



PROJECT PIPELINE

**SA-23-06: Roanoke County
PETERS CREEK ROAD/WILLIAMSON ROAD**



Route 117 (Peters Creek Road) & Route 11 (Williamson Road) – From Route 628 (Wood Haven Road) To Route 115 (Plantation Road)

Final Report

July, 2024

Prepared for



Prepared by



Table of Contents

- Chapter 1: Needs Evaluation and Diagnosis.....4
 - Introduction:5
 - Background5
 - Methodology6
 - Study Area8
 - Planned Projects.....14
 - Phase 1 Existing Conditions Public Outreach.....14
 - Traffic Operations and Accessibility 16
 - Traffic Data16
 - Measures of Effectiveness.....16
 - Future Traffic Forecasting16
 - Existing and No Build Traffic Operations Analysis Results.....17
 - Safety and Reliability26
- Chapter 2: Alternative Development and Refinement 30
- Chapter 3: Public and Stakeholder Outreach and Feedback50
- Chapter 4: Preferred Alternative Design Refinement & Investment Strategy58
 - Investment Strategy:59
 - Preferred Alternative59
 - Planning-Level Cost Estimates59
 - Project Risks.....60
 - Possible Funding Sources60

Appendices

- Appendix A – Stakeholder Working Group Meeting Presentations
- Appendix B – Traffic Count Data
- Appendix C – Synchro, SimTraffic, and SIDRA Results
- Appendix D – iCAP and VJuST Results
- Appendix E - Preferred Alternative Sketch
- Appendix F – Cost Estimate Documents
- Appendix G – Salem District Scope of Work Document



Chapter 1:

Needs Evaluation and Diagnosis

Introduction:

Project Pipeline is a performance-based planning program to identify cost-effective solutions to multimodal transportation needs in Virginia. Through this planning process, projects and solutions may be considered for funding through programs, including SMART SCALE, revenue sharing, interstate funding, and others. Visit the Project Pipeline webpage for additional information: vaprojectpipeline.org.

This study focuses on concepts targeting identified needs including congestion mitigation, safety improvement, pedestrian and bicycle infrastructure along the corridor, and transit access. The objectives of Project Pipeline are shown below in **Figure 1**.









Figure 1: Project Pipeline Objectives

Background

The Office of Intermodal Planning and Investment (OIPI) prepared the VTrans Virginia's statewide transportation plan for the Commonwealth Transportation Board (CTB) in which mid-term needs (0 - 10 years) were identified for different categories listed in **Table 1**. This study focuses on addressing needs identified in VTrans, and those previously identified by the localities.

Table 1: List of VTrans Needs

VTrans Needs	
	Safety Improvement
	Transportation Demand Management
	Congestion Mitigation
	Pedestrian Safety Improvement
	Transit Access
	Capacity Preservation
	Bicycle Access

Methodology

The study is broken down into three phases. Phase I is the problem diagnosis and brainstorming alternatives, Phase II is the alternative evaluation and sketch level analysis, and Phase III is the investment strategy and cost estimates. Details on methods and solutions for each study phase are outlined below in **Figure 2**.

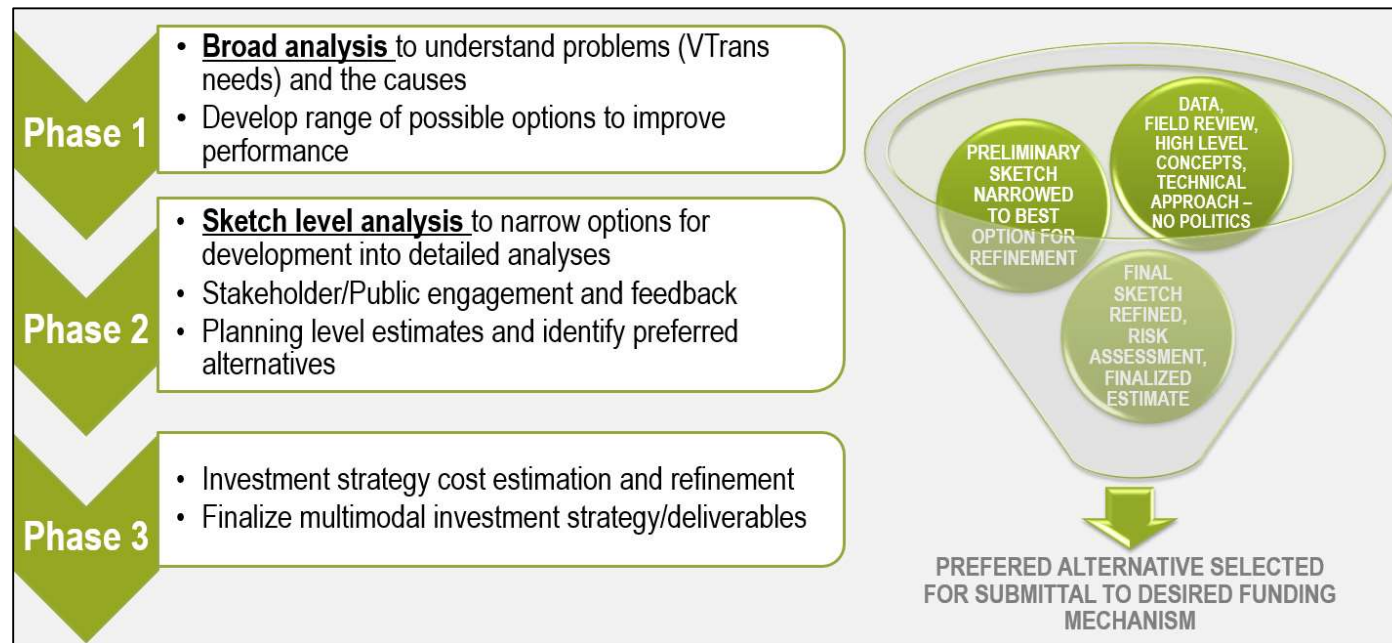


Figure 2: Study Phase Methods and Solutions

The study team is broken down into Technical Teams to improve the efficiency and effectiveness of the study process through extensive collaboration and synchronicity. To achieve the intended efficiency and consistency, it is generally expected that the same Technical Team will be responsible for all studies within a district for the duration of the cycle.

Each Technical Team will include certain leadership and technical roles that will be needed for each study, including the following:

- VDOT District Planning Project Manager – Provides leadership and direction; has overall responsibility for the study progress and outcomes.
- Consultant Team Manager – Provides direct support to the VDOT District Planning Project Manager; coordinates the work and technical efforts of consultant staff.

- District Planning Staff – Provides technical input regarding capacity, forecasting, land use, multimodal, and planning.
- District Traffic Engineering Staff – Provide technical input regarding safety and operations.
- Consultant Team Technical Staff – Provides multidisciplinary input, analysis, technical support, and expertise for the identified VTrans need categories.

A sample organizational chart, including the roles, responsibilities, and structure of a Technical Team is shown below in **Figure 3**.



Figure 3: Structure of a Technical Team

Additional team members and roles should be considered where appropriate. Certain roles may not be necessary for all studies. However, the following roles may contribute to study success during different stages and/or for different types of study areas, as shown in **Table 2**.

Table 2. Roles and Responsibilities for the Technical Team and SWGs

Phase	Responsibility	Role					
		OIPI/Program Support	District	Consultant	DRPT	Locality	VDOT Central Office
Study Selection & Initiation	Identify Study Needs and Priorities		X		X	X	
	Coordinate with CTB Members	X	X				
	Approve final study locations	X					
	Data Collection Planning		X				
	Data Dashboards	X					
	Assign Consultants & Issue Consultant Task Orders	X					X
Phase 1	Initiate Study & Hold Kickoff Meeting		X	X	X		
	Prepare Framework Document		X	X			
	Approve Framework Document		X		X	X	
	Provide Existing Data		X		X	X	
	Collect New Data			X			
	Coordinate with local leaders					X	
	Conduct & Support Initial Public Outreach (if desired)	X	X	X		X	X
	Diagnose Existing Needs			X			
	Brainstorm & Develop Preliminary Alternatives		X	X	X		X
	Present Diagnosis & Alternatives to SWG			X			
	Provide Feedback and Input on Analysis & Alternatives					X	
	Develop Phase 2 Scope of Work			X			
	Approve Scope & Issue Consultant Task Orders	X					X
Phase 2	Conduct Detailed Analysis of Alternatives			X			
	Develop Refinements to Alternatives		X	X	X		X
	Present Alternative Analysis Findings to SWG		X	X			
	Provide Feedback on Alternatives				X	X	X
	Prepare Planning Level Cost Estimates			X			
	Conduct & Support Public Outreach on Alternatives	X	X	X		X	
	Concurrence on Preferred Alternative(s)		X		X	X	X
	Develop Phase 3 Scope of Work			X			
Approve Scope & Issue Consultant Task Orders	X					X	
Phase 3	Conduct Alternative Risk Assessment		X	X			X
	Develop Practical Concept Design & Address Risk of Preferred Alternative		X	X			
	Prepare Cost Estimate with Workbook			X			
	Document Assumptions & Basis of Cost			X			
	Review & Concur with Concept & Estimate		X		X		X
Investment, Application, & Closeout	Prepare Final Study Deliverables, Design Packages, and Estimates			X			
	Apply for Funding of Preferred Alternative(s)				X	X	
	Application Support	X	X	X			
	Submit and Documentation and All Related Work			X			
	Review and approve final deliverables for public visibility		X		X		
	Program Closeout and Summary	X					

Study Area

The Peters Creek Road (Route 117) and Williamson Road (Route 11) study corridor from Wood Haven Road to Plantation Road is located in Roanoke County with the Wood Haven Road Intersection being partially in the City of Roanoke. Route 117 (Peters Creek Road) is classified as an urban minor arterial road with a 45-mph speed limit within the study area. Route 11 (Williamson Road) is classified as a principal arterial roadway with a 35-mph speed limit and is on the Arterial Preservation Network and is a Corridor of Statewide Significance. A map detailing the study area is shown in **Figure 4**.

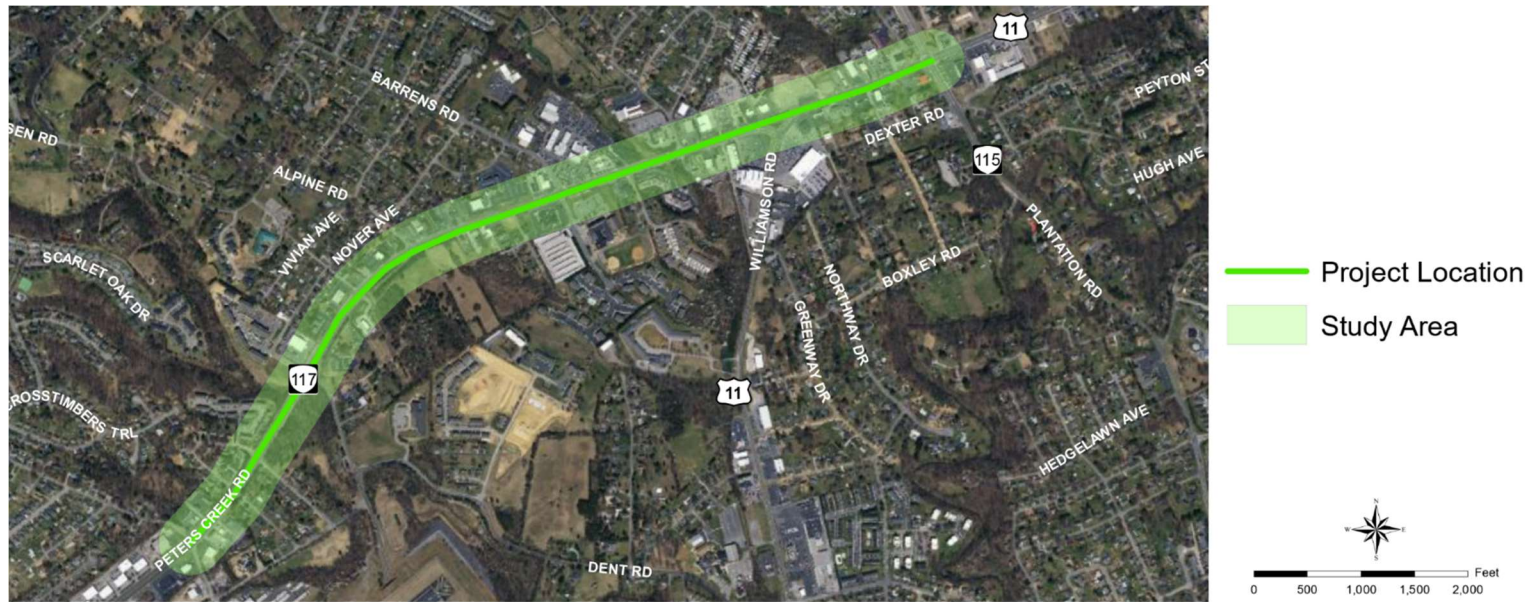


Figure 4: Study Area Map

VTrans is Virginia’s statewide transportation plan. It identifies and prioritizes locations with transportation needs using data-informed transparent processes. The policy for identifying VTrans mid-term needs establishes multimodal need categories that correspond to the Commonwealth Transportation Board-adopted VTrans visions, goals, and objectives.¹ Each need category has one or more performance measures and thresholds to identify one or more needs. Visit the VTrans policy guide for additional information: https://vtrans.org/resources/VTrans_Policy_Guide_v6.pdf.

The mid-term needs, as identified in VTrans for the Peters Creek/Williamson Road study corridor are ‘Very High’ for Bicycle Access, Reliability, and Transportation Demand Management, ‘High’ for Capacity Preservation, Pedestrian Access, Safety Improvement, and Transit Access for Equity Emphasis Areas, ‘Medium’ for Transit Access and ‘Low’ for Congestion Mitigation, as presented in **Table 3**.

Table 3: VTrans Needs in Study Area

VTRANS IDENTIFIED NEEDS	PRIORITIES
Bicycle Access	Very High
Capacity Preservation	High
Congestion Mitigation	Low
IEDA (UDA) Access	None
Pedestrian Access	High
Safety Improvement	High
Pedestrian Safety Improvement	None
Reliability	Very High
Rail on-time Performance	None
Transit Access	Medium
Transit Access for Equity Emphasis Areas	High
Transportation Demand Management	Very High

These mid-term needs, identified in VTrans, are prioritized on a tier from 1 to 4, with 1 being the most critical and 4 being the least critical. The segments ranked as “Priority 1” represent those with multiple categories identified as high in need. **Figure 5** presents a map of the study area with the 2019 VTrans mid-term needs prioritized for district construction. **Figure 6** and **Figure 7** present an overview of the study needs.

¹ Commonwealth Transportation Board, Actions to Approve the 2019 VTrans Vision, Goals, Objectives, Guiding Principles and the 2019 Mid-term Needs Identification Methodology and Accept the 2019 Mid-term Needs, January 15, 2020

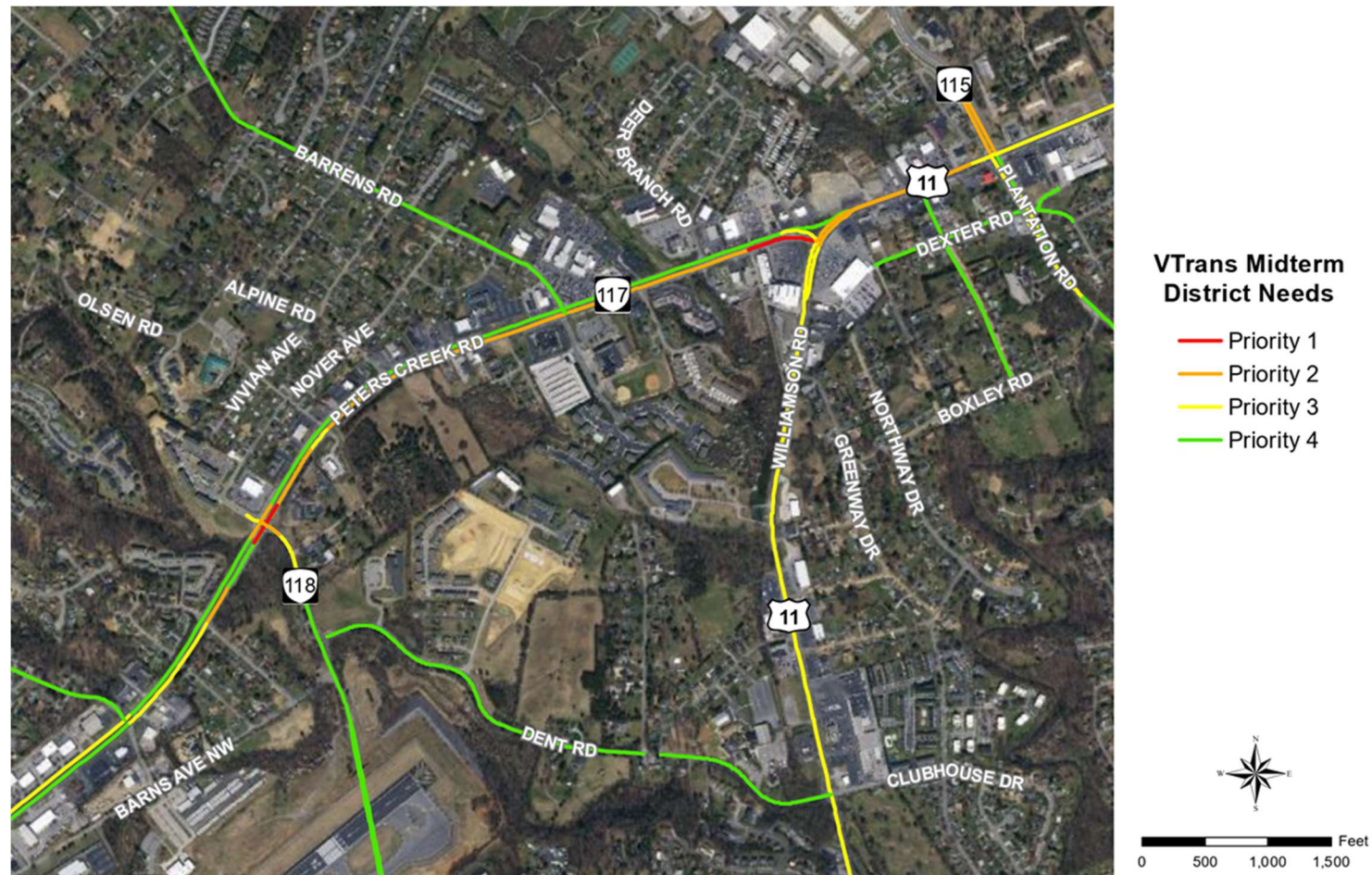


Figure 5: 2019 VTrans Prioritized Mid-term Needs in the Study Area



Purpose, Goals, & Objectives

The purpose of this study is to identify recommendations with a focus on safety, reliability, multi-modal accessibility/connectivity, and TDM along the Route 117 (Peters Creek Road) and Route 11 (Williamson Road) corridors.

Identify cost-effective improvement alternatives that address the identified transportation needs.

Existing Issues in the Study Area

- Congestion and safety needs at the Airport Road, Williamson Road/Peters Creek Road, and Plantation Road intersections
- Lack of sidewalks and pedestrian/bicycle amenities throughout the corridor
- Capacity preservation needs along Williamson Road

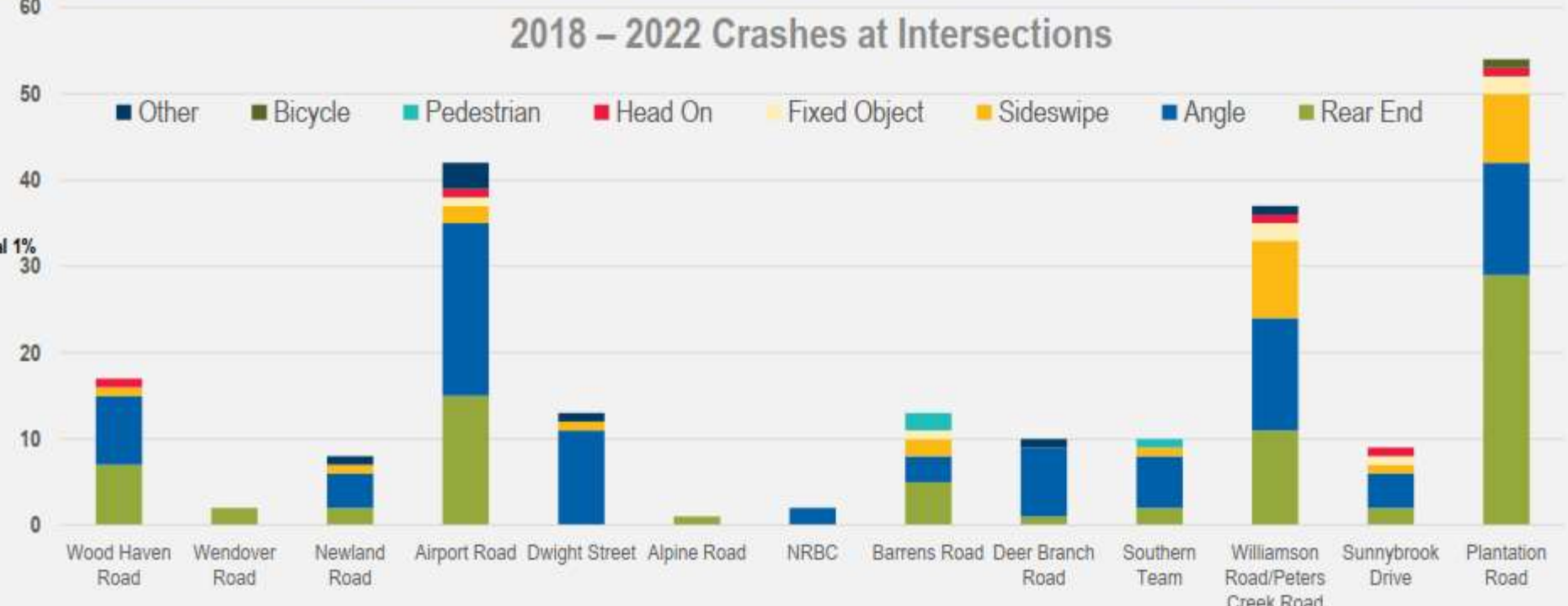
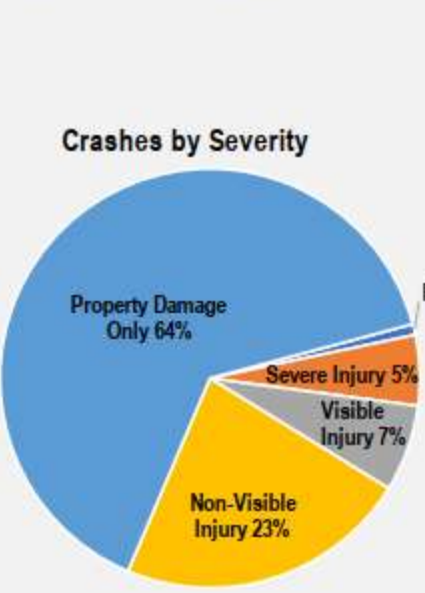
Study Summary

VDOT District	Salem
Locality	Roanoke County
Length	1.64 miles
Study Limits	From Route 628 (Wood Haven Road) to Route 115 (Plantation Road)
Functional Classification	Peters Creek Road - Urban minor arterial Williamson Road - Principal arterial / Corridor of Statewide Significance
Speed Limit	Peters Creek Road - 45 MPH Williamson Road - 35 MPH

VTrans Needs

NEED	PRIORITY
Bicycle Access	Very High
Reliability	Very High
Transportation Demand Management	Very High
Capacity Preservation	High
Pedestrian Access	High
Safety Improvement	High
Transit Access for Equity Emphasis Areas	High
Transit Access	Medium

Figure 6: Study Overview



- Safety Issues in the Study Area**
- 3 pedestrian crashes and 1 bicycle crash
 - 39% angle crashes; 36% rear end crashes
 - 34% of crashes occurred between 3 PM and 6 PM
 - High frequency of angle and rear end crashes at signalized intersections of Wood Haven Road, Airport Road, Williamson Road/Peters Creek Road and Plantation Road

Figure 7: Safety Overview

FHWA Screening Tool for Equity Analysis of Projects (STEAP)

The Federal Highway (FHWA) Screening for Equity Analysis of Projects (STEAP) Tool was reviewed for the study area and surrounding locations. The tool allows you to compare the population to evaluate the metrics and needs of the study area to a city, town, county, or the State of Virginia. The tool is used to elevate consciousness of equity desires in the selection of alternatives. The data source used for the analysis was the American Community Survey 2016 – 2020 and a 0.5-mile radius was used for the analysis buffer. The results of the STEAP Tool analysis are shown in **Figures 8-12** and presented below:

- The majority of households contain two members and only 2% has more than six members of the household as show in **Figure 8**.
- There is a high personal vehicle ownership, with 43% of households owning two or more vehicles, while 4% of the study area does not have a personal vehicle as shown in **Figure 9**.
- Of all the households in the study area, 43% of households make over \$75,000 in annual income. However, 4% make less than \$15,000 as shown in **Figure 10**.
- When compared to the State of Virginia and Roanoke County, the study area has a lower average of households without computer access at only 7% meanwhile, 93% have computer access as shown in **Figure 11**.
- The study area has a higher percentage of veterans (10%) and lower percentage of people with disabilities (29%) compared to Roanoke County, as shown in **Figure 12**.

