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Subject: Napier Avenue Traffic Study

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Date: 09/07/2018

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## **1.0 INTRODUCTION**

Napier Avenue in St. Joseph Charter Township and Benton Charter Township is a four-lane arterial roadway with a posted speed limit varying from 35 to 40 mph. AECOM has been asked to evaluate the possibility of converting the existing roadway to a three-lane cross section with one lane in each direction, a center left-turn lane, and bike lanes within the limits of the study area. The study area along Napier Avenue is from the St. Joseph River east to Union Avenue and includes the signalized intersections along Napier Avenue at Miami Road, Colfax Avenue, and Union Avenue.

Based on the proposed plan, the following actions were taken:

- Field survey was done of the roadway infrastructure, traffic control devices and other relevant information.
- Traffic volume data was collected at the intersections of Napier Avenue at Miami Road, Colfax Avenue, Union Avenue, and M-139 for the weekday AM and PM peak periods.
- A Synchro model was developed for the study area to perform capacity analysis for the existing and the proposed conditions.

For the purposes of the analysis, the intersection of Napier Avenue and M-139 was included in the model to understand what impacts, if any, reducing the number of lanes on Napier Avenue at Union Avenue would have on the intersection at M-139.

MDOT's Safety Program provides crash reduction factors (CRFs) for specific roadway segment and intersection improvements ([https://www.michigan.gov/documents/mdot/Time\\_of\\_Return\\_TOR\\_Spreadsheet\\_Excel\\_560513\\_7.xls](https://www.michigan.gov/documents/mdot/Time_of_Return_TOR_Spreadsheet_Excel_560513_7.xls)). These CRFs are based on various studies within Michigan and around the country. The roadway enhancement of a road diet (4 to 3 lane conversion) on an urban roadway results in a 30% reduction in all applicable crashes. There are also CRFs for various crash types ranging from 20-80% for when a center left-turn lane is constructed at an intersection. The non-signalized intersections along Napier Avenue would benefit from this enhancement and would likely realize the safety improvements associated with these CRFs. There have also been numerous studies around the United States regarding road

diets and the associated safety benefits. The Federal Highway Association's (FHWA) "Road Diet Information Guide" (2014) cites potential overall crash reductions of 19 to 47 percent based on various studies for road diets installed on four-lane roadways. Safety is achieved through reducing the number of conflict points as well as providing improved sight-distance for left-turning vehicles on a three-lane roadway compared to the four-lane undivided roadway.

## 2.0 DATA COLLECTION

Turning movement counts were collected on Thursday, July 19, 2018 at the signalized intersections along Napier Avenue at Miami Road, Colfax Avenue, Union Avenue, and M-139. Data was collected from 7-9 AM and 2-6 PM.

The existing (2018) turning movement count reports are included in **Appendix A**. The three traffic signals along Napier Avenue at the intersections of Colfax Avenue, Union Street, and M-139 operate with four-phase signal operations. The traffic signal at Napier Avenue/M-139 operates with a northbound-southbound leading protected-only left-turn phase, a northbound-southbound through phase, an eastbound-westbound leading protected-only left-turn phase, and an eastbound-westbound through phase. The two traffic signals along Napier Avenue at Colfax Avenue and Union Street both operate with an eastbound-westbound through phase, an eastbound-westbound lagging protected-only left-turn phase, a northbound-southbound through phase, and a northbound-southbound lagging protected-only left-turn phase.

The traffic signal at Napier Avenue/Miami Road is currently controlled by a 3-phase signal. The analysis at the Napier Avenue/Miami Road intersection included phasing changes that the Road Commission is planning to implement later in 2018. The signal will operate with an eastbound-westbound through phase, an eastbound-westbound lagging protected-only left-turn phase, and a northbound-southbound phase.

AECOM field-verified existing geometric information in order to document existing traffic operational conditions at the intersections, and on the segment of Napier Avenue where the proposed lane configuration modification would take place.

Traffic volumes fluctuate with the different seasons as well as with different days of the week. Seasonal and day of week adjustment factors can be used to remove these biases for calculating Average Annual Daily Traffic (AADT) from a small sample size traffic count. MDOT publishes seasonal and day of week adjustment factors to adjust the traffic volume collected on a particular type of roadway. The seasonal factors supplied in the "Napier Avenue Pedestrian & Bicycle Plan Traffic Analysis Memo" are shown in **Table 1**. The appropriate seasonal factor in this scenario is 0.883 as the traffic volumes were collected on Thursday, July 19, 2018 for this study. For conservative purposes, the capacity analysis along Napier Avenue for this study was performed without utilizing the seasonal adjustment factor on the volumes since it was less than 1.0.

**TABLE 1. SEASONAL ADJUSTMENT FACTORS**

Seasonal Factors									
Group	URBAN								
From Year:	2016	To Year:	2016						
	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Month	
Jan	1.788	1.091	1.052	1.016	0.986	1.055	1.345	1.19	
Feb	1.544	0.994	0.984	1.021	1.014	0.917	1.217	1.099	
Mar	1.447	0.964	0.979	0.951	0.93	0.891	1.193	1.051	
Apr	1.502	0.956	0.924	0.926	0.91	0.871	1.19	1.04	
May	1.37	1.004	0.912	0.902	0.881	0.852	0.145	1.009	
Jun	1.332	0.924	0.902	0.891	0.876	0.848	1.109	0.983	
Jul	1.366	1.033	0.916	0.899	0.883	0.864	1.165	1.018	
Aug	1.312	0.914	0.905	0.884	0.872	0.85	1.157	0.985	
Sep	1.369	1.025	0.912	0.909	0.893	0.855	1.171	1.019	
Oct	1.372	0.929	0.899	0.897	0.883	0.836	1.134	0.993	
Nov	1.434	0.933	0.91	0.904	0.973	0.919	1.211	1.041	
Dec	1.774	1.092	0.962	0.946	0.943	0.93	1.321	1.138	

**3.0 LEVEL OF SERVICE ANALYSIS**

In order to quantify intersection traffic operations at the four study area intersections, existing “Level-of-Service” (LOS) values were determined using the industry-standard package, *Highway Capacity Software 2000*.

The Highway Capacity Manual (HCM) considers the average delay per vehicle as the primary measure for assessing the performance of traffic at signalized intersections. Delay is defined as the difference between actual travel time and ideal travel time if no traffic signal is present. Delays may be qualitatively described in terms of “Level of Service” (LOS) provided by the intersection. The term “Level of Service” (LOS) indicates how well (or poorly) traffic operates based on traffic volumes, lane configurations, and traffic controls. Each level is determined by the average amount of traffic control delay experienced by motorists. LOS “A” represents little or no delays while LOS “F” represents operational failure (extensive delays which may include long vehicular queues). LOS “D” or better is typically considered acceptable during peak hours for urban communities like St. Joseph Charter Township and Benton Harbor Charter Township. The Level-of-Service criteria, as defined by the HCM, are described in **Table 2** for signalized and unsignalized intersections.

**TABLE 2  
 PEAK-HOUR LEVEL-OF-SERVICE RANGES  
 HIGHWAY CAPACITY MANUAL (2000)**

Level-of-Service	Signalized Intersections	Unsignalized Intersections
	Control Delay (sec/veh)	Control Delay (sec/veh)
A	≤10	≤10
B	10 – 20	10 – 15
C	20 – 35	15 – 25
D	35 – 55	25 – 35
E	55 – 80	35 – 50
F	>80	>50

Source: 2000 Highway Capacity Manual

A delay and LOS analysis was performed for the Napier Avenue study area using Trafficware’s *Synchro Version 9* software. The operational analysis covers the weekday AM peak period and the weekday PM peak period. It is important to note the LOS analysis was performed on the basis of the peak hour data collected.

