TRAFFIC IMPACT ANALYSIS

for

The Barclay
1940 Park Avenue
Miami Beach, Florida

Prepared For:
1940 Barclay Partners, LLC
1691 Michigan Avenue, Suite 250
Miami Beach, Florida 33139

Prepared By:
Langan Engineering & Environmental Services, LLC
1221 Brickell Avenue, Suite 1800
Miami, FL 33131
FBPE Registry No. 00006601

Maximo G Polanco

Digitally signed by Maximo G Polanco
DN: CN=Maximo G Polanco, dnQualifier=A01410D00000195965DA6810019D15E, O=LANGAN ENGINEERING AND ENVIRONMENTAL SERVICES INC, C=US
Reason: I attest to the accuracy and integrity of this document
Date: 2026.04.09 21:04:52-04'00'

MAXIMO G. POLANCO
LICENSE
No. 91355
STATE OF
FLORIDA
PROFESSIONAL ENGINEER

This item has been digitally signed and sealed by Maximo Polanco, PE on the date adjacent to the seal.

Signature must be verified on any electronic copies.

Maximo G. Polanco, P.E.
P.E. License No. 91355

Eric Schwarz, P.E., LEED AP
Senior Principal

April 2026

300390901

LANGAN

Table of Contents

List of Figures

List of Tables

Appendices

EXECUTIVE SUMMARY

Langan Engineering & Environmental Services LLC was retained to prepare a traffic-impact analysis for the proposed "The Barclay" mixed-use residential development to be located at 1940 Park Avenue in Miami Beach, Florida. The proposed development is replacing a previous 66-unit mid-rise multifamily housing residential building with a 105-unit mid-rise residential building with ground-floor commercial uses and is expected to be built by 2029. We analyzed two (2) signalized intersections, and two (2) stop-sign controlled intersections for the 2029 build conditions. The peak-hour traffic-impact analysis with the proposed development's impacts in 2029 yielded the following results:

- The proposed development is not anticipated to significantly impact the surrounding roadway network, as all study intersections are expected to maintain the same Level of Service (LOS) as existing conditions, with only minor delay increases for certain movements that are not expected to exceed two (2) seconds.
- The study intersections are expected to operate at an overall LOS of "B" or better during the morning and afternoon peak hours with and without the proposed project's impacts.
- The proposed egress driveway connection to Park Avenue is expected to operate at LOS "A" during the morning and afternoon peak hours.
- The proposed ingress driveway connection to Washington Avenue does not warrant the need for exclusive turn lanes.
- The proposed valet operation analysis indicates that queues are not expected to exceed two (2) vehicles with a minimum of eight (8) valet attendants to serve the expected demand.
- The development will promote the use of different modes of transportation through the implementation of several TDM strategies.

We conducted intersection-capacity analyses for 2026 existing, 2029 no-build (future without project), and 2029 build (future with project) conditions. The proposed development is expected to generate 420 daily, 36 morning peak-hour and 42 afternoon peak-hour trips.

1.0 INTRODUCTION

Langan was retained to prepare a traffic-impact analysis for the proposed" The Barclay" mixed-use residential development to be located along Washington Avenue between 19th and 20th streets at 1940 Park Avenue in Miami Beach, Florida. The 0.6-acre site is bound by Washington Avenue on the west, Park Avenue on the east, and mixed-use parcels to the north and south. We analyzed two (2) signalized intersections and two (2) stop sign-controlled intersections during the morning and afternoon peak hours. We found that all study intersections are expected to operate overall within their adopted LOS during the morning and afternoon peak hours. This report presents the traffic data and traffic-impact analysis for this proposed development.

1.1 Project Description

Appendix A contains the figures of this report and **Figure 1** illustrates the site location. **Appendix B** contains a copy of the site plan and the property appraiser summary report showing the development parcel (Folio No.: 02-3234-016-0110). The proposed development will provide primary access to residents and visitors through two (2) driveway connections to public roadways: one (1) ingress-only driveway to Washington Avenue and one (1) egress-only driveway to Park Avenue. The entrance driveway provides direct access to an internal one-way off-street vehicle circulation loop, incorporating a valet booth and passenger loading area that serves residents and visitors, while preventing any encroachment or obstruction within the public right-of-way. Furthermore, the proposed configuration represents an improvement over the existing conditions, which currently consist of a short one-way vehicular loop served by two (2) driveway connections on Washington Avenue.

The proposed development will not provide on-site parking for residents. Instead, all parking will be accommodated through valet operations utilizing reserved spaces at the City of Miami Beach G5 public parking garage located at 640 17th Street. Vehicles will enter the site though the ingress driveway connection to Washington Avenue and proceed to the on-site valet booth, after which a valet attendant will park the vehicle at the off-site garage. Vehicles will exit the site via the egress-only driveway on Park Avenue. For departures, valet attendants will retrieve vehicles from the parking garage, return to the site, and deliver vehicles to the valet booth, where residents will pick-up their vehicle. The maximum acceptable LOS for roadways and intersections is LOS E for county and city roads within the study area.

1.2 Study Methodology and Study Area

Langan undertook the following steps to prepare this study in accordance with the methodology requirements and based on discussion with the City of Miami Beach Transportation and Mobility Department.

- Collected morning (7 to 9 AM) and afternoon (4 to 6 PM) peak-hour vehicle turning-movement volumes at the following study intersections:
    - Washington Avenue & 20th Street (signalized)
    - Washington Avenue & 19th Street (signalized)
    - Park Avenue & 20th Street (unsignalized)
    - Park Avenue & 19th Street (unsignalized)
- Used Peak-Season Conversion Factors (PSCF) from the Florida Department of Transportation (FDOT) to convert the traffic data into peak-season volumes.
- Prepared trip-generation estimates for the proposed development, based on accepted trip-generation rates developed by the Institute of Transportation Engineers (ITE).
- Calculated a growth rate for background traffic by using the highest growth rate calculated between FDOT historical data from traffic-count stations near the project, and from comparing 2015 to 2045 SERPM Traffic Volume growth rates. The 2015 to 2045 SERPM Traffic Volume data yielded the highest growth of 0.54%.
- Developed trip-distribution estimates for the project based on the cardinal distribution for the corresponding Traffic Analysis Zone (TAZ) of the Miami-Dade County 2045 Long Range Transportation Plan (LRTP). A computer program used to develop the 2045 LRTP Directional Distribution Report generates directional distributions for each TAZ for the eight secondary-intercardinal directions (NNE; ENE; ESE; SSE; SSW; WSW; WNW; NNW).
- Prepared morning and afternoon peak-hour intersection-capacity analyses for the following conditions at the study intersections: 2026 existing, 2029 future no-build, and 2029 future build.
- Prepared tables summarizing the LOS and delay for each intersection, intersection approaches, and movements for the existing, no-build, and build conditions.
- Completed morning and afternoon peak-hour LOS intersection-capacity analyses for the proposed development's driveways for the 2029 build conditions.
- Performed queuing analysis for the proposed valet operation based on ITE queuing methodology.

2.0 DESCRIPTION OF EXISTING CONDITIONS

Langan visited the study area to collect the existing lane-configuration and traffic-control data shown in **Figure 2. Appendix C** contains the county's signal-timing data.

2.1 Roadway Characteristics

Washington Avenue

Washington Avenue is a four-lane, undivided, north-south, city-maintained urban major collector with a speed limit of 35 MPH.

Park Avenue

Park Avenue is a two-lane, undivided, north-south, city-maintained urban local roadway with a speed limit of 30 MPH.

20th Street

20th Street is a two-lane, undivided, east-west, city-maintained urban local roadway with a speed limit of 25 MPH.

19th Street

19th Street is a two-lane, undivided, east-west, city-maintained urban local roadway with a speed limit of 25 MPH.

2.2 Traffic Counts and Volumes

Traffic volume data at the study intersections was collected on Tuesday, March 31st, 2026, from 7:00 to 9:00 AM and 4:00 to 6:00 PM. We applied FDOT's season adjustment factor (1.00) to convert the traffic data into peak-season volumes. We used the individual peak hour data of each intersection for a conservative analysis. **Figure 3** illustrates the existing weekday morning and afternoon peak-hour traffic volumes. Appendix C contains the traffic data and peak-season adjustment factors.

2.3 Intersection Capacity Analysis (Level of Service)

We conducted 2026 existing-conditions intersection capacity analysis for the study intersections using Synchro software. Based on the analysis, the signalized intersections are operating overall within their adopted LOS during the morning and afternoon peak hours. The approaches of the stop-sign controlled intersections are operating within their adopted LOS during the morning and afternoon peak-hours. **Table 1** summarizes the results of the existing conditions analysis. **Appendix D** contains intersection volume tables; **Appendix E** contains capacity-analysis worksheets.

Table 1 - 2026 Existing Intersection Capacity Analysis Summary

Location	Traffic Control	Approach	AM Peak Hour		PM Peak Hour	
			LOS	Delay (sec/veh)	LOS	Delay (sec/veh)
(1) Washington Avenue & 20th Street	Signalized	Overall	A	5.3	A	8.4
(2) Washington Avenue & 19th Street	Signalized	Overall	A	6.4	A	7.0
(3) Park Avenue & 20th Street	Unsignalized	Eastbound	A	7.5	A	8.0
		Westbound	A	7.3	A	7.8
		Northbound	A	7.2	A	7.7
		Southbound	A	7.4	A	7.8
(4) Park Avenue & 19th Street	Unsignalized	Northbound	A	9.3	B	10.2
		Southbound	A	9.1	A	9.3

Capacity analysis for stop-sign controlled intersections are calculated for certain intersection approaches, not for the entire intersection. The stop-sign controlled approaches of stop-sign controlled intersections often exceed their adopted LOS during peak hours because all vehicles must stop and incur a delay before proceeding through the intersection. Capacity analysis provides an indication of the adequacy of intersection and roadway facilities to serve traffic demand. The evaluation criteria used to analyze the study intersections is based on the Transportation Research Board's *Highway Capacity Manual (HCM), 7th Edition.*

3.0 PLANNED AND PROGRAMMED ROADWAY IMPROVEMENTS

We reviewed Miami-Dade County's Transportation Planning Organization's (TPO) latest Transportation Improvement Program (TIP 2026 through 2030), and Long Range Transportation Plan (2050 LRTP). We confirmed that none of the projects found will impact the study area's traffic patterns or lane configurations during the analysis period.

4.0 NO BUILD CONDITIONS

This section of the report covers background traffic growth and future traffic volumes used to evaluate the no build conditions. The no build conditions evaluate future traffic volumes without the impact of the proposed development.

4.1 Background/No Build Traffic

Background, or no-build, traffic volumes account for annual increases in traffic from approved and unbuilt land-development projects and historical increases in traffic volumes. Developing no-build traffic operating conditions allows us to project what can be expected to exist in the study area without the proposed development.

We developed 2029 no-build traffic volumes by applying a compounded growth rate to the 2026 volumes. We compared the most conservative ten-year trend analysis growth rate (-1.80%) to the 2015 to 2045 SERPM Traffic Volume growth rate (0.54%) and determined that the 2015 to 2045 SERPM growth rate yielded the highest growth. When developing the ten-year historical trend percentages, we excluded the actual data given for 2020 and 2021, both of which exhibited atypical volumes due to the COVID-19 pandemic. Instead, these volumes were interpolated and conservatively assumed to follow the trend of the adjacent years: 2019 and 2022. However, even with this consideration, the analysis yielded a declining annual growth rate. The SERPM volumes applied in the analysis were derived from roadway segments in closest proximity to the project site. Therefore, based on the SERPM growth rate representing the highest projected growth, this growth rate was selected to provide the most conservative and accurate analysis of future traffic conditions. The growth-rate factor accounts for increased background traffic volumes and was applied to the existing peak-season volumes to develop 2029 no-build traffic volumes. Appendix C includes excerpts of the growth rate calculations.

Based on coordination with the City, we reviewed three (3) approved committed developments located at 1545 Collins Road, 1680 Collins Road, and 2201 Collins Road, respectively. Traffic generated by the development at 2201 Collins Road does not travel through any of the study intersections and was therefore excluded from the analysis. The developments at 1680 Collins Road and 1545 Collins Road generate minimal net-new traffic, and based on their location along Collins Avenue and the surrounding roadway network, their traffic would not pass through the study intersections; accordingly, they were not included in this analysis.

4.2 Intersection Analysis No Build Conditions

We found the signalized intersections are expected to operate overall within their adopted LOS during the morning and afternoon peak hours. The approaches of the stop-sign controlled intersections are expected to operate within their adopted LOS during the morning and afternoon peak hours. **Figure 4** illustrates the 2029 no-build traffic volumes. **Table 2** summarizes the results of the 2029 no-build conditions capacity analysis. Appendix E contains the capacity-analysis worksheets.

Table 2 - 2029 No Build Intersection Capacity Analysis Summary

Location	Traffic Control	Approach	AM Peak Hour		PM Peak Hour	
			LOS	Delay (sec/veh)	LOS	Delay (sec/veh)
(1) Washington Avenue & 20th Street	Signalized	Overall	A	5.3	A	8.5
(2) Washington Avenue & 19th Street	Signalized	Overall	A	6.5	A	7.0
(3) Park Avenue & 20th Street	Unsignalized	Eastbound	A	7.6	A	8.0
		Westbound	A	7.3	A	7.8
		Northbound	A	7.2	A	7.8
		Southbound	A	7.4	A	7.8
(4) Park Avenue & 19th Street	Unsignalized	Northbound	A	9.3	B	10.3
		Southbound	A	9.1	A	9.3

5.0 BUILD CONDITIONS

This section of the report covers site-generated trips, trip distribution, and future traffic volumes used to evaluate the build conditions. The evaluation of the build conditions analyzes the future traffic volumes for the anticipated build-out year of the mixed-use development by adding the development-generated traffic to the 2029 no-build peak hour traffic volumes.

5.1 Site-Generated Trips

The proposed development is anticipated to generate 420 daily, 36 morning peak-hour, and 42 afternoon peak-hour vehicle trips. We prepared daily, morning peak-hour, and afternoon peak-hour trip estimates for the vested and proposed uses on site using the 12th Edition of the ITE *Trip Generation Manual*, based on Land Use Codes (LUC) 220 – Multifamily Housing (Low-Rise) and 231 – Mid-rise Residential with Ground Floor Commercial. While the site's vested use is recognized, this study only considered trips generated by the proposed development for a conservative analysis. Based on the site's census tract characteristics, we determined a 23.9% multimodal reduction factor could be applied to the trip generation to account for non-vehicular trips. However, to provide a conservative analysis, we analyzed the development's impacts based on the project's gross trips without accounting for any multimodal reductions. **Table 3** summarizes the trip-generation estimates for the proposed development. **Appendix F** contains a detailed trip-generation table, ITE excerpts, and census data.

Table 3 - Trip Generation Estimates

Use	Size	Daily	Weekday Morning Peak Hour			Weekday Afternoon Peak Hour		
			In	Out	Total	In	Out	Total
Vested Use Multifamily Housing (Low-Rise)	66 DU	492	9	27	36	24	15	39
Proposed Use Mid-Rise Residential with Ground Floor Commercial (1-25k)	105 DU	420	11	25	36	29	13	42
Total*		**420**	**11**	**25**	**36**	**29**	**13**	**42**
Net-New Trips		*-72*	*2*	*-2*	*0*	*5*	*-2*	*3*

** Trip generation used to evaluate the project's impacts, w/o multimodal reduction.*

5.2 Trip Distribution

We determined the directional distribution of site-generated trips based on the cardinal distribution data for TAZ 636 from the Miami-Dade County 2045 Transportation Model (see Appendix C) and from the development's access to the surrounding roadway network. We interpolated the 2015 and 2045 directional distribution values from the model data to develop percentages for 2029. **Table 4** shows the proposed development's trip distributions. **Figures 5.1** and **6.1,** respectively, illustrate the site-generated trip distribution percentages and trip assignments to the study intersections and proposed driveways. As there are valet operations proposed, **Figures 5.2** and **6.2**, respectively, illustrate the valet-generate trip distribution percentages and trip assignments to the study intersections and proposed driveways. **Figure 6.3** illustrates the total project traffic at the study intersections.

Table 4 - Cardinal Distribution

Year	NNE	ENE	ESE	SSE	SSW	WSW	WNW	NNW
2015	15.0%	0.0%	0.0%	9.9%	16.6%	29.9%	13.1%	15.4%
2045	12.9%	0.0%	0.0%	7.3%	11.8%	36.8%	16.9%	14.4%
2029	**14.0%**	**0.0%**	**0.0%**	**8.7%**	**14.4%**	**33.1%**	**14.9%**	**14.9%**

5.3 Intersection Analysis Build Conditions

We conducted capacity analysis for the study intersections and determined that the signalized intersections are expected to operate within their adopted LOS during the morning and afternoon peak hours with and without the project's impacts. Additionally, the stop-sign-controlled intersections approaches are expected to operate within their adopted LOS during the morning and afternoon peak hours. Based on intersection capacity analysis the proposed development is expected to

The 2029 build traffic volumes were derived by adding the total site-generated trips to the 2029 no-build traffic volumes. **Figure 7** illustrates the 2029 build peak-hour traffic volumes and includes the driveway volumes. **Table 5** summarizes the 2029 build LOS for the morning and afternoon peak hours. Appendix E contains the capacity analysis worksheets.

Table 5 - 2029 Build Intersection Capacity Analysis Summary

Location	Traffic Control	Approach	AM Peak Hour		PM Peak Hour	
			LOS	Delay (sec/veh)	LOS	Delay (sec/veh)
(1) Washington Avenue & 20th Street	Signalized	Overall	A	6.0	A	8.7
(2) Washington Avenue & 19th Street	Signalized	Overall	A	8.0	A	8.8
(3) Park Avenue & 20th Street	Unsignalized	Eastbound	A	7.6	A	8.0
		Westbound	A	7.3	A	7.9
		Northbound	A	7.3	A	7.8
		Southbound	A	7.5	A	7.8
(4) Park Avenue & 19th Street	Unsignalized	Northbound	A	9.4	B	10.5
		Southbound	A	9.1	A	9.4
(5) Washington Avenue & Ingress Driveway	Unsignalized	*[1]*	-	-	-	-
(6) Park Avenue & Egress Driveway	Unsignalized	Eastbound	A	8.8	A	8.9

[1] All approaches expected to operate as free flow condition, with the ingress driveway not allowing egress movements

5.4 Driveway and Turn Lane Analysis

We analyzed the development's proposed driveway connections and determined that the Park Avenue driveway, which will operate as an egress-only connection, is expected to operate at LOS A during the morning and afternoon peak hours for the 2029 build conditions. The Washington Avenue driveway will serve as the sole ingress driveway to the site, providing access to the internal circulation system, valet operations, and passenger loading area.

We evaluated turn-lane warrants for the ingress driveway, including both the inbound right-turn and left-turn movements on the four-lane Washington Avenue roadway. Due to the valet-based parking configuration and circulation pattern, the turn-lane warrant analysis for the northbound right-turn movement was conservatively based on the total inbound and outbound trips generated by the proposed development during the afternoon peak hour, which represents the highest combined site-generated traffic demand. Both entering vehicles and valet-operated returning vehicles are expected to perform a northbound right-turn movement to access the site. Volumes used for this analysis reflect project-generated trips added to the projected 2029 no build-condition traffic on Washington Avenue.

We evaluated the southbound left-turn movement into the ingress driveway using only site-generated ingress trips during the morning and afternoon peak hours. Based on the configuration of the surrounding roadway network and anticipated valet travel patterns, valet

operators are not expected to utilize the southbound left-turn movement to enter the site during resident departures; therefore, outbound trips were not included in the southbound left-turn evaluation. As with the northbound right-turn analysis, volumes reflect site-generated ingress trips added to the projected 2029 no build-condition traffic volumes.

All turn-lane warrant evaluations were conducted using the latest NCHRP turn-lane warrant worksheets, as provided by the Florida Department of Transportation, for exclusive left-turn and exclusive right-turn lanes on a four-lane roadway. The proposed development is expected to generate at most 31 right turns and 13 left turns into the ingress driveway. Due to the low volume and the findings from the NCHRP turn-lane warrants, we determined that exclusive turn lanes are not warranted at the proposed ingress driveway. **Appendix G** contains the turn-lane analysis worksheets.

6.0 MULTIMODAL ACCESS

The proposed development will maintain the existing sidewalk infrastructure along its Washington Avenue and Park Avenue frontages, preserving continuous pedestrian access around the site. The site will provide direct connection from its internal sidewalks to the existing sidewalks on its frontages. Sidewalks across the site's existing driveway connections to Washington Avenue will be reconstructed as closed sidewalks, flush with and continuous with the surrounding sidewalk network. The surrounding street network is highly pedestrian-oriented, with continuous sidewalks and frequent marked crosswalks along Washington Avenue, Park Avenue, and intersecting north–south and east–west streets. Together, this network provides safe and convenient access between the site and surrounding uses and transit services throughout the South Beach area. Bicycle facilities are observed along Washington Avenue, including shared lane markings (sharrows) that facilitate bicycle travel within the corridor. In addition, two Citibike bicycle-sharing stations are located within walking distance of the site on either side of Washington Avenue near 21st and 22nd Streets, providing residents and visitors with convenient access to the City of Miami Beach's bicycle-sharing network and additional non-vehicular travel options.

Public transit service is accessible from the site along Washington Avenue. The nearest Metrobus service is provided by Miami-Dade Transit Route 15, with stops located near 19th Street and 20th Street. Route 15 provides direct north–south service through Miami Beach. Additional transit services are available through Miami-Dade Transit Route 14, 20, 36, 79 and the City of Miami Beach South Beach Trolley, which together provide convenient connections to destinations throughout Miami Beach. The east side of Washington Avenue features Metrobus and trolley stops designed with dedicated bus-bays, allowing transit vehicles to load and unload passengers outside of the general travel lanes and supporting efficient transit operations while minimizing impacts to through traffic.

Overall, the pedestrian infrastructure, bicycle facilities, and public transit services available in the surrounding area provide the proposed development with strong multimodal accessibility and connectivity, allowing convenient access to destinations throughout Miami Beach in a manner consistent with the City's transportation and mobility objectives. Appendix C contains a copy of the transit route maps. **Figure 8** shows the pedestrian access to the site.

7.0 TRANSPORTATION DEMAND MANAGEMENT STRATEGIES

The site abuts Washington and Park Avenues. The proposed development is approximately a three-minute walk to the nearest bus station (Route 15) located between 19th and 20th Streets. Citibike serves the City of Miami Beach, with docking stations along Washington Avenue south 18th Street and north of 21st Street. Appendix C contains a copy of the transit route maps.

To encourage the use of public transportation in the area, the development proposes to implement Transportation Demand Management (TDM) strategies, which will focus on providing Miami-Dade Transit bus and trolley route information on or near resident and employee bulletin boards to promote the use of public transportation. The infrastructure will also provide bicycle racks to encourage non-vehicular travel. The most important action will be doing regular resident and employee outreach to provide them with multiple commute options and establish preferences to target TDM efforts. **Table 6** summarizes the proposed TDM strategies.

Table 6 - Proposed TDM Strategies

Action	Details
Resident and Employee Survey	Conduct surveys to assess current resident and employee commute patterns, identify preferences, and inform targeted TDM initiatives.
Education, Marketing, and Outreach	Provide new residents and employees with informational packets and/or personalized consultations highlighting sustainable travel options (e.g., transit, biking).
Bicycle Facilities	Install on-site bicycle racks accessible to residents, employees and visitors to encourage active transportation.
Valet Operation	Implement a full-service valet system for all residents and guests, with a designated stacking area and overflow capacity to manage peak demand efficiently.
Travel Mapping	Make transit route maps, schedules, and multimodal travel information available on-site for residents, employees, and visitors.
Loading Area	Designate specific loading/unloading timeframes to minimize conflicts with peak-hour traffic and improve site circulation.

8.0 LOADING & TRASH COLLECTION OPERATIONS

The proposed development includes an on-site trash collection area intended to avoid pedestrian and vehicular conflicts within the internal circulation system. Loading and service activities will be accommodated entirely on site and are not anticipated to impact traffic operations or pedestrian circulation along adjacent public roadways. All loading and service activities will be conducted on site, without backing into or encroaching upon the public right-of-way. Trash collection will be conducted in accordance with applicable requirements established by the City of Miami Beach Public Works Department, Sanitation Division.

9.0 VALET OPERATIONS ANALYSIS

We prepared a queueing analysis for the proposed development's valet operations, where residents and visitors can be picked-up or dropped off and valet will be provided. We used the queueing-analysis methodology from *Transportation and Land Development*, published by ITE, excerpts of which are included in **Appendix H**. This methodology requires hourly rates of vehicle arrival and service times for the valet operation to determine vehicle-queue lengths. The queues resulting from this analysis are 95th percentile queues, which are the length of queue that is not expected to be exceeded 95% of the time. We found that the operations will be contained within the on-site vehicle loop and will not interrupt the traffic flow on-site or back onto the adjacent public roadway (Washington Avenue).

The valet booth will be located at the proposed drop-off area, which drivers utilizing the valet service will enter upon entering the ingress driveway from Washington Avenue. From the valet booth, operators will exit the internal circulation loop and proceed to the egress driveway connection to Park Avenue and traverse the roadway network to enter and park the vehicle at an off-site parking garage. The development will incorporate valet parking spaces inside the city-owned G5 public parking garage located near the site at 640 17th Street. This parking garage has gated entry and exit and includes multiple levels of internal circulation; valet operators will access the garage using proximity cards which have a typical gate service time of approximately 6 seconds per vehicle, which is included within the conservative estimate of two (2) minutes of total time spent at the parking garage. In addition, to provide a conservative analysis, valet was assumed to travel to the farthest parking spot on the top floor of the parking garage. The service time for the valet is based on the typical parameters for valet operations, as well as typical travel times to and from the valet booth to the parking garage, which measured as seven (7) minutes during the typical weekday afternoon peak period. From the valet drop-off, valet operators will drive the vehicle to the parking garage. To ensure efficient operations, coordination will occur

between valet operators stationed at "The Barclay" and operators stationed at the off-site parking facility. We calculated the total service time for valet operations to be approximately 9.4 minutes, based on the higher of the drop-off and pick-up service times. Under peak traffic conditions, both service components were determined to be equal given the operational characteristics between the site and the parking garage. The designated drop-off and pick-up area is 27-feet wide, providing one lane for vehicles to queue, and one pass-by lane. Approximately 64 feet of linear queueing space will be provided.

The vehicle-arrival rate for the valet analysis was based on the project's total afternoon peak-hour trip generation, which represents the highest overall activity level. Therefore, the reported queues are combined ingress and egress vehicle queues. For the purpose of calculating the number of valet service operators required, we applied a multimodal reduction of 23.9% (based on the study area's census tract characteristics) to the project-generated ingress and egress volumes, resulting in the 32 total afternoon peak-hour trips included in the valet processing analysis. This approach was used to accurately quantify vehicular demand requiring valet service and to determine appropriate staffing levels and was not applied to the intersection capacity analysis. Appendix F shows the reduced vehicular trip calculations used for this analysis.

The analysis indicates that with eight (8) attendants, the valet area will operate with a 95th percentile queue of two (2) vehicles, or 44 feet, as shown in **Table 7**. Therefore, the drop-off area storage length of 64 feet is sufficient. **Figures 5.2** and **6.2,** respectively, illustrate the valet operation traffic distribution percentages and assignments to the study intersections and proposed driveways. Appendix I contains the queueing-analysis worksheets.

Table 7 – Valet Vehicular Queueing Analysis Summary

Time	**Storage Capacity** (feet)	**95th Percentile Queue Length**		**Exceeds Capacity?**
		Vehicles	**Feet**	
PM	64	2	44	**NO**

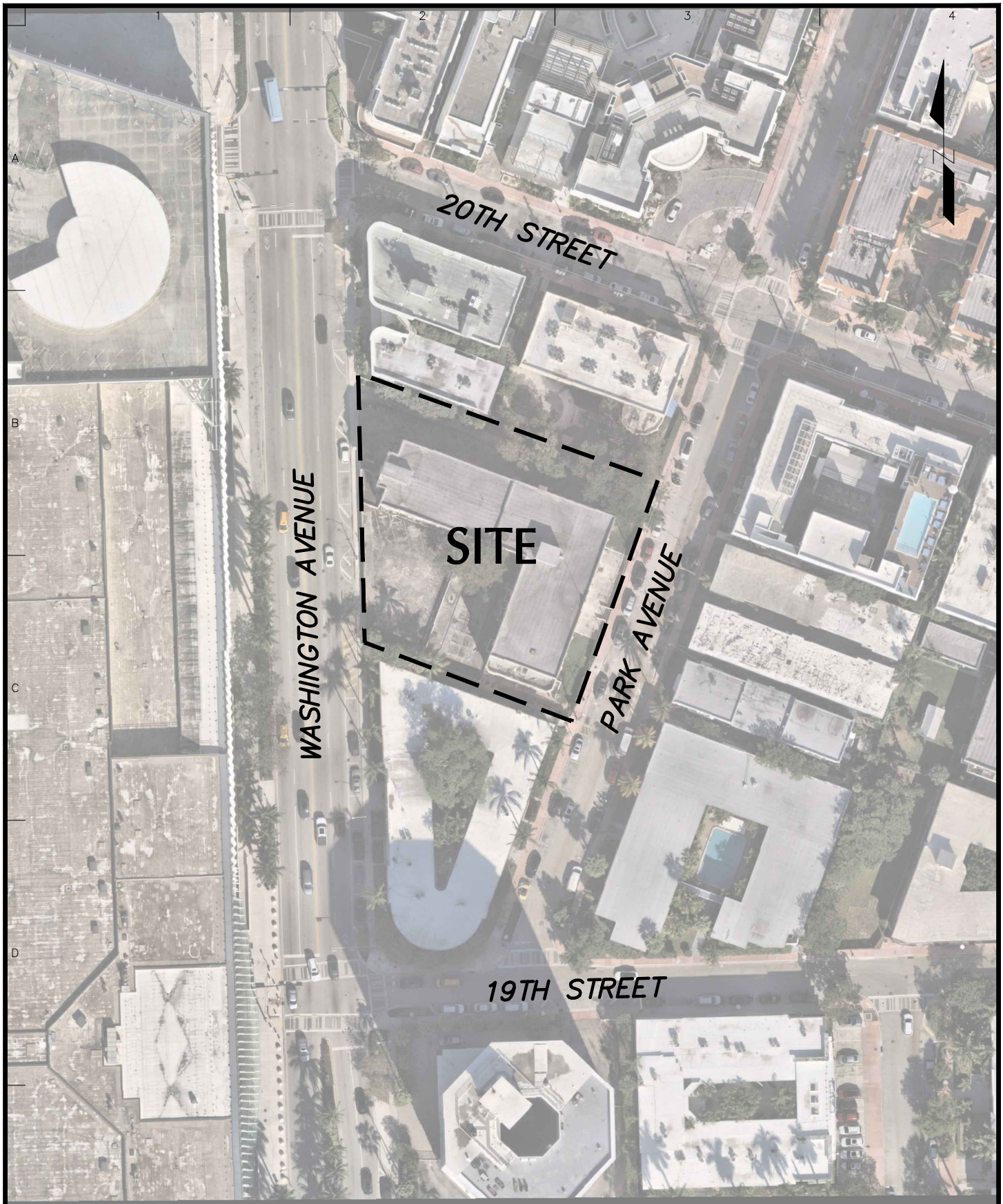
10.0 CONCLUSIONS

Langan Engineering & Environmental Services, LLC was retained to prepare a traffic-impact analysis for the proposed" The Barclay" mixed-use residential development expected to be completed by 2029. The analysis shows the following results for the 2029 build conditions:

- The proposed development is not anticipated to significantly impact the surrounding roadway network, as all study intersections are expected to maintain the same Level of Service (LOS) as existing conditions, with only minor delay increases for certain movements that are not expected to exceed two (2) seconds.
- The study intersections are expected to operate at an overall LOS of "B" or better during the morning and afternoon peak hours with and without the proposed project's impacts.
- The proposed egress driveway connection to Park Avenue is expected to operate at LOS "A" during the morning and afternoon peak hours.
- The projected traffic volumes from the proposed development do not warrant the need for exclusive turn lanes at the ingress driveway connection to Washington Avenue.
- Valet operation queues are not expected to exceed two (2) vehicles with eight (8) valet attendants.
- The development will promote the use of different modes of transportation through the implementation of several TDM strategies.

\\langan.com\data\MIA\data9\300390901\Project Data_Discipline\Traffic\Reports\2026-04-08 The Barclay -1940 Park Avenue TIS.docx

APPENDIX A
FIGURES

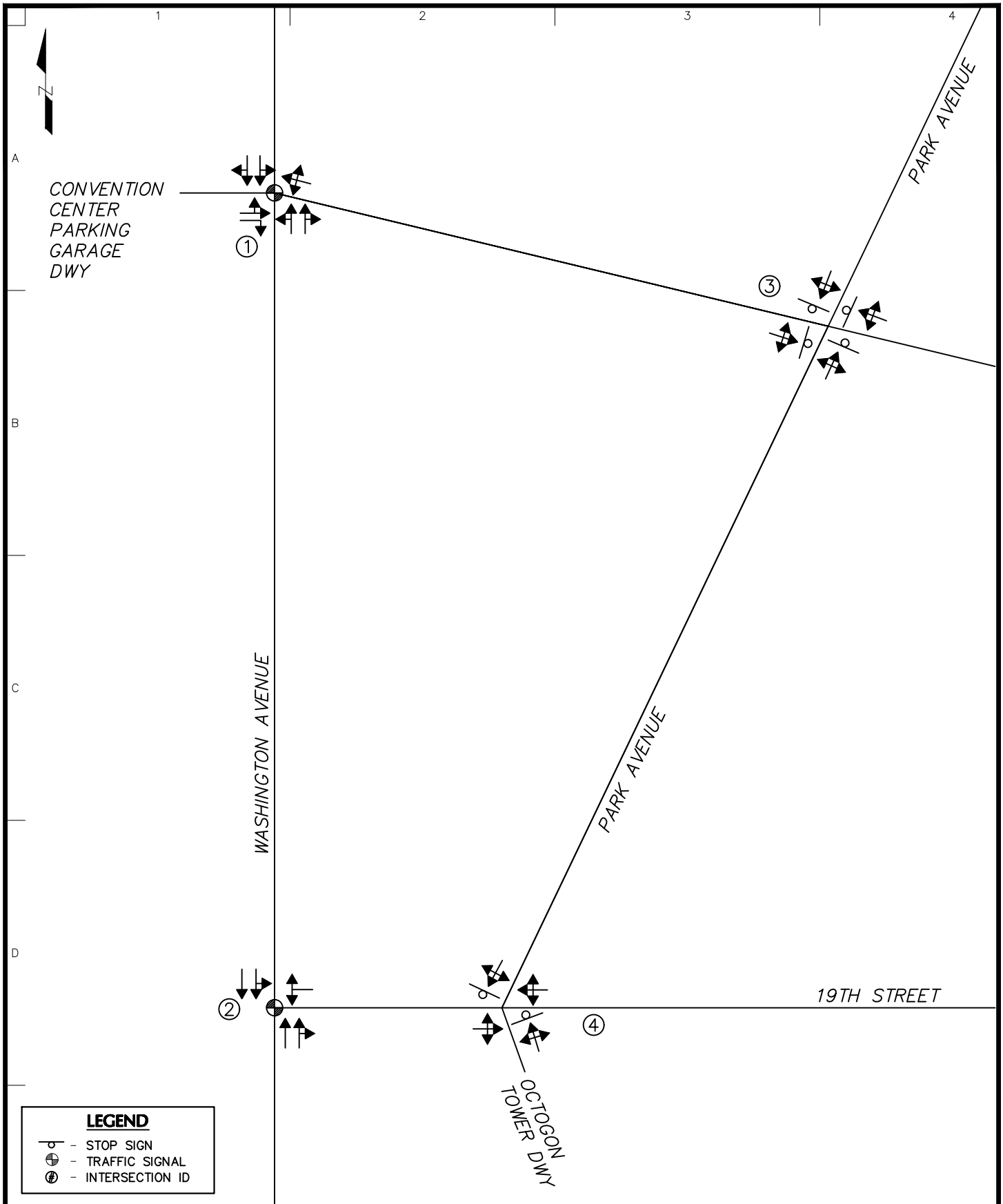


LANGAN

Project No. 300390901

LANGAN Langan Engineering and Environmental Services, LLC. 1221 Brickell Ave, Suite 1800 Miami, FL 33131 T: 786.264.7200 F: 786.264.7201 www.langan.com FL CERTIFICATE OF AUTHORIZATION No. 00006601	Project THE BARCLAY MIAMI BEACH MIAMI-DADE COUNTY FLORIDA	Drawing Title SITE LOCATION MAP	Project No. 300390901 Date APRIL 2026 Drawn By KAL Checked By JCG	Figure 1 Sheet 1 of 11

Date: 4/7/2026 Time: 15:57 User: klemus Style Table: Langan.stb Layout: FIG 1 Document Code: FG01-300390501-0201-KT001-0101



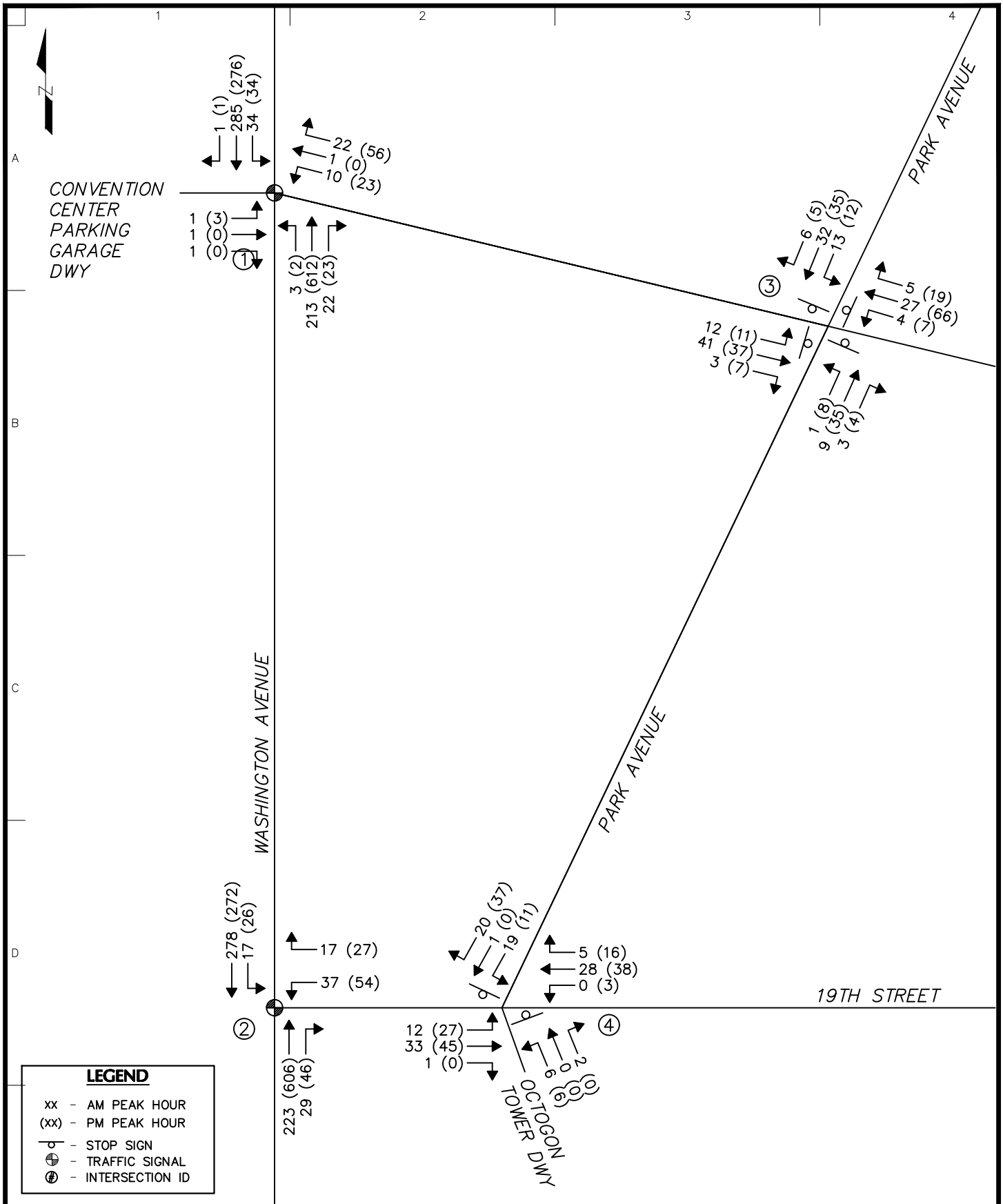
LANGAN

Project No. 300390901

LANGAN
Langan Engineering and Environmental Services, LLC.
1221 Brickell Ave, Suite 1800
Miami, FL 33131
T: 786.264.7200 F: 786.264.7201 www.langan.com
FL CERTIFICATE OF AUTHORIZATION No. 00006601

Project	THE BARCLAY MIAMI BEACH MIAMI-DADE COUNTY FLORIDA
Drawing Title	LANE CONFIGURATION
Project No.	300390901
Date	APRIL 2026
Drawn By	KAL
Checked By	JCG
Figure	2
Sheet	2 of 11

Date: 4/8/2026 Time: 18:06 User: klemus Style Table: Langan.stb Layout: FIG 2 Document Code: FG01-300390501-0201-KT001-0101

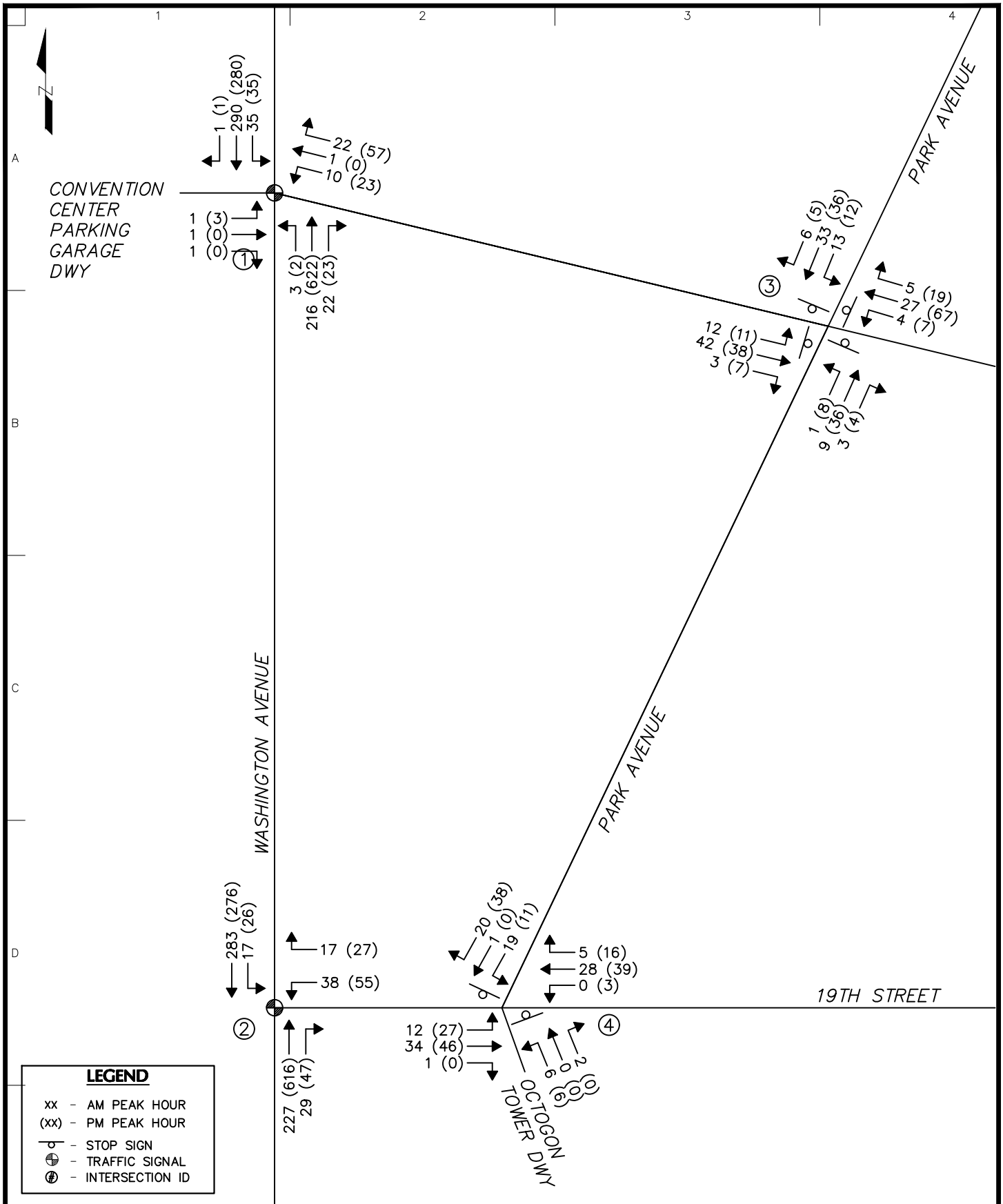


LANGAN

Project No. 300390901

LANGAN Langan Engineering and Environmental Services, LLC. 1221 Brickell Ave, Suite 1800 Miami, FL 33131 T: 786.264.7200 F: 786.264.7201 www.langan.com FL CERTIFICATE OF AUTHORIZATION No. 00006601	Project THE BARCLAY MIAMI BEACH MIAMI-DADE COUNTY FLORIDA	Drawing Title 2026 EXISTING VOLUMES	Project No. 300390901 Date APRIL 2026 Drawn By KAL Checked By JCG	Figure 3 Sheet 3 of 11

Date: 4/8/2026 Time: 18:06 User: klemus Style Table: Langan.stb Layout: FIG 3 Document Code: FG01-300390501-0201-KT001-0101



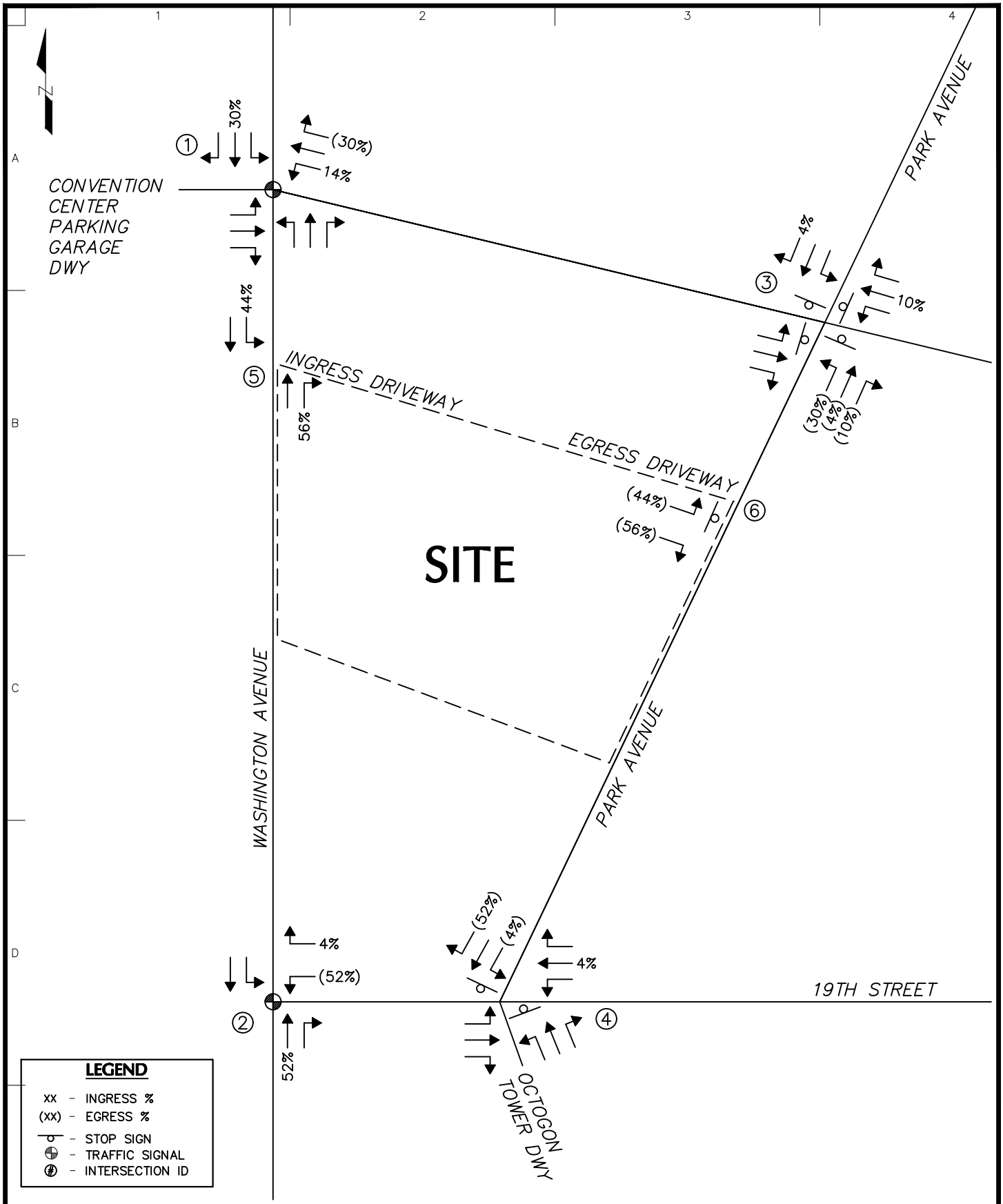
LANGAN

Project No. 300390901

LANGAN
Langan Engineering and Environmental Services, LLC.
1221 Brickell Ave, Suite 1800
Miami, FL 33131
T: 786.264.7200 F: 786.264.7201 www.langan.com
FL CERTIFICATE OF AUTHORIZATION No. 00006601

Project	THE BARCLAY MIAMI BEACH MIAMI-DADE COUNTY FLORIDA
Drawing Title	2029 NO BUILD VOLUMES
Project No.	300390901
Date	APRIL 2026
Drawn By	KAL
Checked By	JCG
Figure	4
Sheet	4 of 11

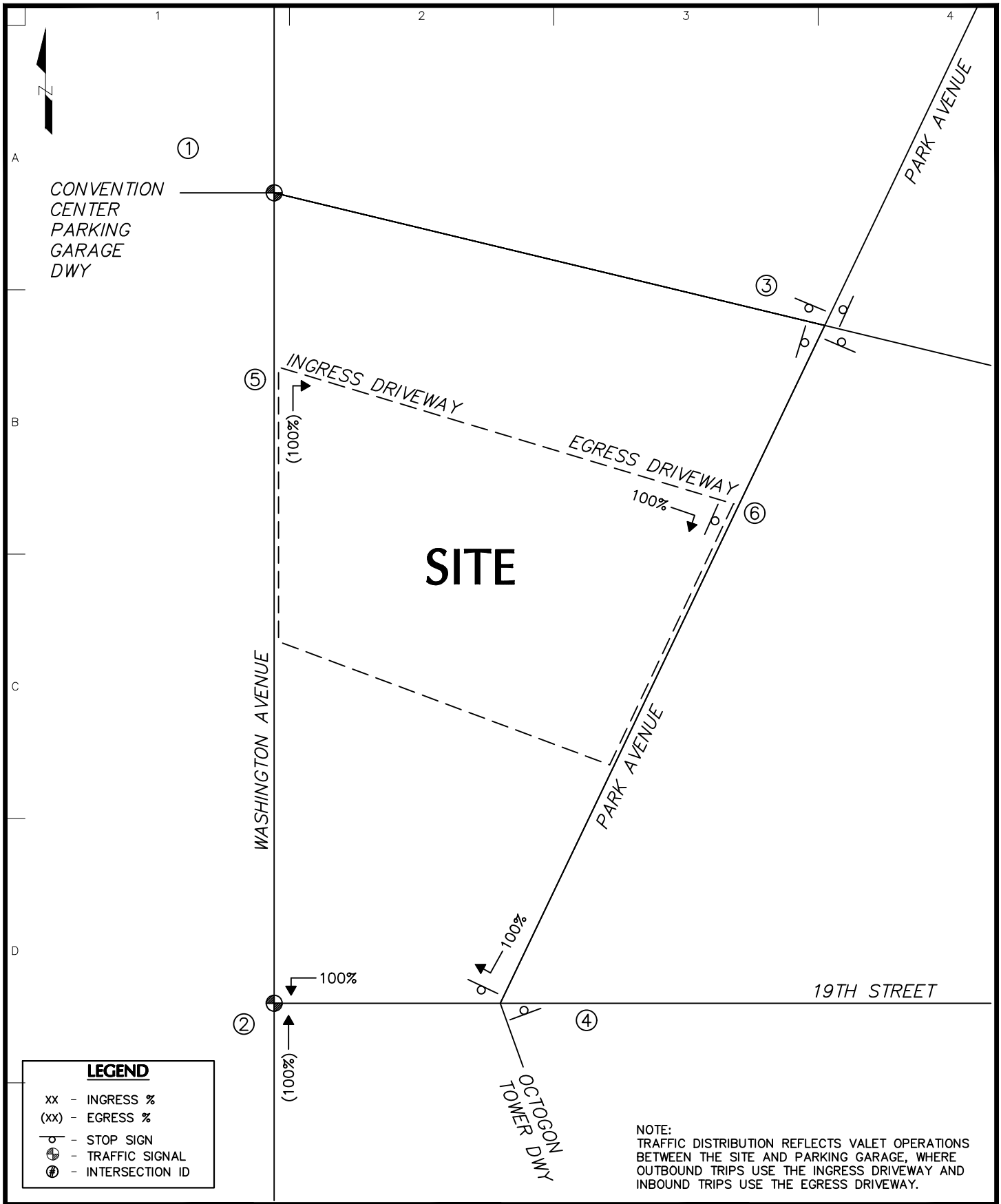
Date: 4/8/2026 Time: 18:06 User: klemus Style Table: Langan.stb Layout: FIG 4 Document Code: FG01-300390501-0201-KT001-0101



LANGAN

Project No. 300390901

LANGAN Langan Engineering and Environmental Services, LLC. 1221 Brickell Ave, Suite 1800 Miami, FL 33131 T: 786.264.7200 F: 786.264.7201 www.langan.com FL CERTIFICATE OF AUTHORIZATION No. 00006601	Project THE BARCLAY MIAMI BEACH MIAMI-DADE COUNTY FLORIDA	Drawing Title SITE TRIP DISTRIBUTION	Project No. 300390901 Date APRIL 2026 Drawn By KAL Checked By JCG Figure 5.1 Sheet 5 of 11

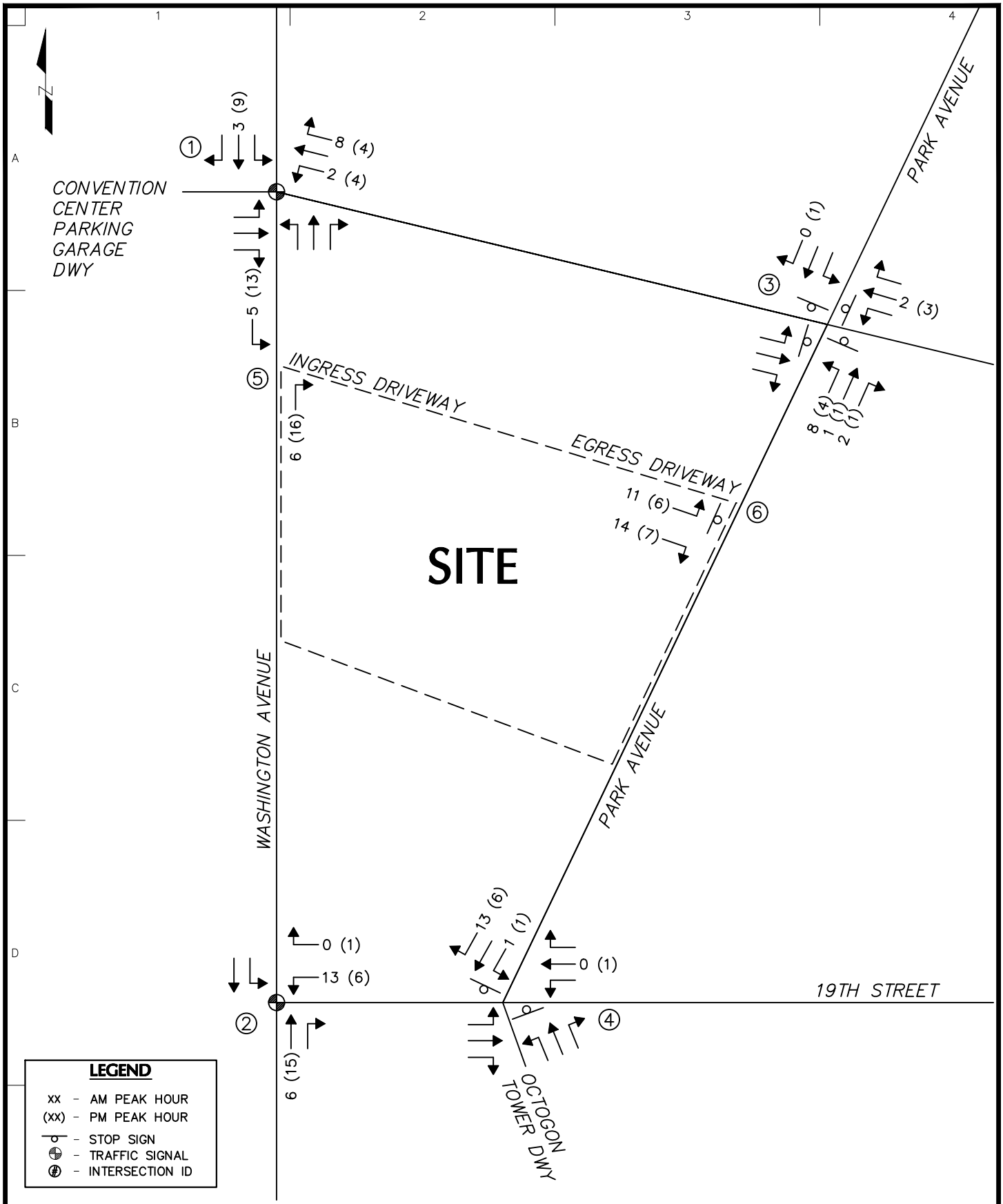


LANGAN

Project No. 300390901

LANGAN
Langan Engineering and Environmental Services, LLC.
1221 Brickell Ave, Suite 1800
Miami, FL 33131
T: 786.264.7200 F: 786.264.7201 www.langan.com
FL CERTIFICATE OF AUTHORIZATION No. 00006601

