



Synergy at Normandy Mixed-Use

City of Deltona, Florida

TRAFFIC IMPACT STUDY

Prepared for:

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EXECUTIVE SUMMARY

This traffic analysis is being conducted to assess the impact of the proposed 320 apartments, 234.6 KSF of light warehouse and a Gas Station with 14 Fuel positions. The proposed development is located east of Normandy Boulevard in City of Deltona, Florida. The analysis included a determination of project trip generation, a review of existing and projected roadway and intersection capacity and a review of access operations.

The results of the traffic analysis are summarized as follows:

- The proposed development will generate a total of 3,514 daily trips of which 355 and 280 will occur during the AM and PM peak hour, respectively.
- Access to the site will be provided via two right-in/right-out and one full access driveway onto Normandy Boulevard. In addition, access will be provided via the proposed new roadway, Amelia Avenue/Rhode Island Avenue.
- The analysis indicates that the study roadway segments generally currently operate adequately within their adopted Level of Service (LOS). There are some segments that are projected to fail with or without construction of the proposed project due to committed trips and background traffic growth.
- An analysis of the study intersections indicates that the study intersections currently operate adequately within their adopted Level of Service standard and are projected to continue to do so upon buildout of the proposed development.
- In summary, an exclusive 235 foot (includes a 50-foot taper) southbound left turn lane is warranted on Normandy Boulevard at Amelia Avenue/Rhode Island Avenue and at the Main Project Access. The turn lane design will be developed and coordinated by the site civil engineers.
- Per City staff, exclusive right turn lanes shall be provided at the driveways, since Normandy Blvd in the study area is a 45 mph roadway.

PROFESSIONAL ENGINEERING CERTIFICATION

I hereby certify that I am a Professional Engineer properly registered in the State of Florida practicing with Premier Traffic Group a dba of Karma Consultancy, LLC. and that I have supervised the preparation and approve the evaluation, findings, opinions, conclusions, and technical advice hereby reported for:

PROJECT: Synergy at Normandy Mixed-Use

LOCATION: City of Deltona, Florida

I acknowledge that the procedures and references used to develop the results contained in these computations are standard to the professional practice of Transportation Engineering as applied through professional judgment and experience.

NAME: Vasu T. Persaud, PE

P.E. #: Florida P.E. No. 72790

DATE: July 16, 2024

SIGNATURE:

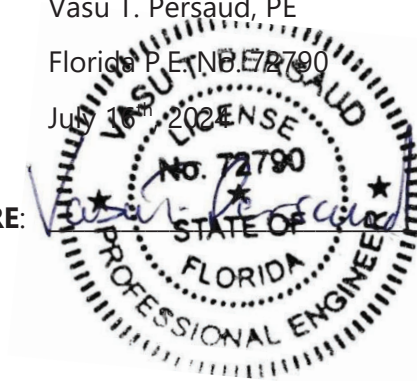


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1.0 INTRODUCTION

The proposed project comprises 320 apartments, 234.6 KSF of light warehouse and a Gas Station with 14 Fuel positions. The proposed development is located east of Normandy Boulevard in City of Deltona, Florida. **Figure 1** depicts the site location and the surrounding transportation network. Access to the site will be provided via two right-in/right-out and one full access driveway onto Normandy Boulevard. In addition, access will be provided via the proposed new roadway, Amelia Avenue/Rhode Island Avenue. A preliminary concept plan is included in **Appendix A**.

1.1 Data and Methodology

Data used in the analysis consisted of site plan/development information provided by the Project Engineers, PM peak hour intersection traffic counts obtained by PTG and roadway segment traffic volumes obtained from Volusia County and the Florida Department of Transportation (FDOT). The analysis was conducted in accordance with the Traffic Impact Analysis (TIA) *Methodology Memorandum* prepared for the project. A copy of the methodology coordination is provided in **Appendix B**.

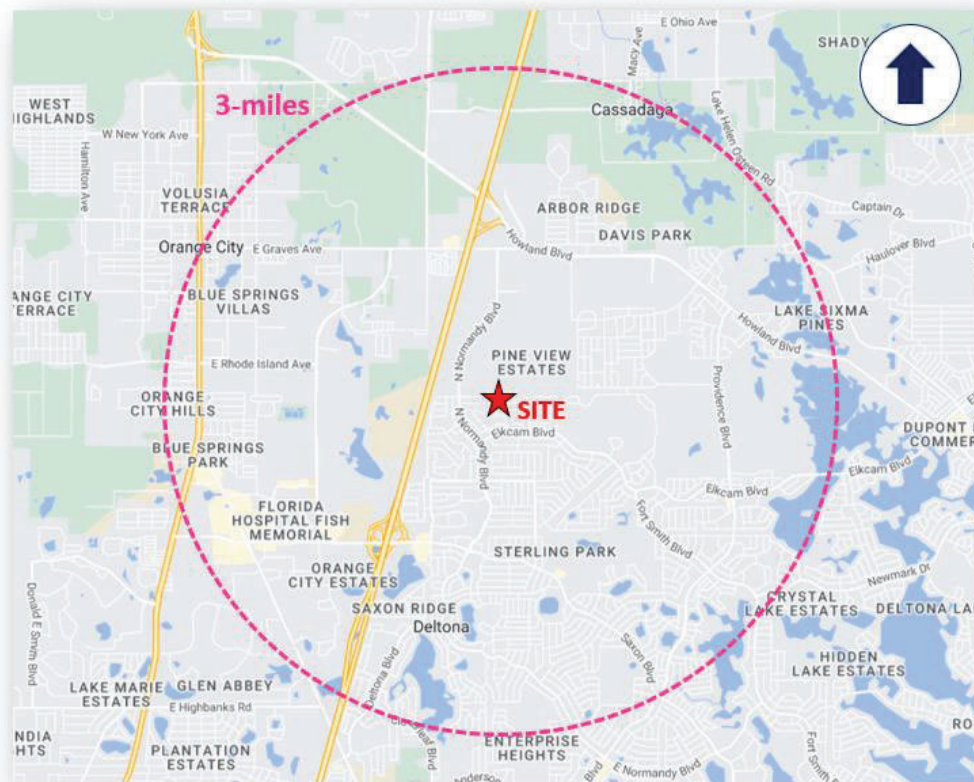


Figure 1: Project Location Map

1.2 Study Area

The study facilities to be considered in the analysis are:

Study Intersections

- Normandy Boulevard and Saxon Boulevard
- Normandy Boulevard and Elkcam Boulevard
- Normandy Boulevard and Graves Avenue
- Graves Avenue and Howland Boulevard
- Normandy Boulevard and Amelia Avenue/Rhode Island Avenue (Full- Full)
- Normandy Boulevard and Project Access 1 (North – Right-in/Right-out)
- Normandy Boulevard and Project Access 2 (Main - Full)
- Normandy Boulevard and Project Access 3 (South – Right-in/Right-out)

Study Segments

- Graves Avenue
 - Veteran's Memorial Parkway to Kentucky Avenue
 - Kentucky Avenue to Normandy Boulevard
 - Normandy Boulevard to Howland Boulevard
- Saxon Boulevard
 - Veterans Memorial Parkway to FDOT Park & Ride
 - FDOT Park & Ride to I-4
 - I-4 to Finland Drive
 - Finland Drive to Normandy Boulevard
- Howland Boulevard
 - I-4/SR 472 to Wolf Pack Run
 - Wolf Pack Run to Catalina Boulevard
- Normandy Boulevard
 - Graves Avenue to Rhode Island
 - Rhode Island to Elkcam Boulevard
 - Elkcam Boulevard to Saxon Boulevard
 - Saxon Boulevard to Deltona Boulevard
- US 17/92
 - DeBary Plantation Blvd to Saxon Boulevard
 - Saxon Boulevard to Enterprise Road
 - Enterprise Road to Rhode Island Avenue
 - Rhode Island Avenue to Graves Avenue
 - Graves Avenue to New York Avenue

1.3 Planned and Programmed Improvements

Based on discussions and review of data documented by FDOT, Volusia County and the Volusia Metropolitan Planning Organization, there are no pertinent roadway capacity improvements that were planned and programmed within three (3) years of the project buildout.

It is known that the City is currently adding turn lanes on Normandy Boulevard in front of the site. Therefore, any turn lane designs will be developed and coordinated by the site civil engineers.

2.0 EXISTING TRAFFIC CONDITIONS

Existing conditions in the vicinity of the site were analyzed to establish a baseline for the traffic conditions prevailing in the vicinity of the proposed development. The analysis included a review of the existing roadway segment capacities and an analysis of the intersection operations at the study intersections.

2.1 Roadway Segment Analysis

Table 1 summarizes the existing roadway segment capacity analysis for study segment within a four (4) mile radius of the proposed development. The existing roadway segment conditions were analyzed by comparing the existing traffic volumes observed on the study roadway segments to the service volumes at the adopted Level of Service (LOS) standard for the roadway segments. The LOS data was obtained from the latest Volusia County traffic data and committed trips spreadsheets.

Table 1: Existing Roadway Segment Capacity Analysis

No.	Roadway	Segment	Lanes	LOS Stnd	PH Dir Capacity	PM PK Hr Ext Vol	Ext LOS Met?
99	Graves Ave	VMP to Kentucky Ave	2	E	1,620	1,640	No
100	Graves Ave	Kentucky to Normandy	2	E	1,620	1,420	Yes
101	Graves Ave	Normandy Blvd to Howland Blvd	4	E	2,740	1,590	Yes
102	Saxon Blvd	VMP to FDOT Park n Ride	6	E	5,140	3,360	Yes
103	Saxon Blvd	Park n Ride to I-4	6	E	5,140	2,710	Yes
104	Saxon Blvd	I-4 to Finland Dr	5	E	4,280	3,580	Yes
105	Saxon Blvd	Finland Dr to Normandy Blvd	4	E	3,410	3,170	Yes
121	Howland Blvd	I-4 to Wolf Pack Run	4	E	3,410	2,530	Yes
122	Howland Blvd	Wolf Pack Run to Catalina Blvd	4	E	3,410	2,310	Yes
189	Normandy Blvd	Graves Ave to Rhode Island	2	E	1,150	787	Yes
190	Normandy Blvd	Rhode Island to Elkcam Blvd	4	E	2,630	636	Yes
191	Normandy Blvd	Elkcam Blvd to Saxon Blvd	4	E	2,630	599	Yes
192	Normandy Blvd	Saxon Blvd to Deltona Blvd	2	E	2,630	936	Yes
53	US 17/92	DeBary Plantation Blvd to Saxon Blvd.	4	E	3,580	1,622	Yes
54	US 17/92	Saxon Blvd. to Enterprise Rd.	4	E	3,580	1,223	Yes
55	US 17/92	Enterprise Rd. to Rhode Island Ave.	4	E	3,580	1,649	Yes
56	US 17/92	Rhode Island Ave. to Graves Ave.	4	E	3,580	1,649	Yes
57	US 17/92	Graves Ave. to New York Ave.	4	E	3,580	1,782	Yes

Note: (1) Volusia Vested Trips 2022 table used for segments No. 99 to 192; (2) VolusiaAADTs2021 table used for segments 53 to 57; (3) PM Peak Hour Existing Volume for US 17/92 was obtained by applying the K and D factors to the AADT values found in the VolusiaAADTs2021 spreadsheet

The analysis indicates that the study roadway segments currently operate adequately within their adopted Level of Service (LOS) standard except Graves Avenue from Veteran’s Memorial Parkway to Kentucky Avenue.

2.2 Intersection Capacity Analysis

Table 2 summarizes the results of the existing intersection capacity analysis. The existing intersection capacity analysis was conducted for the PM peak hour using the *Synchro* software and the methods of the *Highway Capacity Manual (HCM)*. The turning movement count data and the existing PM peak hour Turning Movement Volumes are included in **Appendix C**. It should be noted that the raw turning movement counts were adjusted to peak season volumes using a seasonal adjustment factor (1.02) obtained from the *FDOT Traffic Online* website.

Table 2: Existing Intersection Capacity Analysis

Intersection	Control	Time	EB		WB		NB		SB		Overall	
		Period	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Normandy Blvd & Saxon Blvd	Signal	AM	23.0	C	38.0	D	39.5	D	62.4	E	39.4	D
		PM	40.0	D	32.5	C	54.5	D	56.2	E	42.0	D
Normandy Blvd & Elkam Blvd	Signal	AM	--	--	9.4	A	10.0	A	5.4	A	8.6	A
		PM	--	--	14.5	B	10.2	B	4.4	A	8.5	A
Normandy Blvd & Graves Ave	Signal	AM	20.4	C	17.7	B	9.9	A	--	--	16.0	B
		PM	19.4	B	16.5	B	14.7	B	--	--	17.8	B
Graves Ave & Howland Blvd	Signal	AM	25.0	C	33.8	C	55.9	E	54.0	D	36.3	D
		PM	33.5	C	21.7	C	16.6	B	31.2	C	21.0	C

The analysis indicates that the study intersections operate adequately during the PM peak hour period. The detailed *Synchro* worksheets are included in **Appendix D**.

3.0 TRIP GENERATION

To determine the impact of this development, an analysis of its trip generation characteristics was conducted. This included a determination of the trips to be generated as well as their distribution and assignment to the surrounding roadways. The estimated project buildout is 2026.

3.1 Trip Generation

Table 3 summarizes the trip generation analysis conducted using information published by the Institute of Transportation Engineers (ITE) in the *Trip Generation Manual, 11th Edition* and the *Trip Generation Handbook, 3rd Edition*. The calculation indicated that the proposed development would generate a total of 3,514 daily trips of which 355 and 280 new net trips will occur during the AM and PM peak hour, respectively. The ITE Trip Generation graphs are included as part of the *Methodology Memorandum* in **Appendix B**.

Table 3: Trip Generation

ITE Code	Land Use	Size	Daily		AM Peak Hour			PM Peak Hour				
			Rate	Trips	Rate	Enter	Exit	Total	Rate	Enter	Exit	Total
110	General Light Industrial	234.6 KSF	4.87	1,143	0.74	153	21	174	0.65	21	131	152
221	Multi-Family (Mid-Rise)	320 DUs	4.62	1,478	0.4	29	99	128	0.39	76	49	125
945	Gas Station with Convenience Market (GFA 2-4ksf)	14 FPs	265.1	3,712	16.06	113	112	225	18.42	129	129	258
Subtotal			--	6,333	--	295	232	527	--	226	309	535
<i>Internal Capture (1% AM, 18% PM)</i>			--	63	--	3	2	5	--	41	55	96
<i>Gas Station with Convenience Market Pass-by (75%)</i>			--	2,756	--	84	83	167	--	79	80	159
New Net Trips			--	3,514	--	208	147	355	--	106	174	280

Note: ITE Trip generation equation used as the R-squared value is greater than 0.7

3.2 Trip Distribution/Assignment

The *Central Florida Regional Planning Model (CFRPM)* was used to determine a trip distribution pattern for this project. A model plot showing the trip distribution pattern is provided as part of the *Methodology Memorandum* in **Appendix B**. The trip distribution pattern was assessed for reasonableness using knowledge of the traffic patterns in the area, review of existing traffic counts and engineering judgement.

Figure 2 provides the finalized trip distribution developed for this project. Using this trip distribution pattern, project trips will be assigned to the surrounding study roadway network.

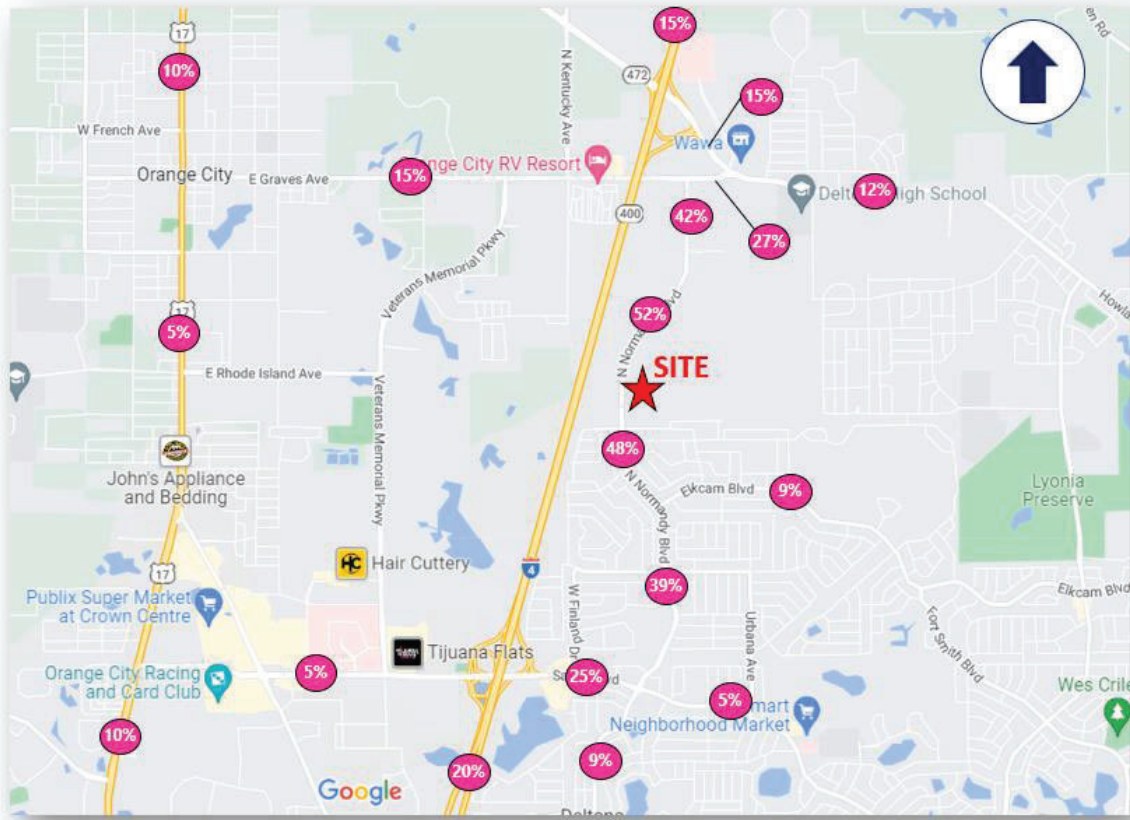


Figure 2: Trip Distribution Map

4.0 PROJECTED TRAFFIC CONDITIONS

An analysis of projected conditions was conducted to determine the proposed development's impact on the roadway segment capacities and to evaluate the operations of the study intersections. The project buildout year for the analysis is 2026.

4.1 Background Traffic Projection

Projected traffic volumes consist of background traffic combined with site generated traffic. Typically, background traffic volumes are determined by expanding existing peak hour traffic volumes to the buildout year using an annual growth rate. A historical trend analysis was conducted based on the Annual Average Daily Traffic (AADT) data obtained from the *FDOT Traffic Online* website in the vicinity of the project (see **Appendix E**). Based on this historical trend analysis, an annual growth rate of 1.96% was calculated. This growth rate was applied to the existing traffic volumes as appropriate in order to determine the projected background volumes in the project buildout year.

4.2 Roadway Segment Analysis

Table 4 and **Table 5** summarize the results of the background and projected study roadway segment capacity analysis, respectively. The Background and Projected roadway segment conditions were analyzed by comparing the projected traffic volumes on the study segments to their respective service volumes at the adopted Level of Service (LOS) standard. The total projected traffic volume is composed of background traffic and project trips. Projected background traffic was estimated using the annual growth rate discussed in the previous section.

The analysis indicates that the study roadway segments generally currently operate adequately within their adopted Level of Service (LOS). There are some segments that are projected to fail with or without the construction of the proposed project due to committed trips and background traffic growth.

Table 4: Background Roadway Segment Capacity Analysis

No.	Roadway	Segment	Lanes	LOS Stnd	PH Dir Capacity	Backg'd Vol	Backg'd Comm	Backg'd Tot Vol	Backd'd LOS Met?
99	Graves Ave	VMP to Kentucky Ave	2	E	1,620	1771	470	2,241	No
100	Graves Ave	Kentucky to Normandy	2	E	1,620	1534	925	2,459	No
101	Graves Ave	Normandy Blvd to Howland Blvd	4	E	2,740	1717	991	2,708	Yes
102	Saxon Blvd	VMP to FDOT Park n Ride	6	E	5,140	3629	316	3,945	Yes
103	Saxon Blvd	Park n Ride to I-4	6	E	5,140	2927	313	3,240	Yes
104	Saxon Blvd	I-4 to Finland Dr	5	E	4,280	3866	262	4,128	Yes
105	Saxon Blvd	Finland Dr to Normandy Blvd	4	E	3,410	3424	262	3,686	No
121	Howland Blvd	I-4 to Wolf Pack Run	4	E	3,410	2732	868	3,600	No
122	Howland Blvd	Wolf Pack Run to Catalina Blvd	4	E	3,410	2495	783	3,278	Yes
189	Normandy Blvd	Graves Ave to Rhode Island	2	E	1,150	850	764	1,614	No
190	Normandy Blvd	Rhode Island to Elkcam Blvd	4	E	2,630	687	507	1,194	Yes
191	Normandy Blvd	Elkcam Blvd to Saxon Blvd	4	E	2,630	647	338	985	Yes
192	Normandy Blvd	Saxon Blvd to Deltona Blvd	2	E	2,630	1011	61	1,072	Yes
53	US 17/92	DeBary Plantation Blvd to Saxon Blvd.	4	E	3,580	1752	0	1,752	Yes
54	US 17/92	Saxon Blvd. to Enterprise Rd.	4	E	3,580	1321	0	1,321	Yes
55	US 17/92	Enterprise Rd. to Rhode Island Ave.	4	E	3,580	1781	0	1,781	Yes
56	US 17/92	Rhode Island Ave. to Graves Ave.	4	E	3,580	1781	0	1,781	Yes
57	US 17/92	Graves Ave. to New York Ave.	4	E	3,580	1925	0	1,925	Yes

Table 5: Projected Roadway Segment Capacity Analysis

No.	Roadway	Segment	Lanes	LOS Stnd	PH Dir Capacity	Backg'd Tot Vol	Trip Dist	Project Vol	Total Vol	Projected LOS Met?
99	Graves Ave	VMP to Kentucky Ave	2	E	1,620	2,241	15%	26	2267	No
100	Graves Ave	Kentucky to Normandy	2	E	1,620	2,459	15%	16	2475	No
101	Graves Ave	Normandy Blvd to Howland Blvd	4	E	2,740	2,708	27%	47	2755	No
102	Saxon Blvd	VMP to FDOT Park n Ride	6	E	5,140	3,945	5%	5	3950	Yes
103	Saxon Blvd	Park n Ride to I-4	6	E	5,140	3,240	5%	9	3249	Yes
104	Saxon Blvd	I-4 to Finland Dr	5	E	4,280	4,128	25%	27	4155	Yes
105	Saxon Blvd	Finland Dr to Normandy Blvd	4	E	3,410	3,686	25%	44	3730	No
121	Howland Blvd	I-4 to Wolf Pack Run	4	E	3,410	3,600	15%	16	3616	No
122	Howland Blvd	Wolf Pack Run to Catalina Blvd	4	E	3,410	3,278	12%	21	3299	Yes
189	Normandy Blvd	Graves Ave to Rhode Island	2	E	1,150	1,614	52%	55	1669	No
190	Normandy Blvd	Rhode Island to Elkcam Blvd	4	E	2,630	1,194	48%	84	1278	Yes
191	Normandy Blvd	Elkcam Blvd to Saxon Blvd	4	E	2,630	985	39%	41	1026	Yes
192	Normandy Blvd	Saxon Blvd to Deltona Blvd	2	E	2,630	1,072	9%	16	1088	Yes
53	US 17/92	DeBary Plantation Blvd to Saxon Blvd.	4	E	3,580	1,752	10%	17	1769	Yes
54	US 17/92	Saxon Blvd. to Enterprise Rd.	4	E	3,580	1,321	5%	5	1326	Yes
55	US 17/92	Enterprise Rd. to Rhode Island Ave.	4	E	3,580	1,781	5%	9	1790	Yes
56	US 17/92	Rhode Island Ave. to Graves Ave.	4	E	3,580	1,781	15%	16	1797	Yes
57	US 17/92	Graves Ave. to New York Ave.	4	E	3,580	1,925	10%	17	1942	Yes

Note: Total Vol = 2022 Existing Vol x [1+(2%x 4 years)] + Project Vol

4.3 Intersection Capacity Analysis

Table 6 summarizes the results of the projected intersection capacity analysis. The projected intersection capacity and operational analysis was conducted using the *Synchro* software and the methods of the *Highway Capacity Manual (HCM)* and was performed for the PM peak hours. The projected volumes for the intersection capacity and operations analysis were calculated as previously discussed. Projected background traffic was estimated using the annual growth rate as previously discussed. The projected peak hour volumes are also provided **Appendix D**.

The analysis indicates that the study intersections are projected to continue to operate adequately during both the AM and PM peak hour periods. The *Synchro* analysis worksheets are included in **Appendix F**.

Table 6: Projected Intersection Capacity Analysis

Intersection	Control	Time	EBL		WBL		NBL		SBL		Overall	
		Period	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Normandy Blvd & Saxon Blvd	Signal	AM	36.1	D	53.9	D	59.1	E	78.4	E	55.3	E
		PM	38.5	D	80.5	F	85.7	F	56.3	E	54.3	D
Normandy Blvd & Elkam Blvd	Signal	AM	--	--	10.8	B	10.8	B	5.7	A	9.4	A
		PM	--	--	15.5	B	11.3	B	4.8	A	9.1	A
Normandy Blvd & Graves Ave	Signal	AM	19.7	B	18.0	B	10.6	B	--	--	16.0	B
		PM	20.3	C	16.9	B	16.3	B	--	--	18.5	B
Graves Ave & Howland Blvd	Signal	AM	27.0	C	41.8	D	69.7	E	56.0	E	44.1	D
		PM	34.9	C	22.1	C	18.0	B	33.8	C	22.3	C
Normandy Blvd & Amelia Ave	Stop	AM	--	--	17.5	C	0.0	A	1.9	A	--	--
		PM	--	--	23.0	C	0.0	A	0.6	A	--	--
Normandy Blvd & Project Access	Stop	AM	--	--	11.2	B	0.0	A	0.0	A	--	--
		PM	--	--	10.1	B	0.0	A	0.0	A	--	--
Normandy Blvd & Project Access	Stop	AM	--	--	18.9	C	0.0	A	2.1	A	--	--
		PM	--	--	25.5	D	0.0	A	0.6	A	--	--
Normandy Blvd & Project Access	Stop	AM	--	--	11.9	B	0.0	A	0.0	A	--	--
		PM	--	--	10.4	B	0.0	A	0.0	A	--	--

Note: Planning level signal timings utilize for projected conditions

4.4 Access Turn Lane Analysis

Left Turn Lane

The need for exclusive southbound left turn lanes on Normandy Boulevard at Amelia Avenue/Rhode Island Avenue and at the Main Project Access was assessed using guidance from the *National Cooperative Highway Research Program (NCHRP) Report 457- Evaluating Intersection Improvements: An Engineering Study Guide*. The review indicated that the project volumes and posted speed limit at this location do meet the warrant thresholds and

consequently, an exclusive southbound left turn lane is warranted at both Locations. The NCHRP 457 worksheet is provided in **Appendix G**.

The minimum required turn lane dimensions is as follows:

Total Turn Lane Length = Vehicular Deceleration Distance + Queue Storage
Deceleration @ 45 mph = 185' (incl. 50-foot taper), per FDOT Design Standards
Queue = 95th percentile queue from Synchro = 1.6 vehicle, use 2 vehicles minimum = 50'
Total Turn Lane Length = 185 + 50 = 235 feet

In summary, an exclusive 235-foot (includes a 50-foot taper) southbound left turn lane is warranted on Normandy Boulevard at Amelia Avenue/Rhode Island Avenue and at the Main Project Access. The turn lane design will be developed and coordinated by the site civil engineers.

Right Turn Lane

Per City staff, exclusive right turn lanes shall be provided at the driveways, since Normandy Blvd in the study area is a 45 mph roadway. Specifically, the following applies

- According to Volusia County LDC Section 72-619 for turn lane requirements, it states that "A right-turn lane of 12 feet in width, conforming to Table VI shall be provided at each driveway when the speed limit equals or exceeds 35 miles per hour or if the development will generate 100 or more right-turn movements during the peak hour."
- According to Section 96-37 (Access to thoroughfare corridors) from City of Deltona ordinances - A right-turn lane with a minimum of 150 feet of storage and 100 feet of transition shall be required at each driveway when the speed limit equals or exceeds 35 miles per hour or if the development will generate 100 or more right-turn movements during the peak hour.

4.5 Intersection Queuing Analysis

A PM peak hour queue analysis was conducted of the study intersection to determine the adequacy of the exiting left turn lane lengths to accommodate the projected volumes. This analysis is summarized in **Table 7**. As shown, the study intersection storage lane lengths accommodate the projected traffic except for the Normandy Boulevard and Saxon Boulevard intersection, which currently had queue storage deficiencies.

Note: The right turn lanes were not analyzed because of the right turn on red allowance which would inherently reduce queuing at these intersections

Table 7: Intersection Queue Analysis

Approach Movement	Data	Normandy Blvd & Saxon Blvd	Normandy Blvd & Elkam Blvd	Normandy Blvd & Graves Ave	Graves Ave & Howland Blvd
EBL	Queue (ft)	915	N/A	N/A	60
	Speed Limit (mph)	30	N/A	35	35
	Decel Distance (ft)	145	N/A	145	145
	Total Required (ft)	1060	N/A	145	205
	Ext Lane Length (ft)	545	N/A	485	545
	Sufficient (Y/N)	N	N/A	Y	Y
WBL	Queue (ft)	47.5	80	175	169
	Speed Limit (mph)	30	35	35	35
	Decel Distance (ft)	145	145	145	145
	Total Required (ft)	192.5	225	320	314
	Ext Lane Length (ft)	180	619	562	367
	Sufficient (Y/N)	N	Y	Y	Y
NBL	Queue (ft)	237.5	N/A	155	94
	Speed Limit (mph)	30	35	35	35
	Decel Distance (ft)	145	145	145	145
	Total Required (ft)	382.5	145	300	239
	Ext Lane Length (ft)	280	N/A	577	732
	Sufficient (Y/N)	N	Y	Y	Y
SBL	Queue (ft)	140	32.5	N/A	81
	Speed Limit (mph)	30	35	N/A	35
	Decel Distance (ft)	145	145	N/A	145
	Total Required (ft)	285	177.5	N/A	226
	Ext Lane Length (ft)	1000	1000	N/A	N/A
	Sufficient (Y/N)	Y	Y	N/A	Y

4.6 Proportionate Fair Share

The roadway segments that are failing in the projected conditions fail during the background conditions. Therefore, as per F.S. 160.3180 3. (B) the roadways are deficient without the project under review and therefore are removed from the proportionate-share calculation.

5.0 MULTIMODAL ASSESSMENT

An assessment was done of the immediate project site and proposed project site plans as it relates to multimodal transportation options.

Existing multimodal provisions in the area primarily includes sidewalks with stripped crosswalks on internally in the adjacent subdivisions. The proposed project would further facilitate multimodal connectivity by providing on-site/site related sidewalks connectivity. In general, the site plan is consistent with the City guidelines that will encourage the following:

- Safe, adequately lit and well-maintained pathways (on-site)
- Share Road Bicycle connectivity
- Identifiable crosswalks
- Removal of natural and/or built barriers that discourage walking
- Compliance with American's with Disabilities Act requirements
- Buffering between vehicular areas and sidewalks
- Linkage to existing or future walkway and/or bikeway network and transit route

Further information on multimodal provisions is documented by the site civil engineer on the site plans.

6.0 STUDY CONCLUSIONS

This traffic analysis is being conducted to assess the impact of the proposed 320 apartments, 234.6 KSF of light warehouse and a Gas Station with 14 Fuel positions. The proposed development is located east of Normandy Boulevard in City of Deltona, Florida. The analysis included a determination of project trip generation, a review of existing and projected roadway and intersection capacity and a review of access operations.

The results of the traffic analysis are summarized as follows:

- The proposed development will generate a total of 3,514 daily trips of which 355 and 280 will occur during the AM and PM peak hour, respectively.
- Access to the site will be provided via two right-in/right-out and one full-access driveway onto Normandy Boulevard. In addition, access will be provided via the proposed new roadway, Amelia Avenue/Rhode Island Avenue.
- The analysis indicates that the study roadway segments generally currently operate adequately within their adopted Level of Service (LOS). There are some segments that are projected to fail with or without the construction of the proposed project due to committed trips and background traffic growth.
- An analysis of the study intersections indicates that the study intersections currently operate adequately within their adopted Level of Service standard and are projected to continue to do so upon buildout of the proposed development.
- In summary, an exclusive 235 foot (includes a 50-foot taper) southbound left turn lane is warranted on Normandy Boulevard at Amelia Avenue/Rhode Island Avenue and at the Main Project Access. The turn lane design will be developed and coordinated by the site civil engineers.
- Per City staff, exclusive right turn lanes shall be provided at the driveways, since Normandy Boulevard within the study area is a 45 mph roadway.

