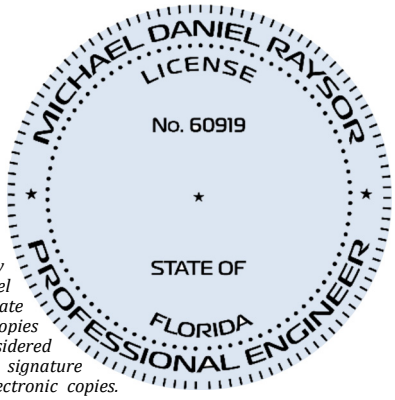
TECHNICAL MEMORANDUM

TO: 411ES, LLC
2753 FL-580, SUITE 110
CLEARWATER, FLORIDA 33761

FROM: MICHAEL D. RAYSOR, P.E.
RAYSOR TRANSPORTATION CONSULTING, LLC

SUBJECT: HARBORVIEW HOTEL
TRAFFIC IMPACT STUDY

DATE: AUGUST 27, 2021



This item has been digitally signed and sealed by Michael Daniel Raysor P.E., on the date adjacent to the seal. Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies.

1.0 | INTRODUCTION

This technical memorandum documents a TRAFFIC IMPACT STUDY undertaken in association with development permitting for the **"HARBORVIEW HOTEL"** project, located at 408 East Shore Drive, in Clearwater, Florida. The subject site is proposed to be developed to consist of a 92 unit hotel, with ancillary marina (boat dockage), integrated parking structure, adjacent surface parking, and valet operations. Refer to ***FIGURE 1.0*** for the project site location map and ***FIGURE 2.0*** for the project site concept plan.

2.0 | PROJECT SITE TRIP GENERATION

The daily and peak hour trip generation for the project site was estimated using trip characteristic data, as identified in the Institute of Transportation Engineers (ITE) *Trip Generation Manual* (10th edition); as summarized in ***TABLE 1.0***. The project site is anticipated to generate 770 trips per day, with 43 trips during the AM peak hour and 56 trips during the PM peak hour. The worst-case period was determined to be the PM peak hour, and was thus used as the analysis period for this study. The distribution of project generated traffic was estimated manually based on area land use patterns and roadway connectivity, as shown in ***FIGURE 3.0*** for PM peak hour conditions.

TABLE 1.0 | **PROJECT SITE TRIP GENERATION ESTIMATE**

ITE LUC	Land Use Description	Size	Weekday		AM Peak Hour				PM Peak Hour			
			Rate	Trips	Rate	Trips	Enter	Exit	Rate	Trips	Enter	Exit
310	Hotel	92 rooms	8.36	770	0.47	43	25	18	0.60	56	28	28

