



MEMORANDUM

To: Grant Webster
City of Miami Beach

From: Adrian K. Dabkowski, P.E., PTOE
Ariel B. Centurion, P.E.

AK

ABC

Date: October 9, 2025

**Subject: 7710 Collins Avenue
TRN25-0041
Traffic Impact Statement**

The purpose of this memorandum is to summarize the traffic impact statement prepared for the proposed redevelopment of the property located at 7710 Collins Avenue in Miami Beach, Florida. Currently, the site is occupied by two (2) low-rise multifamily residential units. The proposed redevelopment consists of one (1) mid-rise multifamily residential unit and a 14-room hotel. Access to the site will be provided via one (1) left-in/left-out driveway on Collins Court which is a one-way southbound alley on the west side of the project. Vehicles accessing the site via Collins Avenue can travel north of the site to 78 Street to access the southbound alley and the project driveway. A total of nine (9) on-site parking spaces will be provided and include eight (8) mechanical stacker parking spaces and one (1) Americans with Disabilities Act (ADA) parking space. Valet service will be provided to operate the mechanical stacker parking spaces. Self-parking will not be permitted on the stackers. A valet attendant will be present 24 hours a day, 7 days a week. Stacker keys are typically left in the stacker as a valet attendant will be present 24 hours a day, 7 days a week. However, car stacker keys can also be removed and located within the locked valet cabinet, as needed. The project is expected to be completed by 2027. A site location map and conceptual plan are provided in Attachment A. The following sections summarize the trip generation calculations, entry gate queuing analysis, valet queuing analysis, parking evaluation, loading operations narrative, maneuverability analysis, and transportation demand management strategies.

TRIP GENERATION

Trip generation calculations for the existing development and proposed redevelopment were calculated using Institute of Transportation Engineers' (ITE) *Trip Generation Manual*, 11th Edition. The trip generation for the existing development was determined using ITE Land Use Code (LUC) 220 (Multifamily Housing [Low-Rise]). The trip generation for the proposed redevelopment was determined using ITE LUC 221 (Multifamily Housing [Mid-Rise]) and LUC 310 (Hotel).

A multimodal (public transit, bicycle, and pedestrian) factor based on US Census *Means of Transportation to Work* data was reviewed for the census tract in the vicinity of the redevelopment. The US Census data indicated that there is a 27.9 percent (27.9%) multimodal factor within the vicinity of the development. However, to provide a conservative analysis, a multimodal factor of 20.0 percent (20.0%) was applied to the trip generation calculations. It is expected that some residents and guests will choose to walk, bike, or use public transit to and from the redevelopment. Detailed trip generation calculations, excerpts of the ITE *Trip Generation Manual*, 11th Edition, and US Census *Means of Transportation to Work* data are included in Attachment B.

Three (3) Miami-Dade County Department of Transportation and Public Works (DPTW) routes and one (1) City of Surfside shuttle routes currently operate within the vicinity of the site during the A.M. and P.M. peak hours. Detailed transit route information is included in Attachment C.

- **DTPW Route 79** operates along Harding Avenue in the vicinity of the project site with the nearest stop located north of 72 Street. This route operates with 15-minute headways in the northbound and southbound directions during the A.M. and P.M. peak hours.
- **DTPW Route 100** operates along Collins Avenue in the vicinity of the project site with the nearest stop located north of 76 Street. This route operates with 9-minute headways in the northbound and southbound directions during the A.M. and P.M. peak hours.
- **DTPW Route 279** operates along Harding Avenue in the vicinity of the project site with the nearest stop located north of 72 Street. This route operates with 24-minute headways in the eastbound and westbound directions during A.M. and P.M. peak hours.
- **Surfside Shuttle** operates along Collins Avenue in the vicinity of the project site with the nearest stop located north of 76 Street. This route operates with a 30-minute headway during the A.M. peak hour and 40-minute headway during the P.M. peak hour in the northbound and southbound directions.

Table 1 presents the weekday, A.M. peak hour, and P.M. peak hour trip generation calculations for the existing and proposed development. As shown in Table 1, the project is expected to result in an increase of 84 weekday, four (4) A.M. peak hour, and six (6) P.M. peak hour net new external vehicular trips.

Table 1: Trip Generation Summary				
Weekday (A.M. Peak Hour) [P.M. Peak Hour]				
Land Use (ITE Code)	Scale	Entering Trips	Exiting Trips	Net New External Trips
<i>Existing Development</i>				
Multifamily Housing (Low-Rise) (220)	2 dwelling units	5 (0) [1]	5 (1) [0]	10 (1) [1]
<i>Subtotal Existing External Trips</i>		5 (0) [1]	5 (1) [0]	10 (1) [1]
<i>Proposed Redevelopment</i>				
Multifamily Housing (Mid-Rise) (221)	1 dwelling unit	2 (0) [1]	2 (0) [0]	4 (0) [1]
Hotel (310)	14 rooms	45 (3) [3]	45 (2) [3]	90 (5) [6]
<i>Subtotal Proposed External Trips</i>		47 (3) [4]	47 (2) [3]	94 (5) [7]
<i>Net New Redevelopment Trips</i>				
Net New Project Trips		42 (3) [3]	42 (1) [3]	84 (4) [6]

PARKING GARAGE ENTRY GATE QUEUING ANALYSIS

A 95th percentile parking garage entry gate queuing analysis for the project using the methodology outlined in the ITE *Transportation and Land Development*, 1988 was performed for the proposed entry gate located on the west side of the site. The gate provides one (1) entry lane and one (1) exit lane. Note that all inbound vehicular trips will be required to utilize the entry gate to access the site. The entry gate is located approximately 21 feet from public right-of-way, providing storage for one (1) vehicle.

All vehicles will gain access via a callbox system. It was assumed that the average service rate will be approximately 60 vehicles per hour (60.0 seconds per vehicle or 1.0 minute per vehicle) for users based on processing times provided in *Parking Structures 3rd Edition: Planning, Design, Construction, Maintenance, and Repair*, 2001.

Based on the trip generation prepared, a total of three (3) A.M. peak hour inbound trips and four (4) P.M. peak hour inbound trips are expected at the entry gate.

The queuing analysis used the single-channel waiting line model with Poisson arrivals and exponential service times. The queuing analysis is based on the coefficient of utilization, ρ , which is the ratio of the average vehicle arrival rate over the average service rate multiplied by the number of channels.

If the coefficient of utilization (average service rate/entry service capacity) is greater than one (>1), the calculation methodology does not yield a finite queue length. This result indicates overcapacity conditions for the entry area. The entry gate service capacity is the number of vehicles the entry gate can service in a one-hour period multiplied by the number of service positions for the project.

The analysis determined the required queue storage, M , which is exceeded P percent of the time. This analysis seeks to examine if the queue length exceeds the storage provided at a level of confidence of 95 percent (95%).

A summary of the entry gate queuing analysis is summarized in Table 2 below. As Table 2 indicates, the proposed redevelopment is expected to result in a queue of less than one (1) vehicle behind the service position at the entry gate during the A.M. and P.M. peak hours. Therefore, vehicle queues are expected to be accommodated on-site without extending onto public-right-of-way. Detailed entry gate queue calculations are included in Attachment D.

Table 2: Peak Hour Entry Gate Queuing Analysis		
A.M. Peak Hour (P.M. Peak Hour)		
Entering Volumes (vph)	Service Rate (minutes/vehicle)	95 th Percentile Queue Behind Service Position
3	1.00	< 1 vehicle
(4)	1.00	(< 1 vehicle)

VALET QUEUING ANALYSIS

The valet queuing operations analysis was performed based on the methodology outlined by ITE's *Transportation and Land Development*, 1988. The analysis was performed to determine if valet operations could accommodate vehicular queues without extending into public right-of-way. Valet operations were analyzed for the number of valet attendants and required vehicle stacking for the proposed traffic.

The redevelopment will be served by two (2) valet drop-off/pick-up stacking spaces and two (2) temporary storage spaces located on-site. The temporary storage spaces are provided to allow for two (2) vehicles to be unloaded from the mechanical stackers to accommodate parking or retrieving a vehicle from the furthest parking space in the mechanical stackers. All trips will be required to valet.

The project is expected to generate five (5) valet trips (3 drop-off/ 2 pick-up) during the A.M. peak hour and seven (7) valet trips (4 drop-off/ 3 pick-up) during the P.M. peak hour. Detailed trip generation calculations are included in Attachment B. A valet stacking figure and graphic illustrations of the proposed valet routes to and from the valet drop-off/pick-up areas are contained in Attachment E.

Valet Assumptions

The queuing analysis used the multiple-channel waiting line model with Poisson arrivals and exponential service items. The queuing analysis is based on the coefficient of utilization, ρ , which is the ratio of the average vehicle arrival rate over the average service rate multiplied by the number of channels.

Valet attendants will be stationed at the valet drop-off/pick-up area. The valet drop-off service time was calculated based on the time it would take a valet parking attendant to obtain a vehicle and park it within the furthest parking space within the parking area. The valet pick-up service time was calculated based on the time it would take a valet parking attendant to bring a parked vehicle back to a patron at the valet drop-off/pick-up area from the furthest parking space within parking area.

The following summarizes the valet drop-off service time:

- Exchange between valet attendant and driver (0.5 minutes)
- Valet attendant drives vehicle from valet drop-off/pick-up area to the furthest parking space in mechanical lift (0.2 minutes)
- Valet attendant parks vehicle in mechanical lift parking space (0.6 minutes)
- Valet attendant returns to valet station (0.2 minutes)
- **Total service rate: 1.5 minutes**

The following summarizes the valet pick-up service time:

- Valet attendant proceeds to the parking garage to retrieve the vehicle (0.2 minutes)
- Valet attendant retrieves vehicle in mechanical lift parking space (1.0 minutes)
- Valet attendant drives vehicle from the furthest space in mechanical garage to the valet drop-off/pick-up area (0.2 minutes)
- Exchange between valet attendant and driver (0.5 minutes)
- **Total service rate: 1.9 minutes**

The car stacker keys are typically left in the stacker as a valet attendant will be present 24 hours a day, 7 days a week. However, car stacker keys can also be removed and located within the locked valet cabinet, as needed. Not that self-parking will not be allowed on the stackers. Detailed travel time calculations are included in Attachment E.

If the coefficient of utilization (average service rate/valet attendant service capacity) is greater than one (>1), the calculation methodology does not yield a finite queue length. This result indicates overcapacity conditions for the valet area. The valet attendant service capacity is the number of total trips a valet attendant can make in a one-hour period multiplied by the number of valet attendants.

The analysis determined the required queue storage, M , which is exceeded P percent of the time. This analysis seeks to ensure that the queue length does not exceed the storage provided at a level of confidence of 95 percent (95%).

Valet Analysis

An iterative approach was used to determine the number of valet attendants required to accommodate the proposed redevelopment demand during the A.M. and P.M. peak hours to ensure that the

95th percentile valet queue does not extend beyond the designated valet service area. Detailed valet analysis worksheets are provided in Attachment E.

The results of the valet operations analysis demonstrate that one (1) valet attendant would be required during both the A.M. and P.M. peak hours to ensure that valet queues do not exceed the storage provided. Note that the projected vehicular volumes and estimated valet processing times were conservatively assumed in the analysis.

PARKING EVALUATION

The proposed redevelopment does not have a parking requirement. The proposed redevelopment will provide eight (8) mechanical lift parking spaces and one (1) ADA parking space for a total of nine (9) parking spaces. Additionally, there will be a total of 26 bicycle storage units and an additional three (3) parking spaces reserved for scooters.

LOADING OPERATIONS NARRATIVE

Loading, unloading, and refuse collection will occur in the alley along the west side of the site. Loading and refuse vehicles utilizing the alley will enter 78 Street and travel southbound to exit the alley on 77 Street. Dumpsters will be rolled out into the alley to be unloaded.

MANEUVERABILITY ANALYSIS

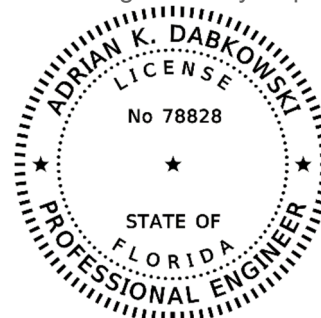
A maneuverability analysis was prepared for the on-site parking area using Transoft's *AutoTurn* software design vehicle turning templates and vehicle turning templates consistent with American Association of State Highway and Transportation Officials' (AASHTO), *A Policy on Geometric Design of Highways and Streets*, 2004/2011/2018. The analysis was prepared using passenger (P) design vehicles.

The results of the maneuverability analysis indicate that passenger vehicles will be able to enter, exit, and circulate the site without conflict. The maneuverability analysis plots are provided in Attachment F.

TRANSPORTATION DEMAND MANAGEMENT STRATEGIES

Transportation Demand Management (TDM) Strategies are proposed to reduce the impacts of the project traffic on the surrounding roadway network. Typical measures promote bicycling and walking, encourage car/vanpooling, and offer alternatives to the typical workday hours. The applicant will commit to providing the following incentives including:

- Providing six (6) short-term bicycle parking spaces and 20 long-term bicycle parking spaces
- Providing three (3) scooter parking spaces



This item has been digitally signed and sealed by Adrian K. Dabkowski, P.E., PTOE, on the date adjacent to the seal.



