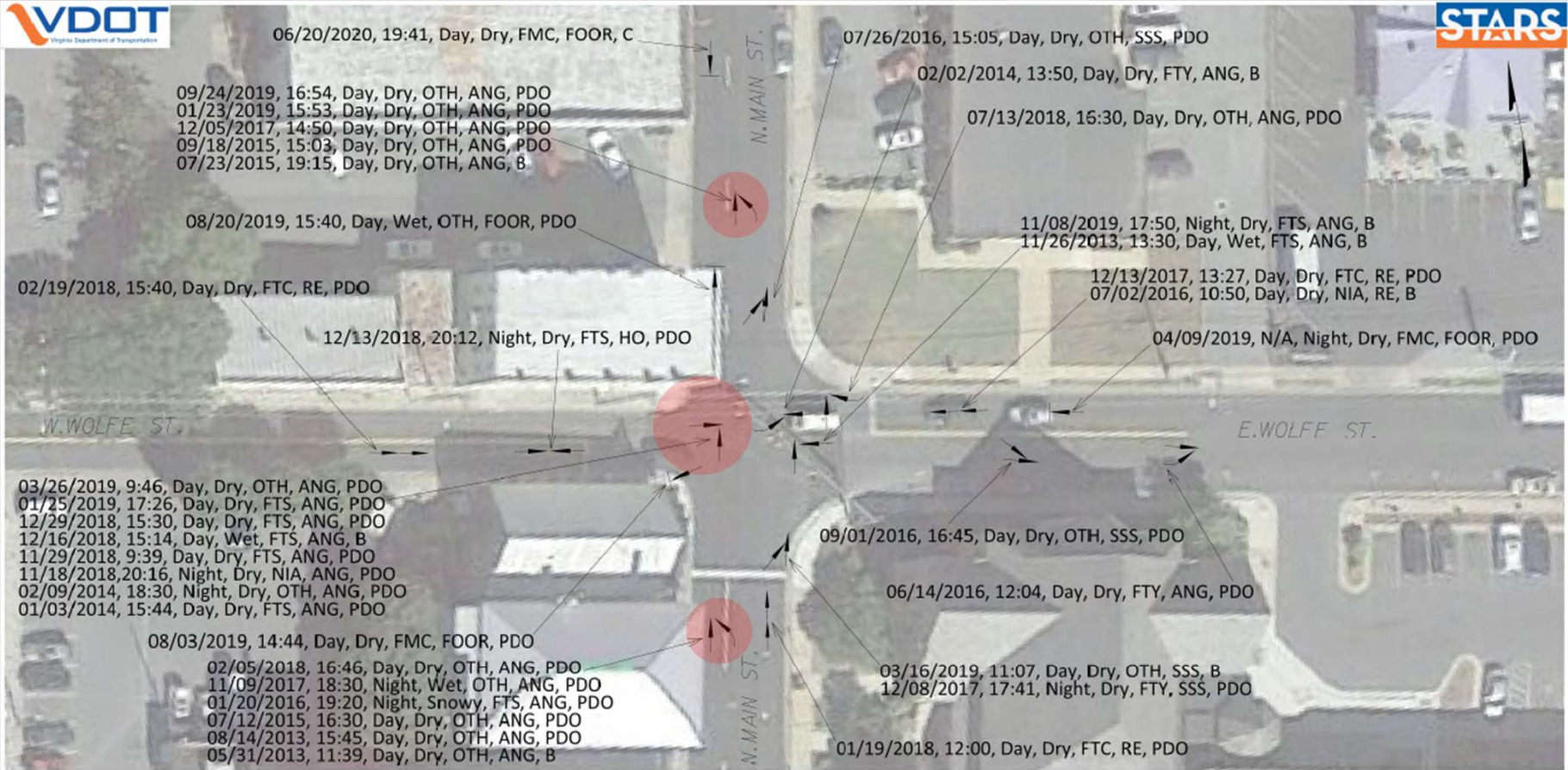


SAFETY ANALYSIS

- 10/37 injury crashes (27%)
- 24 angle crashes (8 NB/EB crashes majority of them NB disregarded the signal)
- 4 sideswipe – same direction crashes
- 4 fixed object – off road crashes



	2013	2014	2015	2016	2017	2018	2019	2020	Total
1. Rear End				1	1	2			4
2. Angle	3	3	3	2	2	6	5		24
3. Head On						1			1
4. Sideswipe - Same Direction				2	1		1		4
9. Fixed Object - Off Road							3	1	4
Total	3	3	3	5	4	9	9	1	37



PDO. Property Damage Only - 27 C. Nonvisible Injury - 2 B. Visible Injury - 8 A. Severe Injury - 0 K. Fatal Injury - 0	Dry - 32 Wet - 4 Snowy - 1 Icy - 0	Day - 29 Night - 8	Total Accidents = 37 Years = 7.8 01/01/13 - 10/01/20	- Angle - Sideswipe	- Head On - Rear End	- Single Vehicle - Pedestrian	ATCS ENGINEERING PLANNING SURVEYING ENVIRONMENTAL 13801 HUNNING VALLEY DRIVE, SUITE 200 HERRINGTON, VA 20171 703-817-3601 FAX 703-430-0860 http://www.atcsgc.com
NIA - No Improper Action ESS - Exceeded Safe Speed FTY - Failure to Yield FTS - Failure to Stop FTC - Following Too Close FMC - Failure to Maintain Control ULC - Unsafe Lane Change OTH - Other	RE - 1. Rear End ANG - 2. Angle HO - 3. Head On SSS - 4. Sideswipe - Same Direction SSO - 5. Sideswipe - Opposite Direction FOIR - 6. Fixed Object in Road TR - 7. Train NC - 8. Non-Collision	Severity	Conditions	Total	FOOR - 9. Fixed Object - Off Road DEER - 10. Deer OA - 11. Other Animal PED - 12. Ped BIC - 13. Bicyclist MOT - 14. Motorcyclist BI - 15. Backed Into OTHR - 16. Other	Key	DISTRICT Harrisonburg LOCALITY Harrisonburg DATE 01/2021 SCALE None
STARS Project Name Figure 5 - Collision Diagram N Main St @ Wolfe St						Type	



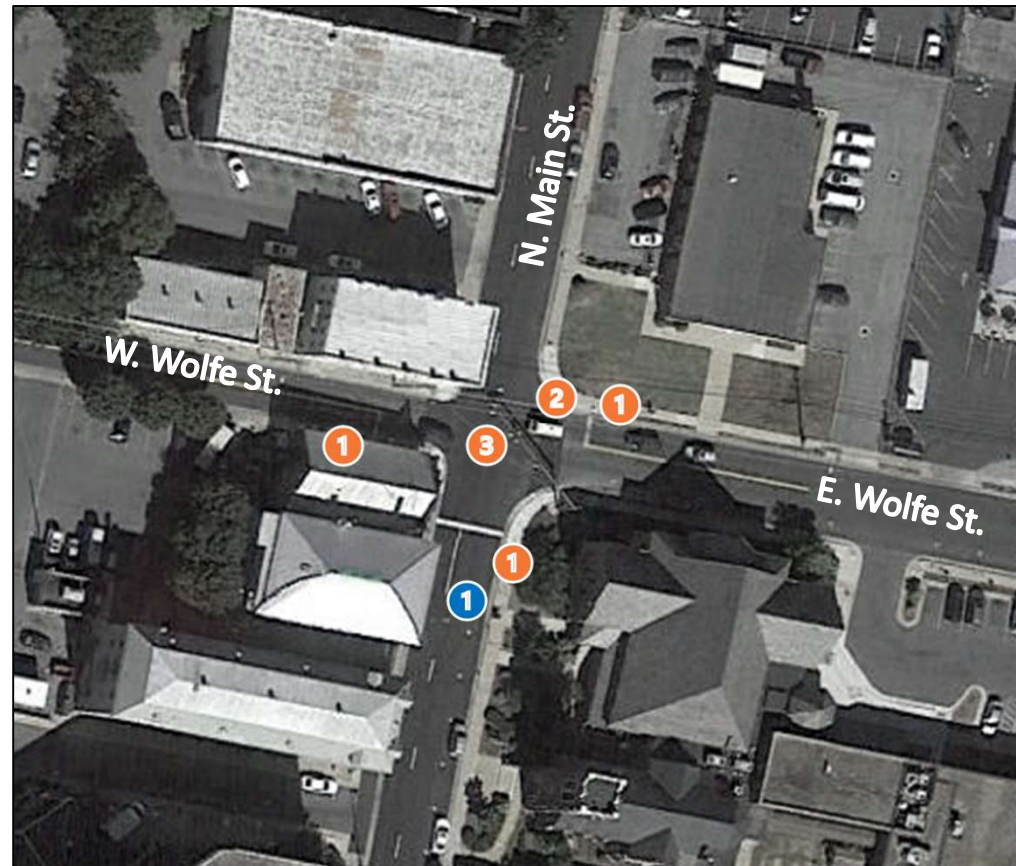
PRELIMINARY IDEAS FOR CONSIDERATION

Safety:

1. Add lane use markings on Main Street

Operational:

