SMART SERVICES, INC.
Surveying ◆ Environmental ◆ Traffic ◆ CA/CM
An Ohio DBE/EDGE Certified Firm

September 4, 2018

Mr. Robert S. Priestas, PE
City of Gahanna
Department of Engineering
200 South Hamilton Road
Gahanna, OH 43230

Re: Hamilton Towne Centre TIS REV 1
City of Gahanna, Franklin County, Ohio

Dear Rob:

With this letter, we are submitting one copy of the revised subject traffic study for your review. We have already provided the PDF version of the study via e-mail. Comments on the initial submission of the subject traffic study were received from the City of Gahanna on August 23, 2018. Below is the disposition of the City's comments (The original comments are in italics followed by our response):

CM-1- Please confirm that the multifamily portion of the development will be 3 to 10 stories tall. Based on the heights of surrounding area multifamily developments, it would appear that LUC (Land Use Code) 220 - Multifamily Housing (Low-Rise) would be the more appropriate Land Use Code for this development. However, if 3+ stories are proposed, LUC 221 would be acceptable.

This revision of the study was updated to the current site plan which does not have any residential land use. Therefore, this comment is no longer relevant.

CM-2 - It would be preferred that the installation of the southbound left turn lane into the proposed full-access along Hamilton Road maintain the raised curb within this area, similar to the northbound left turn lane north and adjacent to the proposed southbound left turn lane.

This preference has been stated in the conclusions.

CM-3 – Due to significant delays, a V/C ratio over 2, and signal warrants not being met, it may be necessary to restrict westbound left turning movements from the full-access drive along Hamilton Road during PM Peak hours (typically 4:00-6:00 PM) via signage.

The developer is okay with the PM Peak hour restriction, so it was added to the conclusions.

CM-4 - There is concern regarding the full-access drive alignment with Villa Oaks Lane due to the width of the existing Villa Oaks Lane access drive and the proposed width of the full-access site drive shown on the site plan. Please provide a schematic drawing of the proposed full-access drive alignment with Villa Oaks Lane. Additionally, please provide anticipated left turning paths for all approaches of the intersection. It will be important that the design and location of the proposed full-access drive minimize conflicts of left turning vehicles from all approaches.

The engineering of the site has not been started. The developer has indicated that there is flexibility with the precise location of the driveway and that during design they will work with the City to provide the best alignment of the proposed driveway with Villa Oaks lane. This has been indicated in the Conclusions.

CM-5 - Please evaluate the proposed full-access drive on Hamilton Road for safety, as requested in the MOU comments from the City.

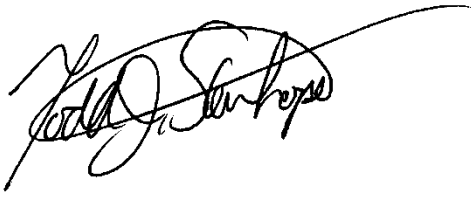
The context in the MOU comments appeared to be related to the driveway on the west side approximately 75 feet south of Villa Oaks Lane as there was references to excess conflict points. Per discussion in the Access Locations subsection of the Analyses section, this driveway is gated, and no existing vehicles were counted in the peak hour of analysis. In the analysis period, there would not be any more conflict than a typical driveway along an arterial street.

CM-6 - It appears that the LOS E for the eastbound approach of the Hamilton Road & Beecher Road intersection during the PM Peak is caused by the coordination of signals along Hamilton Road and the 140 second cycle length. This seems acceptable as eastbound volumes are significantly less than volumes along Hamilton Road. It may be necessary to perform a queuing analysis to ensure all queued eastbound vehicles can enter the intersection with the allotted green time. However, this is a No Build condition, so no improvements would be necessary of the proposed development.

Since the comment concurs that this is a 'No Build' condition and no improvements would be necessary, no additional analyses were performed.

If you have any questions, please contact me. Thank you!

Sincerely,
SMART SERVICES, INC.



Todd J. Stanhope, PE, PTOE
Director of Traffic Engineering

Enclosed: One copy (PDF format) via e-mail

cc: D. Glimcher - Blue Horseshoe Ventures, LTD

Hamilton Towne Centre
Traffic Impact Study

Prepared For:

Blue Horseshoe Ventures, LTD

Prepared By:

SMART SERVICES, INC.

1900 Crown Park Court, Suite E
Columbus, OH 43235
(614) 914-5543

August 2018

REV. 1
8/2018

SSI Project #: 735601

Hamilton Towne Centre
Traffic Impact Study

Prepared For:

Blue Horseshoe Ventures, LTD
118 East Main Street
New Albany, OH 43054

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Under the direction of:

Registered Engineer No. E-64507, Ohio

9-04-2018
Date

STATE OF OHIO
REGISTERED
PROFESSIONAL ENGINEER

August 2018

REV. 1
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TABLE OF CONTENTS

APPENDIX

BACKGROUND

Blue Horseshoe Ventures, LLC is proposing to develop a site with a 120-room hotel, a 36,000 SF office building, and a 2,000 SF coffee shop. The site is located on the east side of Hamilton Road between Giant Eagle and Shagbark Road in the City of Gahanna, Ohio. Figure 1 shows the location of the site. There is one full access proposed on Hamilton Road opposite Villa Oaks Lane and one right-in/right-out access proposed on Hamilton Road south of the Giant Eagle. Figure 2 shows the proposed site layout.

The permitting agency for the access is the City of Gahanna and they are requiring a traffic study. The scope of the study is contained in a Memo of Understanding dated 7/05/2018 and feedback was provided by the City of Gahanna in an e-mail dated 7/09/2018. The MOU is in the Appendix.

A previous version of the study dated 8/9/2018 was submitted to the City of Gahanna. Comments were received from the City in an e-mail dated 8/23/2018. A copy of the comment letter is in the Appendix. The site plan has also changed since the initial submission. This revision incorporates the new site plan and addresses the applicable comments.

EXISTING CONDITIONS

Hamilton Road is currently a five-lane section and has a speed limit of 35 MPH (Assumed Design Speed 40 MPH). There are existing traffic signals on Hamilton Road at Beecher Road, Vista Drive, and Stoneridge Drive. All of the signals are in the City of Gahanna's jurisdiction. New Peak hour (7-9 AM & 4-6 PM) turning movement counts were taken at the study area intersections. A 7-hour link-count was also taken on Hamilton Road at Villa Oaks Drive to be used for the existing traffic in the signal warrant analysis of the proposed site access. A one hour turns only count was performed for the 4525/4529 Hamilton Road driveway which is just south of Village Oaks Lane. The count reports are in the Appendix.

Since the counts were taken when school was not in session, the City asked that the through volumes on Hamilton Road be compared to a count when school was in session and factored if the count when school was in session was higher. To do this, an April 2017 count performed by Smart Services, Inc. at Hamilton Road & Beecher Road as part of the *The Shops at Oberer's Crossing TIS* prepared by Trans Associates was compared. Given that Columbus Academy has access to Beecher Road, the expected result was that volumes in the 2017 count at Hamilton Road & Beecher Road were generally higher. Therefore, the 2017 count at Hamilton Road & Beecher Road was used as the existing 2018 count. A comparison of the north leg volumes were the basis of adjusting the study area intersections. Table 1 shows a summary of the peak hours from each count as well as the school factor applied to the Hamilton Road through movements at the noted intersections.

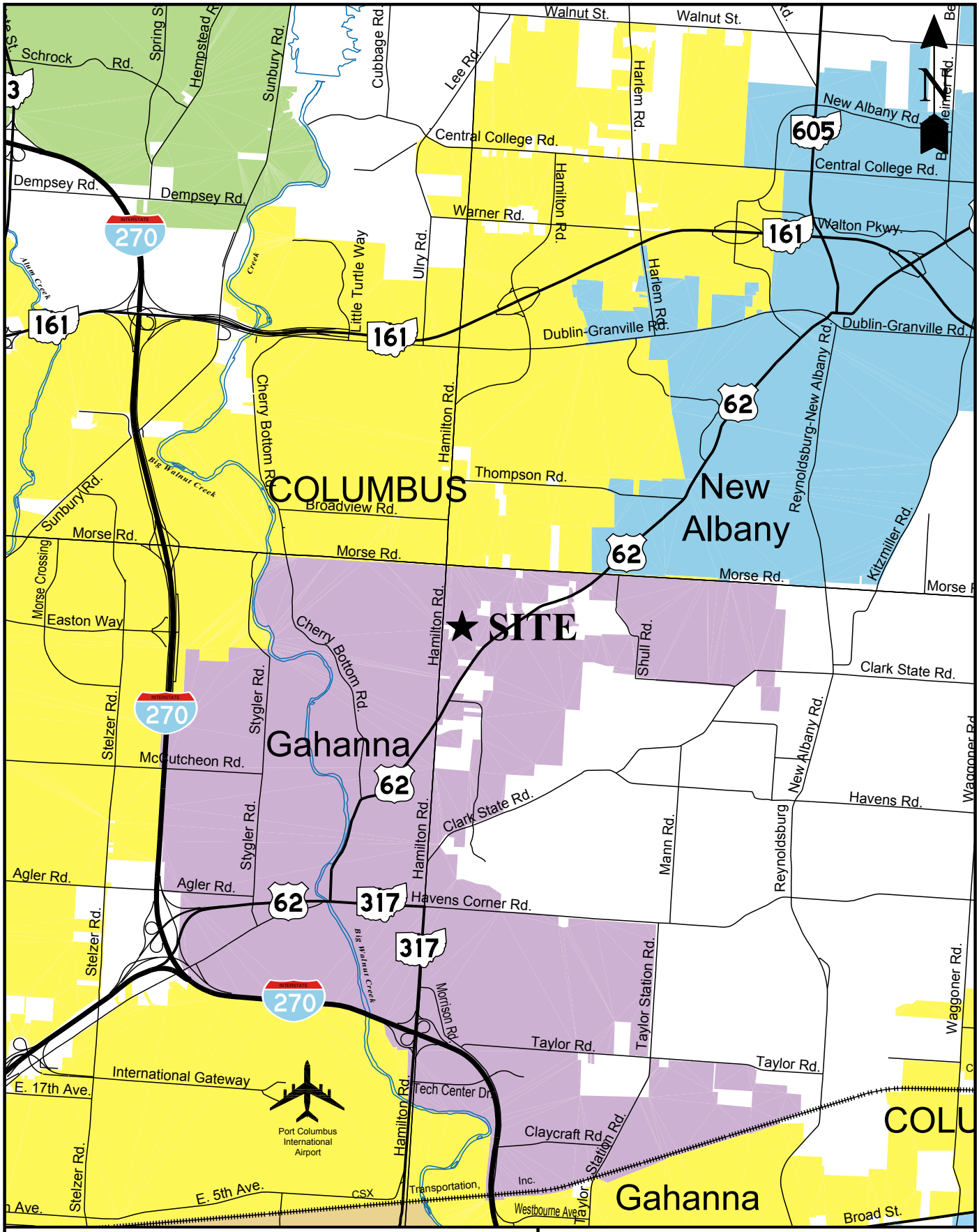

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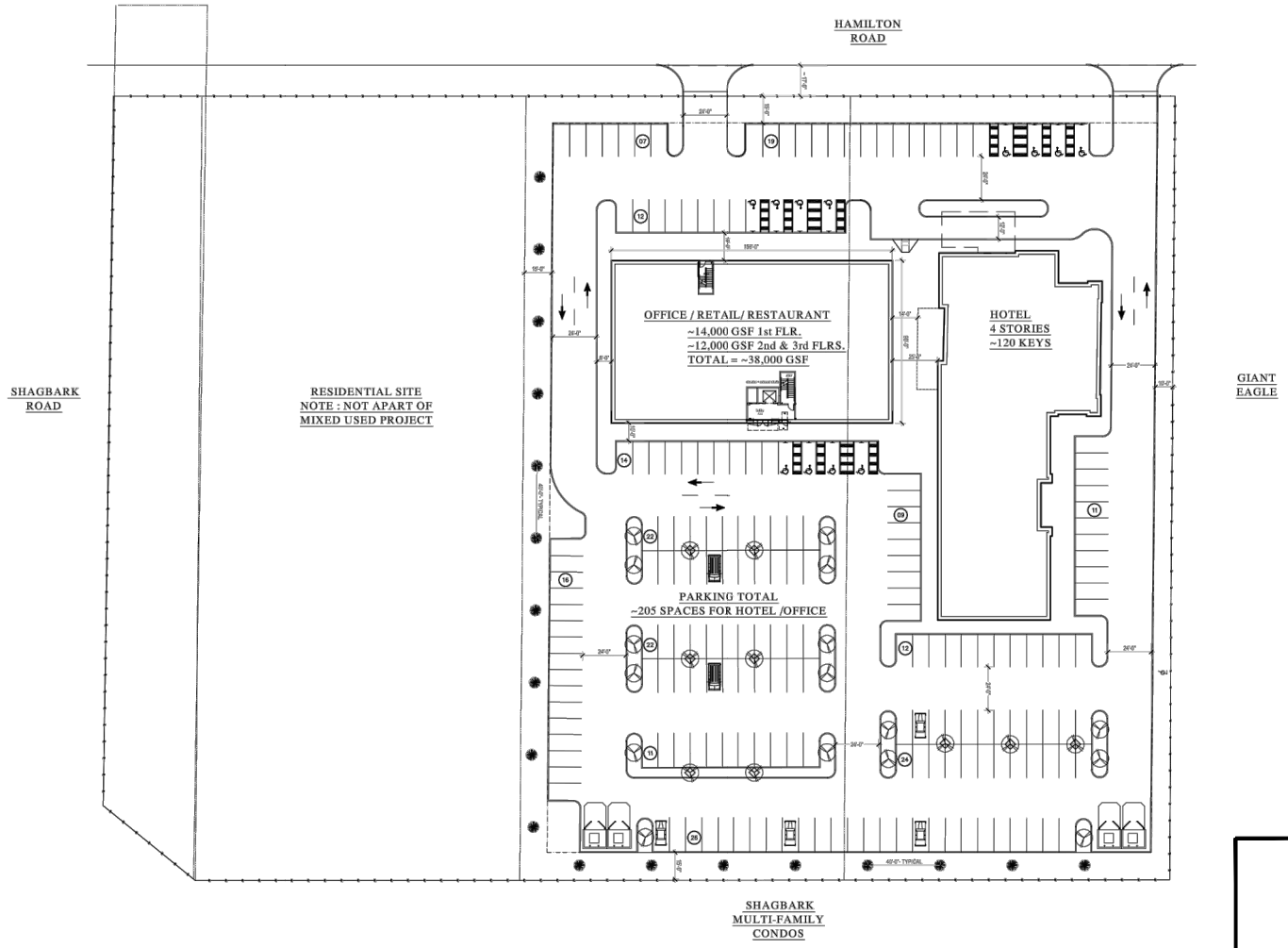
FIGURE 1

SITE LOCATION



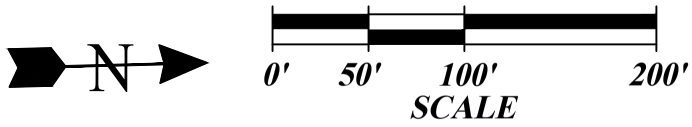


FIGURE 2

SITE LAYOUT

HAMILTON TOWNE CENTRE TRAFFIC IMPACT STUDY

REV 1
8/2018

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Intersection	Source	AM Peak Hour	AM School Factor	PM Peak Hour	PM School Factor
Hamilton Road & Stoneridge Drive	Smart Services, Inc.	6/28/2018 8:00-9:00 AM	NB Through: 1.026 (802/782) SB Through: 1.186 (1073/906)	6/28/2018 5:00-6:00 PM	NB Through: 1.095 (1295/1183) SB Through: 1.030 (1027/997)
Hamilton Road & Villa Oaks Lane	Smart Services, Inc.	6/28/2018 7:45-8:45 AM		6/28/2018 5:00-6:00 PM	
Hamilton Road & Vista Drive	Smart Services, Inc.	6/28/2018 7:45-8:45 AM		6/28/2018 5:00-6:00 PM	
Hamilton Road & Beecher Road	Smart Services, Inc. for *The Shops at Oberer's Crossing TIS* prepared by Trans Associates	4/27/2017 8:00-9:00 AM	Basis	4/27/2017 4:45-5:45 PM	Basis
Hamilton Road & 4525/4529 Hamilton Road	Smart Services, Inc.	6/28/2018 7:45-8:45 AM	NA – Turns Only	6/28/2018 5:00-6:00 PM	NA – Turns Only
Shagbark Road EB-WB east of Hamilton Road	Smart Services, Inc.	6/28/2018 7:00-8:00 AM	NA	6/28/2018 4:30-5:30 PM	NA

TABLE 1 – Summary of Existing Traffic Basis/School Factor

PROJECTED SITE TRAFFIC

Trip Generation

The site traffic was computed using the *Trip Generation Manual, 10th Edition*, published by the Institute of Transportation Engineers (ITE). Since end users of the site are not known, the land use had to be assumed with the highest potential trip generators. It is noted that while this is conservative for looking at traffic impacts, it is not conservative related to signal warrant analyses as less intense users may result in less traffic. The following are the conservative land uses anticipated on the proposed site and the representative land use in *Trip Generation* assumed:

- 2,000 SF Coffee Shop
(Coffee/Donut Shop without Drive-Through Window – ITE Code #936)
- 36,000 SF Office Building (Medical-Dental Office Building - ITE Code #720)
- 120 Room Hotel (ITE Code #310)

Note that ITE Code #936 did not have vehicle trip rates for daily traffic and only one sample of a rate for a person trip which was taken in a "Dense Multi-Use Urban" location. Since this is the only data known to be available, it was assumed that all people would drive and the occupancy would be one person per vehicle. It was also assumed that characteristics of the proposed site would be similar to a "Dense Multi-Use Urban" development. Table 2 shows the trip generation calculations.

Because there will be some trips that will enter the development and have destinations within the site, an internal capture percentage can be computed and applied to the total trips. The internal capture was computed according to the procedure shown in Chapter 6 of the *Trip Generation Handbook-An ITE Recommended Practice, 3rd Edition* also published by ITE. There are three relevant land uses for the site using this procedure; retail, office, and residential. Table 2 also shows the internal capture reduction. The internal capture worksheets are in the Appendix.

Pass-by trips were also considered in the analysis. Pass-by trips are trips to commercial developments that are already on the adjacent street. For example, someone may stop to get gas on the way home from work. This reduces the impact of traffic on the adjacent street. It also changes the distribution of traffic since traffic enters the site from one direction and continues in the same direction after leaving the site. The traffic volume entering the site is not changed. The percentage of pass-by trips are found in the *Trip Generation Handbook-An ITE Recommended Practice, 3rd Edition* published by ITE. The pass-by percentage is applied after the reduction for internal capture. Table 2 also shows the pass-by percentages.

Trip Distribution

The distribution of traffic was based upon what was entering the study area during the AM Peak. The following is the resulting distribution (the volume basis is in brackets).

- To/From the north on Hamilton Road - 50% (737)
- To/From the south on Hamilton Road - 34% (491)
- To/From the east on Beecher Road - 16% (238)

The Pass-by trip distribution was assumed to be as follows

- 80% south to north (NB) on Hamilton Road
- 20% north to south (SB) on Hamilton Road

Traffic Study Subarea	Land Use	Time of Day	Data Set from: *Trip Generation Manual, 10th Edition* (Unless noted Otherwise)	Overide with Average	Regression Equation from: *Trip Generation Manual 10th Edition*	Pass-By % From *Trip Generation Handbook 3rd Edition* unless noted otherwise		Total Trips	Total Primary Trips	Entering							Exiting						
										%	Total Trips	Internal Capture %	Internal Capture Trips	Sub Total	Pass-By Trips	Primary Trips	%	Total Trips	Internal Capture %	Internal Capture Trips	Sub Total	Pass-By Trips	Primary Trips
1	Hotel (ITE Code #310)	Daily	Weekday	☐	Average Rate= 8.36	NA		1003	1003	50%	502	NA	NA	502	0	502	50%	501	NA	NA	501	0	501
		AM Peak	Peak Hour of Adj. Street Traffic, One Hour between 7 & 9 AM	☐	T=0.50(X)-5.34	NA	NA	55	50	59%	32	3%	1	31	0	31	41%	23	17%	4	19	0	19
	Ind. Variable (X) = 120 Rooms	PM Peak	Peak Hour of Adj. Street Traffic, One Hour between 4 & 6 PM	☐	T=0.75X-26.02	NA	NA	64	59	51%	33	9%	3	30	0	30	49%	31	6%	2	29	0	29
2	Medical-Dental Office Building (ITE Code #720)	Daily	Weekday	☐	T=38.42(X)-87.62	NA		1296	1296	50%	648	NA	NA	648	0	648	50%	648	NA	NA	648	0	648
		AM Peak	Peak Hour of Adj. Street Traffic, One Hour between 7 & 9 AM	☐	ln(T)=0.89ln(X)+1.31	NA	NA	90	65	78%	70	17%	12	58	0	58	22%	20	65%	13	7	0	7
	Ind. Variable (X) = 36 1000 SF Gross Floor Area	PM Peak	Peak Hour of Adj. Street Traffic, One Hour between 4 & 6 PM	☐	T=3.39(X)+2.02	NA	NA	124	122	28%	35	3%	1	34	0	34	72%	89	1%	1	88	0	88
3	Coffee/Donut Shop without Drive-Through Window (ITE Code #936)	Daily	Weekday	☐	* Average Rate= 754.55	NA		1509	1509	50%	755	NA	NA	755	0	755	50%	754	NA	NA	754	0	754
		AM Peak	Peak Hour of Adj. Street Traffic, One Hour between 7 & 9 AM	☐	Average Rate= 101.14	49.0%	*Similar to 934	202	90	51%	103	15%	15	88	43	45	49%	99	11%	11	88	43	45
	Ind. Variable (X) = 2 1000 SF Gross Floor Area	PM Peak	Peak Hour of Adj. Street Traffic, One Hour between 4 & 6 PM	☐	Average Rate= 36.31	50.0%	*Similar to 934	73	33	50%	37	8%	3	34	17	17	50%	36	11%	4	32	16	16
TOTALS		**Daily**		☐				**3808**	**3808**		**1905**		**0**	**1905**	**0**	**1905**		**1903**		**0**	**1903**	**0**	**1903**
		AM Peak						**347**	**205**		**205**		**28**	**177**	**43**	**134**		**142**		**28**	**114**	**43**	**71**
		PM Peak						**261**	**214**		**105**		**7**	**98**	**17**	**81**		**156**		**7**	**149**	**16**	**133**

TABLE 2 - SITE TRIP GENERATION SUMMARY

* = Only data available is for person trips. It was assumed that all people drive and occupancy of one person per vehicle.

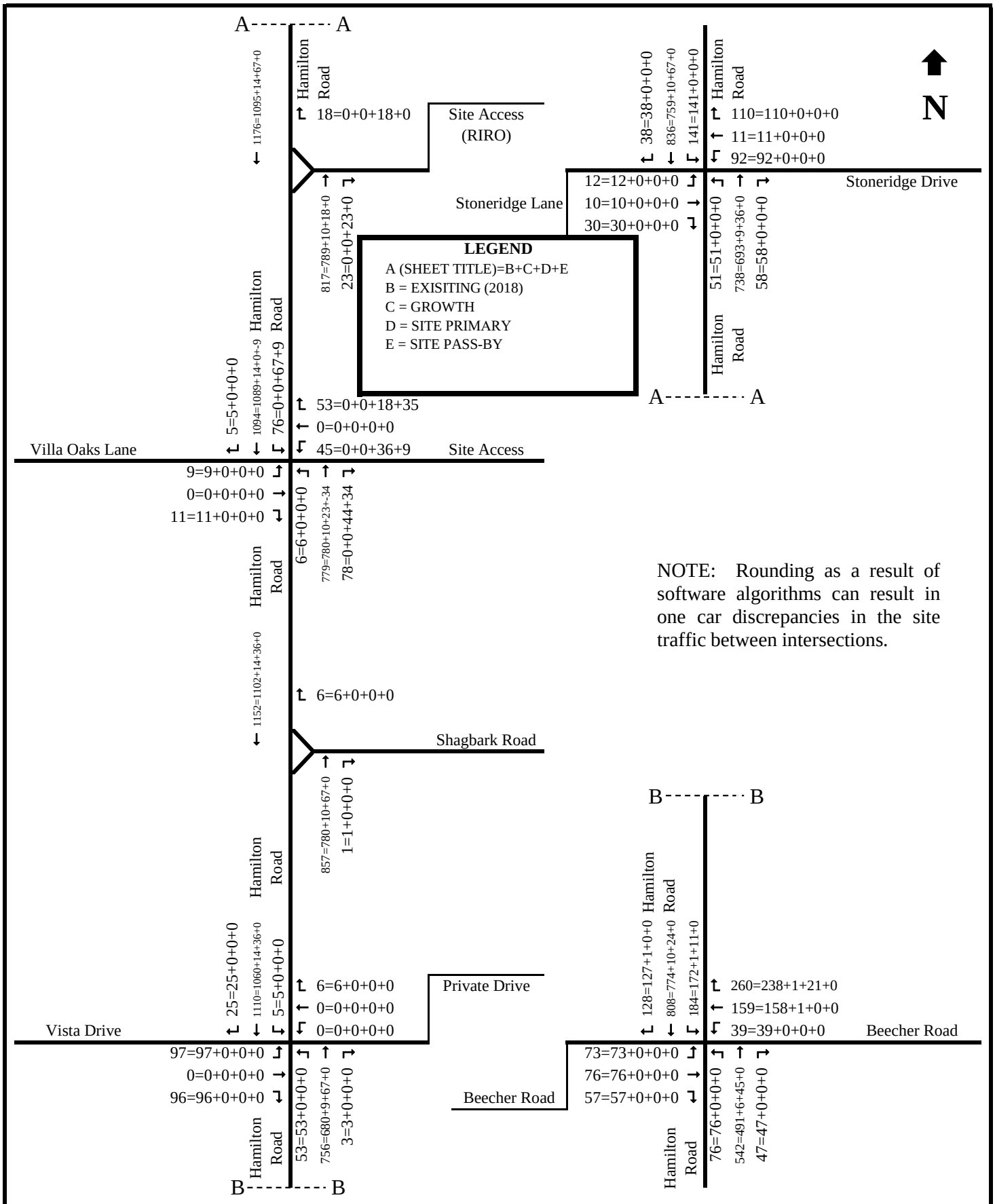
2019 & 2039 TRAFFIC

Per the scope of the study, a 20-year design horizon is required for the analysis. Opening day is 2019 therefore the design year is 2039. The City provided annual growth rates from the City thoroughfare plan. The reference page from the thoroughfare plan is in the Appendix. Table 3 shows the growth factors applied to the 2018 base counts.

Street	Linear Annual Growth Rate	2018 to 2019 Factor	2018 to 2039 Factor
Hamilton Road	1.3%	1.013	1.273
Beecher Road	0.5%	1.005	1.105

TABLE 3 – Growth Factor Summary

Figures 3 and 4 show the 2019 'Build' traffic and Figures 5 and 6 show the 2039 'Build' traffic. To assist with the review, exhibits showing the 2019 and 2039 'No Build' volumes have been provided in the Appendix.



NOTE: Rounding as a result of software algorithms can result in one car discrepancies in the site traffic between intersections.

