



PROJECT PIPELINE

**SA-23-09: Town of Rocky Mount
ROUTE 40 (TANYARD ROAD/
OLD FRANKLIN TURNPIKE)**



Route 40 (Tanyard Road/Old Franklin Turnpike) – From Pell Avenue to School Board Road

Final Report

July 2024

Prepared for



Prepared by



Table of Contents

Chapter 1: Needs Evaluation and Diagnosis.....	4
Introduction:	5
Background	5
Methodology.....	6
Study Area	8
FHWA Screening Tool for Equity Analysis of Projects (STEAP).....	12
Phase 1 Existing Conditions Public Outreach.....	14
Traffic Operations and Accessibility	15
Traffic Data	15
Measures of Effectiveness.....	15
Future Traffic Forecasting	15
Existing and No Build Traffic Operations Analysis Results.....	16
Safety and Reliability	23
Chapter 2: Alternative Development and Refinement	26
Chapter 3: Public and Stakeholder Outreach and Feedback	36
Chapter 4: Preferred Alternative Design Refinement & Investment Strategy	40
Investment Strategy	41
Preferred Alternative	41
Planning-Level Cost Estimates	41
Project Risks.....	41
Possible Funding Sources	41

Appendices

Appendix A – Stakeholder Working Group Meeting Presentations
Appendix B – Traffic Count Data
Appendix C – Synchro & SimTraffic Results
Appendix D - Preferred Alternative Sketch
Appendix E – Cost Estimate Documents
Appendix F – 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: vapipeline.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**.

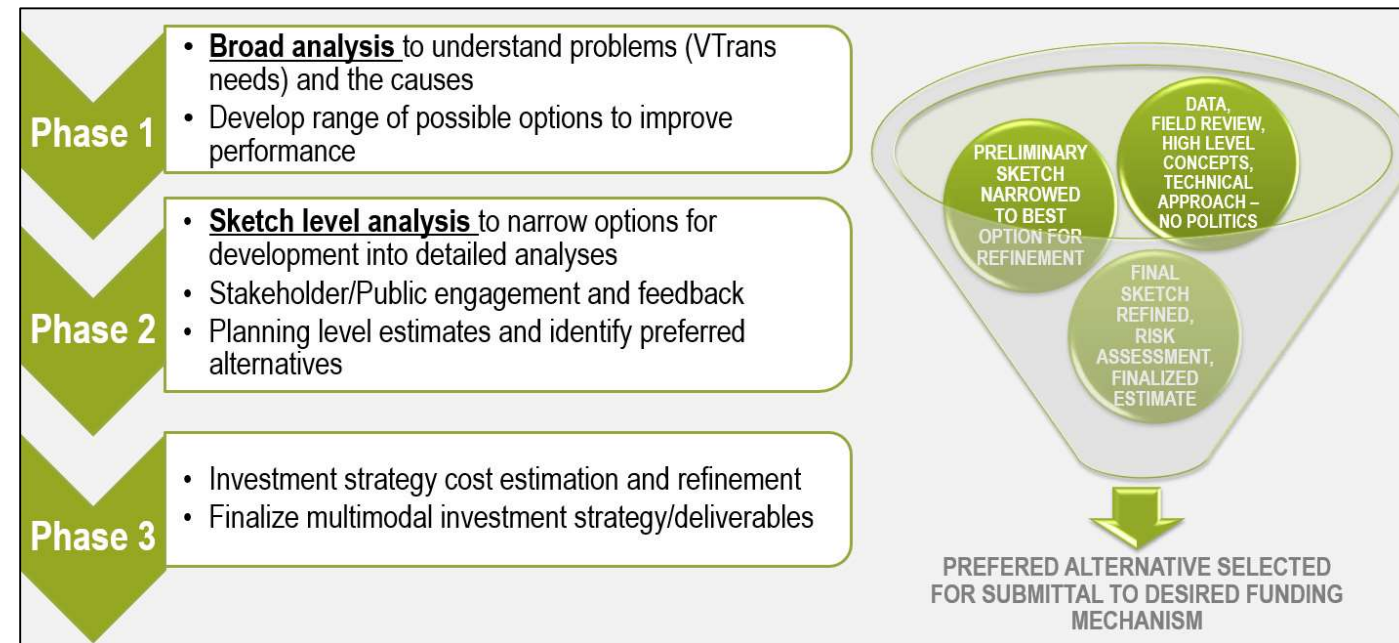


Figure 2: Study Phase Methods and Solutions

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 Tanyard Road/Old Franklin Turnpike (Route 40) study corridor from Pell Avenue to School Board Road is located in Rocky Mount, Virginia. Tanyard Road/Old Franklin Turnpike is classified as a minor arterial road within the study area. The posted speed limit is 25 MPH from Pell Avenue to the US 220 SB Ramps and 35 MPH to the end of the corridor. A map detailing the locations of the study area is shown in **Figure 4**.

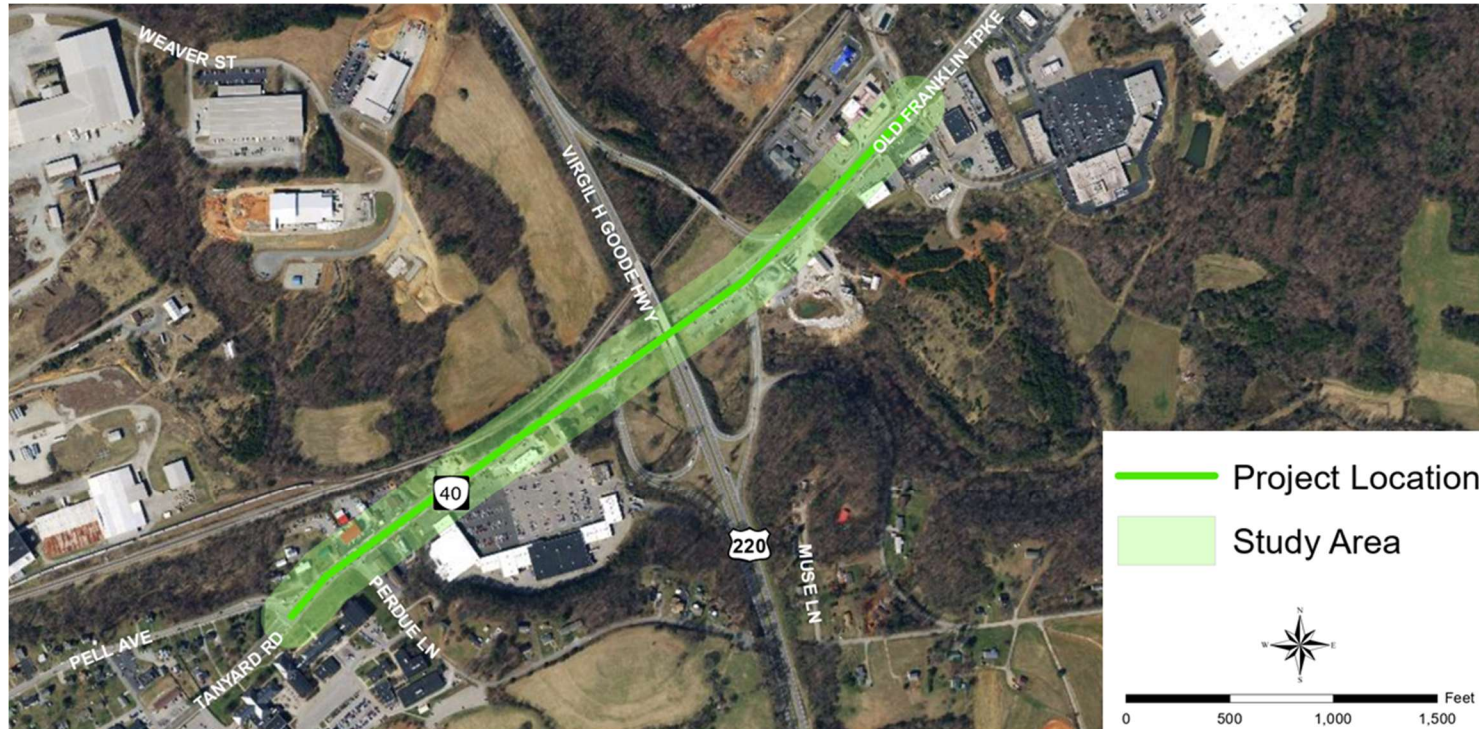


Figure 4: Study Area Map

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 Tanyard Road/Old Franklin Turnpike (Route 40) study corridor are ‘Very High’ for Safety Improvement as presented in **Table 3**.

Table 3: VTrans Needs in Study Area

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

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** presents an overview of this project.

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

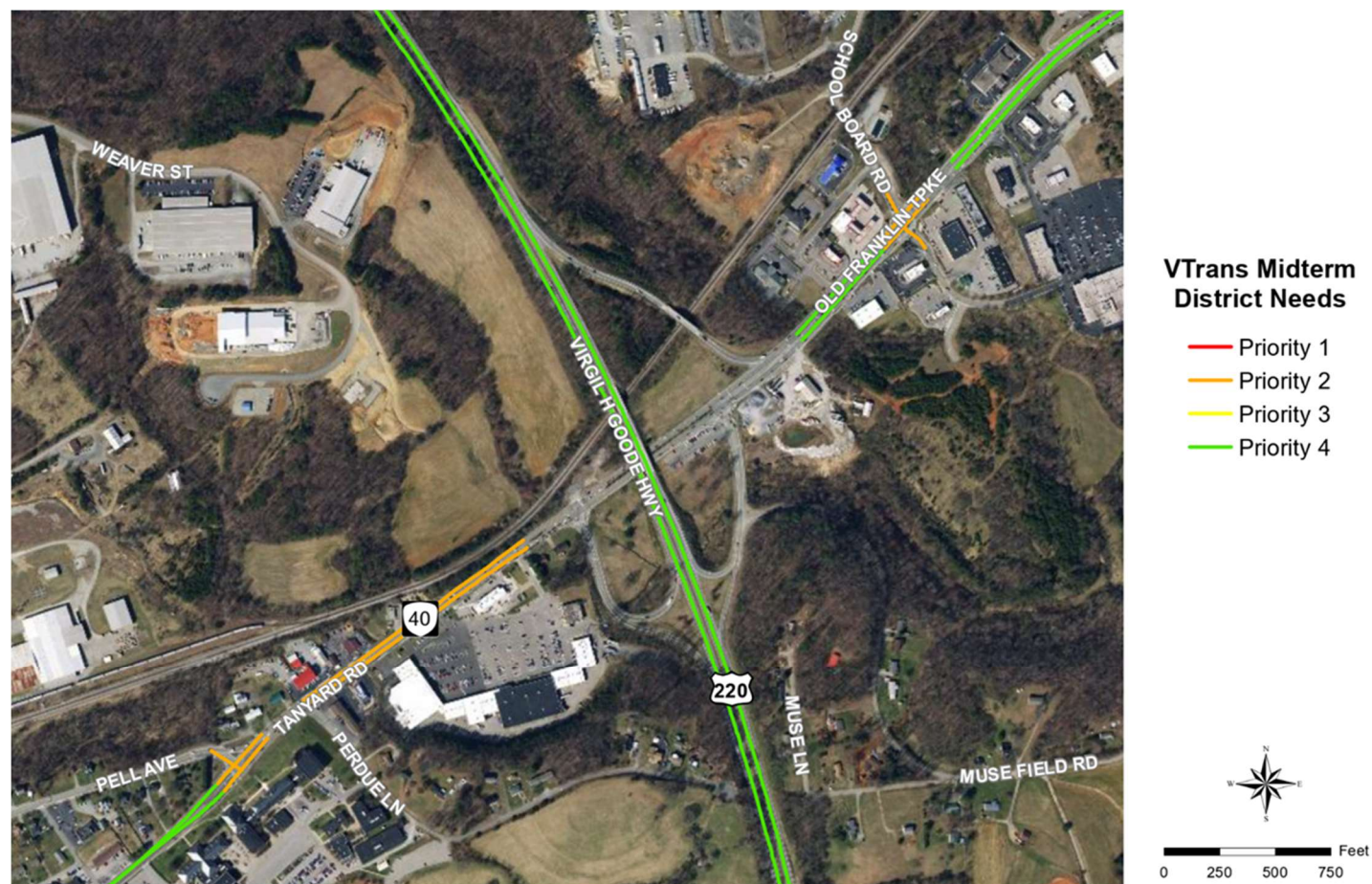
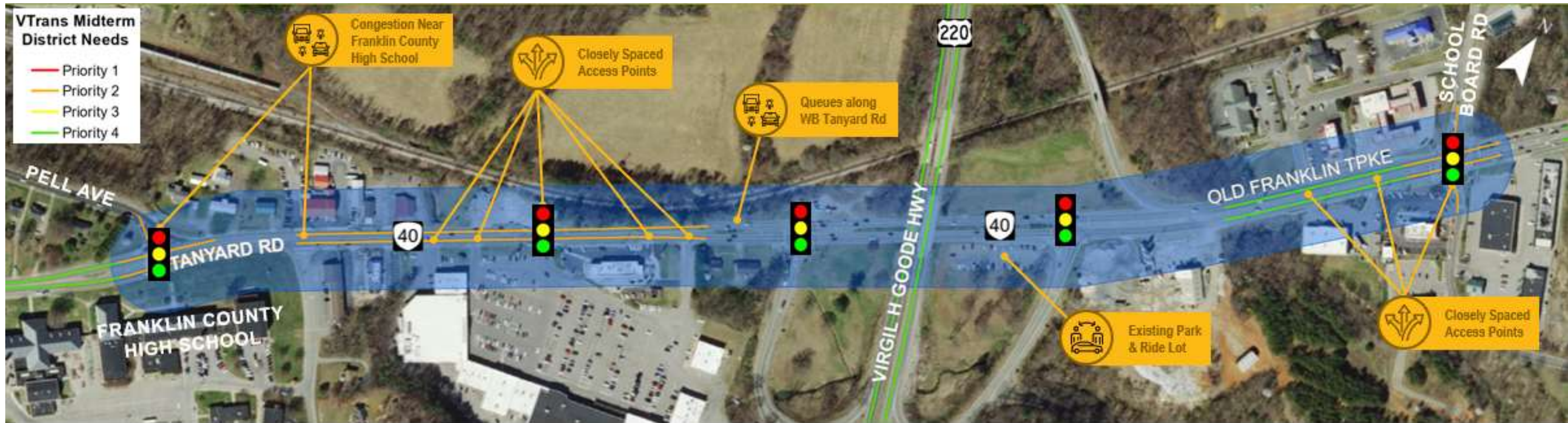


Figure 5: 2019 VTrans Prioritized Mid-term Needs in the Study Area



Existing Issues in the Study Area

- Traffic congestion in vicinity of Franklin County High School (Pell Avenue & Perdue Lane intersections)
- Queues in westbound Tanyard Road shared left-turn/through lane west of US 220 occasionally spill back to US 220 Ramps
- Multiple full access entrances near School Board Road signalized intersection

Purpose, Goals & Objectives

The purpose of this study is to identify recommendations to improve safety along the Route 40 (Tanyard Road) corridor within the Town of Rocky Mount.

