Route 294 & Old Bridge Road Intersection Improvements Project

State Proj. #0294-076-327, UPC# 119073

Traffic Operational Analysis

Aerial Provided by Google Earth

Prepared For:
Virginia Department of Transportation
At the Request of:
Prince William County Department of Transportation

February 2023, Revised July 2024

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Traffic Operational Analysis

Route 294 & Old Bridge Road Intersection Improvements Project

State Project# 0294-076-327
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For the following Intersections:

Route 294 (Prince William Parkway) and Old Bridge Road
Route 294 (Prince William Parkway) and Laurel Hills Drive
Route 294 (Prince William Parkway) & Kenwood Drive
Old Bridge Road & Troupe Street
Old Bridge Road & Touchstone Circle/Titania Way
Old Bridge Road & Westridge Drive/Rockwood Lane
Prince William Parkway & Hillendale Drive
Prince William Parkway & Black Forest Lane/Reids Prospect Drive
Route 294 (Prince William Parkway) and Seeton Square
Route 294 (Prince William Parkway) and Chinn Park Drive
Old Bridge Road and Tribe at the Glen Entrance
Touchstone Circle and Shopping Center Entrance (North of Old Bridge Road)
Touchstone Circle and Seeton Square
Old Bridge Road & Brussels Way
Old Bridge Road & Old Bridge Lane
Troupe Street & Chinn Park Drive

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COMMONWEALTH OF VIRGINIA
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Manassas, Virginia
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APPENDICES:

EXECUTIVE SUMMARY

Purpose

This report presents the results of an intersection operational analysis conducted for Prince William Parkway (Route 294) and Old Bridge Road.

The purpose of this operational report is to assess how well the improvements related to the Prince William County's Route 294 & Old Bridge Road Intersection Improvement Project (VDOT Project #0294-076-327, UPC 119073) will accommodate the forecasted demand.

Study Area

The study area for this Traffic Operational Analysis, as reviewed and agreed to with VDOT NOVA Traffic Engineering staff, was selected and based on those intersections that will be indirectly and directly affected by the Route 294 & Old Bridge Road Intersection Improvement Project. The study area was derived to allow a comparison between the existing traffic generated and anticipated traffic growth. The analysis is limited to the following intersections, which were selected for detailed analysis:

1) Prince William Parkway & Black Forest Lane/Reids Prospect Drive
2) Route 294 (Prince William Parkway) and Laurel Hills Drive
3) Route 294 (Prince William Parkway) and Seeton Square
4) Route 294 (Prince William Parkway) and Old Bridge Road
5) Old Bridge Road and Tribe at the Glen Entrance
6) Old Bridge Road & Troupe Street
7) Old Bridge Road & Touchstone Circle/Titania Way
8) Old Bridge Road & Brussels Way
9) Old Bridge Road & Old Bridge Lane
10) Old Bridge Road & Westridge Drive/Rockwood Lane
11) Touchstone Circle and Exxon Entrance
12) Touchstone Circle and Glen Shopping Centre
13) Touchstone Circle and Seeton Square
14) Touchstone Circle and Merchants Plaza/CVS Entrance
15) Route 294 (Prince William Parkway) and Chinn Park Drive
16) Route 294 (Prince William Parkway) & Kenwood Drive
17) Prince William Parkway & Hillendale Drive
18) Troupe Street & Chinn Park Drive
19) Mohammadia Center Right-In (Future Intersection)
20) Mohammadia Center Right-In/Right-Out (Future Intersection)
21) Old Bridge Road & Touchstone Square (Future Intersection)

Planned Transportation Improvements

This project will realign Prince William Parkway (Rte. 294) as a 6-lane roadway and realign Old Bridge Road (Rte. 641) as a 4-lane roadway to meet at a T-intersection. The Prince William Parkway realignment will be the primary thru movement with 11 and/or 12-foot lanes, a variable-width raised median, a 5-foot sidewalk along the eastbound lanes, and a 10-foot shared use path (SUP) along the westbound lanes. The Old Bridge Road realignment will be the secondary movement with 11 and/or 12-foot lanes, a raised median, and 5-foot sidewalks on both sides of the roadway. The project includes access management, turn lanes, intersection improvements, and a signal modification at the main T-intersection. A Service Road will be provided along the eastbound lanes of Prince William Parkway to reduce driveway entrances.

Overall Conclusions and Recommendations:

Prince William County's Department of Transportation's Prince William Parkway & Old Bridge Road project would improve the congestion and increase capacity at Prince William Parkway & Old Bridge Road by realigning the intersection as a T configuration with Prince William Parkway as the primary movement at the intersection. The project refines the STARS Study configuration by adding an additional southbound left turn lane on Prince William Parkway, removing a northbound right turn lane on prince William Parkway and removing a westbound right turn lane on Old Bridge Road. In addition to reconfiguring the intersection, the following are recommended to further improve congestion along the corridor:

- Old Bridge Road & Troupe Street/Glen Shopping Center – Convert the existing eastbound right turn lane to through-right between Troupe Street and Prince William Parkway. Convert the existing westbound right turn to through-right between Troupe Street and Touchstone Circle/Titania Way.
- Old Bridge Road & Titania Way/Touchstone Circle – Convert the existing westbound right turn lane to through-right between Titania Way/Touchstone Circle and Westridge Drive.

Section 1

INTRODUCTION

STUDY SCOPE

Purpose

This report presents the results of an intersection operational analysis conducted for Prince William Parkway (Route 294) and Old Bridge Road.

The purpose of this operational report is to assess how well the improvements related to the Prince William County's Route 294 & Old Bridge Road Intersection Improvement Project (VDOT Project #0294-076-327, UPC 119073) will accommodate the forecasted demand.

The analysis refines the configuration originally developed in the STARS Study by adding an additional southbound left turn lane on Prince William Parkway, removing a northbound right turn lane on Prince William Parkway, and removing a westbound right turn lane on Old Bridge Road.

Analysis Objectives/Methodology

The objective of this analysis is to evaluate existing traffic conditions in the study area at present, during the Opening Year (2026), and nineteen years after construction is completed, in the Horizon Year (2045). Additionally, this analysis will provide discussions on projected growth, discussions on planned improvements, and conclusions.

Operational analyses were conducted in accordance with methodologies defined in the 2000 Highway Capacity Manual (HCM) as applicable for non-NEMA phasing (due to split phase signal operations within project limits), 2010 Highway Capacity Manual (HCM) as applicable, FHWA Publication No. HRT-01-091, Signalized Intersections: Informational Guide, NCHRP Report #707, VDOT's Road Design Manual, Appendix F, VDOT's Guidance for Determination and Documentation of Left-Turn Phasing Mode (Version 1.1), and the FHWA's MUTCD.

Tasks within the scope of this analysis include the following, which was reviewed and accepted by stakeholders:

1. Review of the plans and timeline for construction of the Route 294 & Old Bridge Road Intersection Improvement Project (VDOT Project #0294-076-327)
2. A review of the existing volumes and the anticipated volumes
3. Field collection of turning counts at study intersections coordinated with VDOT
4. Development of traffic growth rates for traffic projections
5. Analysis of existing levels of service at the study intersections
6. Forecast of design hourly traffic volumes for the Opening Year (2026) and Horizon Year (2045) using growth rates for weekday AM and PM peak periods
7. Analysis of signalized intersections using Synchro™ Version 11.1
8. Analysis of queue lengths for at the study intersections
9. Left Turn Phase Review
10. Crash/Accident Data Review
11. Turn Lane Warrants

This report has been generated to be reviewed by VDOT and to fulfill the requirements for Traffic Operational Analyses per the Traffic Operations and Safety Analysis Manual (TOSAM), typically requested by VDOT.

Study Area

The study area for this Traffic Operational Analysis, as reviewed and agreed to with VDOT NOVA Traffic Engineering, VODT NOVA Planning, and Prince William County Planning, was selected and based on those intersections that will be indirectly and directly affected by the Route 294 & Old Bridge Road Intersection Improvement project. The study area was derived to allow a comparison between the existing traffic generated and anticipated traffic growth. The analysis is limited to the following intersections, which were selected for detailed analysis:

1) Prince William Parkway & Black Forest Lane/Reids Prospect Drive
2) Route 294 (Prince William Parkway) and Laurel Hills Drive
3) Route 294 (Prince William Parkway) and Seeton Square
4) Route 294 (Prince William Parkway) and Old Bridge Road
5) Old Bridge Road and Tribe at the Glen Entrance
6) Old Bridge Road & Troupe Street
7) Old Bridge Road & Touchstone Circle/Titania Way
8) Old Bridge Road & Brussels Way
9) Old Bridge Road & Old Bridge Lane
10) Old Bridge Road & Westridge Drive/Rockwood Lane
11) Touchstone Circle and Exxon Entrance
12) Touchstone Circle and Glen Shopping Centre
13) Touchstone Circle and Seeton Square
14) Touchstone Circle and Merchants Plaza/CVS Entrance
15) Route 294 (Prince William Parkway) and Chinn Park Drive
16) Route 294 (Prince William Parkway) & Kenwood Drive
17) Prince William Parkway & Hillendale Drive
18) Troupe Street & Chinn Park Drive
19) Mohammadia Center Right-In (Future Intersection)
20) Mohammadia Center Right-In/Right-Out (Future Intersection)
21) Old Bridge Road & Touchstone Square (Future Intersection)

Appendix B shows coordination between RDA, VDOT, and Prince William County for the study scope.

Figure 1-1A shows the location of the study area, and **Figure 1-1B** shows the study intersections.

Figure 1-1A: Location of Study Area (Not to Scale)

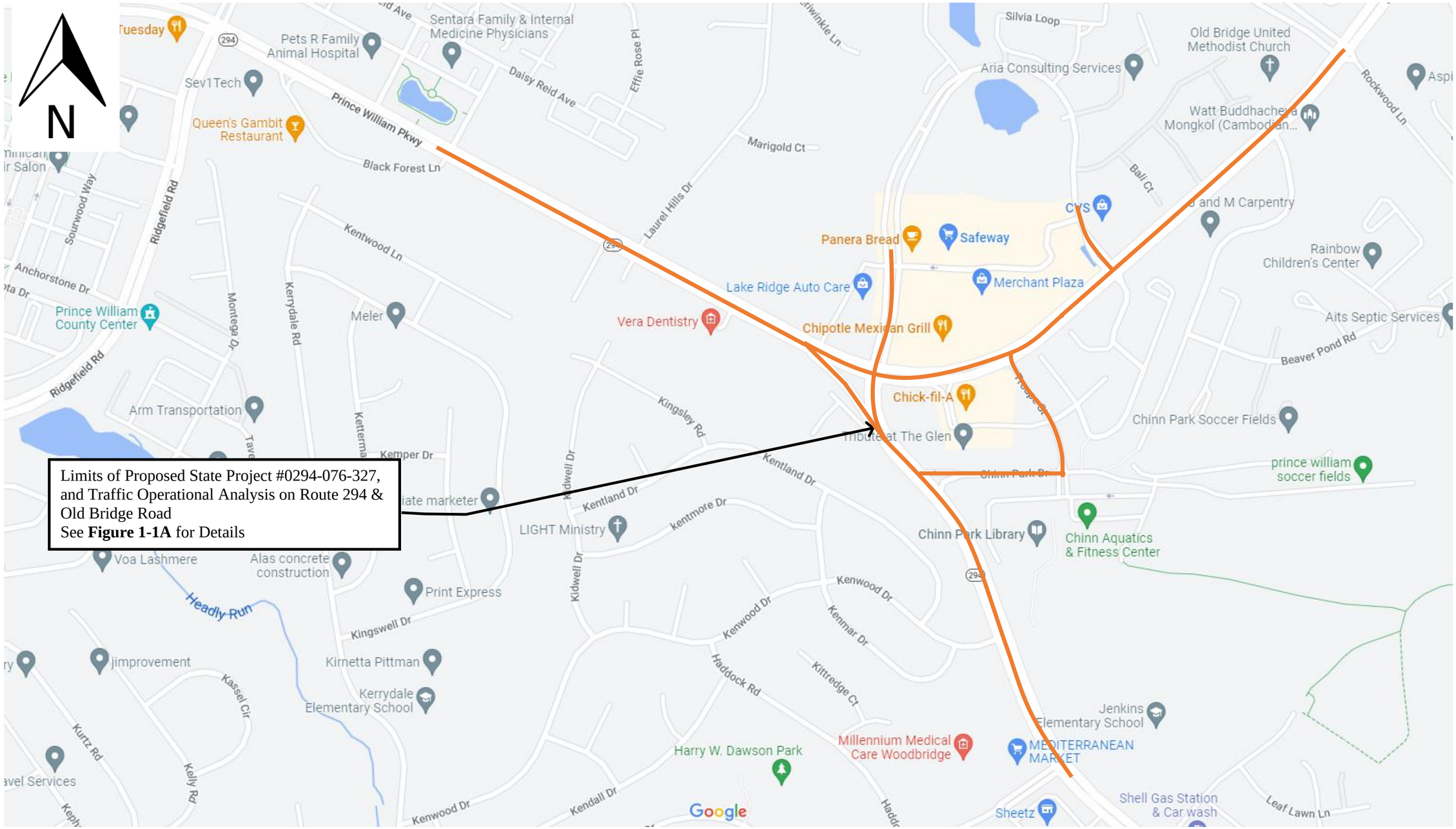

Figure 1-1a: Location of Study Area (Study Intersections)

1) Prince William Parkway & Black Forest Lane/Reids Prospect Drive
2) Route 294 (Prince William Parkway) and Laurel Hills Drive
3) Route 294 (Prince William Parkway) and Seeton Square
4) Route 294 (Prince William Parkway) and Old Bridge Road
5) Old Bridge Road and Tribe at the Glen Entrance
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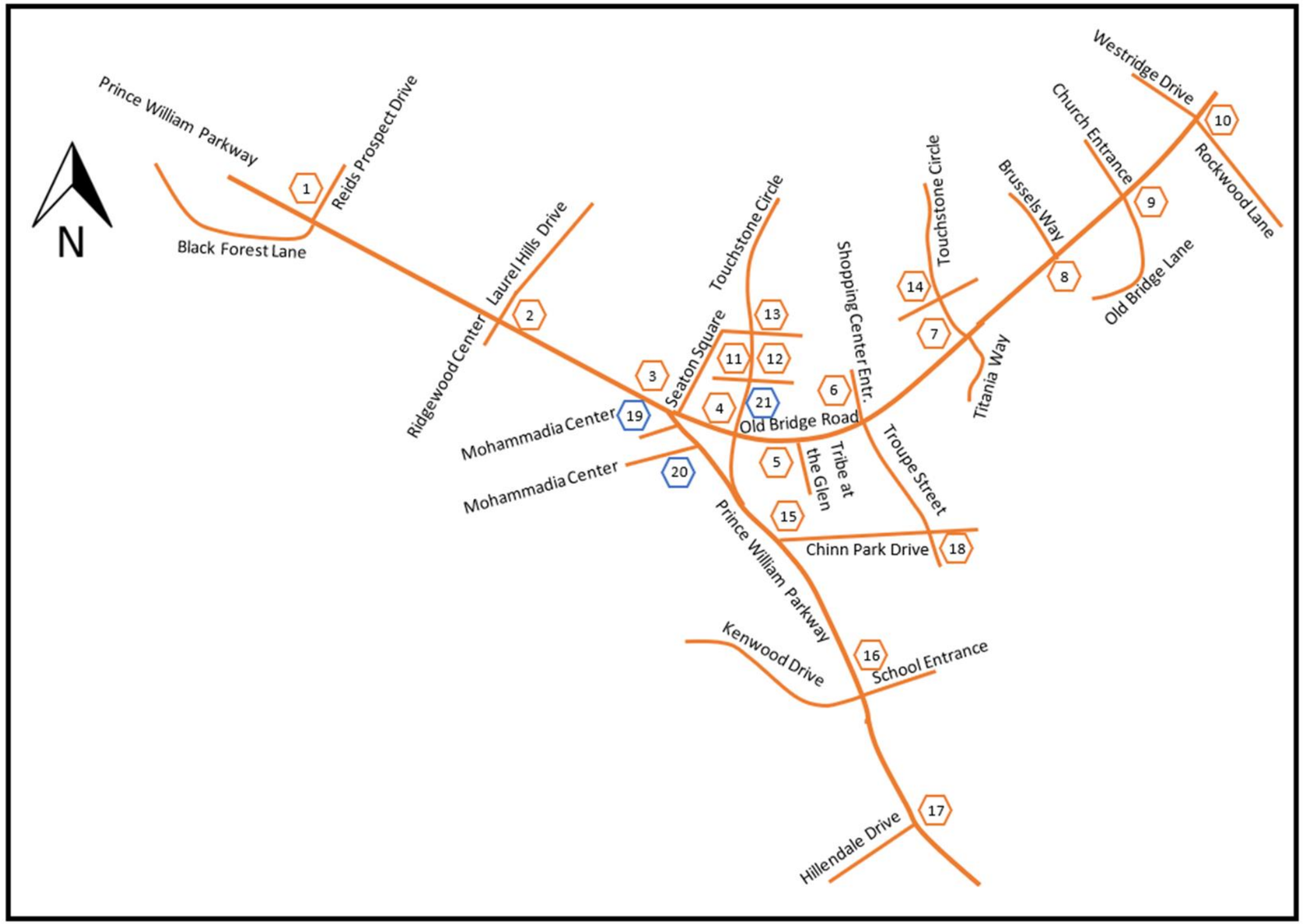


Section 2

Background Information

ROADWAY NETWORK

Existing Roadways

Route 294 (Prince William Parkway)

Route 294 (Prince William Parkway) is an urban principal arterial located in Prince William County that runs east-west within the study area. The road is a six lane, divided highway within the project limits. The posted speed limit is 45 mph. The annual average daily traffic (AADT) on 2019 was 49,000 south of Old Bridge Road and 50,000 west of Old Bridge as reported by VDOT's Daily Traffic Volume Estimates. In 2020, during the peak of the coronavirus, the AADT decreased to 37,000 south of Old Bridge Road and 38,000 west of Old Bridge Road. In 2021 the AADT increased to 42,000 south of Old Bridge Road and 43,000 west of Old Bridge Road

Old Bridge Road

Old Bridge Road is a minor arterial that runs north-south within the study area limits. The road is four-lane divided highway. The posted speed limit is 45 mph. The annual average daily traffic (AADT 2019) is 35,000 as reported by VDOT's Daily Volume Estimates. In 2020, during the peak of the coronavirus, the AADT decreased to 26,000. In 2021, the AADT increased to 30,000.

Study Intersections

Prince William Parkway & Black Forest Lane/Reids Prospect Drive:
Route 294 at this intersection primarily serves local/regional commuter traffic and commercial/retail traffic. Black Forest Lane and Reids Prospect Drive serve as the access point for commercial and residential properties.

Route 294 (Prince William Parkway) and Laurel Hills Drive:
This is an existing signalized intersection in which Route 294 is the east-west movement and Laurel Hills Drive/Ridgewood Center is the north-south movements. Route 294 at this intersection primarily serves local/regional commuter traffic and commercial/retail traffic. Laurel Hills Drive serves as the access point for residential properties.

Route 294 (Prince William Parkway) and Seeton Square:
This is an existing unsignalized T-intersection in which Route 294 is the east-west movement and Seeton Square approaches from the north. Route 294 at this intersection primarily serves local/regional commuter traffic and commercial/retail traffic. Seeton Square serves as the access point for commercial/retail properties along Route 294 and Old Bridge Road.

Route 294 (Prince William Parkway) and Old Bridge Road:
This is an existing signalized intersection in which Route 294 is the north-east movement, Old Bridge Road approaches from the east, and Touchstone Circle approaches from the north. Route 294 and Old Bridge Road at this intersection primarily serve local/regional commuter traffic and commercial/retail traffic. Touchstone Circle serves as the access point for several commercial, retail, and residential properties.

Old Bridge Road and Tribe at the Glen Entrance:
This is an existing unsignalized T-intersection in which Old Bridge Road is the north-south movement and the Tribe at the Glen Entrance approaches from the east. Old Bridge Road at this intersection primarily serves local/regional commuter traffic and commercial/retail traffic. Tribe at the Glen entrance serves as the access point for commercial, retail, and residential properties along Old Bridge Road.

Old Bridge Road & Troupe Street:
This is an existing signalized intersection in which Old Bridge Road is the north-south movement and Troupe Street/Shopping Center Entrance are the east-west movements. Old Bridge Road at this intersection primarily serves local/regional commuter traffic and commercial/retail traffic. Troupe Street serves as the access point for commercial, retail, and residential properties along Old Bridge Road.

Old Bridge Road & Touchstone Circle/Titania Way:
This is an existing signalized intersection in which Old Bridge Road is the north-south movement and Touchstone Circle/Titania Way are the east-west movements. Old Bridge Road at this intersection primarily serves local/regional commuter traffic and commercial/retail traffic. Titania Way serves as the access point for residential properties along Old Bridge Road. Touchstone Circle serves as the access point for a number of commercial, retail, and residential properties.

Old Bridge Road & Brussels Way:
This is an existing unsignalized T-intersection in which Old Bridge Road is the north-south movement and Brussels Way approaches from the west. Old Bridge Road at this intersection primarily serves local/regional commuter traffic and commercial/retail traffic. Brussels Way serves as the access point for residential properties along Old Bridge Road.

Old Bridge Road & Old Bridge Lane:
This is an existing unsignalized four-leg intersection in which Old Bridge Road is the north-south movement and Old Bridge Lane/Church Entrance are the east-west movements. Old Bridge Road at this intersection primarily serves local/regional commuter traffic and commercial/retail traffic. Old Bridge Lane serves as an access point for residential properties, as well as the Virginia Department of Transportation (Lakeridge AHQ).

Old Bridge Road & Westridge Drive/Rockwood Lane:
This is an existing signalized intersection in which Old Bridge Road is the north-south movement and Westridge Drive/Rockwood Lane are the east-west movements. Old Bridge Road at this intersection primarily serves local/regional commuter traffic and commercial/retail traffic. Westridge Lane and Rockwood Lane both serve as access points to residential properties.

Touchstone Circle and Shopping Center Entrance (North of Old Bridge Road):
This is an existing unsignalized four-leg intersection in which Touchstone Circle is the north-south movement, the Exxon entrance approaches from the west, and the shopping center entrance approaches from the east. Touchstone Circle serves as the access point for several commercial, retail, and residential properties. The shopping center entrance serves as one of several access points to commercial/retail properties.

Touchstone Circle and Seeton Square:
This is an existing unsignalized four-leg intersection in which Touchstone Circle is the north-south movement, Seeton Square approaches from the west, and the shopping center entrance approaches from the east. Touchstone Circle serves as the access point for several commercial, retail, and residential properties. Seeton Square serves as the access point for commercial/retail properties along Route 294 and Old Bridge Road. The shopping center entrance serves as one of several access points to commercial/retail properties.

Route 294 (Prince William Parkway) and Chinn Park Drive:
This is an existing unsignalized T-intersection in which Route 294 is the east-west movement and Chinn Park Drive approaches from the north. Route 294 at this intersection primarily serves local/regional commuter traffic and commercial/retail traffic. Chinn Park Drive serves as the access point for commercial, retail, and residential properties along Route 294 and Old Bridge Road.

Route 294 (Prince William Parkway) & Kenwood Drive:
This is an existing signalized intersection in which Route 294 is the east-west movement and Kenwood Drive/School Entrance are the north-south movements. Route 294 at this intersection primarily serves local/regional commuter traffic and commercial/retail traffic. Kenwood Drive serves as the access point for a number of residential properties. The school entrance serves as the only entrance to Jenkins Elementary School.

Prince William Parkway & Hillendale Drive:
This is an existing signalized intersection in which Route 294 is the east-west movement and Hillendale Drive approaches from the south. Route 294 at this intersection primarily serves local/regional commuter traffic and commercial/retail traffic. Hillendale Drive serves as the access point for a number of residential properties, as well as a connection to Dale Boulevard.

Please see **Figure 2-1** showing the existing conditions with lane configurations for the study intersections.

Planned Transportation Improvements

This project will realign Prince William Parkway (Rte. 294) as a 6-lane roadway and realign Old Bridge Road (Route 641) as a 4-lane roadway to meet at a T-intersection. The Prince William Parkway realignment will be the primary thru movement with 11-12-foot lanes, a variable-width raised median, a 5-foot sidewalk along the eastbound lanes, and a 10-foot shared use path (SUP) along the westbound lanes. The Old Bridge Road realignment will be the secondary movement with 11–12-foot lanes, a 4-foot raised median, and 5-foot sidewalks on both sides of the roadway. The project includes access management, turn lanes, intersection improvements, and a signal modification at the main T-intersection. A Service Road will be provided along the eastbound lanes of Prince William Parkway to reduce driveway entrances.

In summary, the primary purposes of the project are as follows:

- Improve the operation along Prince William Parkway and make this movement the primary movement at the intersection.
- Provide adequate roadway capacity and reduce congestion.
- Provide facilities to accommodate pedestrians and bicyclists via shared use paths, etc.

The project team utilized the STARS concept found in **Figure 2-2**. The STARS report can be found in **Appendix C**. The STARS configuration includes three right turn lanes from Old Bridge Road to Prince William Parkway, two right turn lanes from Prince William Parkway to Old Bridge Road, and two left turn lanes from Prince William Parkway to Old Bridge Road. Based on further refinement of the STARS analysis, it was determined the STARS configuration would not fully mitigate the failing LOS and queueing issues observed at the Prince William Parkway & Old Bridge Road intersection. An improved configuration is shown in **Figure 2-3.** This alternative configuration has two right turn lanes from Old Bridge Road to Prince William Parkway, a single right turn lane from Prince William Parkway to Old Bridge Road and three left turn lanes from Prince William Parkway to Old Bridge Road.

Figure 2-1: Existing Year (2022)
Existing Intersection Geometry

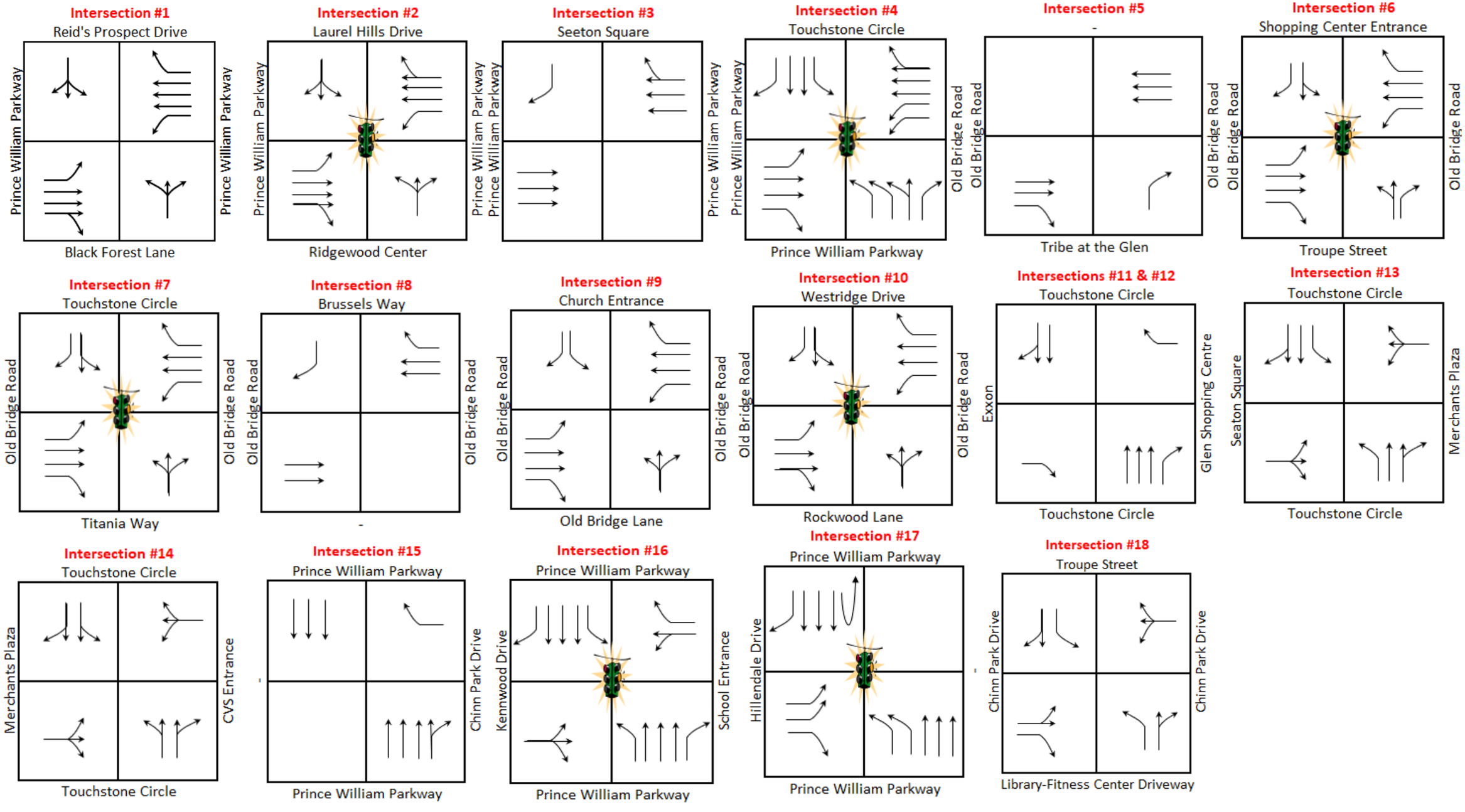
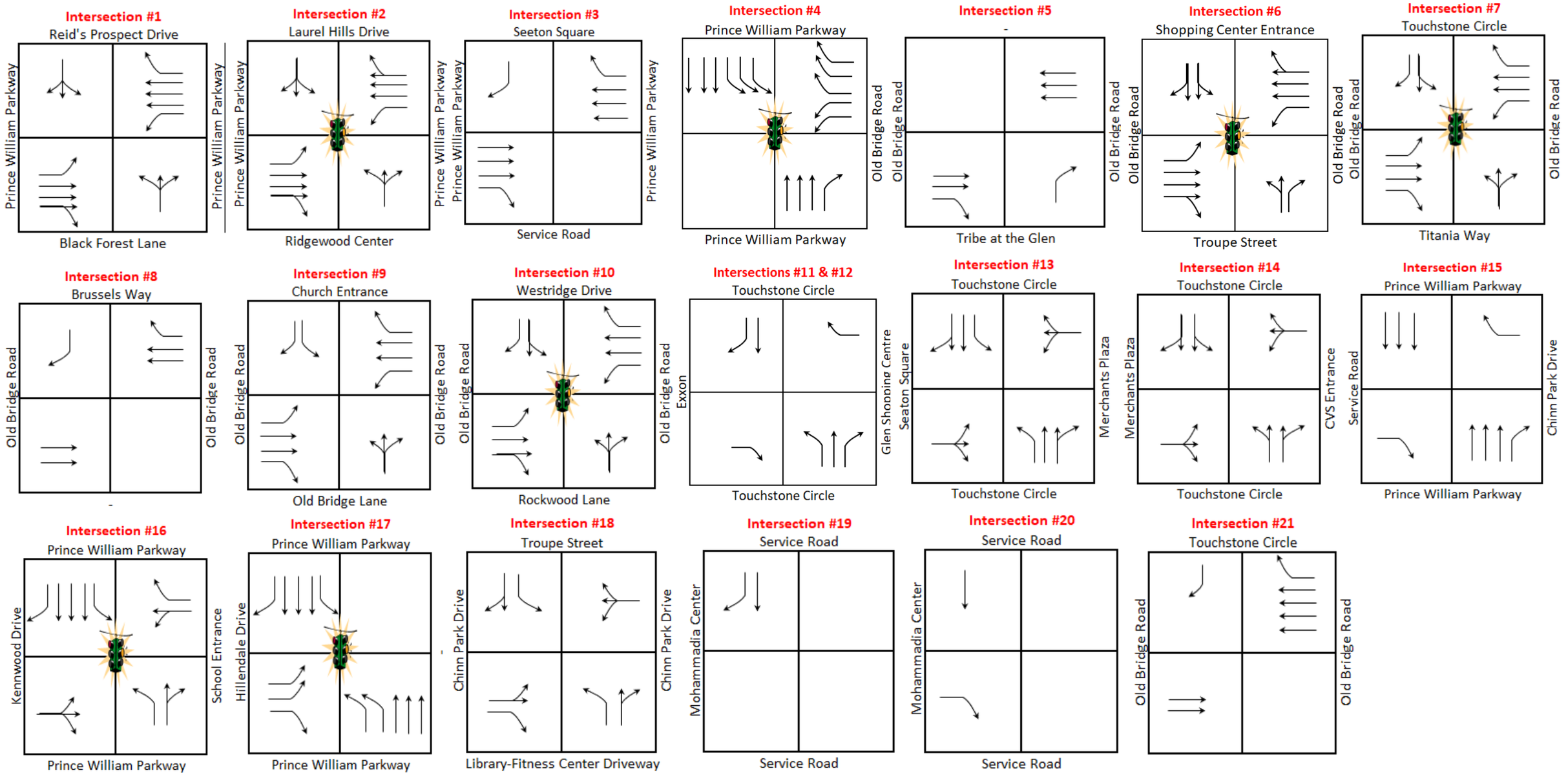


Figure 2-2: **STARS Configuration Intersection Improvements**

Figure 2-3: Recommended Alternative Configuration Intersection Improvements

Figure 2-4: Opening Year (2026) & Horizon Year (2045)
Proposed Alternative Configuration Intersection Geometry



Section 3

EXISTING CONDITIONS ANALYSIS

Existing Year (2022)

Existing Traffic Volumes

Turning movement counts were conducted Thursday May 26th, 2022 from 7:00 AM to 9:00 AM for the morning, 4:30 PM to 6:30 PM for the evening, and 11:00 AM to 1:00 PM for the mid-day for the following existing study intersections:

- Route 294 (Prince William Parkway) at Touchstone Circle/Old Bridge Road
- Route 294 (Prince William Parkway) at Laurel Hills Drive
- Route 294 (Prince William Parkway) at Kenwood Drive/Jenkins Elementary School Entrance
- Old Bridge Road at Troupe Street/Shopping Center Entrance
- Old Bridge Road at Touchstone Circle/Titania Way
- Route 294 (Prince William Parkway) at Seeton Square
- Route 294 (Prince William Parkway) at Chinn Park Drive
- Old Bridge Road at Tribute at the Glen
- Touchstone Circle at Shopping Center Entrance/Exxon
- Touchstone Circle at Seeton Square/Shopping Center Entrance

Turning movement counts were conducted Tuesday September 27th, 2022 from 7:00 AM to 9:00 AM for the morning, 4:00 PM to 6:00 PM for the evening for the following existing study intersections:

- Route 294 (Prince William Parkway) at Hillendale Drive
- Troupe Street at Chinn Park Drive
- Route 294 (Prince William Parkway) at Reids Prospect Dr/Black Forest Lane
- Touchstone Circle at Merchant Plaza/CVS Driveway
- Old Bridge Road at Old Bridge Lane/Church Driveway
- Old Bridge Road at Westridge Drive/Rockwood Lane
- Old Bridge Road at Brussels Way

From these turning movement counts, peak hours along Route 294 and Old Bridge Road were determined based on the most commonly observed peak hours throughout the network. The AM peak hour occurred from 7:45 AM to 8:45 AM, and the PM peak hour occurred from 5:00 PM to 6:00 PM.