Optimization of signal timings at the intersection of Napier Avenue and Colfax Avenue was completed for the proposed conditions. In the morning peak hour, two seconds of green time was shifted to the eastbound-westbound left-turn movement from the eastbound-westbound through movement. In the afternoon peak hour, one second of green time was shifted to the eastbound-westbound through movement from the northbound-southbound left-turn movement. The traffic signal timings were kept same as the existing scenario for the other three intersections for the morning and afternoon peak-hour capacity analysis.

The Napier/Colfax intersection was also modified to include an exclusive eastbound right-turn lane due to the volume of right-turning traffic (207 vehicles) in the afternoon peak hour. With a shared thru/right lane, the proposed delay and LOS was not acceptable. The addition of the right-turn lane with 100’ of storage allows for acceptable delay and LOS values. The signing and striping of the bike lane and roadway on this approach to the intersection will need to be designed in such a way that bike traffic is mixed with right-turning vehicles in the space for the right-turn lane. The National Association of City Transportation Officials’ (NACTO) Urban Bikeway Design Guide (2014, 2<sup>nd</sup> edition) provides recommendations and examples for how this can be done in a shared space.

**Tables 3 – 10** show a detailed breakdown of the delay and LOS analysis performed for the existing volumes on the existing (four-lane cross-section) and the proposed (three-lane cross-section) conditions along Napier Avenue. The delay and LOS for each approach and movement is also included.

**Table 3: LOS for Weekday AM Peak Hour at Napier Avenue and Miami Road**

Approach	Movement	Existing Condition		Proposed Condition	
		Delay	LOS	Delay	LOS
Northbound Miami	Left, Thru and Right	31.2	C	31.2	C
	Approach	31.2	C	31.2	C
Southbound Miami	Left and Thru	31.7	C	31.7	C
	Right	36.6	D	37	D
	Approach	36.1	D	36.4	D
Eastbound Napier	Left	37.5	D	37.5	D
	Thru and Right	3.2	A	4	A
	Approach	6.3	A	7	A
Westbound Napier	Left	-	-	-	-
	Thru and Right	11.6	B	17.9	B
	Approach	11.6	B	17.9	B

**Table 4: LOS for Weekday AM Peak Hour at Napier Avenue and Colfax Avenue**

Approach	Movement	Existing Condition		Proposed Condition	
		Delay	LOS	Delay	LOS
Northbound Colfax	Left	29	C	29.1	C
	Thru and Right	26	C	25.9	C
	Approach	27.5	C	27.5	C
Southbound Colfax	Left	33.6	C	33.5	C
	Thru and Right	34.2	C	34.2	C
	Approach	34	C	34	C
Eastbound Napier	Left	33.6	C	32.5	C
	Thru	16.6	B	22.4	C
	Right	-	-	19.4	B
	Approach	18	B	22.5	C
Westbound Napier	Left	57.1	E	54.2	D
	Thru and Right	24	C	35.5	D
	Approach	26.7	C	37	D

**Table 5: LOS for Weekday AM Peak Hour at Napier Avenue and Union Avenue**

Approach	Movement	Existing Condition		Proposed Condition	
		Delay	LOS	Delay	LOS
Northbound Union	Left	36.7	D	36.9	D
	Thru and Right	34.7	C	34.8	C
	Approach	35.5	D	35.7	D
Southbound Union	Left	38.8	D	39.6	D
	Thru and Right	37.2	D	37.7	D
	Approach	38	D	38.6	D
Eastbound Napier	Left	42.3	D	38.7	D
	Thru and Right	5.5	A	4.5	A
	Approach	6	A	5	A
Westbound Napier	Left	34.8	C	39.2	D
	Thru and Right	9.3	A	9.4	A
	Approach	11.3	B	11.6	B

**Table 6: LOS for Weekday AM Peak Hour at Napier Avenue and M-139**

Approach	Movement	Existing Condition		Proposed Condition	
		Delay	LOS	Delay	LOS
Northbound M-139	Left	46	D	37.8	D
	Thru	17.2	B	16.9	B
	Right	16.1	B	15.8	B
	Approach	23.8	C	21.7	C
Southbound M-139	Left	40.4	D	41.2	D
	Thru	19.3	B	20.5	C
	Right	18.9	B	20.1	C
	Approach	21.9	C	23.1	C
Eastbound Napier	Left	39.6	D	41	D
	Thru	31.6	C	32.8	C
	Right	31.3	C	32.5	C
	Approach	32.9	C	34.2	C
Westbound Napier	Left	38.5	D	39.2	D
	Thru	32.4	C	33.3	C
	Right	30.2	C	31.3	C
	Approach	33.1	C	34	C

**Table 7: LOS for Weekday PM Peak Hour at Napier Avenue and Miami Road**

Approach	Movement	Existing Condition		Proposed Condition	
		Delay	LOS	Delay	LOS
Northbound Miami	Left, Thru and Right	33	C	33	C
	Approach	33	C	33	C
Southbound Miami	Left and Thru	34.5	C	34.5	C
	Right	49.6	D	50.2	D
	Approach	46.9	D	47.3	D
Eastbound Napier	Left	37.1	D	37.1	D
	Thru and Right	8	A	14.8	B
	Approach	10.1	B	16.4	B
Westbound Napier	Left	24.7	C	37.3	D
	Thru and Right	12.2	B	19.5	B
	Approach	12.4	B	19.8	B

**Table 8: LOS for Weekday PM Peak Hour at Napier Avenue and Colfax Avenue**

Approach	Movement	Existing Condition		Proposed Condition	
		Delay	LOS	Delay	LOS
Northbound Colfax	Left	44.2	D	46.4	D
	Thru and Right	38.8	D	38.8	D
	Approach	41.8	D	43.1	D
Southbound Colfax	Left	35.8	D	36.4	D
	Thru and Right	39	D	39	D
	Approach	37.8	D	38.1	D
Eastbound Napier	Left	32.3	C	30.8	C
	Thru	14.9	B	22.4	C
	Right	-	-	18	B
	Approach	16.3	B	21.8	C
Westbound Napier	Left	<b>60.7</b>	<b>E</b>	<b>61.5</b>	<b>E</b>
	Thru and Right	24.3	C	37.3	D
	Approach	26.9	C	39	D

**Table 9: LOS for Weekday PM Peak Hour at Napier Avenue and Union Avenue**

Approach	Movement	Existing Condition		Proposed Condition	
		Delay	LOS	Delay	LOS
Northbound Union	Left	42.2	D	42.2	D
	Thru and Right	37.5	D	37.5	D
	Approach	38.8	D	38.8	D
Southbound Union	Left	42.6	D	42.6	D
	Thru and Right	35.9	D	35.9	D
	Approach	39.2	D	39.2	D
Eastbound Napier	Left	55.6	E	53.6	D
	Thru and Right	18.2	B	35.2	D
	Approach	19.1	B	35.6	D
Westbound Napier	Left	41.2	D	41.2	D
	Thru and Right	14.2	B	14.2	B
	Approach	17	B	17	B

