

Level 1 Traffic Study

829 4th Street



Miami Beach, Florida



Richard Garcia & Associates, Inc.

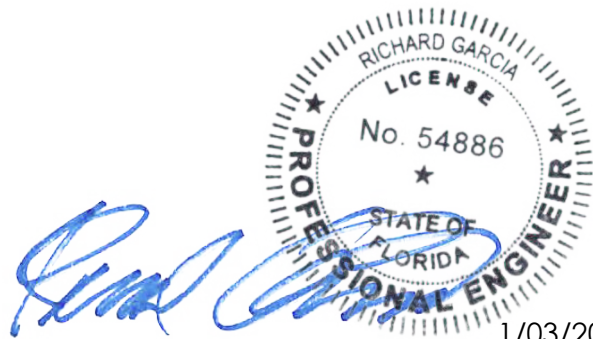
December 15th, 2022
Updated: January 3rd, 2023

Engineer's Certification

I, Richard Garcia, P.E. # 54886, certify that I currently hold an active Professional Engineers License in the State of Florida and am competent through education and experience to provide engineering services in the civil and traffic engineering disciplines contained in this report. In addition, the firm Richard Garcia & Associates, Inc. holds a Certificate of Authorization # 9592 in the State of Florida. I further certify that this report was prepared by me or under my responsible charge as defined in Chapter 61G15-18.001 F.A.C. and that all statements, conclusions and recommendations made herein are true and correct to the best of my knowledge and ability.

PROJECT DESCRIPTION:

829 4th Street - Level 1 Traffic Study

PROJECT LOCATION:829 4th Street
Miami Beach, Florida

1/03/2023

Florida Registration No. 54886

Date



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Introduction

The purpose of this report is to evaluate the trip generation associated with the subject project. As such, a trip generation analysis was performed for a typical weekday AM and PM peak hour (i.e. Adjacent Street Traffic). Lastly, this report follows the Miami-Dade County Traffic Impact Study Standard methodology (Level 1, less than 100 peak hour trips).

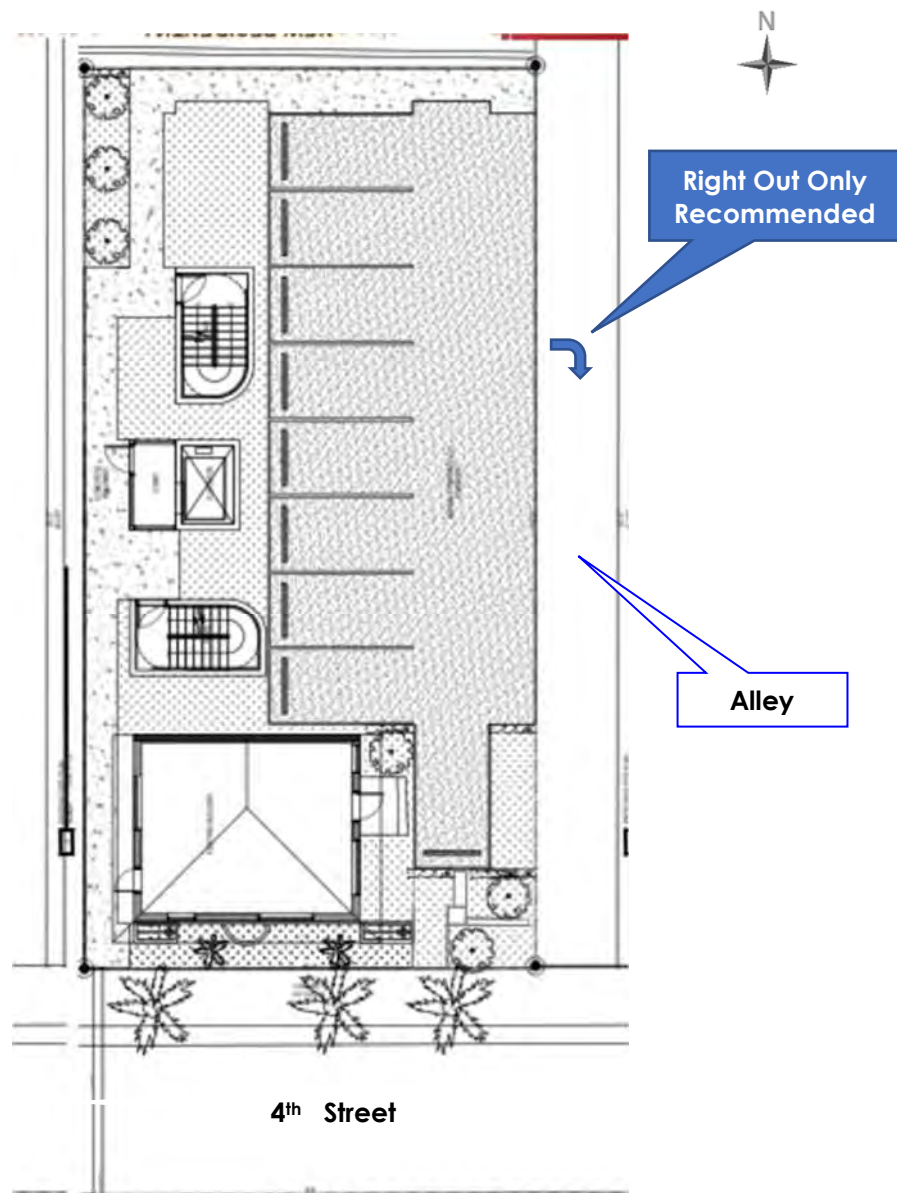
Project Location / Description

The subject site is located on the north side of 4th Street between Meridian Avenue and Jefferson Avenue at 829 4th Street in the City of Miami Beach, Florida. This site has an existing building with 4 residential units of 500 SF each (2,000 SF) that will be demolished as part of the subject project. The proposed redevelopment project consists of multifamily housing (mid-rise) with 9 dwelling units, approximately 850 SF on average (7,650 SF), as well as a small 500 square feet restaurant. This project will have access to the parking area through the alley just east of the property.

Figure 1 depicts the site's location map while Figure 2 is the site plan provided for illustrative purposes only, we refer you to the full-scale Site Plan for more specific details.

Figure 1: Location Map

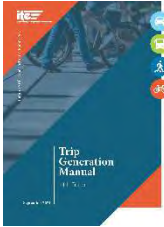


Figure 2: Site Plan

Project Traffic

This section of the report describes the analysis for estimating the trip generation associated with the subject project.

Trip Generation



The trip generation analysis was performed consistent with the methodology described in the *Institute of Transportation Engineers (ITE) Trip Generation Handbook, 3rd Edition* while the trip generation characteristics were obtained from *ITE's Trip Generation Manual, 11th Edition*. This analysis was performed for a typical weekday's AM and PM peak hour. Please note, both rates and equations were evaluated where available. The following land uses, as identified by the Institute of Transportation Engineers (ITE), most closely resemble the subject. These land uses (LU) are as follows:

Existing Use: LU 220: Multifamily Housing (Low-Rise) - 4 Dwelling Units (2,000 SF)
Proposed Use: LU 221: Multifamily Housing (Mid-Rise) - 9 Dwelling Units (7,650 SF)
 LU 930: Restaurant – 500 SF

Based on our trip generation analysis the proposed redevelopment project will generate a total of 4 gross external trips during the AM peak hour and 10 gross external trips during the PM peak hour. Since the trip generation for the existing use resulted in 2 trips for the AM peak hour and 2 trips for the PM peak hour, we did not reduce the existing trips from the proposed trips. Therefore, all of the proposed trips were utilized in this report. Also, we did not assign any trips to other modes such as Walking, Bicycling and Transit as a conservative approach. These modes would further reduce the trips this project would generate. Tables 1 and 2 summarize the trip generation calculations and results for the AM and PM peak hour, respectively. Appendix 1 includes the ITE rates and percentages.