FIGURE 1.0 **| PROJECT SITE LOCATION**

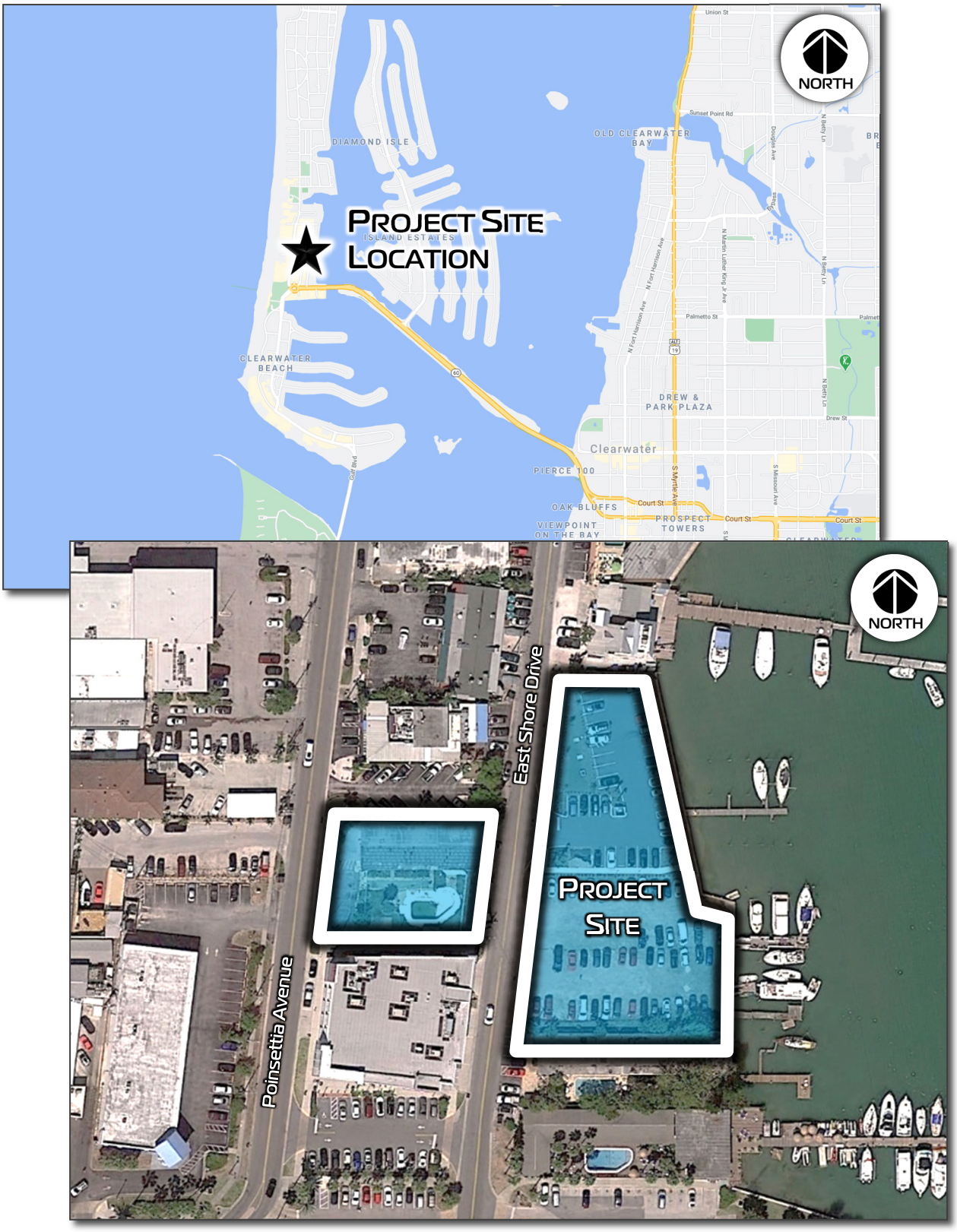


***FIGURE 2.0* | PROJECT SITE CONCEPT PLAN**

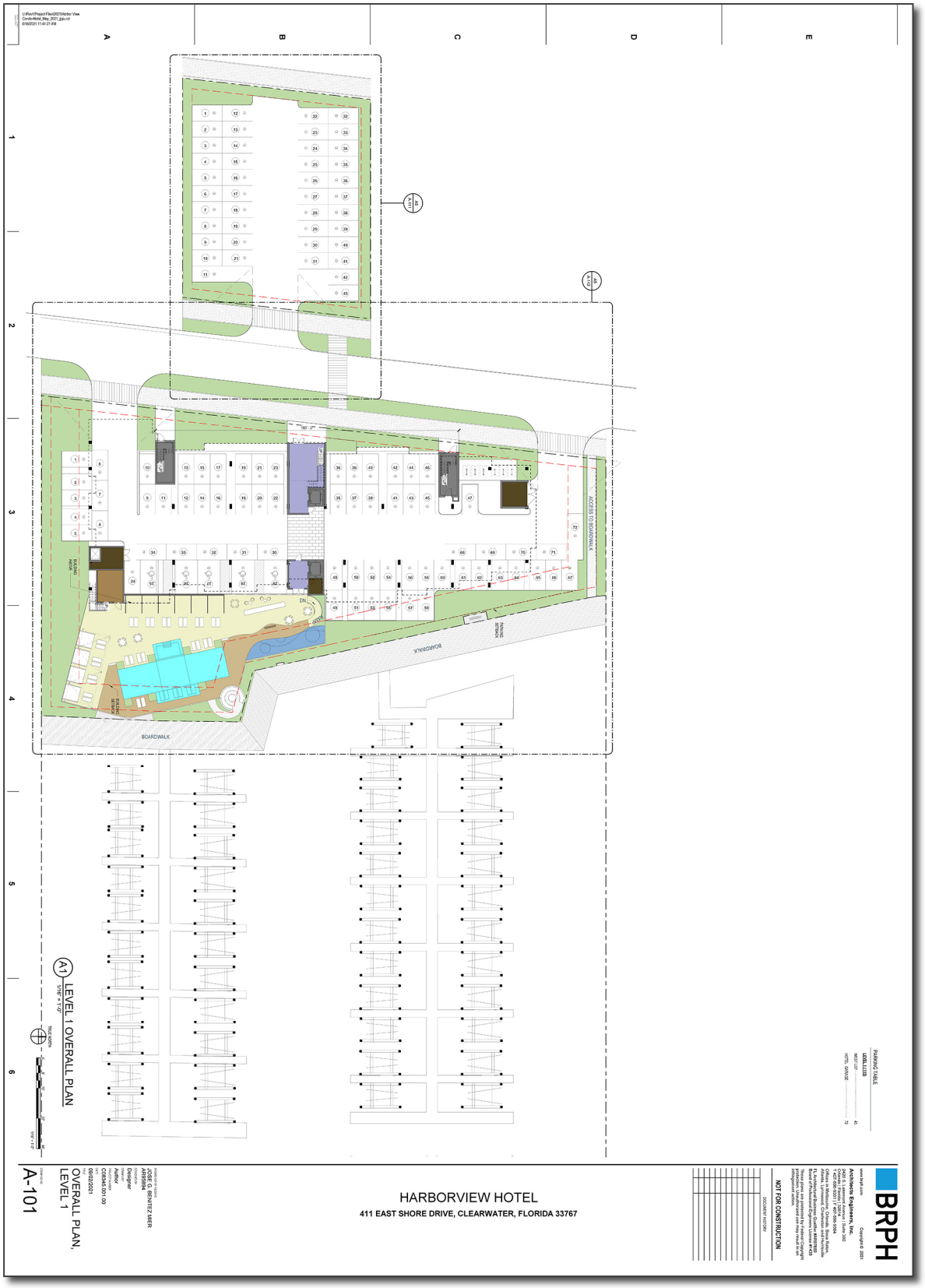
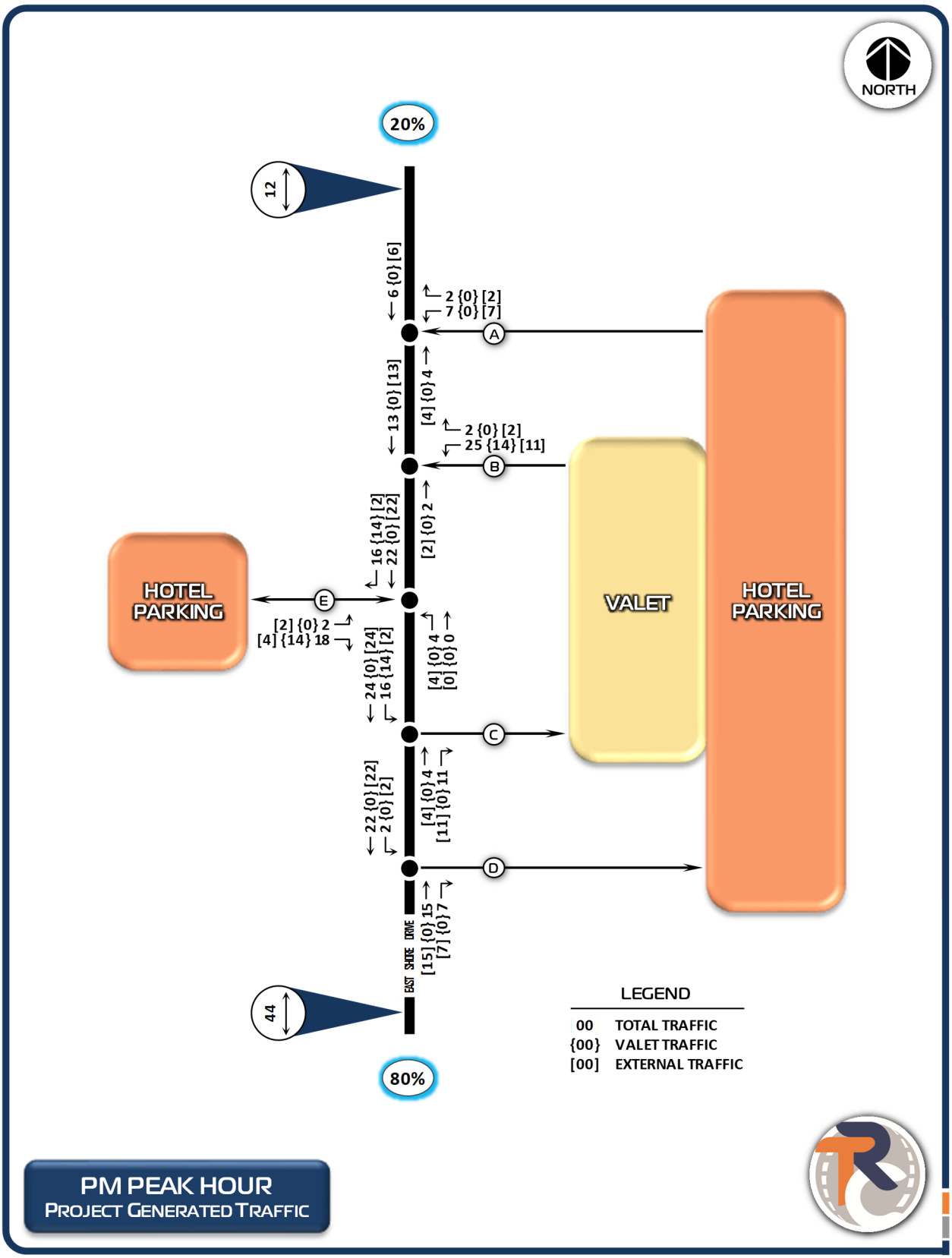


FIGURE 3.0 | **PROJECT GENERATED PM PEAK HOUR TRAFFIC VOLUMES**



3.0 | Study Area & Analysis Scenarios

The study area included in this analysis consisted of the project site access connections and the adjacent roadway segment of East Shore Drive. The project site is anticipated to be developed within two years or less, therefore 2023 was used as the analysis-horizon for this study.

4.0 | Traffic Volumes

Baseline traffic volumes (2015) were identified from the prior traffic studies prepared for the subject site, as shown in ***Figure 4.0*** and documented in ***Attachment A***. Background traffic volumes were estimated through the application of a 1.1% annual growth rate through the 2023 analysis-horizon as shown in ***Figure 5.0***, where the 1.1% annual growth rate was calculated from historical traffic volumes, as documented in ***Attachment B***. The traffic estimated to be generated by the subject project was added to the background traffic volumes to estimate post-development traffic volumes for use in this study, as shown in ***Figure 6.0***.

5.0 | Roadway Segment Analysis

An analysis of the study roadway segment was performed for PM peak hour post-development conditions. The analysis was conducted using FDOT's generalized service flow-rate tables, as shown in ***Table 2.0***, and further documented in ***Attachment C***. The results of the analysis indicate that acceptable operating conditions can be anticipated for the study roadway segment, at level of service "C" for PM peak hour post-development conditions.