1. Relocate stop bars (NB/EB/WB) closer to intersection
2. Add near side signal for EB Wolfe Street
3. Consider actuation for W Wolfe Street



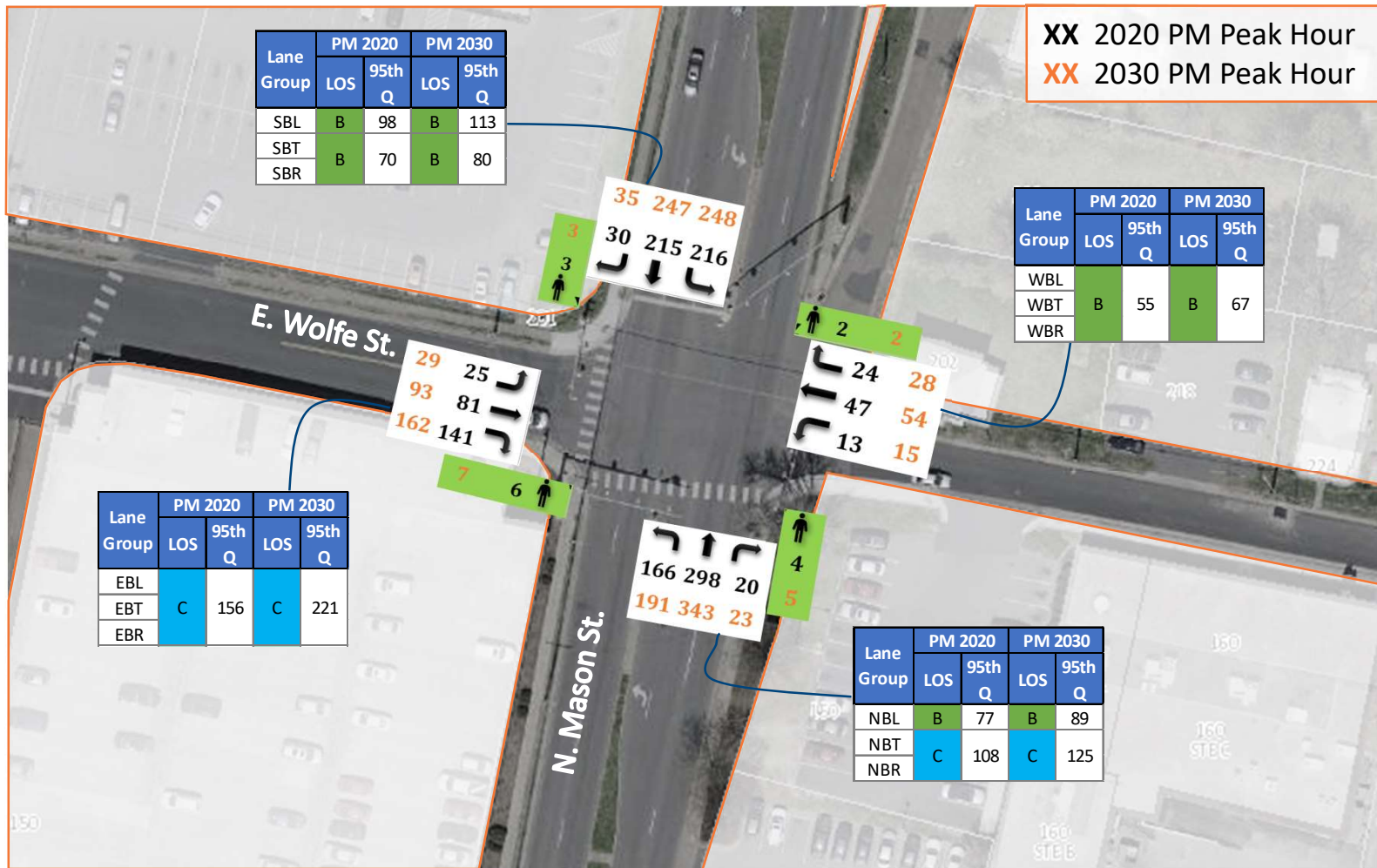
STUDY INTERSECTIONS



N Mason St. and E Wolfe St. (6)

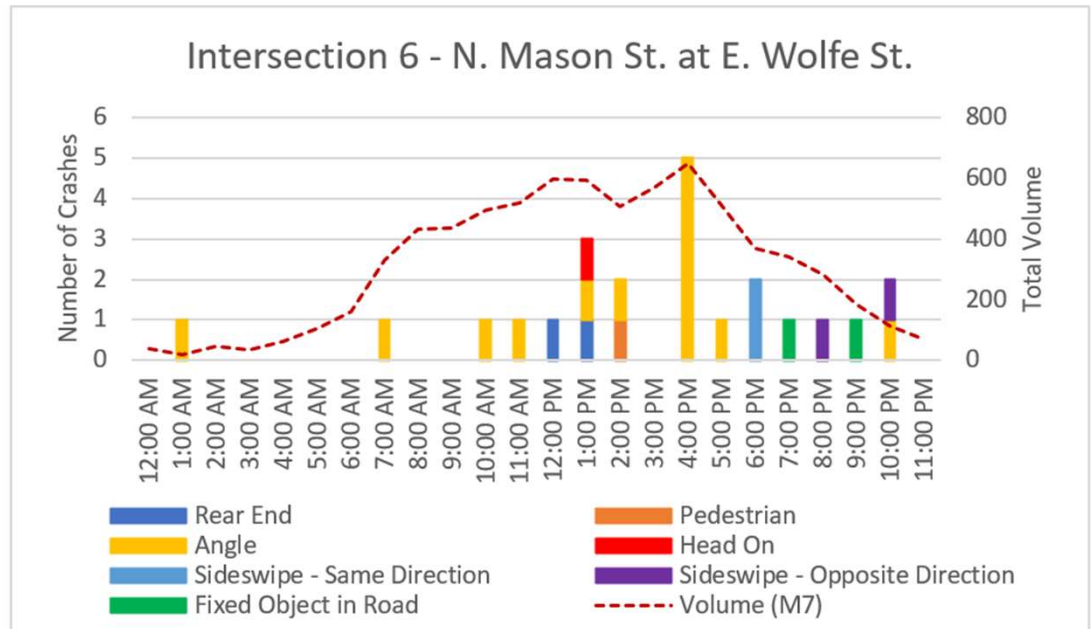
District PSI Rank #93

OPERATIONAL ANALYSIS

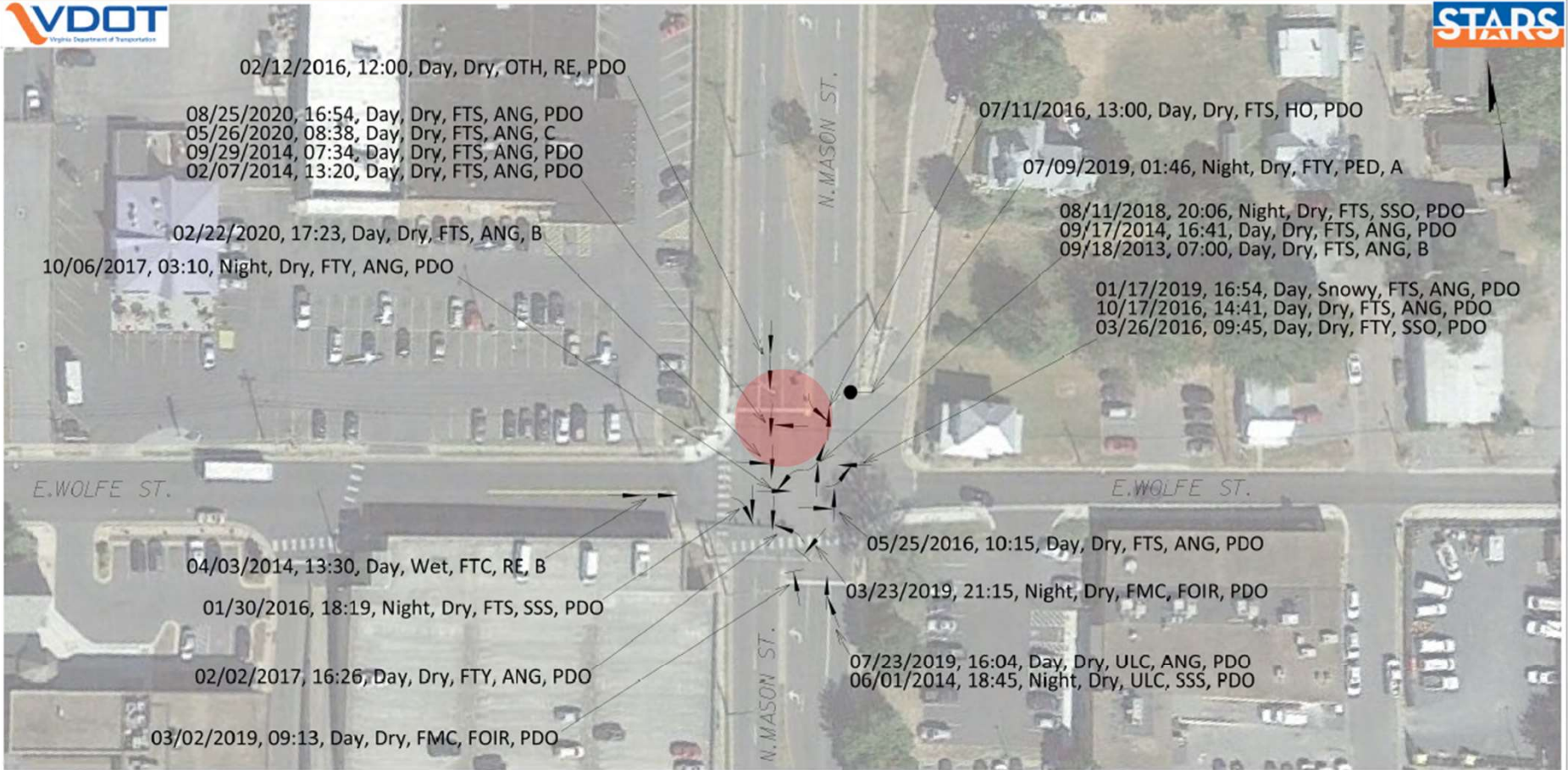


SAFETY ANALYSIS

- 4/23 injury crashes (17%)
- 13 angle crashes (Majority of crashes drivers on Mason St disregarded the traffic light)
- 4 sideswipe crashes
- 2 rear end crashes