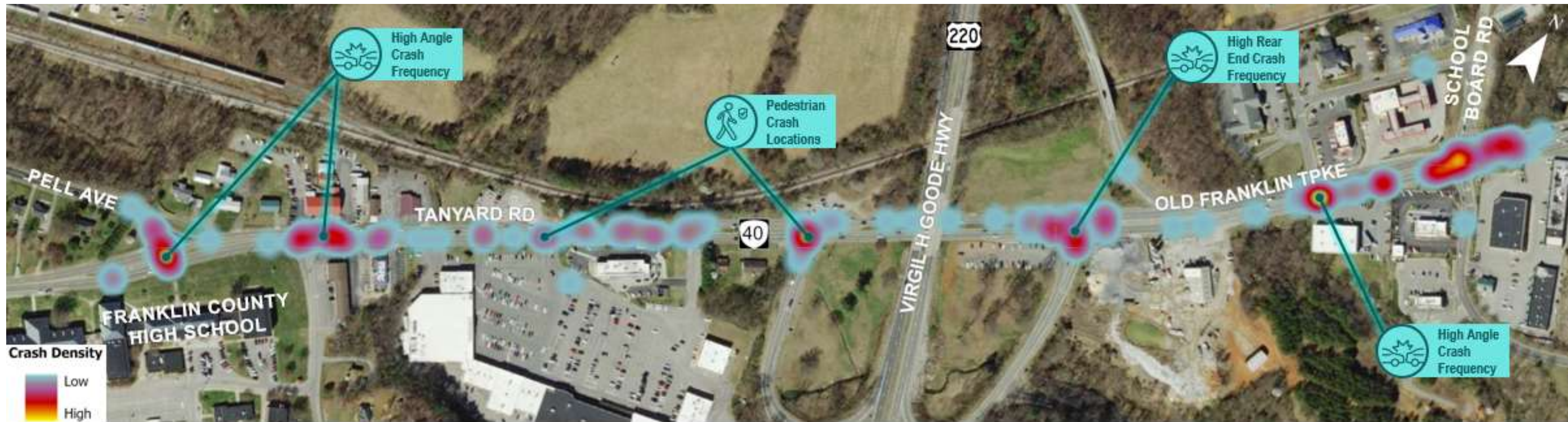
Identify cost-effective improvement alternatives that address the identified safety needs.

Study Summary

VDOT District	Salem
Locality	Town of Rocky Mount
Length	0.74 miles
Study Limits	From Pell Avenue to School Board Road
Functional Classification	Minor arterial
Speed Limit	25 MPH – West of Route 220 SB Ramps 35 MPH – East of Route 220 SB Ramps

VTrans Needs	
NEED	PRIORITY
Safety Improvement	Very High

Figure 6: Project Overview



Safety Issues in the Study Area

- Angle crashes at Pell Avenue, Perdue Lane, and Powder Creek Lane; rear-end crashes at the US 220 NB ramps
- Queues in shared left-turn/through lanes
- Multiple full access commercial entrances near signalized intersections
- Two pedestrian crashes resulting in injuries

2018 – 2022 Crashes at Intersections



Crashes by Severity

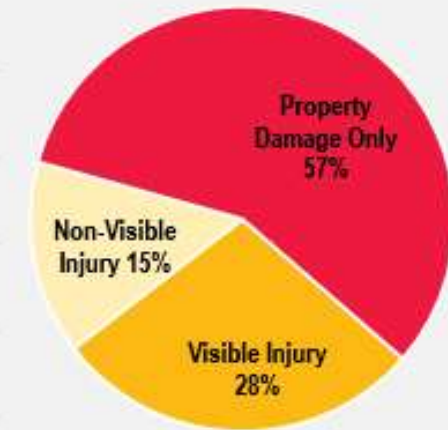


Figure 7: Project Overview

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:

- There is a moderate personal vehicle ownership, with 35% of households owning three or more vehicles, while 7% of the study area does not have a personal vehicle as shown in **Figure 8**.
- The majority of households contain three members and only 1% has more than six members of the household as shown in **Figure 9**.
- Of all the households in the study area, 59% of households make at least \$50,000 in annual income. However, 20% of households make less than \$15,000 as shown in **Figure 10**.
- When compared to the State of Virginia and Franklin County, the study area has a higher average of households without computer access at 75% as shown in **Figure 11**.
- The study area has the same percentage of veterans (8%) and people with disabilities (5%) compared to the County of Franklin, as shown in **Figure 12**.

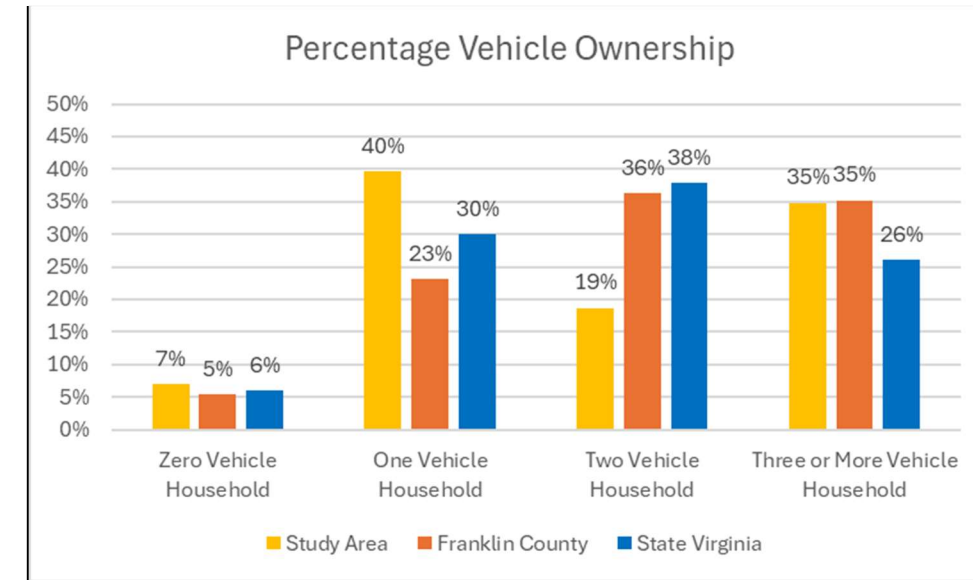


Figure 8: STEAP Tool Analysis Vehicle Ownership

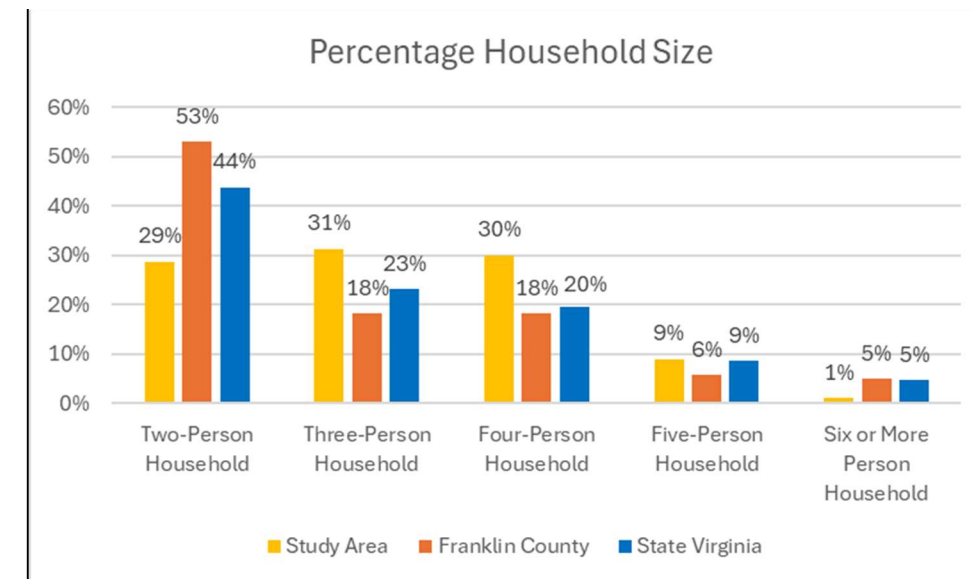


Figure 9: STEAP Tool Analysis Household Size

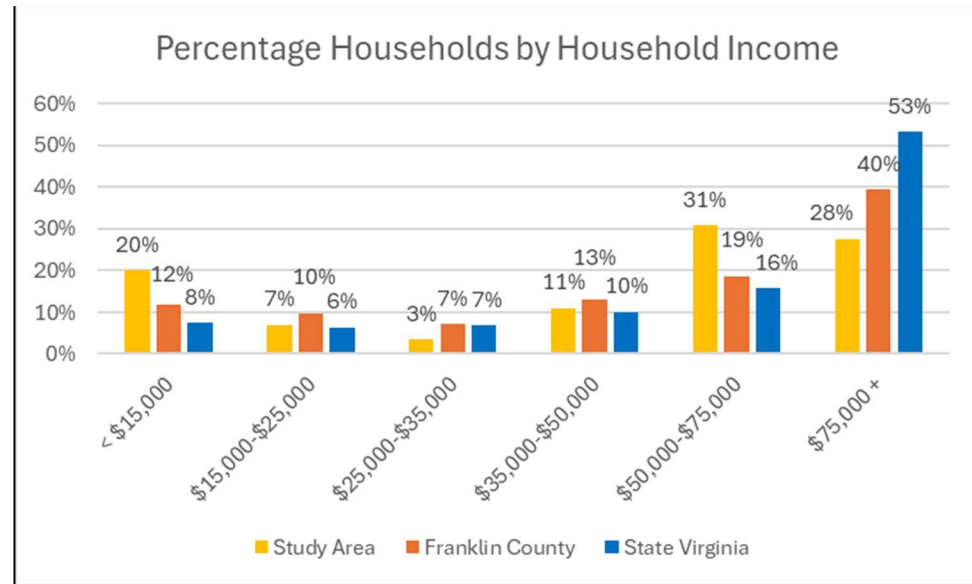


Figure 10: STEAP Tool Analysis Household Income

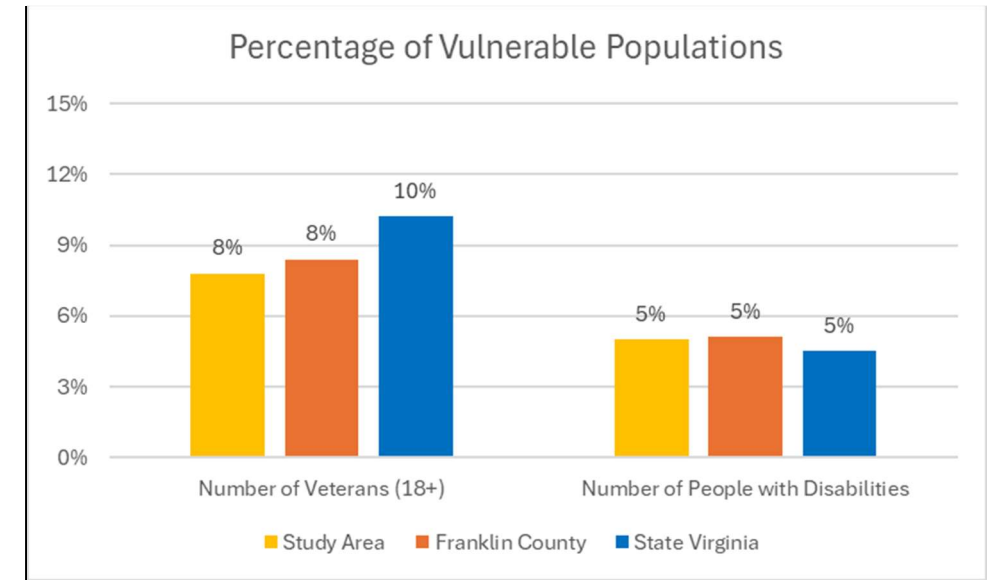


Figure 12: STEAP Tool Analysis Vulnerable Populations

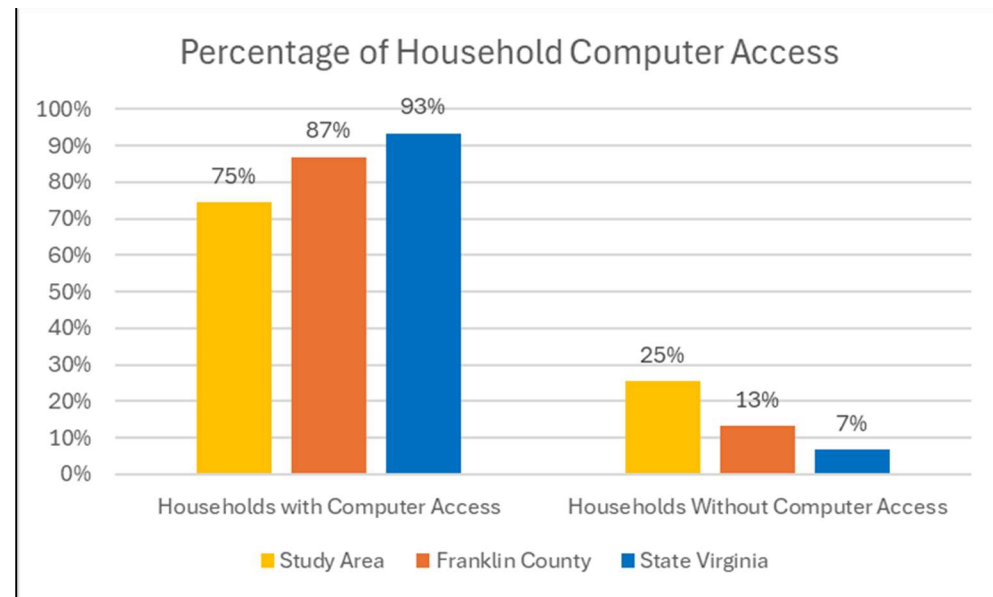


Figure 11: STEAP Tool Analysis Household Computer Access

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 324 participants. The detailed summary of the public survey is included in **Appendix A**.