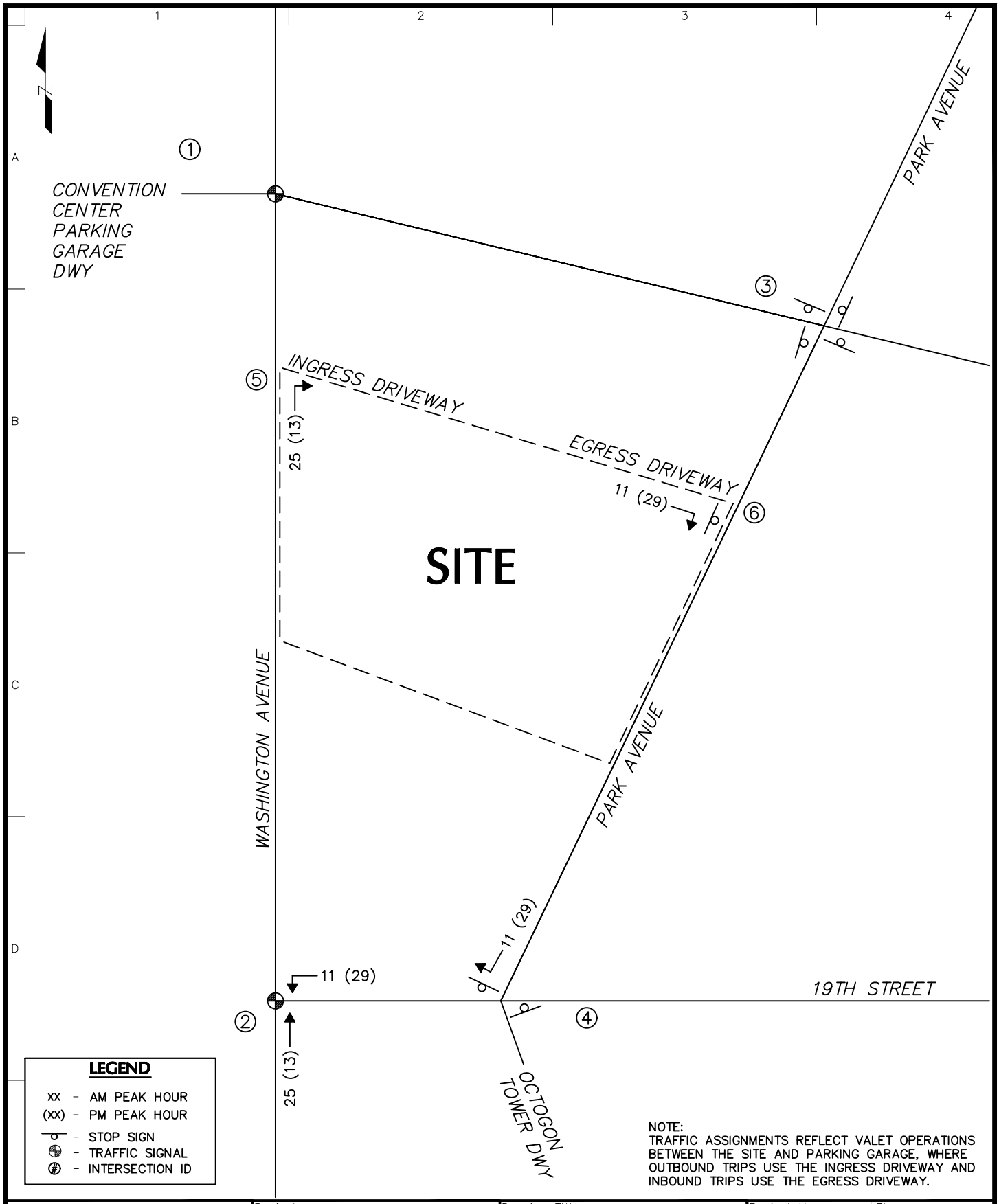
Project	THE BARCLAY
	MIAMI BEACH MIAMI-DADE COUNTY FLORIDA
Drawing Title	VALET TRAFFIC DISTRIBUTION
Project No.	300390901
Date	APRIL 2026
Drawn By	KAL
Checked By	JCG
Figure	5.2
Sheet	6 of 11



LANGAN

Project No. 300390901

LANGAN Langan Engineering and Environmental Services, LLC. 1221 Brickell Ave, Suite 1800 Miami, FL 33131 T: 786.264.7200 F: 786.264.7201 www.langan.com FL CERTIFICATE OF AUTHORIZATION No. 00006601	Project THE BARCLAY MIAMI BEACH MIAMI-DADE COUNTY FLORIDA	Drawing Title SITE TRIP ASSIGNMENTS	Project No. 300390901 Date APRIL 2026 Drawn By KAL Checked By JCG	Figure 6.1 Sheet 7 of 11



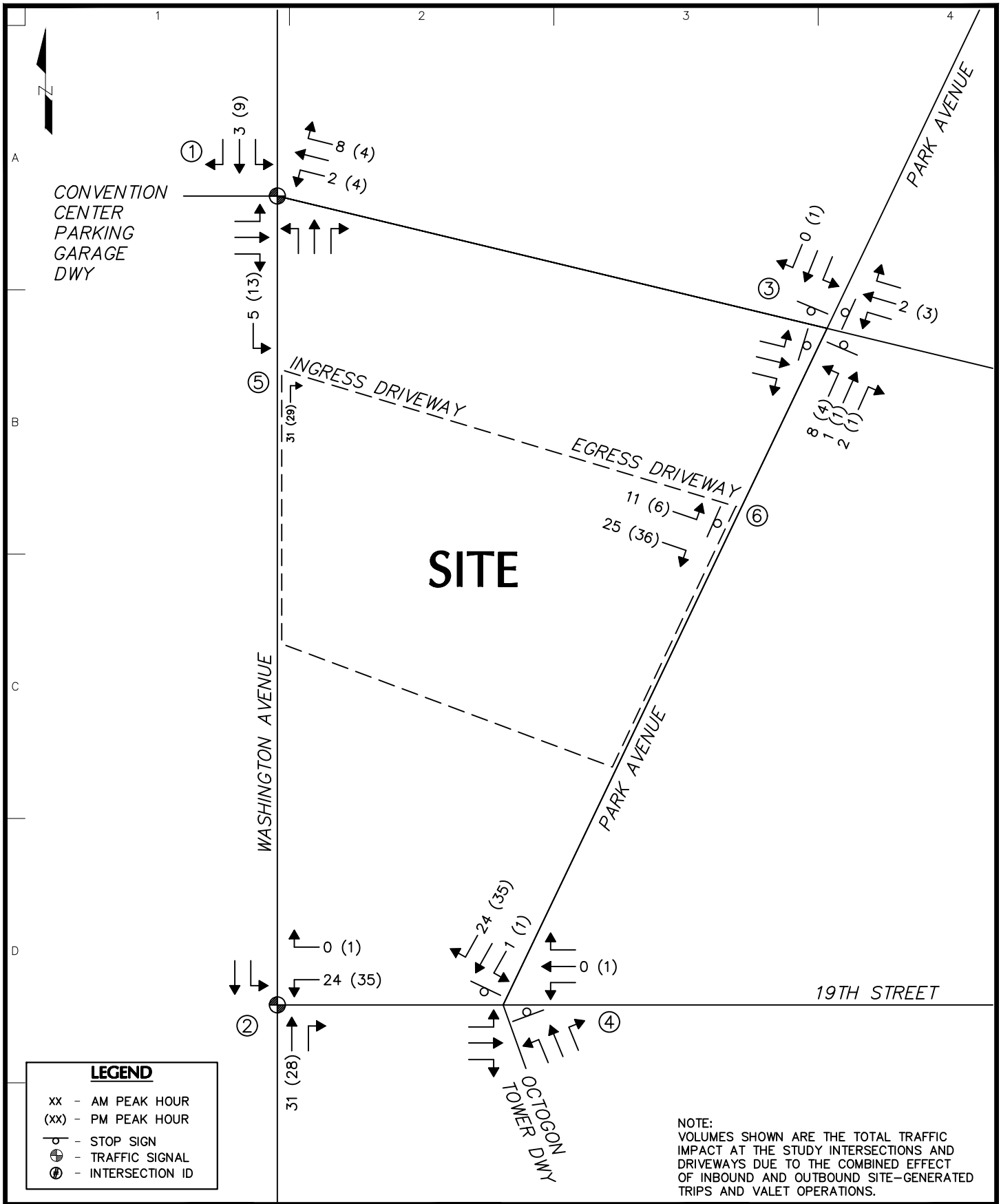
LANGAN

Project No. 300390901

LANGAN
Langan Engineering and Environmental Services, LLC.
1221 Brickell Ave, Suite 1800
Miami, FL 33131
T: 786.264.7200 F: 786.264.7201 www.langan.com
FL CERTIFICATE OF AUTHORIZATION No. 00006601

Project	THE BARCLAY MIAMI BEACH MIAMI-DADE COUNTY FLORIDA
Drawing Title	VALET TRAFFIC ASSIGNMENTS
Project No.	300390901
Date	APRIL 2026
Drawn By	KAL
Checked By	JCG
Figure	6.2
Sheet	8 of 11

Date: 4/8/2026 Time: 18:06 User: klemus Style Table: Langan.stb Layout: FIG 6.2 Document Code: FG01-300390501-0201-KT001-0101

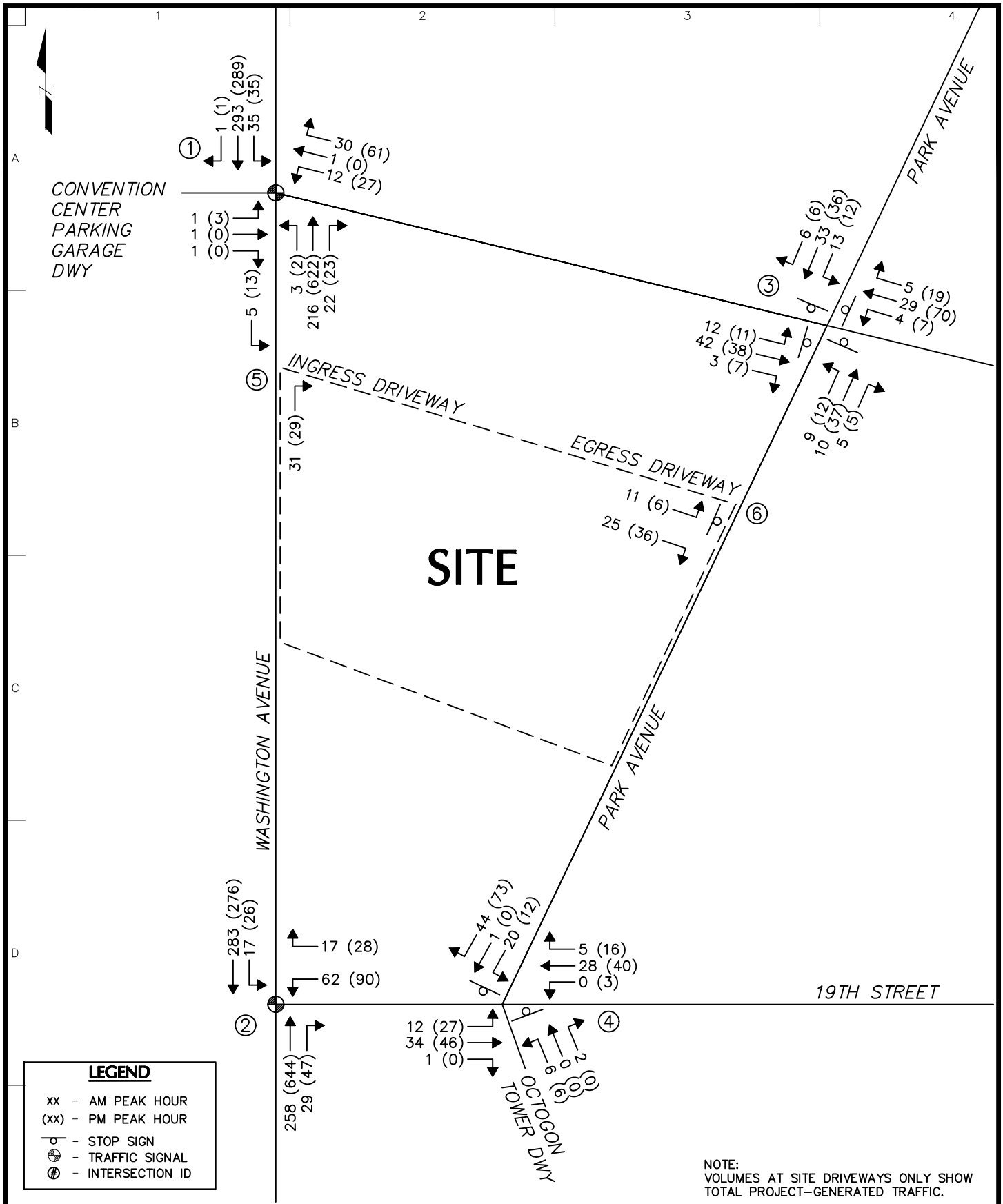


LANGAN

Project No. 300390901

LANGAN
Langan Engineering and Environmental Services, LLC.
1221 Brickell Ave, Suite 1800
Miami, FL 33131
T: 786.264.7200 F: 786.264.7201 www.langan.com
FL CERTIFICATE OF AUTHORIZATION No. 00006601

Project	Drawing Title	Project No.	Figure
THE BARCLAY MIAMI BEACH MIAMI-DADE COUNTY FLORIDA	TOTAL PROJECT TRAFFIC	300390901 Date APRIL 2026 Drawn By KAL Checked By JCG	6.3 Sheet 9 of 11



LANGAN

Project No. 300390901

LANGAN
Langan Engineering and Environmental Services, LLC.
1221 Brickell Ave, Suite 1800
Miami, FL 33131
T: 786.264.7200 F: 786.264.7201 www.langan.com
FL CERTIFICATE OF AUTHORIZATION No. 00006601

Project	THE BARCLAY MIAMI BEACH MIAMI-DADE COUNTY FLORIDA
Drawing Title	2029 BUILD VOLUMES
Project No.	300390901
Date	APRIL 2026
Drawn By	KAL
Checked By	JCG
Figure	7
Sheet	10 of 11

LANGAN

Project No. 300390901

LANGAN Langan Engineering and Environmental Services, LLC. 1221 Brickell Ave, Suite 1800 Miami, FL 33131 T: 786.264.7200 F: 786.264.7201 www.langan.com FL CERTIFICATE OF AUTHORIZATION No. 00006601	Project THE BARCLAY MIAMI BEACH MIAMI-DADE COUNTY FLORIDA	Drawing Title MULTIMODAL ACCESS	Project No. 300390901 Date APRIL 2026 Drawn By KAL Checked By JCG	Figure 8 Sheet 11 of 11

APPENDIX B
SITE PLAN & PROPERTY APPRAISER DATA

PROFORMA

SITE SUMMARY

LOT SIZE:	30,359 SF
FLOORS 1-5 FLOORPLATE	14,868 GSF
FAR / MAX ZFA	2.37 / 71,950 SF
GROSS BUILDING AREA	78,734 SF
RESIDENTIAL NRSF	60,821
COMMERICAL NRSF	1,000
RESIDENTIAL UNITS	105
AVG SQ FT	577 SF

AREA USE	GSF	% OF GSF	NRSF	% OF RSF
RESIDENTIAL	60,821	77.2%	60,821	98.4%
PARKING	-	-	-	-
RETAIL	1,000	1.3%	1,000	1.6%
AMENITY (INDOOR)	1,816	2.3%	-	-
AMENITY (OUTDOOR)	6,370	8.1%	-	-
HISTORIC LOBBY	1,000	1.3%	-	-
CIRCULATION	7,150	9.0%	-	-
BOH*	700	0.9%	-	-
TOTAL	78,734	100.0%	61,821	100.0%

*THE FOLLOWING AREAS ARE EXEMPT FROM FAR PER CMB CODE:
-UNCOVERED STEPS, TERRACES, BREEZEWYAS, OR OPEN PORCHES
-EXTERIOR UNENCLOSED PRIVATE BALCONIES
-ENCLOSED GARBAGE ROOMS, ENCLOSED WITHIN THE BUILDING ON THE GROUND FLOOR LEVEL.
-FIRE CONTROL ROOMS AND RELATED EQUIPMENT FOR LIFE SAFETY PURPOSES.

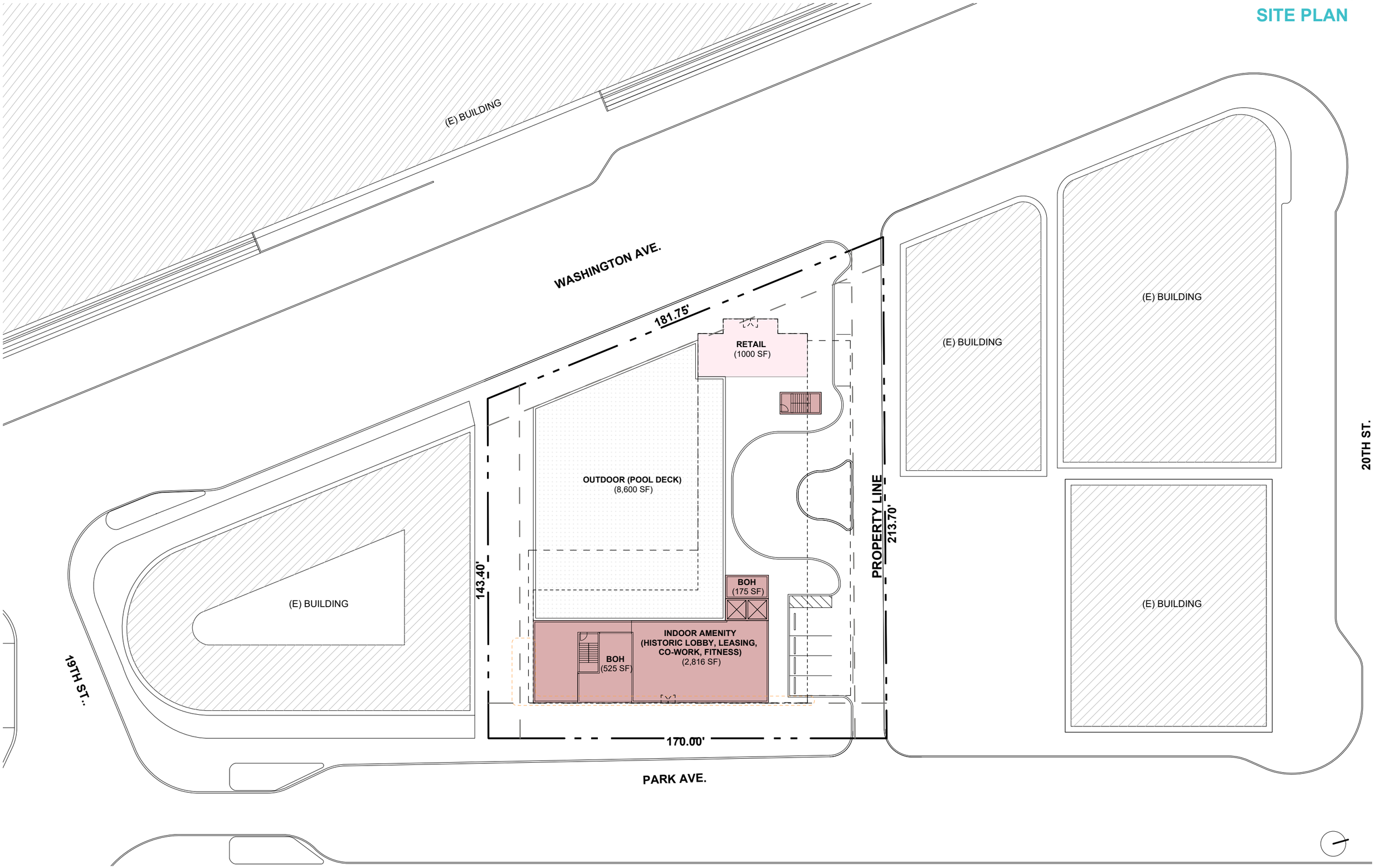
UNIT MIX SUMMARY

UNIT TYPE	UNIT COUNT	% OF UNITS	UNITS SIZE	TOTAL GSF
STUDIO	54	51.4%	452	24,408
1 BR	39	37.4%	649	25,311
2 BR	12	11.2%	926	11,112
TOTAL/AVG	105	100.0%	577	~60,831

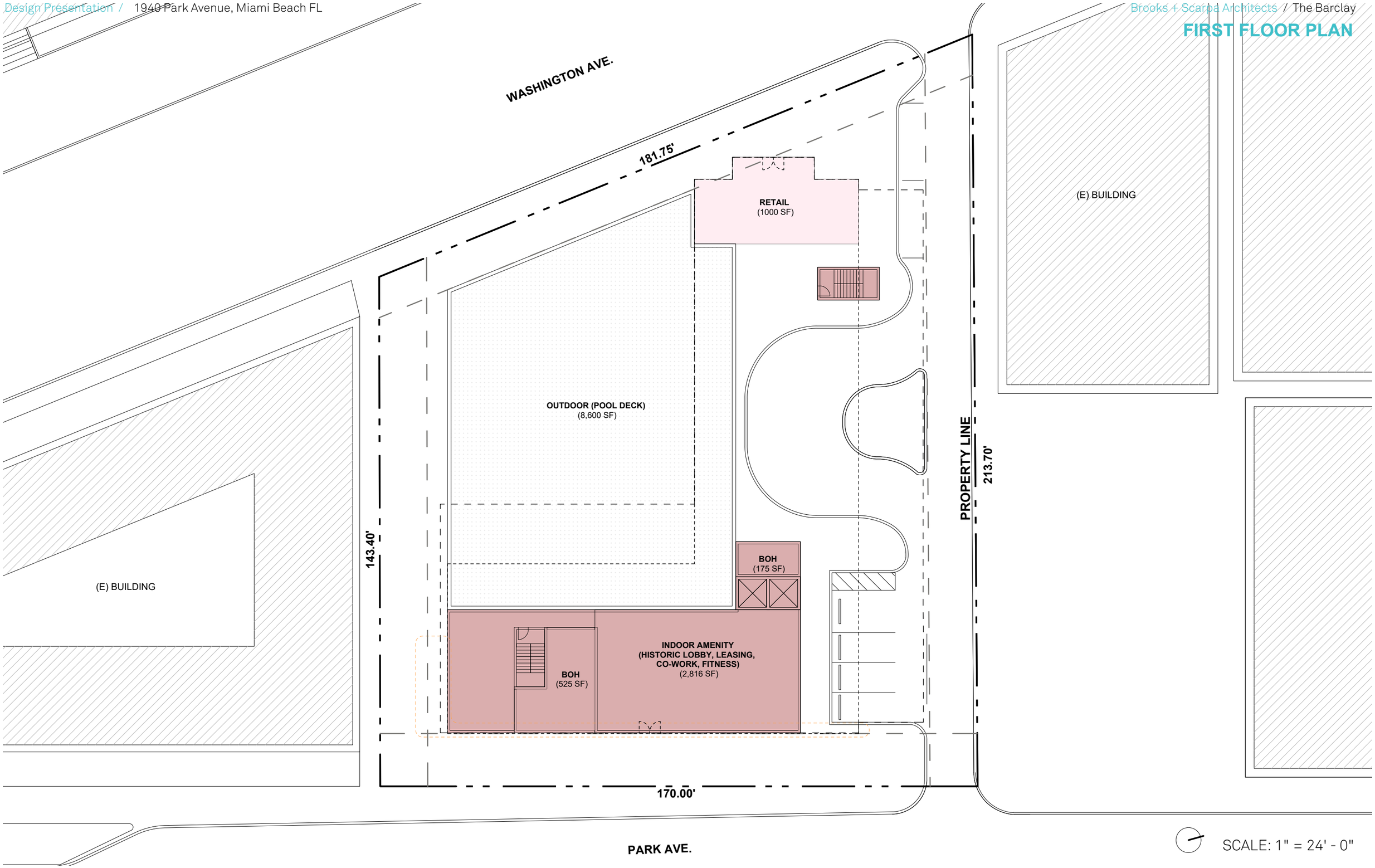
STACKING CHART

	FTF HEIGHT	ELEVATION	MULTIFAMILY	RETAIL	BOH*	HISTORIC LOBBY	INDOOR AMENITY	OUTDOOR AMENITY	CIRCULATION	TOTAL	FAR	NET RENTABLE SQ FT MULTIFAMILY	NET RENTABLE SQ FT RETAIL	NET RENTABLE SQ FT TOTAL	UNITS
ROOF	-	67'-4"	-	-	-	-	-	-	-	-	-	-	-	-	-
LEVEL 6	10'-8"	56'-8"	7,613	-	-	-	-	6086	1,006	14,582	8,783	7,613	-	8,026	13
LEVEL 5	10'-8"	46'-0"	13,089	-	-	-	-	284	1,495	14,868	14,583	13,089	-	13,016	23
LEVEL 4	10'-8"	35'-4"	13,373	-	-	-	-	-	1,495	14,868	14,868	13,373	-	13,016	23
LEVEL 3	10'-8"	24'-8"	13,373	-	-	-	-	-	1,495	14,868	14,868	13,373	-	13,016	23
LEVEL 2	10'-8"	14'-0"	13,373	-	-	-	-	-	1,495	14,868	14,868	13,373	-	13,016	23
LEVEL 1	14'-0"	0'-0"	-	1,000	700	1,000	1,816	8,600 (@ GRADE)	164	4,680	3,980	-	1,000	1,080	-
6	-	67'-4"	60,821	1,000	700	1,000	1,816	6,370	7,150	78,734	71,950	60,821	1,000	61,821	105

SITE PLAN


(E) BUILDING
WASHINGTON AVE.
181.75'
RETAIL
(1000 SF)
(E) BUILDING
(E) BUILDING
OUTDOOR (POOL DECK)
(8,600 SF)
PROPERTY LINE
213.70'
20TH ST.
BOH
(175 SF)
143.40'
INDOOR AMENITY
(HISTORIC LOBBY, LEASING,
CO-WORK, FITNESS)
(2,816 SF)
BOH
(525 SF)
(E) BUILDING
(E) BUILDING
19TH ST..
170.00'
PARK AVE.

FIRST FLOOR PLAN



SCALE: 1" = 24' - 0"

TYP. RESIDENTIAL PLAN - LEVEL 2-4

SCALE: 1" = 24' - 0"

TYP. RES. PLAN - LEVEL 5

SCALE: 1" = 24' - 0"

RES. PLAN - LEVEL 6

SCALE: 1" = 24' - 0"

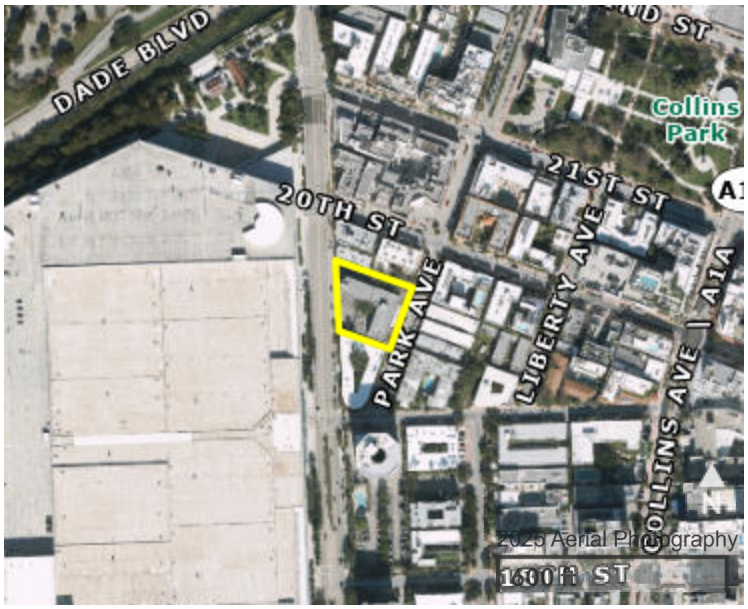
PROPERTY APPRAISER OF MIAMI-DADE COUNTY

Summary Report

Generated On: 02/25/2026

PROPERTY INFORMATION

Folio	02-3234-016-0110
Property Address	1940 PARK AVE MIAMI BEACH, FL 33139-0000
Owner	CITY OF MIAMI BEACH
Mailing Address	1700 CONVENTION CENTER DR 4TH FL MIAMI BEACH, FL 33139
Primary Zone	4000 MULTI-FAMILY - 63-100 U/A
Primary Land Use	8940 MUNICIPAL : MUNICIPAL
Beds / Baths /Half	66 / 66 / 0
Floors	3
Living Units	66
Actual Area	34,376 Sq.Ft
Living Area	34,376 Sq.Ft
Adjusted Area	33,620 Sq.Ft
Lot Size	26,250 Sq.Ft
Year Built	1935



ASSESSMENT INFORMATION

Year	2025	2024	2023
Land Value	$4,331,250	$4,331,250	$4,331,250
Building Value	$1,892,173	$1,892,173	$2,208,750
Extra Feature Value	$71,554	$71,980	$0
Market Value	$6,294,977	$6,295,403	$6,540,000
Assessed Value	$6,294,977	$6,295,403	$6,540,000

BENEFITS INFORMATION

Benefit	Type	2025	2024	2023
Municipal	Exemption	$6,294,977	$6,295,403	$6,540,000

Note: Not all benefits are applicable to all Taxable Values (i.e. County, School Board, City, Regional).

SHORT LEGAL DESCRIPTION

MIAMI BEACH IMPROVEMENT CO OCEAN
FRONT PROP RESUB PB 6-102
LOT 2 & SW20FT LOT 1 BLK H
LOT SIZE 15O.000 X 175
OR 13518-337 1287 1

TAXABLE VALUE INFORMATION

Year	2025	2024	2023
COUNTY			
Exemption Value	$6,294,977	$6,295,403	$6,540,000
Taxable Value	$0	$0	$0
SCHOOL BOARD			
Exemption Value	$6,294,977	$6,295,403	$6,540,000
Taxable Value	$0	$0	$0
CITY			
Exemption Value	$6,294,977	$6,295,403	$6,540,000
Taxable Value	$0	$0	$0
REGIONAL			
Exemption Value	$6,294,977	$6,295,403	$6,540,000
Taxable Value	$0	$0	$0

SALES INFORMATION

Previous Sale	Price	OR Book-Page	Qualification Description
01/30/2015	$5,455,000	29489-3306	Federal, state or local government agency
04/01/2007	$5,668,000	25591-1002	Other disqualified
12/01/1987	$1,200,000	13518-0337	Sales which are qualified

APPENDIX C
TRAFFIC, TAZ, SIGNAL TIMING DATA & FDOT TABLES

Nationwide Traffic Data, LLC
Intersection Turning Movement Count

Location: Washington Ave & 20th St/Miami Beach Convention Center Pkg Dwy
City: Miami Beach
Control: Signalized

Project ID: 26-570032-001
Date: 3/31/2026

Data - Total

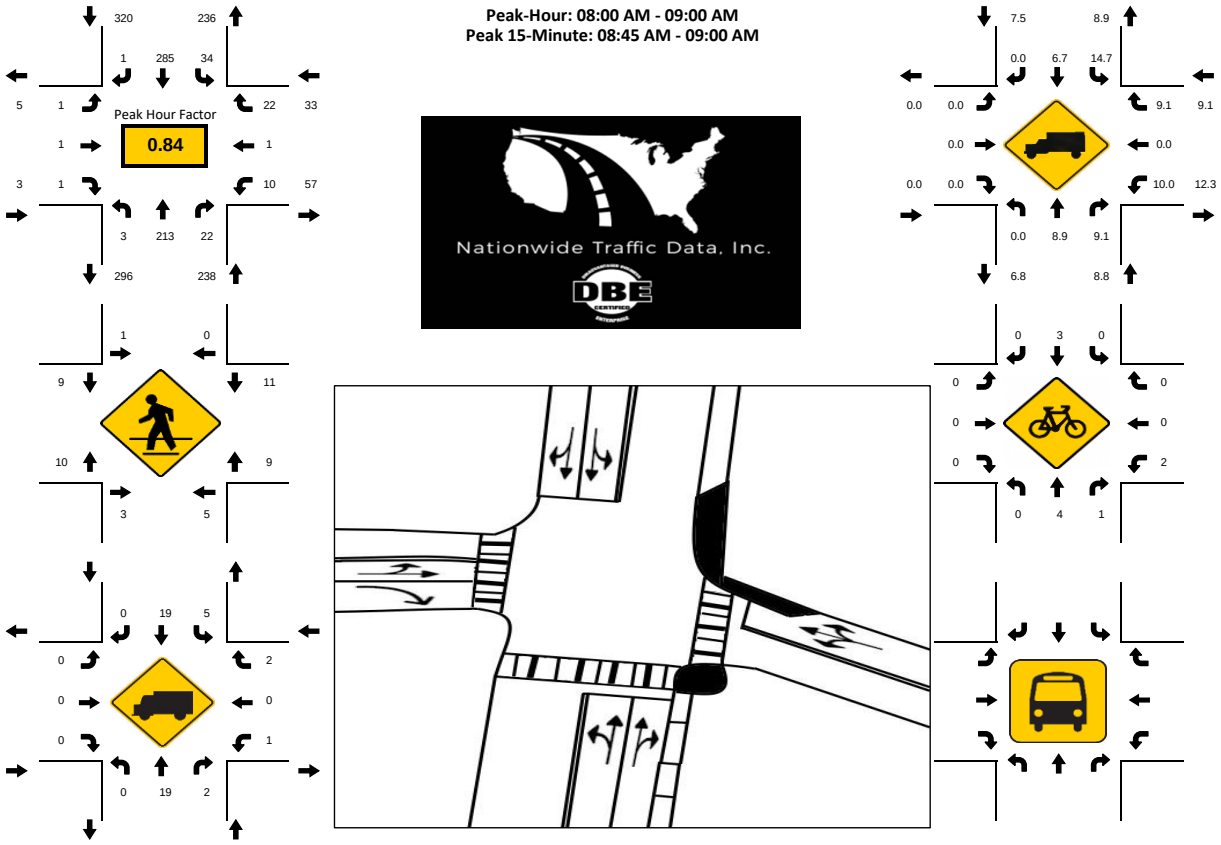
NS/EW Streets:	Washington Ave				Washington Ave				20th St/Miami Beach Convention Center Pkg Dwy				20th St/Miami Beach Convention Center Pkg Dwy				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
7:00 AM	0	44	2	0	9	38	0	0	0	1	1	0	2	1	10	0	108
7:15 AM	0	44	6	0	3	38	0	1	0	0	0	0	1	0	9	0	102
7:30 AM	0	39	3	0	9	47	0	0	0	0	0	0	2	0	3	0	103
7:45 AM	2	39	3	0	9	52	0	0	0	0	0	0	5	0	7	0	117
8:00 AM	0	42	7	0	7	56	1	0	1	0	0	0	2	1	6	0	123
8:15 AM	1	51	3	0	11	64	0	0	0	1	0	0	4	0	4	0	139
8:30 AM	0	61	7	0	6	72	0	0	0	0	0	0	2	0	7	0	155
8:45 AM	2	59	5	0	10	93	0	0	0	0	1	0	2	0	5	0	177
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	5	379	36	0	64	460	1	1	1	2	2	0	20	2	51	0	1024
APPROACH %'s :	1.19%	90.24%	8.57%	0.00%	12.17%	87.45%	0.19%	0.19%	20.00%	40.00%	40.00%	0.00%	27.40%	2.74%	69.86%	0.00%	
PEAK HR :	08:00 AM - 09:00 AM																TOTAL
PEAK HR VOL :	3	213	22	0	34	285	1	0	1	1	1	0	10	1	22	0	594
PEAK HR FACTOR :	0.375	0.873	0.786	0.000	0.773	0.766	0.250	0.000	0.250	0.250	0.250	0.000	0.625	0.250	0.786	0.000	0.839
	0.875				0.777				0.750				0.917				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	160	2	0	7	52	0	0	1	0	1	0	2	0	14	0	239
4:15 PM	0	157	3	0	6	56	0	0	0	0	0	0	6	0	18	1	247
4:30 PM	0	171	9	0	18	43	0	0	1	0	0	0	2	0	16	0	260
4:45 PM	0	139	8	0	3	72	0	0	0	0	0	0	2	0	9	0	233
5:00 PM	0	154	3	0	11	75	0	0	3	0	0	0	4	0	5	0	255
5:15 PM	1	157	7	0	6	72	1	1	0	0	0	0	3	0	13	0	261
5:30 PM	1	158	8	0	9	56	0	0	0	0	0	0	6	0	17	0	255
5:45 PM	0	143	5	0	7	73	0	0	0	0	0	0	10	0	21	0	259
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	2	1239	45	0	67	499	1	1	5	0	1	0	35	0	113	1	2009
APPROACH %'s :	0.16%	96.35%	3.50%	0.00%	11.80%	87.85%	0.18%	0.18%	83.33%	0.00%	16.67%	0.00%	23.49%	0.00%	75.84%	0.67%	
PEAK HR :	05:00 PM - 06:00 PM																TOTAL
PEAK HR VOL :	2	612	23	0	33	276	1	1	3	0	0	0	23	0	56	0	1030
PEAK HR FACTOR :	0.500	0.968	0.719	0.000	0.750	0.920	0.250	0.250	0.250	0.000	0.000	0.000	0.575	0.000	0.667	0.000	0.987
	0.954				0.904				0.250				0.637				

LOCATION: Washington Ave & 20th St/Miami Beach Convention Center Pkg Dwy
CITY/STATE: Miami Beach, FL

PROJECT ID: 26-570032-001
DATE: Tue, Mar 31, 2026

Peak-Hour: 08:00 AM - 09:00 AM
Peak 15-Minute: 08:45 AM - 09:00 AM

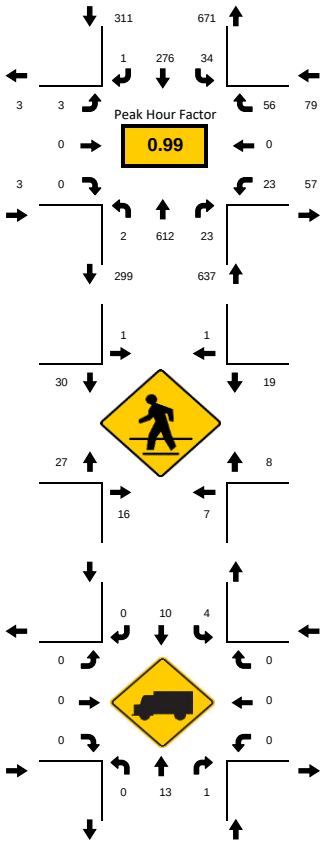


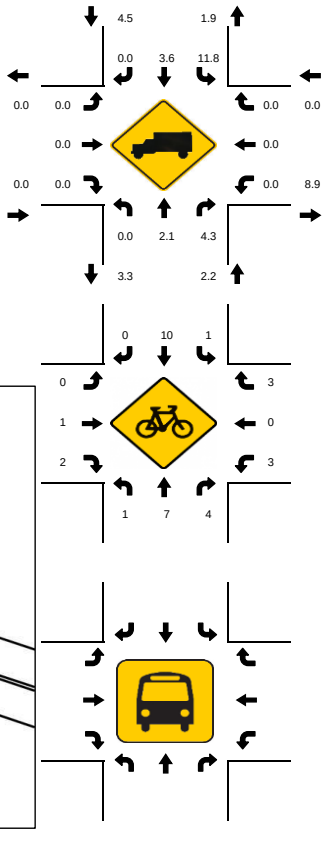
15-Min Count Period Beginning At	Washington Ave Northbound					Washington Ave Southbound					Miami Beach Convention Center Eastbound					Miami Beach Convention Center Westbound					Total	Hourly Total
	Left	Thru	Rgt	U	R*	Left	Thru	Rgt	U	R*	Left	Thru	Rgt	U	R*	Left	Thru	Rgt	U	R*		
7:00 AM	0	44	2	0		9	38	0	0		0	1	1	0		2	1	10	0		108	430
7:15 AM	0	44	6	0		3	38	0	1		0	0	0	0		1	0	9	0		102	445
7:30 AM	0	39	3	0		9	47	0	0		0	0	0	0		2	0	3	0		103	482
7:45 AM	2	39	3	0		9	52	0	0		0	0	0	0		5	0	7	0		117	534
8:00 AM	0	42	7	0		7	56	1	0		1	0	0	0		2	1	6	0		123	594
8:15 AM	1	51	3	0		11	64	0	0		0	1	0	0		4	0	4	0		139	471
8:30 AM	0	61	7	0		6	72	0	0		0	0	0	0		2	0	7	0		155	332
8:45 AM	2	59	5	0		10	93	0	0		0	0	1	0		2	0	5	0		177	177
Peak 15-Min Flowrates	**Northbound**					**Southbound**					**Eastbound**					**Westbound**					**Total**	
	Left	Thru	Rgt	U	R*	Left	Thru	Rgt	U	R*	Left	Thru	Rgt	U	R*	Left	Thru	Rgt	U	R*		
All Vehicles	8	244	28	0		44	372	4	0		4	4	4	0		16	4	28	0		**760**	
Heavy Trucks	0	36	4	0		8	24	0	0		0	0	0	0		4	0	4	0		**80**	
Pedestrians		12					4					36					32				**84**	
Bicycles	0	8	4	0		0	8	0	0		0	0	0	0		4	0	0	0		**24**	
Buses																					**0**	
Stopped Buses																						

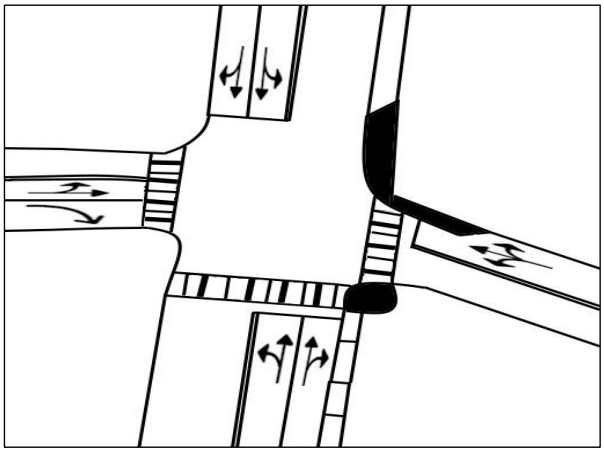
LOCATION: Washington Ave & 20th St/Miami Beach Convention Center Pkg Dwy
CITY/STATE: Miami Beach, FL

PROJECT ID: 26-570032-001
DATE: Tue, Mar 31, 2026

Peak-Hour: 05:00 PM - 06:00 PM
Peak 15-Minute: 05:15 PM - 05:30 PM







Nationwide Traffic Data, Inc.
DBE

15-Min Count Period Beginning At	Washington Ave Northbound					Washington Ave Southbound					Miami Beach Convention Center Eastbound					Miami Beach Convention Center Westbound					Total	Hourly Total
	Left	Thru	Rgt	U	R*	Left	Thru	Rgt	U	R*	Left	Thru	Rgt	U	R*	Left	Thru	Rgt	U	R*		
4:00 PM	0	160	2	0		7	52	0	0		1	0	1	0		2	0	14	0		239	979
4:15 PM	0	157	3	0		6	56	0	0		0	0	0	0		6	0	18	1		247	995
4:30 PM	0	171	9	0		18	43	0	0		1	0	0	0		2	0	16	0		260	1009
4:45 PM	0	139	8	0		3	72	0	0		0	0	0	0		2	0	9	0		233	1004
5:00 PM	0	154	3	0		11	75	0	0		3	0	0	0		4	0	5	0		255	1030
5:15 PM	1	157	7	0		6	72	1	1		0	0	0	0		3	0	13	0		261	775
5:30 PM	1	158	8	0		9	56	0	0		0	0	0	0		6	0	17	0		255	514
5:45 PM	0	143	5	0		7	73	0	0		0	0	0	0		10	0	21	0		259	259
Peak 15-Min Flowrates	**Northbound**					**Southbound**					**Eastbound**					**Westbound**					**Total**	
	Left	Thru	Rgt	U	R*	Left	Thru	Rgt	U	R*	Left	Thru	Rgt	U	R*	Left	Thru	Rgt	U	R*		
All Vehicles	4	632	32	0		44	300	4	4		12	0	0	0		40	0	84	0		**1156**	
Heavy Trucks	0	24	4	0		4	16	0	0		0	0	0	0		0	0	0	0		**48**	
Pedestrians		40					4					92					72				**208**	
Bicycles	0	8	8	4		4	16	0	0		0	4	8	0		8	0	4	0		**60**	
Buses																					**0**	
Stopped Buses																						

Nationwide Traffic Data, LLC
Intersection Turning Movement Count

Location: Washington Ave & 19th St
City: Miami Beach
Control: Signalized

Project ID: 26-570032-002
Date: 3/31/2026

Data - Total

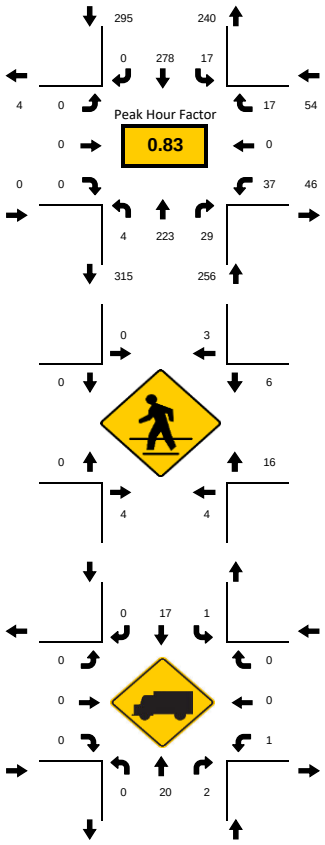
NS/EW Streets:	Washington Ave				Washington Ave				19th St				19th St				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
7:00 AM	0	42	4	1	0	40	0	0	0	0	0	0	5	0	5	0	97
7:15 AM	0	49	3	0	4	36	0	0	0	0	0	0	4	0	5	0	101
7:30 AM	0	36	6	0	4	45	0	0	0	0	0	0	6	0	3	0	100
7:45 AM	0	41	2	0	4	53	0	1	0	0	0	0	8	0	2	0	111
8:00 AM	0	43	7	0	2	53	0	0	0	0	0	0	7	0	7	0	119
8:15 AM	0	53	5	2	6	62	0	0	0	0	0	0	13	0	2	0	143
8:30 AM	0	65	9	2	5	69	0	0	0	0	0	0	7	0	4	0	161
8:45 AM	0	62	8	0	4	94	0	0	0	0	0	0	10	0	4	0	182
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	391	44	5	29	452	0	1	0	0	0	0	60	0	32	0	1014
APPROACH %'s :	0.00%	88.86%	10.00%	1.14%	6.02%	93.78%	0.00%	0.21%					65.22%	0.00%	34.78%	0.00%	
PEAK HR :	08:00 AM - 09:00 AM																TOTAL
PEAK HR VOL :	0	223	29	4	17	278	0	0	0	0	0	0	37	0	17	0	605
PEAK HR FACTOR :	0.000	0.858	0.806	0.500	0.708	0.739	0.000	0.000	0.000	0.000	0.000	0.000	0.712	0.000	0.607	0.000	0.831
		0.842				0.753								0.900			

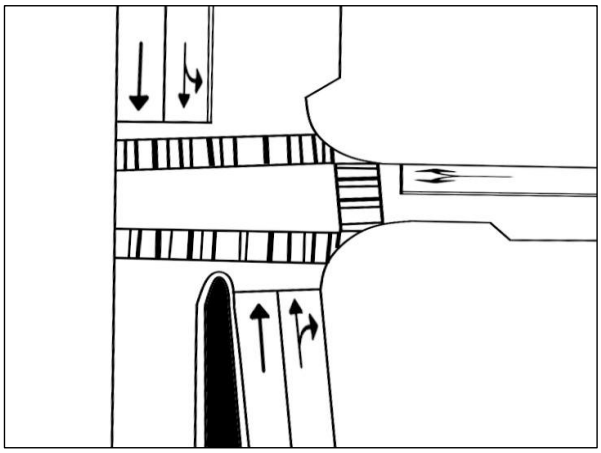
PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	150	14	0	3	53	0	0	0	0	0	0	7	0	7	0	234
4:15 PM	0	150	8	0	2	60	0	0	0	0	0	0	12	0	11	0	243
4:30 PM	0	169	19	0	1	44	0	0	0	0	0	0	12	0	9	0	254
4:45 PM	0	139	10	0	4	66	0	0	0	0	0	0	17	0	4	0	240
5:00 PM	0	153	14	1	7	74	0	0	0	0	0	0	8	0	4	0	261
5:15 PM	0	160	11	0	7	66	0	0	0	0	0	0	14	0	10	0	268
5:30 PM	0	155	11	0	6	56	0	0	0	0	0	0	13	0	2	0	243
5:45 PM	0	138	10	0	6	76	0	0	0	0	0	0	19	0	11	0	260
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	1214	97	1	36	495	0	0	0	0	0	0	102	0	58	0	2003
APPROACH %'s :	0.00%	92.53%	7.39%	0.08%	6.78%	93.22%	0.00%	0.00%					63.75%	0.00%	36.25%	0.00%	
PEAK HR :	05:00 PM - 06:00 PM																TOTAL
PEAK HR VOL :	0	606	46	1	26	272	0	0	0	0	0	0	54	0	27	0	1032
PEAK HR FACTOR :	0.000	0.947	0.821	0.250	0.929	0.895	0.000	0.000	0.000	0.000	0.000	0.000	0.711	0.000	0.614	0.000	0.963
		0.955				0.909								0.675			

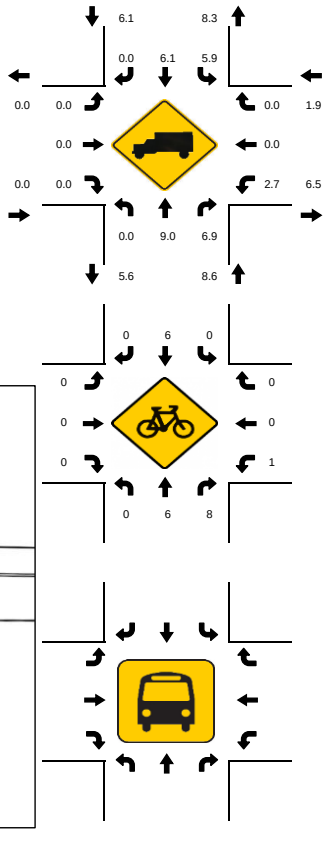
LOCATION: Washington Ave & 19th St
CITY/STATE: Miami Beach, FL

PROJECT ID: 26-570032-002
DATE: Tue, Mar 31, 2026

Peak-Hour: 08:00 AM - 09:00 AM
Peak 15-Minute: 08:45 AM - 09:00 AM





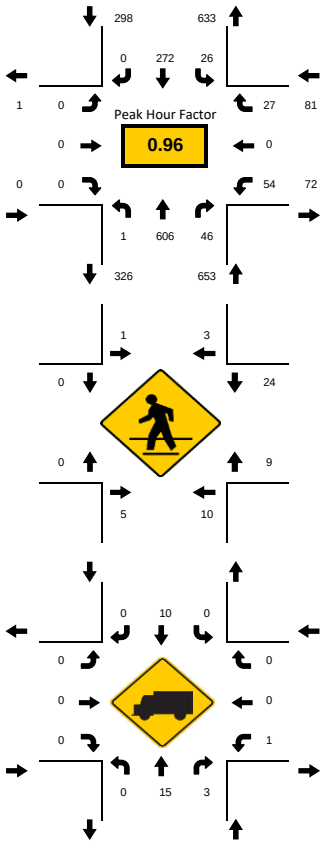


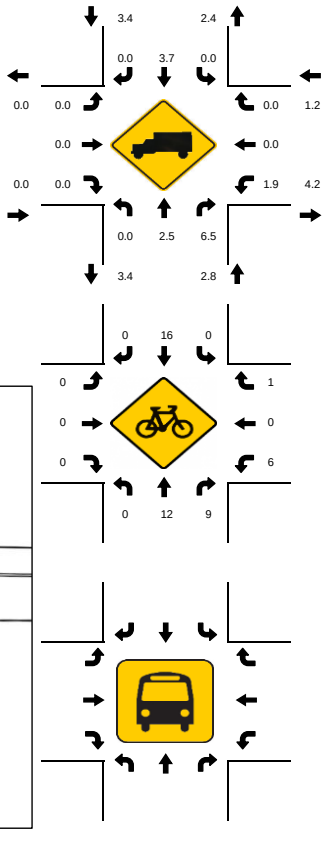
15-Min Count Period Beginning At	Washington Ave Northbound					Washington Ave Southbound					19th St Eastbound					19th St Westbound					Total	Hourly Total
	Left	Thru	Rgt	U	R*	Left	Thru	Rgt	U	R*	Left	Thru	Rgt	U	R*	Left	Thru	Rgt	U	R*		
7:00 AM	0	42	4	1		0	40	0	0		0	0	0	0		5	0	5	0		97	409
7:15 AM	0	49	3	0		4	36	0	0		0	0	0	0		4	0	5	0		101	431
7:30 AM	0	36	6	0		4	45	0	0		0	0	0	0		6	0	3	0		100	473
7:45 AM	0	41	2	0		4	53	0	1		0	0	0	0		8	0	2	0		111	534
8:00 AM	0	43	7	0		2	53	0	0		0	0	0	0		7	0	7	0		119	605
8:15 AM	0	53	5	2		6	62	0	0		0	0	0	0		13	0	2	0		143	486
8:30 AM	0	65	9	2		5	69	0	0		0	0	0	0		7	0	4	0		161	343
8:45 AM	0	62	8	0		4	94	0	0		0	0	0	0		10	0	4	0		182	182
Peak 15-Min Flowrates	**Northbound**					**Southbound**					**Eastbound**					**Westbound**					**Total**	
	Left	Thru	Rgt	U	R*	Left	Thru	Rgt	U	R*	Left	Thru	Rgt	U	R*	Left	Thru	Rgt	U	R*		
All Vehicles	0	260	36	8		24	376	0	0		0	0	0	0		52	0	28	0		**784**	
Heavy Trucks	0	32	4	0		4	20	0	0		0	0	0	0		4	0	0	0		**64**	
Pedestrians		12					12					0					36				**60**	
Bicycles	0	8	16	0		0	8	0	0		0	0	0	0		4	0	0	0		**36**	
Buses																					**0**	
Stopped Buses																						

LOCATION: Washington Ave & 19th St
CITY/STATE: Miami Beach, FL

PROJECT ID: 26-570032-002
DATE: Tue, Mar 31, 2026

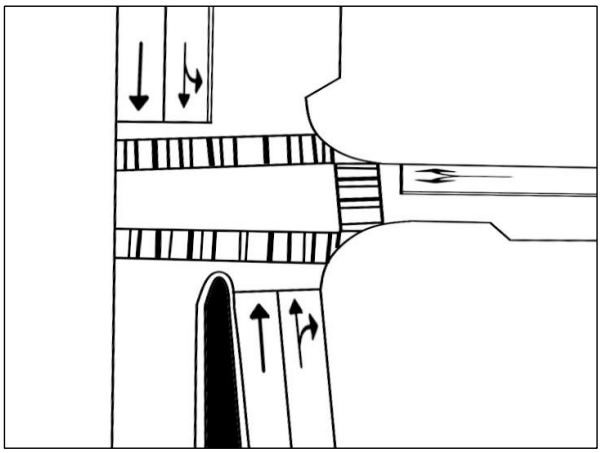
Peak-Hour: 05:00 PM - 06:00 PM
Peak 15-Minute: 05:15 PM - 05:30 PM





Nationwide Traffic Data, Inc.