Table 2.0 | **PM Peak Hour Post-Development Roadway Segment Analysis Summary**

Roadway Segment	LOS Std	Service Volume	Traffic Volume	LOS	V/C Ratio
East Shore Drive [north of project site]	D	1,197	284	**C**	**0.24**
East Shore Drive [south of project site]	D	1,197	316	**C**	**0.26**

FIGURE 4.0 | **BASELINE PM PEAK HOUR TRAFFIC VOLUMES**

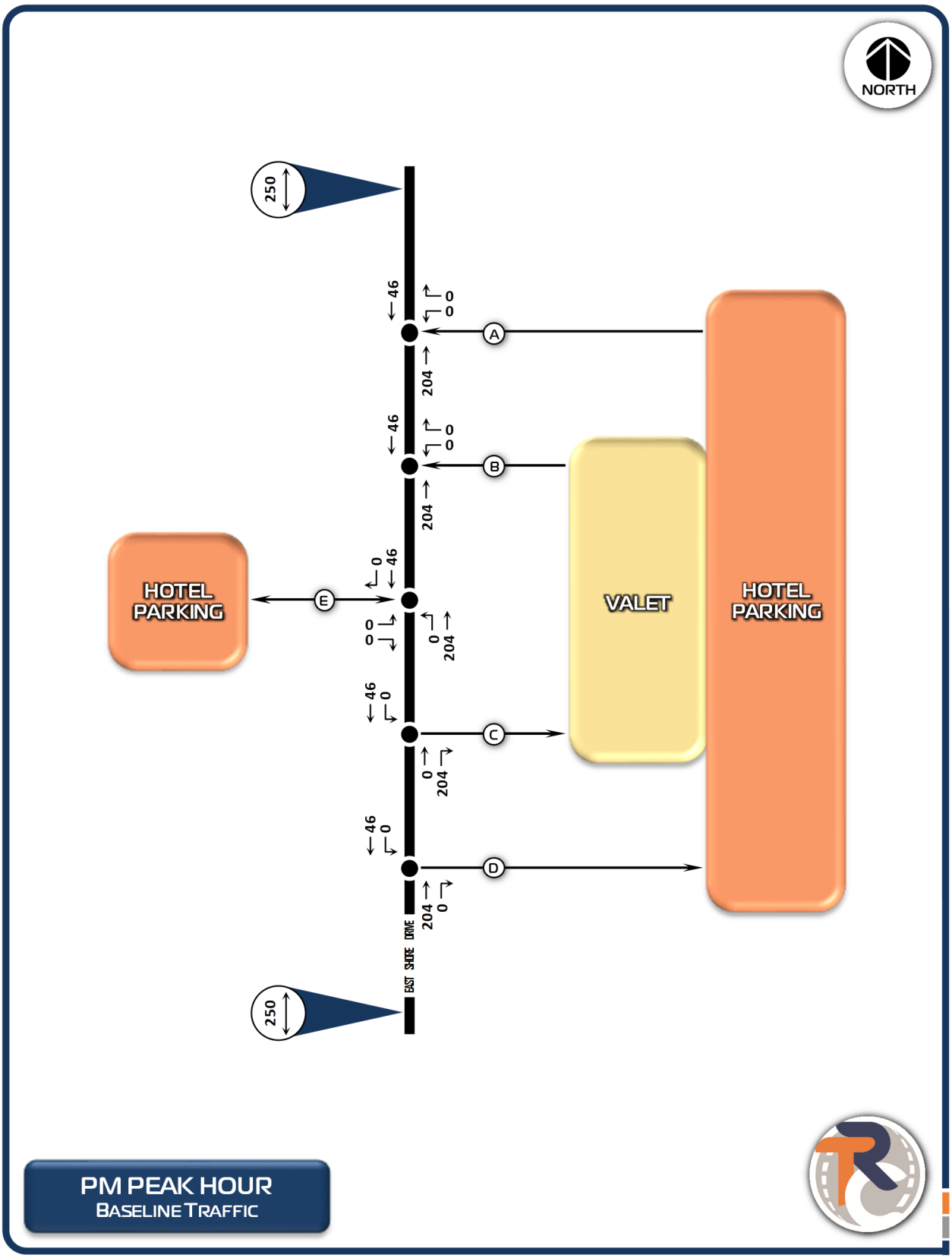


FIGURE 5.0 | **BACKGROUND PM PEAK HOUR TRAFFIC VOLUMES**

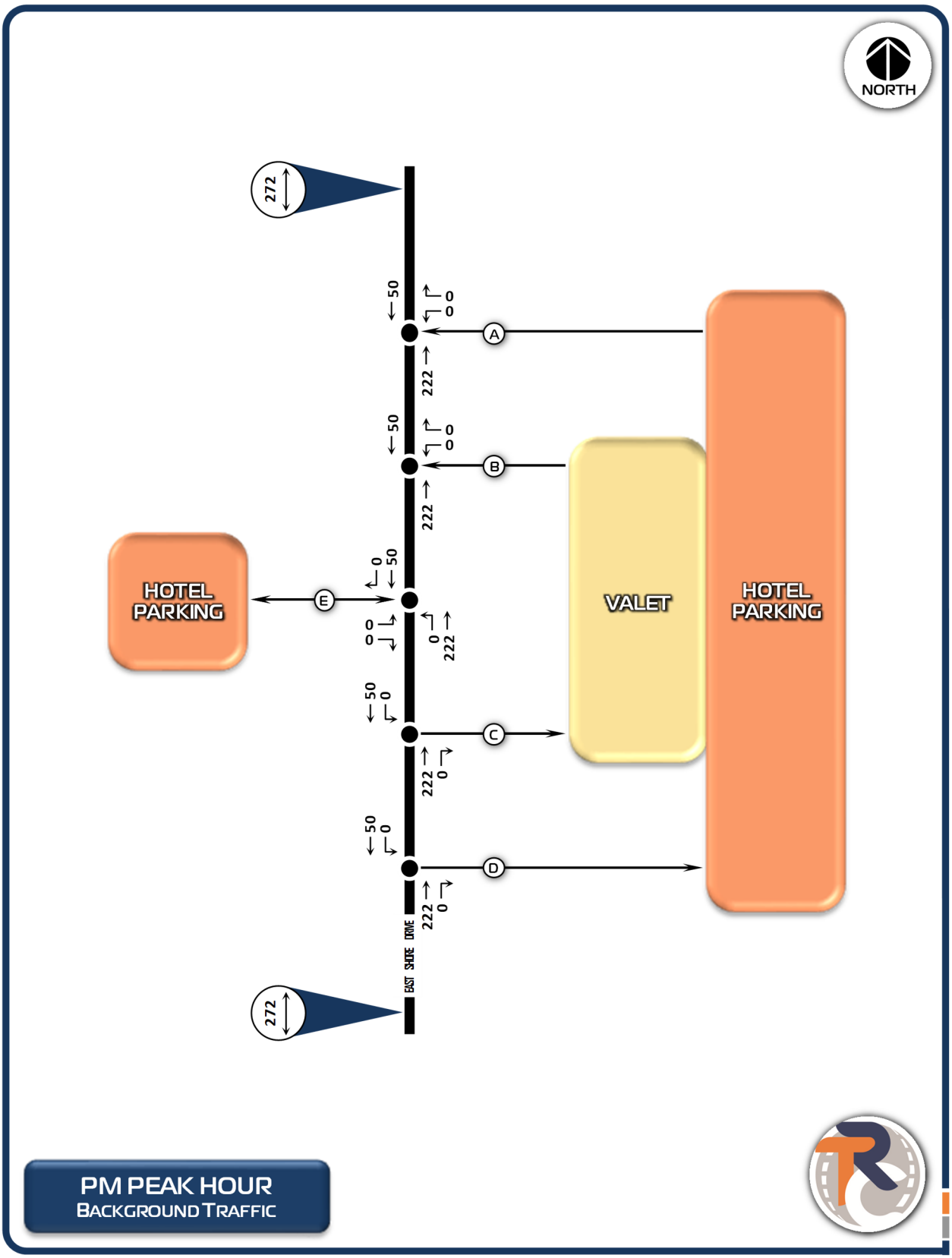
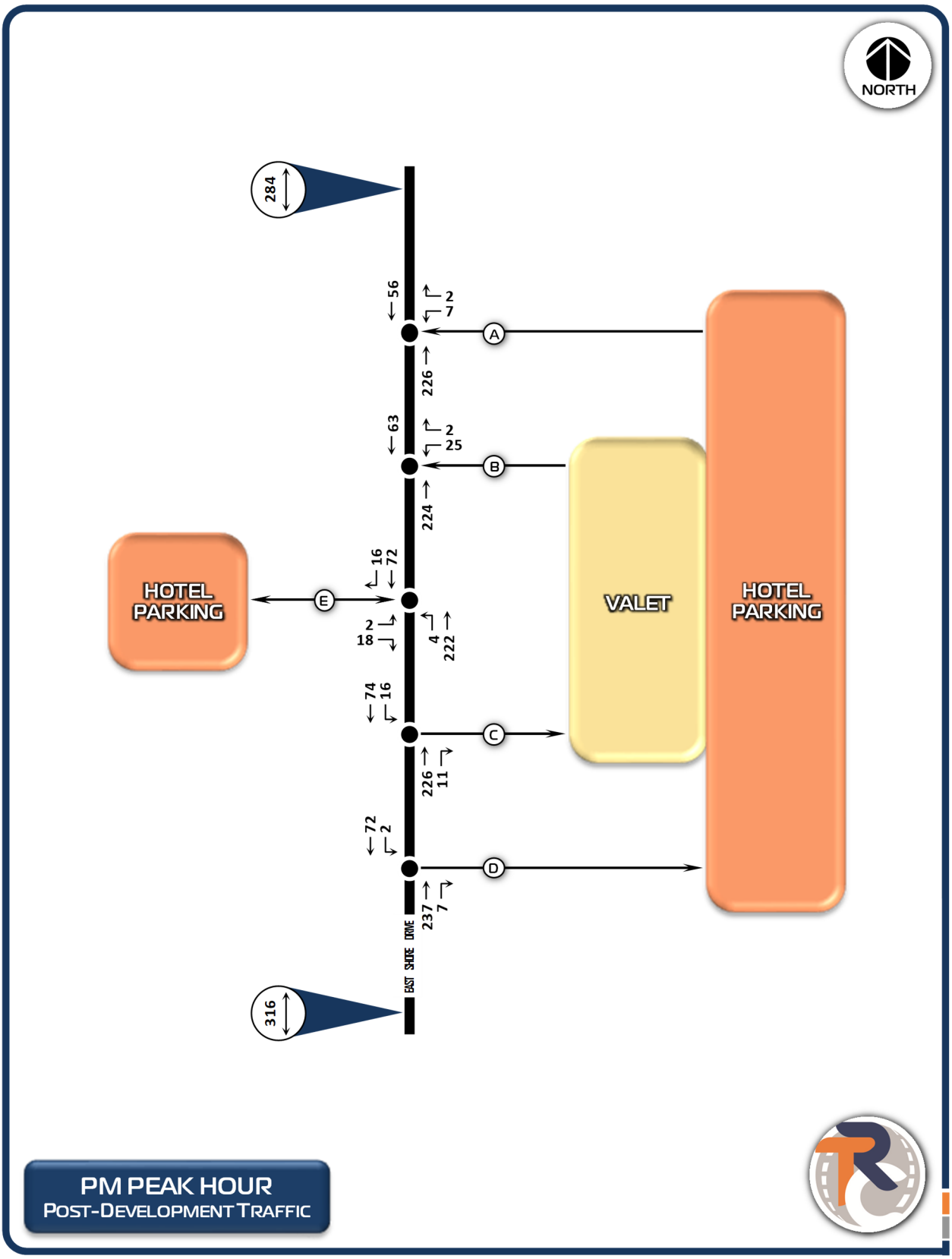