The survey shows that safety is the major need of the corridor as shown in **Figure 13**.

Project Pipeline Tanyard Road Study (SA-23-09)

Project Engagement			
VIEWS	PARTICIPANTS	RESPONSES	COMMENTS
1,324	324	7,136	477

Safety has been identified as the need for this study. Do you agree with this initial assessment?



Figure 13: Public Input Survey Results

Figure 14 shows the most important issues along the study corridor including reducing traffic congestion, corridor/intersection safety, speeding/aggressive driving, and pedestrian safety and accessibility.



Figure 14: Public Input Survey Results

The notable comments from the survey responses are summarized below:

- Poor traffic signal coordination
- Requests for crosswalks/sidewalks
- Excessive speeding
- General congestion issues
- Heavy roadway congestion caused by school traffic
- Requests for more turn lanes

Traffic Operations and Accessibility

The initial traffic operational analysis was performed using Synchro 11 software for the study intersections along the Tanyard Road/Old Franklin Turnpike 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 (PMA). Additional turning movement counts were also performed in September 2023 by PMA. The AM and PM weekday peak hours were identified as 7:30 - 8:30 AM and 5:00– 6:00 PM, respectively. The existing intersection peak hour volumes are shown in **Figure 15**. 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. Additionally, projected site trips from the approved drive-thru bank opposite Rocky Mount Plaza were included in 2050 volumes. Future traffic volumes were re-balanced as necessary through the study area. 2050 design year traffic volumes are included in **Figure 16**.

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			
Tanyard Road	Franklin County Schools	Pell Avenue	2022	6425	7325	0.5%	0.5%
Tanyard Road	Pell Avenue	Route 220 Off Ramp	2022	17305	19728	0.5%	0.5%
Old Franklin Turnpike	Route 220 Off Ramp	East of School Board Road	2022	14253	16248	0.5%	0.5%
Pell Avenue	Wray Street	Tanyard Road	2022	7769	8857	0.5%	0.5%
Route 220 SB Off Ramp	Tanyard Road	Route 220	2022	4251	4846	0.5%	0.5%
Route 220 On Ramps	Tanyard Road	Route 220	2022	3240	3694	0.5%	0.5%
Route 220 NB On Ramp	Franklin Road	Route 220	2022	4009	4570	0.5%	0.5%
Route 220 NB Off Ramp	Route 220	Franklin Street	2022	1463	1668	0.5%	0.5%
School Board Road	Franklin Street	Bernard Road	2019	4138	7063	2.5%	0.5%

Existing and No Build Traffic Operations Analysis Results

Table 5 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 Tanyard Road/Old Franklin Turnpike operate at LOS C or better during both the AM and PM peak hours, with all movements and approaches operating at LOS E or better.

Turning movements at unsignalized intersections also operate at LOS D or better. Queue spillbacks occasionally occur between the adjacent closely spaced intersections around Rocky Mount Plaza and near School Board Road. 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 improvements related to the approved bank, which eliminates the existing site access west of the signalized intersection at Rocky Mount Plaza.

Table 6 depicts queue lengths, Levels of Service, and delays for intersections along Tanyard Road/Old Franklin Turnpike 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 and PM peak hours, the signalized intersections along Tanyard Road/Old Franklin Turnpike are projected to continue operating at LOS C or better, with all movements projected to continue operating at LOS E or better. Queue spillbacks are projected to continue in the areas noted under existing conditions.

Turning movements at unsignalized intersections also projected to continue operating at LOS D or better, except for the southbound business driveway approaches opposite Perdue Lane and the westernmost Rocky Mount Plaza entrance, both of which are projected to degrade to LOS E, although these are very low volume approaches. Detailed analysis results for both signalized and unsignalized intersections are contained in **Appendix C**.

Figure 15: Existing Peak Hour Turning Movement Counts AM(PM)

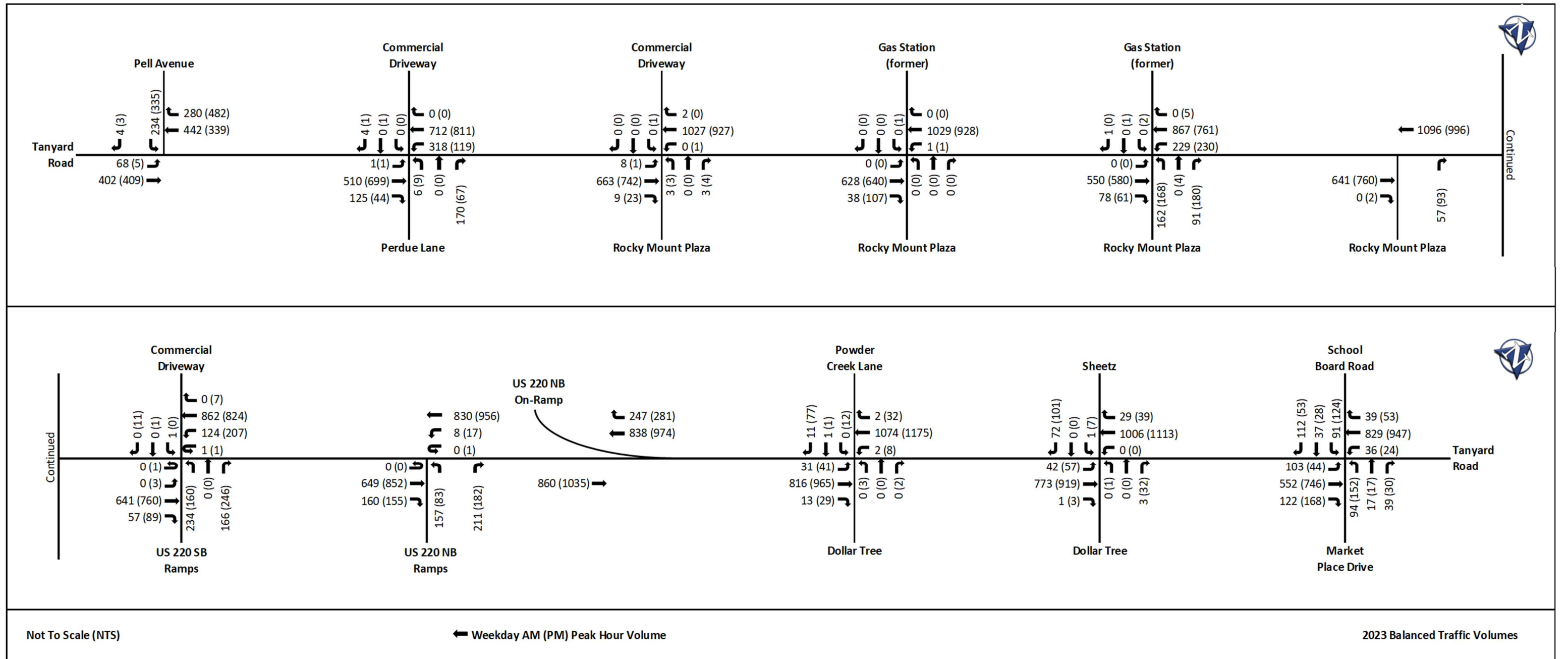


Figure 16: 2050 No Build Peak Hour Turning Movement Counts AM(PM)

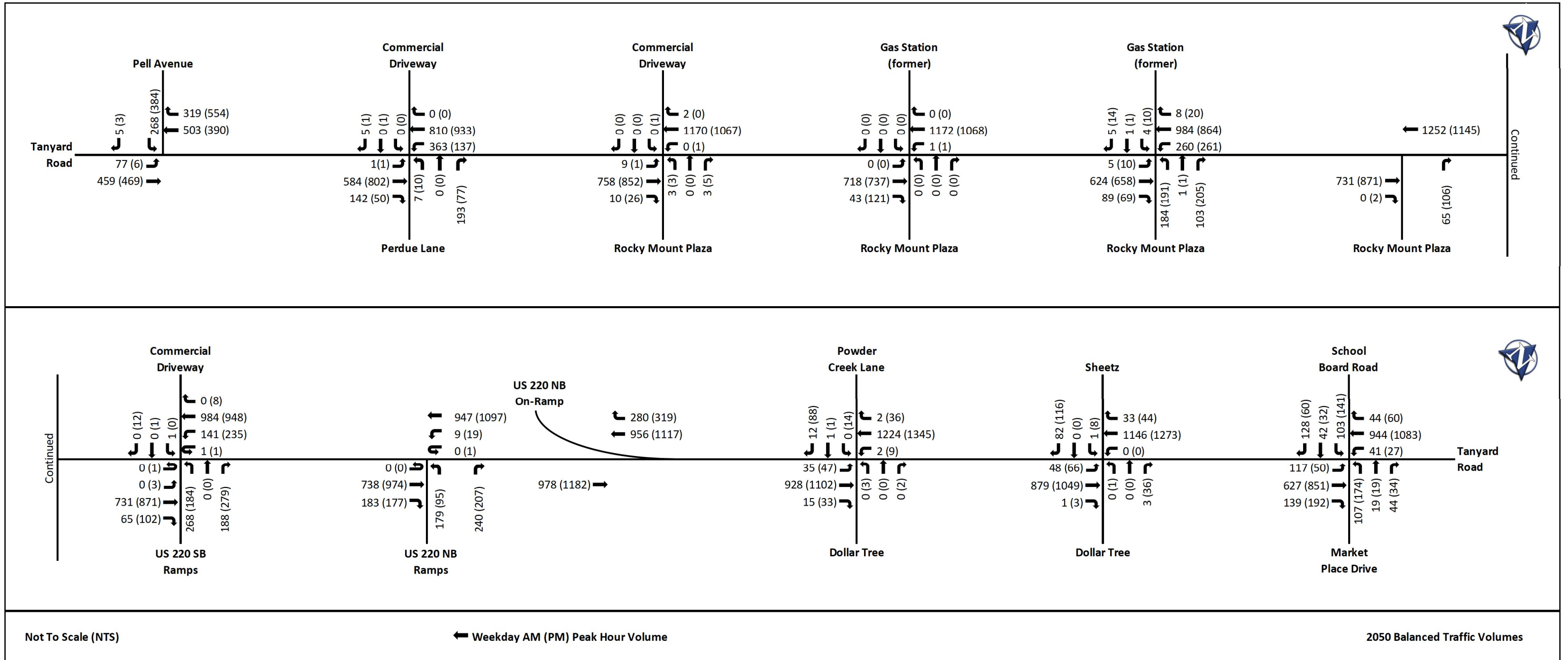


Table 5: 2023 Synchro Analysis Results Summary

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)
Tanyard Road & Pell Avenue Signalized	SB	L-R	246	D	D	B	37.0	37.0	10.2	484	D	D	B	52.3	52.3	14.9
	EB	L	116	A	A		7.1	4.9		34	A	A		3.9	4.4	
		T	180	A	A		4.5	4.4		138	A	A		4.4	4.4	
	WB	T-R	126	A	A		4.8	4.8		94	A	A		4.7	4.7	
Tanyard Road & Perdue Lane Unsignalized	SB	L-T-R	44	A	A	-	9.1	9.1	-	24	D	D	-	32.1	32.1	-
	NB	L-T	32	C	C		16.1	16.1		25	B	B		14.5	14.5	
		R	89	C	C		16.1	59		B	B	14.5		14.5		
	EB	L-T	32	A	-		0.0	-		13	A	-		0.0	-	
		T-R	57	A	-		0.0	-		24	A	-		0.0	-	
	WB	L-T	258*	A	-		9.9	-		96	A	-		3.7	-	
T-R		203*	A	-	0.0	-	38	A	-	0.0	-					
Tanyard Road & Rocky Mount Plaza (West) Unsignalized	SB	L-T-R	0	A	A	-	0.0	0.0	-	24	D	D	-	29.7	29.7	-
	NB	L-T-R	43	C	C		21.3	21.3		55	C	C		17.9	17.9	
	EB	L-T	82	A	-		0.4	-		32	A	-		0.0	-	
		T-R	80	A	-		0.0	-		104	A	-		0.0	-	
	WB	L-T	5	A	-		0.0	-		10	A	-		0.0	-	
		T-R	18	A	-		0.0	-		18	A	-		0.0	-	
Tanyard Road & Rocky Mount Plaza (Middle) Unsignalized	SB	L-T-R	0	A	A	-	0.0	0.0	-	21	D	D	-	29.4	29.4	-
	NB	L-T-R	0	A	A		0.0	0.0		0	A	A		0.0	0.0	
	EB	L-T	103	A	-		0.0	-		128	A	-		0.0	-	
		T-R	160	A	-		0.0	-		169	A	-		0.0	-	
	WB	L-T	16	A	-		0.0	-		8	A	-		0.0	-	
		T-R	6	A	-		0.0	-		0	A	-		0.0	-	
Tanyard Road & Rocky Mount Plaza (Main) Signalized	SB	L-T-R	12	D	D	C	43.4	43.4	24.8	35	E	E	C	61.7	61.7	26.5
	NB	L-T	206	D	D		39.4	36.7		237	D	D		53.0	48.2	
		R	74	C	C		31.9	128		D	D	43.5		43.5		
	EB	L-T-R	399*	D	D		35.7	35.7		423*	D	D		36.3	35.7	
	WB	L-T-R	509*	B	B		15.8	15.8		333*	B	B		12.5	12.5	
Tanyard Road & Rocky Mount Plaza (East) Unsignalized	NB	R	88	A	A	-	9.3	9.3	-	98	A	A	-	9.3	9.3	-
	EB	T-R	14	A	-		0.0	-		70	A	-		0.0	-	
	WB	T	107	A	-		0.0	-		3	A	-		0.0	-	
Tanyard Road & US 220 SB Ramps Signalized	SB	L-T-R	6	C	C	B	20.7	20.7	17.6	39	C	C	B	26.3	26.3	16.6
	NB	L-T	244	C	C		31.0	27.1		172	C	C		33.0	29.6	
		R	187	C	C		21.6	152		C	C	27.4		27.4		
	EB	L	0	A	C		0.0	21.8		51	D	B		45.8	18.2	