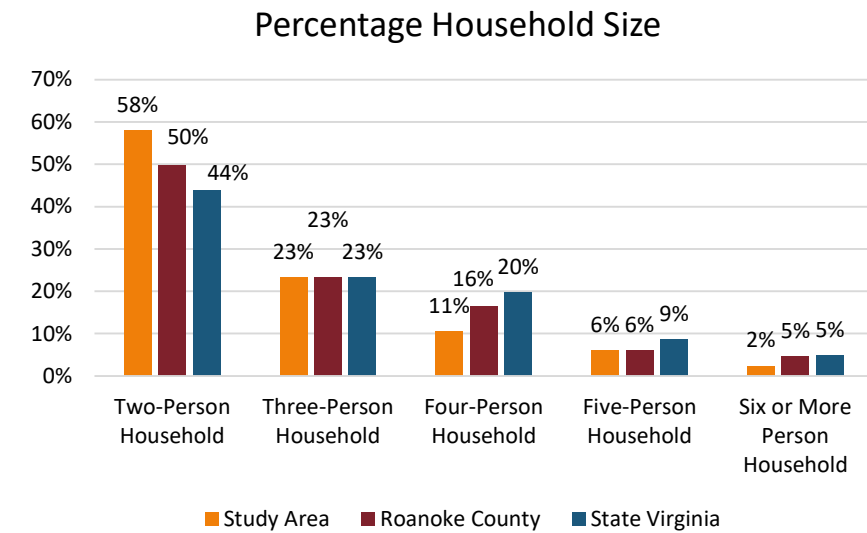


Figure 8: STEAP Tool Analysis Household Size

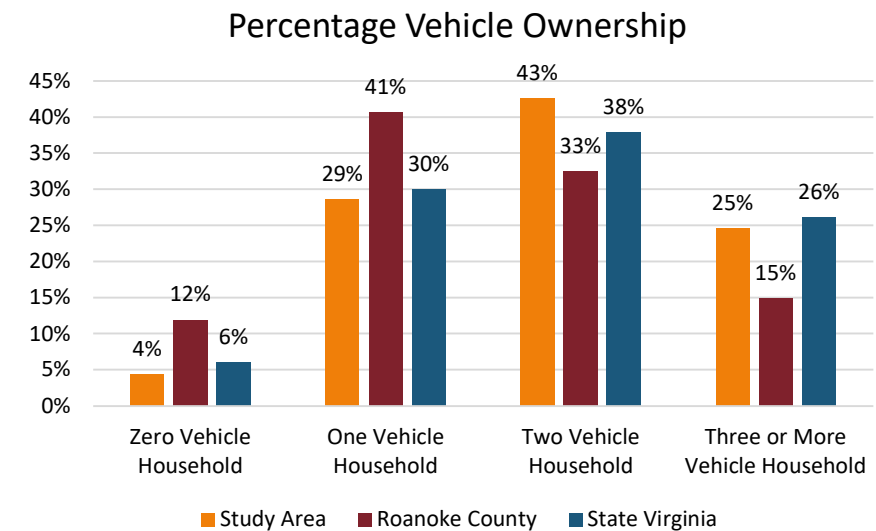


Figure 9: STEAP Tool Analysis Vehicle Ownership

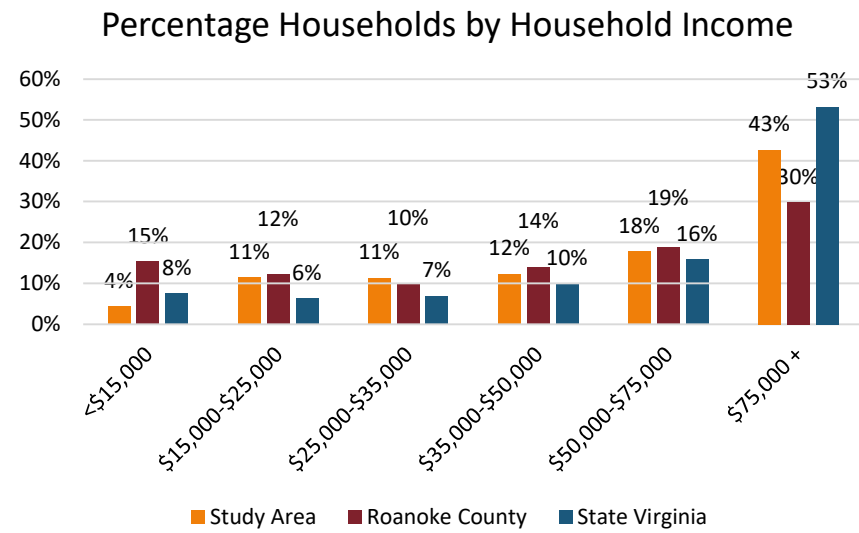


Figure 10: STEAP Tool Analysis Household Income

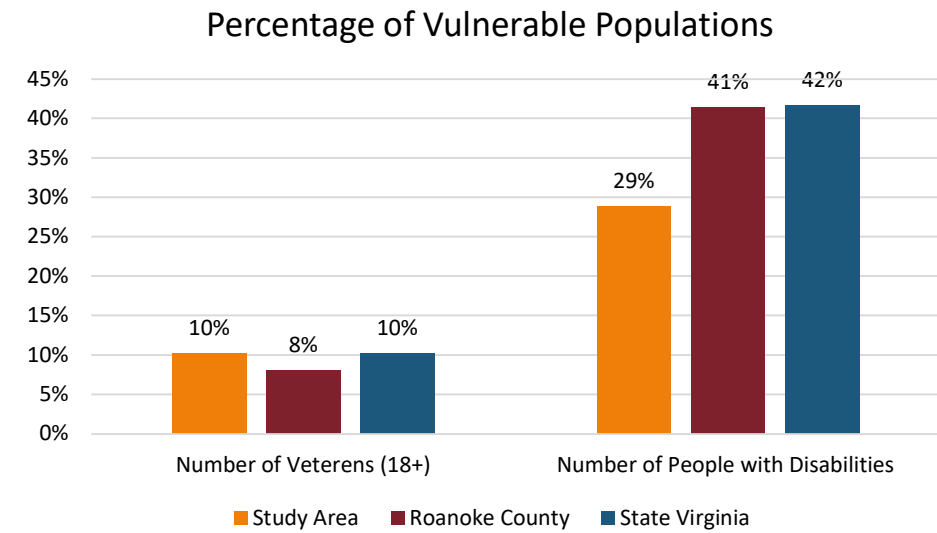


Figure 12: STEAP Tool Analysis Vulnerable Populations

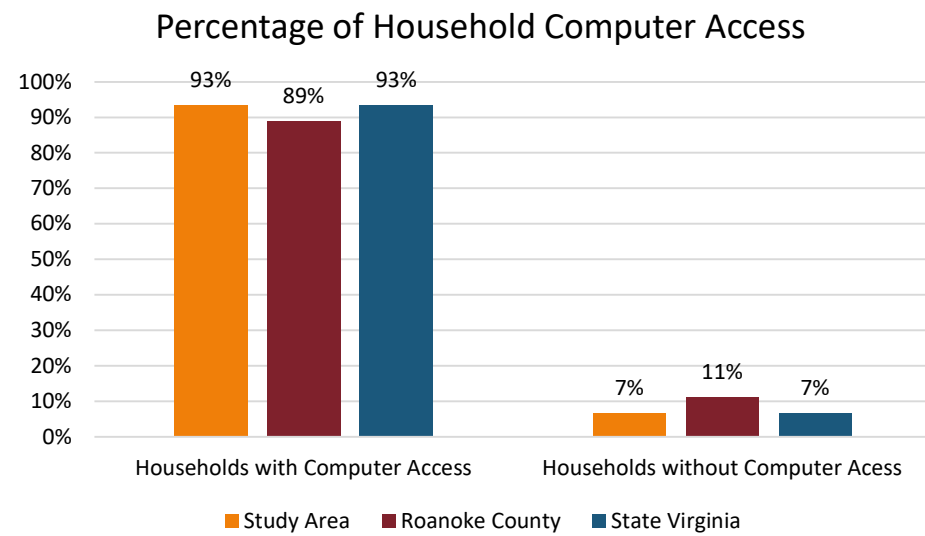


Figure 11: STEAP Tool Analysis Household Computer Access

Planned Projects

Peters Creek Road at Alpine Road Improvements

A Thru-Cut intersection is planned for the Peters Creek Road at Alpine Road intersection in conjunction with the Career and Technical Education Center as shown in **Figure 13**.

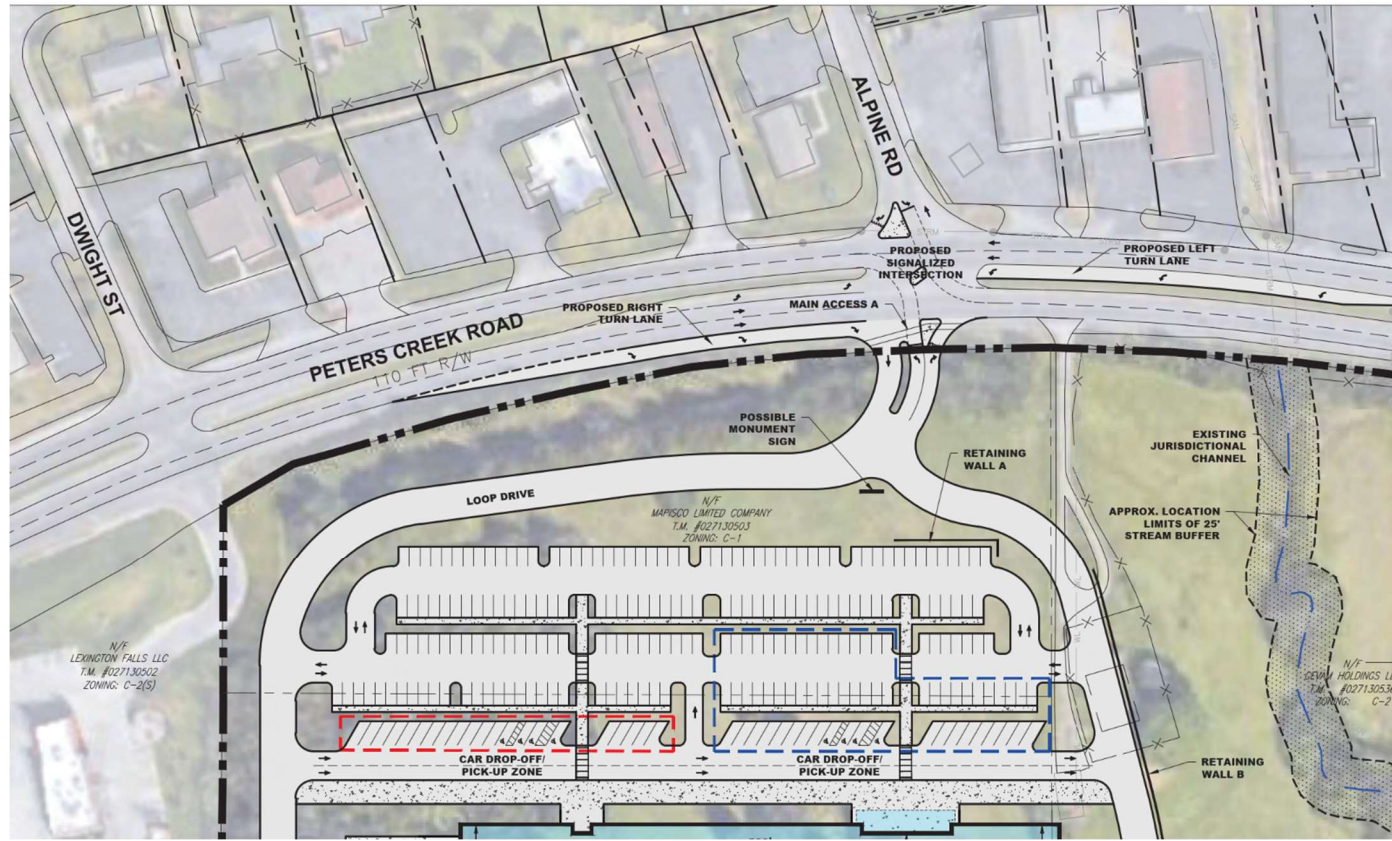


Figure 13: Peters Creek Road at Alpine Road Planned Improvements

Phase 1 Existing Conditions Public Outreach

Initial public outreach was conducted to inform the public of the study efforts and goals and solicit feedback on what the public's priorities and perceptions of the corridor are in the evaluation of potential alternatives. The survey was conducted through PublicInput.com and there were 494 participants. The detailed summary of the public survey is included in **Appendix A**.

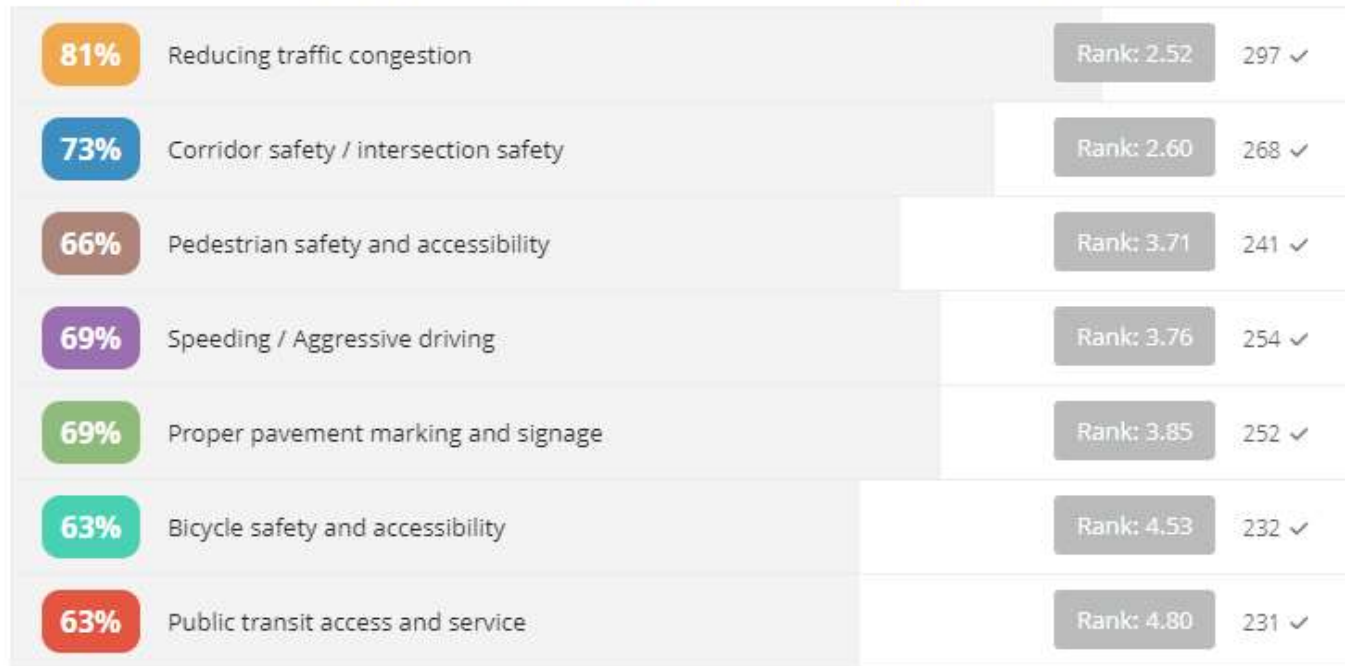
The survey shows that the major needs of the corridor include safety and capacity preservation as shown in **Figure 14**.



Figure 14: Public Input Survey Results

Figure 15 shows the most important issues along the study corridor including reducing traffic congestion, corridor/intersection safety, pedestrian safety and accessibility, and speeding/aggressive driving.

Rank what is the most important issue to you within the study area.



366 Respondents

Figure 15: Public Input Survey Results

The notable comments from the survey responses are summarized below:

- Safety concerns at the Peters Creek Road at Williamson Roat intersection
- Requests for more sidewalks and crosswalks along the corridor
- Too many access points causing more crashes
- Requests for more turn lanes to lessen congestion and rear end crashes
- Concern for traffic overflowing from I-81 incidents
- Safety concerns at Peters Creek Road at Deer Branch Road intersection

Traffic Operations and Accessibility

The initial traffic operational analysis was performed using Synchro 11 software for the study intersections along the Peters Creek Road/Williamson Road corridor. Inputs and analysis methodologies are consistent with the VDOT Traffic Operations and Safety Analysis Manual (TOSAM) guidelines. Both AM and PM peak hour analyses were performed for the existing year (2023) and for the 2050 design year under no build and build conditions.

Traffic Data

Turning movement counts were performed in May 2023 by Peggy Malone and Associates. The AM and PM weekday peak hours were identified as 7:30 - 8:30 AM and 4:45 – 5:45 PM, respectively. The existing intersection peak hour volumes are shown in **Figure 16**. The raw turning movement counts are provided in **Appendix B**.

Measures of Effectiveness

There are many measures of effectiveness (MOE) in traffic operations analysis to quantify operational and safety objectives and provide a basis for evaluating the performance of a transportation network. Several MOEs for intersection analyses can be reported from Synchro/SimTraffic. For this study, guidance for reporting MOEs for signalized and unsignalized intersections was obtained from Chapter 4 of the VDOT TOSAM Version 2.0. A summary of the MOEs evaluated for the study intersections is presented below:

- Control Delay (measured in seconds per vehicle – sec/veh)
- Level of service (LOS)
- Maximum queue Length from SimTraffic (measured in feet – ft)

Future Traffic Forecasting

In order to develop volume forecasts for the future 2050 design year volumes, background linear traffic growth rates were developed in conjunction with VDOT Salem District Planning using Statewide Planning System data. **Table 4** presents the annual linear growth rates along the study area roadways. The growth rates were applied to the existing traffic volumes to develop the 2050 design year traffic volumes. Future traffic volumes were re-balanced as necessary through the study area. 2050 design year traffic volumes are included in **Figure 17**.

Table 4: Growth Rate Summary

Facility	From	To	Pathways for Planning Data				Recommended Growth Rate
			Existing ADT		2050 ADT	Linear Annual Growth Rate	
			Year	ADT			
Peters Creek Road (Route 117)	East of I-581 Interchange	Wood Haven Road	2022	19177	21862	0.5%	0.5%
Peters Creek Road (Route 117)	Wood Haven Road	Williamson Road (Route 11)	2022	19443	28045	1.6%	1.0%
Williamson Road (Route 11)	Roanoke NCL	Roanoke/Botetourt County Line	2022	10471	11937	0.5%	0.5%
Wood Haven Road	Alexander Drive	Peters Creek Road	2022	3680	4195	0.5%	0.5%
Wendover Road	Peters Creek Road	Roanoke NCL	2015	140	208	1.4%	0.5%
Newland Road	Peters Creek Road	Roanoke NCL	2015	210	511	4.1%	0.5%
Airport Road	Peters Creek Road	Dent Road	2022	11115	12671	0.5%	0.5%
Dwight Street	Nover Avenue	Peters Creek Road	2015	440	517	0.5%	0.5%
Alpine Road	Nover Avenue	Peters Creek Road	2015	1700	1998	0.5%	0.5%
Barrens Road	Northmont Avenue	Peters Creek Road	2022	3501	3991	0.5%	0.5%
South Barrens Road	S Barrens Road	Peters Creek Road	2015	2600	5066	2.7%	0.5%
Deer Branch Road	Knoll Road	Peters Creek Road	2019	1300	2650	3.3%	0.5%
Sunnybrook Drive	Peters Creek Road	Dexter Road	2019	810	936	0.5%	0.5%
Plantation Road	Robertson Lane	Peters Creek Road	2022	13124	17717	1.2%	1.2%
Plantation Road	Peters Creek Road	Dexter Road	2022	9723	13398	1.3%	1.3%

Existing and No Build Traffic Operations Analysis Results

Table 4 depicts queue lengths, Levels of Service, and delays for intersections within the study area, for the AM and PM peak hours under 2023 existing conditions. During the peak hours, the signalized intersections along Peters Creek & Williamson Road operate at LOS C or better during the AM peak hour and at LOS D or better during the PM peak hour, with all movements and approaches operating at LOS E or better.

Turning movements at unsignalized intersections also operate at LOS E or better. Detailed analysis results for both signalized and unsignalized intersections are contained in **Appendix C**.

The 2050 No Build analysis has been included for evaluation as a benchmark for the comparison of future conditions and impacts. The No Build analysis retains the same geometry as existing conditions with the exception of the Thru-Cut at Alpine Road.

Table 5 depicts queue lengths, Levels of Service, and delays for intersections along Peters Creek Road and Williamson Road for the AM and PM peak hours for 2050 No Build conditions. By 2050, intersection delays and queues are projected to increase throughout the study area, with worsening levels of service. During the AM peak hour, the signalized intersections along Peters Creek Road and Williamson Road are projected to continue operating at LOS C or better, except for the intersection of Williamson Road at Plantation Road which is projected to degrade to LOS D. Additionally, the eastbound left-turn from Wood Haven Road to northbound Peters Creek Road is projected to degrade to LOS F in the AM peak hour with delays exceeding 100 seconds. During the PM peak hour, the signalized intersections along Peters Creek Road and Williamson Road are projected to continue operating at LOS D or better, except for the intersection of Peters Creek Road at Williamson Road which is projected to degrade to LOS E, with the eastbound left-turn and through movements from Peters Creek Road to northbound Williamson Road and Kroger, respectively, projected to degrade to LOS F with delays exceeding 90 seconds.

Turning movements at unsignalized intersections also projected to continue operating at LOS E or better, except for eastbound Deer Branch Road and the westbound shopping center driveway opposite Southern Team, both of which are projected to degrade to LOS F with delays exceeding 90 seconds. Detailed analysis results for both signalized and unsignalized intersections are contained in **Appendix C**.