**Table 10: LOS for Weekday PM Peak Hour at Napier Avenue and M-139**

Approach	Movement	Existing Condition		Proposed Condition	
		Delay	LOS	Delay	LOS
Northbound M-139	Left	50.1	D	50.1	D
	Thru	26.8	C	26.8	C
	Right	24.6	C	24.6	C
	Approach	34.8	C	34.8	C
Southbound M-139	Left	46.6	D	46.6	D
	Thru	35.6	D	35.6	D
	Right	34.7	C	34.7	C
	Approach	37.2	D	37.2	D
Eastbound Napier	Left	46.6	D	46.6	D
	Thru	41.9	D	41.9	D
	Right	45.1	D	45.1	D
	Approach	43.3	D	43.3	D
Westbound Napier	Left	46.2	D	46.2	D
	Thru	38.3	D	38.3	D
	Right	35.1	D	35.1	D
	Approach	39.2	D	39.2	D

**4.0 CONCLUSIONS**

Based on the analyses performed as part of this study, the following conclusions are made:

1. MDOT and the FHWA provide information based on various studies that document safety benefits associated with converting a four-lane roadway to a three-lane roadway in what is referred to as a “road diet”.



2. The modification in the lane configuration along Napier Avenue from Miami Street to Union Avenue to a three-lane cross section with one lane in each direction and a center left-turn lane is expected to have little or no additional impact on traffic operations in either direction.
3. Optimization of signal timings at the intersection of Napier Avenue and Colfax Avenue was completed for the proposed conditions. In the morning peak hour, two seconds of green time was shifted to the eastbound-westbound left-turn movement from the eastbound-westbound through movement. In the afternoon peak hour, one second of green time was shifted to the eastbound-westbound through movement from the northbound-southbound left-turn movement. The traffic signal timings were kept same as the existing scenario for the other three intersections for the morning and afternoon peak-hour capacity analysis.
4. An exclusive right-turn lane for eastbound Napier Avenue traffic should be included at the Napier/Colfax intersection to accommodate the afternoon peak hour right-turn traffic. Signing and striping design for the shared bike/right-turn lane should follow NACTO recommendations.
5. All movements at the study intersections are projected to operate at an acceptable level of service ("D" or better) in both the morning and afternoon peak-hour under proposed conditions, except for the westbound left-turn movement at Napier Avenue/Colfax Avenue during the afternoon peak hour. This movement showing level of service "E" is not specifically due to the proposed road diet, as it is also LOS E in the existing scenario. The westbound left turn movement at this intersection has relatively low volume (41 vehicles in the PM).
6. The implementation of the road diet along Napier Avenue from Miami Street to Union Avenue could be phased over two years. In the first year, the road diet could be implemented from Miami Street to Colfax Avenue, and in the second year it could be implemented from Colfax Avenue to Union Avenue. However, in the interim condition after year one, the rightmost through lane for westbound traffic at Colfax Avenue would need to be converted from a shared through/right turn lane into a dedicated right turn lane. This would be achieved by modifying the pavement markings and adding suitable lane assignment signs for westbound traffic at Colfax Avenue. We do not anticipate any capacity concerns with this interim lane configuration.

## **Appendix A Traffic Count Data**

### Turning Movement Data

Start Time	Napier Ave Eastbound					Napier Ave Westbound					Berrien Hills Golf Club Driveway Northbound					Miami Rd Southbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
7:00 AM	5	54	0	0	59	1	59	3	0	63	1	0	0	0	1	1	0	3	0	4	127
7:15 AM	7	69	1	0	77	0	80	6	0	86	0	0	0	0	0	2	0	9	1	11	174
7:30 AM	2	75	0	1	77	0	129	4	0	133	1	0	0	0	1	4	0	18	0	22	233
7:45 AM	13	98	0	0	111	0	178	8	0	186	0	0	0	0	0	1	0	15	0	16	313
Hourly Total	27	296	1	1	324	1	446	21	0	468	2	0	0	0	2	8	0	45	1	53	847
8:00 AM	9	94	1	0	104	0	131	4	0	135	0	0	0	0	0	1	0	17	0	18	257
8:15 AM	11	84	0	0	95	0	117	5	0	122	0	0	0	1	0	2	0	17	0	19	236
8:30 AM	6	93	0	0	99	1	107	3	0	111	1	0	0	0	1	5	0	16	0	21	232
8:45 AM	5	84	3	0	92	0	98	5	0	103	0	0	0	0	0	2	0	4	0	6	201
Hourly Total	31	355	4	0	390	1	453	17	0	471	1	0	0	1	1	10	0	54	0	64	926
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:00 PM	6	164	2	0	172	0	118	1	0	119	2	1	0	0	3	3	1	12	0	16	310
2:15 PM	9	140	3	0	152	1	135	2	0	138	1	0	1	0	2	3	0	22	0	25	317
2:30 PM	14	185	4	0	203	1	133	5	0	139	1	0	0	0	1	4	0	17	0	21	364
2:45 PM	14	164	5	0	183	0	165	5	0	170	2	0	1	0	3	2	0	17	0	19	375
Hourly Total	43	653	14	0	710	2	551	13	0	566	6	1	2	0	9	12	1	68	0	81	1366
3:00 PM	4	199	4	0	207	1	118	4	0	123	1	0	1	1	2	3	0	12	0	15	347
3:15 PM	20	227	6	0	253	3	136	5	0	144	1	0	1	0	2	3	0	23	1	26	425
3:30 PM	19	216	7	1	242	1	122	3	0	126	3	0	0	0	3	4	1	22	0	27	398
3:45 PM	16	188	7	0	211	2	158	3	0	163	1	1	1	0	3	4	0	23	0	27	404
Hourly Total	59	830	24	1	913	7	534	15	0	556	6	1	3	1	10	14	1	80	1	95	1574
4:00 PM	15	189	3	0	207	1	139	2	0	142	2	0	0	0	2	7	0	19	0	26	377
4:15 PM	22	214	2	0	238	5	149	5	0	159	1	0	1	0	2	1	0	18	0	19	418
4:30 PM	14	196	9	0	219	3	140	3	0	146	1	0	1	0	2	5	2	20	0	27	394
4:45 PM	14	176	7	0	197	1	149	9	0	159	3	0	1	1	4	4	0	22	0	26	386
Hourly Total	65	775	21	0	861	10	577	19	0	606	7	0	3	1	10	17	2	79	0	98	1575
5:00 PM	14	222	2	1	238	2	157	6	0	165	2	0	2	0	4	9	0	33	0	42	449
5:15 PM	24	209	1	0	234	0	148	4	0	152	2	1	0	0	3	1	0	17	0	18	407
5:30 PM	14	142	2	0	158	0	138	5	0	143	1	2	0	0	3	8	0	12	1	20	324
5:45 PM	10	140	5	2	155	0	138	3	0	141	3	1	1	0	5	4	0	16	0	20	321
Hourly Total	62	713	10	3	785	2	581	18	0	601	8	4	3	0	15	22	0	78	1	100	1501
6:00 PM	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1
Grand Total	287	3622	74	5	3983	23	3143	103	0	3269	30	6	11	3	47	83	4	404	3	491	7790
Approach %	7.2	90.9	1.9	-	-	0.7	96.1	3.2	-	-	63.8	12.8	23.4	-	-	16.9	0.8	82.3	-	-	-
Total %	3.7	46.5	0.9	-	51.1	0.3	40.3	1.3	-	42.0	0.4	0.1	0.1	-	0.6	1.1	0.1	5.2	-	6.3	-
Lights	284	3567	74	-	3925	23	3100	103	-	3226	30	6	11	-	47	82	4	400	-	486	7684
% Lights	99.0	98.5	100.0	-	98.5	100.0	98.6	100.0	-	98.7	100.0	100.0	100.0	-	100.0	98.8	100.0	99.0	-	99.0	98.6
Buses	2	16	0	-	18	0	10	0	-	10	0	0	0	-	0	0	0	2	-	2	30
% Buses	0.7	0.4	0.0	-	0.5	0.0	0.3	0.0	-	0.3	0.0	0.0	0.0	-	0.0	0.0	0.0	0.5	-	0.4	0.4
Trucks	1	39	0	-	40	0	33	0	-	33	0	0	0	-	0	1	0	2	-	3	76
% Trucks	0.3	1.1	0.0	-	1.0	0.0	1.0	0.0	-	1.0	0.0	0.0	0.0	-	0.0	1.2	0.0	0.5	-	0.6	1.0
Bicycles on Crosswalk	-	-	-	3	-	-	-	-	0	-	-	-	-	0	-	-	-	-	2	-	-
% Bicycles on Crosswalk	-	-	-	60.0	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	66.7	-	-
Pedestrians	-	-	-	2	-	-	-	-	0	-	-	-	-	3	-	-	-	-	1	-	-
% Pedestrians	-	-	-	40.0	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	33.3	-	-

