



PROJECT PIPELINE

**ROUTE 11/460 (WEST MAIN STREET) –
ROUTE 112 (WILDWOOD ROAD) TO W 4TH STREET
CITY OF SALEM**

Salem District (SA-03)

Team 1: Congestion & Accessibility and Team 2: Safety & Reliability

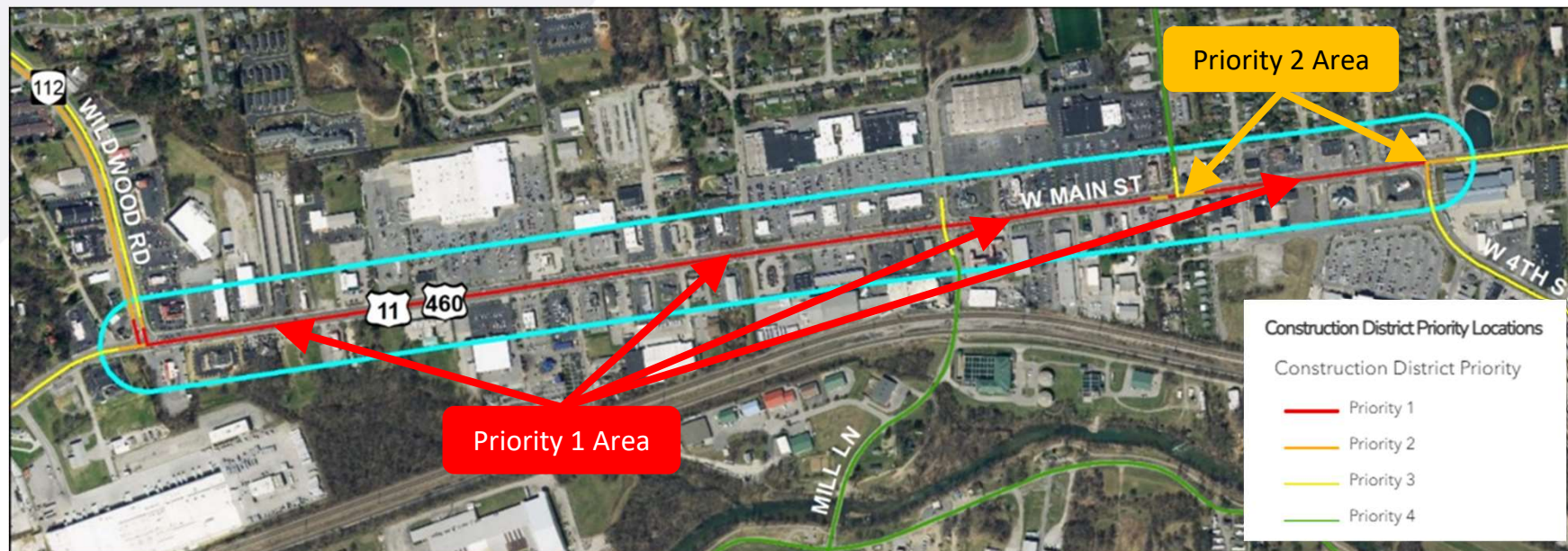


Agenda

- Framework Document Approval
- Study Area/VTrans Priority Areas
- Congestion and Safety Evaluation
- Pedestrian and Bicycle Access
 - Existing conditions
 - Additional needs
- Next Steps

Study Area

- Route 11/460 (West Main Street) – 1.5 miles
 - 5-lane undivided with two-way left-turn lane between signalized intersections
 - 35 MPH speed limit
 - 7 signalized intersections
 - Numerous commercial entrances/access points



VTrans Needs

• Team 1 - Congestion and Accessibility

Congestion Mitigation (CoSS)	Congestion Mitigation (RN)	Capacity Preservation (CoSS)	Capacity Preservation (RN)	Bicycle Access (RN)	Pedestrian Access (RN)	IEDA (UDA) Access
No Need	Medium	No Need	No Need	Very High	Medium	No Need

• Team 2 – Traffic Safety and Reliability

Reliability (CoSS)	Reliability (RN)	Construction District Safety Improvement	Statewide Safety Improvement	Pedestrian Safety Improvement
No Need	No Need	Very High	High	No Need

• Team 3 – Transit / TDM

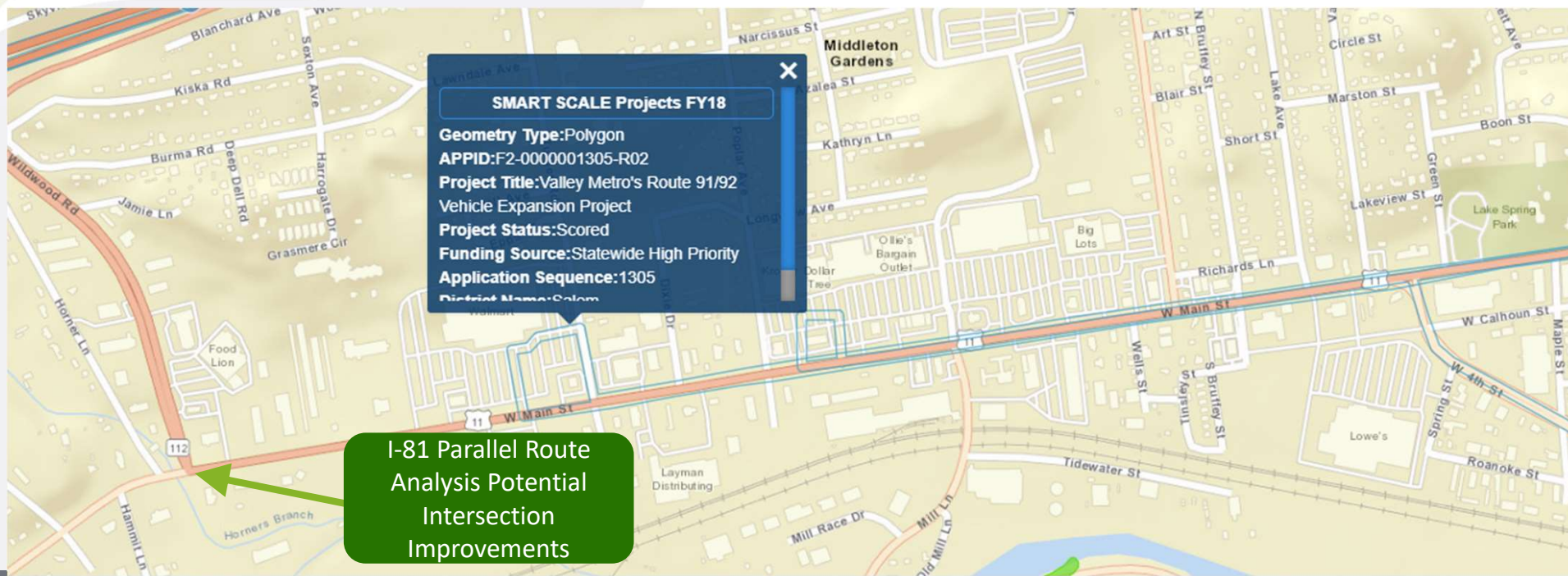
Rail On-time Performance (COSS)	Transportation Demand Management (CoSS)	Transportation Demand Management (RN)	Transit Access for Equity Emphasis Areas (RN)	Transit Access (RN)
No Need	Low	Very High	No Need	High