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)						
	WB	T-R	289*	C			21.8			402*	B			18.1								
		L	120	B	B		12.6	10.7		120	B	B		10.5	10.1							
		T-R	290	B			10.5			314	A			10.0								
Old Franklin Turnpike & US 220 NB Ramps Signalized	NB	L	157	B	B	B	16.5	15.5	10.5	104	B	B	A	16.6	16.1	9.1						
		R	144	B			14.8			119	B			15.9								
	EB	T	221	B	11.5		11.0	218		B	A	10.2										
		R	150	A	9.2			113		A		7.8										
	WB	L	37	C	A		29.6	7.8		64	C	33.8										
		T	210	A			7.5			213	A	6.0										
Old Franklin Turnpike & Powder Creek Lane Unsignalized	SB	L-T-R	50	B	B		10.2	10.2		92	B	B		11.3	11.3							
	NB	L-T-R	0	A	A		0.0	0.0		35	B	B		14.5	14.5							
	EB	L	60	B		-	10.7	-	-	49	B		-	10.8	-	-						
		T-R	50	A	0.0		99			A	0.0											
	WB	L	18	A			9.3			32	A	9.6										
		T-R	15	A			0.0			14	A	0.0										
Tanyard Road & Sheetz / Dollar Tree Unsignalized	SB	L-T-R	64	A	A					9.7	9.7			124			B	B		10.5	10.5	
	NB	L-T-R	22	B	B					10.1	10.1			59			B	B		10.3	10.3	
	EB	L	46	A		-	9.8	-	-	49	B		-	10.5	-	-						
		T-R	70	A	0.0		117			A	0.0											
	WB	L	0	A			0.0			4	A	0.0										
		T-R	6	A			0.0			17	A	0.0										
Old Franklin Turnpike & School Board Road Signalized	SB	L	99	D	D		C			38.7	37.4	28.0		99			E	E	C	59.3	55.2	31.1
		T-R	243	D						36.6				225			D			48.9		
	NB	L	125	D	D	51.4		46.8	246	E	D		56.6									
		T-R	104	D		39.0			130	D			45.6									
	EB	L	153	D	C	51.9		23.9	132	E	C		59.7	27.4								
		T	290*	B		16.2			354*	C			20.4									
	WB	R	100	D	C	35.0		25.9	100	D	C		49.9									
		L	145	D		53.8			160	E			59.7									
	T-R	330	C	24.8	366	C		24.6														

* Maximum queue from SimTraffic extends into the adjacent upstream intersection

Table 6: 2050 Synchro 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)
Tanyard Road & Pell Avenue Signalized	SB	L-R	282	D	D	B	36.8	36.8	10.7	714	D	D	B	53.6	53.6	16.5
	EB	L	117	B	A		10.0	5.8		32	A	A		4.2	4.9	
		T	227	A			5.0			121	A			4.9		
	WB	T-R	178	A	A		5.2	5.2		130	A	A		7.2	7.2	
Tanyard Road & Perdue Lane Unsignalized	SB	L-T-R	48	A	A	-	9.5	9.5	6.7	27	E	E	-	43.1	43.1	-
	NB	L-T	122	C	C		19.8	19.8		34	C	C		16.0	16.0	
		R	124	C			19.8			61	C			16.0		
	EB	L-T	58	A	-		0.0	-		24	A	-		0.0	-	
		T-R	103	A	-		0.0	-		22	A	-		0.0	-	
	WB	L-T	382*	B	-		13.2	-		97	A	-		4.5	-	
T-R		271*	A	-	0.0	-	79	A	-	0.0	-					
Tanyard Road & Rocky Mount Plaza (West) Unsignalized	SB	L-T-R	0	A	A	-	0.0	0.0	-	21	E	E	-	37.1	37.1	-
	NB	L-T-R	44	C	C		23.5	23.5		55	C	C		19.6	19.6	
	EB	L-T	192	A	-		0.5	-		65	A	-		0.0	-	
		T-R	194	A	-		0.0	-		89	A	-		0.0	-	
	WB	L-T	60	A	-		0.0	-		16	A	-		0.0	-	
T-R		31	A	-	0.0	-	17	A	-	0.0	-					
Tanyard Road & Rocky Mount Plaza (Middle) Unsignalized	NB	L-T-R	0	A	A	-	0.0	0.0	-	0	A	A	-	0.0	0.0	-
	EB	L-T	160	A	-		0.0	-		136	A	-		0.0	-	
		T-R	184	A	-		0.0	-		168	A	-		0.0	-	
	WB	L-T	58	A	-		0.0	-		23	A	-		0.0	-	
T-R		19	A	-	0.0	-	2	A	-	0.0	-					
Tanyard Road & Rocky Mount Plaza (Main) Signalized	SB	L-T-R	38	D	D	C	47.2	47.2	34.6	78	E	E	C	57.2	57.2	31.1
	NB	L-T	248	D	D		40.9	37.5		234	D	D		52.8	47.5	
		R	133	C			31.5			144	D			42.5		
	EB	L-T-R	560*	D	D		54.0	54.0		409*	D	D		36.7	36.7	
WB	L-T	741*	C	C	22.7	22.7	578*	C	C	21.2	21.2					
Tanyard Road & Rocky Mount Plaza (East) Unsignalized	NB	R	98	A	A	-	9.6	9.6	-	127	A	A	-	9.5	9.5	-
	EB	T-R	53	A	-		0.0	-		78	A	-		0.0	-	
	WB	T	310	A	-		0.0	-		172	A	-		0.0	-	
Tanyard Road & US 220 SB Ramps Signalized	SB	L-T-R	9	C	C	C	22.2	22.2	20.2	46	C	C	B	29.4	29.4	19.3
	NB	L-T	339	D	C		36.4	31.0		240	D	C		39.2	34.1	
		R	246	C			23.4			208	C			30.8		
	EB	L	0	A	C		0.0	24.5		36	D	C		51.3	21.6	
T-R		372*	C	24.5		412*	C		21.5							

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)	
	WB	L	120	B	B		14.7	12.7		120	B	B		13.5	11.5		
		T-R	463	B			12.4			352	B			11.0			
Old Franklin Turnpike & US 220 NB Ramps Signalized	NB	L	261	B	B		18.3	17.1		115	B	B		18.1	17.5		
		R	181	B			16.2			153	B			17.2			
	EB	T	285	B	A	B	12.2	11.7	11.4	262	B	B	A	10.7	10.2		
		R	171	A			9.4			189	A			7.8			
	WB	L	56	D	A		35.2	8.7		62	D	A		43.8	7.1		
		T	256	A			8.4			228	A			6.4			
Old Franklin Turnpike & Powder Creek Lane Unsignalized	SB	L-T-R	57	B	B		10.7	10.7		130	B	B		12.6	12.6		
	NB	L-T-R	0	A	A		0.0	0.0		33	C	C		16.0	16.0		
	EB	L	61	B	-		11.4	-		-	49	B		-	11.9		-
		T-R	116	A	-		0.0	-		-	93	A		-	0.0		-
	WB	L	21	A	-		9.7	-		-	32	B		-	10.2		-
		T-R	42	A	-		0.0	-		-	26	A		-	0.0		-
Tanyard Road & Sheetz / Dollar Tree Unsignalized	SB	L-T-R	126	B	B		10.3	10.3		167	B	B		11.2	11.2		
	NB	L-T-R	30	A	A		9.8	9.8		66	B	B		10.1	10.1		
	EB	L	48	B	-		10.3	-		-	49	B		-	11.4		-
		T-R	101	A	-		0.0	-		-	153	A		-	0.0		-
	WB	L	19	A	-		0.0	-		-	13	A		-	0.0		-
		T-R	20	A	-		0.0	-		-	14	A		-	0.0		-
Old Franklin Turnpike & School Board Road Signalized	SB	L	100	D	D	C	39.0	37.6	32.2	99	E	E	C	64.4	58.2	33.8	
		T-R	283	D			36.7			257	D			48.8			
	NB	L	165	D	D		46.1	42.9		265	E	E		59.5	56.1		
		T-R	121	D			37.4			126	D			44.9			
	EB	L	155	D	C		45.7	24.4		152	E	C		64.3	29.5		
		T	460*	B			18.2			488*	C			22.5			
		R	102	C			34.8			100	D			51.2			
	WB	L	206	E	D		63.9	35.7		182	E	C		60.2	28.6		
T-R		439	C	34.5		406	C		27.8								

* 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	0	10	2	18	30
2019	0	0	10	1	20	31
2020	0	0	6	5	14	25
2021	0	0	7	4	19	30
2022	0	0	9	10	14	33
Total	0	0	42	22	85	149

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	0	21	11	38	70
Angle	0	0	12	7	29	48
Sideswipe – Same Direction	0	0	0	1	7	8
Fixed Object – Off Road	0	0	2	1	2	5
Non-Collision	0	0	0	0	0	0
Pedestrian	0	0	2	0	0	2
Head On	0	0	3	0	1	4
Sideswipe – Opposite Direction	0	0	2	1	2	5
Fixed Object - in Road	0	0	0	0	1	1
Other	0	0	0	1	5	6
Total	0	0	42	22	85	149

Table 9: Study Area Crash Severity by Intersection

Collision Type and Crash Severity	K. Fatal Injury	A. Severe Injury	B. Visible Injury	C. Nonvisible Injury	PDO. Property Damage Only	Total
Pell Avenue	0	0	4	2	13	19
Perdue Lane	0	0	8	1	9	18
Rocky Mount Plaza (Signalized)	0	0	2	2	7	11
Rocky Mount Plaza (Unsignalized)	0	0	3	2	4	9
US 220 SB Ramps	0	0	4	3	6	13
US 220 NB Ramps	0	0	10	4	11	25
Powder Creek Lane	0	0	3	4	9	16
Dollar Tree Entrance	0	0	1	2	3	6
School Board Road	0	0	5	2	14	21
Total	0	0	40	22	76	138

Table 10: Study Area Crash Types by Intersection

Collision Type and Crash Severity	Rear End	Angle	Sideswipe	Fixed Object	Head On	Pedestrian	Bicycle	Other	Total
Pell Avenue	5	6	5	1	1	0	0	1	19
Perdue Lane	8	8	1	1	0	0	0	0	18
Rocky Mount Plaza (Signalized)	5	3	0	0	0	1	0	2	11
Rocky Mount Plaza (Unsignalized)	6	2	1	0	0	0	0	0	9
US 220 SB Ramps	5	6	0	0	0	1	0	1	13
US 220 NB Ramps	21	2	0	0	1	0	0	1	25
Powder Creek Lane	4	9	1	1	1	0	0	0	16
Dollar Tree Entrance	0	5	1	0	0	0	0	0	6
School Board Road	10	5	3	2	1	0	0	0	21
Total	64	46	12	5	4	2	0	5	138

A total of 149 crashes were reported within the Tanyard Road/Old Franklin Turnpike 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 (33) occurring in 2022, followed by 31 crashes in 2019 and 30 crashes in both 2018 and 2021 as shown in **Table 7**.
2. The approximate average number of reported crash incidents per year is 29.8.

3. The majority of reported crash incidents within the corridor are rear end crashes. These crashes account for 47% of all crashes in the study area.
4. A total of 64 crash incidents were associated with injuries, which account for approximately 43% of the total reported crashes within the corridor.

The collision diagram is presented in **Figure 17** and detailed collision diagrams for each study intersection are included in **Appendix A**.