Existing Year (2022) field collected counts are provided in **Appendix A.**

Existing Year (2022) field collected counts were adjusted to account for drops in traffic since the start of the Covid pandemic in 2020, to comply with VDOT IIM-TMPD-7.0. Factors were calculated using VDOT available ADT data for 2019 (pre-pandemic) and 2021. Using this method, a 16% factor would be applied to all intersections along Prince William Parkway and Old Bridge Road. This factor was then adjusted, assuming traffic has increased between 2021 and when field counts were conducted. Between 2020 and 2021, traffic grew about 13.5% along Prince William Parkway and 15.5% along Old Bridge Road. Assuming traffic has grown at about half this, to be conservative, between 2021 and 2022 when traffic counts were taken, a 9% factor was applied to all intersections along Prince William Parkway and Old Bridge Road. This 9% was calculated by comparing the 2021/2022 volumes to 2019 (pre-covid) volumes. Traffic along Touchstone Circle and Troupe Street was assumed unchanged and were therefore, not factored.

Existing Year (2022) factored and balanced baseline turning movement counts for each existing intersection is provided in **Figure 3-1A** and **Figure 3-1B.**

Capacity Analysis

Levels of service (LOS) analyses were conducted at each existing study intersection based on the existing lane use and traffic control shown in **Figure 2-1**, existing peak hour traffic volumes shown in **Figure 3-1A** and **Figure 3-1B**, and traffic signal timings obtained from VDOT.

> ***Highway Capacity Manual (HCM) 2000 vs. Highway Capacity Manual (HCM) 6th Edition Reports:***
> *VDOT's Traffic Operations and Safety Analysis Manual (TOSAM) expresses that the HCM 6th Edition should be utilized for analysis. However, the HCM 6th Edition has many startling limitations, in which NEMA based phasing shall be utilized for all analysis. VDOT in the Northern Virginia District does not use NEMA Controllers. So, if an intersection proposes phasing that is not consistent with NEMA based phasing, the HCM 6th Edition methodology for analyses cannot be utilized. Where available, HCM 6th edition reports will be utilized. Otherwise, HCM 2000 will be utilized for results.*

Synchro™ (Version 11.1) was used to conduct the analysis of each existing study intersection during the AM and PM peak periods. Synchro™ reports operating conditions for each movement at signalized intersections in terms of LOS. The levels of services reported for the unsignalized intersections were taken from the Highway Capacity Manual (HCM) 6th Edition reports generated by Synchro™. Levels of service descriptions are included in **Appendix D**.

The Synchro™ reports are presented in **Appendix F**. Synchro™ results are summarized and depicted in **Table 3-1**. As shown in **Table 3-1**, the following is observed:

- **AM PEAK HOUR:** All existing stop-controlled study intersections operate at an overall acceptable level of service (LOS D or better) during the AM peak hours. All existing signalized intersections, except Prince William Parkway & Old Bridge Road operate at an overall acceptable level of service (LOS D or better) during the AM peak hours. A number of movements and approaches operate at LOS E or LOS F at intersections #1, #2, #3, #4, #6, #7, #9, #10, #16, and #17.

- **PM PEAK HOUR:** All existing stop-controlled study intersections, except Prince William Parkway & Reids Prospect Drive operate at an overall acceptable level of service (LOS D or better) during PM peak hours. All existing signalized study intersections, except Prince William Parkway & Old Bridge Road and Prince William Parkway & Hillendale Road operate at an overall acceptable level of service (LOS D or better) during PM peak hours. A number of movements and approaches operate at LOS E or LOS F at intersections #1, #3, #4, #6, #7, #8, #9, #10, #16, and #17.

Although Synchro™ 11.1's generated reports provide an overall intersection LOS for unsignalized intersection, per Chapter 19, page 19-2 of the 2010 HCM, unsignalized intersections are not measured with an overall intersection LOS. A representative measure of the side-street level of service provides a good representation of the delays experienced by approaching vehicles attempting turning movements. As observed in Table **3-1**, most approaching side street level of service delays exceed acceptable norms for urban conditions (i.e. LOS "D" or better is acceptable for urban conditions).

Figure 3-1A: **Existing Year (2022) AM Peak Balanced Volumes**

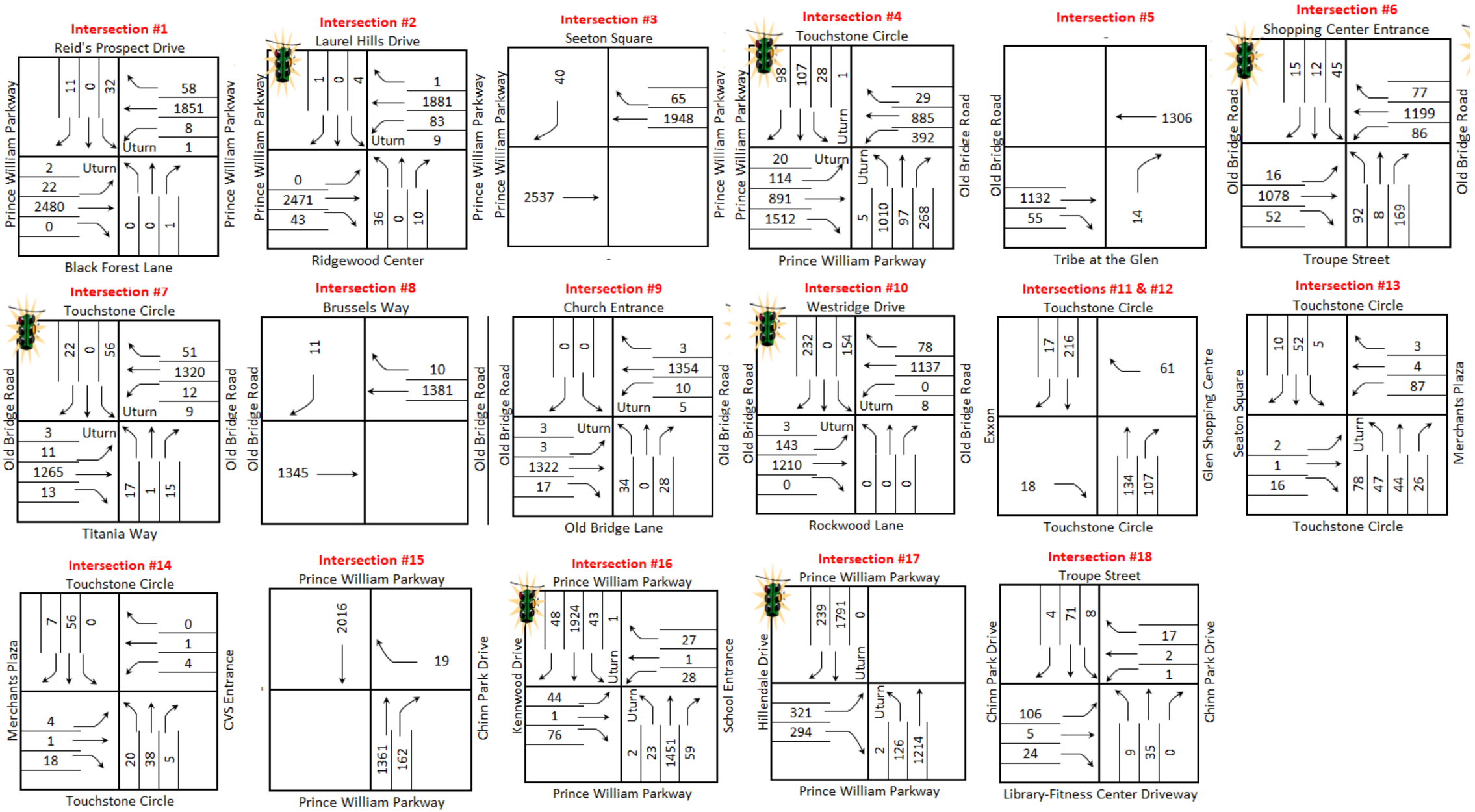


Figure 3-1B:
Existing Year (2022) PM Peak Balanced Volumes

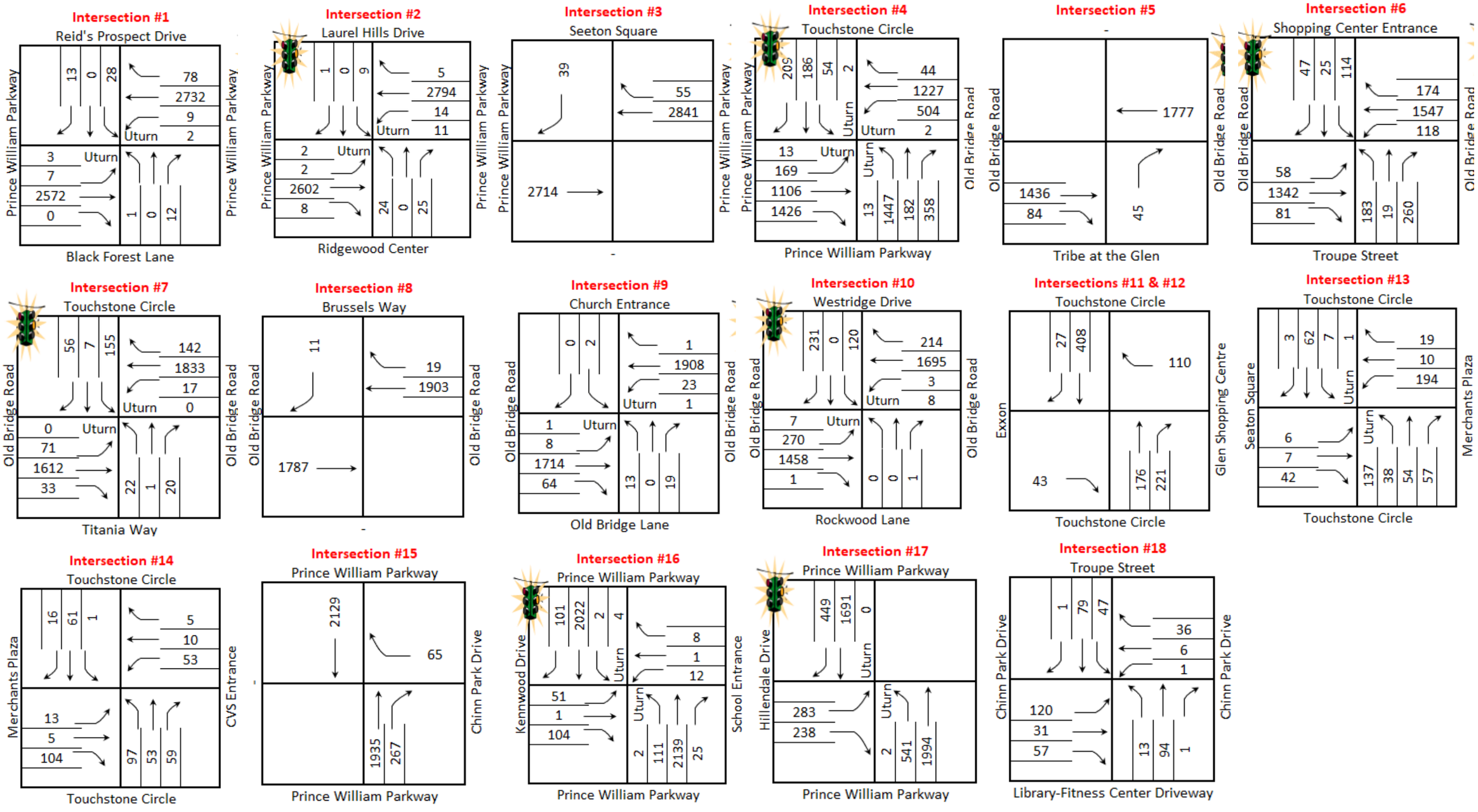


Table 3-1: Existing Year (2022)
LOS Analysis Results

Existing Year (2022) Level of Service (LOS) & Delay													
Intersection		**Control Type**	**Approach**	**Lane Group**	**AM Peak**				**PM Peak**				
1	Prince William Pkwy & Black Forest Ln/Reids Prospect Dr	Unsignalized	EB	Left	37.9	E	0.4	A	124.3	F	0.5	A	
				Through-Right	-	-			-	-			
			WB	Left	60.9	F	0.3	A	74.5	F	0.3	A	
				Through-Right	-	-			-	-			
			NB	Left-Through-Right	30.2	D	30.2	D	200.6	F	200.6	F	
			SB	Left-Through-Right	3394.5	F	3394.5	F	25529.5	F	25529.5	F	
			Overall		33.0		D		192.7		F		
2	Prince William Pkwy & Laurel Hills Dr	Signalized	EB	Left	-	-	13.7	B	46.3	D	25.4	C	
				Through-Right	13.7	B			25.4	C			
			WB	Left	588.6	F	30.3	C	41.9	D	9.5	A	
				Through-Right	3.0	A			9.2	A			
			NB	Left-Through-Right	75.8	E	75.8	E	45.7	D	45.7	D	
			SB	Left-Through-Right	79.1	E	79.1	E	49.1	D	49.1	D	
			Overall		21.6		C		17.5		B		
3	Prince William Pkwy & Seeton Square	Unsignalized	EB	Through	-	-	0.0	A	-	-	0.0	A	
			WB	Through-Right	-	-	0.0	A	-	-	0.0	A	
			SB	Right	42.2	E	42.2	E	283.5	F	283.5	F	
			Overall		0.4		A		2.0		A		
4	Prince William Pkwy & Old Bridge Rd	Signalized	EB	Left	1000.6	F	135.7	F	1959.1	F	172.2	F	
				Through	60.0	E			90.1	F			
				Right	103.5	F			8.6	A			
			WB	Left	69.8	E	48.9	D	2915.6	F	852.4	F	
				Through-Right	39.9	D			30.2	C			
			NB	Left	208.0	F	133.5	F	387.9	F	265.5	F	
				Through	81.4	F			161.1	F			
				Right	4.2	A			67.2	E			
			SB	Left	96.9	F	58.9	E	464.1	F	130.5	F	
				Through	67.2	E			97.2	F			
				Right	38.6	D			70.3	E			
			Overall		111.1		F		370.5		F		
5	Old Bridge Rd & Tribe at the Glen Entrance	Unsignalized	EB	Through	-	-	0.0	A	-	-	0.0	A	
				Right	-	-		A	-	-			
			WB	Through	-	-	0.0	A	-	-	0.0	A	
			NB	Right	14.5	A	14.5	A	16.4	C	16.4	C	
			Overall		0.1		A		0.2		A		

Legend:

XXX	LOS E
XXX	LOS F

Table 3-1: Existing Year (2022) Cont.
LOS Analysis Results

Existing Year (2022) Level of Service (LOS) & Delay													
Intersection		**Control Type**	**Approach**	**Lane Group**	**AM Peak**				**PM Peak**				
6	Old Bridge Rd & Troupe St/Shopping Center Entrance	Signalized	EB	Left	77.4	E	21.2	C	102.7	F	15.5	B	
				Through	19.8	B			12.6	B			
				Right	34.3	C			0.4	A			
			WB	Left	98.3	F	15.9	B	148.3	F	21.3	C	
				Through	10.9	B			13.8	B			
				Right	1.3	A			1.9	A			
			NB	Left-Through	87.5	F	135.0	F	113.1	F	96.8	F	
				Right	163.1	F			84.2	F			
			SB	Left-Through	79.8	E	78.0	E	188.5	F	162.5	F	
				Right	70.8	E			85.9	F			
			Overall		30.9		C		34.6		D		
7	Old Bridge Rd & Titania Way/Touchstone Circle	Signalized	EB	Left	2.2	A	3.0	A	48.1	C	8.0	A	
				Through	3.0	A			6.2	A			
				Right	4.6	A			7.6	A			
			WB	Left	2.9	A	7.5	A	5.1	A	15.6	B	
				Through	7.6	A			16.6	B			
				Right	5.3	A			3.3	A			
			NB	Left-Through-Right	71.4	E	71.4	E	77.3	E	77.3	E	
			SB	Left-Through	89.7	F	84.2	F	120.3	F	108.8	F	
				Right	70.0	E			75.4	E			
			Overall		8.3		A		18.1		B		
8	Old Bridge Rd & Brussels Way	Unsignalized	EB	Through	-	-	0.0	A	-	-	0.0	A	
			WB	Through	-	-	0.0	A	-	-	0.0	A	
				Right	-	-			-	-			
			SB	Right	27.7	D	27.7	D	46.4	E	46.4	E	
			Overall		0.1		A		0.1		A		
9	Old Bridge Rd & Old Bridge Ln/Church Entrance	Unsignalized	EB	Left	18.5	C	0.1	A	22.8	C	0.1	A	
				Through	-	-			-	-			
				Right	-	-			-	-			
			WB	Left	17.4	C	0.2	A	18.6	C	0.2	A	
				Through	-	-			-	-			
				Right	-	-			-	-			
			NB	Left-Through-Right	379.4	F	379.4	F	1204.8	F	1204.8	F	
			SB	Left	138.4	F	138.4	F	801.6	F	801.6	F	
				Right	0.0	A			0.0	A			
			Overall		8.7		A		10.8		B		

Legend:

XXX	LOS E
XXX	LOS F

Table 3-1: Existing Year (2022) Cont.

LOS Analysis Results

Existing Year (2022) Level of Service (LOS) & Delay													
Intersection		**Control Type**	**Approach**	**Lane Group**	**AM Peak**				**PM Peak**				
10	Old Bridge Rd & Westridge Dr/Rockwood Ln	Signalized	EB	Left	16.2	B	11.5	B	82.0	F	23.1	C	
				Through-Right	11.0	B			11.9	B			
			WB	Left	12.6	B	19.6	B	19.0	B	39.7	D	
				Through	20.1	C			42.4	D			
				Right	12.5	B			19.7	B			
			NB	Left-Through-Right	0.0	A	0.0	A	75.1	E	75.1	E	
			SB	Left-Through	76.3	E	65.0	E	90.3	F	69.0	E	
				Right	57.6	E			58.0	E			
			Overall		21.8		C		35.1		D		
11&12	Touchstone Circle & Exxon/Shopping Center	Unsignalized	EB	Right	8.8	A	8.8	A	9.5	A	9.5	A	
			WB	Right	8.9	A	8.9	A	9.3	A	9.3	A	
			NB	Through	0.0	A	0.0	A	0.0	A	0.0	A	
			SB	Through-Right	0.0	A	0.0	A	0.0	A	0.0	A	
			Overall		1.3		A		1.5		A		
13	Touchstone Circle & Seeton Square	Unsignalized	EB	Left-Through-Right	9.2	A	9.2	A	10.4	B	10.4	B	
			WB	Left-Through-Right	13.7	B	13.7	B	31.5	D	31.5	D	
			NB	Left	7.9	A	5.1	A	8.3	A	5.0	A	
				Through-Right	-	-			-	-			
			SB	Left	7.6	A	0.6	A	7.5	A	0.8	A	
				Through-Right	-	-			-	-			
			Overall		6.7		A		14.3		B		
14	Touchstone Circle & Merchant Plaza/CVS	Unsignalized	EB	Left-Through-Right	9.1	A	9.1	A	10.0	B	10.0	B	
			WB	Left-Through-Right	10.2	B	10.2	B	13.8	B	13.8	B	
			NB	Left	7.7	A	2.5	A	7.6	A	3.6	A	
				Through	-	-			0.1	A			
				Right	-	-			-	-			
			SB	Left	0.0	A	0.0	A	7.5	A	0.1	A	
				Through	-	-			0.0	A			
				Right	-	-			-	-			
			Overall		2.7		A		6.1		A		
15	Prince William Pkwy & Chinn Park Dr	Unsignalized	WB	Right	8.9	A	8.9	A	9.7	A	9.7	A	
			NB	Through-Right	0.0	A	0.0	A	0.0	A	0.0	A	
			SB	Through	0.0	A	0.0	A	0.0	A	0.0	A	
			Overall		0.0		A		0.1		A		

Legend:

XXX	LOS E
XXX	LOS F

Table 3-1: Existing Year (2022) Cont.
LOS Analysis Results

Existing Year (2022) Level of Service (LOS) & Delay												
Intersection		Control Type	Approach	Lane Group	AM Peak				PM Peak			
16	Prince William Pkwy & Kennwood Dr/School Entrance	Signalized	EB	Left-Through-Right	79.6	E	79.6	E	113.9	F	113.9	F
			WB	Left-Through	75.7	E	71.3	E	94.2	F	92.0	F
				Right	66.6	E			88.2	F		
			NB	Left	11.1	B	12.8	B	40.1	D	18.7	B
				Through	13.3	B			17.7	B		
				Right	1.3	A			7.2	A		
			SB	Left	16.1	B	24.7	C	12.8	B	18.1	B
				Through	25.5	C			18.7	B		
				Right	2.1	A			5.9	A		
			Overall		22.3		C		22.0		C	
17	Prince William Pkwy & Hillendale Rd	Signalized	EB	Left	54.9	D	53.7	D	59.7	E	56.9	E
				Right	52.5	D			53.7	D		
			NB	Left	377.8	F	44.9	D	2569.2	F	557.7	F
				Through	9.9	A			9.6	A		
			SB	Through	16.3	B	16.1	B	20.1	C	16.9	B
				Right	14.6	B			5.0	A		
			Overall		31.6		C		284.9		F	
18	Troupe St & Chinn Park Dr	Unsignalized	EB	Left	7.5	A	5.9	A	7.6	A	4.4	A
				Through	0.0	A			0.0	A		
				Right	-	-			-	-		
			WB	Left	8.2	A	0.4	A	7.4	A	0.2	A
				Through	0.0	A			0.0	A		
				Right	-	-			-	-		
			NB	Left	12.6	B	12.4	B	13.4	B	13.8	B
				Through-Right	12.4	B			13.9	B		
			SB	Left	13.2	B	14.0	B	16.7	C	16.1	C
				Through-Right	14.1	B			15.8	C		
			Overall		8.9		A		9.2		A	

Legend:

XXX	LOS E
XXX	LOS F

Section 4

ANALYSIS OF FORECASTED GROWTH & BACKGROUND ADJACENT SITE DEVELOPMENT

Regional Traffic Volume Growth

The Prince William County traffic demand models for 2019 and 2040 were utilized to develop traffic growth rates for Route 294 (Prince William Parkway) and Old Bridge Road. Utilizing the models, rates as high as 5.5% were calculated. Following discussions with Prince William County, it was determined the county model produced growth rates that would yield future volumes above the project area's capacity, and modified rates should be utilized. An Interchange Alternative Report (IAR) was recently completed for Minnieville Road & Prince William Parkway, which is approximately 1.80 miles south of Prince William Parkway & Old Bridge Road. Therefore, the VDOT approved growth rates for Minnieville Road with Prince William Parkway IAR, and growth rates for Prince William Parkway/Old Bridge Road STARS Report were used to develop the following rates. Growth rates were agreed upon by Prince William County and VDOT. VDOT confirmed that rates were consistent with the growth shown on the three roadways of the intersection in the TPB/COG Model version 2.4.

- A 1% annual growth rate will be applied to the existing intersection volumes from 2022 to the construction year of 2026.
- The 1% annual growth rate will continue to be applied to grown volumes from 2026 to 2030.
- A 0.5% annual growth rate will be applied to the further grown volumes from 2030 to the future year of 2045.
- All movements associated with Touchstone Circle will be grown at 0% as the area surrounding the road is considered built out. As noted in the STARS report, the AADT on Touchstone Circle has remained stagnant for all reviewed years.

See **Appendix B** for pre-coordinated scope reviewed and accepted by VDOT Traffic Engineering.

See **Appendix G** for documentation of acceptance by locality (Prince William County) of growth rates utilized for this study.

Background Adjacent Site Development

In discussions with the project stakeholders, there are two sites within the project's study area that would alter growth and/or traffic patterns on Prince William Parkway (Route 294). Below is a brief discussion of the sites from the information made available by Prince William County:

Hawthorne Retirement Residence: This site was approved for rezoning in 2019. A traffic memo was submitted by Timmons Group on April 24, 2019, and the final rezoning report was submitted on November 12, 2019. Rezoning documents can be found in **Appendix E**. The proposed development is located approximately 435 feet west of the intersection of Prince William Parkway & Laurel Hills Road. The development consists of 167 assisted living dwelling units with access provided from Prince William Parkway using a right-in/right-out entrance.

The site is expected to generate 12 trips during the AM peak hour and 30 trips during the PM peak hour.

Mohammadia Center Site: The proposed development is located along the proposed service road. This site is not expected to generate any trips during the peak hours since the center's events will only be held on Friday nights. 132 trips are expected to be added to the analysis area during the center's event periods. Desptie not affecting the area during peak hours, these trips have been distributed between the two entrances and throughout the networks to verify the additional traffic will not negatively impact the surrounding area.

Section 5

FORECASTED VOLUMES

For Opening Year (2026) & Horizon Year (2045)

Opening Year (2026) No-Build Traffic Forecast

For the Opening Year (2026), AM & PM peak hour traffic volumes were developed by taking the existing year balanced counts for each intersection and applying the appropriate average annual growth rate discussed in **Section 4** of this report using the following formula:

$$V_{2026} = V_{2022} \times (1 + i)^n$$

The peak hour volumes estimated for the Opening Year (2026) without the reconfigured Prince William Parkway & Old Bridge Road intersection are depicted in **Figure 5-1A** and **Figure 5-1B**. Regional growth and background development are shown in **Figure 5-1C** and **Figure 5-1D**.

Horizon Year (2045) No-Build Traffic Forecast

For the Horizon Year (2045), AM & PM peak hour traffic volumes were developed by applying the average annual growth rate discussed in **Section 4** of this report using the following formula:

$$V_{2045} = V_{2026} \times (1 + i_1)^n \times (1 + i_2)^n$$

The peak hour volumes estimated for the Horizon Year (2045) without the reconfigured Prince William Parkway & Old Bridge Road intersection are depicted in **Figure 5-2A** and **Figure 5-2B**. Regional growth and background development are shown in **Figure 5-2C** and **Figure 5-2D**.

Trip Distribution

With the reconfiguration of Prince William Parkway & Old Bridge Road, traffic will be rerouted through the intersection, as well as adjacent intersections.

Traffic previously turning left from eastbound Prince William Parkway will travel through. Traffic that turned left from eastbound Prince William Parkway to Touchstone Circle and traveled through to Old Bridge Road will turn left.

Traffic previously traveling through from westbound Old Bridge Road to Prince William Parkway will turn right. Traffic that turned left from northbound Prince William Parkway to Prince William Parkway and traveled through to Touchstone Circle will travel through to Prince William Parkway.

Traffic that previously entered the shopping center using Touchstone Circle at the main intersection will be rerouted to the eastern Touchstone Circle entrance, Seeton Square, and Troupe Street. Traffic exiting the shopping center will be split between the same intersections, as well as the western Touchstone Circle intersection.

All traffic rerouting is shown in **Figure 5-3A, Figure 5-3B, Figure 5-3C, Figure 5-3D,** and **Figure 5-3E**. **Figure 5-3F** through **Figure 5-3N** illustrate the rerouted volume for each movement at Prince William Parkway & Old Bridge Road. The trip distribution was reviewed and approved by VDOT on October 26, 2022 and Prince William County on November 4, 2022. **Figure 5-3A** depicts the existing movements at the intersection. **Figure 5-3B, Figure 5-3C, Figure 5-3D,** and **Figure 5-3E** depict the rerouting of the existing movement at the reconfigured intersection, as well as surrounding intersections.

Opening Year (2026) Build Traffic Forecast

The peak hour volumes estimated for the Opening Year (2026) with the reconfigured Prince William Parkway & Old Bridge Road intersection are depicted in **Figure 5-4A** and **Figure 5-4B**. Regional growth and background development are shown in **Figure 5-4C** and **Figure 5-4D**.

Horizon Year (2045) Build Traffic Forecast

The peak hour volumes estimated for the Horizon Year (2045) with the reconfigured Prince William Parkway & Old Bridge Road intersection are depicted in **Figure 5-5A** and **Figure 5-5B**. Regional growth and background development are shown in **Figure 5-5C** and **Figure 5-5D**.