Today's Focus

- Congestion Mitigation
- Safety Improvements
- Bicycle Access
- Pedestrian Access

Relevant Projects and Studies

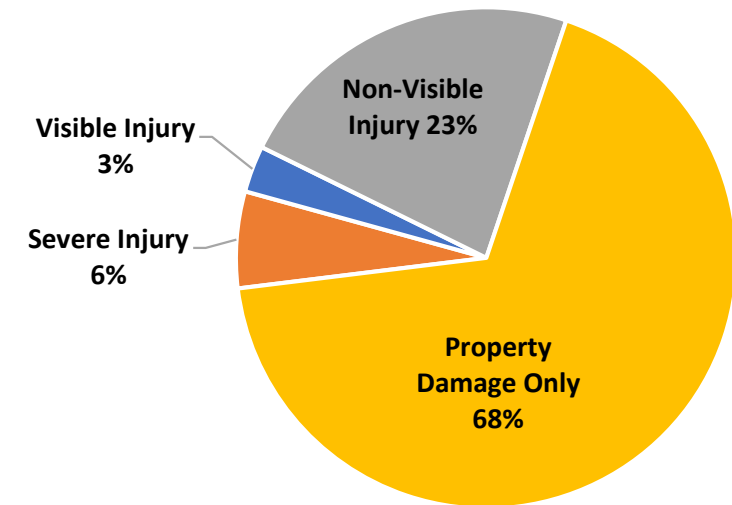
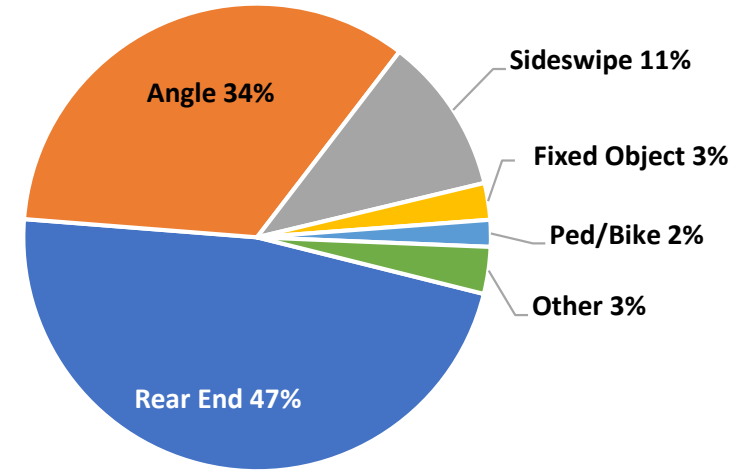
- I-81 Parallel Route Analysis & Signal Upgrades (Ongoing)
 - Route 11/460 at Wildwood Rd intersection recommendations
- Funded transportation projects
 - Valley Metro Route 91/92 Vehicle Expansion (SMART SCALE)



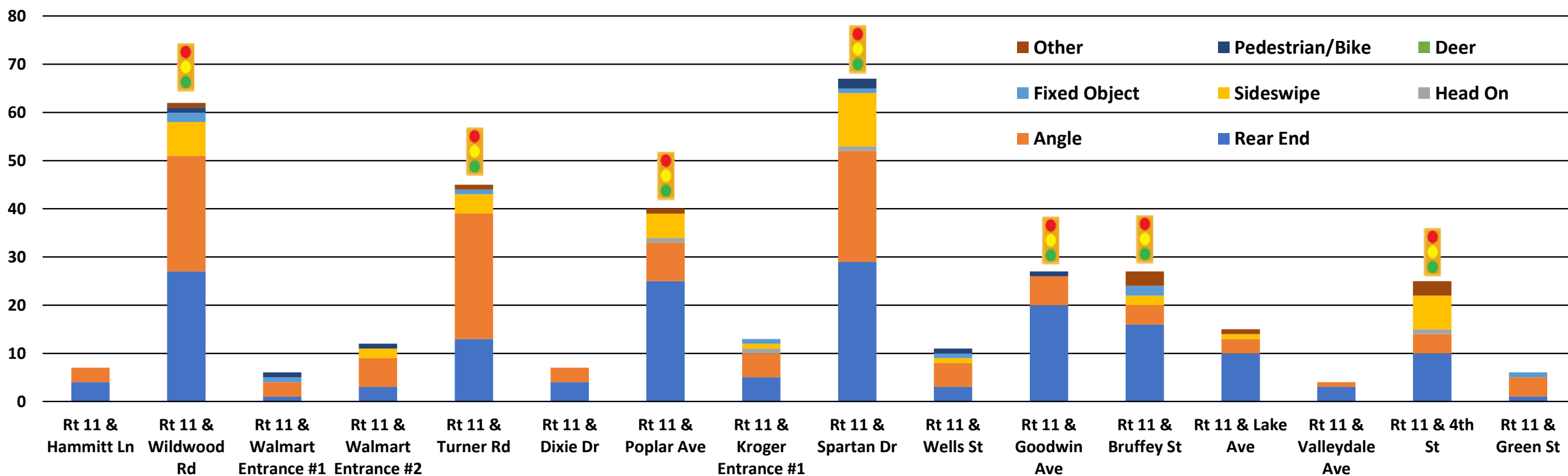
Crash Data Summary (Jan 2015 – Dec 2019)