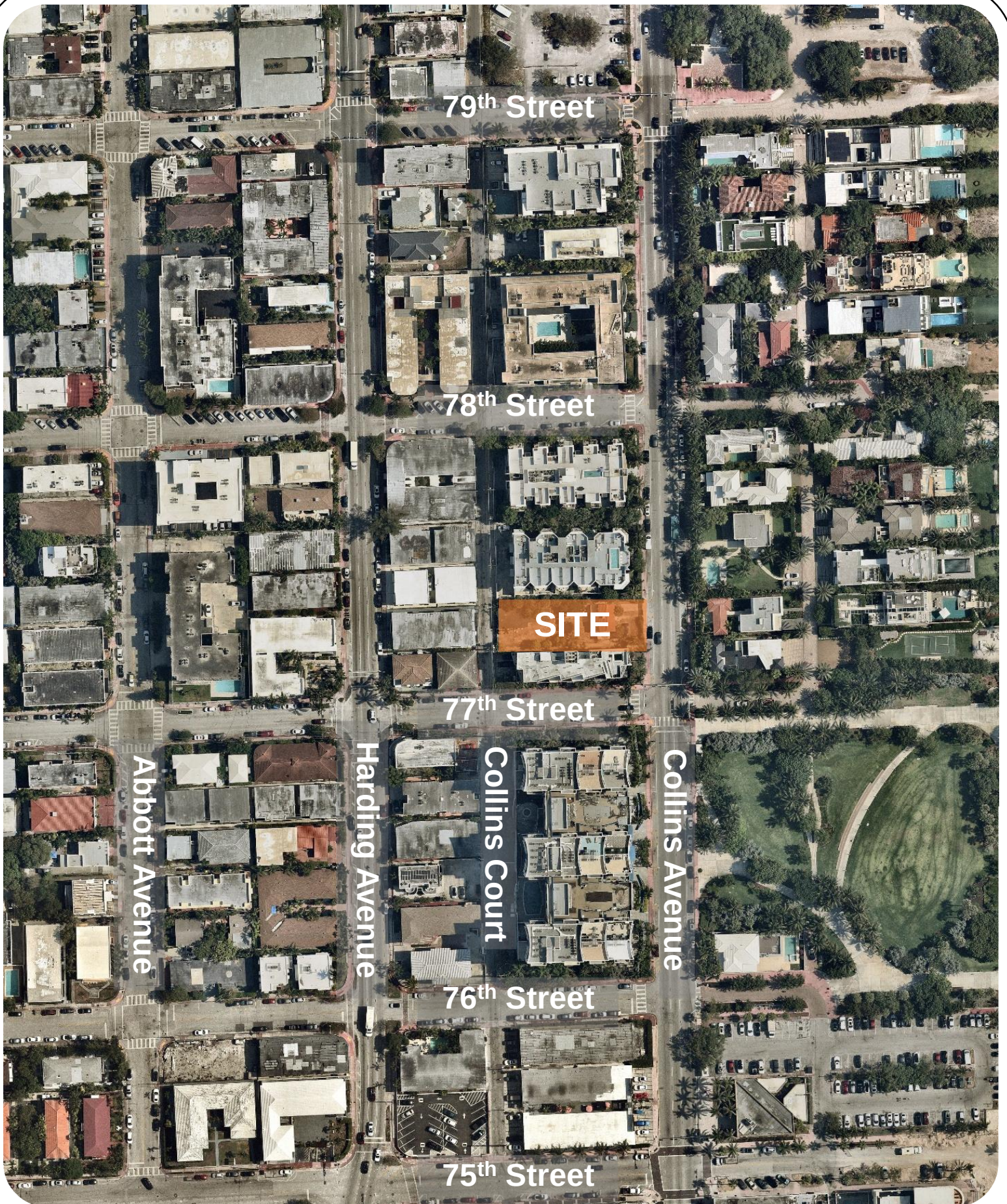
Signature must be verified on any electronic copies.

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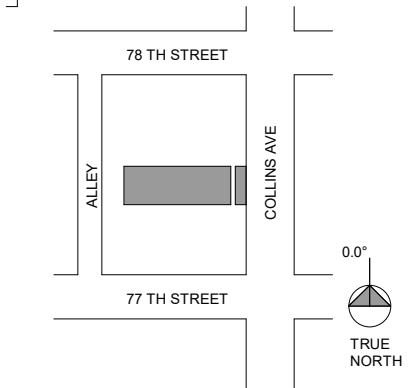
Attachment A

Project Location Map and Conceptual Site Plan

Project Location Map



Conceptual Site Plan



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Email **Fax: +1(305) 573 3766**

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Email: **jose@cabezasalvarez.com**

STRUCTURE

DRB 1st SUBMISSION

Date:	06/06/2025	Sheet No. A-2.00
Scale:	1/16" = 1'-0"	
Project:	2104	



Attachment B

Trip Generation Calculations

Trip Generation Calculations

DAILY TRIP GENERATION COMPARISON

EXISTING DAILY TRIP GENERATION

[illegible]

PROPOSED DAILY TRIP GENERATION

ITE TRIP GENERATION CHARACTERISTICS						DIRECTIONAL DISTRIBUTION		BASELINE TRIPS			MULTIMODAL REDUCTION		GROSS TRIPS			INTERNAL CAPTURE		EXTERNAL VEHICLE TRIPS			PASS-BY CAPTURE		NET NEW EXTERNAL TRIPS						
Land Use					ITE Edition	ITE Code	Scale	ITE Units	Percent		In	Out	Total	Percent	MR Trips	In	Out	Total	Percent	IC Trips	In	Out	Total	Percent	PB Trips	In	Out	Total	
									In	Out																			
GROUP 2	1	Multifamily Housing (Mid-Rise)				11	221	1	du	50%	50%	3	2	5	20.0%	1	2	2	4	0.0%	0	2	2	4	0.0%	0	2	2	4
	2	Hotel				11	310	14	room	50%	50%	56	56	112	20.0%	22	45	45	90	0.0%	0	45	45	90	0.0%	0	45	45	90
	3																												
	4																												
	5																												
	6																												
	7																												
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	9																												
	10																												
	11																												
	12																												
	13																												
	14																												
	15																												
ITE Land Use Code						Rate or Equation			Total:	59	58	117	20.0%	23	47	47	94	0.0%	0	47	47	94	0.0%	0	47	47	94		
221						Y=4.54(X)																							
310						Y=7.99(9(X))																							
											IN	OUT		TOTAL															

	IN	OUT	TOTAL
NET NEW TRIPS	42	42	84

AM PEAK HOUR TRIP GENERATION COMPARISON

EXISTING WEEKDAY AM PEAK HOUR TRIP GENERATION

ITE TRIP GENERATION CHARACTERISTICS						DIRECTIONAL DISTRIBUTION		BASELINE TRIPS			MULTIMODAL REDUCTION		GROSS TRIPS			INTERNAL CAPTURE		EXTERNAL VEHICLE TRIPS			PASS-BY CAPTURE		NET NEW EXTERNAL TRIPS			
Land Use		ITE Edition	ITE Code	Scale	ITE Units	Percent		In	Out	Total	Percent	MR Trips	In	Out	Total	Percent	IC Trips	In	Out	Total	Percent	PB Trips	In	Out	Total	
						In	Out																			
GROUP 1	1	Multifamily Housing (Low-Rise)	11	220	2	du	24%	76%	0	1	1	20.0%	0	0	1	1	0.0%	0	0	1	1	0.0%	0	0	1	1
	2																									
	3																									
	4																									
	5																									
	6																									
	7																									
	8																									
	9																									
	10																									
	11																									
	12																									
	13																									
	14																									
	15																									
ITE Land Use Code		Rate or Equation				Total:		0	1	1	0.0%	0	0	1	1	0.0%	0	0	1	1	0.0%	0	0	1	1	
220		Y=0.4(X)																								

PROPOSED WEEKDAY AM PEAK HOUR TRIP GENERATION

ITE TRIP GENERATION CHARACTERISTICS						DIRECTIONAL DISTRIBUTION		BASELINE TRIPS			MULTIMODAL REDUCTION		GROSS TRIPS			INTERNAL CAPTURE		EXTERNAL VEHICLE TRIPS			PASS-BY CAPTURE		NET NEW EXTERNAL TRIPS				
Land Use	ITE Edition	ITE Code	Scale	ITE Units	Percent		In	Out	Total	Percent	MR Trips	In	Out	Total	Percent	IC Trips	In	Out	Total	Percent	PB Trips	In	Out	Total			
					In	Out																					
1 Multifamily Housing (Mid-Rise)	11	221	1	du	23%	77%	0	0	0	20.0%	0	0	0	0	0.0%	0	0	0	0	0.0%	0	0	0	0			
2 Hotel	11	310	14	room	56%	44%	3	3	6	20.0%	1	3	2	5	0.0%	0	3	2	5	0.0%	0	3	2	5			
3																											
4																											
5																											
6																											
7																											
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9																											
10																											
11																											
12																											
13																											
14																											
15																											
ITE Land Use Code					Rate or Equation		Total:		3	3	6	20.0%	1	3	2	5	0.0%	0	3	2	5	0.0%	0	3	2	5	
221					Y=0.37(X)																						
310					Y=0.46(X)																						
																						IN		OUT		TOTAL	
NET NEW TRIPS																						3		1		4	

PM PEAK HOUR TRIP GENERATION COMPARISON

EXISTING WEEKDAY PM PEAK HOUR TRIP GENERATION

ITE TRIP GENERATION CHARACTERISTICS						DIRECTIONAL DISTRIBUTION		BASELINE TRIPS			MULTIMODAL REDUCTION		GROSS TRIPS			INTERNAL CAPTURE		EXTERNAL VEHICLE TRIPS			PASS-BY CAPTURE		NET NEW EXTERNAL TRIPS			
Land Use		ITE Edition	ITE Code	Scale	ITE Units	Percent		In	Out	Total	Percent	MR Trips	In	Out	Total	Percent	IC Trips	In	Out	Total	Percent	PB Trips	In	Out	Total	
						In	Out																			
GROUP 1	1	Multifamily Housing (Low-Rise)	11	220	2	du	63%	37%	1	0	1	20.0%	0	1	0	1	0.0%	0	1	0	1	0.0%	0	1	0	1
	2																									
	3																									
	4																									
	5																									
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	10																									
	11																									
	12																									
	13																									
	14																									
	15																									
ITE Land Use Code		Rate or Equation				Total:		1	0	1	0.0%	0	1	0	1	0.0%	0	1	0	1	0.0%	0	1	0	1	
220		Y=0.51(X)																								

PROPOSED WEEKDAY PM PEAK HOUR TRIP GENERATION

ITE TRIP GENERATION CHARACTERISTICS						DIRECTIONAL DISTRIBUTION		BASELINE TRIPS			MULTIMODAL REDUCTION		GROSS TRIPS			INTERNAL CAPTURE		EXTERNAL VEHICLE TRIPS			PASS-BY CAPTURE		NET NEW EXTERNAL TRIPS				
Land Use	ITE Edition	ITE Code	Scale	ITE Units	Percent		In	Out	Total	Percent	MR Trips	In	Out	Total	Percent	IC Trips	In	Out	Total	Percent	PB Trips	In	Out	Total			
					In	Out																					
1 Multifamily Housing (Mid-Rise)	11	221	1	du	61%	39%	1	0	1	20.0%	0	1	0	1	0.0%	0	1	0	1	0.0%	0	1	0	1			
2 Hotel	11	310	14	room	51%	49%	4	4	8	20.0%	2	3	3	6	0.0%	0	3	3	6	0.0%	0	3	3	6			
3																											
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10																											
11																											
12																											
13																											
14																											
15																											
ITE Land Use Code					Rate or Equation		Total:		5	4	9	20.0%	2	4	3	7	0.0%	0	4	3	7	0.0%	0	4	3	7	
221					Y=0.39*(X)+0.34																						
310					Y=0.59(X)																						
																						IN		OUT		TOTAL	
NET NEW TRIPS																						3		3		6	