APPENDIX

Appendix A: Preliminary Concept Plan



SYNERGY AT NORMANDY

A Multi-Use Development

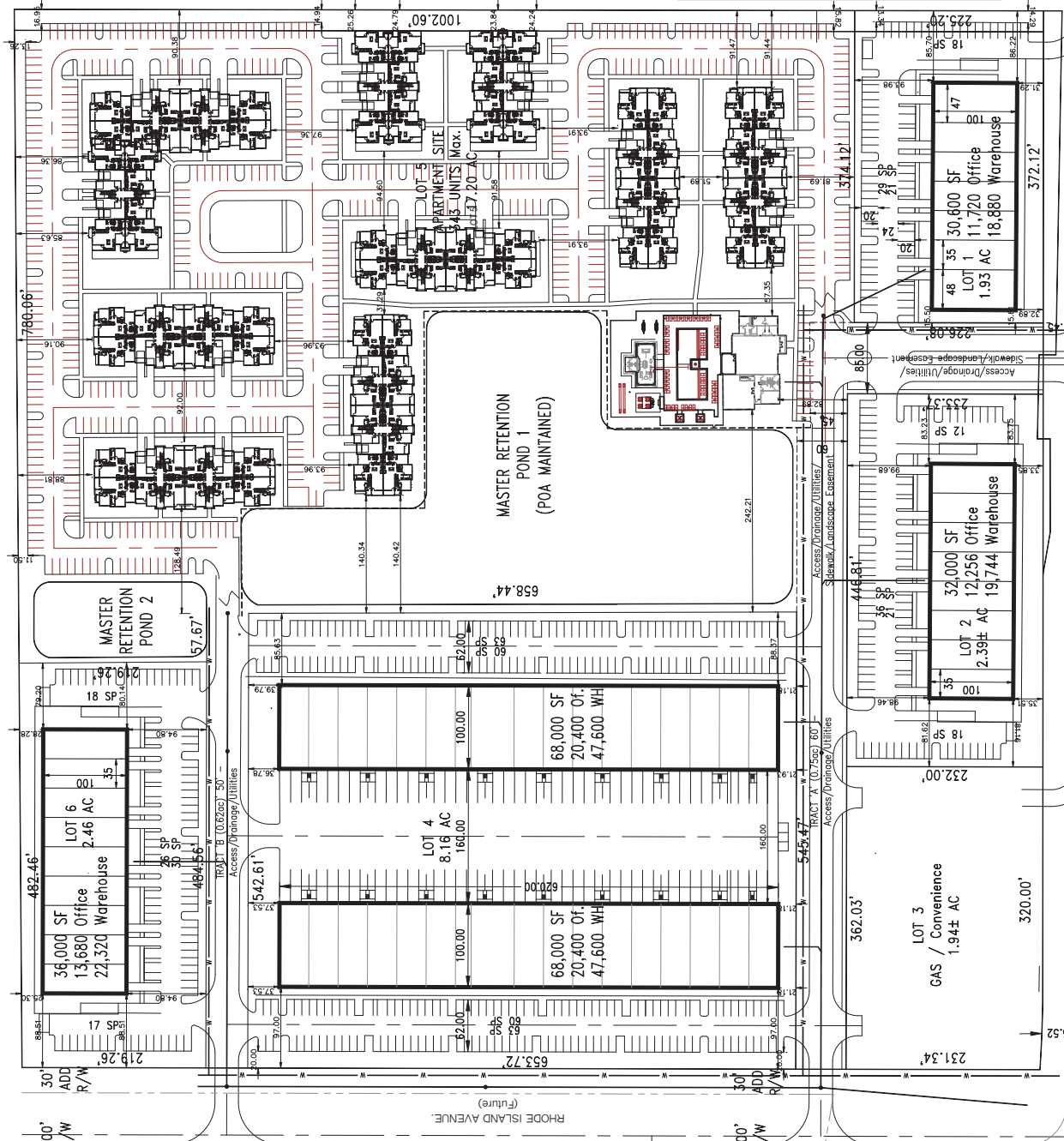
DEVELOPER:
Telesis Services LLC
 Attn: Scott Banta
 scott@telesisservices.com
 1111 N. Ronald Reagan Blvd, Suite 101
 Longwood, FL 32750

OWNER:
Warranty Parts Solutions, LLC
 14527 Whitridge Drive
 Winter Garden, FL 34957

CIVIL ENGINEER:
CFE Central Florida
Engineering Consultants, LLC
 1111 N. Ronald Reagan Blvd, STE 101
 Longwood, FL 32750
 407-599-7010
 ATTN: Russell Maynard
 rmaynard@cfecollc.com

LOT / BUILDING TABLE

Lot #	Industrial Building	Office	Warehouse	Max. Distance (ft)
Lot 1	1,53	30,000	11,720	18,880
Lot 2	2,39	53,000	12,256	19,744
Lot 3	1,54			
Lot 4	8,16	68,000	20,400	47,600
Lot 5	2,46	30,000	11,680	21,320
Lot 6	2,46	30,000	11,680	21,320
Totals				
Developed Total (incl. South St. RW)	18,45	214,000	70,640	156,144
Total Land Area				
Apartment Units: Max. Units	102			
Apartment Units: Min. Units	102			
2 Bedroom	94			
3 Bedroom	8			



SYNERGY AT NORMANDY
 PRELIMINARY Site Plan
 City of Deltona, Florida

DRAWING TITLE
 SYNERGY AT NORMANDY
 PRELIMINARY Site Plan
 City of Deltona, Florida

300 North Florida Avenue
 Deltona, Florida 32725
 Phone Number: (407) 599-7010
 Fax Number: (407) 598-5448
 email: hrmaynard@cfecollc.com ES No. 29173

1/25/2023/2524 POC Comments 1 Approved - Added Unit Counts for Max. and Min. Distances
 Date: JAN 2023
 Scale: 1" = 60'
 Drawn By: [Name]
 Checked By: [Name]
 Project: Synergy at Normandy
 Drawing Number: 2022-25201

Maple S. Pritch, P.E.
 License No. 36149

SHEET NUMBER
 007 of 1

Appendix B: Methodology Coordination

MEMORANDUM

**RE: Synergy at Normandy Mixed-Use
City of Deltona, Florida**
Traffic Impact Analysis Comments Responses
07/16/2024
Job # 22120

The following responds to comments received on the Traffic Impact Analysis (TIA) for the above referenced project.

1. Existing Roadway Segment Capacity Analysis (Table 1):

- a. Roadway segment numbers 190 and 191 (Normandy Blvd from Rhode Island to Saxon Blvd) – Number of lanes should be 4 instead of 2.
- b. It was stated that the PM Peak Hour External Volume for US 17/92 segments are calculated by multiplying the AADTs with K & D factors. Using the AADTs from AADT spreadsheet, K and D factors from Florida Traffic Online website, following are the PM peak hour volumes calculated:
 - I. 1,622 instead of 1,565 on segment number 53,
 - II. 1,223 instead of 1,180 on segment number 54,
 - III. 1,649 instead of 1,590 on segment number 55,
 - IV. 1,649 instead of 1,590 on segment number 56,
 - V. 1,782 instead of 1,719 on segment number 57.

For example, the AADT along segment number 53 is 30,500 veh/day with K&D factors of 9.0 and 59.1% respectively. $AADT \times K \times D = 30,500 \times 0.09 \times 0.591 = 1,622$. Please modify the table with accurate values.

Response: As requested, the TIA was updated per these comments.

2. Trip Generation (Table 3):

- a. It is observed that a total industrial land use size of 234,600 SF was included (75,456 SF of office space and 156,144 SF of warehouse) in the latest site plan, which is higher than the 230,600 SF used in the trip generation table. In the approved methodology and the TIA (September 2023), Lot 6 had 32,000 SF which included 12,256 SF of office space and 19,744 SF of warehouse usage while updated TIA (June 2024) has 36,000 SF which included 13,680 SF of office space and 22,320 SF of warehouse usage. Please update the trip generation table to include the additional 4,000 SF.

- b. Multi-Family (Mid-Rise) - Based on ITE Trip Generation 11th Edition, the AM peak hour trips for 320 dwelling units using the equation calculates to be 129 (Total), 30 (Enter) and 99 (Exit). Please modify the trip generation values.**

Note: The values of 138 (Total), 32 (Enter) and 106 (Exit) shown in the table is for 340 dwelling units.

- c. The values shown in the pass-by trips during the AM peak hour are incorrect. For example, reducing the internal capture of 1% (AM peak hour) from the total trips of 225 equals to approximately 223 and 75% pass-by trips will be 167 trips instead of 138 shown. It seems like the internal capture of 18% is inadvertently used instead of 1% to reduce the internal capture trips, please modify the calculations and update the table.**

Response: As requested, the TIA was updated per these comments.

- 3. Projected Traffic Conditions (Section 4): The body of the report states the build-out year as 2025 while the TIA methodology submission checklist states it as 2026. Please confirm which is the accurate build-out year.**

Response: The build-out year was updated to 2026.

- 4. Background Roadway Segment Capacity Analysis (Table 4):**

- a. Check comments on Table 1 and update this table accordingly.**
- b. The background volumes seems to be incorrect. The AADTs used as a baseline to forecast to build-out year (2025) is from year 2021 and not 2023. Hence, the background volume should be equal to PM peak hour volume from 2021 AADT spreadsheet $\times (1 + 4 \times 1.96\%)$. Please update the background volume column.**
- c. Please confirm with the County the attached July 2022 is the latest vested trip data available.**

Response: As requested, the TIA was updated per these comments. The Vested Trip data July 2022 is the latest.

- 5. Projected Roadway Segment Capacity Analysis (Table 5):**

- a. Check comments on Tables 1 and 4 and update this table accordingly.**
- b. Trip distribution – Based on the review of trip distribution map (Figure 2), the distribution percentages should be as follows:**

- I. **Roadway Number 100 - Project trip percentage should be 15% instead of 52%,**
- II. **Roadway Number 101 - Project trip percentage should be 27% instead of 42%,**
- III. **Roadway Number 103 - Project trip percentage should be 5% instead of 55%,**
- IV. **Roadway Number 105 - Project trip percentage should be 25% instead of 39%,**
- V. **Roadway Number 121 - Project trip percentage should be 15% instead of 27%,**
- VI. **Roadway Number 189 - Project trip percentage should be 52% instead of 25%,**
- VII. **Roadway Number 190 - Project trip percentage should be 48% instead of 39%,**
- VIII. **Roadway Number 191 - Project trip percentage should be 39% instead of 52%,**
- IX. **Roadway Number 192 - Project trip percentage should be 9% instead of 52%,**
- X. **Roadway Number 53 - Project trip percentage should be 10% instead of 5%.**
- XI. **1,782 instead of 1,719 on segment number 57.**

Please update Table 5 based on above modifications.

Response: As requested, the TIA was updated per these comments.

6. Intersection Capacity Analysis (Section 4.3): A queuing analysis has to be performed to confirm the sufficiency of the turn lane storages volumes at the study intersections to accommodate the background and project traffic.

Response: A queuing analysis was added to the report.

7. General: A multimodal analysis reviewing bicycle, pedestrian and transit facilities within the project influence area need to be included as part of the TIA.

Response: As requested, a multimodal discussion was added to the TIA.

END

MEMORANDUM

**RE: Synergy at Normandy Mixed-Use
City of Deltona, Florida**
Traffic Impact Analysis Comments Responses
06/12/2024
Job # 22120

The following responds to comments received on the Traffic Impact Analysis (TIA) for the above referenced project.

City of Deltona Comments

1. Preliminary Site Plan (Figure 2):

- a. **Please include the calculation for number of parking spaces required versus the actual parking spaces provided using the rates from the Volusia County/City of Deltona parking guidelines for residential uses, to make sure adequate spaces are provided for documentation purposes.**
- b. **Based on the review of site plan, it is seen that there will be 312 residential units. Please confirm if the number of residential dwelling units will be 320 or 312.**

Response: The parking calculation will be provided by the site civil engineer as it is not part of the Traffic Impact Study. There are 320 residential units.

2. Existing Roadway Segment Capacity Analysis (Table 1):

- a. **The number of lanes seems to be incorrect for a lot of roadway segments. For example:**
 - i. **Graves Avenue from Kentucky to Normandy is a two-lane roadway based on google street view and Volusia County volume spreadsheet.**
 - ii. **Saxon Boulevard from VMP to FDOT Park & Ride is a six-lane roadway based on google street view and Volusia County volume spreadsheet.**
 - iii. **Normandy Boulevard from Graves Avenue to Rhode Island is a two-lane roadway based on google street view and Volusia County volume spreadsheet.**
 - iv. **The above are just a few examples, please verify all the segments and update the table.**
- b. **Please verify the PM PK Hr Ext Volumes on Saxon Blvd, the values seem different in the 2021 Volume Spreadsheet**
- c. **For the segments on US 17/92:**

- i. **Based on 2021 Volusia County AADT spreadsheet, the peak 2-way capacity is seen as 3,580 vehicle/hour while the table shows a value of 2,000 vehicle/hour. Please explain or reconcile as needed.**
- ii. **Also, please explain where the peak hour volumes were obtained from. No values were seen in the 2021 Volusia County AADT spreadsheet.**

Response: The table was updated and notes added as requested

3. Trip Generation (Table 3):

- a. **General Light Industrial (LUC 110) - It is seen from the preliminary site plan that there will be 77 KSF of office space (33%) and 153.6 KSF of warehouse (67%). Please confirm the office space is related to warehousing and will not be using for other uses. Based on description of land use 110, Light Industrial is defined as "The facility has an emphasis on activities other than manufacturing and typically has minimal office space". If the office space will be used for different purpose, the general light industrial and office uses must be calculated as different land uses.**
- b. **Multi-Family (Mid-Rise) - Based on ITE Trip Generation 11th Edition, the AM peak hour trips calculate to be 129 (Total), 30 (Enter) and 99 (Exit). Please modify as necessary.**
- c. **Internal capture - The 18% internal capture is for PM peak hour and the internal trip capture estimation was not performed for AM peak hour or attached with the methodology. Please calculate the internal capture for AM peak hour. Based on initial analysis, it is observed the internal capture will be less than 1% for the AM peak hour. Please update the trip generation calculations.**

Response: (a) Per the developer, the office space is intended to be incidental to the warehouse space; (b) Per the note at the bottom of Table 3, the ITE trip generation equations were used to derive trip rates; (c) The AM peak hour internal capture was updated as requested.

4. Projected Roadway Segment Capacity Analysis (Table 4):

- a. **Were the vested trips added to the background volume? If yes, please include a column showing the vested trips on each corridor.**
- b. **In addition, please verify the number of lanes are correct.**

Response: (a) Vested trips were used originally in the analysis but a column was not shown in the PDF. A column has now been added to Table 4; (b) The number of lanes was updated per comment #2.

- 5. Turn Lane Analysis (Section 4.4): This section reviewed the requirements for left-turn lanes but did not evaluate for the right-turn lane requirements.**
- a. According to Volusia County LDC Section 72-619 for turn lane requirements, it states that "A right-turn lane of 12 feet in width, conforming to Table VI shall be provided at each driveway when the speed limit equals or exceeds 35 miles per hour or if the development will generate 100 or more right-turn movements during the peak hour."
 - b. According to Section 96-37 (Access to thoroughfare corridors) from City of Deltona ordinances - A right-turn lane with a minimum of 150 feet of storage and 100 feet of transition shall be required at each driveway when the speed limit equals or exceeds 35 miles per hour or if the development will generate 100 or more right-turn movements during the peak hour.

Exclusive right turn lanes shall be provided at the driveways, since Normandy Blvd in the study area is a 45 mph roadway.

Response: The turn lane section was updated accordingly.

- 6. Study Conclusions: Please calculate the Proportionate Fair Share for the proposed mixed-use development.**

Response: A proportionate fair share section was added to the report

- 7. Housekeeping comment: In Section 2.2, it is stated that a seasonal adjustment factor of 1.16 was used, shouldn't it be 1.02**

Response: The seasonal factor used was 1.02, the text was updated to be consistent.

Volusia County Comments

- 1. Please make sure to utilize the County's 2022 AADT spreadsheet.**

Response: The County 2022 AADT Spreadsheet was utilized. References are provided in the TIA.

- 2. Please state any planned or programmed improvements that will be assumed for future conditions.**

Response: Planned and programmed improvements are discussed in Section 1.3 of the TIA.

3. Please provide additional justification to ensure the proposed buildout year of 2025 aligns with realistic development timelines in the TIA study.

Response: This comment will be addressed by the Developer thru discussion with City and County staff.

4. Confirm if there are any planned phases for the development and full development buildout year.

Response: This comment will be addressed by the Developer thru discussion with City and County staff.

5. Please include the following statement (if applicable) Given the staged nature of the development and recognizing the potential evolution of traffic patterns over time, the developer is required to conduct a comprehensive reevaluation of the access control type in conjunction with each stage of development. This process is essential to ensure that access control measures align with the changing transportation needs and conditions associated with the different phases of the project. The developer must collaborate closely with the CTE to assess and adjust the access control type based on the specific requirements and challenges presented by each stage. This reevaluation should consider factors such as the increasing population density, changing land use patterns, and corresponding shifts in traffic volumes. For each stage, the developer is expected to submit a revised access control proposal that reflects the current and anticipated traffic conditions. This proposal should outline any necessary modifications to the initially proposed access control type, taking into account factors such as peak traffic periods, pedestrian movements, and the integration of alternative transportation modes. The CTE will review each stage's access control proposal, ensuring that it complies with established standards and guidelines. The goal is to adapt the access control type to the evolving demands of the development, promoting an efficient and safe transportation network throughout the different phases. This staged approach to access control evaluation aims to create a flexible and responsive framework that accommodates the dynamic nature of the development. It is imperative that the developer remains proactive in reassessing and refining access control measures to uphold the highest standards of transportation planning and engineering throughout the entire staged development process.

Response: This comment will be addressed by the Developer thru discussion with City and County staff.

6. Please Use the updated attached PFS spreadsheet dated 2024.

Response: A Proportionate Fair Share Section has been added to the report.

7. Refer to the attached traffic growth policy for compliance.

Response: This section is noted.

8. Refer to the TIA guideline section 9 (Passer -By Capture) for compliance on, The total passer-by capture shall not exceed 14 percent (14%) of the total background traffic on the adjacent roadway, unless approved by the CTE.

Response: Typically the pass-by trip vs. adjacent street traffic rate cap is not utilized for gas stations since gas stations are acknowledged to have very high pass-by rates. This can be discussed more with the CTE.

9. Refer to TIA guideline section 7 (though an analysis of safety and access management issues may still need to be completed) and provide documentation that support this requirement. A crash diagram as noted below georeferenced to the specific study location(s) highlighting crash trends based on 5yrs period. The proposed design is to consider this input.

Response: This comment is noted and the site civil engineer will coordinate with staff.

10. TIA shall address the following contents:

Response: The TIA was updated to address the contents as requested.

END

METHODOLOGY MEMORANDUM

**RE: Synergy at Normandy Mixed-Use
City of Deltona, FL**
Traffic Impact Analysis Methodology
08/9/2023
Job # 22120

The following is a methodology outline for the Traffic Impact Analysis (TIA) for the above referenced project. In general, the TIA will conform to the methodology requirements and guidelines documented by City of Deltona, Volusia County and the Florida Department of Transportation (FDOT).

Project Description

The traffic analysis will be conducted to assess the impact of the proposed 320 apartments, 230.6 KSF of light warehouse and a Gas Station with 14 Fuel positions. The proposed development is located east of Normandy Boulevard in City of Deltona, Florida. **Figure 1** depicts the site location and the surrounding transportation network.

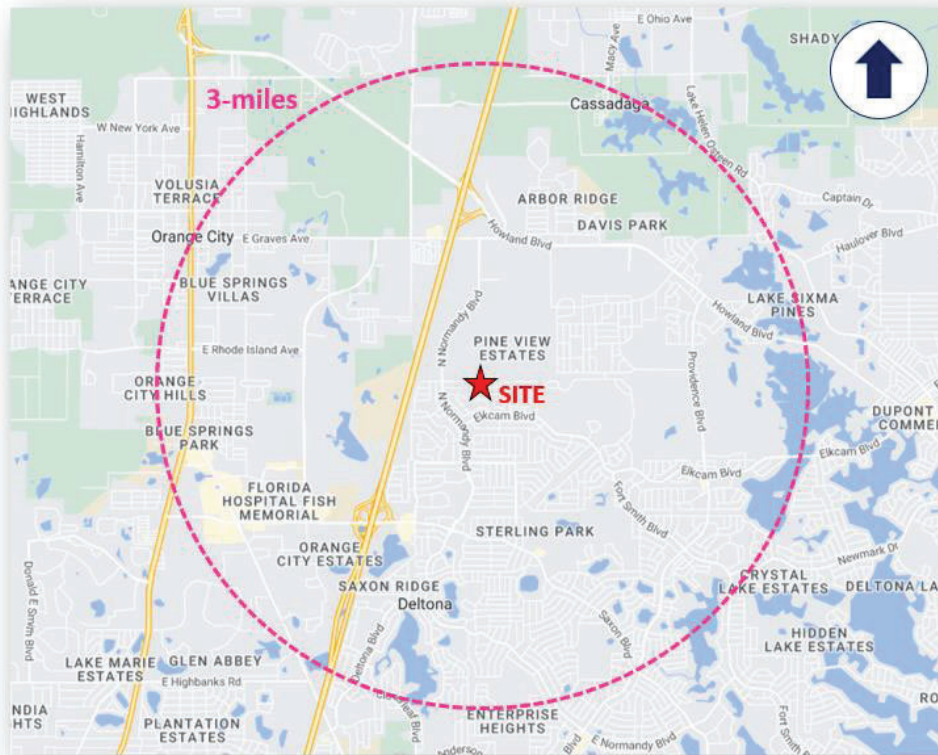


Figure 1: Project Location Map

Site Access

Access to the site will be provided via two right-in/right-out and one full access driveways onto Normandy Boulevard. **Attachment A** provides the preliminary concept plan.

Trip Generation

Table 1 summarizes the trip generation analysis conducted using information published by the Institute of Transportation Engineers (ITE) in the *Trip Generation Manual, 11th Edition* and the *Trip Generation Handbook, 3rd Edition*. The calculation revealed that the proposed development will generate a total of 2,894 daily trips of which 300 and 278 will occur during the AM and PM peak hour, respectively. The ITE Trip Generation information is included for reference in **Attachment B**.

Table 1: Trip Generation

ITE Code	Land Use	Size	Daily		AM Peak Hour				PM Peak Hour			
			Rate	Trips	Rate	Enter	Exit	Total	Rate	Enter	Exit	Total
110	General Light Industrial	230.6 KSF	4.87	1,123	0.74	150	21	171	0.65	21	129	150
221	Multi-Family (Mid-Rise)	320 DUs	4.62	1,478	0.43	32	106	138	0.39	76	49	125
945	Gas Station with Convenience Market (GFA 2-4ksf)	14 FPs	265.1	3,712	16.06	113	112	225	18.42	129	129	258
Subtotal			--	6,313	--	295	239	534	--	226	307	533
Internal Capture (18%)			--	1,136	--	53	43	96	--	41	55	96
Gas Station with Convenience Market Pass-by (75%)			--	2,283	--	69	69	138	--	79	80	159
New Net Trips			--	2,894	--	173	127	300	--	106	172	278

Trip Distribution

A preliminary distribution of the project trips onto the study area roadways was determined using the Florida Standard Urban Area Transportation Study (FSUTMS) model developed for the adjacent approved Portland Industrial Park (see **Attachment C** for model plots). This preliminary trip distribution was adjusted using knowledge of the study area, development type, prevailing traffic flow patterns and existing traffic counts.

Figure 2 provides the derived trip distribution developed for this project. Using this trip distribution pattern, project trips were assigned to the surrounding study roadway network.

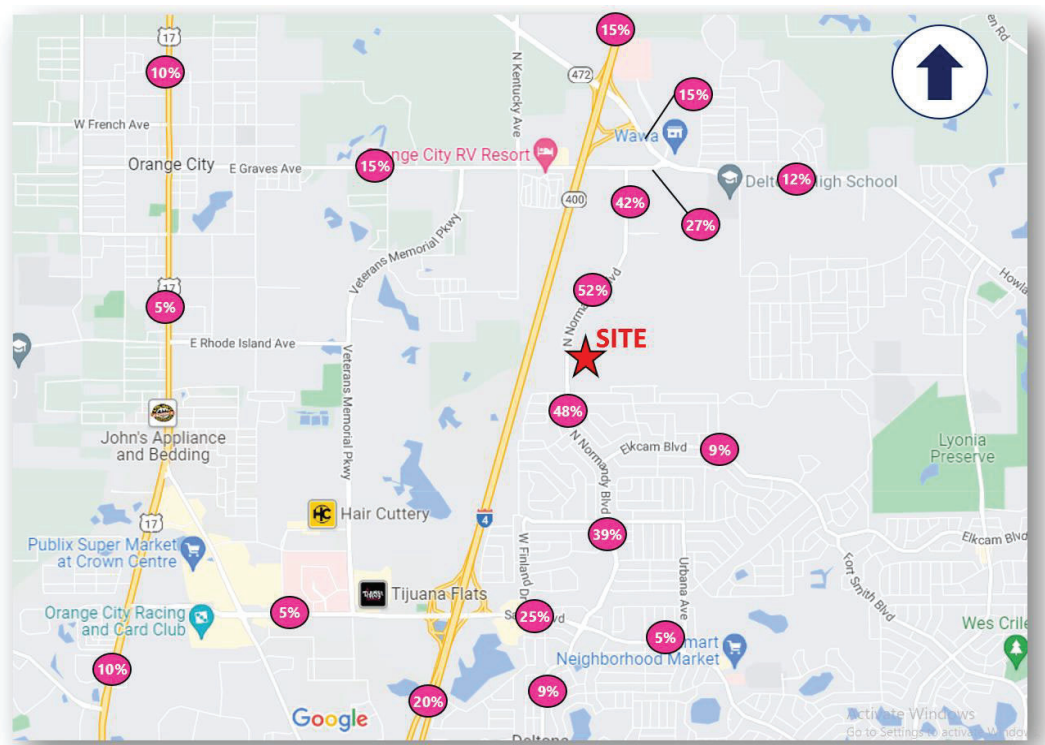


Figure 2: Trip Distribution Map

Study Area

The study facilities to be considered in the analysis are:

Study Intersections

- Normandy Boulevard and Saxon Boulevard
- Normandy Boulevard and Ekcam Boulevard
- Normandy Boulevard and Graves Avenue
- Graves Avenue and Howland Boulevard
- Normandy Boulevard and Amelia Avenue/Rhode Island Avenue (Full)
- Normandy Boulevard and Project Access 1 (North – Right-in/Right-out)
- Normandy Boulevard and Project Access 2 (Middle - Full)
- Normandy Boulevard and Project Access 3 (South – Right-in/Right-out)

Study Segments

- Graves Avenue
 - Veteran's Memorial Parkway to Kentucky Avenue
 - Kentucky Avenue to Normandy Boulevard
 - Normandy Boulevard to Howland Boulevard

- Saxon Boulevard
 - Veterans Memorial Parkway to FDOT Park & Ride
 - FDOT Park & Ride to I-4
 - I-4 to Finland Drive
 - Finland Drive to Normandy Boulevard

- Howland Boulevard
 - I-4/SR 472 to Wolf Pack Run
 - Wolf Pack Run to Catalina Boulevard

- Normandy Boulevard
 - Graves Avenue to Rhode Island
 - Rhode Island to Elkcam Boulevard
 - Elkcam Boulevard to Saxon Boulevard
 - Saxon Boulevard to Deltona Boulevard

- US 17/92
 - DeBary Plantation Blvd to Saxon Boulevard
 - Saxon Boulevard to Enterprise Road
 - Enterprise Road to Rhode Island Avenue
 - Rhode Island Avenue to Graves Avenue
 - Graves Avenue to New York Avenue

The significance analysis is provided in Table The critical and near critical segments near the site are provided in **Attachment D**.

Growth Rate

A historical trend analysis was conducted based on the Annual Average Daily Traffic (AADT) data obtained from the *FDOT Traffic Online* website in the vicinity of the project (see **Attachment E**). Based on this historical trend analysis, an average annual growth rate of 1.96% was calculated. Therefore, a minimum annual growth rate of 2% will be utilized in the study.

Table 2: Roadway Segment Significance Analysis

No.	Roadway	Segment	Lanes	LOS Stnd	PH Dir Capacity	Trip Dist	Project Vol	% of Capacity	Signif at 3%
99	Graves Ave	VMP to Kentucky Ave	4	E	1,620	15%	26	1.60%	No
100	Graves Ave	Kentucky to Normandy	4	E	1,620	52%	55	3.40%	Yes
101	Graves Ave	Normandy Blvd to Howland Blvd	4	E	2,740	42%	72	2.63%	No
102	Saxon Blvd	VMP to FDOT Park n Ride	4	E	5,140	5%	5	0.10%	No
103	Saxon Blvd	Park n Ride to I-4	4	E	5,140	55%	95	1.85%	No
104	Saxon Blvd	I-4 to Finland Dr	4	E	4,280	25%	27	0.63%	No
105	Saxon Blvd	Finland Dr to Normandy Blvd	4	E	3,410	39%	67	1.96%	No
121	Howland Blvd	I-4 to Wolf Pack Run	4	E	3,410	27%	29	0.85%	No
122	Howland Blvd	Wolf Pack Run to Catalina Blvd	4	E	3,410	12%	21	0.62%	No
189	Normandy Blvd	Graves Ave to Rhode Island	4	E	1,150	25%	27	2.35%	No
190	Normandy Blvd	Rhode Island to Elkcam Blvd	4	E	2,630	39%	67	2.55%	No
191	Normandy Blvd	Elkcam Blvd to Saxon Blvd	4	E	2,630	52%	55	2.09%	No
192	Normandy Blvd	Saxon Blvd to Deltona Blvd	4	E	2,630	52%	89	3.38%	Yes
53	US 17/92	DeBary Plantation Blvd to Saxon Blvd.	4	E	2,000	5%	9	0.45%	No
54	US 17/92	Saxon Blvd. to Enterprise Rd.	4	E	2,000	5%	5	0.25%	No
55	US 17/92	Enterprise Rd. to Rhode Island Ave.	4	E	2,000	5%	9	0.45%	No
56	US 17/92	Rhode Island Ave. to Graves Ave.	4	E	2,000	15%	16	0.80%	No
57	US 17/92	Graves Ave. to New York Ave.	4	E	2,000	10%	17	0.85%	No

Note: (1) Volusia Vested Trips 2022 table used for segments No. 99 to 192; (2) VolusiaAADTs2021 table used for segments 53 to 57

Projected Conditions Analysis

The projected conditions analysis will be conducted within the following framework:

- **Counts:** Roadway and intersection counts will be obtained during the AM and PM peak period, as applicable. These counts will be adjusted using a peak season correction factor as necessary.
- **Growth Factors:** Growth factors, derived from historical traffic volume data, will be applied to existing traffic counts to develop future background traffic volumes.
- **Traffic Volumes:** Project traffic volumes will be added to the future background traffic volumes to obtain total future traffic volumes.
- **Analysis Periods:** Analyses will be performed for existing conditions, future background conditions and future background plus project trips (i.e. total traffic/buildout) conditions.
- **Roadway Analysis:** Roadways segments will be evaluated using the applicable Volusia County and FDOT service volume capacities, as applicable.
- **Intersection Analysis:** Intersection capacity analysis will be performed using the latest operational analysis procedures documented in the *Highway Capacity Manual* as applied using the Synchro software during the AM and PM peak period.

- *Turn Lane Analysis:* Turn Lane analysis (based on queues) will be performed for all the site access driveways and will be done in accordance with Volusia County Land Development Code.
- *Buildout Year:* The buildout year of the project is 2025.
- *Mitigation and Concurrency:* Concurrency strategies/transportation improvement to mitigate transportation deficiencies, if any, will be identified in the traffic study.

Multimodal Assessment

An assessment of multimodal options will be documented for: Transit, Bicycle and Pedestrian.

Traffic Impact Study Report

The traffic report prepared will summarize the study procedures, data, analysis, and recommendations.

Volusia County TIA Methodology Checklist

As required by the County this checklist was prepared and is provided in **Attachment F**.

END

Attachment A
Preliminary Concept Plan

Attachment B
Trip Generation Information

Land Use: 110

General Light Industrial

Description

A light industrial facility is a free-standing facility devoted to a single use. The facility has an emphasis on activities other than manufacturing and typically has minimal office space. Typical light industrial activities include printing, material testing, and assembly of data processing equipment. Industrial park (Land Use 130) and manufacturing (Land Use 140) are related uses.

Additional Data

The technical appendices provide supporting information on time-of-day distributions for this land use. The appendices can be accessed through either the ITETripGen web app or the trip generation resource page on the ITE website (<https://www.ite.org/technical-resources/topics/trip-and-parking-generation/>).

The sites were surveyed in the 1980s, the 2000s, and the 2010s in Colorado, Connecticut, Indiana, New Jersey, New York, Oregon, Pennsylvania, and Texas.