DBE



15-Min Count Period Beginning At	Washington Ave Northbound					Washington Ave Southbound					19th St Eastbound					19th St Westbound					Total	Hourly Total
	Left	Thru	Rgt	U	R*	Left	Thru	Rgt	U	R*	Left	Thru	Rgt	U	R*	Left	Thru	Rgt	U	R*		
4:00 PM	0	150	14	0		3	53	0	0		0	0	0	0		7	0	7	0		234	971
4:15 PM	0	150	8	0		2	60	0	0		0	0	0	0		12	0	11	0		243	998
4:30 PM	0	169	19	0		1	44	0	0		0	0	0	0		12	0	9	0		254	1023
4:45 PM	0	139	10	0		4	66	0	0		0	0	0	0		17	0	4	0		240	1012
5:00 PM	0	153	14	1		7	74	0	0		0	0	0	0		8	0	4	0		261	1032
5:15 PM	0	160	11	0		7	66	0	0		0	0	0	0		14	0	10	0		268	771
5:30 PM	0	155	11	0		6	56	0	0		0	0	0	0		13	0	2	0		243	503
5:45 PM	0	138	10	0		6	76	0	0		0	0	0	0		19	0	11	0		260	260
Peak 15-Min Flowrates	**Northbound**					**Southbound**					**Eastbound**					**Westbound**					**Total**	
	Left	Thru	Rgt	U	R*	Left	Thru	Rgt	U	R*	Left	Thru	Rgt	U	R*	Left	Thru	Rgt	U	R*		
All Vehicles	0	640	56	4		28	304	0	0		0	0	0	0		76	0	44	0		**1152**	
Heavy Trucks	0	28	12	0		0	16	0	0		0	0	0	0		4	0	0	0		**60**	
Pedestrians		36					8					0					68				**112**	
Bicycles	0	12	12	0		0	28	0	0		0	0	0	0		16	0	4	0		**72**	
Buses																					**0**	
Stopped Buses																						

Nationwide Traffic Data, LLC
Intersection Turning Movement Count

Location: Park Ave & 20th St
City: Miami Beach
Control: 4-Way Stop

Project ID: 26-570032-003
Date: 3/31/2026

Data - Total

NS/EW Streets:	Park Ave				Park Ave				20th St				20th St				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
7:00 AM	2	6	1	0	1	3	0	0	0	11	0	0	1	10	0	0	35
7:15 AM	1	3	1	0	0	3	3	0	2	7	1	0	0	7	3	0	31
7:30 AM	0	5	3	0	2	5	0	0	0	13	1	0	0	8	0	0	37
7:45 AM	1	1	0	0	6	7	1	0	4	8	2	0	1	8	2	0	41
8:00 AM	0	1	1	0	1	6	1	0	2	12	0	0	1	8	0	1	34
8:15 AM	0	2	0	0	5	9	2	0	2	13	0	0	0	7	1	0	41
8:30 AM	0	5	2	0	1	10	2	0	4	8	1	0	0	4	2	1	40
8:45 AM	0	4	0	0	4	9	0	0	2	12	0	0	0	8	1	0	40
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	4	27	8	0	20	52	9	0	16	84	5	0	3	60	9	2	299
APPROACH %'s :	10.26%	69.23%	20.51%	0.00%	24.69%	64.20%	11.11%	0.00%	15.24%	80.00%	4.76%	0.00%	4.05%	81.08%	12.16%	2.70%	
PEAK HR :	07:45 AM - 08:45 AM																TOTAL
PEAK HR VOL :	1	9	3	0	13	32	6	0	12	41	3	0	2	27	5	2	156
PEAK HR FACTOR :	0.250	0.450	0.375	0.000	0.542	0.800	0.750	0.000	0.750	0.788	0.375	0.000	0.500	0.844	0.625	0.500	0.951
	0.464				0.797				0.933				0.818				

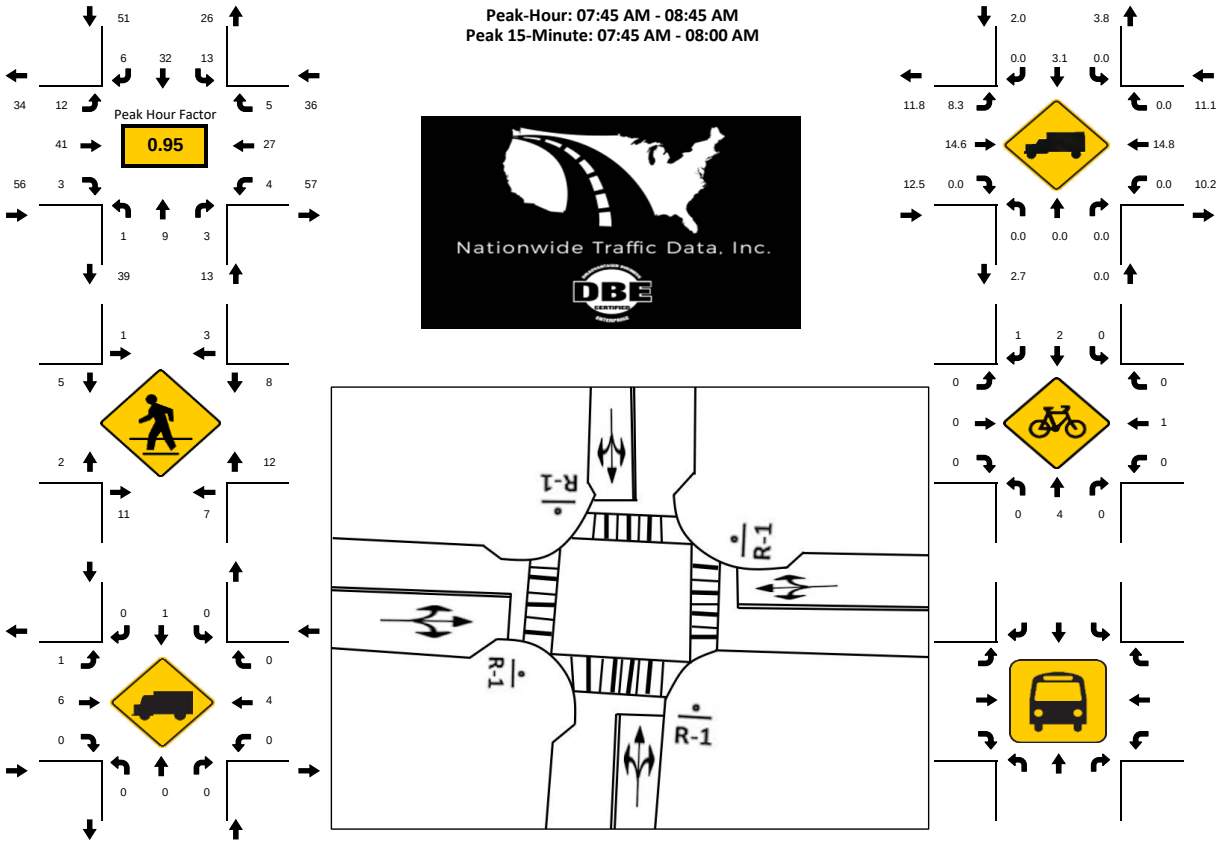
PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	11	1	1	2	5	0	0	2	5	2	0	1	15	3	1	49
4:15 PM	3	6	0	0	4	8	3	0	4	6	1	0	1	18	9	0	63
4:30 PM	0	14	1	0	3	14	0	0	5	16	1	0	1	17	3	0	75
4:45 PM	0	6	0	0	1	12	4	0	2	14	0	0	1	7	3	1	51
5:00 PM	1	9	1	0	1	4	2	1	2	11	0	0	2	6	5	0	45
5:15 PM	3	6	0	0	2	9	2	0	4	9	1	0	1	14	6	0	57
5:30 PM	1	10	2	0	4	9	0	0	4	8	3	0	3	21	6	0	71
5:45 PM	3	10	1	0	4	13	1	0	1	9	3	0	1	25	2	0	73
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	11	72	6	1	21	74	12	1	24	78	11	0	11	123	37	2	484
APPROACH %'s :	12.22%	80.00%	6.67%	1.11%	19.44%	68.52%	11.11%	0.93%	21.24%	69.03%	9.73%	0.00%	6.36%	71.10%	21.39%	1.16%	
PEAK HR :	05:00 PM - 06:00 PM																TOTAL
PEAK HR VOL :	8	35	4	0	11	35	5	1	11	37	7	0	7	66	19	0	246
PEAK HR FACTOR :	0.667	0.875	0.500	0.000	0.688	0.673	0.625	0.250	0.688	0.841	0.583	0.000	0.583	0.660	0.792	0.000	0.842
	0.839				0.722				0.917				0.767				

LOCATION: Park Ave & 20th St
CITY/STATE: Miami Beach, FL

PROJECT ID: 26-570032-003
DATE: Tue, Mar 31, 2026

Peak-Hour: 07:45 AM - 08:45 AM
Peak 15-Minute: 07:45 AM - 08:00 AM

Peak Hour Factor: **0.95**



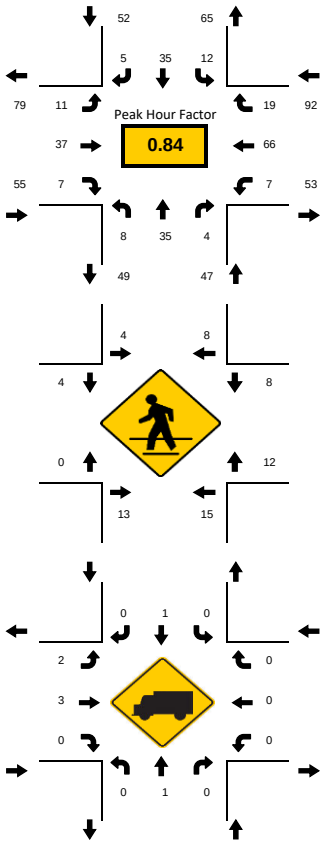
Nationwide Traffic Data, Inc.
DBE

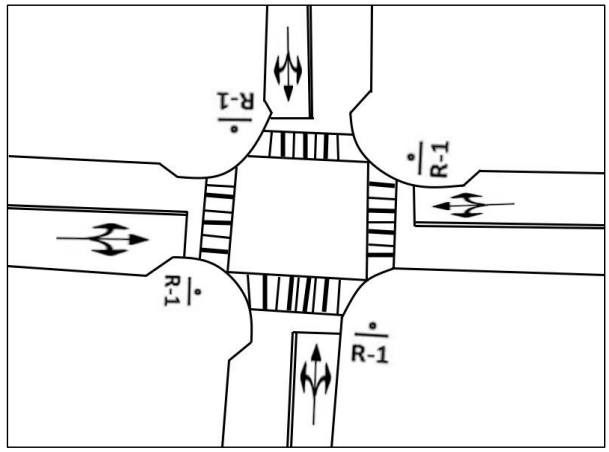
15-Min Count Period Beginning At	Park Ave Northbound					Park Ave Southbound					20th St Eastbound					20th St Westbound					Total	Hourly Total
	Left	Thru	Rgt	U	R*	Left	Thru	Rgt	U	R*	Left	Thru	Rgt	U	R*	Left	Thru	Rgt	U	R*		
7:00 AM	2	6	1	0		1	3	0	0		0	11	0	0		1	10	0	0		35	144
7:15 AM	1	3	1	0		0	3	3	0		2	7	1	0		0	7	3	0		31	143
7:30 AM	0	5	3	0		2	5	0	0		0	13	1	0		0	8	0	0		37	153
7:45 AM	1	1	0	0		6	7	1	0		4	8	2	0		1	8	2	0		41	156
8:00 AM	0	1	1	0		1	6	1	0		2	12	0	0		1	8	0	1		34	155
8:15 AM	0	2	0	0		5	9	2	0		2	13	0	0		0	7	1	0		41	121
8:30 AM	0	5	2	0		1	10	2	0		4	8	1	0		0	4	2	1		40	80
8:45 AM	0	4	0	0		4	9	0	0		2	12	0	0		0	8	1	0		40	40
Peak 15-Min Flowrates	**Northbound**					**Southbound**					**Eastbound**					**Westbound**					**Total**	
	Left	Thru	Rgt	U	R*	Left	Thru	Rgt	U	R*	Left	Thru	Rgt	U	R*	Left	Thru	Rgt	U	R*		
All Vehicles	4	20	8	0		24	40	8	0		16	52	8	0		4	32	8	4		**228**	
Heavy Trucks	0	0	0	0		0	4	0	0		4	8	0	0		0	8	0	0		**24**	
Pedestrians		28					8					12					24				**72**	
Bicycles	0	16	0	0		0	4	4	0		0	0	0	0		0	4	0	0		**28**	
Buses																					**0**	
Stopped Buses																						

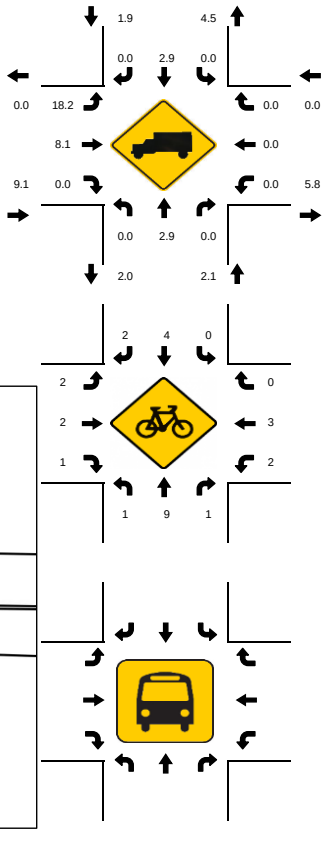
LOCATION: Park Ave & 20th St
CITY/STATE: Miami Beach, FL

PROJECT ID: 26-570032-003
DATE: Tue, Mar 31, 2026

Peak-Hour: 05:00 PM - 06:00 PM
Peak 15-Minute: 05:45 PM - 06:00 PM







15-Min Count Period Beginning At	Park Ave Northbound					Park Ave Southbound					20th St Eastbound					20th St Westbound					Total	Hourly Total
	Left	Thru	Rgt	U	R*	Left	Thru	Rgt	U	R*	Left	Thru	Rgt	U	R*	Left	Thru	Rgt	U	R*		
4:00 PM	0	11	1	1		2	5	0	0		2	5	2	0		1	15	3	1		49	238
4:15 PM	3	6	0	0		4	8	3	0		4	6	1	0		1	18	9	0		63	234
4:30 PM	0	14	1	0		3	14	0	0		5	16	1	0		1	17	3	0		75	228
4:45 PM	0	6	0	0		1	12	4	0		2	14	0	0		1	7	3	1		51	224
5:00 PM	1	9	1	0		1	4	2	1		2	11	0	0		2	6	5	0		45	246
5:15 PM	3	6	0	0		2	9	2	0		4	9	1	0		1	14	6	0		57	201
5:30 PM	1	10	2	0		4	9	0	0		4	8	3	0		3	21	6	0		71	144
5:45 PM	3	10	1	0		4	13	1	0		1	9	3	0		1	25	2	0		73	73
Peak 15-Min Flowrates	**Northbound**					**Southbound**					**Eastbound**					**Westbound**					**Total**	
	Left	Thru	Rgt	U	R*	Left	Thru	Rgt	U	R*	Left	Thru	Rgt	U	R*	Left	Thru	Rgt	U	R*		
All Vehicles	12	40	8	0		16	52	8	4		16	44	12	0		12	100	24	0		**348**	
Heavy Trucks	0	4	0	0		0	4	0	0		4	4	0	0		0	0	0	0		**16**	
Pedestrians		44					20					8					28				**100**	
Bicycles	4	24	4	0		0	8	4	0		4	8	4	0		8	8	0	0		**76**	
Buses																					**0**	
Stopped Buses																						

Nationwide Traffic Data, LLC
Intersection Turning Movement Count

Location: Park Ave/Octagon Tower Dwy & 19th St
City: Miami Beach
Control: 2-Way Stop(NB/SB)

Project ID: 26-570032-004
Date: 3/31/2026

Data - Total

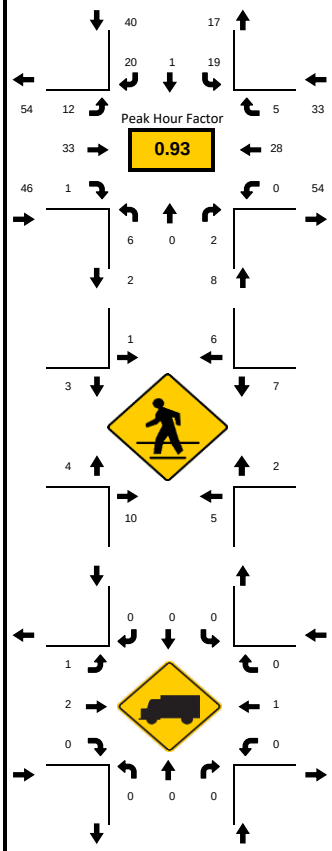
NS/EW Streets:	Park Ave/Octagon Tower Dwy				Park Ave/Octagon Tower Dwy				19th St				19th St				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
7:00 AM	1	1	2	0	3	0	3	0	2	2	0	0	2	6	5	0	27
7:15 AM	0	1	0	0	3	0	2	0	1	6	0	0	2	7	6	0	28
7:30 AM	2	2	1	0	2	0	3	0	2	7	1	0	0	4	2	0	26
7:45 AM	0	0	0	0	8	0	5	0	0	6	0	0	0	5	2	0	26
8:00 AM	3	0	1	0	2	0	5	0	2	7	0	0	0	8	1	0	29
8:15 AM	1	0	0	0	4	1	6	0	2	8	1	0	0	6	2	0	31
8:30 AM	2	0	0	0	7	0	5	0	4	10	0	0	0	5	1	0	34
8:45 AM	0	0	1	0	6	0	4	0	4	8	0	0	0	9	1	0	33
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	9	4	5	0	35	1	33	0	17	54	2	0	4	50	20	0	234
APPROACH %'s :	50.00%	22.22%	27.78%	0.00%	50.72%	1.45%	47.83%	0.00%	23.29%	73.97%	2.74%	0.00%	5.41%	67.57%	27.03%	0.00%	
PEAK HR :	08:00 AM - 09:00 AM																TOTAL
PEAK HR VOL :	6	0	2	0	19	1	20	0	12	33	1	0	0	28	5	0	127
PEAK HR FACTOR :	0.500	0.000	0.500	0.000	0.679	0.250	0.833	0.000	0.750	0.825	0.250	0.000	0.000	0.778	0.625	0.000	0.934
	0.500				0.833				0.821				0.825				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	1	0	0	0	1	1	5	0	10	8	0	0	1	8	4	0	39
4:15 PM	1	0	1	0	0	0	10	0	4	5	1	0	1	13	2	0	38
4:30 PM	0	0	0	0	3	0	11	0	15	3	0	0	0	9	0	0	41
4:45 PM	2	0	0	0	5	0	11	0	6	9	0	0	2	8	1	0	44
5:00 PM	1	0	0	0	0	0	6	0	6	16	0	0	0	5	3	0	37
5:15 PM	1	0	0	0	4	0	9	0	7	11	0	0	1	14	2	0	49
5:30 PM	2	0	0	0	3	0	8	0	8	9	0	0	0	6	4	0	40
5:45 PM	2	0	0	0	4	0	14	0	6	9	0	0	2	13	7	0	57
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	10	0	1	0	20	1	74	0	62	70	1	0	7	76	23	0	345
APPROACH %'s :	90.91%	0.00%	9.09%	0.00%	21.05%	1.05%	77.89%	0.00%	46.62%	52.63%	0.75%	0.00%	6.60%	71.70%	21.70%	0.00%	
PEAK HR :	05:00 PM - 06:00 PM																TOTAL
PEAK HR VOL :	6	0	0	0	11	0	37	0	27	45	0	0	3	38	16	0	183
PEAK HR FACTOR :	0.750	0.000	0.000	0.000	0.688	0.000	0.661	0.000	0.844	0.703	0.000	0.000	0.375	0.679	0.571	0.000	0.803
	0.750				0.667				0.818				0.648				

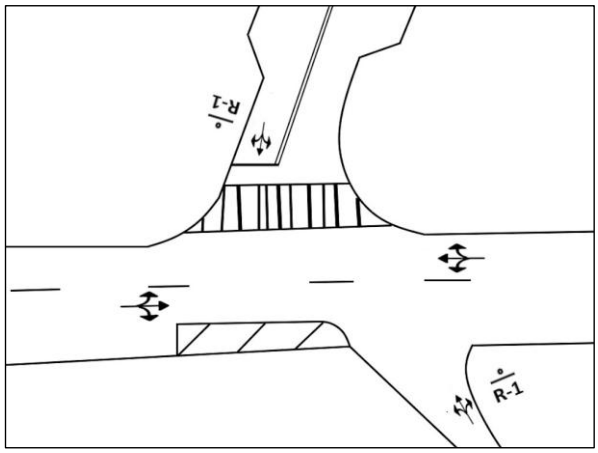
LOCATION: Park Ave/Octagon Tower Dwy & 19th St
CITY/STATE: Miami Beach, FL

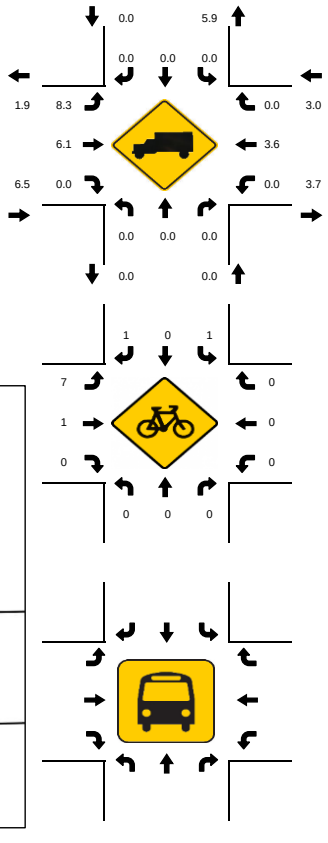
PROJECT ID: 26-570032-004
DATE: Tue, Mar 31, 2026

Peak-Hour: 08:00 AM - 09:00 AM
Peak 15-Minute: 08:30 AM - 08:45 AM



Nationwide Traffic Data, Inc.
DBE



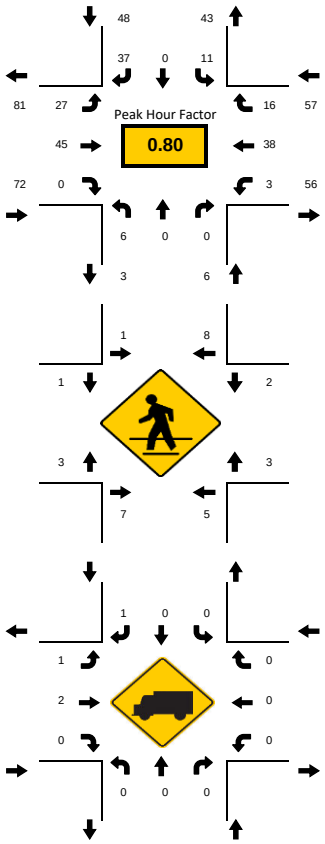


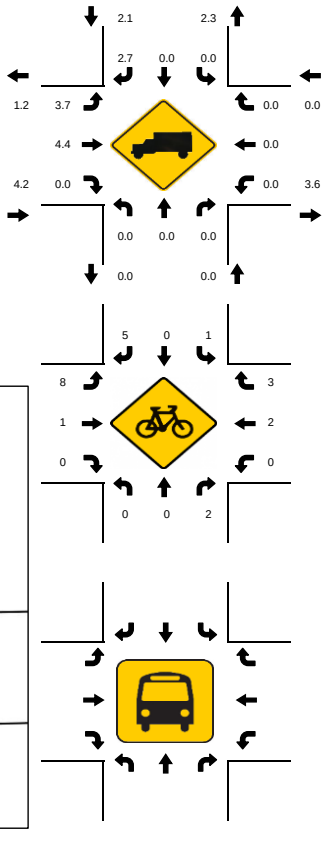
15-Min Count Period Beginning At	Park Ave/Octagon Tower Dwy Northbound					Park Ave/Octagon Tower Dwy Southbound					19th St Eastbound					19th St Westbound					Total	Hourly Total
	Left	Thru	Rgt	U	R*	Left	Thru	Rgt	U	R*	Left	Thru	Rgt	U	R*	Left	Thru	Rgt	U	R*		
7:00 AM	1	1	2	0		3	0	3	0		2	2	0	0		2	6	5	0		27	107
7:15 AM	0	1	0	0		3	0	2	0		1	6	0	0		2	7	6	0		28	109
7:30 AM	2	2	1	0		2	0	3	0		2	7	1	0		0	4	2	0		26	112
7:45 AM	0	0	0	0		8	0	5	0		0	6	0	0		0	5	2	0		26	120
8:00 AM	3	0	1	0		2	0	5	0		2	7	0	0		0	8	1	0		29	127
8:15 AM	1	0	0	0		4	1	6	0		2	8	1	0		0	6	2	0		31	98
8:30 AM	2	0	0	0		7	0	5	0		4	10	0	0		0	5	1	0		34	67
8:45 AM	0	0	1	0		6	0	4	0		4	8	0	0		0	9	1	0		33	33
Peak 15-Min Flowrates	**Northbound**					**Southbound**					**Eastbound**					**Westbound**					**Total**	
	Left	Thru	Rgt	U	R*	Left	Thru	Rgt	U	R*	Left	Thru	Rgt	U	R*	Left	Thru	Rgt	U	R*		
All Vehicles	12	0	4	0		28	4	24	0		16	40	4	0		0	36	8	0		**176**	
Heavy Trucks	0	0	0	0		0	0	0	0		4	4	0	0		0	4	0	0		**12**	
Pedestrians		24					16					16					12				**68**	
Bicycles	0	0	0	0		4	0	4	0		16	4	0	0		0	0	0	0		**28**	
Buses																					**0**	
Stopped Buses																						

LOCATION: Park Ave/Octagon Tower Dwy & 19th St
CITY/STATE: Miami Beach, FL

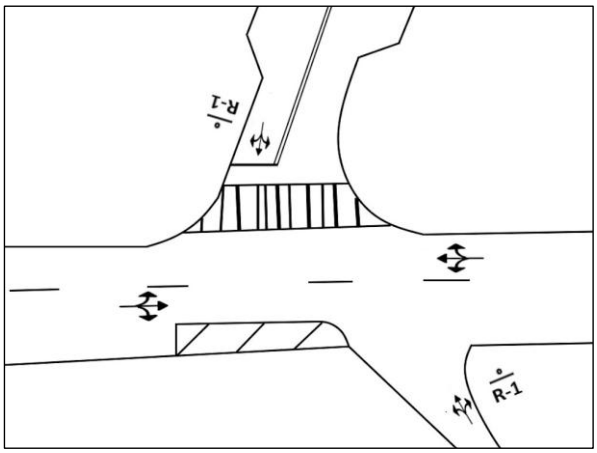
PROJECT ID: 26-570032-004
DATE: Tue, Mar 31, 2026

Peak-Hour: 05:00 PM - 06:00 PM
Peak 15-Minute: 05:45 PM - 06:00 PM





Nationwide Traffic Data, Inc.
DBE



15-Min Count Period Beginning At	Park Ave/Octagon Tower Dwy Northbound					Park Ave/Octagon Tower Dwy Southbound					19th St Eastbound					19th St Westbound					Total	Hourly Total
	Left	Thru	Rgt	U	R*	Left	Thru	Rgt	U	R*	Left	Thru	Rgt	U	R*	Left	Thru	Rgt	U	R*		
4:00 PM	1	0	0	0		1	1	5	0		10	8	0	0		1	8	4	0		39	162
4:15 PM	1	0	1	0		0	0	10	0		4	5	1	0		1	13	2	0		38	160
4:30 PM	0	0	0	0		3	0	11	0		15	3	0	0		0	9	0	0		41	171
4:45 PM	2	0	0	0		5	0	11	0		6	9	0	0		2	8	1	0		44	170
5:00 PM	1	0	0	0		0	0	6	0		6	16	0	0		0	5	3	0		37	183
5:15 PM	1	0	0	0		4	0	9	0		7	11	0	0		1	14	2	0		49	146
5:30 PM	2	0	0	0		3	0	8	0		8	9	0	0		0	6	4	0		40	97
5:45 PM	2	0	0	0		4	0	14	0		6	9	0	0		2	13	7	0		57	57
Peak 15-Min Flowrates	**Northbound**					**Southbound**					**Eastbound**					**Westbound**					**Total**	
	Left	Thru	Rgt	U	R*	Left	Thru	Rgt	U	R*	Left	Thru	Rgt	U	R*	Left	Thru	Rgt	U	R*		
All Vehicles	8	0	0	0		16	0	56	0		32	64	0	0		8	56	28	0		**268**	
Heavy Trucks	0	0	0	0		0	0	4	0		4	8	0	0		0	0	0	0		**16**	
Pedestrians		20					24					8					16				**68**	
Bicycles	0	0	4	0		4	0	8	0		12	4	0	0		0	4	8	0		**44**	
Buses																					**0**	
Stopped Buses																						

2025 PEAK SEASON FACTOR CATEGORY REPORT - REPORT TYPE: ALL
CATEGORY: 8700 MIAMI-DADE NORTH

MOCF: 0.97

WEEK	DATES	SF	PSCF
1	01/01/2025 - 01/04/2025	1.10	1.13
2	01/05/2025 - 01/11/2025	1.06	1.09
3	01/12/2025 - 01/18/2025	1.01	1.04
4	01/19/2025 - 01/25/2025	1.00	1.03
5	01/26/2025 - 02/01/2025	0.99	1.02
6	02/02/2025 - 02/08/2025	0.98	1.01
7	02/09/2025 - 02/15/2025	0.98	1.01
8	02/16/2025 - 02/22/2025	0.97	1.00
9	02/23/2025 - 03/01/2025	0.97	1.00
*10	03/02/2025 - 03/08/2025	0.97	1.00
*11	03/09/2025 - 03/15/2025	0.97	1.00
*12	03/16/2025 - 03/22/2025	0.97	1.00
*13	03/23/2025 - 03/29/2025	0.97	1.00
*14	03/30/2025 - 04/05/2025	0.97	1.00
*15	04/06/2025 - 04/12/2025	0.97	1.00
*16	04/13/2025 - 04/19/2025	0.97	1.00
*17	04/20/2025 - 04/26/2025	0.97	1.00
*18	04/27/2025 - 05/03/2025	0.97	1.00
*19	05/04/2025 - 05/10/2025	0.97	1.00
*20	05/11/2025 - 05/17/2025	0.97	1.00
*21	05/18/2025 - 05/24/2025	0.97	1.00
*22	05/25/2025 - 05/31/2025	0.97	1.00
23	06/01/2025 - 06/07/2025	0.98	1.01
24	06/08/2025 - 06/14/2025	0.98	1.01
25	06/15/2025 - 06/21/2025	0.98	1.01
26	06/22/2025 - 06/28/2025	0.99	1.02
27	06/29/2025 - 07/05/2025	1.00	1.03
28	07/06/2025 - 07/12/2025	1.01	1.04
29	07/13/2025 - 07/19/2025	1.02	1.05
30	07/20/2025 - 07/26/2025	1.01	1.04
31	07/27/2025 - 08/02/2025	1.01	1.04
32	08/03/2025 - 08/09/2025	1.01	1.04
33	08/10/2025 - 08/16/2025	1.01	1.04
34	08/17/2025 - 08/23/2025	1.01	1.04
35	08/24/2025 - 08/30/2025	1.01	1.04
36	08/31/2025 - 09/06/2025	1.01	1.04
37	09/07/2025 - 09/13/2025	1.01	1.04
38	09/14/2025 - 09/20/2025	1.02	1.05
39	09/21/2025 - 09/27/2025	1.01	1.04
40	09/28/2025 - 10/04/2025	1.01	1.04
41	10/05/2025 - 10/11/2025	1.01	1.04
42	10/12/2025 - 10/18/2025	1.01	1.04
43	10/19/2025 - 10/25/2025	1.02	1.05
44	10/26/2025 - 11/01/2025	1.03	1.06
45	11/02/2025 - 11/08/2025	1.04	1.07
46	11/09/2025 - 11/15/2025	1.05	1.08
47	11/16/2025 - 11/22/2025	1.06	1.09
48	11/23/2025 - 11/29/2025	1.07	1.10
49	11/30/2025 - 12/06/2025	1.08	1.11
50	12/07/2025 - 12/13/2025	1.09	1.12
51	12/14/2025 - 12/20/2025	1.10	1.13
52	12/21/2025 - 12/27/2025	1.06	1.09
53	12/28/2025 - 12/31/2025	1.01	1.04

* PEAK SEASON

GROWTH RATE CALCULATION

THE BARCLAY - 1940 PARK AVENUE

Roadway	FDOT Site	10-Year Linear Trend	10-Year Exponential Trend	10-Year Decaying Exponential Trend
VENETIAN CSWY, 200' EAST OF WEST AVENUE	878350	-3.17%	-3.67%	-3.52%
17TH ST, 200' EAST OF MERIDIAN AVE (2011 OFF SYSTEM CYCLE)	878531	-1.90%	-2.11%	-1.84%
WASHINGTON AVE, 200 FT N OF 12 ST (2011 OFF SYSTEM CYCLE)	878414	-3.49%	-4.29%	-3.32%
SR A1A/COLLINS AV, N OF 21 ST (MIAMI BEACH)	875170	-3.12%	-3.56%	-3.38%
23 ST, 200 FT W OF LIBERTY AVE (2011 OFF SYSTEM CYCLE)	878422	-1.36%	-1.48%	-0.83%
PINE TREE DR, 200' SOUTH OF 37 ST (2011 OFF SYSTEM CYCLE)	878600	2.24%	1.79%	1.36%
Average Annual Growth Rate		**-1.80%**	**-2.22%**	**-1.92%**

Table 3b - 2015 to 2045 SERPM Traffic Volumes Growth

Roadway	2015	2045
COLLINS AVENUE, BETWEEN 30TH AND 35TH ST	21,230	30,400
COLLINS AVENUE, JUST NORTH OF 5TH ST	14,478	17,700
DADE BOULEVARD, JUST WEST OF WASHINGTON AVENUE	12,411	16,000
PINE TREE DRIVE, JUST NORTH OF W 24TH STREET	19,607	18,400
ALTON ROAD, JUST NORTH OF 14TH STREET	38,886	42,800
Total	106,612	125,300
Annual Growth Rate	**0.54%**	

LANGAN
ENGINEERING & ENVIRONMENTAL SERVICES

FLORIDA DEPARTMENT OF TRANSPORTATION
TRANSPORTATION STATISTICS OFFICE
2024 HISTORICAL AADT REPORT

COUNTY: 87 - MIAMI-DADE

SITE: 8350 - VENETIAN CSWY, 200' EAST OF WEST AVENUE

YEAR	AADT	DIRECTION 1	DIRECTION 2	*K FACTOR	D FACTOR	T FACTOR
2024	11000 C	E 5200	W 5800	9.00	54.90	3.90
2023	10800 C	E 5200	W 5600	9.00	55.10	2.40
2022	9700 C	E 3100	W 6600	9.00	54.70	2.20
2021	12000 C	E 5600	W 6400	9.00	54.30	1.90
2020	11600 C	E 5200	W 6400	9.00	54.20	1.60
2019	14000 C	E 6900	W 7100	9.00	54.60	2.90
2018	12400 C	E 5900	W 6500	9.00	54.30	2.60
2017	13300 F	E 6600	W 6700	9.00	55.00	2.40
2016	12900 C	E 6400	W 6500	9.00	54.50	2.40
2015	14400 C	E 6200	W 8200	9.00	54.70	12.80
2014	5100 F	E 2100	W 3000	9.00	54.50	11.70
2013	5100 C	E 2100	W 3000	9.00	52.40	16.20
2012	5400 F	E 2500	W 2900	9.00	55.70	16.00
2011	5400 C	E 2500	W 2900	9.00	55.10	14.70

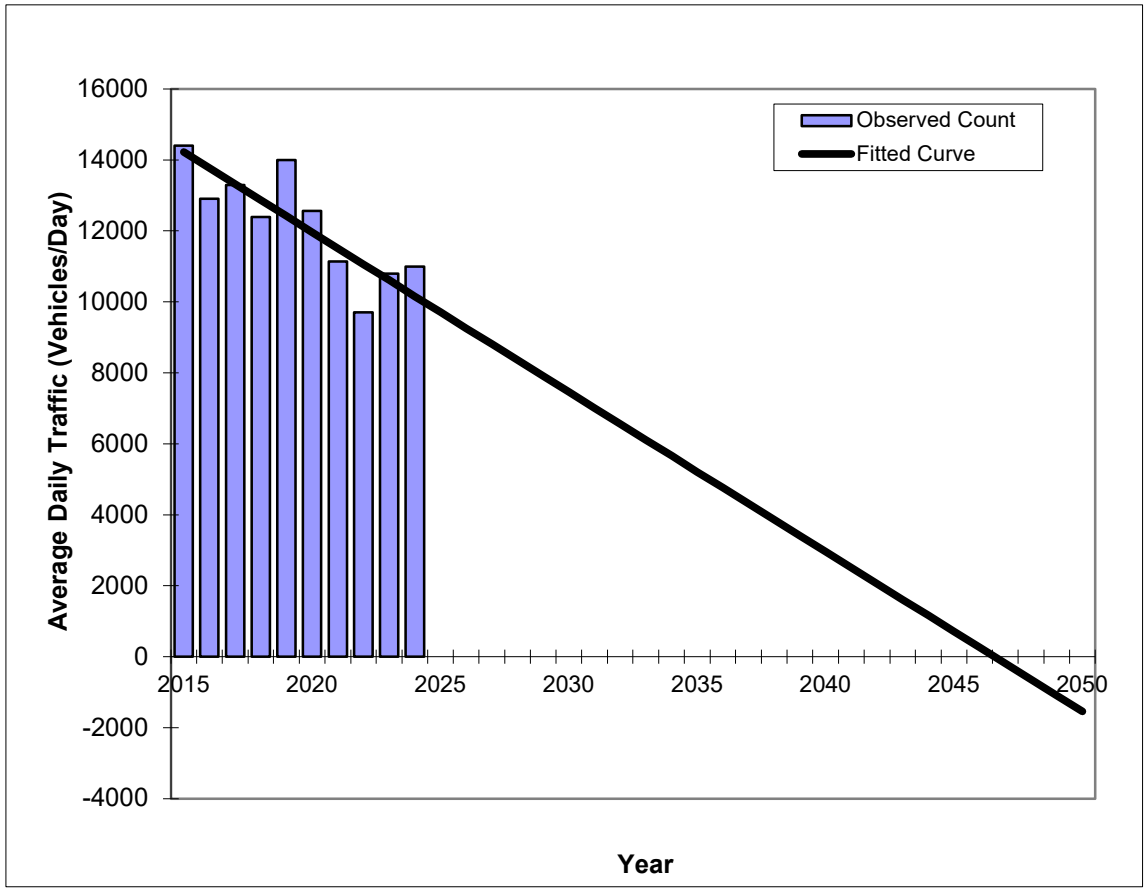
AADT FLAGS: C = COMPUTED; E = MANUAL ESTIMATE; F = FIRST YEAR ESTIMATE
S = SECOND YEAR ESTIMATE; T = THIRD YEAR ESTIMATE; R = FOURTH YEAR ESTIMATE
V = FIFTH YEAR ESTIMATE; 6 = SIXTH YEAR ESTIMATE; X = UNKNOWN
*K FACTOR: STARTING WITH YEAR 2011 IS STANDARDK, PRIOR YEARS ARE K30 VALUES

Traffic Trends - V2023

-- VENETIAN CSWY, 200' EAST OF WEST AVENUE

FM #	**1234**
Location	**1**

County:	Miami-Dade (87)
Station #:	878350
Roadway:	



Year	Traffic (ADT/AADT) Count*	Trend
2015	14,400	14,220
2016	12,900	13,770
2017	13,300	13,320
2018	12,400	12,870
2019	14,000	12,420
2020	12,567	11,960
2021	11,133	11,510
2022	9,700	11,060
2023	10,800	10,610
2024	11,000	10,160
2029 Opening Year Trend		
2029	N/A	7,910
2040 Interim Year Trend		
2040	N/A	2,960
2050 Design Year Trend		
2050	N/A	-1,540
FSUTMS Forecasts/Trends		

*Axle-Adjusted

Annual Trend Decrease:	450
Trend R-squared:	81.17%
Trend Annual Historic Growth Rate:	-3.17%
Trend Growth Rate (2024 to Design Year)	-4.43%
Printed:	3/27/2026

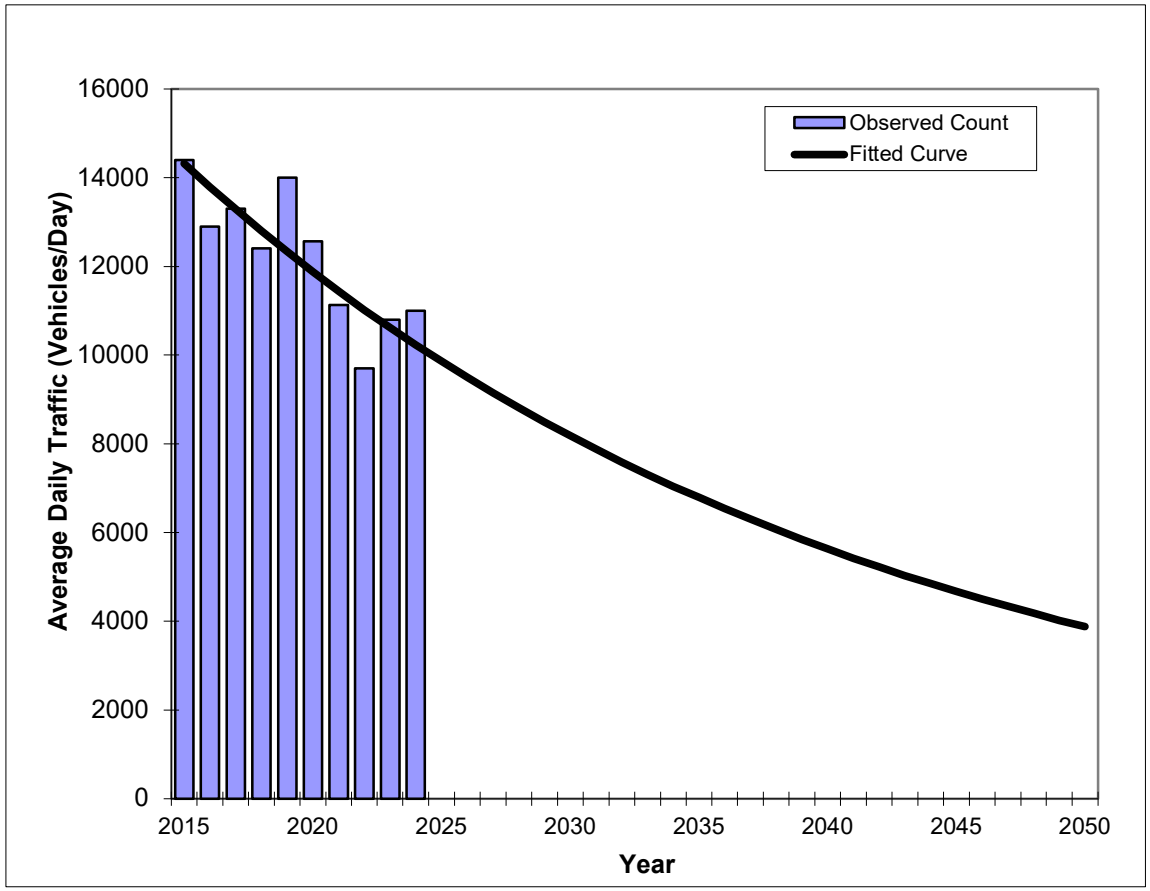
Linear Growth Option

Traffic Trends - V2023

-- VENETIAN CSWY, 200' EAST OF WEST AVENUE

FM #	**1234**
Location	**1**

County:	Miami-Dade (87)
Station #:	878350
Roadway:	



Year	Traffic (ADT/AADT) Count*	Trend
2015	14,400	14,320
2016	12,900	13,790
2017	13,300	13,290
2018	12,400	12,800
2019	14,000	12,330
2020	12,567	11,880
2021	11,133	11,440
2022	9,700	11,020
2023	10,800	10,620
2024	11,000	10,230
2029 Opening Year Trend		
2029	N/A	8,490
2040 Interim Year Trend		
2040	N/A	5,630
2050 Design Year Trend		
2050	N/A	3,880
FSUTMS Forecasts/Trends		

*Axle-Adjusted

Trend R-squared:	78.62%
Compounded Annual Historic Growth Rate:	-3.67%
Compounded Growth Rate (2024 to Design Year)	-3.66%
Printed:	3/27/2026

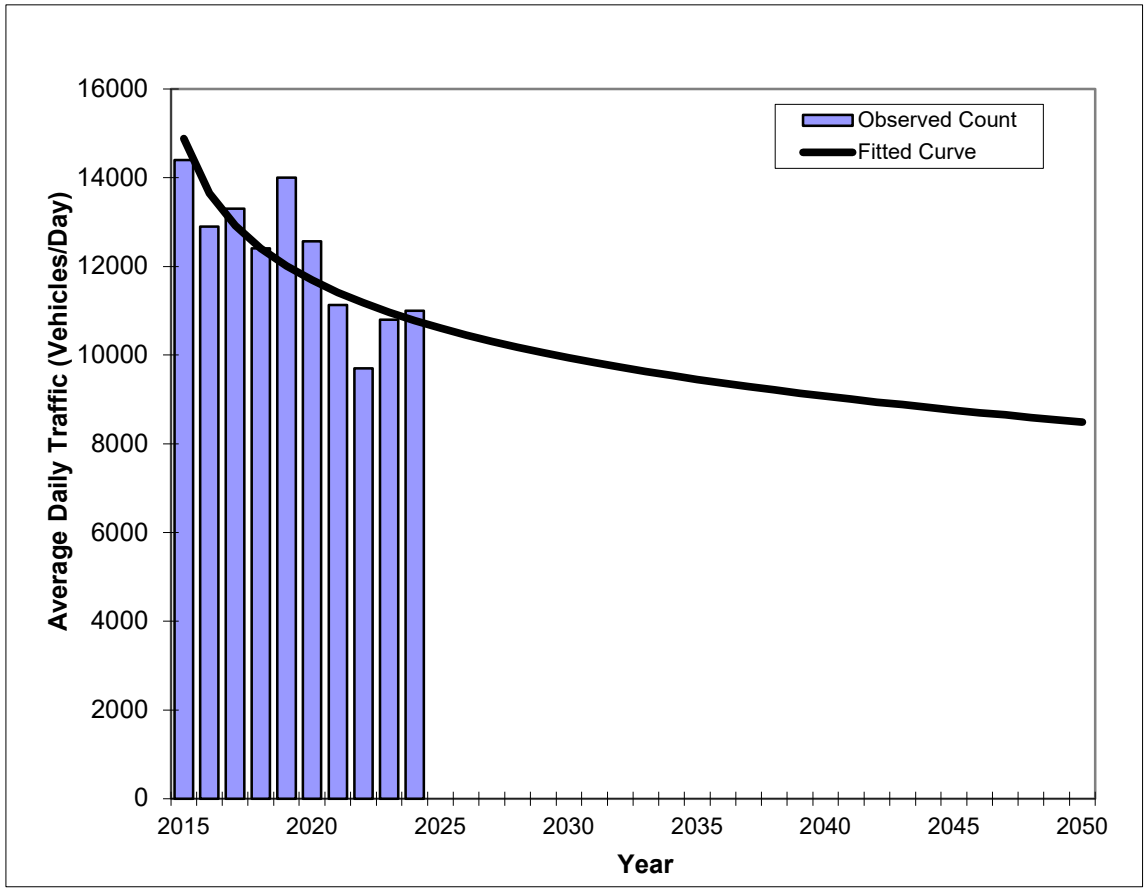
Exponential Growth Option

Traffic Trends - V2023

-- VENETIAN CSWY, 200' EAST OF WEST AVENUE

FM #	**1234**
Location	**1**

County:	Miami-Dade (87)
Station #:	878350
Roadway:	



Trend R-squared:	74.66%
Compounded Annual Historic Growth Rate:	-3.52%
Compounded Growth Rate (2024 to Design Year)	-0.91%
Printed:	3/27/2026

Decaying Exponential Growth Option

Year	Traffic (ADT/AADT) Count*	Trend
2015	14,400	14,880
2016	12,900	13,650
2017	13,300	12,920
2018	12,400	12,410
2019	14,000	12,010
2020	12,567	11,690
2021	11,133	11,410
2022	9,700	11,180
2023	10,800	10,960
2024	11,000	10,780
2029 Opening Year Trend		
2029	N/A	10,050
2040 Interim Year Trend		
2040	N/A	9,070
2050 Design Year Trend		
2050	N/A	8,490
FSUTMS Forecasts/Trends		

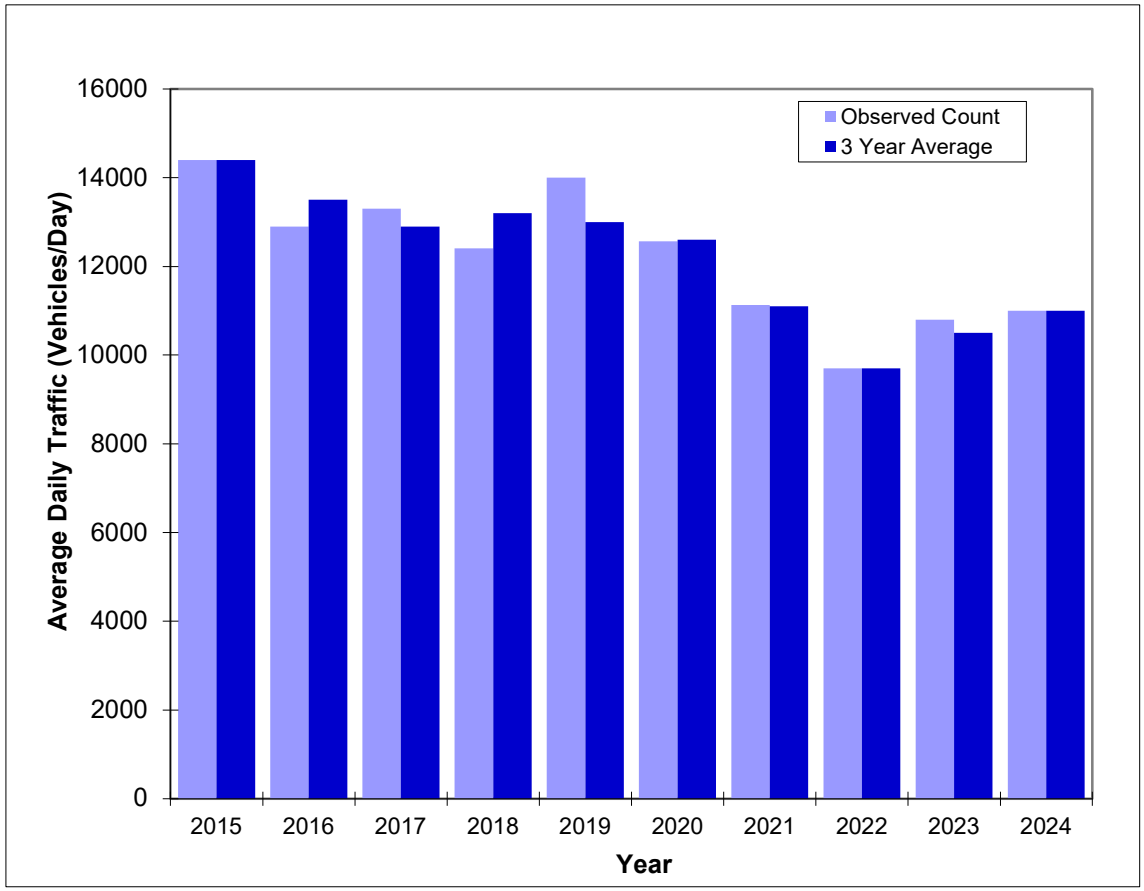
***Axle-Adjusted**

Traffic Trends - V2023

-- VENETIAN CSWY, 200' EAST OF WEST AVENUE

FM #	**1234**
Location	**1**

County:	Miami-Dade (87)
Station #:	878350
Roadway:	



Actual AADT vs 3 Year Average

Year	Traffic (ADT/AADT) Count*	3 Yr Avg
2015	14,400	14,400
2016	12,900	13,500
2017	13,300	12,900
2018	12,400	13,200
2019	14,000	13,000
2020	12,567	12,600
2021	11,133	11,100
2022	9,700	9,700
2023	10,800	10,500
2024	11,000	11,000

***Axle-Adjusted**

FLORIDA DEPARTMENT OF TRANSPORTATION
TRANSPORTATION STATISTICS OFFICE
2024 HISTORICAL AADT REPORT

COUNTY: 87 - MIAMI-DADE

SITE: 8531 - 17TH ST, 200' EAST OFMERIDIAN AVE (2011 OFF SYSTEM CYCLE)

YEAR	AADT	DIRECTION 1	DIRECTION 2	*K FACTOR	D FACTOR	T FACTOR
2024	15400 F	E 8300	W 7100	9.00	52.70	3.80
2023	15600 C	E 8400	W 7200	9.00	63.10	3.70
2022	16900 T	E 8500	W 8400	9.00	56.50	3.50
2021	16500 S	E 8300	W 8200	9.00	55.00	2.90
2020	17300 F	E 8700	W 8600	9.00	56.00	4.40
2019	19400 C	E 9800	W 9600	9.00	56.00	4.00
2018	16800 T	E 7400	W 9400	9.00	54.30	3.00
2017	18800 S	E 8300	W 10500	9.00	59.30	2.50
2016	18900 F	E 8400	W 10500	9.00	56.10	5.10
2015	19000 C	E 8500	W 10500	9.00	57.40	7.10
2014	18700 S	E 9600	W 9100	9.00	59.30	10.70
2013	18900 F	E 9700	W 9200	9.00	58.90	16.20
2012	19000 C	E 9800	W 9200	9.00	59.70	16.00

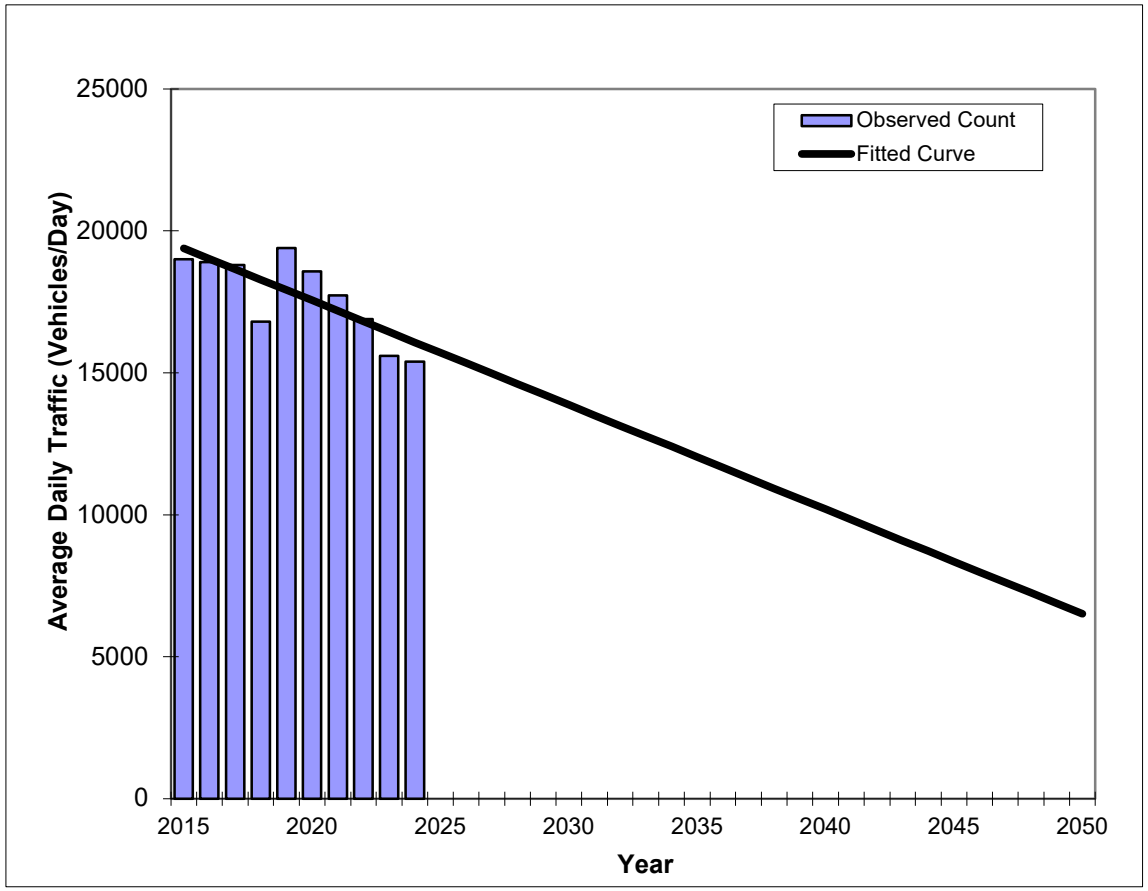
AADT FLAGS: C = COMPUTED; E = MANUAL ESTIMATE; F = FIRST YEAR ESTIMATE
S = SECOND YEAR ESTIMATE; T = THIRD YEAR ESTIMATE; R = FOURTH YEAR ESTIMATE
V = FIFTH YEAR ESTIMATE; 6 = SIXTH YEAR ESTIMATE; X = UNKNOWN
*K FACTOR: STARTING WITH YEAR 2011 IS STANDARDK, PRIOR YEARS ARE K30 VALUES

Traffic Trends - V2023

-- 17TH ST, 200' EAST OFMERIDIAN AVE (2011 OFF SYSTEM CYCLE)

FM #	**1234**
Location	**1**

County:	Miami-Dade (87)
Station #:	878531
Roadway:	



Annual Trend Decrease:	368
Trend R-squared:	81.37%
Trend Annual Historic Growth Rate:	-1.90%
Trend Growth Rate (2024 to Design Year)	-2.29%
Printed:	3/27/2026

Linear Growth Option

Year	Traffic (ADT/AADT) Count*	Trend
2015	19,000	19,390
2016	18,900	19,020
2017	18,800	18,650
2018	16,800	18,280
2019	19,400	17,910
2020	18,567	17,550
2021	17,733	17,180
2022	16,900	16,810
2023	15,600	16,440
2024	15,400	16,070
2029 Opening Year Trend		
2029	N/A	14,240
2040 Interim Year Trend		
2040	N/A	10,190
2050 Design Year Trend		
2050	N/A	6,510
FSUTMS Forecasts/Trends		