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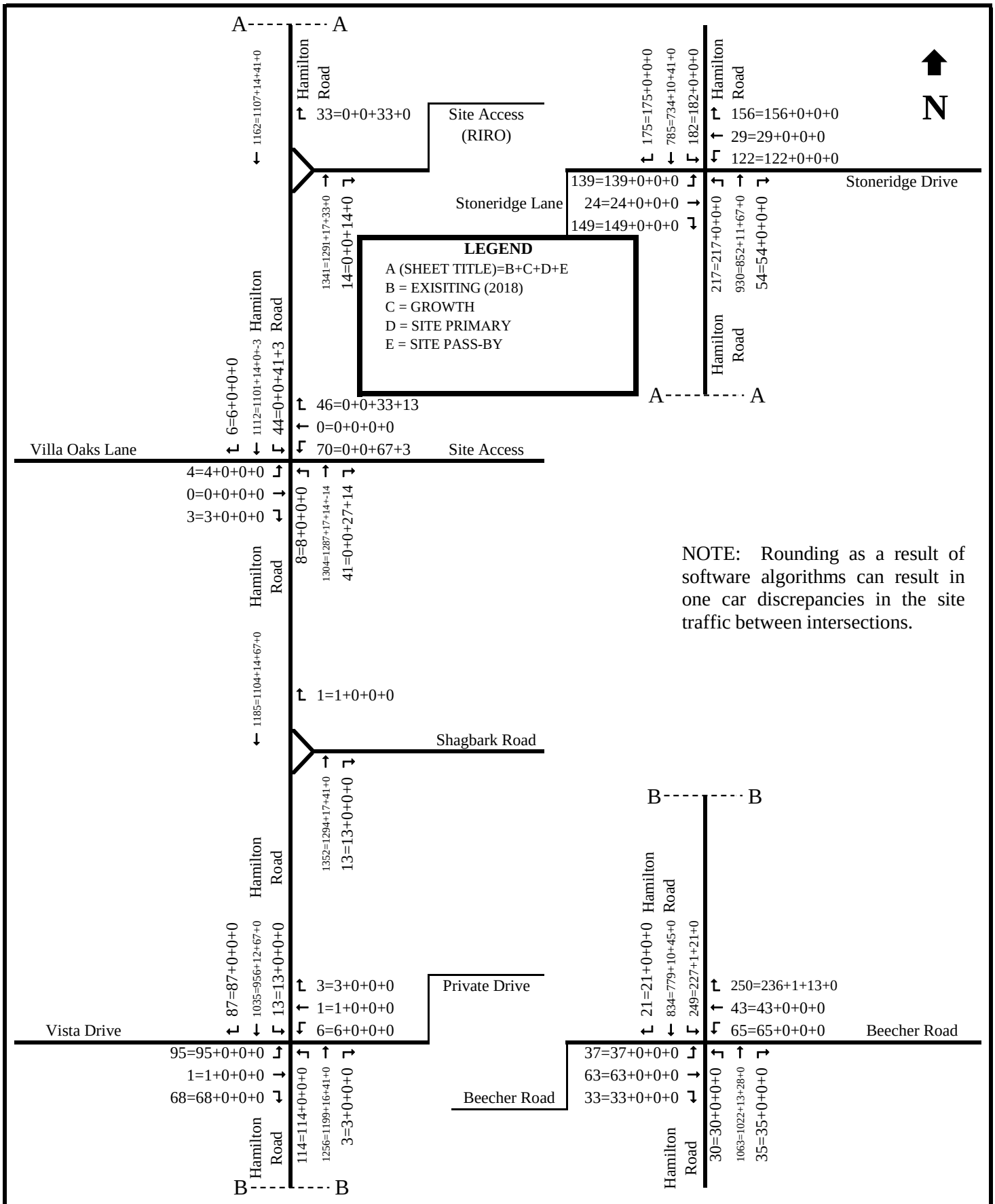
FIGURE 3

2019 'BUILD' - AM PEAK



NOTE: Rounding as a result of software algorithms can result in one car discrepancies in the site traffic between intersections.

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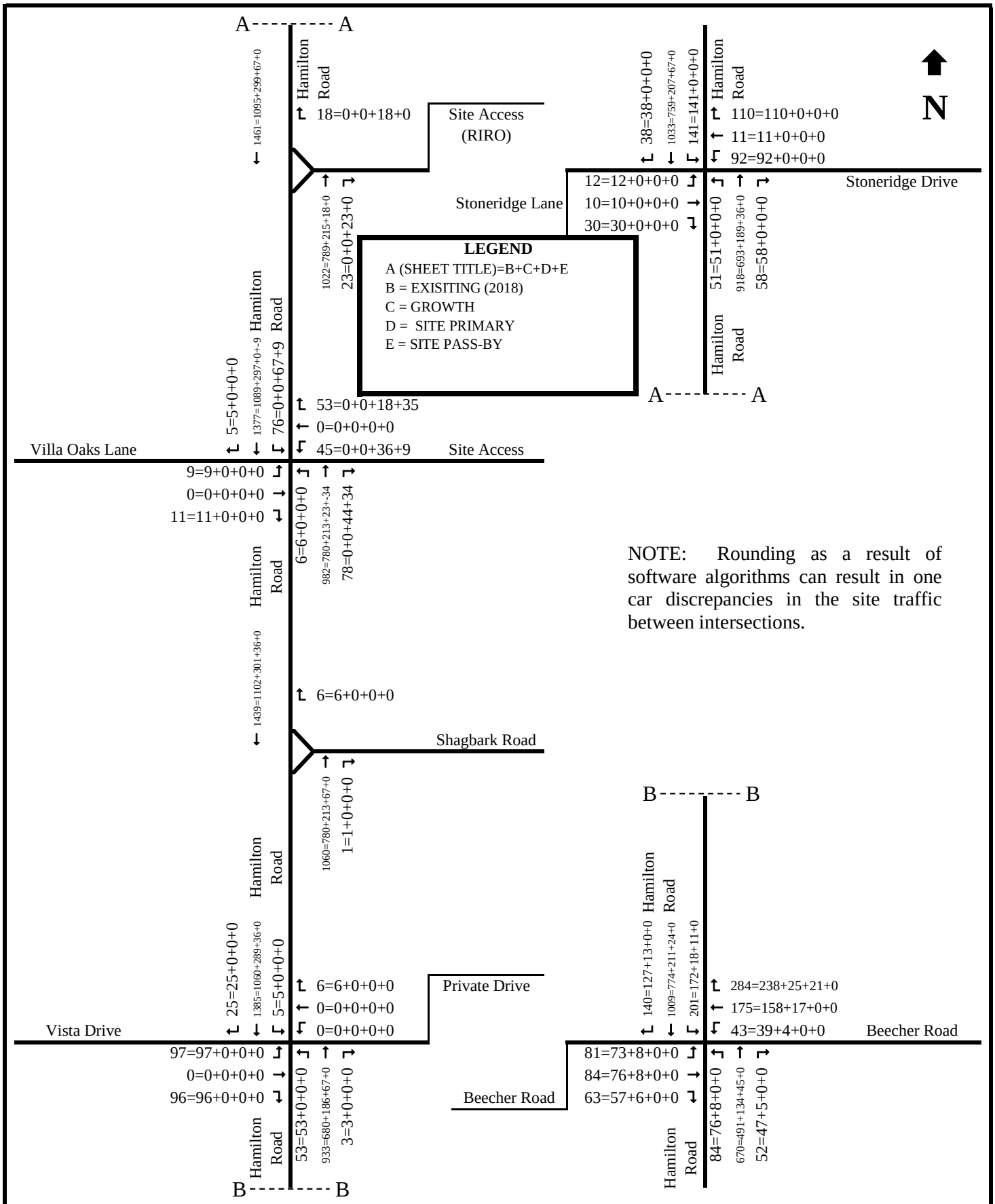
FIGURE 4

2019 'BUILD' - PM PEAK



NOTE: Rounding as a result of software algorithms can result in one car discrepancies in the site traffic between intersections.

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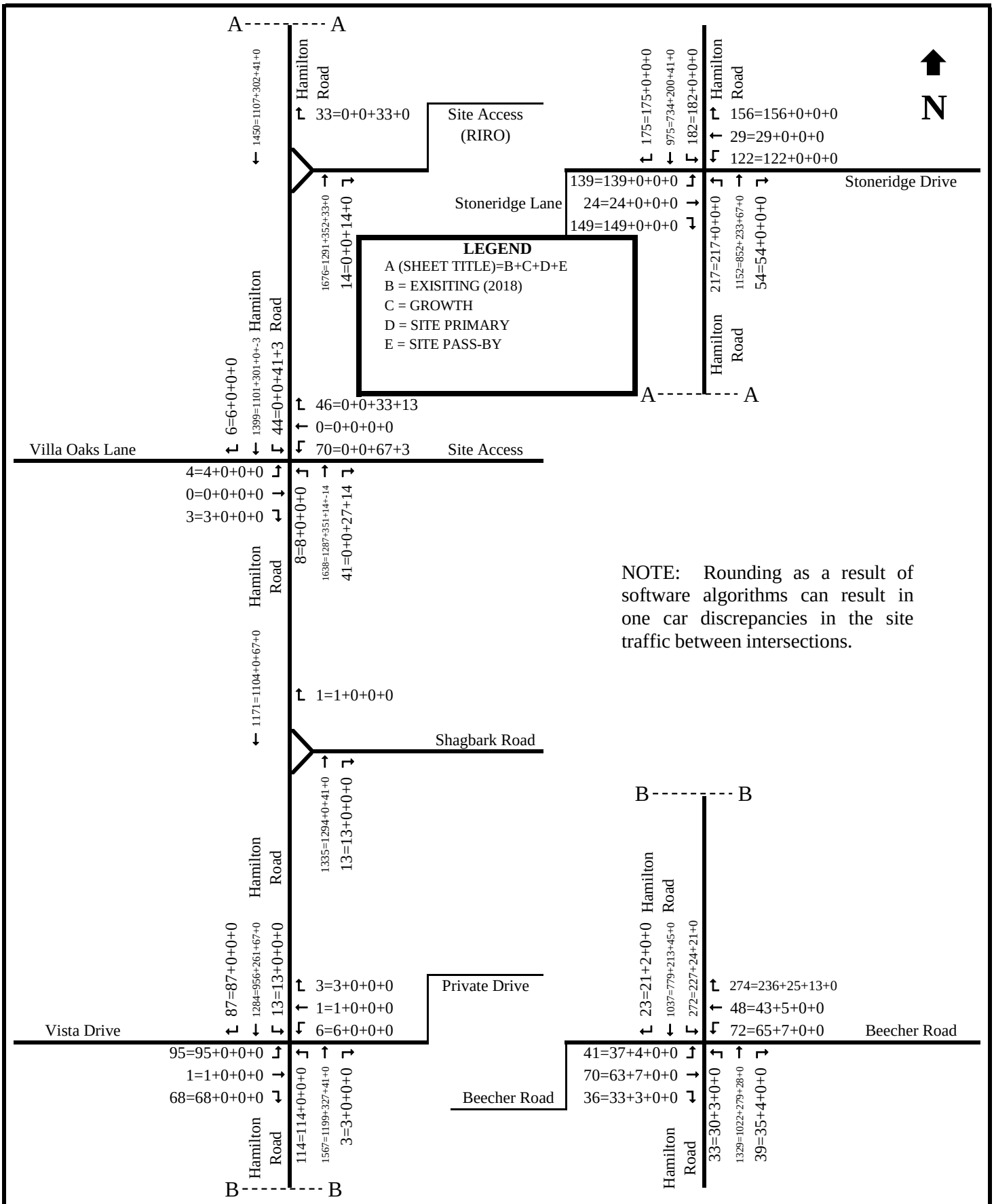
FIGURE 5

2039 'BUILD' - AM PEAK



NOTE: Rounding as a result of software algorithms can result in one car discrepancies in the site traffic between intersections.

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FIGURE 6

2039 'BUILD' - PM PEAK

TRAFFIC ANALYSES

Signal Warrant Analysis

Signal warrant analyses were performed for the 2019 'Build' (Site Full Build-out) and the 2039 'Build' conditions at the proposed full access on Hamilton Road. There are a total of 9 warrants in the *Ohio Manual of Uniform Traffic Control Devices, 2012 Edition (OMUTCD)*. If any of these are met, a signal is "warranted." If a signal is warranted, it means it is above the minimum level that a signal is desirable and may or may not be recommended for installation. A listing of the 9 warrants follows:

- Warrant # 1 – Eight-Hour Vehicular Volume
- Warrant # 2 – Four-Hour Vehicular Volume
- Warrant # 3 – Peak Hour
- Warrant # 4 – Pedestrian Volume
- Warrant # 5 – School Crossing
- Warrant # 6 – Coordinated Signal System
- Warrant # 7 – Crash Experience
- Warrant # 8 – Roadway Network
- Warrant # 9 – Intersection Near a Grade Crossing

For the vehicular volume based warrants, the *OMUTCD* specifies two levels of volume criteria depending on the 85th percentile speed and the population of the municipality. The volumes necessary are lower for speeds greater than 40 MPH or for communities with a population less than 10,000. For the higher speed or lower population criteria, traffic volumes required to meet the warrants are 70 percent of the volumes required for a lower speed or high population community. When speed data is not collected as part of the study, it is common practice to use the speed limit which is 35 MPH on Hamilton Road.

For the analysis, daily distributions for the site had to be projected for use in the warrant analyses. The assumed daily distributions were based on counts Smart Services, Inc. had on file. Internal capture was not developed for daily traffic. Supporting calculations of the daily distribution are in the Appendix. It is noted that for the coffee shop land use, the *Trip Generation Manual* had daily distribution for person trips in a "Dense Multi-Use Urban" location. Since this is the only data known to be available, it was assumed that the vehicle trips would have the same distribution and that characteristics would be similar to a "Dense Multi-Use Urban" location, and that entering and exiting trips would have the same distribution. The information from the *Trip Generation Manual* is in the Appendix.

The *OMUTCD* states under "guidance" that engineering judgment should be used to determine what portion of the right-turn vehicles from the minor street approach should be deducted in the analysis. The warrant was analyzed only considering the minor street left turns which allows for the consideration of the minor street as a one lane approach.

The Eight-Hour and Four-Hour warrants are the volume-based warrants that are typically considered when going forward with the installation of a traffic signal. The results show that neither the Eight-Hour nor Four-Hour warrants are met. The warrant worksheets are attached.

Turn Lane Warrant Analyses

The method for analyzing turn lane warrants is found in sections 401.2.2, 401.6.1, and 401.6.3 of the *ODOT L&D Manual.* Turn lane warrants are only applicable to unsignalized free-flow approaches. The results are shown in Table 4. The graphs from the ODOT *L&D Manual* is in the Appendix.

Intersection	Direction	Peak Hour	2019 'Build'	2039 'Build'
Hamilton Road Prop. RIRO Site Access	NB RT	AM Peak	Warrant Not Met	Warrant Not Met
		PM Peak	Warrant Not Met	Warrant Not Met
Hamilton Road Prop. Site Access	SB LT	AM Peak	**Warrant Met**	**Warrant Met**
		PM Peak	**Warrant Met**	**Warrant Met**
	NB RT	AM Peak	**Warrant Met**	Warrant Not Met
		PM Peak	**Warrant Met**	**Warrant Met**

TABLE 4 – Summary of Turn Lane Warrant Analyses

Signalized Capacity Analyses

Signalized capacity analyses were performed at the existing signalized intersections to determine the impact of the site on the intersections. The analyses were performed using the computer software *Synchro 10*. In the analyses, delays are computed which correspond to a Level of Service (LOS) "A" through "F". In an urban area, Level of Service (LOS) "D" and above is generally considered an acceptable LOS. Since driver expectations are different for various types of traffic control, there are different LOS criteria for unsignalized intersections versus signalized intersections. LOS criteria for signalized intersections are shown in Table 5.

Level of Service	Delay Range (seconds/vehicle)
A	≤ 10
B	> 10 and ≤ 20
C	> 20 and ≤ 35
D	> 35 and ≤ 55
E	> 55 and ≤ 80
F	> 80

Source: *Highway Capacity Manual 2010*

TABLE 5 - Level of Service Criteria for Signalized Intersections

The following comprises the background of the signalized capacity analysis:

- *Synchro 10* was used to perform the analysis.
- Existing intersection peak hour factor was applied at each intersection.
- Existing lane configuration and phasing were considered in the analysis. For the proposed site access, left turn lanes from the minor street were assumed in the analysis.
- Heavy vehicle percentage was assumed to be 2%.
- Based on prior analyses of the corridor, a 120 second cycle length was used in the AM Peak hour and a 140 second cycle length was assumed in the PM Peak hour. Splits were optimized for each condition.

Table 6 shows the results of the capacity analyses. The detailed reports from *Synchro* are in the Appendix.

Intersection	Time	Year	Delay (Level of Service)				
			Intersection	Eastbound	Westbound	Northbound	Southbound
Hamilton Road & Stoneridge Lane/Stoneridge Drive (#110)	AM Peak	2019 'No Build' Traffic	**10.4 (B)**	20.1 (C)	30.5 (C)	7.2 (A)	8.0 (A)
		2019 'Build' Traffic	**10.4 (B)**	20.3 (C)	31.8 (C)	7.3 (A)	8.0 (A)
		2039 'No Build' Traffic	**10.4 (B)**	20.4 (C)	31.3 (C)	7.6 (A)	8.6 (A)
		2039 'Build' Traffic	**10.5 (B)**	20.4 (C)	31.3 (C)	7.4 (A)	8.9 (A)
	PM Peak	2019 'No Build' Traffic	**16.9 (B)**	40.0 (D)	40.1 (D)	8.6 (A)	12.5 (B)
		2019 'Build' Traffic	**17.4 (B)**	39.5 (D)	41.0 (D)	9.7 (A)	13.2 (B)
		2039 'No Build' Traffic	**18.2 (B)**	42.4 (D)	42.8 (D)	10.7 (B)	14.3 (B)
		2039 'Build' Traffic	**18.7 (B)**	42.4 (D)	42.8 (D)	11.2 (B)	15.5 (B)
Hamilton Road & Vista Drive/Private Drive (#160)	AM Peak	2019 'No Build' Traffic	**6.9 (A)**	27.3 (C)		3.8 (A)	5.5 (A)
		2019 'Build' Traffic	**6.9 (A)**	27.3 (C)		3.9 (A)	5.6 (A)
		2039 'No Build' Traffic	**7.4 (A)**	27.5 (C)	0.2 (A)	4.0 (A)	6.9 (A)
		2039 'Build' Traffic	**7.4 (A)**	27.5 (C)	0.2 (A)	4.0 (A)	7.1 (A)
	PM Peak	2019 'No Build' Traffic	**8.3 (A)**	44.7 (D)	52.2 (D)	4.9 (A)	6.6 (A)
		2019 'Build' Traffic	**8.5 (A)**	44.7 (D)	52.2 (D)	5.1 (A)	7.0 (A)
		2039 'No Build' Traffic	**8.9 (A)**	44.7 (D)	52.2 (D)	7.2 (A)	6.3 (A)
		2039 'Build' Traffic	**9.3 (A)**	44.7 (D)	52.2 (D)	7.9 (A)	6.5 (A)
Hamilton Road & Beecher Road (#170)	AM Peak	2019 'No Build' Traffic	**15.6 (B)**	47.2 (D)	33.1 (C)	10.5 (B)	5.5 (A)
		2019 'Build' Traffic	**15.5 (B)**	47.1 (D)	31.8 (C)	11.0 (B)	5.6 (A)
		2039 'No Build' Traffic	**17.1 (B)**	43.9 (D)	32.5 (C)	13.4 (B)	8.9 (A)
		2039 'Build' Traffic	**17.5 (B)**	43.9 (D)	33.8 (C)	14.0 (B)	9.2 (A)
	PM Peak	2019 'No Build' Traffic	**13.9 (B)**	64.3 (E)	31.7 (C)	10.9 (B)	4.6 (A)
		2019 'Build' Traffic	**14.7 (B)**	64.3 (E)	31.2 (C)	12.4 (B)	5.7 (A)
		2039 'No Build' Traffic	**18.4 (B)**	66.6 (E)	30.4 (C)	18.7 (B)	8.9 (A)
		2039 'Build' Traffic	**19.6 (B)**	66.6 (E)	29.9 (C)	20.7 (C)	10.1 (B)

Hamilton Towne Centre Traffic Impact Study - REV. 1: 8/2018

TABLE 6 - Signalized (Synchro 10) Capacity Summary

Unsignalized Capacity Analyses

Unsignalized capacity analyses were performed at the unsignalized full site access opposite Villa Oaks Lane. In the analysis, delays are computed which correspond to a Level of Service (LOS) "A" through "F". Typically, Level of Service (LOS) "D" or above is considered an acceptable LOS. For a Two-Way Stop condition, the unsignalized capacity analysis gives LOS results for vehicles that must wait for gaps to make their maneuver. In this case, it would be the left turns from the major street and the minor street movements. All other movements are free-flowing so they don't encounter delay. Since driver expectations are different for various types of traffic control, there are different LOS criteria for unsignalized intersections versus signalized intersections. The LOS criteria for both two-way stop control and all-way stop control is shown in Table 7.

Level of Service	Delay Range (seconds/vehicle)
A	< 10
B	> 10 and ≤ 15
C	> 15 and ≤ 25
D	> 25 and ≤ 35
E	> 35 and ≤ 50
F	> 50

Source: *Highway Capacity Manual 2010*

TABLE 7- Level of Service Criteria for Unsignalized Intersections

The following comprises the background of the analysis:

- *Synchro 10* was used to perform the analysis.
- The existing Peak Hour Factor (PHF) was used for existing intersections. A peak hour factor of 0.92 was used for the proposed access.
- Two exiting lanes were assumed for the site access.
- Heavy vehicle percentage was assumed to be 2%.

The results are shown in Tables 8. The results are discussed in the Conclusions section. The *Synchro 10* reports are in the Appendix.

Intersection	Time	Year	Delay (Level of Service)					
			Main Street		Minor Street			
			Northbound Left	Southbound Left	Eastbound Left	Eastbound Right-Through	Westbound Left	Westbound Right-Through
Hamilton Road & Villa Oaks Lane/Site Access	AM Peak	2019 'No Build' Traffic	11.1 (B)		46.1 (E)	13.1 (B)		
		2019 'Build' Traffic	11.1 (B)	10.4 (B)	102.5 (F)	13.1 (B)	160.9 (F)	12.2 (B)
		2039 'No Build' Traffic	13.0 (B)		91.0 (F)	15.2 (C)		
		2039 'Build' Traffic	12.9 (B)	11.6 (B)	259.9 (F)	15.2 (C)	519.9 (F)	13.6 (B)
	PM Peak	2019 'No Build' Traffic	11.2 (B)		67.3 (F)	13.0 (B)		
		2019 'Build' Traffic	11.2 (B)	13.4 (B)	143.7 (F)	13.0 (B)	1088.7 (F)	16.0 (C)
		2039 'No Build' Traffic	13.2 (B)		149.2 (F)	15.1 (C)		
		2039 'Build' Traffic	13.1 (B)	16.9 (C)	421.1 (F)	15.1 (C)	3236.3 (F)	20.0 (C)

Hamilton Towne Centre Traffic Impact Study - REV. 1: 8/2018

TABLE 8 - Unsignalized Capacity Summary - (2-Way-Stop, North-South Major Street)

Turn Lane Length Analyses

Turn lane lengths for the warranted or considered turn lanes per the analyses were calculated and the results are shown in Table 9. The calculations were performed per Section 400 of the *ODOT L&D Manual*. The assumed design speed (40 MPH) of Hamilton Road was used as the speed in the calculations. The calculations are in the Appendix.

LOCATION	**Approximate Existing Length**	**2019 'No Build'**	**2019 'Build'**	**2039 'No Build'**	**2039 'Build'**
		ODOT L&D Manual	*ODOT L&D Manual*	*ODOT L&D Manual*	*ODOT L&D Manual*
Hamilton Road SB Left Turn Lane at Prop. Site Access	NA	NA	125'	NA	125'
Hamilton Road NB Right Turn Lane at Prop. Site Access	NA	NA	125'	NA	125'

TABLE 9 – Turn Lane Length Results (Includes the 50' diverging taper)

Access Locations

The proposed full access and right-in/right-out access on Hamilton Road were assessed in relation to the City's *Access Management Guidelines*. The following is the assessment for this determination at each access:

Prop. Site Access -Full Access

1) The Proposed Full Site Access aligns with Villa Oaks Lane on the west side of Hamilton Road.

2) On the west side of Hamilton Road, there is an existing driveway to 4525 & 4529 Hamilton Road which is approximately 75 feet south of Village Oaks Lane. The driveway is gated. A count was performed during the peak hour and there were not any vehicles going in or out of the driveway.

3) On the east side of Hamilton Road, the Proposed Site RIRO access to the north and Shagbark Road to the south meet the driveway spacing requirement of 250 feet.

4) The City's upstream corner clearance requirement of 310 feet to the signal at Stoneridge Drive (approximately 1050 feet) is met.

5) The City's downstream corner clearance requirement of 250 feet to the signal at Vista Drive (approximately 630 feet) is met.

Prop. Site Access – RIRO Access

1) On the east side of Hamilton Road, the Giant Eagle RIRO access to the north and the Proposed Site Access to the south meet the driveway spacing requirement of 250 feet.

2) The City's upstream corner clearance requirement of 310 feet to the signal at Stoneridge Drive (approximately 800 feet) is met.

3) The City's downstream corner clearance requirement of 250 feet to the signal at Vista Drive (approximately 880 feet) is met.

CONCLUSIONS

2019 and 2039 'No Build' and 'Build' volumes were developed for use in signal warrant analyses, turn lane warrant analyses, capacity analyses, and turn lane length analyses. The following is a summary of the conclusions of the study at each intersection in the study area:

2019 'No Build'

- Hamilton Road & Stoneridge Drive
  - The intersection and all approaches operate at Level of Service (LOS) D or above.
- Hamilton Road & Villa Oaks Lane
  - All existing impeded movements operate at LOS D or above except for the eastbound left turn movement which operates at LOS F.
- Hamilton Road & Vista Drive
  - The intersection and all approaches operate at Level of Service (LOS) D or above.
- Hamilton Road & Beecher Road
  - The intersection and all approaches operate at Level of Service (LOS) D or above except for the eastbound approach in the PM Peak which operates just below the LOS D-E threshold.

2019 'Build'

- Hamilton Road & Stoneridge Drive
  - Same as No Build: The intersection and all approaches operate at Level of Service (LOS) D or above.
- Hamilton Road & Prop. Site Access RIRO
  - A northbound right turn lane is not warranted.
- Hamilton Road & Villa Oaks Lane/Prop. Site Access
  - A traffic signal is not warranted. It is noted that the Four Hour Warrant is close as it meets the threshold in three of the four hours and is a few vehicles from meeting it in the fourth hour. As noted in the Projected Traffic section, the projected traffic is conservative for looking at traffic impacts but it is not conservative related to signal warrant analyses as less intense users may result in substantially less traffic. Furthermore, the coffee shop land use, which represents 40% of the daily primary trips in the analysis, is based on several assumptions.
  - In an unsignalized condition, a southbound left turn lane is warranted. The length of the lane is 125 feet which includes the 50-foot diverging taper. The City prefers that the installation of the southbound left turn lane maintain the raised curb within this area, similar to the northbound left turn lane north and adjacent to the proposed southbound left turn lane.
  - In an unsignalized condition, a northbound right turn lane is warranted. The length of the lane is 125 feet which includes the 50-foot diverging taper.

○A westbound through-right lane and a westbound left lane should be provided to minimize delays for the westbound right turning vehicles.
In design of the driveway, the developer will work with the City to provide the best alignment of the proposed driveway with Villa Oaks Lane.
○Same as No Build: All existing impeded movements operate at LOS D or above except for the eastbound left turn movement which operates at LOS F.
○All proposed impeded movements operate at LOS D or above except for the westbound left turn movement which operates at LOS F. This is an expected result for an unsignalized access on an arterial street. The only solution would be a change to the traffic control, but a traffic signal is not warranted. The developer is to restrict westbound left turning movements from the full-access drive along Hamilton Road during PM Peak hours (typically 4:00-6:00 PM) via signage.

●Hamilton Road & Vista Drive
○Same as No Build: The intersection and all approaches operate at Level of Service (LOS) D or above.

●Hamilton Road & Beecher Road
○Same as No Build: The intersection and all approaches operate at Level of Service (LOS) D or above except for the eastbound approach in the PM Peak which operates just below the LOS D-E threshold.

2039 'No Build'

●Hamilton Road & Stoneridge Drive
○The intersection and all approaches operate at Level of Service (LOS) D or above.

●Hamilton Road & Villa Oaks Lane
○All existing impeded movements operate at LOS D or above except for the eastbound left turn movement which operates at LOS F.

●Hamilton Road & Vista Drive
○The intersection and all approaches operate at Level of Service (LOS) D or above.

●Hamilton Road & Beecher Road
○The intersection and all approaches operate at Level of Service (LOS) D or above except for the eastbound approach in the PM Peak which operates just below the LOS D-E threshold.

2039 'Build'

●Hamilton Road & Stoneridge Drive
○Same as No Build: The intersection and all approaches operate at Level of Service (LOS) D or above.

●Hamilton Road & Prop. Site Access RIRO
○A northbound right turn lane is not warranted.

- Hamilton Road & Villa Oaks Lane/Prop. Site Access
  - A traffic signal is not warranted. It is noted that the Four Hour Warrant is close as it meets the threshold in three of the four hours and is a few vehicles from meeting it in the fourth hour. As noted in the Projected Traffic section, the projected traffic is conservative for looking at traffic impacts but it is not conservative related to signal warrant analyses as less intense users may result in substantially less traffic. Furthermore, the coffee shop land use, which represents 40% of the daily primary trips in the analysis, is based on several assumptions.
  - In an unsignalized condition, a southbound left turn lane is warranted. The length of the lane is 125 feet which includes the 50-foot diverging taper. The City prefers that the installation of the southbound left turn lane maintain the raised curb within this area, similar to the northbound left turn lane north and adjacent to the proposed southbound left turn lane.
  - In an unsignalized condition, a northbound right turn lane is warranted. The length of the lane is 125 feet which includes the 50-foot diverging taper.
  - A westbound through-right lane and a westbound left lane should be provided to minimize delays for the westbound right turning vehicles. In design of the driveway, the developer will work with the City to provide the best alignment of the proposed driveway with Villa Oaks Lane.
  - Same as No Build: All existing impeded movements operate at LOS D or above except for the eastbound left turn movement which operates at LOS F.
  - All proposed impeded movements operate at LOS D or above except for the westbound left turn movement which operates at LOS F. This is an expected result for an unsignalized access on an arterial street. The only solution would be a change to the traffic control, but a traffic signal is not warranted. The developer is to restrict westbound left turning movements from the full-access drive along Hamilton Road during PM Peak hours (typically 4:00-6:00 PM) via signage.