Source Numbers

106, 157, 174, 177, 179, 184, 191, 251, 253, 286, 300, 611, 874, 875, 912

General Light Industrial (110)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
On a: Weekday

Setting/Location: General Urban/Suburban

Number of Studies: 37

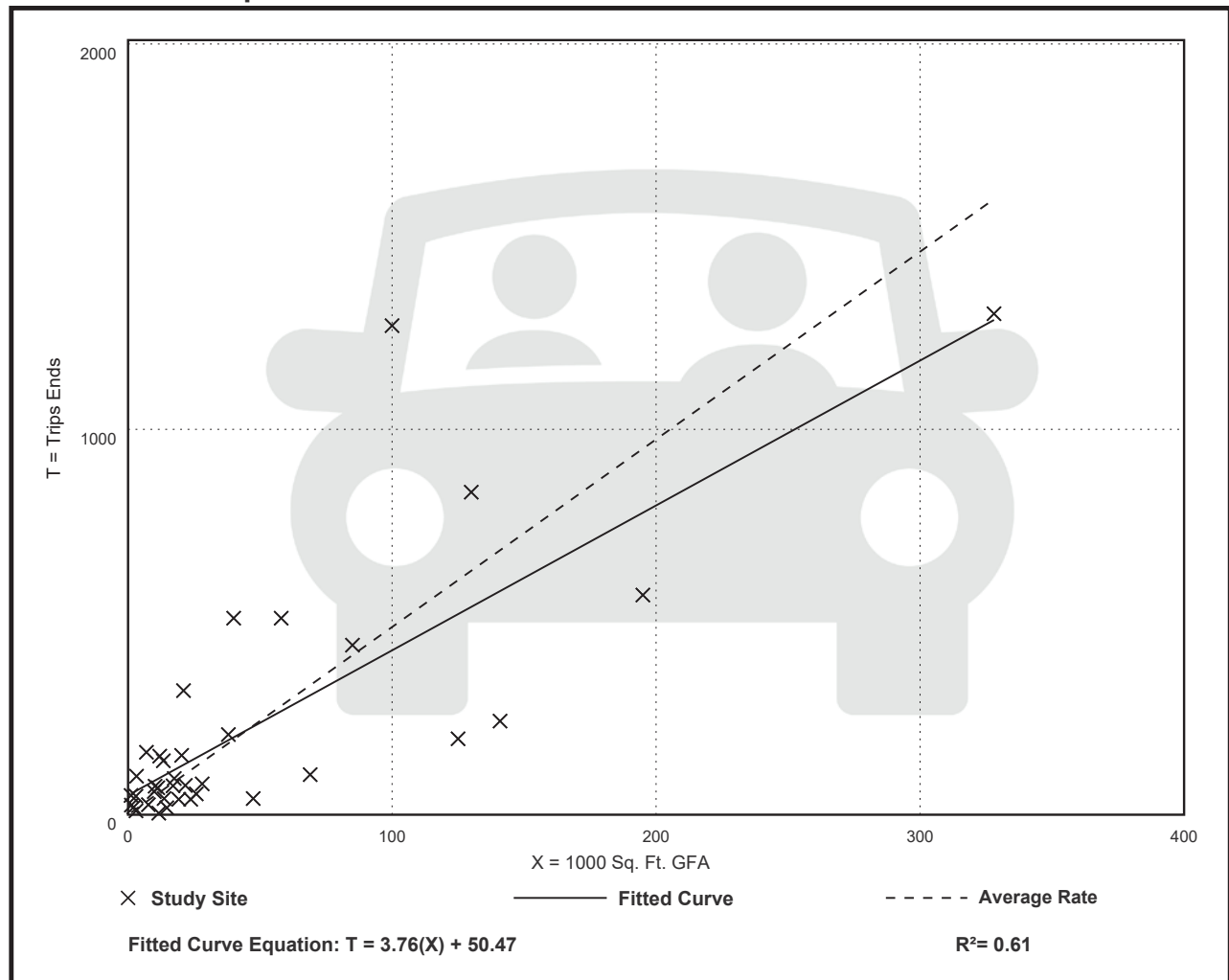
Avg. 1000 Sq. Ft. GFA: 45

Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
4.87	0.34 - 43.86	4.08

Data Plot and Equation



General Light Industrial (110)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA

On a: Weekday,

Peak Hour of Adjacent Street Traffic,

One Hour Between 7 and 9 a.m.

Setting/Location: General Urban/Suburban

Number of Studies: 41

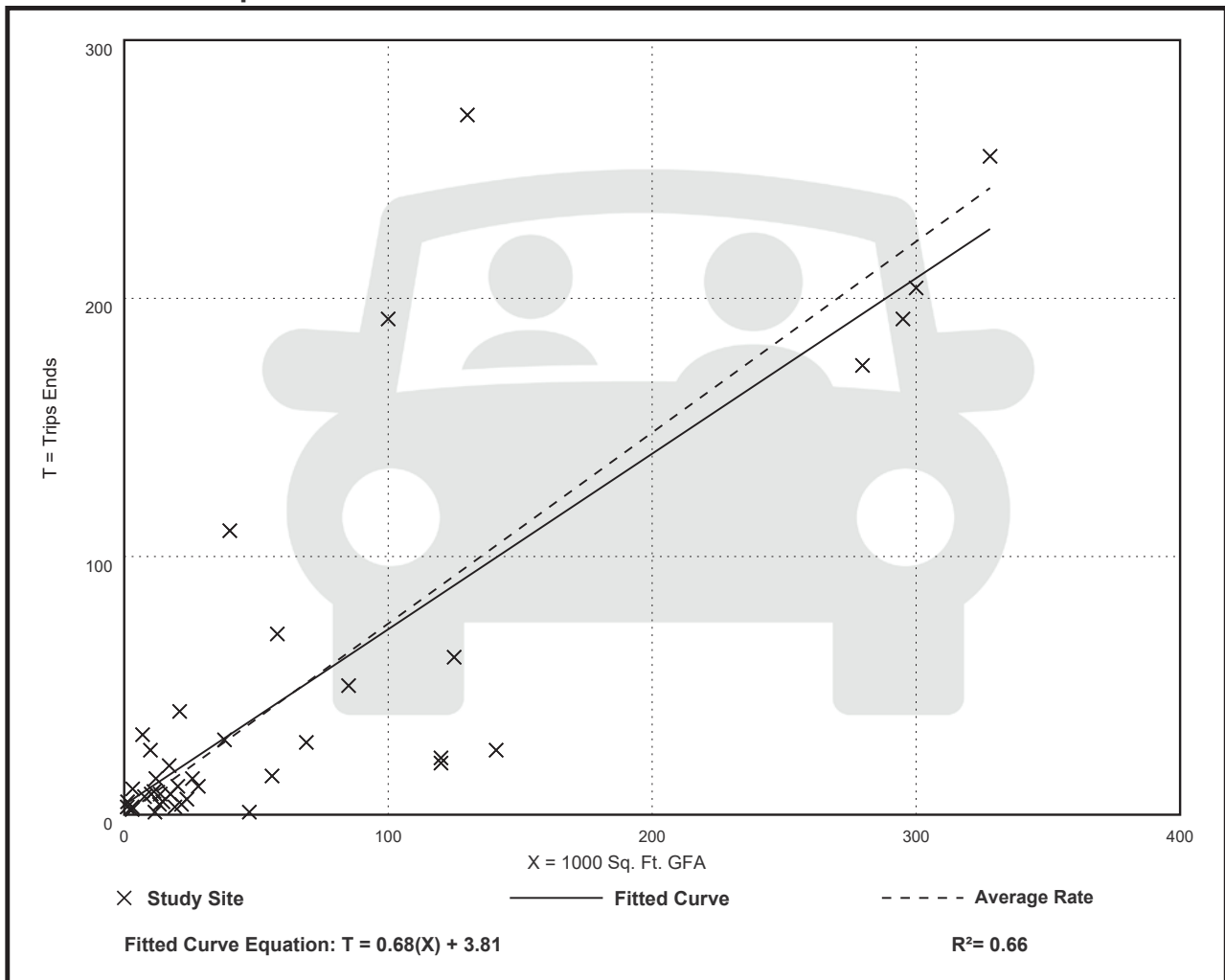
Avg. 1000 Sq. Ft. GFA: 65

Directional Distribution: 88% entering, 12% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.74	0.02 - 4.46	0.61

Data Plot and Equation



General Light Industrial (110)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA

On a: Weekday,

Peak Hour of Adjacent Street Traffic,

One Hour Between 4 and 6 p.m.

Setting/Location: General Urban/Suburban

Number of Studies: 40

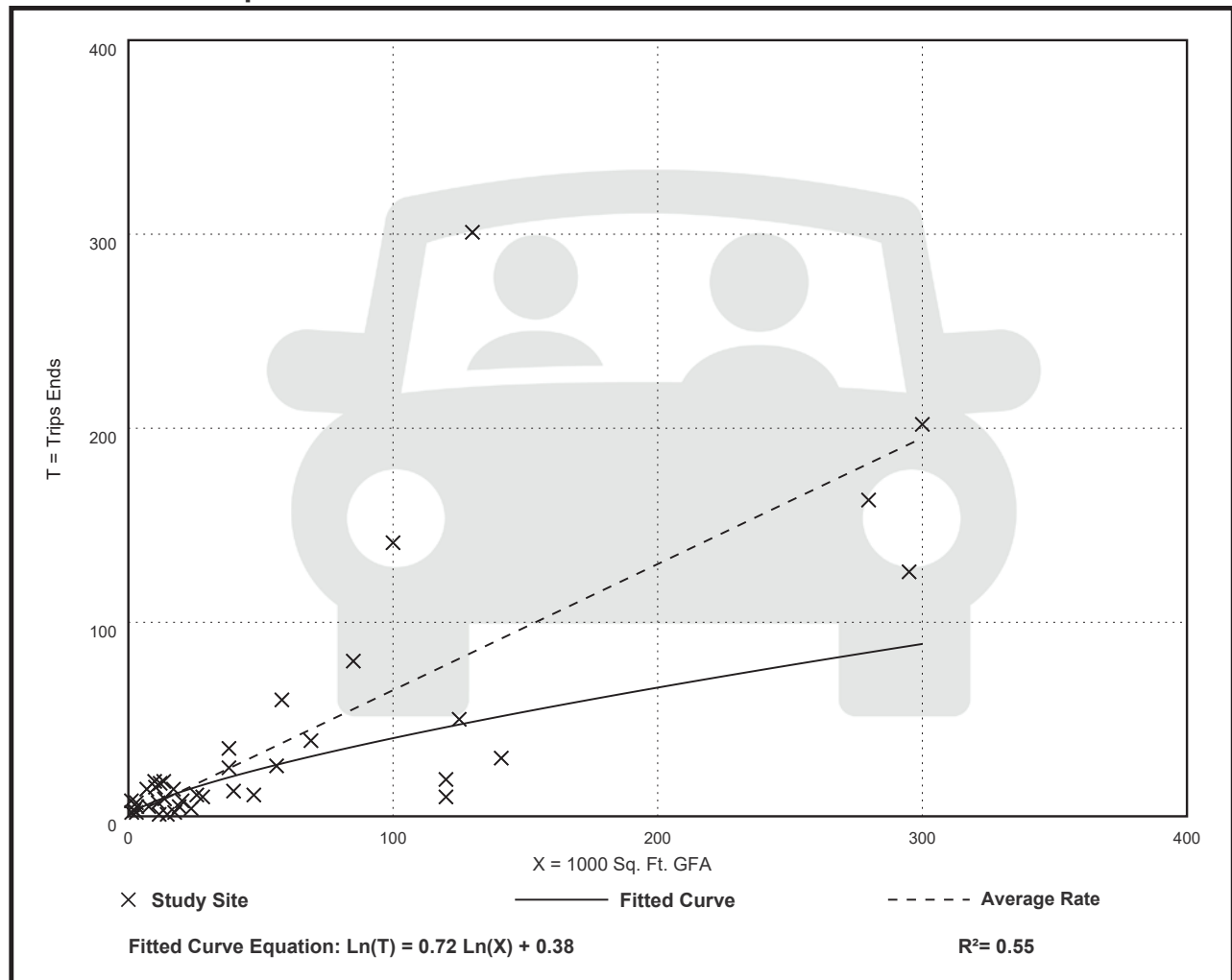
Avg. 1000 Sq. Ft. GFA: 58

Directional Distribution: 14% entering, 86% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.65	0.07 - 7.02	0.56

Data Plot and Equation



Land Use: 221

Multifamily Housing (Mid-Rise)

Description

Mid-rise multifamily housing includes apartments and condominiums located in a building that has between four and 10 floors of living space. Access to individual dwelling units is through an outside building entrance, a lobby, elevator, and a set of hallways.

Multifamily housing (low-rise) (Land Use 220), multifamily housing (high-rise) (Land Use 222), off-campus student apartment (mid-rise) (Land Use 226), and mid-rise residential with ground-floor commercial (Land Use 231) are related land uses.

Land Use Subcategory

Data are presented for two subcategories for this land use: (1) not close to rail transit and (2) close to rail transit. A site is considered close to rail transit if the walking distance between the residential site entrance and the closest rail transit station entrance is ½ mile or less.

Additional Data

For the six sites for which both the number of residents and the number of occupied dwelling units were available, there were an average of 2.5 residents per occupied dwelling unit.

For the five sites for which the numbers of both total dwelling units and occupied dwelling units were available, an average of 96 percent of the total dwelling units were occupied.

The technical appendices provide supporting information on time-of-day distributions for this land use. The appendices can be accessed through either the ITETripGen web app or the trip generation resource page on the ITE website (<https://www.ite.org/technical-resources/topics/trip-and-parking-generation/>).

It is expected that the number of bedrooms and number of residents are likely correlated to the trips generated by a residential site. To assist in future analysis, trip generation studies of all multifamily housing should attempt to obtain information on occupancy rate and on the mix of residential unit sizes (i.e., number of units by number of bedrooms at the site complex).

The sites were surveyed in the 1990s, the 2000s, the 2010s, and the 2020s in Alberta (CAN), California, District of Columbia, Florida, Georgia, Illinois, Maryland, Massachusetts, Minnesota, Montana, New Jersey, New York, Ontario (CAN), Oregon, Utah, and Virginia.

Source Numbers

168, 188, 204, 305, 306, 321, 818, 857, 862, 866, 901, 904, 910, 949, 951, 959, 963, 964, 966, 967, 969, 970, 1004, 1014, 1022, 1023, 1025, 1031, 1032, 1035, 1047, 1056, 1057, 1058, 1071, 1076

Multifamily Housing (Mid-Rise) Not Close to Rail Transit (221)

Vehicle Trip Ends vs: Dwelling Units
On a: Weekday

Setting/Location: General Urban/Suburban

Number of Studies: 11

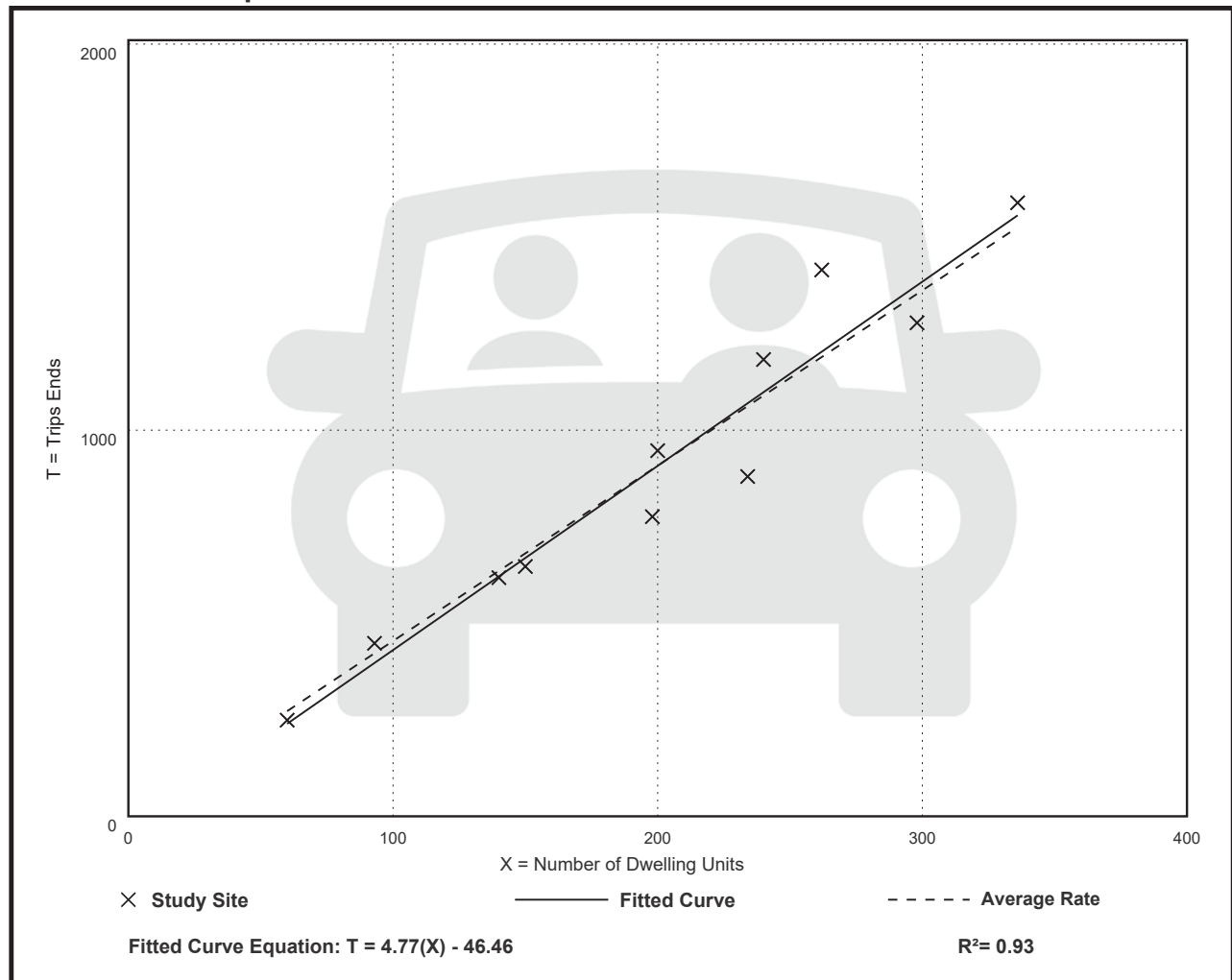
Avg. Num. of Dwelling Units: 201

Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
4.54	3.76 - 5.40	0.51

Data Plot and Equation



Multifamily Housing (Mid-Rise) Not Close to Rail Transit (221)

Vehicle Trip Ends vs: Dwelling Units

On a: Weekday,

Peak Hour of Adjacent Street Traffic,

One Hour Between 7 and 9 a.m.

Setting/Location: General Urban/Suburban

Number of Studies: 30

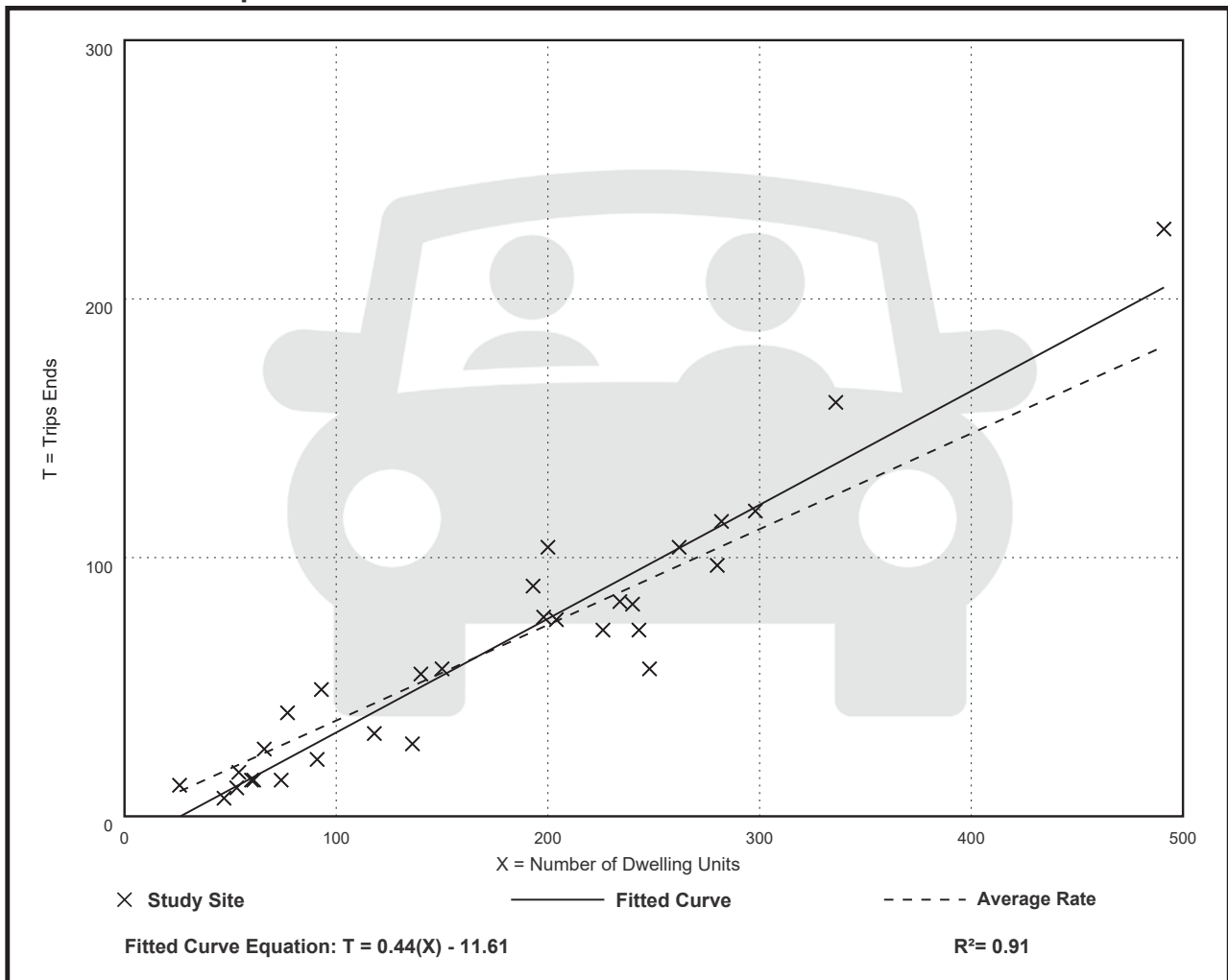
Avg. Num. of Dwelling Units: 173

Directional Distribution: 23% entering, 77% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.37	0.15 - 0.53	0.09

Data Plot and Equation



Multifamily Housing (Mid-Rise) Not Close to Rail Transit (221)

Vehicle Trip Ends vs: Dwelling Units

On a: Weekday,

Peak Hour of Adjacent Street Traffic,

One Hour Between 4 and 6 p.m.

Setting/Location: General Urban/Suburban

Number of Studies: 31

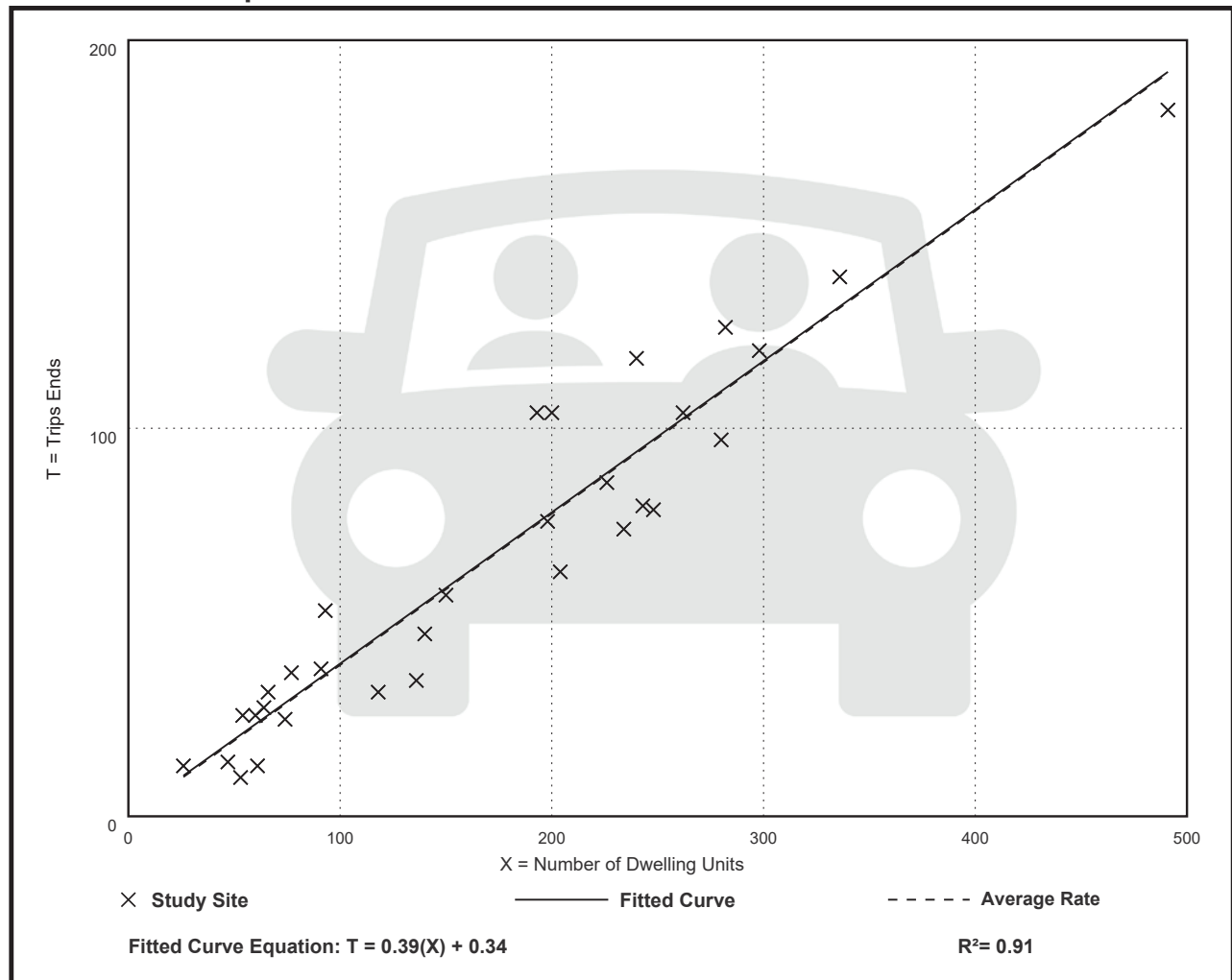
Avg. Num. of Dwelling Units: 169

Directional Distribution: 61% entering, 39% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.39	0.19 - 0.57	0.08

Data Plot and Equation



Land Use: 945

Convenience Store/Gas Station

Description

A convenience store/gas station is a facility with a co-located convenience store and gas station. The convenience store sells grocery and other everyday items that a person may need or want as a matter of convenience. The gas station sells automotive fuels such as gasoline and diesel.

A convenience store/gas station is typically located along a major thoroughfare to optimize motorist convenience. Extended hours of operation (with many open 24 hours, 7 days a week) are common at these facilities.

The convenience store product mix typically includes pre-packaged grocery items, beverages, dairy products, snack foods, confectionary, tobacco products, over-the-counter drugs, and toiletries. A convenience store may sell alcohol, often limited to beer and wine. Coffee and pre-made sandwiches are also commonly sold at a convenience store. Made-to-order food orders are sometimes offered. Some stores offer limited seating.

The sites in this land use include both self-pump and attendant-pumped fueling positions and both pre-pay and post-pay operations.

Convenience store (Land Use 851), gasoline/service station (Land Use 944), and truck stop (Land Use 950) are related uses.

Land Use Subcategory

Multiple subcategories were added to this land use to allow for multi-variable evaluation of sites with single-variable data plots. All study sites are assigned to one of three subcategories, based on the number of vehicle fueling positions (VFP) at the site: between 2 and 8 VFP, between 9 and 15 VFP, and between 16 and 24 VFP. For each VFP range subcategory, data plots are presented with GFA as the independent variable for all time periods and trip types for which data are available. The use of both GFA and VFP (as the independent variable and land use subcategory, respectively) provides a significant improvement in the reliability of a trip generation estimate when compared to the single-variable data plots in prior editions of *Trip Generation Manual*.

Further, the study sites were also assigned to one of three other subcategories, based on the gross floor area (GFA) of the convenience store at the site: between 2,000 and 4,000 square feet, between 4,000 and 5,500 square feet, and between 5,500 and 10,000 square feet. For each GFA subcategory range, data plots are presented with VFP as the independent variable for all time periods and trip types for which data are available. The use of both VFP and GFA (as the independent variable and land use subcategory, respectively) provides a significant improvement in the reliability of a trip generation estimate when compared to the single-variable data plots in prior editions of *Trip Generation Manual*.

When analyzing the convenience store/gas station land use with each combination of GFA and VFP values as described above, the two sets of data plots will produce two estimates of site-generated trips. Both values can be considered when determining a site trip generation estimate.

Data plots are also provided for three additional independent variables: AM peak hour traffic on adjacent street, PM peak hour traffic on adjacent street, and employees. These independent variables are intended to be analyzed as single independent variables and do not have sub-categories associated with them. Within the data plots and within the ITETripGen web app, these plots are found under the land use subcategory “none.”

Additional Data

ITE recognizes there are existing convenience store/gas station sites throughout North America that are larger than the sites presented in the data plots. However, the ITE database does not include any site with more than 24 VFP or any site with gross floor area greater than 10,000 square feet. Submission of trip generation data for larger sites is encouraged.

The technical appendices provide supporting information on time-of-day distributions for this land use. The appendices can be accessed through either the ITETripGen web app or the trip generation resource page on the ITE website (<https://www.ite.org/technical-resources/topics/trip-and-parking-generation/>).

The sites were surveyed in the 1980s, the 1990s, the 2000s, and the 2010s in Alberta (CAN), Arkansas, California, Connecticut, Delaware, Florida, Indiana, Iowa, Kentucky, Maryland, Massachusetts, Minnesota, Nevada, New Hampshire, New Jersey, Pennsylvania, Rhode Island, South Dakota, Texas, Utah, Vermont, Washington, and Wisconsin.

Source Numbers

221, 245, 274, 288, 300, 340, 350, 351, 352, 355, 359, 385, 440, 617, 718, 810, 813, 844, 850, 853, 864, 865, 867, 869, 882, 883, 888, 904, 926, 927, 936, 938, 954, 960, 962, 977, 1004, 1024, 1025, 1027, 1052

Convenience Store/Gas Station - GFA (2-4k) (945)

Vehicle Trip Ends vs: Vehicle Fueling Positions
On a: Weekday

Setting/Location: General Urban/Suburban

Number of Studies: 48

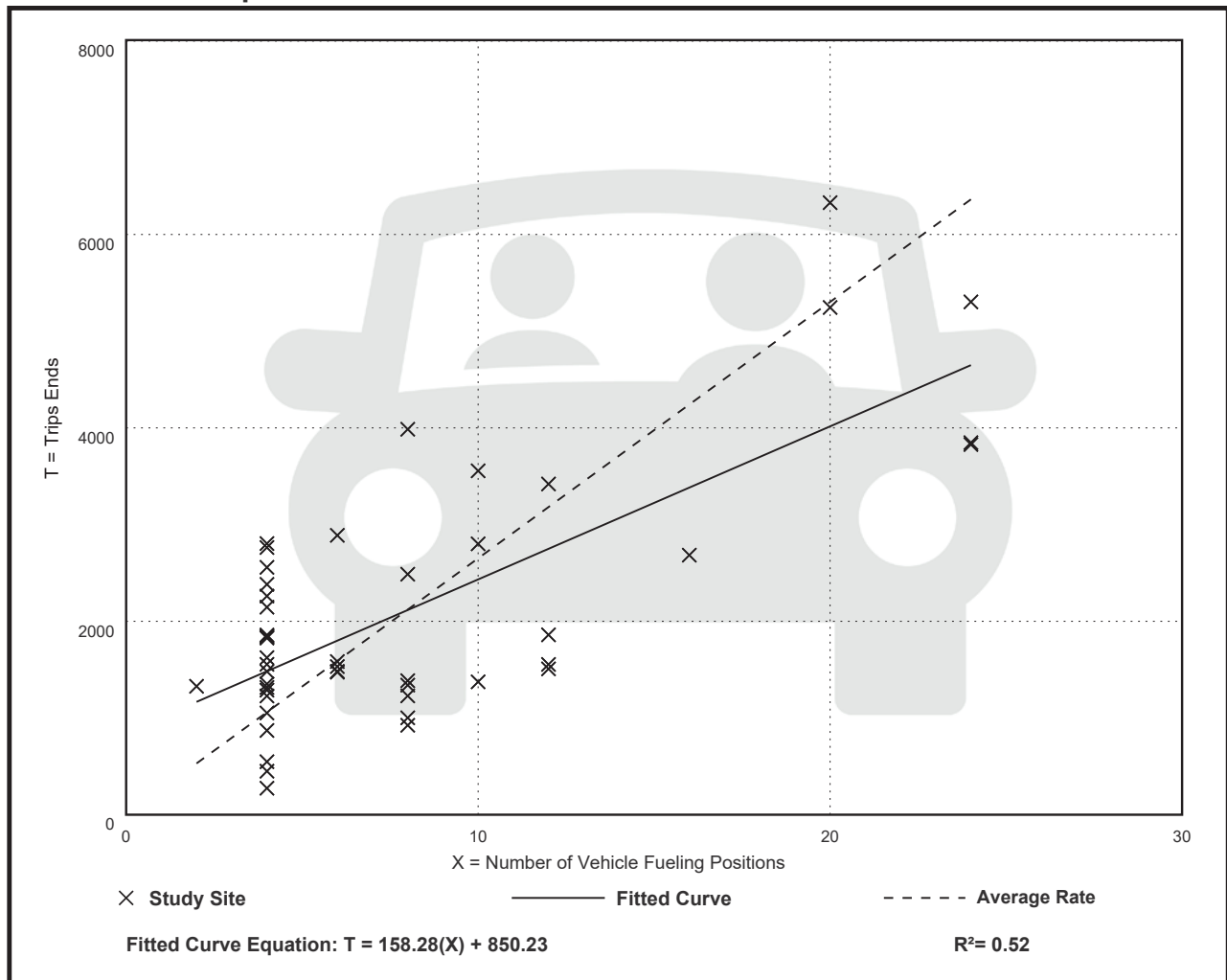
Avg. Num. of Vehicle Fueling Positions: 8

Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Vehicle Fueling Position

Average Rate	Range of Rates	Standard Deviation
265.12	68.50 - 701.00	142.37

Data Plot and Equation



Convenience Store/Gas Station - GFA (2-4k) (945)

Vehicle Trip Ends vs: Vehicle Fueling Positions

On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.

