



TAMPA MOVES

# HABANA AVENUE

APPENDIX

Previous Studies

Speed Study

Traffic Analysis

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Mobility • Opportunity • Vision • Equity • Safety

# Access Management and Safety Study

## N. Habana Avenue at Hillsboro Plaza

### City of Tampa, Florida

City Contract Number: 16-D-62426

Work Order Number: 26

Prepared for:  
City of Tampa  
Transportation and Stormwater Services

Prepared by:  
Tindale Oliver

Tindale Oliver Project Number: 0290026-09.17

January 2018

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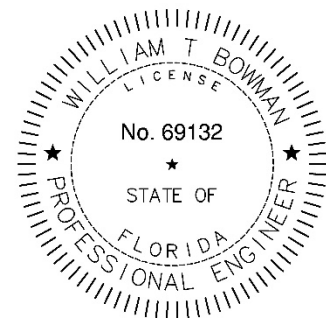
I, W.T. Bowman, P.E. #69132, certify that I currently hold an active Professional Engineers License in the State of Florida and am competent through education or experience to provide engineering services in the civil and traffic engineering disciplines contained in this plan, print, specification, or report.

I further certify that this operational analysis was prepared by me or under my responsible charge as defined in Chapter 61G15-18.001 F.A.C. and that all statements, conclusions and recommendations made herein are true and correct to the best of my knowledge and ability.

Study Roadway: N. Habana Avenue  
Project Start: South of Hillsboro Plaza  
Project End: W. Hillsborough Avenue  
Project Location: City of Tampa, FL

This item has been electronically signed and sealed by W. T. Bowman, P.E. on January 4 2018 using a digital signature.

Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies.





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## EXECUTIVE SUMMARY

This report documents the results of a safety, operational, and access review at the intersection of N. Habana Avenue and Hillsboro Plaza. The City of Tampa requested this analysis be undertaken to analyze and recommend strategies to mitigate safety and operational concerns at the Hillsboro Plaza driveway. The primary safety concerns at this location are angle and left-turn crashes for vehicles exiting the Plaza westbound, conflicting with northbound and southbound vehicles traveling along Habana Avenue. There is an additional conflict for southbound left-turning vehicles into the plaza, conflicting with northbound vehicles. It was identified that the primary cause of these patterns is northbound vehicles using the two-way left-turn lane as an extended left-turn lane for Hillsborough Avenue. Westbound exiting vehicles do not expect and do not have adequate sight distance to anticipate and avoid this hazard.

Based on an analysis of crash patterns, field operations, and evaluation of the adjacent signalized intersection at N. Habana Avenue and W. Hillsborough Avenue, the following actions are recommended:

- Create a raised separator to channelize the northbound left-turn lane along Habana Avenue at Hillsborough Avenue, creating a 300' left-turn lane.
- Prohibit the southbound left-turn from Habana Avenue into the Plaza driveway and require driveway traffic from the north to access the Plaza from eastbound Hillsborough Avenue.
- Provide marking and signage improvements to discourage drivers from blocking the Plaza driveway on N. Habana Avenue.

In the short term, these improvements should be implemented with raised delineators to verify that operations at the signal at N. Habana Avenue and W. Hillsborough Avenue will not be compromised consistent with the analysis for this study. After any adjustments (if necessary) are made, the project should then be advanced to permanent island construction, potentially as an application to the Florida Department of Transportation for Highway Safety Improvement Program (HSIP) funding.

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## 1. INTRODUCTION

Tindale Oliver conducted an operational, safety, and access analysis along N. Habana Avenue at Hillsboro Plaza in Tampa, as shown in Figure 1. The City of Tampa requested this analysis to review options and make recommendations to mitigate an existing safety issue at the Hillsboro Plaza driveway on the east side of N. Habana Avenue. Tindale Oliver undertook the following tasks for this analysis:

- Collected and reviewed PM peak-hour traffic count data at the intersection of Habana Avenue and Hillsborough Avenue.
- Collected driveway and side street PM peak-hour traffic counts at Habana Avenue and the Plaza entrance at Frierson Avenue and Giddens Avenue.
- Collected PM peak-period drone footage of the northbound approach of N. Habana Avenue at W. Hillsborough Avenue to review vehicle behavior and compare to the existing model for validation.
- Reviewed 2012 to 2016 crash data in the vicinity of the driveway, exclusive of the intersection with Hillsborough Avenue.
- Developed and validated an existing conditions Synchro model for N. Habana Avenue and Hillsborough Avenue.
- Made an improvement recommendation to enhance safety and minimize the impacts on operations.
- Developed a concept of the improvement and a preliminary cost estimate.
- Conducted a field review and analysis for constructability and feasibility of the proposed and selected options.
- Estimated Benefit:Cost (BC) and Net Present Value (NPV) based on the expected crash reduction of the improvement.
- Evaluated potential scenarios for feasibility and impacts to traffic operations for the northbound approach of Habana Avenue.



Figure 1: Hillsboro Plaza Study Area



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## 2. EXISTING CONDITIONS

### Roadway Features

Habana Avenue is a four-lane divided (two-way left-turn lane) roadway from Martin Luther King Junior Boulevard to W. Hillsborough Avenue. In the study area, Habana Avenue has a posted speed of 40 mph. At the signalized intersection with W. Hillsborough Avenue, northbound Habana Avenue has left-, through-, and right-turn lanes.

The Hillsboro Plaza intersection with Habana Avenue is located approximately 330 feet south of W. Hillsborough Avenue. Hillsboro Plaza has one eastbound receiving lane (ingress) and one westbound left-turn and right-turn lane (egress).

There are two bus stops south of Hillsboro Plaza on the east and west sides of Habana Avenue.

There are street lights in the vicinity of the Hillsboro Plaza driveway along Habana Avenue. The existing conditions are shown in Figure 2.

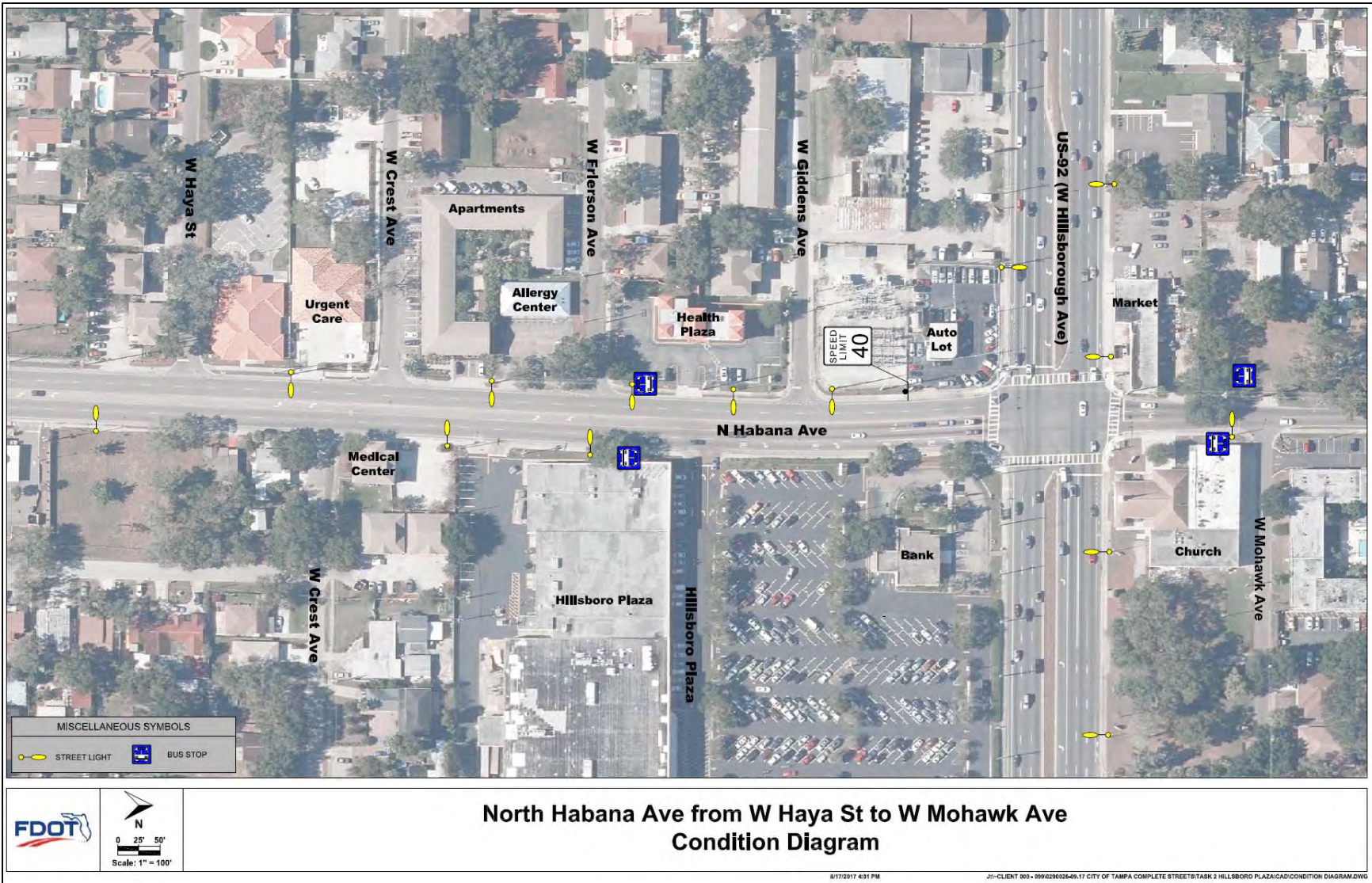


Figure 2: Existing Conditions Diagram

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## Traffic Volumes

For this analysis, the existing PM peak hour traffic conditions were analyzed since the PM peak period most closely corresponds with the peak trip generation of the shopping center. Existing traffic volumes were based on those collected in February 25, 2015, as part of FDOT District 7's Hillsborough Avenue Corridor Evaluation (HACE) from Memorial Highway to Nebraska Avenue. These were used for consistency with FDOT's analysis of this signalized intersection. Driveway volumes were collected for the PM peak period on July 11, 2017.

Upon conducting a field review and after reviewing drone surveillance, it was determined that the data from the HACE study likely overestimates the southbound through movement from north of Hillsborough Avenue along Habana Avenue. A review of the southbound vehicles from drone surveillance also seemed to confirm this assumption. Therefore, a manual adjustment was applied to the southbound through movements in developing traffic volumes for analysis. The adjusted volumes are shown in Figure 3. Raw data and adjustments are included in Appendix A.



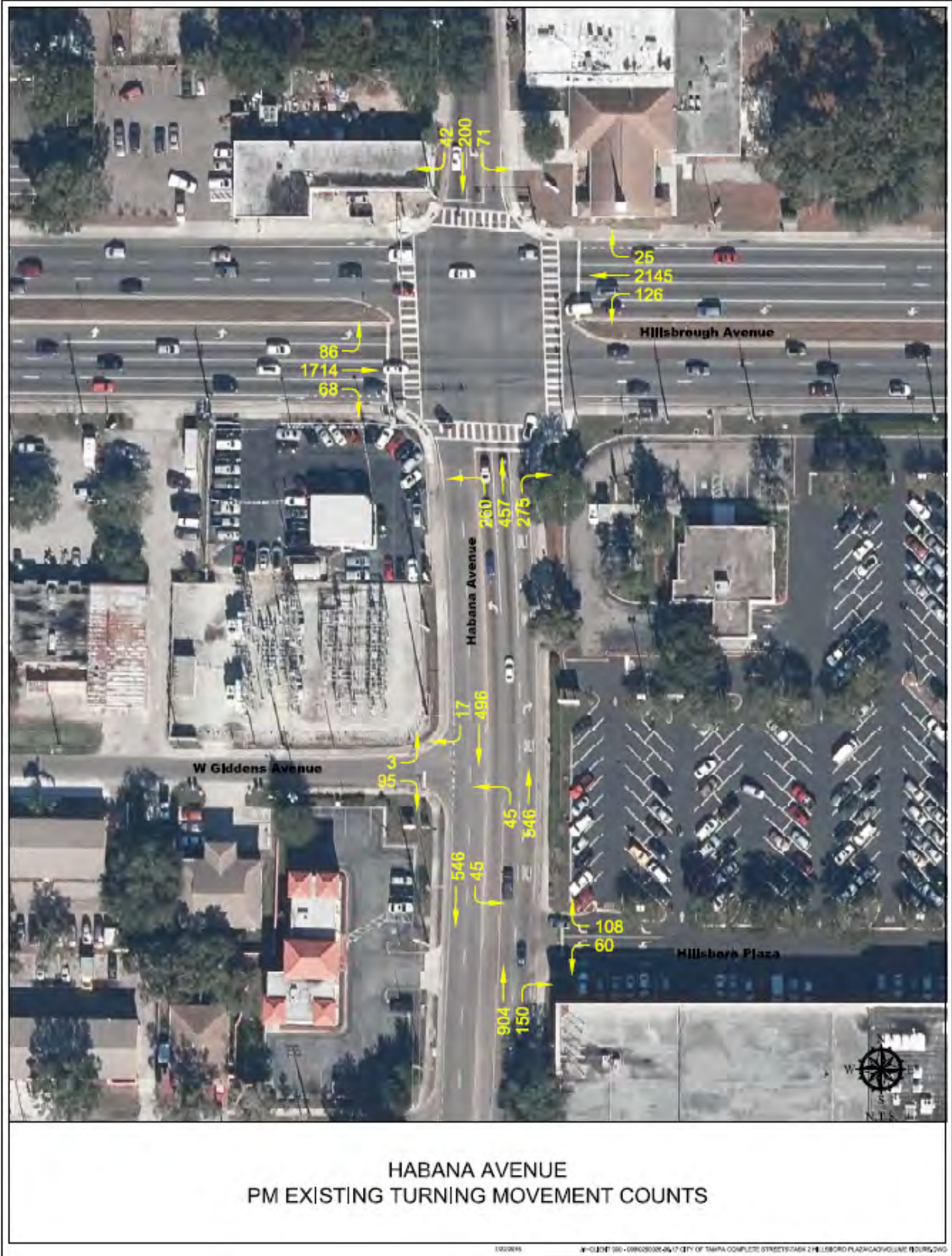


Figure 3: PM Peak-Hour Turning Movement Counts



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## Field Review

Field review was conducted on the afternoon of July 11<sup>th</sup> concurrent with TMC collection and drone video surveillance. Key observations include the following:

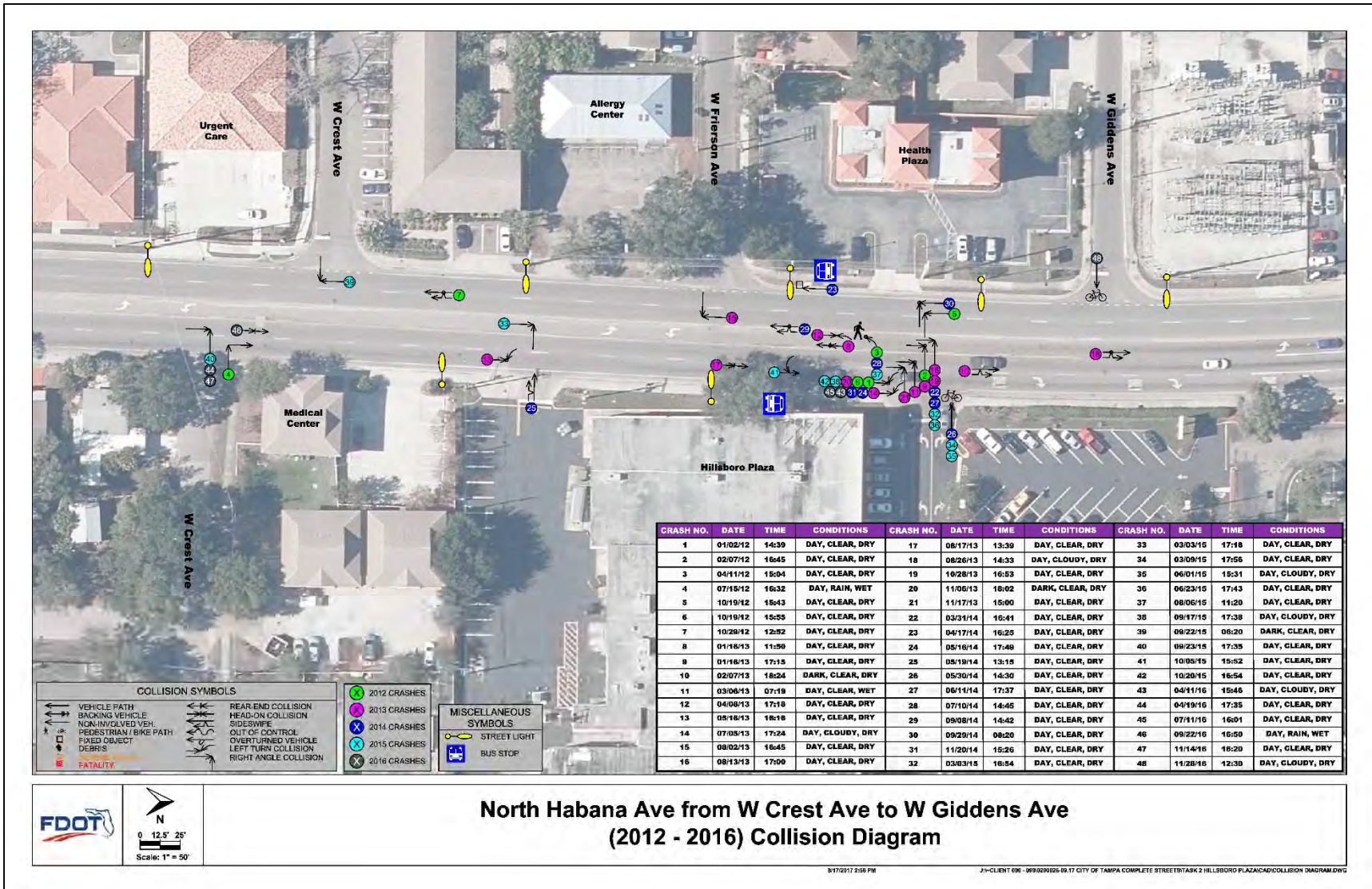
- Queues from northbound Habana Avenue at W. Hillsborough Avenue extended back through the Hillsboro Plaza driveway. This was more prevalent for the northbound thru and northbound left turn queue but occasionally the northbound right turn queue also extended back through the shopping center driveway.
- Drivers making westbound to southbound left turns exiting the shopping center frequently “nosed” through the standing queues. This sometimes resulted in frustration/honking from northbound traffic. The principal safety concern with this movement, however, is conflicts with southbound thru traffic.
- Drivers making southbound to eastbound left turns into the shopping center were also observed crossing thru the queues. The threat of rear-end crashes from southbound thru traffic is minimal because there are two southbound thru lanes and only one lane at any given time (eastbound right, southbound thru, westbound left) serving traffic onto the segment from W. Hillsborough Avenue, however, if FDOT proceeds with the HACE study concept to provide dual westbound left turn lanes at W. Hillsborough Avenue, this conflict could become more significant. A more immediate threat from this movement is with the northbound right turn lane which is more often free-flowing at the Hillsboro Plaza driveway.
- Drivers making westbound to northbound right turns seeking to access the northbound left turn lane also crossed through queues resulting in congestion and frustration at the driveway but no imminent safety threat.
- Drivers were observed making westbound to northbound right turns and then accessing the northbound left turn lane to turn onto N. Giddens Avenue. The destination of these drivers is unknown, however, it is reasonable to assume that they travelled south through the neighborhood.
- Pedestrians were observed crossing Habana Avenue in the influence area of W. Hillsborough Avenue and also to/from the bus stops immediately south of the Hillsboro Plaza driveway
- Parking operations in the throat of the Hillsboro Plaza driveway at times limited drivers ability to enter the driveway contributing to congestion on Habana Avenue
- Some southbound thru traffic appeared to be significantly exceeding the speed limit increasing the risk and potential severity of thru-the-queue crashes.

## 3. CRASH ANALYSIS

A five-year crash history (2012 to 2016) was reviewed in the vicinity of the study location. At the time of this analysis, the 2016 data were not considered official by the Department of Highway Safety and Motor Vehicles (DHSMV). Table 1 summarizes the crash data, and Figure 4 is a crash diagram.