Table 1: Trip Generation - AM Peak Hour

LAND USE (LU)	UNITS	ITE LU CODE	ITE TRIP GENERATION RATE / EQUATION	AM PEAK HOUR TRIPS				
				%	IN	%	OUT	TOTAL
Existing								
Multifamily Housing (Low-Rise)	4 D.U.	220	0.40	24%	0	76%	2	2
	Not Used: Out of Scale	$R^2=0.79$	$T=0.31(X) + 22.85$	24%	6	76%	18	24
Proposed								
Multifamily Housing (Mid-Rise)	9 D.U.	221	0.37	23%	1	77%	2	3
	Not Used: Neg. results	$R^2=0.91$	$T=0.44(X)-11.61$	23%	-2	77%	-6	-8
Restaurant	0.500 Th.SF.	930	1.43	50%	1	50%	0	1
			<i>Eqn Not Available</i>	-	-	-	-	-
Proposed Gross Trips (w/o deducting existing trips)				50%	2	50%	2	4
Notes: Sources: ITE Trip Generation, 11th Edition & ITE Trip Generation Handbook, 3rd Edition. Th.SF.= 1,000 Square Feet; D.U.= Dwelling Units Used in analysis								

Table 2: Trip Generation - PM Peak Hour

LAND USE (LU)	UNITS	ITE LU CODE	ITE TRIP GENERATION RATE / EQUATION	PM PEAK HOUR TRIPS				
				%	IN	%	OUT	TOTAL
Existing								
Multifamily Housing (Low-Rise)	4 D.U.	220	0.51	63%	1	37%	1	2
	Not Used: Out of Scale	$R^2=0.84$	$T=0.43(X) + 20.55$	63%	14	37%	8	22
Proposed								
Multifamily Housing (Mid-Rise)	9 D.U.	221	0.39	61%	2	39%	2	4
		$R^2=0.91$	$T=0.39(X)+0.34$	61%	2	39%	2	4
Restaurant	0.500 Th.SF.	930	12.55	55%	3	45%	3	6
	Not Used: $R^2<0.75$	$R^2=0.65$	$Ln(T)=0.71Ln(X)+2.72$	55%	4	45%	4	9
Proposed Gross Trips (w/o deducting existing trips)				50%	5	50%	5	10
Notes: Sources: ITE Trip Generation, 11th Edition & ITE Trip Generation Handbook, 3rd Edition. Th.SF.= 1,000 Square Feet; D.U.= Dwelling Units Used in analysis								

Trip Distribution

The subject project is located within the Traffic Analysis Zone (TAZ) 652 as assigned by the Transportation Planning Organization (TPO) on the Miami-Dade Long Range Transportation Plan (2045 LRTP) Directional Trip Distribution Report, September 2019. As such, the trip distribution was performed consistent with the trip distribution percentages of TAZ 652 and by interpolating between the 2015 and 2045 TAZ data for the design year of 2023. Figure 3 depicts the TAZ map while the directional trip distribution percentages are outlined in Table 3. Appendix 2 contains the supporting documentation.

Figure 3: TAZ Map

Table 3: Directional Trip Distribution Percentages

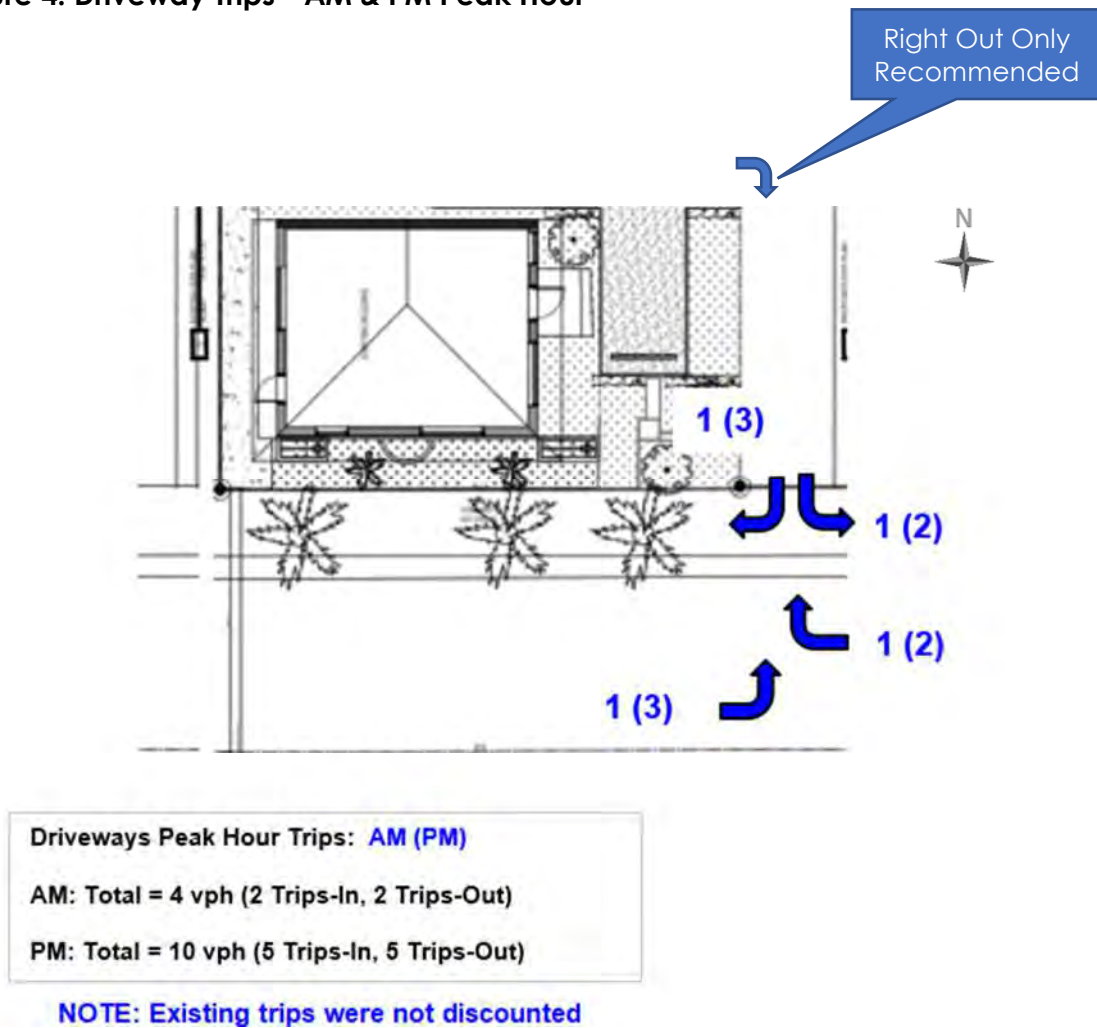
DIRECTION	DISTRIBUTION PERCENTAGES (%)		
	MIAMI-DADE LRTP MODEL YEAR		DESIGN YEAR
	2015	2045	2023
NNE	22.90	18.80	21.81
ENE	4.10	3.20	3.86
ESE	3.50	3.20	3.42
SSE	2.80	1.60	2.48
SSW	2.50	2.30	2.45
WSW	16.70	19.50	17.45
WNW	19.40	29.70	22.15
NNW	28.10	21.80	26.42
TOTAL	100.00	100.00	100.00

As previously mentioned, the proposed **gross trips** have been further distributed into the four quadrants: North, South, East and West. Please note, some rounding was needed as the trips are so small that fractions of trips would results.

Table 4 contains the directional trip distribution for the AM and PM peak hour while Figure 4 depicts the driveway trips for the AM and PM peak hour. It is recommended that the parking area be restricted to a Right Turn Out only. That is all traffic exit to the south as shown in Figure 4.