- Hamilton Road & Vista Drive
  - Same as No Build: The intersection and all approaches operate at Level of Service (LOS) D or above.

- Hamilton Road & Beecher Road
  - Same as No Build: The intersection and all approaches operate at Level of Service (LOS) D or above except for the eastbound approach in the PM Peak which operates just below the LOS D-E threshold.

APPENDIX

Todd Stanhope

From: Robert Priestas <Robert.Priestas@gahanna.gov>
Sent: Thursday, August 23, 2018 2:31 PM
To: Todd Stanhope
Subject: RE: Hamilton Towne Centre Traffic Impact Study
Attachments: 180820 Hamilton Towne Centre Traffic Study Comments.pdf

Good Afternoon Todd,

Please see attached comments for the subject TIS.

Thank you,

Rob

Robert S. Priestas, P.E.
Director
Department of Public Service & Engineering

City of Gahanna
200 S. Hamilton Rd.
Gahanna, Ohio 43230
614.342.4055
614.342.4155(fax)
robert.priestas@gahanna.gov
www.gahanna.gov

From: Todd Stanhope [mailto:tstanhope@smartservices-inc.com]
Sent: Thursday, August 09, 2018 9:42 AM
To: Robert Priestas <Robert.Priestas@gahanna.gov>
Cc: Anthony Jones <Anthony.Jones@gahanna.gov>; David Glimcher <david@gobluehorseshoe.com>; 'Lenni Male' <lenni@gobluehorseshoe.com>; 'Tony Sekulovski' <tony@gobluehorseshoe.com>; Kathleen Krock <kkrock@smartservices-inc.com>
Subject: Hamilton Towne Centre Traffic Impact Study

Hello Rob

Attached is a PDF of the subject traffic impact study for your review. We will be sending one hard copy in the mail. Please let us know if you have any questions. Thank you.

Traffic Study Review Comments

RE: Hamilton Towne Centre Traffic Impact Study
TO: The City of Gahanna
FROM: Carpenter Marty Transportation
DATE: August 20, 2018

Carpenter Marty Transportation (CM) provides traffic engineering services for the City of Gahanna and has been retained to complete a review of the Hamilton Towne Centre Traffic Impact Study. The study is dated August 9, 2018 and was completed by Smart Services, Inc. Carpenter Marty offers the following comments:

1) Please confirm that the multifamily portion of the development will be 3 to 10 stories tall. Based on the heights of surrounding area multifamily developments, it would appear that LUC (Land Use Code) 220 - Multifamily Housing (Low-Rise) would be the more appropriate Land Use Code for this development. However, if 3+ stories are proposed, LUC 221 would be acceptable.

2) It would be preferred that the installation of the southbound left turn lane into the proposed full-access along Hamilton Road maintain the raised curb within this area, similar to the northbound left turn lane north and adjacent to the proposed southbound left turn lane.

3) Due to significant delays, a V/C ratio over 2, and signal warrants not being met, it may be necessary to restrict westbound left turning movements from the full-access drive along Hamilton Road during PM Peak hours (typically 4:00-6:00 PM) via signage.

4) There is concern regarding the full-access drive alignment with Villa Oaks Lane due to the width of the existing Villa Oaks Lane access drive and the proposed width of the full-access site drive shown on the site plan. Please provide a schematic drawing of the proposed full-access drive alignment with Villa Oaks Lane. Additionally, please provide anticipated left turning paths for all approaches of the intersection. It will be important that the design and location of the proposed full-access drive minimize conflicts of left turning vehicles from all approaches.

5) Please evaluate the proposed full-access drive on Hamilton Road for safety, as requested in the MOU comments from the City.

6) It appears that the LOS E for the eastbound approach of the Hamilton Road & Beecher Road intersection during the PM Peak is caused by the coordination of signals along Hamilton Road and the 140 second cycle length. This seems acceptable as eastbound volumes are significantly less than volumes along Hamilton Road. It may be necessary to perform a queuing analysis to ensure all queued eastbound vehicles can enter the intersection with the allotted green time. However, this is a No Build condition, so no improvements would be necessary of the proposed development.

If you have any questions or comments, please contact Drew Laurent at 614-656-2421 or dlaurent@cmtran.com.

Sincerely,
Carpenter Marty Transportation Inc.

Gina Balsamo, PE
Project Engineer

From:	Robert Priestas
To:	Todd Stanhope
Cc:	David Glimcher; Lenni Male
Subject:	RE: Hamilton Towne Center MOU
Date:	Monday, July 09, 2018 6:03:55 PM
Attachments:	image006.png image008.png image010.png image012.png image014.png image016.png

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Good Evening Todd,

I have a couple of comments related to the MOU. They are as follows:

1. I have serious concerns related to the full access proposed onto Hamilton Road. This will need be evaluated for safety. I believe that there is the high likelihood that there are too many conflict points to make this access safe. The preferred full access point for this development would be via connection to the existing roadway and signal at the intersection of Hamilton Road and Vista Drive.
2. The proposed right-in/right-out shall be evaluated for a right turn lane.
3. All access points shall be evaluated for compliance to our access management guidelines.
4. Access along Hamilton Road should be consolidated into one, full-access point. It is recommended that this be located directly across the Villa Oaks development.
5. Capacity analysis of the proposed full access drive/Villa Oaks Drive.
6. The proposed full access point shall be evaluated for signal and turn lane warrants.

Please let me know if you have any questions.

Thanks,

Rob

ROBERT S. PRIESTAS, P.E.

Director
Department of Public Service and Engineering

CITY OF GAHANNA
200 S. Hamilton Rd.
Gahanna, Ohio 43230
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SMART SERVICES, INC.
Surveying ◆ Environmental ◆ Traffic ◆ CA/CM
An Ohio DBE/EDGE Certified Firm

July 5, 2018

Mr. Robert S. Priestas, PE
City of Gahanna
Department of Engineering
200 South Hamilton Road
Gahanna, OH 43230

Re: Hamilton Town Centre TIS MOU
City of Gahanna, Franklin County, Ohio

Dear Rob:

Please consider this letter as a Memo of Understanding (MOU) for the traffic study required for the subject site. The subject site is located on the east side of Hamilton Road between Giant Eagle and Shagbark Road in the City of Gahanna, Ohio. The site is planned to be developed with a 110-room hotel, a 36,000 SF office building, and 156 multi-family units. At this point, there is one full access proposed on Hamilton Road opposite Villa Oaks Lane and one right-in/right-out access proposed on Hamilton Road south of the Giant Eagle. There is potential in the future to have access to the Vista Drive signal but a connection is needed across two properties that are not in control of the developer. The permitting agency for the access is the City of Gahanna and they are requiring a traffic study.

Per a pre-meeting with the City of Gahanna on 6/26/2018, the following is our understanding of the scope of the traffic study:

- The study area is the following intersections:
  - The site access points on Hamilton Road
  - Hamilton Road & Stoneridge Drive
  - Hamilton Road & Shagbark Road
  - Hamilton Road & Vista Drive
  - Hamilton Road & Beecher Road.
- The time of analysis will be the weekday AM Peak hour (one hour between 7 and 9 AM) and the PM Peak hour (one hour between 4 and 6 PM).
- New Peak hour (7-9 AM & 4-6 PM) turning movement counts will be taken at the study area intersections.
- Trip Generation - Site traffic will be computed using *Trip Generation Manual, 10th Edition* published by ITE.
- Since there is potential for future access to the Vista Drive signal, two scenarios will be developed: one with no access to the Vista Drive signal and full access on Hamilton Road and one with access to the Vista Drive signal and no full access on Hamilton Road.
- Design Year Traffic Development – The City of Gahanna requires a 20-year design horizon. Opening Day will be assumed to be 2019. The City indicated that they can

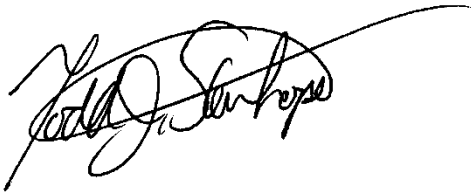
provide growth rates for Hamilton Road. It would be assumed that any minor street traffic would be dependent on additional development so a growth rate would not be applied.

- Analyses
  - Signalized capacity analyses will be performed using *Synchro 10* at all signalized intersections within the study area.
  - The unsignalized full access point on Hamilton Road in the scenario without access to the Vista Drive signal will be analyzed.

If this MOU is acceptable to you, please indicate your approval in the space provided below. If not, please let us know what items need to be changed.

If you have any questions, please contact me. Thank you!

Sincerely,
SMART SERVICES, INC.



Todd J. Stanhope, PE, PTOE
Director of Traffic Engineering

Submitted: One electronic copy (PDF format) via e-mail

cc: D. Glimcher - Blue Horseshoe Ventures, LTD

City of Gahanna

Approved: _____ Date: _____

Smart Services, Inc.

88 W. Church Street
Newark, OH 43055
(740) 345-4700

File Name : Hamilton_Road_&_Beecher_Road_404565_04-27-2017
Site Code : 404565
Start Date : 4/27/2017
Page No : 1

Groups Printed- Cars - Trucks

	Hamilton Road Southbound				Beecher Road Westbound				Hamilton Road Northbound				Beecher Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	17	189	12	218	3	12	43	58	11	61	9	81	2	2	7	11	368
07:15 AM	24	170	23	217	5	37	47	89	12	71	11	94	10	8	19	37	437
07:30 AM	30	202	54	286	10	87	55	152	31	103	8	142	16	16	14	46	626
07:45 AM	49	191	59	299	9	55	62	126	36	110	18	164	34	37	26	97	686
Total	120	752	148	1020	27	191	207	425	90	345	46	481	62	63	66	191	2117
08:00 AM	37	203	5	245	10	11	69	90	8	154	8	170	20	19	11	50	555
08:15 AM	56	178	9	243	10	5	52	67	1	124	13	138	3	4	6	13	461
08:30 AM	46	155	3	204	8	5	58	71	0	144	20	164	4	8	7	19	458
08:45 AM	37	175	1	213	8	3	45	56	4	151	13	168	3	5	6	14	451
Total	176	711	18	905	36	24	224	284	13	573	54	640	30	36	30	96	1925
09:00 AM	45	126	6	177	13	2	33	48	3	112	13	128	5	5	5	15	368
09:15 AM	34	119	1	154	8	3	42	53	2	121	16	139	4	3	2	9	355
09:30 AM	38	113	3	154	11	2	46	59	2	112	17	131	5	0	3	8	352
09:45 AM	44	111	2	157	16	2	39	57	3	139	14	156	7	1	3	11	381
Total	161	469	12	642	48	9	160	217	10	484	60	554	21	9	13	43	1456
10:00 AM	35	100	4	139	12	7	45	64	4	133	12	149	7	7	3	17	369
10:15 AM	47	120	4	171	18	2	42	62	2	154	16	172	3	1	4	8	413
10:30 AM	28	120	2	150	11	1	49	61	0	140	18	158	3	3	1	7	376
10:45 AM	40	128	2	170	13	1	41	55	0	136	12	148	3	4	2	9	382
Total	150	468	12	630	54	11	177	242	6	563	58	627	16	15	10	41	1540
11:00 AM	40	137	5	182	15	1	46	62	2	171	12	185	3	2	2	7	436
11:15 AM	35	151	6	192	15	3	53	71	2	178	12	192	6	0	4	10	465
11:30 AM	42	148	3	193	14	0	74	88	0	172	10	182	3	1	5	9	472
11:45 AM	50	163	4	217	14	3	74	91	3	185	6	194	6	3	3	12	514
Total	167	599	18	784	58	7	247	312	7	706	40	753	18	6	14	38	1887
12:00 PM	55	156	3	214	8	0	67	75	2	232	3	237	3	1	4	8	534
12:15 PM	55	176	6	237	7	0	68	75	1	163	8	172	5	4	5	14	498
12:30 PM	55	182	3	240	9	1	42	52	1	176	16	193	0	0	4	4	489
12:45 PM	59	184	7	250	7	0	44	51	4	169	13	186	5	5	2	12	499
Total	224	698	19	941	31	1	221	253	8	740	40	788	13	10	15	38	2020
01:00 PM	47	176	4	227	10	3	49	62	7	170	13	190	5	0	3	8	487
01:15 PM	50	169	8	227	8	2	41	51	3	147	10	160	2	3	3	8	446
01:30 PM	43	166	6	215	8	4	36	48	3	163	15	181	1	2	1	4	448
01:45 PM	52	177	4	233	19	8	49	76	2	173	15	190	4	3	2	9	508
Total	192	688	22	902	45	17	175	237	15	653	53	721	12	8	9	29	1889
02:00 PM	35	165	2	202	13	2	35	50	3	165	15	183	2	4	2	8	443

Smart Services, Inc.

88 W. Church Street
Newark, OH 43055
(740) 345-4700

File Name : Hamilton_Road_&_Beecher_Road_404565_04-27-2017
Site Code : 404565
Start Date : 4/27/2017
Page No : 2

Groups Printed- Cars - Trucks

	Hamilton Road Southbound				Beecher Road Westbound				Hamilton Road Northbound				Beecher Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
02:15 PM	52	166	6	224	11	6	37	54	7	152	12	171	1	1	1	3	452
02:30 PM	46	172	10	228	14	7	42	63	4	173	8	185	2	0	5	7	483
02:45 PM	42	162	8	212	9	24	39	72	11	179	12	202	2	2	4	8	494
Total	175	665	26	866	47	39	153	239	25	669	47	741	7	7	12	26	1872
03:00 PM	42	171	16	229	12	16	33	61	17	153	16	186	14	18	8	40	516
03:15 PM	51	154	4	209	15	7	57	79	11	202	13	226	35	67	17	119	633
03:30 PM	47	171	5	223	16	4	62	82	8	208	14	230	23	19	9	51	586
03:45 PM	58	155	8	221	13	7	57	77	5	201	12	218	9	7	6	22	538
Total	198	651	33	882	56	34	209	299	41	764	55	860	81	111	40	232	2273
04:00 PM	55	161	13	229	18	9	41	68	8	231	12	251	14	13	12	39	587
04:15 PM	46	174	8	228	17	9	52	78	4	234	6	244	6	4	6	16	566
04:30 PM	61	186	12	259	13	6	42	61	9	196	8	213	7	13	8	28	561
04:45 PM	53	190	4	247	8	12	59	79	4	243	7	254	9	13	4	26	606
Total	215	711	37	963	56	36	194	286	25	904	33	962	36	43	30	109	2320
05:00 PM	54	199	4	257	31	10	68	109	9	277	12	298	11	10	5	26	690
05:15 PM	65	196	8	269	14	12	61	87	12	264	8	284	12	32	17	61	701
05:30 PM	55	194	5	254	12	9	48	69	5	238	8	251	5	8	7	20	594
05:45 PM	62	182	3	247	5	6	52	63	13	242	8	263	9	13	6	28	601
Total	236	771	20	1027	62	37	229	328	39	1021	36	1096	37	63	35	135	2586
06:00 PM	58	177	9	244	11	10	55	76	10	232	6	248	9	14	5	28	596
06:15 PM	58	176	9	243	6	6	50	62	7	194	8	209	8	21	8	37	551
06:30 PM	48	160	6	214	8	5	48	61	9	200	5	214	5	6	11	22	511
06:45 PM	43	152	5	200	6	5	39	50	7	194	9	210	5	8	6	19	479
Total	207	665	29	901	31	26	192	249	33	820	28	881	27	49	30	106	2137
Grand Total	2221	7848	394	10463	551	432	2388	3371	312	8242	550	9104	360	420	304	1084	24022
Apprch %	21.2	75	3.8		16.3	12.8	70.8		3.4	90.5	6		33.2	38.7	28		
Total %	9.2	32.7	1.6	43.6	2.3	1.8	9.9	14	1.3	34.3	2.3	37.9	1.5	1.7	1.3	4.5	
Cars	2197	7691	389	10277	544	429	2364	3337	310	8088	542	8940	360	416	297	1073	23627
% Cars	98.9	98	98.7	98.2	98.7	99.3	99	99	99.4	98.1	98.5	98.2	100	99	97.7	99	98.4
Trucks	24	157	5	186	7	3	24	34	2	154	8	164	0	4	7	11	395
% Trucks	1.1	2	1.3	1.8	1.3	0.7	1	1	0.6	1.9	1.5	1.8	0	1	2.3	1	1.6

Smart Services, Inc.

88 W. Church Street
Newark, OH 43055
(740) 345-4700

File Name : Hamilton_Road_&_Beecher_Road_404565_04-27-2017
Site Code : 404565
Start Date : 4/27/2017
Page No : 3

	Hamilton Road Southbound				Beecher Road Westbound				Hamilton Road Northbound				Beecher Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	30	202	54	286	**10**	**87**	**55**	**152**	31	103	8	142	16	16	14	46	626
07:45 AM	49	191	**59**	**299**	9	55	62	126	**36**	110	**18**		**34**	**37**	**26**	**97**	**686**
08:00 AM	37	**203**					**69**			**154**		**170**	20	19	11	50	555
08:15 AM	**56**	178	9	243	10	5	52	67	1	124	13	138	3	4	6	13	461
Total Volume	172	774	127	1073	39	158	238	435	76	491	47	614	73	76	57	206	2328
% App. Total	16	72.1	11.8		9	36.3	54.7		12.4	80	7.7		35.4	36.9	27.7		
PHF	.768	.953	.538	.897	.975	.454	.862	.715	.528	.797	.653	.903	.537	.514	.548	.531	.848
Peak Hour Analysis From 12:00 PM to 06:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	53	190	4	247	8	**12**	**59**	**79**	**4**	**243**	**7**	**254**	**9**	**13**	**4**	**26**	**606**
05:00 PM	**54**	**199**	**4**	**257**	**31**		**68**	**109**		**277**	**12**	**298**					
05:15 PM	**65**	196	**8**	**269**	14	12	61	87	**12**	264	8	284	**12**	**32**	**17**	**61**	**701**
05:30 PM	55	194	5	254	12	9	48	69	5	238	8	251	5	8	7	20	594
Total Volume	227	779	21	1027	65	43	236	344	30	1022	35	1087	37	63	33	133	2591
% App. Total	22.1	75.9	2		18.9	12.5	68.6		2.8	94	3.2		27.8	47.4	24.8		
PHF	.873	.979	.656	.954	.524	.896	.868	.789	.625	.922	.729	.912	.771	.492	.485	.545	.924

Smart Services Inc.

88 W. Church Street
Newark, OH 43055
(740) 345-4700

File Name : Hamilton_Rd_&_Beecher_Rd_544104_06-28-2018
Site Code : 544104
Start Date : 6/28/2018
Page No : 1

Groups Printed- Cars - Trucks - Bicycles on Crosswalk - Pedestrians

	Hamilton Rd Southbound					Beecher Rd Westbound					Hamilton Rd Northbound					Beecher Rd Eastbound					
Start Time	Left	Thru	Right	North Crosswalk	App. Total	Left	Thru	Right	East Crosswalk	App. Total	Left	Thru	Right	South Crosswalk	App. Total	Left	Thru	Right	West Crosswalk	App. Total	Int. Total
07:00 AM	22	141	2	0	165	0	2	35	0	37	1	61	12	0	74	1	1	5	0	7	283
07:15 AM	29	191	4	0	224	1	2	42	0	45	1	65	12	0	78	4	1	7	0	12	359
07:30 AM	44	179	5	0	228	8	2	52	0	62	3	107	15	0	125	2	0	4	0	6	421
07:45 AM	44	193	11	0	248	9	19	51	0	79	11	87	15	0	113	8	2	4	0	14	454
Total	139	704	22	0	865	18	25	180	0	223	16	320	54	0	390	15	4	20	0	39	1517
08:00 AM	30	189	9	0	228	8	8	58	1	75	12	136	14	0	162	3	7	5	1	16	481
08:15 AM	48	196	9	0	253	7	19	55	0	81	5	127	10	0	142	6	2	12	2	22	498
08:30 AM	35	192	8	0	235	13	24	49	0	86	8	119	15	0	142	8	10	9	0	27	490
08:45 AM	45	134	11	0	190	11	26	54	2	93	7	154	24	0	185	13	9	4	1	27	495
Total	158	711	37	0	906	39	77	216	3	335	32	536	63	0	631	30	28	30	4	92	1964
04:00 PM	84	164	2	0	250	27	5	62	0	94	7	205	17	1	230	12	27	10	0	49	623
04:15 PM	69	170	5	0	244	16	3	56	0	75	7	208	10	1	226	4	9	4	1	18	563
04:30 PM	65	141	5	0	211	18	5	57	0	80	7	231	10	0	248	4	13	5	0	22	561
04:45 PM	77	156	4	0	237	29	4	64	1	98	5	205	16	0	226	12	5	12	0	29	590
Total	295	631	16	0	942	90	17	239	1	347	26	849	53	2	930	32	54	31	1	118	2337
05:00 PM	69	156	2	0	227	27	3	73	0	103	5	216	8	0	229	7	4	11	0	22	581
05:15 PM	71	203	6	0	280	14	2	62	2	80	8	240	3	0	251	3	5	6	1	15	626
05:30 PM	70	182	1	0	253	19	6	70	2	97	1	228	10	0	239	3	4	5	0	12	601
05:45 PM	62	184	4	0	250	11	3	71	1	86	5	228	7	0	240	5	3	4	0	12	588
Total	272	725	13	0	1010	71	14	276	5	366	19	912	28	0	959	18	16	26	1	61	2396
Grand Total	864	2771	88	0	3723	218	133	911	9	1271	93	2617	198	2	2910	95	102	107	6	310	8214
Apprch %	23.2	74.4	2.4	0		17.2	10.5	71.7	0.7		3.2	89.9	6.8	0.1		30.6	32.9	34.5	1.9		
Total %	10.5	33.7	1.1	0	45.3	2.7	1.6	11.1	0.1	15.5	1.1	31.9	2.4	0	35.4	1.2	1.2	1.3	0.1	3.8	
Cars	859	2731	88	0	3678	217	133	909	0	1259	92	2584	198	0	2874	95	102	106	0	303	8114
% Cars	99.4	98.6	100	0	98.8	99.5	100	99.8	0	99.1	98.9	98.7	100	0	98.8	100	100	99.1	0	97.7	98.8
Trucks	5	40	0	0	45	1	0	2	0	3	1	33	0	0	34	0	0	1	0	1	83
% Trucks	0.6	1.4	0	0	1.2	0.5	0	0.2	0	0.2	1.1	1.3	0	0	1.2	0	0	0.9	0	0.3	1
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	1	1	0	0	0	1	1	0	0	0	0	0	2
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	11.1	0.1	0	0	0	50	0	0	0	0	0	0	0
Pedestrians	0	0	0	0	0	0	0	0	8	8	0	0	0	1	1	0	0	0	6	6	15
% Pedestrians	0	0	0	0	0	0	0	0	88.9	0.6	0	0	0	50	0	0	0	0	100	1.9	0.2

Smart Services Inc.

88 W. Church Street
Newark, OH 43055
(740) 345-4700

File Name : Hamilton_Rd_&_Beecher_Rd_544104_06-28-2018
Site Code : 544104
Start Date : 6/28/2018
Page No : 2

	Hamilton Rd Southbound					Beecher Rd Westbound					Hamilton Rd Northbound					Beecher Rd Eastbound					
Start Time	Left	Thru	Right	North Crosswalk	App. Total	Left	Thru	Right	East Crosswalk	App. Total	Left	Thru	Right	South Crosswalk	App. Total	Left	Thru	Right	West Crosswalk	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 08:00 AM																					
08:00 AM	30	189	9	0	228	8	8	58	1	75	12	136	14	0	162	3	7	5	1	16	481
08:15 AM	48	196	9	0	253	7	19	55	0	81	5	127	10	0	142	6	2	12	2	22	498
08:30 AM	35	192	8	0	235	13	24	49	0	86	8	119	15	0	142	8	10	9	0	27	490
08:45 AM	45	134	11	0	190	11	26	54	2	93	7	154	24	0	185	13	9	4	1	27	495
Total Volume	158	711	37	0	906	39	77	216	3	335	32	536	63	0	631	30	28	30	4	92	1964
% App. Total	17.4	78.5	4.1	0		11.6	23	64.5	0.9		5.1	84.9	10	0		32.6	30.4	32.6	4.3		
PHF	.823	.907	.841	.000	.895	.750	.740	.931	.375	.901	.667	.870	.656	.000	.853	.577	.700	.625	.500	.852	.986
Cars	156	697	37	0	890	38	77	215	0	330	32	518	63	0	613	30	28	29	0	87	1920
% Cars	98.7	98.0	100	0	98.2	97.4	100	99.5	0	98.5	100	96.6	100	0	97.1	100	100	96.7	0	94.6	97.8
Trucks	2	14	0	0	16	1	0	1	0	2	0	18	0	0	18	0	0	1	0	1	37
% Trucks	1.3	2.0	0	0	1.8	2.6	0	0.5	0	0.6	0	3.4	0	0	2.9	0	0	3.3	0	1.1	1.9
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	0	0	0	0	0	3	3	0	0	0	0	0	0	0	0	4	4	7
% Pedestrians	0	0	0	0	0	0	0	0	100	0.9	0	0	0	0	0	0	0	0	100	4.3	0.4
Peak Hour Analysis From 12:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:45 PM																					
04:45 PM	77	156	4	0	237	29	4	64	1	98	5	205	16	0	226	12	5	12	0	29	590
05:00 PM	69	156	2	0	227	27	3	73	0	103	5	216	8	0	229	7	4	11	0	22	581
05:15 PM	71	203	6	0	280	14	2	62	2	80	8	240	3	0	251	3	5	6	1	15	626
05:30 PM	70	182	1	0	253	19	6	70	2	97	1	228	10	0	239	3	4	5	0	12	601
Total Volume	287	697	13	0	997	89	15	269	5	378	19	889	37	0	945	25	18	34	1	78	2398
% App. Total	28.8	69.9	1.3	0		23.5	4	71.2	1.3		2	94.1	3.9	0		32.1	23.1	43.6	1.3		
PHF	.932	.858	.542	.000	.890	.767	.625	.921	.625	.917	.594	.926	.578	.000	.941	.521	.900	.708	.250	.672	.958
Cars	286	687	13	0	986	89	15	269	0	373	18	884	37	0	939	25	18	34	0	77	2375
% Cars	99.7	98.6	100	0	98.9	100	100	100	0	98.7	94.7	99.4	100	0	99.4	100	100	100	0	98.7	99.0
Trucks	1	10	0	0	11	0	0	0	0	0	1	5	0	0	6	0	0	0	0	0	17
% Trucks	0.3	1.4	0	0	1.1	0	0	0	0	0	5.3	0.6	0	0	0.6	0	0	0	0	0	0.7
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	20.0	0.3	0	0	0	0	0	0	0	0	0	0	0.0
Pedestrians	0	0	0	0	0	0	0	0	4	4	0	0	0	0	0	0	0	0	1	1	5
% Pedestrians	0	0	0	0	0	0	0	0	80.0	1.1	0	0	0	0	0	0	0	0	100	1.3	0.2

Smart Services Inc.

