Riversbend Development

Suffolk, Virginia

PREPARED FOR

Land Planning Solutions (LPS)
5857 Harbour View Boulevard, Suite
202 Suffolk, VA 23435
757.935.9014

PREPARED BY

Vanasse Hangen Brustlin (VHB), Inc.
4500 Main Street, Suite 400
Virginia Beach, VA 23462

6/20/25

Table of Contents

List of Tables

List of Figures

Executive Summary

The proposed development is located in the City of Suffolk along N. Main Street, just south of Memorial Avenue. The parcel was previously utilized for a Virginia Department of Transportation (VDOT) operational facility. The Riversbend development is requesting a rezoning of approximately 73.5 acres from Business/Commercial land usage to Residential in order to support a mix of condominiums and townhomes. The remaining 15.3 acres of the total site is proposed to remain commercial, per the site plan completed by Land Planning Solutions (LPS), dated March 31, 2025. Detailed site plan is included in the **Appendix**.

The traffic study area includes the roadways and intersections along N. Main Street, Godwin Boulevard, and Pruden Boulevard in the vicinity of the proposed development. As currently proposed, the Riversbend development will increase the volume of traffic on roadways and at intersections throughout the study area, adding 515 and 535 trips during the AM and PM peak hours, respectively.

To maintain traffic operations within the study area and mitigate impacts associated with the proposed development, the following are recommended:

N. Main Street / Site Entrance

Construct site driveway to provide right-in only access.

- Provide a northbound right-turn lane (150' storage / 50' taper, within available property limits)

N. Main Street / Memorial Avenue / Edgewood Avenue

Reconstruct the intersection to include the following laneage:

- N. Main Street (northbound):
  - one exclusive left-turn lane (extend to include 200' storage / 100' taper)
  - two through lanes
  - one exclusive right-turn lane (200' storage / 80' taper to tie into proposed RI/RO driveway)
- N. Main Street (southbound):
  - one exclusive left-turn lane (180' storage / 100' taper)
  - one exclusive through lane
  - one shared through-right turn lane
- Memorial Avenue (eastbound):
  - one shared through-left lane
  - one exclusive right-turn lane
- Edgewood Avenue (westbound):
  - one full (left-through-right) movement lane

Construct a traffic signal. The signal shall be constructed and operational prior to either one of the following thresholds of development

- 100% construction and occupancy of the residential portion of the development OR
- 75% construction and occupancy of the residential portion of the development AND 50% construction and occupancy of the office portion of the development

The recommendations for this TIA have been limited to the proposed land uses listed in **Chapter 5**. Should the developer consider a fast-food restaurant with drive-thru or similar use that generates higher traffic volumes, an updated traffic impact study will be required.

In addition to site entrance improvements, optimized signal timings are recommended as summarized below:

N. Main Street Corridor

Maintain existing laneage and provide optimized signal timings at the following intersections:

- N. Main Street / Pruden Boulevard / Godwin Boulevard
- N. Main Street / Murphy's Mill Road
- N. Main Street / Louise Obici Lane / Northgate Lane
- N. Main Street / Lowe's entrance
- N. Main Street / Walmart entrance
- N. Main Street / Big Lots Entrance
- N. Main Street / Constance Road / US Route 58

Optimized timings should be provided within six months of project completion or with construction of the proposed signal at Memorial Avenue. It is assumed that the City operates the coordinated systems with up to four timing plans. Optimized timings should be developed using existing cycle lengths by time of day and include minor changes to existing corridor progression, limited to updated splits, offsets, and phasing sequences. Data collection for timings is assumed to be provided by the City via Grid Smart data, and the developer will provide updated timing plans and implementation of these timings by a licensed engineer.

1 Preface

1.1 Responsible Traffic Impact Study Certificate

The person identified below has had responsible charge of the attached study, its contents, and the methodologies employed in its creation. This person is a Licensed Professional Engineer in the Commonwealth of Virginia.

✓ Virginia Licensed Professional Engineer

Name (Signature): _____ Date: _____

Name (Print): Oliver Burke

License Number: 0402066657

Company: VHB

Address: 4500 Main Street, Suite 400

Virginia Beach, VA 23462

Telephone: 757.589.6621 Fax: N/A

Email: oburke@vhb.com

This report has been created utilizing nationally accepted methods, City of Suffolk, and Virginia Department of Transportation (VDOT) Standards and Requirements, and/or City approved alternate methodologies, and deviations from approved methodologies are summarized below.

2 Introduction

2.1 Project History and Background

The Riversbend development is a planned mixed-use development located in the City of Suffolk along N. Main Street, just south of Memorial Avenue. The parcel was previously utilized for a Virginia Department of Transportation (VDOT) operational facility. The Riversbend developer is requesting a rezoning of approximately 73.5 acres from Business/Commercial land usage to Residential in order to support a mix of condominiums and townhomes. The remaining 15.3 acres of the total site is proposed to remain commercial.

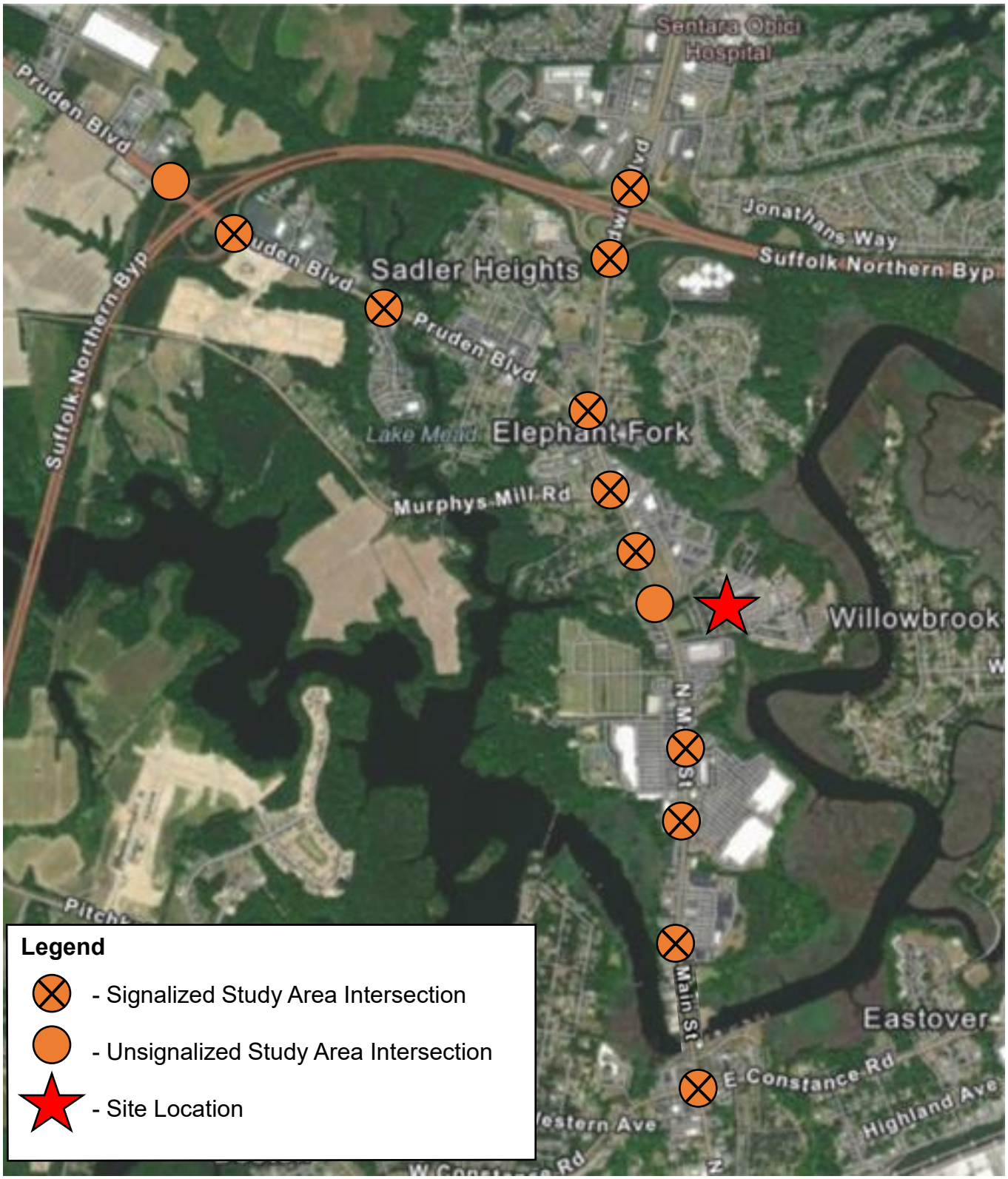
The developer is requesting a rezoning from B-2 to RU-12 to support 497 residential units as well as office and commercial uses. The development will have one driveway located on N. Main Street and a connection to the adjacent site with access provided via Memorial Avenue and Louise Obici Lane. The construction and occupancy timeline for the proposed development is approximately 5 years, with full build-out anticipated in 2030 and a 5-year horizon to 2035.

Figure 1 illustrates the site location and the study area intersections. As shown in Figure 1, N. Main Street runs in an approximate north/south direction with all the side streets oriented in an east/west direction. The site access is currently provided by two driveways, which were formally one way in and out. The proposed development will also have two access points with primary access provided via a signalized intersection at Memorial Avenue, and a secondary site entrance provided by a proposed right-in driveway, to be aligned with the existing full movement driveway to the west of N. Main Street approximately 335 feet south of the Edgewood Avenue and Memorial Avenue intersection.

Vanasse Hangen Brustlin, Inc (VHB) was retained to perform a traffic impact analysis for the proposed development. This report has been prepared for submittal to the City of Suffolk to evaluate existing and future traffic conditions. Assumptions regarding the study area, traffic generation, trip distribution, and traffic control were discussed with City of Suffolk staff prior to the completion of this analysis.

Study Area

North
Not to Scale



2.2 Site Location and Study Area

The study area for this analysis includes the following roadways and intersections, all existing intersections are signalized, unless otherwise noted.

Roadways

- N. Main Street

Existing Intersections

- Godwin Boulevard / US Route 58 westbound on/off ramps
- Godwin Boulevard / US Route 58 eastbound on/off ramps
- Pruden Boulevard / US Route 58 westbound on/off ramps
- Pruden Boulevard / US Route 58 eastbound on/off ramps
- Pruden Boulevard / Meade Parkway
- N. Main Street / Pruden Boulevard / Godwin Boulevard
- N. Main Street / Murphy's Mill Road
- N. Main Street / Louise Obici Lane / Northgate Lane
- N. Main Street / Edgewood Avenue (unsignalized)
- N. Main Street / Lowe's entrance
- N. Main Street / Walmart entrance
- N. Main Street / Big Lots Entrance
- N. Main Street / Constance Road / US Route 58

The study area roadway and intersections were identified during conversations with City of Suffolk staff.

Existing and Proposed Site Uses

The Riversbend development is located on the former VDOT District Office site. The 88.8-acre development is requesting a portion of the site be rezoned from B-2 to RU-12 to support residential development with a portion of the site maintaining a B-2 to support commercial and office land uses.

Within the immediate vicinity of the site, there are a variety of land uses that include restaurants, retail businesses, hotels, car dealerships, and numerous residential neighborhoods.

3 Analysis of Existing Conditions

3.1 Capacity Analysis at Critical Points

Intersection turning movement counts (TMCs) were used in conjunction with the number of lanes and traffic operations at each study intersection to determine existing and future levels of service. Level of Service (LOS) describes traffic conditions—the amount of traffic congestion—at an intersection or on a roadway. Table 1 shows the LOS and delay range for signalized and unsignalized intersections.

Table 1: Levels of Service and Ranges of Delay

LOS	Delay per Vehicle (seconds per vehicle)	
	Signalized	Unsignalized
A	≤ 10	≤ 10
B	> 10 – 20	> 10 – 15
C	> 20 – 35	> 15 – 25
D	> 35 – 55	> 25 – 35
E	> 55 – 80	> 35 – 50
F	> 80	> 50

3.2 Existing Roadways

N. Main Street is the primary external roadway providing access to the Riversbend Development, with connections to Godwin Boulevard and Pruden Boulevard to the north, and Constance Road to the south. The following provides a short description of the primary roadway.

- N. Main Street is a north/south oriented four-lane principal arterial in the City of Suffolk, providing connectivity to numerous residential and commercial developments. Within the project vicinity, N. Main Street has a 2022 ADT volume of 28,250 vehicles per day (VPD) and a posted speed limit of 35-mph.

3.3 Turning Movement Counts (TMCs)

Turning movement counts (TMC) were collected by Data Collection Group during the AM (7:00-9:00) and PM (4:00-6:00) peak periods on March 29 and 31, 2022, archive at the following intersections:

- Godwin Boulevard and US Route 58 westbound on/off ramps
- Godwin Boulevard and US Route 58 eastbound on/off ramps
- N. Main Street / Pruden Boulevard / Godwin Boulevard
- N. Main Street / Murphy's Mill Road
- N. Main Street / Louise Obici Lane
- N. Main Street / Lowe's entrance
- N. Main Street / Walmart entrance
- N. Main Street / Big Lots entrance
- N. Main Street / Constance Road / US Route 58
- Pruden Boulevard and US Route 58 eastbound on/off ramps
- Pruden Boulevard / Meade Parkway

TMCs were collected on May 3, 2022, for the following intersection:

- Pruden Boulevard and US Route 58 westbound on/off ramps

All counts collected in 2022 were grown to 2025 using a growth rate of one percent (1%) to get the Existing (2025) scenario volumes. The growth rate was applied using the methodology outlined in Chapter 4 (Future Conditions without Development).

Figure 2 illustrates the existing roadway conditions, laneages, storage lengths, speed limits, and traffic control at the study area intersections.

3.4 Average Daily Traffic (ADT) Counts

ADT counts were collected by Data Collection Group along Main Street and Edgewood Drive.

Historical 2022 TMC data is summarized in **Figure 3**. Projected 2025 TMC and collected 2022 ADT data are illustrated in **Figure 4**.

Detailed TMC and ADT data are included in the **Appendix**.

North
Not to scale

Pruden Blvd
STOP
(200') 125'
125' (50')
Rte 58 WB On/Off Ramp
Rte 58 EB Off Ramp
125' (125')
SPEED LIMIT 45
(125') 150'
Weade Pkwy
100' (100')
(100') 100'
75' (100')
(150') 275'
Rte 58 WB On/Off Ramp
50' (75')
Rte 58 EB Off Ramp
SPEED LIMIT 45
Godwin Blvd
275' (0')
(0') 150'
Murphys Mill Rd
(75') 100'
200' (200')
(125') 200'
125' (50')
Northgate Lane
Louise Obici Lane
200' (175')
STOP
Edgewood Ave
Memorial Ave
STOP
(0') 225'
Lowes Entrance
SPEED LIMIT 35
Main St
200' (150')
A
Walmart Entrance
(0') 175'
Big Lots Entrance
150' (75')
150' (0')
(0') 625'
200' (100')
Constance Rd
SPEED LIMIT 35
675' (0')
(150') 300'
125' (100')
Main St
A

Legend

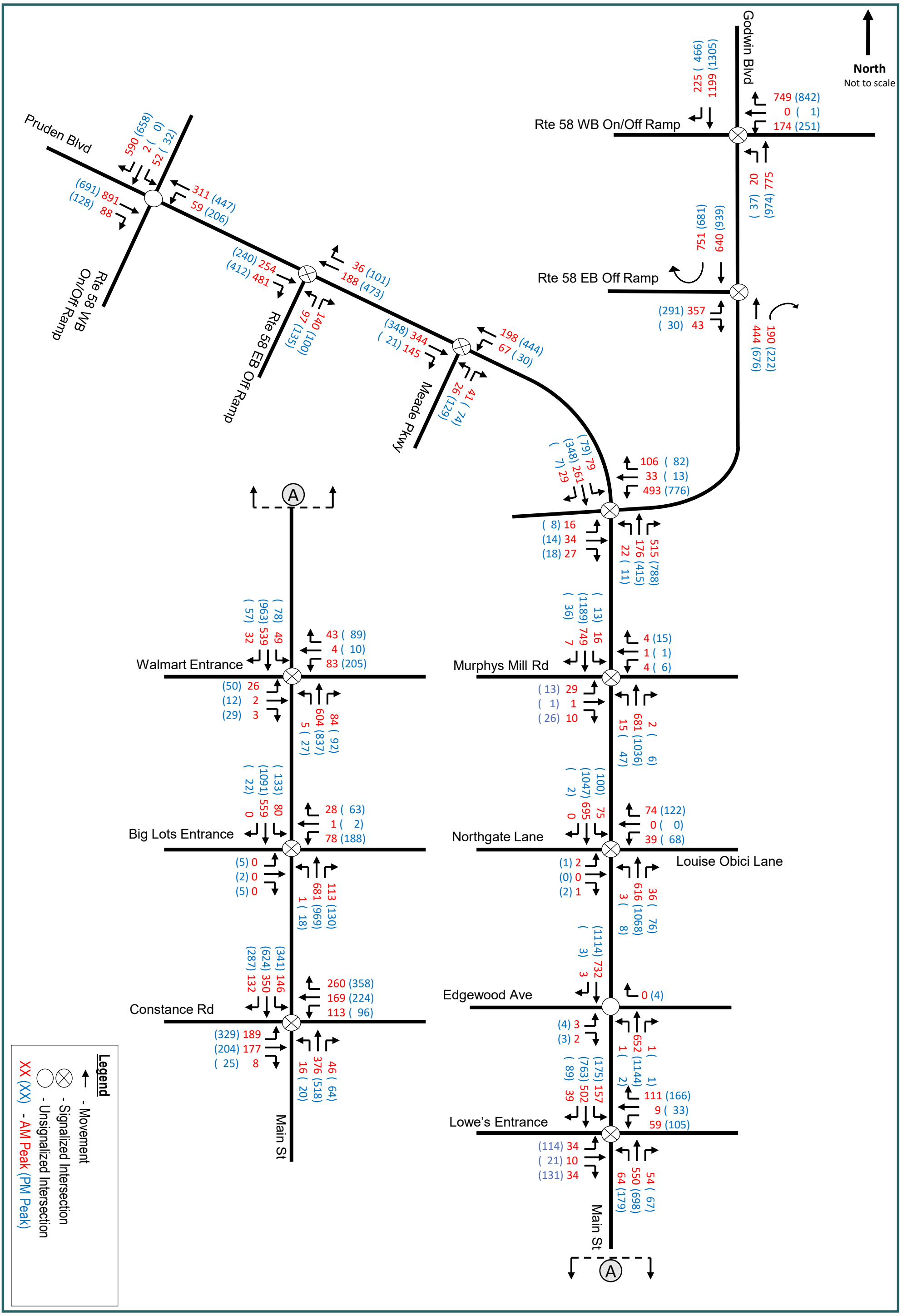
- Laneage
- Signalized Intersection
- Unsignalized Intersection
- Storage (Taper)
- Stop/Yield Controlled Movement
- Channelized Right Turn

XX' (XX')

