

LAND DEVELOPMENT TRAFFIC ANALYSIS

TRIBUTARY DRI for THREE RIVERS DEVELOPERS, LLC

NASSAU COUNTY, FLORIDA

ETM No. 22-483

SUBMITTED BY



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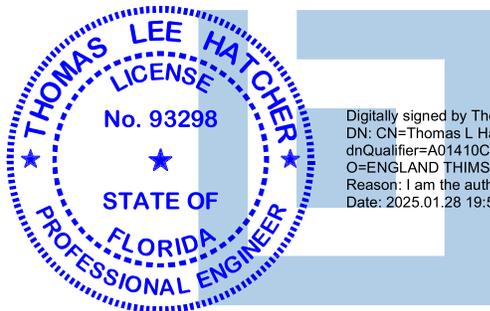
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This work is intended solely for Three Rivers Developers LLC and Nassau County. The scope of work and related responsibilities is as defined in the Client Contract. Any use which a third party makes of the work, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. Decisions made or actions taken as a result of our work shall be the responsibility of the parties directly involved in the decisions or actions.

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Project Overview

England-Thims & Miller, Inc. has been retained by Three Rivers Developers, LLC to conduct a Land Development Traffic Analysis (LDTA) for the Tributary Development of Regional Impact (DRI). The project location is shown in **Figure 1** and is located south of State Road 200 (SR-200) west of Edwards Road. The proposed development is expected to be complete by 2035. The proposed development program is shown in **Table 1**, detailing the existing entitlements versus the proposed entitlements that account for approved development within the DRI. **Figure 2** shows the configuration of the internal road network and land uses. The LDTA documents traffic operating conditions during the morning and afternoon peak hours for roadway segments and intersections within the analysis area.

Executive Summary

This Land Development Traffic Analysis (LDTA) has identified several key findings within the analysis area:

- **Internal Capture Impact:** The removal of the internal link between the eastern and western sections of the Tributary DRI has reduced internal capture by approximately 1.5%, as calculated using the ITE Trip Generation Handbook. However, the travel demand model indicates that approximately 5% of the project traffic from the southwest portion of the development will still travel to the commercial area in the northeast quadrant.
- **Traffic Signal Warrants:** ETM anticipates that traffic signals will be warranted at key intersections, including SR-200 / Police Lodge Rd, SR-200 / Tributary Dr, SR-200 / Edwards Rd and Edwards Rd / Tributary East Entrance. The developer has already secured an ICE approval from FDOT for the SR-200 / Police Lodge Rd intersection, resulting in an RCUT configuration. The final intersection configurations and connections will be determined during FDOT permitting, in coordination with Nassau County.

Intersection Improvements: ETM recommends the installation of a northbound left turn lane and a southbound right turn lane at the intersection of Tributary East

Entrance and Edwards Rd. Additionally, ETM advises the installation of a traffic signal once actual traffic volumes meet the necessary volume thresholds.

- **Edwards Rd Commercial Entrances:** The commercial entrances onto Edwards Rd will be analyzed in future SEP submittals to the County for additional review.

Study Methodology

The traffic study for the Tributary DRI was divided into three analyses. The first compared the relative impacts of the existing and proposed development rights with and without an internal connection to the northeast section of the DRI. The second portion of the study re-evaluates the impacts resulting from the proposed development on the adjacent roadway network. The third portion details the traffic operating conditions during the morning and afternoon peak hours for intersections within the analysis area. **Appendix A** contains the proposed TIA methodology.

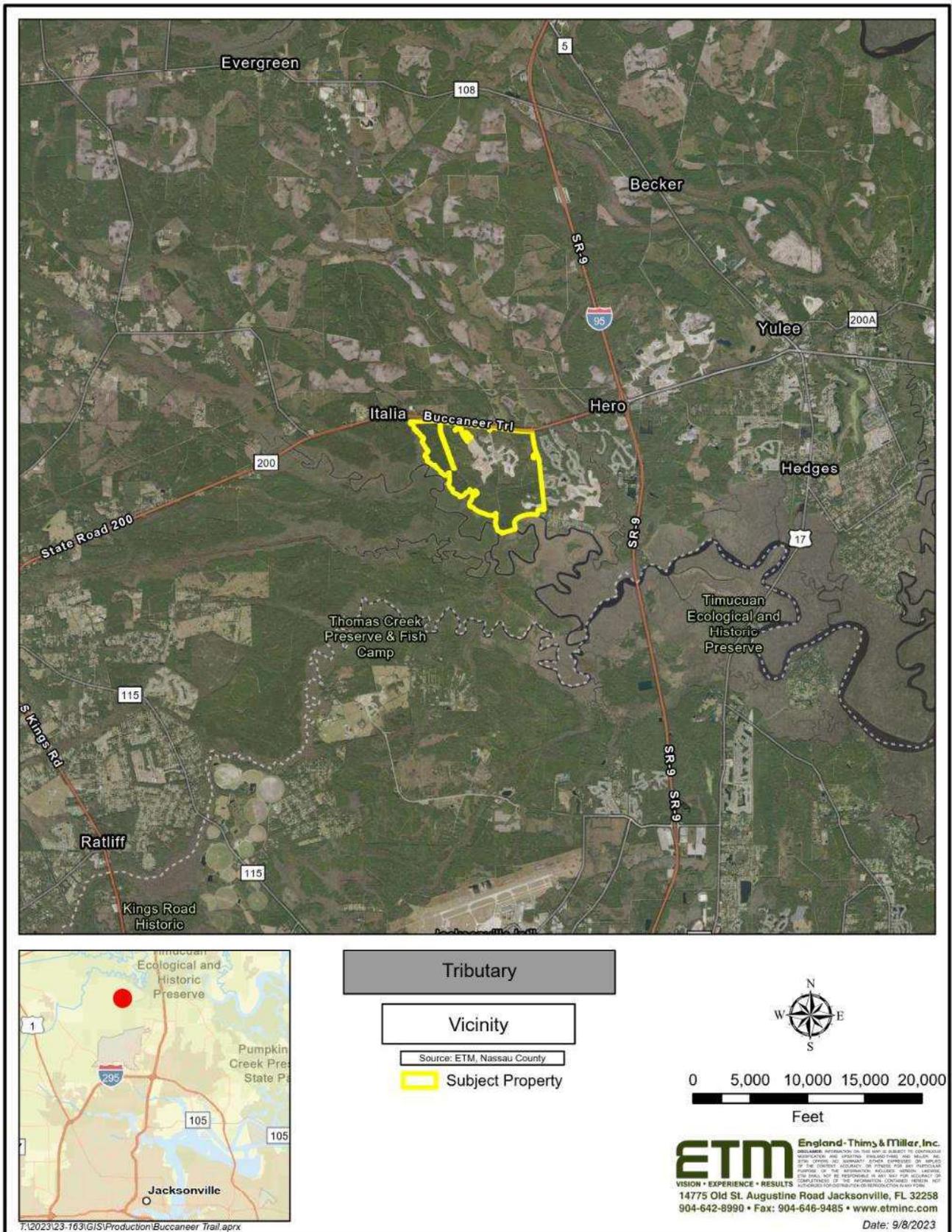
Table 1
Tributary DRI
Development Schedule

Land Use	Use Code	Quantity	Units	Buildout
<u>Currently Occupied</u>				
Single Family Residential	210	600	DUs	2023
Senior Adult Housing - Single-Family	251	100	DUs	2023
<u>Existing Entitlements</u>				
Industrial Park	130	250,000	1000 SF GFA	2035
Single Family Residential	210	3,200	DUs	2035
Multifamily Housing (Low-Rise)	220	0	DUs	2035
Senior Adult Housing - Single-Family	251	0	DUs	2035
Marina	420	300	Berths	2035
General Office Building	710	50,000	1000 SF GFA	2035
Shopping Center (>150k)	820	500,000	1000 SF GFA	2035
<u>Proposed Entitlements</u>				
Industrial Park	130	250,000	1000 SF GFA	2035
Single Family Residential	210	2,617	DUs	2035
Multifamily Housing (Low-Rise)	220	300	DUs	2035
Senior Adult Housing - Single-Family	251	283	DUs	2035
Marina	420	300	Berths	2035
General Office Building	710	50,000	1000 SF GFA	2035
Shopping Center (>150k)	820	500,000	1000 SF GFA	2035

Note: Development by Phase is Cumulative

Buildout Year is an estimate and influenced by market conditions

Figure 1 – Project Location Map



Trip Generation Comparison of the Existing and Proposed Development Rights

A comparison of the net new external traffic for the existing and proposed development rights was conducted using the 11th edition of the Institute of Transportation Engineers (ITE) Trip Generation Manual and the 3rd edition of the ITE Trip Generation Handbook. **Table 2** below illustrates the comparison between the existing and proposed entitlements. According to the TIA methodology, internal capture between the eastern and western portions of the DRI was not permitted based on ITE methods.

Table 3 indicates that the calculated internal capture percentage is approximately 1.5% lower than initially expected. However, the model distribution printouts reveal that around 5% of the project traffic from other areas will flow to the northeast zone of the development. **Appendix B** includes the NCHRP 684 Internal Capture spreadsheets utilized to compute internal capture in each scenario.