	2013	2014	2016	2017	2018	2019	2020	Total
1. Rear End		1	1					2
12. Ped						1		1
2. Angle	1	3	2	2		2	3	13
3. Head On			1					1
4. Sideswipe - Same Direction		1	1					2
5. Sideswipe - Opposite Direction			1		1			2
6. Fixed Object in Road						2		2
Total	1	5	6	2	1	5	3	23



PDO. Property Damage Only - 18 C. Nonvisible Injury - 1 B. Visible Injury - 3 A. Severe Injury - 1 K. Fatal Injury - 0		Dry - 21 Wet - 1 Snowy - 1 Icy - 0		Day - 17 Night - 6		Total Accidents = 23 Years = 7.8 01/01/13 - 10/01/20		- Angle - Head On - Single Vehicle - Sideswipe - Rear End - Pedestrian		ATCS ENGINEERING PLANNING SURVEYING ENVIRONMENTAL 13801 BURNING VALLEY DRIVE, SUITE 200 HERRINGTON, VA 20171 703-877-3600 FAX 703-430-8800 http://www.atcsinc.com/	
NIA - No Improper Action ESS - Exceeded Safe Speed FTY - Failure to Yield FTS - Failure to Stop FTC - Following Too Close FMC - Failure to Maintain Control ULC - Unsafe Lane Change OTH - Other		RE - 1. Rear End ANG - 2. Angle HO - 3. Head On SSS - 4. Sideswipe - Same Direction SSO - 5. Sideswipe - Opposite Direction FOIR - 6. Fixed Object in Road TR - 7. Train NC - 8. Non-Collision		FOOR - 9. Fixed Object - Off Road DEER - 10. Deer OA - 11. Other Animal PED - 12. Ped BIC - 13. Bicyclist MOT - 14. Motorcyclist BI - 15. Backed Into OTHR - 16. Other		STARS Harrisonburg Figure 6 - Collision Diagram North Mason Street @ East Wolfe Street		DISTRICT Harrisonburg LOCALITY Harrisonburg		DATE 01/2021 SCALE None	

PRELIMINARY IDEAS FOR CONSIDERATION

Safety:

1. Extend median to accommodate new crosswalk

Operational:

1. Signal phase configuration evaluation (left turn phases)
2. Consider signal coordination on North Mason Street

Bike/Ped Accommodation:

1. Add crosswalk on north leg (APS Planned)



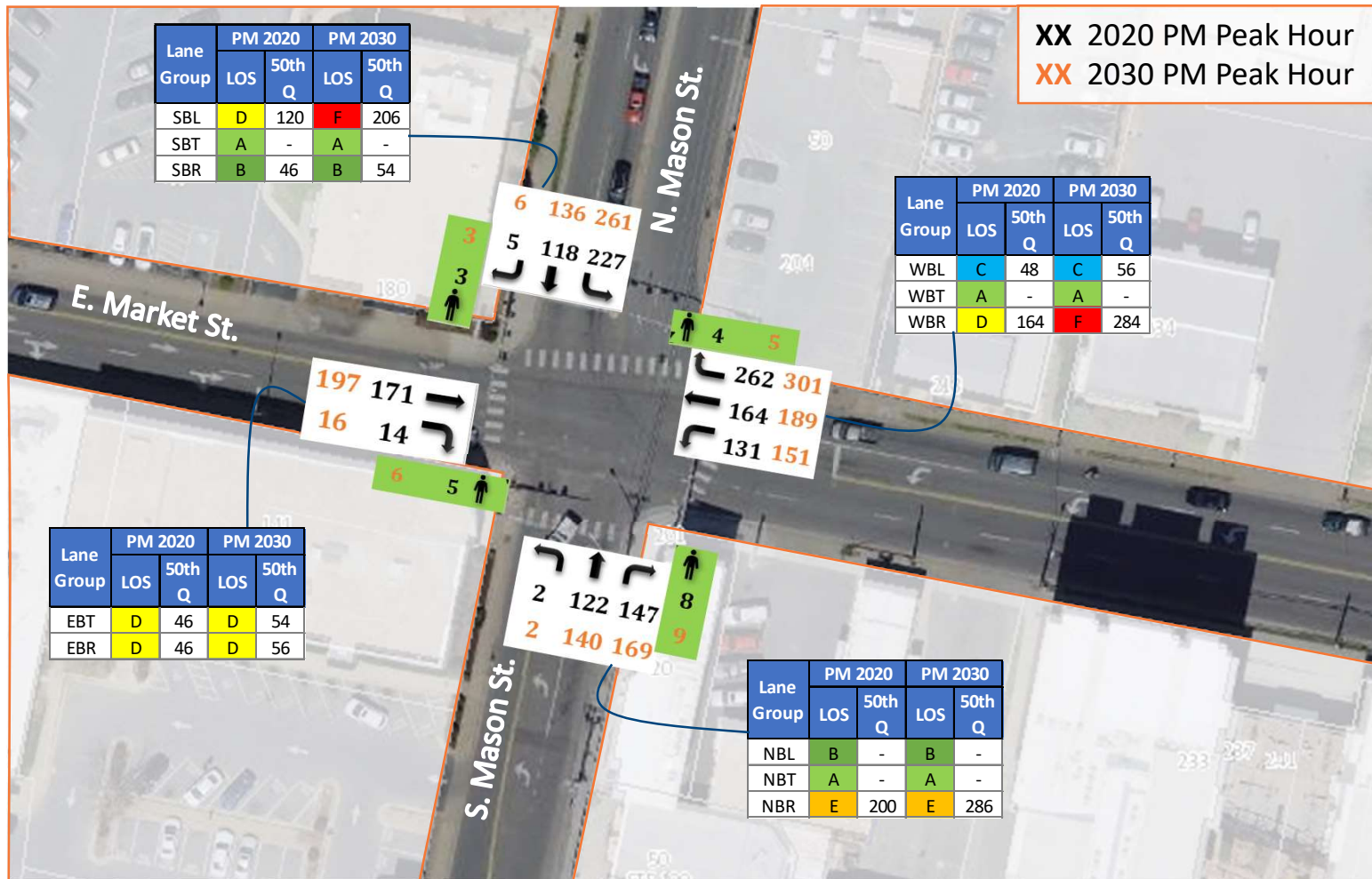
STUDY INTERSECTIONS



Mason St. and E Market St. (7)

