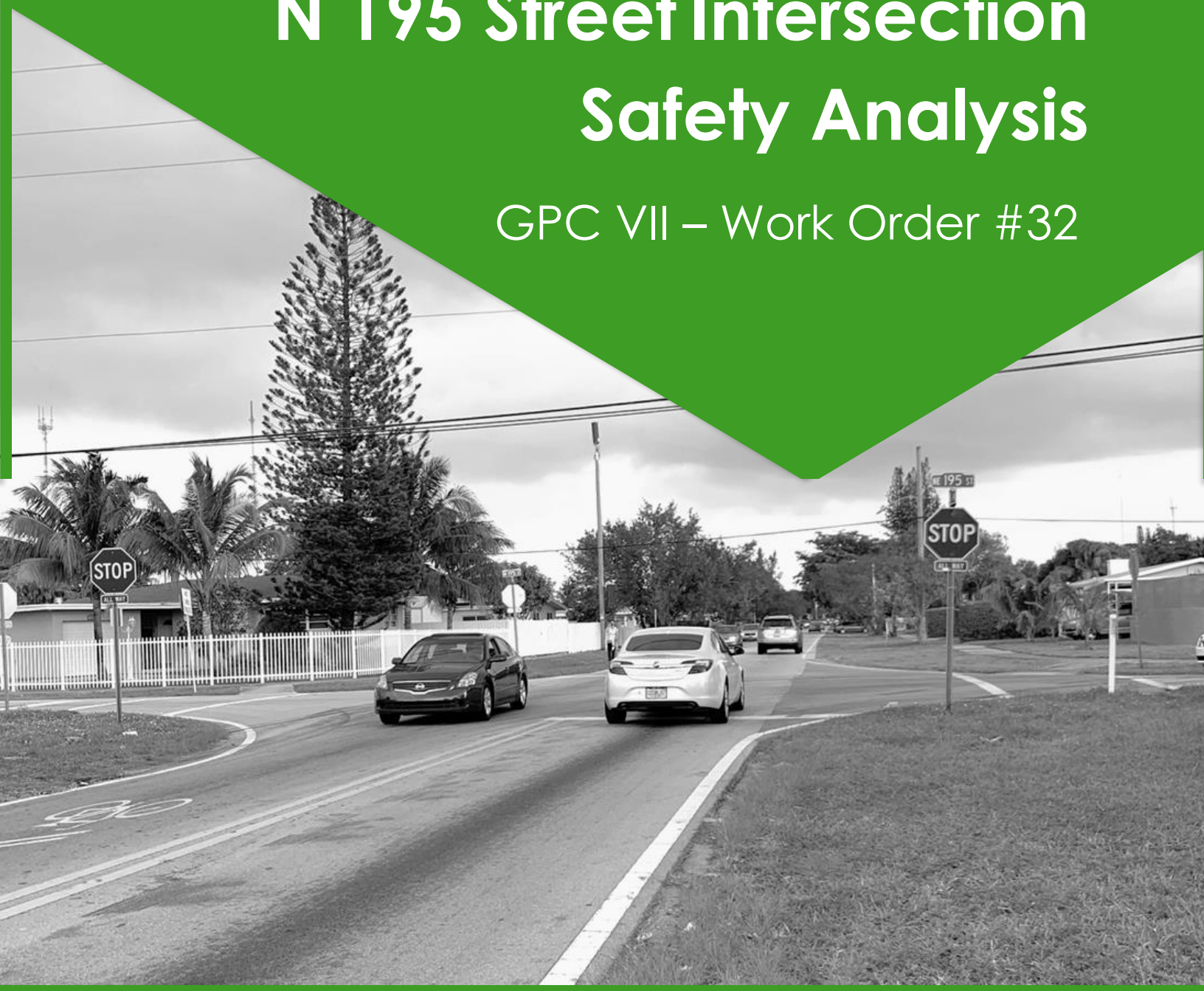
N Miami Avenue and N 195 Street Intersection Safety Analysis

GPC VII – Work Order #32



TPO
Miami-Dade Transportation Planning Organization

KITTELSON & ASSOCIATES

August 2021

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GPC VIII – Work Order #32

August 5, 2021

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PROJECT OVERVIEW

On March 18, 2021, the Miami-Dade Transportation Planning Organization (TPO) Governing Board adopted resolution #12-2021 ratifying the issuance of notice to proceed for the scope of services and budget to conduct a safety analysis for Miami-Dade County safety improvements projects. The TPO is advancing three intersections identified in the TPO's adopted Fiscal Year 2026 List of Program Priorities (LOPP) and prioritized by the Miami-Dade Department of Transportation and Public Works (DTPW) for Safety Program funding. These locations are considered off-system since they are not located on the State Highway System (SHS).

This report addresses one of the selected projects submitted to the Florida Department of Transportation (FDOT) District Six Safety Program for off-system facilities funding.

An Intersection Safety Analysis was conducted at North (N) Miami Avenue and North (N) 195 Street, located between the City of Miami Gardens and unincorporated Miami-Dade County. The intersection was identified as a roadway safety improvement project under the TPO Fiscal Year 2026 LOPP approved June 18, 2020 and included in the newly approved 2027 LOPP on June 17, 2021. Miami-Dade DTPW prioritized improvements for this intersection due to an existing pattern of angle and left turn crashes.

The study's Purpose & Need is to reduce crashes, most importantly fatalities and serious injuries, by evaluating the intersection and providing justification to apply for Highway Safety Improvement Program (HSIP) funding. The HSIP is a data driven program. As such, proposed projects need to meet eligibility requirements through crash and operational analysis and must demonstrate a benefit-cost ratio (B/C) greater than 1 and a positive net present value (NPV). The study analysis, results, and proposed improvements will be presented to the Florida Department of Transportation (FDOT) District Six for evaluation of eligibility and prioritization based on the analysis results.

N Miami Avenue and N 195 Street is an all-way stop-controlled intersection (AWSC). N Miami Avenue and N 195 Street are two-lane roads with each approach consisting of a single shared left/through/right lane.

This report documents the findings of field observations, data collection, crash data analysis, and detailed traffic operations analysis conducted at the study intersection to evaluate the existing safety and operational issues. This report provides a concept for consideration and opinion of probable cost for the implementation of the suggested improvements. In addition, a benefit-cost comparison is provided to determine the project eligibility for HSIP funding (B/C > 1 and + NPV). The findings have been reviewed by Miami-Dade DTPW and FDOT. FDOT's Electronic Review Comments (ERC) and the response to comments are provided in **Appendix K**.

EXISTING CONDITIONS

A field review was conducted at the study intersection to document existing roadway and safety conditions, as well as traffic operations. Within the study limits, N Miami Avenue is a north-south, two-lane undivided roadway, classified as *Urban Major Collector* with 11-foot lanes and a posted speed limit of 30 miles per hour (mph) within the vicinity of study intersection. N 195 Street is an east-west, two-lane undivided urban local roadway, with 10-foot lanes and a posted speed limit of 30 mph.

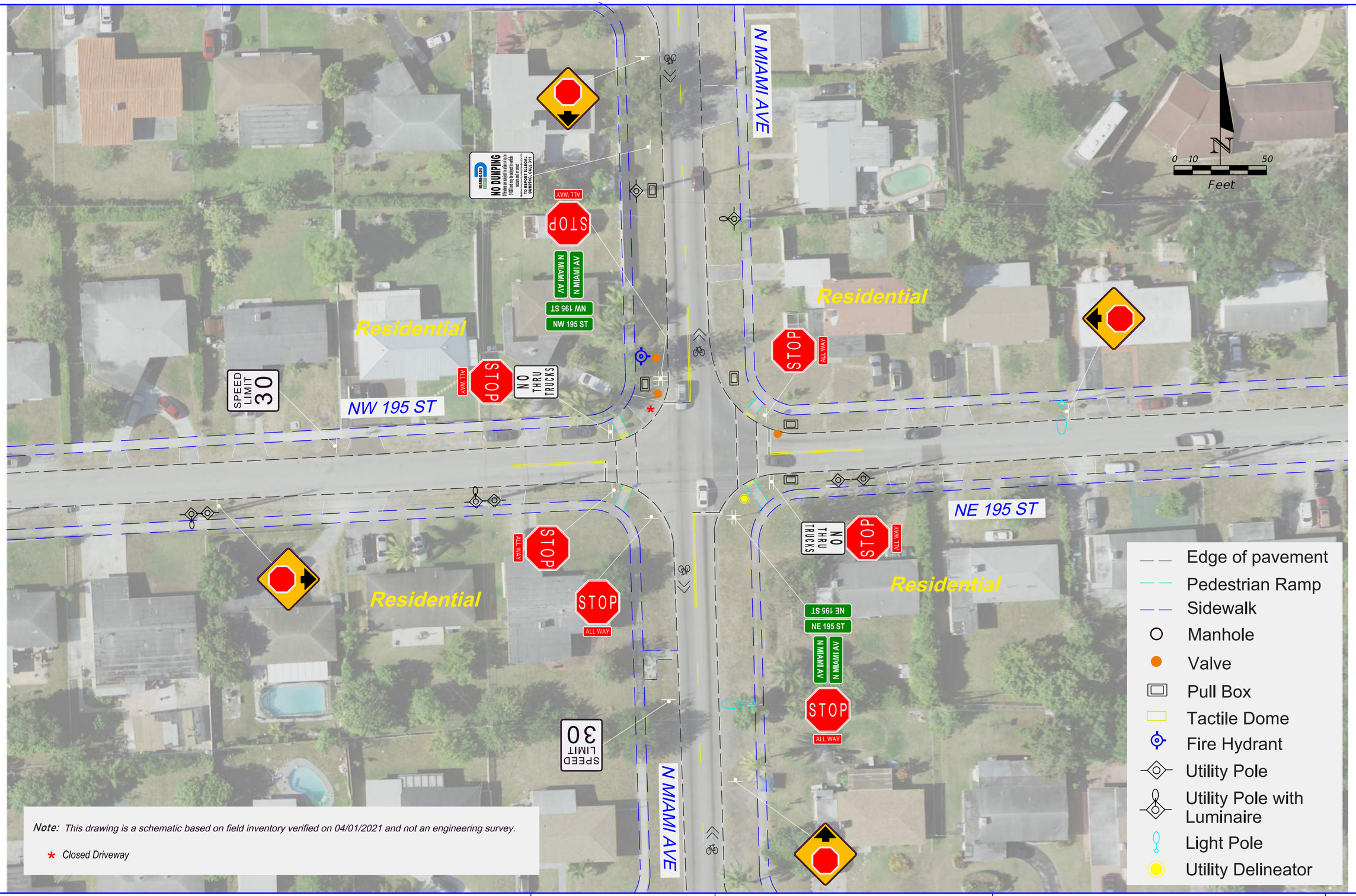
Intersection Geometry

The approach lane configuration for each of the four (4) intersection legs consists of a single shared left/through/right lane. Sidewalk is present on both sides of all four intersection legs. Pedestrian ramps are provided on all four intersection corners.

There are standard crosswalks provided on the intersection's east and west legs. There are no Miami-Dade Transit (MDT) routes traveling through the intersection. N Miami Avenue is marked with "sharrow" pavement markings in the northbound and southbound directions. There were no pedestrians or bicyclists observed at the intersection during the field review. Refer to the turning movement count data under Traffic Data Collection for pedestrian and bicyclist volumes reported during the peak hours. Roadway lighting is present along N 195 Street, but there is no intersection lighting. The land use surrounding the intersection is single family residential, and the surrounding area near the intersection is built out.

The roadway context classification in the vicinity of the intersection is Urban General (C4).

Figure 1 shows the condition diagram detailing existing field conditions. The diagram shows the intersection and the conditions within the surrounding area including the intersection alignment, residential buildings from aerial, sidewalks, trees, utility poles, lighting poles, water hydrants, stop signs, and lane configuration.



Note: *This drawing is a schematic based on field inventory verified on 04/01/2021 and not an engineering survey.*

* *Closed Driveway*

Prepared for:

Miami-Dade Transportation Planning Organization
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Miami-Dade
Transportation Planning Organization

EXISTING CONDITION DIAGRAM

N MIAMI AVE & NE 195 ST

FIGURE NO. 1

xagudelo 4/29/2021 11:52:09 AM O:\Suresh\2019027\N MIAMI AVE & NE 195 ST.dgn

Field Observations

A field review was conducted on Friday, March 19, 2021 during the midday period to observe site characteristics, document findings and identify potential intersection improvements to reduce angle and left turn crashes and improve safety overall. The field observation report is provided in **Appendix A**. The following field observations were made:

- The intersection of N Miami Avenue and N 195 Street is the only intersection that is stop-controlled on N Miami Avenue between the signalized intersections on N 191 Street and N 199 Street (approximately 0.5 miles). Drivers may not expect to have to stop along the segment, potentially increasing the chance that northbound and southbound drivers may not stop.
- Three of the four approaches have two stop signs, one on each side of the approach – southbound approach has a single sign. This could indicate that drivers are either not seeing the stop signs or are ignoring the stop signs and traveling through the intersection without coming to a full stop. **Figure 2** illustrates the two stop signs on the westbound approach of the intersection.

Figure 2: Westbound approach of N Miami Avenue and N 195 Street

TRAFFIC DATA COLLECTION

Mechanical Traffic Counts

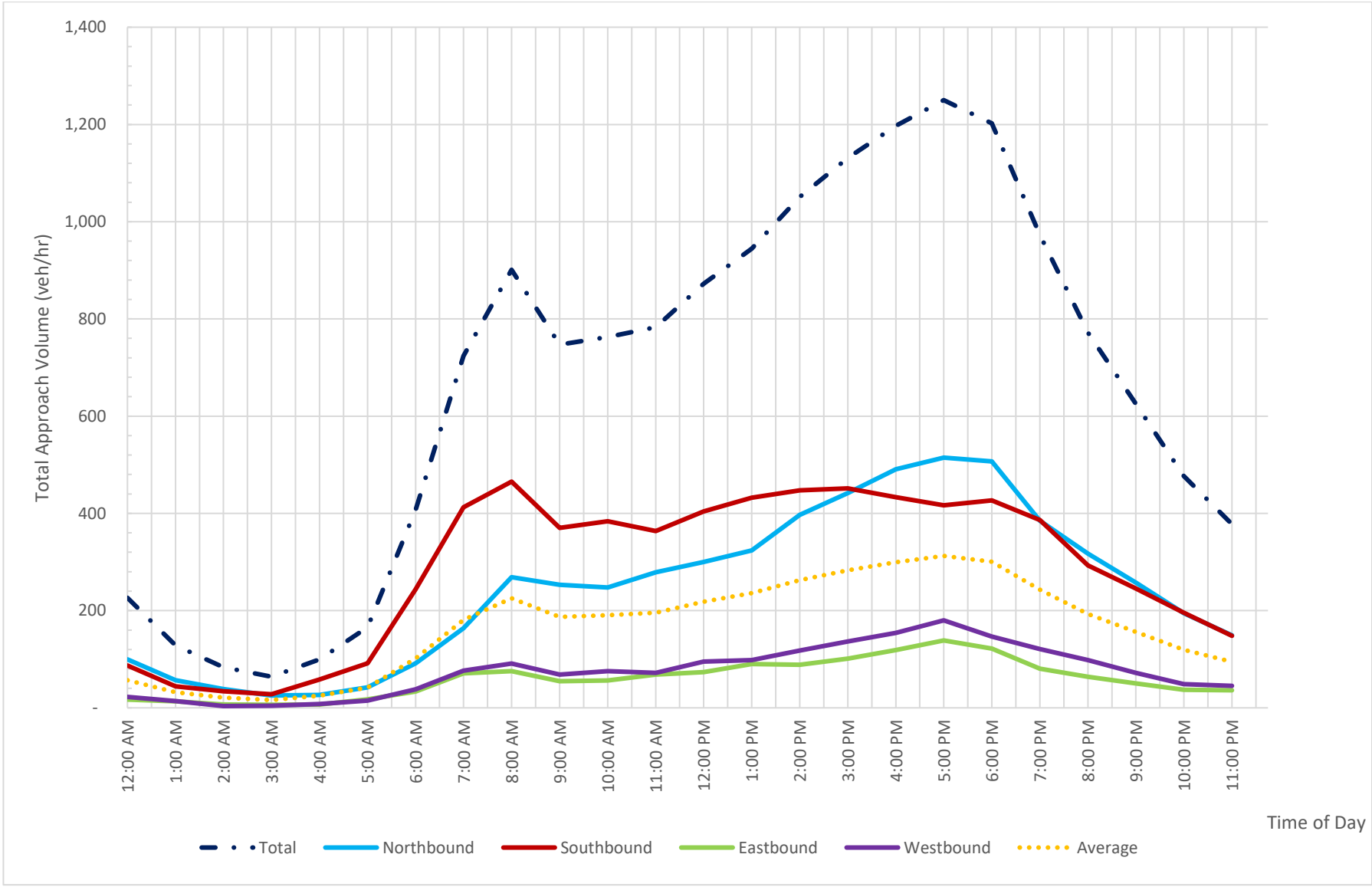
Mechanical traffic counts or bi-directional tube counts were collected on all four approaches of the intersection over a 72-hour period (from Tuesday, March 16, 2021 to Thursday, March 18, 2021). **Figure 3** shows the average variation of hourly traffic volume versus the time of day for a typical weekday (Tuesday, Wednesday, and Thursday).

The eastbound and westbound volumes were observed to have lower variability throughout the day when compared to the northbound and southbound traffic volumes. The 72-hour data yielded the following observations:

- The intersection peak hours are 8:00 to 9:00 AM and 5:30 to 6:30 PM.
- The southbound approach is the peak traffic direction during the AM peak period, from 7:30 to 9:30 AM and the northbound approach is the peak traffic direction during the PM peak period, from 4:15 to 6:15 PM.

Detailed results of the 72-hour counts are included in **Appendix B**.

Figure 3: 72-hour Average Vehicle Counts



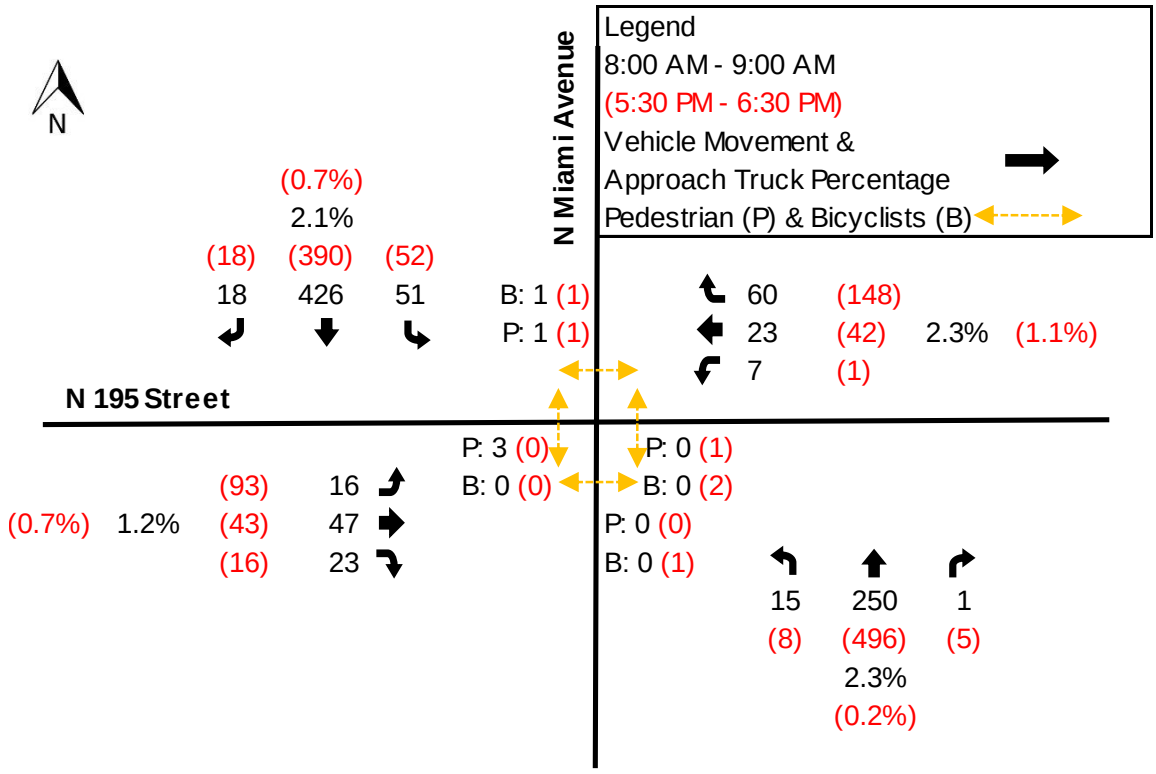
Manual Turning Movement Counts

Video recordings of the intersection turning movements were collected simultaneously during the 72-hour counts. A review of the 72-hour counts helped identify the peak periods to collect four-hour turning movement counts (TMCs). Detailed results of the TMCs are included in **Appendix C**.

Once the peak periods were identified from the 72-hour counts, the video recordings were used to collect and summarize the TMCs at the study intersection. The TMCs were collected on March 17, 2021 from 7:30 AM to 9:30 AM and from 4:30 PM to 6:30 PM. Pedestrian and bicyclist counts were included in the TMCs during the same four hours.

Figure 4 shows the volumes and approach truck percentages for the AM peak hour (8:00 AM to 9:00 AM), PM peak hour (5:30 PM to 6:30 PM) and reported pedestrian / bicyclist crossings.

Figure 4: Turning Movement Counts by Peak Hour



CRASH ANALYSIS

The most current five years of crash data were analyzed for the N Miami Avenue and N 195 Street intersection. The data was obtained from the FDOT's State Safety Office Geographic interface software (SSOGis) and Signal Four Analytics (S4). SSOGis provided verified crash data for 2016-2018 and data from S4 was used to supplement the SSOGis for 2016-2020. The supplement of S4 data was included in the analysis to verify if crash trends and crash patterns continued in the most recent years.

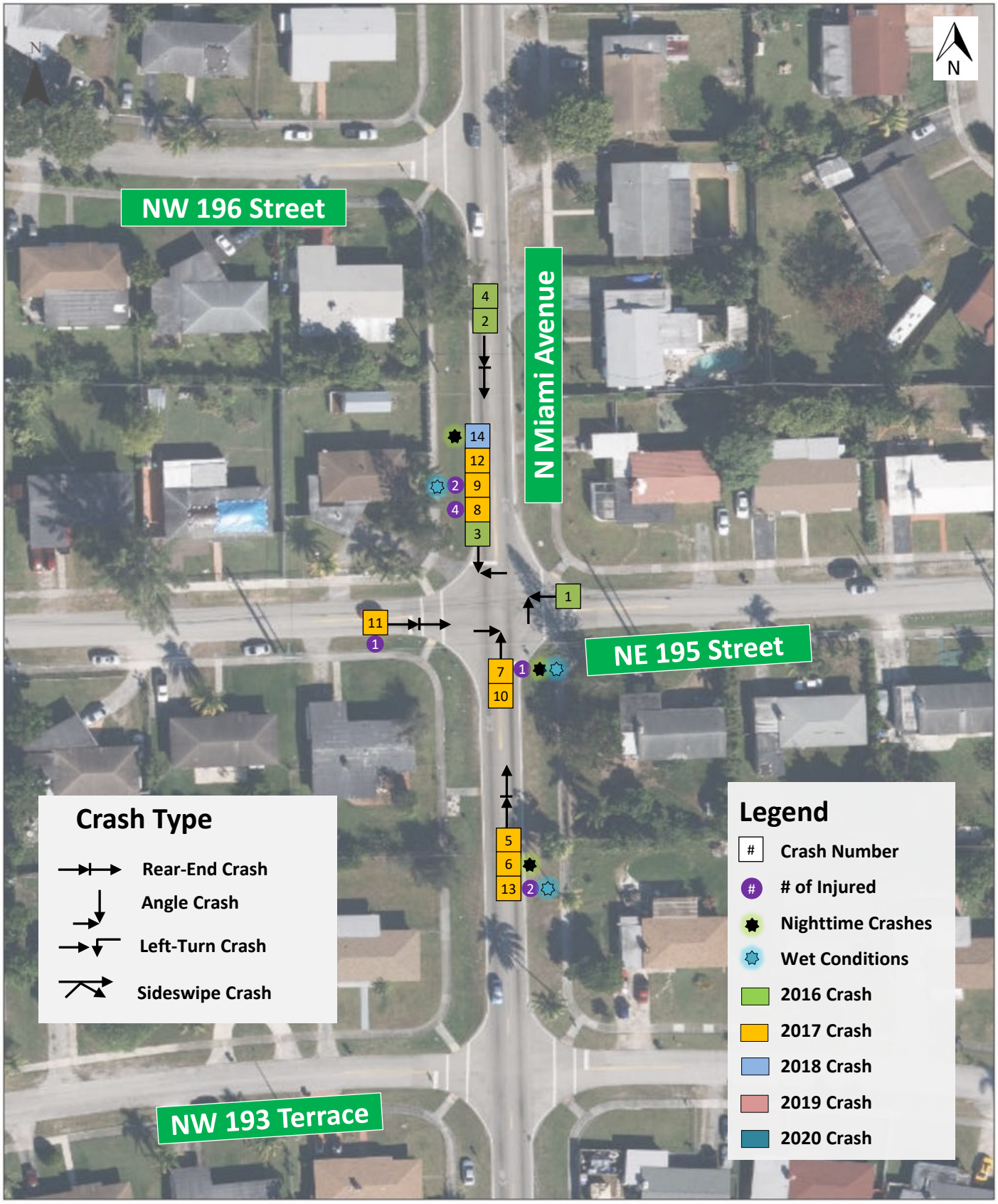
Note that while S4 data is not verified in its raw format, the data for this study was manually verified through a detailed review of the police reports.

The following findings were observed during the five-year analysis:

- A total of 37 crashes were reported within the influence area of the study intersection: four crashes in 2016, thirteen crashes in 2017, six crashes in 2018, five crashes in 2019, and nine crashes in 2020.
- The crash peak period (6:00-9:00 AM) coincides with the vehicular AM peak hour identified through traffic data collection (8:00-9:00 AM).
- Angle (18 crashes or 49 percent) was the highest frequency crash type within the study area. All approaches are stop controlled.
    - Eleven of the 18 angle crashes involved collisions between westbound and southbound vehicles.
    - Four of the 18 angle crashes involved collisions between eastbound and northbound vehicles.
    - Two of the 18 angle crashes involved collisions between westbound and northbound vehicles.
    - One of the 18 angle crashes involved a collision between an eastbound and southbound vehicle.
    - Five or more angle crashes occurred within three separate 12-month periods. Five angle crashes occurred during 2017, 2018, and 2020.
- Nine injury crashes were reported (24 percent). Five of the nine injury crashes were angle crashes with three of these reported in 2017.
- Rear end (17 crashes) is the second highest crash type within the study area.
- One left turn and one sideswipe crash were reported during the study period. The left turn crash was property damage only and the sideswipe crash involved a non-incapacitating injury.
- There were no reported pedestrian or bicycle crashes within the study area.
- Eight crashes (22 percent) occurred under nighttime conditions (dusk, dawn, or dark).
- Six crashes (16 percent) occurred under wet pavement conditions.

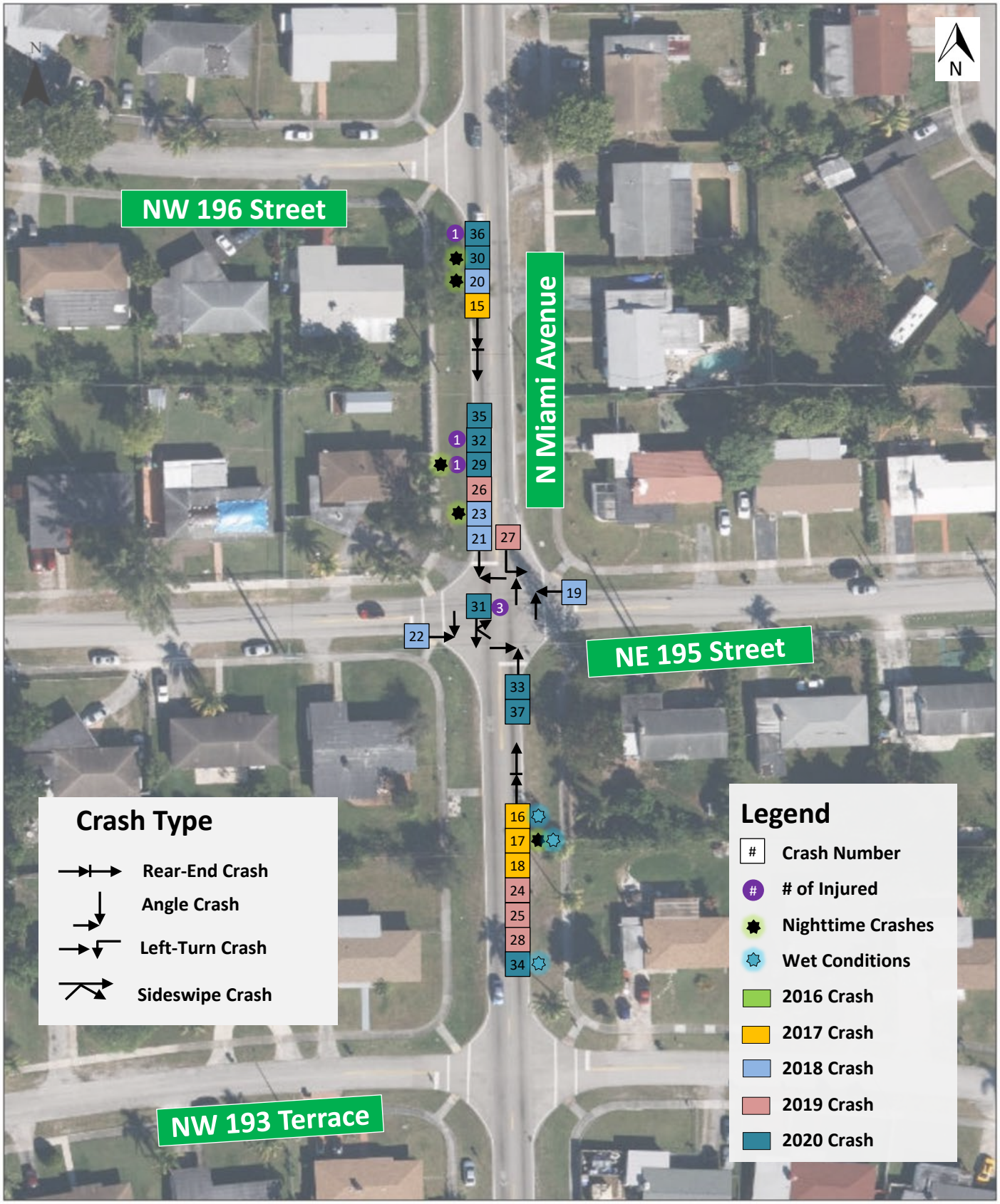
All years of crash data was reviewed to identify trends and potential indicators of a need to change the control type at the study intersection. A SSOGis collision diagram for the crashes during the study period (2016 – 2018) is provided in **Figure 5**. **Figure 6** presents the collision diagram for crash data obtained from S4.