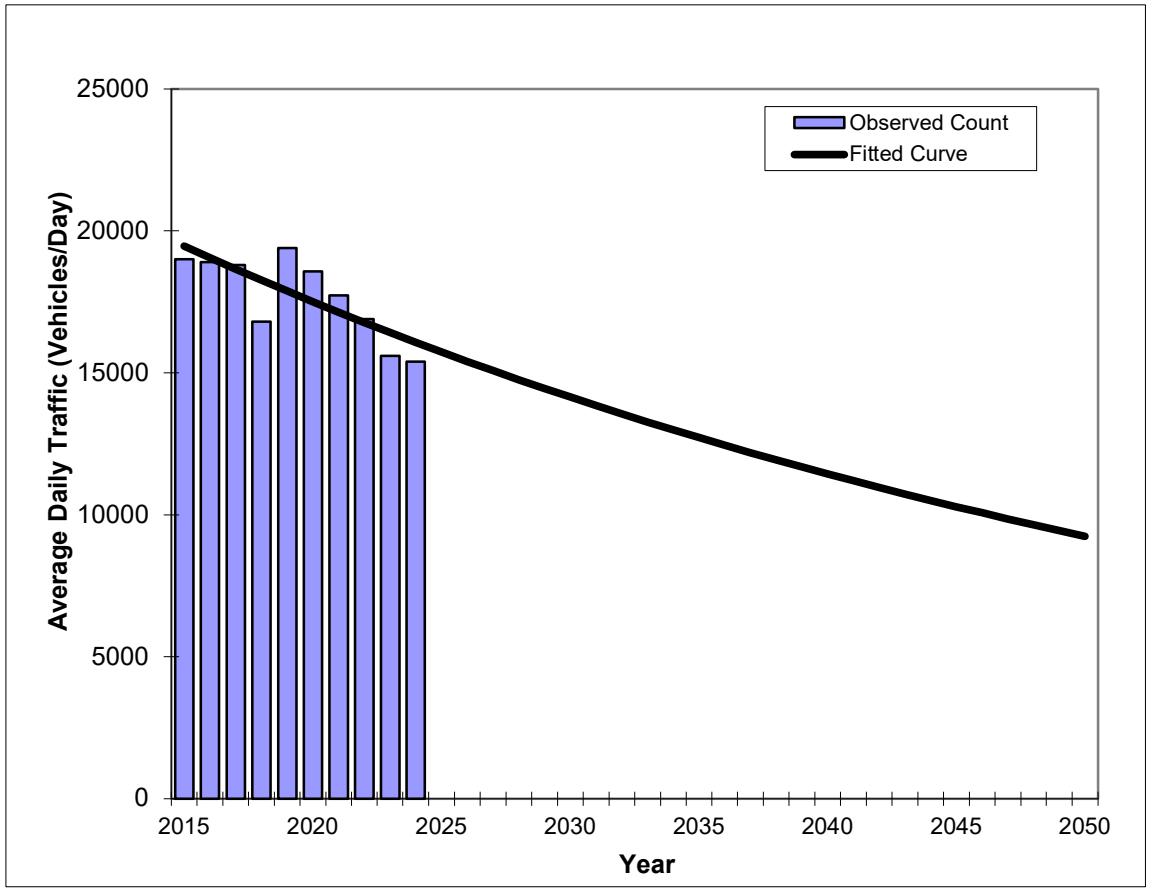
***Axle-Adjusted**

Traffic Trends - V2023

-- 17TH ST, 200' EAST OFMERIDIAN AVE (2011 OFF SYSTEM CYCLE)

FM #	**1234**
Location	**1**

County:	Miami-Dade (87)
Station #:	878531
Roadway:	



Trend R-squared:	80.34%
Compounded Annual Historic Growth Rate:	-2.11%
Compounded Growth Rate (2024 to Design Year)	-2.11%
Printed:	3/27/2026

Exponential Growth Option

Year	Traffic (ADT/AADT) Count*	Trend
2015	19,000	19,470
2016	18,900	19,060
2017	18,800	18,660
2018	16,800	18,260
2019	19,400	17,880
2020	18,567	17,500
2021	17,733	17,130
2022	16,900	16,770
2023	15,600	16,420
2024	15,400	16,070
2029 Opening Year Trend		
2029	N/A	14,450
2040 Interim Year Trend		
2040	N/A	11,440
2050 Design Year Trend		
2050	N/A	9,240
FSUTMS Forecasts/Trends		

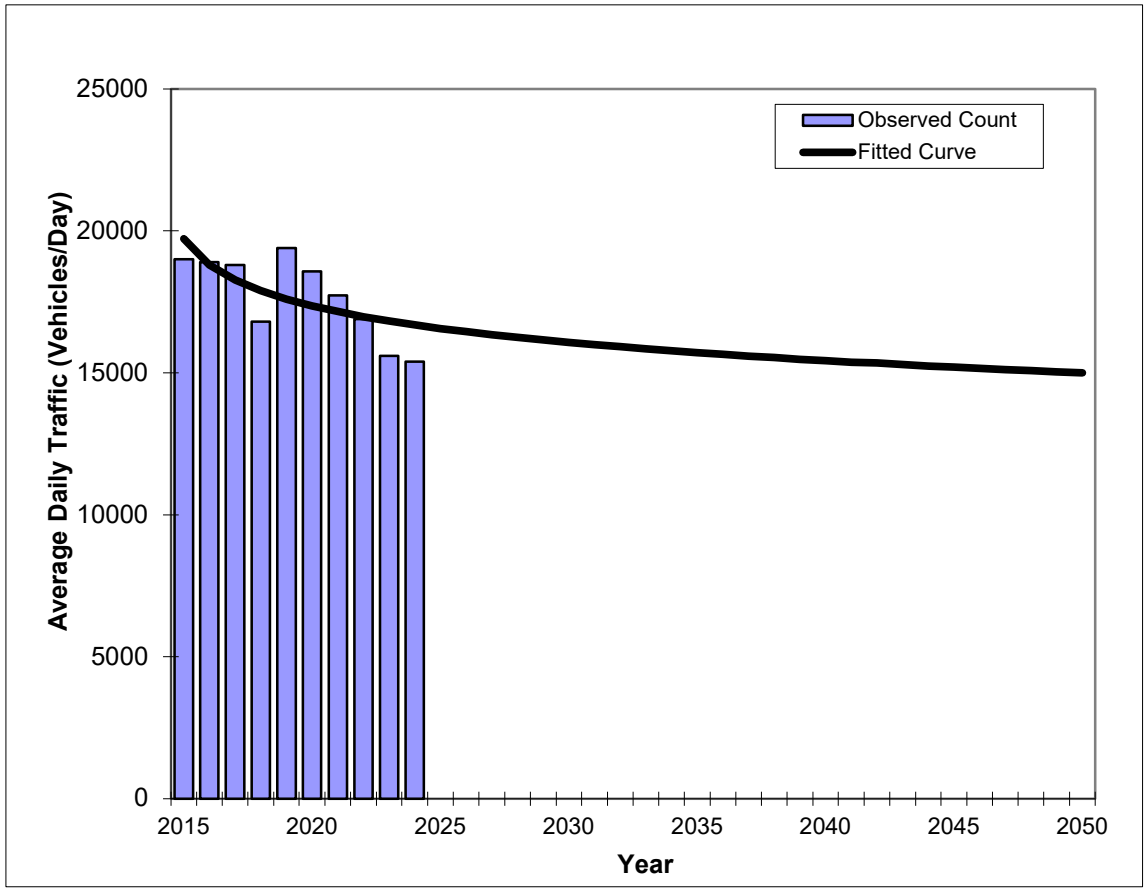
***Axle-Adjusted**

Traffic Trends - V2023

-- 17TH ST, 200' EAST OFMERIDIAN AVE (2011 OFF SYSTEM CYCLE)

FM #	**1234**
Location	**1**

County:	Miami-Dade (87)
Station #:	878531
Roadway:	



Year	Traffic (ADT/AADT) Count*	Trend
2015	19,000	19,720
2016	18,900	18,800
2017	18,800	18,270
2018	16,800	17,890
2019	19,400	17,600
2020	18,567	17,360
2021	17,733	17,160
2022	16,900	16,980
2023	15,600	16,830
2024	15,400	16,690
2029 Opening Year Trend		
2029	N/A	16,160
2040 Interim Year Trend		
2040	N/A	15,430
2050 Design Year Trend		
2050	N/A	15,000
FSUTMS Forecasts/Trends		

Trend R-squared:	60.90%
Compounded Annual Historic Growth Rate:	-1.84%
Compounded Growth Rate (2024 to Design Year)	-0.41%
Printed:	3/27/2026

Decaying Exponential Growth Option

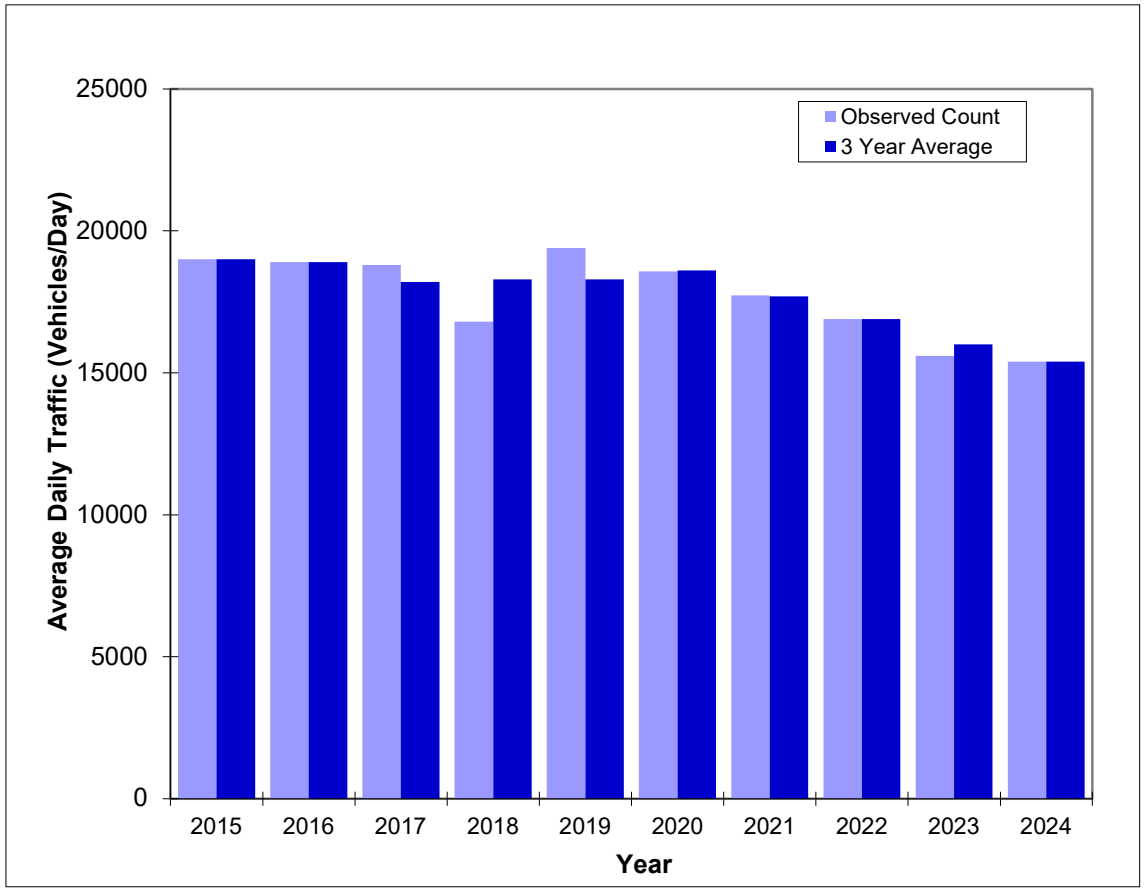
***Axle-Adjusted**

Traffic Trends - V2023

-- 17TH ST, 200' EAST OFMERIDIAN AVE (2011 OFF SYSTEM CYCLE)

FM #	**1234**
Location	**1**

County:	Miami-Dade (87)
Station #:	878531
Roadway:	



Actual AADT vs 3 Year Average

Year	Traffic (ADT/AADT) Count*	3 Yr Avg
2015	19,000	19,000
2016	18,900	18,900
2017	18,800	18,200
2018	16,800	18,300
2019	19,400	18,300
2020	18,567	18,600
2021	17,733	17,700
2022	16,900	16,900
2023	15,600	16,000
2024	15,400	15,400

***Axle-Adjusted**

FLORIDA DEPARTMENT OF TRANSPORTATION
TRANSPORTATION STATISTICS OFFICE
2024 HISTORICAL AADT REPORT

COUNTY: 87 - MIAMI-DADE

SITE: 8414 - WASHINGTON AVE, 200 FT N OF 12 ST (2011 OFF SYSTEM CYCLE)

YEAR	AADT	DIRECTION 1	DIRECTION 2	*K FACTOR	D FACTOR	T FACTOR
2024	14600 C	N 7000	S 7600	9.00	52.70	3.60
2023	15400 C	N 7000	S 8400	9.00	63.10	4.30
2022	15100 C	N 7000	S 8100	9.00	56.50	4.20
2021	14200 C	N 6500	S 7700	9.00	55.00	3.30
2020	14100 C	N 7100	S 7000	9.00	56.00	10.70
2019	23000 C	N 11000	S 12000	9.00	56.00	2.40
2018	20400 C	N 11500	S 8900	9.00	54.30	2.50
2017	20200 C	N 9200	S 11000	9.00	59.30	2.40
2016	20800 C	N 9800	S 11000	9.00	56.10	1.90
2015	20300 C	N 9800	S 10500	9.00	57.40	17.50
2014	21000 C	N 10000	S 11000	9.00	59.30	13.90
2013	18700 F	N 9200	S 9500	9.00	58.90	16.20
2012	18700 C	N 9200	S 9500	9.00	59.70	16.00

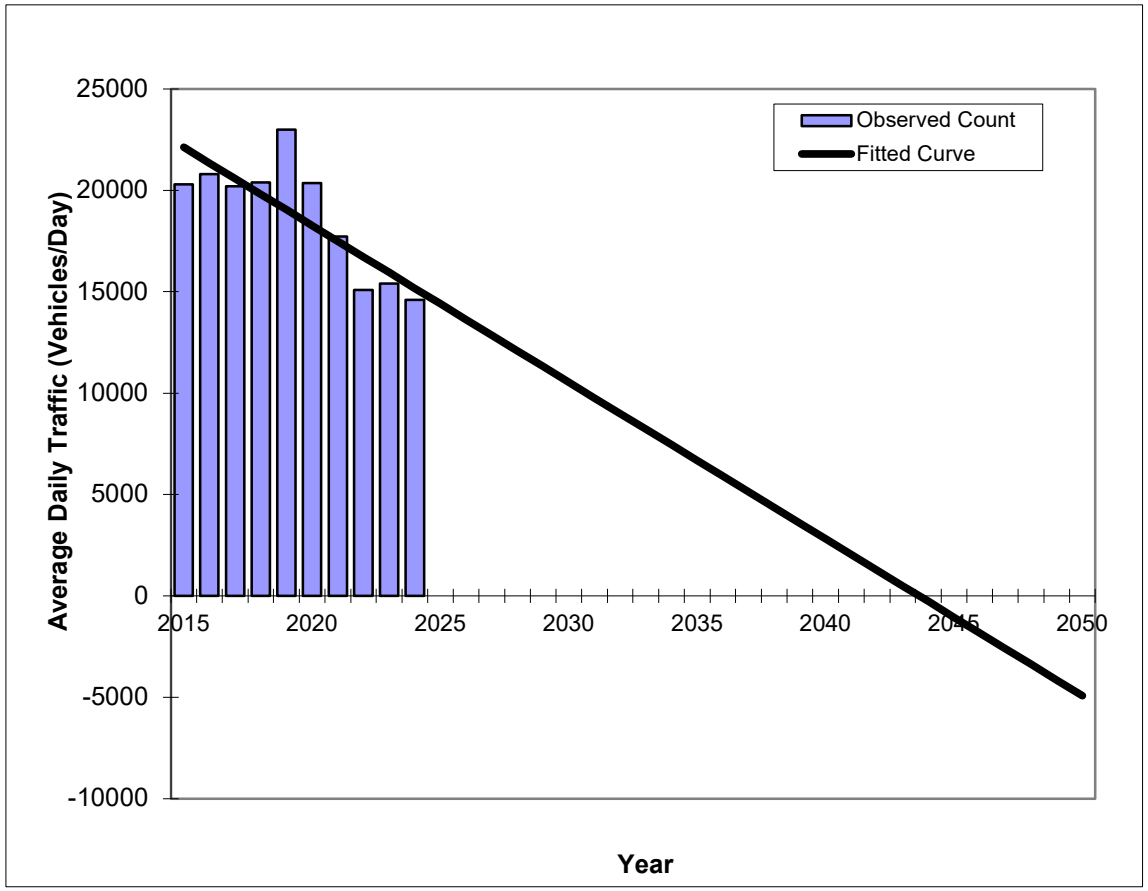
AADT FLAGS: C = COMPUTED; E = MANUAL ESTIMATE; F = FIRST YEAR ESTIMATE
S = SECOND YEAR ESTIMATE; T = THIRD YEAR ESTIMATE; R = FOURTH YEAR ESTIMATE
V = FIFTH YEAR ESTIMATE; 6 = SIXTH YEAR ESTIMATE; X = UNKNOWN
*K FACTOR: STARTING WITH YEAR 2011 IS STANDARDK, PRIOR YEARS ARE K30 VALUES

Traffic Trends - V2023

-- WASHINGTON AVE, 200 FT N OF 12 ST (2011 OFF SYSTEM CYCLE)

FM #	**1234**
Location	**1**

County:	Miami-Dade (87)
Station #:	878414
Roadway:	



Year	Traffic (ADT/AADT) Count*	Trend
2015	20,300	22,130
2016	20,800	21,350
2017	20,200	20,580
2018	20,400	19,810
2019	23,000	19,040
2020	20,367	18,260
2021	17,733	17,490
2022	15,100	16,720
2023	15,400	15,950
2024	14,600	15,170
2029 Opening Year Trend		
2029	N/A	11,310
2040 Interim Year Trend		
2040	N/A	2,810
2050 Design Year Trend		
2050	N/A	-4,920
FSUTMS Forecasts/Trends		

Annual Trend Decrease:	773
Trend R-squared:	71.37%
Trend Annual Historic Growth Rate:	-3.49%
Trend Growth Rate (2024 to Design Year)	-5.09%
Printed:	3/27/2026

Linear Growth Option

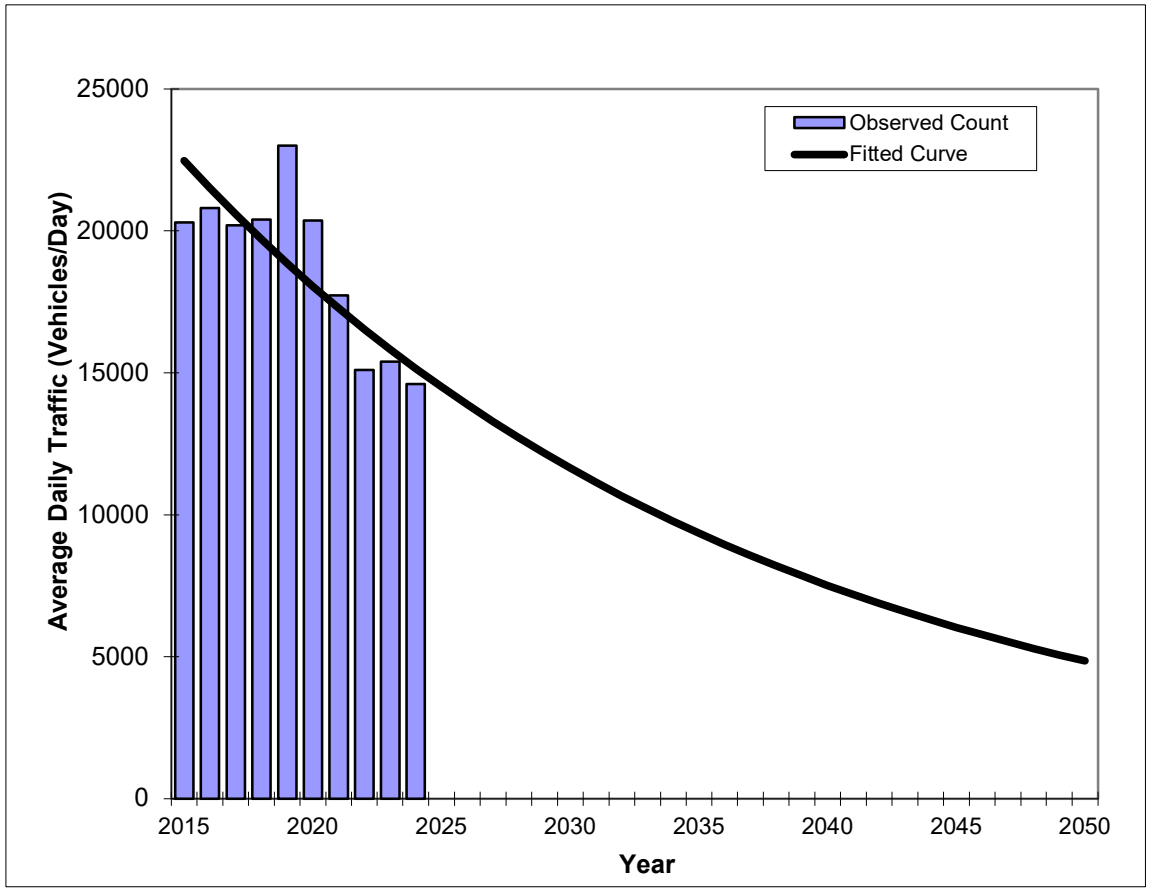
***Axle-Adjusted**

Traffic Trends - V2023

-- WASHINGTON AVE, 200 FT N OF 12 ST (2011 OFF SYSTEM CYCLE)

FM #	**1234**
Location	**1**

County:	Miami-Dade (87)
Station #:	878414
Roadway:	



Trend R-squared:	72.09%
Compounded Annual Historic Growth Rate:	-4.29%
Compounded Growth Rate (2024 to Design Year)	-4.29%
Printed:	3/27/2026

Exponential Growth Option

Year	Traffic (ADT/AADT) Count*	Trend
2015	20,300	22,480
2016	20,800	21,510
2017	20,200	20,590
2018	20,400	19,710
2019	23,000	18,860
2020	20,367	18,050
2021	17,733	17,280
2022	15,100	16,540
2023	15,400	15,830
2024	14,600	15,150
2029 Opening Year Trend		
2029	N/A	12,170
2040 Interim Year Trend		
2040	N/A	7,510
2050 Design Year Trend		
2050	N/A	4,850
FSUTMS Forecasts/Trends		

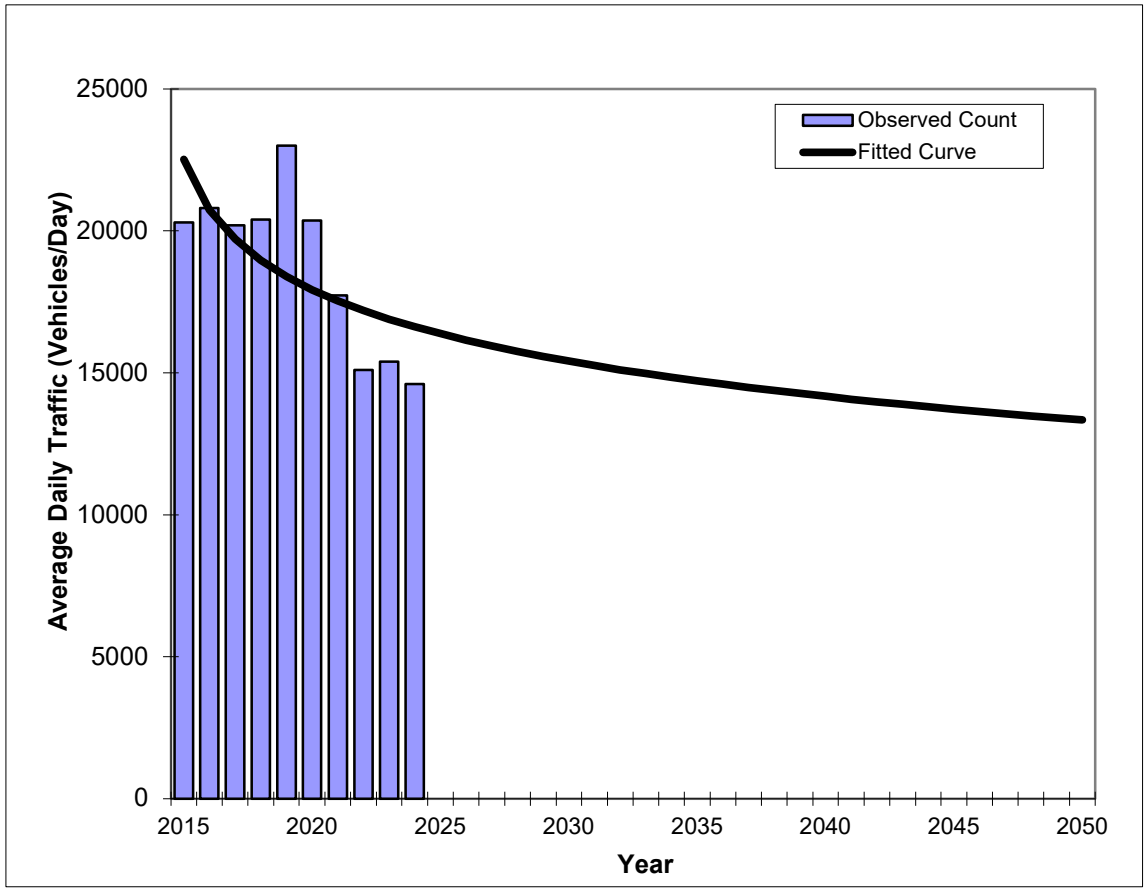
***Axle-Adjusted**

Traffic Trends - V2023

-- WASHINGTON AVE, 200 FT N OF 12 ST (2011 OFF SYSTEM CYCLE)

FM #	**1234**
Location	**1**

County:	Miami-Dade (87)
Station #:	878414
Roadway:	



Year	Traffic (ADT/AADT) Count*	Trend
2015	20,300	22,520
2016	20,800	20,740
2017	20,200	19,710
2018	20,400	18,970
2019	23,000	18,400
2020	20,367	17,930
2021	17,733	17,530
2022	15,100	17,190
2023	15,400	16,890
2024	14,600	16,620
2029 Opening Year Trend		
2029	N/A	15,580
2040 Interim Year Trend		
2040	N/A	14,170
2050 Design Year Trend		
2050	N/A	13,340
FSUTMS Forecasts/Trends		

Trend R-squared:	46.03%
Compounded Annual Historic Growth Rate:	-3.32%
Compounded Growth Rate (2024 to Design Year)	-0.84%
Printed:	3/27/2026

Decaying Exponential Growth Option

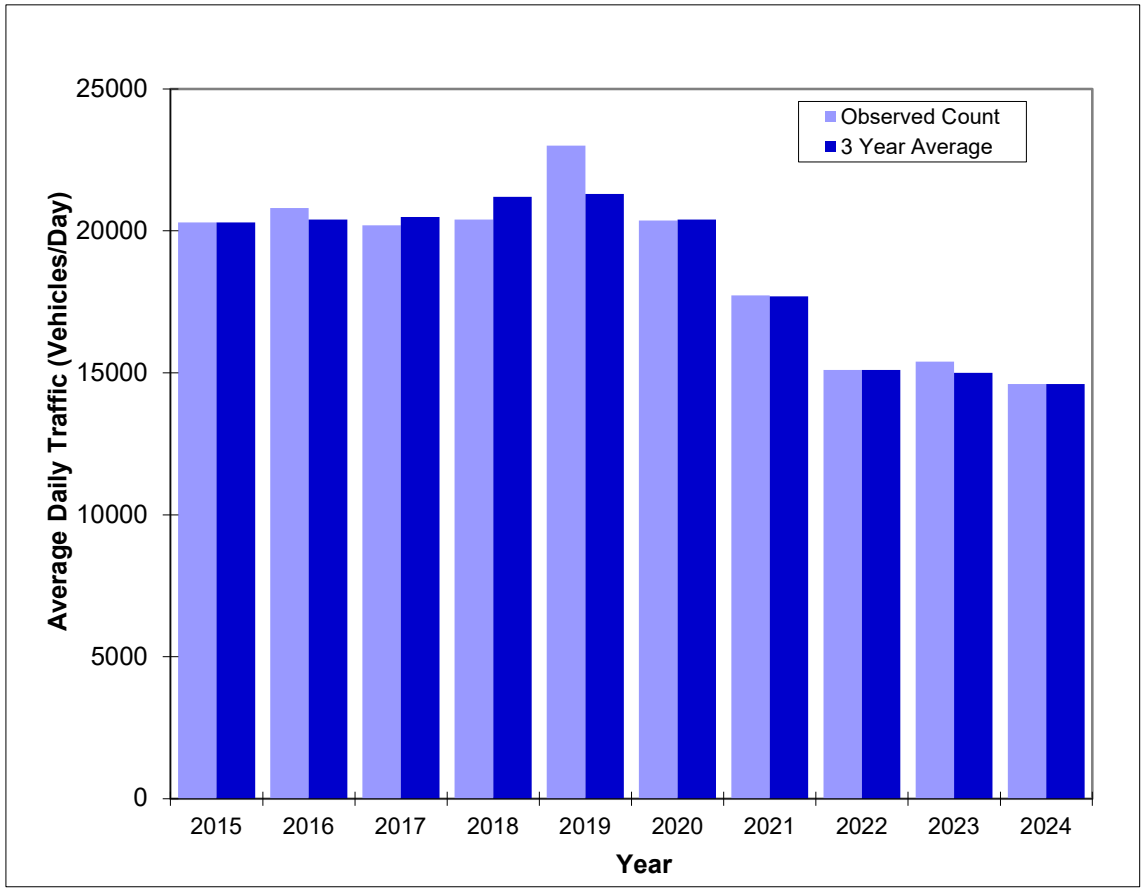
***Axle-Adjusted**

Traffic Trends - V2023

-- WASHINGTON AVE, 200 FT N OF 12 ST (2011 OFF SYSTEM CYCLE)

FM #	**1234**
Location	**1**

County:	Miami-Dade (87)
Station #:	878414
Roadway:	



Actual AADT vs 3 Year Average

Year	Traffic (ADT/AADT) Count*	3 Yr Avg
2015	20,300	20,300
2016	20,800	20,400
2017	20,200	20,500
2018	20,400	21,200
2019	23,000	21,300
2020	20,367	20,400
2021	17,733	17,700
2022	15,100	15,100
2023	15,400	15,000
2024	14,600	14,600

***Axle-Adjusted**

FLORIDA DEPARTMENT OF TRANSPORTATION
TRANSPORTATION STATISTICS OFFICE
2024 HISTORICAL AADT REPORT

COUNTY: 87 - MIAMI-DADE

SITE: 5170 - SR A1A/COLLINS AV, N OF 21 ST (MIAMI BEACH)

YEAR	AADT	DIRECTION 1	DIRECTION 2	*K FACTOR	D FACTOR	T FACTOR
2024	21300 C	N 9800	S 11500	9.00	54.90	22.60
2023	21000 C	N 10000	S 11000	9.00	55.10	25.20
2022	19500 C	N 9000	S 10500	9.00	54.70	6.20
2021	18400 C	N 9300	S 9100	9.00	54.30	8.40
2020	10400 C	N 5200	S 5200	9.00	54.20	31.10
2019	23500 C	N 12000	S 11500	9.00	54.60	10.00
2018	27500 C	N 13000	S 14500	9.00	54.30	7.90
2017	26500 C	N 13000	S 13500	9.00	55.00	6.60
2016	26000 C	N 13500	S 12500	9.00	54.50	20.20
2015	26500 C	N 12500	S 14000	9.00	54.70	4.20
2014	27000 C	N 12500	S 14500	9.00	54.50	4.10
2013	22500 C	N 10500	S 12000	9.00	52.40	9.00
2012	25000 C	N 12000	S 13000	9.00	55.70	4.30
2011	26500 C	N 13500	S 13000	9.00	55.10	2.80
2010	25000 C	N 12500	S 12500	8.98	54.08	2.80
2009	26500 C	N 13000	S 13500	8.99	53.24	2.70

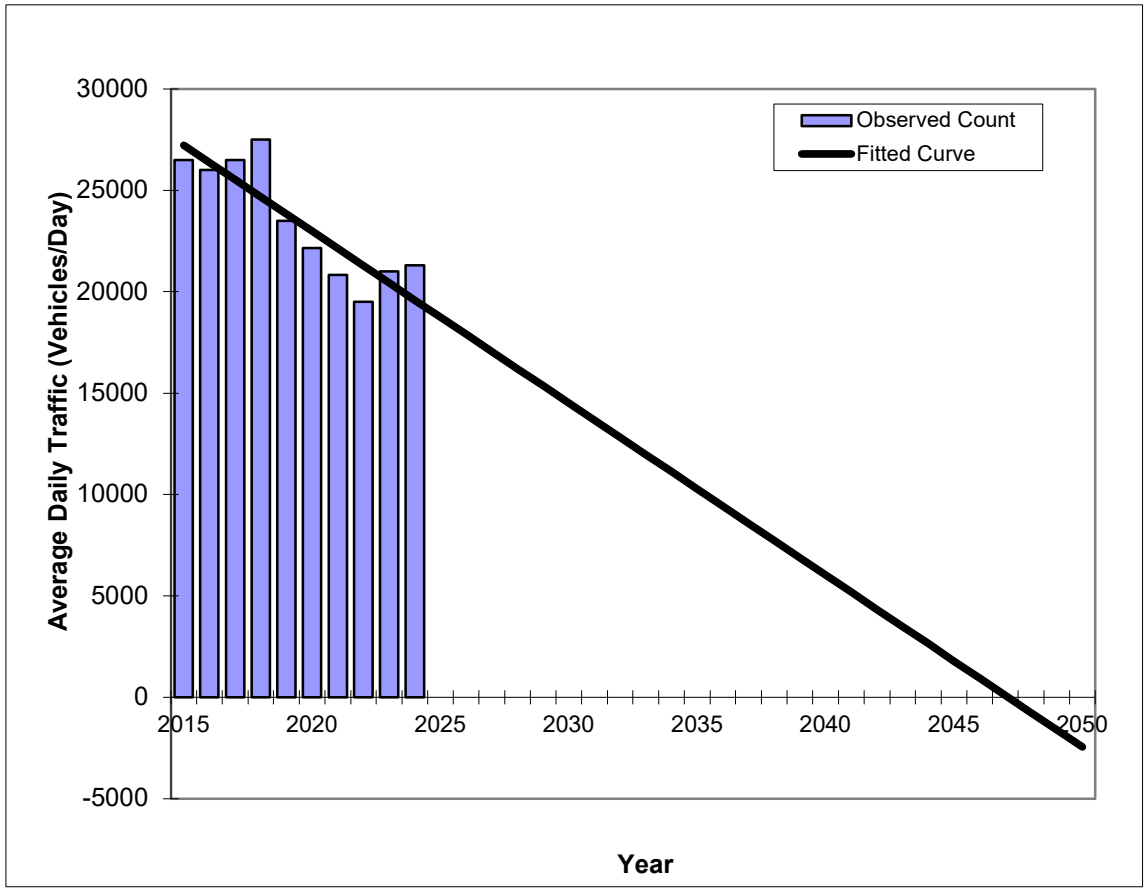
AADT FLAGS: C = COMPUTED; E = MANUAL ESTIMATE; F = FIRST YEAR ESTIMATE
S = SECOND YEAR ESTIMATE; T = THIRD YEAR ESTIMATE; R = FOURTH YEAR ESTIMATE
V = FIFTH YEAR ESTIMATE; 6 = SIXTH YEAR ESTIMATE; X = UNKNOWN
*K FACTOR: STARTING WITH YEAR 2011 IS STANDARDK, PRIOR YEARS ARE K30 VALUES

Traffic Trends - V2023

-- SR A1A/COLLINS AV, N OF 21 ST (MIAMI BEACH)

FM #	**1234**
Location	**1**

County:	Miami-Dade (87)
Station #:	875170
Roadway:	



Year	Traffic (ADT/AADT) Count*	Trend
2015	26,500	27,230
2016	26,000	26,380
2017	26,500	25,530
2018	27,500	24,680
2019	23,500	23,830
2020	22,167	22,990
2021	20,833	22,140
2022	19,500	21,290
2023	21,000	20,440
2024	21,300	19,590
2029 Opening Year Trend		
2029	N/A	15,360
2040 Interim Year Trend		
2040	N/A	6,030
2050 Design Year Trend		
2050	N/A	-2,450
FSUTMS Forecasts/Trends		

*Axle-Adjusted

Annual Trend Decrease:	848
Trend R-squared:	83.15%
Trend Annual Historic Growth Rate:	-3.12%
Trend Growth Rate (2024 to Design Year)	-4.33%
Printed:	3/27/2026

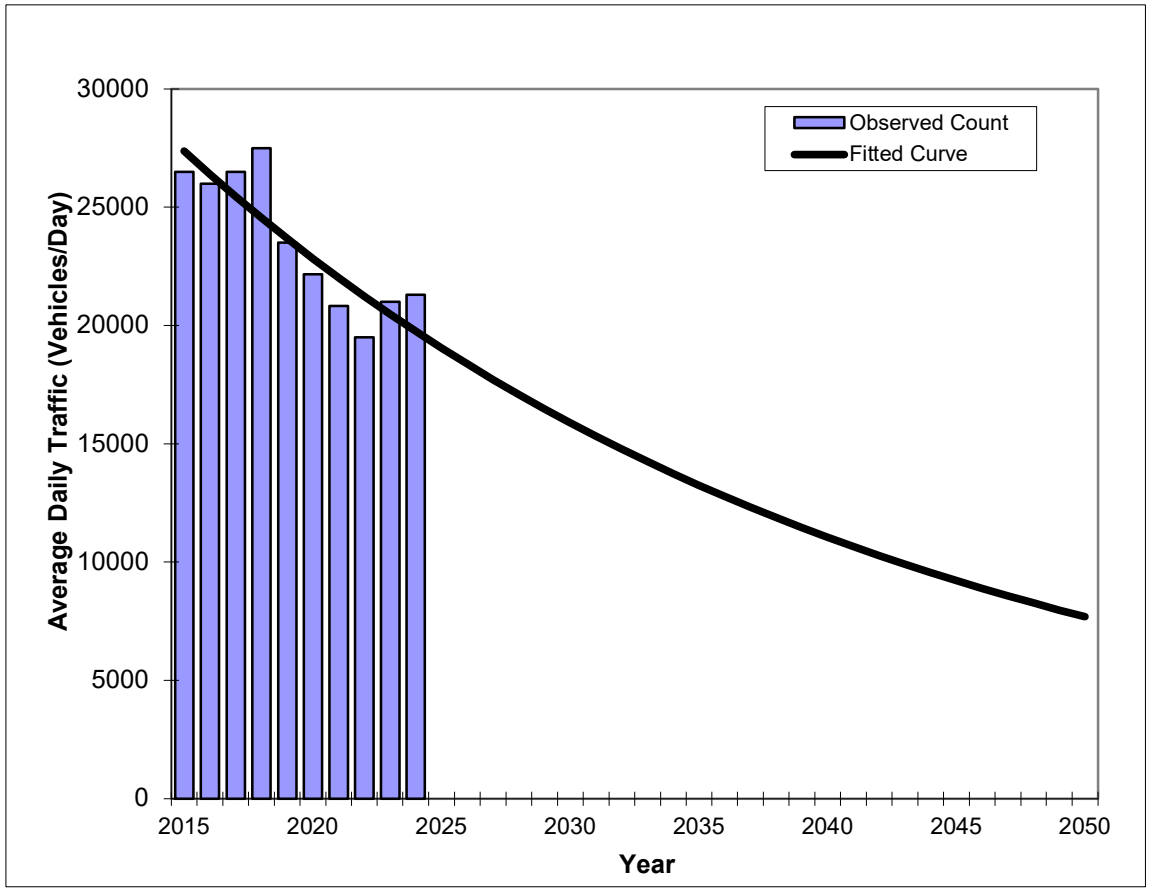
Linear Growth Option

Traffic Trends - V2023

-- SR A1A/COLLINS AV, N OF 21 ST (MIAMI BEACH)

FM #	**1234**
Location	**1**

County:	Miami-Dade (87)
Station #:	875170
Roadway:	



Year	Traffic (ADT/AADT) Count*	Trend
2015	26,500	27,380
2016	26,000	26,410
2017	26,500	25,460
2018	27,500	24,560
2019	23,500	23,680
2020	22,167	22,840
2021	20,833	22,020
2022	19,500	21,240
2023	21,000	20,480
2024	21,300	19,750
2029 Opening Year Trend		
2029	N/A	16,470
2040 Interim Year Trend		
2040	N/A	11,050
2050 Design Year Trend		
2050	N/A	7,690
FSUTMS Forecasts/Trends		

*Axle-Adjusted

Trend R-squared:	82.06%
Compounded Annual Historic Growth Rate:	-3.56%
Compounded Growth Rate (2024 to Design Year)	-3.56%
Printed:	3/27/2026

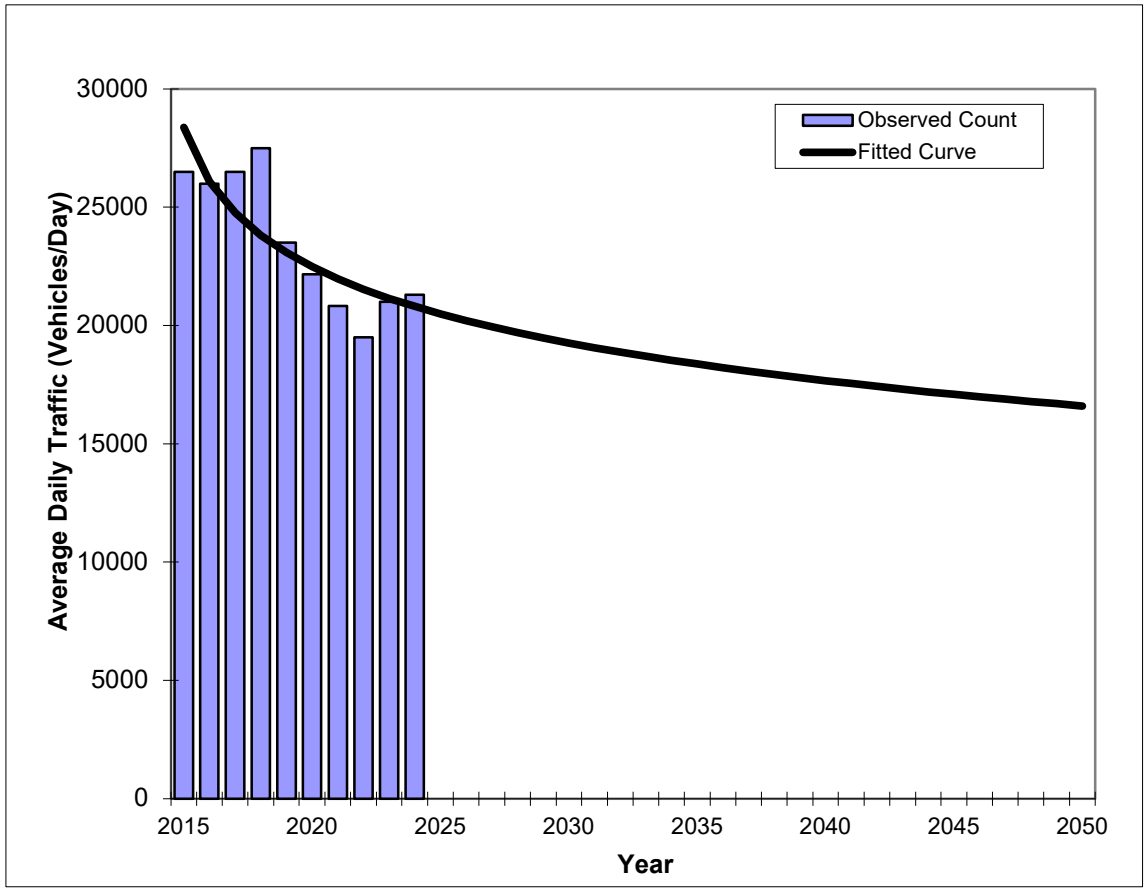
Exponential Growth Option

Traffic Trends - V2023

-- SR A1A/COLLINS AV, N OF 21 ST (MIAMI BEACH)

FM #	**1234**
Location	**1**

County:	Miami-Dade (87)
Station #:	875170
Roadway:	



Year	Traffic (ADT/AADT) Count*	Trend
2015	26,500	28,370
2016	26,000	26,090
2017	26,500	24,760
2018	27,500	23,820
2019	23,500	23,080
2020	22,167	22,490
2021	20,833	21,980
2022	19,500	21,540
2023	21,000	21,150
2024	21,300	20,810
2029 Opening Year Trend		
2029	N/A	19,480
2040 Interim Year Trend		
2040	N/A	17,670
2050 Design Year Trend		
2050	N/A	16,600
FSUTMS Forecasts/Trends		

Trend R-squared:	73.16%
Compounded Annual Historic Growth Rate:	-3.38%
Compounded Growth Rate (2024 to Design Year)	-0.87%
Printed:	3/27/2026

Decaying Exponential Growth Option

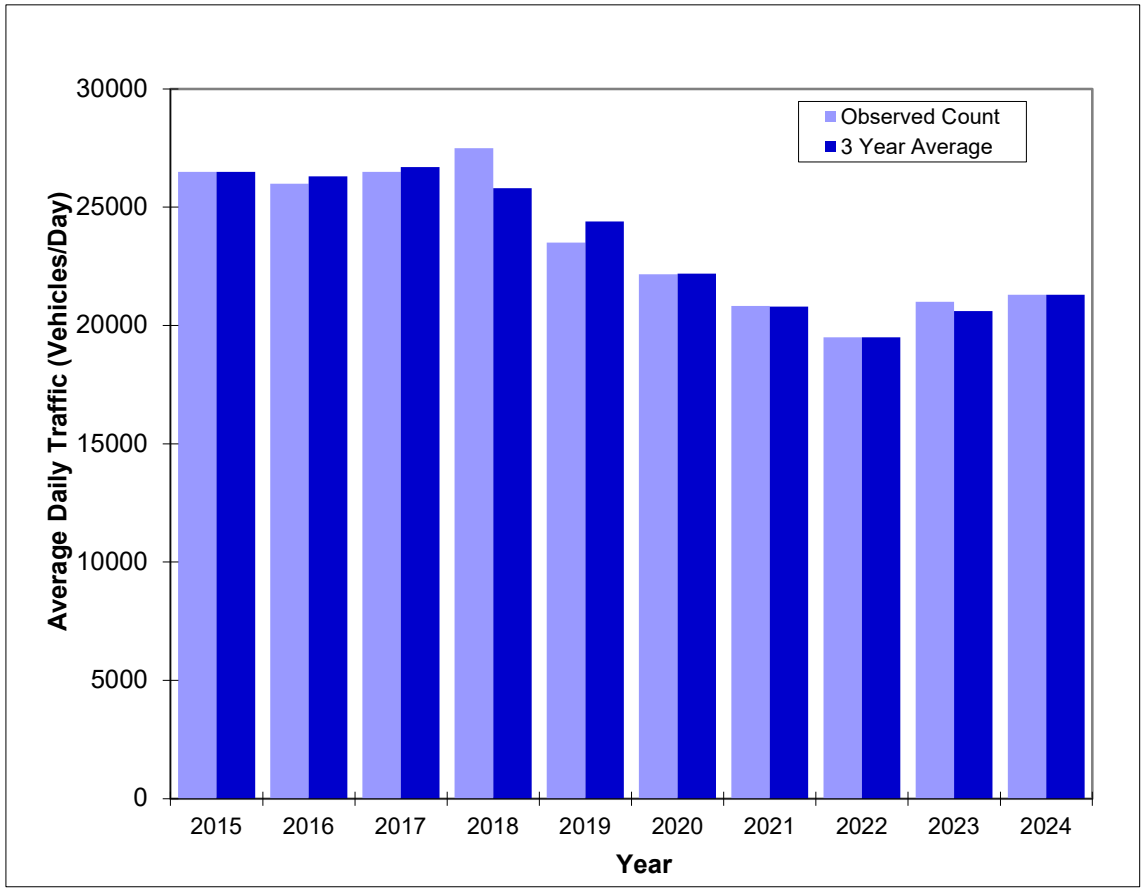
***Axle-Adjusted**

Traffic Trends - V2023

-- SR A1A/COLLINS AV, N OF 21 ST (MIAMI BEACH)

FM #	**1234**
Location	**1**

County:	Miami-Dade (87)
Station #:	875170
Roadway:	



Actual AADT vs 3 Year Average

Year	Traffic (ADT/AADT) Count*	3 Yr Avg
2015	26,500	26,500
2016	26,000	26,300
2017	26,500	26,700
2018	27,500	25,800
2019	23,500	24,400
2020	22,167	22,200
2021	20,833	20,800
2022	19,500	19,500
2023	21,000	20,600
2024	21,300	21,300

***Axle-Adjusted**

FLORIDA DEPARTMENT OF TRANSPORTATION
TRANSPORTATION STATISTICS OFFICE
2024 HISTORICAL AADT REPORT

COUNTY: 87 - MIAMI-DADE

SITE: 8422 - 23 ST, 200 FT W OF LIBERTY AVE (2011 OFF SYSTEM CYCLE)

YEAR	AADT	DIRECTION 1	DIRECTION 2	*K FACTOR	D FACTOR	T FACTOR
2024	9700 C	E 4700	W 5000	9.00	52.70	4.20
2023	10800 C	E 5300	W 5500	9.00	63.10	1.60
2022	11700 C	E 6200	W 5500	9.00	56.50	2.80
2021	20500 C	E 10500	W 10000	9.00	55.00	1.10
2020	9800 F	E 4900	W 4900	9.00	56.00	9.60
2019	11000 C	E 5500	W 5500	9.00	56.00	9.60
2018	13400 C	E 6600	W 6800	9.00	54.30	2.30
2017	13000 C	E 6500	W 6500	9.00	55.70	1.80
2016	11900 C	E 6000	W 5900	9.00	56.10	15.70
2015	10800 C	E 6300	W 4500	9.00	57.40	7.20
2014	9700 C	E 5000	W 4700	9.00	59.30	21.20
2013	9700 F	E 5400	W 4300	9.00	58.90	16.20
2012	9700 C	E 5400	W 4300	9.00	59.70	16.00

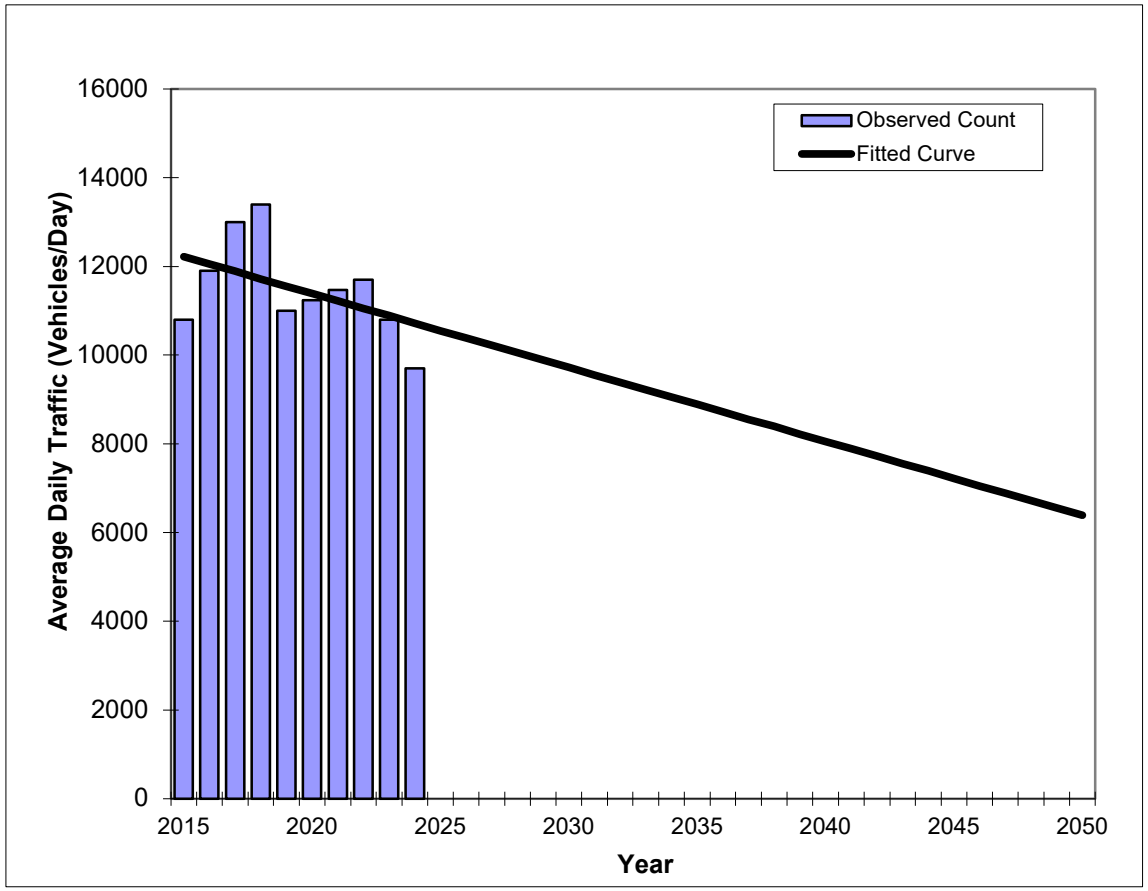
AADT FLAGS: C = COMPUTED; E = MANUAL ESTIMATE; F = FIRST YEAR ESTIMATE
S = SECOND YEAR ESTIMATE; T = THIRD YEAR ESTIMATE; R = FOURTH YEAR ESTIMATE
V = FIFTH YEAR ESTIMATE; 6 = SIXTH YEAR ESTIMATE; X = UNKNOWN
*K FACTOR: STARTING WITH YEAR 2011 IS STANDARDK, PRIOR YEARS ARE K30 VALUES

Traffic Trends - V2023

-- 23 ST, 200 FT W OF LIBERTY AVE (2011 OFF SYSTEM CYCLE)

FM #	**1234**
Location	**1**

County:	Miami-Dade (87)
Station #:	878422
Roadway:	



Annual Trend Decrease:	167
Trend R-squared:	30.55%
Trend Annual Historic Growth Rate:	-1.36%
Trend Growth Rate (2024 to Design Year)	-1.55%
Printed:	3/27/2026

Linear Growth Option

Year	Traffic (ADT/AADT) Count*	Trend
2015	10,800	12,220
2016	11,900	12,050
2017	13,000	11,890
2018	13,400	11,720
2019	11,000	11,550
2020	11,233	11,390
2021	11,467	11,220
2022	11,700	11,050
2023	10,800	10,890
2024	9,700	10,720
2029 Opening Year Trend		
2029	N/A	9,890
2040 Interim Year Trend		
2040	N/A	8,050
2050 Design Year Trend		
2050	N/A	6,390
FSUTMS Forecasts/Trends		

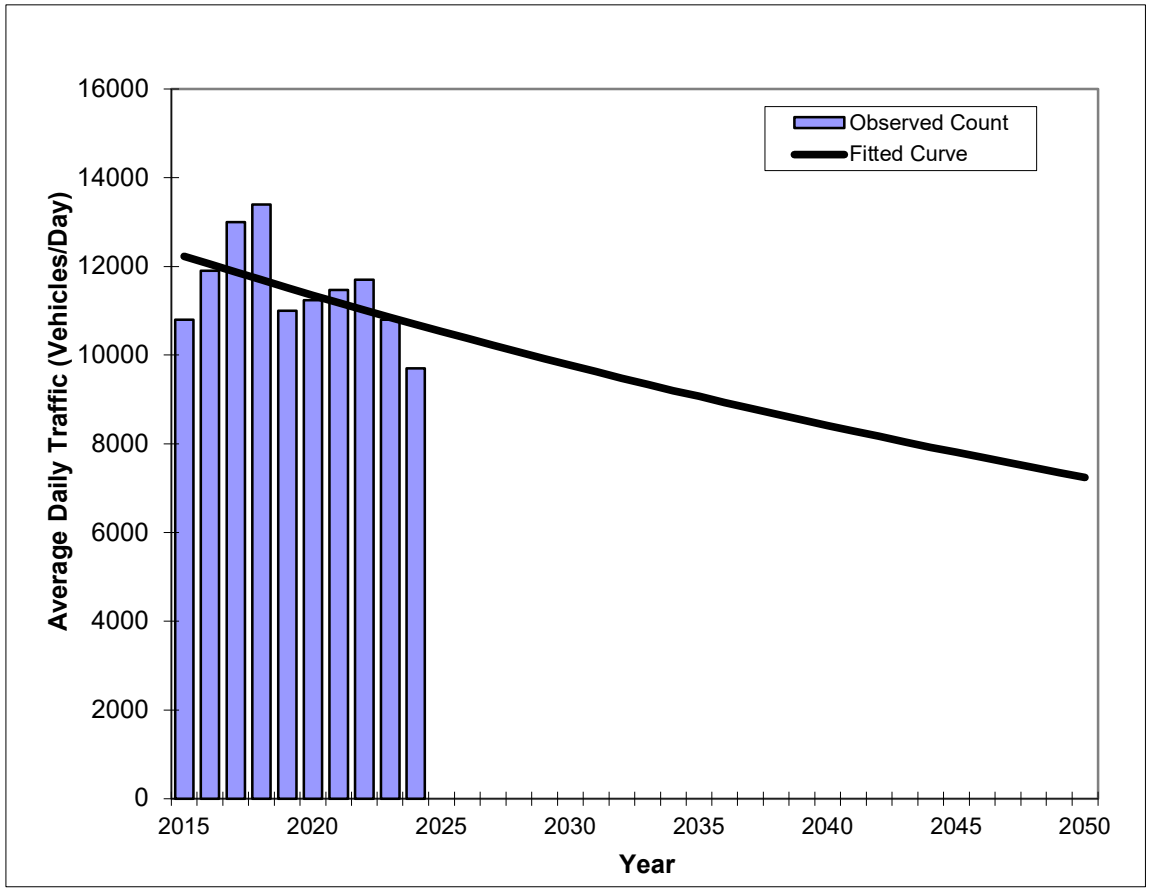
***Axle-Adjusted**

Traffic Trends - V2023

-- 23 ST, 200 FT W OF LIBERTY AVE (2011 OFF SYSTEM CYCLE)