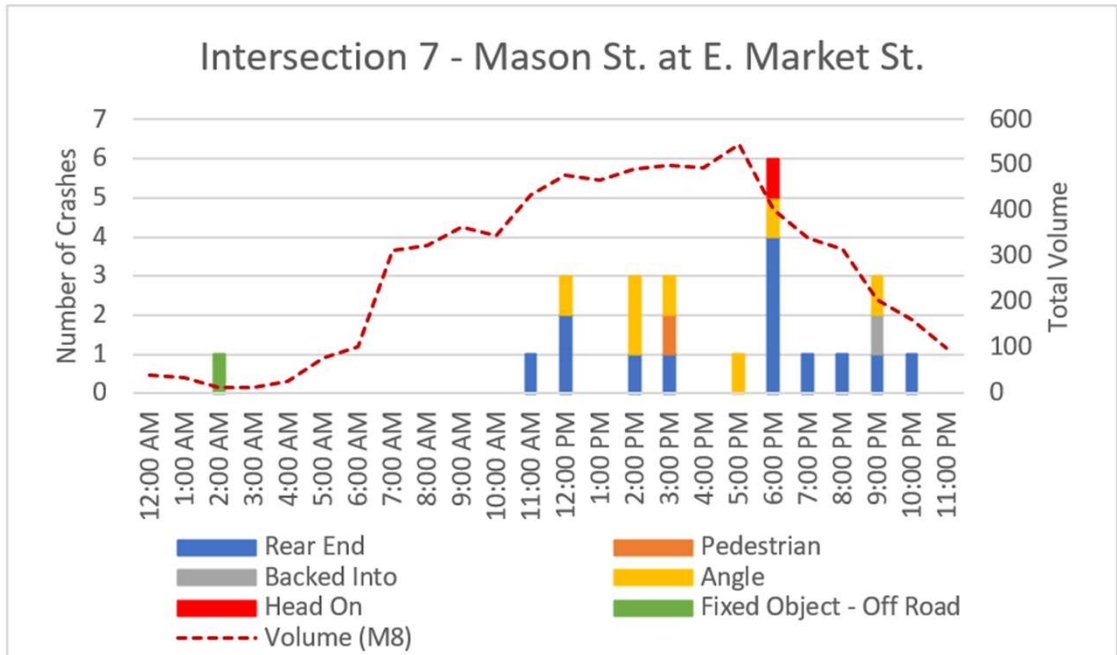
District PSI Rank #95

OPERATIONAL ANALYSIS

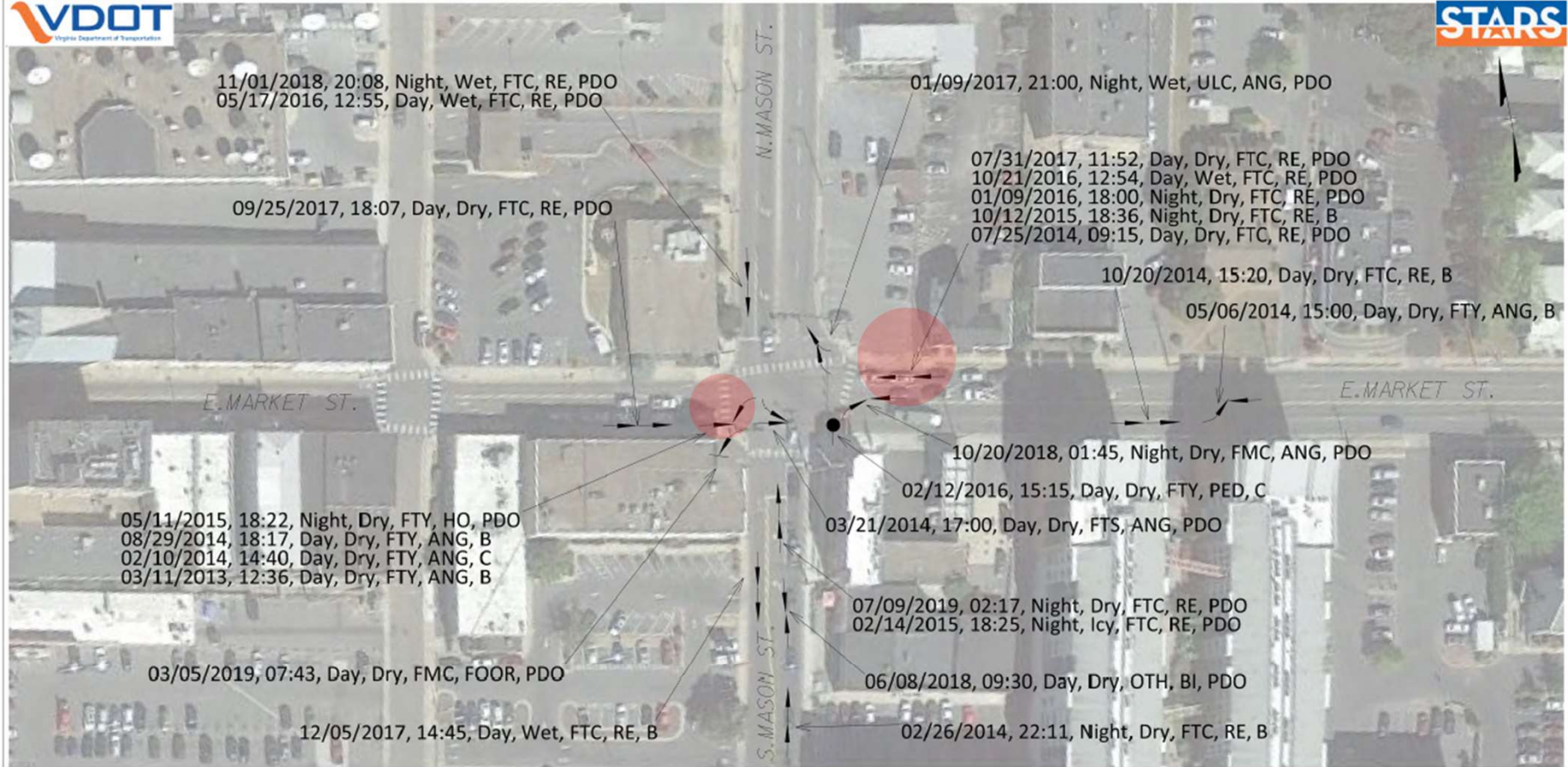


SAFETY ANALYSIS

- 9/24 injury crashes (38%)
- 13 rear end crashes (5 of them were WB)
- 7 angle crashes



	2013	2014	2015	2016	2017	2018	2019	Total
1. Rear End		3	2	3	3	1	1	13
12. Ped				1				1
15. Backed Into						1		1
2. Angle	1	4				1	1	7
3. Head On			1					1
9. Fixed Object - Off Road							1	1
Total	1	7	3	4	4	3	2	24



PDO. Property Damage Only - 15 C. Nonvisible Injury - 2 B. Visible Injury - 7 A. Severe Injury - 0 K. Fatal Injury - 0		Dry - 18 Wet - 5 Snowy - 0 lcy - 1		Day - 15 Night - 9		Total Accidents = 24 Years = 7.8 01/01/13 - 10/01/20		- Angle - Head On - Single Vehicle - Sideswipe - Rear End - Pedestrian		ATCS ENGINEERING PLANNING SURVEYING ENVIRONMENTAL 13801 BUNKER VALLEY DRIVE, SUITE 200 HERRICK, VA 20171 703-817-3601 FAX 703-430-8889 http://www.atcsgc.com	
Severity		Conditions		Total		Key		STARS Harrisonburg		DISTRICT Harrisonburg	
NIA - No Improper Action ESS - Exceeded Safe Speed FTY - Failure to Yield FTS - Failure to Stop FTC - Following Too Close FMC - Failure to Maintain Control ULC - Unsafe Lane Change OTH - Other		RE - 1. Rear End ANG - 2. Angle HO - 3. Head On SSS - 4. Sideswipe - Same Direction SSO - 5. Sideswipe - Opposite Direction FOIR - 6. Fixed Object in Road TR - 7. Train NC - 8. Non-Collision		FOOR - 9. Fixed Object - Off Road DEER - 10. Deer OA - 11. Other Animal PED - 12. Ped BIC - 13. Bicyclist MOT - 14. Motorcyclist BI - 15. Backed Into OTHR - 16. Other		Type		Figure 7 - Collision Diagram Mason Street @ East Market Street		LOCALITY Harrisonburg	
Action								DATE 01/2021		SCALE None	

PRELIMINARY IDEAS FOR CONSIDERATION

Safety:

1. Convert WB approach to TL + R and add SBL overlap with EBR, and add EB RTOR restriction

Operational:

1. Alternative intersection design
2. Change the WBL lane into a through/left turn lane
3. Reconfigure WB approach to L-T-R and one receiving lane.

Bike/Ped Accommodation:

1. Relocate Yield to Pedestrian sign (APS System Planned)



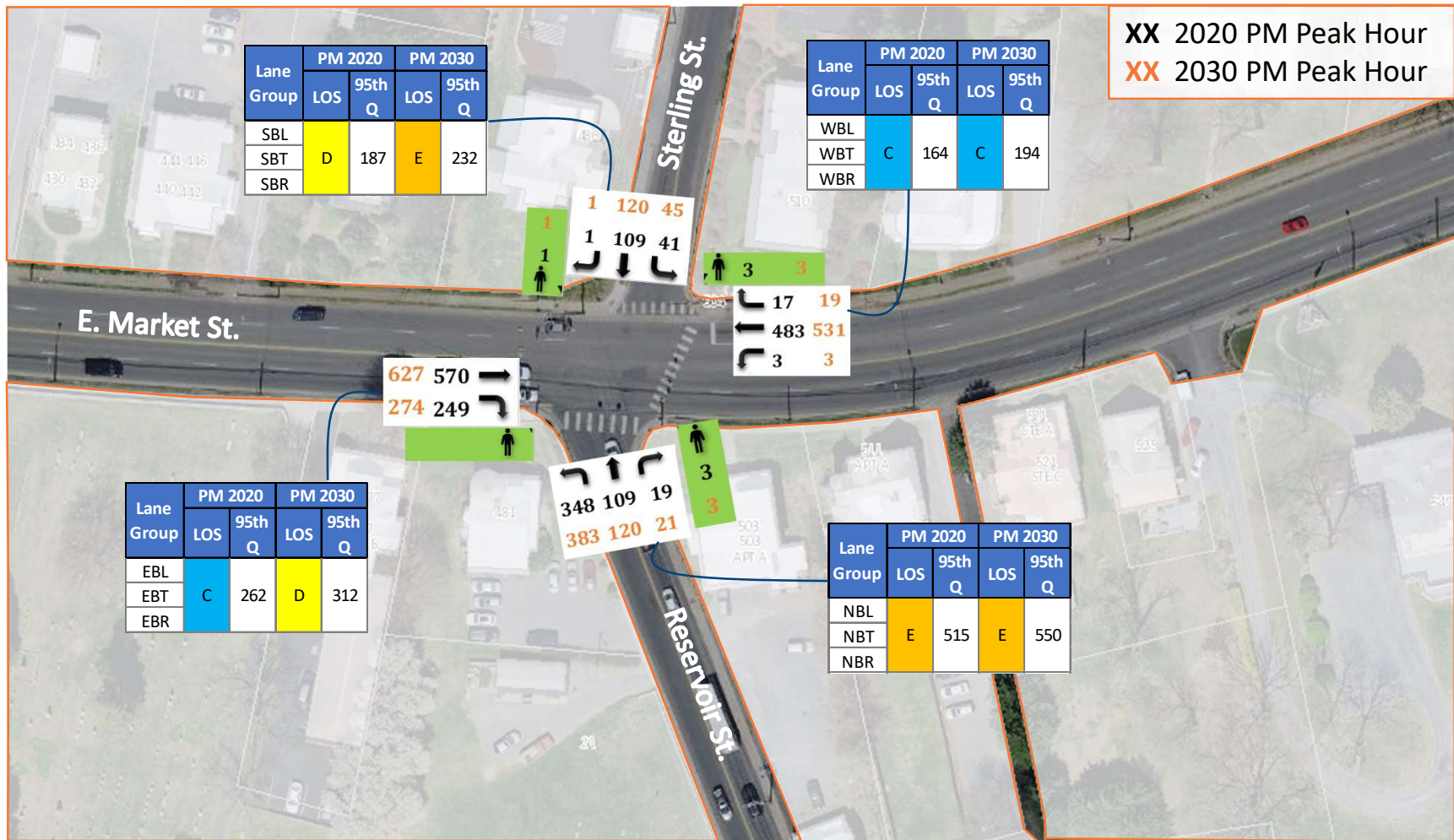
STUDY INTERSECTIONS



E Market St and Reservoir St. (9)

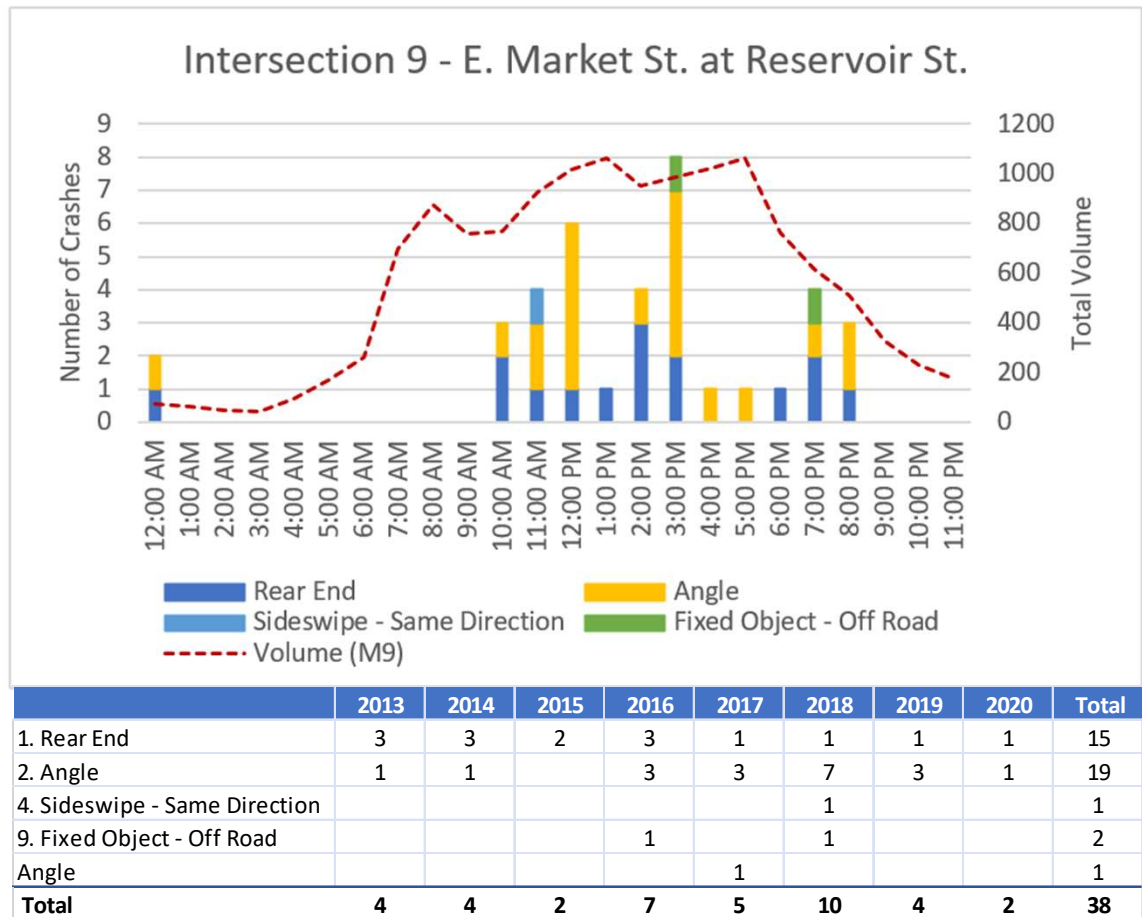
District PSI Rank #41

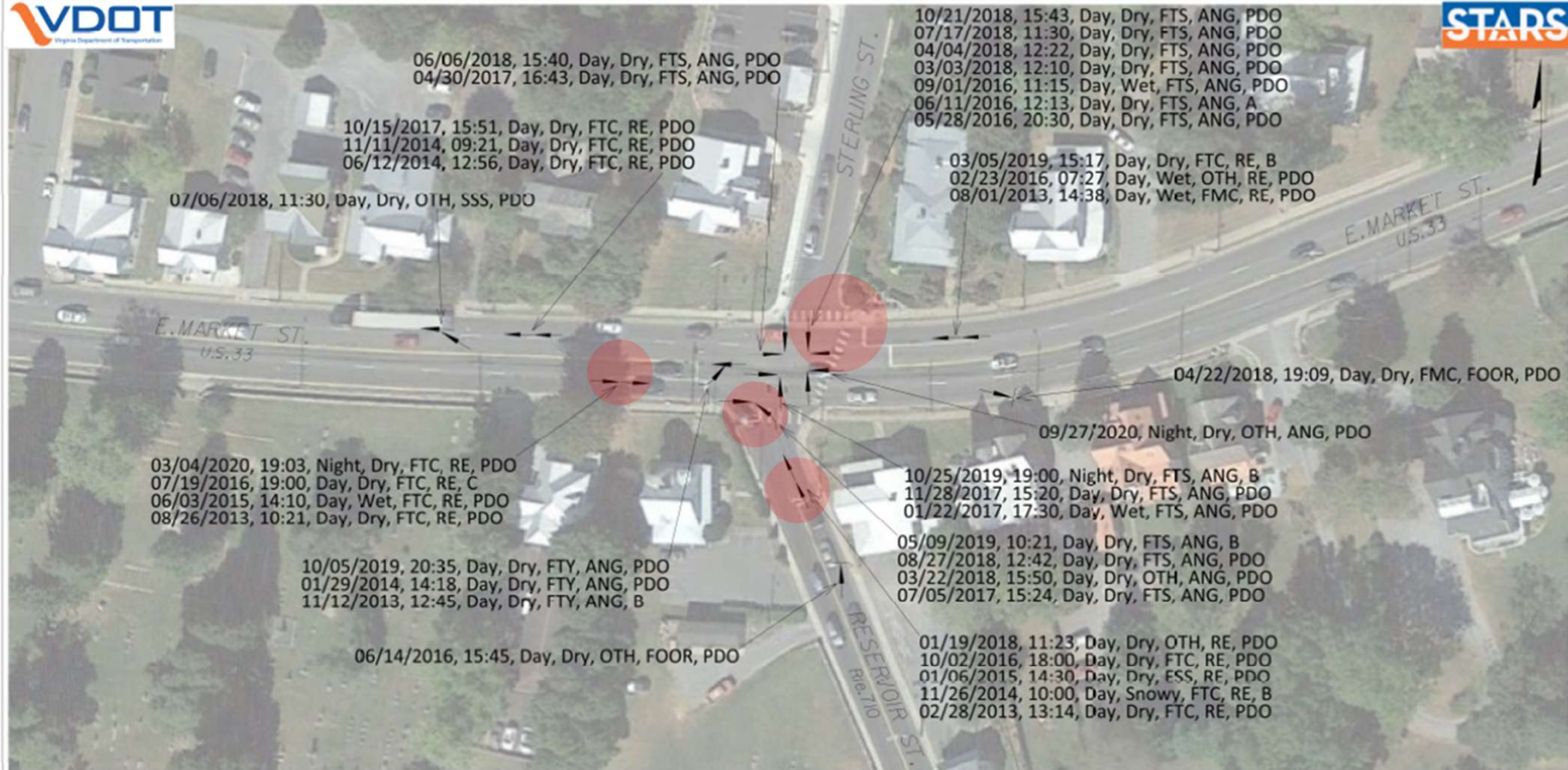
OPERATIONAL ANALYSIS



SAFETY ANALYSIS

- 7/38 injury crashes (18%)
- 20 angle crashes (7 of them were SB/WB in which 6 of them SB had ROW)
- 15 rear end crashes