ITE *Trip Generation Manual*, 11th Edition Excerpts

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

Vehicle Trip Ends vs: Dwelling Units
On a: Weekday

Setting/Location: General Urban/Suburban

Number of Studies: 22

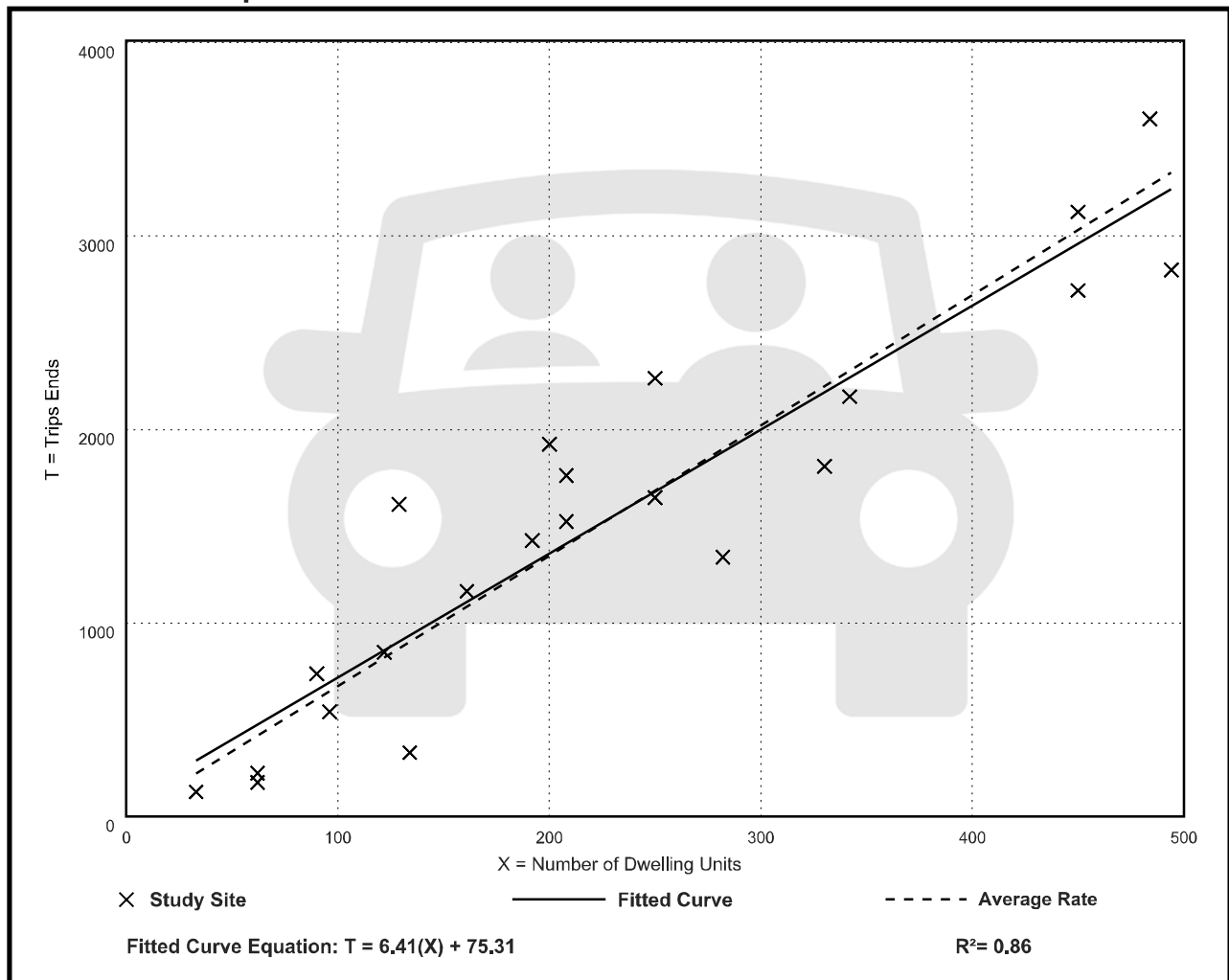
Avg. Num. of Dwelling Units: 229

Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
6.74	2.46 - 12.50	1.79

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 7 and 9 a.m.