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

Start Time	Napier Ave Eastbound					Napier Ave Westbound					Berrien Hills Golf Club Driveway Northbound					Miami Rd Southbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
7:30 AM	2	75	0	1	77	0	129	4	0	133	1	0	0	0	1	4	0	18	0	22	233
7:45 AM	13	98	0	0	111	0	178	8	0	186	0	0	0	0	0	1	0	15	0	16	313
8:00 AM	9	94	1	0	104	0	131	4	0	135	0	0	0	0	0	1	0	17	0	18	257
8:15 AM	11	84	0	0	95	0	117	5	0	122	0	0	0	1	0	2	0	17	0	19	236
Total	35	351	1	1	387	0	555	21	0	576	1	0	0	1	1	8	0	67	0	75	1039
Approach %	9.0	90.7	0.3	-	-	0.0	96.4	3.6	-	-	100.0	0.0	0.0	-	-	10.7	0.0	89.3	-	-	-
Total %	3.4	33.8	0.1	-	37.2	0.0	53.4	2.0	-	55.4	0.1	0.0	0.0	-	0.1	0.8	0.0	6.4	-	7.2	-
PHF	0.673	0.895	0.250	-	0.872	0.000	0.779	0.656	-	0.774	0.250	0.000	0.000	-	0.250	0.500	0.000	0.931	-	0.852	0.830
Lights	35	344	1	-	380	0	540	21	-	561	1	0	0	-	1	8	0	66	-	74	1016
% Lights	100.0	98.0	100.0	-	98.2	-	97.3	100.0	-	97.4	100.0	-	-	-	100.0	100.0	-	98.5	-	98.7	97.8
Buses	0	3	0	-	3	0	4	0	-	4	0	0	0	-	0	0	0	1	-	1	8
% Buses	0.0	0.9	0.0	-	0.8	-	0.7	0.0	-	0.7	0.0	-	-	-	0.0	0.0	-	1.5	-	1.3	0.8
Trucks	0	4	0	-	4	0	11	0	-	11	0	0	0	-	0	0	0	0	-	0	15
% Trucks	0.0	1.1	0.0	-	1.0	-	2.0	0.0	-	1.9	0.0	-	-	-	0.0	0.0	-	0.0	-	0.0	1.4
Bicycles on Crosswalk	-	-	-	1	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	100.0	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	1	-	-	-	-	0	-	-
% Pedestrians	-	-	-	0.0	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-

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

Start Time	Napier Ave Eastbound					Napier Ave Westbound					Berrien Hills Golf Club Driveway Northbound					Miami Rd Southbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
4:15 PM	22	214	2	0	238	5	149	5	0	159	1	0	1	0	2	1	0	18	0	19	418
4:30 PM	14	196	9	0	219	3	140	3	0	146	1	0	1	0	2	5	2	20	0	27	394
4:45 PM	14	176	7	0	197	1	149	9	0	159	3	0	1	1	4	4	0	22	0	26	386
5:00 PM	14	222	2	1	238	2	157	6	0	165	2	0	2	0	4	9	0	33	0	42	449
Total	64	808	20	1	892	11	595	23	0	629	7	0	5	1	12	19	2	93	0	114	1647
Approach %	7.2	90.6	2.2	-	-	1.7	94.6	3.7	-	-	58.3	0.0	41.7	-	-	16.7	1.8	81.6	-	-	-
Total %	3.9	49.1	1.2	-	54.2	0.7	36.1	1.4	-	38.2	0.4	0.0	0.3	-	0.7	1.2	0.1	5.6	-	6.9	-
PHF	0.727	0.910	0.556	-	0.937	0.550	0.947	0.639	-	0.953	0.583	0.000	0.625	-	0.750	0.528	0.250	0.705	-	0.679	0.917
Lights	64	797	20	-	881	11	593	23	-	627	7	0	5	-	12	19	2	92	-	113	1633
% Lights	100.0	98.6	100.0	-	98.8	100.0	99.7	100.0	-	99.7	100.0	-	100.0	-	100.0	100.0	100.0	98.9	-	99.1	99.1
Buses	0	3	0	-	3	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	3
% Buses	0.0	0.4	0.0	-	0.3	0.0	0.0	0.0	-	0.0	0.0	-	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.2
Trucks	0	8	0	-	8	0	2	0	-	2	0	0	0	-	0	0	0	1	-	1	11
% Trucks	0.0	1.0	0.0	-	0.9	0.0	0.3	0.0	-	0.3	0.0	-	0.0	-	0.0	0.0	0.0	1.1	-	0.9	0.7
Bicycles on Crosswalk	-	-	-	1	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	100.0	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	1	-	-	-	-	0	-	-
% Pedestrians	-	-	-	0.0	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-