FIGURE 6.0 | **POST-DEVELOPMENT PEAK HOUR TRAFFIC VOLUMES**



6.0 | SITE ACCESS OPERATIONAL ANALYSIS

An operational analysis of the site access intersections was performed for PM peak hour conditions using *Highway Capacity Manual* methodologies calculated by the *Synchro* software program; as summarized in ***TABLE 3.0***, and further documented in ***ATTACHMENT D***. The results of the analysis indicate that acceptable operating conditions can be anticipated for the project site driveway connections, with all movements identified to operate at level of service "B" (or better) for PM peak hour post-development conditions.

TABLE 3.0 | **PM PEAK HOUR POST-DEVELOPMENT SITE ACCESS INTERSECTION OPERATIONAL ANALYSIS SUMMARY**

Location	Metric	Eastbound			Westbound			Northbound			Southbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Driveway A	LOS	[1]	[1]	[1]	**B**	[1]	[2]	[1]	[3]	[1]	[1]	[3]	[1]
	Delay	[1]	[1]	[1]	**10.2**	[1]	[2]	[1]	[3]	[1]	[1]	[3]	[1]
	V/C	[1]	[1]	[1]	**0.01**	[1]	[2]	[1]	[3]	[1]	[1]	[3]	[1]
Driveway B	LOS	[1]	[1]	[1]	**B**	[1]	[2]	[1]	[3]	[1]	[1]	[3]	[1]
	Delay	[1]	[1]	[1]	**10.5**	[1]	[2]	[1]	[3]	[1]	[1]	[3]	[1]
	V/C	[1]	[1]	[1]	**0.04**	[1]	[2]	[1]	[3]	[1]	[1]	[3]	[1]
Driveway C	LOS	[1]	[1]	[1]	[1]	[1]	[1]	[1]	[3]	[2]	[2]	**A**	[1]
	Delay	[1]	[1]	[1]	[1]	[1]	[1]	[1]	[3]	[2]	[2]	**1.5**	[1]
	V/C	[1]	[1]	[1]	[1]	[1]	[1]	[1]	[3]	[2]	[2]	**0.07**	[1]
Driveway D	LOS	[1]	[1]	[1]	[1]	[1]	[1]	[1]	[3]	[2]	[2]	**A**	[1]
	Delay	[1]	[1]	[1]	[1]	[1]	[1]	[1]	[3]	[2]	[2]	**0.2**	[1]
	V/C	[1]	[1]	[1]	[1]	[1]	[1]	[1]	[3]	[2]	[2]	**0.06**	[1]
Driveway E	LOS	**A**	[1]	[2]	[1]	[1]	[1]	[2]	**A**	[1]	[1]	[3]	[2]
	Delay	**9.0**	[1]	[2]	[1]	[1]	[1]	[2]	**0.1**	[1]	[1]	[3]	[2]
	V/C	**0.02**	[1]	[2]	[1]	[1]	[1]	[2]	**0.16**	[1]	[1]	[3]	[2]

[1] NOT APPLICABLE [2] SHARED LANE [3] UNOPPOSED MOVEMENT

7.0 | SITE ACCESS TURN LANE WARRANT EVALUATION

The potential need for new site access turn lanes on East Shore Drive at the project site driveway connections was evaluated; as documented in ***ATTACHMENT E***. The analysis was performed based on the turn lane warrant criteria pursuant to the *National Cooperative Highway Research Program, Report No. 279*. The results of the analysis found that site access turn lanes are not warranted on East Shore Drive at the project site driveway connections.

8.0 | CONCLUSION

Based on the data, analyses and findings presented within this TRAFFIC IMPACT STUDY prepared in association with development permitting for the **"HARBORVIEW HOTEL"** project, the following is concluded.

- **THE ADJACENT ROADWAY SEGMENT OF EAST SHORE DRIVE IS ANTICIPATED TO OPERATE ACCEPTABLY FOR PM PEAK HOUR POST-DEVELOPMENT TRAFFIC CONDITIONS.**

- **THE SITE ACCESS INTERSECTIONS ARE ANTICIPATED TO OPERATE ACCEPTABLY FOR PM PEAK HOUR POST-DEVELOPMENT TRAFFIC CONDITIONS.**

- **SITE ACCESS TURN LANES WERE FOUND TO NOT BE WARRANTED ON EAST SHORE DRIVE FOR PM PEAK HOUR POST-DEVELOPMENT TRAFFIC CONDITIONS.**