Setting/Location: General Urban/Suburban

Number of Studies: 49

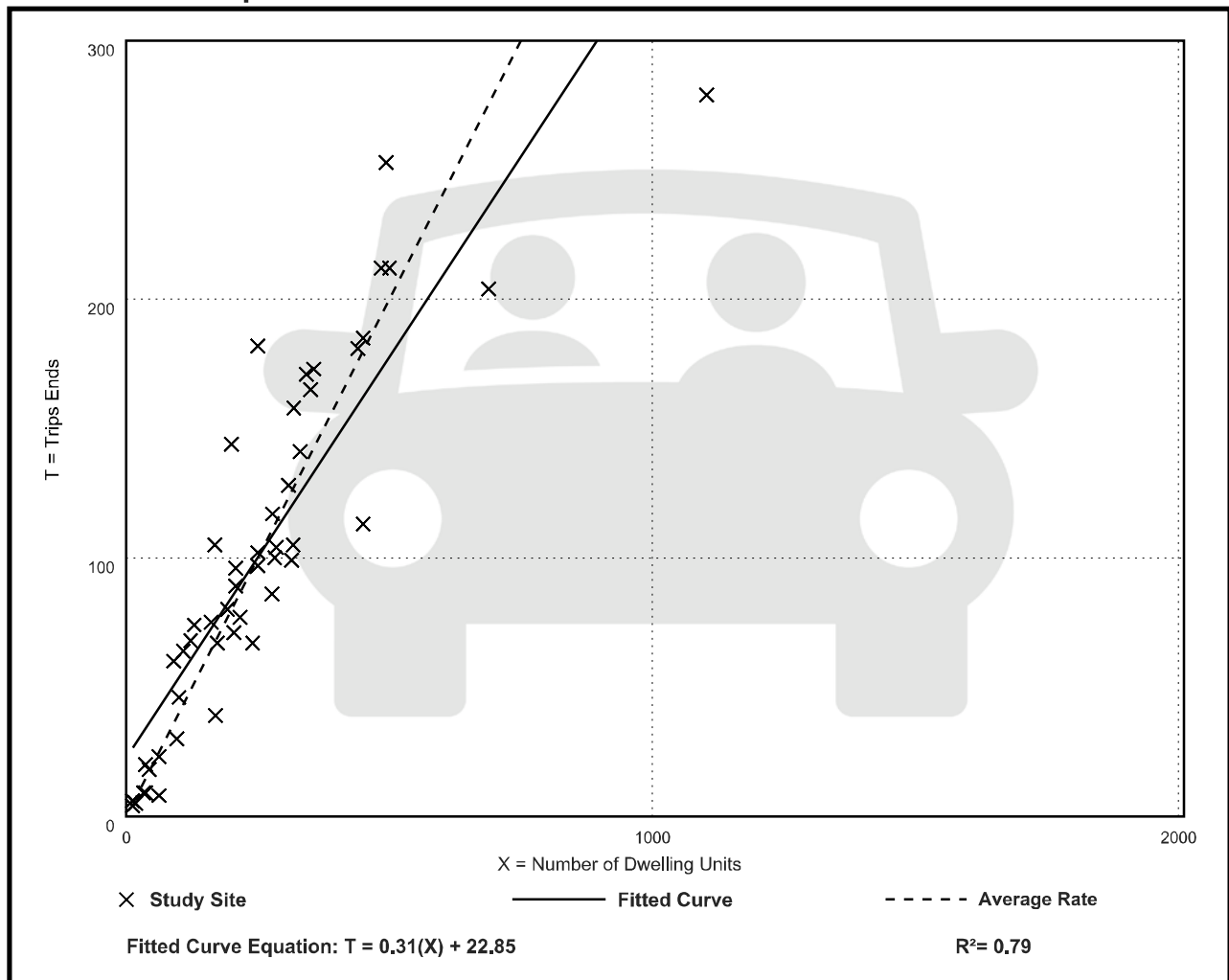
Avg. Num. of Dwelling Units: 249

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

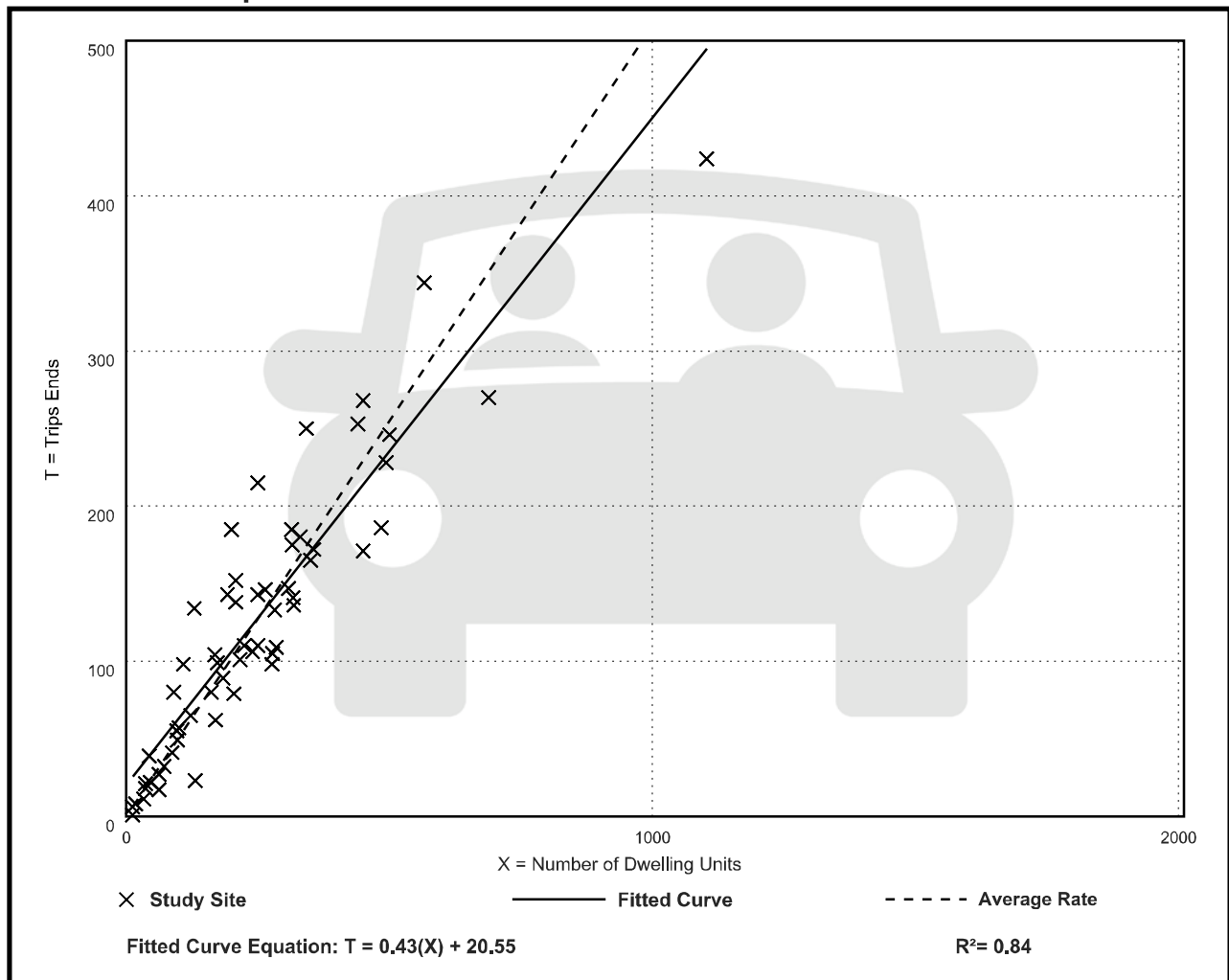
Avg. Num. of Dwelling Units: 241

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

Setting/Location: General Urban/Suburban

Number of Studies: 11

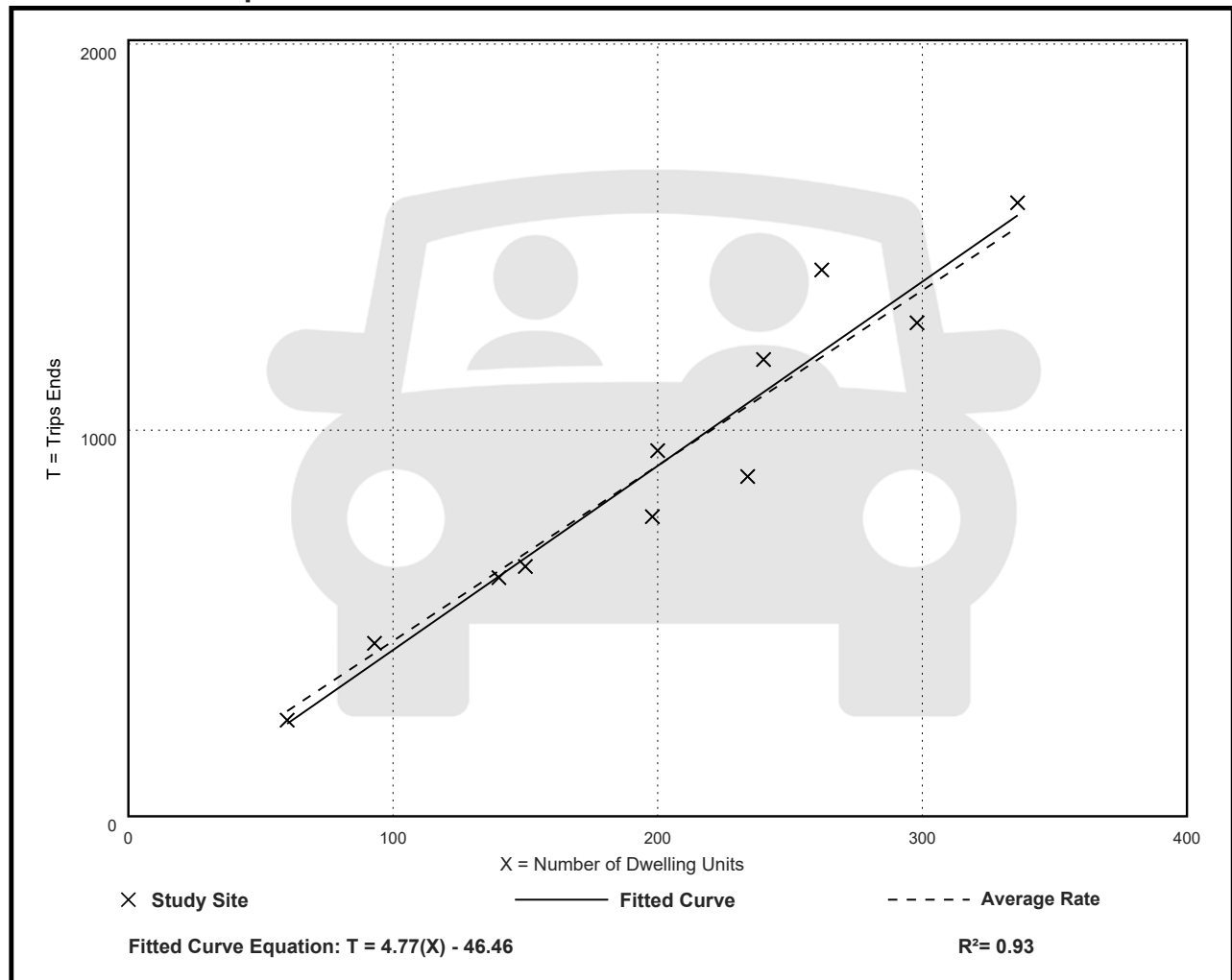
Avg. Num. of Dwelling Units: 201

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

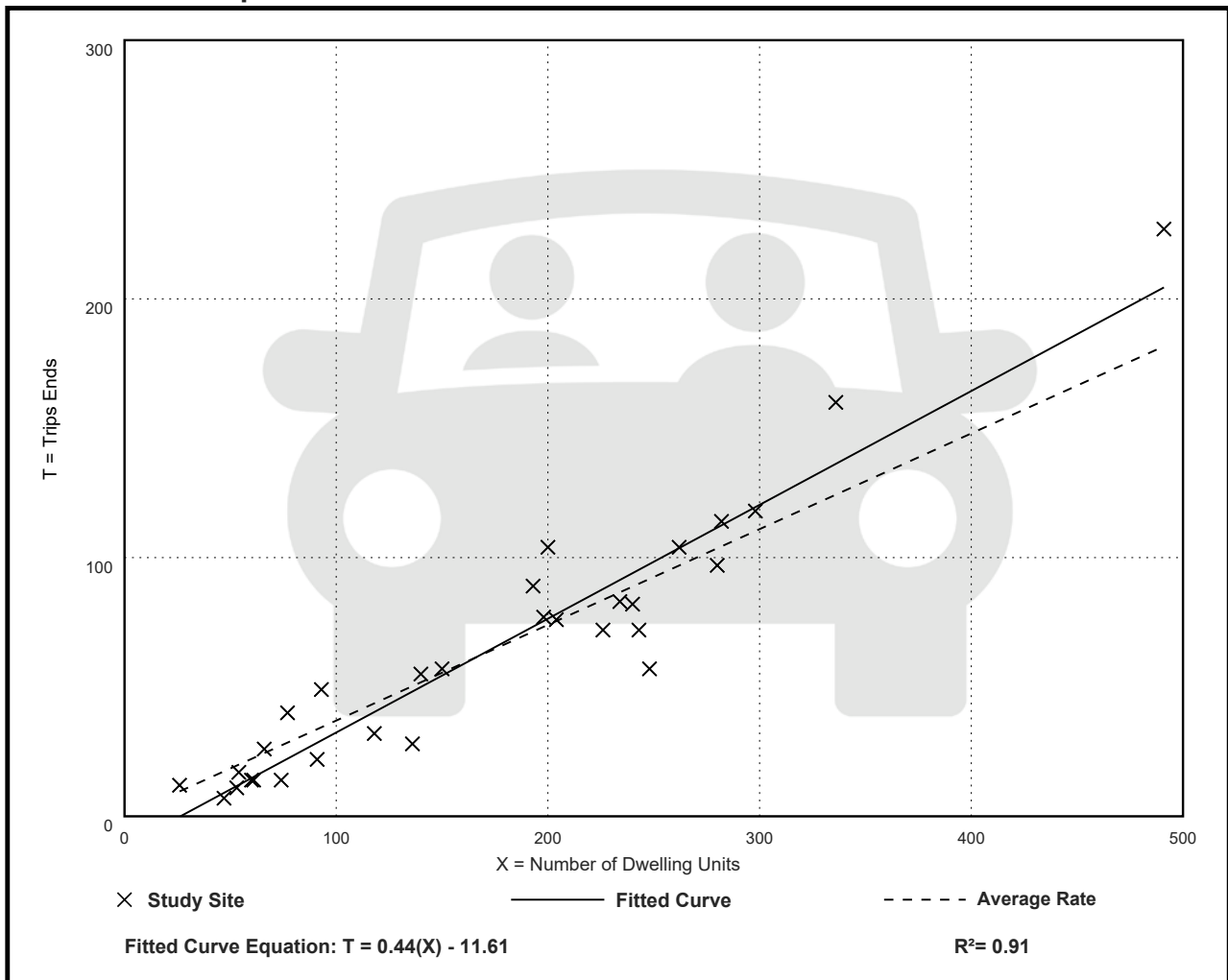
Avg. Num. of Dwelling Units: 173

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

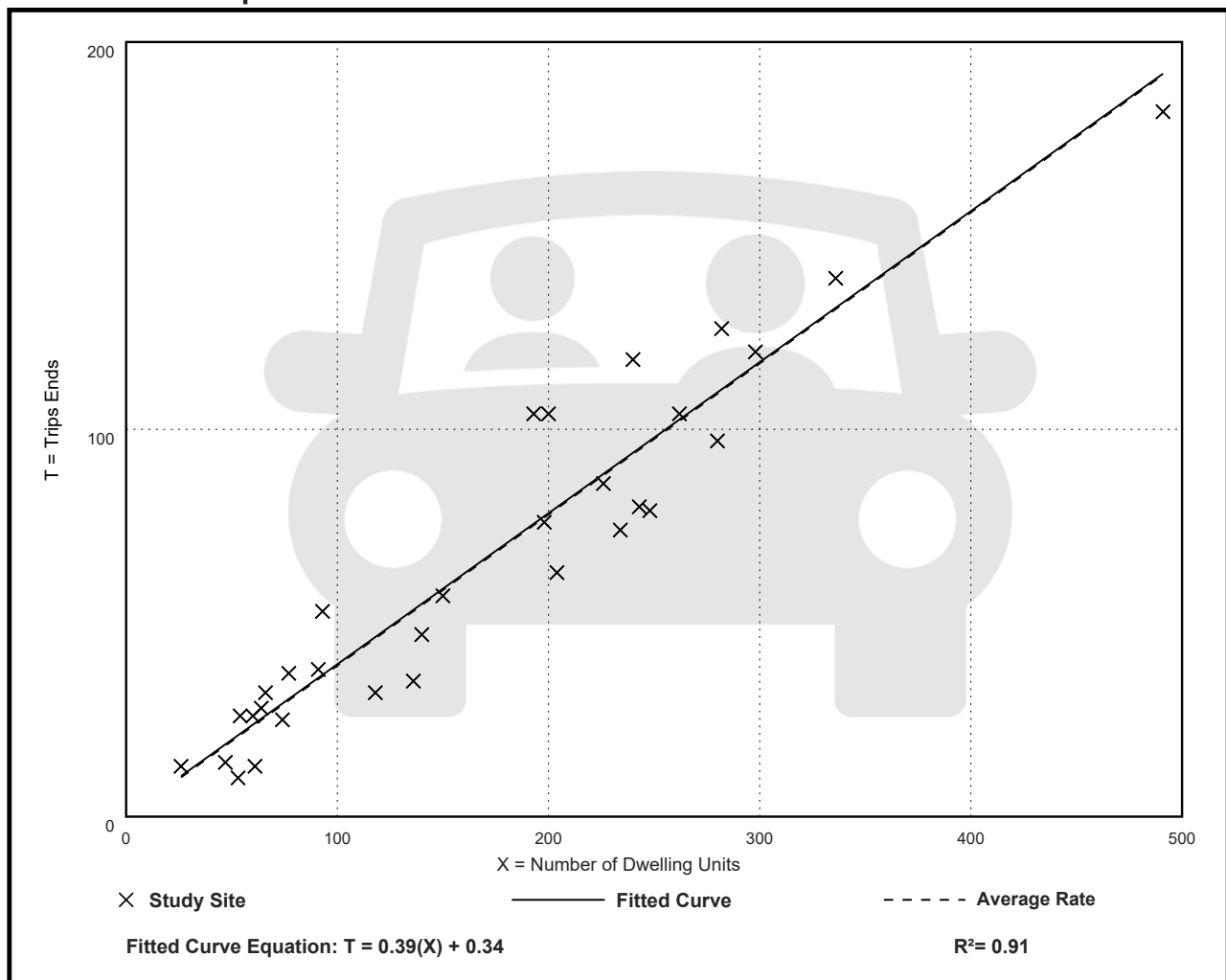
Avg. Num. of Dwelling Units: 169

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



Hotel (310)

Vehicle Trip Ends vs: Rooms On a: Weekday

Setting/Location: General Urban/Suburban

Number of Studies: 7

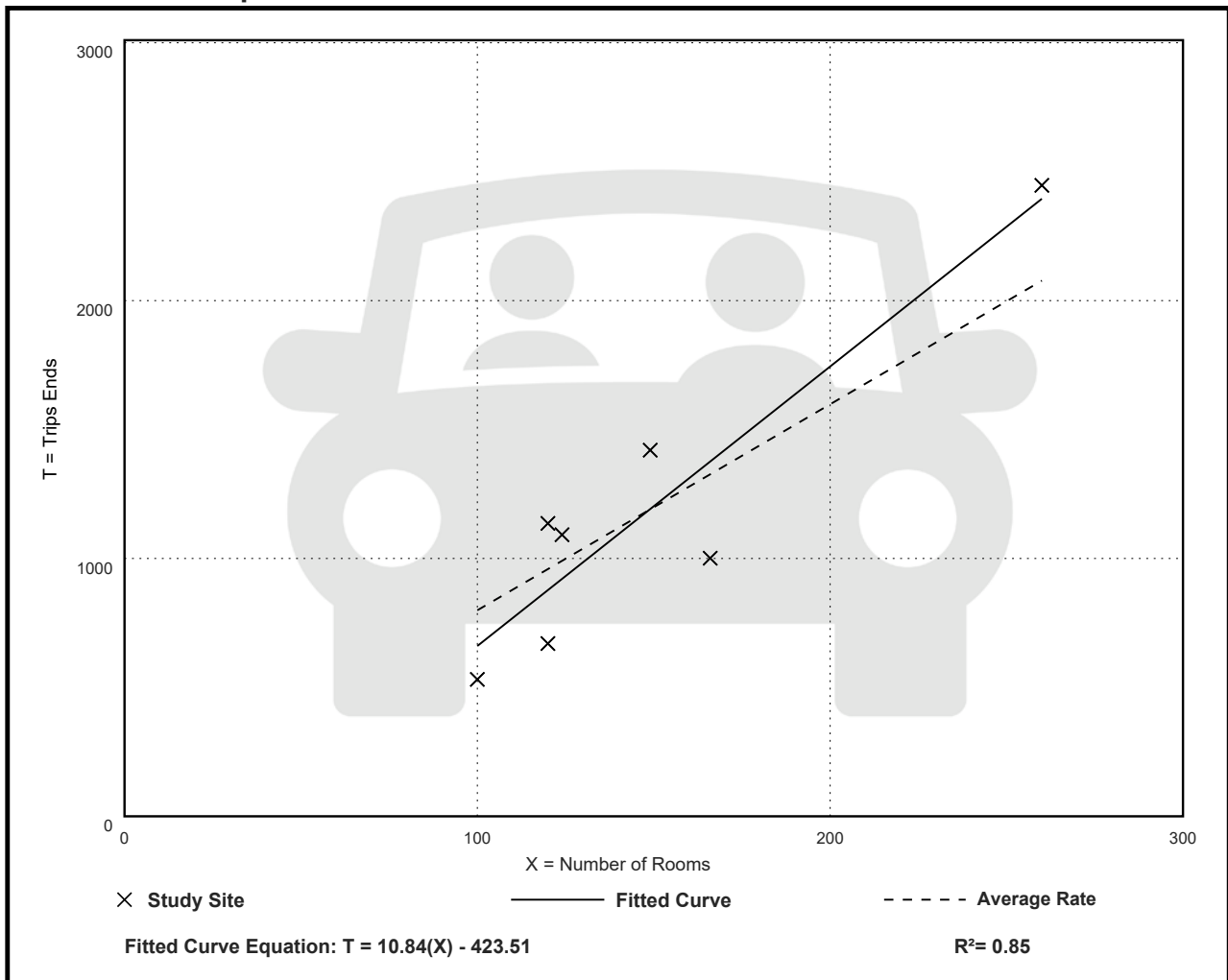
Avg. Num. of Rooms: 148

Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Room

Average Rate	Range of Rates	Standard Deviation
7.99	5.31 - 9.53	1.92

Data Plot and Equation



Hotel (310)