Riversbend Development – Suffolk, VA

2025 Existing Roadway Conditions

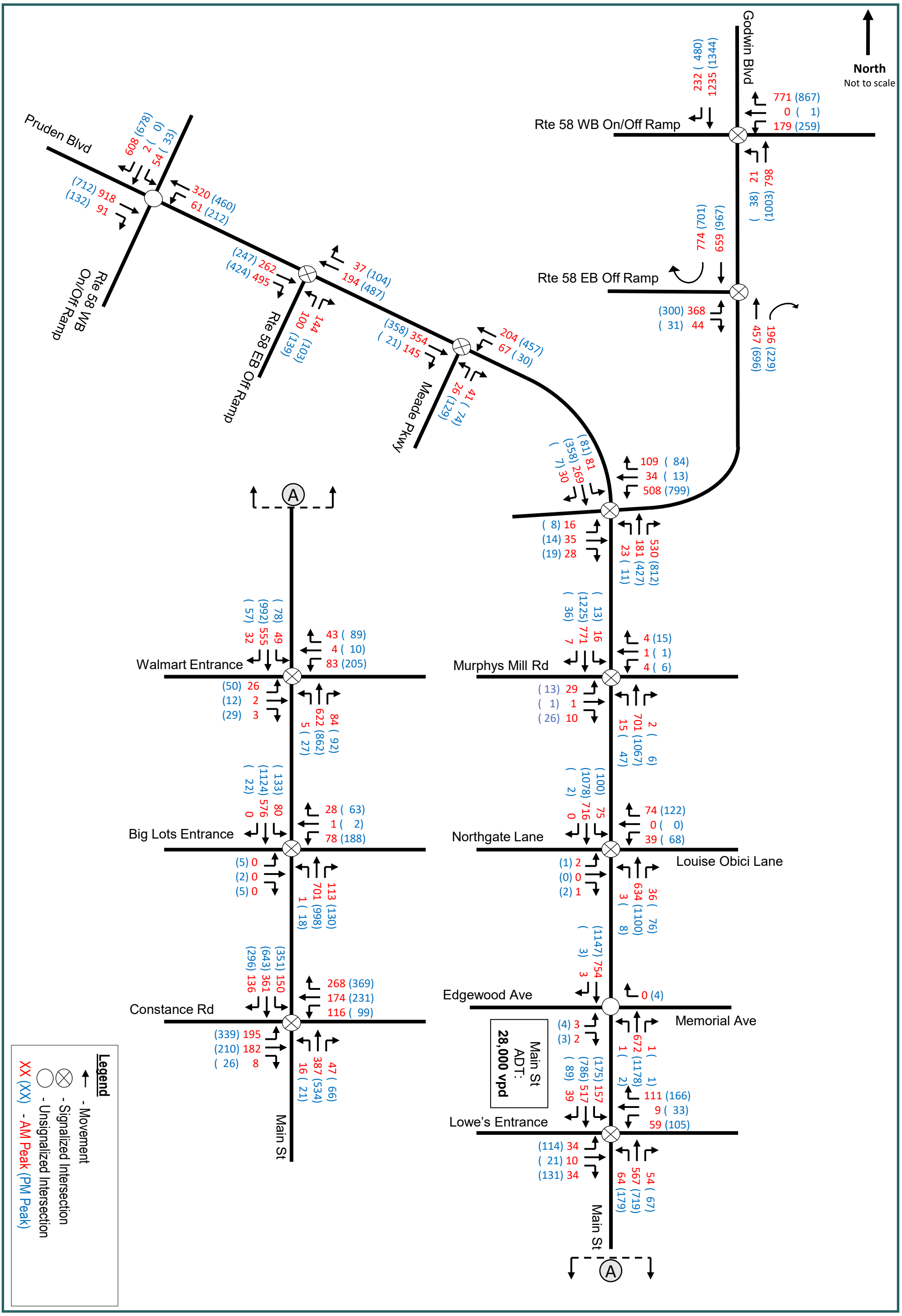
Figure 2



Riversbend Development – Suffolk, VA

2022 Historical Traffic Volumes

Figure 3



Riversbend Development – Suffolk, VA

2025 Projected Traffic Volumes

Figure 4

3.5 Capacity and Levels of Service Analyses at Critical Points

Capacity analyses for all intersections during the AM and PM peak hours were performed for the existing study area intersections. Analyses were completed to determine the operating characteristics of study area intersections using Synchro Professional 11, which uses methodologies contained in the 2000 Highway Capacity Manual (HCM) and HCM 6th Edition.

Level of service analyses were performed using existing signal timings combined with the existing traffic volumes noted above. To compare operations among various scenarios, detailed analyses are illustrated in **Tables 3 – 11 & 14 – 18** in **Chapter 7** to provide a side-by-side comparison.

4 Future Conditions without Development

4.1 Background Traffic Volumes

Background traffic growth is the increase in traffic volumes due to usage increases and non-specific growth throughout an area. One method of determining reasonable growth rates for an area is to research past traffic counts for a roadway to identify historical growth rates. Additionally, approved developments are considered and then combined with annual growth to establish background conditions.

A 1% growth rate was used based on historical data and consistency with recently approved studies. This annual growth rate was applied to all movements for the following intersections as these intersections serve general commuter traffic from all approaches:

- Godwin Boulevard and US Route 58 westbound on/off ramps
- Godwin Boulevard and US Route 58 eastbound on/off ramps
- Pruden Boulevard and US Route 58 eastbound on/off ramps
- Pruden Boulevard and US Route 58 westbound on/off ramps
- N. Main Street / Pruden Boulevard / Godwin Boulevard
- N. Main Street / Constance Road / US Route 58

For the remaining intersections, an annual growth rate of 1% was applied to only the northbound/southbound mainline through movements as it is assumed the side street volumes will not experience annual usage growth or will be captured in existing or approved development volumes. A growth rate of 1% applied exponentially over 5 years and 10 years results in growth factors of 1.05 and 1.10, respectively.

4.2 Approved Developments

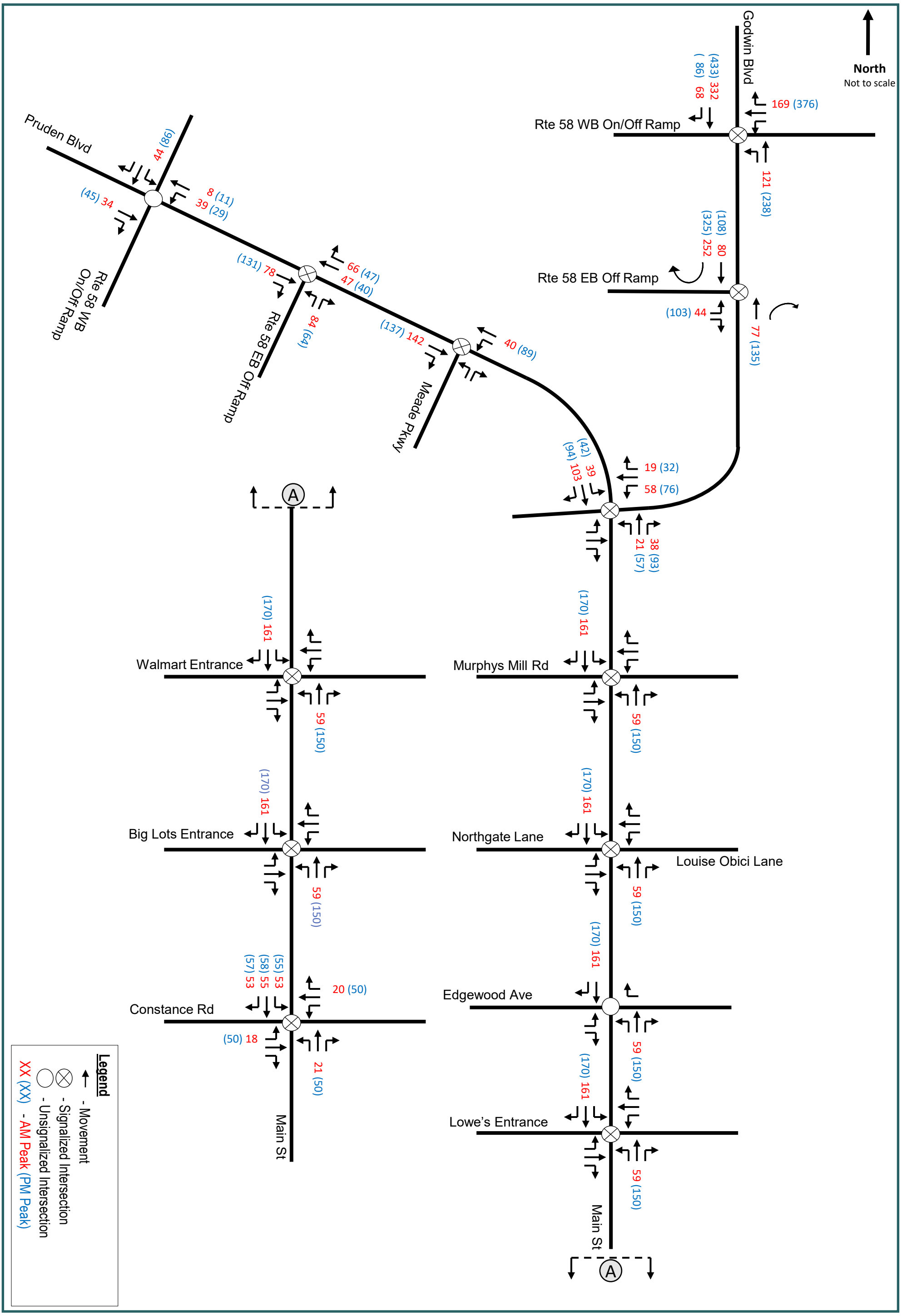
To evaluate future conditions, the study considered previously approved developments located within the project vicinity that have not reached full build-out. The City identified the following developments to be included in the background traffic:

1. Hallstead Reserve (2019)
2. Godwin Park (2020)
3. Planters Station (2014)
4. The Shoppes at Planters Station (2021)
5. Port 58 Apartments (2019)
6. The Gallery at Godwin (2020)
7. Nansemond River Golf Course (NRGC, 2021)

The location of these seven developments and the detailed trip assignments for these developments are included in the **Appendix**. Trips generated by these sites were obtained from the recently approved studies listed above. The total AM and PM peak hour approved development traffic volumes are illustrated in **Figure 5.**

The total Background traffic includes existing traffic volumes with applied annual growth and the additional approved development traffic. **Figures 6** and **7** illustrate the 2030 Background AM and PM peak volumes, respectively.

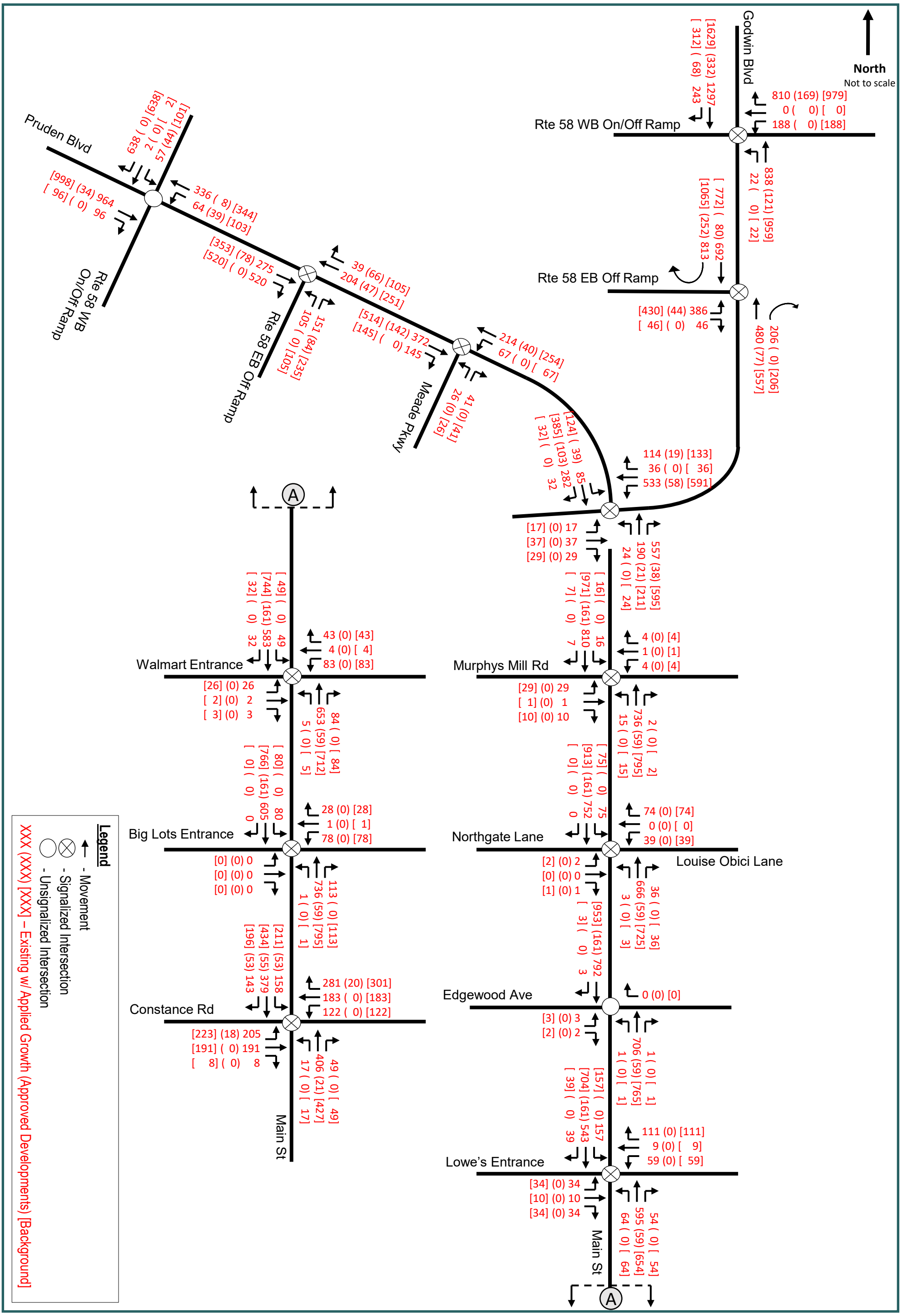
Figures 8 and **9** illustrate the 2035 Background AM and PM peak volumes, respectively, which includes an additional 5 years of annual growth applied to existing traffic volumes.