Setting/Location: General Urban/Suburban

Number of Studies: 76

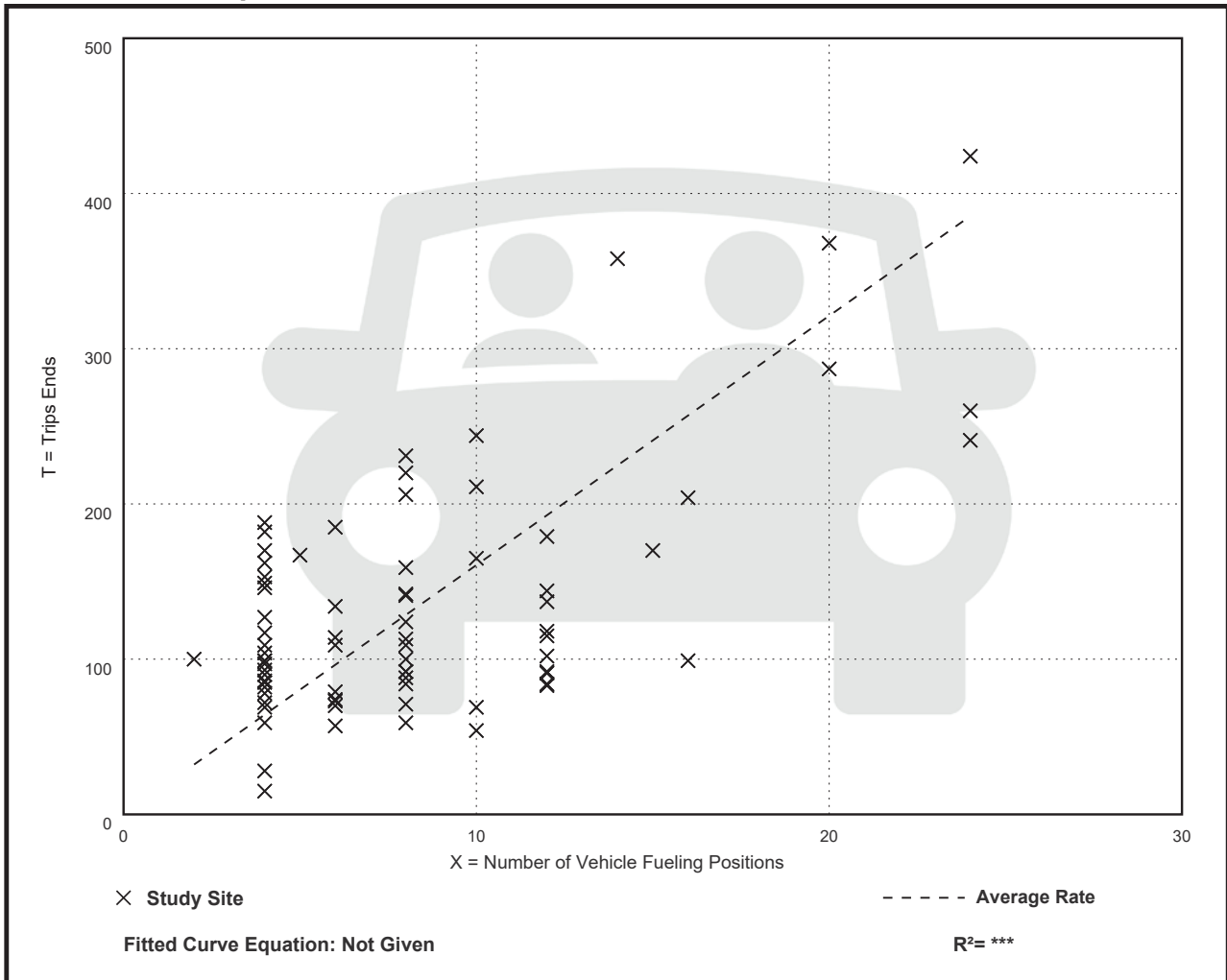
Avg. Num. of Vehicle Fueling Positions: 8

Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Vehicle Fueling Position

Average Rate	Range of Rates	Standard Deviation
16.06	3.75 - 50.00	8.79

Data Plot and Equation



Convenience Store/Gas Station - GFA (2-4k) (945)

Vehicle Trip Ends vs: Vehicle Fueling Positions

On a: Weekday,

Peak Hour of Adjacent Street Traffic,

One Hour Between 4 and 6 p.m.

Setting/Location: General Urban/Suburban

Number of Studies: 93

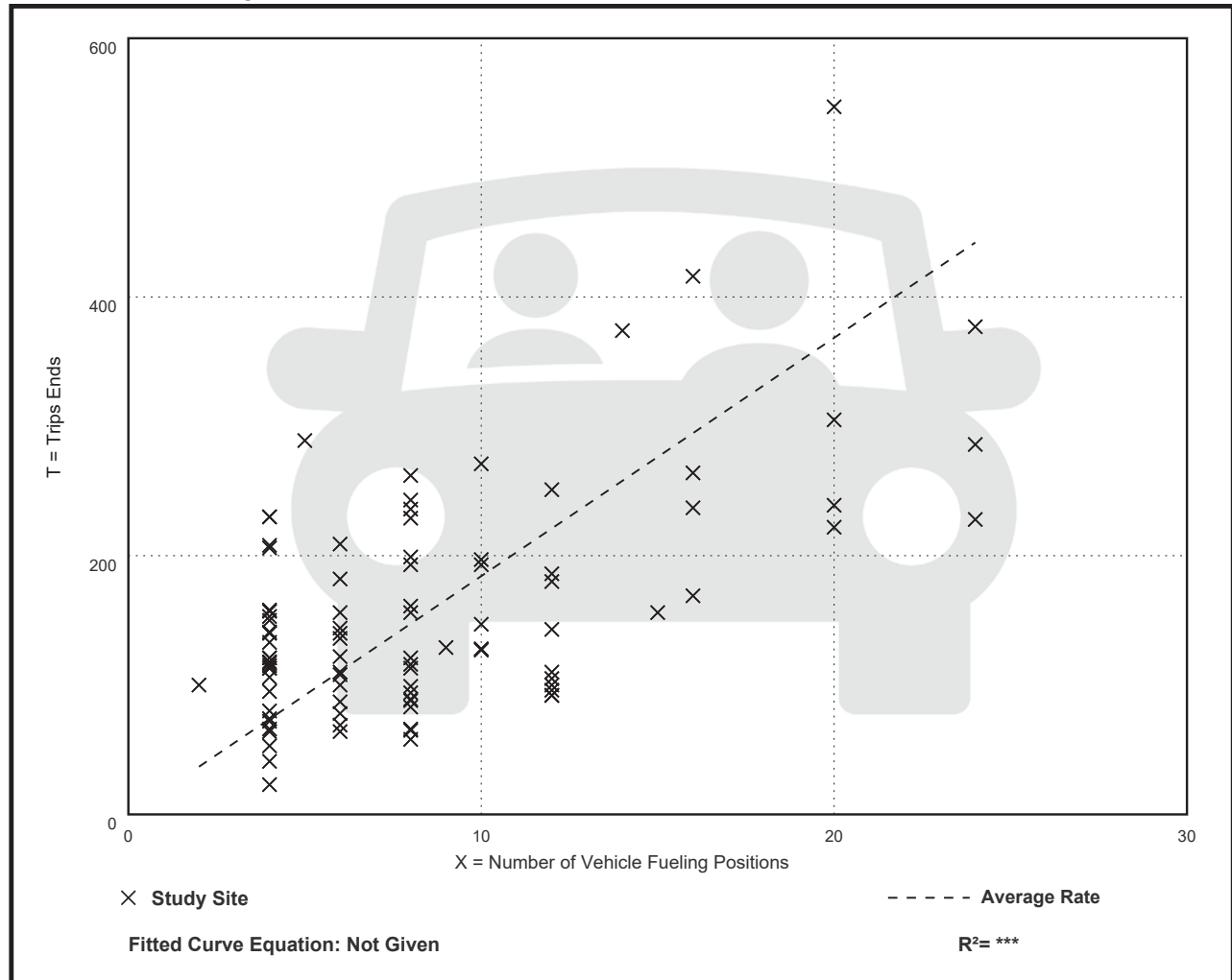
Avg. Num. of Vehicle Fueling Positions: 8

Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Vehicle Fueling Position

Average Rate	Range of Rates	Standard Deviation
18.42	5.75 - 57.80	10.16

Data Plot and Equation



Vehicle Pass-By Rates by Land Use

Source: ITE Trip Generation Manual , 11th Edition

Land Use Code	945									
Land Use	Convenience Store/Gas Station									
Setting	General Urban/Suburban									
Time Period	Weekday PM Peak Period									
# Data Sites	12 Sites with between 2 and 8 VFP					28 Sites with between 9 and 20 VFP				
Average Pass-By Rate	56% for Sites with between 2 and 8 VFP					75% for Sites with between 9 and 20 VFP				
Pass-By Characteristics for Individual Sites										
GFA (000)	VFP	State or Province	Survey Year	# Interviews	Pass-By Trip (%)	Non-Pass-By Trips			Adj Street Peak Hour Volume	Source
						Primary (%)	Diverted (%)	Total (%)		
2.1	8	Maryland	1992	31	52	13	35	48	1785	25
2.1	6	Maryland	1992	30	53	20	27	47	1060	25
2.2	< 8	Indiana	1993	115	48	16	36	52	820	2
2.3	< 8	Kentucky	1993	67	57	16	27	43	1954	2
2.3	6	Maryland	1992	55	40	11	49	60	2760	25
2.4	< 8	Kentucky	1993	—	58	13	29	42	2655	2
2.6	< 8	Kentucky	1993	68	67	15	18	33	950	2
2.8	< 8	Kentucky	1993	—	62	11	27	38	2875	2
3	< 8	Indiana	1993	80	65	15	20	35	1165	2
3.6	< 8	Kentucky	1993	60	56	17	27	44	2505	2
3.7	< 8	Kentucky	1993	70	61	16	23	39	2175	2
4.2	< 8	Kentucky	1993	61	58	26	16	42	2300	2
4.694	12	Maryland	2000	—	78	—	—	22	3549	30
4.694	12	Maryland	2000	—	67	—	—	33	2272	30
4.694	12	Maryland	2000	—	66	—	—	34	3514	30
4.848	12	Virginia	2000	—	71	—	—	29	2350	30
5.06	12	Pennsylvania	2000	—	91	—	—	9	4181	30
5.242	12	Virginia	2000	—	70	—	—	30	2445	30
5.242	12	Virginia	2000	—	56	—	—	44	950	30
5.488	12	Delaware	2000	—	73	—	—	27	—	30
5.5	12	Pennsylvania	2000	—	84	—	—	16	4025	30
4.694	16	Maryland	2000	—	89	—	—	11	2755	30
4.694	16	Delaware	2000	—	73	—	—	27	1858	30
4.694	16	Delaware	2000	—	59	—	—	41	1344	30
4.694	16	Delaware	2000	—	72	—	—	28	3434	30
4.694	16	New Jersey	2000	—	81	—	—	19	1734	30
4.694	20	Delaware	2000	—	76	—	—	24	1616	30
4.848	16	Virginia	2000	—	67	—	—	33	2,954	30
4.848	16	Virginia	2000	—	78	—	—	22	3086	30
4.848	16	Virginia	2000	—	83	—	—	17	4143	30
4.848	16	Virginia	2000	—	73	—	—	27	2534	30
4.993	16	Pennsylvania	2000	—	72	—	—	28	2917	30
5.094	16	New Jersey	2000	—	86	—	—	14	1730	30
5.5	16	Pennsylvania	2000	—	90	—	—	10	2616	30
5.543	16	Pennsylvania	2000	—	87	—	—	13	2363	30
5.565	16	Pennsylvania	2000	—	81	—	—	19	2770	30
5.565	16	Pennsylvania	2000	—	76	—	—	24	3362	30
5.565	16	New Jersey	2000	—	61	—	—	39	1713	30
5.565	16	New Jersey	2000	—	86	—	—	14	1721	30
5.565	16	New Jersey	2000	---	81	---	---	19	2227	30

NCHRP 684 Internal Trip Capture Estimation Tool

Project Name:	Normandy Mixed-Use	Organization:	PTG
Project Location:	City of Deltona	Performed By:	PTG
Scenario Description:	Full Buildout	Date:	3/31/2023
Analysis Year:	n/a	Checked By:	PTG
Analysis Period:	PM Street Peak Hour	Date:	3/31/2023

Table 1-P: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)

Land Use	Development Data (For Information Only)			Estimated Vehicle-Trips ³		
	ITE LUCs ¹	Quantity	Units	Total	Entering	Exiting
Office				0		
Retail	945	14	FPs	258	129	129
Restaurant				0		
Cinema/Entertainment				0		
Residential	221	320	DUs	125	76	49
Hotel				0		
All Other Land Uses ²	110	231	KSF	150	21	129
				533	226	307

Table 2-P: Mode Split and Vehicle Occupancy Estimates

Land Use	Entering Trips			Exiting Trips		
	Veh. Occ. ⁴	% Transit	% Non-Motorized	Veh. Occ. ⁴	% Transit	% Non-Motorized
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						
All Other Land Uses ²						

Table 3-P: Average Land Use Interchange Distances (Feet Walking Distance)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-P: Internal Person-Trip Origin-Destination Matrix*

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	0		0	0	34	0
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	13	0	0		0
Hotel	0	0	0	0	0	

Table 5-P: Computations Summary

	Total	Entering	Exiting
All Person-Trips	533	226	307
Internal Capture Percentage	18%	21%	15%
External Vehicle-Trips ⁵	439	179	260
External Transit-Trips ⁶	0	0	0
External Non-Motorized Trips ⁶	0	0	0

Table 6-P: Internal Trip Capture Percentages by Land Use

Land Use	Entering Trips	Exiting Trips
Office	N/A	N/A
Retail	10%	26%
Restaurant	N/A	N/A
Cinema/Entertainment	N/A	N/A
Residential	45%	27%
Hotel	N/A	N/A

¹Land Use Codes (LUCs) from *Trip Generation Manual*, published by the Institute of Transportation Engineers.

²Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator.

³Enter trips assuming no transit or non-motorized trips (as assumed in ITE *Trip Generation Manual*).

⁴Enter vehicle occupancy assumed in Table 1-P vehicle trips. If vehicle occupancy changes for proposed mixed-use project, manual adjustments must be made

⁵Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P.

⁶Person-Trips

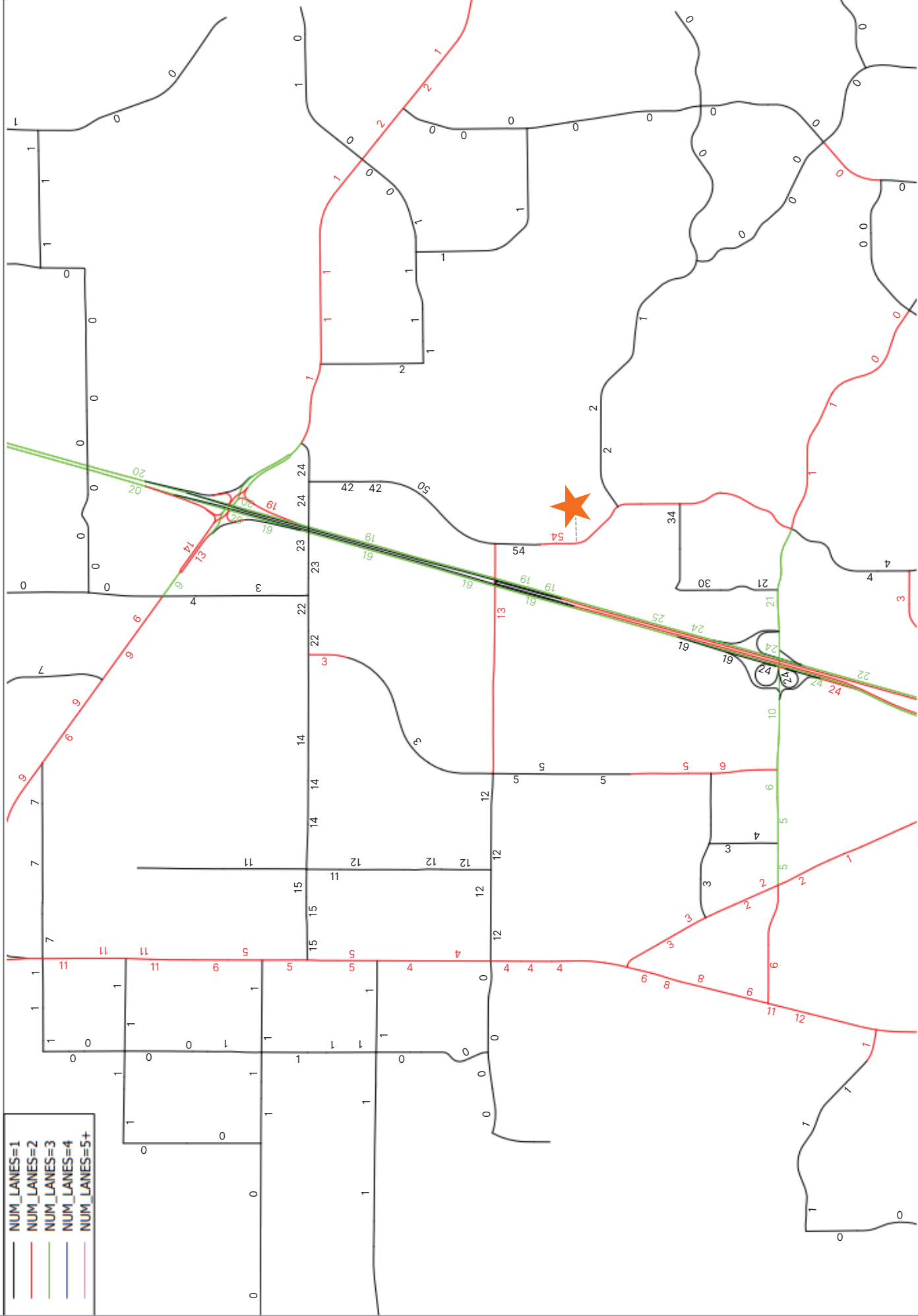
*Indicates computation that has been rounded to the nearest whole number.

Attachment C
Model Plots

Year 2025 - CFRPM 7

Trip Distribution

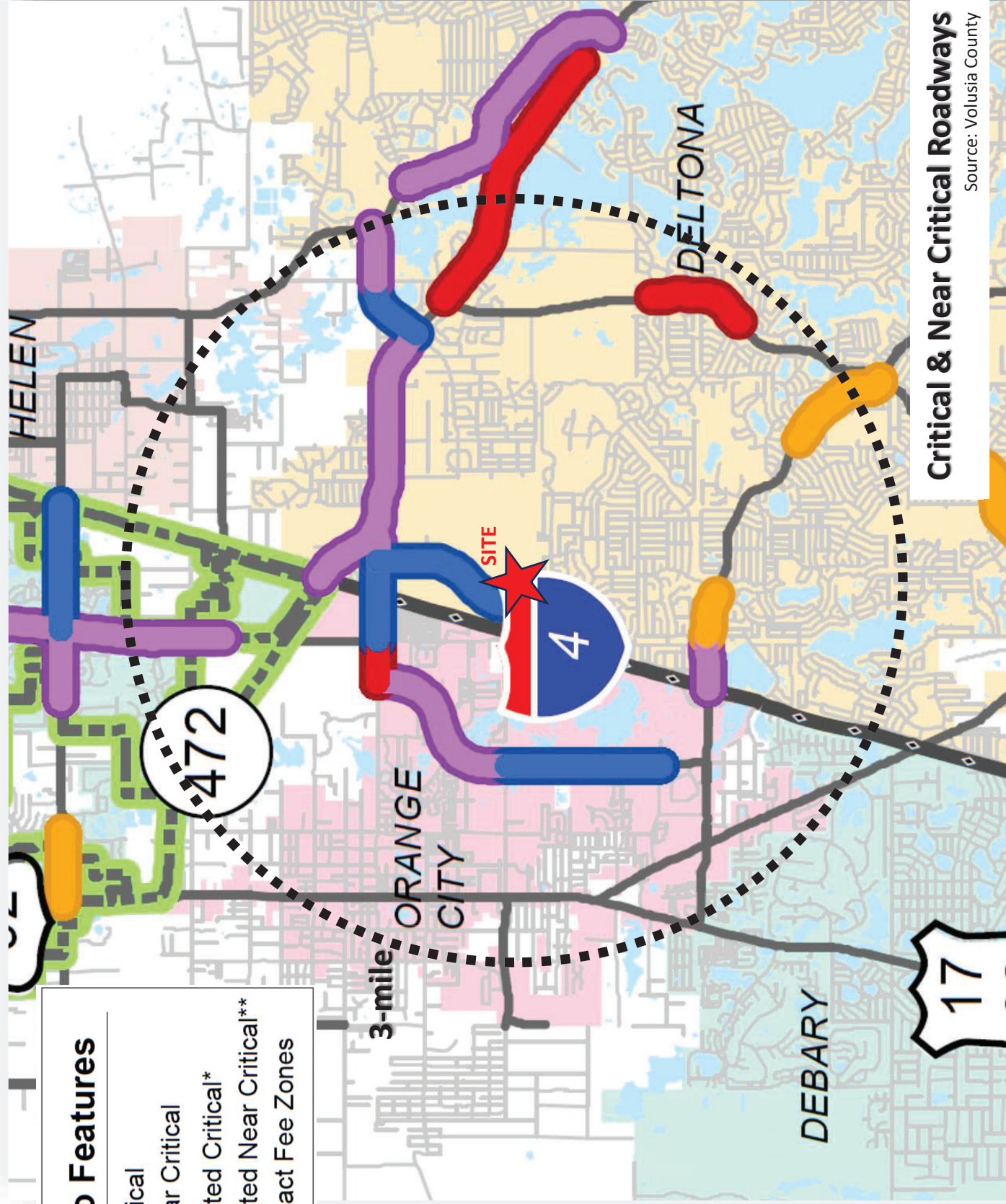
- NUM_LANES=1
- NUM_LANES=2
- NUM_LANES=3
- NUM_LANES=4
- NUM_LANES=5+



Attachment D
Critical and Not Critical Segments

Key To Features

- Critical
- Near Critical
- Vested Critical*
- Vested Near Critical**
- Impact Fee Zones



Critical & Near Critical Roadways

Source: Volusia County

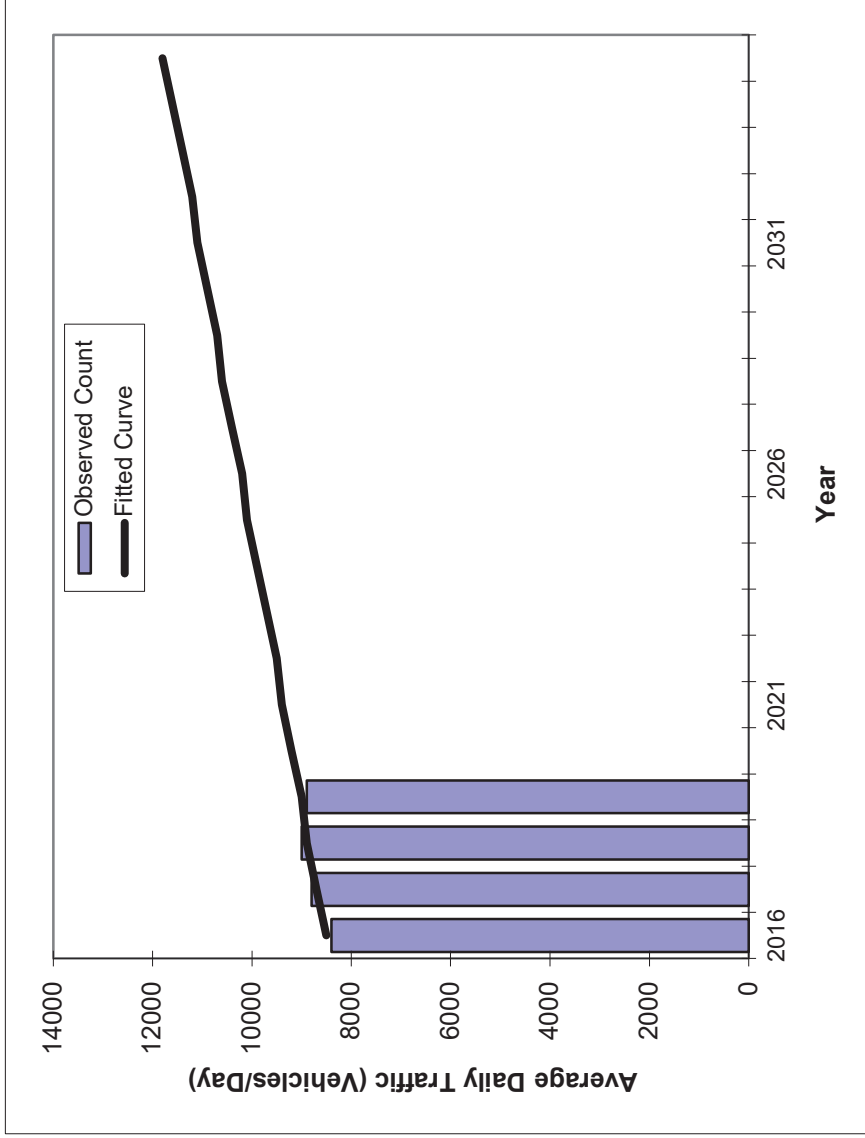
Attachment E
Growth Rate

Traffic Trends - V3.0

NORMANDY BLVD -- N OF ELKCAM BLVD

FIN# 0
Location 1

County: Orange (75)
Station #: 750592
Highway: NORMANDY BLVD



Year	Traffic (ADT/AADT)	
	Count*	Trend**
2016	8400	8500
2017	8800	8700
2018	9000	8900
2019	8900	9000
2023 Opening Year Trend		
2023	N/A	9700
2024 Mid-Year Trend		
2024	N/A	9900
2026 Design Year Trend		
2026	N/A	10200
TRANPLAN Forecasts/Trends		

**** Annual Trend Increase:** 170
Trend R-squared: 69.64%
Trend Annual Historic Growth Rate: 1.96%
Trend Growth Rate (2019 to Design Year): 1.90%
 Printed: 04-Apr-23

Straight Line Growth Option

*Axle-Adjusted

Attachment F
TIA Methodology Checklist

TIA METHODOLOGY SUBMISSION CHECKLIST

Project Name: Normandy Mixed-Use

Location: City of Deltona

	DESCRIPTION	INFORMATION INCLUDED		
		YES	NO	Remarks ¹
TRANSPORTATION IMPACT ANALYSIS METHODOLOGY	Type of TIA Methodology: <input type="checkbox"/> COMP PLAN <input checked="" type="checkbox"/> REZONING <input checked="" type="checkbox"/> SITE PLAN	Y		
	LAND USES being analyzed (# of units, sq. feet, etc.)	Y		320 Apartments; 230.6 ksf warehouse; 14 FP GasStation
	BUILD-OUT SCHEDULE proposed (state year(s))	Y		2026
	Conceptual Site Plan or Proposed Access description	Y		Attachment A
	SITE LOCATION MAP relative to surrounding roadway network	Y		Figure 1
	Analysis Period(s): <input type="checkbox"/> AM <input type="checkbox"/> Mid-Day <input checked="" type="checkbox"/> PM <input type="checkbox"/> Weekend	Y		
	Traffic Volume Counts (Day & Time)		N	To be provided as part of study
	Vested Trip Information (verify with nearby local government(s))		N	To be provided as part of study
	Proposed Project trip generation (check all that apply): <input checked="" type="checkbox"/> Daily <input checked="" type="checkbox"/> 2-Way Peak Hour <input checked="" type="checkbox"/> Internal Capture <input checked="" type="checkbox"/> Pass By Capture (<14% Adjacent Road)	Y		
	Proposed project trip distribution and assignment (include map) <input checked="" type="checkbox"/> CFRPM <input checked="" type="checkbox"/> by Engineering Judgment	Y		Figure 2 and Attachment C
	ROADWAY SIGNIFICANCE TEST TABLE - (includes all 3-mile radius roadway segments, Number of Lanes, Adopted LOS Capacity (cite source), Project Distribution percentages, Project Trips, Project Trips/adopted capacity ratio, 3% significance test check) ALONG WITH all Critical & Near-Critical map road segments within the appropriate radius (5-mile radius for all uses except Parks/Recreational uses (1.5 mile radius) & Convenience Stores (1-mile radius)	Y		Table 2
	ANALYSIS MAP – 3-mile study area boundary including all Critical & Near-Critical map road segments and intersections within the appropriate radius	Y		Figure 1 and Attachment D.
	Proposed roadway segment to be analyzed (list)	Y		
	Proposed intersections to be analyzed (list)	Y		
	Proposed Critical & Near-Critical segments to be analyzed (list)			
	Background Traffic/Build-Out Traffic: <input type="checkbox"/> CFRPM <input checked="" type="checkbox"/> Historical Growth Rate (state & justify proposed minimum	Y		FDOT data used from 2016 to 2021
	Segment Analysis <input type="checkbox"/> Signalized Corridor Analysis Required if Part of Signal System		N	Not applicable
	Intersection Analysis <input type="checkbox"/> HCS <input checked="" type="checkbox"/> Synchro <input type="checkbox"/> Other	Y		
	List Programmed Improvements within first three years: <input checked="" type="checkbox"/> FDOT Work Program <input checked="" type="checkbox"/> County CIP <input checked="" type="checkbox"/> City CIP	Y		None identified
	Proposed Alternative Modes Study (commit to studying project's alternative mode needs associated with transit connection, pedestrian & bicycle facilities, school student access needs, etc.) <input type="checkbox"/> Study to Include TPO's Transit Development Guidelines	Y		A section of the TIA will discuss opportunities for multi-modal mode connectivity
Transportation Improvements (commit to identifying roadway & intersection improvements in TIA if deficiencies are identified)	Y			
Concurrency mitigation strategy (commit to including this in TIA)	Y			

1 – Remarks: Justify "NO"

Submitted By: Vasu T. Persaud, AICP, PE

Date: 08/09/2023

Appendix C: Volusia County CMS

All State Rds =

County

Facility Type =

State Rds =

Total

VC Arterial

VC Collector

Local-Future Rds

Facility Type - Urban/Transitioning

FWS

= Freeways - Interchange Spacing Group 1 (spacing >= 2 miles apart)

FW

= Freeways - Transitioning & Rural

UFR

= Uninterrupted Flow Highways

SSAC1

= State Signalized Arterial Class 1

SSAC2

= State Signalized Arterial Class 2

NSRCL

= Non-State Signalized Road Class 1

NSRCL2

= Non-State Signalized Road Class 2

Facility Type - Rural Developed

FW

= Freeways - Transitioning & Rural

UFR

= Uninterrupted Flow Highways

IFH

= Interrupted Flow Highway

Facility Type - Rural Undeveloped

FW

= Freeways - Transitioning & Rural

IFH

= Interrupted Flow Highway

ISF

= Isolated Signalized Intersection

One-Way/Two-Way

OW

= One-way Directional Volumes

2W

= Two-way Directional Volumes

Number of Lanes

2L, 4L, 5L, etc.