88 W. Church Street
Newark, OH 43055
(740) 345-4700

File Name : Hamilton_Rd_&_Vista_Dr_544103_06-28-2018
Site Code : 544103
Start Date : 6/28/2018
Page No : 1

Groups Printed- Cars - Trucks - Bicycles on Crosswalk - Pedestrians

	Hamilton Rd Southbound					Private Drive Westbound					Hamilton Rd Northbound					Vista Dr Eastbound					
Start Time	Left	Thru	Right	North Crosswalk	App. Total	Left	Thru	Right	East Crosswalk	App. Total	Left	Thru	Right	South Crosswalk	App. Total	Left	Thru	Right	West Crosswalk	App. Total	Int. Total
07:00 AM	0	142	3	0	145	0	0	0	0	0	6	85	0	0	91	13	0	22	2	37	273
07:15 AM	1	187	3	0	191	0	0	1	1	2	8	100	2	0	110	18	0	22	2	42	345
07:30 AM	4	191	6	0	201	2	0	2	0	4	15	143	3	0	161	30	0	20	0	50	416
07:45 AM	1	250	5	0	256	0	0	2	0	2	9	154	1	0	164	18	0	23	1	42	464
Total	6	770	17	0	793	2	0	5	1	8	38	482	6	0	526	79	0	87	5	171	1498
08:00 AM	2	209	7	0	218	0	0	2	0	2	9	184	1	0	194	28	0	18	1	47	461
08:15 AM	2	225	6	1	234	0	0	2	1	3	21	175	0	0	196	25	0	31	2	58	491
08:30 AM	0	210	7	3	220	0	0	0	1	1	14	150	1	0	165	26	0	24	1	51	437
08:45 AM	4	188	8	0	200	0	0	2	2	4	16	203	1	0	220	22	0	14	1	37	461
Total	8	832	28	4	872	0	0	6	4	10	60	712	3	0	775	101	0	87	5	193	1850
04:00 PM	3	242	23	1	269	0	0	4	0	4	16	270	0	0	286	24	0	11	0	35	594
04:15 PM	3	227	15	0	245	0	0	5	1	6	19	249	0	0	268	19	0	6	0	25	544
04:30 PM	6	201	17	1	225	0	0	4	0	4	21	255	0	0	276	27	0	13	0	40	545
04:45 PM	0	212	9	0	221	1	0	3	0	4	20	266	3	0	289	20	0	11	0	31	545
Total	12	882	64	2	960	1	0	16	1	18	76	1040	3	0	1119	90	0	41	0	131	2228
05:00 PM	0	219	23	1	243	1	0	0	1	2	26	264	0	0	290	21	1	12	0	34	569
05:15 PM	5	254	25	0	284	0	1	0	6	7	31	273	0	0	304	28	0	22	0	50	645
05:30 PM	5	239	17	1	262	2	0	1	1	4	24	288	1	0	313	24	0	14	0	38	617
05:45 PM	3	216	22	0	241	3	0	2	0	5	33	270	2	0	305	22	0	20	0	42	593
Total	13	928	87	2	1030	6	1	3	8	18	114	1095	3	0	1212	95	1	68	0	164	2424
Grand Total	39	3412	196	8	3655	9	1	30	14	54	288	3329	15	0	3632	365	1	283	10	659	8000
Apprch %	1.1	93.4	5.4	0.2		16.7	1.9	55.6	25.9		7.9	91.7	0.4	0		55.4	0.2	42.9	1.5		
Total %	0.5	42.7	2.5	0.1	45.7	0.1	0	0.4	0.2	0.7	3.6	41.6	0.2	0	45.4	4.6	0	3.5	0.1	8.2	
Cars	39	3373	195	0	3607	9	1	30	0	40	285	3293	15	0	3593	361	1	280	0	642	7882
% Cars	100	98.9	99.5	0	98.7	100	100	100	0	74.1	99	98.9	100	0	98.9	98.9	100	98.9	0	97.4	98.5
Trucks	0	39	1	0	40	0	0	0	0	0	3	36	0	0	39	4	0	3	0	7	86
% Trucks	0	1.1	0.5	0	1.1	0	0	0	0	0	1	1.1	0	0	1.1	1.1	0	1.1	0	1.1	1.1
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	8	8	0	0	0	14	14	0	0	0	0	0	0	0	0	10	10	32
% Pedestrians	0	0	0	100	0.2	0	0	0	100	25.9	0	0	0	0	0	0	0	0	100	1.5	0.4

Smart Services Inc.

88 W. Church Street
Newark, OH 43055
(740) 345-4700

File Name : Hamilton_Rd_&_Vista_Dr_544103_06-28-2018
Site Code : 544103
Start Date : 6/28/2018
Page No : 2

	Hamilton Rd Southbound					Private Drive Westbound					Hamilton Rd Northbound					Vista Dr Eastbound					
Start Time	Left	Thru	Right	North Crosswalk	App. Total	Left	Thru	Right	East Crosswalk	App. Total	Left	Thru	Right	South Crosswalk	App. Total	Left	Thru	Right	West Crosswalk	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:45 AM																					
07:45 AM	1	250	5	0	256	0	0	2	0	2	9	154	1	0	164	18	0	23	1	42	464
08:00 AM	2	209	7	0	218	0	0	2	0	2	9	184	1	0	194	28	0	18	1	47	461
08:15 AM	2	225	6	1	234	0	0	2	1	3	21	175	0	0	196	25	0	31	2	58	491
08:30 AM	0	210	7	3	220	0	0	0	1	1	14	150	1	0	165	26	0	24	1	51	437
Total Volume	5	894	25	4	928	0	0	6	2	8	53	663	3	0	719	97	0	96	5	198	1853
% App. Total	0.5	96.3	2.7	0.4		0	0	75	25		7.4	92.2	0.4	0		49	0	48.5	2.5		
PHF	.625	.894	.893	.333	.906	.000	.000	.750	.500	.667	.631	.901	.750	.000	.917	.866	.000	.774	.625	.853	.943
Cars	5	875	24	0	904	0	0	6	0	6	52	651	3	0	706	94	0	95	0	189	1805
% Cars	100	97.9	96.0	0	97.4	0	0	100	0	75.0	98.1	98.2	100	0	98.2	96.9	0	99.0	0	95.5	97.4
Trucks	0	19	1	0	20	0	0	0	0	0	1	12	0	0	13	3	0	1	0	4	37
% Trucks	0	2.1	4.0	0	2.2	0	0	0	0	0	1.9	1.8	0	0	1.8	3.1	0	1.0	0	2.0	2.0
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	4	4	0	0	0	2	2	0	0	0	0	0	0	0	0	5	5	11
% Pedestrians	0	0	0	100	0.4	0	0	0	100	25.0	0	0	0	0	0	0	0	0	100	2.5	0.6
Peak Hour Analysis From 12:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	0	219	23	1	243	1	0	0	1	2	26	264	0	0	290	21	1	12	0	34	569
05:15 PM	5	254	25	0	284	0	1	0	6	7	31	273	0	0	304	28	0	22	0	50	645
05:30 PM	5	239	17	1	262	2	0	1	1	4	24	288	1	0	313	24	0	14	0	38	617
05:45 PM	3	216	22	0	241	3	0	2	0	5	33	270	2	0	305	22	0	20	0	42	593
Total Volume	13	928	87	2	1030	6	1	3	8	18	114	1095	3	0	1212	95	1	68	0	164	2424
% App. Total	1.3	90.1	8.4	0.2		33.3	5.6	16.7	44.4		9.4	90.3	0.2	0		57.9	0.6	41.5	0		
PHF	.650	.913	.870	.500	.907	.500	.250	.375	.333	.643	.864	.951	.375	.000	.968	.848	.250	.773	.000	.820	.940
Cars	13	918	87	0	1018	6	1	3	0	10	114	1091	3	0	1208	95	1	67	0	163	2399
% Cars	100	98.9	100	0	98.8	100	100	100	0	55.6	100	99.6	100	0	99.7	100	100	98.5	0	99.4	99.0
Trucks	0	10	0	0	10	0	0	0	0	0	0	4	0	0	4	0	0	1	0	1	15
% Trucks	0	1.1	0	0	1.0	0	0	0	0	0	0	0.4	0	0	0.3	0	0	1.5	0	0.6	0.6
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	2	2	0	0	0	8	8	0	0	0	0	0	0	0	0	0	0	10
% Pedestrians	0	0	0	100	0.2	0	0	0	100	44.4	0	0	0	0	0	0	0	0	0	0	0.4

Smart Services Inc.

88 W. Church Street
Newark, OH 43055
(740) 345-4700

File Name : Hamilton_Rd_&_Villa_Oaks_Lane_545710_06-28-2018
Site Code : 545710
Start Date : 6/28/2018
Page No : 1

Groups Printed- Cars - Trucks

	Hamilton Road Southbound				Hamilton Road Northbound			Villa Oaks Lane Eastbound			
Start Time	U-Turn	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total	Int. Total
07:00 AM	0	149	2	151	0	99	99	3	2	5	255
07:15 AM	0	207	0	207	1	119	120	2	1	3	330
07:30 AM	0	220	2	222	0	169	169	3	2	5	396
07:45 AM	0	239	1	240	0	175	175	2	3	5	420
Total	0	815	5	820	1	562	563	10	8	18	1401
08:00 AM	0	220	1	221	0	215	215	3	4	7	443
08:15 AM	0	244	0	244	3	197	200	1	3	4	448
08:30 AM	1	215	3	219	3	173	176	3	1	4	399
08:45 AM	0	194	1	195	2	208	210	2	2	4	409
Total	1	873	5	879	8	793	801	9	10	19	1699
04:00 PM	0	264	4	268	2	292	294	2	1	3	565
04:15 PM	0	252	1	253	2	268	270	2	3	5	528
04:30 PM	0	239	3	242	1	285	286	1	1	2	530
04:45 PM	0	240	3	243	1	283	284	1	4	5	532
Total	0	995	11	1006	6	1128	1134	6	9	15	2155
05:00 PM	0	253	0	253	1	282	283	1	0	1	537
05:15 PM	0	285	0	285	2	293	295	0	1	1	581
05:30 PM	0	269	4	273	4	314	318	2	1	3	594
05:45 PM	0	262	2	264	1	286	287	1	1	2	553
Total	0	1069	6	1075	8	1175	1183	4	3	7	2265
Grand Total	1	3752	27	3780	23	3658	3681	29	30	59	7520
Apprch %	0	99.3	0.7		0.6	99.4		49.2	50.8		
Total %	0	49.9	0.4	50.3	0.3	48.6	48.9	0.4	0.4	0.8	
Cars	1	3709	26	3736	23	3619	3642	28	30	58	7436
% Cars	100	98.9	96.3	98.8	100	98.9	98.9	96.6	100	98.3	98.9
Trucks	0	43	1	44	0	39	39	1	0	1	84
% Trucks	0	1.1	3.7	1.2	0	1.1	1.1	3.4	0	1.7	1.1

Smart Services Inc.

88 W. Church Street
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(740) 345-4700

File Name : Hamilton_Rd_&_Villa_Oaks_Lane_545710_06-28-2018
Site Code : 545710
Start Date : 6/28/2018
Page No : 2

	Hamilton Road Southbound				Hamilton Road Northbound			Villa Oaks Lane Eastbound			
Start Time	U-Turn	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1											
Peak Hour for Entire Intersection Begins at 07:45 AM											
07:45 AM	0	239	1	240	0	175	175	2	3	5	420
08:00 AM	0	220	1	221	0	215	215	3	4	7	443
08:15 AM	0	244	0	244	3	197	200	1	3	4	448
08:30 AM	1	215	3	219	3	173	176	3	1	4	399
Total Volume	1	918	5	924	6	760	766	9	11	20	1710
% App. Total	0.1	99.4	0.5		0.8	99.2		45	55		
PHF	.250	.941	.417	.947	.500	.884	.891	.750	.688	.714	.954
Cars	1	895	5	901	6	746	752	9	11	20	1673
% Cars	100	97.5	100	97.5	100	98.2	98.2	100	100	100	97.8
Trucks	0	23	0	23	0	14	14	0	0	0	37
% Trucks	0	2.5	0	2.5	0	1.8	1.8	0	0	0	2.2
Peak Hour Analysis From 12:00 PM to 05:45 PM - Peak 1 of 1											
Peak Hour for Entire Intersection Begins at 05:00 PM											
05:00 PM	0	253	0	253	1	282	283	1	0	1	537
05:15 PM	0	285	0	285	2	293	295	0	1	1	581
05:30 PM	0	269	4	273	4	314	318	2	1	3	594
05:45 PM	0	262	2	264	1	286	287	1	1	2	553
Total Volume	0	1069	6	1075	8	1175	1183	4	3	7	2265
% App. Total	0	99.4	0.6		0.7	99.3		57.1	42.9		
PHF	.000	.938	.375	.943	.500	.936	.930	.500	.750	.583	.953
Cars	0	1061	6	1067	8	1168	1176	4	3	7	2250
% Cars	0	99.3	100	99.3	100	99.4	99.4	100	100	100	99.3
Trucks	0	8	0	8	0	7	7	0	0	0	15
% Trucks	0	0.7	0	0.7	0	0.6	0.6	0	0	0	0.7

Smart Services, Inc.
88 W. Church Street

Newark, Ohio, United States 43055
(740) 345 4700 tstanhope@smartservices-inc.com
www.smartservices-inc.com

Count Name: Hamilton Rd NB South of Villa Oaks Lane
Site Code:
Start Date: 06/28/2018

Direction (Northbound)

Start Time	Total
9:00 AM	791
10:00 AM	852
11:00 AM	1051
12:00 PM	1087
1:00 PM	968
2:00 PM	901
3:00 PM	974
Total	6624
Total %	100.0
AM Times	11:00 AM
AM Peaks	1051
PM Times	12:00 PM
PM Peaks	1087

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Count Name: Hamilton Rd SB North of Villa Oaks Lane
Site Code:
Start Date: 06/28/2018

Direction (Southbound)

Start Time	Total
9:00 AM	681
10:00 AM	715
11:00 AM	830
12:00 PM	1008
1:00 PM	1018
2:00 PM	967
3:00 PM	1022
Total	6241
Total %	100.0
AM Times	11:00 AM
AM Peaks	830
PM Times	3:00 PM
PM Peaks	1022

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Count Name: Shagbark Rd EB-WB east of Hamilton Rd
Site Code:
Start Date: 06/28/2018

Direction (Westbound)

Start Time	Total
7:00 AM	1
7:15 AM	2
7:30 AM	2
7:45 AM	1
8:00 AM	1
8:15 AM	0
8:30 AM	1
8:45 AM	1
4:00 PM	0
4:15 PM	0
4:30 PM	0
4:45 PM	0
5:00 PM	1
5:15 PM	0
5:30 PM	0
5:45 PM	0
Total	10
Total %	100.0
AM Times	7:00 AM
AM Peaks	6
PM Times	4:30 PM
PM Peaks	1

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Count Name: Shagbark Rd EB-WB east of Hamilton Rd
Site Code:
Start Date: 06/28/2018

Direction (Eastbound)

Start Time	Total
7:00 AM	1
7:15 AM	0
7:30 AM	0
7:45 AM	0
8:00 AM	1
8:15 AM	0
8:30 AM	0
8:45 AM	3
4:00 PM	0
4:15 PM	2
4:30 PM	3
4:45 PM	3
5:00 PM	3
5:15 PM	4
5:30 PM	3
5:45 PM	1
Total	24
Total %	100.0
AM Times	7:00 AM
AM Peaks	1
PM Times	4:30 PM
PM Peaks	13

Smart Services Inc.

88 W. Church Street
Newark, OH 43055
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File Name : Driveway South of Villa Oaks Lane AM Peak
Site Code :
Start Date : 6/28/2018
Page No : 1

Groups Printed- Cars - Trucks

	Hamilton Road Southbound		Hamilton Road Northbound		Driveway Eastbound			
Start Time	Right	App. Total	Left	App. Total	Left	Right	App. Total	Int. Total
07:45 AM	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0
08:00 AM	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0
Apprch %	0		0		0	0		
Total %								
Cars								0
% Cars	0	0	0	0	0	0	0	0
Trucks								0
% Trucks	0	0	0	0	0	0	0	0

Smart Services Inc.

88 W. Church Street
Newark, OH 43055
(740) 345-4700

File Name : Driveway South of Villa Oaks Lane PM Peak
Site Code :
Start Date : 6/28/2018
Page No : 1

Groups Printed- Cars - Trucks

	Hamilton Road Southbound		Hamilton Road Northbound		Driveway Eastbound			
Start Time	Right	App. Total	Left	App. Total	Left	Right	App. Total	Int. Total
05:00 PM	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0
Apprch %	0		0		0	0		
Total %								
Cars								0
% Cars	0	0	0	0	0	0	0	0
Trucks								0
% Trucks	0	0	0	0	0	0	0	0

Smart Services Inc.

88 W. Church Street
Newark, OH 43055
(740) 345-4700

File Name : Hamilton_Rd_&_Stoneridge_Dr_544105_06-28-2018
Site Code : 544105
Start Date : 6/28/2018
Page No : 1

Groups Printed- Cars - Trucks - Bicycles on Crosswalk - Pedestrians

	Hamilton Rd Southbound					Stoneridge Dr Westbound					Hamilton Rd Northbound					Stoneridge Dr Eastbound					
Start Time	Left	Thru	Right	North Crosswalk	App. Total	Left	Thru	Right	East Crosswalk	App. Total	Left	Thru	Right	South Crosswalk	App. Total	Left	Thru	Right	West Crosswalk	App. Total	Int. Total
07:00 AM	29	137	6	0	172	18	2	16	0	36	8	86	2	0	96	1	0	4	0	5	309
07:15 AM	20	185	8	0	213	21	3	25	0	49	2	105	7	0	114	3	2	4	1	10	386
07:30 AM	25	209	5	0	239	19	2	26	0	47	3	157	6	1	167	2	3	8	1	14	467
07:45 AM	31	196	8	0	235	28	1	24	0	53	8	137	13	1	159	3	2	5	0	10	457
Total	105	727	27	0	859	86	8	91	0	185	21	485	28	2	536	9	7	21	2	39	1619
08:00 AM	27	192	5	0	224	23	3	24	0	50	11	197	14	0	222	3	3	4	1	11	507
08:15 AM	37	209	7	0	253	28	1	27	0	56	8	175	10	0	193	1	1	7	0	9	511
08:30 AM	39	176	10	0	225	22	1	28	0	51	14	134	13	1	162	3	2	10	1	16	454
08:45 AM	38	160	16	0	214	19	6	31	0	56	18	169	21	0	208	5	4	9	0	18	496
Total	141	737	38	0	916	92	11	110	0	213	51	675	58	1	785	12	10	30	2	54	1968
04:00 PM	45	188	34	1	268	33	5	40	0	78	43	185	17	0	245	34	13	35	1	83	674
04:15 PM	44	190	42	0	276	27	10	32	0	69	39	191	22	0	252	34	3	35	0	72	669
04:30 PM	41	171	50	0	262	35	6	37	0	78	41	200	18	0	259	36	8	28	0	72	671
04:45 PM	46	182	50	0	278	36	7	43	0	86	52	195	12	0	259	34	11	23	1	69	692
Total	176	731	176	1	1084	131	28	152	0	311	175	771	69	0	1015	138	35	121	2	296	2706
05:00 PM	44	182	39	1	266	26	8	36	1	71	49	187	13	0	249	30	7	30	1	68	654
05:15 PM	54	187	39	0	280	33	9	42	0	84	57	181	14	0	252	36	7	38	0	81	697
05:30 PM	40	174	48	1	263	28	4	40	1	73	52	219	10	0	281	28	4	42	0	74	691
05:45 PM	44	170	49	0	263	35	8	38	0	81	59	191	17	0	267	45	6	39	0	90	701
Total	182	713	175	2	1072	122	29	156	2	309	217	778	54	0	1049	139	24	149	1	313	2743
Grand Total	604	2908	416	3	3931	431	76	509	2	1018	464	2709	209	3	3385	298	76	321	7	702	9036
Apprch %	15.4	74	10.6	0.1		42.3	7.5	50	0.2		13.7	80	6.2	0.1		42.5	10.8	45.7	1		
Total %	6.7	32.2	4.6	0	43.5	4.8	0.8	5.6	0	11.3	5.1	30	2.3	0	37.5	3.3	0.8	3.6	0.1	7.8	
Cars	597	2867	414	0	3878	429	76	502	0	1007	462	2669	208	0	3339	289	73	318	0	680	8904
% Cars	98.8	98.6	99.5	0	98.7	99.5	100	98.6	0	98.9	99.6	98.5	99.5	0	98.6	97	96.1	99.1	0	96.9	98.5
Trucks	7	41	2	1	51	2	0	7	0	9	2	40	1	0	43	9	3	3	0	15	118
% Trucks	1.2	1.4	0.5	33.3	1.3	0.5	0	1.4	0	0.9	0.4	1.5	0.5	0	1.3	3	3.9	0.9	0	2.1	1.3
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	2	2	0	0	0	2	2	0	0	0	3	3	0	0	0	7	7	14
% Pedestrians	0	0	0	66.7	0.1	0	0	0	100	0.2	0	0	0	100	0.1	0	0	0	100	1	0.2

Smart Services Inc.

88 W. Church Street
Newark, OH 43055
(740) 345-4700

File Name : Hamilton_Rd_&_Stoneridge_Dr_544105_06-28-2018
Site Code : 544105
Start Date : 6/28/2018
Page No : 2

	Hamilton Rd Southbound					Stoneridge Dr Westbound					Hamilton Rd Northbound					Stoneridge Dr Eastbound					
Start Time	Left	Thru	Right	North Crosswalk	App. Total	Left	Thru	Right	East Crosswalk	App. Total	Left	Thru	Right	South Crosswalk	App. Total	Left	Thru	Right	West Crosswalk	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 08:00 AM																					
08:00 AM	27	192	5	0	224	23	3	24	0	50	11	197	14	0	222	3	3	4	1	11	507
08:15 AM	37	209	7	0	253	28	1	27	0	56	8	175	10	0	193	1	1	7	0	9	511
08:30 AM	39	176	10	0	225	22	1	28	0	51	14	134	13	1	162	3	2	10	1	16	454
08:45 AM	38	160	16	0	214	19	6	31	0	56	18	169	21	0	208	5	4	9	0	18	496
Total Volume	141	737	38	0	916	92	11	110	0	213	51	675	58	1	785	12	10	30	2	54	1968
% App. Total	15.4	80.5	4.1	0		43.2	5.2	51.6	0		6.5	86	7.4	0.1		22.2	18.5	55.6	3.7		
PHF	.904	.882	.594	.000	.905	.821	.458	.887	.000	.951	.708	.857	.690	.250	.884	.600	.625	.750	.500	.750	.963
Cars	138	720	37	0	895	91	11	107	0	209	50	654	57	0	761	10	8	29	0	47	1912
% Cars	97.9	97.7	97.4	0	97.7	98.9	100	97.3	0	98.1	98.0	96.9	98.3	0	96.9	83.3	80.0	96.7	0	87.0	97.2
Trucks	3	17	1	0	21	1	0	3	0	4	1	21	1	0	23	2	2	1	0	5	53
% Trucks	2.1	2.3	2.6	0	2.3	1.1	0	2.7	0	1.9	2.0	3.1	1.7	0	2.9	16.7	20.0	3.3	0	9.3	2.7
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	2	2	3
% Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0.1	0	0	0	100	3.7	0.2
Peak Hour Analysis From 12:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	44	182	39	1	266	26	8	36	1	71	49	187	13	0	249	30	7	30	1	68	654
05:15 PM	54	187	39	0	280	33	9	42	0	84	57	181	14	0	252	36	7	38	0	81	697
05:30 PM	40	174	48	1	263	28	4	40	1	73	52	219	10	0	281	28	4	42	0	74	691
05:45 PM	44	170	49	0	263	35	8	38	0	81	59	191	17	0	267	45	6	39	0	90	701
Total Volume	182	713	175	2	1072	122	29	156	2	309	217	778	54	0	1049	139	24	149	1	313	2743
% App. Total	17	66.5	16.3	0.2		39.5	9.4	50.5	0.6		20.7	74.2	5.1	0		44.4	7.7	47.6	0.3		
PHF	.843	.953	.893	.500	.957	.871	.806	.929	.500	.920	.919	.888	.794	.000	.933	.772	.857	.887	.250	.869	.978
Cars	182	705	175	0	1062	122	29	155	0	306	217	773	54	0	1044	138	24	149	0	311	2723
% Cars	100	98.9	100	0	99.1	100	100	99.4	0	99.0	100	99.4	100	0	99.5	99.3	100	100	0	99.4	99.3
Trucks	0	8	0	1	9	0	0	1	0	1	0	5	0	0	5	1	0	0	0	1	16
% Trucks	0	1.1	0	50.0	0.8	0	0	0.6	0	0.3	0	0.6	0	0	0.5	0.7	0	0	0	0.3	0.6
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	1	1	0	0	0	2	2	0	0	0	0	0	0	0	0	1	1	4
% Pedestrians	0	0	0	50.0	0.1	0	0	0	100	0.6	0	0	0	0	0	0	0	0	100	0.3	0.1

NCHRP 684 Internal Trip Capture Estimation Tool			
Project Name:	Hamilton Towne Center TIS REV 1	**Organization:**	Smart Services, Inc.
Project Location:		**Performed By:**	BK
Scenario Description:		**Date:**	8/2018
Analysis Year:	Full Development	**Checked By:**	GLW
Analysis Period:	**AM Street Peak Hour**	**Date:**	8/2018

Table 1-A: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)

Land Use	Development Data (*For Information Only*)			Estimated Vehicle-Trips[3]		
	ITE LUCs[1]	Quantity	Units	Total	Entering	Exiting
Office	720	36	1000 SF GFA	90	70	20
Retail				0		
Restaurant	932	2	1000 SF GFA	202	103	99
Cinema/Entertainment				0		
Residential				0		
Hotel	310	120	Rooms	55	32	23
All Other Land Uses[2]				0		
				347	205	142

Table 2-A: Mode Split and Vehicle Occupancy Estimates

Land Use	Entering Trips			Exiting Trips		
	Veh. Occ.[4]	% Transit	% Non-Motorized	Veh. Occ.[4]	% Transit	% Non-Motorized
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						
All Other Land Uses[2]						

Table 3-A: Average Land Use Interchange Distances (Feet Walking Distance)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-A: Internal Person-Trip Origin-Destination Matrix*

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	13	0	0	0
Retail	0		0	0	0	0
Restaurant	10	0		0	0	1
Cinema/Entertainment	0	0	0		0	0
Residential	0	0	0	0		0
Hotel	2	0	2	0	0	

Table 5-A: Computations Summary

	Total	Entering	Exiting
All Person-Trips	347	205	142
Internal Capture Percentage	16%	14%	20%
External Vehicle-Trips[5]	291	177	114
External Transit-Trips[6]	0	0	0
External Non-Motorized Trips[6]	0	0	0

Table 6-A: Internal Trip Capture Percentages by Land Use

Land Use	Entering Trips	Exiting Trips
Office	17%	65%
Retail	N/A	N/A
Restaurant	15%	11%
Cinema/Entertainment	N/A	N/A
Residential	N/A	N/A
Hotel	3%	17%

[1]Land Use Codes (LUCs) from *Trip Generation Manual* , published by the Institute of Transportation Engineers.

[2]Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator.

[3]Enter trips assuming no transit or non-motorized trips (as assumed in ITE *Trip Generation Manual*).

[4]Enter vehicle occupancy assumed in Table 1-A vehicle trips. If vehicle occupancy changes for proposed mixed-use project, manual adjustments must be made to Tables 5-A, 9-A (O and D). Enter transit, non-motorized percentages that will result with proposed mixed-use project complete.

[5]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A.

[6]Person-Trips

*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas A&M Transportation Institute - Version 2013.1

NCHRP 684 Internal Trip Capture Estimation Tool			
Project Name:	Hamilton Towne Center TIS REV 1	**Organization:**	Smart Services, Inc.
Project Location:		**Performed By:**	BK
Scenario Description:		**Date:**	8/2018
Analysis Year:	Full Development	**Checked By:**	GLW
Analysis Period:	**PM Street Peak Hour**	**Date:**	8/2018

Table 1-P: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)

Land Use	Development Data (*For Information Only*)			Estimated Vehicle-Trips[3]		
	ITE LUCs[1]	Quantity	Units	Total	Entering	Exiting
Office	720	36	1000 SF GFA	124	35	89
Retail				0		
Restaurant	932	2	1000 SF GFA	73	37	36
Cinema/Entertainment				0		
Residential				0		
Hotel	310	120	Rooms	64	33	31
All Other Land Uses[2]				0		
				261	105	156

Table 2-P: Mode Split and Vehicle Occupancy Estimates

Land Use	Entering Trips			Exiting Trips		
	Veh. Occ.[4]	% Transit	% Non-Motorized	Veh. Occ.[4]	% Transit	% Non-Motorized
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						
All Other Land Uses[2]						

Table 3-P: Average Land Use Interchange Distances (Feet Walking Distance)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-P: Internal Person-Trip Origin-Destination Matrix*

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	1	0	0	0
Retail	0		0	0	0	0
Restaurant	1	0		0	0	3
Cinema/Entertainment	0	0	0		0	0
Residential	0	0	0	0		0
Hotel	0	0	2	0	0	

Table 5-P: Computations Summary

	Total	Entering	Exiting
All Person-Trips	261	105	156
Internal Capture Percentage	5%	7%	4%
External Vehicle-Trips[5]	247	98	149
External Transit-Trips[6]	0	0	0
External Non-Motorized Trips[6]	0	0	0

Table 6-P: Internal Trip Capture Percentages by Land Use

Land Use	Entering Trips	Exiting Trips
Office	3%	1%
Retail	N/A	N/A
Restaurant	8%	11%
Cinema/Entertainment	N/A	N/A
Residential	N/A	N/A
Hotel	9%	6%

[1]Land Use Codes (LUCs) from *Trip Generation Manual*, published by the Institute of Transportation Engineers.