Table 2
Tributary DRI
Land Use Policy Comparison - PM Peak Hour Trip Generation Estimates

Land Use	ITE Land Use Code	Sq. Ft. or Number of Units	Independent Variable (Units)	Estimation Method (Rate or Equation)	Gross Trip Ends	Gross Trip Ends				Internal Capture		Pass-by		Net New External Trip Ends
						Entering		Exiting		%	Volume	%	Volume	
						%	Volume	%	Volume					
Existing Entitlements														
Industrial Park	130	250,000	1000 SF GFA	$T = 0.34(X)$	85	22%	19	78%	66	0.0%	0	0%	0	85
Single Family Residential	210	3,200	DUs	$\text{Ln}(T) = 0.94 \text{Ln}(X) + 0.27$	2,583	63%	1,627	37%	956	13.2%	342	0%	0	2,241
Multifamily Housing (Low-Rise)	220	0	DUs	$T = 0.43(X) + 20.55$	0	63%	0	37%	0	0.0%	0	0%	0	0
Senior Adult Housing - Single-Family	251	0	DUs	$\text{Ln}(T) = 0.78 \text{Ln}(X) + 0.20$	0	61%	0	39%	0	0.0%	0	0%	0	0
Marina	420	300	Berths	$T = 0.21(X)$	63	60%	38	40%	25	28.6%	18	0%	0	45
General Office Building	710	50,000	1000 SF GFA	$\text{Ln}(T) = 0.83 \text{Ln}(X) + 1.29$	93	17%	16	83%	77	34.4%	32	0%	0	61
Shopping Center (>150k)	820	500,000	1000 SF GFA	$\text{Ln}(T) = 0.72 \text{Ln}(X) + 3.02$	1,798	48%	863	52%	935	20.2%	364	19%	272	1,162
Total					4,622		2,563		2,059	16.4%	756		272	3,594
Proposed Entitlements														
<i>Tributary DRI - West</i>														
Industrial Park	130	250,000	1000 SF GFA	$T = 0.34(X)$	85	22%	19	78%	66	0.0%	0	0%	0	85
Single Family Residential	210	2,617	DUs	$\text{Ln}(T) = 0.94 \text{Ln}(X) + 0.27$	2,138	63%	1,347	37%	791	11.1%	238	0%	0	1,900
Multifamily Housing (Low-Rise)	220	0	DUs	$T = 0.43(X) + 20.55$	0	63%	0	37%	0	0.0%	0	0%	0	0
Senior Adult Housing - Single-Family	251	283	DUs	$\text{Ln}(T) = 0.78 \text{Ln}(X) + 0.20$	100	61%	61	39%	39	11.1%	11	0%	0	89
Marina	420	300	Berths	$T = 0.21(X)$	63	60%	38	40%	25	27.0%	17	0%	0	46
General Office Building	710	22,000	1000 SF GFA	$\text{Ln}(T) = 0.83 \text{Ln}(X) + 1.29$	47	17%	8	83%	39	31.9%	15	0%	0	32
Shopping Center (>150k)	820	325,900	1000 SF GFA	$\text{Ln}(T) = 0.72 \text{Ln}(X) + 3.02$	1,321	48%	634	52%	687	20.2%	267	19%	200	854
Sub-Total					3,754		2,107		1,647	14.6%	548		200	3,006
<i>Tributary DRI - East</i>														
Industrial Park	130	0	1000 SF GFA	$T = 0.34(X)$	0	22%	0	78%	0	0.0%	0	0%	0	0
Single Family Residential	210	0	DUs	$\text{Ln}(T) = 0.94 \text{Ln}(X) + 0.27$	0	63%	0	37%	0	0.0%	0	0%	0	0
Multifamily Housing (Low-Rise)	220	300	DUs	$T = 0.43(X) + 20.55$	150	63%	95	37%	55	46.7%	70	0%	0	80
Senior Adult Housing - Single-Family	251	0	DUs	$\text{Ln}(T) = 0.78 \text{Ln}(X) + 0.20$	0	61%	0	39%	0	0.0%	0	0%	0	0
Marina	420	0	Berths	$T = 0.21(X)$	0	60%	0	40%	0	0.0%	0	0%	0	0
General Office Building	710	28,000	1000 SF GFA	$\text{Ln}(T) = 0.83 \text{Ln}(X) + 1.29$	58	17%	10	83%	48	27.6%	16	0%	0	42
Shopping Center (>150k)	820	174,100	1000 SF GFA	$\text{Ln}(T) = 0.72 \text{Ln}(X) + 3.02$	841	48%	404	52%	437	9.5%	80	29%	221	540
Sub-Total					1,049		509		540	15.8%	166		221	662
Total					4,803		2,616		2,187	14.9%	714		421	3,668
Volume Increase / (Decrease)														74

Reference: ITE Trip Generation Manual, 11th Edition
ITE Trip Generation Handbook, 3rd Edition

Table 3
Tributary DRI
Land Use Policy Comparison - PM Peak Hour Internal Capture Comparison

Land Use	Gross Trip Ends	Internal Capture		Pass-By	Net New External Trip Ends
		%	Volume	Volume	
<i>Existing Entitlements</i>					
Tributary DRI	4,622	16.4%	756	272	3,594
<i>Proposed Entitlements</i>					
Tributary DRI - West	3,754	14.6%	548	200	3,006
Tributary DRI - East	1,049	15.8%	166	221	662
Total	4,803	14.9%	714	421	3,668
<i>Difference</i>	181	-1.5%	-42	149	74

Note: Values were extracted from Table 2.

Analysis Area

Consistent with the LDTA methodology, the analysis area of the Tributary DRI includes the following intersections:

- SR-200 & Police Lodge Rd / Western Entrance
- SR-200 & Tributary Dr / Eastern Entrance
- SR-200 & Edwards Rd
- Edwards Rd & Tributary East Entrance

Inventory of Existing Conditions

SR-200 serves as a principal arterial roadway and is a Strategic Intermodal Systems (SIS) Corridor. This arterial establishes a connection between the Town of Callahan and Yulee in Nassau County and has a posted speed limit of 65 mph. Adjacent to the proposed project, SR-200 is a four-lane facility from Callahan to I-95 and a six-lane facility from I-95 to Old Nassauville Road. **Table 4** lists the roadways within Nassau County along with their area type, functional classification, PM peak hour traffic volume and maximum service volume (MSV). This information was taken from the Florida Department of Transportation District 2 Level of Service Report (FDOT D2 LOS Report). A straight line diagram for the listed state roadways can be found in **Appendix C**. Copies of the FDOT D2 LOS Report are contained in **Appendix D**.

Planned Improvements

The stretch of US-17 extending from the Duval County Line to CR-108 is included in the North Florida Transportation Planning Organization's (NFTPO) Cost Feasible Plan for expansion from 2 lanes to 4 lanes. **Appendix E** contains an excerpt from the NFTPO Cost Feasible Plan.

**Table 4
Tributary DRI
Existing Conditions**

Roadway	Segment	Area Type	Context Classification	LOS Std.	Segment Length (mi)	Date of Count	Traffic Count AADT	2022 PM Peak Hour Traffic (vph)	2035 PM Peak Hour Traffic (vph)	Peak Hour Maximum Service Volume (vph)	Total Committed PM Peak Hour Traffic	Percent Service Volume Utilized
SR A1A / 200	NE, City Limit of Callahan to Griffen Rd	TR	C2	C	6.130	2022	12,900	1,226	1,521	4,350	1,521	37.8%
SR A1A / 200	Griffen Rd to Police Lodge Rd	TR	C2	C	2.213	2022	20,500	1,948	2,238	4,350	2,238	54.2%
SR A1A / 200	Police Lodge Rd to Tributary Dr	TR	C2	C	0.787	2022	20,500	1,948	2,238	4,350	2,238	54.2%
SR A1A / 200	Tributary Dr to Edwards Rd	TR	C2	C	0.744	2022	20,500	1,948	2,238	4,350	2,238	54.2%
SR A1A / 200	Edwards Rd to I-95	TR	C2	C	1.551	2022	20,500	1,948	2,238	4,350	2,238	54.2%
SR A1A / 200	I-95 to Flocco Ave	UZ	C3C	D	0.824	2022	27,054	2,435	2,648	4,870	2,648	56.2%
SR A1A / 200	Flocco Ave to Oak Tree Ln	UZ	C2	D	1.587	2022	27,054	2,435	2,648	7,950	2,648	34.4%
SR A1A / 200	Oak Tree Ln to US 17	UZ	C3C	D	0.554	2022	27,054	2,435	2,589	4,870	2,589	54.5%
SR A1A / 200	US 17 to CR 107 / Old Nassauville Rd	UZ	C3C	D	5.272	2022	45,500	4,095	4,350	4,870	4,350	91.5%
SR A1A / 200	Old Nassauville Rd to Piney Island Dr	UZ	C3C	D	1.135	2022	49,000	4,410	4,714	3,290	4,714	147.1%
I-95	Duval County Line to SR 200 / A1A	TR	Limited Access	C	3.03	2022	90,000	9,450	10,069	8,490	10,069	121.6%
I-95	SR 200 / A1A to US 17	TR	Limited Access	C	6.64	2022	68,622	7,205	7,931	8,490	7,931	97.0%
I-95	US 17 to Georgia State Line	TR	Limited Access	C	2.556	2022	76,531	8,036	8,538	8,490	8,538	103.0%
US 17	Duval County Line to Urban Boundary	TR	C1	C	1.301	2022	18,000	1,620	3,166	780	3,166	488.6%
US 17	Urban Boundary to Crosby Ave	UZ	C3C	D	2.521	2022	15,900	1,431	2,820	1,950	2,820	174.3%
US 17	Crosby Ave to SR 200	UZ	C3C	D	0.216	2022	15,900	1,431	2,786	3,290	2,786	101.8%
US 17	SR 200 / A1A to Pages Dairy Rd	UZ	C3C	D	0.237	2022	14,000	1,260	1,756	3,290	1,756	59.6%
US 17	Pages Dairy Rd to Hamilton St	UZ	C3C	D	0.639	2022	14,000	1,260	1,834	1,950	1,834	106.4%
US 17	Hamilton St to I-95	TR	C2	C	6.05	2022	14,000	1,330	1,496	780	1,496	200.6%
US 17	I-95 to Georgia State Line	TR	C2	C	2.412	2022	4,300	409	476	780	476	64.6%
Edwards Road	River Glenn Pkwy to East Commercial Access	TR	C3R	C	0.65	2023	4,089	368	368	1,584	368	23.2%
Edwards Road	East Commercial Access to SR-200	TR	C3C	C	0.15	2023	5,244	472	472	1,242	472	38.0%

Notes:

1. FDOT D2 LOS Tool data was downloaded on 12/18/2024
2. The MSV for Edwards Road was estimated using the 2023 FDOT LOS Handbook, based on the identified context classifications and applying a 10% reduction for being a non-state signalized roadway.
3. The Area Type and LOS Standards shown are based on the 2020 FHWA Urban Area Boundary Maps approved on 11/20/2024 and may change in the future as development continues.

Existing Conditions Capacity Analysis

To identify current traffic conditions within the analysis area, turning movement counts were collected at the major intersections within the analysis area as discussed in the traffic study methodology. Traffic counts were corrected with a seasonal factor. **Figures 3 and 4** illustrate the existing weekday morning and afternoon peak hour volumes, respectively, in this area. The existing lane arrangements and levels of service are also shown. Levels of service were calculated using the procedures from the 7th edition of the Highway Capacity Manual using the Synchro/SimTraffic Software program. Copies of the count data can be found in **Appendix F**. The FDOT Seasonal Factor Report is contained in **Appendix G**. The detailed intersection operational analysis printouts can be found in **Appendix H**.