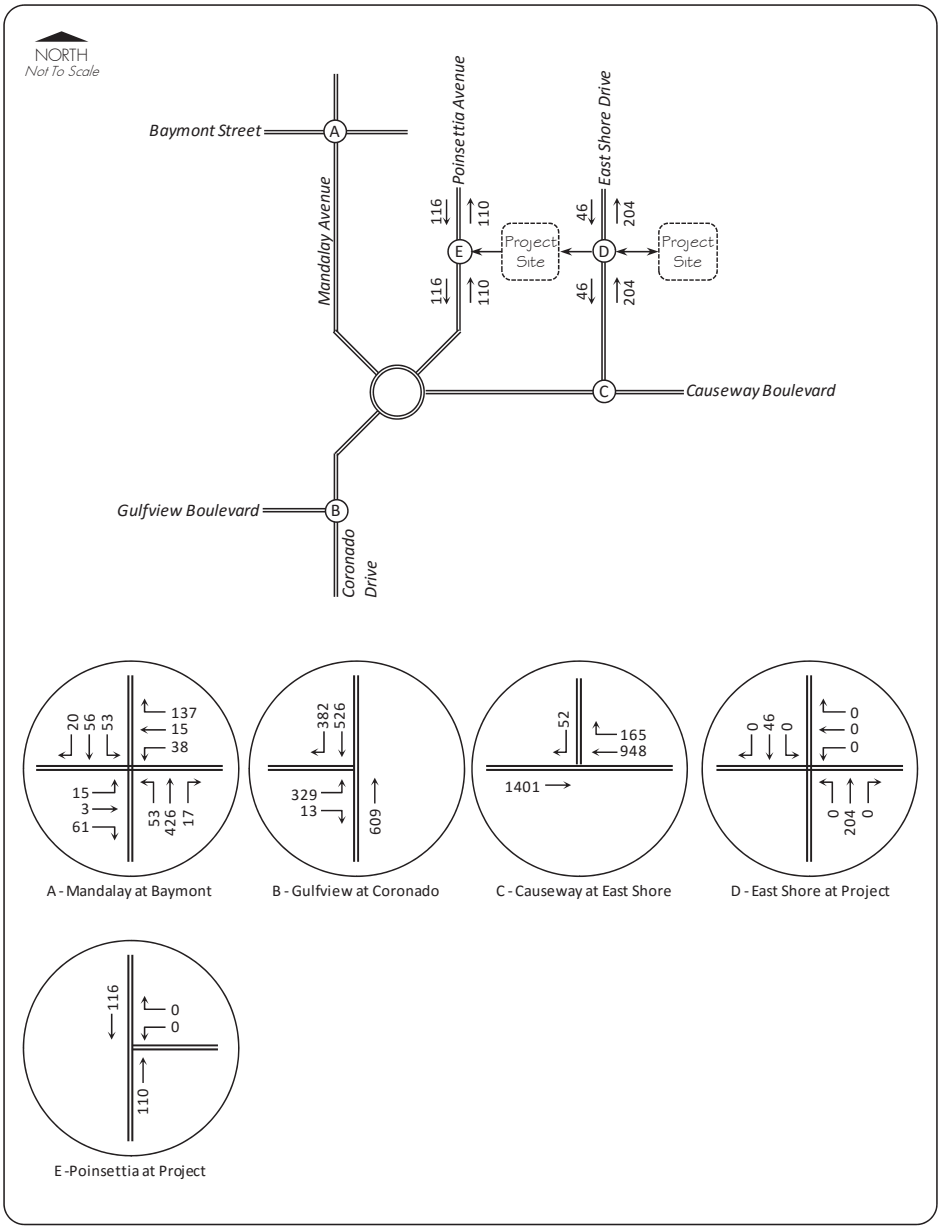
408 East Shore Drive

Traffic Impact Study

Attachment A

Baseline Traffic Volumes

FIGURE 4.0 EXISTING TRAFFIC VOLUMES (2015)



408 East Shore Drive

Traffic Impact Study

Attachment B

Historical Traffic Volume Growth

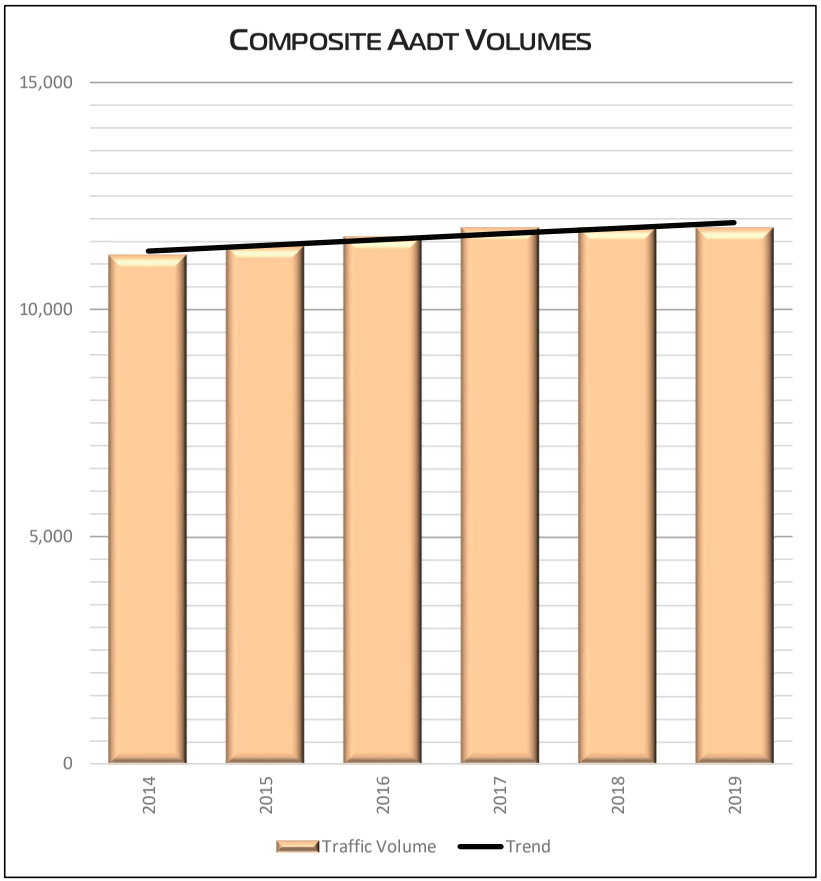
Harbor View

Growth Rate Calculations

Year	Location A	Location B	Location C	Location D	Total	Linear Trend
2019	11,800	--	--	--	11,800	11,914
2018	11,800	--	--	--	11,800	11,789
2017	11,800	--	--	--	11,800	11,663
2016	11,600	--	--	--	11,600	11,537
2015	11,400	--	--	--	11,400	11,411
2014	11,200	--	--	--	11,200	11,286
2013	--	--	--	--	--	--
2012	--	--	--	--	--	--
2011	--	--	--	--	--	--
2010	--	--	--	--	--	--
2009	--	--	--	--	--	--
			5 Year Annual Growth Rate >>>			1.1%

SOURCE

Location A: FDOT Count Station 15-9043 [Mandalay Avenue, north of SR 60]
Location B: N/A
Location C: N/A
Location D: N/A



RAYSOR Transportation Consulting

ATTACHMENT B - 1 of 2

FLORIDA DEPARTMENT OF TRANSPORTATION
TRANSPORTATION STATISTICS OFFICE
2019 HISTORICAL AADT REPORT

COUNTY: 15 - PINELLAS

SITE: 9043 - MANDALAY AVE, N OF SR 60

YEAR	AADT	DIRECTION 1	DIRECTION 2	*K FACTOR	D FACTOR	T FACTOR
2019	11800 V	N 5700	S 6100	9.00	55.70	3.30
2018	11800 R	N 5700	S 6100	9.00	55.50	3.20
2017	11800 T	N 5700	S 6100	9.00	54.50	2.90
2016	11600 S	N 5600	S 6000	9.00	55.90	2.90
2015	11400 F	N 5500	S 5900	9.00	55.00	2.90
2014	11200 C	N 5400	S 5800	9.00	55.40	3.20
2013	13000 S	0	0	9.00	55.20	3.00
2012	13000 F	0	0	9.00	55.00	2.80
2011	13000 C	N 0	S 0	9.00	56.50	3.10

408 East Shore Drive

Traffic Impact Study

Attachment C

FDOT Generalized Capacities

TABLE 4

Generalized **Peak Hour Two-Way** Volumes for Florida's **Urbanized Areas**[1]

12/18/12

INTERRUPTED FLOW FACILITIES

STATE SIGNALIZED ARTERIALS

Class I (40 mph or higher posted speed limit)

Lanes	Median	B	C	D	E
2	Undivided	*	1,510	1,600	**
4	Divided	*	3,420	3,580	**
6	Divided	*	5,250	5,390	**
8	Divided	*	7,090	7,210	**

Class II (35 mph or slower posted speed limit)

Lanes	Median	B	C	D	E
2	Undivided	*	660	1,330	1,410
4	Divided	*	1,310	2,920	3,040
6	Divided	*	2,090	4,500	4,590
8	Divided	*	2,880	6,060	6,130

Non-State Signalized Roadway Adjustments

(Alter corresponding state volumes by the indicated percent.)

Non-State Signalized Roadways - 10%

Median & Turn Lane Adjustments

Lanes	Median	Exclusive Left Lanes	Exclusive Right Lanes	Adjustment Factors
2	Divided	Yes	No	+5%
2	Undivided	No	No	-20%
Multi	Undivided	Yes	No	-5%
Multi	Undivided	No	No	-25%
–	–	–	Yes	+ 5%

One-Way Facility Adjustment

Multiply the corresponding two-directional volumes in this table by 0.6

BICYCLE MODE[2]

(Multiply motorized vehicle volumes shown below by number of directional roadway lanes to determine two-way maximum service volumes.)