[2]Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator.

[3]Enter trips assuming no transit or non-motorized trips (as assumed in ITE *Trip Generation Manual*).

[4]Enter vehicle occupancy assumed in Table 1-P vehicle trips. If vehicle occupancy changes for proposed mixed-use project, manual adjustments must be

[5]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P.

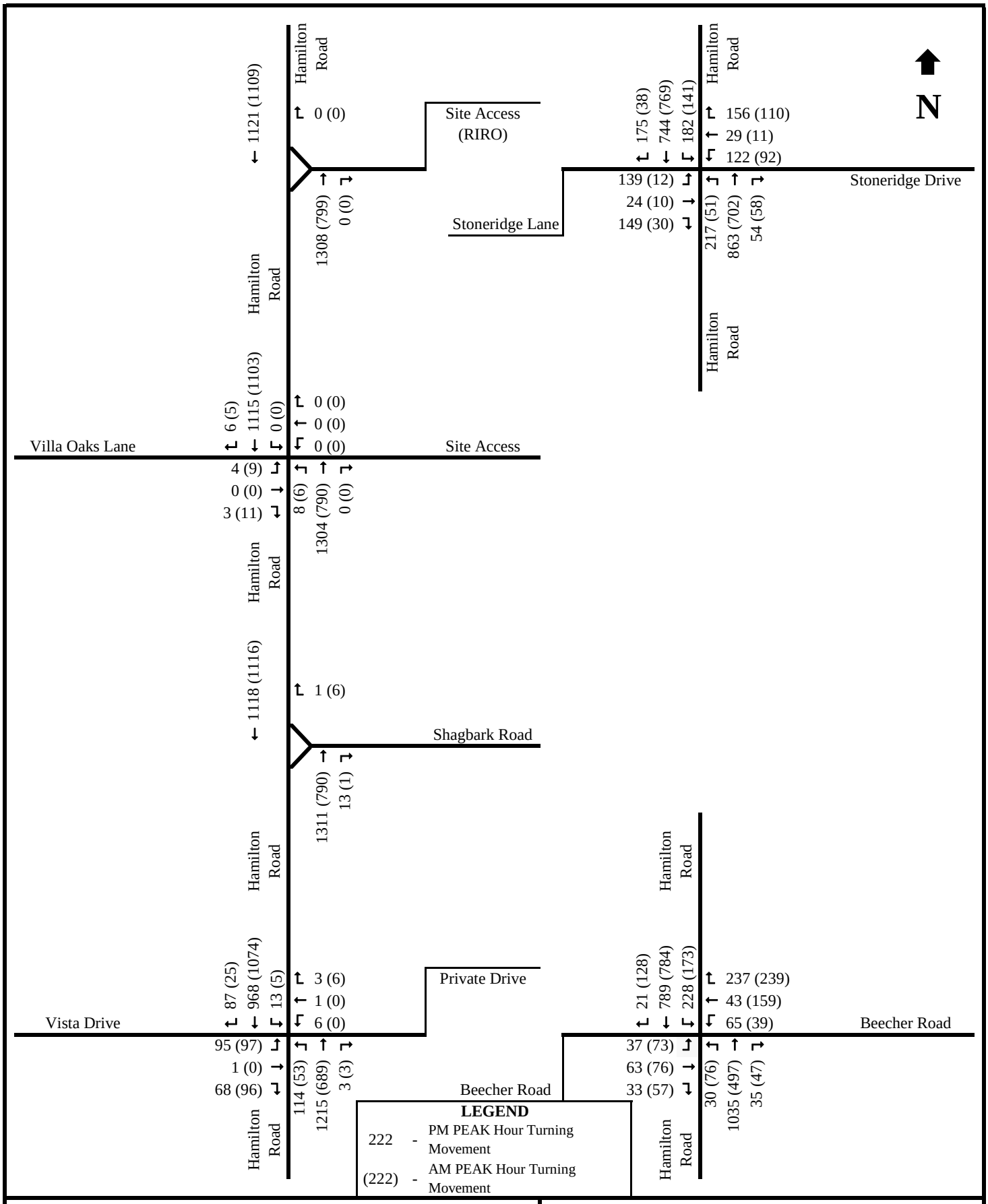
[6]Person-Trips

*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas A&M Transportation Institute - Version 2013.1

MORPC Provided Growh Rates

Study Corridor	Intersection Location	Linear Annual Growth Rate
Morse	Morse Rd w/o Johnstown Rd	1.00%
	Morse Rd e/o Johnstown Rd	1.10%
	Morse Rd e/o Hamilton Rd	0.50%
	Morse Rd w/o Hamilton Rd	0.70%
	Hamilton Rd s/o Morse Rd	1.20%
	Morse Rd e/o Cherry Bottom Rd	0.50%
	Cherry Bottom Rd n/o Morse Rd	1.70%
	Morse Rd w/o Cherry Bottom Rd	0.70%
	Cherry Bottom Rd s/o Morse Rd	0.50%
	Morse Rd e/o Stygler Rd	0.70%
	Morse Rd w/o Stygler Rd	0.50%
	Stygler Rd s/o Morse Rd	1.60%
Hamilton	Beecher Rd e/o Hamilton Rd	0.50%
	Hamilton Rd n/o Beecher Rd	1.30%
	Beecher Rd w/o Hamilton Rd	0.50%
	Hamilton Rd s/o Beecher Rd	1.30%
	E Johnstown Rd e/o Hamilton Rd	0.90%
	Hamilton Rd n/o E Johnstown Rd	1.30%
	E Johnstown Rd w/o Hamilton Rd	0.90%
	Hamilton Rd s/o E Johnstown Rd	1.30%
	Clark State Rd e/o Hamilton Rd	0.90%
	Hamilton Rd n/o Clark State Rd	1.40%
	Hamilton Rd s/o Clark State Rd	1.20%
	Banks e/o Hamilton Rd	0.50%
	Hamilton Rd n/o Banks/Gatsby	1.10%
	Gatsby w/o Hamilton Rd	0.50%
	Hamilton Rd s/o Banks/Gatsby	1.10%
	KEMA e/o Hamilton Rd	0.50%
	Hamilton Rd n/o KEMA/Shopping	1.10%
	Shopping Center w/o Hamilton Rd	0.50%
	Hamilton Rd s/o KEMA/Shopping	1.10%
	Havens Corners Rd e/o Hamilton Rd	0.70%
	Hamilton Rd n/o Havens Corners/Granville	1.10%
	Granville St w/o Hamilton Rd	0.70%
	Hamilton Rd s/o Havens Corners/Granville	0.80%
	Rocky Fork Blvd e/o Hamilton Rd	0.50%
	Hamilton Rd n/o Rocky Fork Blvd	0.80%
	Rocky Fork Blvd w/o Hamilton Rd	0.50%

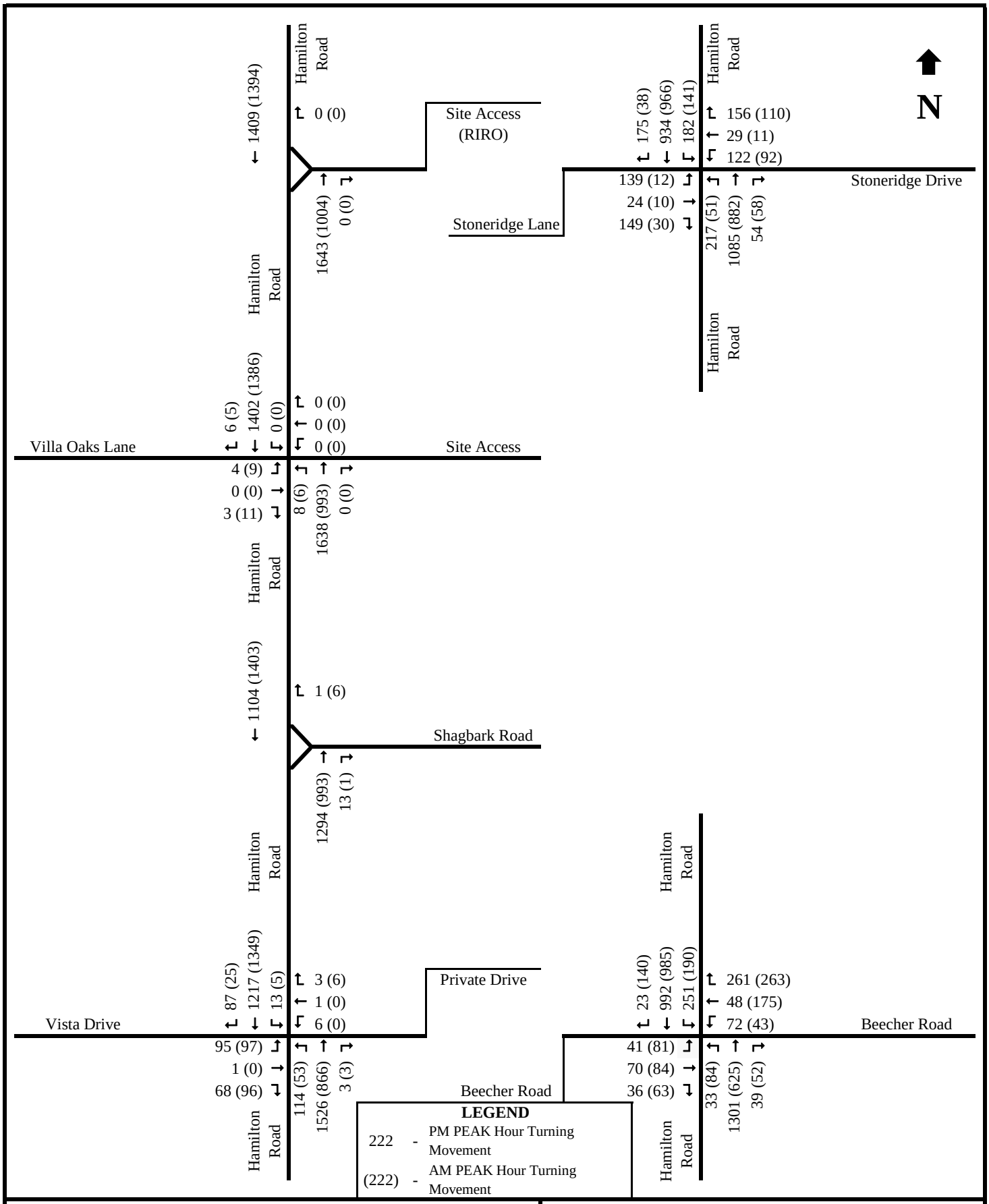


HAMILTON TOWNE CENTRE TRAFFIC IMPACT STUDY

PREPARED BY: SMART SERVICES, INC. 8/2018

APPENDIX EXHIBIT

2019 'NO BUILD' TRAFFIC

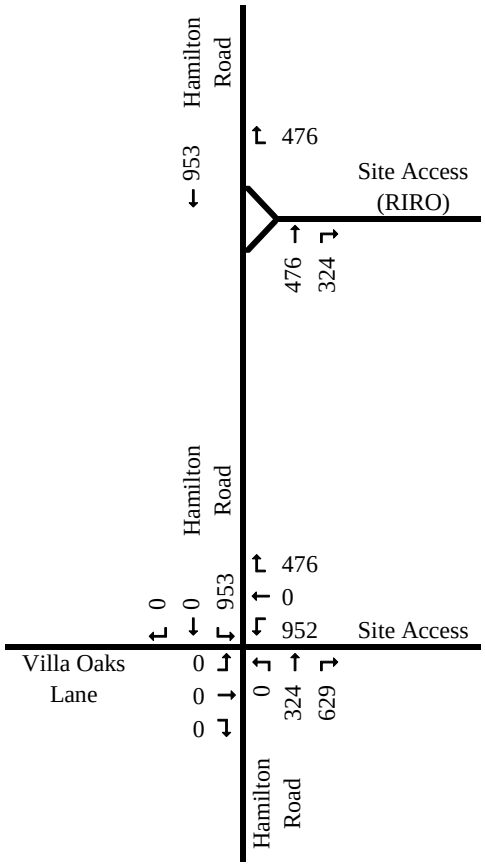


HAMILTON TOWNE CENTRE TRAFFIC IMPACT STUDY

PREPARED BY: SMART SERVICES, INC. 8/2018

APPENDIX EXHIBIT

2039 'NO BUILD' TRAFFIC



HAMILTON TOWNE CENTRE TRAFFIC IMPACT STUDY

PREPARED BY: SMART SERVICES, INC. REV. 1 8/2018

APPENDIX EXHIBIT

SITE GENERATED TRAFFIC - DAILY

Land Use	935 Fast-Food Restaurant with Drive-Through Window and No Indoor Seating		936 Coffee/Donut Shop without Drive-Through Window						941 Quick Lubrication Vehicle Shop		943 Automobile Parts and Service Center	
Setting	General Urban/Suburban		Dense Multi-Use Urban						General Urban/ Suburban		General Urban/ Suburban	
Time Period	Weekday		Weekday		Saturday		Sunday		Weekday		Weekday	
Trip Type	Vehicle		Person		Person		Person		Vehicle		Vehicle	
# Data Sites	5		1		1		1		1		30	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
12:00	0.0	13.8	0.0	12.2	0.0	7.4	0.0	13.6	0.0	6.3	0.0	9.4
12:15	0.0	11.5	0.0	11.0	0.0	9.2	0.0	14.4	0.0	7.3	0.0	9.1
12:30	0.0	9.0	0.0	8.8	0.0	10.5	0.0	16.6	0.0	5.2	0.0	9.7
12:45	0.0	7.0	0.0	7.8	0.0	11.1	0.0	17.2	0.0	9.4	0.0	9.9
1:00	0.0	7.3	0.0	7.0	0.0	12.8	0.0	18.5	0.0	8.3	0.0	9.3
1:15	0.0	7.9	0.0	7.8	0.0	11.7	0.0	14.9	0.0	8.3	0.0	9.7
1:30	0.0	8.2	0.0	7.1	0.0	10.4	0.0	14.2	0.0	12.5	0.0	9.4
1:45	0.0	8.3	0.0	6.6	0.0	10.4	0.0	15.7	0.0	8.3	0.0	8.8
2:00	0.0	7.2	0.0	6.6	0.0	9.0	0.0	17.2	0.0	9.4	0.0	8.8
2:15	0.0	7.0	0.0	5.7	0.0	8.2	0.0	17.9	0.0	9.4	0.0	8.1
2:30	0.0	7.6	0.0	6.6	0.0	8.8	0.0	14.7	0.0	6.3	0.0	7.3
2:45	0.0	8.3	0.0	7.8	0.0	8.6	0.0	12.7	0.0	10.4	0.0	7.2
3:00	0.0	9.1	0.0	6.5	0.0	7.8	0.0	10.8	0.0	11.5	0.0	7.0
3:15	0.0	9.0	0.0	7.2	0.0	10.0	0.0	11.2	0.0	10.4	0.0	7.3
3:30	0.0	8.9	0.0	7.3	0.0	9.0	0.0	15.5	0.0	13.5	0.0	8.0
3:45	0.0	8.3	0.0	7.6	0.0	10.4	0.0	17.9	0.0	13.5	0.0	9.2
4:00	0.0	7.9	0.0	9.2	0.0	10.7	0.0	16.6	0.0	11.5	0.0	10.2
4:15	0.0	7.8	0.0	10.5	0.0	9.7	0.0	12.9	0.0	12.5	0.0	10.6
4:30	0.2	7.3	0.0	10.1	0.0	10.1	0.0	8.4	0.0	12.5	0.0	10.2
4:45	0.2	6.8	0.0	10.0	0.0	8.0	0.0	2.8	0.0	11.5	0.0	9.4
5:00	0.5	6.2	0.0	10.5	0.0	9.0	0.0	1.3	0.0	10.4	0.0	7.7
5:15	0.8	6.3	0.0	10.8	0.0	10.3	0.0	1.7	0.0	8.3	0.0	5.8
5:30	1.3	6.7	0.0	12.3	0.0	11.1	0.0	0.4	0.0	4.2	0.0	4.6
5:45	2.0	6.7	0.0	13.3	0.0	11.7	0.0	0.4	0.0	0.0	0.1	2.8
6:00	2.5	6.7	0.0	13.5	0.0	11.1	0.0	0.4	0.0	0.0	0.1	2.3
6:15	3.3	5.9	0.0	11.9	0.0	9.4	0.0	0.0	0.0	0.0	0.7	1.6
6:30	4.3	5.1	0.0	9.6	0.0	7.2	0.0	0.0	0.0	0.0	1.7	1.4
6:45	4.8	4.8	0.0	8.3	0.0	6.3	0.0	0.0	0.0	0.0	3.7	1.1
7:00	5.6	4.4	0.0	6.9	0.0	5.4	0.0	0.0	0.0	0.0	5.7	0.8
7:15	5.6	4.1	0.0	5.9	0.0	3.9	0.0	0.0	4.2	0.0	8.0	1.0
7:30	5.0	3.4	0.0	5.8	0.0	3.4	0.0	0.0	5.2	0.0	9.1	0.9
7:45	4.4	3.3	0.0	3.5	0.0	2.0	0.0	0.0	6.3	0.0	9.0	0.8
8:00	3.7	3.1	0.5	1.7	0.0	0.7	0.0	0.0	8.3	0.0	9.3	0.6
8:15	3.8	3.5	2.2	0.8	2.6	0.4	0.0	0.0	6.3	0.0	8.8	0.3
8:30	3.5	3.4	3.7	0.0	3.9	0.1	0.0	0.0	8.3	0.0	9.0	0.2
8:45	3.7	3.1	6.5	0.0	5.8	0.0	0.0	0.0	8.3	0.0	9.0	0.0
9:00	3.7	3.0	8.7	0.0	7.4	0.0	0.0	0.0	9.4	0.0	9.0	0.0
9:15	3.0	2.4	11.3	0.0	7.4	0.0	5.2	0.0	10.4	0.0	8.6	0.0
9:30	3.6	2.6	10.6	0.0	8.1	0.0	7.8	0.0	13.5	0.0	8.8	0.0
9:45	3.9	2.3	9.9	0.0	9.0	0.0	9.1	0.0	14.6	0.0	9.5	0.0
10:00	4.0	2.1	8.6	0.0	8.5	0.0	11.4	0.0	12.5	0.0	9.7	0.0
10:15	4.6	1.7	7.6	0.0	9.2	0.0	10.3	0.0	14.6	0.0	10.4	0.0
10:30	5.6	1.2	8.7	0.0	11.1	0.0	8.4	0.0	11.5	0.0	10.3	0.0
10:45	7.1	0.7	8.1	0.0	10.0	0.0	8.8	0.0	12.5	0.0	9.8	0.0
11:00	8.9	0.4	8.3	0.0	10.1	0.0	10.1	0.0	12.5	0.0	10.0	0.0
11:15	11.8	0.1	7.2	0.0	8.0	0.0	11.4	0.0	8.3	0.0	10.0	0.0
11:30	13.1	0.0	9.3	0.0	6.3	0.0	14.0	0.0	7.3	0.0	9.4	0.0
11:45	14.3	0.0	10.6	0.0	6.6	0.0	15.3	0.0	5.2	0.0	9.7	0.0

Percent of Daily Traffic During the 60-Minute Period Beginning at Displayed Time

Time	Residential Source: *Locust Curve Drive - Delaware, Ohio*										Medical Office/Hospital Source: *Thomas Lane - Columbus, Ohio*										Coffee/Donut Shop without Drive-Through Window Source: *ITE Trip Generation Manual 10th Edition*										TOTAL DAILY DISTRIBUTION									
	% of 24 Hour Entering (Weekday)	% of 24 Hour Exiting (Weekday)	Volume Entering (Weekday)				Volume Exiting (Weekday)				% of 24 Hour Entering (Weekday)	% of 24 Hour Exiting (Weekday)	Volume Entering (Weekday)				Volume Exiting (Weekday)				% of 24 Hour Entering (Weekday)	% of 24 Hour Exiting (Weekday)	Volume Entering (Weekday)				Volume Exiting (Weekday)				Volume									
			NB	SB	WB		NB	SB	WB				NB	SB	WB		NB	SB	WB				NB	SB	WB		NB	SB	WB		NB	SB	WB							
					LT	RT			LT	RT					LT	RT			LT	RT					LT	RT			LT	RT			LT	RT				
			248	248	0	0	0	0	248	124			324	324	0	0	0	0	324	162			381	381	0	0	0	0	381	190	953	953	952	476				
000	0.2%	0.1%	1	1	0	0	0	0	0	0	0.2%	0.6%	1	1	0	0	0	0	2	1	0.0%	0.0%	0	0	0	0	0	0	0	0	1	1	2	1				
100	0.3%	0.0%	1	1	0	0	0	0	0	0	0.2%	0.5%	1	1	0	0	0	0	2	1	0.0%	0.0%	0	0	0	0	0	0	0	0	1	1	2	1				
200	0.5%	0.1%	1	1	0	0	0	0	0	0	0.3%	0.1%	1	1	0	0	0	0	0	0	0.0%	0.0%	0	0	0	0	0	0	0	0	2	2	1	0				
300	0.2%	0.1%	1	1	0	0	0	0	0	0	0.3%	0.5%	1	1	0	0	0	0	2	1	0.0%	0.0%	0	0	0	0	0	0	0	0	2	2	2	1				
400	0.0%	0.3%	0	0	0	0	0	0	1	0	0.8%	0.7%	3	3	0	0	0	0	2	1	0.0%	0.0%	0	0	0	0	0	0	0	0	3	3	3	2				
500	0.1%	1.5%	0	0	0	0	0	0	4	2	1.8%	0.8%	6	6	0	0	0	0	2	1	0.0%	0.0%	0	0	0	0	0	0	0	0	6	6	6	3				
600	1.2%	5.7%	3	3	0	0	0	0	14	7	8.8%	2.4%	28	28	0	0	0	0	8	4	0.0%	0.0%	0	0	0	0	0	0	0	0	32	32	22	11				
700	3.3%	13.5%	8	8	0	0	0	0	33	17	9.2%	7.6%	30	30	0	0	0	0	24	12	0.5%	0.5%	2	2	0	0	0	0	2	1	40	40	60	30				
800	5.0%	9.5%	12	12	0	0	0	0	24	12	9.2%	4.1%	30	30	0	0	0	0	13	7	8.7%	8.7%	33	33	0	0	0	0	33	17	75	75	70	35				
900	4.4%	6.4%	11	11	0	0	0	0	16	8	8.1%	5.4%	26	26	0	0	0	0	17	9	8.6%	8.6%	33	33	0	0	0	0	33	16	70	70	66	33				
1000	4.6%	4.5%	11	11	0	0	0	0	11	6	7.4%	7.5%	24	24	0	0	0	0	24	12	8.3%	8.3%	32	32	0	0	0	0	32	16	67	67	67	33				
1100	5.5%	5.2%	14	14	0	0	0	0	13	6	6.5%	6.8%	21	21	0	0	0	0	22	11	12.2%	12.2%	47	47	0	0	0	0	46	23	81	81	81	41				
1200	5.4%	7.1%	13	13	0	0	0	0	17	9	7.1%	6.6%	23	23	0	0	0	0	21	11	7.0%	7.0%	27	27	0	0	0	0	27	13	63	63	66	33				
1300	4.5%	4.6%	11	11	0	0	0	0	11	6	7.4%	7.9%	24	24	0	0	0	0	26	13	6.6%	6.6%	25	25	0	0	0	0	25	13	60	60	62	31				
1400	5.3%	4.8%	13	13	0	0	0	0	12	6	7.4%	9.0%	24	24	0	0	0	0	29	15	6.5%	6.5%	25	25	0	0	0	0	25	12	62	62	66	33				
1500	6.9%	4.9%	17	17	0	0	0	0	12	6	5.9%	9.1%	19	19	0	0	0	0	29	15	9.2%	9.2%	35	35	0	0	0	0	35	18	71	71	77	38				
1600	7.4%	6.8%	18	18	0	0	0	0	17	8	4.4%	7.7%	14	14	0	0	0	0	25	12	10.5%	10.5%	40	40	0	0	0	0	40	20	73	73	82	41				
1700	11.8%	6.7%	29	29	0	0	0	0	17	8	3.5%	5.4%	11	11	0	0	0	0	17	9	13.5%	13.5%	51	51	0	0	0	0	51	26	92	92	85	43				
1800	8.7%	6.3%	21	21	0	0	0	0	16	8	4.6%	4.3%	15	15	0	0	0	0	14	7	6.9%	6.9%	26	26	0	0	0	0	26	13	63	63	56	28				
1900	8.3%	4.8%	21	21	0	0	0	0	12	6	2.0%	3.8%	6	6	0	0	0	0	12	6	1.7%	1.7%	6	6	0	0	0	0	6	3	33	33	31	15				
2000	7.9%	3.8%	20	20	0	0	0	0	9	5	1.6%	3.8%	5	5	0	0	0	0	12	6	0.0%	0.0%	0	0	0	0	0	0	0	0	25	25	22	11				
2100	4.6%	2.0%	11	11	0	0	0	0	5	2	1.0%	2.3%	3	3	0	0	0	0	7	4	0.0%	0.0%	0	0	0	0	0	0	0	0	15	15	12	6				
2200	2.8%	1.1%	7	7	0	0	0	0	3	1	1.7%	1.1%	6	6	0	0	0	0	3	2	0.0%	0.0%	0	0	0	0	0	0	0	0	13	13	6	3				
2300	1.0%	0.1%	3	3	0	0	0	0	0	0	0.6%	2.1%	2	2	0	0	0	0	7	3	0.0%	0.0%	0	0	0	0	0	0	0	0	5	5	7	3				
TOTAL	100.00%	100.0%	248	248	0	0	0	0	248	124	100.00%	100.0%	324	324	0	0	0	0	324	162	100.20%	100.2%	382	382	0	0	0	0	382	191	954	954	953	476				

TABLE - Daily Site Traffic Distribution-Hamilton Road & Villa Oaks Lane/Site Access (Ref. #3)

Signal Warrant #1 Worksheet (Ref. #3)

Hamilton Road & Villa Oaks Lane/Site Access

2019 'Build' Traffic

Speed Limit on Hamilton Road: 35 MPH (Community Population >10,000)

CONDITION	# OF LANES	HAMILTON ROAD MAJOR STREET									VILLA OAKS LANE/SITE ACCESS MINOR STREET											WARRANT #1 - CONDITION A				WARRANT #1 - CONDITION B			
		Existing		Growth		Site		Total			Existing		Growth		Site		Right Turn Reduction		Total			MAJOR		MINOR		MAJOR		MINOR	
		NB	SB	NB	SB	NB	SB	NB	SB	2-WAY	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	1-WAY							
																						100%	80%	100%	80%	100%	80%	100%	80%
Warrant	1																				X	500	400	**150**	**120**	750	600	**75**	**60**
Warrant	2									X												**600**	**480**	200	160	**900**	**720**	100	80
70% Warrant	1																					350	280	105	84	525	420	53	42
70% Warrant	2																					420	336	140	112	630	504	70	56
7-8 AM		563	820	7	11	40	40	610	870	**1480**	18	0	0	0	0	90	-8	-30	10	60	**60**	YES	YES	NO	NO	YES	YES	NO	YES
8-9 AM		801	879	10	11	75	75	887	966	**1852**	19	0	0	0	0	105	-10	-35	9	70	**70**	YES	YES	NO	NO	YES	YES	NO	YES
9-10 AM		791	681	10	9	70	70	871	760	**1631**		0	0	0	0	99	0	-33	0	66	**66**	YES	YES	NO	NO	YES	YES	NO	YES
10-11 AM		852	715	11	9	67	67	930	791	**1722**		0	0	0	0	100	0	-33	0	67	**67**	YES	YES	NO	NO	YES	YES	NO	YES
11-12 Noon		1051	830	14	11	81	81	1146	922	**2068**		0	0	0	0	122	0	-41	0	81	**81**	YES	YES	NO	NO	YES	YES	YES	YES
12-1 PM		1087	1008	14	13	63	63	1164	1084	**2249**		0	0	0	0	98	0	-33	0	66	**66**	YES	YES	NO	NO	YES	YES	NO	YES
1-2 PM		968	1018	13	13	60	60	1041	1091	**2132**		0	0	0	0	93	0	-31	0	62	**62**	YES	YES	NO	NO	YES	YES	NO	YES
2-3 PM		901	967	12	13	62	62	975	1041	**2016**		0	0	0	0	99	0	-33	0	66	**66**	YES	YES	NO	NO	YES	YES	NO	YES
3-4 PM		974	1022	13	13	71	71	1058	1106	**2164**		0	0	0	0	115	0	-38	0	77	**77**	YES	YES	NO	NO	YES	YES	YES	YES
4-5 PM		1134	1006	15	13	73	73	1221	1092	**2313**	15	0	0	0	0	123	-9	-41	6	82	**82**	YES	YES	NO	NO	YES	YES	YES	YES
5-6 PM		1183	1075	15	14	92	92	1291	1181	**2472**	7	0	0	0	0	128	-3	-43	4	85	**85**	YES	YES	NO	NO	YES	YES	YES	YES

WARRANT STATUS	**0 Hours Met (8 Required) CONDITION NOT MET**	**4 Hours Met (8 Required) CONDITION NOT MET**

	WARRANT #1 - COMBINATION OF 80% CONDITION A & 80% CONDITION B
WARRANT STATUS	**0 Hours Met (8 Required) CONDITION NOT MET**

WARRANT #1 : NOT MET

NOTE(S)

Existing traffic component on Hamilton Road is based on count taken 6/28/2018.
Existing traffic component on Villa Oaks Lane/Site Access is based on count taken 6/28/2018.
Only minor street left turning traffic was considered in analysis.
A growth factor of 1.013 was applied to the existing Hamilton Road counts.