Figure 5-1A:

Opening Year (2026) No-Build AM Peak Volumes

Forecasted Peak Hour Volumes

[**Note:** Arrows refer to lane groups, **not number of lanes**; see **Figure 2-4** in **Section 2** for lane configurations]

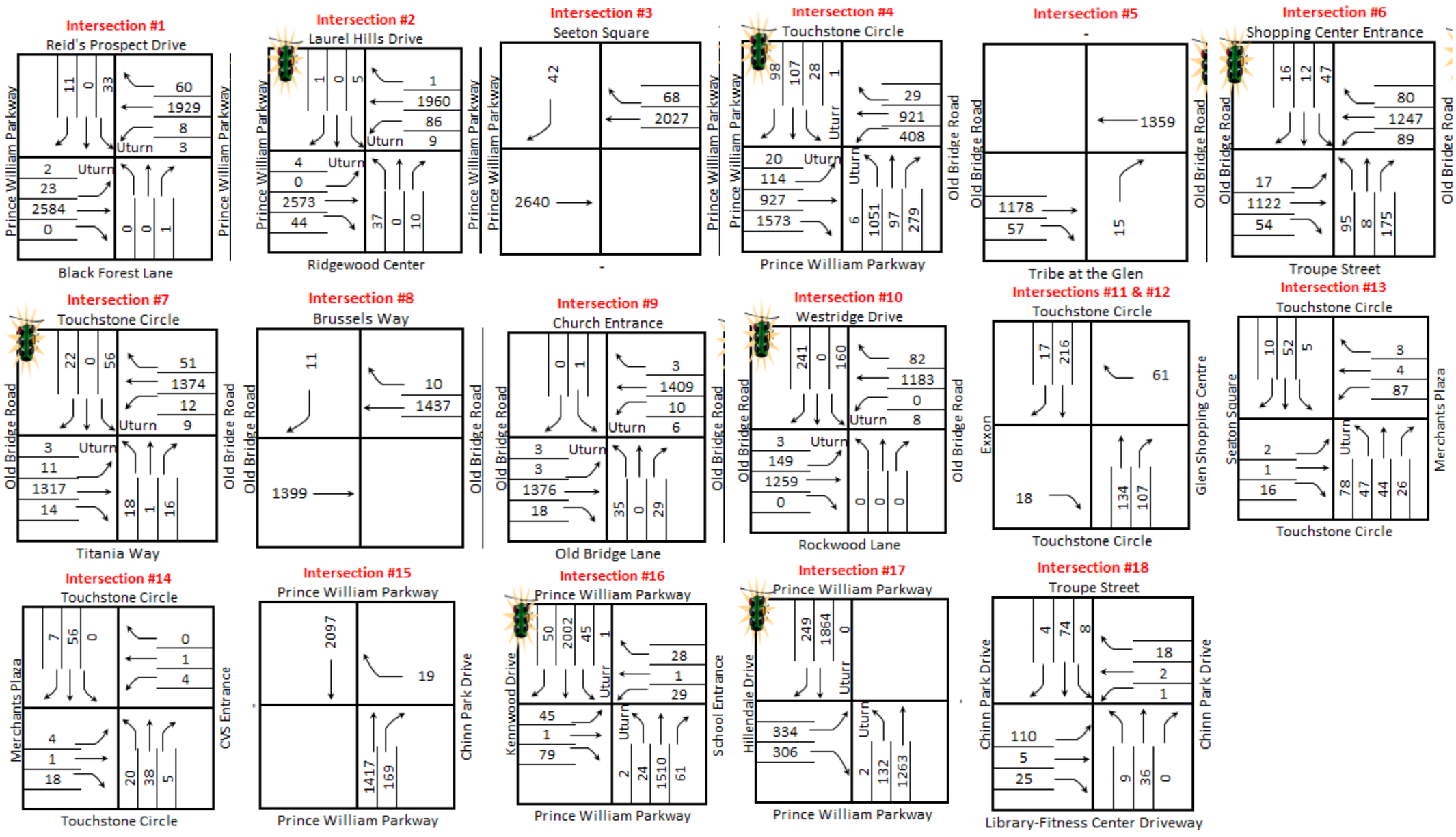


Figure 5-1B:

Opening Year (2026) No-Build PM Peak Volumes

Forecasted Peak Hour Volumes

[**Note:** Arrows refer to lane groups, **not number of lanes**; see **Figure 2-4** in **Section 2** for lane configurations]

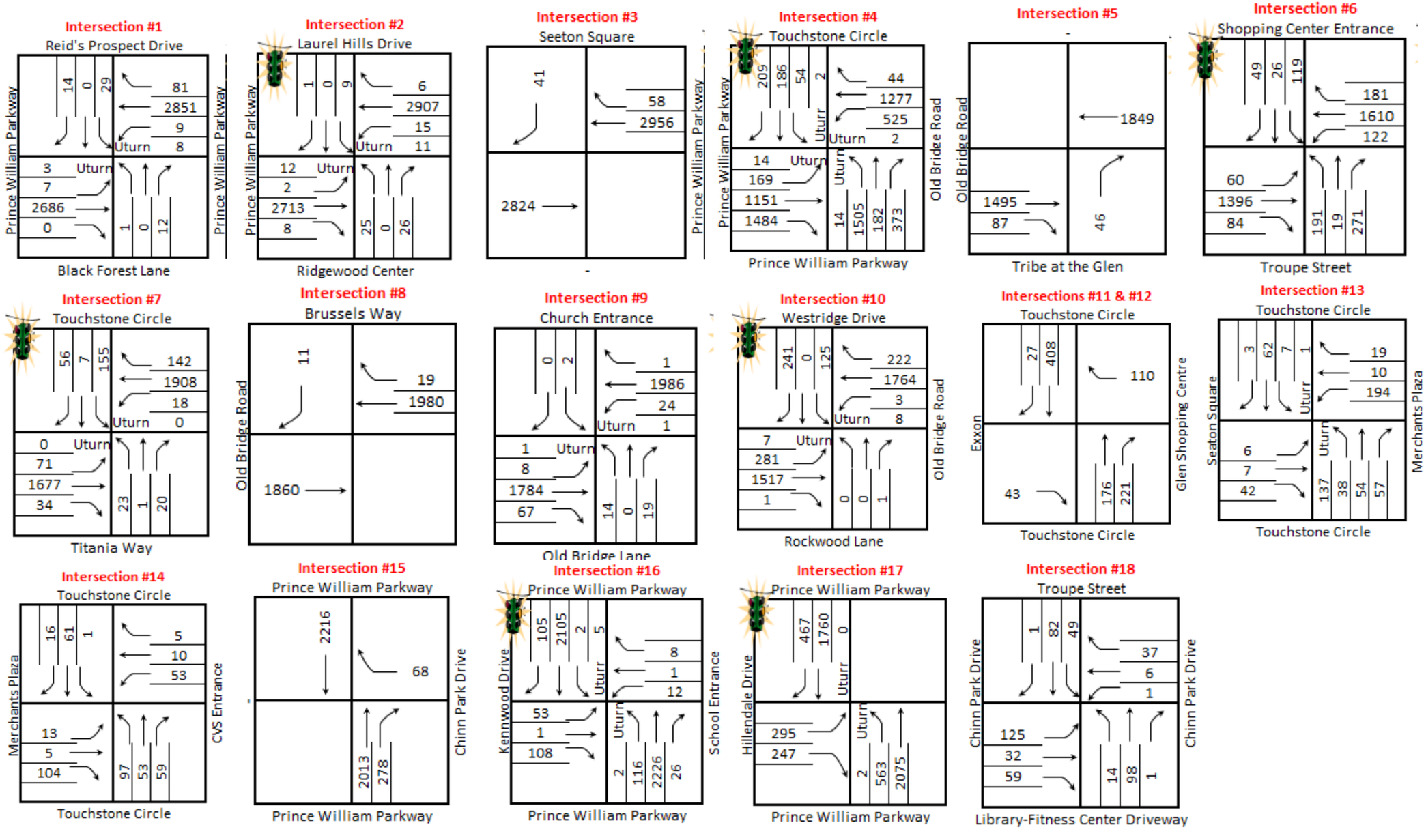


Figure 5-1C:
Regional Growth & Background Development
Existing Year to No-Build Year 2026 AM Peak
[**Note:** Arrows refer to lane groups, **not number of lanes**; see **Figure 2-4** in **Section 2** for lane configurations]

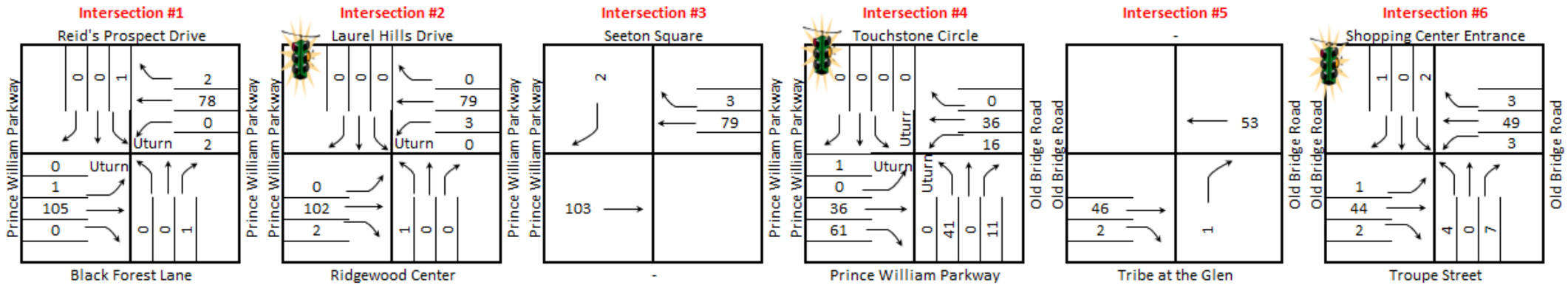


Figure 5-1D:

Regional Growth & Background Development

Existing Year to No-Build Year 2026 PM Peak

[**Note:** Arrows refer to lane groups, **not number of lanes**; see **Figure 2-4** in **Section 2** for lane configurations]

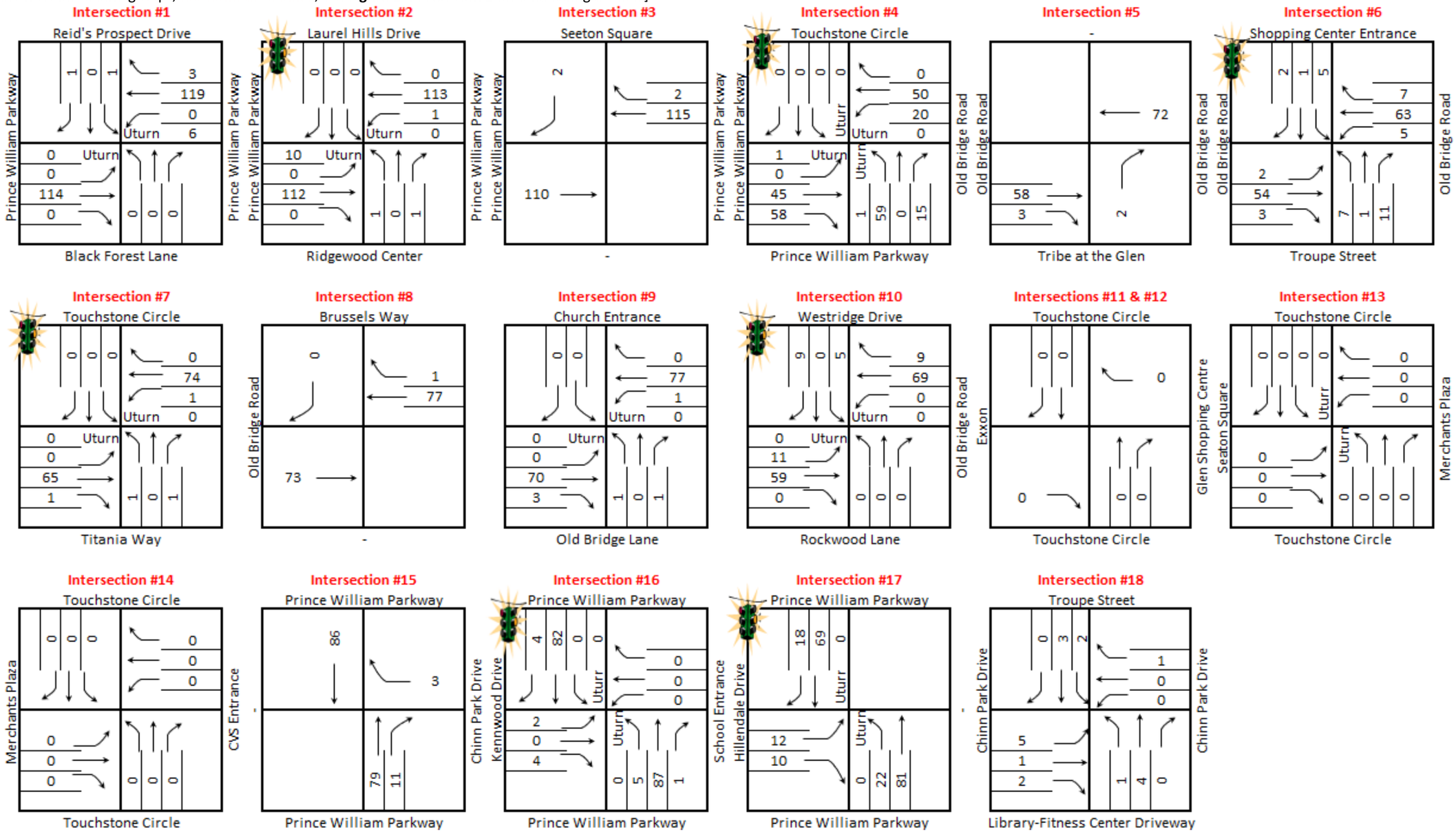


Figure 5-2A:

Horizon Year (2045) No-Build AM Peak Volumes

Forecasted Peak Hour Volumes

[**Note:** Arrows refer to lane groups, **not number of lanes**; see **Figure 2-4** in **Section 2** for lane configurations]

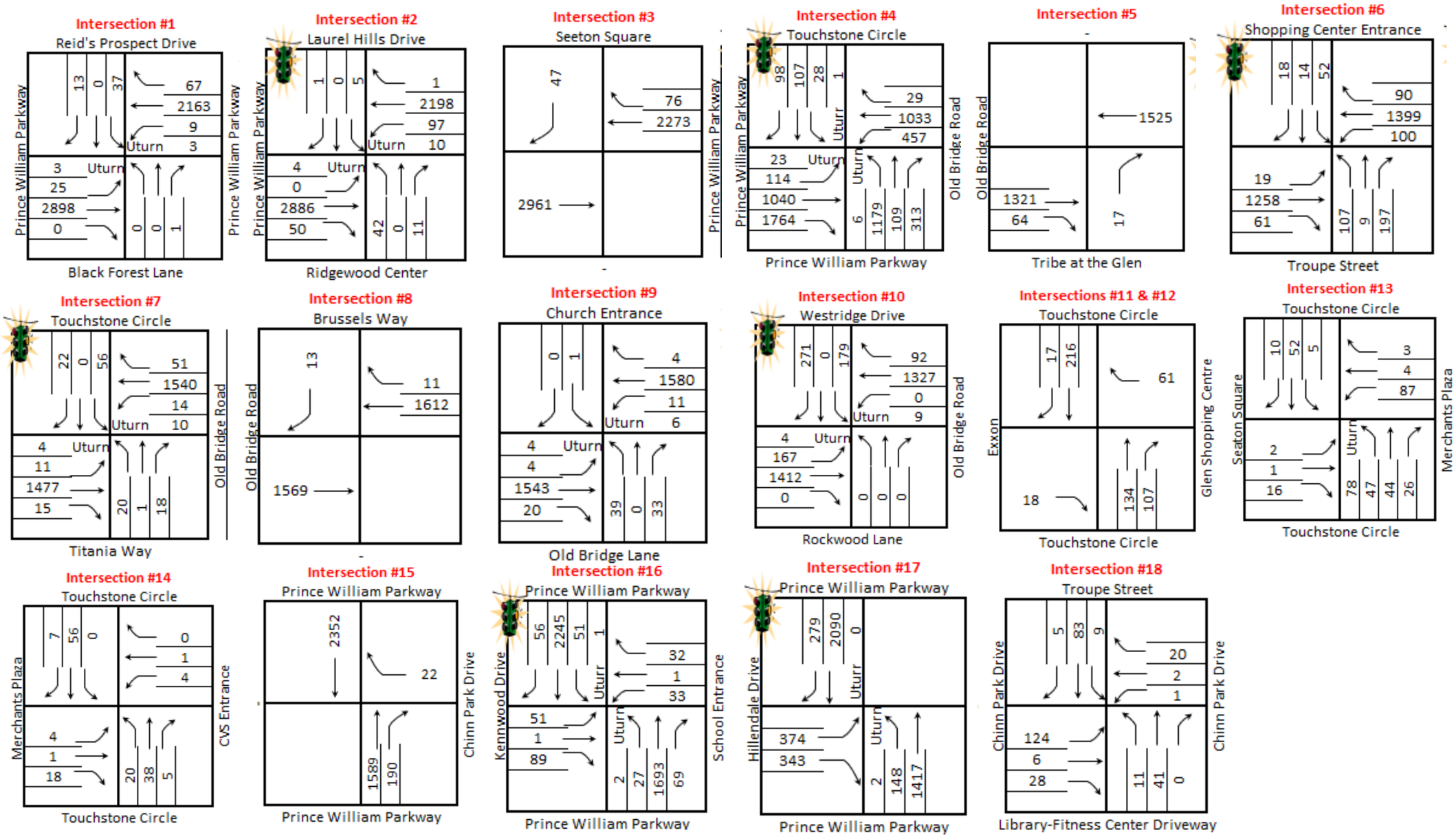


Figure 5-2B:
Horizon Year (2045) No-Build PM Peak Volumes
Forecasted Peak Hour Volumes
[**Note:** Arrows refer to lane groups, **not number of lanes**; see **Figure 2-4** in **Section 2** for lane configurations]

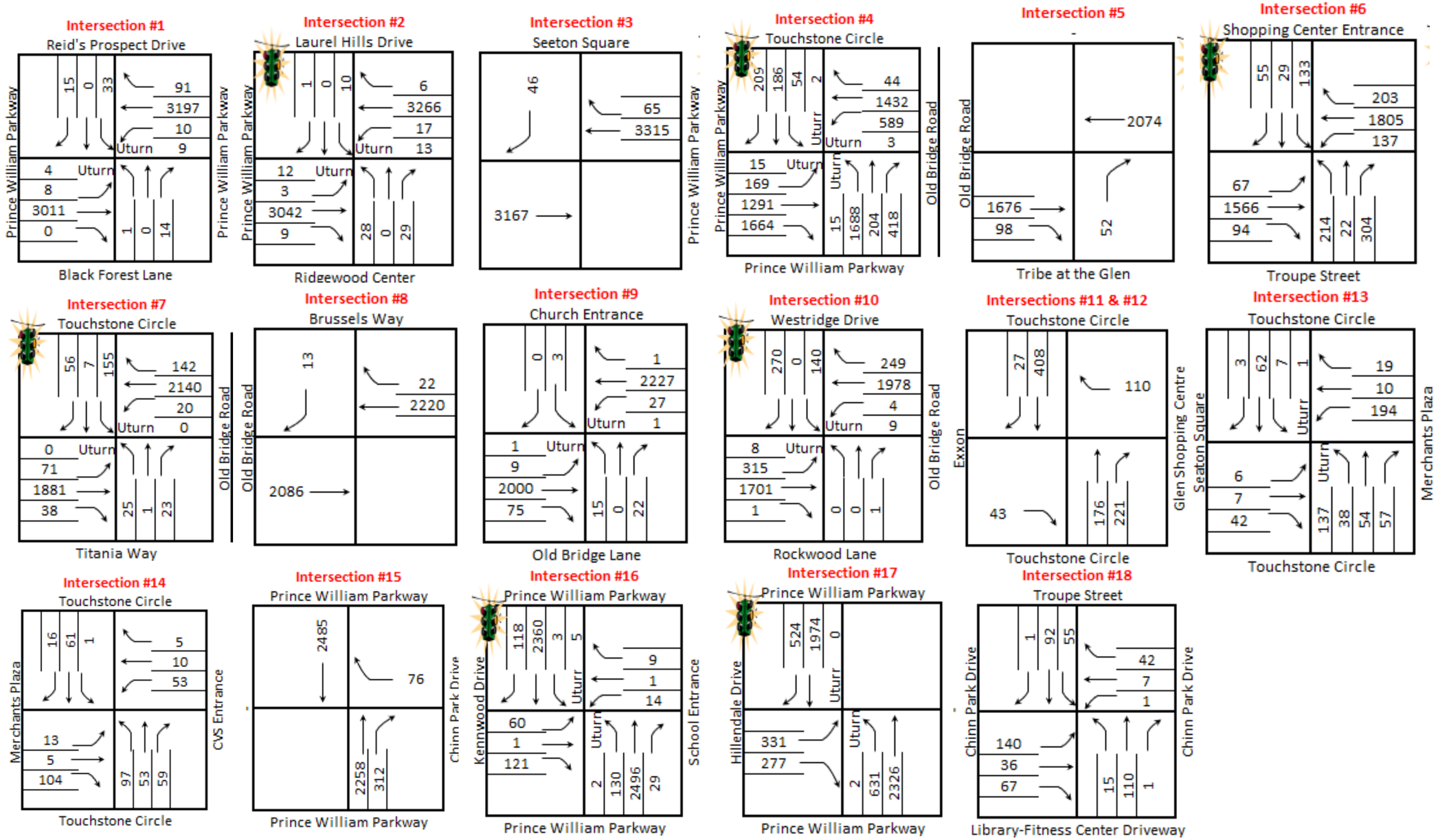


Figure 5-2C:
Regional Growth & Background Development
Existing Year to No-Build Year 2045 AM Peak
[**Note:** Arrows refer to lane groups, **not number of lanes**; see **Figure 2-4** in **Section 2** for lane configurations]

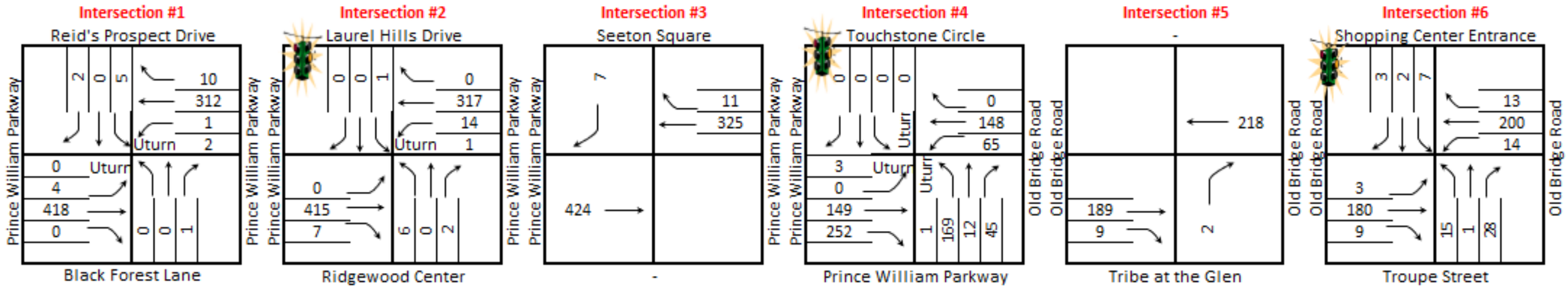


Figure 5-2D:
Regional Growth & Background Development
Existing Year to No-Build Year 2045 PM Peak
[**Note:** Arrows refer to lane groups, **not number of lanes**; see **Figure 2-4** in **Section 2** for lane configurations]

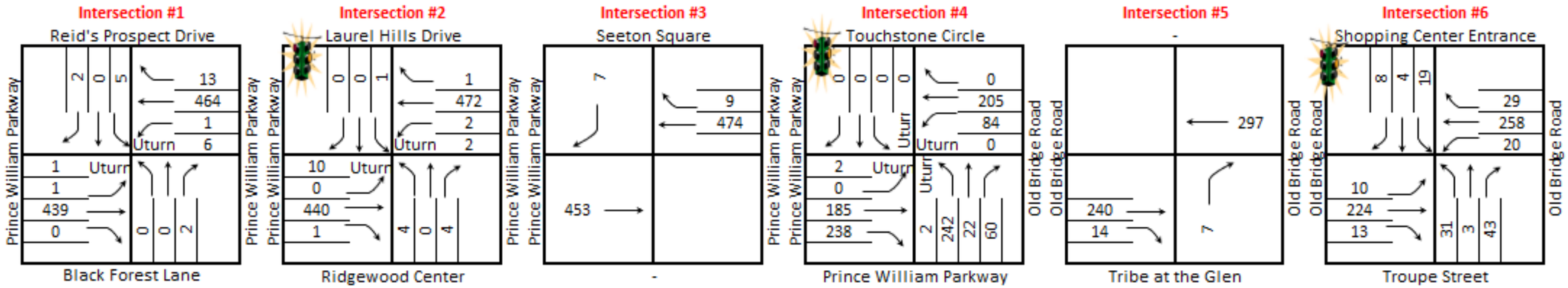


Figure 5-3A
Existing Prince William Parkway &
Old Bridge Road Intersection Movements

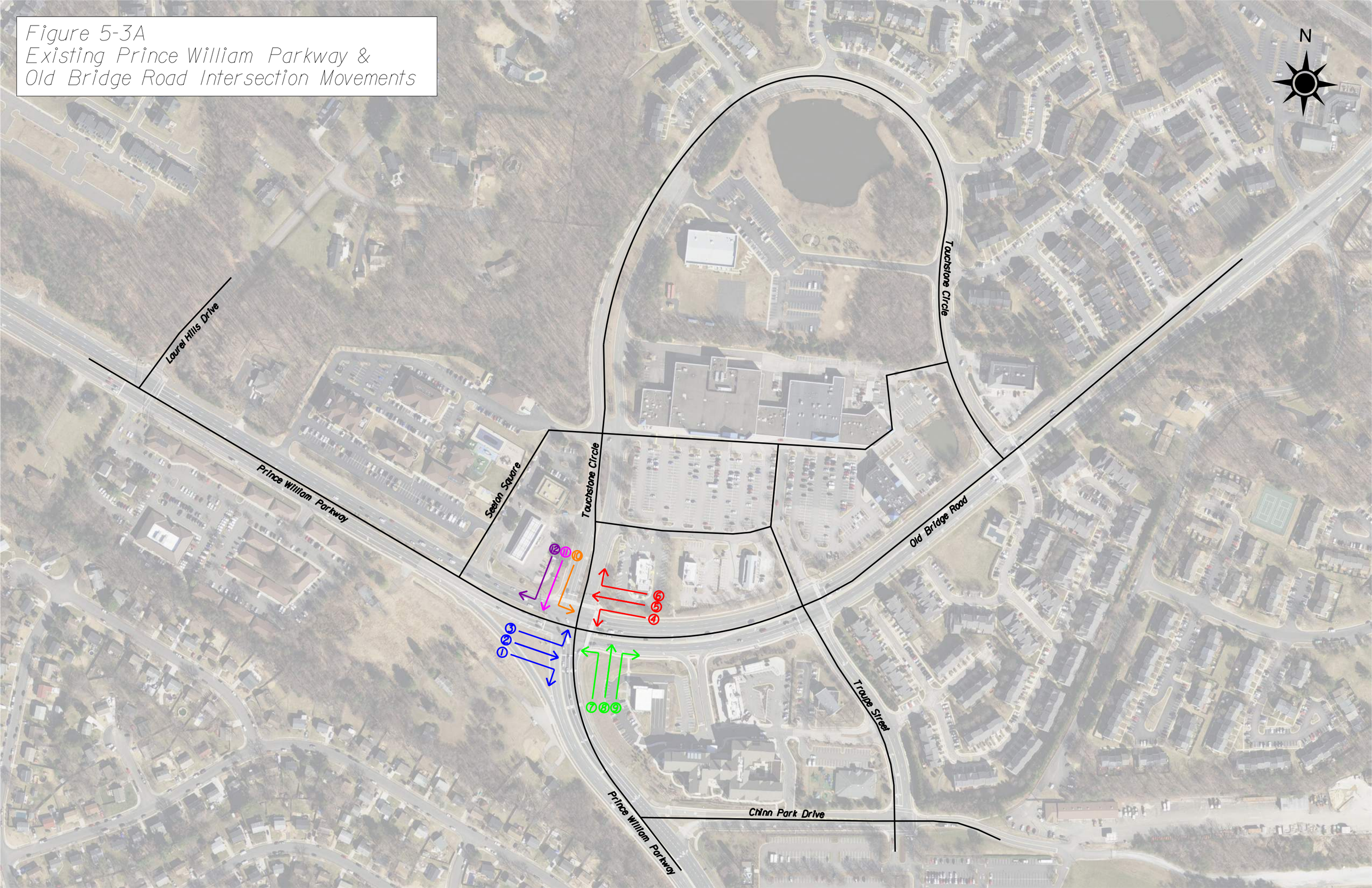


Figure 5-3B
Proposed Prince William Parkway &
Old Bridge Road Intersection Movements
Eastbound Prince William Parkway

N

Laurel Hills Drive

Prince William Parkway

Seaton Square

Touchstone Circle

Touchstone Circle

20%

80%

Old Bridge Road

1

2

3

100%

100%

Prince William Parkway

Troupe Street

Chinn Park Drive

Figure 5-3C
Proposed Prince William Parkway &
Old Bridge Road Intersection Movements
Westbound Old Bridge Road

N

Laurel Hills Drive

Prince William Parkway

Season Square

Touchstone Circle

Touchstone Circle

Old Bridge Road

Troupe Street

Prince William Parkway

Chinn Park Drive

100%

⑤

④

100%

100%

⑥

Figure 5-3D
Proposed Prince William Parkway &
Old Bridge Road Intersection Movements
Northbound Prince William Parkway

N

Laurel Hills Drive

Prince William Parkway

Sesan Square

Touchstone Circle

Touchstone Circle

Old Bridge Road

Troupe Street

Prince William Parkway

Chinn Park Drive

33%

34%

33%

25%

100%

75%

A

B

C

Figure 5-3E
Proposed Prince William Parkway &
Old Bridge Road Intersection Movements
Southbound Touchstone Circle

N

Laurel Hills Drive

Prince William Parkway

Seton Square

Touchstone Circle

Touchstone Circle

Old Bridge Road

Troupe Street

Prince William Parkway

Chinn Park Drive

12 → 50%

12 → 50%

12 → 50%

100%

12 → 50%

11 → 100%

12 → 50%

12 → 100%

12 → 25%

11 → 25%

10 → 20%

12 → 25%

11 → 25%

10 → 80%

12 → 25%

11 → 25%

10 → 20%

Figure 5-3F
Proposed Prince William Parkway &
Old Bridge Road Intersection Movements
Eastbound Prince William Parkway 2026 AM(PM)

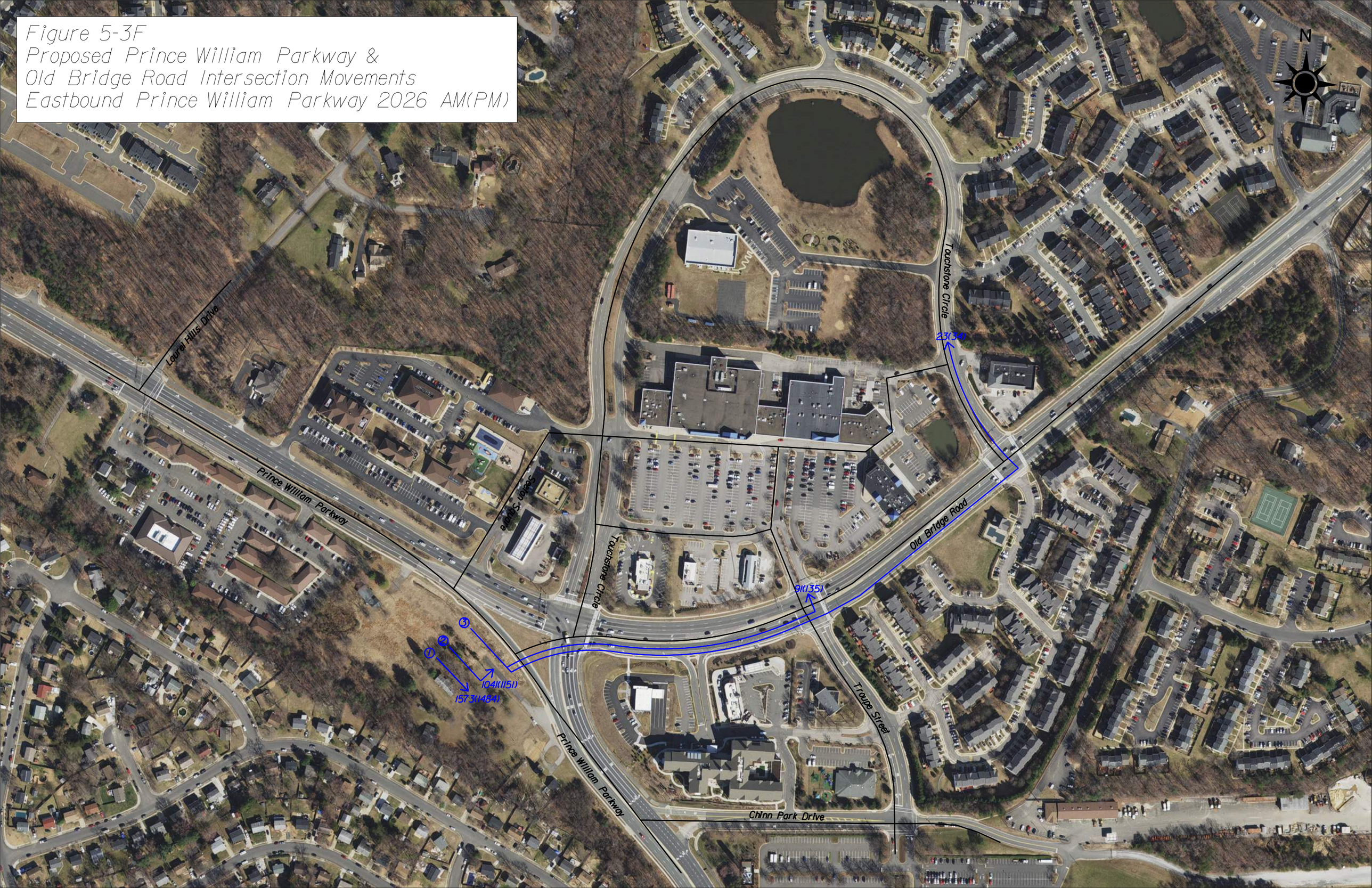


Figure 5-3G
Proposed Prince William Parkway &
Old Bridge Road Intersection Movements
Westbound Old Bridge Road 2026 AM(PM)

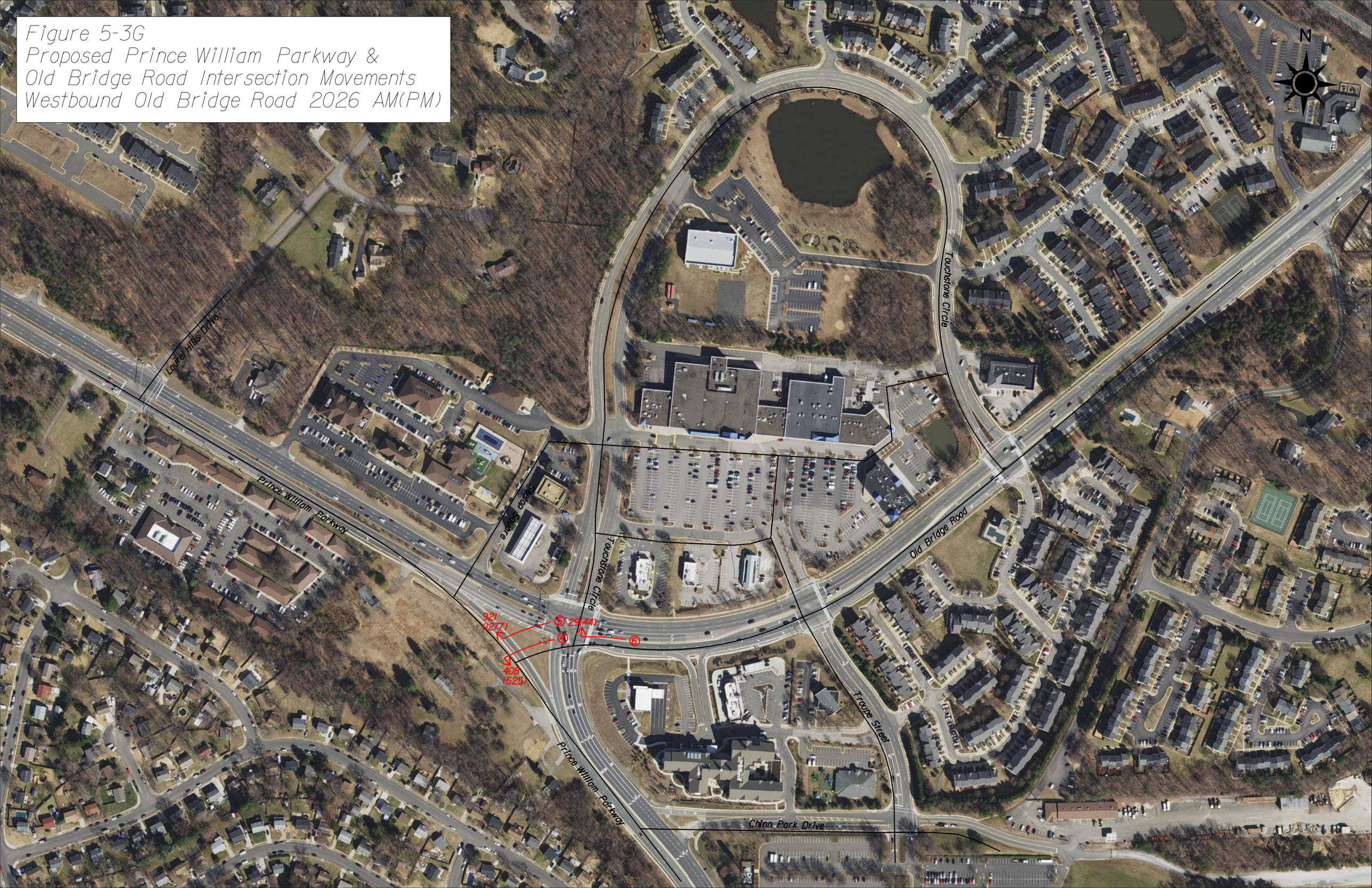


Figure 5-3H
Proposed Prince William Parkway &
Old Bridge Road Intersection Movements
Northbound Prince William Parkway 2026 AM(PM)