Riversbend Development – Suffolk, VA

Total Approved Development Site Trips

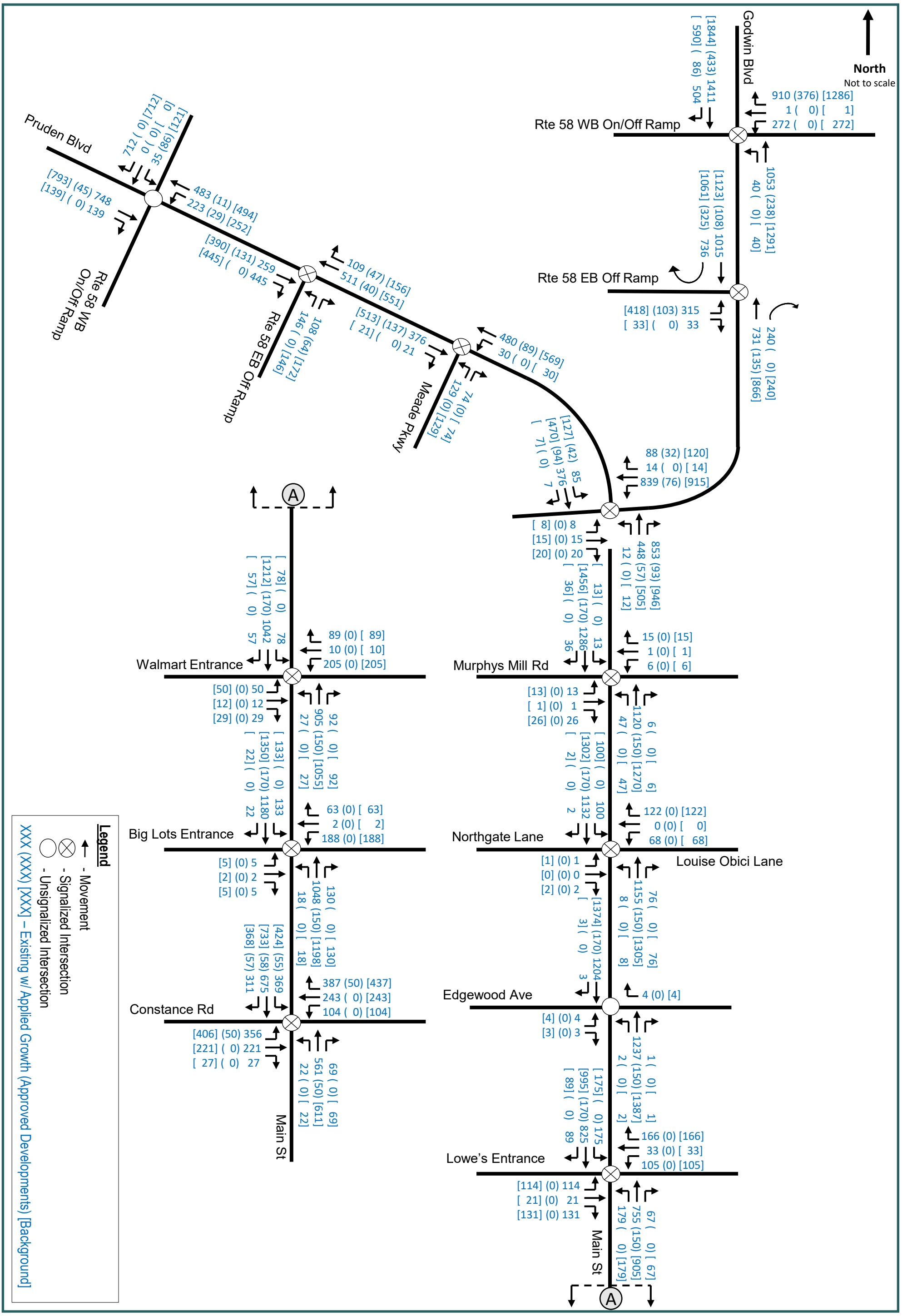
Figure 5



Riversbend Development – Suffolk, VA

2030 Background Traffic: AM Peak

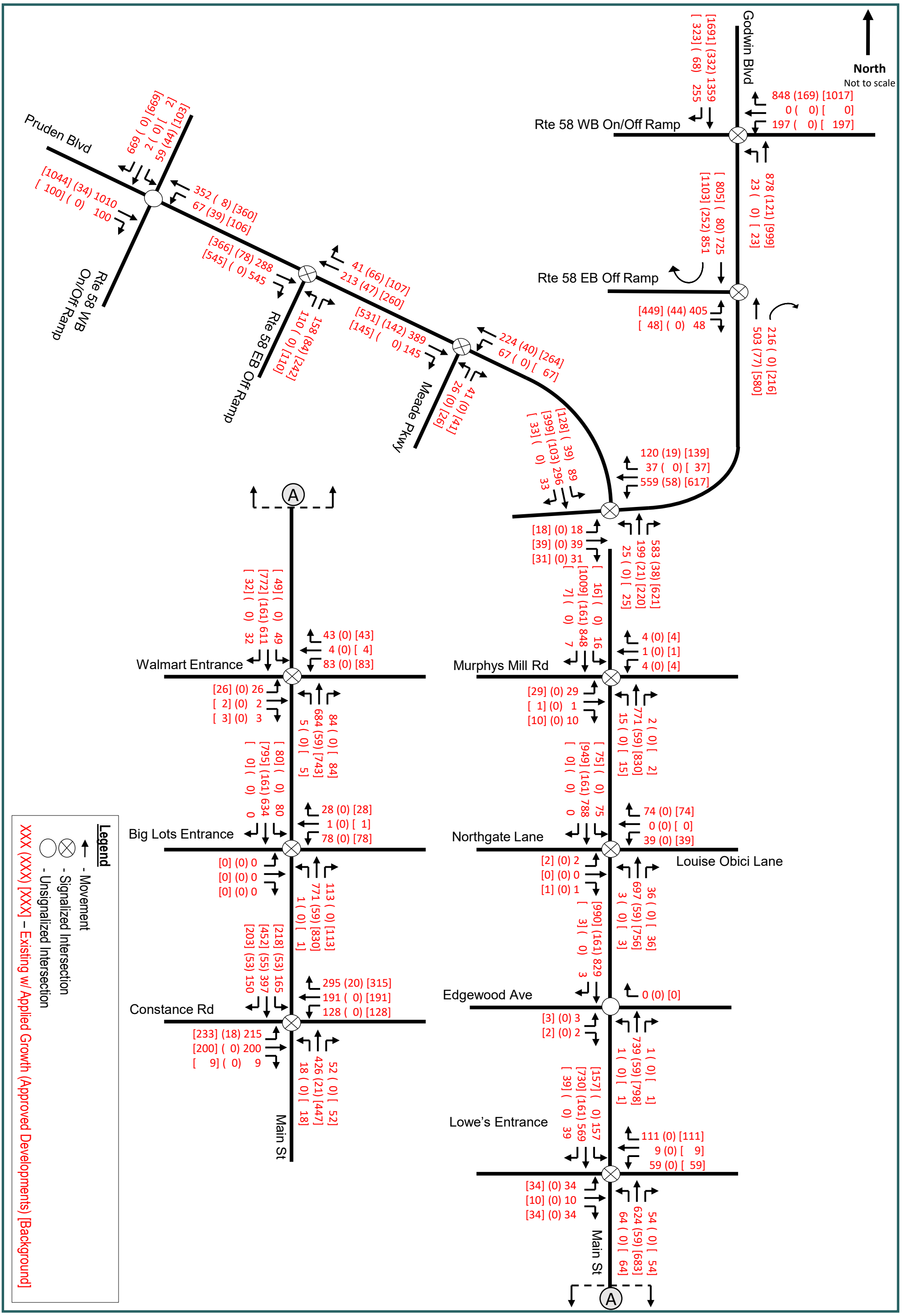
Figure 6



Riversbend Development – Suffolk, VA

2030 Background Traffic: PM Peak

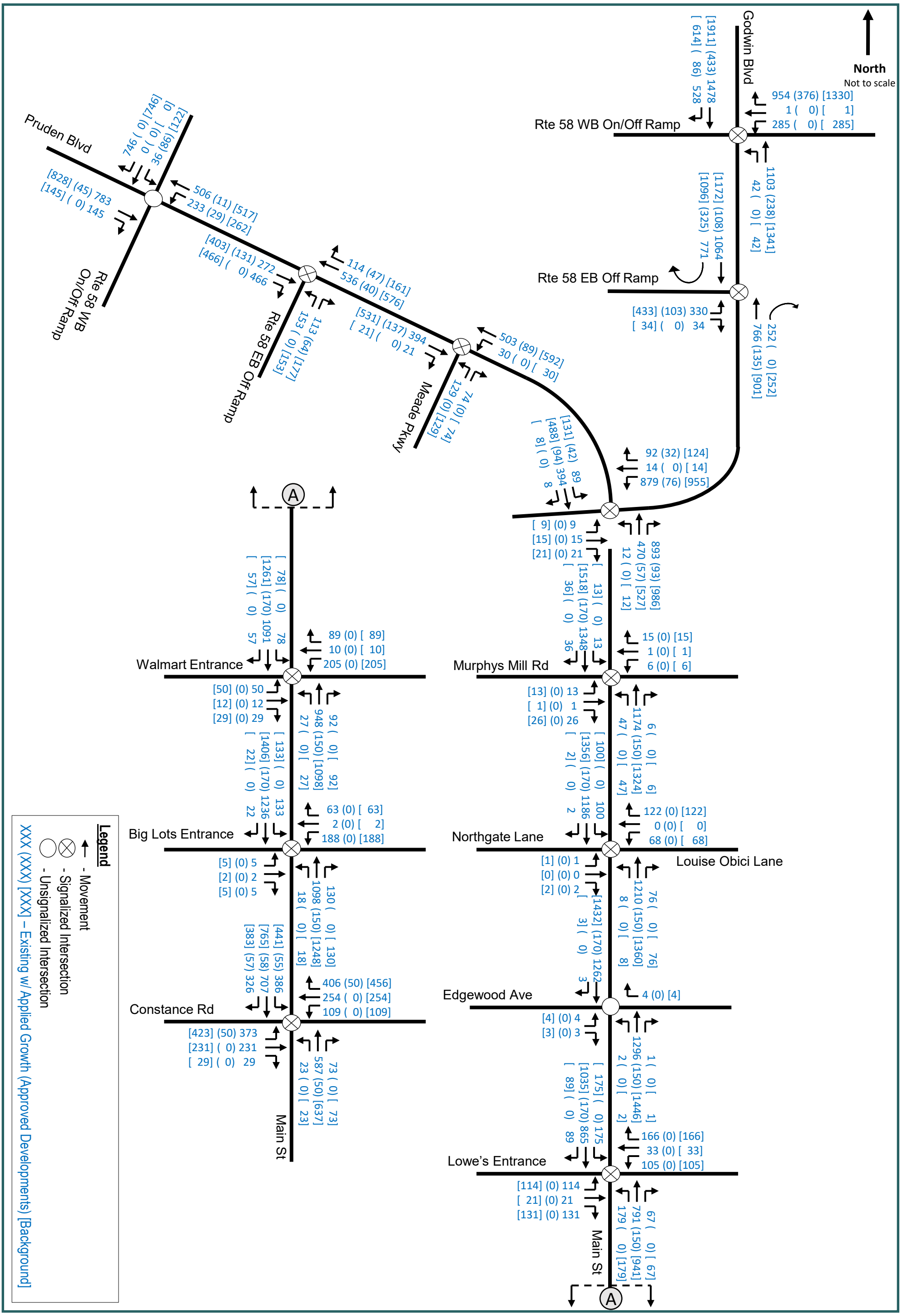
Figure 7



Riversbend Development – Suffolk, VA

2035 Background Traffic: AM Peak

Figure 8



Riversbend Development – Suffolk, VA

2035 Background Traffic: PM Peak

Figure 9

4.3 Capacity and Levels of Service Analyses at Critical Points

Analyses were completed to determine the operating characteristics of study area intersections and roadways using Synchro Professional 11, which uses methodologies contained in the 2000 Highway Capacity Manual (HCM) and HCM 6th Edition.

Level of service analyses for the Background scenarios were performed using existing signal timings.

To compare operations among various scenarios detailed analyses are illustrated in **Tables 3 – 11 & 14 – 18** in **Chapter 7** to provide a side-by-side comparison.

5 Trip Generation

Traffic generated by the proposed development was determined using trip generation methodology contained in the *Institute of Transportation Engineers (ITE) Trip Generation Manual, 11th Edition, 2021*.

5.1 Trip Generation

Table 2 summarizes the proposed trip generation for the Riversbend development being considered as part of this rezoning to support the residential uses in addition to by-right B-2 uses.

Table 2: Proposed Trip Generation

Land Use (ITE code)	Variable	Daily		AM Peak		PM Peak	
		In	Out	In	Out	In	Out
Residential Development							
Single Family Attached Housing (215)	329 units	1204	1203	39	120	111	78
Senior Adult Housing Multifamily (252)	168 units	272	272	12	22	24	18
Commercial Development							
High-Turnover (Sit-Down) Restaurant (932)	6 KSF	322	321	31	26	33	21
Office Development							
General Office Building (710)	232 employees	568	570	193	26	28	134
Medical Dental Office (720)	82 employees	263	262	34	12	33	55
Total		**5,257**		**515**		**535**	

Trips generated by the office portion of the development were generated using average rates based on employee counts. Employee counts were estimated using one 38,000 square foot (SF) building size, and one 20,400 SF building size for General Office (710), and one 20,000 SF building size for Medical Dental Office (720), with an applied average ratio of 1 employee per 250 square feet.

While there are higher generators allowed under the B2 zoning, the development criteria will restrict the ability to construct a fast-food with drive-thru or similar use. If these uses are requested in the future, an updated traffic impact study will be required.

Table 2 indicates that the proposed development has the possibility to generate approximately 515 and 535 trips in the AM and PM peak periods, respectively. Additionally, the site has the potential to generate 5,257 daily trips.

6 Site Traffic Distributions and Traffic Assignments

6.1 Traffic Distribution

The directional distribution and assignment of trips generated by the proposed development is based on a review of existing intersections, roadway volumes, and an understanding of travel patterns within the study area. The following assumptions were discussed and agreed upon with the City of Suffolk prior to moving forward with trip assignments and analysis.

The overall external distribution for the Riversbend development site are as follows and is within the **Appendix**:

Residential/General Office

- 5% to/from the north/west via Pruden Boulevard
- 10% to/from the north via Godwin Boulevard
- 10% to/from the south via N. Main Street
- 50% to/from the east via US Route 58 at Godwin Boulevard
- 5% to/from the east via E. Constance Road
- 15% to/from the west via US Route 58 at Pruden Boulevard
- 5% to/from the west via W. Constance Road

Local Commercial

- 20% to/from the north/west via Pruden Boulevard
- 20% to/from the north via Godwin Boulevard
- 20% to/from the south via N. Main Street
- 20% to/from the east via E. Constance Road
- 20% to/from the west via W. Constance Road

6.2 Internal Capture

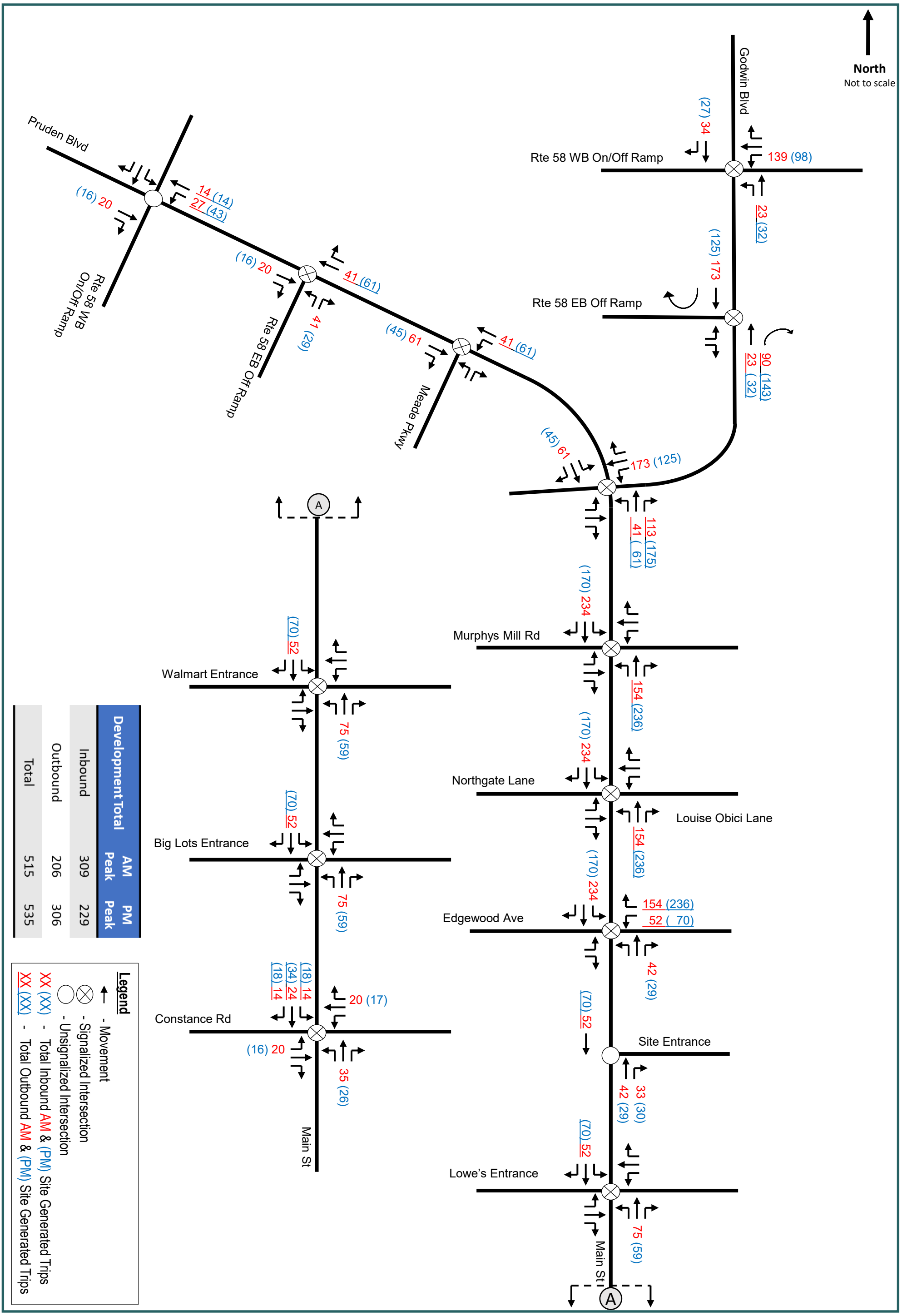
Internal capture accounts for those motorists who access multiple land uses during a single trip. While the proposed land uses may experience internal trips, internal capture was not applied in order to be conservative for analysis.

6.3 Pass-by

Pass-by trips are vehicles already on the roadway network generated from another primary origin and destination route that chose to make an intermediate stop without a route diversion. Given the proposed land uses for this development, pass-by reductions were not applied.

6.4 Traffic Assignments

The trip distribution percentages by land use listed above were applied to the proposed trip generation outlined in **Table 2**. The proposed AM and PM total site generated traffic is illustrated in **Figure 10**. Detailed trip assignments for each land use are located in the **Appendix**.



Riversbend Development – Suffolk, VA
Trip Distribution and Assignment
Total

Figure 10

7 Future Conditions with Development

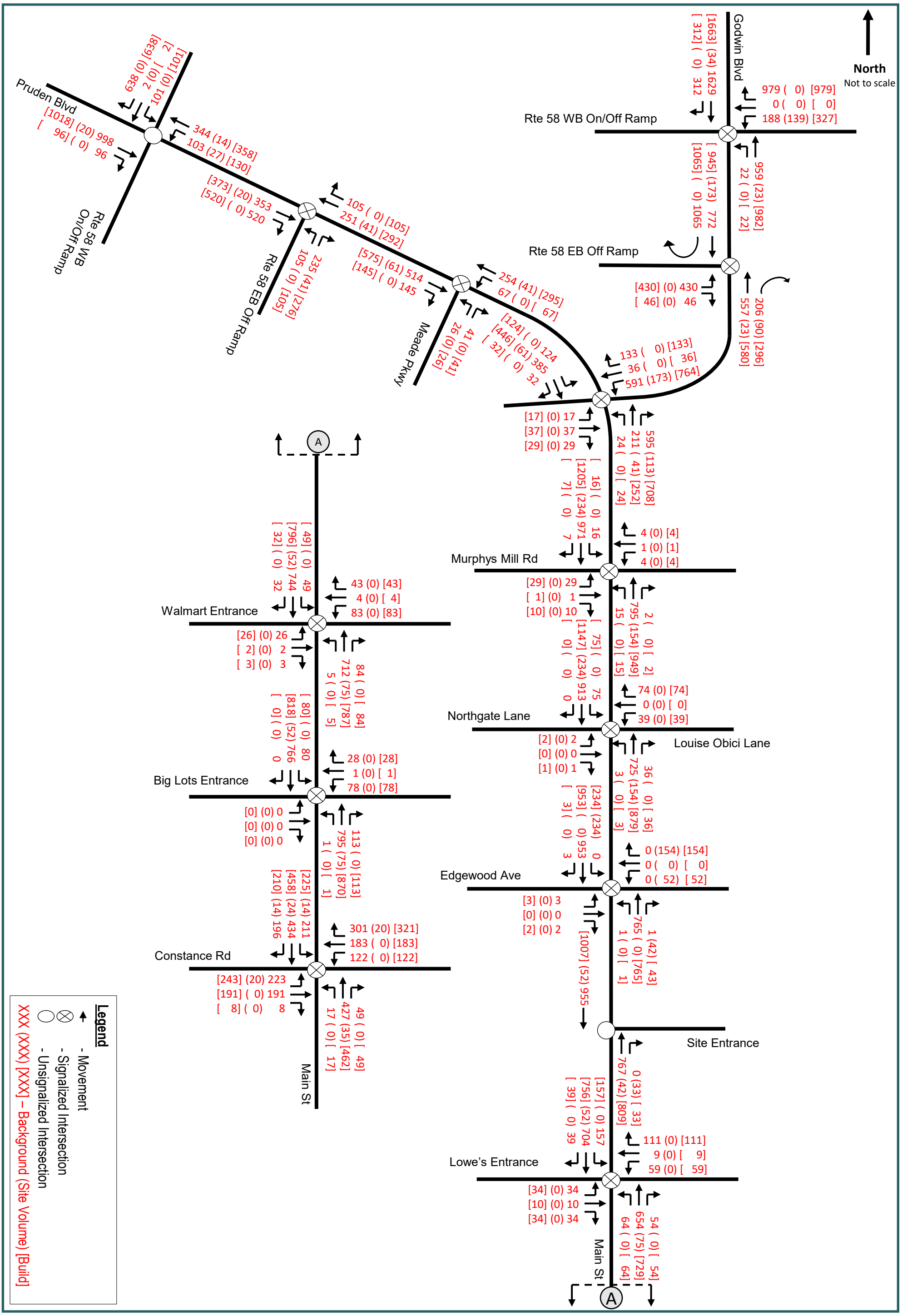
7.1 Daily and Peak Hour(s) Traffic Volumes

Total future traffic volumes represent the addition of new traffic generated by the proposed Riversbend development in addition to the Background traffic volumes. These resulting volumes are also referred to as "Build" volumes. The initial 2030 Build volumes are illustrated as follows:

- **Figure 11** – 2030 Build Traffic: AM Peak Hour
- **Figure 12** – 2030 Build Traffic: PM Peak Hour

Future Build conditions for 2035 were generated similar to the 2030 volumes by adding site generated traffic to the 2035 Background volumes, and are illustrated as follows:

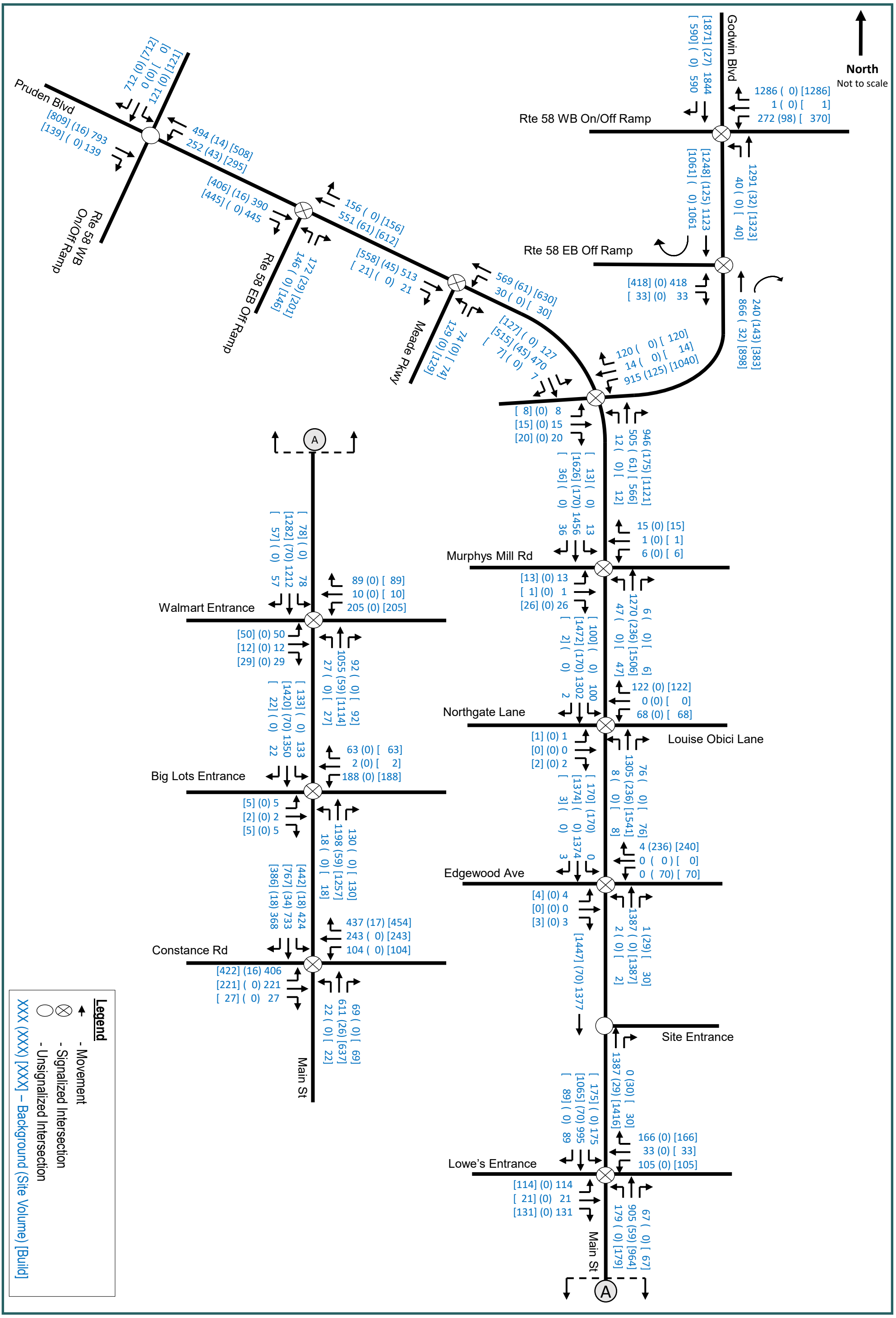
- **Figure 13** – 2035 Build Traffic: AM Peak Hour
- **Figure 14** – 2035 Build Traffic: PM Peak Hour



Riversbend Development – Suffolk, VA

2030 Build Traffic: AM Peak

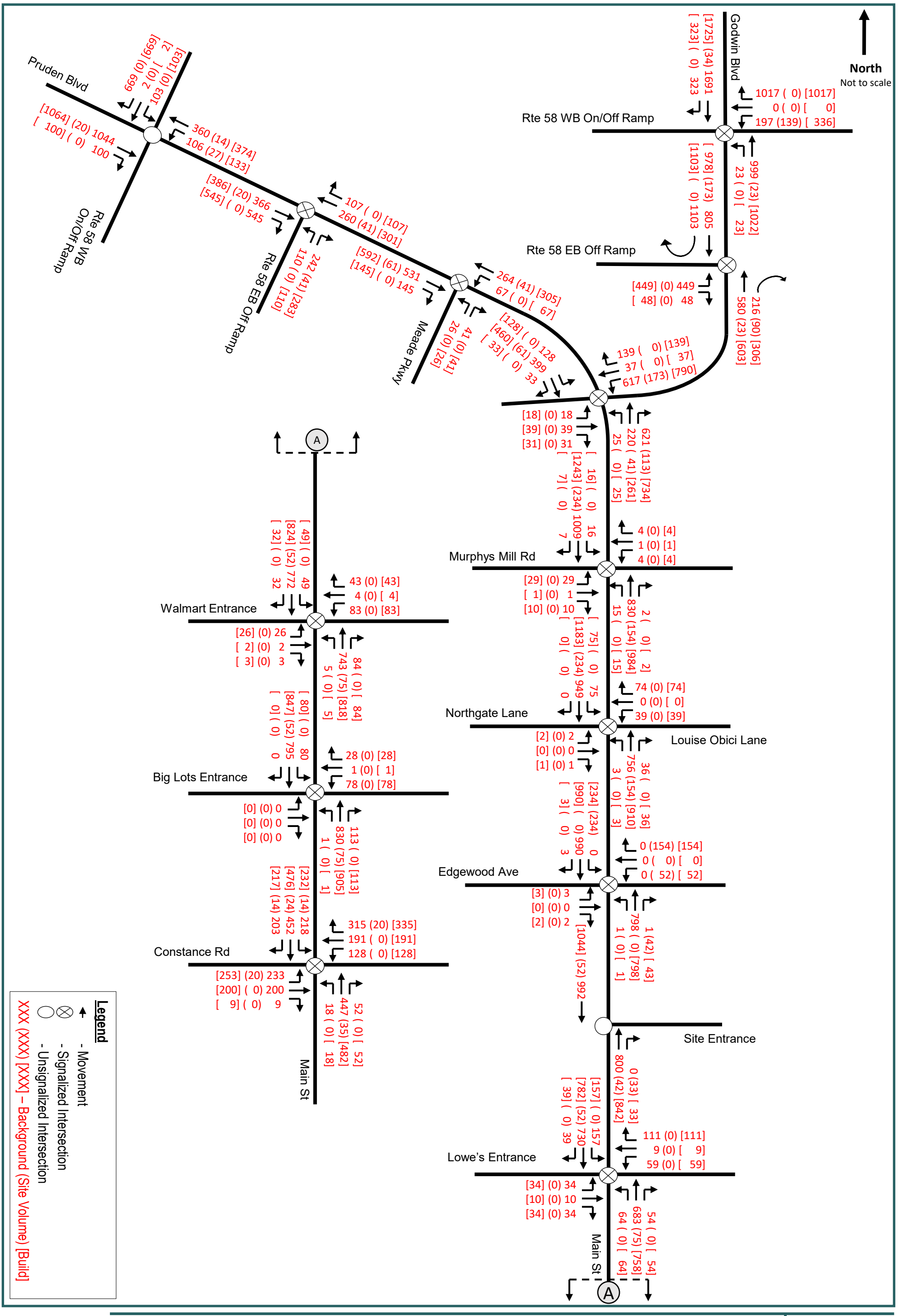
Figure 11



Riversbend Development – Suffolk, VA

2030 Build Traffic: PM Peak

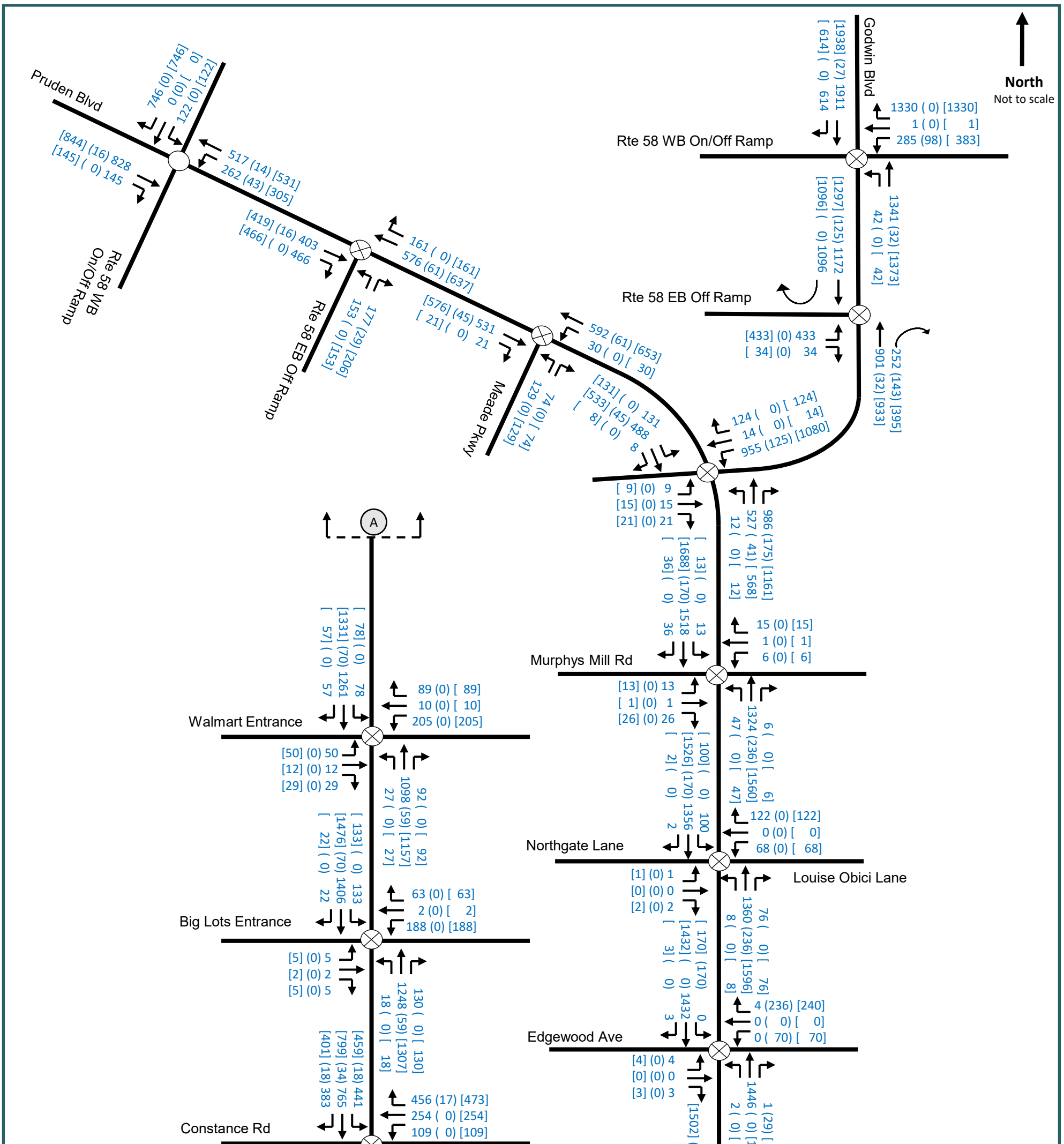
Figure 12



Riversbend Development – Suffolk, VA

2035 Build Traffic: AM Peak

Figure 13



Riversbend Development – Suffolk, VA

2035 Build Traffic: PM Peak

Figure 14

7.2 Capacity and Level of Service Analyses at Critical Points

Capacity analyses for signalized and unsignalized intersections in the AM and PM peak hours were performed for the 2030 and 2035 Build conditions for existing study area intersections as previously identified. Analyses were completed to determine the operating characteristics of the study area intersections and roadways using *Synchro Professional 11*, which uses methodologies contained in the *2010 Highway Capacity Manual (HCM) and HCM 6th Edition*.

To provide a comparison of development impacts, the operational analysis applies the existing signal timings to the Existing and Background condition scenarios and optimized signal timings for the future Build scenarios. Detailed analyses are illustrated in **Tables 3 – 11 & 14 – 18** below for the following scenarios:

- Existing (2025) Conditions
- 2030 Background Conditions
  - *1% growth rate applied for 5 years plus the approved development traffic.*
- 2030 Build Conditions
  - *2030 Background volumes with optimized signal timing plus the site traffic.*
- 2035 Horizon Background Conditions
  - *1% growth rate applied for 10 years plus the approved development traffic.*
- 2035 Horizon Build Conditions
  - *2035 Background volumes with optimized signal timing plus site traffic.*

7.2.1 Godwin Boulevard / US Route 58 Westbound On/Off Ramps

This signalized intersection currently provides the following laneage.

- Godwin Boulevard (northbound): one exclusive left-turn lane and two through lanes.
- Godwin Boulevard (southbound): two through lanes and one exclusive right-turn lane.
- US Route 58 off ramp (westbound): two left-turn lanes and two right-turn lanes (signal-controlled).

The results for the five scenarios are illustrated in **Table 3**. Detailed analyses are provided in the Appendix.

Table 3: Godwin Boulevard / US Route 58 Westbound Ramps Signalized Intersection Level of Service

Scenario	Overall Delay (LOS)	Delay per Lane Group by Approach [sec/veh] (Level of Service)					
		Westbound		Northbound		Southbound	
		LT	RT	LT	TH	TH	RT
AM Peak Hour							
Existing	25.6 (C)	68.9 (E)	41.7 (D)	26.1 (C)	34.3 (C)	7.5 (A)	5.3 (A)
		46.8 (D)		34.1 (C)		7.2 (A)	
2030 Background	28.2 (C)	68.9 (E)	50.8 (D)	29.7 (C)	35.9 (D)	9.6 (A)	5.8 (A)
		53.7 (D)		35.8 (D)		9.0 (A)	
2030 Build	29.5 (C)	68.5 (E)	42.7 (D)	30.0 (C)	37.9 (D)	13.2 (B)	7.7 (A)
		49.2 (D)		37.7 (D)		12.3 (B)	
2035 Background	29.2 (C)	68.9 (E)	53.0 (D)	30.9 (C)	36.8 (D)	10.3 (B)	6.0 (A)
		55.6 (E)		36.7 (D)		9.6 (A)	
2035 Build	30.2 (C)	68.5 (E)	43.7 (D)	31.3 (C)	38.5 (D)	14.1 (B)	7.9 (A)
		49.8 (D)		38.3 (D)		13.1 (B)	
PM Peak Hour							
Existing	27.8 (C)	74.5 (E)	60.9 (E)	14.9 (B)	21.0 (C)	9.9 (A)	8.0 (A)
		64.1 (E)		20.8 (C)		9.4 (A)	
2030 Background	71.5 (E)	74.4 (E)	230.5 (F)	23.4 (C)	24.7 (C)	14 (B)	9.0 (A)
		203.2 (F)		24.6 (C)		12.7 (B)	
2030 Build	35.2 (D)	73.4 (E)	62.8 (E)	30.8 (C)	33.2 (C)	17.8 (B)	11 (B)
		65.2 (E)		33.1 (C)		16.2 (B)	
2035 Background	76.4 (E)	74.8 (E)	248.2 (F)	27.0 (C)	25.8 (C)	15.1 (B)	9.4 (A)
		217.6 (F)		25.8 (C)		13.7 (B)	
2035 Build	37.8 (D)	73.3 (E)	69.2 (E)	32.8 (C)	35.4 (D)	19.4 (B)	11.6 (B)
		70.1 (E)		35.3 (D)		17.5 (B)	

During the Existing scenario, this intersection currently operates at LOS C during both AM and PM peaks. With the application of annual growth rates and inclusion of approved development traffic, this intersection degrades to overall LOS E with increased delay experienced at the off ramp.

Under the Build scenario, signal timings were optimized to include split and offset adjustments and operates at overall LOS C and D during AM and PM peak periods, respectively. This intersection will operate adequately with existing laneage and optimized signal timing.

7.2.2 Godwin Boulevard / US Route 58 Eastbound On/Off Ramps

This signalized intersection currently provides the following laneage.

- Godwin Boulevard (northbound): two through lanes.
- Godwin Boulevard (southbound): two through lanes.
- US Route 58 off ramp (eastbound): one shared left-right-turn lane.

There are additional ramps/loops at this intersection; however, these are not included as part of the signalized operations of the intersection and are free flow movements. Because of this, the northbound right-turn on ramp and southbound on-loop are not included in level of service analysis at this intersection.

The results for the five scenarios are illustrated in **Table 4**. Detailed analyses are provided in the **Appendix**.

Table 4: Godwin Boulevard / US Route 58 Eastbound On/Off Ramps Signalized Level of Service

Scenario	Overall Delay (LOS)	Delay per Lane Group by Approach [sec/veh] (Level of Service)		
		Eastbound	Northbound	Southbound
		LT - RT	TH	TH
AM Peak Hour				
Existing	29.5 (C)	85.4 (F)	9.3 (A)	8.6 (A)
2030 Background	38.2 (D)	116.9 (F)	10.1 (B)	10.0 (B)
2030 Build	32.5 (C)	69.0 (E)	13.2 (B)	29.4 (C)
2035 Background	42.7 (D)	132.7 (F)	10.2 (B)	10.5 (B)
2035 Build	28.1 (C)	68.7 (E)	14.0 (B)	16.1 (B)
PM Peak Hour				
Existing	20.6 (C)	84.8 (F)	8.3 (A)	7.5 (A)
2030 Background	33.4 (C)	137.4 (F)	10.3 (B)	9.5 (A)
2030 Build	23.7 (C)	77.7 (E)	13.9 (B)	11.4 (B)
2035 Background	36.1 (D)	151.4 (F)	10.5 (B)	9.9 (A)
2035 Build	24.7 (C)	79.5 (E)	14.5 (B)	12.3 (B)

This intersection operates at an overall LOS C for both AM and PM Existing scenarios. During the Background scenarios, vehicle delays are increased, particularly in the AM peak as the intersection operates at overall LOS D. With optimized signal timings, this intersection can operate at LOS C during all Build scenarios.

7.2.3 Pruden Boulevard / US Route 58 Westbound Bypass

This unsignalized intersection currently provides the following laneage.

- US Route 58 (southbound): one shared through-left-turn lane and one channelized free flow right-turn lane.
- Pruden Boulevard (eastbound): two through lanes and one exclusive free flow right-turn lane.
- Pruden Boulevard (westbound): one exclusive left-turn lane and two exclusive through lanes.

Pruden Boulevard is an east/west oriented roadway, and therefore the US Route 58 Westbound Bypass leg of the intersection is considered oriented north/south.

The results for the five scenarios are illustrated in **Table 5**. Detailed analyses are provided in the **Appendix**.