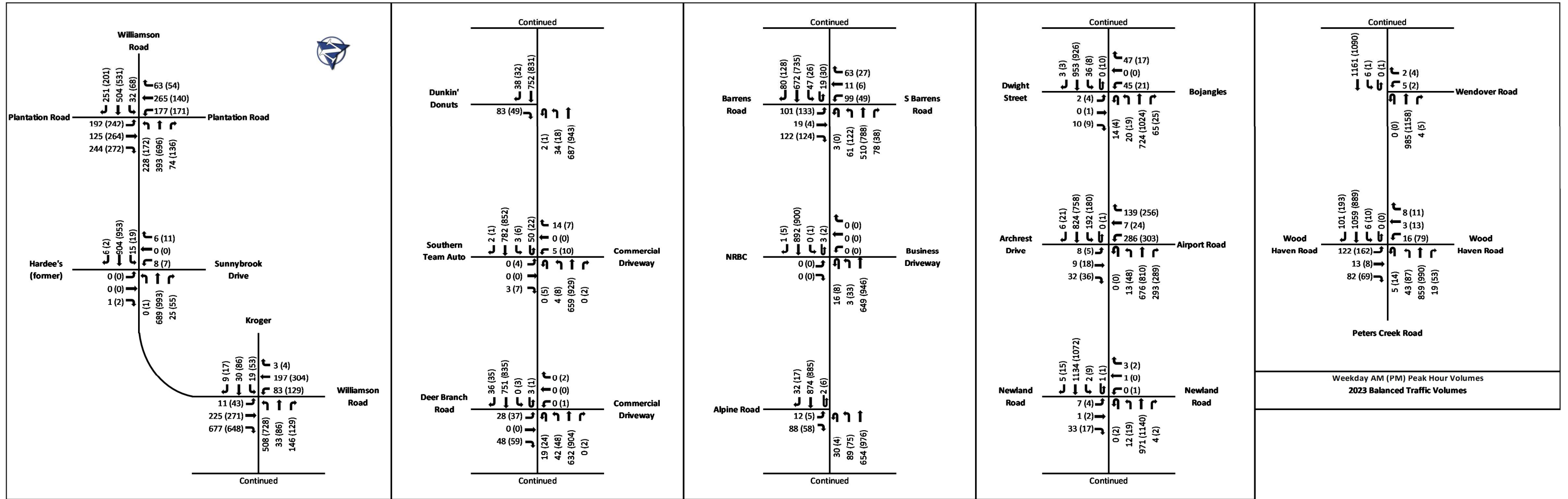


Figure 16: Existing Peak Hour Turning Movement Counts

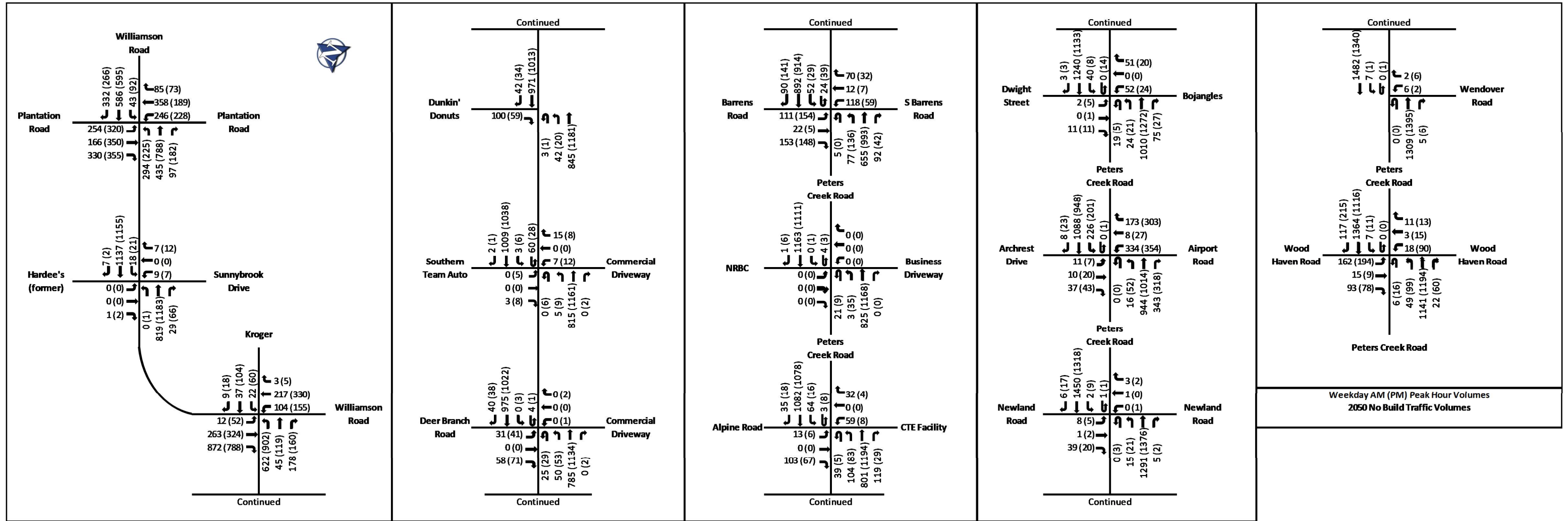


Figure 17: 2050 Peak Hour Forecasted Traffic Volumes

Table 5: 2023 Existing Conditions Traffic Analysis Results Summary

Intersection	Approach	Movement	Existing AM							Existing PM						
			Queue Length (ft)	Movement LOS	Approach LOS	Overall LOS	Delays (sec)	Approach Delay (sec)	Overall Delay (sec)	Queue Length (ft)	Movement LOS	Approach LOS	Overall LOS	Delays (sec)	Approach Delay (sec)	Overall Delay (sec)
Peters Creek Road & Wood Haven Road Signalized	EB	L	291	E	E	B	67.6	60.0	17.8	328	E	E	C	65.8	60.6	25.9
		T-R	100	D	E		50.2			100	D	E		49.8		
	WB	L-T-R	79	E	E		58.2	58.2		144	E	E		59.3	59.3	
	NB	L	76	A	B		9.2	11.0		168	B	B		15.0	19.2	
		T-R	182	B			11.0			315	B			19.6		
	SB	L	73	A	B		7.7	14.4		19	B	C		13.9	22.2	
		T	266	B			14.9			391	C			23.2		
		R	83	A			9.9			300	B			17.7		
	Peters Creek Road & Wendover Road Unsignalized	WB	L-R	52	C		C	-		18.0	18.0	-		31	B	
SB		L	45	B	-	-	10.5	-	-	24	B	-	-	10.4	-	-
Peters Creek Road & Newland Road Unsignalized	EB	L-T-R	82	B	B	-	14.4	14.4	-	69	B	B	-	14.5	14.5	-
	WB	L-T-R	36	C	C		18.6	18.6		25	B	B		13.8	13.8	
	NB	L	26	B	-		10.5	-		63	B	-		10.4	-	
	SB	L	22	B	-		12.0	-		44	B	-		10.4	-	
Peters Creek Road & Airport Road Signalized	EB	L	31	C	D	29.0	44.5	27.4	24	C	D	C	31.8	51.1	30.2	
		T-R	61	D		47.4			166	D			52.8			
	WB	L	293	D		D	38.9		36.5	277	D		D	43.2		40.0
		T-R	177	C		31.6	199			D	36.5					
	NB	L	35	B		C	17.2		25.9	259	B		C	17.6		28.5
		T	378	C			31.4			408	C			34.5		
		R	210	B			13.5			210	B			13.2		
	SB	L	183	C		C	21.3		24.1	244	C		C	22.4		25.1
		T	239	C			24.8			300	C			25.9		
R		24	B	16.2	25		B	17.5								
Peters Creek Road & Dwight Street/Bojangles Unsignalized	EB	L-T-R	33	C	C	-	19.0	19.0	-	53	D	D	-	28.8	28.8	-
	WB	L-T-R	99	E	E		39.7	39.7		61	E	E		45.5	45.5	
	NB	L	49	B	-		10.6	-		22	B	-		10.5	-	
	SB	L	44	A	-		9.2	-		22	B	-		10.0	-	
Peters Creek Road & Alpine Road Unsignalized	EB	L-R	140	C	C	-	22.4	22.4	-	54	C	C	-	18.4	18.4	-
	NB	L	114	B	-		11.2	-		94	B	-		10.9	-	
	SB	U-T	47	A	-		0.0	-		25	A	-		0.0	-	
Peters Creek Road & NRBC Unsignalized	EB	L-R	0	A	A	-	0.0	0.0	-	0	A	A	-	0.0	0.0	-
	WB	L-T-R	0	A	A		0.0	0.0		0	A	A		0.0	0.0	
	NB	L-T	101	A	-		0.1	-		135	A	-		1.2	-	
	SB	L-T	52	A	-		0.0	-		74	A	-		0.0	-	

Intersection	Approach	Movement	Existing AM							Existing PM											
			Queue Length (ft)	Movement LOS	Approach LOS	Overall LOS	Delays (sec)	Approach Delay (sec)	Overall Delay (sec)	Queue Length (ft)	Movement LOS	Approach LOS	Overall LOS	Delays (sec)	Approach Delay (sec)	Overall Delay (sec)					
Peters Creek Road & Barrens Road Signalized	EB	L-T	174	D	D	C	44.0	41.3	33.6	158	D	D	C	40.1	37.9	28.9					
		R	97	D			38.6			88	D			35.5							
	WB	L	177	D	D		44.7	42.7		108	D	D		45.3	44.1						
		T-R	130	D			40.2			68	D			42.3							
	NB	L	173	D	C		46.0	29.7		180	D	C		40.8	25.3						
		T	273	C			28.6			286	C			23.2							
		R	175	C			23.5			30	B			17.5							
	SB	L	190	D	C		46.3	32.4		111	D	C		45.9	28.7						
		T	290	C			32.0			243	C			28.3							
		R	66	C			24.8			93	C			23.1							
	Peters Creek Road & Deer Branch Road Unsignalized	EB	L-T-R	98	C		C	-		22.9	22.9	-		76	D		D	-	34.1	34.1	-
		WB	L-T-R	0	A		A	-		0.0	0.0	-		23	C		C	-	21.4	21.4	-
NB		L	63	A	-	-	9.9	-	-	89	B	-	-	10.1	-	-					
SB		L	14	A	-	-	0.0	-	-	24	A	-	-	9.2	-	-					
Peters Creek Road & Southern Team Unsignalized	EB	L-T-R	29	B	B	-	11.2	11.2	-	50	C	C	-	23.7	23.7	-					
	WB	L-T-R	71	C	C	-	16.3	16.3	-	74	E	E	-	37.4	37.4	-					
	NB	L	18	A	-	-	9.5	-	-	30	A	-	-	9.8	-	-					
	SB	L	66	A	-	-	9.0	-	-	48	B	-	-	10.2	-	-					
Williamson Road & Peters Creek Road Signalized	EB	L	220*	C	C	29.6	28.1	28.1	391*	D	D	D	45.1	42.1	43.1						
		T	233*	C		29.5			369*	D			43.9								
		R	77	C		22.9			75	C			27.2								
	WB	L	53	D		D	37.4		38.1	95	D		D	47.2		49.4					
		T-R	80	D			38.4			175	D			50.5							
	NB	L	114	D		C	39.7		25.3	120	D		D	53.2		39.2					
		T	135	B			19.3			213	C			33.3							
	SB	R	90	B		19.3	140		C	33.3											
		L	45	E		C	64.0		28.7	71	D		D	54.3		48.5					
		T	233*	C			26.9			271*	D			47.5							
Williamson Road & Sunnybrook Drive Unsignalized	EB	L	0	A	-		-	0.0		-	-	0		A	-		-	9.6	-	-	
	WB	L	31	A	-	-	9.3	-	-	31	B	-	-	10.6	-	-					
	NB	L-T-R	54	B	B	-	14.5	14.5	-	51	C	C	-	15.0	15.0	-					
	SB	L-T-R	24	A	A	-	9.5	9.5	-	31	A	A	-	9.6	9.6	-					
Williamson Road & Plantation Road Signalized	EB	L	205	C	C	23.1	23.7	32.4	209	C	D	D	23.7	35.8	35.3						
		T	225	C		24.0			411	D			38.4								
		R	223	C		24.0			400	D			38.4								
	WB	L	71	B		C	18.5		32.8	70	C		C	23.7		33.2					
		T	258	C			34.9			282	D			35.4							
		R	122	C			30.6			104	C			30.4							

Intersection	Approach	Movement	Existing AM							Existing PM						
			Queue Length (ft)	Movement LOS	Approach LOS	Overall LOS	Delays (sec)	Approach Delay (sec)	Overall Delay (sec)	Queue Length (ft)	Movement LOS	Approach LOS	Overall LOS	Delays (sec)	Approach Delay (sec)	Overall Delay (sec)
	NB	L	175	C	D	C	29.7	39.1		193	C	C	C	28.4	34.6	
		T	208	D			44.2			134	D			40.1		
		R	194	D			44.2			121	D			40.1		
	SB	L	255	C	D		32.2	36.5		248	C	D		29.8	37.1	
		T	188	D			40.5			370	D			45.3		
		R	153	D			37.9			196	D			35.5		

* Maximum queue from SimTraffic extends into the adjacent upstream intersection

Table 6: 2050 No Build Traffic Analysis Results Summary

Intersection	Approach	Movement	2050 No Build AM							2050 No Build PM							
			Queue Length (ft)	Movement LOS	Approach LOS	Overall LOS	Delays (sec)	Approach Delay (sec)	Overall Delay (sec)	Queue Length (ft)	Movement LOS	Approach LOS	Overall LOS	Delays (sec)	Approach Delay (sec)	Overall Delay (sec)	
Peters Creek Road & Wood Haven Road Signalized	EB	L	434	F	F	C	103.5	82.2	22.2	400	E	E	C	73.3	65.7	30.9	
		T-R	100	D	F		50.1			100	D	E		48.9			
	WB	L-T-R	79	E	E		58.4	58.4		182	E	E		60.3	60.3		
	NB	L	120	B	B		13.2	13.2		170	C	C		20.3	24.7		
		T-R	270	B	B		13.2			388	C	C		25.1			
	SB	L	53	A	B		9.0	17.9		87	B	C		17.3	27.3		
		T	374	B			18.6			404	C			28.9			
		R	204	B			10.4			299	B			19.4			
	Peters Creek Road & Wendover Road Unsignalized	WB	L-R	61	C		C	-		22.1	22.1	-		37	B		B
SB		L	32	B	-	-	12.5	-	-	19	B	-	-	11.6	-	-	
Peters Creek Road & Newland Road Unsignalized	EB	L-T-R	110	C	C	-	16.9	16.9	-	63	C	C	-	16.6	16.6	-	
	WB	L-T-R	37	D	D		25.6	25.6		23	C	C		15.3	15.3		
	NB	L	37	B	-		12.7	-		49	B	-		11.9	0.2		
	SB	L	19	B	-		14.7	-		34	B	-		11.5	0.1		
Peters Creek Road & Airport Road Signalized	EB	L	39	D	D	C	36.5	54.9	33.2	34	D	E	D	36.9	57.4	35.9	
		T-R	95	E	D		59.1			107	E	E		59.8			
	WB	L	444	E	D		56.3	50.5		542	E	D		58.8	50.9		
		T-R	300	D	D		39.7			300	D	D		42.3			
	NB	L	192	B	C		18.5	32.0		259	B	C		18.9	33.6		
		T	509	D			38.6			578	D			40.6			
		R	210	B			14.5			210	B			13.8			
	SB	L	293	C	C		28.0	26.7		286	C	C		33.8	28.6		
		T	365	C			26.5			414	C			27.8			
R		53	B	15.6		118	B		17.1								
Peters Creek Road & Dwight Street/Bojangles Unsignalized	EB	L-T-R	37	B	B	-	11.2	11.2	-	63	B	B	-	12.7	12.7	-	
	WB	L-T-R	199	B	B		14.4	14.4		84	B	B		14.4	14.4		
	NB	L	56	B	-		10.9	-		52	B	-		10.2	-		
	SB	L	64	B	-		10.3	-		48	B	-		11.1	-		
Peters Creek Road & Alpine Road Signalized	EB	L	46	C	C	30.8	25.3	14.4	34	C	C	B	34.2	25.5	10.5		
		R	0	C		24.6			0	C			24.7				
	WB	L	91	C		C	33.1		30.5	31			D	C		37.0	33.9
		R	5	C		25.9	0			C			26.9				
	NB	L	178	A		B	9.1		10.4	144			A	A		5.9	9.0
		T	270	B			10.9			291			A			9.3	
		R	151	A			8.5			78			A			5.6	

Intersection	Approach	Movement	2050 No Build AM							2050 No Build PM							
			Queue Length (ft)	Movement LOS	Approach LOS	Overall LOS	Delays (sec)	Approach Delay (sec)	Overall Delay (sec)	Queue Length (ft)	Movement LOS	Approach LOS	Overall LOS	Delays (sec)	Approach Delay (sec)	Overall Delay (sec)	
	SB	L	186	A	B		6.4	15.7		57	A	B		5.4	11.2		
		T-R	350	B		16.3	332		B		11.3						
Peters Creek Road & NRBC Unsignalized	EB	L-R	0	A	A		0.0	0.0		0	A	A		0.0	0.0		
	WB	L-T-R	0	A	A		0.0	0.0		0	A	A		0.0	0.0		
	NB	L-T	193	A	-		0.1	-		209	A	-		1.4	-		
	SB	L-T	101	A	-		0.0	-		73	A	-		0.0	-		
Peters Creek Road & Barrens Road Signalized	EB	L-T	191	D	D		50.5	46.7		194	D	D		51.1	47.0	31.8	
		R	124	D		43.5	125		D		42.6						
	WB	L	182	D	D		50.8	48.2		112	D	D		54.7	52.9		
		T-R	141	D		44.5	78		D		50.1						
	NB	L	197	D	C		51.3	29.2	34.4	200	D	C		51.9	27.7		
		T	347	C		27.4	434			C		24.9					
	SB	R	175	C		22.1	175	B			17.1						
		L	219	D	C		51.7	32.5		205	E		56.2	30.1			
	T	380	C		31.8	335	C				29.4						
	R	124	C		23.7	75	C			22.3							
Peters Creek Road & Deer Branch Road Unsignalized	EB	L-T-R	180	E	E		45.8	45.8			303	F	F		100.0	100.0	
	WB	L-T-R	0	A	A		0.0	0.0			21	E	E		36.8	36.8	
	NB	L	82	B	-		11.2	-			90	B	-		11.2	-	
	SB	L	25	A	-		0.0	-			22	B	-		10.1	-	
Peters Creek Road & Southern Team Unsignalized	EB	L-T-R	29	B	B		12.4	12.4		51	E	E		39.1	39.1		
	WB	L-T-R	80	C	C		24.9	24.9		83	F	F		76.1	76.1		
	NB	L	27	B	-		10.6	-		33	B	-		10.8	-		
	SB	L	62	A	-		9.6	-		72	B	-		11.5	-		
Williamson Road & Peters Creek Road Signalized	EB	L	342*	D	C		36.2	34.1	33.4	615*	F	F		93.4	68.0		
		T	309*	D		36.4	619*			F		93.4					
		R	85	C		25.6	149*			C		31.0					
	WB	L	64	D	D		44.1	45.3		119	D	D		49.9		53.2	
		T-R	90	D		45.8	196			D		54.8					
	NB	L	119	D	C		42.2	28.4		120	E	D		61.6		42.8	
		T	165	C		21.8	312			C		34.1					
	SB	R	100	C		21.8	202	C			34.1						
		L	43	D	C		51.7	34.4		166	E	D		58.7		54.6	
	T	321*	C		33.6	406*	D				53.9						
Williamson Road & Sunnybrook Drive Unsignalized	EB	L	0	A	-		0.0	-		10	B	-		10.6	-		
	WB	L	37	A	-		9.9	-		43	B	-		11.9	-		
	NB	L-T-R	57	C	C		16.2	16.2		67	C	C		17.6	17.6		
	SB	L-T-R	21	A	A		10.0	10.0		28	A	B		10.0	10.0		

Intersection	Approach	Movement	2050 No Build AM							2050 No Build PM						
			Queue Length (ft)	Movement LOS	Approach LOS	Overall LOS	Delays (sec)	Approach Delay (sec)	Overall Delay (sec)	Queue Length (ft)	Movement LOS	Approach LOS	Overall LOS	Delays (sec)	Approach Delay (sec)	Overall Delay (sec)
Williamson Road & Plantation Road Signalized	EB	L	209	D	C	D	35.3	32.9	45.7	210	C	D	D	32.9	49.3	46.7
		T	415	C			31.6			588	D			53.1		
		R	348	C			31.6			592	D			53.1		
	WB	L	127	C	23.8		48.9	157		C	33.3	D		44.5		
		T	331	D	53.3		318	D		48.3						
		R	380	D	44.3		177	D		40.0						
	NB	L	200	D	D		37.6	53.8		198	D	D		44.0		
		T	411	E			62.7			308	D				48.8	
		R	349	E			62.7			244	D				48.8	
	SB	L	306	D	D		46.4	48.4		384	D	D		46.8		
		T	248	D			51.8			443	E				59.1	
		R	251	D			48.2			346	D				43.6	

* Maximum queue from SimTraffic extends into the adjacent upstream intersection

Safety and Reliability

For the analysis of existing safety conditions, the VDOT Crash Analysis PowerBI Tool was utilized to determine the crash history at the study intersections and along the study corridor. Crash data was collected and analyzed for five years from January 2018 to December 2022. For the purposes of this analysis, “injury crashes” is defined as the sum of type A (severe injury), B (visible injury), and C (non-visible injury) crashes.

The crash severity within the study area is summarized by year and type in **Table 7** and **Table 8**, respectively. A summary of the crash severity and crash type by intersection is shown in **Table 9** and **Table 10**, respectively. A summary of the safety needs and diagnosis is illustrated in **Figure 7**.

Table 7: Study Area Crash Severity by Year

Crash Year and Severity	K. Fatal Injury	A. Severe Injury	B. Visible Injury	C. Nonvisible Injury	PDO. Property Damage Only	Total
2018	0	4	3	12	30	49
2019	1	2	2	17	29	51
2020	1	2	1	9	29	42
2021	0	2	5	12	30	49
2022	0	3	5	4	36	48
Total	2	13	16	54	154	239

Table 8: Study Area Crash Severity by Type

Collision Type and Crash Severity	K. Fatal Injury	A. Severe Injury	B. Visible Injury	C. Nonvisible Injury	PDO. Property Damage Only	Total
Rear End	0	4	4	28	50	86
Angle	2	3	10	17	62	94
Sideswipe – Same Direction	0	0	0	5	23	28
Fixed Object – Off Road	0	1	0	0	7	8
Non-Collision	0	1	0	0	0	1
Pedestrian	0	2	0	1	0	3
Head On	0	1	1	2	1	5
Sideswipe – Opposite Direction	0	0	0	0	2	2
Fixed Object in Road	0	0	0	0	1	1
Deer	0	0	0	0	7	7
Bicyclist	0	1	0	0	0	1
Other	0	0	1	1	1	3
Total	2	13	16	54	154	239

Table 9: Study Area Crash Severity by Intersection

Intersection and Crash Severity	K. Fatal Injury	A. Severe Injury	B. Visible Injury	C. Nonvisible Injury	PDO. Property Damage Only	Total
Wood Haven Road	0	2	3	2	10	17
Wendover Road	0	0	0	1	1	2
Newland Road	1	0	0	2	5	8
Airport Road	0	3	6	10	23	42
Dwight Street	1	0	1	1	10	13
Alpine Road	0	0	1	0	0	1
NRBC	0	0	0	0	2	2
Barrens Road	0	3	1	3	6	13
Deer Branch Road	0	1	1	0	8	10
Southern Team	0	0	0	4	6	10
Williamson Road	0	2	1	9	25	37
Sunnybrook Drive	0	0	0	5	4	9
Plantation Drive	0	2	1	14	37	54
Total	2	13	15	51	137	218

Table 10: Study Area Crash Types by Intersection

Intersections and Crash Types	Rear End	Angle	Sideswipe	Fixed Object	Head On	Pedestrian	Bicycle	Other	Total
Wood Haven Road	7	8	1	0	1	0	0	0	17
Wendover Road	2	0	0	0	0	0	0	0	2
Newland Road	2	4	1	0	0	0	0	1	8
Airport Road	15	20	2	1	1	0	0	3	42
Dwight Street	0	11	1	0	0	0	0	1	13
Alpine Road	1	0	0	0	0	0	0	0	1
NRBC	0	2	0	0	0	0	0	0	2
Barrens Road	5	3	2	1	0	2	0	0	13
Deer Branch Road	1	8	0	0	0	0	0	1	10
Southern Team	2	6	1	0	0	1	0	0	10
Williamson Road	11	13	9	2	1	0	0	1	37
Sunnybrook Drive	2	4	1	1	1	0	0	0	9
Plantation Drive	29	13	8	2	1	0	1	0	54
Total	77	92	26	7	5	3	1	7	218

A total of 239 crashes were reported within the Peters Creek/Williamson Road study area during the five-year study period. Key findings from the crash data are as follows:

1. Crash frequency varies each year with the highest number of crashes (51) occurring in 2019, followed by 49 crashes in 2018 and 2021 and 48 crashes in 2022 as shown in **Table 7**.
2. The average number of reported crash incidents per year is 47.8.
3. Angle crashes account for 39% of all crashes and rear end crashes account for 36% of all crashes.
4. A total of 85 crash incidents were associated with injuries, which account for approximately 36% of the total reported crashes within the corridor.
5. There were 3 pedestrian crashes and 1 bicycle crash reported within the corridor.