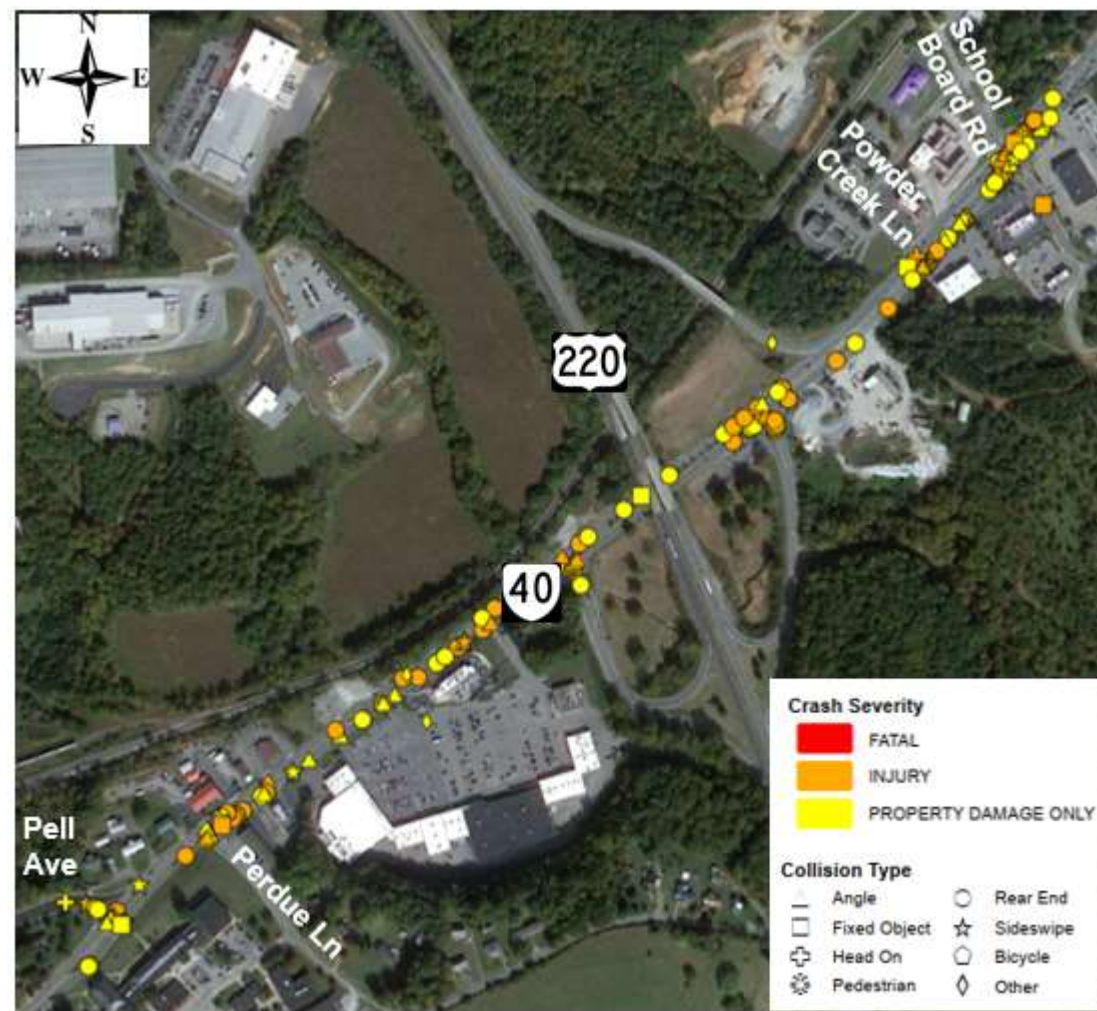


Figure 17: Collision Diagram

The locations of the pedestrian and bicycle crashes are depicted in **Figure 18** in addition to the locations of the Pedestrian Safety Action Plan (PSAP) corridors.

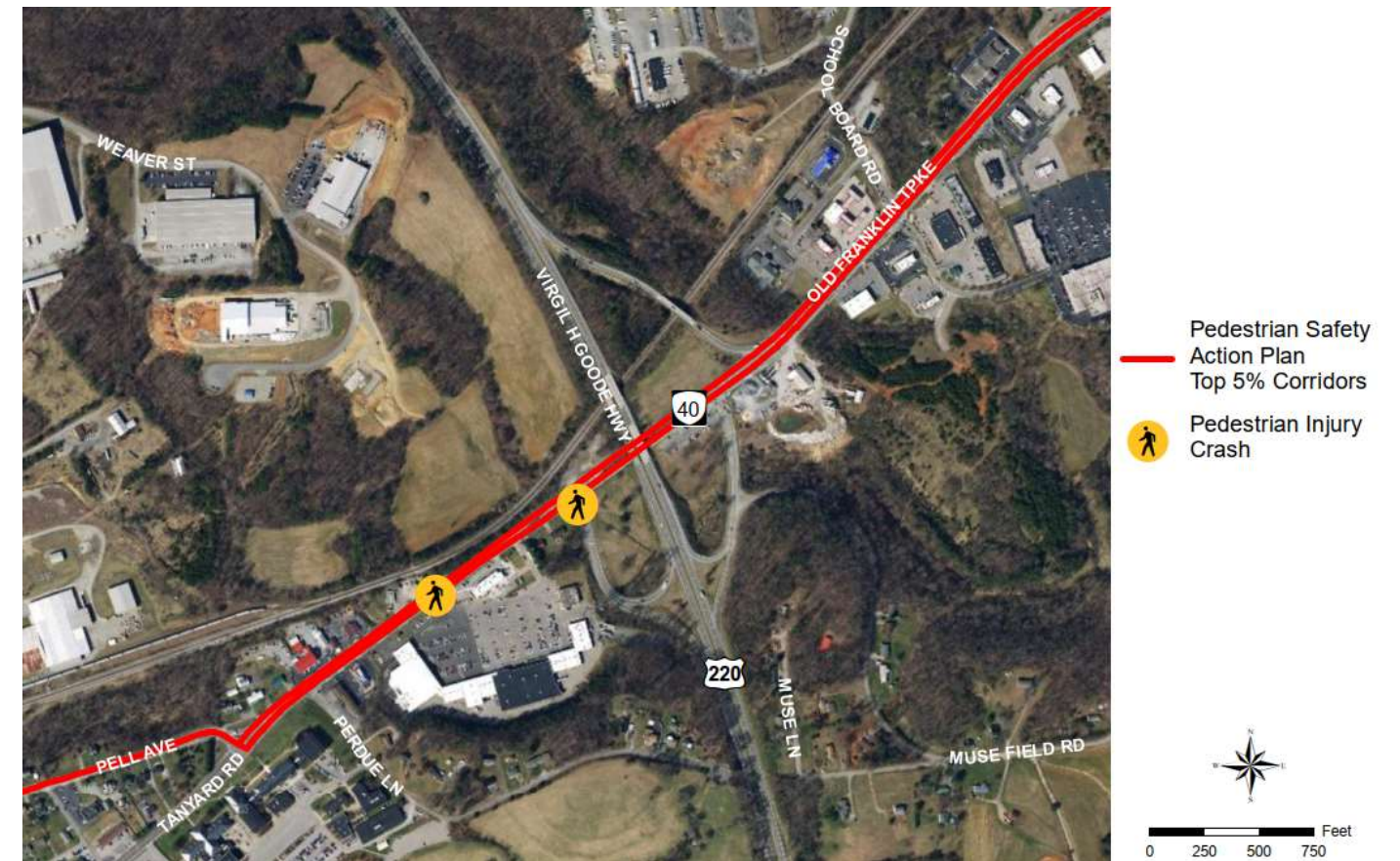


Figure 18: Pedestrian and Bicycle Crash Locations and PSAP Corridors

The locations of the Potential for Safety Improvement (PSI) intersections and segments for the Salem District are depicted in **Figure 19**.



Figure 19: 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 Tanyard Road/Old Franklin Turnpike. Intersection improvements were identified 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**.

Tanyard Road at Pell Avenue and Perdue Lane

The existing crosswalk on the west leg of the Tanyard Road at Pell Avenue intersection does not have pedestrian signalization or push buttons. Pedestrian signalization with push buttons were considered on the west leg of the Pell Avenue intersection to be provided with the existing crosswalk. In addition, the existing permissive left-turn phasing on the eastbound Tanyard Road approach to Pell Avenue is proposed to be revised to flashing yellow arrow left-turn phasing.

At the Tanyard Road at Perdue Lane intersection, a marked crosswalk was considered on the south side of the intersection across Perdue Lane due to the heavy presence of pedestrians in this area due to the Franklin County High School located in close proximity.

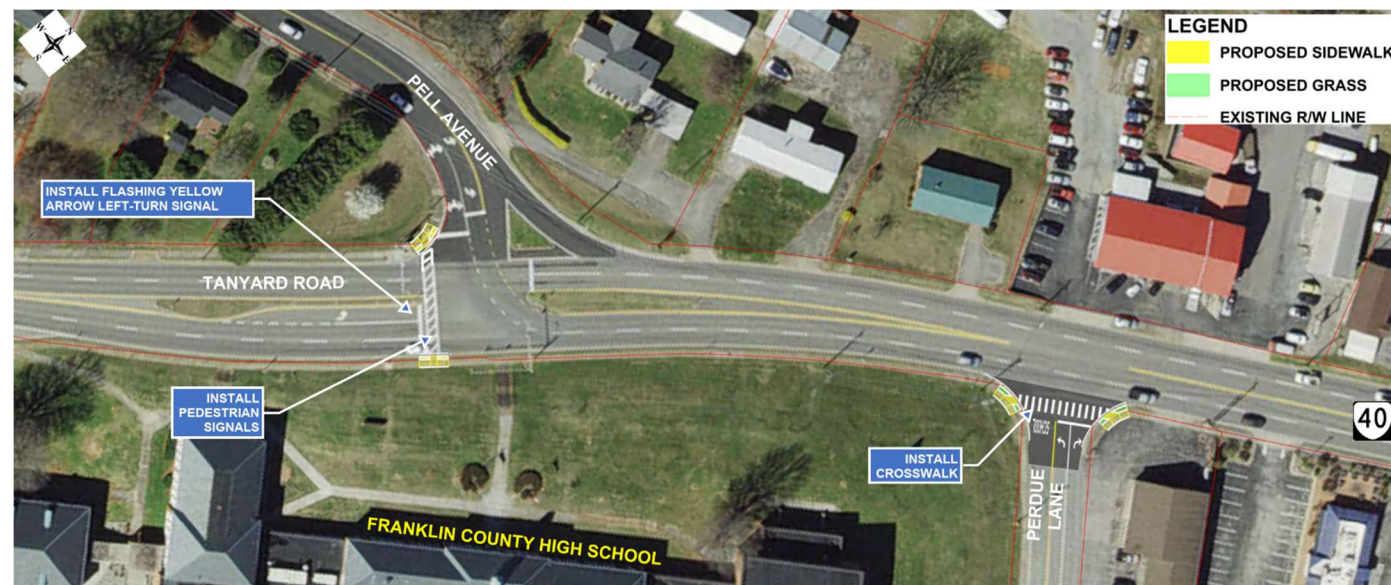


Figure 20: Tanyard Road at Pell Avenue and Perdue Lane

Tanyard Road at Rocky Mount Plaza

A westbound left-turn lane from Tanyard Road to Rocky Mount Plaza was considered due to the high left-turning volume into the Plaza and the lack of an existing left-turn lane. Although this improvement would reduce the potential for westbound rear end crashes involving vehicles stopping for left turns and reduce the potential for queue spillback to the US 220 interchange, it was not recommended for inclusion in the SMART SCALE application due to anticipated impacts to the Norfolk Southern railroad property located on the north side of Tanyard Road that would impact readiness of the application.

In addition, reconstruction of the western Rocky Mount Plaza to discourage left turns from using this entrance was considered.



Figure 21: Tanyard Road at Rocky Mount Plaza

Tanyard Road at US 220 Southbound Ramps

The extension of the westbound Tanyard Road left-turn lane to the US 220 Southbound Ramps was considered to reduce the risk of queue spillback into the inside westbound US 220 through lane. In addition, the eastbound left-turn phase is proposed to be converted to flashing yellow arrow left-turn phasing and the pedestrian signal head is proposed to be relocated from the outside of the channelized right turn to the concrete island on the southwest corner to reduce confusion for pedestrians crossing the free right turn and seeing a WALK indication on the outside corner of the intersection. In addition to relocating the pedestrian signal heads to the islands, upgrading the push buttons to accessible push buttons is proposed.