Traffic Signal Warrant Analysis – SR-200 & Tributary Dr

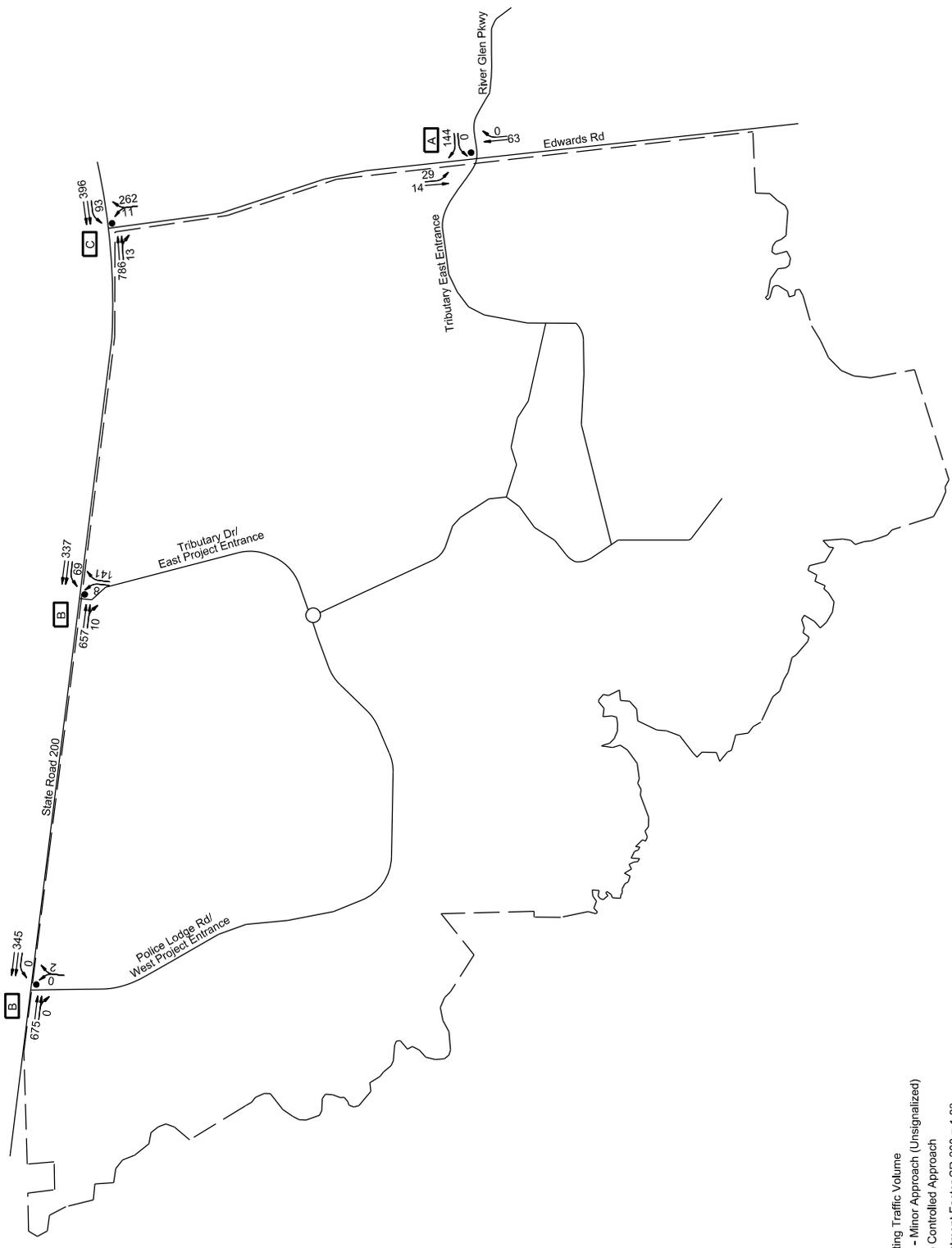
The traffic signal warrant analysis in this report documents the need for a traffic signal at the intersection of SR-200 and Tributary Dr in the existing condition. 13 Hour turning movement counts and delay data was collected at the intersection. This study analyzed the northbound approach as one-lane, where only left-turns were included, due to the minimal delay experienced by the northbound right turn movement. **Table 5** presents the 13-hour weekday traffic volumes used for the traffic signal warrant analysis in the existing condition. It should be noted that none of the traffic signal warrants are met in either condition. **Appendix I** contains the traffic signal warrant volume development sheets as well as the summary sheets.

Table 5

Tributary DRI

13 Hour Weekday Approach Volume Summary

Time	Existing	
	SR-200 (EB+WB)	Tributary Dr (NBLT)
6:00 AM	751	4
7:00 AM	961	9
8:00 AM	882	10
9:00 AM	895	5
10:00 AM	858	9
11:00 AM	879	13
12:00 PM	972	3
1:00 PM	945	10
2:00 PM	933	9
3:00 PM	1,119	3
4:00 PM	1,175	12
5:00 PM	1,140	6
6:00 PM	749	8



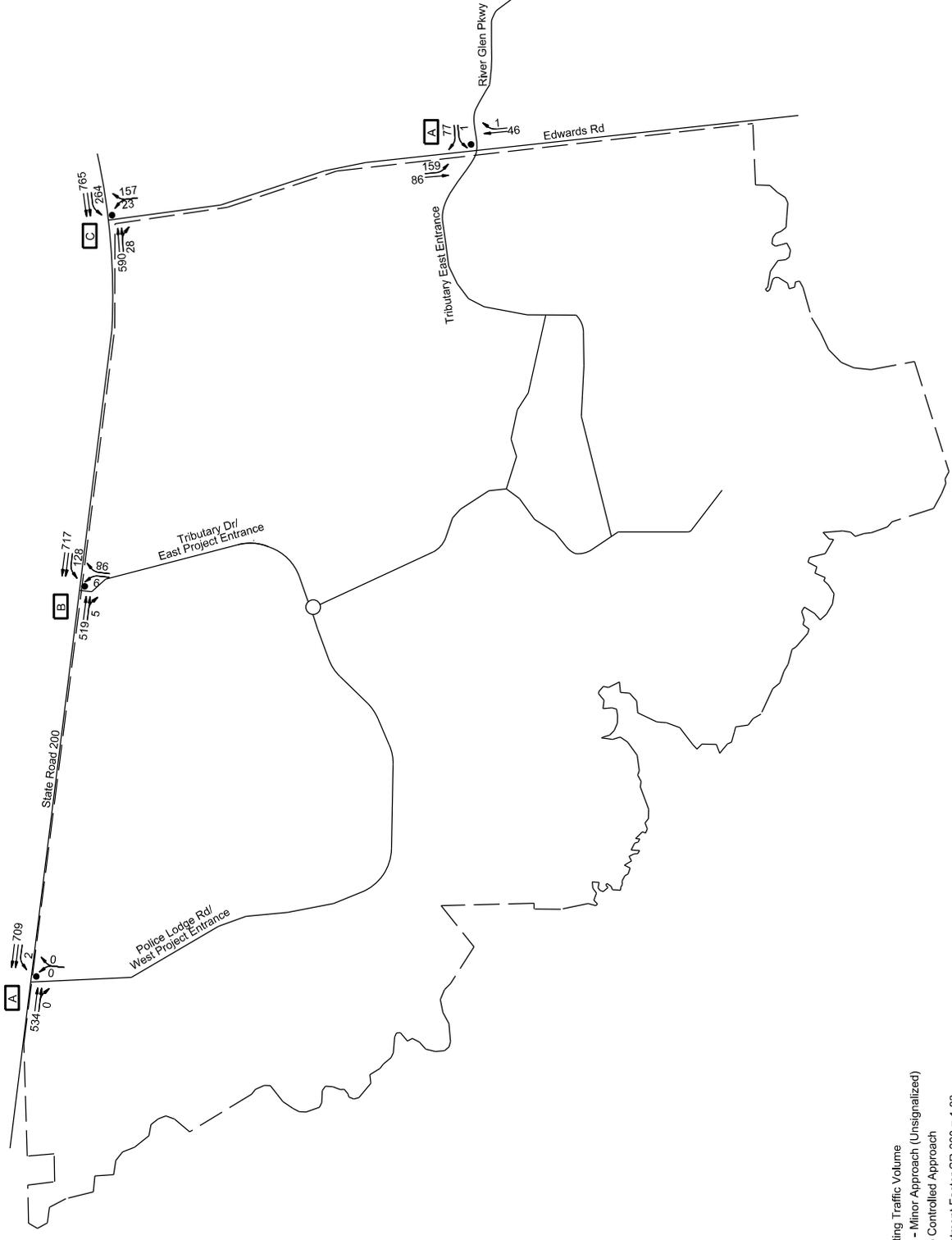
Tributary DRI
 Land Development Traffic Analysis

AM Peak Hour
 Existing Volumes (2023)

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Figure 3



LEGEND
 XXX Existing Traffic Volume
 [X] LOS - Minor Approach (Unsignalized)
 • Stop Controlled Approach
 Seasonal Adjustment Factor SR-200 = 1.03
 Seasonal Adjustment Factor Edwards Rd = 0.98

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Tributary DRI
 Land Development Traffic Analysis

PM Peak Hour
 Existing Volumes (2023)

Figure 4

Intersection Delay Study

Additional data collection was collected to perform an intersection delay study per Chapter 7 of the FDOT *Manual on Uniform Traffic Studies* (MUTS). The MUTS states that “an intersection delay study is used to evaluate the performance of intersections in allowing traffic to enter and pass through, or to enter and turn onto another route.” The delay study was conducted during the AM peak hour and the PM peak hour. Both hours of the delay study were conducted for the northbound approach of Tributary Dr. The average delay observed was between 7 and 8 seconds per vehicle, corresponding to a level of service (LOS) “A”. The results are detailed in **Table 6**, and the data collection sheets, along with the level of service standards for a two-way stop-controlled intersection, are provided in **Appendix J**.

Table 6
Tributary DRI
Delay Study Summary

Data	AM		PM	
	Left Turn	Right Turn	Left Turn	Right Turn
Total Vehicle Count	8	136	9	96
Average Delay per Lane (seconds)	7.37	8.15	7.11	8.10
Maximum Queue (vehicles)	1	3	1	3
Total Delay (vehicle-hours)	0.02	0.31	0.02	0.22

Crash Analysis

Crash data was obtained from Signal 4 Analytics for the intersection of SR-200 and Tributary Drive, covering the period from 1/1/2019 to 10/4/2024. Only one crash was recorded at the project intersection, which is significantly below the threshold of five correctable crashes within a 12-month period, as required to meet Warrant 7: Crash Experience in the MUTCD. The reported crash involved a westbound vehicle making a left turn and failing to yield to an eastbound vehicle making a right turn.