The collision diagram is presented in **Figure 18** and detailed collision diagrams for each study intersection are included in **Appendix A**.

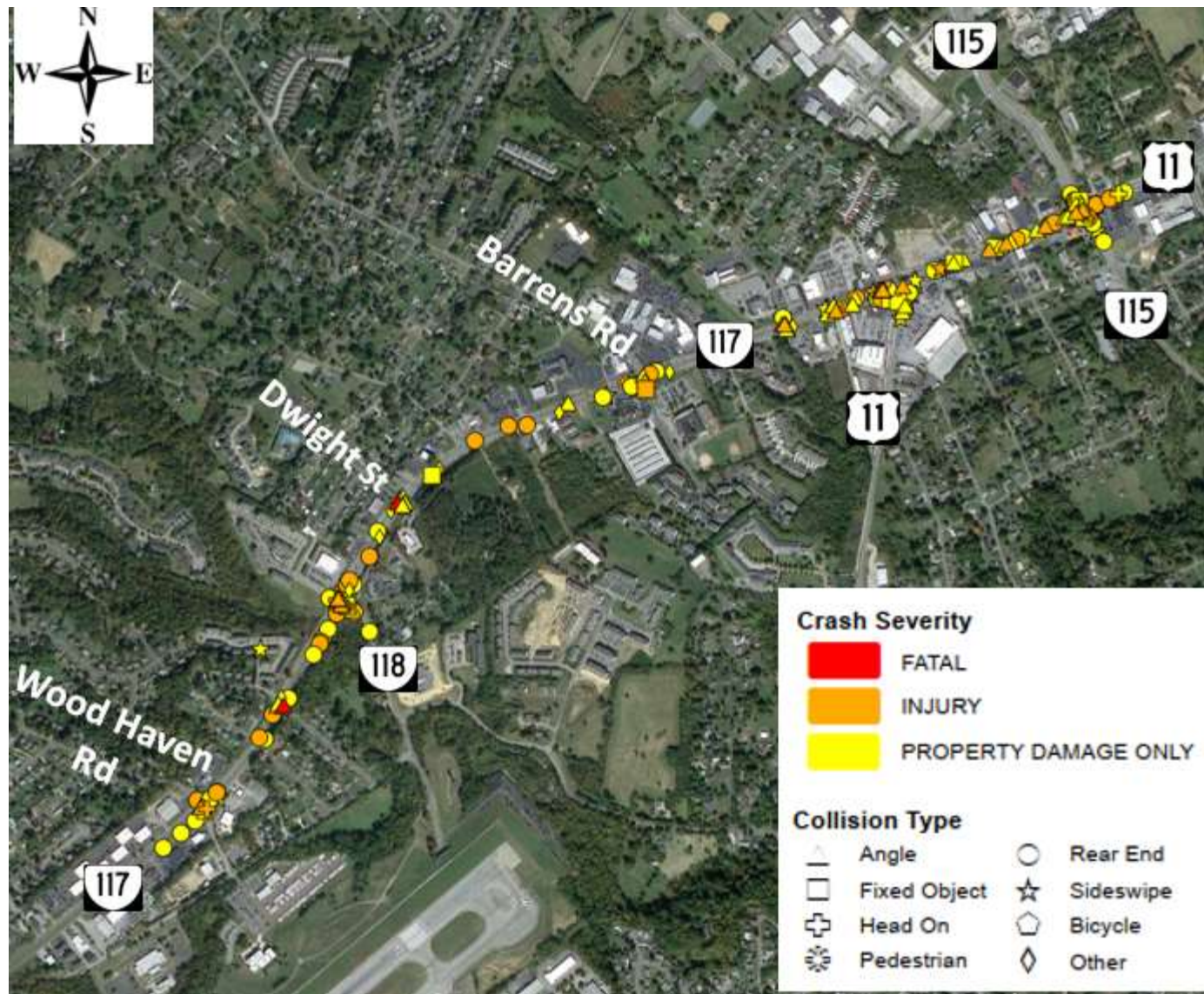


Figure 18: Collision Diagram

The locations of the pedestrian and bicycle crashes are depicted in Figure 19 in addition to the locations of the Pedestrian Safety Action Plan (PSAP) corridors.

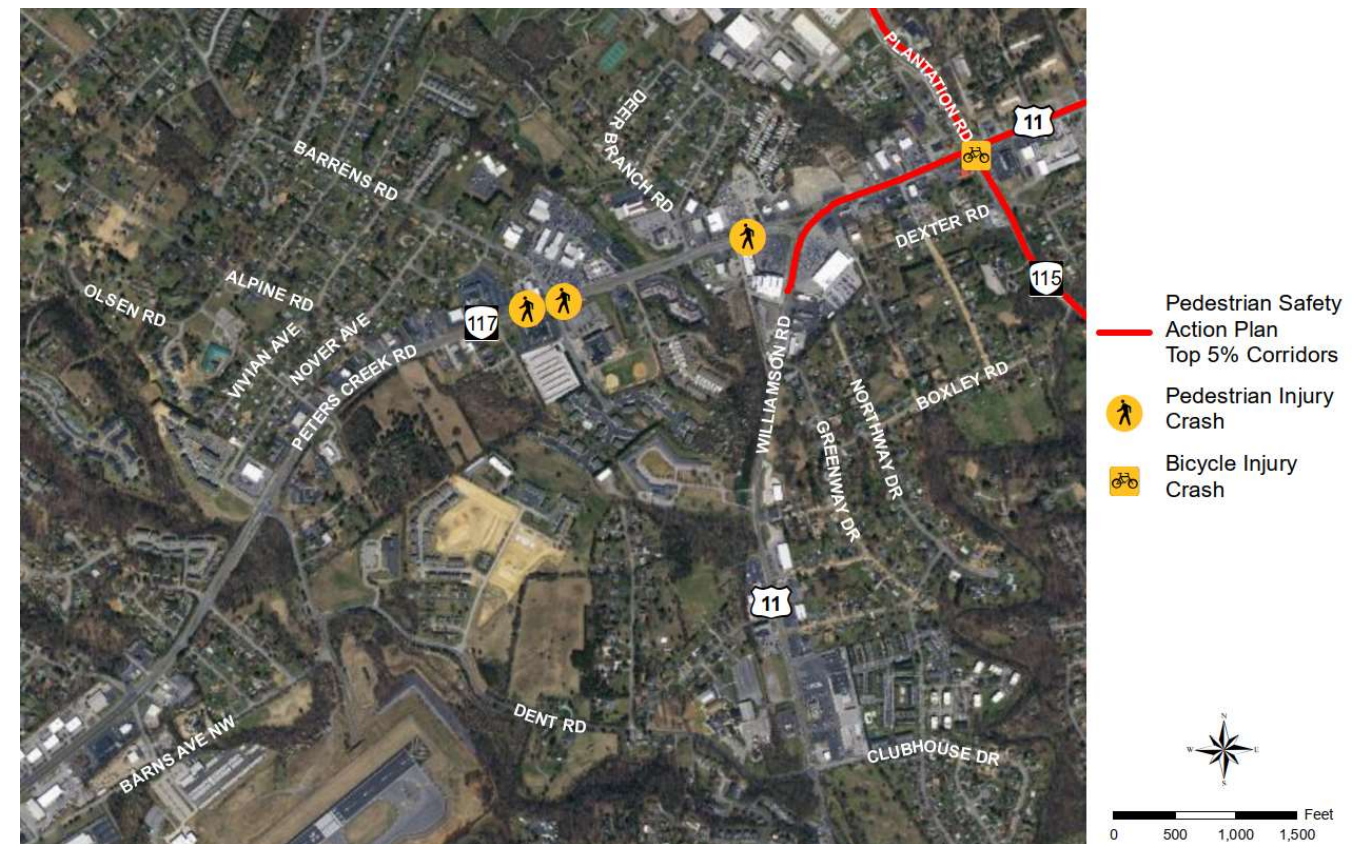


Figure 19: Pedestrian and Bicycle Crash Locations and PSAP Corridors

The locations of the Potential for Safety Improvement (PSI) intersections and segments are depicted in Figure 20.

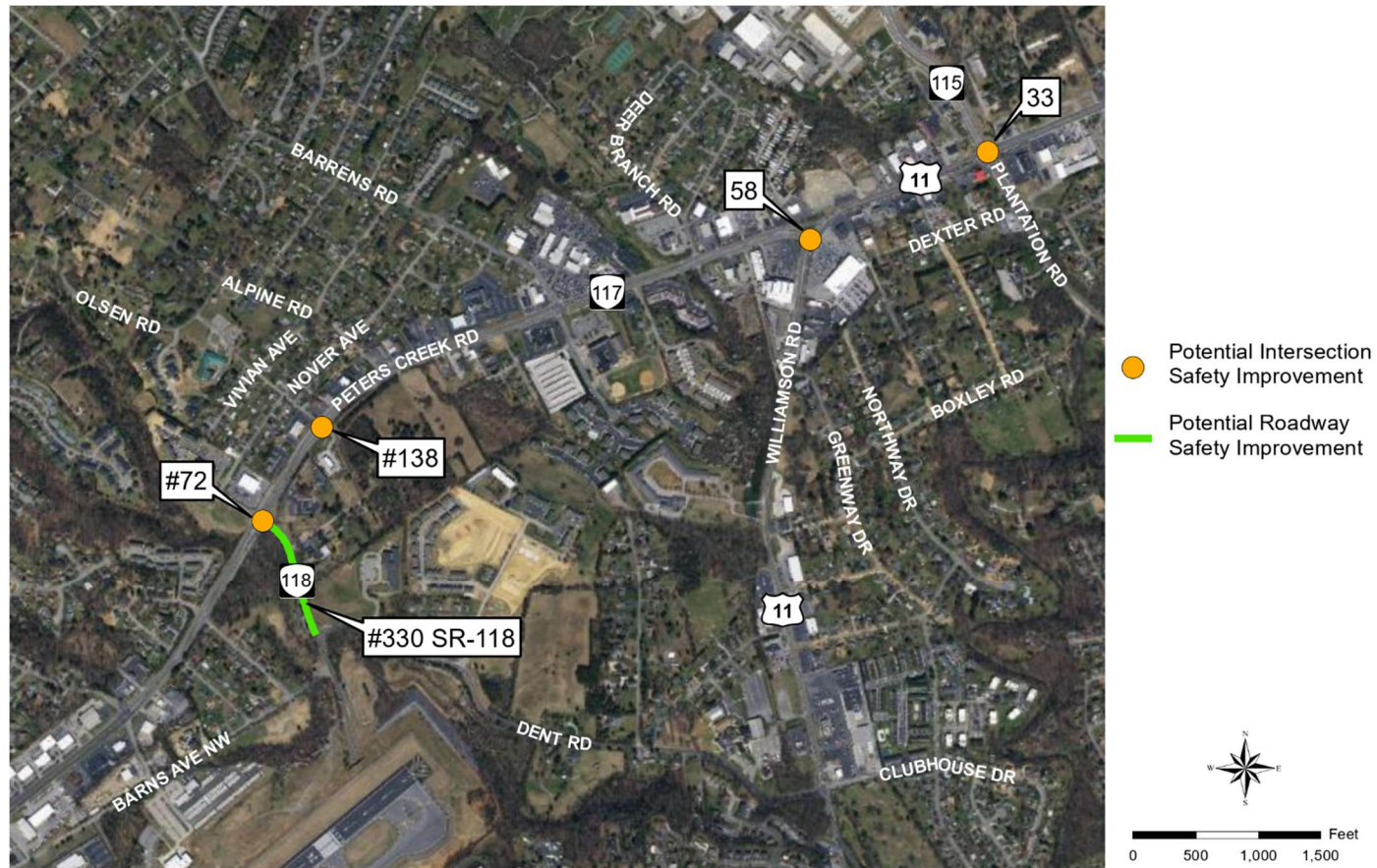


Figure 20: Potential for Safety Improvement (PSI) Locations



Chapter 2:

Alternative Development and Refinement

Alternative Development and Screening

In order to develop alternative concepts to address the needs and incorporate diagnosis identified in Chapter 1, a thorough review of the existing conditions data was conducted. A screening-level analysis was performed to identify potential improvements along Peters Creek Road (Route 117) and Williamson Road (Route 11). Corridorwide pedestrian improvements were identified as well as improvements at each study intersection as described in the following sections. A more detailed evaluation of operational and safety benefits is included in the Stakeholder Working Group Meeting #3 presentation included in **Appendix A**.

Peters Creek Road at Wood Haven Road

A Thru-Cut intersection was considered for the Peters Creek Road at Wood Haven Road intersection (see **Figure 21**). The Thru-Cut that would restrict eastbound and westbound through vehicles from traveling across Peters Creek Road. Significant safety and operational benefits are expected for replacing conventional intersections with Thru-Cuts by reducing the number of conflict points thereby reducing the potential for crashes, particularly angle crashes which typically lead to the most severe injuries. The number of conflict points are reduced from 32 at conventional intersection to 20 for Thru-Cuts. **Figure 22** compares the number of conflict points between the conventional intersection and the Thru-Cut intersection. Additionally, a Thru-Cut would reduce the number of signal phases by allowing the eastbound and westbound split phasing to be converted to concurrent phasing.

Signalized pedestrian crossings are proposed for the east and west legs of the intersection in addition to crossing Peters Creek Road. In addition, to accommodate downstream U-turns, a left-turn lane is proposed on southbound Peters Creek Road at Highway Motors where there is currently no left-turn lane.

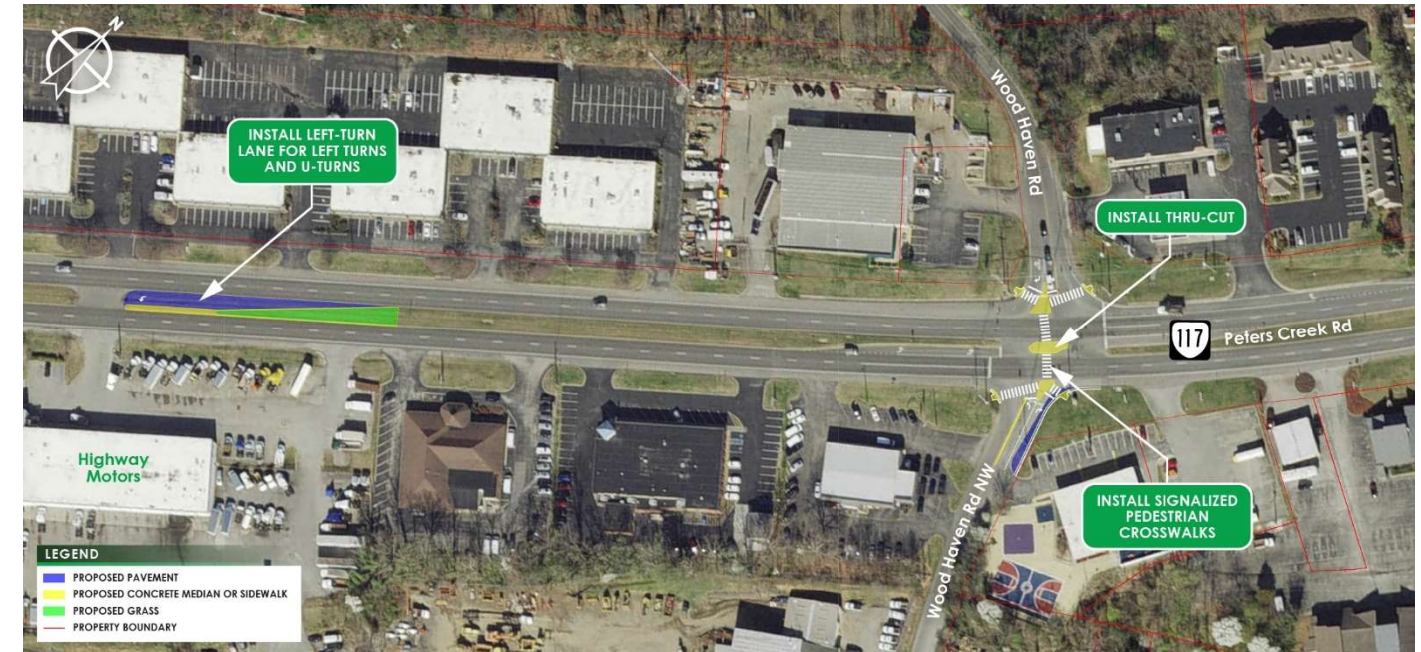


Figure 21: Peters Creek Road at Wood Haven Road

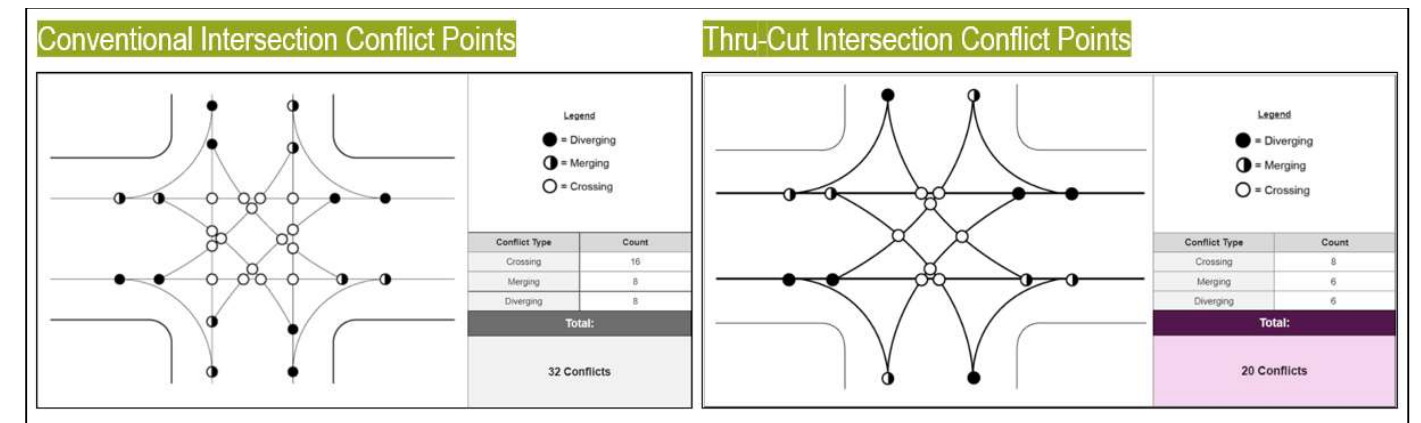


Figure 22: Intersection Conflict Point Comparison – Conventional vs. Thru-Cut

Peters Creek Road at Wendover Road & Newland Road

An RCUT intersection was considered for the Peters Creek Road at Newland Road intersection and closure of the median opening at Wendover Road was considered (see **Figure 23**). The RCUT at Newland Road would restrict left-turn and through movements from Newland Road. Left turn and through traffic volumes from the minor street approaches at both intersections are less than 10 vehicles per hour during the AM and PM peaks and therefore would not significantly impact adjacent upstream or downstream intersections as a result of U-turn movements. Significant safety benefits are expected for replacing conventional intersections with RCUTs by reducing the number of conflict points thereby reducing the potential for crashes, particularly angle crashes which typically lead to the most severe injuries. The number of conflict points are reduced from 32 at conventional intersection to 18 for the RCUTs.

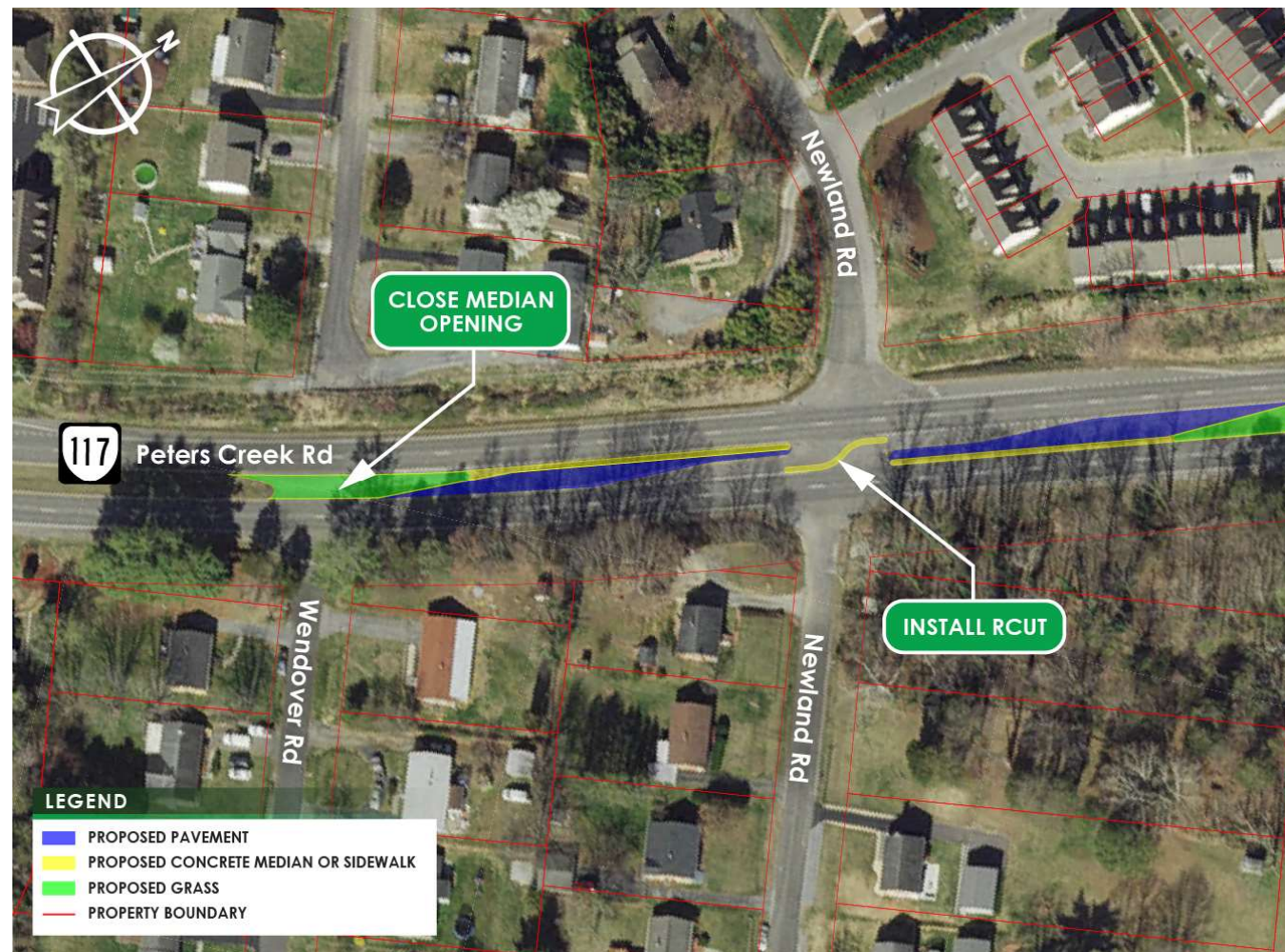


Figure 23: Peters Creek Road at Wendover Road & Newland Road

Figure 24 compares the number of conflict points between the conventional intersection and the RCUT intersection. The median closure at Wendover Road would eliminate all crossing conflict points at the intersection and reduce conflict points from 9 to 2.