A summary of the crash data is provided in **Appendix D**.



Collision Diagram at N Miami Avenue N 195 Street (Source: FDOT SSOGIS 2016 – 2018)

Figure 5



Collision Diagram at N Miami Avenue N 195 Street (Source: S4 2016-2020)

Figure 6

A safety performance evaluation was conducted for the intersection existing configuration of all-way stop-controlled (AWSC) using FDOT's Safety Performance for Intersection Control Evaluation (SPICE) tool. The number of design year 2045 predicted, observed, and expected crashes per year are displayed in **Table 1**.

The number of observed crashes per year represents the average number of crashes per year based on the collected 2016-2018 historical crash data. While there are Safety Performance Functions (SPFs) available for an AWSC intersection, a Florida calibration factor is not available. Uncalibrated Safety Performance Functions (SPFs) were used to determine the number of predicted crashes per year based on the existing intersection control type. SPFs are developed to analyze locations with similar characteristics including intersection control type and can be applied to state, county, and local roadways. The number of expected crashes per year is developed using empirical Bayes method which applies a weighting factor to the predicted number of crashes based on the observed historical crash data.

The observed crashes per year represents the number of crashes that occurred. The predicted crashes per year represents the number of crashes that are generally predicted to occur based on the intersection control type. The expected crashes per year represents the number of crashes that would be expected based on the intersection control type and historical crash data.

Per the results obtained, the number of crashes observed is considerably higher when compared to the predicted number for the existing intersection control type (AWSC).

Table 1: Existing Control Type (AWSC) Year 2045 Predicted, Observed, and Expected Crashes Per Year

Crash Severity	Predicted Crashes/Year	Observed Crashes/Year	Expected Crashes/Year	Potential for Safety Improvements
Property Damage Only	1.63	5.80	4.19	2.56
Fatal and Injury	0.91	1.80	1.30	0.39
Total	**2.54**	**7.60**	**5.49**	**2.95**

The existing intersection configuration experienced higher than the predicted number crashes per year for property damage only (PDO) and fatal and injury (F&I) crashes during the study period. The potential for safety improvement for the existing configuration is determined as the difference between the number of expected crashes and number of predicted crashes. For this study period, the potential for safety improvement is 2.56 PDO and 0.39 F&I crashes per year.

SIGNAL WARRANT ANALYSIS

A signal warrant analysis was performed at the study intersection to evaluate the need for traffic signal. The traffic signal warrant analysis was conducted in conformance with the requirements of the Federal Highway Administration (FHWA) Manual on Uniform Traffic Control Devices (MUTCD) and the FDOT Manual on Uniform Traffic Studies (MUTS). Guidance from the MUTCD indicates that a traffic signal is warranted if one or more warrants is met. The following warrants are applicable at the study intersection:

- Warrant 1 – Eight-Hour Vehicular Volume
- Warrant 2 – Four-Hour Vehicular Volume
- Warrant 7 – Crash Experience

Warrant 1, Condition A and Condition B are **not met** at the study intersection based on the highest eight hours of traffic volumes.

Warrant 2 is **met** based on the highest four hours of traffic volumes for the 100% volume level.

Warrant 7 is not met based on criteria 1 – adequate trial of remedial measures and criteria 3 – volume warrants. **Although Warrant 7 is not met, the intersection does meet criteria 2 – correctable crashes, with five or more angle crashes in a 12-month period.** Five angle crashes occurred during 2017, 2018, and 2020. This suggests that an intersection treatment is needed to correct the existing safety issue.

Based on the signal warrant analysis, a signal is warranted at the intersection of N Miami Avenue and N 195 Street due to meeting Warrant 2. The signal warrant forms are provided in **Appendix E**.

INTERSECTION CONTROL EVALUATION

Intersection Control Evaluation (ICE) is an evaluation process or methodology used to consider multiple context-sensitive intersection control strategies when planning a new or modified intersection. The goal of ICE is to provide a quantitative decision-making process to identify and select a control strategy fitting the location's context, providing safe travel facilities for all road users, and offering the best overall value. An ICE analysis was performed at the intersection of N Miami Avenue and N 195 Street.

ICE Stage 1

ICE Stage 1 involves two analysis components: 1) A planning level volume-to-capacity (V/C) ratio assessment using the Capacity Analysis at Junctions (CAP-X) tool; and 2) a planning level safety assessment using Safety Performance for Intersection Control Evaluation (SPICE). These assessments are high level in nature, due to the potentially numerous intersection control types that need to be reviewed during the ICE Stage 1 evaluation. The intersection does meet signal warrant 2 and the traffic signal was considered as part of the ICE Stage 1 analysis. The following intersection control types were evaluated in ICE Stage 1 at the study intersections including the No-Build condition:

- Two-Way Stop Control (TWSC)
- All-Way Stop Control (AWSC) – No-Build
- Signalized Control
- 1x1 Roundabout (one-lane major road and one-lane minor road)
- 50' Inscribed Circle Diameter (ICD) Mini-Roundabout
- 75' ICD Mini-Roundabout

Each control type was compared operationally using a planning level V/C ratio and for safety based on existing 2021 volumes. The V/C ratio is a comparison of the expected traffic volume to intersection capacity. The safety ranking is based upon a predicted number of total and fatal/injury crashes based upon the design year (2045) traffic volumes. A safety ranking of 1 denotes a lower predicted number of fatal/injury crashes while a higher ranking denotes a higher predicted number of crashes when compared to the other alternatives. Note that the AWSC and TWSC alternatives are ranked ahead of the signalized control alternative due to having a lower number of predicted fatal and injury crashes. **Table 2** provides a comparison of the Stage 1 V/C ratio, safety ranking, and predicted crashes for the alternatives evaluated. ICE Stage 1 CAP-X and SPICE Outputs are included in **Appendix F**.

Table 2: Stage 1 ICE Results

Control Strategy	V/C		Safety Ranking	Design Year Predicted Crashes/Year	
	AM	PM		Total	Fatal & Injury
TWSC	0.27	0.72	3	5.96	2.43
AWSC (No-Build)	0.77	1.07	2	2.54	0.91
Signalized Control	0.34	0.40	4	8.08	2.70
1x1 Roundabout	0.38	0.44	1	2.33	0.45
50' ICD Mini-Roundabout	0.51	0.61	1	2.33	0.45
75' ICD Mini-Roundabout	0.51	0.59	1	2.33	0.45

Following the completion of the Stage 1 analysis, the alternatives were compared. The No-Build AWSC condition is predicted to have more than two times the number of fatal and injury crashes when compared to the roundabout alternatives. The No-Build does not meet the Purpose & Need for the intersection improvement.

The TWSC and signalized control alternatives had lower V/C ratios, but higher numbers of predicted crashes compared to the No-Build condition, defeating the purpose and need of the project.

The roundabout alternatives have lower V/C ratios and lower numbers of predicted crashes when compared to the No-Build condition.

Due to the safety emphasis of the project, the roundabout alternative was selected as the preferred alternative following the completion of ICE Stage 1. ICE Stage 2 is not needed.

The mini-roundabout was selected for concept development due to a balance of right-of-way (ROW) constraints and design vehicle access. The concept is discussed in greater detail in the Concept Development section in this report.

OPERATIONAL ANALYSIS

A detailed Level of Service (LOS) analysis was conducted to compare the existing all-way stop control intersection with a mini-roundabout. The alternatives were evaluated using future weekday AM and PM peak hour traffic volume conditions. The land use surrounding the intersection consists of single family residential. Low traffic volume growth is anticipated due to the surrounding land use being fully built-out. A growth rate of 1.0 percent was selected as a conservative estimate to develop future volumes. The 2045 volumes were developed by applying a linear 1.0 percent growth rate to all movements. The No-Build scenario (AWSC) was evaluated in Synchro Version 10 using Highway Capacity Manual (HCM) 6th Edition methodologies.

The mini-roundabout alternative was evaluated in SIDRA Intersection 8.0 using HCM 2010 methodologies. The purpose of using HCM 2010 for the mini-roundabout analysis was to develop a more conservative capacity analysis. HCM 2010 capacity model is based upon older US data collected in 2006 which found that drivers frequently tended to come to a full stop even in the absence of conflicting traffic which generated lower capacities compared to international models. More recent data collected feeding into the latest HCM 6th Edition model found that roundabout capacities in the US have increased over time and the HCM 6th Edition now estimates higher capacity. There is not a widely accepted capacity model for mini-roundabouts currently available in the US. While not specifically intended for mini-roundabouts, use of the HCM 2010 model will generate a lower capacity estimate (more conservative) than the HCM 6th Edition. Due to mini-roundabouts having lower capacity than full size roundabouts, HCM 2010 was used to provide a more conservative estimate of the mini-roundabout capacity.

Table 3 provides the results of the operational analysis. The AWSC scenario operates at LOS D in the AM peak hour and LOS F in the PM peak hour. The mini-roundabout operates at LOS B or better in the AM peak hour and LOS C or better in the PM peak hour for all intersection approaches. The operational analysis report outputs are provided in **Appendix G**.

Table 3: Year 2045 AM and PM Peak Hour Intersection Operational Analysis

Scenario			Eastbound	Westbound	Northbound	Southbound	Overall
AM Peak Hour	AWSC (No-Build)	Delay	11.3	11.0	15.1	39.6	27.3
		LOS	B	B	C	E	D
		V/C	0.20	0.20	0.54	0.91	-
	Mini-Roundabout	Delay	8.2	6.3	7.6	11.4	9.6
		LOS	A	A	A	B	A
		V/C	0.18	0.15	0.36	0.60	-
PM Peak Hour	AWSC (No-Build)	Delay	19.6	20.3	151.8	107.2	101.6
		LOS	C	C	F	F	F
		V/C	0.50	0.57	1.28	1.19	-
	Mini-Roundabout	Delay	9.6	14.9	17.5	10.4	13.7
		LOS	A	B	C	B	B
		V/C	0.30	0.46	0.72	0.55	-

PROPOSED IMPROVEMENTS

The No-Build AWSC, TWSC, traffic signal, and roundabout scenarios were evaluated through ICE Stage 1. The mini-roundabout was identified as the preferred alternative based on operations and safety performance. Due to ROW constraints and the intersection context, a mini-roundabout was determined to be the best alternative. The following section describes the development of a planning level concept and opinion of probable cost for a mini-roundabout at N Miami Avenue and N 195 Street.

Concept Development

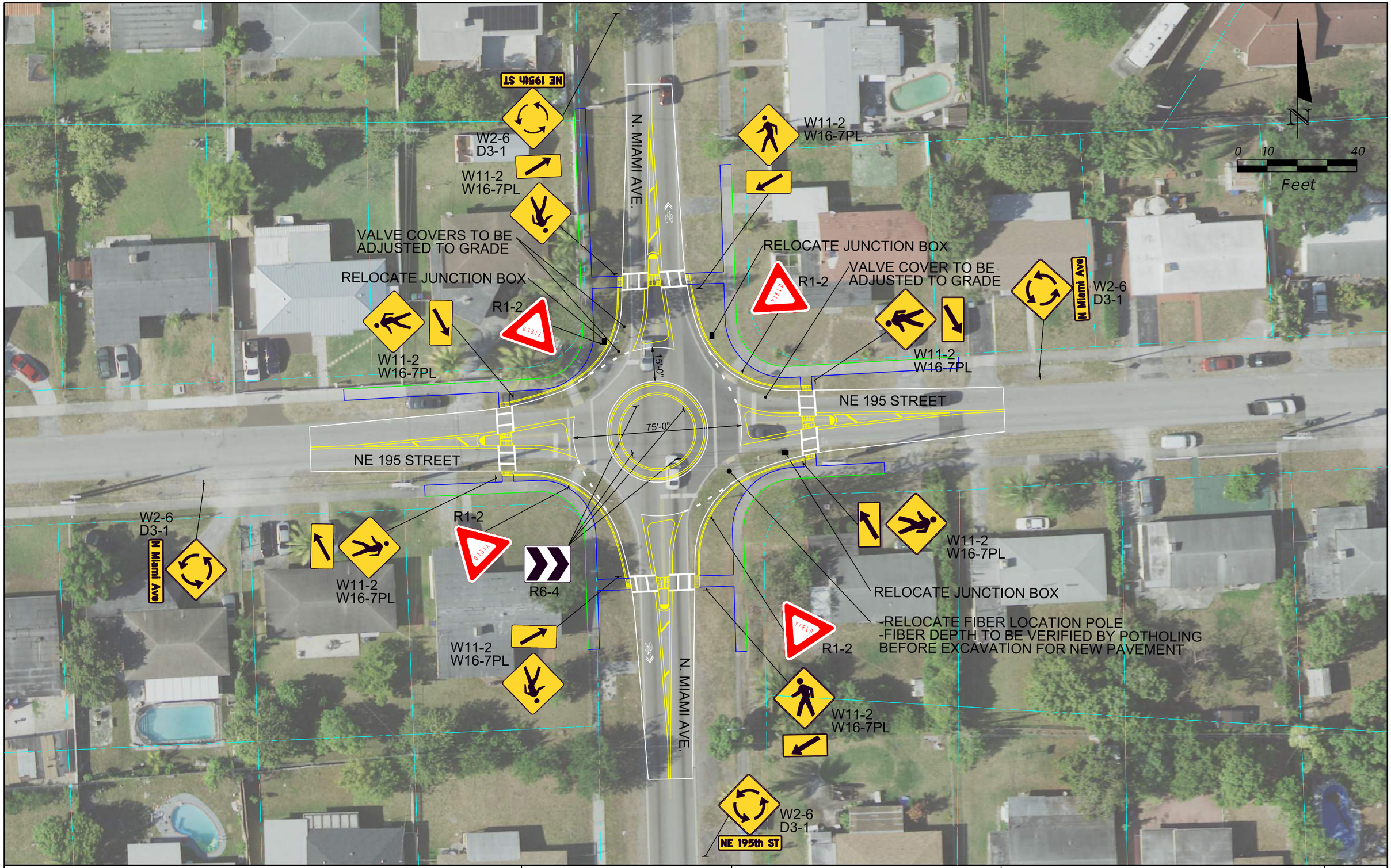
A planning level concept was developed for the mini-roundabout alternative to understand impacts and to be able to develop opinion of probable cost for use in a benefit-cost analysis. The concept is provided in **Figure 7**. The concept incorporates the following elements:

- 75' inscribed circle diameter. **Figure 8** provides a diagram showing how the inscribed circle diameter is measured.
- 15' circulatory roadway width. **Figure 8** provides a diagram showing how the circulatory roadway is measured.
- Splitter islands on all four approaches with pedestrian refuges.
- The design vehicle used was a 34' Fire Pumper Tanker.
- Light poles will be added to each corner of the intersection.
- Entry speeds were designed for 25 mph to provide low speeds for bicyclists to travel through the roundabout with vehicular traffic.

The proposed concept has the following impacts to the existing conditions:

- Utility relocation
  - Fiber location pole (1)
  - Valve assembly (3)
  - Junction Box (3)
- Drainage
  - Sediment barrier

The concept stays within the existing ROW and provides new sidewalk connections on all four legs. Fastest path and design vehicle checks are provided in **Appendix H**.



REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

TPO
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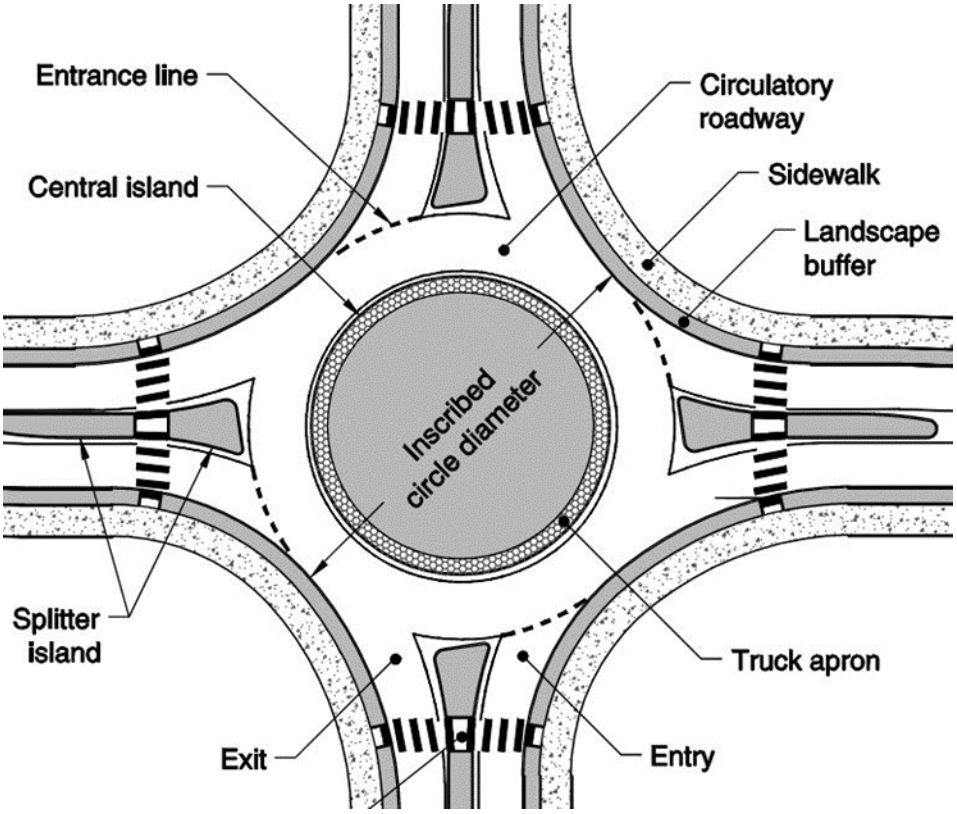
MIAMI-DADE
TRANSPORTATION PLANNING ORGANIZATION

N. MIAMI AVE. & NE 195 STREET ROUNDABOUT CONCEPT

FIGURE NO.
7

Figure 8: Roundabout Diagram



Source: NCHRP Report 672, Page 6-9

Opinion of Probable Cost

An opinion of probable cost was developed based on the planning level concept. A 30% contingency cost was included. A detailed cost estimate is provided in **Appendix I**.

Table 4 provides a summary of the opinion of probable cost based on the mini-roundabout concept.

Table 4: Opinion of Probable Cost

Cost Item	Cost
Total Estimated Construction Costs	$296,887
Total Estimated Capital Support Costs	$142,530
Total Estimated Right-of-Way Costs	$0
Total Project Cost	**$439,417**

Benefit/Cost

The FDOT ICE Tool was used to conduct a benefit/cost analysis. The ICE Tool is used to compare the operational and safety analyses, along with the opinion of probable cost to develop a benefit/cost ratio (B/C) and net present value (NPV) of the alternative. The ICE Tool results are provided in **Appendix J**.

Table 5 provides the ICE Tool overall, delay, and safety B/C analysis results as well as the estimated NPV of the alternative. The overall benefit/cost is 23.99.

Table 5: ICE Tool Benefit/Cost Analysis Results

Alternative	Overall B/C	Delay B/C	Safety B/C	Net Present Value
Mini-Roundabout	23.99	16.64	7.35	$11,446,052

STAKEHOLDER COORDINATION

The study team conducted two coordination meetings with City of Miami Gardens and Miami Dade County Public Works (DTPW) Traffic Operations and Traffic Engineering Divisions staff to discuss the proposed mini-roundabout alternative. The following meetings were held with City and County staff to discuss the study intersection concept development:

- April 1, 2021 – a meeting was held to discuss the alternative and understand any issues the City may have with the proposed mini-roundabout.
- April 20, 2021 – a meeting was held to review the concept and discuss anticipated impacts.

The City of Miami Gardens staff is in support of the proposed alternative.

In addition, the following meetings were held with DTPW staff:

- March 8, 2021 – a meeting was held to kick-off the project and discuss the study intersection selection process.
- April 1, 2021 – a meeting was held to discuss the selection of study intersections. The County identified 13 intersections for safety analysis. The 13 locations were reviewed and the top three were identified based on historical crash data and potential safety benefit. N Miami Avenue and N 195 Street was selected as one of three study intersections. Discussion included a review of the County proposed recommendations. The County's proposed recommendations were implemented into the concept development presented in this report.
- April 12, 2021 – a meeting was held to discuss data collection and the design vehicle to be used for the concept development.
    - A 34' Fire Pumper Tanker was selected as the design vehicle.
- April 20, 2021 – a meeting was held to review and receive input on design aspects of the concept development.
- April 23, 2021 – a meeting was held to provide further details on the concept development and discuss anticipated impacts of the mini-roundabout.

DTPW staff is in support of the proposed alternative.

SUMMARY

An Intersection Safety Analysis was conducted at N Miami Avenue and N 195 Street, located in Miami-Dade County. The intersection was identified as a roadway safety improvement project under the TPO Fiscal Year 2026 List of Program Priorities approved June 18, 2020 and included in the newly approved 2027 LOPP on June 17, 2021. Improvements for this intersection were prioritized for evaluation due to an existing pattern of angle crashes. The Purpose & Need of the study is to reduce crashes, most importantly fatalities and serious injuries, by evaluating the intersection and providing justification to apply for Highway Safety Improvement Program (HSIP) funding.

An ICE Stage 1 analysis was conducted to determine the best control type for the intersection. A mini-roundabout was identified as the preferred alternative. There are no right-of-way impacts anticipated with the proposed mini-roundabout design.

A benefit/cost analysis shows an overall benefit of 23.99 with a delay benefit of 16.64 and a safety benefit of 7.35 when compared to the No-Build condition. The net present value of the alternative is $11,446,052. The safety benefit/cost ratio is greater than 1.0 and the net present value is positive, which meets the requirements for HSIP funding.

APPENDIX A. FIELD OBSERVATION REPORT

FIELD OBSERVATION REPORT

Location	N Miami Avenue & N 195 Street	Date	March 19, 2021
Observer	KAI	Time	Midday

PART I - PHYSICAL CHECKLIST

		NO	*YES*	*COMMENTS*
1.	Are there sight distance obstructions to:			
	a. Traffic control devices?	X		
	b. Intersections and driveways?	X		
	c. Turning or on-coming vehicles?	X		
2.	Does parking affect:			
	a. Sight distance?	X		
	b. Through or turning vehicle paths?	X		
3.	Is horizontal alignment inadequate?	X		
4.	Is vertical alignment inadequate?	X		
5.	Is pavement width or the number of lanes inadequate?	X		
6.	Are intersection or driveway radii too short?	X		
7.	Are there problems with driveways such as:			
	a. Inadequate design?	X		
	b. Location near major intersection?	X		
	c. Too many driveways?	X		
8.	Is channelization inadequate for:			
	a. Reducing conflict points?	X		
	b. Separating traffic flows or defining movements?	X		
9.	Should pedestrian crosswalks be:			
	a. Added?		X	Crosswalks missing on north and south legs – to be added in traffic circle concept.
	b. Relocated or repainted?	X		

FIELD OBSERVATION REPORT

		NO	YES	COMMENTS
10.	Are there problems with traffic signs such as:			
	a. Inadequate or improper message?	X		
	b. Too many signs?	X		
	c. Placement or size?	X		
11.	Are there problems with traffic signals such as:			
	a. Timing?			N/A
	b. Number of signal heads?			N/A
	c. Placement or size?			N/A
12.	Are there problems with pavement markings such as:			
	a. Vehicle paths not clearly marked?	X		
	b. Location of the markings?	X		
13.	Do posted speed limits appear to be too high or too low for conditions?	X		
14.	Does the pavement condition (potholes, irregular surface, etc. appear to contribute to safety problems?	X		
15.	Is roadway lighting inadequate?	X		
16.	Are there tire skid marks on pavement?	X		
17.	Is there evidence of vehicle accident debris such as scar marks on trees, utility poles, embankments or other objects?	X		
18.	Is there an abundance of vehicle accident debris such as small pieces of crushed glass, plastic, etc. along the shoulder or in the median area?	X		

FIELD OBSERVATION REPORT

PART II - OPERATIONAL CHECKLIST

		NO	*YES*	*COMMENTS*
1.	Do obstructions block the driver's view of opposing or conflicting vehicles?	X		
2.	Do drivers have trouble finding the correct path through the location?	X		
3.	Is there any indication of driver confusion about routes, street names or other guidance information?	X		
4.	Do steep grades create large speed differences?	X		
5.	Are pavement surface conditions creating erratic driver movements?	X		
6.	Does the presence of existing driveways contribute to erratic driver movements?	X		
7.	Is excessive vehicle delay creating unsafe risk taking by motorists?	X		
8.	Are there large speed differences between vehicles:			
	a. Traveling through the location?	X		
	b. Turning at driveways or intersections?	X		
9.	Do drivers respond incorrectly to:			
	a. Signals?			N/A
	b. Signs or other traffic control devices?	X		

FIELD OBSERVATION REPORT

		NO	YES	COMMENTS
10.	Are problems being caused by the volume of:			
	a. Through traffic?	X		
	b. Turning traffic?	X		
11.	Do pedestrian movements create conflicts?	X		
12.	Do bicycle movements create conflicts?	X		
13.	Is there considerable weaving or lane changing by drivers at the location?	X		
14.	Are there violations of parking at the location?	X		
15.	Are there violations of other traffic control devices or regulations such as:			
	a. Running red light?	X		
	b. Failing to stop or yield the right-of-way?		X	High number of recorded angle and left turn crashes.
	c. Speed limits?	X		
	d. Right-turn-on-red?	X		
	e. Other?	X		
16.	Are there traffic flow problems or traffic conflict patterns associated with turning vehicles?		X	High number of recorded angle and left turn crashes.
17.	Are there any other unusual traffic flow problems or traffic conflict patterns?	X		
18.	Does inadequate lighting cause drivers to slow down or create erratic maneuvers?	X		
19.	Do transit operations create conflicts / excessive delays.	X		

NOTES:

APPENDIX B. BI-DIRECTIONAL 72-HOUR COUNTS

County: 87
Station: 1951
Description: N MIAMI AVE N OF NE 195TH ST
Start Date: 03/16/2021
Start Time: 0000

	Direction: N					Direction: S					Combined
Time	1st	2nd	3rd	4th	Total	1st	2nd	3rd	4th	Total	Total
0000	37	28	25	30	120	31	29	27	9	96	216
0100	13	23	21	14	71	17	11	8	16	52	123
0200	9	10	10	9	38	8	12	12	7	39	77
0300	10	5	9	6	30	8	10	5	12	35	65
0400	4	6	10	10	30	6	14	19	22	61	91
0500	10	7	15	24	56	19	18	22	32	91	147
0600	20	24	27	35	106	46	44	71	68	229	335
0700	35	57	55	48	195	75	106	91	135	407	602
0800	62	68	86	97	313	120	110	108	127	465	778
0900	79	69	73	62	283	98	101	90	87	376	659
1000	79	63	58	70	270	91	112	95	96	394	664
1100	86	92	88	89	355	92	93	97	97	379	734
1200	91	83	87	85	346	97	110	100	105	412	758
1300	91	100	95	92	378	105	114	114	100	433	811
1400	109	109	115	111	444	104	112	110	122	448	892
1500	119	106	116	143	484	106	120	96	121	443	927
1600	135	142	141	135	553	120	123	96	102	441	994
1700	145	152	157	162	616	95	110	118	90	413	1029
1800	164	160	128	119	571	114	109	104	96	423	994
1900	126	98	100	99	423	96	92	110	98	396	819
2000	111	107	99	59	376	88	85	68	61	302	678
2100	83	59	65	52	259	56	67	56	49	228	487
2200	62	67	51	46	226	46	44	44	45	179	405
2300	44	40	33	42	159	45	39	26	29	139	298
24-Hour Totals:					6702					6881	13583

Peak Volume Information

	Direction: N		Direction: S		Combined Directions	
	Hour	Volume	Hour	Volume	Hour	Volume
A.M.	830	331	745	473	800	778
P.M.	1730	643	1530	460	1730	1074
Daily	1730	643	745	473	1730	1074

Generated by SPS 5.0.49P

County: 87
Station: 1951
Description: N MIAMI AVE N OF NE 195TH ST
Start Date: 03/17/2021
Start Time: 0000

	Direction: N					Direction: S					Combined
Time	1st	2nd	3rd	4th	Total	1st	2nd	3rd	4th	Total	Total
0000	38	29	20	18	105	18	21	15	13	67	172
0100	16	12	12	9	49	12	10	10	2	34	83
0200	15	12	8	7	42	10	8	3	3	24	66
0300	10	4	5	7	26	13	3	8	2	26	52
0400	10	4	4	8	26	9	9	12	22	52	78
0500	5	5	15	16	41	15	14	31	40	100	141
0600	21	20	23	36	100	43	47	72	76	238	338
0700	38	44	54	58	194	91	97	115	126	429	623
0800	79	61	76	82	298	113	118	119	120	470	768
0900	74	93	69	68	304	92	103	84	88	367	671
1000	67	71	59	79	276	97	98	75	94	364	640
1100	71	83	75	79	308	90	106	79	89	364	672
1200	70	81	90	80	321	95	95	96	109	395	716
1300	91	97	97	109	394	110	123	111	107	451	845
1400	130	105	112	101	448	110	109	105	135	459	907
1500	94	140	125	130	489	112	116	128	107	463	952
1600	126	139	165	151	581	82	117	127	106	432	1013
1700	148	170	164	150	632	103	98	101	102	404	1036
1800	158	159	167	146	630	108	109	87	101	405	1035
1900	134	111	138	104	487	101	101	89	90	381	868
2000	112	99	103	95	409	87	70	82	65	304	713
2100	74	79	85	75	313	60	63	78	61	262	575
2200	58	58	50	67	233	67	55	38	50	210	443
2300	59	42	42	44	187	43	33	42	30	148	335
24-Hour Totals:					6893					6849	13742

Peak Volume Information

	Direction: N		Direction: S		Combined Directions	
	Hour	Volume	Hour	Volume	Hour	Volume
A.M.	830	325	745	476	800	768
P.M.	1715	642	1445	491	1630	1068
Daily	1715	642	1445	491	1630	1068

Generated by SPS 5.0.49P

County: 87
Station: 1951
Description: N MIAMI AVE N OF NE 195TH ST
Start Date: 03/18/2021
Start Time: 0000