Table 4: Directional Trip Distribution

DIRECTION	DISTRIBUTION	AM PEAK HOUR			PM PEAK HOUR		
		IN	OUT	TOTAL	IN	OUT	TOTAL
NORTH	50%	1	1	2	3	3	6
EAST	0%	0	0	0	0	0	0
SOUTH	50%	1	1	2	2	2	4
WEST	0%	0	0	0	0	0	0
		0	0	0	0	0	0
	100.00%	2	2	4	5	5	10

Figure 4: Driveway Trips - AM & PM Peak Hour

Conclusion

In conclusion, the proposed residential project will generate a total of 4 gross external trips during the AM peak hour and 10 gross external trips during the PM peak hour. Since the trip generation for the existing use resulted in 2 gross trips for the AM peak hour and 2 gross trips for the PM peak hour, these trips were not discounted. Likewise, no reduction was taken for Pedestrians, Bicycle or Transit utilization.

Based on these results, this project will have a de-minimis traffic impact on the adjacent roadways and no additional traffic analysis is required or recommended at this time.

Appendix 1: Trip Generation



TABLE: A1

TRIP GENERATION ANALYSIS AM PEAK HOUR

Project Name: 829 4th Street Miami Beach

LAND USE (LU)	UNITS	ITE LU CODE	ITE TRIP GENERATION RATE / EQUATION	AM PEAK HOUR TRIPS				
				%	IN	%	OUT	TOTAL
Existing								
Multifamily Housing (Low-Rise)	4 D.U.	220	0.40	24%	0	76%	2	2
	Not Used: Out of Scale	$R^2=0.79$	$T=0.31(X) + 22.85$	24%	6	76%	18	24
Proposed								
Multifamily Housing (Mid-Rise)	9 D.U.	221	0.37	23%	1	77%	2	3
	Not Used: Neg. results	$R^2=0.91$	$T=0.44(X)-11.61$	23%	-2	77%	-6	-8
Restaurant	0.500 Th.SF.	930	1.43	50%	1	50%	0	1
			Eqn Not Available	-	-	-	-	-
Proposed Gross Trips (w/o deducting existing trips)				50%	2	50%	2	4

Notes:

Sources: ITE Trip Generation, 11th Edition & ITE Trip Generation Handbook, 3rd Edition.

Th.SF. = 1,000 Square Feet; D.U. = Dwelling Units

Used in analysis

TABLE: A2

TRIP GENERATION ANALYSIS PM PEAK HOUR

Project Name: 829 4th Street Miami Beach

LAND USE (LU)		UNITS	ITE LU CODE	ITE TRIP GENERATION RATE / EQUATION	PM PEAK HOUR TRIPS				
					%	IN	%	OUT	TOTAL
Existing	Multifamily Housing (Low-Rise)	4 D.U.	220	0.51	63%	1	37%	1	2
		Not Used: Out of Scale	R ² =0.84	T=0.43(X) + 20.55	63%	14	37%	8	22
Proposed	Multifamily Housing (Mid-Rise)	9 D.U.	221	0.39	61%	2	39%	2	4
			R ² =0.91	T=0.39(X)+0.34	61%	2	39%	2	4
Restaurant	0.500 Th.SF.	930		12.55	55%	3	45%	3	6
	Not Used: R ² <0.75		R ² =0.65	Ln(T)=0.71Ln(X)+2.72	55%	4	45%	4	9
Proposed Gross Trips (w/o deducting existing trips)					50%	5	50%	5	10

Notes:

Sources: ITE Trip Generation, 11th Edition & ITE Trip Generation Handbook, 3rd Edition.

Th.SF. = 1,000 Square Feet; D.U. = Dwelling Units

Used in analysis

Multifamily Housing (Low-Rise) Not Close to Rail Transit (220)

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: 49

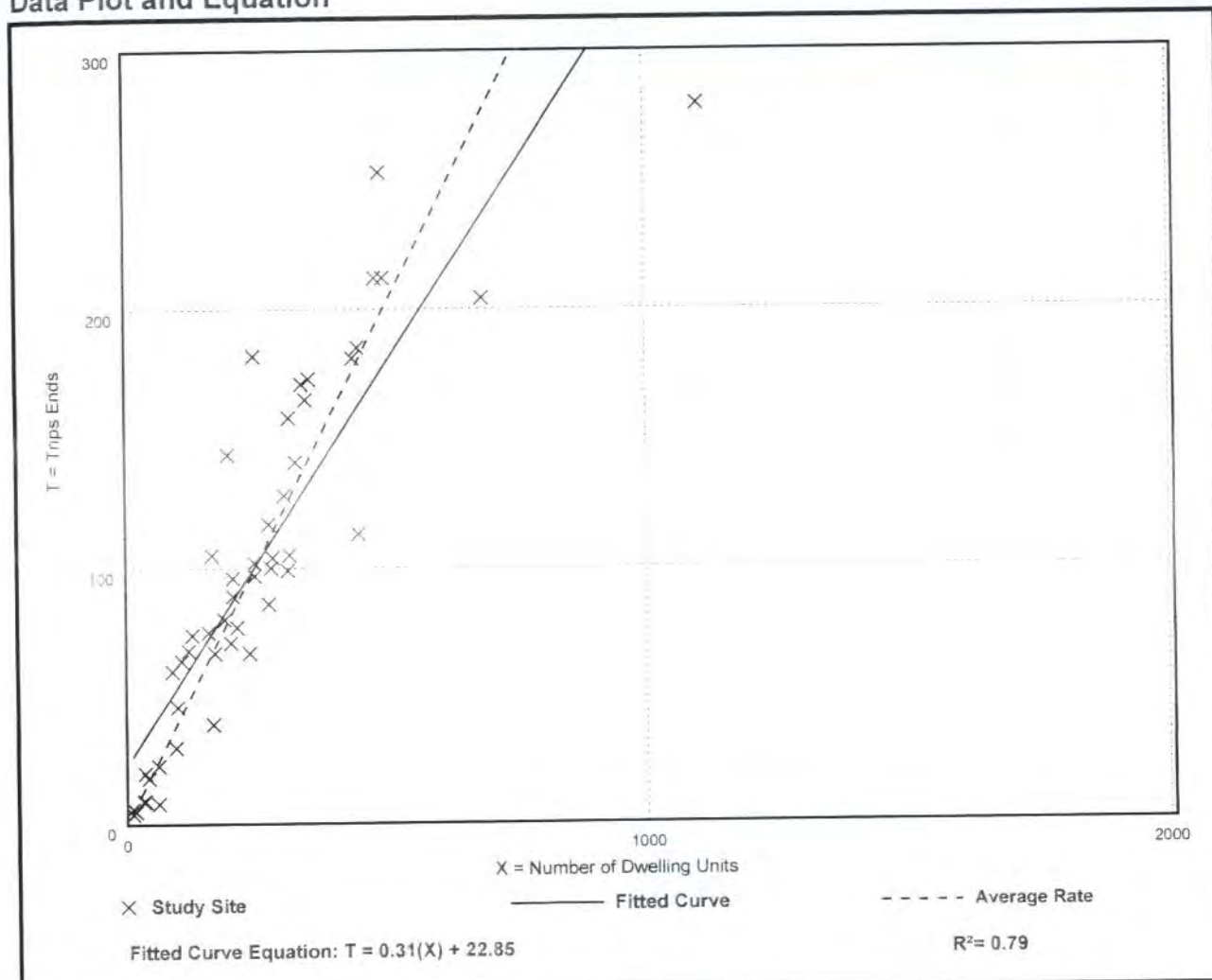
Avg. Num. of Dwelling Units: 249

Directional Distribution: 24% entering, 76% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.40	0.13 - 0.73	0.12