PDO. Property Damage Only - 31 C. Nonvisible Injury - 1 B. Visible Injury - 5 A. Severe Injury - 1 K. Fatal Injury - 0	Dry - 32 Wet - 5 Snowy - 1 Icy - 0	Day - 35 Night - 3	Total Accidents = 38 Years = 7.8 01/01/13 - 10/01/20		
NIA - No Improper Action ESS - Exceeded Safe Speed FTY - Failure to Yield FTS - Failure to Stop FTC - Following Too Close FMC - Failure to Maintain Control ULC - Unsafe Lane Change OTH - Other	RE - 1. Rear End ANG - 2. Angle HO - 3. Head On SSS - 4. Sideswipe - Same Direction SSO - 5. Sideswipe - Opposite Direction FOIR - 6. Fixed Object in Road TR - 7. Train NC - 8. Non-Collision	FOOR - 9. Fixed Object - Off Road DEER - 10. Deer OA - 11. Other Animal PED - 12. Ped BIC - 13. Bicyclist MOT - 14. Motorcyclist BI - 15. Backed Into OTHR - 16. Other	STARS Project Name Figure 9 - Collision Diagram E Market St @ Reservoir St	DISTRICT Harrisonburg LOCALITY Harrisonburg DATE 01/2021 SCALE None	ENGINEERING PLANNING SURVEYING ENVIRONMENTAL 1301 BURNING VALLEY DRIVE, SUITE 200 HARRISONBURG, VA 22071 703-817-3001 FAX 703-430-0889 http://www.atcst.com

PRELIMINARY IDEAS FOR CONSIDERATION

Safety:

1. Turn radius redesign / no- right on red
2. Clearance interval update

Operational:

1. Lane reconfiguration on Market Street
2. Relocate stop bars (Design vehicle)
3. Alternative intersection design

Bike/Ped Accommodation:

1. ADA and sidewalk improvement



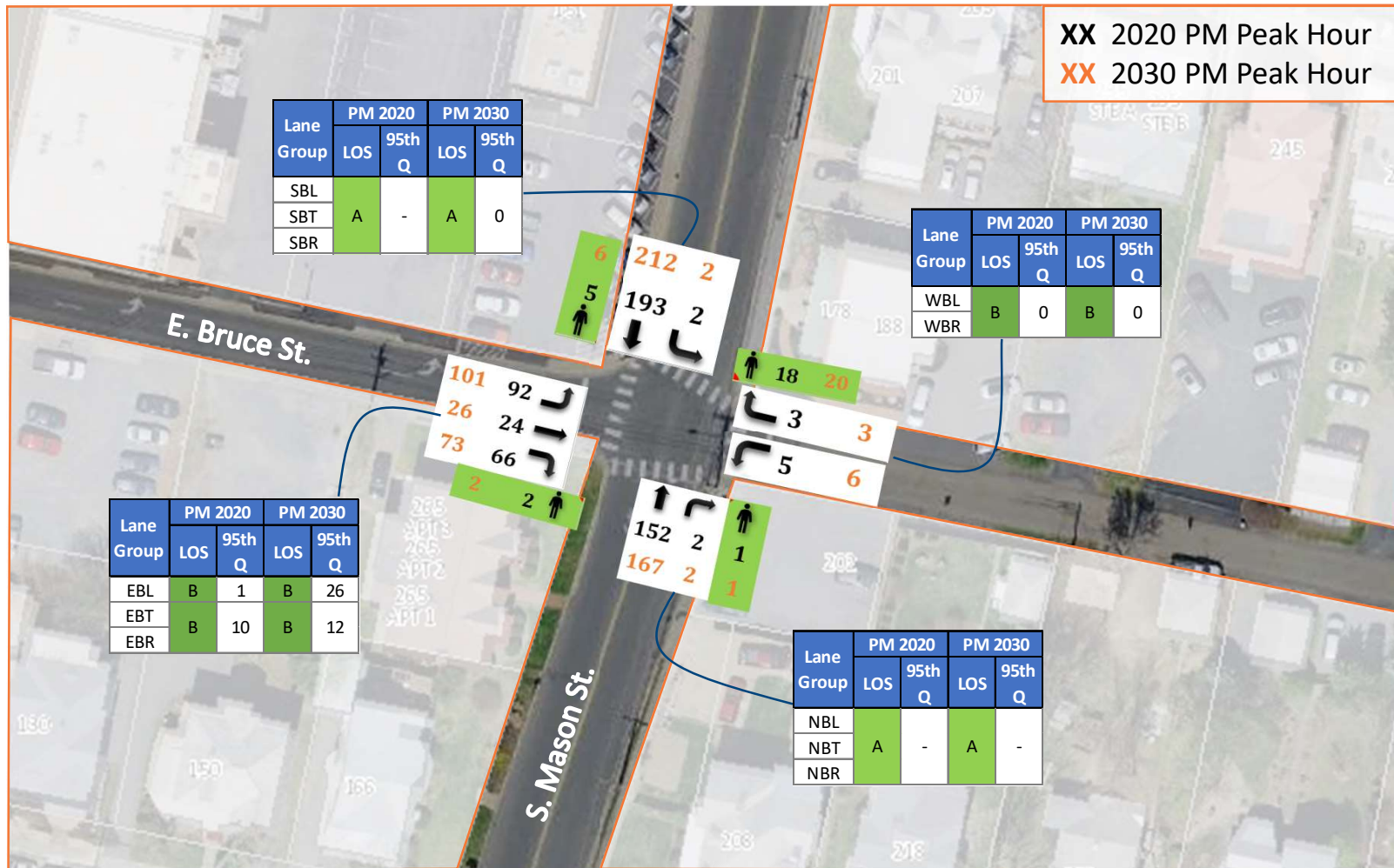
STUDY INTERSECTIONS



S Mason St. and E Bruce St. (8)

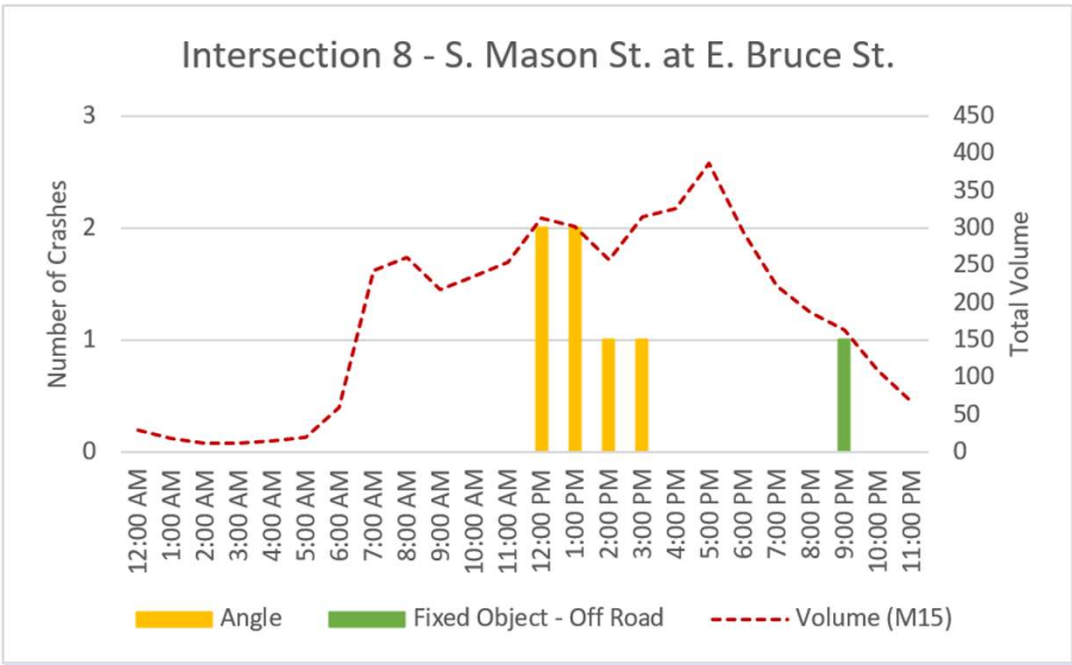
District PSI Rank #37

OPERATIONAL ANALYSIS



SAFETY ANALYSIS

- 2/7 injury crashes (29%)
- 6 angle crashes
- 1 fixed object – off road



	2014	2015	2016	2017	2018	Total
2. Angle	2		2	1	1	6
9. Fixed Object - Off Road		1				1
Total	2	1	2	1	1	7



02/26/2018, 15:33, Day, Dry, FTY, ANG, PDO
 10/31/2017, 14:59, Day, Dry, FTY, ANG, PDO
 01/27/2016, 13:29, Day, Dry, FTY, ANG, PDO
 10/29/2014, 12:42, Day, Wet, FTY, ANG, PDO