Vehicle Trip Ends vs: Rooms

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: 28

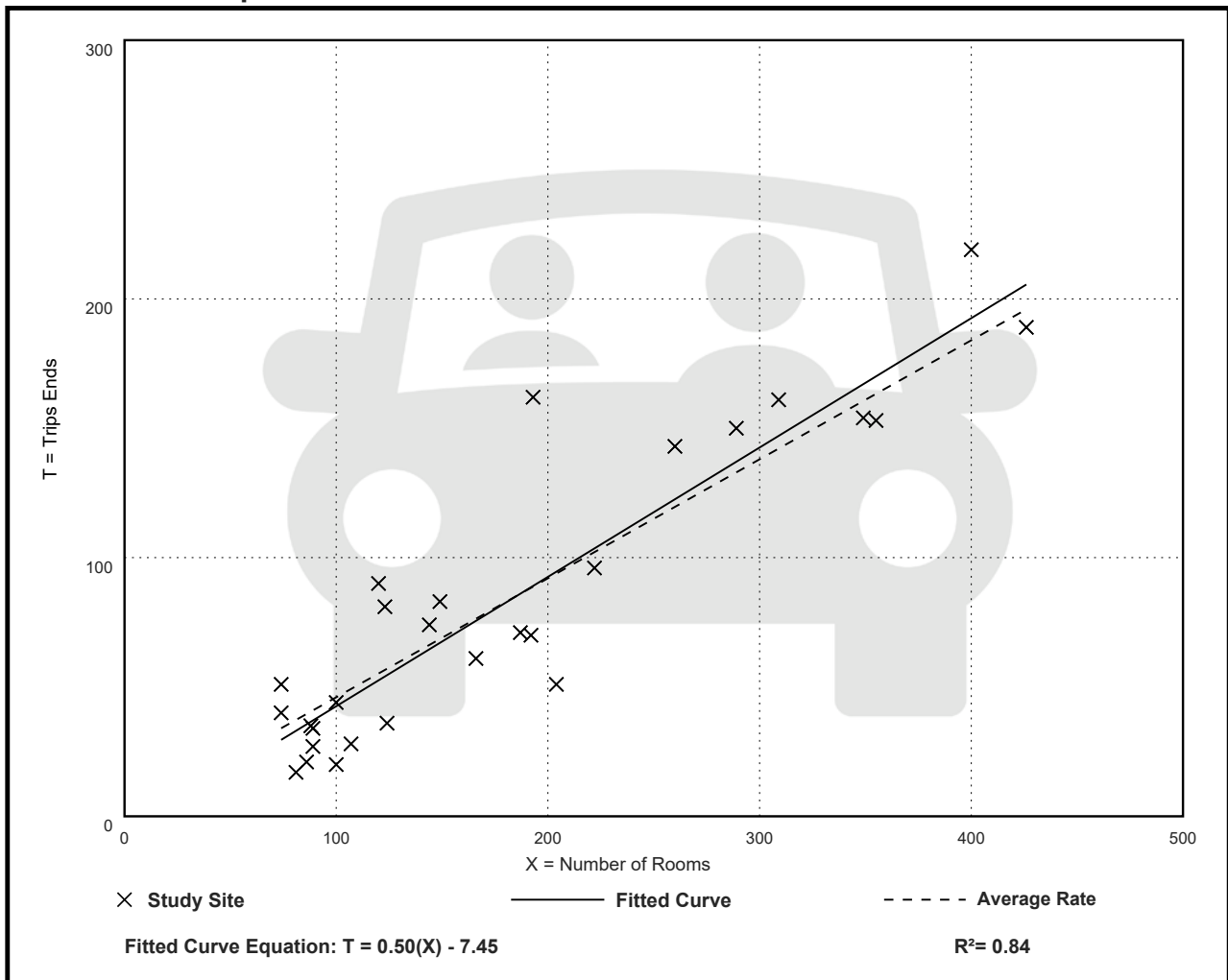
Avg. Num. of Rooms: 182

Directional Distribution: 56% entering, 44% exiting

Vehicle Trip Generation per Room

Average Rate	Range of Rates	Standard Deviation
0.46	0.20 - 0.84	0.14

Data Plot and Equation



Hotel (310)

Vehicle Trip Ends vs: Rooms

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

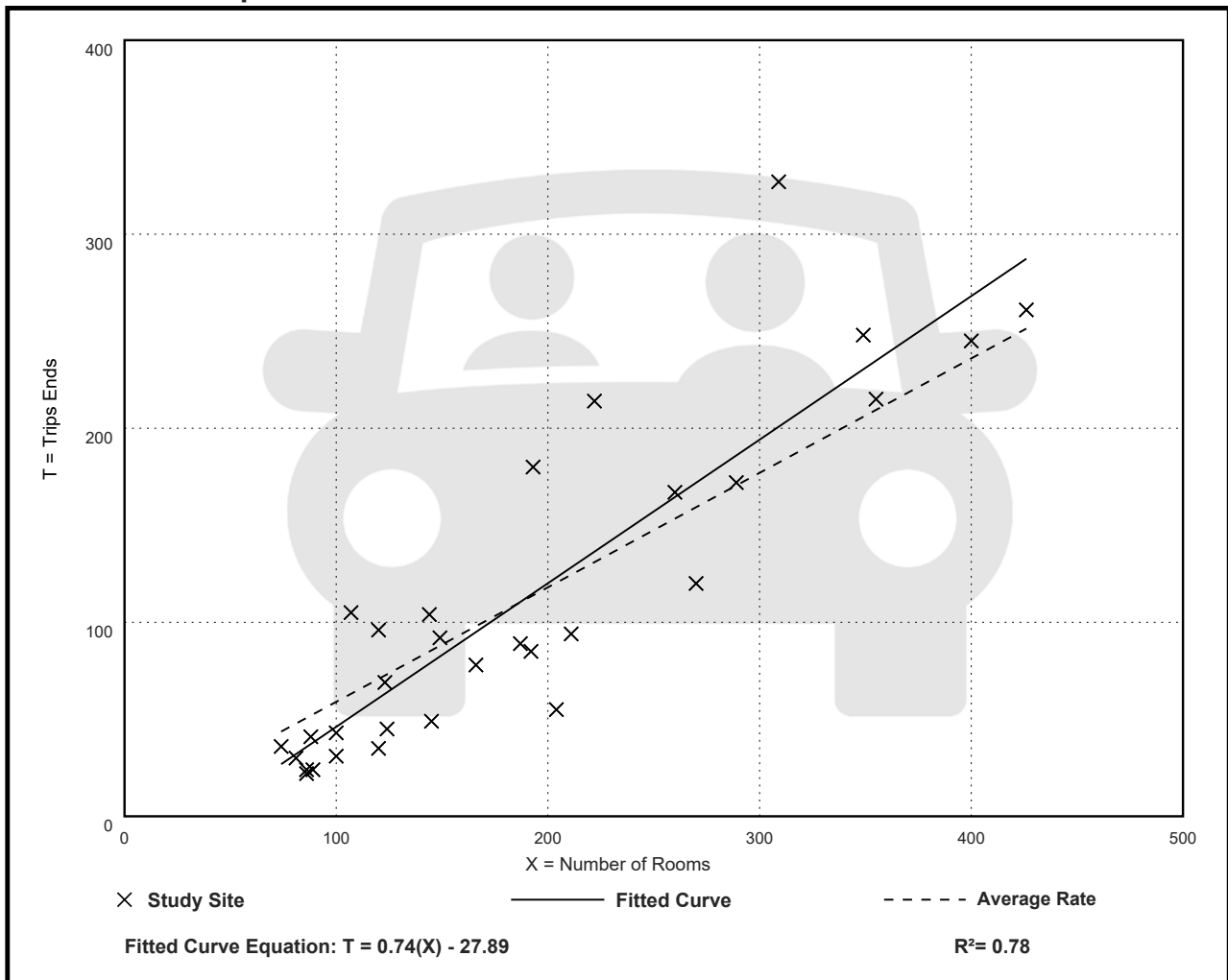
Avg. Num. of Rooms: 186

Directional Distribution: 51% entering, 49% exiting

Vehicle Trip Generation per Room

Average Rate	Range of Rates	Standard Deviation
0.59	0.26 - 1.06	0.22

Data Plot and Equation



US Census Data

Means of Transportation to Work

Note: This is a modified view of the original table produced by the U.S. Census Bureau. This download or printed version may have missing information from the original table.

$$(597+0+130)/(2,816-212) = 27.9\%$$

Census Tract 39.11; Miami-Dade County; Florida

Label	Estimate	Margin of Error
▼ Total:	2,816	±727
▼ Car, truck, or van:	1,692	±596
Drove alone	1,563	±574
▼ Carooled:	129	±168
In 2-person carpool	129	±168
In 3-person carpool	0	±15
In 4-person carpool	0	±15
In 5- or 6-person carpool	0	±15
In 7-or-more-person carpool	0	±15
▼ Public transportation (excluding taxicab):	597	±352
Bus	597	±352
Subway or elevated rail	0	±15
Long-distance train or commuter rail	0	±15
Light rail, streetcar or trolley (carro público in Puerto Rico)	0	±15
Ferryboat	0	±15
Taxicab	38	±52
Motorcycle	69	±52
Bicycle	0	±15
Walked	130	±205
Other means	78	±95
Worked from home	212	±169

Table Notes

Means of Transportation to Work

Survey/Program: American Community Survey

Universe: Workers 16 years and over

Year: 2023

Estimates: 5-Year

Table ID: B08301

Although the American Community Survey (ACS) produces population, demographic and housing unit estimates, the decennial census is the official source of population totals for April 1st of each decennial year. In between censuses, the Census Bureau's Population Estimates Program produces and disseminates the official estimates of the population for the nation, states, counties, cities, and towns and estimates of housing units and the group quarters population states and counties.

Information about the American Community Survey (ACS) can be found on the ACS website. Supporting documentation including code lists, subject definitions, data accuracy, and statistical testing, and a full list of ACS tables and table shells (without estimates) can be found on the Technical Documentation section of the ACS website.

Sample size and data quality measures (including coverage rates, allocation rates, and response rates) can be found on the American Community Survey website in the [Methodology](#) section.

Source: U.S. Census Bureau, 2019-2023 American Community Survey 5-Year Estimates

ACS data generally reflect the geographic boundaries of legal and statistical areas as of January 1 of the estimate year. For more information, see Geographic Boundaries by Year.

Data are based on a sample and are subject to sampling variability. The degree of uncertainty for an estimate arising from sampling variability is represented through the use of a margin of error. The value shown here is the 90 percent margin of error. The margin of error can be interpreted roughly as providing a 90 percent probability that the interval defined by the estimate minus the margin of error and the estimate plus the margin of error (the lower and upper confidence bounds) contains the true value. In addition to sampling variability, the ACS estimates are subject to nonsampling error (for a discussion of nonsampling variability, see ACS Technical Documentation). The effect of nonsampling error is not represented in these tables.

Users must consider potential differences in geographic boundaries, questionnaire content or coding, or other methodological issues when comparing ACS data from different years. Statistically significant differences shown in ACS Comparison Profiles, or in data users' own analysis, may be the result of these differences and thus might not necessarily reflect changes to the social, economic, housing, or demographic characteristics being compared. For more information, see Comparing ACS Data.

Workers include members of the Armed Forces and civilians who were at work last week.

Estimates of urban and rural populations, housing units, and characteristics reflect boundaries of urban areas defined based on 2020 Census data. As a result, data for urban and rural areas from the ACS do not necessarily reflect the results of ongoing urbanization.

Explanation of Symbols:

- The estimate could not be computed because there were an insufficient number of sample observations. For a ratio of medians estimate, one or both of the median estimates falls in the lowest interval or highest interval of an open-ended distribution. For a 5-year median estimate, the margin of error associated with a median was larger than the median itself.
- N
The estimate or margin of error cannot be displayed because there were an insufficient number of sample cases in the selected geographic area.
- (X)
The estimate or margin of error is not applicable or not available.
- median-
The median falls in the lowest interval of an open-ended distribution (for example "2,500-")
- median+
The median falls in the highest interval of an open-ended distribution (for example "250,000+").
- **
The margin of error could not be computed because there were an insufficient number of sample observations.
- ***

Attachment C

Transit Route Information

SERVICE FREQUENCIES
FRECUENCIAS DE SERVICIO / FREKANS SÈVIS YO

	FROM DESDE / DE	TO HASTA / A	EVERY CADA / CHAK
WEEKDAY DIAS LABORABLES LASEMÈN	12:00 a.m.	4:00 a.m.	60 min (Northside-M Beach)
	4:00 a.m.	6:00 a.m.	30 min (Hialeah-M Beach)
	6:00 a.m.	10:00 p.m.	15 min (Hialeah-M Beach)
	10:00 p.m.	12:00a.m.	30 min (Hialeah-M Beach)
SATURDAY SÁBADO SAMDI	12:00 a.m.	5:00 a.m.	60 min (Northside-M Beach)
	5:00 a.m.	7:00 a.m.	30 min (Hialeah-M Beach)
	7:00 a.m.	10:00 p.m.	15 min (Hialeah-M Beach)
	10:00 p.m.	12:00 a.m.	30 min (Hialeah-M Beach)
SUNDAY DOMINGO DIMANCH	12:00 a.m.	5:00 a.m.	60 min (Northside-M Beach)
	5:00 a.m.	8:00 a.m.	30 min (Hialeah-M Beach)
	8:00 a.m.	8:00 p.m.	20 min (Hialeah-M Beach)
	8:00 p.m.	12:00 a.m.	60 min (Hialeah-M Beach)

Frequencies are approximate and may vary depending on traffic and road conditions

Language Assistance: Miami-Dade Transit (MDT) is committed to providing information about its transit services to passengers with limited English as part of its non-discrimination program. MDT publishes route information in Spanish and Haitian Creole and offers assistance in both languages at our Call Center at 3-1-1 or 305- 468-5900. For more information, call MDT's Office of Civil Rights & Labor Relations at 786-469-5486.