Table 5: Pruden Boulevard / US Route 58 Westbound Bypass On/Off Ramps Unsignalized Level of Service

Scenario	Overall Delay (LOS)	Delay per Lane Group by Approach [sec/veh] (Level of Service)					
		Eastbound		Westbound		Southbound	
		TH	RT	LT	TH	LT - TH	RT
AM Peak Hour							
Existing	1.3 (A)	- (-)		10.3 (B)	- (-)	23.0 (C)	- (-)
				1.7 (A)		23.0 (C)	
2030 Background	3.5 (A)	- (-)		11.1 (B)	- (-)	44.4 (E)	- (-)
				2.6 (A)		44.4 (E)	
2030 Build	4.6 (A)	- (-)		11.6 (B)	- (-)	61.1 (F)	- (-)
				3.1 (A)		61.1 (F)	
2035 Background	3.9 (A)	- (-)		11.5 (B)	- (-)	52.4 (F)	- (-)
				2.6 (A)		52.4 (F)	
2035 Build	5.3 (A)	- (-)		11.9 (B)	- (-)	74.8 (F)	- (-)
				3.1 (A)		74.8 (F)	
PM Peak Hour							
Existing	2.3 (A)	- (-)		10.4 (B)	- (-)	43.0 (E)	- (-)
				3.3 (A)		43.0 (E)	
2030 Background	20.6 (C)	- (-)		11.3 (B)	- (-)	283.0 (F)	- (-)
				3.8 (A)		283.0 (F)	
2030 Build	32.1 (D)	- (-)		11.9 (B)	- (-)	467.1 (F)	- (-)
				4.4 (A)		467.1 (F)	
2035 Background	25.8 (D)	- (-)		11.7 (B)	- (-)	370.9 (F)	- (-)
				3.9 (A)		370.9 (F)	
2035 Build	38.3 (E)	- (-)		12.4 (B)	- (-)	579.8 (F)	- (-)
				4.5 (A)		579.8 (F)	
- (-) Indicates Free Movement / 0 Seconds of Delay							

This intersection currently operates at acceptable LOS during the AM and PM peak hours with unsignalized control. The unsignalized southbound left-turn movement currently operates at LOS C and LOS E during the AM and PM peak hours, respectively. With the addition of 2030 background traffic, it is expected to operate at a LOS F during both the AM and PM peak hours.

Improvements have been recommended at this intersection as part of other studies and funding applications to consider signalized control or restricted access. Given the current uncertainty of these improvements, modifications to laneage or intersection control were not modeled in level of service determinations. However, these improvements are intended to address projected increased delays experienced in the Background scenarios and additional site traffic.

7.2.4 Pruden Boulevard / US Route 58 Eastbound Bypass

This signalized intersection currently provides the following laneage.

- US Route 58 (eastbound): one exclusive left-turn lane and one exclusive right-turn lane.
- Pruden Boulevard (southbound): two through lanes.
- Pruden Boulevard (northbound): two through lanes.

Pruden Boulevard is an east/west oriented roadway, and therefore the US Route 58 Eastbound Bypass leg of the intersection is considered oriented north/south.

The results for the five scenarios are illustrated in **Table 6**. Detailed analyses are provided in the **Appendix**.

Table 6: Pruden Boulevard / Route 58 Eastbound Bypass Signalized Intersection Level of Service

Scenario	Overall Delay (LOS)	Delay per Lane Group by Approach [sec/veh] (Level of Service)			
		Eastbound	Westbound	Northbound	
		TH	TH	LT	RT
AM Peak Hour					
Existing	9.9 (A)	3.4 (A)	3.1 (A)	49.9 (D)	3.2 (A)
				22.4 (C)	
2030 Background	8.7 (A)	3.6 (A)	3.2 (A)	50.1 (D)	3.6 (A)
				17.9 (B)	
2030 Build	7.1 (A)	4.4 (A)	3.3 (A)	50.1 (D)	3.7 (A)
				16.5 (B)	
2035 Background	8.8 (A)	3.7 (A)	3.3 (A)	50.2 (D)	3.7 (A)
				18.2 (B)	
2035 Build	8.4 (A)	3.7 (A)	3.4 (A)	50.2 (D)	3.8 (A)
				16.8 (B)	
PM Peak Hour					
Existing	10.7 (B)	3.9 (A)	4.1 (A)	51.6 (D)	3.7 (A)
				31.2 (C)	
2030 Background	9.7 (A)	4.1 (A)	4.3 (A)	52.0 (D)	4.0 (A)
				26.0 (C)	
2030 Build	8.4 (A)	4.8 (A)	4.4 (A)	52.0 (D)	4.0 (A)
				24.2 (C)	
2035 Background	10 (A)	4.3 (A)	4.4 (A)	52.6 (D)	4.1 (A)
				26.6 (C)	
2035 Build	9.6 (A)	4.3 (A)	4.5 (A)	52.6 (D)	4.1 (A)
				24.8 (C)	

This intersection operates at an overall LOS A for all scenarios in the AM peak hour and a maximum LOS B in the PM peak. The intersection functions adequately with existing laneage and optimized signal timing.

7.2.5 Pruden Boulevard / Meade Parkway

This signalized intersection currently provides the following laneage.

- Meade Parkway (northbound): one exclusive left-turn lane and one exclusive right-turn lane.
- Pruden Boulevard (eastbound): two through lanes and one exclusive right-turn lane.
- Pruden Boulevard (westbound): one exclusive left-turn lane and two through lanes.

The results for the five scenarios are illustrated in **Table 7**. Detailed analyses are provided in the **Appendix**.

Table 7: Pruden Boulevard / Meade Parkway Signalized Intersection Level of Service

Scenario	Overall Delay (LOS)	Delay per Lane Group by Approach [sec/veh] (Level of Service)					
		Eastbound		Westbound		Northbound	
		TH	RT	LT	TH	LT	RT
AM Peak Hour							
Existing	4.7 (A)	4.6 (A)	4.5 (A)	1.7 (A)	1.5 (A)	44.8 (D)	1.4 (A)
		4.6 (A)		1.5 (A)		18.2 (B)	
2030 Background	4.7 (A)	4.9 (A)	4.5 (A)	1.7 (A)	1.5 (A)	44.8 (D)	1.4 (A)
		4.8 (A)		1.5 (A)		18.2 (B)	
2030 Build	4.6 (A)	5 (A)	4.5 (A)	1.7 (A)	1.5 (A)	44.8 (D)	1.4 (A)
		4.9 (A)		1.5 (A)		18.2 (B)	
2035 Background	4.7 (A)	4.9 (A)	4.5 (A)	1.7 (A)	1.5 (A)	44.8 (D)	1.4 (A)
		4.8 (A)		1.5 (A)		18.2 (B)	
2035 Build	4.6 (A)	5.1 (A)	4.5 (A)	1.7 (A)	1.5 (A)	44.8 (D)	1.4 (A)
		5.0 (A)		1.6 (A)		18.2 (B)	
PM Peak Hour							
Existing	9.3 (A)	6.4 (A)	5.7 (A)	3.3 (A)	3.6 (A)	42.7 (D)	3.2 (A)
		6.3 (A)		3.6 (A)		28.3 (C)	
2030 Background	8.7 (A)	6.8 (A)	5.7 (A)	3.3 (A)	3.8 (A)	42.7 (D)	3.2 (A)
		6.7 (A)		3.7 (A)		28.3 (C)	
2030 Build	8.5 (A)	6.9 (A)	5.7 (A)	3.3 (A)	3.9 (A)	42.7 (D)	3.2 (A)
		6.9 (A)		3.8 (A)		28.3 (C)	
2035 Background	8.6 (A)	6.8 (A)	5.7 (A)	3.3 (A)	3.8 (A)	42.7 (D)	3.2 (A)
		6.8 (A)		3.8 (A)		28.3 (C)	
2035 Build	8.5 (A)	7.0 (A)	5.7 (A)	3.3 (A)	3.9 (A)	42.7 (D)	3.2 (A)
		6.9 (A)		3.9 (A)		28.3 (C)	

This intersection operates at a LOS A for all peak periods. This intersection will operate at acceptable levels of service with existing laneage and optimized signal timing.

7.2.6 N. Main Street / Pruden Boulevard / Godwin Boulevard

This signalized intersection currently provides the following laneage:

- N. Main Street / Pruden Boulevard (northbound): one exclusive left-turn lane, two through lanes, and one channelized free flow right-turn lane.
- N. Main Street / Pruden Boulevard (southbound): one exclusive left-turn lane, one through lane, and one shared through-right-turn lane.
- Godwin Boulevard (eastbound): one shared left-through lane and one exclusive right-turn lane.
- Godwin Boulevard (westbound): one exclusive left-turn lane, one shared left-through lane, one exclusive right-turn lane.

The results for the five scenarios are illustrated in **Table 8**. Detailed analyses are provided in the **Appendix**.

Table 8: N. Main Street / Pruden Boulevard / Godwin Boulevard Signalized Intersection Level of Service

Scenario	Overall Delay (LOS)	Delay per Lane Group by Approach [sec/veh] (Level of Service)									
		Eastbound		Westbound			Northbound			Southbound	
		LT - TH	RT	LT	TH	RT	LT	TH	RT	LT	TH - RT
AM Peak Hour											
Existing	19.8 (B)	41.4 (D)	38.7 (D)	38.7 (D)	39.0 (D)	27.7 (C)	5.4 (A)	7.5 (A)	0.6 (A)	15.3 (B)	20.6 (C)
		40.4 (D)		37.0 (D)			2.4 (A)			19.4 (B)	
2030 Background	20.6 (C)	41.5 (D)	38.6 (D)	39.3 (D)	39.0 (D)	26.2 (C)	5.9 (A)	9.6 (A)	0.7 (A)	16 (B)	23.3 (C)
		40.5 (D)		36.9 (D)			3.1 (A)			21.6 (C)	
2030 Build	24.1 (C)	41.5 (D)	38.6 (D)	46.2 (D)	46.8 (D)	24.3 (C)	10.7 (B)	13.1 (B)	0.9 (A)	17.7 (B)	26.2 (C)
		40.5 (D)		43.3 (D)			4.3 (A)			24.5 (C)	
2035 Background	21.0 (C)	41.5 (D)	38.5 (D)	40.3 (D)	39.9 (D)	26.0 (C)	6.7 (A)	9.8 (A)	0.7 (A)	16.4 (B)	23.8 (C)
		40.5 (D)		37.6 (D)			3.2 (A)			22.1 (C)	
2035 Build	24.8 (C)	41.5 (D)	38.5 (D)	47.8 (D)	48.3 (D)	24.1 (C)	11 (B)	13.6 (B)	0.9 (A)	18.1 (B)	26.9 (C)
		40.5 (D)		44.6 (D)			4.4 (A)			25.1 (C)	
PM Peak Hour											
Existing	24.1 (C)	58.6 (E)	55.5 (E)	47.5 (D)	46.9 (D)	29.8 (C)	12.8 (B)	21.9 (C)	1.1 (A)	17.8 (B)	23.3 (C)
		57.1 (E)		45.6 (D)			8.3 (A)			22.3 (C)	
2030 Background	25.6 (C)	58.5 (E)	55.4 (E)	47.8 (D)	46.6 (D)	27.6 (C)	14.2 (B)	27.3 (C)	1.6 (A)	20.6 (C)	28.0 (C)
		57.0 (E)		45.0 (D)			10.5 (B)			26.4 (C)	
2030 Build	26.8 (C)	58.5 (E)	55.4 (E)	50.2 (D)	48.4 (D)	25.5 (C)	14.1 (B)	28.4 (C)	2.4 (A)	23.1 (C)	31.1 (C)
		57 (E)		46.8 (D)			11.1 (B)			29.6 (C)	
2035 Background	26.2 (C)	58.7 (E)	55.4 (E)	48.4 (D)	46.8 (D)	26.8 (C)	14.8 (B)	28.4 (C)	1.7 (A)	21.5 (C)	29.1 (C)
		57.1 (E)		45.3 (D)			11.0 (B)			27.5 (C)	
2035 Build	27.6 (C)	58.7 (E)	55.4 (E)	52.4 (D)	50 (D)	25 (C)	14.6 (B)	28.5 (C)	2.7 (A)	23.8 (C)	32.0 (C)
		57.1 (E)		48.6 (D)			11.2 (B)			30.4 (C)	

This intersection operates at an overall LOS C or better during all scenarios. This intersection will operate at acceptable levels of service with existing laneage and optimized signal timing.

7.2.7 N. Main Street / Murphys Mill Road

This signalized intersection currently provides the following laneage:

- N. Main Street (northbound): one exclusive left-turn lane, one through lane, and one shared through-right turn lane.
- N. Main Street (southbound): one exclusive left-turn lane, one through lane, and one shared through-right turn lane.
- Murphys Mill Road (eastbound): one shared left-through turn lane and one right-turn lane.
- Murphys Mill Road (westbound): one shared left-through turn lane and one right-turn lane.

The results for the five scenarios are illustrated in **Table 9**. Detailed analyses are provided in the **Appendix**.

Table 9: N. Main Street / Murphy's Mill Road Signalized Intersection Level of Service

Scenario	Overall Delay (LOS)	Delay per Lane Group by Approach [sec/veh] (Level of Service)							
				Westbound		Northbound		Southbound	
		LT - TH	RT	LT - TH	RT	LT	TH - RT	LT	TH - RT
AM Peak Hour									
Existing	6.9 (A)	43.0 (D)	40.4 (D)	47.8 (D)	43.8 (D)	1.4 (A)	1.6 (A)	5.4 (A)	9.6 (A)
		42.3 (D)		46.0 (D)		1.6 (A)		9.5 (A)	
2030 Background	7.5 (A)	43.0 (D)	40.4 (D)	47.8 (D)	43.8 (D)	1.3 (A)	1.6 (A)	5.1 (A)	10.6 (B)
		42.3 (D)		46.0 (D)		1.6 (A)		10.5 (B)	
2030 Build	7.9 (A)	43.0 (D)	40.4 (D)	47.8 (D)	43.8 (D)	1.5 (A)	1.7 (A)	5.0 (A)	11.5 (B)
		42.3 (D)		46.0 (D)		1.7 (A)		11.4 (B)	
2035 Background	7.4 (A)	43.0 (D)	40.4 (D)	47.8 (D)	43.8 (D)	1.3 (A)	1.6 (A)	5.0 (A)	10.6 (B)
		42.3 (D)		46.0 (D)		1.6 (A)		10.5 (B)	
2035 Build	8.2 (A)	43.0 (D)	40.4 (D)	47.8 (D)	43.8 (D)	1.5 (A)	2.1 (A)	4.9 (A)	11.7 (B)
		42.3 (D)		46.0 (D)		2.1 (A)		11.6 (B)	
PM Peak Hour									
Existing	6.1 (A)	58.0 (E)	55.9 (E)	57.3 (E)	56.3 (E)	1.7 (A)	1.8 (A)	3.7 (A)	7.4 (A)
		56.7 (E)		56.6 (E)		1.8 (A)		7.3 (A)	
2030 Background	8.3 (A)	58.0 (E)	55.9 (E)	57.3 (E)	56.3 (E)	2.1 (A)	1.9 (A)	4.9 (A)	12.1 (B)
		56.7 (E)		56.6 (E)		1.9 (A)		12.0 (B)	
2030 Build	9.4 (A)	58.0 (E)	55.9 (E)	57.3 (E)	56.3 (E)	5.5 (A)	2.1 (A)	5.9 (A)	14.5 (B)
		56.7 (E)		56.6 (E)		2.2 (A)		14.4 (B)	
2035 Background	8.8 (A)	58.0 (E)	55.9 (E)	57.3 (E)	56.3 (E)	2.3 (A)	1.9 (A)	5.1 (A)	13.0 (B)
		56.7 (E)		56.6 (E)		1.9 (A)		12.9 (B)	
2035 Build	10.0 (B)	58.0 (E)	55.9 (E)	57.3 (E)	56.3 (E)	11.6 (B)	2.5 (A)	6.0 (A)	15.2 (B)
		56.7 (E)		56.6 (E)		2.7 (A)		15.1 (B)	

This intersection operates at an overall LOS B or better during all scenarios. This intersection will operate adequately with existing laneage and optimized signal timing.

7.2.8 N. Main Street / Louise Obici Lane / Northgate Lane

This signalized intersection currently provides the following laneage:

- N. Main Street (northbound): one exclusive left-turn lane, two through lanes, and one exclusive right-turn lane.
- N. Main Street (southbound): one exclusive left-turn lane, one through lane, and one shared through-right turn lane.
- Northgate Lane (eastbound): one left-through-right turn lane.
- Louise Obici Lane (westbound): one exclusive left-turn lane and one shared through-right turn lane.

The results for the five scenarios are illustrated in **Table 10**. Detailed analyses are provided in the **Appendix**.

Table 10: N. Main Street / Louise Obici Lane / Northgate Lane Signalized Intersection Level of Service

Scenario	Overall Delay (LOS)	Delay per Lane Group by Approach [sec/veh] (Level of Service)										
		Eastbound			Westbound			Northbound			Southbound	
		LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH - RT
AM Peak Hour												
Existing	4.8 (A)	42.8 (D)			34.3 (C)	33.3 (C)		2.6 (A)	3.9 (A)	7.2 (A)	0.6 (A)	1.2 (A)
					33.7 (C)			4.1 (A)			1.1 (A)	
2030 Background	4.8 (A)	42.8 (D)			34.3 (C)	33.3 (C)		2.4 (A)	3.7 (A)	7.2 (A)	1.2 (A)	2.1 (A)
					33.7 (C)			3.9 (A)			2.1 (A)	
2030 Build	5.6 (A)	42.8 (D)			34.3 (C)	33.3 (C)		2.2 (A)	4.4 (A)	7.2 (A)	2.5 (A)	3.9 (A)
					33.7 (C)			4.5 (A)			3.8 (A)	
2035 Background	4.8 (A)	42.8 (D)			34.3 (C)	33.3 (C)		2.4 (A)	3.7 (A)	7.2 (A)	1.3 (A)	2.3 (A)
					33.7 (C)			3.9 (A)			2.2 (A)	
2035 Build	5.6 (A)	42.8 (D)			34.3 (C)	33.3 (C)		1.7 (A)	3.9 (A)	7.2 (A)	2.8 (A)	4.2 (A)
					33.7 (C)			4.0 (A)			4.1 (A)	
PM Peak Hour												
Existing	7.3 (A)	57.8 (E)			47.7 (D)	45.4 (D)		4 (A)	5.9 (A)	1.3 (A)	3.2 (A)	2.7 (A)
					46.2 (D)			5.6 (A)			2.7 (A)	
2030 Background	7.1 (A)	57.8 (E)			47.7 (D)	45.4 (D)		3.7 (A)	5.7 (A)	0.1 (A)	11 (B)	2.8 (A)
					46.2 (D)			5.4 (A)			3.4 (A)	
2030 Build	7.7 (A)	57.8 (E)			47.7 (D)	45.4 (D)		1.4 (A)	4.1 (A)	0.1 (A)	47.9 (D)	4.1 (A)
					46.2 (D)			3.9 (A)			6.9 (A)	
2035 Background	7.4 (A)	57.8 (E)			47.7 (D)	45.4 (D)		3.7 (A)	6.1 (A)	0.1 (A)	15.5 (B)	3.1 (A)
					46.2 (D)			5.8 (A)			4 (A)	
2035 Build	8.2 (A)	57.8 (E)			47.7 (D)	45.4 (D)		1.6 (A)	4.0 (A)	0.1 (A)	55.8 (E)	4.9 (A)
					46.2 (D)			3.8 (A)			8.1 (A)	

This intersection operates at an overall LOS A or better for all peak periods. This intersection will operate at acceptable levels of service with existing laneage and optimized signal timing.