Background Traffic Estimates

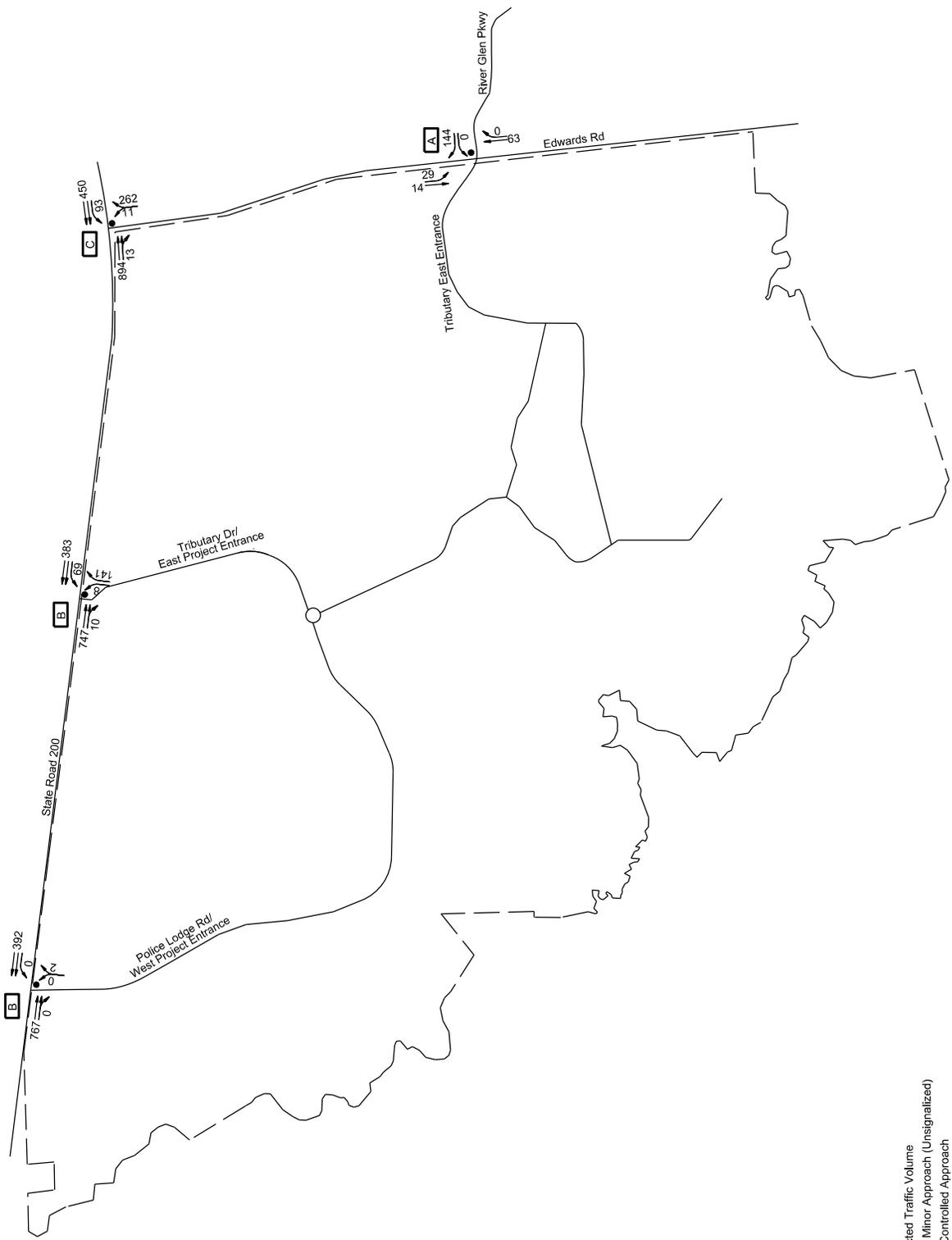
As shown in **Table 4**, several roadway segments are expected to exceed their capacity with forecasted traffic volumes, without project traffic from the Tributary DRI. However, many of these segments are on the NFTPO Cost Feasible Plan to be widened. These roadways are above capacity without the proposed project, therefore the cost of correcting the deficiency does not lie with the proposed development, per Section 163.3180 (5)(h)2.b. Florida Statutes. Background traffic growth was calculated in accordance with the Transportation Impact Analysis (TIA) methodology, utilizing the FDOT D2 LOS Tool for FDOT roadways. **Table 7** provides a breakdown of the growth rate calculations for SR-200 adjacent to the project. **Table 4** illustrates the future traffic and roadway data for the roadway segments within Nassau County. **Figures 5** and **6** illustrate the estimated traffic volumes (existing plus background) in the year 2035 during the morning and afternoon peak hours. Copies of the Synchro printouts of the background traffic condition are contained in **Appendix K**.

Table 7
Tributary DRI
Growth Rate Summary

Segment		2022 AADT	2035 AADT	Annual Percentage Growth from 2022-2035	Growth Factor 2023-2035
SR A1A/200	from Griffen Rd to I-95	20,500	23,555	1.07%	1.137

Note:

1. Future Volume projections were extracted from the FDOT D2 LOS Tool 12/13/2024
2. Intersection Traffic Counts were collected in 2023



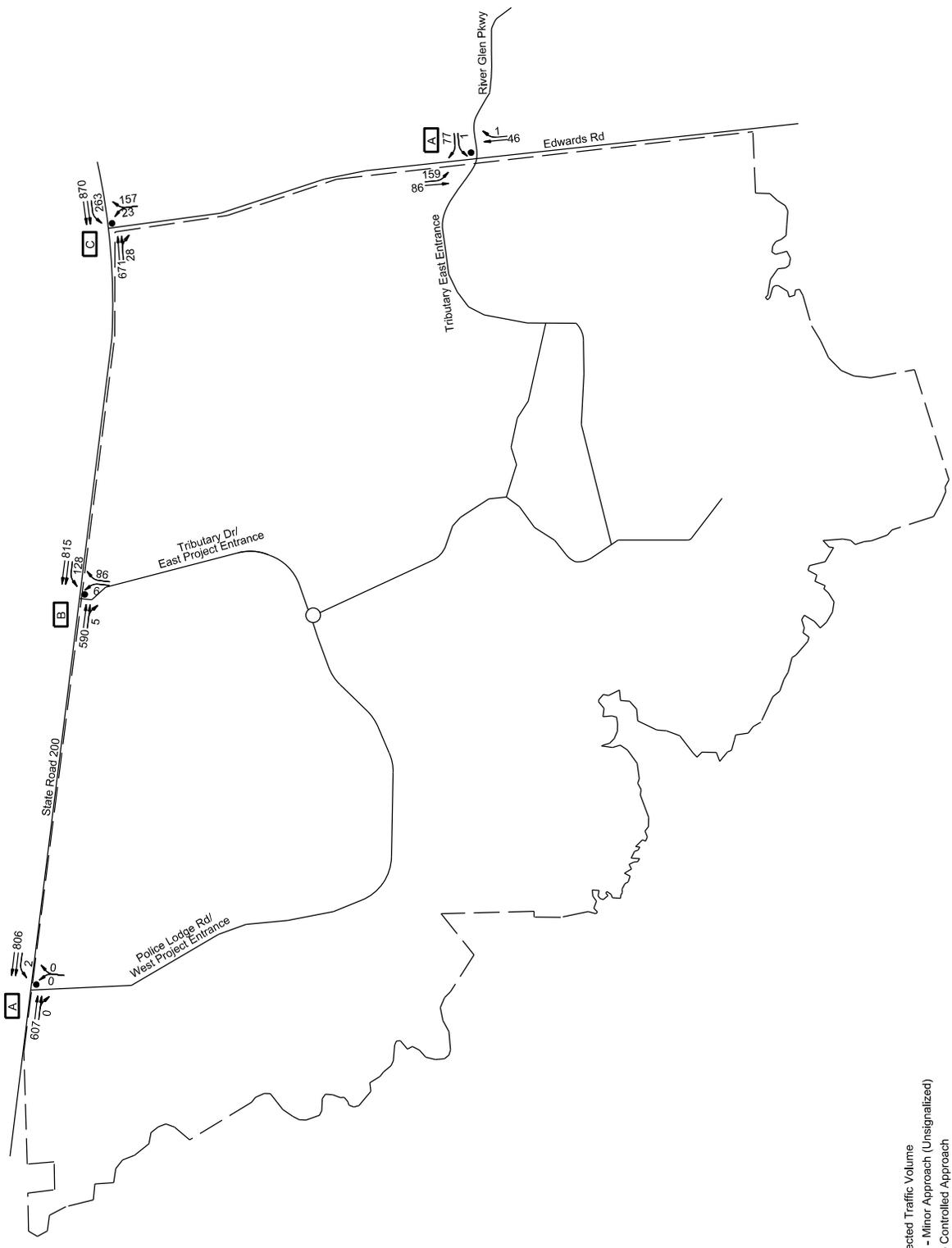
LEGEND
 XXXX Projected Traffic Volume
 [X] LOS - Minor Approach (Unsignalized)
 • Stop Controlled Approach
 Growth Factor = 1.137



Tributary DRI
 Land Development Traffic Analysis

AM Peak Hour
 Background Traffic (2035)

Figure 5



LEGEND
 XXXX Projected Traffic Volume
 [X] LOS - Minor Approach (Unsignalized)
 • Stop Controlled Approach
 Growth Factor = 1.137



Tributary DRI
 Land Development Traffic Analysis

PM Peak Hour
 Background Traffic (2035)

Figure 6

Project Trip Generation Estimates

The development traffic was estimated based on the trip generation rates and equations contained in the 11th edition of the Institute of Transportation Engineers (ITE) *Trip Generation Manual*. The development was approximated into four regions based off land uses and connection locations as follows: West Commercial, Residential, East Commercial and School. **Tables 8, 9, 10 and 11** illustrate the trip generation calculations of the proposed project by each region during a typical weekday, along with the morning and afternoon peak hours. The NCHRP 684 Internal Capture Spreadsheets are contained in **Appendix L**.