Data Plot and Equation



Multifamily Housing (Low-Rise) Not Close to Rail Transit (220)

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: 59

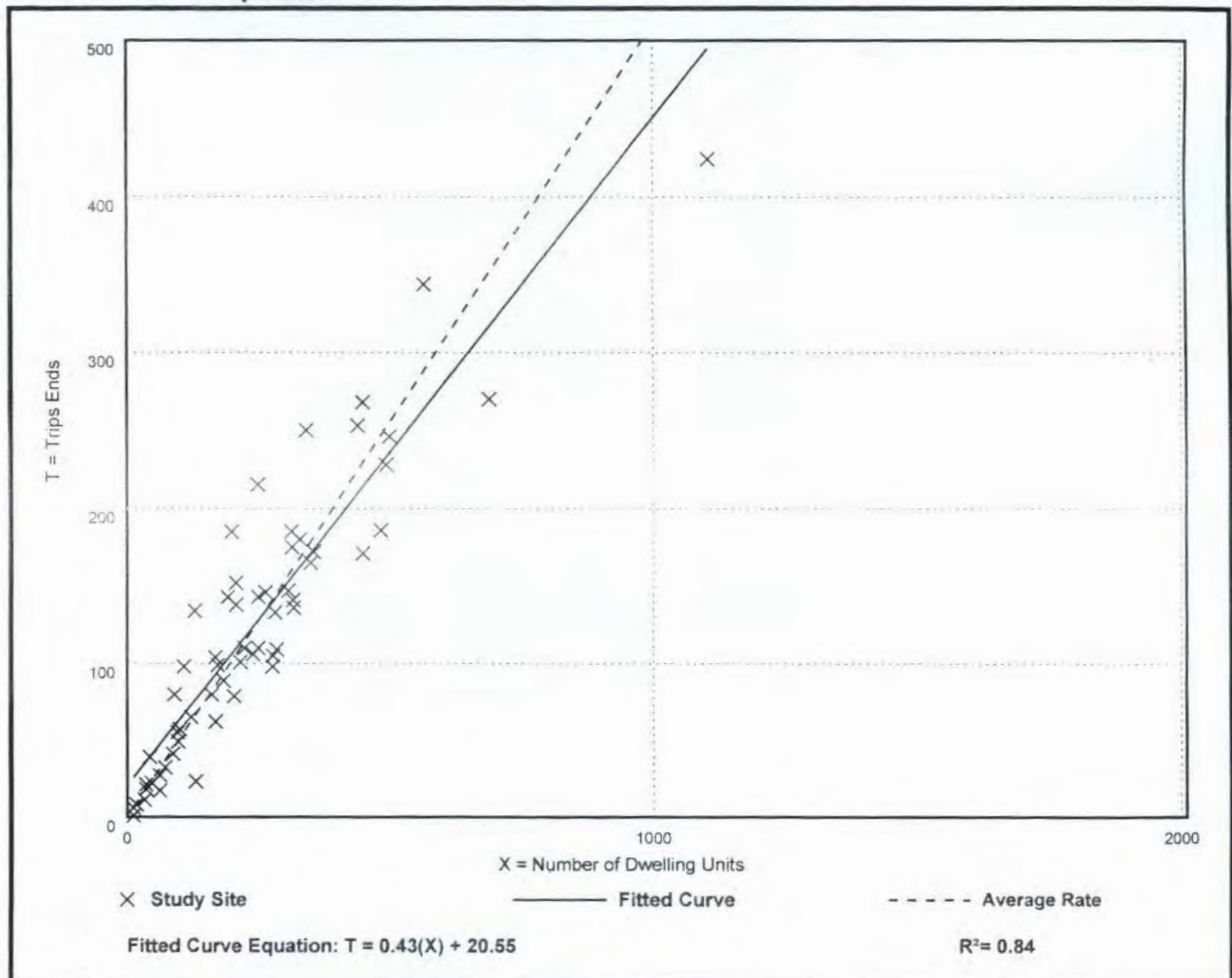
Avg. Num. of Dwelling Units: 241

Directional Distribution: 63% entering, 37% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.51	0.08 - 1.04	0.15