### Turning Movement Data

Start Time	Napier Ave Eastbound					Napier Ave Westbound					Colfax Ave Northbound					Colfax Ave Southbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
7:00 AM	6	37	12	0	55	2	33	8	0	43	24	13	2	0	39	3	12	6	0	21	158
7:15 AM	7	41	29	0	77	2	41	7	0	50	30	24	3	0	57	7	15	4	0	26	210
7:30 AM	6	51	24	1	81	1	45	9	0	55	57	27	1	0	85	9	22	9	0	40	261
7:45 AM	10	65	23	0	98	7	70	19	0	96	54	71	2	0	127	10	20	11	0	41	362
Hourly Total	29	194	88	1	311	12	189	43	0	244	165	135	8	0	308	29	69	30	0	128	991
8:00 AM	6	70	23	0	99	6	74	13	0	93	46	42	1	0	89	10	17	10	0	37	318
8:15 AM	9	61	24	0	94	5	59	10	0	74	39	27	2	0	68	9	13	8	0	30	266
8:30 AM	8	61	31	0	100	10	62	15	0	87	29	22	4	0	55	14	21	9	0	44	286
8:45 AM	7	57	27	0	91	6	68	17	1	91	33	21	7	0	61	17	22	5	0	44	287
Hourly Total	30	249	105	0	384	27	263	55	1	345	147	112	14	0	273	50	73	32	0	155	1157
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2:00 PM	16	107	34	0	157	3	79	18	1	100	32	19	8	1	59	27	21	15	0	63	379
2:15 PM	16	119	27	0	162	8	100	20	1	128	31	24	4	1	59	15	18	14	0	47	396
2:30 PM	17	128	36	0	181	10	103	22	0	135	31	20	10	0	61	28	35	15	0	78	455
2:45 PM	12	116	32	0	160	8	93	22	0	123	50	18	7	0	75	22	27	10	0	59	417
Hourly Total	61	470	129	0	660	29	375	82	2	486	144	81	29	2	254	92	101	54	0	247	1647
3:00 PM	23	127	41	0	191	4	87	29	0	120	28	10	7	0	45	17	27	10	0	54	410
3:15 PM	23	140	42	1	205	8	102	14	0	124	31	23	12	1	66	26	22	13	0	61	456
3:30 PM	21	147	53	0	221	12	93	21	0	126	34	17	10	1	61	25	26	13	0	64	472
3:45 PM	14	140	34	0	188	5	107	26	0	138	44	15	6	0	65	21	30	9	0	60	451
Hourly Total	81	554	170	1	805	29	389	90	0	508	137	65	35	2	237	89	105	45	0	239	1789
4:00 PM	17	129	41	0	187	10	101	19	0	130	42	14	9	0	65	21	44	10	0	75	457
4:15 PM	18	136	59	0	213	5	108	19	0	132	35	25	7	0	67	22	34	20	0	76	488
4:30 PM	11	112	50	0	173	6	96	39	0	141	48	24	11	0	83	35	29	11	0	75	472
4:45 PM	15	114	47	0	176	10	114	22	0	146	39	22	14	0	75	24	31	17	0	72	469
Hourly Total	61	491	197	0	749	31	419	99	0	549	164	85	41	0	290	102	138	58	0	298	1886
5:00 PM	14	135	60	0	209	16	117	15	0	148	41	29	6	1	76	32	34	27	0	93	526
5:15 PM	19	128	50	0	197	9	101	26	0	136	47	26	6	0	79	27	46	18	1	91	503
5:30 PM	14	104	37	0	155	8	88	18	0	114	45	18	14	0	77	21	31	11	0	63	409
5:45 PM	11	99	30	0	140	8	105	23	0	136	31	33	11	0	75	20	31	14	0	65	416
Hourly Total	58	466	177	0	701	41	411	82	0	534	164	106	37	1	307	100	142	70	1	312	1854
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	320	2424	866	2	3610	169	2046	451	3	2666	921	584	164	5	1669	462	628	289	1	1379	9324
Approach %	8.9	67.1	24.0	-	-	6.3	76.7	16.9	-	-	55.2	35.0	9.8	-	-	33.5	45.5	21.0	-	-	-
Total %	3.4	26.0	9.3	-	38.7	1.8	21.9	4.8	-	28.6	9.9	6.3	1.8	-	17.9	5.0	6.7	3.1	-	14.8	-
Lights	315	2388	856	-	3559	163	2012	439	-	2614	914	566	157	-	1637	451	612	286	-	1349	9159
% Lights	98.4	98.5	98.8	-	98.6	96.4	98.3	97.3	-	98.0	99.2	96.9	95.7	-	98.1	97.6	97.5	99.0	-	97.8	98.2
Buses	2	6	6	-	14	5	8	6	-	19	1	8	4	-	13	3	5	0	-	8	54
% Buses	0.6	0.2	0.7	-	0.4	3.0	0.4	1.3	-	0.7	0.1	1.4	2.4	-	0.8	0.6	0.8	0.0	-	0.6	0.6
Trucks	3	30	4	-	37	1	26	6	-	33	6	10	3	-	19	8	11	3	-	22	111
% Trucks	0.9	1.2	0.5	-	1.0	0.6	1.3	1.3	-	1.2	0.7	1.7	1.8	-	1.1	1.7	1.8	1.0	-	1.6	1.2
Bicycles on Crosswalk	-	-	-	2	-	-	-	-	1	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	100.0	-	-	-	-	33.3	-	-	-	-	0.0	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	0	-	-	-	-	2	-	-	-	-	5	-	-	-	-	1	-	-
% Pedestrians	-	-	-	0.0	-	-	-	-	66.7	-	-	-	-	100.0	-	-	-	-	100.0	-	-

### Turning Movement Peak Hour Data (7:45 AM)

Start Time	Napier Ave Eastbound					Napier Ave Westbound					Colfax Ave Northbound					Colfax Ave Southbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
7:45 AM	10	65	23	0	98	7	70	19	0	96	54	71	2	0	127	10	20	11	0	41	362
8:00 AM	6	70	23	0	99	6	74	13	0	93	46	42	1	0	89	10	17	10	0	37	318
8:15 AM	9	61	24	0	94	5	59	10	0	74	39	27	2	0	68	9	13	8	0	30	266
8:30 AM	8	61	31	0	100	10	62	15	0	87	29	22	4	0	55	14	21	9	0	44	286
Total	33	257	101	0	391	28	265	57	0	350	168	162	9	0	339	43	71	38	0	152	1232
Approach %	8.4	65.7	25.8	-	-	8.0	75.7	16.3	-	-	49.6	47.8	2.7	-	-	28.3	46.7	25.0	-	-	-
Total %	2.7	20.9	8.2	-	31.7	2.3	21.5	4.6	-	28.4	13.6	13.1	0.7	-	27.5	3.5	5.8	3.1	-	12.3	-
PHF	0.825	0.918	0.815	-	0.978	0.700	0.895	0.750	-	0.911	0.778	0.570	0.563	-	0.667	0.768	0.845	0.864	-	0.864	0.851
Lights	31	249	100	-	380	27	253	56	-	336	165	157	9	-	331	42	69	38	-	149	1196
% Lights	93.9	96.9	99.0	-	97.2	96.4	95.5	98.2	-	96.0	98.2	96.9	100.0	-	97.6	97.7	97.2	100.0	-	98.0	97.1
Buses	1	3	1	-	5	0	3	1	-	4	1	1	0	-	2	1	1	0	-	2	13
% Buses	3.0	1.2	1.0	-	1.3	0.0	1.1	1.8	-	1.1	0.6	0.6	0.0	-	0.6	2.3	1.4	0.0	-	1.3	1.1
Trucks	1	5	0	-	6	1	9	0	-	10	2	4	0	-	6	0	1	0	-	1	23
% Trucks	3.0	1.9	0.0	-	1.5	3.6	3.4	0.0	-	2.9	1.2	2.5	0.0	-	1.8	0.0	1.4	0.0	-	0.7	1.9
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