	Direction: N					Direction: S					Combined
Time	1st	2nd	3rd	4th	Total	1st	2nd	3rd	4th	Total	Total
0000	31	26	24	26	107	31	28	23	16	98	205
0100	27	12	19	7	65	18	8	9	12	47	112
0200	9	14	12	8	43	16	12	7	5	40	83
0300	7	7	6	8	28	5	7	2	9	23	51
0400	8	5	10	7	30	12	10	17	23	62	92
0500	11	5	10	18	44	15	18	27	24	84	128
0600	14	30	29	39	112	40	58	88	79	265	377
0700	53	52	45	60	210	90	88	104	119	401	611
0800	68	66	77	93	304	125	117	115	104	461	765
0900	72	70	71	72	285	96	88	102	82	368	653
1000	76	73	72	73	294	99	103	86	105	393	687
1100	82	66	86	67	301	88	84	93	83	348	649
1200	102	85	84	90	361	77	124	103	101	405	766
1300	91	102	93	75	361	100	105	116	92	413	774
1400	87	113	117	121	438	98	114	114	109	435	873
1500	136	137	125	123	521	117	99	120	113	449	970
1600	115	135	124	146	520	95	118	111	103	427	947
1700	169	154	156	161	640	110	114	105	104	433	1073
1800	160	143	135	124	562	117	117	105	113	452	1014
1900	131	131	118	93	473	108	93	98	83	382	855
2000	96	92	103	84	375	80	57	75	61	273	648
2100	79	81	90	91	341	61	76	54	55	246	587
2200	64	64	57	39	224	44	61	46	47	198	422
2300	51	29	51	36	167	39	44	36	38	157	324
24-Hour Totals:					6806					6860	13666

Peak Volume Information

	Direction: N		Direction: S		Combined Directions	
	Hour	Volume	Hour	Volume	Hour	Volume
A.M.	830	312	745	476	800	765
P.M.	1700	640	1415	454	1700	1073
Daily	1700	640	745	476	1700	1073

Generated by SPS 5.0.49P

County: 87
Station: 1953
Description: NE 195TH ST E OF N MIAMI AVE
Start Date: 03/16/2021
Start Time: 0000

	Direction: E					Direction: W					Combined
Time	1st	2nd	3rd	4th	Total	1st	2nd	3rd	4th	Total	Total
0000	7	8	7	5	27	8	5	3	8	24	51
0100	4	4	5	5	18	2	1	7	2	12	30
0200	3	1	0	0	4	1	0	1	1	3	7
0300	1	2	2	2	7	2	0	2	0	4	11
0400	2	3	1	6	12	4	2	0	3	9	21
0500	5	6	10	11	32	5	3	5	5	18	50
0600	6	6	21	14	47	6	8	12	12	38	85
0700	27	14	19	27	87	15	15	19	25	74	161
0800	27	18	32	23	100	22	22	27	26	97	197
0900	20	15	17	13	65	18	15	12	19	64	129
1000	14	18	22	21	75	20	20	23	20	83	158
1100	17	15	20	18	70	18	15	17	18	68	138
1200	23	27	18	26	94	29	26	15	27	97	191
1300	18	19	21	24	82	20	30	26	23	99	181
1400	28	20	22	28	98	29	31	29	29	118	216
1500	28	23	27	21	99	26	25	48	39	138	237
1600	30	19	23	28	100	39	38	37	47	161	261
1700	25	23	26	19	93	46	43	37	49	175	268
1800	9	19	20	26	74	32	40	31	27	130	204
1900	17	30	16	21	84	31	31	34	34	130	214
2000	22	20	10	14	66	24	17	38	29	108	174
2100	19	21	10	14	64	26	18	18	20	82	146
2200	14	8	11	12	45	18	12	11	11	52	97
2300	16	17	4	10	47	10	10	14	12	46	93
24-Hour Totals:					1490					1830	3320

Peak Volume Information

	Direction: E		Direction: W		Combined Directions	
	Hour	Volume	Hour	Volume	Hour	Volume
A.M.	745	104	800	97	745	200
P.M.	1445	106	1700	175	1645	275
Daily	1445	106	1700	175	1645	275

Generated by SPS 5.0.49P

County: 87
Station: 1953
Description: NE 195TH ST E OF N MIAMI AVE
Start Date: 03/17/2021
Start Time: 0000

	Direction: E					Direction: W					Combined
Time	1st	2nd	3rd	4th	Total	1st	2nd	3rd	4th	Total	Total
0000	8	3	2	1	14	10	10	1	3	24	38
0100	3	2	3	0	8	7	2	4	1	14	22
0200	2	1	1	2	6	0	1	0	1	2	8
0300	0	0	1	0	1	1	2	0	1	4	5
0400	1	2	3	7	13	0	3	1	3	7	20
0500	0	6	8	10	24	4	0	6	3	13	37
0600	9	12	13	16	50	5	12	6	11	34	84
0700	22	15	30	29	96	9	19	28	21	77	173
0800	26	28	23	26	103	23	15	25	26	89	192
0900	16	18	18	16	68	17	20	13	20	70	138
1000	14	20	13	20	67	18	18	14	15	65	132
1100	22	16	23	16	77	13	16	31	25	85	162
1200	20	24	18	28	90	27	29	13	30	99	189
1300	21	18	21	19	79	20	22	30	30	102	181
1400	27	20	22	33	102	30	26	29	25	110	212
1500	22	25	18	13	78	21	26	30	48	125	203
1600	27	30	20	21	98	48	29	42	35	154	252
1700	22	17	22	34	95	31	36	62	54	183	278
1800	27	20	20	24	91	39	38	44	29	150	241
1900	18	18	24	20	80	30	38	34	27	129	209
2000	20	11	19	15	65	23	22	22	24	91	156
2100	17	11	19	9	56	16	14	20	17	67	123
2200	13	12	10	10	45	16	9	11	12	48	93
2300	12	11	4	9	36	14	9	14	10	47	83
24-Hour Totals:					1442					1789	3231

Peak Volume Information

	Direction: E		Direction: W		Combined Directions	
	Hour	Volume	Hour	Volume	Hour	Volume
A.M.	730	113	715	91	730	200
P.M.	1730	103	1730	193	1730	296
Daily	730	113	1730	193	1730	296

Generated by SPS 5.0.49P

County: 87
Station: 1953
Description: NE 195TH ST E OF N MIAMI AVE
Start Date: 03/18/2021
Start Time: 0000

	Direction: E					Direction: W					Combined
Time	1st	2nd	3rd	4th	Total	1st	2nd	3rd	4th	Total	Total
0000	7	4	8	3	22	9	2	4	5	20	42
0100	2	0	3	1	6	6	2	7	1	16	22
0200	5	1	0	0	6	2	0	4	0	6	12
0300	2	3	2	2	9	3	1	1	0	5	14
0400	2	0	1	5	8	1	2	1	4	8	16
0500	6	13	9	9	37	5	2	3	4	14	51
0600	7	12	24	15	58	4	13	14	12	43	101
0700	22	18	26	30	96	14	19	25	21	79	175
0800	30	14	28	28	100	17	23	17	30	87	187
0900	23	15	16	18	72	21	17	11	23	72	144
1000	20	18	11	22	71	20	20	21	17	78	149
1100	17	13	20	12	62	20	14	13	16	63	125
1200	23	29	18	23	93	26	23	16	24	89	182
1300	14	29	26	28	97	19	37	22	16	94	191
1400	28	17	22	23	90	27	36	29	33	125	215
1500	33	20	24	25	102	28	35	42	41	146	248
1600	24	21	24	30	99	34	43	28	43	148	247
1700	18	24	27	19	88	39	37	49	57	182	270
1800	14	20	31	24	89	52	48	36	24	160	249
1900	27	15	26	13	81	26	26	26	26	104	185
2000	30	7	16	18	71	25	25	21	24	95	166
2100	12	18	13	23	66	15	16	14	22	67	133
2200	7	16	11	15	49	17	12	8	10	47	96
2300	12	11	14	8	45	17	14	3	8	42	87
24-Hour Totals:					1517					1790	3307

Peak Volume Information

	Direction: E		Direction: W		Combined Directions	
	Hour	Volume	Hour	Volume	Hour	Volume
A.M.	715	104	815	91	800	187
P.M.	1315	111	1730	206	1730	286
Daily	1315	111	1730	206	1730	286

Generated by SPS 5.0.49P

County: 87
Station: 1955
Description: N MIAMI AVE S OF NE 195TH ST
Start Date: 03/16/2021
Start Time: 0000

	Direction: N					Direction: S					Combined
Time	1st	2nd	3rd	4th	Total	1st	2nd	3rd	4th	Total	Total
0000	33	26	22	25	106	29	22	24	9	84	190
0100	15	27	10	14	66	16	9	7	13	45	111
0200	9	11	8	8	36	7	10	11	7	35	71
0300	7	5	7	6	25	7	6	5	10	28	53
0400	3	8	7	8	26	7	9	18	19	53	79
0500	10	5	14	21	50	16	16	15	32	79	129
0600	18	21	25	29	93	44	40	63	66	213	306
0700	26	47	49	40	162	72	104	90	132	398	560
0800	51	58	71	86	266	112	104	101	110	427	693
0900	67	63	59	53	242	87	94	76	85	342	584
1000	59	58	57	69	243	80	103	88	98	369	612
1100	81	78	79	78	316	83	80	94	80	337	653
1200	85	72	76	72	305	84	96	93	97	370	675
1300	82	71	82	85	320	96	95	109	98	398	718
1400	94	92	98	102	386	94	105	104	107	410	796
1500	108	101	107	118	434	89	110	112	92	403	837
1600	109	135	110	112	466	83	89	104	83	359	825
1700	125	136	135	121	517	82	95	85	72	334	851
1800	133	133	123	106	495	97	77	92	77	343	838
1900	90	82	76	89	337	85	81	102	94	362	699
2000	87	98	69	36	290	65	69	59	55	248	538
2100	62	48	50	39	199	50	53	51	36	190	389
2200	44	57	44	39	184	37	38	41	42	158	342
2300	42	40	27	36	145	38	39	23	24	124	269
24-Hour Totals:					5709					6109	11818

Peak Volume Information

	Direction: N		Direction: S		Combined Directions	
	Hour	Volume	Hour	Volume	Hour	Volume
A.M.	830	287	745	449	800	693
P.M.	1715	525	1445	418	1715	874
Daily	1715	525	745	449	1715	874

Generated by SPS 5.0.49P

County: 87
Station: 1955
Description: N MIAMI AVE S OF NE 195TH ST
Start Date: 03/17/2021
Start Time: 0000

	Direction: N					Direction: S					Combined
Time	1st	2nd	3rd	4th	Total	1st	2nd	3rd	4th	Total	Total
0000	35	27	20	15	97	17	20	13	12	62	159
0100	14	12	12	8	46	12	7	9	4	32	78
0200	16	11	8	7	42	9	6	4	4	23	65
0300	10	4	5	6	25	12	2	8	2	24	49
0400	10	2	6	8	26	9	7	13	18	47	73
0500	4	8	10	16	38	17	12	22	38	89	127
0600	17	17	21	34	89	38	43	62	73	216	305
0700	30	28	50	48	156	80	96	110	117	403	559
0800	63	57	71	73	264	119	116	109	117	461	725
0900	72	77	63	58	270	91	95	71	74	331	601
1000	55	61	52	74	242	89	81	64	86	320	562
1100	69	76	52	62	259	78	87	80	83	328	587
1200	58	66	81	76	281	81	74	95	100	350	631
1300	82	79	80	84	325	95	104	114	92	405	730
1400	114	93	106	109	422	94	104	106	110	414	836
1500	93	125	111	106	435	117	117	130	121	485	920
1600	119	129	143	126	517	125	97	101	102	425	942
1700	136	139	127	118	520	114	90	88	78	370	890
1800	141	122	133	128	524	106	95	65	85	351	875
1900	111	94	108	88	401	96	89	72	80	337	738
2000	94	79	81	80	334	79	63	70	56	268	602
2100	70	69	76	62	277	56	61	67	61	245	522
2200	52	55	42	55	204	58	50	34	41	183	387
2300	46	36	36	36	154	42	30	37	24	133	287
24-Hour Totals:					5948					6302	12250

Peak Volume Information

	Direction: N		Direction: S		Combined Directions	
	Hour	Volume	Hour	Volume	Hour	Volume
A.M.	830	293	730	462	800	725
P.M.	1630	544	1515	493	1515	954
Daily	1630	544	1515	493	1515	954

Generated by SPS 5.0.49P

County: 87
Station: 1955
Description: N MIAMI AVE S OF NE 195TH ST
Start Date: 03/18/2021
Start Time: 0000

	Direction: N					Direction: S					Combined
Time	1st	2nd	3rd	4th	Total	1st	2nd	3rd	4th	Total	Total
0000	28	27	23	18	96	30	28	17	15	90	186
0100	23	12	15	8	58	19	9	9	12	49	107
0200	7	13	10	8	38	12	11	7	5	35	73
0300	6	6	7	7	26	6	5	3	9	23	49
0400	8	4	9	6	27	10	11	16	19	56	83
0500	10	5	8	15	38	15	11	18	25	69	107
0600	13	24	26	30	93	36	47	77	78	238	331
0700	45	40	37	51	173	78	87	102	102	369	542
0800	65	54	78	80	277	123	117	103	104	447	724
0900	60	63	62	63	248	80	84	92	84	340	588
1000	61	62	73	61	257	90	104	76	100	370	627
1100	71	65	74	52	262	78	75	83	77	313	575
1200	91	82	72	69	314	74	118	90	94	376	690
1300	84	70	85	88	327	96	86	109	104	395	722
1400	78	98	100	107	383	94	106	102	103	405	788
1500	115	110	109	122	456	100	86	103	93	382	838
1600	114	131	121	124	490	108	111	105	70	394	884
1700	140	120	122	125	507	82	93	85	92	352	859
1800	142	132	116	112	502	83	99	83	103	368	870
1900	114	112	108	82	416	95	80	79	75	329	745
2000	88	78	94	67	327	72	57	64	56	249	576
2100	68	74	81	74	297	60	61	49	47	217	514
2200	53	57	54	32	196	43	47	44	44	178	374
2300	45	24	49	30	148	31	40	27	33	131	279
24-Hour Totals:					5956					6175	12131

Peak Volume Information

	Direction: N		Direction: S		Combined Directions	
	Hour	Volume	Hour	Volume	Hour	Volume
A.M.	830	281	800	447	800	724
P.M.	1730	521	1545	417	1545	905
Daily	1730	521	800	447	1545	905

Generated by SPS 5.0.49P

County: 87
Station: 1957
Description: NE 195TH ST W OF N MIAMI AVE
Start Date: 03/16/2021
Start Time: 0000

	Direction: E					Direction: W					Combined
Time	1st	2nd	3rd	4th	Total	1st	2nd	3rd	4th	Total	Total
0000	5	5	3	5	18	4	4	2	1	11	29
0100	2	1	10	3	16	5	3	3	3	14	30
0200	3	1	1	1	6	2	2	2	0	6	12
0300	3	0	2	2	7	2	2	0	1	5	12
0400	2	1	2	4	9	3	3	2	2	10	19
0500	2	3	4	10	19	3	1	5	2	11	30
0600	3	6	14	9	32	5	8	11	6	30	62
0700	25	14	16	18	73	8	10	14	15	47	120
0800	19	16	23	13	71	11	16	11	12	50	121
0900	15	13	14	10	52	13	10	11	15	49	101
1000	12	10	17	16	55	14	13	18	12	57	112
1100	21	23	17	20	81	17	15	14	21	67	148
1200	14	17	19	24	74	19	16	15	21	71	145
1300	19	23	21	28	91	17	20	10	21	68	159
1400	22	16	23	28	89	13	19	20	18	70	159
1500	21	24	29	24	98	16	13	18	15	62	160
1600	21	28	27	26	102	16	18	14	20	68	170
1700	23	30	36	28	117	17	17	18	18	70	187
1800	34	31	20	16	101	19	17	14	14	64	165
1900	22	31	18	21	92	14	18	19	16	67	159
2000	16	15	13	10	54	12	15	16	13	56	110
2100	12	15	11	7	45	7	11	9	9	36	81
2200	11	8	8	11	38	10	5	4	6	25	63
2300	13	12	2	8	35	6	9	11	8	34	69
24-Hour Totals:					1375					1048	2423

Peak Volume Information

	Direction: E		Direction: W		Combined Directions	
	Hour	Volume	Hour	Volume	Hour	Volume
A.M.	745	76	730	56	745	129
P.M.	1730	129	1230	73	1730	201
Daily	1730	129	1230	73	1730	201

Generated by SPS 5.0.49P

County: 87
Station: 1957
Description: NE 195TH ST W OF N MIAMI AVE
Start Date: 03/17/2021
Start Time: 0000

	Direction: E					Direction: W					Combined
Time	1st	2nd	3rd	4th	Total	1st	2nd	3rd	4th	Total	Total
0000	8	2	3	3	16	9	8	4	3	24	40
0100	4	1	3	3	11	5	5	4	1	15	26
0200	2	2	1	3	8	2	2	0	1	5	13
0300	0	0	2	0	2	1	3	4	0	8	10
0400	1	2	4	2	9	0	1	4	3	8	17
0500	2	1	4	6	13	2	1	8	2	13	26
0600	5	6	8	13	32	4	6	10	7	27	59
0700	16	13	19	19	67	7	8	14	9	38	105
0800	22	25	19	23	89	10	15	16	16	57	146
0900	13	15	11	12	51	13	14	9	18	54	105
1000	13	18	10	12	53	15	19	9	16	59	112
1100	15	9	18	19	61	14	18	13	14	59	120
1200	13	12	21	23	69	27	16	14	24	81	150
1300	20	22	21	29	92	19	23	12	22	76	168
1400	24	17	20	26	87	10	20	19	16	65	152
1500	24	30	24	30	108	16	15	14	26	71	179
1600	35	36	26	26	123	28	13	21	19	81	204
1700	33	28	38	42	141	20	19	23	12	74	215
1800	43	36	32	25	136	17	14	19	19	69	205
1900	24	9	26	18	77	10	18	17	18	63	140
2000	24	22	15	13	74	20	12	10	14	56	130
2100	12	12	9	9	42	9	9	11	7	36	78
2200	8	8	5	12	33	12	7	5	11	35	68
2300	12	12	4	7	35	4	5	12	7	28	63
24-Hour Totals:					1429					1102	2531

Peak Volume Information

	Direction: E		Direction: W		Combined Directions	
	Hour	Volume	Hour	Volume	Hour	Volume
A.M.	800	89	815	60	800	146
P.M.	1730	159	1545	88	1730	225
Daily	1730	159	1545	88	1730	225

Generated by SPS 5.0.49P

County: 87
Station: 1957
Description: NE 195TH ST W OF N MIAMI AVE
Start Date: 03/18/2021
Start Time: 0000

	Direction: E					Direction: W					Combined
Time	1st	2nd	3rd	4th	Total	1st	2nd	3rd	4th	Total	Total
0000	2	5	4	6	17	4	4	3	2	13	30
0100	6	2	4	2	14	4	5	4	2	15	29
0200	3	2	1	0	6	3	1	3	0	7	13
0300	2	3	3	2	10	1	2	1	0	4	14
0400	1	0	2	0	3	1	0	2	2	5	8
0500	6	4	3	7	20	4	2	3	2	11	31
0600	4	4	13	16	37	3	8	11	7	29	66
0700	18	19	16	20	73	11	11	14	11	47	120
0800	17	9	17	24	67	10	13	11	19	53	120
0900	13	14	16	19	62	16	9	4	16	45	107
1000	15	11	11	24	61	8	10	22	14	54	115
1100	16	11	17	19	63	19	14	15	15	63	126
1200	15	22	16	24	77	10	15	16	17	58	135
1300	17	23	21	26	87	14	17	7	19	57	144
1400	20	14	26	30	90	15	17	20	19	71	161
1500	27	27	23	21	98	11	16	16	25	68	166
1600	30	32	35	34	131	20	12	20	20	72	203
1700	30	43	47	38	158	14	15	20	17	66	224
1800	33	36	31	29	129	17	19	26	15	77	206
1900	26	17	20	10	73	11	18	16	16	61	134
2000	18	9	19	18	64	13	13	21	14	61	125
2100	11	14	14	25	64	10	15	12	15	52	116
2200	14	4	12	11	41	11	8	4	4	27	68
2300	11	10	12	5	38	12	13	6	7	38	76
24-Hour Totals:					1483					1054	2537

Peak Volume Information

	Direction: E		Direction: W		Combined Directions	
	Hour	Volume	Hour	Volume	Hour	Volume
A.M.	700	73	815	59	830	123
P.M.	1715	161	1745	79	1715	230
Daily	1715	161	1745	79	1715	230

Generated by SPS 5.0.49P

APPENDIX C. TURNING MOVEMENT COUNTS (AM AND PM)

CTS Engineering, Inc
8095 NW 12 Street, Ste 301
Doral, FL 33126

CLIENT: MDC TPO
JOB NO.:TWO 3
PROJECT:N Miami Avenue and NE 195 Street
COUNTY: Miami-Dade

File Name : 1- N Miami Ave & NE 195th St
Site Code : 00000000
Start Date : 3/17/2021
Page No : 1

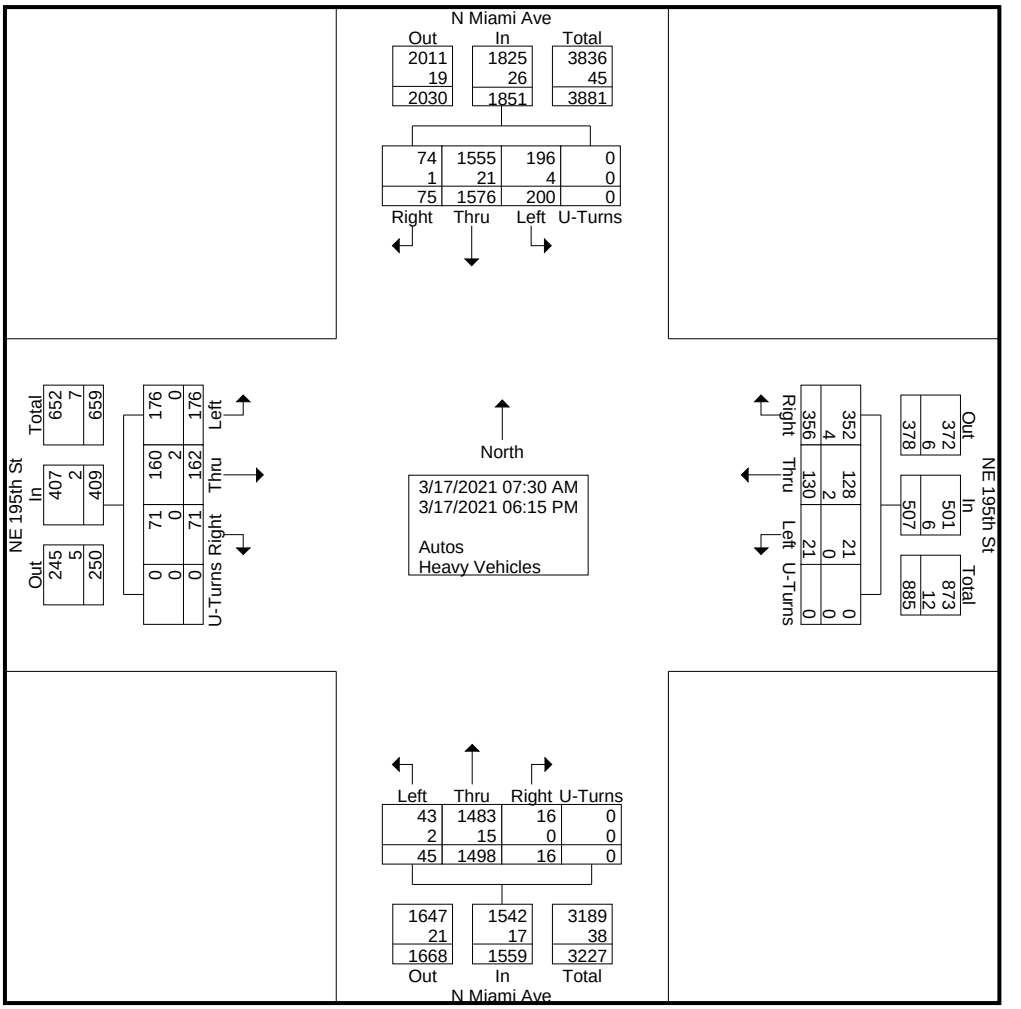
Groups Printed- Autos - Heavy Vehicles

	NE 195th St Eastbound					NE 195th St Westbound					N Miami Ave Northbound					N Miami Ave Southbound					
Start Time	U-Turns	Left	Thru	Right	App. Total	U-Turns	Left	Thru	Right	App. Total	U-Turns	Left	Thru	Right	App. Total	U-Turns	Left	Thru	Right	App. Total	Int. Total
07:30 AM	0	1	16	0	17	0	5	11	11	27	0	3	46	0	49	0	13	105	0	118	211
07:45 AM	0	3	13	2	18	0	3	6	11	20	0	2	45	2	49	0	16	112	1	129	216
Total	0	4	29	2	35	0	8	17	22	47	0	5	91	2	98	0	29	217	1	247	427
08:00 AM	0	2	12	7	21	0	2	3	18	23	0	3	63	0	66	0	11	108	4	123	233
08:15 AM	0	7	16	5	28	0	1	4	11	16	0	5	50	1	56	0	8	112	5	125	225
08:30 AM	0	4	9	3	16	0	2	9	13	24	0	4	67	0	71	0	16	104	4	124	235
08:45 AM	0	3	10	8	21	0	2	7	18	27	0	3	70	0	73	0	16	102	5	123	244
Total	0	16	47	23	86	0	7	23	60	90	0	15	250	1	266	0	51	426	18	495	937
09:00 AM	0	4	5	4	13	0	2	6	9	17	0	6	64	2	72	0	9	83	2	94	196
09:15 AM	0	2	9	4	15	0	0	5	15	20	0	2	72	1	75	0	8	92	5	105	215
*** BREAK ***																					
Total	0	6	14	8	28	0	2	11	24	37	0	8	136	3	147	0	17	175	7	199	411
*** BREAK ***																					
04:30 PM	0	13	7	6	26	0	0	11	31	42	0	4	131	0	135	0	14	98	7	119	322
04:45 PM	0	12	7	6	25	0	2	7	27	36	0	2	126	2	130	0	15	89	9	113	304
Total	0	25	14	12	51	0	2	18	58	78	0	6	257	2	265	0	29	187	16	232	626
05:00 PM	0	18	7	4	29	0	0	8	21	29	0	2	129	2	133	0	11	100	9	120	311
05:15 PM	0	14	8	6	28	0	1	11	23	35	0	1	139	1	141	0	11	81	6	98	302
05:30 PM	0	27	7	3	37	0	0	19	43	62	0	3	119	0	122	0	11	97	3	111	332
05:45 PM	0	21	15	5	41	0	1	8	43	52	0	1	126	1	128	0	18	102	3	123	344
Total	0	80	37	18	135	0	2	46	130	178	0	7	513	4	524	0	51	380	21	452	1289
06:00 PM	0	20	14	4	38	0	0	8	33	41	0	2	130	2	134	0	10	97	9	116	329
06:15 PM	0	25	7	4	36	0	0	7	29	36	0	2	121	2	125	0	13	94	3	110	307
Grand Total	0	176	162	71	409	0	21	130	356	507	0	45	1498	16	1559	0	200	1576	75	1851	4326
Apprch %	0	43	39.6	17.4		0	4.1	25.6	70.2		0	2.9	96.1	1		0	10.8	85.1	4.1		
Total %	0	4.1	3.7	1.6	9.5	0	0.5	3	8.2	11.7	0	1	34.6	0.4	36	0	4.6	36.4	1.7	42.8	
Autos	0	176	160	71	407	0	21	128	352	501	0	43	1483	16	1542	0	196	1555	74	1825	4275
% Autos	0	100	98.8	100	99.5	0	100	98.5	98.9	98.8	0	95.6	99	100	98.9	0	98	98.7	98.7	98.6	98.8
Heavy Vehicles	0	0	2	0	2	0	0	2	4	6	0	2	15	0	17	0	4	21	1	26	51
% Heavy Vehicles	0	0	1.2	0	0.5	0	0	1.5	1.1	1.2	0	4.4	1	0	1.1	0	2	1.3	1.3	1.4	1.2

CTS Engineering, Inc
8095 NW 12 Street, Ste 301
Doral, FL 33126

CLIENT: MDC TPO
JOB NO.:TWO 3
PROJECT:N Miami Avenue and NE 195 Street
COUNTY: Miami-Dade

File Name : 1- N Miami Ave & NE 195th St
Site Code : 00000000
Start Date : 3/17/2021
Page No : 2

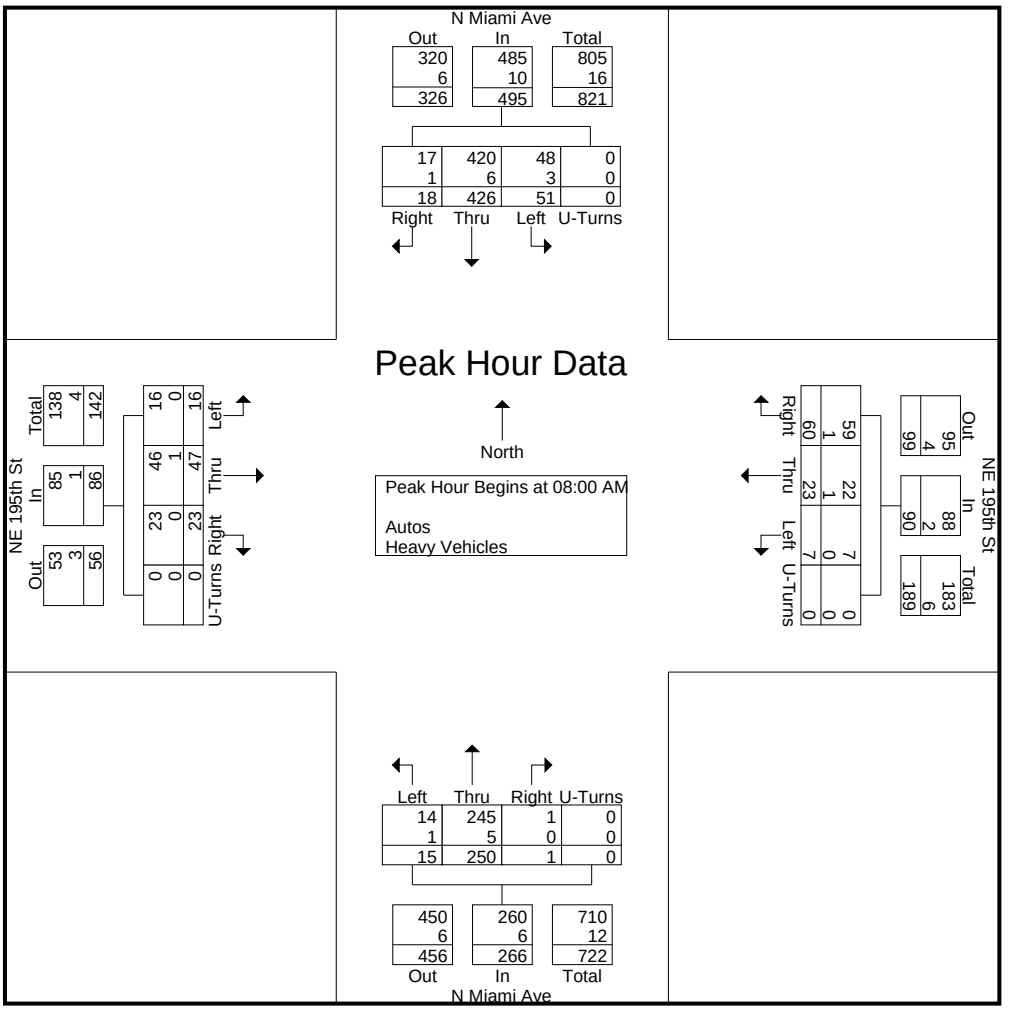


CTS Engineering, Inc
8095 NW 12 Street, Ste 301
Doral, FL 33126

CLIENT: MDC TPO
JOB NO.:TWO 3
PROJECT:N Miami Avenue and NE 195 Street
COUNTY: Miami-Dade