Divided/Undivided

D

= Divided

U

= Undivided

Left Turn Bays

LC


= Left Turn Bay

NC

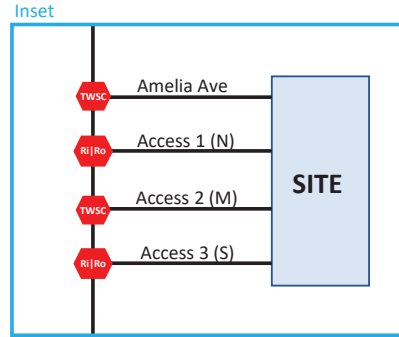
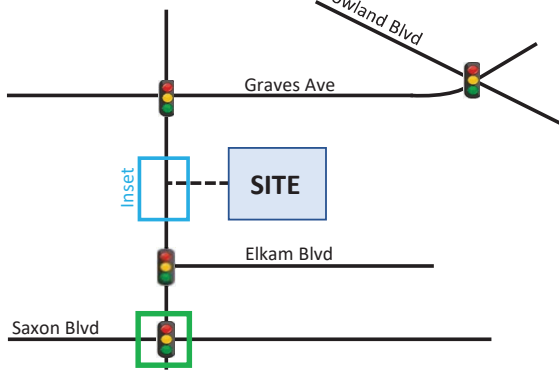
= No Left Turn Bays

Appendix D: Traffic Volumes

INTERSECTION TRAFFIC VOLUMES

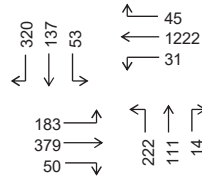
 - Subject Intersection

Intx 1: Normandy Blvd & Saxon Blvd
AM Peak Hour



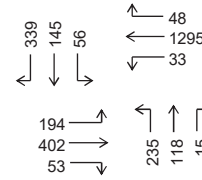
*Background + <Pass-By Vol> + (Project Vol) = Total Volume

2023 VOLUMES



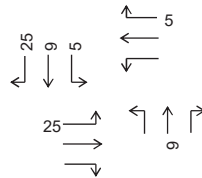
*SF applied = 1.02

2026 VOLUMES

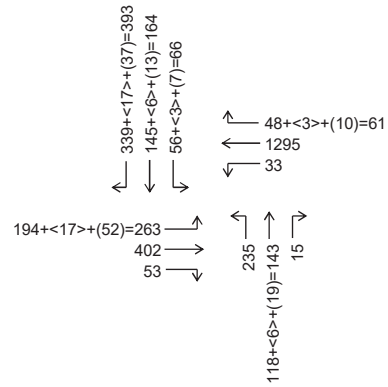


*Growth rate applied = 1.06

TRIP DISTRIBUTION %




PROJECTED VOLUMES

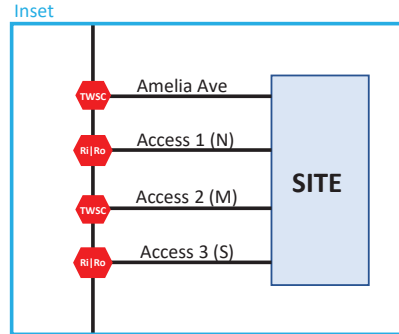
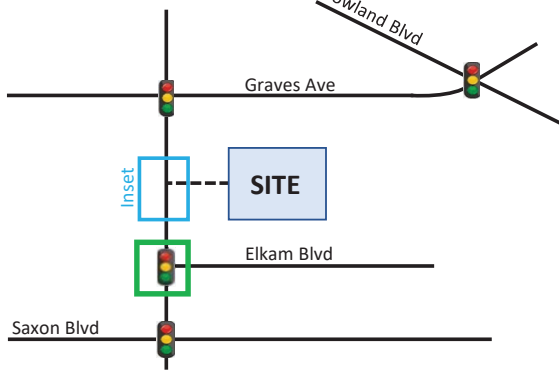


Note: +/- errors due to rounding

INTERSECTION TRAFFIC VOLUMES

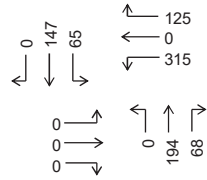
 - Subject Intersection

Intx 2: Normandy Blvd & Elkcam Blvd
AM Peak Hour



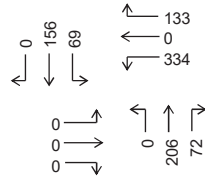
*Background + <Pass-By Vol> + (Project Vol) = Total Volume

2023 VOLUMES



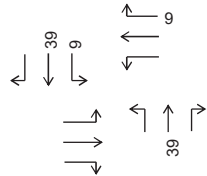
*SF applied = 1.02

2026 VOLUMES

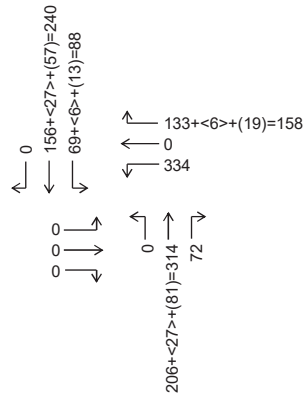


*Growth rate applied = 1.06

TRIP DISTRIBUTION %




PROJECTED VOLUMES

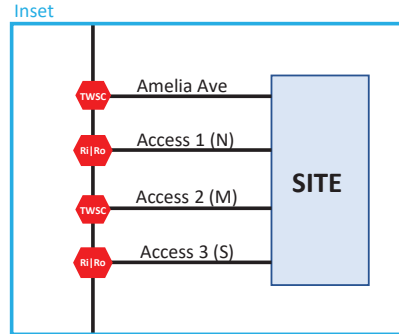
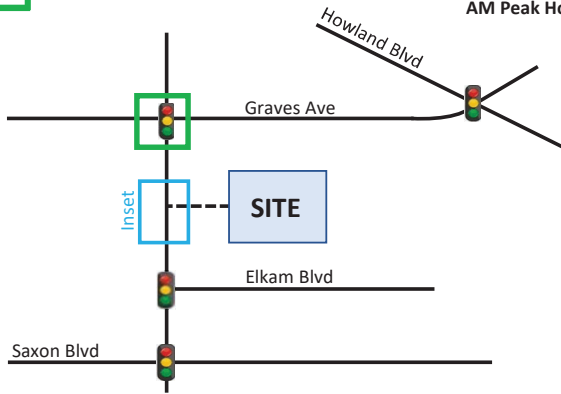


Note: +/- errors due to rounding

INTERSECTION TRAFFIC VOLUMES

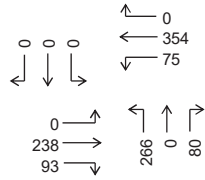
 - Subject Intersection

Intx 3: Normandy Blvd & Graves Ave
AM Peak Hour



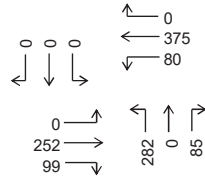
*Background + <Pass-By Vol> + (Project Vol) = Total Volume

2023 VOLUMES



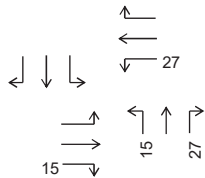
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2026 VOLUMES

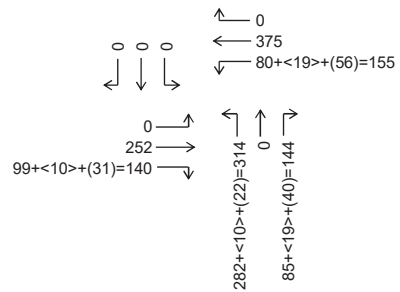


*Growth rate applied = 1.06

TRIP DISTRIBUTION %



PROJECTED VOLUMES

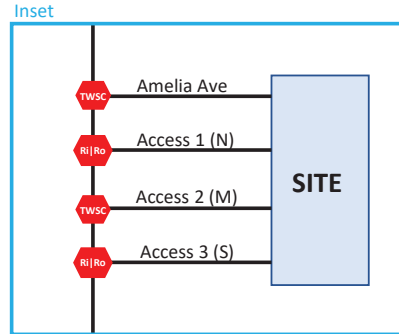
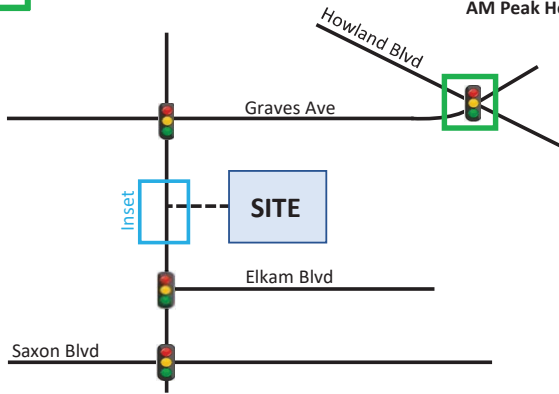


Note: +/- errors due to rounding

INTERSECTION TRAFFIC VOLUMES

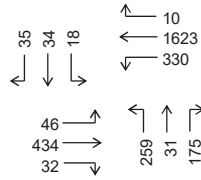
 - Subject Intersection

Intx 4: Graves Ave & Howland Blvd
AM Peak Hour



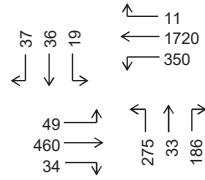
*Background + <Pass-By Vol> + (Project Vol) = Total Volume

2023 VOLUMES



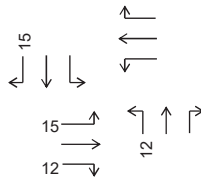
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2026 VOLUMES

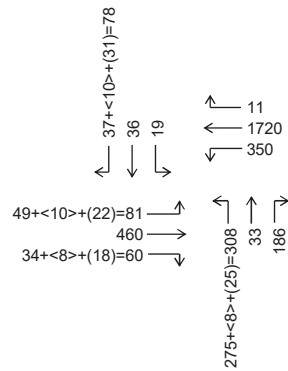


*Growth rate applied = 1.06

TRIP DISTRIBUTION %




PROJECTED VOLUMES

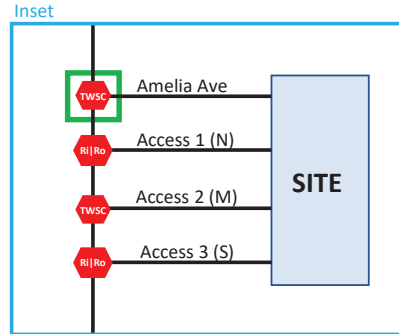
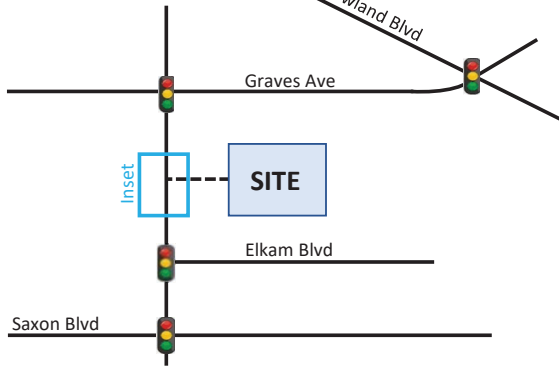


Note: +/- errors due to rounding

INTERSECTION TRAFFIC VOLUMES

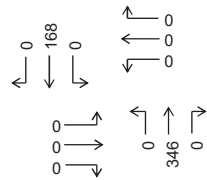
 - Subject Intersection

Intx 5: Normandy Blvd & Amelia Ave
AM Peak Hour



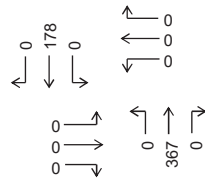
*Background + <Pass-By Vol> + (Project Vol) = Total Volume

2023 VOLUMES



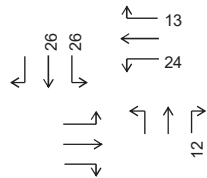
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2026 VOLUMES

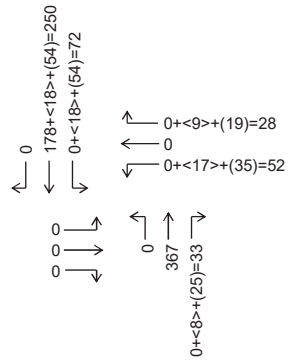


*Growth rate applied = 1.06

TRIP DISTRIBUTION %




PROJECTED VOLUMES

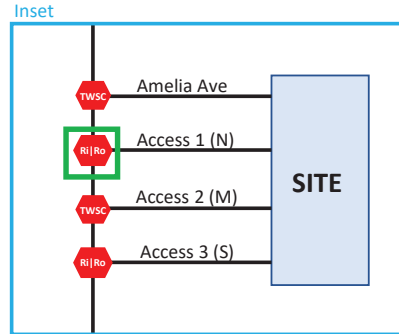
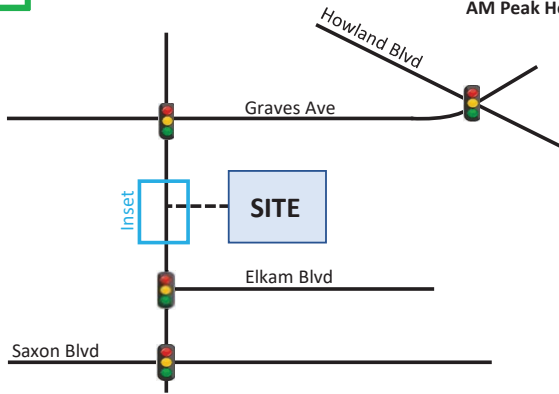


Note: +/- errors due to rounding

INTERSECTION TRAFFIC VOLUMES

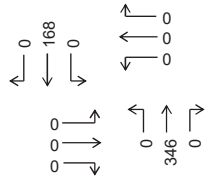
 - Subject Intersection

Intx 6: Normandy Blvd & Access 1 (N)
AM Peak Hour



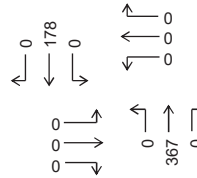
*Background + <Pass-By Vol> + (Project Vol) = Total Volume

2023 VOLUMES



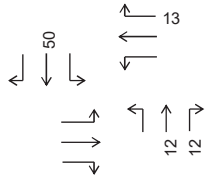
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2026 VOLUMES

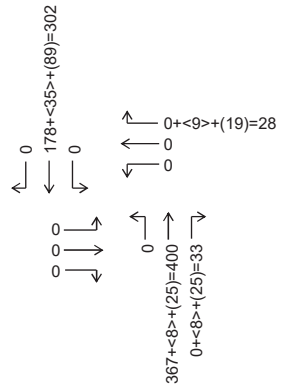


*Growth rate applied = 1.06

TRIP DISTRIBUTION %




PROJECTED VOLUMES

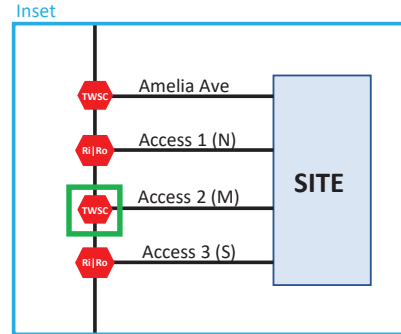
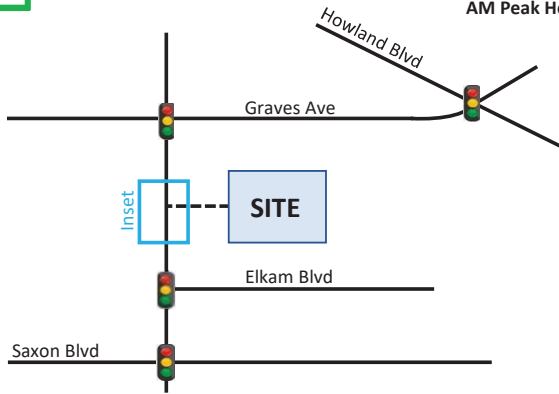


Note: +/- errors due to rounding

INTERSECTION TRAFFIC VOLUMES

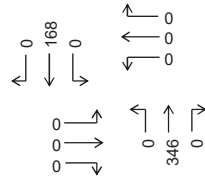
 - Subject Intersection

Intx 7: Normandy Blvd & Access 2 (M)
AM Peak Hour



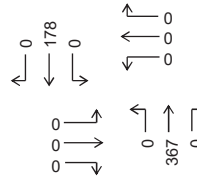
*Background + <Pass-By Vol> + (Project Vol) = Total Volume

2023 VOLUMES



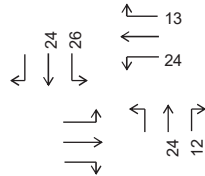
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2026 VOLUMES

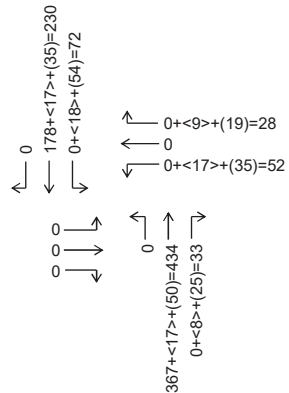


*Growth rate applied = 1.06

TRIP DISTRIBUTION %




PROJECTED VOLUMES

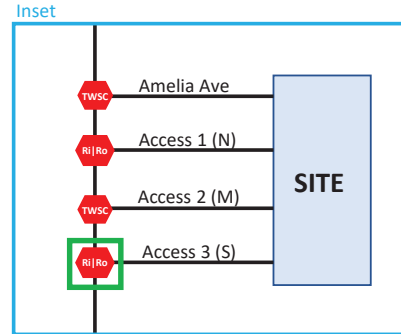
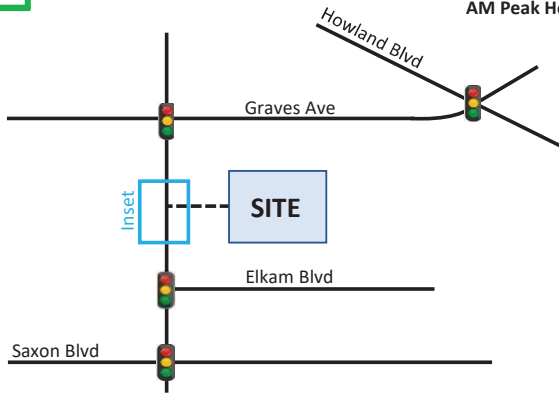


Note: +/- errors due to rounding

INTERSECTION TRAFFIC VOLUMES

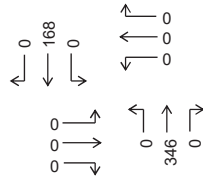
 - Subject Intersection

Intx 8: Normandy Blvd & Access 3 (S)
AM Peak Hour



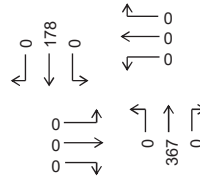
*Background + <Pass-By Vol> + (Project Vol) = Total Volume

2023 VOLUMES



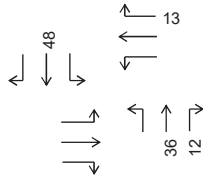
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2026 VOLUMES

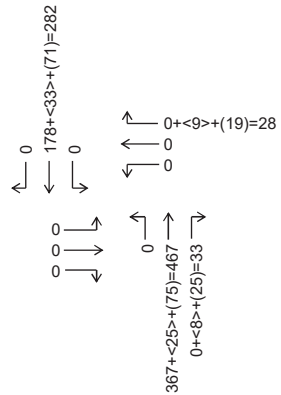


*Growth rate applied = 1.06

TRIP DISTRIBUTION %




PROJECTED VOLUMES

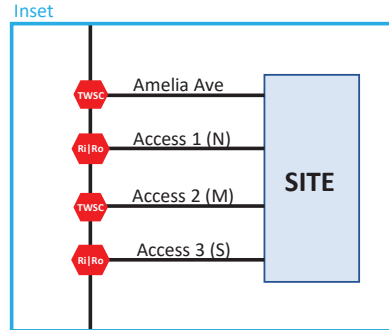
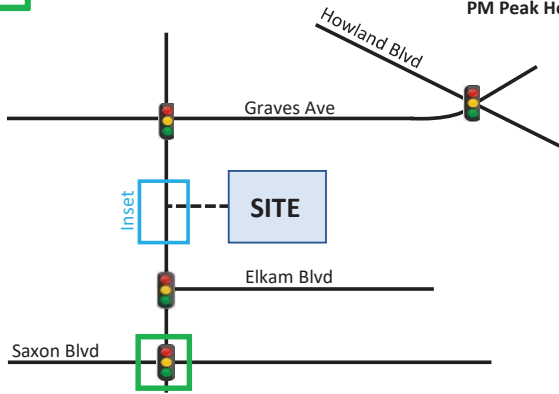


Note: +/- errors due to rounding

INTERSECTION TRAFFIC VOLUMES

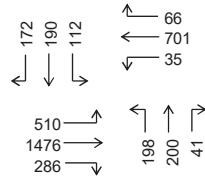
 - Subject Intersection

Intx 1: Normandy Blvd & Saxon Blvd
PM Peak Hour



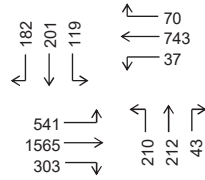
*Background + <Pass-By Vol> + (Project Vol) = Total Volume

2023 VOLUMES



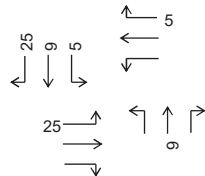
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2026 VOLUMES

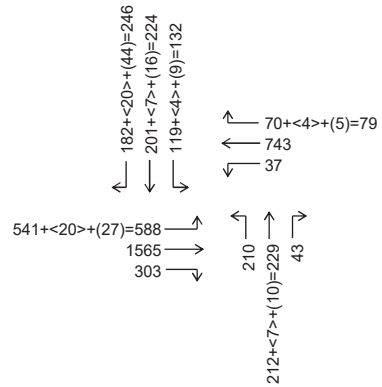


*Growth rate applied = 1.06

TRIP DISTRIBUTION %




PROJECTED VOLUMES

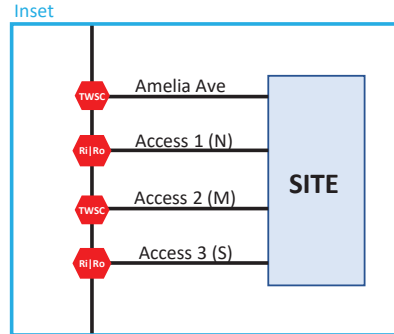
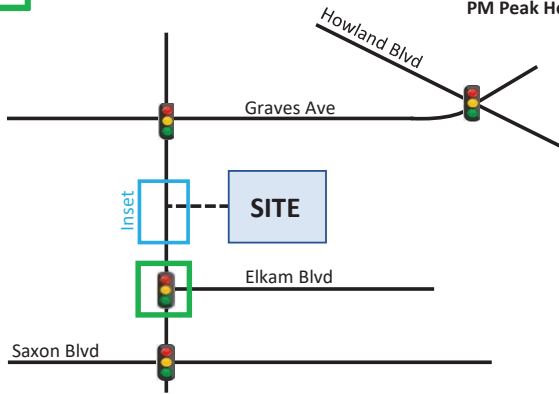


Note: +/- errors due to rounding

INTERSECTION TRAFFIC VOLUMES

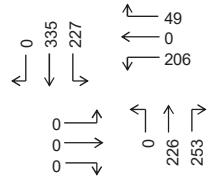
 - Subject Intersection

Intx 2: Normandy Blvd & Elkcam Blvd
PM Peak Hour



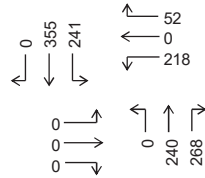
*Background + <Pass-By Vol> + (Project Vol) = Total Volume

2023 VOLUMES



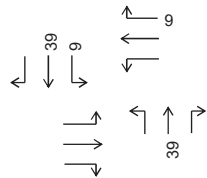
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2026 VOLUMES

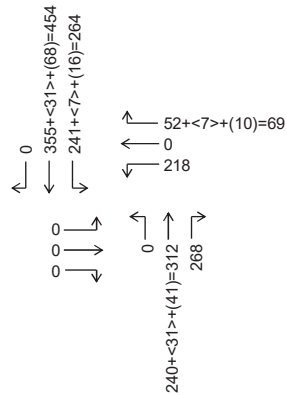


*Growth rate applied = 1.06

TRIP DISTRIBUTION %




PROJECTED VOLUMES

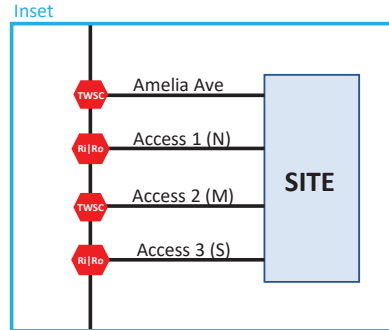
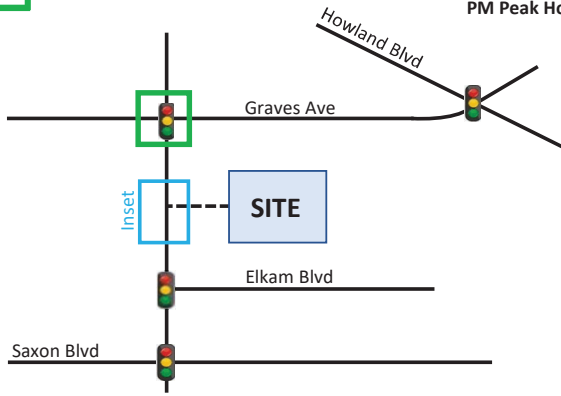


Note: +/- errors due to rounding

INTERSECTION TRAFFIC VOLUMES

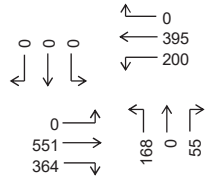
 - Subject Intersection

Intx 3: Normandy Blvd & Graves Ave
PM Peak Hour



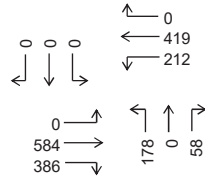
*Background + <Pass-By Vol> + (Project Vol) = Total Volume

2023 VOLUMES



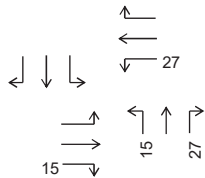
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2026 VOLUMES

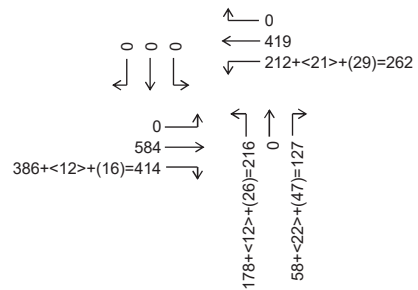


*Growth rate applied = 1.06

TRIP DISTRIBUTION %




PROJECTED VOLUMES

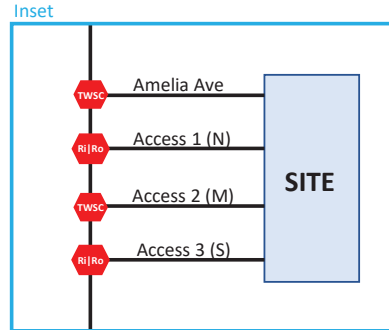
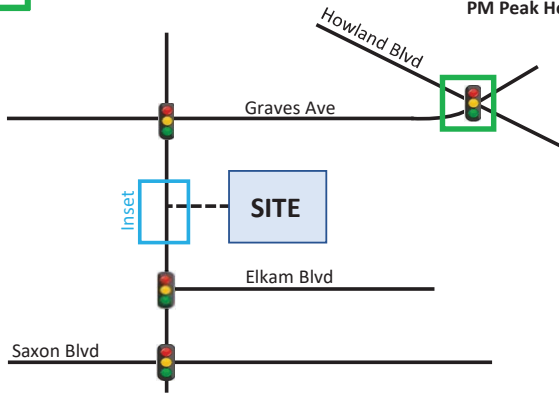


Note: +/- errors due to rounding

INTERSECTION TRAFFIC VOLUMES

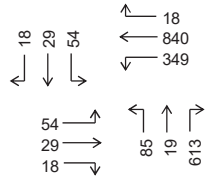
 - Subject Intersection

Intx 4: Graves Ave & Howland Blvd
PM Peak Hour



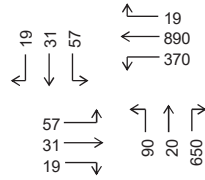
*Background + <Pass-By Vol> + (Project Vol) = Total Volume

2023 VOLUMES



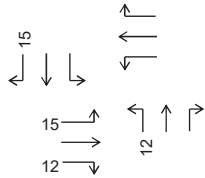
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2026 VOLUMES

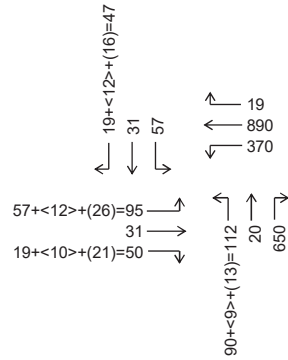


*Growth rate applied = 1.06

TRIP DISTRIBUTION %




PROJECTED VOLUMES

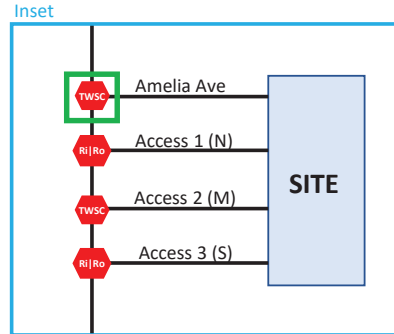
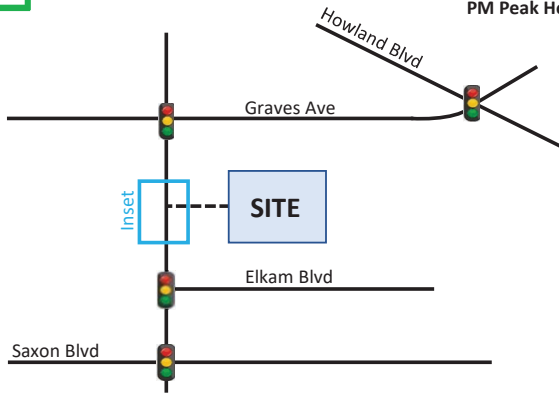


Note: +/- errors due to rounding

INTERSECTION TRAFFIC VOLUMES

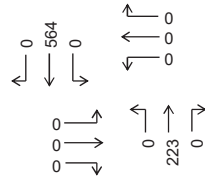
 - Subject Intersection

Intx 5: Normandy Blvd & Amelia Ave
PM Peak Hour



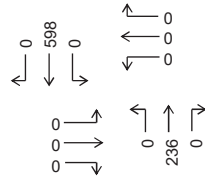
*Background + <Pass-By Vol> + (Project Vol) = Total Volume

2023 VOLUMES



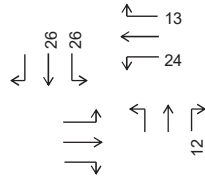
*SF applied = 1.02

2026 VOLUMES

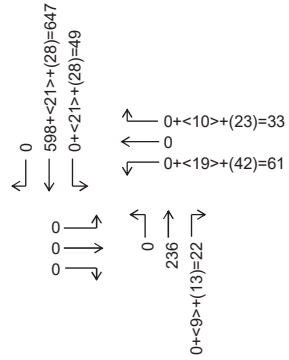


*Growth rate applied = 1.06

TRIP DISTRIBUTION %




PROJECTED VOLUMES

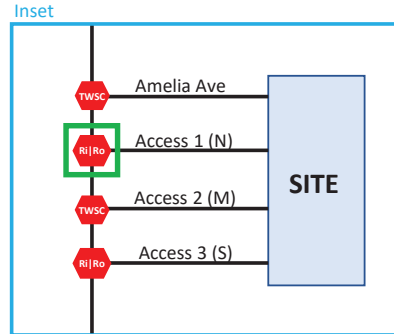
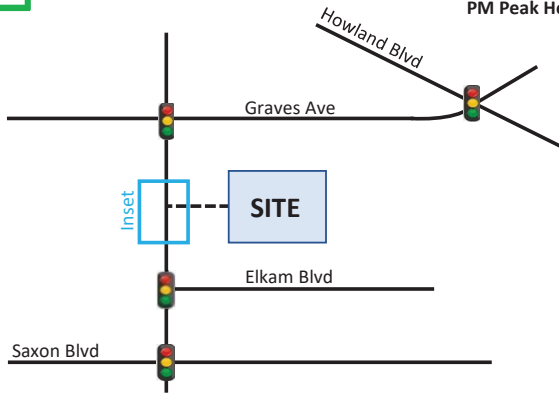


Note: +/- errors due to rounding

INTERSECTION TRAFFIC VOLUMES

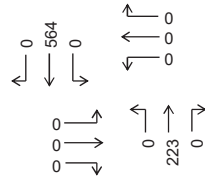
 - Subject Intersection

Intx 6: Normandy Blvd & Access 1 (N)
PM Peak Hour



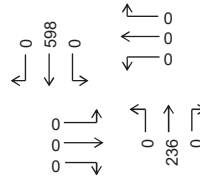
*Background + <Pass-By Vol> + (Project Vol) = Total Volume

2023 VOLUMES



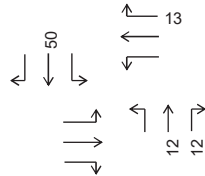
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2026 VOLUMES