### Turning Movement Peak Hour Data (4:30 PM)

Start Time	Napier Ave Eastbound					Napier Ave Westbound					Colfax Ave Northbound					Colfax Ave Southbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
4:30 PM	11	112	50	0	173	6	96	39	0	141	48	24	11	0	83	35	29	11	0	75	472
4:45 PM	15	114	47	0	176	10	114	22	0	146	39	22	14	0	75	24	31	17	0	72	469
5:00 PM	14	135	60	0	209	16	117	15	0	148	41	29	6	1	76	32	34	27	0	93	526
5:15 PM	19	128	50	0	197	9	101	26	0	136	47	26	6	0	79	27	46	18	1	91	503
Total	59	489	207	0	755	41	428	102	0	571	175	101	37	1	313	118	140	73	1	331	1970
Approach %	7.8	64.8	27.4	-	-	7.2	75.0	17.9	-	-	55.9	32.3	11.8	-	-	35.6	42.3	22.1	-	-	-
Total %	3.0	24.8	10.5	-	38.3	2.1	21.7	5.2	-	29.0	8.9	5.1	1.9	-	15.9	6.0	7.1	3.7	-	16.8	-
PHF	0.776	0.906	0.863	-	0.903	0.641	0.915	0.654	-	0.965	0.911	0.871	0.661	-	0.943	0.843	0.761	0.676	-	0.890	0.936
Lights	58	485	206	-	749	40	427	101	-	568	175	99	37	-	311	117	137	72	-	326	1954
% Lights	98.3	99.2	99.5	-	99.2	97.6	99.8	99.0	-	99.5	100.0	98.0	100.0	-	99.4	99.2	97.9	98.6	-	98.5	99.2
Buses	0	0	0	-	0	1	0	0	-	1	0	2	0	-	2	0	1	0	-	1	4
% Buses	0.0	0.0	0.0	-	0.0	2.4	0.0	0.0	-	0.2	0.0	2.0	0.0	-	0.6	0.0	0.7	0.0	-	0.3	0.2
Trucks	1	4	1	-	6	0	1	1	-	2	0	0	0	-	0	1	2	1	-	4	12
% Trucks	1.7	0.8	0.5	-	0.8	0.0	0.2	1.0	-	0.4	0.0	0.0	0.0	-	0.0	0.8	1.4	1.4	-	1.2	0.6
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	1	-	-	-	-	1	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	100.0	-	-

### Turning Movement Data

Start Time	Napier Ave Eastbound					Napier Ave Westbound					Union Ave Northbound					Union Ave Southbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
7:00 AM	1	39	4	0	44	5	53	7	0	65	4	3	7	0	14	5	5	0	0	10	133
7:15 AM	1	62	4	0	67	3	48	3	0	54	5	3	6	0	14	10	8	0	0	18	153
7:30 AM	0	67	5	0	72	4	59	6	0	69	5	7	13	0	25	10	10	0	0	20	186
7:45 AM	3	79	8	0	90	12	93	10	0	115	10	3	17	0	30	9	10	2	0	21	256
Hourly Total	5	247	21	0	273	24	253	26	0	303	24	16	43	0	83	34	33	2	0	69	728
8:00 AM	2	82	9	0	93	9	80	5	0	94	8	5	11	0	24	7	9	2	0	18	229
8:15 AM	0	79	5	1	84	3	72	6	0	81	13	6	5	0	24	9	7	0	0	16	205
8:30 AM	0	80	7	0	87	4	73	5	0	82	8	4	6	0	18	10	6	1	1	17	204
8:45 AM	3	66	11	0	80	12	84	6	0	102	8	5	7	0	20	11	6	3	0	20	222
Hourly Total	5	307	32	1	344	28	309	22	0	359	37	20	29	0	86	37	28	6	1	71	860
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:00 PM	4	143	5	0	152	7	123	19	0	149	5	9	17	0	31	13	8	0	0	21	353
2:15 PM	5	144	9	0	158	17	121	13	0	151	7	11	13	0	31	13	12	7	0	32	372
2:30 PM	2	156	11	0	169	14	132	16	0	162	3	11	9	0	23	26	9	3	0	38	392
2:45 PM	7	140	11	0	158	16	119	15	0	150	9	7	11	0	27	21	9	5	0	35	370
Hourly Total	18	583	36	0	637	54	495	63	0	612	24	38	50	0	112	73	38	15	0	126	1487
3:00 PM	3	134	9	0	146	10	136	16	1	162	11	6	15	0	32	19	9	3	0	31	371
3:15 PM	5	169	13	0	187	14	135	21	0	170	10	18	11	0	39	14	20	3	0	37	433
3:30 PM	3	185	17	0	205	9	139	16	0	164	12	14	9	0	35	12	14	2	0	28	432
3:45 PM	2	170	4	0	176	7	148	11	0	166	11	12	12	0	35	30	12	5	0	47	424
Hourly Total	13	658	43	0	714	40	558	64	1	662	44	50	47	0	141	75	55	13	0	143	1660
4:00 PM	5	152	12	0	169	13	139	21	2	173	10	15	15	0	40	21	9	3	0	33	415
4:15 PM	5	161	16	0	182	20	121	11	1	152	13	8	12	0	33	17	16	3	0	36	403
4:30 PM	2	153	16	0	171	22	170	16	0	208	9	12	21	0	42	23	13	0	0	36	457
4:45 PM	2	147	13	0	162	15	160	19	2	194	7	12	20	0	39	14	11	6	0	31	426
Hourly Total	14	613	57	0	684	70	590	67	5	727	39	47	68	0	154	75	49	12	0	136	1701
5:00 PM	8	175	10	0	193	20	143	24	0	187	10	10	14	1	34	16	14	11	0	41	455
5:15 PM	5	154	12	0	171	14	129	20	0	163	4	12	12	0	28	21	10	4	0	35	397
5:30 PM	3	138	10	2	151	16	123	20	1	159	10	10	11	0	31	12	13	7	0	32	373
5:45 PM	2	120	13	0	135	14	128	13	0	155	9	14	14	0	37	17	7	8	0	32	359
Hourly Total	18	587	45	2	650	64	523	77	1	664	33	46	51	1	130	66	44	30	0	140	1584
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	73	2995	234	3	3302	280	2728	319	7	3327	201	217	288	1	706	360	247	78	1	685	8020
Approach %	2.2	90.7	7.1	-	-	8.4	82.0	9.6	-	-	28.5	30.7	40.8	-	-	52.6	36.1	11.4	-	-	-
Total %	0.9	37.3	2.9	-	41.2	3.5	34.0	4.0	-	41.5	2.5	2.7	3.6	-	8.8	4.5	3.1	1.0	-	8.5	-
Lights	72	2937	231	-	3240	274	2681	311	-	3266	198	209	283	-	690	351	242	75	-	668	7864
% Lights	98.6	98.1	98.7	-	98.1	97.9	98.3	97.5	-	98.2	98.5	96.3	98.3	-	97.7	97.5	98.0	96.2	-	97.5	98.1
Buses	1	10	0	-	11	2	13	5	-	20	0	6	1	-	7	5	2	2	-	9	47
% Buses	1.4	0.3	0.0	-	0.3	0.7	0.5	1.6	-	0.6	0.0	2.8	0.3	-	1.0	1.4	0.8	2.6	-	1.3	0.6
Trucks	0	48	3	-	51	4	34	3	-	41	3	2	4	-	9	4	3	1	-	8	109
% Trucks	0.0	1.6	1.3	-	1.5	1.4	1.2	0.9	-	1.2	1.5	0.9	1.4	-	1.3	1.1	1.2	1.3	-	1.2	1.4
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	1	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	14.3	-	-	-	-	0.0	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	3	-	-	-	-	6	-	-	-	-	1	-	-	-	-	1	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	85.7	-	-	-	-	100.0	-	-	-	-	100.0	-	-