File Name : 1- N Miami Ave & NE 195th St
Site Code : 00000000
Start Date : 3/17/2021
Page No : 3

	NE 195th St Eastbound					NE 195th St Westbound					N Miami Ave Northbound					N Miami Ave Southbound					
Start Time	U-Turns	Left	Thru	Right	App. Total	U-Turns	Left	Thru	Right	App. Total	U-Turns	Left	Thru	Right	App. Total	U-Turns	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:30 AM to 11:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 08:00 AM																					
08:00 AM	0	2	12	7	21	0	**2**	3	**18**	23	0	3	63	0	66	0	11	108	4	123	233
08:15 AM	0	**7**	**16**	5	**28**	0	1	4	11	16	0	**5**	50	**1**	56	0	8	**112**	**5**	**125**	225
08:30 AM	0	4	9	3	16	0	2	**9**	13	24	0	4	67	0	71	0	**16**	104	4	124	235
08:45 AM	0	3	10	**8**	21	0	2	7	18	**27**	0	3	**70**	0	**73**	0	16	102	5	123	**244**
Total Volume	0	16	47	23	86	0	7	23	60	90	0	15	250	1	266	0	51	426	18	495	937
% App. Total	0	18.6	54.7	26.7		0	7.8	25.6	66.7		0	5.6	94	0.4		0	10.3	86.1	3.6		
PHF	.000	.571	.734	.719	.768	.000	.875	.639	.833	.833	.000	.750	.893	.250	.911	.000	.797	.951	.900	.990	.960
Autos	0	16	46	23	85	0	7	22	59	88	0	14	245	1	260	0	48	420	17	485	918
% Autos	0	100	97.9	100	98.8	0	100	95.7	98.3	97.8	0	93.3	98.0	100	97.7	0	94.1	98.6	94.4	98.0	98.0
Heavy Vehicles	0	0	1	0	1	0	0	1	1	2	0	1	5	0	6	0	3	6	1	10	19
% Heavy Vehicles	0	0	2.1	0	1.2	0	0	4.3	1.7	2.2	0	6.7	2.0	0	2.3	0	5.9	1.4	5.6	2.0	2.0

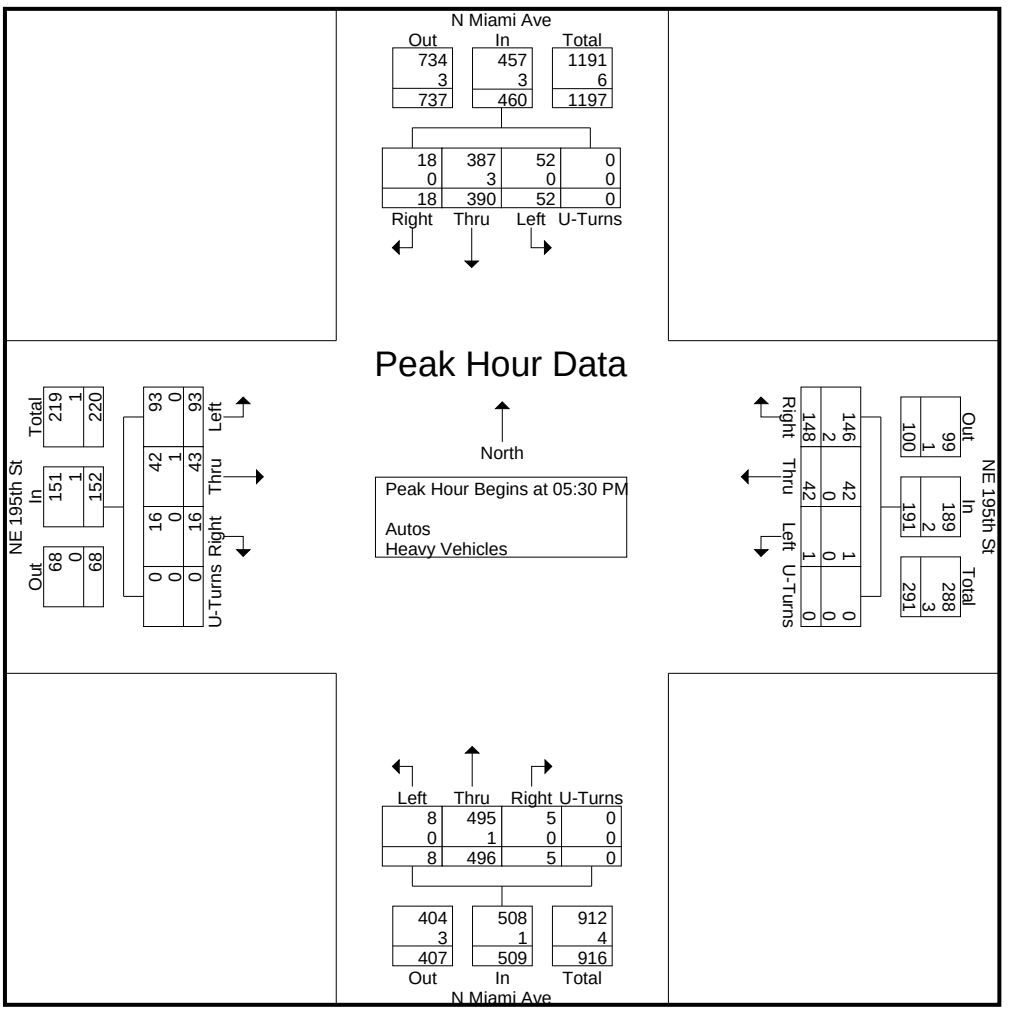


CTS Engineering, Inc
8095 NW 12 Street, Ste 301
Doral, FL 33126

CLIENT: MDC TPO
JOB NO.:TWO 3
PROJECT:N Miami Avenue and NE 195 Street
COUNTY: Miami-Dade

File Name : 1- N Miami Ave & NE 195th St
Site Code : 00000000
Start Date : 3/17/2021
Page No : 4

	NE 195th St Eastbound					NE 195th St Westbound					N Miami Ave Northbound					N Miami Ave Southbound					
Start Time	U-Turns	Left	Thru	Right	App. Total	U-Turns	Left	Thru	Right	App. Total	U-Turns	Left	Thru	Right	App. Total	U-Turns	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 06:15 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:30 PM																					
05:30 PM	0	**27**	7	3	37	0	0	**19**	**43**	**62**	0	**3**	119	0	122	0	11	97	3	111	332
05:45 PM	0	21	**15**	**5**	**41**	0	**1**	8	43	52	0	1	126	1	128	0	**18**	**102**	3	**123**	**344**
06:00 PM	0	20	14	4	38	0	0	8	33	41	0	2	**130**	**2**	**134**	0	10	97	**9**	116	329
06:15 PM	0	25	7	4	36	0	0	7	29	36	0	2	121	2	125	0	13	94	3	110	307
Total Volume	0	93	43	16	152	0	1	42	148	191	0	8	496	5	509	0	52	390	18	460	1312
% App. Total	0	61.2	28.3	10.5		0	0.5	22	77.5		0	1.6	97.4	1		0	11.3	84.8	3.9		
PHF	.000	.861	.717	.800	.927	.000	.250	.553	.860	.770	.000	.667	.954	.625	.950	.000	.722	.956	.500	.935	.953
Autos	0	93	42	16	151	0	1	42	146	189	0	8	495	5	508	0	52	387	18	457	1305
% Autos	0	100	97.7	100	99.3	0	100	100	98.6	99.0	0	100	99.8	100	99.8	0	100	99.2	100	99.3	99.5
Heavy Vehicles	0	0	1	0	1	0	0	0	2	2	0	0	1	0	1	0	0	3	0	3	7
% Heavy Vehicles	0	0	2.3	0	0.7	0	0	0	1.4	1.0	0	0	0.2	0	0.2	0	0	0.8	0	0.7	0.5



CTS Engineering, Inc
8095 NW 12 Street, Ste 301
Doral, FL 33126

CLIENT: MDC TPO
JOB NO.:TWO 3
PROJECT:N Miami Avenue and NE 195 Street
COUNTY: Miami-Dade

File Name : 1- N Miami Ave & NE 195th St
Site Code : 00000000
Start Date : 3/17/2021
Page No : 1

Groups Printed- Heavy Vehicles

	NE 195th St Eastbound					NE 195th St Westbound					N Miami Ave Northbound					N Miami Ave Southbound					
Start Time	U-Turns	Left	Thru	Right	App. Total	U-Turns	Left	Thru	Right	App. Total	U-Turns	Left	Thru	Right	App. Total	U-Turns	Left	Thru	Right	App. Total	Int. Total
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	1
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	1	0	1	2
Total	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	0	0	1	0	1	3
08:00 AM	0	0	1	0	1	0	0	0	0	0	0	1	1	0	2	0	1	2	0	3	6
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	3	1	4	5
08:30 AM	0	0	0	0	0	0	0	1	0	1	0	0	2	0	2	0	1	1	0	2	5
08:45 AM	0	0	0	0	0	0	0	0	1	1	0	0	1	0	1	0	1	0	0	1	3
Total	0	0	1	0	1	0	0	1	1	2	0	1	5	0	6	0	3	6	1	10	19
09:00 AM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	2	0	2	3
09:15 AM	0	0	0	0	0	0	0	0	1	1	0	0	2	0	2	0	1	2	0	3	6
*** BREAK ***																					
Total	0	0	0	0	0	0	0	0	1	1	0	1	2	0	3	0	1	4	0	5	9
*** BREAK ***																					
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	2	0	2	3
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	4	0	4	5
Total	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	0	0	6	0	6	8
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	0	0	1	0	1	3
05:15 PM	0	0	0	0	0	0	0	1	0	1	0	0	1	0	1	0	0	0	0	0	2
05:30 PM	0	0	1	0	1	0	0	0	1	1	0	0	0	0	0	0	0	2	0	2	4
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	1
Total	0	0	1	0	1	0	0	1	1	2	0	0	4	0	4	0	0	3	0	3	10
06:00 PM	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	1	0	1	2
*** BREAK ***																					
Grand Total	0	0	2	0	2	0	0	2	4	6	0	2	15	0	17	0	4	21	1	26	51
Apprch %	0	0	100	0		0	0	33.3	66.7		0	11.8	88.2	0		0	15.4	80.8	3.8		
Total %	0	0	3.9	0	3.9	0	0	3.9	7.8	11.8	0	3.9	29.4	0	33.3	0	7.8	41.2	2	51	

CTS Engineering, Inc
8095 NW 12 Street, Ste 301
Doral, FL 33126

CLIENT: MDC TPO
JOB NO.:TWO 3
PROJECT:N Miami Avenue and NE 195 Street
COUNTY: Miami-Dade

File Name : 1- N Miami Ave & NE 195th St
Site Code : 00000000
Start Date : 3/17/2021
Page No : 1

Groups Printed- Peds & Bikes

	NE 195th St Eastbound					NE 195th St Westbound					N Miami Ave Northbound					N Miami Ave Southbound					
Start Time	Peds			Bikes	App. Total	Peds			Bikes	App. Total	Peds			Bikes	App. Total	Peds			Bikes	App. Total	Int. Total
*** BREAK ***																					
07:45 AM	0	0	0	0	0	2	0	0	1	3	0	0	0	0	0	1	0	0	0	1	4
Total	0	0	0	0	0	2	0	0	1	3	0	0	0	0	0	1	0	0	0	1	4
*** BREAK ***																					
08:15 AM	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	1	0	0	0	1	2
*** BREAK ***																					
08:45 AM	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	2	0	0	0	2	3
Total	0	0	0	0	0	1	0	0	1	2	0	0	0	0	0	3	0	0	0	3	5
09:00 AM	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	3
09:15 AM	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
*** BREAK ***																					
Total	3	0	0	0	3	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	4
*** BREAK ***																					
04:45 PM	1	0	0	0	1	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	3
Total	1	0	0	0	1	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	3
05:00 PM	0	0	0	0	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2
05:15 PM	0	0	0	0	0	1	0	0	1	2	0	0	0	0	0	0	0	0	0	0	2
05:30 PM	0	0	0	1	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	2
05:45 PM	0	0	0	0	0	1	0	0	0	1	0	0	0	1	1	0	0	0	0	0	2
Total	0	0	0	1	1	4	0	0	1	5	0	0	0	2	2	0	0	0	0	0	8
*** BREAK ***																					
06:15 PM	0	0	0	0	0	0	0	0	1	1	1	0	0	0	1	0	0	0	0	0	2
Grand Total	4	0	0	1	5	9	0	0	4	13	1	0	0	2	3	5	0	0	0	5	26
Apprch %	80	0	0	20		69.2	0	0	30.8		33.3	0	0	66.7		100	0	0	0		
Total %	15.4	0	0	3.8	19.2	34.6	0	0	15.4	50	3.8	0	0	7.7	11.5	19.2	0	0	0	19.2	

APPENDIX D. CRASH SUMMARY

Crash Summary

Crash Number	Collision Diagram Number	Date	Time	Crash Type	Fatal	Injuries	Property Damage	Day / Night	Wet / Dry	Data Source
859786990	1	01/19/2016	0816	Angle	0	0	1	Day	Dry	SSOGis
863225770	2	04/16/2016	1228	Rear End	0	0	1	Day	Dry	SSOGis
863214180	3	01/09/2016	0851	Angle	0	0	1	Day	Dry	SSOGis
863239540	4	08/10/2016	1507	Rear End	0	0	1	Day	Dry	SSOGis
873281360	5	10/26/2017	1203	Rear End	0	0	1	Day	Dry	SSOGis
868986910	6	06/21/2017	2224	Rear End	0	0	1	Night	Dry	SSOGis
868823820	7	01/15/2017	0510	Angle	0	1	0	Night	Wet	SSOGis
875417960	8	10/11/2017	1156	Angle	0	4	0	Day	Dry	SSOGis
875418000	9	10/12/2017	0655	Angle	0	2	0	Day	Wet	SSOGis
873067120	10	08/11/2017	1325	Angle	0	0	1	Day	Dry	SSOGis
869350160	11	05/17/2017	1819	Rear End	0	1	0	Day	Dry	SSOGis
875421530	12	11/06/2017	0724	Angle	0	0	1	Day	Dry	SSOGis
873150330	13	10/03/2017	2325	Rear End	0	2	0	Day	Wet	SSOGis
876198070	14	01/06/2018	1853	Angle	0	0	1	Night	Dry	SSOGis
86933829	15	2/3/2017	651	Rear End	0	0	1	Day	Dry	S4
86887819	16	2/22/2017	1618	Rear End	0	0	1	Day	Wet	S4
86895528	17	3/23/2017	2022	Rear End	0	0	1	Night	Wet	S4
86935410	18	6/20/2017	2030	Rear End	0	0	1	Day	Dry	S4
87543973	19	3/26/2018	1238	Angle	0	0	1	Day	Dry	S4
87544304	20	4/21/2018	2058	Rear End	0	0	1	Night	Dry	S4
87948915	21	8/3/2018	739	Angle	0	0	1	Day	Dry	S4
87654434	22	10/19/2018	850	Angle	0	0	1	Day	Dry	S4
87950387	23	11/19/2018	1839	Angle	0	0	1	Night	Dry	S4
88989837	24	2/27/2019	1550	Rear End	0	0	1	Day	Dry	S4
88872658	25	4/16/2019	1554	Rear End	0	0	1	Day	Dry	S4
88871002	26	4/22/2019	636	Angle	0	0	1	Day	Dry	S4
88874674	27	5/9/2019	1516	Left Turn	0	0	1	Day	Dry	S4
88993450	28	12/7/2019	1526	Rear End	0	0	1	Day	Dry	S4
88993842	29	1/6/2020	1907	Angle	0	1	0	Night	Dry	S4
89928861	30	1/29/2020	2122	Rear End	0	0	1	Night	Dry	S4
89518136	31	2/14/2020	1232	Sideswipe	0	3	0	Day	Dry	S4
89929082	32	2/17/2020	741	Angle	0	1	0	Day	Dry	S4
89929702	33	4/23/2020	629	Angle	0	0	1	Day	Dry	S4
89535615	34	8/19/2020	2010	Rear End	0	0	1	Day	Wet	S4
89533750	35	8/21/2020	2326	Angle	0	0	1	Day	Dry	S4
89930908	36	9/1/2020	839	Rear End	0	1	0	Day	Dry	S4
89548270	37	12/28/2020	940	Angle	0	0	1	Day	Dry	S4

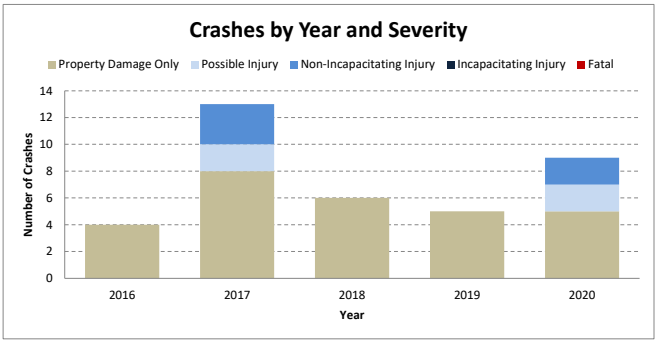
CRASH ANALYSIS - N MIAMI AVENUE & 195 STREET

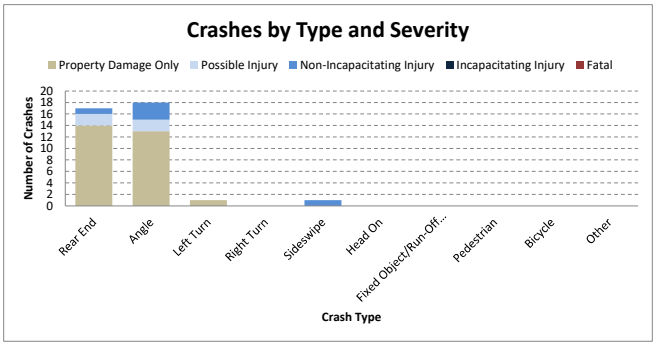
		Analysis Year					Severity					Total	Average	Percent
		2016	2017	2018	2019	2020	Property Damage Only	Possible Injury	Non-Incapacitating Injury	Incapacitating Injury	Fatal			
Type of Crash	Rear End	2	8	1	3	3	14	2	1	0	0	17	3.4	45.9%
	Angle	2	5	5	1	5	13	2	3	0	0	18	3.6	48.6%
	Left Turn	0	0	0	1	0	1	0	0	0	0	1	0.2	2.7%
	Right Turn	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0%
	Sideswipe	0	0	0	0	1	0	0	1	0	0	1	0.2	2.7%
	Head On	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0%
	Fixed Object/Run-Off Road	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0%
	Pedestrian	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0%
	Bicycle	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0%
	Other	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0%
	Total Crashes	**4**	**13**	**6**	**5**	**9**	**28**	**4**	**5**	**0**	**0**	**37**	**7.4**	**100.0%**
Crash Severity	Property Damage Only	4	8	6	5	5						28	5.6	75.7%
	Possible Injury	0	2	0	0	2						4	0.8	10.8%
	Non-Incapacitating Injury	0	3	0	0	2						5	1.0	13.5%
	Incapacitating Injury	0	0	0	0	0						0	0.0	0.0%
	Fatal	0	0	0	0	0						0	0.0	0.0%
Light Conditions	Daylight	4	9	3	5	7	22	3	3	0	0	28	5.6	75.7%
	Dusk	0	1	0	0	0	0	0	1	0	0	1	0.2	2.7%
	Dawn	0	1	0	0	0	1	0	0	0	0	1	0.2	2.7%
	Dark - Lighted	0	1	3	0	1	4	0	1	0	0	5	1.0	13.5%
	Dark - Not Lighted	0	1	0	0	1	1	1	0	0	0	2	0.4	5.4%
	Dark - Lighting Unknown	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0%
	Other/Unknown	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0%
Road Surface Condition	Dry	4	8	6	5	8	25	3	3	0	0	31	6.2	83.8%
	Wet	0	5	0	0	1	3	1	2	0	0	6	1.2	16.2%
	Other	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0%
Month	January	2	1	1	0	2	4	1	1	0	0	6	1.2	16.2%
	February	0	2	0	1	2	3	1	1	0	0	5	1.0	13.5%
	March	0	1	1	0	0	2	0	0	0	0	2	0.4	5.4%
	April	1	0	1	2	1	5	0	0	0	0	5	1.0	13.5%
	May	0	1	0	1	0	1	1	0	0	0	2	0.4	5.4%
	June	0	2	0	0	0	2	0	0	0	0	2	0.4	5.4%
	July	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0%
	August	1	1	1	0	2	5	0	0	0	0	5	1.0	13.5%
	September	0	0	0	0	1	0	0	1	0	0	1	0.2	2.7%
	October	0	4	1	0	0	2	1	2	0	0	5	1.0	13.5%
	November	0	1	1	0	0	2	0	0	0	0	2	0.4	5.4%
	December	0	0	0	1	1	2	0	0	0	0	2	0.4	5.4%
Day of Week	Monday	0	1	2	1	3	5	2	0	0	0	7	1.4	18.9%
	Tuesday	1	2	0	1	1	3	1	1	0	0	5	1.0	13.5%
	Wednesday	1	4	0	1	2	6	1	1	0	0	8	1.6	21.6%
	Thursday	0	3	0	1	1	4	0	1	0	0	5	1.0	13.5%
	Friday	0	2	2	0	2	5	0	1	0	0	6	1.2	16.2%
	Saturday	2	0	2	1	0	5	0	0	0	0	5	1.0	13.5%
	Sunday	0	1	0	0	0	0	0	1	0	0	1	0.2	2.7%

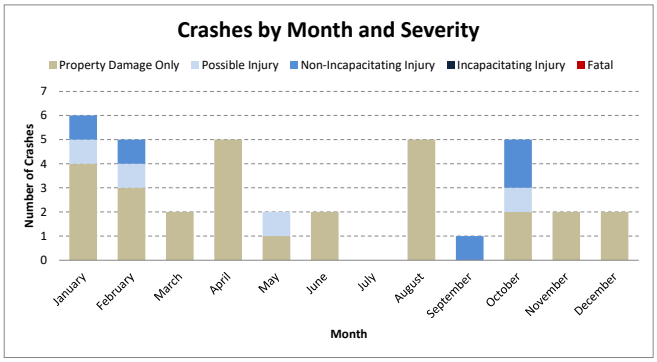
CRASH ANALYSIS - N MIAMI AVENUE & 195 STREET

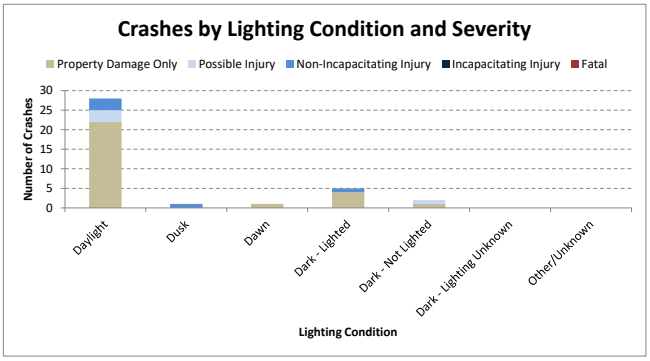
		Analysis Year					Severity					Total	Average	Percent
		2016	2017	2018	2019	2020	Property Damage Only	Possible Injury	Non-Incapacitating Injury	Incapacitating Injury	Fatal			
Hour of Day	0:00	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0%
	1:00	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0%
	2:00	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0%
	3:00	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0%
	4:00	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0%
	5:00	0	1	0	0	0	0	0	1	0	0	1	0.2	2.7%
	6:00	0	2	0	1	1	3	0	1	0	0	4	0.8	10.8%
	7:00	0	1	1	0	1	2	1	0	0	0	3	0.6	8.1%
	8:00	2	0	1	0	1	3	0	1	0	0	4	0.8	10.8%
	9:00	0	0	0	0	1	1	0	0	0	0	1	0.2	2.7%
	10:00	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0%
	11:00	0	1	0	0	0	0	0	1	0	0	1	0.2	2.7%
	12:00	1	1	1	0	1	3	0	1	0	0	4	0.8	10.8%
	13:00	0	1	0	0	0	1	0	0	0	0	1	0.2	2.7%
	14:00	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0%
	15:00	1	0	0	4	0	5	0	0	0	0	5	1.0	13.5%
	16:00	0	2	0	0	0	2	0	0	0	0	2	0.4	5.4%
	17:00	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0%
	18:00	0	1	2	0	0	2	1	0	0	0	3	0.6	8.1%
	19:00	0	0	0	0	1	0	1	0	0	0	1	0.2	2.7%
	20:00	0	1	1	0	1	3	0	0	0	0	3	0.6	8.1%
	21:00	0	0	0	0	1	1	0	0	0	0	1	0.2	2.7%
	22:00	0	1	0	0	0	1	0	0	0	0	1	0.2	2.7%
	23:00	0	1	0	0	1	1	1	0	0	0	2	0.4	5.4%
Time Period	12AM-6AM	0	1	0	0	0	0	0	1	0	0	1	0.2	2.7%
	6AM-12PM	2	4	2	1	4	9	1	3	0	0	13	2.6	35.1%
	12PM-6PM	2	4	1	4	1	11	0	1	0	0	12	2.4	32.4%
	6PM-12AM	0	4	3	0	4	8	3	0	0	0	11	2.2	29.7%
Alcohol & Drugs	None	3	13	6	5	9	27	4	5	0	0	36	7.2	97.3%
	Alcohol Involved	1	0	0	0	0	1	0	0	0	0	1	0.2	2.7%
	Drugs Involved	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0%
	Alcohol and Drugs	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0%
	Undetermined	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0%
Age of Driver 1 (Typically Driver at Fault)	19 and Under	0	0	0	0	0						0	0.0	0.0%
	20-24	0	0	0	0	0						0	0.0	0.0%
	25-29	0	0	0	0	0						0	0.0	0.0%
	30-34	0	0	0	0	0						0	0.0	0.0%
	35-39	0	0	0	0	0						0	0.0	0.0%
	40-44	0	0	0	0	0						0	0.0	0.0%
	45-49	0	0	0	0	0						0	0.0	0.0%
	50-54	0	0	0	0	0						0	0.0	0.0%
	55-59	0	0	0	0	0						0	0.0	0.0%
	60-64	0	0	0	0	0						0	0.0	0.0%
	65-69	0	0	0	0	0						0	0.0	0.0%
	70-74	0	0	0	0	0						0	0.0	0.0%
	75-79	0	0	0	0	0						0	0.0	0.0%
	80-84	0	0	0	0	0						0	0.0	0.0%
	85 and Over	0	0	0	0	0						0	0.0	0.0%
	Unknown	0	0	0	0	0						0	0.0	0.0%

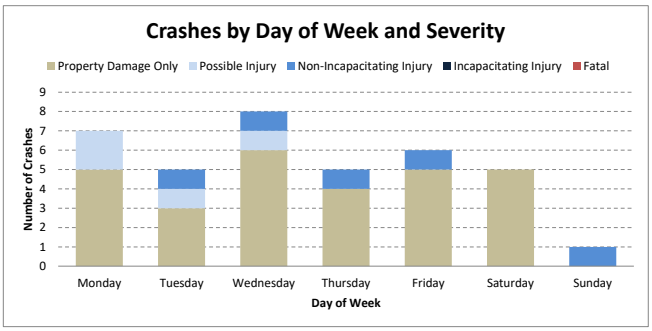
CRASH ANALYSIS - N MIAMI AVENUE & 195 STREET

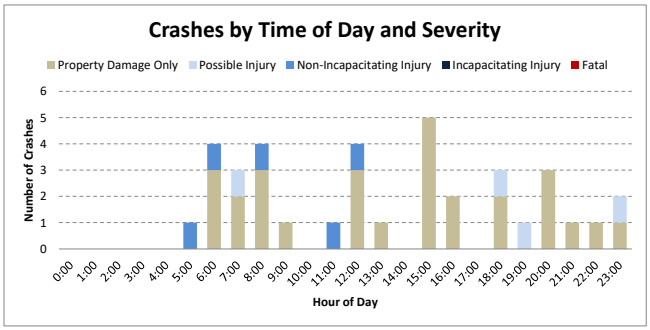












APPENDIX E. SIGNAL WARRANT ANALYSIS

TRAFFIC SIGNAL WARRANT SUMMARY

Introduction

- The Signal Warrant Analysis Spreadsheets are a tool for assisting traffic engineers when evaluating the need for a traffic signal installation
- The filled spreadsheets can be used as part of the supporting documents for the signal warrant evaluation

Note: This templates are a useful resource, but it remains necessary to apply engineering judgment and to consider specific environmental, traffic, geometric, and operational conditions

Instructions

Fill in "Orange" areas only	
Automated cells based on in Input Data in "orange" cells	
General Information	Fill in below the general information including: District, County (drop-down menu) City, Engineer, Date Major and Minor Street with corresponding number of lanes and speed limits
Enter Eight Hour Volumes	Any 8 hours of an average day. Major-street and minor-street volumes shall be for the same 8 hours; however, the 8 hours satisfied in Condition A shall **not** be required to be the same 8 hours satisfied in Condition B **for 80% columns only.** On the minor street, the higher volume shall not be required to be on the same approach during each of the 8 hours.
Enter Four Hour Volumes	Any 4 hours of an average day. Vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour on the higher-volume minor-street approach (one direction only, not required to be on the same approach during each of the 4 hours)
Enter Pedestrian Volumes (4-h	Pedestrians per hour crossing the major street (total of all crossings)
Enter Peak Hour Volumes	Vehicular: Any four consecutive 15-minute periods of an average day Pedestrian: Any four consecutive 15-minute periods of an average day representing the vehicles per hour on the major street (total of both approaches) and the corresponding pedestrians per hour crossing the major street (total of all crossings)

Input Data

Form 750-020-01
TRAFFIC ENGINEERING
October 2020

City: **Miami**
County: **87 – Miami Dade**
District: **Six**
Engineer:
Date: **March 31, 2021**

Major Street: **N Miami Ave**
Minor Street: **NW 195 St**
Major Street # Lanes: **2**
Minor Street # Lanes: **2**
Major Approach Speed: **30**
Minor Approach Speed: **30**

Eight Hour Volumes (Condition A)			For Warrant 7
Hours	Major Street (total of both approaches)	Minor Street (one direction only)	Ped Crossings on Major Street
1:00 PM	753	99	
2:00 PM	834	118	
3:00 PM	877	138	
4:00 PM	907	161	
5:00 PM	930	175	
6:00 PM	918	130	
7:00 PM	733	130	
8:00 PM	592	108	

Eight Hour Volumes (Condition B)		
Hours	Major Street (total of both approaches)	Minor Street (one direction only)
1:00 PM	753	99
2:00 PM	834	118
3:00 PM	877	138
4:00 PM	907	161
5:00 PM	930	175
6:00 PM	918	130
7:00 PM	733	130
8:00 PM	592	108

Highest Four Hour Vehicular Volumes		
Hours	Major Street (total of both approaches)	Minor Street (one direction only)
3:00 PM	877	138
4:00 PM	907	161
5:00 PM	930	175
6:00 PM	918	130

Highest Four Hour Pedestrian Volumes		
Hours	Major Street (total of both approaches)	Pedestrian Crossings on Major Street

Vehicular Peak Hour Volumes			
Peak Hour	Major Street (total of both approaches)	Minor Street (one direction only)	Total Entering Volume
5:00 PM	930	175	1222

Pedestrian Peak Hour Volumes		
Peak Hour	Major Street (total of both approaches)	Pedestrian Crossing Volumes on Major Street

State of Florida Department of Transportation

TRAFFIC SIGNAL WARRANT SUMMARY

City:	Miami	Engineer:	
County:	87 – Miami Dade	Date:	March 31, 2021
District:	Six		

Major Street:	N Miami Ave	Lanes:	2	Major Approach Speed:	30
Minor Street:	NW 195 St	Lanes:	2	Minor Approach Speed:	30

MUTCD Electronic Reference to Chapter 4: http://mutcd.fhwa.dot.gov/pdfs/2009r1r2/part4.pdf

Volume Level Criteria

1. Is the posted speed or 85th-percentile of major street > 40 mph? ☐ Yes ☑ No
2. Is the intersection in a built-up area of an isolated community with a population < 10,000? ☐ Yes ☑ No

"70%" volume level **may** be used if Question 1 **or** 2 above is answered "Yes" ☐ MAY ☐ 70% ☑ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

*Warrant 1 is satisfied if Condition A **or** Condition B is "100%" satisfied for eight hours.* ☐ Yes ☑ No

*Warrant 1 is also satisfied if both Condition A **and** Condition B are "80%" satisfied (should only be applied after an adequate trial of other alternatives that could cause less delay and inconvenience to traffic has failed to solve the traffic problems).* ☐ Yes ☑ No

*Warrant 1 is satisfied if Condition A **or** Condition B is "70%" satisfied for eight hours.* ☐ Yes ☑ No

Condition A - Minimum Vehicular Volume

Condition A is intended for application at locations where a large volume of intersecting traffic is the principal reason to consider installing a traffic control signal.