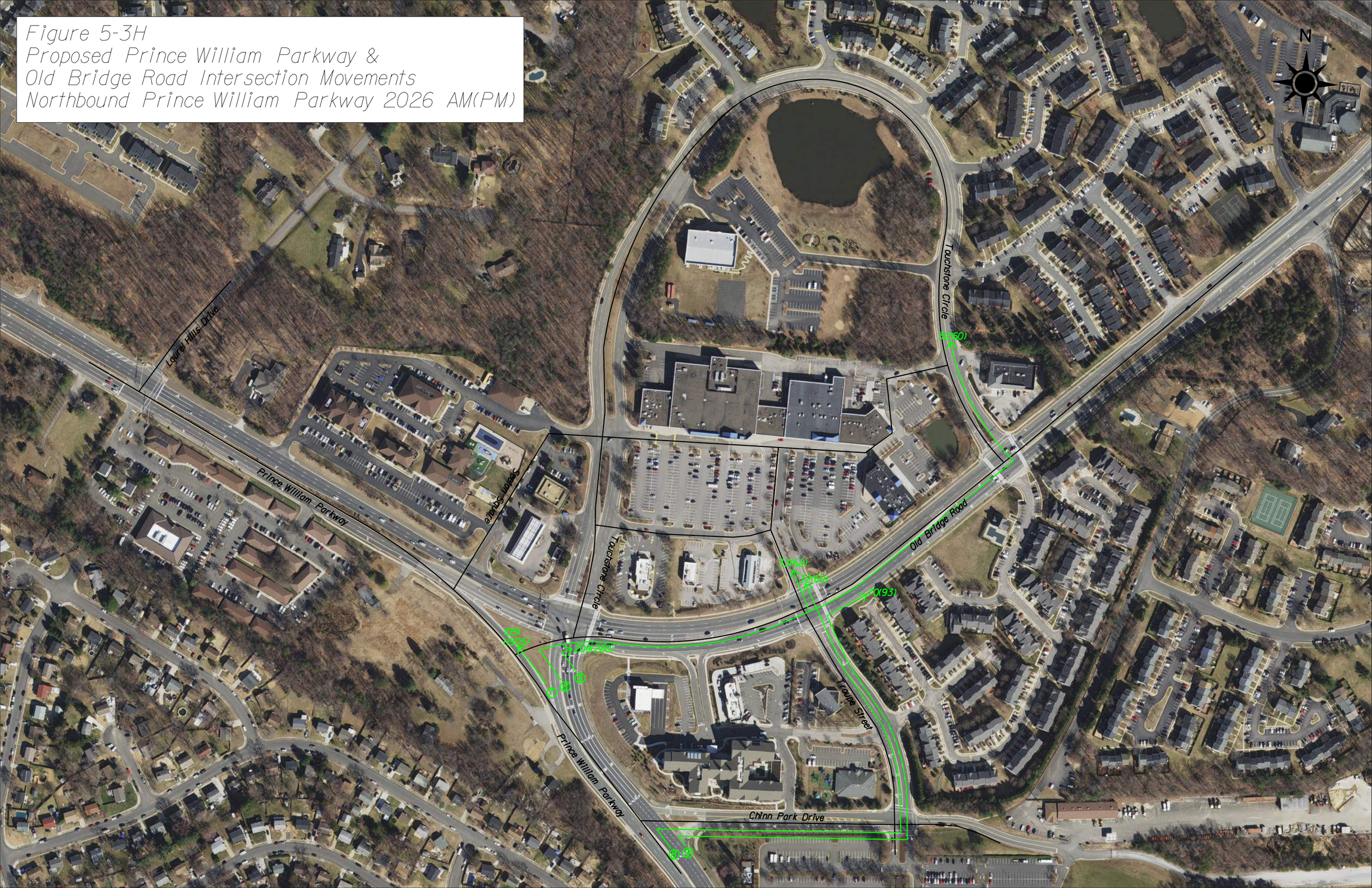


Figure 5-3J
Proposed Prince William Parkway &
Old Bridge Road Intersection Movements
Southbound Touchstone Circle 2026 AM(PM)

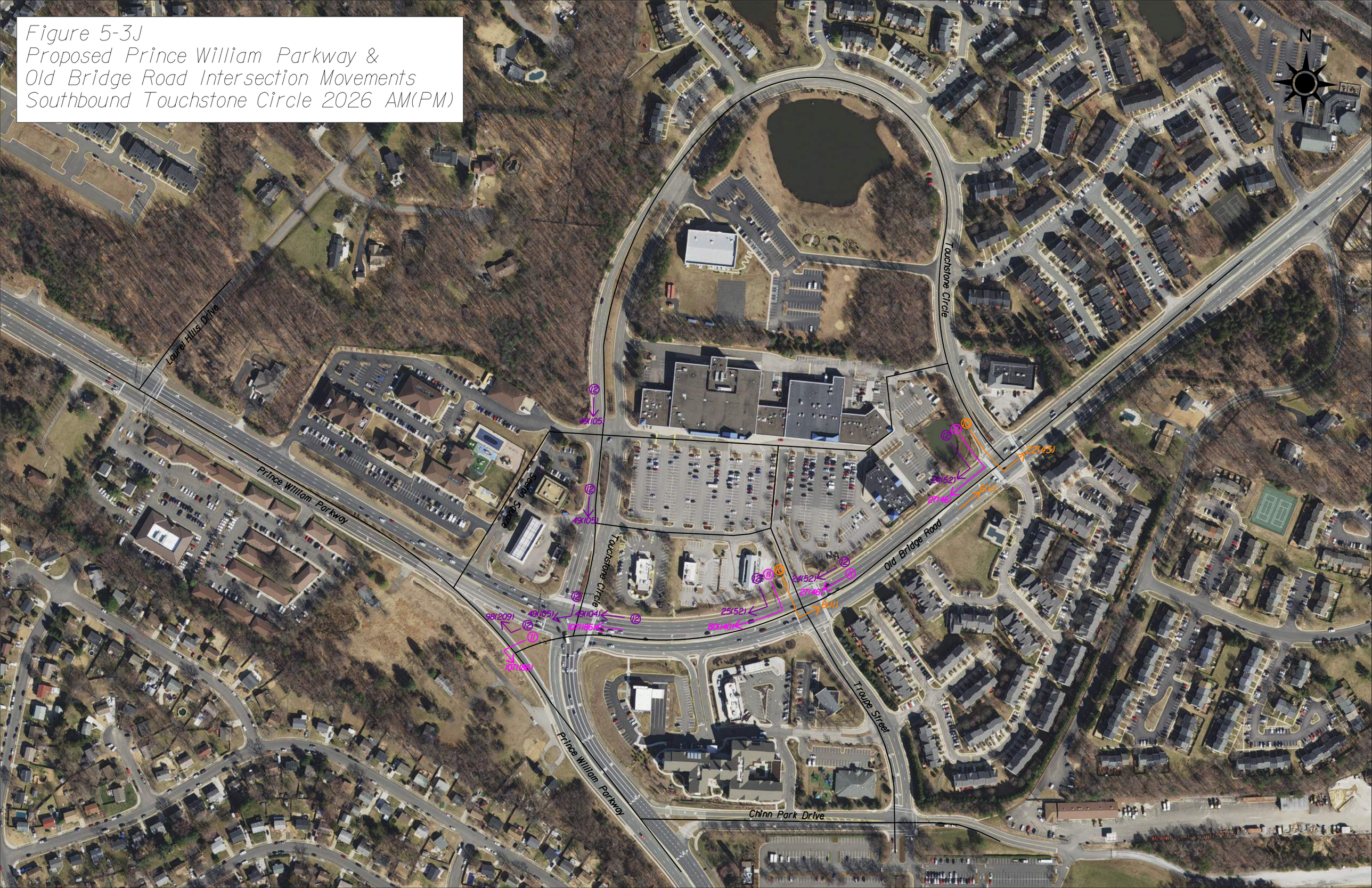


Figure 5-3K
Proposed Prince William Parkway &
Old Bridge Road Intersection Movements
Eastbound Prince William Parkway 2045 AM(PM)

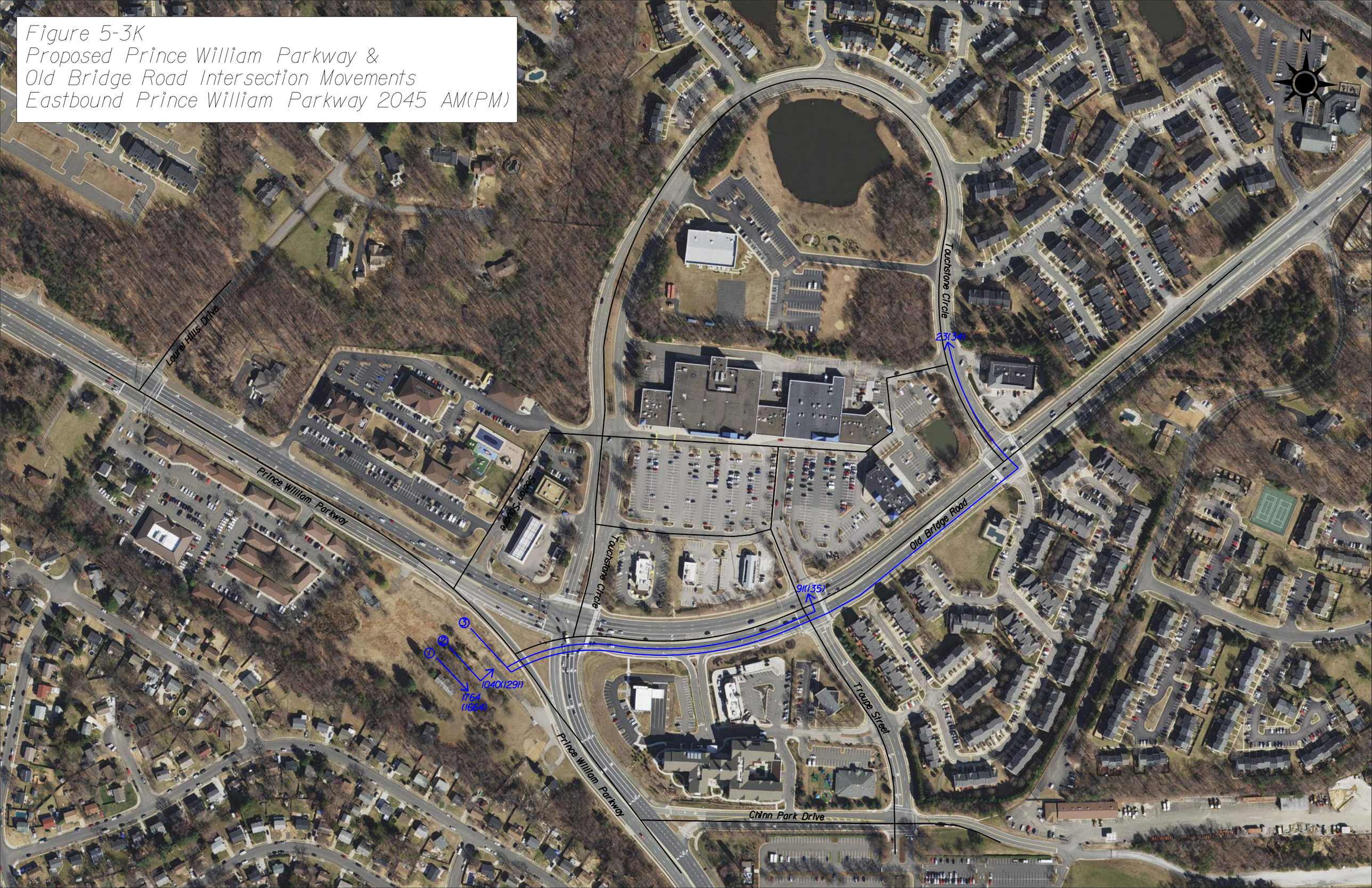


Figure 5-3L
Proposed Prince William Parkway &
Old Bridge Road Intersection Movements
Westbound Old Bridge Road 2045 AM(PM)

N

Laurel Hills Drive

Touchstone Circle

Prince William Parkway

Senior Square

Touchstone Circle

Old Bridge Road

1033
(1432)

5: 2944

4

6

4571589)

Prince William Parkway

Troupe Street

Chinn Park Drive

Figure 5-3M
Proposed Prince William Parkway &
Old Bridge Road Intersection Movements
Northbound Prince William Parkway 2045 AM(PM)

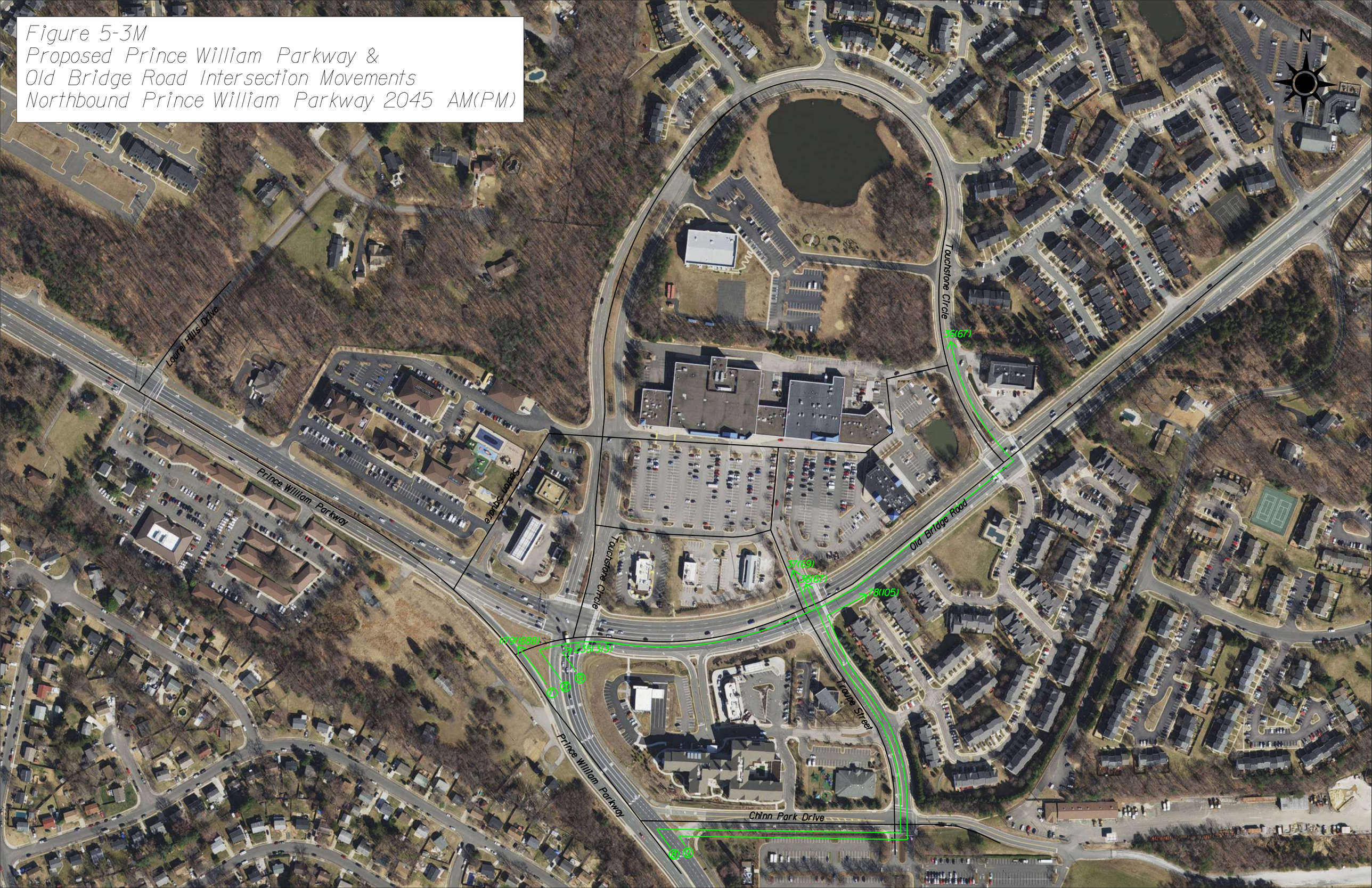


Figure 5-3N
Proposed Prince William Parkway & Old Bridge Road Intersection Movements
Southbound Touchstone Circle 2045 AM(PM)

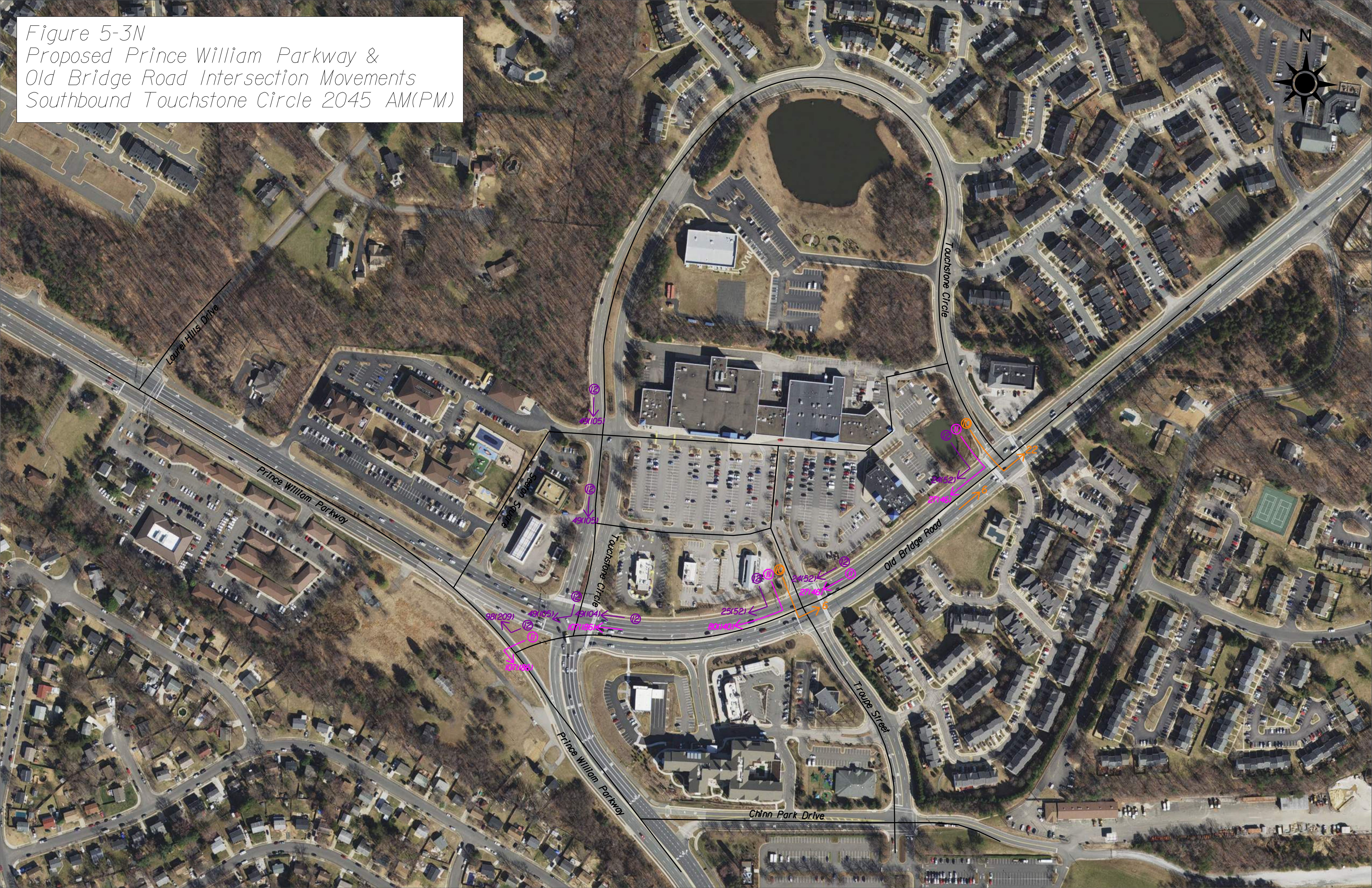


Figure 5-4A:
Opening Year (2026) Build AM Peak Volumes
Forecasted Peak Hour Volumes
[**Note:** Arrows refer to lane groups, **not number of lanes**; see **Figure 2-4** in **Section 2** for lane configurations]

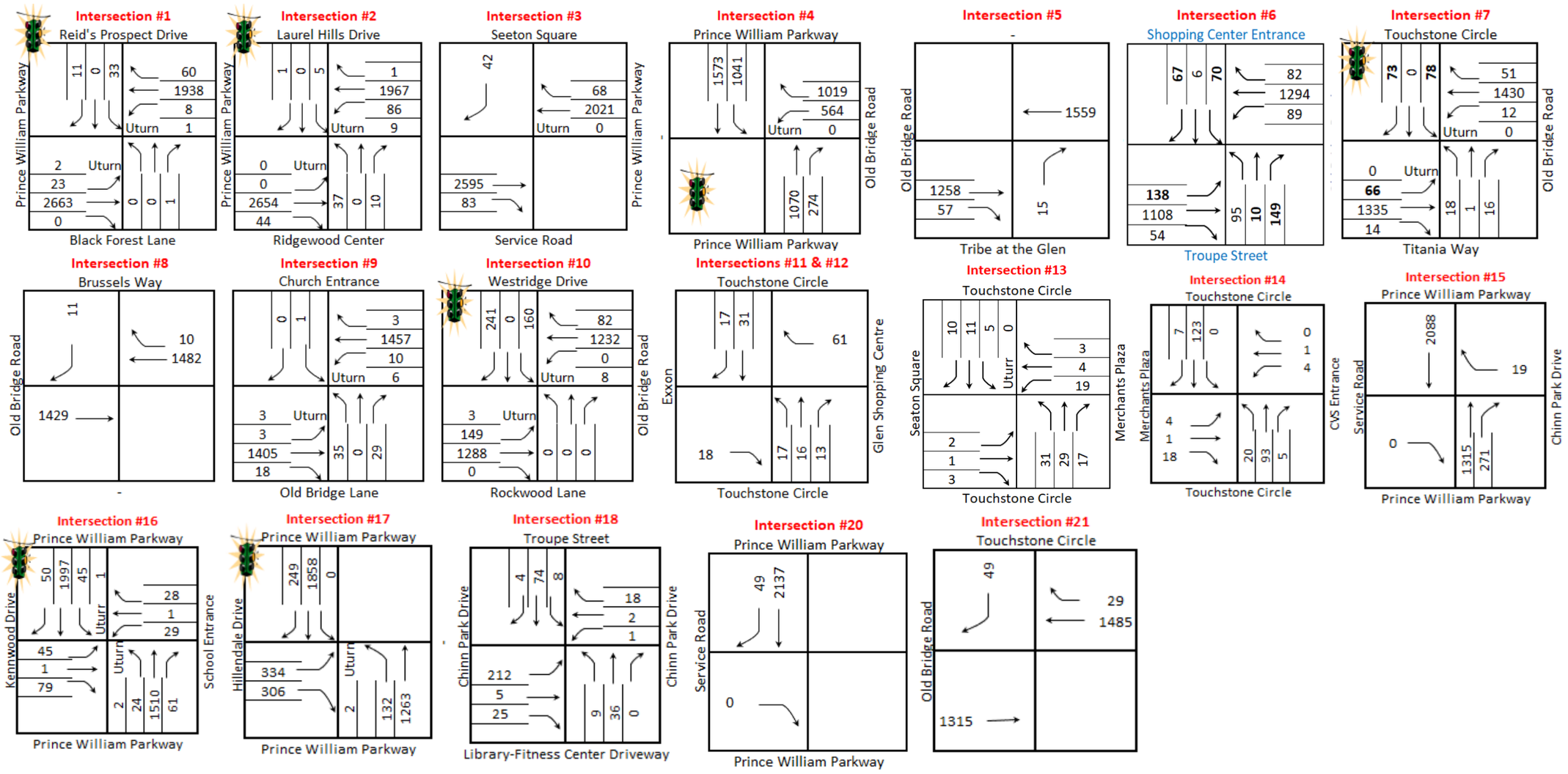


Figure 5-4B:
Opening Year (2026) Build PM Peak Volumes
Forecasted Peak Hour Volumes
[**Note:** Arrows refer to lane groups, **not number of lanes**; see **Figure 2-4** in **Section 2** for lane configurations]

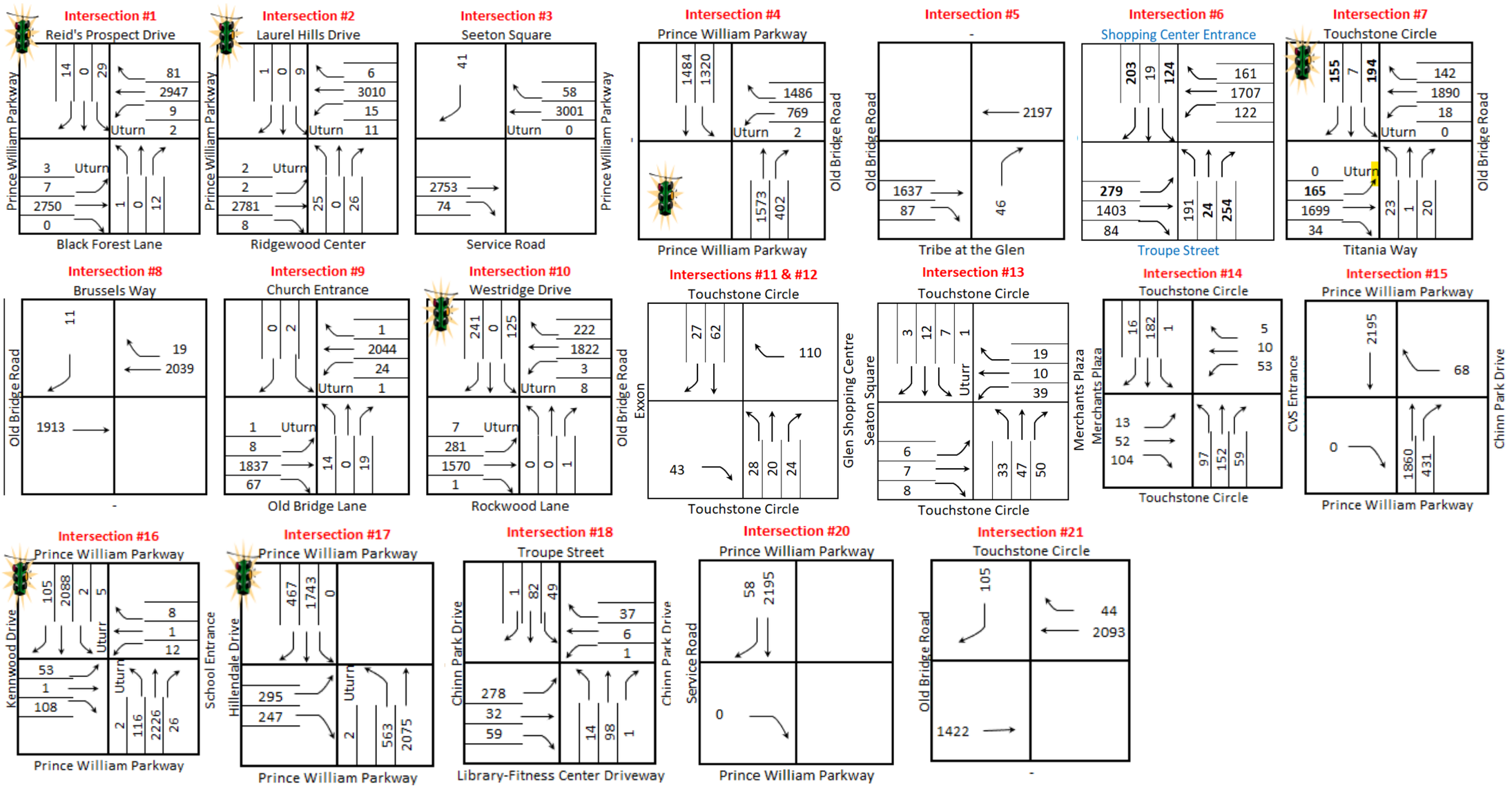


Figure 5-4C:
Regional Growth & Background Development
No-Build Year 2026 to Build Year 2026 AM Peak
[**Note:** Arrows refer to lane groups, **not number of lanes**; see **Figure 2-4** in **Section 2** for lane configurations]

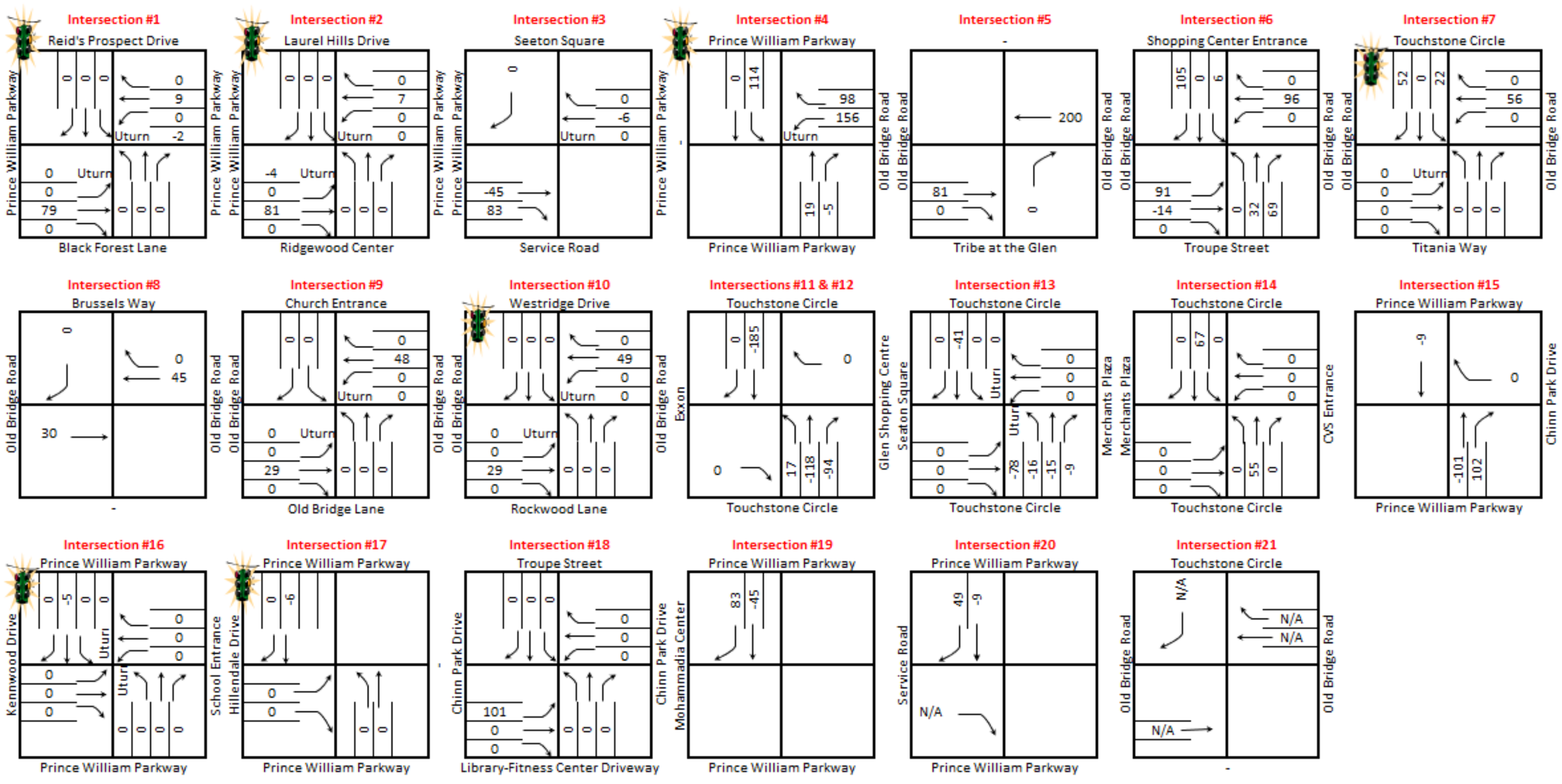


Figure 5-4D:
Regional Growth & Background Development
No-Build Year 2026 to Build Year 2026 PM Peak
[**Note:** Arrows refer to lane groups, **not number of lanes**; see **Figure 2-4** in **Section 2** for lane configurations]