FM #	**1234**
Location	**1**

County:	Miami-Dade (87)
Station #:	878422
Roadway:	



Year	Traffic (ADT/AADT) Count*	Trend
2015	10,800	12,230
2016	11,900	12,050
2017	13,000	11,870
2018	13,400	11,700
2019	11,000	11,520
2020	11,233	11,350
2021	11,467	11,180
2022	11,700	11,020
2023	10,800	10,850
2024	9,700	10,690
2029 Opening Year Trend		
2029	N/A	9,920
2040 Interim Year Trend		
2040	N/A	8,410
2050 Design Year Trend		
2050	N/A	7,240
FSUTMS Forecasts/Trends		

*Axle-Adjusted

Trend R-squared:	31.06%
Compounded Annual Historic Growth Rate:	-1.48%
Compounded Growth Rate (2024 to Design Year)	-1.49%
Printed:	3/27/2026

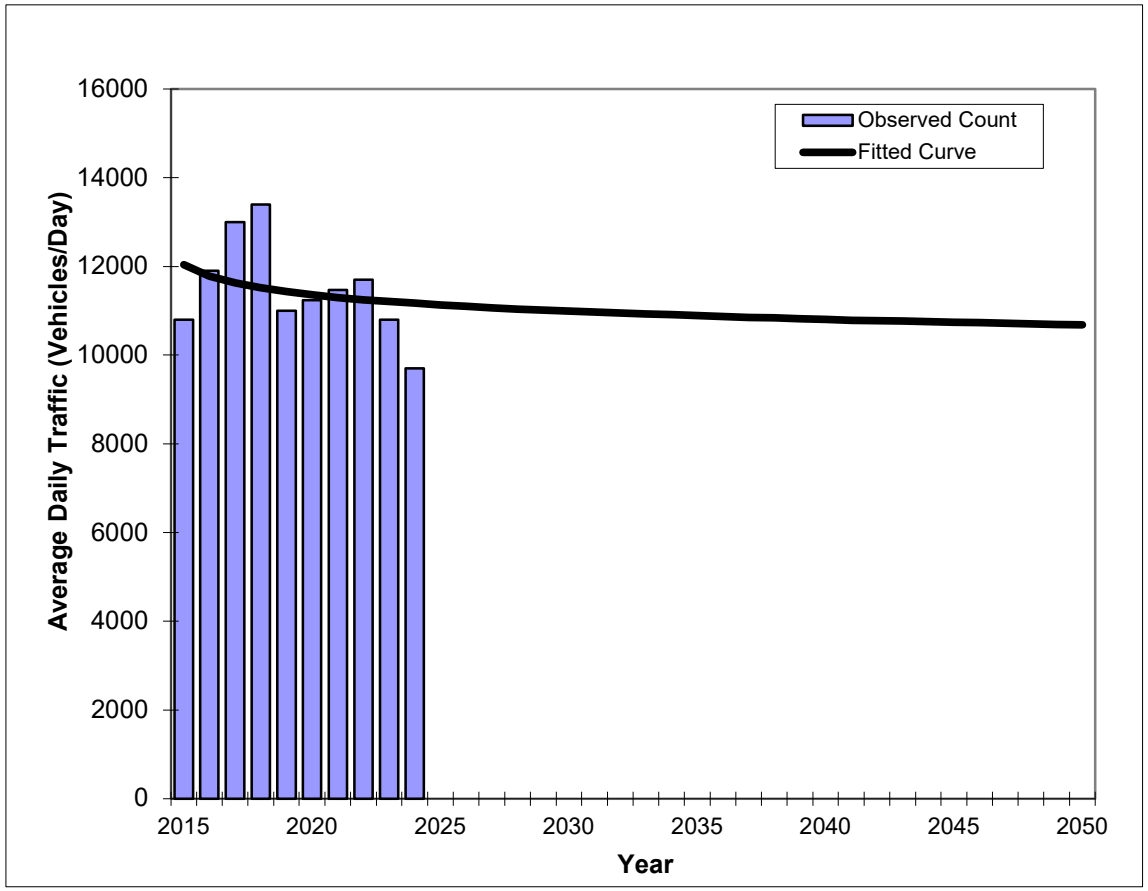
Exponential Growth Option

Traffic Trends - V2023

-- 23 ST, 200 FT W OF LIBERTY AVE (2011 OFF SYSTEM CYCLE)

FM #	**1234**
Location	**1**

County:	Miami-Dade (87)
Station #:	878422
Roadway:	



Year	Traffic (ADT/AADT) Count*	Trend
2015	10,800	12,040
2016	11,900	11,780
2017	13,000	11,630
2018	13,400	11,520
2019	11,000	11,430
2020	11,233	11,360
2021	11,467	11,300
2022	11,700	11,250
2023	10,800	11,210
2024	9,700	11,170
2029 Opening Year Trend		
2029	N/A	11,020
2040 Interim Year Trend		
2040	N/A	10,810
2050 Design Year Trend		
2050	N/A	10,680
FSUTMS Forecasts/Trends		

*Axle-Adjusted

Trend R-squared:	9.29%
Compounded Annual Historic Growth Rate:	-0.83%
Compounded Growth Rate (2024 to Design Year)	-0.17%
Printed:	3/27/2026

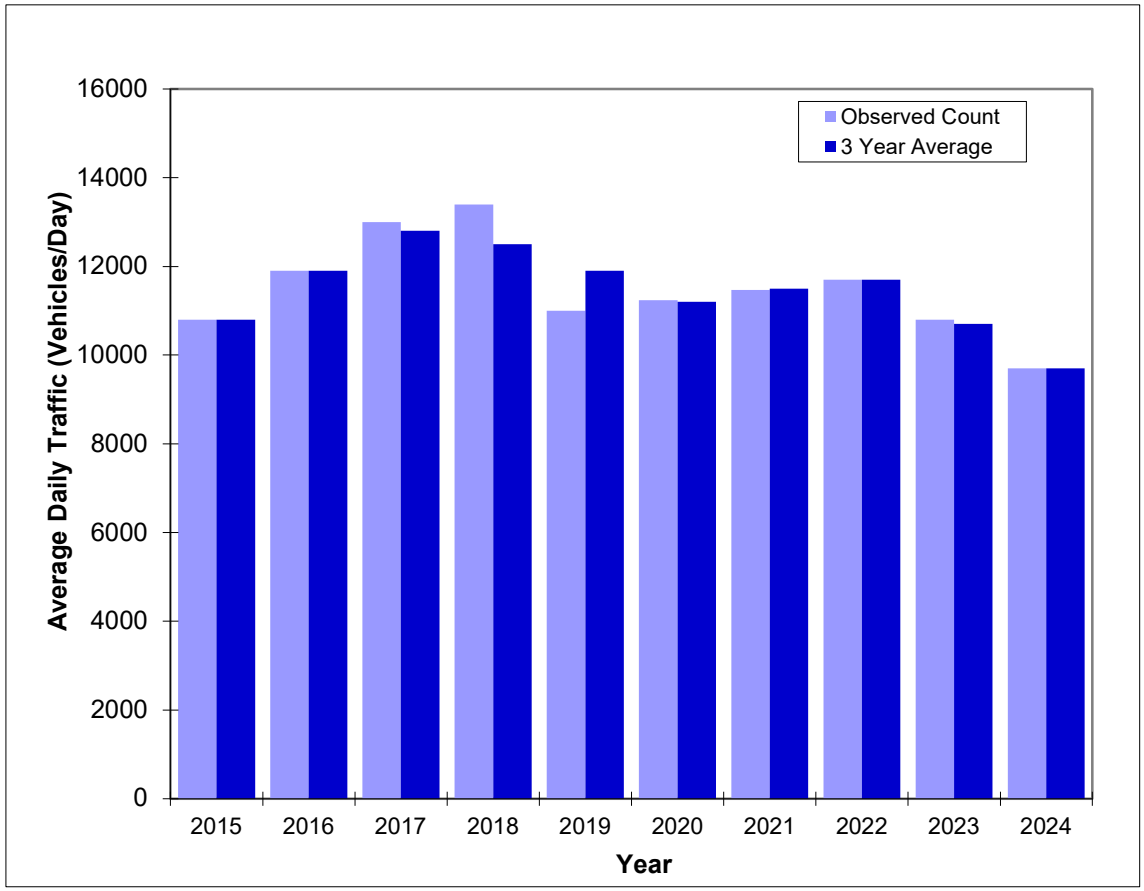
Decaying Exponential Growth Option

Traffic Trends - V2023

-- 23 ST, 200 FT W OF LIBERTY AVE (2011 OFF SYSTEM CYCLE)

FM #	**1234**
Location	**1**

County:	Miami-Dade (87)
Station #:	878422
Roadway:	



Year	Traffic (ADT/AADT) Count*	3 Yr Avg
2015	10,800	10,800
2016	11,900	11,900
2017	13,000	12,800
2018	13,400	12,500
2019	11,000	11,900
2020	11,233	11,200
2021	11,467	11,500
2022	11,700	11,700
2023	10,800	10,700
2024	9,700	9,700

Actual AADT vs 3 Year Average

***Axle-Adjusted**

FLORIDA DEPARTMENT OF TRANSPORTATION
TRANSPORTATION STATISTICS OFFICE
2024 HISTORICAL AADT REPORT

COUNTY: 87 - MIAMI-DADE

SITE: 8600 - PINE TREE DR, 200' SOUTH OF 37 ST (2011 OFF SYSTEM CYCLE)

YEAR	AADT	DIRECTION 1	DIRECTION 2	*K FACTOR	D FACTOR	T FACTOR
2024	20300 F	N 11000	S 9300	9.00	52.70	3.80
2023	20400 C	N 11000	S 9400	9.00	63.10	3.70
2022	13700 T	N 6700	S 7000	9.00	56.50	3.50
2021	13300 S	N 6500	S 6800	9.00	55.00	2.90
2020	14000 F	N 6800	S 7200	9.00	56.00	4.40
2019	15700 C	N 7600	S 8100	9.00	56.00	4.00
2018	13700 T	N 7500	S 6200	9.00	54.30	3.00
2017	15300 S	N 8400	S 6900	9.00	59.30	2.50
2016	15500 F	N 8500	S 7000	9.00	56.10	5.10
2015	15700 C	N 8600	S 7100	9.00	57.40	7.10
2014	16000 S	N 8100	S 7900	9.00	59.30	10.70
2013	16200 F	N 8200	S 8000	9.00	58.90	16.20
2012	16200 C	N 8200	S 8000	9.00	59.70	16.00

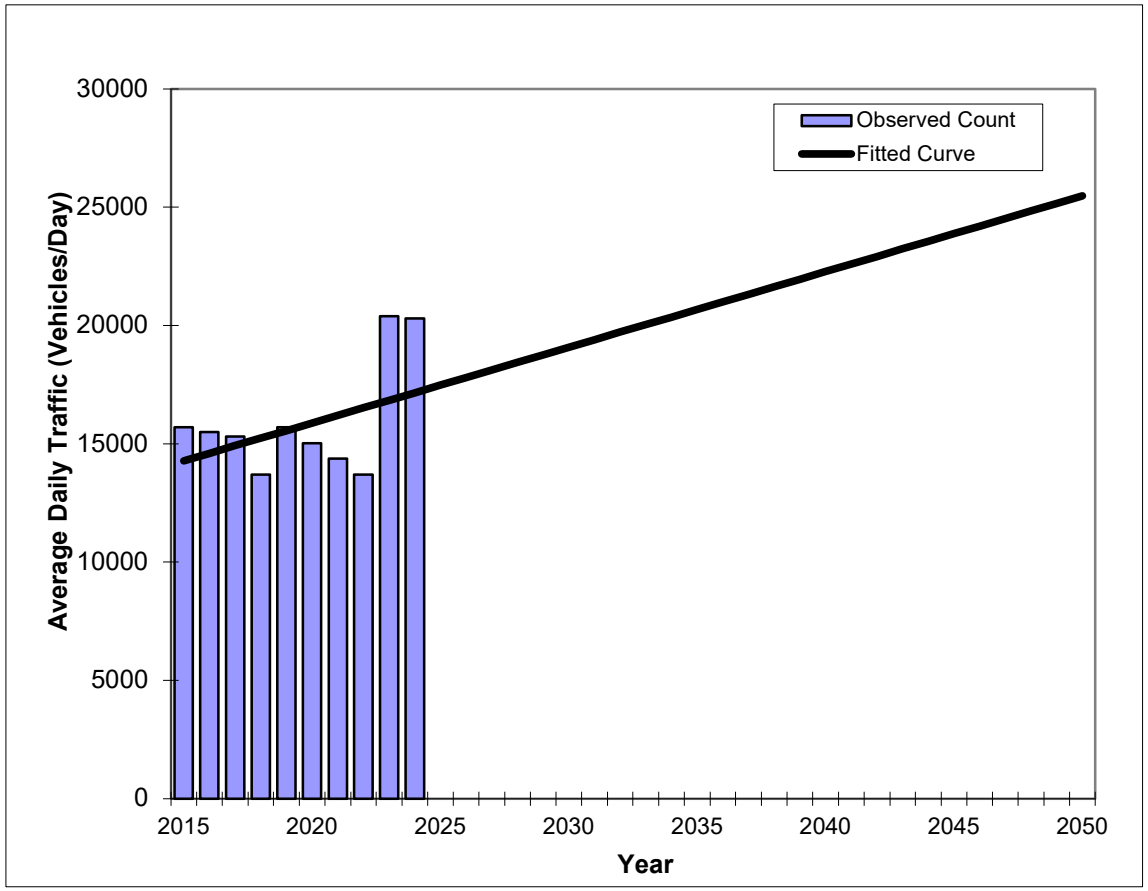
AADT FLAGS: C = COMPUTED; E = MANUAL ESTIMATE; F = FIRST YEAR ESTIMATE
S = SECOND YEAR ESTIMATE; T = THIRD YEAR ESTIMATE; R = FOURTH YEAR ESTIMATE
V = FIFTH YEAR ESTIMATE; 6 = SIXTH YEAR ESTIMATE; X = UNKNOWN
*K FACTOR: STARTING WITH YEAR 2011 IS STANDARDK, PRIOR YEARS ARE K30 VALUES

Traffic Trends - V2023

-- PINE TREE DR, 200' SOUTH OF 37 ST (2011 OFF SYSTEM CYCLE)

FM #	**1234**
Location	**1**

County:	Miami-Dade (87)
Station #:	878600
Roadway:	



Year	Traffic (ADT/AADT) Count*	Trend
2015	15,700	14,280
2016	15,500	14,600
2017	15,300	14,920
2018	13,700	15,240
2019	15,700	15,560
2020	15,033	15,880
2021	14,367	16,200
2022	13,700	16,520
2023	20,400	16,840
2024	20,300	17,160
2029 Opening Year Trend		
2029	N/A	18,760
2040 Interim Year Trend		
2040	N/A	22,280
2050 Design Year Trend		
2050	N/A	25,480
FSUTMS Forecasts/Trends		

Annual Trend Increase:	320
Trend R-squared:	23.87%
Trend Annual Historic Growth Rate:	2.24%
Trend Growth Rate (2024 to Design Year)	1.86%
Printed:	3/27/2026

Linear Growth Option

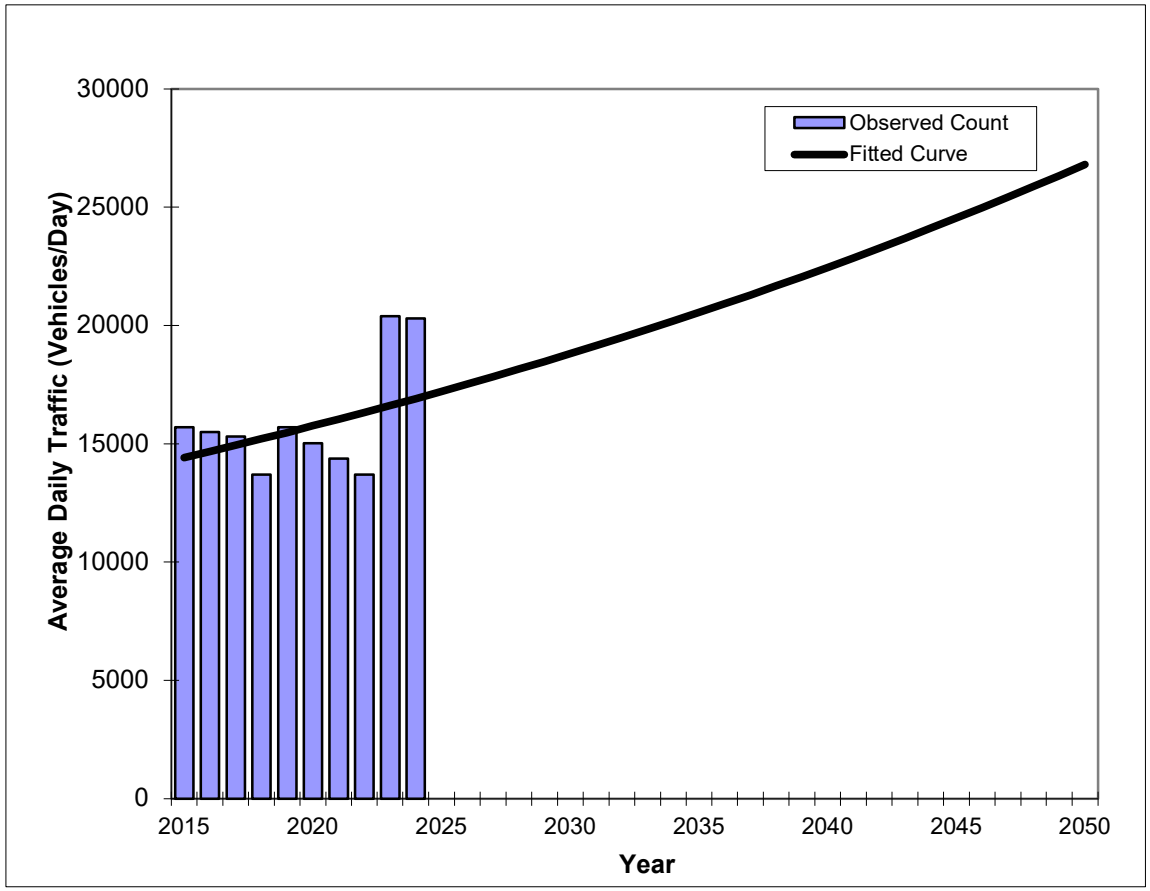
***Axle-Adjusted**

Traffic Trends - V2023

-- PINE TREE DR, 200' SOUTH OF 37 ST (2011 OFF SYSTEM CYCLE)

FM #	**1234**
Location	**1**

County:	Miami-Dade (87)
Station #:	878600
Roadway:	



Year	Traffic (ADT/AADT) Count*	Trend
2015	15,700	14,420
2016	15,500	14,680
2017	15,300	14,940
2018	13,700	15,210
2019	15,700	15,480
2020	15,033	15,760
2021	14,367	16,040
2022	13,700	16,330
2023	20,400	16,620
2024	20,300	16,910
2029 Opening Year Trend		
2029	N/A	18,480
2040 Interim Year Trend		
2040	N/A	22,460
2050 Design Year Trend		
2050	N/A	26,810
FSUTMS Forecasts/Trends		

*Axle-Adjusted

Trend R-squared:	20.88%
Compounded Annual Historic Growth Rate:	1.79%
Compounded Growth Rate (2024 to Design Year)	1.79%
Printed:	3/27/2026

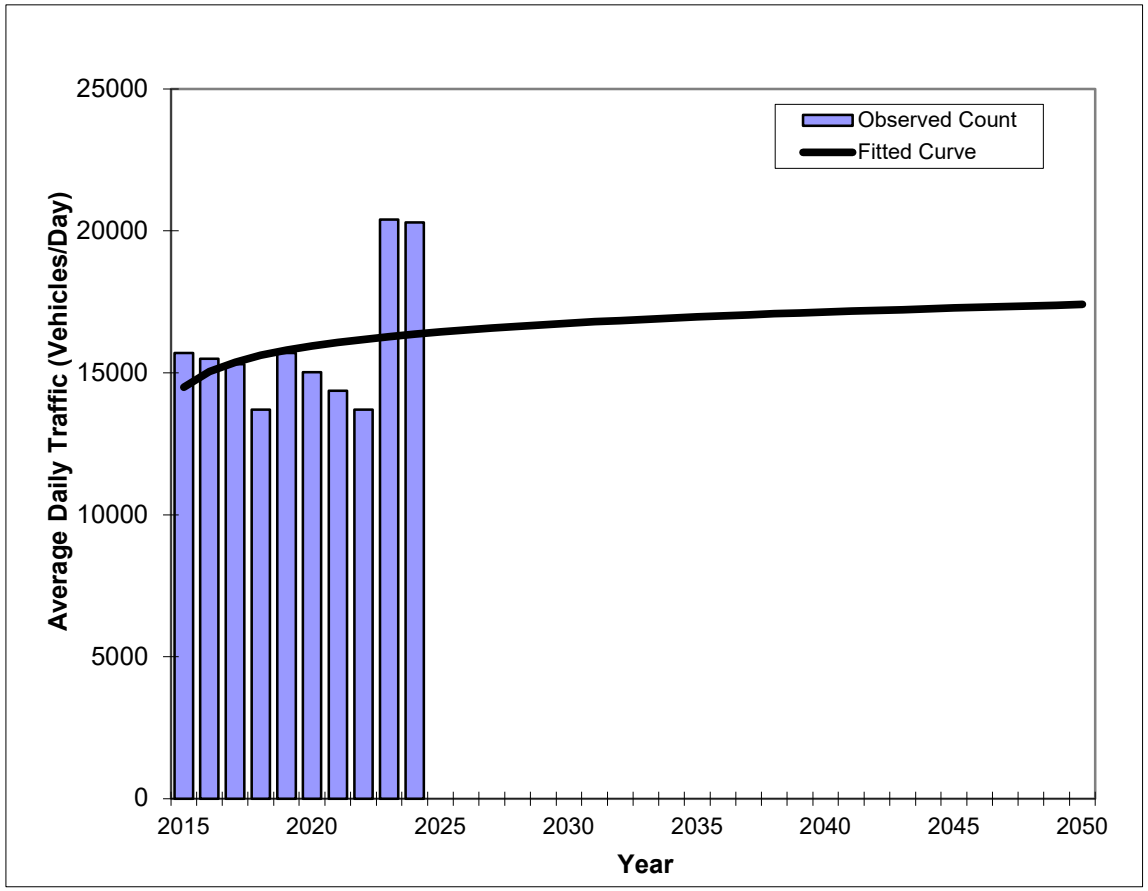
Exponential Growth Option

Traffic Trends - V2023

-- PINE TREE DR, 200' SOUTH OF 37 ST (2011 OFF SYSTEM CYCLE)

FM #	**1234**
Location	**1**

County:	Miami-Dade (87)
Station #:	878600
Roadway:	



Year	Traffic (ADT/AADT) Count*	Trend
2015	15,700	14,490
2016	15,500	15,050
2017	15,300	15,380
2018	13,700	15,620
2019	15,700	15,800
2020	15,033	15,950
2021	14,367	16,070
2022	13,700	16,180
2023	20,400	16,280
2024	20,300	16,360
2029 Opening Year Trend		
2029	N/A	16,690
2040 Interim Year Trend		
2040	N/A	17,140
2050 Design Year Trend		
2050	N/A	17,410
FSUTMS Forecasts/Trends		

Trend R-squared:	9.05%
Compounded Annual Historic Growth Rate:	1.36%
Compounded Growth Rate (2024 to Design Year)	0.24%
Printed:	3/27/2026

Decaying Exponential Growth Option

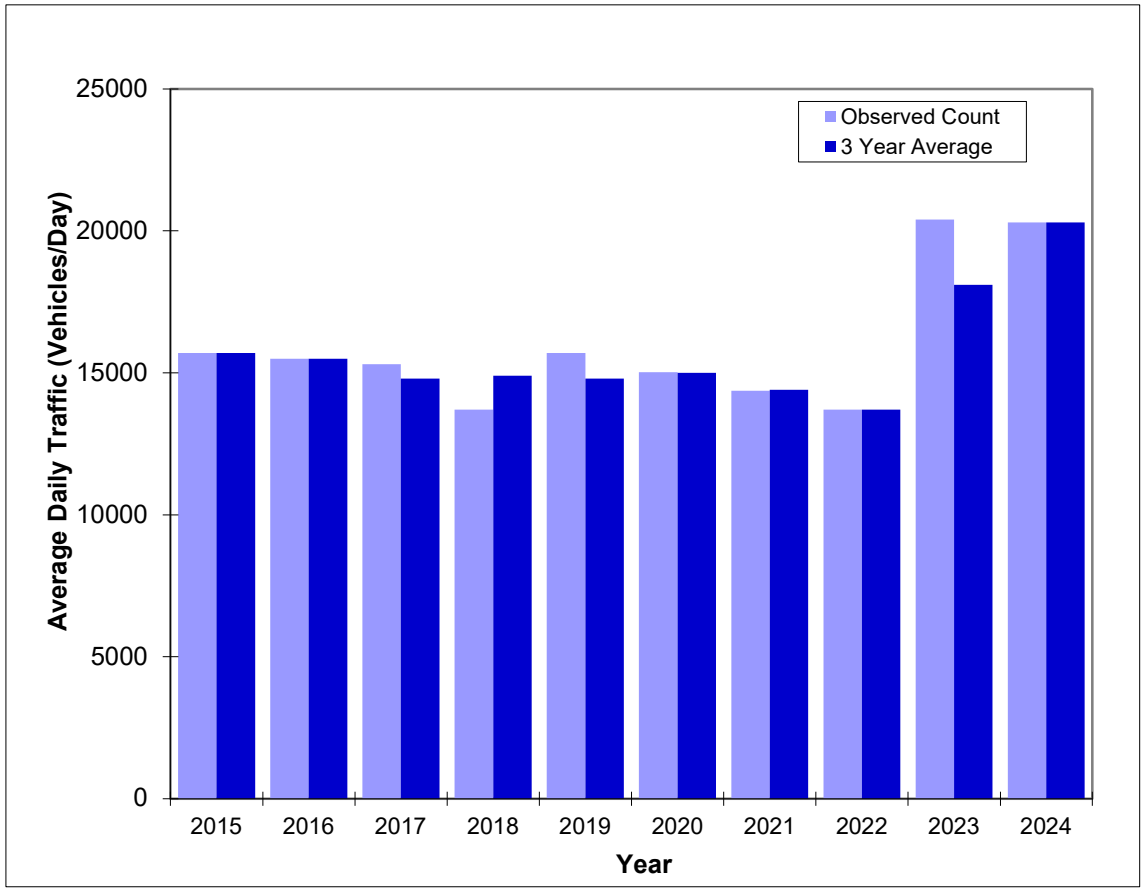
***Axle-Adjusted**

Traffic Trends - V2023

-- PINE TREE DR, 200' SOUTH OF 37 ST (2011 OFF SYSTEM CYCLE)

FM #	**1234**
Location	**1**

County:	Miami-Dade (87)
Station #:	878600
Roadway:	

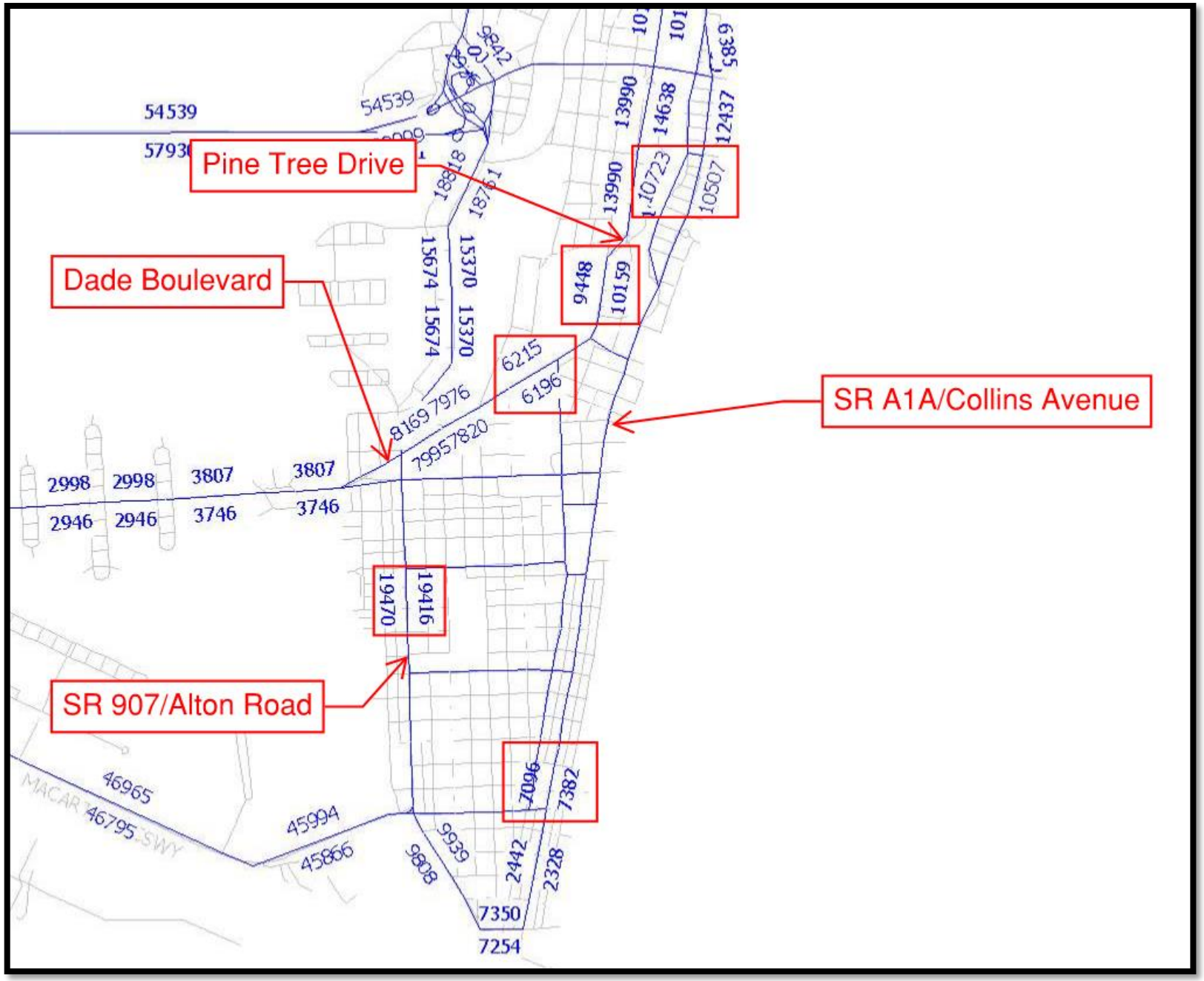


Year	Traffic (ADT/AADT) Count*	3 Yr Avg
2015	15,700	15,700
2016	15,500	15,500
2017	15,300	14,800
2018	13,700	14,900
2019	15,700	14,800
2020	15,033	15,000
2021	14,367	14,400
2022	13,700	13,700
2023	20,400	18,100
2024	20,300	20,300

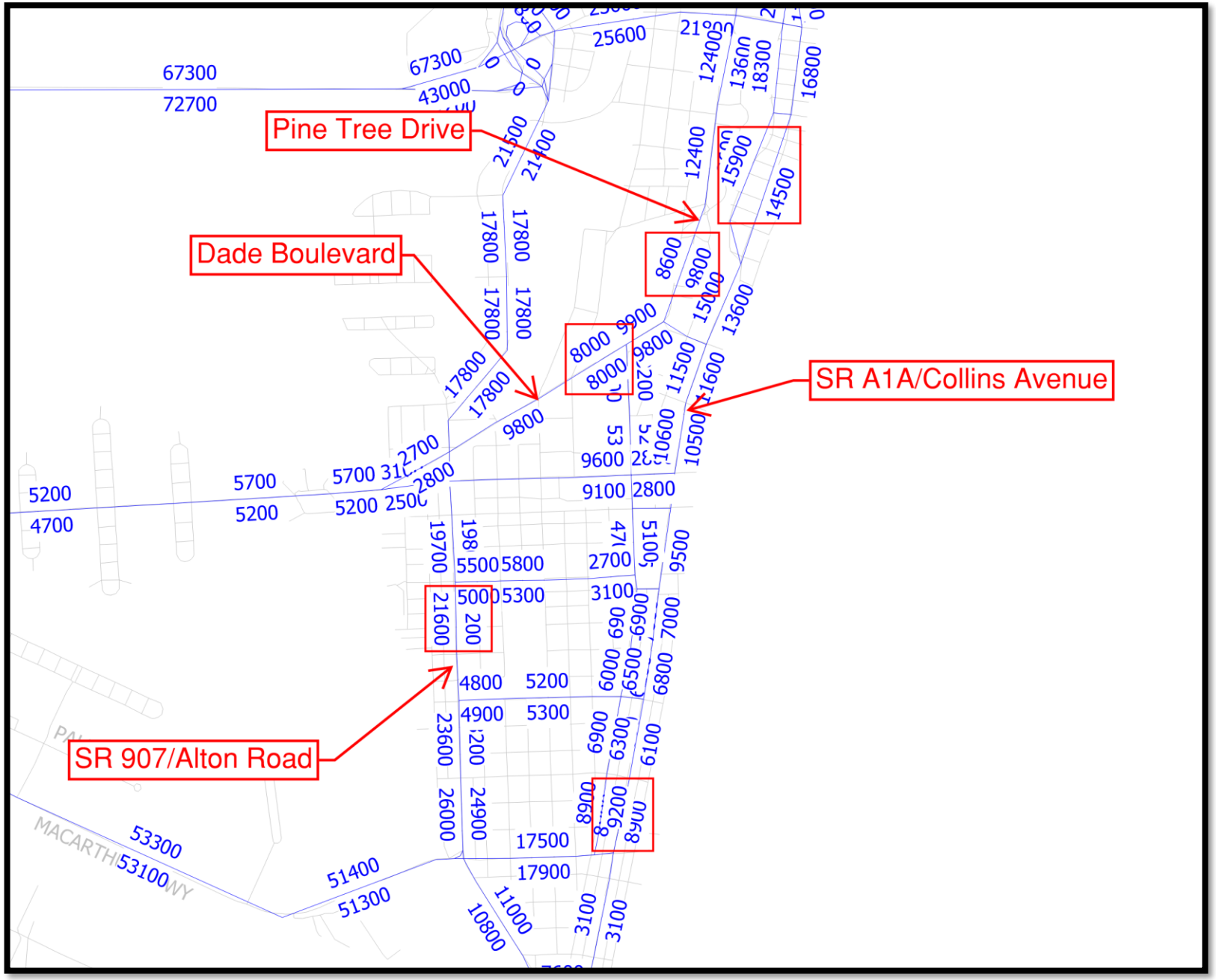
Actual AADT vs 3 Year Average

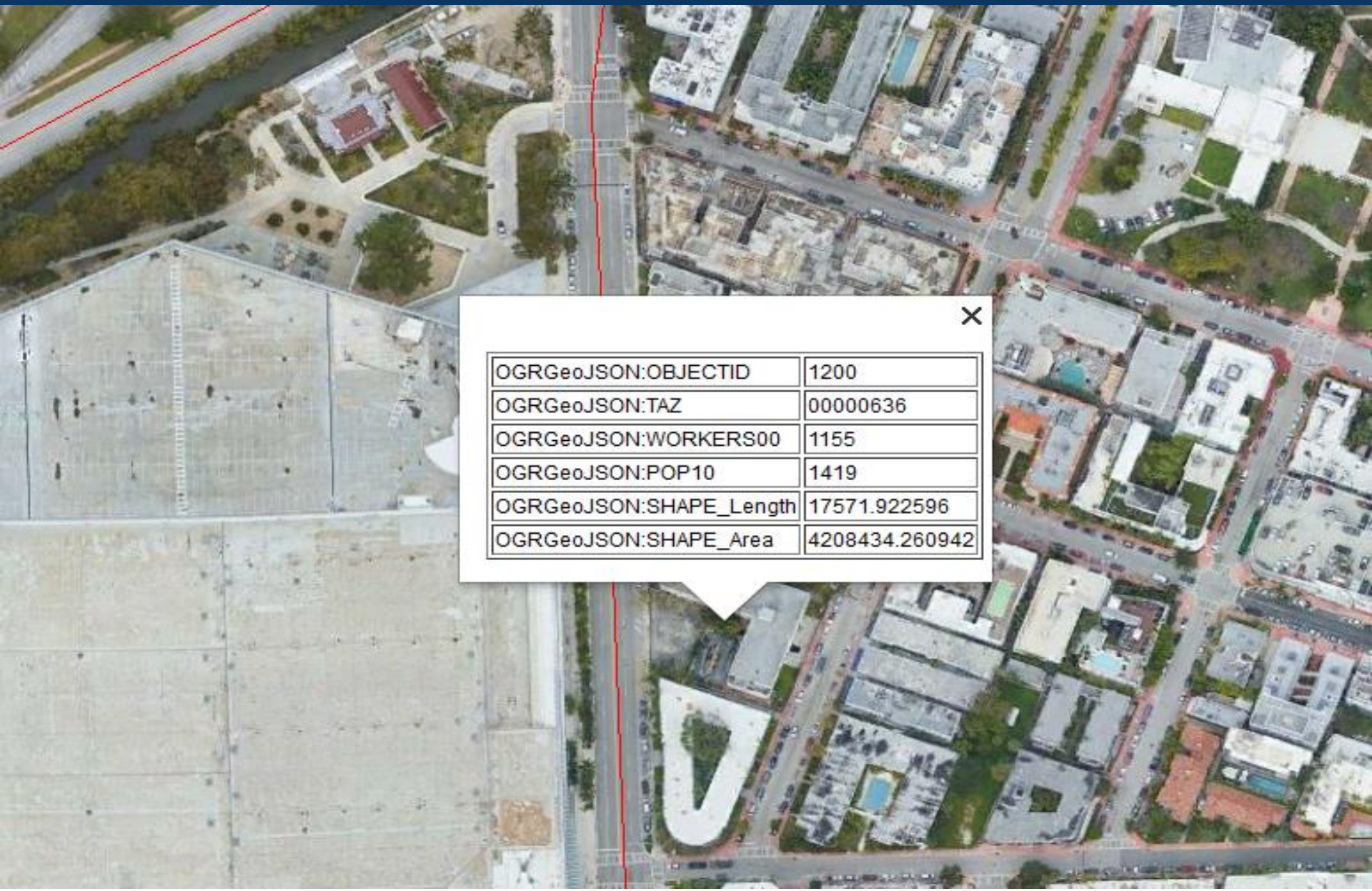
***Axle-Adjusted**

2015 SERPM Traffic Volume



2045 SERPM Traffic Volume





Traffic Analysis Zones 2015

Miami-Dade 2015 Base Year Direction Trip Distribution Summary											
TAZ of Origin		Trips / Percent	Cardinal Directions								Total Trips
County TAZ	Regional TAZ		NNE	ENE	ESE	SSE	SSW	WSW	WNW	NNW	
625	3525	Trips	610	160	-	557	431	1,317	679	1,035	4,961
625	3525	Percent	12.7	3.3	-	11.6	9.0	27.5	14.2	21.6	
626	3526	Trips	122	-	-	-	2,090	2,277	1,198	2,942	9,399
626	3526	Percent	1.4	-	-	-	24.2	26.4	13.9	34.1	
627	3527	Trips	279	-	-	-	2,051	2,578	845	1,965	8,061
627	3527	Percent	3.6	-	-	-	26.6	33.4	11.0	25.5	
628	3528	Trips	298	-	49	79	984	902	332	679	3,579
628	3528	Percent	9.0	-	1.5	2.4	29.6	27.2	10.0	20.5	
629	3529	Trips	1,374	549	344	1,656	1,708	3,707	1,668	2,101	14,261
629	3529	Percent	10.5	4.2	2.6	12.6	13.0	28.3	12.7	16.0	
630	3530	Trips	952	-	210	347	1,696	2,375	794	1,114	8,135
630	3530	Percent	12.7	-	2.8	4.6	22.7	31.7	10.6	14.9	
631	3531	Trips	255	-	-	-	1,215	1,471	440	1,030	4,651
631	3531	Percent	5.8	-	-	-	27.6	33.4	10.0	23.4	
632	3532	Trips	309	-	-	-	1,242	1,751	750	635	4,880
632	3532	Percent	6.6	-	-	-	26.5	37.4	16.0	13.5	
633	3533	Trips	310	-	-	-	1,181	1,428	750	730	4,590
633	3533	Percent	7.0	-	-	-	26.9	32.5	17.1	16.6	
634	3534	Trips	1,502	112	240	837	1,718	1,928	976	1,727	9,998
634	3534	Percent	16.6	1.2	2.7	9.3	19.0	21.3	10.8	19.1	
635	3535	Trips	779	-	-	-	2,021	1,994	952	1,411	8,010
635	3535	Percent	10.9	-	-	-	28.2	27.9	13.3	19.7	
636	3536	Trips	1,041	-	-	686	1,152	2,072	911	1,071	7,384
636	3536	Percent	15.0	-	-	9.9	16.6	29.9	13.1	15.4	
637	3537	Trips	323	31	87	217	126	601	303	290	1,987
637	3537	Percent	16.4	1.6	4.4	11.0	6.4	30.4	15.3	14.7	
638	3538	Trips	152	35	87	86	114	218	162	126	999
638	3538	Percent	15.5	3.6	8.9	8.7	11.6	22.3	16.5	12.9	
639	3539	Trips	825	281	277	1,089	131	1,364	796	599	5,721
639	3539	Percent	15.4	5.2	5.2	20.3	2.4	25.4	14.9	11.2	
640	3540	Trips	344	247	868	104	43	685	405	274	3,053
640	3540	Percent	11.6	8.3	29.2	3.5	1.5	23.1	13.6	9.2	
641	3541	Trips	1,051	1,714	291	723	309	1,572	1,188	916	8,356
641	3541	Percent	13.5	22.1	3.7	9.3	4.0	20.3	15.3	11.8	
642	3542	Trips	1,849	1,404	115	1,263	457	2,697	1,962	1,518	12,299
642	3542	Percent	16.4	12.5	1.0	11.2	4.1	23.9	17.4	13.5	
643	3543	Trips	1,747	551	-	965	479	2,595	1,554	1,715	10,383
643	3543	Percent	18.2	5.7	-	10.1	5.0	27.0	16.2	17.9	
644	3544	Trips	2,022	-	-	-	2,250	4,141	2,585	2,646	15,224
644	3544	Percent	14.8	-	-	-	16.5	30.4	19.0	19.4	
645	3545	Trips	1,268	-	-	-	907	1,498	1,720	1,351	7,018
645	3545	Percent	18.8	-	-	-	13.5	22.2	25.5	20.0	
646	3546	Trips	986	-	156	520	250	1,081	1,094	1,181	5,470
646	3546	Percent	18.7	-	3.0	9.9	4.7	20.5	20.8	22.4	
647	3547	Trips	350	103	114	165	66	354	359	408	1,979
647	3547	Percent	18.2	5.4	5.9	8.6	3.5	18.5	18.7	21.2	
648	3548	Trips	1,027	434	254	401	48	903	1,001	514	4,747
648	3548	Percent	22.4	9.5	5.5	8.8	1.0	19.7	21.9	11.2	
649	3549	Trips	754	192	184	230	41	612	743	427	3,320
649	3549	Percent	23.7	6.0	5.8	7.2	1.3	19.2	23.3	13.4	
650	3550	Trips	45	80	104	0	14	155	304	133	850
650	3550	Percent	5.4	9.6	12.4	0.0	1.6	18.5	36.5	16.0	

Miami-Dade 2045 Cost Feasible Plan Direction Trip Distribution Summary											
TAZ of Origin		Trips / Percent	Cardinal Directions								Total Trips
County TAZ	Regional TAZ		NNE	ENE	ESE	SSE	SSW	WSW	WNW	NNW	
625	3525	Trips	515	114	-	541	802	1,791	829	1,096	5,972
625	3525	Percent	9.1	2.0	-	9.5	14.1	31.5	14.6	19.3	
626	3526	Trips	66	-	-	-	2,417	3,260	1,417	2,993	11,237
626	3526	Percent	0.7	-	-	-	23.8	32.1	14.0	29.5	
627	3527	Trips	174	-	-	-	2,276	3,212	1,138	1,885	9,055
627	3527	Percent	2.0	-	-	-	26.2	37.0	13.1	21.7	
628	3528	Trips	238	-	23	101	1,053	1,266	390	660	4,028
628	3528	Percent	6.4	-	0.6	2.7	28.2	33.9	10.5	17.7	
629	3529	Trips	1,686	621	373	1,692	1,801	6,032	2,362	2,490	18,425
629	3529	Percent	9.9	3.6	2.2	9.9	10.6	35.4	13.9	14.6	
630	3530	Trips	888	-	326	303	1,717	3,876	1,515	1,553	11,277
630	3530	Percent	8.7	-	3.2	3.0	16.9	38.1	14.9	15.3	
631	3531	Trips	296	-	-	-	1,351	2,360	838	1,324	6,591
631	3531	Percent	4.8	-	-	-	21.9	38.3	13.6	21.5	
632	3532	Trips	343	-	-	-	1,500	2,647	1,390	1,098	7,499
632	3532	Percent	4.9	-	-	-	21.5	37.9	19.9	15.7	
633	3533	Trips	368	-	-	-	1,052	1,986	859	841	5,391
633	3533	Percent	7.2	-	-	-	20.6	38.9	16.8	16.5	
634	3534	Trips	1,404	80	149	773	1,637	2,733	1,332	1,712	10,593
634	3534	Percent	14.3	0.8	1.5	7.9	16.7	27.8	13.6	17.4	
635	3535	Trips	566	-	-	-	1,311	2,266	1,228	1,254	7,246
635	3535	Percent	8.5	-	-	-	19.8	34.2	18.5	18.9	
636	3536	Trips	1,066	-	-	607	978	3,045	1,398	1,193	8,805
636	3536	Percent	12.9	-	-	7.3	11.8	36.8	16.9	14.4	
637	3537	Trips	468	44	144	315	198	868	501	309	2,865
637	3537	Percent	16.5	1.6	5.1	11.1	6.9	30.5	17.6	10.9	
638	3538	Trips	127	33	78	94	79	401	285	185	1,342
638	3538	Percent	9.9	2.6	6.1	7.3	6.2	31.3	22.2	14.5	
639	3539	Trips	944	303	253	1,068	176	2,395	1,085	905	7,569
639	3539	Percent	13.2	4.3	3.6	15.0	2.5	33.6	15.2	12.7	
640	3540	Trips	119	74	216	10	30	177	136	147	1,166
640	3540	Percent	13.1	8.2	23.7	1.1	3.4	19.4	14.9	16.2	
641	3541	Trips	1,145	1,056	206	569	242	2,378	1,724	1,142	9,066
641	3541	Percent	13.5	12.5	2.4	6.7	2.9	28.1	20.4	13.5	
642	3542	Trips	1,701	1,196	113	964	433	3,470	2,140	1,631	12,324
642	3542	Percent	14.6	10.3	1.0	8.3	3.7	29.8	18.4	14.0	
643	3543	Trips	1,884	580	-	1,133	631	3,768	2,190	2,157	13,183
643	3543	Percent	15.3	4.7	-	9.2	5.1	30.5	17.7	17.5	
644	3544	Trips	1,948	-	-	-	2,227	5,534	3,264	3,082	17,780
644	3544	Percent	12.1	-	-	-	13.9	34.5	20.3	19.2	
645	3545	Trips	1,314	-	-	-	844	1,661	2,170	1,703	8,075
645	3545	Percent	17.1	-	-	-	11.0	21.6	28.2	22.1	
646	3546	Trips	1,025	-	125	496	263	1,741	1,656	1,299	6,976
646	3546	Percent	15.5	-	1.9	7.5	4.0	26.4	25.1	19.7	
647	3547	Trips	296	122	96	109	79	582	661	405	2,490
647	3547	Percent	12.6	5.2	4.1	4.6	3.4	24.8	28.1	17.3	
648	3548	Trips	943	278	128	313	73	1,525	1,351	576	5,397
648	3548	Percent	18.2	5.4	2.5	6.0	1.4	29.4	26.0	11.1	
649	3549	Trips	643	120	121	216	43	873	952	508	3,661
649	3549	Percent	18.5	3.4	3.5	6.2	1.3	25.1	27.4	14.6	
650	3550	Trips	60	71	65	8	14	279	312	136	969
650	3550	Percent	6.4	7.5	6.9	0.9	1.5	29.5	33.0	14.4	

SERVICE FREQUENCIES

FRECUENCIAS DE SERVICIO / FREKANS SÈVIS YO

	FROM DESDE / DE	TO HASTA / A	EVERY CADA / CHAK
WEEKDAY DIAS LABORABLES LASEMÈN	6:00 a.m.	7:00 p.m.	30 min
	7:00 p.m.	12:00 a.m.	60 min
SATURDAY SÁBADO SAMDI	6:00 a.m.	10:00 p.m.	30 min
	10:00 p.m.	12:00 a.m.	60 min
SUNDAY DOMINGO MANCH	6:00 a.m.	7:00 a.m.	60 min
	7:00 a.m.	8:00 p.m.	30 min
	8:00 p.m.	10:00 p.m.	60 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.

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.

Miami-Dade County provides equal access and equal opportunity in employment and does not discriminate on the basis of disability in its programs or services. Auxiliary aids and services for communication are available with five days' advance notice. For material in alternate format (audiotape, Braille or computer disk), a signlanguage interpreter or other accommodations, please contact: Miami-Dade Transit, Office of Civil Rights and Labor Relations, 701 NW 1st Court, Suite 1700, Miami, FL 33136. Attention: ADA Coordinator. Telephone: 786-469-5225, Fax: 786-469-5589. E-mail: DTPW-ADA@miamidade.gov.

Español: El Departamento de Transporte Público de Miami-Dade (MDT, su sigla en inglés) está dedicado a proveer información sobre sus servicios a los pasajeros que no hablan inglés. MDT publica información sobre sus rutas de autobús en español y creole haitiano y ofrece asistencia en ambos idiomas en nuestro Centro de Llamadas en el 3-1-1 o 305-468-5900. Para más informacion, llame la Oficina de Derechos Humanos y Relaciones Laborales de MDT al 786-469-5486.

El Condado de Miami-Dade ofrece igualdad de acceso y de oportunidades en el empleo y no practica la discriminación por discapacidad, en sus programas o servicios. Los dispositivos y servicios de ayuda auditiva para la comunicación están disponibles previa solicitud, con cinco días de anticipación. Para obtener materiales en formato alternativo (cinta de audio, Braille o disco de computadora), para solicitar un intérprete del lenguaje de las señas u otros servicios similares sírvase llamar a: Transporte de Miami-Dade, Oficina de Derechos Civiles y Relaciones Laborales, 701 NW 1st Court, Suite 1700, Miami, FL 33136. Atención: ADA Coordinator. Teléfono: 786-469-5225, Fax: 786-469-5589. Correo electrónico: DTPW-ADA@miamidade.gov.

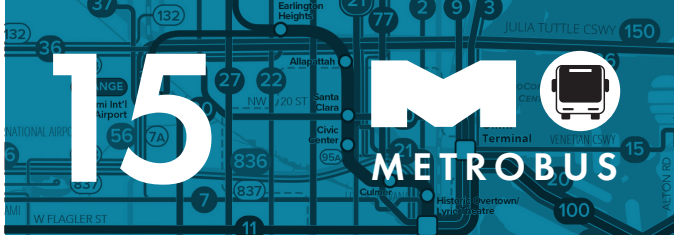
Kreyòl Ayisyen: Miami-Dade Transit (MDT) angaje li a bay pasaje ak konesans limite an Anglè yo tout enfòmasyon sou sèvis transpò piblik nan lang pa yo. MDT pibliye enfòmasyon sou trajè otobis yo an Espanyòl ak an Kreyòl Ayisyen epi li bay asistans nan toude lang yo nan Sant Repons nou an 3-1-1 oswa 305-468-5900. Pou plis enfòmasyon, rele Biwo Dwa Sivik ak Relasyon Travay MDT la nan 786-469-5486.

Konte Miami-Dade bay aksè ak opòtinite egal ego nan anplwa epi li pa fè diskriminasyon baze sou enfi mite nan pwogram li yo ak sèvis li yo. Aparèy ak sèvis kominikasyon pou moun ki pa tande/wè byen yo disponib ak yon preyavi senk jou. Pou jwenn dokiman nan lòt fòma (tep odyo, Bray oswa disk konpit), sèvis yon entèprèt ki pale lang siy oswa lòt akomodasyon, tanpri kontakte: Miami-Dade Transit, Biwo Dwa Civil ak Relasyon Travay, 701 NW 1st Court, Suite 1700, Miami, FL 33136. Atansyon: ADA Coordinator. Telefòn: 786-469-5225, Faks: 786-469-5589. Imel: DTPW-ADA@miamidade.gov.

miamidade.gov/transportation

Information • Información • Enfòmasyon
311 (305.468.5900) TTY/Florida Relay: **711**

@GoMiamiDade **GO Miami-Dade Transit**



NOVEMBER 2024 NOVIEMBRE 2024 | NOVANM 2024

- Local service seven days a week
- Travels from South Beach to Omni Metrobus Terminal / Adrienne Arsht Metromover Station along the Venetian Causeway.

- Servicio local los siete días de la semana.
- Va desde South Beach hasta la terminal Omni del Metrobús/estación Adrienne Arsht Center del Metromover, pasando por Venetian Causeway.

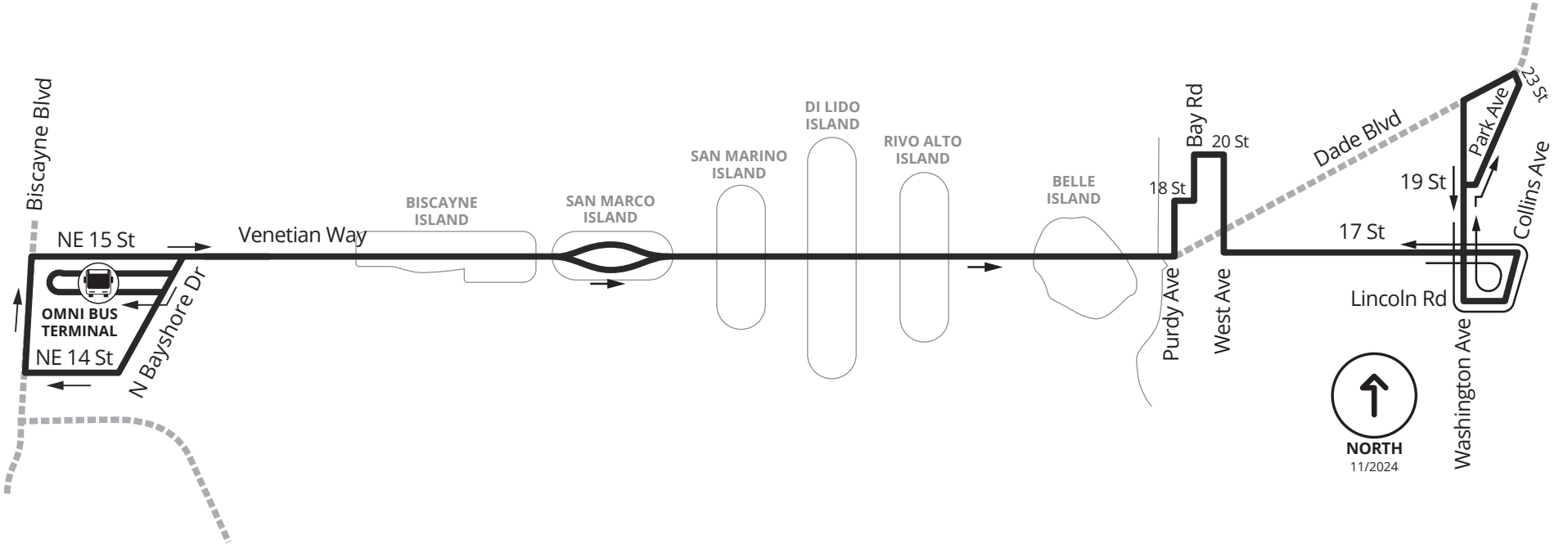
- Sèvis lokal sèt jou sou sèt.
- Vwayaje soti nan South Beach pou rive nan Tèminal Omni Metrobus / Adrienne Arsht Metromover Station sou Venetian Causeway la.