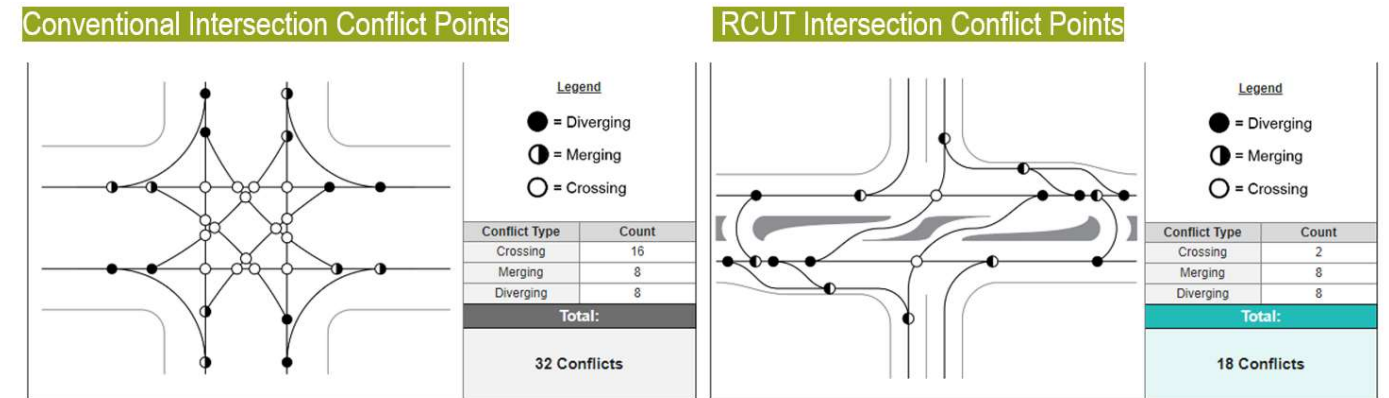


Figure 24: Intersection Conflict Point Comparison – Conventional vs. RCUT

Peters Creek Road at Airport Road

A Thru-Cut intersection was considered for the Peters Creek Road at Airport Road intersection (see **Figure 25**). The Thru-Cut that would restrict eastbound and westbound through vehicles from traveling across Peters Creek Road. Significant safety and operational benefits are expected for replacing conventional intersections with Thru-Cuts by reducing the number of conflict points thereby reducing the potential for crashes, particularly angle crashes which typically lead to the most severe injuries. The number of conflict points are reduced from 32 at conventional intersection to 20 for Thru-Cuts. Additionally, a Thru-Cut would reduce the number of signal phases by allowing the eastbound and westbound split phasing to be converted to concurrent phasing. In addition to the Thru-Cut, the following safety and operational improvements are proposed at the Peters Creek Road at Airport Road intersection:

- Offset the northbound and southbound Peters Creek Road left-turn lanes to improve sight distance for left-turning vehicles.
- Install a double left-turn lane on westbound Airport Road.
- Install signalized pedestrian crossings of the west leg crossing Archcrest Drive and crossing Peters Creek Road.

- Install a raised median along Airport Road between Peters Creek Road and Burlington Drive; restrict access from the commercial driveway located just east of Peters Creek Road to right-in/right-out.
- Install a left-turn lane on eastbound Airport Road to Burlington Drive to accommodate U-turns and left turns.

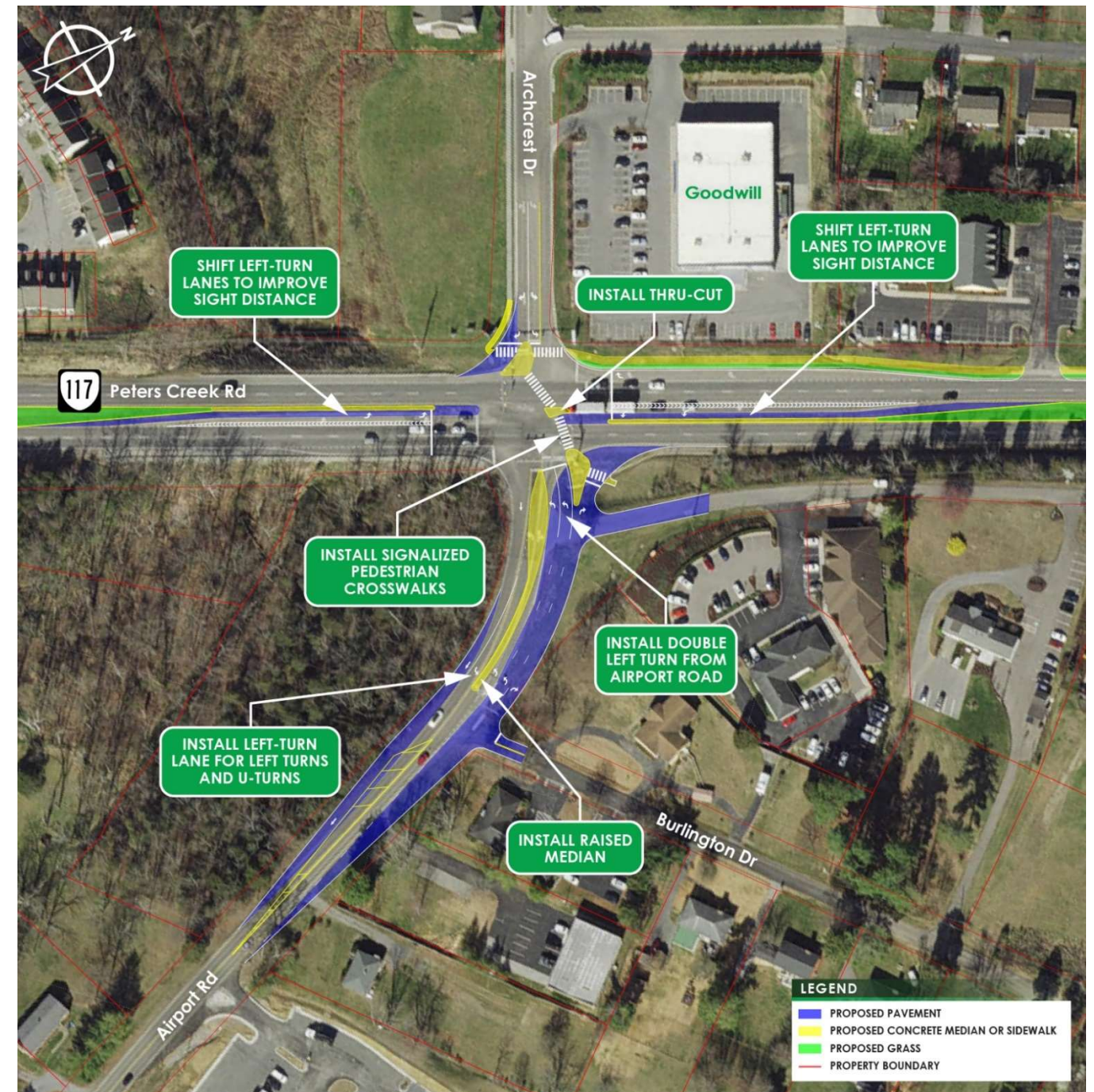


Figure 25: Peters Creek Road at Airport Road

Peters Creek Road at Dwight Street

An RCUT intersection was considered for the Peters Creek Road at Dwight Street intersection (see **Figure 26**). The RCUT at Dwight Street would restrict left-turn and through movements from Dwight Street. Left turn and through traffic volumes from the minor street approaches at both intersections are approximately 50 vehicles per hour or less during the AM and PM peaks and therefore would not significantly impact adjacent upstream or downstream intersections as a result of U-turn movements. Significant safety benefits are expected for replacing conventional intersections with RCUTs by reducing the number of conflict points thereby reducing the potential for crashes, particularly angle crashes which typically lead to the most severe injuries. The number of conflict points are reduced from 32 at conventional intersection to 18 for the RCUTs.

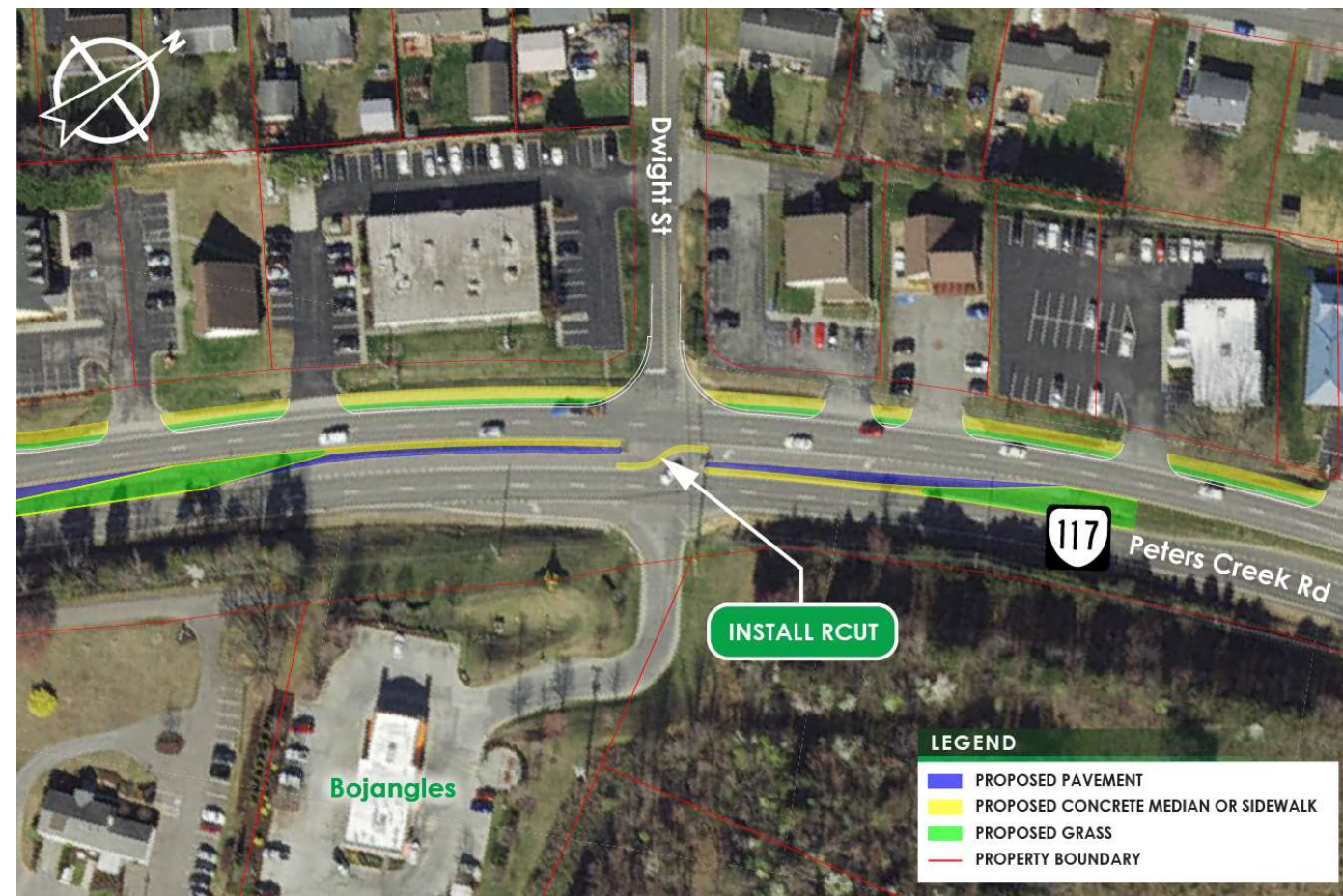


Figure 26: Peters Creek Road at Dwight Street

Peters Creek Road at North Roanoke Baptist Church

An RCUT intersection was considered for the Peters Creek Road at North Roanoke Baptist Church (NRBC) intersection (see **Figure 27**). The RCUT would restrict left-turn movements from NRBC. Left-turn traffic volumes from NRBC are negligible during the AM and PM peaks and therefore would not significantly impact adjacent upstream or downstream intersections as a result of U-turn movements. Additionally, NRBC has access to Barrens Road via Northmont Avenue via the back entrance to the church. Significant safety benefits are expected for replacing conventional intersections with RCUTs by reducing the number of conflict points thereby reducing the potential for crashes, particularly angle crashes which typically lead to the most severe injuries. The number of conflict points are reduced from 32 at conventional intersection to 18 for the RCUTs.

In addition to the installation of an RCUT, northbound and southbound left-turn lane are proposed on Peters Creek Road.

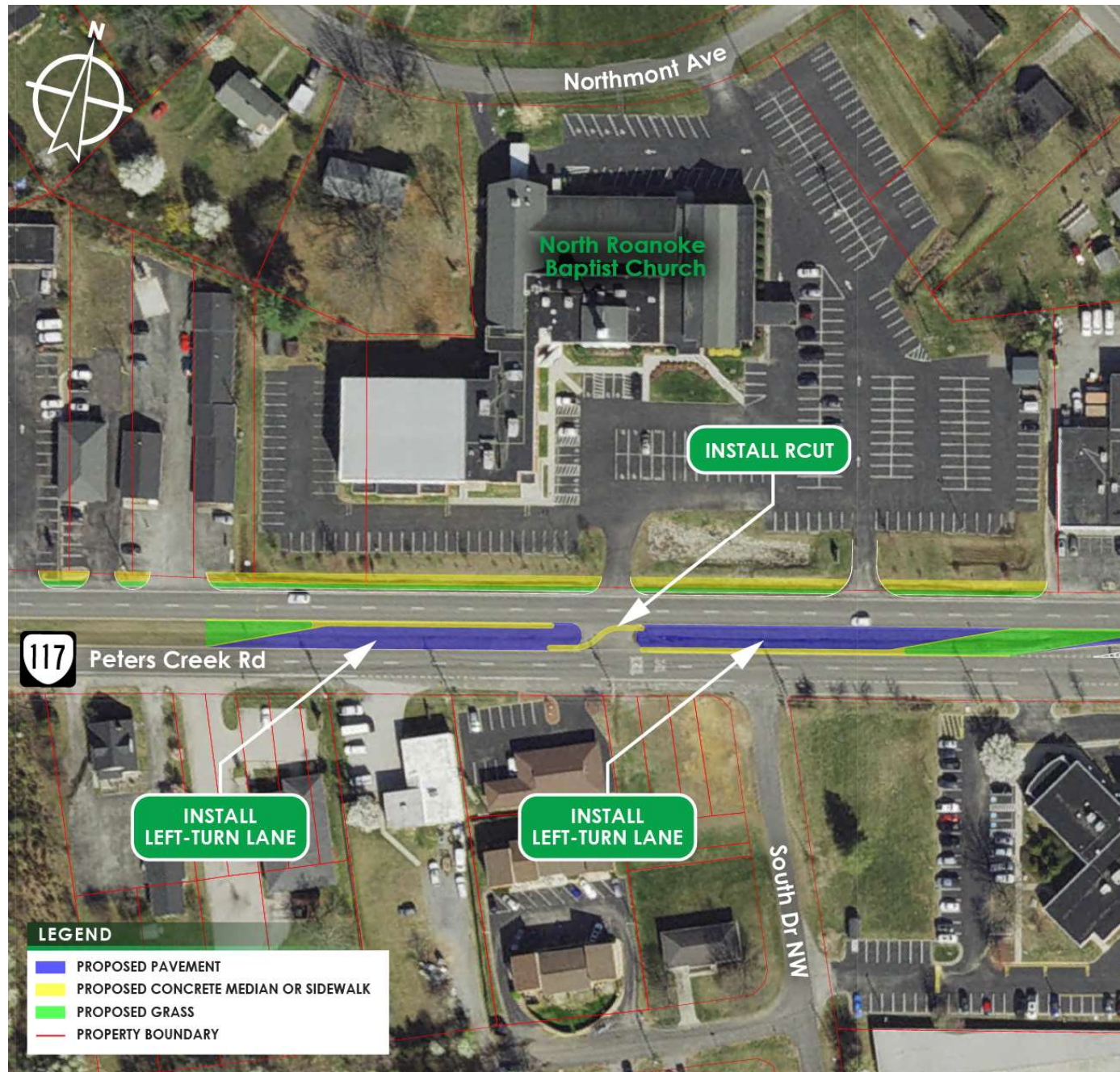


Figure 27: Peters Creek Road at North Roanoke Baptist Church

Peters Creek Road at Barrens Road

Improvements considered for the Peters Creek Road at Barrens Road intersection include the following:

- Shift the left-turn lanes on northbound and southbound Peters Creek Road to improve sight distance for left-turning vehicles.
- Conversion from protected-only left-turn phasing to flashing yellow arrow (FYA) left-turn phasing.
- Installing signaled pedestrian crossings on the north, west, and east legs of the intersection.



Figure 28: Peters Creek Road at Barrens Road

Based on further discussion by the SWG, the intersection improvements at Peters Creek Road at Barrens Road were refined to realign the south leg of the intersection to reduce the offset for motorists traveling northbound and southbound through the intersection as shown in **Figure 28a**.

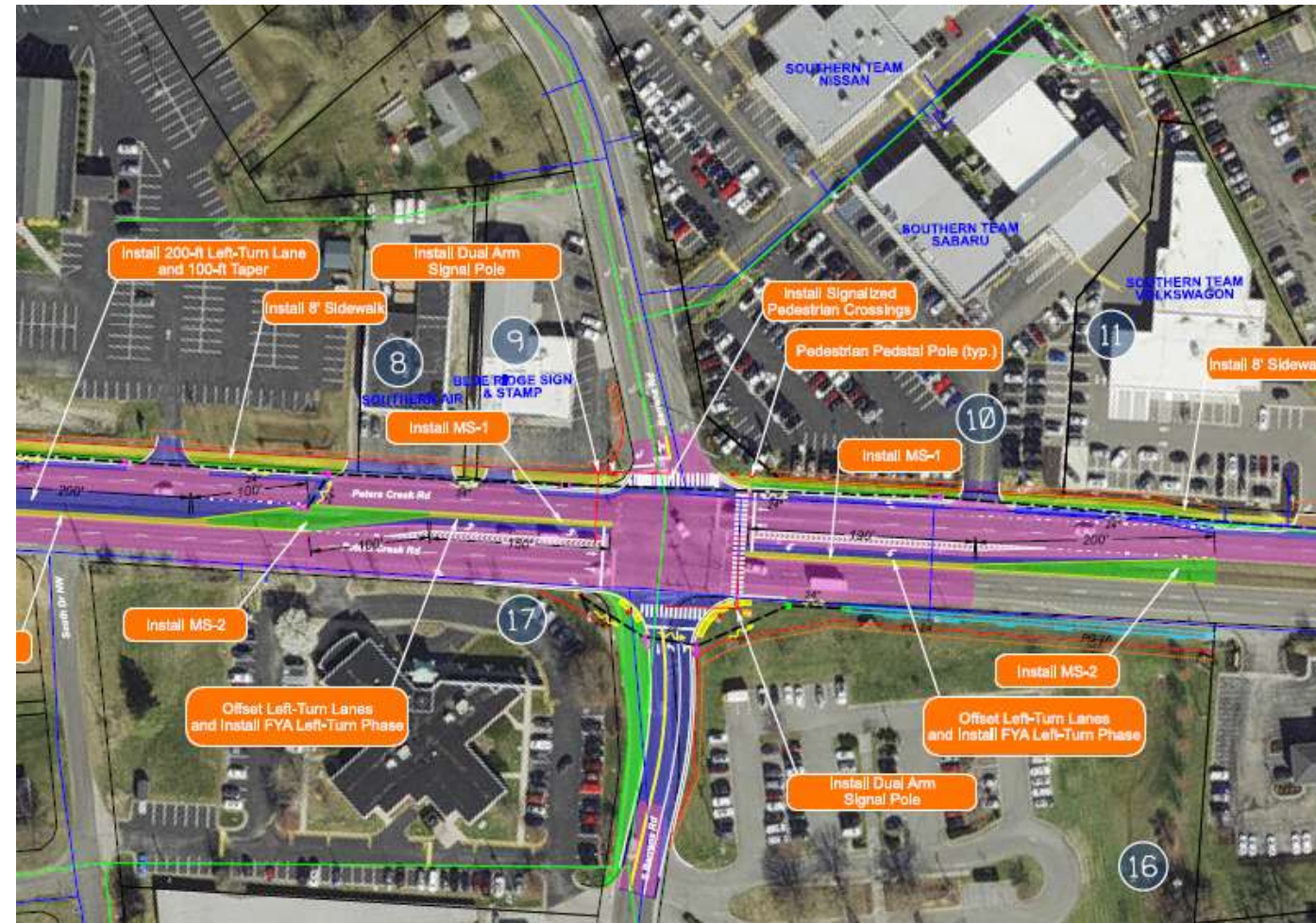


Figure 28a: Peters Creek Road at Barrens Road Refined Concept

Peters Creek Road at Deer Branch Road

An RCUT intersection was considered for the Peters Creek Road at Deer Branch Road intersection (see **Figure 29**). The RCUT at Deer Branch Road would restrict left-turn and through movements from Deer Branch Road. Left turn and through traffic volumes from the minor street approaches are less than 15 vehicles per hour during the AM and PM peaks and therefore would not significantly impact adjacent upstream or downstream intersections as a result of U-turn movements. Significant safety benefits are expected for replacing conventional intersections with RCUTs by reducing the number of conflict points thereby reducing the potential for crashes, particularly angle crashes which typically lead to the most

severe injuries. The number of conflict points are reduced from 32 at conventional intersection to 18 for the RCUTs.



Figure 29: Peters Creek Road at Deer Branch Road

Peters Creek Road at Williamson Road and Southern Team Commercial Driveway

Three options were considered for the Peters Creek Road at Williamson Road intersection and the Southern Team adjacent median opening as follows:

Peters Creek Road at Williamson Road: Double Left Turn (see Figure 30): A double left turn from Peters Creek Road, signaling the right turn from Williamson Road to Peters Creek Road, and widening to provide a double right turn was considered. This option would also close the median opening to Dunkin' and eliminate conflict points at the current left turn which is located within the channelized right turn from westbound Williamson Road to Peters Creek Road. This option would remove the high-speed pedestrian conflict involving right turns from Williamson Road to Peters Creek Road. In addition, the median opening at the back entrance to Market Square North/Southern Team along Peters Creek Road would be converted to an RCUT.



Figure 30: Peters Creek Road at Williamson Road: Double Left Turn

Realigned Intersection (see Figure 31): The Realigned Intersection option would realign the intersection to favor the high volume left-turn and right turn movements between Peters Creek Road and Williamson Road and reduce the bottleneck along Peters Creek Road/Williamson Road during I-81 detour operations. It would also eliminate conflict points at the current left turn to Dunkin' which is located within the channelized right turn from westbound Williamson Road to Peters Creek Road. The existing Kroger shopping center access which has direct access to the existing traffic signal would be eliminated and relocated to the south as a partial Thru-Cut intersection. A right-in/right-out entrance to the shopping center would be provided along Williamson Road east of the intersection. The median opening at the back entrance to Market Square North/Southern Team along Peters Creek Road would be closed due to the proximity to the intersection.