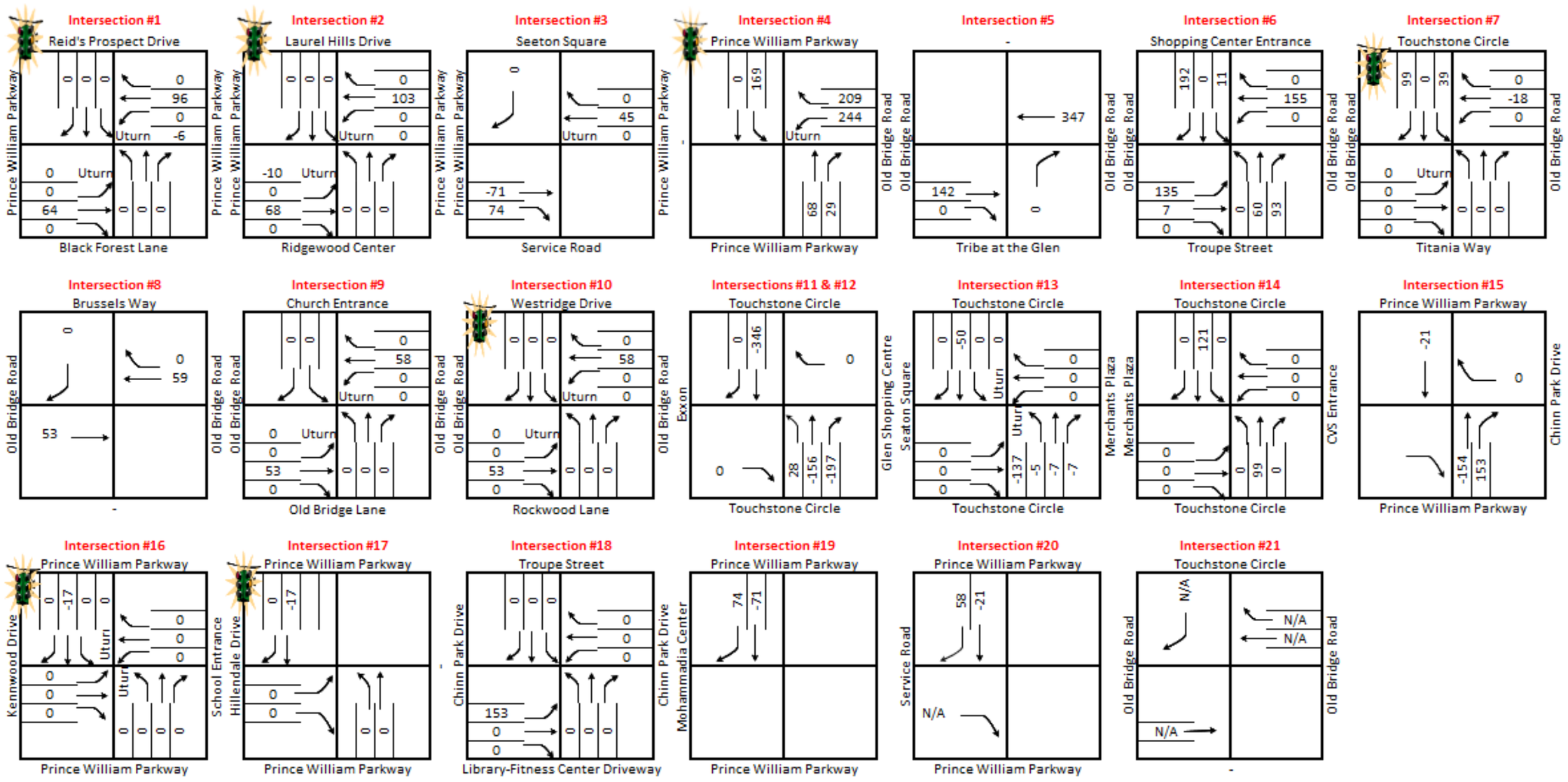


Figure 5-5A:
Horizon Year (2045) Build AM Peak Volumes
Forecasted Peak Hour Volumes
[**Note:** Arrows refer to lane groups, **not number of lanes**; see **Figure 2-4** in **Section 2** for lane configurations]

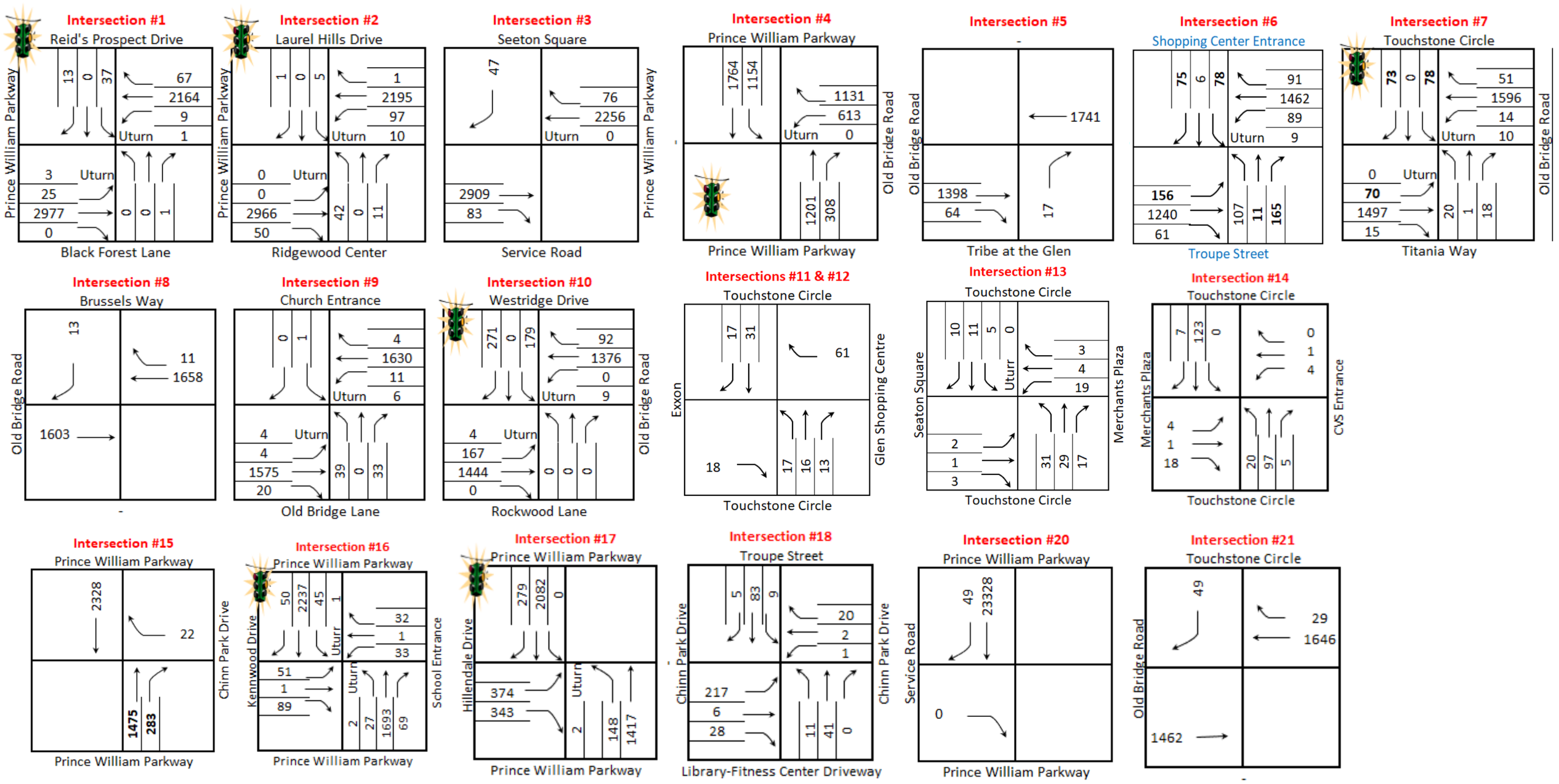


Figure 5-5B:
Horizon Year (2045) Build PM Peak Volumes
Forecasted Peak Hour Volumes
[**Note:** Arrows refer to lane groups, **not number of lanes**; see **Figure 2-4** in **Section 2** for lane configurations]

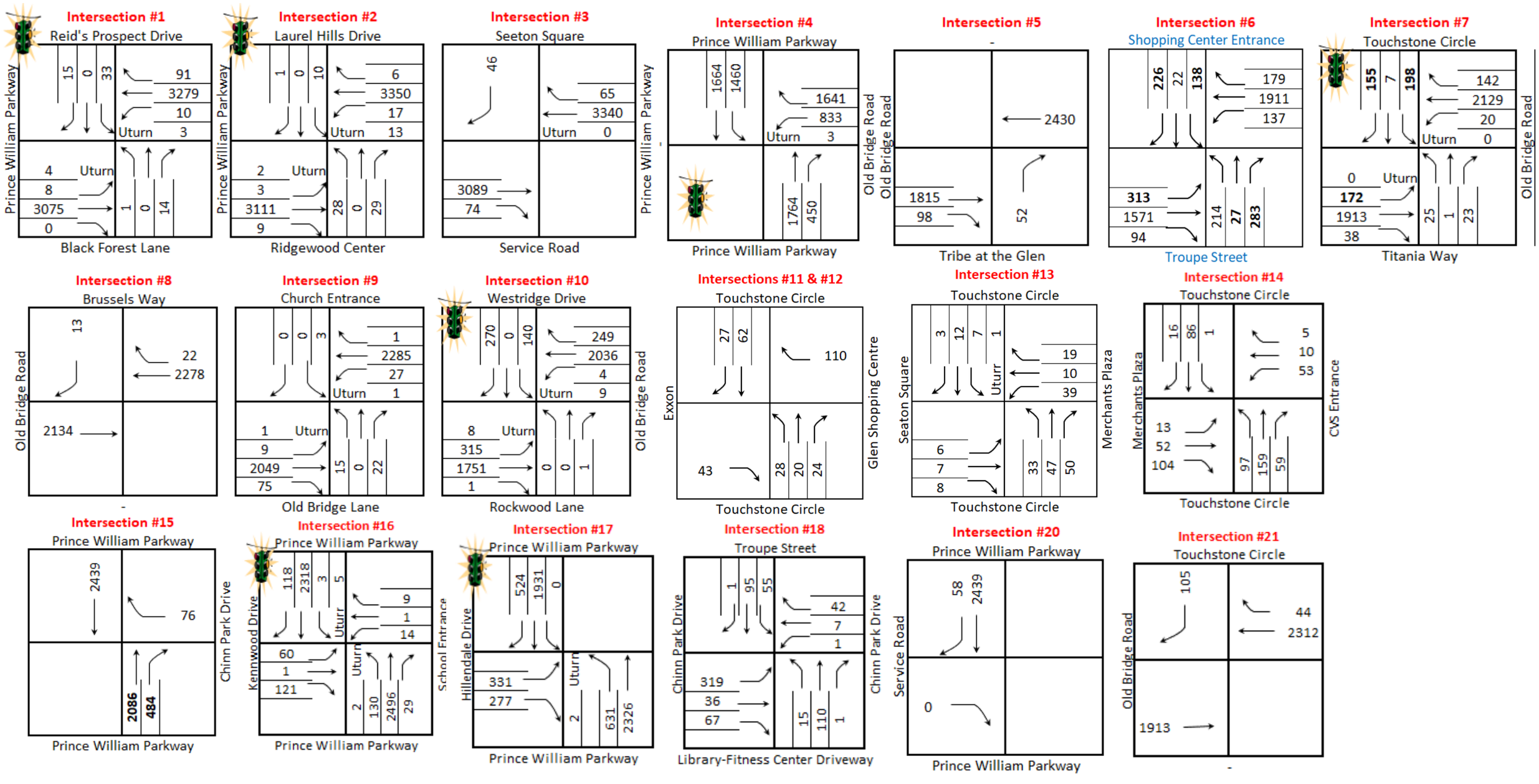


Figure 5-5C:

Regional Growth & Background Development

No-Build Year 2045 to Build Year 2045 AM Peak

[**Note:** Arrows refer to lane groups, **not number of lanes**; see **Figure 2-4** in **Section 2** for lane configurations]

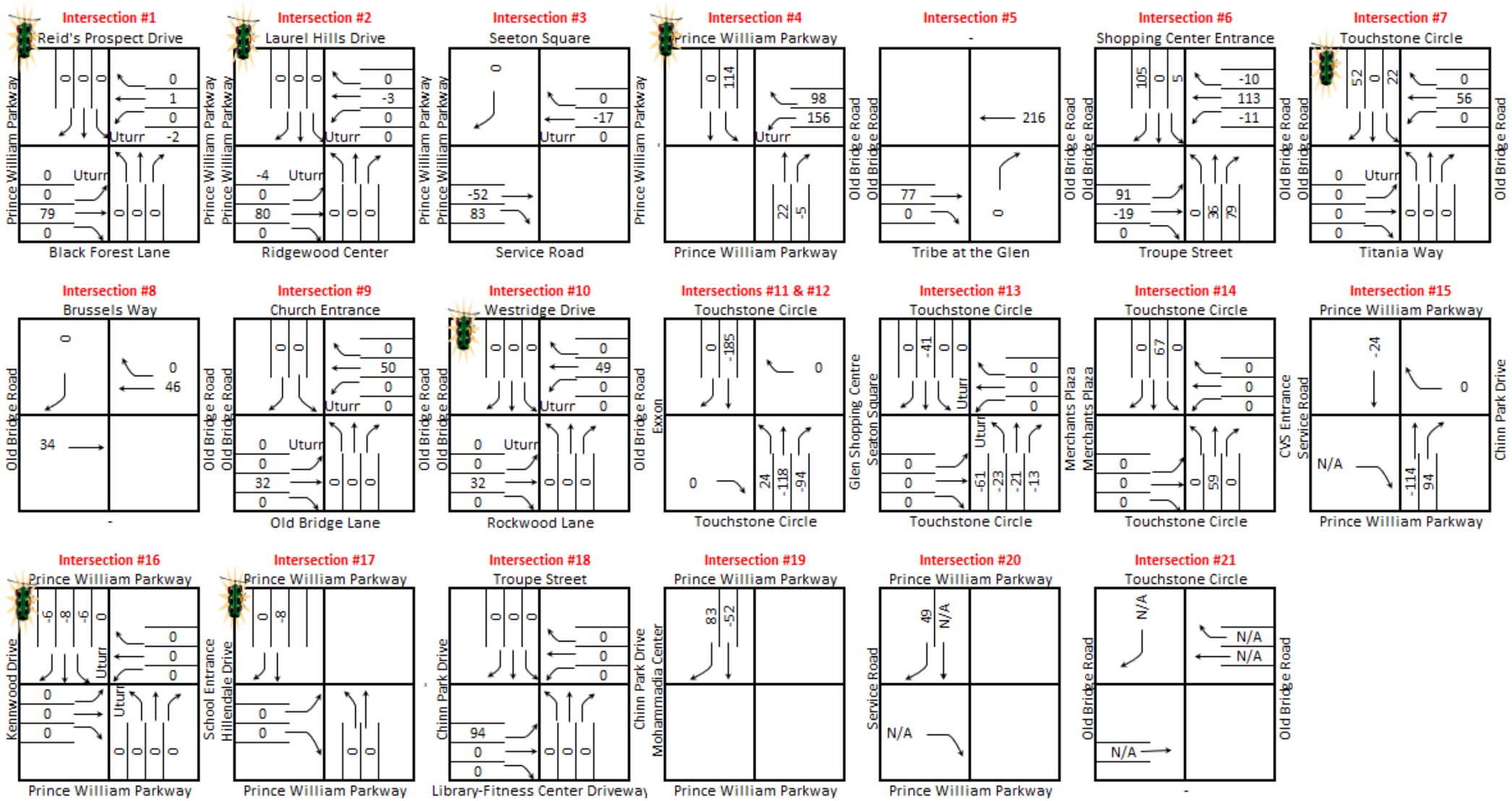
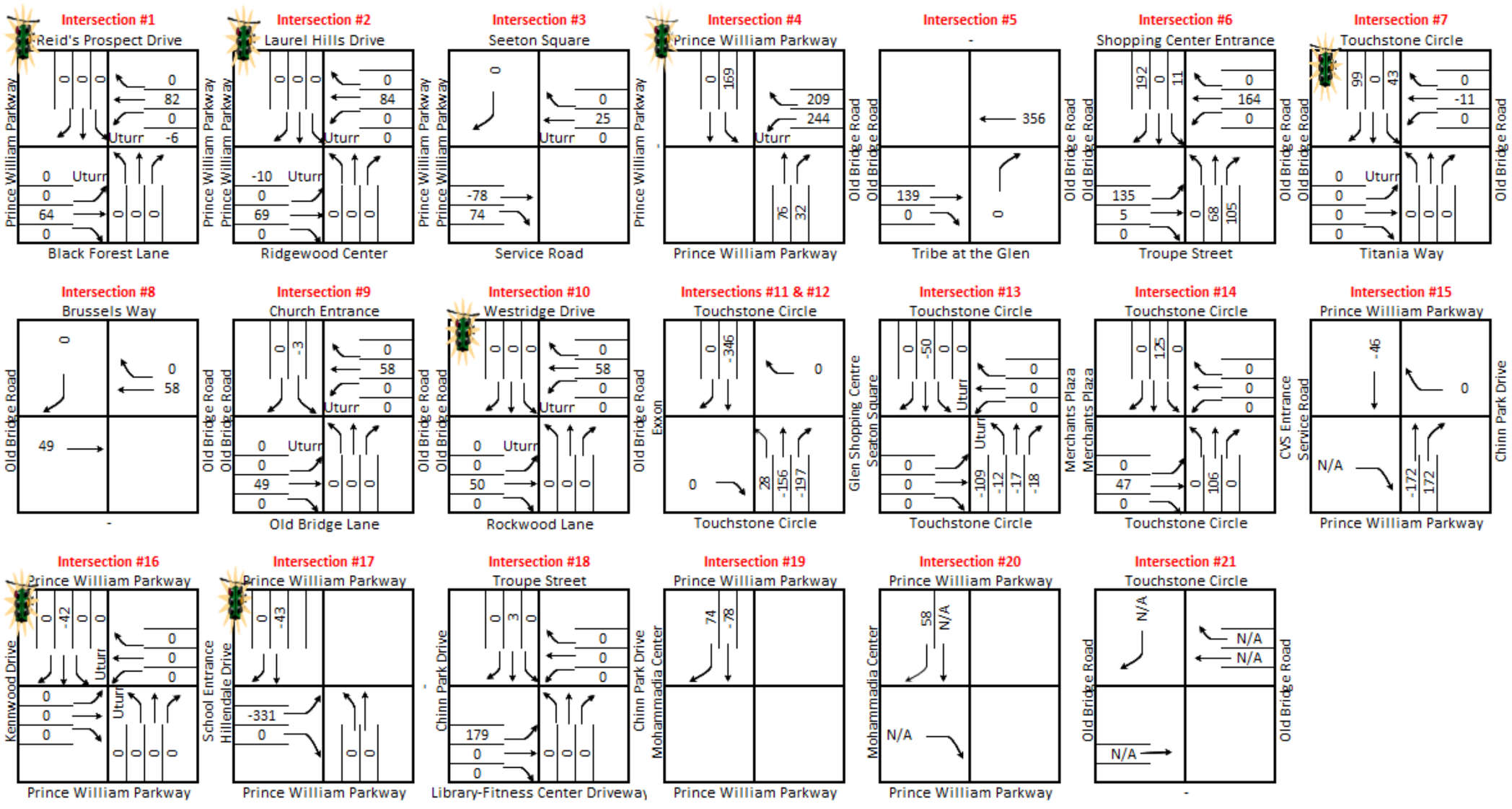


Figure 5-5D:
Regional Growth & Background Development
No-Build Year 2045 to Build Year 2045 PM Peak
[**Note:** Arrows refer to lane groups, **not number of lanes**; see **Figure 2-4** in **Section 2** for lane configurations]



Section 6

SUPPLEMENTAL REVIEWS: PART I

For Opening Year (2026) & Horizon Year (2045)

Alternative Intersection Evaluation:

An evaluation of four alternatives for Prince William Parkway & Old Bridge Road in the STARS Study, which can be found in **Appendix C**. The study the following scenarios:

- Conventional T Intersection
- Through-Cut
- Roundabout
- Grade Separation

The evaluation concluded the Conventional T meets the County goal of making Prince William Parkway the through movement which providing operational benefits.

Left Turn Phase Analysis: (Signalized Intersections)

VDOT now requires that the left turn phase (i.e. permissive, protected conditions, etc.) be reviewed for signalized intersections. As agreed during scoping, only the signal at the intersection of Prince William Parkway (Route 294) at Old Bridge Road required a reevaluation since the intersection alignment is being updated. Review of other intersections is not needed since the proposed lane configurations will not change. In review, protected left turn phasing should be utilized for the eastbound (Prince William Parkway) and westbound (Old Bridge Road) approaches at the reconfigured intersection.

[Note: The formal assessment documents and required analysis charts/tables are shown in Appendix K.]

At intersection #4, Prince William Parkway (Route 294) and Old Bridge Road:

	Speed Limit	# of Exclusive LT Lanes - Existing	# of Exclusive LT Lanes - Proposed	# of Shared LT Lanes	Existing LT Phasing:	Proposed LT Phasing:
NB Approach	45	2	0	0	Protected (Split)	N/A
SB Approach	30	1	0	0	Protected (Split)	N/A
EB Approach	45	1	3	0	Protected	Protected
WB Approach	45	2	2	0	Protected	Protected

Section 6A

SUPPLEMENTAL REVIEWS: PART II

Accident History within Project Limits

Three Year Crash History (2018 thru 2020)

Data Collection

Accident Data was collected from 2018 through 2020 within the project's limits. There have been 51 reported crashes which ranged in severity from property damage to personal body injury. Rear End collisions were the most common type accounting for 65% of crashes in the study period. There were no reported fatalities. **Table 6A-1** shows the quantitative summary (raw) data, provided by VDOT, of the reported incidents.

Crashes per Year:

- 2018 – 17
- 2019 – 19
- 2020 – 15

Intersection Crash Rate:

- 2018 – 0.93 per million entering vehicles
- 2019 – 1.04 per million entering vehicles
- 2020 – 1.08 per million entering vehicles

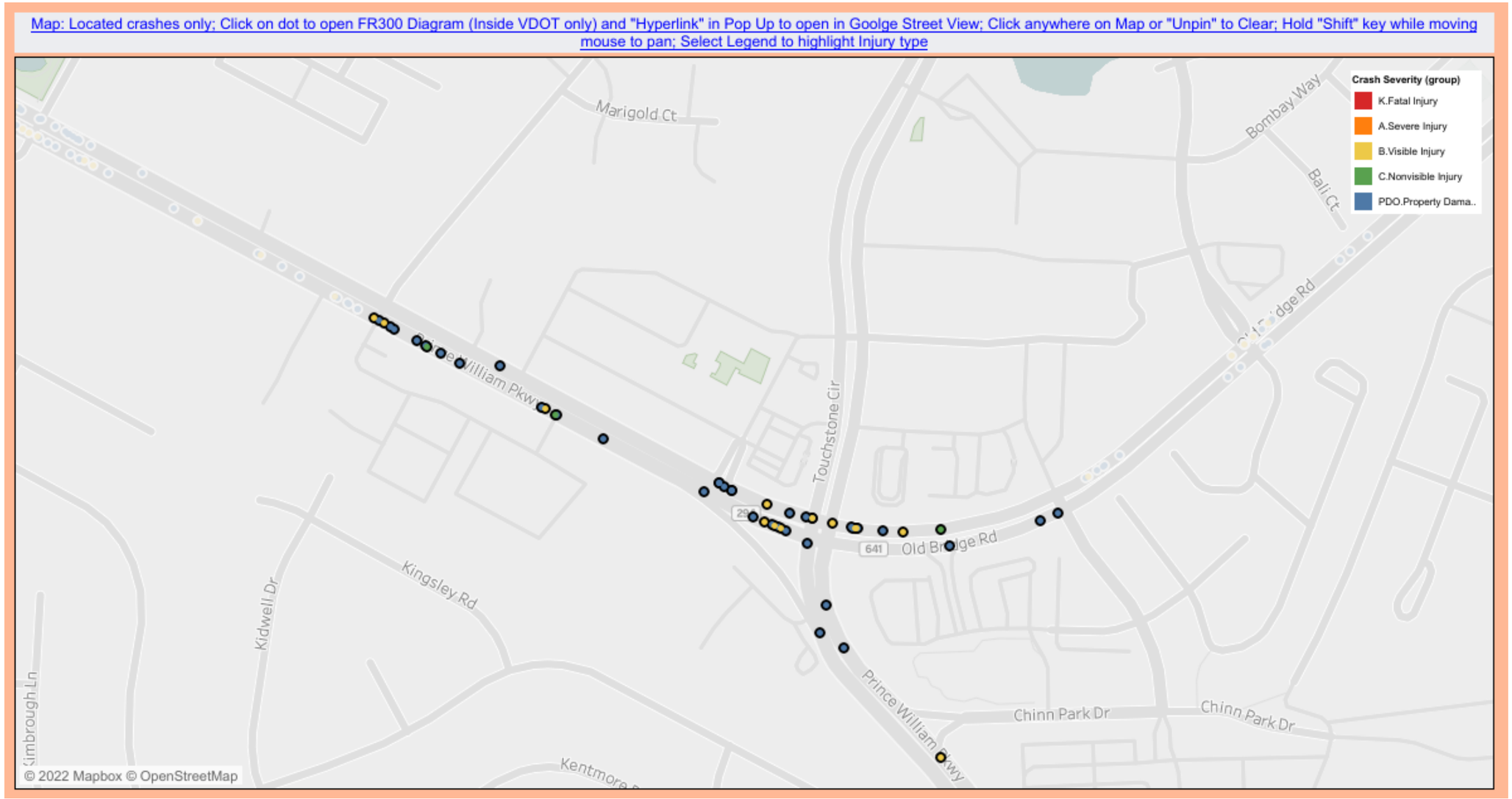
Table 6A-1: Three Year (2018-2020) Crash History

Crash Data													
Tabulation of Data within Project Area													
# Accident in Project Scope Area	Year	Doc #	Date	Collision Type	# of Vehicles	# of Injuries	# of Fatalities	Pedestrians Injured	Weather	Light Condition	Alcohol?	Distracted Driver?	Speed Related?
1	2018	183025113	10/26/2018	2. Angle	2	2	0	0	1. No Adverse Condition (Clear/Cloudy)	2. Daylight	No	No	No
2	2018	181495132	5/25/2018	1. Rear End	2	1	0	0	1. No Adverse Condition (Clear/Cloudy)	2. Daylight	No	No	No
3	2018	183625219	12/20/2018	1. Rear End	3	1	0	0	5. Rain	4. Darkness - Road Lighted	No	No	No
4	2018	180165652	1/8/2018	1. Rear End	3	3	0	0	5. Rain	4. Darkness - Road Lighted	No	Yes	No
5	2018	180545280	2/20/2018	1. Rear End	2	2	0	0	1. No Adverse Condition (Clear/Cloudy)	4. Darkness - Road Lighted	No	No	No
6	2018	182955227	10/20/2018	1. Rear End	2	2	0	0	1. No Adverse Condition (Clear/Cloudy)	2. Daylight	No	Yes	No
7	2018	180725206	3/9/2018	1. Rear End	2	1	0	0	1. No Adverse Condition (Clear/Cloudy)	2. Daylight	No	No	No
8	2018	183175099	10/31/2018	1. Rear End	3	3	0	0	1. No Adverse Condition (Clear/Cloudy)	2. Daylight	No	No	No
9	2018	180165660	1/5/2018	3. Head On	2	1	0	0	1. No Adverse Condition (Clear/Cloudy)	2. Daylight	No	No	No
10	2018	180795067	3/15/2018	1. Rear End	2	0	0	0	1. No Adverse Condition (Clear/Cloudy)	4. Darkness - Road Lighted	No	No	No
11	2018	182255200	8/10/2018	2. Angle	2	0	0	0	1. No Adverse Condition (Clear/Cloudy)	2. Daylight	No	No	No
12	2018	182395151	8/15/2018	2. Angle	2	0	0	0	1. No Adverse Condition (Clear/Cloudy)	2. Daylight	No	No	No
13	2018	183625327	12/27/2018	2. Angle	2	0	0	0	1. No Adverse Condition (Clear/Cloudy)	3. Dusk	No	Yes	Yes
14	2018	182115063	7/26/2018	1. Rear End	2	0	0	0	1. No Adverse Condition (Clear/Cloudy)	2. Daylight	No	No	No
15	2018	180335127	1/31/2018	1. Rear End	3	0	0	0	1. No Adverse Condition (Clear/Cloudy)	2. Daylight	No	No	No
16	2018	182745227	9/27/2018	9. Fixed Object - Off Road	1	0	0	0	5. Rain	4. Darkness - Road Lighted	No	No	No
17	2018	181495117	5/9/2018	1. Rear End	2	0	0	0	1. No Adverse Condition (Clear/Cloudy)	2. Daylight	No	No	Yes
1	2019	192175172	8/2/2019	2. Angle	2	1	0	0	1. No Adverse Condition (Clear/Cloudy)	2. Daylight	No	Yes	Yes
2	2019	190375067	2/5/2019	1. Rear End	2	1	0	0	1. No Adverse Condition (Clear/Cloudy)	2. Daylight	No	No	No
3	2019	191495103	5/24/2019	1. Rear End	3	3	0	0	1. No Adverse Condition (Clear/Cloudy)	1. Dawn	No	No	No
4	2019	191895252	7/5/2019	1. Rear End	2	1	0	0	1. No Adverse Condition (Clear/Cloudy)	2. Daylight	No	No	No
5	2019	192465099	8/28/2019	1. Rear End	2	1	0	0	5. Rain	2. Daylight	No	No	No
6	2019	192335095	8/16/2019	1. Rear End	2	0	0	0	1. No Adverse Condition (Clear/Cloudy)	2. Daylight	No	No	No
7	2019	191225074	4/30/2019	1. Rear End	2	0	0	0	1. No Adverse Condition (Clear/Cloudy)	2. Daylight	No	Yes	No
8	2019	191265180	5/4/2019	1. Rear End	2	0	0	0	5. Rain	4. Darkness - Road Lighted	Yes	No	Yes
9	2019	190075314	1/6/2019	4. Sideswipe - Same Direction	2	0	0	0	1. No Adverse Condition (Clear/Cloudy)	2. Daylight	No	Yes	No
10	2019	191685124	6/14/2019	1. Rear End	2	0	0	0	1. No Adverse Condition (Clear/Cloudy)	2. Daylight	No	Yes	No
11	2019	191135086	4/4/2019	1. Rear End	3	0	0	0	1. No Adverse Condition (Clear/Cloudy)	2. Daylight	No	Yes	No
12	2019	192135099	7/30/2019	1. Rear End	3	0	0	0	1. No Adverse Condition (Clear/Cloudy)	2. Daylight	No	No	No
13	2019	190915202	3/30/2019	1. Rear End	2	0	0	0	1. No Adverse Condition (Clear/Cloudy)	2. Daylight	No	No	No
14	2019	193085423	10/29/2019	1. Rear End	3	0	0	0	1. No Adverse Condition (Clear/Cloudy)	2. Daylight	No	Yes	No
15	2019	192805072	10/4/2019	2. Angle	2	0	0	0	1. No Adverse Condition (Clear/Cloudy)	2. Daylight	No	No	No
16	2019	192695083	9/25/2019	1. Rear End	3	0	0	0	1. No Adverse Condition (Clear/Cloudy)	2. Daylight	No	No	No
17	2019	193365148	11/26/2019	1. Rear End	2	0	0	0	1. No Adverse Condition (Clear/Cloudy)	4. Darkness - Road Lighted	No	No	No
18	2019	191295063	5/6/2019	2. Angle	2	0	0	0	1. No Adverse Condition (Clear/Cloudy)	2. Daylight	No	No	Yes
19	2019	192965114	10/17/2019	1. Rear End	2	0	0	0	1. No Adverse Condition (Clear/Cloudy)	2. Daylight	No	Yes	No
1	2020	202765206	9/19/2020	2. Angle	2	2	0	0	1. No Adverse Condition (Clear/Cloudy)	2. Daylight	No	No	No
2	2020	201955081	7/11/2020	2. Angle	2	2	0	0	1. No Adverse Condition (Clear/Cloudy)	2. Daylight	No	No	No
3	2020	202125066	7/28/2020	1. Rear End	2	0	0	0	1. No Adverse Condition (Clear/Cloudy)	2. Daylight	No	Yes	No
4	2020	202795188	10/1/2020	1. Rear End	3	0	0	0	5. Rain	3. Dusk	No	Yes	No
5	2020	201845063	6/30/2020	1. Rear End	2	0	0	0	1. No Adverse Condition (Clear/Cloudy)	2. Daylight	Yes	Yes	No
6	2020	201565055	6/1/2020	1. Rear End	2	0	0	0	1. No Adverse Condition (Clear/Cloudy)	2. Daylight	No	No	No
7	2020	200435070	2/10/2020	2. Angle	2	0	0	0	5. Rain	4. Darkness - Road Lighted	No	No	No
8	2020	203075137	10/31/2020	2. Angle	2	0	0	0	1. No Adverse Condition (Clear/Cloudy)	2. Daylight	No	No	No
9	2020	203355284	11/27/2020	2. Angle	2	0	0	0	1. No Adverse Condition (Clear/Cloudy)	2. Daylight	No	No	No
10	2020	200275065	1/25/2020	1. Rear End	2	0	0	0	1. No Adverse Condition (Clear/Cloudy)	2. Daylight	No	Yes	No
11	2020	202375120	8/3/2020	1. Rear End	3	0	0	0	1. No Adverse Condition (Clear/Cloudy)	2. Daylight	No	No	No
12	2020	202475067	9/1/2020	4. Sideswipe - Same Direction	2	0	0	0	5. Rain	1. Dawn	No	No	Yes
13	2020	200355204	2/2/2020	1. Rear End	2	0	0	0	1. No Adverse Condition (Clear/Cloudy)	2. Daylight	No	No	Yes
14	2020	202335099	8/18/2020	4. Sideswipe - Same Direction	2	0	0	0	1. No Adverse Condition (Clear/Cloudy)	4. Darkness - Road Lighted	No	No	No
15	2020	203585105	12/18/2020	1. Rear End	2	0	0	0	1. No Adverse Condition (Clear/Cloudy)	6. Darkness - Unknown Road Lighting	No	No	No
Totals					112	27	0	0			2	14	7
Percentage (Incident vs. Total)						53%	0%	0%			4%	27%	14%

Data Collection (Continued)

Accident Data was collected from 2018 through 2020 within the project's limits. There have been 51 reported crashes which ranged in severity from property damage to personal body injury. There were no reported fatalities.
Figure 6A-1 shows the locations of the crashes.

Figure 6A-1:
Crash Locations



Review of Crash History Collected

The obtained accident Data was analyzed and summarized in **Table 6A-2**.