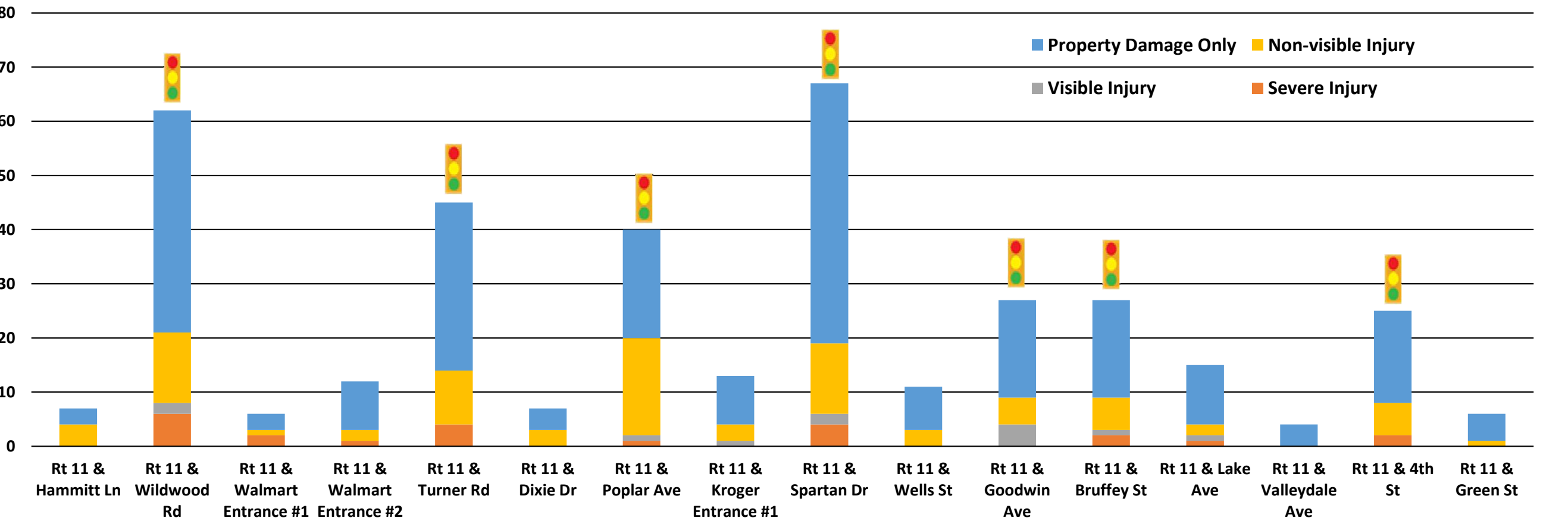
- 433 total crashes
 - 205 (47%) rear end crashes
 - 148 (34%) angle crashes
 - 3 pedestrian crashes; 5 bicycle crashes
 - No fatal crashes; 27 (6%) severe injury crashes
 - High percentage of crashes at commercial driveways and unsignalized intersections
 - 32% of total crashes
 - 36% of angle crashes
 - >30% of rear end crashes