Prepared By:

SMART SERVICES, INC.

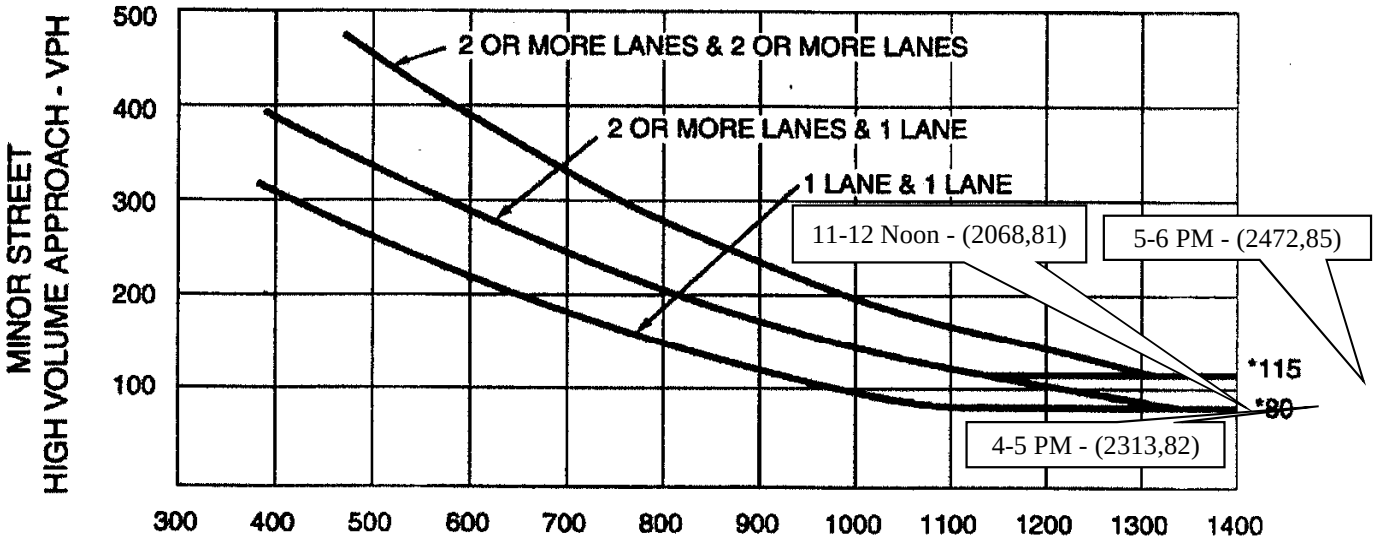
REV. 1
8/2018

Appendix

Signal Warrant 2 (Ref. #3)

Hamilton Road & Villa Oaks Lane/Site Access
2019 'Build' Traffic

Figure 4C-1. Warrant 2, Four-Hour Vehicular Volume



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

Lanes	Time	Major Street Volume (2-Way)	Minor Street Volume (1-Way)	Criteria Met in Hour	Warrant Result
2 Or More Lanes & 1 Lane					NOT MET
	7-8 AM	1480	60	NO	
	8-9 AM	1852	70	NO	
	9-10 AM	1631	66	NO	
	10-11 AM	1722	67	NO	
	11-12 Noon	2068	81	YES	
	12-1 PM	2249	66	NO	
	1-2 PM	2132	62	NO	
	2-3 PM	2016	66	NO	
	3-4 PM	2164	77	NO	
	4-5 PM	2313	82	YES	
	5-6 PM	2472	85	YES	
	6-7 PM				
	7-8 PM				
	8-9 PM				

NOTE(S)

Existing traffic component on Hamilton Road is based on count taken 6/28/2018.
Existing traffic component on Villa Oaks Lane/Site Access is based on count taken 6/28/2018.
Only minor street left turning traffic was considered in analysis.
A growth factor of 1.013 was applied to the existing Hamilton Road counts.

Signal Warrant #1 Worksheet (Ref. #4)

Hamilton Road & Villa Oaks Lane/Site Access

2039 'Build' Traffic

Speed Limit on Hamilton Road: 35 MPH (Community Population >10,000)

CONDITION	# OF LANES	HAMILTON ROAD MAJOR STREET									VILLA OAKS LANE/SITE ACCESS MINOR STREET											WARRANT #1 - CONDITION A				WARRANT #1 - CONDITION B			
		Existing		Growth		Site		Total			Existing		Growth		Site		Right Turn Reduction		Total			MAJOR		MINOR		MAJOR		MINOR	
		NB	SB	NB	SB	NB	SB	NB	SB	2-WAY	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	1-WAY							
																						100%	80%	100%	80%	100%	80%	100%	80%
Warrant	1																				X	500	400	**150**	**120**	750	600	**75**	**60**
Warrant	2									X												**600**	**480**	200	160	**900**	**720**	100	80
70% Warrant	1																					350	280	105	84	525	420	53	42
70% Warrant	2																					420	336	140	112	630	504	70	56
7-8 AM		563	820	154	224	40	40	756	1084	**1840**	18	0	0	0	0	90	-8	-30	10	60	**60**	YES	YES	NO	NO	YES	YES	NO	YES
8-9 AM		801	879	219	240	75	75	1095	1194	**2289**	19	0	0	0	0	105	-10	-35	9	70	**70**	YES	YES	NO	NO	YES	YES	NO	YES
9-10 AM		791	681	216	186	70	70	1077	937	**2013**		0	0	0	0	99	0	-33	0	66	**66**	YES	YES	NO	NO	YES	YES	NO	YES
10-11 AM		852	715	233	195	67	67	1152	977	**2129**		0	0	0	0	100	0	-33	0	67	**67**	YES	YES	NO	NO	YES	YES	NO	YES
11-12 Noon		1051	830	287	227	81	81	1419	1138	**2557**		0	0	0	0	122	0	-41	0	81	**81**	YES	YES	NO	NO	YES	YES	YES	YES
12-1 PM		1087	1008	297	275	63	63	1447	1346	**2793**		0	0	0	0	98	0	-33	0	66	**66**	YES	YES	NO	NO	YES	YES	NO	YES
1-2 PM		968	1018	264	278	60	60	1292	1356	**2649**		0	0	0	0	93	0	-31	0	62	**62**	YES	YES	NO	NO	YES	YES	NO	YES
2-3 PM		901	967	246	264	62	62	1209	1293	**2502**		0	0	0	0	99	0	-33	0	66	**66**	YES	YES	NO	NO	YES	YES	NO	YES
3-4 PM		974	1022	266	279	71	71	1311	1372	**2683**		0	0	0	0	115	0	-38	0	77	**77**	YES	YES	NO	NO	YES	YES	YES	YES
4-5 PM		1134	1006	310	275	73	73	1516	1353	**2869**	15	0	0	0	0	123	-9	-41	6	82	**82**	YES	YES	NO	NO	YES	YES	YES	YES
5-6 PM		1183	1075	323	293	92	92	1598	1461	**3059**	7	0	0	0	0	128	-3	-43	4	85	**85**	YES	YES	NO	NO	YES	YES	YES	YES

WARRANT STATUS	**0 Hours Met (8 Required) CONDITION NOT MET**	**4 Hours Met (8 Required) CONDITION NOT MET**

	WARRANT #1 - COMBINATION OF 80% CONDITION A & 80% CONDITION B
WARRANT STATUS	**0 Hours Met (8 Required) CONDITION NOT MET**

WARRANT #1 : NOT MET

NOTE(S)

Existing traffic component on Hamilton Road is based on count taken 6/28/2018.
Existing traffic component on Villa Oaks Lane/Site Access is based on count taken 6/28/2018.
Only minor street left turning traffic was considered in analysis.
A growth factor of 1.273 was applied to the existing Hamilton Road counts.

Prepared By:

SMART SERVICES, INC.

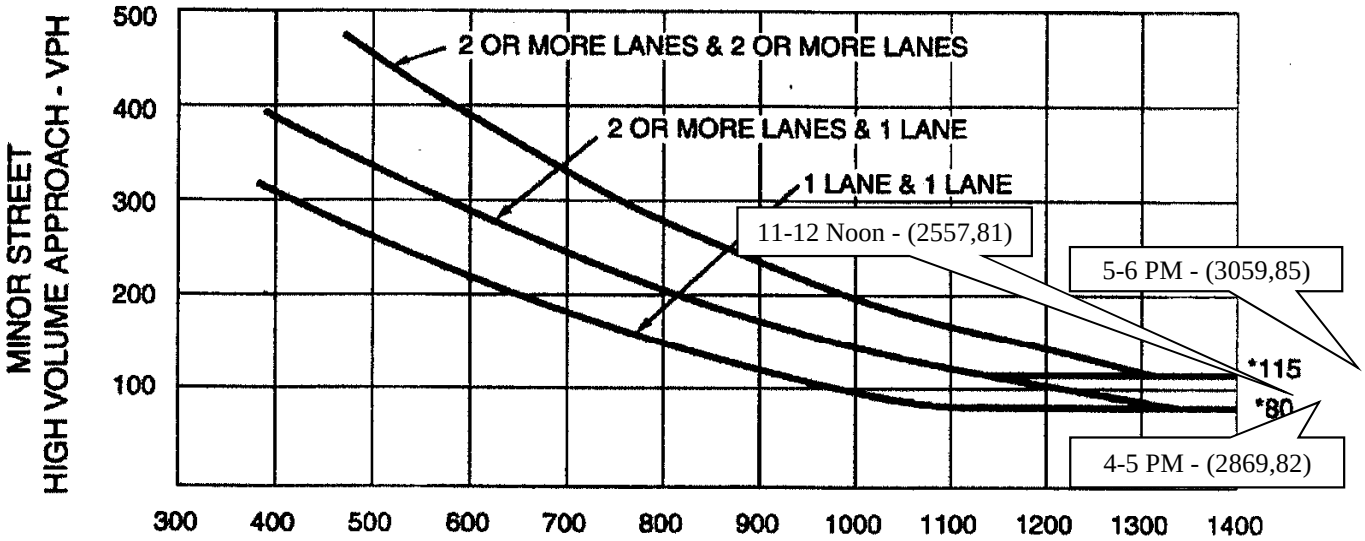
REV. 1
8/2018

Appendix

Signal Warrant 2 (Ref. #4)

Hamilton Road & Villa Oaks Lane/Site Access
2039 'Build' Traffic

Figure 4C-1. Warrant 2, Four-Hour Vehicular Volume



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

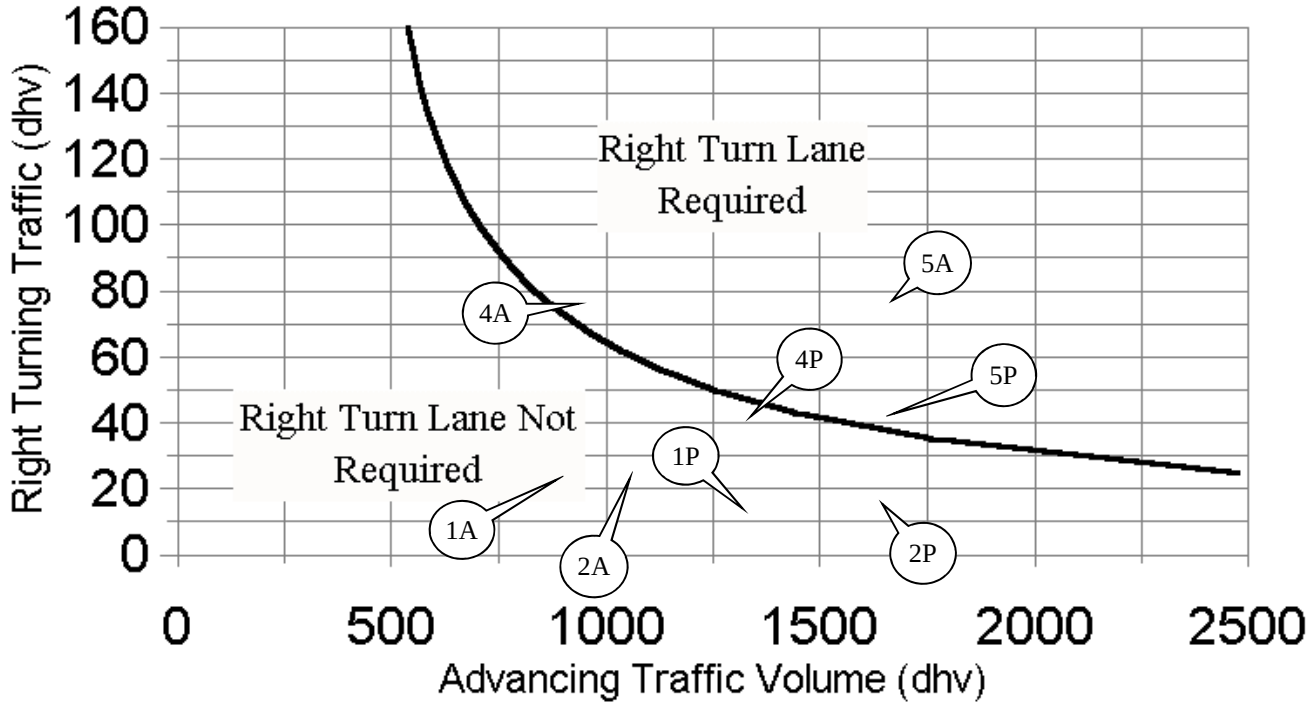
Lanes	Time	Major Street Volume (2-Way)	Minor Street Volume (1-Way)	Criteria Met in Hour	Warrant Result
2 Or More Lanes & 1 Lane					NOT MET
	7-8 AM	1840	60	NO	
	8-9 AM	2289	70	NO	
	9-10 AM	2013	66	NO	
	10-11 AM	2129	67	NO	
	11-12 Noon	2557	81	YES	
	12-1 PM	2793	66	NO	
	1-2 PM	2649	62	NO	
	2-3 PM	2502	66	NO	
	3-4 PM	2683	77	NO	
	4-5 PM	2869	82	YES	
	5-6 PM	3059	85	YES	
	6-7 PM				
	7-8 PM				
	8-9 PM				

NOTE(S)

Existing traffic component on Hamilton Road is based on count taken 6/28/2018.
Existing traffic component on Villa Oaks Lane/Site Access is based on count taken 6/28/2018.
Only minor street left turning traffic was considered in analysis.
A growth factor of 1.273 was applied to the existing Hamilton Road counts.

4 Lane Highway Right Turn Lane Warrant

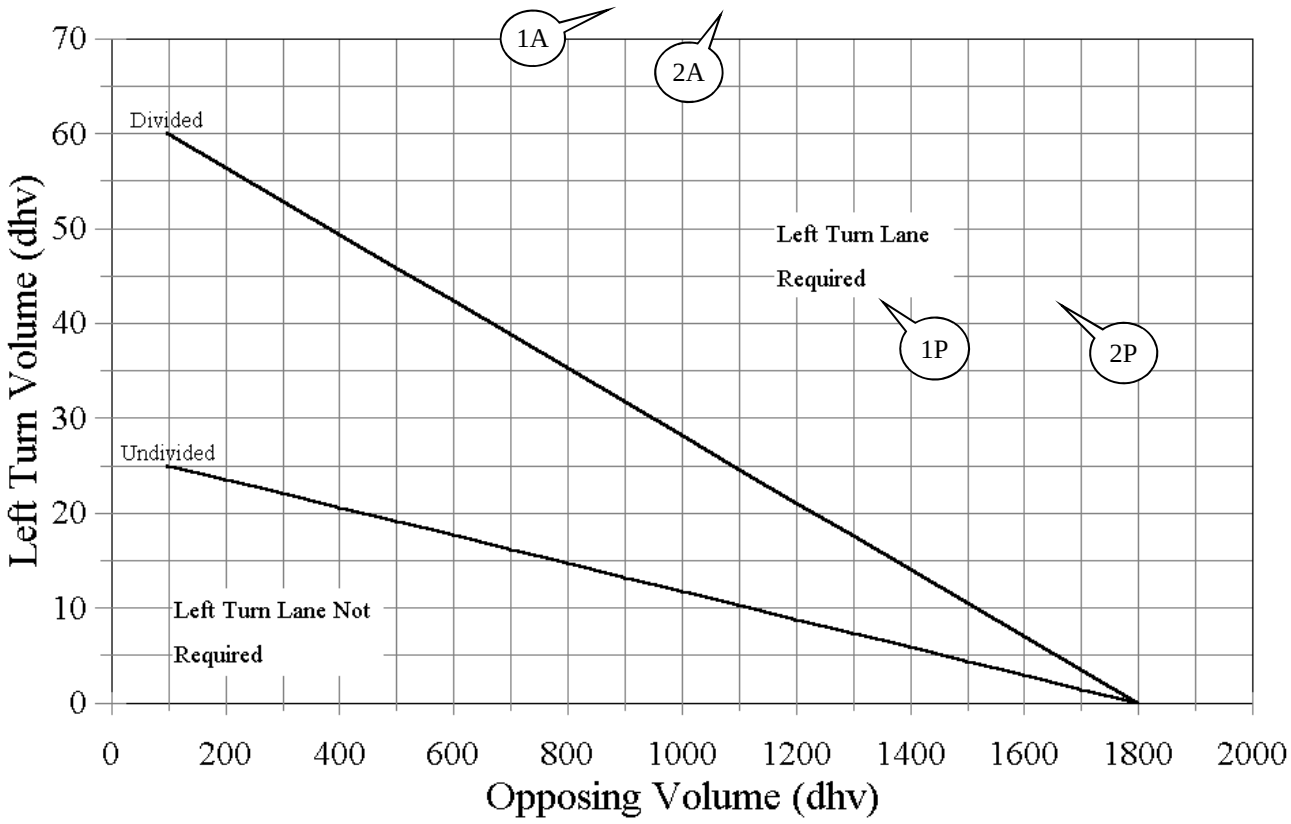
(=<40 mph or 70 kph Posted Speed)



WARRANT SUMMARY

ID	INTERSECTION [MOVEMENT] - VOLUME SET	AM PEAK (A)	PM PEAK (P)		RESULT
1	Hamilton Road & Site Access (RIRO) [NB RT] - 2019 'BUILD'	(840,23)	(1355,14)		NOT MET
2	Hamilton Road & Site Access (RIRO) [NB RT] - 2039 'BUILD'	(1045,23)	(1690,14)		NOT MET
4	**Hamilton Road & Villa Oaks Lane/Site Access [NB RT] - 2019 'BUILD'**	**(863,78)**	(1353,41)		**MET**
5	**Hamilton Road & Villa Oaks Lane/Site Access [NB RT] - 2039 'BUILD'**	**(1066,78)**	**(1687,41)**		**MET**

4-Lane Highway Left Turn Lane Warrant



WARRANT SUMMARY

ID	INTERSECTION [MOVEMENT] - VOLUME SET	AM PEAK (A)	PM PEAK (P)		RESULT
1	**Hamilton Road & Villa Oaks Lane/Site Access [SB LT] - 2019 'BUILD'**	**(863,76)**	**(1353,44)**		**MET**
2	**Hamilton Road & Villa Oaks Lane/Site Access [SB LT] - 2039 'BUILD'**	**(1066,76)**	**(1687,44)**		**MET**

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	12	10	30	92	11	110	51	702	58	141	769	38
Future Volume (vph)	12	10	30	92	11	110	51	702	58	141	769	38
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	13	10	31	96	11	115	53	731	60	147	801	40
Shared Lane Traffic (%)												
Lane Group Flow (vph)	13	10	31	96	11	115	53	731	60	147	841	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8		8	4		4	6		6	2		
Detector Phase	3	8	8	7	4	4	1	6	6	5	2	
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	20.0	20.0	5.0	20.0	
Minimum Split (s)	9.0	30.0	30.0	9.0	30.0	30.0	9.0	26.0	26.0	9.0	26.0	
Total Split (s)	11.0	32.0	32.0	13.0	34.0	34.0	11.0	57.0	57.0	18.0	64.0	
Total Split (%)	9.2%	26.7%	26.7%	10.8%	28.3%	28.3%	9.2%	47.5%	47.5%	15.0%	53.3%	
Yellow Time (s)	3.0	3.5	3.5	3.0	3.5	3.5	3.0	3.5	3.5	3.0	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.5	1.5	1.0	1.5	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	4.5	4.5	4.0	4.5	4.5	4.0	5.0	5.0	4.0	5.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	
Act Effct Green (s)	11.8	10.0	10.0	17.8	13.7	13.7	88.9	81.6	81.6	91.4	84.3	
Actuated g/C Ratio	0.10	0.08	0.08	0.15	0.11	0.11	0.74	0.68	0.68	0.76	0.70	
v/c Ratio	0.08	0.06	0.12	0.48	0.05	0.39	0.11	0.30	0.05	0.27	0.34	
Control Delay	41.3	51.8	1.0	51.9	47.6	11.0	2.7	8.0	1.3	5.1	8.6	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	41.3	51.8	1.0	51.9	47.6	11.0	2.7	8.0	1.3	5.1	8.6	
LOS	D	D	A	D	D	B	A	A	A	A	A	
Approach Delay		20.1			30.5			7.2			8.0	
Approach LOS		C			C			A			A	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 86 (72%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green	
Natural Cycle: 75	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.48	
Intersection Signal Delay: 10.4	Intersection LOS: B
Intersection Capacity Utilization 50.2%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 110: Hamilton Rd. & Stoneridge Lane

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	97	0	96	0	0	6	53	689	3	5	1074	25
Future Volume (vph)	97	0	96	0	0	6	53	689	3	5	1074	25
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	103	0	102	0	0	6	56	733	3	5	1143	27
Shared Lane Traffic (%)												
Lane Group Flow (vph)	103	102	0	0	6	0	56	736	0	5	1170	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases	4			8			6			2		
Detector Phase	7	4		3	8		1	6		5	2	
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	5.0		5.0	30.0		5.0	30.0	
Minimum Split (s)	21.0	29.0		9.0	29.0		8.0	36.0		9.0	36.0	
Total Split (s)	21.0	41.0		9.0	29.0		9.0	61.0		9.0	61.0	
Total Split (%)	17.5%	34.2%		7.5%	24.2%		7.5%	50.8%		7.5%	50.8%	
Yellow Time (s)	3.0	3.5		3.5	3.5		3.0	3.5		3.0	3.5	
All-Red Time (s)	0.0	1.5		0.0	1.5		0.0	1.5		0.0	1.5	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	5.0		3.5	5.0		3.0	5.0		3.0	5.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	
Act Effct Green (s)	15.6	13.6			5.5		97.8	94.6		95.7	89.2	
Actuated g/C Ratio	0.13	0.11			0.05		0.82	0.79		0.80	0.74	
v/c Ratio	0.44	0.27			0.02		0.15	0.26		0.01	0.45	
Control Delay	52.5	1.8			0.0		3.3	3.9		3.0	5.5	
Queue Delay	0.0	0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay	52.5	1.8			0.0		3.3	3.9		3.0	5.5	
LOS	D	A			A		A	A		A	A	
Approach Delay		27.3						3.8			5.5	
Approach LOS		C						A			A	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 108 (90%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green	
Natural Cycle: 95	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.45	
Intersection Signal Delay: 6.9	Intersection LOS: A
Intersection Capacity Utilization 58.4%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 160: Hamilton Rd. & Vista Dr./Access Road

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	73	76	57	39	159	239	76	497	47	173	784	128
Future Volume (vph)	73	76	57	39	159	239	76	497	47	173	784	128
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	86	89	67	46	187	281	89	585	55	204	922	151
Shared Lane Traffic (%)												
Lane Group Flow (vph)	86	156	0	46	187	281	89	585	55	204	1073	0
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8			4		4	6		6	2		
Detector Phase	3	8		7	4	4	1	6	6	5	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	8.0	8.0	8.0	20.0	20.0	8.0	20.0	
Minimum Split (s)	8.0	29.0		8.0	29.0	29.0	11.0	35.0	35.0	11.0	35.0	
Total Split (s)	8.0	34.0		8.0	34.0	34.0	12.0	61.0	61.0	17.0	66.0	
Total Split (%)	6.7%	28.3%		6.7%	28.3%	28.3%	10.0%	50.8%	50.8%	14.2%	55.0%	
Yellow Time (s)	3.0	3.5		3.0	3.5	3.5	3.0	3.5	3.5	3.0	3.5	
All-Red Time (s)	0.0	1.5		0.0	1.5	1.5	0.0	1.5	1.5	0.0	1.5	
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)	3.0	5.0		3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None		None	None	None	None	C-Max	C-Max	None	C-Max	
Act Effct Green (s)	22.6	16.6		22.6	16.6	16.6	84.5	74.5	74.5	87.1	75.9	
Actuated g/C Ratio	0.19	0.14		0.19	0.14	0.14	0.70	0.62	0.62	0.73	0.63	
v/c Ratio	0.49	0.58		0.23	0.73	0.61	0.24	0.27	0.05	0.33	0.49	
Control Delay	47.7	46.9		38.0	65.1	11.0	7.1	12.0	0.4	2.2	6.1	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	47.7	46.9		38.0	65.1	11.0	7.1	12.0	0.4	2.2	6.1	
LOS	D	D		D	E	B	A	B	A	A	A	
Approach Delay		47.2			33.1			10.5			5.5	
Approach LOS		D			C			B			A	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 4 (3%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green	
Natural Cycle: 85	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.73	
Intersection Signal Delay: 15.6	Intersection LOS: B
Intersection Capacity Utilization 60.0%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 170: Hamilton Rd. & Beecher Rd.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	139	24	149	122	29	156	217	863	54	182	744	175
Future Volume (vph)	139	24	149	122	29	156	217	863	54	182	744	175
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	142	24	152	124	30	159	221	881	55	186	759	179
Shared Lane Traffic (%)												
Lane Group Flow (vph)	142	24	152	124	30	159	221	881	55	186	938	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8		8	4		4	6		6	2		
Detector Phase	3	8	8	7	4	4	1	6	6	5	2	
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	20.0	20.0	5.0	20.0	
Minimum Split (s)	9.0	30.0	30.0	9.0	30.0	30.0	9.0	26.0	26.0	9.0	26.0	
Total Split (s)	15.0	34.0	34.0	13.0	32.0	32.0	27.0	72.0	72.0	21.0	66.0	
Total Split (%)	10.7%	24.3%	24.3%	9.3%	22.9%	22.9%	19.3%	51.4%	51.4%	15.0%	47.1%	
Yellow Time (s)	3.0	3.5	3.5	3.0	3.5	3.5	3.0	3.5	3.5	3.0	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.5	1.5	1.0	1.5	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	4.5	4.5	4.0	4.5	4.5	4.0	5.0	5.0	4.0	5.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	
Act Effct Green (s)	23.4	12.3	12.3	19.8	10.5	10.5	105.1	92.9	92.9	99.0	89.5	
Actuated g/C Ratio	0.17	0.09	0.09	0.14	0.08	0.08	0.75	0.66	0.66	0.71	0.64	
v/c Ratio	0.59	0.15	0.55	0.57	0.21	0.60	0.48	0.38	0.05	0.40	0.43	
Control Delay	61.7	60.7	16.5	61.6	64.4	18.6	10.4	8.6	0.4	7.8	13.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	61.7	60.7	16.5	61.6	64.4	18.6	10.4	8.6	0.4	7.8	13.4	
LOS	E	E	B	E	E	B	B	A	A	A	B	
Approach Delay		40.0			40.1			8.6			12.5	
Approach LOS		D			D			A			B	

Intersection Summary	
Cycle Length: 140	
Actuated Cycle Length: 140	
Offset: 13 (9%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green	
Natural Cycle: 80	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.60	
Intersection Signal Delay: 16.9	Intersection LOS: B
Intersection Capacity Utilization 63.8%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 110: Hamilton Rd. & Stoneridge Lane