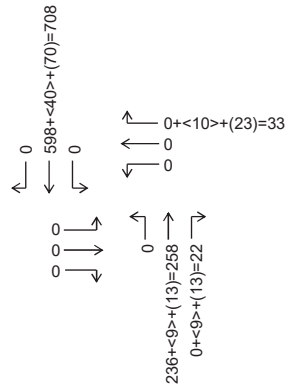


*Growth rate applied = 1.06

TRIP DISTRIBUTION %



PROJECTED VOLUMES

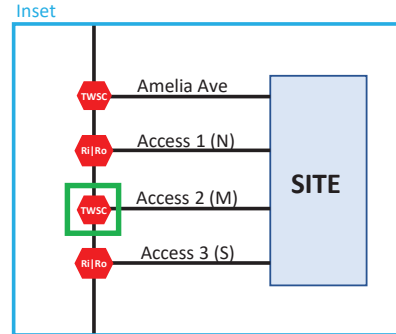
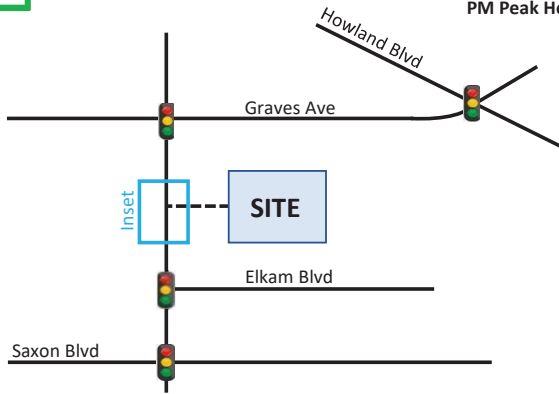


Note: +/- errors due to rounding

INTERSECTION TRAFFIC VOLUMES

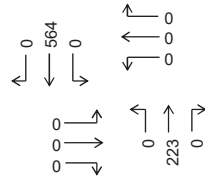
 - Subject Intersection

Intx 7: Normandy Blvd & Access 2 (M)
PM Peak Hour



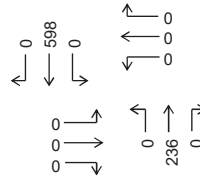
*Background + <Pass-By Vol> + (Project Vol) = Total Volume

2023 VOLUMES



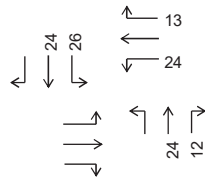
*SF applied = 1.02

2026 VOLUMES

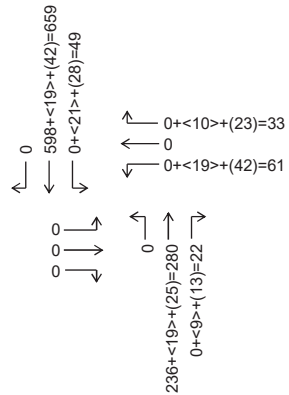


*Growth rate applied = 1.06

TRIP DISTRIBUTION %




PROJECTED VOLUMES

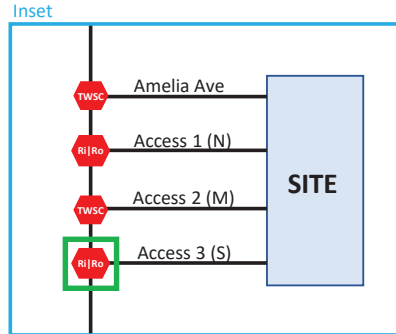
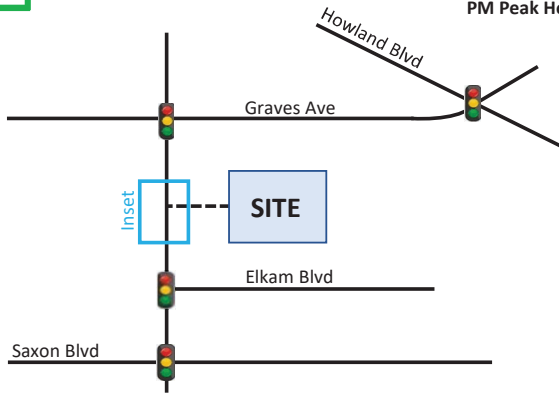


Note: +/- errors due to rounding

INTERSECTION TRAFFIC VOLUMES

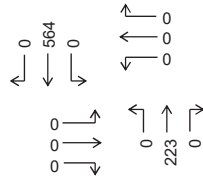
 - Subject Intersection

Intx 7: Normandy Blvd & Access 3 (S)
PM Peak Hour



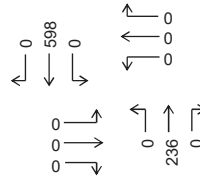
*Background + <Pass-By Vol> + (Project Vol) = Total Volume

2023 VOLUMES



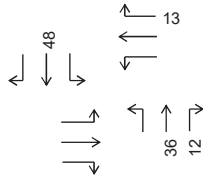
*SF applied = 1.02

2026 VOLUMES

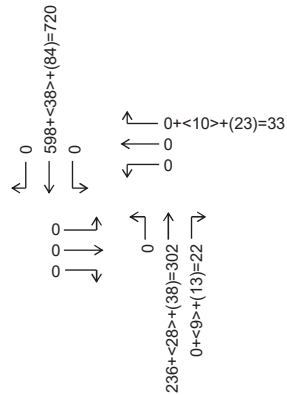


*Growth rate applied = 1.06

TRIP DISTRIBUTION %



PROJECTED VOLUMES



Note: +/- errors due to rounding

15 MINUTE TURNING MOVEMENT COUNTS

(Cars and Trucks)

DATE: June 1, 2023 (Thursday)

LOCATION: Normandy Boulevard and Saxon Boulevard

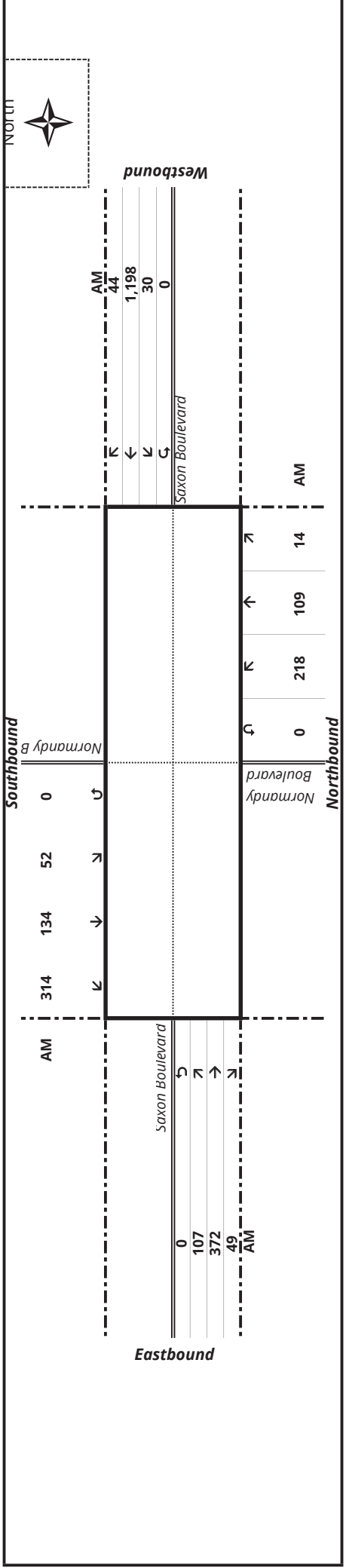
CITY: Deltona
COUNTY: Volusia

LATITUDE: 0
LONGITUDE: 0

Normandy Boulevard Normandy Boulevard Saxon Boulevard

TIME BEGIN	NORTHBOUND			SOUTHBOUND			N/S TOTAL	EASTBOUND			WESTBOUND			E/W TOTAL	GRAND TOTAL				
	L	T	R	L	T	R		L	T	R	L	T	R						
07:00 AM	52	23	2	0	0	0	104	181	27	76	9	0	112	8	273	8	0	289	401
07:15 AM	70	27	4	0	0	0	137	238	33	69	10	0	112	6	278	2	0	286	398
07:30 AM	58	25	3	0	0	0	139	225	25	92	16	0	133	8	387	18	0	413	546
07:45 AM	45	31	5	0	0	0	119	200	19	108	11	0	138	11	267	10	0	288	426
TOTAL	225	106	14	0	0	0	499	844	104	345	46	0	495	33	1,205	38	0	1,276	1,771
08:00 AM	45	26	2	0	0	0	105	178	30	103	12	0	145	5	266	14	0	285	430
08:15 AM	49	27	3	0	0	0	104	183	39	84	22	0	145	11	269	4	0	284	429
08:30 AM	55	31	3	0	0	0	112	201	36	96	26	0	158	5	240	14	0	259	417
08:45 AM	43	27	6	0	0	0	89	165	33	112	19	0	164	9	243	14	0	266	430
TOTAL	192	111	14	0	0	0	410	727	138	395	79	0	612	30	1,018	46	0	1,094	1,706

AM Peak	Peak Hour Factor: 0.856																							
07:15 AM to 08:15 AM	218	109	14	0	341	52	134	134	314	0	500	841	107	372	49	0	528	30	1,198	44	0	1,272	1,800	2,641



15 MINUTE TURNING MOVEMENT COUNTS

(Cars and Trucks)

DATE: June 1, 2023 (Thursday)

LOCATION: Normandy Boulevard and Elkcam Boulevard

CITY: Deltona

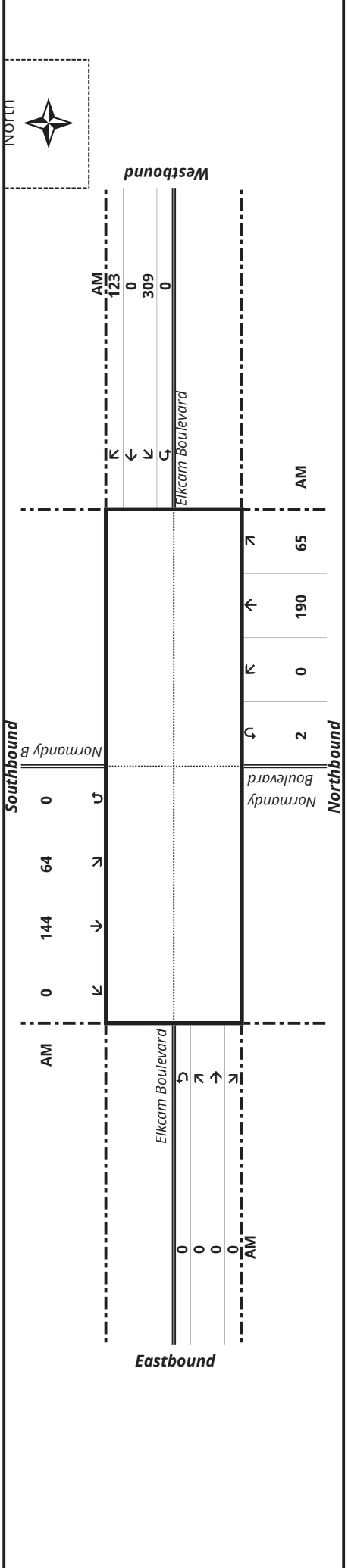
LATITUDE: 0

COUNTY: Volusia

LONGITUDE: 0

TIME BEGIN	NORTHBOUND				SOUTHBOUND				N/S TOTAL	EASTBOUND				WESTBOUND				E/W TOTAL	GRAND TOTAL	
	L	T	R	U-turn	L	T	R	U-turn		L	T	R	U-turn	L	T	R	U-turn			
07:00 AM	0	49	9	0	58	12	22	0	34	92	0	0	0	0	0	67	0	18	85	177
07:15 AM	0	44	16	0	60	18	41	0	59	119	0	0	0	0	0	74	0	37	111	230
07:30 AM	0	68	14	0	82	14	26	0	40	122	0	0	0	0	0	89	0	39	128	250
07:45 AM	0	44	17	1	62	19	51	0	70	132	0	0	0	0	0	74	0	23	97	229
TOTAL	0	205	56	1	262	63	140	0	203	465	0	0	0	0	0	304	0	117	421	886
08:00 AM	0	34	18	1	53	13	26	0	39	92	0	0	0	0	0	72	0	24	96	188
08:15 AM	0	39	12	0	51	10	35	0	45	96	0	0	0	0	0	78	0	18	96	192
08:30 AM	0	45	15	0	60	11	27	0	38	98	0	0	0	0	0	77	0	12	89	187
08:45 AM	0	50	24	0	74	12	47	0	59	133	0	0	0	0	0	76	0	11	87	220
TOTAL	0	168	69	1	238	46	135	0	181	419	0	0	0	0	0	303	0	65	368	787

AM Peak																Peak Hour Factor: 0.897						
07:15 AM to 08:15 AM	0	190	65	2	257	64	144	0	0	208	465	0	0	0	0	309	0	123	0	432	432	897



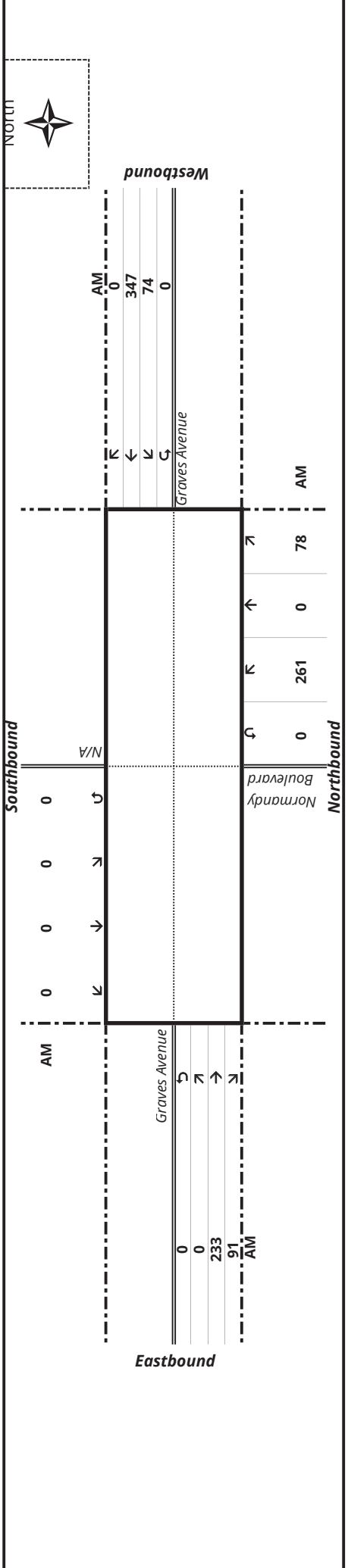
15 MINUTE TURNING MOVEMENT COUNTS

(Cars and Trucks)

DATE: June 1, 2023 (Thursday) CITY: Deltona LATITUDE: 0 _____
 LOCATION: Normandy Boulevard and Graves Avenue COUNTY: Volusia LONGITUDE: 0 _____

TIME BEGIN	Normandy Boulevard						Graves Avenue						Graves Avenue						E/W TOTAL	GRAND TOTAL			
	NORTHBOUND			SOUTHBOUND			N/S TOTAL			EASTBOUND			WESTBOUND			TOTAL							
	L	T	R	L	T	R	L	T	R	L	T	R	L	T	R								
07:00 AM	58	0	18	0	0	0	0	0	0	76	0	56	13	0	0	69	11	68	0	0	79	148	224
07:15 AM	69	0	26	0	0	0	0	0	0	95	0	66	25	0	0	91	17	75	0	0	92	183	278
07:30 AM	71	0	30	0	0	0	0	0	0	101	0	55	14	0	0	69	15	92	0	0	107	176	277
07:45 AM	77	0	18	0	0	0	0	0	0	95	0	54	29	0	0	83	24	96	0	0	120	203	298
TOTAL	275	0	92	0	0	0	0	0	0	367	0	231	81	0	0	312	67	331	0	0	398	710	1,077
08:00 AM	44	0	4	0	0	0	0	0	0	48	0	58	23	0	0	81	18	84	0	0	102	183	231
08:15 AM	53	0	10	0	0	0	0	0	0	63	0	43	9	0	0	52	22	103	0	0	125	177	240
08:30 AM	54	0	11	0	0	0	0	0	0	65	0	72	25	0	0	97	19	77	0	0	96	193	258
08:45 AM	60	0	14	0	0	0	0	0	0	74	0	56	21	0	0	77	27	89	0	0	116	193	267
TOTAL	211	0	39	0	0	0	0	0	0	250	0	229	78	0	0	307	86	353	0	0	439	746	996

AM Peak													Peak Hour Factor: 0.909										
07:15 AM to 08:15 AM	261	0	78	0	0	0	0	0	0	339	0	233	91	0	0	324	74	347	0	0	421	745	1,084



15 MINUTE TURNING MOVEMENT COUNTS

(Cars and Trucks)

DATE: June 1, 2023 (Thursday)

LOCATION: Graves Avenue and Howland Boulevard

CITY: Deltona
COUNTY: Volusia

LATITUDE: 0
LONGITUDE: 0

Graves Avenue

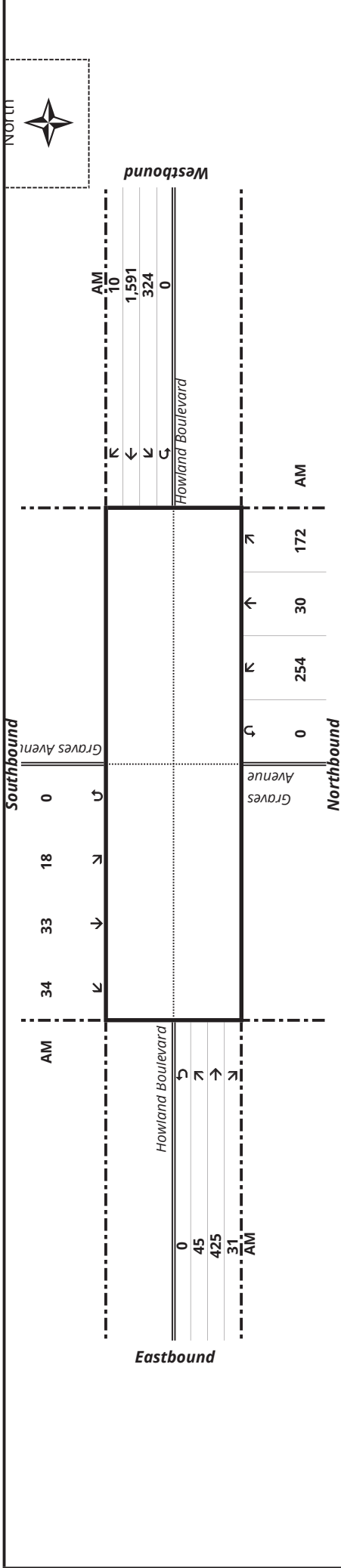
Graves Avenue

Howland Boulevard

Howland Boulevard

TIME BEGIN	NORTHBOUND			SOUTHBOUND			N/S TOTAL			EASTBOUND			WESTBOUND			E/W TOTAL	GRAND TOTAL						
	L	T	R	L	T	R	L	T	R	L	T	R	L	T	R								
07:00 AM	57	9	31	0	97	4	8	11	0	23	14	96	4	0	0	114	67	359	2	0	428	542	662
07:15 AM	83	9	40	0	132	6	11	10	0	27	10	107	6	0	0	123	74	456	2	0	532	655	814
07:30 AM	64	9	46	0	119	6	10	8	0	24	12	106	6	0	0	124	90	424	2	0	516	640	783
07:45 AM	50	3	55	0	108	2	4	5	0	11	9	116	15	0	0	140	93	352	4	0	449	589	708
TOTAL	254	30	172	0	456	18	33	34	0	85	45	425	31	0	0	501	324	1,591	10	0	1,925	2,426	2,967
08:00 AM	37	11	42	0	90	6	9	4	0	19	11	129	9	0	0	149	78	313	3	0	394	543	652
08:15 AM	32	13	42	0	87	9	6	4	0	19	9	109	10	0	0	128	115	359	2	0	476	604	710
08:30 AM	41	5	59	0	105	6	8	10	0	24	13	112	12	0	0	137	67	319	4	0	390	527	656
08:45 AM	15	2	72	0	89	11	3	0	0	14	10	120	11	0	0	141	102	254	2	0	358	499	602
TOTAL	125	31	215	0	371	32	26	18	0	76	43	470	42	0	0	555	362	1,245	11	0	1,618	2,173	2,620

AM Peak													Peak Hour Factor: 0.911																							
07:00 AM to 08:00 AM													254	30	172	0	456	18	33	34	0	85	541	45	425	31	0	0	501	324	1,591	10	0	1,925	2,426	2,967



15 MINUTE TURNING MOVEMENT COUNTS
(Cars and Trucks)

DATE: June 1, 2023 (Thursday)

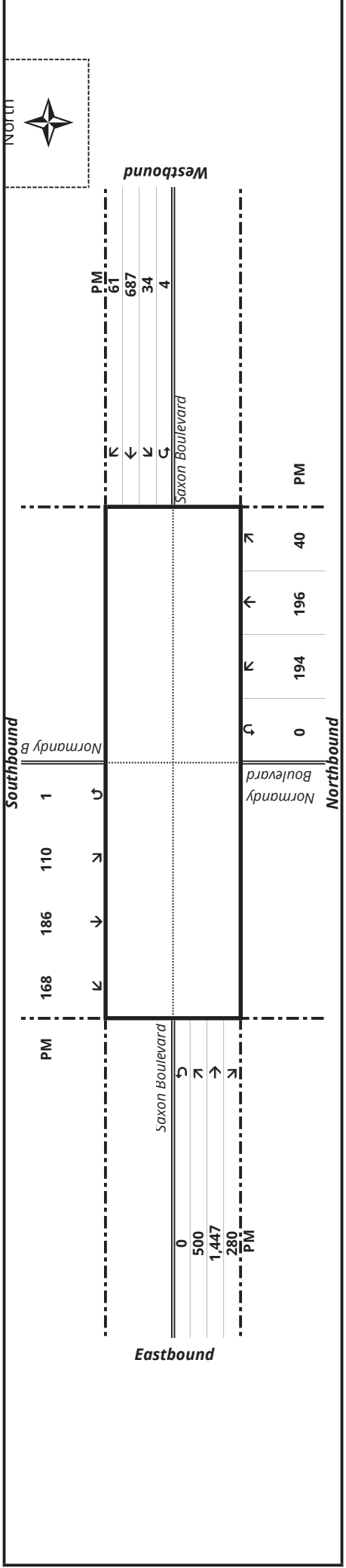
LOCATION: Normandy Boulevard and Saxon Boulevard

CITY: Deltona
COUNTY: Volusia

LATITUDE: 0
LONGITUDE: 0

TIME BEGIN	NORTHBOUND				SOUTHBOUND				N/S TOTAL		EASTBOUND				WESTBOUND				E/W TOTAL	GRAND TOTAL		
	L	T	R	U-turn	L	T	R	U-turn	L	T	R	U-turn	L	T	R	U-turn	L	T			R	U-turn
04:00 PM	38	32	9	0	79	16	24	0	68	147	91	274	58	0	423	4	187	17	0	208	631	778
04:15 PM	49	42	6	0	97	18	37	0	91	188	111	300	57	0	468	9	192	9	0	210	678	866
04:30 PM	45	31	9	0	85	19	40	0	113	198	130	310	52	0	492	8	171	18	0	197	689	887
04:45 PM	59	34	9	0	102	23	50	0	98	200	102	345	62	0	509	5	184	13	0	202	711	911
TOTAL	191	139	33	0	363	76	155	0	370	733	434	1,229	229	0	1,892	26	734	57	0	817	2,709	3,442
05:00 PM	50	51	12	0	113	24	44	0	109	222	124	375	76	0	575	10	196	11	0	217	792	1,014
05:15 PM	45	54	9	0	108	25	53	0	135	243	122	355	76	0	553	9	185	11	0	205	758	1,001
05:30 PM	52	39	11	0	102	34	44	0	112	214	119	377	69	0	565	6	156	23	1	186	751	965
05:45 PM	47	52	8	0	107	27	45	0	109	216	135	340	59	0	534	9	150	16	3	178	712	928
TOTAL	194	196	40	0	430	110	186	0	465	895	500	1,447	280	0	2,227	34	687	61	4	786	3,013	3,908

PM Peak	Peak Hour Factor: 0.964																					
05:00 PM to 06:00 PM	194	196	40	0	430	110	186	1	465	895	500	1,447	280	0	2,227	34	687	61	4	786	3,013	3,908



15 MINUTE TURNING MOVEMENT COUNTS

(Cars and Trucks)

DATE: June 1, 2023 (Thursday)

CITY: Deltona

LATITUDE: 0

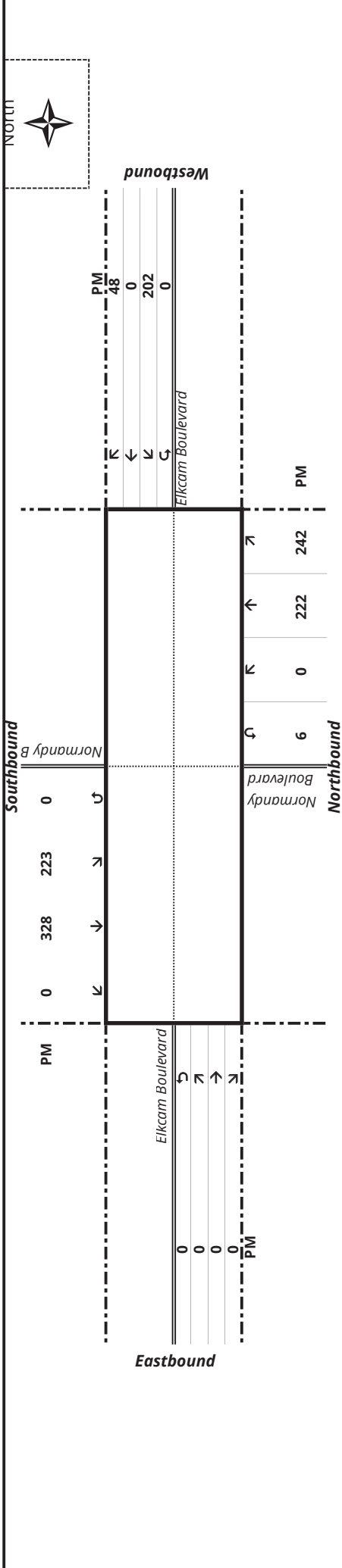
LOCATION: Normandy Boulevard and Elkcam Boulevard

COUNTY: Volusia

LONGITUDE: 0

TIME BEGIN	NORTHBOUND				SOUTHBOUND				N/S TOTAL	EASTBOUND				WESTBOUND				E/W TOTAL	GRAND TOTAL	
	L	T	R	U-turn	L	T	R	U-turn		L	T	R	U-turn	L	T	R	U-turn			
04:00 PM	0	56	57	0	113	34	67	0	102	215	0	0	0	0	0	28	0	10	38	253
04:15 PM	0	44	60	0	104	42	56	0	98	202	0	0	0	0	0	45	0	3	48	250
04:30 PM	0	50	50	0	100	43	67	0	110	210	0	0	0	0	0	48	0	6	54	264
04:45 PM	0	44	46	0	90	43	71	0	114	204	0	0	0	0	0	39	0	16	55	259
TOTAL	0	194	213	0	407	162	261	0	424	831	0	0	0	0	0	160	0	35	195	1,026
05:00 PM	0	51	57	0	108	50	44	0	94	202	0	0	0	0	0	54	0	17	71	273
05:15 PM	0	44	64	1	109	60	91	0	151	260	0	0	0	0	0	61	0	11	72	332
05:30 PM	0	66	66	3	135	65	98	0	163	298	0	0	0	0	0	38	0	6	44	342
05:45 PM	0	61	55	2	118	48	95	0	143	261	0	0	0	0	0	49	0	14	63	324
TOTAL	0	222	242	6	470	223	328	0	551	1,021	0	0	0	0	0	202	0	48	250	1,271

PM Peak	Peak Hour Factor: 0.929																				
05:00 PM to 06:00 PM	0	222	242	6	470	223	328	0	0	551	1,021	0	0	0	0	202	0	48	0	250	1,271



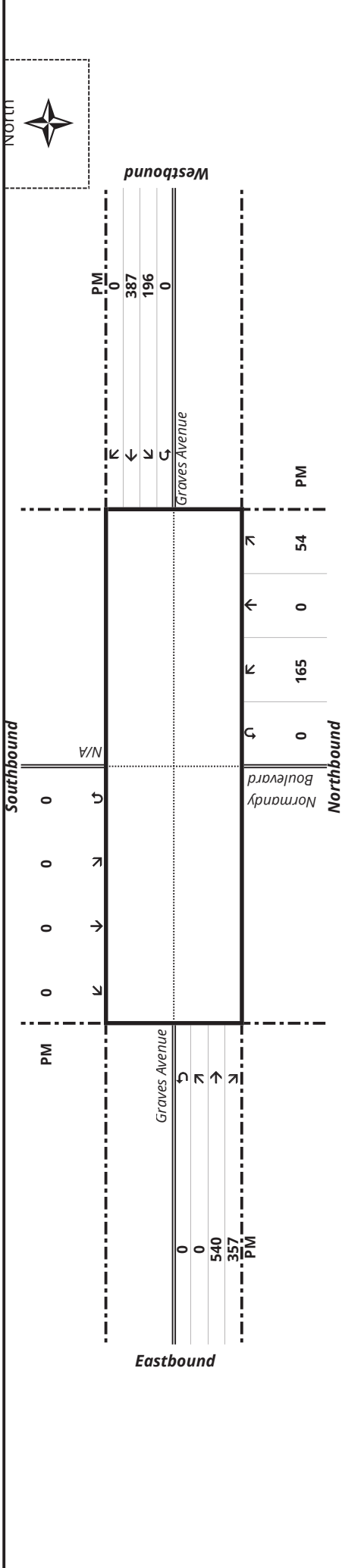
15 MINUTE TURNING MOVEMENT COUNTS

(Cars and Trucks)

DATE: June 1, 2023 (Thursday) CITY: Deltona LATITUDE: 0 _____
 LOCATION: Normandy Boulevard and Graves Avenue COUNTY: Volusia LONGITUDE: 0 _____

TIME BEGIN	Normandy Boulevard						Graves Avenue						E/W TOTAL	GRAND TOTAL					
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND									
	L	T	R	L	T	R	L	T	R	L	T	R			L	T	R		
04:00 PM	51	0	8	0	0	0	0	0	0	140	55	0	47	78	0	195	125	0	379
04:15 PM	36	0	8	0	0	0	0	0	0	137	60	0	42	111	0	197	153	0	394
04:30 PM	36	0	9	0	0	0	0	0	0	136	56	0	52	69	0	192	121	0	358
04:45 PM	42	0	5	0	0	0	0	0	0	120	67	0	49	87	0	187	136	0	370
TOTAL	165	0	30	0	0	0	0	0	0	533	238	0	190	345	0	771	535	0	1,501
05:00 PM	33	0	11	0	0	0	0	0	0	162	58	0	32	106	0	220	138	0	402
05:15 PM	40	0	14	0	0	0	0	0	0	130	110	0	62	96	0	240	158	0	452
05:30 PM	33	0	10	0	0	0	0	0	0	138	95	0	54	89	0	233	143	0	419
05:45 PM	59	0	19	0	0	0	0	0	0	110	94	0	48	96	0	204	144	0	426
TOTAL	165	0	54	0	0	0	0	0	0	540	357	0	196	387	0	897	583	0	1,699

PM Peak															Peak Hour Factor: 0.940																					
05:00 PM to 06:00 PM															165	0	54	0	219	0	0	0	0	219	0	540	357	0	897	196	387	0	0	583	1,480	1,699

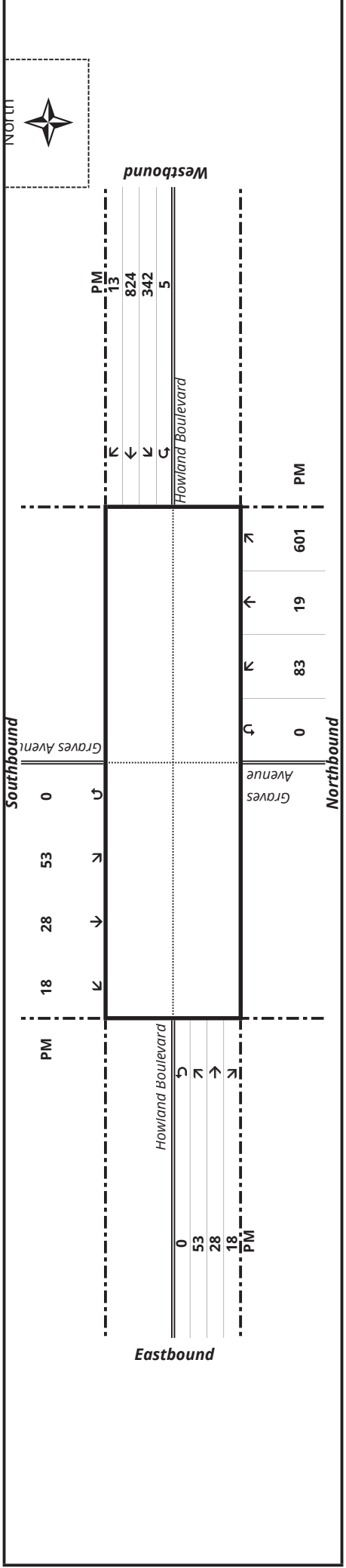


15 MINUTE TURNING MOVEMENT COUNTS
(Cars and Trucks)

DATE: June 1, 2023 (Thursday) CITY: Deltona LATITUDE: 0
 LOCATION: Graves Avenue and Howland Boulevard COUNTY: Volusia LONGITUDE: 0