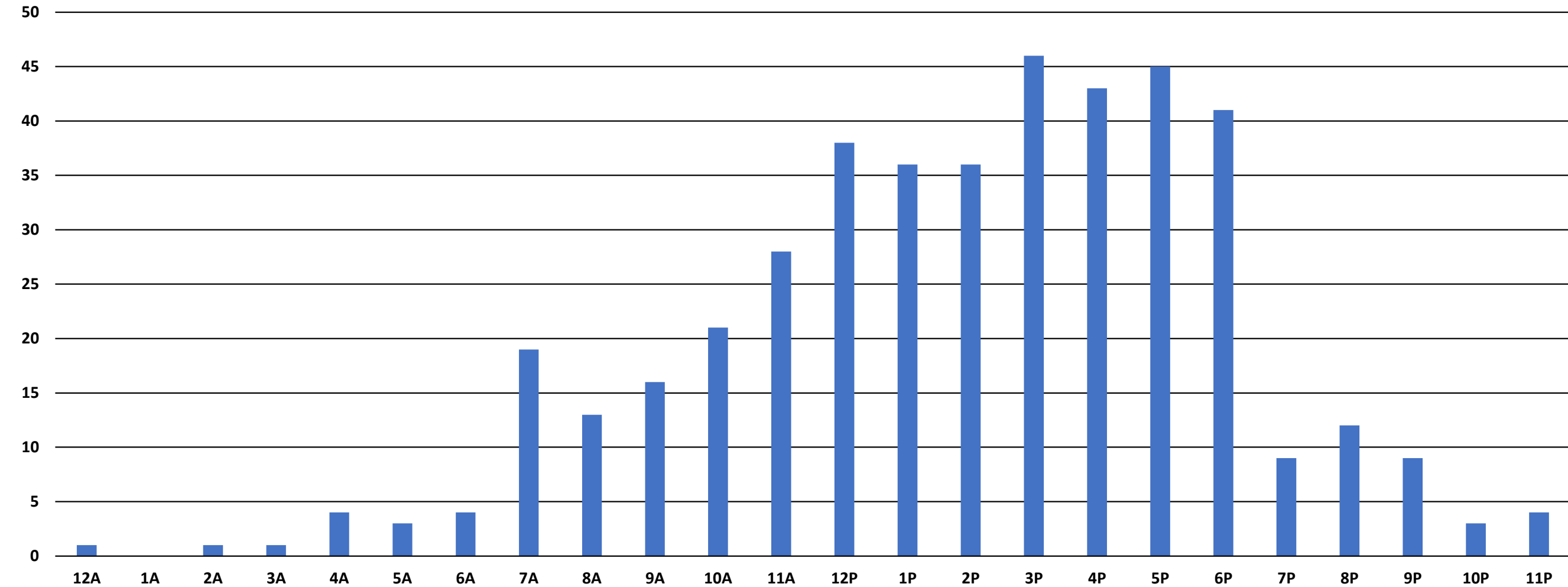
Crashes by Type



Crashes by Severity



Crashes by Time of Day



Ped/Bicycle Crashes



- 8 total crashes
 - All 8 resulted in injuries
 - 7 occurred during daylight hours; 1 bicycle crash occurred at night with lighting
 - 3 pedestrian crashes
 - 1 west of Wells St - vehicle exiting the Pizza Hut struck a stroller on the sidewalk (non-visible injuries)
 - 1 near the Walmart - vehicle exiting the Go Mart made a left turn onto WB Route 11 and struck a ped crossing Route 11 (non-visible injuries)
 - 1 at Wildwood Rd - SB vehicle made a right turn to WB Route 11 and struck a pedestrian in the crosswalk on the west leg (non-visible injuries)
 - 5 bicycle crashes
 - Two in the vicinity of Route 11 & Spartan Dr intersection
 - SB vehicle made a right turn from Spartan Dr onto WB Route 11 and struck a bicycle (severe injuries)
 - Vehicle making a right turn from Sheetz to EB Route 11 struck a bicycle traveling WB on the sidewalk (visible injuries)
 - Two in the vicinity of Walmart
 - WB bicycle on sidewalk struck an EB Route 11 vehicle trailer making a right turn to the Go Mart parking lot (severe injuries)
 - Vehicle exiting the Walmart parking lot struck a bicycle traveling EB on the sidewalk (non-visible injuries)
 - 1 west of Goodwin Ave – vehicle was exiting McDonald's and struck a bicycle traveling along the north side of Main Street (visible injuries)

Bicycle and Pedestrian Access*

* Bicycle Access identified as Very High Priority and
Pedestrian Access identified as Medium Priority

- Sidewalks along EB/WB lanes throughout study area
- Signalized pedestrian crossings at all signalized intersections
- No bicycle accommodations along Route 11/460



Pedestrian Crossing Inventory



Signalized Intersection	Crosswalk				Ped Signal				Push Buttons			
	North Leg	South Leg	East Leg	West Leg	North Leg	South Leg	East Leg	West Leg	North Leg	South Leg	East Leg	West Leg
Wildwood Rd/Hardees	✓		✓	✓	✓		✓	✓	✓		✓	✓
Turner Rd/Hurt Ln	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Poplar Ave	✓		✓		✓		✓		✓		✓	
Spartan Dr/Mill Ln	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Goodwin Ave	✓		✓		✓		✓		✓		✓	
Bruffey St	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
W 4 th St/Burger King		✓	✓			✓	✓			✓	✓	

Crashes by Type and Severity (2015-2019) – Sheet 1 of 7



Crashes by Type and Severity
Route 11/460 (Main St)
from Route 112 to 4th Street
January 2015 - December 2019
Sheet 1 of 7

VDOT Virginia Department of Transportation
Salem District Traffic Studies

0 100 200 300 400 Feet

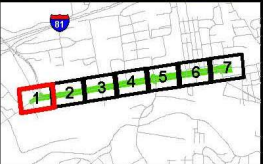
Aerial Imagery: Virginia Geographic Information Network (VGIN)

Collision Type

- △ Angle
- Fixed Object
- ⊕ Head On
- ⊛ Pedestrian
- Rear End
- ☆ Sideswipe
- ◇ Other

Crash Severity

- FATAL
- INJURY
- PROPERTY DAMAGE ONLY



Crashes by Type and Severity (2015-2019) – Sheet 2 of 7



Crashes by Type and Severity
Route 11/460 (Main St)
from Route 112 to 4th Street
January 2015 - December 2019
Sheet 2 of 7

VDOT Virginia Department of Transportation
Salem District



Aerial Imagery: Virginia Geographic Information Network (VGIN)

Collision Type

- △ Angle
- Fixed Object
- ⊕ Head On
- ⊛ Pedestrian
- Rear End
- ☆ Sideswipe
- ◇ Other

Crash Severity

- FATAL
- INJURY
- PROPERTY DAMAGE ONLY



Crashes by Type and Severity (2015-2019) – Sheet 3 of 7



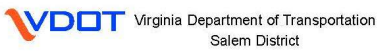
Crashes by Type and Severity (2015-2019) – Sheet 4 of 7



Crashes by Type and Severity (2015-2019) – Sheet 5 of 7



Crashes by Type and Severity
Route 11/460 (Main St)
from Route 112 to 4th Street
January 2015 - December 2019
Sheet 5 of 7



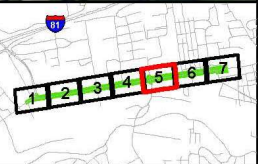
Aerial Imagery: Virginia Geographic Information Network (VGIN)