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	95	1	68	6	1	3	114	1215	3	13	968	87
Future Volume (vph)	95	1	68	6	1	3	114	1215	3	13	968	87
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	101	1	72	6	1	3	121	1293	3	14	1030	93
Shared Lane Traffic (%)												
Lane Group Flow (vph)	101	73	0	6	4	0	121	1296	0	14	1123	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases	4			8			6			2		
Detector Phase	7	4		3	8		1	6		5	2	
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	5.0		5.0	30.0		5.0	30.0	
Minimum Split (s)	21.0	29.0		9.0	29.0		8.0	36.0		9.0	36.0	
Total Split (s)	21.0	41.0		9.0	29.0		15.0	81.0		9.0	75.0	
Total Split (%)	15.0%	29.3%		6.4%	20.7%		10.7%	57.9%		6.4%	53.6%	
Yellow Time (s)	3.0	3.5		3.5	3.5		3.0	3.5		3.0	3.5	
All-Red Time (s)	0.0	1.5		0.0	1.5		0.0	1.5		0.0	1.5	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	5.0		3.5	5.0		3.0	5.0		3.0	5.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	
Act Effct Green (s)	16.4	12.6		7.1	5.8		117.4	112.0		113.0	105.3	
Actuated g/C Ratio	0.12	0.09		0.05	0.04		0.84	0.80		0.81	0.75	
v/c Ratio	0.49	0.35		0.07	0.06		0.30	0.46		0.04	0.43	
Control Delay	64.5	17.2		56.0	46.5		4.4	5.0		2.9	6.7	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	64.5	17.2		56.0	46.5		4.4	5.0		2.9	6.7	
LOS	E	B		E	D		A	A		A	A	
Approach Delay		44.7			52.2			4.9			6.6	
Approach LOS		D			D			A			A	

Intersection Summary	
Cycle Length: 140	
Actuated Cycle Length: 140	
Offset: 126 (90%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green	
Natural Cycle: 95	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.49	
Intersection Signal Delay: 8.3	Intersection LOS: A
Intersection Capacity Utilization 61.4%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 160: Hamilton Rd. & Vista Dr./Access Road

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	37	63	33	65	43	237	30	1035	35	228	789	21
Future Volume (vph)	37	63	33	65	43	237	30	1035	35	228	789	21
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	40	68	36	71	47	258	33	1125	38	248	858	23
Shared Lane Traffic (%)												
Lane Group Flow (vph)	40	104	0	71	47	258	33	1125	38	248	881	0
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8			4		4	6		6	2		
Detector Phase	3	8		7	4	4	1	6	6	5	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	8.0	8.0	8.0	20.0	20.0	8.0	20.0	
Minimum Split (s)	8.0	29.0		8.0	29.0	29.0	11.0	35.0	35.0	11.0	35.0	
Total Split (s)	8.0	32.0		8.0	32.0	32.0	11.0	73.0	73.0	27.0	89.0	
Total Split (%)	5.7%	22.9%		5.7%	22.9%	22.9%	7.9%	52.1%	52.1%	19.3%	63.6%	
Yellow Time (s)	3.0	3.5		3.0	3.5	3.5	3.0	3.5	3.5	3.0	3.5	
All-Red Time (s)	0.0	1.5		0.0	1.5	1.5	0.0	1.5	1.5	0.0	1.5	
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)	3.0	5.0		3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None		None	None	None	None	C-Max	C-Max	None	C-Max	
Act Effct Green (s)	17.7	11.7		17.7	11.7	11.7	107.4	97.4	97.4	113.5	105.3	
Actuated g/C Ratio	0.13	0.08		0.13	0.08	0.08	0.77	0.70	0.70	0.81	0.75	
v/c Ratio	0.22	0.64		0.47	0.30	0.70	0.06	0.46	0.03	0.59	0.33	
Control Delay	52.6	68.7		62.6	64.0	17.3	4.0	11.5	0.1	13.8	2.0	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	52.6	68.7		62.6	64.0	17.3	4.0	11.5	0.1	13.8	2.0	
LOS	D	E		E	E	B	A	B	A	B	A	
Approach Delay		64.3			31.7			10.9			4.6	
Approach LOS		E			C			B			A	

Intersection Summary	
Cycle Length: 140	
Actuated Cycle Length: 140	
Offset: 4 (3%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green	
Natural Cycle: 85	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.70	
Intersection Signal Delay: 13.9	Intersection LOS: B
Intersection Capacity Utilization 63.2%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 170: Hamilton Rd. & Beecher Rd.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	12	10	30	92	11	110	51	738	58	141	836	38
Future Volume (vph)	12	10	30	92	11	110	51	738	58	141	836	38
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	13	10	31	96	11	115	53	769	60	147	871	40
Shared Lane Traffic (%)												
Lane Group Flow (vph)	13	10	31	96	11	115	53	769	60	147	911	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8		8	4		4	6		6	2		
Detector Phase	3	8	8	7	4	4	1	6	6	5	2	
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	20.0	20.0	5.0	20.0	
Minimum Split (s)	9.0	30.0	30.0	9.0	30.0	30.0	9.0	26.0	26.0	9.0	26.0	
Total Split (s)	11.0	33.0	33.0	12.0	34.0	34.0	11.0	57.0	57.0	18.0	64.0	
Total Split (%)	9.2%	27.5%	27.5%	10.0%	28.3%	28.3%	9.2%	47.5%	47.5%	15.0%	53.3%	
Yellow Time (s)	3.0	3.5	3.5	3.0	3.5	3.5	3.0	3.5	3.5	3.0	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.5	1.5	1.0	1.5	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	4.5	4.5	4.0	4.5	4.5	4.0	5.0	5.0	4.0	5.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	
Act Effct Green (s)	11.8	10.0	10.0	16.8	13.1	13.1	89.6	82.3	82.3	91.9	84.9	
Actuated g/C Ratio	0.10	0.08	0.08	0.14	0.11	0.11	0.75	0.69	0.69	0.77	0.71	
v/c Ratio	0.08	0.06	0.12	0.51	0.05	0.40	0.11	0.32	0.05	0.28	0.37	
Control Delay	42.0	51.8	1.0	54.3	48.5	11.4	2.7	8.1	1.1	5.0	8.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	42.0	51.8	1.0	54.3	48.5	11.4	2.7	8.1	1.1	5.0	8.5	
LOS	D	D	A	D	D	B	A	A	A	A	A	
Approach Delay		20.3			31.8			7.3			8.0	
Approach LOS		C			C			A			A	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 91 (76%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green	
Natural Cycle: 75	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.51	
Intersection Signal Delay: 10.4	Intersection LOS: B
Intersection Capacity Utilization 51.5%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 110: Hamilton Rd. & Stoneridge Lane

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	97	0	96	0	0	6	53	756	3	5	1110	25
Future Volume (vph)	97	0	96	0	0	6	53	756	3	5	1110	25
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	103	0	102	0	0	6	56	804	3	5	1181	27
Shared Lane Traffic (%)												
Lane Group Flow (vph)	103	102	0	0	6	0	56	807	0	5	1208	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases	4			8			6			2		
Detector Phase	7	4		3	8		1	6		5	2	
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	5.0		5.0	30.0		5.0	30.0	
Minimum Split (s)	21.0	29.0		9.0	29.0		8.0	36.0		9.0	36.0	
Total Split (s)	21.0	41.0		9.0	29.0		9.0	61.0		9.0	61.0	
Total Split (%)	17.5%	34.2%		7.5%	24.2%		7.5%	50.8%		7.5%	50.8%	
Yellow Time (s)	3.0	3.5		3.5	3.5		3.0	3.5		3.0	3.5	
All-Red Time (s)	0.0	1.5		0.0	1.5		0.0	1.5		0.0	1.5	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	5.0		3.5	5.0		3.0	5.0		3.0	5.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	
Act Effct Green (s)	15.6	13.6			5.5		97.8	94.6		95.7	89.2	
Actuated g/C Ratio	0.13	0.11			0.05		0.82	0.79		0.80	0.74	
v/c Ratio	0.44	0.28			0.02		0.16	0.29		0.01	0.46	
Control Delay	52.5	1.8			0.0		3.4	4.0		2.8	5.6	
Queue Delay	0.0	0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay	52.5	1.8			0.0		3.4	4.0		2.8	5.6	
LOS	D	A			A		A	A		A	A	
Approach Delay		27.3						3.9			5.6	
Approach LOS		C						A			A	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 112 (93%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green	
Natural Cycle: 95	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.46	
Intersection Signal Delay: 6.9	Intersection LOS: A
Intersection Capacity Utilization 59.4%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 160: Hamilton Rd. & Vista Dr./Access Road

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	73	76	57	39	159	260	76	542	47	184	808	128
Future Volume (vph)	73	76	57	39	159	260	76	542	47	184	808	128
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	86	89	67	46	187	306	89	638	55	216	951	151
Shared Lane Traffic (%)												
Lane Group Flow (vph)	86	156	0	46	187	306	89	638	55	216	1102	0
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8			4		4	6		6	2		
Detector Phase	3	8		7	4	4	1	6	6	5	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	8.0	8.0	8.0	20.0	20.0	8.0	20.0	
Minimum Split (s)	8.0	29.0		8.0	29.0	29.0	11.0	35.0	35.0	11.0	35.0	
Total Split (s)	8.0	33.0		8.0	33.0	33.0	11.0	61.0	61.0	18.0	68.0	
Total Split (%)	6.7%	27.5%		6.7%	27.5%	27.5%	9.2%	50.8%	50.8%	15.0%	56.7%	
Yellow Time (s)	3.0	3.5		3.0	3.5	3.5	3.0	3.5	3.5	3.0	3.5	
All-Red Time (s)	0.0	1.5		0.0	1.5	1.5	0.0	1.5	1.5	0.0	1.5	
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)	3.0	5.0		3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None		None	None	None	None	C-Max	C-Max	None	C-Max	
Act Effct Green (s)	22.8	16.8		22.8	16.8	16.8	84.1	74.1	74.1	87.2	75.8	
Actuated g/C Ratio	0.19	0.14		0.19	0.14	0.14	0.70	0.62	0.62	0.73	0.63	
v/c Ratio	0.49	0.58		0.23	0.72	0.63	0.25	0.29	0.05	0.37	0.50	
Control Delay	47.2	47.0		37.8	64.4	11.1	7.3	12.5	0.4	2.6	6.2	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	47.2	47.0		37.8	64.4	11.1	7.3	12.5	0.4	2.6	6.2	
LOS	D	D		D	E	B	A	B	A	A	A	
Approach Delay		47.1			31.8			11.0			5.6	
Approach LOS		D			C			B			A	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 8 (7%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green	
Natural Cycle: 85	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.72	
Intersection Signal Delay: 15.5	Intersection LOS: B
Intersection Capacity Utilization 60.6%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 170: Hamilton Rd. & Beecher Rd.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	139	24	149	122	29	156	217	930	54	182	785	175
Future Volume (vph)	139	24	149	122	29	156	217	930	54	182	785	175
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	142	24	152	124	30	159	221	949	55	186	801	179
Shared Lane Traffic (%)												
Lane Group Flow (vph)	142	24	152	124	30	159	221	949	55	186	980	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8		8	4		4	6		6	2		
Detector Phase	3	8	8	7	4	4	1	6	6	5	2	
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	20.0	20.0	5.0	20.0	
Minimum Split (s)	9.0	30.0	30.0	9.0	30.0	30.0	9.0	26.0	26.0	9.0	26.0	
Total Split (s)	15.0	35.0	35.0	12.0	32.0	32.0	27.0	72.0	72.0	21.0	66.0	
Total Split (%)	10.7%	25.0%	25.0%	8.6%	22.9%	22.9%	19.3%	51.4%	51.4%	15.0%	47.1%	
Yellow Time (s)	3.0	3.5	3.5	3.0	3.5	3.5	3.0	3.5	3.5	3.0	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.5	1.5	1.0	1.5	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	4.5	4.5	4.0	4.5	4.5	4.0	5.0	5.0	4.0	5.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	
Act Effct Green (s)	24.2	13.1	13.1	19.0	10.5	10.5	105.3	92.9	92.9	98.4	88.8	
Actuated g/C Ratio	0.17	0.09	0.09	0.14	0.08	0.08	0.75	0.66	0.66	0.70	0.63	
v/c Ratio	0.59	0.14	0.53	0.59	0.21	0.60	0.50	0.40	0.05	0.43	0.45	
Control Delay	61.6	59.5	15.7	63.9	64.4	18.6	9.5	10.2	2.4	8.4	14.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	61.6	59.5	15.7	63.9	64.4	18.6	9.5	10.2	2.4	8.4	14.1	
LOS	E	E	B	E	E	B	A	B	A	A	B	
Approach Delay		39.5			41.0			9.7			13.2	
Approach LOS		D			D			A			B	

Intersection Summary	
Cycle Length: 140	
Actuated Cycle Length: 140	
Offset: 70 (50%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green	
Natural Cycle: 80	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.60	
Intersection Signal Delay: 17.4	Intersection LOS: B
Intersection Capacity Utilization 64.9%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 110: Hamilton Rd. & Stoneridge Lane

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	95	1	68	6	1	3	114	1256	3	13	1035	87
Future Volume (vph)	95	1	68	6	1	3	114	1256	3	13	1035	87
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	101	1	72	6	1	3	121	1336	3	14	1101	93
Shared Lane Traffic (%)												
Lane Group Flow (vph)	101	73	0	6	4	0	121	1339	0	14	1194	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases	4			8			6			2		
Detector Phase	7	4		3	8		1	6		5	2	
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	5.0		5.0	30.0		5.0	30.0	
Minimum Split (s)	21.0	29.0		9.0	29.0		8.0	36.0		9.0	36.0	
Total Split (s)	21.0	41.0		9.0	29.0		13.0	81.0		9.0	77.0	
Total Split (%)	15.0%	29.3%		6.4%	20.7%		9.3%	57.9%		6.4%	55.0%	
Yellow Time (s)	3.0	3.5		3.5	3.5		3.0	3.5		3.0	3.5	
All-Red Time (s)	0.0	1.5		0.0	1.5		0.0	1.5		0.0	1.5	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	5.0		3.5	5.0		3.0	5.0		3.0	5.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	
Act Effct Green (s)	16.4	12.6		7.1	5.8		117.4	112.0		113.0	105.3	
Actuated g/C Ratio	0.12	0.09		0.05	0.04		0.84	0.80		0.81	0.75	
v/c Ratio	0.49	0.35		0.07	0.06		0.32	0.47		0.04	0.45	
Control Delay	64.5	17.2		56.0	46.5		5.1	5.1		1.6	7.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	64.5	17.2		56.0	46.5		5.1	5.1		1.6	7.1	
LOS	E	B		E	D		A	A		A	A	
Approach Delay		44.7			52.2			5.1			7.0	
Approach LOS		D			D			A			A	

Intersection Summary	
Cycle Length: 140	
Actuated Cycle Length: 140	
Offset: 123 (88%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green	
Natural Cycle: 95	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.49	
Intersection Signal Delay: 8.5	Intersection LOS: A
Intersection Capacity Utilization 62.6%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 160: Hamilton Rd. & Vista Dr./Access Road

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	37	63	33	65	43	250	30	1063	35	249	834	21
Future Volume (vph)	37	63	33	65	43	250	30	1063	35	249	834	21
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	40	68	36	71	47	272	33	1155	38	271	907	23
Shared Lane Traffic (%)												
Lane Group Flow (vph)	40	104	0	71	47	272	33	1155	38	271	930	0
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8			4		4	6		6	2		
Detector Phase	3	8		7	4	4	1	6	6	5	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	8.0	8.0	8.0	20.0	20.0	8.0	20.0	
Minimum Split (s)	8.0	29.0		8.0	29.0	29.0	11.0	35.0	35.0	11.0	35.0	
Total Split (s)	8.0	31.0		8.0	31.0	31.0	11.0	72.0	72.0	29.0	90.0	
Total Split (%)	5.7%	22.1%		5.7%	22.1%	22.1%	7.9%	51.4%	51.4%	20.7%	64.3%	
Yellow Time (s)	3.0	3.5		3.0	3.5	3.5	3.0	3.5	3.5	3.0	3.5	
All-Red Time (s)	0.0	1.5		0.0	1.5	1.5	0.0	1.5	1.5	0.0	1.5	
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)	3.0	5.0		3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None		None	None	None	None	C-Max	C-Max	None	C-Max	
Act Effct Green (s)	17.7	11.7		17.7	11.7	11.7	105.2	95.2	95.2	113.9	105.3	
Actuated g/C Ratio	0.13	0.08		0.13	0.08	0.08	0.75	0.68	0.68	0.81	0.75	
v/c Ratio	0.22	0.64		0.47	0.30	0.71	0.07	0.48	0.03	0.63	0.35	
Control Delay	52.6	68.7		62.6	64.0	17.4	4.3	13.1	0.1	17.3	2.3	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	52.6	68.7		62.6	64.0	17.4	4.3	13.1	0.1	17.3	2.3	
LOS	D	E		E	E	B	A	B	A	B	A	
Approach Delay		64.3			31.2			12.4			5.7	
Approach LOS		E			C			B			A	

Intersection Summary	
Cycle Length: 140	
Actuated Cycle Length: 140	
Offset: 4 (3%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green	
Natural Cycle: 85	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.71	
Intersection Signal Delay: 14.7	Intersection LOS: B
Intersection Capacity Utilization 65.1%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 170: Hamilton Rd. & Beecher Rd.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	12	10	30	92	11	110	51	882	58	141	966	38
Future Volume (vph)	12	10	30	92	11	110	51	882	58	141	966	38
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	13	10	31	96	11	115	53	919	60	147	1006	40
Shared Lane Traffic (%)												
Lane Group Flow (vph)	13	10	31	96	11	115	53	919	60	147	1046	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8		8	4		4	6		6	2		
Detector Phase	3	8	8	7	4	4	1	6	6	5	2	
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	20.0	20.0	5.0	20.0	
Minimum Split (s)	9.0	30.0	30.0	9.0	30.0	30.0	9.0	26.0	26.0	9.0	26.0	
Total Split (s)	9.0	30.0	30.0	12.0	33.0	33.0	11.0	61.0	61.0	17.0	67.0	
Total Split (%)	7.5%	25.0%	25.0%	10.0%	27.5%	27.5%	9.2%	50.8%	50.8%	14.2%	55.8%	
Yellow Time (s)	3.0	3.5	3.5	3.0	3.5	3.5	3.0	3.5	3.5	3.0	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.5	1.5	1.0	1.5	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	4.5	4.5	4.0	4.5	4.5	4.0	5.0	5.0	4.0	5.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	
Act Effct Green (s)	11.3	10.0	10.0	17.3	13.6	13.6	89.6	82.3	82.3	91.9	84.9	
Actuated g/C Ratio	0.09	0.08	0.08	0.14	0.11	0.11	0.75	0.69	0.69	0.77	0.71	
v/c Ratio	0.09	0.06	0.12	0.50	0.05	0.40	0.13	0.38	0.05	0.32	0.42	
Control Delay	42.2	51.8	1.0	53.7	47.5	11.0	4.0	8.2	0.9	5.6	9.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	42.2	51.8	1.0	53.7	47.5	11.0	4.0	8.2	0.9	5.6	9.0	
LOS	D	D	A	D	D	B	A	A	A	A	A	
Approach Delay		20.4			31.3			7.6			8.6	
Approach LOS		C			C			A			A	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 70 (58%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green	
Natural Cycle: 75	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.50	
Intersection Signal Delay: 10.4	Intersection LOS: B
Intersection Capacity Utilization 55.2%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 110: Hamilton Rd. & Stoneridge Lane

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	97	0	96	0	0	6	53	866	3	5	1349	25
Future Volume (vph)	97	0	96	0	0	6	53	866	3	5	1349	25
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	103	0	102	0	0	6	56	921	3	5	1435	27
Shared Lane Traffic (%)												
Lane Group Flow (vph)	103	102	0	0	6	0	56	924	0	5	1462	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases	4			8			6			2		
Detector Phase	7	4		3	8		1	6		5	2	
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	5.0		5.0	30.0		5.0	30.0	
Minimum Split (s)	21.0	29.0		9.0	29.0		8.0	36.0		9.0	36.0	
Total Split (s)	21.0	41.0		9.0	29.0		8.0	61.0		9.0	62.0	
Total Split (%)	17.5%	34.2%		7.5%	24.2%		6.7%	50.8%		7.5%	51.7%	
Yellow Time (s)	3.0	3.5		3.5	3.5		3.0	3.5		3.0	3.5	
All-Red Time (s)	0.0	1.5		0.0	1.5		0.0	1.5		0.0	1.5	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	5.0		3.5	5.0		3.0	5.0		3.0	5.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes			Yes		Yes		
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	
Act Effct Green (s)	15.6	13.6			5.5		97.6	94.6		96.5	90.0	
Actuated g/C Ratio	0.13	0.11			0.05		0.81	0.79		0.80	0.75	
v/c Ratio	0.44	0.30			0.02		0.21	0.33		0.01	0.55	
Control Delay	52.5	2.2			0.2		4.5	4.0		1.6	7.0	
Queue Delay	0.0	0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay	52.5	2.2			0.2		4.5	4.0		1.6	7.0	
LOS	D	A			A		A	A		A	A	
Approach Delay		27.5			0.2			4.0			6.9	
Approach LOS		C			A			A			A	

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 119 (99%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green
Natural Cycle: 105
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.55
Intersection Signal Delay: 7.4 Intersection LOS: A
Intersection Capacity Utilization 64.4% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 160: Hamilton Rd. & Vista Dr./Access Road

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	81	84	63	43	175	263	84	625	52	190	985	140
Future Volume (vph)	81	84	63	43	175	263	84	625	52	190	985	140
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	95	99	74	51	206	309	99	735	61	224	1159	165
Shared Lane Traffic (%)												
Lane Group Flow (vph)	95	173	0	51	206	309	99	735	61	224	1324	0
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8			4		4	6		6	2		
Detector Phase	3	8		7	4	4	1	6	6	5	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	8.0	8.0	8.0	20.0	20.0	8.0	20.0	
Minimum Split (s)	8.0	29.0		8.0	29.0	29.0	11.0	35.0	35.0	11.0	35.0	
Total Split (s)	9.0	32.0		8.0	31.0	31.0	12.0	63.0	63.0	17.0	68.0	
Total Split (%)	7.5%	26.7%		6.7%	25.8%	25.8%	10.0%	52.5%	52.5%	14.2%	56.7%	
Yellow Time (s)	3.0	3.5		3.0	3.5	3.5	3.0	3.5	3.5	3.0	3.5	
All-Red Time (s)	0.0	1.5		0.0	1.5	1.5	0.0	1.5	1.5	0.0	1.5	
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)	3.0	5.0		3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None		None	None	None	None	C-Max	C-Max	None	C-Max	
Act Effct Green (s)	27.3	20.5		24.9	17.9	17.9	80.1	69.9	69.9	83.6	71.9	
Actuated g/C Ratio	0.23	0.17		0.21	0.15	0.15	0.67	0.58	0.58	0.70	0.60	
v/c Ratio	0.49	0.54		0.22	0.74	0.62	0.36	0.36	0.06	0.44	0.63	
Control Delay	44.3	43.6		35.8	64.2	10.8	10.5	14.9	0.9	5.7	9.4	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	44.3	43.6		35.8	64.2	10.8	10.5	14.9	0.9	5.7	9.4	
LOS	D	D		D	E	B	B	B	A	A	A	
Approach Delay		43.9			32.5			13.4			8.9	
Approach LOS		D			C			B			A	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green	
Natural Cycle: 85	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.74	
Intersection Signal Delay: 17.1	Intersection LOS: B
Intersection Capacity Utilization 67.1%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 170: Hamilton Rd. & Beecher Rd.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	139	24	149	122	29	156	217	1085	54	182	934	175
Future Volume (vph)	139	24	149	122	29	156	217	1085	54	182	934	175
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	142	24	152	124	30	159	221	1107	55	186	953	179
Shared Lane Traffic (%)												
Lane Group Flow (vph)	142	24	152	124	30	159	221	1107	55	186	1132	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8		8	4		4	6		6	2		
Detector Phase	3	8	8	7	4	4	1	6	6	5	2	
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	20.0	20.0	5.0	20.0	
Minimum Split (s)	9.0	30.0	30.0	9.0	30.0	30.0	9.0	26.0	26.0	9.0	26.0	
Total Split (s)	13.0	32.0	32.0	11.0	30.0	30.0	26.0	76.0	76.0	21.0	71.0	
Total Split (%)	9.3%	22.9%	22.9%	7.9%	21.4%	21.4%	18.6%	54.3%	54.3%	15.0%	50.7%	
Yellow Time (s)	3.0	3.5	3.5	3.0	3.5	3.5	3.0	3.5	3.5	3.0	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.5	1.5	1.0	1.5	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	4.5	4.5	4.0	4.5	4.5	4.0	5.0	5.0	4.0	5.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	
Act Effct Green (s)	21.9	12.5	12.5	18.0	10.5	10.5	107.3	94.6	94.6	98.7	89.3	
Actuated g/C Ratio	0.16	0.09	0.09	0.13	0.08	0.08	0.77	0.68	0.68	0.70	0.64	
v/c Ratio	0.65	0.15	0.54	0.63	0.22	0.60	0.55	0.46	0.05	0.49	0.51	
Control Delay	67.3	60.7	16.3	68.5	64.5	18.7	10.4	11.2	2.0	9.8	15.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	67.3	60.7	16.3	68.5	64.5	18.7	10.4	11.2	2.0	9.8	15.1	
LOS	E	E	B	E	E	B	B	B	A	A	B	
Approach Delay		42.4			42.8			10.7			14.3	
Approach LOS		D			D			B			B	

Intersection Summary	
Cycle Length: 140	
Actuated Cycle Length: 140	
Offset: 81 (58%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green	
Natural Cycle: 80	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.65	
Intersection Signal Delay: 18.2	Intersection LOS: B
Intersection Capacity Utilization 69.0%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 110: Hamilton Rd. & Stoneridge Lane

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	95	1	68	6	1	3	114	1526	3	13	1217	87
Future Volume (vph)	95	1	68	6	1	3	114	1526	3	13	1217	87
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	101	1	72	6	1	3	121	1623	3	14	1295	93
Shared Lane Traffic (%)												
Lane Group Flow (vph)	101	73	0	6	4	0	121	1626	0	14	1388	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases	4			8			6			2		
Detector Phase	7	4		3	8		1	6		5	2	
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	5.0		5.0	30.0		5.0	30.0	
Minimum Split (s)	21.0	29.0		9.0	29.0		8.0	36.0		9.0	36.0	
Total Split (s)	21.0	41.0		9.0	29.0		14.0	81.0		9.0	76.0	
Total Split (%)	15.0%	29.3%		6.4%	20.7%		10.0%	57.9%		6.4%	54.3%	
Yellow Time (s)	3.0	3.5		3.5	3.5		3.0	3.5		3.0	3.5	
All-Red Time (s)	0.0	1.5		0.0	1.5		0.0	1.5		0.0	1.5	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	5.0		3.5	5.0		3.0	5.0		3.0	5.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes			Yes		Yes		
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	
Act Effct Green (s)	16.4	12.6		7.1	5.8		117.6	112.0		111.8	104.1	
Actuated g/C Ratio	0.12	0.09		0.05	0.04		0.84	0.80		0.80	0.74	
v/c Ratio	0.49	0.35		0.07	0.06		0.38	0.57		0.06	0.53	
Control Delay	64.5	17.2		56.0	46.5		9.4	7.0		2.9	6.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	64.5	17.2		56.0	46.5		9.4	7.0		2.9	6.3	
LOS	E	B		E	D		A	A		A	A	
Approach Delay		44.7			52.2			7.2			6.3	
Approach LOS		D			D			A			A	

Intersection Summary	
Cycle Length: 140	
Actuated Cycle Length: 140	
Offset: 125 (89%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green	
Natural Cycle: 115	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.57	
Intersection Signal Delay: 8.9	Intersection LOS: A
Intersection Capacity Utilization 70.0%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 160: Hamilton Rd. & Vista Dr./Access Road