MORE INFORMATION
MÁS INFORMACIÓN | PLIS ENFÒMASYON

MIAMI-DADE COUNTY

DEPARTMENT OF TRANSPORTATION AND PUBLIC WORKS

15

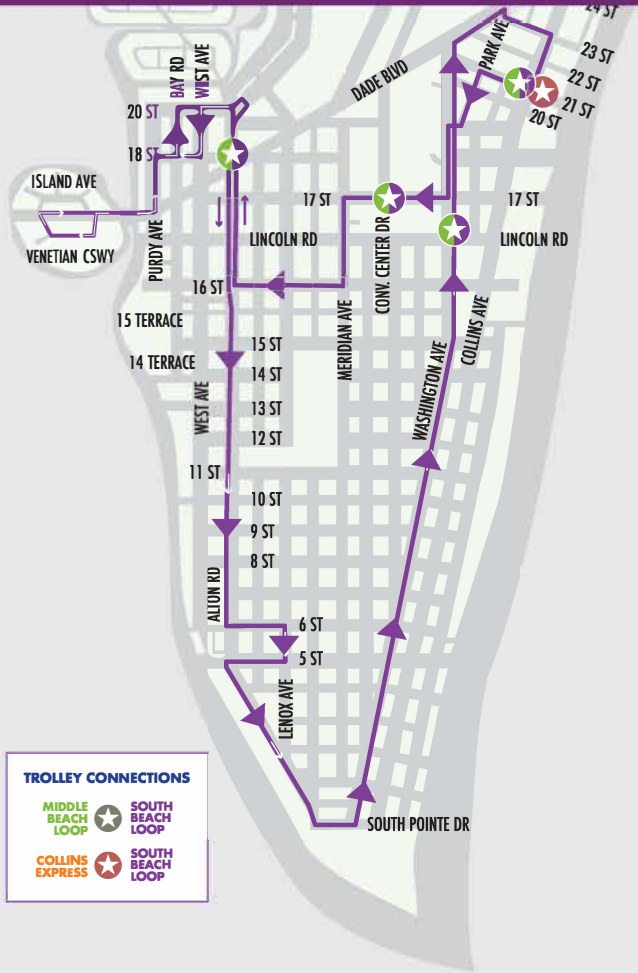

Biscayne Blvd
NE 15 St
Venetian Way
BISCAYNE ISLAND
SAN MARCO ISLAND
SAN MARINO ISLAND
DI LIDO ISLAND
RIVO ALTO ISLAND
BELLE ISLAND
OMNI BUS TERMINAL
NE 14 St
N Bayshore Dr
Purdy Ave
West Ave
Bay Rd
18 St
20 St
Dade Blvd
19 St
17 St
Park Ave
23 St
Collins Ave
Lincoln Rd
Washington Ave
NORTH
11/2024

SOUTH BEACH LOOP - A
Clockwise

TROLLEY CONNECTIONS

- MIDDLE BEACH LOOP ↔ SOUTH BEACH LOOP
- COLLINS EXPRESS ↔ SOUTH BEACH LOOP

SOUTH BEACH LOOP - B
Counter Clockwise



TROLLEY CONNECTIONS

- MIDDLE BEACH LOOP ↔ SOUTH BEACH LOOP
- COLLINS EXPRESS ↔ SOUTH BEACH LOOP

LEGEND

- NORTH BEACH LOOP
- COLLINS EXPRESS
- MIDDLE BEACH LOOP
- SOUTH BEACH LOOP

7 DAYS A WEEK
7 días a la semana

Hours of operation: 8 a.m. to 11 p.m.
Horario de servicio: 8 a.m. a 11 p.m.

Customer Support: 305.673.7117
Servicio al cliente: 305.673.7117

Email: trolley@miamibeachfl.gov

MIAMIBEACHTROLLEY.COM

LEGEND

- MIAMI BEACH WATER TAXI

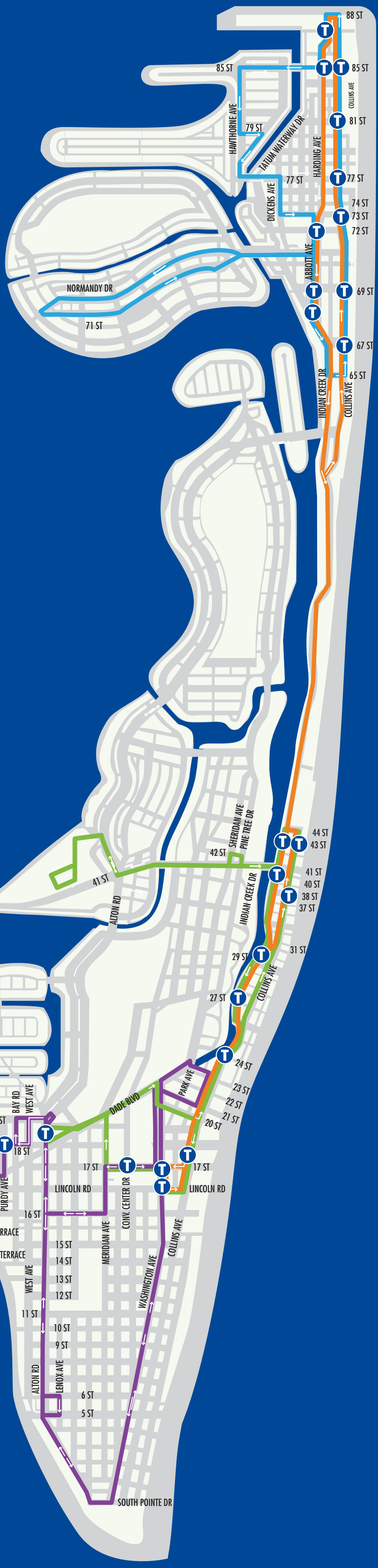
MONDAY – FRIDAY
De lunes a viernes

Hours of operation: 7 a.m. to 7:30 p.m.
Horario de servicio: 7 a.m. a 7:30 p.m.

MIAMIBEACHFL.GOV/WATER-TAXI

TRANSFER POINT

T



Miami-Dade Advanced Traffic Management System
Signal Information Report

Washington Av and 20 St
Intersection Asset Num: 2809: Washington Av&20 St
3/27/2026 From 12:00 AM , To 11:59 PM

Phase Diagram

1	2 SBT 	3	4 WBT 
5	6 NBT 	7	8 EBT 

Report generated on: 3/27/2026 11:50:59 AM

Pattern Summary: 2809: Washington Av&20 St

Pattern Summary

Pattern	Cycle	Offset	1	2-SBT	3	4-WBT	5	6-NBT	7	8-EBT
1	90	68	0	50	0	40	0	50	0	40
2	100	13	0	60	0	40	0	60	0	40
4	110	32	0	70	0	40	0	70	0	40
5	90	21	0	50	0	40	0	50	0	40
6	110	2	0	70	0	40	0	70	0	40
7	90	39	0	50	0	40	0	50	0	40
8	100	14	0	60	0	40	0	60	0	40
10	100	55	0	60	0	40	0	60	0	40
11	100	78	0	60	0	40	0	60	0	40
12	110	12	0	70	0	40	0	70	0	40
14	90	40	0	50	0	40	0	50	0	40
15	110	60	0	70	0	40	0	70	0	40
16	150	64	0	110	0	40	0	110	0	40
18	90	12	0	50	0	40	0	50	0	40
19	100	0	0	60	0	40	0	60	0	40
20	110	0	0	70	0	40	0	70	0	40
21	120	0	0	80	0	40	0	80	0	40
26	120	0	0	80	0	40	0	80	0	40

Pattern Green Summary

Pattern	Cycle	Offset	1	2-SBT	3	4-WBT	5	6-NBT	7	8-EBT
1	90	68	0	44	0	34	0	44	0	34
2	100	13	0	54	0	34	0	54	0	34
4	110	32	0	64	0	34	0	64	0	34
5	90	21	0	44	0	34	0	44	0	34
6	110	2	0	64	0	34	0	64	0	34
7	90	39	0	44	0	34	0	44	0	34
8	100	14	0	54	0	34	0	54	0	34
10	100	55	0	54	0	34	0	54	0	34
11	100	78	0	54	0	34	0	54	0	34
12	110	12	0	64	0	34	0	64	0	34
14	90	40	0	44	0	34	0	44	0	34
15	110	60	0	64	0	34	0	64	0	34
16	150	64	0	104	0	34	0	104	0	34
18	90	12	0	44	0	34	0	44	0	34
19	100	0	0	54	0	34	0	54	0	34
20	110	0	0	64	0	34	0	64	0	34
21	120	0	0	74	0	34	0	74	0	34
26	120	0	0	74	0	34	0	74	0	34

Phase Bank

Phase	Walk			DontWalk			Min Initial			Veh Ext			Max Limit			Max2			Yellow			Red		
Phase Bank	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**
1	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
2-SBT	10	10	10	22	22	22	7	7	7	1.0	1.0	1.0	45	45	45	0	45	45	4.0	4.0	4.0	2.0	2.0	2.0
3	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
4-WBT	0	0	0	0	0	0	7	7	7	2.5	2.5	2.5	25	25	25	40	40	40	4.0	4.0	4.0	2.0	2.0	2.0
5	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
6-NBT	10	10	10	22	22	22	7	7	7	1.0	1.0	1.0	45	45	45	0	45	45	4.0	4.0	4.0	2.0	2.0	2.0
7	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
8-EBT	10	10	10	22	22	22	7	7	7	2.5	2.5	2.5	25	25	25	40	40	40	4.0	4.0	4.0	2.0	2.0	2.0

	Phases
Permit	**-2-4-6-8**
External Permit 0	**-2-4-6-8**
External Permit 1	**-2-4-6-8**
External Permit 2	**-2-4-6-8**

TOD Schedule

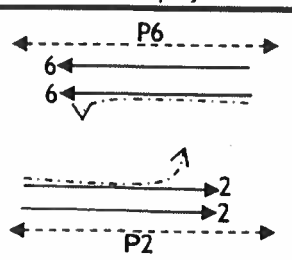
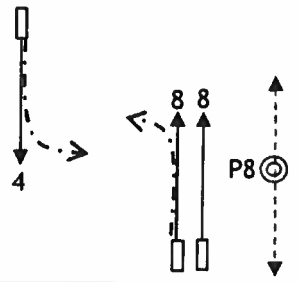
Schedule	Time	Plan	Days of Week						
1	0000	8	Su	M	T	W	Th	F	S
2	0200	Free	Su	M	T	W	Th	F	S
3	0530	10	Su						S
4	0545	10		M	T	W	Th	F	
5	0715	2		M	T	W	Th	F	
6	0800	11		M	T	W	Th	F	
7	0900	4		M	T	W	Th	F	
8	1000	4	Su						S
9	1330	12		M	T	W	Th	F	
10	1530	6		M	T	W	Th	F	
11	1800	8		M	T	W	Th	F	
12	2000	8	Su						S

TOD Function

Schedule	Time	Function	Settings	Days of Week						
1	0000	15 TOD Outputs	--------	Su	M	T	W	Th	F	S

* Settings
Blank - FREE - Phase Bank 1, Max 1
Blank - Plan - Phase Bank 1, Max 2
1 - Phase Bank 2, Max 1
2 - Phase Bank 2, Max 2
3 - Phase Bank 3, Max 1
4 - Phase Bank 3, Max 2
5 - EXTERNAL PERMIT 1
6 - EXTERNAL PERMIT 2
7 - X-PED OMIT
8 - TBA

SIGNAL OPERATING PLAN

	Direction	SBT	NBT	EBT	WBT	Ped Heads				
Timing Phases	Head No.	2	6	4	8	P2	P6		P8	Movements/Display/Actuation
(2+6) Washington Av	Dwell	G	G	R	R	W/F	W/F		DW	
	4+8	Y	Y	R	R	DW	DW		DW	
RECALL										
(4+8) 20 St	Dwell	R	R	G	G	DW	DW		W/F	
	2+6	R	R	Y	Y	DW	DW		DW	
ACTUATED										
	Dwell									
	Dwell									
	Dwell									
	Dwell									
Flashing Operation		FY	FY	FR	FR					Page 1 of 1

Miami-Dade County Public Works Department

Drawn	Date	Washington Av & 20 St		
MLH	04-04-2018			
Checked Evelin Izquierdo PE	Date 4/9/18	Placed in Service Date:	By:	Phasing No. 4	Asset Number 2809

Miami-Dade Advanced Traffic Management System
Signal Information Report

Washington Av and 19 St
Intersection Asset Num: 3394: Washington Av&19 St
3/27/2026 From 12:00 AM , To 11:59 PM

Phase Diagram

1	2 SBT 	3	4 WBT 
5	6 NBT 	7	8

Report generated on: 3/27/2026 11:51:21 AM

Pattern Summary: 3394: Washington Av&19 St

Pattern Summary

Pattern	Cycle	Offset	1	2-SBT	3	4-WBT	5	6-NBT	7	8
1	90	55	0	53	0	37	0	53	0	0
2	100	21	0	63	0	37	0	63	0	0
4	110	51	0	73	0	37	0	73	0	0
5	90	10	0	53	0	37	0	53	0	0
6	110	12	0	73	0	37	0	73	0	0
7	90	55	0	53	0	37	0	53	0	0
8	100	27	0	63	0	37	0	63	0	0
10	100	69	0	63	0	37	0	63	0	0
11	100	89	0	63	0	37	0	63	0	0
12	110	12	0	73	0	37	0	73	0	0
14	90	32	0	53	0	37	0	53	0	0
15	110	63	0	73	0	37	0	73	0	0
16	150	78	0	113	0	37	0	113	0	0
18	90	25	0	53	0	37	0	53	0	0
19	100	0	0	63	0	37	0	63	0	0
20	110	0	0	73	0	37	0	73	0	0
21	120	13	0	83	0	37	0	83	0	0
26	120	0	0	83	0	37	0	83	0	0

Pattern Green Summary

Pattern	Cycle	Offset	1	2-SBT	3	4-WBT	5	6-NBT	7	8
1	90	55	0	47	0	31	0	47	0	0
2	100	21	0	57	0	31	0	57	0	0
4	110	51	0	67	0	31	0	67	0	0
5	90	10	0	47	0	31	0	47	0	0
6	110	12	0	67	0	31	0	67	0	0
7	90	55	0	47	0	31	0	47	0	0
8	100	27	0	57	0	31	0	57	0	0
10	100	69	0	57	0	31	0	57	0	0
11	100	89	0	57	0	31	0	57	0	0
12	110	12	0	67	0	31	0	67	0	0
14	90	32	0	47	0	31	0	47	0	0
15	110	63	0	67	0	31	0	67	0	0
16	150	78	0	107	0	31	0	107	0	0
18	90	25	0	47	0	31	0	47	0	0
19	100	0	0	57	0	31	0	57	0	0
20	110	0	0	67	0	31	0	67	0	0
21	120	13	0	77	0	31	0	77	0	0
26	120	0	0	77	0	31	0	77	0	0

Phase Bank

Phase	Walk			DontWalk			Min Initial			Veh Ext			Max Limit			Max2			Yellow			Red		
Phase Bank	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**
1	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
2-SBT	7	7	7	14	14	14	7	7	7	1.0	1.0	1.0	40	40	40	0	50	50	4.0	4.0	4.0	2.0	2.0	2.0
3	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
4-WBT	7	7	7	24	24	24	7	7	7	2.5	2.5	2.5	10	10	10	40	40	40	4.0	4.0	4.0	2.0	2.0	2.0
5	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
6-NBT	7	7	7	14	14	14	7	7	7	1.0	1.0	1.0	40	40	40	0	50	50	4.0	4.0	4.0	2.0	2.0	2.0
7	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
8	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0

	Phases
Permit	**-2-4-6--**
External Permit 0	**-2-4-6--**
External Permit 1	**-2-4-6--**
External Permit 2	**-2-4-6--**

TOD Schedule

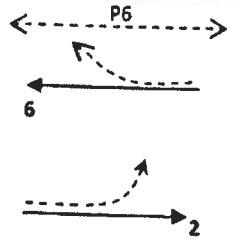
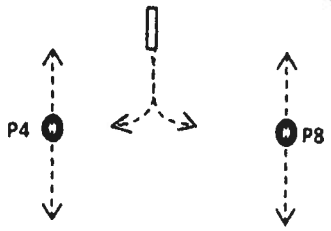
Schedule	Time	Plan	Days of Week						
1	0000	8	Su	M	T	W	Th	F	S
2	0200	Free	Su	M	T	W	Th	F	S
3	0530	10	Su						S
4	0545	10		M	T	W	Th	F	
5	0715	2		M	T	W	Th	F	
6	0800	11		M	T	W	Th	F	
7	0900	4		M	T	W	Th	F	
8	1000	4	Su						S
9	1330	12		M	T	W	Th	F	
10	1530	6		M	T	W	Th	F	
11	1800	8		M	T	W	Th	F	
12	2000	8	Su						S

TOD Function

Schedule	Time	Function	Settings	Days of Week						
1	0000	15 TOD Outputs	--------	Su	M	T	W	Th	F	S
2	0000	14 Output Bits	----4---	Su	M	T	W	Th	F	S
3	0500	14 Output Bits	--------	Su	M	T	W	Th	F	S

* Settings
Blank - FREE - Phase Bank 1, Max 1
Blank - Plan - Phase Bank 1, Max 2
1 - Phase Bank 2, Max 1
2 - Phase Bank 2, Max 2
3 - Phase Bank 3, Max 1
4 - Phase Bank 3, Max 2
5 - EXTERNAL PERMIT 1
6 - EXTERNAL PERMIT 2
7 - X-PED OMIT
8 - TBA

SIGNAL OPERATING PLAN

	Direction	SB	NB	WB		Ped Heads			N ⇦
Timing Phases	Head No.	2	6	4		P6	P4	P8	Movements/Display/Actuation
(2+6) N/S WASHINGTON AVE RECALL	Dwell	G	G	R		W/F	DW	DW	
	4	Y	Y	R		DW	DW	DW	
	Clear to								
(4) 19 STREET ACTUATED	Dwell	R	R	G		DW	W/F	W/F	
	2+6	R	R	Y		DW	DW	DW	
	Clear to								
	Dwell								
	Clear to								
	Dwell								
	Clear to								
	Dwell								
	Clear to								
	Dwell								
	Clear to								
Flashing Operation		FY	FY	FR					Page 1 of 1

	MIAMI-DADE COUNTY PUBLIC WORK DEPARMENT				
MLH	Date 6/4/2018	WASHINGTON Av & 19 STREET			
Checked EA Espinal	Date 8/10/2018	Placed in Service		Phasing No.	Asset Number
		Date	By	4	3394

APPENDIX D
INTERSECTION VOLUME SPREADSHEETS

AM Peak Hour Volumes

THE BARCLAY - 1940 PARK AVENUE

						Site						
Intersection	Road	Direction	Movement	AM PEAK 2026 Existing Volumes	AM PEAK 2029 No Build Volumes	AM PEAK Site Trip Distribution	AM PEAK Site Trip Assignments	AM PEAK Valet Traffic Distribution	AM PEAK Valet Traffic Assignments	AM PEAK Total Site Trips	AM PEAK 2029 Build Volumes	
(1) Washington Avenue & 20th Street	20th Street	Eastbound	EBL	1	1		0		0	0	1	Int 1
			EBT	1	1		0		0	0	1	
			EBR	1	1		0		0	0	1	
			Approach	3	3		0		0	0	3	
		Westbound	WBL	10	10	14%	2		0	2	12	
			WBT	1	1		0		0	0	1	
			WBR	22	22	(30%)	8		0	8	30	
			Approach	33	33	14% (30%)	10		0	10	43	
	Washington Avenue	Northbound	NBL	3	3		0		0	0	3	
			NBT	213	216		0		0	0	216	
			NBR	22	22		0		0	0	22	
			Approach	238	241		0		0	0	241	
		Southbound	SBL	34	35		0		0	0	35	
			SBT	285	290	30%	3		0	3	293	
			SBR	1	1		0		0	0	1	
			Approach	320	326	30%	3		0	3	329	
(2) Washington Avenue & 19th Street	19th Street	Eastbound	EBL	0	0		0		0	0	0	Int 2
			EBT	0	0		0		0	0	0	
			EBR	0	0		0		0	0	0	
			Approach	0	0		0		0	0	0	
		Westbound	WBL	37	38	(52%)	13	100%	11	24	62	
			WBT	0	0		0		0	0	0	
			WBR	17	17	4%	0		0	0	17	
			Approach	54	55	4% (52%)	13	100%	11	24	79	
	Washington Avenue	Northbound	NBL	4	4		0		0	0	4	
			NBT	223	227	52%	6	(100%)	25	31	258	
			NBR	29	29		0		0	0	29	
			Approach	256	260	52%	6	(100%)	25	31	291	
		Southbound	SBL	17	17		0		0	0	17	
			SBT	278	283		0		0	0	283	
			SBR	0	0		0		0	0	0	
			Approach	295	300		0		0	0	300	
(3) Park Avenue & 20th Street	20th Street	Eastbound	EBL	12	12		0		0	0	12	Int 3
			EBT	41	42		0		0	0	42	
			EBR	3	3		0		0	0	3	
			Approach	56	57		0		0	0	57	
		Westbound	WBL	4	4		0		0	0	4	
			WBT	27	27	10%	2		0	2	29	
			WBR	5	5		0		0	0	5	
			Approach	36	36	10%	2		0	2	38	
	Park Avenue	Northbound	NBL	1	1	(30%)	8		0	8	9	
			NBT	9	9	(4%)	1		0	1	10	
			NBR	3	3	(10%)	2		0	2	5	
			Approach	13	13	(44%)	11		0	11	24	
		Southbound	SBL	13	13		0		0	0	13	
			SBT	32	33		0		0	0	33	
			SBR	6	6	4%	0		0	0	6	
			Approach	51	52	4%	0		0	0	52	

AM Peak Hour Volumes

THE BARCLAY - 1940 PARK AVENUE

Intersection	Road	Direction	Movement	AM PEAK 2026 Existing Volumes	AM PEAK 2029 No Build Volumes	Site: AM PEAK Site Trip Distribution	Site: AM PEAK Site Trip Assignments	Site: AM PEAK Valet Traffic Distribution	Site: AM PEAK Valet Traffic Assignments	AM PEAK Total Site Trips	AM PEAK 2029 Build Volumes	
(4) Park Avenue & 19th Street	19th Street	Eastbound	EBL	12	12		0		0	0	12	Int 4
			EBT	33	34		0		0	0	34	
			EBR	1	1		0		0	0	1	
			Approach	46	47		0		0	0	47	
		Westbound	WBL	0	0		0		0	0	0	
			WBT	28	28	4%	0		0	0	28	
			WBR	5	5		0		0	0	5	
			Approach	33	33	4%	0		0	0	33	
	Park Avenue	Northbound	NBL	6	6		0		0	0	6	
			NBT	0	0		0		0	0	0	
			NBR	2	2		0		0	0	2	
			Approach	8	8		0		0	0	8	
		Southbound	SBL	19	19	(4%)	1		0	1	20	
			SBT	1	1		0		0	0	1	
			SBR	20	20	(52%)	13	100%	11	24	44	
			Approach	40	40	(56%)	14	100%	11	25	65	
(5) Washington Avenue & Ingress Driveway	Ingress Driveway	Eastbound	EBL	0	0		0		0	0	0	Int 5
			EBT	0	0		0		0	0	0	
			EBR	0	0		0		0	0	0	
			Approach	0	0		0		0	0	0	
		Westbound	WBL	0	0		0		0	0	0	
			WBT	0	0		0		0	0	0	
			WBR	0	0		0		0	0	0	
			Approach	0	0		0		0	0	0	
	Washington Avenue	Northbound	NBL	0	0		0		0	0	0	
			NBT	0	0		0		0	0	0	
			NBR	0	0	56%	6	(100%)	25	31	31	
			Approach	0	0	56%	6	(100%)	25	31	31	
		Southbound	SBL	0	0	44%	5		0	5	5	
			SBT	0	0		0		0	0	0	
			SBR	0	0		0		0	0	0	
			Approach	0	0	44%	5		0	5	5	
(6) Park Avenue & Egress Driveway	Egress Driveway	Eastbound	EBL	0	0	(44%)	11		0	11	11	Int 6
			EBT	0	0		0		0	0	0	
			EBR	0	0	(56%)	14	100%	11	25	25	
			Approach	0	0	(100%)	25	100%	11	36	36	
		Westbound	WBL	0	0		0		0	0	0	
			WBT	0	0		0		0	0	0	
			WBR	0	0		0		0	0	0	
			Approach	0	0		0		0	0	0	
	Park Avenue	Northbound	NBL	0	0		0		0	0	0	
			NBT	0	0		0		0	0	0	
			NBR	0	0		0		0	0	0	
			Approach	0	0		0		0	0	0	
		Southbound	SBL	0	0		0		0	0	0	
			SBT	0	0		0		0	0	0	
			SBR	0	0		0		0	0	0	
			Approach	0	0		0		0	0	0	

PM Peak Hour Volumes

THE BARCLAY - 1940 PARK AVENUE

						Site						
Intersection	Road	Direction	Movement	PM PEAK 2026 Existing Volumes	PM PEAK 2029 No Build Volumes	PM PEAK Site Trip Distribution	PM PEAK Site Trip Assignments	PM PEAK Valet Traffic Distribution	PM PEAK Valet Traffic Assignments	PM PEAK Total Site Trips	PM PEAK 2029 Build Volumes	
(1) Washington Avenue & 20th Street	20th Street	Eastbound	EBL	3	3		0		0	0	3	Int 1
			EBT	0	0		0		0	0	0	
			EBR	0	0		0		0	0	0	
			Approach	3	3		0		0	0	3	
		Westbound	WBL	23	23	14%	4		0	4	27	
			WBT	0	0		0		0	0	0	
			WBR	56	57	(30%)	4		0	4	61	
			Approach	79	80	14% (30%)	8		0	8	88	
	Washington Avenue	Northbound	NBL	2	2		0		0	0	2	
			NBT	612	622		0		0	0	622	
			NBR	23	23		0		0	0	23	
			Approach	637	647		0		0	0	647	
		Southbound	SBL	34	35		0		0	0	35	
			SBT	276	280	30%	9		0	9	289	
			SBR	1	1		0		0	0	1	
			Approach	311	316	30%	9		0	9	325	
(2) Washington Avenue & 19th Street	19th Street	Eastbound	EBL	0	0		0		0	0	0	Int 2
			EBT	0	0		0		0	0	0	
			EBR	0	0		0		0	0	0	
			Approach	0	0		0		0	0	0	
		Westbound	WBL	54	55	(52%)	6	100%	29	35	90	
			WBT	0	0		0		0	0	0	
			WBR	27	27	4%	1		0	1	28	
			Approach	81	82	4% (52%)	7	100%	29	36	118	
	Washington Avenue	Northbound	NBL	1	1		0		0	0	1	
			NBT	606	616	52%	15	(100%)	13	28	644	
			NBR	46	47		0		0	0	47	
			Approach	653	664	52%	15	(100%)	13	28	692	
		Southbound	SBL	26	26		0		0	0	26	
			SBT	272	276		0		0	0	276	
			SBR	0	0		0		0	0	0	
			Approach	298	302		0		0	0	302	
(3) Park Avenue & 20th Street	20th Street	Eastbound	EBL	11	11		0		0	0	11	Int 3
			EBT	37	38		0		0	0	38	
			EBR	7	7		0		0	0	7	
			Approach	55	56		0		0	0	56	
		Westbound	WBL	7	7		0		0	0	7	
			WBT	66	67	10%	3		0	3	70	
			WBR	19	19		0		0	0	19	
			Approach	92	93	10%	3		0	3	96	
	Park Avenue	Northbound	NBL	8	8	(30%)	4		0	4	12	
			NBT	35	36	(4%)	1		0	1	37	
			NBR	4	4	(10%)	1		0	1	5	
			Approach	47	48	(44%)	6		0	6	54	
		Southbound	SBL	12	12		0		0	0	12	
			SBT	35	36		0		0	0	36	
			SBR	5	5	4%	1		0	1	6	
			Approach	52	53	4%	1		0	1	54	

PM Peak Hour Volumes

THE BARCLAY - 1940 PARK AVENUE

Intersection	Road	Direction	Movement	PM PEAK 2026 Existing Volumes	PM PEAK 2029 No Build Volumes	Site: PM PEAK Site Trip Distribution	Site: PM PEAK Site Trip Assignments	Site: PM PEAK Valet Traffic Distribution	Site: PM PEAK Valet Traffic Assignments	Site: PM PEAK Total Site Trips	PM PEAK 2029 Build Volumes	
(4) Park Avenue & 19th Street	19th Street	Eastbound	EBL	27	27		0		0	0	27	Int 4
			EBT	45	46		0		0	0	46	
			EBR	0	0		0		0	0	0	
			Approach	72	73		0		0	0	73	
		Westbound	WBL	3	3		0		0	0	3	
			WBT	38	39	4%	1		0	1	40	
			WBR	16	16		0		0	0	16	
			Approach	57	58	4%	1		0	1	59	
	Park Avenue	Northbound	NBL	6	6		0		0	0	6	
			NBT	0	0		0		0	0	0	
			NBR	0	0		0		0	0	0	
			Approach	6	6		0		0	0	6	
		Southbound	SBL	11	11	(4%)	1		0	1	12	
			SBT	0	0		0		0	0	0	
			SBR	37	38	(52%)	6	100%	29	35	73	
			Approach	48	49	(56%)	7	100%	29	36	85	
(5) Washington Avenue & Ingress Driveway	Ingress Driveway	Eastbound	EBL	0	0		0		0	0	0	Int 5
			EBT	0	0		0		0	0	0	
			EBR	0	0		0		0	0	0	
			Approach	0	0		0		0	0	0	
		Westbound	WBL	0	0		0		0	0	0	
			WBT	0	0		0		0	0	0	
			WBR	0	0		0		0	0	0	
			Approach	0	0		0		0	0	0	
	Washington Avenue	Northbound	NBL	0	0		0		0	0	0	
			NBT	0	0		0		0	0	0	
			NBR	0	0	56%	16	(100%)	13	29	29	
			Approach	0	0	56%	16	(100%)	13	29	29	
		Southbound	SBL	0	0	44%	13		0	13	13	
			SBT	0	0		0		0	0	0	
			SBR	0	0		0		0	0	0	
			Approach	0	0	44%	13		0	13	13	
(6) Park Avenue & Egress Driveway	Egress Driveway	Eastbound	EBL	0	0	(44%)	6		0	6	6	Int 6
			EBT	0	0		0		0	0	0	
			EBR	0	0	(56%)	7	100%	29	36	36	
			Approach	0	0	(100%)	13	100%	29	42	42	
		Westbound	WBL	0	0		0		0	0	0	
			WBT	0	0		0		0	0	0	
			WBR	0	0		0		0	0	0	
			Approach	0	0		0		0	0	0	
	Park Avenue	Northbound	NBL	0	0		0		0	0	0	
			NBT	0	0		0		0	0	0	
			NBR	0	0		0		0	0	0	
			Approach	0	0		0		0	0	0	
		Southbound	SBL	0	0		0		0	0	0	
			SBT	0	0		0		0	0	0	
			SBR	0	0		0		0	0	0	
			Approach	0	0		0		0	0	0	

APPENDIX E
INTERSECTION CAPACITY REPORTS

EXISTING CONDITIONS

Table 1.1 - 2026 Existing Intersection Capacity Analysis Summary

Location	Time	Level of Service[1]							
		(1) Washington Avenue & 20th Street		(2) Washington Avenue & 19th Street		(3) Park Avenue & 20th Street		(4) Park Avenue & 19th Street	
		Signalized		Signalized		Unsignalized		Unsignalized	
		LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
EBL	AM	D	40.3	N/A				[2]	
	PM	D	37.3						
EBT	AM	D	40.3						
	PM	D	37.3						
EBR	AM	D	40.2						
	PM	D	37.3						
EB Approach	AM	D	40.3			A	7.5		
	PM	D	37.3			A	8.0		
WBL	AM	D	41.6	D	45.4			[2]	
	PM	D	39.6	D	47.6				
WBT	AM	D	41.6	N/A					
	PM	D	39.6						
WBR	AM	D	41.6	D	45.4				
	PM	D	39.6	D	47.6				
WB Approach	AM	D	41.6	D	45.4	A	7.3		
	PM	D	39.6	D	47.6	A	7.8		
NBL	AM	A	2.9	N/A					
	PM	A	6.0						
NBT	AM	A	2.9	A	2.5				
	PM	A	6.0	A	3.7				
NBR	AM	A	2.9	A	2.5				
	PM	A	6.0	A	3.7				
NB Approach	AM	A	2.9	A	2.5	A	7.2	A	9.3
	PM	A	6.0	A	3.7	A	7.7	B	10.2
SBL	AM	A	3.0	A	2.6				
	PM	A	5.2	A	3.1				
SBT	AM	A	3.1	A	2.6				
	PM	A	5.2	A	3.1				
SBR	AM	A	3.1	N/A					
	PM	A	5.2						
SB Approach	AM	A	3.1	A	2.6	A	7.4	A	9.1
	PM	A	5.2	A	3.1	A	7.8	A	9.3
Overall	AM	A	5.3	A	6.4	A	7.4		
	PM	A	8.4	A	7.0	A	7.8		

[1] Delay is average delay per vehicle in seconds

[2] Approach operates under Free-flow conditions

Table 1.2 - 2026 Existing Intersection Queue Lengths Summary

Location	Time	95th Percentile Queue Lengths (ft)															
		EBL		EBR		WBL		WBR		NBL		NBR		SBL		SBR	
		Storage (ft)	95th %tile	Storage (ft)	95th %tile	Storage (ft)	95th %tile	Storage (ft)	95th %tile	Storage (ft)	95th %tile	Storage (ft)	95th %tile	Storage (ft)	95th %tile	Storage (ft)	95th %tile
(1) Washington Avenue & 20th Street	AM	40	3														
	PM		3														
(2) Washington Avenue & 19th Street	AM																
	PM																
(3) Park Avenue & 20th Street	AM																
	PM																
(4) Park Avenue & 19th Street	AM																
	PM																

LANGAN
ENGINEERING & ENVIRONMENTAL SERVICES

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	1	1	10	1	22	3	213	22	34	285	1
Future Volume (vph)	1	1	1	10	1	22	3	213	22	34	285	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	9	9	9	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	40		0	0		0	0		0	0		0
Storage Lanes	1		1	0		0	0		0	0		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			35			35	
Link Distance (ft)		123			335			560			189	
Travel Time (s)		3.4			9.1			10.9			3.7	
Adj. Flow (vph)	1	1	1	12	1	26	4	254	26	40	339	1
Lane Group Flow (vph)	0	2	1	0	39	0	0	284	0	0	380	0
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			6			2	
Permitted Phases	8		8	4			6			2		
Detector Phase	8	8	8	4	4		6	6		2	2	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	38.0	38.0	38.0	13.0	13.0		38.0	38.0		38.0	38.0	
Total Split (s)	40.0	40.0	40.0	40.0	40.0		60.0	60.0		60.0	60.0	
Total Split (%)	40.0%	40.0%	40.0%	40.0%	40.0%		60.0%	60.0%		60.0%	60.0%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0	0.0		0.0			0.0			0.0	
Total Lost Time (s)		6.0	6.0		6.0			6.0			6.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None		C-Max	C-Max		C-Max	C-Max	

Intersection Summary	
Area Type:	Other
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 78 (78%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow	
Natural Cycle: 80	
Control Type: Actuated-Coordinated	

Splits and Phases: 1: Washington Avenue & 20th Street

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	1	1	10	1	22	3	213	22	34	285	1
Future Volume (veh/h)	1	1	1	10	1	22	3	213	22	34	285	1
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	0.96	0.96	0.96	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	0.98		0.98	0.98		0.98	0.99		0.97	0.99		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1682	1781	1696	1856	1767	1767	1678	1796	1856
Adj Flow Rate, veh/h	1	1	1	12	1	26	4	254	26	40	339	1
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	3	3	3	10	3	9	3	9	9	15	7	3
Cap, veh/h	120	102	159	76	22	102	51	2312	232	272	2265	7
Arrive On Green	0.10	0.10	0.10	0.10	0.10	0.10	0.78	0.78	0.78	0.78	0.78	0.78
Sat Flow, veh/h	637	986	1536	277	216	986	18	2976	299	294	2916	9
Grp Volume(v), veh/h	2	0	1	39	0	0	150	0	134	192	0	188
Grp Sat Flow(s),veh/h/ln	1623	0	1536	1479	0	0	1752	0	1541	1586	0	1633
Q Serve(g_s), s	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	2.1	0.0	0.0	2.9
Cycle Q Clear(g_c), s	0.1	0.0	0.1	2.3	0.0	0.0	2.1	0.0	2.1	2.7	0.0	2.9
Prop In Lane	0.50		1.00	0.31		0.67	0.03		0.19	0.21		0.01
Lane Grp Cap(c), veh/h	222	0	159	200	0	0	1398	0	1197	1275	0	1268
V/C Ratio(X)	0.01	0.00	0.01	0.20	0.00	0.00	0.11	0.00	0.11	0.15	0.00	0.15
Avail Cap(c_a), veh/h	591	0	522	538	0	0	1398	0	1197	1275	0	1268
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	40.2	0.0	40.2	41.2	0.0	0.0	2.7	0.0	2.7	2.8	0.0	2.8
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.3	0.0	0.0	0.2	0.0	0.2	0.3	0.0	0.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.1	0.0	0.0	1.6	0.0	0.0	1.0	0.0	0.9	1.4	0.0	1.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	40.3	0.0	40.2	41.6	0.0	0.0	2.9	0.0	2.9	3.0	0.0	3.1
LnGrp LOS	D		D	D			A		A	A		A
Approach Vol, veh/h		3			39			284			380	
Approach Delay, s/veh		40.3			41.6			2.9			3.1	
Approach LOS		D			D			A			A	

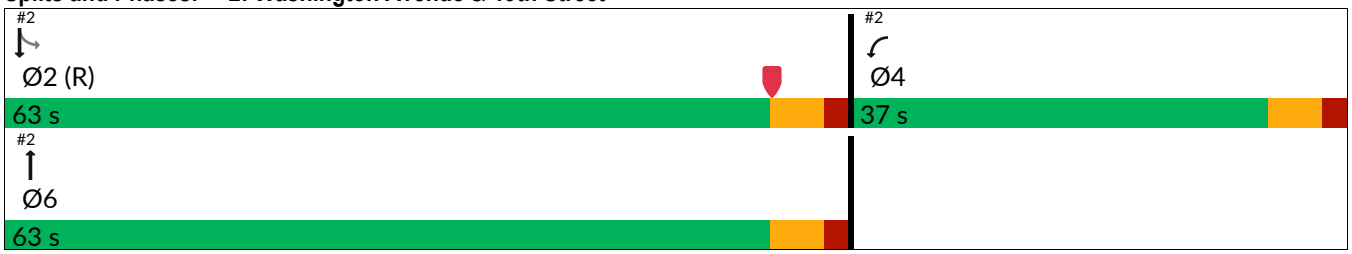
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		83.7		16.3		83.7		16.3				
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0				
Max Green Setting (Gmax), s		54.0		34.0		54.0		34.0				
Max Q Clear Time (g_c+I1), s		4.9		4.3		4.1		2.1				
Green Ext Time (p_c), s		0.8		0.1		0.5		0.0				

Intersection Summary												
HCM 7th Control Delay, s/veh			5.3									
HCM 7th LOS			A									

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	37	17	223	29	17	278
Future Volume (vph)	37	17	223	29	17	278
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	9	9	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	0	0		0	0	
Storage Lanes	1	0		0	0	
Taper Length (ft)	25	25		25	25	
Right Turn on Red		Yes		Yes		
Link Speed (mph)	25		35			35
Link Distance (ft)	123		293			560
Travel Time (s)	3.4		5.7			10.9
Adj. Flow (vph)	45	20	269	35	20	335
Lane Group Flow (vph)	65	0	304	0	0	355
Turn Type	Prot		NA		Perm	NA
Protected Phases	4		6			2
Permitted Phases					2	
Detector Phase	4		6		2	2
Switch Phase						
Minimum Initial (s)	7.0		7.0		7.0	7.0
Minimum Split (s)	37.0		27.0		27.0	27.0
Total Split (s)	37.0		63.0		63.0	63.0
Total Split (%)	37.0%		63.0%		63.0%	63.0%
Yellow Time (s)	4.0		4.0		4.0	4.0
All-Red Time (s)	2.0		2.0		2.0	2.0
Lost Time Adjust (s)	0.0		0.0			0.0
Total Lost Time (s)	6.0		6.0			6.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None		Max		C-Max	C-Max

Intersection Summary	
Area Type:	Other
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 89 (89%), Referenced to phase 2:SBTL, Start of Yellow	
Natural Cycle: 65	
Control Type: Actuated-Coordinated	

Splits and Phases: 2: Washington Avenue & 19th Street



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	37	17	223	29	17	278
Future Volume (veh/h)	37	17	223	29	17	278
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	0.96	0.96	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00	0.97		0.96	0.99	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1781	1781	1767	1796	1811	1811
Adj Flow Rate, veh/h	45	20	269	35	20	335
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83
Percent Heavy Veh, %	3	3	9	7	6	6
Cap, veh/h	95	42	2364	304	152	2485
Arrive On Green	0.09	0.09	0.79	0.79	0.79	0.79
Sat Flow, veh/h	1105	491	3065	382	142	3211
Grp Volume(v), veh/h	66	0	150	154	187	168
Grp Sat Flow(s),veh/h/ln	1621	0	1678	1681	1704	1566
Q Serve(g_s), s	3.9	0.0	2.0	2.1	0.0	2.5
Cycle Q Clear(g_c), s	3.9	0.0	2.0	2.1	2.4	2.5
Prop In Lane	0.68	0.30		0.23	0.11	
Lane Grp Cap(c), veh/h	139	0	1333	1335	1394	1244
V/C Ratio(X)	0.47	0.00	0.11	0.12	0.13	0.13
Avail Cap(c_a), veh/h	502	0	1333	1335	1394	1244
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.99	0.99
Uniform Delay (d), s/veh	43.6	0.0	2.3	2.3	2.4	2.4
Incr Delay (d2), s/veh	1.9	0.0	0.2	0.2	0.2	0.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	2.9	0.0	0.9	0.9	1.1	1.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	45.4	0.0	2.5	2.5	2.6	2.6
LnGrp LOS	D		A	A	A	A
Approach Vol, veh/h	66		304			355
Approach Delay, s/veh	45.4		2.5			2.6
Approach LOS	D		A			A

Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		85.4		14.6		85.4
Change Period (Y+Rc), s		6.0		6.0		6.0
Max Green Setting (Gmax), s		57.0		31.0		57.0
Max Q Clear Time (g_c+I1), s		4.5		5.9		4.1
Green Ext Time (p_c), s		0.7		0.1		0.6

Intersection Summary	
HCM 7th Control Delay, s/veh	6.4
HCM 7th LOS	A

Intersection	
Intersection Delay, s/veh	7.4
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	12	41	3	4	27	5	1	9	3	13	32	6
Future Vol, veh/h	12	41	3	4	27	5	1	9	3	13	32	6
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles, %	8	15	3	3	15	3	3	3	3	3	3	3
Mvmt Flow	13	43	3	4	28	5	1	9	3	14	34	6
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay, s/veh	7.5	7.3	7.2	7.4
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	8%	21%	11%	25%
Vol Thru, %	69%	73%	75%	63%
Vol Right, %	23%	5%	14%	12%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	13	56	36	51
LT Vol	1	12	4	13
Through Vol	9	41	27	32
RT Vol	3	3	5	6
Lane Flow Rate	14	59	38	54
Geometry Grp	1	1	1	1
Degree of Util (X)	0.015	0.069	0.043	0.061
Departure Headway (Hd)	4.037	4.193	4.052	4.109
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	879	851	879	866
Service Time	2.099	2.233	2.098	2.162
HCM Lane V/C Ratio	0.016	0.069	0.043	0.062
HCM Control Delay, s/veh	7.2	7.5	7.3	7.4
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0	0.2	0.1	0.2

Intersection	
Int Delay, s/veh	4.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	12	33	1	0	28	5	6	0	2	19	1	20
Future Vol, veh/h	12	33	1	0	28	5	6	0	2	19	1	20
Conflicting Peds, #/hr	7	0	15	15	0	7	7	0	9	9	0	7
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	8	6	3	3	4	3	3	3	3	3	3	3
Mvmt Flow	13	35	1	0	30	5	6	0	2	20	1	22

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	42	0	0	52	0	0	114	119	60	110	117	47
Stage 1	-	-	-	-	-	-	77	77	-	40	40	-
Stage 2	-	-	-	-	-	-	38	42	-	70	77	-
Critical Hdwy	4.18	-	-	4.13	-	-	7.13	6.53	6.23	7.13	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Follow-up Hdwy	2.272	-	-	2.227	-	-	3.527	4.027	3.327	3.527	4.027	3.327
Pot Cap-1 Maneuver	1529	-	-	1548	-	-	860	769	1003	866	771	1020
Stage 1	-	-	-	-	-	-	930	829	-	973	860	-
Stage 2	-	-	-	-	-	-	975	858	-	937	829	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1521	-	-	1524	-	-	816	747	981	847	749	1009
Mov Cap-2 Maneuver	-	-	-	-	-	-	816	747	-	847	749	-
Stage 1	-	-	-	-	-	-	907	809	-	968	856	-
Stage 2	-	-	-	-	-	-	948	853	-	921	809	-

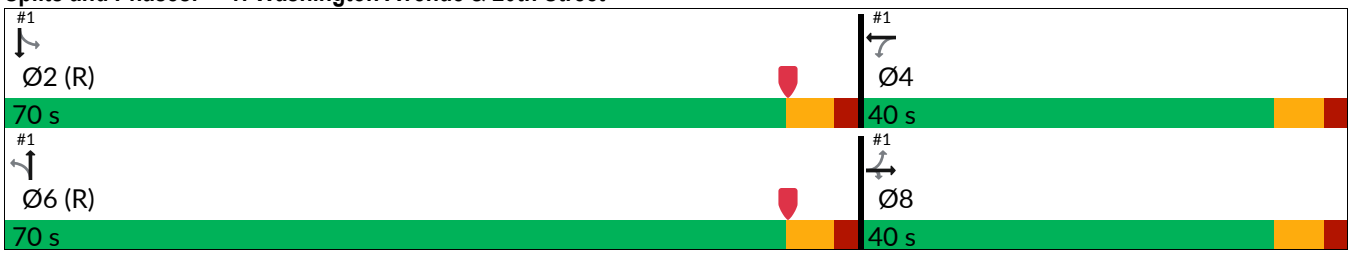
Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	1.93	0	9.27	9.12
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	852	467	-	-	1524	-	-	918
HCM Lane V/C Ratio	0.01	0.008	-	-	-	-	-	0.047
HCM Ctrl Dly (s/v)	9.3	7.4	0	-	0	-	-	9.1
HCM Lane LOS	A	A	A	-	A	-	-	A
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0.1

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	0	0	23	0	56	2	612	23	34	276	1
Future Volume (vph)	3	0	0	23	0	56	2	612	23	34	276	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	9	9	9	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	40		0	0		0	0		0	0		0
Storage Lanes	1		1	0		0	0		0	0		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			35			35	
Link Distance (ft)		123			335			560			189	
Travel Time (s)		3.4			9.1			10.9			3.7	
Adj. Flow (vph)	3	0	0	23	0	57	2	618	23	34	279	1
Lane Group Flow (vph)	0	3	0	0	80	0	0	643	0	0	314	0
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			6			2	
Permitted Phases	8		8	4			6			2		
Detector Phase	8	8	8	4	4		6	6		2	2	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	38.0	38.0	38.0	13.0	13.0		38.0	38.0		38.0	38.0	
Total Split (s)	40.0	40.0	40.0	40.0	40.0		70.0	70.0		70.0	70.0	
Total Split (%)	36.4%	36.4%	36.4%	36.4%	36.4%		63.6%	63.6%		63.6%	63.6%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0	0.0		0.0			0.0			0.0	
Total Lost Time (s)		6.0	6.0		6.0			6.0			6.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None		C-Max	C-Max		C-Max	C-Max	

Intersection Summary	
Area Type:	Other
Cycle Length: 110	
Actuated Cycle Length: 110	
Offset: 2 (2%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow	
Natural Cycle: 80	
Control Type: Actuated-Coordinated	

Splits and Phases: 1: Washington Avenue & 20th Street



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	0	0	23	0	56	2	612	23	34	276	1
Future Volume (veh/h)	3	0	0	23	0	56	2	612	23	34	276	1
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	0.96	0.96	0.96	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	0.97		1.00	0.96		0.96	0.98		0.94	0.99		0.94
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1781	1781	1781	1856	1856	1841	1722	1841	1856
Adj Flow Rate, veh/h	3	0	0	23	0	57	2	618	23	34	279	1
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	4	12	4	3
Cap, veh/h	299	0	279	96	19	181	34	2414	89	241	2015	7
Arrive On Green	0.18	0.00	0.00	0.18	0.00	0.18	0.71	0.71	0.71	0.71	0.71	0.71
Sat Flow, veh/h	1315	0	1572	305	108	1022	1	3384	125	282	2824	10
Grp Volume(v), veh/h	3	0	0	80	0	0	339	0	304	154	0	160
Grp Sat Flow(s),veh/h/ln	1315	0	1572	1435	0	0	1854	0	1656	1444	0	1672
Q Serve(g_s), s	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	7.1	0.0	0.0	3.3
Cycle Q Clear(g_c), s	0.2	0.0	0.0	5.0	0.0	0.0	7.1	0.0	7.1	7.1	0.0	3.3
Prop In Lane	1.00		1.00	0.29		0.71	0.01		0.08	0.22		0.01
Lane Grp Cap(c), veh/h	299	0	279	297	0	0	1356	0	1182	1071	0	1193
V/C Ratio(X)	0.01	0.00	0.00	0.27	0.00	0.00	0.25	0.00	0.26	0.14	0.00	0.13
Avail Cap(c_a), veh/h	469	0	486	482	0	0	1356	0	1182	1071	0	1193
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	0.98	0.00	0.98	1.00	0.00	1.00
Uniform Delay (d), s/veh	37.3	0.0	0.0	39.3	0.0	0.0	5.5	0.0	5.5	4.9	0.0	5.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.4	0.0	0.0	0.4	0.0	0.5	0.3	0.0	0.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.1	0.0	0.0	3.5	0.0	0.0	4.5	0.0	4.1	1.9	0.0	1.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	37.3	0.0	0.0	39.6	0.0	0.0	6.0	0.0	6.0	5.2	0.0	5.2
LnGrp LOS	D			D			A		A	A		A
Approach Vol, veh/h		3			80			643			314	
Approach Delay, s/veh		37.3			39.6			6.0			5.2	
Approach LOS		D			D			A			A	

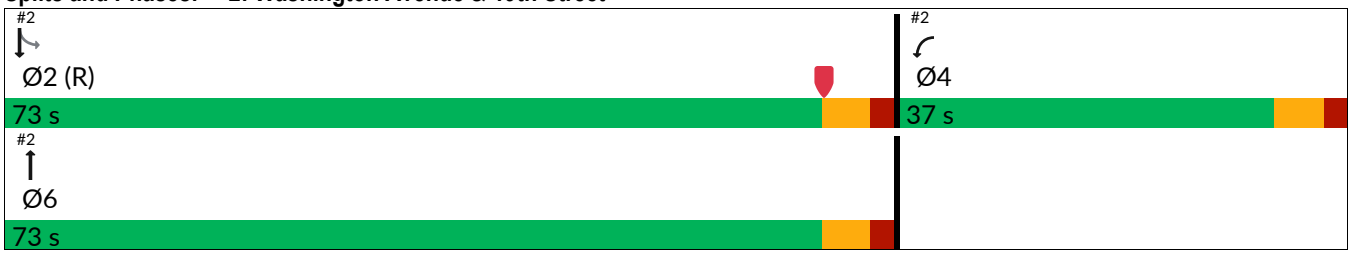
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		84.5		25.5		84.5		25.5				
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0				
Max Green Setting (Gmax), s		64.0		34.0		64.0		34.0				
Max Q Clear Time (g_c+I1), s		9.1		7.0		9.1		2.2				
Green Ext Time (p_c), s		0.7		0.4		1.3		0.0				

Intersection Summary												
HCM 7th Control Delay, s/veh			8.4									
HCM 7th LOS			A									

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	54	27	606	46	26	272
Future Volume (vph)	54	27	606	46	26	272
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	9	9	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	0	0		0	0	
Storage Lanes	1	0		0	0	
Taper Length (ft)	25	25		25	25	
Right Turn on Red		Yes		Yes		
Link Speed (mph)	25		35			35
Link Distance (ft)	123		296			560
Travel Time (s)	3.4		5.8			10.9
Adj. Flow (vph)	56	28	631	48	27	283
Lane Group Flow (vph)	84	0	679	0	0	310
Turn Type	Prot		NA		Perm	NA
Protected Phases	4		6			2
Permitted Phases					2	
Detector Phase	4		6		2	2
Switch Phase						
Minimum Initial (s)	7.0		7.0		7.0	7.0
Minimum Split (s)	37.0		27.0		27.0	27.0
Total Split (s)	37.0		73.0		73.0	73.0
Total Split (%)	33.6%		66.4%		66.4%	66.4%
Yellow Time (s)	4.0		4.0		4.0	4.0
All-Red Time (s)	2.0		2.0		2.0	2.0
Lost Time Adjust (s)	0.0		0.0			0.0
Total Lost Time (s)	6.0		6.0			6.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None		Max		C-Max	C-Max

Intersection Summary	
Area Type:	Other
Cycle Length: 110	
Actuated Cycle Length: 110	
Offset: 12 (11%), Referenced to phase 2:SBTL, Start of Yellow	
Natural Cycle: 65	
Control Type: Actuated-Coordinated	

Splits and Phases: 2: Washington Avenue & 19th Street



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	54	27	606	46	26	272
Future Volume (veh/h)	54	27	606	46	26	272
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	0.96	0.96	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00	0.96		0.95	0.99	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1781	1781	1856	1796	1856	1841
Adj Flow Rate, veh/h	56	28	631	48	27	283
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	3	3	3	7	3	4
Cap, veh/h	116	58	2584	196	212	2251
Arrive On Green	0.11	0.11	0.78	0.78	0.78	0.78
Sat Flow, veh/h	1058	529	3400	251	223	2965
Grp Volume(v), veh/h	85	0	336	343	158	152
Grp Sat Flow(s),veh/h/ln	1606	0	1763	1796	1513	1591
Q Serve(g_s), s	5.5	0.0	5.7	5.7	0.0	2.5
Cycle Q Clear(g_c), s	5.5	0.0	5.7	5.7	2.3	2.5
Prop In Lane	0.66	0.33		0.14	0.17	
Lane Grp Cap(c), veh/h	176	0	1377	1403	1220	1243
V/C Ratio(X)	0.48	0.00	0.24	0.24	0.13	0.12
Avail Cap(c_a), veh/h	453	0	1377	1403	1220	1243
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.99	0.99
Uniform Delay (d), s/veh	46.0	0.0	3.2	3.2	2.9	2.9
Incr Delay (d2), s/veh	1.5	0.0	0.4	0.4	0.2	0.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	4.1	0.0	3.0	3.0	1.2	1.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	47.6	0.0	3.7	3.7	3.1	3.1
LnGrp LOS	D		A	A	A	A
Approach Vol, veh/h	85		679			310
Approach Delay, s/veh	47.6		3.7			3.1
Approach LOS	D		A			A

Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		92.0		18.0		92.0
Change Period (Y+Rc), s		6.0		6.0		6.0
Max Green Setting (Gmax), s		67.0		31.0		67.0
Max Q Clear Time (g_c+I1), s		4.5		7.5		7.7
Green Ext Time (p_c), s		0.7		0.2		1.4

Intersection Summary	
HCM 7th Control Delay, s/veh	7.0
HCM 7th LOS	A

Intersection	
Intersection Delay, s/veh	7.8
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	11	37	7	7	66	19	8	35	4	12	35	5
Future Vol, veh/h	11	37	7	7	66	19	8	35	4	12	35	5
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Heavy Vehicles, %	18	8	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	13	44	8	8	79	23	10	42	5	14	42	6
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay, s/veh	8	7.8	7.7	7.8
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	17%	20%	8%	23%
Vol Thru, %	74%	67%	72%	67%
Vol Right, %	9%	13%	21%	10%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	47	55	92	52
LT Vol	8	11	7	12
Through Vol	35	37	66	35
RT Vol	4	7	19	5
Lane Flow Rate	56	65	110	62
Geometry Grp	1	1	1	1
Degree of Util (X)	0.068	0.083	0.125	0.076
Departure Headway (Hd)	4.4	4.562	4.097	4.399
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	818	790	860	818
Service Time	2.406	2.562	2.195	2.404
HCM Lane V/C Ratio	0.068	0.082	0.128	0.076
HCM Control Delay, s/veh	7.7	8	7.8	7.8
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.2	0.3	0.4	0.2

Intersection	
Int Delay, s/veh	4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	27	45	0	3	38	16	6	0	0	11	0	37
Future Vol, veh/h	27	45	0	3	38	16	6	0	0	11	0	37
Conflicting Peds, #/hr	9	0	12	12	0	9	4	0	5	5	0	4
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	80	80	80	80	80	80	80	80	80	80	80
Heavy Vehicles, %	4	4	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	34	56	0	4	48	20	8	0	0	14	0	46

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	77	0	0	68	0	0	195	220	73	203	210	71
Stage 1	-	-	-	-	-	-	136	136	-	74	74	-
Stage 2	-	-	-	-	-	-	59	84	-	129	136	-
Critical Hdwy	4.14	-	-	4.13	-	-	7.13	6.53	6.23	7.13	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Follow-up Hdwy	2.236	-	-	2.227	-	-	3.527	4.027	3.327	3.527	4.027	3.327
Pot Cap-1 Maneuver	1510	-	-	1527	-	-	762	677	986	753	686	989
Stage 1	-	-	-	-	-	-	865	782	-	933	831	-
Stage 2	-	-	-	-	-	-	950	823	-	873	782	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1500	-	-	1508	-	-	697	647	970	727	655	980
Mov Cap-2 Maneuver	-	-	-	-	-	-	697	647	-	727	655	-
Stage 1	-	-	-	-	-	-	835	755	-	924	824	-
Stage 2	-	-	-	-	-	-	900	816	-	849	755	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	2.8	0.39	10.22	9.25
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	697	675	-	-	89	-	-	908
HCM Lane V/C Ratio	0.011	0.022	-	-	0.002	-	-	0.066
HCM Ctrl Dly (s/v)	10.2	7.5	0	-	7.4	0	-	9.2
HCM Lane LOS	B	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0	0.1	-	-	0	-	-	0.2