Collision Type

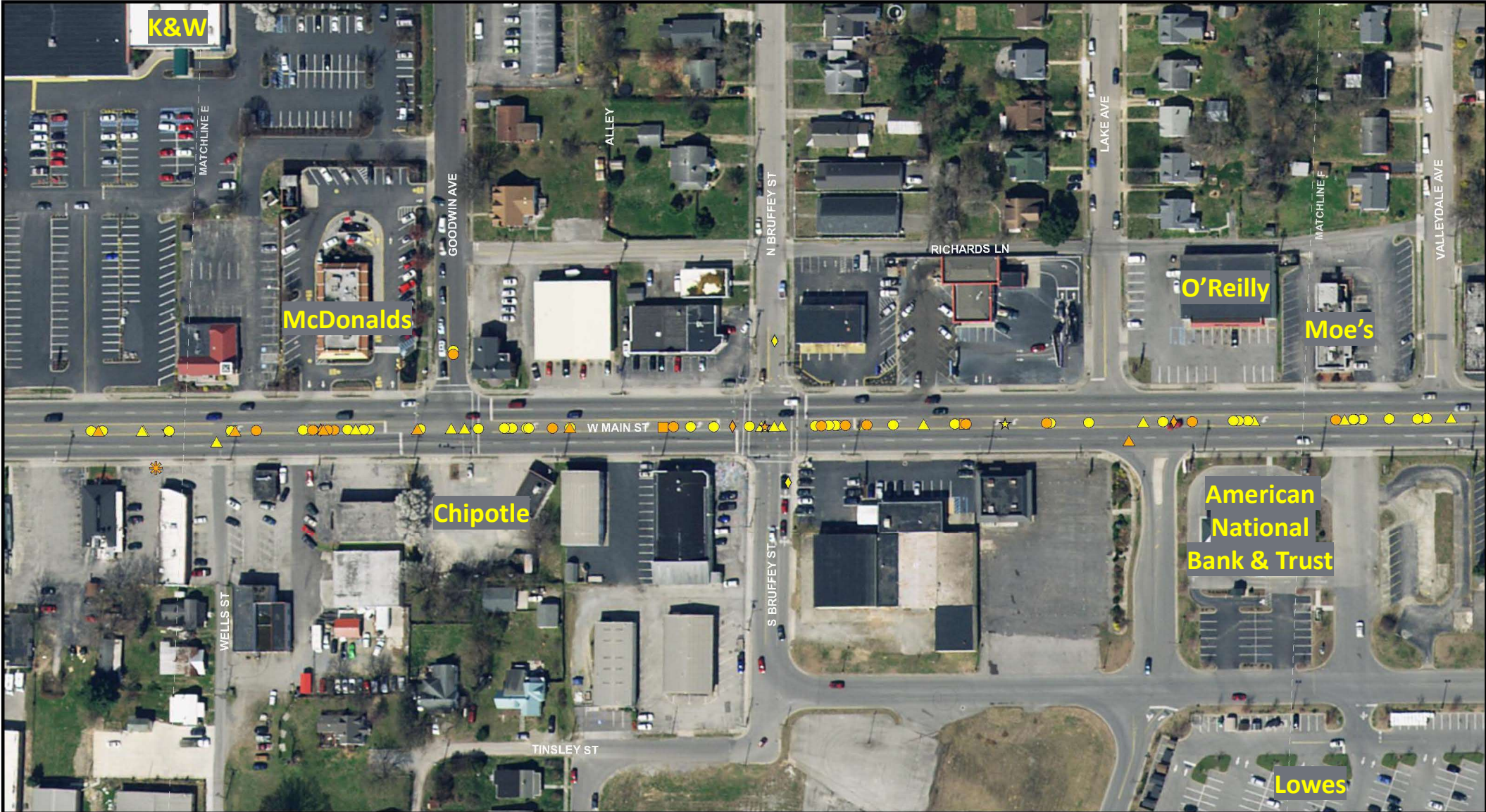
- △ Angle
- Fixed Object
- ⊕ Head On
- ⊛ Pedestrian
- Rear End
- ☆ Sideswipe
- ◇ Other

Crash Severity

- FATAL
- INJURY
- PROPERTY DAMAGE ONLY



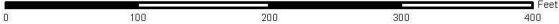
Crashes by Type and Severity (2015-2019) – Sheet 6 of 7



Crashes by Type and Severity
Route 11/460 (Main St)
from Route 112 to 4th Street
January 2015 - December 2019
Sheet 6 of 7



Virginia Department of Transportation
Salem District



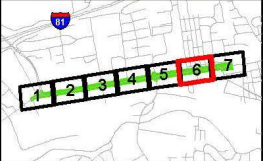
Aerial Imagery: Virginia Geographic Information Network (VGIN)

Collision Type

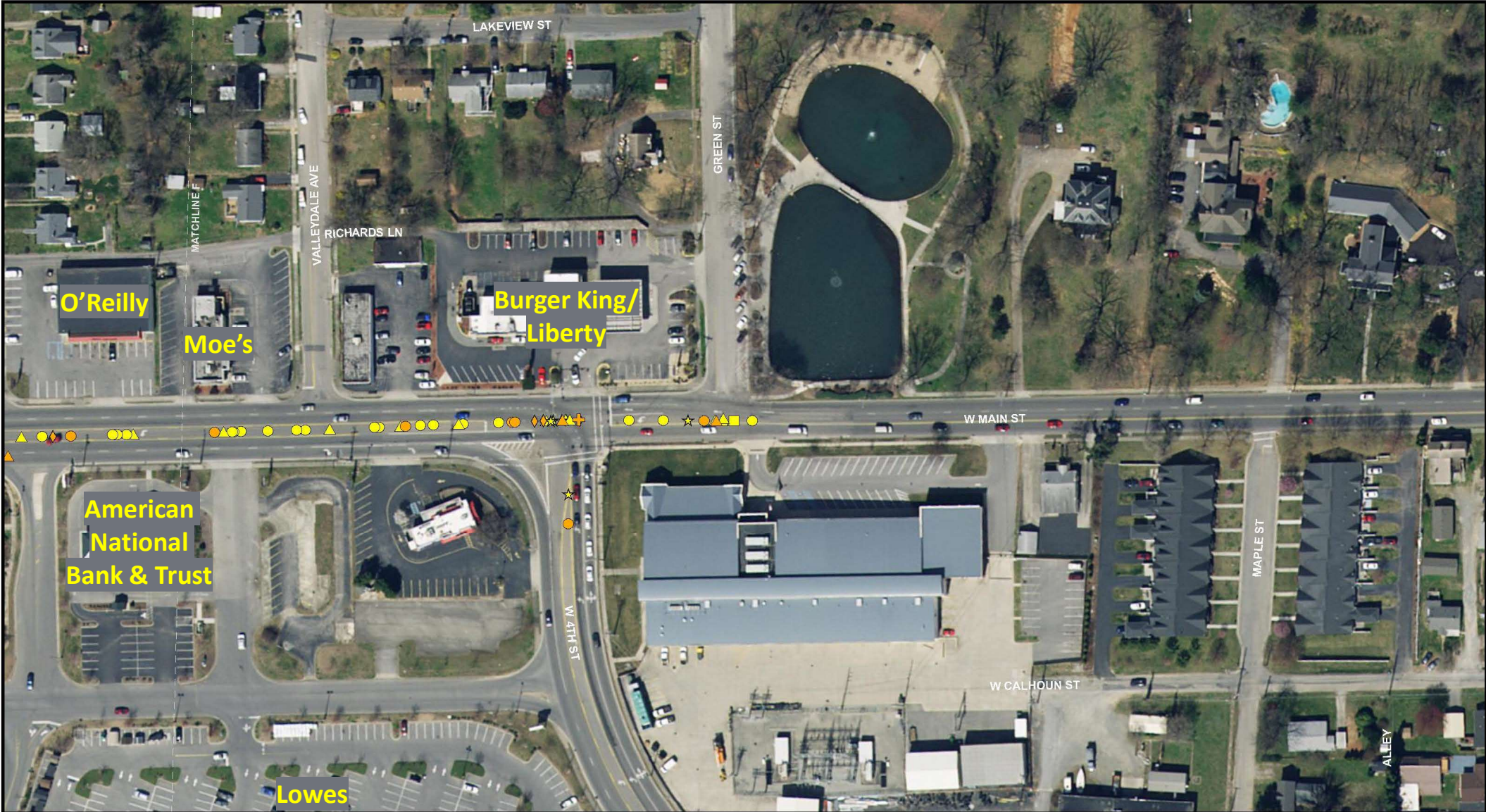
- △ Angle
- Fixed Object
- ⊕ Head On
- ⊛ Pedestrian
- Rear End
- ☆ Sideswipe
- ◇ Other