Project Traffic Distribution and Assignment Methodology

Traffic from the Tributary DRI was distributed across the surrounding roadway network using patterns from the Northeast Regional Planning Model (NERPM). For the East Commercial portion of the development and Edwards Rd, traffic was preliminarily assigned to a single driveway, despite the conceptual master plan showing multiple access points onto Edwards Rd. As a result, the current traffic volumes are preliminary, and no access improvements are planned at this time. Final access improvements along Edwards Rd will be determined during the Site Engineering Plan (SEP) stage as that portion of the project develops. NERPM plots are provided in **Appendix M**. The peak hour project traffic distribution by area is depicted in **Figures 7, 8, 9 and 10**. The calculation of total project traffic on each segment within the impact area is presented in **Table 12**.

Total Traffic Volumes

Background, project and total traffic volumes on the roadway segments within the impact area are presented in **Table 13**. The percentage of the MSV consumed by the project traffic is also depicted along with the determination if the roadway segment is significantly impacted by the project. The significance criteria used is 5% of the maximum service volume for the project traffic (as previously used in the prior concurrency analysis). The project will have a significant impact on several links; however, the links have available capacity. None of the links are significantly and adversely impacted.

**Table 8
Tributary DRI
Trip Generation Estimates - West Commercial**

Land Use	ITE Land Use Code	Sq. Ft. or Number of Units	Independent Variable (Units)	Estimation Method (Rate or Equation)	Gross Trip Ends		Internal Capture		Pass-by		Pass-by 10% of Adj. Vol Through Volume		Lesser of Pass-by Trips Volume		Net New External Trip Ends		
					Entering %	Exiting %	Entering Volume	Exiting Volume	%	Volume	%	Volume	%	Volume	%	Volume	%
<i>Daily</i>																	
Industrial Park	130	250,000	1000 SF GFA	$\text{Ln}(T) = 0.52 \text{Ln}(X) + 4.45$	50%	756	0	0	0%	0	0	N/A	0	0	1,512	50%	756
General Office Building	710	37,500	1000 SF GFA	$\text{Ln}(T) = 0.87 \text{Ln}(X) + 3.05$	50%	247	37	15%	74	0%	0	N/A	0	0	420	50%	210
Shopping Center (S-150k)	820	169,000	1000 SF GFA	$T = 26.11(X) + 5865.73$	50%	5,138	116	2%	232	29%	2,913	17%	17,044	1,704	8,340	50%	4,170
Total						6,141	153	2.5%	306		2,913		1,704	1,704	10,272		5,156
<i>AM Peak Hour</i>																	
Industrial Park	130	250,000	1000 SF GFA	$T = 0.34(X)$	81%	69	0	0	0%	0	0	N/A	0	0	85	81%	69
General Office Building	710	37,500	1000 SF GFA	$\text{Ln}(T) = 0.86 \text{Ln}(X) + 1.16$	88%	63	3	3%	6	0%	0	N/A	0	0	66	88%	58
Shopping Center (S-150k)	820	169,000	1000 SF GFA	$T = 0.59(X) + 133.55$	62%	144	3	3%	6	29%	66	54%	1261	66	161	62%	100
Total						276	114	3.1%	12		66		126	66	312		227
<i>PM Peak Hour</i>																	
Industrial Park	130	250,000	1000 SF GFA	$T = 0.34(X)$	22%	19	0	0	0%	0	0	0	0	0	85	22%	19
General Office Building	710	37,500	1000 SF GFA	$\text{Ln}(T) = 0.83 \text{Ln}(X) + 1.29$	17%	13	4	12%	16	0%	0	N/A	0	0	58	17%	10
Shopping Center (S-150k)	820	169,000	1000 SF GFA	$\text{Ln}(T) = 0.72 \text{Ln}(X) + 3.02$	48%	395	428	2%	16	29%	234	19%	1,534	153	654	63%	412
Total						427	555	3.3%	32		234		153	153	797		441

Reference: ITE Trip Generation Manual, 11th Edition
ITE Trip Generation Handbook, 3rd Edition

Table 9
Tributary DRI
Trip Generation Estimates - Residential

Land Use	ITE Land Use Code	Sq. Ft. or Number of Units	Independent Variable (Units)	Estimation Method (Rate or Equation)	Gross Trip Ends		Internal Capture		Pass-by		Pass-by 10% of Adj Vol Through		Lesser of Pass-by Trips		Net New External Trip Ends		
					Entering	Exiting	Entering	Exiting	Volume	%	Volume	%	Volume	%	Volume	%	Volume
<i>Daily</i>																	
Single Family Residential	210	2,017	DUs	$\ln(T) = 0.92 \ln(X) + 2.68$	16,004	50%	8,002	33%	334	4%	0	0%	0	0	15,337	50%	7,668
Senior Adult Housing - Single-Family	251	183	DUs	$\ln(T) = 0.85 \ln(X) + 2.47$	990	50%	495	25	5%	0	0%	0	0	940	50%	470	
Marina	420	300	Berths	$T = 2.41(X)$	723	50%	361	49	13%	98	0%	0	0	625	50%	313	
Shopping Plaza (40-150k) - Supermarket - No	821	131,000	1000 SF GFA	$T = 67.52(X)$	8,845	50%	4,422	595	13%	1,190	40%	3,062	28%	2,506	50%	2,574	
Total					26,562		13,282	1,002	1,003	7.5%	2,005	3,062	2,506	2,506	22,021	11,027	
<i>AM Peak Hour</i>																	
Single Family Residential	210	2,017	DUs	$\ln(T) = 0.91 \ln(X) + 0.12$	1,347	25%	287	6	8	1%	0	0%	0	0	1,133	25%	283
Senior Adult Housing - Single-Family	251	183	DUs	$\ln(T) = 0.76 \ln(X) + 0.16$	62	33%	20	0	1	2%	0	0%	0	0	61	33%	20
Marina	420	300	Berths	$T = 0.07(X)$	21	33%	7	0	0	0%	0	0%	0	0	21	33%	7
Shopping Plaza (40-150k) - Supermarket - No	821	131,000	1000 SF GFA	$T = 1.73(X)$	227	62%	141	86	6	7%	15	40%	85	85%	127	62%	79
Total					1,457		455	15	15	2.1%	30	85	193	85	1,342	389	
<i>PM Peak Hour</i>																	
Single Family Residential	210	2,017	DUs	$\ln(T) = 0.94 \ln(X) + 0.27$	1,674	63%	1,055	88	31	7%	0	0%	0	0	1,555	63%	980
Senior Adult Housing - Single-Family	251	183	DUs	$\ln(T) = 0.78 \ln(X) + 0.20$	71	61%	43	28	4	8%	0	0%	0	0	65	61%	40
Marina	420	300	Berths	$T = 0.21(X)$	63	60%	38	25	10	7%	0	0%	0	0	46	60%	28
Shopping Plaza (40-150k) - Supermarket - No	821	131,000	1000 SF GFA	$T = 5.19(X)$	680	49%	333	347	38	100%	138	40%	217	33%	325	48%	156
Total					2,488		1,469	140	140	11.3%	280	217	226	217	1,991	1,204	

Reference: ITE Trip Generation Manual, 11th Edition
ITE Trip Generation Handbook, 3rd Edition

Note: 600 single family DUs and 100 active adult DUs were occupied at the time of the turning movement count collection and have been removed from the trip generation.

Table 10
Tributary DRI
Trip Generation Estimates - East Commercial

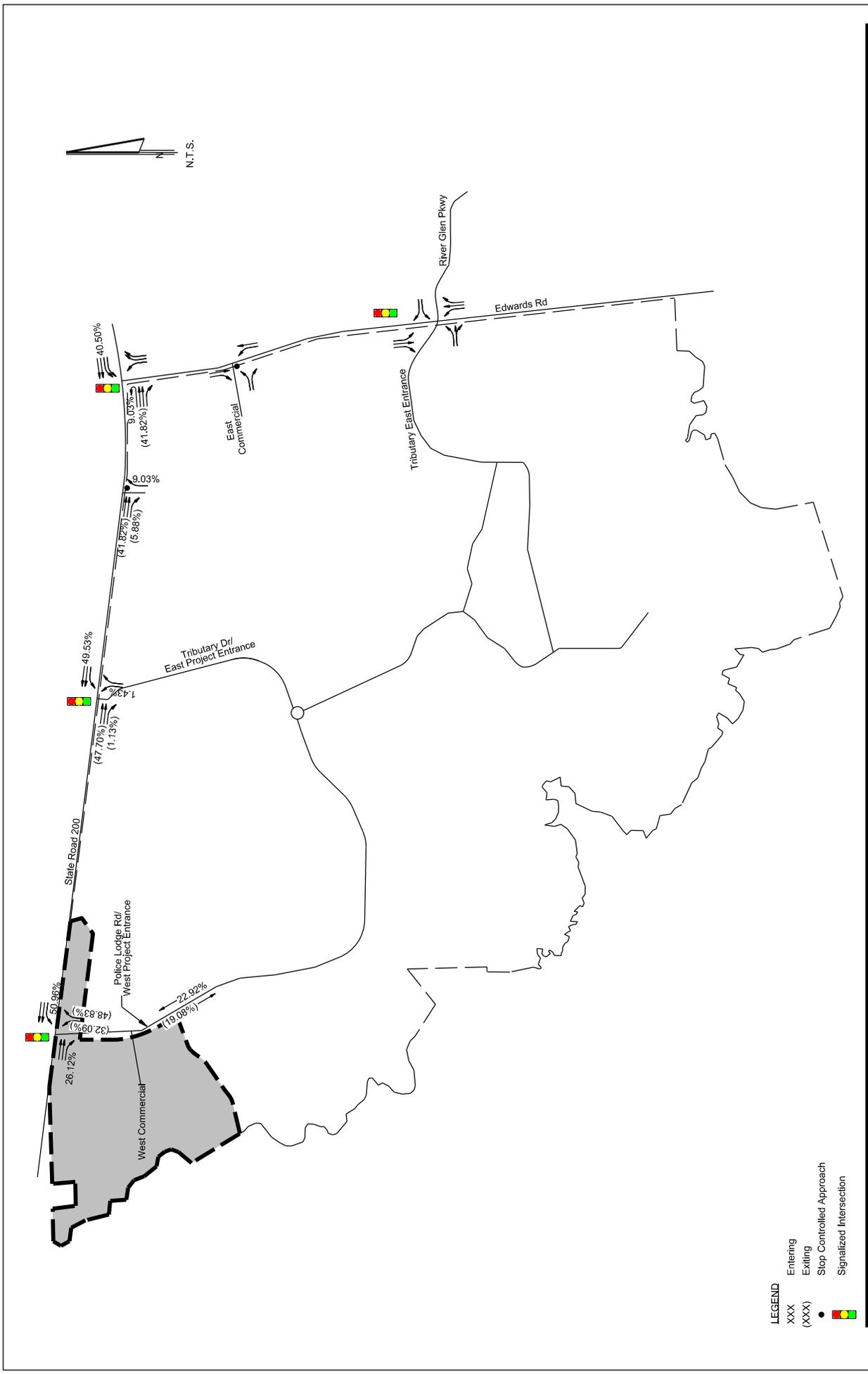
Land Use	ITE Land Use Code	Sq. Ft. or Number of Units	Independent Variable (Units)	Estimation Method (Rate or Equation)	Gross Trip Ends	Gross Trip Ends			Internal Capture			Pass-by		Pass-by 10% of Adj Vol Through Volume		Lesser of Pass-by Trips Volume		Net New External Trip Ends					
						Entering	Exiting	%	Entering	Exiting	%	Volume	%	Volume	%	Volume	%	Volume	%	Volume	%	Volume	%
						%	Volume	%	Volume	%	Volume	%	Volume	%	Volume	%	Volume	%	Volume	%	Volume	%	Volume
<i>Daily</i>																							
Multifamily Housing (Low-Rise)	220	300	DUs	$T = 6.41(X) + 75.31$	1,998	50%	999	246	246	25%	482	0%	0	N/A	0	0	0	1,506	50%	753			
General Office Building	710	12,500	1000 SF GFA	$\ln(T) = 0.87 \ln(X) + 3.05$	190	50%	95	21	21	22%	42	0%	0	N/A	0	0	0	148	50%	74			
Shopping Center (>150k)	820	200,000	1000 SF GFA	$T = 26.11(X) + 5863.73$	11,086	50%	5,543	265	264	5%	529	29%	3,062	23%	25,056	2,506	8,051	4,026	50%	4,025			
Total					13,274		6,637		531	8.0%	1,063		3,062		2,506		9,705		4,853				
<i>AM Peak Hour</i>																							
Multifamily Housing (Low-Rise)	220	300	DUs	$T = 0.31(X) + 22.85$	116	24%	28	1	2	3%	3	0%	0	N/A	0	0	0	113	24%	27			
General Office Building	710	12,500	1000 SF GFA	$\ln(T) = 0.86 \ln(X) + 1.16$	28	88%	25	3	2	11%	3	0%	0	N/A	0	0	25	88%	22				
Shopping Center (>150k)	820	200,000	1000 SF GFA	$T = 0.59(X) + 133.55$	252	62%	156	96	2	2%	4	29%	72	77%	1927	193	176	62%	109				
Total					396		209		187	2.5%	10		72		193		314		158				
<i>PM Peak Hour</i>																							
Multifamily Housing (Low-Rise)	220	300	DUs	$T = 0.43(X) + 20.55$	150	63%	95	45	25	47%	70	0%	0	N/A	0	0	80	63%	50				
General Office Building	710	12,500	1000 SF GFA	$\ln(T) = 0.83 \ln(X) + 1.29$	30	83%	25	4	6	33%	10	0%	0	N/A	0	0	20	17%	3				
Shopping Center (>150k)	820	200,000	1000 SF GFA	$\ln(T) = 0.72 \ln(X) + 3.02$	930	48%	446	484	28	8%	74	29%	248	24%	2,255	226	630	63%	397				
Total					1,110		546		564	13.9%	154		248		226		730		450				