Table 6A-2:
Summary of Accident Data (Years 2018 thru 2020)

Crash Data		
Summary/Analysis of Data		
Total Crashes	**51**	
Crash Type	**Rear End**	**34**
	Angle	**12**
	Sideswipe – Same Direction	**3**
	Head On	**1**
	Fixed Object – Off Road	**1**
No. of Crashes per Year	**15 to 19 Incidents a Year**	
Highest Collision Type	**34 of 51 collisions are Rear End Collisions, representing 67% of the collisions within the project study area.** ***Potential Mitigations:*** *Intersection reconfiguration and signal timing optimization will decrease traffic queues and the number of unexpectedly stopped vehicles within the vicinity of the intersection. This will lead to a reduction in rear-end crashes.*	
Distracted Drivers	**14 of 51 collisions are caused by a Distracted Driver, representing 27% of the collisions within the project study area.** ***Potential Mitigations:*** *Currently the only viable mitigation for distracted driving is police enforcement and driver awareness campaigns. Police enforcement and driver awareness campaigns will help in the reduction of all collision types.*	
Pedestrian Injuries	**No Pedestrians were injured in the project study area.**	

Safety Analysis

A quantitative safety analysis, focused on the review of crash modification factors and their application of converting a conventional four-leg intersection to two T-intersections, was completed for the intersection. The analysis can be found in **Appendix M**.

Conclusions for Accident History Review:

Route 294 & Old Bridge Road Intersection Improvements Project proposes realigning Prince William Parkway (Rte. 294) as a 6-lane roadway and realign Old Bridge Road (Rte. 641) as a 4-lane roadway to meet at a T-intersection. The realignment and additional capacity will decrease traffic queues by allowing more flow of traffic and providing more physical space for passing vehicles. The additional capacity provided by reconfiguring the intersection will reduce queues and decrease the number of unexpectedly stopped vehicles within the vicinity of the intersection, leading to a reduction of rear-end crashes.

As noted in the safety analysis document in **Appendix M**, a number of the elements of the project would provide safety benefits to the Prince William Parkway & Old Bridge Road intersection by reducing the potential for crashes, while others have the potential to increase crashes. The potential increase in crashes from the reduction of turn lanes may be offset by the other design elements.

Section 7

CAPACITY ANALYSIS OF FUTURE CONDITIONS

For Opening Year (2026) & Horizon Year (2045)

Modeling Base for Opening Year (2026) and Horizon Year (2045):

For both the Opening Year (2026) and Horizon Year (2045), the following was implemented for the Synchro™ modeling based on existing conditions and anticipated conditions:

- Peak hour factors (PHF) were applied based on the higher of 0.92 or existing PHF, as required by the Traffic Operations and Safety Analysis Manual (TOSAM).
- All clearance interval timings were kept "as-is" in the no-build analysis. Updated clearance interval calculations were performed for the build analysis at the main intersection of Prince William Parkway and Old Bridge Road to account for the new configuration.
- For the No-Build Option(s), all signalized intersections were optimized for best timing practices.

[Note: Clearance Interval Timings are presented in Appendix L.]

Highway Capacity Manual (HCM) 2000 vs. Highway Capacity Manual (HCM) 6th Edition Reports:

VDOT's Traffic Operations and Safety Analysis Manual (TOSAM) expresses that the HCM 6th Edition should be utilized for analysis. However, the HCM 6th Edition has many startling limitations, in which NEMA based phasing shall be utilized for all analysis. VDOT in the Northern Virginia District does not use NEMA Controllers. Thus, if an intersection proposes phasing that is not consistent with NEMA based phasing, the HCM 6th Edition methodology for analyses cannot be utilized. Where available, HCM 6th edition reports will be utilized. Otherwise, HCM 2000 will be utilized for results.

Opening Year (2026) Capacity Analyses

Capacity analyses were performed for the study intersections for both:

1. Without proposed Route 294 & Old Bridge Road intersection improvements [No-Build Option]
2. With proposed Route 294 & Old Bridge Road intersection improvements [Build Option]

Without proposed Route 294 & Old Bridge Road Improvements [No-Build Option] (Opening Year 2026):
The Synchro™ results are summarized and depicted in **Table 7-1**. The Synchro™ reports are presented in **Appendix H**.

As shown in **Table 7-1**, the following is observed:

- **AM PEAK HOUR:** All stop-controlled study intersections, except Prince William Parkway & Black Forest Lane/Reids Prospect Drive, operate at an overall acceptable level of service (LOS D or better) during the AM peak hours. As shown in the attached tables, most approaching side street level of service delays along Old Bridge Road and the western part of Prince William Parkway exceed acceptable norms for urban conditions (i.e. LOS "D" or better is acceptable for urban conditions). This is due to the high volume of vehicles on the mainline, leaving minimum gaps for the side street vehicles to enter.
  All signalized intersections, except Prince William Parkway & Old Bridge Road operate at an overall acceptable level of service (LOS D or better) during the AM peak hours. A number of movements and approaches operate at LOS E or LOS F at intersections #1, #2, #3, #4, #6, #7, #9, #10, #16, and #17. Volumes exceed the available capacity at intersections #1, #2, #4, and #9

- **PM PEAK HOUR:** All stop-controlled study intersections, except Prince William Parkway & Reids Prospect Drive operate at an overall acceptable level of service (LOS D or better) during PM peak hours. As shown in the attached tables, most approaching side street level of service delays along Old Bridge Road and the western part of Prince William Parkway exceed acceptable norms for urban conditions (i.e. LOS "D" or better is acceptable for urban conditions). This is due to the high volume of vehicles on the mainline, leaving minimum gaps for the side street vehicles to enter.
  All signalized study intersections, except Prince William Parkway & Old Bridge Road and Prince William Parkway & Hillendale Road operate at an overall acceptable level of service (LOS D or better) during PM peak hours. Both intersections operate at LOS F during the PM peak hours. A number of movements and approaches operate at LOS E or LOS F at intersections #1, #2, #3, #4, #6, #7, #8, #9, #10, #16, and #17. Volumes exceed the available capacity at intersections #1, #3, #4, #9, #10, and #17.

Although Synchro™ 11.1's generated reports provide an overall intersection LOS for unsignalized intersection, per Chapter 19, page 19-2 of the 2010 HCM, unsignalized intersections are not measured with an overall intersection level of service. A representative measure of the side-street level of service provides a good representation of the delays experienced by approaching vehicles attempting turning movements. As observed in **Table 7-1**, most approaching side street level of service delays exceed acceptable norms for urban conditions (i.e. LOS "D" or better is acceptable for urban conditions).

With proposed Route 294 & Old Bridge Road Improvements [Build Option] (Opening Year 2026):
Synchro™ results are summarized and depicted in **Table 7-2**. The Synchro™ reports are presented in **Appendix H**.

As shown in **Table 7-2**, the following is observed:

- **AM PEAK HOUR:** When applying the STARS configuration to Prince William Parkway & Old Bridge Road, all signalized intersections, except Prince William Parkway & Old Bridge Road operate at an overall acceptable level of service (LOS D or better) during the AM peak hours. The alternative configuration for the intersection improves the overall level of service to LOS C. A number of movements and approaches operate at LOS E or LOS F at intersections #1, #2, #6, #7, #9, #10, #16, and #17. Volumes exceed the available capacity at intersections #1, #2, #9, and #17.

- **PM PEAK HOUR:** When applying the STARS configuration to Prince William Parkway & Old Bridge Road, all signalized intersections, except Prince William Parkway & Old Bridge Road, Old Bridge Road & Troupe Street/Glen Shopping Center, and Prince William Parkway & Hillendale Road operate at an overall acceptable level of service (LOS D or better) during the PM peak hours. The alternative configuration for the intersection improves the overall level of service at Prince William Parkway & Old Bridge Road to LOS C. A number of movements and approaches operate at LOS E or LOS F at intersections #1, #2, #6, #7, #8, #9, #10, #14, #16, #17, and #18. Volumes exceed the available capacity at intersections #1, #6, #9, #10, and #17.

Although Synchro™ 11.1's generated reports provide an overall intersection LOS for unsignalized intersections, per Chapter 19, page 19-2 of the 2010 HCM, unsignalized intersections are not measured with an overall intersection level

of service. A representative measure of the side-street level of service provides a good representation of the delays experienced by approaching vehicles attempting turning movements. As observed in **Table 7-2**, most approaching side street level of service delays exceed acceptable norms for urban conditions (i.e. LOS "D" or better is acceptable for urban conditions).

Opening Year (2026) Traffic Forecast Conclusions:

With the proposed improvements associated with the Prince William Parkway & Old Bridge Road project, the intersection is expected to experience a significant improvement in travel conditions (delay) over a scenario in which no improvements are constructed. The following is further observed for the intersections within the study area:

Signalized Intersections: The observations for the signalized intersections are as follows:

- **Intersection #2**: Prince William Parkway & Laurel Hills Drive/Ridgewood Center Drive:
  - **AM PEAK HOUR:** The intersection delay in the AM Peak hour is approximately the same in the Build Condition vs. the No-Build Condition. The delay for the failing westbound left movement improves by 8 seconds between the Building Condition vs. the No-Build Condition, however, continues to fail. The overall level of service remains LOS C.
  - **PM PEAK HOUR:** The intersection delay in the PM Peak hour is approximately the same in the Build Condition vs. the No-Build Condition. The LOS for the eastbound left and westbound left movement fails in both the No-Build and Build Conditions, but is no worse in the Build condition. The failing westbound left movement improves to LOS E in the Build condition.
- **Intersection #4**: Prince William Parkway & Old Bridge Road:
  - **AM PEAK HOUR:** The intersection delay in the AM peak hour improves from LOS F in the No-Build Condition to and acceptable LOS C in the Build Condition. All movements and approaches improve to LOS D or better in the Build Condition.
  - **PM PEAK HOUR:** The intersection delay in the PM peak hour improves from LOS F in the No-Build Condition to and acceptable LOS C in the Build Condition. All movements and approaches improve to LOS D or better in the Build Condition.
- **Intersection #6**: Old Bridge Road & Troupe Street/Glen Shopping Center:
  - **AM PEAK HOUR:** The intersection delay in the AM peak hour increases however, remains LOS C in the Build Condition vs. No-Build Condition. The eastbound left Level of service improves to LOS C in the Build Condition. With the addition of designated left turn lanes on the northbound and southbound approaches, the northbound approach to LOS C and the southbound approach improves to LOS D.
  - **PM PEAK HOUR:** The intersection delay in the PM Peak hour increases however, remains LOS D in the Build Condition vs. No-Build Condition. Delay for all movements improves in the Build Condition, except the eastbound left and northbound right.
- **Intersection #7**: Old Bridge Road & Titania Way/Touchstone Circle:
  - **AM PEAK HOUR:** The intersection delay and LOS in the AM Peak hour remain acceptable in the Build Condition vs. the No-Build Condition. The northbound LOS improves from LOS E to LOS D and the southbound right delay improves, but remains LOS E.
  - **PM PEAK HOUR:** The intersection delay in the PM Peak hour worsens to LOS D in the Build Condition vs. the No-Build Condition, however, remains acceptable. The eastbound left delay more than doubles, and Level of service worsens to LOS F. All other movements and approaches remain approximately the same as the No-Build Condition.
- **Intersection #10**: Old Bridge Road & Rockwood Lane/Westridge Drive:
  - **AM PEAK HOUR:** The movements, approaches, and intersection LOS in the AM Peak hour is unchanged in the Build Condition vs. the No-Build Condition.
  - **PM PEAK HOUR:** The intersection delay in the PM Peak hour increases by approximately 12 seconds and remains an acceptable LOS D in the Build Condition vs. the No-Build Condition. Movement delays increase; however, all level of service remain the same in the Build Condition vs. the No-Build Condition.
- **Intersection #16**: Prince William Parkway & Kennwood Drive:
  - **AM PEAK HOUR:** The intersection delay in the AM peak hour increases by 5 seconds and the LOS worsens to LOS C, which is still considered acceptable, in the Build Condition vs No-Build Condition. The southbound right LOS fails in the Build Condition. All other movements LOS and delay remain approximately the same.
  - **PM PEAK HOUR:** The intersection delay in the PM Peak improves by 3 seconds and the level of service remains an acceptable LOS C in the Build Condition vs. No-Build Condition. The eastbound approach continues to fail; however, all delays remain the same or improve in the Build Condition vs. No-Build Condition.
- **Intersection #17**: Prince William Parkway & Hillendale Road:
  - **AM PEAK HOUR:** The intersection delay in the AM peak remains approximately the same and level of service remains LOS C in the Build Condition vs. No-Build Condition. The northbound left movement continues to fail, but delay does not increase between the No-Build Condition and Build Condition.
  - **PM PEAK HOUR:** The intersection delay in the PM Peak hour increases by approximately 15 seconds and Level of service remains LOS F in the Build Condition vs. No-Build Condition. Delay for all approaches increase or remain approximately the same. All levels of service are unchanged in the Build Condition vs. No-Build Condition.

Unsignalized Intersections: The observations for the unsignalized intersections are as follows:

- **Intersection #1**: Prince William Parkway & Black Forest Lane/Reids Prospect Drive:
    - **AM PEAK HOUR:** The intersection delay in the AM Peak hour remains the same in the Build Condition vs. No-Build Condition. The level of service remains LOS E. The southbound approach continues to fail due to the volume of through traffic on the mainline, resulting in minimal gaps for vehicles to enter.
    - **PM PEAK HOUR:** The intersection delay in the AM Peak hour remains the same in the Build Condition vs. No-Build Condition. The level of service remains LOS F. The northbound and southbound approaches, and eastbound left and westbound left movements continue to fail due to the volume of through traffic on the mainline, resulting in minimal gaps for vehicles to enter.
- **Intersection #3**: Prince William Parkway & Seeton Square:
    - **AM PEAK HOUR:** The southbound delay in the AM Peak hour is improved by approximately 20 seconds and level of service improves to LOS D in the Build Condition vs. No-Build Condition.
    - **PM PEAK HOUR:** The southbound delay in the PM Peak hour is improved, however continues to fail in the Build Condition vs. No-Build Condition. The southbound approach continues to fail due to the volumes of westbound through traffic on the mainline, resulting in minimal gaps for vehicles to enter.
- **Intersection #5**: Old Bridge Road & Tribe at the Glen:
    - **AM PEAK HOUR:** The intersection delay in the AM Peak hour is approximately the same in the Build Condition vs. No-Build Condition. The southbound delay increases by approximately 9 seconds and the level of service worsens to LOS C.
    - **PM PEAK HOUR:** The intersection delay in the PM Peak hour is approximately the same in the Build Condition vs. No-Build Condition. The southbound delay increases by approximately 3 seconds and the level of service worsens to LOS D.
- **Intersection #8**: Old Bridge Road & Brussels Way:
    - **AM PEAK HOUR:** The intersection delay in the AM Peak hour remains approximately the same in the Build Condition vs. No-Build Condition. The southbound approach continues to fail due to the volume of through traffic on the mainline, resulting in minimal gaps for vehicles to enter.
    - **PM PEAK HOUR:** The intersection delay in the PM Peak hour remains approximately the same in the Build Condition vs. No-Build Condition. The southbound approach continues to fail due to the volume of through traffic on the mainline, resulting in minimal gaps for vehicles to enter.
- **Intersection #9**: Old Bridge Road & Old Bridge Lane/Church Entrance:
    - **AM PEAK HOUR:** The intersection delay in the AM Peak hour increases by 2 seconds in the Build Condition vs. No-Build Condition. The northbound and southbound approaches continue to fail due to the volume of through traffic on the mainline, resulting in minimal gaps for vehicles to enter.
    - **PM PEAK HOUR:** The intersection delay in the PM Peak hour remains approximately the same in the Build Condition vs. No-Build Condition. The northbound and southbound approaches continue to fail due to the volume of through traffic on the mainline, resulting in minimal gaps for vehicles to enter.
- **Intersection #12 & 13**: Touchstone Circle & Seeton Square/Merchant Plaza:
    - **AM PEAK HOUR:** The intersection delay in the AM Peak hour improves in the Build Condition vs. No-Build Condition. All movement and approach delay and level of service improve or remain the same.
    - **PM PEAK HOUR:** The intersection delay in the PM Peak hour improves in the Build Condition vs. No-Build Condition. All movement and approach delay and level of service improve or remain the same.
- **Intersection #14**: Touchstone Circle & Merchant Plaza/CVS:
    - **AM PEAK HOUR:** The intersection delay in the AM Peak hour is approximately the same in the Build Condition vs. No-Build Condition. All movement and approach level of service remain the same.
    - **PM PEAK HOUR:** The intersection delay in the PM Peak hour increases by 13 seconds in the Build Condition vs. No-Build Condition. The eastbound stop-controlled approach level of service worsens to LOS E, and the westbound stop-controlled approach level of service worsens to LOS F.
- **Intersection #18**: Chinn Park Drive & Troupe Street:
    - **AM PEAK HOUR:** The intersection delay in the AM Peak hour increases by 2 seconds in the Build Condition vs. No-Build Condition. The northbound and southbound stop-controlled approaches delays increase, and level of service worsen to LOS C.
    - **PM PEAK HOUR:** The intersection delay in the PM Peak hour increases by approximately 20 seconds in the Build Condition vs. No-Build Condition. The northbound level of service worsens to LOS E, and the southbound level of service worsens to failing LOS F.

Table 7-1: Opening Year (2026)

Without proposed Prince William Parkway & Old Bridge Road Improvements [No-Build Option]

LOS Analysis Results

Opening Year (2026) Level of Service (LOS) & Delay

Intersection		Control Type	Approach	Lane Group	No-Build							
					AM Peak				PM Peak			
1	Prince William Pkwy & Black Forest Ln/Reids Prospect Dr	Unsignalized	EB	Left	42.5	E	0.4	A	153.6	F	0.6	A
				Through-Right	-	-			-	-		
			WB	Left	64.3	F	0.4		77.9	F	0.4	A
				Through-Right	-	-			-	-		
			NB	Left-Through-Right	32.3	D	32.3	D	311.9	F	311.9	F
			SB	Left-Through-Right	4996.9	F	4996.9	F	26483.0	F	26483.0	F
			Overall		47.6		E		201.0		F	
2	Prince William Pkwy & Laurel Hills Dr	Signalized	EB	Left	67.5	E	31.1	C	80.4	F	13.5	B
				Through-Right	31.0	C			13.2	B		
			WB	Left	450.4	F	25.9	C	79.7	E	14.7	B
				Through-Right	5.4	A			14.1	B		
			NB	Left-Through-Right	60.7	E	60.7	E	75.8	E	75.8	E
			SB	Left-Through-Right	64.2	E	64.2	E	77.9	E	77.9	E
			Overall		29.2		C		14.8		B	
3	Prince William Pkwy & Seeton Square	Unsignalized	EB	Through	-	-	0.0	A	-	-	0.0	A
			WB	Through-Right	-	-	0.0	A	-	-	0.0	A
			SB	Right	39.2	E	36.2	E	138.3	F	138.3	F
			Overall		0.3		A		1.0		A	
4	Prince William Pkwy & Old Bridge Rd	Signalized	EB	Left	760.3	F	117.5	F	1454.5	F	217.7	F
				Through	57.2	E			285.4	F		
				Right	98.2	F			13.1	B		
			WB	Left	120.6	F	53.5	D	2340.6	F	691.8	F
				Through-Right	24.7	C			34.0	C		
			NB	Left	119.0	F	85.0	F	366.2	F	240.6	F
				Through	47.7	D			157.0	F		
				Right	44.5	D			6.9	A		
			SB	Left	68.2	E	76.5	E	289.9	F	111.8	F
				Through	95.2	F			118.8	F		
				Right	58.6	E			57.5	E		
			Overall		92.2		F		339.4		F	
5	Old Bridge Rd & Tribe at the Glen Entrance	Unsignalized	EB	Through	-	-	0.0	A	-	-	0.0	A
				Right	-	-			-	-		
			WB	Through	-	-	0.0	A	-	-	0.0	A
			NB	Right	13.9	B	13.9	B	18.5	C	18.5	C
			Overall		0.1		A		0.2		A	

Legend:

XXX LOS E

XXX LOS F

Table 7-1: Opening Year (2026) Cont.

Without proposed Prince William Parkway & Old Bridge Road Improvements [No-Build Option]

LOS Analysis Results

Opening Year (2026) Level of Service (LOS) & Delay

Intersection		Control Type	Approach	Lane Group	No-Build							
					AM Peak				PM Peak			
6	Old Bridge Rd & Troupe St/Shopping Center Entrance	Signalized	EB	Left	66.0	E	13.1	B	70.2	E	55.2	E
				Through	12.9	B			55.3	E		
				Right	1.3	A			42.4	D		
			WB	Left	53.6	D	20.8	C	112.2	F	24.0	C
				Through	18.3	B			20.0	C		
				Right	23.2	C			0.4	A		
			NB	Left-Through	52.3	D	39.2	D	87.1	F	88.4	F
				Right	31.4	C			89.5	F		
			SB	Left-Through	68.1	E	65.9	E	113.0	F	101.2	F
				Right	57.6	E			66.2	E		
			Overall		20.6		C		46.8		D	
7	Old Bridge Rd & Titania Way/Touchstone Circle	Signalized	EB	Left	1.5	A	2.1	A	18.8	D	9.7	A
				Through	2.1	A			8.1	A		
				Right	5.3	A			8.7	A		
			WB	Left	8.7	A	11.9	B	6.3	A	26.3	C
				Through	12.2	B			27.5	C		
				Right	5.1	A			12.7	B		
			NB	Left-Through-Right	57.3	E	57.3	E	58.8	E	58.8	E
			SB	Left-Through	67.7	E	64.5	E	86.4	F	79.1	E
				Right	56.1	E			57.7	E		
			Overall		9.3		A		22.3		C	
8	Old Bridge Rd & Brussels Way	Unsignalized	EB	Through	-	-	0.0	A	-	-	0.0	A
			WB	Through	-	-	0.0	A	-	-	0.0	A
				Right	-	-			-	-		
			SB	Right	16.6	D	16.6	D	26.9	D	26.9	D
			Overall		0.1		A		0.1		A	
9	Old Bridge Rd & Old Bridge Ln/Church Entrance	Unsignalized	EB	Left	19.6	C	0.1	A	24.6	C	0.1	A
				Through	-	-			-	-		
				Right	-	-			-	-		
			WB	Left	19.0	C	0.2	A	19.7	C	0.2	A
				Through	-	-			-	-		
				Right	-	-			-	-		
			NB	Left-Through-Right	496.8	F	496.8	F	1669.8	F	1669.8	F
			SB	Left	161.6	F	161.6	F	988.9	F	988.9	F
				Right	0.0	A			0.0	A		
			Overall		11.2		B		14.8		B	

Legend:

XXX	LOS E
XXX	LOS F

Table 7-1: Opening Year (2026) Cont.

Without proposed Prince William Parkway & Old Bridge Road Improvements [No-Build Option]

LOS Analysis Results

Opening Year (2026) Level of Service (LOS) & Delay

Intersection		Control Type	Approach	Lane Group	No-Build							
					AM Peak				PM Peak			
10	Old Bridge Rd & Westridge Dr/Rockwood Ln	Signalized	EB	Left	38.8	C	6.8	A	212.7	F	48.1	D
				Through-Right	3.0	A			16.9	B		
			WB	Left	13.1	B	21.2	C	14.9	B	33.9	C
				Through	21.9	C			36.4	D		
				Right	12.9	B			15.3	B		
			NB	Left-Through-Right	0.0	A	0.0	A	56.9	E	56.9	E
			SB	Left-Through	62.9	E	52.3	D	66.7	E	57.6	E
				Right	45.2	D			52.9	D		
			Overall		18.7		B		42.2		D	
11 & 12	Touchstone Circle & Exxon/Shopping Center	Unsignalized	EB	Right	8.8	A	8.8	A	9.4	A	9.4	A
			WB	Right	8.8	A	8.8	A	9.2	A	9.2	A
			NB	Through	0.0	A	0.0	A	0.0	A	0.0	A
			SB	Through-Right	0.0	A	0.0	A	0.0	A	0.0	A
			Overall		1.3		A		1.4		A	
13	Touchstone Circle & Seeton Square	Unsignalized	EB	Left-Through-Right	9.2	A	9.2	A	10.3	B	10.3	B
			WB	Left-Through-Right	13.7	B	13.7	B	30.2	D	30.2	D
			NB	Left	7.9	A	5.1	A	8.2	A	5.0	A
				Through-Right	-	-			-	-		
			SB	Left	7.6	A	0.6	A	7.5	A	0.8	A
				Through-Right	-	-			-	-		
			Overall		6.7		A		13.8		B	
14	Touchstone Circle & Merchant Plaza/CVS	Unsignalized	EB	Left-Through-Right	8.9	A	8.9	A	9.9	A	9.9	A
			WB	Left-Through-Right	9.6	A	9.6	A	13.6	B	13.6	B
			NB	Left	7.6	A	2.4	A	7.6	A	3.5	A
				Through	0.0	A			0.1	A		
				Right	-	-			-	-		
			SB	Left	0.0	A	0.0	A	7.5	A	0.1	A
				Through	-	-			0.0	A		
				Right	-	-			-	-		
			Overall		2.6		A		6.0		A	
15	Prince William Pkwy & Chinn Park Dr	Unsignalized	WB	Right	9.1	A	9.1	A	10.0	B	10.0	B
			NB	Through-Right	0.0	A	0.0	A	0.0	A	0.0	A
			SB	Through	0.0	A	0.0	A	0.0	A	0.0	A
			Overall		0.0		A		0.1		A	

Legend:

XXX	LOS E
XXX	LOS F

Table 7-1: Opening Year (2026) Cont.

Without proposed Prince William Parkway & Old Bridge Road Improvements [No-Build Option]

LOS Analysis Results

Opening Year (2026) Level of Service (LOS) & Delay

Intersection		Control Type	Approach	Lane Group	No-Build							
					AM Peak				PM Peak			
16	Prince William Pkwy & Kennwood Dr/School Entrance	Signalized	EB	Left-Through-Right	57.9	E	57.9	E	93.7	F	93.7	F
			WB	Left-Through	59.7	E	56.0	E	73.6	E	72.1	E
				Right	52.1	D			69.6	E		
			NB	Left	14.9	B	15.4	B	66.0	E	16.3	B
				Through	16.0	B			13.8	B		
				Right	2.1	A			7.4	A		
			SB	Left	11.2	B	18.8	B	23.7	C	34.4	C
				Through	19.5	B			35.6	D		
				Right	0.0	A			11.9	B		
			Overall		19.2		B		27.6		C	
17	Prince William Pkwy & Hillendale Rd	Signalized	EB	Left	45.0	D	37.7	D	58.7	E	56.2	E
				Right	29.7	C			53.1	D		
			NB	Left	250.9	F	32.3	C	2685.3	F	583.0	F
				Through	9.2	A			10.6	B		
			SB	Through	26.6	C	25.6	C	3.9	A	3.3	A
				Right	18.5	B			0.9	A		
			Overall		29.7		C		291.5		F	
18	Troupe St & Chinn Park Dr	Unsignalized	EB	Left	7.5	A	5.9	A	7.6	A	4.4	A
				Through	0.0	A			0.0	A		
				Right	-	-			-	-		
			WB	Left	8.2	A	0.4	A	7.4	A	0.2	A
				Through	0.0	A			0.0	A		
				Right	-	-			-	-		
			NB	Left	11.5	B	11.7	B	13.7	B	14.2	B
				Through-Right	11.7	B			14.3	B		
			SB	Left	12.2	B	12.7	B	17.4	C	16.7	C
				Through-Right	12.8	B			16.3	C		
			Overall		8.4		A		9.4		A	

Legend:

XXX	LOS E
XXX	LOS F

Table 7-2: Opening Year (2026)

With proposed Prince William Parkway & Old Bridge Road Improvements [Build Option]

LOS Analysis Results

Opening Year (2026) Level of Service (LOS) & Delay													
Intersection		Control Type	Approach	Lane Group	Build								
					AM Peak				PM Peak				
1	Prince William Pkwy & Black Forest Ln/Reids Prospect Dr	Unsignalized	EB	Left	42.9	E	0.4	A	127.5	F	0.5	A	
				Through-Right	0.0	A			0.0	A			
			WB	Left	77.4	F	0.3	A	87.9	F	0.3	A	
				Through-Right	0.0	A			0.0	A			
			NB	Left-Through-Right	34.0	D	34.0	D	308.2	F	308.2	F	
			SB	Left-Through-Right	4996.9	F	4996.9	F	26064.7	F	26064.7	F	
			Overall		46.7		E		192.5		F		
2	Prince William Pkwy & Laurel Hills Dr	Signalized	EB	Left	-	-	35.6	D	83.5	F	15.5	B	
				Through-Right	35.6	D			15.5	B			
			WB	Left	448.0	F	27.3	C	78.8	E	16.6	B	
				Through-Right	7.0	A			16.1	B			
			NB	Left-Through-Right	60.7	E	60.7	E	75.8	E	75.8	E	
			SB	Left-Through-Right	64.2	E	64.2	E	78.0	E	78.0	E	
			Overall		32.3		C		16.7		B		
3	Prince William Pkwy & Seeton Square	Unsignalized	EB	Through									
			WB	Through-Right	-	-	0.0	A	0.0	A	0.0	A	
			SB	Right	32.1	D	32.1	D	102.4	F	102.4	F	
			Overall		0.7		A		1.4		A		
4	Prince William Pkwy & Old Bridge Rd	Signalized	EB	Left									
				Through									
				Right									
			WB	Left	5.7	A	2.2	A	26.9	C	12.5	B	
				Right	0.2	A			5.1	A			
			NB	Left			30.9	D			32.5	D	
				Through	38.8	D			40.6	D			
				Right	0.0	A			0.9	A			
			SB	Left	54.2	D	29.2	C	54.1	D	27.9	C	
				Through	12.6	B			4.6	A			
				Right									
			Overall		21.9		C		24.3		C		
5	Old Bridge Rd & Tribe at the Glen Entrance	Unsignalized	EB	Through	0.0	A	0.0	A	0.0	A	0.0	A	
				Right	0.0	A			0.0	A			
			WB	Through									
			NB	Right	16.2	C	16.2	C	23.1	C	23.1	C	
			Overall		0.2		A		0.6		A		

Legend:

XXX	LOS E
XXX	LOS F

Table 7-2: Opening Year (2026) Cont.

With proposed Prince William Parkway & Old Bridge Road Improvements [Build Option]

LOS Analysis Results

Opening Year (2026) Level of Service (LOS) & Delay														
Intersection		Control Type	Approach	Lane Group	Build									
					AM Peak						PM Peak			
6	Old Bridge Rd & Troupe St/Shopping Center Entrance	Signalized	EB	Left	19.1	B	27.4	C	74.6	E	54.8	D		
				Through	28.4	C			52.2	D				
				Right										
			WB	Left	41.4	D	28.8	C	108.4	F	35.0	C		
				Through	28.0	C			30.4	C				
				Right										
			NB	Left	38.8	D	41.6	D	57.2	E	84.9	F		
				Through	39.7	D			63.6	E				
				Right	43.6	D			104.1	F				
			SB	Left	52.1	D	52.9	D	63.9	E	64.1	E		
				Through	53.7	D			62.6	E				
				Right	53.7	D			64.3	E				
			Overall		30.3		C		51.0		D			
7	Old Bridge Rd & Titania Way/Touchstone Circle	Signalized	EB	Left	16.3	B	11.5	A	86.4	F	25.5	C		
				Through	11.4	B			19.9	B				
				Right	5.9	A			10.8	B				
			WB	Left	11.5	B	15.3	B	12.9	B	52.7	D		
				Through	15.7	B			55.3	E				
				Right	7.3	A			23.3	C				
			NB	Left-Through-Right	54.1	D	54.1	D	54.0	D	54.0	D		
			SB	Left-Through	64.5	E	59.1	E	91.9	F	75.9	E		
				Right	53.3	D			55.1	E				
			Overall		16.2		B		42.7		D			
8	Old Bridge Rd & Brussels Way	Unsignalized	EB	Through	0.0	A	0.0	A	0.0	A	0.0	A		
			WB	Through	0.0	A	0.0	A	0.0	A	0.0	A		
				Right	0.0	A			0.0	A				
			SB	Right	17.0	C	17.0	C	24.7	C	24.7	C		
			Overall		0.1		A		0.1		A			
9	Old Bridge Rd & Old Bridge Ln/Church Entrance	Unsignalized	EB	Left	20.6	C	0.1	A	24.3	C	0.1	A		
				Through	0.0	A			0.0	A				
				Right	0.0	A			0.0	A				
			WB	Left	19.6	C	0.2	A	21.1	C	0.3	A		
				Through	0.0	A			0.0	A				
				Right	0.0	A			0.0	A				
			NB	Left-Through-Right	608.9	F	608.9	F	1626.1	F	1626.1	F		
			SB	Left	185.1	F	185.1	F	981.5	F	981.5	F		
				Right	0.0	A			-	-				
			Overall		13.3		B		14.0		B			

Legend:

XXX	LOS E
XXX	LOS F

Table 7-2: Opening Year (2026) Cont.