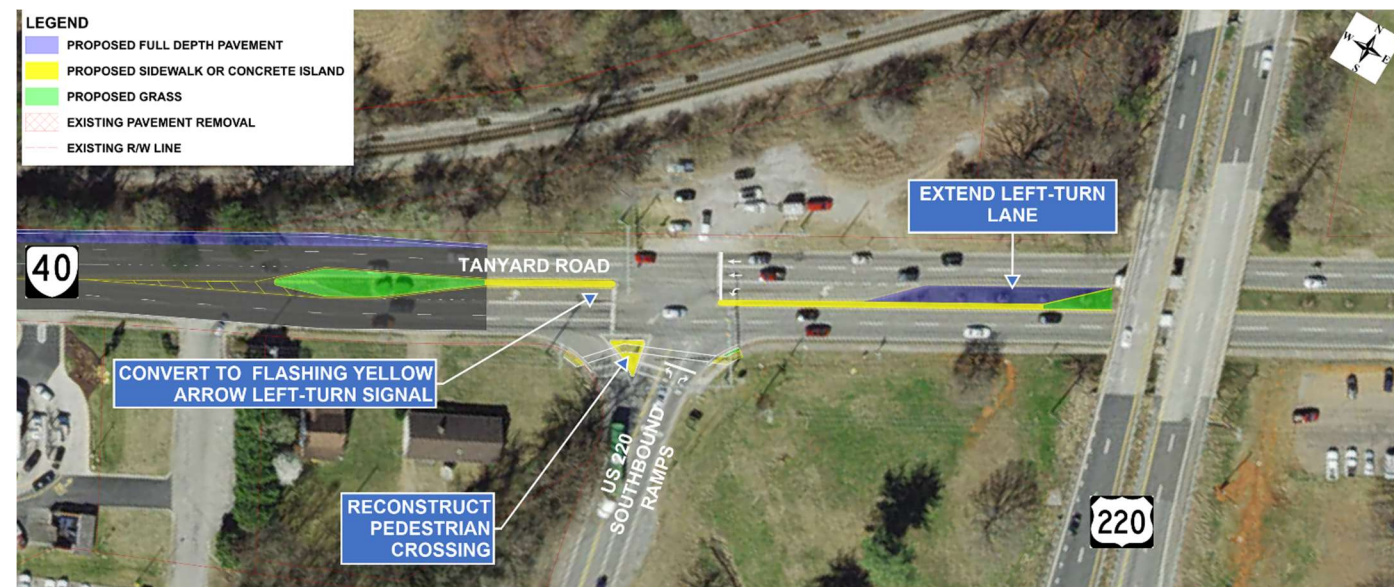


Figure 22: Tanyard Road at US 220 Southbound Ramp

Old Franklin Turnpike at US 220 Northbound Ramps

The westbound left-turn phase is proposed to be converted to a flashing yellow arrow left-turn phase and the pedestrian signal head is proposed to be relocated from the outside of the channelized right turn to the concrete island on the southwest corner to reduce confusion for pedestrians crossing the free right turn and seeing a WALK indication on the outside corner of the intersection. In addition to relocating the pedestrian signal heads to the islands, upgrading the push buttons to accessible push buttons is proposed.



Figure 23: Old Franklin Turnpike at US 220 Northbound Ramp

Old Franklin Turnpike from Powder Creek Lane to School Board Road/Market Place Drive

An RCUT intersection was considered for the Old Franklin Turnpike at Powder Creek Lane intersection (see **Figure 26**). The RCUT would restrict left-turn and through movements from Powder Creek Lane and Dollar Tree. Left turn and through traffic volumes from the minor street approaches at both intersections 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. Additionally, left turns from Powder Creek Lane have access to School Board Road to make a left turn onto Old Franklin Turnpike. 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. **Figure 24** compares the number of conflict points between the conventional intersection and the RCUT intersection. The number of conflict points are reduced from 32 at conventional intersection to 18 for the RCUTs.

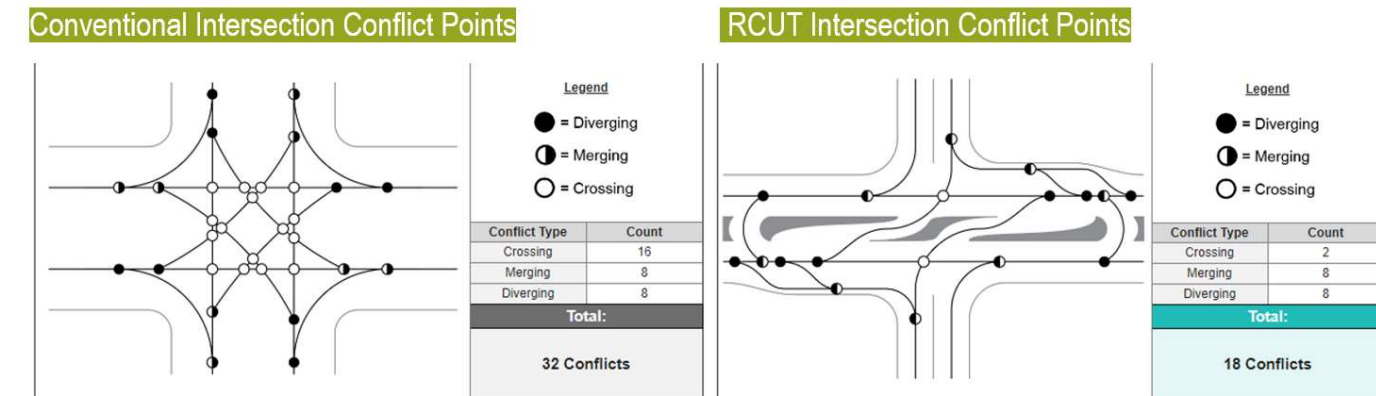


Figure 24: Intersection Conflict Point Comparison – Conventional vs. RCUT

A Thru-Cut intersection was considered for the Old Franklin Turnpike at School Board Road intersection (see **Figure 26**). The Thru-Cut that would restrict northbound and southbound through vehicles from traveling across Old Franklin Turnpike. 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 25** 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.

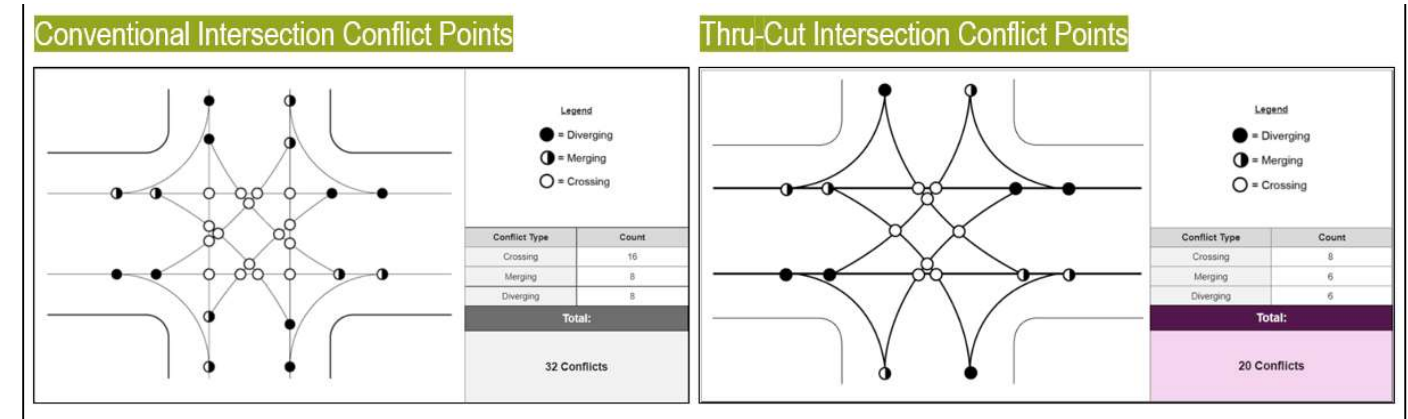


Figure 25: Intersection Conflict Point Comparison – Conventional vs. Thru-Cut

In addition, the left-turn phasing on the westbound Old Franklin Turnpike approach to Market Place Drive is proposed to be converted to flashing yellow left-turn phasing.

A raised median is also proposed along Old Franklin Turnpike from west of Powder Creek Lane to School Board Road to improve access management.



Figure 26: Old Franklin Turnpike from Powder Creek Lane to School Board Road

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 improvement 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 improvement included in the Preferred Alternative is shown in **Table 11** and a detailed concept is included in **Appendix D**.

Table 11: List of Preferred Alternative Improvement

Location	Proposed Improvement	Improvement Categories
Tanyard Road at Pell Avenue	Install ADA-compliant ramps, pedestrian signals, and a crosswalk on the west leg of the intersection	Pedestrian Access Pedestrian Safety Improvement
	Convert the EB left-turn signal to FYA left-turn signal	Congestion Mitigation Safety Improvement
Tanyard Road at Perdue Lane	Install ADA-compliant ramps and a crosswalk across Perdue Lane	Pedestrian Access Pedestrian Safety Improvement
Tanyard Road at Rocky Mount Plaza	Reconstruct the western Rocky Mount Plaza entrance to prohibit left turns	Safety Improvement
Tanyard Road at US 220 Southbound Ramps	Install ADA-compliant ramps, pedestrian signals, and a crosswalk on the US 220 Southbound ramps	Pedestrian Access Pedestrian Safety Improvement
	Convert the EB left-turn signal to FYA left-turn signal	Congestion Mitigation Safety Improvement
	Extend the WB left-turn lane	Congestion Mitigation Safety Improvement
Old Franklin Turnpike at US 220 Northbound Ramps	Install ADA-compliant ramps, pedestrian signals, and a crosswalk on the US 220 Northbound ramps	Pedestrian Access Pedestrian Safety Improvement
	Convert the WB left-turn signal to FYA left-turn signal	Congestion Mitigation Safety Improvement
Old Franklin Turnpike at Powder Creek Lane	Convert the intersection to an RCUT	Capacity Preservation Congestion Mitigation Safety Improvement
Old Franklin Turnpike at School Board Road/ Market Place Drive	Convert the intersection to a Thru-Cut	Capacity Preservation Congestion Mitigation Safety Improvement
	Convert the WB left-turn signal to FYA left-turn signal	Congestion Mitigation 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 Tanyard Road/Old Franklin Turnpike for the AM and PM peak hours for 2050 Build conditions. During the AM and PM peak hours, the signalized intersections along Tanyard Road/Old Franklin Turnpike are generally projected to experience reduced delays and congestion, with all intersections projected to operate at LOS C or better, with the proposed Thru-Cut at School Board Road projected to improve the intersection from LOS C to LOS B with overall delay reductions of more than 50% compared to No Build conditions. All turning movements at the signalized intersections are projected to operate at LOS D or better, except for the eastbound left turn from Old Franklin Turnpike to School Board Road, which is projected to operate at LOS E during the AM peak hour.

Turning movements at unsignalized intersections, including the proposed RCUT at Powder Creek Lane, are also projected to operate at LOS C or better, except for the southbound business driveway approaches opposite Perdue Lane and the westernmost Rocky Mount Plaza entrance. These two approaches are projected remain at LOS E, although these are very low volume approaches. Queue lengths at the study area intersections, particularly in the area of the proposed Thru-Cut at School Board Road, are projected to generally decrease compared to No Build conditions. Detailed analysis results for both signalized and unsignalized intersections 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)
Tanyard Road & Pell Avenue Signalized	SB	L-R	278	D	D	B	41.7	41.7	12.5	380	D	D	B	40.9	40.9	13.4
	EB	L	118	A	A		7.6	5.3		38	A	A		7.0	5.5	
		T	209	A	A		4.9	5.3		136	A	A		5.4	5.5	
	WB	T-R	201	A	A		7.5	7.5		136	A	A		6.1	6.1	
Tanyard Road & Perdue Lane Unsignalized	SB	L-T-R	65	A	A	-	9.4	9.4	-	21	E	E	-	42.0	42.0	-
	NB	L-T	46	C	C		20.1	20.1		44	C	C		15.7	15.7	
		R	114	C	C		20.1	20.1		67	C	C		15.7	15.7	
	EB	L-T	37	A	-		0.0	-		36	A	-		0.0	-	
		T-R	58	A	-		0.0	-		53	A	-		0.0	-	
	WB	L-T	399*	B	-		13.2	-		135	A	-		4.5	-	
T-R		317*	A	-	0.0	-	111	A	-	0.0	-					
Tanyard Road & Rocky Mount Plaza (West) Unsignalized	SB	L-T-R	0	A	A	-	0.0	0.0	-	30	E	E	-	36.1	36.1	-
	NB	L-T-R	52	C	C		24.4	24.4		53	C	C		19.2	19.2	
	EB	L-T	112	A	-		0.5	-		71	A	-		0.0	-	
		T-R	126	A	-		0.0	-		84	A	-		0.0	-	
	WB	L-T	67	A	-		0.0	-		25	A	-		0.1	-	
T-R		39	A	-	0.0	-	12	A	-	0.0	-					
Tanyard Road & Rocky Mount Plaza (Middle) Unsignalized	EB	T-R	192	A	-	-	0.0	-	-	172	A	-	-	0.0	-	-
	WB	T	27	A	-		0.0	-		8	A	-		0.0	-	
Tanyard Road & Rocky Mount Plaza (Main) Signalized	SB	L-T-R	47	D	D	C	53.1	53.1	30.4	68	D	D	C	46.7	46.7	29.5
	NB	L-T	210	D	D		48.8	44.2		205	D	D		44.4	39.7	
		R	91	D	D		36.0	44.2		133	D	D		35.3	39.7	
	EB	L-T-R	490*	D	D		50.8	50.8		404*	C	C		27.7	27.7	
	WB	L-T	638*	B	B		15.4	15.4		447*	C	C		26.7	26.7	
Tanyard Road & Rocky Mount Plaza (East) Unsignalized	NB	R	90	A	A	-	9.5	9.5	-	108	A	A	-	9.7	9.7	-
	EB	T-R	54	A	A		0.0	-		26	A	A		0.0	-	
	WB	T	218	A	A		0.0	-		69	A	A		0.0	-	
Tanyard Road & US 220 SB Ramps Signalized	SB	L-T-R	21	C	C	C	25.9	25.9	23.0	34	C	C	B	32.2	32.2	12.9
	NB	L-T	350	D	D		44.0	37.1		219	D	D		44.8	38.1	
		R	274	C	D		27.2	37.1		210	C	D		33.6	38.1	