### Turning Movement Peak Hour Data (7:45 AM)

Start Time	Napier Ave Eastbound					Napier Ave Westbound					Union Ave Northbound					Union Ave Southbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
7:45 AM	3	79	8	0	90	12	93	10	0	115	10	3	17	0	30	9	10	2	0	21	256
8:00 AM	2	82	9	0	93	9	80	5	0	94	8	5	11	0	24	7	9	2	0	18	229
8:15 AM	0	79	5	1	84	3	72	6	0	81	13	6	5	0	24	9	7	0	0	16	205
8:30 AM	0	80	7	0	87	4	73	5	0	82	8	4	6	0	18	10	6	1	1	17	204
Total	5	320	29	1	354	28	318	26	0	372	39	18	39	0	96	35	32	5	1	72	894
Approach %	1.4	90.4	8.2	-	-	7.5	85.5	7.0	-	-	40.6	18.8	40.6	-	-	48.6	44.4	6.9	-	-	-
Total %	0.6	35.8	3.2	-	39.6	3.1	35.6	2.9	-	41.6	4.4	2.0	4.4	-	10.7	3.9	3.6	0.6	-	8.1	-
PHF	0.417	0.976	0.806	-	0.952	0.583	0.855	0.650	-	0.809	0.750	0.750	0.574	-	0.800	0.875	0.800	0.625	-	0.857	0.873
Lights	5	315	28	-	348	27	306	25	-	358	38	17	38	-	93	32	31	4	-	67	866
% Lights	100.0	98.4	96.6	-	98.3	96.4	96.2	96.2	-	96.2	97.4	94.4	97.4	-	96.9	91.4	96.9	80.0	-	93.1	96.9
Buses	0	2	0	-	2	0	2	1	-	3	0	1	0	-	1	2	1	1	-	4	10
% Buses	0.0	0.6	0.0	-	0.6	0.0	0.6	3.8	-	0.8	0.0	5.6	0.0	-	1.0	5.7	3.1	20.0	-	5.6	1.1
Trucks	0	3	1	-	4	1	10	0	-	11	1	0	1	-	2	1	0	0	-	1	18
% Trucks	0.0	0.9	3.4	-	1.1	3.6	3.1	0.0	-	3.0	2.6	0.0	2.6	-	2.1	2.9	0.0	0.0	-	1.4	2.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	1	-	-	-	-	0	-	-	-	-	0	-	-	-	-	1	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-

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

Start Time	Napier Ave Eastbound					Napier Ave Westbound					Union Ave Northbound					Union Ave Southbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
4:15 PM	5	161	16	0	182	20	121	11	1	152	13	8	12	0	33	17	16	3	0	36	403
4:30 PM	2	153	16	0	171	22	170	16	0	208	9	12	21	0	42	23	13	0	0	36	457
4:45 PM	2	147	13	0	162	15	160	19	2	194	7	12	20	0	39	14	11	6	0	31	426
5:00 PM	8	175	10	0	193	20	143	24	0	187	10	10	14	1	34	16	14	11	0	41	455
Total	17	636	55	0	708	77	594	70	3	741	39	42	67	1	148	70	54	20	0	144	1741
Approach %	2.4	89.8	7.8	-	-	10.4	80.2	9.4	-	-	26.4	28.4	45.3	-	-	48.6	37.5	13.9	-	-	-
Total %	1.0	36.5	3.2	-	40.7	4.4	34.1	4.0	-	42.6	2.2	2.4	3.8	-	8.5	4.0	3.1	1.1	-	8.3	-
PHF	0.531	0.909	0.859	-	0.917	0.875	0.874	0.729	-	0.891	0.750	0.875	0.798	-	0.881	0.761	0.844	0.455	-	0.878	0.952
Lights	17	625	55	-	697	74	591	69	-	734	37	40	66	-	143	68	54	20	-	142	1716
% Lights	100.0	98.3	100.0	-	98.4	96.1	99.5	98.6	-	99.1	94.9	95.2	98.5	-	96.6	97.1	100.0	100.0	-	98.6	98.6
Buses	0	0	0	-	0	1	2	0	-	3	0	1	0	-	1	0	0	0	-	0	4
% Buses	0.0	0.0	0.0	-	0.0	1.3	0.3	0.0	-	0.4	0.0	2.4	0.0	-	0.7	0.0	0.0	0.0	-	0.0	0.2
Trucks	0	11	0	-	11	2	1	1	-	4	2	1	1	-	4	2	0	0	-	2	21
% Trucks	0.0	1.7	0.0	-	1.6	2.6	0.2	1.4	-	0.5	5.1	2.4	1.5	-	2.7	2.9	0.0	0.0	-	1.4	1.2
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-	-	-	-
Pedestrians	-	-	-	0	-	-	-	-	3	-	-	-	-	1	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	100.0	-	-	-	-	100.0	-	-	-	-	-	-	-