**Table 1: Crash Summary**

Hillsboro Plaza at Habana Ave.		Crash Years					5 Year Total	Mean Crashes	%
		2012	2013	2014	2015	2016			
Crash Type	Angle	6	12	5	7	3	33	6.6	69%
	Front to Rear	0	1	0	1	2	4	0.8	8%
	Front to Front	0	0	0	0	0	0	0.0	0%
	Rear to Rear	0	0	0	0	0	0	0.0	0%
	Lost Control	0	0	0	0	0	0	0.0	0%
	Sideswipe, same direction	0	0	0	0	0	0	0.0	0%
	Pedestrian	1	0	1	1	0	3	0.6	6%
	Bicycle	0	0	1	2	1	4	3	8%
	Other, Explain in Narrative	0	0	2	0	0	2	0.4	4%
	No Data	0	0	1	0	0	1	0.2	2%
	Unknown	0	1	0	0	0	1	0.2	2%
<b>Total</b>	<b>7</b>	<b>14</b>	<b>10</b>	<b>11</b>	<b>6</b>	<b>48</b>	<b>9.6</b>	<b>100%</b>	
Injury Severity	Fatal	0	0	0	0	0	0	0.0	0%
	Incapacitating	0	0	0	0	0	0	0.0	0%
	NonIncapacitating	4	3	2	1	2	12	2.4	25%
	Possible Injury	1	4	4	3	0	12	2.4	25%
	None	2	7	4	7	4	24	4.8	50%
<b>Total</b>	<b>7</b>	<b>14</b>	<b>10</b>	<b>11</b>	<b>6</b>	<b>48</b>	<b>9.6</b>	<b>100%</b>	
Lighting Condition	Daylight	7	12	10	10	6	45	9.0	94%
	Dawn	0	0	0	0	0	0	0.0	0%
	Dusk	0	0	0	0	0	0	0.0	0%
	Dark-Lighted	0	2	0	1	0	3	0.6	6%
	Dark-Not Lighted	0	0	0	0	0	0	0.0	0%
	<b>Total</b>	<b>7</b>	<b>14</b>	<b>10</b>	<b>11</b>	<b>6</b>	<b>48</b>	<b>9.6</b>	<b>100%</b>
Surface Conditions	Dry	5	11	10	11	5	42	8.4	88%
	Unknown	0	1	0	0	0	1	0.2	2%
	Wet	2	2	0	0	1	5	1.0	10%
	<b>Total</b>	<b>7</b>	<b>14</b>	<b>10</b>	<b>11</b>	<b>6</b>	<b>48</b>	<b>9.6</b>	<b>100%</b>



North Habana Ave from W Crest Ave to W Giddens Ave  
(2012 - 2016) Collision Diagram

Figure 4: Collision Diagram (2012 to 2016)

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As shown, there is a concentration of certain crash types at the Hillsboro Plaza driveway:

- 10 westbound-to-northbound angle crashes (8 with vehicles using the two-way left-turn lane)
- 10 southbound-to-northbound left-turn crashes
- 2 westbound-to-southbound angle crashes
- 3 westbound left-turn to pedestrian crashes
- 3 westbound crashes with bicyclists

A detailed crash extract is provided in Appendix B.

For these key crash patterns, the detailed police report narratives were reviewed to identify any patterns as far as vehicular behavior. Several key observations were realized:

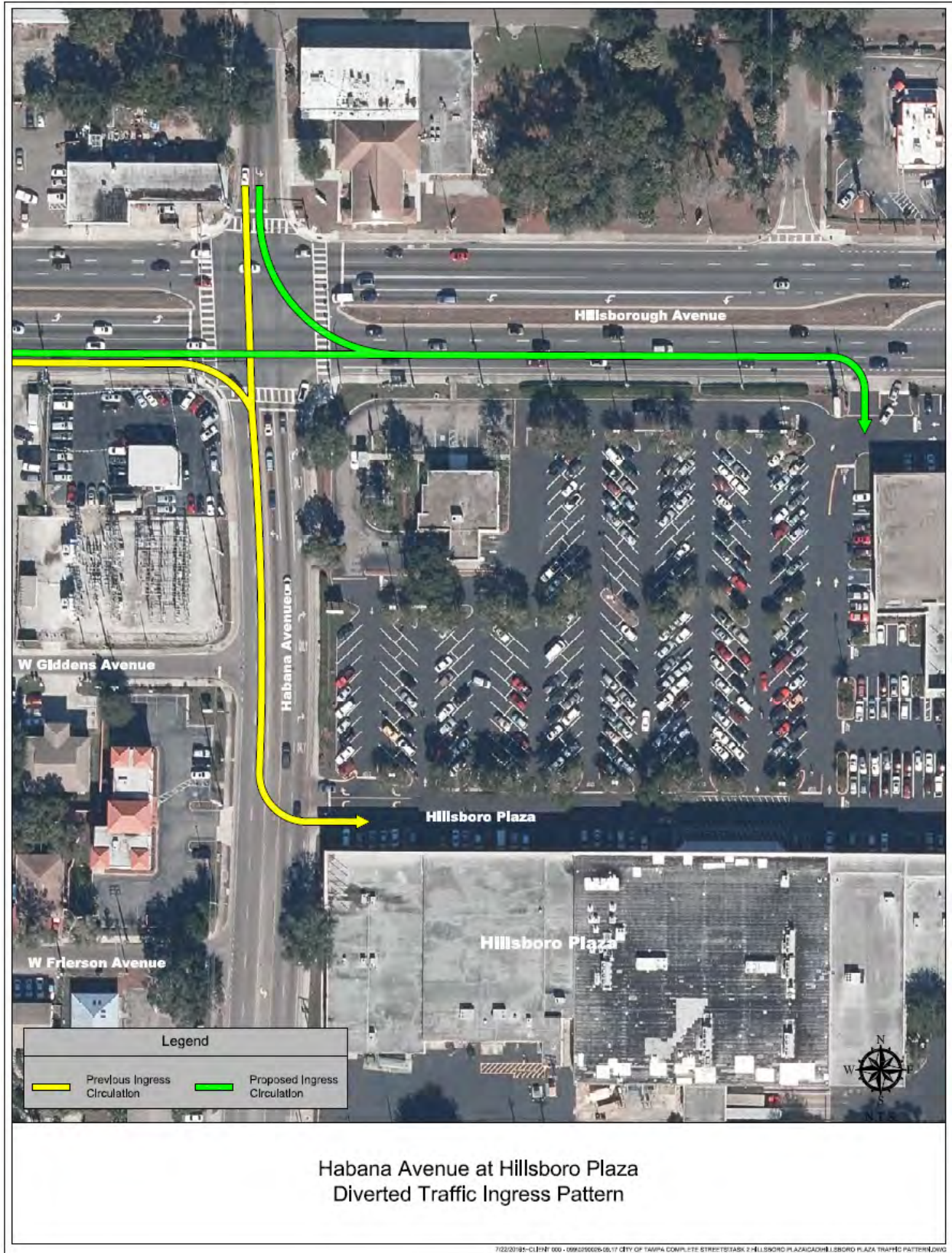
- For the westbound-to-northbound angle crashes, eight crashes were between vehicles attempting to make a westbound-to-southbound left turn and vehicles going northbound using the two-way left-turn lane, likely proceeding to make a left-turn at Hillsborough Avenue. Two crashes resulted in a serious injury.
- For the southbound-to-northbound left-turn crashes, all crashes involved a vehicle making a southbound left turn into the plaza; five crashes resulted in injury.

Based on the review of crash analysis, measures were identified to minimize these crash patterns.

Proposed strategies for consideration include:

- Prevent vehicles from using the two-way left-turn lane as an approach to Hillsborough Avenue by channelizing the northbound left-turn lane at Hillsborough Avenue north of the Hillsboro Plaza driveway. The westbound vehicles from the plaza do not have adequate sight distance or anticipation of this condition, particularly when there is a northbound queue in the through and right-turn lanes.
- Remove the southbound left-turn conflict with northbound vehicles by prohibiting the southbound left-turn movement. These vehicles would be able to access the plaza via the right-in/right-out driveway on Hillsborough Avenue east of Habana Avenue. This redistribution of traffic is shown in Figure 5.





7/22/2018 - CLIENT: 000 - 099250026-05.17 CITY OF TAMPA COMPLETE STREET TASK 2 HILLSBORO PLAZA GADSDEN HILLSBORO PLAZA TRAFFIC PATTERNING

Figure 5: Diverted Traffic Ingress Pattern

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## 4. OPERATIONAL ANALYSIS

As discussed, potential strategies were identified to mitigate crash issues. These improvements must consider potential impacts to the operation of the northbound approach to Hillsborough Avenue. Therefore, a Synchro model was developed, and SimTraffic micro-simulation was used to analyze the impacts of the improvement scenarios. The following were undertaken for the operational analysis:

- Develop a validated existing condition model using existing volumes and signal timing data.
- Review the following scenarios:
  - Split-phase northbound and southbound Habana Avenue and modify northbound lane use to a left-, shared left-through, and right-turn lane.
  - Create dual northbound left-turn lanes and shared through/right-turn lane.
  - Channelize northbound left-turn lane and provide 200' of storage.
  - Channelize northbound left-turn lane and provide 300' of storage.
  - Channelize northbound left-turn lane and provide 500' of storage.

For each of the analyzed scenarios, the cycle length remained unchanged, as did the splits for Hillsborough Avenue. Any analyzed improvements, therefore, would only introduce impacts or improvements to Habana Avenue and would not impact Hillsborough Avenue operation either at Habana Avenue or within the context of the coordinated system.

In addition, the movements into and out of the Hillsboro Plaza driveway were not included in the analysis. Synchro and SimTraffic do not effectively simulate actual interactions between vehicles at unsignalized locations within the influence area of a signalized intersection. In particular, it does not account for (or fully account for) drivers providing gaps for these movements. However, the impact on the driveway was reviewed and is discussed anecdotally herein.

### Existing Conditions

A model was developed for the existing PM peak-hour conditions. The model was then reviewed versus field observations and drone video to validate that the Synchro/SimTraffic model closely matched the existing operation. With the exception of the southbound movement, all approaches showed similar operational characteristics when comparing the model and field reviews, with the exception of the southbound movement. The existing model showed significant queuing for the southbound approach. However, field reviews and drone video indicated that the movement had minimal queuing and the signal was able to process demand on each cycle. Further review of the drone video revealed southbound vehicular volume to be less than that from the previous counts. Therefore, the adjusted southbound through volume was used in the simulation.

The key performance measures analyzed from an operational perspective were queuing, level of service (LOS), and v/c. Delay was not included as a key performance measure, as in this case it is more a function of cycle length than the ability of the intersection to process vehicles.

The existing conditions are summarized in Table 2 and Table 3, and detailed worksheets are provided in Appendix C.

**Table 2: Level of Service (LOS) Analysis – Existing Condition**

Habana Avenue at Hillsborough Avenue (PM Peak Hour)											
Baseline	Movement	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBTR	
	V/C Ratio	0.67	0.93	0.82	1.08	0.70	0.89	0.41	0.48	0.63	
	Delay (s)	102.0	64.7	115.3	103.1	54.9	83.4	56.4	58.8	72.9	
	LOS	F	E	F	F	D	F	E	E	E	
	Approach Delay (s)	66.4		103.8		68.5			69.7		
	Approach LOS	E		F		E			E		
	HCM 2000 Ctrl Delay	82.7									
	ICU	97.8%									
	HCM 2000 LOS	F									

**Table 3: Queuing Analysis**

Habana Avenue at Hillsborough Avenue (PM Peak Hour)						
Baseline	Movement	NBL	NBT	NBR	SBL	SBTR
	Maximum Queue (ft)	599	967	662	105	718
	Average Queue (ft)	272	546	168	71	387
	95th Queue (ft)	455	878	298	127	696
	<b>Storage Bay (ft)</b>	<b>1000</b>	-		<b>80</b>	-

As shown in Table 2, the northbound and southbound movements operate acceptably. Although delay, as a result of cycle length, results in LOS D and F, the v/c ratios of 0.89 and below indicate that the northbound and southbound movements are able to process during the cycle. This is consistent with the field observations.

### Scenario 1: Split Phase Operation

Scenario 1 modified the northbound lane use to a left-, left/through-, and right-turn lane. The shared left/through-lane necessitates split phase operation for the northbound and southbound approaches. As shown the following tables, this modification significantly increases the v/c ratio and queuing for the northbound and southbound through movements and approaches. Additionally, the resulting v/c ratios and inability of the signal to process the northbound movement results in significant queuing for the northbound approach. The analysis results are summarized in Table 4 and Table 5, and detailed worksheets are provided in the Appendix D.



Table 4: Level of Service (LOS) Analysis

Habana Avenue at Hillsborough Avenue (PM Peak Hour)											
Baseline	Movement	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBTR	
	V/C Ratio	0.67	0.93	0.82	1.08	0.70	0.89	0.41	0.48	0.63	
	Delay (s)	102.0	64.7	115.3	103.1	54.9	83.4	56.4	58.8	72.9	
	LOS	F	E	F	F	D	F	E	E	E	
	Approach Delay (s)	66.4		103.8		68.5			69.7		
	Approach LOS	E		F		E			E		
	HCM 2000 Ctrl Delay	82.7									
	ICU	97.8%									
	HCM 2000 LOS	F									

Habana Avenue at Hillsborough Avenue (PM Peak Hour)											
Scenario 1 Split phase (NB & SB)	Movement	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	
	V/C Ratio	0.67	0.90	0.82	1.05	0.86	1.68	0.72	0.27	0.88	
	Delay (s)	102.0	59.4	115.3	88.0	100.4	400.7	88.6	73.8	106.7	
	LOS	F	E	F	F	F	F	F	E	FK	
	Approach Delay (s)	61.3		89.5		243.2			99.3		
	Approach LOS	E		F		F			F		
	HCM 2000 Ctrl Delay	108.4									
	ICU	106.9%									
	HCM 2000 LOS	F									

Table 5: Queuing Analysis

Habana Avenue at Hillsborough Avenue (PM Peak Hour)						
Baseline	Movement	NBL	NBT	NBR	SBL	SBTR
	Maximum Queue (ft)	599	967	662	105	718
	Average Queue (ft)	272	546	168	71	387
	95th Queue (ft)	455	878	298	127	696
	Storage Bay (ft)	1000	-	-	80	-

Habana Avenue at Hillsborough Avenue (PM Peak Hour)						
Scenario 1 Split phase (NB & SB)	Movement	NBL	NBT	NBR	SBL	SBTR
	Maximum Queue (ft)	1050	2888	2891	105	900
	Average Queue (ft)	827	2362	2205	55	525
	95th Queue (ft)	1405	3687	3874	122	951
	Storage Bay (ft)	1000	-	-	80	-

*Due to the significant and unacceptable increase in v/c ratios and queuing, this improvement is not recommended.*

### Scenario 2: Dual Left-turn Lanes and Shared Through/Right-Turn Lane

Scenario 2 modified the northbound lane use to dual left-turn lanes and a shared through/right-turn lane. Although this improvement would allow for additional capacity (and less storage required) for the northbound left-turn movement, it was anticipated and verified that the movement would have significant impacts to the through and right-turn movements. As shown in

Table 6, this improvement is estimated to have significant adverse impacts to the northbound approach. Detailed worksheets are provided in Appendix D.



Table 6: Level of Service (LOS) Analysis

Habana Avenue at Hillsborough Avenue (PM Peak Hour)											
Baseline	Movement	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBTR	
	V/C Ratio	0.67	0.93	0.82	1.08	0.70	0.89	0.41	0.48	0.63	
	Delay (s)	102.0	64.7	115.3	103.1	54.9	83.4	56.4	58.8	72.9	
	LOS	F	E	F	F	D	F	E	E	E	
	Approach Delay (s)	66.4		103.8		68.5			69.7		
	Approach LOS	E		F		E			E		
	HCM 2000 Ctrl Delay	82.7									
	ICU	97.8%									
	HCM 2000 LOS	F									
	Habana Avenue at Hillsborough Avenue (PM Peak Hour)										
Scenario 2, Dual NB Lefts (200 ft), Shared thru-right	Movement	EBL	EBT	WBL	WBT	NBL	NBTR	SBL	SBT		
	V/C Ratio	0.67	0.93	0.82	1.08	0.75	1.47	0.61	0.57		
	Delay (s)	102.0	64.7	115.3	103.1	96.0	281.8	98.6	67.5		
	LOS	F	E	F	F	F	F	F	E		
	Approach Delay (s)	66.4		103.8		237.9			74.5		
	Approach LOS	E		F		F			E		
	HCM 2000 Ctrl Delay	113.7									
	ICU	108.5%									
	HCM 2000 LOS	F									

Table 7: Queuing Analysis

Habana Avenue at Hillsborough Avenue (PM Peak Hour)						
Baseline	Movement	NBL	NBT	NBR	SBL	SBTR
	Maximum Queue (ft)	599	967	662	105	718
	Average Queue (ft)	272	546	168	71	387
	95th Queue (ft)	455	878	298	127	696
	Storage Bay (ft)	1000	-	-	80	-
Habana Avenue at Hillsborough Avenue (PM Peak Hour)						
Scenario 2 Dual NB Left (200 ft), Shared thru-right	Movement	NBL	NBL	NBTR	SBL	SBTR
	Maximum Queue (ft)	136	250	2873	104	608
	Average Queue (ft)	8	36	2717	78	274
	95th Queue (ft)	57	166	3453	127	543
	Storage Bay (ft)	200	200	-	80	-

*Due to the significant and unacceptable impacts of this modification, it is not recommended.*

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### Scenario 3: Northbound Left-turn Channelization

As discussed, channelizing the northbound left-turn lane would prevent northbound vehicles from using the two-way left-turn lane to approach the intersection with Hillsborough Avenue. Removing this conflict would help mitigate westbound-to-northbound angle crashes. However, by channelizing the left-turn lane, there is potential to create queue spillback from the northbound left-turn lane into the northbound through-lane. This would result in increased congestion and queuing. The existing condition effectively provides an unlimited northbound left-turn lane. In the field, vehicles were observed queuing as far back as Crest Avenue, and the simulation model confirmed this. Therefore, the existing model assumed a 1000' northbound left-turn lane. This would allow the model to indicate what the demand would be in an unconstrained situation. Based on the existing condition, the maximum and average queuing for the northbound left-turn lane is estimated at 599' and 272', respectively.

Providing the maximum storage demonstrated in the simulation model may not be feasible, as channelizing for a distance of over 400' would impact driveways and side streets, eliminating left turns inbound and outbound. Therefore, several scenarios were reviewed:

- 200' northbound left-turn lane (would provide storage for southbound left-turn into Plaza)
- 300' northbound left-turn lane (would not provide storage for southbound left-turn lane but would provide for left turn outbound)
- 500' northbound left-turn lane (would not provide for left turns into or out of Plaza)

Performance measures for each of these are summarized in Table 8 and Table 9.