Paved Shoulder/Bicycle Lane Coverage	B	C	D	E
0-49%	*	260	680	1,770
50-84%	190	600	1,770	>1,770
85-100%	830	1,770	>1,770	**

PEDESTRIAN MODE[2]

(Multiply motorized vehicle volumes shown below by number of directional roadway lanes to determine two-way maximum service volumes.)

Sidewalk Coverage	B	C	D	E
0-49%	*	*	250	850
50-84%	*	150	780	1,420
85-100%	340	960	1,560	>1,770

BUS MODE (Scheduled Fixed Route)[3]

(Buses in peak hour in peak direction)

Sidewalk Coverage	B	C	D	E
0-84%	> 5	≥ 4	≥ 3	≥ 2
85-100%	> 4	≥ 3	≥ 2	≥ 1

UNINTERRUPTED FLOW FACILITIES

FREEWAYS

Lanes	B	C	D	E
4	4,120	5,540	6,700	7,190
6	6,130	8,370	10,060	11,100
8	8,230	11,100	13,390	15,010
10	10,330	14,040	16,840	18,930
12	14,450	18,880	22,030	22,860

Freeway Adjustments

Auxiliary Lanes Present in Both Directions	Ramp Metering
+ 1,800	+ 5%

UNINTERRUPTED FLOW HIGHWAYS

Lanes	Median	B	C	D	E
2	Undivided	770	1,530	2,170	2,990
4	Divided	3,300	4,660	5,900	6,530
6	Divided	4,950	6,990	8,840	9,790

Uninterrupted Flow Highway Adjustments

Lanes	Median	Exclusive left lanes	Adjustment factors
2	Divided	Yes	+5%
Multi	Undivided	Yes	-5%
Multi	Undivided	No	-25%

[1] Values shown are presented as peak hour two-way volumes for levels of service and are for the automobile/truck modes unless specifically stated. This table does not constitute a standard and should be used only for general planning applications. The computer models from which this table is derived should be used for more specific planning applications. The table and deriving computer models should not be used for corridor or intersection design, where more refined techniques exist. Calculations are based on planning applications of the Highway Capacity Manual and the Transit Capacity and Quality of Service Manual.

[2] Level of service for the bicycle and pedestrian modes in this table is based on number of motorized vehicles, not number of bicyclists or pedestrians using the facility.

[3] Buses per hour shown are only for the peak hour in the single direction of the higher traffic flow.

* Cannot be achieved using table input value defaults.

** Not applicable for that level of service letter grade. For the automobile mode, volumes greater than level of service D become F because intersection capacities have been reached. For the bicycle mode, the level of service letter grade (including F) is not achievable because there is no maximum vehicle volume threshold using table input value defaults.

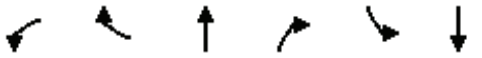
Source:
Florida Department of Transportation
Systems Planning Office
www.dot.state.fl.us/planning/systems/sm/los/default.shtm

408 East Shore Drive

Traffic Impact Study

Attachment D

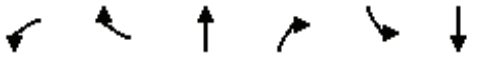
Intersection Analysis



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	7	2	226	0	0	56
Future Volume (Veh/h)	7	2	226	0	0	56
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	2	246	0	0	61
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	307	246			246	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	307	246			246	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	100			100	
cM capacity (veh/h)	685	793			1320	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	10	246	61
Volume Left	8	0	0
Volume Right	2	0	0
cSH	704	1700	1700
Volume to Capacity	0.01	0.14	0.04
Queue Length 95th (ft)	1	0	0
Control Delay (s)	10.2	0.0	0.0
Lane LOS	B		
Approach Delay (s)	10.2	0.0	0.0
Approach LOS	B		

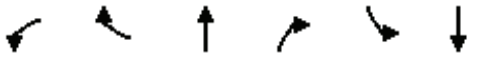
Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	21.9%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	25	2	224	0	0	63
Future Volume (Veh/h)	25	2	224	0	0	63
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	27	2	243	0	0	68
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	311	243			243	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	311	243			243	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	96	100			100	
cM capacity (veh/h)	681	796			1323	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	29	243	68
Volume Left	27	0	0
Volume Right	2	0	0
cSH	688	1700	1700
Volume to Capacity	0.04	0.14	0.04
Queue Length 95th (ft)	3	0	0
Control Delay (s)	10.5	0.0	0.0
Lane LOS	B		
Approach Delay (s)	10.5	0.0	0.0
Approach LOS	B		

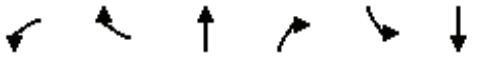
Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	21.8%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	0	226	11	16	74
Future Volume (Veh/h)	0	0	226	11	16	74
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	246	12	17	80
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	366	252			258	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	366	252			258	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			99	
cM capacity (veh/h)	625	787			1307	

Direction, Lane #	NB 1	SB 1
Volume Total	258	97
Volume Left	0	17
Volume Right	12	0
cSH	1700	1307
Volume to Capacity	0.15	0.01
Queue Length 95th (ft)	0	1
Control Delay (s)	0.0	1.5
Lane LOS		A
Approach Delay (s)	0.0	1.5
Approach LOS		

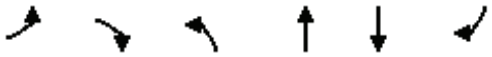
Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	21.0%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	0	237	7	2	72
Future Volume (Veh/h)	0	0	237	7	2	72
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	258	8	2	78
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	344	262			266	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	344	262			266	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	651	777			1298	

Direction, Lane #	NB 1	SB 1
Volume Total	266	80
Volume Left	0	2
Volume Right	8	0
cSH	1700	1298
Volume to Capacity	0.16	0.00
Queue Length 95th (ft)	0	0
Control Delay (s)	0.0	0.2
Lane LOS		A
Approach Delay (s)	0.0	0.2
Approach LOS		

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	16.2%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	2	18	4	222	72	16
Future Volume (Veh/h)	2	18	4	222	72	16
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	20	4	241	78	17
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	336	86	95			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	336	86	95			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	98	100			
cM capacity (veh/h)	658	972	1499			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	22	245	95
Volume Left	2	4	0
Volume Right	20	0	17
cSH	932	1499	1700
Volume to Capacity	0.02	0.00	0.06
Queue Length 95th (ft)	2	0	0
Control Delay (s)	9.0	0.1	0.0
Lane LOS	A	A	
Approach Delay (s)	9.0	0.1	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	24.9%	ICU Level of Service	A
Analysis Period (min)	15		