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)		
	EB	L	0	A	C	B	0.0	34.8	11.8	26	A	A	A	3.7	7.5	7.4		
		T-R	383*	C			34.8			298*	A			7.5				
	WB	L	166	C	20.5		8.9	210		B	A	14.3						
		T-R	205	A	7.3			210		A		5.7						
Old Franklin Turnpike & US 220 NB Ramps Signalized	NB	L	319	D	D	44.3	39.1	11.8	145	D	D	A	43.5	41.1	7.4			
		R	200	D		35.2			168	D			40.0					
	EB	T	172	A	A	3.1	2.6		136	A	A		1.9					
		R	19	A		0.2			38	A			0.2					
	WB	L	53	A	A	6.5	8.8		67	A	A		5.4					
		T	233	A		8.8			202	A			4.2					
Old Franklin Turnpike & Powder Creek Lane Unsignalized	SB	R	53	B	B	10.6	10.6	-	84	B	B	-	10.6	10.6	-			
	NB	R	0	A	A	0.0	0.0	-	31	B	B	-	10.5	10.5	-			
	EB	L	97	B	-	-	12.6	-	118	B	-	-	13.5	-	-			
		T-R	5	A	0.0		20		A	0.0								
	WB	L	26	A	-		9.7	-	32	B	-		10.3					
		T-R	31	A	0.0		29		A	0.0								
Tanyard Road & Sheetz / Dollar Tree Unsignalized	SB	R	70	B	B		10.1	10.1	-	115	B		B	-		10.2	10.2	-
	NB	R	22	B	B		10.3	10.3	-	50	B		B	-		10.9	10.9	-
	EB	T-R	21	A	-	0.0	-	-	0	A	-	-	0.0	-	-			
	WB	T-R	35	A	-	0.0	-	-	4	A	-	-	0.0	-	-			
Old Franklin Turnpike & School Board Road Signalized	SB	L	98	D	D	43.5	35.3	18.4	99	D	D	B	44.6	40.5	16.3			
		R	200	C		28.7			212	C			30.0					
	NB	L	151	D	D	41.5	38.0		230	D	D		43.9					
		R	93	C		32.1			120	C			30.1					
	EB	L	191	E	B	57.0	12.3		99	E	A		58.3					
		T	240*	A		6.0			157	A			5.5					
		R	100	A		2.8			100	A			1.7					
	WB	L	187	A	B	5.9	16.6		144	A	B		7.2					
T-R		333	B	17.5		308		B	15.4									

* Maximum queue from SimTraffic extends into the adjacent upstream intersection

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 SMART SCALE, 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
Tanyard Road at Pell Avenue	Convert the EB left-turn signal to FYA left turn signal	Angle	0.63	0.63	0.63	0.63
Tanyard Road at Pell Avenue	Install ADA-compliant ramps and pedestrians signals on the west leg of the intersection	Pedestrian	0.85	0.85	0.85	0.85
Tanyard Road at Perdue Lane	Install ADA-compliant ramps and a crosswalk along the south leg of the intersection	Pedestrian	0.60	0.60	0.60	0.60
Tanyard Road at US 220 SB Ramps	Convert the EB left-turn signal to FYA left-turn signal	Angle	2.24	2.24	2.24	2.24

Location	Proposed Improvement	Applicable Crash Type	K	A	B C	O
Tanyard Road at US 220 SB Ramps	Extend the WB left-turn lane	All	0.85	0.85	0.85	0.85
Old Franklin Turnpike at US 220 NB Ramps	Convert the WB left-turn signal to FYA left-turn signal	Angle	2.24	2.24	2.24	2.24
Old Franklin Turnpike at Powder Creek Lane	Convert the intersection to a RCUT	All	0.37	0.37	0.37	0.37
Old Franklin Turnpike at School Board Road	Convert the WB left-turn signal to FYA left-turn signal	Angle	0.63	0.63	0.63	0.63
Old Franklin Turnpike at School Board Road	Convert the intersection to a Thru-Cut	All	0.96	0.96	0.96	0.96

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
Tanyard Road at Pell Avenue	Angle Crashes	0	0	2	4	6
	Total Expected Crashes	0.0	0.0	1.3	2.5	3.8
	<i>Change in Crashes</i>	0.0	0.0	-0.7	-1.5	-2.2
Tanyard Road at Pell Avenue	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
Tanyard Road at Perdue Lanet	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
Tanyard Road at US 220 SB Ramps	Angle Crashes	0	0	4	2	6
	Total Expected Crashes	0.0	0.0	9.0	4.5	13.4
	<i>Change in Crashes</i>	0.0	0.0	5.0	2.5	7.4
Tanyard Road at US 220 SB Ramps	Total Crashes	0	0	7	6	13
	Total Expected Crashes	0.0	0.0	6.0	5.1	11.1
	<i>Change in Crashes</i>	0.0	0.0	-1.1	-0.9	-2.0
Old Franklin Turnpike at US 220 NB Ramps	Angle Crashes	0	0	1	1	2
	Total Expected Crashes	0.0	0.0	2.2	2.2	4.5
	<i>Change in Crashes</i>	0.0	0.0	1.2	1.2	2.5
Old Franklin Turnpike at Powder Creek Lane	Total Crashes	0	0	7	9	16
	Total Expected Crashes	0.0	0.0	2.6	3.3	5.9
	<i>Change in Crashes</i>	0.0	0.0	-4.4	-5.7	-10.1

Location		K	A	B C	O	Total
Old Franklin Turnpike at School Board Road	Angle Crashes	0	0	2	3	5
	Total Expected Crashes	0.0	0.0	1.3	1.9	3.2
	<i>Change in Crashes</i>	0.0	0.0	-0.7	-1.1	-1.9
Old Franklin Turnpike at School Board Road	Total Crashes	0	0	7	14	21
	Total Expected Crashes	0.0	0.0	6.7	13.4	20.2
	<i>Change in Crashes</i>	0.0	0.0	-0.3	-0.6	-0.8
Total Crashes Associated with Improvements Influence Area		0	0	30	39	69
Total Expected Crashes After Improvements		0.0	0.0	29.0	33.0	62.0
<i>Change in Crashes (Expected - Total)</i>		0.0	0.0	-1.0	-6.0	-7.0
Percent Crash Reduction After Improvements		N/A	N/A	1%	15%	10%

*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 1 crash is expected along Tanyard Road/Old Franklin Turnpike from Pell Avenue to School Board Road, which is equivalent to an approximately 10% reduction in crashes.

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

Converting the westbound left-turn signal phase to a flashing yellow arrow received an average rating of 3.824, while the pedestrian signal improvements at the ramp received a 4.072 average rating (see **Figure 31**).

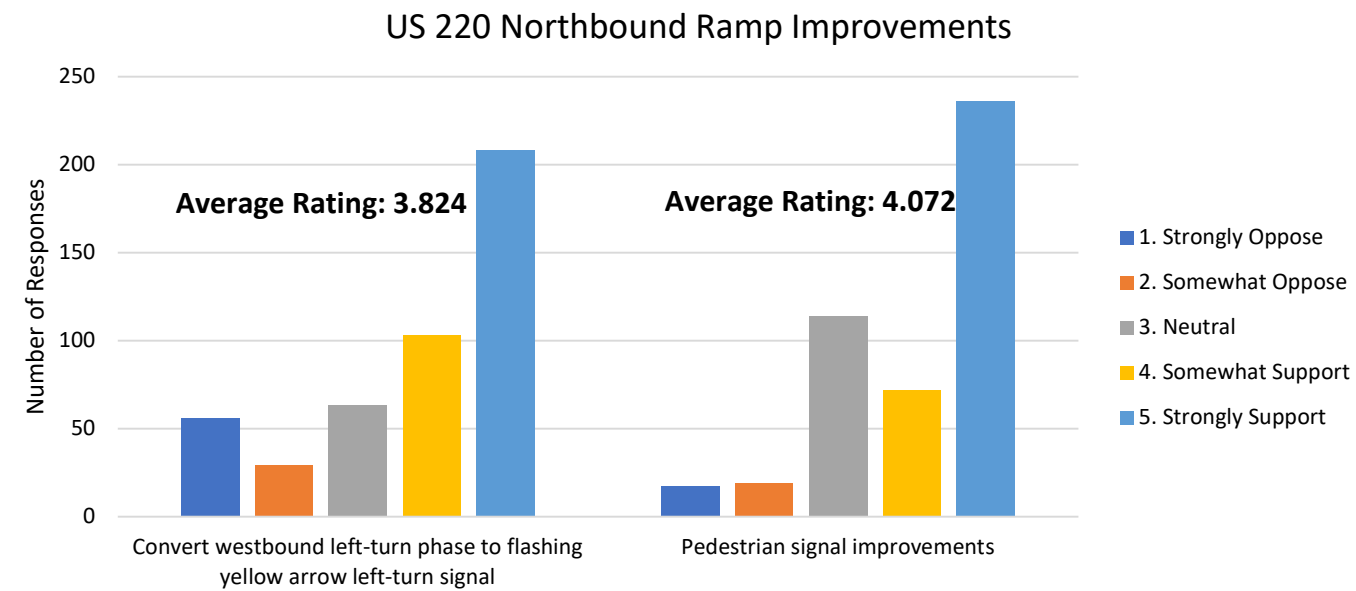


Figure 31: US 220 Northbound Ramp Survey Results

Three improvements were shown from Powder Creek Lane to School Board Road along Old Franklin Turnpike (see **Figure 32**). The RCUT at the Powder Creek Lane intersection received an average rating of 3.623. The proposed Thru-Cut at the School Board Road/ Market Place Drive intersection received a rating of 2.984. Converting both the eastbound and westbound left-turn phases to a flashing yellow arrow received an average rating of 3.588.

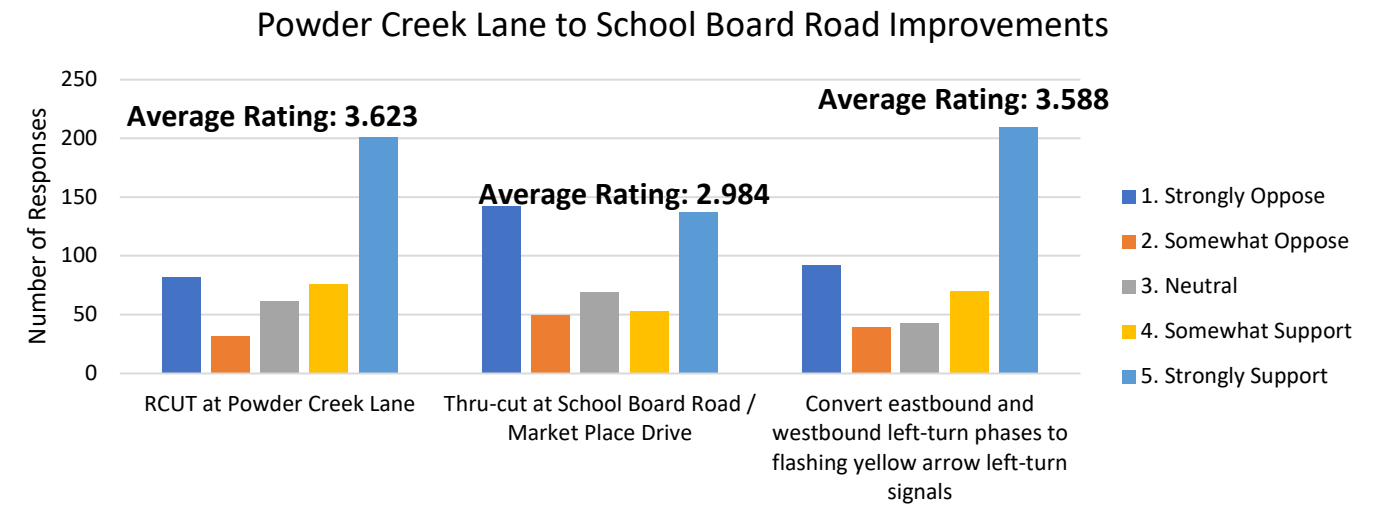


Figure 32: Powder Creek Lane to School Board Road Survey Results

Public Involvement

Following the development and analysis of the build alternatives, a public involvement survey was developed to determine the public's response to the improvements and what they perceived as the relevant issues within the study area. This survey was available online for 14 days from March 1 – March 15, 2024.

Survey Design

Public involvement for this study took place in the form of an online survey developed in Public Input, which is an online engagement platform that is designed to educate the public while gathering informed output. The goal of this survey was to educate the public and to seek feedback on the possible alternative solutions in the area.

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

1. Introduction with overview of the project and study area
2. Recommended improvements at each intersection
3. 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. A total of 615 surveys were completed and 689 comments were provided. **Figure 27** presents an example of one of the rating screens from the survey.

Tanyard Road at Pell Avenue and Perdue Lane

Click the image to see the proposed recommendations

Pedestrian signals with pushbuttons are proposed on the west leg of the Pell Avenue intersection to improve pedestrian safety. The curb ramps serving the crosswalk will also be improved.

A flashing yellow arrow left-turn signal is proposed for the eastbound Tanyard Road approach to Pell Avenue to improve safety for left-turning vehicles.

A marked crosswalk is proposed on the south leg of the Perdue Lane intersection to improve pedestrian safety. The curb ramps serving the crosswalk will also be improved.

Rate the concepts on a scale of 1 to 5. (1 = Strongly oppose; 5 = Strongly support)

	1. Strongly oppose	2. Somewhat oppose	3. Neutral	4. Somewhat support	5. Strongly support
Pedestrian signals at Pell Avenue	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Figure 27: Public Survey Layout

Survey Question and Results

Two improvements were presented at the Pell Avenue intersection and one improvement was shown for Perdue Lane (see **Figure 28**). The pedestrian signals along the west leg of the intersection received an average rating of 3.898. Converting the signal to a flashing yellow arrow for left turns received an average rating of 3.690. The crosswalk across Perdue Lane received an average rating of 4.154.