Figure 31: Peters Creek Road at Williamson Road: Realigned Intersection

Option 3: Roundabout (see Figure 32): A roundabout option would accommodate the heavy left turn from Peters Creek Road to Williamson Road and reduce delays compared to existing conditions and when there is a detour condition along I-81. Conflict points would be reduced by 75 percent (from 32 to 8) compared to the existing traffic signal. It would also eliminate conflict points at the current left turn to

Dunkin' which is located within the channelized right turn from westbound Williamson Road to Peters Creek Road. The median opening at the back entrance to Market Square North/Southern Team along Peters Creek Road would be converted to an RCUT.

Given that Route Williamson Road is on the Arterial Preservation Network (APN), an iCAP analysis including VJuST was performed for the 2050 design year for both the AM and PM peak hours to document the three alternatives under consideration. The results are summarized in **Appendix D**. Both VJuST and iCAP indicated that the roundabout alternative scored the highest given the significant safety benefits and conflict reduction with the roundabout. The roundabout was selected as the preferred option based on their proven safety benefits and the access issues associated with the Realigned Intersection option.



Figure 32: Peters Creek Road at Williamson Road: Roundabout

Williamson Road at Plantation Road

Right-turn lanes were considered on the eastbound Williamson Road and northbound Plantation Road approaches to increase intersection efficiency, reduce delays, and the potential for rear end crashes (see Figure 33).



Figure 33: Williamson Road at Plantation Road

Peters Creek Road Pedestrian Improvements

In addition to the intersection improvements discussed above which include pedestrian upgrades at intersections, an 8-foot sidewalk is proposed along the west side of Peters Creek Road from Archcrest Drive to Williamson Road.



Figure 34: Peters Creek Road Pedestrian Improvements

Preferred Alternative:

The Preferred Alternative option was developed for the study area based on the results of a screening-level Synchro analysis as discussed in the previous *Alternative Development and Screening* section as well as through stakeholder meetings to gauge general interest. The proposed improvements and analyses performed for the Preferred Alternative are discussed in greater detail in the following section.

Summary of Preferred Alternative

A summary of the proposed improvements included in the Preferred Alternative is shown in **Table 11** and a detailed concept is included in **Appendix E**.

Table 11: List of Preferred Alternative Improvements

Location	Proposed Improvement	Improvement Categories
Peters Creek Road at Highway Motors	Install SB left-turn lane at the median opening	Capacity Preservation Congestion Mitigation Safety Improvement
Peters Creek Road at Wood Haven Road	Install ADA-compliant ramps, pedestrians signals and crosswalks on the east and west legs and crossing Peters Creek Road	Pedestrian Access Pedestrian Safety Improvement
	Convert the intersection to a Thru-cut	Capacity Preservation Congestion Mitigation Safety Improvement

Location	Proposed Improvement	Improvement Categories
Peters Creek Road at Wendover Road	Close median opening	Capacity Preservation Congestion Mitigation Safety Improvement
Peters Creek Road at Newland Road	Convert the intersection to an RCUT	Capacity Preservation Congestion Mitigation Safety Improvement
Peters Creek Road at Airport Road/Archcrest Drive	Convert the intersection to a Thru-cut	Capacity Preservation Congestion Mitigation Safety Improvement
	Add WB left-turn lane	
	Extend the NB and SB left-turn lanes	
	Offset the NB and SB left-turn lanes	Pedestrian Access Pedestrian Safety Improvement
Commercial Entrance South of Peters Creek Road on Airport Road	Install ADA-compliant ramps, pedestrians signals and crosswalks on the east and west legs and crossing Peters Creek Road	Pedestrian Access Pedestrian Safety Improvement
Commercial Entrance South of Peters Creek Road on Airport Road	Convert the entrance to right-in/right-out	Safety Improvement
Airport Road at Dent Road	Install an EB left-turn lane at Burlington Rd	Safety Improvement
Peters Creek Road at Dwight Street	Convert the intersection to an RCUT	Capacity Preservation Congestion Mitigation Safety Improvement
Peters Creek Road at NRBC	Convert the intersection to an RCUT	Capacity Preservation Congestion Mitigation Safety Improvement
	Install NB and SB left-turn lanes	

Location	Proposed Improvement	Improvement Categories
Peters Creek Road at Barrens Road	Convert the NB and SB left-turn signals to FYA left-turn signals	Capacity Preservation Congestion Mitigation Safety Improvement
	Shift the NB and SB left-turn lanes toward the median to improve sight distance	Safety Improvement
	Install ADA-compliant ramps, pedestrians signals and crosswalks on the north, east, and west legs of the intersection	Pedestrian Access Pedestrian Safety Improvement
Peters Creek Road at Deer Branch Road	Convert the intersection to an RCUT	Capacity Preservation Congestion Mitigation Safety Improvement
Peters Creek Road at Southern Team median opening	Convert the intersection to an RCUT	Capacity Preservation Congestion Mitigation Safety Improvement
Peters Creek Road at Williamson Road	Convert to roundabout	Capacity Preservation Congestion Mitigation Safety Improvement
Peters Creek Road at Williamson Road	Install ADA-compliant ramps and RRFBs (two lane approaches) along each leg of the roundabout	Pedestrian Access Pedestrian Safety Improvement
Williamson Road at Plantation Road	Install eastbound and northbound right-turn lanes	Capacity Preservation Congestion Mitigation Safety Improvement

Location	Proposed Improvement	Improvement Categories
Sidewalk from Airport Rd/Archcrest Rd to Williamson Rd	Install 8-foot sidewalk on west side of Peters Creek Road	Pedestrian Access Pedestrian Safety Improvement

Traffic Operations Analysis

Following the alternatives development process and the selection of preferred improvements, the 2050 No Build Synchro traffic analysis network files were updated to reflect the recommended improvements proposed for intersections within the study area. Traffic signal timings and coordination offsets were also updated to reflect the proposed improvements. The results of the Synchro traffic analysis and SimTraffic microsimulation are documented for the measures of effectiveness (MOEs) in accordance with the TOSAM.

Table 12 depicts queue lengths, Levels of Service, and delays for intersections along Peters Creek Road and Williamson Road for the AM and PM peak hours for 2050 Build conditions. During the AM peak hour, the signalized intersections along Peters Creek Road and Williamson Road are projected to experience reduced delays and congestion, with all intersections projected to operate at LOS C or better except for the intersection of Williamson Road at Plantation Road, which is projected to continue operating at LOS D. Additionally, the intersection of Peters Creek Road at Williamson Road is projected to operate at LOS A during the AM peak hour as a roundabout, with significantly shorter delays and queues compared to No Build conditions as a signalized intersection. During the PM peak hour, the signalized intersections along Peters Creek Road and Williamson Road are also projected to experience reduced delays and congestion, with all intersections projected to operate at LOS C or better except for

the intersection of Williamson Road at Plantation Road, which is projected to continue operating at LOS D. Additionally, the intersection of Peters Creek Road at Williamson Road is projected to operate at LOS B during the AM peak hour as a roundabout, with significantly shorter delays and queues compared to LOS E under No Build conditions as a signalized intersection. Further, no turning movements at the signalized intersections or the roundabout are projected to operate worse than LOS E under 2050 Build conditions, compared to No Build conditions in which numerous movements were projected to operate at LOS F.

Under 2050 Build conditions, all turning movements at the unsignalized intersections along Peters Creek Road and Williamson Road are projected to operate at LOS C or better, compared to numerous movements projected to operate at LOS E or LOS F under No Build conditions, with significantly shorter traffic queues and delays. Detailed analysis results for both signalized and unsignalized intersections, including the SIDRA roundabout analysis results, are contained in **Appendix C**.

Table 12: 2050 Build Peak Hour Traffic Operations Analysis Results

Intersection	Approach	Movement	2050 Build AM							2050 Build PM						
			Queue Length (ft)	Movement LOS	Approach LOS	Overall LOS	Delays (sec)	Approach Delay (sec)	Overall Delay (sec)	Queue Length (ft)	Movement LOS	Approach LOS	Overall LOS	Delays (sec)	Approach Delay (sec)	Overall Delay (sec)
Peters Creek Road & Wood Haven Road Signalized	EB	L	262	E	D	B	57.3	52.5	12.6	314	E	E	B	64.5	60.2	14.4
		R	125	D			45.2			125	D			50.5		
	WB	L	55	D	D		45.3	45.0		156	D	D		54.1	53.1	
		R	24	D			44.6			88	D			49.9		
	NB	L	113	A	B		8.9	10.6		169	A	B		8.9	12.0	
		T-R	238	B			10.7			342	B			12.3		
	SB	L	76	A	A		2.7	6.4		39	A	A		1.7	3.9	
		T	178	A			6.6			196	A			4.3		
		R	56	A			5.0			78	A			2.2		
	Peters Creek Road & Wendover Road Unsignalized	WB	R	59	B		B	-		11.0	11.0	-		33	B	
Peters Creek Road & Newland Road Unsignalized	EB	R	95	B	B	-	12.0	12.0	-	68	B	B	-	11.7	11.7	-
	WB	R	48	B	B		10.9	10.9		26	B	B		10.5	10.5	
	NB	L	55	B	-		13.1	-		67	B	-		12.3	-	
	SB	L	39	C	-		15.1	-		55	B	-		12.2	-	
Peters Creek Road & Airport Road Signalized	EB	L	43	D	D	B	42.9	42.9	16.9	28	D	D	C	50.9	51.0	24.5
		R	12	D			42.9			75	D			51.0		
	WB	L	259	D	D		51.1	46.0		273	E	E		62.4	60.6	
		R	114	D			36.6			222	E			58.7		
	NB	L	52	A	B		7.3	11.0		97	A	A		5.8	10.3	
		T	265	B			13.3			292	B			12.7		
		R	202	A			4.9			190	A			3.8		
	SB	L	259	B	B		16.3	10.4		226	B	B		12.4	19.0	
		T	193	A			9.2			258	B			18.1		
		R	29	A			8.2			64	E			63.2		
Peters Creek Road & Dwight Street/Bojangles Unsignalized	EB	R	37	B	B	-	10.2	10.2	-	42	B	B	-	10.7	10.7	-
	WB	R	94	B	B		10.1	10.1		49	B	B		10.7	10.7	
	NB	L	61	B	-		11.8	-		56	B	-		11.1	-	
	SB	L	62	B	-		10.8	-		47	B	-		11.7	-	
	EB	L	55	D	D	B	51.4	51.1	14.7	58	E	E	A	65.7	64.8	8.6
		R	12	D			51.1			0	E			64.7		

Intersection	Approach	Movement	2050 Build AM							2050 Build PM						
			Queue Length (ft)	Movement LOS	Approach LOS	Overall LOS	Delays (sec)	Approach Delay (sec)	Overall Delay (sec)	Queue Length (ft)	Movement LOS	Approach LOS	Overall LOS	Delays (sec)	Approach Delay (sec)	Overall Delay (sec)
Peters Creek Road & Alpine Road Signalized	WB	L	120	D	D	C	54.5	53.1	-	37	E	E	C	65.3	65.0	-
		R	19	D			50.7			0	E			64.2		
	NB	L	214	B	B		15.2	17.4		146	A	A		6.0	9.2	
		T	303	B			16.4			119	A			9.7		
		R	83	C			28.2			25	A			3.9		
	SB	L	70	A	A		2.9	5.5		56	A	A		1.9	3.3	
		T-R	160	A			5.7			118	A			3.3		
	Peters Creek Road & NRBC Unsignalized	EB	R	0	A		A	-		0.0	0.0	-		0	A	
WB		R	0	A	A	-	0.0	0.0	-	0	A	A	-	0.0	0.0	-
NB		L	75	B	-	-	10.6	-	-	65	B	-	-	10.7	-	-
SB		L	24	A	-	-	0.0	-	-	31	B	-	-	10.9	-	-
Peters Creek Road & Barrens Road Signalized	EB	L-T	289	E	D	C	60.8	53.7	25.5	263	E	E	C	68.6	61.4	21.5
		R	159	D			47.5			174	D			53.7		
	WB	L	219	E	D		59.6	54.9		131	E	E		68.7	66.0	
		T-R	150	D			48.3			87	E			61.9		
	NB	L	156	B	B		14.3	11.4		192	B	B		11.9	11.4	
		T	325	B			10.0			414	B			11.2		
		R	82	B			18.2			58	B			15.4		
	SB	L	180	B	C		13.4	23.4		152	B	B		11.5	17.4	
		T	267	C			25.2			268	B			18.8		
		R	61	B			17.1			70	B			12.7		
Peters Creek Road & Deer Branch Road Unsignalized	EB	R	81	B	B	-	14.4	14.4	-	102	C	C	-	15.1	15.1	-
	WB	R	0	A	A	-	0.0	0.0	-	25	A	A	-	9.5	9.5	-
	NB	L	166	B	-	-	11.2	-	-	105	B	-	-	11.2	-	-
	SB	L	37	A	-	-	0.0	-	-	32	B	-	-	10.5	-	-
Peters Creek Road & Southern Team Unsignalized	EB	R	29	B	B	-	12.5	12.5	-	36	B	B	-	12.8	12.8	-
	WB	R	83	B	B	-	12.3	12.3	-	52	B	B	-	13.8	13.8	-
	NB	L	22	B	-	-	10.6	-	-	48	B	-	-	10.8	-	-
	SB	L	89	A	-	-	9.6	-	-	68	B	-	-	11.5	-	-
Williamson Road & Peters Creek Road Roundabout	EB	L	77	A	A	A	8.0	7.6	7.8	224	C	B	B	15.0	13.9	13.1
		L-T-R	80	A			7.2			234	B			13.0		
	WB	L-T-R	14	A	A		9.3	9.3		78	D	D		25.3	25.3	
	NB	L-T	24	A	A		7.5	6.9		64	B	B		14.6	13.1	
		T-R	26	A			6.4			70	B			11.9		

Intersection	Approach	Movement	2050 Build AM							2050 Build PM						
			Queue Length (ft)	Movement LOS	Approach LOS	Overall LOS	Delays (sec)	Approach Delay (sec)	Overall Delay (sec)	Queue Length (ft)	Movement LOS	Approach LOS	Overall LOS	Delays (sec)	Approach Delay (sec)	Overall Delay (sec)
	SB	L-T	97	A	A		8.6	8.2		144	C	B		11.0	10.3	
		R	100	A			7.8			138	B			9.7		
Williamson Road & Sunnybrook Drive Unsignalized	EB	L	0	A	-	-	0.0	-	-	7	B	-	-	10.7	-	-
	WB	L	32	A	-		9.9	-		41	B	-		11.9	-	
	NB	L-T-R	55	C	C		16.1	16.1		52	C	C		17.7	17.7	
	SB	L-T-R	21	B	B		10.2	10.2		18	B	B		10.3	10.3	
Williamson Road & Plantation Road Signalized	EB	L	210	C	C	D	23.4	22.7	37.7	206	C	C	D	25.4	23.7	38.3
		T	396	B			14.5			299	C			24.9		
		R	56	E			57.4			173	B			16.3		
	WB	L	172	B	D		18.8	36.2		267	C	D		27.0	38.1	
		T	326	D			39.0			366	D			41.1		
		R	166	C			33.4			144	D			35.0		
	NB	L	199	D	D		37.9	49.2		199	D	D		46.5	47.3	
		T	348	E			58.1			349	D			48.7		
		R	164	D			44.5			94	D			46.1		
	SB	L	372	D	D		46.0	45.7		408	D	D		39.6	51.4	
		T	259	D			49.6			472	E			66.8		
		R	191	D			43.5			277	D			46.9		

Expected Crash Reduction

A Crash Modification Factor (CMF) is used to determine the expected number of crashes after implementing a countermeasure on a road or intersection. CMFs for the various improvements under consideration were applied to the relevant crash history to evaluate the expected crash reduction. CMFs were obtained from Virginia State Preferred CMF List or the Crash Modification Factors Clearinghouse, which provides a searchable database of CMFs along with a five-star quality rating. **Table 13** presents the CMF value used for each crash severity type to calculate the crash reduction expected from the installation of the various safety improvements.

Table 13: Recommended Improvement CMFs by Crash Severity

Location	Proposed Improvement	Applicable Crash Type	K	A	B C	O
Peters Creek Road at Highway Motors	Install SB left-turn lane at the median opening	All	0.73	0.73	0.73	0.73
Peters Creek Road at Wood Haven Road	Install ADA-compliant ramps, pedestrians signals and crosswalks on the east and west legs and crossing Peters Creek Road	Pedestrian	0.30	0.30	0.30	0.30
Peters Creek Road at Wood Haven Road	Convert the intersection to a Thru-cut	All	0.96	0.96	0.96	0.96
Peters Creek Road at Wendover Road	Close median opening	All	0.20	0.20	0.20	0.20
Peters Creek Road at Newland Road	Convert the intersection to an RCUT	All	0.37	0.37	0.37	0.37

Location	Proposed Improvement	Applicable Crash Type	K	A	B C	O
Peters Creek Road at Airport Road/Archcrest Drive	Convert the intersection to a Thru-cut	All	0.96	0.96	0.96	0.96
	Add WB left-turn lane*		0.90	0.90	0.90	0.90
	Extend the NB and SB left-turn lanes*		0.72	0.72	0.72	0.72
	Offset the NB and SB left-turn lanes		0.64	0.64	0.64	0.66
	Combined CMF		0.62	0.62	0.62	0.63
Commercial Entrance South of Peters Creek Road on Airport Road	Convert the entrance to right-in/right-out	All	0.20	0.20	0.20	0.20
Airport Road at Dent Road	Install an EB left-turn lane at Burlington Rd	All	0.67	0.67	0.67	0.67
Peters Creek Road at Airport Road/Archcrest Drive	Install ADA-compliant ramps, pedestrians signals and crosswalks on the east and west legs and crossing Peters Creek Road	Pedestrian	0.30	0.30	0.30	0.30
Peters Creek Road at Dwight Street	Convert the intersection to an RCUT	All	0.37	0.37	0.37	0.37
Peters Creek Road at NRBC	Convert the intersection to an RCUT	All	0.37	0.37	0.37	0.37
	Install NB and SB left-turn lanes*		0.81	0.81	0.81	0.81
Peters Creek Road at Barrens Road	Convert the NB and SB left-turn signals to FYA left-turn signals	Angle	2.24	2.24	2.24	2.24

Location	Proposed Improvement	Applicable Crash Type	K	A	B C	O
Peters Creek Road at Barrens Road	Shift the NB and SB left-turn lanes toward the median to improve sight distance	All	0.64	0.64	0.64	0.66
Peters Creek Road at Barrens Road	Install ADA-compliant ramps, pedestrians signals and crosswalks on the north, east, and west legs of the intersection	Pedestrian	0.30	0.30	0.30	0.30
Peters Creek Road at Deer Branch Road	Convert the intersection an RCUT	All	0.37	0.37	0.37	0.37
Peters Creek Road at Southern Team median opening	Convert the intersection to an RCUT	All	0.37	0.37	0.37	0.37
Peters Creek Road at Williamson Road	Convert to roundabout	All	0.22	0.22	0.22	0.22
Peters Creek Road at Williamson Road	Install ADA-compliant ramps and RRFBs (two lane approaches) along each leg of the roundabout	Pedestrian	0.53	0.53	0.53	0.53
Williamson Road at Plantation Road	Install eastbound and northbound right-turn lanes	All	0.92	0.92	0.92	0.92
Sidewalk from Airport Rd/Archcrest Rd to Williamson Rd	Install 8-foot sidewalk on west side of Peters Creek Road	Pedestrian	0.60	0.60	0.60	0.60

* CMF not included in the calculation to avoid duplication of CMFs based on guidance from SMART SCALE documentation

CMFs for total crashes were applied to the total number of crashes during the 5-year study period to determine the expected crash reductions within the study area. CMFs for fatal and injury crashes were applied to the type K (fatal), A (severe injury), B (visible injury), and C (non-visible injury) crashes. **Table 14** summarizes the expected crash reductions for each crash severity and the overall crashes.

Table 14: Total Expected Number of Crashes and % Crash Reduction (2018 – 2022)

Location		K	A	B C	O	Total
Peters Creek Road at Highway Motors	Total Crashes	0	0	1	0	1
	Total Expected Crashes	0.0	0.0	0.7	0.0	0.7
	<i>Change in Crashes</i>	0.0	0.0	-0.3	0.0	-0.3
Peters Creek Road at Wood Haven Road	Pedestrian Crashes	0	0	0	0	0
	Total Expected Crashes	0.0	0.0	0.0	0.0	0.0
	<i>Change in Crashes</i>	0.0	0.0	0.0	0.0	0.0
Peters Creek Road at Wood Haven Road	Total Crashes	0	2	5	10	17
	Total Expected Crashes	0.0	1.9	4.8	9.6	16.3
	<i>Change in Crashes</i>	0.0	-0.1	-0.2	-0.4	-0.7
Peters Creek Road at Wendover Road	Total Crashes	0	0	1	1	2
	Total Expected Crashes	0.0	0.0	0.2	0.2	0.4
	<i>Change in Crashes</i>	0.0	0.0	-0.8	-0.8	-1.6
Peters Creek Road at Newland Road	Total Crashes	1	0	2	5	8
	Total Expected Crashes	0.4	0.0	0.7	1.9	3.0
	<i>Change in Crashes</i>	-0.6	0.0	-1.3	-3.2	-5.0
Peters Creek Road at Airport Road/Archcrest Drive	Total Crashes	0	3	15	22	40
	Total Expected Crashes	0.0	1.9	9.3	14.0	25.1
	<i>Change in Crashes</i>	0.0	-1.1	-5.7	-8.0	-14.9
	Total Crashes	0	0	1	1	2

Location		K	A	B C	O	Total
Commercial Entrance South of Peters Creek Road on Airport Road	Total Expected Crashes	0.0	0.0	0.2	0.2	0.4
	<i>Change in Crashes</i>	0.0	0.0	-0.8	-0.8	-1.6
Airport Road at Burlington Road	Total Crashes	0	1	5	9	15
	Total Expected Crashes	0.0	0.7	3.4	6.0	10.1
	<i>Change in Crashes</i>	0.0	-0.3	-1.7	-3.0	-5.0
Peters Creek Road at Airport Road/Archcrest Drive	Pedestrian Crashes	0	0	0	0	0
	Total Expected Crashes	0.0	0.0	0.0	0.0	0.0
	<i>Change in Crashes</i>	0.0	0.0	0.0	0.0	0.0
Peters Creek Road at Dwight Street	Total Crashes	1	0	2	10	13
	Total Expected Crashes	0.4	0.0	0.7	3.7	4.8
	<i>Change in Crashes</i>	-0.6	0.0	-1.3	-6.3	-8.2
Peters Creek Road at NRBC	Total Crashes	0	0	0	2	2
	Total Expected Crashes	0.0	0.0	0.0	0.7	0.7
	<i>Change in Crashes</i>	0.0	0.0	0.0	-1.3	-1.3
Peters Creek Road at Barrens Road	Angle Crashes	0	0	1	2	3
	Total Expected Crashes	0.0	0.0	2.2	4.5	6.7
	<i>Change in Crashes</i>	0.0	0.0	1.2	2.5	3.7
Peters Creek Road at Barrens Road	Total Crashes	0	3	4	6	13
	Total Expected Crashes	0.0	1.9	2.6	4.0	8.5
	<i>Change in Crashes</i>	0.0	-1.1	-1.4	-2.0	-4.5
Peters Creek Road at Barrens Road	Pedestrian Crashes	0	2	0	0	2
	Total Expected Crashes	0.0	0.6	0.0	0.0	0.6
	<i>Change in Crashes</i>	0.0	-1.4	0.0	0.0	-1.4

Location		K	A	B C	O	Total
Peters Creek Road at Deer Branch Road	Total Crashes	0	1	1	8	10
	Total Expected Crashes	0.0	0.4	0.4	3.0	3.7
	<i>Change in Crashes</i>	0.0	-0.6	-0.6	-5.0	-6.3
Peters Creek Road at Southern Team median opening	Total Crashes	0	0	4	6	10
	Total Expected Crashes	0.0	0.0	1.5	2.2	3.7
	<i>Change in Crashes</i>	0.0	0.0	-2.5	-3.8	-6.3
Peters Creek Road at Williamson Road	Total Crashes	0	2	10	25	37
	Total Expected Crashes	0.0	0.4	2.2	5.5	8.1
	<i>Change in Crashes</i>	0.0	-1.6	-7.8	-19.5	-28.9
Peters Creek Road at Williamson Road	Pedestrian Crashes	0	0	0	0	0
	Total Expected Crashes	0.0	0.0	0.0	0.0	0.0
	<i>Change in Crashes</i>	0.0	0.0	0.0	0.0	0.0
Williamson Road at Plantation Road	Total Crashes	0	2	15	37	54
	Total Expected Crashes	0.0	1.8	13.8	34.1	49.8
	<i>Change in Crashes</i>	0.0	-0.2	-1.2	-2.9	-4.2
Sidewalk from Airport Rd/Archcrest Rd to Williamson Rd	Pedestrian Crashes	0	2	1	0	3
	Total Expected Crashes	0.0	1.2	0.6	0.0	1.8
	<i>Change in Crashes</i>	0.0	-0.8	-0.4	0.0	-1.2
Total Crashes Associated with Improvements Influence Area		2	18	68	144	232
Total Expected Crashes After Improvements*		0.7	10.8	43.3	89.5	144.3
Change in Crashes (Expected - Total)		-1.3	-7.2	-24.7	-54.5	-87.7
Percent Crash Reduction After Improvements		63%	40%	36%	38%	38%

*Total expected number of crashes is rounded to the nearest tenth

Key findings from the expected crash analysis are as follows:

- An annual crash reduction of 18 crashes is expected along Peters Creek Road from Wood Haven Road to Plantation Road, which is equivalent to an approximately 38% reduction in crashes
- Approximately 38% of injury-related crashes where improvements are proposed are expected to be reduced along Peters Creek Road from Wood Haven Road to Plantation Road
- The installation of RCUT intersections along Peters Creek Road at Newland Road, Dwight Street, NRBC, Deer Branch Road, and Southern Team median opening has an annual crash reduction of 5.4 crashes which is equivalent to a 63% reduction in crashes at these intersections
- The pedestrian improvements along this corridor will reduce the likelihood of crashes involving pedestrians by approximately 50%

A sketch depicting the Preferred Build Alternative is shown in **Appendix E**.