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

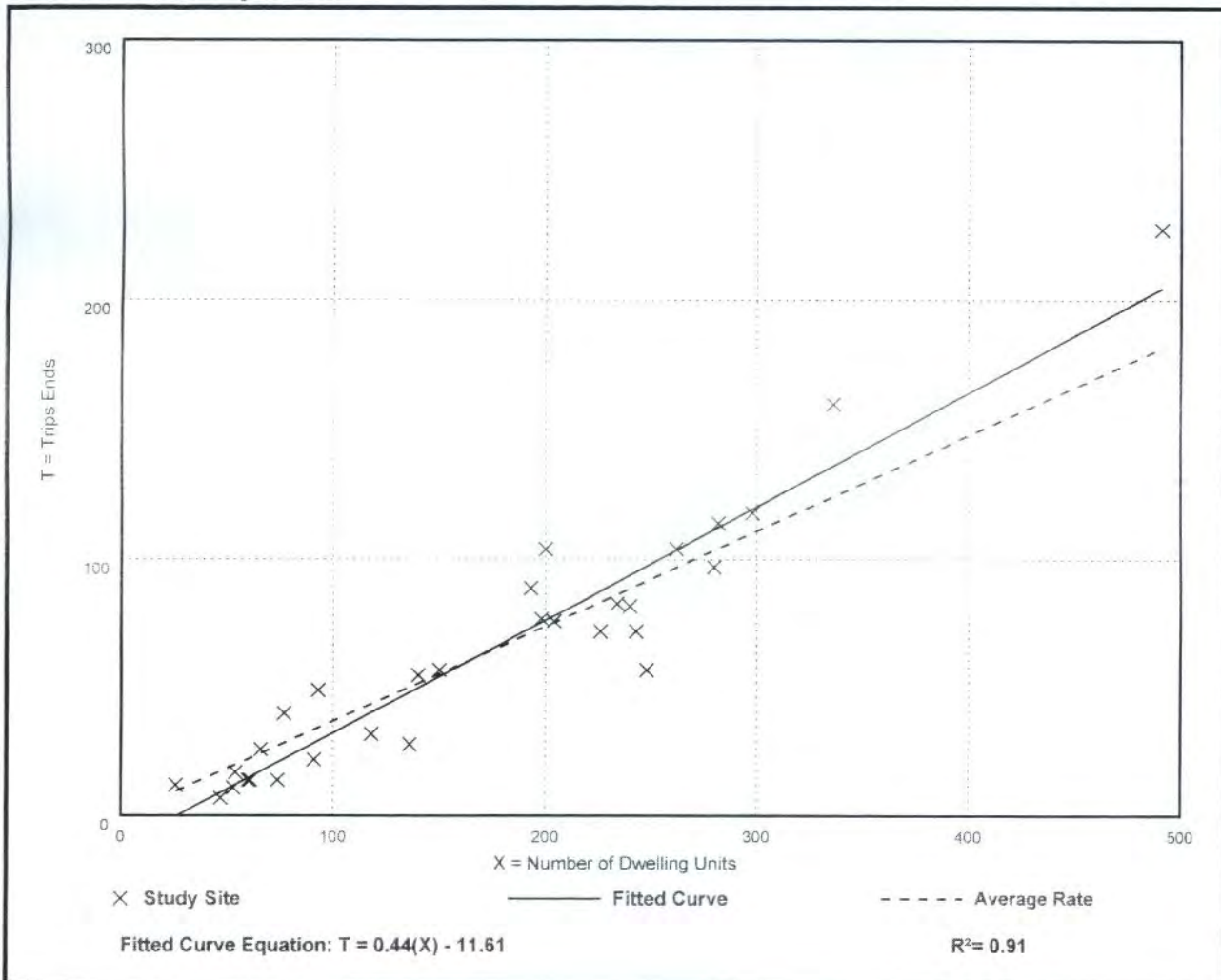
Avg. Num. of Dwelling Units: 173

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

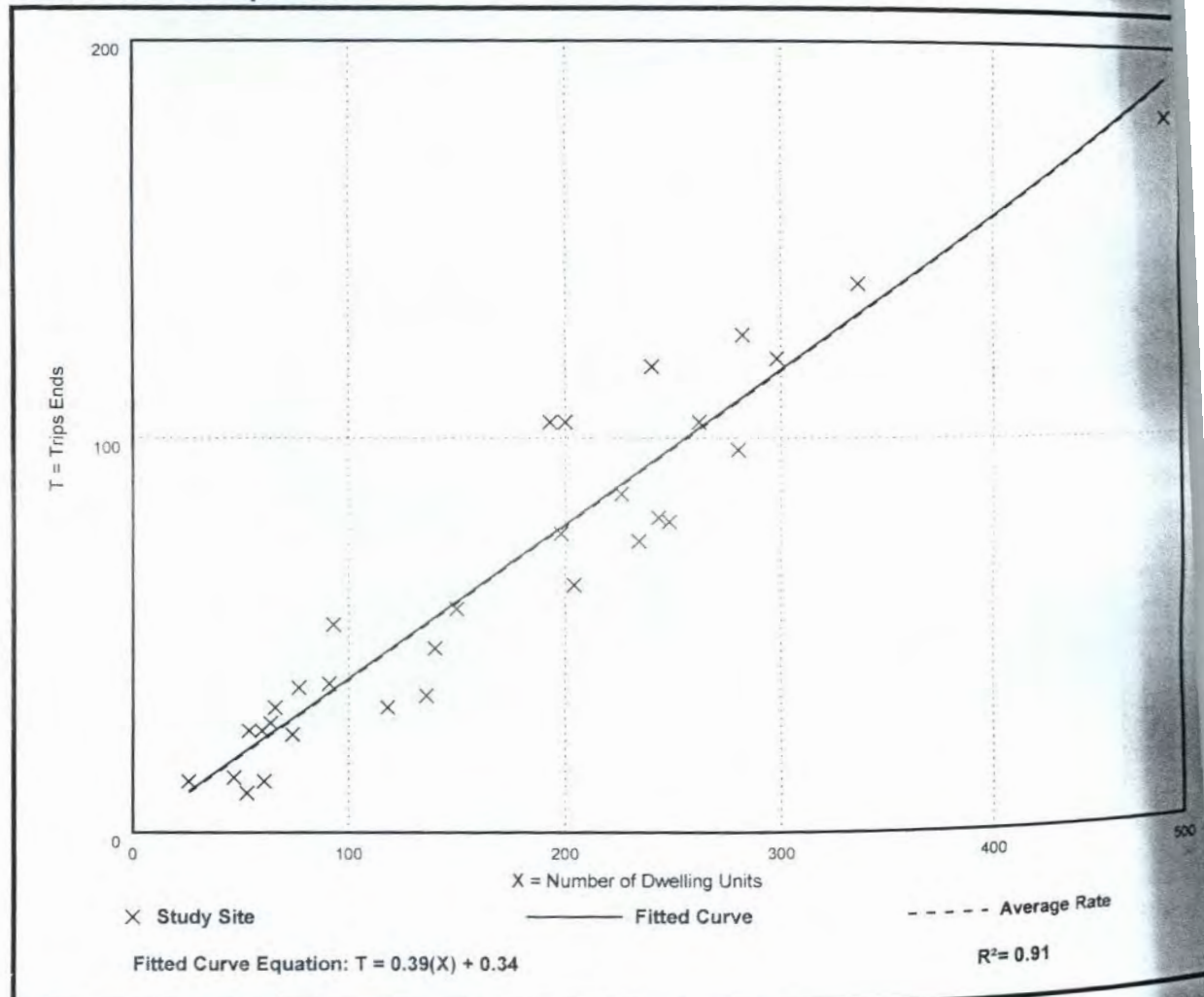
Avg. Num. of Dwelling Units: 169

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



Fast Casual Restaurant (930)

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: 1

Avg. 1000 Sq. Ft. GFA: 1

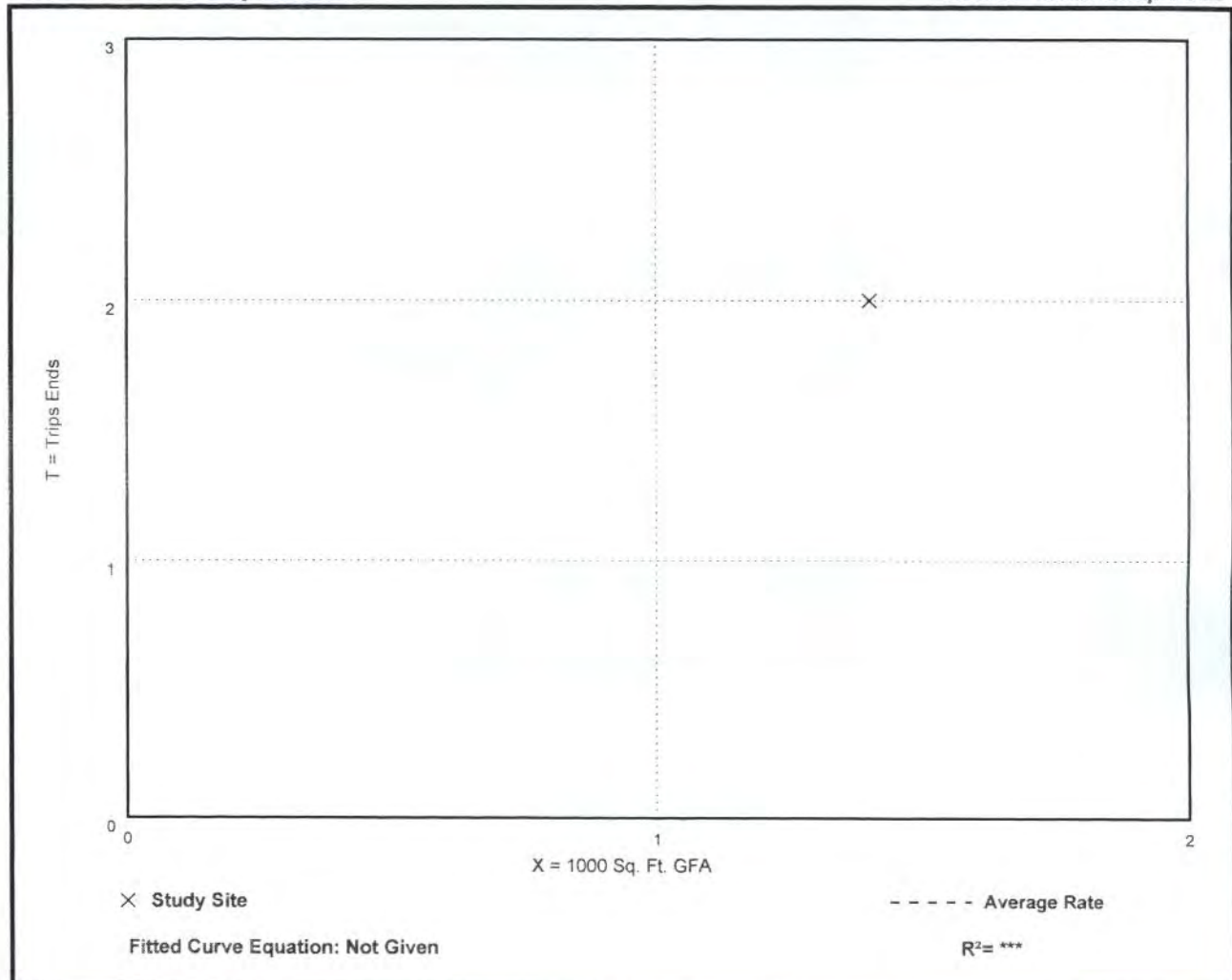
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
1.43	1.43 - 1.43	***