With proposed Prince William Parkway & Old Bridge Road Improvements [Build Option]

LOS Analysis Results

Opening Year (2026) Level of Service (LOS) & Delay														
Intersection		Control Type	Approach	Lane Group	Build									
					AM Peak						PM Peak			
10	Old Bridge Rd & Westridge Dr/Rockwood Ln	Signalized	EB	Left	45.0	D	7.9	A	285.0	F	59.8	E		
				Through-Right	3.5	A			18.6	B				
			WB	Left	13.2	B	22.2	C	15.9	B	49.8	D		
				Through	22.9	C			54.2	D				
				Right	13.1	B			15.7	B				
			NB	Left-Through-Right	0.0	A	0.0	A	56.3	E	56.3	E		
			SB	Left-Through	62.9	E	52.0	D	66.8	E	57.5	E		
				Right	44.8	D			52.7	D				
			Overall		19.5		B		54.8		D			
11 & 12	Touchstone Circle & Exxon/Shopping Center	Unsignalized	EB	Right	8.5	A	8.5	A	8.8	A	8.8	A		
			WB	Right	8.6	A	8.6	A	8.9	A	8.9	A		
			NB	Left	7.3	A	3.8	A	7.4	A	4.3	A		
				Through	0.0	A			0.0	A				
			SB	Through-Right	0.0	A	0.0	A	0.0	A	0.0	A		
			Overall		5.6		A		5.9		A			
13	Touchstone Circle & Seeton Square	Unsignalized	EB	Left-Through-Right	8.9	A	8.9	A	9.4	A	9.4	A		
			WB	Left-Through-Right	9.4	A	9.4	A	9.8	A	9.8	A		
			NB	Left	7.3	A	2.9	A	7.3	A	1.9	A		
				Through-Right	0.0	A			0.0	A				
			SB	Left	7.5	A	1.4	A	7.6	A	2.4	A		
				Through-Right	0.0	A			0.0	A				
			Overall		4.3		A		5.2		A			
14	Touchstone Circle & Merchant Plaza/CVS	Unsignalized	EB	Left-Through-Right	9.2	A	9.2	A	14.3	B	14.3	B		
			WB	Left-Through-Right	10.5	B	10.5	B	19.5	C	19.5	C		
			NB	Left	7.8	A	1.3	A	8.3	A	2.7	A		
				Through	0.0	A			0.2	A				
				Right	-	-			-	-				
			SB	Left	0.0	A	0.0	A	7.7	A	0.0	A		
				Through	-	-			0.0	A				
				Right	-	-			-	-				
			Overall		1.5		A		6.1		A			
15	Prince William Pkwy & Chinn Park Dr	Unsignalized	WB	Right	9.1	A	9.1	A	10.1	B	10.1	B		
			NB	Through-Right	0.0	A	0.0	A	0.0	A	0.0	A		
			SB	Through	0.0	A	0.0	A	0.0	A	0.0	A		
			Overall		0.0		A		0.2		A			

Legend:

XXX	LOS E
XXX	LOS F

Table 7-2: Opening Year (2026) Cont.

With proposed Prince William Parkway & Old Bridge Road Improvements [Build Option]

LOS Analysis Results

Opening Year (2026) Level of Service (LOS) & Delay												
Intersection		Control Type	Approach	Lane Group	Build							
					AM Peak				PM Peak			
16	Prince William Pkwy & Kennwood Dr/School Entrance	Signalized	EB	Left-Through-Right	57.9	E	57.9	E	94.4	F	94.4	F
			WB	Left-Through	59.7	E	56.0	E	73.7	E	72.2	E
				Right	52.1	D			69.6	E		
			NB	Left	14.9	B	15.4	B	63.5	E	16.0	B
				Through	16.0	B			13.6	B		
				Right	2.1	A			7.4	A		
			SB	Left	13.0	B	28.0	C	15.4	B	27.9	C
				Through	23.6	C			28.9	C		
				Right	217.3	F			8.8	A		
			Overall		24.2		C		24.4		C	
17	Prince William Pkwy & Hillendale Rd	Signalized	EB	Left	45.0	D	37.7	D	56.1	E	56.1	E
				Right	29.7	C			53.2	D		
			NB	Left	250.9	F	32.3	C	2786.4	F	605.2	F
				Through	9.2	A			11.3	B		
			SB	Through	27.4	C	26.6	C	4.4	A	3.7	A
				Right	20.2	B			0.9	A		
			Overall		30.2		C		303.4		F	
18	Troupe St & Chinn Park Dr	Unsignalized	EB	Left	7.7	A	6.7	A	7.9	A	5.9	A
				Through	0.0	A			0.0	A		
				Right	-	-			-	-		
			WB	Left	8.2	A	0.4	A	8.4	A	0.2	A
				Through	0.0	A			0.0	A		
				Right	-	-			-	-		
			NB	Left	15.2	C	14.8	B	22.1	C	23.2	C
				Through-Right	14.7	C			23.4	C		
			SB	Left	16.5	C	17.6	C	39.3	E	32.9	D
				Through-Right	17.7	C			29.1	D		
			Overall		9.7		A		13.9		B	
19	Prince William Pkwy & Mohammadia Center (North)	Unsignalized	SB	Through	7.6	A	7.4	A	11.4	B	11.2	B
				Right	1.2	A			3.4	A		
			Overall		7.4		A		11.2		B	
20	Prince William Pkwy & Mohammadia Center (South)	Unsignalized	SB	Through	2.5	A	2.5	A	1.3	A	1.3	A
				Right	1.4	A			0.6	A		
			Overall		2.5		A		1.3		A	
21	Old Bridge Rd & Touchstone Circle	Unsignalized	WB	Through-Right	0.0	A	0.0	A	0.0	A	0.0	A
			SB	Right	20.0	C	20.0	C	50.8	F	50.8	F
			Overall		0.6		A		2.3		A	

Legend:

XXX	LOS E
XXX	LOS F

Horizon Year (2045) Capacity Analyses

Capacity analyses were performed for the study intersections for the following:

1. Without proposed Route 294 & Old Bridge Road intersection improvements [No-Build Option]; and
2. With proposed Route 294 & Old Bridge Road intersection improvements [Build Option]

Without proposed Route 294 & Old Bridge Road Improvements [No-Build Option] (Horizon Year 2045):
Synchro™ results are summarized and depicted in **Table 7-3**. The Synchro™ reports are presented in **Appendix I**.

As shown in **Table 7-3**, the following is observed:

- **AM PEAK HOUR:** All stop-controlled study intersections operate at an overall acceptable level of service (LOS D or better) during the AM peak hours. As shown in the attached tables, most approaching side street level of service delays along Old Bridge Road and the western part of Prince William Parkway exceed acceptable norms for urban conditions (i.e. LOS "D" or better is acceptable for urban conditions). This is due to the high volume of vehicles on the mainline, leaving minimum gaps for the side street vehicles to enter.
  All signalized intersections, except Prince William Parkway & Old Bridge Road and Prince William Parkway & Hillendale Road operate at an overall acceptable level of service (LOS D or better) during the AM peak hours. A number of movements and approaches operate at LOS E or LOS F at intersections #1, #2, #3, #4, #6, #7, #8, #9, #10, #16, and #17. Volumes exceed the available capacity at intersections #1, #2, #4, #9, and #17.

- **PM PEAK HOUR:** All stop-controlled study intersections operate at an overall acceptable level of service (LOS D or better) during PM peak hours. As shown in the attached tables, most approaching side street level of service delays along Old Bridge Road and the western part of Prince William Parkway exceed acceptable norms for urban conditions (i.e. LOS "D" or better is acceptable for urban conditions). This is due to the high volume of vehicles on the mainline, leaving minimum gaps for the side street vehicles to enter.
  All signalized study intersections, except Prince William Parkway & Old Bridge Road, Old Bridge Road & Westridge Drive/Rockwood Lane, and Prince William Parkway & Hillendale Road operate at an overall acceptable level of service (LOS D or better) during PM peak hours. A number of movements and approaches operate at LOS E or LOS F at intersections #1, #2, #3, #4, #6, #7, #8, #9, #10, #16, and #17. Volumes exceed the available capacity at intersections #1, #2, #3, #4, #6, #9, #10, and #17.

Although Synchro™ 11.1's generated reports provide an overall intersection LOS for unsignalized intersection, per Chapter 19, page 19-2 of the 2010 HCM, unsignalized intersections are not measured with an overall intersection level of service. A representative measure of the side-street level of service provides a good representation of the delays experienced by approaching vehicles attempting turning movements. As observed in Table **7-3**, most approaching side street level of service delays exceed acceptable norms for urban conditions (i.e. LOS "D" or better is acceptable for urban conditions).

With proposed Route 294 & Old Bridge Road Improvements [Build Option] (Horizon Year 2045):
Synchro™ results are summarized and depicted in **Table 7-4**. The Synchro™ reports are presented in **Appendix I**.

As shown in **Table 7-4**, the following is observed:

- **AM PEAK HOUR:** When applying the STARS configuration to Prince William Parkway & Old Bridge Road, all signalized intersections, except Prince William Parkway & Old Bridge Road, Old Bridge Road & Troupe Street/Glen Shopping Center, and Prince William Parkway & Hillendale Road operate at an overall acceptable level of service (LOS D or better) during the AM peak hours. The alternative configuration for the intersection improves the overall level of service to LOS C. A number of movements and approaches operate at LOS E or LOS F at intersections #1, #2, #6, #7, #8, #9, #10, #16, and #17. Volumes exceed the available capacity at intersections #1, #2, #6, #9, and #17.

- **PM PEAK HOUR:** When applying the STARS configuration to Prince William Parkway & Old Bridge Road, the majority of signalized intersections operate at an overall unacceptable level of service (LOS E or F) during the PM peak hours. This includes Prince William Parkway & Old Bridge Road, Old Bridge Road & Troupe Street/Glen Shopping Center, Old Bridge Road & Titania Way/Touchstone Circle, Old Bridge Road & Rockwood Lane/Westridge Drive, and Prince William Parkway & Hillendale Road. The alternative configuration for the intersection improves the overall level of service at Prince William Parkway & Old Bridge Road to LOS C. The other signalized intersections continue to operate the same. A number of movements and approaches operate at LOS E or LOS F at intersections #1, #2, #6, #7, #8, #9, #10, #14, #16, #17, and #18. Volumes exceed the available capacity at intersections #1, #6, #7, #9, #10, #17, & #18.

Although Synchro™ 11.1's generated reports provide an overall intersection LOS for unsignalized intersection, per Chapter 19, page 19-2 of the 2010 HCM, unsignalized intersections are not measured with an overall intersection level of service. A representative measure of the side-street level of service provides a good representation of the delays experienced by approaching vehicles attempting turning movements. As observed in **Table 7-4**, most approaching side street level of service delays exceed acceptable norms for urban conditions (i.e. LOS "D" or better is acceptable for urban conditions).

Horizon Year (2045) Traffic Forecast Conclusions:

With the proposed improvements associated with the Prince William Parkway & Old Bridge Road project, the intersection is expected to experience a significant improvement in travel conditions (delay) over a scenario in which no improvements are constructed. The following is further observed for the additional intersections within the study area:

Signalized Intersections: The observations for the signalized intersections are as follows:

- **Intersection #2**: Prince William Parkway & Laurel Hills Drive/Ridgewood Center Drive:
  - **AM PEAK HOUR:** The intersection delay in the AM Peak hour increases by 6 seconds in the Build Condition vs. the No-Build Condition. The delay for the failing westbound left movement increases by 6 seconds between the Building Condition vs. the No-Build Condition. The overall level of service remains LOS D.
  - **PM PEAK HOUR:** The intersection delay in the PM Peak hour increases by approximately 5 seconds and the level of service worsens to LOS C in the Build Condition vs. the No-Build Condition. The LOS for the eastbound left movement fails in the Build Conditions. The failing westbound left movement improves to LOS E in the Build condition. All other movements and approach delays remain approximately the same.

- **Intersection #4**: Prince William Parkway & Old Bridge Road:

    - **AM PEAK HOUR:** The intersection delay in the AM peak hour improves from LOS F in the No-Build Condition to and acceptable LOS C in the alternative configuration Build Condition. All movements and approaches improve to LOS D or better in the Build Condition.

    - **PM PEAK HOUR:** The intersection delay in the PM peak hour improves from LOS F in the No-Build Condition to and acceptable LOS C in the alternative configuration Build Condition. All movements and approaches improve to LOS D or better in the Build Condition. The northbound through movements are approaching capacity in 2045 with a volume to capacity ratio (v/c) of 0.919. The v/c is above 0.80 beginning in 2030.

- **Intersection #6**: Old Bridge Road & Troupe Street/Glen Shopping Center:

    - **AM PEAK HOUR:** The intersection delay in the AM peak increases by approximately 3 seconds, but remains an acceptable LOS C in the Build Condition vs No-Build Condition. The southbound delay improves by 18 seconds and LOS improves to LOS D in the Build Condition.

    - **PM PEAK HOUR:** The intersection delay in the PM Peak improves by approximately 5 seconds and LOS improves to LOS D in the Build Condition vs. No-Build Condition. Delay for the southbound approach improves by 15 seconds in the Build Condition, however, remains LOS F.

- **Intersection #7**: Old Bridge Road & Titania Way/Touchstone Circle:

    - **AM PEAK HOUR:** The intersection delay and LOS in the AM Peak hour remain an acceptable LOS B in the Build Condition vs. the No-Build Condition. The northbound LOS improves from LOS E to LOS D and the southbound right LOS improves from LOS E to LOS D. The southbound left-through movement remains at LOS E, however the delay improves by 3 seconds.

    - **PM PEAK HOUR:** The intersection delay in the PM Peak hour worsens to LOS E in the Build Condition vs. the No-Build Condition. The eastbound left and westbound through levels of service degrade to failing conditions and the southbound left-through continues to fail. All other movements and approaches remain acceptable.

- **Intersection #10**: Old Bridge Road & Rockwood Lane/Westridge Drive:

    - **AM PEAK HOUR:** The movements, approaches, and intersection delays in the AM Peak hour are approximately the same in the Build Condition vs. the No-Build Condition.

    - **PM PEAK HOUR:** The intersection delay in the PM Peak hour increases by approximately 18 seconds and remains a LOS E in the Build Condition vs. the No-Build Condition. The westbound through movement and westbound approach levels of service degrade to LOS F and the eastbound approach degrades to LOS E in the Build Condition vs. the No-Build Condition.

- **Intersection #16**: Prince William Parkway & Kennwood Drive:

    - **AM PEAK HOUR:** The intersection delay in the AM peak hour remains approximately the same and is an acceptable LOS C in the Build Condition vs No-Build Condition. All approach delay is unchanged.

    - **PM PEAK HOUR:** The intersection delay in the PM Peak increases by 4 seconds and the level of service remains an acceptable LOS C in the Build Condition vs. No-Build Condition. The eastbound approach continues to fail; however, the delay remains approximately the same in the Build Condition vs. No-Build Condition. The southbound approach delay increases by 10 seconds, however, remains an acceptable LOS C.

- **Intersection #17**: Prince William Parkway & Hillendale Road:

    - **AM PEAK HOUR:** The intersection delay in the AM peak decreases by 1.5 seconds and level of service remains LOS E in the Build Condition vs. No-Build Condition. The northbound left movement continues to fail, but delay does not increase between the No-Build Condition and Build Condition.

    - **PM PEAK HOUR:** The intersection delay in the PM Peak hour increases by approximately 20 seconds and Level of service remains LOS F in the Build Condition vs. No-Build Condition. Delay for the southbound approach increases by 30 seconds and remains LOS F. All other approaches delays remain approximately the same. All levels of service are unchanged in the Build Condition vs. No-Build Condition.

<u>Unsignalized Intersections:</u> The observations for the unsignalized intersections are as follows:

- **Intersection #1**: Prince William Parkway & Black Forest Lane/Reids Prospect Drive:

    - **AM PEAK HOUR:** The intersection delay in the AM Peak hour remains the same in the Build Condition vs. No-Build Condition. The level of service remains LOS F. The southbound approach and eastbound left movement continue to fail due to the volume of through traffic on the mainline, resulting in minimal gaps for vehicles to enter.

    - **PM PEAK HOUR:** The intersection delay in the AM Peak hour remains approximately the same in the Build Condition vs. No-Build Condition. The level of service remains LOS A. The northbound and southbound approaches, and eastbound left and westbound left movements continue to fail due to the volume of through traffic on the mainline, resulting in minimal gaps for vehicles to enter.

- **Intersection #3**: Prince William Parkway & Seeton Square:

    - **AM PEAK HOUR:** The southbound delay in the AM Peak hour decreases by approximately 40 seconds in the Build Condition vs. No-Build Condition. The level of service improves from LOS F in the No-Build Condition to LOS D in the Build Condition.

    - **PM PEAK HOUR:** The southbound delay in the AM Peak hour decreases in the Build Condition vs. No-Build Condition, however level of service remains LOS F. The southbound right movement continues to fail due to the volume of through traffic on the mainline, resulting in minimal gaps for vehicles to enter.

- **Intersection #5**: Old Bridge Road & Tribe at the Glen:

    - **AM PEAK HOUR:** The intersection delay in the AM Peak hour remains approximately the same in the Build Condition vs. No-Build Condition. The northbound delay increases by 3 seconds and remains an acceptable LOS C.

    - **PM PEAK HOUR:** The intersection delay in the PM Peak hour remains approximately the same in the Build Condition vs. No-Build Condition. The northbound delay increases by 16 seconds and level of service degrades to LOS E.

- **Intersection #8**: Old Bridge Road & Brussels Way:

    - **AM PEAK HOUR:** The intersection delay in the AM Peak hour remains approximately the same in the Build Condition vs. No-Build Condition. The southbound approach remains at LOS E due to the volume of through traffic on the mainline, resulting in minimal gaps for vehicles to enter.

    - **PM PEAK HOUR:** The intersection delay in the PM Peak hour remains approximately the same in the Build Condition vs. No-Build Condition. The southbound approach continues to fail and delay increases by 30 seconds due to the volume of through traffic on the mainline, resulting in minimal gaps for vehicles to enter.

- **Intersection #9**: Old Bridge Road & Old Bridge Lane/Church Entrance:

    - **AM PEAK HOUR:** The intersection delay in the AM Peak hour remains approximately the same in the Build Condition vs. No-Build Condition. The northbound and southbound approaches continue to fail due to the volume of through traffic on the mainline, resulting in minimal gaps for vehicles to enter.

    - **PM PEAK HOUR:** The intersection delay in the PM Peak hour remains approximately the same in the Build Condition vs. No-Build Condition. The northbound and southbound approaches continue to fail due to the volume of through traffic on the mainline, resulting in minimal gaps for vehicles to enter.

- **Intersection #12 & #13**: Touchstone Circle & Seeton Square/Merchant Plaza:

    - **AM PEAK HOUR:** The intersection delay in the AM Peak hour improves in the Build Condition vs. No-Build Condition. All movement and approach delay and level of service improve or remain the same.

    - **PM PEAK HOUR:** The intersection delay in the PM Peak hour improves in the Build Condition vs. No-Build Condition. All movement and approach delay and level of service improve or remain the same.

- **Intersection #14**: Touchstone Circle & Merchant Plaza/CVS:

    - **AM PEAK HOUR:** The intersection delay in the AM Peak hour is approximately the same in the Build Condition vs. No-Build Condition. All movement and approach level of service remain the same and are an acceptable LOS B or better.

    - **PM PEAK HOUR:** The intersection delay in the PM Peak hour increases by 14 seconds in the Build Condition vs. No-Build Condition. The eastbound stop-controlled approach level of service worsens to LOS E, and the westbound stop-controlled approach level of service worsens to LOS F.

- **Intersection #18**: Chinn Park Drive & Troupe Street:

    - **AM PEAK HOUR:** The intersection delay in the AM Peak hour increases by 3 seconds in the Build Condition vs. No-Build Condition. The northbound and southbound stop-controlled approaches delays increase, and level of service worsen to LOS C.

    - **PM PEAK HOUR:** The intersection delay in the PM Peak hour increases by approximately 64 seconds in the Build Condition vs. No-Build Condition. The northbound and southbound level of service worsen to failing LOS F.

Table 7-3: Horizon Year (2045)

Without proposed Prince William Parkway & Old Bridge Road Improvements [No-Build Option]

LOS Analysis Results

Future Year (2045) Level of Service (LOS) & Delay														
Intersection		Control Type	Approach	Lane Group	No-Build									
					AM Peak					PM Peak				
1	Prince William Pkwy & Black Forest Ln/Reids Prospect Dr	Unsignalized	EB	Left	61.2	F	0.6	A		300.7	F	1.2	A	
				Through-Right	-	-				-	-			
			WB	Left	103.9	F	0.6	A		139.8	F	0.8	A	
				Through-Right	-	-				-	-			
			NB	Left-Through-Right	40.0	E	40.0	E		717.0	F	717.0	F	
			SB	Left-Through-Right	9513.4	F	9513.4	F		207.7	F	207.7	F	
			Overall		91.8		F			4.2		A		
2	Prince William Pkwy & Laurel Hills Dr	Signalized	EB	Left	67.5	E	60.3	E		79.2	E	16.9	B	
				Through-Right	60.2	E				16.6	B			
			WB	Left	540.0	F	30.7	C		83.3	F	18.1	B	
				Through-Right	5.9	A				17.5	B			
			NB	Left-Through-Right	60.8	E	60.8	E		75.8	E	75.8	E	
			SB	Left-Through-Right	64.2	E	64.2	E		78.0	E	78.0	E	
			Overall		47.4		D			18.2		B		
3	Prince William Pkwy & Seeton Square	Unsignalized	EB	Through	-	-	0.0	A		-	-	0.0	A	
			WB	Through-Right	-	-	0.0	A		-	-	0.0	A	
			SB	Right	56.3	F	56.3	F		299.5	F	299.5	F	
			Overall		0.5		A			2.1		A		
4	Prince William Pkwy & Old Bridge Rd	Signalized	EB	Left	772.9	F	160.1	F		1462.6	F	321.8	F	
				Through	96.6	F				412.8	F			
				Right	149.9	F				125.5	F			
			WB	Left	165.7	F	69.1	E		2691.6	F	835.2	F	
				Through-Right	27.5	C				90.6	F			
			NB	Left	173.2	F	116.2	F		451.8	F	309.0	F	
				Through	58.7	E				222.1	F			
				Right	41.1	D				29.4	C			
			SB	Left	67.7	E	76.1	E		288.0	F	101.7	F	
				Through	94.9	F				96.5	F			
				Right	58.2	E				56.2	E			
			Overall		123.9		F			438.6		F		
5	Old Bridge Rd & Tribe at the Glen Entrance	Unsignalized	EB	Through	-	-	0.0	A		-	-	0.0	A	
				Right	-	-				-	-			
			WB	Through	-	-	0.0	A		-	-	0.0	A	
			NB	Right	15.1	C	15.1	C		21.6	C	21.6	C	
			Overall		0.1		A			0.3		A		

Legend:

XXX	LOS E
XXX	LOS F

Table 7-3: Horizon Year (2045) Cont.

Without proposed Prince William Parkway & Old Bridge Road Improvements [No-Build Option]

LOS Analysis Results

Future Year (2045) Level of Service (LOS) & Delay														
Intersection		Control Type	Approach	Lane Group	No-Build									
					AM Peak				PM Peak					
6	Old Bridge Rd & Troupe St/Shopping Center Entrance	Signalized	EB	Left	63.5	E	16.4	B	93.5	F	29.4	C		
				Through	16.4	B			28.4	C				
				Right	1.1	A			1.6	A				
			WB	Left	55.0	E	23.5	C	104.9	F	69.2	E		
				Through	21.5	C			74.2	E				
				Right	19.0	B			0.6	A				
			NB	Left-Through	52.5	D	37.5	D	87.0	F	83.9	F		
				Right	28.8	C			81.6	F				
			SB	Left-Through	73.8	E	70.3	E	137.1	F	119.2	F		
				Right	57.5	E			66.0	E				
			Overall		23.1		C		58.5		E			
7	Old Bridge Rd & Titania Way/Touchstone Circle	Signalized	EB	Left	2.0	A	3.2	A	60.7	E	16.2	B		
				Through	3.2	A			14.7	B				
				Right	5.3	A			8.7	A				
			WB	Left	11.2	A	14.7	A	8.6	A	28.2	C		
				Through	15.1	B			29.7	C				
				Right	5.1	A			8.6	A				
			NB	Left-Through-Right	57.4	E	57.4	E	59.0	E	59.0	E		
			SB	Left-Through	67.7	E	64.5	E	80.1	F	74.3	E		
				Right	56.1	E			57.6	E				
			Overall		11.1		B		25.5		C			
8	Old Bridge Rd & Brussels Way	Unsignalized	EB	Through	-	-	0.0	A	-	-	0.0	A		
			WB	Through	-	-	0.0	A	-	-	0.0	A		
				Right	-	-			-	-				
			SB	Right	18.5	C	18.5	C	33.4	D	33.4	D		
			Overall		0.1		A		0.1		A			
9	Old Bridge Rd & Old Bridge Ln/Church Entrance	Unsignalized	EB	Left	23.8	C	0.1	A	30.7	D	0.1	A		
				Through	-	-			-	-				
				Right	-	-			-	-				
			WB	Left	22.6	C	0.2	A	24.3	C	0.3	A		
				Through	-	-			-	-				
				Right	-	-			-	-				
			NB	Left-Through-Right	1215.5	F	1215.5	F	3103.3	F	3103.3	F		
			SB	Left	262.0	F	262.0	F	3083.8	F	3083.8	F		
				Right	0.0	A			0.0	A				
			Overall		27.2		C		28.5		C			

Legend:

XXX	LOS E
XXX	LOS F

Table 7-3: Horizon Year (2045) Cont.

Without proposed Prince William Parkway & Old Bridge Road Improvements [No-Build Option]

LOS Analysis Results

Future Year (2045) Level of Service (LOS) & Delay													
Intersection		Control Type	Approach	Lane Group	No-Build								
					AM Peak				PM Peak				
10	Old Bridge Rd & Westridge Dr/Rockwood Ln	Signalized	EB	Left	67.4	E	10.3	B	232.7	F	54.6	D	
				Through-Right	3.4	A			20.7	C			
			WB	Left	15.1	B	27.0	C	18.5	B	69.8	E	
				Through	27.9	C			76.7	E			
				Right	14.6	B			17.6	B			
			NB	Left-Through-Right	0.0	A	0.0	A	54.8	D	54.8	D	
			SB	Left-Through	64.7	E	51.9	D	64.9	E	55.2	E	
				Right	43.4	D			50.2	D			
			Overall		22.6		C		61.9		E		
11 & 12	Touchstone Circle & Exxon/Shopping Center	Unsignalized	EB	Right	8.8	A	8.8	A	9.4	A	9.4	A	
			WB	Right	8.8	A	8.8	A	9.2	A	9.2	A	
			NB	Through	0.0	A	0.0	A	0.0	A	0.0	A	
			SB	Through-Right	0.0	A	0.0	A	0.0	A	0.0	A	
			Overall		1.3		A		1.4		A		
13	Touchstone Circle & Seeton Square	Unsignalized	EB	Left-Through-Right	9.2	A	9.2	A	10.3	B	10.3	B	
			WB	Left-Through-Right	13.7	B	13.7	B	30.2	D	30.2	D	
			NB	Left	7.9	A	5.1	A	8.2	A	5.0	A	
				Through-Right	-	-			-	-			
			SB	Left	7.6	A	0.6	A	7.5	A	0.8	A	
				Through-Right	-	-			-	-			
			Overall		6.7		A		13.8		B		
14	Touchstone Circle & Merchant Plaza/CVS	Unsignalized	EB	Left-Through-Right	8.9	A	8.9	A	9.9	A	9.9	A	
			WB	Left-Through-Right	9.6	A	9.6	A	13.6	B	13.8	B	
			NB	Left	7.6	A	2.4	A	7.6	A	3.5	A	
				Through	0.0	A			0.1	A			
				Right	-	-			-	-			
			SB	Left	0.0	A	0.0	A	7.5	A	0.1	A	
				Through	-	-			0.0	A			
				Right	-	-			-	-			
			Overall		2.6		A		6.0		A		
15	Prince William Pkwy & Chinn Park Dr	Unsignalized	WB	Right	9.3	A	9.3	A	11.0	B	11.0	B	
			NB	Through-Right	0.0	A	0.0	A	0.0	A	0.0	A	
			SB	Through	0.0	A	0.0	A	0.0	A	0.0	A	
			Overall		0.0		A		0.2		A		

Legend:

XXX LOS E

XXX LOS F

Table 7-3: Horizon Year (2045) Cont.

Without proposed Prince William Parkway & Old Bridge Road Improvements [No-Build Option]

LOS Analysis Results

Future Year (2045) Level of Service (LOS) & Delay													
Intersection		Control Type	Approach	Lane Group	No-Build								
					AM Peak				PM Peak				
16	Prince William Pkwy & Kennwood Dr/School Entrance	Signalized	EB	Left-Through-Right	58.5	E	58.5	E	86.9	F	86.9	F	
			WB	Left-Through	60.0	E	56.1	E	73.8	E	71.8	E	
				Right	52.0	D			68.3	E			
			NB	Left	18.1	B	16.3	B	75.7	E	21.1	C	
				Through	16.8	B			18.3	B			
				Right	1.8	A			8.7	A			
			SB	Left	13.8	B	21.1	C	19.6	B	22.8	C	
				Through	21.8	C			23.5	C			
				Right	0.0	A			7.6	A			
			Overall		20.9		C		24.3		C		
17	Prince William Pkwy & Hillendale Rd	Signalized	EB	Left	43.1	D	36.3	D	56.6	E	54.6	D	
				Right	28.8	C			52.2	D			
			NB	Left	317.4	F	40.4	D	3048.9	F	662.7	F	
				Through	11.0	B			13.6	B			
			SB	Through	78.0	E	71.2	E	5.1	A	4.3	A	
				Right	19.9	C			1.1	A			
			Overall		55.4		E		330.5		F		
18	Troupe St & Chinn Park Dr	Unsignalized	EB	Left	7.5	A	5.9	A	7.6	A	4.4	A	
				Through	0.0	A			0.0	A			
				Right	-	-			-	-			
			WB	Left	8.2	A	0.4	A	7.4	A	0.1	A	
				Through	0.0	A			0.0	A			
				Right	-	-			-	-			
			NB	Left	12.2	B	12.1	B	14.0	B	14.4	B	
				Through-Right	12.1	B			14.5	B			
			SB	Left	12.8	B	13.5	B	17.9	C	17.1	C	
				Through-Right	13.6	C			16.7	C			
			Overall		8.7		A		9.6		B		

Legend:

XXX	LOS E
XXX	LOS F

Table 7-4: Horizon Year (2045)

With proposed Prince William Parkway & Old Bridge Road Improvements [Build Option]

LOS Analysis Results

Future Year (2045) Level of Service (LOS) & Delay													
Intersection		Control Type	Approach	Lane Group	Build								
					AM Peak				PM Peak				
1	Prince William Pkwy & Black Forest Ln/Reids Prospect Dr	Unsignalized	EB	Left	60.6	E	0.6	A	231.5	F	0.9	A
				Through-Right	0.0	A			0.0	A		
			WB	Left	125.9	F	0.6	A	145.7	F	0.6	A
				Through-Right	0.0	A			0.0	A		
			NB	Left-Through-Right	42.1	E	42.1	E	707.0	F	707.0	F
			SB	Left-Through-Right	9513.4	F	9513.4	F	189.6	F	189.6	F
			Overall		90.4		F		3.8		A	
2	Prince William Pkwy & Laurel Hills Dr	Signalized	EB	Left	0.0	A	71.4	E	85.2	F	21.6	C
				Through-Right	71.4	E			21.6	C		
			WB	Left	546.8	F	30.0	C	74.5	E	23.6	C
				Through-Right	4.9	A			23.1	C		
			NB	Left-Through-Right	60.8	E	60.8	E	75.9	E	75.9	E
			SB	Left-Through-Right	64.2	E	64.2	E	78.0	E	78.0	E
			Overall		53.6		D		23.2		C	
3	Prince William Pkwy & Seeton Square	Unsignalized	EB	Through								
			WB	Through-Right	0.0	A	0.0	A	0.0	A	0.0	A
			SB	Right	46.1	E	42.4	E	194.3	F	194.3	F
			Overall		0.9		A		2.6		A	
4	Prince William Pkwy & Old Bridge Rd	Signalized	EB	Left								
				Through								
				Right								
			WB	Left	6.2	A	2.3	A	27.0	C	12.9	B
				Through-Right	0.3	A			5.8	A		
			NB	Left			35.1	D			55.1	E
				Through	44.0	D			68.6	E		
				Right	0.1	A			2.2	A		
			SB	Left	53.0	D	28.8	C	77.0	E	40.7	D
				Through	13.0	B			8.8	A		
				Right								
			Overall		22.9		C		36.0		D	
5	Old Bridge Rd & Tribe at the Glen Entrance	Unsignalized	EB	Through	0.0	A	0.0	A	0.0	A	0.0	A
				Right	0.0	A			0.0	A		
			WB	Through								
			NB	Right	17.7	C	17.7	C	29.4	D	29.4	D
			Overall		0.2		A		0.8		A	

Legend:

XXX	LOS E
XXX	LOS F

Table 7-4: Horizon Year (2045) Cont.

With proposed Prince William Parkway & Old Bridge Road Improvements [Build Option]

LOS Analysis Results

Future Year (2045) Level of Service (LOS) & Delay													
Intersection		Control Type	Approach	Lane Group	Build								
					AM Peak				PM Peak				
6	Old Bridge Rd & Troupe St/Shopping Center Entrance	Signalized	EB	Left	46.8	D	20.1	C	76.5	E	31.5	C
				Through	16.9	B			23.1	C		
				Right								
			WB	Left	41.8	D	33.9	C	79.2	E	98.5	F
				Through	33.4	C			99.7	F		
				Right								
			NB	Left	49.5	D	46.0	D	80.8	F	76.2	E
				Through	46.2	D			75.7	F		
				Right	43.7	D			72.8	E		
			SB	Left	48.0	D	49.4	D	84.7	F	62.5	E
				Through	50.6	D			78.6	E		
				Right	50.8	D			47.4	D		
			Overall		26.7		30.1		68.0		E	
7	Old Bridge Rd & Titania Way/Touchstone Circle	Signalized	EB	Left	37.9	D	8.4	A	65.5	F	25.6	C
				Through	7.0	A			19.6	B		
				Right	6.0	A			11.0	B		
			WB	Left	13.4	B	19.1	B	23.1	C	91.4	F
				Through	19.5	B			96.9	F		
				Right	7.8	A			17.1	B		
			NB	Left-Through-Right	54.2	D	54.2	D	53.8	D	53.8	D
			SB	Left-Through	64.7	E	59.2	E	93.4	F	76.8	E
				Right	53.3	D			54.8	D		
			Overall		16.3		B		60.9		E	
8	Old Bridge Rd & Brussels Way	Unsignalized	EB	Through	0.0	A	0.0	A	0.0	A	0.0	A
			WB	Through	0.0	A	0.0	A	0.0	A	0.0	A
				Right	0.0	A			0.0	A		
			SB	Right	19.1	C	18.5	C	28.5	D	29.8	D
			Overall		0.1		A		0.1		A	
9	Old Bridge Rd & Old Bridge Ln/Church Entrance	Unsignalized	EB	Left	25.2	D	0.1	A	30.4	D	0.1	A
				Through	0.0	A			0.0	A		
				Right	0.0	A			0.0	A		
			WB	Left	23.5	C	0.2	A	26.0	D	0.3	A
				Through	0.0	A			0.0	A		
				Right	0.0	A			0.0	A		
			NB	Left-Through-Right	1354.4	F	1354.4	F	3024.8	F	3024.8	F
			SB	Left	304.5	F	304.5	F	3053.9	F	3053.9	F
				Right	0.0	A			0.0	A		
			Overall		29.5		D		27.2		D	

Legend:

XXX	LOS E
XXX	LOS F

Table 7-4: Horizon Year (2045) Cont.