Chapter 3:

Public and Stakeholder Outreach and Feedback

Public Involvement

Following the development and analysis of the build alternatives, a public involvement survey was developed using the PublicInput survey tool to determine the public’s response to the improvements and what they perceived as the relevant issues within the study area. The survey was available online for 14 days from March 18 – April 1st, 2024. In addition, a public meeting was held on March 18, 2024, from 5:00 to 7:00 PM at the Hollins Library.

Overall, the survey is divided into four sections, which include the following:

1. Introduction with overview of the project and study area as well as introducing some of the concepts shown as options later in the survey
2. Recommended improvements at each intersection
3. Recommended pedestrian improvements along the corridor
4. Wrap up with demographic questions

For the recommended improvement concepts, participants were asked to provide a rating based on their opinion from one to five, with one being strongly opposed to the concept and 5 being strongly support the concept. Respondents were also provided with an option to provide comments or concerns. At the end of the survey, the participants were asked demographic questions. There were a total of 923 participants and 1,840 comments were provided. **Figure 35** presents an example of one of the rating screens from the survey.

The screenshot displays a public survey interface. At the top, there are navigation tabs: 'Introduction', 'Intersection Improvements' (selected), 'Pedestrian Improvements', and 'Wrap Up'. The main title is 'Peters Creek Road at Wood Haven Road & Highway Motors Median Opening'. Below the title is an aerial map of the intersection area. Three callout boxes point to specific locations on the map: 'INSTALL LEFT-TURN LANE FOR LEFT TURNS AND U-TURNS' at the Highway Motors intersection, 'INSTALL THRU-CUT' at the Wood Haven Road intersection, and 'INSTALL SIGNALIZED PEDESTRIAN CROSSLINKS' at the intersection of Wood Haven Road and Peters Creek Road. A legend in the bottom left of the map identifies symbols for 'PROPOSED PAVEMENT', 'PROPOSED CONCRETE MEDIAN OR SIDEWALK', 'PROPOSED GRASS', and 'PROPERTY BOUNDARY'. Below the map, there is a text prompt: 'Click the image to see the proposed recommendations'. This is followed by a descriptive paragraph for the Thru-cut improvement, explaining that it would prohibit through movements from Wood Haven Road across Peters Creek Road and divert traffic to other openings. Another paragraph describes the proposed signalized pedestrian crosswalks. Below these descriptions is a rating scale: 'Rate the concepts on a scale of 1 to 5. (1 = Strongly oppose; 5 = Strongly support)'. The scale has five columns: '1. Strongly oppose', '2. Somewhat oppose', '3. Neutral', '4. Somewhat support', and '5. Strongly support'. Two rows of radio buttons are shown, corresponding to the two improvement concepts described above.

Figure 35: Public Survey Layout

Survey Questions and Results

The Thru-Cut at Wood Haven Road received an average rating of 3.149 while the pedestrian improvements received an average rating of 3.327 (see **Figure 36**).

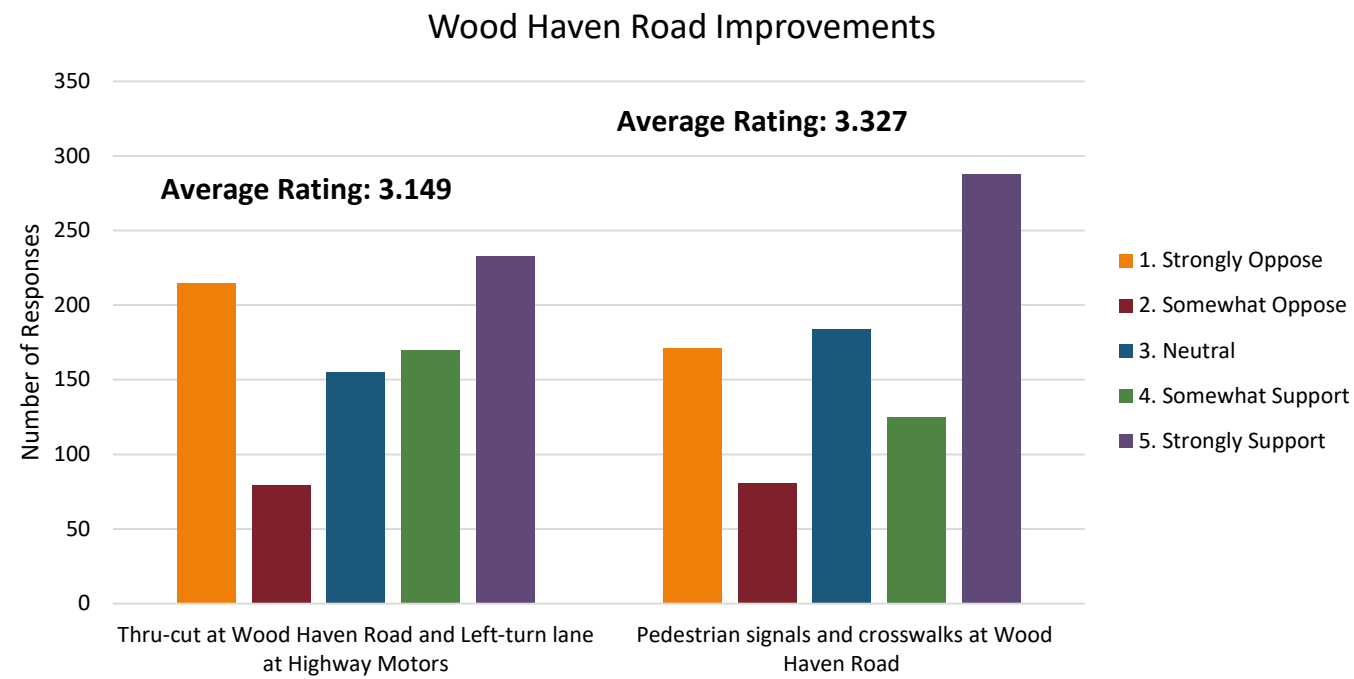


Figure 36: Wood Haven Road Survey Results

The closure of the Wendover Road median opening received an average rating of 3.366 while the RCUT at Newland Road received an average rating of 3.413 (see **Figure 37**).

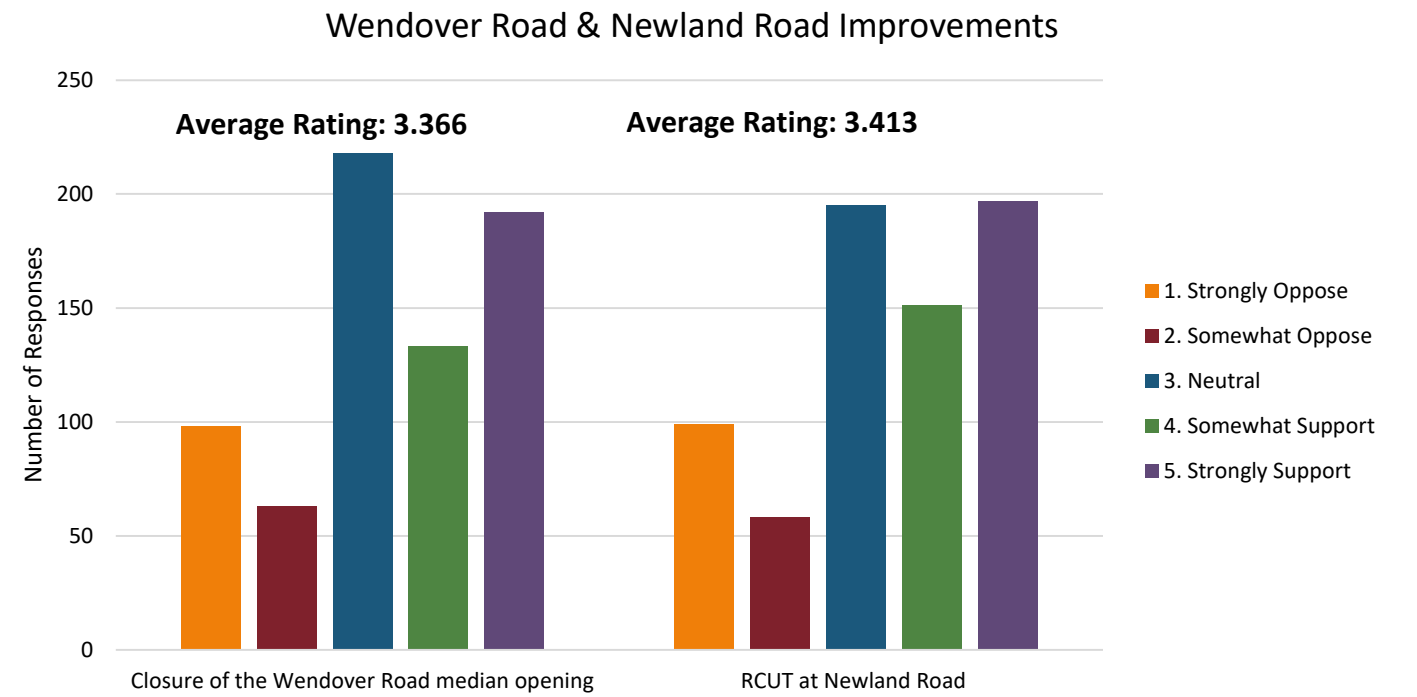


Figure 37: Wendover & Newland Road Survey Results

Five improvements were presented at the Peters Creek Road at Airport Road intersection (see **Figure 38**). The Thru-Cut proposed at Airport Road received an average rating of 3.354. The double left-turn and raised median on Airport Road received a rating of 3.949. Pedestrian improvements at the intersection received an average rating of 3.544. Shifting the left-turn lanes on Peters Creek Road received an average rating of 3.921. The left-turn lane from Airport Road to Burlington Drive received an average rating of 3.847.

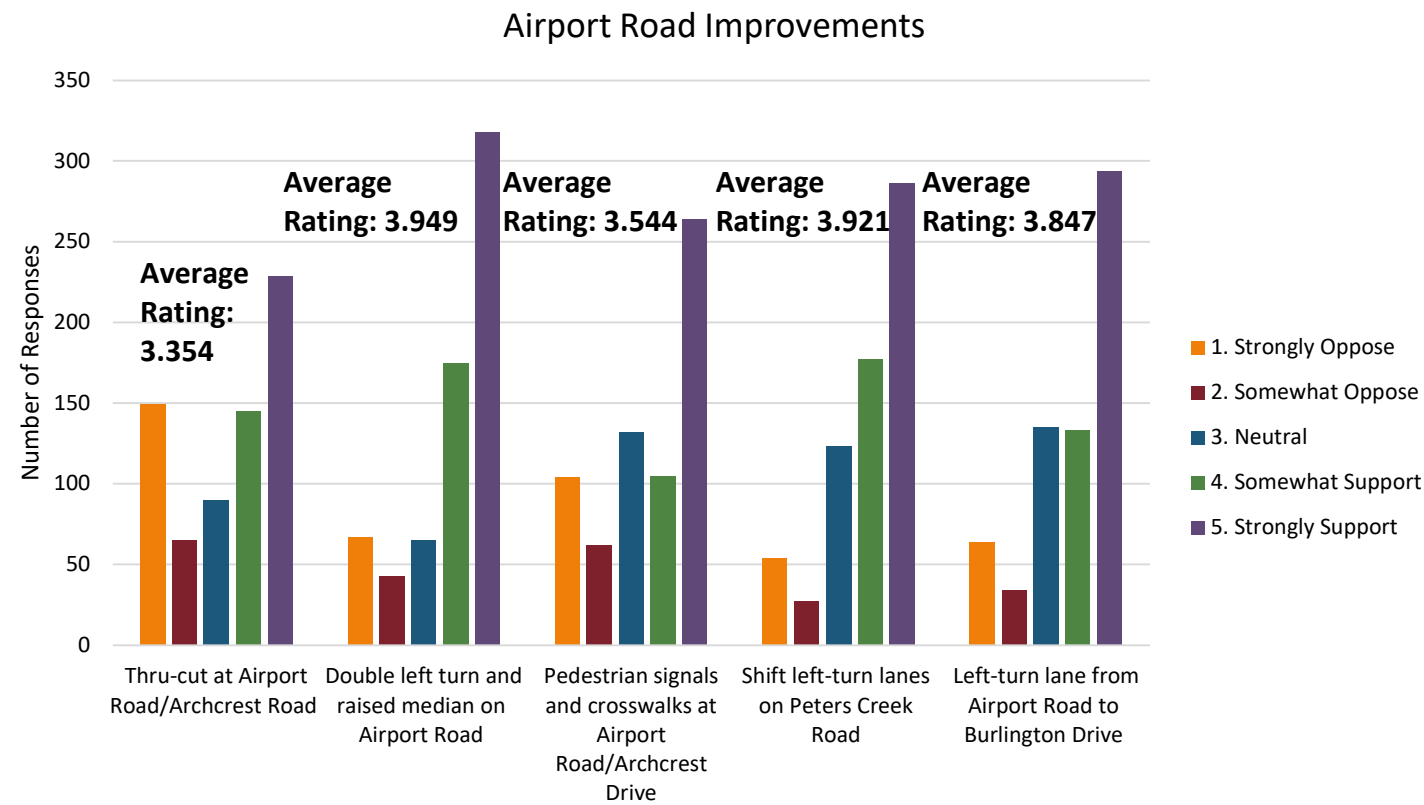


Figure 38: Airport Road Survey Results

The RCUT at Dwight Street improvement received an average rating of 3.524 (see **Figure 39**).

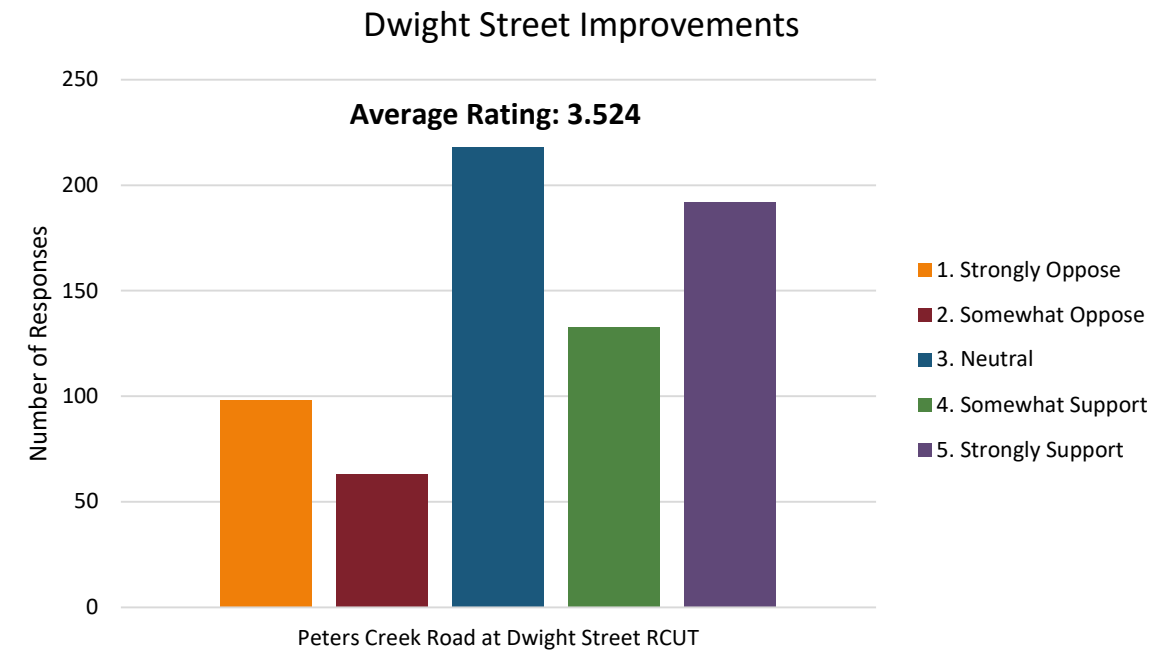


Figure 39: Dwight Street Survey Results

The RCUT at the Peters Creek Road and North Roanoke Baptist Church intersection and the proposed left-turn lanes received average ratings of 3.742 and 4.011, respectively (see **Figure 40**).

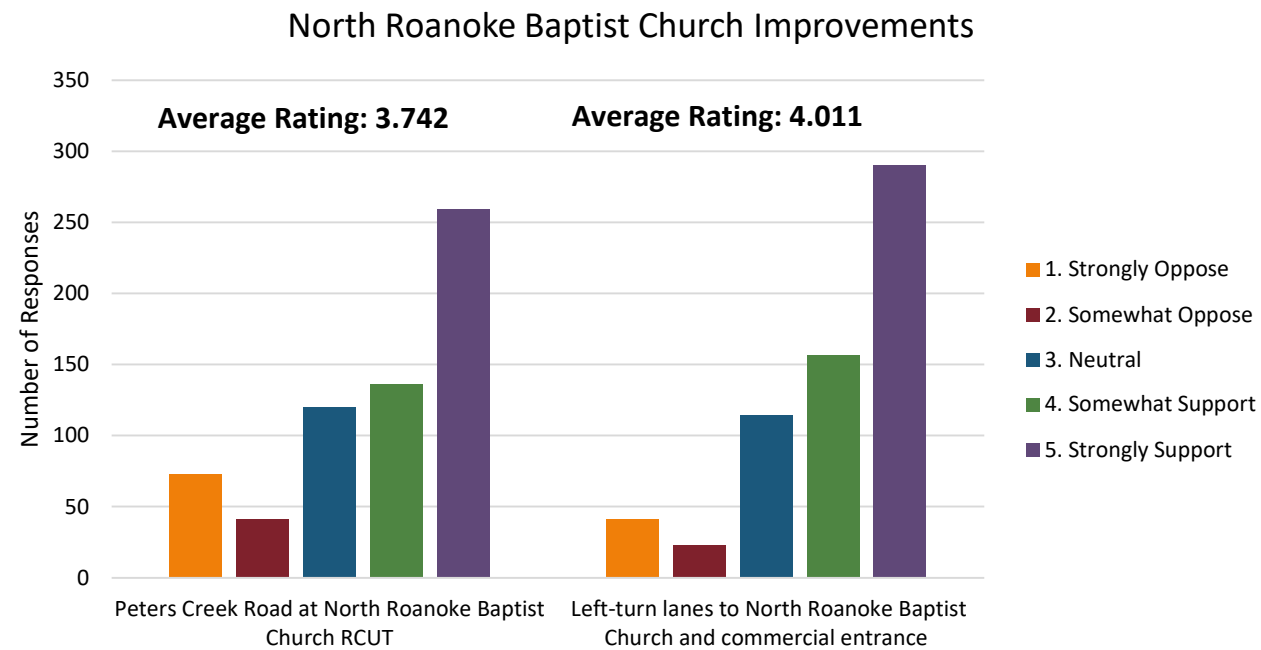


Figure 40: North Roanoke Baptist Church Survey Results

Three improvements were presented at the Barrens Road intersection. Shifting the left-turn lanes on Peters Creek Road had the highest average rating of the improvements with a rating of 4.175. Converting the left-turn phases to flashing yellow left-turn signals received an average rating of 4.111 and the pedestrian improvements at the intersection received a rating of 3.877 (see **Figure 41**).

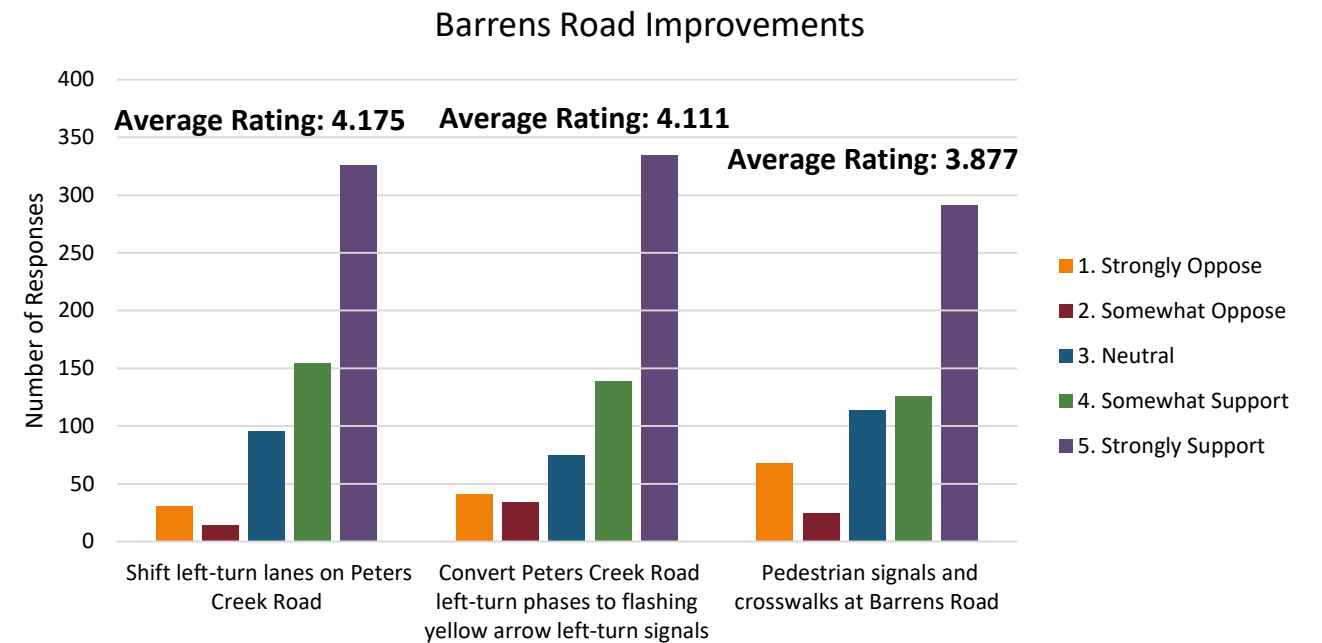


Figure 41: Barrens Road Survey Results

The RCUT at Peters Creek Road at Deer Branch Road received an average rating of 3.555 (see **Figure 42**).