Data Plot and Equation

Caution – Small Sample Size



Fast Casual Restaurant (930)

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: 15

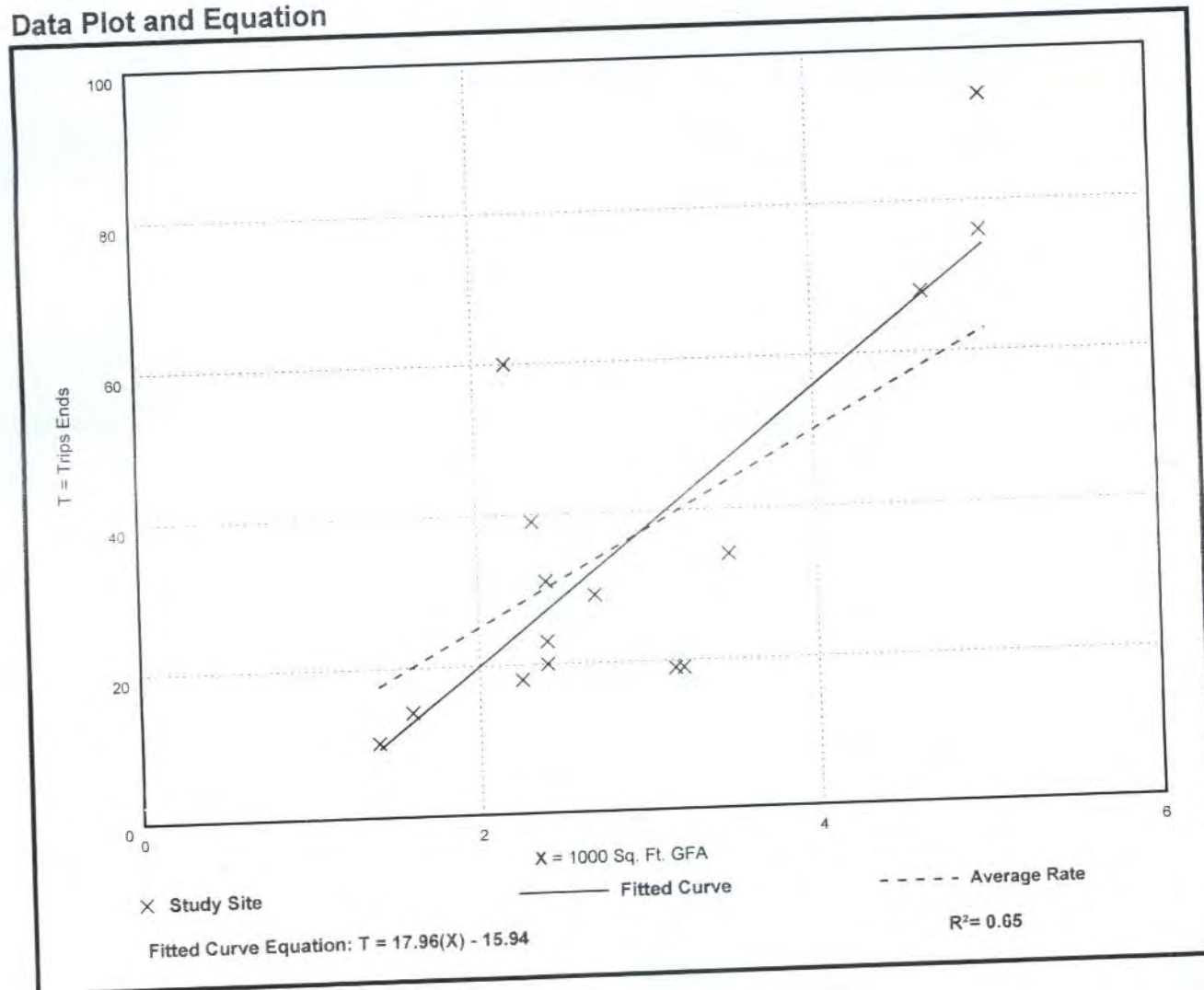
Avg. 1000 Sq. Ft. GFA: 3

Directional Distribution: 55% entering, 45% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
12.55	5.94 - 27.40	5.52

Data Plot and Equation



Appendix 2: Trip Distribution & Driveway Trips



TRAFFIC ANALYSIS ZONE (TAZ)

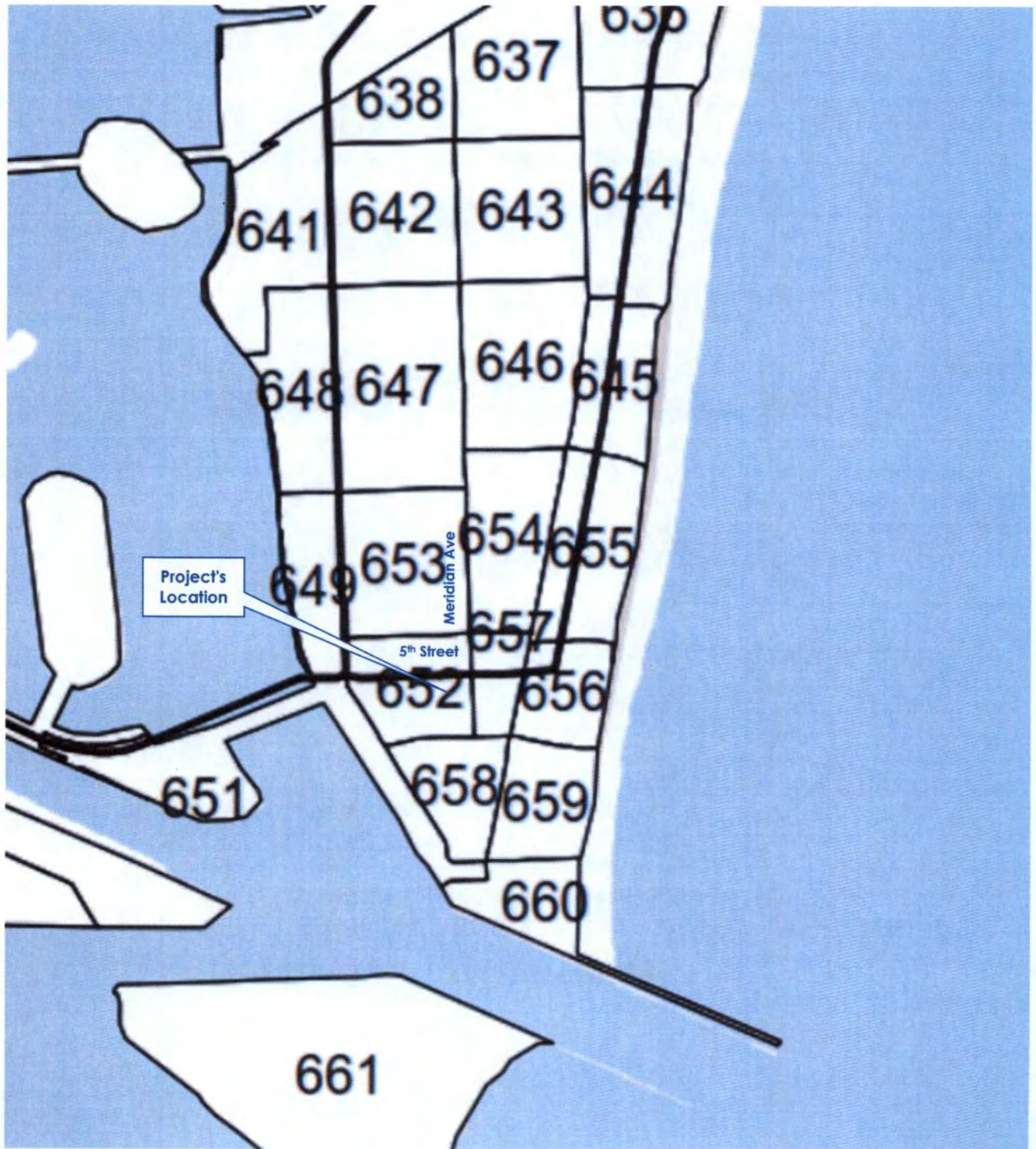


TABLE: A3

Trip Distribution AM Peak Hour

Project Name: 829 4th Street Miami Beach

DIRECTION	DISTRIBUTION	AM PEAK HOUR		
		IN	OUT	TOTAL
NORTH	50%	1	1	2
EAST	0%	0	0	0
SOUTH	50%	1	1	2
WEST	0%	0	0	0
	100.00%	2	2	4