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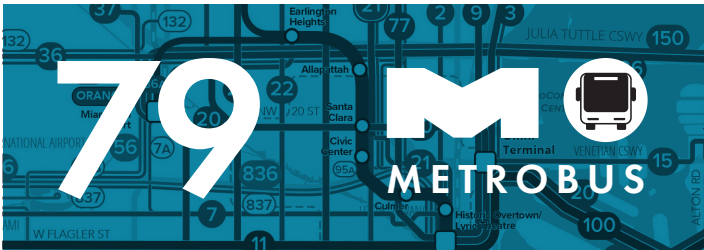
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APRIL 2024 ABRIL 2024 | AVRIL 2024

- Local service seven days a week.
- Travels from Hialeah Metrorail Station to South Beach along NW/NE 79 St, the 79th Street Causeway and Collins Ave
- Overnight trips travel from Northside Metrorail Station



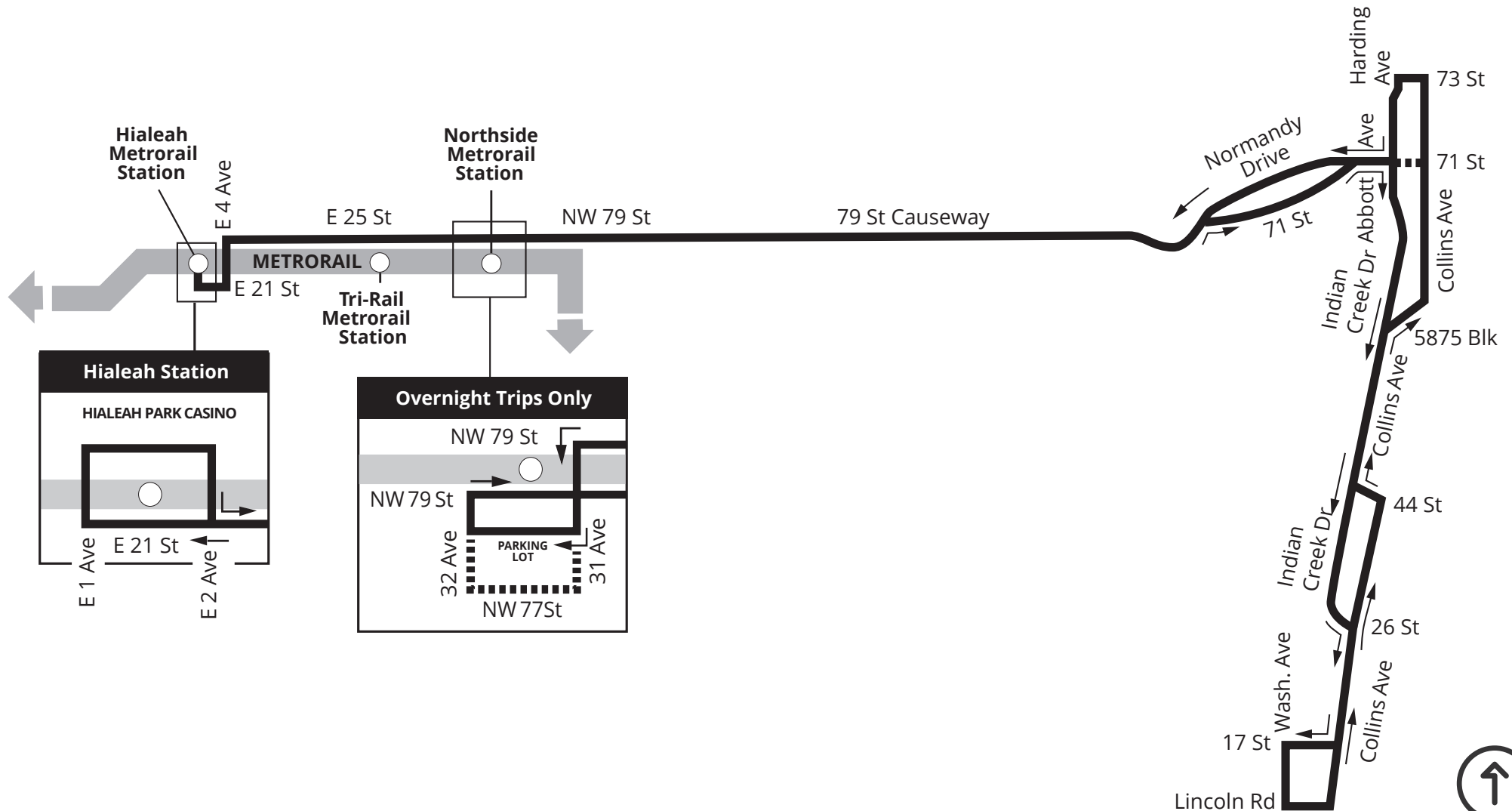
- Servicio local los siete días de la semana.
- Va desde la estación de Hialeah del Metrorail hasta South Beach, pasando por NW/NE 79 St, 79th Street Causeway y Collins Ave.
- En el horario nocturno el recorrido comienza en la estación Northside del Metrorail.
- Sèvis lokal sèt jou sou sèt.
- Vwayaje soti nan estasyon Hialeah Metrorail pou rive nan South Beach sou NW/NE 79 St, 79th Street Causeway ak Collins Ave.
- Vwayaj lannwit yo fèt soti nan estasyon Northside Metrorail.



MORE INFORMATION
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79



NORTH
11/2023

SERVICE FREQUENCIES

FRECUENCIAS DE SERVICIO / FREKANS SÈVIS YO

	FROM DESDE / DE	TO HASTA / A	EVERY CADA / CHAK
WEEKDAY DIAS LABORABLES LASEMÈN	12:00 a.m.	4:00 a.m.	60 min
	4:00 a.m.	10:00 p.m.	9 min
	10:00 p.m.	12:00 a.m.	20 min
SATURDAY SÁBADO SAMDI	12:00 a.m.	5:00 a.m.	60 min
	5:00 a.m.	7:00 a.m.	15 min
	7:00 a.m.	10:00 p.m.	9 min
SUNDAY DOMINGO DIMANCH	10:00 p.m.	12:00 a.m.	15 min
	12:00 a.m.	5:00 a.m.	60 min
	5:00 a.m.	7:00 a.m.	30 min
	7:00 a.m.	8:30 p.m.	15 min
	8:30 p.m.	12:00 a.m.	30 min

Frequencies are approximate and may vary depending on traffic and road conditions.
Las frecuencias son aproximadas, pues dependen del tráfico y otras condiciones de las vías.
Asosye yo apwoksimatif epi yo ka varye selon kondisyon sikilasyon sou wout yo.



YOUR FREE AND DIRECT CONNECTION TO MIAMI-DADE TRANSIT

SCAN TO DOWNLOAD THE APP OR CALL 786-321-5842




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MARCH 2025 MARZO 2025 | MAS 2025

- Local service seven days a week.
- Travels from the Bus Terminal at Aventura Mall to Downtown Miami through Miami Beach.
- Stops include the Government Center Metrorail / Metromover station.



- Servicio local los siete días de la semana.
- Va desde la terminal de autobuses en Aventura Mall hasta el downtown de Miami, pasando por Miami Beach.
- Con parada en la estación Government Center del Metrorail y el Metromover.

- Sèvis lokal sèt jou psou sèt.
- Vwayaje soti nan Tèminal Otobis la nan Aventura Mall pou rive nan Downtown Miami a travè Miami Beach.
- Arè yo gen ladan estasyon Metrorail / Metromover Government Center.



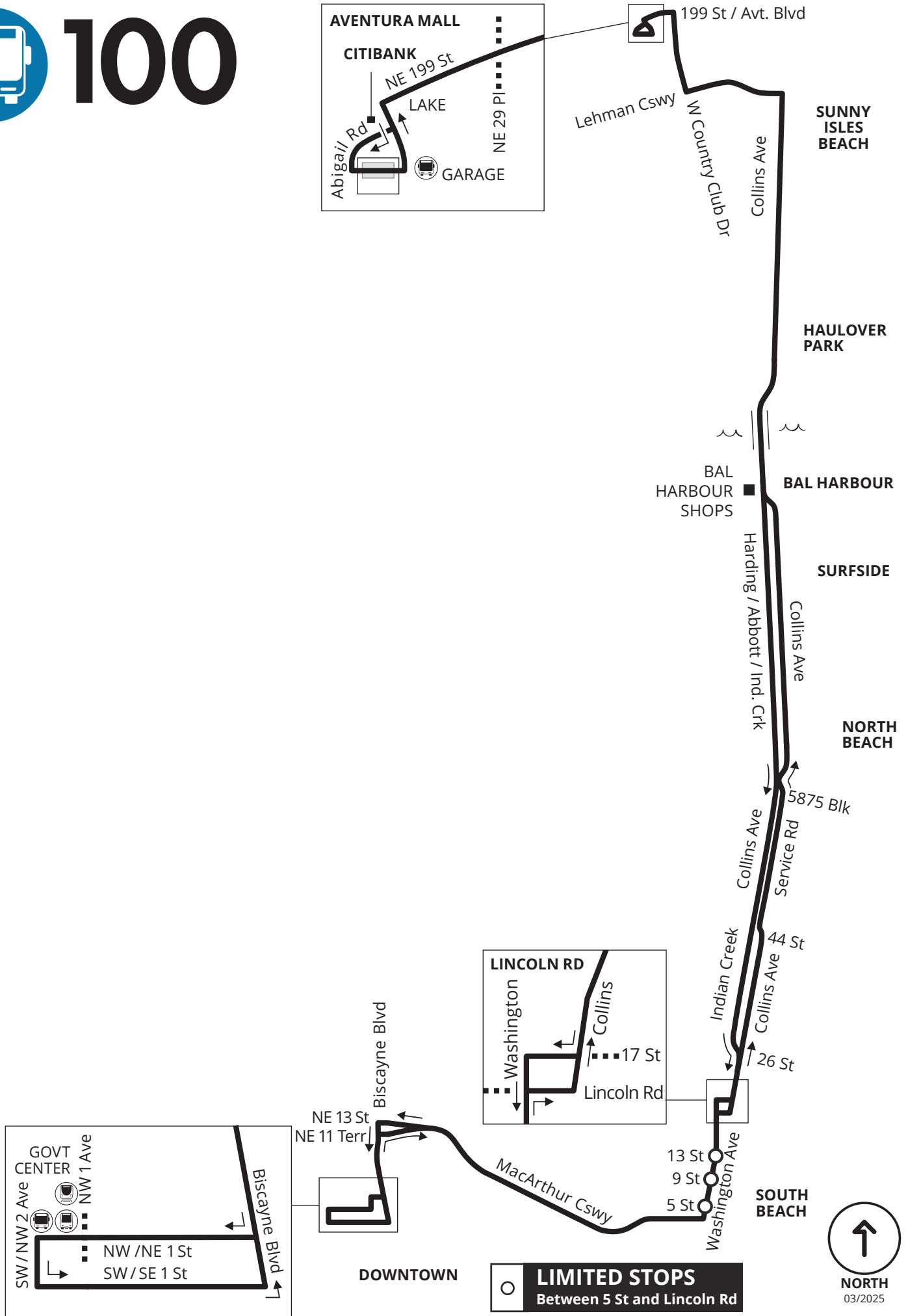
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100



SERVICE FREQUENCIES

FRECUENCIAS DE SERVICIO / FREKANS SÈVIS YO

	FROM DESDE / DE	TO HASTA / A	EVERY CADA / CHAK
WEEKDAY DIAS LABORABLES LASEMÈN	5:45 a.m.	8:15 a.m.	24 min
	4:00 p.m.	6:00 p.m.	24 min

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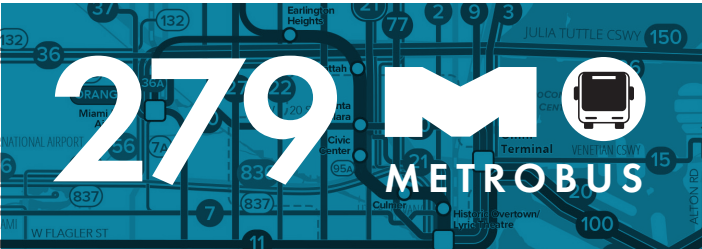
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MARCH 2024 MARZO 2024 | MAS 2024

79 STREET MAX

- 

- Limited-stop weekday morning and afternoon service.
 - Travels from Northside Metrorail station to 73 St & Collins Ave on Miami Beach along NW/NE 79 St and the 79th Street Causeway.
-
- Servicio con paradas limitadas en las mañanas y las tardes de los días laborables.
 - Va desde la estación Northside del Metrorail hasta 73 St y Collins Ave en Miami Beach, pasando por NW/NE 79 St y 79th Street Causeway.
-
- Sèvis arè limite nan maten ak apre midi nan lasemèn.
 - Vwayaje soti nan estasyon Northside Metrorail pou rive nan 73 St & Collins Ave sou Miami Beach sou NW/NE 79 St ak 79th Street Causeway.