Crash Severity


- FATAL
- INJURY
- PROPERTY DAMAGE ONLY




Crashes by Type and Severity (2015-2019) – Sheet 7 of 7



Crashes by Type and Severity
Route 11/460 (Main St)
from Route 112 to 4th Street
January 2015 - December 2019
Sheet 7 of 7



Virginia Department of Transportation
Salem District



0 100 200 300 400 Feet

Aerial Imagery: Virginia Geographic Information Network (VGIN)

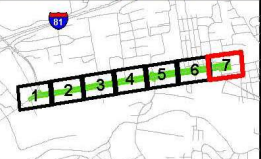
Collision Type

- △ Angle
- Fixed Object
- ⊕ Head On
- ⊗ Pedestrian

- Rear End
- ☆ Sideswipe
- ◇ Other

Crash Severity

- FATAL
- INJURY
- PROPERTY DAMAGE ONLY



Route 11/460 & Wildwood Rd/Hardees



- 62 total crashes
 - 27 rear end crashes
 - 24 angle crashes
 - 4 EBL/WBT
 - 10 crashes at commercial driveways
 - 7 sideswipe crashes
 - 1 pedestrian crash
 - SB vehicle made a right turn to WB Route 11 and struck a pedestrian in the crosswalk on the west leg (non-visible injuries)



Collision Type

- △ Angle
- Fixed Object
- ⊕ Head On
- ⊛ Pedestrian

- Rear End
- ☆ Sideswipe
- ◇ Other

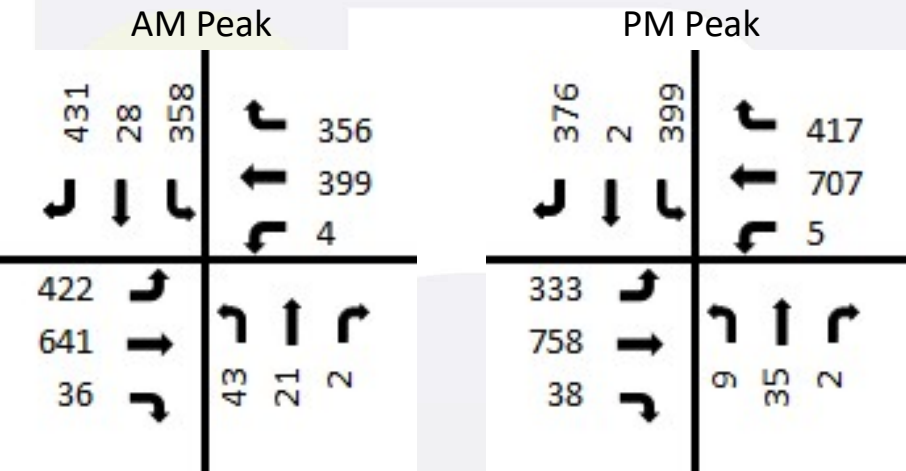
Crash Severity

- FATAL
- INJURY
- PROPERTY DAMAGE ONLY

Route 11/460 & Wildwood Rd/Hardees



- Existing traffic volumes



- Existing signal phasing
 - EB/WB Route 11/460 protected-permissive left-turn phasing
 - NB/SB split-phasing
 - WBR and SBR right-turn overlaps
- EBL queue to Wildwood Rd regularly exceeds available storage
- EBT queue regularly extends to Fort Lewis Blvd signal



Peak Hour	INT		NB LTR	SB LTR	EB L	EB TR	WB L	WB TR
	LOS	Delay	Movement/Approach Delay (sec)					
AM	C	23	49	33	19	15	22	28
PM	C	34	57	42	26	15	27	46

Route 11/460 & Turner Rd/Hurt Ln

- 45 total crashes
 - 26 angle crashes
 - 6 crashes at commercial driveways
 - 6 NBL/EBT
 - 3 WBL/EBT
 - 2 WBT/SBT
 - 13 rear end crashes
 - 4 sideswipe crashes



Collision Type

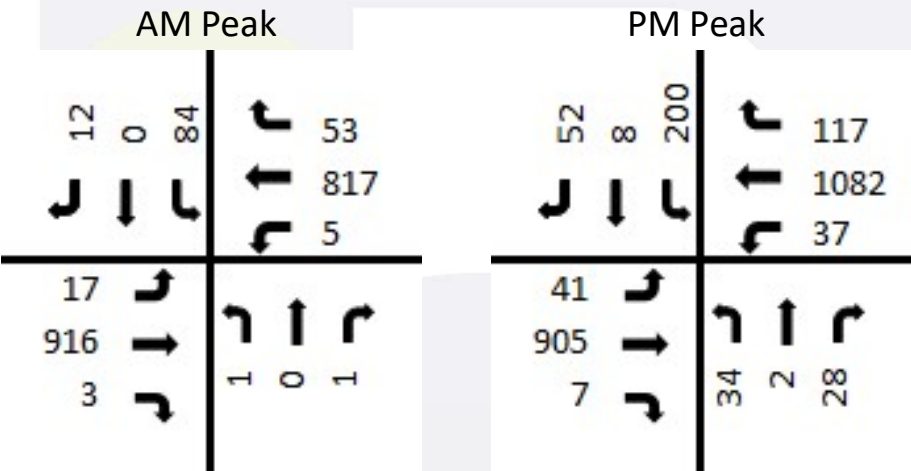
△	Angle	○	Rear End
□	Fixed Object	☆	Sideswipe
+	Head On	◇	Other
✱	Pedestrian		