Table 8: Level of Service (LOS) Analysis

Habana Avenue at Hillsborough Avenue (PM Peak Hour)											
Baseline	Movement	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBTR	
	V/C Ratio	0.67	0.93	0.82	1.08	0.70	0.89	0.41	0.48	0.63	
	Delay (s)	102.0	64.7	115.3	103.1	54.9	83.4	56.4	58.8	72.9	
	LOS	F	E	F	F	D	F	E	E	E	
	Approach Delay (s)	66.4		103.8		68.5			69.7		
	Approach LOS	E		F		E			E		
	HCM 2000 Ctrl Delay	82.7									
	ICU	97.8%									
	HCM 2000 LOS	F									
Habana Avenue at Hillsborough Avenue (PM Peak Hour)											
Scenario 3 200 ft NBL	Movement	EBL	EBTR	WBL	WBTR	NBL	NBT	NBR	SBL	SBT	
	V/C Ratio	0.67	0.93	0.82	1.08	1.16	0.94	0.42	0.61	0.66	
	Delay (s)	102.0	64.7	115.3	103.1	195.8	95.3	59.0	98.6	75.4	
	LOS	F	E	F	F	F	F	E	F	E	
	Approach Delay (s)	66.4		103.8		111.6			80.6		
	Approach LOS	E		F		F			F		
	HCM 2000 Ctrl Delay	91.1									
	ICU	102.2%									
	HCM 2000 LOS	F									
Habana Avenue at Hillsborough Avenue (PM Peak Hour)											
Scenario 3 300 ft NBL	Movement	EBL	EBTR	WBL	WBTR	NBL	NBT	NBR	SBL	SBT	
	V/C Ratio	0.67	0.93	0.82	1.08	0.76	0.89	0.42	0.48	0.63	
	Delay (s)	102.0	64.7	115.3	103.1	54.9	83.4	56.4	58.8	72.9	
	LOS	F	E	F	F	D	F	E	E	E	
	Approach Delay (s)	66.4		103.8		68.5			69.7		
	Approach LOS	E		F		E			E		
	HCM 2000 Ctrl Delay	82.7									
	ICU	97.8%									
	HCM 2000 LOS	F									
Habana Avenue at Hillsborough Avenue (PM Peak Hour)											
Scenario 3 500 ft NBL	Movement	EBL	EBTR	WBL	WBTR	NBL	NBT	NBR	SBL	SBT	
	V/C Ratio	0.67	0.93	0.82	1.08	0.76	0.89	0.41	0.48	0.68	
	Delay (s)	102.0	64.7	115.3	103.1	54.9	83.4	56.4	58.8	72.9	
	LOS	F	E	F	F	D	F	E	E	E	
	Approach Delay (s)	66.4		103.8		68.5			69.7		
	Approach LOS	E		F		E			E		
	HCM 2000 Ctrl Delay	82.7									
	ICU	97.8%									
	HCM 2000 LOS	F									

Table 9: Queuing Analysis

Habana Avenue at Hillsborough Avenue (PM Peak Hour)						
Baseline	Movement	NBL	NBT	NBR	SBL	SBTR
	Maximum Queue (ft)	599	967	662	105	718
	Average Queue (ft)	272	546	168	71	387
	95th Queue (ft)	455	878	298	127	696
	<b>Storage Bay (ft)</b>	<b>1000</b>	-		<b>80</b>	-
Scenario 3 200 ft NBL	Movement	NBL	NBT	NBR	SBL	SBTR
	Maximum Queue (ft)	250	2893	2896	105	596
	Average Queue (ft)	231	2349	2106	79	338
	95th Queue (ft)	300	3600	3915	129	531
	<b>Storage Bay (ft)</b>	<b>200</b>	-		<b>80</b>	-
Scenario 3 300 ft NBL	Movement	NBL	NBT	NBR	SBL	SBTR
	Maximum Queue (ft)	349	1125	331	104	477
	Average Queue (ft)	323	958	162	87	346
	95th Queue (ft)	425	1432	408	133	551
	<b>Storage Bay (ft)</b>	<b>300</b>	-		<b>80</b>	-
Scenario 3 500 ft NBL	Movement	NBL	NBT	NBR	SBL	SBTR
	Maximum Queue (ft)	550	799	288	105	551
	Average Queue (ft)	323	458	132	60	326
	95th Queue (ft)	577	778	251	121	523
	<b>Storage Bay (ft)</b>	<b>500</b>	-		<b>80</b>	-

As shown, the 200' left-turn lane scenario results in a significant increase in the through lane for the northbound through movement. A review of the simulation revealed that the additional left-turning vehicles that were storing in the northbound through lane were not only adding to queuing through presence but also were creating friction near the intersection when maneuvering into the northbound left-turn lane. This effectively reduced headways and resulted in fewer northbound vehicles processing through the intersection of Hillsborough Avenue.

At 300', additional storage is provided each cycle, and the friction point is further from the signalized intersection. The simulation results indicated a drastic improvement over the 200' scenario and queuing similar to the existing condition.

At 500', the differences with 300' were marginal. This indicates that there is no significant benefit from extending the left-turn lane past the driveway at the sacrifice of the left-turn out.

Based on this analysis, a 300' left-turn lane with prohibition of the southbound left-turn into the Plaza is the recommended improvement.

Detailed Synchro and SimTraffic Worksheets are provided in Appendix E.



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## 5. IMPROVEMENT REVIEW

As requested by the City of Tampa, several improvement alternatives were reviewed that would enhance the safety of the intersection of Habana Avenue and Hillsboro Plaza. The improvements were reviewed to improve safety by reducing angle and left-turn crashes between northbound vehicles using the two-way left-turn lane along Habana Avenue and southbound left-turning or westbound left-turning vehicles entering and exiting the plaza. It was determined that the most effective improvement would be to channelize the northbound left-turn movement to remove the incentive for vehicles to use the two-way left-turn lane as an extension of the marked northbound left-turn lane at Hillsborough Avenue.

As shown in the operational analysis, only two scenarios were estimated to provide adequate storage to the northbound left-turn movements and not result in significant increases in northbound queuing—300' left-turn lane and 500' (or greater) left-turn lane. The 300' option is preferred, as it maintains egress for westbound-to-southbound left-turning vehicles from the Plaza. If this movement were eliminated, efficient alternatives are not readily available on the existing roadway network. This would impact approximately 60 vehicles during the PM peak hour. These vehicles would not have an efficient egress point as an alternative.

Although this improvement eliminates the southbound left-turning movement into the Plaza, this movement is easily accommodated along Hillsborough Avenue at the Plaza's right-in/right-out access point east of Habana Avenue. This modification is estimated to redistribute approximately 45 vehicles during the PM peak hour. These vehicles would have access to the plaza east of Habana Avenue along Hillsborough Avenue.

Other improvements are also recommended to improve safety, operation, and access:

- Clearly designate the intersection of Hillsboro Plaza and Habana Avenue with markings and signs that encourage vehicles on Habana Avenue to not block the intersection.
- Install signage to alert drivers to look right when exiting the plaza for bicyclists.

If blocking continues after the improvements discussed herein and above are implemented, consider additional delineation of the driveway interaction with Habana Avenue.

- Provide a painted island south of Hillsboro Plaza to provide refuge for pedestrians in the vicinity of the bus stops. This improvement could also help mitigate the crash history of westbound left-turning vehicles colliding with pedestrians.

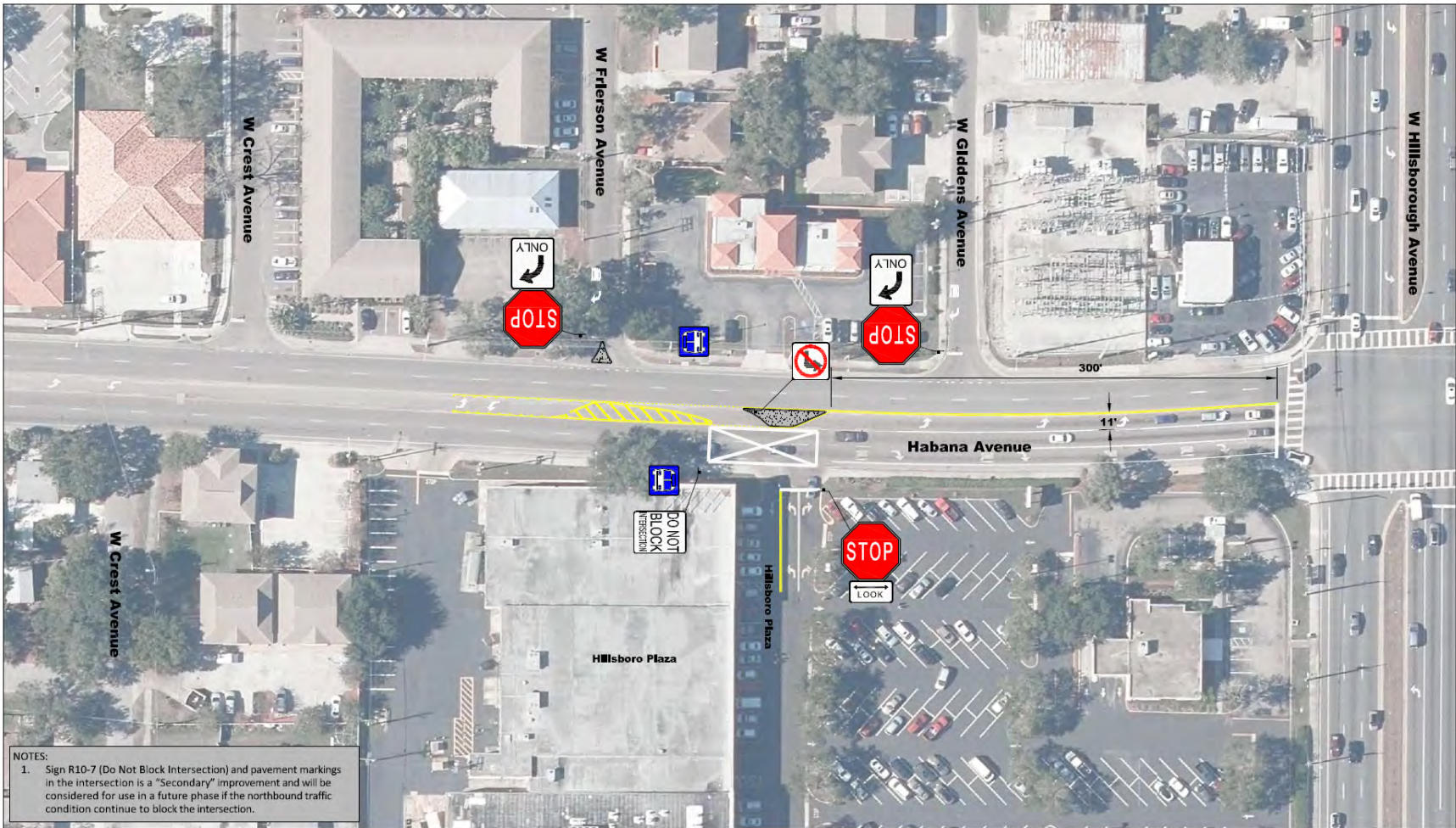
The recommended improvement concept is shown in Figure 6.

It should be noted that a traffic signal was considered, but dismissed as an option early in the analysis process. The proximity of the Plaza entrance to Hillsborough Avenue would have created issues with properly coordinating traffic so as not to create queuing into Hillsborough Avenue intersection.

Additionally obstacles to the signal included:

- 
- There is not sufficient available space to provide a dedicated southbound left-turn lane into the plaza as this would require modifications to the storage for the northbound left-turn a Hillsborough Avenue.
  - In order to mitigate the southbound left-turn to northbound crash risk, a protected left-turn or split phase operation would be required along Habana Avenue at the plaza. Split phase operation would have required coordination between the southbound movement at the plaza and the intersection with Hillsborough Avenue. However, vehicles proceed southbound on Habana Avenue from eastbound (right turn), westbound (left turn), and southbound. Coordinating all of these movements with the southbound approach, in order to minimize queuing in the southbound direction, would require phasing that introduces significant delay for the northbound approach.

Therefore, due to geometrics, proximity to Hillsborough Avenue, and inefficient signal phasing that would be required, the signalization options was removed from consideration.



NOTES:  
 1. Sign R10-7 (Do Not Block Intersection) and pavement markings in the intersection is a "Secondary" improvement and will be considered for use in a future phase if the northbound traffic condition continue to block the intersection.



### Habana Avenue at Hillsboro Plaza Conceptual Median Improvement

10/25/2017 1:05 PM J:\CLIENT 006 - 0990280204\017 CITY OF TAMPA COMPLETE STREETS\TASK 2 HILLSBORO PLAZA\CAD\HILLSBORO PLAZA CONCEPT 4 DIAGRAM\_REM5ED 10252017.DWG

Figure 6: Conceptual Median Improvement

## 6. COST ANALYSIS

A preliminary cost estimate was developed for this improvement and is shown below.

PIN	Description	Unit	Measurement	Cost	Total
327-70-1	Milling Existing Asphalt Pavement, 1" Average Depth	SY	3951	\$2.39	\$9,442.89
337-7-82	Asphaltic Concrete, Traffic C, FC-9.5, PG 76-22	TN	218	\$118.83	\$25,904.94
522-1	Concrete Sidewalk and Driveways, 4" Thick	SY	60	\$38.02	\$2,281.20
700-1-11	Single Post Sign, F&I, Ground Mount, Up to 12 SF	AS	5	\$352.82	\$1,764.10
711-11-125	Thermoplastic, Standard, White, Solid, 24" for Stop Line	LF	100	\$4.29	\$429.00
711-11-141	Thermoplastic, Standard, White, 2-4 Doted Guide Line, 6"	GM	0.04	\$2,078.67	\$76.77
711-11-241	Thermoplastic, Standard, Yellow, 2-4 Doted Guide Line, 6"	GM	0.03	\$2,078.67	\$59.05
711-11-224	Thermoplastic, Standard-Open Graded Asphalt Surfaces, Yellow, Solid 18"	LF	200	\$3.41	\$682.00
711-11-160	Thermoplastic, Preformed, White, Message	EA	4	\$133.76	\$535.04
711-11-170	Thermoplastic, Preformed, White, Arrow	EA	15	\$133.76	\$2,006.40
711-16-101	Thermoplastic, Standard-Open Graded Asphalt Surfaces, White, Solid 6"	GM	0.5	\$4,123.25	\$1,897.63
711-16-201	Thermoplastic, Standard-Open Graded Asphalt Surfaces, Yellow, Solid 6"	GM	0.3	\$4,179.53	\$1,108.21
711-16-131	Thermoplastic, Standard-Open Graded Asphalt Surfaces, White, Skip, 10'x30'	GM	0.2	\$1,436.60	\$244.88
711-16-231	Thermoplastic, Standard-Open Graded Asphalt Surfaces, Yellow, Skip, 10'x30'	GM	0.04	\$1,436.60	\$57.46
<b>Total</b>					<b>\$46,489.57</b>

Using the cost estimate above, a Benefit:Cost (BC) and Net Present Value (NPV) analysis was conducted for the safety benefits of this project.

- Reduce eight northbound to westbound angle crashes (those that occurred with northbound vehicles in the two-way left-turn lane)
- Reduce ten northbound to southbound left-turn crashes as this movement would no longer be permitted.
- Other crash benefits from the raised island and enhanced signage were not directly accounted for in the calculation. However, benefits would be expected to all crashes in the impact area

As shown below, it is estimated that this project would have a B:C of over 40 and an NPV of \$3,2 million.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION SAFETY OFFICE ANNUAL BENEFIT COST ANALYSIS					Yellow cells require information from you. Gray cells are automatically tabulated.						
1. SUBMITTED BY:	WT Bowman			WPA NO.:	N/A		S.N.:				
2. DATE SUBMITTED:	08/18/17			SKID (I.D.):	N/A		SPEED:	40 mph			
3. FM PROJECT NO.:				5. PRIORITY:	N/A		S.R.:	N/A			
4. ALTERNATIVE NO.:				SECTION:	N/A		U.S. RD.:	N/A			
6. DISTRICT 7 COUNTY:	City of Tampa/Hills. Co.			END M.P.:	N/A		LGTH:				
7. BEGINNING MILE POST:							NODE:	N/A			
8. DESCRIPTION OF LOCATION/FACILITY TYPE:	<p>Habana Avenue is a 4-lane arterial roadway that intersection Hillsborough Avenue.</p> <p>The study location is the driveway to the Hillsboro Plaza approximately 350' south of Hillsborough Avenue</p>										
9. CAUSE OF CRASH PROBLEMS (LIST AND DISCUSS):	<p>The most significant crash problems are northbound to westbound angle crashes due to northbound vehicles using the two-way left-turn lane to travel to the left-turn lane at Hillsborough Avenue.</p> <p>Additionally, there is a southbound left-turn to northbound crash problem. In the vicinity of the intersection, there have also been crashes with three pedestrians and three bicyclists.</p>										
10. PROPOSED IMPROVEMENTS (LIST AND DISCUSS):	<p>Channelize the northbound left-turn movement to discourage the use of the two-way left-turn lane as a travel lane.</p> <p>Eliminated the southbound left-turn movement into the driveway.</p> <p>Additional signage and marking</p>										
COMMENTS/CRASH REDUCTION METHOD:	<p>The improvement is estimated to reduce all southbound left-turn crashes and well as any westbound to northbound angle crashes that occur due to vehicles traveling in the northbound two-way left-turn lane.</p>										
COST NOTES	<p>Crash cost from the PPM January 1, 2017. Table 23.6.1</p>										
<b>11. CRASH TYPES</b>	<b>5 YEAR CRASHES</b>			<b>CRF %</b>	<b>TOTAL TO BE PREVENTED</b>	<b>14. CRASH INFORMATION FOR FACILITY</b>					
Non-Serious Injury			<b>Total</b>			A. COST PER CRASH:		\$ 119,072			
WB Angle Crashes with NB Vehicle (Turn Lane Only)			8.0	100%	8.00	B. CRASH CLEANUP:		\$ 100 per year			
SB Left-Turn with NB Vehicle			10.0	100%	10.00	C. INTEREST (DISCOUNT) RATE:		4.0%			
					0.00	<b>15. ANNUAL COST OF IMPROVEMENTS</b>					
					0.00	<b>TYPE</b>	<b>COST</b>	<b>LIFE (YR)</b>	<b>CRF</b>	<b>COST/YR</b>	
<b>SUBTOTAL:</b>					<b>18.00</b>	CONSTRUCTION	\$ 50,000	10	0.1233	\$ 6,165	
Serious Injury	<b>5 YEAR CRASHES</b>			<b>CRF</b>	<b>PREVENTED</b>	MOT (10% of CST)	\$ 5,000	10	0.123	\$ 616	
None					0.00	MOB (10% of CST)	\$ 5,000	10	0.123	\$ 616	
					0.00	CEI (10% of CST)	\$ 5,000	10	0.123	\$ 616	
					0.00	DESIGN (50% of CST)	\$ 25,000	10	0.123	\$ 3,082	
					0.00						
<b>SUBTOTAL:</b>					<b>0.00</b>						
Fatal Injury	<b>5 YEAR CRASHES</b>			<b>CRF</b>	<b>PREVENTED</b>	H. SUBTOTAL:		\$ 90,000		10.00	\$ 11,096
None					0.00	I. CHANGE IN MAINTENANCE:				\$ -	
					0.00	J. CRASH CLEANUP:				\$ (600)	
					0.00	K. TOTAL ANNUAL COST:				\$ 10,496	
					0.00	16. BENEFIT/COST:				40.84	
<b>SUBTOTAL:</b>					<b>0.00</b>	17. NET PRESENT VALUE					
D. TOTAL CRASHES (ALL TYPES)	-	-	18.00			A. CURRENT YEAR				2018	
<b>12. TOTAL TO BE PREVENTED</b>	-	-	18.00		<b>18.00</b>	B. PROJECT COMPLETION				2020	
<b>13. BENEFIT</b>						C. NPV				\$ 3,253,087	
A. TOTAL CRASH BENEFIT					\$ 2,143,296	Prepared By:	WT Bowman		Date: 12/8/2017		
B. TOTAL ANNUAL BENEFIT:					\$ 428,659.20	Approved By:			Date:		



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## 7. CONCLUSIONS

Based on the results of this analysis, it is recommended that the City of Tampa undertake a project to channelize the northbound left-turn lane of Habana Avenue at Hillsborough Avenue. The channelization should provide as much storage as possible (approximately 300') without impeding the westbound left turn out of the Plaza driveway.

In the short term, it is recommended that the City use channelizing devices for this improvement. Once it is determined that the improvement is successful in reducing crashes with minimal impact on operation, the City could deploy a permanent project with raised medians. Such a project could be eligible for HSIP funding.