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279

79 STREET MAX



NORTH
11/2023



Metrorail Station



LIMITED STOPS
entire route

SURFSIDE

Monday - Friday

Surfside Publix (shops & services)	7:30 am	8:00 am	8:30 am	9:11 am	9:52 am	10:33 am	11:14 am	11:55 am	12:36 pm	1:17 pm	1:58 pm	2:39 pm	3:20 pm	4:00 pm	4:42 pm
Bay Dr. & 95th St.	7:33 am	8:03 am	8:33 am	9:14 am	9:55 am	10:36 am	11:17 am	11:58 am	12:39 pm	1:20 pm	2:00 pm	2:42 pm	3:23 pm	4:04 pm	4:45 pm
Bay Dr. & Dickens	7:39 am	8:09 am	8:39 am	9:20 am	10:00 am	10:42 am	11:23 am	12:04 pm	12:45 pm	1:26 pm	2:07 pm	2:48 pm	3:29 pm	4:10 pm	4:41 pm
Bay Dr. & 92nd St.	7:41 am	8:11 am	8:41 am	9:21 am	10:03 am	10:44 am	11:25 am	12:06 pm	12:47 pm	1:28 pm	2:09 pm	2:50 pm	3:31 pm	4:12 pm	4:53 pm
Byron & 92nd St.	7:42 am	8:12 am	8:42 am	9:23 am	10:04 am	10:46 am	11:26 am	12:07 pm	12:48 pm	1:29 pm	2:10 pm	2:51 pm	3:32 pm	4:13 pm	4:54 pm
Dickens & 90th St.	7:44 am	8:14 am	8:44 am	9:25 am	10:06 am	10:47 am	11:28 am	12:09 pm	12:50 pm	1:31 pm	2:12 pm	2:53 pm	3:34 pm	4:15 pm	4:56 pm
Hawthorne & 90th St.	7:45 am	8:15 am	8:46 am	9:27 am	10:07 am	10:48 am	11:29 am	12:10 pm	12:51 pm	1:32 pm	2:13 pm	2:54 pm	3:35 pm	4:16 pm	4:57 pm
Byron & 88th St.	7:48 am	8:18 am	8:48 am	9:29 am	10:10 am	10:51 am	11:32 am	12:13 pm	12:54 pm	1:35 pm	2:16 pm	2:57 pm	3:38 pm	4:19 pm	4:59 pm
Byron & 87th St./8638	7:49 am	8:19 am	8:49 am	9:30 am	10:11 am	10:52 am	11:33 am	12:14 pm	12:55 pm	1:36 pm	2:17 pm	2:58 pm	3:39 pm	4:20 pm	5:00 pm
North Shore Library	no stop	no stop	8:50 am	9:31 am	10:12 am	10:53 am	11:34 am	12:15 pm	12:56 pm	1:37 pm	2:18 pm	3:00 pm	3:40 pm	4:21 pm	5:01 pm
90th St. & Collins	7:51 am	8:21 am	8:51 am	9:32 am	10:13 am	10:54 am	11:35 am	12:16 pm	12:57 pm	1:38 pm	2:19 pm	3:00 pm	3:41 pm	4:22 pm	5:02 pm
Community Center	7:52 am	8:22 am	8:58 am	9:39 am	10:20 am	11:01 am	11:42 am	12:23 pm	1:04 pm	1:45 pm	2:26 pm	3:07 pm	3:48 pm	4:29 pm	5:09 pm
Post Office	7:53 am	8:23 am	9:05 am	9:40 am	10:27 am	11:08 am	11:49 am	12:30 pm	1:11 pm	1:52 pm	2:33 pm	3:14 pm	3:55 pm	4:36 pm	5:16 pm

The Surfside Shuttle provides a limited shuttle schedule on **Saturdays from 8 am–1:30 pm**. The same stops are serviced at the same times listed above during this time period.

BAL HARBOUR

Monday - Thursday & Sunday

Friday & Saturday

96th St. & The Majestic, 9601 Collins Avenue	9:00 am	10:20 am	11:40 am	1:45 pm	3:15 pm	5:00 pm	6:50 pm	8:10 pm
St. Regis, 9703 Collins Avenue	9:01 am	10:22 am	11:41 am	1:46 pm	3:16 pm	5:05 pm	6:52 pm	8:12 pm
The Balmoral, 9801 Collins Avenue	9:02 am	10:22 am	11:42 am	1:47 pm	3:17 pm	5:08 pm	7:00 pm	8:13 pm
The Sea View Hotel, 9909 Collins Avenue	9:03 am	10:23 am	11:43 am	1:48 pm	3:18 pm	5:10 pm	7:02 pm	8:15 pm
The Bal Harbor Tower, 9999 Collins Avenue	9:05 am	10:25 am	11:45 am	1:50 pm	3:20 pm	5:12 pm	7:04 pm	8:16 pm
The Palace, 10101 Collins Avenue	9:06 am	10:26 am	11:46 am	1:51 pm	3:21 pm	5:14 pm	7:06 pm	8:17 pm
Bal Harbour 101 (curbside), 10155 Collins Avenue	9:07 am	10:27 am	11:47 am	1:52 pm	3:22 pm	5:16 pm	7:07 pm	8:18 pm
The Tiffany, 10175 Collins Avenue	9:09 am	10:29 am	11:49 am	1:54 pm	3:24 pm	5:18 pm	7:08 pm	8:20 pm
The Plaza/Beach Club Access, 10185 Collins Avenue	9:11 am	10:31 am	11:51 am	1:56 pm	3:26 pm	5:20 pm	7:09 pm	8:22 pm
The Carlton Terrace, 10245 Collins Avenue	9:13 am	10:33 am	11:53 am	1:58 pm	3:28 pm	5:22 pm	7:11 pm	8:24 pm
The Harbour House, 10275 Collins Avenue	9:14 am	10:34 am	11:54 am	1:59 pm	3:29 pm	5:23 pm	7:12 pm	8:25 pm
Ritz-Carlton Bal Harbour, 10295 Collins Avenue	9:15 am	10:35 am	11:55 am	2:00 pm	3:30 pm	5:25 pm	7:13 pm	8:26 pm
Haulover Bridge underpass, Frontage Road southbound	9:17 am	10:37 am	11:57 am	2:02 pm	3:32 pm	5:27 pm	7:15 pm	8:28 pm
Bal Bridge North, 10240 Collins Avenue	9:18 am	10:38 am	11:58 am	2:03 pm	3:33 pm	5:28 pm	7:16 pm	8:29 pm
Harbour Way, 10200 Collins Avenue	9:19 am	10:39 am	11:59 pm	2:04 pm	3:34 pm	5:30 pm	7:18 pm	8:31 pm
Bal Harbour Collins Apts, 9930 Collins Avenue	9:20 am	10:40 am	12:00 pm	2:05 pm	3:35 pm	5:32 pm	7:19 pm	8:32 pm
Bal Harbour Shops, 9700 Collins Avenue	9:21 am	10:41 am	12:01 pm	2:06 pm	3:36 pm	5:35 pm	7:20 pm	8:34 pm
Bal Harbour Village Hall/Park, 655 96th Street	9:22 am	10:42 am	12:02 pm	2:07 pm	3:37 pm	No stop	No stop	No stop
Bay Harbor/96th St. Town Hall, 9665 Bay Harbor Ter.	9:25 am	10:43 am	12:03 pm	2:08 pm	3:39 pm	No stop	No stop	No stop
Bay Harbor Terrace, corner of 95th St & Bay Harbor Ter.	9:27 am	10:43 am	12:03 pm	2:08 pm	3:39 pm	No stop	No stop	No stop
Surfside Publix, (shops & services)	9:31 am	10:49 am	12:09 pm	2:14 pm	3:45 pm	5:39 pm	7:25 pm	8:39 pm
169th St. & Collins (northbound)	9:41 am	11:05 am	12:25 pm	2:30 pm	4:00 pm	5:54 pm	7:35 pm	8:49 pm
Aventura Mall, 19535 Biscayne Blvd.	9:51 am	11:15 am	12:35 pm	2:45 pm	4:15 pm	6:10 pm	7:45 pm	8:59 pm
Sunny Isles Library, 18070 Collins Avenue	9:59 am	11:22 am	12:43 pm	2:53 pm	4:23 pm	6:23 pm	7:53 pm	No stop
170th St. & Collins (southbound)	10:01 am	11:25 am	12:45 pm	2:55 pm	4:30 pm	6:25 pm	7:55 pm	No stop
Haulover Beach	10:11 am	11:35 am	12:55 pm	3:10 pm	4:45 pm	6:35 pm	8:05 pm	No stop
Bal Harbour Collins Apts, 9930 Collins Avenue	10:13 am	11:36 am	12:57 pm	3:12 pm	4:47 pm	6:40 pm	8:07 pm	No stop

BAY HARBOR ISLANDS

Monday - Friday

Town Hall, 9665 Bay Harbor Ter	9:00 am	10:15 am	11:45 am	1:45 pm	3:15 pm	4:45 pm
Island Point, 10350 W. Bay Harbor Dr	9:05 am	10:20 am	11:50 am	1:50 pm	3:20 pm	4:50 pm
Blair House, 9100 W. Bay Harbor Dr	9:10 am	10:25 am	11:55 am	1:55 pm	3:25 pm	4:55 pm
1077 95 Street (Open Kitchen, Orlando's Pizza, Unico Cafe)	9:15 am	10:30 am	12:00 pm	2:00 pm	3:30 pm	No stop
North Park, 103 St./E. Broadview	No stop	10:37 am	12:07 pm	2:07 pm	3:37 pm	No stop
South Park, 94 St./E. Broadview	No stop	10:42 am	12:12 pm	2:12 pm	3:42 pm	No stop
Surfside Publix (shops & services)	9:20 am	10:49 am	12:19 pm	2:19 pm	3:49 pm	No stop
Saks (Bal Harbour Shops)	9:25 am	10:54 am	12:24 pm	2:24 pm	3:54 pm	No stop
Island Point, 10350 W. Bay Harbor Dr	9:30 am	10:59 am	12:29 pm	2:29 pm	3:59 pm	No stop
Blair House, 9100 W. Bay Harbor Dr	9:35 am	11:04 am	12:34 pm	2:34 pm	4:04 pm	No stop
Starbucks, 135th St & Biscayne Blvd	9:43 am	11:12 am	12:42 pm	2:42 pm	4:12 pm	No stop
Costco/Publix, 146th St & Biscayne Blvd	9:50 am	11:19 am	12:49 pm	2:49 pm	4:19 pm	No stop
Walgreens, 123rd St & Biscayne Blvd	10:00 am	11:30 am	1:30 pm	3:00 pm	4:30 pm	No stop

• Red schedules indicate when all three shuttles stop at the Surfside Publix, allowing riders to change routes.

• Brown schedules indicate when Bay Harbor Islands and Bal Harbour shuttles stop at the Bay Harbor Islands Town Hall, allowing riders to change routes.

Together We Will Get You There!

Get to where you need to go by making the connection among our three free shuttle routes.

Residents of Surfside, Bal Harbour and Bay Harbor Islands can take advantage of three complementary shuttle routes to enhance transportation opportunities within our three communities and to various locations in neighboring communities.

This map and corresponding schedules show how to connect from one shuttle to another and to access neighboring municipalities and destinations throughout the region, including Aventura, Miami Beach and North Miami. Use this interlocal shuttle system to also access the Miami-Dade County bus stops at various locations.



9293 Harding Avenue
Surfside, Florida 33154
(305) 861-4863
townofsurfsidefl.org

BAL HARBOUR
- VILLAGE -
655 96th Street
Bal Harbour, Florida 33154
(305) 866-4633
balharbourgov.com



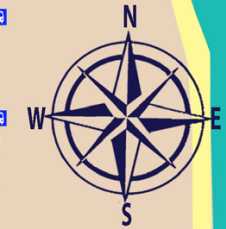
9665 Bay Harbor Terrace
Bay Harbor Islands, FL 33154
(305) 866-6241
bayharborislands.org



Make Your Connection with the Interlocal Shuttle System

SURF
BAL
BAY

Get to where you need to go by
making the connection among our
three free shuttle routes



-  **SURFSIDE shuttle stops**
-  **BAL HARBOUR shuttle stops**
-  **BAY HARBOR ISLANDS shuttle stops**
-  **SHOPS, SERVICES, and DINING AREAS**



Miami-Dade Transit stops
For bus routes, updated schedules
and the live bus tracker, visit
www.miamidade.gov/transit

The Surfside shuttle continues south to the North Shore Library, where riders can connect to the North Beach Trolley  and the Miami Beach Trolley system.

DISCLAIMER

Note that each municipality provided the accompanying routes, times and stops in this guide. Each municipality is responsible for the operation of their shuttle bus. Schedules may change based on ridership levels, special events, traffic or other variables. Riders should check with each municipality for details and more information.

Attachment D

Entry Gate Analysis Worksheets

Entry Gate Analysis (A.M. Peak Hour)

Arrival Rate

IN
3

 veh/hr

Number of Entry Gates (N) = 1

Level of Confidence = 0.95

Storage Provided On-Site = 1 vehicles

Service Rate

IN
1.000

 mins/veh

Total Entering and Exiting Vehicles(q) = 3 veh/hr

Service Capacity per N (60 mins/Service Rate) (Q) = 60.00 veh/hr/pos

Average Service Rate (t) = 1.00 mins/veh

rho (t/Q) = 0.050

Control Delay = min

Service Time = 1.00 mins/veh

Expected (avg.) number of vehicles in the system E(m)= 0.00

Expected (avg.) number of vehicles waiting in queue E(n)= 0.05

Mean time in the queue E(w)= 0.05 mins

Mean time in system E(t)= 1.05 mins

Proportion of customers who wait (P) (E(w) > 0)= 5.00%

Probability of a queue exceeding a length (M) P(x > M)= 5.00%

Queue length which is exceeded 5.00% of the time is equal to less than one (1) vehicle.