Applicable: ☑ Yes ☐ No
100% Satisfied: ☐ Yes ☑ No
80% Satisfied: ☐ Yes ☑ No
70% Satisfied: ☐ Yes ☑ No

Number of Lanes for moving traffic on each approach		Vehicles per hour on major-street (total of both approaches)			Vehicles per hour on minor-street (one direction only)		
Major	Minor	100%[a]	80%[b]	70%[c]	100%[a]	80%[b]	70%[c]
1	1	500	400	350	150	120	105
2 or more	1	600	480	420	150	120	105
2 or more	2 or more	600	480	420	200	160	140
1	2 or more	500	400	350	200	160	140

[a] Basic Minimum hourly volume
[b] Used for combination of Conditions A and B after adequate trial of other remedial measures
[c] May be used when the major-street speed exceeds 40 mph or in an isolated community with a population of less than 10,000

Record 8 highest hours and the corresponding major-street and minor-street volumes in the Instructions Sheet.

Street	Eight Highest Hours							
	1:00 PM	2:00 PM	3:00 PM	4:00 PM	5:00 PM	6:00 PM	7:00 PM	8:00 PM
Major	753	834	877	907	930	918	733	592
Minor	99	118	138	161	175	130	130	108

Existing Volumes

State of Florida Department of Transportation

TRAFFIC SIGNAL WARRANT SUMMARY

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where Condition A is not satisfied and the traffic volume on a major street is so heavy that traffic on the minor intersecting street suffers excessive delay or conflict in entering or crossing the major street.

Applicable:	☑ Yes	☐ No
100% Satisfied:	☐ Yes	☑ No
80% Satisfied:	☑ Yes	☐ No
70% Satisfied:	☐ Yes	☑ No

Number of Lanes for moving traffic on each approach		Vehicles per hour on major-street (total of both approaches)			Vehicles per hour on minor-street (one direction only)		
Major	**Minor**	**100%[a]**	**80%[b]**	**70%[c]**	**100%[a]**	**80%[b]**	**70%[c]**
1	1	750	600	525	75	60	53
2 or more	1	900	720	630	75	60	53
2 or more	2 or more	900	720	630	100	80	70
1	2 or more	750	600	525	100	80	70

[a] Basic Minimum hourly volume

[b] Used for combination of Conditions A and B after adequate trial of other remedial measures

[c] May be used when the major-street speed exceeds 40 mph or in an isolated community with a population of less than 10,000

Record 8 highest hours and the corresponding major-street and minor-street volumes in the Instructions Sheet.

Eight Highest Hours								
Street	**1:00 PM**	**2:00 PM**	**3:00 PM**	**4:00 PM**	**5:00 PM**	**6:00 PM**	**7:00 PM**	**8:00 PM**
Major	753	834	877	907	930	918	733	592
Minor	99	118	138	161	175	130	130	108

Existing Volumes

State of Florida Department of Transportation

TRAFFIC SIGNAL WARRANT SUMMARY

City:	Miami	Engineer:	
County:	87 – Miami Dade	Date:	March 31, 2021
District:	Six		

Major Street:	N Miami Ave	Lanes:	2	Major Approach Speed:	30
Minor Street:	NW 195 St	Lanes:	2	Minor Approach Speed:	30

MUTCD Electronic Reference to Chapter 4: http://mutcd.fhwa.dot.gov/pdfs/2009r1r2/part4.pdf

Volume Level Criteria

1. Is the posted speed or 85th-percentile of major street > 40 mph? ☐ Yes ☑ No
2. Is the intersection in a built-up area of an isolated community with a population < 10,000? ☐ Yes ☑ No

"70%" volume level **may** be used if Question 1 **or** 2 above is answered "Yes" ☐ MAY ☐ 70% ☑ 100%

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

If all four points lie above the appropriate line, then the warrant is satisfied.

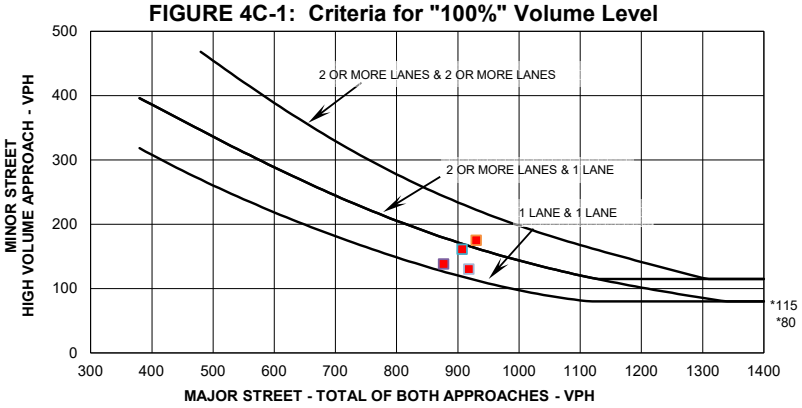
Applicable: ☑ Yes ☐ No
Satisfied: ☑ Yes ☐ No

Plot four volume combinations on the applicable figure below.

100% Volume Level

Four Highest Hours	Volumes	
	Major Street	Minor Street
3:00 PM	877	138
4:00 PM	907	161
5:00 PM	930	175
6:00 PM	918	130

FIGURE 4C-1: Criteria for "100%" Volume Level



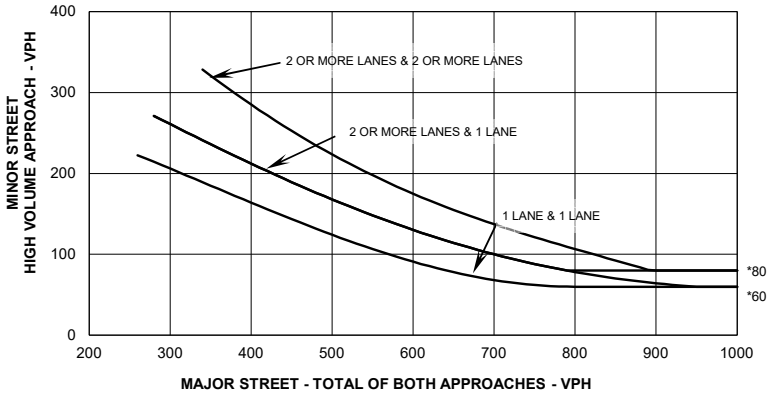
** Note: 115 ph. applies as the lower threshold volume for a minor street approach with two or more lanes and 80 mph applies as the lower threshold volume threshold for a minor street approach with one lane.*

70% Volume Level

Four Highest Hours	Volumes	
	Major Street	Minor Street

FIGURE 4C-2: Criteria for "70%" Volume Level

(Community Less than 10,000 population or above 70 km/hr. (40 mph) on Major Street)



** Note: 80 ph. applies as the lower threshold volume for a minor street approach with two or more lanes and 60 ph. applies as the lower threshold volume threshold for a minor street approach with one lane.*

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TRAFFIC SIGNAL WARRANT SUMMARY

City:	**Miami**	Engineer:	
County:	**87 – Miami Dade**	Date:	**March 31, 2021**
District:	**Six**		

Major Street:	**N Miami Ave**	Lanes:	**2**	Major Approach Speed:	**30**
Minor Street:	**NW 195 St**	Lanes:	**2**	Minor Approach Speed:	**30**

MUTCD Electronic Reference to Chapter 4: http://mutcd.fhwa.dot.gov/pdfs/2009r1r2/part4.pdf

Volume Level Criteria

1. Is the posted speed or 85th-percentile of major street > 40 mph? ☐ Yes ☑ No
2. Is the intersection in a built-up area of an isolated community with a population < 10,000? ☐ Yes ☑ No

"70%" volume level **may** be used if Question 1 **or** 2 above is answered "Yes" ☐ MAY ☐ 70% ☑ 100%

WARRANT 3 - PEAK HOUR

*If all three criteria are fulfilled **or** the plotted point lies above the appropriate line, then the warrant is satisfied.*

Applicable: ☐ Yes ☑ No
Satisfied: ☐ Yes ☐ No

Unusual condition justifying use of warrant:

Industrial Complex

-

Record hour when criteria are fulfilled and the corresponding delay or volume in boxes provided.

Peak Hour 100% Volume		
Time	Major Vol.	Minor Vol.
5:00 PM	930	175

Peak Hour 70% Volume		
Time	Major Vol.	Minor Vol.

Criteria

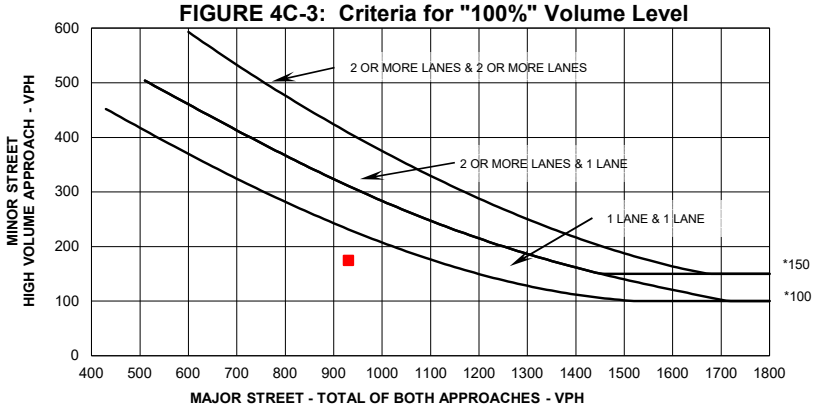
1. Delay on Minor Approach *(vehicle-hours)		
Approach Lanes	1	2
Delay Criteria*	4.0	5.0
Delay*		
Fulfilled?:	☐ Yes ☐ No	

2. Volume on Minor Approach One-Direction *(vehicles per hour)		
Approach Lanes	1	2
Volume Criteria*	100	150
Volume*		
Fulfilled?:	☐ Yes ☐ No	

3. Total Intersection Entering Volume *(vehicles per hour)		
No. of Approaches	3	4
Volume Criteria*	650	800
Volume*		
Fulfilled?:	☐ Yes ☐ No	

Plot volume combination on the applicable figure below.

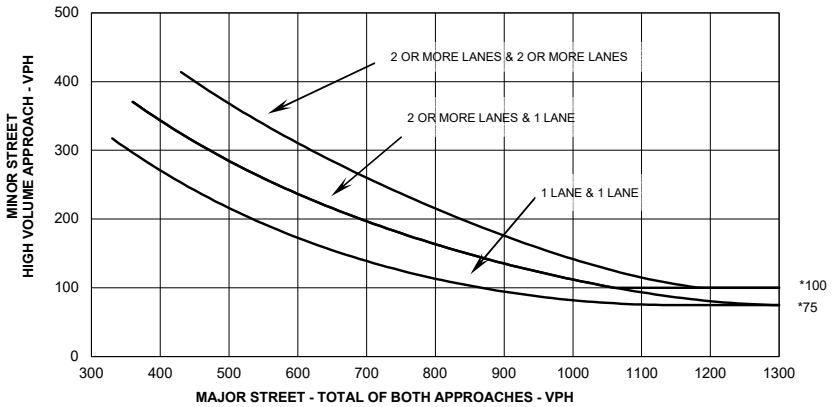
FIGURE 4C-3: Criteria for "100%" Volume Level



** Note: 150 vph applies as the lower threshold volume for a minor street approach with two or more lanes and 100 vph applies as the lower threshold volume threshold for a minor street approach with one lane.*

FIGURE 4C-4: Criteria for "70%" Volume Level

(Community Less than 10,000 population or above 70 km/hr. (40 mph) on Major Street)



** Note: 100 ph. applies as the lower threshold volume for a minor street approach with two or more lanes and 75 phi applies as the lower threshold volume threshold for a minor street approach with one lane.*

State of Florida Department of Transportation

TRAFFIC SIGNAL WARRANT SUMMARY

City:	**Miami**	Engineer:	
County:	**87 – Miami Dade**	Date:	**March 31, 2021**
District:	**Six**		

Major Street:	**N Miami Ave**	Lanes:	**2**	Major Approach Speed:	**30**
Minor Street:	**NW 195 St**	Lanes:	**2**	Minor Approach Speed:	**30**

MUTCD Electronic Reference to Chapter 4: http://mutcd.fhwa.dot.gov/pdfs/2009r1r2/part4.pd

Volume Level Criteria

1. Is the posted speed or 85th-percentile of major street > 35 mph? ☐ Yes ☑ No
2. Is the intersection in a built-up area of an isolated community with a population < 10,000? ☐ Yes ☑ No

"70%" volume level **may** be used if Question 1 **or** 2 above is answered "Yes" ☐ MAY ☐ 70% ☑ 100%

Option

*Pedestrian volume crossing the major street **may** be reduced as much as 50% if the 15th-percentile crossing speed of pedestrians is less than 3.5 ft/sec.* A walking speed study was conducted which reported a pedestrian speed less than 3.5 ft/sec for the 15th percentile. ☐ Yes ☐ No

WARRANT 4 - PEDESTRIAN VOLUME

For each of any 4 hours of an average day, the plotted points lie above the appropriate line, then the warrant is satisfied.

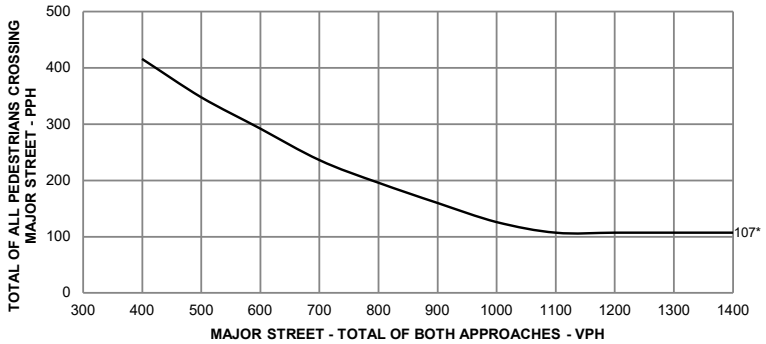
Applicable: ☐ Yes ☑ No
Satisfied: ☐ Yes ☑ No

100% Volume Level

Four Highest Hours	Volumes	
	Major Street	Pedestrian Total

Plot four volume combinations on the applicable figure below.

Figure 4C-5. Criteria for "100%" Volume Level

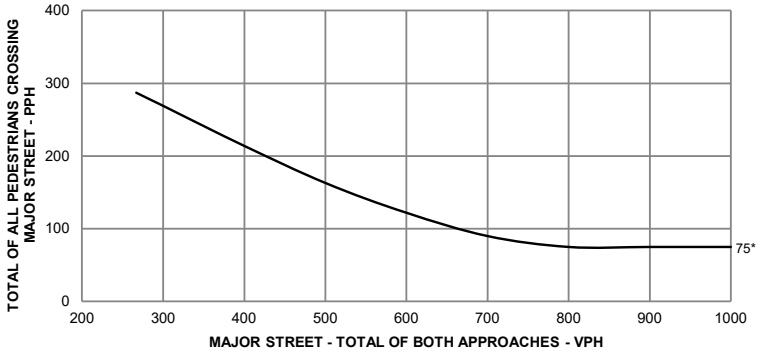


** Note: 107 pph applies as the lower threshold volume for 100% volume level*

70% Volume Level

Four Highest Hours	Volumes	
	Major Street	Pedestrian Total

Figure 4C-6 Criteria for "70%" Volume Level



** Note: 75 pph applies as the lower threshold volume for 70% volume level*

WARRANT 4 - PEDESTRIAN VOLUME

For 1 hour (any four consecutive 15-minute periods) of an average day, the plotted point falls above the appropriate line, then the warrant is satisfied.

Applicable: ☐ Yes ☐ No

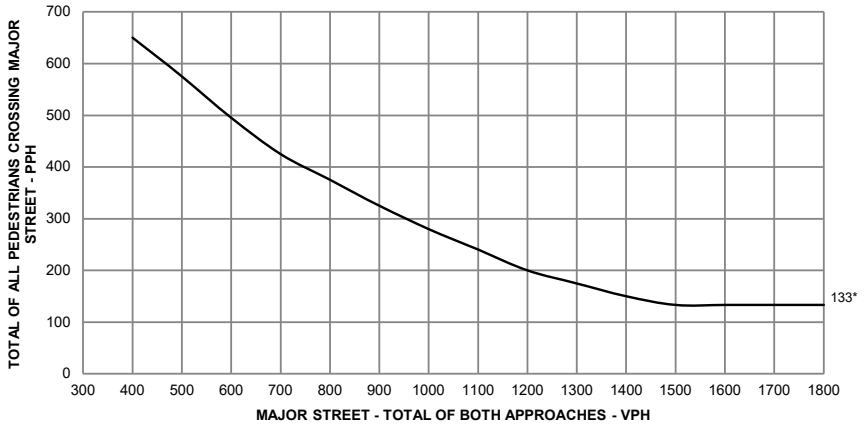
Satisfied: ☐ Yes ☐ No

Plot one volume combination on the applicable figure below.

100% Volume Level

Peak Hour	Volumes	
	Major Street	Pedestrian Total

Figure 4C-7. Criteria for "100%" Volume Level - Peak Hour

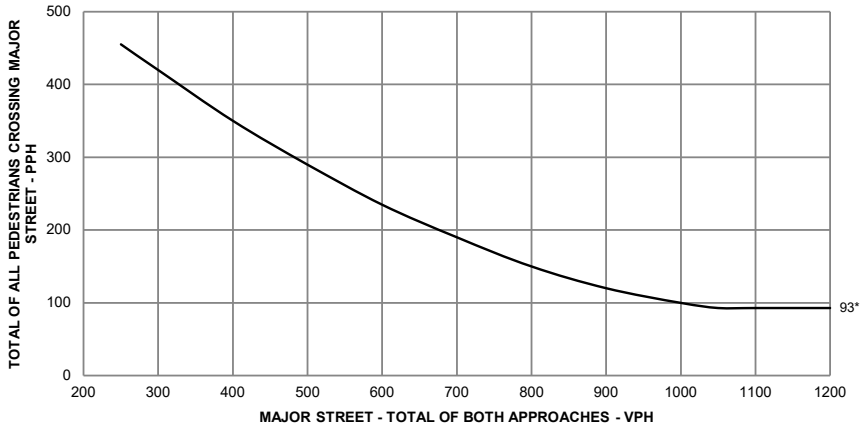


** Note: 133 pph applies as the lower threshold volume*

70% Volume Level

Peak Hour	Volumes	
	Major Street	Pedestrian Total

Figure 4C-8 Criteria for "70%" Volume Level - Peak Hour



** Note: 93 pph applies as the lower threshold volume*

State of Florida Department of Transportation

TRAFFIC SIGNAL WARRANT SUMMARY

City:	**Miami**	Engineer:	
County:	**87 – Miami Dade**	Date:	**March 31, 2021**
District:	**Six**		

Major Street:	**N Miami Ave**	Lanes:	**2**	Major Approach Speed:	**30**
Minor Street:	**NW 195 St**	Lanes:	**2**	Minor Approach Speed:	**30**

MUTCD Electronic Reference to Chapter 4: http://mutcd.fhwa.dot.gov/pdfs/2009r1r2/part4.pdf

WARRANT 5 - SCHOOL CROSSING

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Applicable: ☐ Yes ☑ No

Satisfied: ☐ Yes ☐ No

Criteria				Fulfilled? Yes	Fulfilled? No
1. There are a minimum of 20 students crossing the major street during the highest crossing hour.	Students:	Hour:			
2. There are fewer adequate gaps in the major street traffic stream during the period when the children are using the established school crossing than the number of minutes in the same period.		Minutes:	Gaps:		
3. The nearest traffic signal along the major street is located more than 300 ft. (90 m) away, or the nearest signal is within 300 ft. (90 m) but the proposed traffic signal will not restrict the progressive movement of traffic.					

State of Florida Department of Transportation

TRAFFIC SIGNAL WARRANT SUMMARY

City:	**Miami**	Engineer:	
County:	**87 – Miami Dade**	Date:	**March 31, 2021**
District:	**Six**		

Major Street:	**N Miami Ave**	Lanes:	**2**	Major Approach Speed:	**30**
Minor Street:	**NW 195 St**	Lanes:	**2**	Minor Approach Speed:	**30**

MUTCD Electronic Reference to Chapter 4: http://mutcd.fhwa.dot.gov/pdfs/2009r1r2/part4.pdf

WARRANT 6 - COORDINATED SIGNAL SYSTEM

Indicate if the criteria are fulfilled in the boxes provided. The warrant is satisfied if either criterion is fulfilled. This warrant should not be applied when the resulting signal spacing would be less than 300 m (1,000 ft.).

Applicable: ☐ Yes ☑ No

Satisfied: ☐ Yes ☐ No

Criteria	Fulfilled? Yes	Fulfilled? No
1. On a one-way street or a street that has traffic predominately in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.		
2. On a two-way street, adjacent signals do not provide the necessary degree of platooning, and the proposed and adjacent signals will collectively provide a progressive operation.		

State of Florida Department of Transportation

TRAFFIC SIGNAL WARRANT SUMMARY

City:	**Miami**	Engineer:	
County:	**87 – Miami Dade**	Date:	**March 31, 2021**
District:	**Six**		

Major Street:	**N Miami Ave**	Lanes:	**2**	Major Approach Speed:	**30**
Minor Street:	**NW 195 St**	Lanes:	**2**	Minor Approach Speed:	**30**

MUTCD Electronic Reference to Chapter 4: http://mutcd.fhwa.dot.gov/pdfs/2009r1r2/part4.pdf

WARRANT 7 - CRASH EXPERIENCE

*Record hours where criteria are fulfilled, the corresponding volume, and other information in the boxes provided. The warrant is satisfied if **all three** of the criteria are fulfilled.*

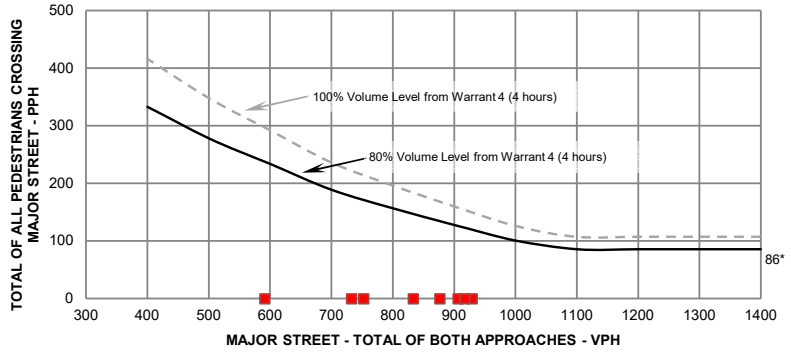
Applicable: ☑ Yes ☐ No
Satisfied: ☐ Yes ☑ No

Criteria					Fulfilled? Yes	Fulfilled? No
1. Adequate trial of other remedial measure has failed to reduce crash frequency.	Measure tried:					x
2. Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12-month period.	Observed Crash Types:	Angle	Number of crashes per 12 months:	5	x	
3. **One of the following volume warrants is met:**				**Met?**	Yes	
Warrant 1, Condition A (80% satisfied), or				No		
Warrant 1, Condition B (80% satisfied), or				Yes		

Warrant 4, Pedestrian Volume satisfied at 80% of volume requirements for any 8 hours of an average day.

Hour	Major Street Volume	Ped Crossings Volume
1:00 PM	753	
2:00 PM	834	
3:00 PM	877	
4:00 PM	907	
5:00 PM	930	
6:00 PM	918	
7:00 PM	733	
8:00 PM	592	

Figure 4C-5. Criteria for "100%" Volume Level



* Note: 86 pph applies as the lower threshold volume for the 80% volume threshold.

State of Florida Department of Transportation

TRAFFIC SIGNAL WARRANT SUMMARY

City:	**Miami**	Engineer:	
County:	**87 – Miami Dade**	Date:	**March 31, 2021**
District:	**Six**		

Major Street:	**N Miami Ave**	Lanes:	**2**	Major Approach Speed:	**30**
Minor Street:	**NW 195 St**	Lanes:	**2**	Minor Approach Speed:	**30**

MUTCD Electronic Reference to Chapter 4: http://mutcd.fhwa.dot.gov/pdfs/2009r1r2/part4.pdf

WARRANT 8 - ROADWAY NETWORK

Record hours where criteria are fulfilled, and the corresponding volume or other information in the boxes provided. The warrant is satisfied if at least one of the criteria is fulfilled and if all intersecting routes have one or more of the Major Route characteristics listed.

Applicable: ☐ Yes ☑ No

Satisfied: ☐ Yes ☐ No

Criteria									Met?		Fulfilled?	
									Yes	No	Yes	No
1. Both of the criteria to the right are met.	a. Total entering volume of at least 1,000 veh/hr during a typical weekday peak hour.			Entering Volume:								
	b. Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.			Warrant:	1	2	3					
				Satisfied?:								
2. Total entering volume at least 1,000 veh/hr for each of any 5 hrs of a non-normal business day (Sat. or Sun.)									← Hour			
									←Volume			

Characteristics of Major Routes		Met?		Fulfilled?	
		Yes	No	Yes	No
1. Part of the street or highway system that serves as the principal roadway network for through traffic flow.	Major Street:				
	Minor Street:				
2. Rural or suburban highway outside of, entering, or traversing a city.	Major Street:				
	Minor Street:				
3. Appears as a major route on an official plan.	Major Street:				
	Minor Street:				

State of Florida Department of Transportation

TRAFFIC SIGNAL WARRANT SUMMARY

City:	Miami	Engineer:	
County:	87 – Miami Dade	Date:	March 31, 2021
District:	Six		

Major Street:	N Miami Ave	Lanes:	2	Major Approach Speed:	30
Minor Street:	NW 195 St	Lanes:	2	Minor Approach Speed:	30

MUTCD Electronic Reference to Chapter 4: http://mutcd.fhwa.dot.gov/pdfs/2009r1r2/part4.pdf

Approach Lane Criteria

1. How many approach lanes are there at the track crossing?

☑ 1 ☐ 2 or more

If there is 1 lane, use Figure 4C-9 and if there are 2 or more, use Figure 4C-10.

☑ Fig 4C-9 ☐ Fig 4C-10

WARRANT 9 - INTERSECTION NEAR A GRADE CROSSING

This signal warrant should be applied only after adequate consideration has been given to other alternatives or after a trial of an alternative has failed to alleviate the safety concerns associated with the grade crossing.

Indicate if both criteria are fulfilled in the boxes provided. The warrant is satisfied if both criteria are met.

Applicable: ☐ Yes ☑ No

Satisfied: ☐ Yes ☐ No

Criteria	Fulfilled? Yes	Fulfilled? No
1. A grade crossing exists on an approach controlled by a STOP or YIELD sign and the center of the track nearest to the intersection is within 140 feet of the stop line or yield line on the approach; and	☐	☑
2. During the highest traffic volume hour during which the rail uses the crossing, the plotted point falls above the applicable curve for the existing combination of approach lanes over the track and the distance D (clear storage distance).	☐	☑

Use the following tables (4C-2, 4C-3, and 4C-4 to appropriately adjust the minor-street approach volume).