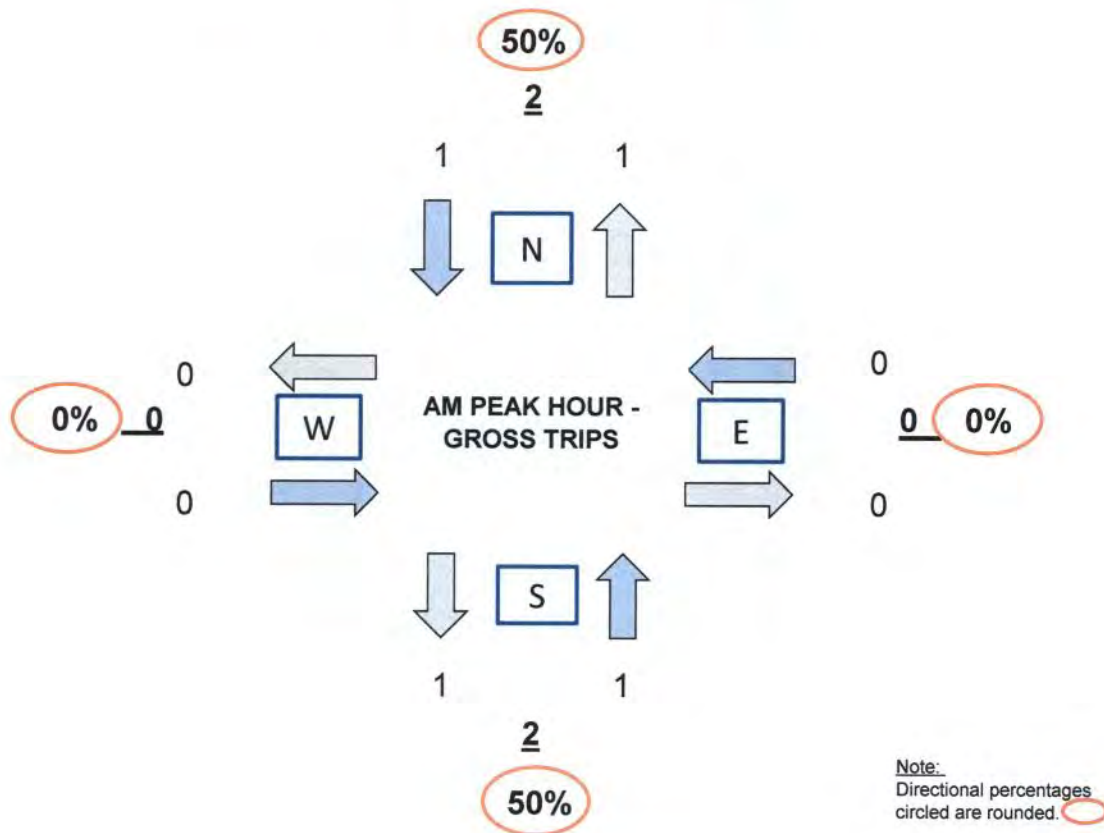


TABLE: A3-1

Cardinal Distribution
AM Peak Hour
Traffic Analysis Zone (TAZ) 652
 Project Name: 829 4th Street Miami Beach

DIRECTION	DISTRIBUTION PERCENTAGES (%)			AM PEAK HOUR		
	MIAMI-DADE LRTP MODEL YEAR		DESIGN YEAR	IN	OUT	TOTAL
	2015	2045	2023			
NNE	22.90	18.80	21.81	1	1	2
ENE	4.10	3.20	3.86	0	0	0
ESE	3.50	3.20	3.42	0	0	0
SSE	2.80	1.60	2.48	0	0	0
SSW	2.50	2.30	2.45	0	0	0
WSW	16.70	19.50	17.45	0	0	0
WNW	19.40	29.70	22.15	0	0	0
NNW	28.10	21.80	26.42	1	1	2
TOTAL	100.00	100.00	100.00	2	2	4

Note:

Based on Miami-Dade Transportation Plan (to the Year 2040) Directional Trip Distribution Report, October 2014. Since the current data is only available for the model years 2010 and 2040, the eight (8) cardinal directions were interpolated to the design year of 2018.

TABLE: A3-2

TRIPS: 2 2 4
 PERCENT: 50.00% 50.00% (Calculated)

DIRECTION	DISTRIBUTION %	INGRESS		EGRESS		TOTAL
		CALCULATED	USED	CALCULATED	USED	
NNE	21.81	0.436	1	0.436	1	2
ENE	3.86	0.077	0	0.077	0	0
ESE	3.42	0.068	0	0.068	0	0
SSE	2.48	0.050	0	0.050	0	0
SSW	2.45	0.049	0	0.049	0	0
WSW	17.45	0.349	0	0.349	0	0
WNW	22.15	0.443	0	0.443	0	0
NNW	26.42	0.528	1	0.528	1	2
TOTAL	100.00	2.001	2	2.001	2	4

TABLE: A4

Trip Distribution PM Peak Hour

Project Name: 829 4th Street Miami Beach

DIRECTION	DISTRIBUTION	PM PEAK HOUR		
		IN	OUT	TOTAL
NORTH	50%	3	3	6
EAST	0%	0	0	0
SOUTH	50%	2	2	4
WEST	0%	0	0	0
	100.00%	5	5	10