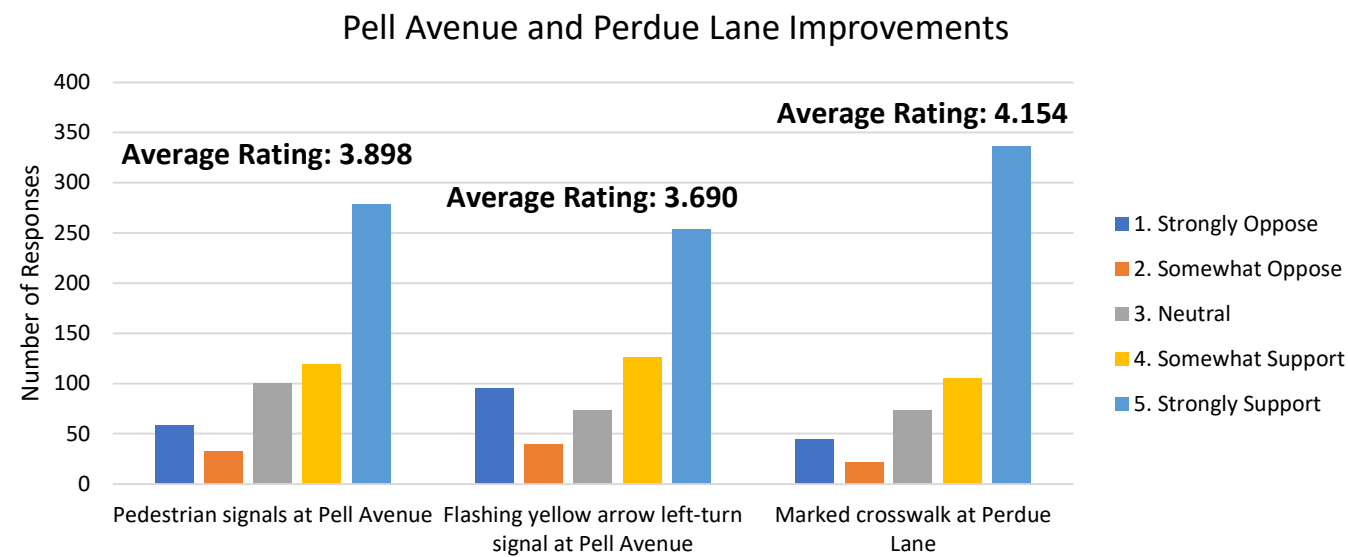


Figure 28: Pell Avenue and Perdue Lane Survey Results

The proposed left-turn lane to Rocky Mount Plaza received an average rating of 4.538. Reconstructing the western entrance to Rocky Mount Plaza to discourage left turns from the Plaza received an average rating of 4.064 (see **Figure 29**).

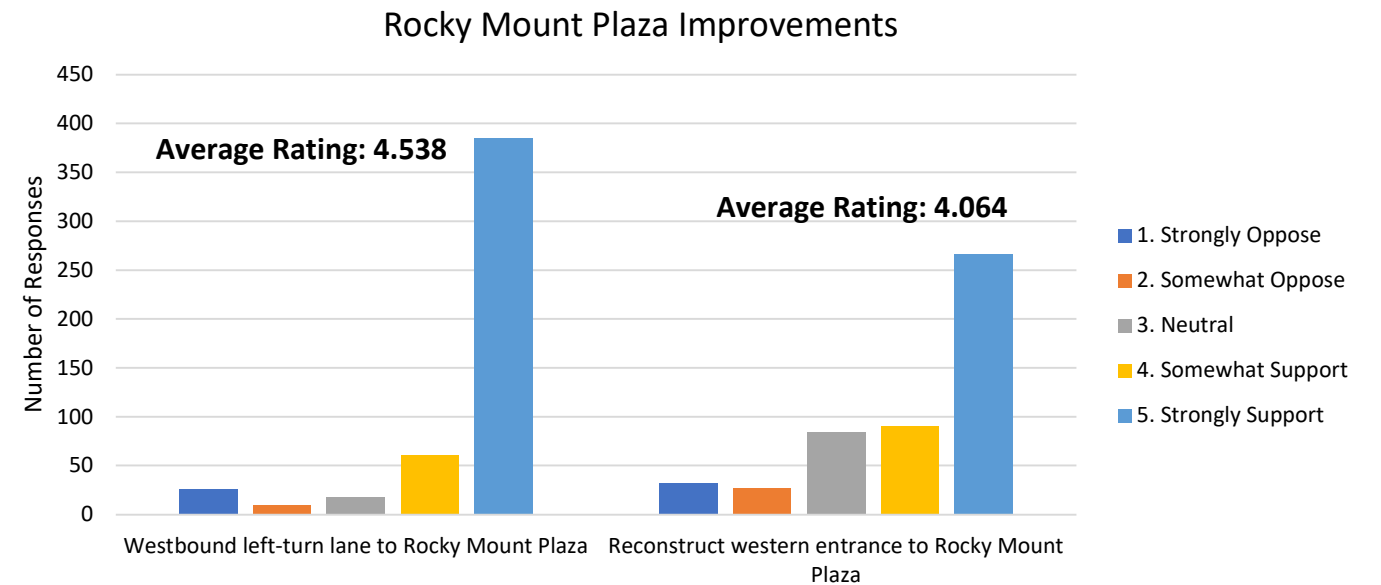


Figure 29: Rocky Mount Plaza Survey Results

Three improvements were shown for the US 220 southbound ramp (see **Figure 30**). Extending the westbound left-turn lane received an average rating of 4.694. Converting westbound left-turn lane phasing to a flashing yellow arrow received a rating of 3.838. The pedestrian signal improvements, including relocating the signal to the island received a rating of 4.072.

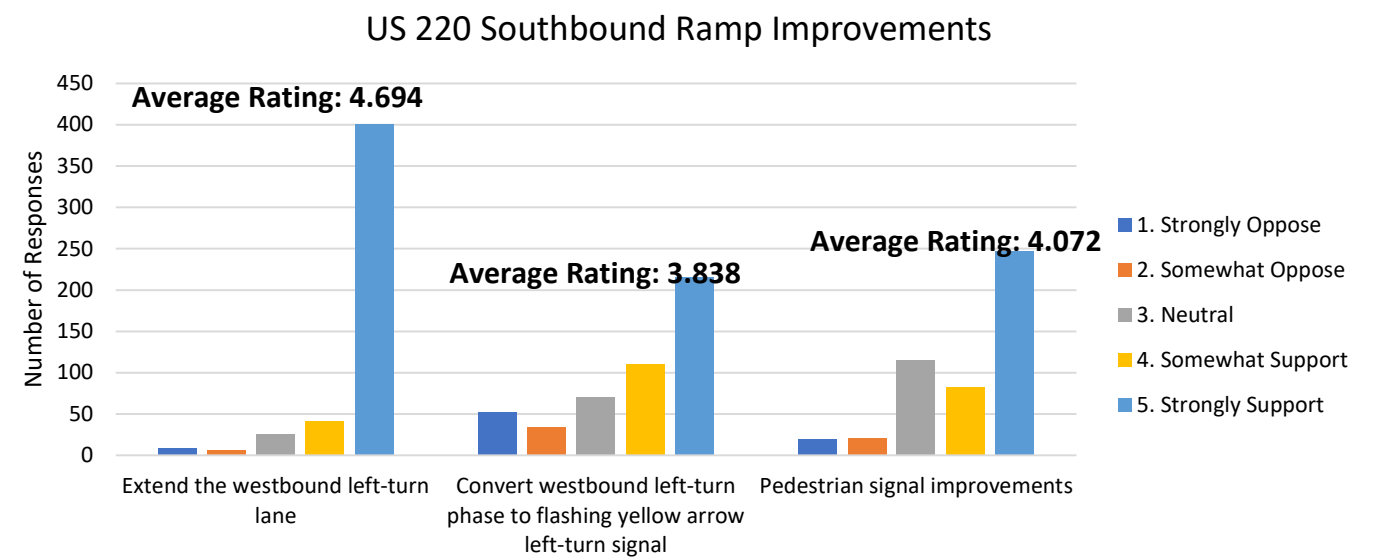


Figure 30: US 220 Southbound Ramp Survey Results

Converting the westbound left-turn signal phase to a flashing yellow arrow received an average rating of 3.824, while the pedestrian signal improvements at the ramp received a 4.072 average rating (see **Figure 31**).

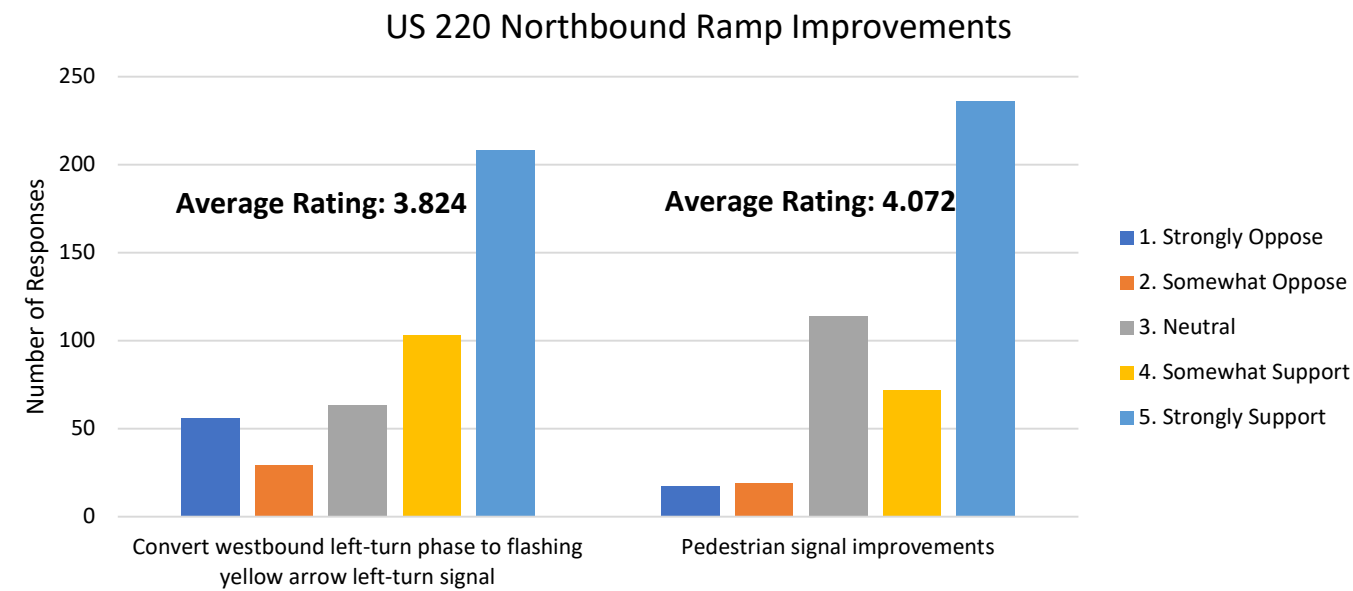


Figure 31: US 220 Northbound Ramp Survey Results

Three improvements were shown from Powder Creek Lane to School Board Road along Old Franklin Turnpike (see **Figure 32**). The RCUT at the Powder Creek Lane intersection received an average rating of 3.623. The proposed Thru-Cut at the School Board Road/ Market Place Drive intersection received a rating of 2.984. Converting both the eastbound and westbound left-turn phases to a flashing yellow arrow received an average rating of 3.588.

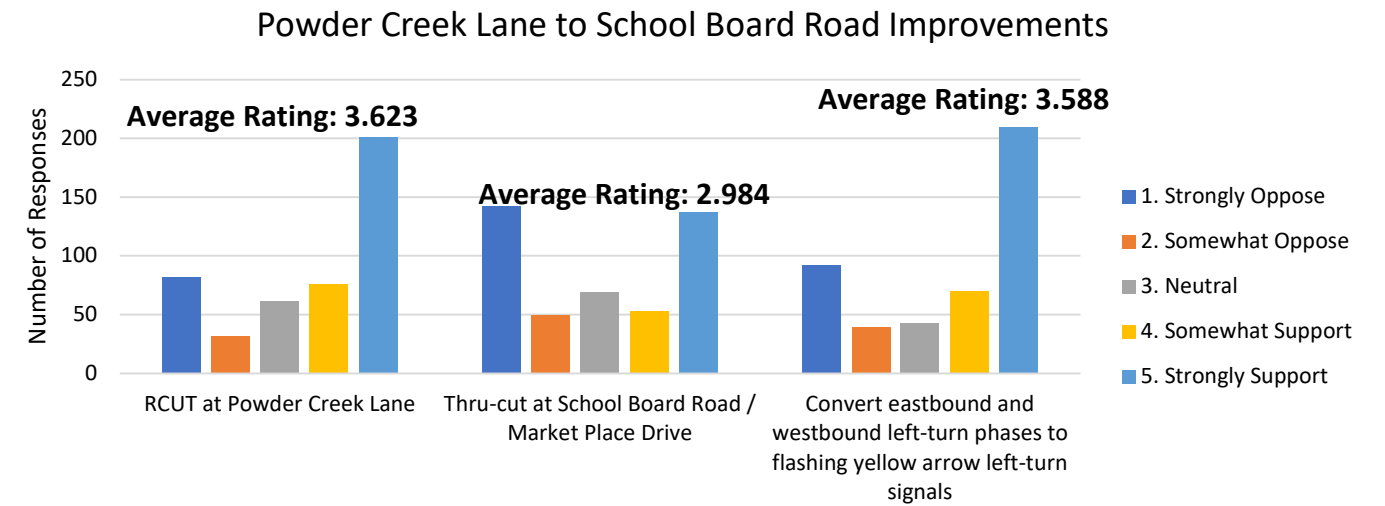


Figure 32: Powder Creek Lane to School Board Road Survey Results

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 the Town of Rocky Mount 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 D** 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.

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 E** includes detailed cost estimates.

Table 15: Planning Level Cost Estimates for the Preferred Alternative

Phase Description	Budget
Preliminary Engineering	\$1,519,310
Right of Way and Utility Relocation	\$2,049,298
Construction	\$9,478,865
Total Project Budget	\$13,047,473

*Estimate as of July 26, 2024

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 F**).

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. The Town of Rocky Mount 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.
- **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.