Inputs		Adjustment Factors from Tables
Occurrences of Rail traffic per day		
% of High Occupancy Buses on Approach Lane at Track Crossing		1.00
Enter D (feet)		
% of Tractor-Trailer Trucks on Approach Lane at Track Crossing		0.50

Table 4C-2. Adjustment Factor for Daily Frequency of Rail Traffic

Rail Traffic per Day	Adjustment Factor
1	0.67
2	0.91
3 to 5	1.00
6 to 8	1.18
9 to 11	1.25
12 or more	1.33

Table 4C-3. Adjustment Factor for Percentage of High-Occupancy Buses

% of High-Occupancy Buses* on Minor Street Approach	Adjustment Factor
0%	1.00
2%	1.09
4%	1.19
6% or more	1.32

* A high-occupancy bus is defined as a bus occupied by at least 20 people

Table 4C-4. Adjustment Factor for Percentage of Tractor-Trailer Trucks

% of Tractor-Trailer Trucks on Minor-Street Approach	Adjustment Factor	
	D less than 70 feet	D of 70 feet or more
0% to 2.5%	0.50	0.50
2.6% to 7.5%	0.75	0.75
7.6% to 12.5%	1.00	1.00
12.6% to 17.5%	2.30	1.15
17.6% to 22.5%	2.70	1.35
22.6% to 27.5%	3.28	1.64
More than 27.5%	4.18	2.09

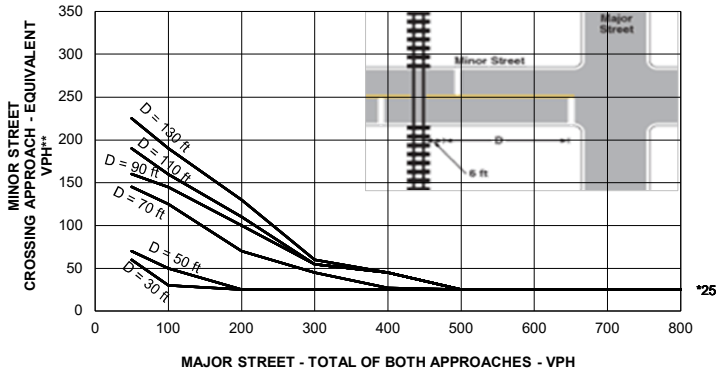
Input the major and minor street volumes before adjustment factors are applied

1 Approach Lane		
D (ft)	Major Vol.	Minor Vol.

After adjustment factors are applied

1 Approach Lane w/Factors		
D (ft)	Major Vol.	Minor Vol.

FIGURE 4C-9: Criteria for 1 Approach Lane at the Track Crossing



** Note: 25 vph applies as the lower threshold volume*

** *Note: VPH after applying the adjustment factors in Tables 4C-2, 4C, and or 4C-4, if appropriate*

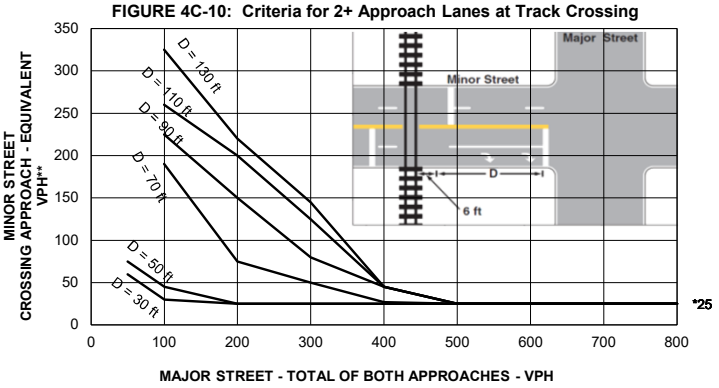
Input D and the major and minor street volumes before adjustment factors are applied

2 or more Approach Lanes		
D (ft)	Major Vol.	Minor Vol.

After adjustment factors are applied

2+ Approach Lane w/Factors		
D (ft)	Major Vol.	Minor Vol.

FIGURE 4C-10: Criteria for 2+ Approach Lanes at Track Crossing



** Note: 25 vph applies as the lower threshold volume*

** *Note: VPH after applying the adjustment factors in Tables 4C-2, 4C, and or 4C-4, if appropriate*

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TRAFFIC SIGNAL WARRANT SUMMARY

City:	**Miami**	Engineer:	
County:	**87 – Miami Dade**	Date:	**March 31, 2021**
District:	**Six**		

Major Street:	**N Miami Ave**	Lanes:	**2**	Major Approach Speed:	**30**
Minor Street:	**NW 195 St**	Lanes:	**2**	Minor Approach Speed:	**30**

MUTCD Electronic Reference to Chapter 4: http://mutcd.fhwa.dot.gov/pdfs/2009r1r2/part4.pdf

CONCLUSIONS

Remarks:

WARRANTS SATISFIED:

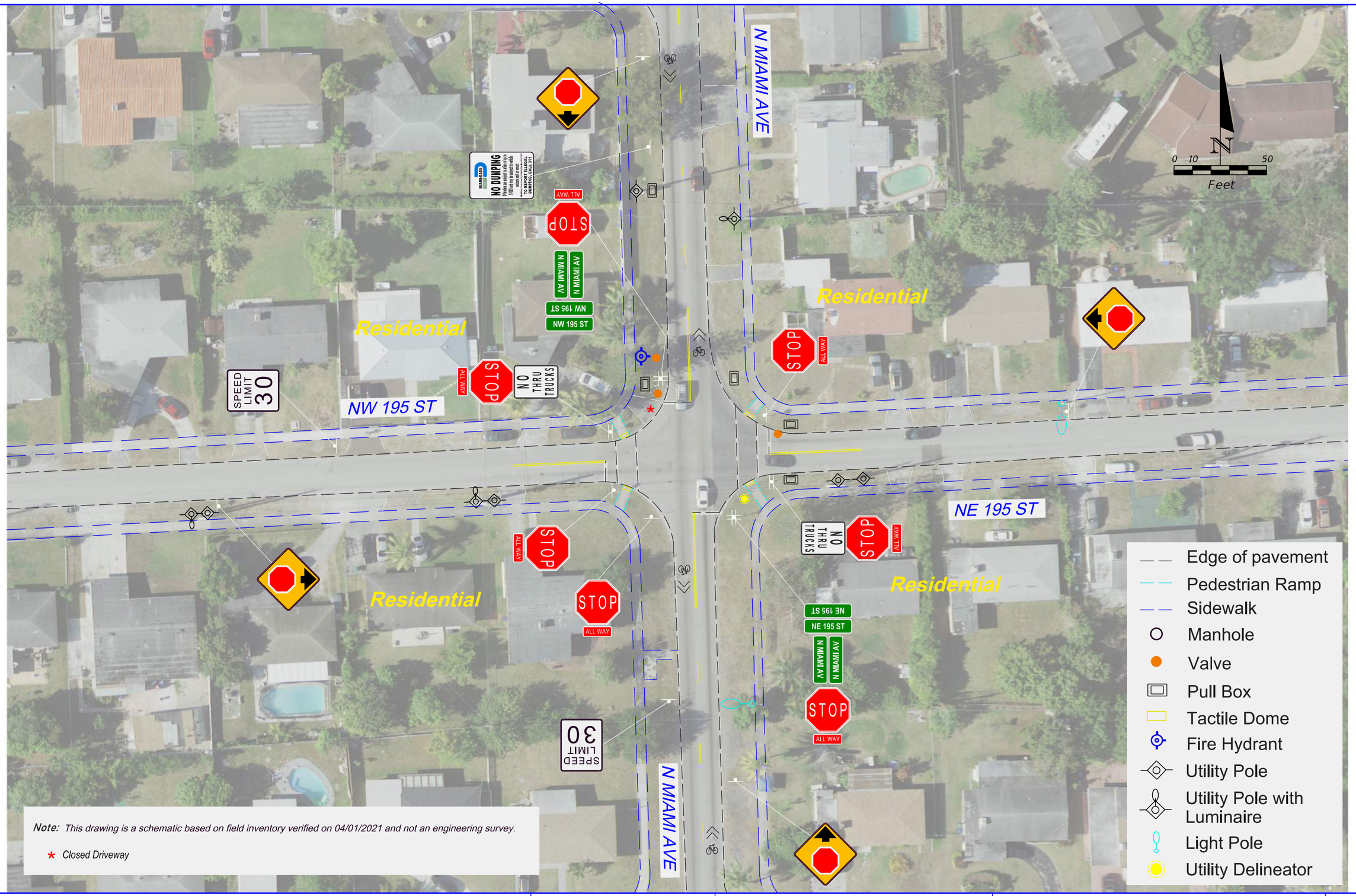
Warrant 1	☐ Not Applicable	☐ Met	☑ Not Met
Warrant 2	☐ Not Applicable	☑ Met	☐ Not Met
Warrant 3	☑ Not Applicable	☐ Met	☐ Not Met
Warrant 4	☑ Not Applicable	☐ Met	☐ Not Met
Warrant 5	☑ Not Applicable	☐ Met	☐ Not Met
Warrant 6	☑ Not Applicable	☐ Met	☐ Not Met
Warrant 7	☐ Not Applicable	☐ Met	☑ Not Met
Warrant 8	☑ Not Applicable	☐ Met	☐ Not Met
Warrant 9	☑ Not Applicable	☐ Met	☐ Not Met

APPENDIX F. ICE STAGE 1

Existing Conditions

Intersection: N Miami Avenue @ N 195 Street

Location: Miami-Dade County – D6



Note: *This drawing is a schematic based on field inventory verified on 04/01/2021 and not an engineering survey.*

* *Closed Driveway*

Prepared for:

Miami-Dade Transportation Planning Organization
and
Kittelson & Associates, Inc.

CTS ENGINEERING, INC.
8095 NW 12th STREET,
SUITE 301
DORAL, FL 33126

Miami-Dade
Transportation Planning Organization

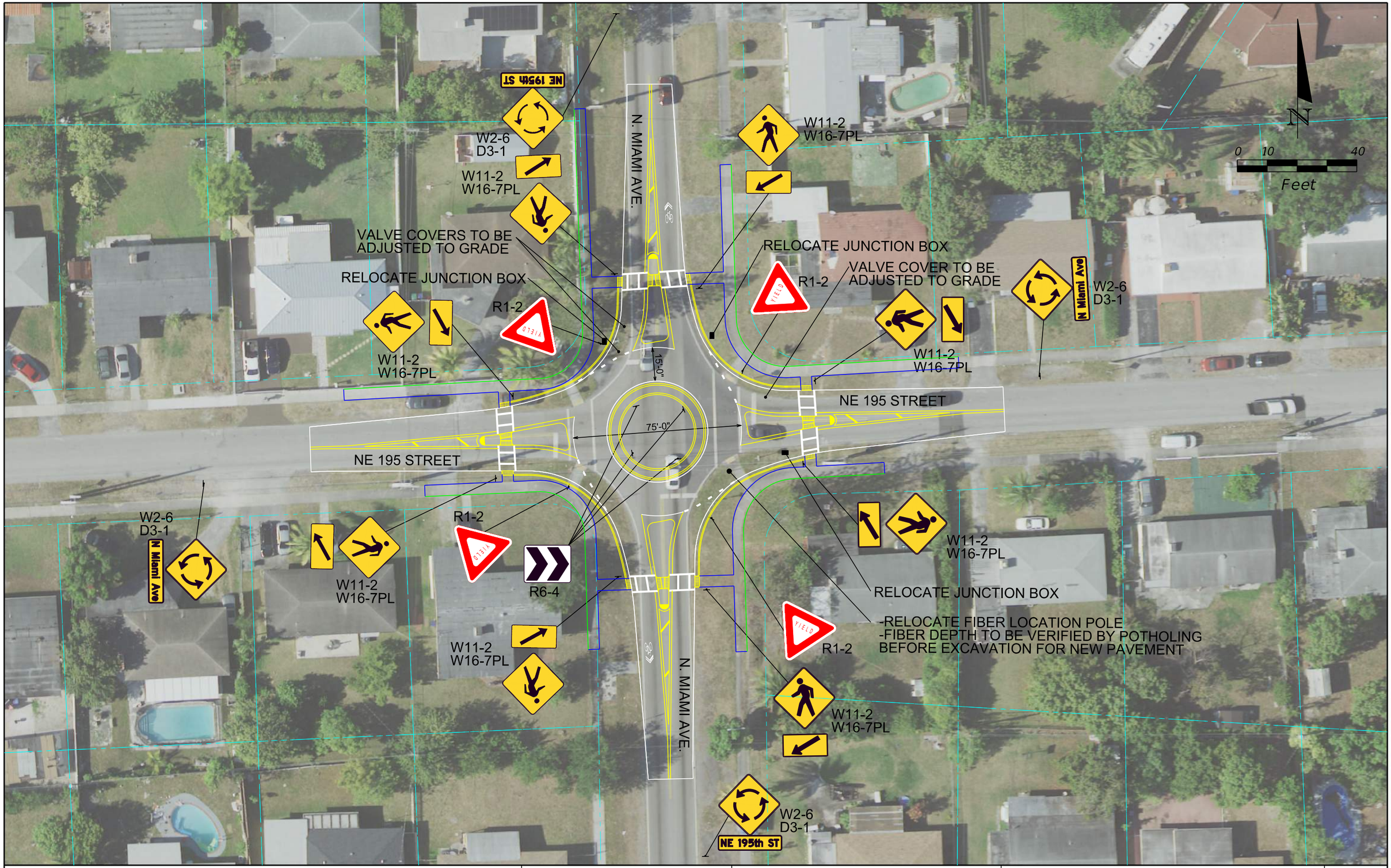
EXISTING CONDITION DIAGRAM

N MIAMI AVE & NE 195 ST

FIGURE NO. 1

xagudelo 4/29/2021 11:52:09 AM O:\Suresh\2019027\N MIAMI AVE & NE 195 ST.dgn

Proposed Concept Design



REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

TPO
Miami-Dade Transportation Planning Organization

MIAMI-DADE
TRANSPORTATION PLANNING ORGANIZATION

N. MIAMI AVE. & NE 195 STREET ROUNDABOUT CONCEPT

FIGURE NO.
7

Crash Summary

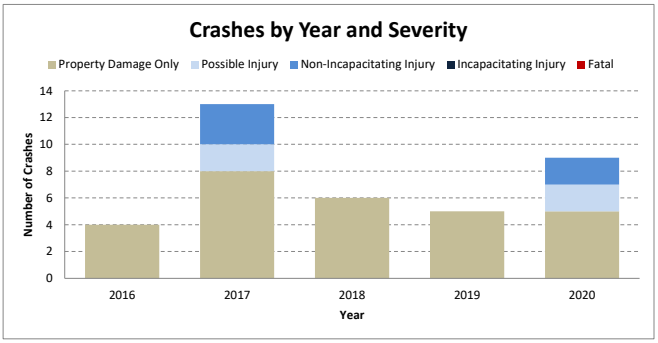
CRASH ANALYSIS - N MIAMI AVENUE & 195 STREET

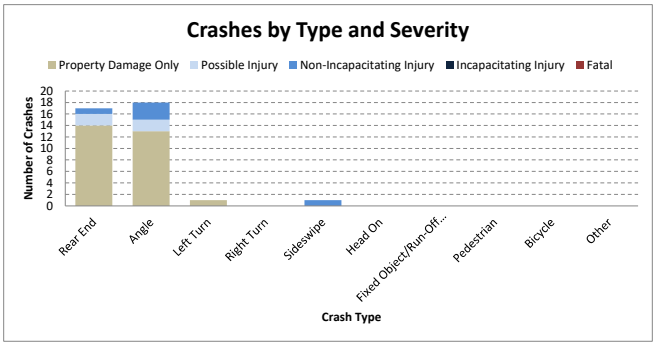
		Analysis Year					Severity					Total	Average	Percent
		2016	2017	2018	2019	2020	Property Damage Only	Possible Injury	Non-Incapacitating Injury	Incapacitating Injury	Fatal			
Type of Crash	Rear End	2	8	1	3	3	14	2	1	0	0	17	3.4	45.9%
	Angle	2	5	5	1	5	13	2	3	0	0	18	3.6	48.6%
	Left Turn	0	0	0	1	0	1	0	0	0	0	1	0.2	2.7%
	Right Turn	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0%
	Sideswipe	0	0	0	0	1	0	0	1	0	0	1	0.2	2.7%
	Head On	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0%
	Fixed Object/Run-Off Road	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0%
	Pedestrian	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0%
	Bicycle	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0%
	Other	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0%
	Total Crashes	**4**	**13**	**6**	**5**	**9**	**28**	**4**	**5**	**0**	**0**	**37**	**7.4**	**100.0%**
Crash Severity	Property Damage Only	4	8	6	5	5						28	5.6	75.7%
	Possible Injury	0	2	0	0	2						4	0.8	10.8%
	Non-Incapacitating Injury	0	3	0	0	2						5	1.0	13.5%
	Incapacitating Injury	0	0	0	0	0						0	0.0	0.0%
	Fatal	0	0	0	0	0						0	0.0	0.0%
Light Conditions	Daylight	4	9	3	5	7	22	3	3	0	0	28	5.6	75.7%
	Dusk	0	1	0	0	0	0	0	1	0	0	1	0.2	2.7%
	Dawn	0	1	0	0	0	1	0	0	0	0	1	0.2	2.7%
	Dark - Lighted	0	1	3	0	1	4	0	1	0	0	5	1.0	13.5%
	Dark - Not Lighted	0	1	0	0	1	1	1	0	0	0	2	0.4	5.4%
	Dark - Lighting Unknown	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0%
	Other/Unknown	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0%
Road Surface Condition	Dry	4	8	6	5	8	25	3	3	0	0	31	6.2	83.8%
	Wet	0	5	0	0	1	3	1	2	0	0	6	1.2	16.2%
	Other	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0%
Month	January	2	1	1	0	2	4	1	1	0	0	6	1.2	16.2%
	February	0	2	0	1	2	3	1	1	0	0	5	1.0	13.5%
	March	0	1	1	0	0	2	0	0	0	0	2	0.4	5.4%
	April	1	0	1	2	1	5	0	0	0	0	5	1.0	13.5%
	May	0	1	0	1	0	1	1	0	0	0	2	0.4	5.4%
	June	0	2	0	0	0	2	0	0	0	0	2	0.4	5.4%
	July	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0%
	August	1	1	1	0	2	5	0	0	0	0	5	1.0	13.5%
	September	0	0	0	0	1	0	0	1	0	0	1	0.2	2.7%
	October	0	4	1	0	0	2	1	2	0	0	5	1.0	13.5%
	November	0	1	1	0	0	2	0	0	0	0	2	0.4	5.4%
	December	0	0	0	1	1	2	0	0	0	0	2	0.4	5.4%
Day of Week	Monday	0	1	2	1	3	5	2	0	0	0	7	1.4	18.9%
	Tuesday	1	2	0	1	1	3	1	1	0	0	5	1.0	13.5%
	Wednesday	1	4	0	1	2	6	1	1	0	0	8	1.6	21.6%
	Thursday	0	3	0	1	1	4	0	1	0	0	5	1.0	13.5%
	Friday	0	2	2	0	2	5	0	1	0	0	6	1.2	16.2%
	Saturday	2	0	2	1	0	5	0	0	0	0	5	1.0	13.5%
	Sunday	0	1	0	0	0	0	0	1	0	0	1	0.2	2.7%

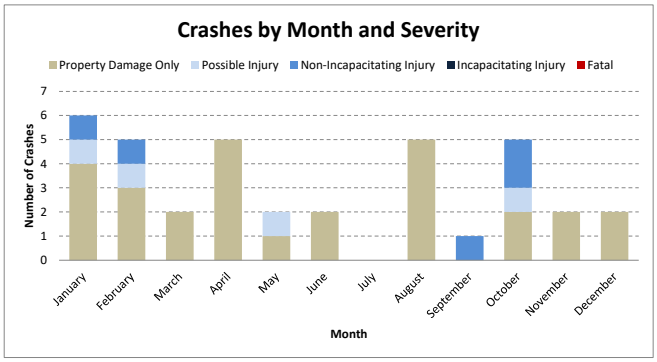
CRASH ANALYSIS - N MIAMI AVENUE & 195 STREET

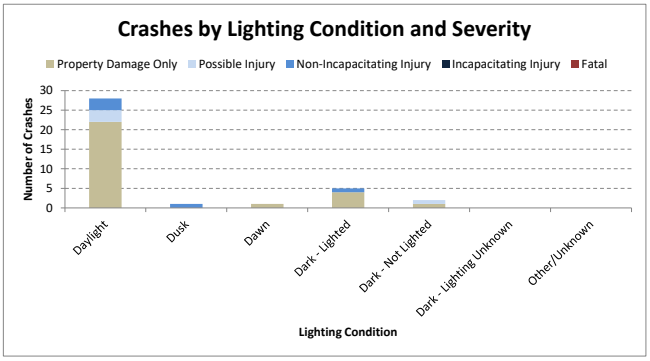
		Analysis Year					Severity					Total	Average	Percent
		2016	2017	2018	2019	2020	Property Damage Only	Possible Injury	Non-Incapacitating Injury	Incapacitating Injury	Fatal			
Hour of Day	0:00	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0%
	1:00	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0%
	2:00	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0%
	3:00	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0%
	4:00	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0%
	5:00	0	1	0	0	0	0	0	1	0	0	1	0.2	2.7%
	6:00	0	2	0	1	1	3	0	1	0	0	4	0.8	10.8%
	7:00	0	1	1	0	1	2	1	0	0	0	3	0.6	8.1%
	8:00	2	0	1	0	1	3	0	1	0	0	4	0.8	10.8%
	9:00	0	0	0	0	1	1	0	0	0	0	1	0.2	2.7%
	10:00	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0%
	11:00	0	1	0	0	0	0	0	1	0	0	1	0.2	2.7%
	12:00	1	1	1	0	1	3	0	1	0	0	4	0.8	10.8%
	13:00	0	1	0	0	0	1	0	0	0	0	1	0.2	2.7%
	14:00	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0%
	15:00	1	0	0	4	0	5	0	0	0	0	5	1.0	13.5%
	16:00	0	2	0	0	0	2	0	0	0	0	2	0.4	5.4%
	17:00	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0%
	18:00	0	1	2	0	0	2	1	0	0	0	3	0.6	8.1%
	19:00	0	0	0	0	1	0	1	0	0	0	1	0.2	2.7%
	20:00	0	1	1	0	1	3	0	0	0	0	3	0.6	8.1%
	21:00	0	0	0	0	1	1	0	0	0	0	1	0.2	2.7%
	22:00	0	1	0	0	0	1	0	0	0	0	1	0.2	2.7%
	23:00	0	1	0	0	1	1	1	0	0	0	2	0.4	5.4%
Time Period	12AM-6AM	0	1	0	0	0	0	0	1	0	0	1	0.2	2.7%
	6AM-12PM	2	4	2	1	4	9	1	3	0	0	13	2.6	35.1%
	12PM-6PM	2	4	1	4	1	11	0	1	0	0	12	2.4	32.4%
	6PM-12AM	0	4	3	0	4	8	3	0	0	0	11	2.2	29.7%
Alcohol & Drugs	None	3	13	6	5	9	27	4	5	0	0	36	7.2	97.3%
	Alcohol Involved	1	0	0	0	0	1	0	0	0	0	1	0.2	2.7%
	Drugs Involved	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0%
	Alcohol and Drugs	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0%
	Undetermined	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0%
Age of Driver 1 (Typically Driver at Fault)	19 and Under	0	0	0	0	0						0	0.0	0.0%
	20-24	0	0	0	0	0						0	0.0	0.0%
	25-29	0	0	0	0	0						0	0.0	0.0%
	30-34	0	0	0	0	0						0	0.0	0.0%
	35-39	0	0	0	0	0						0	0.0	0.0%
	40-44	0	0	0	0	0						0	0.0	0.0%
	45-49	0	0	0	0	0						0	0.0	0.0%
	50-54	0	0	0	0	0						0	0.0	0.0%
	55-59	0	0	0	0	0						0	0.0	0.0%
	60-64	0	0	0	0	0						0	0.0	0.0%
	65-69	0	0	0	0	0						0	0.0	0.0%
	70-74	0	0	0	0	0						0	0.0	0.0%
	75-79	0	0	0	0	0						0	0.0	0.0%
	80-84	0	0	0	0	0						0	0.0	0.0%
	85 and Over	0	0	0	0	0						0	0.0	0.0%
	Unknown	0	0	0	0	0						0	0.0	0.0%

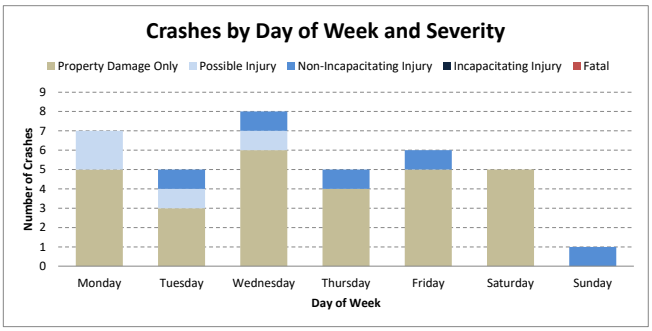
CRASH ANALYSIS - N MIAMI AVENUE & 195 STREET

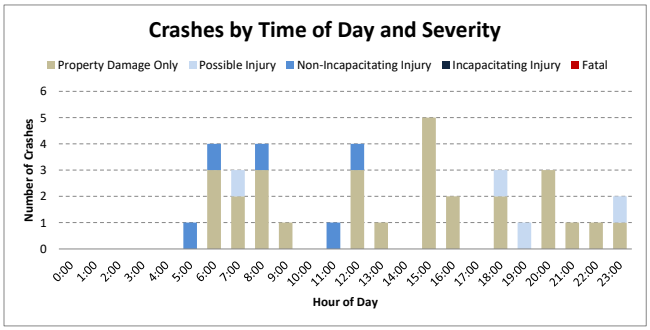












CAP-X – 2021 AM Peak

Capacity Analysis for Planning of Junctions

Summary Report - Page 1 of 2

Project Name:	MD TPO Intersection Safety Analysis
Project Number:	22756.32
Location:	N Miami Ave & N 195 St
Date:	2021 AM
Number of Intersection Legs:	4
Major Street Direction	North-South

Traffic Volume Demand

	Volume (Veh/hr)				Percent (%)	
	U-Turn	**Left**	**Thru**	**Right**	Heavy Vehicles	Volume Growth
Eastbound	0	16	46	22	1.20%	0.00%
Westbound	0	7	22	58	2.28%	0.00%
Southbound	0	49	413	17	2.07%	0.00%
Northbound	0	15	243	1	2.28%	0.00%
Adjustment Factor	0.80	0.95		0.85		
Suggested	**0.80**	**0.95**		**0.85**		

Truck to PCE Factor		**Suggested = 2.00**	2.00
FDOT Context Zone	**C4-General Urban Residential**		
Critical Lane Volume Threshold	2-phase signal	**Suggested = 1800**	**1800**
	3-phase signal	**Suggested = 1750**	**1750**
	4-phase signal	**Suggested = 1700**	**1700**

Capacity Analysis for Planning of Junctions

TYPE OF INTERSECTION	Overall v/c Ratio	V/C Ranking	Multimodal Score	Pedestrian Accommodations	Bicycle Accommodations	Transit Accommodations
Two-Way Stop Control N-S	0.27	1	1.9	Poor	Poor	Fair
Traffic Signal	0.34	2	2.4	Poor	Poor	Fair
1 X 1	0.38	3	3.3	Fair	Fair	Fair
75 ICD	0.51	4	3.3	Fair	Fair	Fair
50 ICD	0.51	5	3.3	Fair	Fair	Fair
All-Way Stop Control	0.77	6	3.3	Fair	Fair	Fair
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CAP-X – 2021 PM Peak

Capacity Analysis for Planning of Junctions

Summary Report - Page 1 of 2

Project Name:	MD TPO Intersection Safety Analysis
Project Number:	22756.32
Location:	N Miami Ave & N 195 St
Date:	2021 PM
Number of Intersection Legs:	4
Major Street Direction	North-South

Traffic Volume Demand

	Volume (Veh/hr)				Percent (%)	
	U-Turn	**Left**	**Thru**	**Right**	Heavy Vehicles	Volume Growth
Eastbound	0	90	42	16	0.68%	0.00%
Westbound	0	1	41	144	1.08%	0.00%
Southbound	0	50	378	17	0.68%	0.00%
Northbound	0	8	481	5	0.19%	0.00%
Adjustment Factor	0.80	0.95		0.85		
Suggested	**0.80**	**0.95**		**0.85**		

Truck to PCE Factor		**Suggested = 2.00**	2.00
FDOT Context Zone	**C4-General Urban Residential**		
Critical Lane Volume Threshold	2-phase signal	**Suggested = 1800**	**1800**
	3-phase signal	**Suggested = 1750**	**1750**
	4-phase signal	**Suggested = 1700**	**1700**

Capacity Analysis for Planning of Junctions

TYPE OF INTERSECTION	Overall v/c Ratio	V/C Ranking	Multimodal Score	Pedestrian Accommodations	Bicycle Accommodations	Transit Accommodations
Traffic Signal	0.40	1	2.4	Poor	Poor	Fair
1 X 1	0.44	2	3.3	Fair	Fair	Fair
75 ICD	0.59	3	3.3	Fair	Fair	Fair
50 ICD	0.61	4	3.3	Fair	Fair	Fair
Two-Way Stop Control N-S	0.72	5	1.9	Poor	Poor	Fair
All-Way Stop Control	1.07	6	3.3	Fair	Fair	Fair
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SPICE – Stage 1

Federal Highway Administration (FHWA)

Safety Performance for Intersection Control Evaluation Tool

Results

Summary of crash prediction results for each alternative

Project Information

Project Name:	MD TPO Intersection Safety Analysis	**Intersection Type**	At-Grade Intersections
Intersection:	N Miami Ave & N 195 St	**Opening Year**	2025
Agency:	Miami Dade TPO	**Design Year**	2045
Project Reference:	22756.32	**Facility Type**	On Urban and Suburban Arterial
City:	Miami	**Number of Legs**	4-leg
State:	Florida	**1-Way/2-Way**	2-way Intersecting 2-way
Date:	4/11/2021	**# of Major Street Lanes (both directions)**	5 or fewer
Analyst:	RMM	**Major Street Approach Speed**	Less than 55 mph

Crash Prediction Summary

Control Strategy	Crash Type	Opening Year	Design Year	Total Project Life Cycle	Rank	AADT Within Prediction Range?	Source of Prediction
Traffic Signal	Total	6.73	8.08	155.38	4	Yes	Calibrated SPF
	Fatal & Injury	2.23	2.70	51.72			
Minor Road Stop	Total	5.14	5.96	116.57	3	Yes	Calibrated SPF
	Fatal & Injury	2.06	2.43	47.19			
All Way Stop	Total	2.15	2.54	49.27	2	N/A	N/A
	Fatal & Injury	0.76	0.91	17.45			
1-lane Roundabout	Total	2.09	2.33	46.37	1	Yes	Uncalibrated SPF
	Fatal & Injury	0.40	0.45	8.91			

ICE FORM – Stage 1

Florida Department of Transportation
Intersection Control Evaluation (ICE) Form
Stage 1: Screening

To fulfill the requirements of Stage 1 (Screening) of FDOT's ICE procedures, complete the following form and append all supporting documentation. Completed forms can be submitted to the District Traffic Operations Engineer (DTOE) and District Design Engineer (DDE) for the project's approval.

Project Name	Miami-Dade TPO Intersection Safety Analysis			FDOT Project #		
Submitted By	Benazir Portal	Agency/Company		Kittelson & Associates, Inc.	Date	4/15/2021
Email	bportal@kittelson.com	FDOT District	District 6	County	Miami-Dade	
Project Locality (*City/Town/Village*)	Miami, FL			Project Type	Safety Improvement Project	
Project Funding Source	Federal	FDOT Context Classification		C4 - Urban General		
Project Purpose (*What is the catalyst for this project and why is it being undertaken?*)	The Purpose & Need (P&N) for the project is to improve safety due to a pattern of angle and left turn crashes at the intersection of N Miami Avenue & N 195 Street. The study is to evaluate the intersection and provide justification to apply for HSIP Funds. An Intersection Control Evaluation (ICE) was conducted to determine the appropriate control type for the intersection.					
Project Setting Description (*Describe the area surrounding the intersection*)	The existing intersection control type is all-way stop control. The intersection meets Signal Warrant 2 - Four-Hour Vehicular Volume. North Miami Avenue, located in Miami-Dade County, is a north-south roadway that functions as a local connector between N 183 Street and N 199 Street. N 195 Street is a local roadway that connects NW 2 Avenue to NE 2 Avenue. The intersection is surrounded by residential properties.					
Multimodal Context (*Describe the pedestrian, bicycle, and transit activity in the area and the potential for activity based on surrounding land uses and development patterns*)	There was little pedestrian or bicycle activity observed in this area. There are sidewalks present on each leg of the intersection. N Miami Avenue is marked with sharrows in the northbound and southbound directions. Marked crosswalks are present on the east and west legs of the intersection. There are no transit routes that travel through the intersection. Under the proposed mini-roundabout condition bicyclists will travel through the intersection on the roadway with vehicular traffic. The existing sharrow pavement markings are anticipated to remain.					