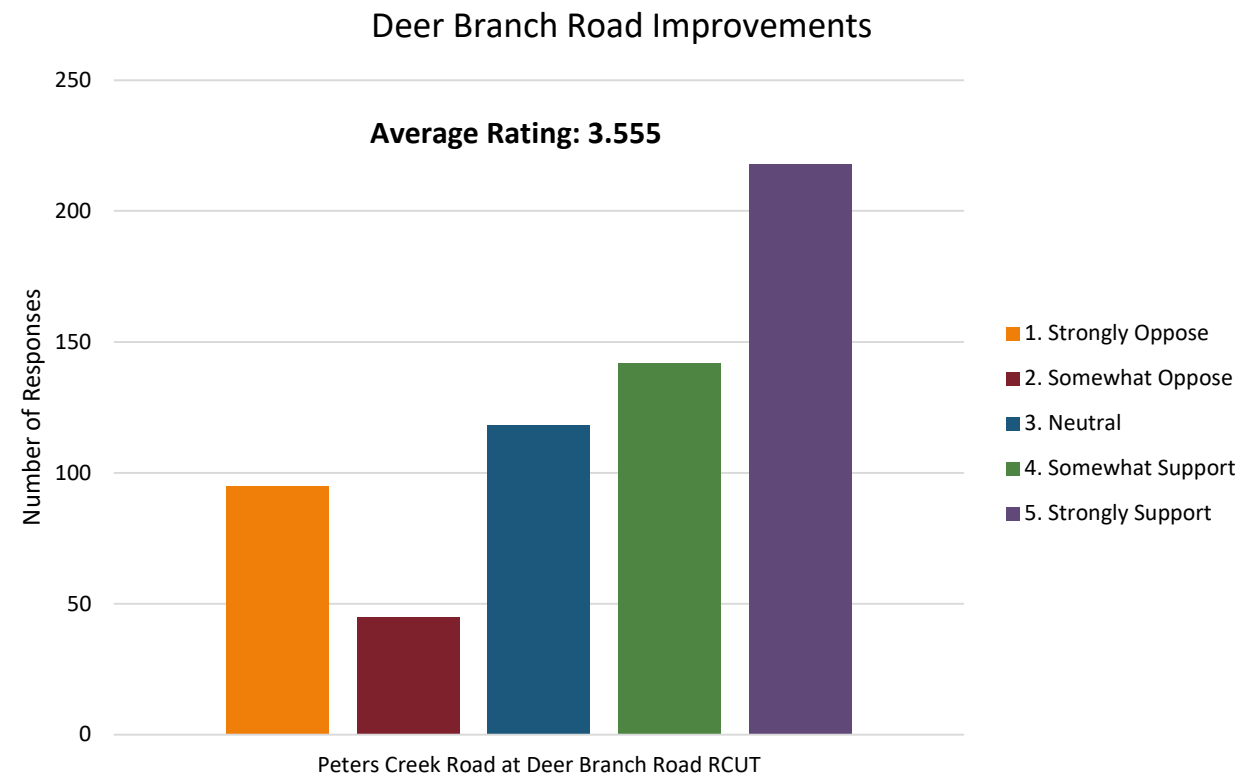


Figure 42: Deer Branch Road Survey Results

Two independent options were presented for the intersection of Peters Creek Road and Williamson Road. For the first option of improvements at the Williamson Road and Peters Creek Road intersection, three ideas were polled (see **Figure 43**). The double right turn lanes from Williamson to Peters Creek Road received an average rating of 3.164. The closure of the median in front of the Dunkin' had the highest rating of the three with 3.437. Finally, the proposed RCUT at the Southern Team and Market Square North intersection was given an average rating of 3.237.

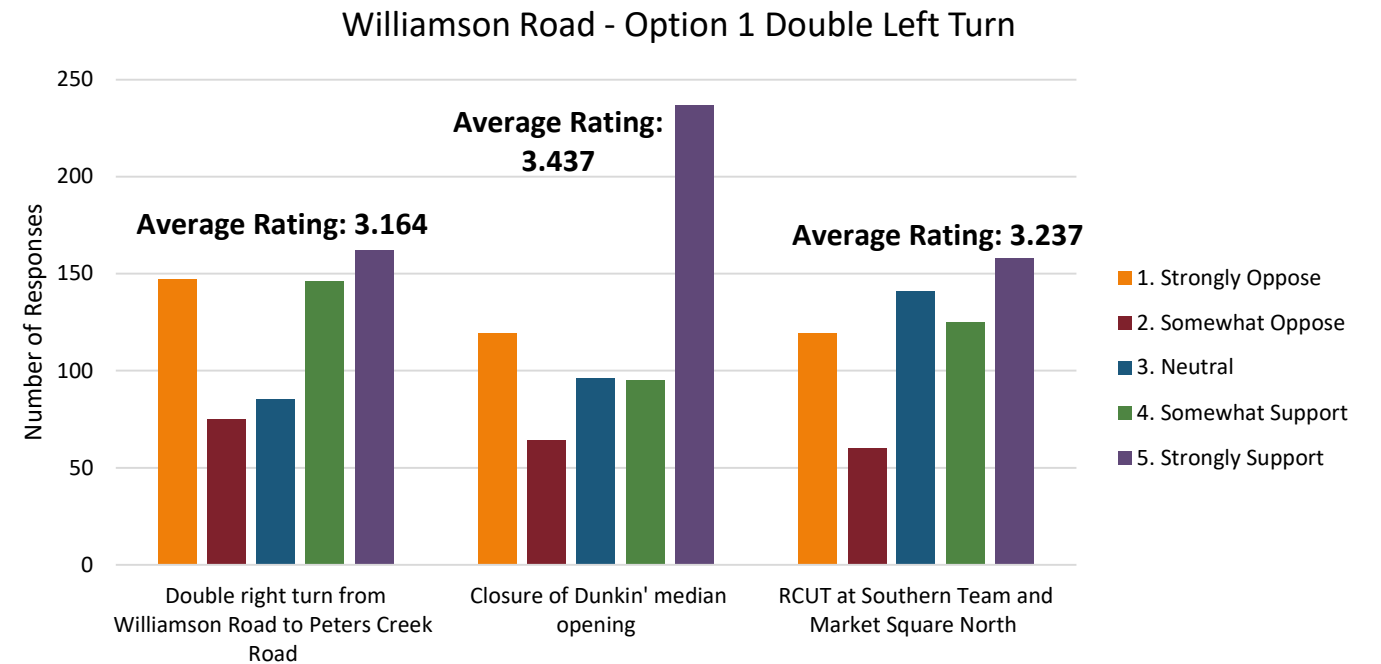


Figure 43: Williamson Road Option 1

For the option 2 of improvements at the Williamson Road and Peters Creek Road intersection, four ideas were polled (see **Figure 44**). Realigning the intersection and installing a right-in/right-out entrance to Kroger received an average rating of 3.573. The addition of a partial Thru-Cut along Williamson Road at Kroger and Market Square North had an average rating of 3.460. The Southern Team and Market Square North intersection median closing was received an average rating of 3.432. The highest rating for this option of 3.836 was given to installing sidewalks along Kroger's frontage along Peters Creek Road and Williamson Road.

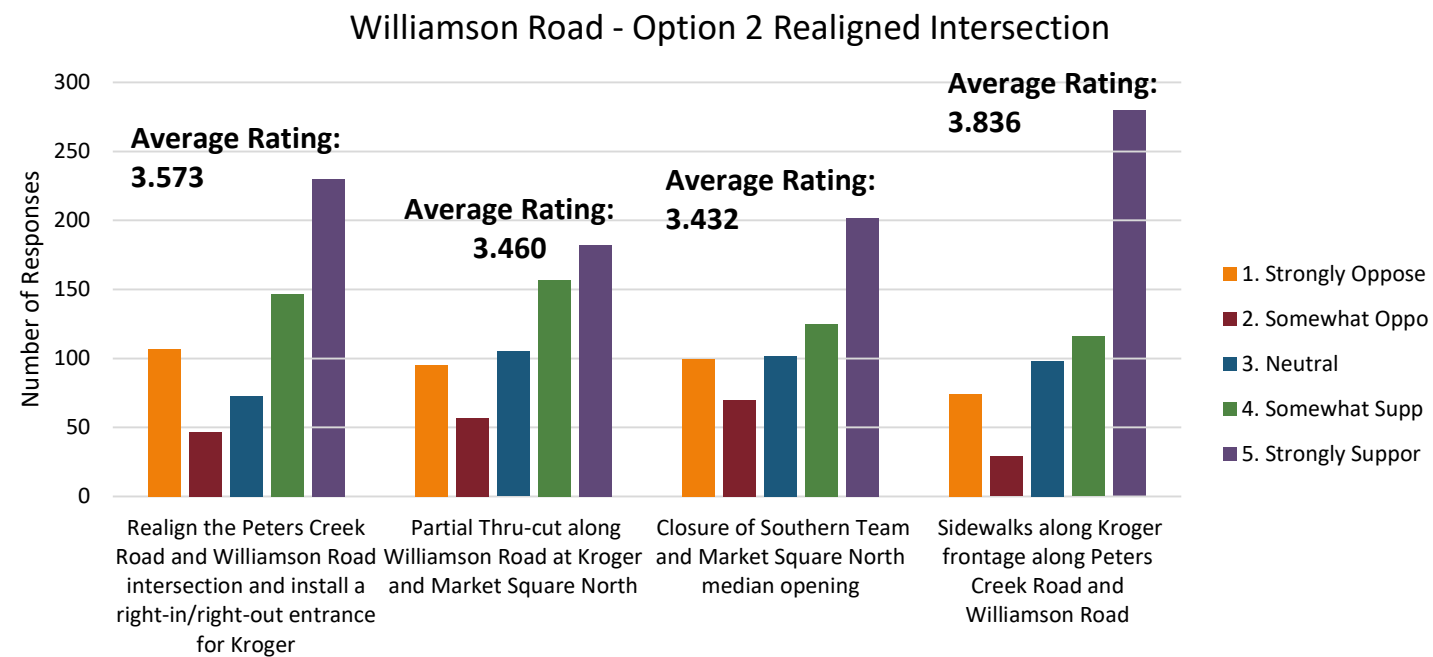


Figure 44: Williamson Road Option 2

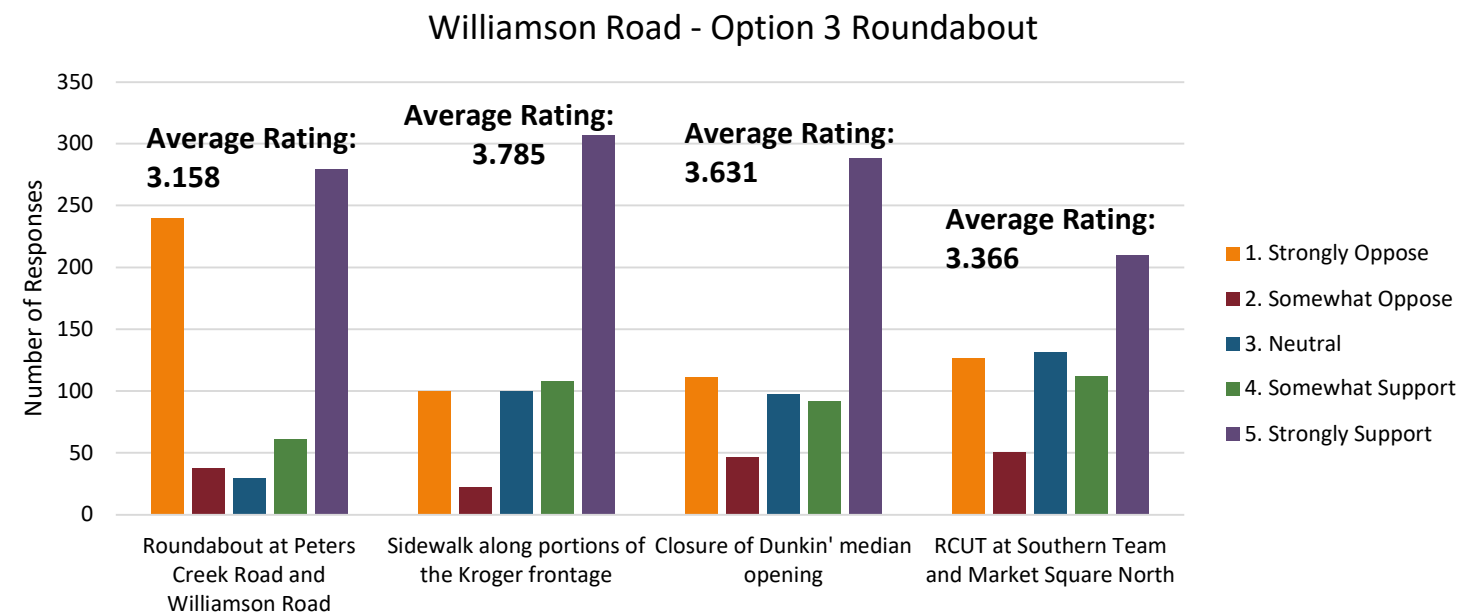


Figure 45: Williamson Road Option 3

Option 3 for the Peters Creek Road and Williamson Road intersection asked respondents to rate four different improvements (see Figure 45). The construction of a roundabout at the intersection received very polar results with an average rating of 3.158. Introducing sidewalk along portions of the Kroger frontage had the highest average rating for option 3 at 3.785. The closure of the Dunkin' median opening had an average rating of 3.631. The RCUT at the Southern Team and Market Square North intersection received an average rating of 3.366.

The right turn lane on eastbound Williamson Road and the right turn lane on northbound Plantation Road received average ratings of 4.520 and 4.511 (see **Figure 46**).

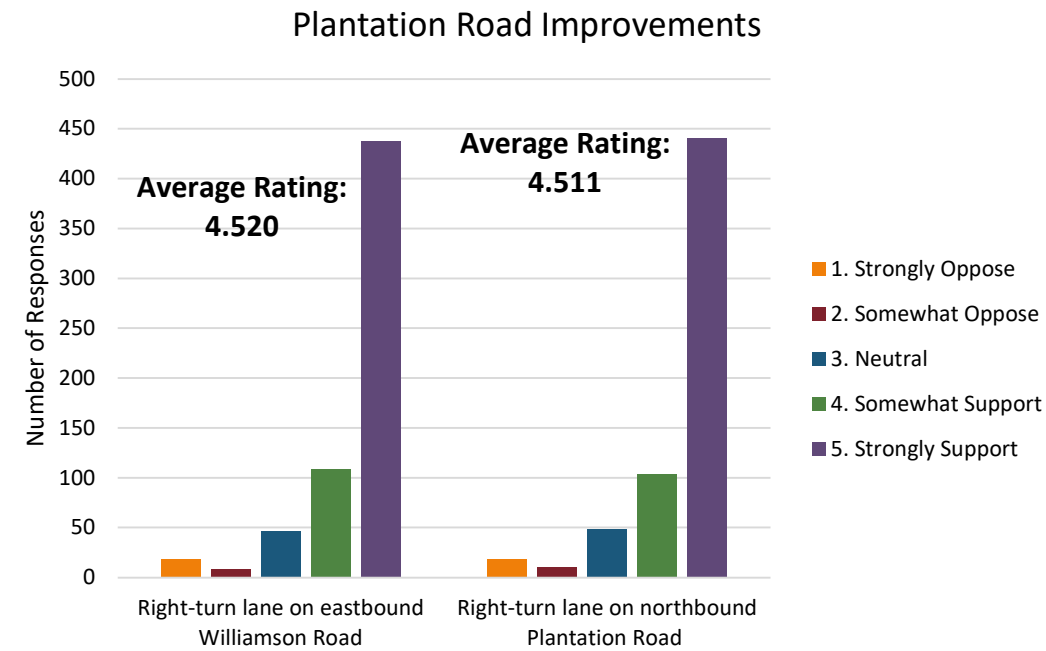


Figure 46: Plantation Road Survey Results

The sidewalk improvements along the Peters Creek Road (Route 117) from Archcrest Drive to Williamson Road received an overall average rating of 3.55 (see **Figure 47**).

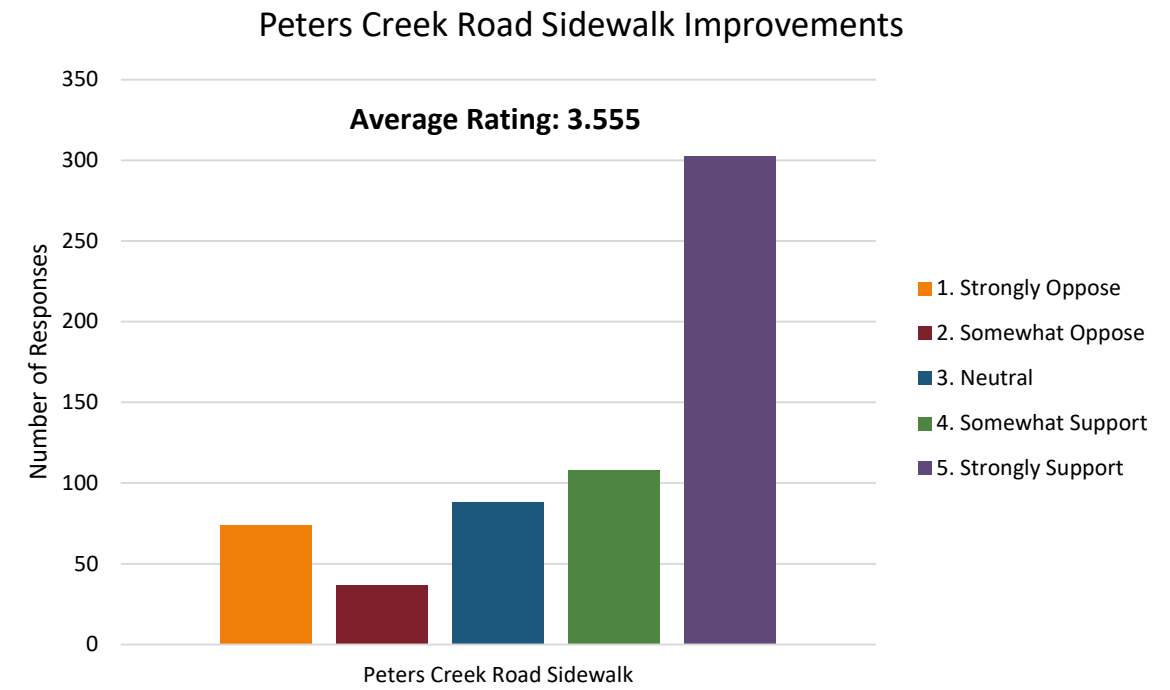


Figure 47: Sidewalk Improvements



Chapter 4:

Preferred Alternative Design Refinement & Investment Strategy

Investment Strategy:

This study should be used as a planning tool to achieve the next steps of planning, programming, designing, and constructing the identified improvements along study corridor. To build upon the efforts of this study, VDOT Salem District should continue to coordinate with Roanoke County and other stakeholders.

Improvement projects should be prioritized on a local and regional level. Prior to submitting funding applications, the applicant must have inclusion or proven consistency with the Constrained Long-Range Transportation Plan (CLRP) or resolution of support from a governing body.

Preferred Alternative

Throughout the study process, proposed improvements were presented for stakeholder and public engagement, refined based on feedback, and analyzed in detail to verify that they met both safety and operational needs. As of the completion of this report, the concept plan displayed in **Appendix E** is the final recommended preferred alternative. This conceptual design was developed in accordance with the following applicable guidelines:

- A Policy on Geometric Design of Highways and Streets (AASHTO 2018)
- VDOT Road Design Manual (Issued January 2005, Revised June 2022)
- VDOT Road and Bridge Standards (VDOT 2016, latest revisions)
- Manual on Uniform Traffic Control Devices (MUTCD 2009)
- 2011 Virginia Supplement to the MUTCD

Design criteria and guidance from these documents were applied to roadways within the project limits based on functional classification and roadway design speeds.

Three different applications are being pursued for SMART SCALE Round 6:

- Project ID 11449: Peters Creek Road/Williamson Road – From Wood Haven Road to Plantation Road – Submitted by RVTPO
- Application ID 11710: Peters Creek Road – From Wendover Road to Dwight Street – Submitted by Roanoke County
- Project ID 11698: Peters Creek Road/Williamson Road – From East of Deer Branch Road to Plantation Road – Submitted by Roanoke County

Planning-Level Cost Estimates

An engineer's preliminary opinion of probable cost was created for construction costs, right of way acquisition costs, and utility relocation costs for the preferred alternative using Version 3.1 of the Cost Estimate Workbook (CEWB) as shown in **Table 15**. **Appendix F** includes detailed cost estimates.

Table 15: Planning Level Cost Estimates for the Preferred Alternative For Project ID 11449

Phase Description	Budget *
Preliminary Engineering	\$7,982,478
Right of Way and Utility Relocation	\$9,649,628
Construction	\$84,886,655
Total Project Budget	\$102,518,761

*Estimate as of July 29, 2024

Table 16: Planning Level Cost Estimates for the Preferred Alternative For Project ID 11698

Phase Description	Budget *
Preliminary Engineering	\$4,262,570
Right of Way and Utility Relocation	\$1,040,553
Construction	\$36,317,175
Total Project Budget	\$41,620,298

*Estimate as of July 29, 2024

Table 17: Planning Level Cost Estimates for the Preferred Alternative For Project ID 11710

Phase Description	Budget *
Preliminary Engineering	\$2,922,743
Right of Way and Utility Relocation	\$657,840
Construction	\$24,370,833
Total Project Budget	\$27,951,417

*Estimate as of July 29, 2024

- **Highway Safety Improvement Program (HSIP):** a competitive funding program providing funds for improvements that correct or improve safety on a section of roadway or intersection with a high incidence of crashes.

Project Risks

The project team worked with VDOT staff to identify potential project risks, discuss mitigation strategies and determine risk items which needed additional contingencies carried with the project estimate. The Salem District Scope of Work document identifies project risks (see **Appendix G**).

Possible Funding Sources

The development of this study and the preferred alternative were conducted in accordance with eligibility criteria for SMART SCALE, a competitive funding program that allocates funding from the construction District Grants Program (DGP) and High-Priority Projects Program (HPPP) to transportation projects. SMART SCALE uses a scoring process that evaluates, scores, and ranks project applications based on six measures: congestion mitigation, economic development, accessibility, safety, environmental quality, and land use. Roanoke Valley Transportation Planning Organization (RVTPO) submitted the proposed roadway improvements for SMART SCALE Round 6 funding consideration.

Other funding sources that may be considered for the proposed roadway improvements identified in this study include:

- **Revenue Sharing:** a competitive funding program providing a dollar-for-dollar state match to local funds for transportation projects. Projects eligible for Revenue Sharing funds include construction, reconstruction, improvement, and maintenance projects.
- **Congestion Mitigation and Air Quality (CMAQ):** a competitive funding program allocating funds to surface transportation projects that improve air quality by reducing congestion.