06/14/2016, 12:07, Day, Dry, FTY, ANG, PDO

01/05/2015, Night, Wet, ESS, FOOR, A

09/04/2014, 13:53, Day, Dry, FTY, ANG, B

PDO. Property Damage Only - 5 C. Nonvisible Injury - 0 B. Visible Injury - 1 A. Severe Injury - 1 K. Fatal Injury - 0		Dry - 5 Wet - 2 Snowy - 0 Icy - 0	Day - 6 Night - 1	Total Accidents = 7 Years = 7.8 01/01/13 - 10/01/20	↙ ↘ ↗ - Angle ↔ - Sideswipe	→ - Head On ← - Rear End	- Single Vehicle ● - Pedestrian	ATCS ENGINEERING PLANNING SURVEYING ENVIRONMENTAL 13861 BURNING VALLEY DRIVE, SUITE 200 HARRISONBURG, VA 20171 703-817-3601 FAX 703-430-8889 http://www.atcspc.com	
NIA - No Improper Action ESS - Exceeded Safe Speed FTY - Failure to Yield FTS - Failure to Stop FTC - Following Too Close FMC - Failure to Maintain Control ULC - Unsafe Lane Change OTH - Other		RE - 1. Rear End ANG - 2. Angle HO - 3. Head On SSS - 4. Sideswipe - Same Direction SSO - 5. Sideswipe - Opposite Direction FOIR - 6. Fixed Object in Road TR - 7. Train NC - 8. Non-Collision		FOOR - 9. Fixed Object - Off Road DEER - 10. Deer OA - 11. Other Animal PED - 12. Ped BIC - 13. Bicyclist MOT - 14. Motorcyclist BI - 15. Backed Into OTHR - 16. Other		STARS Harrisonburg Figure 8 - Collision Diagram South Mason Street @ East Bruce Street		DISTRICT Staunton LOCALITY Harrisonburg DATE 01/2021 SCALE None	

PRELIMINARY IDEAS FOR CONSIDERATION

Safety:

1. Add intersection warning signs on SB Mason Street
2. Improve sight distance

Operational:

1. All-way stop evaluation
2. Remove EB left-turn lane on Bruce St
3. Relocate stop bars (EB/WB) close to the intersection

Bike/Ped Accommodation:

1. ADA and sidewalk improvement



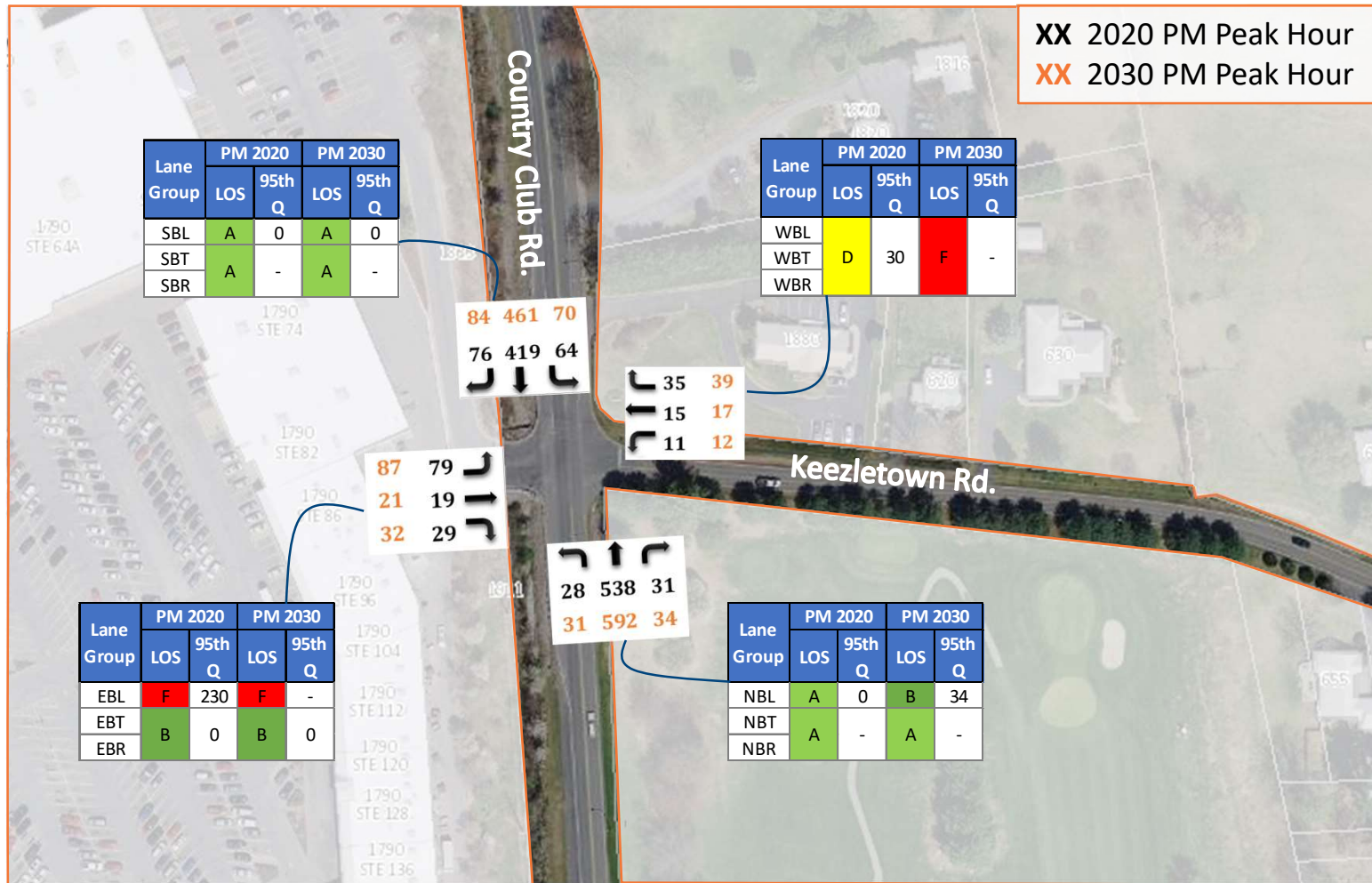
STUDY INTERSECTIONS



Country Club Rd. and Keezletown Rd. (10)

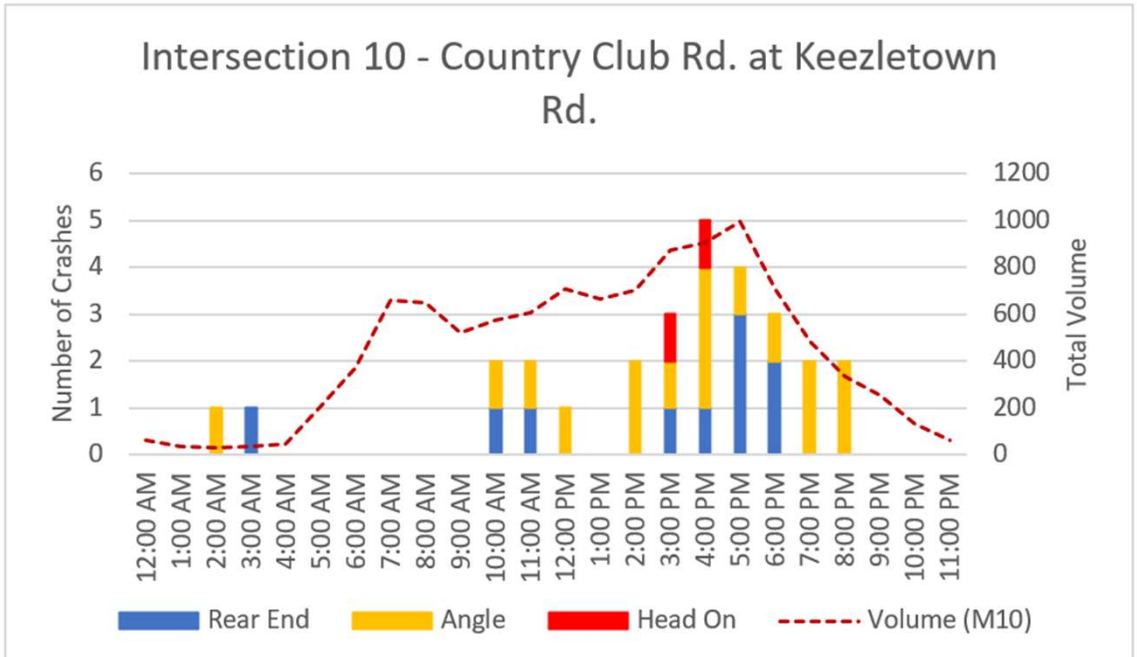
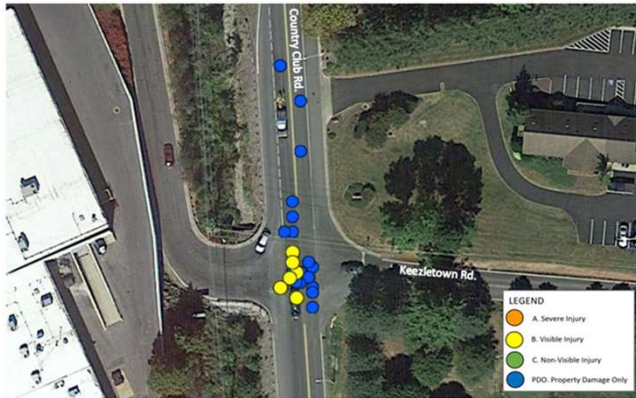
District PSI Rank #46