Entry Gate Analysis (P.M. Peak Hour)

Arrival Rate

IN
4

 veh/hr

Number of Entry Gates (N) = 1

Level of Confidence = 0.95

Storage Provided On-Site = 1 vehicles

Service Rate

IN
1.000

 mins/veh

Total Entering and Exiting Vehicles(q) = 4 veh/hr

Service Capacity per N (60 mins/Service Rate) (Q) = 60.00 veh/hr/pos

Average Service Rate (t) = 1.00 mins/veh

Control Delay = min

rho (t/Q) = 0.067

Service Time = 1.00 mins/veh

Expected (avg.) number of vehicles in the system	E(m)=	0.00	
Expected (avg.) number of vehicles waiting in queue	E(n)=	0.07	
Mean time in the queue	E(w)=	0.07	mins
Mean time in system	E(t)=	1.07	mins

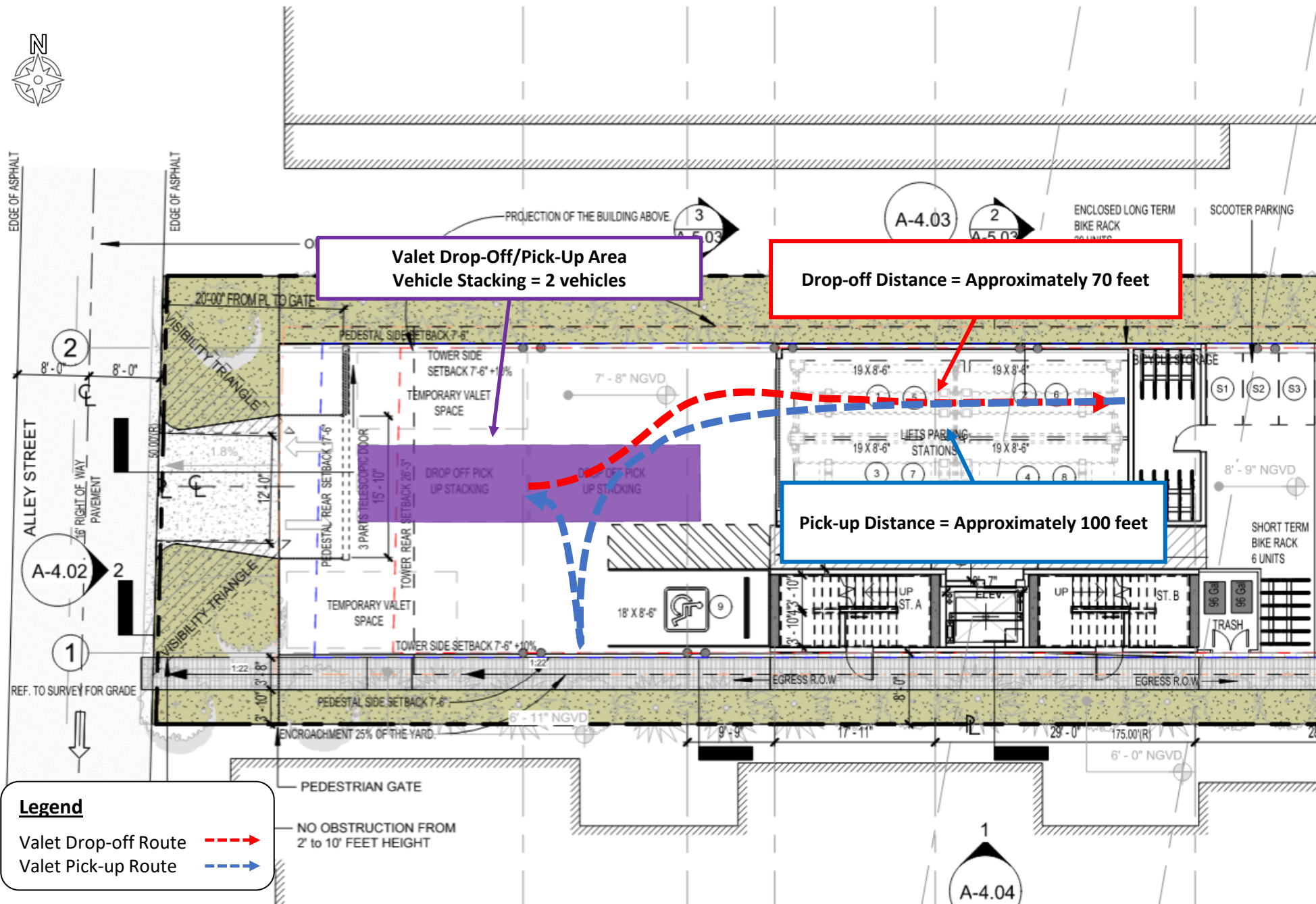
Proportion of customers who wait (P) (E(w) > 0) = 6.67%

Probability of a queue exceeding a length (M) P(x > M) = 5.00%

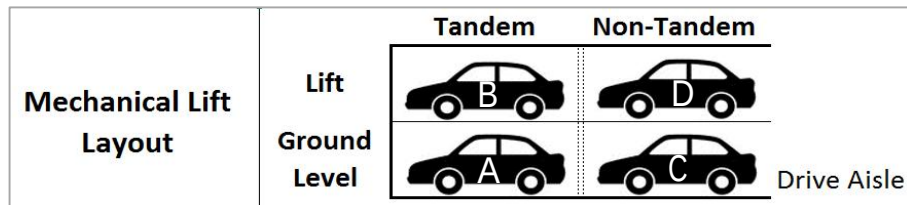
Queue length which is exceeded 5.00% of the time is equal to less than one (1) vehicle.

Attachment E

Valet Analysis Worksheets



Vehicle Processing Scenarios



Vehicle A and C - Drop-Off

- | | |
|-------------------------------|--------------|
| 1. Attendant drives onto lift | 10 |
| 2. Attendant exits vehicle | 5 |
| | <hr/> 15 sec |

Vehicle B and D - Drop-Off

- | | |
|--|--------------|
| 1. Attendant exits vehicle to be parked | 5 |
| 2. Attendant raises lift to move Vehicle A to B or Vehicle C to D | 30 |
| 3. Attendant re-enters vehicle and drives onto lift into position A or C | 15 |
| 4. Attendant exits vehicle | 5 |
| | <hr/> 55 sec |

Vehicle C - Pick-Up

- | | |
|---|--------------|
| 1. Attendant enters Vehicle C and drives to drive aisle | 15 |
| | <hr/> 15 sec |

Vehicle D - Pick-Up (Vehicle C not Parked)

- | | |
|--|--------------|
| 1. Attendant lowers lift | 20 |
| 2. Attendant enters vehicle and drives off of lift | 15 |
| | <hr/> 35 sec |

Vehicle D - Pick-Up (Vehicle C Parked)

- | | |
|--|--------------|
| 1. Attendant moves Vehicle C underneath lift to drive aisle | 10 |
| 2. Attendant exits Vehicle C | 5 |
| 3. Attendant lowers lift | 20 |
| 4. Attendant enters Vehicle D and drives off of lift | 15 |
| 5. Attendant exits Vehicle D | 5 |
| 6. Attendant re-enters Vehicle C and drives into parking space | 15 |
| 7. Attendant exits Vehicle C | 5 |
| 8. Attendant re-enters Vehicle D | 5 |
| | <hr/> 80 sec |

Vehicle A - Pick-Up (Vehicle C not Parked)

- | | |
|---|--------------|
| 1. Attendant enters Vehicle A and drives to drive aisle | 15 |
| | <hr/> 15 sec |

Vehicle A - Pick-Up (Vehicle C Parked)

- | | |
|--|--------------|
| 1. Attendant enters and moves Vehicle C underneath lift to drive aisle | 15 |
| 2. Attendant exits Vehicle C | 5 |
| 3. Attendant enters and drives Vehicle A to drive aisle | 15 |
| 4. Attendant exits Vehicle A | 5 |
| 5. Attendant re-enters Vehicle C and drives into parking space | 15 |
| 6. Attendant exits Vehicle C | 5 |
| 7. Attendant re-enters Vehicle A | 5 |
| | <hr/> 65 sec |

Vehicle Processing Scenarios

Vehicle B - Pick-Up (Vehicle A and C not Parked)

1. Attendant lowers lift	20
2. Attendant enters vehicle and drives off of lift	15
	35 sec

Vehicle B - Pick-Up (Vehicle C not Parked, Vehicle A Parked)

1. Attendant enters and moves Vehicle A underneath lift to drive aisle	15
2. Attendant exits Vehicle A	5
3. Attendant lowers lift	20
4. Attendant enters Vehicle B and drives off of lift	15
5. Attendant exits Vehicle B	5
6. Attendant re-enters Vehicle A and drives into position A	15
7. Attendant exits Vehicle A	5
8. Attendant re-enters Vehicle B	5
	85 sec

Vehicle B - Pick-Up (Vehicle A and C Parked)

1. Attendant enters and moves Vehicle C underneath lift to drive aisle	15
2. Attendant exits Vehicle C	5
3. Attendant enters Vehicle A and moves to drive aisle	15
4. Attendant exits Vehicle A	5
5. Attendant lowers lift	20
6. Attendant enters Vehicle B and drives off of lift	15
7. Attendant exits Vehicle B	5
8. Attendant re-enters Vehicle A and drives into position A	15
9. Attendant exits Vehicle A	5
10. Attendant re-enters Vehicle C and drives into position C	15
11. Attendant exits Vehicle C	5
12. Attendant re-enters Vehicle B	5
	125 sec

Average Drop-off Processing Time	35 Sec
Average Pick-up Processing Time	57 Sec

Valet Drop-off/Pick-Up Calculated Travel Time

Parking Garage Calculated Travel Time

VALET DROP-OFF			
VEHICLE TRAVEL TIME		VALET ATTENDANT TRAVEL TIME	
Travel Times (Assume 5 mph speed)		Travel Times (Assume 5 ft/s speed)	
To Valet Lift Parking Stations (In vehicle)		Return from Lift Parking Stations (Walk/Run) to Valet Area	
Distance	Travel Time	Distance	Travel Time
0.013 miles	0.2 minutes	0.013 miles	0.2 minutes
Controlled Delay	0.5 Minutes		
Klaus Stacker	0.6 Minutes		
Total Time	1.5 Minutes		

Parking Garage Calculated Travel Time

VALET PICK-UP			
VALET ATTENDANT TRAVEL TIME		VEHICLE TRAVEL TIME	
Travel Times (Assume 5 ft/s speed)		Travel Times (Assume 5 mph speed)	
Return from Valet Area		Return from Lift Parking	
Distance	Travel Time	Distance	Travel Time
0.013 miles	0.2 minutes	0.019 miles	0.2 minutes
Controlled Delay	0.5 Minutes		
Klaus Stacker	1.0 Minutes		
Total Time	1.9 Minutes		

Valet Analysis - A.M. Peak Hour

Arrival Rate	IN	OUT	veh/hr
	4	2	

Service Rate	IN	OUT	mins/veh
	1.50	1.90	

Number of Valet Attendants (N) =	1
Level of Confidence =	0.95
Storage Provided On-Site =	2 vehicles
Total Entering and Exiting Vehicles(q) =	6 veh/hr
Service Capacity per N (60 mins/Service Rate) (Q) =	36.73 veh/hr/pos
Average Service Rate (t) =	1.63 mins/veh
rho (t/Q) =	0.163
Control Delay =	min
Service Time =	1.63 mins/veh

Expected (avg.) number of vehicles in the system	E(m)=	0.03	
Expected (avg.) number of vehicles waiting in queue	E(n)=	0.20	
Mean time in the queue	E(w)=	0.32	mins
Mean time in system	E(t)=	1.95	mins

Proportion of customers who wait (P) (E(w) > 0)=	16.33%
Probability of a queue exceeding a length (M) P(x > M)=	5.00%

Queue length which is exceeded 5.00% of the times is equal to -0.3 vehicles

Valet Analysis - P.M. Peak Hour

Arrival Rate

IN	OUT
4	3

veh/hr

Service Rate

IN	OUT
1.50	1.90

mins/veh

Number of Valet Attendants (N) = 1
 Level of Confidence = 0.95
 Storage Provided On-Site = 4 vehicles
 Total Entering and Exiting Vehicles(q) = 7 veh/hr
 Service Capacity per N (60 mins/Service Rate) (Q) = 35.90 veh/hr/pos
 Average Service Rate (t) = 1.67 mins/veh
 rho (t/Q) = 0.195
 Control Delay = min
 Service Time = 1.67 mins/veh

Expected (avg.) number of vehicles in the system E(m)= 0.05
 Expected (avg.) number of vehicles waiting in queue E(n)= 0.24
 Mean time in the queue E(w)= 0.40 mins
 Mean time in system E(t)= 2.08 mins

Proportion of customers who wait (P) (E(w) > 0)= 19.50%
 Probability of a queue exceeding a length (M) P(x > M)= 5.00%

Queue length which is exceeded 5.00% of the times is equal to -0.2 vehicles

Attachment F

Maneuverability Analysis Worksheets

Ground