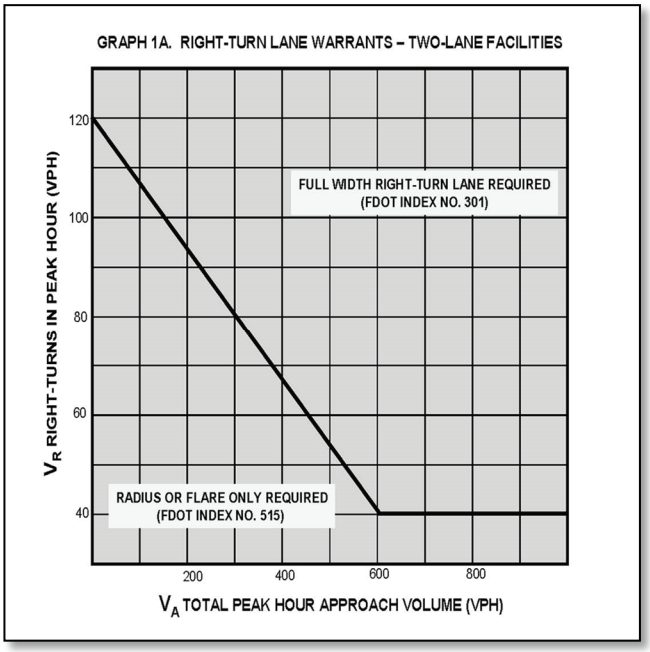
408 East Shore Drive

Traffic Impact Study

Attachment E

Turn Lane Warrant Evaluation

LOCATION: EAST SHORE DRIVE & PROJECT DRIVEWAY A

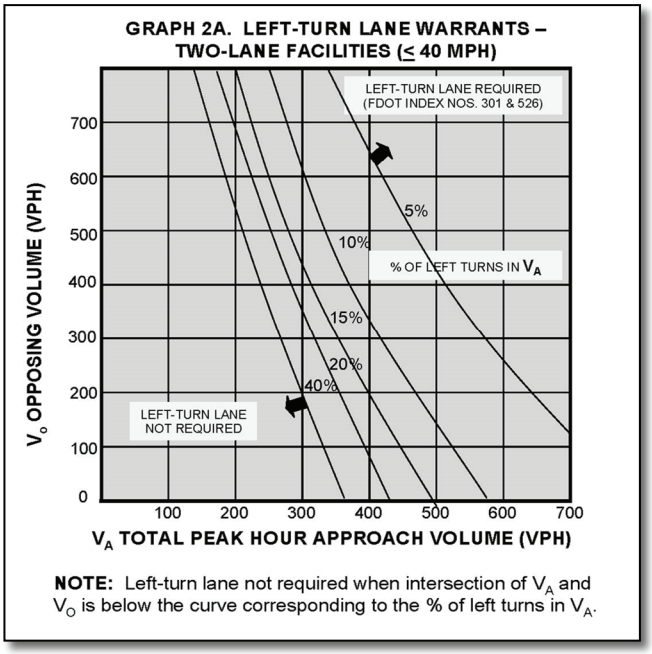


SOURCE: ADAPTED FROM NCHRP NO. 279

Right Turn Lane Warrant

NORTHBOUND RIGHT TURN LANE

RESULT: NOT APPLICABLE



NOTE: Left-turn lane not required when intersection of V_A and V_O is below the curve corresponding to the % of left turns in V_A.

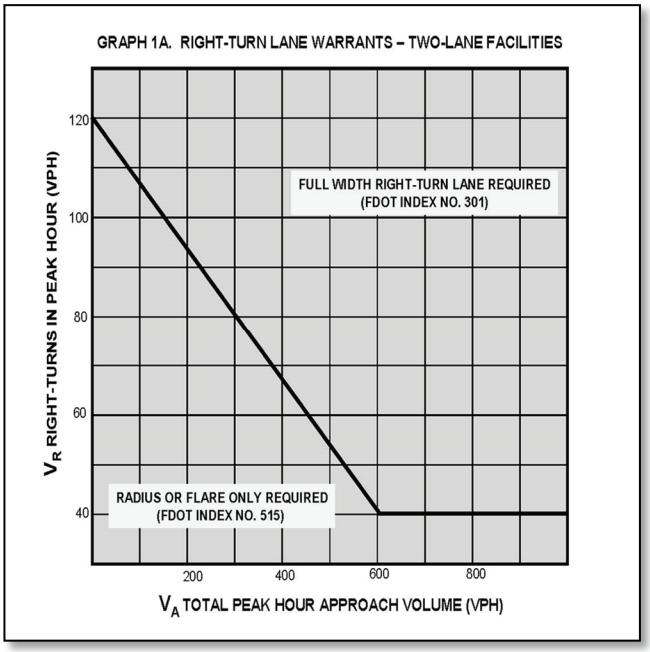
SOURCE: ADAPTED FROM NCHRP NO. 279

Left Turn Lane Warrant

SOUTHBOUND LEFT TURN LANE

RESULT: NOT APPLICABLE

LOCATION: EAST SHORE DRIVE & PROJECT DRIVEWAY B

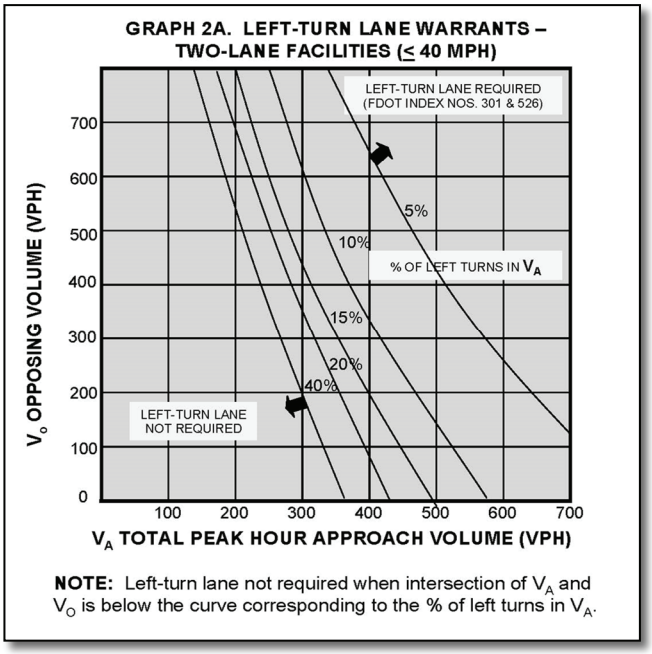


SOURCE: ADAPTED FROM NCHRP NO. 279

Right Turn Lane Warrant

NORTHBOUND RIGHT TURN LANE

RESULT: NOT APPLICABLE



NOTE: Left-turn lane not required when intersection of V_A and V_O is below the curve corresponding to the % of left turns in V_A.

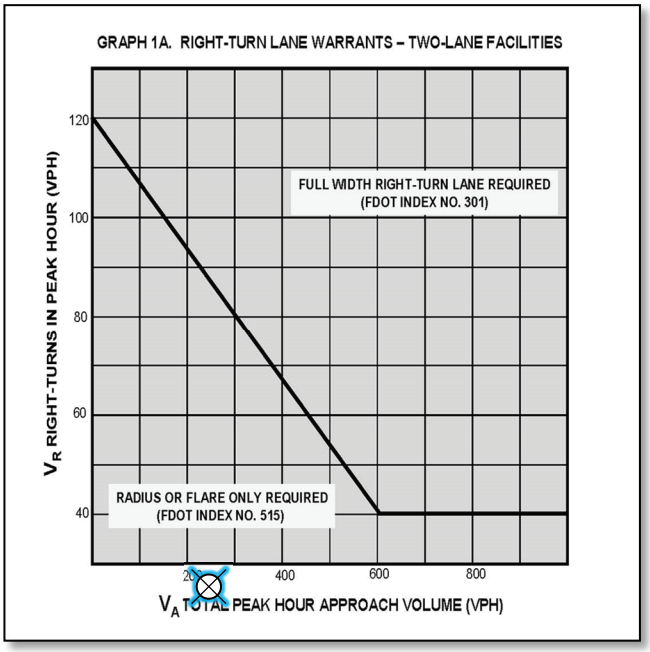
SOURCE: ADAPTED FROM NCHRP NO. 279

Left Turn Lane Warrant

SOUTHBOUND LEFT TURN LANE

RESULT: NOT APPLICABLE

LOCATION: EAST SHORE DRIVE & PROJECT DRIVEWAY C



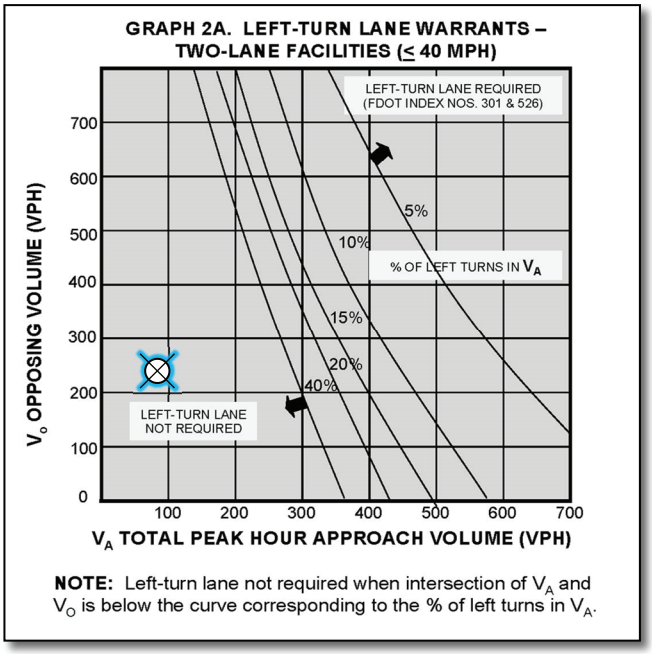
SOURCE: ADAPTED FROM NCHRP NO. 279

Right Turn Lane Warrant

NORTHBOUND RIGHT TURN LANE

- **PM PEAK HOUR**
  Right Turn Volume: 11 vph
  Approach Volume: 237 vph

RESULT: NOT WARRANTED



NOTE: Left-turn lane not required when intersection of V_A and V_O is below the curve corresponding to the % of left turns in V_A.