Major Street Information

Route #:		Route Name(s)	N Miami Avenue			Milepost		
Existing Control Type	All-way Stop-Control		Existing AADT	13,000		Design Year AADT	16,000	
Design Vehicle	34' Fire Pumper Tanker		Control Vehicle	34' Fire Pumper Tanker				
Primary Functional Classification	Urban Major Collector					Design Speed (mph)	30	
Secondary Functional Classification (if app.)						Target Speed (mph) [if app.]		

Approach #1	Direction	Northbound	Number of Lanes		Study Period #1 Traffic Volumes		Study Period #2 Traffic Volumes	
	Sidewalks along	Both sides of the approach	Left-Turn	0				
	Crosswalk on Approach?	No	Left-Through	0	Weekday AM Peak		Weekday PM Peak	
	On-Street Bike Facilities?	No	Through	0	Left	15	Left	8
	Multi-Use Path?	No	Left-Through-Right	1	Through	243	Through	481
	Scheduled Bus Service?	No	Through-Right	0	Right	1	Right	5
	Bus Stop on Approach?	No	Right-Turn	0	Daily Truck %		0.9%	
Approach #2	Direction	Southbound	Number of Lanes		Study Period #1 Traffic Volumes		Study Period #2 Traffic Volumes	
	Sidewalks along:	Both sides of the approach	Left-Turn	0				
	Crosswalk on Approach?	No	Left-Through	0	Weekday AM Peak		Weekday PM Peak	
	On-Street Bike Facilities?	No	Through	0	Left	49	Left	50
	Multi-Use Path?	No	Left-Through-Right	1	Through	413	Through	378
	Scheduled Bus Service?	No	Through-Right	0	Right	17	Right	17
	Bus Stop on Approach?	No	Right-Turn	0	Daily Truck %		1.4%	

Minor Street Information											
Route #:		Route Name(s)	N 195 St					Milepost (if app.)			
Existing Control Type	All-way Stop-Control			Existing AADT	3,200			Design Year AADT	4,000		
Design Vehicle	34' Fire Pumper Tanker			Control Vehicle	34' Fire Pumper Tanker						
Primary Functional Classification	Urban Local							Design Speed (mph)	30		
Secondary Functional Classification (if app.)								Target Speed (mph) [if app.]			

Approach #1	Direction	Eastbound	Number of Lanes		Study Period #1 Traffic Volumes			Study Period #2 Traffic Volumes			
	Sidewalks along:	Both sides of the approach	Left-Turn	0							
	Crosswalk on Approach?	Yes	Left-Through	0	Weekday AM Peak			Weekday PM Peak			
	On-Street Bike Facilities?	No	Through	0	Left	16		Left	90		
	Multi-Use Path?	No	Left-Through-Right	1	Through	46		Through	42		
	Scheduled Bus Service?	No	Through-Right	0	Right	22		Right	16		
	Bus Stop on Approach?	No	Right-Turn	0	Daily Truck %			0.9%			
Approach #2	Direction	Westbound	Number of Lanes		Study Period #1 Traffic Volumes			Study Period #2 Traffic Volumes			
	Sidewalks along:	Both sides of the approach	Left-Turn	0							
	Crosswalk on Approach?	Yes	Left-Through	0	Weekday AM Peak			Weekday PM Peak			
	On-Street Bike Facilities?	No	Through	0	Left	7		Left	1		
	Multi-Use Path?	No	Left-Through-Right	1	Through	22		Through	41		
	Scheduled Bus Service?	No	Through-Right	0	Right	58		Right	144		
	Bus Stop on Approach?	No	Right-Turn	0	Daily Truck %			1.5%			
Approach #3	Direction		Number of Lanes		Study Period #1 Traffic Volumes			Study Period #2 Traffic Volumes			
	Sidewalks along:		Left-Turn								
	Crosswalk on Approach?		Left-Through		Weekday AM Peak			Weekday PM Peak			
	On-Street Bike Facilities?		Through		Left			Left			
	Multi-Use Path?		Left-Through-Right		Through			Through			
	Scheduled Bus Service?		Through-Right		Right			Right			
	Bus Stop on Approach?		Right-Turn		Daily Truck %						

Crash History (Existing Intersections Only)
Append the most recent five-years of crash data for the intersection from the CAR System. If the crash data evidences any issues relating to safety performance, discuss briefly here:
The most recent three years of verified SSOGIS crash data on record (2016-2018) was collected for the study intersection. In addition, the most recent five years of Signal Four Analytics (S4) crash data (2016-2020) was downloaded and included in the analysis to verify crash patterns remained consistent in the most recent years. Over the five year history, 37 total crashes occurred with zero being fatal and nine resulting in at least one injury. Angle crashes were the most common crash type with 18 crashes (49 percent), followed by rear end with 17 crashes (46 percent). Five of the nine injury crashes were angle crashes and four were rear end.

Control Strategy Evaluation						
Provide a brief justification as to why each of the following control strategies should be advanced or not. Justification should consider potential environmental impacts.						
	CAP-X Outputs			SPICE Ranking	Strategy to Be Advanced?	Justification
	V/C Ratio		Multimodal Score			
Control Strategy	Weekday AM Peak	Weekday PM Peak				
Two-Way Stop-Controlled	0.27	0.72	1.9	3	No	Improved V/C when compared to existing AWSC; however, the TWSC has a higher number of predicted crashes defeating the project P&N.
All-Way Stop-Controlled	0.77	1.07	3.3	2	No	No-Build alternative is not viable due to existing angle and left turn crash patterns. In addition, the PM peak hour V/C is greater than 1.0.
Signalized Control	0.34	0.40	2.4	4	No	Signal Warrant 2 is met. The signal has improved V/C when compared to existing AWSC; however, the Signal has a higher number of predicted crashes defeating the project's P&N.
Roundabout	0.38 (1x1) 0.51 (75' ICD) 0.51 (50' ICD)	0.44 (1x1) 0.59 (75' ICD) 0.61 (50' ICD)	3.3	1	Yes	Improved V/C and lower number of predicted crashes when compared to the existing AWSC. The 75' ICD will be moved forward.
Median U-Turn	-	-	-	-	No	This alternative intersection is not a viable alternative for two lane roads.
RCUT (Signalized)	-	-	-	-	No	This alternative intersection is not a viable alternative for two lane roads.
RCUT (Unsignalized)	-	-	-	-	No	This alternative intersection is not a viable alternative for two lane roads.
Jughandle				-	No	Significant ROW and environmental impacts in the area surrounding the intersection.
Displaced Left-Turn	-	-	-	-	No	This alternative intersection is not a viable alternative for two lane roads.
Continuous Green Tee	-	-	-	-	No	The intersection is a four-leg intersection.
Quadrant Roadway	-	-	-		No	Significant ROW and environmental impacts in the area surrounding the intersection.
Partial MUT	-	-	-	-	No	This alternative intersection is not a viable alternative for two lane roads.
Other 2 (Type)	-	-	-	-	No	N/A

Resolution					
To be filled out by FDOT District Traffic Operations Engineer and District Design Engineer					
Project Determination	Identified Control Strategy Approved				
Comments					
DOTE Name		Signature		Date	
DDE Name		Signature		Date	

APPENDIX G. OPERATIONAL ANALYSIS REPORT OUTPUTS

Intersection	
Intersection Delay, s/veh	14.8
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	16	46	22	7	22	58	15	243	1	49	413	17
Future Vol, veh/h	16	46	22	7	22	58	15	243	1	49	413	17
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, %	0	2	0	0	5	2	7	2	0	6	1	6
Mvmt Flow	17	48	23	7	23	61	16	256	1	52	435	18
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	10	9.6	11.7	18.3
HCM LOS	A	A	B	C

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	6%	19%	8%	10%
Vol Thru, %	94%	55%	25%	86%
Vol Right, %	0%	26%	67%	4%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	259	84	87	479
LT Vol	15	16	7	49
Through Vol	243	46	22	413
RT Vol	1	22	58	17
Lane Flow Rate	273	88	92	504
Geometry Grp	1	1	1	1
Degree of Util (X)	0.396	0.145	0.143	0.692
Departure Headway (Hd)	5.225	5.9	5.631	4.94
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	690	607	636	736
Service Time	3.257	3.946	3.679	2.94
HCM Lane V/C Ratio	0.396	0.145	0.145	0.685
HCM Control Delay	11.7	10	9.6	18.3
HCM Lane LOS	B	A	A	C
HCM 95th-tile Q	1.9	0.5	0.5	5.6

Intersection	
Intersection Delay, s/veh	29.8
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	90	42	16	1	41	144	8	481	5	50	378	17
Future Vol, veh/h	90	42	16	1	41	144	8	481	5	50	378	17
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, %	0	2	0	0	0	1	0	0	0	0	1	0
Mvmt Flow	95	44	17	1	43	152	8	506	5	53	398	18
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	14.4	14.2	39.5	30.8
HCM LOS	B	B	E	D

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	2%	61%	1%	11%
Vol Thru, %	97%	28%	22%	85%
Vol Right, %	1%	11%	77%	4%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	494	148	186	445
LT Vol	8	90	1	50
Through Vol	481	42	41	378
RT Vol	5	16	144	17
Lane Flow Rate	520	156	196	468
Geometry Grp	1	1	1	1
Degree of Util (X)	0.885	0.33	0.38	0.809
Departure Headway (Hd)	6.125	7.629	6.992	6.322
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	588	474	517	576
Service Time	4.224	5.642	4.992	4.322
HCM Lane V/C Ratio	0.884	0.329	0.379	0.813
HCM Control Delay	39.5	14.4	14.2	30.8
HCM Lane LOS	E	B	B	D
HCM 95th-tile Q	10.3	1.4	1.8	8

Intersection	
Intersection Delay, s/veh	16
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	17	48	23	7	23	60	16	253	1	51	430	18
Future Vol, veh/h	17	48	23	7	23	60	16	253	1	51	430	18
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, %	0	2	0	0	5	2	7	2	0	6	1	6
Mvmt Flow	18	51	24	7	24	63	17	266	1	54	453	19
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	10.2	9.8	12.1	20.2
HCM LOS	B	A	B	C

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	6%	19%	8%	10%
Vol Thru, %	94%	55%	26%	86%
Vol Right, %	0%	26%	67%	4%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	270	88	90	499
LT Vol	16	17	7	51
Through Vol	253	48	23	430
RT Vol	1	23	60	18
Lane Flow Rate	284	93	95	525
Geometry Grp	1	1	1	1
Degree of Util (X)	0.418	0.155	0.151	0.729
Departure Headway (Hd)	5.296	6.009	5.742	4.999
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	679	596	622	730
Service Time	3.335	4.062	3.797	2.999
HCM Lane V/C Ratio	0.418	0.156	0.153	0.719
HCM Control Delay	12.1	10.2	9.8	20.2
HCM Lane LOS	B	B	A	C
HCM 95th-tile Q	2.1	0.5	0.5	6.4

Intersection	
Intersection Delay, s/veh	39.9
Intersection LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	94	44	17	1	43	150	8	500	5	52	393	18
Future Vol, veh/h	94	44	17	1	43	150	8	500	5	52	393	18
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, %	0	2	0	0	0	1	0	0	0	0	1	0
Mvmt Flow	99	46	18	1	45	158	8	526	5	55	414	19
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	15.4	15.4	56	40.6
HCM LOS	C	C	F	E

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	2%	61%	1%	11%
Vol Thru, %	97%	28%	22%	85%
Vol Right, %	1%	11%	77%	4%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	513	155	194	463
LT Vol	8	94	1	52
Through Vol	500	44	43	393
RT Vol	5	17	150	18
Lane Flow Rate	540	163	204	487
Geometry Grp	1	1	1	1
Degree of Util (X)	0.969	0.359	0.412	0.882
Departure Headway (Hd)	6.462	7.924	7.262	6.518
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	567	452	494	556
Service Time	4.462	6.008	5.341	4.578
HCM Lane V/C Ratio	0.952	0.361	0.413	0.876
HCM Control Delay	56	15.4	15.4	40.6
HCM Lane LOS	F	C	C	E
HCM 95th-tile Q	13.2	1.6	2	10

Intersection	
Intersection Delay, s/veh	27.3
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	20	57	27	9	27	72	19	301	1	61	512	21
Future Vol, veh/h	20	57	27	9	27	72	19	301	1	61	512	21
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, %	0	2	0	0	5	2	7	2	0	6	1	6
Mvmt Flow	21	60	28	9	28	76	20	317	1	64	539	22
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	11.3	11	15.1	39.6
HCM LOS	B	B	C	E

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	6%	19%	8%	10%
Vol Thru, %	94%	55%	25%	86%
Vol Right, %	0%	26%	67%	4%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	321	104	108	594
LT Vol	19	20	9	61
Through Vol	301	57	27	512
RT Vol	1	27	72	21
Lane Flow Rate	338	109	114	625
Geometry Grp	1	1	1	1
Degree of Util (X)	0.532	0.2	0.199	0.914
Departure Headway (Hd)	5.672	6.567	6.295	5.26
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	632	542	565	688
Service Time	3.741	4.662	4.391	3.313
HCM Lane V/C Ratio	0.535	0.201	0.202	0.908
HCM Control Delay	15.1	11.3	11	39.6
HCM Lane LOS	C	B	B	E
HCM 95th-tile Q	3.1	0.7	0.7	12

Intersection	
Intersection Delay, s/veh	101.6
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	112	52	20	1	51	179	10	596	6	62	469	21
Future Vol, veh/h	112	52	20	1	51	179	10	596	6	62	469	21
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, %	0	2	0	0	0	1	0	0	0	0	1	0
Mvmt Flow	118	55	21	1	54	188	11	627	6	65	494	22
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	19.6	20.3	151.8	107.2
HCM LOS	C	C	F	F

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	2%	61%	0%	11%
Vol Thru, %	97%	28%	22%	85%
Vol Right, %	1%	11%	77%	4%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	612	184	231	552
LT Vol	10	112	1	62
Through Vol	596	52	51	469
RT Vol	6	20	179	21
Lane Flow Rate	644	194	243	581
Geometry Grp	1	1	1	1
Degree of Util (X)	1.25	0.447	0.515	1.128
Departure Headway (Hd)	7.285	9.304	8.542	7.468
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	502	389	426	488
Service Time	5.285	7.304	6.542	5.468
HCM Lane V/C Ratio	1.283	0.499	0.57	1.191
HCM Control Delay	151.8	19.6	20.3	107.2
HCM Lane LOS	F	C	C	F
HCM 95th-tile Q	24.8	2.2	2.9	18.6

MOVEMENT SUMMARY

Site: 101 [N Miami Ave & N 195 St_Existing AM]

Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: N Miami Ave												
3	L2	16	7.0	0.278	6.7	LOS A	1.2	30.5	0.29	0.18	0.29	32.2
8	T1	256	2.0	0.278	6.5	LOS A	1.2	30.5	0.29	0.18	0.29	32.6
18	R2	1	0.0	0.278	6.4	LOS A	1.2	30.5	0.29	0.18	0.29	32.1
Approach		273	2.3	0.278	6.5	LOS A	1.2	30.5	0.29	0.18	0.29	32.6
East: N 195 St												
1	L2	7	0.0	0.112	5.4	LOS A	0.4	10.0	0.39	0.30	0.39	32.9
6	T1	23	5.0	0.112	5.6	LOS A	0.4	10.0	0.39	0.30	0.39	32.9
16	R2	61	2.0	0.112	5.5	LOS A	0.4	10.0	0.39	0.30	0.39	32.5
Approach		92	2.6	0.112	5.5	LOS A	0.4	10.0	0.39	0.30	0.39	32.6
North: N Miami Ave												
7	L2	52	6.0	0.476	9.0	LOS A	2.8	72.0	0.24	0.11	0.24	31.1
4	T1	435	1.0	0.476	8.8	LOS A	2.8	72.0	0.24	0.11	0.24	31.5
14	R2	18	6.0	0.476	9.0	LOS A	2.8	72.0	0.24	0.11	0.24	30.8
Approach		504	1.7	0.476	8.8	LOS A	2.8	72.0	0.24	0.11	0.24	31.4
West: N 195 St												
5	L2	17	0.0	0.131	6.7	LOS A	0.5	11.4	0.50	0.47	0.50	32.1
2	T1	48	2.0	0.131	6.8	LOS A	0.5	11.4	0.50	0.47	0.50	32.2
12	R2	23	0.0	0.131	6.7	LOS A	0.5	11.4	0.50	0.47	0.50	31.8
Approach		88	1.1	0.131	6.8	LOS A	0.5	11.4	0.50	0.47	0.50	32.1
All Vehicles		957	1.9	0.476	7.7	LOS A	2.8	72.0	0.29	0.18	0.29	31.9

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [N Miami Ave & N 195 St_Existing PM]

Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: N Miami Ave												
3	L2	8	0.0	0.558	11.4	LOS B	3.7	92.0	0.53	0.42	0.55	30.3
8	T1	506	0.0	0.558	11.4	LOS B	3.7	92.0	0.53	0.42	0.55	30.5
18	R2	5	0.0	0.558	11.4	LOS B	3.7	92.0	0.53	0.42	0.55	30.0
Approach		520	0.0	0.558	11.4	LOS B	3.7	92.0	0.53	0.42	0.55	30.5
East: N 195 St												
1	L2	1	0.0	0.321	10.2	LOS B	1.3	32.3	0.61	0.62	0.65	30.8
6	T1	43	0.0	0.321	10.2	LOS B	1.3	32.3	0.61	0.62	0.65	31.0
16	R2	152	1.0	0.321	10.3	LOS B	1.3	32.3	0.61	0.62	0.65	30.5
Approach		196	0.8	0.321	10.3	LOS B	1.3	32.3	0.61	0.62	0.65	30.6
North: N Miami Ave												
7	L2	53	0.0	0.441	8.2	LOS A	2.5	63.1	0.24	0.11	0.24	31.5
4	T1	398	1.0	0.441	8.2	LOS A	2.5	63.1	0.24	0.11	0.24	31.7
14	R2	18	0.0	0.441	8.2	LOS A	2.5	63.1	0.24	0.11	0.24	31.2
Approach		468	0.8	0.441	8.2	LOS A	2.5	63.1	0.24	0.11	0.24	31.7
West: N 195 St												
5	L2	95	0.0	0.219	7.5	LOS A	0.8	20.6	0.51	0.49	0.51	31.1
2	T1	44	2.0	0.219	7.6	LOS A	0.8	20.6	0.51	0.49	0.51	31.2
12	R2	17	0.0	0.219	7.5	LOS A	0.8	20.6	0.51	0.49	0.51	30.8
Approach		156	0.6	0.219	7.6	LOS A	0.8	20.6	0.51	0.49	0.51	31.1
All Vehicles		1340	0.5	0.558	9.7	LOS A	3.7	92.0	0.44	0.35	0.45	31.0

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [N Miami Ave & N 195 St_2025 AM]

Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: N Miami Ave												
3	L2	17	7.0	0.292	6.8	LOS A	1.3	32.4	0.30	0.19	0.30	32.1
8	T1	266	2.0	0.292	6.7	LOS A	1.3	32.4	0.30	0.19	0.30	32.5
18	R2	1	0.0	0.292	6.6	LOS A	1.3	32.4	0.30	0.19	0.30	32.0
Approach		284	2.3	0.292	6.7	LOS A	1.3	32.4	0.30	0.19	0.30	32.5
East: N 195 St												
1	L2	7	0.0	0.117	5.5	LOS A	0.4	10.5	0.40	0.31	0.40	32.8
6	T1	24	5.0	0.117	5.7	LOS A	0.4	10.5	0.40	0.31	0.40	32.9
16	R2	63	2.0	0.117	5.6	LOS A	0.4	10.5	0.40	0.31	0.40	32.4
Approach		95	2.6	0.117	5.6	LOS A	0.4	10.5	0.40	0.31	0.40	32.6
North: N Miami Ave												
7	L2	54	6.0	0.497	9.4	LOS A	3.1	77.8	0.25	0.12	0.25	30.9
4	T1	453	1.0	0.497	9.2	LOS A	3.1	77.8	0.25	0.12	0.25	31.3
14	R2	19	6.0	0.497	9.4	LOS A	3.1	77.8	0.25	0.12	0.25	30.7
Approach		525	1.7	0.497	9.2	LOS A	3.1	77.8	0.25	0.12	0.25	31.2
West: N 195 St												
5	L2	18	0.0	0.140	6.9	LOS A	0.5	12.3	0.51	0.49	0.51	32.0
2	T1	51	2.0	0.140	7.0	LOS A	0.5	12.3	0.51	0.49	0.51	32.1
12	R2	24	0.0	0.140	6.9	LOS A	0.5	12.3	0.51	0.49	0.51	31.7
Approach		93	1.1	0.140	7.0	LOS A	0.5	12.3	0.51	0.49	0.51	32.0
All Vehicles		997	1.9	0.497	7.9	LOS A	3.1	77.8	0.30	0.19	0.30	31.8

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [N Miami Ave & N 195 St_2025 PM]

Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: N Miami Ave												
3	L2	8	0.0	0.584	12.1	LOS B	4.8	121.0	0.56	0.50	0.67	30.0
8	T1	526	0.0	0.584	12.1	LOS B	4.8	121.0	0.56	0.50	0.67	30.2
18	R2	5	0.0	0.584	12.1	LOS B	4.8	121.0	0.56	0.50	0.67	29.8
Approach		540	0.0	0.584	12.1	LOS B	4.8	121.0	0.56	0.50	0.67	30.2
East: N 195 St												
1	L2	1	0.0	0.343	10.8	LOS B	1.4	36.3	0.62	0.65	0.72	30.5
6	T1	45	0.0	0.343	10.8	LOS B	1.4	36.3	0.62	0.65	0.72	30.7
16	R2	158	1.0	0.343	10.9	LOS B	1.4	36.3	0.62	0.65	0.72	30.2
Approach		204	0.8	0.343	10.9	LOS B	1.4	36.3	0.62	0.65	0.72	30.3
North: N Miami Ave												
7	L2	55	0.0	0.459	8.5	LOS A	2.7	67.7	0.25	0.12	0.25	31.4
4	T1	414	1.0	0.459	8.5	LOS A	2.7	67.7	0.25	0.12	0.25	31.6
14	R2	19	0.0	0.459	8.5	LOS A	2.7	67.7	0.25	0.12	0.25	31.1
Approach		487	0.8	0.459	8.5	LOS A	2.7	67.7	0.25	0.12	0.25	31.5
West: N 195 St												
5	L2	99	0.0	0.233	7.8	LOS A	0.9	22.1	0.53	0.51	0.53	31.0
2	T1	46	2.0	0.233	7.9	LOS A	0.9	22.1	0.53	0.51	0.53	31.1
12	R2	18	0.0	0.233	7.8	LOS A	0.9	22.1	0.53	0.51	0.53	30.7
Approach		163	0.6	0.233	7.9	LOS A	0.9	22.1	0.53	0.51	0.53	31.0
All Vehicles		1395	0.5	0.584	10.2	LOS B	4.8	121.0	0.46	0.39	0.51	30.8

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [N Miami Ave & N 195 St_2045 AM]

Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: N Miami Ave												
3	L2	20	7.0	0.355	7.8	LOS A	1.7	42.1	0.36	0.24	0.36	31.7
8	T1	317	2.0	0.355	7.6	LOS A	1.7	42.1	0.36	0.24	0.36	32.1
18	R2	1	0.0	0.355	7.6	LOS A	1.7	42.1	0.36	0.24	0.36	31.6
Approach		338	2.3	0.355	7.6	LOS A	1.7	42.1	0.36	0.24	0.36	32.0
East: N 195 St												
1	L2	9	0.0	0.149	6.2	LOS A	0.5	13.5	0.44	0.38	0.44	32.5
6	T1	28	5.0	0.149	6.4	LOS A	0.5	13.5	0.44	0.38	0.44	32.5
16	R2	76	2.0	0.149	6.2	LOS A	0.5	13.5	0.44	0.38	0.44	32.1
Approach		114	2.6	0.149	6.3	LOS A	0.5	13.5	0.44	0.38	0.44	32.2
North: N Miami Ave												
7	L2	64	6.0	0.598	11.6	LOS B	4.4	112.0	0.33	0.17	0.33	30.0
4	T1	539	1.0	0.598	11.4	LOS B	4.4	112.0	0.33	0.17	0.33	30.4
14	R2	22	6.0	0.598	11.6	LOS B	4.4	112.0	0.33	0.17	0.33	29.8
Approach		625	1.7	0.598	11.4	LOS B	4.4	112.0	0.33	0.17	0.33	30.3
West: N 195 St												
5	L2	21	0.0	0.182	8.2	LOS A	0.6	16.1	0.56	0.56	0.56	31.4
2	T1	60	2.0	0.182	8.3	LOS A	0.6	16.1	0.56	0.56	0.56	31.6
12	R2	28	0.0	0.182	8.2	LOS A	0.6	16.1	0.56	0.56	0.56	31.1
Approach		109	1.1	0.182	8.2	LOS A	0.6	16.1	0.56	0.56	0.56	31.4
All Vehicles		1186	1.9	0.598	9.6	LOS A	4.4	112.0	0.37	0.25	0.37	31.1

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

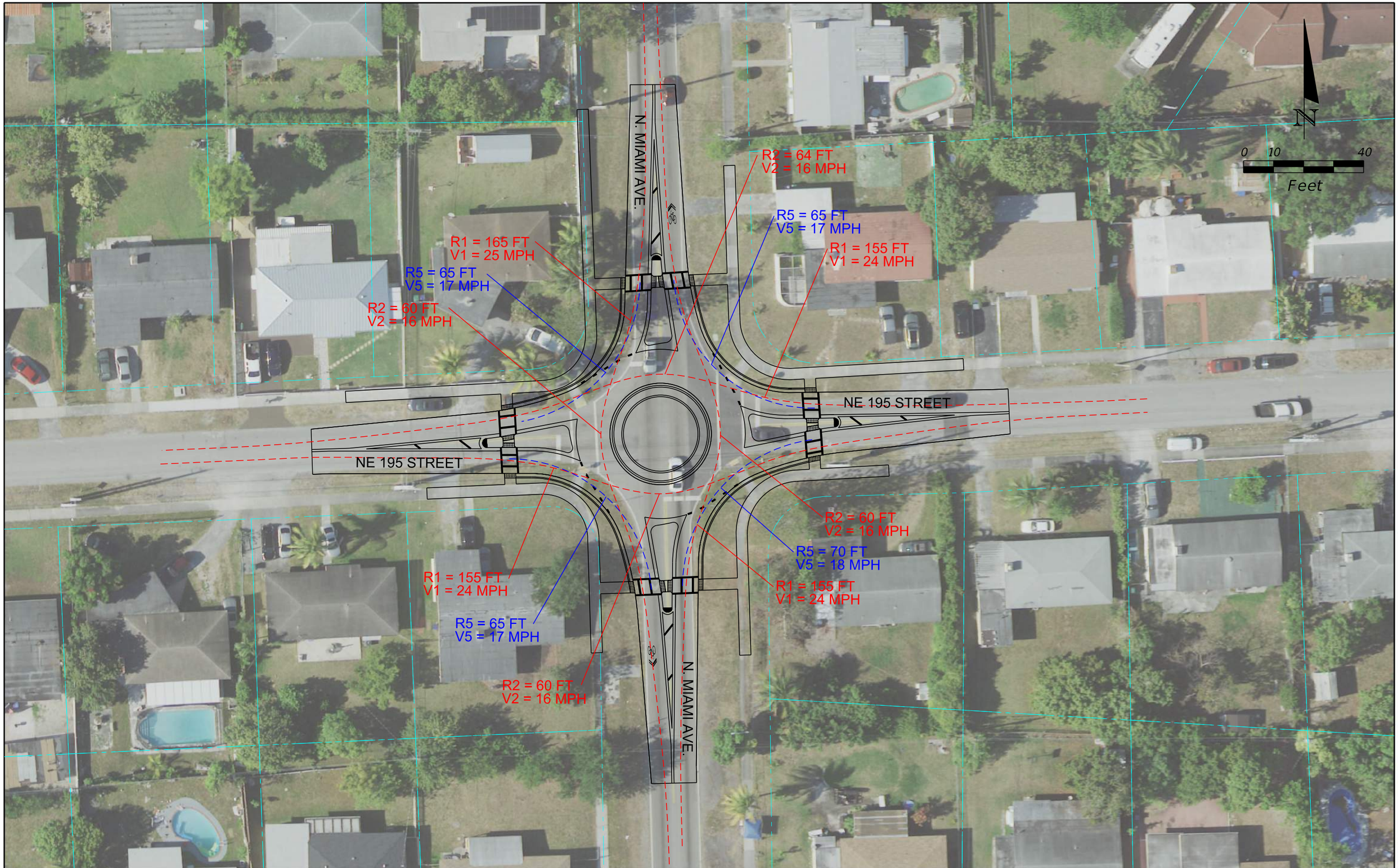
Site: 101 [N Miami Ave & N 195 St_2045 PM]

Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: N Miami Ave												
3	L2	11	0.0	0.724	17.5	LOS C	12.0	299.8	0.75	0.90	1.32	28.0
8	T1	627	0.0	0.724	17.5	LOS C	12.0	299.8	0.75	0.90	1.32	28.2
18	R2	6	0.0	0.724	17.5	LOS C	12.0	299.8	0.75	0.90	1.32	27.8
Approach		644	0.0	0.724	17.5	LOS C	12.0	299.8	0.75	0.90	1.32	28.2
East: N 195 St												
1	L2	1	0.0	0.462	14.8	LOS B	2.3	58.8	0.69	0.80	1.03	28.9
6	T1	54	0.0	0.462	14.8	LOS B	2.3	58.8	0.69	0.80	1.03	29.1
16	R2	188	1.0	0.462	14.9	LOS B	2.3	58.8	0.69	0.80	1.03	28.7
Approach		243	0.8	0.462	14.9	LOS B	2.3	58.8	0.69	0.80	1.03	28.8
North: N Miami Ave												
7	L2	65	0.0	0.554	10.3	LOS B	3.8	95.5	0.32	0.16	0.32	30.6
4	T1	494	1.0	0.554	10.4	LOS B	3.8	95.5	0.32	0.16	0.32	30.8
14	R2	22	0.0	0.554	10.3	LOS B	3.8	95.5	0.32	0.16	0.32	30.3
Approach		581	0.8	0.554	10.4	LOS B	3.8	95.5	0.32	0.16	0.32	30.7
West: N 195 St												
5	L2	118	0.0	0.303	9.6	LOS A	1.2	29.4	0.59	0.59	0.59	30.2
2	T1	55	2.0	0.303	9.7	LOS A	1.2	29.4	0.59	0.59	0.59	30.4
12	R2	21	0.0	0.303	9.6	LOS A	1.2	29.4	0.59	0.59	0.59	30.0
Approach		194	0.6	0.303	9.6	LOS A	1.2	29.4	0.59	0.59	0.59	30.2
All Vehicles		1662	0.5	0.724	13.7	LOS B	12.0	299.8	0.57	0.59	0.84	29.3