7.2.9 N. Main Street / Edgewood Avenue / Memorial Avenue

This signalized intersection currently provides the following laneage:

- N. Main Street (northbound): one exclusive left-turn lane, two through lanes, and one exclusive right-turn lane.
- N. Main Street (southbound): one through lane, and one shared right-through lane.
- Memorial Avenue (eastbound): one exclusive right-turn lane.
- Edgewood Avenue (westbound): one shared full movement lane.

The results for the five scenarios are illustrated in **Table 11**. Detailed analyses are provided in the **Appendix**.

Table 11: Main Street / Edgewood Avenue / Memorial Avenue Unsignalized Intersection Level of Service

Scenario	Overall Delay (LOS)	Delay per Lane Group by Approach [sec/veh] (Level of Service)									
		Eastbound	Westbound			Northbound			Southbound		
		LT - TH - RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
AM Peak Hour											
Existing	0.1 (A)	20.5 (C)	-	-	0.0 (A)	9.2 (A)	0.0 (A)	0.0 (A)	-	0.0 (A)	
			0.0 (A)			0.0 (A)			0.0 (A)		
2030 Background	0.1 (A)	27.9 (D)	-	-	0.0 (A)	10.0 (A)	0.0 (A)	0.0 (A)	-	0.0 (A)	
			0.0 (A)			0 (A)			0.0 (A)		
2030 Build	10.0 (A)	90.5 (F)	326.9 (F)		12.8 (B)	10.0 (A)	0.0 (A)	0.0 (A)	11.2 (B)	0.0 (A)	
			92.1 (F)			0.0 (A)			2.2 (A)		
2035 Background	0.1 (A)	30.0 (D)	-	-	0.0 (A)	10.2 (B)	0.0 (A)	0.0 (A)	-	0.0 (A)	
			0.0 (A)			0.0 (A)			0.0 (A)		
2035 Build	11.1 (B)	102.0 (F)	385.0 (F)		13.0 (B)	10.2 (B)	0.0 (A)	0.0 (A)	11.5 (B)	0.0 (A)	
			106.9 (F)			0.0 (A)			2.2 (A)		
PM Peak Hour											
Existing	0.2 (A)	50.0 (F)	-	-	13.0 (B)	11.0 (B)	0.0 (A)	0.0 (A)	-	0.0 (A)	
			13.0 (B)			0.0 (A)			0.0 (A)		
2030 Background	0.2 (A)	86.5 (F)	-	-	14.4 (B)	12.3 (B)	0.0 (A)	0.0 (A)	-	0.0 (A)	
			14.4 (B)			0.0 (A)			0.0 (A)		
2030 Build	64.1 (F)	732.5 (F)	2,796.1 (F)		28.6 (D)	12.3 (B)	0.0 (A)	0.0 (A)	16.7 (C)	0.0 (A)	
			653.5 (F)			0.0 (A)			1.8 (A)		
2035 Background	0.3 (A)	99.2 (F)	-	-	14.9 (B)	12.7 (B)	0.0 (A)	0.0 (A)	-	0.0 (A)	
			14.9 (B)			0.0 (A)			0.0 (A)		
2035 Build	75.9 (F)	1,000.4 (F)	3,434.4 (F)		31.2 (D)	12.7 (B)	0.0 (A)	0.0 (A)	17.7 (C)	0.0 (A)	
			799.7 (F)			0.0 (A)			1.9 (A)		

- Indicates Movement Does Not Exist

This intersection currently operates as a restricted right-in/right-out access. With the development of the Riversbend, this intersection is recommended to be modified to provide full-movement access and is modeled as such in all build scenarios.

During the build scenarios, the overall intersection level of service is worsened in large part due to increased delays along the westbound approach for vehicles making a left-turn to travel southbound along Main Street. Due to these increased delays, a signal warrant analysis was performed for this intersection as outlined below:

7.2.9.1 Traffic Signal Warrant Analysis

The analysis evaluated the proposed build-out conditions using the warrant analysis as outlined in the *Manual on Uniform Traffic Control Devices (MUTCD)* for the following three warrants:

- Warrant 1, Eight-Hour Vehicular Volume
- Warrant 2, Four-Hour Vehicular Volume
- Warrant 3, Peak Hour

To project daily build-out conditions for this intersection, actual ADT volumes were used along N. Main Street. To project daily volumes along the site driveway, ITE methodologies for hourly trip distributions of entering and exiting vehicles were selected using arrival patterns for the land uses shown in the trip generation outlined in **Chapter 5**. This methodology applied arrival patterns to estimate hourly side street volumes between 6:00 AM – 10:00 PM at this intersection.

Signal warrant analysis was performed for two scenarios:

1. N Main Street Mainline (NB and SB, 2 lane approach) vs. Side Street Traffic (2 lane approach, 50% right-turn reduction)
2. N Main Street Mainline (NB only) vs. Southbound Left-turn (1 lane approach)

The results of these signal warrant analyses are illustrated in **Tables 12** and **13** below. Under both approaches, a traffic signal is warranted under Warrant 1 – Condition B, Part 1. Detailed results of these analyses are contained in the **Appendix**.

Table 12: Main Street / Edgewood Avenue / Memorial Avenue Signal Warrant Analysis: Scenario 1

Warrant 1	Warrant 1: 8-hr Condition A	Warrant 1: 8-hr Condition B	Warrant 1: Condition A, Part 2	Warrant 1: Condition B, Part 2	Warrant 2: 4-hr
Conditions Met					
Major Street	Y – 16 hrs	Y – 14 hrs	Y – 16 hrs	Y – 14 hrs	
Minor Street	Y – 0 hrs	Y –10 hrs	Y – 0 hrs	Y – 12 hrs	
Both	**Y – 0 hrs**	**Y – 10 hrs**	**Y – 0 hrs**	**Y – 12 hrs**	**Y - 4 hrs**
Warrant Satisfied?	**NOT SATISFIED**	**SATISFIED**	**NOT SATISFIED**		**SATISFIED**

Signal warrant analysis for Scenario 1 was performed with 2 approach lanes for northbound and westbound approaches with a 50% reduction for westbound right-turns. The results of this analysis conclude that a traffic signal is warranted based on 8-hour and 4-hour traffic volume conditions.

Table 13: Main Street / Edgewood Avenue / Memorial Avenue Signal Warrant Analysis: Scenario 2

Warrant 1	Warrant 1: 8-hr Condition A	Warrant 1: 8-hr Condition B	Warrant 1: Condition A, Part 2	Warrant 1: Condition B, Part 2	Warrant 2: 4-hr
Conditions Met					
Major Street	Y – 12 hrs	Y – 8 hrs	Y – 14 hrs	Y – 11 hrs	
Minor Street	Y – 3 hrs	Y – 14 hrs	Y – 9 hrs	Y – 14 hrs	
Both	**Y – 3 hrs**	**Y – 8 hrs**	**Y – 9 hrs**	**Y – 11 hrs**	**Y - 6 hrs**
Warrant Satisfied?	**NOT SATISFIED**	**SATISFIED**	**SATISFIED**		**SATISFIED**

Signal warrant analysis for Scenario 2 was performed with the northbound approach accounting for the major street traffic volumes, and the opposing southbound left-turn accounting for the minor street vehicles. This approach is consistent with MUTCD guidance (MUTCD 11th edition, section 4C.01, note 14).

The results of this analysis conclude that a traffic signal is warranted based on 8-hour traffic volume conditions.

This is an extremely conservative approach as the project volumes do not capture the additional build-out traffic associated with commercial property to the immediate north of the site. With the addition of a full movement signalized entrance, traffic currently using the Northgate Lane signal will shift to this new signalized access. **Table 17** illustrates the delay and LOS for the AM and PM peak period Build scenarios under signalized operations. Detailed results of these analyses are contained in the **Appendix**.

Table 14: Main Street / Edgewood Avenue / Memorial Avenue Signalized Intersection Level of Service

Scenario	Overall Delay (LOS)	Delay per Lane Group by Approach [sec/veh] (Level of Service)									
		Eastbound	Westbound			Northbound			Southbound		
		LT - TH - RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
AM Peak Hour											
2030 Build	6.9 (A)	36.7 (D)	39.8 (D)		37.3 (D)	2.2 (A)	3.6 (A)	8.5 (A)	5.3 (A)	3.1 (A)	
			37.9 (D)			3.8 (A)			3.5 (A)		
2035 Build	6.6 (A)	36.7 (D)	39.8 (D)		37.3 (D)	1.9 (A)	4.1 (A)	8.5 (A)	4.3 (A)	2.4 (A)	
			37.9 (D)			4.4 (A)			2.8 (A)		
PM Peak Hour											
2030 Build	9.3 (A)	48.9 (D)	54.7 (D)		51.8 (D)	4.4 (A)	7.1 (A)	7.7 (A)	9.1 (A)	1.7 (A)	
			52.5 (D)			7.1 (A)			2.5 (A)		
2035 Build	9.5 (A)	48.8 (D)	54.6 (D)		52.1 (D)	4.5 (A)	7.9 (A)	7.8 (A)	10.8 (B)	1.4 (A)	
			52.6 (D)			7.9 (A)			2.4 (A)		

7.2.10 N. Main Street / Lowe's Entrance

This signalized intersection currently provides the following laneage:

- N. Main Street (northbound): one exclusive left-turn lane, two through lanes, and one exclusive right-turn lane.
- N. Main Street (southbound): one exclusive left-turn lane, two through lanes, and one exclusive right-turn lane.
- Lowe's entrance (eastbound): one shared left-through lane and one exclusive right-turn lane.
- Lowe's entrance (westbound): one shared left-through lane and one exclusive right-turn lane.

The results for the five scenarios are illustrated in **Table 12**. Detailed analyses are provided in the **Appendix**.

Table 15: Main Street / Lowe's Entrance Signalized Intersection Level of Service

Scenario	Overall Delay (LOS)	Delay per Lane Group by Approach [sec/veh] (Level of Service)									
		Eastbound		Westbound		Northbound			Southbound		
		LT - TH	RT	LT - TH	RT	LT	TH	RT	LT	TH	RT
AM Peak Hour											
Existing	20.6 (C)	41.1 (D)	38.8 (D)	41.2 (D)	38.1 (D)	51.8 (D)	9.1 (A)	14.8 (B)	48.6 (D)	12.8 (B)	11.6 (B)
		40.1 (D)		39.3 (D)		13.6 (B)			20.6 (C)		
2030 Background	19.8 (B)	41.1 (D)	38.8 (D)	41.2 (D)	38.1 (D)	53.7 (D)	9.4 (A)	14.8 (B)	49.4 (D)	13.4 (B)	11.6 (B)
		40.1 (D)		39.3 (D)		13.5 (B)			19.6 (B)		
2030 Build	18.8 (B)	41.1 (D)	38.8 (D)	41.2 (D)	38.1 (D)	54.8 (D)	9.8 (A)	14.8 (B)	46.3 (D)	12.4 (B)	11.6 (B)
		40.1 (D)		39.3 (D)		13.5 (B)			18 (B)		
2035 Background	19.7 (B)	41.1 (D)	38.8 (D)	41.2 (D)	38.1 (D)	54.0 (D)	9.5 (A)	14.8 (B)	49.5 (D)	13.6 (B)	11.6 (B)
		40.1 (D)		39.3 (D)		13.4 (B)			19.6 (B)		
2035 Build	18.9 (B)	41.1 (D)	38.8 (D)	41.2 (D)	38.1 (D)	55.3 (E)	9.9 (A)	14.8 (B)	46.5 (D)	12.9 (B)	11.6 (B)
		40.1 (D)		39.3 (D)		13.5 (B)			18.2 (B)		
PM Peak Hour											
Existing	33.0 (C)	56.5 (E)	47.2 (D)	62.2 (E)	48.3 (D)	81.3 (F)	14.7 (B)	19.6 (B)	76.9 (E)	16.2 (B)	25.6 (C)
		51.9 (D)		54.6 (D)		27.4 (C)			27.1 (C)		
2030 Background	30.5 (C)	56.5 (E)	47.2 (D)	62.2 (E)	48.3 (D)	82.2 (F)	15.8 (B)	19.6 (B)	76.9 (E)	15.2 (B)	17.2 (B)
		51.9 (D)		54.6 (D)		26.3 (C)			23.9 (C)		
2030 Build	29.2 (C)	56.5 (E)	47.2 (D)	62.2 (E)	48.3 (D)	76.7 (E)	11.0 (B)	19.6 (B)	73.4 (E)	18.8 (B)	20.3 (C)
		51.9 (D)		54.6 (D)		21.2 (C)			26.1 (C)		
2035 Background	30.0 (C)	56.5 (E)	47.2 (D)	62.2 (E)	48.3 (D)	82.4 (F)	15.7 (B)	19.6 (B)	76.4 (E)	15.1 (B)	16.5 (B)
		51.9 (D)		54.6 (D)		26.0 (C)			23.4 (C)		
2035 Build	28.8 (C)	56.5 (E)	47.2 (D)	62.2 (E)	48.3 (D)	76.7 (E)	11.4 (B)	19.6 (B)	72.6 (E)	18.2 (B)	22.5 (C)
		51.9 (D)		54.6 (D)		21.2 (C)			25.5 (C)		

This intersection operates at an overall LOS C or better during all peak periods. This intersection will operate adequately with existing laneage and optimized signal timing.

7.2.11 N. Main Street / Walmart Entrance

This signalized intersection currently provides the following laneage:

- Main Street (northbound): one exclusive left-turn lane, two through lanes, and one exclusive right-turn lane.
- Main Street (southbound): one exclusive left-turn lane, two through lanes, and one exclusive right-turn lane.
- Walmart Entrance (eastbound): one shared left-through-right turn lane.
- Walmart Entrance (westbound): one exclusive left-turn lane, one shared through-left turn lane, one exclusive right-turn lane.

The results for the five scenarios are illustrated in **Table 13**. Detailed analyses are provided in the **Appendix**.

Table 16: Main Street / Walmart Entrance Signalized Level of Service

Scenario	Overall Delay (LOS)	Delay per Lane Group by Approach [sec/veh] (Level of Service)										
		Eastbound	Westbound			Northbound			Southbound			
		LT - TH -RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
AM Peak Hour												
Existing	15.5 (B)	43.0 (D)	41.2 (D)	41.3 (D)	38.7 (D)	7.8 (A)	8.2 (A)	9.3 (A)	13.7 (B)	17.8 (B)	7.7 (A)	
			40.4 (D)			8.3 (A)			17.0 (B)			
2030 Background	16.0 (B)	43.0 (D)	41.2 (D)	41.3 (D)	38.7 (D)	7.8 (A)	8.3 (A)	9.3 (A)	14.3 (B)	19.3 (B)	7.7 (A)	
			40.4 (D)			8.4 (A)			18.6 (B)			
2030 Build	16.2 (B)	43.0 (D)	41.2 (D)	41.3 (D)	38.7 (D)	7.6 (A)	8.4 (A)	9.3 (A)	15.5 (B)	20.0 (C)	7.7 (A)	
			40.4 (D)			8.5 (A)			19.3 (B)			
2035 Background	16.0 (B)	43.0 (D)	41.2 (D)	41.3 (D)	38.7 (D)	7.8 (A)	8.4 (A)	9.3 (A)	14.3 (B)	19.4 (B)	7.7 (A)	
			40.4 (D)			8.5 (A)			18.6 (B)			
2035 Build	16.3 (B)	43.0 (D)	41.2 (D)	41.3 (D)	38.7 (D)	7.8 (A)	8.5 (A)	9.3 (A)	15.8 (B)	20.3 (C)	7.7 (A)	
			40.4 (D)			8.6 (A)			19.6 (B)			
PM Peak Hour												
Existing	17.4 (B)	55.8 (E)	55.6 (E)	55.6 (E)	48.0 (D)	6.1 (A)	8.3 (A)	12.8 (B)	10.9 (B)	12.4 (B)	11.4 (B)	
			53.4 (D)			8.6 (A)			12.3 (B)			
2030 Background	18.4 (B)	55.8 (E)	55.6 (E)	55.6 (E)	48.0 (D)	6.3 (A)	8.4 (A)	12.8 (B)	15.5 (B)	16.8 (B)	11.4 (B)	
			53.4 (D)			8.7 (A)			16.5 (B)			
2030 Build	22.1 (C)	55.8 (E)	55.6 (E)	55.6 (E)	48.0 (D)	20.7 (C)	17.5 (B)	12.8 (B)	17.2 (B)	17.7 (B)	11.4 (B)	
			53.4 (D)			17.2 (B)			17.4 (B)			
2035 Background	18.5 (B)	55.8 (E)	55.6 (E)	55.6 (E)	48.0 (D)	6.3 (A)	8.3 (A)	12.8 (B)	16.4 (B)	17.5 (B)	11.4 (B)	
			53.4 (D)			8.6 (A)			17.2 (B)			
2035 Build	22.6 (C)	55.8 (E)	55.6 (E)	55.6 (E)	48 (D)	21.4 (C)	17.9 (B)	12.9 (B)	19.1 (B)	18.8 (B)	11.4 (B)	
			53.4 (D)			17.6 (B)			18.5 (B)			

This intersection operates at an overall LOS A during the AM peak period scenarios and an overall LOS C or better during the PM peak period scenarios. This intersection will operate acceptably with existing laneages and optimized signal timing.

7.2.12 N. Main Street / Big Lots Entrance

This signalized intersection currently provides the following laneage:

- N. Main Street (northbound): one exclusive left-turn lane, two exclusive through lanes, and one exclusive right-turn lane.
- N. Main Street (southbound): one exclusive left-turn lane, one through lane, and one through-right turn lane.
- Big Lots (eastbound): one left-through-right turn lane.
- Big Lots (westbound): one exclusive left-turn lane and one left-through-right turn lane.

The results for the five scenarios are illustrated in **Table 14**. Detailed analyses are provided in the **Appendix**.