TIME BEGIN	Graves Avenue					Graves Avenue					Howland Boulevard					Howland Boulevard					E/W TOTAL	GRAND TOTAL		
	NORTHBOUND		SOUTHBOUND			NORTHBOUND		SOUTHBOUND			EASTBOUND		WESTBOUND			EASTBOUND		WESTBOUND						
	L	T	R	U-turn	TOTAL	L	T	R	U-turn	TOTAL	L	T	R	U-turn	TOTAL	L	T	R	U-turn	TOTAL				
04:00 PM	31	6	139	0	176	4	3	1	0	8	4	3	1	0	8	98	182	5	0	285	8	285	293	477
04:15 PM	22	8	135	0	165	13	12	3	0	28	13	12	3	0	28	81	173	4	0	258	28	258	286	479
04:30 PM	28	4	129	0	161	10	4	5	0	19	10	4	5	0	19	75	176	1	2	254	19	254	273	453
04:45 PM	17	2	139	0	158	9	3	5	0	17	9	3	5	0	17	91	154	0	0	245	17	245	262	437
TOTAL	98	20	542	0	660	36	22	14	0	72	36	22	14	0	72	345	685	10	2	1,042	72	1,042	1,114	1,846
05:00 PM	19	8	166	0	193	17	4	2	0	23	17	4	2	0	23	85	198	4	0	287	23	287	310	526
05:15 PM	20	2	144	0	166	10	9	11	0	30	10	9	11	0	30	79	198	3	2	282	30	282	312	508
05:30 PM	19	4	153	0	176	12	5	4	0	21	12	5	4	0	21	88	232	3	3	326	21	326	347	544
05:45 PM	25	5	138	0	168	14	10	1	0	25	14	10	1	0	25	90	196	3	0	289	25	289	314	507
TOTAL	83	19	601	0	703	53	28	18	0	99	53	28	18	0	99	342	824	13	5	1,184	99	1,184	1,283	2,085

PM Peak													Peak Hour Factor:	0.958																					
05:00 PM to 06:00 PM													83	19	601	0	703	53	28	18	0	99	802	53	28	18	0	99	342	824	13	5	1,184	1,283	2,085



2022 PEAK SEASON FACTOR CATEGORY REPORT - REPORT TYPE: ALL
 CATEGORY: 7900 VOLUSIA COUNTYWIDE

WEEK	DATES	SF	MOCF: 0.94 PSCF
1	01/01/2022 - 01/01/2022	1.02	1.09
2	01/02/2022 - 01/08/2022	1.03	1.10
3	01/09/2022 - 01/15/2022	1.04	1.11
4	01/16/2022 - 01/22/2022	1.02	1.09
5	01/23/2022 - 01/29/2022	1.01	1.07
6	01/30/2022 - 02/05/2022	0.99	1.05
* 7	02/06/2022 - 02/12/2022	0.97	1.03
* 8	02/13/2022 - 02/19/2022	0.95	1.01
* 9	02/20/2022 - 02/26/2022	0.94	1.00
*10	02/27/2022 - 03/05/2022	0.93	0.99
*11	03/06/2022 - 03/12/2022	0.92	0.98
*12	03/13/2022 - 03/19/2022	0.91	0.97
*13	03/20/2022 - 03/26/2022	0.92	0.98
*14	03/27/2022 - 04/02/2022	0.93	0.99
*15	04/03/2022 - 04/09/2022	0.94	1.00
*16	04/10/2022 - 04/16/2022	0.96	1.02
*17	04/17/2022 - 04/23/2022	0.96	1.02
*18	04/24/2022 - 04/30/2022	0.97	1.03
*19	05/01/2022 - 05/07/2022	0.98	1.04
20	05/08/2022 - 05/14/2022	0.98	1.04
21	05/15/2022 - 05/21/2022	0.99	1.05
22	05/22/2022 - 05/28/2022	1.00	1.06
23	05/29/2022 - 06/04/2022	1.02	1.09
24	06/05/2022 - 06/11/2022	1.03	1.10
25	06/12/2022 - 06/18/2022	1.04	1.11
26	06/19/2022 - 06/25/2022	1.05	1.12
27	06/26/2022 - 07/02/2022	1.06	1.13
28	07/03/2022 - 07/09/2022	1.06	1.13
29	07/10/2022 - 07/16/2022	1.07	1.14
30	07/17/2022 - 07/23/2022	1.06	1.13
31	07/24/2022 - 07/30/2022	1.05	1.12
32	07/31/2022 - 08/06/2022	1.04	1.11
33	08/07/2022 - 08/13/2022	1.03	1.10
34	08/14/2022 - 08/20/2022	1.02	1.09
35	08/21/2022 - 08/27/2022	1.04	1.11
36	08/28/2022 - 09/03/2022	1.05	1.12
37	09/04/2022 - 09/10/2022	1.06	1.13
38	09/11/2022 - 09/17/2022	1.07	1.14
39	09/18/2022 - 09/24/2022	1.05	1.12
40	09/25/2022 - 10/01/2022	1.02	1.09
41	10/02/2022 - 10/08/2022	0.99	1.05
42	10/09/2022 - 10/15/2022	0.97	1.03
43	10/16/2022 - 10/22/2022	0.98	1.04
44	10/23/2022 - 10/29/2022	0.99	1.05
45	10/30/2022 - 11/05/2022	1.01	1.07
46	11/06/2022 - 11/12/2022	1.02	1.09
47	11/13/2022 - 11/19/2022	1.04	1.11
48	11/20/2022 - 11/26/2022	1.03	1.10
49	11/27/2022 - 12/03/2022	1.03	1.10
50	12/04/2022 - 12/10/2022	1.02	1.09
51	12/11/2022 - 12/17/2022	1.02	1.09
52	12/18/2022 - 12/24/2022	1.03	1.10
53	12/25/2022 - 12/31/2022	1.04	1.11

* PEAK SEASON

23-FEB-2023 09:11:23

830UPD

5_7900_PKSEASON.TXT

Appendix E: Existing Intersection Analysis Output

HCM 6th Signalized Intersection Summary

1: Normandy Blvd & Saxon Blvd

09/12/2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	183	379	50	31	1222	45	222	111	14	53	137	320
Future Volume (veh/h)	183	379	50	31	1222	45	222	111	14	53	137	320
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	199	412	54	34	1328	49	241	121	15	58	149	348
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	237	1709	962	510	1540	57	362	389	48	347	301	381
Arrive On Green	0.08	0.48	0.48	0.04	0.44	0.44	0.13	0.24	0.24	0.05	0.16	0.16
Sat Flow, veh/h	1781	3554	1585	1781	3495	129	1781	1632	202	1781	1870	1585
Grp Volume(v), veh/h	199	412	54	34	674	703	241	0	136	58	149	348
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1847	1781	0	1834	1781	1870	1585
Q Serve(g_s), s	7.4	8.5	1.7	1.3	42.5	42.6	13.5	0.0	7.6	3.3	9.0	20.0
Cycle Q Clear(g_c), s	7.4	8.5	1.7	1.3	42.5	42.6	13.5	0.0	7.6	3.3	9.0	20.0
Prop In Lane	1.00		1.00	1.00		0.07	1.00		0.11	1.00		1.00
Lane Grp Cap(c), veh/h	237	1709	962	510	783	814	362	0	437	347	301	381
V/C Ratio(X)	0.84	0.24	0.06	0.07	0.86	0.86	0.67	0.00	0.31	0.17	0.49	0.91
Avail Cap(c_a), veh/h	441	2347	1246	541	930	967	381	0	443	360	301	381
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.9	18.9	9.9	17.2	31.3	31.4	35.5	0.0	38.9	40.1	47.5	45.9
Incr Delay (d2), s/veh	7.7	0.1	0.0	0.1	7.3	7.2	4.1	0.0	0.4	0.2	1.3	26.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.5	3.5	0.6	0.5	19.4	20.2	6.3	0.0	3.5	1.5	4.3	13.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	34.6	19.0	10.0	17.3	38.6	38.5	39.6	0.0	39.3	40.3	48.7	71.9
LnGrp LOS	C	B	A	B	D	D	D	A	D	D	D	E
Approach Vol, veh/h		665			1411			377			555	
Approach Delay, s/veh		23.0			38.0			39.5			62.4	
Approach LOS		C			D			D			E	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	12.1	35.6	10.8	65.7	21.6	26.0	15.8	60.7				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	7.0	30.0	7.0	82.0	17.0	20.0	24.0	65.0				
Max Q Clear Time (g_c+I1), s	5.3	9.6	3.3	10.5	15.5	22.0	9.4	44.6				
Green Ext Time (p_c), s	0.0	0.6	0.0	3.3	0.1	0.0	0.5	10.1				

Intersection Summary

HCM 6th Ctrl Delay	39.4
HCM 6th LOS	D

HCM 6th Signalized Intersection Summary

2: Normandy Blvd & Elkcam Blvd

09/12/2023



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	315	125	194	68	65	147
Future Volume (veh/h)	315	125	194	68	65	147
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	342	136	211	74	71	160
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	518	461	551	188	524	1487
Arrive On Green	0.29	0.29	0.21	0.21	0.06	0.42
Sat Flow, veh/h	1781	1585	2695	886	1781	3647
Grp Volume(v), veh/h	342	136	142	143	71	160
Grp Sat Flow(s),veh/h/ln	1781	1585	1777	1711	1781	1777
Q Serve(g_s), s	4.6	1.8	1.9	2.0	0.7	0.8
Cycle Q Clear(g_c), s	4.6	1.8	1.9	2.0	0.7	0.8
Prop In Lane	1.00	1.00		0.52	1.00	
Lane Grp Cap(c), veh/h	518	461	376	362	524	1487
V/C Ratio(X)	0.66	0.30	0.38	0.39	0.14	0.11
Avail Cap(c_a), veh/h	2917	2596	3427	3300	3008	12546
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	8.6	7.6	9.3	9.3	6.4	4.9
Incr Delay (d2), s/veh	1.5	0.4	0.6	0.7	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	0.4	0.5	0.6	0.2	0.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	10.0	7.9	9.9	10.0	6.6	4.9
LnGrp LOS	B	A	A	B	A	A
Approach Vol, veh/h	478		285			231
Approach Delay, s/veh	9.4		10.0			5.4
Approach LOS	A		A			A
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	5.7	9.8			15.5	12.0
Change Period (Y+Rc), s	4.0	4.0			4.0	4.0
Max Green Setting (Gmax), s	40.0	53.0			97.0	45.0
Max Q Clear Time (g_c+I1), s	2.7	4.0			2.8	6.6
Green Ext Time (p_c), s	0.2	1.8			1.1	1.6
Intersection Summary						
HCM 6th Ctrl Delay			8.6			
HCM 6th LOS			A			

HCM 6th Signalized Intersection Summary

3: Normandy Blvd & Graves Ave

09/12/2023



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↵	↑↑	↵	↵↵
Traffic Volume (veh/h)	238	93	75	354	266	80
Future Volume (veh/h)	238	93	75	354	266	80
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	259	101	82	385	289	87
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	535	1026	340	1147	884	1614
Arrive On Green	0.15	0.15	0.08	0.32	0.50	0.50
Sat Flow, veh/h	3647	1585	1781	3647	1781	2790
Grp Volume(v), veh/h	259	101	82	385	289	87
Grp Sat Flow(s),veh/h/ln	1777	1585	1781	1777	1781	1395
Q Serve(g_s), s	4.4	1.6	2.4	5.5	6.5	0.9
Cycle Q Clear(g_c), s	4.4	1.6	2.4	5.5	6.5	0.9
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	535	1026	340	1147	884	1614
V/C Ratio(X)	0.48	0.10	0.24	0.34	0.33	0.05
Avail Cap(c_a), veh/h	2192	1765	944	4010	884	1614
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	25.9	4.4	19.3	17.1	10.1	6.1
Incr Delay (d2), s/veh	0.7	0.0	0.4	0.2	1.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	1.4	1.0	2.1	2.4	0.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	26.5	4.5	19.6	17.3	11.0	6.2
LnGrp LOS	C	A	B	B	B	A
Approach Vol, veh/h	360			467	376	
Approach Delay, s/veh	20.4			17.7	9.9	
Approach LOS	C			B	A	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	11.5	16.0			27.5	39.0
Change Period (Y+Rc), s	6.0	6.0			6.0	6.0
Max Green Setting (Gmax), s	28.0	41.0			75.0	33.0
Max Q Clear Time (g_c+I1), s	4.4	6.4			7.5	8.5
Green Ext Time (p_c), s	0.2	2.1			2.9	1.2
Intersection Summary						
HCM 6th Ctrl Delay			16.0			
HCM 6th LOS			B			

HCM Signalized Intersection Capacity Analysis

4: Graves Rd & Howland Blvd

09/12/2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↗	↕	↖	↖↗	↕	↖	↖	↖↗	↖	↖	↕	↖
Traffic Volume (vph)	46	434	32	330	1623	10	259	31	175	18	34	35
Future Volume (vph)	46	434	32	330	1623	10	259	31	175	18	34	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.96	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	3433	3539	1583	1681	1703	1583	1770	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.96	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	3433	3539	1583	1681	1703	1583	1770	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	50	472	35	359	1764	11	282	34	190	20	37	38
RTOR Reduction (vph)	0	0	15	0	0	4	0	0	137	0	0	33
Lane Group Flow (vph)	50	472	20	359	1764	7	158	158	53	20	37	5
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Split	NA	pm+ov	Split	NA	pm+ov
Protected Phases	5	2	8	1	6	4	8	8	1	4	4	5
Permitted Phases			2			6			8			4
Actuated Green, G (s)	5.9	59.5	75.8	19.9	73.5	83.9	16.3	16.3	36.2	10.4	10.4	16.3
Effective Green, g (s)	5.9	59.5	75.8	19.9	73.5	83.9	16.3	16.3	36.2	10.4	10.4	16.3
Actuated g/C Ratio	0.05	0.46	0.58	0.15	0.56	0.64	0.13	0.13	0.28	0.08	0.08	0.13
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	155	1618	922	525	1999	1093	210	213	513	141	148	198
v/s Ratio Prot	0.01	0.13	0.00	c0.10	c0.50	0.00	c0.09	0.09	0.02	0.01	c0.02	0.00
v/s Ratio Perm			0.01			0.00			0.02			0.00
v/c Ratio	0.32	0.29	0.02	0.68	0.88	0.01	0.75	0.74	0.10	0.14	0.25	0.02
Uniform Delay, d1	60.2	22.1	11.5	52.1	24.6	8.2	55.0	54.9	34.9	55.7	56.2	49.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.2	0.1	0.0	3.7	5.0	0.0	14.1	13.0	0.1	0.5	0.9	0.0
Delay (s)	61.4	22.2	11.5	55.8	29.5	8.2	69.1	67.9	35.0	56.2	57.1	50.0
Level of Service	E	C	B	E	C	A	E	E	C	E	E	D
Approach Delay (s)		25.0			33.8			55.9			54.0	
Approach LOS		C			C			E			D	

Intersection Summary		
HCM 2000 Control Delay	36.3	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.81	D
Actuated Cycle Length (s)	130.1	Sum of lost time (s)
Intersection Capacity Utilization	80.4%	24.0
Analysis Period (min)	15	ICU Level of Service
		D

c Critical Lane Group

HCM 6th Signalized Intersection Summary

1: Normandy Blvd & Saxon Blvd

09/12/2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	510	1476	286	35	701	66	198	200	41	112	190	172
Future Volume (veh/h)	510	1476	286	35	701	66	198	200	41	112	190	172
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	554	1604	311	38	762	72	215	217	45	122	207	187
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	514	1892	1030	160	1281	121	283	290	60	212	240	492
Arrive On Green	0.18	0.53	0.53	0.04	0.39	0.39	0.12	0.19	0.19	0.05	0.13	0.13
Sat Flow, veh/h	1781	3554	1585	1781	3281	310	1781	1503	312	1781	1870	1585
Grp Volume(v), veh/h	554	1604	311	38	412	422	215	0	262	122	207	187
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1815	1781	0	1814	1781	1870	1585
Q Serve(g_s), s	24.0	50.8	11.3	1.6	24.3	24.3	13.4	0.0	18.0	7.0	14.3	12.2
Cycle Q Clear(g_c), s	24.0	50.8	11.3	1.6	24.3	24.3	13.4	0.0	18.0	7.0	14.3	12.2
Prop In Lane	1.00		1.00	1.00		0.17	1.00		0.17	1.00		1.00
Lane Grp Cap(c), veh/h	514	1892	1030	160	693	708	283	0	350	212	240	492
V/C Ratio(X)	1.08	0.85	0.30	0.24	0.59	0.60	0.76	0.00	0.75	0.57	0.86	0.38
Avail Cap(c_a), veh/h	514	2209	1171	184	875	894	304	0	413	212	284	529
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	25.8	26.3	10.1	26.5	31.9	31.9	42.2	0.0	50.2	48.9	56.3	35.6
Incr Delay (d2), s/veh	62.2	2.9	0.2	0.8	0.8	0.8	9.9	0.0	6.2	3.7	20.2	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	18.7	21.6	3.9	0.7	10.6	10.8	6.7	0.0	8.8	0.7	8.1	4.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	88.0	29.2	10.2	27.3	32.8	32.7	52.1	0.0	56.5	52.6	76.5	36.0
LnGrp LOS	F	C	B	C	C	C	D	A	E	D	E	D
Approach Vol, veh/h		2469			872			477				516
Approach Delay, s/veh		40.0			32.5			54.5				56.2
Approach LOS		D			C			D				E
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	13.0	31.4	11.3	76.2	21.5	23.0	30.0	57.5				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	7.0	30.0	7.0	82.0	17.0	20.0	24.0	65.0				
Max Q Clear Time (g_c+I1), s	9.0	20.0	3.6	52.8	15.4	16.3	26.0	26.3				
Green Ext Time (p_c), s	0.0	1.0	0.0	17.5	0.1	0.7	0.0	6.3				

Intersection Summary

HCM 6th Ctrl Delay	42.0
HCM 6th LOS	D

HCM 6th Signalized Intersection Summary

2: Normandy Blvd & Elkcam Blvd

09/12/2023



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	206	49	226	253	227	335
Future Volume (veh/h)	206	49	226	253	227	335
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	224	53	246	275	247	364
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	332	296	559	499	619	2049
Arrive On Green	0.19	0.19	0.31	0.31	0.14	0.58
Sat Flow, veh/h	1781	1585	1870	1585	1781	3647
Grp Volume(v), veh/h	224	53	246	275	247	364
Grp Sat Flow(s),veh/h/ln	1781	1585	1777	1585	1781	1777
Q Serve(g_s), s	3.9	0.9	3.7	4.9	2.6	1.6
Cycle Q Clear(g_c), s	3.9	0.9	3.7	4.9	2.6	1.6
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	332	296	559	499	619	2049
V/C Ratio(X)	0.67	0.18	0.44	0.55	0.40	0.18
Avail Cap(c_a), veh/h	2375	2113	2790	2489	2475	10212
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	12.8	11.6	9.2	9.6	5.5	3.4
Incr Delay (d2), s/veh	2.4	0.3	0.5	1.0	0.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.4	0.3	1.1	1.3	0.5	0.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	15.2	11.8	9.7	10.5	6.0	3.4
LnGrp LOS	B	B	A	B	A	A
Approach Vol, veh/h	277		521			611
Approach Delay, s/veh	14.5		10.2			4.4
Approach LOS	B		B			A
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	8.8	14.6			23.5	10.3
Change Period (Y+Rc), s	4.0	4.0			4.0	4.0
Max Green Setting (Gmax), s	40.0	53.0			97.0	45.0
Max Q Clear Time (g_c+I1), s	4.6	6.9			3.6	5.9
Green Ext Time (p_c), s	0.7	3.8			2.7	0.9
Intersection Summary						
HCM 6th Ctrl Delay			8.5			
HCM 6th LOS			A			

HCM 6th Signalized Intersection Summary

3: Normandy Blvd & Graves Ave

09/12/2023



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↓	↑↑	↓	↑↑
Traffic Volume (veh/h)	551	364	200	395	168	55
Future Volume (veh/h)	551	364	200	395	168	55
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	599	396	217	429	183	60
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	895	1048	352	1570	729	1464
Arrive On Green	0.25	0.25	0.12	0.44	0.41	0.41
Sat Flow, veh/h	3647	1585	1781	3647	1781	2790
Grp Volume(v), veh/h	599	396	217	429	183	60
Grp Sat Flow(s),veh/h/ln	1777	1585	1781	1777	1781	1395
Q Serve(g_s), s	12.2	9.1	6.8	6.2	5.5	0.8
Cycle Q Clear(g_c), s	12.2	9.1	6.8	6.2	5.5	0.8
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	895	1048	352	1570	729	1464
V/C Ratio(X)	0.67	0.38	0.62	0.27	0.25	0.04
Avail Cap(c_a), veh/h	1808	1455	765	3307	729	1464
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	27.1	6.2	19.0	14.3	15.7	9.3
Incr Delay (d2), s/veh	0.9	0.2	1.8	0.1	0.8	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.1	7.4	2.8	2.4	2.3	0.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	28.0	6.4	20.8	14.4	16.5	9.4
LnGrp LOS	C	A	C	B	B	A
Approach Vol, veh/h	995			646	243	
Approach Delay, s/veh	19.4			16.5	14.7	
Approach LOS	B			B	B	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	15.3	26.3			41.6	39.0
Change Period (Y+Rc), s	6.0	6.0			6.0	6.0
Max Green Setting (Gmax), s	28.0	41.0			75.0	33.0
Max Q Clear Time (g_c+I1), s	8.8	14.2			8.2	7.5
Green Ext Time (p_c), s	0.6	6.1			3.2	0.7

Intersection Summary

HCM 6th Ctrl Delay	17.8
HCM 6th LOS	B

HCM Signalized Intersection Capacity Analysis

4: Graves Rd & Howland Blvd

09/12/2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↗↘	↕	↗	↗↘	↕	↗	↗	↕	↗	↗↘	↕	↗
Traffic Volume (vph)	54	29	18	349	840	18	85	19	613	54	29	18
Future Volume (vph)	54	29	18	349	840	18	85	19	613	54	29	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.97	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	3433	3539	1583	1681	1715	1583	1770	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.97	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	3433	3539	1583	1681	1715	1583	1770	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	59	32	20	379	913	20	92	21	666	59	32	20
RTOR Reduction (vph)	0	0	15	0	0	10	0	0	349	0	0	16
Lane Group Flow (vph)	59	32	5	379	913	10	56	57	317	59	32	4
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Split	NA	pm+ov	Split	NA	pm+ov
Protected Phases	5	2	8	1	6	4	8	8	1	4	4	5
Permitted Phases			2			6			8			4
Actuated Green, G (s)	5.6	8.2	18.8	28.3	30.9	41.5	10.6	10.6	38.9	10.6	10.6	16.2
Effective Green, g (s)	5.6	8.2	18.8	28.3	30.9	41.5	10.6	10.6	38.9	10.6	10.6	16.2
Actuated g/C Ratio	0.07	0.10	0.23	0.35	0.38	0.51	0.13	0.13	0.48	0.13	0.13	0.20
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	235	355	364	1189	1338	920	218	222	869	229	241	313
v/s Ratio Prot	0.02	0.01	0.00	0.11	c0.26	0.00	0.03	0.03	c0.13	c0.03	0.02	0.00
v/s Ratio Perm			0.00			0.00			0.07			0.00
v/c Ratio	0.25	0.09	0.01	0.32	0.68	0.01	0.26	0.26	0.36	0.26	0.13	0.01
Uniform Delay, d1	36.1	33.4	24.3	19.6	21.3	9.9	32.0	32.0	13.6	32.0	31.5	26.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.6	0.1	0.0	0.2	1.5	0.0	0.6	0.6	0.3	0.6	0.3	0.0
Delay (s)	36.6	33.5	24.3	19.8	22.7	10.0	32.6	32.6	13.8	32.6	31.7	26.3
Level of Service	D	C	C	B	C	A	C	C	B	C	C	C
Approach Delay (s)		33.5			21.7			16.6			31.2	
Approach LOS		C			C			B			C	

Intersection Summary		
HCM 2000 Control Delay	21.0	HCM 2000 Level of Service C
HCM 2000 Volume to Capacity ratio	0.57	
Actuated Cycle Length (s)	81.7	Sum of lost time (s) 24.0
Intersection Capacity Utilization	69.6%	ICU Level of Service C
Analysis Period (min)	15	

c Critical Lane Group

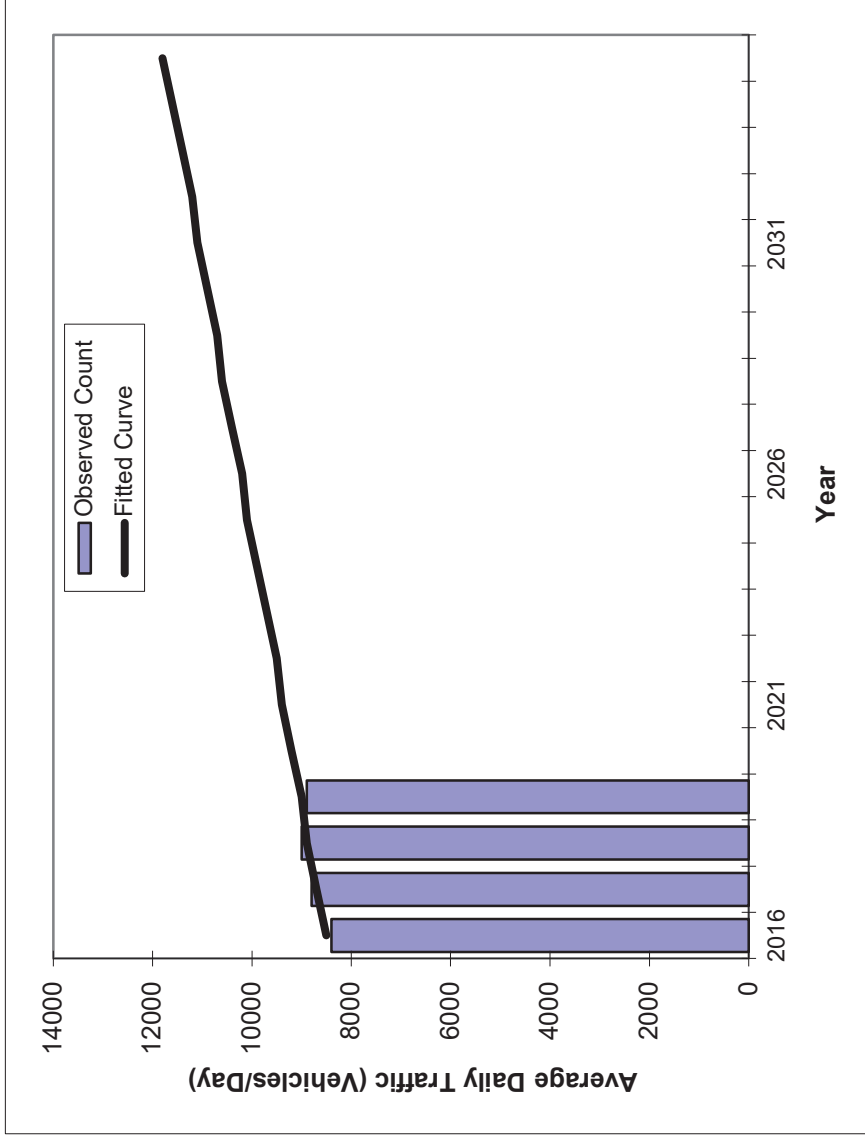
Appendix F: Historical Trends Analysis

Traffic Trends - V3.0

NORMANDY BLVD -- N OF ELKCAM BLVD

FIN# 0
Location 1

County: Orange (75)
Station #: 750592
Highway: NORMANDY BLVD



Year	Traffic (ADT/AADT)	
	Count*	Trend**
2016	8400	8500
2017	8800	8700
2018	9000	8900
2019	8900	9000
2023 Opening Year Trend		
2023	N/A	9700
2024 Mid-Year Trend		
2024	N/A	9900
2026 Design Year Trend		
2026	N/A	10200
TRANPLAN Forecasts/Trends		

**** Annual Trend Increase:** 170
Trend R-squared: 69.64%
Trend Annual Historic Growth Rate: 1.96%
Trend Growth Rate (2019 to Design Year): 1.90%
Printed: 04-Apr-23

Straight Line Growth Option

*Axle-Adjusted

FLORIDA DEPARTMENT OF TRANSPORTATION
 TRANSPORTATION STATISTICS OFFICE
 2021 HISTORICAL AADT REPORT

COUNTY: 79 - VOLUSIA

SITE: 7060 - NORMANDY BLVD, 0.3 MI N OF ELKCAM BLVD, (HPMS)

YEAR	AADT	DIRECTION 1	DIRECTION 2	*K FACTOR	D FACTOR	T FACTOR
2021	8700 S	N 4400	S 4300	9.00	58.20	1.70
2020	8700 F	N 4400	S 4300	9.00	58.70	1.70
2019	8900 C	N 4500	S 4400	9.00	59.00	1.70
2018	9000 S	N 4500	S 4500	9.00	60.00	1.80
2017	8800 F	N 4400	S 4400	9.00	60.90	1.80
2016	8400 C	N 4200	S 4200	9.00	61.40	1.80
2015	5750 E			9.00	60.20	3.60
2014	5700 S	N 2800	S 2900	9.00	59.20	3.00
2013	5700 F	N 2800	S 2900	9.00	61.00	3.00
2012	5700 C	N 2800	S 2900	9.00	61.90	3.00
2010	6800 C	N 2900	S 3900	10.39	62.46	3.10
2009	5400 C	N 2600	S 2800	10.54	62.19	3.70

AADT FLAGS: C = COMPUTED; E = MANUAL ESTIMATE; F = FIRST YEAR ESTIMATE
 S = SECOND YEAR ESTIMATE; T = THIRD YEAR ESTIMATE; R = FOURTH YEAR ESTIMATE
 V = FIFTH YEAR ESTIMATE; 6 = SIXTH YEAR ESTIMATE; X = UNKNOWN
 *K FACTOR: STARTING WITH YEAR 2011 IS STANDARDK, PRIOR YEARS ARE K30 VALUES

Appendix G: Projected Intersection Analysis Output

HCM 6th Signalized Intersection Summary

1: Normandy Blvd & Saxon Blvd

07/09/2024



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	263	402	53	33	1295	61	235	143	15	66	164	393
Future Volume (veh/h)	263	402	53	33	1295	61	235	143	15	66	164	393
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	286	437	58	36	1408	66	255	155	16	72	178	427
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	311	1909	1039	512	1515	71	301	354	37	292	261	437
Arrive On Green	0.14	0.54	0.54	0.04	0.44	0.44	0.12	0.21	0.21	0.05	0.14	0.14
Sat Flow, veh/h	1781	3554	1585	1781	3456	162	1781	1667	172	1781	1870	1585
Grp Volume(v), veh/h	286	437	58	36	722	752	255	0	171	72	178	427
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1841	1781	0	1839	1781	1870	1585
Q Serve(g_s), s	17.1	9.3	1.9	1.6	55.1	55.5	17.0	0.0	11.6	4.9	13.0	20.0
Cycle Q Clear(g_c), s	17.1	9.3	1.9	1.6	55.1	55.5	17.0	0.0	11.6	4.9	13.0	20.0
Prop In Lane	1.00		1.00	1.00		0.09	1.00		0.09	1.00		1.00
Lane Grp Cap(c), veh/h	311	1909	1039	512	779	807	301	0	390	292	261	437
V/C Ratio(X)	0.92	0.23	0.06	0.07	0.93	0.93	0.85	0.00	0.44	0.25	0.68	0.98
Avail Cap(c_a), veh/h	367	2033	1095	533	806	835	301	0	390	297	261	437
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	44.5	17.5	8.8	20.1	38.1	38.2	45.8	0.0	49.0	49.5	58.6	51.5
Incr Delay (d2), s/veh	25.5	0.1	0.0	0.1	16.5	16.6	19.4	0.0	0.8	0.4	7.1	37.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	12.4	3.9	0.7	0.7	27.3	28.5	9.4	0.0	5.5	2.2	6.7	19.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	70.0	17.6	8.8	20.2	54.6	54.8	65.2	0.0	49.8	50.0	65.7	88.5
LnGrp LOS	E	B	A	C	D	D	E	A	D	D	E	F
Approach Vol, veh/h		781			1510			426			677	
Approach Delay, s/veh		36.1			53.9			59.1			78.4	
Approach LOS		D			D			E			E	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	12.6	36.4	11.3	83.0	23.0	26.0	25.5	68.8				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	7.0	30.0	7.0	82.0	17.0	20.0	24.0	65.0				
Max Q Clear Time (g_c+I1), s	6.9	13.6	3.6	11.3	19.0	22.0	19.1	57.5				
Green Ext Time (p_c), s	0.0	0.8	0.0	3.5	0.0	0.0	0.4	5.3				
Intersection Summary												
HCM 6th Ctrl Delay			55.3									
HCM 6th LOS			E									