### Turning Movement Data

Start Time	Napier Ave Eastbound					Napier Ave Westbound					M-139 Northbound					M-139 Southbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
7:00 AM	10	37	8	0	55	8	35	5	0	48	19	39	6	0	64	2	23	9	0	34	201
7:15 AM	10	42	15	0	67	19	50	6	0	75	14	48	9	0	71	1	32	4	1	37	250
7:30 AM	19	71	18	0	108	14	57	5	0	76	13	71	9	0	93	6	51	5	3	62	339
7:45 AM	16	69	22	0	107	14	81	5	0	100	35	77	15	0	127	6	59	11	0	76	410
Hourly Total	55	219	63	0	337	55	223	21	0	299	81	235	39	0	355	15	165	29	4	209	1200
8:00 AM	18	61	21	0	100	12	62	15	0	89	21	53	12	0	86	10	42	12	0	64	339
8:15 AM	18	70	23	0	111	13	57	9	0	79	22	75	9	0	106	5	38	11	0	54	350
8:30 AM	20	60	23	0	103	15	51	12	0	78	22	74	13	0	109	14	48	19	0	81	371
8:45 AM	21	55	31	0	107	13	70	10	0	93	27	41	15	0	83	7	50	15	0	72	355
Hourly Total	77	246	98	0	421	53	240	46	0	339	92	243	49	0	384	36	178	57	0	271	1415
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2:00 PM	35	111	54	0	200	25	76	28	0	129	54	79	27	0	160	22	73	19	0	114	603
2:15 PM	24	112	47	0	183	19	65	21	0	105	58	95	16	0	169	17	84	31	0	132	589
2:30 PM	19	128	25	0	172	17	87	23	0	127	53	64	19	0	136	25	89	21	0	135	570
2:45 PM	18	123	48	0	189	19	66	13	0	98	64	104	21	0	189	23	69	26	0	118	594
Hourly Total	96	474	174	0	744	80	294	85	0	459	229	342	83	0	654	87	315	97	0	499	2356
3:00 PM	29	96	40	0	165	22	79	30	0	131	51	69	21	0	141	17	84	21	2	122	559
3:15 PM	26	133	52	0	211	29	93	24	0	146	58	95	20	0	173	17	66	26	0	109	639
3:30 PM	27	124	57	0	208	19	85	17	0	121	57	93	23	0	173	28	84	24	0	136	638
3:45 PM	33	127	57	1	217	19	69	24	0	112	59	108	28	0	195	28	102	35	0	165	689
Hourly Total	115	480	206	1	801	89	326	95	0	510	225	365	92	0	682	90	336	106	2	532	2525
4:00 PM	27	132	49	0	208	27	78	21	0	126	62	101	29	0	192	24	97	26	0	147	673
4:15 PM	33	118	46	0	197	20	97	26	0	143	54	91	20	0	165	21	72	23	0	116	621
4:30 PM	22	132	54	0	208	20	98	19	0	137	71	92	21	0	184	37	93	34	0	164	693
4:45 PM	17	111	53	0	181	27	100	24	0	151	60	119	20	0	199	25	110	30	0	165	696
Hourly Total	99	493	202	0	794	94	373	90	0	557	247	403	90	0	740	107	372	113	0	592	2683
5:00 PM	31	130	60	0	221	29	95	22	0	146	55	81	14	0	150	26	105	37	0	168	685
5:15 PM	30	116	46	0	192	19	95	15	0	129	65	100	18	0	183	15	98	25	0	138	642
5:30 PM	19	102	38	0	159	21	84	17	0	122	53	81	28	0	162	24	76	19	1	119	562
5:45 PM	17	93	43	0	153	22	85	16	0	123	68	72	18	0	158	24	68	27	0	119	553
Hourly Total	97	441	187	0	725	91	359	70	0	520	241	334	78	0	653	89	347	108	1	544	2442
Grand Total	539	2353	930	1	3822	462	1815	407	0	2684	1115	1922	431	0	3468	424	1713	510	7	2647	12621
Approach %	14.1	61.6	24.3	-	-	17.2	67.6	15.2	-	-	32.2	55.4	12.4	-	-	16.0	64.7	19.3	-	-	-
Total %	4.3	18.6	7.4	-	30.3	3.7	14.4	3.2	-	21.3	8.8	15.2	3.4	-	27.5	3.4	13.6	4.0	-	21.0	-
Lights	523	2305	912	-	3740	452	1768	401	-	2621	1096	1883	422	-	3401	414	1650	499	-	2563	12325
% Lights	97.0	98.0	98.1	-	97.9	97.8	97.4	98.5	-	97.7	98.3	98.0	97.9	-	98.1	97.6	96.3	97.8	-	96.8	97.7
Buses	7	9	5	-	21	1	12	2	-	15	7	12	0	-	19	3	23	4	-	30	85
% Buses	1.3	0.4	0.5	-	0.5	0.2	0.7	0.5	-	0.6	0.6	0.6	0.0	-	0.5	0.7	1.3	0.8	-	1.1	0.7
Trucks	9	39	13	-	61	9	35	4	-	48	12	27	9	-	48	7	40	7	-	54	211
% Trucks	1.7	1.7	1.4	-	1.6	1.9	1.9	1.0	-	1.8	1.1	1.4	2.1	-	1.4	1.7	2.3	1.4	-	2.0	1.7
Bicycles on Crosswalk	-	-	-	1	-	-	-	-	0	-	-	-	-	0	-	-	-	-	1	-	-
% Bicycles on Crosswalk	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.3	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	6	-	-
% Pedestrians	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	85.7	-	-

### Turning Movement Peak Hour Data (7:45 AM)

Start Time	Napier Ave Eastbound					Napier Ave Westbound					M-139 Northbound					M-139 Southbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
7:45 AM	16	69	22	0	107	14	81	5	0	100	35	77	15	0	127	6	59	11	0	76	410
8:00 AM	18	61	21	0	100	12	62	15	0	89	21	53	12	0	86	10	42	12	0	64	339
8:15 AM	18	70	23	0	111	13	57	9	0	79	22	75	9	0	106	5	38	11	0	54	350
8:30 AM	20	60	23	0	103	15	51	12	0	78	22	74	13	0	109	14	48	19	0	81	371
Total	72	260	89	0	421	54	251	41	0	346	100	279	49	0	428	35	187	53	0	275	1470
Approach %	17.1	61.8	21.1	-	-	15.6	72.5	11.8	-	-	23.4	65.2	11.4	-	-	12.7	68.0	19.3	-	-	-
Total %	4.9	17.7	6.1	-	28.6	3.7	17.1	2.8	-	23.5	6.8	19.0	3.3	-	29.1	2.4	12.7	3.6	-	18.7	-
PHF	0.900	0.929	0.967	-	0.948	0.900	0.775	0.683	-	0.865	0.714	0.906	0.817	-	0.843	0.625	0.792	0.697	-	0.849	0.896
Lights	66	251	86	-	403	54	237	40	-	331	95	269	45	-	409	35	173	51	-	259	1402
% Lights	91.7	96.5	96.6	-	95.7	100.0	94.4	97.6	-	95.7	95.0	96.4	91.8	-	95.6	100.0	92.5	96.2	-	94.2	95.4
Buses	3	3	1	-	7	0	3	0	-	3	2	2	0	-	4	0	6	0	-	6	20
% Buses	4.2	1.2	1.1	-	1.7	0.0	1.2	0.0	-	0.9	2.0	0.7	0.0	-	0.9	0.0	3.2	0.0	-	2.2	1.4
Trucks	3	6	2	-	11	0	11	1	-	12	3	8	4	-	15	0	8	2	-	10	48
% Trucks	4.2	2.3	2.2	-	2.6	0.0	4.4	2.4	-	3.5	3.0	2.9	8.2	-	3.5	0.0	4.3	3.8	-	3.6	3.3
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

### Turning Movement Peak Hour Data (4:30 PM)

Start Time	Napier Ave Eastbound					Napier Ave Westbound					M-139 Northbound					M-139 Southbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
4:30 PM	22	132	54	0	208	20	98	19	0	137	71	92	21	0	184	37	93	34	0	164	693
4:45 PM	17	111	53	0	181	27	100	24	0	151	60	119	20	0	199	25	110	30	0	165	696
5:00 PM	31	130	60	0	221	29	95	22	0	146	55	81	14	0	150	26	105	37	0	168	685
5:15 PM	30	116	46	0	192	19	95	15	0	129	65	100	18	0	183	15	98	25	0	138	642
Total	100	489	213	0	802	95	388	80	0	563	251	392	73	0	716	103	406	126	0	635	2716
Approach %	12.5	61.0	26.6	-	-	16.9	68.9	14.2	-	-	35.1	54.7	10.2	-	-	16.2	63.9	19.8	-	-	-
Total %	3.7	18.0	7.8	-	29.5	3.5	14.3	2.9	-	20.7	9.2	14.4	2.7	-	26.4	3.8	14.9	4.6	-	23.4	-
PHF	0.806	0.926	0.888	-	0.907	0.819	0.970	0.833	-	0.932	0.884	0.824	0.869	-	0.899	0.696	0.923	0.851	-	0.945	0.976
Lights	99	485	210	-	794	94	386	79	-	559	251	386	72	-	709	102	400	126	-	628	2690
% Lights	99.0	99.2	98.6	-	99.0	98.9	99.5	98.8	-	99.3	100.0	98.5	98.6	-	99.0	99.0	98.5	100.0	-	98.9	99.0
Buses	0	1	0	-	1	0	0	0	-	0	0	2	0	-	2	1	2	0	-	3	6
% Buses	0.0	0.2	0.0	-	0.1	0.0	0.0	0.0	-	0.0	0.0	0.5	0.0	-	0.3	1.0	0.5	0.0	-	0.5	0.2
Trucks	1	3	3	-	7	1	2	1	-	4	0	4	1	-	5	0	4	0	-	4	20
% Trucks	1.0	0.6	1.4	-	0.9	1.1	0.5	1.3	-	0.7	0.0	1.0	1.4	-	0.7	0.0	1.0	0.0	-	0.6	0.7
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-