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**APPENDIX A**

**TURNING MOVEMENT COUNTS AND VOLUME ADJUSTMENTS**

### Hillsborough Ave at Habana Ave

Counter: 0255078  
 Counted By: DN\_BG  
 Weather: Fair  
 Other:

File Name : Habana Ave  
 Site Code : 00002222  
 Start Date : 2/25/2015  
 Page No : 1

Groups Printed- 1 - Unshifted

Start Time	Habana Ave Southbound					Hillsborough Ave Westbound					Habana Ave Northbound					Hillsborough Ave Eastbound						
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total	
	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0			
Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0
07:00 AM	17	70	14	0	101	46	544	5	0	595	43	36	46	0	125	18	367	27	0	412	1233	
07:15 AM	8	117	2	0	127	75	595	11	0	681	40	38	41	0	119	15	386	41	0	442	1369	
07:30 AM	9	91	8	0	108	79	599	8	0	686	36	35	46	0	117	21	465	43	0	529	1440	
07:45 AM	13	144	1	0	158	97	548	6	0	651	42	47	27	0	116	16	421	38	0	475	1400	
Total	47	422	25	0	494	297	2286	30	0	2613	161	156	160	0	477	70	1639	149	0	1858	5442	
08:00 AM	7	127	6	0	140	76	525	6	0	607	46	35	28	0	109	9	328	26	0	363	1219	
08:15 AM	7	110	5	0	122	93	497	4	0	594	30	25	18	0	73	7	314	56	0	377	1166	
08:30 AM	7	124	5	0	136	59	566	3	0	628	40	26	27	0	93	4	346	44	0	394	1251	
08:45 AM	7	126	8	0	141	92	549	3	0	644	36	37	32	0	105	13	263	47	0	323	1213	
Total	28	487	24	0	539	320	2137	16	0	2473	152	123	105	0	380	33	1251	173	0	1457	4849	
04:00 PM	20	65	9	0	94	25	559	10	0	594	75	128	74	0	277	12	418	31	0	461	1426	
04:15 PM	11	62	12	0	85	34	522	4	0	560	52	99	65	0	216	21	466	20	0	507	1368	
04:30 PM	16	54	11	0	81	21	529	7	0	557	67	103	72	0	242	21	432	35	0	488	1368	
04:45 PM	12	81	15	0	108	42	503	3	0	548	65	88	81	0	234	10	496	12	0	518	1408	
Total	59	262	47	0	368	122	2113	24	0	2259	259	418	292	0	969	64	1812	98	0	1974	5570	
05:00 PM	17	91	12	0	120	47	520	6	0	573	51	119	63	0	233	28	474	22	0	524	1450	
05:15 PM	18	69	14	0	101	26	492	9	0	527	72	95	72	0	239	22	416	17	0	455	1322	
05:30 PM	14	87	10	0	111	19	655	6	0	680	68	111	72	0	251	22	436	15	0	473	1515	
05:45 PM	23	79	7	0	109	37	522	5	0	564	74	141	74	0	289	16	423	15	0	454	1416	
Total	72	326	43	0	441	129	2189	26	0	2344	265	466	281	0	1012	88	1749	69	0	1906	5703	
Grand Total	206	1497	139	0	1842	868	8725	96	0	9689	837	1163	838	0	2838	255	6451	489	0	7195	21564	
Approch %	11.2	81.3	7.5	0.0		9.0	90.1	1.0	0.0		29.5	41.0	29.5	0.0		3.5	89.7	6.8	0.0			
Total %	1.0	6.9	0.6	0.0	8.5	4.0	40.5	0.4	0.0	44.9	3.9	5.4	3.9	0.0	13.2	1.2	29.9	2.3	0.0	33.4		

1 2 3 4 5 6 7 8 9 10 11

Duration	Time Stamp	Count	VPS	VPH	Cum. S			Vehicles Per interval	Calc per 15 minutes	
243	4:10 PM	4	0.016461	59.26	243.00	4.05				
248	4:14 PM	18	0.072581	261.29	491.00	8.18				
292	4:19 PM	9	0.030822	110.96	783.00	13.05	13.05	31	35.63	
166	4:23 PM	8	0.048193	173.49	949.00	15.82				
545	4:26 PM	16	0.029358	105.69	1,494.00	24.90				
545	4:35 PM	26	0.047706	171.74	2,039.00	33.98	20.93	50	35.83	
279	4:45 PM	9	0.032258	116.13	2,318.00	38.63				
341	4:50 PM	13	0.038123	137.24	2,659.00	44.32	10.33	22	31.94	
540	4:55 PM	12	0.022222	80.00	3,199.00	53.32				
545	5:03 PM	33	0.06055	217.98	3,744.00	62.40	18.08	45	37.33	140.72
386	5:12 PM	22	0.056995	205.18	4,130.00	68.83				
170	5:19 PM	14	0.082353	296.47	4,300.00	71.67				
270	5:21 PM	9	0.033333	120.00	4,570.00	76.17	13.77	45	49.03	154.12
494	5:25 PM	24	0.048583	174.90	5,064.00	84.40				
276	5:34 PM	19	0.068841	247.83	5,340.00	89.00				
545	5:44 PM	16	0.029358	105.69	5,885.00	98.08	21.92	59	40.38	158.67

Average: 161.49

- Column Description
- 1 Duration of the video interval (seconds)
- 2 Trimestamp of the video when viewing
- 3 Number of SB cars observed south of Hillsborough
- 4 Calculated vehicles per second in the interval (Column 3 divided by Column 1)
- 5 Extrapolated vehicles per hour for that interval (Column 4 \* 3,600 s/h)
- 6 Cumulative videoed seconds. To be used to break up into "roughly" 15 minute intervals
- 7 Column 6 converted to minutes
- 8 "Approximately" 15-minute intervals of the count duration (time from last interval)
- 9 Sum of vehicles in the interval
- 10 Using vehicles per recorded interval, calculate estimated vehicles per 15-minutes (15/Interval\*Vehicle)
- 11 Vehicles in an hour, estimated

Note: The highest 15-minute interval is 50 cars per 15-minutes which estimates to 200 vph  
 Note: The highest videotaped hour estimates at 158  
 Note: The count provided used approximately 350 vph

We also conducted a field count and over 15-minutes got 43 vehicles which is in line with the data above

Based on this information, the modeling is going to use a conservative 200 vph for SBT



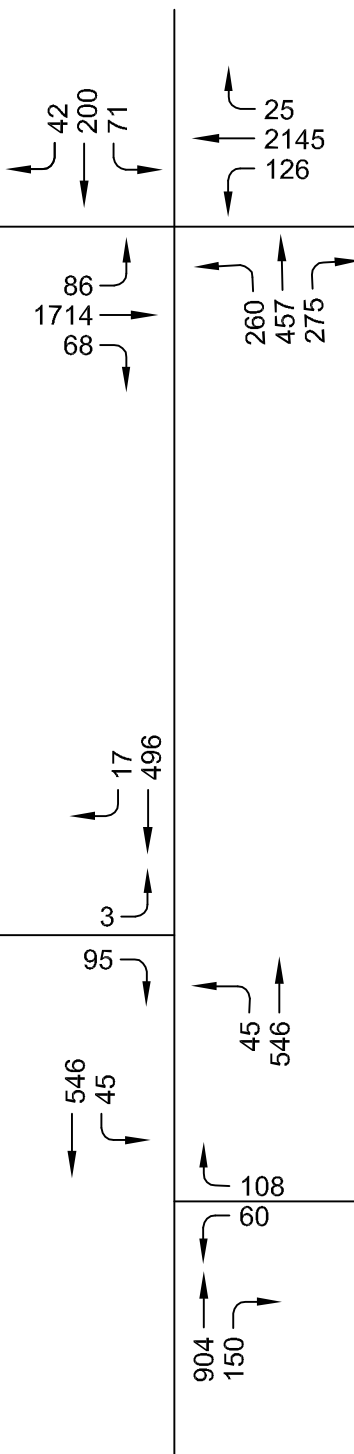
Scale:  
N.T.S.

**Habana  
Avenue**

**Hillsborough  
Avenue**

**W Giddens  
Avenue**

**Hillsboro  
Plaza**



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**APPENDIX B**  
**DETAILED CRASH EXTRACTS**



Event ID	EventCrashDate	EventCrashTime	EventOnStreet	EventCrossStreet	EventImpactType	EventLightingCondition	RoadSurfaceCondition	Fatal	Incapacitating	PersonDriverCauseMain
51954122	1/2/2012	1639	HABANA AV N	HILLSBOROUGH AV W	Angle	Daylight	Dry	0	0	Unknown
51954619	2/7/2012	1645	NORTH HABANA AVENUE	WEST FRIERSON AVENUE	Angle	Daylight	Dry	0	0	Failed to Yield Right-of-Way
51955561	4/11/2012	1504	HABANA AVENUE NORTH	HILLSBOROUGH AVENUE WEST	Pedestrian	Daylight	Wet	0	0	Unknown
51956849	7/15/2012	1632	HABANA AVENUE NORTH	CREST AVENUE WEST	Angle	Daylight	Wet	0	0	Ran Stop Sign
83616067	10/19/2012	1543	HABANA AVE N	GIDDENS AVE W	Angle	Daylight	Dry	0	0	Other Contributing Actions
83616201	10/19/2012	1555	N HABANA AVE	GIDDENS AVE N	Angle	Daylight	Dry	0	0	Improper Turn
83616394	10/29/2012	1252	N HABANA AVENUE	W CREST AVENUE	Angle	Daylight	Dry	0	0	Failed to Keep in Proper Lane
83884023	1/16/2013	1715	HABANA AVENUE N	GIDDENS AVENUE W	Angle	Daylight	Dry	0	0	Other Contributing Actions
83884039	1/16/2013	2350	N HABANA AVE	W FRIERSON AV	Unknown	Daylight	Unknown	0	0	Operated MV in Careless or Negligent Manner

Event ID	EventCrashDate	EventCrashTime	EventOnStreet	EventCrossStreet	EventImpactType	EventLightingCondition	RoadSurfaceCondition	Fatal	Incapacitating	PersonDriverCauseMain
83884012	2/7/2013	1825	HABANNA	GIDDENS AV	Angle	Dark-Lighted	Dry	0	0	Other Contributing Actions
83884648	3/6/2013	719	N HABANA AVENUE	W GIDDENS AVENUE	Angle	Daylight	Wet	0	0	Failed to Yield Right-of-Way
83946265	4/8/2013	1718	HABANA AVENUE N	FRIERSON AVE W	Angle	Daylight	Dry	0	0	Failed to Yield Right-of-Way
83946930	5/16/2013	1616	HABANA AV N	FRIERSON AV W	Angle	Daylight	Dry	0	0	Failed to Yield Right-of-Way
84144019	7/5/2013	524	HABANA AVE N	GIDDENS AV E W	Angle	Daylight	Dry	0	0	Failed to Yield Right-of-Way
84144474	8/2/2013	1446	HABANA AVE N	FRIERSON ST W	Angle	Daylight	Wet	0	0	Failed to Yield Right-of-Way
84144649	8/13/2013	1700	HABANA AVENUE NORTH	GIDDENS AVENUE WEST	Angle	Daylight	Dry	0	0	Failed to Yield Right-of-Way
83947867	8/17/2013	1339	HABANA AVE N	FRIERSON AVE W	Front to Rear	Daylight	Dry	0	0	Operated MV in Careless or Negligent Manner
84144884	8/26/2013	1433	HABANA AVE N	GIDDENS AVE	Angle	Daylight	Dry	0	0	Operated MV in Careless or Negligent Manner
83947992	10/28/2013	1653	HABANA AVE N	FRIERSON AVE W	Angle	Daylight	Dry	0	0	Failed to Yield Right-of-Way

Event ID	EventCrashDate	EventCrashTime	EventOnStreet	EventCrossStreet	EventImpactType	EventLightingCondition	RoadSurfaceCondition	Fatal	Incapacitating	PersonDriverCauseMain
84407558	11/6/2013	1802	HABANA AVENUE NORTH	HILLSBOROUGH PLAZA	Angle	Dark-Lighted	Dry	0	0	Failed to Yield Right-of-Way
84407758	11/17/2013	1500	HABANA AVENUE NORTH	HILLSBOROUGH PLAZA PRIVATE DRIVE	Angle	Daylight	Dry	0	0	Failed to Yield Right-of-Way
84621929	3/31/2014	1641	HABANA AVE N	GIDDEN AVE W	Angle	Daylight	Dry	0	0	Failed to Keep in Proper Lane
84736490	4/17/2014	1625	HABANA AVE N	FRIERSON AVE W	No Data	Daylight	Dry	0	0	Ran off Roadway
84736993	5/16/2014	1749	HABANA AVE N	HILLSBOROUGH AVE W	Angle	Daylight	Dry	0	0	Unknown
84737039	5/19/2014	1315	HABANA AVE N	FRIERSON AVE W	Other, Explain in Narrative	Daylight	Dry	0	0	No Contributing Action
84737279	5/30/2014	1430	HABANA AVE N	GIDDENS AVE W	Bicycle	Daylight	Dry	0	0	Other Contributing Actions
84737528	6/11/2014	1737	HABANA AVE N	GIDDENS AVE W	Angle	Daylight	Dry	0	0	Failed to Yield Right-of-Way
84738060	7/10/2014	1445	HABANA AVE N	FRIERSON AVE W	Pedestrian	Daylight	Dry	0	0	Operated MV in Careless or Negligent Manner

Event ID	EventCrashDate	EventCrashTime	EventOnStreet	EventCrossStreet	EventImpactType	EventLightingCondition	RoadSurfaceCondition	Fatal	Incapacitating	PersonDriverCauseMain
84964783	9/8/2014	1442	HABANA AVE N	FRIERSON AVE W	Angle	Daylight	Dry	0	0	Failed to Yield Right-of-Way
84965260	9/29/2014	820	HABANA AVE N	FRIERSON AVE W	Angle	Daylight	Dry	0	0	Failed to Yield Right-of-Way
85612622	11/20/2014	1526	HABANA AVE N	HILLSBOROUGH AVE W	Other, Explain in Narrative	Daylight	Dry	0	0	Unknown
85788857	3/3/2015	1654	HABANA AVE N	GIDDEN AVE W	Angle	Daylight	Dry	0	0	Failed to Yield Right-of-Way
85788860	3/3/2015	1718	HABANA AVE N	FRIERSON AVE	Angle	Daylight	Dry	0	0	No Contributing Action
85789047	3/9/2015	1756	HABANA AVE	CREST AVE	Bicycle	Daylight	Dry	0	0	No Contributing Action
85919833	6/1/2015	1531	HABANA AVE N	GIDDENS AVE W	Bicycle	Daylight	Dry	0	0	No Contributing Action
85920345	6/23/2015	1743	HABANA AVE	GIDDENS AVE	Angle	Daylight	Dry	0	0	Failed to Yield Right-of-Way
86072665	8/6/2015	1120	HABANA AVE N	FRIERSON AVE W	Pedestrian	Daylight	Dry	0	0	No Contributing Action
86073655	9/17/2015	1738	HABANA AVE N	HILLSBOROUGH AVE W	Angle	Daylight	Dry	0	0	Unknown
86073749	9/22/2015	620	HABANA AVE N	CREST AVE W	Angle	Dark-Lighted	Dry	0	0	Failed to Yield Right-of-Way

Event ID	EventCrashDate	EventCrashTime	EventOnStreet	EventCrossStreet	EventImpactType	EventLightingCondition	RoadSurfaceCondition	Fatal	Incapacitating	PersonDriverCauseMain
86073784	9/23/2015	1735	HABANA AVE N	CREST AVE W	Angle	Daylight	Dry	0	0	No Data
86074102	10/5/2015	1552	HABANA AVE N	HILLSBOROUGH AVE W	Angle	Daylight	Dry	0	0	Unknown
86074668	10/20/2015	1654	HABANA AVE N	HILLSBOROUGH AVE W	Front to Rear	Daylight	Dry	0	0	Unknown
86151514	4/11/2016	1546	HABANA AVE N	GIDDENS AVE W	Angle	Daylight	Dry	0	0	Improper Turn
86151725	4/19/2016	1735	HABANA AVE N	CREST AVE W	Angle	Daylight	Dry	0	0	No Data
86154095	7/11/2016	1601	HABANA AVE N	FRIERSON AVE W	Front to Rear	Daylight	Dry	0	0	Failed to Yield Right-of-Way
86155767	9/22/2016	1650	HABANA AVE N	CREST AVE W	Front to Rear	Daylight	Wet	0	0	Followed too Closely
86157224	11/14/2016	1620	HABANA AVE	CREST AVE	Angle	Daylight	Dry	0	0	Failed to Yield Right-of-Way
86157582	11/28/2016	1230	HABANA AVE N	GIDDENS AVE W	Bicycle	Daylight	Dry	0	0	No Data



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























**APPENDIX C**

**EXISTING DELAY-LOS WORKSHEETS AND QUEUING REPORT**

# HCM Signalized Intersection Capacity Analysis

## 3: Habana Ave & Hillsborough Ave

Existing Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 						 	
Volume (vph)	86	1714	68	126	2145	25	260	457	275	71	200	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.3	6.3		6.3	6.3		7.5	7.5	7.5	7.5	7.5	
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00	1.00	1.00	1.00	
Flt	1.00	0.99		1.00	1.00		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	5056		1770	5077		1770	1863	1583	1770	1814	
Flt Permitted	0.95	1.00		0.95	1.00		0.30	1.00	1.00	0.15	1.00	
Satd. Flow (perm)	1770	5056		1770	5077		556	1863	1583	276	1814	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	93	1863	74	137	2332	27	283	497	299	77	217	46
RTOR Reduction (vph)	0	2	0	0	1	0	0	0	106	0	4	0
Lane Group Flow (vph)	93	1935	0	137	2358	0	283	497	193	77	259	0
Turn Type	Prot	NA		Prot	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases							4		4	8		
Actuated Green, G (s)	15.6	82.5		18.9	85.8		78.5	59.9	59.9	56.5	45.4	
Effective Green, g (s)	15.6	82.5		18.9	85.8		78.5	59.9	59.9	56.5	45.4	
Actuated g/C Ratio	0.08	0.41		0.09	0.43		0.39	0.30	0.30	0.28	0.23	
Clearance Time (s)	6.3	6.3		6.3	6.3		7.5	7.5	7.5	7.5	7.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	138	2085		167	2178		373	557	474	160	411	
v/s Ratio Prot	0.05	0.38		c0.08	c0.46		c0.10	c0.27		0.03	0.14	
v/s Ratio Perm							0.20		0.12	0.11		
v/c Ratio	0.67	0.93		0.82	1.08		0.76	0.89	0.41	0.48	0.63	
Uniform Delay, d1	89.7	55.9		88.9	57.1		46.3	67.0	55.9	56.5	69.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	12.2	8.7		26.4	46.0		8.6	16.5	0.6	2.3	3.1	
Delay (s)	102.0	64.7		115.3	103.1		54.9	83.4	56.4	58.8	72.9	
Level of Service	F	E		F	F		D	F	E	E	E	
Approach Delay (s)		66.4			103.8			68.5			69.7	
Approach LOS		E			F			E			E	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			82.7				HCM 2000 Level of Service			F		
HCM 2000 Volume to Capacity ratio			1.01									
Actuated Cycle Length (s)			200.0				Sum of lost time (s)			27.6		
Intersection Capacity Utilization			97.8%				ICU Level of Service			F		
Analysis Period (min)			15									
c Critical Lane Group												

Queuing and Blocking Report  
Existing Baseline

Existing Conditions

Intersection: 3: Habana Ave & Hillsborough Ave

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	T	T	TR	L	T	T	TR	L	T	R	L
Maximum Queue (ft)	300	832	809	750	430	1674	1683	1683	599	967	662	105
Average Queue (ft)	182	565	546	496	293	1400	1389	1346	272	546	168	71
95th Queue (ft)	338	855	822	756	522	2085	2077	2069	455	878	398	127
Link Distance (ft)		1757	1757	1757		1628	1628	1628		2844	2844	
Upstream Blk Time (%)						38	32	30				
Queuing Penalty (veh)						0	0	0				
Storage Bay Dist (ft)	250				380				1000			80
Storage Blk Time (%)	1	41			1	52				1		21
Queuing Penalty (veh)	3	38			4	70				2		55

Intersection: 3: Habana Ave & Hillsborough Ave

Movement	SB
Directions Served	TR
Maximum Queue (ft)	718
Average Queue (ft)	387
95th Queue (ft)	696
Link Distance (ft)	1838
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	60
Queuing Penalty (veh)	45