HCM 6th Signalized Intersection Summary

2: Normandy Blvd & Elkcam Blvd

07/09/2024



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	334	158	314	72	88	240
Future Volume (veh/h)	334	158	314	72	88	240
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	363	172	341	78	96	261
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	528	470	728	165	502	1603
Arrive On Green	0.30	0.30	0.25	0.25	0.07	0.45
Sat Flow, veh/h	1781	1585	2973	650	1781	3647
Grp Volume(v), veh/h	363	172	209	210	96	261
Grp Sat Flow(s),veh/h/ln	1781	1585	1777	1753	1781	1777
Q Serve(g_s), s	5.7	2.7	3.2	3.2	1.1	1.4
Cycle Q Clear(g_c), s	5.7	2.7	3.2	3.2	1.1	1.4
Prop In Lane	1.00	1.00		0.37	1.00	
Lane Grp Cap(c), veh/h	528	470	449	443	502	1603
V/C Ratio(X)	0.69	0.37	0.46	0.47	0.19	0.16
Avail Cap(c_a), veh/h	2529	2250	2971	2931	2621	10874
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	9.9	8.8	10.0	10.1	6.8	5.2
Incr Delay (d2), s/veh	1.6	0.5	0.7	0.8	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	0.7	1.0	1.0	0.3	0.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	11.5	9.3	10.8	10.8	6.9	5.2
LnGrp LOS	B	A	B	B	A	A
Approach Vol, veh/h	535		419			357
Approach Delay, s/veh	10.8		10.8			5.7
Approach LOS	B		B			A
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	6.3	12.0			18.3	13.4
Change Period (Y+Rc), s	4.0	4.0			4.0	4.0
Max Green Setting (Gmax), s	40.0	53.0			97.0	45.0
Max Q Clear Time (g_c+I1), s	3.1	5.2			3.4	7.7
Green Ext Time (p_c), s	0.3	2.8			1.9	1.8
Intersection Summary						
HCM 6th Ctrl Delay			9.4			
HCM 6th LOS			A			

HCM 6th Signalized Intersection Summary

3: Normandy Blvd & Graves Ave

07/09/2024



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↵	↑↑	↵	↵↵
Traffic Volume (veh/h)	252	140	155	375	314	144
Future Volume (veh/h)	252	140	155	375	314	144
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	274	152	168	408	341	157
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	521	999	366	1210	862	1645
Arrive On Green	0.15	0.15	0.11	0.34	0.48	0.48
Sat Flow, veh/h	3647	1585	1781	3647	1781	2790
Grp Volume(v), veh/h	274	152	168	408	341	157
Grp Sat Flow(s),veh/h/ln	1777	1585	1781	1777	1781	1395
Q Serve(g_s), s	4.9	2.7	5.1	5.8	8.3	1.7
Cycle Q Clear(g_c), s	4.9	2.7	5.1	5.8	8.3	1.7
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	521	999	366	1210	862	1645
V/C Ratio(X)	0.53	0.15	0.46	0.34	0.40	0.10
Avail Cap(c_a), veh/h	2136	1719	909	3907	862	1645
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.9	5.2	19.8	16.8	11.2	6.1
Incr Delay (d2), s/veh	0.8	0.1	0.9	0.2	1.4	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.0	2.3	2.1	2.2	3.2	0.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	27.7	5.2	20.7	16.9	12.6	6.2
LnGrp LOS	C	A	C	B	B	A
Approach Vol, veh/h	426			576	498	
Approach Delay, s/veh	19.7			18.0	10.6	
Approach LOS	B			B	B	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	13.2	16.0			29.2	39.0
Change Period (Y+Rc), s	6.0	6.0			6.0	6.0
Max Green Setting (Gmax), s	28.0	41.0			75.0	33.0
Max Q Clear Time (g_c+I1), s	7.1	6.9			7.8	10.3
Green Ext Time (p_c), s	0.4	2.4			3.1	1.7
Intersection Summary						
HCM 6th Ctrl Delay			16.0			
HCM 6th LOS			B			

HCM Signalized Intersection Capacity Analysis

4: Graves Rd & Howland Blvd

07/09/2024



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↗	↖↖	↗	↖↗	↖↖	↗	↖	↖	↗	↖	↖	↗
Traffic Volume (vph)	81	460	60	350	1720	11	308	33	186	19	36	78
Future Volume (vph)	81	460	60	350	1720	11	308	33	186	19	36	78
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.96	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	3433	3539	1583	1681	1701	1583	1770	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.96	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	3433	3539	1583	1681	1701	1583	1770	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	88	500	65	380	1870	12	335	36	202	21	39	85
RTOR Reduction (vph)	0	0	26	0	0	4	0	0	145	0	0	73
Lane Group Flow (vph)	88	500	39	380	1870	8	184	187	57	21	39	12
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Split	NA	pm+ov	Split	NA	pm+ov
Protected Phases	5	2	8	1	6	4	8	8	1	4	4	5
Permitted Phases			2			6			8			4
Actuated Green, G (s)	9.0	65.7	83.4	21.3	78.0	88.3	17.7	17.7	39.0	10.3	10.3	19.3
Effective Green, g (s)	9.0	65.7	83.4	21.3	78.0	88.3	17.7	17.7	39.0	10.3	10.3	19.3
Actuated g/C Ratio	0.06	0.47	0.60	0.15	0.56	0.64	0.13	0.13	0.28	0.07	0.07	0.14
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	222	1672	949	526	1985	1073	214	216	512	131	138	219
v/s Ratio Prot	0.03	0.14	0.01	c0.11	c0.53	0.00	0.11	c0.11	0.02	0.01	c0.02	0.00
v/s Ratio Perm			0.02			0.00			0.02			0.00
v/c Ratio	0.40	0.30	0.04	0.72	0.94	0.01	0.86	0.87	0.11	0.16	0.28	0.05
Uniform Delay, d1	62.4	22.5	11.4	56.0	28.4	9.3	59.4	59.5	37.1	60.3	60.9	51.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.2	0.1	0.0	4.9	9.7	0.0	27.3	28.4	0.1	0.6	1.1	0.1
Delay (s)	63.6	22.6	11.4	60.9	38.1	9.3	86.8	87.9	37.2	60.9	62.0	52.0
Level of Service	E	C	B	E	D	A	F	F	D	E	E	D
Approach Delay (s)		27.0			41.8			69.7			56.0	
Approach LOS		C			D			E			E	

Intersection Summary		
HCM 2000 Control Delay	44.1	HCM 2000 Level of Service D
HCM 2000 Volume to Capacity ratio	0.88	
Actuated Cycle Length (s)	139.0	Sum of lost time (s) 24.0
Intersection Capacity Utilization	84.4%	ICU Level of Service E
Analysis Period (min)	15	

c Critical Lane Group

Intersection						
Int Delay, s/veh	2.5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	52	28	367	33	72	250
Future Vol, veh/h	52	28	367	33	72	250
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	57	30	399	36	78	272

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	845	417	0	0	435
Stage 1	417	-	-	-	-
Stage 2	428	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218
Pot Cap-1 Maneuver	333	636	-	-	1125
Stage 1	665	-	-	-	-
Stage 2	657	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	306	636	-	-	1125
Mov Cap-2 Maneuver	306	-	-	-	-
Stage 1	665	-	-	-	-
Stage 2	603	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	17.5	0	1.9
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	374	1125
HCM Lane V/C Ratio	-	-	0.233	0.07
HCM Control Delay (s)	-	-	17.5	8.4
HCM Lane LOS	-	-	C	A
HCM 95th %tile Q(veh)	-	-	0.9	0.2

HCM 6th TWSC
6: Normany Blvd & Access (N)

07/09/2024

Intersection						
Int Delay, s/veh	0.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↖			↑
Traffic Vol, veh/h	0	28	400	33	0	302
Future Vol, veh/h	0	28	400	33	0	302
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	30	435	36	0	328

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	-	453	0	0	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	6.22	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	3.318	-	-	-
Pot Cap-1 Maneuver	0	607	-	-	0
Stage 1	0	-	-	-	0
Stage 2	0	-	-	-	0
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	-	607	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.2	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBT
Capacity (veh/h)	-	-	607
HCM Lane V/C Ratio	-	-	0.05
HCM Control Delay (s)	-	-	11.2
HCM Lane LOS	-	-	B
HCM 95th %tile Q(veh)	-	-	0.2

HCM 6th TWSC
7: Normany Blvd & Access (Main)

07/09/2024

Intersection						
Int Delay, s/veh	2.5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	52	28	434	33	72	230
Future Vol, veh/h	52	28	434	33	72	230
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	57	30	472	36	78	250

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	896	490	0	0	508
Stage 1	490	-	-	-	-
Stage 2	406	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218
Pot Cap-1 Maneuver	311	578	-	-	1057
Stage 1	616	-	-	-	-
Stage 2	673	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	284	578	-	-	1057
Mov Cap-2 Maneuver	284	-	-	-	-
Stage 1	616	-	-	-	-
Stage 2	615	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	18.9	0	2.1
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	346	1057
HCM Lane V/C Ratio	-	-	0.251	0.074
HCM Control Delay (s)	-	-	18.9	8.7
HCM Lane LOS	-	-	C	A
HCM 95th %tile Q(veh)	-	-	1	0.2

Intersection						
Int Delay, s/veh	0.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↘			↑
Traffic Vol, veh/h	0	28	467	33	0	282
Future Vol, veh/h	0	28	467	33	0	282
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	30	508	36	0	307

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	-	526	0	0	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	6.22	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	3.318	-	-	-
Pot Cap-1 Maneuver	0	552	-	-	0
Stage 1	0	-	-	-	0
Stage 2	0	-	-	-	0
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	-	552	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.9	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBT
Capacity (veh/h)	-	-	552
HCM Lane V/C Ratio	-	-	0.055
HCM Control Delay (s)	-	-	11.9
HCM Lane LOS	-	-	B
HCM 95th %tile Q(veh)	-	-	0.2

HCM 6th Signalized Intersection Summary

1: Normandy Blvd & Saxon Blvd

07/09/2024



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	588	1565	303	37	743	79	210	229	43	132	224	246
Future Volume (veh/h)	588	1565	303	37	743	79	210	229	43	132	224	246
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	639	1701	329	40	808	86	228	249	47	143	243	267
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	652	1972	1022	149	847	90	231	293	55	174	281	765
Arrive On Green	0.33	0.56	0.56	0.04	0.26	0.26	0.09	0.19	0.19	0.05	0.15	0.15
Sat Flow, veh/h	1781	3554	1585	1781	3240	345	1781	1530	289	1781	1870	1585
Grp Volume(v), veh/h	639	1701	329	40	443	451	228	0	296	143	243	267
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1808	1781	0	1818	1781	1870	1585
Q Serve(g_s), s	46.4	59.0	13.4	2.3	35.4	35.4	13.0	0.0	22.7	7.0	18.3	15.1
Cycle Q Clear(g_c), s	46.4	59.0	13.4	2.3	35.4	35.4	13.0	0.0	22.7	7.0	18.3	15.1
Prop In Lane	1.00		1.00	1.00		0.19	1.00		0.16	1.00		1.00
Lane Grp Cap(c), veh/h	652	1972	1022	149	465	473	231	0	349	174	281	765
V/C Ratio(X)	0.98	0.86	0.32	0.27	0.95	0.95	0.99	0.00	0.85	0.82	0.87	0.35
Avail Cap(c_a), veh/h	652	1972	1022	179	467	476	231	0	415	174	350	823
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	40.2	27.4	11.5	37.4	52.5	52.5	50.9	0.0	56.4	56.4	60.0	23.3
Incr Delay (d2), s/veh	30.3	4.2	0.2	0.9	30.0	29.7	55.6	0.0	13.4	26.4	16.8	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	28.0	25.6	4.8	1.1	19.6	20.0	5.6	0.0	11.7	3.1	10.0	5.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	70.4	31.6	11.7	38.3	82.5	82.2	106.5	0.0	69.7	82.8	76.8	23.5
LnGrp LOS	E	C	B	D	F	F	F	A	E	F	E	C
Approach Vol, veh/h		2669			934			524				653
Approach Delay, s/veh		38.5			80.5			85.7				56.3
Approach LOS		D			F			F				E
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	13.0	33.7	11.6	86.2	19.0	27.7	54.0	43.8				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	7.0	33.0	8.0	78.0	13.0	27.0	48.0	38.0				
Max Q Clear Time (g_c+I1), s	9.0	24.7	4.3	61.0	15.0	20.3	48.4	37.4				
Green Ext Time (p_c), s	0.0	1.1	0.0	12.6	0.0	1.4	0.0	0.3				

Intersection Summary

HCM 6th Ctrl Delay	54.3
HCM 6th LOS	D

HCM 6th Signalized Intersection Summary
 2: Normandy Blvd & Elkcam Blvd

07/09/2024



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	218	69	312	268	264	454
Future Volume (veh/h)	218	69	312	268	264	454
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	237	75	339	291	287	493
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	347	308	607	512	609	2111
Arrive On Green	0.19	0.19	0.33	0.33	0.16	0.59
Sat Flow, veh/h	1781	1585	1922	1541	1781	3647
Grp Volume(v), veh/h	237	75	329	301	287	493
Grp Sat Flow(s),veh/h/ln	1781	1585	1777	1593	1781	1777
Q Serve(g_s), s	4.7	1.5	5.7	5.9	3.3	2.5
Cycle Q Clear(g_c), s	4.7	1.5	5.7	5.9	3.3	2.5
Prop In Lane	1.00	1.00		0.97	1.00	
Lane Grp Cap(c), veh/h	347	308	590	529	609	2111
V/C Ratio(X)	0.68	0.24	0.56	0.57	0.47	0.23
Avail Cap(c_a), veh/h	2119	1885	2489	2231	2214	9110
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	14.2	12.9	10.4	10.4	6.0	3.6
Incr Delay (d2), s/veh	2.4	0.4	0.8	1.0	0.6	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	0.5	1.8	1.7	0.7	0.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	16.5	13.3	11.2	11.4	6.6	3.7
LnGrp LOS	B	B	B	B	A	A
Approach Vol, veh/h	312		630			780
Approach Delay, s/veh	15.8		11.3			4.8
Approach LOS	B		B			A
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	9.9	16.6			26.5	11.4
Change Period (Y+Rc), s	4.0	4.0			4.0	4.0
Max Green Setting (Gmax), s	40.0	53.0			97.0	45.0
Max Q Clear Time (g_c+I1), s	5.3	7.9			4.5	6.7
Green Ext Time (p_c), s	0.9	4.7			3.8	1.0
Intersection Summary						
HCM 6th Ctrl Delay			9.1			
HCM 6th LOS			A			

HCM 6th Signalized Intersection Summary

3: Normandy Blvd & Graves Ave

07/09/2024



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↵	↑↑	↵	↗↗
Traffic Volume (veh/h)	584	414	262	419	216	127
Future Volume (veh/h)	584	414	262	419	216	127
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	635	450	285	455	235	138
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	930	1027	389	1682	688	1472
Arrive On Green	0.26	0.26	0.14	0.47	0.39	0.39
Sat Flow, veh/h	3647	1585	1781	3647	1781	2790
Grp Volume(v), veh/h	635	450	285	455	235	138
Grp Sat Flow(s),veh/h/ln	1777	1585	1781	1777	1781	1395
Q Serve(g_s), s	13.7	11.9	9.3	6.6	8.0	2.1
Cycle Q Clear(g_c), s	13.7	11.9	9.3	6.6	8.0	2.1
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	930	1027	389	1682	688	1472
V/C Ratio(X)	0.68	0.44	0.73	0.27	0.34	0.09
Avail Cap(c_a), veh/h	1706	1373	721	3120	688	1472
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.4	7.4	19.4	13.6	18.5	10.0
Incr Delay (d2), s/veh	0.9	0.3	2.7	0.1	1.4	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.8	9.3	3.9	2.5	3.4	0.6
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	29.3	7.7	22.1	13.7	19.9	10.1
LnGrp LOS	C	A	C	B	B	B
Approach Vol, veh/h	1085			740	373	
Approach Delay, s/veh	20.3			16.9	16.3	
Approach LOS	C			B	B	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	18.1	28.3			46.4	39.0
Change Period (Y+Rc), s	6.0	6.0			6.0	6.0
Max Green Setting (Gmax), s	28.0	41.0			75.0	33.0
Max Q Clear Time (g_c+I1), s	11.3	15.7			8.6	10.0
Green Ext Time (p_c), s	0.8	6.6			3.5	1.2

Intersection Summary

HCM 6th Ctrl Delay	18.5
HCM 6th LOS	B

HCM Signalized Intersection Capacity Analysis

4: Graves Rd & Howland Blvd

07/09/2024



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	95	31	50	370	890	19	112	20	650	57	31	47
Future Volume (vph)	95	31	50	370	890	19	112	20	650	57	31	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.97	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	3433	3539	1583	1681	1710	1583	1770	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.97	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	3433	3539	1583	1681	1710	1583	1770	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	103	34	54	402	967	21	122	22	707	62	34	51
RTOR Reduction (vph)	0	0	42	0	0	10	0	0	335	0	0	40
Lane Group Flow (vph)	103	34	12	402	967	11	72	72	372	62	34	11
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Split	NA	pm+ov	Split	NA	pm+ov
Protected Phases	5	2	8	1	6	4	8	8	1	4	4	5
Permitted Phases			2			6			8			4
Actuated Green, G (s)	8.4	9.7	20.6	34.8	36.1	46.6	10.9	10.9	45.7	10.5	10.5	18.9
Effective Green, g (s)	8.4	9.7	20.6	34.8	36.1	46.6	10.9	10.9	45.7	10.5	10.5	18.9
Actuated g/C Ratio	0.09	0.11	0.23	0.39	0.40	0.52	0.12	0.12	0.51	0.12	0.12	0.21
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	320	381	362	1328	1421	926	203	207	910	206	217	332
v/s Ratio Prot	0.03	0.01	0.00	0.12	c0.27	0.00	0.04	0.04	c0.16	c0.04	0.02	0.00
v/s Ratio Perm			0.00			0.01			0.08			0.00
v/c Ratio	0.32	0.09	0.03	0.30	0.68	0.01	0.35	0.35	0.41	0.30	0.16	0.03
Uniform Delay, d1	38.1	36.1	26.9	19.1	22.2	10.5	36.3	36.2	13.7	36.3	35.7	28.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.6	0.1	0.0	0.1	1.4	0.0	1.1	1.0	0.3	0.8	0.3	0.0
Delay (s)	38.7	36.2	27.0	19.3	23.5	10.5	37.3	37.3	14.0	37.2	36.1	28.3
Level of Service	D	D	C	B	C	B	D	D	B	D	D	C
Approach Delay (s)		34.9			22.1			18.0			33.8	
Approach LOS		C			C			B			C	

Intersection Summary		
HCM 2000 Control Delay	22.3	HCM 2000 Level of Service C
HCM 2000 Volume to Capacity ratio	0.60	
Actuated Cycle Length (s)	89.9	Sum of lost time (s) 24.0
Intersection Capacity Utilization	71.9%	ICU Level of Service C
Analysis Period (min)	15	

c Critical Lane Group

Intersection						
Int Delay, s/veh	2.5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	61	33	236	22	49	647
Future Vol, veh/h	61	33	236	22	49	647
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	66	36	257	24	53	703

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1078	269	0	0	281
Stage 1	269	-	-	-	-
Stage 2	809	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218
Pot Cap-1 Maneuver	242	770	-	-	1282
Stage 1	776	-	-	-	-
Stage 2	438	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	226	770	-	-	1282
Mov Cap-2 Maneuver	226	-	-	-	-
Stage 1	776	-	-	-	-
Stage 2	408	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	23	0	0.6
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	301	1282
HCM Lane V/C Ratio	-	-	0.339	0.042
HCM Control Delay (s)	-	-	23	7.9
HCM Lane LOS	-	-	C	A
HCM 95th %tile Q(veh)	-	-	1.5	0.1

HCM 6th TWSC
6: Normany Blvd & Access (N)

07/09/2024

Intersection						
Int Delay, s/veh	0.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↖			↑
Traffic Vol, veh/h	0	33	258	22	0	708
Future Vol, veh/h	0	33	258	22	0	708
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	36	280	24	0	770

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	-	292	0	0	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	6.22	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	3.318	-	-	-
Pot Cap-1 Maneuver	0	747	-	-	0
Stage 1	0	-	-	-	0
Stage 2	0	-	-	-	0
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	-	747	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.1	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBT
Capacity (veh/h)	-	-	747
HCM Lane V/C Ratio	-	-	0.048
HCM Control Delay (s)	-	-	10.1
HCM Lane LOS	-	-	B
HCM 95th %tile Q(veh)	-	-	0.2

HCM 6th TWSC
7: Normany Blvd & Access (Main)

07/09/2024

Intersection						
Int Delay, s/veh	2.6					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	61	33	280	22	49	659
Future Vol, veh/h	61	33	280	22	49	659
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	66	36	304	24	53	716

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1138	316	0	0	328
Stage 1	316	-	-	-	-
Stage 2	822	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218
Pot Cap-1 Maneuver	223	724	-	-	1232
Stage 1	739	-	-	-	-
Stage 2	432	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	207	724	-	-	1232
Mov Cap-2 Maneuver	207	-	-	-	-
Stage 1	739	-	-	-	-
Stage 2	401	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	25.5	0	0.6
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	276	1232
HCM Lane V/C Ratio	-	-	0.37	0.043
HCM Control Delay (s)	-	-	25.5	8.1
HCM Lane LOS	-	-	D	A
HCM 95th %tile Q(veh)	-	-	1.6	0.1

HCM 6th TWSC
 8: Access(S) & Normany Blvd

07/09/2024

Intersection

Int Delay, s/veh 0.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↖			↑
Traffic Vol, veh/h	0	33	302	22	0	720
Future Vol, veh/h	0	33	302	22	0	720
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	36	328	24	0	783

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	-	340	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	6.22	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	3.318	-
Pot Cap-1 Maneuver	0	702	-
Stage 1	0	-	-
Stage 2	0	-	-
Platoon blocked, %			
Mov Cap-1 Maneuver	-	702	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.4	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBT
Capacity (veh/h)	-	-	702
HCM Lane V/C Ratio	-	-	0.051
HCM Control Delay (s)	-	-	10.4
HCM Lane LOS	-	-	B
HCM 95th %tile Q(veh)	-	-	0.2

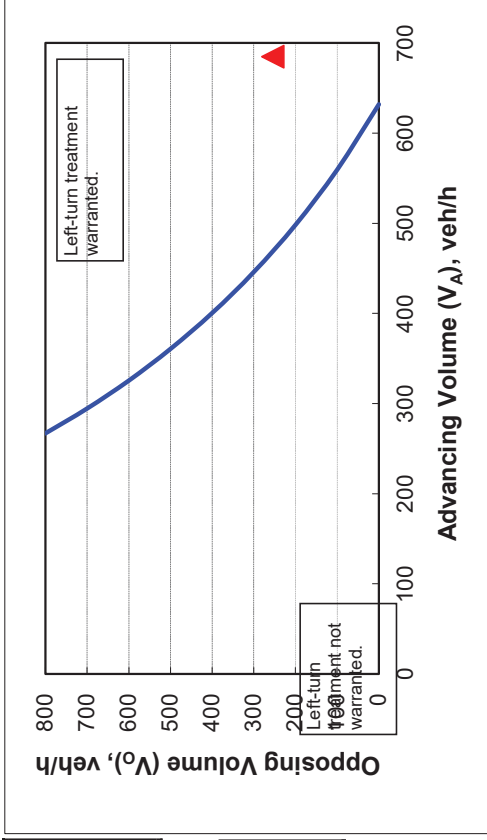
Appendix H: Turn Lane Analysis

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

2-lane roadway (English)

INPUT	
Variable	Value
85 th percentile speed, mph:	45
Percent of left-turns in advancing volume (V_A), %:	7%
Advancing volume (V_A), veh/h:	685
Opposing volume (V_O), veh/h:	254

OUTPUT	
Variable	Value
Limiting advancing volume (V_A), veh/h:	469
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment warranted.	



CALIBRATION CONSTANTS	
Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

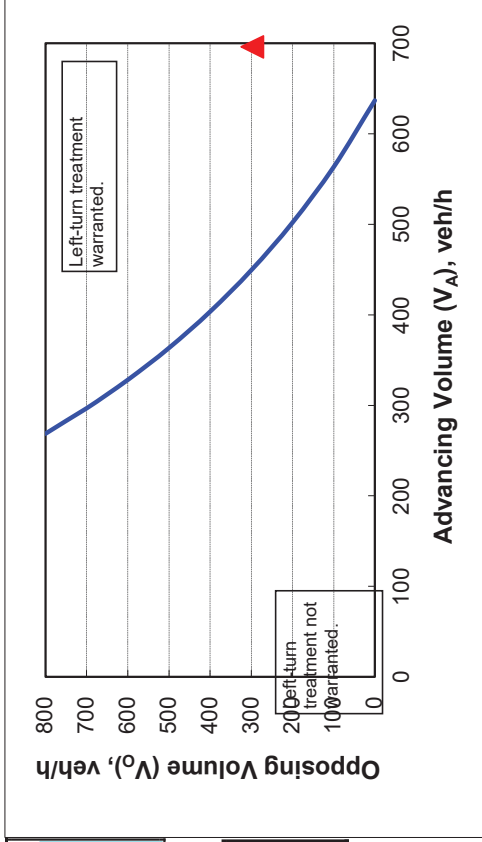
Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

2-lane roadway (English)

INPUT	
Variable	Value
85 th percentile speed, mph:	45
Percent of left-turns in advancing volume (V_A), %:	7%
Advancing volume (V_A), veh/h:	696
Opposing volume (V_O), veh/h:	298

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	450
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

Appendix I: Intersection Queue Analysis

HCM 6th Signalized Intersection Summary

1: Normandy Blvd & Saxon Blvd

07/10/2024



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	588	1565	303	37	743	79	210	229	43	132	224	246
Future Volume (veh/h)	588	1565	303	37	743	79	210	229	43	132	224	246
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	639	1701	329	40	808	86	228	249	47	143	243	267
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	652	1972	1022	149	847	90	231	293	55	174	281	765
Arrive On Green	0.33	0.56	0.56	0.04	0.26	0.26	0.09	0.19	0.19	0.05	0.15	0.15
Sat Flow, veh/h	1781	3554	1585	1781	3240	345	1781	1530	289	1781	1870	1585
Grp Volume(v), veh/h	639	1701	329	40	443	451	228	0	296	143	243	267
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1808	1781	0	1818	1781	1870	1585
Q Serve(g_s), s	46.4	59.0	13.4	2.3	35.4	35.4	13.0	0.0	22.7	7.0	18.3	15.1
Cycle Q Clear(g_c), s	46.4	59.0	13.4	2.3	35.4	35.4	13.0	0.0	22.7	7.0	18.3	15.1
Prop In Lane	1.00		1.00	1.00		0.19	1.00		0.16	1.00		1.00
Lane Grp Cap(c), veh/h	652	1972	1022	149	465	473	231	0	349	174	281	765
V/C Ratio(X)	0.98	0.86	0.32	0.27	0.95	0.95	0.99	0.00	0.85	0.82	0.87	0.35
Avail Cap(c_a), veh/h	652	1972	1022	179	467	476	231	0	415	174	350	823
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	40.2	27.4	11.5	37.4	52.5	52.5	50.9	0.0	56.4	56.4	60.0	23.3
Incr Delay (d2), s/veh	30.3	4.2	0.2	0.9	30.0	29.7	55.6	0.0	13.4	26.4	16.8	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	36.6	33.8	8.3	1.9	26.9	27.3	9.5	0.0	17.4	5.6	15.2	9.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	70.4	31.6	11.7	38.3	82.5	82.2	106.5	0.0	69.7	82.8	76.8	23.5
LnGrp LOS	E	C	B	D	F	F	F	A	E	F	E	C
Approach Vol, veh/h		2669			934			524				653
Approach Delay, s/veh		38.5			80.5			85.7				56.3
Approach LOS		D			F			F				E
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	13.0	33.7	11.6	86.2	19.0	27.7	54.0	43.8				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	7.0	33.0	8.0	78.0	13.0	27.0	48.0	38.0				
Max Q Clear Time (g_c+I1), s	9.0	24.7	4.3	61.0	15.0	20.3	48.4	37.4				
Green Ext Time (p_c), s	0.0	1.1	0.0	12.6	0.0	1.4	0.0	0.3				

Intersection Summary

HCM 6th Ctrl Delay	54.3
HCM 6th LOS	D

HCM 6th Signalized Intersection Summary

2: Normandy Blvd & Elkcam Blvd

07/10/2024



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	218	69	312	268	264	454
Future Volume (veh/h)	218	69	312	268	264	454
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	237	75	339	291	287	493
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	347	308	607	512	609	2111
Arrive On Green	0.19	0.19	0.33	0.33	0.16	0.59
Sat Flow, veh/h	1781	1585	1922	1541	1781	3647
Grp Volume(v), veh/h	237	75	329	301	287	493
Grp Sat Flow(s),veh/h/ln	1781	1585	1777	1593	1781	1777
Q Serve(g_s), s	4.7	1.5	5.7	5.9	3.3	2.5
Cycle Q Clear(g_c), s	4.7	1.5	5.7	5.9	3.3	2.5
Prop In Lane	1.00	1.00		0.97	1.00	
Lane Grp Cap(c), veh/h	347	308	590	529	609	2111
V/C Ratio(X)	0.68	0.24	0.56	0.57	0.47	0.23
Avail Cap(c_a), veh/h	2119	1885	2489	2231	2214	9110
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	14.2	12.9	10.4	10.4	6.0	3.6
Incr Delay (d2), s/veh	2.4	0.4	0.8	1.0	0.6	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	3.2	0.8	3.2	3.0	1.3	0.7
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	16.5	13.3	11.2	11.4	6.6	3.7
LnGrp LOS	B	B	B	B	A	A
Approach Vol, veh/h	312		630			780
Approach Delay, s/veh	15.8		11.3			4.8
Approach LOS	B		B			A
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	9.9	16.6			26.5	11.4
Change Period (Y+Rc), s	4.0	4.0			4.0	4.0
Max Green Setting (Gmax), s	40.0	53.0			97.0	45.0
Max Q Clear Time (g_c+I1), s	5.3	7.9			4.5	6.7
Green Ext Time (p_c), s	0.9	4.7			3.8	1.0
Intersection Summary						
HCM 6th Ctrl Delay			9.1			
HCM 6th LOS			A			

HCM 6th Signalized Intersection Summary

3: Normandy Blvd & Graves Ave

07/10/2024



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↵	↑↑	↵	↵↵
Traffic Volume (veh/h)	584	414	262	419	216	127
Future Volume (veh/h)	584	414	262	419	216	127
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	635	450	285	455	235	138
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	930	1027	389	1682	688	1472
Arrive On Green	0.26	0.26	0.14	0.47	0.39	0.39
Sat Flow, veh/h	3647	1585	1781	3647	1781	2790
Grp Volume(v), veh/h	635	450	285	455	235	138
Grp Sat Flow(s),veh/h/ln	1777	1585	1781	1777	1781	1395
Q Serve(g_s), s	13.7	11.9	9.3	6.6	8.0	2.1
Cycle Q Clear(g_c), s	13.7	11.9	9.3	6.6	8.0	2.1
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	930	1027	389	1682	688	1472
V/C Ratio(X)	0.68	0.44	0.73	0.27	0.34	0.09
Avail Cap(c_a), veh/h	1706	1373	721	3120	688	1472
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.4	7.4	19.4	13.6	18.5	10.0
Incr Delay (d2), s/veh	0.9	0.3	2.7	0.1	1.4	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	9.7	14.3	7.0	4.6	6.2	1.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	29.3	7.7	22.1	13.7	19.9	10.1
LnGrp LOS	C	A	C	B	B	B
Approach Vol, veh/h	1085			740	373	
Approach Delay, s/veh	20.3			16.9	16.3	
Approach LOS	C			B	B	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	18.1	28.3			46.4	39.0
Change Period (Y+Rc), s	6.0	6.0			6.0	6.0
Max Green Setting (Gmax), s	28.0	41.0			75.0	33.0
Max Q Clear Time (g_c+I1), s	11.3	15.7			8.6	10.0
Green Ext Time (p_c), s	0.8	6.6			3.5	1.2

Intersection Summary

HCM 6th Ctrl Delay	18.5
HCM 6th LOS	B

Queues

4: Graves Rd & Howland Blvd

07/10/2024



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	103	34	54	402	967	21	72	72	707	62	34	51
v/c Ratio	0.31	0.05	0.12	0.29	0.74	0.02	0.34	0.33	0.58	0.29	0.15	0.12
Control Delay	41.5	27.8	0.5	22.9	27.1	0.1	42.6	42.4	4.1	42.0	39.8	0.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.5	27.8	0.5	22.9	27.1	0.1	42.6	42.4	4.1	42.0	39.8	0.6
Queue Length 50th (ft)	26	8	0	52	224	0	36	36	3	30	16	0
Queue Length 95th (ft)	60	21	1	169	335	0	94	94	94	81	52	0
Internal Link Dist (ft)		555			745			579			524	
Turn Bay Length (ft)	340		340	545		750	285			155		
Base Capacity (vph)	484	940	586	2828	3205	1057	356	362	1539	375	394	497
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.04	0.09	0.14	0.30	0.02	0.20	0.20	0.46	0.17	0.09	0.10

Intersection Summary