OPERATIONAL ANALYSIS

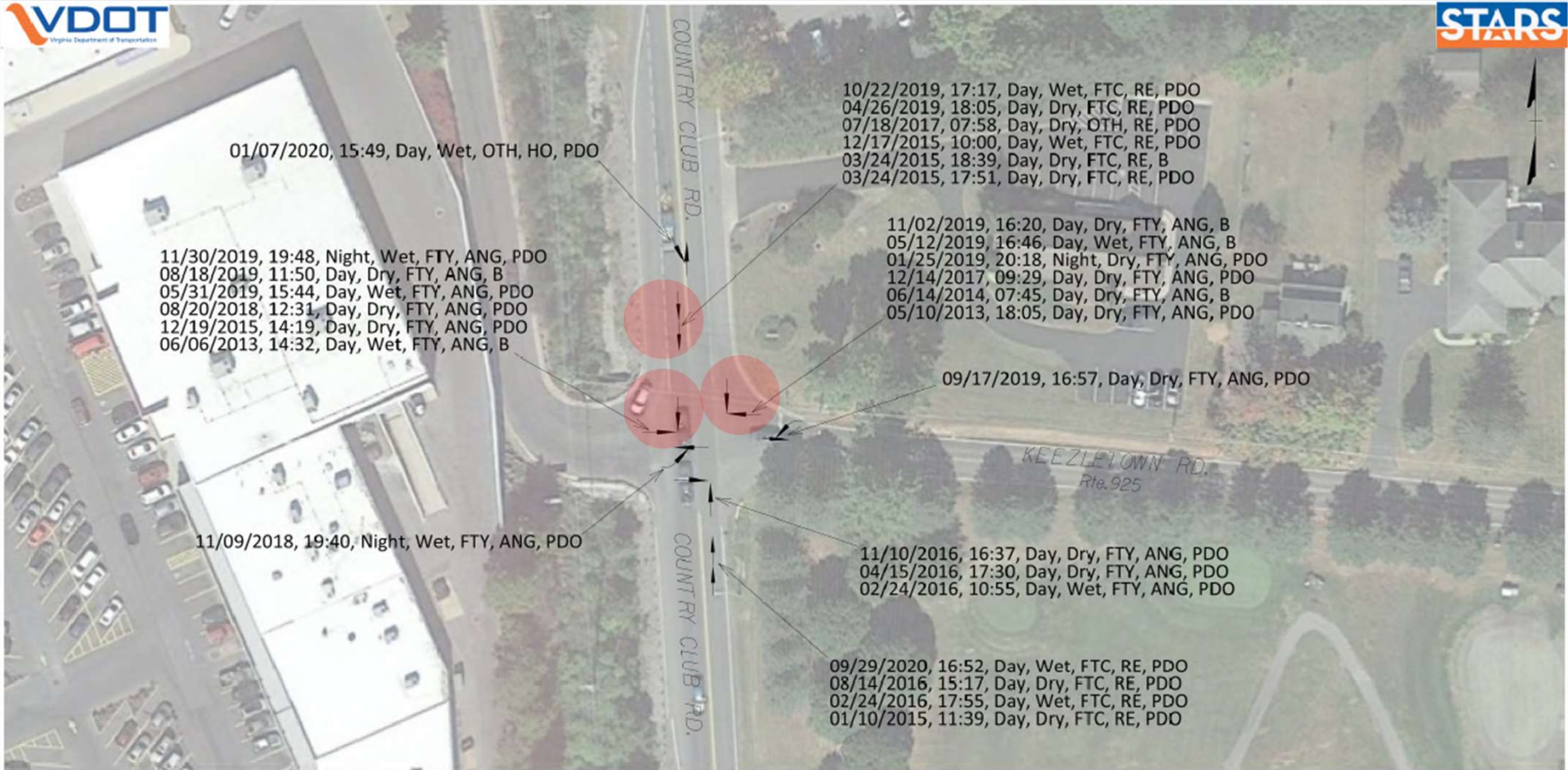


SAFETY ANALYSIS

- 6/28 injury crashes (21%)
- 16 angle crashes
- 10 rear end crashes



	2013	2014	2015	2016	2017	2018	2019	2020	Total
1. Rear End			4	2	1		2	1	10
2. Angle	2	1	1	3	1	2	6		16
3. Head On							1	1	2
Total	2	1	5	5	2	2	9	2	28



01/07/2020, 15:49, Day, Wet, OTH, HO, PDO

11/30/2019, 19:48, Night, Wet, FTY, ANG, PDO
 08/18/2019, 11:50, Day, Dry, FTY, ANG, B
 05/31/2019, 15:44, Day, Wet, FTY, ANG, PDO
 08/20/2018, 12:31, Day, Dry, FTY, ANG, PDO
 12/19/2015, 14:19, Day, Dry, FTY, ANG, PDO
 06/06/2013, 14:32, Day, Wet, FTY, ANG, B

11/09/2018, 19:40, Night, Wet, FTY, ANG, PDO

10/22/2019, 17:17, Day, Wet, FTC, RE, PDO
 04/26/2019, 18:05, Day, Dry, FTC, RE, PDO
 07/18/2017, 07:58, Day, Dry, OTH, RE, PDO
 12/17/2015, 10:00, Day, Wet, FTC, RE, PDO
 03/24/2015, 18:39, Day, Dry, FTC, RE, B
 03/24/2015, 17:51, Day, Dry, FTC, RE, PDO

11/02/2019, 16:20, Day, Dry, FTY, ANG, B
 05/12/2019, 16:46, Day, Wet, FTY, ANG, B
 01/25/2019, 20:18, Night, Dry, FTY, ANG, PDO
 12/14/2017, 09:29, Day, Dry, FTY, ANG, PDO
 06/14/2014, 07:45, Day, Dry, FTY, ANG, B
 05/10/2013, 18:05, Day, Dry, FTY, ANG, PDO

09/17/2019, 16:57, Day, Dry, FTY, ANG, PDO

11/10/2016, 16:37, Day, Dry, FTY, ANG, PDO
 04/15/2016, 17:30, Day, Dry, FTY, ANG, PDO
 02/24/2016, 10:55, Day, Wet, FTY, ANG, PDO

09/29/2020, 16:52, Day, Wet, FTC, RE, PDO
 08/14/2016, 15:17, Day, Dry, FTC, RE, PDO
 02/24/2016, 17:55, Day, Wet, FTC, RE, PDO
 01/10/2015, 11:39, Day, Dry, FTC, RE, PDO

PDO. Property Damage Only - 22 C. Nonvisible Injury - 0 B. Visible Injury - 6 A. Severe Injury - 0 K. Fatal Injury - 0	Dry - 17 Wet - 11 Snowy - 0 Icy - 0	Day - 25 Night - 3	Total Accidents = 28 Years = 7.8 01/01/13 - 10/01/20	- Angle - Sideswipe	- Head On - Rear End	- Single Vehicle - Pedestrian	ATCS ENGINEERING PLANNING SURVEYING ENVIRONMENTAL 12801 WURNING VALLEY DRIVE, SUITE 200 HERRINGTON, VA 20171 703-847-3601 FAX 703-430-0809 http://www.atcsgc.com
NIA - No Improper Action ESS - Exceeded Safe Speed FTY - Failure to Yield FTS - Failure to Stop FTC - Following Too Close FMC - Failure to Maintain Control ULC - Unsafe Lane Change OTH - Other	RE - 1. Rear End ANG - 2. Angle HO - 3. Head On SSS - 4. Sideswipe - Same Direction SSO - 5. Sideswipe - Opposite Direction FOIR - 6. Fixed Object in Road TR - 7. Train NC - 8. Non-Collision	Severity	Conditions	Total	Type	STARS Project Name Figure 10 - Collision Diagram Country Club Rd @ Keezletown Rd	DISTRICT Harrisonburg LOCALITY Harrisonburg DATE 01/2021 SCALE None

PRELIMINARY IDEAS FOR CONSIDERATION

Safety:

1. Relocate WB stop bar closer to the intersection
2. Add striping for EB right-turn lane and for NB/SB left-turn lanes
3. Add intersection warning signs
4. NE corner turning radius

Operational:

1. Alternative intersection design
2. Add NB/SB left turn lanes

Bike/Ped Accommodation:

1. Add crosswalk on north leg



OPEN DISCUSSION



- Local updates/News
- Feedback on initial proposed improvements
- Alternative evaluation (Quantitative / Qualitative)
- Public Involvement

SCHEDULE AND NEXT STEPS



STARS

STRATEGICALLY TARGETED AND
AFFORDABLE ROADWAY SOLUTIONS

QUESTIONS/COMMENTS?

Thank you!