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

APPENDIX H. DESIGN CHECKS



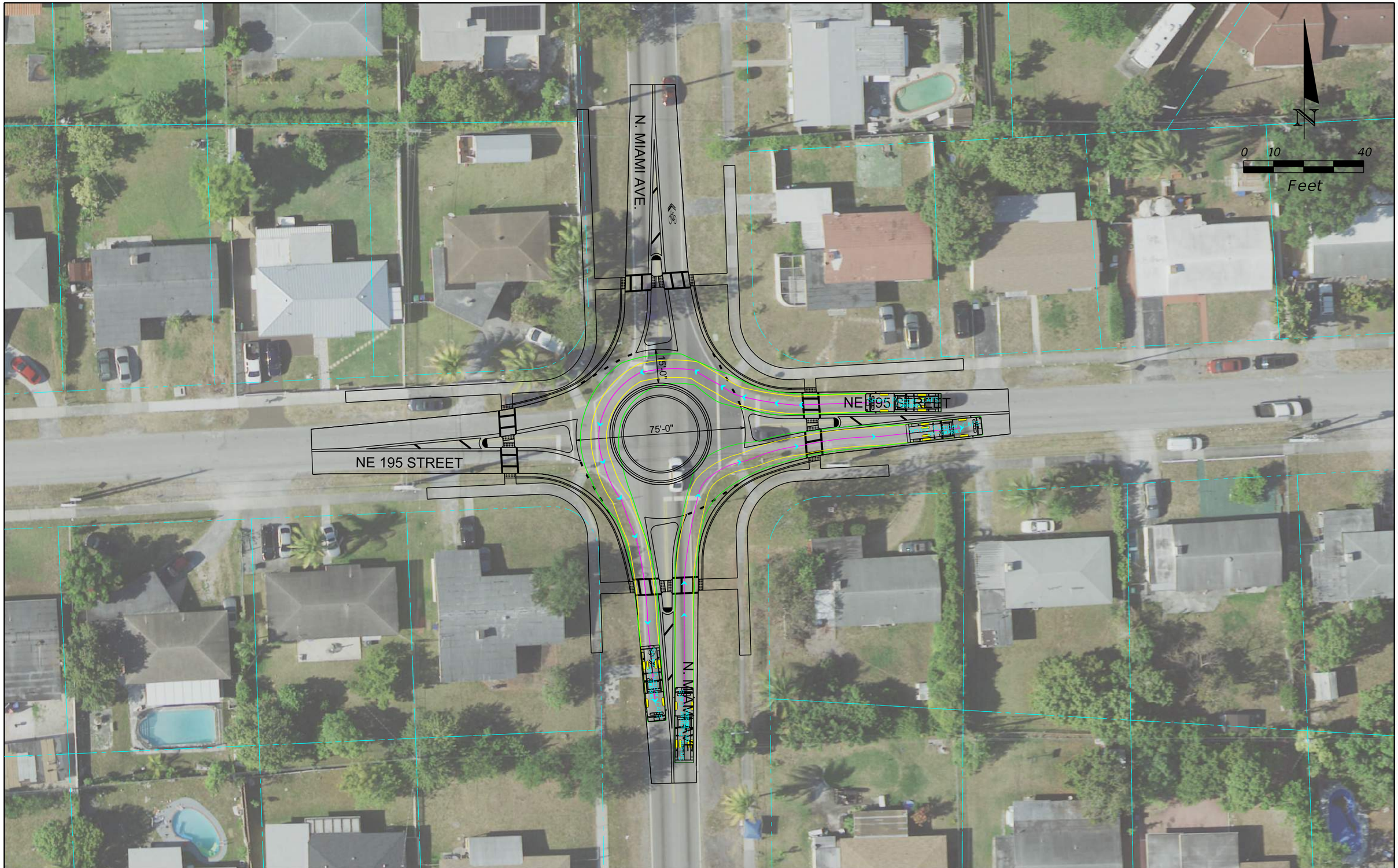
REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

TPO Miami-Dade Transportation Planning Organization

MIAMI-DADE TRANSPORTATION PLANNING ORGANIZATION

N. MIAMI AVE. & NE 195 STREET ROUNDABOUT CONCEPT FASTEST PATHS

FIGURE NO.



REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

TPO Miami-Dade Transportation Planning Organization

MIAMI-DADE
TRANSPORTATION PLANNING ORGANIZATION

N. MIAMI AVE. & NE 195 STREET ROUNDABOUT CONCEPT TURNING MOVEMENTS (33'-6" FIRE TANKER)

FIGURE NO.

APPENDIX I. OPINION OF PROBABLE COST

N Miami Avenue at NE 195 Street

Miami-Dade TPO

Conceptual Roundabout Design

KITTELSON & ASSOCIATES

Engineer's Opinion of Probable Cost - Conceptual Improvements

Prepared By: Brandon W. Kelley — *Date: May 25, 2021*

	PAY ITEM	DESCRIPTION	UNIT	TOTAL QUANTITY	UNIT PRICE	TOTAL COST
		SECTION 1: ROADWAY				
1	0110 1 1	Clearing & Grubbing	AC	0.10	$20,613.10	$2,061.31
2	0110 4 10	Removal of Existing Concrete	SY	155.00	$15.05	$2,332.75
3	0120 6	Excavation	CY	312.00	$15.21	$4,745.52
4	0160 4	Type B Stabilization	SY	416.00	$3.97	$1,544.33
5	285709	Optional Base, Base Group 09	SY	346.00	$23.68	$8,193.28
6	0327 70 5	Milling Existing Asphalt Pavement, 2" Avg Depth	SY	1600.00	$1.98	$3,168.00
7	0334 1 52	Superpave Asphaltic Concrete, Traffic B, PG 76-22	TN	109.00	$130.00	$14,170.00
8	0337-7-80	Asph Conc FC, Traffic B, FC-9.5, PG 76-22	TN	109.00	$219.69	$23,946.21
9	350-30-13	Concrete Pavement for Roundabout Apron, 12" depth	SY	47.00	$218.34	$10,261.98
10	0520-1-10	Concrete Curb and Gutter, Type F	LF	309.00	$17.49	$5,404.41
11	0520-2-4	Concrete Curb, Type D	LF	109.00	$35.42	$3,860.78
12	0520-2-8	Concrete Curb and Gutter, Type RA	LF	142.00	$22.53	$3,199.26
13	520-70	Concrete Traffic Separator, Special, Variable Width	SY	112.00	$177.30	$19,857.60
14	0522-1	Concrete Sidewalk and Driveways, 4"	SY	415.00	$32.84	$13,628.60
15	0527 2	Detectable Warnings	SF	160.00	$28.22	$4,515.20
16	0570-1-2	Performance Turf, SOD	SY	225.00	$3.72	$837.00
		SUBTOTAL ROADWAY				**$ 121,726**
		SECTION 2: STRIPING				
17	0710-11290	Painted Pavement Markings, Standard, Yellow, Island Nose	SF	24.00	$2.95	$70.80
18	0711-16-102	Thermoplastic, Standard - Other Surfaces, White, Solid, 6"	GM	0.20	$3,995.30	$799.06
19	0711-16-201	Thermoplastic, Standard - Other Surfaces, Yellow, Solid, 6"	GM	0.26	$3,993.45	$1,038.30
20	0711-11123	Thermoplastic, STD, White, Solid, 12" For Crosswalk and Roundabout	LF	180.00	$1.62	$291.60
21	0711-11125	Thermoplastic, STD, White, Solid, 24" For Stop Line and Crosswalk	LF	113.00	$3.51	$396.63
22	0711-11224	Thermoplastic, STD, Yellow, Solid, 18" For Diagonals or Crosswalk	LF	40.00	$2.42	$96.80
23	0711 11144	Thermoplastic, Standard, White, 2-2 Dotted Extension Line, 12" for Roundabout	GM	0.02	$4,150.00	$83.00
24	0711 11160	Thermoplastic, Standard, White, Message or Symbol	EA	2.00	$114.72	$229.44
		SUBTOTAL STRIPING				**$ 3,006**
		SECTION 3: SIGNING				
25	0700 1 11	Single Post Sign, F&I Ground Mount, Up to 12 SF	EA	20.00	$299.42	$5,988.40
26	0700 1 60	Single Post Sign, Remove	EA	6.00	$18.93	$113.58
		SUBTOTAL SIGNING				**$ 6,102**
		SECTION 4: UTILITIES				
27		Fiber Location Pole, Relocate (Includes Fiber Relocation Allowance)	EA	1.00	$5,000.00	$5,000.00
28	1080 24500	Utility Fixture, Valve Assembly, Adjust/Modify	EA	3.00	$358.08	$1,074.24
29	0635 3 12	Junction Box, Furnish & Install, Embedded	EA	3.00	$373.40	$1,120.20
		SUBTOTAL DRAINAGE				**$ 7,194**
		SECTION 5: ADDITIONAL MODIFICATIONS				
30		Sediment Barrier	LF	960.00	$1.18	$1,132.80
		SUBTOTAL ADDITIONAL MODIFICATIONS				**$ 1,133**
		SECTION 6: LIGHTING				
31		Intersection Lighting, 4 Light Pole Complete, F&I Standard Pole, 30' Mounting Height Including Connections/Wiring	LS	1.00	$30,000.00	$30,000.00
		SUBTOTAL ADDITIONAL MODIFICATIONS				**$ 30,000**
					SUBTOTAL SECTIONS 1 -6	**$ 169,161**
		SECTION 7: MAINTENANCE OF TRAFFIC				
32		Subtotal Sections 1-6	LS	15.00%	$25,374.16	$25,374.16
		SECTION 8: MOBILIZATION				
33		Subtotal Sections 1-6	LS	20.00%	$33,832.22	$33,832.22
					ESTIMATED CONSTRUCTION COSTS	**$ 228,367**
					30% CONTINGENCY	**$ 68,520**
					TOTAL ESTIMATED CONSTRUCTION COSTS	**$ 296,887**
		CAPITAL SUPPORT COSTS				
34		Project Engineering	LS	25%	$ 296,887	$74,230.00
35		Construction Support / Construction Management	LS	15%	$ 296,887	$44,540.00
36		Post Design	LS	8%	$ 296,887	$23,760.00
					TOTAL ESTIMATE CAPITAL SUPPORT COSTS	**$ 142,530**
					TOTAL PROJECT COST	**$ 439,417**

APPENDIX J. BENEFIT/COST ANALYSIS

Outputs

This sheet compiles the data from summary tables in individual alternatives sheets. To populate the output sheet press the "Setup Worksheets" button in the

Agency:	MD TPO
Project Name:	MD TPO Intersection Safety Analysis
Project Reference:	22756.32
Intersection:	N Miami Avenue and N 195 Street
City:	Miami
State:	Florida
Performing Department or Organization:	KAI
Date:	4/22/2021
Analyst:	RMM
Analysis Type	At-Grade Intersection

Analysis Summary

Cost Categories	Net Present Value of Costs		
	All Way Stop	Roundabout	
Planning, Construction & Right of Way Costs	$ -	$ 439,417	
Post-Opening Costs	$ 14,590	$ 72,952	
Auto Passenger Delay	$ 11,692,387	$ 3,692,498	
Truck Delay	$ 413,313	$ 130,525	
Safety	$ 5,783,991	$ 2,122,838	
Total cost	**$17,904,281**	**$6,458,229**	**Net Present Value of Benefits Relative to Base Case**

Select Base Case for Benefit-Cost Comparison: (Choose from list)	All Way Stop		
Benefit Categories	**Net Present Value of Benefits Relative to Base Case**		
	All Way Stop	**Roundabout**	
Auto Passenger Delay		$ 7,999,889	
Truck Delay		$ 282,788	
Safety		$ 3,661,153	
Net Present Value of Benefits		**$ 11,943,830**	
Net Present Value of Costs		**$ 497,778**	
Net Present Value of Improvement		**$ 11,446,052**	
Benefit-Cost (B/C) Ratio		**23.99**	
Delay B/C		**16.64**	
Safety B/C		**7.35**	

APPENDIX K. FDOT ELECTRONIC REVIEW COMMENTS (ERC)

Submittal Report

Financial Project:	249796-8-32-01	Submittal Type:	SAFETY REPORT
Submittal Phase:	OTHER	Submittal Staff Type:	CONSULTANT
Received Date:	5/7/2021	Response Due Date:	5/24/2021
Grace Period:	0	District:	SIXTH
Status:	OPEN	Create Date:	5/7/2021
Create User Id:	RD652NP	Last Update:	5/7/2021
		Last Update User Id:	RD652NP

Description:

249796-8: TWO 32 _N Miami Avenue and N 195 Street Intersection Safety Analysis_20210506
Group: PRELIMINARY ENGINEERING Phase Review Type: Safety Study
Status: Submitted
Phase Initiation Date: 5/7/2021
Comments Due Date: 5/21/2021 Days Allowed for Review: 15
Review Meeting: 5/24/2021 8:30 PM to 8:45 PM @ No review needed
Field Meeting:
Plans Format: Electronic
Comments: Please have Benazir Portal as the PM for responses. bportal@kittelson.com
Direct: 954.653.5634
Please add Ryan Mansfield as a Designer to respond to comments.
rmansfield@kittelson.com
Direct: 407.373.1136

Threads:

Name	Assignment	Due Date	Status	Comments
Alejandro Almaguer	REVIEWER	5/21/2021	ACTIVE	0
Name	**Assignment**	**Due Date**	**Status**	**Comments**
Alejandro Casals	LEAD REVIEWER	5/21/2021	ACTIVE	0
Name	**Assignment**	**Due Date**	**Status**	**Comments**
Alejandro Gomez	LEAD REVIEWER	5/21/2021	ACTIVE	0
Name	**Assignment**	**Due Date**	**Status**	**Comments**
Amanda De Cun	REVIEWER	5/21/2021	ACTIVE	5

No	Status	Current Holder	Reference	Categories
5	COMMENT AGREED WITH		General	ENVIRONMENTAL MANAGEMENT OFF.

Created By	Created On	Version	Delegate For
Amanda De Cun	5/20/2021	1	

The class of action will be determined once the full scope of work and funding information is available.

Benazir Portal	5/24/2021	1	

Noted. No action needed in response to the comment at this study stage. Thank you.

No	Status	Current Holder	Reference	Categories
6	COMMENT AGREED WITH		General	ENVIRONMENTAL MANAGEMENT OFF.

Created By	Created On	Version	Delegate For
Amanda De Cun	5/20/2021	1	

Please be aware that this project location is within the consultation area for the Florida bonneted bat, which is listed as an endangered species. A field review may be warranted to determine if roosting and/or foraging habitat exists within the project corridor for any tree and/or bridge impacts, and coordination with the U.S. Fish and Wildlife Service may be required.

Benazir Portal	5/24/2021	1	

Noted. This comment will be addressed under the final design stage. Thank you.

No	Status	Current Holder	Reference	Categories
7	COMMENT AGREED WITH		General	ENVIRONMENTAL MANAGEMENT OFF.

Created By	Created On	Version	Delegate For
Amanda De Cun	5/20/2021	1	

Please be aware that this project is within the consultation area for the Everglade snail kite the Wood stork and may inhabit or migrate through the project area.

Benazir Portal	5/24/2021	1	

Noted. No future ROW impacts are anticipated with the proposed improvements. No action needed in response to the comment. Thank you.

No	Status	Current Holder	Reference	Categories
8	COMMENT AGREED WITH		General	ENVIRONMENTAL MANAGEMENT OFF.

Created By	Created On	Version	Delegate For
Amanda De Cun	5/20/2021	1	

Please be aware that this project is adjacent to the Section 4(f) property, Sierra Park. If any future work is proposed within the park, coordination with the Florida Department of Transportation's Office of Environmental Management (OEM) may be required.

Benazir Portal	5/24/2021	1	

No action needed in response to the comment. Thank you.

No	Status	Current Holder	Reference	Categories
9	COMMENT AGREED WITH		Contact Information	ENVIRONMENTAL MANAGEMENT OFF.

Created By	Created On	Version	Delegate For
Amanda De Cun	5/20/2021	1	

Should you have any questions or require clarification regarding these environmental comments, please contact Amanda De Cun at Amanda.DeCun@dot.state.fl.us.

Benazir Portal	5/24/2021	1	

No action needed in response to the comment. Thank you.

Name	Assignment	Due Date	Status	Comments
Amanda Montgomery	REVIEWER	5/21/2021	ACTIVE	2

No	Status	Current Holder	Reference	Categories
10	COMMENT AGREED WITH			ENVIRONMENTAL PERMITS

Created By	Created On	Version	Delegate For
Amanda Montgomery	5/21/2021	1	

No local, state, or federal environmental permits are anticipated based on the recommended scope of work.

Benazir Portal	5/24/2021	1	

Noted. No action needed in response to the comment. Thank you.

No	Status	Current Holder	Reference	Categories
11	COMMENT AGREED WITH			ENVIRONMENTAL PERMITS

Created By	Created On	Version	Delegate For
Amanda Montgomery	5/21/2021	1	

Please contact me at Amanda.Montgomery@dot.state.fl.us with any questions pertaining to environmental permits for this project.

Benazir Portal	5/24/2021	1	

No action needed in response to the comment. Thank you.

Name	Assignment	Due Date	Status	Comments
Antonette Adams	LEAD REVIEWER	5/21/2021	ACTIVE	0
Name	Assignment	Due Date	Status	Comments
Arturo Gomez	REVIEWER	5/21/2021	ACTIVE	0
Name	Assignment	Due Date	Status	Comments
Barbara J Culhane	LEAD REVIEWER	5/21/2021	ACTIVE	0
Name	Assignment	Due Date	Status	Comments

Barbara Russell	REVIEWER	5/21/2021	ACTIVE	0
Name	**Assignment**	**Due Date**	**Status**	**Comments**
Benazir Portal	CONSULTANT PROJECT MANAGER	5/24/2021	ACTIVE	0
Name	**Assignment**	**Due Date**	**Status**	**Comments**
Bencze Vajta	REVIEWER	5/21/2021	ACTIVE	0
Name	**Assignment**	**Due Date**	**Status**	**Comments**
Calvin Mason	LEAD REVIEWER	5/21/2021	ACTIVE	0*
Name	**Assignment**	**Due Date**	**Status**	**Comments**
Carlos Benitez	REVIEWER	5/21/2021	ACTIVE	0
Name	**Assignment**	**Due Date**	**Status**	**Comments**
Carlos Perez	REVIEWER	5/21/2021	ACTIVE	0
Name	**Assignment**	**Due Date**	**Status**	**Comments**
Carlos Perez	REVIEWER	5/21/2021	ACTIVE	0*
Name	**Assignment**	**Due Date**	**Status**	**Comments**
Christopher Tavella	REVIEWER	5/21/2021	ACTIVE	0*
Name	**Assignment**	**Due Date**	**Status**	**Comments**
Diana Peralta	REVIEWER	5/21/2021	ACTIVE	0*
Name	**Assignment**	**Due Date**	**Status**	**Comments**
Dima Poe	REVIEWER	5/21/2021	ACTIVE	6

No	Status	Current Holder	Reference	Categories
12	RESPONSE SUBMITTED	Dima Poe	Page 4	SAFETY,OTHER

Created By	Created On	Version	Delegate For
Dima Poe	5/21/2021	1	

Page 4: Bullet 2 under field observations states that all approached have wo stop signs. However, it appears from google image and from the existing condition diagram that the SB approach only has the one stop sign on the approach. This is important to note since that is the approach with the majority of the angle crashes and the left turn crash. Where sight triangles measured in the field, where there any obstructions on that approach? Are short term recommendations considered as part of this study?

Benazir Portal	6/23/2021	1

Noted. Existing conditions section has been updated accordingly. Sight distance triangles were not field verified. Phased / short-term improvements will be considered depending on the FY funding availability.

No	Status	Current Holder	Reference	Categories
13	COMMENT AGREED WITH		Page 11	SAFETY,OTHER

Created By	Created On	Version	Delegate For
Dima Poe	5/21/2021	1	

Page 11, Last sentence: Values within narrative do not match values in table, please revise.

Benazir Portal	5/24/2021	1

Noted. Report has been updated accordingly. Thank you.

No	Status	Current Holder	Reference	Categories
14	RESPONSE SUBMITTED	Dima Poe	Page 15	SAFETY,OTHER

Created By	Created On	Version	Delegate For
Dima Poe	5/21/2021	1	

Operational Analysis: Please consider conducting the analysis for the two scenarios (existing condition and roundabout) with the same software for consistency and comparability. Synchro should still allow for an HCM 2010 analysis/report if required.

Benazir Portal	5/24/2021	1

Understood. Please refer to Page 16 of the report for justification on the use of HCM 6th Edition versus SIDRA HCM 2010 results. No action needed in response to the comment. Thank you.

No	Status	Current Holder	Reference	Categories
15	RESPONSE SUBMITTED	Dima Poe	Page 17-Concept	SAFETY,OTHER

Created By	Created On	Version	Delegate For
Dima Poe	5/21/2021	1	

Page 17 (Sheet 7) - Conceptual Design: Please revise page number. Please consider adding the existing roadway features as a layer on the proposed conceptual design, this would greatly help in the review of the concept and easy identification of required relocations. Also, it is shown that crosswalks are being added on all approaches even those that do not currently have crosswalks; are these additional crosswalks warranted? Is there any lighting being proposed for the roundabout or crosswalks?

Benazir Portal	6/23/2021	1

Page numbers have been updated. Utilities needing relocation or adjustment are noted on the concept drawing.

Given the proposed configuration (mini-roundabout) is common best practice to add marked crosswalks to better delineate expected path for all road users. It is recommended having crosswalks at all four legs to provide safer crossings for all pedestrians.

Per County requirements, new projects are required to provide a sidewalk connections. For blocks without the existing crosswalk connection, it is required to add one concrete slab at a minimum.

No	Status	Current Holder	Reference	Categories
16	RESPONSE SUBMITTED	Dima Poe	Page 18	SAFETY,OTHER

Created By	Created On	Version	Delegate For
Dima Poe	5/21/2021	1	

Page 18 Opinion of Probable Cost: does the cost take into consideration the relocation of the utility pole?

Benazir Portal	5/24/2021	1

The relocation of the transmission line is not anticipated. No action needed in response to the comment. Thank you.

No	Status	Current Holder	Reference	Categories
17	RESPONSE SUBMITTED	Dima Poe	Page 20	SAFETY,OTHER

Created By	Created On	Version	Delegate For
Dima Poe	5/21/2021	1	

Page 20 Stakeholder coordination: At the end of bullet 2, there is a statement that there was a review of County proposed recommendation. Please provide what the County proposed recommendations were and if any were incorporated into the study's proposed conceptual design.

Benazir Portal	5/24/2021	1

The County's proposed recommendations included a variety of design adjustments which have been incorporated in the proposed concept improvements. No action needed in response to the comment. Thank you.

Name	Assignment	Due Date	Status	Comments
Dionne Richardson	LEAD REVIEWER	5/21/2021	ACTIVE	0*
Elio Espino	REVIEWER	5/21/2021	ACTIVE	0
Elisa Azcona	REVIEWER	5/21/2021	ACTIVE	0
Felipe Gonzalez	REVIEWER	5/21/2021	ACTIVE	0
Felix Hernandez	LEAD REVIEWER	5/21/2021	ACTIVE	0
Gustavo Firpi	REVIEWER	5/21/2021	ACTIVE	0*
Hailing Zhang	LEAD REVIEWER	5/21/2021	ACTIVE	0
Hector Hartmann	LEAD REVIEWER	5/21/2021	ACTIVE	0*
Javier Hurtado	REVIEWER	5/21/2021	ACTIVE	0

Name	Assignment	Due Date	Status	Comments
Javier Rodriguez	LEAD REVIEWER	5/21/2021	ACTIVE	0*

Name	Assignment	Due Date	Status	Comments
Jesus Perez	IN-HOUSE PROJECT MANAGER	5/21/2021	ACTIVE	0

Name	Assignment	Due Date	Status	Comments
Jinyan Lu	LEAD REVIEWER	5/21/2021	ACTIVE	0

Name	Assignment	Due Date	Status	Comments
JOHN MCWILLIAMS	REVIEWER	5/21/2021	ACTIVE	0*

Name	Assignment	Due Date	Status	Comments
Judy Solaun-Gonzalez	LEAD REVIEWER	5/21/2021	ACTIVE	0

Name	Assignment	Due Date	Status	Comments
Ken Jeffries	LEAD REVIEWER	5/21/2021	ACTIVE	0

Name	Assignment	Due Date	Status	Comments
Kirenia Borbolla	LEAD REVIEWER	5/21/2021	ACTIVE	0

Name	Assignment	Due Date	Status	Comments
Krish Dial	REVIEWER	5/21/2021	ACTIVE	0

Name	Assignment	Due Date	Status	Comments
Leonard Salazar	LEAD REVIEWER	5/21/2021	ACTIVE	0

Name	Assignment	Due Date	Status	Comments
Luis Lopez	REVIEWER	5/21/2021	ACTIVE	0

Name	Assignment	Due Date	Status	Comments
Marvin Guillen	REVIEWER	5/21/2021	ACTIVE	0

Name	Assignment	Due Date	Status	Comments
Mauricio Gomez	LEAD REVIEWER	5/21/2021	ACTIVE	0

Name	Assignment	Due Date	Status	Comments
Max Imberman	REVIEWER	5/21/2021	ACTIVE	1

No	Status	Current Holder	Reference	Categories
3	COMMENT AGREED WITH		General Comment	CULTURAL RESOURCES

Created By	Created On	Version	Delegate For
Max Imberman	5/20/2021	1	

The preliminary cultural review identified no archaeological or historic properties within the area recommended for improvements. The Planning and Environmental Management Office (PLEMO) will need to revisit this project during design once the full scope of work and funding information is available. This information is needed to confirm an area of potential effect (APE) and to determine the appropriate scope of coordination with state and/or federal agencies. If you have any questions or require clarification for these comments, please contact Max Adriel Imberman at 813-330-9111/ max_imberman@janus-research.com.

Created By	Created On	Version	Delegate For
Benazir Portal	5/24/2021	1	

Noted. No action needed in response to the comment at this study stage. Thank you.

Name	Assignment	Due Date	Status	Comments
Michael Hughes	REVIEWER	5/21/2021	ACTIVE	0*

Name	Assignment	Due Date	Status	Comments
Michael Miller	REVIEWER	5/21/2021	ACTIVE	1

No	Status	Current Holder	Reference	Categories
1	COMMENT AGREED WITH			CONTAMINATION

Created By	Created On	Version	Delegate For
Michael Miller	5/18/2021	1	

There are no documented contaminated sites within a 500-foot radius of the project corridor. Therefore, no contamination impacts are anticipated.

Created By	Created On	Version	Delegate For
Benazir Portal	5/24/2021	1	

Noted. No action needed in response to the comment. Thank you.

Name	Assignment	Due Date	Status	Comments
Mikhail Dubrovsky	LEAD REVIEWER	5/21/2021	ACTIVE	0

Name	Assignment	Due Date	Status	Comments
Pablo Orozco	LEAD REVIEWER	5/21/2021	ACTIVE	0

Name	Assignment	Due Date	Status	Comments
Paola Baez	REVIEWER	5/21/2021	ACTIVE	0*

Name	Assignment	Due Date	Status	Comments
Patrick Marchant	LEAD REVIEWER	5/21/2021	ACTIVE	0

Name	Assignment	Due Date	Status	Comments
Phil Steinmiller	REVIEWER	5/21/2021	ACTIVE	0*

Name	Assignment	Due Date	Status	Comments
Rafael Diaz	REVIEWER	5/21/2021	ACTIVE	0*

Name	Assignment	Due Date	Status	Comments
Rodrigo Ley	LEAD REVIEWER	5/21/2021	ACTIVE	0

Name	Assignment	Due Date	Status	Comments
Rudy Westerman	REVIEWER	5/21/2021	ACTIVE	1

No	Status	Current Holder	Reference	Categories
4	COMMENT AGREED WITH		General Comment	CULTURAL RESOURCES

Created By	Created On	Version	Delegate For
Rudy Westerman	5/20/2021	1	

My comments are contained within the comment entered by Max Imberman.

Created By	Created On	Version	Delegate For
Benazir Portal	5/24/2021	1	

Noted. No action needed in response to the comment. Thank you.

Name	Assignment	Due Date	Status	Comments
Ryan Mansfield	LEAD DESIGNER	5/24/2021	ACTIVE	0

Name	Assignment	Due Date	Status	Comments
Simon Gutierrez	REVIEWER	5/21/2021	ACTIVE	1

No	Status	Current Holder	Reference	Categories
2	COMMENT AGREED WITH			MAINTENANCE

Created By	Created On	Version	Delegate For
Simon Gutierrez	5/19/2021	1	

No comments since the report was for a section outside FDOT ROW

Created By	Created On	Version	Delegate For
Benazir Portal	5/24/2021	1	

Noted. No action needed in response to the comment. Thank you.

Name	Assignment	Due Date	Status	Comments
Simon Prilutsky	REVIEWER	5/21/2021	ACTIVE	0
Name	**Assignment**	**Due Date**	**Status**	**Comments**
Stefan Escanes	REVIEWER	5/21/2021	ACTIVE	0
Name	**Assignment**	**Due Date**	**Status**	**Comments**
Steven James	LEAD REVIEWER	5/21/2021	ACTIVE	0
Name	**Assignment**	**Due Date**	**Status**	**Comments**
Tiffany Gehrke	LEAD REVIEWER	5/21/2021	ACTIVE	0
Name	**Assignment**	**Due Date**	**Status**	**Comments**
X Negrin	LEAD REVIEWER	5/21/2021	ACTIVE	0*
Name	**Assignment**	**Due Date**	**Status**	**Comments**
Xiomara Nunez	LEAD REVIEWER	5/21/2021	ACTIVE	0
Name	**Assignment**	**Due Date**	**Status**	**Comments**
Yimy Perez	REVIEWER	5/21/2021	ACTIVE	0
Name	**Assignment**	**Due Date**	**Status**	**Comments**
Zachary Taylor	REVIEWER	5/21/2021	ACTIVE	0
Name	**Assignment**	**Due Date**	**Status**	**Comments**
Zurelys Perez De Alejo	LEAD REVIEWER	5/21/2021	ACTIVE	0