Reference: ITE Trip Generation Manual, 11th Edition
ITE Trip Generation Handbook, 3rd Edition

**Table 11
Tributary DRI
Trip Generation Estimates - School**

Land Use	ITE Land Use Code	Sq. Ft. or Number of Units	Independent Variable (Units)	Estimation Method (Rate or Equation)	Gross Trip Ends		Gross Trip Ends		
					%	Volume	Entering	Exiting	
Private School (K-12)	532	1,000	Students	$T = 2.48(X)$	50%	1,240	50%	1,240	
Daily									
Private School (K-12)	532	1,000	Students	$T = 0.77(X) + 13.81$	63%	494	37%	290	
AM Peak Hour									
Private School (K-12)	532	1,000	Students	$T = 0.17(X)$	43%	73	57%	97	
PM Peak Hour									

Reference: ITE Trip Generation Manual, 11th Edition
ITE Trip Generation Handbook, 3rd Edition





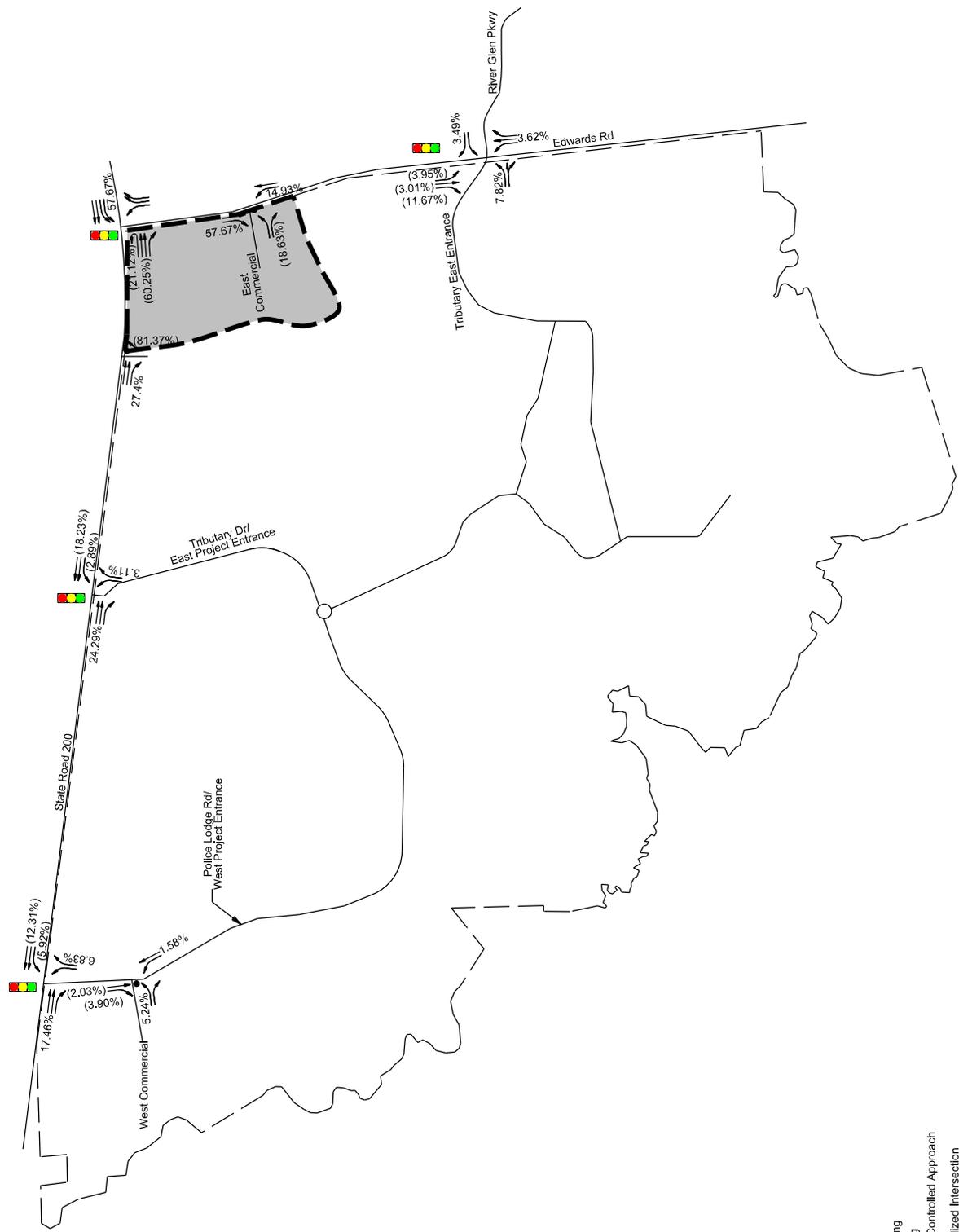
LEGEND
 XXX Entering
 (XXX) Exiting
 ● Stop Controlled Approach
 ● Signalized Intersection