FUTURE NO BUILD CONDITIONS

Table 2.1 - 2029 No Build Intersection Capacity Analysis Summary

Location	Time	Level of Service[1]							
		(1) Washington Avenue & 20th Street		(2) Washington Avenue & 19th Street		(3) Park Avenue & 20th Street		(4) Park Avenue & 19th Street	
		Signalized		Signalized		Unsignalized		Unsignalized	
		LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
EBL	AM	D	40.3	N/A				[2]	
	PM	D	37.3						
EBT	AM	D	40.3						
	PM	D	37.3						
EBR	AM	D	40.2						
	PM	D	37.3						
EB Approach	AM	D	40.3			A	7.6		
	PM	D	37.3			A	8.0		
WBL	AM	D	41.6	D	45.5			[2]	
	PM	D	39.6	D	47.6				
WBT	AM	D	41.6	N/A					
	PM	D	39.6						
WBR	AM	D	41.6	D	45.5				
	PM	D	39.6	D	47.6				
WB Approach	AM	D	41.6	D	45.5	A	7.3		
	PM	D	39.6	D	47.6	A	7.8		
NBL	AM	A	2.9	N/A					
	PM	A	6.0						
NBT	AM	A	2.9	A	2.5				
	PM	A	6.1	A	3.7				
NBR	AM	A	2.9	A	2.5				
	PM	A	6.1	A	3.7				
NB Approach	AM	A	2.9	A	2.5	A	7.2	A	9.3
	PM	A	6.0	A	3.7	A	7.8	B	10.3
SBL	AM	A	3.1	A	2.6				
	PM	A	5.2	A	3.1				
SBT	AM	A	3.1	A	2.6				
	PM	A	5.2	A	3.1				
SBR	AM	A	3.1	N/A					
	PM	A	5.2						
SB Approach	AM	A	3.1	A	2.6	A	7.4	A	9.1
	PM	A	5.2	A	3.1	A	7.8	A	9.3
Overall	AM	A	5.3	A	6.5	A	7.4		
	PM	A	8.5	A	7.0	A	7.8		

[1] Delay is average delay per vehicle in seconds

[2] Approach operates under Free-flow conditions

Table 2.2 - 2029 No Build Intersection Queue Lengths Summary

Location	Time	95th Percentile Queue Lengths (ft)															
		EBL		EBR		WBL		WBR		NBL		NBR		SBL		SBR	
		Storage (ft)	95th %tile	Storage (ft)	95th %tile	Storage (ft)	95th %tile	Storage (ft)	95th %tile	Storage (ft)	95th %tile	Storage (ft)	95th %tile	Storage (ft)	95th %tile	Storage (ft)	95th %tile
(1) Washington Avenue & 20th Street	AM	40	3														
	PM		3														
(2) Washington Avenue & 19th Street	AM																
	PM																
(3) Park Avenue & 20th Street	AM																
	PM																
(4) Park Avenue & 19th Street	AM																
	PM																

LANGAN
ENGINEERING & ENVIRONMENTAL SERVICES

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	1	1	10	1	22	3	216	22	35	290	1
Future Volume (vph)	1	1	1	10	1	22	3	216	22	35	290	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	9	9	9	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	40		0	0		0	0		0	0		0
Storage Lanes	1		1	0		0	0		0	0		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			35			35	
Link Distance (ft)		123			335			560			189	
Travel Time (s)		3.4			9.1			10.9			3.7	
Adj. Flow (vph)	1	1	1	12	1	26	4	257	26	42	345	1
Lane Group Flow (vph)	0	2	1	0	39	0	0	287	0	0	388	0
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			6			2	
Permitted Phases	8		8	4			6			2		
Detector Phase	8	8	8	4	4		6	6		2	2	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	38.0	38.0	38.0	13.0	13.0		38.0	38.0		38.0	38.0	
Total Split (s)	40.0	40.0	40.0	40.0	40.0		60.0	60.0		60.0	60.0	
Total Split (%)	40.0%	40.0%	40.0%	40.0%	40.0%		60.0%	60.0%		60.0%	60.0%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0	0.0		0.0			0.0			0.0	
Total Lost Time (s)		6.0	6.0		6.0			6.0			6.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None		C-Max	C-Max		C-Max	C-Max	

Intersection Summary	
Area Type:	Other
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 78 (78%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow	
Natural Cycle: 80	
Control Type: Actuated-Coordinated	

Splits and Phases: 1: Washington Avenue & 20th Street

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	1	1	10	1	22	3	216	22	35	290	1
Future Volume (veh/h)	1	1	1	10	1	22	3	216	22	35	290	1
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	0.96	0.96	0.96	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	0.98		0.98	0.98		0.98	0.99		0.97	0.99		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1682	1781	1696	1856	1767	1767	1678	1796	1856
Adj Flow Rate, veh/h	1	1	1	12	1	26	4	257	26	42	345	1
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	3	3	3	10	3	9	3	9	9	15	7	3
Cap, veh/h	120	102	159	76	22	102	51	2315	230	279	2253	7
Arrive On Green	0.10	0.10	0.10	0.10	0.10	0.10	0.78	0.78	0.78	0.78	0.78	0.78
Sat Flow, veh/h	637	986	1536	277	216	986	18	2980	296	302	2900	8
Grp Volume(v), veh/h	2	0	1	39	0	0	152	0	135	196	0	192
Grp Sat Flow(s),veh/h/ln	1623	0	1536	1479	0	0	1752	0	1542	1578	0	1633
Q Serve(g_s), s	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	2.2	0.0	0.0	3.0
Cycle Q Clear(g_c), s	0.1	0.0	0.1	2.3	0.0	0.0	2.1	0.0	2.2	2.7	0.0	3.0
Prop In Lane	0.50		1.00	0.31		0.67	0.03		0.19	0.21		0.01
Lane Grp Cap(c), veh/h	222	0	159	200	0	0	1398	0	1198	1270	0	1268
V/C Ratio(X)	0.01	0.00	0.01	0.20	0.00	0.00	0.11	0.00	0.11	0.15	0.00	0.15
Avail Cap(c_a), veh/h	591	0	522	538	0	0	1398	0	1198	1270	0	1268
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	40.2	0.0	40.2	41.2	0.0	0.0	2.7	0.0	2.7	2.8	0.0	2.8
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.3	0.0	0.0	0.2	0.0	0.2	0.3	0.0	0.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.1	0.0	0.0	1.6	0.0	0.0	1.0	0.0	0.9	1.4	0.0	1.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	40.3	0.0	40.2	41.6	0.0	0.0	2.9	0.0	2.9	3.1	0.0	3.1
LnGrp LOS	D		D	D			A		A	A		A
Approach Vol, veh/h		3			39			287			388	
Approach Delay, s/veh		40.3			41.6			2.9			3.1	
Approach LOS		D			D			A			A	

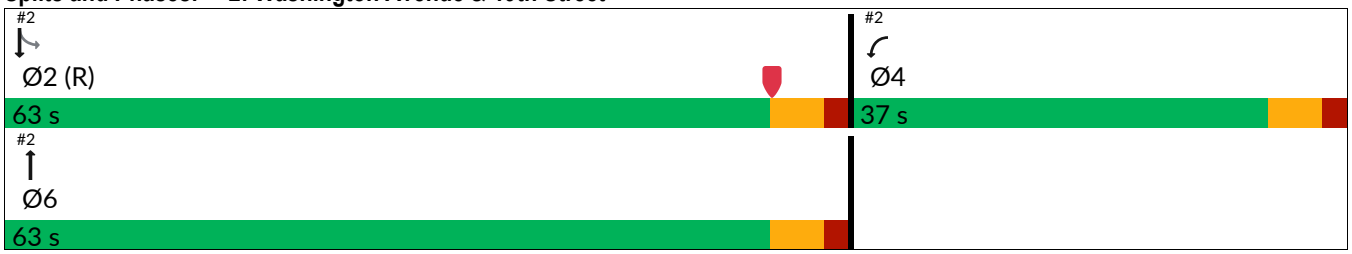
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		83.7		16.3		83.7		16.3				
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0				
Max Green Setting (Gmax), s		54.0		34.0		54.0		34.0				
Max Q Clear Time (g_c+I1), s		5.0		4.3		4.2		2.1				
Green Ext Time (p_c), s		0.8		0.1		0.6		0.0				

Intersection Summary												
HCM 7th Control Delay, s/veh			5.3									
HCM 7th LOS			A									

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	38	17	227	29	17	283
Future Volume (vph)	38	17	227	29	17	283
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	9	9	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	0	0		0	0	
Storage Lanes	1	0		0	0	
Taper Length (ft)	25	25		25	25	
Right Turn on Red		Yes		Yes		
Link Speed (mph)	25		35			35
Link Distance (ft)	123		293			560
Travel Time (s)	3.4		5.7			10.9
Adj. Flow (vph)	46	20	273	35	20	341
Lane Group Flow (vph)	66	0	308	0	0	361
Turn Type	Prot		NA		Perm	NA
Protected Phases	4		6			2
Permitted Phases					2	
Detector Phase	4		6		2	2
Switch Phase						
Minimum Initial (s)	7.0		7.0		7.0	7.0
Minimum Split (s)	37.0		27.0		27.0	27.0
Total Split (s)	37.0		63.0		63.0	63.0
Total Split (%)	37.0%		63.0%		63.0%	63.0%
Yellow Time (s)	4.0		4.0		4.0	4.0
All-Red Time (s)	2.0		2.0		2.0	2.0
Lost Time Adjust (s)	0.0		0.0			0.0
Total Lost Time (s)	6.0		6.0			6.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None		Max		C-Max	C-Max

Intersection Summary	
Area Type:	Other
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 89 (89%), Referenced to phase 2:SBTL, Start of Yellow	
Natural Cycle: 65	
Control Type: Actuated-Coordinated	

Splits and Phases: 2: Washington Avenue & 19th Street



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	38	17	227	29	17	283
Future Volume (veh/h)	38	17	227	29	17	283
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	0.96	0.96	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00	0.97		0.96	0.99	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1781	1781	1767	1796	1811	1811
Adj Flow Rate, veh/h	46	20	273	35	20	341
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83
Percent Heavy Veh, %	3	3	9	7	6	6
Cap, veh/h	96	42	2368	300	150	2487
Arrive On Green	0.09	0.09	0.79	0.79	0.79	0.79
Sat Flow, veh/h	1114	484	3071	378	139	3215
Grp Volume(v), veh/h	67	0	152	156	191	170
Grp Sat Flow(s),veh/h/ln	1622	0	1678	1682	1706	1566
Q Serve(g_s), s	3.9	0.0	2.1	2.1	0.0	2.5
Cycle Q Clear(g_c), s	3.9	0.0	2.1	2.1	2.4	2.5
Prop In Lane	0.69	0.30		0.22	0.10	
Lane Grp Cap(c), veh/h	139	0	1333	1335	1394	1243
V/C Ratio(X)	0.48	0.00	0.11	0.12	0.14	0.14
Avail Cap(c_a), veh/h	503	0	1333	1335	1394	1243
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.99	0.99
Uniform Delay (d), s/veh	43.6	0.0	2.3	2.3	2.4	2.4
Incr Delay (d2), s/veh	1.9	0.0	0.2	0.2	0.2	0.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	3.0	0.0	0.9	0.9	1.1	1.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	45.5	0.0	2.5	2.5	2.6	2.6
LnGrp LOS	D		A	A	A	A
Approach Vol, veh/h	67		308			361
Approach Delay, s/veh	45.5		2.5			2.6
Approach LOS	D		A			A

Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		85.4		14.6		85.4
Change Period (Y+Rc), s		6.0		6.0		6.0
Max Green Setting (Gmax), s		57.0		31.0		57.0
Max Q Clear Time (g_c+I1), s		4.5		5.9		4.1
Green Ext Time (p_c), s		0.7		0.1		0.6

Intersection Summary	
HCM 7th Control Delay, s/veh	6.5
HCM 7th LOS	A

Intersection	
Intersection Delay, s/veh	7.4
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	12	42	3	4	27	5	1	9	3	13	33	6
Future Vol, veh/h	12	42	3	4	27	5	1	9	3	13	33	6
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles, %	8	15	3	3	15	3	3	3	3	3	3	3
Mvmt Flow	13	44	3	4	28	5	1	9	3	14	35	6
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay, s/veh	7.6	7.3	7.2	7.4
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	8%	21%	11%	25%
Vol Thru, %	69%	74%	75%	63%
Vol Right, %	23%	5%	14%	12%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	13	57	36	52
LT Vol	1	12	4	13
Through Vol	9	42	27	33
RT Vol	3	3	5	6
Lane Flow Rate	14	60	38	55
Geometry Grp	1	1	1	1
Degree of Util (X)	0.015	0.07	0.043	0.063
Departure Headway (Hd)	4.04	4.195	4.055	4.112
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	878	851	878	865
Service Time	2.103	2.236	2.103	2.164
HCM Lane V/C Ratio	0.016	0.071	0.043	0.064
HCM Control Delay, s/veh	7.2	7.6	7.3	7.4
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0	0.2	0.1	0.2

Intersection	
Int Delay, s/veh	4.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	12	34	1	0	28	5	6	0	2	19	1	20
Future Vol, veh/h	12	34	1	0	28	5	6	0	2	19	1	20
Conflicting Peds, #/hr	7	0	15	15	0	7	7	0	9	9	0	7
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	8	6	3	3	4	3	3	3	3	3	3	3
Mvmt Flow	13	37	1	0	30	5	6	0	2	20	1	22

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	42	0	0	53	0	0	116	120	61	111	118	47
Stage 1	-	-	-	-	-	-	78	78	-	40	40	-
Stage 2	-	-	-	-	-	-	38	42	-	71	78	-
Critical Hdwy	4.18	-	-	4.13	-	-	7.13	6.53	6.23	7.13	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Follow-up Hdwy	2.272	-	-	2.227	-	-	3.527	4.027	3.327	3.527	4.027	3.327
Pot Cap-1 Maneuver	1529	-	-	1547	-	-	859	768	1001	864	770	1020
Stage 1	-	-	-	-	-	-	928	828	-	973	860	-
Stage 2	-	-	-	-	-	-	975	858	-	936	828	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1521	-	-	1523	-	-	815	746	979	845	748	1009
Mov Cap-2 Maneuver	-	-	-	-	-	-	815	746	-	845	748	-
Stage 1	-	-	-	-	-	-	906	808	-	968	856	-
Stage 2	-	-	-	-	-	-	948	853	-	920	808	-

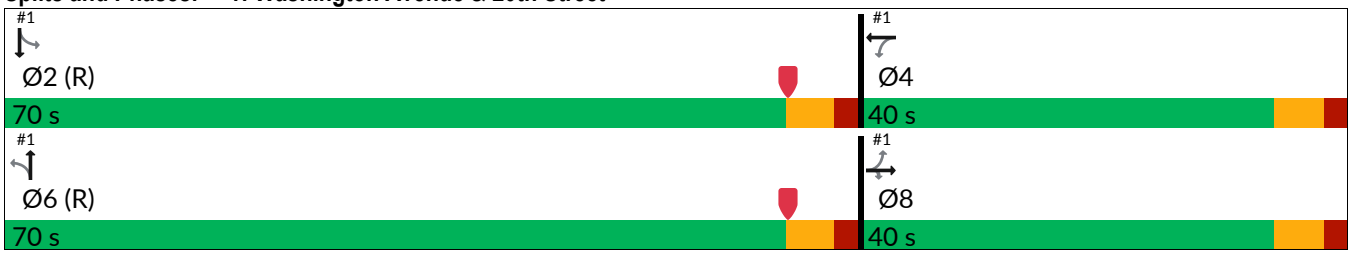
Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	1.89	0	9.28	9.12
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	851	457	-	-	1523	-	-	917
HCM Lane V/C Ratio	0.01	0.008	-	-	-	-	-	0.047
HCM Ctrl Dly (s/v)	9.3	7.4	0	-	0	-	-	9.1
HCM Lane LOS	A	A	A	-	A	-	-	A
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0.1

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	0	0	23	0	57	2	622	23	35	280	1
Future Volume (vph)	3	0	0	23	0	57	2	622	23	35	280	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	9	9	9	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	40		0	0		0	0		0	0		0
Storage Lanes	1		1	0		0	0		0	0		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			35			35	
Link Distance (ft)		123			335			560			189	
Travel Time (s)		3.4			9.1			10.9			3.7	
Adj. Flow (vph)	3	0	0	23	0	58	2	628	23	35	283	1
Lane Group Flow (vph)	0	3	0	0	81	0	0	653	0	0	319	0
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			6			2	
Permitted Phases	8		8	4			6			2		
Detector Phase	8	8	8	4	4		6	6		2	2	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	38.0	38.0	38.0	13.0	13.0		38.0	38.0		38.0	38.0	
Total Split (s)	40.0	40.0	40.0	40.0	40.0		70.0	70.0		70.0	70.0	
Total Split (%)	36.4%	36.4%	36.4%	36.4%	36.4%		63.6%	63.6%		63.6%	63.6%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0	0.0		0.0			0.0			0.0	
Total Lost Time (s)		6.0	6.0		6.0			6.0			6.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None		C-Max	C-Max		C-Max	C-Max	

Intersection Summary	
Area Type:	Other
Cycle Length: 110	
Actuated Cycle Length: 110	
Offset: 2 (2%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow	
Natural Cycle: 80	
Control Type: Actuated-Coordinated	

Splits and Phases: 1: Washington Avenue & 20th Street



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	0	0	23	0	57	2	622	23	35	280	1
Future Volume (veh/h)	3	0	0	23	0	57	2	622	23	35	280	1
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	0.96	0.96	0.96	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	0.97		1.00	0.96		0.96	0.98		0.94	0.99		0.94
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1781	1781	1781	1856	1856	1841	1722	1841	1856
Adj Flow Rate, veh/h	3	0	0	23	0	58	2	628	23	35	283	1
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	4	12	4	3
Cap, veh/h	298	0	279	95	19	183	34	2415	88	243	2002	7
Arrive On Green	0.18	0.00	0.00	0.18	0.00	0.18	0.71	0.71	0.71	0.71	0.71	0.71
Sat Flow, veh/h	1310	0	1572	300	108	1028	1	3386	124	284	2806	10
Grp Volume(v), veh/h	3	0	0	81	0	0	345	0	308	156	0	163
Grp Sat Flow(s),veh/h/ln	1310	0	1572	1436	0	0	1854	0	1657	1429	0	1672
Q Serve(g_s), s	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	7.2	0.0	0.0	3.4
Cycle Q Clear(g_c), s	0.2	0.0	0.0	5.1	0.0	0.0	7.2	0.0	7.2	7.3	0.0	3.4
Prop In Lane	1.00		1.00	0.28		0.72	0.01		0.07	0.22		0.01
Lane Grp Cap(c), veh/h	298	0	279	297	0	0	1356	0	1182	1059	0	1193
V/C Ratio(X)	0.01	0.00	0.00	0.27	0.00	0.00	0.25	0.00	0.26	0.15	0.00	0.14
Avail Cap(c_a), veh/h	468	0	486	482	0	0	1356	0	1182	1059	0	1193
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	0.98	0.00	0.98	1.00	0.00	1.00
Uniform Delay (d), s/veh	37.3	0.0	0.0	39.3	0.0	0.0	5.5	0.0	5.6	4.9	0.0	5.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.4	0.0	0.0	0.4	0.0	0.5	0.3	0.0	0.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.1	0.0	0.0	3.5	0.0	0.0	4.6	0.0	4.2	1.9	0.0	2.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	37.3	0.0	0.0	39.6	0.0	0.0	6.0	0.0	6.1	5.2	0.0	5.2
LnGrp LOS	D			D			A		A	A		A
Approach Vol, veh/h		3			81			653			319	
Approach Delay, s/veh		37.3			39.6			6.0			5.2	
Approach LOS		D			D			A			A	

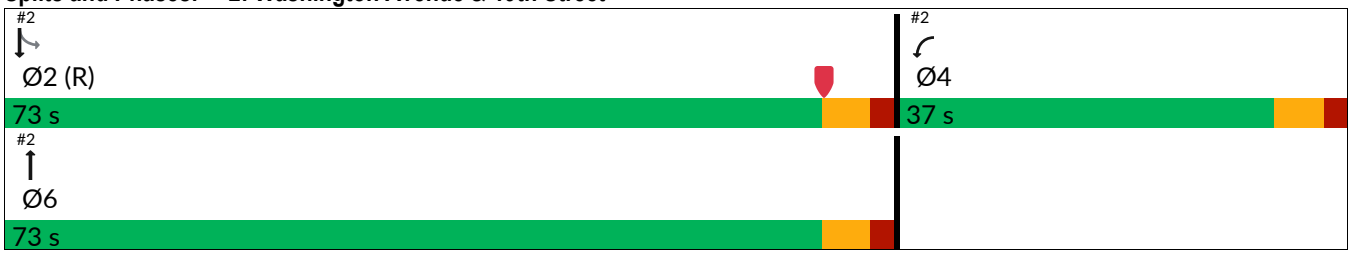
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		84.5		25.5		84.5		25.5				
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0				
Max Green Setting (Gmax), s		64.0		34.0		64.0		34.0				
Max Q Clear Time (g_c+I1), s		9.3		7.1		9.2		2.2				
Green Ext Time (p_c), s		0.7		0.4		1.3		0.0				

Intersection Summary												
HCM 7th Control Delay, s/veh		8.5										
HCM 7th LOS		A										

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	55	27	616	47	26	276
Future Volume (vph)	55	27	616	47	26	276
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	9	9	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	0	0		0	0	
Storage Lanes	1	0		0	0	
Taper Length (ft)	25	25		25	25	
Right Turn on Red		Yes		Yes		
Link Speed (mph)	25		35			35
Link Distance (ft)	123		296			560
Travel Time (s)	3.4		5.8			10.9
Adj. Flow (vph)	57	28	642	49	27	288
Lane Group Flow (vph)	85	0	691	0	0	315
Turn Type	Prot		NA		Perm	NA
Protected Phases	4		6			2
Permitted Phases					2	
Detector Phase	4		6		2	2
Switch Phase						
Minimum Initial (s)	7.0		7.0		7.0	7.0
Minimum Split (s)	37.0		27.0		27.0	27.0
Total Split (s)	37.0		73.0		73.0	73.0
Total Split (%)	33.6%		66.4%		66.4%	66.4%
Yellow Time (s)	4.0		4.0		4.0	4.0
All-Red Time (s)	2.0		2.0		2.0	2.0
Lost Time Adjust (s)	0.0		0.0			0.0
Total Lost Time (s)	6.0		6.0			6.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None		Max		C-Max	C-Max

Intersection Summary	
Area Type:	Other
Cycle Length: 110	
Actuated Cycle Length: 110	
Offset: 12 (11%), Referenced to phase 2:SBTL, Start of Yellow	
Natural Cycle: 65	
Control Type: Actuated-Coordinated	

Splits and Phases: 2: Washington Avenue & 19th Street



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	55	27	616	47	26	276
Future Volume (veh/h)	55	27	616	47	26	276
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	0.96	0.96	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00	0.96		0.95	0.99	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1781	1781	1856	1796	1856	1841
Adj Flow Rate, veh/h	57	28	642	49	27	288
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	3	3	3	7	3	4
Cap, veh/h	117	58	2582	197	209	2253
Arrive On Green	0.11	0.11	0.78	0.78	0.78	0.78
Sat Flow, veh/h	1065	523	3399	252	219	2969
Grp Volume(v), veh/h	86	0	342	349	160	155
Grp Sat Flow(s),veh/h/ln	1608	0	1763	1796	1513	1591
Q Serve(g_s), s	5.5	0.0	5.8	5.8	0.0	2.6
Cycle Q Clear(g_c), s	5.5	0.0	5.8	5.8	2.3	2.6
Prop In Lane	0.66	0.33		0.14	0.17	
Lane Grp Cap(c), veh/h	177	0	1376	1402	1219	1243
V/C Ratio(X)	0.49	0.00	0.25	0.25	0.13	0.12
Avail Cap(c_a), veh/h	453	0	1376	1402	1219	1243
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.99	0.99
Uniform Delay (d), s/veh	46.0	0.0	3.3	3.3	2.9	2.9
Incr Delay (d2), s/veh	1.5	0.0	0.4	0.4	0.2	0.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	4.1	0.0	3.0	3.1	1.3	1.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	47.6	0.0	3.7	3.7	3.1	3.1
LnGrp LOS	D		A	A	A	A
Approach Vol, veh/h	86		691			315
Approach Delay, s/veh	47.6		3.7			3.1
Approach LOS	D		A			A

Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		91.9		18.1		91.9
Change Period (Y+Rc), s		6.0		6.0		6.0
Max Green Setting (Gmax), s		67.0		31.0		67.0
Max Q Clear Time (g_c+I1), s		4.6		7.5		7.8
Green Ext Time (p_c), s		0.7		0.2		1.4

Intersection Summary	
HCM 7th Control Delay, s/veh	7.0
HCM 7th LOS	A

Intersection	
Intersection Delay, s/veh	7.8
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	11	38	7	7	67	19	8	36	4	12	36	5
Future Vol, veh/h	11	38	7	7	67	19	8	36	4	12	36	5
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Heavy Vehicles, %	18	8	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	13	45	8	8	80	23	10	43	5	14	43	6
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay, s/veh	8	7.8	7.8	7.8
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	17%	20%	8%	23%
Vol Thru, %	75%	68%	72%	68%
Vol Right, %	8%	13%	20%	9%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	48	56	93	53
LT Vol	8	11	7	12
Through Vol	36	38	67	36
RT Vol	4	7	19	5
Lane Flow Rate	57	67	111	63
Geometry Grp	1	1	1	1
Degree of Util (X)	0.07	0.085	0.129	0.077
Departure Headway (Hd)	4.407	4.569	4.203	4.406
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	815	789	858	816
Service Time	2.418	2.572	2.204	2.417
HCM Lane V/C Ratio	0.07	0.085	0.129	0.077
HCM Control Delay, s/veh	7.8	8	7.8	7.8
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.2	0.3	0.4	0.2

Intersection	
Int Delay, s/veh	4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	27	46	0	3	39	16	6	0	0	11	0	38
Future Vol, veh/h	27	46	0	3	39	16	6	0	0	11	0	38
Conflicting Peds, #/hr	9	0	12	12	0	9	4	0	5	5	0	4
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	80	80	80	80	80	80	80	80	80	80	80
Heavy Vehicles, %	4	4	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	34	58	0	4	49	20	8	0	0	14	0	48

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	78	0	0	70	0	0	197	222	75	205	212	72
Stage 1	-	-	-	-	-	-	137	137	-	75	75	-
Stage 2	-	-	-	-	-	-	60	85	-	130	137	-
Critical Hdwy	4.14	-	-	4.13	-	-	7.13	6.53	6.23	7.13	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Follow-up Hdwy	2.236	-	-	2.227	-	-	3.527	4.027	3.327	3.527	4.027	3.327
Pot Cap-1 Maneuver	1508	-	-	1525	-	-	759	675	984	750	683	988
Stage 1	-	-	-	-	-	-	864	781	-	931	830	-
Stage 2	-	-	-	-	-	-	949	822	-	871	781	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1498	-	-	1506	-	-	693	645	969	724	653	979
Mov Cap-2 Maneuver	-	-	-	-	-	-	693	645	-	724	653	-
Stage 1	-	-	-	-	-	-	833	754	-	923	823	-
Stage 2	-	-	-	-	-	-	898	815	-	848	754	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	2.76	0.38	10.25	9.26
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	693	666	-	-	88	-	-	907
HCM Lane V/C Ratio	0.011	0.023	-	-	0.002	-	-	0.068
HCM Ctrl Dly (s/v)	10.2	7.5	0	-	7.4	0	-	9.3
HCM Lane LOS	B	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0	0.1	-	-	0	-	-	0.2

FUTURE BUILD CONDITIONS

Table 5.1 - 2029 Build Intersection Capacity Analysis Summary

Location	Time	Level of Service[1]											
		(1) Washington Avenue & 20th Street		(2) Washington Avenue & 19th Street		(3) Park Avenue & 20th Street		(4) Park Avenue & 19th Street		(5) Washington Avenue & Ingress Driveway[3]		(6) Park Avenue & Egress Driveway	
		Signalized		Signalized		Unsignalized		Unsignalized		Unsignalized		Unsignalized	
		LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
EBL	AM	D	39.8	N/A				[2]		N/A			
	PM	D	37.3										
EBT	AM	D	39.8										
	PM	D	37.3										
EBR	AM	D	39.8										
	PM	D	37.3										
EB Approach	AM	D	39.8			A	7.6					A	8.8
	PM	D	37.3			A	8.0					A	8.9
WBL	AM	D	41.6	D	45.8			[2]				N/A	
	PM	D	39.9	D	47.0								
WBT	AM	D	41.6	N/A									
	PM	D	39.9										
WBR	AM	D	41.6	D	45.8								
	PM	D	39.9	D	47.0								
WB Approach	AM	D	41.6	D	45.8	A	7.3						
	PM	D	39.9	D	47.0	A	7.9						
NBL	AM	A	3.0	N/A								[2]	
	PM	A	6.0										
NBT	AM	A	3.0	A	2.8								
	PM	A	6.1	A	4.4								
NBR	AM	A	3.1	A	2.9								
	PM	A	6.1	A	4.4								
NB Approach	AM	A	3.0	A	2.8	A	7.3	A	9.4				
	PM	A	6.1	A	4.4	A	7.8	B	10.5				
SBL	AM	A	3.2	A	2.9							[2]	
	PM	A	5.3	A	3.7								
SBT	AM	A	3.2	A	2.9								
	PM	A	5.3	A	3.7								
SBR	AM	A	3.2	N/A									
	PM	A	5.3										
SB Approach	AM	A	3.2	A	2.9	A	7.5	A	9.1				
	PM	A	5.3	A	3.7	A	7.8	A	9.4				
Overall	AM	A	6.0	A	8.0	A	7.5						
	PM	A	8.7	A	8.8	A	7.9						

[1] Delay is average delay per vehicle in seconds

[2] Approach operates under Free-flow conditions

[3] All approaches are free-flowing, with the ingress driveway not allowing egress movements

Table 5.2 - 2029 Build Intersection Queue Lengths Summary

Location	Time	95th Percentile Queue Lengths (ft)															
		EBL		EBR		WBL		WBR		NBL		NBR		SBL		SBR	
		Storage (ft)	95th %tile	Storage (ft)	95th %tile	Storage (ft)	95th %tile	Storage (ft)	95th %tile	Storage (ft)	95th %tile	Storage (ft)	95th %tile	Storage (ft)	95th %tile	Storage (ft)	95th %tile
(1) Washington Avenue & 20th Street	AM	40	3														
	PM		3														
(2) Washington Avenue & 19th Street	AM																
	PM																
(3) Park Avenue & 20th Street	AM																
	PM																
(4) Park Avenue & 19th Street	AM																
	PM																
(5) Washington Avenue & Ingress Driveway	AM																
	PM																
(6) Park Avenue & Egress Driveway	AM																
	PM																

LANGAN
ENGINEERING & ENVIRONMENTAL SERVICES

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	1	1	12	1	30	3	216	22	35	293	1
Future Volume (vph)	1	1	1	12	1	30	3	216	22	35	293	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	9	9	9	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	40		0	0		0	0		0	0		0
Storage Lanes	1		1	0		0	0		0	0		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			35			35	
Link Distance (ft)		123			335			215			189	
Travel Time (s)		3.4			9.1			4.2			3.7	
Adj. Flow (vph)	1	1	1	14	1	36	4	257	26	42	349	1
Lane Group Flow (vph)	0	2	1	0	51	0	0	287	0	0	392	0
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			6			2	
Permitted Phases	8		8	4			6			2		
Detector Phase	8	8	8	4	4		6	6		2	2	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	38.0	38.0	38.0	13.0	13.0		38.0	38.0		38.0	38.0	
Total Split (s)	40.0	40.0	40.0	40.0	40.0		60.0	60.0		60.0	60.0	
Total Split (%)	40.0%	40.0%	40.0%	40.0%	40.0%		60.0%	60.0%		60.0%	60.0%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0	0.0		0.0			0.0			0.0	
Total Lost Time (s)		6.0	6.0		6.0			6.0			6.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None		C-Max	C-Max		C-Max	C-Max	

Intersection Summary	
Area Type:	Other
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 78 (78%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow	
Natural Cycle: 80	
Control Type: Actuated-Coordinated	

Splits and Phases: 1: Washington Avenue & 20th Street

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	1	1	12	1	30	3	216	22	35	293	1
Future Volume (veh/h)	1	1	1	12	1	30	3	216	22	35	293	1
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	0.96	0.96	0.96	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	0.98		0.98	0.98		0.98	0.99		0.97	0.99		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1682	1781	1696	1856	1767	1767	1678	1796	1856
Adj Flow Rate, veh/h	1	1	1	14	1	36	4	257	26	42	349	1
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	3	3	3	10	3	9	3	9	9	15	7	3
Cap, veh/h	124	106	166	71	22	113	50	2300	228	274	2243	6
Arrive On Green	0.11	0.11	0.11	0.11	0.11	0.11	0.77	0.77	0.77	0.77	0.77	0.77
Sat Flow, veh/h	648	983	1538	235	201	1046	18	2980	296	299	2906	8
Grp Volume(v), veh/h	2	0	1	51	0	0	152	0	135	198	0	194
Grp Sat Flow(s),veh/h/ln	1631	0	1538	1482	0	0	1752	0	1542	1581	0	1633
Q Serve(g_s), s	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	2.2	0.0	0.0	3.1
Cycle Q Clear(g_c), s	0.1	0.0	0.1	3.0	0.0	0.0	2.1	0.0	2.2	2.8	0.0	3.1
Prop In Lane	0.50		1.00	0.27		0.71	0.03		0.19	0.21		0.01
Lane Grp Cap(c), veh/h	231	0	166	206	0	0	1389	0	1190	1264	0	1260
V/C Ratio(X)	0.01	0.00	0.01	0.25	0.00	0.00	0.11	0.00	0.11	0.16	0.00	0.15
Avail Cap(c_a), veh/h	591	0	523	539	0	0	1389	0	1190	1264	0	1260
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	39.8	0.0	39.8	41.1	0.0	0.0	2.8	0.0	2.9	2.9	0.0	3.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.5	0.0	0.0	0.2	0.0	0.2	0.3	0.0	0.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.1	0.0	0.0	2.1	0.0	0.0	1.1	0.0	1.0	1.5	0.0	1.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	39.8	0.0	39.8	41.6	0.0	0.0	3.0	0.0	3.1	3.2	0.0	3.2
LnGrp LOS	D		D	D			A		A	A		A
Approach Vol, veh/h		3			51			287			392	
Approach Delay, s/veh		39.8			41.6			3.0			3.2	
Approach LOS		D			D			A			A	

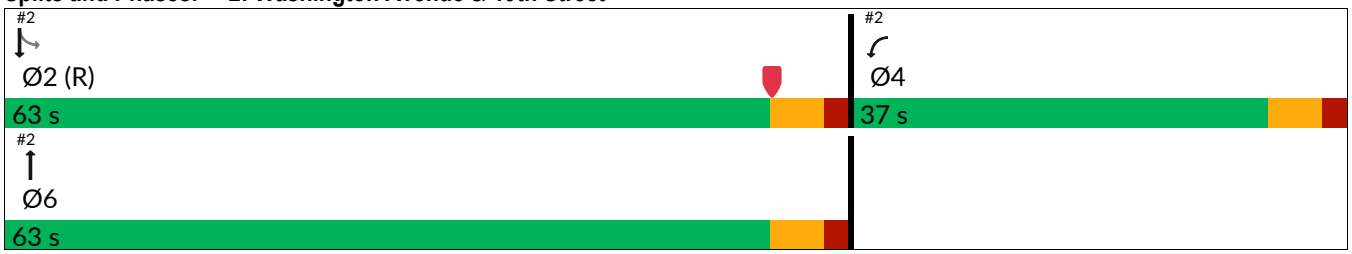
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		83.2		16.8		83.2		16.8				
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0				
Max Green Setting (Gmax), s		54.0		34.0		54.0		34.0				
Max Q Clear Time (g_c+I1), s		5.1		5.0		4.2		2.1				
Green Ext Time (p_c), s		0.8		0.2		0.6		0.0				

Intersection Summary												
HCM 7th Control Delay, s/veh			6.0									
HCM 7th LOS			A									

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	62	17	258	29	17	283
Future Volume (vph)	62	17	258	29	17	283
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	9	9	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	0	0		0	0	
Storage Lanes	1	0		0	0	
Taper Length (ft)	25	25		25	25	
Right Turn on Red		Yes		Yes		
Link Speed (mph)	25		35			35
Link Distance (ft)	123		293			344
Travel Time (s)	3.4		5.7			6.7
Adj. Flow (vph)	75	20	311	35	20	341
Lane Group Flow (vph)	95	0	346	0	0	361
Turn Type	Prot		NA		Perm	NA
Protected Phases	4		6			2
Permitted Phases					2	
Detector Phase	4		6		2	2
Switch Phase						
Minimum Initial (s)	7.0		7.0		7.0	7.0
Minimum Split (s)	37.0		27.0		27.0	27.0
Total Split (s)	37.0		63.0		63.0	63.0
Total Split (%)	37.0%		63.0%		63.0%	63.0%
Yellow Time (s)	4.0		4.0		4.0	4.0
All-Red Time (s)	2.0		2.0		2.0	2.0
Lost Time Adjust (s)	0.0		0.0			0.0
Total Lost Time (s)	6.0		6.0			6.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None		Max		C-Max	C-Max

Intersection Summary	
Area Type:	Other
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 89 (89%), Referenced to phase 2:SBTL, Start of Yellow	
Natural Cycle: 65	
Control Type: Actuated-Coordinated	

Splits and Phases: 2: Washington Avenue & 19th Street



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	62	17	258	29	17	283
Future Volume (veh/h)	62	17	258	29	17	283
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	0.96	0.96	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00	0.98		0.96	0.99	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1781	1781	1767	1796	1811	1811
Adj Flow Rate, veh/h	75	20	311	35	20	341
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83
Percent Heavy Veh, %	3	3	9	7	6	6
Cap, veh/h	126	33	2371	264	147	2446
Arrive On Green	0.10	0.10	0.78	0.78	0.78	0.78
Sat Flow, veh/h	1285	343	3120	338	138	3209
Grp Volume(v), veh/h	96	0	171	175	190	171
Grp Sat Flow(s),veh/h/ln	1645	0	1678	1691	1698	1566
Q Serve(g_s), s	5.6	0.0	2.5	2.5	0.0	2.7
Cycle Q Clear(g_c), s	5.6	0.0	2.5	2.5	2.6	2.7
Prop In Lane	0.78	0.21		0.20	0.11	
Lane Grp Cap(c), veh/h	161	0	1313	1323	1368	1225
V/C Ratio(X)	0.60	0.00	0.13	0.13	0.14	0.14
Avail Cap(c_a), veh/h	510	0	1313	1323	1368	1225
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	43.2	0.0	2.6	2.6	2.6	2.7
Incr Delay (d2), s/veh	2.6	0.0	0.2	0.2	0.2	0.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	4.3	0.0	1.1	1.2	1.3	1.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	45.8	0.0	2.8	2.9	2.9	2.9
LnGrp LOS	D		A	A	A	A
Approach Vol, veh/h	96		346			361
Approach Delay, s/veh	45.8		2.8			2.9
Approach LOS	D		A			A

Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		84.2		15.8		84.2
Change Period (Y+Rc), s		6.0		6.0		6.0
Max Green Setting (Gmax), s		57.0		31.0		57.0
Max Q Clear Time (g_c+I1), s		4.7		7.6		4.5
Green Ext Time (p_c), s		0.7		0.2		0.7

Intersection Summary	
HCM 7th Control Delay, s/veh	8.0
HCM 7th LOS	A

Intersection	
Intersection Delay, s/veh	7.5
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	12	42	3	4	29	5	9	10	5	13	33	6
Future Vol, veh/h	12	42	3	4	29	5	9	10	5	13	33	6
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles, %	8	15	3	3	15	3	3	3	3	3	3	3
Mvmt Flow	13	44	3	4	31	5	9	11	5	14	35	6
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay, s/veh	7.6	7.3	7.3	7.5
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	38%	21%	11%	25%
Vol Thru, %	42%	74%	76%	63%
Vol Right, %	21%	5%	13%	12%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	24	57	38	52
LT Vol	9	12	4	13
Through Vol	10	42	29	33
RT Vol	5	3	5	6
Lane Flow Rate	25	60	40	55
Geometry Grp	1	1	1	1
Degree of Util (X)	0.029	0.07	0.045	0.063
Departure Headway (Hd)	4.117	4.216	4.077	4.124
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	862	845	872	862
Service Time	2.18	2.265	2.133	2.181
HCM Lane V/C Ratio	0.029	0.071	0.046	0.064
HCM Control Delay, s/veh	7.3	7.6	7.3	7.5
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.1	0.2	0.1	0.2

Intersection	
Int Delay, s/veh	4.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	12	34	1	0	28	5	6	0	2	20	1	44
Future Vol, veh/h	12	34	1	0	28	5	6	0	2	20	1	44
Conflicting Peds, #/hr	7	0	15	15	0	7	7	0	9	9	0	7
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	8	6	3	3	4	3	3	3	3	3	3	3
Mvmt Flow	13	37	1	0	30	5	6	0	2	22	1	47

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	42	0	0	53	0	0	116	120	61	111	118	47
Stage 1	-	-	-	-	-	-	78	78	-	40	40	-
Stage 2	-	-	-	-	-	-	38	42	-	71	78	-
Critical Hdwy	4.18	-	-	4.13	-	-	7.13	6.53	6.23	7.13	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Follow-up Hdwy	2.272	-	-	2.227	-	-	3.527	4.027	3.327	3.527	4.027	3.327
Pot Cap-1 Maneuver	1529	-	-	1547	-	-	859	768	1001	864	770	1020
Stage 1	-	-	-	-	-	-	928	828	-	973	860	-
Stage 2	-	-	-	-	-	-	975	858	-	936	828	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1521	-	-	1523	-	-	794	746	979	845	748	1009
Mov Cap-2 Maneuver	-	-	-	-	-	-	794	746	-	845	748	-
Stage 1	-	-	-	-	-	-	906	808	-	968	856	-
Stage 2	-	-	-	-	-	-	924	853	-	920	808	-

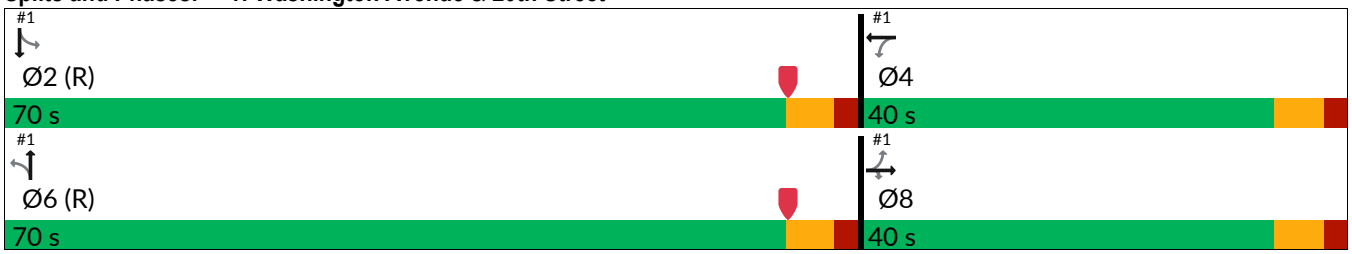
Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	1.89	0	9.37	9.1
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	833	457	-	-	1523	-	-	948
HCM Lane V/C Ratio	0.01	0.008	-	-	-	-	-	0.074
HCM Ctrl Dly (s/v)	9.4	7.4	0	-	0	-	-	9.1
HCM Lane LOS	A	A	A	-	A	-	-	A
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0.2

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	0	0	27	0	61	2	622	23	35	289	1
Future Volume (vph)	3	0	0	27	0	61	2	622	23	35	289	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	9	9	9	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	40		0	0		0	0		0	0		0
Storage Lanes	1		1	0		0	0		0	0		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			35			35	
Link Distance (ft)		123			335			215			189	
Travel Time (s)		3.4			9.1			4.2			3.7	
Adj. Flow (vph)	3	0	0	27	0	62	2	628	23	35	292	1
Lane Group Flow (vph)	0	3	0	0	89	0	0	653	0	0	328	0
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			6			2	
Permitted Phases	8		8	4			6			2		
Detector Phase	8	8	8	4	4		6	6		2	2	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	38.0	38.0	38.0	13.0	13.0		38.0	38.0		38.0	38.0	
Total Split (s)	40.0	40.0	40.0	40.0	40.0		70.0	70.0		70.0	70.0	
Total Split (%)	36.4%	36.4%	36.4%	36.4%	36.4%		63.6%	63.6%		63.6%	63.6%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0	0.0		0.0			0.0			0.0	
Total Lost Time (s)		6.0	6.0		6.0			6.0			6.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None		C-Max	C-Max		C-Max	C-Max	

Intersection Summary	
Area Type:	Other
Cycle Length: 110	
Actuated Cycle Length: 110	
Offset: 2 (2%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow	
Natural Cycle: 80	
Control Type: Actuated-Coordinated	

Splits and Phases: 1: Washington Avenue & 20th Street



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	0	0	27	0	61	2	622	23	35	289	1
Future Volume (veh/h)	3	0	0	27	0	61	2	622	23	35	289	1
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	0.96	0.96	0.96	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	0.97		1.00	0.96		0.96	0.98		0.94	0.99		0.94
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1781	1781	1781	1856	1856	1841	1722	1841	1856
Adj Flow Rate, veh/h	3	0	0	27	0	62	2	628	23	35	292	1
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	4	12	4	3
Cap, veh/h	293	0	280	101	19	178	34	2414	88	238	2016	7
Arrive On Green	0.18	0.00	0.00	0.18	0.00	0.18	0.71	0.71	0.71	0.71	0.71	0.71
Sat Flow, veh/h	1280	0	1572	328	106	998	1	3386	124	278	2828	10
Grp Volume(v), veh/h	3	0	0	89	0	0	345	0	308	161	0	167
Grp Sat Flow(s),veh/h/ln	1280	0	1572	1432	0	0	1854	0	1657	1443	0	1672
Q Serve(g_s), s	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	7.2	0.0	0.0	3.5
Cycle Q Clear(g_c), s	0.2	0.0	0.0	5.7	0.0	0.0	7.2	0.0	7.2	7.2	0.0	3.5
Prop In Lane	1.00		1.00	0.30		0.70	0.01		0.07	0.22		0.01
Lane Grp Cap(c), veh/h	293	0	280	298	0	0	1355	0	1181	1069	0	1192
V/C Ratio(X)	0.01	0.00	0.00	0.30	0.00	0.00	0.25	0.00	0.26	0.15	0.00	0.14
Avail Cap(c_a), veh/h	462	0	486	481	0	0	1355	0	1181	1069	0	1192
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	37.2	0.0	0.0	39.4	0.0	0.0	5.6	0.0	5.6	5.0	0.0	5.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.4	0.0	0.0	0.5	0.0	0.5	0.3	0.0	0.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.1	0.0	0.0	3.9	0.0	0.0	4.6	0.0	4.2	1.9	0.0	2.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	37.3	0.0	0.0	39.9	0.0	0.0	6.0	0.0	6.1	5.3	0.0	5.3
LnGrp LOS	D			D			A		A	A		A
Approach Vol, veh/h		3			89			653			328	
Approach Delay, s/veh		37.3			39.9			6.1			5.3	
Approach LOS		D			D			A			A	

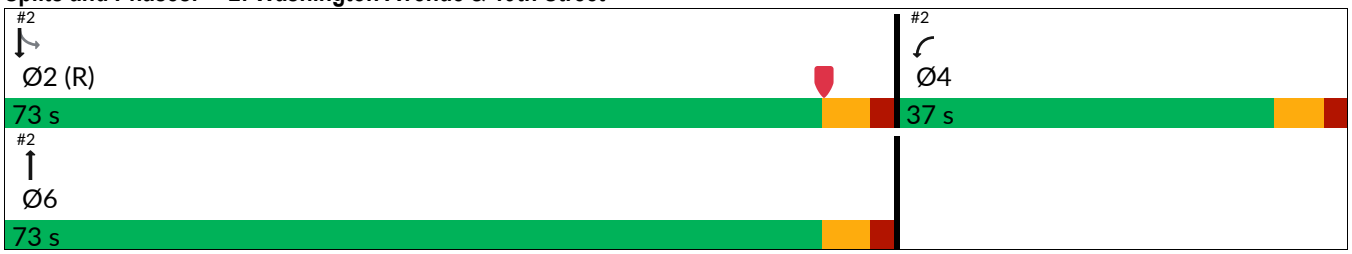
Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	84.4	25.6	84.4	25.6
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	64.0	34.0	64.0	34.0
Max Q Clear Time (g_c+I1), s	9.2	7.7	9.2	2.2
Green Ext Time (p_c), s	0.7	0.4	1.3	0.0

Intersection Summary	
HCM 7th Control Delay, s/veh	8.7
HCM 7th LOS	A

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	90	28	644	47	26	276
Future Volume (vph)	90	28	644	47	26	276
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	9	9	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	0	0		0	0	
Storage Lanes	1	0		0	0	
Taper Length (ft)	25	25		25	25	
Right Turn on Red		Yes		Yes		
Link Speed (mph)	25		35			35
Link Distance (ft)	123		296			344
Travel Time (s)	3.4		5.8			6.7
Adj. Flow (vph)	94	29	671	49	27	288
Lane Group Flow (vph)	123	0	720	0	0	315
Turn Type	Prot		NA		Perm	NA
Protected Phases	4		6			2
Permitted Phases					2	
Detector Phase	4		6		2	2
Switch Phase						
Minimum Initial (s)	7.0		7.0		7.0	7.0
Minimum Split (s)	37.0		27.0		27.0	27.0
Total Split (s)	37.0		73.0		73.0	73.0
Total Split (%)	33.6%		66.4%		66.4%	66.4%
Yellow Time (s)	4.0		4.0		4.0	4.0
All-Red Time (s)	2.0		2.0		2.0	2.0
Lost Time Adjust (s)	0.0		0.0			0.0
Total Lost Time (s)	6.0		6.0			6.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None		Max		C-Max	C-Max

Intersection Summary	
Area Type:	Other
Cycle Length: 110	
Actuated Cycle Length: 110	
Offset: 12 (11%), Referenced to phase 2:SBTL, Start of Yellow	
Natural Cycle: 65	
Control Type: Actuated-Coordinated	

Splits and Phases: 2: Washington Avenue & 19th Street



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	90	28	644	47	26	276
Future Volume (veh/h)	90	28	644	47	26	276
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	0.96	0.96	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00	0.97		0.95	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1781	1781	1856	1796	1856	1841
Adj Flow Rate, veh/h	94	29	671	49	27	288
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	3	3	3	7	3	4
Cap, veh/h	161	50	2526	184	203	2189
Arrive On Green	0.13	0.13	0.76	0.76	0.76	0.76
Sat Flow, veh/h	1239	382	3411	242	217	2960
Grp Volume(v), veh/h	124	0	356	364	160	155
Grp Sat Flow(s),veh/h/ln	1634	0	1763	1798	1501	1591
Q Serve(g_s), s	7.9	0.0	6.6	6.7	0.0	2.8
Cycle Q Clear(g_c), s	7.9	0.0	6.6	6.7	2.5	2.8
Prop In Lane	0.76	0.23		0.13	0.17	
Lane Grp Cap(c), veh/h	212	0	1342	1369	1181	1211
V/C Ratio(X)	0.58	0.00	0.27	0.27	0.14	0.13
Avail Cap(c_a), veh/h	461	0	1342	1369	1181	1211
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	45.1	0.0	3.9	3.9	3.4	3.5
Incr Delay (d2), s/veh	1.9	0.0	0.5	0.5	0.2	0.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	6.0	0.0	3.7	3.8	1.5	1.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	47.0	0.0	4.4	4.4	3.7	3.7
LnGrp LOS	D		A	A	A	A
Approach Vol, veh/h	124		720			315
Approach Delay, s/veh	47.0		4.4			3.7
Approach LOS	D		A			A

Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		89.7		20.3		89.7
Change Period (Y+Rc), s		6.0		6.0		6.0
Max Green Setting (Gmax), s		67.0		31.0		67.0
Max Q Clear Time (g_c+I1), s		4.8		9.9		8.7
Green Ext Time (p_c), s		0.7		0.2		1.5

Intersection Summary	
HCM 7th Control Delay, s/veh	8.8
HCM 7th LOS	A

Intersection	
Intersection Delay, s/veh	7.9
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	11	38	7	7	70	19	12	37	5	12	36	6
Future Vol, veh/h	11	38	7	7	70	19	12	37	5	12	36	6
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Heavy Vehicles, %	18	8	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	13	45	8	8	83	23	14	44	6	14	43	7
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay, s/veh	8	7.9	7.8	7.8
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	22%	20%	7%	22%
Vol Thru, %	69%	68%	73%	67%
Vol Right, %	9%	13%	20%	11%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	54	56	96	54
LT Vol	12	11	7	12
Through Vol	37	38	70	36
RT Vol	5	7	19	6
Lane Flow Rate	64	67	114	64
Geometry Grp	1	1	1	1
Degree of Util (X)	0.079	0.085	0.134	0.079
Departure Headway (Hd)	4.424	4.588	4.229	4.413
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	813	784	853	814
Service Time	2.436	2.598	2.229	2.424
HCM Lane V/C Ratio	0.079	0.085	0.134	0.079
HCM Control Delay, s/veh	7.8	8	7.9	7.8
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.3	0.3	0.5	0.3

Intersection	
Int Delay, s/veh	4.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	27	46	0	3	40	16	6	0	0	12	0	73
Future Vol, veh/h	27	46	0	3	40	16	6	0	0	12	0	73
Conflicting Peds, #/hr	9	0	12	12	0	9	4	0	5	5	0	4
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	80	80	80	80	80	80	80	80	80	80	80
Heavy Vehicles, %	4	4	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	34	58	0	4	50	20	8	0	0	15	0	91

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	79	0	0	70	0	0	199	224	75	207	214	73
Stage 1	-	-	-	-	-	-	137	137	-	77	77	-
Stage 2	-	-	-	-	-	-	62	87	-	130	137	-
Critical Hdwy	4.14	-	-	4.13	-	-	7.13	6.53	6.23	7.13	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Follow-up Hdwy	2.236	-	-	2.227	-	-	3.527	4.027	3.327	3.527	4.027	3.327
Pot Cap-1 Maneuver	1507	-	-	1525	-	-	758	674	984	749	682	986
Stage 1	-	-	-	-	-	-	864	781	-	930	829	-
Stage 2	-	-	-	-	-	-	947	821	-	871	781	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1497	-	-	1506	-	-	659	644	969	722	652	977
Mov Cap-2 Maneuver	-	-	-	-	-	-	659	644	-	722	652	-
Stage 1	-	-	-	-	-	-	833	754	-	922	822	-
Stage 2	-	-	-	-	-	-	854	814	-	848	754	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	2.76	0.38	10.52	9.37
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	659	666	-	-	87	-	-	931
HCM Lane V/C Ratio	0.011	0.023	-	-	0.002	-	-	0.114
HCM Ctrl Dly (s/v)	10.5	7.5	0	-	7.4	0	-	9.4
HCM Lane LOS	B	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0	0.1	-	-	0	-	-	0.4

DRIVEWAYS

Intersection	
Int Delay, s/veh	3.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	11	25	0	17	40	0
Future Vol, veh/h	11	25	0	17	40	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	3	3	3	8	3	3
Mvmt Flow	12	27	0	18	43	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	61	43	-	0	-	0
Stage 1	43	-	-	-	-	-
Stage 2	18	-	-	-	-	-
Critical Hdwy	6.43	6.23	-	-	-	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.327	-	-	-	-
Pot Cap-1 Maneuver	943	1025	0	-	-	0
Stage 1	977	-	0	-	-	0
Stage 2	1002	-	0	-	-	0
Platoon blocked, %				-	-	
Mov Cap-1 Maneuver	943	1025	-	-	-	-
Mov Cap-2 Maneuver	943	-	-	-	-	-
Stage 1	977	-	-	-	-	-
Stage 2	1002	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	8.75	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT
Capacity (veh/h)	-	998	-
HCM Lane V/C Ratio	-	0.039	-
HCM Ctrl Dly (s/v)	-	8.8	-
HCM Lane LOS	-	A	-
HCM 95th %tile Q(veh)	-	0.1	-

Intersection	
Int Delay, s/veh	2.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	6	36	0	43	50	0
Future Vol, veh/h	6	36	0	43	50	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	80	80	80	80	80	80
Heavy Vehicles, %	3	3	3	4	3	3
Mvmt Flow	8	45	0	54	63	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	116	63	-	0	-	0
Stage 1	63	-	-	-	-	-
Stage 2	54	-	-	-	-	-
Critical Hdwy	6.43	6.23	-	-	-	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.327	-	-	-	-
Pot Cap-1 Maneuver	877	999	0	-	-	0
Stage 1	958	-	0	-	-	0
Stage 2	966	-	0	-	-	0
Platoon blocked, %				-	-	
Mov Cap-1 Maneuver	877	999	-	-	-	-
Mov Cap-2 Maneuver	877	-	-	-	-	-
Stage 1	958	-	-	-	-	-
Stage 2	966	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	8.88	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT
Capacity (veh/h)	-	980	-
HCM Lane V/C Ratio	-	0.054	-
HCM Ctrl Dly (s/v)	-	8.9	-
HCM Lane LOS	-	A	-
HCM 95th %tile Q(veh)	-	0.2	-