SOURCE: ADAPTED FROM NCHRP NO. 279

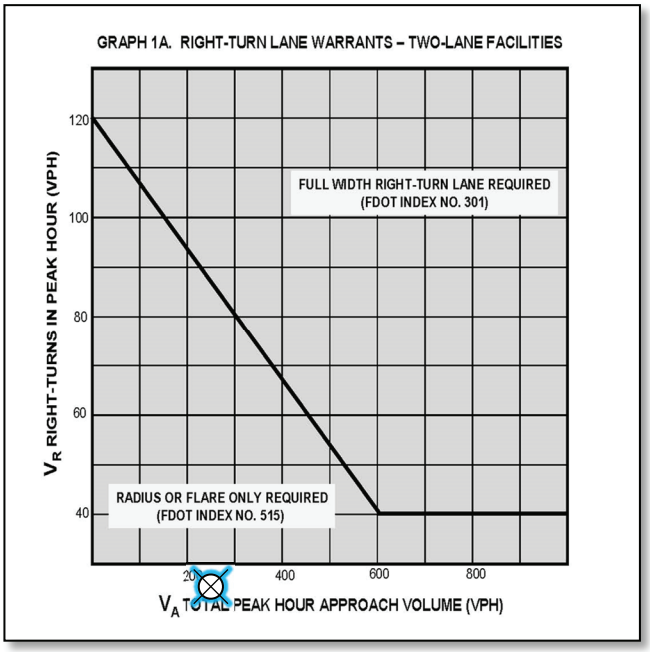
Left Turn Lane Warrant

SOUTHBOUND LEFT TURN LANE

- **PM PEAK HOUR**
  Left Turn Volume: 16 vph
  Approach Volume: 90 vph
  Opposing Volume: 237 vph

RESULT: NOT WARRANTED

LOCATION: EAST SHORE DRIVE & PROJECT DRIVEWAY D



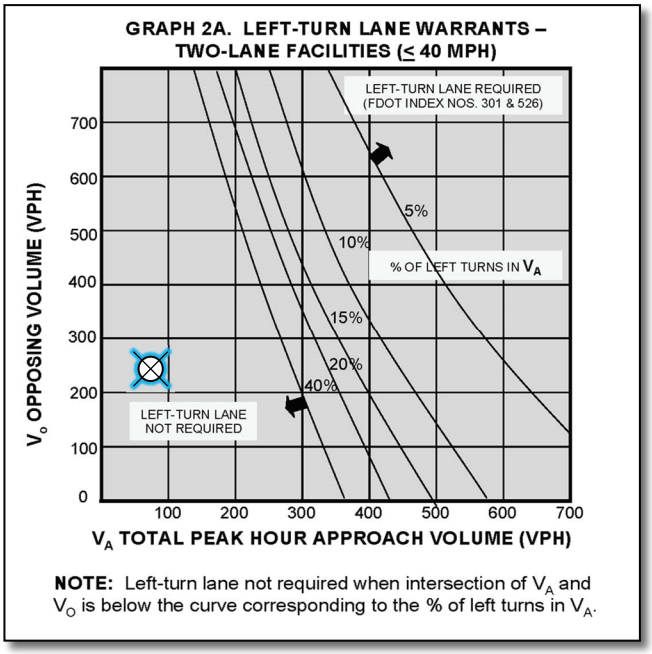
SOURCE: ADAPTED FROM NCHRP NO. 279

Right Turn Lane Warrant

NORTHBOUND RIGHT TURN LANE

- **PM PEAK HOUR**
  Right Turn Volume: 7 vph
  Approach Volume: 244 vph

RESULT: NOT WARRANTED



NOTE: Left-turn lane not required when intersection of V_A and V_O is below the curve corresponding to the % of left turns in V_A.

SOURCE: ADAPTED FROM NCHRP NO. 279

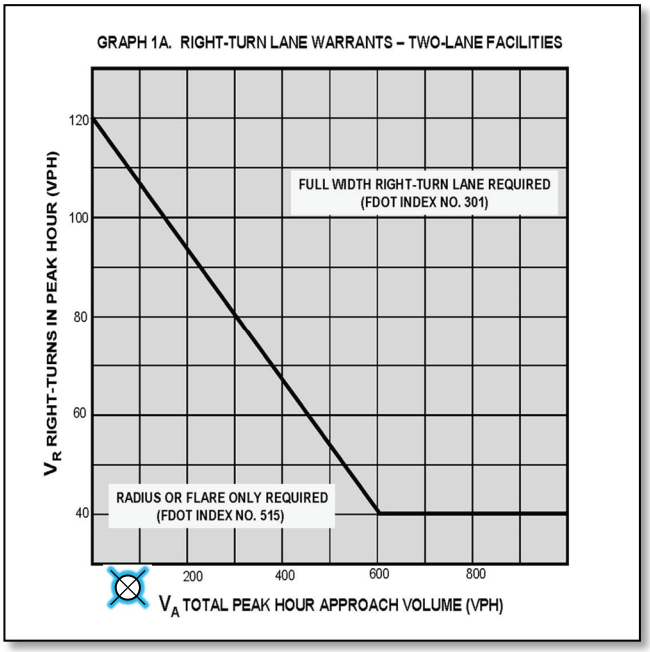
Left Turn Lane Warrant

SOUTHBOUND LEFT TURN LANE

- **PM PEAK HOUR**
  Left Turn Volume: 2 vph
  Approach Volume: 74 vph
  Opposing Volume: 244 vph

RESULT: NOT WARRANTED

LOCATION: EAST SHORE DRIVE & PROJECT DRIVEWAY E



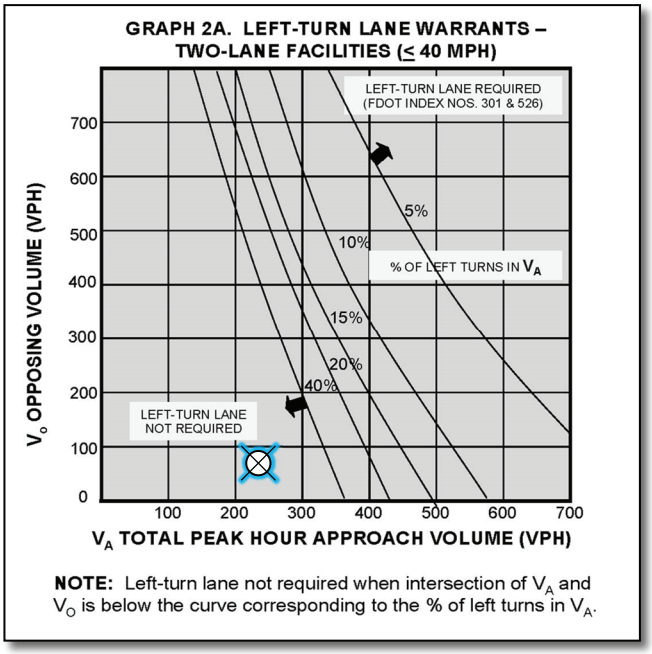
SOURCE: ADAPTED FROM NCHRP NO. 279

Right Turn Lane Warrant

SOUTHBOUND RIGHT TURN LANE

PM PEAK HOUR
Right Turn Volume: 16 vph
Approach Volume: 88 vph

RESULT: NOT WARRANTED



NOTE: Left-turn lane not required when intersection of V_A and V_O is below the curve corresponding to the % of left turns in V_A.

SOURCE: ADAPTED FROM NCHRP NO. 279

Left Turn Lane Warrant

NORTHBOUND LEFT TURN LANE

PM PEAK HOUR
Left Turn Volume: 4 vph
Approach Volume: 226 vph
Opposing Volume: 88 vph

RESULT: NOT WARRANTED