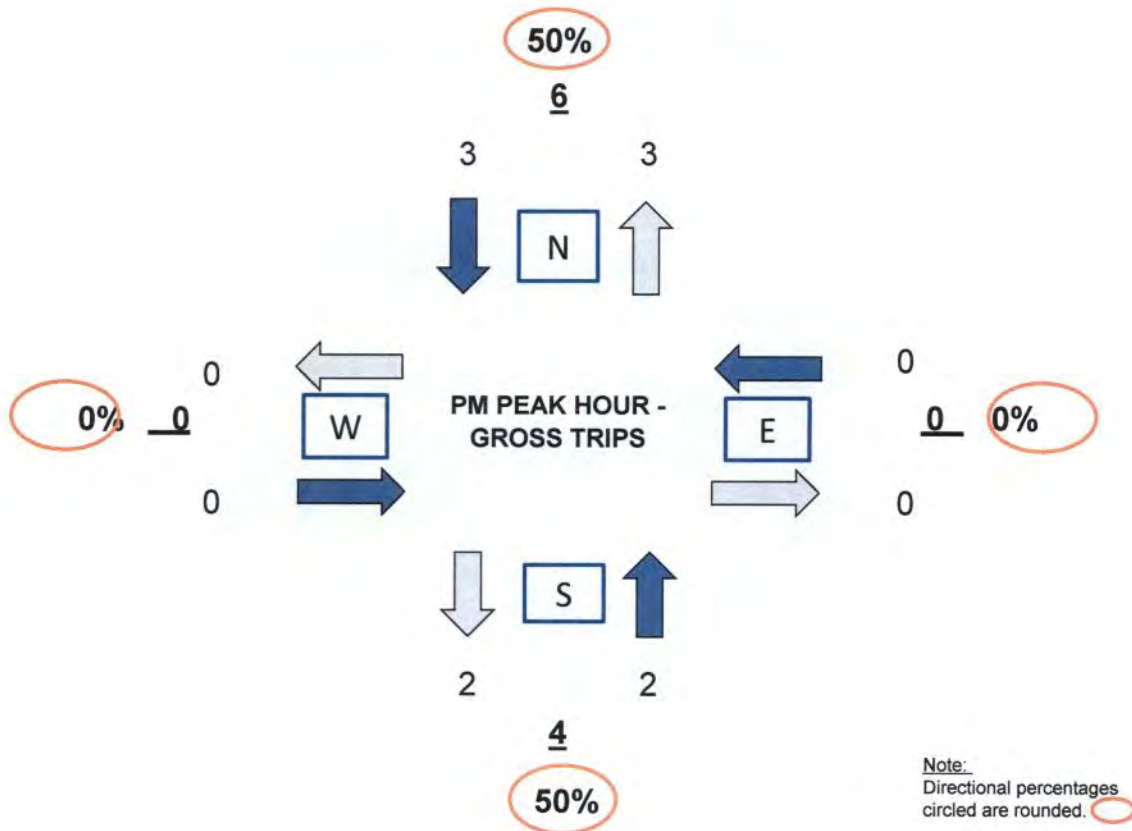


TABLE: A3-1

Cardinal Distribution
PM Peak Hour
Traffic Analysis Zone (TAZ) 652
 Project Name: 829 4th Street Miami Beach

DIRECTION	DISTRIBUTION PERCENTAGES (%)			AM PEAK HOUR		
	MIAMI-DADE LRTP MODEL YEAR		DESIGN YEAR	IN	OUT	TOTAL
	2015	2045	2023			
NNE	22.90	18.80	21.81	1	2	3
ENE	4.10	3.20	3.86	0	0	0
ESE	3.50	3.20	3.42	0	0	0
SSE	2.80	1.60	2.48	0	0	0
SSW	2.50	2.30	2.45	0	0	0
WSW	16.70	19.50	17.45	1	1	2
WNW	19.40	29.70	22.15	1	1	2
NNW	28.10	21.80	26.42	2	1	3
TOTAL	100.00	100.00	100.00	5	5	10

Note:

Based on Miami-Dade Transportation Plan (to the Year 2040) Directional Trip Distribution Report, October 2014. Since the current data is only available for the model years 2010 and 2040, the eight (8) cardinal directions were interpolated to the design year of 2018.

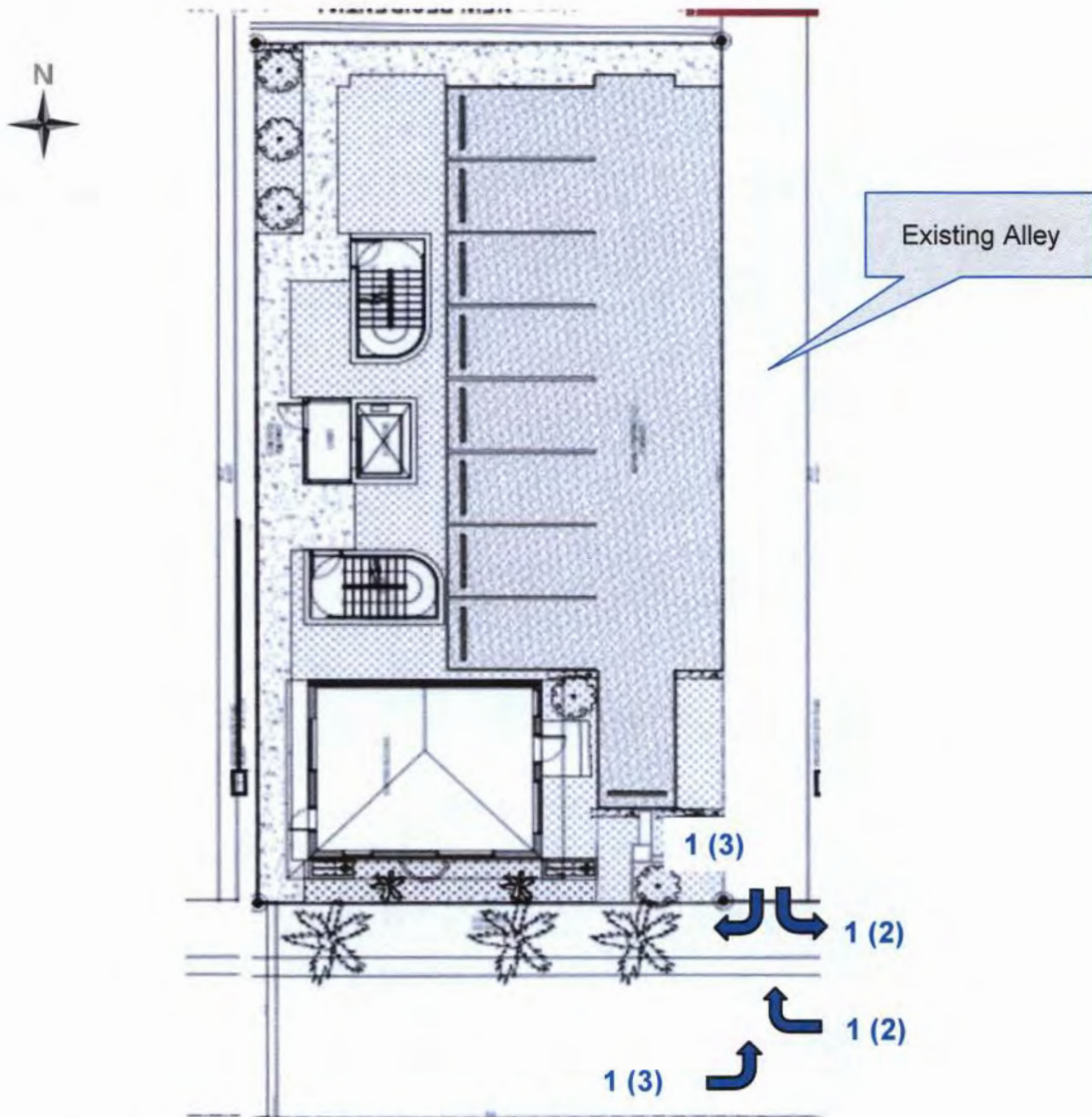
TABLE: A3-2

TRIPS: 5 5 10
 PERCENT: 50.00% 50.00% (Calculated)

DIRECTION	DISTRIBUTION %	INGRESS		EGRESS		TOTAL
		CALCULATED	USED	CALCULATED	USED	
NNE	21.81	1.090	1	1.090	2	3
ENE	3.86	0.193	0	0.193	0	0
ESE	3.42	0.171	0	0.171	0	0
SSE	2.48	0.124	0	0.124	0	0
SSW	2.45	0.122	0	0.122	0	0
WSW	17.45	0.872	1	0.872	1	2
WNW	22.15	1.107	1	1.107	1	2
NNW	26.42	1.321	2	1.321	1	3
TOTAL	100.00	5.001	5	5.001	5	10

Driveway Trips

Project Name: 829 4th Street Miami Beach



Driveways Peak Hour Trips: AM (PM)

AM: Total = 4 vph (2 Trips-In, 2 Trips-Out)

PM: Total = 10 vph (5 Trips-In, 5 Trips-Out)

NOTE: Existing trips were not discounted