Network Summary

Network wide Queuing Penalty: 217

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
























**APPENDIX D**

**SCENARIO 1 AND SCENARIO 2 DELAY-LOS WORKSHEETS AND QUEUING REPORTS**























HCM Signalized Intersection Capacity Analysis  
3: Habana Ave & Hillsborough Ave

Scenario 1  
Split phase NB & SB

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 			 		 		
Volume (vph)	86	1714	68	126	2145	25	260	457	275	71	200	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.3	6.3		6.3	6.3		7.5	7.5	7.5	7.5	7.5	
Lane Util. Factor	1.00	0.91		1.00	0.91		0.95	0.95	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	1.00		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	5056		1770	5077		1681	1765	1583	1770	1814	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	5056		1770	5077		1681	1765	1583	1770	1814	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	93	1863	74	137	2332	27	283	497	299	77	217	46
RTOR Reduction (vph)	0	2	0	0	1	0	0	0	115	0	4	0
Lane Group Flow (vph)	93	1935	0	137	2358	0	255	525	184	77	259	0
Turn Type	Prot	NA		Prot	NA		Split	NA	custom	Split	NA	
Protected Phases	1	6		5	2		3	3		4	4	
Permitted Phases									4			
Actuated Green, G (s)	15.6	85.5		18.9	88.8		35.5	35.5	32.5	32.5	32.5	
Effective Green, g (s)	15.6	85.5		18.9	88.8		35.5	35.5	32.5	32.5	32.5	
Actuated g/C Ratio	0.08	0.43		0.09	0.44		0.18	0.18	0.16	0.16	0.16	
Clearance Time (s)	6.3	6.3		6.3	6.3		7.5	7.5	7.5	7.5	7.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	138	2161		167	2254		298	313	257	287	294	
v/s Ratio Prot	0.05	0.38		c0.08	c0.46		0.15	c0.30		0.04	c0.14	
v/s Ratio Perm									0.12			
v/c Ratio	0.67	0.90		0.82	1.05		0.86	1.68	0.72	0.27	0.88	
Uniform Delay, d1	89.7	53.1		88.9	55.6		79.8	82.2	79.4	73.3	81.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	12.2	6.3		26.4	32.4		20.7	318.4	9.2	0.5	24.9	
Delay (s)	102.0	59.4		115.3	88.0		100.4	400.7	88.6	73.8	106.7	
Level of Service	F	E		F	F		F	F	F	E	F	
Approach Delay (s)		61.3			89.5			243.2			99.3	
Approach LOS		E			F			F			F	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			108.4				HCM 2000 Level of Service			F		
HCM 2000 Volume to Capacity ratio			1.14									
Actuated Cycle Length (s)			200.0				Sum of lost time (s)			27.6		
Intersection Capacity Utilization			106.9%				ICU Level of Service			G		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
3: Habana Ave & Hillsborough Ave

Scenario 2  
Existing timing and phasing

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	86	1714	68	126	2145	25	260	457	275	71	200	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.3	6.3		6.3	6.3		7.5	7.5		7.5	7.5	
Lane Util. Factor	1.00	0.91		1.00	0.91		0.91	0.91		1.00	1.00	
Fr <sub>t</sub>	1.00	0.99		1.00	1.00		1.00	0.95		1.00	0.97	
Fl <sub>t</sub> Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	5056		1770	5077		3221	1600		1770	1814	
Fl <sub>t</sub> Permitted	0.95	1.00		0.95	1.00		0.95	0.85		0.95	1.00	
Satd. Flow (perm)	1770	5056		1770	5077		3221	1367		1770	1814	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	93	1863	74	137	2332	27	283	497	299	77	217	46
RTOR Reduction (vph)	0	2	0	0	1	0	0	7	0	0	4	0
Lane Group Flow (vph)	93	1935	0	137	2358	0	255	817	0	77	259	0
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases												
Actuated Green, G (s)	15.6	82.5		18.9	85.8		21.1	77.8		14.3	49.9	
Effective Green, g (s)	15.6	82.5		18.9	85.8		21.1	77.8		14.3	49.9	
Actuated g/C Ratio	0.08	0.41		0.09	0.43		0.11	0.39		0.07	0.25	
Clearance Time (s)	6.3	6.3		6.3	6.3		7.5	7.5		7.5	7.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	138	2085		167	2178		339	556		126	452	
v/s Ratio Prot	0.05	0.38		c0.08	c0.46		0.08	c0.15		0.04	0.14	
v/s Ratio Perm								c0.42				
v/c Ratio	0.67	0.93		0.82	1.08		0.75	1.47		0.61	0.57	
Uniform Delay, d <sub>1</sub>	89.7	55.9		88.9	57.1		86.9	61.1		90.2	65.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d <sub>2</sub>	12.2	8.7		26.4	46.0		9.1	220.7		8.5	1.8	
Delay (s)	102.0	64.7		115.3	103.1		96.0	281.8		98.6	67.5	
Level of Service	F	E		F	F		F	F		F	E	
Approach Delay (s)		66.4			103.8			237.9			74.5	
Approach LOS		E			F			F			E	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			113.7				HCM 2000 Level of Service				F	
HCM 2000 Volume to Capacity ratio			1.29									
Actuated Cycle Length (s)			200.0				Sum of lost time (s)			27.6		
Intersection Capacity Utilization			108.3%				ICU Level of Service			G		
Analysis Period (min)			15									
c Critical Lane Group												

Intersection: 3: Habana Ave & Hillsborough Ave

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	T	T	TR	L	T	T	TR	L	LT	R	L
Maximum Queue (ft)	300	771	752	717	430	1678	1671	1668	1050	2888	2891	105
Average Queue (ft)	173	521	502	450	269	1330	1302	1246	827	2362	2205	55
95th Queue (ft)	330	771	743	685	505	1981	1956	1924	1405	3687	3874	122
Link Distance (ft)		1757	1757	1757		1628	1628	1628		2844	2844	
Upstream Blk Time (%)						24	18	17		59	52	
Queuing Penalty (veh)						0	0	0		0	0	
Storage Bay Dist (ft)	250				380				1000			80
Storage Blk Time (%)	0	38				51			0	74		12
Queuing Penalty (veh)	2	35				69			0	102		32

Intersection: 3: Habana Ave & Hillsborough Ave

Movement	SB
Directions Served	TR
Maximum Queue (ft)	900
Average Queue (ft)	525
95th Queue (ft)	951
Link Distance (ft)	1838
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	72
Queuing Penalty (veh)	55

Network Summary

Network wide Queuing Penalty: 295
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Intersection: 3: Habana Ave & Hillsborough Ave

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	T	T	TR	L	T	T	TR	L	L	LTR	L
Maximum Queue (ft)	300	854	818	761	430	1684	1651	1621	136	250	2873	104
Average Queue (ft)	156	543	525	474	254	1295	1263	1201	8	36	2717	78
95th Queue (ft)	314	813	792	725	488	1986	1956	1910	57	166	3453	127
Link Distance (ft)		1751	1751	1751		1634	1634	1634			2844	
Upstream Blk Time (%)						22	18	18			88	
Queuing Penalty (veh)						0	0	0			0	
Storage Bay Dist (ft)	250				380				200	200		80
Storage Blk Time (%)	0	39			0	50			0	95		37
Queuing Penalty (veh)	2	36			0	68			0	176		97

Intersection: 3: Habana Ave & Hillsborough Ave

Movement	SB
Directions Served	TR
Maximum Queue (ft)	608
Average Queue (ft)	274
95th Queue (ft)	543
Link Distance (ft)	1838
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	33
Queuing Penalty (veh)	25

Network Summary

Network wide Queuing Penalty: 405
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






















**APPENDIX E**

**SCENARIO 3 DELAY-LOS WORKSHEETS AND QUEUING REPORTSAPPENDIX F**





























HCM Signalized Intersection Capacity Analysis  
3: Habana Ave & Hillsborough Ave

Scenario 3  
200 ft NBL

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 							
Volume (vph)	86	1714	68	126	2145	25	260	457	275	71	200	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.3	6.3		6.3	6.3		7.5	7.5	7.5	7.5	7.5	
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00	1.00	1.00	1.00	
Fr <sub>t</sub>	1.00	0.99		1.00	1.00		1.00	1.00	0.85	1.00	0.97	
Fl <sub>t</sub> Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	5056		1770	5077		1770	1863	1583	1770	1814	
Fl <sub>t</sub> Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	5056		1770	5077		1770	1863	1583	1770	1814	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	93	1863	74	137	2332	27	283	497	299	77	217	46
RTOR Reduction (vph)	0	2	0	0	1	0	0	0	109	0	4	0
Lane Group Flow (vph)	93	1935	0	137	2358	0	283	497	190	77	259	0
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases									4			
Actuated Green, G (s)	15.6	82.5		18.9	85.8		27.5	56.7	56.7	14.3	43.5	
Effective Green, g (s)	15.6	82.5		18.9	85.8		27.5	56.7	56.7	14.3	43.5	
Actuated g/C Ratio	0.08	0.41		0.09	0.43		0.14	0.28	0.28	0.07	0.22	
Clearance Time (s)	6.3	6.3		6.3	6.3		7.5	7.5	7.5	7.5	7.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	138	2085		167	2178		243	528	448	126	394	
v/s Ratio Prot	0.05	0.38		c0.08	c0.46		c0.16	c0.27		0.04	0.14	
v/s Ratio Perm									0.12			
v/c Ratio	0.67	0.93		0.82	1.08		1.16	0.94	0.42	0.61	0.66	
Uniform Delay, d <sub>1</sub>	89.7	55.9		88.9	57.1		86.2	70.0	58.4	90.2	71.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d <sub>2</sub>	12.2	8.7		26.4	46.0		109.5	25.3	0.6	8.5	3.9	
Delay (s)	102.0	64.7		115.3	103.1		195.8	95.3	59.0	98.6	75.4	
Level of Service	F	E		F	F		F	F	E	F	E	
Approach Delay (s)		66.4			103.8			111.6			80.6	
Approach LOS		E			F			F			F	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			91.1				HCM 2000 Level of Service		F			
HCM 2000 Volume to Capacity ratio			1.07									
Actuated Cycle Length (s)			200.0				Sum of lost time (s)		27.6			
Intersection Capacity Utilization			102.2%				ICU Level of Service		G			
Analysis Period (min)			15									
c Critical Lane Group												


























HCM Signalized Intersection Capacity Analysis  
3: Habana Ave & Hillsborough Ave

Scenario 3  
300 ft NBL

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  							
Volume (vph)	86	1714	68	126	2145	25	260	457	275	71	200	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.3	6.3		6.3	6.3		7.5	7.5	7.5	7.5	7.5	
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00	1.00	1.00	1.00	
Flt	1.00	0.99		1.00	1.00		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	5056		1770	5077		1770	1863	1583	1770	1814	
Flt Permitted	0.95	1.00		0.95	1.00		0.30	1.00	1.00	0.15	1.00	
Satd. Flow (perm)	1770	5056		1770	5077		556	1863	1583	276	1814	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	93	1863	74	137	2332	27	283	497	299	77	217	46
RTOR Reduction (vph)	0	2	0	0	1	0	0	0	106	0	4	0
Lane Group Flow (vph)	93	1935	0	137	2358	0	283	497	193	77	259	0
Turn Type	Prot	NA		Prot	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases							4		4	8		
Actuated Green, G (s)	15.6	82.5		18.9	85.8		78.5	59.9	59.9	56.5	45.4	
Effective Green, g (s)	15.6	82.5		18.9	85.8		78.5	59.9	59.9	56.5	45.4	
Actuated g/C Ratio	0.08	0.41		0.09	0.43		0.39	0.30	0.30	0.28	0.23	
Clearance Time (s)	6.3	6.3		6.3	6.3		7.5	7.5	7.5	7.5	7.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	138	2085		167	2178		373	557	474	160	411	
v/s Ratio Prot	0.05	0.38		c0.08	c0.46		c0.10	c0.27		0.03	0.14	
v/s Ratio Perm							0.20		0.12	0.11		
v/c Ratio	0.67	0.93		0.82	1.08		0.76	0.89	0.41	0.48	0.63	
Uniform Delay, d1	89.7	55.9		88.9	57.1		46.3	67.0	55.9	56.5	69.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	12.2	8.7		26.4	46.0		8.6	16.5	0.6	2.3	3.1	
Delay (s)	102.0	64.7		115.3	103.1		54.9	83.4	56.4	58.8	72.9	
Level of Service	F	E		F	F		D	F	E	E	E	
Approach Delay (s)		66.4			103.8			68.5			69.7	
Approach LOS		E			F			E			E	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			82.7				HCM 2000 Level of Service			F		
HCM 2000 Volume to Capacity ratio			1.01									
Actuated Cycle Length (s)			200.0				Sum of lost time (s)			27.6		
Intersection Capacity Utilization			97.8%				ICU Level of Service			F		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
3: Habana Ave & Hillsborough Ave

Scenario 3  
500 ft NBL

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 						 	
Volume (vph)	86	1714	68	126	2145	25	260	457	275	71	200	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.3	6.3		6.3	6.3		7.5	7.5	7.5	7.5	7.5	
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00	1.00	1.00	1.00	
Fr <sub>t</sub>	1.00	0.99		1.00	1.00		1.00	1.00	0.85	1.00	0.97	
Fl <sub>t</sub> Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	5056		1770	5077		1770	1863	1583	1770	1814	
Fl <sub>t</sub> Permitted	0.95	1.00		0.95	1.00		0.30	1.00	1.00	0.15	1.00	
Satd. Flow (perm)	1770	5056		1770	5077		556	1863	1583	276	1814	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	93	1863	74	137	2332	27	283	497	299	77	217	46
RTOR Reduction (vph)	0	2	0	0	1	0	0	0	106	0	4	0
Lane Group Flow (vph)	93	1935	0	137	2358	0	283	497	193	77	259	0
Turn Type	Prot	NA		Prot	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases							4		4	8		
Actuated Green, G (s)	15.6	82.5		18.9	85.8		78.5	59.9	59.9	56.5	45.4	
Effective Green, g (s)	15.6	82.5		18.9	85.8		78.5	59.9	59.9	56.5	45.4	
Actuated g/C Ratio	0.08	0.41		0.09	0.43		0.39	0.30	0.30	0.28	0.23	
Clearance Time (s)	6.3	6.3		6.3	6.3		7.5	7.5	7.5	7.5	7.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	138	2085		167	2178		373	557	474	160	411	
v/s Ratio Prot	0.05	0.38		c0.08	c0.46		c0.10	c0.27		0.03	0.14	
v/s Ratio Perm							0.20		0.12	0.11		
v/c Ratio	0.67	0.93		0.82	1.08		0.76	0.89	0.41	0.48	0.63	
Uniform Delay, d <sub>1</sub>	89.7	55.9		88.9	57.1		46.3	67.0	55.9	56.5	69.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d <sub>2</sub>	12.2	8.7		26.4	46.0		8.6	16.5	0.6	2.3	3.1	
Delay (s)	102.0	64.7		115.3	103.1		54.9	83.4	56.4	58.8	72.9	
Level of Service	F	E		F	F		D	F	E	E	E	
Approach Delay (s)		66.4			103.8			68.5			69.7	
Approach LOS		E			F			E			E	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			82.7				HCM 2000 Level of Service			F		
HCM 2000 Volume to Capacity ratio			1.01									
Actuated Cycle Length (s)			200.0				Sum of lost time (s)			27.6		
Intersection Capacity Utilization			97.8%				ICU Level of Service			F		
Analysis Period (min)			15									
c Critical Lane Group												

Intersection: 3: Habana Ave & Hillsborough Ave

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	T	T	TR	L	T	T	TR	L	T	R	L
Maximum Queue (ft)	300	738	722	671	430	1506	1503	1398	250	2893	2896	105
Average Queue (ft)	167	500	480	444	265	1071	1034	953	231	2349	2106	79
95th Queue (ft)	327	756	726	677	502	1679	1628	1537	300	3600	3915	129
Link Distance (ft)		1757	1757	1757		1628	1628	1628		2844	2844	
Upstream Blk Time (%)						6	4	3		55	35	
Queuing Penalty (veh)						0	0	0		0	0	
Storage Bay Dist (ft)	250				380				200			80
Storage Blk Time (%)	0	36			0	48			54	34		40
Queuing Penalty (veh)	3	33			3	65			263	95		104

Intersection: 3: Habana Ave & Hillsborough Ave

Movement	SB
Directions Served	TR
Maximum Queue (ft)	596
Average Queue (ft)	338
95th Queue (ft)	531
Link Distance (ft)	1838
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	47
Queuing Penalty (veh)	36

Network Summary

Network wide Queuing Penalty: 601
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Intersection: 3: Habana Ave & Hillsborough Ave

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB		
Directions Served	L	T	T	TR	L	T	T	TR	L	T	R	L		
Maximum Queue (ft)	299	555	546	488	381	665	666	624	349	1125	331	104		
Average Queue (ft)	173	388	370	327	256	489	464	417	323	958	162	87		
95th Queue (ft)	343	643	631	578	469	814	794	748	425	1432	408	133		
Link Distance (ft)		1757	1757	1757		1628	1628	1628		2844	2844			
Upstream Blk Time (%)														
Queuing Penalty (veh)														
Storage Bay Dist (ft)	250					380					300			
Storage Blk Time (%)		32					28					6	54	36
Queuing Penalty (veh)		28					35					29	140	86

Intersection: 3: Habana Ave & Hillsborough Ave

Movement	SB
Directions Served	TR
Maximum Queue (ft)	477
Average Queue (ft)	346
95th Queue (ft)	551
Link Distance (ft)	1838
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	52
Queuing Penalty (veh)	37

Network Summary

Network wide Queuing Penalty: 354
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Intersection: 3: Habana Ave & Hillsborough Ave

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB	
Directions Served	L	T	T	TR	L	T	T	TR	L	T	R	L	
Maximum Queue (ft)	300	646	631	595	430	969	922	809	550	799	288	105	
Average Queue (ft)	159	443	425	380	257	662	632	569	323	458	132	60	
95th Queue (ft)	332	673	648	595	496	1053	1005	925	577	778	251	121	
Link Distance (ft)		1757	1757	1757		1628	1628	1628		2844	2844		
Upstream Blk Time (%)													
Queuing Penalty (veh)													
Storage Bay Dist (ft)	250				380				500				80
Storage Blk Time (%)	0	33			0	34			1	10			12
Queuing Penalty (veh)	0	28			0	42			4	26			30

Intersection: 3: Habana Ave & Hillsborough Ave

Movement	SB
Directions Served	TR
Maximum Queue (ft)	551
Average Queue (ft)	326
95th Queue (ft)	523
Link Distance (ft)	1838
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	61
Queuing Penalty (veh)	43

Network Summary

Network wide Queuing Penalty: 175
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# City of Tampa

Mobility Department  
306 E. Jackson Street  
Tampa, FL 33602

Site Code:  
Site Code:  
Habana Avenue\_Northbound  
From Osborne Ave to Hillsborough Ave  
Latitude: 0.000000  
Longitude: 0.000000