Crash Severity

■	FATAL
■	INJURY
■	PROPERTY DAMAGE ONLY

Route 11/460 & Turner Rd/Hurt Ln

- Existing traffic volumes



- Existing signal phasing
 - EB/WB Route 11/460 protected-permissive left-turn phasing
 - NB/SB split-phasing



Peak Hour	INT		NB LTR	SB LTR	EB L	EB TR	WB L	WB TR
	LOS	Delay	Movement/Approach Delay (sec)					
AM	A	8	43	40	5	8	5	6
PM	B	18	55	54	11	13	4	12

Route 11/460 & Poplar Ave

- 40 total crashes
 - 25 rear end crashes
 - 18 EB Route 11/460
 - 8 angle crashes
 - 2 EBL/WBT
 - 1 crash at commercial driveway
 - 5 sideswipe crashes



Collision Type

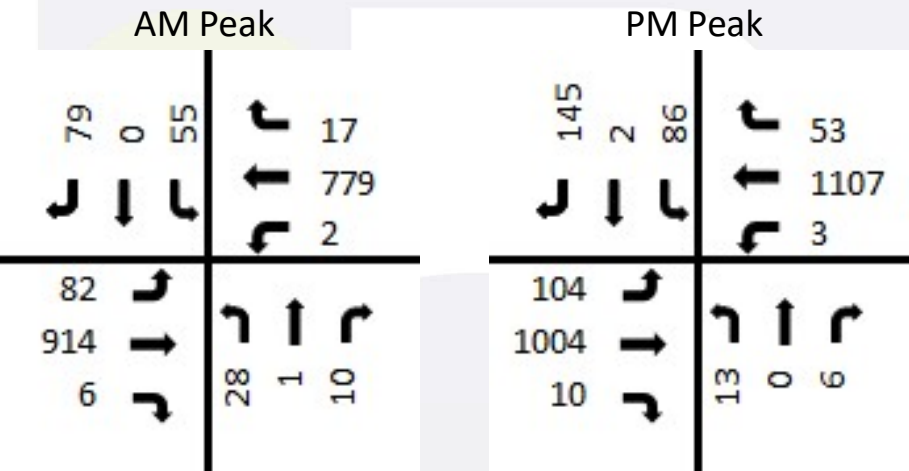
△	Angle	○	Rear End
□	Fixed Object	☆	Sideswipe
+	Head On	◇	Other
✱	Pedestrian		

Crash Severity

■	FATAL
■	INJURY
■	PROPERTY DAMAGE ONLY

Route 11/460 & Poplar Ave

- Existing traffic volumes



- Existing signal phasing
 - EB/WB Route 11/460 protected-permissive left-turn phasing
 - NB/SB concurrent with permissive left-turn phasing



Peak Hour	INT		NB LTR	SB LTR	EB L	WB TR	EB L	EB TR
	LOS	Delay	Movement/Approach Delay (sec)					
AM	A	8	36	36	2	3	4	8
PM	B	14	47	51	11	8	9	11

Route 11/460 & Spartan Dr/Mill Ln

- 67 total crashes
 - 29 rear end crashes
 - 23 angle crashes
 - 7 crashes at commercial driveways
 - 2 WBL/EBT
 - 11 sideswipe crashes
 - 2 bicycle-related crashes
 - SB vehicle made a right turn from Spartan Dr onto WB Route 11 and struck a bicycle (severe injuries)
 - Vehicle making a right turn from Sheetz to EB Route 11 struck a bicycle traveling WB on the sidewalk (visible injuries)



Collision Type

△	Angle	○	Rear End
□	Fixed Object	☆	Sideswipe
+	Head On	◇	Other
⊗	Pedestrian		

Crash Severity

■	FATAL
■	INJURY
■	PROPERTY DAMAGE ONLY

Route 11/460 & Spartan Dr/Mill Ln

- Existing traffic volumes

AM Peak			PM Peak		
84	94	211	83	126	186
↙	↓	↙	↙	↓	↙
		↗			↗
100	↗		62	↗	
725	↑	↘	843	↑	↘
140	↘	219	156	↘	233
		154			78
		144			141
		127			74
		588			980
		84			100

- Existing signal phasing
 - EB/WB Route 11/460 protected-permissive left-turn phasing
 - NB/SB split-phasing
- Spartan Dr & Mill Ln approaches have significant traffic throughout the day
 - Salem High School at end of Spartan Dr



Peak Hour	INT		NB LTR	SB LTR	EB L	EB TR	WB L	WB TR
	LOS	Delay	Movement/Approach Delay (sec)					
AM	C	33	35	43	19	38	25	21
PM	C	32	50	54	16	23	23	26

Route 11/460 & Goodwin Ave



- 27 total crashes
 - 20 rear end crashes
 - 6 angle crashes
 - 3 crashes at commercial driveways
 - 1 bicycle crash
 - Vehicle was exiting McDonald's and struck a bicycle traveling along the north side of Main Street (visible injuries)



Collision Type

- △ Angle
- Fixed Object
- ⊕ Head On
- ⊗ Pedestrian

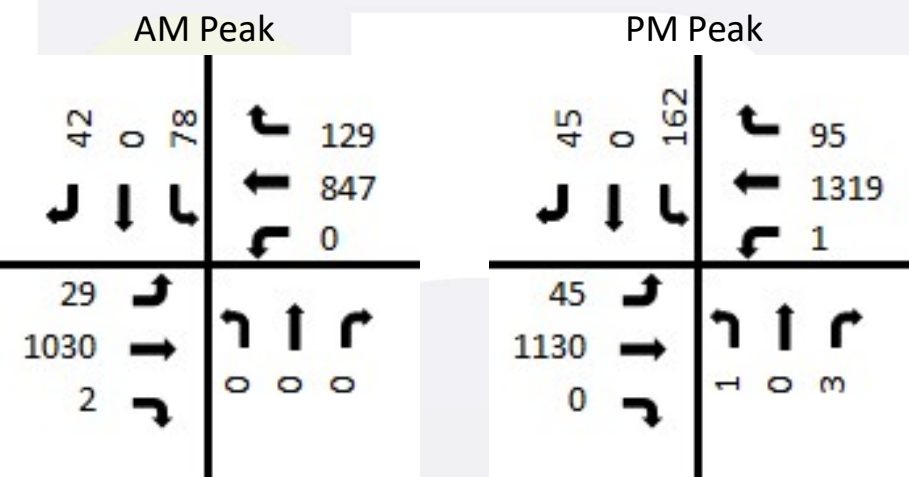
- Rear End
- ☆ Sideswipe
- ◇ Other

Crash Severity

- FATAL
- INJURY
- PROPERTY DAMAGE ONLY

Route 11/460 & Goodwin Ave

- Existing traffic volumes



- Existing signal phasing – recent signal replacement
 - EB/WB Route 11/460 protected-permissive left-turn phasing (Flashing Yellow Arrow)
 - NB/SB concurrent with permissive left-turn phasing
- Occasional WB queue spillover to Bruffey St intersection
- Occasional EB queue spillover from Bruffey St intersection