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	41	70	36	72	48	261	33	1301	39	251	992	23
Future Volume (vph)	41	70	36	72	48	261	33	1301	39	251	992	23
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	45	76	39	78	52	284	36	1414	42	273	1078	25
Shared Lane Traffic (%)												
Lane Group Flow (vph)	45	115	0	78	52	284	36	1414	42	273	1103	0
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8			4		4	6		6	2		
Detector Phase	3	8		7	4	4	1	6	6	5	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	8.0	8.0	8.0	20.0	20.0	8.0	20.0	
Minimum Split (s)	8.0	29.0		8.0	29.0	29.0	11.0	35.0	35.0	11.0	35.0	
Total Split (s)	8.0	29.0		8.0	29.0	29.0	11.0	74.0	74.0	29.0	92.0	
Total Split (%)	5.7%	20.7%		5.7%	20.7%	20.7%	7.9%	52.9%	52.9%	20.7%	65.7%	
Yellow Time (s)	3.0	3.5		3.0	3.5	3.5	3.0	3.5	3.5	3.0	3.5	
All-Red Time (s)	0.0	1.5		0.0	1.5	1.5	0.0	1.5	1.5	0.0	1.5	
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)	3.0	5.0		3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None		None	None	None	None	C-Max	C-Max	None	C-Max	
Act Effct Green (s)	19.3	12.3		19.9	13.9	13.9	97.7	87.7	87.7	111.7	100.9	
Actuated g/C Ratio	0.14	0.09		0.14	0.10	0.10	0.70	0.63	0.63	0.80	0.72	
v/c Ratio	0.23	0.68		0.51	0.28	0.69	0.09	0.64	0.04	0.72	0.43	
Control Delay	52.0	72.3		63.6	62.0	15.4	5.3	19.6	0.1	34.8	2.5	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	52.0	72.3		63.6	62.0	15.4	5.3	19.6	0.1	34.8	2.5	
LOS	D	E		E	E	B	A	B	A	C	A	
Approach Delay		66.6			30.4			18.7			8.9	
Approach LOS		E			C			B			A	

Intersection Summary	
Cycle Length: 140	
Actuated Cycle Length: 140	
Offset: 3 (2%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green	
Natural Cycle: 85	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.72	
Intersection Signal Delay: 18.4	Intersection LOS: B
Intersection Capacity Utilization 72.2%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 170: Hamilton Rd. & Beecher Rd.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	12	10	30	92	11	110	51	918	58	141	1033	38
Future Volume (vph)	12	10	30	92	11	110	51	918	58	141	1033	38
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	13	10	31	96	11	115	53	956	60	147	1076	40
Shared Lane Traffic (%)												
Lane Group Flow (vph)	13	10	31	96	11	115	53	956	60	147	1116	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8		8	4		4	6		6	2		
Detector Phase	3	8	8	7	4	4	1	6	6	5	2	
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	20.0	20.0	5.0	20.0	
Minimum Split (s)	9.0	30.0	30.0	9.0	30.0	30.0	9.0	26.0	26.0	9.0	26.0	
Total Split (s)	9.0	30.0	30.0	12.0	33.0	33.0	11.0	61.0	61.0	17.0	67.0	
Total Split (%)	7.5%	25.0%	25.0%	10.0%	27.5%	27.5%	9.2%	50.8%	50.8%	14.2%	55.8%	
Yellow Time (s)	3.0	3.5	3.5	3.0	3.5	3.5	3.0	3.5	3.5	3.0	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.5	1.5	1.0	1.5	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	4.5	4.5	4.0	4.5	4.5	4.0	5.0	5.0	4.0	5.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	
Act Effct Green (s)	11.3	10.0	10.0	17.3	13.6	13.6	89.6	82.3	82.3	91.9	84.9	
Actuated g/C Ratio	0.09	0.08	0.08	0.14	0.11	0.11	0.75	0.69	0.69	0.77	0.71	
v/c Ratio	0.09	0.06	0.12	0.50	0.05	0.40	0.14	0.39	0.05	0.34	0.45	
Control Delay	42.2	51.8	1.0	53.7	47.5	11.0	4.0	8.0	1.4	5.8	9.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	42.2	51.8	1.0	53.7	47.5	11.0	4.0	8.0	1.4	5.8	9.3	
LOS	D	D	A	D	D	B	A	A	A	A	A	
Approach Delay		20.4			31.3			7.4			8.9	
Approach LOS		C			C			A			A	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 69 (58%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green	
Natural Cycle: 80	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.50	
Intersection Signal Delay: 10.5	Intersection LOS: B
Intersection Capacity Utilization 56.9%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 110: Hamilton Rd. & Stoneridge Lane

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	97	0	96	0	0	6	53	933	3	5	1385	25
Future Volume (vph)	97	0	96	0	0	6	53	933	3	5	1385	25
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	103	0	102	0	0	6	56	993	3	5	1473	27
Shared Lane Traffic (%)												
Lane Group Flow (vph)	103	102	0	0	6	0	56	996	0	5	1500	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases	4			8			6			2		
Detector Phase	7	4		3	8		1	6		5	2	
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	5.0		5.0	30.0		5.0	30.0	
Minimum Split (s)	21.0	29.0		9.0	29.0		8.0	36.0		9.0	36.0	
Total Split (s)	21.0	41.0		9.0	29.0		8.0	61.0		9.0	62.0	
Total Split (%)	17.5%	34.2%		7.5%	24.2%		6.7%	50.8%		7.5%	51.7%	
Yellow Time (s)	3.0	3.5		3.5	3.5		3.0	3.5		3.0	3.5	
All-Red Time (s)	0.0	1.5		0.0	1.5		0.0	1.5		0.0	1.5	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	5.0		3.5	5.0		3.0	5.0		3.0	5.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	
Act Effct Green (s)	15.6	13.6			5.5		97.6	94.6		96.5	90.0	
Actuated g/C Ratio	0.13	0.11			0.05		0.81	0.79		0.80	0.75	
v/c Ratio	0.44	0.30			0.02		0.22	0.36		0.01	0.57	
Control Delay	52.5	2.2			0.2		4.6	4.0		1.6	7.1	
Queue Delay	0.0	0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay	52.5	2.2			0.2		4.6	4.0		1.6	7.1	
LOS	D	A			A		A	A		A	A	
Approach Delay		27.5			0.2			4.0			7.1	
Approach LOS		C			A			A			A	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 118 (98%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green	
Natural Cycle: 105	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.57	
Intersection Signal Delay: 7.4	Intersection LOS: A
Intersection Capacity Utilization 64.4%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 160: Hamilton Rd. & Vista Dr./Access Road

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	81	84	63	43	175	284	84	670	52	201	1009	140
Future Volume (vph)	81	84	63	43	175	284	84	670	52	201	1009	140
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	95	99	74	51	206	334	99	788	61	236	1187	165
Shared Lane Traffic (%)												
Lane Group Flow (vph)	95	173	0	51	206	334	99	788	61	236	1352	0
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8			4		4	6		6	2		
Detector Phase	3	8		7	4	4	1	6	6	5	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	8.0	8.0	8.0	20.0	20.0	8.0	20.0	
Minimum Split (s)	8.0	29.0		8.0	29.0	29.0	11.0	35.0	35.0	11.0	35.0	
Total Split (s)	9.0	32.0		8.0	31.0	31.0	12.0	62.0	62.0	18.0	68.0	
Total Split (%)	7.5%	26.7%		6.7%	25.8%	25.8%	10.0%	51.7%	51.7%	15.0%	56.7%	
Yellow Time (s)	3.0	3.5		3.0	3.5	3.5	3.0	3.5	3.5	3.0	3.5	
All-Red Time (s)	0.0	1.5		0.0	1.5	1.5	0.0	1.5	1.5	0.0	1.5	
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)	3.0	5.0		3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None		None	None	None	None	C-Max	C-Max	None	C-Max	
Act Effct Green (s)	27.3	20.5		24.9	17.9	17.9	79.8	69.6	69.6	83.7	71.9	
Actuated g/C Ratio	0.23	0.17		0.21	0.15	0.15	0.66	0.58	0.58	0.70	0.60	
v/c Ratio	0.49	0.54		0.22	0.74	0.68	0.37	0.38	0.06	0.49	0.65	
Control Delay	44.3	43.6		35.8	64.2	14.8	10.8	15.4	1.0	7.7	9.4	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	44.3	43.6		35.8	64.2	14.8	10.8	15.4	1.0	7.7	9.4	
LOS	D	D		D	E	B	B	B	A	A	A	
Approach Delay		43.9			33.8			14.0			9.2	
Approach LOS		D			C			B			A	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green	
Natural Cycle: 85	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.74	
Intersection Signal Delay: 17.5	Intersection LOS: B
Intersection Capacity Utilization 67.7%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 170: Hamilton Rd. & Beecher Rd.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	139	24	149	122	29	156	217	1152	54	182	975	175
Future Volume (vph)	139	24	149	122	29	156	217	1152	54	182	975	175
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	142	24	152	124	30	159	221	1176	55	186	995	179
Shared Lane Traffic (%)												
Lane Group Flow (vph)	142	24	152	124	30	159	221	1176	55	186	1174	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8		8	4		4	6		6	2		
Detector Phase	3	8	8	7	4	4	1	6	6	5	2	
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	20.0	20.0	5.0	20.0	
Minimum Split (s)	9.0	30.0	30.0	9.0	30.0	30.0	9.0	26.0	26.0	9.0	26.0	
Total Split (s)	13.0	32.0	32.0	11.0	30.0	30.0	26.0	77.0	77.0	20.0	71.0	
Total Split (%)	9.3%	22.9%	22.9%	7.9%	21.4%	21.4%	18.6%	55.0%	55.0%	14.3%	50.7%	
Yellow Time (s)	3.0	3.5	3.5	3.0	3.5	3.5	3.0	3.5	3.5	3.0	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.5	1.5	1.0	1.5	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	4.5	4.5	4.0	4.5	4.5	4.0	5.0	5.0	4.0	5.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	
Act Effct Green (s)	21.9	12.5	12.5	18.0	10.5	10.5	107.5	94.3	94.3	98.4	88.6	
Actuated g/C Ratio	0.16	0.09	0.09	0.13	0.08	0.08	0.77	0.67	0.67	0.70	0.63	
v/c Ratio	0.65	0.15	0.54	0.63	0.22	0.60	0.56	0.49	0.05	0.53	0.53	
Control Delay	67.3	60.7	16.3	68.5	64.5	18.7	11.2	11.7	2.1	10.9	15.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	
Total Delay	67.3	60.7	16.3	68.5	64.5	18.7	11.2	11.7	2.1	10.9	16.2	
LOS	E	E	B	E	E	B	B	B	A	B	B	
Approach Delay		42.4			42.8			11.2			15.5	
Approach LOS		D			D			B			B	

Intersection Summary	
Cycle Length: 140	
Actuated Cycle Length: 140	
Offset: 85 (61%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.65	
Intersection Signal Delay: 18.7	Intersection LOS: B
Intersection Capacity Utilization 70.2%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 110: Hamilton Rd. & Stoneridge Lane

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	95	1	68	6	1	3	114	1567	3	13	1284	87
Future Volume (vph)	95	1	68	6	1	3	114	1567	3	13	1284	87
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	101	1	72	6	1	3	121	1667	3	14	1366	93
Shared Lane Traffic (%)												
Lane Group Flow (vph)	101	73	0	6	4	0	121	1670	0	14	1459	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases	4			8			6			2		
Detector Phase	7	4		3	8		1	6		5	2	
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	5.0		5.0	30.0		5.0	30.0	
Minimum Split (s)	21.0	29.0		9.0	29.0		8.0	36.0		9.0	36.0	
Total Split (s)	21.0	41.0		9.0	29.0		14.0	81.0		9.0	76.0	
Total Split (%)	15.0%	29.3%		6.4%	20.7%		10.0%	57.9%		6.4%	54.3%	
Yellow Time (s)	3.0	3.5		3.5	3.5		3.0	3.5		3.0	3.5	
All-Red Time (s)	0.0	1.5		0.0	1.5		0.0	1.5		0.0	1.5	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	5.0		3.5	5.0		3.0	5.0		3.0	5.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	
Act Effct Green (s)	16.4	12.6		7.1	5.8		117.6	112.0		111.2	103.5	
Actuated g/C Ratio	0.12	0.09		0.05	0.04		0.84	0.80		0.79	0.74	
v/c Ratio	0.49	0.35		0.07	0.06		0.40	0.59		0.06	0.56	
Control Delay	64.5	17.2		56.0	46.5		11.5	7.6		2.8	6.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	64.5	17.2		56.0	46.5		11.5	7.7		2.8	6.6	
LOS	E	B		E	D		B	A		A	A	
Approach Delay		44.7			52.2			7.9			6.5	
Approach LOS		D			D			A			A	

Intersection Summary	
Cycle Length: 140	
Actuated Cycle Length: 140	
Offset: 128 (91%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green	
Natural Cycle: 115	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.59	
Intersection Signal Delay: 9.3	Intersection LOS: A
Intersection Capacity Utilization 71.2%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 160: Hamilton Rd. & Vista Dr./Access Road

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	41	70	36	72	48	274	33	1329	39	272	1037	23
Future Volume (vph)	41	70	36	72	48	274	33	1329	39	272	1037	23
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	45	76	39	78	52	298	36	1445	42	296	1127	25
Shared Lane Traffic (%)												
Lane Group Flow (vph)	45	115	0	78	52	298	36	1445	42	296	1152	0
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8			4		4	6		6	2		
Detector Phase	3	8		7	4	4	1	6	6	5	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	8.0	8.0	8.0	20.0	20.0	8.0	20.0	
Minimum Split (s)	8.0	29.0		8.0	29.0	29.0	11.0	35.0	35.0	11.0	35.0	
Total Split (s)	8.0	29.0		8.0	29.0	29.0	11.0	73.0	73.0	30.0	92.0	
Total Split (%)	5.7%	20.7%		5.7%	20.7%	20.7%	7.9%	52.1%	52.1%	21.4%	65.7%	
Yellow Time (s)	3.0	3.5		3.0	3.5	3.5	3.0	3.5	3.5	3.0	3.5	
All-Red Time (s)	0.0	1.5		0.0	1.5	1.5	0.0	1.5	1.5	0.0	1.5	
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)	3.0	5.0		3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None		None	None	None	None	C-Max	C-Max	None	C-Max	
Act Effct Green (s)	19.3	12.3		19.9	13.9	13.9	95.3	85.3	85.3	111.7	100.9	
Actuated g/C Ratio	0.14	0.09		0.14	0.10	0.10	0.68	0.61	0.61	0.80	0.72	
v/c Ratio	0.23	0.68		0.51	0.28	0.70	0.09	0.67	0.04	0.75	0.45	
Control Delay	52.0	72.3		63.6	62.0	15.5	5.7	21.7	0.1	40.9	2.2	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	52.0	72.3		63.6	62.0	15.5	5.7	21.7	0.1	40.9	2.2	
LOS	D	E		E	E	B	A	C	A	D	A	
Approach Delay		66.6			29.9			20.7			10.1	
Approach LOS		E			C			C			B	

Intersection Summary	
Cycle Length: 140	
Actuated Cycle Length: 140	
Offset: 7 (5%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green	
Natural Cycle: 85	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.75	
Intersection Signal Delay: 19.6	Intersection LOS: B
Intersection Capacity Utilization 74.1%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 170: Hamilton Rd. & Beecher Rd.

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	9	11	6	790	1103	5
Future Vol, veh/h	9	11	6	790	1103	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	360	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	9	12	6	832	1161	5

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1592	583	1166	0	-	0
Stage 1	1164	-	-	-	-	-
Stage 2	428	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	98	456	595	-	-	-
Stage 1	259	-	-	-	-	-
Stage 2	625	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	97	456	595	-	-	-
Mov Cap-2 Maneuver	97	-	-	-	-	-
Stage 1	256	-	-	-	-	-
Stage 2	625	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	28	0.1	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	595	-	97	456	-	-
HCM Lane V/C Ratio	0.011	-	0.098	0.025	-	-
HCM Control Delay (s)	11.1	-	46.1	13.1	-	-
HCM Lane LOS	B	-	E	B	-	-
HCM 95th %tile Q(veh)	0	-	0.3	0.1	-	-

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	4	3	8	1304	1115	6
Future Vol, veh/h	4	3	8	1304	1115	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	360	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	3	8	1373	1174	6

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1880	590	1180	0	-	0
Stage 1	1177	-	-	-	-	-
Stage 2	703	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	63	451	588	-	-	-
Stage 1	255	-	-	-	-	-
Stage 2	452	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	62	451	588	-	-	-
Mov Cap-2 Maneuver	62	-	-	-	-	-
Stage 1	251	-	-	-	-	-
Stage 2	452	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	44	0.1	0
HCM LOS	E		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	588	-	62	451	-	-
HCM Lane V/C Ratio	0.014	-	0.068	0.007	-	-
HCM Control Delay (s)	11.2	-	67.3	13	-	-
HCM Lane LOS	B	-	F	B	-	-
HCM 95th %tile Q(veh)	0	-	0.2	0	-	-

Intersection	
Int Delay, s/veh	4.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	9	0	11	45	0	53	6	779	78	76	1094	5
Future Vol, veh/h	9	0	11	45	0	53	6	779	78	76	1094	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	0	-	-	360	-	-	75	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	9	0	12	47	0	56	6	820	82	80	1152	5

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1737	2229	579	1609	2190	451	1157	0	0	902	0	0
Stage 1	1315	1315	-	873	873	-	-	-	-	-	-	-
Stage 2	422	914	-	736	1317	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	56	42	458	70	45	556	600	-	-	749	-	-
Stage 1	167	226	-	311	366	-	-	-	-	-	-	-
Stage 2	580	350	-	377	225	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	46	37	458	62	40	556	600	-	-	749	-	-
Mov Cap-2 Maneuver	46	37	-	62	40	-	-	-	-	-	-	-
Stage 1	165	202	-	308	362	-	-	-	-	-	-	-
Stage 2	517	347	-	328	201	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	53.3	80.5	0.1	0.7
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	600	-	-	46	458	62	556	749	-	-
HCM Lane V/C Ratio	0.011	-	-	0.206	0.025	0.764	0.1	0.107	-	-
HCM Control Delay (s)	11.1	-	-	102.5	13.1	160.9	12.2	10.4	-	-
HCM Lane LOS	B	-	-	F	B	F	B	B	-	-
HCM 95th %tile Q(veh)	0	-	-	0.7	0.1	3.4	0.3	0.4	-	-

Intersection	
Int Delay, s/veh	29.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	4	0	3	70	0	46	8	1304	41	44	1112	6
Future Vol, veh/h	4	0	3	70	0	46	8	1304	41	44	1112	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	0	-	-	360	-	-	75	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	4	0	3	74	0	48	8	1373	43	46	1171	6

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1969	2698	589	2089	2680	708	1177	0	0	1416	0	0
Stage 1	1266	1266	-	1411	1411	-	-	-	-	-	-	-
Stage 2	703	1432	-	678	1269	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	37	21	452	~ 30	22	377	589	-	-	477	-	-
Stage 1	179	238	-	145	203	-	-	-	-	-	-	-
Stage 2	394	198	-	408	238	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	30	19	452	~ 27	20	377	589	-	-	477	-	-
Mov Cap-2 Maneuver	30	19	-	~ 27	20	-	-	-	-	-	-	-
Stage 1	176	215	-	143	200	-	-	-	-	-	-	-
Stage 2	339	195	-	366	215	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	87.7	$ 663.3	0.1	0.5
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	589	-	-	30	452	27	377	477	-	-
HCM Lane V/C Ratio	0.014	-	-	0.14	0.007	2.729	0.128	0.097	-	-
HCM Control Delay (s)	11.2	-	-	143.7	13	$ 1088.7	16	13.4	-	-
HCM Lane LOS	B	-	-	F	B	F	C	B	-	-
HCM 95th %tile Q(veh)	0	-	-	0.4	0	8.9	0.4	0.3	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	9	11	6	993	1386	5
Future Vol, veh/h	9	11	6	993	1386	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	360	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	9	12	6	1045	1459	5

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1997	732	1464	0	-	0
Stage 1	1462	-	-	-	-	-
Stage 2	535	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	52	364	457	-	-	-
Stage 1	179	-	-	-	-	-
Stage 2	551	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	51	364	457	-	-	-
Mov Cap-2 Maneuver	51	-	-	-	-	-
Stage 1	177	-	-	-	-	-
Stage 2	551	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	49.3	0.1	0
HCM LOS	E		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	457	-	51	364	-	-
HCM Lane V/C Ratio	0.014	-	0.186	0.032	-	-
HCM Control Delay (s)	13	-	91	15.2	-	-
HCM Lane LOS	B	-	F	C	-	-
HCM 95th %tile Q(veh)	0	-	0.6	0.1	-	-

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	4	3	8	1638	1402	6
Future Vol, veh/h	4	3	8	1638	1402	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	360	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	3	8	1724	1476	6

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2357	741	1482	0	-	0
Stage 1	1479	-	-	-	-	-
Stage 2	878	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	30	359	450	-	-	-
Stage 1	176	-	-	-	-	-
Stage 2	367	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	29	359	450	-	-	-
Mov Cap-2 Maneuver	29	-	-	-	-	-
Stage 1	173	-	-	-	-	-
Stage 2	367	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	91.7	0.1	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	450	-	29	359	-	-
HCM Lane V/C Ratio	0.019	-	0.145	0.009	-	-
HCM Control Delay (s)	13.2	-	149.2	15.1	-	-
HCM Lane LOS	B	-	F	C	-	-
HCM 95th %tile Q(veh)	0.1	-	0.4	0	-	-

Intersection	
Int Delay, s/veh	10.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	9	0	11	45	0	53	6	982	78	76	1377	5
Future Vol, veh/h	9	0	11	45	0	53	6	982	78	76	1377	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	0	-	-	360	-	-	75	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	9	0	12	47	0	56	6	1034	82	80	1449	5

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2141	2740	727	1972	2701	558	1454	0	0	1116	0	0
Stage 1	1612	1612	-	1087	1087	-	-	-	-	-	-	-
Stage 2	529	1128	-	885	1614	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	28	20	366	~ 37	21	473	461	-	-	622	-	-
Stage 1	109	162	-	231	290	-	-	-	-	-	-	-
Stage 2	501	278	-	306	161	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	22	17	366	~ 32	18	473	461	-	-	622	-	-
Mov Cap-2 Maneuver	22	17	-	~ 32	18	-	-	-	-	-	-	-
Stage 1	108	141	-	228	286	-	-	-	-	-	-	-
Stage 2	436	274	-	258	140	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	125.3	246.1	0.1	0.6
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	461	-	-	22	366	32	473	622	-	-
HCM Lane V/C Ratio	0.014	-	-	0.431	0.032	1.48	0.118	0.129	-	-
HCM Control Delay (s)	12.9	-	-	259.9	15.2	$ 519.9	13.6	11.6	-	-
HCM Lane LOS	B	-	-	F	C	F	B	B	-	-
HCM 95th %tile Q(veh)	0	-	-	1.3	0.1	5.3	0.4	0.4	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	70.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	4	0	3	70	0	46	8	1638	41	44	1399	6
Future Vol, veh/h	4	0	3	70	0	46	8	1638	41	44	1399	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	0	-	-	360	-	-	75	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	4	0	3	74	0	48	8	1724	43	46	1473	6

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2446	3351	740	2591	3333	884	1479	0	0	1767	0	0
Stage 1	1568	1568	-	1762	1762	-	-	-	-	-	-	-
Stage 2	878	1783	-	829	1571	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	16	8	359	~ 12	8	288	451	-	-	349	-	-
Stage 1	116	170	-	87	136	-	-	-	-	-	-	-
Stage 2	309	133	-	331	169	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	12	7	359	~ 11	7	288	451	-	-	349	-	-
Mov Cap-2 Maneuver	12	7	-	~ 11	7	-	-	-	-	-	-	-
Stage 1	114	148	-	85	134	-	-	-	-	-	-	-
Stage 2	252	131	-	285	147	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	247.1	$ 1960.9	0.1	0.5
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	451	-	-	12	359	11	288	349	-	-
HCM Lane V/C Ratio	0.019	-	-	0.351	0.009	6.699	0.168	0.133	-	-
HCM Control Delay (s)	13.1	-	-	$ 421.1	15.1	$ 3236.3	20	16.9	-	-
HCM Lane LOS	B	-	-	F	C	F	C	C	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.9	0	10.5	0.6	0.5	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

City of Gahanna Access Management Criteria

MAJOR ARTERIAL

Roadway Characteristics

Two to three through lanes in each direction
Signalized intersections at several intersections
Signalized intersections at select drives
Turn lanes designed per ODOT L&D Manual
Access to interstate system

Speed Limit Range

25 MPH business district
35 to 50 other areas

Traffic Signal Spacing

Recommended Spacing 1/2 mile (2640 ft)
Minimum spacing 1/4 mile (1320 ft)

Median Treatment

Divided median, minimum width 16 feet
Two-Way left turn lane, minimum width 12 feet

Driveway Types

High volume drive, 200+ trip ends in peak hour
Medium volume drive, 100-199 trip ends in peak hour
Low volume drive, 5-99 trip ends in peak hour
Minimal use drive, less than 5 trip ends in peak hour

Driveway Access

One (1) private access per parcel
Full access

Driveway Spacing

(minimum distance based on posted speed limit)

Speed Limit	Distance (ft)
25	155
30	200
35	250
40	305
45	360
50	425

Upstream Corner Clearance

(Desirable functional distance from corner)

Speed Limit	Distance (ft)
25	140
30	225
35	310
40	395
45	480
50	570

Downstream Corner Clearance

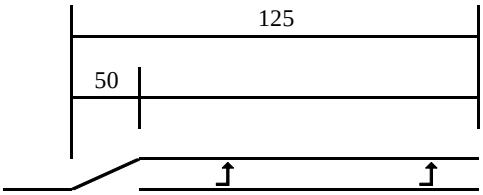
(Desirable functional distance from corner)

Speed Limit	Distance (ft)
25	155
30	200
35	250
40	305
45	360
50	425

(1) HAMILTON ROAD & VILLA OAKS LANE/SITE ACCESS - SB LT - 2019 'BUILD'

Critical Analysis Period: AM PEAK

Type =	Unsignalized Through Road				
Speed =	40	MPH	Storage Length (Adj) =	NA	
Cycle Length =	60	seconds	Deceleration/Div. Taper =	125	feet
Turning Volume =	76	VPH	Turn Lane Length =	125	feet
# of Turning Lanes =	1				
Advancing Volume =	1175	VPH			
Turning % (>10% HIGH) =	6.5%	LOW			
Design Condition =	B				
Vehicles per Cycle =	1.3				
Storage Length (Calc) =	100	feet			

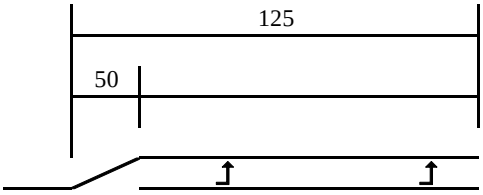


Calculations based on 401-7E in ODOT L&D Manual. All dimensions are in feet.

(2) HAMILTON ROAD & VILLA OAKS LANE/SITE ACCESS - SB LT - 2039 'BUILD'

Critical Analysis Period: AM PEAK

Type =	Unsignalized Through Road				
Speed =	40	MPH	Storage Length (Adj) =	NA	
Cycle Length =	60	seconds	Deceleration/Div. Taper =	125	feet
Turning Volume =	76	VPH	Turn Lane Length =	125	feet
# of Turning Lanes =	1				
Advancing Volume =	1458	VPH			
Turning % (>10% HIGH) =	5.2%	LOW			
Design Condition =	B				
Vehicles per Cycle =	1.3				
Storage Length (Calc) =	100	feet			



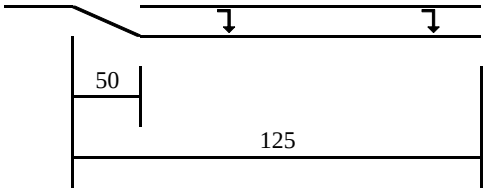
Calculations based on 401-7E in ODOT L&D Manual. All dimensions are in feet.

(4) HAMILTON ROAD & VILLA OAKS LANE/SITE ACCESS - NB RT - 2019 'BUILD'

Critical Analysis Period: AM Peak

Type =	Unsignalized Through Road				
Speed =	40	MPH	Storage Length (Adj) =	NA	
Cycle Length =	60	seconds	Deceleration/Div. Taper =	125	feet
Turning Volume =	78	VPH	Turn Lane Length =	125	feet
# of Turning Lanes =	1				
Advancing Volume =	863	VPH			
Turning % (>10% HIGH) =	9.0%	LOW			
Design Condition =	B				
Vehicles per Cycle =	1.30				
Storage Length (Calc) =	100	feet			

Calculations based on 401-7E in ODOT L&D Manual. All dimensions are in feet.



(5) HAMILTON ROAD & VILLA OAKS LANE/SITE ACCESS - NB RT - 2039 'BUILD'

Critical Analysis Period: AM Peak

Type =	Unsignalized Through Road				
Speed =	40	MPH	Storage Length (Adj) =	NA	
Cycle Length =	60	seconds	Deceleration/Div. Taper =	125	feet
Turning Volume =	78	VPH	Turn Lane Length =	125	feet
# of Turning Lanes =	1				
Advancing Volume =	1066	VPH			
Turning % (>10% HIGH) =	7.3%	LOW			
Design Condition =	B				
Vehicles per Cycle =	1.30				
Storage Length (Calc) =	100	feet			

Calculations based on 401-7E in ODOT L&D Manual. All dimensions are in feet.