APPENDIX F
TRIP GENERATION DATA

TRIP GENERATION ANALYSIS
THE BARCLAY - 1940 PARK AVENUE

DAILY

Land Use	ITE Code	Size	Trip Generation Rate	In	Out	Total Site Trips			Multi-Modal Trips				Total Vehicle Trips		
						In	Out	Total	In	Out	Total	%	In	Out	Total
Vested Use															
Multifamily Housing (Low-Rise)	220	66 DU	T = 5.63 (X) + 120.45	50%	50%	246	246	492	59	59	118	23.9%	187	187	374
Total						246	246	492	59	59	118		187	187	374
Proposed Use															
Mid-Rise Residential with Ground Floor Commercial (1-25k)	231	105 DU	N/A[1]	50%	50%	210	210	420	50	50	100	23.9%	160	160	320
Total*						**210**	**210**	**420**	50	50	100		160	160	320
Net-New						-36	-36	-72	-9	-9	-18		-27	-27	-54

MORNING PEAK HOUR

Land Use	ITE Code	Size	Trip Generation Rate	In	Out	Total Site Trips			Multi-Modal Trips				Total Vehicle Trips		
						In	Out	Total	In	Out	Total	%	In	Out	Total
Vested Use															
Multifamily Housing (Low-Rise)	220	66 DU	T = 0.35 (X) + 12.93	24%	76%	9	27	36	2	7	9	23.9%	7	20	27
Total						9	27	36	2	7	9		7	20	27
Proposed Use															
Mid-Rise Residential with Ground Floor Commercial (1-25k)	231	105 DU	T = 0.34 (X)	30%	70%	11	25	36	3	6	9	23.9%	8	19	27
Total*						**11**	**25**	**36**	3	6	9		8	19	27
Net-New						2	-2	0	1	-1	0		1	-1	0

AFTERNOON PEAK HOUR

Land Use	ITE Code	Size	Trip Generation Rate	In	Out	Total Site Trips			Multi-Modal Trips				Total Vehicle Trips		
						In	Out	Total	In	Out	Total	%	In	Out	Total
Vested Use															
Multifamily Housing (Low-Rise)	220	66 DU	T = 0.48 (X) + 7.35	62%	38%	24	15	39	6	3	9	23.9%	18	12	30
Total						24	15	39	6	3	9		18	12	30
Proposed Use															
Mid-Rise Residential with Ground Floor Commercial (1-25k)	231	105 DU	T = 0.40 (X)	70%	30%	29	13	42	7	3	10	23.9%	22	10	32
Total*						**29**	**13**	**42**	7	3	10		22	10	32
Net-New						5	-2	3	1	0	1		4	-2	2

[1] For LUC 231, the PM peak hour volume represents 10% of daily traffic

**** Trip generation values in bold were used to evaluate the project's impacts at the study intersections and represent a conservative analysis that does not apply a multimodal reduction factor.***

LANGAN
ENGINEERING & ENVIRONMENTAL SERVICES

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

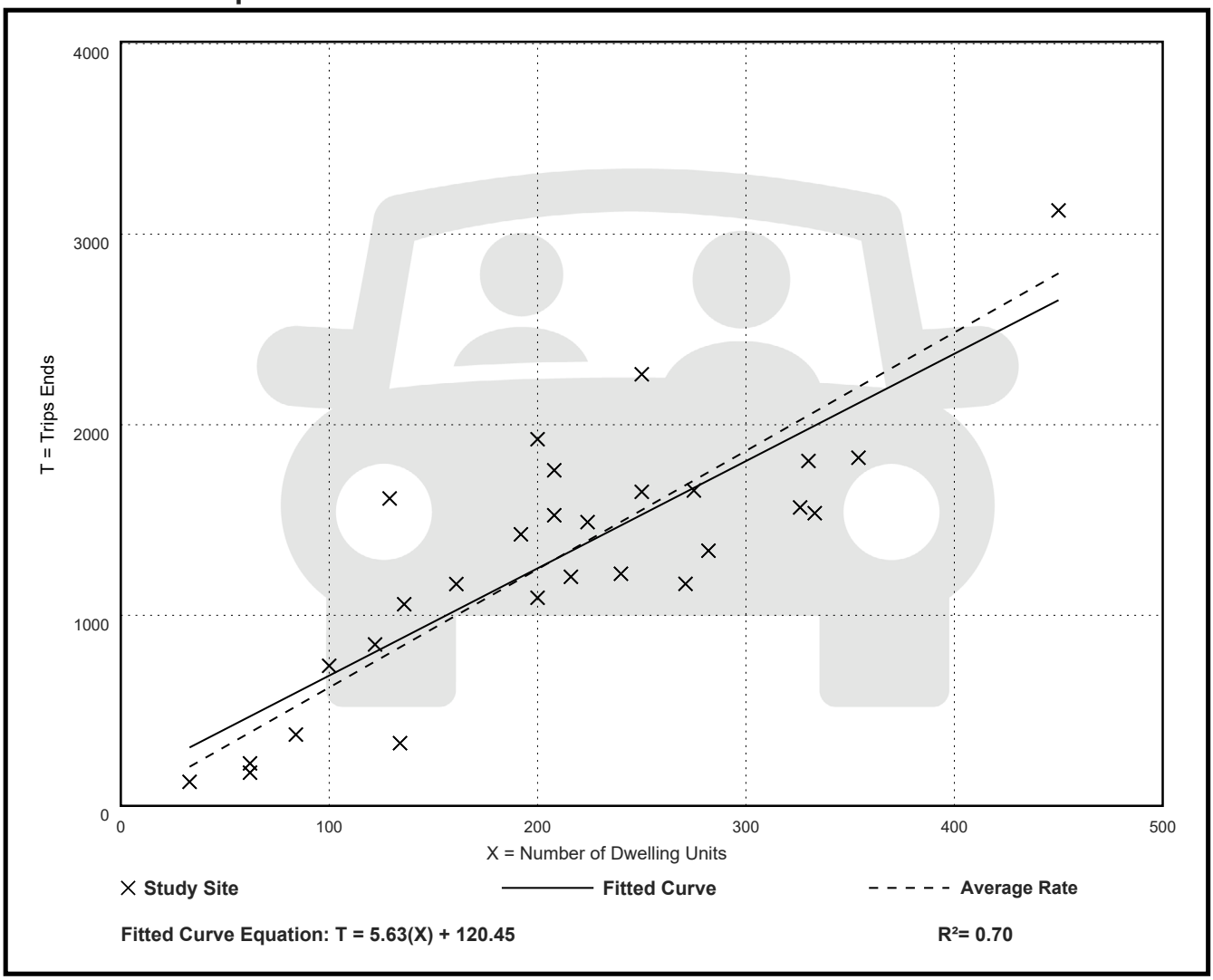
Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday**

Setting/Location: **General Urban/Suburban**
Number of Studies: 28
Avg. Num. of Dwelling Units: 208
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
6.21	2.46 - 12.50	1.87

Data Plot and Equation



Fitted Curve Equation: T = 5.63(X) + 120.45

R^2= 0.70

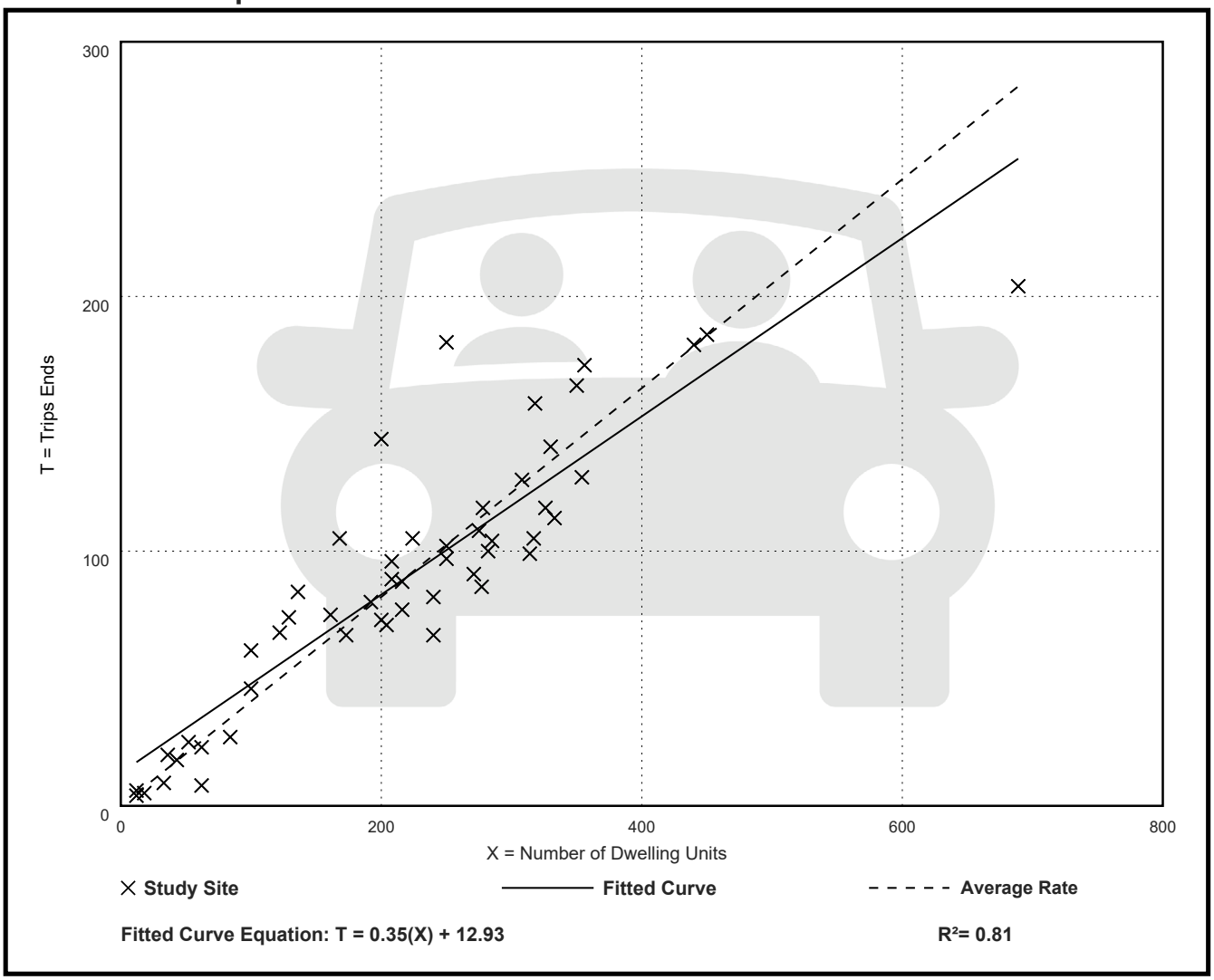
Multifamily Housing (Low-Rise)
Not Close to Rail Transit (220)

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:	51
Avg. Num. of Dwelling Units:	219
Directional Distribution:	24% entering, 76% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.41	0.13 - 0.73	0.10

Data Plot and Equation



Fitted Curve Equation: T = 0.35(X) + 12.93

R^2= 0.81

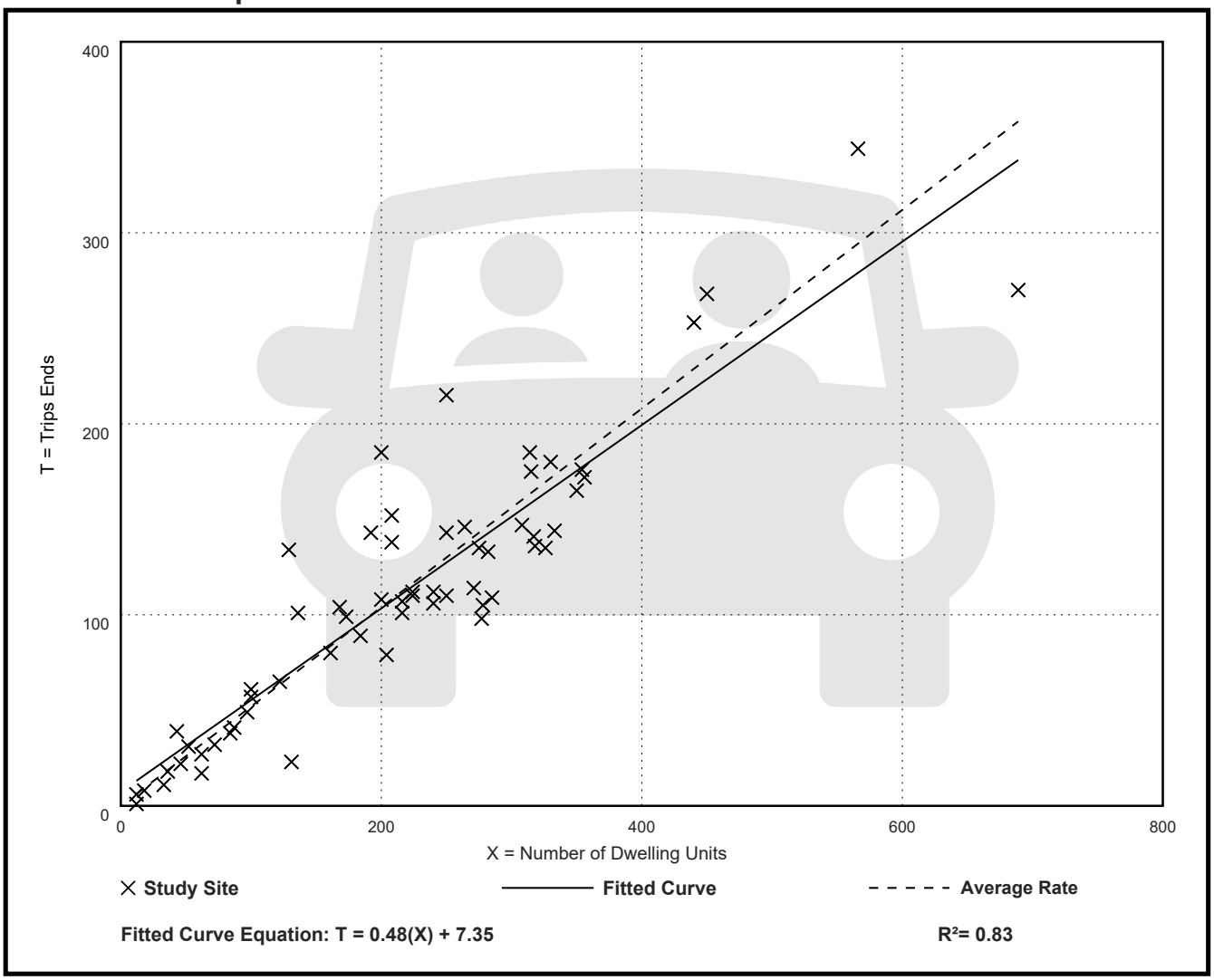
Multifamily Housing (Low-Rise)
Not Close to Rail Transit (220)

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:	61
Avg. Num. of Dwelling Units:	215
Directional Distribution:	62% entering, 38% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.52	0.08 - 1.04	0.13

Data Plot and Equation



Fitted Curve Equation: T = 0.48(X) + 7.35

R^2= 0.83

Mid-Rise Residential with Ground-Floor Commercial
GFA (1-25k) (231)

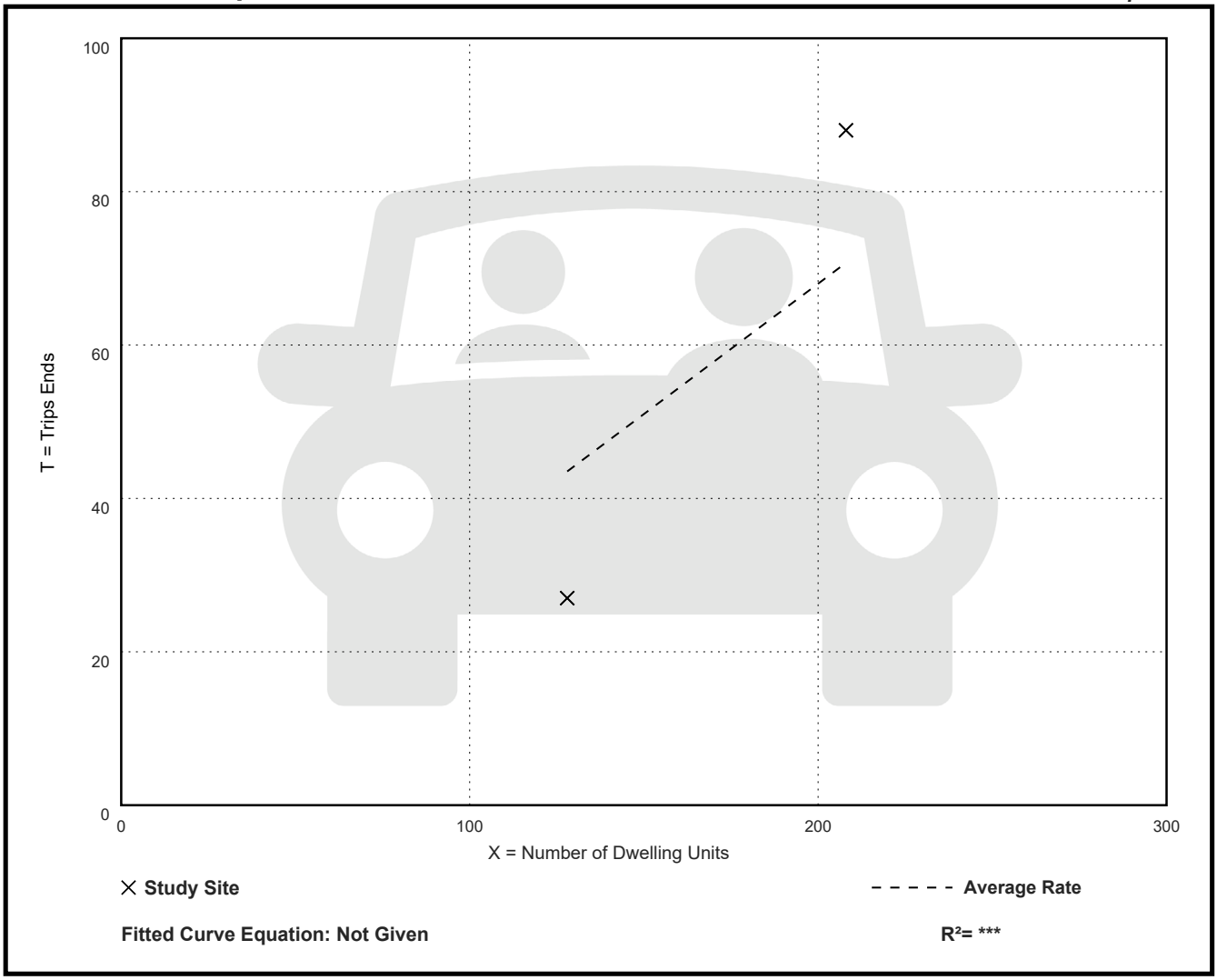
Vehicle Trip Ends vs:	**Dwelling Units**
On a:	**Weekday,**
	Peak Hour of Adjacent Street Traffic,
	One Hour Between 7 and 9 a.m.
Setting/Location:	**General Urban/Suburban**
Number of Studies:	2
Avg. Num. of Dwelling Units:	168
Directional Distribution:	30% entering, 70% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.34	0.21 - 0.42	***

Data Plot and Equation

Caution – Small Sample Size



Mid-Rise Residential with Ground-Floor Commercial
GFA (1-25k) (231)

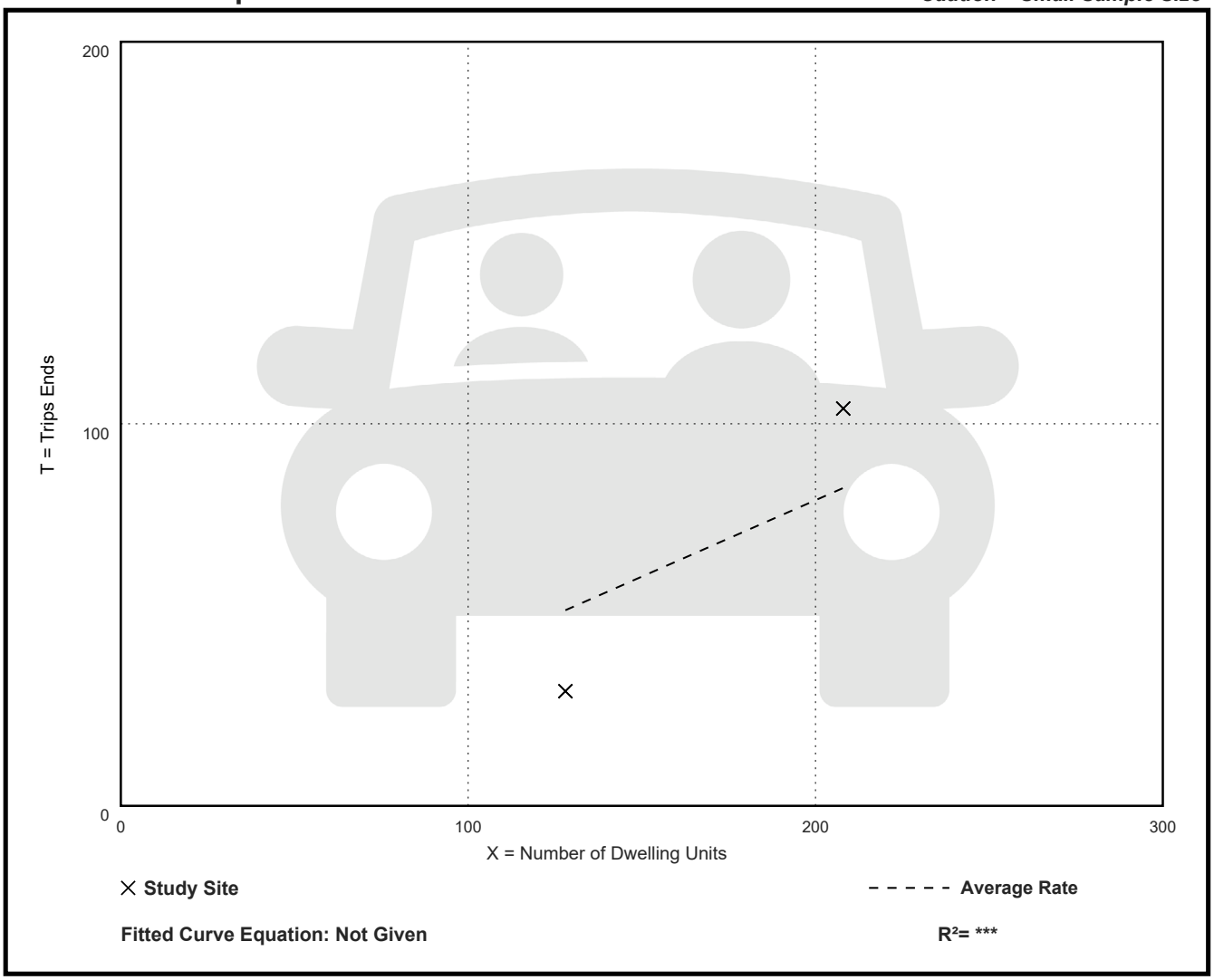
Vehicle Trip Ends vs:	**Dwelling Units**
On a:	**Weekday,**
	Peak Hour of Adjacent Street Traffic,
	One Hour Between 4 and 6 p.m.
Setting/Location:	**General Urban/Suburban**
Number of Studies:	2
Avg. Num. of Dwelling Units:	168
Directional Distribution:	70% entering, 30% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.40	0.23 - 0.50	***

Data Plot and Equation

Caution – Small Sample Size



Fitted Curve Equation: Not Given

R^2= *

	Census Tract 42.06; Miami-Dade County; Florida	
	Total	
Label	**Estimate**	**Margin of Error**
Workers 16 years and over	1,061	±642
MEANS OF TRANSPORTATION TO WORK		
Car, truck, or van	63.7%	±26.2
Drove alone	63.3%	±26.5
Carpooled	0.4%	±0.8
In 2-person carpool	0.4%	±0.8
In 3-person carpool	0.0%	±4.8
In 4-or-more person carpool	0.0%	±4.8
Workers per car, truck, or van	1.00	±0.01
Public transportation (excluding taxicab)	3.0%	±4.1
Walked	15.3%	±16.7
Bicycle	3.0%	±4.5
Taxicab, motorcycle, or other means	4.0%	±3.9
Worked from home	11.0%	±8.7

Census Tract 42.06 Weighted Average; Miami-Dade County; Florida		
Label	**Estimate**	**Scaled Percentage**
MEANS OF TRANSPORTATION TO WORK		
Car, truck, or van	63.7%	72%
Public transportation (excluding taxicab)	3.0%	3%
Walked	15.3%	17%
Bicycle	3.0%	3%
Taxicab, motorcycle, or other means	4.0%	4%
Worked from home	11.0%	-
	Total	**23.9%**

APPENDIX G
TURN LANE WARRANT SHEETS

LANGAN
ENGINEERING & ENVIRONMENTAL SERVICES

Left Turn Lane Warrant
Analyst: KAL
Date: APRIL 2026
Analysis Year: 2029 AM
Job#: 300390901

Intersection:
N/S: Washington Avenue
E/W: Ingress Driveway
SOUTHBOUND LEFT TURN

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

4-lane roadway

INPUT

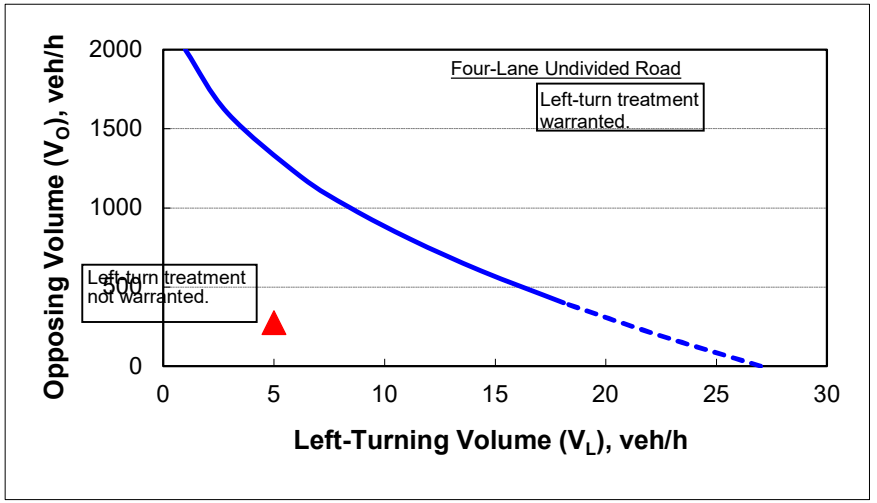
Variable	Value
Left-turning volume (V_L), veh/h:	5
Advancing volume (V_A), veh/h:	306
Opposing volume (V_O), veh/h:	275

OUTPUT

Variable	Message
Opposing volume (Vo) check:	O.K.
Combined volume (V_A and V_O) check:	No bay needed.
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	

CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	4.0
Critical headway, s:	6.0



Note: When V_O < 400 veh/h (dashed line), a left-turn lane is not normally warranted unless the advancing volume (V_A) in the same direction as the left-turning traffic exceeds 400 veh/h (V_A > 400 veh/h).

Data Source: NCHRP 457 Evaluation of Intersection Improvements

LANGAN
ENGINEERING & ENVIRONMENTAL SERVICES

Left Turn Lane Warrant
Analyst: KAL
Date: APRIL 2026
Analysis Year: 2029 PM
Job#: 300390901

Intersection:
N/S: Washington Avenue
E/W: Ingress Driveway
SOUTHBOUND LEFT TURN

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

4-lane roadway

INPUT

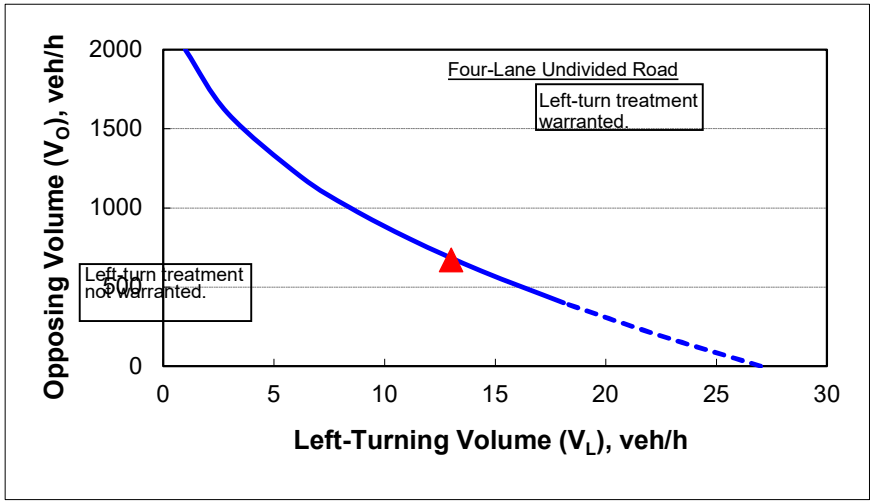
Variable	Value
Left-turning volume (V_L), veh/h:	13
Advancing volume (V_A), veh/h:	316
Opposing volume (V_O), veh/h:	672

OUTPUT

Variable	Message
Opposing volume (Vo) check:	O.K.
Combined volume (V_A and V_O) check:	O.K.
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	

CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	4.0
Critical headway, s:	6.0



Note: When V_O < 400 veh/h (dashed line), a left-turn lane is not normally warranted unless the advancing volume (V_A) in the same direction as the left-turning traffic exceeds 400 veh/h (V_A > 400 veh/h).

Data Source: NCHRP 457 Evaluation of Intersection Improvements

LANGAN
ENGINEERING & ENVIRONMENTAL SERVICES

Right Turn Lane Warrant
Analyst: KAL
Date: APRIL 2026
Analysis Year: 2029 AM
Job#: 300390901

Intersection:
N/S: Washington Avenue
E/W: Ingress Driveway
NORTHBOUND RIGHT TURN

Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

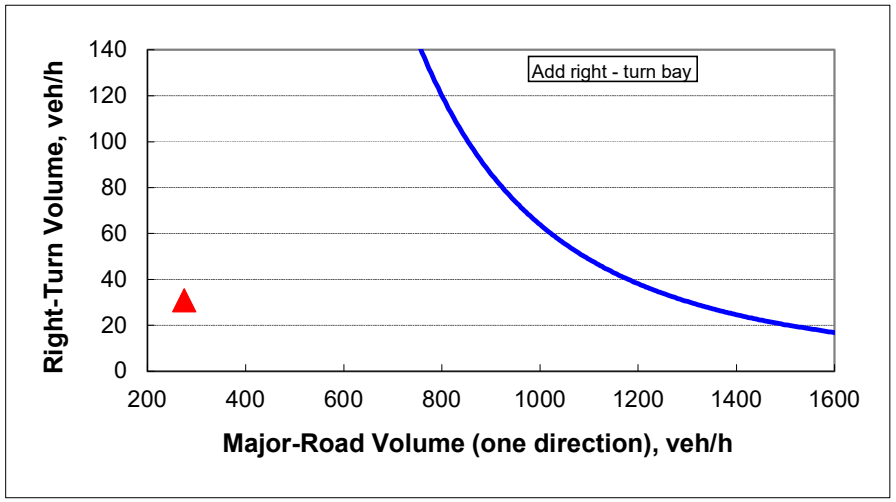
INPUT

Roadway geometry:	4-lane roadway

Variable	Value
Major-road speed, mph:	35
Major-road volume (one direction), veh/h:	275
Right-turn volume, veh/h:	31

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	2460
Guidance for determining the need for a major-road right-turn bay for a 4-lane roadway:	
Do NOT add right-turn bay.	



Data Source: NCHRP 457 Evaluation of Intersection Improvements

LANGAN
ENGINEERING & ENVIRONMENTAL SERVICES

Right Turn Lane Warrant
Analyst: KAL
Date: APRIL 2026
Analysis Year: 2029 PM
Job#: 300390901

Intersection:
N/S: Washington Avenue
E/W: Ingress Driveway
NORTHBOUND RIGHT TURN

Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

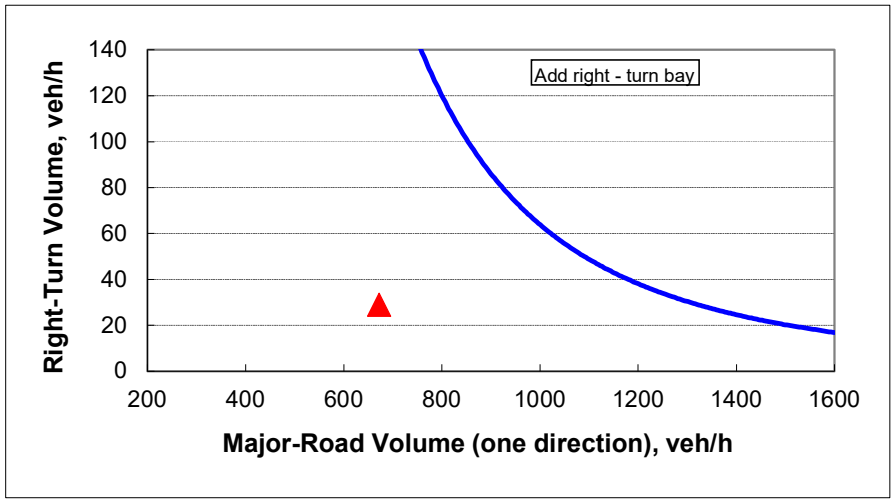
INPUT

Roadway geometry:	4-lane roadway

Variable	Value
Major-road speed, mph:	35
Major-road volume (one direction), veh/h:	672
Right-turn volume, veh/h:	29

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	197
Guidance for determining the need for a major-road right-turn bay for a 4-lane roadway:	
Do NOT add right-turn bay.	



Data Source: NCHRP 457 Evaluation of Intersection Improvements

APPENDIX H
ITE SERVICE RATE & QUEUEING SYSTEM EXCERPTS

The impact of PARC systems on vehicle capacity is significant. Table 14-17 highlights the service rates of various PARC systems. The service rates are affected by the approach to the access point. Sharp turns reduce the service rate. Figure 14-21 highlights the relationship between the turn radius approach to the access point and the impact on service rate. As the radius decreases, turning speed also decreases, which lowers capacity. For example, turns with a 25-ft. inside radius may reduce service rates by 7 sec. per vehicle. The increase in time per vehicle noted in Figure 14-21 can be added to the PARC service rates (shown as sec. per vehicle) in Table 14-17.

Table 14-17. PARC Service Rates.

	Vehicle/Hour	Seconds/Vehicle
No Pay, No Gate		
Entry—clear access, no controls	800	4.5
Exit—little street traffic, no controls (sensitive to street traffic flow)	400	9
Prepaid Systems—Entry or Exit System		
Card insertion	435	8.3
Proximity card	600	6
Automatic vehicle ID	800	4.5
Pay Per Use—Entry Systems		
Pushbutton ticket spitter	400	9
Auto-spit ticket	450	8
Pay on entry—flat fee, gated, ticketed	200	18
Pay on entry—flat fee, non-gated, ticketed	300	12
Pay Per Use—Exit Systems		
Cashier—cash only, variable rate	135	27
Cashier—flat rate	180	20
Cashier—credit card, online check (telephone), sign	95	38
Cashier—credit card, online check, no sign	110	33
Cashier—credit card, batch check, high speed, no sign	175	21
Validated for free parking	300	12
Pay-on-foot ticket insertion	360	10
License plate recognition	120	30

Note: These service rates can be affected by the curvature of the approach to the parking entrance or exit, the volume of traffic on the street adjacent to the parking facility and the frequency of pedestrian conflicts.

Source: Chrest, Smith, Bhuyan, Monahan and Iqbal. *Parking Structures: Planning, Design, Construction, Maintenance and Repair*, 3rd Edition. New York, NY, USA: Kluwer Academic Publishers, 2001.

2. Arrival and Departure Rates

The vehicle trip generation rate of a parking facility can be linked to its associated land use in most suburban cases. In situations where there is a single land use or a mixed-use site, *Trip Generation: An ITE Informational Report* provides a tool for estimating vehicle trip flow at peak hours in the morning or afternoon.[27]

Many parking situations do not involve a single land use. Table 14-18 provides a comparison of the peak-hour vehicle trip rates (peak a.m. and p.m. average vehicle trip rates from *Trip Generation*) for various land uses to the 85th-percentile peak parking demand (from *Parking Generation*). These ratios represent the number of vehicle trips per parked vehicle—a tool that can be used to estimate arrival and departure rates from a parking facility by multiplying the ratio times the number of spaces.

In central cities, parking lots or structures serve many land uses and commonly fall into short-term parking and long-term parking. Counts of short-term parking facilities provide trip rates per space in the peak hours.

INSTITUTE
OF
TRANSPORTATION ENGINEERS

Transportation and Land Development

Vergil G. Stover
Texas A & M University

Frank J. Koepke
The Traffic Institute, Northwestern University

Prentice Hall, *Englewood Cliffs, New Jersey 07632*

APPLICATIONS OF QUEUEING ANALYSIS

Providing an adequate and well-defined storage area for drive-thru traffic is particularly critical, especially at fast-food restaurants and drive-thru bank facilities where queues can, and do, become quite long. Waiting vehicles should be stored on private property clear of driveways so that traffic back-up does not interfere with movement on the arterial street. At fast-food restaurants, the menu board should be installed upstream of the service window to permit drive-thru customers to place their orders prior to their arrival at the service window. Preparation of their order can then begin before they reach the service window, thus minimizing their time at the service window. A well-defined storage area for the waiting traffic should be located so that the waiting vehicles do not block or impede the movement of driveway traffic.

Where a single service position is involved, the situation is referred to as a *single-channel problem*. *Multiple-channel problems* arise when two or more service positions are available. Such problems commonly arise with bank tellers (indoor as well as drive-in windows), entrances and exits at large parking lots and garages, at passenger pick-up areas at transit stations and taxi stands, truck terminals or loading/unloading areas, supermarket checkout counters, telephone calls, building entrances, and transit-station turnstiles. The assumptions of Poisson arrivals and negative exponential service time are commonly acceptable and used for both single- and multiple-channel problems. Thurgood [11] found these assumptions to be representative of drive-in facilities.

Customers arriving randomly at a drive-in facility may enter into service immediately or may have to enter the queue until they can be served. Waiting lines occur whenever the immediate demand for service exceeds the current capacity of the facility providing that service.

Basic Notation and Terminology

The following notation is employed throughout this section:

n = number of customers in the drive-in system
M = number of customers in the queue waiting to be served (number of customers in the system minus the number being served)
$P(n)$ = steady-state probability that exactly n customers are in the queueing system
$P(0)$ = probability that zero vehicles are in the queueing system
N = number of parallel service positions
q = mean average arrival rate of vehicles into the system (vehicles/hour)
Q = mean average service rate per service position (vehicles/hour/position)
Avg (t) = $\%_Q$ = mean service time expressed in minutes per vehicle
ρ = $\%_{NQ}$ = coefficient of utilization
$E(m)$ = expected (average) number of customers in the system
$E(n)$ = expected (average) number of customers waiting in the queue
$E(t)$ = expected (average) waiting time in system (includes service time)
$E(w)$ = expected (average) waiting time in queue (excludes service time)

The equations employed in the analysis of queueing problems are given in Table 8-10.

Jones, Woods, and Thurgood [4] have developed a graph (Figure 8-6) for determining the probability that there will be no customers in the system—values for $P(0)$. They also developed graphs for determining the average number of waiting customers (Figure 8-7), the average waiting time (Figure 8-8), and average queue length (Figure 8-9). These figures avoid the necessity to perform the time-consuming, although simple, queueing-analysis calculations. See pp. 228–30.

TABLE 8-10
Queueing System Equations

Equation Number	*Variable*	*Equation*
(8-1)	Coefficient of utilization	$\rho = \dfrac{q}{NQ}$
(8-2)	Probability of no customers in the system	$P(0) = \left[\sum_{n=0}^{N-1} \dfrac{\left(\frac{q}{Q}\right)^n}{n!} + \dfrac{\left(\frac{q}{Q}\right)^N}{N!(1-\rho)}\right]^{-1}$
(8-3)	Mean number in the queue	$E(m) = \left[\dfrac{\rho\left(\frac{q}{Q}\right)^N}{N!(1-\rho)^2}\right] P(0)$
(8-4)	Mean number in the system	$E(n) = E(m) + \dfrac{q}{Q}$
(8-5)	Mean wait time in queue (hours)	$E(w) = \dfrac{E(m)}{q}$
(8-6)	Mean time in the system (hours)	$E(t) = E(w) + \dfrac{1}{Q}$ $= E(w) + \text{Avg}\ (t)$
(8-7)	Proportion of customers who wait	$P[E(w) > 0] = \left[\dfrac{\left(\frac{q}{Q}\right)^N}{N!(1-\rho)}\right] P(0)$
(8-8)	Probability of a queue exceeding a length M	$P(x > M) = (\rho^{N+1})P[E(w) > 0]$
(8-9a)	Queue storage required	$M = \left[\dfrac{\ln P(x > M) - \ln E(w) > 0}{\ln \rho}\right] - 1$
(8-9b)*	Queue storage required	$M = \left[\dfrac{\ln P(x > M) - \ln Q_M}{\ln \rho}\right] - 1$

*Q_M is a statistic which is a function of the utilization rate and the number of service channels (service positions); see Table 8-11. The table of Q_M values and use of Equation (8-9b) greatly simplifies the calculations compared to those using Equations (8-9a).

Use of the equations and the graphs may be illustrated by the following example of a drive-in bank.

Conditions:

Number of drive-in windows, $N = 3$

Demand on the system, $q = 70$

Service capacity per channel, $Q = 28.6$ for an average service time, Avg $(t) = 2.1$ minutes

Solution Using Graphs:

- Coefficient of utilization $= 70/(3)(28.6) = 0.816$
- Probability that there are customers waiting in the system, Figure 8-6: $P(0) = 0.05$
- Expected average number of customers waiting in the queue, Figure 8-7: $E(m)/N = 1.0$; and the average number $E(m) = (3)(1.0) = 3$

location, a 5% probability of back-up onto the adjacent street is judged to be acceptable. Demand on the system for design is expected to be 110 vehicles in a 45-minute period. Average service time was expected to be 2.2 minutes. Is the queue storage adequate?

Such problems can be quickly solved using Equation (8–9b) given in Table 8-10 and repeated below for convenience.

$$M = \left[\frac{\ln P(x > M) - \ln Q_M}{\ln \rho}\right] - 1$$

where:

M = queue length which is exceeded p percent of the time
N = number of service channels (drive-in positions)
Q = service rate per channel (vehicles per hour)
$\rho = \dfrac{\text{demand rate}}{\text{service rate}} = \dfrac{q}{NQ}$ = utilization factor
q = demand rate on the system (vehicles per hour)
Q_M = tabled values of the relationship between queue length, number of channels, and utilization factor (see Table 8.11)

TABLE 8-11
Table of Q_M Values

	$N = 1$	2	3	4	6	8	10
0.0	0.0000	0.0000	0.0000	0.0000			
0.1	.1000	.0182	.0037	.0008	.0000	0.0000	0.0000
.2	.2000	.0666	.0247	.0096	.0015	.0002	.0000
.3	.3000	.1385	.0700	.0370	.0111	.0036	.0011
.4	.4000	.2286	.1411	.0907	.0400	.0185	.0088
.5	.5000	.3333	.2368	.1739	.0991	.0591	.0360
.6	.6000	.4501	.3548	.2870	.1965	.1395	.1013
.7	.7000	.5766	.4923	.4286	.3359	.2706	.2218
.8	.8000	.7111	.6472	.5964	.5178	.4576	.4093
.9	.9000	.8526	.8172	.7878	.7401	.7014	.6687
1.0	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

$\rho = \dfrac{q}{NQ} = \dfrac{\text{arrival rate, total}}{(\text{number of channels})(\text{service rate per channel})}$
N = number of channels (service positions)

Solution

Step 1: $Q = \dfrac{60 \text{ min/hr}}{2.2 \text{ min/service}} = 27.3$ services per hour

Step 2: $q = (110 \text{ veh}/45 \text{ min}) \times (60 \text{ min/hr}) = 146.7$ vehicles per hour

Step 3: $\rho = \dfrac{q}{NQ} = \dfrac{146.7}{(6)(27.3)} = 0.8956$

Step 4: $Q_M = 0.7303$ by interpolation between 0.8 and 0.9 for $N = 6$ from the table of Q_M values (see Table 8-11).

Step 5: The acceptable probability of the queue, M, being longer than the storage, 18 spaces in this example, was stated to be 5%. $P(x > M) = 0.05$, and:

$$M = \left[\frac{\ln 0.05 - \ln 0.7303}{\ln 0.8956}\right] - 1 = \left[\frac{-2.996 - (-0.314)}{-0.110}\right] - 1$$

$$= 24.38 - 1 = 23.38, \text{ say } 23 \text{ vehicles.}$$

The number of vehicles in the queue would be expected to exceed 23 more than 5% of the time. Since the site plan will accommodate a queue of 18 vehicles, the storage is not sufficient for the conditions stated.

It is important to realize that, for any $P\ (x > M)$ value, the queue length required increases very rapidly for values of $\rho > 0.85$ (see Figure 8-9). When $\rho > 1.0$, the solution is indeterminate and the queue length theoretically becomes infinite.

Analysis of Service Times. In many instances it is effective to demonstrate that a proposed design not only is inadequate to store vehicles waiting for service but will result in unacceptable wait times as well. The necessary equations are given in Table 8-10.

For purposes of checking computations it is convenient to know that the limit of $P(0)$, as the number of channels approaches infinity (in practical terms when $N > 10$), is:

$$\lim_{N \to \infty} P(0) = e^{-\lambda} \qquad \text{where } \lambda = q/Q$$

Drive-In Bank Example: Under the site-development approval requirements, representatives of a bank presented a site plan for the construction of a new bank having three service positions. Information provided by bank officials and observations at other local banks provided the following data:

- Expected average arrival rate during the design hour (4:30–5:30 p.m. on Fridays) = 70 vehicles per hour (vph)
- Average service time per customer = 2.1 minutes

Does the site plan provide for sufficient storage to accommodate all vehicles arriving 95% of the time?

$$q = 70 \text{ vph arrival rate}$$

$$Q = \frac{60 \text{ minutes per hour}}{2.1 \text{ minutes per service}} = 28.6 \text{ vph service rate}$$

$$\rho = \frac{70}{(3)(28.6)} = 0.816$$

$$\frac{q}{Q} = \frac{70}{28.6} = 2.45$$

$$Q_M = 0.674 \text{ by interpolation from Table 8-11}$$

$$P(x > M) = 1.00 - 0.95 = 0.05$$

By Equation (8-9b)

$$M = \left[\frac{\ln 0.05 - \ln 0.674}{\ln 0.816}\right] - 1 = \left[\frac{-2.996 - (-0.396)}{-0.203}\right] - 1 = 11.8, \text{ say } 12$$

Thus, it would be necessary to store 12 vehicles, exclusive of the three service positions, in order to accommodate the arriving vehicles 95% of the time; or alternatively, to have waiting vehicles extending back into the adjacent street no more than 5% of the time between 4:30 and 5:30 p.m. on Fridays. Since the site plan provides for six spaces, the site plan as submitted is inadequate and should be disapproved.

A solution to the problem would be to increase the storage, or if this is not possible add a service position in order to reduce the average service time.

Addition of a service position would reduce the number of storage spaces needed to three (three storage plus four service positions)—assuming the same arrival rate and service time:

$$M = \left[\frac{\ln 0.05 - \ln 0.301}{\ln 0.612}\right] - 1 = 2.7, \text{ say } 3$$

A redesign to provide four service positions would have the additional benefit of substantially reducing the expected waiting time (from over 4 minutes to less than $\frac{1}{2}$ minute) for the bank customers using the drive-in windows:

With Three Service Positions:

$$q = 70 \text{ vph}$$
$$Q = 28.6 \text{ vph}$$
$$\frac{q}{Q} = 2.45$$
$$\rho = \frac{70}{(3)(28.6)} = 0.816$$
$$P(0) = \left[\frac{(2.45)^0}{0!} + \frac{(2.45)^1}{1!} + \frac{(2.45)^2}{2!} + \frac{(2.45)^3}{3!\left[1 - \left(\frac{2.45}{3}\right)\right]}\right]^{-1}$$
$$= [1 + 2.45 + 3.00 + 13.37]^{-1} = 0.0505$$
$$E(m) = \left[\frac{(0.816)\left(\frac{70}{28.6}\right)^3}{3!(1 - 0.816)^2}\right] 0.0505 = 2.97$$
$$E(n) = 2.97 + 70.28.6 = 5.42$$
$$E(t) = \frac{2.97}{70} = 0.0424 \text{ hours or } 2.55 \text{ minutes}$$
$$E(w) = 0.0424 + \frac{1}{28.6} = 0.0774 \text{ hours or } 4.64 \text{ minutes}$$

With Four Service Positions:

$$q = 70 \text{ vph}$$
$$Q = 28.6 \text{ vph}$$
$$\frac{q}{Q} = 2.45$$
$$\rho = \frac{70}{(4)(28.6)} = 0.612$$
$$P(0) = \left[\frac{(2.45)^0}{0!} + \frac{(2.45)^1}{1!} + \frac{(2.45)^2}{2!} + \frac{(2.45)^3}{3!} + \frac{(2.45)^4}{4!\left[1 - \left(\frac{2.45}{4}\right)\right]}\right]^{-1}$$
$$= 0.0783$$
$$E(m) = \left[\frac{(0.612)(2.45)^4}{4!(1 - 0.612)^2}\right] 0.0783 = 0.48$$
$$E(n) = 0.48 + 2.45 = 2.93$$
$$E(t) = 0.007 + \frac{1}{28.6} = 0.042 \text{ hours or } 2.51 \text{ minutes}$$
$$E(w) = \frac{0.48}{70} = 0.007 \text{ hours or } 0.41 \text{ minutes}$$

However, the service time would increase somewhat unless an additional teller were also added. Nevertheless, an increase to 2.5 minutes, or more, would still reduce the storage space required and result in better service (less time in the system). Besides, time spent being served is less irritating to the customer than an equal time spent waiting.

Conversion of a Residence. An existing single-family residence was situated on a 2.5-acre tract fronting on the major north–south arterial in the urbanizing fringe of a metropolitan area of 100,000 population. The 85th percentile speed exceeded 50 mph; however, it was anticipated that the speed limit would be reduced to 45 mph as further urbanization occurred.

Requests for rezoning from single-family residential to general commercial had received negative recommendations from the Planning and Zoning Commission and denied by the City Council. Nevertheless, the fact that changing conditions in the vicinity of the site were making the property less desirable as a single-family residence was generally recognized. Therefore, when an application was submitted for a Conditional Use Permit to establish a private school using the existing residence for classrooms, the Planning and Zoning Commission was very favorably disposed to the request. The applicant provided the following information prior to the public hearing.

1. The completed application for a conditional use
2. A statement that the intended use was for a Montessori school using the existing structure
3. A site plan as required for all proposed development, other than single-family and duplex residential development, before a building permit will be issued for a new structure and for remodeling of an existing one

The following information was presented at the public hearing by the applicant:

1. At least 40 students would be enrolled before any change would be made in the site circulation.
2. Eighty percent of the students were expected to be picked up within a 20-minute period—a substantial additional fee was to be charged for children picked up more than 30 minutes after school.
3. A strong parent–school relationship was intended, so that average pick-up time of at least 2 minutes and visits of 5 minutes or longer would not be unusual.

The following were agreed upon at the public hearing:

1. The probability of vehicles backing up onto the main lane of the major arterial should be negligible, less than 1%.
2. The site plan, with no change in the circulation pattern, would provide for four service positions and three storage positions.

Based upon these conditions, the following analysis was performed using Equation (8-9b):

$$M = 3$$

$$N = 4$$

$$Q = 60 \text{ minutes per hour} \div 2 \text{ minutes per service} = 30 \text{ vph}$$

$$q = (40 \text{ students})\,(80\% \text{ in } 20 \text{ minutes})\left(\frac{60}{20}\right) = 96 \text{ vph}$$

$$\rho = \frac{96}{(4)\,(30)} = 0.8000$$

$$P(x > 3) = 0.01 \text{ (a 1\% chance of vehicles backing up onto the arterial)}$$

$$Q_M = 0.8585, \text{ from Table 8-11}$$

$$3 = \left[\frac{\ln P(x > 3) - \ln 0.5964}{\ln 0.8000}\right] - 1$$

$$3 = \left[\frac{\ln P(x > 3) - (-0.5168)}{-0.2231}\right] - 1$$

Then,

$$\ln P(x > 3) = (4)(-0.2231) - 0.5168 = -1.4092$$

and

$$P(x > 3) = e^{-1.4092} = 0.244 \text{ or } 24\%$$

Thus, the calculated probability that the queue could back up onto the arterial is 24% (given the stated conditions), which is considerably greater than the acceptable probability of less than 1%, and the application was denied. The Planning and Zoning Commission suggested various compromises of redesign of the site and issuance of a conditional use permit for a school (under the ordinance, a school can be located in any zoning district by condition) with the condition that the maximum enrollment would not exceed 24 students, which is the number necessary to achieve a value of $P(x > 3) < 0.01$. All such proposals were rejected by the applicant. The site was subsequently rezoned to the Administrative and Professional District (a restricted office district) and is now being used as a dentist's office.

REFERENCES

1. Barton-Aschman Associates, Inc., *McDonald's Site Traffic Analysis Manual,* 1980.
2. Fairfax County, Virginia, *Stacking Space Standards for Drive-In Windows At Fast Food Restaurants,* 1980.
3. Institute of Transportation Engineers, *Trip Generation Rates,* 1976.
4. Jones, Robert L., Woods, Donald, L., and Thurgood, Glen S., "Drive-In Banking: Managing for Maximum Service," *ITE Journal,* publication pending.
5. Lalani, Nazir, "Factoring 'Passer-By' Trips Into Traffic Impact Analyses," *Public Works,* May 1984.
6. Lopata, Roy H. and Jaffe, Stuart J., "Fast Food Restaurant Trip Generation: Another Look," *ITE Journal,* 1980.
7. Petersen, David O., "Bank-Savings and Loan Traffic and Parking Analysis," unpublished internal memorandum, Barton-Aschman Associates Inc., February 1974.
8. Scifres, Peter N., "Traffic Planning for Drive-In Financial Institutions," *Traffic Engineering,* September 1975.
9. The Traffic Institute, Northwestern University, Selected Studies of Burger King Restaurants.
10. The Traffic Institute, Northwestern University, short course notes.
11. Thurgood, Glen S., "The Application of Stochastic Queueing Theory in the Development of Suggested Traffic Design Guidelines for Drive-In Service Facilities," doctoral dissertation, Texas A&M University, December 1975.

APPENDIX I
VALET OPERATIONS FIGURE & QUEUEING ANALYSIS

The Barclay
1940 Park Avenue to 640 17th Street Parking Garage
Valet Figure

Valet Parking Operations

Legend

- Ingress
- Egress
- Valet Drop Off/Pick Up Area

LANGAN
ENGINEERING & ENVIRONMENTAL SERVICES

Valet Service Time Calculations

THE BARCLAY - 1940 PARK AVENUE

Valet Service Time Drop-off	
Activity	**Service Time (min)**
Vehicle Pick-Up	0.40
Vehicle Travel Time	4.00
Internal Circulation inside Garage	2.00
Return to Valet booth	3.00
Total Service Time	**9.40**

Notes:

(1) Measurements for vehicle travel time and return to valet booth based on Google Maps directions typical route average time measurements on typical weekday at typical afternoon peak time.

(2) Internal circulation inside Garage time conservatively based on typical gated parking garage service times, and time spent circulating garage to the furthest parking space.

Valet Service Time Pick-up	
Activity	**Service Time (min)**
Get Ticket/Keys	0.15
Pickup Car Time	3.00
Internal Circulation inside Garage	2.00
Vehicle Travel Time	4.00
Return car	0.25
Total Service Time	**9.40**

Notes:

(1) Measurements for vehicle travel time, pickup car time, and vehicle travel time based on Google Maps directions typical route average time measurements on typical weekday at typical afternoon peak time.

(2) Internal circulation inside Garage time conservatively based on typical gated parking garage service times, and time spent circulating garage to the furthest parking space.

LANGAN
ENGINEERING & ENVIRONMENTAL SERVICES

VALET QUEUING ANALYSIS
THE BARCLAY - 1940 PARK AVENUE

Estimated Service Time

Operation Type	Time (min)*
Valet Operation	**9.40**

Afternoon Peak Hour Trip Generation Summary[1]

Land Use	ITE Code	In	Out	Total Trips
Mid-Rise Residential with Ground Floor Commercial (1-25k)	231	**22**	**10**	**32**

[1] Valet operations analysis applies a 23.9% non-vehicular reduction factor to the project-generated trips for an accurate valet attendant estimate.

Afternoon Peak Hour Valet Parking Queuing Analysis

Variable	Equation	
Peak hour service rate per attendant (veh/hr/attendant)	$Q = \frac{60}{Service\ Time}$	6.3830
Number of valet attendants	N	**8**
Peak hour arrival rate of vehicles (veh/hr)	q	**32**
Coefficient of utilization	$\rho = \frac{q}{NQ}$	0.6267
Probability of no guests in system	$P(0) = \left[\sum_{n=0}^{N-1} \frac{\left(\frac{q}{Q}\right)^n}{n!} + \frac{\left(\frac{q}{Q}\right)^N}{N!\,(1-\rho)}\right]^{-1}$	0.0064
Proportion of guests who wait	$P[(E(w)>0)] = \left[\frac{\left(\frac{q}{Q}\right)^N}{N!\,(1-\rho)}\right] P(0)$	0.1692
Probability of a queue exceeding a length M (95th Percentile)	$P(x>M) = (\rho^{N+1})\,P[E(w)>0]$	0.05
Queue length which is exceeded 5% of the time (veh)	$M = \left[\frac{\ln P\,(x>M) - \ln P\,[E(w)>0]}{\ln \rho}\right] - 1$	**1.6**

** Adopted from ITE Transportation and Development, 1988*

LANGAN
ENGINEERING & ENVIRONMENTAL SERVICES