With proposed Prince William Parkway & Old Bridge Road Improvements [Build Option]

LOS Analysis Results

Future Year (2045) Level of Service (LOS) & Delay													
Intersection		Control Type	Approach	Lane Group	Build								
					AM Peak				PM Peak				
10	Old Bridge Rd & Westridge Dr/Rockwood Ln	Signalized	EB	Left	66.8	F	11.0	B	285.8	F	65.6	E	
				Through-Right	4.4	A			25.1	C			
			WB	Left	15.3	B	28.3	C	20.8	C	109.7	F	
				Through	29.3	C			121.5	F			
				Right	14.6	B			18.1	B			
			NB	Left-Through-Right	0.0	A	0.0	A	54.2	D	54.2	D	
			SB	Left-Through	64.7	E	51.9	D	65.4	E	55.3	E	
				Right	43.4	D			50.0	D			
			Overall		23.4		C		85.9		F		
11 & 12	Touchstone Circle & Exxon/Shopping Center	Unsignalized	EB	Right	8.5	A	8.5	A	8.8	A	8.8	A	
			WB	Right	8.6	A	8.6	A	8.9	A	8.9	A	
			NB	Left	7.3	A	3.8	A	7.4	A	4.3	A	
				Through	0.0	A			0.0	A			
			SB	Through-Right	0.0	A	0.0	A	0.0	A	0.0	A	
			Overall		5.6		A		5.9		A		
13	Touchstone Circle & Seeton Square	Unsignalized	EB	Left-Through-Right	8.9	A	8.9	A	9.4	A	9.4	A	
			WB	Left-Through-Right	9.4	A	9.4	A	9.8	B	9.8	B	
			NB	Left	7.3	A	2.9	A	7.3	A	1.9	A	
				Through-Right	0.0	A			0.0	A			
			SB	Left	7.5	A	1.4	A	7.6	A	2.4	A	
				Through-Right	0.0	A			0.0	A			
			Overall		4.3		A		5.2		A		
14	Touchstone Circle & Merchant Plaza/CVS	Unsignalized	EB	Left-Through-Right	9.2	A	9.2	A	14.5	B	14.5	B	
			WB	Left-Through-Right	10.5	B	10.5	B	19.9	C	19.9	C	
			NB	Left	7.8	A	1.3	A	8.3	A	2.6	A	
				Through	0.0	A			0.2	A			
				Right	-	-			-	-			
			SB	Left	0.0	A	0.0	A	7.7	A	0.0	A	
				Through	-	-			0.0	A			
				Right	-	-			-	-			
			Overall		1.5		A		6.1		A		
15	Prince William Pkwy & Chinn Park Dr	Unsignalized	WB	Right	9.3	A	9.3	A	11.2	B	11.2	B	
			NB	Through-Right	0.0	A	0.0	A	0.0	A	0.0	A	
			SB	Through	0.0	A	0.0	A	0.0	A	0.0	A	
			Overall		0.1		A		0.2		A		

Legend:

XXX LOS E

XXX LOS F

Table 7-4: Horizon Year (2045) Cont.

With proposed Prince William Parkway & Old Bridge Road Improvements [Build Option]

LOS Analysis Results

Future Year (2045) Level of Service (LOS) & Delay													
Intersection		Control Type	Approach	Lane Group	Build								
					AM Peak				PM Peak				
16	Prince William Pkwy & Kennwood Dr/School Entrance	Signalized	EB	Left-Through-Right	58.5	E	58.5	E	87.3	F	87.3	F	
			WB	Left-Through	60.0	E	56.1	E	74.0	E	72.0	E	
				Right	52.0	D			68.3	E			
			NB	Left	18.0	B	16.3	B	71.7	E	20.7	C	
				Through	16.8	B			18.1	B			
				Right	1.8	A			8.7	A			
			SB	Left	15.6	B	21.0	C	23.7	C	33.4	C	
				Through	21.3	C			34.6	C			
				Right	9.2	A			10.8	B			
			Overall		20.8		C		29.1		C		
17	Prince William Pkwy & Hillendale Rd	Signalized	EB	Left	43.1	D	36.3	D	56.3	E	54.5	D	
				Right	28.8	C			52.2	D			
			NB	Left	317.4	F	40.4	D	3164.5	F	688.7	F	
				Through	11.0	B			14.9	B			
			SB	Through	74.5	E	67.8	E	5.5	A	4.5	A	
				Right	17.8	B			1.0	A			
			Overall		53.7		D		345.7		F		
18	Troupe St & Chinn Park Dr	Unsignalized	EB	Left	7.7	A	6.6	A	8.0	A	6.1	A	
				Through	0.0	A			0.0	A			
				Right	0.0	A			0.0	A			
			WB	Left	8.2	A	0.4	A	8.5	A	0.2	A	
				Through	0.0	A			0.0	A			
				Right	0.0	A			0.0	A			
			NB	Left	16.0	C	15.3	C	30.9	D	31.2	D	
				Through-Right	15.1	C			31.2	D			
			SB	Left	17.2	C	18.6	C	71.2	F	53.5	F	
				Through-Right	18.7	C			43.3	E			
			Overall		10.1		B		19.5		C		
19	Prince William Pkwy & Mohammadia Center (North)	Unsignalized	SB	Through	8.8	A	8.7	A	34.9	C	34.2	C	
				Right	6.6	A			4.3	A			
			Overall		8.7		A		34.2		C		
20	Prince William Pkwy & Mohammadia Center (South)	Unsignalized	SB	Through	1.9	A	1.9	A	1.5	A	1.5	A	
				Right	1.1	A			0.8	A			
			Overall		1.9		A		1.5		A		
21	Old Bridge Rd & Touchstone Circle	Unsignalized	WB	Through-Right	0.0	A	0.0	A	0.0	A	0.0	A	
			SB	Right	25.5	D	25.5	D	117.7	F	17.7	F	
			Overall		0.7		A		4.9		A		

Legend:

XXX	LOS E
XXX	LOS F

Section 8

QUEUING ANALYSIS FOR TURNING MOVEMENTS

For Existing Year (2022) and Horizon Year (2045)

Overview

In this section, the queue length faced by vehicles is analyzed. The respective queues developed at each intersection are analyzed in this section. Queue lengths can be calculated as maximum queue length (95th percentile), average queue length (50th percentile), or field-measured queue length. The 95th percentile queue is defined to be the maximum back of queue with 95th percentile of traffic volumes, and it accounts for fluctuation in traffic arrival. The 95% percentile is the length best utilized to determine a proposed turn lane's length.

All intersections are reviewed as a part of the analysis. To model the queues, Synchro 11.1^{TM} was used to approximate the lengths needed, based on forecasted traffic volumes for the Existing Year (2022) and Horizon Year (2045). The approximate queue length of each turn lane, as appropriate for the study intersections, was obtained. These approximate queue length values were analyzed in accordance with proposed turn lane lengths shown in the current Route 294 & Old Bridge Road intersection improvement plans and the current VDOT Road Design Manual, Appendix F's guidelines for turn lane lengths.

All described queue lengths presented in this report figuratively discuss the length of the full-width turn bay only. All taper lengths constructed as part of the project shall comply with VDOT's Road Design Manual, Appendix F, based on the design speed of the roadway. This report assumes that based on the current plans, all taper lengths for all constructed or reconstructed turn lanes will meet VDOT's requirements.

Existing Year (2022) Queuing Analysis

At the request of VDOT NOVA TE during scoping of this report for comparative purposes, a queuing analysis was conducted for both AM & PM peak hours for all study intersections. See **Appendix J** for the Synchro^{TM} results, which are also summarized in **Table 8-1**.

Horizon Year (2045) Queuing Analysis

Queuing analysis was conducted for both AM & PM peak hours for all study intersections. See **Appendix J** for the Synchro^{TM} results, which are also summarized in **Table 8-2**.

As shown in **Table 8-3**, the following was observed:

- Intersection #2 – Prince William Parkway & Laurel Hills Drive
  - The eastbound through queue extends to the adjacent intersections during the AM and PM peak hours.
  - The westbound through-right queue extends past the driveway 260 feet from the intersection.
- Intersection #4 – Prince William Parkway & Old Bridge Road
  - The southbound left and through queues will extend beyond the available storage during the PM peak hour.
  - The westbound through-right queue will extend beyond the adjacent intersection during the PM peak hour.
- Intersection #6 – Old Bridge Road & Troupe Street/Shopping Center Entrance
  - The eastbound and westbound through queues extend beyond the available storage during the AM and PM peak hours.
  - The eastbound left, northbound, and southbound queues extend to adjacent driveways during the PM peak hour.
- Intersection #7 – Old Bridge Road & Titania Way/Touchstone Circle
  - The eastbound left, westbound through, and southbound left-through queues extend to adjacent stop-controlled intersections during the PM peak hours.
- Intersection # 10 – Old Bridge Road & Westridge Drive/Rockwood Lane
  - The eastbound left queue extends beyond the available storage during the AM and PM peak hours
  - The westbound through queue extends beyond the adjacent church entrance during the PM peak hour.
- Intersection #16 – Prince William Parkway & Kennwood Drive/School Entrance
  - The eastbound queue extends beyond the adjacent stop-controlled intersection during the PM peak hour.
  - The northbound through queue extends into the Prince William Parkway & Hillendale Road intersection during the PM peak hour.
- Intersection #17 – Prince William Parkway & Hillendale Road
  - The eastbound left queue extends beyond the existing storage during the AM and PM peak hours.
  - The eastbound right queue extends to the adjacent intersection during the PM peak hour.
  - The northbound left queue extends beyond the adjacent intersection during the PM peak hour.
  - The southbound through queue extends beyond the adjacent shopping center entrance during the AM peak hour.

At intersection #4, Prince William Parkway and Old Bridge Road, the southbound left turn lane queues will extend beyond the proposed storage length during the AM and PM peak hours. To provide turn lanes acceptable for the maximum 95th percentile queues, the following storage lengths should be utilized:

- Prince William Parkway Southbound Left – 600 feet
- Old Bridge Road Westbound Left – 550 feet

The following is recommended to mitigate the queueing issues at the intersections surrounding Prince William Parkway and Old Bridge Road:

- Old Bridge Road & Titania Way/Touchstone Circle – Extend eastbound left storage to 150 feet
- Old Bridge Road & Westridge Drive/Rockwood Lane – Extend eastbound left storage to 250 feet

Table 8-1: Existing Year (2022) – Design Year for Queue Lengths

Existing Conditions

Queue Length Results

Existing Year (2022) Queue Lengths (Synchro 95th Percentile Queue Lengths)							
Intersection		Control Type	Approach	Lane Group	Available Storage	AM Peak	PM Peak
1	Prince William Pkwy & Black Forest Ln/Reids Prospect Dr	Unsignalized	EB	Left	465	12	18
			WB	Left	450	8	12
			NB	Left-Through-Right	760*	0	28
			SB	Left-Through-Right	265*	140	148
2	Prince William Pkwy & Laurel Hills Dr	Signalized	EB	Left	460	0	#29
				Through-Right	460	697	#781
			WB	Left	470	m#230	m#84
				Through-Right	260*	m113	m382
			NB	Left-Through-Right	40*	0	0
			SB	Left-Through-Right	780*	0	0
3	Prince William Pkwy & Seeton Square	Unsignalized	SB	Right	95*	5	7
4	Prince William Pkwy & Old Bridge Rd	Signalized	EB	Left	325	m#432	m#629
				Through	600*	#673	#940
				Right	600*	#1430	509
			WB	Left	285	246	#861
				Through-Right	600*	348	448
			NB	Left	975	#975	#1668
				Through	1510*	#683	#1320
				Right	550*	2	380
			SB	Left	250	m#128	m#249
				Through	205*	m81	m166
				Right	205	m23	m93
5	Old Bridge Rd & Tribe at the Glen Entrance	Unsignalized	NB	Right	250*	2	5
6	Old Bridge Rd & Troupe St/Shopping Center Entrance	Signalized	EB	Left	175	m29	m94
				Through	275*	m357	m236
				Right	210	m10	m0
			WB	Left	335	144	m#254
				Through	615*	684	560
				Right	630*	0	9
			NB	Left-Through	320*	181	#424
				Right	330*	103	#308
			SB	Left-Through	190*	114	#375
				Right	100	0	0

* To adjacent driveway or intersection

Queue exceeds available storage

95th percentile volume exceeds capacity; queue may be longer. Queue shown is maximum after two cycles.

m volume for 95th percentile queue is metered by upstream signal

Existing Year (2022) Queue Lengths (Synchro 95th Percentile Queue Lengths)							
Intersection		Control Type	Approach	Lane Group	Available Storage	AM Peak	PM Peak
7	Old Bridge Rd & Titania Way/Touchstone Circle	Signalized	EB	Left	145	m2	m44
				Through	640*	100	m266
				Right	640*	m0	m0
			WB	Left	225	m4	m3
				Through	600*	479	1202
				Right	440	m4	m9
			NB	Left-Through-Right	350*	56	76
			SB	Left-Through	260*	111	#337
				Right	270*	0	27
8	Old Bridge Rd & Brussels Way	Unsignalized	SB	Right	415*	5	2
9	Old Bridge Rd & Old Bridge Ln/Church Entrance	Unsignalized	EB	Left	365	0	2
			WB	Left	225	2	6
			NB	Left-Through-Right		127	27
			SB	Left	240*	3	4
				Right	240*	0	0
10	Old Bridge Rd & Westridge Dr/Rockwood Ln	Signalized	EB	Left	165	93	410
				Through-Right	480*	557	752
			WB	Left	300	15	22
				Through	965*	577	#1390
				Right	1000	27	48
			SB	Left-Through	1030*	241	239
				Right	1030*	251	283
11 & 12	Touchstone Circle & Exxon/Shopping Center	Unsignalized	EB	Right	60*	2	5
			WB	Right	115*	6	11
13	Touchstone Circle & Seeton Square	Unsignalized	EB	Left-Through-Right	105*	2	6
			WB	Left-Through-Right	55*	13	48
			NB	Left	55*	3	2
14	Touchstone Circle & Merchant Plaza/CVS	Unsignalized	EB	Left-Through-Right	140*	3	14
			WB	Left-Through-Right	150*	1	17
			NB	Left	240*	2	6
			SB	Left	230*	0	0
15	Prince William Pkwy & Chinn Park Dr	Unsignalized	WB	Right	350*	2	7

Table 8-1: Existing Year (2022) – Design Year for Queue Lengths Cont.

Existing Conditions

Queue Length Results

Existing Year (2022) Queue Lengths (Synchro 95th Percentile Queue Lengths)							
Intersection		Control Type	Approach	Lane Group	Available Storage	AM Peak	PM Peak
16	Prince William Pkwy & Kennwood Dr/School Entrance	Signalized	EB	Left-Through-Right	190*	161	#272
			WB	Left-Through	415*	68	47
				Right	415*	0	0
			NB	Left	195	19	144
				Through	650*	242	685
				Right	245	1	0
			SB	Left	230	m23	m2
				Through	1560*	m610	423
				Right	235	m0	m2
17	Prince William Pkwy & Hillendale Rd	Signalized	EB	Left	125	205	182
				Right	295*	353	278
			NB	Left	475	#233	#769
				Through	610*	260	449
			SB	U-Turn	350	0	0
				Through	320*	724	521
				Right	500	16	18
18	Troupe St & Chinn Park Dr	Unsignalized	EB	Left	285*	7	8
			WB	Left	430*	0	0
			NB	Left	90*	2	3
				Through-Right	90*	7	22
			SB	Left	215*	2	12
				Through-Right	215*	18	19

* To adjacent driveway or intersection

Queue exceeds available storage

95th percentile volume exceeds capacity; queue may be longer. Queue shown is maximum after two cycles.

m volume for 95th percentile queue is metered by upstream signal

Table 8-2: Horizon Year (2045) – Design Year for Queue Lengths

With Proposed Prince William Parkway & Old Bridge Road Improvements [Build Option]

Queue Length Results

Future Year (2045) Queue Lengths (Synchro 95th Percentile Queue Lengths)							
Intersection		Control Type	Approach	Lane Group	Available Storage	AM Peak	PM Peak
1	Prince William Pkwy & Black Forest Ln/Reids Prospect Dr	Unsignalized	EB	Left	465	24	28
			WB	Left	450	16	22
			NB	Left-Through-Right	760*	0	50
			SB	Left-Through-Right	265*	166	76
2	Prince William Pkwy & Laurel Hills Dr	Signalized	EB	Left	460	0	16
				Through-Right	460	#1279	1216
			WB	Left	470	m#237	m35
				Through-Right	260*	489	m758
			NB	Left-Through-Right	40*	0	2
			SB	Left-Through-Right	780*	0	0
3	Prince William Pkwy & Seeton Square	Unsignalized	SB	Right	95*	19.5	28
4	Prince William Pkwy & Old Bridge Rd	Signalized	WB	Left	310/600	#375	m#638
				Right	800*	227	m132
			NB	Through	1510*	459	#816
				Right	550*	355	272
			SB	Left	465	m292	#698
				Through	600*	m30	161
5	Old Bridge Rd & Tribe at the Glen Entrance	Unsignalized	NB	Right	250*	3	13
6	Old Bridge Rd & Troupe St/Shopping Center Entrance	Signalized	EB	Left	175	m185	m377
				Through	275*	218	m279
				Right	210		
			WB	Left	335	m123	m154
				Through	615*	380	m#1028
				Right	630*		
			NB	Left	320*	93	m318
				Through		m59	m50
				Right	330*	47	m281
			SB	Left	190*	106	#262
				Through		20	58
				Right	100	16	157
7	Old Bridge Rd & Titania Way/Touchstone Circle	Signalized	EB	Left	145	39	m#395
				Through	640*	353	m#1309
				Right	640*	m0	m0
			WB	Left	225	m8	m3
				Through	600*	603	m1145
				Right	440	m4	m27
			NB	Left-Through-Right	350*	52	63
			SB	Left-Through	260*	118	#331
				Right	270*	16	109
8	Old Bridge Rd & Brussels Way	Unsignalized	SB	Right	415*	2	2
9	Old Bridge Rd & Old Bridge Ln/Church Entrance	Unsignalized	EB	Left	365	1	4
			WB	Left	225	2	9
			NB	Left-Through-Right		21	6
			SB	Left	240*	0	1
				Right	240*	0	0
10	Old Bridge Rd & Westridge Dr/Rockwood Ln	Signalized	EB	Left	165	#216	m#557
				Through-Right	480*	116	1168
			WB	Left	300	16	26
				Through	965*	#773	#1692
				Right	1000	27	49
			NB	Left-Through-Right		0	0
			SB	Left-Through	1030*	232	213
				Right	1030*	238	284
11 & 12	Touchstone Circle & Exxon/Shopping Center	Unsignalized	EB	Right	60*	1	4
			WB	Right	115*	5	10
			NB	Left	115	1	1
13	Touchstone Circle & Seeton Square	Unsignalized	EB	Left-Through-Right	105*	0	2
			WB	Left-Through-Right	55*	2	7
			NB	Left	55*	1	1
14	Touchstone Circle & Merchant Plaza/CVS	Unsignalized	EB	Left-Through-Right	140*	2	35
			WB	Left-Through-Right	150*	1	27
			NB	Left	240*	1	7
			SB	Left	230*	0	0
15	Prince William Pkwy & Chinn Park Dr	Unsignalized	WB	Right	350*	2	11

* To adjacent driveway or intersection

Queue exceeds available storage

95th percentile volume exceeds capacity; queue may be longer. Queue shown is maximum after two cycles.

m volume for 95th percentile queue is metered by upstream signal

[1]Queue Results are maximum queue from SimTraffic

Table 8-2: Horizon Year (2045) – Design Year for Queue Lengths Cont.

With Proposed Prince William Parkway & Old Bridge Road Improvements [Build Option]

Queue Length Results

Future Year (2045) Queue Lengths (Synchro 95th Percentile Queue Lengths)							
Intersection		Control Type	Approach	Lane Group	Available Storage	AM Peak	PM Peak
16	Prince William Pkwy & Kennwood Dr/School Entrance	Signalized	EB	Left-Through-Right	190*	132	234
			WB	Left-Through	415*	63	43
				Right	415*	0	0
			NB	Left	195	m17	m166
				Through	650*	529	696
				Right	245	2	m0
			SB	Left	230	m29	m4
				Through	1560*	#812	m740
				Right	235	m1	m45
17	Prince William Pkwy & Hillendale Rd	Signalized	EB	Left	125	186	208
				Right	295*	259	326
			NB	Left	475	#173	#848
				Through	610*	301	71
			SB	U-Turn	350	0	0
				Through	320*	#980	76
				Right	500	m36	m6
18	Troupe St & Chinn Park Dr	Unsignalized	EB	Left	285*	13	22
			WB	Left	430*	0	0
			NB	Left	90*	3	8
				Through-Right	90*	10	65
			SB	Left	215*	2	52
				Through-Right	215*	24	55
19[1]	Mohammadia Center (North)	Unsignalized	SB	Right	350	38	0
20[1]	Mohammadia Center (South)	Unsignalized	SB	Right	100	0	0
21	Old Bridge Rd & Touchstone Circle	Unsignalized	SB	Right		10	43

* To adjacent driveway or intersection

Queue exceeds available storage

95th percentile volume exceeds capacity; queue may be longer. Queue shown is maximum after two cycles.

m volume for 95th percentile queue is metered by upstream signal

[1]Queue Results are maximum queue from SimTraffic

Section 9

PRINCIPAL FINDINGS

The following summarizes the principal findings of this report:

Overall, with the proposed improvements associated with the Prince William Parkway & Old Bridge Road intersection project, the corridor is expected to experience an improvement in travel conditions (delay) compared to a scenario in which no improvements are constructed. The following is further observed for unsignalized intersections:

Unsignalized Intersections (Opening Year [2026] & Horizon Year [2045]): In both the AM and PM peak hours, the majority of the side-street approaches at unsignalized intersections improved as part of the Prince William Parkway & Old Bridge Road intersection project and are expected to continue to experience acceptable levels of service (LOS "D" or better for urban conditions) for all movements. Intersection #14, Touchstone Circle & Merchant Plaza/CVS, and Intersection #18, Chinn Park Drive & Troupe Street, are expected to experience increased delay as a result of the project due to increased traffic being rerouted through the intersections.

For signalized intersection, the following is further observed:

Opening Year (2026) Traffic Forecast Conclusions: (Signalized Intersections)

Signalized Intersections: In both the AM and PM peak hours, the majority of the signalized intersections improved or continued to operate similarly as part of the Prince William Parkway & Old Bridge Road Project ("Build Condition"). The observations for the signalized intersections are as follows:

- **Intersection #2**: Prince William Parkway & Laurel Hills Drive/Ridgewood Center Drive:
  - **AM PEAK HOUR:** The intersection delay in the AM Peak hour is approximately the same in the Build Condition vs. the No-Build Condition. The delay for the failing westbound left movement improves by 8 seconds between the Building Condition vs. the No-Build Condition, however, continues to fail. The overall level of service remains LOS C.
  - **PM PEAK HOUR:** The intersection delay in the PM Peak hour is approximately the same in the Build Condition vs. the No-Build Condition. The LOS for the eastbound left and westbound left movement fails in both the No-Build and Build Conditions, but is no worse in the Build condition. The failing westbound left movement improves to LOS E in the Build condition.
- **Intersection #4**: Prince William Parkway & Old Bridge Road:
  - **AM PEAK HOUR:** The intersection delay in the AM peak hour improves from LOS F in the No-Build Condition to and acceptable LOS C in the Build Condition. All movements and approaches improve to LOS D or better in the Build Condition.
  - **PM PEAK HOUR:** The intersection delay in the PM peak hour improves from LOS F in the No-Build Condition to and acceptable LOS C in the Build Condition. All movements and approaches improve to LOS D or better in the Build Condition.
- **Intersection #6**: Old Bridge Road & Troupe Street/Glen Shopping Center:
  - **AM PEAK HOUR:** The intersection delay in the AM peak hour increases however, remains LOS C in the Build Condition vs. No-Build Condition. The eastbound left Level of service improves to LOS C in the Build Condition. With the addition of designated left turn lanes on the northbound and southbound approaches, the northbound approach to LOS C and the southbound approach improves to LOS D.
  - **PM PEAK HOUR:** The intersection delay in the PM Peak hour increases however, remains LOS D in the Build Condition vs. No-Build Condition. Delay for all movements improves in the Build Condition, except the eastbound left and northbound right.
- **Intersection #7**: Old Bridge Road & Titania Way/Touchstone Circle:
  - **AM PEAK HOUR:** The intersection delay and LOS in the AM Peak hour remain acceptable in the Build Condition vs. the No-Build Condition. The northbound LOS improves from LOS E to LOS D and the southbound right delay improves, but remains LOS E.
  - **PM PEAK HOUR:** The intersection delay in the PM Peak hour worsens to LOS D in the Build Condition vs. the No-Build Condition, however, remains acceptable. The eastbound left delay more than doubles, and Level of service worsens to LOS F. All other movements and approaches remain approximately the same as the No-Build Condition.
- **Intersection #10**: Old Bridge Road & Rockwood Lane/Westridge Drive:
  - **AM PEAK HOUR:** The movements, approaches, and intersection LOS in the AM Peak hour is unchanged in the Build Condition vs. the No-Build Condition.
  - **PM PEAK HOUR:** The intersection delay in the PM Peak hour increases by approximately 12 seconds and remains an acceptable LOS D in the Build Condition vs. the No-Build Condition. Movement delays increase; however, all level of service remain the same in the Build Condition vs. the No-Build Condition.
- **Intersection #16**: Prince William Parkway & Kennwood Drive:
  - **AM PEAK HOUR:** The intersection delay in the AM peak hour increases by 5 seconds and the LOS worsens to LOS C, which is still considered acceptable, in the Build Condition vs No-Build Condition. The southbound right LOS fails in the Build Condition. All other movements LOS and delay remain approximately the same.
  - **PM PEAK HOUR:** The intersection delay in the PM Peak improves by 3 seconds and the level of service remains an acceptable LOS C in the Build Condition vs. No-Build Condition. The eastbound approach continues to fail; however, all delays remain the same or improve in the Build Condition vs. No-Build Condition.

- **Intersection #17**: Prince William Parkway & Hillendale Road:

  - **AM PEAK HOUR:** The intersection delay in the AM peak remains approximately the same and level of service remains LOS C in the Build Condition vs. No-Build Condition. The northbound left movement continues to fail, but delay does not increase between the No-Build Condition and Build Condition.

  - **PM PEAK HOUR:** The intersection delay in the PM Peak hour increases by approximately 15 seconds and Level of service remains LOS F in the Build Condition vs. No-Build Condition. Delay for all approaches increase or remain approximately the same. All levels of service are unchanged in the Build Condition vs. No-Build Condition.

Horizon Year (2045) Traffic Forecast Conclusions: (Signalized Intersections)

- **Intersection #2**: Prince William Parkway & Laurel Hills Drive/Ridgewood Center Drive:

  - **AM PEAK HOUR:** The intersection delay in the AM Peak hour increases by 6 seconds in the Build Condition vs. the No-Build Condition. The delay for the failing westbound left movement increases by 6 seconds between the Building Condition vs. the No-Build Condition. The overall level of service remains LOS D.

  - **PM PEAK HOUR:** The intersection delay in the PM Peak hour increases by approximately 5 seconds and the level of service worsens to LOS C in the Build Condition vs. the No-Build Condition. The LOS for the eastbound left movement fails in the Build Conditions. The failing westbound left movement improves to LOS E in the Build condition. All other movements and approach delays remain approximately the same.

  - **Queueing:** The eastbound through queue extends to the adjacent intersections during the AM and PM peak hours. The westbound through-right queue extends past the driveway 260 feet from the intersection.

- **Intersection #4**: Prince William Parkway & Old Bridge Road:

  - **AM PEAK HOUR:** The intersection delay in the AM peak hour improves from LOS F in the No-Build Condition to and acceptable LOS C in the alternative configuration Build Condition. All movements and approaches improve to LOS D or better in the Build Condition.

  - **PM PEAK HOUR:** The intersection delay in the PM peak hour improves from LOS F in the No-Build Condition to and acceptable LOS C in the alternative configuration Build Condition. All movements and approaches improve to LOS D or better in the Build Condition.

  - **Queueing:** The westbound left queues will extend beyond the available storage of the outside left turn lane during the AM and PM peak hours. The northbound right queue will extend beyond the adjacent intersection during the PM peak hour. The southbound left queue will extend beyond the available storage during the PM peak hour.

- **Intersection #6**: Old Bridge Road & Troupe Street/Glen Shopping Center:

  - **AM PEAK HOUR:** The intersection delay in the AM peak increases by approximately 3 seconds, but remains an acceptable LOS C in the Build Condition vs No-Build Condition. The southbound delay improves by 18 seconds and LOS improves to LOS D in the Build Condition.

  - **PM PEAK HOUR:** The intersection delay in the PM Peak improves by approximately 5 seconds and LOS improves to LOS D in the Build Condition vs. No-Build Condition. Delay for the southbound approach improves by 15 seconds in the Build Condition, however, remains LOS F.

  - **Queueing:** The eastbound and westbound through-right queues extend beyond the available storage during the AM and PM peak hours. The eastbound left, northbound, and southbound queues extend to adjacent driveways during the PM peak hour.

- **Intersection #7**: Old Bridge Road & Titania Way/Touchstone Circle:

  - **AM PEAK HOUR:** The intersection delay and LOS in the AM Peak hour remain an acceptable LOS B in the Build Condition vs. the No-Build Condition. The northbound LOS improves from LOS E to LOS D and the southbound right LOS improves from LOS E to LOS D. The southbound left-through movement remains at LOS E, however the delay improves by 3 seconds.

  - **PM PEAK HOUR:** The intersection delay in the PM Peak hour worsens to LOS E in the Build Condition vs. the No-Build Condition. The eastbound left and westbound through levels of service degrade to failing conditions and the southbound left-through continues to fail. All other movements and approaches remain acceptable.

  - **Queueing:** The eastbound left, westbound through, and southbound left-through queues extend to adjacent stop-controlled intersections during the PM peak hours.

- **Intersection #10**: Old Bridge Road & Rockwood Lane/Westridge Drive:

  - **AM PEAK HOUR:** The movements, approaches, and intersection delays in the AM Peak hour are approximately the same in the Build Condition vs. the No-Build Condition.

  - **PM PEAK HOUR:** The intersection delay in the PM Peak hour increases by approximately 18 seconds and remains a LOS E in the Build Condition vs. the No-Build Condition. The westbound through movement and westbound approach levels of service degrade to LOS F and the eastbound approach degrades to LOS E in the Build Condition vs. the No-Build Condition.

  - **Queueing:** The eastbound left queue extends beyond the available storage during the AM and PM peak hours. The westbound through queue extends beyond the adjacent church entrance during the PM peak hour.

- **Intersection #16**: Prince William Parkway & Kennwood Drive:

    - **AM PEAK HOUR:** The intersection delay in the AM peak hour remains approximately the same and is an acceptable LOS C in the Build Condition vs No-Build Condition. All approach delay is unchanged.

    - **PM PEAK HOUR:** The intersection delay in the PM Peak increases by 4 seconds and the level of service remains an acceptable LOS C in the Build Condition vs. No-Build Condition. The eastbound approach continues to fail; however, the delay remains approximately the same in the Build Condition vs. No-Build Condition. The southbound approach delay increases by 10 seconds, however, remains an acceptable LOS C.

    - **Queueing:** The eastbound left queue extends beyond the available storage during the AM and PM peak hours. The westbound through queue extends beyond the adjacent church entrance during the PM peak hour.

- **Intersection #17**: Prince William Parkway & Hillendale Road:

    - **AM PEAK HOUR:** The intersection delay in the AM peak decreases by 1.5 seconds and level of service remains LOS E in the Build Condition vs. No-Build Condition. The northbound left movement continues to fail, but delay does not increase between the No-Build Condition and Build Condition.

    - **PM PEAK HOUR:** The intersection delay in the PM Peak hour increases by approximately 20 seconds and Level of service remains LOS F in the Build Condition vs. No-Build Condition. Delay for the southbound approach increases by 30 seconds and remains LOS F. All other approaches delays remain approximately the same. All levels of service are unchanged in the Build Condition vs. No-Build Condition.

    - **Queueing:** The eastbound left queue extends beyond the existing storage during the AM and PM peak hours. The eastbound right queue extends to the adjacent intersection during the PM peak hour. The northbound left queue extends beyond the adjacent intersection during the PM peak hour. The southbound through queue extends beyond the adjacent shopping center entrance during the AM peak hour.

Overall Conclusions and Recommendations:

Prince William County's Department of Transportation's Prince William Parkway & Old Bridge Road project would improve the congestion and increase capacity at Prince William Parkway & Old Bridge Road. In addition to reconfiguring the intersection, the following are recommended to further improve congestion along the corridor:

- Old Bridge Road & Troupe Street/Glen Shopping Center – Convert the existing eastbound right turn lane to through-right. Convert the existing westbound right turn to through-right.
- Old Bridge Road & Titania Way/Touchstone Circle – Convert the existing westbound right turn lane to through-right. Extend eastbound left storage to 150 feet.
- Old Bridge Road & Westridge Drive/Rockwood Lane – Extend eastbound left storage to 250 feet.