Direction: Combined

5/4/2023																	
Time	0 - 15 MPH	> 15 - 20 MPH	> 20 - 25 MPH	> 25 - 30 MPH	> 30 - 35 MPH	> 35 - 40 MPH	> 40 - 45 MPH	> 45 - 50 MPH	> 50 - 55 MPH	> 55 - 60 MPH	> 60 - 65 MPH	> 65 - 70 MPH	> 70 - 75 MPH	> 75 MPH	Total	50th Percent	85th Percent
12:00 AM	1	1	7	17	34	23	8	2	2	0	0	0	0	0	95	34	40
1:00	0	0	3	8	16	8	6	1	1	0	0	0	0	0	43	33	42
2:00	0	0	1	12	5	9	2	4	0	0	0	0	0	0	33	35	45
3:00	0	1	4	4	8	6	5	2	0	0	0	0	0	0	30	34	42
4:00	0	1	2	8	7	3	4	5	2	1	0	0	0	0	33	32	48
5:00	0	6	4	11	20	15	7	6	1	1	0	0	0	0	71	34	43
6:00	0	3	16	34	58	40	20	12	1	0	1	0	0	0	185	34	42
7:00	2	12	37	90	125	101	47	21	11	1	2	0	0	0	449	34	41
8:00	3	10	45	93	111	80	59	16	1	2	0	0	0	0	420	32	41
9:00	6	29	74	128	132	90	35	12	3	0	0	0	0	0	509	31	38
10:00	0	20	63	117	159	118	53	11	6	0	0	0	0	0	547	32	39
11:00	4	25	53	131	176	106	59	9	4	1	0	0	0	0	568	32	39
12:00 PM	6	20	65	158	189	135	51	8	6	1	0	0	0	0	639	32	39
1:00	2	30	85	125	161	109	52	15	6	1	0	0	0	0	586	32	39
2:00	9	22	57	160	202	118	60	19	3	1	0	0	0	0	651	32	39
3:00	7	28	55	154	232	153	55	16	6	1	0	0	0	0	707	32	39
4:00	10	28	65	172	244	202	84	17	4	0	0	0	0	0	826	33	40
5:00	5	20	70	148	236	190	88	32	2	0	0	0	0	0	791	34	40
6:00	3	12	53	108	154	134	101	24	7	2	0	1	0	0	599	34	42
7:00	3	4	38	99	114	110	71	21	4	3	0	0	0	0	467	34	41
8:00	0	14	40	59	95	83	48	12	2	1	0	0	0	0	354	34	41
9:00	2	12	29	57	66	57	34	4	4	1	0	0	0	0	266	32	40
10:00	0	3	18	36	63	45	33	6	3	1	0	0	0	0	208	34	42
11:00	0	5	9	26	35	48	22	13	0	1	0	0	0	0	159	36	42
Total	63	306	893	1955	2642	1983	1004	288	79	19	3	1	0	0	9236		
Percent	0.7%	3.3%	9.7%	21.2%	28.6%	21.5%	10.9%	3.1%	0.9%	0.2%	0.0%	0.0%	0.0%	0.0%			
AM Peak Vol.	9:00	9:00	9:00	11:00	11:00	10:00	8:00	7:00	7:00	8:00	7:00				11:00		
	6	29	74	131	176	118	59	21	11	2	2	*	*	*	568		
PM Peak Vol.	4:00	1:00	1:00	4:00	4:00	4:00	6:00	5:00	6:00	7:00		6:00			4:00		
	10	30	85	172	244	202	101	32	7	3	*	1	*	*	826		
Statistics			Percentile	15th	50th	85th	95th										
			Speed	25.4	32.8	40.3	44										
			Mean Speed (Average)	32.7													
			10 MPH Pace Speed	30-39													
			Number in Pace	4624													
			Percent in Pace	50.1%													
			Number > 50 MPH	102													
			Percent > 50 MPH	1.1%													

# City of Tampa

Mobility Department  
306 E. Jackson Street  
Tampa, FL 33602

Site Code:  
Site Code:  
Habana Avenue\_Southbound  
From Osborne Ave to Hillsborough Ave  
Latitude: 0.000000  
Longitude: 0.000000

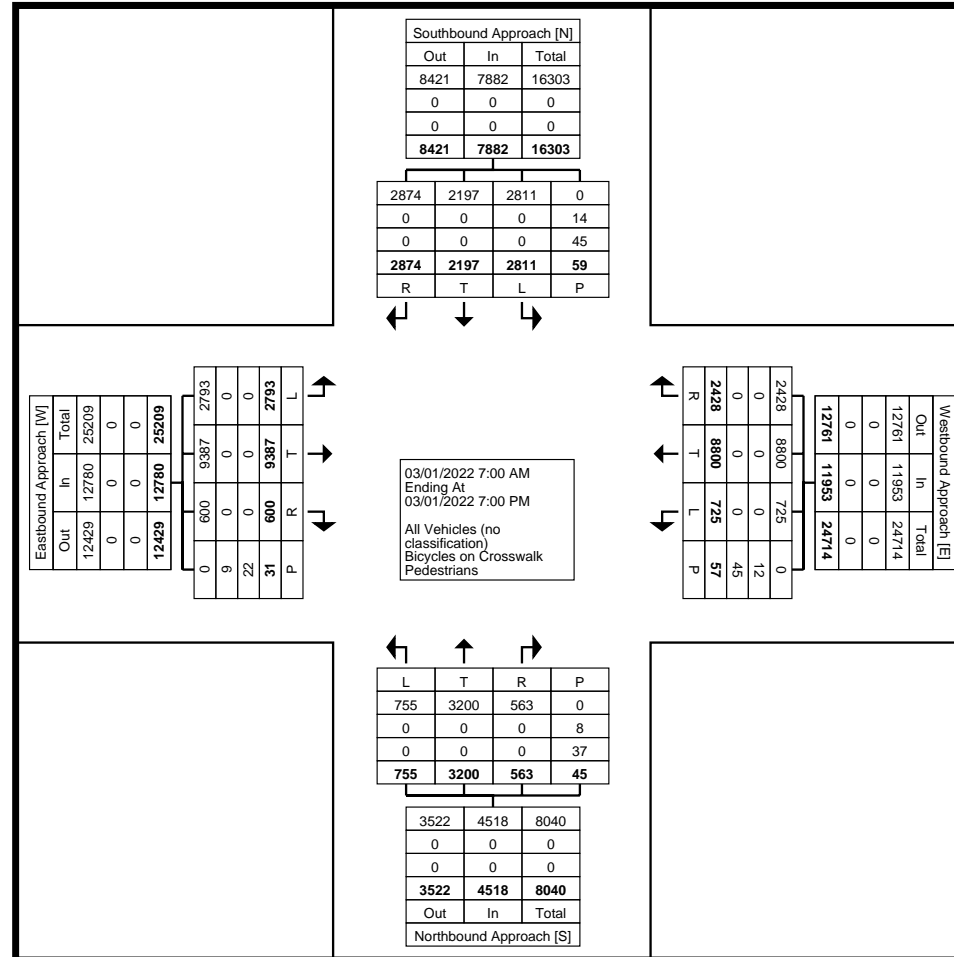
Direction: Combined

5/4/2023																Total	50th Percent	85th Percent
Time	0 - 15 MPH	> 15 - 20 MPH	> 20 - 25 MPH	> 25 - 30 MPH	> 30 - 35 MPH	> 35 - 40 MPH	> 40 - 45 MPH	> 45 - 50 MPH	> 50 - 55 MPH	> 55 - 60 MPH	> 60 - 65 MPH	> 65 - 70 MPH	> 70 - 75 MPH	> 75 MPH				
12:00 AM	1	5	13	8	6	3	2	1	0	0	0	0	0	0	0	39	25	37
1:00	0	3	6	5	6	4	1	0	0	0	0	0	0	0	0	25	30	36
2:00	0	4	3	5	7	5	1	0	2	0	0	0	0	0	0	27	30	38
3:00	0	4	4	4	3	1	1	0	0	0	0	0	0	0	0	17	25	34
4:00	0	2	9	14	5	2	2	0	0	0	0	0	0	0	0	34	27	34
5:00	0	5	19	41	30	15	7	3	3	0	0	1	0	0	0	124	30	37
6:00	3	18	48	84	97	77	11	6	0	0	0	0	0	0	0	344	31	37
7:00	11	23	67	165	239	99	41	6	0	0	0	0	0	0	0	651	32	37
8:00	16	26	86	170	207	97	25	10	2	0	0	0	0	0	0	639	30	37
9:00	14	16	87	158	130	61	21	1	1	0	0	0	0	0	0	489	29	35
10:00	19	29	80	154	110	36	17	5	2	0	0	0	0	0	0	452	29	35
11:00	6	20	55	117	110	51	14	1	0	0	0	0	0	0	0	374	30	35
12:00 PM	14	18	78	140	105	55	16	2	2	0	0	0	0	0	0	430	29	35
1:00	17	18	88	134	127	48	21	9	4	1	0	0	0	0	0	467	29	36
2:00	9	17	65	129	133	68	15	5	0	2	0	0	0	0	0	443	30	36
3:00	18	13	54	157	137	61	13	3	1	1	0	0	0	0	0	458	30	35
4:00	10	13	48	106	136	51	19	2	2	0	0	0	0	0	0	387	30	36
5:00	16	13	53	110	104	53	18	2	2	0	0	0	0	0	0	371	30	37
6:00	11	20	32	110	124	74	19	8	0	1	1	0	0	0	0	400	31	37
7:00	6	18	32	75	65	37	12	4	2	0	0	0	0	0	0	251	30	36
8:00	7	8	36	61	47	27	6	2	1	0	0	0	0	0	0	195	29	36
9:00	8	11	26	54	48	17	6	1	1	0	0	0	0	0	0	172	29	35
10:00	1	12	19	32	29	16	4	2	0	0	0	0	0	0	0	115	29	37
11:00	2	3	13	16	10	5	1	1	1	0	0	0	0	0	0	52	26	35
Total	189	319	1021	2049	2015	963	293	74	26	5	1	1	0	0	0	6956		
Percent	2.7%	4.6%	14.7%	29.5%	29.0%	13.8%	4.2%	1.1%	0.4%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%			
AM Peak Vol.	10:00	10:00	9:00	8:00	7:00	7:00	7:00	8:00	5:00			5:00				7:00		
	19	29	87	170	239	99	41	10	3	*	*	1	*	*		651		
PM Peak Vol.	3:00	6:00	1:00	3:00	3:00	6:00	1:00	1:00	1:00	2:00	6:00					1:00		
	18	20	88	157	137	74	21	9	4	2	1	*	*	*		467		
Statistics			Percentile	15th	50th	85th	95th											
			Speed	23.5	29.7	35.9	40.9											
			Mean Speed (Average)	29.6														
			10 MPH Pace Speed	25-34														
			Number in Pace	4044														
			Percent in Pace	58.1%														
			Number > 50 MPH	33														
			Percent > 50 MPH	0.5%														

### Turning Movement Data

Start Time	Southbound Approach					Westbound Approach					Northbound Approach					Eastbound Approach					Int. Total
	Southbound					Westbound					Northbound					Eastbound					
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
7:00 AM	55	32	56	0	143	33	147	6	2	186	5	43	7	0	55	5	127	36	0	168	552
7:15 AM	53	40	48	0	141	46	234	13	0	293	9	38	4	0	51	10	182	40	0	232	717
7:30 AM	66	72	76	2	214	46	230	11	3	287	14	76	15	1	105	17	203	46	0	266	872
7:45 AM	80	64	59	0	203	36	257	23	2	316	10	91	19	2	120	21	158	51	1	230	869
Hourly Total	254	208	239	2	701	161	868	53	7	1082	38	248	45	3	331	53	670	173	1	896	3010
8:00 AM	71	59	62	2	192	52	218	16	0	286	12	51	15	0	78	23	174	67	0	264	820
8:15 AM	77	59	78	1	214	55	200	21	0	276	11	45	10	0	66	19	143	62	0	224	780
8:30 AM	66	55	57	3	178	57	230	23	1	310	4	43	17	0	64	20	191	59	0	270	822
8:45 AM	66	41	64	0	171	50	230	21	1	301	14	58	17	0	89	11	160	63	0	234	795
Hourly Total	280	214	261	6	755	214	878	81	2	1173	41	197	59	0	297	73	668	251	0	992	3217
9:00 AM	63	50	71	3	184	47	208	23	0	278	12	61	13	0	86	8	172	63	0	243	791
9:15 AM	37	34	55	3	126	55	213	29	1	297	3	51	16	0	70	18	166	56	0	240	733
9:30 AM	53	48	46	0	147	47	158	20	1	225	12	53	9	3	74	15	151	48	3	214	660
9:45 AM	46	51	63	0	160	41	118	23	0	182	11	60	15	0	86	14	141	61	0	216	644
Hourly Total	199	183	235	6	617	190	697	95	2	982	38	225	53	3	316	55	630	228	3	913	2828
10:00 AM	47	42	45	0	134	40	176	25	1	241	12	47	16	1	75	7	134	49	0	190	640
10:15 AM	65	37	61	1	163	67	136	23	3	226	13	39	18	1	70	8	140	54	0	202	661
10:30 AM	60	37	54	0	151	58	153	21	0	232	17	60	11	1	88	12	129	55	0	196	667
10:45 AM	52	40	52	1	144	45	163	10	0	218	18	51	21	0	90	13	153	66	0	232	684
Hourly Total	224	156	212	2	592	210	628	79	4	917	60	197	66	3	323	40	556	224	0	820	2652
11:00 AM	66	52	54	2	172	57	133	16	0	206	11	57	15	0	83	15	175	53	0	243	704
11:15 AM	55	30	47	0	132	51	165	14	0	230	6	54	22	2	82	14	201	43	0	258	702
11:30 AM	70	54	76	1	200	44	159	17	1	220	15	73	22	6	110	16	141	54	3	211	741
11:45 AM	64	33	64	3	161	34	183	11	2	228	10	65	14	0	89	20	173	55	0	248	726
Hourly Total	255	169	241	6	665	186	640	58	3	884	42	249	73	8	364	65	690	205	3	960	2873
12:00 PM	55	54	59	2	168	41	194	17	3	252	7	56	18	0	81	10	180	66	0	256	757
12:15 PM	47	43	57	1	147	43	208	20	2	271	15	76	14	5	105	16	166	71	3	253	776
12:30 PM	50	38	55	4	143	44	203	16	6	263	14	60	16	0	90	16	184	56	2	256	752
12:45 PM	60	34	54	2	148	48	177	18	0	243	10	72	17	2	99	12	179	71	2	262	752
Hourly Total	212	169	225	9	606	176	782	71	11	1029	46	264	65	7	375	54	709	264	7	1027	3037
1:00 PM	64	37	54	2	155	56	183	15	2	254	3	54	13	2	70	10	198	73	1	281	760
1:15 PM	49	51	61	1	161	45	147	12	0	204	13	75	10	0	98	19	190	58	3	267	730
1:30 PM	51	50	59	3	160	52	171	16	0	239	15	47	19	0	81	11	181	67	0	259	739
1:45 PM	67	49	63	1	179	58	171	10	1	239	14	76	22	4	112	22	149	63	0	234	764
Hourly Total	231	187	237	7	655	211	672	53	3	936	45	252	64	6	361	62	718	261	4	1041	2993
2:00 PM	65	36	61	0	162	46	144	17	1	207	6	72	22	2	100	11	193	63	3	267	736
2:15 PM	64	38	54	2	156	56	164	14	1	234	18	67	17	2	102	18	185	57	0	260	752
2:30 PM	54	57	58	3	169	62	169	20	2	251	18	85	21	2	124	12	191	60	0	263	807
2:45 PM	56	43	59	0	158	48	178	20	1	246	20	66	12	0	98	17	213	75	1	305	807

Hourly Total	239	174	232	5	645	212	655	71	5	938	62	290	72	6	424	58	782	255	4	1095	3102
3:00 PM	56	56	84	1	196	53	159	14	4	226	14	92	17	0	123	14	210	60	0	284	829
3:15 PM	74	60	75	1	209	48	188	12	2	248	17	83	11	0	111	11	237	69	0	317	885
3:30 PM	68	51	77	3	196	59	205	19	1	283	13	48	15	0	76	10	227	57	0	294	849
3:45 PM	64	46	66	1	176	50	176	9	1	235	17	92	13	0	122	9	255	64	0	328	861
Hourly Total	262	213	302	6	777	210	728	54	8	992	61	315	56	0	432	44	929	250	0	1223	3424
4:00 PM	56	39	59	1	154	62	206	6	0	274	15	94	26	0	135	7	279	59	0	345	908
4:15 PM	62	56	65	0	183	52	192	10	3	254	15	109	22	2	146	11	270	72	0	353	936
4:30 PM	66	45	58	1	169	47	216	6	1	269	14	94	23	0	131	9	286	65	0	360	929
4:45 PM	76	48	41	2	165	65	222	6	0	293	13	106	18	0	137	5	261	48	0	314	909
Hourly Total	260	188	223	4	671	226	836	28	4	1090	57	403	89	2	549	32	1096	244	0	1372	3682
5:00 PM	68	67	50	1	185	42	199	13	1	254	21	100	30	1	151	8	295	70	0	373	963
5:15 PM	60	43	61	4	164	60	208	15	0	283	7	70	22	0	99	12	273	54	2	339	885
5:30 PM	60	49	53	0	162	58	165	7	5	230	17	84	14	4	115	10	282	72	0	364	871
5:45 PM	56	30	59	1	145	70	209	8	1	287	9	66	16	0	91	9	325	56	0	390	913
Hourly Total	244	189	223	6	656	230	781	43	7	1054	54	320	82	5	456	39	1175	252	2	1466	3632
6:00 PM	56	49	59	0	164	44	161	14	1	219	6	78	8	1	92	11	266	54	3	331	806
6:15 PM	50	37	40	0	127	62	225	8	0	295	7	49	6	1	62	4	172	49	2	225	709
6:30 PM	51	31	47	0	129	57	146	12	0	215	4	60	15	0	79	4	178	50	1	232	655
6:45 PM	57	30	35	0	122	39	103	5	0	147	2	53	2	0	57	6	148	33	1	187	513
Hourly Total	214	147	181	0	542	202	635	39	1	876	19	240	31	2	290	25	764	186	7	975	2683
Grand Total	2874	2197	2811	59	7882	2428	8800	725	57	11953	563	3200	755	45	4518	600	9387	2793	31	12780	37133
Approach %	36.5	27.9	35.7	-	-	20.3	73.6	6.1	-	-	12.5	70.8	16.7	-	-	4.7	73.5	21.9	-	-	-
Total %	7.7	5.9	7.6	-	21.2	6.5	23.7	2.0	-	32.2	1.5	8.6	2.0	-	12.2	1.6	25.3	7.5	-	34.4	-
All Vehicles (no classification)	2874	2197	2811	-	7882	2428	8800	725	-	11953	563	3200	755	-	4518	600	9387	2793	-	12780	37133
% All Vehicles (no classification)	100.0	100.0	100.0	-	100.0	100.0	100.0	100.0	-	100.0	100.0	100.0	-	100.0	100.0	100.0	100.0	100.0	-	100.0	100.0
Bicycles on Crosswalk	-	-	-	14	-	-	-	-	12	-	-	-	-	8	-	-	-	-	9	-	-
% Bicycles on Crosswalk	-	-	-	23.7	-	-	-	-	21.1	-	-	-	-	17.8	-	-	-	-	29.0	-	-
Pedestrians	-	-	-	45	-	-	-	-	45	-	-	-	-	37	-	-	-	-	22	-	-
% Pedestrians	-	-	-	76.3	-	-	-	-	78.9	-	-	-	-	82.2	-	-	-	-	71.0	-	-



Turning Movement Data Plot

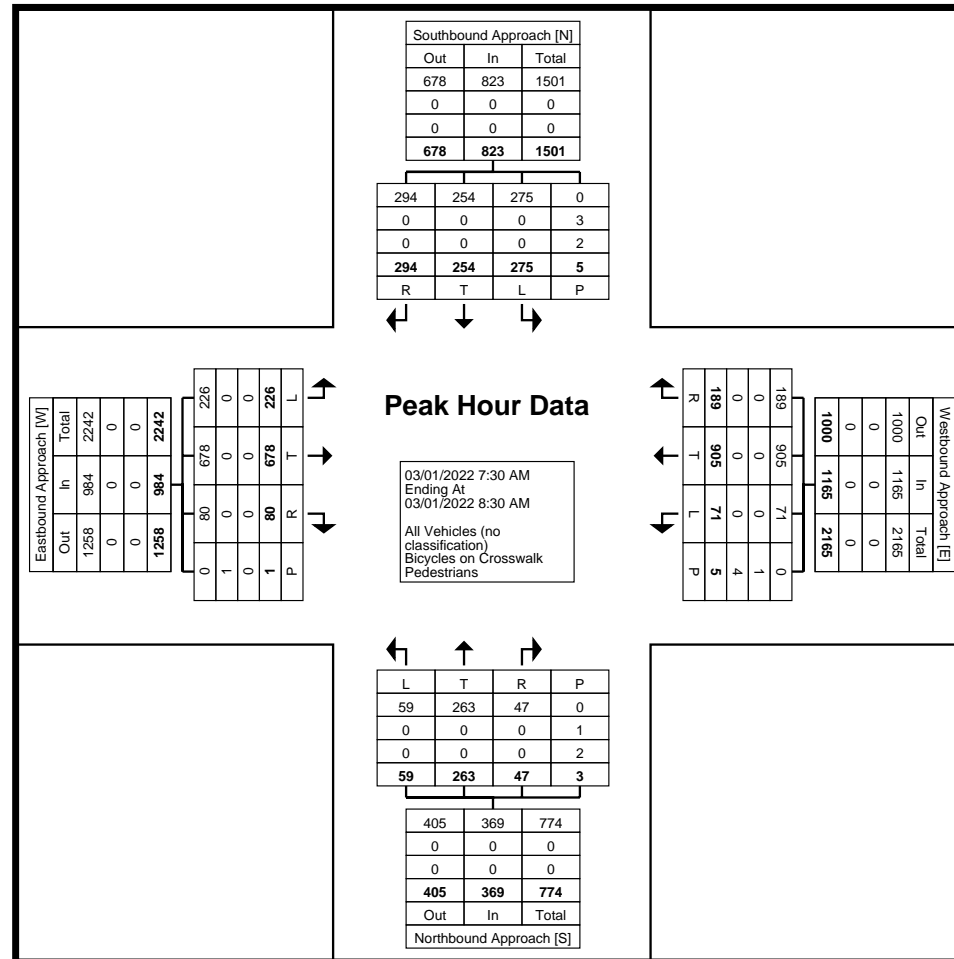
City of Tampa (FL)  
 306 East Jackson Street  
 PO Box 2000  
 Tampa, Florida, United States 33602  
 (813) 274-8105