Tributary DRI
 Land Development Traffic Analysis

Residential Peak Hour
 Project Traffic Distribution

Figure 8

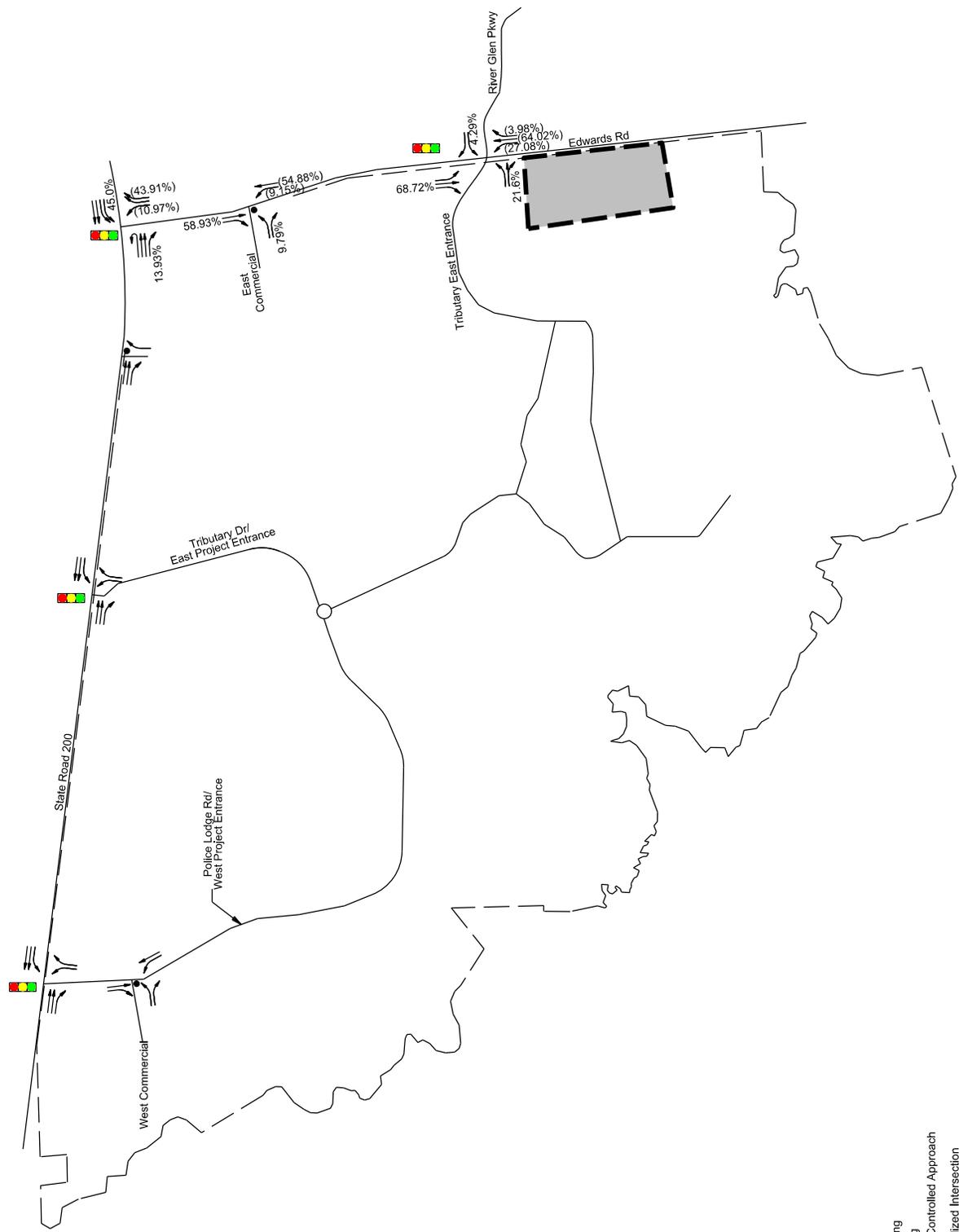


LEGEND
 XXX Entering
 (XXX) Exiting
 ● Stop Controlled Approach
 ● Signalized Intersection



Tributary DRI
 Land Development Traffic Analysis

East Commercial Peak Hour
 Project Traffic Distribution



- LEGEND**
- XXX Entering
 - (XXX) Exiting
 - Stop Controlled Approach
 - ◻ Signalized Intersection

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Tributary DRI
 Land Development Traffic Analysis

School Peak Hour
 Project Traffic Distribution

Table 12
Tributary DRI
Net New P.M. Peak Hour External Project Trip Assignment

Segment Number	Roadway Name	From / To	West Commercial		Residential		East Commercial		School		Total Project Traffic (vph)	Maximum Service Volume (vph)	Percent MSV (%)	Significantly Impacted
			Traffic Distribution	Project Traffic										
Total Net New P.M. Peak Hour External Residential Trip Ends (Tables 7 to 10) =			797	1,991	730	170								
21308	SR A1A / 200	NE, City Limit of Callahan to Griffen Rd	24,290%	194	27,980%	557	12,690%	93	0.000%	0	844	4,350	19.40%	YES
21309	SR A1A / 200	Griffen Rd to Police Lodge Rd	29,110%	232	30,300%	603	14,880%	109	0.000%	0	944	4,350	21.70%	YES
21309	SR A1A / 200	Police Lodge Rd to Tributary Dr	49,890%	398	17,860%	356	21,260%	155	0.000%	0	909	4,350	20.90%	YES
21309	SR A1A / 200	Tributary Dr to Edwards Rd	50,190%	400	50,040%	996	51,240%	374	0.000%	0	1,770	4,350	40.69%	YES
21309	SR A1A / 200	Edwards Rd to I-95	41,160%	328	59,270%	1,180	58,960%	430	0.000%	0	1,938	4,350	44.55%	YES
21312	SR A1A / 200	I-95 to Floco Ave	27,070%	216	38,030%	757	33,330%	243	0.000%	0	1,216	4,870	24.97%	YES
21313	SR A1A / 200	Floco Ave to Oak Tree Ln	23,960%	191	33,650%	670	26,980%	197	0.000%	0	1,058	7,950	13.31%	YES
0	SR A1A / 200	Oak Tree Ln to US 17	19,650%	157	28,070%	559	21,220%	155	0.000%	0	871	4,870	17.89%	YES
21317	SR A1A / 200	US 17 to CR 107 / Old Nassauville Rd	8,550%	68	9,840%	196	6,010%	44	0.000%	0	308	4,870	6.32%	YES
21318	SR A1A / 200	Old Nassauville Rd to Piney Island Dr	3,770%	30	4,240%	84	2,190%	16	0.000%	0	130	3,290	3.95%	NO
21337	I-95	Duval County Line to SR 200 / A1A	4,080%	33	13,930%	277	12,960%	95	0.000%	0	405	8,490	4.77%	NO
21338	I-95	SR 200 / A1A to US 17	3,220%	26	0,920%	18	2,400%	18	0.000%	0	62	8,490	0.73%	NO
21339	I-95	US 17 to Georgia State Line	1,990%	16	0,440%	9	1,010%	7	0.000%	0	32	8,490	0.38%	NO
21288	US 17	Duval County Line to Urban Boundary	0,550%	4	0,510%	10	0,540%	4	0.000%	0	18	780	2.31%	NO
21289	US 17	Urban Boundary to Crosby Ave	2,870%	23	4,740%	94	4,410%	32	0.000%	0	149	1,950	7.64%	YES
21290	US 17	Crosby Ave to SR 200	2,870%	23	4,740%	94	4,410%	32	0.000%	0	149	3,290	4.53%	NO
21291	US 17	SR 200 / A1A to Pages Dairy Rd	0,000%	0	0,000%	0	0,000%	0	0.000%	0	0	3,290	0.00%	NO
21292	US 17	Pages Dairy Rd to Hamilton St	0,000%	0	0,000%	0	0,070%	1	0.070%	0	1	1,950	0.05%	NO
21293	US 17	Hamilton St to I-95	0,000%	0	0,000%	0	0,000%	0	0.000%	0	0	780	0.00%	NO
21294	US 17	I-95 to Georgia State Line	1,130%	9	0,380%	8	1,300%	9	0.000%	0	26	780	3.33%	NO
N/A	Edwards Road	River Glenn Pkwy to East Commercial Access	0,000%	0	13,920%	277	16,780%	122	66,370%	113	512	1,584	32.32%	YES
N/A	Edwards Road	East Commercial Access to SR-200	0,000%	0	10,800%	215	28,830%	210	56,900%	97	522	1,242	42.03%	YES

Shading Indicates Directly Accessed Segment(s)

Table 12 Notes/References/Justification:
 Distribution extracted from the 2035 data set of NERP/AB 1/3

**Table 13
Tributary DRI
PM Peak Hour Roadway Status Calculations**

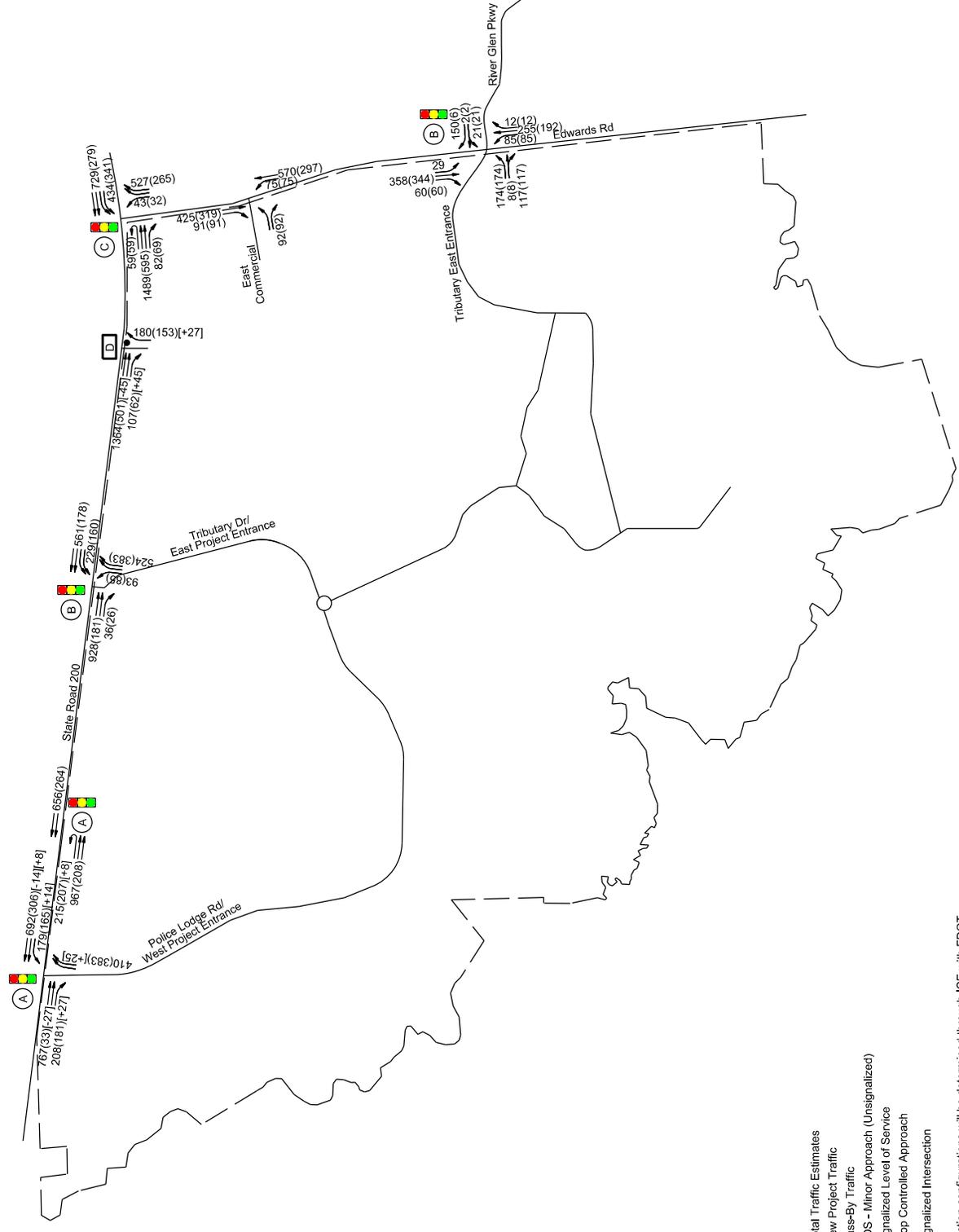
Roadway	From/To	Total Committed PM Peak Hour		Peak Hour Project		Total Peak Hour		Approved Peak Hour Maximum Service		Project Traffic % of the MSV		Within 4 Miles Of Project Boundary		Directly Accessed OR Impacted Segment? (Yes or No)		Total P.M. Peak Hour Volume As Percent of Approved Service Volume		Roadway Concurrency Status
		Traffic (vph)	Traffic (vph)	Traffic (vph)	Traffic (vph)	Traffic (vph)	Traffic (vph)	Volume (vph)	Volume (%)	Volume (%)	Volume (%)	Yes	No	Yes	No	Yes	No	
SR A1A / 200	NE. City Limit of Callahan to Griffen Rd	1,521	844	2,365	4,350	19.402%	Yes	Yes	54.37%	Pass								
SR A1A / 200	Griffen Rd to Police Lodge Rd	2,238	944	3,182	4,350	21.701%	Yes	Yes	73.15%	Pass								
SR A1A / 200	Police Lodge Rd to Tributary Dr	2,238	909	3,147	4,350	20.897%	Yes	Yes	72.34%	Pass								
SR A1A / 200	Tributary Dr to Edwards Rd	2,238	1,770	4,008	4,350	40.690%	Yes	Yes	92.14%	Pass Critical								
SR A1A / 200	Edwards Rd to I-95	2,238	1,938	4,176	4,350	44.552%	Yes	Yes	96.00%	Pass Critical								
SR A1A / 200	I-95 to Floco Ave	2,648	1,216	3,864	4,870	24.969%	Yes	Yes	79.34%	Pass								
SR A1A / 200	Floco Ave to Oak Tree Ln	2,648	1,058	3,706	7,950	13.308%	Yes	Yes	46.62%	Pass								
SR A1A / 200	Oak Tree Ln to US 17	2,589	871	3,460	4,870	17.885%	Yes	Yes	71.05%	Pass								
SR A1A / 200	US 17 to CR 107 / Old Nassauville Rd	4,350	308	4,658	4,870	6.324%	Yes	Yes	95.65%	Pass Critical								
SR A1A / 200	Old Nassauville Rd to Piney Island Dr	4,714	130	4,844	3,290	3.951%	Yes	No	147.23%	Not Significant								
I-95	Duval County Line to SR 200 / A1A	10,069	405	10,474	8,490	4.770%	Yes	No	123.37%	Not Significant								
I-95	SR 200 / A1A to US 17	7,931	62	7,993	8,490	0.730%	Yes	No	94.15%	Not Significant								
I-95	US 17 to Georgia State Line	8,538	32	8,570	8,490	0.377%	Yes	No	100.94%	Not Significant								
US 17	Duval County Line to Urban Boundary	3,166	18	3,184	780	2.308%	Yes	No	408.21%	Not Significant								
US 17	Urban Boundary to Crosby Ave	2,820	149	2,969	1,950	7.641%	Yes	Yes	152.26%	Fail								
US 17	Crosby Ave to SR 200	2,786	149	2,935	3,290	4.529%	Yes	No	89.21%	Not Significant								
US 17	SR 200 / A1A to Pages Dairy Rd	1,756	0	1,756	3,290	0.000%	Yes	No	53.37%	Not Significant								
US 17	Pages Dairy Rd to Hamilton St	1,834	1	1,835	1,950	0.051%	Yes	No	94.10%	Not Significant								
US 17	Hamilton St to I-95	1,496	0	1,496	780	0.000%	Yes	No	191.79%	Not Significant								
US 17	I-95 to Georgia State Line	476	26	502	780	3.333%	Yes	No	64.36%	Not Significant								
Edwards Road	River Glenn Pkwy to East Commercial Access	368	512	880	1,584	32.323%	Yes	Yes	55.56%	Pass								
Edwards Road	East Commercial Access to SR-200	472	522	994	1,242	42.029%	Yes	Yes	80.03%	Pass								