Table 17: Main Street / Big Lots Entrance Signalized Level of Service

Scenario	Overall Delay (LOS)	Delay per Lane Group by Approach [sec/veh] (Level of Service)								
		Eastbound	Westbound		Northbound			Southbound		
		LT - TH - RT	LT	TH - RT	LT	TH	RT	LT	TH	RT
AM Peak Hour										
Existing	7.6 (A)	- (-)	41.2 (D)	39.4 (D)	5.0 (A)	7.0 (A)	5.7 (A)	1.9 (A)	3.5 (A)	
			40.4 (D)		6.8 (A)			3.3 (A)		
2030 Background	8.2 (A)	- (-)	41.2 (D)	39.4 (D)	5.0 (A)	7.3 (A)	5.7 (A)	3.2 (A)	5.6 (A)	
			40.4 (D)		7.1 (A)			5.4 (A)		
2030 Build	8.4 (A)	- (-)	41.2 (D)	39.4 (D)	5.0 (A)	7.5 (A)	5.7 (A)	3.6 (A)	6.1 (A)	
			40.4 (D)		7.3 (A)			5.9 (A)		
2035 Background	8.3 (A)	- (-)	41.2 (D)	39.4 (D)	5.0 (A)	7.4 (A)	5.7 (A)	3.4 (A)	5.8 (A)	
			40.4 (D)		7.2 (A)			5.6 (A)		
2035 Build	8.5 (A)	- (-)	41.2 (D)	39.4 (D)	5.0 (A)	7.7 (A)	5.7 (A)	3.8 (A)	6.3 (A)	
			40.4 (D)		7.5 (A)			6.0 (A)		
PM Peak Hour										
Existing	26.7 (C)	59.6 (E)	57.3 (E)	51.1 (D)	16.5 (B)	21.8 (C)	103.2 (F)	11.6 (B)	17.7 (B)	
			54.3 (D)		31.0 (C)			17.1 (B)		
2030 Background	29.0 (C)	59.6 (E)	57.3 (E)	51.1 (D)	17.9 (B)	26.0 (C)	93.5 (F)	19.2 (B)	21.8 (C)	
			54.3 (D)		32.4 (C)			21.5 (C)		
2030 Build	20.5 (C)	59.6 (E)	57.3 (E)	51.1 (D)	20.7 (C)	28.2 (C)	32.7 (C)	13.5 (B)	7.0 (A)	
			54.3 (D)		28.5 (C)			7.5 (A)		
2035 Background	29.5 (C)	59.6 (E)	57.3 (E)	51.1 (D)	18.5 (B)	26.6 (C)	92.2 (F)	21.4 (C)	22.5 (C)	
			54.3 (D)		32.6 (C)			22.4 (C)		
2035 Build	20.6 (C)	59.6 (E)	57.3 (E)	51.1 (D)	21.5 (C)	28.7 (C)	32.2 (C)	15.1 (B)	7.0 (A)	
			54.3 (D)		28.9 (C)			7.7 (A)		

This intersection operates at an overall LOS A during the AM peak period scenarios and an overall LOS C or better during the PM peak period scenarios. This intersection will operate adequately with existing laneage and optimized signal timing.

7.2.13 Main Street / Constance Road / US Route 58

This signalized intersection currently provides the following laneage:

- N. Main Street (northbound): one exclusive left-turn lane, one through lane, and one shared through-right-turn lane.
- N. Main Street (southbound): one exclusive left-turn lane, one through lane, and one through-right-turn lane.
- Constance Road (eastbound): two exclusive left-turn lanes and one through lane, and one through-right-turn lane.
- Constance Road (westbound): one exclusive left-turn lane, one through lane, and an exclusive right-turn lane.

The results for the five scenarios are illustrated in **Table 15**. Detailed analyses are provided in the **Appendix**.

Table 18: N Main Street / Constance Road / US 58 Signalized Level of Service

Scenario	Overall Delay (LOS)	Delay per Lane Group by Approach [sec/veh] (Level of Service)								
		Eastbound		Westbound			Northbound		Southbound	
		LT	TH - RT	LT	TH	RT	LT	TH - RT	LT	TH - RT
AM Peak Hour										
Existing	35.3 (D)	53.5 (D)	48.4 (D)	55.8 (E)	55.1 (E)	30.4 (C)	62.2 (E)	24.1 (C)	56.8 (E)	16.5 (B)
		51.0 (D)		43.4 (D)			25.4 (C)		25.8 (C)	
2030 Background	36.0 (D)	53.5 (D)	47.3 (D)	55.9 (E)	55.1 (E)	28.3 (C)	62.1 (E)	28.8 (C)	56.8 (E)	18.4 (B)
		50.6 (D)		41.9 (D)			29.9 (C)		28.1 (C)	
2030 Build	37.3 (D)	69 (E)	42.0 (D)	61.7 (E)	53.0 (D)	24.3 (C)	58.7 (E)	30.9 (C)	56.6 (E)	19.7 (B)
		56.8 (E)		40 (D)			31.8 (C)		29.0 (C)	
2035 Background	36.5 (D)	53.5 (D)	47.0 (D)	56.2 (E)	54.6 (D)	28.1 (C)	62.6 (E)	30.1 (C)	56.8 (E)	19.2 (B)
		50.5 (D)		41.7 (D)			31.3 (C)		28.6 (C)	
2035 Build	37.7 (D)	69.6 (E)	41.2 (D)	62.6 (E)	52.0 (D)	23.9 (C)	59.5 (E)	32.1 (C)	56.9 (E)	20.4 (C)
		56.8 (E)		39.7 (D)			33.0 (C)		29.6 (C)	
PM Peak Hour										
Existing	42.6 (D)	53.2 (D)	40.1 (D)	55.3 (E)	55.6 (E)	22 (C)	63.7 (E)	48.8 (D)	56.7 (E)	33.2 (C)
		47.8 (D)		37.8 (D)			49.3 (D)		39.6 (D)	
2030 Background	53.0 (D)	53.2 (D)	37.4 (D)	55.6 (E)	52.9 (D)	22 (C)	58.6 (E)	79.4 (E)	84.6 (F)	40.1 (D)
		47.2 (D)		36.0 (D)			78.8 (E)		52.5 (D)	
2030 Build	43.8 (D)	67.2 (E)	36.1 (D)	75.2 (E)	77.7 (E)	20.3 (C)	54.4 (D)	71.9 (E)	41.9 (D)	19.6 (B)
		55.7 (E)		44.9 (D)			71.4 (E)		25.8 (C)	
2035 Background	58.6 (E)	53.7 (D)	37.0 (D)	55.7 (E)	53.1 (D)	22.8 (C)	58.8 (E)	90.7 (F)	106.7 (F)	42.8 (D)
		47.3 (D)		36.5 (D)			89.7 (F)		60.5 (E)	
2035 Build	48.7 (D)	72.5 (E)	36.3 (D)	76.4 (E)	84.3 (F)	20.9 (C)	54.9 (D)	87.9 (F)	44.9 (D)	21.0 (C)
		59.0 (E)		47.4 (D)			86.9 (F)		27.6 (C)	

This intersection currently operates at an overall LOS D during AM and PM Existing scenarios. With the addition of general growth and approved developments, this intersection will operate at LOS E during the 2035 Background PM scenario. To achieve acceptable levels of service, this intersection is recommended to be coordinated with upstream and downstream traffic signals along Constance Road. These optimized timings are modeled in the Build scenario analysis and the intersection will operate at overall LOS D during both AM and PM peak Build scenarios.

7.2.14 Riversbend Development Driveway

Primary access to the site is provided via a signalized intersection at Memorial Avenue. However, a secondary site entrance providing right-in/right-out access is proposed approximately 335' south of Memorial Avenue, see site plan included in the **Appendix**.

Based on the volumes of traffic, the site driveway will require a full length right-turn lane with 150' of storage and 50' of taper.

The site driveway should be configured to allow right-out only movements and restrict inbound left-turns.

7.3 Site Access Management

The site access is currently provided by two driveways, which were formally one way in (southern entrance) and one way out (northern entrance). The location and operations of these driveways do not meet the needs of the proposed site layout and furthermore do not meet access management criteria. The City of Suffolk Public Works Facilities Manual (PFM) states that the minimum crossover spacing requirement for a 45-mph design speed (35-mph posted speed plus 10mph) is 650 feet, with a desired spacing of 800 feet.

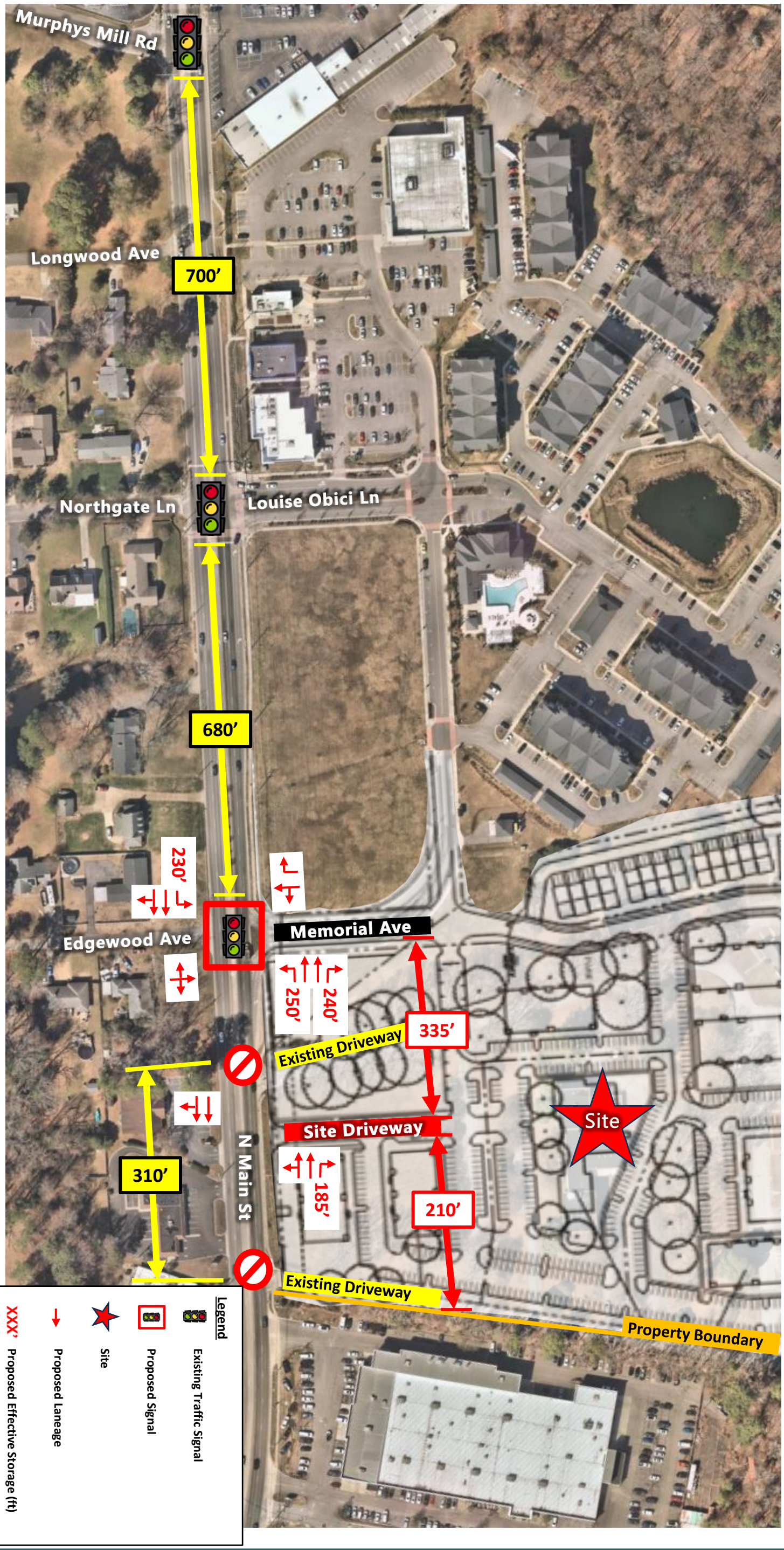
N. Main Street is a key corridor in the City that supports both residential commuters as well as various retail establishments. Some of the more recent developments generate higher traffic demands and have warranted signalized access, however there are a number of commercial and office sites with a single tenant/office that have full movement driveways.

Figure 15 illustrates the existing signal spacing along N. Main Street.

Access for the Riversbend development requires a minimum of two points, with at least one full movement access and a secondary right-in/right-out (RI/RO) driveway. With limited frontage along N. Main Street, the ability to provide two access points within the property limits that meet City standards is not feasible.

Various options for site access were developed and shared with City staff and are included in the **Appendix**. It was determined that connection via Memorial Avenue was the preferred option for full movement access and also allows for the secondary RI/RO to be provided within the development property limits. This option does not negatively impact the adjacent properties, maintains the existing center turn to support a northbound left-turn for the properties west of N. Main Streets, and meets the access management requirements.

With proposed shared access to the N. Main Street and Memorial Avenue intersection, this existing RI/RO access can be converted to full movement signalized. Signalized control operations at the intersection of N Main Street and Memorial Avenue meet minimum city standards for access management spacing, allow the construction of turn lanes within the site's frontage, and cause minimal impact to adjacent parcels. A traffic signal adequately supports the traffic generated by the Riversbend development.



North
Not to scale

vhb

Riversbend Development – Suffolk, VA

Main Street Access Management

Figure 15

7.4 Safety Analysis

The city noted that the study area has experienced a high frequency of crashes. As part of the traffic impact study, crash data was analyzed using the Virginia Department of Transportation (VDOT) Crash Analysis tool, along Main St in the immediate vicinity of the proposed Riversbend development site frontage. Data from 2019 through 2025 is summarized in **Table 19** and identifies a total of 51 crashes occurring over the study period. Detailed crash information by crash type and severity is illustrated in figures as follows:

- **Figure 16** – Crash Analysis Study Area Overview
- **Figure 17** – Crash Analysis Diagram A
- **Figure 18** – Crash Analysis Diagram B
- **Figure 19** – Crash Analysis Diagram C

Table 19: Main Street Crash Summary by Type and Severity

	Crash Severity				
Crash Type	**A. Severe Injury**	**B. Visible Injury**	**C. Non-visible Injury**	**PDO. Property Damage Only**	**Total**
Angle	0	0	5	5	**10**
Rear End	0	1	15	9	**25**
Sideswipe - Same Direction	0	0	2	6	**8**
Fixed Object - Off Road	0	1	0	1	**2**
Pedestrian	1	0	1	0	**2**
Deer	0	1	0	0	**1**
Other	1	0	1	1	**3**
Total	**2**	**3**	**24**	**22**	**51**

This segment of Main St is especially afflicted by rear end crashes, contributing to 49% of the crashes within the study area. Additionally, angle and side swipe – same direction account for 20% and 16%, respectively, of the total crashes occurring within the study area.

While some identified recommendations supporting site traffic for the proposed Riversbend development may not directly mitigate existing corridor crashes, they align with countermeasures statistically shown to reduce crash risks.

In accordance with City of Suffolk's Public Facilities Manual (PFM), an exclusive right-tun lane is required at the proposed right-in only site entrance to adequately support site traffic to the mixed-use development. The construction of the exclusive right-turn lane is compatible with the below described crash modification factor (CMF):

- Presence of right turning lane on arterial with signal coordination – CMF ID: 3071

This countermeasure allows right-turning vehicles to remove themselves from mainline through movements while reducing speed to make the right turn, reducing conflicts at the proposed site entrance. While the addition of a driveway creates a new conflict point along Main Street, a right-turn lane has a CMF of 0.06, indicating a significant reduction in rear end crashes at coordinated signalized intersections when exclusive right-turn lanes are installed.

Therefore, the additional driveway will be constructed with countermeasures applied to ensure rear end crashes, which are consistent throughout this segment of Main St, are proactively mitigated. Additionally, the site driveway is restricted to right-in only and is not anticipated to create additional crashes.

The primary access point for the Riversbend development will be provided via a proposed full-movement signalized intersection at the intersection of Main Street and Edgewood Lane/Memorial Avenue. This improvement supports ingress and egress for side streets with signalized control, providing benefits from both an operational and safety perspective. While a traffic signal would create an additional stop along Main Street, optimized signal timings are recommended to support the additional site traffic along Main Street. Though optimized signal timing doesn't correlate to an evaluated and established countermeasure, coordinated conditions with platooned traffic can enable drivers to move through the corridor with reduced stops and stopped delay, thereby reducing speed variations and mitigating risk of rear-end collisions. [1]

Additionally, to provide safer conditions for vehicles destined to and from the proposed development, dedicated left-turn lanes are recommended at the Main Street & Edgewood Ave/Memorial Ave signalized intersection. The southbound left-turn lane is expected to be constructed within the existing raised median and a raised median is expected to be constructed with the northbound left turn lane. A raised median along Main Street within the development frontage limits would restrict access for neighboring developments west of Main Street to right-in/right-out access only and would reduce the potential for angle crashes from left turning vehicles using the existing two way left turn lane (TWLTL). This condition is in alignment with the following CMF:

- Replace TWLTL with raised median – CMF ID: 2515

This countermeasure allows left-turning vehicles using the existing TWLTL to have a physical barrier between them and opposing traffic. Implementing this countermeasure can reduce angle and sideswipe crashes by 36% and 21% respectively, two crash types that are prevalent within the study area.

[1] Yue, R., Yang, G., Zheng, Y. et al. *Effects of traffic signal coordination on the safety performance of urban arterials*. Computational Urban Science. 2, 3. 2022.