Count Name: W Dr Martin L King Blvd & N  
 Habana Ave  
 Site Code:  
 Start Date: 03/01/2022  
 Page No: 4

### Turning Movement Peak Hour Data (7:30 AM)

Start Time	Southbound Approach Southbound					Westbound Approach Westbound					Northbound Approach Northbound					Eastbound Approach Eastbound					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
7:30 AM	66	72	76	2	214	46	230	11	3	287	14	76	15	1	105	17	203	46	0	266	872
7:45 AM	80	64	59	0	203	36	257	23	2	316	10	91	19	2	120	21	158	51	1	230	869
8:00 AM	71	59	62	2	192	52	218	16	0	286	12	51	15	0	78	23	174	67	0	264	820
8:15 AM	77	59	78	1	214	55	200	21	0	276	11	45	10	0	66	19	143	62	0	224	780
Total	294	254	275	5	823	189	905	71	5	1165	47	263	59	3	369	80	678	226	1	984	3341
Approach %	35.7	30.9	33.4	-	-	16.2	77.7	6.1	-	-	12.7	71.3	16.0	-	-	8.1	68.9	23.0	-	-	-
Total %	8.8	7.6	8.2	-	24.6	5.7	27.1	2.1	-	34.9	1.4	7.9	1.8	-	11.0	2.4	20.3	6.8	-	29.5	-
PHF	0.919	0.882	0.881	-	0.961	0.859	0.880	0.772	-	0.922	0.839	0.723	0.776	-	0.769	0.870	0.835	0.843	-	0.925	0.958
All Vehicles (no classification)	294	254	275	-	823	189	905	71	-	1165	47	263	59	-	369	80	678	226	-	984	3341
% All Vehicles (no classification)	100.0	100.0	100.0	-	100.0	100.0	100.0	100.0	-	100.0	100.0	100.0	100.0	-	100.0	100.0	100.0	100.0	-	100.0	100.0
Bicycles on Crosswalk	-	-	-	3	-	-	-	-	1	-	-	-	-	1	-	-	-	-	1	-	-
% Bicycles on Crosswalk	-	-	-	60.0	-	-	-	-	20.0	-	-	-	-	33.3	-	-	-	-	100.0	-	-
Pedestrians	-	-	-	2	-	-	-	-	4	-	-	-	-	2	-	-	-	-	0	-	-
% Pedestrians	-	-	-	40.0	-	-	-	-	80.0	-	-	-	-	66.7	-	-	-	-	0.0	-	-





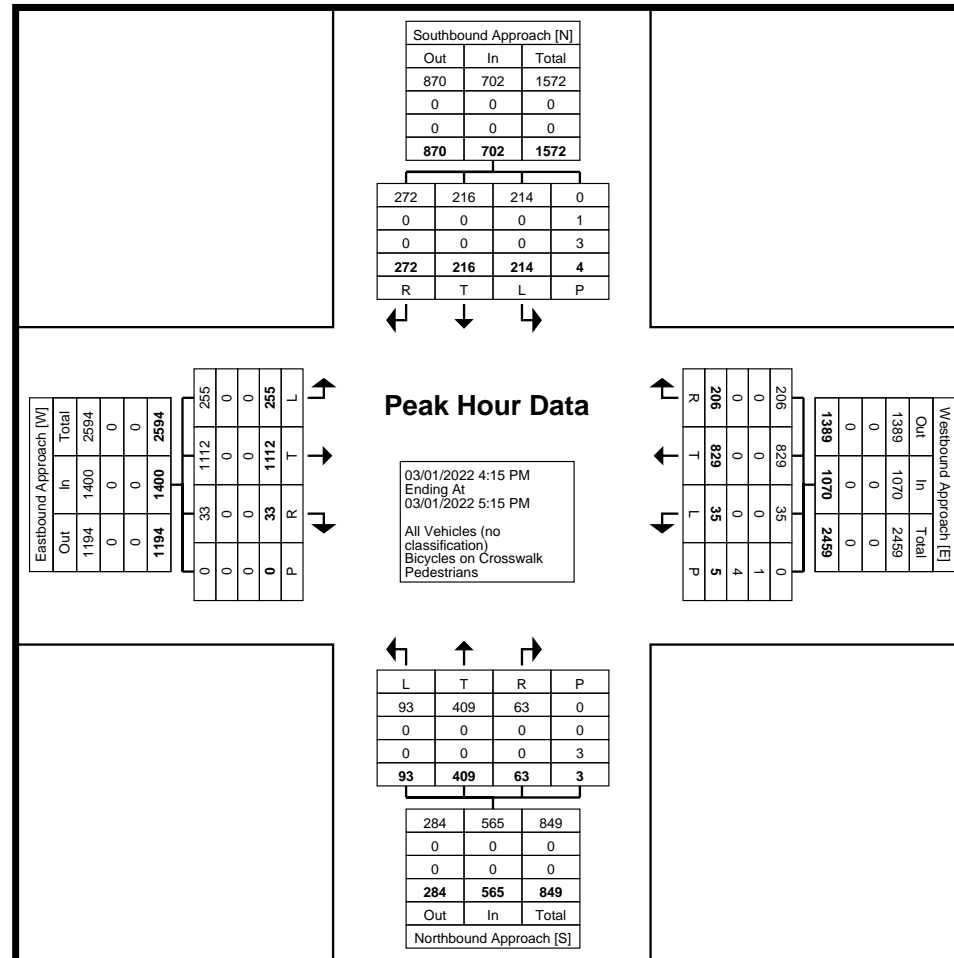
Turning Movement Peak Hour Data Plot (7:30 AM)

City of Tampa (FL)  
 306 East Jackson Street  
 PO Box 2000  
 Tampa, Florida, United States 33602  
 (813) 274-8105

Count Name: W Dr Martin L King Blvd & N  
 Habana Ave  
 Site Code:  
 Start Date: 03/01/2022  
 Page No: 6

### Turning Movement Peak Hour Data (4:15 PM)

Start Time	Southbound Approach Southbound					Westbound Approach Westbound					Northbound Approach Northbound					Eastbound Approach Eastbound					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
4:15 PM	62	56	65	0	183	52	192	10	3	254	15	109	22	2	146	11	270	72	0	353	936
4:30 PM	66	45	58	1	169	47	216	6	1	269	14	94	23	0	131	9	286	65	0	360	929
4:45 PM	76	48	41	2	165	65	222	6	0	293	13	106	18	0	137	5	261	48	0	314	909
5:00 PM	68	67	50	1	185	42	199	13	1	254	21	100	30	1	151	8	295	70	0	373	963
Total	272	216	214	4	702	206	829	35	5	1070	63	409	93	3	565	33	1112	255	0	1400	3737
Approach %	38.7	30.8	30.5	-	-	19.3	77.5	3.3	-	-	11.2	72.4	16.5	-	-	2.4	79.4	18.2	-	-	-
Total %	7.3	5.8	5.7	-	18.8	5.5	22.2	0.9	-	28.6	1.7	10.9	2.5	-	15.1	0.9	29.8	6.8	-	37.5	-
PHF	0.895	0.806	0.823	-	0.949	0.792	0.934	0.673	-	0.913	0.750	0.938	0.775	-	0.935	0.750	0.942	0.885	-	0.938	0.970
All Vehicles (no classification)	272	216	214	-	702	206	829	35	-	1070	63	409	93	-	565	33	1112	255	-	1400	3737
% All Vehicles (no classification)	100.0	100.0	100.0	-	100.0	100.0	100.0	100.0	-	100.0	100.0	100.0	100.0	-	100.0	100.0	100.0	100.0	-	100.0	100.0
Bicycles on Crosswalk	-	-	-	1	-	-	-	-	1	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	25.0	-	-	-	-	20.0	-	-	-	-	0.0	-	-	-	-	-	-	-
Pedestrians	-	-	-	3	-	-	-	-	4	-	-	-	-	3	-	-	-	-	0	-	-
% Pedestrians	-	-	-	75.0	-	-	-	-	80.0	-	-	-	-	100.0	-	-	-	-	-	-	-

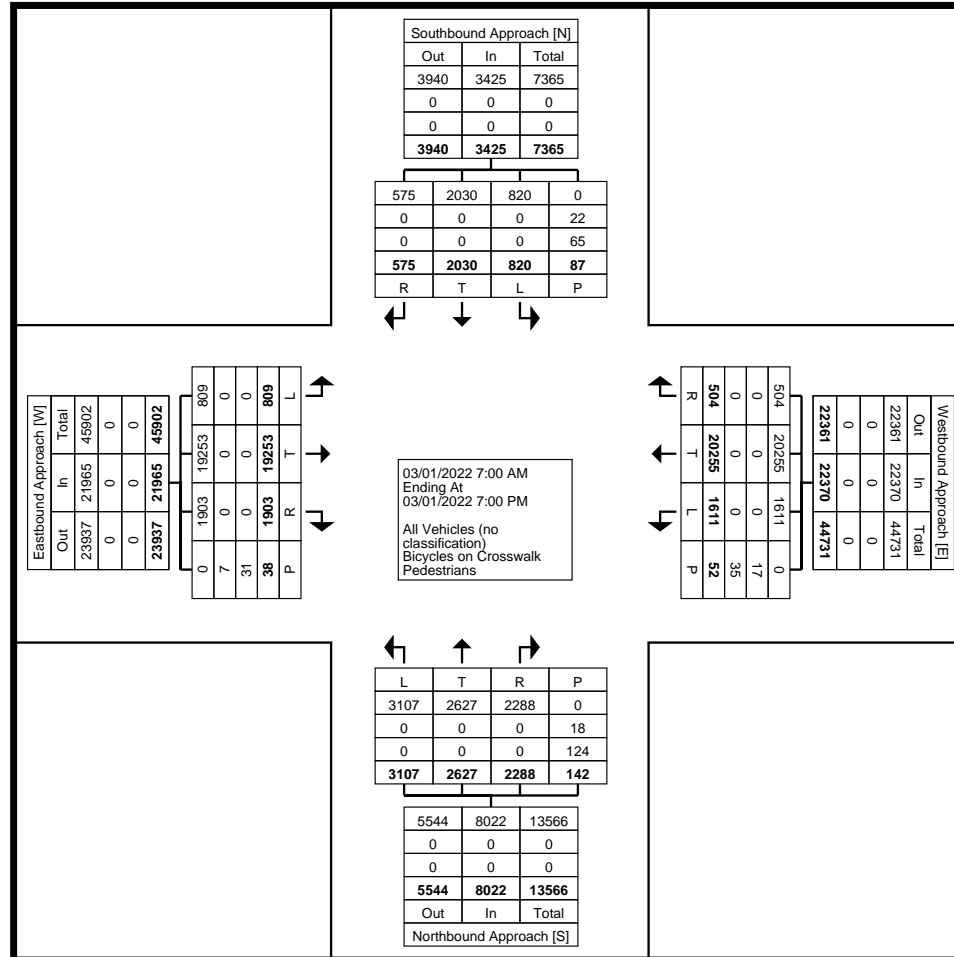


Turning Movement Peak Hour Data Plot (4:15 PM)

### Turning Movement Data

Start Time	Southbound Approach Southbound					Westbound Approach Westbound					Northbound Approach Northbound					Eastbound Approach Eastbound					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
7:00 AM	4	44	16	1	64	8	479	14	0	501	29	25	40	0	94	42	358	8	0	408	1067
7:15 AM	5	39	23	0	67	11	463	32	1	506	45	36	47	3	128	42	384	24	0	450	1151
7:30 AM	8	70	22	3	100	22	522	50	0	594	36	39	58	0	133	38	427	15	0	480	1307
7:45 AM	8	59	12	3	79	8	557	54	1	619	36	41	42	2	119	47	490	23	0	560	1377
Hourly Total	25	212	73	7	310	49	2021	150	2	2220	146	141	187	5	474	169	1659	70	0	1898	4902
8:00 AM	7	61	13	4	81	7	481	59	0	547	29	36	47	0	112	70	374	17	0	461	1201
8:15 AM	7	61	18	0	86	2	401	49	0	452	26	34	62	0	122	66	349	6	0	421	1081
8:30 AM	11	61	14	0	86	6	479	56	0	541	29	28	49	1	106	50	374	9	0	433	1166
8:45 AM	12	51	8	1	71	11	515	37	0	563	29	36	50	0	115	56	323	17	0	396	1145
Hourly Total	37	234	53	5	324	26	1876	201	0	2103	113	134	208	1	455	242	1420	49	0	1711	4593
9:00 AM	6	53	25	0	84	11	441	49	1	501	25	33	54	0	112	37	320	16	1	373	1070
9:15 AM	11	51	11	1	73	5	369	30	2	404	35	38	65	1	138	42	289	13	0	344	959
9:30 AM	8	26	16	3	50	2	385	39	0	426	38	29	42	1	109	55	311	10	0	376	961
9:45 AM	4	42	12	0	58	6	352	36	0	394	33	34	68	1	135	45	330	9	0	384	971
Hourly Total	29	172	64	4	265	24	1547	154	3	1725	131	134	229	3	494	179	1250	48	1	1477	3961
10:00 AM	14	31	17	0	62	4	374	29	0	407	44	37	68	1	149	52	288	7	0	347	965
10:15 AM	5	31	9	2	45	7	363	33	0	403	53	33	68	1	154	52	292	9	1	353	955
10:30 AM	11	33	15	2	59	8	421	30	1	459	42	34	72	1	148	49	323	16	1	388	1054
10:45 AM	16	44	12	0	72	6	409	39	0	454	43	46	77	3	166	41	355	15	3	411	1103
Hourly Total	46	139	53	4	238	25	1567	131	1	1723	182	150	285	6	617	194	1258	47	5	1499	4077
11:00 AM	13	39	15	2	67	1	364	26	2	391	46	37	73	2	156	48	357	20	1	425	1039
11:15 AM	20	40	25	2	85	5	357	31	2	393	33	42	72	11	147	44	315	18	3	377	1002
11:30 AM	16	31	14	1	61	8	364	30	3	402	44	52	77	4	173	45	343	13	2	401	1037
11:45 AM	12	38	17	0	67	9	352	30	5	391	38	52	83	6	173	34	348	13	0	395	1026
Hourly Total	61	148	71	5	280	23	1437	117	12	1577	161	183	305	23	649	171	1363	64	6	1598	4104
12:00 PM	15	26	15	1	56	7	382	23	1	412	54	49	62	12	165	48	354	21	1	423	1056
12:15 PM	8	32	16	2	56	7	387	29	4	423	52	47	90	0	189	34	400	17	1	451	1119
12:30 PM	17	39	23	2	79	7	370	35	0	412	47	45	62	3	154	34	393	20	2	447	1092
12:45 PM	10	29	11	3	50	9	449	39	1	497	52	46	68	3	166	43	357	20	1	420	1133
Hourly Total	50	126	65	8	241	30	1588	126	6	1744	205	187	282	18	674	159	1504	78	5	1741	4400
1:00 PM	14	43	14	5	71	7	367	32	1	406	45	47	55	2	147	50	430	14	3	494	1118
1:15 PM	12	45	16	2	73	2	430	29	0	461	46	40	63	0	149	34	469	12	1	515	1198
1:30 PM	12	37	18	1	67	10	432	42	0	484	41	47	74	2	162	45	436	19	0	500	1213
1:45 PM	10	35	19	4	64	10	420	44	3	474	47	53	70	2	170	42	433	14	2	489	1197
Hourly Total	48	160	67	12	275	29	1649	147	4	1825	179	187	262	6	628	171	1768	59	6	1998	4726
2:00 PM	19	46	13	0	78	10	377	21	2	408	52	46	65	0	163	42	410	11	0	463	1112
2:15 PM	11	43	14	1	68	12	433	41	0	486	58	59	64	0	181	42	356	18	0	416	1151
2:30 PM	18	53	15	3	86	10	393	27	0	430	54	61	71	0	186	41	415	11	0	467	1169
2:45 PM	16	49	20	1	85	15	450	38	0	503	50	73	70	2	193	34	314	22	0	370	1151

Hourly Total	64	191	62	5	317	47	1653	127	2	1827	214	239	270	2	723	159	1495	62	0	1716	4583
3:00 PM	10	39	17	3	66	9	425	33	1	467	65	70	85	4	220	53	447	27	1	527	1280
3:15 PM	16	37	23	3	76	12	446	29	1	487	80	76	70	4	226	36	413	20	2	469	1258
3:30 PM	19	54	11	2	84	14	429	28	1	471	70	67	65	8	202	41	463	22	1	526	1283
3:45 PM	13	37	16	3	66	19	481	38	1	538	49	85	74	1	208	32	425	20	1	477	1289
Hourly Total	58	167	67	11	292	54	1781	128	4	1963	264	298	294	17	856	162	1748	89	5	1999	5110
4:00 PM	11	39	14	2	64	22	410	29	2	461	52	79	74	0	205	35	531	22	1	588	1318
4:15 PM	5	42	27	3	74	18	496	27	0	541	88	93	64	4	245	29	445	17	2	491	1351
4:30 PM	16	42	19	2	77	20	405	29	1	454	70	82	68	8	220	26	530	20	2	576	1327
4:45 PM	18	36	18	2	72	17	466	28	2	511	76	117	68	7	261	16	466	15	0	497	1341
Hourly Total	50	159	78	9	287	77	1777	113	5	1967	286	371	274	19	931	106	1972	74	5	2152	5337
5:00 PM	19	43	19	1	81	9	410	20	1	439	72	88	78	5	238	18	520	19	0	557	1315
5:15 PM	10	35	30	4	75	23	553	35	2	611	66	91	64	6	221	22	449	14	0	485	1392
5:30 PM	15	53	18	3	86	14	450	22	0	486	57	102	71	5	230	21	514	23	0	558	1360
5:45 PM	12	48	22	4	82	21	475	24	2	520	55	91	67	5	213	22	455	29	0	506	1321
Hourly Total	56	179	89	12	324	67	1888	101	5	2056	250	372	280	21	902	83	1938	85	0	2106	5388
6:00 PM	14	44	22	1	80	15	406	27	3	448	34	72	63	8	169	26	526	32	3	584	1281
6:15 PM	9	33	25	3	67	13	394	32	3	439	39	72	65	4	176	36	446	17	2	499	1181
6:30 PM	12	35	14	0	61	12	354	35	0	401	41	55	63	6	159	23	472	20	0	515	1136
6:45 PM	16	31	17	1	64	13	317	22	2	352	43	32	40	3	115	23	434	15	0	472	1003
Hourly Total	51	143	78	5	272	53	1471	116	8	1640	157	231	231	21	619	108	1878	84	5	2070	4601
Grand Total	575	2030	820	87	3425	504	20255	1611	52	22370	2288	2627	3107	142	8022	1903	19253	809	38	21965	55782
Approach %	16.8	59.3	23.9	-	-	2.3	90.5	7.2	-	-	28.5	32.7	38.7	-	-	8.7	87.7	3.7	-	-	-
Total %	1.0	3.6	1.5	-	6.1	0.9	36.3	2.9	-	40.1	4.1	4.7	5.6	-	14.4	3.4	34.5	1.5	-	39.4	-
All Vehicles (no classification)	575	2030	820	-	3425	504	20255	1611	-	22370	2288	2627	3107	-	8022	1903	19253	809	-	21965	55782
% All Vehicles (no classification)	100.0	100.0	100.0	-	100.0	100.0	100.0	100.0	-	100.0	100.0	100.0	100.0	-	100.0	100.0	100.0	100.0	-	100.0	100.0
Bicycles on Crosswalk	-	-	-	22	-	-	-	-	17	-	-	-	-	18	-	-	-	-	7	-	-
% Bicycles on Crosswalk	-	-	-	25.3	-	-	-	-	32.7	-	-	-	-	12.7	-	-	-	-	18.4	-	-
Pedestrians	-	-	-	65	-	-	-	-	35	-	-	-	-	124	-	-	-	-	31	-	-
% Pedestrians	-	-	-	74.7	-	-	-	-	67.3	-	-	-	-	87.3	-	-	-	-	81.6	-	-