Peak Hour	INT		NB LTR	SB LTR	EB L	EB TR	WB L	WB TR
	LOS	Delay	Movement/Approach Delay (sec)					
AM	B	17	0	40	8	11	0	20
PM	B	17	39	60	11	7	14	19

Route 11/460 & Bruffey St



PROJECT PIPELINE

- 27 total crashes
 - 16 rear end crashes
 - 4 angle crashes
 - 1 angle crash at commercial driveway
 - 2 sideswipe crashes
 - 2 fixed-object crashes



Collision Type

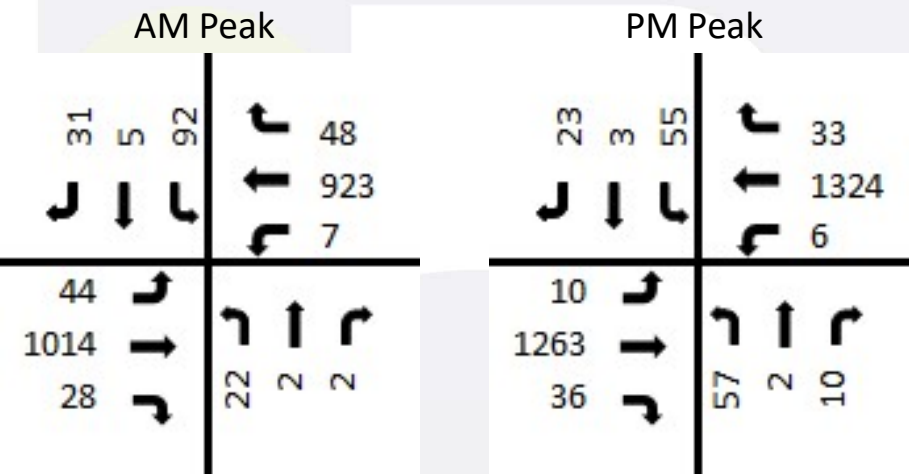
△	Angle	○	Rear End
□	Fixed Object	☆	Sideswipe
⊕	Head On	◇	Other
⊗	Pedestrian		

Crash Severity

■	FATAL
■	INJURY
■	PROPERTY DAMAGE ONLY

Route 11/460 & Bruffey St

- Existing traffic volumes



- Existing signal phasing
 - EB/WB Route 11/460 protected-permissive left-turn phasing
 - NB/SB split-phasing
- Occasional EB queue spillover to Goodwin Ave intersection
- Occasional WB queue spillover from Goodwin Ave intersection



Peak Hour	INT		NB LTR	SB LTR	EB L	EB TR	WB L	WB TR
	LOS	Delay	Movement/Approach Delay (sec)					
AM	B	18	42	43	17	22	7	10
PM	B	13	56	54	6	10	10	12

Route 11/460 & W 4th St

- 25 total crashes
 - 10 rear end crashes
 - 7 sideswipe crashes
 - 4 angle crashes
 - 2 NBL/WBT
 - 2 WBL/EBT



Collision Type

- △ Angle
- Fixed Object
- ⊕ Head On
- ⊗ Pedestrian

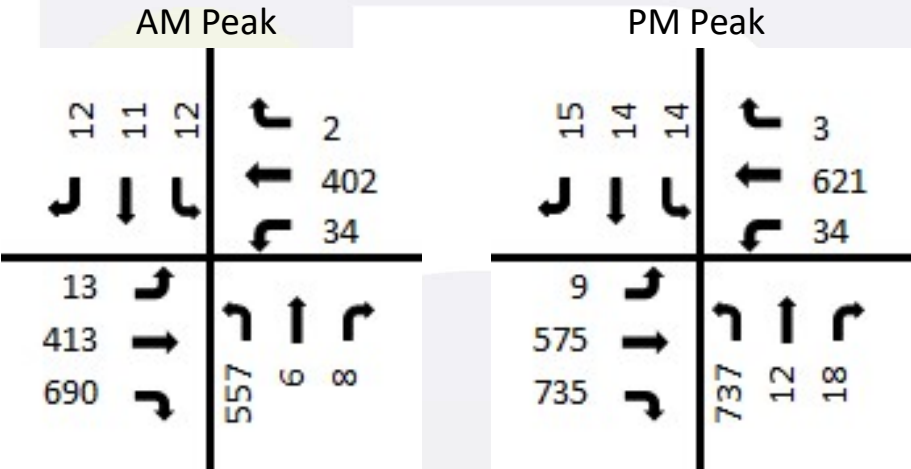
- Rear End
- ☆ Sideswipe
- ◇ Other

Crash Severity

- FATAL
- INJURY
- PROPERTY DAMAGE ONLY

Route 11/460 & W 4th St

- Existing traffic volumes



- Existing signal phasing
 - EB/WB Route 11/460 protected-permissive left-turn phasing
 - NB/SB split-phasing
- Long NBL queues in PM peak hour
- No advance signage for EBR lane drop to W 4th St
- Abrupt WB lane shift



Peak Hour	INT		NB LTR	SB LTR	EB L	EB T	WB L	WB TR
	LOS	Delay	Movement/Approach Delay (sec)					
AM	C	20	41	42	18	27	14	17
PM	C	27	55	57	13	31	17	19

Next Steps

- Approve Framework Document
- Stakeholder Meeting #2
 - Develop potential alternatives to be considered in Phase 2
 - Team 3 – Transit/TDM Recommendations
- Phase 2: October - December
 - Detailed analysis and modeling
 - Concept development
 - Planning level estimates
 - Public outreach