Shading Indicates Directly Accessed Segment(s)

Buildout Intersection Capacity Analysis

Figures 10 and **11** display the total (background plus project traffic) turning movement volumes and lane arrangements at key intersections within the study area during the morning and afternoon peak hours, respectively. Based on the projected volumes, ETM anticipates traffic signals will be warranted at the following intersections: SR-200 / Police Lodge Rd, SR-200 / Tributary Dr, SR-200 / Edwards Rd, and Edwards Rd / Tributary East Entrance. The developer has already secured an ICE approval for the SR-200 / Police Lodge Rd intersection, resulting in an RCUT configuration. Additional analysis of these intersections and their connections to SR-200 will be provided in future submittals to the Florida Department of Transportation and coordinated with Nassau County.

The commercial entrances onto Edwards Rd will be further evaluated during the SEP submittals. ETM recommends the installation of a southbound right turn lane and a northbound left turn lane at the intersection of Edwards Rd and the Tributary East Entrance. Given the posted speed limit of 45 mph on Edwards Rd, per FDOT FDM Exhibit 212-1, ETM recommends a deceleration distance of 185 feet. For the northbound left turn lane, a queue length of 100 feet is recommended. A signal warrant analysis was conducted at the intersection of Tributary East Entrance and Edwards Rd, concluding that a traffic signal may be warranted at buildout. ETM recommends installing a traffic signal once actual volumes meet the necessary warrant thresholds. Synchro results can be found in **Appendix N**, and the volume calculation spreadsheets are provided in **Appendix O**. The Stage 2 ICE Approval from FDOT for the SR-200 / West Entrance and the conceptual configuration are available in **Appendix P**. **Appendix Q** contains the traffic signal warrant analysis for the Tributary East Entrance and Edwards Rd.



- LEGEND**
- XXX Total Traffic Estimates
 - (XXX) New Project Traffic
 - [XXX] Pass-By Traffic
 - LOS - Minor Approach (Unsignalized)
 - Signalized Level of Service
 - Stop Controlled Approach
 - Signalized Intersection

SR-200 Intersection configurations will be determined through ICE with FDOT. Access Improvements at East Commercial onto Edwards Rd will be determined at the SEP submittals.



Tributary DRI
Land Development Traffic Analysis

AM Peak Hour
Total Traffic Estimates (2035)

Figure 11

Recommendations

As shown in **Table 13**, the project is expected to have a significant impact on several roadway links; however, all impacted links have available capacity. No links are significantly and adversely affected.

Based on the projected buildout traffic volumes, a traffic signal will be warranted at the intersection of SR-200 and Tributary Dr. To accommodate these volumes, dual westbound left-turn lanes, dual northbound right-turn lanes, and a single eastbound right-turn lane are anticipated to be necessary. Similarly, a traffic signal will also be warranted at the intersection of SR-200 and Edwards under buildout conditions. Dual westbound left-turn lanes, dual northbound right-turn lanes, and a single eastbound right-turn lane are expected to be required at this location as well. Final design decisions will need to be coordinated with FDOT as part of the ICE process.

Accesses onto Edwards Rd at the East Commercial area will be further analyzed in future SEP submittals. ETM recommends the installation of a northbound left turn lane and a southbound right turn lane at the intersection of Tributary East Entrance and Edwards Rd. Additionally, ETM advises installing a traffic signal at this intersection once actual volumes meet the required warrant thresholds.

The timing of the need for improvements will be determined through monitoring in the biennial monitoring report.

Appendix A

TIA Methodology

Traffic Impact Assessment Methodology for Tributary DRI

This project is a proposed mixed-use development of regional impact (DRI) located in the central portion of Nassau County. The project is located west of Interstate 95 and south of State Road 200. The project is expected to consist of 3,200 residential dwelling units, 250ksf of industrial development, 50ksf of office space, 500ksf of retail development and 300 berths for a Marina / Boat Launch. Access to the development will be primarily from State Road 200 with several minor entrances onto Edwards Road. The project will be developed in multiple phases expected to be completed by 2035. **Figure 1** is a map showing the location of the property. **Figure 2** illustrates the conceptual site plan of the proposed project. **Table 1** lists the development schedule.

Existing Conditions of the intersections will be analyzed using current turning movement counts. Existing conditions of the roadway segments will be taken from the Florida Department of Transportation District 2 Level of Service Report (FDOT D2 LOS Report).

Background growth will be taken from the Florida Department of Transportation District 2 FDOT D2 LOS Report. Traffic forecasts in the LOS Report are based on historical counts and future traffic projections from the Northeast Regional Planning Model (NERPM-AB) travel demand model.

Trip Generation for this development will be prepared using ITE *Trip Generation Manual, 11th edition*. Attached is **Table 2** illustrating the gross trip generation calculations for the entire project. Net new external trips generated by this development will be compared to the original Three Rivers DRI.

Internal Trips will be calculated using methodologies from the ITE *Trip Generation Handbook, 3rd edition* for the proposed development within the project boundaries shown on **Figure 3**. The net new external trip generation for Tributary DRI West and the net new external trip generation for Tributary DRI East will be calculated separately. The sum of the net new external trips for the entire project will be used for the purposes of concurrency analysis.

Trip Distribution for new traffic associated this project will be extracted from the NERPM-AB 1v3 model for the project. Copies of the model distribution printouts will be attached.

Programmed and Planned Improvements to be completed within the buildout year time frame will be included in the analysis. Sources for these improvements include the FDOT and Nassau County 5-year work programs and the North Florida Transportation Planning Organization's Cost Feasible Plan.

Project Traffic Assignments will be made for each roadway link by multiplying the total net new external trips anticipated to be generated by the project with the percentage of traffic estimated to use each roadway segment. These volumes will be added to the background traffic to calculate the total volume at each intersection. **Table 5** will illustrate the project

traffic distribution of the proposed development on the roadways within Nassau County. **Table 5** will also illustrate the determination of whether the project significantly impacts each link within the impact area. The project is assumed to have a significant impact on a link if the project's traffic consumes 5% on the adopted maximum service volume of a link.

Pass-by Traffic, calculated based on methodologies contained in the *ITE Trip Generation Handbook, 3rd edition* will be assigned to the commercial driveways based on existing travel patterns.

Total Traffic Volumes will be calculated by summing the background traffic and project related traffic on an intersection and segment basis for the link. The total traffic on each link will be compared to the adopted maximum service volume. ~~The proportionate share calculations will be in accordance with Chapter 163.3180(5)(h)(2) of the Florida Statutes.~~

Intersection analysis will be performed for the following intersections in the existing, background, and buildout conditions using the Synchro/SimTraffic software.

- State Road 200 and the Western Entrance
- State Road 200 and the Eastern Entrance
- State Road 200 and Edwards Road
- Edwards Road and Project Entrances

Access and Internal Circulation will not be evaluated during the study. An operational analysis of the accesses onto State Road 200 will be estimated, however the Florida Department of Transportation will be the governing agency for the State Road 200 accesses. Access improvements into parcels will be evaluated at the time of construction plans.