Turning Movement Data Plot

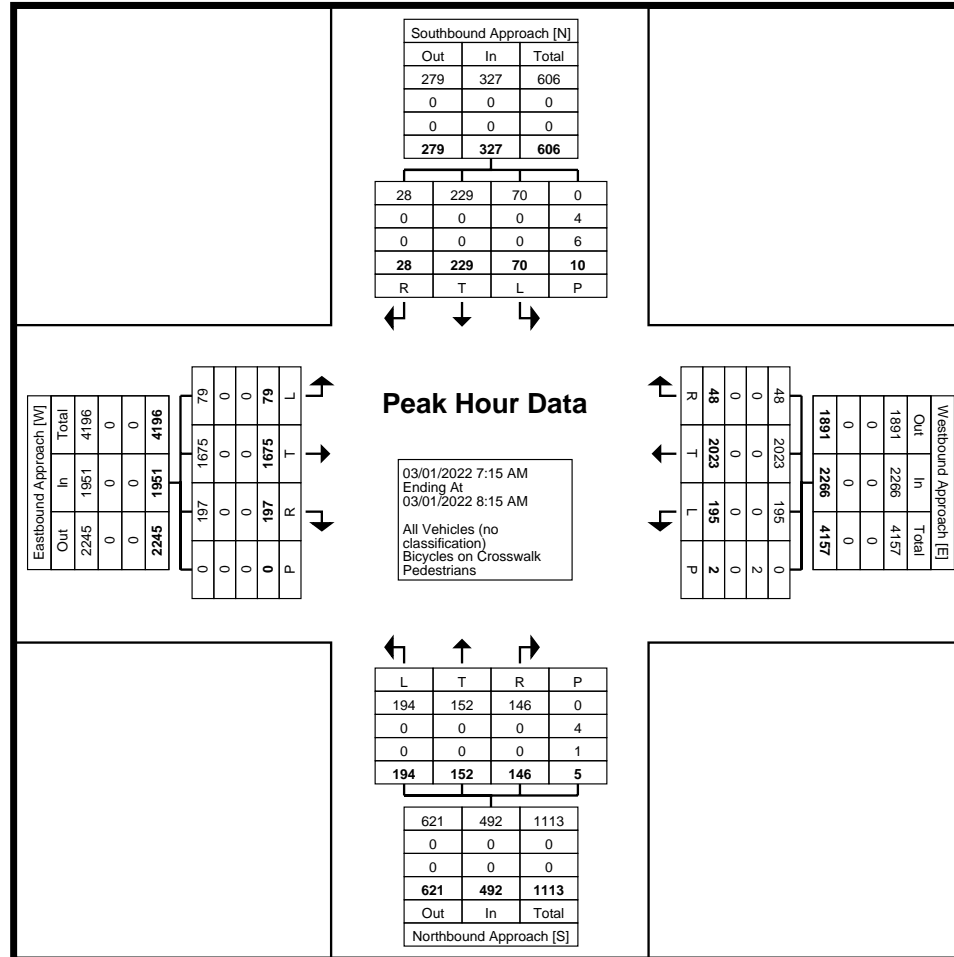


City of Tampa (FL)  
 306 East Jackson Street  
 PO Box 2000  
 Tampa, Florida, United States 33602  
 (813) 274-8105

Count Name: W Hillsborough & N Habana Ave  
 Site Code:  
 Start Date: 03/01/2022  
 Page No: 4

### Turning Movement Peak Hour Data (7:15 AM)

Start Time	Southbound Approach Southbound					Westbound Approach Westbound					Northbound Approach Northbound					Eastbound Approach Eastbound					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
7:15 AM	5	39	23	0	67	11	463	32	1	506	45	36	47	3	128	42	384	24	0	450	1151
7:30 AM	8	70	22	3	100	22	522	50	0	594	36	39	58	0	133	38	427	15	0	480	1307
7:45 AM	8	59	12	3	79	8	557	54	1	619	36	41	42	2	119	47	490	23	0	560	1377
8:00 AM	7	61	13	4	81	7	481	59	0	547	29	36	47	0	112	70	374	17	0	461	1201
Total	28	229	70	10	327	48	2023	195	2	2266	146	152	194	5	492	197	1675	79	0	1951	5036
Approach %	8.6	70.0	21.4	-	-	2.1	89.3	8.6	-	-	29.7	30.9	39.4	-	-	10.1	85.9	4.0	-	-	-
Total %	0.6	4.5	1.4	-	6.5	1.0	40.2	3.9	-	45.0	2.9	3.0	3.9	-	9.8	3.9	33.3	1.6	-	38.7	-
PHF	0.875	0.818	0.761	-	0.818	0.545	0.908	0.826	-	0.915	0.811	0.927	0.836	-	0.925	0.704	0.855	0.823	-	0.871	0.914
All Vehicles (no classification)	28	229	70	-	327	48	2023	195	-	2266	146	152	194	-	492	197	1675	79	-	1951	5036
% All Vehicles (no classification)	100.0	100.0	100.0	-	100.0	100.0	100.0	100.0	-	100.0	100.0	100.0	100.0	-	100.0	100.0	100.0	100.0	-	100.0	100.0
Bicycles on Crosswalk	-	-	-	4	-	-	-	-	2	-	-	-	-	4	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	40.0	-	-	-	-	100.0	-	-	-	-	80.0	-	-	-	-	-	-	-
Pedestrians	-	-	-	6	-	-	-	-	0	-	-	-	-	1	-	-	-	-	0	-	-
% Pedestrians	-	-	-	60.0	-	-	-	-	0.0	-	-	-	-	20.0	-	-	-	-	-	-	-



Turning Movement Peak Hour Data Plot (7:15 AM)

City of Tampa (FL)  
 306 East Jackson Street  
 PO Box 2000  
 Tampa, Florida, United States 33602  
 (813) 274-8105

Count Name: W Hillsborough & N Habana Ave  
 Site Code:  
 Start Date: 03/01/2022  
 Page No: 6

### Turning Movement Peak Hour Data (4:45 PM)

Start Time	Southbound Approach Southbound					Westbound Approach Westbound					Northbound Approach Northbound					Eastbound Approach Eastbound					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
4:45 PM	18	36	18	2	72	17	466	28	2	511	76	117	68	7	261	16	466	15	0	497	1341
5:00 PM	19	43	19	1	81	9	410	20	1	439	72	88	78	5	238	18	520	19	0	557	1315
5:15 PM	10	35	30	4	75	23	553	35	2	611	66	91	64	6	221	22	449	14	0	485	1392
5:30 PM	15	53	18	3	86	14	450	22	0	486	57	102	71	5	230	21	514	23	0	558	1360
Total	62	167	85	10	314	63	1879	105	5	2047	271	398	281	23	950	77	1949	71	0	2097	5408
Approach %	19.7	53.2	27.1	-	-	3.1	91.8	5.1	-	-	28.5	41.9	29.6	-	-	3.7	92.9	3.4	-	-	-
Total %	1.1	3.1	1.6	-	5.8	1.2	34.7	1.9	-	37.9	5.0	7.4	5.2	-	17.6	1.4	36.0	1.3	-	38.8	-
PHF	0.816	0.788	0.708	-	0.913	0.685	0.849	0.750	-	0.838	0.891	0.850	0.901	-	0.910	0.875	0.937	0.772	-	0.940	0.971
All Vehicles (no classification)	62	167	85	-	314	63	1879	105	-	2047	271	398	281	-	950	77	1949	71	-	2097	5408
% All Vehicles (no classification)	100.0	100.0	100.0	-	100.0	100.0	100.0	100.0	-	100.0	100.0	100.0	100.0	-	100.0	100.0	100.0	100.0	-	100.0	100.0
Bicycles on Crosswalk	-	-	-	3	-	-	-	-	1	-	-	-	-	2	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	30.0	-	-	-	-	20.0	-	-	-	-	8.7	-	-	-	-	-	-	-
Pedestrians	-	-	-	7	-	-	-	-	4	-	-	-	-	21	-	-	-	-	0	-	-
% Pedestrians	-	-	-	70.0	-	-	-	-	80.0	-	-	-	-	91.3	-	-	-	-	-	-	-



Lanes, Volumes, Timings  
3: Habana & MLK

Habana @ Hillsborough AM Peak Proposed  
09/27/2023

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	226	678	80	71	905	189	59	263	47	275	254	294	
Future Volume (vph)	226	678	80	71	905	189	59	263	47	275	254	294	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	8	11	11	10	11	11	11	12	12	11	11	11	
Storage Length (ft)	213		0	163		0	211		0	184		0	
Storage Lanes	1		0	1		0	1		1	3		1	
Taper Length (ft)	25			25			25			25			
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	0.97	1.00	1.00	
Ped Bike Factor		1.00			0.99							0.98	
Frt		0.984			0.974				0.850			0.850	
Flt Protected	0.950			0.950			0.950			0.950			
Satd. Flow (prot)	1534	3359	0	1652	3310	0	1711	1863	1583	3319	1801	1531	
Flt Permitted	0.079			0.339			0.950			0.950			
Satd. Flow (perm)	128	3359	0	589	3310	0	1711	1863	1583	3319	1801	1498	
Right Turn on Red			Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		14			19				166			310	
Link Speed (mph)		35			35			40				40	
Link Distance (ft)		852			1053			473			5432		
Travel Time (s)		16.6			20.5			8.1			92.6		
Confl. Peds. (#/hr)						4			2			2	
Confl. Bikes (#/hr)			1			1			1			3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Growth Factor	101%	101%	101%	101%	101%	101%	101%	101%	101%	101%	101%	101%	
Adj. Flow (vph)	248	744	88	78	994	207	65	289	52	302	279	323	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	248	832	0	78	1201	0	65	289	52	302	279	323	
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No	
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right	
Median Width(ft)		10			10			22			22		
Link Offset(ft)		0			0			0			0		
Crosswalk Width(ft)		16			16			16			16		
Two way Left Turn Lane													
Headway Factor	1.20	1.04	1.04	1.09	1.04	1.04	1.04	1.00	1.00	1.04	1.04	1.04	
Turning Speed (mph)	15		9	15		9	15		9	15		9	
Turn Type	pm+pt	NA		Perm	NA		Prot	NA	NA	Prot	NA	Perm	
Protected Phases	7	4			8		5	2		1		6	
Permitted Phases	4			8								6	
Minimum Split (s)	20.0	60.0		60.0	60.0		20.0	25.0		20.0	25.0	25.0	
Total Split (s)	25.0	100.0		75.0	75.0		25.0	35.0		25.0	35.0	35.0	
Total Split (%)	15.6%	62.5%		46.9%	46.9%		15.6%	21.9%		15.6%	21.9%	21.9%	
Maximum Green (s)	18.4	93.4		68.4	68.4		17.7	28.1		17.7	28.1	28.1	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.4	4.4		4.4	4.4	4.4	
All-Red Time (s)	2.6	2.6		2.6	2.6		2.9	2.5		2.9	2.5	2.5	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0	
Total Lost Time (s)	6.6	6.6		6.6	6.6		7.3	6.9		7.3	6.9	6.9	
Lead/Lag	Lead			Lag	Lag		Lead	Lag		Lead	Lag	Lag	
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes		Yes	Yes	Yes	
Walk Time (s)		7.0		7.0	7.0			7.0			7.0	7.0	

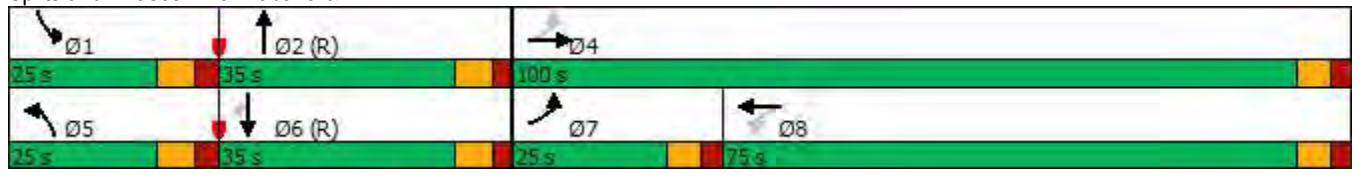
Lanes, Volumes, Timings  
3: Habana & MLK

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Flash Dont Walk (s)		11.0		11.0	11.0			11.0			11.0	11.0
Pedestrian Calls (#/hr)		0		0	0			0			0	0
Act Effct Green (s)	93.4	93.4		68.4	68.4		17.7	28.1	0.0	17.7	28.1	28.1
Actuated g/C Ratio	0.58	0.58		0.43	0.43		0.11	0.18	0.00	0.11	0.18	0.18
v/c Ratio	1.05	0.42		0.31	0.84		0.34	0.88	0.31	0.82	0.88	0.62
Control Delay	112.0	18.9		34.6	47.0		71.4	91.5	4.9	88.0	92.0	12.6
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	112.0	18.9		34.6	47.0		71.4	91.5	4.9	88.0	92.0	12.6
LOS	F	B		C	D		E	F	A	F	F	B
Approach Delay		40.3			46.3			77.2			62.3	
Approach LOS		D			D			E			E	
Stops (vph)	139	402		48	960		55	243	0	261	235	37
Fuel Used(gal)	8	11		1	26		2	8	0	18	17	12
CO Emissions (g/hr)	534	746		99	1831		112	573	14	1243	1160	844
NOx Emissions (g/hr)	104	145		19	356		22	111	3	242	226	164
VOC Emissions (g/hr)	124	173		23	424		26	133	3	288	269	196
Dilemma Vehicles (#)	0	24		0	35		0	8	0	0	8	0
Queue Length 50th (ft)	~215	240		53	580		64	299	0	162	289	12
Queue Length 95th (ft)	#404	289		101	680		117	#469	0	#235	#455	112
Internal Link Dist (ft)		772			973			393			5352	
Turn Bay Length (ft)	213			163			211			184		
Base Capacity (vph)	236	1966		251	1425		189	327	166	367	316	518
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	1.05	0.42		0.31	0.84		0.34	0.88	0.31	0.82	0.88	0.62

Intersection Summary

Area Type: Other  
 Cycle Length: 160  
 Actuated Cycle Length: 160  
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green  
 Natural Cycle: 125  
 Control Type: Pretimed  
 Maximum v/c Ratio: 1.05  
 Intersection Signal Delay: 51.9 Intersection LOS: D  
 Intersection Capacity Utilization 89.8% ICU Level of Service E  
 Analysis Period (min) 15  
 ~ Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Splits and Phases: 3: Habana & MLK



Lanes, Volumes, Timings  
3: Habana & MLK

Habana @ Hillsborough PM Peak Proposed  
09/27/2023

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	258	1123	33	35	837	208	94	413	64	216	218	275
Future Volume (vph)	258	1123	33	35	837	208	94	413	64	216	218	275
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	8	11	11	10	11	11	11	12	12	11	11	11
Storage Length (ft)	213		0	163		0	211		0	184		0
Storage Lanes	1		0	1		0	1		1	3		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	0.97	1.00	1.00
Ped Bike Factor		1.00			0.99				0.98			0.98
Frt		0.996			0.970				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1534	3406	0	1652	3294	0	1711	1863	1583	3319	1801	1531
Flt Permitted	0.067			0.194			0.950			0.950		
Satd. Flow (perm)	108	3406	0	337	3294	0	1711	1863	1555	3319	1801	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			24				132			302
Link Speed (mph)		35			35			40				40
Link Distance (ft)		852			1053			473			5432	
Travel Time (s)		16.6			20.5			8.1			92.6	
Confl. Peds. (#/hr)						4			2			2
Confl. Bikes (#/hr)			1			1			1			3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	101%	101%	101%	101%	101%	101%	101%	101%	101%	101%	101%	101%
Adj. Flow (vph)	283	1233	36	38	919	228	103	453	70	237	239	302
Shared Lane Traffic (%)												
Lane Group Flow (vph)	283	1269	0	38	1147	0	103	453	70	237	239	302
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		10			10			22			22	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.20	1.04	1.04	1.09	1.04	1.04	1.04	1.00	1.00	1.04	1.04	1.04
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	pm+pt	NA		Perm	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases	4			8					2			6
Minimum Split (s)	20.0	60.0		60.0	60.0		20.0	25.0	25.0	20.0	25.0	25.0
Total Split (s)	26.0	86.0		60.0	60.0		22.0	39.0	39.0	20.0	37.0	37.0
Total Split (%)	17.9%	59.3%		41.4%	41.4%		15.2%	26.9%	26.9%	13.8%	25.5%	25.5%
Maximum Green (s)	19.4	79.4		53.4	53.4		14.7	32.1	32.1	12.7	30.1	30.1
Yellow Time (s)	4.0	4.0		4.0	4.0		4.4	4.4	4.4	4.4	4.4	4.4
All-Red Time (s)	2.6	2.6		2.6	2.6		2.9	2.5	2.5	2.9	2.5	2.5
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.6	6.6		6.6	6.6		7.3	6.9	6.9	7.3	6.9	6.9
Lead/Lag	Lead			Lag	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Walk Time (s)		7.0		7.0	7.0			7.0	7.0		7.0	7.0



Lanes, Volumes, Timings  
3: Habana & MLK

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Flash Dont Walk (s)		11.0		11.0	11.0			11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0		0	0			0	0		0	0
Act Effct Green (s)	79.4	79.4		53.4	53.4		14.7	32.1	32.1	12.7	30.1	30.1
Actuated g/C Ratio	0.55	0.55		0.37	0.37		0.10	0.22	0.22	0.09	0.21	0.21
v/c Ratio	1.14	0.68		0.31	0.93		0.60	1.10	0.16	0.82	0.64	0.55
Control Delay	138.7	25.9		41.2	57.4		77.3	125.2	0.8	86.8	61.4	9.0
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	138.7	25.9		41.2	57.4		77.3	125.2	0.8	86.8	61.4	9.0
LOS	F	C		D	E		E	F	A	F	E	A
Approach Delay		46.5			56.9			103.4			48.8	
Approach LOS		D			E			F			D	
Stops (vph)	175	814		26	944		90	354	0	204	200	28
Fuel Used(gal)	10	19		1	27		3	15	0	14	13	11
CO Emissions (g/hr)	717	1360		53	1918		188	1080	15	971	896	771
NOx Emissions (g/hr)	139	265		10	373		36	210	3	189	174	150
VOC Emissions (g/hr)	166	315		12	445		43	250	3	225	208	179
Dilemma Vehicles (#)	0	40		0	35		0	12	0	0	8	0
Queue Length 50th (ft)	~266	439		25	538		95	~484	0	115	208	0
Queue Length 95th (ft)	#456	520		62	#682		160	#701	0	#183	304	84
Internal Link Dist (ft)		772			973			393			5352	
Turn Bay Length (ft)	213			163			211			184		
Base Capacity (vph)	249	1866		124	1228		173	412	447	290	373	550
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	1.14	0.68		0.31	0.93		0.60	1.10	0.16	0.82	0.64	0.55

Intersection Summary

Area Type: Other  
 Cycle Length: 145  
 Actuated Cycle Length: 145  
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green  
 Natural Cycle: 145  
 Control Type: Pretimed  
 Maximum v/c Ratio: 1.14  
 Intersection Signal Delay: 58.5 Intersection LOS: E  
 Intersection Capacity Utilization 95.6% ICU Level of Service F  
 Analysis Period (min) 15  
 ~ Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Splits and Phases: 3: Habana & MLK