Figure 16: Crash Analysis Study Area

Riversbend TIA | Suffolk, Virginia

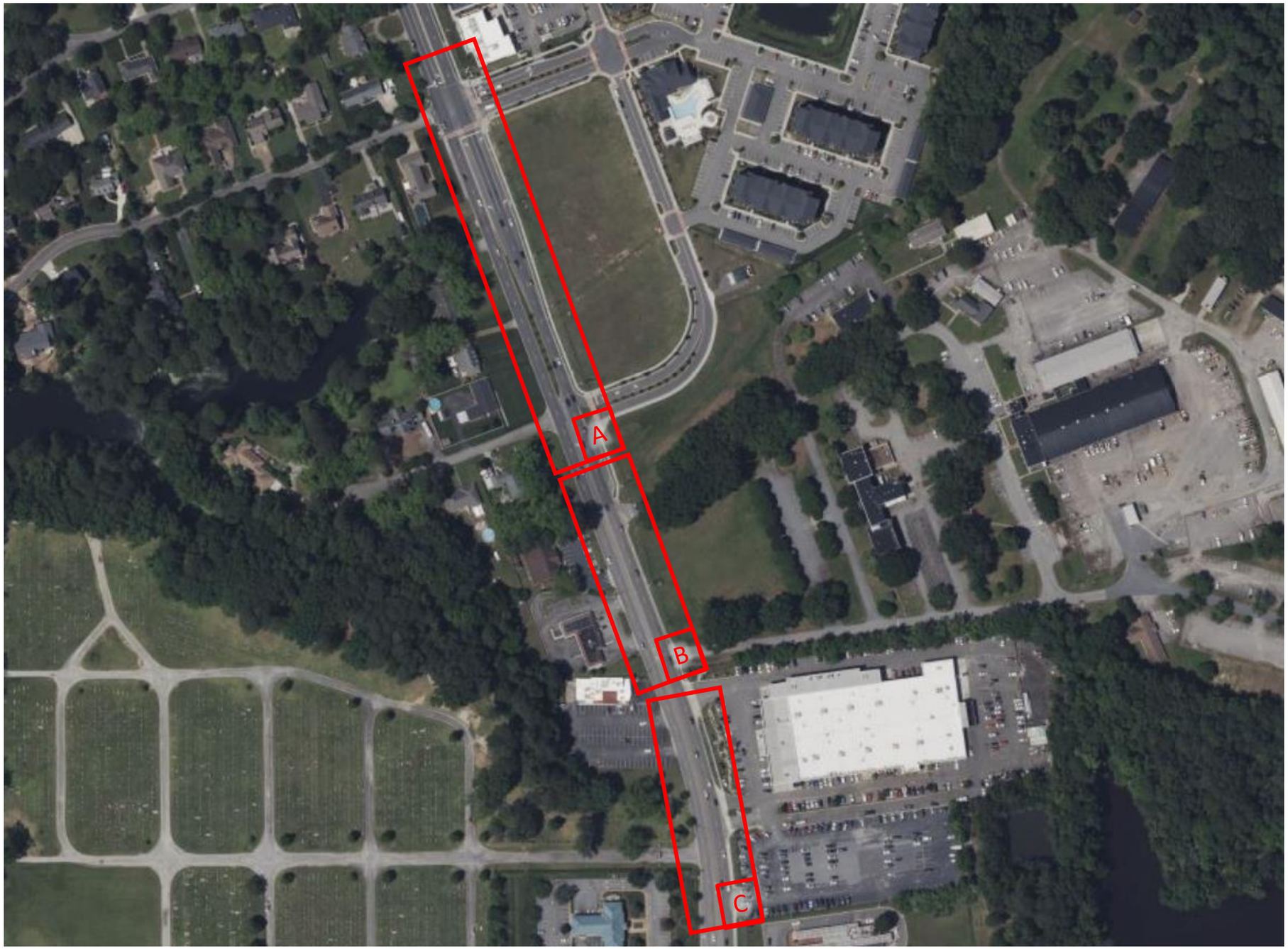
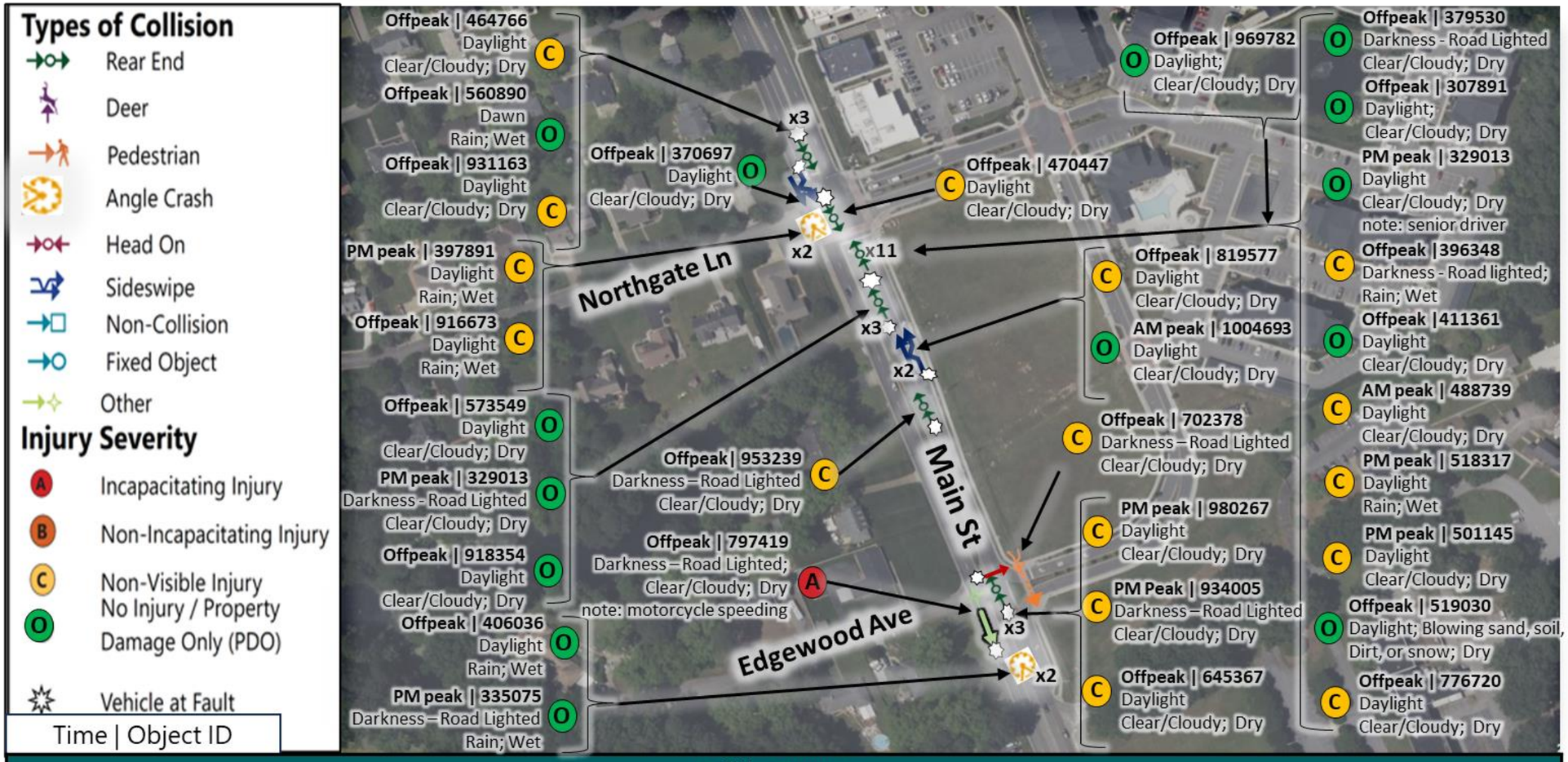


Figure 17: Crash Analysis Diagram A – Main St: Northgate Ln to Edgewood Ave

Riversbend TIA | Suffolk, Virginia



Collision Summary

Year	Type of Collision						Time of Day			Lighting			Weather		Pavement Condition			Severity					Total
	Angle	Rear-End	Head-On	Sideswipe	Fixed Object	Other	AM Peak (7-10AM)	PM Peak (4-7PM)	Off Peak	Daylight	Dawn/Dusk	Darkness – Lighting	Clear	Rain/Snow	Dry	Wet	Icy	K	A	B	C	PDO	
2019	1	3		1				2	3	3		2	5		5							5	5
2020	2	5					1	1	5	6		1	4	3	4	3					5	2	7
2021		5						2	3	4	1		2	3	3	2					2	3	5
2022		1				1			2	1		1	2		2						2		2
2023		1		1		1			3	1		2	3		3				1		2		3
2024	1	6						2	5	5		2	6	1	6	1					5	2	7
2025				1			1			1			1		1							1	1
Total	4	21		3		2	2	7	21	21	1	8							1		16	13	30

Figure 18: Crash Analysis Diagram B – Main St: Edgewood Ave to Commercial Property Entrance

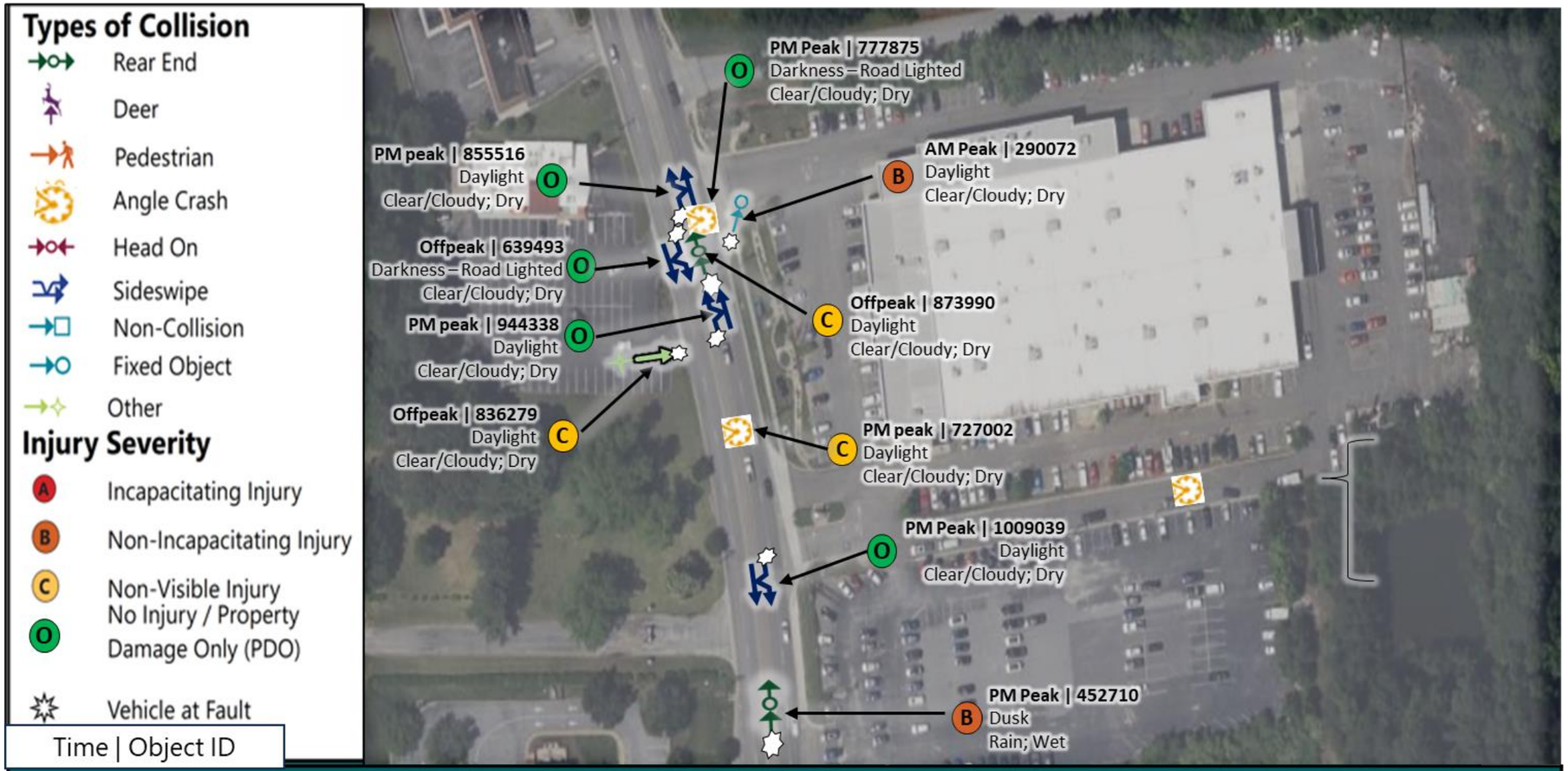
Riversbend TIA | Suffolk, Virginia

Collision Summary

Year	Type of Collision						Time of Day			Lighting			Weather		Pavement Condition			Severity					Total
	Angle	Rear-End	Head-On	Sideswipe	Fixed Object	Other	AM Peak (7-10AM)	PM Peak (4-7PM)	Off Peak	Daylight	Dawn/Dusk	Darkness – Lighting	Clear	Rain/Snow	Dry	Wet	Icy	K	A	B	C	PDO	
2019	1	1							2	2			2		2						1	1	2
2020				1					1	1			1		1						1		1
2021						2		1	1	1		1	2		2				1			1	2
2022	1				1		1		1	1		1	2		2							2	2
2023	1	1							2		1	1	2		2						2		2
2024	1					1		2		2			2		2					1	1		2
2025																							
Total	4	2		1	1	3	1	3	7	7	1	3	11		11				1	1	5	4	11

Figure 19: Crash Analysis Diagram C – Main St: Commercial Entrance (Barton Ford) to Holly Lawn Cemetery Entrance

Riversbend TIA | Suffolk, Virginia

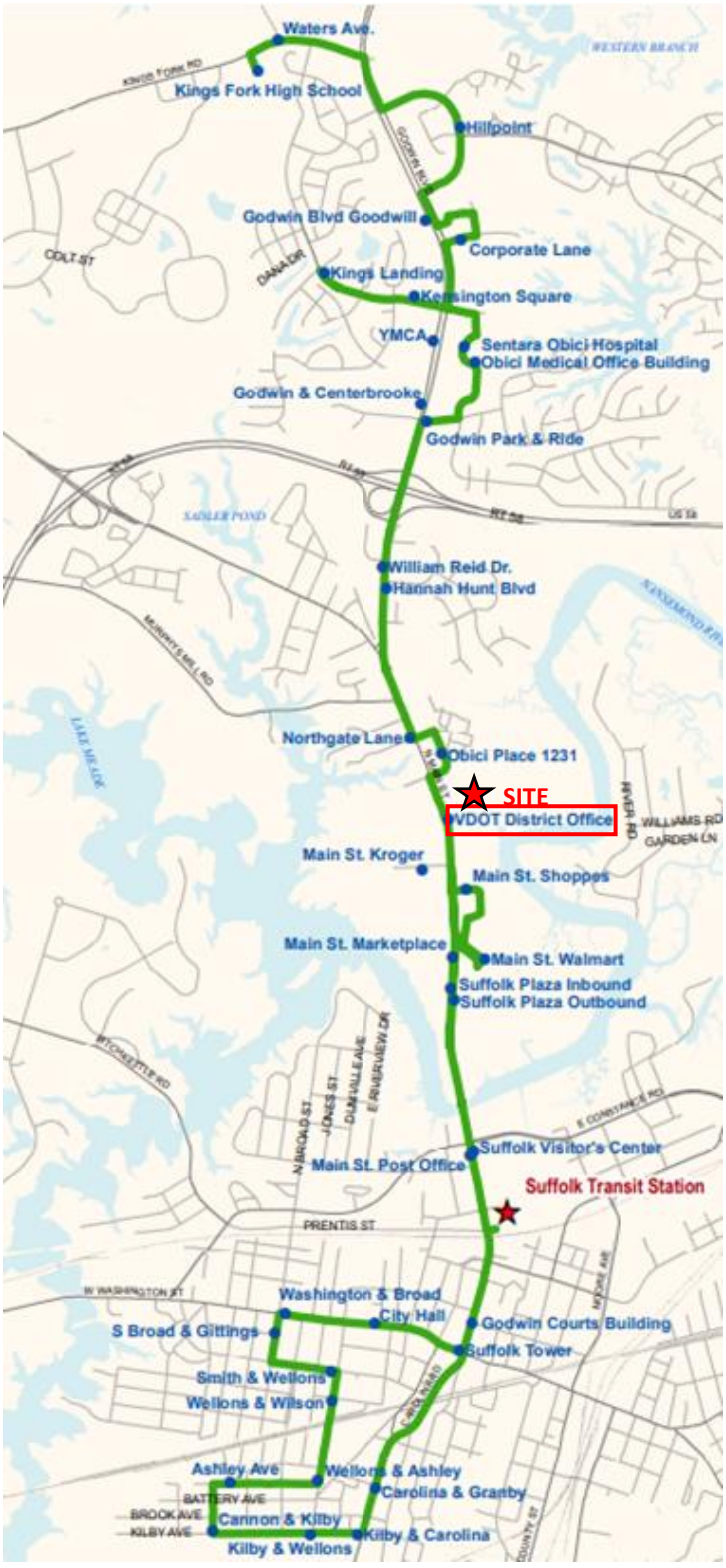


Collision Summary

Year	Type of Collision						Time of Day			Lighting			Weather		Pavement Condition			Severity					Total
	Angle	Rear-End	Head-On	Sideswipe	Fixed Object	Other	AM Peak (7-10AM)	PM Peak (4-7PM)	Off Peak	Daylight	Dawn/Dusk	Darkness – Lighting	Clear	Rain/Snow	Dry	Wet	Icy	K	A	B	C	PDO	
2019					1		1			1			1		1					1			1
2020		1						1			1			1		1				1			1
2021																							
2022	1			1					2	1		1	2		2						1	1	2
2023	1			1		1		2	1	3			2	1	2	1					1	2	3
2024		1		1				2		1	1		2		2						1	1	2
2025				1				1		1			1		1							1	1
Total	2	2		4	1	1	1	6	3	7	2	1	8	2	8	2				2	3	5	10

8 Multimodal Opportunity

Transit service is provided throughout the City via Suffolk Transit. Within the study area limits, the Green Route travels along N. Main Street and Godwin Boulevard and heads north to Kings Fork Road. This route provides thirteen stops within the study area, located at various locations as shown below. The route provides a stop right where the Riversbend development is to be located (former VDOT District Office).



9 Conclusions and Recommendations

The proposed development is located in the City of Suffolk along N. Main Street, just south of Memorial Avenue. The parcel was previously utilized for a Virginia Department of Transportation (VDOT) operational facility. The Riversbend development is requesting a rezoning of approximately 73.5 acres from Business/Commercial land usage to Residential in order to support a mix of condominiums and townhomes. The remaining 15.3 acres of the total site is proposed to remain commercial, per the site plan completed by Land Planning Solutions (LPS), dated March 31, 2025. Detailed site plan is included in the **Appendix**.

The traffic study area includes the roadways and intersections along N. Main Street, Godwin Boulevard, and Pruden Boulevard in the vicinity of the proposed development. As currently proposed, the Riversbend development will increase the volume of traffic on roadways and at intersections throughout the study area, adding 515 and 535 trips during the AM and PM peak hours, respectively.

To maintain traffic operations within the study area and mitigate impacts associated with the proposed development, the following are recommended:

N. Main Street / Site Entrance

Construct site driveway to provide right-in only access.

- Provide a northbound right-turn lane (150' storage / 50' taper, within available property limits)

N. Main Street / Memorial Avenue / Edgewood Avenue

Reconstruct the intersection to include the following laneage:

- N. Main Street (northbound):
  - one exclusive left-turn lane (extend to include 200' storage / 100' taper)
  - two through lanes
  - one exclusive right-turn lane (200' storage / 80' taper to tie into proposed RI/RO driveway)
- N. Main Street (southbound):
  - one exclusive left-turn lane (180' storage / 100' taper)
  - one exclusive through lane
  - one shared through-right turn lane
- Memorial Avenue (eastbound):
  - one shared through-left lane
  - one exclusive right-turn lane
- Edgewood Avenue (westbound):
  - one full (left-through-right) movement lane

Construct a traffic signal. The signal shall be constructed and operational prior to either one of the following thresholds of development

- 100% construction and occupancy of the residential portion of the development OR
- 75% construction and occupancy of the residential portion of the development AND 50% construction and occupancy of the office portion of the development

The recommendations for this TIA have been limited to the proposed land uses listed in **Chapter 5**. Should the developer consider a fast-food restaurant with drive-thru or similar use that generates higher traffic volumes, an updated traffic impact study will be required.

In addition to site entrance improvements, optimized signal timings are recommended as summarized below:

N. Main Street Corridor

Maintain existing laneage and provide optimized signal timings at the following intersections:

- N. Main Street / Pruden Boulevard / Godwin Boulevard
- N. Main Street / Murphy's Mill Road
- N. Main Street / Louise Obici Lane / Northgate Lane
- N. Main Street / Lowe's entrance
- N. Main Street / Walmart entrance
- N. Main Street / Big Lots Entrance
- N. Main Street / Constance Road / US Route 58

Optimized timings should be provided within six months of project completion or with construction of the proposed signal at Memorial Avenue. It is assumed that the City operates the coordinated systems with up to four timing plans. Optimized timings should be developed using existing cycle lengths by time of day and include minor changes to existing corridor progression, limited to updated splits, offsets, and phasing sequences. Data collection for timings is assumed to be provided by the City via Grid Smart data, and the developer will provide updated timing plans and implementation of these timings by a licensed engineer.